ITU-T

TELECOMMUNICATION STANDARDIZATION SECTOR OF ITU



# SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

E-health multimedia services and applications – Interoperability compliance testing of personal health systems (HRN, PAN, LAN, TAN and WAN)

Conformance of ITU-T H.810 personal health system: Personal Health Devices interface Part 10F: Transcoding for Bluetooth Low Energy: Personal Health Gateway – Pulse oximeter

Recommendation ITU-T H.850.6

-01



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## **Recommendation ITU-T H.850.6**

## Conformance of ITU-T H.810 personal health system: Personal Health Devices interface Part 10F: Transcoding for Bluetooth Low Energy: Personal Health Gateway – Pulse oximeter

#### Summary

Recommendation ITU-T H.850.6 provides a test suite structure (TSS) and the test purposes (TP) for the transcoding of pulse oximeter data by personal health gateways 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.850.6 is a transposition of clause 3.8 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 scales 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.850.6	2017-04-29	16	11.1002/1000/13359

#### Keywords

Bluetooth Generic Attribute Profile, Bluetooth Low Energy (BLE), Conformance testing, Continua Design Guidelines, 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, pulse oximeter, touch area network.

<sup>\*</sup> 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, <u>http://handle.itu.int/11.1002/1000/11</u> <u>830-en</u>.

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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 <u>http://www.itu.int/ITU-T/ipr/</u>.

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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.

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#### Introduction

This Recommendation is a transposition of clause 3.8 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	<ul> <li>Initial release for Test Tool DG2016. It uses "TSS&amp;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]</li> <li>Adds PLX BLE device specialization</li> <li>Adds PLX CGM device specialization</li> </ul>	
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.	

## **Recommendation ITU-T H.850.6**

# Conformance of ITU-T H.810 personal health devices: Personal Health Devices interface Part 10F: Transcoding for Bluetooth Low Energy: Personal Health Gateway – Pulse oximeter

### 1 Scope

The scope of this Recommendation<sup>1</sup> 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 10F.

- 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

<sup>&</sup>lt;sup>1</sup> 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 7: Continua Design Guidelines. BLE Personal Health Device
- Part 8: Continua Design Guidelines. BLE Personal Health Gateway
- 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 into 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), <i>Interoperability design</i> guidelines for personal health systems.
[Bluetooth PHDT v1.4]	Bluetooth SIG (2013), <i>Personal Health Devices Transcoding</i> <i>White Paper</i> , v1.4. <u>https://www.bluetooth.org/DocMan/handlers/DownloadDoc.ashx?doc_id=2945</u> <u>39</u>
[Bluetooth PHDT v1.5]	Bluetooth SIG (2014), <i>Personal Health Devices Transcoding</i> <i>White Paper</i> , v1.5. <u>https://www.bluetooth.org/DocMan/handlers/DownloadDoc.ashx?doc_id=2723</u> <u>46</u>
[Bluetooth PHDT v1.6]	Bluetooth SIG (2015), <i>Personal Health Devices Transcoding</i> <i>White Paper</i> , v1.6. <u>https://www.bluetooth.org/DocMan/handlers/DownloadDoc.ashx?doc_id=3106</u> <u>57</u>
[ISO/IEEE 11073-104xx]	ISO/IEEE 11073-104xx (in force), <i>Health informatics –</i> <i>Personal health device communication – Device specialization</i> . 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, <i>Health informatics – Personal</i> <i>health device communication – Part 20601: Application</i> <i>profile – Optimized exchange protocol</i> , 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, <i>Health informatics – Personal</i> <i>health device communication – Part 20601: Application</i> <i>profile – Optimized exchange protocol</i> , including ISO/IEEE 11073-20601:2016/Cor.1:2016. <u>https://www.iso.org/standard/66717.html</u> with <u>https://www.iso.org/standard/71886.html</u>
[IHE PCD TF 1]	IHE PCD TF 1 (2012), <i>IHE Patient Care Device Technical</i> <i>Framework – Revision 2.0. Volume 1: Integration Profiles.</i> <u>http://www.ihe.net/Technical Framework/upload/IHE PCD TF Rev2-0 Vol1 FT 2012-08-16.pdf</u>
[IHE PCD TF 2]	IHE PCD TF 2 (2012), <i>IHE Patient Care Device Technical</i> <i>Framework – Revision 2.0. Volume 2: Transactions.</i> <u>http://www.ihe.net/Technical Framework/upload/IHE_PCD_TF_Rev2-0_Vol2_FT_2012-08-16.pdf</u>
[IHE PCD TF 3]	IHE PCD TF 3 (2012), <i>IHE Patient Care Device Technical</i> <i>Framework – Revision 2.0. Volume 3: Semantic Content.</i> 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.

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 En maintenance updates of the CDG 2012 and additional guidelines that cover new functionalities.	
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 Adres maintenance updates of the CDG 2010 and additional guidelines that cover new functionalities [b-CDG 2011].	
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].	-

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

#### 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 2.4.7 (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)

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- 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)
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    - 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)
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    - Subgroup 2.3.12: Body composition analyser (BCA)
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    - Subgroup 2.4.2: Whitepaper thermometer requirements (TH)
    - Subgroup 2.4.3: Whitepaper blood pressure measurement requirements (BPM)

- Subgroup 2.4.4: Whitepaper heart rate requirements (HR)
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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 <a href="http://handle.itu.int/11.1002/2000/12067">http://handle.itu.int/11.1002/2000/12067</a>.

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.

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-000			
TP label Whitepaper. Pulse Oximeter MDS Object - System-Type Attribute					
Coverage	Spec	[Bluetooth PHDT v1.6]			
	Testable items	PLX Specific MDS 1; M			
Test purpo	se	Check that:			
		PHG does not include MDS object, System-Type attribute in transcoder output.			
Applicabilit	y	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040			
Other PICS					
Initial cond	ition	The PHG under test and the simulated PHD are in the Standby state.			
Test proced	dure	<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a measurement ready to be sent and it is in the Advertising state (it is discoverable).</li> </ol>			
		<ol> <li>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).</li> </ol>			
		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 c	riteria	In Step 4, the MDS object, System-Type attribute is not present.			
Notes		Possible values in typical points of observation after transcoder output are:			
(To assist r testing)	nanual	a) IEEE 11073 Objects and Attributes			
looning)		System-Type attribute is not present:			
		Object: MDS Object			
		Attribute-id: MDC_ATTR_SYS_TYPE (2438)			
		Attribute-type: TYPE			
		Attribute-value: <not present=""></not>			
		b) WAN PCD-01 message			
		PCD-01 message does not include segments with System-Type attribute value (67974^MDC_ATTR_SYS_TYPE^MDC)			

# A.2 Subgroup 2.4.7 – Whitepaper Pulse oximeter requirements (PLX)

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-001		
TP label		Whitepaper. Pulse Oximeter 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]		
		Dev-Configuration-Id value is Configuration)	set to any value in range of 0x40	00 to 0x7FFF (Extended

Applicability	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040			
Other PICS				
Initial condition	The PHG under test and the simulated PHD are in the Standby state.			
Test Procedure	<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a measurement ready to be sent and it is in the Advertising state (it is discoverable).</li> </ol>			
	<ol> <li>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).</li> </ol>			
	<ol> <li>When the pairing has been completed (Connection state) the simulated PHD sends the Measurement to the PHG under test.</li> </ol>			
	4. Check in PHG transcoder output the MDS object, Dev-Configuration-Id attribute			
Pass/Fail criteria	In Step 4, the MDS object, Dev-Configuration-Id attribute is present, its value is inside the range 0x4000 - 0x7FFF			
Notes	Possible values in typical points of observation after transcoder output are:			
(To assist manual testing)	a) IEEE 11073 Objects and Attributes			
5,	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.			

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-002			
TP label		Whitepaper. Pulse Oxin	neter MDS Object - System-Type-S	pec-List Attribute	
Coverage	Spec	[Bluetooth PHDT v1.6]			
	Testable items	Common MDS 15; M	PLX Specific MDS 2; M		
Test purpose		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_PULS_OXIM, Version 1)			
Applicabilit	ÿ	C_MAN_BLE_000 AND	C_MAN_BLE_002 AND C_MAN_E	BLE_040	
Other PICS					
Initial cond	ition	The PHG under test and the simulated PHD are in the Standby state.			
Test procedure		1. The simulated PHD is configured with a Pulse Oximeter 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).			
		<ol> <li>When the pairing has been completed (Connection state) the simulated PHD sends the Measurement to the PHG under test.</li> </ol>			

	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_PULS_OXIM, Version 1)			
Notes (To assist manual testing)	<ul> <li>Possible values in typical points of observation after transcoder output are:</li> <li>a) IEEE 11073 Objects and Attributes</li> <li>System-Type-Spec-List attribute is present:</li> <li>Dbject: MDS Object</li> <li>Attribute-id: MDC_ATTR_SYS_TYPE_SPEC_LIST (2650)</li> <li>Attribute-type: SEQUENCE OF [ {type (INT-U16), version (INT-U16)} ]</li> </ul>			
	<ul> <li>Attribute-value:         <ul> <li>type: MDC_DEV_SPEC_PROFILE_PULS_OXIM, 4100 (dec) or 10 04 (hex)</li> <li>version: 1 (dec) or 00 01 (hex)</li> </ul> </li> <li>b) WAN PCD-01 message         <ul> <li>PCD-01 message includes a segment like this with System-Type-Spec-List attribute value (check OBX-5):</li></ul></li></ul>			

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-003				
TP label		Whitepaper. Pulse Oxime	Whitepaper. Pulse Oximeter MDS Object - Reg-Cert-Data-List Attribute			
Coverage	Spec	[Bluetooth PHDT v1.6]	[Bluetooth PHDT v1.6]			
	Testable items	Common MDS 14; M	Regulatory Conv 1; M			
F		Check that: PHG transcodes IEEE 11073-20601 Regulatory Certification Data List characteristic into MDS object, Reg-Cert-Data-List attribute				
Applicabilit	y	C_MAN_BLE_000 AND C	C_MAN_BLE_002 AND C_MAN_BLE_040			
Other PICS						
Initial cond	ition	The PHG under test and the simulated PHD are in the Standby state.				
Test proced	dure	1. The simulated PHD is configured with a Pulse Oximeter 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 ir interest for this Test 0	mplements several BTLE characteristics. The characteristic of Case is:			
		a. IEEE 11073-206	01 Regulatory Certification Data List (0x2A2A)			
		Format: reg-	-cert-data-list (opaque structure)			
		• Value: 00 02 (hex)	2 00 12 02 01 00 08 06 01 00 01 00 02 80 04 02 02 00 02 80 00			
		i. Elemen	it:			
		• aut	th-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 04 (hex) BTLE Pulse Oximeter
	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
	<ol> <li>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.</li> </ol>
	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 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	Possible values in typical points of observation after transcoder output are:
(To assist manual testing)	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}, {}]
	<ul> <li>Attribute-value: 00 02 00 12 02 01 00 08 06 01 00 01 00 02 80 04 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]</li> </ul>
	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 04 (hex). BTLE Pulse Oximeter
	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  6.1      R

OBX ? NA 532353^MDC_REG_CERT_DATA_CONTINUA_CERT_DEV_LIST^MDC  1.0.0.a.y 32772      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 ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-004	
TP label Whitepaper. SpO2 Numeric Object (Spot-Check Measurement) - Handle		Whitepaper. SpO2 Numeric Object (Spot-Check Measurement) - Handle Attribute	
Coverage	Spec	[Bluetooth PHDT v1.6]	
	Testable items	SpO2 Numeric 1; O	
using spot-check measurement mode. [OR]		<ul><li>PHG does not include SpO2 Numeric object, Handle Attribute in transcoder output when using spot-check measurement mode.</li><li>[OR]</li><li>If PHG includes SpO2 Numeric object, Handle attribute in transcoder output, then its value</li></ul>	
Applicabilit	у	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040	
Other PICS		C_MAN_BLE_042	
Initial cond	ition	The PHG under test and the simulated PHD are in the Standby state.	
Other PICS Initial condition Test procedure		<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a spot-check measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also supports the RACP characteristic and has an identical spot-check measurement temporarily stored.</li> <li>The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:         <ul> <li>a. PLX Features (0x2A60)</li> <li>i. Field: Supported Features</li> <li>Format: 16 bit</li> <li>Value: 0000 0000 0000 1100 (MSB → LSB). Measurement Storage for spot-check measurements is supported (bit 2). Timestamp for Spot-Check measurements is supported.</li> <li>ii. Field: Measurement Status Support</li> <li>This field is not included</li> <li>iii. Field: Device and Sensor Status Support</li> <li>This field is not included</li> <li>b. PLX Spot-Check Measurement (0x2A5E)</li> <li>i. Field: Flags</li> <li>Format: 8 bit</li> <li>Value: 0000 0001 (MSB → LSB). Timestamp field is present. Measurement Status, Device and Sensor Status, and Pulse Amplitude Index fields are not present. Device Clock is set.</li> <li>ii. Field: SpO2PR-Spot-Check - SpO2 (%)</li> </ul> </li> </ol>	

	Value: Not Relevant
	iii. Field: SpO2PR-Spot-Check – PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	iv. Field: Time Stamp
	Format: Date and Time
	Value: Not Relevant
	v. Field: Measurement Status
	This field is not included
	vi. Field: Device and Sensor Status
	This field is not included
	vii. Field: Pulse Amplitude Index (%)
	This field is not included
	<ol> <li>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).</li> </ol>
	4. When the pairing has been completed (Connection state), force the PHG under test to read the PLX Features characteristic.
	5. The simulated PHD sends the measurement to the PHG under test.
	6. Check in PHG transcoder output the SpO2 Numeric object, Handle attribute
	7. IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	<ul> <li>a) 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 spot-check measurement to PHG under test</li> </ul>
	b) Check in PHG transcoder output the SpO2 Numeric object, Handle attribute
Pass/Fail criteria	In Step 6, the SpO2 Numeric object, Handle attribute is not present or, if it is present then its value is different than 0
	If the PHG supports RACP, the same criteria applies to Step 7.b
Notes	Possible values in typical points of observation after transcoder output are:
(To assist manual	a) IEEE 11073 Objects and Attributes
testing)	Handle attribute is not present, or if it is present then:
	Object: SpO2 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

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-005
TP label		Whitepaper. SpO2 Numeric Object (Continuous Measurements) - Handle Attribute
Coverage	Spec	[Bluetooth PHDT v1.6]
	Testable items	SpO2 Numeric 11; O

Test purpose	Check that:				
	<ul> <li>PHG does not include SpO2 Numeric object, Handle Attribute in transcoder output when using continuous measurements</li> <li>[OR]</li> <li>If PHG includes SpO2 Numeric object, Handle attribute in transcoder output, then its value shall be different than 0</li> </ul>				
Applicability	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040				
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 Pulse Oximeter Profile (device specialization), it has a continuous measurement (including fast and slow response measurement values) ready to be sent and it is in the Advertising state (it is discoverable).				
	2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:				
	a. PLX Features (0x2A60)				
	i. Field: Supported Features				
	Format: 16 bit				
	<ul> <li>Value: 0000 0000 0011 0000 (MSB → LSB). Fast and slow response modes are supported (bits 4 and 5).</li> </ul>				
	ii. Field: Measurement Status Support				
	This field is not included				
	iii. Field: Device and Sensor Status Support				
	This field is not included				
	b. PLX Continuous Measurement (0x2A5F)				
	i. Field: Flags				
	Format: 8 bit				
	<ul> <li>Value: 0000 0011 (MSB → LSB). SpO2PR–Fast, SpO2PR-Slow fields are present. Measurement Status, Device and Sensor Status and Pulse Amplitude Index fields are not present.</li> </ul>				
	ii. Field: SpO2PR-Normal - SpO2 (%)				
	Format: SFLOAT				
	Value: Not Relevant				
	iii. Field: SpO2PR-Normal – PR (bpm)				
	Format: SFLOAT				
	Value: Not Relevant				
	iv. Field: SpO2PR-Fast - SpO2 (%)				
	Format: SFLOAT				
	Value: Not Relevant				
	v. Field: SpO2PR-Fast - PR (bpm)				
	Format: SFLOAT				
	Value: Not Relevant				
	vi. Field: SpO2PR-Slow - SpO2 (%)				
	Format: SFLOAT				
	Value: Not Relevant				
	vii. Field: SpO2PR-Slow - PR (bpm)				

	Format: SFLOAT
	Value: Not Relevant
	viii. Field: Measurement Status
	This field is not included
	ix. Field: Device and Sensor Status
	This field is not included
	x. Field: Pulse Amplitude Index (%)
	This field is not included
	<ol> <li>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).</li> </ol>
	4. When the pairing has been completed (Connection state), force the PHG under test to read the PLX Features characteristic.
	5. The simulated PHD sends the Measurement to the PHG under test.
	<ol> <li>Check in PHG transcoder output the SpO2 Numeric object, Handle attribute in all three SpO2 objects (continuous normal, fast and slow).</li> </ol>
Pass/Fail criteria	In Step 6,
	• There are three SpO2 objects (for normal, fast and slow measurement modes).
	<ul> <li>In all three objects, the SpO2 Numeric object, Handle attribute is not present or, if it is present then its value is different than 0</li> </ul>
Notes	Possible values in typical points of observation after transcoder output are:
(To assist manual testing)	a) IEEE 11073 Objects and Attributes
testing)	Handle attribute is not present in SpO2 objects, or if it is present then:
	Object: SpO2 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 ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-006					
TP label		Whitepaper. SpO2 Numeric Object (Spot-Check Measurement) - Type Attribute					
Coverage	Spec	[Bluetooth PHDT v1.6]	luetooth PHDT v1.6]				
	Testable items	SpO2 Numeric 2; M	SpO2 Numeric 2; M				
Test purpose		measurement mode. [AND]	neric object, Type attribute in trai RT_SCADA, MDC_PULS_OXIM	nscoder output when using spot-check _SAT_O2}			
Applicability C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040		_BLE_040					
Other PICS		C_MAN_BLE_042					
Initial condition The PHG under test and the simulated PHD are in the Standby state.			andby state.				

Test procedure	1.	has disc	a sp over	ulated PHD is configured with a Pulse Oximeter Profile (device specialization), it ot-check measurement ready to be sent and it is in the Advertising state (it is able). The simulated PHD also supports the RACP characteristic and has an spot-check measurement temporarily stored.
	2.			ulated PHD implements several BTLE characteristics. The characteristics of for this Test Case are:
		a.	PLX	(Features (0x2A60)
			i.	Field: Supported Features
				Format: 16 bit
				• Value: 0000 0000 0000 1100 (MSB → LSB). Measurement Storage for spot- check measurements is supported (bit 2). Timestamp for Spot-Check measurements is supported.
			ii.	Field: Measurement Status Support
				This field is not included
			iii.	Field: Device and Sensor Status Support
				This field is not included
		b.	PLX	Spot-Check Measurement (0x2A5E)
			i.	Field: Flags
				Format: 8 bit
				<ul> <li>Value: 0000 0001 (MSB → LSB). Timestamp field is present. Measurement Status, Device and Sensor Status, and Pulse Amplitude Index fields are not present. Device Clock is set.</li> </ul>
			ii.	Field: SpO2PR-Spot-Check - SpO2 (%)
				Format: SFLOAT
				Value: Not Relevant
			iii.	Field: SpO2PR-Spot-Check – PR (bpm)
				Format: SFLOAT
				Value: Not Relevant
			iv.	Field: Time Stamp
				Format: Date and Time
				Value: Not Relevant
			v.	Field: Measurement Status
				This field is not included
			vi.	Field: Device and Sensor Status
				This field is not included
			vii.	Field: Pulse Amplitude Index (%)
				This field is not included
	3.			G under test initiates a discovery process (Scanning state), it discovers the d PHD and it starts a pairing process with the simulated PHD (Initiating state).
	4.			e pairing has been completed (Connection state), force the PHG under test to read Features characteristic.
	5.	The	sim	ulated PHD sends the Measurement to the PHG under test.
	6.	Che	eck ir	PHG transcoder output the SpO2 Numeric object, Type attribute
	7.	IF C	C_MA	N_BLE_042 = TRUE (PHG supports RACP) THEN
		a)	perf	PHG under test requests the Simulated PHD to report stored records by orming a writing operation in the Record Access Control Point (RACP) and the ulated PHD sends the temporarily stored spot-check measurement to PHG under

	b. Check in PHG transcoder output the SpO2 Numeric object, Type attribute			
Pass/Fail criteria	In Step 6, the SpO2 Numeric object, Type attribute is present and its value is {MDC_PART_SCADA, MDC_PULS_OXIM_SAT_O2}			
	If the PHG supports RACP, the same criteria applies to Step 7.b			
Notes (To assist manual	Possible values in typical points of observation after transcoder output are:			
testing)	a) IEEE 11073 Objects and Attributes			
	Type attribute is present:			
	Object: SpO2 Numeric Object			
	Attribute-id: MDC_ATTR_ID_TYPE (2351)			
	Attribute-type : SEQUENCE {partition (INT-U16), code (INT-U16)}			
	□ Attribute-value:			
	<ul> <li>partition: MDC_PART_SCADA or 2 (dec) or 00 02 (hex)</li> </ul>			
	• code: MDC_PULS_OXIM_SAT_O2 or 19384 (dec) or 4B B8 (hex)			
	b) WAN PCD-01 message			
	PCD-01 message includes a segment like this with Type attribute (check OBX-3):			
	OBX n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x [value]  262688^MDC_DIM_PERCENT^MDC     R   [current_date_time]			

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-007			
TP label		Whitepaper. SpO2 Numeric Object (Continuous Measurements) – Type Attribute			
Coverage	Spec	[Bluetooth PHDT v1.6]			
	Testable items	SpO2 Numeric 12; M			
Test purpo	se	Check that:			
		PHG includes SpO2 Numeric object, Type attribute in transcoder output when using continuous measurements.			
		[AND]			
		Type is set to {MDC_PART_SCADA, MDC_PULS_OXIM_SAT_O2}			
Applicabili	ty	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040			
Other PICS	•				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.			
Test procedure		<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a continuous measurement (including fast and slow response measurement values) ready to be sent and it is in the Advertising state (it is discoverable).</li> </ol>			
		2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:			
		a. PLX Feature (0x2A60)			
		i. Field: Supported Features			
		Format: 16 bit			
		<ul> <li>Value: 0000 0000 0011 0000 (MSB → LSB). Fast and slow response modes are supported (bits 4 and 5).</li> </ul>			
		ii. Field: Measurement Status Support			

			This field is not included
		iii.	Field: Device and Sensor Status Support
			This field is not included
	b.	PLX	Continuous Measurement (0x2A5F)
		i.	Field: Flags
			Format: 8 bit
			<ul> <li>Value: 0000 0011 (MSB → LSB). SpO2PR–Fast, SpO2PR-Slow fields are present. Measurement Status, Device and Sensor Status and Pulse Amplitude Index fields are not present.</li> </ul>
		ii.	Field: SpO2PR-Normal - SpO2 (%)
			Format: SFLOAT
			Value: Not Relevant
		iii.	Field: SpO2PR-Normal – PR (bpm)
			Format: SFLOAT
			Value: Not Relevant
		iv.	Field: SpO2PR-Fast - SpO2 (%)
			Format: SFLOAT
			Value: Not Relevant
		٧.	Field: SpO2PR-Fast - PR (bpm)
			Format: SFLOAT
			Value: Not Relevant
		vi.	Field: SpO2PR-Slow - SpO2 (%)
			Format: SFLOAT
			Value: Not Relevant
		vii.	Field: SpO2PR-Slow - PR (bpm)
			Format: SFLOAT
			Value: Not Relevant
		viii.	Field: Measurement Status
			This field is not included
		ix.	Field: Device and Sensor Status
			This field is not included
		х.	Field: Pulse Amplitude Index (%)
			This field is not included
			G under test initiates a discovery process (Scanning state), it discovers the d PHD and it starts a pairing process with the simulated PHD (Initiating state).
			e pairing has been completed (Connection state), force the PHG under test to read Feature characteristic.
	5. TI	he simu	ulated PHD sends the Measurement to the PHG under test.
			PHG transcoder output the SpO2 Numeric object, Type attribute in all three SpO2 continuous normal, fast and slow).
Pass/Fail criteria	In Ste	p 6.	
			e three SpO2 objects (for normal, fast and slow measurement modes).
	• In	all thre	ee objects, the SpO2 Numeric object, Type attribute is present and its value is ART_SCADA, MDC_PULS_OXIM_SAT_O2}

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 in all three SpO2 objects:	
	Object: SpO2 Numeric Object	
	Attribute-id: MDC_ATTR_ID_TYPE (2351)	
	Attribute-type: SEQUENCE {partition (INT-U16), code (INT-U16)}	
	Attribute-value:	
	<ul> <li>partition: MDC_PART_SCADA or 2 (dec) or 00 02 (hex)</li> </ul>	
	<ul> <li>code: MDC_PULS_OXIM_SAT_O2 or 19384 (dec) or 4B B8 (hex)</li> </ul>	
	b) WAN PCD-01 message	
	PCD-01 message includes three segments like this with Type attribute (check OBX-3):	
	OBX n NM  <b>150456^MDC_PULS_OXIM_SAT_O2^MDC</b>  m.0.0.x [value]  262688^MDC_DIM_PERCENT^MDC    R   [current_date_time]	

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-008					
TP label		Whitepaper. SpO2 Numeric Object (Spot-Check Measurement) – Supplemental-Types Attribute					
Coverage	Spec	[Bluetooth PHDT v1.6]					
	Testable items	SpO2 Numeric 3; M					
Test purpose		Check that:					
		PHG includes SpO2 Numeric object, Supplemental-Types attribute in transcoder output when using spot-check measurement mode.					
		[AND]					
		Supplemental-Types attribute is set to {MDC_PART_SCADA, MDC_MODALITY_SPOT}.					
Applicabilit	y	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040					
Other PICS		C_MAN_BLE_042					
Initial condi	tion	The PHG under test and the simulated PHD are in the Standby state.					
Test procedure		<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a spot-check measurement ready to be sent and it is in the Advertising state (it is discoverable). Simulated PHD also supports the RACP characteristic and has an identical spot-check measurement temporarily stored.</li> </ol>					
		2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:					
		a. PLX Features (0x2A60)					
		i. Field: Supported Features					
		Format: 16 bit					
		<ul> <li>Value: 0000 0000 0000 1100 (MSB → LSB). Measurement Storage for spot- check measurements is supported (bit 2). Timestamp for Spot-Check measurements is supported.</li> </ul>					
		ii. Field: Measurement Status Support					
		This field is not included					
		iii. Field: Device and Sensor Status Support					
		This field is not included					

	b. PLX Spot-Check Measurement (0x2A5E)		
	i. Field: Flags		
	Format: 8 bit		
	<ul> <li>Value: 0000 0001 (MSB → LSB). Timestamp field is present. Measurement Status, Device and Sensor Status, and Pulse Amplitude Index fields are not present. Device Clock is set.</li> </ul>		
	ii. Field: SpO2PR-Spot-Check - SpO2 (%)		
	Format: SFLOAT		
	Value: Not Relevant		
	iii. Field: SpO2PR-Spot-Check – PR (bpm)		
	Format: SFLOAT		
	Value: Not Relevant		
	iv. Field: Time Stamp		
	Format: Date and Time		
	Value: Not Relevant		
	v. Field: Measurement Status		
	This field is not included		
	vi. Field: Device and Sensor Status		
	This field is not included		
	vii. Field: Pulse Amplitude Index (%)		
	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).		
	<ol> <li>When the pairing has been completed (Connection state), force the PHG under test to read the PLX Features characteristic.</li> </ol>		
	5. The simulated PHD sends the Measurement to the PHG under test.		
	6. Check in PHG transcoder output the SpO2 Numeric object, Supplemental-Types attribute		
	7. IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN		
	<ul> <li>a) 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 spot-check measurement to PHG under test</li> </ul>		
	b) Check in PHG transcoder output the SpO2 Numeric object, Supplemental-Types attribute		
Pass/Fail criteria	In Step 6, the SpO2 Numeric object, Supplemental-Types attribute is present and its value is {MDC_PART_SCADA, MDC_MODALITY_SPOT}.		
	If the PHG supports RACP, the same criteria applies to Step 7.b.		
Notes	Possible values in typical points of observation after transcoder output are:		
(To assist manual testing)	a) IEEE 11073 Objects and Attributes		
testing)	Supplemental-Types attribute is present:		
	Object: SpO2 Numeric Object (Spot-Check measurement)		
	Attribute-id: MDC_ATTR_SUPPLEMENTAL_TYPES (2657)		
	Attribute-type: SEQUENCE of SEQUENCE {partition (INT-U16), code (INT-U16)}		
	Attribute-value: {MDC_PART_SCADA, MDC_MODALITY_SPOT}.		
	b) WAN PCD-01 message		
	PCD-01 message includes a facet OBX segment of the SpO2 measurement OBX segment		

OBX n CWE 68193^MDC_ATTR_SUPPLEMENTAL_TYPES^MDC m.0.0.x.y  150580^MDC_MODALITY_SPOT^MDC      R
OBX n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x [value]  262688^MDC_DIM_PERCENT^MDC    R   [current_date_time]
with Supplemental-Types attribute (check OBX-3 and OBX-5):

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-009					
TP label		Whitepaper. SpO2 Numeric Object (Continuous Measurements) – Supplemental-Types Attribute					
Coverage	Spec	[Bluetooth PHDT v1.6	]				
	Testable items	SpO2 Numeric 13; M	SpO2 Numeric 14; M	SpO2 Numeric 15; M			
Test purpo	se	Check that:					
			SpO2 Numeric object, Supp us measurement object (nor	olemental-Types attribute in transcoder outpu mal).			
		[AND]					
		PHG includes SpO2 Numeric object, Supplemental-Types attribute in transcoder output for the SpO2 continuous measurement object (fast mode). Supplemental-Types attribute is set to {MDC_PART_SCADA, MDC_MODALITY_FAST}.					
		[AND]					
		PHG includes SpO2 Numeric object, Supplemental-Types attribute in transcoder output for the SpO2 continuous measurement object (slow mode). Supplemental-Types attribute is set to {MDC_PART_SCADA, MDC_MODALITY_SLOW}.					
Applicabili	ty	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040					
Other PICS	6						
Initial cond	lition	The PHG under test and the simulated PHD are in the Standby state.					
Test procedure		<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a continuous measurement (including fast and slow response measurement values) ready to be sent and it is in the Advertising state (it is discoverable).</li> </ol>					
		2. The simulated PH interest for this Te		characteristics. The characteristics of			
		a. PLX Feature (0x2A60)					
		i. Field: Su	pported Features				
		• For	nat: 16 bit				
			ue: 0000 0000 00 <b>11</b> 0000 (M supported (bits 4 and 5).	ISB $\rightarrow$ LSB). Fast and slow response modes			
		ii. Field: Me	easurement Status Support				
		• This	field is not included				
		iii. Field: De	evice and Sensor Status Sup	oport			
		• This	field is not included				
		b. PLX Continu	ous Measurement (0x2A5F)				
		i. Field: Fla	ags				
		• For	nat: 8 bit				
		pres		). SpO2PR–Fast, SpO2PR-Slow fields are Device and Sensor Status and Pulse resent.			

