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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

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Conformance of ITU-T H.810 personal health system: Personal Health Devices interface Part 10G: Transcoding for Bluetooth Low Energy: Personal Health Gateway – Continuous glucose monitoring

Recommendation ITU-T H.850.7

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Recommendation ITU-T H.850.7

Conformance of ITU-T H.810 personal health system: Personal Health Devices interface Part 10G: Transcoding for Bluetooth Low Energy: Personal Health Gateway – Continuous glucose monitoring

Summary

Recommendation ITU-T H.850.7 provides a test suite structure (TSS) and the test purposes (TP) for the transcoding of continuous glucose monitoring data by personal health gateways (PHGs) in the Personal Health Devices (PHD) interface of application-level data between the Bluetooth Low Energy Bluetooth Generic Attribute Profile (GATT) format and the IEEE 11073-20601 data format, of which Recommendation ITU-T H.810 (2016) is the base Recommendation. The objective of this test specification is to provide a high probability of interoperability at this interface.

Recommendation ITU-T H.850.7 is a transposition of clause 3.9 of Continua Test Tool DG2016, Test Suite Structure & Test Purposes, Personal Health Devices Interface; Part 10: PHD Transcoding Whitepaper. Personal Health Gateway (Version 1.7, 2017-07-18), that was developed by the Personal Connected Health Alliance. A number of versions of this specification existed before transposition.

This Recommendation includes an electronic attachment with the protocol implementation conformance statements (PICS) and the protocol implementation extra information for testing (PIXIT) required for the implementation of Annex A.

This Recommendation is part of ITU-T H.850 that was originally approved in 04/2017 as a single part, but which was split at publication time into eight sub-parts for easier use, maintenance and expandability:

– ITU-T H.850 with the general requirements;
– ITU-T H.850.1 with thermometer PHD requirements;
– ITU-T H.850.2 with blood pressure PHD requirements;
– ITU-T H.850.3 with heart rate PHD requirements;
– ITU-T H.850.4 with glucose meter PHD requirements;
– ITU-T H.850.5 with weighing scale PHD requirements;
– ITU-T H.850.6 with pulse oximeter PHD requirements;
– ITU-T H.850.7 with continuous glucose monitoring PHD requirements.

History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T H.850.7	2017-04-29	16	11.1002/1000/13360
2.0	ITU-T H.850.7	2019-11-29	16	11.1002/1000/14122

Keywords

Bluetooth Generic Attribute Profile, Bluetooth Low Energy (BLE), Conformance testing, Continua Design Guidelines, continuous glucose monitoring, data format transcoding, e-health, IEEE 11073-20601, ITU-T H.810, personal area network, personal connected health devices, Personal Health Devices interface, Personal Health Gateway, touch area network.

* To access the Recommendation, type the URL http://handle.itu.int/ in the address field of your web browser, followed by the Recommendation's unique ID. For example, http://handle.itu.int/11.1002/1000/11830-en.

FOREWORD

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The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

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NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure, e.g., interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

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As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at http://www.itu.int/ITU-T/ipr/.

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Electronic attachment: This Recommendation includes an electronic attachment with the protocol implementation conformance statements (PICS) and the protocol implementation extra information for testing (PIXIT) required for the implementation of Annex A.

Introduction

This Recommendation is a transposition of clause 3.9 of Continua Test Tool DG2016, Test Suite Structure & Test Purposes, Personal Health Devices Interface; Part 10: PHD Transcoding Whitepaper. Personal Health Gateway (Version 1.7, 2017-07-18), that was developed by the Personal Connected Health Alliance. The table below shows the revision history of this test specification; it may contain versions that existed before transposition.

Version	Date	Revision history
1.0	2012-10-05	Initial release for Test Tool DG2011 based on the requirements in [b-CDG 2011].
1.1	2013-05-24	Initial release for Test Tool DG2012. It uses "TSS&TP_DG2011_LP-PAN_PART_10_v1.0.doc" as a baseline and adds new features included in [b-CDG 2012] (BPM and HR profiles).
1.2	2014-01-24	Initial release for Test Tool DG2013. It uses "TSS&TP_ DG2012_LP-PAN_PART_10_v1.1.doc" as a baseline and adds new features included in [b-ITU-T H.810 (2013)]/ [b-CDG 2013]: • Adds glucose meter BLE • Adds BLE SSP support • Adds NFC new transport • Adds INR device specialization
1.3	2014-04-24	TM Lite & Doc Enhancements (Test Tool v4.0 Maintenance Release 1). It uses "TSS&TP_DG2013_LP-PAN_PART_10_ v1.2.doc" as a baseline and adds new features included in Documentation Enhancements: • "Other PICS" row has been added
1.4	2015-07-01	Initial release for Test Tool DG2015. It uses "TSS&TP_ DG2013_LP-PAN_PART_10_v1.3.doc" as a baseline and adds new features included in [b-ITU-T H.810 (2015)]/[b-CDG 2015]: • Adds WS/BCA BLE device specialization • Adds SABTE IEEE device specialization
1.5	2016-01-26	First maintenance release for Test Tool DG2015. It uses "TSS&TP_DG2015_LP-PAN_PART_10_v1.4.doc" as a baseline and adds some updates according to the Maintenance 2015 activity.
1.6	2016-09-20	Initial release for Test Tool DG2016. It uses "TSS&TP_ DG2016_LP-PAN_PART_10_v1.5.doc" as a baseline and adds new features included in [ITU-T H.810 (2016)]/[b-CDG 2016]: • Adds PLX BLE device specialization • Adds PLX CGM device specialization
1.7	2017-07-18	Second Maintenance Release for Test Tool DG2016. It uses "TSS&TP_DG2016_LP-PAN_PART_10_v1.6.doc" as a baseline and corrects minor typos.
1.8	2018-10-17	It uses version 1.7 as a baseline and adds corrections due to the inclusion of CGM BLE profile test cases.

Recommendation ITU-T H.850.7

Conformance of ITU-T H.810 personal health system: Personal Health Devices interface Part 10G: Transcoding for Bluetooth Low Energy: Personal Health Gateway – Continuous glucose monitoring

1 Scope

The scope of this Recommendation[1] is to provide a test suite structure (TSS) and the test purposes (TP) for the Personal Health Devices interface based on the requirements defined in the Continua Design Guidelines (CDG) [ITU-T H.810 (2016)]. The objective of this test specification is to provide a high probability of interoperability at this interface.

The TSS and TP for the Personal Health Devices interface have been divided into the parts specified below. This Recommendation covers Part 10G.

- Part 1: Optimized exchange protocol. Personal Health Device
- Part 2: Optimized exchange protocol. Personal Health Gateway
- Part 3: Continua design guidelines. Personal Health Device
- Part 4: Continua design guidelines. Personal Health Gateway
- Part 5: Device specializations. Personal Health Devices interface. This document is divided into the following subparts:
  - Part 5A: Weighing scales
  - Part 5B: Glucose meter
  - Part 5C: Pulse oximeter
  - Part 5D: Blood pressure monitor
  - Part 5E: Thermometer
  - Part 5F: Cardiovascular fitness and activity monitor
  - Part 5G: Strength fitness equipment
  - Part 5H: Independent living activity hub
  - Part 5I: Adherence monitor
  - Part 5J: Insulin pump
  - Part 5K: Peak expiratory flow monitor
  - Part 5L: Body composition analyser
  - Part 5M: Basic electrocardiograph
  - Part 5N: International normalized ratio monitor
  - Part 5O: Sleep apnoea breathing therapy equipment (SABTE)
  - Part 5P: Continuous glucose monitor (CGM)
- Part 6: Device specializations. Personal Health Gateway
- Part 7: Continua Design Guidelines. BLE Personal Health Device
- Part 8: Continua Design Guidelines. BLE Personal Health Gateway

[1] This Recommendation includes an electronic attachment with the protocol implementation conformance statements (PICS) and the protocol implementation extra information for testing (PIXIT) required for the implementation of Annex A.

– Part 9: Personal Health Devices Transcoding Whitepaper. Personal Health Devices
– Part 10: Personal Health Devices Transcoding Whitepaper. Personal Health Gateway. In addition to the main part, the document is subdivided in the following subparts:
  - Part 10A: Whitepaper Thermometer requirements
  - Part 10B: Whitepaper Blood pressure requirements
  - Part 10C: Whitepaper Heart rate requirements
  - Part 10D: Whitepaper Glucose meter requirements
  - Part 10E: Whitepaper Weighing scales requirements
  - Part 10F: Whitepaper Pulse oximeter requirements
  - **Part 10G: Whitepaper Continuous glucose monitoring requirements**

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[ITU-T H.810 (2016)] Recommendation ITU-T H.810 (2016), *Interoperability design guidelines for personal health systems*.

[Bluetooth PHDT v1.4] Bluetooth SIG (2013), *Personal Health Devices Transcoding White Paper, v1.4*. https://www.bluetooth.org/DocMan/handlers/DownloadDoc.ashx?doc_id=294539

[Bluetooth PHDT v1.5] Bluetooth SIG (2014), *Personal Health Devices Transcoding White Paper, v1.5*. https://www.bluetooth.org/DocMan/handlers/DownloadDoc.ashx?doc_id=272346

[Bluetooth PHDT v1.6] Bluetooth SIG (2015), *Personal Health Devices Transcoding White Paper, v1.6*. https://www.bluetooth.org/DocMan/handlers/DownloadDoc.ashx?doc_id=310657

[ISO/IEEE 11073-104xx] ISO/IEEE 11073-104xx (in force), *Health informatics – Personal health device communication – Device specialization*.
NOTE – Shorthand to refer to the collection of device specialization standards that utilize [ISO/IEEE 11073-20601-2015A], where xx can be any number from 01 to 99, inclusive.

[ISO/IEEE 11073-20601-2015A] ISO/IEEE 11073-20601:2010, *Health informatics – Personal health device communication – Part 20601: Application profile – Optimized exchange protocol,* including ISO/IEEE 11073-20601:2010 Amd 1:2015.
https://www.iso.org/standard/54331.html with https://www.iso.org/standard/63972.html

[ISO/IEEE 11073-20601-2016C] ISO/IEEE 11073-20601:2016, *Health informatics – Personal health device communication – Part 20601: Application profile – Optimized exchange protocol*, including ISO/IEEE 11073-20601:2016/Cor.1:2016.

	https://www.iso.org/standard/66717.html with https://www.iso.org/standard/71886.html
[IHE PCD TF 1]	IHE PCD TF 1 (2012), *IHE Patient Care Device Technical Framework – Revision 2.0. Volume 1: Integration Profiles*. http://www.ihe.net/Technical_Framework/upload/IHE_PCD_TF_Rev2-0_Vol1_FT_2012-08-16.pdf
[IHE PCD TF 2]	IHE PCD TF 2 (2012), *IHE Patient Care Device Technical Framework – Revision 2.0. Volume 2: Transactions*. http://www.ihe.net/Technical_Framework/upload/IHE_PCD_TF_Rev2-0_Vol2_FT_2012-08-16.pdf
[IHE PCD TF 3]	IHE PCD TF 3 (2012), *IHE Patient Care Device Technical Framework – Revision 2.0. Volume 3: Semantic Content*. http://www.ihe.net/Technical_Framework/upload/IHE_PCD_TF_Rev2-0_Vol3_FT_2012-08-16.pdf

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 agent [ISO/IEEE 11073-20601-2016C]: A node that collects and transmits personal health data to an associated manager.

3.1.2 manager [ISO/IEEE 11073-20601-2016C]: A node receiving data from one or more agent systems. Some examples of managers include a cellular phone, health appliance, set top box, or a computer system.

3.2 Terms defined in this Recommendation

None.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

ATS Abstract Test Suite

CDG Continua Design Guidelines

CGM Continuous Glucose Monitor

DUT Device Under Test

GUI Graphical User Interface

INR International Normalized Ratio

IP Insulin Pump

IUT Implementation Under Test

LSB Least Significant Bit

MDS Medical Device System

MSB Most Significant Bit

NFC Near Field Communication

PAN Personal Area Network

PCD Patient Care Device

PCO	Point of Control and Observation
PCT	Protocol Conformance Testing
PHD	Personal Health Device
PHDC	Personal Healthcare Device Class
PHG	Personal Health Gateway
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation extra Information for Testing
RACP	Record Access Control Point
SABTE	Sleep Apnoea Breathing Therapy Equipment
SCR	Static Conformance Review
SDP	Service Discovery Protocol
SOAP	Simple Object Access Protocol
TCRL	Test Case Reference List
TCWG	Test and Certification Working Group
TP	Test Purposes
TSS	Test Suite Structure
USB	Universal Serial Bus
WDM	Windows Driver Model

5 Conventions

In this text, the uppercase letter L is used as the symbol for litre.

Several of the test purposes in Annex A refer to "WAN PCD-01 messages"; these messages are specified in the patient care device (PCD) technical framework defined in [IHE PCD TF 1], [IHE PCD TF 2] and [IHE PCD TF 3]. Similarly, the "IEEE 11073 Objects and Attributes" are defined in [ISO/IEEE 11073-104xx].

The key words "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "MAY", "MAY NOT" in this Recommendation are to be interpreted as in [b-ETSI SR 001 262].

– SHALL is equivalent to 'must' or 'it is required to'.
– SHALL NOT is equivalent to 'must not' or 'it is not allowed'.
– SHOULD is equivalent to 'it is recommended to'.
– SHOULD NOT is equivalent to 'it is not recommended to'.
– MAY is equivalent to 'is permitted'.
– MAY NOT is equivalent to 'it is not required that'.

NOTE – The above-mentioned key words are capitalized for illustrative purposes only and they do not appear capitalized within this Recommendation.

In this document, hexadecimal numbers are denoted either with the prefix "0x" or by "(hex)" after the number; "(dec)" after a number indicates it is expressed in decimal format.

Reference is made in the ITU-T H.800-series of Recommendations to different versions of the Continua Design Guidelines (CDG) by a specific designation. The list of terms that may be used in this Recommendation is provided in Table 1.

Table 1 – List of designations associated with the various versions of the CDG

CDG release	Transposed as	Version	Description	Designation
2016 plus errata	[ITU-T H.810 (2016)]	6.1	Release 2016 plus errata noting all ratified bugs [b-CDG 2016].	–
2016	–	6.0	Release 2016 of the CDG including maintenance updates of the CDG 2015 and additional guidelines that cover new functionalities.	Iris
2015 plus errata	[b-ITU-T H.810 (2015)]	5.1	Release 2015 plus errata noting all ratified bugs [b-CDG 2015]. The 2013 edition of ITU-T H.810 is split into eight parts in the ITU-T H.810-series.	–
2015	–	5.0	Release 2015 of the CDG including maintenance updates of the CDG 2013 and additional guidelines that cover new functionalities.	Genome
2013 plus errata	[b-ITU-T H.810 (2013)]	4.1	Release 2013 plus errata noting all ratified bugs [b-CDG 2013].	–
2013	–	4.0	Release 2013 of the CDG including maintenance updates of the CDG 2012 and additional guidelines that cover new functionalities.	Endorphin
2012 plus errata	–	3.1	Release 2012 plus errata noting all ratified bugs [b-CDG 2012].	–
2012	–	3.0	Release 2012 of the CDG including maintenance updates of the CDG 2011 and additional guidelines that cover new functionalities.	Catalyst
2011 plus errata	–	2.1	CDG 2011 integrated with identified errata.	–
2011	–	2.0	Release 2011 of the CDG including maintenance updates of the CDG 2010 and additional guidelines that cover new functionalities [b-CDG 2011].	Adrenaline
2010 plus errata	–	1.6	CDG 2010 integrated with identified errata.	–
2010	–	1.5	Release 2010 of the CDG with maintenance updates of the CDG Version 1 and additional guidelines that cover new functionalities [b-CDG 2010].	1.5
1.0	–	1.0	First released version of the CDG [b-CDG 1.0].	–

6 Test suite structure

The test purposes (TP) for the Personal Health Devices interface have been divided into the groups and subgroups specified below. Annex A describes the TPs for subgroup 2.4.8 (shown in bold).

– Group 1: Personal Health Device (PHD)
  - Group 1.1: Transport (TR)
    - Subgroup 1.1.1: Design guidelines: Common (DGC)
    - Subgroup 1.1.2: USB design guidelines (UDG)
    - Subgroup 1.1.3: Bluetooth design guidelines (BDG)
    - Subgroup 1.1.4: Pulse oximeter design guidelines (PODG)
    - Subgroup 1.1.5: Cardiovascular design guidelines (CVDG)
    - Subgroup 1.1.6: Activity hub design guidelines (HUBDG)
    - Subgroup 1.1.7: ZigBee design guidelines (ZDG)
    - Subgroup 1.1.8: Glucose meter design guidelines (GLDG)
    - Subgroup 1.1.9: Bluetooth low energy design guidelines (BLEDG)
    - Subgroup 1.1.10: Basic electrocardiograph design guidelines (ECGDG)
    - Subgroup 1.1.11: NFC design guidelines (NDG)
  - Group 1.2: IEEE 20601 Optimized exchange protocol (OXP)
    - Subgroup 1.2.1: PHD domain information model (DIM)
    - Subgroup 1.2.2: PHD service model (SER)
    - Subgroup 1.2.3: PHD communication model (COM)
  - Group 1.3: Devices class specializations (CLASS)
    - Subgroup 1.3.1: Weighing scales (WEG)
    - Subgroup 1.3.2: Glucose meter (GL)
    - Subgroup 1.3.3: Pulse oximeter (PO)
    - Subgroup 1.3.4: Blood pressure monitor (BPM)
    - Subgroup 1.3.5: Thermometer (TH)
    - Subgroup 1.3.6: Cardiovascular (CV)
    - Subgroup 1.3.7: Strength (ST)
    - Subgroup 1.3.8: Activity hub (HUB)
    - Subgroup 1.3.9: Adherence monitor (AM)
    - Subgroup 1.3.10: Insulin pump (IP)
    - Subgroup 1.3.11: Peak flow (PF)
    - Subgroup 1.3.12: Body composition analyser (BCA)
    - Subgroup 1.3.13: Basic electrocardiograph (ECG)
    - Subgroup 1.3.14: International normalized ratio (INR)
    - Subgroup 1.3.15: Sleep apnoea breathing therapy equipment (SABTE)
    - Subgroup 1.3.16: Continuous glucose monitor (CGM)
  - Group 1.4: Personal health device transcoding whitepaper (PHDTW)
    - Subgroup 1.4.1: Whitepaper general requirements (GEN)
    - Subgroup 1.4.2: Whitepaper thermometer requirements (TH)
    - Subgroup 1.4.3: Whitepaper blood pressure requirements (BPM)
    - Subgroup 1.4.4: Whitepaper heart rate requirements (HR)
    - Subgroup 1.4.5: Whitepaper glucose meter requirements (GL)
    - Subgroup 1.4.6: Whitepaper weight scale requirements (WS)

  - Subgroup 1.4.7: Whitepaper pulse oximeter requirements (PLX)
  - Subgroup 1.4.8: Whitepaper continuous glucose monitoring requirements (CGM)

– Group 2: Personal Health Gateway (PHG)

- Group 2.1: Transport (TR)
  - Subgroup 2.1.1: Design guidelines: Common (DGC)
  - Subgroup 2.1.2: USB design guidelines (UDG)
  - Subgroup 2.1.3: Bluetooth design guidelines (BDG)
  - Subgroup 2.1.4: Cardiovascular design guidelines (CVDG)
  - Subgroup 2.1.5: Activity hub design guidelines (HUBDG)
  - Subgroup 2.1.6: ZigBee design guidelines (ZDG)
  - Subgroup 2.1.7: Bluetooth low energy design guidelines (BLEDG)
  - Subgroup 2.1.8: NFC design guidelines (NDG)
- Group 2.2: IEEE 20601 Optimized exchange protocol (OXP)
  - Subgroup 2.2.1: General (GEN)
  - Subgroup 2.2.2: PHD domain information model (DIM)
  - Subgroup 2.2.3: PHD service model (SER)
  - Subgroup 2.2.4: PHD communication model (COM)
- Group 2.3: Devices class specializations (CLASS)
  - Subgroup 2.3.1: Weighing scales (WEG)
  - Subgroup 2.3.2: Glucose meter (GL)
  - Subgroup 2.3.3: Pulse oximeter (PO)
  - Subgroup 2.3.4: Blood pressure monitor (BPM)
  - Subgroup 2.3.5: Thermometer (TH)
  - Subgroup 2.3.6: Cardiovascular (CV)
  - Subgroup 2.3.7: Strength (ST)
  - Subgroup 2.3.8: Activity hub (HUB)
  - Subgroup 2.3.9: Adherence monitor (AM)
  - Subgroup 2.3.10: Insulin pump (IP)
  - Subgroup 2.3.11: Peak flow (PF)
  - Subgroup 2.3.12: Body composition analyser (BCA)
  - Subgroup 2.3.13: Basic electrocardiograph (ECG)
  - Subgroup 2.3.14: International normalized ratio (INR)
  - Subgroup 2.3.15: Sleep apnoea breathing therapy equipment (SABTE)
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  - Subgroup 2.4.2: Whitepaper thermometer requirements (TH)
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  - Subgroup 2.4.6: Whitepaper weight scale requirements (WS)

- ○ Subgroup 2.4.7: Whitepaper pulse oximeter requirements (PLX)
- ○ **Subgroup 2.4.8: Whitepaper continuous glucose monitoring requirements (CGM)**

7 Electronic attachment

The protocol implementation conformance statements (PICS) and the protocol implementation extra information for testing (PIXIT) required for the implementation of Annex A can be downloaded from http://handle.itu.int/11.1002/2000/12067.

In the electronic attachment, letters "C" and "I" in the column labelled "Mandatory" are used to distinguish between "PICS" and "PIXIT" respectively during testing. If the cell is empty, the corresponding PICS is "independent". If the field contains a "C", the corresponding PICS is dependent on other PICS, and the logical expression is detailed in the "SCR_Expression" field. The static conformance review (SCR) is used in the test tool to assert whether the PICS selection is consistent.

Annex A

Test purposes

(This annex forms an integral part of this Recommendation.)

A.1 TP definition conventions

The test purposes (TPs) are defined according to the following rules:

– **TP Id**: This is a unique identifier (TP/<TT>/<DUT>/<GR>/<SGR>/<XX> – <NNN>). It is specified according to the naming convention defined below:
  - Each test purpose identifier is introduced by the prefix "TP".
  - <TT>: This is the test tool that will be used in the test case.
    - PAN: Personal area network (Bluetooth or USB)
    - LAN: Local area network (ZigBee)
    - PAN-LAN: Personal area network (Bluetooth or USB) – Local area network (ZigBee)
    - LP-PAN: Low power personal area network (Bluetooth low energy)
    - TAN: Touch area network (NFC)
    - PLT: Personal area network (Bluetooth or USB) – Local area network (ZigBee) – Touch area network (NFC)
  - <DUT>: This is the device under test.
    - PHD: Personal Health Device
    - PHG: Personal Health Gateway
  - <GR>: This identifies a group of test cases.
  - <SGR>: This identifies a subgroup of test cases.
  - <XX>: This identifies the type of testing.
    - BV: Valid behaviour test
    - BI: Invalid behaviour test
  - <NNN>: This is a sequential number that identifies a test purpose.

– **TP label**: This is the TP's title.

– **Coverage**: This contains the specification reference and clause to be checked by the TP.
  - Spec: This indicates the earliest version of the specification from which the testable items to be checked by the TP were included.
  - Testable item: This contains the testable items to be checked by the TP.

– **Test purpose**: This is a description of the requirements to be tested.

– **Applicability**: This contains the PICS items that define if the test case is applicable or not for a specific device. When a TP contains an "ALL" in this field it means that it applies to the device under test within that scope of the test (specialization, transport used, etc.).

– **Other PICS**: This contains additional PICS items (apart from the PICS specified in the Applicability row) which are used within the test case implementation and can modify the final verdict. When this row is empty, it means that only the PICS specified in the Applicability row are used within the test case implementation.

– **Initial condition**: This indicates the state to which the DUT needs to be moved at the beginning of TC execution.

– **Test procedure**: This describes the steps to be followed in order to execute the test case.
– **Pass/Fail criteria**: This provides criteria to decide whether the DUT passes or fails the test case.

A.2 Subgroup 2.4.8 – Whitepaper Continuous glucose monitoring requirements (CGM)

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-000		
TP label		Whitepaper. Continuous Glucose Monitoring MDS Object - System-Type Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	CGM Specific MDS 1; M		
Test purpose		Check that: PHG does not include MDS Object – System-Type attribute in transcoder output.		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated Personal Health Device (PHD) are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a measurement ready to be sent and it is in the Advertising state (it is discoverable). 2. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 3. When the pairing has been completed (Connection state) the simulated PHD sends the Measurement to the PHG under test. 4. Check in PHG transcoder output the MDS Object – System-Type attribute		
Pass/Fail criteria		In Step 4, the MDS Object – System-Type attribute is not present.		
Notes (To assist manual testing)		Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes System-Type attribute is not present: ❑ Object: MDS Object ❑ Attribute-id: MDC_ATTR_SYS_TYPE (2438) ❑ Attribute-type: TYPE ❑ Attribute-value: <NOT PRESENT> b) WAN PCD-01 message PCD-01 message does not include segments with System-Type attribute value (67974^MDC_ATTR_SYS_TYPE^MDC)		

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-001		
TP label		Whitepaper. Continuous Glucose Monitoring MDS Object - Dev-Configuration-Id Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	Common MDS 17; M		
Test purpose		Check that: PHG includes MDS Object – Dev-Configuration-Id attribute in transcoder output. [AND]		

<table>
<tr><td></td><td>Dev-Configuration-Id value is set to any value in range of 0x4000 to 0x7FFF (Extended Configuration)</td></tr>
<tr><td>Applicability</td><td>C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043</td></tr>
<tr><td>Other PICS</td><td></td></tr>
<tr><td>Initial condition</td><td>The PHG under test and the simulated PHD are in the Standby state.</td></tr>
<tr><td>Test procedure</td><td>1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a measurement ready to be sent and it is in the Advertising state (it is discoverable).
2. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state).
3. When the pairing has been completed (Connection state) the simulated PHD sends the Measurement to the PHG under test.
4. Check in PHG transcoder output the MDS Object – Dev-Configuration-Id attribute</td></tr>
<tr><td>Pass/Fail criteria</td><td>In Step 4, the MDS Object – Dev-Configuration-Id attribute is present, its value is inside the range 0x4000 - 0x7FFF</td></tr>
<tr><td>Notes
(To assist manual testing)</td><td>Possible values in typical points of observation after transcoder output are:
a) IEEE 11073 Objects and Attributes
Dev-Configuration-Id attribute is present:
❑ Object: MDS Object
❑ Attribute-id: MDC_ATTR_DEV_CONFIG_ID (2628)
❑ Attribute-type: INT-U16
❑ Attribute-value: Any value inside the range 16384 - 32767 (dec) or 0x4000 – 0x7FFF (hex)
b) WAN PCD-01 message
According to Continua DG, the Dev-Configuration-Id shall not be transmitted in PCD-01 message, therefore it is not possible to check this attribute.</td></tr>
</table>

<table>
<tr><td colspan="2">TP Id</td><td colspan="3">TP/LP-PAN/PHG/PHDTW/CGM/BV-002</td></tr>
<tr><td colspan="2">TP label</td><td colspan="3">Whitepaper. Continuous Glucose Monitoring MDS Object - System-Type-Spec-List Attribute</td></tr>
<tr><td rowspan="2">Coverage</td><td>Spec</td><td colspan="3">[Bluetooth PHDT v1.6]</td></tr>
<tr><td>Testable items</td><td>Common MDS 15; M</td><td>CGM Specific MDS 2; M</td><td></td></tr>
<tr><td colspan="2">Test purpose</td><td colspan="3">Check that:
PHG includes MDS Object – System-Type-Spec-List attribute in transcoder output.
[AND]
System-Type-Spec-List is set to (MDC_DEV_SPEC_PROFILE_CGM, Version 1)</td></tr>
<tr><td colspan="2">Applicability</td><td colspan="3">C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043</td></tr>
<tr><td colspan="2">Other PICS</td><td colspan="3"></td></tr>
<tr><td colspan="2">Initial condition</td><td colspan="3">The PHG under test and the simulated PHD are in the Standby state.</td></tr>
<tr><td colspan="2">Test procedure</td><td colspan="3">1. The simulated PHD is configured with a Continuous Glucose Monitoring (device specialization), it has a measurement ready to be sent and it is in the Advertising state (it is discoverable).</td></tr>
</table>

	2. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 3. When the pairing has been completed (Connection state) the simulated PHD sends the Measurement to the PHG under test. 4. Check in PHG transcoder output the MDS Object – System-Type-Spec-List attribute
Pass/Fail criteria	In Step 4, the MDS Object – System-Type-Spec-List attribute is present, its value is (MDC_DEV_SPEC_PROFILE_CGM, Version 1)
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes System-Type-Spec-List attribute is present: ❑ Object: MDS Object ❑ Attribute-id: MDC_ATTR_SYS_TYPE_SPEC_LIST (2650) ❑ Attribute-type: SEQUENCE OF [{type (INT-U16), version (INT-U16)}] ❑ Attribute-value: • type: MDC_DEV_SPEC_PROFILE_CGM, 4106 (dec) or 10 0A (hex) • version: 1 (dec) or 00 01 (hex) b) WAN PCD-01 message PCD-01 message includes a segment like this with System-Type-Spec-List attribute value (check OBX-5): OBX|?|NM|68186^MDC_ATTR_SYS_TYPE_SPEC_LIST^MDC|1.0.0.a| **528410^MDC_DEV_SPEC_PROFILE_CGM^MDC**||||||R

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-003		
TP label		Whitepaper. Continuous Glucose Monitoring MDS Object - Reg-Cert-Data-List Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	Common MDS 14; M	Regulatory Conv 1; M	
Test purpose		Check that: PHG transcodes IEEE 11073-20601 Regulatory Certification Data List characteristic into MDS Object – Reg-Cert-Data-List attribute		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a measurement ready to be sent and it is in the Advertising state (it is discoverable). 2. The simulated PHD implements several BTLE characteristics. The characteristic of interest for this Test Case is: a. IEEE 11073-20601 Regulatory Certification Data List (0x2A2A) • Format: reg-cert-data-list (opaque structure) • Value: 00 02 00 12 02 01 00 08 06 01 00 01 00 02 80 1A 02 02 00 02 80 00 (hex) i. Element:		

	• auth-body-and-struc-type: - auth-body: 02 (hex) auth-body-continua(2) - auth-body-struc-type: 01 (hex). continua-version-struct(1) • auth-body-data: - major-IG-version: 07 (hex) - minor-IG-version: 00 (hex) - certified-devices: 80 1A (hex) BLE Continuous Glucose Monitor ii. Element: • auth-body-and-struc-type: - auth-body: 02 (hex). auth-body-continua(2) - auth-body-struc-type: 02 (hex). continua-reg-struct(2) • auth-body-data: - regulation-bit-field: 80 00 (hex). Unregulated device 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with simulated PHD. 4. When the pairing has been completed (Connection state), force the PHG under test to read IEEE 11073-20601 Regulatory Certification Data List characteristic. 5. Check in the PHG transcoder output the MDS Object – Reg-Cert-Data-List attribute
Pass/Fail criteria	In Step 5, the MDS Object – Reg-Cert-Data-List attribute is present and its value matches with IEEE 11073-20601 Regulatory Certification Data List characteristic value
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Reg-Cert-Data-List attribute is present: ❑ Object: MDS Object ❑ Attribute-id: MDC_ATTR_REG_CERT_DATA_LIST (2635) ❑ Attribute-type: SEQUENCE OF [{auth-body-and-struc-type, auth-body-data}, {…}] ❑ Attribute-value: 00 02 00 12 02 01 00 08 06 01 00 01 00 02 80 1A 02 02 00 02 80 00 (hex) [Note that 0x00 0x02 is the number of elements in the sequence and 0x00 0x12 is the length of the sequence] i. Reg-Cert-Data Element: • auth-body-and-struc-type: - auth-body: 02 (hex) auth-body-continua(2) - auth-body-struc-type: 01 (hex). continua-version-struct(1) • auth-body-data: - major-IG-version: 06 (hex) - minor-IG-version: 01 (hex) - certified-devices: 80 1A (hex). BLE Continuous Glucose Monitor ii. Reg-Cert-Data Element: • auth-body-and-struc-type: - auth-body: 02 (hex). auth-body-continua(2) - auth-body-struc-type: 02 (hex). continua-reg-struct(2) • auth-body-data: - regulation-bit-field: 80 00 (hex). Unregulated device b) WAN PCD-01 message

	PCD-01 message includes five segments like these with Reg-Cert-Data-List attribute value (check OBX-5 in five segments): OBX|?|CWE|68218^MDC_REG_CERT_DATA_AUTH_BODY^MDC|1.0.0.a|**2^auth-body-continua**||||||R OBX|?|ST|532352^MDC_REG_CERT_DATA_CONTINUA_VERSION^MDC|1.0.0.a.x| **7.0**||||||R OBX|?|NA|532353^MDC_REG_CERT_DATA_CONTINUA_CERT_DEV_LIST^MDC|1.0.0.a.y|**32794**||||||R OBX|?|CWE|68218^MDC_REG_CERT_DATA_AUTH_BODY^MDC|1.0.0.b|**2^auth-body-continua**||||||R OBX|?|CWE|532354^MDC_REG_CERT_DATA_CONTINUA_REG_STATUS^MDC|1.0.0.b.z|**1^unregulated-device(0)**||||||R

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-004		
TP label		Whitepaper. Glucose Numeric Object - Handle Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	Glucose Numeric 1; O		
Test purpose		Check that: PHG does not include Glucose Numeric Object – Handle Attribute in transcoder output. [OR] If PHG includes Glucose Numeric Object – Handle attribute in transcoder output, then its value shall be different than 0		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristic of interest for this Test Case is: a. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: 0000 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: not relevant		

	iv. Field: Time Offset • Format: uint16 • Value: not relevant v. Field: Sensor Status Annunciation • This field is not included vi. Field: CGM Trend Information • This field is not included vii. Field: CGM Quality • This field is not included viii. Field: E2E-CRC • This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics. Then, the simulated PHD sends the CGM measurement to the PHG under test. 5. Check in the PHG transcoder output the Glucose Numeric Object – Handle attribute 6. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP) and the simulated PHD sends the temporarily stored CGM measurement to the PHG under test. 7. Check in the PHG transcoder output the Glucose Numeric Object – Handle attribute
Pass/Fail criteria	In Step 5 and 7, the Glucose Numeric Object – Handle attribute is not present or, if it is present then its value is different than 0.
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Handle attribute is not present, or if it is present then: ❑ Object: Glucose Numeric Object ❑ Attribute-id: MDC_ATTR_ID_HANDLE (2337) ❑ Attribute-type: INT-U16 ❑ Attribute-value: Any value different than 0 b) WAN PCD-01 message PCD-01 message does not include segments with Handle attribute value

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-005		
TP label		Whitepaper. Glucose Numeric Object - Type Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	Glucose Numeric 2; M		
Test purpose		Check that: PHG includes Glucose Numeric Object – Type attribute in transcoder output. [AND] Type is set to the correct value according to CGM Type field value		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		

Other PICS	
Initial condition	The PHG under test and the simulated PHD are in the Standby state.
Test procedure	1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature • Format: 24 bit • Value: 0000 0000 0000 0000 0000 0000 (MSB → LSB). No extra features supported. ii. Field: CGM Type • Format: 4 bit • Value: 0x1 (capillary wholeblood) iii. Field: CGM Sample Location • Format: 4 bit • Value: not relevant iv. Field: E2E-CRC • Format: uint16 • Value: not relevant b. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: 0000 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: not relevant iv. Field: Time Offset • Format: uint16 • Value: not relevant v. Field: Sensor Status Annunciation • This field is not included vi. Field: CGM Trend Information • This field is not included vii. Field: CGM Quality • This field is not included viii. Field: E2E-CRC • This field is not included

	3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed (Connection state), force the PHG under test to read the CGM Feature characteristic and CGM Session Start Time characteristic. 5. The simulated PHD sends the Measurement to the PHG under test. 6. Check in the PHG transcoder output the Glucose Numeric Object – Type attribute 7. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP) and the simulated PHD sends the temporarily stored CGM measurement to the PHG under test. 8. Check in the PHG transcoder output the Glucose Numeric Object – Type attribute 9. End current CGM session and start a new one. The simulated PHD will now have CGM Type field of the CGM Feature characteristic set to 0x2 (capillary plasma). Repeat steps 3-8 and check in PHG transcoder output the Glucose Numeric Object-Type attribute as in step 6 and 8. 10. End current CGM session and start a new one. The simulated PHD will now have CGM Type field of the CGM Feature characteristic set to 0x3 (venous wholeblood). Repeat steps 3-8 and check in PHG transcoder output the Glucose Numeric Object-Type attribute as in step 6 and 8. 11. End current CGM session and start a new one. The simulated PHD will now have CGM Type field of the CGM Feature characteristic set to 0x4 (venous plasma). Repeat steps 3-8 and check in PHG transcoder output the Glucose Numeric Object-Type attribute as in step 6 and 8. 12. End current CGM session and start a new one. The simulated PHD will now have CGM Type field of the CGM Feature characteristic set to 0x5 (arterial wholeblood). Repeat steps 3-8 and check in PHG transcoder output the Glucose Numeric Object-Type attribute as in step 6 and 8. 13. End current CGM session and start a new one. The simulated PHD will now have CGM Type field of the CGM Feature characteristic set to 0x6 (arterial plasma). Repeat steps 3-8 and check in PHG transcoder output the Glucose Numeric Object-Type attribute as in step 6 and 8. 14. End current CGM session and start a new one. The simulated PHD will now have CGM Type field of the CGM Feature characteristic set to 0x7 (undetermined wholeblood). Repeat steps 3-8 and check in PHG transcoder output the Glucose Numeric Object-Type attribute as in step 6 and 8. 15. End current CGM session and start a new one. The simulated PHD will now have CGM Type field of the CGM Feature characteristic set to 0x8 (undetermined plasma). Repeat steps 3-8 and check in PHG transcoder output the Glucose Numeric Object-Type attribute as in step 6 and 8. 16. End current CGM session and start a new one. The simulated PHD will now have CGM Type field of the CGM Feature characteristic set to 0x9 (interstitial fluid – ISF). Repeat steps 3-8 and check in PHG transcoder output the Glucose Numeric Object-Type attribute as in step 6 and 8. 17. End current CGM session and start a new one. The simulated PHD will now have CGM Type field of the CGM Feature characteristic set to 0xA (control solution). Repeat steps 3-8 and check in PHG transcoder output the Glucose Numeric Object-Type attribute as in step 6 and 8.
Pass/Fail criteria	• In Step 6 and 8, the Glucose Numeric Object – Type attribute is set to {MDC_PART_SCADA | MDC_CONC_GLU_CAPILLARY_WHOLEBLOOD} • In Step 9, the Glucose Numeric Object – Type attribute is set to {MDC_PART_SCADA | MDC_CONC_GLU_CAPILLARY_PLASMA} in both cases. • In Step 10, the Glucose Numeric Object – Type attribute is set to {MDC_PART_SCADA | MDC_CONC_GLU_VENOUS_WHOLEBLOOD} in both cases. • In Step 11, the Glucose Numeric Object – Type attribute is set to {MDC_PART_SCADA | MDC_CONC_GLU_VENOUS_PLASMA} in both cases. • In Step 12, the Glucose Numeric Object – Type attribute is set to {MDC_PART_SCADA | MDC_CONC_GLU_ARTERIAL_WHOLEBLOOD} in both cases.