	ii. Field: SpO2PR-Normal - SpO2 (%)	
	Format: SFLOAT	
	Value: Not Relevant	
	iii. Field: SpO2PR-Normal - PR (bpm)	
	Format: SFLOAT	
	Value: Not Relevant	
	iv. Field: SpO2PR-Fast - SpO2 (%)	
	Format: SFLOAT	
	Value: Not Relevant	
	v. Field: SpO2PR-Fast - PR (bpm)	
	Format: SFLOAT	
	Value: Not Relevant	
	vi. Field: SpO2PR-Slow - SpO2 (%)	
	Format: SFLOAT	
	Value: Not Relevant	
	vii. Field: SpO2PR-Slow - PR (bpm)	
	Format: SFLOAT	
	Value: Not Relevant	
	viii. Field: Measurement Status	
	This field is not included	
	ix. Field: Device and Sensor Status	
	This field is not included	
	x. Field: Pulse Amplitude Index (%)	
	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).	
	<ol> <li>When the pairing has been completed (Connection state), force the PHG under test to read the PLX Feature characteristic.</li> </ol>	
	5. The simulated PHD sends the Measurement to the PHG under test.	
	<ol> <li>Check in PHG transcoder output the SpO2 Numeric object, Supplemental-Types attribute in all three SpO2 objects (continuous normal, fast and slow).</li> </ol>	
Pass/Fail criteria	In Step 6,	
	<ul> <li>The SpO2 Numeric Object (normal) – Supplemental-Types attribute is not present</li> </ul>	
	<ul> <li>The SpO2 Numeric Object (fast response) Supplemental-Types attribute is present and its value is {MDC_PART_SCADA, MDC_MODALITY_FAST}.</li> </ul>	
	<ul> <li>The SpO2 Numeric Object (slow response) Supplemental-Types attribute is present and its value is {MDC_PART_SCADA, MDC_MODALITY_SLOW}.</li> </ul>	
Notes	Possible values in typical points of observation after transcoder output are:	
(To assist manual	a) IEEE 11073 Objects and Attributes	
testing)	Supplemental Types attribute is not present for SpO2 Numeric Object (normal).	
	Supplemental-Types attribute is present for SpO2 Numeric Object (fast response):	
	<ul> <li>Object: SpO2 Numeric Object (fast response)</li> </ul>	
	<ul> <li>Attribute-id: MDC_ATTR_SUPPLEMENTAL_TYPES (2657)</li> </ul>	
	<ul> <li>Attribute-type: SEQUENCE of SEQUENCE {partition (INT-U16), code (INT-U16)}</li> </ul>	

	Attribute-value: {MDC_PART_SCADA, MDC_MODALITY_FAST}.
	Supplemental-Types attribute is present for SpO2 Numeric Object (slow response):
	Object: SpO2 Numeric Object (slow response)
	Attribute-id: MDC_ATTR_SUPPLEMENTAL_TYPES (2657)
	Attribute-type: SEQUENCE of SEQUENCE {partition (INT-U16), code (INT-U16)}
	Attribute-value: {MDC_PART_SCADA, MDC_MODALITY_SLOW}.
b)	WAN PCD-01 message
	For SpO2 Numeric Object (normal)
	PCD-01 message does not include segments with Supplemental-Types attribute.
	For SpO2 Numeric Object (fast)
	<ul> <li>PCD-01 message includes a facet OBX segment of the SpO2 measurement OBX segment with Supplemental-Types attribute (check OBX-3 and OBX-5):</li> </ul>
	OBX n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC  <b>m.0.0.x</b>  [value]  262688^MDC_DIM_PERCENT^MDC     R   [current_date_time]
	OBX n CWE  <b>68193^MDC_ATTR_SUPPLEMENTAL_TYPES^MDC m.0.0.x.y</b>   150580^MDC_MODALITY_FAST^MDC      R
	For SpO2 Numeric Object (slow)
	PCD-01 message includes a facet OBX segment of the SpO2 measurement OBX segment with Supplemental-Types attribute (check OBX-3 and OBX-5):
	OBX n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC  <b>m.0.0.y</b>  [value]  262688^MDC_DIM_PERCENT^MDC     R   [current_date_time]
	OBX n CWE  <b>68193^MDC_ATTR_SUPPLEMENTAL_TYPES^MDC m.0.0.y.z </b> 150580^MDC_MODALITY_SLOW^MDC      R

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-010			
TP label		Whitepaper. SpO2 Numeric Object (Spot-Check Measurement) - Metric-Spec-Small Attribute 1			
Coverage	Spec	[Bluetooth PHDT v1.6]	[Bluetooth PHDT v1.6]		
	Testable items	SpO2 Numeric 4; M	SpO2 Numeric 6; M		
Test purpose		Check that: PHG includes SpO2 Numeric object, Metric-Spec-Small attribute in transcoder output when using spot-check measurement mode. [AND]			
Applicability		Metric-Spec-Small is set to {0x5040} when the sensor device supports measurement storage.			
Other PICS		C_MAN_BLE_042			
Initial condi	tion	The PHG under test and the simulated PHD are in the Standby state.			
Test procedure		<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a spot-check measurement ready to be sent and it is in the Advertising state (it is discoverable). Simulated PHD also supports the RACP characteristic and has an identical spot-check measurement temporarily stored.</li> </ol>			
		2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:			
		<ul><li>a. PLX Spot-Check Measurement (0x2A5E)</li><li>b. PLX Feature (0x2A60)</li></ul>			

	i.	Field: Supported Features
		Format: 16 bit
		• Value: 0000 0000 0000 1100 (MSB → LSB). Measurement Storage for spot- check measurements is supported (bit 2). Timestamp for Spot-Check measurements is supported (bit 3).
	ii.	Field: Measurement Status Support
		This field is not included
	iii.	Field: Device and Sensor Status Support
		This field is not included
3.		G under test initiates a discovery process (Scanning state), it discovers the ed PHD and it starts a pairing process with the simulated PHD (Initiating state).
4.		ne pairing has been completed (Connection state), force the PHG under test to PLX Feature characteristic.
5.	. The sim value:	ulated PHD sends the Measurement to the PHG under test with the following
	a. PL	K Spot-Check Measurement (0x2A5E)
	i.	Field: Flags
		Format: 8 bit
		<ul> <li>Value: 0000 0001 (MSB → LSB). Timestamp field is supported. Measurement Status, Device and Sensor Status, and Pulse Amplitude Index fields are not present. Device Clock is set.</li> </ul>
	ii.	Field: SpO2PR-Spot-Check - SpO2 (%)
		Format: SFLOAT
		Value: Not Relevant
	iii.	Field: SpO2PR-Spot-Check – PR (bpm)
		Format: SFLOAT
		Value: Not Relevant
	iv.	Field: Time Stamp
		Format: Date and Time
		Value: Not Relevant
	v.	Field: Measurement Status
		This field is not included
	vi.	Field: Device and Sensor Status
		This field is not included
	vii.	Field: Pulse Amplitude Index (%)
		This field is not included
6.	. Check i	n PHG transcoder output the SpO2 numeric object, Metric-Spec-Small attribute
7.	. IF C_M	AN_BLE_042 = TRUE (PHG supports RACP) THEN
	per	PHG under test requests the simulated PHD to report stored records by forming a writing operation in the Record Access Control Point (RACP) and the ulated PHD sends the temporarily stored spot-check measurement to PHG under t
		eck in PHG transcoder output the SpO2 numeric object, Metric-Spec-Small ibute
{C	0x5040} (m	e SpO2 Numeric Object – Metric-Spec-Small attribute is present and its value is ss-avail-stored-data  mss-msmt-aperiodic  mss-acc-agent-initiated). upports RACP, the same criteria applies to Step 7.b

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: SpO2 Numeric Object
	Attribute-id: MDC_ATTR_METRIC_SPEC_SMALL (2630)
	Attribute-type: BITS-16
	Attribute-value: 50 40 (hex) or BITS mss-avail-stored-data (1), 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 ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-011			
TP label		Whitepaper. SpO2 Numeric Object (Spot-Check Measurement) - Metric-Spec-Small Attribute 2			
Coverage Spec		[Bluetooth PHDT v1.6]			
	Testable items	SpO2 Numeric 4; M	SpO2 Numeric 5; M		
Test purpose		Check that:			
		PHG includes SpO2 Numeric Object – Metric-Spec-Small attribute in transcoder output when using spot-check measurement mode.			
		[AND]			
		Metric-Spec-Small is set to {0x1040} when the sensor device does not support measurement storage.			
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040			
Other PICS					
Initial condition		The PHG under test and the simulated PHD are in the Standby state.			
Test procedure		<ol> <li>The Ssimulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a spot-check measurement ready to be sent and it is in the Advertising state (it is discoverable).</li> </ol>			
		<ol> <li>The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:</li> </ol>			
		a. PLX Spot-Check Measurement (0x2A5E)			
		b. PLX Feature (0x2A60)			
		i. Field: Sup	ported Features		
		• Forma	at: 16 bit		
			: 0000 0000 0000 000 (MSB $\rightarrow$ LSB). Measurement Storage for Spot- measurements is not supported (bit 2).		
		ii. Field: Mea	surement Status Support		
		This f	eld is not included		
		iii. Field: Dev	ice and Sensor Status Support		
		This f	eld 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 ha	as been completed (Connection state), force the PHG under test to		

	read the PLX Feature characteristic.		
	<ol> <li>The simulated PHD sends the Measurement to the PHG under test with the following value:</li> </ol>		
	a. PLX Spot-Check Measurement (0x2A5E)		
	i. Field: Flags		
	Format: 8 bit		
	<ul> <li>Value: 0000 0000 (MSB → LSB). Timestamp, Measurement Status, Device and Sensor Status, and Pulse Amplitude Index fields are not present. Device Clock is set.</li> </ul>		
	ii. Field: SpO2PR-Spot-Check - SpO2 (%)		
	Format: SFLOAT		
	Value: Not Relevant		
	iii. Field: SpO2PR-Spot-Check – PR (bpm)		
	Format: SFLOAT		
	Value: Not Relevant		
	iv. Field: Time Stamp		
	This field is not included		
	v. Field: Measurement Status		
	This field is not included		
	vi. Field: Device and Sensor Status		
	This field is not included		
	vii. Field: Pulse Amplitude Index (%)		
	This field is not included		
	6. Check in PHG transcoder output the SpO2 Numeric Object – Metric-Spec-Small attribute		
Pass/Fail criteria	In Step 6, the SpO2 Numeric Object – Metric-Spec-Small attribute is present and its value is {0x1040} (mss-msmt-aperiodic   mss-acc-agent-initiated).		
Notes	Possible values in typical points of observation after transcoder output are:		
(To assist manual testing)	a) IEEE 11073 Objects and Attributes		
testing	Metric-Spec-Small attribute is present:		
	Object: SpO2 Numeric Object		
	Attribute-id: MDC_ATTR_METRIC_SPEC_SMALL (2630)		
	Attribute-type: BITS-16		
	Attribute-value: 10 40 (hex) or BITS 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 ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-012		
TP label		Whitepaper. SpO2 Numeric Object (Continuous Measurements) - Metric-Spec-Small Attribute		
Coverage	Spec	[Bluetooth PHDT v1.6]		
	Testable items	SpO2 Numeric 16; M		
Test purpose		Check that:		

	PHG includes SpO2 Numeric Object – Metric-Spec-Small attribute in transcoder output when using continuous measurements. [AND] Metric-Spec-Small is set to {0x0040} (mss-acc-agent-initiated)		
Applicability	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040		
Other PICS			
Initial condition	The PHG under test and the simulated PHD are in the Standby state.		
Test procedure	<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a continuous measurement (including fast and slow response measurement values) ready to be sent and it is in the Advertising state (it is discoverable).</li> </ol>		
	2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:		
	a. PLX Feature (0x2A60)		
	i. Field: Supported Features		
	Format: 16 bit		
	<ul> <li>Value: 0000 0000 0011 0000 (MSB → LSB). Fast and slow response modes are supported (bits 4 and 5).</li> </ul>		
	ii. Field: Measurement Status Support		
	This field is not included		
	iii. Field: Device and Sensor Status Support		
	This field is not included		
	b. PLX Continuous Measurement (0x2A5F)		
	i. Field: Flags		
	Format: 8 bit		
	<ul> <li>Value: 0000 0011 (MSB → LSB). SpO2PR–Fast, SpO2PR-Slow fields are present. Measurement Status, Device and Sensor Status and Pulse Amplitude Index fields are not present.</li> </ul>		
	ii. Field: SpO2PR-Normal - SpO2 (%)		
	Format: SFLOAT		
	Value: Not Relevant		
	iii. Field: SpO2PR-Normal – PR (bpm)		
	Format: SFLOAT		
	Value: Not Relevant		
	iv. Field: SpO2PR-Fast - SpO2 (%)		
	Format: SFLOAT		
	Value: Not Relevant		
	v. Field: SpO2PR-Fast - PR (bpm)		
	Format: SFLOAT		
	Value: Not Relevant		
	vi. Field: SpO2PR-Slow - SpO2 (%)		
	Format: SFLOAT		
	Value: Not Relevant		
	vii. Field: SpO2PR-Slow - PR (bpm)		
	Format: SFLOAT		

	Value: Not Relevant
	viii. Field: Measurement Status
	This field is not included
	ix. Field: Device and Sensor Status
	This field is not included
	x. Field: Pulse Amplitude Index (%)
	This field is not included
	<ol> <li>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).</li> </ol>
	4. When the pairing has been completed (Connection state), force the PHG under test to read the PLX Feature characteristic.
	5. The simulated PHD sends the Measurement to the PHG under test.
	<ol> <li>Check in PHG transcoder output the SpO2 Numeric Object – Metric-Spec-Small attribute in all three SpO2 objects (continuous normal, fast and slow).</li> </ol>
Pass/Fail criteria	In Step 6,
	• There are three SpO2 objects (for normal, fast and slow measurement modes).
	<ul> <li>In all three objects, the SpO2 Numeric Object – Metric-Spec-Small attribute is present and its value is {0x0040} (mss-acc-agent-initiated).</li> </ul>
Notes	Possible values in typical points of observation after transcoder output are:
(To assist manual testing)	a) IEEE 11073 Objects and Attributes
tooling,	Metric-Spec-Small attribute is present in all three SpO2 objects:
	Object: SpO2 Numeric Object
	Attribute-id: MDC_ATTR_METRIC_SPEC_SMALL (2630)
	Attribute-type: BITS-16
	Attribute-value: 00 40 (hex) or BITS 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 ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-013	
TP label	Whitepaper. SpO2 Numeric Object (Spot-Check Measurement) – Measurement-Status Attribute		Check Measurement) – Measurement-Status
Coverage	Spec	[Bluetooth PHDT v1.6]	
	Testable items	SpO2 Numeric 7; M	
Test purpose		Check that:	
		PHG includes SpO2 Numeric Object – Meausing spot-check measurement mode.	asurement-Status attribute in transcoder output when
		[AND]	
		PHG transcodes the Bluetooth Measuremet to 11073 Measurement-Status attribute pro	ent Status field of the PLX Spot-Check characteristic operly
Applicabili	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040		2 AND C_MAN_BLE_040
Other PICS	;	C_MAN_BLE_042	

Initial condition	The PHG under test and the simulated PHD are in the Standby state.
Test procedure	<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a spot-check measurement ready to be sent and it is in the Advertising state (it is discoverable). Simulated PHD also supports the RACP characteristic and has an identical spot-check measurement temporarily stored.</li> </ol>
	2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:
	a. PLX Spot-Check Measurement (0x2A5E)
	b. PLX Feature (0x2A60)
	i. Field: Supported Features
	Format: 16 bit
	<ul> <li>Value: 0000 0000 0000 1101 (MSB → LSB). Measurement Status support is present (bit 0). Measurement Storage for spot-check measurements is supported (bit 2). Timestamp for Spot-Check measurements is supported (b 3).</li> </ul>
	ii. Field: Measurement Status Support
	Format: 16 bit
	<ul> <li>Value: 1111 1111 1110 0000 (MSB → LSB). All Measurement Status bits an supported</li> </ul>
	iii. Field: Device and Sensor Status Support
	This field is not included
	<ol> <li>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).</li> </ol>
	4. When the pairing has been completed (Connection state), force the PHG under test to read the PLX Feature characteristic.
	5. The simulated PHD sends the Measurement to the PHG under test with the following value:
	a. PLX Spot-Check Measurement (0x2A5E)
	i. Field: Flags
	Format: 8 bit
	<ul> <li>Value: 0000 0011 (MSB → LSB). Measurement Status and Timestamp field are present. Device and Sensor Status, and Pulse Amplitude Index fields ar not present. Device Clock is set.</li> </ul>
	ii. Field: SpO2PR-Spot-Check - SpO2 (%)
	Format: SFLOAT
	Value: Not Relevant
	iii. Field: SpO2PR-Spot-Check – PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	iv. Field: Time Stamp
	This field is not included
	v. Field: Measurement Status
	Format: 16 bit
	<ul> <li>Value: 1000 0000 0000 0000 (MSB → LSB). Invalid measurement detected (bit 15).</li> </ul>
	vi. Field: Device and Sensor Status
	This field is not included
	vii. Field: Pulse Amplitude Index (%)

	This field is not included
6.	Check in PHG transcoder output the SpO2 Numeric Object – Measurement-Status attribute
7.	IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	a) 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 spot-check measurement to PHG under test
	<ul> <li>b) Check in PHG transcoder output the SpO2 Numeric Object – Measurement-Status attribute</li> </ul>
8.	Simulated PHD sends a Measurement to PHG under test with Measurement Status field set to 0100 0000 0000 (MSB $\rightarrow$ LSB), questionable measurement detected (bit 14). All remaining fields remain equal to those in step 5. Simulated PHD also deletes all stored records in RACP and stores an identical measurement.
9.	Check in PHG transcoder output the SpO2 Numeric Object – Measurement-Status attribute
10.	IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	a) 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 spot-check measurement to PHG under test
	<ul> <li>b) Check in PHG transcoder output the SpO2 Numeric Object – Measurement-Status attribute</li> </ul>
11.	Simulated PHD sends a Measurement to PHG under test with Measurement Status field set to 0010 0000 0000 (MSB $\rightarrow$ LSB), measurement not available (bit 13). All remaining fields remain equal to those in step 5. Simulated PHD also deletes all stored records in RACP and stores an identical measurement.
12.	Check in PHG transcoder output the SpO2 Numeric Object – Measurement-Status attribute
13.	IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	a) 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 spot-check measurement to PHG under test
	<ul> <li>b) Check in PHG transcoder output the SpO2 Numeric Object – Measurement-Status attribute</li> </ul>
14.	The simulated PHD sends a Measurement to PHG under test with Measurement Status field set to 0001 0000 0000 (MSB $\rightarrow$ LSB), calibration ongoing (bit 12). All remaining fields remain equal to those in step 5. Simulated PHD also deletes all stored records in RACP and stores an identical measurement.
15.	Check in PHG transcoder output the SpO2 Numeric Object – Measurement-Status attribute
16.	IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	a) 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 spot-check measurement to PHG under test
	<ul> <li>b) Check in PHG transcoder output the SpO2 Numeric Object – Measurement-Status attribute</li> </ul>
17.	The simulated PHD sends a Measurement to PHG under test with Measurement Status field set to 0000 1000 0000 (MSB $\rightarrow$ LSB), data for testing (bit 11). All remaining fields remain equal to those in step 5. Simulated PHD also deletes all stored records in RACP and stores an identical measurement.
10	Check in PHG transcoder output the SpO2 Numeric Object – Measurement-Status
10.	attribute

1	
	a) 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 spot-check measurement to PHG under test
	<ul> <li>b) Check in PHG transcoder output the SpO2 Numeric Object – Measurement-Status attribute</li> </ul>
20.	The simulated PHD sends a Measurement to PHG under test with Measurement Status field set to 0000 0100 0000 (MSB $\rightarrow$ LSB), data for demonstration (bit 10). All remaining fields remain equal to those in step 5. Simulated PHD also deletes all stored records in RACP and stores an identical measurement.
21.	Check in PHG transcoder output the SpO2 Numeric Object – Measurement-Status attribute
22.	IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	a) 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 spot-check measurement to PHG under test
	<ul> <li>b) Check in PHG transcoder output the SpO2 Numeric Object – Measurement-Status attribute</li> </ul>
23.	The simulated PHD sends a Measurement to PHG under test with Measurement Status field set to 0000 0000 1000 0000 (MSB $\rightarrow$ LSB), fully qualified data (bit 7). All remaining fields remain equal to those in step 5. Simulated PHD also deletes all stored records in RACP and stores an identical measurement.
24.	Check in PHG transcoder output the SpO2 Numeric Object – Measurement-Status attribute
25.	IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	a) 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 spot-check measurement to PHG under test
	<ul> <li>b) Check in PHG transcoder output the SpO2 Numeric Object – Measurement-Status attribute</li> </ul>
26.	The simulated PHD sends a Measurement to PHG under test with Measurement Status field set to 0000 0000 0100 0000 (MSB $\rightarrow$ LSB), early estimated data (bit 6). All remaining fields remain equal to those in step 5. Simulated PHD also deletes all stored records in RACP and stores an identical measurement.
27.	Check in PHG transcoder output the SpO2 Numeric Object – Measurement-Status attribute
28.	IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	a) 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 spot-check measurement to PHG under test
	<ul> <li>b) Check in PHG transcoder output the SpO2 Numeric Object – Measurement-Status attribute</li> </ul>
29.	The simulated PHD sends a Measurement to PHG under test with Measurement Status field set to 0000 0000 0010 0000 (MSB $\rightarrow$ LSB), measurement ongoing (bit 5). All remaining fields remain equal to those in step 5. Simulated PHD also deletes all stored records in RACP and stores an identical measurement.
30.	Check in PHG transcoder output the SpO2 Numeric Object – Measurement-Status attribute
31.	IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	a) 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 spot-check measurement to PHG under test
	b) Check in PHG transcoder output the SpO2 Numeric Object – Measurement-Status

	attribute
Pass/Fail criteria	In Step 6, the SpO2 Numeric Object – Measurement-Status attribute is present and its set to "invalid" (0x8000). If PHG supports RACP, same criteria applies to 7.b.
	In Step 9, the SpO2 Numeric Object – Measurement-Status attribute is present and its set to "questionable" (0x4000). If PHG supports RACP, same criteria applies to 10.b.
	In Step 12, the SpO2 Numeric Object – Measurement-Status attribute is present and its set to "not-available" (0x2000). If PHG supports RACP, same criteria applies to 13.b.
	In Step 15, the SpO2 Numeric Object – Measurement-Status attribute is present and its set to "calibration-ongoing" (0x1000). If PHG supports RACP, same criteria applies to 16.b.
	In Step 18, the SpO2 Numeric Object – Measurement-Status attribute is present and its set to "test-data" (0x0800). If PHG supports RACP, same criteria applies to 19.b.
	In Step 21, the SpO2 Numeric Object – Measurement-Status attribute is present and its set to "demo-data" (0x0400). If PHG supports RACP, same criteria applies to 22.b.
	In Step 24, the SpO2 Numeric Object – Measurement-Status attribute is present and its set to "validated-data" (0x0080). If PHG supports RACP, same criteria applies to 25.b.
	In Step 27, the SpO2 Numeric Object – Measurement-Status attribute is present and its set to "early-indication" (0x0040). If PHG supports RACP, same criteria applies to 28.b.
	In Step 30, the SpO2 Numeric Object – Measurement-Status attribute is present and its set to "msmt-ongoing" (0x0020). If PHG supports RACP, same criteria applies to 31.b.
Notes (To assist manual	In step 6 (and step 7.b if applicable), possible values in typical points of observation after transcoder output are:
testing)	a) IEEE 11073 Objects and Attributes
	Measurement-Status attribute is present:
	Object: SpO2 Numeric Object
	Attribute-id: MDC_ATTR_MSMT_STAT (2375)
	Attribute-type: BITS16
	Attribute-value: 80 00 (hex)
	b) WAN PCD-01 message
	PCD-01 message includes a segment like this with Measurement-Status attribute value (check OBX-8 and OBX-11):
	OBX n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x [value]  262688^MDC_DIM_PERCENT^MDC   <b>INV</b>     <b>X</b>    [current_date_time]
	In step 9 (and step 10.b if applicable), possible values in typical points of observation after transcoder output are:
	a) IEEE 11073 Objects and Attributes
	Measurement-Status attribute is present:
	Object: SpO2 Numeric Object
	Attribute-id: MDC_ATTR_MSMT_STAT (2375)
	Attribute-type: BITS16
	Attribute-value: 40 00 (hex)
	b) WAN PCD-01 message
	PCD-01 message includes a segment like this with Measurement-Status attribute value (check OBX-8 and OBX-11):
	OBX n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x[[value]] 262688^MDC_DIM_PERCENT^MDC   <b>QUES</b>     <b>R</b>    [current_date_time]
	In step 12 (and step 13.b if applicable), possible values in typical points of observation after transcoder output are:
	a) IEEE 11073 Objects and Attributes
	Measurement-Status attribute is present:

		Object: SpO2 Numeric Object
		Attribute-id: MDC_ATTR_MSMT_STAT (2375)
		Attribute-type: BITS16
		Attribute-value: 20 00 (hex)
b)	WA	N PCD-01 message
		D-01 message includes a segment like this with Measurement-Status attribute value eck OBX-8 and OBX-11):
		OBX n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x [value]  262688^MDC_DIM_PERCENT^MDC   <b>NAV</b>     <b>X</b>    [current_date_time]
		15 (and step 16.b if applicable), possible values in typical points of observation after der output are:
a)	IEE	E 11073 Objects and Attributes
	Mea	asurement-Status attribute is present:
		Object: SpO2 Numeric Object
		Attribute-id: MDC_ATTR_MSMT_STAT (2375)
		Attribute-type: BITS16
		Attribute-value: 10 00 (hex)
b)	WA	N PCD-01 message
		D-01 message includes a segment like this with Measurement-Status attribute value eck OBX-8 and OBX-11):
		OBX n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x [value]  262688^MDC_DIM_PERCENT^MDC   <b>CAL</b>     <b>R</b>    [current_date_time]
		18 (and step 19.b if applicable), possible values in typical points of observation after der output are:
a)	IEE	E 11073 Objects and Attributes
	Mea	asurement-Status attribute is present:
		Object: SpO2 Numeric Object
		Attribute-id: MDC_ATTR_MSMT_STAT (2375)
		Attribute-type: BITS16
		Attribute-value: 08 00 (hex)
b)	WA	N PCD-01 message
		D-01 message includes a segment like this with Measurement-Status attribute value eck OBX-8 and OBX-11):
		OBX n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x [value]  262688^MDC_DIM_PERCENT^MDC   <b>TEST</b>     <b>R</b>    [current_date_time]
		21 (and step 22.b if applicable), possible values in typical points of observation after der output are:
a)	IEE	E 11073 Objects and Attributes
	Mea	asurement-Status attribute is present:
		Object: SpO2 Numeric Object
		Attribute-id: MDC_ATTR_MSMT_STAT (2375)
		Attribute-type: BITS16
		Attribute-value: 04 00 (hex)
b)	WA	N PCD-01 message
		D-01 message includes a segment like this with Measurement-Status attribute value eck OBX-8 and OBX-11):
		OBX n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x [value]  262688^MDC_DIM_PERCENT^MDC   <b>DEMO</b>     <b>R</b>    [current_date_time]

	step 24 (and step 25.b if applicable), possible values in typical points of observation after anscoder output are:
a)	IEEE 11073 Objects and Attributes
	Measurement-Status attribute is present:
	Object: SpO2 Numeric Object
	Attribute-id: MDC_ATTR_MSMT_STAT (2375)
	Attribute-type: BITS16
	Attribute-value: 00 80 (hex)
b)	WAN PCD-01 message
	PCD-01 message includes a segment like this with Measurement-Status attribute value (check OBX-8 and OBX-11):
	OBX n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x [value]  262688^MDC_DIM_PERCENT^MDC       <b>F</b>    [current_date_time]
	step 27 (and step 28.b if applicable), possible values in typical points of observation after anscoder output are:
a)	IEEE 11073 Objects and Attributes
	Measurement-Status attribute is present:
	Object: SpO2 Numeric Object
	Attribute-id: MDC_ATTR_MSMT_STAT (2375)
	Attribute-type: BITS16
	Attribute-value: 00 40 (hex)
b)	WAN PCD-01 message
	PCD-01 message includes a segment like this with Measurement-Status attribute value (check OBX-8 and OBX-11):
	OBX n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x [value]  262688^MDC_DIM_PERCENT^MDC   <b>EARLY</b>     <b>R</b>    [current_date_time]
	step 30 (and step 31.b if applicable), possible values in typical points of observation after anscoder output are:
a)	IEEE 11073 Objects and Attributes
	Measurement-Status attribute is present:
	Object: SpO2 Numeric Object
	Attribute-id: MDC_ATTR_MSMT_STAT (2375)
	Attribute-type: BITS16
	Attribute-value: 00 20 (hex)
b)	WAN PCD-01 message
	PCD-01 message includes a segment like this with Measurement-Status attribute value (check OBX-8 and OBX-11):
	OBX n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x [value]  262688^MDC_DIM_PERCENT^MDC   <b>BUSY</b>     <b>X</b>    [current_date_time]

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-014	
TP label		Whitepaper. SpO2 Numeric Object (Continuous Measurements) – Measurement-Status Attribute	
Coverage	Spec	[Bluetooth PHDT v1.6]	
	Testable items	SpO2 Numeric 17; M	