	• In Step 13, the Glucose Numeric Object – Type attribute is set to {MDC_PART_SCADA | MDC_CONC_GLU_ARTERIAL_PLASMA} in both cases. • In Step 14, the Glucose Numeric Object – Type attribute is set to {MDC_PART_SCADA | MDC_CONC_GLU_UNDETERMINED_WHOLEBLOOD} in both cases. • In Step 15, the Glucose Numeric Object – Type attribute is set to {MDC_PART_SCADA | MDC_CONC_GLU_UNDETERMINED_PLASMA} in both cases. • In Step 16, the Glucose Numeric Object – Type attribute is set to {MDC_PART_SCADA | MDC_CONC_GLU_ISF} in both cases. • In Step 17, the Glucose Numeric Object – Type attribute is set to {MDC_PART_SCADA | MDC_CONC_GLU_CONTROL} in both cases.
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Type attribute is present: ❑ Object: Glucose Numeric Object ❑ Attribute-id: MDC_ATTR_ID_TYPE (2351) ❑ Attribute-type: SEQUENCE {partition (INT-U16), code (INT-U16)} ❑ Attribute-value (Steps 6 & 8): • partition: MDC_PART_SCADA or 2 (dec) or 00 02 (hex) • code: MDC_CONC_GLU_CAPILLARY_WHOLEBLOOD or 29112 (dec) or 71 B8 (hex) ❑ Attribute-value (Step 9): • partition: MDC_PART_SCADA or 2 (dec) or 00 02 (hex) • code: MDC_CONC_GLU_CAPILLARY_PLASMA or 29116 (dec) or 71 BC (hex) ❑ Attribute-value (Step 10): • partition: MDC_PART_SCADA or 2 (dec) or 00 02 (hex) • code: MDC_CONC_GLU_VENOUS_WHOLEBLOOD or 29120 (dec) or 71 C0 (hex) ❑ Attribute-value (Step 11): • partition: MDC_PART_SCADA or 2 (dec) or 00 02 (hex) • code: MDC_CONC_GLU_VENOUS_PLASMA or 29124 (dec) or 71 C4 (hex) ❑ Attribute-value (Step 12): • partition: MDC_PART_SCADA or 2 (dec) or 00 02 (hex) • code: MDC_CONC_GLU_ARTERIAL_WHOLEBLOOD or 29128 (dec) or 71 C8 (hex) ❑ Attribute-value (Step 13): • partition: MDC_PART_SCADA or 2 (dec) or 00 02 (hex) • code: MDC_CONC_GLU_ARTERIAL_PLASMA or 29132 (dec) or 71 CC (hex) ❑ Attribute-value (Step 14): • partition: MDC_PART_SCADA or 2 (dec) or 00 02 (hex) • code: MDC_CONC_GLU_UNDETERMINED_WHOLEBLOOD or 29292 (dec) or 72 6C (hex) ❑ Attribute-value (Step 15): • partition: MDC_PART_SCADA or 2 (dec) or 00 02 (hex) • code: MDC_CONC_GLU_UNDETERMINED_PLASMA or 29296 (dec) or 72 70 (hex) ❑ Attribute-value (Step 16):

	• partition: MDC_PART_SCADA or 2 (dec) or 00 02 (hex) • code: MDC_CONC_GLU_ISF or 29140 (dec) or 71 D4 (hex) ❑ Attribute-value (Step 17): • partition: MDC_PART_SCADA or 2 (dec) or 00 02 (hex) • code: MDC_CONC_GLU_CONTROL or 29136 (dec) or 71 D0 (hex) b) WAN PCD-01 message PCD-01 message includes a segment like this with Type attribute (check OBX-3): • Steps 6 & 8 OBX|n|NM|160184^MDC_CONC_GLU_CAPILLARY_WHOLEBLOOD^MDC|m.0.0.x|[value]|264274^MDC_DIM_MILLI_G_PER_DL^MDC|||||R|||[date_time] • Step 9 OBX|n|NM|160188^MDC_CONC_GLU_CAPILLARY_PLASMA^MDC|m.0.0.x|[value]|264274^MDC_DIM_MILLI_G_PER_DL^MDC|||||R|||[date_time] • Step 10 OBX|n|NM|160192^MDC_CONC_GLU_VENOUS_WHOLEBLOOD^MDC|m.0.0.x|[value]|264274^MDC_DIM_MILLI_G_PER_DL^MDC|||||R|||[date_time] • Step 11 OBX|n|NM|160196^MDC_CONC_GLU_VENOUS_PLASMA^MDC|m.0.0.x|[value]|264274^MDC_DIM_MILLI_G_PER_DL^MDC|||||R|||[date_time] • Step 12 OBX|n|NM|160200^MDC_CONC_GLU_ARTERIAL_WHOLEBLOOD^MDC|m.0.0.x|[value]|264274^MDC_DIM_MILLI_G_PER_DL^MDC|||||R|||[date_time] • Step 13 OBX|n|NM|160204^MDC_CONC_GLU_ARTERIAL_PLASMA^MDC|m.0.0.x|[value]|264274^MDC_DIM_MILLI_G_PER_DL^MDC|||||R|||[date_time] • Step 14 OBX|n|NM|160364^MDC_CONC_GLU_UNDETERMINED_WHOLEBLOOD^MDC|m.0.0.x|[value]|264274^MDC_DIM_MILLI_G_PER_DL^MDC|||||R|||[date_time] • Step 15 OBX|n|NM|160368^MDC_CONC_GLU_UNDETERMINED_PLASMA^MDC|m.0.0.x|[value]|264274^MDC_DIM_MILLI_G_PER_DL^MDC|||||R|||[date_time] • Step 16 OBX|n|NM|160212^MDC_CONC_GLU_ISF^MDC|m.0.0.x|[value]|264274^MDC_DIM_MILLI_G_PER_DL^MDC|||||R|||[date_time] • Step 17 OBX|n|NM|160208^MDC_CONC_GLU_CONTROL^MDC|m.0.0.x|[value]|264274^MDC_DIM_MILLI_G_PER_DL^MDC|||||R|||[date_time]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-006		
TP label		Whitepaper. Glucose Numeric Object – Supplemental-Types Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	Glucose Numeric 3; O		
Test purpose		Check that: PHG may include Glucose Numeric Object – Supplemental-Types attribute in transcoder output.		

	[AND] If present, Supplemental-Types is set to the correct value according to CGM Sample Location field value
Applicability	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043
Other PICS	
Initial condition	The PHG under test and the simulated PHD are in the Standby state.
Test procedure	1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature • Format: 24 bit • Value: 0000 0000 0000 0000 0000 0000 (MSB → LSB). No extra features supported. ii. Field: CGM Type • Format: 4 bit • Value: not relevant iii. Field: CGM Sample Location • Format: 4 bit • Value: 0x1 (finger) iv. Field: E2E-CRC • Format: uint16 • Value: not relevant b. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: 0000 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: not relevant iv. Field: Time Offset • Format: uint16 • Value: not relevant v. Field: Sensor Status Annunciation • This field is not included vi. Field: CGM Trend Information • This field is not included

	vii. Field: CGM Quality • This field is not included viii. Field: E2E-CRC • This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed (Connection state), force the PHG under test to read the CGM Feature and CGM Session Start Time characteristics. 5. The simulated PHD sends the Measurement to PHG under test. 6. Check in the PHG transcoder output the Glucose Numeric Object–Supplemental-Types attribute 7. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP) and the simulated PHD sends the temporarily stored CGM measurement to the PHG under test. 8. Check in the PHG transcoder output the Glucose Numeric Object – Supplemental-Types attribute 9. End current CGM session and start a new one. The simulated PHD will now have CGM Sample Location field of the CGM Feature characteristic set to 0x2 (alternative site test). Repeat steps 3-8 and check in PHG transcoder output the Glucose Numeric Object-Supplemental-Types attribute as in step 6 and 8. 10. End current CGM session and start a new one. The simulated PHD will now have CGM Sample Location field of the CGM Feature characteristic set to 0x3 (earlobe). Repeat steps 3-8 and check in PHG transcoder output the Glucose Numeric Object-Supplemental-Types attribute as in step 6 and 8. 11. End current CGM session and start a new one. The simulated PHD will now have CGM Sample Location field of the CGM Feature characteristic set to 0x4 (control solution). Repeat steps 3-8 and check in PHG transcoder output the Glucose Numeric Object-Supplemental-Types attribute as in step 6 and 8. 12. End current CGM session and start a new one. The simulated PHD will now have CGM Sample Location field of the CGM Feature characteristic set to 0x5 (subcutaneous tissue). Repeat steps 3-8 and check in PHG transcoder output the Glucose Numeric Object-Supplemental-Types attribute as in step 6 and 8. 13. End current CGM session and start a new one. The simulated PHD will now have CGM Sample Location field of the CGM Feature characteristic set to 0xF (sample location value not available). Repeat steps 3-8 and check in PHG transcoder output the Glucose Numeric Object-Supplemental-Types attribute as in step 6 and 8.
Pass/Fail criteria	• In Step 6 and 8, if present, the Glucose Numeric Object – Supplemental-Types attribute is set to {MDC_PART_PHD_DM | MDC_CTXT_GLU_SAMPLELOCATION_FINGER} • In Step 9, if present, the Glucose Numeric Object – Supplemental-Types attribute is set to {MDC_PART_PHD_DM | MDC_CTXT_GLU_SAMPLELOCATION_AST} in both cases. • In Step 10, if present, the Glucose Numeric Object – Supplemental-Types attribute is set to {MDC_PART_PHD_DM | MDC_CTXT_GLU_SAMPLELOCATION_EARLOBE} in both cases. • In Step 11, if present, the Glucose Numeric Object – Supplemental-Types attribute is set to {MDC_PART_PHD_DM | MDC_CTXT_GLU_SAMPLELOCATION_CTRLSOLUTION} in both cases. • In Step 12, if present, the Glucose Numeric Object – Supplemental-Types attribute is set to {MDC_PART_PHD_DM | MDC_CTXT_GLU_SAMPLELOCATION_SUBCUTANEOUS} in both cases. • In Step 13, if present, the Glucose Numeric Object – Supplemental-Types attribute is set to {MDC_PART_PHD_DM | MDC_CTXT_GLU_SAMPLELOCATION_UNDERTERMINED} in both cases.
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes

	If Supplemental-Types attribute is present: ❑ Object: Glucose Numeric Object ❑ Attribute-id: MDC_ATTR_SUPPLEMENTAL_TYPES (2657) ❑ Attribute-type: SEQUENCE of SEQUENCE {partition (INT-U16), code (INT-U16)} ❑ Attribute-value (Steps 6 & 8): • partition: MDC_PART_PHD_DM or 128 (dec) or 00 80 (hex) • code: MDC_CTXT_GLU_SAMPLELOCATION_FINGER or 29240 (dec) or 72 38 (hex) ❑ Attribute-value (Step 9): • partition: MDC_PART_PHD_DM or 128 (dec) or 00 80 (hex) • code: MDC_CTXT_GLU_SAMPLELOCATION_AST or 29244 (dec) or 72 3C (hex) ❑ Attribute-value (Step 10): • partition: MDC_PART_PHD_DM or 128 (dec) or 00 80 (hex) • code: MDC_CTXT_GLU_SAMPLELOCATION_EARLOBE or 29248 (dec) or 72 40 (hex) ❑ Attribute-value (Step 11): • partition: MDC_PART_PHD_DM or 128 (dec) or 00 80 (hex) • code: MDC_CTXT_GLU_SAMPLELOCATION_CTRLSOLUTION or 29252 (dec) or 72 44 (hex) ❑ Attribute-value (Step 12): • partition: MDC_PART_PHD_DM or 128 (dec) or 00 80 (hex) • code: MDC_CTXT_GLU_SAMPLELOCATION_SUBCUTANEOUS or 29241 (dec) or 72 39 (hex) ❑ Attribute-value (Step 13): • partition: MDC_PART_PHD_DM or 128 (dec) or 00 80 (hex) • code: MDC_CTXT_GLU_SAMPLELOCATION_UNDERTERMINED or 29237 (dec) or 72 35 (hex) b) WAN PCD-01 message If Supplemental-Types is present, PCD-01 message includes a facet OBX segment of the CGM measurement OBX segment with Supplemental-Types attribute (check OBX-3 and OBX-5): OBX|n|NM|[GlucoseType]|m.0.0.x|[value]|264274^MDC_DIM_MILLI_G_PER_DL ^MDC|||||R|||[date_time] • Steps 6 & 8 OBX|n|CWE|68193^MDC_ATTR_SUPPLEMENTAL_TYPES^MDC|m.0.0.x.y| 8417848^MDC_CTXT_GLU_SAMPLELOCATION_FINGER^MDC||||||R • Step 9 OBX|n|CWE|68193^MDC_ATTR_SUPPLEMENTAL_TYPES^MDC|m.0.0.x.y| 8417852^MDC_CTXT_GLU_SAMPLELOCATION_AST^MDC||||||R • Step 10 OBX|n|CWE|68193^MDC_ATTR_SUPPLEMENTAL_TYPES^MDC|m.0.0.x.y| 8417856^MDC_CTXT_GLU_SAMPLELOCATION_EARLOBE^MDC||||||R • Step 11 OBX|n|CWE|68193^MDC_ATTR_SUPPLEMENTAL_TYPES^MDC|m.0.0.x.y| 8417860^MDC_CTXT_GLU_SAMPLELOCATION_CTRLSOLUTION^MDC||||||R • Step 12

	OBX|n|CWE|68193^MDC_ATTR_SUPPLEMENTAL_TYPES^MDC|m.0.0.x.y| 8417849^MDC_CTXT_GLU_SAMPLELOCATION_SUBCUTANEOUS^MDC||||||R • Step 13 OBX|n|CWE|68193^MDC_ATTR_SUPPLEMENTAL_TYPES^MDC|m.0.0.x.y| 8417845^MDC_CTXT_GLU_SAMPLELOCATION_UNDERTERMINED^MDC||||||R

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-007		
TP label		Whitepaper. Glucose Numeric Object - Metric-Spec-Small Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	Glucose Numeric 4; M		
Test purpose		Check that: PHG includes Glucose Numeric Object – Metric-Spec-Small attribute in transcoder output. [AND] Metric-Spec-Small is set to {0xC042}.		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: 0000 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: not relevant iv. Field: Time Offset • Format: uint16 • Value: not relevant v. Field: Sensor Status Annunciation • This field is not included vi. Field: CGM Trend Information • This field is not included vii. Field: CGM Quality		

	• This field is not included viii. Field: E2E-CRC • This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed (Connection state), force the PHG to read the CGM Feature and CGM Session Start Time characteristics. Then, the simulated PHD sends the Measurement to PHG under test. 5. Check in PHG transcoder output the Glucose Numeric Object– Metric-Spec-Small attribute 6. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP) and the simulated PHD sends the temporarily stored CGM measurement to the PHG under test. 7. Check in the PHG transcoder output the Glucose Numeric Object – Metric-Spec-Small attribute
Pass/Fail criteria	In Step 5 and 7, the Glucose Numeric Object – Metric-Spec-Small attribute is present and its value is {0xC042} (mss-avail-intermittent | mss-avail-stored-data | mss-acc-agent-initiated | mss-cat-calculation)
Notes **(To assist manual testing)**	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Metric-Spec-Small attribute is present: ❑ Object: Glucose Numeric Object ❑ Attribute-id: MDC_ATTR_METRIC_SPEC_SMALL (2630) ❑ Attribute-type: BITS-16 ❑ Attribute-value: 0xC042 (hex) or BITS mss-avail-intermittent (0), mss-avail-stored-data (1), mss-acc-agent-initiated(9), mss-cat-calculation(14) set to TRUE and remaining BITS set to FALSE b) WAN PCD-01 message PCD-01 message does not include segments with Metric-Spec-Small attribute value

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-008		
TP label		Whitepaper. Glucose Numeric Object – Measurement-Status Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	Glucose Numeric 5; O		
Test purpose		Check that: PHG may include Glucose Numeric Object – Measurement-Status attribute in transcoder output. [AND] If present and related to the Sensor Status Annunciation field, Measurement-Status is set to the correct value		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		

Test procedure	1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature • Format: 24 bit • Value: 0000 0000 0000 **1111 1111 1111** (MSB → LSB). Calibration supported, patient high/low alerts supported, hypo alerts supported, yper alerts supported, rate of increase/decrease alerts supported, device specific alert supported, sensor malfunction detection supported, sensor temperature high-low detection supported, sensor result high-low detecntion supported, low battery detection supported, sensor type error detection supported, general device fault supported. ii. Field: CGM Type • Format: 4 bit • Value: not relevant iii. Field: CGM Sample Location • Format: 4 bit • Value: not relevant iv. Field: E2E-CRC • Format: uint16 • Value: not relevant b. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: 0**1**00 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) present, Sensor Status Annunciation Field (Status-Octet) not present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: not relevant iv. Field: Time Offset • Format: uint16 • Value: not relevant v. Field: Sensor Status Annunciation • Format: 8 bit • Value: 0000 **1**000 (MSB → LSB) (calibration required). vi. Field: CGM Trend Information • This field is not included vii. Field: CGM Quality • This field is not included viii. Field: E2E-CRC

	• This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed (Connection state), force the simulated PHG to read the CGM Feature and CGM Session Start Time characteristics. Then, the simulated PHD sends the Measurement to the PHG under test. 5. Check in the PHG transcoder output the Glucose Numeric Object– Measurement-Status attribute. 6. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP) and the simulated PHD sends the temporarily stored CGM measurement to the PHG under test. 7. Check in the PHG transcoder output the Glucose Numeric Object – Measurement-Status attribute 8. The simulated PHD sends a Measurement to PHG under test with Sensor Status Annunciation field set to 000**1** 0000 (MSB → LSB), sensor temperature too high for valid test/result at time of measurement (bit 12). All remaining fields remain equal to those in step 2. The simulated PHD also deletes all stored records in RACP and stores an identical measurement. Repeat steps 5-7. 9. The simulated PHD sends a Measurement to PHG under test with Sensor Status Annunciation field set to 00**1**0 0000 (MSB → LSB), sensor temperature too low for valid test/result at time of measurement (bit 13). All remaining fields remain equal to those in step 2. The simulated PHD also deletes all stored records in RACP and stores an identical measurement. Repeat steps 5-7. 10. The simulated PHD sends a Measurement to PHG under test with Sensor Status Annunciation field set to 0000 000**1** (MSB → LSB) and Flags field set to **1**000 0000 (MSB → LSB), Sensor result lower than the Patient Low level (bit 16). All remaining fields remain equal to those in step 2. The simulated PHD also deletes all stored records in RACP and stores an identical measurement. Repeat steps 5-7. 11. The simulated PHD sends a Measurement to PHG under test with Sensor Status Annunciation field set to 0000 00**1**0 (MSB → LSB) and Flags field set to **1**000 0000 (MSB → LSB), Sensor result higher than the Patient Low level (bit 17). All remaining fields remain equal to those in step 2. The simulated PHD also deletes all stored records in RACP and stores an identical measurement. Repeat steps 5-7. 12. The simulated PHD sends a Measurement to PHG under test with Sensor Status Annunciation field set to 0000 0**1**00 (MSB → LSB) and Flags field set to **1**000 0000 (MSB → LSB), Sensor result lower than the Hypo level (bit 18). All remaining fields remain equal to those in step 2. The simulated PHD also deletes all stored records in RACP and stores an identical measurement. Repeat steps 5-7. 13. The simulated PHD sends a Measurement to PHG under test with Sensor Status Annunciation field set to 0000 **1**000 (MSB → LSB) and Flags field set to **1**000 0000 (MSB → LSB), Sensor result higher than the Hyper level (bit 19). All remaining fields remain equal to those in step 2. The simulated PHD also deletes all stored records in RACP and stores an identical measurement. Repeat steps 5-7. 14. The simulated PHD sends a Measurement to PHG under test with Sensor Status Annunciation field set to 0**1**00 0000 (MSB → LSB) and Flags field set to **1**000 0000 (MSB → LSB), sensor result lower than the device can process (bit 22). All remaining fields remain equal to those in step 2. The simulated PHD also deletes all stored records in RACP and stores an identical measurement. Repeat steps 5-7. 15. The simulated PHD sends a Measurement to PHG under test with Sensor Status Annunciation field set to **1**000 0000 (MSB → LSB) and Flags field set to **1**000 0000 (MSB → LSB), sensor result higher than the device can process (bit 23). All remaining fields remain equal to those in step 2. The simulated PHD also deletes all stored records in RACP and stores an identical measurement. Repeat steps 5-7.
Pass/Fail criteria	• In Step 5 and 7 the Glucose Numeric Object – Measurement-Status attribute, if present, is set to “questionable” (bit 1). • In Step 8 the Glucose Numeric Object – Measurement-Status attribute, if present, is set to “invalid” (bit 0). • In Step 9 the Glucose Numeric Object – Measurement-Status, if present, is set to “invalid” (bit 0).

	• In Step 10 the Glucose Numeric Object – Measurement-Status attribute, if present, is set to "measurement outside threshold boundaries" (bit 14) • In Step 11 the Glucose Numeric Object – Measurement-Status attribute, if present, is set to "measurement outside threshold boundaries" (bit 14) • In Step 12 the Glucose Numeric Object – Measurement-Status attribute, if present, is set to "measurement outside threshold boundaries" (bit 14) • In Step 13 the Glucose Numeric Object – Measurement-Status attribute, if present, is set to "measurement outside threshold boundaries" (bit 14) • In Step 14 the Glucose Numeric Object – Measurement-Status attribute, if present, is set to "invalid" (bit 0). • In Step 15 the Glucose Numeric Object – Measurement-Status attribute, if present, is set to "invalid" (bit 0).
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes If Measurement-Status attribute is present: ❑ Object: Glucose Numeric Object ❑ Attribute-id: MDC_ATTR_MSMT_STAT (2375) ❑ Attribute-type: BITS16 ❑ Attribute-value (Steps 5 & 7): "questionable" (0x4000) ❑ Attribute-value (Step 8): "invalid" (0x8000) ❑ Attribute-value (Step 9): "invalid" (0x8000) ❑ Attribute-value (Step 10): "measurement outside threshold boundaries" (0x0002) ❑ Attribute-value (Step 11): "measurement outside threshold boundaries" (0x0002) ❑ Attribute-value (Step 12): "measurement outside threshold boundaries" (0x0002) ❑ Attribute-value (Step 13): "measurement outside threshold boundaries" (0x0002) ❑ Attribute-value (Step 14): "invalid" (0x8000) ❑ Attribute-value (Step 15): "invalid" (0x8000) b) WAN PCD-01 message If Measurement-Status is present, PCD-01 message includes a segment like this with Measurement-Status attribute value (check OBX-8 and OBX-11): • Steps 5 & 7 OBX|n|NM|[GlucoseType]|m.0.0.x|[value]|264274^MDC_DIM_MILLI_G_PER_DL ^MDC||QUES|||R|||[date_time] • Step 8 OBX|n|NM|[GlucoseType]|m.0.0.x|[value]|264274^MDC_DIM_MILLI_G_PER_DL ^MDC||INV|||X|||[date_time] • Step 9 OBX|n|NM|[GlucoseType]|m.0.0.x|[value]|264274^MDC_DIM_MILLI_G_PER_DL ^MDC||INV|||X|||[date_time] • Step 10 OBX|n|NM|[GlucoseType]|m.0.0.x|[value]|264274^MDC_DIM_MILLI_G_PER_DL ^MDC||ALACT|||R|||[date_time] • Step 11 OBX|n|NM|[GlucoseType]|m.0.0.x|[value]|264274^MDC_DIM_MILLI_G_PER_DL ^MDC||ALACT|||R|||[date_time] • Step 12 OBX|n|NM|[GlucoseType]|m.0.0.x|[value]|264274^MDC_DIM_MILLI_G_PER_DL ^MDC||ALACT|||R|||[date_time]

	• Step 13 OBX|n|NM|[GlucoseType]|m.0.0.x|[value]|264274^MDC_DIM_MILLI_G_PER_DL^MDC||ALACT|||R|||[date_time] • Step 14 OBX|n|NM|[GlucoseType]|m.0.0.x|[value]|264274^MDC_DIM_MILLI_G_PER_DL^MDC||INV|||X|||[date_time] • Step 15 OBX|n|NM|[GlucoseType]|m.0.0.x|[value]|264274^MDC_DIM_MILLI_G_PER_DL^MDC||INV|||X|||[date_time]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-009		
TP label		Whitepaper. Glucose Numeric Object – Unit-Code Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	Glucose Numeric 6; M		
Test purpose		Check that: PHG includes Glucose Numeric Object – Unit-Code attribute in transcoder output. [AND] Unit-Code attribute value is set to MDC_DIM_MILLI_G_PER_DL		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristic of interest for this Test Case is: a. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: 0000 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: not relevant iv. Field: Time Offset • Format: uint16 • Value: not relevant v. Field: Sensor Status Annunciation		

	• This field is not included vi. Field: CGM Trend Information • This field is not included vii. Field: CGM Quality • This field is not included viii. Field: E2E-CRC • This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed (Connection state), force the PHG to read the CGM Feature and CGM Session Start Time characteristic. Then, the simulated PHD sends the Measurement to the PHG under test. 5. Check in the PHG transcoder output the Glucose Numeric Object– Unit-Code attribute. 6. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP) and the simulated PHD sends the temporarily stored CGM measurement to the PHG under test. 7. Check in the PHG transcoder output the Glucose Numeric Object – Unit-Code attribute
Pass/Fail criteria	In Step 5 and 7 the Glucose Numeric Object – Unit-Code attribute is present and its value is set to MDC_DIM_MILLI_G_PER_DL
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Unit-Code attribute is present: ❑ Object: Glucose Numeric Object ❑ Attribute-id: MDC_ATTR_UNIT_CODE (2454) ❑ Attribute-type: OID-Type ❑ Attribute-value: MDC_DIM_MILLI_G_PER_DL or 2130 (dec) or 08 52 (hex) b) WAN PCD-01 message PCD-01 message includes a segment like this with Unit-Code attribute value (check OBX-6): OBX|n|NM|[GlucoseType]|m.0.0.x|[value]|264274^MDC_DIM_MILLI_G_PER_DL ^MDC|||||R|||[date_time]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-010		
TP label		Whitepaper. Glucose Numeric Object – Base-Offset-Time-Stamp Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	Glucose Numeric 7; M	BaseOffset 3; M	
Test purpose		Check that: PHG includes Glucose Numeric Object Base-Offset-Time-Stamp attribute in transcoder output. [AND] Base-Offset-Time-Stamp attribute is set to the correct value according to Base-Offset time stamp derivation		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		

Other PICS	
Initial condition	The PHG under test and the simulated PHD are in the Standby state.
Test procedure	1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Session Start Time (0x2AAA) i. Field: Session Start Time • Format: {uint16, uint8, uint8, uint8, uint8, uint8} • Value: {2016, 5, 12, 16, 39, 27} (May 12, 2016, 16:39:27) ii. Field: Time Zone • Format: sint8 • Value: 4 (UTC+1:00) iii. Field: DST-Offset • Format: uint8 • Value: 4 (Daylight Time (+1h)) iv. Field: E2E-CRC • This field is not included b. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: 0000 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: not relevant iv. Field: Time Offset • Format: uint16 • Value: 20 v. Field: Sensor Status Annunciation • This field is not included vi. Field: CGM Trend Information • This field is not included vii. Field: CGM Quality • This field is not included viii. Field: E2E-CRC • This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state).

	4. When the pairing has been completed (Connection state), force the PHG under test to read the CGM Features and CGM Session Start Time characteristics. 5. The simulated PHD sends the Measurement to the PHG under test. 6. Check in the PHG transcoder output the Glucose Numeric Object–Base-Offset-Time-Stamp attribute 7. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP). The simulated PHD sends the temporarily stored CGM measurement to the PHG under test. 8. Check in PHG transcoder output the Glucose Numeric Object – Base-Offset-Time-Stamp attribute
Pass/Fail criteria	In Step 6 and 8, the Glucose Numeric Object – Base-Offset-Time-Stamp is set to the addition of CGM Session Start Time characteristic's Session Start Time (May 12, 2016, 16:39:27) field plus CGM Measurement characteristic's Time Offset field (20 min).
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Base-Offset-Time-Stamp attribute is present: ❑ Object: Glucose Numeric Object ❑ Attribute-id: MDC_ATTR_TIME_STAMP_BO (2690) ❑ Attribute-type: SEQUENCE {bo-seconds (INT-U32), bo-fraction (INT-U16), bo-time-offset (INT-I16)} ❑ Attribute-value: addition of • CGM Session Start Time characteristic Session Start Time field (May 12, 2016, 16:39:27) • CGM Measurement characteristic Time Offset field (20m) Note that the same Base-Offset-Time-Stamp can have different representations depending on bo-time-offset value. If it is set to 20 min (CGM Measurement characteristic Time Offset field), then Base-Offset-Time-Stamp value shall be {3672059967, 0, 20} b) WAN PCD-01 message PCD-01 message includes a segment like this with Base-Offset-Time-Stamp attribute value (check OBX-14): OBX|n|NM|[GlucoseType]|m.0.0.x|[value]|264274^MDC_DIM_MILLI_G_PER_DL ^MDC|||||R|||[value described in a) coded in DTM format]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-011_A		
TP label		Whitepaper. Glucose Numeric Object – Basic-Nu-Observed-Value Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	Glucose Numeric 8; M		
Test purpose		Check that: PHG includes Glucose Numeric Object Basic-Nu-Observed-Value attribute in transcoder output. [AND] Basic-Nu-Observed-Value attribute is set to the correct value.		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				

Initial condition	The PHG under test and the simulated PHD are in the Standby state.
Test procedure	1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristic of interest for this Test Case is: a. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: 0000 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: 160.0 iv. Field: Time Offset • Format: uint16 • Value: not relevant v. Field: Sensor Status Annunciation • This field is not included vi. Field: CGM Trend Information • This field is not included vii. Field: CGM Quality • This field is not included viii. Field: E2E-CRC • This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed (Connection state), force the PHG to read the CGM Feature and CGM Session Start Time characteristics. Then, the simulated PHD sends the Measurement to the PHG under test. 5. Check in the PHG transcoder output the Glucose Numeric Object–Basic-Nu-Observed-Value attribute 6. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP). The simulated PHD sends the temporarily stored CGM measurement to the PHG under test. 7. Check in the PHG transcoder output the Glucose Numeric Object – Basic-Nu-Observed-Value attribute
Pass/Fail criteria	In Step 5 and 7, the Glucose Numeric Object – Basic-Nu-Observed-Value is set to 160 mg/dL
Notes **(To assist manual testing)**	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Basic-Nu-Observed-Value attribute is present: ❑ Object: Glucose Numeric Object

	❑ Attribute-id: MDC_ATTR_NU_VAL_OBS_BASIC (2636) ❑ Attribute-type: SFLOAT ❑ Attribute-value: 160 (dec) or 00A0 (hex) or 0110 (hex) or F640 (hex) b) WAN PCD-01 message PCD-01 message includes a segment like this with Basic-Nu-Observed-Value attribute value (check OBX-5): OBX|n|NM|[GlucoseType]|m.0.0.x|160|264274^MDC_DIM_MILLI_G_PER_DL^MDC|||||R|||[date_time]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-011_B		
TP label		Whitepaper. Glucose Numeric Object – Basic-Nu-Observed-Value Attribute Special Values		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	Glucose Numeric 9; M	Glucose Numeric 10; M	Float Type 1; C
		Float Type 2; M		
Test purpose		Check that: PHG transcodes CGM Glucose Concentration field of CGM Measurement characteristic into Glucose Numeric Object – Basic-Nu-Observed-Value attribute [AND] PHG assigns the following special values: NaN (0x07FF), NRes (0x0800), +INFINITY (0x07FE) and -INFINITY (0x0802)		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature • Format: 24 bit • Value: 0000 0000 0000 **1111 1111 1111** (MSB → LSB). Calibration supported, patient high/low alerts supported, hypo alerts supported, yper alerts supported, rate of increase/decrease alerts supported, device specific alert supported, sensor malfunction detection supported, sensor temperature high-low detection supported, sensor result high-low detecntion supported, low battery detection supported, sensor type error detection supported, general device fault supported. ii. Field: CGM Type • Format: 4 bit • Value: not relevant iii. Field: CGM Sample Location • Format: 4 bit • Value: not relevant		

	iv. Field: E2E-CRC • Format: uint16 • Value: not relevant b. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: 00**1**0 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: 07 FF (hex). Special value: NaN iv. Field: Time Offset • Format: uint16 • Value: not relevant v. Field: Sensor Status Annunciation • Format: 8 bit • Value: 0000 **1**000 (MSB → LSB) (sensor malfunction). vi. Field: CGM Trend Information • This field is not included vii. Field: CGM Quality • This field is not included viii. Field: E2E-CRC • This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed (Connection state), the simulated PHD sends the Measurement to the PHG under test. 5. Check in the PHG transcoder output the Glucose Numeric Object–Basic-Nu-Observed-Value attribute 6. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP). The simulated PHD sends the temporarily stored CGM measurement to the PHG under test. 7. Check in the PHG transcoder output the Glucose Numeric Object – Basic-Nu-Observed-Value attribute 8. The simulated PHD sends a CGM Measurement to PHG under test with the following values. The simulated PHD also deletes all previous stored records in RACP and stores an identical measurement in it. a. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit

	• Value: 00**1**0 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: 08 00(hex). Special value: NRes iv. Field: Time Offset • Format: uint16 • Value: not relevant v. Field: Sensor Status Annunciation • Format: 8 bit • Value: 0000 **1**000 (MSB → LSB) (sensor malfunction). vi. Field: CGM Trend Information • This field is not included vii. Field: CGM Quality • This field is not included viii. Field: E2E-CRC • This field is not included 9. Repeat steps 5-7 to check in transcoder output the Glucose Numeric Object – Basic-Nu-Observed-Value attribute. 10. The simulated PHD sends a CGM Measurement to PHG under test with the following values. The simulated PHD also deletes all stored records in RACP and stores an identical measurement in it. a. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: **1**000 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: 08 02(hex). Special value: -INFINITY iv. Field: Time Offset • Format: uint16 • Value: not relevant v. Field: Sensor Status Annunciation • Format: 8 bit • Value: 0**1**00 0000 (MSB → LSB) (sensor result lower than the device can process). vi. Field: CGM Trend Information • This field is not included vii. Field: CGM Quality

	• This field is not included viii. Field: E2E-CRC • This field is not included 11. Repeat steps 5-7 to check in transcoder output the Glucose Numeric Object – Basic-Nu-Observed-Value attribute 12. The simulated PHD sends a CGM Measurement to PHG under test with the following values. The simulated PHD also deletes all stored records in RACP and stores an identical measurement in it. a. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: **1**000 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: 07 FE(hex). Special value: +INFINITY iv. Field: Time Offset • Format: uint16 • Value: not relevant v. Field: Sensor Status Annunciation • Format: 8 bit • Value: **1**000 0000 (MSB → LSB) (sensor result higher than the device can process). vi. Field: CGM Trend Information • This field is not included vii. Field: CGM Quality • This field is not included viii. Field: E2E-CRC • This field is not included 13. Repeat steps 5-7 to check in transcoder output the Glucose Numeric Object – Basic-Nu-Observed-Value attribute
Pass/Fail criteria	• In Step 5 and 7, the Glucose Numeric Object – Basic-Nu-Observed-Value is set to 0x07FF • In Step 9, the Glucose Numeric Object – Basic-Nu-Observed-Value is set to 0x0800 for both cases. • In Step 11, the Glucose Numeric Object – Basic-Nu-Observed-Value is set to 0x0802 for both cases. • In Step 13, the Glucose Numeric Object – Basic-Nu-Observed-Value is set to 0x07FE for both cases.
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Basic-Nu-Observed-Value attribute is present: ❑ Object: Glucose Numeric Object

	❑ Attribute-id: MDC_ATTR_NU_VAL_OBS_BASIC (2636) ❑ Attribute-type: SFLOAT ❑ Attribute-value (Steps 5 & 7): 0x07FF (hex) ❑ Attribute-value (Step 9): 0x0800 (hex) ❑ Attribute-value (Step 11): 0x0802 (hex) ❑ Attribute-value (Step 13): 0x07FE (hex) b) WAN PCD-01 message • Steps 5 & 7 OBX|n|NM|[GlucoseType]|m.0.0.x||264274^MDC_DIM_MILLI_G_PER_DL^MDC||NAN|||X|||[date_time] • Step 9 OBX|n|NM|[GlucoseType]|m.0.0.x||264274^MDC_DIM_MILLI_G_PER_DL^MDC||OTH|||X|||[date_time] • Step 11 OBX|n|NM|[GlucoseType]|m.0.0.x||264274^MDC_DIM_MILLI_G_PER_DL^MDC||NINF|||X|||[date_time] • Step 13 OBX|n|NM|[GlucoseType]|m.0.0.x||264274^MDC_DIM_MILLI_G_PER_DL^MDC||PINF|||X|||[date_time]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-012		
TP label		Whitepaper. Glucose Numeric Object – Threshold-Notification-Text-String		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	Glucose Numeric 11; O		
Test purpose		Check that: PHG may transcode bits 16 through 19 of the CGM Sensor Status Annunciation field of CGM Measurement characteristic into Glucose Numeric Object – Threshold-Notification-Text-String attribute		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature • Format: 24 bit • Value: 0000 0000 0000 **1111 1111 1111** (MSB → LSB). Calibration supported, patient high/low alerts supported, hypo alerts supported, yper alerts supported, rate of increase/decrease alerts supported, device specific alert supported, sensor malfunction detection supported, sensor temperature high-low detection supported, sensor result high-low detecntion		

	supported, low battery detection supported, sensor type error detection supported, general device fault supported. ii. Field: CGM Type • Format: 4 bit • Value: not relevant iii. Field: CGM Sample Location • Format: 4 bit • Value: not relevant iv. Field: E2E-CRC • Format: uint16 • Value: not relevant b. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: **1**000 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: not relevant iv. Field: Time Offset • Format: uint16 • Value: not relevant v. Field: Sensor Status Annunciation • Format: 8 bit • Value: 0000 000**1** (MSB → LSB) (sensor result lower than the patient low level). vi. Field: CGM Trend Information • This field is not included vii. Field: CGM Quality • This field is not included viii. Field: E2E-CRC • This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed (Connection state), the simulated PHD sends the Measurement to the PHG under test. 5. Check in the PHG transcoder output the Glucose Numeric Object– Threshold-Notification-Text-String attribute 6. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP). The simulated PHD sends the temporarily stored CGM measurement to the PHG under test. 7. Check in the PHG transcoder output the Glucose Numeric Object – Threshold-Notification-Text-String attribute

	8. The simulated PHD sends a CGM Measurement to the PHG under test with the following values. The simulated PHD also deletes all previous stored records in RACP and stores an identical measurement in it. a. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: **1**000 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) present.. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: not relevant iv. Field: Time Offset • Format: uint16 • Value: not relevant v. Field: Sensor Status Annunciation • Format: 8 bit • Value: 0000 00**1**0 (MSB → LSB) (sensor result higher than the patient high level). vi. Field: CGM Trend Information • This field is not included vii. Field: CGM Quality • This field is not included viii. Field: E2E-CRC • This field is not included 9. Repeat steps 5-7 to check in transcoder output the Glucose Numeric Object – Threshold-Notification-Text-String attribute. 10. The simulated PHD sends a CGM Measurement to PHG under test with the following values. The simulated PHD also deletes all stored records in RACP and stores an identical measurement in it. a. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: **1**000 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: not relevant iv. Field: Time Offset • Format: uint16

	• Value: not relevant v. Field: Sensor Status Annunciation • Format: 8 bit • Value: 0000 0**1**00 (MSB → LSB) (sensor result lower than the Hypo level). vi. Field: CGM Trend Information • This field is not included vii. Field: CGM Quality • This field is not included viii. Field: E2E-CRC • This field is not included 11. Repeat steps 5-7 to check in transcoder output the Glucose Numeric Object – Threshold-Notification-Text-String attribute 12. The simulated PHD sends a CGM Measurement to PHG under test with the following values. The simulated PHD also deletes all stored records in RACP and stores an identical measurement in it. a. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: **1**000 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: not relevant iv. Field: Time Offset • Format: uint16 • Value: not relevant v. Field: Sensor Status Annunciation • Format: 8 bit • Value: 0000 1000 (MSB → LSB) (sensor result higher than the Hyper Level). vi. Field: CGM Trend Information • This field is not included vii. Field: CGM Quality • This field is not included viii. Field: E2E-CRC • This field is not included 13. Repeat steps 5-7 to check in transcoder output the Glucose Numeric Object – Threshold-Notification-Text-String attribute
Pass/Fail criteria	• In Step 5 and 7, if present, the Glucose Numeric Object – Threshold-Notification-Text-String is set to an OCTET STRING with a readable description of the threshold notification "sensor result lower than the patient low level"

	• In Step 9, if present, the Glucose Numeric Object – Threshold-Notification-Text-String is set to an OCTET STRING with a readable description of the threshold notification "sensor result higher than the patient high level" for both cases. • In Step 11, if present, the Glucose Numeric Object – Threshold-Notification-Text-String is set to an OCTET STRING with a readable description of the threshold notification "sensor result lower than the Hypo level" for both cases. • In Step 13, if present,, the Glucose Numeric Object – Threshold-Notification-Text-String is set to an OCTET STRING with a readable description of the threshold notification "sensor result higher than the Hyper level" for both cases.
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes If Threshold-Notification-Text-String attribute is present: ❑ Object: Glucose Numeric Object ❑ Attribute-id: MDC_ATTR_THRES_NOTIF_TEXT_STRING (2696) ❑ Attribute-type: OCTET STRING ❑ Attribute-value (Steps 5 & 7): readable description of the threshold notification "sensor result lower than the patient low level" ❑ Attribute-value (Step 9): readable description of the threshold notification "sensor result higher than the patient high level" ❑ Attribute-value (Step 11): readable description of the threshold notification "sensor result lower than the Hypo level" ❑ Attribute-value (Step 13): readable description of the threshold notification "sensor result higher than the Hyper level" b) WAN PCD-01 message Threshold-Notification-Text-String attribute is not included in PCD-01 message

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-013		
TP label		Whitepaper. Sensor Calibration Numeric Object - Handle Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	SensCal Numeric 1; O		
Test purpose		Check that: PHG does not include Sensor Calibration Numeric Object – Handle Attribute in transcoder output. [OR] If PHG includes Sensor Calibration Numeric Object – Handle attribute in transcoder output, then its value shall be different than 0		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The simulated PHD has a Calibration Data Record stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8)		

	i. Field: CGM Feature • Format: 24 bit • Value: 0000 0000 0000 0000 0000 000**1** (MSB → LSB). Calibration supported. ii. Field: CGM Type • Format: 4 bit • Value: not relevant iii. Field: CGM Sample Location • Format: 4 bit • Value: not relevant iv. Field: E2E-CRC • Format: uint16 • Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ❑ Value: 0x06 (Glucose Calibration Value Response) ii. Field: Calibration Value – Glucose concentration of Calibration (mg/dL) ❑ Format: SFLOAT ❑ Value: not relevant iii. Field: Calibration Value – Calibration Time ❑ Format: uint16 ❑ Value: not relevant iv. Field: Calibration Value – Calibration Type ❑ Format: 4 bit ❑ Value: not relevant v. Field: Calibration Value – Calibration Sample Location ❑ Format: 4 bit ❑ Value: not relevant vi. Field: Calibration Value - Next Calibration Time ❑ Format: uint16 ❑ Value: not relevant vii. Field: Calibration Value – Calibration Data Record Number ❑ Format: uint16 ❑ Value: not relevant viii. Field: Calibration Value – Calibration Status ❑ Format: 8 bit ❑ Value: not relevant ix. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics, and then to perform a Glucose Calibration procedure using Op Code "Get Glucose Calibration value" (0x05) with Operand "0xFFFF"(by

	performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code and Calibration Data Record Number fields respectively). 5. The simulated PHD will respond with an indication including a "Calibration Value Response" Op Code (0x06) and a Calibration Data Record containing the requested calibration information. 6. Check in PHG transcoder output the Sensor Calibration Numeric Object – Handle attribute
Pass/Fail criteria	In Step 6, the Sensor Calibration Numeric Object – Handle attribute is not present or, if it is present then its value is different than 0
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Handle attribute is not present, or if it is present then: ❑ Object: Sensor Calibration Numeric Object ❑ Attribute-id: MDC_ATTR_ID_HANDLE (2337) ❑ Attribute-type: INT-U16 ❑ Attribute-value: Any value different than 0 b) WAN PCD-01 message PCD-01 message does not include segments with Handle attribute value

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-014		
TP label		Whitepaper. Sensor Calibration Numeric Object - Type Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	SensCal Numeric 2; M		
Test purpose		Check that: PHG includes Sensor Calibration Numeric Object – Type attribute in transcoder output. [AND] Type is set to MDC_PART_PHD_DM | MDC_CGM_SENSOR_CALIBRATION		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The simulated PHD has a Calibration Data Record stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 0000 000**1** (MSB → LSB). Calibration supported. ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant		

	iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ❑ Value: 0x06 (Glucose Calibration Value Response) ii. Field: Calibration Value – Glucose concentration of Calibration (mg/dL) ❑ Format: SFLOAT ❑ Value: not relevant iii. Field: Calibration Value – Calibration Time ❑ Format: uint16 ❑ Value: not relevant iv. Field: Calibration Value – Calibration Type ❑ Format: 4 bit ❑ Value: not relevant v. Field: Calibration Value – Calibration Sample Location ❑ Format: 4 bit ❑ Value: not relevant vi. Field: Calibration Value - Next Calibration Time ❑ Format: uint16 ❑ Value: not relevant vii. Field: Calibration Value – Calibration Data Record Number ❑ Format: uint16 ❑ Value: not relevant viii. Field: Calibration Value – Calibration Status ❑ Format: 8 bit ❑ Value: not relevant ix. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics, and then to perform a Glucose Calibration procedure using Op Code “Get Glucose Calibration value” (0x05) with Operand “0xFFFF”(by performing a write operation to the CGM Specific Ops Control Point characteristic’s Op Code and Calibration Data Record Number fields respectively). 5. The simulated PHD will respond with an indication including a “Calibration Value Response” Op Code (0x06) and a Calibration Data Record containing the requested calibration information. 6. Check in PHG transcoder output the Sensor Calibration Numeric Object – Type attribute
Pass/Fail criteria	In Step 6, the Sensor Calibration Numeric Object – Type attribute is present and set to MDC_PART_PHD_DM | MDC_CGM_SENSOR_CALIBRATION

Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Type attribute is present: ❑ Object: Sensor Calibration Numeric Object ❑ Attribute-id: MDC_ATTR_ID_TYPE (2351) ❑ Attribute-type: SEQUENCE {partition (INT-U16), code (INT-U16)} ❑ Attribute-value: • partition: MDC_PART_PHD_DM or 128 (dec) or 00 80 (hex) • code: MDC_CGM_SENSOR_CALIBRATION or 29428 (dec) or 72 F4 (hex) b) WAN PCD-01 message PCD-01 message includes a segment like this with Type attribute (check OBX-3): OBX|n|NM|8418036^MDC_CGM_SENSOR_CALIBRATION^MDC|m.0.0.x|[value]|[unit]|||||R|||[date_time]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-015		
TP label		Whitepaper. Sensor Calibration Numeric Object – Supplemental-Types Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	SensCal Numeric 3; O		
Test purpose		Check that: PHG may include Sensor Calibration Numeric Object – Supplemental-Types attribute in transcoder output. [AND] If present, Supplemental-Types is set to the correct value according to Sample Location Nibble in Calibration Data Record		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The simulated PHD has six different Calibration Data Records stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 0000 000**1** (MSB → LSB). Calibration supported. ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant		

	iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ❑ Value: 0x06 (Glucose Calibration Value Response) ii. Field: Calibration Value – Glucose concentration of Calibration (mg/dL) ❑ Format: SFLOAT ❑ Value: not relevant iii. Field: Calibration Value – Calibration Time ❑ Format: uint16 ❑ Value: not relevant iv. Field: Calibration Value – Calibration Type ❑ Format: 4 bit ❑ Value: not relevant v. Field: Calibration Value – Calibration Sample Location ❑ Format: 4 bit ❑ Value (CDR number 1): 0x1 (finger) ❑ Value (CDR number 2): 0x2 (alternative site test) ❑ Value (CDR number 3): 0x3 (earlobe) ❑ Value (CDR number 4): 0x4 (control solution) ❑ Value (CDR number 5): 0x5 (subcutaneous tissue) ❑ Value (CDR number 6): 0xF (sample location value not available) vi. Field: Calibration Value - Next Calibration Time ❑ Format: uint16 ❑ Value: not relevant vii. Field: Calibration Value – Calibration Data Record Number ❑ Format: uint16 ❑ Value: 1 to 6 (six Calibration Data Records (CDR) stored) viii. Field: Calibration Value – Calibration Status ❑ Format: 8 bit ❑ Value: not relevant ix. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics, and then to perform a Glucose Calibration procedure using Op Code "Get Glucose Calibration value" (0x05) with Operand "0x0001"(by performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code and Calibration Data Record Number fields respectively). 5. The simulated PHD will respond with an indication including a "Calibration Value Response" Op Code (0x06) and a Calibration Data Record containing the requested calibration information. 6. Check in PHG transcoder output the Sensor Calibration Numeric Object – Supplemental-Types attribute

	7. Force the PHG to perform a Glucose Calibration procedure using Op Code "Get Glucose Calibration value" (0x05) with Operand "0x0002". The simulated PHD will respond with an indication including a "Calibration Value Response" Op Code (0x06) and a Calibration Data Record containing the requested calibration information. Check in PHG transcoder output the Sensor Calibration Numeric Object – Supplemental-Types attribute 8. Force the PHG to perform a Glucose Calibration procedure using Op Code "Get Glucose Calibration value" (0x05) with Operand "0x0003". The simulated PHD will respond with an indication including a "Calibration Value Response" Op Code (0x06) and a Calibration Data Record containing the requested calibration information. Check in PHG transcoder output the Sensor Calibration Numeric Object – Supplemental-Types attribute 9. Force the PHG to perform a Glucose Calibration procedure using Op Code "Get Glucose Calibration value" (0x05) with Operand "0x0004". The simulated PHD will respond with an indication including a "Calibration Value Response" Op Code (0x06) and a Calibration Data Record containing the requested calibration information. Check in PHG transcoder output the Sensor Calibration Numeric Object – Supplemental-Types attribute 10. Force the PHG to perform a Glucose Calibration procedure using Op Code "Get Glucose Calibration value" (0x05) with Operand "0x0005".The simulated PHD will respond with an indication including a "Calibration Value Response" Op Code (0x06) and a Calibration Data Record containing the requested calibration information. Check in PHG transcoder output the Sensor Calibration Numeric Object – Supplemental-Types attribute 11. Force the PHG to perform a Glucose Calibration procedure using Op Code "Get Glucose Calibration value" (0x05) with Operand "0x0006". The simulated PHD will respond with an indication including a "Calibration Value Response" Op Code (0x06) and a Calibration Data Record containing the requested calibration information. Check in PHG transcoder output the Sensor Calibration Numeric Object – Supplemental-Types attribute
Pass/Fail criteria	• In Step 6, if present, the Sensor Calibration Numeric Object – Supplemental-Types attribute is set to {MDC_PART_PHD_DM | MDC_CTXT_GLU_SAMPLELOCATION_FINGER} • In Step 7, if present, the Sensor Calibration Numeric Object – Supplemental-Types attribute is to {MDC_PART_PHD_DM | MDC_CTXT_GLU_SAMPLELOCATION_AST} • In Step 8, if present, the Sensor Calibration Numeric Object – Supplemental-Types attribute is set to {MDC_PART_PHD_DM | MDC_CTXT_GLU_SAMPLELOCATION_EARLOBE} • In Step 9, if pesent, the Sensor Calibration Numeric Object – Supplemental-Types attribute is set to {MDC_PART_PHD_DM | MDC_CTXT_GLU_SAMPLELOCATION_CTRLSOLUTION} • In Step 10, if present the Sensor Calibration Numeric Object – Supplemental-Types attribute is set to {MDC_PART_PHD_DM | MDC_CTXT_GLU_SAMPLELOCATION_SUBCUTANEOUS} • In Step 11, if present, the Sensor Calibration Numeric Object – Supplemental-Types attribute is set to {MDC_PART_PHD_DM | MDC_CTXT_GLU_SAMPLELOCATION_UNDERTERMINED}
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes If Supplemental-Types attribute is present: ❑ Object: Sensor Calibration Numeric Object ❑ Attribute-id: MDC_ATTR_SUPPLEMENTAL_TYPES (2657) ❑ Attribute-type: SEQUENCE of SEQUENCE {partition (INT-U16), code (INT-U16)} ❑ Attribute-value (Step 6): • partition: MDC_PART_PHD_DM or 128 (dec) or 00 80 (hex) • code: MDC_CTXT_GLU_SAMPLELOCATION_FINGER or 29240 (dec) or 72 38 (hex) ❑ Attribute-value (Step 7): • partition: MDC_PART_PHD_DM or 128 (dec) or 00 80 (hex)

- code: MDC_CTXT_GLU_SAMPLELOCATION_AST or 29244 (dec) or 72 3C (hex)

❑ Attribute-value (Step 8):

- partition: MDC_PART_PHD_DM or 128 (dec) or 00 80 (hex)
- code: MDC_CTXT_GLU_SAMPLELOCATION_EARLOBE or 29248 (dec) or 72 40 (hex)

❑ Attribute-value (Step 9):

- partition: MDC_PART_PHD_DM or 128 (dec) or 00 80 (hex)
- code: MDC_CTXT_GLU_SAMPLELOCATION_CTRLSOLUTION or 29252 (dec) or 72 44 (hex)

❑ Attribute-value (Step 10):

- partition: MDC_PART_PHD_DM or 128 (dec) or 00 80 (hex)
- code: MDC_CTXT_GLU_SAMPLELOCATION_SUBCUTANEOUS or 29241 (dec) or 72 39 (hex)

❑ Attribute-value (Step 11):

- partition: MDC_PART_PHD_DM or 128 (dec) or 00 80 (hex)
- code: MDC_CTXT_GLU_SAMPLELOCATION_UNDERTERMINED or 29237 (dec) or 72 35 (hex)

b) WAN PCD-01 message

If Supplemental-Types is present, PCD-01 message includes a facet OBX segment of the Sensor Calibration OBX segment with Supplemental-Types attribute (check OBX-3 and OBX-5):

OBX|n|NM|8418036^MDC_CGM_SENSOR_CALIBRATION^MDC|m.0.0.x|[value]|[unit]||||||R|||[date_time]

- Step 6

  OBX|n|CWE|68193^MDC_ATTR_SUPPLEMENTAL_TYPES^MDC|m.0.0.x.y|8417848^MDC_CTXT_GLU_SAMPLELOCATION_FINGER^MDC||||||R

- Step 7

  OBX|n|CWE|68193^MDC_ATTR_SUPPLEMENTAL_TYPES^MDC|m.0.0.x.y|8417852^MDC_CTXT_GLU_SAMPLELOCATION_AST^MDC||||||R

- Step 8

  OBX|n|CWE|68193^MDC_ATTR_SUPPLEMENTAL_TYPES^MDC|m.0.0.x.y|8417856^MDC_CTXT_GLU_SAMPLELOCATION_EARLOBE^MDC||||||R

- Step 9

  OBX|n|CWE|68193^MDC_ATTR_SUPPLEMENTAL_TYPES^MDC|m.0.0.x.y|8417860^MDC_CTXT_GLU_SAMPLELOCATION_CTRLSOLUTION^MDC||||||R

- Step 10

  OBX|n|CWE|68193^MDC_ATTR_SUPPLEMENTAL_TYPES^MDC|m.0.0.x.y|8417849^MDC_CTXT_GLU_SAMPLELOCATION_SUBCUTANEOUS^MDC||||||R

- Step 11

  OBX|n|CWE|68193^MDC_ATTR_SUPPLEMENTAL_TYPES^MDC|m.0.0.x.y|8417845^MDC_CTXT_GLU_SAMPLELOCATION_UNDERTERMINED^MDC||||||R

<table>
<tr><td colspan="2">TP Id</td><td colspan="3">TP/LP-PAN/PHG/PHDTW/CGM/BV-016_A</td></tr>
<tr><td colspan="2">TP label</td><td colspan="3">Whitepaper. Sensor Calibration Numeric Object - Metric-Spec-Small Attribute 1</td></tr>
<tr><td rowspan="2">Coverage</td><td>Spec</td><td colspan="3">[Bluetooth PHDT v1.6]</td></tr>
<tr><td>Testable</td><td>SensCal Numeric 4; M</td><td>SensCal Numeric 6; M</td><td></td></tr>
</table>

<table>
<tr><td>items</td><td></td></tr>
<tr><td>Test purpose</td><td>Check that:
PHG includes Sensor Calibration Numeric Object – Metric-Spec-Small attribute in transcoder output.
[AND]
Metric-Spec-Small is set to {0x604C} when the calibration is updated manually by the user.</td></tr>
<tr><td>Applicability</td><td>C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043</td></tr>
<tr><td>Other PICS</td><td></td></tr>
<tr><td>Initial condition</td><td>The PHG under test and the simulated PHD are in the Standby state.</td></tr>
<tr><td>Test procedure</td><td>1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The simulated PHD has a Calibration Data Record stored.
2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:
a. CGM Feature (0x2AA8)
i. Field: CGM Feature
❑ Format: 24 bit
❑ Value: 0000 0000 0000 0000 0000 0001 (MSB → LSB). Calibration supported.
ii. Field: CGM Type
❑ Format: 4 bit
❑ Value: not relevant
iii. Field: CGM Sample Location
❑ Format: 4 bit
❑ Value: not relevant
iv. Field: E2E-CRC
❑ Format: uint16
❑ Value: not relevant
b. CGM Specific Ops Control Point (0x2AAC)
i. Field: Op Code
❑ Format: uint8
❑ Value: 0x06 (Glucose Calibration Value Response)
ii. Field: Calibration Value – Glucose concentration of Calibration (mg/dL)
❑ Format: SFLOAT
❑ Value: not relevant
iii. Field: Calibration Value – Calibration Time
❑ Format: uint16
❑ Value: not relevant
iv. Field: Calibration Value – Calibration Type
❑ Format: 4 bit
❑ Value: not relevant
v. Field: Calibration Value – Calibration Sample Location
❑ Format: 4 bit
❑ Value: not relevant
vi. Field: Calibration Value - Next Calibration Time</td></tr>
</table>

	❑ Format: uint16 ❑ Value: not relevant vii. Field: Calibration Value – Calibration Data Record Number ❑ Format: uint16 ❑ Value: not relevant viii. Field: Calibration Value – Calibration Status ❑ Format: 8 bit ❑ Value: not relevant ix. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics, and then to request the las Calibration Data Record stored performing a Glucose Calibration procedure using Op Code "Get Glucose Calibration value" (0x05) with Operand "0xFFFF"(by performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code and Calibration Data Record Number fields respectively). 5. The simulated PHD will respond with an indication including a "Calibration Value Response" Op Code (0x06) and a Calibration Data Record containing the requested calibration information, which was manually updated by the user. 6. Check in PHG transcoder output the Sensor Calibration Numeric Object – Metric-Spec-Small attribute
Pass/Fail criteria	In Step 6, the Sensor Calibration Numeric Object – Metric-Spec-Small attribute is present and its value is {0x604C} (mss-avail-stored-data | mss-upd-aperiodic | mss-acc-agent-initiated | mss-cat-manual | mss-cat-setting)
Notes **(To assist manual testing)**	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Metric-Spec-Small attribute is present: ❑ Object: Sensor Calibration Numeric Object ❑ Attribute-id: MDC_ATTR_METRIC_SPEC_SMALL (2630) ❑ Attribute-type: BITS-16 ❑ Attribute-value: 0x604C (hex) or BITS mss-avail-stored-data (1), mss-upd-aperiodic(2), mss-acc-agent-initiated(9), mss-cat-manual(12), mss-cat-setting(13) set to TRUE and remaining BITS set to FALSE b) WAN PCD-01 message PCD-01 message does not include segments with Metric-Spec-Small attribute value

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-016_B		
TP label		Whitepaper. Sensor Calibration Numeric Object - Metric-Spec-Small Attribute 2		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	SensCal Numeric 4; M	SensCal Numeric 5; M	
Test purpose		Check that: PHG includes Sensor Calibration Numeric Object – Metric-Spec-Small attribute in transcoder output.		

	[AND] Metric-Spec-Small is set to {0x6044} when the Glucose Calibration procedure has been executed.
Applicability	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043
Other PICS	
Initial condition	The PHG under test and the simulated PHD are in the Standby state.
Test procedure	1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 0000 000**1** (MSB → LSB). Calibration supported. ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ❑ Value: 0x06 (Glucose Calibration Value Response) ii. Field: Calibration Value – Glucose concentration of Calibration (mg/dL) ❑ Format: SFLOAT ❑ Value: not relevant iii. Field: Calibration Value – Calibration Time ❑ Format: uint16 ❑ Value: not relevant iv. Field: Calibration Value – Calibration Type ❑ Format: 4 bit ❑ Value: not relevant v. Field: Calibration Value – Calibration Sample Location ❑ Format: 4 bit ❑ Value: not relevant vi. Field: Calibration Value - Next Calibration Time ❑ Format: uint16 ❑ Value: not relevant vii. Field: Calibration Value – Calibration Data Record Number

<table>
<tr><td></td><td>
❑ Format: uint16
❑ Value: not relevant
viii. Field: Calibration Value – Calibration Status
❑ Format: 8 bit
❑ Value: not relevant
ix. Field: E2E-CRC
❑ This field is not present
3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state).
4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics.
5. Force the PHG to calibrate the CGM Sensor, writing a “Set Glucose Calibration Value” Op Code (0x04) and a Calibration Data Record operand with valid values. The simulated PHD will respond with an indication including a Response Op Code value of “Success”.
6. Then request the last Calibration Data Record stored performing a Glucose Calibration procedure using Op Code “Get Glucose Calibration value” (0x05) with Operand “0xFFFF”(by performing a write operation to the CGM Specific Ops Control Point characteristic’s Op Code and Calibration Data Record Number fields respectively).
7. The simulated PHD will respond with an indication including a “Calibration Value Response” Op Code (0x06) and a Calibration Data Record containing the previously set calibration information.
8. Check in the PHG transcoder output the Sensor Calibration Numeric Object – Metric-Spec-Small
</td></tr>
<tr><td>Pass/Fail criteria</td><td>In Step 6, the Sensor Calibration Numeric Object – Metric-Spec-Small attribute is present and its value is {0x6044} (mss-avail-stored-data | mss-upd-aperiodic | mss-acc-agent-initiated | mss-cat-setting)</td></tr>
<tr><td>Notes
(To assist manual testing)</td><td>
Possible values in typical points of observation after transcoder output are:
a) IEEE 11073 Objects and Attributes
Metric-Spec-Small attribute is present:
❑ Object: Sensor Calibration Numeric Object
❑ Attribute-id: MDC_ATTR_METRIC_SPEC_SMALL (2630)
❑ Attribute-type: BITS-16
❑ Attribute-value: 0x6044 (hex) or BITS mss-avail-stored-data (1), mss-upd-aperiodic(2), mss-acc-agent-initiated(9), mss-cat-setting(13) set to TRUE and remaining BITS set to FALSE
b) WAN PCD-01 message
PCD-01 message does not include segments with Metric-Spec-Small attribute value
</td></tr>
</table>

<table>
<tr><td colspan="2">TP Id</td><td colspan="3">TP/LP-PAN/PHG/PHDTW/CGM/BV-017</td></tr>
<tr><td colspan="2">TP label</td><td colspan="3">Whitepaper. Sensor Calibration Numeric Object – Measurement-Status Attribute</td></tr>
<tr><td rowspan="2">Coverage</td><td>Spec</td><td colspan="3">[Bluetooth PHDT v1.6]</td></tr>
<tr><td>Testable items</td><td>SensCal Numeric 7; O</td><td>SensCal Numeric 8; M</td><td>SensCal Numeric 9; M</td></tr>
<tr><td colspan="2">Test purpose</td><td colspan="3">Check that:
PHG may include Sensor Calibration Numeric Object – Measurement-Status attribute in transcoder output.
[AND]</td></tr>
</table>

	If present and related to the Sensor Status Annunciation field, Measurement-Status is set to the correct value
Applicability	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043
Other PICS	
Initial condition	The PHG under test and the simulated PHD are in the Standby state.
Test procedure	1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The simulated PHD has four different Calibration Data Records stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 0000 000**1** (MSB → LSB). Calibration supported. ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ❑ Value: 0x06 (Glucose Calibration Value Response) ii. Field: Calibration Value – Glucose concentration of Calibration (mg/dL) ❑ Format: SFLOAT ❑ Value: not relevant iii. Field: Calibration Value – Calibration Time ❑ Format: uint16 ❑ Value: not relevant iv. Field: Calibration Value – Calibration Type ❑ Format: 4 bit ❑ Value: not relevant v. Field: Calibration Value – Calibration Sample Location ❑ Format: 4 bit ❑ Value: not relevant vi. Field: Calibration Value - Next Calibration Time ❑ Format: uint16 ❑ Value: not relevant vii. Field: Calibration Value – Calibration Data Record Number ❑ Format: uint16

	❑ Value: 1 to 4 (four Calibration Data Records (CDR) stored) viii. Field: Calibration Value – Calibration Status ❑ Format: 8 bit ❑ Value (CDR number 1): 0000 0001 (calibration data rejected) ❑ Value (CDR number 2): 0000 0010 (calibration data out-of-range) ❑ Value (CDR number 3): 0000 0100 (calibration process pending) ❑ Value (CDR number 4): 0000 0000 ix. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics, and then to perform a Glucose Calibration procedure using Op Code "Get Glucose Calibration value" (0x05) with Operand "0x0001"(by performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code and Calibration Data Record Number fields respectively). 5. The simulated PHD will respond with an indication including a "Calibration Value Response" Op Code (0x06) and a Calibration Data Record containing the requested calibration information. 6. Check in PHG transcoder output the Sensor Calibration Numeric Object – Measurement-Status attribute 7. Force the PHG to perform a Glucose Calibration procedure using Op Code "Get Glucose Calibration value" (0x05) with Operand "0x0002". The simulated PHD will respond with an indication including a "Calibration Value Response" Op Code (0x06) and a Calibration Data Record containing the requested calibration information. Check in PHG transcoder output the Sensor Calibration Numeric Object – Measurement-Status attribute 8. Force the PHG to perform a Glucose Calibration procedure using Op Code "Get Glucose Calibration value" (0x05) with Operand "0x0003". The simulated PHD will respond with an indication including a "Calibration Value Response" Op Code (0x06) and a Calibration Data Record containing the requested calibration information. Check in PHG transcoder output the Sensor Calibration Numeric Object – Measurement-Status attribute 9. Force the PHG to perform a Glucose Calibration procedure using Op Code "Get Glucose Calibration value" (0x05) with Operand "0x0004". The simulated PHD will respond with an indication including a "Calibration Value Response" Op Code (0x06) and a Calibration Data Record containing the requested calibration information. Check in PHG transcoder output the Sensor Calibration Numeric Object – Measurement-Status attribute
Pass/Fail criteria	• In Step 6 the Sensor Calibration Numeric Object – Measurement-Status attribute, if present, is set to "invalid" (bit 0). • In Step 7 the Sensor Calibration Numeric Object – Measurement-Status attribute, if present, is set to "invalid" (bit 0). • In Step 8 the Sensor Calibration Numeric Object – Measurement-Status, if present, is set to "calibration-ongoing" (bit 3). • In Step 9 the Sensor Calibration Numeric Object – Measurement-Status attribute, if present, is set to "validated-data" (bit 8)
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes If Measurement-Status attribute is present: ❑ Object: Sensor Calibration Numeric Object ❑ Attribute-id: MDC_ATTR_MSMT_STAT (2375) ❑ Attribute-type: BITS16 ❑ Attribute-value (Step 6): "invalid" (0x8000) ❑ Attribute-value (Step 7): "invalid" (0x8000)

	❑ Attribute-value (Step 8): "calibration-ongoing" (0x1000) ❑ Attribute-value (Step 9): "validated-data" (0x0080) b) WAN PCD-01 message If Measurement-Status is present, PCD-01 message includes a segment like this with Measurement-Status attribute value (check OBX-8 and OBX-11): • Step 6 OBX|n|NM|8418036^MDC_CGM_SENSOR_CALIBRATION^MDC|m.0.0.x|[value]|[unit]||INV|||X|||[date_time] • Step 7 OBX|n|NM|8418036^MDC_CGM_SENSOR_CALIBRATION^MDC|m.0.0.x|[value]|[unit]||INV|||X|||[date_time] • Step 8 OBX|n|NM|8418036^MDC_CGM_SENSOR_CALIBRATION^MDC|m.0.0.x|[value]|[unit]||CAL|||R|||[date_time] • Step 9 OBX|n|NM|8418036^MDC_CGM_SENSOR_CALIBRATION^MDC|m.0.0.x|[value]|[unit]|||||R|||[date_time]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-018		
TP label		Whitepaper. Sensor Calibration Numeric Object – Unit-Code Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	SensCal Numeric 10; M		
Test purpose		Check that: PHG includes Sensor Calibration Numeric Object – Unit-Code attribute in transcoder output. [AND] Unit-Code attribute value is set to MDC_DIM_MILLI_G_PER_DL		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The simulated PHD has a Calibration Data Record stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 0000 000**1** (MSB → LSB). Calibration supported. ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location		

	❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ❑ Value: 0x06 (Glucose Calibration Value Response) ii. Field: Calibration Value – Glucose concentration of Calibration (mg/dL) ❑ Format: SFLOAT ❑ Value: not relevant iii. Field: Calibration Value – Calibration Time ❑ Format: uint16 ❑ Value: not relevant iv. Field: Calibration Value – Calibration Type ❑ Format: 4 bit ❑ Value: not relevant v. Field: Calibration Value – Calibration Sample Location ❑ Format: 4 bit ❑ Value: not relevant vi. Field: Calibration Value - Next Calibration Time ❑ Format: uint16 ❑ Value: not relevant vii. Field: Calibration Value – Calibration Data Record Number ❑ Format: uint16 ❑ Value: not relevant viii. Field: Calibration Value – Calibration Status ❑ Format: 8 bit ❑ Value: not relevant ix. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics, and then to perform a Glucose Calibration procedure using Op Code “Get Glucose Calibration value” (0x05) with Operand “0xFFFF”(by performing a write operation to the CGM Specific Ops Control Point characteristic’s Op Code and Calibration Data Record Number fields respectively). 5. The simulated PHD will respond with an indication including a “Calibration Value Response” Op Code (0x06) and a Calibration Data Record containing the requested calibration information. 6. Check in PHG transcoder output the Sensor Calibration Numeric Object – Unit-Code attribute
Pass/Fail criteria	In Step 6, the Sensor Calibration Numeric Object – Unit-Code attribute is present and set to MDC_DIM_MILLI_G_PER_DL

Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Unit-Code attribute is present: ❑ Object: Sensor Calibration Numeric Object ❑ Attribute-id: MDC_ATTR_UNIT_CODE (2454) ❑ Attribute-type: OID-Type ❑ Attribute-value: MDC_DIM_MILLI_G_PER_DL or 2130 (dec) or 08 52 (hex) b) WAN PCD-01 message PCD-01 message includes a segment like this with Unit-Code attribute value (check OBX-6): OBX|n|NM|8418036^MDC_CGM_SENSOR_CALIBRATION^MDC|m.0.0.x|[value]|264274^MDC_DIM_MILLI_G_PER_DL^MDC|||||R|||[date_time]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-019		
TP label		Whitepaper. Sensor Calibration Numeric Object – Base-Offset-Time-Stamp Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	SensCal Numeric 11; M	BaseOffset 3; M	
Test purpose		Check that: PHG includes Glucose Numeric Object Base-Offset-Time-Stamp attribute in transcoder output. [AND] Base-Offset-Time-Stamp attribute is set to the correct value according to Base-Offset time stamp derivation		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The simulated PHD has a Calibration Data Record stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Session Start Time (0x2AAA) i. Field: Session Start Time ❑ Format: {uint16, uint8, uint8, uint8, uint8, uint8} ❑ Value: {2016, 5, 12, 16, 39, 27} (May 12, 2016, 16:39:27) ii. Field: Time Zone ❑ Format: sint8 ❑ Value: 4 (UTC+1:00) iii. Field: DST-Offset ❑ Format: uint8 ❑ Value: 4 (Daylight Time (+1h)) iv. Field: E2E-CRC ❑ This field is not included		

	b. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 0000 000**1** (MSB → LSB). Calibration supported. ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant c. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ❑ Value: 0x06 (Glucose Calibration Value Response) ii. Field: Calibration Value – Glucose concentration of Calibration (mg/dL) ❑ Format: SFLOAT ❑ Value: not relevant iii. Field: Calibration Value – Calibration Time ❑ Format: uint16 (min) ❑ Value: 20 iv. Field: Calibration Value – Calibration Type ❑ Format: 4 bit ❑ Value: not relevant v. Field: Calibration Value – Calibration Sample Location ❑ Format: 4 bit ❑ Value: not relevant vi. Field: Calibration Value - Next Calibration Time ❑ Format: uint16 ❑ Value: not relevant vii. Field: Calibration Value – Calibration Data Record Number ❑ Format: uint16 ❑ Value: not relevant viii. Field: Calibration Value – Calibration Status ❑ Format: 8 bit ❑ Value: not relevant ix. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics, and then to perform a Glucose Calibration procedure

	using Op Code "Get Glucose Calibration value" (0x05) with Operand "0xFFFF"(by performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code and Calibration Data Record Number fields respectively). 5. The simulated PHD will respond with an indication including a "Calibration Value Response" Op Code (0x06) and a Calibration Data Record containing the requested calibration information. 6. Check in PHG transcoder output the Sensor Calibration Numeric Object – Base-Offset-Time-Stamp attribute
Pass/Fail criteria	In Step 6 and 8, the Sensor Calibration Numeric Object – Base-Offset-Time-Stamp is set to the addition of CGM Session Start Time characteristic's Session Start Time (May 12, 2016, 16:39:27) field plus the Calibration Time field of the obtained Calibration Data Record (20 min).
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Base-Offset-Time-Stamp attribute is present: ❑ Object: Sensor Calibration Numeric Object ❑ Attribute-id: MDC_ATTR_TIME_STAMP_BO (2690) ❑ Attribute-type: SEQUENCE {bo-seconds (INT-U32), bo-fraction (INT-U16), bo-time-offset (INT-I16)} ❑ Attribute-value: addition of • CGM Session Start Time characteristic Session Start Time field (May 12, 2016, 16:39:27) • CGM Special Ops Control Point characteristic Calibration Time field (20m) Note that the same Base-Offset-Time-Stamp can have different representations depending on bo-time-offset value. If it is set to 20 min (CGM Measurement characteristic's Time Offset field), then Base-Offset-Time-Stamp value shall be {3672059967, 0, 20} b) WAN PCD-01 message PCD-01 message includes a segment like this with Base-Offset-Time-Stamp attribute value (check OBX-14): OBX|n|NM|8418036^MDC_CGM_SENSOR_CALIBRATION^MDC|m.0.0.x|[value]|264274^MDC_DIM_MILLI_G_PER_DL^MDC|||||R|||[value described in a) coded in DTM format]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-020		
TP label		Whitepaper. Sensor Calibration Numeric Object – Basic-Nu-Observed-Value Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	SensCal Numeric 12; M		
Test purpose		Check that: PHG includes Sensor Calibration Numeric Object Basic-Nu-Observed-Value attribute in transcoder output. [AND] Basic-Nu-Observed-Value attribute is set to the correct value.		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		

Test procedure	1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The simulated PHD has a Calibration Data Record stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 0000 000**1** (MSB → LSB). Calibration supported. ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ❑ Value: 0x06 (Glucose Calibration Value Response) ii. Field: Calibration Value – Glucose concentration of Calibration (mg/dL) ❑ Format: SFLOAT (mg/dL) ❑ Value: 115.3 iii. Field: Calibration Value – Calibration Time ❑ Format: uint16 ❑ Value: not relevant iv. Field: Calibration Value – Calibration Type ❑ Format: 4 bit ❑ Value: not relevant v. Field: Calibration Value – Calibration Sample Location ❑ Format: 4 bit ❑ Value: not relevant vi. Field: Calibration Value - Next Calibration Time ❑ Format: uint16 ❑ Value: not relevant vii. Field: Calibration Value – Calibration Data Record Number ❑ Format: uint16 ❑ Value: not relevant viii. Field: Calibration Value – Calibration Status ❑ Format: 8 bit ❑ Value: not relevant ix. Field: E2E-CRC ❑ This field is not present

	3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics, and then to perform a Glucose Calibration procedure using Op Code "Get Glucose Calibration value" (0x05) with Operand "0xFFFF"(by performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code and Calibration Data Record Number fields respectively). 5. The simulated PHD will respond with an indication including a "Calibration Value Response" Op Code (0x06) and a Calibration Data Record containing the requested calibration information. 6. Check in PHG transcoder output the Sensor Calibration Numeric Object – Basic-Nu-Observed-Value attribute
Pass/Fail criteria	In Step 6, the Sensor Calibration Numeric Object – Unit-Code attribute is present and set to MDC_DIM_MILLI_G_PER_DL
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Basic-Nu-Observed-Value attribute is present: ❑ Object: Sensor Calibration Numeric Object ❑ Attribute-id: MDC_ATTR_NU_VAL_OBS_BASIC (2636) ❑ Attribute-type: SFLOAT ❑ Attribute-value: 115.3 (dec) or F481 (hex) b) WAN PCD-01 message PCD-01 message includes a segment like this with Basic-Nu-Observed-Value attribute value (check OBX-5): OBX|n|NM|8418036^MDC_CGM_SENSOR_CALIBRATION^MDC|m.0.0.x|15.3| 264274^MDC_DIM_MILLI_G_PER_DL^MDC|||||R|||[date_time]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-021		
TP label		Whitepaper. Sensor Run-time Numeric Object - Handle Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	SRT Numeric 1; O		
Test purpose		Check that: PHG does not include Sensor Run-time Numeric Object – Handle Attribute in transcoder output. [OR] If PHG includes Sensor Run-time Numeric Object – Handle attribute in transcoder output, then its value shall be different than 0		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:		

	a. CGM Session Start Time (0x2AAA) i. Field: Session Start Time • Format: {uint16, uint8, uint8, uint8, uint8, uint8} • Value: not relevant ii. Field: Time Zone • Format: sint8 • Value: not relevant iii. Field: DST-Offset • Format: uint8 • Value: not relevant iv. Field: E2E-CRC • This field is not included b. CGM Session Run Time (0x2AAB) i. Field: Session Run Time • Format: uint16 • Value: not relevant ii. Field: E2E-CRC • This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature, CGM Session Start Time and CGM Session Run Time characteristics. 5. Check in the PHG transcoder output the Sensor Run-time Numeric Object – Handle attribute
Pass/Fail criteria	In Step 5, the Sensor Run-time Numeric Object – Handle attribute is not present or, if it is present then its value is different than 0
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Handle attribute is not present, or if it is present then: ❑ Object: Sensor Run-time Numeric Object ❑ Attribute-id: MDC_ATTR_ID_HANDLE (2337) ❑ Attribute-type: INT-U16 ❑ Attribute-value: Any value different than 0 b) WAN PCD-01 message PCD-01 message does not include segments with Handle attribute value

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-022		
TP label		Whitepaper. Sensor Run-time Numeric Object - Type Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	SRT Numeric 2; M		
Test purpose		Check that:		

	PHG includes Sensor Run-time Numeric Object – Type attribute in transcoder output. [AND] Type is set to MDC_PART_PHD_DM | MDC_CGM_SENSOR_RUN_TIME
Applicability	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043
Other PICS	
Initial condition	The PHG under test and the simulated PHD are in the Standby state.
Test procedure	1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Session Start Time (0x2AAA) i. Field: Session Start Time • Format: {uint16, uint8, uint8, uint8, uint8, uint8} • Value: not relevant ii. Field: Time Zone • Format: sint8 • Value: not relevant iii. Field: DST-Offset • Format: uint8 • Value: not relevant iv. Field: E2E-CRC • This field is not included b. CGM Session Run Time (0x2AAB) i. Field: Session Run Time • Format: uint16 • Value: not relevant ii. Field: E2E-CRC • This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature, CGM Session Start Time and CGM Session Run Time characteristics. 5. Check in the PHG transcoder output the Sensor Run-time Numeric Object – Type attribute
Pass/Fail criteria	In Step 5, the Sensor Run-time Numeric Object – Type attribute is present and its value is MDC_PART_PHD_DM | MDC_CGM_SENSOR_RUN_TIME
Notes **(To assist manual testing)**	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Type attribute is not present, or if it is present then: ❑ Object: Sensor Run-time Numeric Object ❑ Attribute-id: MDC_ATTR_ID_TYPE (2351) ❑ Attribute-type: SEQUENCE {partition (INT-U16), code (INT-U16)} ❑ Attribute-value:

	• partition: MDC_PART_PHD_DM or 128 (dec) or 00 80 (hex) • code: MDC_CGM_SENSOR_RUN_TIME or 29432 (dec) or 72 F8 (hex) b) WAN PCD-01 message PCD-01 message includes a segment like this with Type attribute (check OBX-3): OBX|n|NM|8418040^MDC_CGM_SENSOR_RUN_TIME^MDC|m.0.0.x|[value]|264384^MDC_DIM_HR^MDC|||||R|||[date_time]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-023		
TP label		Whitepaper. Sensor Run-time Numeric Object - Metric-Spec-Small Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	SRT Numeric 3; M		
Test purpose		Check that: PHG includes Sensor Run-time Numeric Object – Metric-Spec-Small attribute in transcoder output. [AND] Metric-Spec-Small is set to {0x7046}.		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Session Start Time (0x2AAA) i. Field: Session Start Time • Format: {uint16, uint8, uint8, uint8, uint8, uint8} • Value: not relevant ii. Field: Time Zone • Format: sint8 • Value: not relevant iii. Field: DST-Offset • Format: uint8 • Value: not relevant iv. Field: E2E-CRC • This field is not included b. CGM Session Run Time (0x2AAB) i. Field: Session Run Time • Format: uint16 • Value: not relevant ii. Field: E2E-CRC • This field is not included		

	3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature, CGM Session Start Time and CGM Session Run Time characteristics. 5. Check in PHG transcoder output the Sensor Run-time Numeric Object – Metric-Spec-Small attribute
Pass/Fail criteria	In Step 5 the Sensor Run-time Numeric Object – Metric-Spec-Small attribute is present and its value is {0x7046} (mss-upd-aperiodic | mss-msmt-aperiodic | mss-acc-agent-initiated | mss-cat-calculation | mss-avail-stored-data | mss-cat-setting)
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Metric-Spec-Small attribute is present: ❑ Object: Sensor Run-time Numeric Object ❑ Attribute-id: MDC_ATTR_METRIC_SPEC_SMALL (2630) ❑ Attribute-type: BITS-16 ❑ Attribute-value: 0x7046 (hex) or BITS mss-avail-stored-data (1), mss-upd-aperiodic (2), mss-msmt-aperiodic (3), mss-acc-agent-initiated(9), mss-cat-setting(13), mss-cat-calculation(14) set to TRUE and remaining BITS set to FALSE b) WAN PCD-01 message PCD-01 message does not include segments with Metric-Spec-Small attribute value

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-024		
TP label		Whitepaper. Sensor Run-time Numeric Object – Unit-Code Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	SRT Numeric 4; M		
Test purpose		Check that: PHG includes Sensor Run-time Numeric Object – Unit-Code attribute in transcoder output. [AND] Unit-Code attribute value is set to MDC_DIM_HR		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Session Start Time (0x2AAA) i. Field: Session Start Time • Format: {uint16, uint8, uint8, uint8, uint8, uint8} • Value: not relevant ii. Field: Time Zone • Format: sint8		

	• Value: not relevant iii. Field: DST-Offset • Format: uint8 • Value: not relevant iv. Field: E2E-CRC • This field is not included b. CGM Session Run Time (0x2AAB) i. Field: Session Run Time • Format: uint16 • Value: not relevant ii. Field: E2E-CRC • This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature, CGM Session Start Time and CGM Session Run Time characteristics. 5. Check in PHG transcoder output the Sensor Run-time Numeric Object – Unit-Code attribute
Pass/Fail criteria	In Step 5 the Sensor Run-time Numeric Object – Unit-Code attribute is present and its value is set to MDC_DIM_HR
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Unit-Code attribute is present: ❑ Object: Sensor Run-time Numeric Object ❑ Attribute-id: MDC_ATTR_UNIT_CODE (2454) ❑ Attribute-type: OID-Type ❑ Attribute-value: MDC_DIM_HR or 2240 (dec) or 08 C0 (hex) b) WAN PCD-01 message PCD-01 message includes a segment like this with Unit-Code attribute value (check OBX-6): OBX|n|NM|8418040^MDC_CGM_SENSOR_RUN_TIME^MDC|m.0.0.x|[value]|264384^MDC_DIM_HR^MDC|||||R|||[date_time]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-025		
TP label		Whitepaper. Sensor Run-time Numeric Object – Base-Offset-Time-Stamp Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	SRT Numeric 5; M	BaseOffset 2; M	
Test purpose		Check that: PHG includes Sensor Run-time Numeric Object Base-Offset-Time-Stamp attribute in transcoder output. [AND] Base-Offset-Time-Stamp attribute is set to the correct value according to Base-Offset time stamp derivation		

Applicability	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043
Other PICS	
Initial condition	The PHG under test and the simulated PHD are in the Standby state.
Test procedure	1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Session Start Time (0x2AAA) i. Field: Session Start Time • Format: {uint16, uint8, uint8, uint8, uint8, uint8} • Value: {2016, 5, 12, 16, 39, 27} (May 12, 2016, 16:39:27) ii. Field: Time Zone • Format: sint8 • Value: 4 (UTC+1:00) iii. Field: DST-Offset • Format: uint8 • Value: 4 (Daylight Time (+1h)) iv. Field: E2E-CRC • This field is not included b. CGM Session Run Time (0x2AAB) i. Field: Session Run Time • Format: uint16 • Value: not relevant ii. Field: E2E-CRC • This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature, CGM Session Start Time and CGM Session Run Time characteristics. 5. Check in PHG transcoder output the Sensor Run-time Numeric Object – Base-Offset-Time-Stamp attribute
Pass/Fail criteria	In Step 5, the Sensor Run-time Numeric Object – Base-Offset-Time-Stamp is set to the CGM Session Start Time characteristic's Session Start Time (May 12, 2016, 16:39:27) field.
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Base-Offset-Time-Stamp attribute is present: ❑ Object: Sensor Run-time Numeric Object ❑ Attribute-id: MDC_ATTR_TIME_STAMP_BO (2690) ❑ Attribute-type: SEQUENCE {bo-seconds (INT-U32), bo-fraction (INT-U16), bo-time-offset (INT-I16)} ❑ Attribute-value: • CGM Session Start Time characteristic Session Start Time field (May 12, 2016, 16:39:27)

	Note that the same Base-Offset-Time-Stamp can have different representations depending on bo-time-offset value. If it is set to 0 min then Base-Offset-Time-Stamp value shall be {3672059967, 0, 0} b) WAN PCD-01 message PCD-01 message includes a segment like this with Base-Offset-Time-Stamp attribute value (check OBX-14): OBX|n|NM|8418040^MDC_CGM_SENSOR_RUN_TIME^MDC|m.0.0.x|[value]|264384^MDC_DIM_HR^MDC|||||R|||[value described in a) coded in DTM format]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-026		
TP label		Whitepaper. Sensor Run-time Numeric Object – Simple-Nu-Observed-Value Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	SRT Numeric 6; M		
Test purpose		Check that: PHG includes Sensor Run-time Numeric Object Simple-Nu-Observed-Value attribute in transcoder output. [AND] Simple-Nu-Observed-Value attribute is set to the correct value.		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Session Start Time (0x2AAA) i. Field: Session Start Time • Format: {uint16, uint8, uint8, uint8, uint8, uint8} • Value: not relevant ii. Field: Time Zone • Format: sint8 • Value: not relevant iii. Field: DST-Offset • Format: uint8 • Value: not relevant iv. Field: E2E-CRC • This field is not included b. CGM Session Run Time (0x2AAB) i. Field: Session Run Time • Format: uint16 (h) • Value: 168 ii. Field: E2E-CRC		

	• This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature, CGM Session Start Time and CGM Session Run Time characteristics. 5. Check in PHG transcoder output the Sensor Run-time Numeric Object – Simple-Nu-Observed-Value attribute
Pass/Fail criteria	In Step 5 the Sensor Run-time Numeric Object – Simple-Nu-Observed-Value is set to 0x000000A8 (uint16 value converted to FLOAT-Type with an exponent of 0).
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Simple-Nu-Observed-Value attribute is present: ❑ Object: Sensor Run-time Numeric Object ❑ Attribute-id: MDC_ATTR_NU_VAL_OBS_SIMP (2646) ❑ Attribute-type: FLOAT ❑ Attribute-value: 168 (dec) or 000000A8 (hex) b) WAN PCD-01 message PCD-01 message includes a segment like this with Simple-Nu-Observed-Value attribute value (check OBX-5): OBX|n|NM|8418040^MDC_CGM_SENSOR_RUN_TIME^MDC|m.0.0.x|168|264384^MDC_DIM_HR^MDC|||||R|||[date_time]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-027		
TP label		Whitepaper. Glucose Sampling Interval Numeric Object - Handle Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	GSI Numeric 1; O		
Test purpose		Check that: PHG does not include .Glucose Sampling Interval Numeric Object – Handle Attribute in transcoder output. [OR] If PHG includes .Glucose Sampling Interval Numeric Object – Handle attribute in transcoder output, then its value shall be different than 0		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). PHD has a manually entered communication interval value stored. 2. The simulated PHD implements several BTLE characteristics. The characteristic of interest for this Test Case is: a. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code • Format: uint8		

	• Value: 0x03 ii. Field: Operand • Format: uint8 (min) • Value: not relevant iii. Field: E2E-CRC • This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to perform a CGM Communication Interval procedure using Op Code "Get CGM Communication Interval" (0x02) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code field). 5. The simulated PHD will respond with an indication including a "Communication Interval Response" Op Code (0x03) and an UINT8 containing the communication interval in minutes. 6. Check in PHG transcoder output the Glucose Sampling Interval Numeric Object – Handle attribute
Pass/Fail criteria	In Step 6, the Glucose Sampling Interval Numeric Object – Handle attribute is not present or, if it is present then its value is different than 0
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Handle attribute is not present, or if it is present then: ❑ Object: Glucose Sampling Interval Numeric Object ❑ Attribute-id: MDC_ATTR_ID_HANDLE (2337) ❑ Attribute-type: INT-U16 ❑ Attribute-value: Any value different than 0 b) WAN PCD-01 message PCD-01 message does not include segments with Handle attribute value

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-028		
TP label		Whitepaper. Glucose Sampling Interval Numeric Object – Type Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	GSI Numeric 2; M		
Test purpose		Check that: PHG includes Glucose Sampling Interval Numeric Object – Type Attribute in transcoder output. [OR] Type is set to MDC_PART_PHD_DM | MDC_CGM_SENSOR_SAMPLE_INTERVAL		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). PHD has a manually entered communication interval value stored.		