Test purpose	Check that:
	PHG includes SpO2 Numeric Object – Measurement-Status attribute in transcoder output when using continuous measurements.
	[AND] PHG transcodes the Bluetooth Measurement Status field of the PLX Continuous Measurement
	characteristic to 11073 Measurement-Status attribute properly
Applicability	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040
Other PICS	
Initial condition	The PHG under test and the simulated PHD are in the Standby state.
Test procedure	<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a continuous measurement (including fast and slow response measurement values) ready to be sent and it is in the Advertising state (it is discoverable).</li> </ol>
	2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:
	a. PLX Continuous Measurement (0x2A5F)
	b. PLX Feature (0x2A60)
	i. Field: Supported Features
	Format: 16 bit
	<ul> <li>Value: 0000 0000 0011 0001 (MSB → LSB). Measurement Status support is present (bit 0). Fast and slow response modes are supported (bits 4 and 5).</li> </ul>
	ii. Field: Measurement Status Support
	Format: 16 bit
	• Value: 1111 1111 1110 0000 (MSB → LSB). All Measurement Status bits are supported
	iii. Field: Device and Sensor Status Support
	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 PLX Feature characteristic.
	5. The simulated PHD sends the Measurement to the PHG under test with the following value:
	a. PLX Continuous Measurement (0x2A5F)
	i. Field: Flags
	Format: 8 bit
	<ul> <li>Value: 0000 0111 (MSB → LSB). Measurement Status, SpO2PR–Fast and SpO2PR-Slow fields are present. Device and Sensor Status and Pulse Amplitude Index fields are not present.</li> </ul>
	ii. Field: SpO2PR-Normal - SpO2 (%)
	Format: SFLOAT
	Value: Not Relevant
	iii. Field: SpO2PR-Normal - PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	iv. Field: SpO2PR-Fast - SpO2 (%)
	Format: SFLOAT

- Value: Not Relevant
- v. Field: SpO2PR-Fast PR (bpm)
  - Format: SFLOAT
  - Value: Not Relevant
- vi. Field: SpO2PR-Slow SpO2 (%)
  - Format: SFLOAT
  - Value: Not Relevant
- vii. Field: SpO2PR-Slow PR (bpm)
  - Format: SFLOAT
  - Value: Not Relevant
- viii. Field: Measurement Status
  - Format: 16 bit
  - Value: 1000 0000 0000 0000 (MSB → LSB). Invalid measurement detected (bit 15).
- ix. Field: Device and Sensor Status
  - This field is not included
- x. Field: Pulse Amplitude Index (%)
  - This field is not included
- 6. Check in PHG transcoder output the SpO2 Numeric Object Measurement-Status attribute in all three SpO2 objects.
- Simulated PHD sends a Measurement to PHG under test with Measurement Status field set to 0100 0000 0000 (MSB → LSB), questionable measurement detected (bit 14). All remaining fields remain equal to those in step 5.
- 8. Check in PHG transcoder output the SpO2 Numeric Object Measurement-Status attribute in all three SpO2 objects.
- Simulated PHD sends a Measurement to PHG under test with Measurement Status field set to 0010 0000 0000 (MSB → LSB), measurement not available (bit 13). All remaining fields remain equal to those in step 5.
- 10. Check in PHG transcoder output the SpO2 Numeric Object Measurement-Status attribute in all three SpO2 objects.
- Simulated PHD sends a Measurement to PHG under test with Measurement Status field set to 0001 0000 0000 (MSB → LSB), calibration ongoing (bit 12). All remaining fields remain equal to those in step 5.
- 12. Check in PHG transcoder output the SpO2 Numeric Object Measurement-Status attribute in all three SpO2 objects.
- Simulated PHD sends a Measurement to PHG under test with Measurement Status field set to 0000 1000 0000 (MSB → LSB), data for testing (bit 11). All remaining fields remain equal to those in step 5.
- 14. Check in PHG transcoder output the SpO2 Numeric Object Measurement-Status attribute in all three SpO2 objects.
- 15. Simulated PHD sends a Measurement to PHG under test with Measurement Status field set to 0000 0100 0000 (MSB → LSB), data for demonstration (bit 10). All remaining fields remain equal to those in step 5.
- 16. Check in PHG transcoder output the SpO2 Numeric Object Measurement-Status attribute in all three SpO2 objects.
- Simulated PHD sends a Measurement to PHG under test with Measurement Status field set to 0000 0000 1000 0000 (MSB → LSB), fully qualified data (bit 7). All remaining fields remain equal to those in step 5.
- 18. Check in PHG transcoder output the SpO2 Numeric Object Measurement-Status attribute in all three SpO2 objects.
- 19. Simulated PHD sends a Measurement to PHG under test with Measurement Status field

set to 0000 0000 0100 0000 (MSB $\rightarrow$ LSB), early estimated data (bit 6). All remaining fields remain equal to those in step 5. Check in PHG transcoder output the SpO2 Numeric Object – Measurement-Status
Check in PHG transcoder output the SpO2 Numeric Object – Measurement-Status
attribute in all three SpO2 objects.
Simulated PHD sends a Measurement to PHG under test with Measurement Status field set to 0000 0000 0010 0000 (MSB $\rightarrow$ LSB), measurement ongoing (bit 5). All remaining fields remain equal to those in step 5.
Check in PHG transcoder output the SpO2 Numeric Object – Measurement-Status attribute in all three SpO2 objects.
Step 6, the SpO2 Numeric Object – Measurement-Status attribute is present in all three D2 objects and its set to "invalid" (0x8000)
Step 8, the SpO2 Numeric Object – Measurement-Status attribute is present in all three D2 objects and its set to "questionable" (0x4000)
Step 10, the SpO2 Numeric Object – Measurement-Status attribute is present in all three D2 objects and its set to "not-available" (0x2000)
Step 12, the SpO2 Numeric Object – Measurement-Status attribute is present in all three D2 objects and its set to "calibration-ongoing" (0x1000)
Step 14, the SpO2 Numeric Object – Measurement-Status attribute is present in all three D2 objects and its set to "test-data" (0x0800)
Step 16, the SpO2 Numeric Object – Measurement-Status attribute is present in all three D2 objects and its set to "demo-data" (0x0400)
Step 18, the SpO2 Numeric Object – Measurement-Status attribute is present in all three D2 objects and its set to "validated-data" (0x0080)
Step 20, the SpO2 Numeric Object – Measurement-Status attribute is present in all three D2 objects and its set to "early-indication" (0x0040)
Step 22, the SpO2 Numeric Object – Measurement-Status attribute is present in all three D2 objects and its set to "msmt-ongoing" (0x0020)
tep 6, possible values in typical points of observation after transcoder output are:
IEEE 11073 Objects and Attributes
Measurement-Status attribute is present in all three SpO2 objects:
Object: SpO2 Numeric Object
Attribute-id: MDC_ATTR_MSMT_STAT (2375)
Attribute-type: BITS16
Attribute-value: <b>80 00</b> (hex)
WAN PCD-01 message
PCD-01 message includes a segment like for each SpO2 object this with Measurement- Status attribute value (check OBX-8 and OBX-11):
OBX n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x [value]  262688^MDC_DIM_PERCENT^MDC   <b>INV</b>     <b>X</b>   [current_date_time]
tep 8, possible values in typical points of observation after transcoder output are:
IEEE 11073 Objects and Attributes
Measurement-Status attribute is present in all three SpO2 objects:
Object: SpO2 Numeric Object
Attribute-id: MDC_ATTR_MSMT_STAT (2375)
Attribute-type: BITS16
Attribute-value: <b>40 00</b> (hex)
WAN PCD-01 message
PCD-01 message includes a segment like this for each SpO2 object with Measurement- Status attribute value (check OBX-8 and OBX-11):

In step 10, possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Measurement-Status attribute is present in all three Sp02 objects: b) WAN PCD-01 message PCD-01 message includes a segment like this for each Sp02 object with Measurement- Status attribute-value: 20 00 (hex) b) WAN PCD-01 message PCD-01 message includes a segment like this for each Sp02 object with Measurement- Status attribute value (check OBX-8 and OBX-11): OBX(ININIT)65456*MDC_PULS_OXIM_SAT_O2*MDC[m.0.0.x](value]] 252688*MDC_DIM_PERCENT*MDC[IMAVI][XII][current_date_time] In step 12, possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Measurement-Status attribute is present in all three Sp02 objects:     Object: Sp02 Numeric Object     Attribute-value: 10 00 (hex) b) WAN PCD-01 message PCD-		
<ul> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 objects: <ul> <li>Object: SpO2 Numeric Object</li> <li>Attribute-vide: 20 00 (nex)</li> </ul> </li> <li>b) WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):</li> <li>OBXININI GadSeMDC - DULS: OXIM SAT 02/MOCIm 0.0 x[/value]] 262688/MDC-DIM_PERCENT*MDC][MAVI][X]][[current_date_time]</li> <li>In step 12, possible values in typical points of observation after transcoder output are:</li> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-value: 10 00 (nex)</li> <li>b) WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-value: 10 00 (nex)</li> <li>b) WAN PCD-01 message</li> <li>PCD-01 message&lt;</li></ul>		262688^MDC_DIM_PERCENT^MDC   <b>QUES</b>     <b>R</b>    [current_date_time]
Measurement-Status attribute is present in all three SpO2 objects:         Object: SpO2 Numeric Object         Attribute-idt: MDC_ATTR_MSMT_STAT (2375)         Attribute-idype: BITS16         Attribute-value: 20 00 (hex)         WAN PCD-01 message         PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):         OBX_ININN156456/MDC_PULS_OXIM_SAT_O2/MDC[m.0.0.x](value)]         262688/MDC_DIM_PERCENT/MDC[MAVII][X][[current_data_time]         In step 12, possible values in typical points of observation after transcoder output are:         a)       IEEE 11073 Objects and Attributes         Measurement-Status attribute is present in all three SpO2 objects:         Object: SpO2 Numeric Object         Attribute-value: 1000 (nex)         b)       WAN PCD-01 message         PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):         Object: SpO2 Numeric Object         Attribute-value: 1000 (nex)         b)       WAN PCD-01 MPERCENT*MDC[ICAL][R]][[current_date_time]         In step 14, possible values in typical points of observation after transcoder output are:         a)       IEEE 11073 Objects and Attributes         Measurement-Status attribute is present in all three SpO2 objects:         Object: SpO2 Numeric Object		
<ul> <li>□ Object: Sp02 Numeric Object</li> <li>□ Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>□ Attribute-value: 20 00 (hex)</li> <li>b) WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each Sp02 object with Measurement-Status attribute value (check OBX-8 and OBX-11):</li> <li>□ OEXINININI Objects and Attributes</li> <li>Measurement-Status attribute is present in all three Sp02 objects:</li> <li>□ Object: Sp02 Numeric Object</li> <li>□ Attribute-value: 10 00 (hex)</li> <li>b) WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each Sp02 objects:</li> <li>□ Object: Sp02 Numeric Object</li> <li>□ Attribute-value: 10 00 (hex)</li> <li>b) WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each Sp02 objects with Measurement-Status attribute value (hex OBX-8 and OBX-11):</li> <li>□ OBXIn[NNI150456*MDC_PULS_OXIM_SAT_02*MDC[m 0.0.x][value]] 226288*MDC_DIM_PERCENT*MDC[IGALI][R][[current date time]</li> <li>In step 14, possible values in typical points of observation after transcoder output are:</li> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three Sp02 objects:</li> <li>□ Object: Sp02 Numeric Object</li> <li>□ Attribute-value: 08 00 (hex)</li> <li>b) WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each Sp02 objects:</li> <li>□ Object: Sp02 Numeric Object</li> <li>□ Attribute-value: 08 00 (hex)</li> <li>b) WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each Sp02 objects:</li> <li>□ Object: Sp02 Numeric Object</li> <li>□ Attribute-value: 08 00 (hex)</li> <li>b) WAN PCD-01 message</li> <li>PCD-01 message</li> <li>PCD-01 message includes a segment like this for each Sp02 object with Measurement-Status attribute value (heck OBX-8 and OBX-11):</li> <li>□ Object: Sp02 Numeric Object</li> <li>□ Attribute-</li></ul>	a)	
<ul> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-vpie: BITS16</li> <li>Attribute-value: 200 (hex)</li> <li>WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):</li> <li>DBX/INIMI1604694/DC_PULS_CXIM.SAT_O2/MDC(m 0.0.x[/value])</li> <li>262688*MDC_DIM_PERCENT*MDC[INAVI  X  [(current_date_time])</li> <li>In step 12, possible values in typical points of observation after transcoder output are:</li> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-value: 10 00 (hex)</li> <li>WAN PCD-01 message</li> <li>PCD-01 message</li> <li>PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):</li> <li>OBX/INIMI150456*MDC_PULS_OXIM_SAT_02*MDC[m.0.0.x][value]]</li> <li>262688*MDC_DIM_PERCENT*MDC][CALI][RI][[current_date_time]</li> <li>In step 14, possible values in typical points of observation after transcoder output are:</li> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-value: 66 00 (hex)</li> <li>WAN PCD-01 message</li> <li>PCD-01 message includes a segment like thi</li></ul>		
<ul> <li>Attribute-type: BITS16</li> <li>Attribute-value: 20 00 (hex)</li> <li>WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11): OBX()(NM150456vMDC PULS OXIM SAT .02vMDC[m.0.0.x][value]] 262688/WDC_DIM_PERCENTYMDC][NAV][X][[(current_date_time]]</li> <li>In step 12, possible values in typical points of observation after transcoder output are:</li> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-type: BITS16</li> <li>Attribute-type: BITS16</li> <li>Attribute-value: 10 00 (hex)</li> <li>b) WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11): OBX()NIM150456vMDC_PULS_OXIM_SAT_022MDC[m.0.0.x][value]]</li> <li>262688/WDC_DIM_PERCENTYMDC][CALI][[][(urrent_date_time]]</li> <li>In step 14, possible values in typical points of observation after transcoder output are:</li> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-value: 100 (hex)</li> <li>b) WAN PCD-01 message</li> <li>PCD-01 message</li> <li>PCD-01</li></ul>		
<ul> <li>Attribute-value: 20 00 (hex)</li> <li>WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11): OBX[n]NM[150456*MDC_PULS_OXIM_SAT_O2*MDC[m.0.x][value]] 262686*MDC_DIM_PERCENT*MDC][NAVI][XIII[current_date_time]</li> <li>In step 12, possible values in typical points of observation after transcoder output are:</li> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-value: 10 00 (hex)</li> <li>WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (heck OBX-8 and OBX-11):</li> <li>OBX[n]MN[150456*MDC_PULS_OXIM_SAT_O2*MDC[m.0.x][value]] 262688*MDC_DIM_PERCENT*MDC][CALI][R][[[current_date_time]]</li> <li>In step 14, possible values in typical points of observation after transcoder output are:</li> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-value: 08 00 (hex)</li> <li>WAN PCD-01 message</li> <li>PCD-01 messa</li></ul>		
<ul> <li>b) WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):</li> <li>OBX/[NIM1150456*MDC_PULS_OXIM_SAT_O2*MDC[m.0.0.x][value]]</li> <li>262688*MDC_DIM_PERCENT*MDC[NAV[]XI[][current_date_time]</li> <li>In step 12, possible values in typical points of observation after transcoder output are:</li> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-vipe: BITS16</li> <li>Attribute-vipe: BITS16</li> <li>OKNN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value: (ACX DEV. PLLS_OXIM_SAT_O2*MDC[m.0.0.x][value]]</li> <li>262688*MDC_DIM_PERCENT*MDC[ICAL] R1  [current_date_time]</li> <li>In step 14, possible values in typical points of observation after transcoder output are:</li> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>In step 14, possible values in typical points of observation after transcoder output are:</li> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-value: 80 00 (hex)</li> <li>b) WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute site present in all three SpO2 object with Measurement-Status attribute site segment is for each SpO2 object with Measurement-Status attribute value: (ACX OB×A and OBX-11):</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-value: 80 00 (hex)</li> <li>b) WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute sater water and DEX-11):</li> <li>OBX N N1150455*MDC_PULS_OXIM_SAT_O2*MDC[m.0.0.x][</li></ul>		
PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11): OBX[n]NM]50456/MDC_PULS_OXIM_SAT_O2/MDC[m.0.0.x[[value]] 225686/MDC_DIM_PERCENT*MDC]NAVIJ[X][[[current_atae_time]         In step 12, possible values in typical points of observation after transcoder output are:         a)       IEEE 11073 Objects and Attributes         Measurement-Status attribute is present in all three SpO2 objects:         Object: SpO2 Numeric Object         Attribute-id: MDC_ATTR_MSMT_STAT (2375)         Attribute-value: 10 00 (hex)         b)       WAN PCD-01 message         PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):         OBX[n]NM]150456PMDC_PULS_OXIM_SAT_O2*MDC[m.0.0.x[[value]] 226268PMDC_DIM_PERCENT*MDC][CAL][R]][[current_date_time]         In step 14, possible values in typical points of observation after transcoder output are:         a)       IEEE 11073 Objects and Attributes         Measurement-Status attribute is present in all three SpO2 objects:         Object: SpO2 Numeric Object         Attribute-value: 08 00 (hex)         b)       WAN PCD-01 message         PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):         Object: SpO2 Numeric Object         Attribute-value: 08 00 (hex)         b)       WAN PCD-01 message		
Status attribute value (check OBX-8 and OBX-11):         OBX n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC[m.0.0.xi[value]]         282688^MDC_DIM_PERCENT*MDC[INAVI][X][I][current_date_time]         In step 12, possible values in typical points of observation after transcoder output are:         a)       IEEE 11073 Objects and Attributes         Measurement-Status attribute is present in all three SpO2 objects:         Object: SpO2 Numeric Object         Attribute-type: BITS16         Attribute-value: 10 00 (hex)         b)       WAN PCD-01 message         PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):         OBX[n]NM 150456^MDC_PULS_OXIM_SAT_O2*MDC]m.0.0.xi[value]]         282688^MDC_DIM_PERCENT*MDC]CAL[I]R1][[current_date_time]         In step 14, possible values in typical points of observation after transcoder output are:         a)       IEEE 11073 Objects and Attributes         Measurement-Status attribute is present in all three SpO2 objects:         Object: SpO2 Numeric Object         Attribute-type: BITS16         Attribute-value: 08 00 (hex)         b)       WAN PCD-01 message         PCD-01 message includes a segment like this for each SpO2 objects with Measurement-Status attribute value (check OBX-8 and OBX-11):         Object: SpO2 Numeric Object         Attribute-vide: 08 00 (hex)	b)	WAN PCD-01 message
262688^MDC_DIM_PERCENT^MDC  NAV   X   (current_date_time)         In step 12, possible values in typical points of observation after transcoder output are:         a)       IEEE 11073 Objects and Attributes         Measurement-Status attribute is present in all three SpO2 objects:         a)       Object: SpO2 Numeric Object         a)       Attribute-id: MDC_ATTR_MSMT_STAT (2375)         a)       Attribute-tid: 00 (hex)         b)       WAN PCD-01 message         PCD-01 message       PCD-01 message         PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):         OBXIn NM 150456MDC_PULS_OXIM_SAT_O2^MDC[m.0.0.x [value]]         262688/MDC_DIM_PERCENT*MDC]CAL  R  [current_date_time]         In step 14, possible values in typical points of observation after transcoder output are:         a)       IEEE 11073 Objects and Attributes         Measurement-Status attribute is present in all three SpO2 objects:         a)       Object: SpO2 Numeric Object         a)       Attribute-value: 08 00 (hex)         b)       WAN PCD-01 message         PCD-01 message       PCD-01 message         PCD-01 message       PCD-01 message         PCD-01 message       PCD-01 message         PCD-01 message       PCD-01 message         PCD-01 mes		
<ul> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 objects: <ul> <li>Object: SpO2 Numeric Object</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-value: 10 00 (hex)</li> </ul> </li> <li>b) WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):</li> <li>OBX/nINM150456*MDC_PULS_OXIM_SAT_O2*MDC[m.0.0.x[[value]] 262688*MDC_DIM_PERCENT*MDC][CALI][R][[[current_date_time]]</li> <li>In step 14, possible values in typical points of observation after transcoder output are:</li> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-value: 08 00 (hex)</li> <li>b) WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):</li> <li>OBX[n]NM150456*MDC_PULS_OXIM_SAT_02*MDC[m.0.x][value]] 262688*MDC_DIM_PERCENT*MDC][TEST][[R]][[current_date_time]</li> <li>In step 16, possible values in typical points of observation after transcoder output are:</li> <li>a) IEEE 11073 Objects and Attributes</li> <li>MAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):</li> <li>OBX[n]NM150456*MDC_PULS_OXIM_SAT_02*MDC[m.0.x][value]] 262688*MDC_DIM_PERCENT*MDC][TEST][[R]][[current_date_time]</li> <li>In step 16, possible values in typical points of observation after transcoder output are:</li> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Att</li></ul>		
Measurement-Status attribute is present in all three SpO2 objects:         Object: SpO2 Numeric Object         Attribute-id: MDC_ATTR_MSMT_STAT (2375)         Attribute-id: MDC_ATTR_MSMT_STAT (2375)         Attribute-value: 10 00 (hex)         WAN PCD-01 message         PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):         OBX[n]NM150456*MDC_PULS_OXIM_SAT_O2*MDC[m.0.0.x][value]]         262688*MDC_DIM_PERCENT*MDC[ICAL][R[]][[current_date_time]]         In step 14, possible values in typical points of observation after transcoder output are:         a)       IEEE 11073 Objects and Attributes         Measurement-Status attribute is present in all three SpO2 objects:         Object: SpO2 Numeric Object         Attribute-value: 08 00 (hex)         b)       WAN PCD-01 message         PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):         OBX[n]NIN150456*MDC_PULS_OXIM_SAT_O2*MDC[m.0.0.x][value]]         262688*MDC_DIM_PERCENT*MCDC]TESTIJR[R][[[current_date_time]]         In step 16, possible values in typical points of observation after transcoder output are:         a)       IEEE 11073 Objects and Attributes         DBX[n]NIN150456*MDC_PULS_OXIM_SAT_O2*MDC[m.0.0.x][value]]         262688*MDC_DIM_PERCENT*MDC[ITESTI][R][R][[current_date_time]]	Ins	step 12, possible values in typical points of observation after transcoder output are:
<ul> <li>Object: SpO2 Numeric Object</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-type: BITS16</li> <li>Attribute-value: 10 00 (hex)</li> <li>WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):</li> <li>OBX/n NM 150456/MDC_PULS_OXIM_SAT_O2^MDC[m.0.0.x[[value]]</li> <li>262688^MDC_DIM_PERCENT^MDC  CAL  R   [current_date_time]</li> <li>In step 14, possible values in typical points of observation after transcoder output are:</li> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-value: 08 00 (hex)</li> <li>WAN PCD-01 message</li> <li>PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):</li> <li>OBX/n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC[m.0.0.x[[value]]</li> <li>262688^MDC_DIM_PERCENT^MDC] TEST  R   [current_date_time]</li> <li>In step 16, possible values in typical points of observation after transcoder output are:</li> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):</li> <li>OBX/n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC[m.0.0.x[[value]]</li> <li>262688^MDC_DIM_PERCENT^MDC] TEST  R   [current_date_time]</li> <li>In step 16, possible values in typical points of observation after transcoder output are:</li> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (23</li></ul>	a)	IEEE 11073 Objects and Attributes
<ul> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-type: BITS16</li> <li>Attribute-value: 10 00 (hex)</li> <li>WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11): OBX[n]NNI/150456<sup>A</sup>MDC_PULS_OXIM_SAT_O2<sup>A</sup>MDC[m.0.0.x[[Value]]] Z22688<sup>A</sup>MDC_DIM_PERCENT^MDCI[CAL][IR][I[current_date_time]</li> <li>In step 14, possible values in typical points of observation after transcoder output are:         <ul> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-type: BITS16</li> <li>Attribute-value: 08 00 (hex)</li> <li>b) WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):</li></ul></li></ul>		Measurement-Status attribute is present in all three SpO2 objects:
<ul> <li>Attribute-type: BITS16</li> <li>Attribute-value: 10 00 (hex)</li> <li>WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11): OBX/n NM 150456^MDC_PULS_OXIM_SAT_02^MDC m.0.0.x [value]  262688^MDC_DIM_PERCENT^MDC  CAL   R   [current_date_time]</li> <li>In step 14, possible values in typical points of observation after transcoder output are:         <ul> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-value: 08 00 (hex)</li> <li>WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):</li> <li>OBXIn NM150456^MDC_PULS_OXIM_SAT_02^MDC m.0.0,x [value] </li> <li>266688^MDC_DIM_PERCENT^MDC  TEST  R   [current_date_time]</li> <li>In step 16, possible values in typical points of observation after transcoder output are:</li> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status</li></ul></li></ul>		Object: SpO2 Numeric Object
<ul> <li>Attribute-value: 10 00 (hex)</li> <li>WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11): OBX/n NM 150456^MDC_PULS_OXIM_SAT_022MDC m.0.0.x [value]  262688^MDC_DIM_PERCENT^MDC  CAL   R   [current_date_time]</li> <li>In step 14, possible values in typical points of observation after transcoder output are:         <ul> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-value: 08 00 (hex)</li> <li>WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):</li> <li>OBX n NM 150456^MDC_PULS_OXIM_SAT_02^MDC m.0.0.x [value] </li> <li>262688^MDC_DIM_PERCENT^MDC  TEST   R   [current_date_time]</li> </ul> </li> <li>In step 16, possible values in typical points of observation after transcoder output are:         <ul> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 objects:             <ul> <li>Object: SpO2 Numeric Object</li> <li>Attribute-id: MDC_ATTR_MSMT_ST</li></ul></li></ul></li></ul>		Attribute-id: MDC_ATTR_MSMT_STAT (2375)
<ul> <li>b) WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):</li> <li>OBX n NM 150456^MDC_PULS_OXIM_SAT_02^MDC[m.0.0.x[[value]] 262688^MDC_DIM_PERCENT^MDC][CAL[I]R[I][[current_date_time]]</li> <li>In step 14, possible values in typical points of observation after transcoder output are:</li> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-value: 08 00 (hex)</li> <li>b) WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):</li> <li>OBX[n NM 150456^MDC_PULS_OXIM_SAT_02^MDC[m.0.0.x[[value]] 262688^MDC_DIM_PERCENT^MDC][TEST][[R][[[current_date_time]]</li> <li>In step 16, possible values in typical points of observation after transcoder output are:</li> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>In step 16, possible values in typical points of observation after transcoder output are:</li> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> </ul>		Attribute-type: BITS16
PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):         OBX[n]NM[150456^MDC_PULS_OXIM_SAT_O2^MDC[m.0.0.x][value]]         262688^MDC_DIM_PERCENT^MDC][CAL[  R   [current_date_time]]         In step 14, possible values in typical points of observation after transcoder output are:         a)       IEEE 11073 Objects and Attributes         Measurement-Status attribute is present in all three SpO2 objects:         Object: SpO2 Numeric Object         Attribute-vid: MDC_ATTR_MSMT_STAT (2375)         Attribute-value: 08 00 (hex)         b)       WAN PCD-01 message         PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):         OBX[n]NM[150456^MDC_PULS_OXIM_SAT_O2^MDC[m.0.0.x][value]]         262688^MDC_DIM_PERCENT^MDC] TEST  R   [current_date_time]         In step 16, possible values in typical points of observation after transcoder output are:         a)       IEEE 11073 Objects and Attributes         Measurement-Status attribute is present in all three SpO2 objects:		Attribute-value: <b>10 00</b> (hex)
Status attribute value (check OBX-8 and OBX-11):         OBX n MM 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x[[value]]         262688^MDC_DIM_PERCENT^MDC  CAL   R   [current_date_time]         In step 14, possible values in typical points of observation after transcoder output are:         a)       IEEE 11073 Objects and Attributes         Measurement-Status attribute is present in all three SpO2 objects:         Object: SpO2 Numeric Object         Attribute-id: MDC_ATTR_MSMT_STAT (2375)         Attribute-value: 08 00 (hex)         b)       WAN PCD-01 message         PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):         OBX[n]NM 150456^MDC_PULS_OXIM_SAT_O2^MDC[m.0.0.x[[value]]         262688^MDC_DIM_PERCENT^MDC  TEST  R   [current_date_time]         In step 16, possible values in typical points of observation after transcoder output are:         a)       IEEE 11073 Objects and Attributes         Measurement-Status attribute supersent in all three SpO2 objects:         © DSN[n]NM 150456^MDC_PULS_OXIM_SAT_O2^MDC[m.0.0.x[[value]]         262688^MDC_DIM_PERCENT^MDC  TEST  R   [current_date_time]         In step 16, possible values in typical points of observation after transcoder output are:         a)       IEEE 11073 Objects and Attributes         Measurement-Status attribute is present in all three SpO2 objects:         Object: S	b)	WAN PCD-01 message
262688^MDC_DIM_PERCENT^MDC  CAL   R   [current_date_time]         In step 14, possible values in typical points of observation after transcoder output are:         a)       IEEE 11073 Objects and Attributes         Measurement-Status attribute is present in all three SpO2 objects:		
<ul> <li>a) IEEE 11073 Objects and Attributes Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-type: BITS16</li> <li>Attribute-value: 08 00 (hex)</li> <li>b) WAN PCD-01 message PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11): OBX/n/NM/150456^MDC_PULS_OXIM_SAT_O2^MDC[m.0.0.x[[value]] 262688^MDC_DIM_PERCENT^MDC] TEST  R   [current_date_time]</li> <li>In step 16, possible values in typical points of observation after transcoder output are:</li> <li>a) IEEE 11073 Objects and Attributes Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-type: BITS16</li> <li>Attribute-value: 04 00 (hex)</li> </ul>		OBX n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x [value]  262688^MDC_DIM_PERCENT^MDC   <b>CAL</b>     <b>R</b>    [current_date_time]
Measurement-Status attribute is present in all three SpO2 objects:         Object: SpO2 Numeric Object         Attribute-id: MDC_ATTR_MSMT_STAT (2375)         Attribute-type: BITS16         Attribute-value: 08 00 (hex)         WAN PCD-01 message         PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):         OBX n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x[[value]]         262688^MDC_DIM_PERCENT^MDC  TEST   R   [current_date_time]         In step 16, possible values in typical points of observation after transcoder output are:         a)       IEEE 11073 Objects and Attributes         Measurement-Status attribute is present in all three SpO2 objects:         Object: SpO2 Numeric Object         Attribute-id: MDC_ATTR_MSMT_STAT (2375)         Attribute-type: BITS16         Attribute-value: 04 00 (hex)	Ins	step 14, possible values in typical points of observation after transcoder output are:
<ul> <li>Object: SpO2 Numeric Object</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-type: BITS16</li> <li>Attribute-value: 08 00 (hex)</li> <li>WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11): OBX/n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x [value]] 262688^MDC_DIM_PERCENT^MDC  TEST   R   [current_date_time]</li> <li>In step 16, possible values in typical points of observation after transcoder output are:         <ul> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-type: BITS16</li> <li>Attribute-value: 04 00 (hex)</li> </ul> </li> </ul>	a)	IEEE 11073 Objects and Attributes
<ul> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-type: BITS16</li> <li>Attribute-value: 08 00 (hex)</li> <li>WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):         <ul> <li>OBX[n]NM[150456^MDC_PULS_OXIM_SAT_O2^MDC[m.0.0.x][value]]</li> <li>262688^MDC_DIM_PERCENT^MDC][TEST][]R][][current_date_time]</li> </ul> </li> <li>In step 16, possible values in typical points of observation after transcoder output are:         <ul> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-type: BITS16</li> <li>Attribute-value: 04 00 (hex)</li> </ul> </li> </ul>		Measurement-Status attribute is present in all three SpO2 objects:
<ul> <li>Attribute-type: BITS16</li> <li>Attribute-value: 08 00 (hex)</li> <li>WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11): OBX[n]NM]150456^MDC_PULS_OXIM_SAT_O2^MDC[m.0.0.x][value]] 262688^MDC_DIM_PERCENT^MDC] TEST   R   [current_date_time]</li> <li>In step 16, possible values in typical points of observation after transcoder output are:         <ul> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-type: BITS16</li> <li>Attribute-value: 04 00 (hex)</li> </ul> </li> </ul>		Object: SpO2 Numeric Object
<ul> <li>Attribute-value: 08 00 (hex)</li> <li>WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):         <ul> <li>OBX n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x[[value]]</li> <li>262688^MDC_DIM_PERCENT^MDC  TEST   R   [current_date_time]</li> </ul> </li> <li>In step 16, possible values in typical points of observation after transcoder output are:         <ul> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-type: BITS16</li> <li>Attribute-value: 04 00 (hex)</li> </ul> </li> </ul>		Attribute-id: MDC_ATTR_MSMT_STAT (2375)
<ul> <li>b) WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):</li> <li>OBX n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x [value]]</li> <li>262688^MDC_DIM_PERCENT^MDC  TEST   R   [current_date_time]</li> <li>In step 16, possible values in typical points of observation after transcoder output are:</li> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-type: BITS16</li> <li>Attribute-value: 04 00 (hex)</li> </ul>		Attribute-type: BITS16
<ul> <li>PCD-01 message includes a segment like this for each SpO2 object with Measurement-Status attribute value (check OBX-8 and OBX-11):</li> <li>OBX n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x [value]]</li> <li>262688^MDC_DIM_PERCENT^MDC  TEST   R   [current_date_time]</li> <li>In step 16, possible values in typical points of observation after transcoder output are:</li> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-type: BITS16</li> <li>Attribute-value: 04 00 (hex)</li> </ul>		Attribute-value: 08 00 (hex)
Status attribute value (check OBX-8 and OBX-11): OBX n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x[[value]] 262688^MDC_DIM_PERCENT^MDC   <b>TEST</b>     <b>R</b>    [current_date_time] In step 16, possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes Measurement-Status attribute is present in all three SpO2 objects: Object: SpO2 Numeric Object Attribute-id: MDC_ATTR_MSMT_STAT (2375) Attribute-type: BITS16 Attribute-value: <b>04 00</b> (hex)	b)	WAN PCD-01 message
<ul> <li>262688^MDC_DIM_PERCENT^MDC  TEST   R   [current_date_time]</li> <li>In step 16, possible values in typical points of observation after transcoder output are:</li> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-type: BITS16</li> <li>Attribute-value: 04 00 (hex)</li> </ul>		
<ul> <li>a) IEEE 11073 Objects and Attributes Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-type: BITS16</li> <li>Attribute-value: 04 00 (hex)</li> </ul>		
<ul> <li>Measurement-Status attribute is present in all three SpO2 objects:</li> <li>Object: SpO2 Numeric Object</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-type: BITS16</li> <li>Attribute-value: 04 00 (hex)</li> </ul>	Ins	step 16, possible values in typical points of observation after transcoder output are:
<ul> <li>Object: SpO2 Numeric Object</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-type: BITS16</li> <li>Attribute-value: 04 00 (hex)</li> </ul>	a)	IEEE 11073 Objects and Attributes
<ul> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-type: BITS16</li> <li>Attribute-value: 04 00 (hex)</li> </ul>		Measurement-Status attribute is present in all three SpO2 objects:
<ul> <li>Attribute-type: BITS16</li> <li>Attribute-value: 04 00 (hex)</li> </ul>		Object: SpO2 Numeric Object
<ul> <li>Attribute-type: BITS16</li> <li>Attribute-value: 04 00 (hex)</li> </ul>		Attribute-id: MDC_ATTR_MSMT_STAT (2375)
Attribute-value: 04 00 (hex)		
D) WAN POD-UT MESSAGE	b)	WAN PCD-01 message
PCD-01 message includes a segment like this for each SpO2 object with Measurement- Status attribute value (check OBX-8 and OBX-11):	,	PCD-01 message includes a segment like this for each SpO2 object with Measurement-