	2. The simulated PHD implements several BTLE characteristics. The characteristic of interest for this Test Case is: a. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code • Format: uint8 • Value: 0x03 ii. Field: Operand • Format: uint8 (min) • Value: not relevant iii. Field: E2E-CRC • This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to perform a CGM Communication Interval procedure using Op Code "Get CGM Communication Interval" (0x02) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code field). 5. The simulated PHD will respond with an indication including a "Communication Interval Response" Op Code (0x03) and an UINT8 containing the communication interval in minutes. 6. Check in PHG transcoder output the Glucose Sampling Interval Numeric Object – Type attribute
Pass/Fail criteria	In Step 6, the Glucose Sampling Interval Numeric Object – Type attribute is present and set to MDC_PART_PHD_DM | MDC_CGM_SENSOR_SAMPLE_INTERVAL
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Type attribute is not present, or if it is present then: ❑ Object: Glucose Sampling Interval Numeric Object ❑ Attribute-id: MDC_ATTR_ID_TYPE (2351) ❑ Attribute-type: SEQUENCE {partition (INT-U16), code (INT-U16)} ❑ Attribute-value: • partition: MDC_PART_PHD_DM or 128 (dec) or 00 80 (hex) • code: MDC_CGM_SENSOR_SAMPLE_INTERVAL or 29436 (dec) or 72 FC (hex) b) WAN PCD-01 message PCD-01 message includes a segment like this with Type attribute (check OBX-3): OBX|n|NM|8418044^MDC_CGM_SENSOR_SAMPLE_INTERVAL^MDC|m.0.0.x|[value]|264352^MDC_DIM_MIN^MDC|||||R|||[date_time]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-029_A		
TP label		Whitepaper. Glucose Sampling Interval Numeric Object - Metric-Spec-Small Attribute 1		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	GSI Numeric 3; M	GSI Numeric 5; M	
Test purpose		Check that:		

	PHG includes Glucose Sampling Interval Numeric Object – Metric-Spec-Small attribute in transcoder output. [AND] Metric-Spec-Small is set to {0x604C} when the communication interval was updated manually by the user
Applicability	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043
Other PICS	
Initial condition	The PHG under test and the simulated PHD are in the Standby state.
Test procedure	1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The PHD has a manually entered communication interval value stored. 2. The simulated PHD implements several BTLE characteristics. The characteristic of interest for this Test Case is: a. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code • Format: uint8 • Value: 0x03 ii. Field: Operand • Format: uint8 (min) • Value: not relevant iii. Field: E2E-CRC • This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to perform a CGM Communication Interval procedure using Op Code “Get CGM Communication Interval” (0x02) (performing a write operation to the CGM Specific Ops Control Point characteristic’s Op Code field). 5. The simulated PHD will respond with an indication including a “Communication Interval Response” Op Code (0x03) and an UINT8 containing the communication interval in minutes. 6. Check in PHG transcoder output the Glucose Sampling Interval Numeric Object – Metric-Spec-Small attribute
Pass/Fail criteria	In Step 6, the Glucose Sampling Interval Numeric Object – Metric-Spec-Small attribute is present and its value is {0x604C} (mss-avail-stored-data | mss-upd-aperiodic | mss-acc-agent-initiated | mss-cat-manual | mss-cat-setting)
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Metric-Spec-Small attribute is present: ❑ Object: Glucose Sampling Interval Numeric Object ❑ Attribute-id: MDC_ATTR_METRIC_SPEC_SMALL (2630) ❑ Attribute-type: BITS-16 ❑ Attribute-value: 60 4C (hex) or BITS mss-avail-stored-data (1), mss-upd-aperiodic(2), mss-acc-agent-initiated(9), mss-cat-manual(12), mss-cat-setting(13) set to TRUE and remaining BITS set to FALSE b) WAN PCD-01 message PCD-01 message does not include segments with Metric-Spec-Small attribute value

<table>
<tr><td colspan="2">TP Id</td><td colspan="3">TP/LP-PAN/PHG/PHDTW/CGM/BV-029_B</td></tr>
<tr><td colspan="2">TP label</td><td colspan="3">Whitepaper. Glucose Sampling Interval Numeric Object - Metric-Spec-Small Attribute 2</td></tr>
<tr><td rowspan="2">Coverage</td><td>Spec</td><td colspan="3">[Bluetooth PHDT v1.6]</td></tr>
<tr><td>Testable items</td><td>GSI Numeric 3; M</td><td>GSI Numeric 4; M</td><td></td></tr>
<tr><td colspan="2">Test purpose</td><td colspan="3">Check that:
PHG includes Glucose Sampling Interval Numeric Object – Metric-Spec-Small attribute in transcoder output.
[AND]
Metric-Spec-Small is set to {0x6044} when the CGM Communication Interval procedure has been executed</td></tr>
<tr><td colspan="2">Applicability</td><td colspan="3">C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND C_MAN_BLE_044</td></tr>
<tr><td colspan="2">Other PICS</td><td colspan="3"></td></tr>
<tr><td colspan="2">Initial condition</td><td colspan="3">The PHG under test and the simulated PHD are in the Standby state.</td></tr>
<tr><td colspan="2">Test procedure</td><td colspan="3">1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization).
2. The simulated PHD implements several BTLE characteristics. The characteristic of interest for this Test Case is:
a. CGM Specific Ops Control Point (0x2AAC)
i. Field: Op Code
• Format: uint8
• Value: 0x03
ii. Field: Operand
• Format: uint8 (min)
• Value: not relevant
iii. Field: E2E-CRC
• This field is not present
3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state).
4. When the pairing has been completed, force the PHG to set the communication interval by performing a CGM Communication Interval procedure using Op Code “Set CGM Communication Interval” (0x01) followed by a valid UINT8 value in minutes (performing a write operation to the CGM Specific Ops Control Point characteristic’s Op Code and Operand fields, respectively). The simulated PHD will respond with an indication including a Response Op Code value of “Success”.
5. Then force the PHG to perform a CGM Communication Interval procedure using Op Code “Get CGM Communication Interval” (0x02) (performing a write operation to the CGM Specific Ops Control Point characteristic’s Op Code field).
6. The simulated PHD will respond with an indication including a “Communication Interval Response” Op Code (0x03) and an UINT8 containing the entered communication interval in minutes.
7. Check in the PHG transcoder output the Glucose Sampling Interval Numeric Object – Metric-Spec-Small attribute</td></tr>
<tr><td colspan="2">Pass/Fail criteria</td><td colspan="3">In Step 7, the Sensor Calibration Numeric Object – Metric-Spec-Small attribute is present and its value is {0x6044} (mss-avail-stored-data | mss-upd-aperiodic | mss-acc-agent-initiated | mss-cat-setting)</td></tr>
<tr><td colspan="2">Notes</td><td colspan="3">Possible values in typical points of observation after transcoder output are:</td></tr>
</table>

(To assist manual testing)	a) IEEE 11073 Objects and Attributes Metric-Spec-Small attribute is present: ❑ Object: Glucose Sampling Interval Numeric Object ❑ Attribute-id: MDC_ATTR_METRIC_SPEC_SMALL (2630) ❑ Attribute-type: BITS-16 ❑ Attribute-value: 60 44 (hex) or BITS mss-avail-stored-data (1), mss-upd-aperiodic(2), mss-acc-agent-initiated(9), mss-cat-setting(13) set to TRUE and remaining BITS set to FALSE b) WAN PCD-01 message PCD-01 message does not include segments with Metric-Spec-Small attribute value

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-030		
TP label		Whitepaper. Glucose Sampling Interval Numeric Object – Unit-Code Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	GSI Numeric 6; M		
Test purpose		Check that: PHG includes Glucose Sampling Interval Numeric – Unit-Code attribute in transcoder output. [AND] Unit-Code attribute value is set to MDC_DIM_MIN		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). PHD has a manually entered communication interval value stored. 2. The simulated PHD implements several BTLE characteristics. The characteristic of interest for this Test Case is: a. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code • Format: uint8 • Value: 0x03 ii. Field: Operand • Format: uint8 (min) • Value: not relevant iii. Field: E2E-CRC • This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to perform a CGM Communication Interval procedure using Op Code "Get CGM Communication Interval" (0x02) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code field). 5. The simulated PHD will respond with an indication including a "Communication Interval Response" Op Code (0x03) and an UINT8 containing the communication interval in minutes.		

	6. Check in the PHG transcoder output the Glucose Sampling Interval Numeric Object – Unit-Code attribute
Pass/Fail criteria	In Step 6 the Glucose Sampling Interval Numeric Object – Unit-Code attribute is present and its value is set to MDC_DIM_MIN
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Unit-Code attribute is present: ❑ Object: Glucose Sampling Interval Numeric Object ❑ Attribute-id: MDC_ATTR_UNIT_CODE (2454) ❑ Attribute-type: OID-Type ❑ Attribute-value: MDC_DIM_MIN or 2208 (dec) or 08 A0 (hex) b) WAN PCD-01 message PCD-01 message includes a segment like this with Unit-Code attribute value (check OBX-6): OBX|n|NM|8418044^MDC_CGM_SENSOR_SAMPLE_INTERVAL^MDC|m.0.0.x|[value]|264352^MDC_DIM_MIN^MDC|||||R|||[date_time]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-031		
TP label		Whitepaper. Glucose Sampling Interval Numeric Object – Base-Offset-Time-Stamp Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	GSI Numeric 7; M	BaseOffset 1; M	
Test purpose		Check that: PHG includes Glucose Sampling Interval Numeric Object Base-Offset-Time-Stamp attribute in transcoder output. [AND] Base-Offset-Time-Stamp attribute is set to the correct value according to Base-Offset time stamp derivation (Base-Offset-Time-Stamp attribute will be derived from the collector's time at the time of collection)		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The PHD has a manually entered communication interval value stored. 2. The simulated PHD implements several BTLE characteristics. The characteristic of interest for this Test Case is: a. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code • Format: uint8 • Value: 0x03 ii. Field: Operand • Format: uint8 (min) • Value: not relevant		

	iii. Field: E2E-CRC • This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to perform a CGM Communication Interval procedure using Op Code "Get CGM Communication Interval" (0x02) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code field). 5. The simulated PHD will respond with an indication including a "Communication Interval Response" Op Code (0x03) and an UINT8 containing the communication interval in minutes. 6. Check in PHG transcoder output the Glucose Sampling Interval Numeric Object – Base-Offset-Time-Stamp attribute
Pass/Fail criteria	In Step 6 the Glucose Sampling Interval Numeric Object – Base-Offset-Time-Stamp attribute is present and it is set to the collector's time at the time of collection.
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Base-Offset-Time-Stamp attribute is present: ❑ Object: Glucose Sampling Interval Numeric Object ❑ Attribute-id: MDC_ATTR_TIME_STAMP_BO (2690) ❑ Attribute-type: SEQUENCE {bo-seconds (INT-U32), bo-fraction (INT-U16), bo-time-offset (INT-I16)} ❑ Attribute-value: collector's time at the time of collection. b) WAN PCD-01 message PCD-01 message includes a segment like this with Base-Offset-Time-Stamp attribute value (check OBX-14): OBX|n|NM|8418044^MDC_CGM_SENSOR_SAMPLE_INTERVAL^MDC|m.0.0.x|[value]|264352^MDC_DIM_MIN^MDC|||||R|||[value described in a) coded in DTM format]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-032		
TP label		Whitepaper. Glucose Sampling Interval Numeric Object – Basic-Nu-Observed-Value Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	GSI Numeric 8; M		
Test purpose		Check that: PHG includes Glucose Sampling Interval Numeric Object Basic-Nu-Observed-Value attribute in transcoder output. [AND] Basic-Nu-Observed-Value attribute is set to the correct value.		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The PHD has a manually entered communication interval value stored.		

<table>
<tr><td></td><td>2. The simulated PHD implements several BTLE characteristics. The characteristic of interest for this Test Case is:
a. CGM Specific Ops Control Point (0x2AAC)
i. Field: Op Code
• Format: uint8
• Value: 0x03
ii. Field: Operand
• Format: uint8 (min)
• Value: 15
iii. Field: E2E-CRC
• This field is not present
3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state).
4. When the pairing has been completed, force the PHG to perform a CGM Communication Interval procedure using Op Code “Get CGM Communication Interval” (0x02) (performing a write operation to the CGM Specific Ops Control Point characteristic’s Op Code field).
5. The simulated PHD will respond with an indication including a “Communication Interval Response” Op Code (0x03) and an UINT8 containing the communication interval in minutes.
6. Check in PHG transcoder output the Glucose Sampling Interval Numeric Object – Basic-Nu-Observed-Value attribute</td></tr>
<tr><td>Pass/Fail criteria</td><td>In Step 6 the Glucose Sampling Interval Numeric Object – Basic-Nu-Observed-Value attribute is present and it is set to 0x000F (SFLOAT-Type conversion of uint8 with exponent of 0)</td></tr>
<tr><td>Notes
(To assist manual testing)</td><td>Possible values in typical points of observation after transcoder output are:
a) IEEE 11073 Objects and Attributes
Basic-Nu-Observed-Value attribute is present:
❑ Object: Glucose Sampling Interval Numeric Object
❑ Attribute-id: MDC_ATTR_NU_VAL_OBS_BASIC (2636)
❑ Attribute-type: SFLOAT
❑ Attribute-value: 15 (dec) or 000F (hex)
b) WAN PCD-01 message
PCD-01 message includes a segment like this with Basic-Nu-Observed-Value attribute value (check OBX-5):
OBX|n|NM|8418044^MDC_CGM_SENSOR_SAMPLE_INTERVAL^MDC|m.0.0.x|15|264352^MDC_DIM_MIN^MDC|||||R|||[date_time]</td></tr>
</table>

<table>
<tr><td colspan="2">TP Id</td><td colspan="3">TP/LP-PAN/PHG/PHDTW/CGM/BV-033</td></tr>
<tr><td colspan="2">TP label</td><td colspan="3">Whitepaper. Glucose trend Numeric Object - Handle Attribute</td></tr>
<tr><td rowspan="2">Coverage</td><td>Spec</td><td colspan="3">[Bluetooth PHDT v1.6]</td></tr>
<tr><td>Testable items</td><td>GT Numeric 1; O</td><td></td><td></td></tr>
<tr><td colspan="2">Test purpose</td><td colspan="3">Check that:
PHG does not include Glucose trend Numeric Object – Handle Attribute in transcoder output.
[OR]</td></tr>
</table>

	If PHG includes Glucose trend Numeric Object – Handle attribute in transcoder output, then its value shall be different than 0
Applicability	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043
Other PICS	
Initial condition	The PHG under test and the simulated PHD are in the Standby state.
Test procedure	1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature • Format: 24 bit • Value: 0000 0000 **1**000 0000 0000 0000 (MSB → LSB). CGM trend information supported. ii. Field: CGM Type • Format: 4 bit • Value: not relevant iii. Field: CGM Sample Location • Format: 4 bit • Value: not relevant iv. Field: E2E-CRC • Format: uint16 • Value: not relevant b. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: 0000 000**1** (MSB → LSB). CGM Trend information present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: not Relevant iv. Field: Time Offset • Format: uint16 • Value: not relevant v. Field: Sensor Status Annunciation • This field is not included vi. Field: CGM Trend Information (mg/dL)/min • Format: SFLOAT • Value: not relevant

	vii. Field: CGM Quality • This field is not included viii. Field: E2E-CRC • This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed (Connection state), force the PHG under test to read the CGM Feature and CGM Session Start Time characteristics. 5. The simulated PHD sends the Measurement to the PHG under test. 6. Check in the PHG transcoder output the Glucose trend Numeric Object– Handle attribute 7. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP). The simulated PHD sends the temporarily stored CGM measurement to the PHG under test. 8. Check in the PHG transcoder output the Glucose trend Numeric Object – Handle attribute
Pass/Fail criteria	In Step 6 and 8, the Glucose Numeric Object – Handle attribute is not present or, if it is present then its value is different than 0
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Handle attribute is not present, or if it is present then: ❑ Object: Glucose trend Numeric Object ❑ Attribute-id: MDC_ATTR_ID_HANDLE (2337) ❑ Attribute-type: INT-U16 ❑ Attribute-value: Any value different than 0 b) WAN PCD-01 message PCD-01 message does not include segments with Handle attribute value

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-034		
TP label		Whitepaper. Glucose trend Numeric Object - Type Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	GT Numeric 2; M		
Test purpose		Check that: PHG includes Glucose trend Numeric Object – Type attribute in transcoder output. [AND] Type is set to MDC_PART_PHD_DM | MDC_CONC_GLU_TREND		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored.		

	2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature • Format: 24 bit • Value: 0000 0000 **1**000 0000 0000 0000 (MSB → LSB). CGM trend information supported. ii. Field: CGM Type • Format: 4 bit • Value: not relevant iii. Field: CGM Sample Location • Format: 4 bit • Value: not relevant iv. Field: E2E-CRC • Format: uint16 • Value: not relevant b. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: 0000 000**1** (MSB → LSB). CGM Trend information present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: not Relevant iv. Field: Time Offset • Format: uint16 • Value: not relevant v. Field: Sensor Status Annunciation • This field is not included vi. Field: CGM Trend Information (mg/dL)/min • Format: SFLOAT • Value: not relevant vii. Field: CGM Quality • This field is not included viii. Field: E2E-CRC • This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed (Connection state), force the PHG under test to read the CGM Feature and CGM Session Start Time characteristics. 5. The simulated PHD sends the Measurement to the PHG under test.

	6. Check in the PHG transcoder output the Glucose trend Numeric Object– Type attribute 7. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP). The simulated PHD sends the temporarily stored CGM measurement to the PHG under test. 8. Check in PHG transcoder output the Glucose trend Numeric Object – Type attribute
Pass/Fail criteria	In Step 6 and 8, the Glucose Numeric Object – Type attribute is present and its value is MDC_PART_PHD_DM | MDC_CONC_GLU_TREND
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Type attribute is not present, or if it is present then: ❑ Object: Glucose trend Numeric Object ❑ Attribute-id: MDC_ATTR_ID_TYPE (2351) ❑ Attribute-type: SEQUENCE {partition (INT-U16), code (INT-U16)} ❑ Attribute-value: • partition: MDC_PART_PHD_DM or 128 (dec) or 00 80 (hex) • code: MDC_CONC_GLU_TREND or 29400 (dec) or 72 D8 (hex) b) WAN PCD-01 message PCD-01 message includes a segment like this with Type attribute (check OBX-3): OBX|n|NM|8418008^MDC_CONC_GLU_TREND^MDC|m.0.0.x|[value]| 266868^MDC_DIM_MILLI_G_PER_DL_PER_MIN^MDC|||||R|||[date_time]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-035		
TP label		Whitepaper. Glucose trend Numeric Object - Metric-Spec-Small Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	GT Numeric 3; M		
Test purpose		Check that: PHG includes Glucose trend Numeric Object – Metric-Spec-Small attribute in transcoder output. [AND] Metric-Spec-Small is set to {0xF042}.		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature • Format: 24 bit		

	• Value: 0000 0000 **1**000 0000 0000 0000 (MSB → LSB). CGM trend information supported. ii. Field: CGM Type • Format: 4 bit • Value: not relevant iii. Field: CGM Sample Location • Format: 4 bit • Value: not relevant iv. Field: E2E-CRC • Format: uint16 • Value: not relevant b. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: 0000 000**1** (MSB → LSB). CGM Trend information present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: not Relevant iv. Field: Time Offset • Format: uint16 • Value: not relevant v. Field: Sensor Status Annunciation • This field is not included vi. Field: CGM Trend Information (mg/dL)/min • Format: SFLOAT • Value: not relevant vii. Field: CGM Quality • This field is not included viii. Field: E2E-CRC • This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed (Connection state), force the PHG under test to read the CGM Feature and CGM Session Start Time characteristics. 5. The simulated PHD sends the Measurement to the PHG under test. 6. Check in the PHG transcoder output the Glucose trend Numeric Object– Metric-Spec-Small attribute 7. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP). The simulated PHD sends the temporarily stored CGM measurement to the PHG under test. 8. Check in PHG transcoder output the Glucose trend Numeric Object – Metric-Spec-Small attribute

Pass/Fail criteria	In Step 6 and 8, the Glucose trend Numeric Object – Metric-Spec-Small attribute is present and its value is {0xF042} (mss-avail-intermittent | mss-upd-aperiodic | mss-msmt-aperiodic | mss-acc-agent-initiated | mss-cat-calculation | mss-avail-stored-data)
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Metric-Spec-Small attribute is present: ❑ Object: Glucose trend Numeric Object ❑ Attribute-id: MDC_ATTR_METRIC_SPEC_SMALL (2630) ❑ Attribute-type: BITS-16 ❑ Attribute-value: 0xF042 (hex) or BITS mss-avail-intermittent (0), mss-avail-stored-data (1), mss-upd-aperiodic (2), mss-msmt-aperiodic (3), mss-acc-agent-initiated(9), mss-cat-calculation(14) set to TRUE and remaining BITS set to FALSE b) WAN PCD-01 message PCD-01 message does not include segments with Metric-Spec-Small attribute value

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-036		
TP label		Whitepaper. Glucose trend Numeric Object – Measurement-Status Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	GT Numeric 4; O		
Test purpose		Check that: PHG may include Glucose trend Numeric Object – Measurement-Status attribute in transcoder output. [AND] If present, and related to Sensor Status Annunciation field, Measurement-Status is set to the correct value.		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature • Format: 24 bit • Value: 0000 0000 **1**000 0000 000**1** 0000 (MSB → LSB). CGM trend information supported, rate of increase/decrease alert supported. ii. Field: CGM Type • Format: 4 bit • Value: not relevant iii. Field: CGM Sample Location		

	• Format: 4 bit • Value: not relevant iv. Field: E2E-CRC • Format: uint16 • Value: not relevant b. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: **1**000 000**1** (MSB → LSB). CGM Trend information present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: not Relevant iv. Field: Time Offset • Format: uint16 • Value: not relevant v. Field: Sensor Status Annunciation • Format: 8 bit • Value: 000**1** 0000 (MSB → LSB) (sensor rate of decrease exceeded). vi. Field: CGM Trend Information (mg/dL)/min • Format: SFLOAT • Value: not relevant vii. Field: CGM Quality • This field is not included viii. Field: E2E-CRC • This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed (Connection state), force the PHG under test to read the CGM Feature and CGM Session Start Time characteristics. 5. The simulated PHD sends the Measurement to the PHG under test. 6. Check in the PHG transcoder output the Glucose trend Numeric Object– Measurement-Status attribute 7. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP). The simulated PHD sends the temporarily stored CGM measurement to the PHG under test. 8. Check in the PHG transcoder output the Glucose trend Numeric Object – Measurement-Status attribute 9. The simulated PHD sends a Measurement to PHG under test with Sensor Status Annunciation field set to 0010 0000 (MSB → LSB), sensor rate of increase exceeded (bit 21). All remaining fields remain equal to those in step 2. The simulated PHD also deletes all stored records in RACP and stores an identical measurement. Repeat steps 5-7.

Pass/Fail criteria	• In Step 6 and 8 the Glucose trend Numeric Object – Measurement-Status attribute, if present, is set to "measurement outside threshold boundaries" (bit 14). • In Step 9 the Glucose trend Numeric Object – Measurement-Status attribute, if present is set to "measurement outside threshold boundaries" (bit 14) for both cases.
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes If Measurement-Status attribute is present: ❑ Object: Glucose trend Numeric Object ❑ Attribute-id: MDC_ATTR_MSMT_STAT (2375) ❑ Attribute-type: BITS16 ❑ Attribute-value (Steps 6 & 8): "measurement outside threshold boundaries" (0x0020) ❑ Attribute-value (Step 9): "measurement outside threshold boundaries" (0x0020) b) WAN PCD-01 message If Measurement-Status is present, PCD-01 message includes a segment like this with Measurement-Status attribute value (check OBX-8 and OBX-11): • Steps 6 & 8 OBX|n|NM|8418008^MDC_CONC_GLU_TREND^MDC|m.0.0.x|[value]|[266868^MDC_DIM_MILLI_G_PER_DL_PER_MIN^MDC||ALACT|||R|||[date_time] • Step 9 OBX|n|NM|8418008^MDC_CONC_GLU_TREND^MDC|m.0.0.x|[value]|[266868^MDC_DIM_MILLI_G_PER_DL_PER_MIN^MDC||ALACT|||R|||[date_time]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-037		
TP label		Whitepaper. Glucose trend Numeric Object – Unit-Code Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	GT Numeric 5; M		
Test purpose		Check that: PHG includes Glucose trend Numeric Object – Unit-Code attribute in transcoder output. [AND] Unit-Code attribute value is set to MDC_DIM_MILLI_G_PER_DL_PER_MIN		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature • Format: 24 bit		

	• Value: 0000 0000 **1**000 0000 0000 0000 (MSB → LSB). CGM trend information supported. ii. Field: CGM Type • Format: 4 bit • Value: not relevant iii. Field: CGM Sample Location • Format: 4 bit • Value: not relevant iv. Field: E2E-CRC • Format: uint16 • Value: not relevant b. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: 0000 000**1** (MSB → LSB). CGM Trend information present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: not relevant iv. Field: Time Offset • Format: uint16 • Value: not relevant v. Field: Sensor Status Annunciation • This field is not included vi. Field: CGM Trend Information (mg/dL)/min • Format: SFLOAT • Value: not relevant vii. Field: CGM Quality • This field is not included viii. Field: E2E-CRC • This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed (Connection state), force the PHG under test to read the CGM Feature and CGM Session Start Time characteristics. 5. The simulated PHD sends the Measurement to the PHG under test. 6. Check in PHG transcoder output the Glucose trend Numeric Object– Unit-Code attribute 7. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP). The simulated PHD sends the temporarily stored CGM measurement to the PHG under test. 8. Check in PHG transcoder output the Glucose trend Numeric Object – Unit-Code attribute

Pass/Fail criteria	In Step 6 and 8 the Glucose trend Numeric Object – Unit-Code attribute is present and its value is set to MDC_DIM_MILLI_G_PER_DL_PER_MIN
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Unit-Code attribute is present: ❑ Object: Glucose trend Numeric Object ❑ Attribute-id: MDC_ATTR_UNIT_CODE (2454) ❑ Attribute-type: OID-Type ❑ Attribute-value: MDC_DIM_MILLI_G_PER_DL_PER_MIN or 4724 (dec) or 12 74 (hex) b) WAN PCD-01 message PCD-01 message includes a segment like this with Unit-Code attribute value (check OBX-6): OBX|n|NM|8418008^MDC_CONC_GLU_TREND^MDC|m.0.0.x|[value]|266868^MDC_DIM_MILLI_G_PER_DL_PER_MIN^MDC|||||R|||[date_time]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-038		
TP label		Whitepaper. Glucose trend Numeric Object – Base-Offset-Time-Stamp Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	GT Numeric 6; M	BaseOffset 3; M	
Test purpose		Check that: PHG includes Glucose trend Numeric Object Base-Offset-Time-Stamp attribute in transcoder output. [AND] Base-Offset-Time-Stamp attribute is set to the correct value according to Base-Offset time stamp derivation		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature • Format: 24 bit • Value: 0000 0000 **1**000 0000 0000 0000 (MSB → LSB). CGM trend information supported. ii. Field: CGM Type • Format: 4 bit • Value: not relevant		

	iii. Field: CGM Sample Location • Format: 4 bit • Value: not relevant iv. Field: E2E-CRC • Format: uint16 • Value: not relevant b. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: 0000 000**1** (MSB → LSB). CGM Trend information present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: not relevant iv. Field: Time Offset • Format: uint16 • Value: 20 (min) v. Field: Sensor Status Annunciation • This field is not included vi. Field: CGM Trend Information (mg/dL)/min • Format: SFLOAT • Value: not relevant vii. Field: CGM Quality • This field is not included viii. Field: E2E-CRC • This field is not included c. CGM Session Start Time (0x2AAA) i. Field: Session Start Time • Format: {uint16, uint8, uint8, uint8, uint8, uint8} • Value: {2016, 5, 12, 16, 39, 27} (May 12, 2016, 16:39:27) ii. Field: Time Zone • Format: sint8 • Value: 4 (UTC+1:00) iii. Field: DST-Offset • Format: uint8 • Value: 4 (Daylight Time (+1h)) iv. Field: E2E-CRC • This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state).

	4. When the pairing has been completed (Connection state), force the PHG under test to read the CGM Feature and CGM Session Start Time characteristics. 5. The simulated PHD sends the Measurement to the PHG under test. 6. Check in the PHG transcoder output the Glucose trend Numeric Object– Base-Offset-Time-Stamp attribute 7. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP). The simulated PHD sends the temporarily stored CGM measurement to the PHG under test. 8. Check in PHG transcoder output the Glucose trend Numeric Object – Base-Offset-Time-Stamp attribute
Pass/Fail criteria	In Step 6 and 8, the Glucose Numeric Object – Base-Offset-Time-Stamp is set to the addition of CGM Session Start Time characteristic's Session Start Time (May 12, 2016, 16:39:27) field plus CGM Measurement characteristic's Time Offset field (20 min).
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Base-Offset-Time-Stamp attribute is present: ❑ Object: Glucose trend Numeric Object ❑ Attribute-id: MDC_ATTR_TIME_STAMP_BO (2690) ❑ Attribute-type: SEQUENCE {bo-seconds (INT-U32), bo-fraction (INT-U16), bo-time-offset (INT-I16)} ❑ Attribute-value: addition of • CGM Session Start Time characteristic Session Start Time field (May 12, 2016, 16:39:27) • CGM Measurement characteristic Time Offset field (20m) Note that the same Base-Offset-Time-Stamp can have different representations depending on bo-time-offset value. If it is set to 20 min (CGM Measurement characteristic's Time Offset field), then Base-Offset-Time-Stamp value shall be {3672059967, 0, 20} b) WAN PCD-01 message PCD-01 message includes a segment like this with Base-Offset-Time-Stamp attribute value (check OBX-14): OBX|n|NM|8418008^MDC_CONC_GLU_TREND^MDC|m.0.0.x|[value]|266868^MDC_DIM_MILLI_G_PER_DL_PER_MIN^MDC|||||R|||[value described in a) coded in DTM format]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-039		
TP label		Whitepaper. Glucose trend Numeric Object – Basic-Nu-Observed-Value Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	GT Numeric 7; M		
Test purpose		Check that: PHG includes Glucose trend Numeric Object Basic-Nu-Observed-Value attribute in transcoder output. [AND] Basic-Nu-Observed-Value attribute is set to the correct value.		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		

Other PICS	
Initial condition	The PHG under test and the simulated PHD are in the Standby state.
Test procedure	1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature • Format: 24 bit • Value: 0000 0000 **1**000 0000 0000 0000 (MSB → LSB). CGM trend information supported. ii. Field: CGM Type • Format: 4 bit • Value: not relevant iii. Field: CGM Sample Location • Format: 4 bit • Value: not relevant iv. Field: E2E-CRC • Format: uint16 • Value: not relevant b. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: 0000 000**1** (MSB → LSB). CGM Trend information present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: not relevant iv. Field: Time Offset • Format: uint16 • Value: not relevant v. Field: Sensor Status Annunciation • This field is not included vi. Field: CGM Trend Information (mg/dL)/min • Format: SFLOAT • Value: 3.6 vii. Field: CGM Quality • This field is not included viii. Field: E2E-CRC

	• This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed (Connection state), force the PHG under test to read the CGM Feature and CGM Session Start Time characteristics. 5. The simulated PHD sends the Measurement to the PHG under test. 6. Check in the PHG transcoder output the Glucose trend Numeric Object– Basic-Nu-Observed-Value attribute 7. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP). The simulated PHD sends the temporarily stored CGM measurement to the PHG under test. 8. Check in PHG transcoder output the Glucose trend Numeric Object – Basic-Nu-Observed-Value attribute
Pass/Fail criteria	In Step 6 and 8, the Glucose trend Numeric Object – Basic-Nu-Observed-Value is set to 3.6 (mg/dL)/min
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Basic-Nu-Observed-Value attribute is present: ❑ Object: Glucose trend Numeric Object ❑ Attribute-id: MDC_ATTR_NU_VAL_OBS_BASIC (2636) ❑ Attribute-type: SFLOAT ❑ Attribute-value: 3.6 (dec) or F0 24 (hex) or E1 68 (hex) or DE 10 (hex) b) WAN PCD-01 message PCD-01 message includes a segment like this with Basic-Nu-Observed-Value attribute value (check OBX-5): OBX|n|NM|8418008^MDC_CONC_GLU_TREND^MDC|m.0.0.x|3.6|266868^MDC_DIM_MILLI_G_PER_DL_PER_MIN^MDC|||||R|||[date_time]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-040		
TP label		Whitepaper. Glucose trend Numeric Object – Threshold-Notification-Text-String		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	GT Numeric 8; O		
Test purpose		Check that: PHG may transcode bits 20 and 21 of the CGM Sensor Status Annunciation field of CGM Measurement characteristic into Glucose trend Numeric Object – Threshold-Notification-Text-String attribute		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored.		

	2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature • Format: 24 bit • Value: 0000 0000 **1**000 0000 000**1** 0000 (MSB → LSB). CGM trend information supported, rate of increase/decrease alerts supported. ii. Field: CGM Type • Format: 4 bit • Value: not relevant iii. Field: CGM Sample Location • Format: 4 bit • Value: not relevant iv. Field: E2E-CRC • Format: uint16 • Value: not relevant b. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: **1**000 000**1** (MSB → LSB). CGM Trend information present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: not relevant iv. Field: Time Offset • Format: uint16 • Value: not relevant v. Field: Sensor Status Annunciation • Format: 8 bit • Value: 000**1** 0000 (MSB → LSB) (sensor rate of decrease exceeded). vi. Field: CGM Trend Information (mg/dL)/min • Format: SFLOAT • Value: not relevant vii. Field: CGM Quality • This field is not included viii. Field: E2E-CRC • This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed (Connection state), force the PHG under test to read the CGM Feature and CGM Session Start Time characteristics.

	5. The simulated PHD sends the Measurement to the PHG under test. 6. Check in the PHG transcoder output the Glucose trend Numeric Object– Threshold-Notification-Text-String attribute 7. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP). The simulated PHD sends the temporarily stored CGM measurement to the PHG under test. 8. Check in PHG transcoder output the Glucose trend Numeric Object – Threshold-Notification-Text-String attribute 9. The simulated PHD sends a CGM Measurement to PHG under test with the following values. The simulated PHD also deletes all previous stored records in RACP and stores an identical measurement in it. a. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: **1**000 000**1** (MSB → LSB). CGM Trend information present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: not relevant iv. Field: Time Offset • Format: uint16 • Value: not relevant v. Field: Sensor Status Annunciation • Format: 8 bit • Value: 00**1**0 0000 (MSB → LSB) (sensor rate of increase exceeded). vi. Field: CGM Trend Information (mg/dL)/min • Format: SFLOAT • Value: not relevant vii. Field: CGM Quality • This field is not included viii. Field: E2E-CRC • This field is not included 10. Repeat steps 6-8 to check in transcoder output the Glucose trend Numeric Object – Threshold-Notification-Text-String attribute.
Pass/Fail criteria	• In Step 6 and 8, if present, the Glucose trend Numeric Object – Threshold-Notification-Text-String is set to an OCTET STRING that may contain a readable description of the threshold notification "sensor rate of decrease exceeded" • In Step 10, if present, the Glucose trend Numeric Object – Threshold-Notification-Text-String is set to an OCTET STRING that may contain a readable description of the threshold notification "sensor rate of increase exceeded" for both cases.
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes If Threshold-Notification-Text-String attribute is present:

	❑ Object: Glucose trend Numeric Object ❑ Attribute-id: MDC_ATTR_THRES_NOTIF_TEXT_STRING (2696) ❑ Attribute-type: OCTET STRING ❑ Attribute-value (Steps 6 & 8): readable description of the threshold notification "sensor rate of decrease exceeded" ❑ Attribute-value (Step 10): readable description of the threshold notification "sensor rate of increase exceeded" b) WAN PCD-01 message Threshold-Notification-Text-String attribute is not included in PCD-01 message

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-041		
TP label		Whitepaper. Patient low/high thresholds Compound Numeric Object - Handle Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	PLH Numeric 1; O		
Test purpose		Check that: PHG does not include Patient low/high thresholds Compound Numeric Object – Handle Attribute in transcoder output. [OR] If PHG includes Patient low/high thresholds Compound Numeric Object – Handle attribute in transcoder output, then its value shall be different than 0		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND C_MAN_BLE_046 AND C_MAN_BLE_048		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). PHD has manually entered Patient Low Alert Level and Patient High Alert Level values stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature • Format: 24 bit • Value: 0000 0000 0000 0000 0000 00**1**0 (MSB → LSB). Patient High/Low Alerts supported. ii. Field: CGM Type • Format: 4 bit • Value: not relevant iii. Field: CGM Sample Location • Format: 4 bit • Value: not relevant iv. Field: E2E-CRC • Format: uint16 • Value: not relevant		

	b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ❑ Value: 0x09 (Patient High Alert Level Response) / 0x0C (Patient Low Alert Level Response) ii. Field: Operand ❑ Format: SFLOAT (mg/dL) ❑ Value: not relevant iii. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics, and then to perform a Patient High Alert procedure using Op Code "Get Patient High Alert Level" (0x08) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 5. The simulated PHD will respond with an indication including a "Patient High Alert Level Response" (0x09) Op Code and an SFLOAT containing the requested value in mg/dL. 6. Force the PHG to perform a Patient Low Alert procedure using Op Code "Get Patient Low Alert Level" (0x0B) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 7. The simulated PHD will respond with an indication including a "Patient Low Alert Level Response" (0x0C) Op Code and an SFLOAT containing the requested value in mg/dL. 8. Check in the PHG transcoder output the Patient low/high thresholds Compound Numeric Object – Handle attribute
Pass/Fail criteria	In Step 8, the Patient low/high thresholds Compound Numeric Object – Handle attribute is not present or, if it is present then its value is different than 0
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Handle attribute is not present, or if it is present then: ❑ Object: Patient low/high thresholds Compound Numeric Object ❑ Attribute-id: MDC_ATTR_ID_HANDLE (2337) ❑ Attribute-type: INT-U16 ❑ Attribute-value: Any value different than 0 b) WAN PCD-01 message PCD-01 message does not include segments with Handle attribute value

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-042		
TP label		Whitepaper. Patient low/high thresholds Compound Numeric Object - Type Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	PLH Numeric 2; M		
Test purpose		Check that: PHG includes Patient low/high thresholds Compound Numeric Object – Type attribute in transcoder output. [AND]		

	Type is set to MDC_PART_PHD_DM | MDC_CONC_GLU_PATIENT_THRESHOLDS_LOW_HIGH
Applicability	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND C_MAN_BLE_046 AND C_MAN_BLE_048
Other PICS	
Initial condition	The PHG under test and the simulated PHD are in the Standby state.
Test procedure	1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). PHD has manually entered Patient Low Alert Level and Patient High Alert Level values stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 0000 00**1**0 (MSB → LSB). Patient High/Low Alerts supported. ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ❑ Value: 0x09 (Patient High Alert Level Response) / 0x0C (Patient Low Alert Level Response) ii. Field: Operand ❑ Format: SFLOAT (mg/dL) ❑ Value: not relevant iii. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics, and then to perform a Patient High Alert procedure using Op Code "Get Patient High Alert Level" (0x08) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 5. The simulated PHD will respond with an indication including a "Patient High Alert Level Response" (0x09) Op Code and an SFLOAT containing the requested value in mg/dL. 6. Force the PHG to perform a Patient Low Alert procedure using Op Code "Get Patient Low Alert Level" (0x0B) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 7. The simulated PHD will respond with an indication including a "Patient Low Alert Level Response" (0x0C) Op Code and an SFLOAT containing the requested value in mg/dL.

	8. Check in PHG transcoder output the Patient low/high thresholds Compound Numeric Object – Type attribute
Pass/Fail criteria	In Step 8, the Patient low/high thresholds Compound Numeric Object – Type attribute is present and set to MDC_PART_PHD_DM | MDC_CONC_GLU_PATIENT_THRESHOLDS_LOW_HIGH
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Type attribute is present: ❑ Object: Patient low/high thresholds Compound Numeric Object ❑ Attribute-id: MDC_ATTR_ID_TYPE (2351) ❑ Attribute-type: SEQUENCE {partition (INT-U16), code (INT-U16)} ❑ Attribute-value: • partition: MDC_PART_PHD_DM or 128 (dec) or 00 80 (hex) • code: MDC_CONC_GLU_PATIENT_THRESHOLDS_LOW_HIGH or 29404 (dec) or 72 DC (hex) b) WAN PCD-01 message PCD-01 message includes a segment like this with Type attribute (check OBX-3): OBX|n||8418012^MDC_CONC_GLU_PATIENT_THRESHOLDS_LOW_HIGH^MDC|m.0.x.0||||||X|||[date_time]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-043_A		
TP label		Whitepaper. Patient low/high thresholds Compound Numeric Object - Metric-Spec-Small Attribute 1		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	PLH Numeric 3; M	PLH Numeric 5; M	
Test purpose		Check that: PHG includes Patient low/high thresholds Compound Numeric Object – Metric-Spec-Small attribute in transcoder output. [AND] Metric-Spec-Small is set to {0x604C} when the patient low/high thresholds were updated manually by the user		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND C_MAN_BLE_046 AND C_MAN_BLE_048		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). PHD has manually entered Patient Low Alert Level and Patient High Alert Level values stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit		

	❑ Value: 0000 0000 0000 0000 0000 00**1**0 (MSB → LSB). Patient High/Low Alerts supported. ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ❑ Value: 0x09 (Patient High Alert Level Response) / 0x0C (Patient Low Alert Level Response) ii. Field: Operand ❑ Format: SFLOAT (mg/dL) ❑ Value: not relevant iii. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics, and then to perform a Patient High Alert procedure using Op Code "Get Patient High Alert Level" (0x08) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 5. The simulated PHD will respond with an indication including a "Patient High Alert Level Response" (0x09) Op Code and an SFLOAT containing the requested value in mg/dL. 6. Force the PHG to perform a Patient Low Alert procedure using Op Code "Get Patient Low Alert Level" (0x0B) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 7. The simulated PHD will respond with an indication including a "Patient Low Alert Level Response" (0x0C) Op Code and an SFLOAT containing the requested value in mg/dL. 8. Check in PHG transcoder output the Patient low/high thresholds Compound Numeric Object – Type attributeCheck in PHG transcoder output the Patient low/high thresholds Compound Numeric Object – Metric-Spec-Small attribute
Pass/Fail criteria	In Step 8, the Patient low/high thresholds Compound Numeric Object – Metric-Spec-Small attribute is present and its value is {0x604C} (mss-avail-stored-data | mss-upd-aperiodic | mss-acc-agent-initiated | mss-cat-manual | mss-cat-setting)
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Metric-Spec-Small attribute is present: ❑ Object: Patient low/high thresholds Compound Numeric Object ❑ Attribute-id: MDC_ATTR_METRIC_SPEC_SMALL (2630) ❑ Attribute-type: BITS-16 ❑ Attribute-value: 60 4C (hex) or BITS mss-avail-stored-data (1), mss-upd-aperiodic(2), mss-acc-agent-initiated(9), mss-cat-manual(12), mss-cat-setting(13) set to TRUE and remaining BITS set to FALSE

	b) WAN PCD-01 message PCD-01 message does not include segments with Metric-Spec-Small attribute value

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-043_B		
TP label		Whitepaper. Patient low/high thresholds Compound Numeric Object - Metric-Spec-Small Attribute 2		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	PLH Numeric 3; M	PLH Numeric 4; M	
Test purpose		Check that: PHG includes Patient low/high thresholds Compound Numeric Object – Metric-Spec-Small attribute in transcoder output. [AND] Metric-Spec-Small is set to {0x6044} when the Patient High/Low Alert Level procedure has been executed		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND C_MAN_BLE_045 AND C_MAN_BLE_046 AND C_MAN_BLE_047 AND C_MAN_BLE_048		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 0000 00**1**0 (MSB → LSB). Patient High/Low Alerts supported. ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ❑ Value: 0x09 (Patient High Alert Level Response) / 0x0C (Patient Low Alert Level Response) ii. Field: Operand ❑ Format: SFLOAT (mg/dL)		

	❑ Value: not relevant iii. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics. 5. Force the PHG to set the patient high threshold by performing a Patient High Alert procedure using Op Code “Set Patient High Alert Level” (0x07) followed by a valid SFLOAT value (performing a write operation to the CGM Specific Ops Control Point characteristic’s Op Code and Operand fields respectively). The simulated PHD will respond with an indication including a Response Op Code value of “Success”. 6. Force the PHG to set the patient low threshold by performing a Patient Low Alert procedure using Op Code “Set Patient Low Alert Level” (0x0A) followed by a valid SFLOAT value (performing a write operation to the CGM Specific Ops Control Point characteristic’s Op Code and Operand fields respectively). The simulated PHD will respond with an indication including a Response Op Code value of “Success”. 7. Then, force the PHG to perform a Patient High Alert procedure using Op Code “Get Patient High Alert Level” (0x08) (performing a write operation to the CGM Specific Ops Control Point characteristic’s Op Code). 8. The simulated PHD will respond with an indication including a “Patient High Alert Level Response” (0x09) Op Code and an SFLOAT containing the requested value in mg/dL. 9. Force the PHG to perform a Patient Low Alert procedure using Op Code “Get Patient Low Alert Level” (0x0B) (performing a write operation to the CGM Specific Ops Control Point characteristic’s Op Code). 10. The simulated PHD will respond with an indication including a “Patient Low Alert Level Response” (0x0C) Op Code and an SFLOAT containing the requested value in mg/dL. 11. Check in PHG transcoder output the Patient low/high thresholds Compound Numeric Object – Type attributeCheck in PHG transcoder output the Patient low/high thresholds Compound Numeric Object – Metric-Spec-Small attribute
Pass/Fail criteria	In Step 11, the Patient low/high thresholds Compound Numeric Object – Metric-Spec-Small attribute is present and its value is {0x6044} (mss-avail-stored-data | mss-upd-aperiodic | mss-acc-agent-initiated | mss-cat-setting)
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Metric-Spec-Small attribute is present: ❑ Object: Patient low/high thresholds Compound Numeric Object ❑ Attribute-id: MDC_ATTR_METRIC_SPEC_SMALL (2630) ❑ Attribute-type: BITS-16 ❑ Attribute-value: 0x6044 (hex) or BITS mss-avail-stored-data (1), mss-upd-aperiodic(2), mss-acc-agent-initiated(9), mss-cat-setting(13) set to TRUE and remaining BITS set to FALSE b) WAN PCD-01 message PCD-01 message does not include segments with Metric-Spec-Small attribute value

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-044		
TP label		Whitepaper. Patient low/high thresholds Compound Numeric Object – Metric-Structure-Small Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable	PLH Numeric 6; M		

	items			
Test purpose		Check that: PHG includes Patient low/high thresholds Compound Numeric Object – Metric-Structure-Small attribute in transcoder output. [AND] Metric-Structure-Small is set to {0x40, 0x02}		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND C_MAN_BLE_046 AND C_MAN_BLE_048		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). PHD has manually entered Patient Low Alert Level and Patient High Alert Level values stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 0000 00**1**0 (MSB → LSB). Patient High/Low Alerts supported. ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ❑ Value: 0x09 (Patient High Alert Level Response) / 0x0C (Patient Low Alert Level Response) ii. Field: Operand ❑ Format: SFLOAT (mg/dL) ❑ Value: not relevant iii. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics, and then to perform a Patient High Alert procedure using Op Code "Get Patient High Alert Level" (0x08) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 5. The simulated PHD will respond with an indication including a "Patient High Alert Level Response" (0x09) Op Code and an SFLOAT containing the requested value in mg/dL.		

	6. Force the PHG to perform a Patient Low Alert procedure using Op Code "Get Patient Low Alert Level" (0x0B) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 7. The simulated PHD will respond with an indication including a "Patient Low Alert Level Response" (0x0C) Op Code and an SFLOAT containing the requested value in mg/dL. 8. Check in PHG transcoder output the Patient low/high thresholds Compound Numeric Object – Metric-Structure-Small attribute
Pass/Fail criteria	In Step 8, the Patient low/high thresholds Compound Numeric Object – Metric-Structure-Small attribute is present and set to 0x40 (ms-struct-compound), 0x02 (number of components is 2)
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Metric-Structure-Small attribute is present: ❑ Object: Patient low/high thresholds Compound Numeric Object ❑ Attribute-id: MDC_ATTR_METRIC_STRUCT_SMALL (2675) ❑ Attribute-type: SEQUENCE {ms-struct (INT-U8), ms-comp-no (INT-U8)} ❑ Attribute-value: • ms-struct: 0x40 (ms-struct-compound) • ms-comp-no: 0x02 (number of components) b) WAN PCD-01 message PCD-01 message does not include segments with Metric-Structure-Small attribute value

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-045		
TP label		Whitepaper. Patient low/high thresholds Compound Numeric Object – Metric-Id-List Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	PLH Numeric 7; M		
Test purpose		Check that: PHG includes Patient low/high thresholds Compound Numeric Object – Metric-Id-List attribute in transcoder output. [AND] Metric-Id-List is set to { 0x0002, 0x0004, MDC_CONC_GLU_PATIENT_THRESHOLD_LOW, MDC_CONC_GLU_PATIENT_THRESHOLD_HIGH }		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND C_MAN_BLE_046 AND C_MAN_BLE_048		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). PHD has manually entered Patient Low Alert Level and Patient High Alert Level values stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit		

	❑ Value: 0000 0000 0000 0000 0000 00**1**0 (MSB → LSB). Patient High/Low Alerts supported. ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ❑ Value: 0x09 (Patient High Alert Level Response) / 0x0C (Patient Low Alert Level Response) ii. Field: Operand ❑ Format: SFLOAT (mg/dL) ❑ Value: not relevant iii. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics, and then to perform a Patient High Alert procedure using Op Code "Get Patient High Alert Level" (0x08) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 5. The simulated PHD will respond with an indication including a "Patient High Alert Level Response" (0x09) Op Code and an SFLOAT containing the requested value in mg/dL. 6. Force the PHG to perform a Patient Low Alert procedure using Op Code "Get Patient Low Alert Level" (0x0B) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 7. The simulated PHD will respond with an indication including a "Patient Low Alert Level Response" (0x0C) Op Code and an SFLOAT containing the requested value in mg/dL. 8. Check in PHG transcoder output the Patient low/high thresholds Compound Numeric Object – Metric-Id-List attribute
Pass/Fail criteria	In Step 8, the Patient low/high thresholds Compound Numeric Object – Metric-Id-List attribute is present and set to 0x0002 (count of metric ids is 2), 0x0004 (list length is 4 octets), MDC_CONC_GLU_PATIENT_THRESHOLD_LOW, MDC_CONC_GLU_PATIENT_THRESHOLD_HIGH
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Metric-Id-List attribute is present: ❑ Object: Patient low/high thresholds Compound Numeric Object ❑ Attribute-id: MDC_ATTR_ID_PHYSIO_LIST (2678) ❑ Attribute-type: SEQUENCE OF [{OID-Type(INT-U16)}] ❑ Attribute-value: 0x0002 (number of elements), 0x0004 (length of the sequence), followed by

	• First element: MDC_CONC_GLU_PATIENT_THRESHOLD_LOW (0x72DD) • Second element: MDC_CONC_GLU_PATIENT_THRESHOLD_HIGH (0x72DE) b) WAN PCD-01 message PCD-01 message includes two segments like these with Metric-Id-List attribute values (check OBX-3 in both segments): OBX|n|NM|8418013^MDC_CONC_GLU_PATIENT_THRESHOLD_LOW^MDC|m.0.x.a|[value]|264274^MDC_DIM_MILLI_G_PER_DL^MDC|||||R OBX|n|NM|8418014^MDC_CONC_GLU_PATIENT_THRESHOLD_HIGH^MDC|m.0.x.b|[value]|264274^MDC_DIM_MILLI_G_PER_DL^MDC|||||R

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-046		
TP label		Whitepaper. Patient low/high thresholds Compound Numeric Object – Unit-Code Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	PLH Numeric 8; M		
Test purpose		Check that: PHG includes Patient low/high thresholds Compound Numeric Object – Unit-Code attribute in transcoder output. [AND] Unit-Code is set to MDC_DIM_MILLI_G_PER_DL		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND C_MAN_BLE_046 AND C_MAN_BLE_048		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). PHD has manually entered Patient Low Alert Level and Patient High Alert Level values stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 0000 00**1**0 (MSB → LSB). Patient High/Low Alerts supported. ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC)		

	i. Field: Op Code ❑ Format: uint8 ❑ Value: 0x09 (Patient High Alert Level Response) / 0x0C (Patient Low Alert Level Response) ii. Field: Operand ❑ Format: SFLOAT (mg/dL) ❑ Value: not relevant iii. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics, and then to perform a Patient High Alert procedure using Op Code "Get Patient High Alert Level" (0x08) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 5. The simulated PHD will respond with an indication including a "Patient High Alert Level Response" (0x09) Op Code and an SFLOAT containing the requested value in mg/dL. 6. Force the PHG to perform a Patient Low Alert procedure using Op Code "Get Patient Low Alert Level" (0x0B) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 7. The simulated PHD will respond with an indication including a "Patient Low Alert Level Response" (0x0C) Op Code and an SFLOAT containing the requested value in mg/dL. 8. Check in the PHG transcoder output the Patient low/high thresholds Compound Numeric Object – Unit-Code attribute
Pass/Fail criteria	In Step 8, the Patient low/high thresholds Compound Numeric Object – Unit-Code attribute is present and set to MDC_DIM_MILLI_G_PER_DL
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Unit-Code attribute is present: ❑ Object: Patient low/high thresholds Compound Numeric Object ❑ Attribute-id: MDC_ATTR_UNIT_CODE (2454) ❑ Attribute-type: OID-Type ❑ Attribute-value: MDC_DIM_MILLI_G_PER_DL or 2130 (dec) or 0x0852 (hex) b) WAN PCD-01 message PCD-01 message includes two segments like these with Unit-Code attribute value (check OBX-6 in both segments): OBX|n|NM|8418013^MDC_CONC_GLU_PATIENT_THRESHOLD_LOW^MDC|m.0.x.a|[value]|264274^MDC_DIM_MILLI_G_PER_DL^MDC|||||R OBX|n|NM|8418014^MDC_CONC_GLU_PATIENT_THRESHOLD_HIGH^MDC|m.0.x.b|[value]|264274^MDC_DIM_MILLI_G_PER_DL^MDC|||||R

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-047		
TP label		Whitepaper. Patient low/high thresholds Compound Numeric Object – Base-Offset-Time-Stamp Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	PLH Numeric 9; M	BaseOffset 1; M	

Test purpose	Check that: PHG includes Patient low/high thresholds Compound Numeric Object – Base-Offset-Time-Stamp Attribute [AND] Base-Offset-Time-Stamp attribute is set to the correct value according to Base-Offset time stamp derivation (Base-Offset-Time-Stamp attribute will be derived from the collector's time at the time of collection)
Applicability	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND C_MAN_BLE_046 AND C_MAN_BLE_048
Other PICS	
Initial condition	The PHG under test and the simulated PHD are in the Standby state.
Test procedure	1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The PHD has manually entered Patient Low Alert Level and Patient High Alert Level values stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 0000 00**1**0 (MSB → LSB). Patient High/Low Alerts supported. ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ❑ Value: 0x09 (Patient High Alert Level Response) / 0x0C (Patient Low Alert Level Response) ii. Field: Operand ❑ Format: SFLOAT (mg/dL) ❑ Value: not relevant iii. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics, and then to perform a Patient High Alert procedure using Op Code "Get Patient High Alert Level" (0x08) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code).

	5. The simulated PHD will respond with an indication including a "Patient High Alert Level Response" (0x09) Op Code and an SFLOAT containing the requested value in mg/dL. 6. Force the PHG to perform a Patient Low Alert procedure using Op Code "Get Patient Low Alert Level" (0x0B) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 7. The simulated PHD will respond with an indication including a "Patient Low Alert Level Response" (0x0C) Op Code and an SFLOAT containing the requested value in mg/dL. 8. Check in PHG transcoder output the Patient low/high thresholds Compound Numeric Object – Base-Offset-Time-Stamp attribute
Pass/Fail criteria	In Step 8, the Patient low/high thresholds Compound Numeric Object – Base-Offset-Time-Stamp attribute is present and it is set to the collector's time at the time of collection.
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Base-Offset-Time-Stamp attribute is present: ❑ Object: Patient low/high thresholds Compound Numeric Object ❑ Attribute-id: MDC_ATTR_TIME_STAMP_BO (2690) ❑ Attribute-type: SEQUENCE {bo-seconds (INT-U32), bo-fraction (INT-U16), bo-time-offset (INT-I16)} ❑ Attribute-value: collector's time at the time of collection. b) WAN PCD-01 message PCD-01 message includes a segment like this with Base-Offset-Time-Stamp attribute (check OBX-14): OBX|n||8418012^MDC_CONC_GLU_PATIENT_THRESHOLDS_LOW_HIGH^MDC|m.0.x.0||||||X|||[value described in a) coded in DTM format]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-048		
TP label		Whitepaper. Patient low/high thresholds Compound Numeric Object – Compound-Basic-Nu-Observed-Value Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	PLH Numeric 10; M		
Test purpose		Check that: PHG includes Patient low/high thresholds Compound Numeric Object Compound-Basic-Nu-Observed-Value attribute in transcoder output. [AND] Compound-Basic-Nu-Observed-Value attribute is set to the correct value.		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND C_MAN_BLE_046 AND C_MAN_BLE_048		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). PHD has manually entered Patient Low Alert Level and Patient High Alert Level values stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:		

	a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 0000 00**1**0 (MSB → LSB). Patient High/Low Alerts supported. ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ❑ Value: 0x09 (Patient High Alert Level Response) / 0x0C (Patient Low Alert Level Response) ii. Field: Operand ❑ Format: SFLOAT (mg/dL) ❑ Value: 72.0 (Patient Low threshold) / 144.0 (Patient High threshold) iii. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics, and then to perform a Patient High Alert procedure using Op Code "Get Patient High Alert Level" (0x08) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 5. The simulated PHD will respond with an indication including a "Patient High Alert Level Response" (0x09) Op Code and an SFLOAT containing the requested value in mg/dL. 6. Force the PHG to perform a Patient Low Alert procedure using Op Code "Get Patient Low Alert Level" (0x0B) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 7. The simulated PHD will respond with an indication including a "Patient Low Alert Level Response" (0x0C) Op Code and an SFLOAT containing the requested value in mg/dL. 8. Check in PHG transcoder output the Patient low/high thresholds Compound Numeric Object – Compound-Basic-Nu-Observed-Value attribute
Pass/Fail criteria	In Step 8, the Patient low/high thresholds Compound Numeric Object – Compound-Basic-Nu-Observed-Value attributeis set to 0x0002 (count of components is 2), 0x0004 (component list length is 4 octets), the Patient Low Alert Level Response Operand followed by the Patient High Alert Level Response Operand
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Compound-Basic-Nu-Observed-Value attribute is present: ❑ Object: Patient low/high thresholds Compound Numeric Object ❑ Attribute-id: MDC_ATTR_NU_CMPD_VAL_OBS_BASIC (2677)

	❑ Attribute-type: SEQUENCE OF [{SFLOAT}] ❑ Attribute-value: 0x0002 (number of elements), 0x0004 (length of the sequence), followed by • First element (Patient Low Alert Level Response Operand): 00 48 (hex) or F2 D0 (hex) or 72.0 (dec) • Second element (Patient High Level Response Operand): 00 90 (hex) or F5 A0 (hex) or 144.0 (dec) b) WAN PCD-01 message PCD-01 message includes two segments like these with Compound-Basic-Nu-Observed-Value attribute value (check OBX-5 in both segments): OBX|n|NM|8418013^MDC_CONC_GLU_PATIENT_THRESHOLD_LOW^MDC|m.0.x.a|72.0|264274^MDC_DIM_MILLI_G_PER_DL^MDC|||||R OBX|n|NM|8418014^MDC_CONC_GLU_PATIENT_THRESHOLD_HIGH^MDC|m.0.x.b|144.0|264274^MDC_DIM_MILLI_G_PER_DL^MDC|||||R

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-049		
TP label		Whitepaper. Device hypo/hyper thresholds Compound Numeric Object - Handle Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	DHH Numeric 1; O		
Test purpose		Check that: PHG does not include Device hypo/hyper thresholds Compound Numeric Object – Handle Attribute in transcoder output. [OR] If PHG includes Device hypo/hyper thresholds Compound Numeric Object – Handle attribute in transcoder output, then its value shall be different than 0		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND (C_MAN_BLE_050 OR C_MAN_BLE_052)		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The PHD has manually entered Hypo and Hyper Alert Level values stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature • Format: 24 bit • Value: 0000 0000 0000 0000 0000 **11**00 (MSB → LSB). Hypo Alerts and Hyper Alerts supported. ii. Field: CGM Type • Format: 4 bit • Value: not relevant iii. Field: CGM Sample Location • Format: 4 bit		

	• Value: not relevant iv. Field: E2E-CRC • Format: uint16 • Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ❑ Value: 0x0F (Hypo Alert Level Response) / 0x12 (Hyper Alert Level Response) ii. Field: Operand ❑ Format: SFLOAT (mg/dL) ❑ Value: not relevant iii. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics. 5. IF C_MAN_BLE_050 = TRUE, force the PHG to perform a Hypo Alert procedure using Op Code "Get Hypo Alert Level" (0x0E) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). simulated PHD will respond with an indication including a "Hypo Alert Level Response" (0x0F) Op Code and an SFLOAT containing the requested alert level in mg/dL. 6. IF C_MAN_BLE_052 = TRUE, force the PHG to perform a Hyper Alert procedure using Op Code "Get Hyper Alert Level" (0x11) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). The simulated PHD will respond with an indication including a "Hyper Alert Level Response" (0x12) Op Code and an SFLOAT containing the requested alert level in mg/dL. 7. Check in PHG transcoder output the Device hypo/hyper thresholds Compound Numeric Object – Handle attribute
Pass/Fail criteria	In Step 7, the Device hypo/hyper thresholds Compound Numeric Object – Handle attribute is not present or, if it is present then its value is different than 0
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Handle attribute is not present, or if it is present then: ❑ Object: Device hypo/hyper thresholds Compound Numeric Object ❑ Attribute-id: MDC_ATTR_ID_HANDLE (2337) ❑ Attribute-type: INT-U16 ❑ Attribute-value: Any value different than 0 b) WAN PCD-01 message PCD-01 message does not include segments with Handle attribute value

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-050		
TP label		Whitepaper. Device hypo/hyper thresholds Compound Numeric Object - Type Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable	DHH Numeric 2; M		

	items			

Test purpose	Check that: PHG includes Device hypo/hyper thresholds Compound Numeric Object – Type attribute in transcoder output. [AND] Type is set to MDC_PART_PHD_DM | MDC_CONC_GLU_THRESHOLDS_HYPO_HYPER
Applicability	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND (C_MAN_BLE_050 OR C_MAN_BLE_052)
Other PICS	
Initial condition	The PHG under test and the simulated PHD are in the Standby state.
Test procedure	1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The PHD has manually entered Hypo and Hyper Alert Level values stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 0000 **11**00 (MSB → LSB). Hypo Alerts and Hyper Alerts supported. ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ❑ Value: 0x0F (Hypo Alert Level Response) / 0x12 (Hyper Alert Level Response) ii. Field: Operand ❑ Format: SFLOAT (mg/dL) ❑ Value: not relevant iii. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics. 5. IF C_MAN_BLE_050 = TRUE, force the PHG to perform a Hypo Alert procedure using Op Code "Get Hypo Alert Level" (0x0E) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). The simulated PHD will respond with an

	indication including a "Hypo Alert Level Response" (0x0F) Op Code and an SFLOAT containing the requested alert level in mg/dL. 6. IF C_MAN_BLE_052 = TRUE, force the PHG to perform a Hyper Alert procedure using Op Code "Get Hyper Alert Level" (0x11) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). The simulated PHD will respond with an indication including a "Hyper Alert Level Response" (0x12) Op Code and an SFLOAT containing the requested alert level in mg/dL. 7. Check in the PHG transcoder output the Device hypo/hyper thresholds Compound Numeric Object – Type attribute
Pass/Fail criteria	In Step 7, the Device hypo/hyper thresholds CompoundNumeric Object – Type attribute is present and set to MDC_PART_PHD_DM | MDC_CONC_GLU_THRESHOLDS_HYPO_HYPER
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Type attribute is present: ❑ Object: Device hypo/hyper thresholds Compound Numeric Object ❑ Attribute-id: MDC_ATTR_ID_TYPE (2351) ❑ Attribute-type: SEQUENCE {partition (INT-U16), code (INT-U16)} ❑ Attribute-value: • partition: MDC_PART_PHD_DM or 128 (dec) or 00 80 (hex) • code: MDC_CONC_GLU_THRESHOLDS_HYPO_HYPER or 29408 (dec) or 72 E0 (hex) b) WAN PCD-01 message PCD-01 message includes a segment like this with Type attribute (check OBX-3): OBX|n||8418016^MDC_CONC_GLU_THRESHOLDS_HYPO_HYPER^MDC|m.0.x.0||||||X|||[date_time]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-051_A		
TP label		Whitepaper. Device hypo/hyper thresholds Compound Numeric Object - Metric-Spec-Small Attribute 1		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	DHH Numeric 3; M	DHH Numeric 4; M	
Test purpose		Check that: PHG includes Device hypo/hyper thresholds Compound Numeric Object – Metric-Spec-Small attribute in transcoder output. [AND] Metric-Spec-Small is set to {0x604C} when the hypo/hyper thresholds were updated manually by the user		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND (C_MAN_BLE_050 OR C_MAN_BLE_052)		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The PHD has manually entered Hypo and Hyper Alert Level values stored.		

	2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 0000 **11**00 (MSB → LSB). Hypo Alerts and Hyper Alerts supported. ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ❑ Value: 0x0F (Hypo Alert Level Response) / 0x12 (Hyper Alert Level Response) ii. Field: Operand ❑ Format: SFLOAT (mg/dL) ❑ Value: not relevant iii. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics. 5. IF C_MAN_BLE_050 = TRUE, force the PHG to perform a Hypo Alert procedure using Op Code "Get Hypo Alert Level" (0x0E) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). The simulated PHD will respond with an indication including a "Hypo Alert Level Response" (0x0F) Op Code and an SFLOAT containing the requested alert level in mg/dL. 6. IF C_MAN_BLE_052 = TRUE, force the PHG to perform a Hyper Alert procedure using Op Code "Get Hyper Alert Level" (0x11) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). The simulated PHD will respond with an indication including a "Hyper Alert Level Response" (0x12) Op Code and an SFLOAT containing the requested alert level in mg/dL. 7. Check in PHG transcoder output the Device hypo/hyper thresholds Compound Numeric Object – Metric-Spec-Small attribute
Pass/Fail criteria	In Step 7, the Device hypo/hyper thresholds Compound Numeric Object – Metric-Spec-Small attribute is present and its value is {0x604C} (mss-avail-stored-data | mss-upd-aperiodic | mss-acc-agent-initiated | mss-cat-manual | mss-cat-setting)
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Metric-Spec-Small attribute is present: ❑ Object: Device hypo/hyper thresholds Compound Numeric Object

	❑ Attribute-id: MDC_ATTR_METRIC_SPEC_SMALL (2630) ❑ Attribute-type: BITS-16 ❑ Attribute-value: 60 4C (hex) or BITS mss-avail-stored-data (1), mss-upd-aperiodic(2), mss-acc-agent-initiated(9), mss-cat-manual(12), mss-cat-setting(13) set to TRUE and remaining BITS set to FALSE b) WAN PCD-01 message PCD-01 message does not include segments with Metric-Spec-Small attribute value

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-051_B		
TP label		Whitepaper. Device hypo/hyper thresholds Compound Numeric Object - Metric-Spec-Small Attribute 2		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	DHH Numeric 3; M	DHH Numeric 4; M	
Test purpose		Check that: PHG includes Device hypo/hyper thresholds Compound Numeric Object – Metric-Spec-Small attribute in transcoder output. [AND] Metric-Spec-Small is set to {0x6044} when either the Hypo Alert or Hyper Alert procedure has been executed		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND (C_MAN_BLE_050 OR C_MAN_BLE_052) AND (C_MAN_BLE_049 OR C_MAN_BLE_051)		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 0000 **11**00 (MSB → LSB). Hypo Alerts and Hyper Alerts supported. ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code		

<table>
<tr><td></td><td>
❑ Format: uint8
❑ Value: 0x0F (Hypo Alert Level Response) / 0x12 (Hyper Alert Level Response)
ii. Field: Operand
❑ Format: SFLOAT (mg/dL)
❑ Value: not relevant
iii. Field: E2E-CRC
❑ This field is not present
3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state).
4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics.
5. IF C_MAN_BLE_049 = TRUE, force the PHG to set the Hypo Alert Level by performing a Hypo Alert procedure using Op Code “Set Hypo Alert Level” (0x0D) followed by a valid SFLOAT value (performing a write operation to the CGM Specific Ops Control Point characteristic’s Op Code and Operand fields respectively). The simulated PHD will respond with an indication including a Response Op Code value of “Success”.
6. IF C_MAN_BLE_051 = TRUE, force the PHG to set the Hyper Alert Level by performing a Hyper Alert procedure using Op Code “Set Hyper Alert Level” (0x10) followed by a valid SFLOAT value (performing a write operation to the CGM Specific Ops Control Point characteristic’s Op Code and Operand fields respectively). The simulated PHD will respond with an indication including a Response Op Code value of “Success”.
7. IF C_MAN_BLE_050 = TRUE, force the PHG to perform a Hypo Alert procedure using Op Code “Get Hypo Alert Level” (0x0E) (performing a write operation to the CGM Specific Ops Control Point characteristic’s Op Code). The simulated PHD will respond with an indication including a “Hypo Alert Level Response” (0x0F) Op Code and an SFLOAT containing the requested alert level in mg/dL.
8. IF C_MAN_BLE_052 = TRUE, force the PHG to perform a Hyper Alert procedure using Op Code “Get Hyper Alert Level” (0x11) (performing a write operation to the CGM Specific Ops Control Point characteristic’s Op Code). The simulated PHD will respond with an indication including a “Hyper Alert Level Response” (0x12) Op Code and an SFLOAT containing the requested alert level in mg/dL.
9. Check in PHG transcoder output the Device hypo/hyper thresholds Compound Numeric Object – Metric-Spec-Small attribute
</td></tr>
<tr><td>Pass/Fail criteria</td><td>In Step 9, the Device hypo/hyper thresholds Compound Numeric Object – Metric-Spec-Small attribute is present and its value is {0x6044} (mss-avail-stored-data | mss-upd-aperiodic | mss-acc-agent-initiated | mss-cat-setting)</td></tr>
<tr><td>Notes
(To assist manual testing)</td><td>Possible values in typical points of observation after transcoder output are:
a) IEEE 11073 Objects and Attributes
Metric-Spec-Small attribute is present:
❑ Object: Device hypo/hyper thresholds Compound Numeric Object
❑ Attribute-id: MDC_ATTR_METRIC_SPEC_SMALL (2630)
❑ Attribute-type: BITS-16
❑ Attribute-value: 0x6044 (hex) or BITS mss-avail-stored-data (1), mss-upd-aperiodic(2), mss-acc-agent-initiated(9), mss-cat-setting(13) set to TRUE and remaining BITS set to FALSE
b) WAN PCD-01 message
PCD-01 message does not include segments with Metric-Spec-Small attribute value
</td></tr>
</table>

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-052		
TP label		Whitepaper. Device hypo/hyper thresholds Compound Numeric Object – Metric-Structure-Small Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	DHH Numeric 6; M		
Test purpose		Check that: PHG includes Device hypo/hyper thresholds Compound Numeric Object – Metric-Structure-Small attribute in transcoder output. [AND] Metric-Structure-Small is set to {0x40, 0x02}		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND (C_MAN_BLE_050 OR C_MAN_BLE_052)		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The PHD has manually entered Hypo and Hyper Alert Level values stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 0000 1100 (MSB → LSB). Hypo Alerts and Hyper Alerts supported. ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ❑ Value: 0x0F (Hypo Alert Level Response) / 0x12 (Hyper Alert Level Response) ii. Field: Operand ❑ Format: SFLOAT (mg/dL) ❑ Value: not relevant iii. Field: E2E-CRC ❑ This field is not present		

	3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics. 5. IF C_MAN_BLE_050 = TRUE, force the PHG to perform a Hypo Alert procedure using Op Code "Get Hypo Alert Level" (0x0E) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). The simulated PHD will respond with an indication including a "Hypo Alert Level Response" (0x0F) Op Code and an SFLOAT containing the requested alert level in mg/dL. 6. IF C_MAN_BLE_052 = TRUE, force the PHG to perform a Hyper Alert procedure using Op Code "Get Hyper Alert Level" (0x11) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). The simulated PHD will respond with an indication including a "Hyper Alert Level Response" (0x12) Op Code and an SFLOAT containing the requested alert level in mg/dL. 7. Check in the PHG transcoder output the Device hypo/hyper thresholds Compound Numeric Object – Metric-Structure-Small attribute
Pass/Fail criteria	In Step 7, the Device hypo/hyper thresholds Compound Numeric Object – Metric-Structure-Small attribute is present and set to 0x40 (ms-struct-compound), 0x02 (number of components is 2)
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Metric-Structure-Small attribute is present: ❑ Object: Device hypo/hyper thresholds Compound Numeric Object ❑ Attribute-id: MDC_ATTR_METRIC_STRUCT_SMALL (2675) ❑ Attribute-type: SEQUENCE {ms-struct (INT-U8), ms-comp-no (INT-U8)} ❑ Attribute-value: • ms-struct: 0x40 (ms-struct-compound) • ms-comp-no: 0x02 (number of components) b) WAN PCD-01 message PCD-01 message does not include segments with Metric-Structure-Small attribute value

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-053		
TP label		Whitepaper. Device hypo/hyper thresholds Compound Numeric Object – Metric-Id-List Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	DHH Numeric 7; M		
Test purpose		Check that: PHG includes Device hypo/hyper thresholds Compound Numeric Object – Metric-Id-List attribute in transcoder output. [AND] Metric-Id-List is set to { 0x0002, 0x0004, MDC_CONC_GLU_THRESHOLD_HYPO, MDC_CONC_GLU_THRESHOLD_HYPER }		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND (C_MAN_BLE_050 OR C_MAN_BLE_052)		
Other PICS				

Initial condition	The PHG under test and the simulated PHD are in the Standby state.
Test procedure	1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The PHD has manually entered Hypo and Hyper Alert Level values stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 0000 1100 (MSB → LSB). Hypo Alerts and Hyper Alerts supported. ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ❑ Value: 0x0F (Hypo Alert Level Response) / 0x12 (Hyper Alert Level Response) ii. Field: Operand ❑ Format: SFLOAT (mg/dL) ❑ Value: not relevant iii. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics. 5. IF C_MAN_BLE_050 = TRUE, force the PHG to perform a Hypo Alert procedure using Op Code "Get Hypo Alert Level" (0x0E) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). The simulated PHD will respond with an indication including a "Hypo Alert Level Response" (0x0F) Op Code and an SFLOAT containing the requested alert level in mg/dL. 6. IF C_MAN_BLE_052 = TRUE, force the PHG to perform a Hyper Alert procedure using Op Code "Get Hyper Alert Level" (0x11) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). The simulated PHD will respond with an indication including a "Hyper Alert Level Response" (0x12) Op Code and an SFLOAT containing the requested alert level in mg/dL. 7. Check in the PHG transcoder output the Device hypo/hyper thresholds Compound Numeric Object – Metric-Id-List attribute
Pass/Fail criteria	In Step 7, the Device hypo/hyper thresholds Compound Numeric Object – Metric-Id-List attribute is present and set to 0x0002 (count of metric ids is 2), 0x0004 (list length is 4 octets), MDC_CONC_GLU_THRESHOLD_HYPO, MDC_CONC_GLU_THRESHOLD_HYPER

Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Metric-Id-List attribute is present: ❑ Object: Device hypo/hyper thresholds Compound Numeric Object ❑ Attribute-id: MDC_ATTR_ID_PHYSIO_LIST (2678) ❑ Attribute-type: SEQUENCE OF [{OID-Type(INT-U16)}] ❑ Attribute-value: 0x0002 (number of elements), 0x0004 (length of the sequence), followed by • First element: MDC_CONC_GLU_THRESHOLD_HYPO (0x72E1) • Second element: MDC_CONC_GLU_THRESHOLD_HYPER (0x72E2) b) WAN PCD-01 message If both Hypo/Hyper Alert Level Responses are received, then PCD-01 message includes two segments like these with Metric-Id-List attribute values (check OBX-3 in both segments): OBX|n|NM|8418017^MDC_CONC_GLU_THRESHOLD_HYPO^MDC|m.0.x.a|[value]|264274^MDC_DIM_MILLI_G_PER_DL^MDC|||||R OBX|n|NM|8418018^MDC_CONC_GLU_THRESHOLD_HYPER^MDC|m.0.x.b|[value]|264274^MDC_DIM_MILLI_G_PER_DL^MDC|||||R Note: If one of the responses is not available, its related segment will appear with en empty [value], the value "NAN" in OBX-8 and the value "X" in OBX-11

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-054		
TP label		Whitepaper. Device hypo/hyper thresholds Compound Numeric Object – Unit-Code Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	DHH Numeric 8; M		
Test purpose		Check that: PHG includes Device hypo/hyper thresholds Compound Numeric Object – Unit-Code attribute in transcoder output. [AND] Unit-Code is set to MDC_DIM_MILLI_G_PER_DL		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND (C_MAN_BLE_050 OR C_MAN_BLE_052)		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The PHD has manually entered Hypo and Hyper Alert Level values stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 0000 1100 (MSB → LSB). Hypo Alerts and Hyper Alerts supported.		

	ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ❑ Value: 0x0F (Hypo Alert Level Response) / 0x12 (Hyper Alert Level Response) ii. Field: Operand ❑ Format: SFLOAT (mg/dL) ❑ Value: not relevant iii. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics. 5. IF C_MAN_BLE_050 = TRUE, force the PHG to perform a Hypo Alert procedure using Op Code "Get Hypo Alert Level" (0x0E) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). The simulated PHD will respond with an indication including a "Hypo Alert Level Response" (0x0F) Op Code and an SFLOAT containing the requested alert level in mg/dL. 6. IF C_MAN_BLE_052 = TRUE, force the PHG to perform a Hyper Alert procedure using Op Code "Get Hyper Alert Level" (0x11) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). The simulated PHD will respond with an indication including a "Hyper Alert Level Response" (0x12) Op Code and an SFLOAT containing the requested alert level in mg/dL. 7. Check in the PHG transcoder output the Device hypo/hyper thresholds Compound Numeric Object – Unit-Code attribute
Pass/Fail criteria	In Step 7, the Device hypo/hyper thresholds Compound Numeric Object – Unit-Code attribute is present and set to MDC_DIM_MILLI_G_PER_DL
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Unit-Code attribute is present: ❑ Object: Device hypo/hyper thresholds Compound Numeric Object ❑ Attribute-id: MDC_ATTR_UNIT_CODE (2454) ❑ Attribute-type: OID-Type ❑ Attribute-value: MDC_DIM_MILLI_G_PER_DL or 2130 (dec) or 0x0852 (hex) b) WAN PCD-01 message If both Hypo/Hyper Alert Level Responses are received, then PCD-01 message includes two segments like these with Unit-Code attribute value (check OBX-6 in both segments):

	OBX|n|NM|8418017^MDC_CONC_GLU_THRESHOLD_HYPO^MDC|m.0.x.a|[value]|264274^MDC_DIM_MILLI_G_PER_DL^MDC|||||R OBX|n|NM|8418018^MDC_CONC_GLU_THRESHOLD_HYPER^MDC|m.0.x.b|[value]|264274^MDC_DIM_MILLI_G_PER_DL^MDC|||||R Note: If one of the responses is not available, its related segment will appear with en empty [value], the value "NAN" in OBX-8 and the value "X" in OBX-11

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-055		
TP label		Whitepaper. Device hypo/hyper thresholds Compound Numeric Object – Base-Offset-Time-Stamp Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	DHH Numeric 9; M	BaseOffset 1; M	
Test purpose		Check that: PHG includes Device hypo/hyper thresholds Compound Numeric Object – Base-Offset-Time-Stamp Attribute [AND] Base-Offset-Time-Stamp attribute is set to the correct value according to Base-Offset time stamp derivation (Base-Offset-Time-Stamp attribute will be derived from the collector's time at the time of collection)		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND (C_MAN_BLE_050 OR C_MAN_BLE_052)		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The PHD has manually entered Hypo and Hyper Alert Level values stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 0000 1100 (MSB → LSB). Hypo Alerts and Hyper Alerts supported. ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code		

	❑ Format: uint8 ❑ Value: 0x0F (Hypo Alert Level Response) / 0x12 (Hyper Alert Level Response) ii. Field: Operand ❑ Format: SFLOAT (mg/dL) ❑ Value: not relevant iii. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics. 5. IF C_MAN_BLE_050 = TRUE, force the PHG to perform a Hypo Alert procedure using Op Code "Get Hypo Alert Level" (0x0E) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). The simulated PHD will respond with an indication including a "Hypo Alert Level Response" (0x0F) Op Code and an SFLOAT containing the requested alert level in mg/dL. 6. IF C_MAN_BLE_052 = TRUE, force the PHG to perform a Hyper Alert procedure using Op Code "Get Hyper Alert Level" (0x11) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). The simulated PHD will respond with an indication including a "Hyper Alert Level Response" (0x12) Op Code and an SFLOAT containing the requested alert level in mg/dL. 7. Check in PHG transcoder output the Device hypo/hyper thresholds Compound Numeric Object – Base-Offset-Time-Stamp attribute
Pass/Fail criteria	In Step 7, the Device hypo/hyper thresholds Compound Numeric Object – Base-Offset-Time-Stamp attribute is present and it is set to the collector's time at the time of collection.
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Base-Offset-Time-Stamp attribute is present: ❑ Object: Device hypo/hyper thresholds Compound Numeric Object ❑ Attribute-id: MDC_ATTR_TIME_STAMP_BO (2690) ❑ Attribute-type: SEQUENCE {bo-seconds (INT-U32), bo-fraction (INT-U16), bo-time-offset (INT-I16)} ❑ Attribute-value: collector's time at the time of collection. b) WAN PCD-01 message PCD-01 message includes a segment like this with Type attribute (check OBX-14): OBX|n||8418016^MDC_CONC_GLU_THRESHOLDS_HYPO_HYPER^MDC|m.0.x.0||||||X|||[value described in a) coded in DTM format]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-056_A		
TP label		Whitepaper. Device hypo/hyper thresholds Compound Numeric Object – Compound-Basic-Nu-Observed-Value Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	DHH Numeric 10; M		
Test purpose		Check that: PHG includes Device hypo/hyper thresholds Compound Numeric Object Compound-Basic-Nu-Observed-Value attribute in transcoder output.		

	[AND] Compound-Basic-Nu-Observed-Value attribute is set to the correct value.
Applicability	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND (C_MAN_BLE_050 OR C_MAN_BLE_052)
Other PICS	
Initial condition	The PHG under test and the simulated PHD are in the Standby state.
Test procedure	1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The PHD has manually entered Hypo and Hyper Alert Level values stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 0000 1100 (MSB → LSB). Hypo Alerts and Hyper Alerts supported. ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ❑ Value: 0x0F (Hypo Alert Level Response) / 0x12 (Hyper Alert Level Response) ii. Field: Operand ❑ Format: SFLOAT (mg/dL) ❑ Value: 36.0 (Hypo Alert Level Response) / 360.0 (Hyper Alert Level Response) iii. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics. 5. IF C_MAN_BLE_050 = TRUE, force the PHG to perform a Hypo Alert procedure using Op Code "Get Hypo Alert Level" (0x0E) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). The simulated PHD will respond with an indication including a "Hypo Alert Level Response" (0x0F) Op Code and an SFLOAT containing the requested alert level in mg/dL. 6. IF C_MAN_BLE_052 = TRUE, force the PHG to perform a Hyper Alert procedure using Op Code "Get Hyper Alert Level" (0x11) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). The simulated PHD will respond

	with an indication including a "Hyper Alert Level Response" (0x12) Op Code and an SFLOAT containing the requested alert level in mg/dL. 7. Check in PHG transcoder output the Device hypo/hyper thresholds Compound Numeric Object – Compound-Basic-Nu-Observed-Value attribute
Pass/Fail criteria	In Step 7, the Device hypo/hyper thresholds Compound Numeric Object – Compound-Basic-Nu-Observed-Value attributeis set to 0x0002 (count of components is 2), 0x0004 (component list length is 4 octets), the Hypo Alert Level Response Operand followed by the Hyper Alert Level Response Operand
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Compound-Basic-Nu-Observed-Value attribute is present: ❑ Object: Device hypo/hyper thresholds Compound Numeric Object ❑ Attribute-id: MDC_ATTR_NU_CMPD_VAL_OBS_BASIC (2677) ❑ Attribute-type: SEQUENCE OF [{SFLOAT}] ❑ Attribute-value: 0x0002 (number of elements), 0x0004 (length of the sequence), followed by • IF C_MAN_BLE_050 = TRUE, first element (Hypo Alert Level Response Operand) will be set to: 00 24 (hex) or F1 68 (hex) or EE 10 (hex) or 36.0 (dec). IF C_MAN_BLE_050 = FALSE, first element will be set to NaN (0x07FF) • IF C_MAN_BLE_052 = TRUE, second element (Hyper Alert Level Response Operand) will be set to: 01 24 (hex) or FE 10 (hex) or 360.0 (dec). IF C_MAN_BLE_052 = FALSE, second element will be set to NaN (0x07FF) b) WAN PCD-01 message If both Hypo/Hyper Alert Level Responses are received,PCD-01 message includes two segments like these with Compound-Basic-Nu-Observed-Value attribute value (check OBX-5 in both segments): OBX|n|NM|8418017^MDC_CONC_GLU_THRESHOLD_HYPO^MDC|m.0.x.a|36.0|264274^MDC_DIM_MILLI_G_PER_DL^MDC|||||R OBX|n|NM|8418018^MDC_CONC_GLU_THRESHOLD_HYPER^MDC|m.0.x.b|360.0|264274^MDC_DIM_MILLI_G_PER_DL^MDC|||||R Note: If one of the responses is not available, its related segment will appear with en empty [value], the value "NAN" in OBX-8 and the value "X" in OBX-11

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-056_B		
TP label		Whitepaper. Device hypo/hyper thresholds Compound Numeric Object – Compound-Basic-Nu-Observed-Value Attribute Special Values		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	DHH Numeric 10; M	DHH Numeric 11; M	
Test purpose		Check that: PHG includes Device hypo/hyper thresholds Compound Numeric Object Compound-Basic-Nu-Observed-Value attribute in transcoder output. [AND] If only one of the Hypo Alert or the Hyper Alert support is indicated in the CGM Feature characteristic, NaN will be used for the component of the Compound-Basic-Nu-Observed-Value that corresponds with the unsupported alert.		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND (C_MAN_BLE_050 OR C_MAN_BLE_052)		

Other PICS	
Initial condition	The PHG under test and the simulated PHD are in the Standby state.
Test procedure	1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The PHD has manually entered Hypo and Hyper Alert Level values stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 0000 0**1**00 (MSB → LSB). Hypo Alerts supported. ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ❑ Value: 0x0F (Hypo Alert Level Response) ii. Field: Operand ❑ Format: SFLOAT (mg/dL) ❑ Value: 36.0 (Hypo Alert Level Response) iii. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics. 5. IF C_MAN_BLE_050 = TRUE, force the PHG to perform a Hypo Alert procedure using Op Code "Get Hypo Alert Level" (0x0E) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). The simulated PHD will respond with an indication including a "Hypo Alert Level Response" (0x0F) Op Code and an SFLOAT containing the requested alert level in mg/dL. 6. IF C_MAN_BLE_050 = TRUE, check in PHG transcoder output the Device hypo/hyper thresholds Compound Numeric Object – Compound-Basic-Nu-Observed-Value attribute. 7. End current CGM session and start a new one. 8. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization) and implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit

<table>
<tr><td></td><td>
❑ Value: 0000 0000 0000 0000 0000 1000 (MSB → LSB). Hyper Alerts supported.
ii. Field: CGM Type
❑ Format: 4 bit
❑ Value: not relevant
iii. Field: CGM Sample Location
❑ Format: 4 bit
❑ Value: not relevant
iv. Field: E2E-CRC
❑ Format: uint16
❑ Value: not relevant
b. CGM Specific Ops Control Point (0x2AAC)
Field: Op Code
❑ Format: uint8
❑ Value: 0x12 (Hyper Alert Level Response)
i. Field: Operand
❑ Format: SFLOAT (mg/dL)
❑ Value: 360.0 (Hyper Alert Level Response)
ii. Field: E2E-CRC
❑ This field is not present
9. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state).
10. When the pairing has been completed, IF C_MAN_BLE_052 = TRUE, force the PHG to perform a Hyper Alert procedure using Op Code “Get Hyper Alert Level” (0x11) (performing a write operation to the CGM Specific Ops Control Point characteristic’s Op Code). The simulated PHD will respond with an indication including a “Hyper Alert Level Response” (0x12) Op Code and an SFLOAT containing the requested alert level in mg/dL.
11. IF C_MAN_BLE_052 = TRUE, Check in PHG transcoder output the Device hypo/hyper thresholds Compound Numeric Object – Compound-Basic-Nu-Observed-Value attribute
</td></tr>
<tr><td>Pass/Fail criteria</td><td>
• If Step 6 was checked, the Device hypo/hyper thresholds Compound Numeric Object – Compound-Basic-Nu-Observed-Value attributeis set to 0x0002 (count of components is 2), 0x0004 (component list length is 4 octets), the Hypo Alert Level Response Operand followed by the special value NaN (0x07FF)
• If Step 11 was checked, the Device hypo/hyper thresholds Compound Numeric Object – Compound-Basic-Nu-Observed-Value attributeis set to 0x0002 (count of components is 2), 0x0004 (component list length is 4 octets), the special value NaN (0x07FF) followed by the Hyper Alert Level Response Operand
</td></tr>
<tr><td>Notes
(To assist manual testing)</td><td>
Possible values in typical points of observation after transcoder output are:
a) IEEE 11073 Objects and Attributes
Compound-Basic-Nu-Observed-Value attribute is present:
❑ Object: Device hypo/hyper thresholds Compound Numeric Object
❑ Attribute-id: MDC_ATTR_NU_CMPD_VAL_OBS_BASIC (2677)
❑ Attribute-type: SEQUENCE OF [{SFLOAT}]
❑ Attribute-value (If Step 6 was checked): 0x0002 (number of elements), 0x0004 (length of the sequence), followed by
• First element (Hypo Alert Level Response Operand): 00 24 (hex) or F1 68 (hex) or EE 10 (hex) or 36.0 (dec)
• Second element (Hyper Alert Level Response Operand): NaN (0x07FF)
</td></tr>
</table>

	❑ Attribute-value (if Step 11 was checked): 0x0002 (number of elements), 0x0004 (length of the sequence), followed by • First element (Hypo Alert Level Response Operand): NaN (0x07FF) • Second element (Hyper Alert Level Response Operand): 01 24 (hex) or FE 10 (hex) or 360.0 (dec) b) WAN PCD-01 message PCD-01 message includes two segments like this with Compound-Basic-Nu-Observed-Value attribute value (check OBX-5): • If Step 6 was checked: OBX|n|NM|8418017^MDC_CONC_GLU_THRESHOLD_HYPO^MDC|m.0.x.a|36.0|264274^MDC_DIM_MILLI_G_PER_DL^MDC|||||R OBX|n|NM|8418017^MDC_CONC_GLU_THRESHOLD_HYPO^MDC|m.0.x.a||264274^MDC_DIM_MILLI_G_PER_DL^MDC||NAN|||X • IF Step 11 was checked: OBX|n|NM|8418017^MDC_CONC_GLU_THRESHOLD_HYPO^MDC|m.0.x.a||264274^MDC_DIM_MILLI_G_PER_DL^MDC||NAN|||X OBX|n|NM|8418018^MDC_CONC_GLU_THRESHOLD_HYPER^MDC|m.0.x.b|360.0|264274^MDC_DIM_MILLI_G_PER_DL^MDC|||||R

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-057		
TP label		Whitepaper.Glucose rate of charge thresholds Compound Numeric Object - Handle Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	GRC Numeric 1; O		
Test purpose		Check that: PHG does not include Glucose rate of charge thresholds Compound Numeric Object – Handle Attribute in transcoder output. [OR] If PHG includes Glucose rate of charge thresholds Compound Numeric Object – Handle attribute in transcoder output, then its value shall be different than 0		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND C_MAN_BLE_054 AND C_MAN_BLE_056		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The PHD has manually entered Rate of Decrease and Increase Alert Level values stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 000**1** 0000 (MSB → LSB). Rate of Increase/Decrease Alerts supported. ii. Field: CGM Type ❑ Format: 4 bit		

	❑ Value: not relevant iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant 2. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ii. Field: Op Code – Response Codes ❑ Format: 8 bit ❑ Value: 0x15 (Rate of Decrease Alert Level Response) / 0x18 (Rate of Increase Alert Level Response) iii. Field: Operand ❑ Format: SFLOAT (mg/dL/min) ❑ Value: not relevant iv. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics, and then to perform a Rate of Decrease Alert Level procedure using Op Code "Get Rate of Decrease Alert Level" (0x14) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 5. The simulated PHD will respond with an indication including a "Rate of Decrease Alert Level Response" (0x15) Op Code and an SFLOAT containing the requested alert level in mg/dL/min. 6. Force the PHG to perform a Rate of Increase Alert Level procedure using Op Code "Get Rate of Increase Alert Level" (0x17) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 7. The simulated PHD will respond with an indication including a "Rate of Increase Alert Level Response" (0x18) Op Code and an SFLOAT containing the requested alert level in mg/dL/min. 8. Check in PHG transcoder output the Glucose rate of charge thresholds Compound Numeric Object – Handle attribute
Pass/Fail criteria	In Step 8, the Glucose rate of charge thresholds Compound Numeric Object – Handle attribute is not present or, if it is present then its value is different than 0
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Handle attribute is not present, or if it is present then: ❑ Object: Glucose rate of charge thresholds Compound Numeric Object ❑ Attribute-id: MDC_ATTR_ID_HANDLE (2337) ❑ Attribute-type: INT-U16 ❑ Attribute-value: Any value different than 0 b) WAN PCD-01 message PCD-01 message does not include segments with Handle attribute value

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-058		
TP label		Whitepaper. Glucose rate of charge thresholds Compound Numeric Object - Type Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	GRC Numeric 2; M		
Test purpose		Check that: PHG includes Glucose rate of charge thresholds Compound Numeric Object – Type attribute in transcoder output. [AND] Type is set to MDC_PART_PHD_DM | MDC_CONC_GLU_RATE_THRESHOLDS		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND C_MAN_BLE_054 AND C_MAN_BLE_056		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The PHD has manually entered Rate of Decrease and Increase Alert Level values stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 000**1** 0000 (MSB → LSB). Rate of Increase/Decrease Alerts supported. ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ii. Field: Op Code – Response Codes ❑ Format: 8 bit ❑ Value: 0x15 (Rate of Decrease Alert Level Response) / 0x18 (Rate of Increase Alert Level Response) iii. Field: Operand ❑ Format: SFLOAT (mg/dL/min) ❑ Value: not relevant iv. Field: E2E-CRC		

<table>
<tr><td></td><td>❑ This field is not present
3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state).
4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics, and then to perform a Rate of Decrease Alert Level procedure using Op Code “Get Rate of Decrease Alert Level” (0x14) (performing a write operation to the CGM Specific Ops Control Point characteristic’s Op Code).
5. The simulated PHD will respond with an indication including a “Rate of Decrease Alert Level Response” (0x15) Op Code and an SFLOAT containing the requested alert level in mg/dL/min.
6. Force the PHG to perform a Rate of Increase Alert Level procedure using Op Code “Get Rate of Increase Alert Level” (0x17) (performing a write operation to the CGM Specific Ops Control Point characteristic’s Op Code).
7. The simulated PHD will respond with an indication including a “Rate of Increase Alert Level Response” (0x18) Op Code and an SFLOAT containing the requested alert level in mg/dL/min.
8. Check in the PHG transcoder output the Glucose rate of charge thresholds Compound Numeric Object – Type attribute</td></tr>
<tr><td>Pass/Fail criteria</td><td>In Step 8, the Glucose rate of charge thresholds Compound Numeric Object – Type attribute is present and set to MDC_PART_PHD_DM | MDC_CONC_GLU_RATE_THRESHOLDS</td></tr>
<tr><td>Notes
(To assist manual testing)</td><td>Possible values in typical points of observation after transcoder output are:
a) IEEE 11073 Objects and Attributes
Type attribute is present:
❑ Object: Glucose rate of charge thresholds Compound Numeric Object
❑ Attribute-id: MDC_ATTR_ID_TYPE (2351)
❑ Attribute-type: SEQUENCE {partition (INT-U16), code (INT-U16)}
❑ Attribute-value:
• partition: MDC_PART_PHD_DM or 128 (dec) or 00 80 (hex)
• code: MDC_CONC_GLU_RATE_THRESHOLDS or 29412 (dec) or 72 E4 (hex)
b) WAN PCD-01 message
PCD-01 message includesa segments like this with Type attribute (check OBX-3):
OBX|n||8391520^MDC_CONC_GLU_RATE_THRESHOLDS^MDC|
m.0.x.0|||||||X|||[date_time]</td></tr>
</table>

<table>
<tr><td colspan="2">TP Id</td><td colspan="3">TP/LP-PAN/PHG/PHDTW/CGM/BV-059_A</td></tr>
<tr><td colspan="2">TP label</td><td colspan="3">Whitepaper. Glucose rate of charge thresholds Compound Numeric Object - Metric-Spec-Small Attribute 1</td></tr>
<tr><td rowspan="2">Coverage</td><td>Spec</td><td colspan="3">[Bluetooth PHDT v1.6]</td></tr>
<tr><td>Testable items</td><td>GRC Numeric 3; M</td><td>GRCNumeric 5; M</td><td></td></tr>
<tr><td colspan="2">Test purpose</td><td colspan="3">Check that:
PHG includes Glucose rate of charge thresholds Compound Numeric Object – Metric-Spec-Small attribute in transcoder output.
[AND]
Metric-Spec-Small is set to {0x604C} when the rate of change thresholds were updated manually by the user.</td></tr>
</table>

Applicability	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND C_MAN_BLE_054 AND C_MAN_BLE_056
Other PICS	
Initial condition	The PHG under test and the simulated PHD are in the Standby state.
Test procedure	1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The PHD has manually entered Rate of Decrease and Increase Alert Level values stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 000**1** 0000 (MSB → LSB). Rate of Increase/Decrease Alerts supported. ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ii. Field: Op Code – Response Codes ❑ Format: 8 bit ❑ Value: 0x15 (Rate of Decrease Alert Level Response) / 0x18 (Rate of Increase Alert Level Response) iii. Field: Operand ❑ Format: SFLOAT (mg/dL/min) ❑ Value: not relevant iv. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics, and then to perform a Rate of Decrease Alert Level procedure using Op Code "Get Rate of Decrease Alert Level" (0x14) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 5. The simulated PHD will respond with an indication including a "Rate of Decrease Alert Level Response" (0x15) Op Code and an SFLOAT containing the requested alert level in mg/dL/min. 6. Force the PHG to perform a Rate of Increase Alert Level procedure using Op Code "Get Rate of Increase Alert Level" (0x17) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code).

	7. The simulated PHD will respond with an indication including a "Rate of Increase Alert Level Response" (0x18) Op Code and an SFLOAT containing the requested alert level in mg/dL/min. 8. Check in the PHG transcoder output the Glucose rate of charge thresholds Compound Numeric Object – Metric-Spec-Small attribute
Pass/Fail criteria	In Step 8, the Patient low/high thresholds Compound Numeric Object – Metric-Spec-Small attribute is present and its value is {0x604C} (mss-avail-stored-data | mss-upd-aperiodic | mss-acc-agent-initiated | mss-cat-manual | mss-cat-setting)
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Metric-Spec-Small attribute is present: ❑ Object: Glucose rate of charge thresholds Compound Numeric Object ❑ Attribute-id: MDC_ATTR_METRIC_SPEC_SMALL (2630) ❑ Attribute-type: BITS-16 ❑ Attribute-value: 60 4C (hex) or BITS mss-avail-stored-data (1), mss-upd-aperiodic(2), mss-acc-agent-initiated(9), mss-cat-manual(12), mss-cat-setting(13) set to TRUE and remaining BITS set to FALSE b) WAN PCD-01 message PCD-01 message does not include segments with Metric-Spec-Small attribute value

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-059_B		
TP label		Whitepaper. Glucose rate of charge thresholds Compound Numeric Object - Metric-Spec-Small Attribute 2		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	GRC Numeric 3; M	GRCNumeric 4; M	
Test purpose		Check that: PHG includes Glucose rate of charge thresholds Compound Numeric Object – Metric-Spec-Small attribute in transcoder output. [AND] Metric-Spec-Small is set to {0x6044} when the Rate of Increase/Decrease Alert Level procedure has been executed		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND C_MAN_BLE_054 AND C_MAN_BLE_056 AND C_MAN_BLE_053 AND C_MAN_BLE_055		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 000**1** 0000 (MSB → LSB). Rate of Increase/Decrease Alerts supported.		

	ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ii. Field: Op Code – Response Codes ❑ Format: 8 bit ❑ Value: 0x15 (Rate of Decrease Alert Level Response) / 0x18 (Rate of Increase Alert Level Response) iii. Field: Operand ❑ Format: SFLOAT (mg/dL/min) ❑ Value: not relevant iv. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics. 5. Force the PHG to set the Rate of Decrease Alert Level by performing a Rate of Decrease Alert Level procedure using Op Code "Set Rate of Decrease Alert Level" (0x13) followed by a valid SFLOAT value (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code and Operand fields respectively). The simulated PHD will respond with an indication including a Response Op Code value of "Success". 6. Force the PHG to set the Rate of Increase Alert Level by performing a Rate of Increase Alert Level procedure using Op Code "Set Rate of Increase Alert Level" (0x16) followed by a valid SFLOAT value (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code and Operand fields respectively). The simulated PHD will respond with an indication including a Response Op Code value of "Success". 7. Then, force the PHG to perform a Rate of Decrease Alert Level procedure using Op Code "Get Rate of Decrease Alert Level" (0x14) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 8. The simulated PHD will respond with an indication including a "Rate of Decrease Alert Level Response" (0x15) Op Code and an SFLOAT containing the requested alert level in mg/dL/min. 9. Force the PHG to perform a Rate of Increase Alert Level procedure using Op Code "Get Rate of Increase Alert Level" (0x17) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 10. The simulated PHD will respond with an indication including a "Rate of Increase Alert Level Response" (0x18) Op Code and an SFLOAT containing the requested alert level in mg/dL/min. 11. Check in the PHG transcoder output the Glucose rate of charge thresholds Compound Numeric Object – Metric-Spec-Small attribute

Pass/Fail criteria	In Step 11, the Glucose rate of charge thresholds Compound Numeric Object – Metric-Spec-Small attribute is present and its value is {0x6044} (mss-avail-stored-data | mss-upd-aperiodic | mss-acc-agent-initiated | mss-cat-setting)
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Metric-Spec-Small attribute is present: ❑ Object: Glucose rate of charge thresholds Compound Numeric Object ❑ Attribute-id: MDC_ATTR_METRIC_SPEC_SMALL (2630) ❑ Attribute-type: BITS-16 ❑ Attribute-value: 60 44 (hex) or BITS mss-avail-stored-data (1), mss-upd-aperiodic(2), mss-acc-agent-initiated(9), mss-cat-setting(13) set to TRUE and remaining BITS set to FALSE b) WAN PCD-01 message PCD-01 message does not include segments with Metric-Spec-Small attribute value

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-060		
TP label		Whitepaper. Glucose rate of charge thresholds Compound Numeric Object – Metric-Structure-Small Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	GRC Numeric 6; M		
Test purpose		Check that: PHG includes Glucose rate of charge thresholds Compound Numeric Object – Metric-Structure-Small attribute in transcoder output. [AND] Metric-Structure-Small is set to {0x40, 0x02}		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND C_MAN_BLE_054 AND C_MAN_BLE_056		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The PHD has manually entered Rate of Decrease and Increase Alert Level values stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 000**1** 0000 (MSB → LSB). Rate of Increase/Decrease Alerts supported. ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location		

	❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ❑ Value: 0x15 (Rate of Decrease Alert Level Response) / 0x18 (Rate of Increase Alert Level Response) ii. Field: Operand ❑ Format: SFLOAT (mg/dL/min) ❑ Value: not relevant iii. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics, and then to perform a Rate of Decrease Alert Level procedure using Op Code "Get Rate of Decrease Alert Level" (0x14) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 5. The simulated PHD will respond with an indication including a "Rate of Decrease Alert Level Response" (0x15) Op Code and an SFLOAT containing the requested alert level in mg/dL/min. 6. Force the PHG to perform a Rate of Increase Alert Level procedure using Op Code "Get Rate of Increase Alert Level" (0x17) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 7. The simulated PHD will respond with an indication including a "Rate of Increase Alert Level Response" (0x18) Op Code and an SFLOAT containing the requested alert level in mg/dL/min. 8. Check in PHG transcoder output the Glucose rate of charge thresholds Compound Numeric Object – Metric-Structure-Small attribute
Pass/Fail criteria	In Step 8, the Glucose rate of charge thresholds Compound Numeric Object – Metric-Structure-Small attribute is present and set to 0x40 (ms-struct-compound), 0x02 (number of components is 2)
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Metric-Structure-Small attribute is present: ❑ Object: Glucose rate of charge thresholds Compound Numeric Object ❑ Attribute-id: MDC_ATTR_METRIC_STRUCT_SMALL (2675) ❑ Attribute-type: SEQUENCE {ms-struct (INT-U8), ms-comp-no (INT-U8)} ❑ Attribute-value: • ms-struct: 0x40 (ms-struct-compound) • ms-comp-no: 0x02 (number of components) b) WAN PCD-01 message PCD-01 message does not include segments with Metric-Structure-Small attribute value

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-061		
TP label		Whitepaper. Glucose rate of charge thresholds Compound Numeric Object – Metric-Id-List Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	GRC Numeric 7; M		
Test purpose		Check that: PHG includes Glucose rate of charge thresholds Compound Numeric Object – Metric-Id-List attribute in transcoder output. [AND] Metric-Id-List is set to { 0x0002, 0x0004, MDC_CONC_GLU_RATE_THRESHOLD_INCREASE, MDC_CONC_GLU_RATE_THRESHOLD_DECREASE }		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND C_MAN_BLE_054 AND C_MAN_BLE_056		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The PHD has manually entered Rate of Decrease and Increase Alert Level values stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 000**1** 0000 (MSB → LSB). Rate of Increase/Decrease Alerts supported. ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ❑ Value: 0x15 (Rate of Decrease Alert Level Response) / 0x18 (Rate of Increase Alert Level Response) ii. Field: Operand ❑ Format: SFLOAT (mg/dL/min) ❑ Value: not relevant iii. Field: E2E-CRC		

	❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics, and then to perform a Rate of Decrease Alert Level procedure using Op Code "Get Rate of Decrease Alert Level" (0x14) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 5. The simulated PHD will respond with an indication including a "Rate of Decrease Alert Level Response" (0x15) Op Code and an SFLOAT containing the requested alert level in mg/dL/min. 6. Force the PHG to perform a Rate of Increase Alert Level procedure using Op Code "Get Rate of Increase Alert Level" (0x17) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 7. The simulated PHD will respond with an indication including a "Rate of Increase Alert Level Response" (0x18) Op Code and an SFLOAT containing the requested alert level in mg/dL/min. 8. Check in PHG transcoder output the Glucose rate of charge thresholds Compound Numeric Object – Metric-Id-List attribute
Pass/Fail criteria	In Step 8, the Glucose rate of charge thresholds Compound Numeric Object – Metric-Id-List attribute is present and set to 0x0002 (count of metric ids is 2), 0x0004 (list length is 4 octets), MDC_CONC_GLU_RATE_THRESHOLD_INCREASE, MDC_CONC_GLU_RATE_THRESHOLD_DECREASE
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Metric-Id-List attribute is present: ❑ Object: Glucose rate of charge thresholds Compound Numeric Object ❑ Attribute-id: MDC_ATTR_ID_PHYSIO_LIST (2678) ❑ Attribute-type: SEQUENCE OF [{OID-Type(INT-U16)}] ❑ Attribute-value: 0x0002 (number of elements), 0x0004 (length of the sequence), followed by • First element: MDC_CONC_GLU_RATE_THRESHOLD_INCREASE (0x72E5) • Second element: MDC_CONC_GLU_RATE_THRESHOLD_DECREASE (0x72E6) b) WAN PCD-01 message PCD-01 message includes two segments like these with Metric-Id-List attribute values (check OBX-3 in both segments): OBX|n|NM|8391521^MDC_CONC_GLU_RATE_THRESHOLD_INCREASE^MDC|m.0.x.a|[value]||266868^MDC_DIM_MILLI_G_PER_DL_PER_MIN^MDC|||||R OBX|n|NM|8391522^MDC_CONC_GLU_RATE_THRESHOLD_DECREASE^MDC|m.0.x.b|[value]||266868^MDC_DIM_MILLI_G_PER_DL_PER_MIN^MDC |||||R

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-062		
TP label		Whitepaper. Glucose rate of charge thresholds Compound Numeric Object – Unit-Code Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	GRC Numeric 8; M		
Test purpose		Check that:		

	PHG includes Glucose rate of charge thresholds Compound Numeric Object – Unit-Code attribute in transcoder output. [AND] Unit-Code is set to MDC_DIM_MILLI_G_PER_DL_PER_MIN
Applicability	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND C_MAN_BLE_054 AND C_MAN_BLE_056
Other PICS	
Initial condition	The PHG under test and the simulated PHD are in the Standby state.
Test procedure	1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The PHD has manually entered Rate of Decrease and Increase Alert Level values stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 000**1** 0000 (MSB → LSB). Rate of Increase/Decrease Alerts supported. ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ❑ Value: 0x15 (Rate of Decrease Alert Level Response) / 0x18 (Rate of Increase Alert Level Response) ii. Field: Operand ❑ Format: SFLOAT (mg/dL/min) ❑ Value: not relevant iii. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics, and then to perform a Rate of Decrease Alert Level procedure using Op Code "Get Rate of Decrease Alert Level" (0x14) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 5. The simulated PHD will respond with an indication including a "Rate of Decrease Alert Level Response" (0x15) Op Code and an SFLOAT containing the requested alert level in mg/dL/min.

	6. Force the PHG to perform a Rate of Increase Alert Level procedure using Op Code "Get Rate of Increase Alert Level" (0x17) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 7. The simulated PHD will respond with an indication including a "Rate of Increase Alert Level Response" (0x18) Op Code and an SFLOAT containing the requested alert level in mg/dL/min. 8. Check in PHG transcoder output the Glucose rate of charge thresholds Compound Numeric Object – Unit-Code attribute
Pass/Fail criteria	In Step 8, the Glucose rate of charge thresholds Compound Numeric Object – Unit-Code attribute is present and set to MDC_DIM_ MILLI_G_PER_DL_PER_MIN
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Unit-Code attribute is present: ❑ Object: Glucose rate of charge thresholds Compound Numeric Object ❑ Attribute-id: MDC_ATTR_UNIT_CODE (2454) ❑ Attribute-type: OID-Type ❑ Attribute-value: MDC_DIM_ MILLI_G_PER_DL_PER_MIN or 4724 (dec) or 0x1274 (hex) b) WAN PCD-01 message PCD-01 message includes two segments like these with Unit-Code attribute value (check OBX-6 in both segments): OBX|n|NM|8391521^MDC_CONC_GLU_RATE_THRESHOLD_INCREASE^MDC| m.0.x.a|[value]|266868^MDC_DIM_MILLI_G_PER_DL_PER_MIN^MDC|||||R OBX|n|NM|8391522^MDC_CONC_GLU_RATE_THRESHOLD_DECREASE^MDC| m.0.x.b|[value]|266868^MDC_DIM_MILLI_G_PER_DL_PER_MIN^MDC |||||R

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-063		
TP label		Whitepaper. Glucose rate of charge thresholds Compound Numeric Object – Base-Offset-Time-Stamp Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	GRC Numeric 9; M	BaseOffset 1; M	
Test purpose		Check that: PHG includes Glucose rate of charge thresholds Compound Numeric Object – Base-Offset-Time-Stamp Attribute [AND] Base-Offset-Time-Stamp attribute is set to the correct value according to Base-Offset time stamp derivation (Base-Offset-Time-Stamp attribute will be derived from the collector's time at the time of collection)		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND C_MAN_BLE_054 AND C_MAN_BLE_056		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The PHD has manually entered Rate of Decrease and Increase Alert Level values stored.		

	2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 000**1** 0000 (MSB → LSB). Rate of Increase/Decrease Alerts supported. ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16 ❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ❑ Value: 0x15 (Rate of Decrease Alert Level Response) / 0x18 (Rate of Increase Alert Level Response) ii. Field: Operand ❑ Format: SFLOAT (mg/dL/min) ❑ Value: not relevant iii. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics, and then to perform a Rate of Decrease Alert Level procedure using Op Code "Get Rate of Decrease Alert Level" (0x14) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 5. The simulated PHD will respond with an indication including a "Rate of Decrease Alert Level Response" (0x15) Op Code and an SFLOAT containing the requested alert level in mg/dL/min. 6. Force the PHG to perform a Rate of Increase Alert Level procedure using Op Code "Get Rate of Increase Alert Level" (0x17) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 7. The simulated PHD will respond with an indication including a "Rate of Increase Alert Level Response" (0x18) Op Code and an SFLOAT containing the requested alert level in mg/dL/min. 8. Check in the PHG transcoder output the Glucose rate of charge thresholds Compound Numeric Object – Base-Offset-Time-Stamp attribute
Pass/Fail criteria	In Step 8, the Glucose rate of charge thresholds Compound Numeric Object – Base-Offset-Time-Stamp attribute is present and it is set to the collector's time at the time of collection.
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Base-Offset-Time-Stamp attribute is present:

	❑ Object: Glucose rate of charge thresholds Compound Numeric Object ❑ Attribute-id: MDC_ATTR_TIME_STAMP_BO (2690) ❑ Attribute-type: SEQUENCE {bo-seconds (INT-U32), bo-fraction (INT-U16), bo-time-offset (INT-I16)} ❑ Attribute-value: collector's time at the time of collection. b) WAN PCD-01 message PCD-01 message includesa segments like this with Base-Offset-Time-Stamp attribute (check OBX-14): OBX|n||8391520^MDC_CONC_GLU_RATE_THRESHOLDS^MDC|m.0.x.0||||||X|||[value described in a) coded in DTM format]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-064		
TP label		Whitepaper. Glucose rate of charge thresholds Compound Numeric Object – Compound-Basic-Nu-Observed-Value Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	GRC Numeric 10; M		
Test purpose		Check that: PHG includes Glucose rate of charge thresholds Compound Numeric Object Compound-Basic-Nu-Observed-Value attribute in transcoder output. [AND] Compound-Basic-Nu-Observed-Value attribute is set to the correct value.		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND C_MAN_BLE_054 AND C_MAN_BLE_056		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The PHD has manually entered Rate of Decrease and Increase Alert Level values stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature ❑ Format: 24 bit ❑ Value: 0000 0000 0000 0000 000**1** 0000 (MSB → LSB). Rate of Increase/Decrease Alerts supported. ii. Field: CGM Type ❑ Format: 4 bit ❑ Value: not relevant iii. Field: CGM Sample Location ❑ Format: 4 bit ❑ Value: not relevant iv. Field: E2E-CRC ❑ Format: uint16		

	❑ Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code ❑ Format: uint8 ❑ Value: 0x15 (Rate of Decrease Alert Level Response) / 0x18 (Rate of Increase Alert Level Response) ii. Field: Operand ❑ Format: SFLOAT (mg/dL/min) ❑ Value: 9.0 (Rate of Decrease Alert Level Response) / 9.0 (Rate of Increase Alert Level Response) iii. Field: E2E-CRC ❑ This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics, and then to perform a Rate of Decrease Alert Level procedure using Op Code "Get Rate of Decrease Alert Level" (0x14) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 5. The simulated PHD will respond with an indication including a "Rate of Decrease Alert Level Response" (0x15) Op Code and an SFLOAT containing the requested alert level in mg/dL/min. 6. Force the PHG to perform a Rate of Increase Alert Level procedure using Op Code "Get Rate of Increase Alert Level" (0x17) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 7. The simulated PHD will respond with an indication including a "Rate of Increase Alert Level Response" (0x18) Op Code and an SFLOAT containing the requested alert level in mg/dL/min. 8. Check in PHG transcoder output the Glucose rate of charge thresholds Compound Numeric Object – Compound-Basic-Nu-Observed-Value attribute
Pass/Fail criteria	In Step 8, the Glucose rate of charge thresholds Compound Numeric Object – Compound-Basic-Nu-Observed-Value attributeis set to 0x0002 (count of components is 2), 0x0004 (component list length is 4 octets), the Rate of Increase Alert Level Response Operand followed by the Rate of Decrease Alert Level Response Operand
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Compound-Basic-Nu-Observed-Value attribute is present: ❑ Object: Glucose rate of charge thresholds Compound Numeric Object ❑ Attribute-id: MDC_ATTR_NU_CMPD_VAL_OBS_BASIC (2677) ❑ Attribute-type: SEQUENCE OF [{SFLOAT}] ❑ Attribute-value: 0x0002 (number of elements), 0x0004 (length of the sequence), followed by • First element (Rate of Increase Alert Level Response Operand): 00 09 (hex) or F0 5A (hex) or E3 84 (hex) or 9.0 (dec) • Second element (Rate of Decrease Alert Level Response Operand): 00 09 (hex) or F0 5A (hex) or E3 84 (hex) or 9.0 (dec) b) WAN PCD-01 message PCD-01 message includes two segments like these with Compound-Basic-Nu-Observed-Value attribute value (check OBX-5 in both segments): OBX|n|NM|8391521^MDC_CONC_GLU_RATE_THRESHOLD_INCREASE^MDC|m.0.x.a|9.0|266868^MDC_DIM_MILLI_G_PER_DL_PER_MIN^MDC|||||R

	OBX|n|NM|8391522^MDC_CONC_GLU_RATE_THRESHOLD_DECREASE^MDC| m.0.x.b|9.0|266868^MDC_DIM_MILLI_G_PER_DL_PER_MIN^MDC |||||R

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-065		
TP label		Whitepaper. PHD DM Status Enumeration Object - Handle Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	PHDM Enumeration 1; O		
Test purpose		Check that: PHG does not include PHD DM Status Enumeration Object – Handle Attribute in transcoder output. [OR] If PHG includes PHD DM Status Enumeration Object – Handle attribute in transcoder output, then its value shall be different than 0		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature • Format: 24 bit • Value: 0000 0000 0000 **1**0**1**0 0000 0000 (MSB → LSB). Low Battery detection supported, General Device Fault supported. ii. Field: CGM Type • Format: 4 bit • Value: not relevant iii. Field: CGM Sample Location • Format: 4 bit • Value: not relevant iv. Field: E2E-CRC • Format: uint16 • Value: not relevant b. CGM Status (0x2AA8) i. Field: Time Offset • Format: uint16 • Value: not relevant. ii. Field: CGM Status • Format: 24 bit		

	• Value: not relevant iii. Field: E2E-CRC • This field is not included c. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: 00**1**0 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: not Relevant iv. Field: Time Offset • Format: uint16 • Value: not relevant v. Field: Sensor Status Annunciation • Format: 8 bit • Value: not relevant vi. Field: CGM Trend Information (mg/dL) • This field is not included vii. Field: CGM Quality • This field is not included viii. Field: E2E-CRC • This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed (Connection state), force the PHG under test to read the CGM Feature and CGM Session Start Time characteristics. 5. The simulated PHD sends the Measurement to PHG under test 6. Check in the PHG transcoder output the PHD DM Status Enumeration Object– Handle attribute 7. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP). The simulated PHD sends the temporarily stored CGM measurement to the PHG under test 8. Check in the PHG transcoder output the PHD DM Status Enumeration Object – Handle attribute 9. Force the PHG under test to read the CGM Status characteristic to actively request the status of the CGM sensor. 10. Check in the PHG transcoder output the PHD DM Status Enumeration Object – Handle attribute
Pass/Fail criteria	In Step 6, 8 and 10, the PHD DM Status Enumeration Object – Handle attribute is not present or, if it is present then its value is different than 0
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes

	Handle attribute is not present, or if it is present then: ❑ Object: PHD DM Status Enumeration Object ❑ Attribute-id: MDC_ATTR_ID_HANDLE (2337) ❑ Attribute-type: INT-U16 ❑ Attribute-value: Any value different than 0 b) WAN PCD-01 message PCD-01 message does not include segments with Handle attribute value

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-066		
TP label		Whitepaper. PHD DM Status Enumeration Object - Type Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	PHDM Enumeration 2; M		
Test purpose		Check that: PHG includes PHD DM Status Enumeration Object – Type attribute in transcoder output. [AND] Type is set to MDC_PART_PHD_DM | MDC_PHD_DM_DEV_STAT		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature • Format: 24 bit • Value: 0000 0000 0000 **1**0**1**0 0000 0000 (MSB → LSB). Low Battery detection supported, General Device Fault supported. ii. Field: CGM Type • Format: 4 bit • Value: not relevant iii. Field: CGM Sample Location • Format: 4 bit • Value: not relevant iv. Field: E2E-CRC • Format: uint16 • Value: not relevant b. CGM Status (0x2AA8) i. Field: Time Offset		

- Format: uint16
- Value: not relevant.

ii. Field: CGM Status

- Format: 24 bit
- Value: not relevant

iii. Field: E2E-CRC

- This field is not included

c. CGM Measurement (0x2AA7)

i. Field: Size

- Format: uint8

ii. Field: Flags

- Format: 8 bit
- Value: 00**1**0 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present.

iii. Field: CGM Glucose Concentration (mg/dL)

- Format: SFLOAT
- Value: not Relevant

iv. Field: Time Offset

- Format: uint16
- Value: not relevant

v. Field: Sensor Status Annunciation

- Format: 8 bit
- Value: not relevant

vi. Field: CGM Trend Information (mg/dL)

- This field is not included

vii. Field: CGM Quality

- This field is not included

viii. Field: E2E-CRC

- This field is not included

3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state).
4. When the pairing has been completed (Connection state), force the PHG under test to read the CGM Feature and CGM Session Start Time characteristics.
5. The simulated PHD sends the Measurement to the PHG under test.
6. Check in PHG transcoder output the PHD DM Status Enumeration Object– Type attribute
7. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP). The simulated PHD sends the temporarily stored CGM measurement to the PHG under test
8. Check in the PHG transcoder output the PHD DM Status Enumeration Object – Type attribute
9. Force the PHG under test to read the CGM Status characteristic to actively request the status of the CGM sensor.
10. Check in the PHG transcoder output the PHD DM Status Enumeration Object – Type attribute

Pass/Fail criteria	In Step 6, 8 and 10, the PHD DM Status Enumeration Object – Type attribute is present and its value is MDC_PART_PHD_DM | MDC_PHD_DM_DEV_STAT
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Type attribute is present: ❑ Object: PHD DM Status Enumeration Object ❑ Attribute-id: MDC_ATTR_ID_TYPE (2351) ❑ Attribute-type: SEQUENCE {partition (INT-U16), code (INT-U16)} ❑ Attribute-value: • partition: MDC_PART_PHD_DM or 128 (dec) or 00 80 (hex) • code: MDC_PHD_DM_DEV_STAT or 20000 (dec) or 4E 20 (hex) b) WAN PCD-01 message PCD-01 message includes a segments like this with Type attribute (check OBX-3): OBX|n|CWE|8408608^MDC_PHD_DM_DEV_STAT^MDC| m.0.0.a|[value]||||||R|||[date_time]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-067		
TP label		Whitepaper. PHD DM Status Enumeration Object - Supplemental-Types Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	PHDM Enumeration 3; O		
Test purpose		Check that: PHG may include PHD DM Status Enumeration Object – Supplemental-Types attribute in transcoder output. [AND] If present, Supplemental-Types is set to a correct value		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature • Format: 24 bit • Value: 0000 0000 0000 **1**0**1**0 0000 0000 (MSB → LSB). Low Battery detection supported, General Device Fault supported. ii. Field: CGM Type • Format: 4 bit • Value: not relevant		

iii. Field: CGM Sample Location

- Format: 4 bit
- Value: not relevant

iv. Field: E2E-CRC

- Format: uint16
- Value: not relevant

b. CGM Status (0x2AA8)

i. Field: Time Offset

- Format: uint16
- Value: not relevant.

ii. Field: CGM Status

- Format: 24 bit
- Value: not relevant

iii. Field: E2E-CRC

- This field is not included

c. CGM Measurement (0x2AA7)

i. Field: Size

- Format: uint8

ii. Field: Flags

- Format: 8 bit
- Value: 00**1**0 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present.

iii. Field: CGM Glucose Concentration (mg/dL)

- Format: SFLOAT
- Value: not Relevant

iv. Field: Time Offset

- Format: uint16
- Value: not relevant

v. Field: Sensor Status Annunciation

- Format: 8 bit
- Value: not relevant

vi. Field: CGM Trend Information (mg/dL)

- This field is not included

vii. Field: CGM Quality

- This field is not included

viii. Field: E2E-CRC

- This field is not included

3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state).
4. When the pairing has been completed (Connection state), force the PHG under test to read the CGM Feature and CGM Session Start Time characteristics.
5. The simulated PHD sends the Measurement to the PHG under test.