	OBX n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x [value]  262688^MDC_DIM_PERCENT^MDC   <b>DEMO</b>     <b>R</b>    [current_date_time]
In st	ep 18, possible values in typical points of observation after transcoder output are:
a)	IEEE 11073 Objects and Attributes
	Measurement-Status attribute is present in all three SpO2 objects:
	Object: SpO2 Numeric Object
	Attribute-id: MDC_ATTR_MSMT_STAT (2375)
	Attribute-type: BITS16
	Attribute-value: 00 80 (hex)
b)	WAN PCD-01 message
	PCD-01 message includes a segment like this for each SpO2 object with Measurement- Status attribute value (check OBX-8 and OBX-11):
	OBX n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x [value]  262688^MDC_DIM_PERCENT^MDC       <b>F</b>    [current_date_time]
In st	ep 20, possible values in typical points of observation after transcoder output are:
a)	IEEE 11073 Objects and Attributes
	Measurement-Status attribute is present in all three SpO2 objects:
	Object: SpO2 Numeric Object
	Attribute-id: MDC_ATTR_MSMT_STAT (2375)
	Attribute-type: BITS16
	Attribute-value: 00 40 (hex)
b)	WAN PCD-01 message
	PCD-01 message includes a segment like this for each SpO2 object with Measurement- Status attribute value (check OBX-8 and OBX-11):
	OBX n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x [value]  262688^MDC_DIM_PERCENT^MDC   <b>EARLY</b>     <b>R</b>    [current_date_time]
In st	ep 22, possible values in typical points of observation after transcoder output are:
a)	IEEE 11073 Objects and Attributes
	Measurement-Status attribute is present in all three SpO2 objects:
	Object: SpO2 Numeric Object
	Attribute-id: MDC_ATTR_MSMT_STAT (2375)
	Attribute-type: BITS16
	Attribute-value: 00 20 (hex)
b)	WAN PCD-01 message
	PCD-01 message includes a segment like this for each SpO2 object with Measurement- Status attribute value (check OBX-8 and OBX-11):
	OBX n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x [value]  262688^MDC_DIM_PERCENT^MDC   <b>BUSY</b>     <b>X</b>    [current_date_time]

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-015		
TP label		Whitepaper. SpO2 Numeric Object (Spot-Check Measurement) – Unit-Code Attribute		
Coverage	Spec	[Bluetooth PHDT v1.6]		
	Testable items	SpO2 Numeric 8; M		
Test purpo	Test purpose Check that:			

	PHG includes SpO2 Numeric Object –Unit-Code attribute in transcoder output when using spot-check measurement mode.				
	[AND]				
	Unit-Code is set to MDC_DIM_PERCENT				
Applicability	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040				
Other PICS	C_MAN_BLE_042				
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 Pulse Oximeter Profile (device specialization), it has a spot-check measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also supports the RACP characteristic and has an identical spot-check measurement temporarily stored.				
	2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:				
	a. PLX Features (0x2A60)				
	i. Field: Supported Features				
	Format: 16 bit				
	<ul> <li>Value: 0000 0000 0000 1100 (MSB → LSB). Measurement Storage for spot- check measurements is supported (bit 2). Timestamp for Spot-Check measurements is supported (bit 3).</li> </ul>				
	ii. Field: Measurement Status Support				
	This field is not included				
	iii. Field: Device and Sensor Status Support				
	<ul> <li>This field is not included</li> <li>b. PLX Spot-Check Measurement (0x2A5E)</li> </ul>				
	i. Field: Flags				
	Format: 8 bit				
	<ul> <li>Value: 0000 0001 (MSB → LSB). Timestamp field is present. Measurer Status, Device and Sensor Status, and Pulse Amplitude Index fields an present. Device Clock is set.</li> </ul>				
	ii. Field: SpO2PR-Spot-Check - SpO2 (%)				
	Format: SFLOAT				
	Value: Not Relevant				
	iii. Field: SpO2PR-Spot-Check – PR (bpm)				
	Format: SFLOAT				
	Value: Not Relevant				
	iv. Field: Time Stamp				
	Format: Date and Time				
	Value: Not Relevant				
	v. Field: Measurement Status				
	This field is not included				
	vi. Field: Device and Sensor Status				
	This field is not included				
	vii. Field: Pulse Amplitude Index (%)				
	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 PLX Features characteristic.				
	5. The simulated PHD sends the Measurement to the PHG under test.				
	6. Check in PHG transcoder output the SpO2 Numeric Object – Unit-Code attribute				
	7. IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN				
	<ul> <li>a) 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 spot-check measurement to PHG under test</li> </ul>				
	b) Check in PHG transcoder output the SpO2 Numeric Object – Unit-Code attribute				
Pass/Fail criteria	In Step 6, the SpO2 Numeric Object – Unit-Code attribute is present and its set to MDC_DIM_PERCENT. If the PHG supports RACP, the same criteria applies to Step 7.b.				
Notes	Possible values in typical points of observation after transcoder output are:				
(To assist manual	a) IEEE 11073 Objects and Attributes				
testing)	Unit-Code attribute is present:				
	Object: SpO2 Numeric Object				
	Attribute-id: MDC_ATTR_UNIT_CODE (2454)				
	Attribute-type: INT-U16				
	Attribute-value: MDC_DIM_PERCENT or 544 (dec) or 02 20 (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 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x [value]  262688^MDC_DIM_PERCENT^MDC     R   [current_date_time]				

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-016			
TP label Whitepaper. SpO2 Numeric Object (Continuous Measureme		Whitepaper. SpO2 Numeric Object (Continuous Measurements) – Unit-Code Attribute			
Coverage	Spec	[Bluetooth PHDT v1.6]			
	Testable items	SpO2 Numeric 18; M			
Test purpo	se	Check that:			
		PHG includes SpO2 Numeric Object – Unit-Code attribute in transcoder output when using continuous measurements.			
		[AND]			
		Unit-Code is set to MDC_DIM_PERCENT			
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040			
Other PICS					
Initial cond	<b>nitial condition</b> The PHG under test and the simulated PHD are in the Standby state.				
Test procedure		<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a continuous measurement (including fast and slow response measurement values) ready to be sent and it is in the Advertising state (it is discoverable).</li> </ol>			
		2. The simulated PHD implements several BTLE characteristics. The characteristics of			

	int	erest	for this Test Case are:
	a.	PL>	K Feature (0x2A60)
		i.	Field: Supported Features
			Format: 16 bit
			<ul> <li>Value: 0000 0000 0011 0000 (MSB → LSB). Fast and slow response modes are supported (bits 4 and 5).</li> </ul>
		ii.	Field: Measurement Status Support
			This field is not included
		iii.	Field: Device and Sensor Status Support
			This field is not included
	b.	PL>	Continuous Measurement (0x2A5F)
		i.	Field: Flags
			Format: 8 bit
			<ul> <li>Value: 0000 0011(MSB → LSB). SpO2PR–Fast, SpO2PR-Slow fields are present. Measurement Status, Device and Sensor Status and Pulse Amplitude Index fields are not present.</li> </ul>
		ii.	Field: SpO2PR-Normal - SpO2 (%)
			Format: SFLOAT
			Value: Not Relevant
		iii.	Field: SpO2PR-Normal – PR (bpm)
			Format: SFLOAT
			Value: Not Relevant
		iv.	Field: SpO2PR-Fast - SpO2 (%)
			Format: SFLOAT
			Value: Not Relevant
		٧.	Field: SpO2PR-Fast - PR (bpm)
			Format: SFLOAT
			Value: Not Relevant
		vi.	Field: SpO2PR-Slow - SpO2 (%)
			Format: SFLOAT
			Value: Not Relevant
		vii.	Field: SpO2PR-Slow - PR (bpm)
			Format: SFLOAT
			Value: Not Relevant
		viii.	Field: Measurement Status
			This field is not included
		ix.	Field: Device and Sensor Status
			This field is not included
		х.	Field: Pulse Amplitude Index (%)
			This field is not included
3			G under test initiates a discovery process (Scanning state), it discovers the ed PHD and it starts a pairing process with the simulated PHD (Initiating state).
4			e pairing has been completed (Connection state), force the PHG under test to PLX Feature characteristic.

5. The simulated PHD sends the Measurement to the PHG under test.

	<ol> <li>Check in PHG transcoder output the SpO2 Numeric Object – Unit-Code attribute in all three SpO2 objects (continuous normal, fast and slow).</li> </ol>			
Pass/Fail criteria	In Step 6,			
	<ul> <li>There are three SpO2 objects (for normal, fast and slow measurement modes).</li> </ul>			
	<ul> <li>In all three objects, the SpO2 Numeric Object – Unit-Code attribute is present and its set to MDC_DIM_PERCENT.</li> </ul>			
Notes (To assist manual	Possible values in typical points of observation after transcoder output are: a) IEEE 11073 Objects and Attributes			
testing)	Unit-Code attribute is present in all three SpO2 objects:			
	Object: SpO2 Numeric Object			
	Attribute-id: MDC_ATTR_UNIT_CODE (2454)			
	Attribute-type: INT-U16			
	Attribute-value: MDC_DIM_PERCENT or 544 (dec) or 02 20 (hex)			
	b) WAN PCD-01 message			
	PCD-01 message includes a segment like this for each SpO2 object with Unit-Code attribute value (check OBX-6):			
	OBX n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x [value]  262688^MDC_DIM_PERCENT^MDC     R   [current_date_time]			

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-017					
TP label		Whitepaper. SpO2 Numeric Object (Spot-Check Measurement) – Absolute-Time-Stamp Attribute					
Coverage	Spec	[Bluetooth PHDT v1.6]					
	Testable	SpO2 Numeric 9; M	SpO2 Numeric 9; M Date-Time Conv 2; M				
	items	Date-Time Conv 4; M	Date-Time Conv 4; M Date-Time Conv 5; M				
Test purpo	se	Check that:					
		PHG transcodes Time Stamp field of Spot-Check Measurement characteristic into SpO2 Numeric Object - Absolute-Time-Stamp attribute					
		[AND]					
		PHG transcodes the Bluetooth Time Stamp field format to Absolute Time format					
		[AND]					
		The fraction of seconds in Absolute Time at transcoder output is 0					
Applicabili	ty	C_MAN_BLE_000 AND	C_MAN_BLE_002 AND C_MA	N_BLE_040			
Other PICS C_MAN_BLE_042							
Initial cond	condition The PHG under test and the simulated PHD are in the Standby state.			Standby state.			
Test procedure		<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a Spot-Check measurement ready to be sent and it is in Advertising state (it is discoverable). The simulated PHD also supports the RACP characteristic and has an identical spot-check measurement temporarily stored.</li> </ol>					
			<ol> <li>The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:</li> </ol>				
		a. PLX Features (	0x2A60)				
		i. Field: Sup	ported Features				

	Format: 16 bit
	• Value: 0000 0000 0000 1100 (MSB → LSB). Measurement Storage for spot- check measurements is supported (bit 2). Timestamp for Spot-Check measurements is supported (bit 3).
	ii. Field: Measurement Status Support
	This field is not included
	iii. Field: Device and Sensor Status Support
	This field is not included
	b. PLX Spot-Check Measurement (0x2A5E)
	i. Field: Flags
	Format: 8 bit
	<ul> <li>Value: 0000 0001 (MSB → LSB). Timestamp field is present. Measurement Status, Device and Sensor Status, and Pulse Amplitude Index fields are not present. Device Clock is set.</li> </ul>
	ii. Field: SpO2PR-Spot-Check - SpO2 (%)
	Format: SFLOAT
	Value: Not Relevant
	iii. Field: SpO2PR-Spot-Check – PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	iv. Field: Time Stamp
	Format: Date and Time
	• Value: October 12nd, 2015, 10:39:27
	v. Field: Measurement Status
	This field is not included
	vi. Field: Device and Sensor Status
	This field is not included
	vii. Field: Pulse Amplitude Index (%)
	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 PLX Features characteristic.
	5. The simulated PHD sends the Measurement to the PHG under test.
	6. Check in PHG transcoder output the SpO2 Numeric Object – Absolute-Time-Stamp attribute
	7. IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	<ul> <li>a) 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 spot-check measurement to PHG under test</li> </ul>
	<ul> <li>b) Check in PHG transcoder output the SpO2 Numeric Object – Absolute-Time-Stamp attribute</li> </ul>
Pass/Fail criteria	In Step 6, the SpO2 Numeric Object – Absolute-Time-Stamp attribute is present, its value matches with Time Stamp field of Spot-Check Measurement characteristic and fraction of seconds is set to 0.
	If the PHG supports RACP, the same criteria applies to Step 7.b.

Notes	Possible values in typical points of observation after transcoder output are:				
(To assist manual testing)	a) IEEE 11073 Objects and Attributes				
	Absolute-Time-Stamp attribute is present:				
	Object: SpO2 Numeric Object				
	Attribute-id: MDC_ATTR_TIME_STAMP_ABS (2448)				
	<ul> <li>Attribute-type: SEQUENCE {century (INT-U8), year (INT-U8), month (INT-U8), day (INT-U8), hour (INT-U8), minute (INT-U8), second (INT-U8), sec-fractions (INT-U8)} (BCD encoding)</li> </ul>				
	Attribute-value:				
	• century: 20 (hex) or 32 (dec)				
	• year: 15 (hex) or 21 (dec)				
	• month: 10 (hex) or 16 (dec)				
	• day: 12 (hex) or 18 (dec)				
	• hour: 10 (hex) or 16 (dec)				
	• minute: 39 (hex) or 57 (dec)				
	• second: 27 (hex) or 39 (dec)				
	• sec-fractions: 00 (hex) or 0 (dec)				
	b) WAN PCD-01 message				
	PCD-01 message includes a segment like this with Absolute-Time-Stamp attribute value (check OBX-14):				
	OBX n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x [value]  262688^MDC_DIM_PERCENT^MDC     R    <b>20151012103927+0000</b>				

TP Id TP label		TP/LP-PAN/PHG/PHDTW/PLX/BV-018 Whitepaper. SpO2 Numeric Object (Spot-Check Measurement) – Basic-Nu-Observed-Value Attribute 1				
	Testable items	SpO2 Numeric 10; M	Short Float Type 1; C			
Test purpo	se	Check that:				
		PHG transcodes SpO2 value of the SpO2PR-Spot-Check field in PLX Spot-Check Measurement chactacteristic into SpO2 Numeric Object - Basic-Nu-Observed-Value attribute				
Applicabili	ty	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040				
Other PICS		C_MAN_BLE_042				
Initial cond	ition	The PHG under test and the simulated PHD are in the Standby state.				
Test procedure		1. The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a Spot-Check measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also supports the RACP characteristic and has an identical spot-check measurement temporarily stored.				
		2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:				
		a. PLX Features (	(0x2A60)			
		i. Field: Sup	ported Features			
		Forma	at: 16 bit			

	1			
				• Value: 0000 0000 0000 <b>11</b> 00 (MSB → LSB). Measurement Storage for spot- check measurements is supported (bit 2). Timestamp for Spot-Check measurements is supported (bit 3).
			ii.	Field: Measurement Status Support
				This field is not included
			iii.	Field: Device and Sensor Status Support
				This field is not included
	b.	PLΣ	K Spo	ot-Check Measurement (0x2A5E)
			i.	Field: Flags
				Format: 8 bit
				<ul> <li>Value: 0000 0001 (MSB → LSB). Timestamp field is present. Measurement Status, Device and Sensor Status, and Pulse Amplitude Index fields are not present. Device Clock is set.</li> </ul>
			ii.	Field: SpO2PR-Spot-Check - SpO2 (%)
				• Format: 96 (%)
				Value: Not Relevant
			iii.	Field: SpO2PR-Spot-Check – PR (bpm)
				Format: SFLOAT
				Value: Not Relevant
			iv.	Field: Time Stamp
				Format: Date and Time
				Value: Not Relevant
			v.	Field: Measurement Status
				This field is not included
			vi.	Field: Device and Sensor Status
				This field is not included
			vii.	Field: Pulse Amplitude Index (%)
				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 PLX Features characteristic.		
	5.	The simulated PHD sends the Measurement to the PHG under test.		
	6.	Check in PHG transcoder output the SpO2 Numeric Object – Basic-Nu-Observed-Value attribute		
	7.	IF C	C_MA	N_BLE_042 = TRUE (PHG supports RACP) THEN
		a)	per	PHG under test requests the Simulated PHD to report stored records by forming a writing operation in the Record Access Control Point (RACP) and the ulated PHD sends the temporarily stored spot-check measurement to PHG under
		b)		eck in PHG transcoder output the SpO2 Numeric Object – Basic-Nu-Observed- ue attribute
Pass/Fail criteria	In Step 6, the SpO2 Numeric Object – Basic-Nu-Observed-Value attribute is present and its value matches with the value of the SpO2 subfield of the SpO2PR-Spot-Check field in the PLX Spot-Check Measurement chactacteristic (96%).			
	lf ti	he P⊦	lG s	upports RACP, the same criteria applies to Step 7.b.
Notes (To assist manual	Po	ssible	e valı	ues in typical points of observation after transcoder output are:

testing)	a)	IEEE 11073 Objects and Attributes	
		Basic-Nu-Observed-Value attribute is present:	
		Object: SpO2 Numeric Object	
		Attribute-id: MDC_ATTR_NU_VAL_OBS_BASIC (2636)	
		Attribute-type: SFLOAT	
		Attribute-value: 00 60 (hex) or F3C0 (hex) or 96 (dec)	
	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 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x  <b>96</b>   262688^MDC_DIM_PERCENT^MDC     R   [current_date_time]	

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-019						
TP label		Whitepaper. SpO2 Numeric Object (Spot-Check Measurement) – Basic-Nu-Observed-Value Attribute 2						
Coverage	Spec	[Bluetooth P	[Bluetooth PHDT v1.6]					
	Testable items	SpO2 Nume	ric 10; M	SpO2 Numeric 20; M	Short Float Type 2; M			
Test purpo	se	Check that:						
				the SpO2PR-Spot-Check fir ric Object - Basic-Nu-Obser	eld in PLX Spot-Check Measurement rved-Value attribute			
		PHG assigns special value NaN (0x07FF) when SpO2 value is unavailable.						
Applicabili	ty	C_MAN_BLE	E_000 AND C_MAN	N_BLE_002 AND C_MAN_B	LE_040			
Other PICS	6	C_MAN_BLE	E_042					
Initial cond	lition	The PHG un	der test and the sin	nulated PHD are in the Stan	dby state.			
Test procedure		<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a Spot-Check measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also supports the RACP characteristic and has an identical spot-check measurement temporarily stored.</li> </ol>						
		<ol> <li>The simulated PHD implements several BTLE characteristics. The characteristics of inter for this Test Case are:</li> </ol>						
		a. PL>	K Features (0x2A60	))				
		i.	Field: Supported F	eatures				
			• Format: 16 bi	t				
			check measu	0000 0000 <b>11</b> 00 (MSB $\rightarrow$ LS rements is supported (bit 2). Its is supported (bit 3).	B). Measurement Storage for spot- Timestamp for Spot-Check			
		ii.	Field: Measureme	nt Status Support				
			• This field is no	ot included				
		iii.	Field: Device and	Sensor Status Support				
			• This field is no	ot included				
		b. PLX Spot-Check Measurement (0x2A5E)						
		i.	Field: Flags					

	Format: 8 bit
	<ul> <li>Value: 0000 0001 (MSB → LSB). Timestamp field is present. Measurement Status, Device and Sensor Status, and Pulse Amplitude Index fields are not present. Device Clock is set.</li> </ul>
	ii. Field: SpO2PR-Spot-Check - SpO2 (%)
	Format: SFLOAT
	Value: 07 FF (hex). Special value: NaN
	iii. Field: SpO2PR-Spot-Check – PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	iv. Field: Time Stamp
	Format: Date and Time
	Value: Not Relevant
	v. Field: Measurement Status
	This field is not included
	vi. Field: Device and Sensor Status
	This field is not included
	vii. Field: Pulse Amplitude Index (%)
	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 PLX Features characteristic.
	5. The simulated PHD sends the Measurement to the PHG under test.
	<ol> <li>Check in PHG transcoder output the SpO2 Numeric Object – Basic-Nu-Observed-Value attribute</li> </ol>
	7. IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	<ul> <li>a) 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 spot-check measurement to PHG under test</li> </ul>
	<ul> <li>b) Check in PHG transcoder output the SpO2 Numeric Object – Basic-Nu-Observed- Value attribute</li> </ul>
Pass/Fail criteria	In Step 6, the SpO2 Numeric Object – Basic-Nu-Observed-Value attribute is present and its value is is 0x07FF (NaN).
	If the PHG supports RACP, the same criteria applies to Step 7.b.
Notes	Possible values in typical points of observation after transcoder output are:
(To assist manual	a) IEEE 11073 Objects and Attributes
testing)	Basic-Nu-Observed-Value attribute is present:
	<ul> <li>Object: SpO2 Numeric Object</li> </ul>
	<ul> <li>Attribute-id: MDC_ATTR_NU_VAL_OBS_BASIC (2636)</li> </ul>
	Attribute-type: SFLOAT
	<ul> <li>Attribute-value: 07 FF (hex) or NaN (note that a decimal value is not allowed)</li> </ul>
	b) WAN PCD-01 message
	PCD-01 message does not include special values
	<b>v</b>

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-020					
TP label		Whitepaper. SpO2 Numeric Object (Continuous Measurements) – Basic-Nu-Observed-Value Attribute 1					
Coverage	Spec	[Bluetooth PHDT v1.6]					
	Testable items	SpO2 Numeric 19; M	Short Float Type 1; C				
Test purpo	se	Check that:					
			alue of the SpO2PR-Normal field in PL Numeric Object (Continuous normal r				
		[AND]					
			alue of the SpO2PR-Fast field in PLX ( Numeric Object (Continuous fast resp				
		[AND]					
			alue of the SpO2PR-Slow field in PLX Numeric Object (Continuous slow res				
Applicabili	ty	C_MAN_BLE_000 AND	C_MAN_BLE_002 AND C_MAN_BLE_	_040			
Other PICS	;						
Initial cond	lition	The PHG under test and	the simulated PHD are in the Standby	state.			
Test procedure		<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a continuous measurement (including fast and slow response measurement values) ready to be sent and it is in the Advertising state (it is discoverable).</li> </ol>					
		-	implements several BTLE characterist				
		a. PLX Feature (0	x2A60)				
		i. Field: Supp	orted Features				
		Forma	t: 16 bit				
			0000 0000 0011 0000 (MSB $\rightarrow$ LSB). poprted (bits 4 and 5).	Fast and slow response modes			
		ii. Field: Meas	surement Status Support				
		This field	eld is not included				
		iii. Field: Devi	ce and Sensor Status Support				
		This field	eld is not included				
		b. PLX Continuou	s Measurement (0x2A5F)				
		i. Field: Flag	3				
		Forma	t: 8 bit				
		preser	0000 0011 (MSB $\rightarrow$ LSB). SpO2PR–F t. Measurement Status, Device and Se ude Index fields are not present.				
		ii. Field: SpO	2PR-Normal - SpO2 (%)				
		Forma	t: SFLOAT				
		Value:	96 (%)				
		iii. Field: SpO	2PR-Normal - PR (bpm)				
		Forma	t: SFLOAT				

	Value: Not Relevant
	iv. Field: SpO2PR-Fast - SpO2 (%)
	Format: SFLOAT
	• Value: 98 (%)
	v. Field: SpO2PR-Fast - PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	vi. Field: SpO2PR-Slow - SpO2 (%)
	Format: SFLOAT
	• Value: 94 (%)
	vii. Field: SpO2PR-Slow - PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	viii. Field: Measurement Status
	This field is not included
	ix. Field: Device and Sensor Status
	This field is not included
	x. Field: Pulse Amplitude Index (%)
	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 PLX Feature characteristic.
	5. The simulated PHD sends the Measurement to the PHG under test.
	<ol> <li>Check in PHG transcoder output the SpO2 Numeric Object – Basic-Nu-Observed-Value attribute in all three SpO2 objects.</li> </ol>
Pass/Fail criteria	In Step 6,
	<ul> <li>The SpO2 Numeric Object (Continuous measurement normal) – Basic-Nu-Observed-Value attribute is present and its value matches with the value of the SpO2 subfield of the SpO2PR-Normal field in the PLX Continuous Measurement chactacteristic (96%).</li> </ul>
	• The SpO2 Numeric Object (Continuous measurement fast) – Basic-Nu-Observed-Value attribute is present and its value matches with the value of the SpO2 subfield of the SpO2PR-Fast field in the PLX Continuous Measurement chactacteristic (98%).
	The SpO2 Numeric Object (Continuous measurement slow) – Basic-Nu-Observed-Value attribute is present and its value matches with the value of the SpO2 subfield of the SpO2PR-Slow field in the PLX Continuous Measurement chactacteristic (94%).
Notes	Possible values in typical points of observation after transcoder output are:
(To assist manual testing)	a. IEEE 11073 Objects and Attributes
<i></i>	SpO2 Numeric object (Continous measurement normal):
	Supplemental-types attribute is not present.
	Basic-Nu-Observed-Value attribute is present:
	Object: SpO2 Numeric Object
	Attribute-id: MDC_ATTR_NU_VAL_OBS_BASIC (2636)
	Attribute-type: SFLOAT
	Attribute-value: 00 60 (hex) or F3 C0 (hex) or 96 (dec)
	SpO2 Numeric object (Continous measurement fast):

	Supplemental-types attribute is present:
	Object: SpO2 Numeric Object (fast response)
	Attribute-id: MDC_ATTR_SUPPLEMENTAL_TYPES (2657)
	Attribute-type: SEQUENCE of SEQUENCE {partition (INT-U16), code (INT-U16)}
	Attribute-value: {MDC_PART_SCADA, MDC_MODALITY_FAST}.
	Basic-Nu-Observed-Value attribute is present:
	Object: SpO2 Numeric Object
	Attribute-id: MDC_ATTR_NU_VAL_OBS_BASIC (2636)
	Attribute-type: SFLOAT
	Attribute-value: 00 62 (hex) or F3D4 (hex) or 98 (dec)
	SpO2 Numeric object (Continous measurement slow):
	Supplemental-types attribute is present:
	Object: SpO2 Numeric Object (slow response)
	Attribute-id: MDC_ATTR_SUPPLEMENTAL_TYPES (2657)
	Attribute-type: SEQUENCE of SEQUENCE {partition (INT-U16), code (INT-U16)}
	Attribute-value: {MDC_PART_SCADA, MDC_MODALITY_SLOW}.
	Basic-Nu-Observed-Value attribute is present:
	Object: SpO2 Numeric Object
	Attribute-id: MDC_ATTR_NU_VAL_OBS_BASIC (2636)
	Attribute-type: SFLOAT
	Attribute-value: 00 5E (hex) or F3AC (hex) or 94 (dec)
b.	WAN PCD-01 message
	SpO2 Numeric object (Continous measurement normal):
	PCD-01 message includes a segment like this with Basic-Nu-Observed-Value attribute value (check OBX-5):
	OBX n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x  <b>96</b>   262688^MDC_DIM_PERCENT^MDC     R   [current_date_time]
	SpO2 Numeric object (Continous measurement fast):
	PCD-01 message includes two segments like these for SpO2 Numeric object (Fast response), with Basic-Nu-Observed-Value attribute and Supplemental-Types attribute values (check OBX-5 in both segments):
	OBX n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x  <b>98</b>   262688^MDC_DIM_PERCENT^MDC     R   [current_date_time]
	OBX n CWE 68193^MDC_ATTR_SUPPLEMENTAL_TYPES^MDC m.0.0.x.y  150580^MDC_MODALITY_FAST^MDC      [obx-11 of the parent]
	SpO2 Numeric object (Continous measurement slow):
	PCD-01 message includes two segments like these for SpO2 Numeric object (Slow response), with Basic-Nu-Observed-Value attribute and Supplemental-Types attribute values (check OBX-5 in both segments):
	OBX n NM 150456^MDC_PULS_OXIM_SAT_O2^MDC m.0.0.x  <b>94</b>   262688^MDC_DIM_PERCENT^MDC     R   [current_date_time]
	OBX n CWE 68193^MDC_ATTR_SUPPLEMENTAL_TYPES^MDC m.0.0.x.y  150580^MDC_MODALITY_SLOW^MDC      [obx-11 of the parent]

TP ld	TP/LP-PAN/PHG/PHDTW/PLX/BV-021
TP label	Whitepaper. SpO2 Numeric Object (Continuous Measurements) – Basic-Nu-Observed-Value Attribute 2

Coverage	Spec	[Bluet	ooth F	PHDT v1.6]				
Testable items		SpO2 Numeric 19; M SpO2 Numeric 20; M Short Float Type 2; M						
Test purpo	Test purpose		< that:					
		PHG transcodes SpO2 value of the SpO2PR-Normal field in PLX Continuous Measurement chactacteristic into SpO2 Numeric Object (Continuous normal response) - Basic-Nu-Observed-Value attribute						
		[AND]						
		PHG transcodes SpO2 value of the SpO2PR-Fast field in PLX Continuous Measurement chactacteristic into SpO2 Numeric Object (Continuous fast response) - Basic-Nu-Observed-Value attribute						
		[AND]	l					
		chacta	PHG transcodes SpO2 value of the SpO2PR-Slow field in PLX Continuous Measurement chactacteristic into SpO2 Numeric Object (Continuous slow response) - Basic-Nu-Observed-Value attribute					
		[AND]						
		PHG	assign	is special value N	IaN (0x07FF) when SpO2 valu	ie is unavailable.		
Applicabili	ity	C_MA	N_BL	E_000 AND C_N	IAN_BLE_002 AND C_MAN_E	BLE_040		
Other PICS	3							
	-	Th - D						
Initial cond	aition	The PHG under test and the simulated PHD are in the Standby state.						
Test procedure		<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a continuous measurement (including fast and slow response measurement values) ready to be sent and it is in the Advertising state (it is discoverable).</li> </ol>						
				nulated PHD impl Test Case are:	lements several BTLE characte	eristics. The characteristics of interes		
		a	. PL	X Feature (0x2A	60)			
			i.	Field: Supporte	d Features			
				Format: 16	5 bit			
					0 0000 00 <b>11</b> 0000 (MSB $\rightarrow$ LS ted (bits 4 and 5).	SB). Fast and slow response modes		
			ii.	Field: Measure	ment Status Support			
				This field is	s not included			
			iii.	Field: Device a	nd Sensor Status Support			
				This field is	s not included			
		b	. PL	X Continuous Me	easurement (0x2A5F)			
			i.	Field: Flags				
				Format: 8 I	bit			
				present. M		PR-Fast, SpO2PR-Slow fields are ad Sensor Status and Pulse Amplitude		
			ii.	Field: SpO2PR	-Normal - SpO2 (%)			
				Format: SF	FLOAT			
				Value: 07 I	FF (hex). Special value: NaN			
			iii.	Field: SpO2PR	-Normal - PR (bpm)			
				Format: SF	FLOAT			
				Value: Not	Relevant			

	iv. Field: SpO2PR-Fast - SpO2 (%)
	Format: SFLOAT
	Value: 07 FF (hex). Special value: NaN
	v. Field: SpO2PR-Fast - PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	vi. Field: SpO2PR-Slow - SpO2 (%)
	Format: SFLOAT
	Value: 07 FF (hex). Special value: NaN
	vii. Field: SpO2PR-Slow - PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	viii. Field: Measurement Status
	This field is not included
	ix. Field: Device and Sensor Status
	This field is not included
	x. Field: Pulse Amplitude Index (%)
	This field is not included
	<ol> <li>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).</li> </ol>
	4. When the pairing has been completed (Connection state), force the PHG under test to read the PLX Feature characteristic.
	5. The simulated PHD sends the Measurement to the PHG under test.
	<ol> <li>Check in PHG transcoder output the SpO2 Numeric Object – Basic-Nu-Observed-Value attribute for all SpO2 objects.</li> </ol>
Pass/Fail criteria	In Step 6,
	The SpO2 Numeric Object (Continuous measurement normal) – Basic-Nu-Observed-Value attribute is present and its value is is 0x07FF (NaN).
	<ul> <li>The SpO2 Numeric Object (Continuous measurement fast) – Basic-Nu-Observed-Value attribute is present and its value is is 0x07FF (NaN).</li> </ul>
	The SpO2 Numeric Object (Continuous measurement slow) – Basic-Nu-Observed-Value attribute is present and its value is is 0x07FF (NaN).
Notes	Possible values in typical points of observation after transcoder output are:
(To assist manual testing)	a) IEEE 11073 Objects and Attributes
	SpO2 Numeric object (Continous measurement normal):
	Supplemental-types attribute is not present.
	Basic-Nu-Observed-Value attribute is present:
	Object: SpO2 Numeric Object
	Attribute-id: MDC_ATTR_NU_VAL_OBS_BASIC (2636)
	Attribute-type: SFLOAT
	Attribute-value: Attribute-value: 07 FF (hex) or NaN (note that a decimal value is not allowed)
	SpO2 Numeric object (Continous measurement fast):
	<ul><li>SpO2 Numeric object (Continous measurement fast):</li><li>Supplemental-types attribute is present:</li></ul>

	Attribute-id: MDC_ATTR_SUPPLEMENTAL_TYPES (2657)
	Attribute-type: SEQUENCE of SEQUENCE {partition (INT-U16), code (INT-U16)}
	Attribute-value: {MDC_PART_SCADA, MDC_MODALITY_FAST}.
	Basic-Nu-Observed-Value attribute is present:
	Object: SpO2 Numeric Object
	Attribute-id: MDC_ATTR_NU_VAL_OBS_BASIC (2636)
	Attribute-type: SFLOAT
	Attribute-value: Attribute-value: 07 FF (hex) or NaN (note that a decimal value is not allowed)
	SpO2 Numeric object (Continous measurement slow):
	Supplemental-types attribute is present:
	Object: SpO2 Numeric Object (slow response)
	Attribute-id: MDC_ATTR_SUPPLEMENTAL_TYPES (2657)
	Attribute-type: SEQUENCE of SEQUENCE {partition (INT-U16), code (INT-U16)}
	Attribute-value: {MDC_PART_SCADA, MDC_MODALITY_SLOW}.
	Basic-Nu-Observed-Value attribute is present:
	Object: SpO2 Numeric Object
	Attribute-id: MDC_ATTR_NU_VAL_OBS_BASIC (2636)
	Attribute-type: SFLOAT
	Attribute-value: Attribute-value: 07 FF (hex) or NaN (note that a decimal value is not allowed)
b)	WAN PCD-01 message
	PCD-01 message does not include special values

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-022				
TP label		Whitepaper. SpO2 measurement value (Spot-Check Measurement)				
Coverage	Spec	[Bluetooth PHDT v1.6]				
	Testable	Short Float Type 1; C	Date-Time Conv 1; M	SpO2 Numeric 9; M		
	items	SpO2 Numeric 10; M				
Test purpose		Check that: PHG processes correctly the SpO2 value (%) of the SpO2PR-Spot-Check field and and the value of the Time Stamp field of the PLX Spot-Check characteristic				
Applicability	/	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040				
Other PICS		C_MAN_BLE_042				
Initial condi	tion	The PHG under test and the simulated PHD are in the Standby state.				
Test procedure		<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a Spot-Check measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also supports the RACP characteristic and has an identical spot-check measurement temporarily stored.</li> </ol>				
		<ol> <li>The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:</li> </ol>				
		a. PLX Features (0x2A60)				

			i.	Field: Supported Features
				• Format: 16 bit
				<ul> <li>Value: 0000 0000 0000 1100 (MSB → LSB). Measurement Storage for spot-</li> </ul>
				check measurements is supported (bit 2). Timestamp for Spot-Check measurements is supported (bit 3).
			ii.	Field: Measurement Status Support
				This field is not included
			iii.	Field: Device and Sensor Status Support
				This field is not included
	b.	PLX	Spo	t-Check Measurement (0x2A5E)
			i.	Field: Flags
				Format: 8 bit
				<ul> <li>Value: 0000 0001 (MSB → LSB). Timestamp field is present. Measurement Status, Device and Sensor Status, and Pulse Amplitude Index fields are not present. Device Clock is set.</li> </ul>
			ii.	Field: SpO2PR-Spot-Check - SpO2 (%)
				Format: SFLOAT
				• Value: 96 (%)
			iii.	Field: SpO2PR-Spot-Check – PR (bpm)
				Format: SFLOAT
				Value: Not Relevant
			iv.	Field: Time Stamp
				Format: Date and Time
				• Value: October 12nd, 2015, 10:39:27
			v.	Field: Measurement Status
				This field is not included
			vi.	Field: Device and Sensor Status
				This field is not included
			vii.	Field: Pulse Amplitude Index (%)
				This field is not included
	3.			G under test initiates a discovery process (Scanning state), it discovers the d PHD and it starts a pairing process with the simulated PHD (Initiating state).
	4.			e pairing has been completed (Connection state), force the PHG under test to PLX Features characteristic.
	5.	The	sim	lated PHD sends the Measurement to the PHG under test.
	6.			at the PHG accepts the measurement and decodes its value properly (SpO2 ment value, units and time stamp).
	7.	IF C	_MA	N_BLE_042 = TRUE (PHG supports RACP) THEN
			perf	PHG under test requests the Simulated PHD to report stored records by orming a writing operation in the Record Access Control Point (RACP) and the ulated PHD sends the temporarily stored spot-check measurement to PHG under
				ck that PHG accepts the measurement and decodes its value properly (SpO2 surement value, units and time stamp)
Pass/Fail criteria				PHG under test shows the following measurement SpO2 = 96(%) with timestamp 10:39:27'.
	If the PHG supports RACP, the same criteria applies to Step 7.b.			

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-023					
TP label		Whitepaper. Pulse Rate Numeric Object (Spot-Check Measurement) - Handle Attribute					
Coverage	Spec	[Bluetooth PHDT v1.6]					
	Testable items	PR Numeric 1; O					
Test purpose		Check that: PHG does not include Pulse Rate Numeric Object – Handle Attribute in transcoder output when using spot-check measurement mode. [OR] If PHG includes Pulse Rate 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	N_BLE_040				
Other PICS		C_MAN_BLE_042					
Initial condi	tion	The PHG under test and the simulated PHD are in the S	standby state.				
Test proced	ure	The simulated PHD is configured with a Pulse Oxim has a spot-check measurement ready to be sent an discoverable). The simulated PHD also supports the identical spot-check measurement temporarily store	d it is in the Advertising state (it is e RACP characteristic and has an ed.				
		<ol> <li>The simulated PHD implements several BTLE chara interest for this Test Case are:</li> </ol>	acteristics. The characteristics of				
		a. PLX Features (0x2A60)					
		i. Field: Supported Features					
		• Format: 16 bit					
		<ul> <li>Value: 0000 0000 0000 1100 (MSB → check measurements is supported (bit measurements is supported (bit 3).</li> </ul>	LSB). Measurement Storage for spot- t 2). Timestamp for Spot-Check				
		ii. Field: Measurement Status Support					
		This field is not included					
		iii. Field: Device and Sensor Status Support					
		This field is not included					
		<ul> <li>PLX Spot-Check Measurement (0x2A5E)</li> </ul>					
		i. Field: Flags					
		Format: 8 bit					
		<ul> <li>Value: 0000 0001 (MSB → LSB). Time Status, Device and Sensor Status, and present. Device Clock is set.</li> </ul>					
		ii. Field: SpO2PR-Spot-Check - SpO2 (%)					
		Format: SFLOAT					
		Value: Not Relevant					
		iii. Field: SpO2PR-Spot-Check – PR (bpm)					
		Format: SFLOAT					
		Value: Not Relevant					

	iv. Field: Time Stamp					
	Format: Date and Time					
	Value: Not Relevant					
	v. Field: Measurement Status					
	This field is not included					
	vi. Field: Device and Sensor Status					
	This field is not included					
	vii. Field: Pulse Amplitude Index (%)					
	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 PLX Features characteristic.					
	5. The simulated PHD sends the measurement to the PHG under test.					
	6. Check in PHG transcoder output the Pulse Rate Numeric Object – Handle attribute					
	7. IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN					
	<ul> <li>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 spot-check measurement to the PHG under test</li> </ul>					
	b) Check in PHG transcoder output the SpO2 Numeric Object – Handle attribute					
Pass/Fail criteria	In Step 6, the Pulse Rate Numeric Object – Handle attribute is not present or, if it is present then its value is different than 0.					
	If the PHG supports RACP, the same criteria applies to Step 7.b.					
Notes	Possible values in typical points of observation after transcoder output are:					
(To assist manual	a) IEEE 11073 Objects and Attributes					
testing)	Handle attribute is not present, or if it is present then:					
	<ul> <li>Object: Pulse Rate Numeric Object</li> </ul>					
	<ul> <li>Attribute-id: MDC_ATTR_ID_HANDLE (2337)</li> </ul>					
	<ul> <li>Attribute-type: INT-U16</li> </ul>					
	<ul> <li>Attribute-value: Any value different than 0</li> </ul>					
	b) WAN PCD-01 message					
	PCD-01 message does not include segments with Handle attribute value					

TP ld		TP/LP-PAN/PHG/PHDTW/PLX	/BV-024		
TP label		Whitepaper. Pulse Rate Numeric Object (Continuous Measurements) - Handle Attribute			
Coverage Spec		[Bluetooth PHDT v1.6]			
	Testable items	PR Numeric 11; O			
Test purpose		Check that:			
		PHG does not include Pulse Rate Numeric Object – Handle Attribute in transcoder output when using continuous measurements			
		[OR]			
		If PHG includes Pulse Rate 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_040			
Other PICS				
Initial condition	The PHG under test and the simulated PHD are in the Standby state.			
Test procedure	<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a continuous measurement (including fast and slow response measurement values) ready to be sent and it is in the advertising state (it is discoverable).</li> </ol>			
	2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:			
	a. PLX Features (0x2A60)			
	i. Field: Supported Features			
	Format: 16 bit			
	<ul> <li>Value: 0000 0000 0011 0000 (MSB → LSB). Fast and slow response modes are supported (bits 4 and 5).</li> </ul>			
	ii. Field: Measurement Status Support			
	This field is not included			
	iii. Field: Device and Sensor Status Support			
	This field is not included			
	b. PLX Continuous Measurement (0x2A5F)			
	i. Field: Flags			
	Format: 8 bit			
	<ul> <li>Value: 0000 0011 (MSB → LSB). SpO2PR–Fast, SpO2PR-Slow fields are present. Measurement Status, Device and Sensor Status and Pulse Amplitude Index fields are not present.</li> </ul>			
	ii. Field: SpO2PR-Normal - SpO2 (%)			
	Format: SFLOAT			
	Value: Not Relevant			
	iii. Field: SpO2PR-Normal – PR (bpm)			
	Format: SFLOAT			
	Value: Not Relevant			
	iv. Field: SpO2PR-Fast - SpO2 (%)			
	Format: SFLOAT			
	Value: Not Relevant			
	v. Field: SpO2PR-Fast - PR (bpm)			
	Format: SFLOAT			
	Value: Not Relevant			
	vi. Field: SpO2PR-Slow - SpO2 (%)			
	Format: SFLOAT			
	Value: Not Relevant			
	vii. Field: SpO2PR-Slow - PR (bpm)			
	Format: SFLOAT			
	Value: Not Relevant			
	viii. Field: Measurement Status			
	This field is not included			

ix. Field: Device and Sensor Status
This field is not included
x. Field: Pulse Amplitude Index (%)
This field is not included
<ol> <li>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).</li> </ol>
<ol> <li>When the pairing has been completed (Connection state), force the PHG under test to read the PLX Features characteristic.</li> </ol>
5. The simulated PHD sends the Measurement to the PHG under test.
<ol> <li>Check in PHG transcoder output the Pulse Rate Numeric Object – Handle attribute in all three Pulse Rate objects (continuous normal, fast and slow).</li> </ol>
In Step 6,
• There are three Pulse Rate objects (for normal, fast and slow measurement modes).
• In all three objects, the Pulse Rate Numeric Object – Handle attribute is not present or, if it is present then its value is different than 0
Possible values in typical points of observation after transcoder output are:
a) IEEE 11073 Objects and Attributes
Handle attribute is not present in SpO2 objects, or if it is present then:
Object: Pulse Rate 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 label		TP/LP-PAN/PHG/PHDTW/PLX/BV-025				
		Whitepaper. Pulse Rate Numeric Object (Spot-Check Measurement) - Type Attribute				
Coverage	Spec	[Bluetooth PHDT v1.6]				
	Testable items	PR Numeric 2; M				
Test purpo	se	Check that:				
		PHG includes Pulse Rate Numeric Object – Type attribute in transcoder output when using spot-check measurement mode.				
		[AND]				
		Type is set to {MDC_PART_SCADA, MDC_PULS_OXIM_PULS_RATE}				
Applicabili	ty	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040				
Other PICS	i	C_MAN_BLE_042				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.				
Test procedure		<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a spot-check measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also supports the RACP characteristic and has an identical spot-check measurement temporarily stored.</li> </ol>				
		2. The simulated PHD implements several BTLE characteristics. The characteristics of				

	interest for this Test Case are:			
	a. PLX Features (0x2A60)			
			i.	Field: Supported Features
				Format: 16 bit
				• Value: 0000 0000 0000 <b>11</b> 00 (MSB → LSB). Measurement Storage for spot- check measurements is supported (bit 2). Timestamp for Spot-Check measurements is supported (bit 3).
			ii.	Field: Measurement Status Support
				This field is not included
			iii.	Field: Device and Sensor Status Support
				This field is not included
	b.	PL>	( Spo	ot-Check Measurement (0x2A5E)
			i.	Field: Flags
				Format: 8 bit
				<ul> <li>Value: 0000 0001 (MSB → LSB). Timestamp field is present. Measurement Status, Device and Sensor Status, and Pulse Amplitude Index fields are not present. Device Clock is set.</li> </ul>
			ii.	Field: SpO2PR-Spot-Check - SpO2 (%)
				Format: SFLOAT
				Value: Not Relevant
			iii.	Field: SpO2PR-Spot-Check – PR (bpm)
				Format: SFLOAT
				Value: Not Relevant
			iv.	Field: Time Stamp
				Format: Date and Time
				Value: Not Relevant
			v.	Field: Measurement Status
				This field is not included
			vi.	Field: Device and Sensor Status
				This field is not included
			vii.	Field: Pulse Amplitude Index (%)
				This field is not included
	3.			G under test initiates a discovery process (Scanning state), it discovers the d PHD and it starts a pairing process with the simulated PHD (Initiating state).
	4.			e pairing has been completed (Connection state), force the PHG under test to PLX Features characteristic.
	5.	The	sim	ulated PHD sends the Measurement to the PHG under test.
	6.	Che	eck ir	PHG transcoder output the Pulse Rate Numeric Object – Type attribute
	7.	IF C	C_MA	N_BLE_042 = TRUE (PHG supports RACP) THEN
		a)	perf	PHG under test requests the Simulated PHD to report stored records by orming a writing operation in the Record Access Control Point (RACP) and the ulated PHD sends the temporarily stored spot-check measurement to PHG under
		b)	Che	eck in PHG transcoder output the SpO2 Numeric Object – Type attribute
Pass/Fail criteria				Pulse Rate Numeric Object – Type attribute is present and its value is SCADA, MDC_PULS_OXIM_PULS_RATE
	lf th	ne PH	IG si	upports RACP, the same criteria applies to Step 7.b

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: Pulse Rate Numeric Object	
	Attribute-id: MDC_ATTR_ID_TYPE (2351)	
	Attribute-type: SEQUENCE {partition (INT-U16), code (INT-U16)}	
	Attribute-value:	
	<ul> <li>partition: MDC_PART_SCADA or 2 (dec) or 00 02 (hex)</li> </ul>	
	code: MDC_PULS_OXIM_PULS_RATE or 18458 (dec) or 48 1A (hex)	
	b) WAN PCD-01 message	
	PCD-01 message includes a segment like this with Type attribute (check OBX-3):	
	OBX n NM  <b>149530^MDC_PULS_OXIM_PULS_RATE^MDC</b>  m.0.0.x [value]  264864^MDC_DIM_BEAT_PER_MIN^MDC     R   [current_date_time]	

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-026					
TP label		Whitepaper. Pulse Rate Numeric Object (Continuous Measurements) - Type Attribute					
Coverage	Spec	[Bluetooth PHDT v1.6]					
	Testable items	SpO2 Numeric 12; M					
Test purpose		Check that:					
		PHG includes Pulse Rate Numeric Object – Type attribute in transcoder output when using continuous measurements.					
		[AND]					
		Type is set to {MDC_PART_SCADA, MDC_PULS_OXIM_PULS_RATE}					
Applicabilit	ty	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040					
Other PICS							
Initial cond	ition	The PHG under test and the simulated PHD are in the Standby state.					
Test proce	dure	<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a continuous measurement (including fast and slow response measurement values) ready to be sent and it is in the Advertising state (it is discoverable).</li> </ol>					
		2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:					
		a. PLX Features (0x2A60)					
		i. Field: Supported Features					
		• Format: 16 bit					
		<ul> <li>Value: 0000 0000 0011 0000 (MSB → LSB). Fast and slow response modes are supported (bits 4 and 5).</li> </ul>					
		ii. Field: Measurement Status Support					
		This field is not included					
		iii. Field: Device and Sensor Status Support					
		This field is not included					
		b. PLX Continuous Measurement (0x2A5F)					
		i. Field: Flags					

	Format: 8 bit
	<ul> <li>Value: 0000 0011 (MSB → LSB). SpO2PR–Fast, SpO2PR-Slow fields are present. Measurement Status, Device and Sensor Status and Pulse Amplitude Index fields are not present.</li> </ul>
	ii. Field: SpO2PR-Normal - SpO2 (%)
	Format: SFLOAT
	Value: Not Relevant
	iii. Field: SpO2PR-Normal – PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	iv. Field: SpO2PR-Fast - SpO2 (%)
	Format: SFLOAT
	Value: Not Relevant
	v. Field: SpO2PR-Fast - PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	vi. Field: SpO2PR-Slow - SpO2 (%)
	Format: SFLOAT
	Value: Not Relevant
	vii. Field: SpO2PR-Slow - PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	viii. Field: Measurement Status
	This field is not included
	ix. Field: Device and Sensor Status
	This field is not included
	x. Field: Pulse Amplitude Index (%)
	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 PLX Features characteristic.
	5. The simulated PHD sends the Measurement to the PHG under test.
	<ol> <li>Check in PHG transcoder output the Pulse Rate Numeric Object – Type attribute in all three Pulse Rate objects (continuous normal, fast and slow).</li> </ol>
Pass/Fail criteria	In Step 6,
	There are three Pulse Rate objects (for normal, fast and slow measurement modes).
	<ul> <li>In all three objects, the Pulse Rate Numeric Object – Type attribute is present and its value is {MDC_PART_SCADA, MDC_PULS_OXIM_PULS_RATE}</li> </ul>
Notes	Possible values in typical points of observation after transcoder output are:
(To assist manual testing)	a) IEEE 11073 Objects and Attributes
	Type attribute is present in all three SpO2 objects:
	Object: Pulse Rate Numeric Object
	Attribute-id: MDC_ATTR_ID_TYPE (2351)

<ul> <li>Attribute-type: SEQUENCE {partition (INT-U16), code (INT-U16)}</li> <li>Attribute-value:</li> </ul>
partition: MDC_PART_SCADA or 2 (dec) or 00 02 (hex)
<ul> <li>code: MDC_PULS_OXIM_PULS_RATE or 18458 (dec) or 48 1A (hex)</li> <li>b) WAN PCD-01 message</li> </ul>
PCD-01 message includes three segments like this with Type attribute (check OBX-3):
OBX n NM  <b>149530^MDC_PULS_OXIM_PULS_RATE^MDC</b>  m.0.0.x [value]  264864^MDC_DIM_BEAT_PER_MIN^MDC     R   [current_date_time]

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-027
TP label		Whitepaper. Pulse Rate Numeric Object (Spot-Check Measurement) – Supplemental-Types Attribute
Coverage	Spec	[Bluetooth PHDT v1.6]
	Testable items	PR Numeric 3; M
Test purpose		Check that: PHG includes Pulse Rate Numeric Object – Supplemental-Types attribute in transcoder output when using spot-check measurement mode. [AND] Supplemental-Types attribute is set to {MDC_PART_SCADA, MDC_MODALITY_SPOT}.
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040
Other PICS		C_MAN_BLE_042
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 Pulse Oximeter Profile (device specialization), it has a spot-check measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also supports the RACP characteristic and has an identical spot-check measurement temporarily stored.
		2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:
		a. PLX Features (0x2A60)
		i. Field: Supported Features
		Format: 16 bit
		<ul> <li>Value: 0000 0000 0000 1100 (MSB → LSB). Measurement Storage for spot- check measurements is supported (bit 2). Timestamp for Spot-Check measurements is supported (bit 3).</li> </ul>
		ii. Field: Measurement Status Support
		This field is not included
		iii. Field: Device and Sensor Status Support
		This field is not included
		b. PLX Spot-Check Measurement (0x2A5E)
		i. Field: Flags
		Format: 8 bit
		<ul> <li>Value: 0000 0001 (MSB → LSB). Timestamp field is present. Measurement Status, Device and Sensor Status, and Pulse Amplitude Index fields are not</li> </ul>

	present. Device Clock is set.			
	ii. Field: SpO2PR-Spot-Check - SpO2 (%)			
	Format: SFLOAT			
	Value: Not Relevant			
	iii. Field: SpO2PR-Spot-Check – PR (bpm)			
	Format: SFLOAT			
	Value: Not Relevant			
	iv. Field: Time Stamp			
	Format: Date and Time			
	Value: Not Relevant			
	v. Field: Measurement Status			
	This field is not included			
	vi. Field: Device and Sensor Status			
	This field is not included			
	vii. Field: Pulse Amplitude Index (%)			
	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).			
	<ol> <li>When the pairing has been completed (Connection state), force the PHG under test to read the PLX Features characteristic.</li> </ol>			
	5. The simulated PHD sends the Measurement to the PHG under test.			
	6. Check in PHG transcoder output the Pulse Rate Numeric Object – Supplemental-Types attribute			
	7. IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN			
	<ul> <li>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 spot-check measurement to PHG under test</li> </ul>			
	<ul> <li>b) Check in PHG transcoder output the Pulse Rate Numeric Object – Supplemental- Types attribute</li> </ul>			
Pass/Fail criteria	In Step 6, the Pulse Rate Numeric Object – Supplemental-Types attribute is present and its value is {MDC_PART_SCADA, MDC_MODALITY_SPOT}.			
	If the PHG supports RACP, the same criteria applies to Step 7.b.			
Notes	Possible values in typical points of observation after transcoder output are:			
(To assist manual	a) IEEE 11073 Objects and Attributes			
testing)	Supplemental-Types attribute is present:			
	<ul> <li>Object: Pulse Rate Numeric Object (Spot-Check measurement)</li> </ul>			
	Attribute-id: MDC_ATTR_SUPPLEMENTAL_TYPES (2657)			
	Attribute-type: SEQUENCE of SEQUENCE {partition (INT-U16), code (INT-U16)}			
	Attribute-value: {MDC_PART_SCADA, MDC_MODALITY_SPOT}.			
	b) WAN PCD-01 message			
	PCD-01 message includes a facet OBX segment of the SpO2 measurement OBX segment with Supplemental-Types attribute (check OBX-3 and OBX-5):			
	OBX n NM 149530^MDC_PULS_OXIM_PULS_RATE^MDC m.0.0.x [value]  264864^MDC_DIM_BEAT_PER_MIN^MDC     R   [current_date_time]			
	OBX n CWE 68193^MDC_ATTR_SUPPLEMENTAL_TYPES^MDC m.0.0.x.y  150580^MDC_MODALITY_SPOT^MDC      R			