<table>
<tr><td></td><td>6. Check in the PHG transcoder output the PHD DM Status Enumeration Object–Supplemental-Types attribute
7. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP). The simulated PHD sends the temporarily stored CGM measurement to the PHG under test.
8. Check in the PHG transcoder output the PHD DM Status Enumeration Object – Supplemental-Types attribute
9. Force the PHG under test to read the CGM Status characteristic to actively request the status of the CGM sensor.
10. Check in the PHG transcoder output the PHD DM Status Enumeration Object – Supplemental-Types attribute</td></tr>
<tr><td>Pass/Fail criteria</td><td>In Step 6, 8 and 10, the PHD DM Status Enumeration Object – Supplemental-Types attribute may be present. If present, it is set to one of the following values: MDC_CGM_DEV_TYPE_SENSOR, MDC_CGM_DEV_TYPE_TRANSMITTER, MDC_CGM_DEV_TYPE_RECEIVER, or MDC_CGM_DEV_TYPE_OTHER</td></tr>
<tr><td>Notes
(To assist manual testing)</td><td>Possible values in typical points of observation after transcoder output are:
a) IEEE 11073 Objects and Attributes
Supplemental-Types attribute may be present. If it is present:
❑ Object: PHD DM Status Enumeration Object
❑ Attribute-id: MDC_ATTR_SUPPLEMENTAL_TYPES (2657)
❑ Attribute-type: SEQUENCE of SEQUENCE {partition (INT-U16), code (INT-U16)}
❑ Attribute-value:
• partition: MDC_PART_PHD_DM or 128 (dec) or 00 80 (hex) followed by one of:
• code: MDC_CGM_DEV_TYPE_SENSOR or 29460 (dec) or 73 14 (hex)
• code: MDC_CGM_DEV_TYPE_TRANSMITTER or 29461 (dec) or 73 15 (hex)
• code: MDC_CGM_DEV_TYPE_RECEIVER or 29462 (dec) or 73 16 (hex)
• code: MDC_CGM_DEV_TYPE_OTHER or 29463 (dec) or 73 17 (hex)
b) WAN PCD-01 message
If Supplemental-Types attribute is present, PCD-01 message includes a facet OBX segment of the PHD DM Status OBX segment with Supplemental-Types attribute (check OBX-3 and OBX-5):
OBX|n|CWE|8408608^MDC_PHD_DM_DEV_STAT^MDC |m.0.0.a|[value]||||||R|||[date_time]
The following facet OBX segments are allowed:
OBX|n|CWE|68193^MDC_ATTR_SUPPLEMENTAL_TYPES^MDC|m.0.0.a.y| 8418068^MDC_CGM_DEV_TYPE_SENSOR^MDC||||||R
OBX|n|CWE|68193^MDC_ATTR_SUPPLEMENTAL_TYPES^MDC|m.0.0.a.y| 8418069^MDC_CGM_DEV_TYPE_TRANSMITTER^MDC||||||R
OBX|n|CWE|68193^MDC_ATTR_SUPPLEMENTAL_TYPES^MDC|m.0.0.a.y| 8418070^MDC_CGM_DEV_TYPE_RECEIVER^MDC||||||R
OBX|n|CWE|68193^MDC_ATTR_SUPPLEMENTAL_TYPES^MDC|m.0.0.a.y| 8418071^MDC_CGM_DEV_TYPE_OTHER^MDC||||||R</td></tr>
</table>

<table>
<tr><td colspan="2">TP Id</td><td colspan="3">TP/LP-PAN/PHG/PHDTW/CGM/BV-068</td></tr>
<tr><td colspan="2">TP label</td><td colspan="3">Whitepaper. PHD DM Status Enumeration Object – Metric-Spec-Small Attribute</td></tr>
<tr><td rowspan="2">Coverage</td><td>Spec</td><td colspan="3">[Bluetooth PHDT v1.6]</td></tr>
<tr><td>Testable</td><td>PHDM Enumeration 4; M</td><td></td><td></td></tr>
</table>

items	
Test purpose	Check that: PHG includes PHD DM Status Enumeration Object – Metric-Spec-Small attribute in transcoder output. [AND] Metric-Spec-Small is set to {0xF040}.
Applicability	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043
Other PICS	
Initial condition	The PHG under test and the simulated PHD are in the Standby state.
Test procedure	1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature • Format: 24 bit • Value: 0000 0000 0000 **1**0**1**0 0000 0000 (MSB → LSB). Low Battery detection supported, General Device Fault supported. ii. Field: CGM Type • Format: 4 bit • Value: not relevant iii. Field: CGM Sample Location • Format: 4 bit • Value: not relevant iv. Field: E2E-CRC • Format: uint16 • Value: not relevant b. CGM Status (0x2AA8) i. Field: Time Offset • Format: uint16 • Value: not relevant. ii. Field: CGM Status • Format: 24 bit • Value: not relevant iii. Field: E2E-CRC • This field is not included c. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit

	- Value: 00**1**0 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present. iii. Field: CGM Glucose Concentration (mg/dL) - Format: SFLOAT - Value: not Relevant iv. Field: Time Offset - Format: uint16 - Value: not relevant v. Field: Sensor Status Annunciation - Format: 8 bit - Value: not relevant vi. Field: CGM Trend Information (mg/dL) - This field is not included vii. Field: CGM Quality - This field is not included viii. Field: E2E-CRC - This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed (Connection state), force the PHG under test to read the CGM Feature and CGM Session Start Time characteristics. 5. The simulated PHD sends the Measurement to the PHG under test. 6. Check in the PHG transcoder output the PHD DM Status Enumeration Object– Metric-Spec-Small attribute 7. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP). The simulated PHD sends the temporarily stored CGM measurement to the PHG under test. 8. Check in the PHG transcoder output the PHD DM Status Enumeration Object – Metric-Spec-Small attribute 9. Force the PHG under test to read the CGM Status characteristic to actively request the status of the CGM sensor. 10. Check in PHG transcoder output the PHD DM Status Enumeration Object – Metric-Spec-Small attribute
Pass/Fail criteria	In Step 6, 8 and 10, the PHD DM Status Enumeration Object – Metric-Spec-Small attribute is present and its value is 0xF040 (mss-avail-intermittent | mss-upd-aperiodic | mss-msmt-aperiodic | mss-acc-agent-initiated | mss-avail-stored-data)
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Metric-Spec-Small attribute is present: ❑ Object: PHD DM Status Enumeration Object ❑ Attribute-id: MDC_ATTR_METRIC_SPEC_SMALL (2630) ❑ Attribute-type: BITS-16 ❑ Attribute-value: F0 40 (hex) or BITS mss-avail-intermittent (0), mss-avail-stored-data (1), mss-upd-aperiodic (2), mss-msmt-aperiodic (3), mss-acc-agent-initiated(9) set to TRUE and remaining BITS set to FALSE b) WAN PCD-01 message

	PCD-01 message does not include segments with Metric-Spec-Small attribute value

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-069		
TP label		Whitepaper. PHD DM Status Enumeration Object – Base-Offset-Time-Stamp Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	PHDM Enumeration 5; M	BaseOffset 3; M	
Test purpose		Check that: PHG includes PHD DM Status Enumeration Object Base-Offset-Time-Stamp attribute in transcoder output. [AND] Base-Offset-Time-Stamp attribute is set to the correct value according to Base-Offset time stamp derivation		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature • Format: 24 bit • Value: 0000 0000 0000 **1**0**1**0 0000 0000 (MSB → LSB). Low Battery detection supported, General Device Fault supported. ii. Field: CGM Type • Format: 4 bit • Value: not relevant iii. Field: CGM Sample Location • Format: 4 bit • Value: not relevant iv. Field: E2E-CRC • Format: uint16		

- Value: not relevant

b. CGM Status (0x2AA8)

 i. Field: Time Offset
  - Format: uint16
  - Value: 5 (min)

 ii. Field: CGM Status
  - Format: 24 bit
  - Value: not relevant

 iii. viii. Field: E2E-CRC
  - This field is not included

c. CGM Measurement (0x2AA7)

 i. Field: Size
  - Format: uint8

 ii. Field: Flags
  - Format: 8 bit
  - Value: 00**1**0 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present.

 iii. Field: CGM Glucose Concentration (mg/dL)
  - Format: SFLOAT
  - Value: not Relevant

 iv. Field: Time Offset
  - Format: uint16
  - Value: 20 (min)

 v. Field: Sensor Status Annunciation
  - Format: 8 bit
  - Value: not relevant

 vi. Field: CGM Trend Information (mg/dL)
  - This field is not included

 vii. Field: CGM Quality
  - This field is not included

 viii. Field: E2E-CRC
  - This field is not included

d. CGM Session Start Time (0x2AAA)

 i. Field: Session Start Time
  - Format: {uint16, uint8, uint8, uint8, uint8, uint8}
  - Value: {2016, 5, 12, 16, 39, 27} (May 12, 2016, 16:39:27)

 ii. Field: Time Zone
  - Format: sint8
  - Value: 4 (UTC+1:00)

 iii. Field: DST-Offset
  - Format: uint8
  - Value: 4 (Daylight Time (+1h))

<table>
<tr><td></td><td>
iv. Field: E2E-CRC
• This field is not included
3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state).
4. When the pairing has been completed (Connection state), force the PHG under test to read the CGM Feature and CGM Session Start Time characteristics.
5. The simulated PHD sends the Measurement to the PHG under test.
6. Check in the PHG transcoder output PHD DM Status Enumeration Object – Base-Offset-Time-Stamp attribute.
7. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP). The simulated PHD sends the temporarily stored CGM measurement to the PHG under test.
8. Check in the PHG transcoder output the PHD DM Status Enumeration Object - Base-Offset-Time-Stamp attribute.
9. Force the PHG under test to read the CGM Status characteristic to actively request the status of the CGM sensor.
10. Check in the PHG transcoder output the PHD DM Status Enumeration Object - Base-Offset-Time-Stamp attribute.
</td></tr>
<tr><td>Pass/Fail criteria</td><td>
• In Step 6 and 8 the PHD DM Status Enumeration Object - Base-Offset-Time-Stamp attribute is present and set is to the addition of CGM Session Start Time characteristic's Session Start Time field (May 12, 2016, 16:39:27) plus CGM Measurement characteristic's Time Offset field (20 min).
• In Step 10 the PHD DM Status Enumeration Object - Base-Offset-Time-Stamp attribute is present and set is to the addition of CGM Session Start Time characteristic's Session Start Time field (May 12, 2016, 16:39:27) plus CGM Status characteristic's Time Offset field (5 min).
</td></tr>
<tr><td>Notes
(To assist manual testing)</td><td>
Possible values in typical points of observation after transcoder output are:
a) IEEE 11073 Objects and Attributes
Base-Offset-Time-Stamp attribute is present:
❑ Object: PHD DM Status Enumeration Object
❑ Attribute-id: MDC_ATTR_TIME_STAMP_BO (2690)
❑ Attribute-type: SEQUENCE {bo-seconds (INT-U32), bo-fraction (INT-U16), bo-time-offset (INT-I16)}
❑ Attribute-value: addition of
• CGM Session Start Time characteristic Session Start Time field (May 12, 2016, 16:39:27)
• Steps 6 & 8
CGM Measurement characteristic Time Offset field (20m)
• Steps 10
CGM Status characteristic Time Offset field (5m)
Note that the same Base-Offset-Time-Stamp can have different representations depending on bo-time-offset value. If it is set to 20 min (CGM Measurement or CGM Status characteristic Time Offset field), then Base-Offset-Time-Stamp value shall be {3672059967, 0, 20} or {3672059967, 0, 5}
b) WAN PCD-01 message
PCD-01 message includes a segment like this with Base-Offset-Time-Stamp attribute value (check OBX-14):
OBX|n|CWE|8408608^MDC_PHD_DM_DEV_STAT^MDC|
m.0.0.a|[value]||||||R|||[value described in a) coded in DTM format]
</td></tr>
</table>

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-070		
TP label		Whitepaper. PHD DM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	PHDM Enumeration 6; M		
Test purpose		Check that: PHG includes PHD DM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str attribute in transcoder output. [AND] Enum-Observed-Value-Simple-Bit-Str is set to the correct value.		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature • Format: 24 bit • Value: 0000 0000 0000 **1**0**1**0 0000 0000 (MSB → LSB). Low Battery detection supported, General Device Fault supported. ii. Field: CGM Type • Format: 4 bit • Value: not relevant iii. Field: CGM Sample Location • Format: 4 bit • Value: not relevant iv. Field: E2E-CRC • Format: uint16 • Value: not relevant b. CGM Status (0x2AA8) i. Field: Time Offset • Format: uint16 • Value: not relevant. ii. Field: CGM Status • Format: 24 bit • Value: 0000 0000 0000 0000 0000 0010 (MSB -> LSB). Device Battery Low. iii. Field: E2E-CRC • Format: uint16		

	• Value: not relevant c. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: 00**1**0 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: not Relevant iv. Field: Time Offset • Format: uint16 • Value: not relevant v. Field: Sensor Status Annunciation • Format: 8 bit • Value: 0000 0010 (MSB -> LSB). Device Battery Low. vi. Field: CGM Trend Information (mg/dL) • This field is not included vii. Field: CGM Quality • This field is not included viii. Field: E2E-CRC • This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed (Connection state), force the PHG under test to read the CGM Feature and CGM Session Start Time characteristics. 5. The simulated PHD sends the Measurement to the PHG under test. 6. Check in PHG transcoder output the PHD DM Status Enumeration Object– Enum-Observed-Value-Simple-Bit-Str attribute 7. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP). The simulated PHD sends the temporarily stored CGM measurement to the PHG under test. 8. Check in the PHG transcoder output the PHD DM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str attribute 9. Force the PHG under test to read the CGM Status characteristic to actively request the status of the CGM sensor. 10. Check in the PHG transcoder output the PHD DM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str attribute 11. End current CGM session and start a new one. The simulated PHD will now have the following values in the specified fields: a. CGM Status (0x2AA8) i. Field: CGM Status • Format: 24 bit • Value: 0000 0000 0000 0000 0010 0000 (MSB -> LSB). General device fault has ocurred in the sensor.

	b. CGM Measurement (0x2AA7) i. Field: Flags • Format: 8 bit • Value: 00**1**0 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present. ii. Field: Sensor Status Annunciation • Format: 8 bit • Value: 0010 0000 (MSB -> LSB). General device fault has ocurred in the sensor. The rest of the fields will remain with the same value as in step 2. Repeat steps 3-10 to check in PHG transcoder output the PHD DM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str attribute like in 6, 8 and 10. 12. End current CGM session and start a new one. The simulated PHD will now have the following values in the specified fields: a. CGM Status (0x2AA8) i. Field: CGM Status • Format: 24 bit • Value: 0000 0000 0000 0001 0000 0000 (MSB -> LSB). Time synchronization between sensor and collector required. b. CGM Measurement (0x2AA7) i. Field: Flags • Format: 8 bit • Value: 0**1**00 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) present, Sensor Status Annunciation Field (Status-Octet) not present. ii. Field: Sensor Status Annunciation • Format: 8 bit • Value: 0000 0001 (MSB -> LSB). Time synchronization between sensor and collector required. The rest of the fields will remain with the same value as in step 2. Repeat steps 3-10 to check in PHG transcoder output the PHD DM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str attribute like in 6, 8 and 10.
Pass/Fail criteria	• In Step 6, 8 and 10, the PHD DM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str is present with bit 25 set to 1 (device-status-battery-low). Rest of bits set to 0. • In Step 11, the PHD DM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str is present with bit 5 set to 1 (device-status-error). Rest of bits set to 0. • In Step 12, the PHD DM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str is present with bit 16 set to 1 (device-status-service-time-sync-required). Rest of bits set to 0.
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Enum-Observed-Value-Simple-Bit-Str attribute is present: ❑ Object: PHD DM Status Enumeration Object ❑ Attribute-id: MDC_ATTR_ENUM_OBS_VAL_SIMP_BIT_STR (2661) ❑ Attribute-type: BITS-32

	❑ Attribute-value (Steps 6,8,10): 02 00 00 00 (hex) ❑ Attribute-value (Step 11): 00 00 00 20 (hex) ❑ Attribute-value (Step 12): 00 00 01 00 (hex) b) WAN PCD-01 message PCD-01 message includes a segment like this with Enum-Observed-Value-Basic-Bit-Str attribute value (check OBX-5): • Steps 6, 8 &10 OBX|n|CWE|8408608^MDC_PHD_DM_DEV_STAT^MDC|m.0.0.a|[1^device-status-battery-low(25)||||||R|||[date_time] • Step 11 OBX|n|CWE|8408608^MDC_PHD_DM_DEV_STAT^MDC|m.0.0.a|1^device-status-error(5)||||||R|||[date_time] • Step 12 OBX|n|CWE|8408608^MDC_PHD_DM_DEV_STAT^MDC|m.0.0.a|1^device-status-service-time-sync-required(16)||||||R|||[date_time]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-071		
TP label		Whitepaper. CGM Status Enumeration Object - Handle Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	CGM Enumeration 1; O		
Test purpose		Check that: PHG does not include CGM Status Enumeration Object – Handle Attribute in transcoder output. [OR] If PHG includes CGM Status Enumeration Object – Handle attribute in transcoder output, then its value shall be different than 0		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature • Format: 24 bit • Value: 0000 0000 0000 0**1**0**1** **1**0**11** **1111** (MSB → LSB). Sensor Type Error Detection supported, Device Specific Alert supported, Calibration supported, Sensor Temperature High-Low Detection supported, Patient High/Low Alerts supported, Hypo Alerts supported, Hyper Alerts supported, Rate of Increase/Decrease Alerts supported, Sensor Result High-Low Detection supported. ii. Field: CGM Type		

- Format: 4 bit
- Value: not relevant

iii. Field: CGM Sample Location

- Format: 4 bit
- Value: not relevant

iv. Field: E2E-CRC

- Format: uint16
- Value: not relevant

b. CGM Status (0x2AA8)

i. Field: Time Offset

- Format: uint16
- Value: not relevant.

ii. Field: CGM Status

- Format: 24 bit
- Value: not relevant

iii. Field: E2E-CRC

- This field is not included

c. CGM Measurement (0x2AA7)

i. Field: Size

- Format: uint8

ii. Field: Flags

- Format: 8 bit
- Value: 00**1**0 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present.

iii. Field: CGM Glucose Concentration (mg/dL)

- Format: SFLOAT
- Value: not Relevant

iv. Field: Time Offset

- Format: uint16
- Value: not relevant

v. Field: Sensor Status Annunciation

- Format: 8 bit
- Value: not relevant

vi. Field: CGM Trend Information (mg/dL)

- This field is not included

vii. Field: CGM Quality

- This field is not included

viii. Field: E2E-CRC

- This field is not included

3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state).
4. When the pairing has been completed (Connection state), force the PHG under test to read the CGM Feature and CGM Session Start Time characteristics.

	5. The simulated PHD sends the Measurement to the PHG under test. 6. Check in PHG transcoder output CGM Status Enumeration Object - Handle attribute. 7. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP). The simulated PHD sends the temporarily stored CGM measurement to the PHG under test. 8. Check in the PHG transcoder output the CGM Status Enumeration Object - Handle attribute. 9. Force the PHG under test to read the CGM Status characteristic to actively request the status of the CGM sensor. 10. Check in the PHG transcoder output the CGM Status Enumeration Object - Handle attribute.
Pass/Fail criteria	In Step 6, 8 and 10, the CGM Status Enumeration Object - Handle attribute is not present or, if it is present then its value is different than 0
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Handle attribute is not present, or if it is present then: ❑ Object: CGM Status Enumeration Object ❑ Attribute-id: MDC_ATTR_ID_HANDLE (2337) ❑ Attribute-type: INT-U16 ❑ Attribute-value: Any value different than 0 b) WAN PCD-01 message PCD-01 message does not include segments with Handle attribute value

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-072		
TP label		Whitepaper. CGM Status Enumeration Object - Type Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	CGM Enumeration 2; M		
Test purpose		Check that: PHG includes CGM Status Enumeration Object – Type attribute in transcoder output. [AND] Type is set to MDC_PART_PHD_DM | MDC_CGM_DEV_STAT		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature • Format: 24 bit		

- Value: 0000 0000 0000 0**1**0**1** **1**0**11** **1111** (MSB → LSB). Sensor Type Error Detection supported, Device Specific Alert supported, Calibration supported, Sensor Temperature High-Low Detection supported, Patient High/Low Alerts supported, Hypo Alerts supported, Hyper Alerts supported, Rate of Increase/Decrease Alerts supported, Sensor Result High-Low Detection supported.

ii. Field: CGM Type
- Format: 4 bit
- Value: not relevant

iii. Field: CGM Sample Location
- Format: 4 bit
- Value: not relevant

iv. Field: E2E-CRC
- Format: uint16
- Value: not relevant

b. CGM Status (0x2AA8)

i. Field: Time Offset
- Format: uint16
- Value: not relevant.

ii. Field: CGM Status
- Format: 24 bit
- Value: not relevant

iii. Field: E2E-CRC
- This field is not included

c. CGM Measurement (0x2AA7)

i. Field: Size
- Format: uint8

ii. Field: Flags
- Format: 8 bit
- Value: 00**1**0 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present.

iii. Field: CGM Glucose Concentration (mg/dL)
- Format: SFLOAT
- Value: not Relevant

iv. Field: Time Offset
- Format: uint16
- Value: not relevant

v. Field: Sensor Status Annunciation
- Format: 8 bit
- Value: not relevant

vi. Field: CGM Trend Information (mg/dL)
- This field is not included

vii. Field: CGM Quality
- This field is not included

	viii. Field: E2E-CRC • This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed (Connection state), force the PHG under test to read the CGM Feature and CGM Session Start Time characteristics. 5. The simulated PHD sends the Measurement to the PHG under test. 6. Check in the PHG transcoder output CGM Status Enumeration Object - Type attribute. 7. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP). The simulated PHD sends the temporarily stored CGM measurement to the PHG under test. 8. Check in the PHG transcoder output the CGM Status Enumeration Object - Type attribute. 9. Force the PHG under test to read the CGM Status characteristic to actively request the status of the CGM sensor. 10. Check in the PHG transcoder output the CGM Status Enumeration Object - Type attribute.
Pass/Fail criteria	In Step 6, 8 and 10, the CGM Status Enumeration Object - Type attribute is present and set to MDC_PART_PHD_DM | MDC_CGM_DEV_STAT
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Type attribute is not present, or if it is present then: ❑ Object: CGM Status Enumeration Object ❑ Attribute-id: MDC_ATTR_ID_TYPE (2351) ❑ Attribute-type: SEQUENCE {partition (INT-U16), code (INT-U16)} ❑ Attribute-value: • partition: MDC_PART_PHD_DM or 128 (dec) or 00 80 (hex) • code: MDC_CGM_DEV_STAT or 29452 (dec) or 73 0C (hex) b) WAN PCD-01 message PCD-01 message includesa segments like this with Type attribute (check OBX-3): OBX|n|CWE|8418060^MDC_CGM_DEV_STAT^MDC| m.0.0.a|[value]||||||R|||[date_time]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-073		
TP label		Whitepaper. CGM Status Enumeration Object – Metric-Spec-Small Attribute		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	CGM Enumeration 3; M		
Test purpose		Check that: PHG includes CGM Status Enumeration Object – Metric-Spec-Small attribute in transcoder output. [AND] Metric-Spec-Small is set to {0x F040}.		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		

Other PICS	
Initial condition	The PHG under test and the simulated PHD are in the Standby state.
Test procedure	1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature • Format: 24 bit • Value: 0000 0000 0000 0**1**0**1** **1**0**11** **1111** (MSB → LSB). Sensor Type Error Detection supported, Device Specific Alert supported, Calibration supported, Sensor Temperature High-Low Detection supported, Patient High/Low Alerts supported, Hypo Alerts supported, Hyper Alerts supported, Rate of Increase/Decrease Alerts supported, Sensor Result High-Low Detection supported. ii. Field: CGM Type • Format: 4 bit • Value: not relevant iii. Field: CGM Sample Location • Format: 4 bit • Value: not relevant iv. Field: E2E-CRC • Format: uint16 • Value: not relevant b. CGM Status (0x2AA8) i. Field: Time Offset • Format: uint16 • Value: not relevant. ii. Field: CGM Status • Format: 24 bit • Value: not relevant iii. Field: E2E-CRC • This field is not included c. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: 00**1**0 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: not Relevant

	iv. Field: Time Offset • Format: uint16 • Value: not relevant v. Field: Sensor Status Annunciation • Format: 8 bit • Value: not relevant vi. Field: CGM Trend Information (mg/dL) • This field is not included vii. Field: CGM Quality • This field is not included viii. Field: E2E-CRC • This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed (Connection state), force the PHG under test to read the CGM Feature and CGM Session Start Time characteristics. 5. The simulated PHD sends the Measurement to the PHG under test. 6. Check in the PHG transcoder output CGM Status Enumeration Object – Metric-Spec-Small attribute. 7. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP). The simulated PHD sends the temporarily stored CGM measurement to the PHG under test 8. Check in the PHG transcoder output the CGM Status Enumeration Object - Metric-Spec-Small attribute. 9. Force the PHG under test to read the CGM Status characteristic to actively request the status of the CGM sensor. 10. Check in the PHG transcoder output the CGM Status Enumeration Object - Metric-Spec-Small attribute.
Pass/Fail criteria	In Step 6, 8 and 10, the CGM Status Enumeration Object - Metric-Spec-Small attribute is present and set to 0xF040 (mss-avail-intermittent | mss-upd-aperiodic | mss-msmt-aperiodic | mss-acc-agent-initiated | mss-avail-stored-data)
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Metric-Spec-Small attribute is present: ❑ Object: CGM Status Enumeration Object ❑ Attribute-id: MDC_ATTR_METRIC_SPEC_SMALL (2630) ❑ Attribute-type: BITS-16 ❑ Attribute-value: 0xF040 (hex) or BITS mss-avail-intermittent (0), mss-avail-stored-data (1), mss-upd-aperiodic (2), mss-msmt-aperiodic(3), mss-acc-agent-initiated (9) set to TRUE and remaining BITS set to FALSE b) WAN PCD-01 message PCD-01 message does not include segments with Metric-Spec-Small attribute value

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-074
TP label		Whitepaper. CGM Status Enumeration Object – Base-Offset-Time-Stamp Attribute
Coverage	**Spec**	[Bluetooth PHDT v1.6]

	Testable items	CGM Enumeration 4; M	BaseOffset 3; M	
Test purpose		Check that: PHG includes CGM Status Enumeration Object Base-Offset-Time-Stamp attribute in transcoder output. [AND] Base-Offset-Time-Stamp attribute is set to the correct value according to Base-Offset time stamp derivation		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature • Format: 24 bit • Value: 0000 0000 0000 0**1**0**1** **1**0**11** **1111** (MSB → LSB). Sensor Type Error Detection supported, Device Specific Alert supported, Calibration supported, Sensor Temperature High-Low Detection supported, Patient High/Low Alerts supported, Hypo Alerts supported, Hyper Alerts supported, Rate of Increase/Decrease Alerts supported, Sensor Result High-Low Detection supported. ii. Field: CGM Type • Format: 4 bit • Value: not relevant iii. Field: CGM Sample Location • Format: 4 bit • Value: not relevant iv. Field: E2E-CRC • Format: uint16 • Value: not relevant b. CGM Status (0x2AA8) i. Field: Time Offset • Format: uint16 • Value: 5 (min) ii. Field: CGM Status • Format: 24 bit • Value: not relevant iii. Field: E2E-CRC • This field is not included c. CGM Measurement (0x2AA7) i. Field: Size		

	• Format: uint8 ii. Field: Flags • Format: 8 bit • Value: 00**1**0 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: not Relevant iv. Field: Time Offset • Format: uint16 • Value: 20 (min) v. Field: Sensor Status Annunciation • Format: 8 bit • Value: not relevant vi. Field: CGM Trend Information (mg/dL) • This field is not included vii. Field: CGM Quality • This field is not included viii. Field: E2E-CRC • This field is not included d. CGM Session Start Time (0x2AAA) i. Field: Session Start Time • Format: {uint16, uint8, uint8, uint8, uint8, uint8} • Value: {2016, 5, 12, 16, 39, 27} (May 12, 2016, 16:39:27) ii. Field: Time Zone • Format: sint8 • Value: 4 (UTC+1:00) iii. Field: DST-Offset • Format: uint8 • Value: 4 (Daylight Time (+1h)) iv. Field: E2E-CRC • This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed (Connection state), force the PHG under test to read the CGM Feature and CGM Session Start Time characteristics. 5. The simulated PHD sends the Measurement to PHG under test. 6. Check in the PHG transcoder output CGM Status Enumeration Object – Base-Offset-Time-Stamp attribute. 7. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP). The simulated PHD sends the temporarily stored CGM measurement to the PHG under test 8. Check in the PHG transcoder output the CGM Status Enumeration Object - Base-Offset-Time-Stamp attribute.

	9. Force the PHG under test to read the CGM Status characteristic to actively request the status of the CGM sensor. 10. Check in the PHG transcoder output the CGM Status Enumeration Object - Base-Offset-Time-Stamp attribute.
Pass/Fail criteria	• In Step 6 and 8 the CGM Status Enumeration Object - Base-Offset-Time-Stamp attribute is present and set is to the addition of CGM Session Start Time characteristic's Session Start Time (May 12, 2016, 14:39:27) field plus CGM Measurement characteristic's Time Offset field (20 min). • In Step 10 the CGM Status Enumeration Object - Base-Offset-Time-Stamp attribute is present and set is to the addition of CGM Session Start Time characteristic's Session Start Time (May 12, 2016, 14:39:27) field plus CGM Status characteristic's Time Offset field (5 min).
Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Base-Offset-Time-Stamp attribute is present: ❑ Object: CGM Status Enumeration Object ❑ Attribute-id: MDC_ATTR_TIME_STAMP_BO (2690) ❑ Attribute-type: SEQUENCE {bo-seconds (INT-U32), bo-fraction (INT-U16), bo-time-offset (INT-I16)} ❑ Attribute-value: addition of • CGM Session Start Time characteristic Session Start Time field (May 12, 2016, 14:39:27) • Steps 6 & 8 CGM Measurement characteristic Time Offset field (20m) • Step 10 CGM Status characteristic Time Offset field (5m) Note that the same Base-Offset-Time-Stamp can have different representations depending on bo-time-offset value. If it is set to 20 min (CGM Measurement or CGM Status characteristic Time Offset field), then Base-Offset-Time-Stamp value shall be {3672059967, 0, 20} or {3672059967, 0, 5} b) WAN PCD-01 message PCD-01 message includes a segment like this with Base-Offset-Time-Stamp attribute value (check OBX-14): OBX|n|CWE|8418060^MDC_CGM_DEV_STAT^MDC|m.0.0.a|[value]||||||R|||[value described in a) coded in DTM format]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-075		
TP label		Whitepaper. CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	CGM Enumeration 4; M		
Test purpose		Check that: PHG includes CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str attribute in transcoder output. [AND] Enum-Observed-Value-Simple-Bit-Str is set to the correct value.		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		

Other PICS	
Initial condition	The PHG under test and the simulated PHD are in the Standby state.
Test procedure	1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature • Format: 24 bit • Value: 0000 0000 0000 0**1**0**1** **1**0**11** **1111** (MSB → LSB). Sensor Type Error Detection supported, Device Specific Alert supported, Calibration supported, Sensor Temperature High-Low Detection supported, Patient High/Low Alerts supported, Hypo Alerts supported, Hyper Alerts supported, Rate of Increase/Decrease Alerts supported, Sensor Result High-Low Detection supported. ii. Field: CGM Type • Format: 4 bit • Value: not relevant iii. Field: CGM Sample Location • Format: 4 bit • Value: not relevant iv. Field: E2E-CRC • Format: uint16 • Value: not relevant b. CGM Status (0x2AA8) i. Field: Time Offset • Format: uint16 • Value: 20 (min) ii. Field: CGM Status • Format: 24 bit • Value: 0000 0000 0000 0000 0000 0001 (MSB -> LSB). Session stopped. iii. Field: E2E-CRC • This field is not included c. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: **1**000 0000 (MSB → LSB). CGM Trend information not present, CGM Quality not present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: not Relevant

	iv. Field: Time Offset • Format: uint16 • Value: not relevant v. Field: Sensor Status Annunciation • Format: 8 bit • Value: 0000 0001 (MSB -> LSB). Session stopped. vi. Field: CGM Trend Information (mg/dL) • This field is not included vii. Field: CGM Quality • This field is not included viii. Field: E2E-CRC • This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed (Connection state), force the PHG under test to read the CGM Feature and CGM Session Start Time characteristics. 5. The simulated PHD sends the Measurement to the PHG under test. 6. Check in the PHG transcoder output the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str attribute 7. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP). The simulated PHD sends the temporarily stored CGM measurement to the PHG under test. 8. Check in the PHG transcoder output the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str attribute 9. Force the PHG under test to read the CGM Status characteristic to actively request the status of the CGM sensor. 10. Check in the PHG transcoder output the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str attribute 11. End current CGM session and start a new one. The simulated PHD will now have the following values in the specified fields: a. CGM Status (0x2AA8) i. Field: CGM Status • Format: 24 bit • Value: 0000 0000 0000 0000 0000 0100 (MSB -> LSB). Sensor type incorrect for device. b. CGM Measurement (0x2AA7) i. Field: Flags • Format: 8 bit • Value: **1**000 0000 (MSB → LSB). CGM Trend information not present, CGM Quality not present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) present. ii. Field: Sensor Status Annunciation • Format: 8 bit • Value: 0000 0100 (MSB -> LSB). Sensor type incorrect for device. The rest of the fields will remain with the same value as in step 2. Repeat steps 3-10 to check in PHG transcoder output the CGM Status Enumeration Object– Enum-Observed-Value-Simple-Bit-Str attribute like in 6, 8 and 10.

	12. End current CGM session and start a new one. The simulated PHD will now have the following values in the specified fields: a. CGM Status (0x2AA8) i. Field: CGM Status • Format: 24 bit • Value: 0000 0000 0000 0000 0000 1000 (MSB -> LSB). Sensor malfunction. b. CGM Measurement (0x2AA7) i. Field: Flags • Format: 8 bit • Value: **1**000 0000 (MSB → LSB). CGM Trend information not present, CGM Quality not present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) present. ii. Field: Sensor Status Annunciation • Format: 8 bit • Value: 0000 1000 (MSB -> LSB). Sensor malfunction. The rest of the fields will remain with the same value as in step 2. Repeat steps 3-10 to check in PHG transcoder output the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str attribute like in 6, 8 and 10. 13. End current CGM session and start a new one. The simulated PHD will now have the following values in the specified fields: a. CGM Status (0x2AA8) i. Field: CGM Status • Format: 24 bit • Value: 0000 0000 0000 0000 0001 0000 (MSB -> LSB). Device specific alert. b. CGM Measurement (0x2AA7) i. Field: Flags • Format: 8 bit • Value: **1**000 0000 (MSB → LSB). CGM Trend information not present, CGM Quality not present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) present. ii. Field: Sensor Status Annunciation • Format: 8 bit • Value: 0001 0000 (MSB -> LSB). Device specific alert. The rest of the fields will remain with the same value as in step 2. Repeat steps 3-10 to check in PHG transcoder output the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str attribute like in 6, 8 and 10. 14. End current CGM session and start a new one. The simulated PHD will now have the following values in the specified fields: a. CGM Status (0x2AA8) i. Field: CGM Status • Format: 24 bit • Value: 0000 0000 0000 0010 0000 0000 (MSB -> LSB). Calibration not allowed. b. CGM Measurement (0x2AA7) i. Field: Flags • Format: 8 bit

        - Value: 0**1**00 0000 (MSB → LSB). CGM Trend information not present, CGM Quality not present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) present, Sensor Status Annunciation Field (Status-Octet) not present.

      ii. Field: Sensor Status Annunciation

        - Format: 8 bit
        - Value: 0000 0010 (MSB -> LSB). Calibration not allowed.

   The rest of the fields will remain with the same value as in step 2. Repeat steps 3-10 to check in PHG transcoder output the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str attribute like in 6, 8 and 10.

15. End current CGM session and start a new one. The simulated PHD will now have the following values in the specified fields:

    a. CGM Status (0x2AA8)

      i. Field: CGM Status

        - Format: 24 bit
        - Value: 0000 0000 0000 0100 0000 0000 (MSB -> LSB). Calibration recommended.

    b. CGM Measurement (0x2AA7)

      i. Field: Flags

        - Format: 8 bit
        - Value: 0**1**00 0000 (MSB → LSB). CGM Trend information not present, CGM Quality not present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) present, Sensor Status Annunciation Field (Status-Octet) not present.

      ii. Field: Sensor Status Annunciation

        - Format: 8 bit
        - Value: 0000 0100 (MSB -> LSB). Calibration recommended.

    The rest of the fields will remain with the same value as in step 2. Repeat steps 3-10 to check in PHG transcoder output the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str attribute like in 6, 8 and 10.

16. End current CGM session and start a new one. The simulated PHD will now have the following values in the specified fields:

    a. CGM Status (0x2AA8)

      i. Field: CGM Status

        - Format: 24 bit
        - Value: 0000 0000 0000 1000 0000 0000 (MSB -> LSB). Calibration required.

    b. CGM Measurement (0x2AA7)

      i. Field: Flags

        - Format: 8 bit
        - Value: 0**1**00 0000 (MSB → LSB). CGM Trend information not present, CGM Quality not present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) present, Sensor Status Annunciation Field (Status-Octet) not present.

      ii. Field: Sensor Status Annunciation

        - Format: 8 bit
        - Value: 0000 1000 (MSB -> LSB). Calibration required.

    The rest of the fields will remain with the same value as in step 2. Repeat steps 3-10 to check in PHG transcoder output the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str attribute like in 6, 8 and 10.

	17. End current CGM session and start a new one. The simulated PHD will now have the following values in the specified fields: a. CGM Status (0x2AA8) i. Field: CGM Status • Format: 24 bit • Value: 0000 0000 0001 0000 0000 0000 (MSB -> LSB). Sensor temperature too high for valid test/result at time of measurement. b. CGM Measurement (0x2AA7) i. Field: Flags • Format: 8 bit • Value: 0**1**00 0000 (MSB → LSB). CGM Trend information not present, CGM Quality not present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) present, Sensor Status Annunciation Field (Status-Octet) not present. ii. Field: Sensor Status Annunciation • Format: 8 bit • Value: 0001 0000 (MSB -> LSB). Sensor temperature too high for valid test/result at time of measurement. The rest of the fields will remain with the same value as in step 2. Repeat steps 3-10 to check in PHG transcoder output the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str attribute like in 6, 8 and 10. 18. End current CGM session and start a new one. The simulated PHD will now have the following values in the specified fields: a. CGM Status (0x2AA8) i. Field: CGM Status • Format: 24 bit • Value: 0000 0000 0010 0000 0000 0000 (MSB -> LSB). Sensor temperature too low for valid test/result at time of measurement. b. CGM Measurement (0x2AA7) i. Field: Flags • Format: 8 bit • Value: 0**1**00 0000 (MSB → LSB). CGM Trend information not present, CGM Quality not present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) present, Sensor Status Annunciation Field (Status-Octet) not present. ii. Field: Sensor Status Annunciation • Format: 8 bit • Value: 0010 0000 (MSB -> LSB). Sensor temperature too low for valid test/result at time of measurement. The rest of the fields will remain with the same value as in step 2. Repeat steps 3-10 to check in PHG transcoder output the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str attribute like in 6, 8 and 10. 19. End current CGM session and start a new one. The simulated PHD will now have the following values in the specified fields: a. CGM Status (0x2AA8) i. Field: CGM Status • Format: 24 bit • Value: 0000 0001 0000 0000 0000 0000 (MSB -> LSB). Sensor result lower than the patient low level. b. CGM Measurement (0x2AA7)

	i. Field: Flags • Format: 8 bit • Value: 00**1**0 0000 (MSB → LSB). CGM Trend information not present, CGM Quality not present, Sensor Status Annunciation Field (Warning-Octet) present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present. ii. Field: Sensor Status Annunciation • Format: 8 bit • Value: 0000 0001 (MSB -> LSB). Sensor result lower than the patient low level. The rest of the fields will remain with the same value as in step 2. Repeat steps 3-10 to check in PHG transcoder output the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str attribute like in 6, 8 and 10. 20. End current CGM session and start a new one. The simulated PHD will now have the following values in the specified fields: a. CGM Status (0x2AA8) i. Field: CGM Status • Format: 24 bit • Value: 0000 0010 0000 0000 0000 0000 (MSB -> LSB). Sensor result higher than the patient low level. b. CGM Measurement (0x2AA7) i. Field: Flags • Format: 8 bit • Value: 00**1**0 0000 (MSB → LSB). CGM Trend information not present, CGM Quality not present, Sensor Status Annunciation Field (Warning-Octet) present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present. ii. Field: Sensor Status Annunciation • Format: 8 bit • Value: 0000 0010 (MSB -> LSB). Sensor result higher than the patient low level. The rest of the fields will remain with the same value as in step 2. Repeat steps 3-10 to check in PHG transcoder output the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str attribute like in 6, 8 and 10. 21. End current CGM session and start a new one. The simulated PHD will now have the following values in the specified fields: a. CGM Status (0x2AA8) i. Field: CGM Status • Format: 24 bit • Value: 0000 0100 0000 0000 0000 0000 (MSB -> LSB). Sensor result lower than the hypo level. b. CGM Measurement (0x2AA7) i. Field: Flags • Format: 8 bit • Value: 00**1**0 0000 (MSB → LSB). CGM Trend information not present, CGM Quality not present, Sensor Status Annunciation Field (Warning-Octet) present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present. ii. Field: Sensor Status Annunciation • Format: 8 bit

	• Value: 0000 0100 (MSB -> LSB). Sensor result lower than the hypo level. The rest of the fields will remain with the same value as in step 2. Repeat steps 3-10 to check in PHG transcoder output the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str attribute like in 6, 8 and 10. 22. End current CGM session and start a new one. The simulated PHD will now have the following values in the specified fields: a. CGM Status (0x2AA8) i. Field: CGM Status • Format: 24 bit • Value: 0000 1000 0000 0000 0000 0000 (MSB -> LSB). Sensor result lower than the hyper level. b. CGM Measurement (0x2AA7) i. Field: Flags • Format: 8 bit • Value: 00**1**0 0000 (MSB → LSB). CGM Trend information not present, CGM Quality not present, Sensor Status Annunciation Field (Warning-Octet) present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present. ii. Field: Sensor Status Annunciation • Format: 8 bit • Value: 0000 1000 (MSB -> LSB). Sensor result lower than the hyper level. The rest of the fields will remain with the same value as in step 2. Repeat steps 3-10 to check in PHG transcoder output the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str attribute like in 6, 8 and 10. 23. End current CGM session and start a new one. The simulated PHD will now have the following values in the specified fields: a. CGM Status (0x2AA8) i. Field: CGM Status • Format: 24 bit • Value: 0001 0000 0000 0000 0000 0000 (MSB -> LSB). Sensor rate of decrease exceeded. b. CGM Measurement (0x2AA7) i. Field: Flags • Format: 8 bit • Value: 00**1**0 0000 (MSB → LSB). CGM Trend information not present, CGM Quality not present, Sensor Status Annunciation Field (Warning-Octet) t present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present. ii. Field: Sensor Status Annunciation • Format: 8 bit • Value: 0001 0000 (MSB -> LSB). Sensor rate of decrease exceeded. The rest of the fields will remain with the same value as in step 2. Repeat steps 3-10 to check in PHG transcoder output the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str attribute like in 6, 8 and 10. 24. End current CGM session and start a new one. The simulated PHD will now have the following values in the specified fields: a. CGM Status (0x2AA8) i. Field: CGM Status • Format: 24 bit

- Value: 0010 0000 0000 0000 0000 0000 (MSB -> LSB). Sensor rate of increase exceeded.

b. CGM Measurement (0x2AA7)

i. Field: Flags

- Format: 8 bit
- Value: 00**1**0 0000 (MSB → LSB). CGM Trend information not present, CGM Quality not present, Sensor Status Annunciation Field (Warning-Octet) present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present.

ii. Field: Sensor Status Annunciation

- Format: 8 bit
- Value: 0010 0000 (MSB -> LSB). Sensor rate of increase exceeded.

The rest of the fields will remain with the same value as in step 2. Repeat steps 3-10 to check in PHG transcoder output the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str attribute like in 6, 8 and 10.

25. End current CGM session and start a new one. The simulated PHD will now have the following values in the specified fields:

a. CGM Status (0x2AA8)

i. Field: CGM Status

- Format: 24 bit
- Value: 0100 0000 0000 0000 0000 0000 (MSB -> LSB). Sensor result lower than the device can process.

b. CGM Measurement (0x2AA7)

i. Field: Flags

- Format: 8 bit
- Value: 00**1**0 0000 (MSB → LSB). CGM Trend information not present, CGM Quality not present, Sensor Status Annunciation Field (Warning-Octet) present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present.

ii. Field: Sensor Status Annunciation

- Format: 8 bit
- Value: 0100 0000 (MSB -> LSB). Sensor result lower than the device can process.

The rest of the fields will remain with the same value as in step 2. Repeat steps 3-10 to check in PHG transcoder output the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str attribute like in 6, 8 and 10.

26. End current CGM session and start a new one. The simulated PHD will now have the following values in the specified fields:

a. CGM Status (0x2AA8)

i. Field: CGM Status

- Format: 24 bit
- Value: 1000 0000 0000 0000 0000 0000 (MSB -> LSB). Sensor result higher than the device can process.

b. CGM Measurement (0x2AA7)

i. Field: Flags

- Format: 8 bit
- Value: 00**1**0 0000 (MSB → LSB). CGM Trend information not present, CGM Quality not present, Sensor Status Annunciation Field (Warning-Octet) present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present.

	ii. Field: Sensor Status Annunciation • Format: 8 bit • Value: 1000 0000 (MSB -> LSB). Sensor result higher than the device can process. The rest of the fields will remain with the same value as in step 2. Repeat steps 3-10 to check in PHG transcoder output the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str attribute like in 6, 8 and 10.
Pass/Fail criteria	• In Step 6, 8 and 10, the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str is present with bit 0 set to 1 (sensor-session-stopped). Rest of bits set to 0. • In Step 11, the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str is present with bit 2 set to 1 (sensor-type-incorrect). Rest of bits set to 0. • In Step 12, the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str is present with bit 3 set to 1 (sensor-malfunction). Rest of bits set to 0. • In Step 13, the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str is present with bit 4 set to 1 (device-specific-alert). Rest of bits set to 0. • In Step 14, the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str is present with bit 7 set to 1 (sensor-calibration-not-allowed). Rest of bits set to 0. • In Step 15, the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str is present with bit 8 set to 1 (sensor-calibration-recommended). Rest of bits set to 0. • In Step 16, the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str is present with bit 9 set to 1 (sensor-calibration-required). Rest of bits set to 0. • In Step 17, the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str is present with bit 10 set to 1 (sensor-temp-too-high). Rest of bits set to 0. • In Step 18, the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str is present with bit 11 set to 1 (sensor-temp-too-low). Rest of bits set to 0. • In Step 19, the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str is present with bit 12 set to 1 (sensor-result-below-patient-low). Rest of bits set to 0. • In Step 20, the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str is present with bit 13 set to 1 (sensor-result-above-patient-high). Rest of bits set to 0. • In Step 21, the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str is present with bit 14 set to 1 (sensor-low-hypo). Rest of bits set to 0. • In Step 22, the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str is present with bit 15 set to 1 (sensor-high-hyper). Rest of bits set to 0. • In Step 23, the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str is present with bit 16 set to 1 (sensor-rate-decrease-exceeded). Rest of bits set to 0. • In Step 24, the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str is present with bit 17 set to 1 (sensor-rate-increase-exceeded). Rest of bits set to 0. • In Step 25, the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str is present with bit 18 set to 1 (sensor-result-too-low). Rest of bits set to 0. • In Step 26, the CGM Status Enumeration Object – Enum-Observed-Value-Simple-Bit-Str is present with bit 19 set to 1 (sensor-result-too-high). Rest of bits set to 0.

Notes (To assist manual testing)	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Enum-Observed-Value-Simple-Bit-Str attribute is present: ❑ Object: PHD DM Status Enumeration Object ❑ Attribute-id: MDC_ATTR_ENUM_OBS_VAL_SIMP_BIT_STR (2661) ❑ Attribute-type: BITS-32 ❑ Attribute-value (Steps 6,8,10): 00 00 00 01 (hex) ❑ Attribute-value (Step 11): 00 00 00 04 (hex) ❑ Attribute-value (Step 12): 00 00 00 08 (hex) ❑ Attribute-value (Step 13): 00 00 00 10 (hex) ❑ Attribute-value (Step 14): 00 00 00 80 (hex) ❑ Attribute-value (Step 15): 00 00 01 00 (hex) ❑ Attribute-value (Step 16): 00 00 02 00 (hex) ❑ Attribute-value (Step 17): 00 00 04 00 (hex) ❑ Attribute-value (Step 18): 00 00 08 00 (hex) ❑ Attribute-value (Step 19): 00 00 10 00 (hex) ❑ Attribute-value (Step 20): 00 00 20 00 (hex) ❑ Attribute-value (Step 21): 00 00 40 00 (hex) ❑ Attribute-value (Step 22): 00 00 80 00 (hex) ❑ Attribute-value (Step 23): 00 01 00 00 (hex) ❑ Attribute-value (Step 24): 00 02 00 00 (hex) ❑ Attribute-value (Step 25): 00 04 00 00 (hex) ❑ Attribute-value (Step 26): 00 08 00 00 (hex) b) WAN PCD-01 message PCD-01 message includes a segment like this with Enum-Observed-Value-Basic-Bit-Str attribute value (check OBX-5): • Steps 6, 8 &10 OBX|n|CWE|8418060^MDC_CGM_DEV_STAT^MDC|1.0.0.a|1^sensor-session-stopped(0)||||||R|||[date_time] • Step 11 OBX|n|CWE|8418060^MDC_CGM_DEV_STAT^MDC|1.0.0.a|1^sensor-type-incorrect(2)||||||R|||[date_time] • Step 12 OBX|n|CWE|8418060^MDC_CGM_DEV_STAT^MDC|1.0.0.a|1^sensor-malfunction(3)||||||R|||[date_time] • Step 13 OBX|n|CWE|8418060^MDC_CGM_DEV_STAT^MDC|1.0.0.a|1^device-specific-alert(4)||||||R|||[date_time] • Step 14 OBX|n|CWE|8418060^MDC_CGM_DEV_STAT^MDC|1.0.0.a|1^sensor-calibration-not-allowed(7)||||||R|||[date_time] • Step 15 OBX|n|CWE|8418060^MDC_CGM_DEV_STAT^MDC|1.0.0.a|1^sensor-calibration-recommended(8)||||||R|||[date_time] • Step 16

	OBX|n|CWE|8418060^MDC_CGM_DEV_STAT^MDC|1.0.0.a|1^sensor-calibration-required(9)||||||R|||[date_time] • Step 17 OBX|n|CWE|8418060^MDC_CGM_DEV_STAT^MDC|1.0.0.a|1^sensor-temp-too-high(10)||||||R|||[date_time] • Step 18 OBX|n|CWE|8418060^MDC_CGM_DEV_STAT^MDC|1.0.0.a|1^sensor-temp-too-low(11)||||||R|||[date_time] • Step 19 OBX|n|CWE|8418060^MDC_CGM_DEV_STAT^MDC|1.0.0.a|1^sensor-result-below-patient-low(12)||||||R|||[date_time] • Step 20 OBX|n|CWE|8418060^MDC_CGM_DEV_STAT^MDC|1.0.0.a|1^sensor-result-above-patient-high(13)||||||R|||[date_time] • Step 21 OBX|n|CWE|8418060^MDC_CGM_DEV_STAT^MDC|1.0.0.a|1^sensor-low-hypo(14)||||||R|||[date_time] • Step 22 OBX|n|CWE|8418060^MDC_CGM_DEV_STAT^MDC|1.0.0.a|1^sensor-high-hyper(15)||||||R|||[date_time] • Step 23 OBX|n|CWE|8418060^MDC_CGM_DEV_STAT^MDC|1.0.0.a|1^sensor-rate-decrease-exceeded(16)||||||R|||[date_time] • Step 24 OBX|n|CWE|8418060^MDC_CGM_DEV_STAT^MDC|1.0.0.a|1^sensor-rate-increase-exceeded(17)||||||R|||[date_time] • Step 25 OBX|n|CWE|8418060^MDC_CGM_DEV_STAT^MDC|1.0.0.a|1^sensor-result-too-low(18)||||||R|||[date_time] • Step 26 OBX|n|CWE|8418060^MDC_CGM_DEV_STAT^MDC|1.0.0.a|1^sensor-result-too-high(19)||||||R|||[date_time]

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-076		
TP label		Whitepaper. Glucose Numeric Object value		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	Short Float Type 1; C	BaseOffset 3; M	Glucose Numeric 7; M
		Glucose Numeric 8; M		
Test purpose		Check that: PHG processes correctly the values of the CGM Glucose Concentration field (mg/dL) and the Time Offset field (m) of the CGM Measurement characteristic and the CGM Session Start Time field of the CGM Session Start Time characteristic.		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		

Test procedure	1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Session Start Time (0x2AAA) i. Field: Session Start Time • Format: {uint16, uint8, uint8, uint8, uint8, uint8} • Value: {2016, 5, 12, 16, 39, 27} (May 12, 2016, 16:39:27) ii. Field: Time Zone • Format: sint8 • Value: 4 (UTC+1:00) iii. Field: DST-Offset • Format: uint8 • Value: 4 (Daylight Time (+1h)) iv. Field: E2E-CRC • This field is not included b. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: 0000 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: 160.0 iv. Field: Time Offset • Format: uint16 • Value: 20 v. Field: Sensor Status Annunciation • This field is not included vi. Field: CGM Trend Information • This field is not included vii. Field: CGM Quality • This field is not included viii. Field: E2E-CRC • This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed (Connection state), force the PHG under test to read the CGM Features and CGM Session Start Time characteristics. 5. The simulated PHD sends the Measurement to the PHG under test.

	6. Check that the PHG accepts the measurement and decodes its value properly (glucose concentration value, units and time stamp) 7. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP). The simulated PHD sends the temporarily stored CGM measurement to the PHG under test 8. Check that the PHG accepts the measurement and decodes its value properly (glucose concentration value, units and time stamp)
Pass/Fail criteria	In Steps 6 and 8, the PHG under test shows the following measurement: Glucose Concentration = 160(mg/dL) with timestamp '2016-05-12 16:59:27'
Notes (To assist manual testing)	

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-077		
TP label		Whitepaper. Sensor Calibration Numeric Object value		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	Short Float Type 1; C	BaseOffset 3; M	SensCal Numeric 11; M
		SensCal Numeric 12; M		
Test purpose		Check that: PHG processes correctly the values of the Calibration Value – Glucose concentration of Calibration field (mg/dL) and the Calibration Time field (m) of the CGM Specific Ops Control Point characteristic when it receives a Calibration Value Response, and the CGM Session Start Time field of the CGM Session Start Time characteristic.		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The simulated PHD has a Calibration Data Record stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Session Start Time (0x2AAA) i. Field: Session Start Time • Format: {uint16, uint8, uint8, uint8, uint8, uint8} • Value: {2016, 5, 12, 16, 39, 27} (May 12, 2016, 16:39:27) ii. Field: Time Zone • Format: sint8 • Value: 4 (UTC+1:00) iii. Field: DST-Offset • Format: uint8 • Value: 4 (Daylight Time (+1h)) iv. Field: E2E-CRC • This field is not included b. CGM Feature (0x2AA8)		

	i. Field: CGM Feature • Format: 24 bit • Value: 0000 0000 0000 0000 0000 000**1** (MSB → LSB). Calibration supported. ii. Field: CGM Type • Format: 4 bit • Value: not relevant iii. Field: CGM Sample Location • Format: 4 bit • Value: not relevant iv. Field: E2E-CRC • Format: uint16 • Value: not relevant c. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code • Format: uinnt8 • Value: 0x06 (Glucose Calibration Value Response) ii. Field: Calibration Value – Glucose concentration of Calibration (mg/dL) • Format: SFLOAT (mg/dL) • Value: 115.3 iii. Field: Calibration Value – Calibration Time • Format: uint16 (min) • Value: 20 iv. Field: Calibration Value – Calibration Type • Format: 4 bit • Value: not relevant v. Field: Calibration Value – Calibration Sample Location • Format: 4 bit • Value: not relevant vi. Field: Calibration Value - Next Calibration Time • Format: uint16 • Value: not relevant vii. Field: Calibration Value – Calibration Data Record Number • Format: uint16 • Value: not relevant viii. Field: Calibration Value – Calibration Status • Format: 8 bit • Value: not relevant ix. Field: E2E-CRC • This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics, and then to perform a Glucose Calibration procedure

	using Op Code "Get Glucose Calibration value" (0x05) with Operand "0xFFFF"(by performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code and Calibration Data Record Number fields respectively). 5. The simulated PHD will respond with an indication including a "Calibration Value Response" Op Code (0x06) and a Calibration Data Record containing the requested calibration information. 6. Check that the PHG accepts the measurement and decodes its value properly (glucose concentration calibration value, units and time stamp).
Pass/Fail criteria	In Step 6, the PHG under test shows the following measurement: Glucose Concentration of Calibration= 115.3(mg/dL) with timestamp '2016-05-12 16:59:27'
Notes (To assist manual testing)	

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-078		
TP label		Whitepaper. Sensor Run-time Numeric Object value		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	BaseOffset 2; M	SRT Numeric 5; M	SRT Numeric 6; M
Test purpose		Check that: PHG processes correctly the values of the Session Run Time field (h) of the CGM Session Run Time characteristic and the CGM Session Start Time field of the CGM Session Start Time characteristic.		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Session Start Time (0x2AAA) i. Field: Session Start Time • Format: {uint16, uint8, uint8, uint8, uint8, uint8} • Value: {2016, 5, 12, 16, 39, 27} (May 12, 2016, 16:39:27) ii. Field: Time Zone • Format: sint8 • Value: 4 (UTC+1:00) iii. Field: DST-Offset • Format: uint8 • Value: 4 (Daylight Time (+1h)) iv. Field: E2E-CRC • This field is not included b. CGM Session Run Time (0x2AAB) i. Field: Session Run Time		

	• Format: uint16 (h) • Value: 168 ii. Field: E2E-CRC • This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature, CGM Session Start Time and CGM Session Run Time characteristics. 5. Check that the PHG decodes values properly (session run time, units and time stamp).
Pass/Fail criteria	In Step 5, the PHG under test shows the following measurement: Sensor Run Time = 168 (h) with timestamp '2016-05-12 16:39:27'
Notes (To assist manual testing)	

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-079		
TP label		Whitepaper. Glucose Sampling Interval Numeric Object value		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	BaseOffset 1; M	GSI Numeric 8; M	
Test purpose		Check that: PHG processes correctly the value of the Operand field (m) of the CGM Specific Ops Control Point when it receives a Communication Interval Response, and sets the timestamp to the collector's time of the collection		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). PHD has a manually entered communication interval value stored. 2. The simulated PHD implements several BTLE characteristics. The characteristic of interest for this Test Case is: a. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code • Format: uint8 • Value: 0x03 ii. Field: Operand • Format: uint8 (min) • Value: 15 iii. Field: E2E-CRC • This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state).		

	4. When the pairing has been completed, force the PHG to perform a CGM Communication Interval procedure using Op Code "Get CGM Communication Interval" (0x02) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code field). 5. The simulated PHD will respond with an indication including a "Communication Interval Response" Op Code (0x03) and an UINT8 containing the communication interval in minutes. 6. Check that the PHG decodes values properly (glucose sampling interval and units)
Pass/Fail criteria	In Step 6, the PHG under test shows the following measurement: Glucose Sampling Interval = 15 (m) with timestamp set to the collector's time of the collection
Notes (To assist manual testing)	

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-080		
TP label		Whitepaper. Glucose trend Numeric Object value		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	Short Float Type 1; C	BaseOffset 3; M	GT Numeric 6; M
		GT Numeric 7; M		
Test purpose		Check that: PHG processes correctly the values of the CGM Trend Information field ((mg/dL)/min) and the Time Offset field (m) of the CGM Measurement characteristic and the CGM Session Start Time field of the CGM Session Start Time characteristic.		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature • Format: 24 bit • Value: 0000 0000 **1**000 0000 0000 0000 (MSB → LSB). CGM trend information supported. ii. Field: CGM Type • Format: 4 bit • Value: not relevant iii. Field: CGM Sample Location • Format: 4 bit • Value: not relevant iv. Field: E2E-CRC • Format: uint16		

	• Value: not relevant b. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: 0000 000**1** (MSB → LSB). CGM Trend information present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) not present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present. iii. Field: CGM Glucose Concentration (mg/dL) • Format: SFLOAT • Value: not relevant iv. Field: Time Offset • Format: uint16 • Value: 20 (min) v. Field: Sensor Status Annunciation • This field is not included vi. Field: CGM Trend Information (mg/dL)/min • Format: SFLOAT • Value: 3.6 vii. Field: CGM Quality • This field is not included viii. Field: E2E-CRC • This field is not included c. CGM Session Start Time (0x2AAA) i. Field: Session Start Time • Format: {uint16, uint8, uint8, uint8, uint8, uint8} • Value: {2016, 5, 12, 16, 39, 27} (May 12, 2016, 16:39:27) ii. Field: Time Zone • Format: sint8 • Value: 4 (UTC+1:00) iii. Field: DST-Offset • Format: uint8 • Value: 4 (Daylight Time (+1h)) iv. Field: E2E-CRC • This field is not included 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed (Connection state), force the PHG under test to read the CGM Feature and CGM Session Start Time characteristics. 5. The simulated PHD sends the Measurement to the PHG under test. 6. Check that the PHG accepts the measurement and decodes its value properly (glucose trend value, units and time stamp).

	7. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP). The simulated PHD sends the temporarily stored CGM measurement to the PHG under test. 8. Check that the PHG accepts the measurement and decodes its value properly (glucose trend value, units and time stamp).
Pass/Fail criteria	In Steps 6 and 8, the PHG under test shows the following measurement: Glucose Trend = 3.6 (mg/dL/min) with timestamp '2016-05-12 16:59:27'
Notes (To assist manual testing)	

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-081		
TP label		Whitepaper. Patient low/high thresholds Compound Numeric Object value		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	Short Float Type 1; C	BaseOffset 1; M	PLH Numeric 9; M
		PLH Numeric 10; M		
Test purpose		Check that: PHG processes correctly the values of the Operand fields (mg/dL) of the CGM Specific Ops Control Point characteristic when it receives a Patient High Alert Level Response and a Patient Low Alert Level Response, and sets the timestamp to the collector's time of the collection		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND C_MAN_BLE_046 AND C_MAN_BLE_048		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). PHD has manually entered Patient Low Alert Level and Patient High Alert Level values stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature • Format: 24 bit • Value: 0000 0000 0000 0000 0000 00**1**0 (MSB → LSB). Patient High/Low Alerts supported. ii. Field: CGM Type • Format: 4 bit • Value: not relevant iii. Field: CGM Sample Location • Format: 4 bit • Value: not relevant iv. Field: E2E-CRC • Format: uint16 • Value: not relevant		

	b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code • Format: uint8 • Value: 0x09 (Patient High Alert Level Response) / 0x0C (Patient Low Alert Level Response) ii. Field: Operand • Format: SFLOAT (mg/dL) • Value: 72.0 (Patient Low threshold) / 144.0 (Patient High threshold) iii. Field: E2E-CRC • This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics, and then to perform a Patient High Alert procedure using Op Code "Get Patient High Alert Level" (0x08) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 5. The simulated PHD will respond with an indication including a "Patient High Alert Level Response" (0x09) Op Code and an SFLOAT containing the requested value in mg/dL. 6. Force the PHG to perform a Patient Low Alert procedure using Op Code "Get Patient Low Alert Level" (0x0B) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 7. The simulated PHD will respond with an indication including a "Patient Low Alert Level Response" (0x0C) Op Code and an SFLOAT containing the requested value in mg/dL. 8. Check that the PHG accepts the measurement and decodes its value properly (patient low and high thresholds and units).
Pass/Fail criteria	In Step 8, the PHG under test shows the following measurement: Patient Low threshold = 72.0 (mg/dL), Patient High threshold = 144.0 (mg/dL) with timestamp set to the collector's time of the collection
Notes (To assist manual testing)	

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-082		
TP label		Whitepaper. Device hypo/hyper thresholds Compound Numeric Object value		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	Short Float Type 1; C	BaseOffset 1; M	DHH Numeric 9; M
		DHH Numeric 10; M		
Test purpose		Check that: PHG processes correctly the values of the Operand fields (mg/dL) of the CGM Specific Ops Control Point characteristic when it receives a Hypo Alert Level Response and a Hyper Alert Level Response, and sets the timestamp to the collector's time of the collection		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND (C_MAN_BLE_050 OR C_MAN_BLE_052)		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		

<table>
<tr><td>Test procedure</td><td>
1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). PHD has manually entered Hypo and Hyper Alert Level values stored.
2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:
a. CGM Feature (0x2AA8)
i. Field: CGM Feature
• Format: 24 bit
• Value: 0000 0000 0000 0000 0000 1100 (MSB → LSB). Hypo Alerts and Hyper Alerts supported.
ii. Field: CGM Type
• Format: 4 bit
• Value: not relevant
iii. Field: CGM Sample Location
• Format: 4 bit
• Value: not relevant
iv. Field: E2E-CRC
• Format: uint16
• Value: not relevant
b. CGM Specific Ops Control Point (0x2AAC)
i. Field: Op Code
• Format: uint8
• Value: 0x0F (Hypo Alert Level Response) / 0x12 (Hyper Alert Level Response)
ii. Field: Operand
• Format: SFLOAT (mg/dL)
• Value: 36.0 (Hypo Alert Level Response) / 360.0 (Hyper Alert Level Response)
iii. Field: E2E-CRC
• This field is not present
3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state).
4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics.
5. IF C_MAN_BLE_050 = TRUE, force the PHG to perform a Hypo Alert procedure using Op Code “Get Hypo Alert Level” (0x0E) (performing a write operation to the CGM Specific Ops Control Point characteristic’s Op Code). The simulated PHD will respond with an indication including a “Hypo Alert Level Response” (0x0F) Op Code and an SFLOAT containing the requested alert level in mg/dL.
6. IF C_MAN_BLE_052 = TRUE, force the PHG to perform a Hyper Alert procedure using Op Code “Get Hyper Alert Level” (0x11) (performing a write operation to the CGM Specific Ops Control Point characteristic’s Op Code). The simulated PHD will respond with an indication including a “Hyper Alert Level Response” (0x12) Op Code and an SFLOAT containing the requested alert level in mg/dL.
7. Check that the PHG accepts the measurement and decodes its value properly (hypo and hyper thresholds and units).
</td></tr>
<tr><td>Pass/Fail criteria</td><td>In Step 7, the PHG under test shows the following measurement: Hypo threshold = 36.0 (mg/dL), Hyper threshold = 360.0 (mg/dL) with timestamp set to the collector’s time of the collection</td></tr>
<tr><td>Notes</td><td></td></tr>
</table>

(To assist manual testing)	

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-083		
TP label		Whitepaper.Glucose rate of charge thresholds Compound Numeric Object value		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	Short Float Type 1; C	BaseOffset 1; M	GRC Numeric 9; M
		GRC Numeric 10; M		
Test purpose		Check that: PHG processes correctly the values of the Operand fields (mg/dL) of the CGM Specific Ops Control Point characteristic when it receives a Rate of Decrease Alert Level Response and a Rate of Decrease Alert Level Response, and sets the timestamp to the collector's time of the collection		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043 AND C_MAN_BLE_054 AND C_MAN_BLE_056		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization). The PHD has manually entered Rate of Decrease and Increase Alert Level values stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature • Format: 24 bit • Value: 0000 0000 0000 0000 000**1** 0000 (MSB → LSB). Rate of Increase/Decrease Alerts supported. ii. Field: CGM Type • Format: 4 bit • Value: not relevant iii. Field: CGM Sample Location • Format: 4 bit • Value: not relevant iv. Field: E2E-CRC • Format: uint16 • Value: not relevant b. CGM Specific Ops Control Point (0x2AAC) i. Field: Op Code • Format: uint8 • Value: 0x15 (Rate of Decrease Alert Level Response) / 0x18 (Rate of Increase Alert Level Response) ii. Field: Operand • Format: SFLOAT (mg/dL/min)		

	• Value: 9.0 (Rate of Decrease Alert Level Response) / 9.0 (Rate of Increase Alert Level Response) iii. Field: E2E-CRC • This field is not present 3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state). 4. When the pairing has been completed, force the PHG to read CGM Feature and CGM Session Start Time characteristics, and then to perform a Rate of Decrease Alert Level procedure using Op Code "Get Rate of Decrease Alert Level" (0x14) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 5. The simulated PHD will respond with an indication including a "Rate of Decrease Alert Level Response" (0x15) Op Code and an SFLOAT containing the requested alert level in mg/dL/min. 6. Force the PHG to perform a Rate of Increase Alert Level procedure using Op Code "Get Rate of Increase Alert Level" (0x17) (performing a write operation to the CGM Specific Ops Control Point characteristic's Op Code). 7. The simulated PHD will respond with an indication including a "Rate of Increase Alert Level Response" (0x18) Op Code and an SFLOAT containing the requested alert level in mg/dL/min. 8. Check that PHG accepts the measurement and decodes its value properly (glucose rate of decrease and increase thresholds and units).
Pass/Fail criteria	In Step 8, the PHG under test shows the following measurement: Glucose rate of decrease threshold = 9.0 (mg/dL/min), Glucose rate of increase threshold = 9.0 (mg/dL/min) with timestamp set to the collector's time of the collection
Notes (To assist manual testing)	

TP Id		TP/LP-PAN/PHG/PHDTW/CGM/BV-084		
TP label		Whitepaper. PHD DM Status Enumeration Object value		
Coverage	**Spec**	[Bluetooth PHDT v1.6]		
	Testable items	BaseOffset 3; M	PHDM Enumeration 5; M	PHDM Enumeration 6; M
Test purpose		Check that: PHG processes correctly the values of the Sensor Status Annunciation field and the Time Offset field (m) of the CGM Measurement characteristic, the CGM Status field of the CGM Status characteristic and the CGM Session Start Time field of the CGM Session Start Time characteristic.		
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043		
Other PICS				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.		
Test procedure		1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8)		

i. Field: CGM Feature
   - Format: 24 bit
   - Value: 0000 0000 0000 **1**0**1**0 0000 0000 (MSB → LSB). Low Battery detection supported, General Device Fault supported.

ii. Field: CGM Type
   - Format: 4 bit
   - Value: not relevant

iii. Field: CGM Sample Location
   - Format: 4 bit
   - Value: not relevant

iv. Field: E2E-CRC
   - Format: uint16
   - Value: not relevant

b. CGM Status (0x2AA8)

i. Field: Time Offset
   - Format: uint16
   - Value: not relevant.

ii. Field: CGM Status
   - Format: 24 bit
   - Value: 0000 0000 0000 0000 0000 0010 (MSB -> LSB). Device Battery Low.

iii. Field: E2E-CRC
   - This field is not included

c. CGM Measurement (0x2AA7)

i. Field: Size
   - Format: uint8

ii. Field: Flags
   - Format: 8 bit
   - Value: 00**1**0 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present.

iii. Field: CGM Glucose Concentration (mg/dL)
   - Format: SFLOAT
   - Value: not Relevant

iv. Field: Time Offset
   - Format: uint16
   - Value: not relevant

v. Field: Sensor Status Annunciation
   - Format: 8 bit
   - Value: 0000 0010 (MSB -> LSB). Device Battery Low.

vi. Field: CGM Trend Information (mg/dL)
   - This field is not included

vii. Field: CGM Quality
   - This field is not included

<table>
<tr><td></td><td>
viii. Field: E2E-CRC
• This field is not included
d. CGM Session Start Time (0x2AAA)
i. Field: Session Start Time
• Format: {uint16, uint8, uint8, uint8, uint8, uint8}
• Value: {2016, 5, 12, 16, 39, 27} (May 12, 2016, 16:39:27)
ii. Field: Time Zone
• Format: sint8
• Value: 4 (UTC+1:00)
iii. Field: DST-Offset
• Format: uint8
• Value: 4 (Daylight Time (+1h))
iv. Field: E2E-CRC
• This field is not included
3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state).
4. When the pairing has been completed (Connection state), force the PHG under test to read the CGM Feature and CGM Session Start Time characteristics.
5. The simulated PHD sends the Measurement to the PHG under test.
6. Check that the PHG accepts the measurement and decodes its value properly (sensor status and time stamp).
7. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP). The simulated PHD sends the temporarily stored CGM measurement to the PHG under test.
8. Check that the PHG accepts the measurement and decodes its value properly (sensor status and time stamp).
9. Force the PHG under test to read the CGM Status characteristic to actively request the status of the CGM sensor.
10. Check that the PHG accepts the measurement and decodes its value properly (sensor status and time stamp).
</td></tr>
<tr><td>Pass/Fail criteria</td><td>In Step 6, 8 and 10, the PHG under test shows the following measurement: PHD DM Status = ‘device-status-battery-low’ (1) with timestamp '2016-05-12 16:59:27'</td></tr>
<tr><td>Notes
(To assist manual testing)</td><td></td></tr>
</table>

<table>
<tr><td colspan="2">TP Id</td><td colspan="3">TP/LP-PAN/PHG/PHDTW/CGM/BV-085</td></tr>
<tr><td colspan="2">TP label</td><td colspan="3">Whitepaper. CGM Status Enumeration Object value</td></tr>
<tr><td rowspan="2">Coverage</td><td>Spec</td><td colspan="3">[Bluetooth PHDT v1.6]</td></tr>
<tr><td>Testable items</td><td>BaseOffset 3; M</td><td>CGM Enumeration 4; M</td><td>CGM Enumeration 5; M</td></tr>
<tr><td colspan="2">Test purpose</td><td colspan="3">Check that:

PHG processes correctly the values of the Sensor Status Annunciation field and the Time Offset field (m) of the CGM Measurement characteristic, the CGM Status field of the CGM Status characteristic and the CGM Session Start Time field of the CGM Session Start Time characteristic.</td></tr>
</table>

Applicability	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_043
Other PICS	
Initial condition	The PHG under test and the simulated PHD are in the Standby state.
Test procedure	1. The simulated PHD is configured with a Continuous Glucose Monitoring Profile (device specialization), it has a CGM measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also has an identical CGM measurement temporarily stored. 2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are: a. CGM Feature (0x2AA8) i. Field: CGM Feature • Format: 24 bit • Value: 0000 0000 0000 0**1**0**1** **1**0**11** **1111** (MSB → LSB). Sensor Type Error Detection supported, Device Specific Alert supported, Calibration supported, Sensor Temperature High-Low Detection supported, Patient High/Low Alerts supported, Hypo Alerts supported, Hyper Alerts supported, Rate of Increase/Decrease Alerts supported, Sensor Result High-Low Detection supported. ii. Field: CGM Type • Format: 4 bit • Value: not relevant iii. Field: CGM Sample Location • Format: 4 bit • Value: not relevant iv. Field: E2E-CRC • Format: uint16 • Value: not relevant b. CGM Status (0x2AA8) i. Field: Time Offset • Format: uint16 • Value: 20 (min) ii. Field: CGM Status • Format: 24 bit • Value: 0000 0000 0000 0000 0000 0001 (MSB -> LSB). Session stopped. iii. Field: E2E-CRC • This field is not included c. CGM Measurement (0x2AA7) i. Field: Size • Format: uint8 ii. Field: Flags • Format: 8 bit • Value: 00**1**0 0000 (MSB → LSB). CGM Trend information not present, CGM Quality nor present, Sensor Status Annunciation Field (Warning-Octet) present, Sensor Status Annunciation Field (Cal/Temp-Octet) not present, Sensor Status Annunciation Field (Status-Octet) not present. iii. Field: CGM Glucose Concentration (mg/dL)

<table>
<tr><td></td><td>
Format: SFLOAT
Value: not Relevant
iv. Field: Time Offset
Format: uint16
Value: 20 (min)
v. Field: Sensor Status Annunciation
Format: 8 bit
Value: 0000 0001 (MSB -> LSB). Session stopped.
vi. Field: CGM Trend Information (mg/dL)
This field is not included
vii. Field: CGM Quality
This field is not included
viii. Field: E2E-CRC
This field is not included
d. CGM Session Start Time (0x2AAA)
i. Field: Session Start Time
Format: {uint16, uint8, uint8, uint8, uint8, uint8}
Value: {2016, 5, 12, 16, 39, 27} (May 12, 2016, 16:39:27)
ii. Field: Time Zone
Format: sint8
Value: 4 (UTC+1:00)
iii. Field: DST-Offset
Format: uint8
Value: 4 (Daylight Time (+1h))
vi. Field: E2E-CRC
This field is not included
3. The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHD (Initiating state).
4. When the pairing has been completed (Connection state), force the PHG under test to read the CGM Feature and CGM Session Start Time characteristics.
5. The simulated PHD sends the Measurement to the PHG under test.
6. Check that the PHG accepts the measurement and decodes its value properly (sensor status and time stamp).
7. The PHG under test requests the simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP). The simulated PHD sends the temporarily stored CGM measurement to the PHG under test
8. Check that the PHG accepts the measurement and decodes its value properly (sensor status and time stamp).
9. Force the PHG under test to read the CGM Status characteristic to actively request the status of the CGM sensor.
10. Check that the PHG accepts the measurement and decodes its value properly (sensor status and time stamp).
</td></tr>
<tr><td>Pass/Fail criteria</td><td>In Step 6, 8 and 10, the PHG under test shows the following measurement: CGM Status = ‘sensor-session-stopped’ (0) with timestamp '2016-05-12 16:59:27'</td></tr>
<tr><td>Notes
(To assist manual</td><td></td></tr>
</table>

testing)	

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