TP Id TP label		TP/LP-	PAN/PHG/PHDT	W/PLX/BV-028	
		Whitepaper. Pulse Rate Numeric Object (Continuous Measurements) – Supplemental-Types Attribute			
Coverage	Spec	[Bluetooth PHDT v1.6]			
	Testable items	PR Nur	meric 13; M	PR Numeric 14; M	PR Numeric 15; M
Test purpose		transco [AND] PHG in for the is set to [AND]	bes not include P der output for the cludes Pulse Rat Pulse Rate contir o {MDC_PART_S	nuous measurement object (fas SCADA, MDC_MODALITY_FAS	ntal-Types attribute in transcoder outpu t mode). Supplemental-Types attribute
		is set to	> {MDC_PART_S	SCADA, MDC_MODALITY_SLC	
Applicabili	ty	C_MAN	LBLE_000 AND	C_MAN_BLE_002 AND C_MA	N_BLE_040
Other PICS	;				
Initial condition		The PH	IG under test and	the simulated PHD are in the s	Standby state.
Test procedure		ha	s a continuous m		neter Profile (device specialization), it slow response measurement values) i is discoverable).
			e simulated PHD erest for this Test		racteristics. The characteristics of
		a.	PLX Features (	(0x2A60)	
			i. Field: Sup	ported Features	
			Forma	at: 16 bit	
				: 0000 0000 00 <b>11</b> 0000 (MSB <del>-</del> ipported (bits 4 and 5).	→ LSB). Fast and slow response modes
			ii. Field: Mea	surement Status Support	
			This fi	eld is not included	
			iii. Field: Devi	ice and Sensor Status Support	
			This fi	eld is not included	
		b.	PLX Continuou	is Measurement (0x2A5F)	
			i. Field: Flag	S	
			Forma	at: 8 bit	
			preser	: 0000 00 <b>11</b> (MSB → LSB). Sp( nt. Measurement Status, Device tude Index fields are not presen	
			ii. Field: SpO	2PR-Normal - SpO2 (%)	
			• Forma	at: SFLOAT	
			Value:	: Not Relevant	

	Format: SFLOAT
	Value: Not Relevant
	iv. Field: SpO2PR-Fast - SpO2 (%)
	Format: SFLOAT
	Value: Not Relevant
	v. Field: SpO2PR-Fast - PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	vi. Field: SpO2PR-Slow - SpO2 (%)
	Format: SFLOAT
	Value: Not Relevant
	vii. Field: SpO2PR-Slow - PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	viii. Field: Measurement Status
	This field is not included
	ix. Field: Device and Sensor Status
	This field is not included
	x. Field: Pulse Amplitude Index (%)
	This field is not included
	<ol> <li>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).</li> </ol>
	4. When the pairing has been completed (Connection state), force the PHG under test to read the PLX Features characteristic.
	5. The simulated PHD sends the Measurement to the PHG under test.
	<ol> <li>Check in the PHG transcoder output the Pulse Rate Numeric Object – Supplemental- Types attribute in all three Pulse Rate objects (continuous normal, fast and slow).</li> </ol>
Pass/Fail criteria	In Step 6,
	The Pulse Rate Numeric Object (normal) – Supplemental-Types attribute is not present
	<ul> <li>The Pulse Rate Numeric Object (fast response) Supplemental-Types attribute is present and its value is {MDC_PART_SCADA, MDC_MODALITY_FAST}.</li> </ul>
	<ul> <li>The Pulse Rate Numeric Object (slow response) Supplemental-Types attribute is present and its value is {MDC_PART_SCADA, MDC_MODALITY_SLOW}.</li> </ul>
Notes	Possible values in typical points of observation after transcoder output are:
(To assist manual testing)	a) IEEE 11073 Objects and Attributes
coung)	Supplemental Types attribute is not present for Pulse Rate Numeric Object (normal).
	Supplemental-Types attribute is present for Pulse Rate Numeric Object (fast response):
	Object: Pulse Rate Numeric Object (fast response)
	Attribute-id: MDC_ATTR_SUPPLEMENTAL_TYPES (2657)
	Attribute-type: SEQUENCE of SEQUENCE {partition (INT-U16), code (INT-U16)}
	Attribute-value: {MDC_PART_SCADA, MDC_MODALITY_FAST}.
	Supplemental-Types attribute is present for Pulse Rate Numeric Object (slow response):
	Object: Pulse Rate Numeric Object (slow response)
	Attribute-id: MDC_ATTR_SUPPLEMENTAL_TYPES (2657)

	Attribute-type: SEQUENCE of SEQUENCE {partition (INT-U16), code (INT-U16)}
	Attribute-value: {MDC_PART_SCADA, MDC_MODALITY_SLOW}.
b	WAN PCD-01 message
	For Pulse Rate Numeric Object (normal)
	PCD-01 message does not include segments with Supplemental-Types attribute.
	For Pulse Rate Numeric Object (fast)
	<ul> <li>PCD-01 message includes a facet OBX segment of the Pulse Rate measurement OBX segment with Supplemental-Types attribute (check OBX-3 and OBX-5):</li> </ul>
	OBX n NM 149530^MDC_PULS_OXIM_PULS_RATE^MDC m.0.0.x [value]  264864^MDC_DIM_BEAT_PER_MIN^MDC     R   [current_date_time]
	OBX n CWE 68193^MDC_ATTR_SUPPLEMENTAL_TYPES^MDC m.0.0.x.y  150580^MDC_MODALITY_FAST^MDC      R
	For Pulse Rate Numeric Object (slow)
	<ul> <li>PCD-01 message includes a facet OBX segment of the Pulse Rate measurement OBX segment with Supplemental-Types attribute (check OBX-3 and OBX-5):</li> </ul>
	OBX n NM 149530^MDC_PULS_OXIM_PULS_RATE^MDC m.0.0.x [value]  264864^MDC_DIM_BEAT_PER_MIN^MDC     R   [current_date_time]
	OBX n CWE 68193^MDC_ATTR_SUPPLEMENTAL_TYPES^MDC m.0.0.y.z  150580^MDC_MODALITY_SLOW^MDC      R

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-029			
TP label		Whitepaper. Pulse Rate Numeric Object (Spot-Check Measurement) - Metric-Spec-Small Attribute 1			
Coverage	Spec	[Bluetooth PHDT v1.6]			
	Testable items	PR Numeric 4; M	PR Numeric 6; M		
Test purpose		Check that:			
		PHG includes Pulse Rate Numeric Object – Metric-Spec-Small attribute in transcoder output when using spot-check measurement mode.			
		[AND]			
	Metric-Spec-Small is set to {0x5040} when the sensor device supports measureme				
Applicability	y	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040			
Other PICS		C_MAN_BLE_042			
Initial condi	tial condition The PHG under test and the simulated PHD are in the Standby state.				
Test procedure		has a spot-check m discoverable). The	is configured with a Pulse Oximeter Profile (device specialization), it easurement ready to be sent and it is in the Advertising state (it is simulated PHD also supports the RACP characteristic and has an measurement temporarily stored.		
		2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:			
		a. PLX Spot-Check Measurement (0x2A5E)			
		b. PLX Feature (0x2A60)			
		i. Field: Supported Features			
		Forma	at: 16 bit		
		Value	: 0000 0000 0000 1100 (MSB $\rightarrow$ LSB). Measurement Storage for spot-		

	check measurements is supported (bit 2). Timestamp for Spot-Check measurements is supported.
	ii. Field: Measurement Status Support
	This field is not included
	iii. Field: Device and Sensor Status Support
	This field is not included
	<ol><li>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).</li></ol>
	4. When the pairing has been completed (Connection state), force the PHG under test to read the PLX Feature characteristic.
	5. The simulated PHD sends the Measurement to the PHG under test with the following value:
	a. PLX Spot-Check Measurement (0x2A5E)
	i. Field: Flags
	Format: 8 bit
	<ul> <li>Value: 0000 0001 (MSB → LSB). Timestamp field is present. Measurement Status, Device and Sensor Status, and Pulse Amplitude Index fields are not present. Device Clock is set.</li> </ul>
	ii. Field: SpO2PR-Spot-Check - SpO2 (%)
	Format: SFLOAT
	Value: Not Relevant
	iii. Field: SpO2PR-Spot-Check – PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	iv. Field: Time Stamp
	Format: Date and Time
	• Value: October 12nd, 2015, 10:39:27
	v. Field: Measurement Status
	This field is not included
	vi. Field: Device and Sensor Status
	This field is not included
	vii. Field: Pulse Amplitude Index (%)
	This field is not included
	<ol> <li>Check in the PHG transcoder output the Pulse Rate Numeric Object – Metric-Spec-Small attribute</li> </ol>
	7. IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	<ul> <li>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 spot-check measurement to PHG under test</li> </ul>
	<ul> <li>b) Check in PHG transcoder output the Pulse Rate Numeric Object – Metric-Spec-Small attribute</li> </ul>
Pass/Fail criteria	In Step 6, the Pulse Rate Numeric Object – Metric-Spec-Small attribute is present and its value is {0x5040} (mss-avail-stored-data  mss-msmt-aperiodic  mss-acc-agent-initiated).
	If the PHG supports RACP, the same criteria applies to Step 7.b.
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: Pulse Rate Numeric Object
	Attribute-id: MDC_ATTR_METRIC_SPEC_SMALL (2630)
	Attribute-type: BITS-16
	Attribute-value: 50 40 (hex) or BITS mss-avail-stored-data (1), 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/PLX	/BV-030		
TP label		Whitepaper. Pulse Rate Numeric Object (Spot-Check Measurement) - Metric-Spec-Small Attribute 2				
Coverage	Spec	[Bluetooth F	[Bluetooth PHDT v1.6]			
	Testable items	PR Numerio	c 4; M	PR Numeric 5; M		
Test purpos	e	Check that:				
		PHG includes Pulse Rate Numeric Object – Metric-Spec-Small attribute in transcoder output when using spot-check measurement mode.				
		[AND]				
		Metric-Spec storage.	c-Small is set to {0x <sup>2</sup>	1040} when the sensor device do	es not support measurement	
Applicability	/	C_MAN_BL	.E_000 AND C_MAI	N_BLE_002 AND C_MAN_BLE_	040	
Other PICS						
Initial condit	tion	The PHG u	nder test and the sir	nulated PHD are in the Standby	state.	
Test procedure			pot-check measure	igured with a Pulse Oximeter Pro ment ready to be sent and it is in		
			nulated PHD implen t for this Test Case a	nents several BTLE characteristic are:	cs. The characteristics of	
		a. PLX Spot-Check Measurement (0x2A5E)				
		b. PLX Features (0x2A60)				
		i.	Field: Supported I	Features		
			Format: 16 bi	t		
				0000 0000 0 <b>0</b> 00 (MSB $\rightarrow$ LSB). If rements is not supported (bit 2).	Measurement Storage for Spot-	
		ii.	Field: Measureme	ent Status Support		
			• This field is n	ot included		
		iii.	Field: Device and	Sensor Status Support		
			• This field is n	ot included		
				es a discovery process (Scanning s a pairing process with the simu		
			he pairing has beer e PLX Features cha	completed (Connection state), for a completed (Connection state),	orce the PHG under test to	
		5. The sir	nulated PHD sends	the Measurement to the PHG un	der test with the following	

	value:
	a. PLX Spot-Check Measurement (0x2A5E)
	i. Field: Flags
	Format: 8 bit
	<ul> <li>Value: 0000 0000 (MSB → LSB). Timestamp, Measurement Status, Device and Sensor Status, and Pulse Amplitude Index fields are not present. Device Clock is set.</li> </ul>
	ii. Field: SpO2PR-Spot-Check - SpO2 (%)
	Format: SFLOAT
	Value: Not Relevant
	iii. Field: SpO2PR-Spot-Check – PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	iv. Field: Time Stamp
	This field is not included
	v. Field: Measurement Status
	This field is not included
	vi. Field: Device and Sensor Status
	This field is not included
	vii. Field: Pulse Amplitude Index (%)
	This field is not included
	<ol> <li>Check in the PHG transcoder output the Pulse Rate Numeric Object – Metric-Spec-Small attribute</li> </ol>
Pass/Fail criteria	In Step 6, the Pulse Rate Numeric Object – Metric-Spec-Small attribute is present and its value is {0x1040} (mss-msmt-aperiodic   mss-acc-agent-initiated).
Notes	Possible values in typical points of observation after transcoder output are:
(To assist manual testing)	a) IEEE 11073 Objects and Attributes
lootingy	Metric-Spec-Small attribute is present:
	Object: Pulse Rate Numeric Object
	Attribute-id: MDC_ATTR_METRIC_SPEC_SMALL (2630)
	Attribute-type: BITS-16
	Attribute-value: 10 40 (hex) or BITS 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 ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-031		
TP label Whitepaper. Pulse Rate Numeric Object (Continuous Measurements) - Metric-Spec-S Attribute				
Coverage	Coverage Spec [Bluetooth PHDT v1.6]			
	Testable items	PR Numeric 16; M		
Test purpose		Check that:		
		PHG includes Pulse Rate Numeric Object – Metric-Spec-Small attribute in transcoder output		

	when using continuous measurements.			
	[AND]			
	Metric-Spec-Small is set to {0x0040} (mss-acc-agent-initiated)			
Applicability	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040			
Other PICS				
Initial condition	The PHG under test and the simulated PHD are in the Standby state.			
Test procedure	<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a continuous measurement (including fast and slow response measurement values) ready to be sent and it is in the Advertising state (it is discoverable).</li> </ol>			
	2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:			
	a. PLX Features (0x2A60)			
	i. Field: Supported Features			
	Format: 16 bit			
	<ul> <li>Value: 0000 0000 0011 0000 (MSB → LSB). Fast and slow response modes are supported (bits 4 and 5).</li> </ul>			
	ii. Field: Measurement Status Support			
	This field is not included			
	iii. Field: Device and Sensor Status Support			
	This field is not included			
	b. PLX Continuous Measurement (0x2A5F)			
	i. Field: Flags			
	Format: 8 bit			
	<ul> <li>Value: 0000 0011 (MSB → LSB). SpO2PR–Fast, SpO2PR-Slow fields are present. Measurement Status, Device and Sensor Status and Pulse Amplitude Index fields are not present.</li> </ul>			
	ii. Field: SpO2PR-Normal - SpO2 (%)			
	Format: SFLOAT			
	Value: Not Relevant			
	iii. Field: SpO2PR-Normal – PR (bpm)			
	Format: SFLOAT			
	Value: Not Relevant			
	iv. Field: SpO2PR-Fast - SpO2 (%)			
	Format: SFLOAT			
	Value: Not Relevant			
	v. Field: SpO2PR-Fast - PR (bpm)			
	Format: SFLOAT			
	Value: Not Relevant			
	vi. Field: SpO2PR-Slow - SpO2 (%)			
	Format: SFLOAT			
	Value: Not Relevant			
	vii. Field: SpO2PR-Slow - PR (bpm)			
	Format: SFLOAT			
	Value: Not Relevant			

	viii. Field: Measurement Status
	This field is not included
	ix. Field: Device and Sensor Status
	This field is not included
	x. Field: Pulse Amplitude Index (%)
	This field is not included
	<ol> <li>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).</li> </ol>
	4. When the pairing has been completed (Connection state), force the PHG under test to read the PLX Features characteristic.
	5. The simulated PHD sends the Measurement to the PHG under test.
	<ol> <li>Check in PHG transcoder output the Pulse Rate Numeric Object – Metric-Spec-Small attribute in all three Pulse Rate objects (continuous normal, fast and slow).</li> </ol>
Pass/Fail criteria	In Step 6,
	• There are three Pulse Rate objects (for normal, fast and slow measurement modes).
	<ul> <li>In all three objects, the Pulse Rate Numeric Object – Metric-Spec-Small attribute is present and its value is {0x0040} (mss-acc-agent-initiated).</li> </ul>
Notes	Possible values in typical points of observation after transcoder output are:
(To assist manual testing)	a) IEEE 11073 Objects and Attributes
tootingy	Metric-Spec-Small attribute is present in all three SpO2 objects:
	Object: Pulse Rate Numeric Object
	Attribute-id: MDC_ATTR_METRIC_SPEC_SMALL (2630)
	Attribute-type: BITS-16
	Attribute-value: 00 40 (hex) or BITS 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 ld		TP/LP-PAN/PHG/PHDTW/PLX	(/BV-032	
TP label		Whitepaper. Pulse Rate Numeric Object (Spot-Check Measurement) – Measurement-Status Attribute		
Coverage Spec		[Bluetooth PHDT v1.6]		
	Testable items	PR Numeric 7; M		
Test purpose		Check that: PHG includes Pulse Rate Num when using spot-check measu	neric Object – Measurement-Statu rement mode.	s attribute in transcoder output
		[AND] PHG transcodes the Bluetooth to 11073 Measurement-Status	Measurement Status field of the attribute properly	PLX Spot-Check characteristic
Applicability		C_MAN_BLE_000 AND C_MA	N_BLE_002 AND C_MAN_BLE_	040
Other PICS		C_MAN_BLE_042		
Initial condition		The PHG under test and the si	mulated PHD are in the Standby	state.

Test procedure	1.	has disc	s a sp covei	ulated PHD is configured with a Pulse Oximeter Profile (device specialization), it ot-check measurement ready to be sent and it is in the Advertising state (it is able). The simulated PHD also supports the RACP characteristic and has an spot-check measurement temporarily stored.
	2.			ulated PHD implements several BTLE characteristics. The characteristics of for this Test Case are:
		a.	PL)	(Spot-Check Measurement (0x2A5E)
		b.	PL>	(Features (0x2A60)
			i.	Field: Supported Features
				Format: 16 bit
				• Value: 0000 0000 0000 1101 (MSB → LSB). Measurement Status support is present (bit 0). Measurement Storage for spot-check measurements is supported (bit 2). Timestamp for Spot-Check measurements is supported (bit 3).
			ii.	Field: Measurement Status Support
				Format: 16 bit
				• Value: 1111 1111 1110 0000 (MSB $\rightarrow$ LSB). All Measurement Status bits are supported
			iii.	Field: Device and Sensor Status Support
				This field is not included
	3.			G under test initiates a discovery process (Scanning state), it discovers the dPHD and it starts a pairing process with the simulated PHD (Initiating state).
	4.			e pairing has been completed (Connection state), force the PHG under test to PLX Feature characteristic.
	5.	The valu		ulated PHD sends the Measurement to the PHG under test with the following
		a.	PL>	(Spot-Check Measurement (0x2A5E)
			i.	Field: Flags
				Format: 8 bit
				• Value: 0000 0011 (MSB → LSB). Timestamp and Measurement Status fields are present. Device and Sensor Status, and Pulse Amplitude Index fields are not present. Device Clock is set.
			ii.	Field: SpO2PR-Spot-Check - SpO2 (%)
				Format: SFLOAT
				Value: Not Relevant
			iii.	Field: SpO2PR-Spot-Check – PR (bpm)
				Format: SFLOAT
				Value: Not Relevant
			iv.	Field: Time Stamp
				Format: SFLOAT
				Value: Not Relevant
			v.	Field: October 12nd, 2015, 10:39:27
				Format: 16 bit
				<ul> <li>Value: 1000 0000 0000 (MSB → LSB). Invalid measurement detected (bit 15).</li> </ul>
			vi.	Field: Device and Sensor Status
				This field is not included
			vii.	Field: Pulse Amplitude Index (%)

	This field is not included
6.	Check in PHG transcoder output the Pulse Rate Numeric Object – Measurement-Status
7.	attribute IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	<ul> <li>a) 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 spot-check measurement to PHG under test</li> </ul>
	<ul> <li>b) Check in PHG transcoder output the Pulse Rate Numeric Object – Measurement- Status attribute</li> </ul>
8.	Simulated PHD sends a Measurement to PHG under test with Measurement Status field set to 0100 0000 0000 (MSB $\rightarrow$ LSB), questionable measurement detected (bit 14). All remaining fields remain equal to those in step 5. Simulated PHD also deletes all stored records in RACP and stores an identical measurement.
9.	Check in PHG transcoder output the Pulse Rate Numeric Object – Measurement-Status attribute
10.	IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	a) 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 spot-check measurement to PHG under test
	<ul> <li>b) Check in PHG transcoder output the Pulse Rate Numeric Object – Measurement- Status attribute</li> </ul>
11.	Simulated PHD sends a Measurement to PHG under test with Measurement Status field set to 0010 0000 0000 (MSB $\rightarrow$ LSB), measurement not available (bit 13). All remaining fields remain equal to those in step 5. Simulated PHD also deletes all stored records in RACP and stores an identical measurement.
12.	Check in PHG transcoder output the Pulse Rate Numeric Object – Measurement-Status attribute
13.	IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	a) 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 spot-check measurement to PHG under test
	b) Check in PHG transcoder output the Pulse Rate Numeric Object – Measurement- Status attribute
14.	Simulated PHD sends a Measurement to PHG under test with Measurement Status field set to 0001 0000 0000 (MSB $\rightarrow$ LSB), calibration ongoing (bit 12). All remaining fields remain equal to those in step 5. Simulated PHD also deletes all stored records in RACP and stores an identical measurement.
15.	Check in PHG transcoder output the Pulse Rate Numeric Object – Measurement-Status attribute
16.	IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	<ul> <li>a) 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 spot-check measurement to PHG unde test</li> </ul>
	b) Check in PHG transcoder output the Pulse Rate Numeric Object – Measurement- Status attribute
17.	Simulated PHD sends a Measurement to PHG under test with Measurement Status field set to 0000 1000 0000 (MSB $\rightarrow$ LSB), data for testing (bit 11). All remaining fields remain equal to those in step 5. Simulated PHD also deletes all stored records in RACP and stores an identical measurement.
4.0	Check in PHG transcoder output the Pulse Rate Numeric Object – Measurement-Status
18.	attribute

	a) 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 spot-check measurement to PHG under test
	<ul> <li>b) Check in PHG transcoder output the Pulse Rate Numeric Object – Measurement- Status attribute</li> </ul>
20.	Simulated PHD sends a Measurement to PHG under test with Measurement Status field set to 0000 0100 0000 (MSB $\rightarrow$ LSB), data for demonstration (bit 10). All remaining fields remain equal to those in step 5. Simulated PHD also deletes all stored records in RACP and stores an identical measurement.
21.	Check in PHG transcoder output the Pulse Rate Numeric Object – Measurement-Status attribute
22.	IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	a) 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 spot-check measurement to PHG under test
	<ul> <li>b) Check in PHG transcoder output the Pulse Rate Numeric Object – Measurement- Status attribute</li> </ul>
23.	Simulated PHD sends a Measurement to PHG under test with Measurement Status field set to 0000 0000 1000 0000 (MSB $\rightarrow$ LSB), fully qualified data (bit 7). All remaining fields remain equal to those in step 5. Simulated PHD also deletes all stored records in RACP and stores an identical measurement.
24.	Check in PHG transcoder output the Pulse Rate Numeric Object – Measurement-Status attribute
25.	IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	a) 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 spot-check measurement to PHG under test
	<ul> <li>b) Check in PHG transcoder output the Pulse Rate Numeric Object – Measurement- Status attribute</li> </ul>
26.	Simulated PHD sends a Measurement to PHG under test with Measurement Status field set to 0000 0000 0100 0000 (MSB $\rightarrow$ LSB), early estimated data (bit 6). All remaining fields remain equal to those in step 5. Simulated PHD also deletes all stored records in RACP and stores an identical measurement.
27.	Check in PHG transcoder output the Pulse Rate Numeric Object – Measurement-Status attribute
28.	IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	<ul> <li>a) 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 spot-check measurement to PHG under test</li> </ul>
	<ul> <li>b) Check in PHG transcoder output the Pulse Rate Numeric Object – Measurement- Status attribute</li> </ul>
29.	Simulated PHD sends a Measurement to PHG under test with Measurement Status field set to 0000 0000 0010 0000 (MSB $\rightarrow$ LSB), measurement ongoing (bit 5). All remaining fields remain equal to those in step 5. Simulated PHD also deletes all stored records in RACP and stores an identical measurement.
30.	Check in PHG transcoder output the Pulse Rate Numeric Object – Measurement-Status attribute
31.	IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	a) 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 spot-check measurement to PHG under test
	b) Check in PHG transcoder output the Pulse Rate Numeric Object – Measurement-

	Status attribute
Pass/Fail criteria	In Step 6, the Pulse Rate Numeric Object – Measurement-Status attribute is present and its se to "invalid" (0x8000). If PHG supports RACP, same criteria applies to 7.b.
	In Step 9, the Pulse Rate Numeric Object – Measurement-Status attribute is present and its se to "questionable" (0x4000). If PHG supports RACP, same criteria applies to 10.b.
	In Step 12, the Pulse Rate Numeric Object – Measurement-Status attribute is present and its set to "not-available" (0x2000). If PHG supports RACP, same criteria applies to 13.b.
	In Step 15, the Pulse Rate Numeric Object – Measurement-Status attribute is present and its set to "calibration-ongoing" (0x1000). If PHG supports RACP, same criteria applies to 16.b.
	In Step 18, the Pulse Rate Numeric Object – Measurement-Status attribute is present and its set to "test-data" (0x0800). If PHG supports RACP, same criteria applies to 19.b.
	In Step 21, the Pulse Rate Numeric Object – Measurement-Status attribute is present and its set to "demo-data" (0x0400). If PHG supports RACP, same criteria applies to 22.b.
	In Step 24, the Pulse Rate Numeric Object – Measurement-Status attribute is present and its set to "validated-data" (0x0080). If PHG supports RACP, same criteria applies to 25.b.
	In Step 27, the Pulse Rate Numeric Object – Measurement-Status attribute is present and its set to "early-indication" (0x0040). If PHG supports RACP, same criteria applies to 28.b.
	In Step 30, the Pulse Rate Numeric Object – Measurement-Status attribute is present and its set to "msmt-ongoing" (0x0020). If PHG supports RACP, same criteria applies to 31.b.
Notes To assist manual	In step 6 (and step 7.b if applicable), possible values in typical points of observation after transcoder output are:
esting)	a) IEEE 11073 Objects and Attributes
	Measurement-Status attribute is present:
	Object: Pulse Rate Numeric Object
	Attribute-id: MDC_ATTR_MSMT_STAT (2375)
	Attribute-type: BITS16
	Attribute-value: <b>80 00</b> (hex)
	b) WAN PCD-01 message
	PCD-01 message includes a segment like this with Measurement-Status attribute value (check OBX-8 and OBX-11):
	OBX n NM 149530^MDC_PULS_OXIM_PULS_RATE^MDC m.0.0.x [value]  264864^MDC_DIM_BEAT_PER_MIN^MDC   <b>INV</b>     <b>X</b>    [current_date_time]
	In step 9 (and step 10.b if applicable), possible values in typical points of observation after transcoder output are:
	a) IEEE 11073 Objects and Attributes
	Measurement-Status attribute is present:
	Object: Pulse Rate Numeric Object
	Attribute-id: MDC_ATTR_MSMT_STAT (2375)
	Attribute-type: BITS16
	Attribute-value: 40 00 (hex)
	b) WAN PCD-01 message
	PCD-01 message includes a segment like this with Measurement-Status attribute value (check OBX-8 and OBX-11):
	OBX n NM 149530^MDC_PULS_OXIM_PULS_RATE^MDC m.0.0.x[[value]] 264864^MDC_DIM_BEAT_PER_MIN^MDC   <b>QUES</b>     <b>R</b>   [current_date_time]
	In step 12 (and step 13.b if applicable), possible values in typical points of observation after transcoder output are:
	a) IEEE 11073 Objects and Attributes
	Measurement-Status attribute is present:

		Object: Pulse Rate Numeric Object
		Attribute-id: MDC_ATTR_MSMT_STAT (2375)
		Attribute-type: BITS16
		Attribute-value: 20 00 (hex)
1	b)	WAN PCD-01 message
		PCD-01 message includes a segment like this with Measurement-Status attribute value (check OBX-8 and OBX-11):
		OBX n NM 149530^MDC_PULS_OXIM_PULS_RATE^MDC m.0.0.x [value]  264864^MDC_DIM_BEAT_PER_MIN^MDC   <b>NAV</b>     <b>X</b>    [current_date_time]
		ep 15 (and step 16.b if applicable), possible values in typical points of observation after scoder output are:
	a)	IEEE 11073 Objects and Attributes
		Measurement-Status attribute is present:
		Object: Pulse Rate Numeric Object
		Attribute-id: MDC_ATTR_MSMT_STAT (2375)
		Attribute-type: BITS16
		Attribute-value: <b>10 00</b> (hex)
	b)	WAN PCD-01 message
	,	PCD-01 message includes a segment like this with Measurement-Status attribute value (check OBX-8 and OBX-11):
		OBX n NM 149530^MDC_PULS_OXIM_PULS_RATE^MDC m.0.0.x [value]  264864^MDC_DIM_BEAT_PER_MIN^MDC   <b>CAL</b>     <b>R</b>    [current_date_time]
		ep 18 (and step 19.b if applicable), possible values in typical points of observation after scoder output are:
		IEEE 11073 Objects and Attributes
		Measurement-Status attribute is present:
		Object: Pulse Rate Numeric Object
		Attribute-id: MDC_ATTR_MSMT_STAT (2375)
		Attribute-type: BITS16
		Attribute-value: 08 00 (hex)
	b)	WAN PCD-01 message
	,	PCD-01 message includes a segment like this with Measurement-Status attribute value (check OBX-8 and OBX-11):
		OBX n NM 149530^MDC_PULS_OXIM_PULS_RATE^MDC m.0.0.x [value]  264864^MDC_DIM_BEAT_PER_MIN^MDC   <b>TEST</b>     <b>R</b>    [current_date_time]
		ep 21 (and step 22.b if applicable), possible values in typical points of observation after scoder output are:
4	a)	IEEE 11073 Objects and Attributes
		Measurement-Status attribute is present:
		Object: Pulse Rate Numeric Object
		Attribute-id: MDC_ATTR_MSMT_STAT (2375)
		Attribute-type: BITS16
		Attribute-value: 04 00 (hex)
	b)	WAN PCD-01 message
		PCD-01 message includes a segment like this with Measurement-Status attribute value (check OBX-8 and OBX-11):
		OBX n NM 149530^MDC_PULS_OXIM_PULS_RATE^MDC m.0.0.x [value]  264864^MDC_DIM_BEAT_PER_MIN^MDC   <b>DEMO</b>     <b>R</b>    [current_date_time]

	step 24 (and step 25.b if applicable), possible values in typical points of observation after ascoder output are:
a)	IEEE 11073 Objects and Attributes
	Measurement-Status attribute is present:
	Object: Pulse Rate Numeric Object
	Attribute-id: MDC_ATTR_MSMT_STAT (2375)
	Attribute-type: BITS16
	Attribute-value: 00 80 (hex)
b)	WAN PCD-01 message
	PCD-01 message includes a segment like this with Measurement-Status attribute value (check OBX-8 and OBX-11):
	OBX n NM 149530^MDC_PULS_OXIM_PULS_RATE^MDC m.0.0.x [value]  264864^MDC_DIM_BEAT_PER_MIN^MDC      <b>F</b>   [current_date_time]
	tep 27 (and step 28.b if applicable), possible values in typical points of observation after ascoder output are:
a)	IEEE 11073 Objects and Attributes
	Measurement-Status attribute is present:
	Object: Pulse Rate Numeric Object
	Attribute-id: MDC_ATTR_MSMT_STAT (2375)
	Attribute-type: BITS16
	Attribute-value: 00 40 (hex)
b)	WAN PCD-01 message
	PCD-01 message includes a segment like this with Measurement-Status attribute value (check OBX-8 and OBX-11):
	OBX n NM 149530^MDC_PULS_OXIM_PULS_RATE^MDC m.0.0.x [value]  264864^MDC_DIM_BEAT_PER_MIN^MDC   <b>EARLY  R</b>    [current_date_time]
	step 30 (and step 31.b if applicable), possible values in typical points of observation after scoder output are:
a)	IEEE 11073 Objects and Attributes
	Measurement-Status attribute is present:
	Object: Pulse Rate Numeric Object
	Attribute-id: MDC_ATTR_MSMT_STAT (2375)
	Attribute-type: BITS16
	Attribute-value: 00 20 (hex)
b)	WAN PCD-01 message
	PCD-01 message includes a segment like this with Measurement-Status attribute value (check OBX-8 and OBX-11):
	OBX n NM 149530^MDC_PULS_OXIM_PULS_RATE^MDC m.0.0.x [value]  264864^MDC_DIM_BEAT_PER_MIN^MDC   <b>BUSY</b>    <b>X</b>    [current_date_time]

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-033		
TP label		Whitepaper. Pulse Rate Numeric Object (Continuous Measurements) – Measurement-Status Attribute		
Coverage	Spec	[Bluetooth PHDT v1.6]		
	Testable items	PR Numeric 17; M		

Test purpose	Check that:		
	PHG includes Pulse Rate Numeric Object – Measurement-Status attribute in transcoder output		
	when using continuous measurements.		
	PHG transcodes the Bluetooth Measurement Status field of the PLX Continuous Measurement characteristic to 11073 Measurement-Status attribute properly		
Applicability	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040		
Other PICS			
Initial condition	The PHG under test and the simulated PHD are in the Standby state.		
Test procedure	<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a continuous measurement (including fast and slow response measurement values) ready to be sent and it is in the Advertising state (it is discoverable).</li> </ol>		
	2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:		
	a. PLX Continuous Measurement (0x2A5F)		
	b. PLX Features (0x2A60)		
	i. Field: Supported Features		
	Format: 16 bit		
	<ul> <li>Value: 0000 0000 0011 0001 (MSB → LSB). Measurement Status support is present (bit 0). Fast and slow response modes are supported (bits 4 and 5).</li> </ul>		
	ii. Field: Measurement Status Support		
	Format: 16 bit		
	<ul> <li>Value: 1111 1111 1110 0000 (MSB → LSB). All Measurement Status bits are supported</li> </ul>		
	iii. Field: Device and Sensor Status Support		
	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 PLX Feature characteristic.		
	5. The simulated PHD sends the Measurement to the PHG under test with the following value:		
	a. PLX Continuous Measurement (0x2A5F)		
	i. Field: Flags		
	Format: 8 bit		
	<ul> <li>Value: 0000 0111 (MSB → LSB). Measurement Status, SpO2PR–Fast and SpO2PR-Slow fields are present. Device and Sensor Status and Pulse Amplitude Index fields are not present.</li> </ul>		
	ii. Field: SpO2PR-Normal - SpO2 (%)		
	Format: SFLOAT		
	Value: Not Relevant		
	iii. Field: SpO2PR-Normal - PR (bpm)		
	Format: SFLOAT		
	Value: Not Relevant		
	iv. Field: SpO2PR-Fast - SpO2 (%)		
	Format: SFLOAT		

- Value: Not Relevant
- v. Field: SpO2PR-Fast PR (bpm)
  - Format: SFLOAT
  - Value: Not Relevant
- vi. Field: SpO2PR-Slow SpO2 (%)
  - Format: SFLOAT
  - Value: Not Relevant
- vii. Field: SpO2PR-Slow PR (bpm)
  - Format: SFLOAT
  - Value: Not Relevant
- viii. Field: Measurement Status
  - Format: 16 bit
  - Value: 1000 0000 0000 (MSB → LSB). Invalid measurement detected (bit 15).
- ix. Field: Device and Sensor Status
  - This field is not included
- x. Field: Pulse Amplitude Index (%)
  - This field is not included
- 6. Check in the PHG transcoder output the Pulse Rate Numeric Object Measurement-Status attribute in all three Pulse Rate objects.
- The simulated PHD sends a Measurement to the PHG under test with the Measurement Status field set to 0100 0000 0000 (MSB → LSB), questionable measurement detected (bit 14). All remaining fields remain equal to those in step 5.
- 8. Check in the PHG transcoder output the Pulse Rate Numeric Object Measurement-Status attribute in all three Pulse Rate objects.
- The simulated PHD sends a Measurement to PHG under test with Measurement Status field set to 0010 0000 0000 (MSB → LSB), measurement not available (bit 13). All remaining fields remain equal to those in step 5.
- 10. Check in the PHG transcoder output the Pulse Rate Numeric Object Measurement-Status attribute in all three Pulse Rate objects.
- 11. The simulated PHD sends a Measurement to PHG under test with Measurement Status field set to 0001 0000 0000 (MSB → LSB), calibration ongoing (bit 12). All remaining fields remain equal to those in step 5.
- 12. Check in the PHG transcoder output the Pulse Rate Numeric Object Measurement-Status attribute in all three Pulse Rate objects.
- The simulated PHD sends a Measurement to PHG under test with Measurement Status field set to 0000 1000 0000 (MSB → LSB), data for testing (bit 11). All remaining fields remain equal to those in step 5.
- 14. Check in the PHG transcoder output the Pulse Rate Numeric Object Measurement-Status attribute in all three Pulse Rate objects.
- 15. The simulated PHD sends a Measurement to PHG under test with Measurement Status field set to 0000 0100 0000 (MSB → LSB), data for demonstration (bit 10). All remaining fields remain equal to those in step 5.
- 16. Check in the PHG transcoder output the Pulse Rate Numeric Object Measurement-Status attribute in all three Pulse Rate objects.
- 17. The simulated PHD sends a Measurement to PHG under test with Measurement Status field set to 0000 0000 1000 0000 (MSB → LSB), fully qualified data (bit 7). All remaining fields remain equal to those in step 5.
- 18. Check in the PHG transcoder output the Pulse Rate Numeric Object Measurement-Status attribute in all three Pulse Rate objects.
- 19. The simulated PHD sends a Measurement to PHG under test with Measurement Status

	field set to 0000_0000 0100 0000 (MSB → LSB), early estimated data (bit 6). All remaining fields remain equal to those in step 5.
	<ol> <li>Check in the PHG transcoder output the Pulse Rate Numeric Object – Measurement- Status attribute in all three Pulse Rate objects.</li> </ol>
	21. The simulated PHD sends a Measurement to PHG under test with Measurement Status field set to 0000 0000 0010 0000 (MSB → LSB), measurement ongoing (bit 5). All remaining fields remain equal to those in step 5.
	<ol> <li>Check in the PHG transcoder output the Pulse Rate Numeric Object – Measurement- Status attribute in all three Pulse Rate objects.</li> </ol>
Pass/Fail criteria	In Step 6, the Pulse Rate Numeric Object – Measurement-Status attribute is present in all three Pulse Rate objects and its set to "invalid" (0x8000)
	In Step 8, the Pulse Rate Numeric Object – Measurement-Status attribute is present in all three Pulse Rate objects and its set to "questionable" (0x4000)
	In Step 10, the Pulse Rate Numeric Object – Measurement-Status attribute is present in all three Pulse Rate objects and its set to "not-available" (0x2000)
	In Step 12, the Pulse Rate Numeric Object – Measurement-Status attribute is present in all three Pulse Rate objects and its set to "calibration-ongoing" (0x1000)
	In Step 14, the Pulse Rate Numeric Object – Measurement-Status attribute is present in all three Pulse Rate objects and its set to "test-data" (0x0800)
	In Step 16, the Pulse Rate Numeric Object – Measurement-Status attribute is present in all three Pulse Rate objects and its set to "demo-data" (0x0400)
	In Step 18, the Pulse Rate Numeric Object – Measurement-Status attribute is present in all three Pulse Rate objects and its set to "validated-data" (0x0080)
	In Step 20, the Pulse Rate Numeric Object – Measurement-Status attribute is present in all three Pulse Rate objects and its set to "early-indication" (0x0040)
	In Step 22, the Pulse Rate Numeric Object – Measurement-Status attribute is present in all three Pulse Rate objects and its set to "msmt-ongoing" (0x0020)
Notes	In step 6, possible values in typical points of observation after transcoder output are:
(To assist manual	a) IEEE 11073 Objects and Attributes
testing)	Measurement-Status attribute is present in all three Pulse Rate objects:
	Object: Pulse Rate Numeric Object
	Attribute-id: MDC_ATTR_MSMT_STAT (2375)
	□ Attribute-type: BITS16
	Attribute-value: 80 00 (hex)
	b) WAN PCD-01 message
	PCD-01 message includes a segment like for each SpO2 object this with Measurement- Status attribute value (check OBX-8 and OBX-11):
	OBX n NM 149530^MDC_PULS_OXIM_PULS_RATE^MDC m.0.0.x [value]  264864^MDC_DIM_BEAT_PER_MIN^MDC   <b>INV</b>     <b>X</b>    [current_date_time]
	In step 8, possible values in typical points of observation after transcoder output are:
	a) IEEE 11073 Objects and Attributes
	<ul> <li>a) IEEE 11073 Objects and Attributes</li> <li>Measurement-Status attribute is present in all three Pulse Rate objects:</li> </ul>
	Measurement-Status attribute is present in all three Pulse Rate objects:
	Measurement-Status attribute is present in all three Pulse Rate objects: <ul> <li>Object: Pulse Rate Numeric Object</li> </ul>
	<ul> <li>Measurement-Status attribute is present in all three Pulse Rate objects:</li> <li>Object: Pulse Rate Numeric Object</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> </ul>
	<ul> <li>Measurement-Status attribute is present in all three Pulse Rate objects:</li> <li>Object: Pulse Rate Numeric Object</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-type: BITS16</li> <li>Attribute-value: 40 00 (hex)</li> </ul>
	<ul> <li>Measurement-Status attribute is present in all three Pulse Rate objects:</li> <li>Object: Pulse Rate Numeric Object</li> <li>Attribute-id: MDC_ATTR_MSMT_STAT (2375)</li> <li>Attribute-type: BITS16</li> <li>Attribute-value: 40 00 (hex)</li> </ul>

	264864^MDC_DIM_BEAT_PER_MIN^MDC   <b>QUES</b>     <b>R</b>   [current_date_time]
	step 10, possible values in typical points of observation after transcoder output are:
a)	IEEE 11073 Objects and Attributes
	Measurement-Status attribute is present in all three Pulse Rate objects:
	Object: Pulse Rate Numeric Object
	Attribute-id: MDC_ATTR_MSMT_STAT (2375)
	Attribute-type: BITS16
	Attribute-value: 20 00 (hex)
b)	WAN PCD-01 message
	PCD-01 message includes a segment like this for each SpO2 object with Measurement- Status attribute value (check OBX-8 and OBX-11):
	OBX n NM 149530^MDC_PULS_OXIM_PULS_RATE^MDC m.0.0.x [value]  264864^MDC_DIM_BEAT_PER_MIN^MDC   <b>NAV</b>     <b>X</b>    [current_date_time]
In s	step 12, possible values in typical points of observation after transcoder output are:
a)	IEEE 11073 Objects and Attributes
	Measurement-Status attribute is present in all three Pulse Rate objects:
	Object: Pulse Rate Numeric Object
	Attribute-id: MDC_ATTR_MSMT_STAT (2375)
	Attribute-type: BITS16
	Attribute-value: <b>10 00</b> (hex)
b)	WAN PCD-01 message
	PCD-01 message includes a segment like this for each SpO2 object with Measurement- Status attribute value (check OBX-8 and OBX-11):
	OBX n NM 149530^MDC_PULS_OXIM_PULS_RATE^MDC m.0.0.x [value]  264864^MDC_DIM_BEAT_PER_MIN^MDC   <b>CAL</b>     <b>R</b>    [current_date_time]
In s	step 14, possible values in typical points of observation after transcoder output are:
a)	IEEE 11073 Objects and Attributes
	Measurement-Status attribute is present in all three Pulse Rate objects:
	Object: Pulse Rate Numeric Object
	Attribute-id: MDC_ATTR_MSMT_STAT (2375)
	Attribute-type: BITS16
	Attribute-value: 08 00 (hex)
b)	WAN PCD-01 message
	PCD-01 message includes a segment like this for each SpO2 object with Measurement- Status attribute value (check OBX-8 and OBX-11):
	OBX n NM 149530^MDC_PULS_OXIM_PULS_RATE^MDC m.0.0.x [value]  264864^MDC_DIM_BEAT_PER_MIN^MDC   <b>TEST</b>     <b>R</b>    [current_date_time]
Ins	step 16, possible values in typical points of observation after transcoder output are:
a)	IEEE 11073 Objects and Attributes
	Measurement-Status attribute is present in all three Pulse Rate objects:
	Object: Pulse Rate Numeric Object
	Attribute-id: MDC_ATTR_MSMT_STAT (2375)
	Attribute-type: BITS16
	Attribute-value: 04 00 (hex)
b)	WAN PCD-01 message
,	PCD-01 message includes a segment like this for each SpO2 object with Measurement- Status attribute value (check OBX-8 and OBX-11):

	OBX n NM 149530^MDC_PULS_OXIM_PULS_RATE^MDC m.0.0.x [value]  264864^MDC_DIM_BEAT_PER_MIN^MDC   <b>DEMO</b>     <b>R</b>    [current_date_time]			
In step 18, possible values in typical points of observation after transcoder output are:				
a) IEEE 11073 Objects and Attributes				
Me	asurement-Status attribute is present in all three Pulse Rate objects:			
	Object: Pulse Rate Numeric Object			
	Attribute-id: MDC_ATTR_MSMT_STAT (2375)			
	Attribute-type: BITS16			
	Attribute-value: 00 80 (hex)			
b) WA	N PCD-01 message			
	D-01 message includes a segment like this for each SpO2 object with Measurement- tus attribute value (check OBX-8 and OBX-11):			
	OBX n NM 149530^MDC_PULS_OXIM_PULS_RATE^MDC m.0.0.x [value]  264864^MDC_DIM_BEAT_PER_MIN^MDC      <b>F</b>    [current_date_time]			
In step 2	20, possible values in typical points of observation after transcoder output are:			
a) IEE	E 11073 Objects and Attributes			
Me	asurement-Status attribute is present in all three Pulse Rate objects:			
	Object: Pulse Rate Numeric Object			
	Attribute-id: MDC_ATTR_MSMT_STAT (2375)			
	Attribute-type: BITS16			
	Attribute-value: 00 40 (hex)			
b) WA	N PCD-01 message			
	D-01 message includes a segment like this for each SpO2 object with Measurement- tus attribute value (check OBX-8 and OBX-11):			
	OBX n NM 149530^MDC_PULS_OXIM_PULS_RATE^MDC m.0.0.x [value]  264864^MDC_DIM_BEAT_PER_MIN^MDC   <b>EARLY</b>    <b>R</b>    [current_date_time]			
In step 2	22, possible values in typical points of observation after transcoder output are:			
a) IEE	E 11073 Objects and Attributes			
Me	asurement-Status attribute is present in all three Pulse Rate objects:			
	Object: Pulse Rate Numeric Object			
	Attribute-id: MDC_ATTR_MSMT_STAT (2375)			
	Attribute-type: BITS16			
	Attribute-value: 00 20 (hex)			
b) WA	N PCD-01 message			
	D-01 message includes a segment like this for each SpO2 object with Measurement- tus attribute value (check OBX-8 and OBX-11):			
	OBX n NM 149530^MDC_PULS_OXIM_PULS_RATE^MDC m.0.0.x [value]  264864^MDC_DIM_BEAT_PER_MIN^MDC   <b>BUSY  X</b>    [current_date_time]			

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-034		
TP label		Whitepaper. Pulse Rate Numeric Object (Spot-Check Measurement) – Unit-Code Attribute		
Coverage Spec		[Bluetooth PHDT v1.6]		
Testable items		PR Numeric 8; M		
Test purpose		Check that:		

		PHG includes Pulse Rate Numeric Object –Unit-Code attribute in transcoder output when using spot-check measurement mode.		
			эск п	neasurement mode.
	[AN	-	do io	
	Unit-Code is set to MDC_DIM_BEAT_PER_MIN			
Applicability	C_	MAN	_BLE	E_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040
Other PICS	C_MAN_BLE_042			
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 Pulse Oximeter Profile (device specialization), it has a spot-check measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also supports the RACP characteristic and has an identical spot-check measurement temporarily stored.			
	2.			ulated PHD implements several BTLE characteristics. The characteristics of for this Test Case are:
		a.	PL)	K Features (0x2A60)
			i.	Field: Supported Features
				Format: 16 bit
				• Value: 0000 0000 0000 1100 (MSB → LSB). Measurement Storage for spot- check measurements is supported (bit 2). Timestamp for Spot-Check measurements is supported (bit 3).
			ii.	Field: Measurement Status Support
				This field is not included
			iii.	Field: Device and Sensor Status Support
				This field is not included
	b. PLX Spot-Check Measurement (0x2A5E)		ot-Check Measurement (0x2A5E)	
			i.	Field: Flags
				Format: 8 bit
				• Value: 0000 0001 (MSB → LSB). Timestamp field is present. Measurement Status, Device and Sensor Status, and Pulse Amplitude Index fields are not present. Device Clock is set.
			ii.	Field: SpO2PR-Spot-Check - SpO2 (%)
				Format: SFLOAT
				Value: Not Relevant
			iii.	Field: SpO2PR-Spot-Check – PR (bpm)
				Format: SFLOAT
				Value: Not Relevant
			iv.	Field: Time Stamp
				Format: Date and Time
				Value: Not Relevant
			v.	Field: Measurement Status
				This field is not included
			vi.	Field: Device and Sensor Status
				This field is not included
			vii.	Field: Pulse Amplitude Index (%)
				This field is not included
	3.	The	PH	G 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 PLX Features characteristic.		
	5. The simulated PHD sends the Measurement to the PHG under test.		
	6. Check in PHG transcoder output the Pulse Rate Numeric Object – Unit-Code attribute		
	7. IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN		
	<ul> <li>a) 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 spot-check measurement to PHG under test</li> </ul>		
	b) Check in PHG transcoder output the Pulse Rate Numeric Object – Unit-Code attribute		
Pass/Fail criteria	In Step 6, the Pulse Rate Numeric Object – Unit-Code attribute is present and its set to MDC_DIM_BEAT_PER_MIN. If the PHG supports RACP, the same criteria applies to Step 7.b.		
Notes (To assist manual	Possible values in typical points of observation after transcoder output are:		
testing)	a) IEEE 11073 Objects and Attributes		
	Unit-Code attribute is present:		
	Object: Pulse Rate Numeric Object		
	Attribute-id: MDC_ATTR_UNIT_CODE (2454)		
	Attribute-type: INT-U16		
	Attribute-value: MDC_DIM_BEAT_PER_MIN or 2720 (dec) or 0A 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 149530^MDC_PULS_OXIM_PULS_RATE^MDC m.0.0.x [value]  264864^MDC_DIM_BEAT_PER_MIN^MDC    R   [current_date_time]		

TP Id TP label		TP/LP-PAN/PHG/PHDTW/PLX/BV-035         Whitepaper. Pulse Rate Numeric Object (Continuous Measurements) – Unit-Code Attribute			
PR Numeric 18; M					
Test purpo	se	Check that:			
		PHG includes Pulse Rate Numeric Object – Unit-Code attribute in transcoder output when using continuous measurements.			
		[AND]			
		Unit-Code is set to MDC_DIM_BEAT_PER_MIN			
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040			
Other PICS	5				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.			
Test procedure		<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a continuous measurement (including fast and slow response measurement values) ready to be sent and it is in the Advertising state (it is discoverable).</li> </ol>			
		2. The simulated PHD implements several BTLE characteristics. The characteristics of			

	int	erest	for this Test Case are:
	a.	PLX	K Features (0x2A60)
		i.	Field: Supported Features
			Format: 16 bit
			<ul> <li>Value: 0000 0000 0011 0000 (MSB → LSB). Fast and slow response modes are supported (bits 4 and 5).</li> </ul>
		ii.	Field: Measurement Status Support
			This field is not included
		iii.	Field: Device and Sensor Status Support
			This field is not included
	b.	PL>	Continuous Measurement (0x2A5F)
		i.	Field: Flags
			Format: 8 bit
			<ul> <li>Value: 0000 0011(MSB → LSB). SpO2PR–Fast, SpO2PR-Slow fields are present. Measurement Status, Device and Sensor Status and Pulse Amplitude Index fields are not present.</li> </ul>
		ii.	Field: SpO2PR-Normal - SpO2 (%)
			Format: SFLOAT
			Value: Not Relevant
		iii.	Field: SpO2PR-Normal – PR (bpm)
			Format: SFLOAT
			Value: Not Relevant
		iv.	Field: SpO2PR-Fast - SpO2 (%)
			Format: SFLOAT
			Value: Not Relevant
		٧.	Field: SpO2PR-Fast - PR (bpm)
			Format: SFLOAT
			Value: Not Relevant
		vi.	Field: SpO2PR-Slow - SpO2 (%)
			Format: SFLOAT
			Value: Not Relevant
		vii.	Field: SpO2PR-Slow - PR (bpm)
			Format: SFLOAT
			Value: Not Relevant
		viii.	Field: Measurement Status
			This field is not included
		ix.	Field: Device and Sensor Status
			This field is not included
		x.	Field: Pulse Amplitude Index (%)
			This field is not included
3			G under test initiates a discovery process (Scanning state), it discovers the ed PHD and it starts a pairing process with the simulated PHD (Initiating state).
4			e pairing has been completed (Connection state), force the PHG under test to PLX Features characteristic.

5. The simulated PHD sends the Measurement to the PHG under test.

	<ol> <li>Check in PHG transcoder output the Pulse Rate Numeric Object – Unit-Code attribute in all three Pulse Rate objects (continuous normal, fast and slow).</li> </ol>		
Pass/Fail criteria	In Step 6,		
	• There are three Pulse Rate objects (for normal, fast and slow measurement modes).		
	<ul> <li>In all three objects, the Pulse Rate Numeric Object – Unit-Code attribute is present and its set to MDC_DIM_BEAT_PER_MIN.</li> </ul>		
Notes	Possible values in typical points of observation after transcoder output are:		
(To assist manual testing)	a) IEEE 11073 Objects and Attributes		
	Unit-Code attribute is present in all three Pulse Rate objects:		
	Object: Pulse Rate Numeric Object		
	Attribute-id: MDC_ATTR_UNIT_CODE (2454)		
	Attribute-type: INT-U16		
	Attribute-value: MDC_DIM_BEAT_PER_MIN or 2720 (dec) or 0A A0 (hex)		
	b) WAN PCD-01 message		
	PCD-01 message includes a segment like this for each Pulse Rate object with Unit-Code attribute value (check OBX-6):		
	OBX n NM 149530^MDC_PULS_OXIM_PULS_RATE^MDC m.0.0.x [value]  264864^MDC_DIM_BEAT_PER_MIN^MDC    R   [current_date_time]		

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-036				
TP label		Whitepaper. Pulse Rate Numeric Object (Spot-Check Measurement) – Absolute-Time-Stamp Attribute				
Coverage	Spec	[Bluetooth PHDT v1.6]				
	Testable	PR Numeric 9; M Date-Time Conv 2; M		Date-Time Conv 3; M		
	items	Date-Time Conv 4; M	Date-Time Conv 5; M			
Test purpo	se	Check that:				
		PHG transcodes Time Stamp field of Spot-Check Measurement characteristic into Pulse Rate Numeric Object - Absolute-Time-Stamp attribute				
		[AND]				
		PHG transcodes the Bluetooth Time Stamp field format to Absolute Time format				
		[AND]				
		The fraction of seconds in Absolute Time at transcoder output is 0				
Applicabili	ty	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040				
Other PICS	5	C_MAN_BLE_042				
Initial cond	lition	The PHG under test and the simulated PHD are in the Standby state.				
Test procedure		<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a Spot-Check measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also supports the RACP characteristic and has an identical spot-check measurement temporarily stored.</li> </ol>				
		2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:				
		a. PLX Features	a. PLX Features (0x2A60)			
		i. Field: Supported Features				

	- Formet 16 hit
	• Format: 16 bit
	<ul> <li>Value: 0000 0000 0000 1100 (MSB → LSB). Measurement Storage for spot- check measurements is supported (bit 2). Timestamp for Spot-Check measurements is supported (bit 3).</li> </ul>
	ii. Field: Measurement Status Support
	This field is not included
	iii. Field: Device and Sensor Status Support
	This field is not included
	b. PLX Spot-Check Measurement (0x2A5E)
	i. Field: Flags
	Format: 8 bit
	<ul> <li>Value: 0000 0001 (MSB → LSB). Timestamp field is present. Measurement Status, Device and Sensor Status, and Pulse Amplitude Index fields are not present. Device Clock is set.</li> </ul>
	ii. Field: SpO2PR-Spot-Check - SpO2 (%)
	Format: SFLOAT
	Value: Not Relevant
	iii. Field: SpO2PR-Spot-Check – PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	iv. Field: Time Stamp
	Format: Date and Time
	• Value: October 12nd, 2015, 10:39:27
	v. Field: Measurement Status
	This field is not included
	vi. Field: Device and Sensor Status
	This field is not included
	vii. Field: Pulse Amplitude Index (%)
	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).
	<ol> <li>When the pairing has been completed (Connection state), force the PHG to read the PLX Features characteristic.</li> </ol>
	5. The simulated PHD sends the Measurement to the PHG under test.
	<ol> <li>Check in PHG transcoder output the Pulse Rate Numeric Object – Absolute-Time-Stamp attribute</li> </ol>
	7. IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	<ul> <li>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 spot-check measurement to PHG under test</li> </ul>
	<ul> <li>b) Check in PHG transcoder output the Pulse Rate Numeric Object – Absolute-Time- Stamp attribute</li> </ul>
Pass/Fail criteria	In Step 6, the Pulse Rate Numeric Object – Absolute-Time-Stamp attribute is present, its value matches with Time Stamp field of Spot-Check Measurement characteristic and fraction of seconds is set to 0.
	If the PHG supports RACP, the same criteria applies to Step 7.b.

Notes	Possible values in typical points of observation after transcoder output are:				
(To assist manual testing)	a) IEEE 11073 Objects and Attributes				
	Absolute-Time-Stamp attribute is present:				
	Object: Pulse Rate Numeric Object				
	Attribute-id: MDC_ATTR_TIME_STAMP_ABS (2448)				
	Attribute-type: SEQUENCE {century (INT-U8), year (INT-U8), month (INT-U8), day (INT-U8), hour (INT-U8), minute (INT-U8), second (INT-U8), sec-fractions (INT-U8)} (BCD encoding)				
	Attribute-value:				
	• century: 20 (hex) or 32 (dec)				
	• year: 15 (hex) or 21 (dec)				
	• month: 10 (hex) or 16 (dec)				
	• day: 12 (hex) or 18 (dec)				
	• hour: 10 (hex) or 16 (dec)				
	• minute: 39 (hex) or 57 (dec)				
	• second: 27 (hex) or 39 (dec)				
	• sec-fractions: 00 (hex) or 0 (dec)				
	b) WAN PCD-01 message				
	PCD-01 message includes a segment like this with Absolute-Time-Stamp attribute value (check OBX-14):				
	OBX n NM 149530^MDC_PULS_OXIM_PULS_RATE^MDC m.0.0.x [value]  264864^MDC_DIM_BEAT_PER_MIN^MDC    R    <b>20151012103927+0000</b>				

TP Id TP label		TP/LP-PAN/PHG/PHDTW/PLX/BV-037 Whitepaper. Pulse Rate Numeric Object (Spot-Check Measurement) – Basic-Nu-Observed- Value Attribute 1				
	Testable items	PR Numeric 10; M	Short Float Type 1; C			
Test purpo	se	Check that:				
			alue of the SpO2PR-Spot-Check field se Rate Numeric Object - Basic-Nu-			
Applicabili	ty	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040				
Other PICS		C_MAN_BLE_042				
Initial cond	lition	The PHG under test and the simulated PHD are in the Standby state.				
Test procedure		1. The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a Spot-Check measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also supports the RACP characteristic and has an identical spot-check measurement temporarily stored.				
		2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:				
		a. PLX Features	(0x2A60)			
		i. Field: Sup	oported Features			
		• Form	at: 16 bit			

		• Value: 0000 0000 0000 <b>11</b> 00 (MSB → LSB). Measurement Storage for spot- check measurements is supported (bit 2). Timestamp for Spot-Check measurements is supported (bit 3).
	ii.	Field: Measurement Status Support
		This field is not included
	iii.	Field: Device and Sensor Status Support
		This field is not included
	b. PLX Sp	oot-Check Measurement (0x2A5E)
	i.	Field: Flags
		Format: 8 bit
		<ul> <li>Value: 0000 0001 (MSB → LSB). Timestamp field is present. Measurement Status, Device and Sensor Status, and Pulse Amplitude Index fields are not present. Device Clock is set.</li> </ul>
	ii.	Field: SpO2PR-Spot-Check - SpO2 (%)
		Format: SFLOAT
		Value: Not Relevant
	iii.	Field: SpO2PR-Spot-Check – PR (bpm)
		Format: SFLOAT
		Value: 90 (bpm)
	iv.	Field: Time Stamp
		Format: Date and Time
		Value: Not relevant
	v.	Field: Measurement Status
		This field is not included
	vi.	Field: Device and Sensor Status
		This field is not included
	vii	Field: Pulse Amplitude Index (%)
		This field is not included
		IG under test initiates a discovery process (Scanning state), it discovers the ed PHD and it starts a pairing process with the simulated PHD (Initiating state).
		he pairing has been completed (Connection state), force the PHG under test to ePLX Features characteristic.
	5. The sir	nulated PHD sends the Measurement to PHG under test.
		in PHG transcoder output the Pulse Rate Numeric Object – Basic-Nu-Observed- attribute
	7. IF C_N	AN_BLE_042 = TRUE (PHG supports RACP) THEN
	pe	e PHG under test requests the Simulated PHD to report stored records by rforming a writing operation in the Record Access Control Point (RACP) and the nulated PHD sends the temporarily stored spot-check measurement to PHG under st
		eck in PHG transcoder output the Pulse Rate Numeric Object – Basic-Nu- served-Value attribute
Pass/Fail criteria	its value ma	ne Pulse Rate Numeric Object – Basic-Nu-Observed-Value attribute is present and atches with the value of the PR subfield of the SpO2PR-Spot-Check field in the PLX Measurement chactacteristic (90bpm).
	If the PHG	supports RACP, the same criteria applies to Step 7.b.
Notes (To assist manual	Possible va	lues in typical points of observation after transcoder output are:

testing)	a)	IEEE 11073 Objects and Attributes
		Basic-Nu-Observed-Value attribute is present:
		Object: Pulse Rate Numeric Object
		Attribute-id: MDC_ATTR_NU_VAL_OBS_BASIC (2636)
		Attribute-type: SFLOAT
		Attribute-value: F3 84 (hex) or 10 09 (hex) or 00 5A (hex) or 90 (dec)
	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 149530^MDC_PULS_OXIM_PULS_RATE^MDC m.0.0.x  <b>90</b>   264864^MDC_DIM_BEAT_PER_MIN^MDC    R   [current_date_time]

TP Id TP label		TP/LP-PAN/PHG/PHDTW/PLX/BV-038         Whitepaper. Pulse Rate Numeric Object (Spot-Check Measurement) – Basic-Nu-Observed-Value Attribute 2					
							Coverage
	Testable items	PR Numeric 10;	Λ	PR Numeric 20; M	Short Float Type 2; M		
Test purpose		Check that:					
			surement ch		the SpO2PR-Spot-Check field in PLX e Numeric Object - Basic-Nu-		
		[AND]					
		PHG assigns special value NaN (0x07FF) when Pulse Rate value is unavailable.					
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040					
Other PICS	5	C_MAN_BLE_042					
Initial cond	lition	The PHG under test and the simulated PHD are in the Standby state.					
Test procedure		<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a Spot-Check measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also supports the RACP characteristic and has an identical spot-check measurement temporarily stored.</li> </ol>					
		<ol> <li>The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:</li> </ol>					
		a. PLX Features (0x2A60)					
		i. Field: Supported Features					
		Format: 16 bit					
		•	check mea		LSB). Measurement Storage for spot 2). Timestamp for Spot-Check		
		ii. Fie	d: Measure	ment Status Support			
		•	This field is	s not included			
		iii. Fie	d: Device a	nd Sensor Status Support			
		This field is not included					
		b. PLX Spot-Check Measurement (0x2A5E)					
		i. Fie	d: Flags				

	Format: 8 bit				
	<ul> <li>Value: 0000 0001 (MSB → LSB). Timestamp field is present. Measurement Status, Device and Sensor Status, and Pulse Amplitude Index fields are not present. Device Clock is set.</li> </ul>				
	ii. Field: SpO2PR-Spot-Check - SpO2 (%)				
	Format: SFLOAT				
	Value: Not Relevant				
	iii. Field: SpO2PR-Spot-Check – PR (bpm)				
	Format: SFLOAT				
	Value: 07 FF (hex). Special value: NaN				
	iv. Field: Time Stamp				
	Format: Date and Time				
	Value: Not Relevant				
	v. Field: Measurement Status				
	This field is not included				
	vi. Field: Device and Sensor Status				
	This field is not included				
	vii. Field: Pulse Amplitude Index (%)				
	This field is not included				
	<ol> <li>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).</li> </ol>				
	4. When the pairing has been completed (Connection state), force the PHG under test to read the PLX Features characteristic.				
	5. The simulated PHD sends the Measurement to the PHG under test.				
	6. Check in PHG transcoder output the Pulse Rate Numeric Object – Basic-Nu-Observed- Value attribute				
	7. IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN				
	<ul> <li>a) 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 spot-check measurement to PHG under test</li> </ul>				
	<ul> <li>b) Check in PHG transcoder output the Pulse Rate Numeric Object – Basic-Nu- Observed-Value attribute</li> </ul>				
Pass/Fail criteria	In Step 6, the Pulse Rate Numeric Object – Basic-Nu-Observed-Value attribute is present and its value is is 0x07FF (NaN).				
	If the PHG supports RACP, the same criteria applies to Step 7.b.				
Notes	Possible values in typical points of observation after transcoder output are:				
(To assist manual testing)	a) IEEE 11073 Objects and Attributes				
	Basic-Nu-Observed-Value attribute is present:				
	Object: Pulse Rate Numeric Object				
	Attribute-id: MDC_ATTR_NU_VAL_OBS_BASIC (2636)				
	Attribute-type: SFLOAT				
	Attribute-value: 07 FF (hex) or NaN (note that a decimal value is not allowed)				
	b) WAN PCD-01 message				
	PCD-01 message does not include special values				

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-039					
TP label		Pulse Rate Numeric Object (Continuous Measurements) – Basic-Nu-Observed-Value Attribute					
Coverage	Spec	[Bluetooth PHDT v1.6]					
	Testable items	PR Numeric 19; M Short Float Type 1; C					
Test purpo	se	Check that:					
		PHG transcodes Pulse Rate value of the PR subfield of the SpO2PR-Normal field in PLX Continuous Measurement chactacteristic into Pulse Rate Numeric Object (Continuous normal response) - Basic-Nu-Observed-Value attribute					
		[AND]					
		PHG transcodes Pulse Rate value of the PR subfield of the SpO2PR-Fast field in PLX Continuous Measurement chactacteristic into Pulse Rate Numeric Object (Continuous fast response) - Basic-Nu-Observed-Value attribute					
		[AND]					
		PHG transcodes Pulse Rate value of the PR subfield of the SpO2PR-Slow field in PLX Continuous Measurement chactacteristic into Pulse Rate Numeric Object (Continuous slow response) - Basic-Nu-Observed-Value attribute					
Applicabilit	ÿ	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040					
Other PICS							
Initial cond	ition	The PHG under test and the simulated PHD are in the Standby state.					
Test procedure		<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a continuous measurement (including fast and slow response measurement values) ready to be sent and it is in the Advertising state (it is discoverable).</li> </ol>					
		<ol> <li>The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:</li> </ol>					
		a. PLX Features (0x2A60)					
		i. Field: Supported Features					
		• Format: 16 bit					
		<ul> <li>Value: 0000 0000 0011 0000 (MSB → LSB). Fast and slow response mode are supported (bits 4 and 5).</li> </ul>					
		ii. Field: Measurement Status Support					
		This field is not included					
		iii. Field: Device and Sensor Status Support					
		This field is not included					
		b. PLX Continuous Measurement (0x2A5F)					
		i. Field: Flags					
		Format: 8 bit					
		<ul> <li>Value: 0000 0011 (MSB → LSB). SpO2PR–Fast, SpO2PR-Slow fields are present. Measurement Status, Device and Sensor Status and Pulse Amplitude Index fields are not present.</li> </ul>					
		ii. Field: SpO2PR-Normal - SpO2 (%)					
		Format: SFLOAT					
		Value: Not Relevant					
		iii. Field: SpO2PR-Normal - PR (bpm)					
		Format: SFLOAT					

	Value: 90 (bpm)		
	iv. Field: SpO2PR-Fast - SpO2 (%)		
	Format: SFLOAT		
	Value: Not Relevant		
	v. Field: SpO2PR-Fast - PR (bpm)		
	Format: SFLOAT		
	Value: 91 (bpm)		
	vi. Field: SpO2PR-Slow - SpO2 (%)		
	Format: SFLOAT		
	Value: Not Relevant		
	vii. Field: SpO2PR-Slow - PR (bpm)		
	Format: SFLOAT		
	Value: 92 (bpm)		
	viii. Field: Measurement Status		
	This field is not included		
	ix. Field: Device and Sensor Status		
	This field is not included		
	x. Field: Pulse Amplitude Index (%)		
	This field is not included		
	<ol> <li>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).</li> </ol>		
	4. When the pairing has been completed (Connection state), force the PHG under test to read the PLX Features characteristic.		
	5. The simulated PHD sends the Measurement to PHG under test.		
	<ol> <li>Check in PHG transcoder output the Pulse Rate Numeric Object – Basic-Nu-Observed- Value attribute in all three Pulse Rate objects.</li> </ol>		
Pass/Fail criteria	In Step 6,		
	• The Pulse Rate Numeric Object (Continuous measurement normal) – Basic-Nu-Observed- Value attribute is present and its value matches with the value of the PR field of the SpO2PR-Normal field in the PLX Continuous Measurement chactacteristic (90bpm).		
	The Pulse Rate Numeric Object (Continuous measurement fast) – Basic-Nu-Observed- Value attribute is present and its value matches with the value of the PR subfield of the SpO2PR-Fast field in the PLX Continuous Measurement chactacteristic (91bpm).		
	<ul> <li>The Pulse Rate Numeric Object (Continuous measurement slow) – Basic-Nu-Observed- Value attribute is present and its value matches with the value of the PR subfield of the SpO2PR-Slow field in the PLX Continuous Measurement chactacteristic (92bpm).</li> </ul>		
Notes	Possible values in typical points of observation after transcoder output are:		
(To assist manual testing)	a) IEEE 11073 Objects and Attributes		
	Pulse Rate Numeric object (Continous measurement normal):		
	Supplemental-types attribute is not present.		
	Basic-Nu-Observed-Value attribute is present:		
	Object: Pulse Rate Numeric Object		
	Attribute-id: MDC_ATTR_NU_VAL_OBS_BASIC (2636)		
	Attribute-type: SFLOAT		
	Attribute-value: F3 84 (hex) or 10 09 (hex) or 00 5A (hex) or 90 (dec)		
	Pulse Rate Numeric object (Continous measurement fast):		

	•	Supplemental-types attribute is present:
		Object: Pulse Rate Numeric Object (fast response)
		Attribute-id: MDC_ATTR_SUPPLEMENTAL_TYPES (2657)
		□ Attribute-type: SEQUENCE of SEQUENCE {partition (INT-U16), code (INT-U16)
		Attribute-value: {MDC_PART_SCADA, MDC_MODALITY_FAST}.
	•	Basic-Nu-Observed-Value attribute is present:
		Object: Pulse Rate Numeric Object
		Attribute-id: MDC_ATTR_NU_VAL_OBS_BASIC (2636)
		Attribute-type: SFLOAT
		Attribute-value: F3 8E (hex) or 00 5B (hex) or 91 (dec)
	Pul	se Rate Numeric object (Continous measurement slow):
	•	Supplemental-types attribute is present:
		Object: Pulse Rate Numeric Object (slow response)
		Attribute-id: MDC_ATTR_SUPPLEMENTAL_TYPES (2657)
		Attribute-type: SEQUENCE of SEQUENCE {partition (INT-U16), code (INT-U16)
		Attribute-value: {MDC_PART_SCADA, MDC_MODALITY_SLOW}.
	•	Basic-Nu-Observed-Value attribute is present:
		Object: Pulse Rate Numeric Object
		Attribute-id: MDC_ATTR_NU_VAL_OBS_BASIC (2636)
		□ Attribute-type: SFLOAT
		Attribute-value: F3 98 (hex) or 00 5C (hex) or 92 (dec)
b)	WA	N PCD-01 message
,		se Rate Numeric object (Continous measurement normal):
	•	PCD-01 message includes a segment like this with Basic-Nu-Observed-Value attribute value (check OBX-5):
		OBX n NM 149530^MDC_PULS_OXIM_PULS_RATE^MDC m.0.0.x 90  264864^MDC_DIM_BEAT_PER_MIN^MDC    R   [current_date_time]
	Pul	se Rate Numeric object (Continous measurement fast):
	•	PCD-01 message includes two segments like these for Pulse Rate Numeric object (Fast response), with Basic-Nu-Observed-Value attribute and Supplemental-Types attribute values (check OBX-5 in both segments):
		OBX n NM 149530^MDC_PULS_OXIM_PULS_RATE^MDC m.0.0.x  <b>91</b>   264864^MDC_DIM_BEAT_PER_MIN^MDC    R   [current_date_time]
		OBX n CWE 68193^MDC_ATTR_SUPPLEMENTAL_TYPES^MDC m.0.0.x.y  150580^MDC_MODALITY_FAST^MDC      [obx-11 of the parent]
	Pul	se Rate Numeric object (Continous measurement slow):
	•	PCD-01 message includes two segments like these for Pulse Rate Numeric object (Slow response), with Basic-Nu-Observed-Value attribute and Supplemental-Types attribute values (check OBX-5 in both segments):
		OBX n NM 149530^MDC_PULS_OXIM_PULS_RATE^MDC m.0.0.x  <b>92</b>   264864^MDC_DIM_BEAT_PER_MIN^MDC    R   [current_date_time]
		OBX n CWE 68193^MDC_ATTR_SUPPLEMENTAL_TYPES^MDC m.0.0.x.y  150580^MDC_MODALITY_SLOW^MDC      [obx-11 of the parent]

TP ld	TP/LP-PAN/PHG/PHDTW/PLX/BV-040
TP label	Whitepaper. Pulse Rate Numeric Object (Continuous Measurements) – Basic-Nu-Observed-

	1	Value Att	ribute 2						
Coverage	Spec	[Bluetoot	h PHDT v1.6]				1		
	Testable items	PR Nume	eric 19; M	PR	Numeric 20; M		Short Float Type 2; M		
Test purpo	se	Check th	at:						
		Continuo	PHG transcodes Pulse Rate value of the PR subfield of the SpO2PR-Normal field in PLX Continuous Measurement chactacteristic into Pulse Rate Numeric Object (Continuous normal response) - Basic-Nu-Observed-Value attribute						
		[AND]							
		PHG transcodes Pulse Rate value of the PR subfield of the SpO2PR-Fast field in PLX Continuous Measurement chactacteristic into Pulse Rate Numeric Object (Continuous fast response) - Basic-Nu-Observed-Value attribute							
		[AND]							
		Continuo	PHG transcodes Pulse Rate value of the PR subfield of the SpO2PR-Slow field in PLX Continuous Measurement chactacteristic into Pulse Rate Numeric Object (Continuous slow response) - Basic-Nu-Observed-Value attribute						
		[AND]	[AND]						
		PHG ass	igns special v	alue NaN (0	x07FF) when Pulse	Rate val	ue is unavailable.		
Applicabili	ty	C_MAN_	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040						
Other PICS	5								
Initial cond	lition	The PHG under test and the simulated PHD are in the Standby state.							
Test procedure		<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a continuous measurement (including fast and slow response measurement values) ready to be sent and it is in the Advertising state (it is discoverable).</li> </ol>							
		2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:							
		a. PLX Features (0x2A60)							
			i. Field: Su	oported Fea	tures				
			• Form	at: 16 bit					
					0 00 <b>11</b> 0000 (MSB - its 4 and 5).	→ LSB).	Fast and slow response mode		
			ii. Field: Me	asurement \$	Status Support				
			• This	field is not ir	ncluded				
			iii. Field: Dev	vice and Se	nsor Status Support				
			• This	field is not ir	ncluded				
		b.	PLX Continuo	us Measure	ment (0x2A5F)				
			i. Field: Fla	gs					
				at: 8 bit					
			prese	ent. Measur		e and Se	ast, SpO2PR-Slow fields are ensor Status and Pulse		
			ii. Field: Spo	O2PR-Norm	al - SpO2 (%)				
			• Form	at: SFLOAT	-				
			Value	e: Not Relev	vant				
			iii. Field: Spo	O2PR-Norm	al - PR (bpm)				
			• Form	at: SFLOAT					

	Value: 07 FF (hex). Special value: NaN				
	iv. Field: SpO2PR-Fast - SpO2 (%)				
	Format: SFLOAT				
	Value: Not Relevant				
	v. Field: SpO2PR-Fast - PR (bpm)				
	Format: SFLOAT				
	Value: 07 FF (hex). Special value: NaN				
	vi. Field: SpO2PR-Slow - SpO2 (%)				
	Format: SFLOAT				
	Value: Not Relevant				
	vii. Field: SpO2PR-Slow - PR (bpm)				
	Format: SFLOAT				
	Value: 07 FF (hex). Special value: NaN				
	viii. Field: Measurement Status				
	This field is not included				
	ix. Field: Device and Sensor Status				
	This field is not included				
	x. Field: Pulse Amplitude Index (%)				
	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).				
	<ol> <li>When the pairing has been completed (Connection state), force the PHG under test to read the PLX Features characteristic.</li> </ol>				
	5. The simulated PHD sends the Measurement to PHG under test.				
	<ol> <li>Check in PHG transcoder output the Pulse Rate Numeric Object – Basic-Nu-Observed- Value attribute for all Pulse Rate objects.</li> </ol>				
Pass/Fail criteria	In Step 6,				
	• The Pulse Rate Numeric Object (Continuous measurement normal) – Basic-Nu-Observed- Value attribute is present and its value is is 0x07FF (NaN).				
	• The Pulse Rate Numeric Object (Continuous measurement fast) – Basic-Nu-Observed- Value attribute is present and its value is is 0x07FF (NaN).				
	• The Pulse Rate Numeric Object (Continuous measurement slow) – Basic-Nu-Observed- Value attribute is present and its value is is 0x07FF (NaN).				
Notes	Possible values in typical points of observation after transcoder output are:				
(To assist manual	a) IEEE 11073 Objects and Attributes				
testing)	Pulse Rate Numeric object (Continous measurement normal):				
	Supplemental-types attribute is not present.				
	Basic-Nu-Observed-Value attribute is present:				
	Object: Pulse Rate Numeric Object				
	Attribute-id: MDC_ATTR_NU_VAL_OBS_BASIC (2636)				
	<ul> <li>Attribute-type: SFLOAT</li> </ul>				
	Attribute-value: Attribute-value: 07 FF (hex) or NaN (note that a decimal value is				
	not allowed)				
	Pulse Rate Numeric object (Continous measurement fast):				
	Supplemental-types attribute is present:				

Object: Pulse Rate Numeric Object (fast response)
Attribute-id: MDC_ATTR_SUPPLEMENTAL_TYPES (2657)
Attribute-type: SEQUENCE of SEQUENCE {partition (INT-U16), code (INT-U16)}
Attribute-value: {MDC_PART_SCADA, MDC_MODALITY_FAST}.
Basic-Nu-Observed-Value attribute is present:
Object: Pulse Rate Numeric Object
Attribute-id: MDC_ATTR_NU_VAL_OBS_BASIC (2636)
Attribute-type: SFLOAT
Attribute-value: Attribute-value: 07 FF (hex) or NaN (note that a decimal value is not allowed)
Pulse Rate Numeric object (Continous measurement slow):
Supplemental-types attribute is present:
Object: Pulse Rate Numeric Object (slow response)
Attribute-id: MDC_ATTR_SUPPLEMENTAL_TYPES (2657)
Attribute-type: SEQUENCE of SEQUENCE {partition (INT-U16), code (INT-U16)}
Attribute-value: {MDC_PART_SCADA, MDC_MODALITY_SLOW}.
Basic-Nu-Observed-Value attribute is present:
Object: Pulse Rate Numeric Object
Attribute-id: MDC_ATTR_NU_VAL_OBS_BASIC (2636)
Attribute-type: SFLOAT
Attribute-value: Attribute-value: 07 FF (hex) or NaN (note that a decimal value is not allowed)
b) WAN PCD-01 message
PCD-01 message does not include special values

TP Id TP label		TP/LP-PAN/PHG/PHDTW/PLX/BV-041 Whitepaper. Pulse Rate measurement value (Spot-Check Measurement)				
						Coverage
	Testable	Short Float Type 1; C	Date-Time Conv 1; M	PR Numeric 9; M		
	items	PR Numeric 10; M				
Test purpose		Check that: PHG processes correctly the Pulse Rate value (bpm) of the PR subfield of the SpO2PR-Spot- Check field and and the value of the Time Stamp field of the PLX Spot-Check characteristic				
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040				
Other PICS		C_MAN_BLE_042				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.				
Test procedure		<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a Spot-Check measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also supports the RACP characteristic and has an identical spot-check measurement temporarily stored.</li> <li>The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:</li> </ol>				

	a. PLX Features (0x2A60)		
	i. Field: Supported Features		
	Format: 16 bit		
	<ul> <li>Value: 0000 0000 0000 1100 (MSB → LSB). Measurement Storage for spot- check measurements is supported (bit 2). Timestamp for Spot-Check measurements is supported (bit 3).</li> </ul>		
	ii. Field: Measurement Status Support		
	This field is not included		
	iii. Field: Device and Sensor Status Support		
	This field is not included		
	b. PLX Spot-Check Measurement (0x2A5E)		
	i. Field: Flags		
	Format: 8 bit		
	<ul> <li>Value: 0000 0001 (MSB → LSB). Timestamp field is present. Measurement Status, Device and Sensor Status, and Pulse Amplitude Index fields are not present. Device Clock is set.</li> </ul>		
	ii. Field: SpO2PR-Spot-Check - SpO2 (%)		
	Format: SFLOAT		
	Value: Not Relevant		
	iii. Field: SpO2PR-Spot-Check – PR (bpm)		
	Format: SFLOAT		
	• Value: 90 (bpm)		
	iv. Field: Time Stamp		
	Format: Date and Time		
	• Value: October 12nd, 2015, 10:39:27		
	v. Field: Measurement Status		
	This field is not included		
	vi. Field: Device and Sensor Status		
	This field is not included		
	vii. Field: Pulse Amplitude Index (%)		
	This field is not included		
	<ol> <li>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).</li> </ol>		
	When the pairing has been completed (Connection state), force the PHG under test to read the PLX Features characteristic.		
	5. The simulated PHD sends the Measurement to the PHG under test.		
	6. Check that PHG accepts the measurement and decodes its value properly (Pulse Rate measurement value, units and time stamp).		
	7. IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN		
	a) 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 spot-check measurement to the PHG under test		
	<ul> <li>b) Check that the PHG accepts the measurement and decodes its value properly (Pulse Rate measurement value, units and time stamp)</li> </ul>		
Pass/Fail criteria	In Step 6, the PHG under test shows the following measurement Pulse Rate = 90(bpm) with timestamp '2015-10-12 10:39:27'.		

	If the PHG supports RACP, the same criteria applies to Step 7.b.
Notes	

TP Id TP/LP-PAN/PHG/PHDTW/PLX/BV-042		TP/LP-PAN/PHG/PHDTW/PLX/BV-042				
TP label		Whitepaper. Pulsatile Quality Numeric Object (Spot-Check Measurement) - Handle Attribute				
Coverage	Spec	[Bluetooth PHDT v1.6]				
	Testable items	PQ Numeric 1; O				
Test purpos	e	Check that: PHG does not include Pulsatile Quality Numeric Object – Handle Attribute in transcoder output when using spot-check measurement mode. [OR] If PHG includes Pulsatile Quality 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_040				
Other PICS		C_MAN_BLE_042				
Initial condi	tion	The PHG under test and the simulated PHD are in the Standby state.				
Test procedure		<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a spot-check measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also supports the RACP characteristic and has an identical spot-check measurement temporarily stored.</li> <li>The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:         <ul> <li>a. PLX Features (0x2A60)</li> <li>i. Field: Supported Features</li> </ul> </li> </ol>				
		Format: 16 bit				
		<ul> <li>Value: 0000 0000 0100 1100 (MSB → LSB). Pulse Amplitude Index field is supported (bit 6). Measurement Storage for spot-check measurements is supported (bit 2). Timestamp for Spot-Check measurements is supported (bit 3).</li> </ul>				
		ii. Field: Measurement Status Support				
		This field is not included				
		iii. Field: Device and Sensor Status Support				
		This field is not included				
		b. PLX Spot-Check Measurement (0x2A5E)				
		i. Field: Flags				
		Format: 8 bit				
		<ul> <li>Value: 0000 1001 (MSB → LSB). Timestamp and Pulse Amplitude Index fields are present. Measurement Status and Device and Sensor Status fields are not present. Device Clock is set.</li> </ul>				
		ii. Field: SpO2PR-Spot-Check - SpO2 (%)				
		Format: SFLOAT				
		Value: Not Relevant				
		iii. Field: SpO2PR-Spot-Check – PR (bpm)				

	Format: SFLOAT
	Value: Not Relevant
	iv. Field: Time Stamp
	Format: Date and Time
	Value: Not Relevant
	v. Field: Measurement Status
	This field is not included
	vi. Field: Device and Sensor Status
	This field is not included
	vii. Field: Pulse Amplitude Index (%)
	Format: SFLOAT
	Value: Not Relevant
	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 PLX Features characteristic.
	5. The simulated PHD sends the measurement to the PHG under test.
	6. Check in PHG transcoder output the Pulsatile Quality Numeric Object – Handle attribute
	7. IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	<ul> <li>a) 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 spot-check measurement to PHG under test</li> </ul>
	<ul> <li>b) Check in PHG transcoder output the Pulsatile Quality Numeric Object – Handle attribute</li> </ul>
Pass/Fail criteria	In Step 6, the Pulsatile Quality Numeric Object – Handle attribute is not present or, if it is present then its value is different than 0
	If the PHG supports RACP, the same criteria applies to Step 7.b.
Notes	Possible values in typical points of observation after transcoder output are:
(To assist manual	a) IEEE 11073 Objects and Attributes
testing)	Handle attribute is not present, or if it is present then:
	Object: Pulsatile Quality 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 ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-043				
TP label	1	Whitepaper. Pulsatile Quality Numeric Object (Continuous Measurements) - Handle Attribute				
Coverage	Spec	[Bluetooth PHDT v1.6]				
	Testable items	PQ Numeric 9; O				
Test purpose Check that:						

	PHG does not include Pulsatile Quality Numeric Object – Handle Attribute in transcoder output		
	when using continuous measurements		
	[OR]		
	If PHG includes Pulsatile Quality 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_040		
Other PICS			
Initial condition	The PHG under test and the simulated PHD are in the Standby state.		
Test procedure	<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a continuous measurement (including fast and slow response measurement values) ready to be sent and it is in the Advertising state (it is discoverable).</li> </ol>		
	2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:		
	a. PLX Features (0x2A60)		
	i. Field: Supported Features		
	Format: 16 bit		
	<ul> <li>Value: 0000 0000 0111 0000 (MSB → LSB). Fast and slow response modes are supported (bits 4 and 5). Pulse Amplitude Index field is supported.</li> </ul>		
	ii. Field: Measurement Status Support		
	This field is not included		
	iii. Field: Device and Sensor Status Support		
	This field is not included		
	b. PLX Continuous Measurement (0x2A5F)		
	i. Field: Flags		
	Format: 8 bit		
	<ul> <li>Value: 0001 0011 (MSB → LSB). SpO2PR–Fast, SpO2PR-Slow and Pulse Amplitude Index fields are present. Measurement Status, and Device and Sensor Status and fields are not present.</li> </ul>		
	ii. Field: SpO2PR-Normal - SpO2 (%)		
	Format: SFLOAT		
	Value: Not Relevant		
	iii. Field: SpO2PR-Normal – PR (bpm)		
	Format: SFLOAT		
	Value: Not Relevant		
	iv. Field: SpO2PR-Fast - SpO2 (%)		
	Format: SFLOAT		
	Value: Not Relevant		
	v. Field: SpO2PR-Fast - PR (bpm)		
	Format: SFLOAT		
	Value: Not Relevant		
	vi. Field: SpO2PR-Slow - SpO2 (%)		
	Format: SFLOAT		
	Value: Not Relevant		
	vii. Field: SpO2PR-Slow - PR (bpm)		
	Format: SFLOAT		

	Value: Not Relevant
	viii. Field: Measurement Status
	This field is not included
	ix. Field: Device and Sensor Status
	This field is not included
	x. Field: Pulse Amplitude Index (%)
	Format: SFLOAT
	Value: Not Relevant
	<ol> <li>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).</li> </ol>
	4. When the pairing has been completed (Connection state), force the PHG under test to read the PLX Feature characteristic
	5. The simulated PHD sends the Measurement to the PHG under test.
	6. Check in PHG transcoder output the Pulsatile Quality Numeric Object – Handle attribute.
Pass/Fail criteria	In Step 6, the Pulsatile Quality Numeric Object – Handle attribute is not present or, if it is present then its value is different than 0.
Notes	Possible values in typical points of observation after transcoder output are:
(To assist manual testing)	a) IEEE 11073 Objects and Attributes
5,	Handle attribute is not present, or if it is present then:
	Object: Pulsatile Quality 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 ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-044				
TP label		Whitepaper. Pulsatile Quality Numeric Object (Spot-Check Measurement) - Type Attribute				
Coverage Spec [Bluetooth PHDT v1.6]						
	Testable items	PQ Numeric 2; M				
Test purpo	se	Check that:				
		PHG includes Pulsatile Quality Numeric Object – Type attribute in transcoder output when using spot-check measurement mode.				
		[AND]				
		Type is set to {MDC_PART_SCADA, MDC_SAT_O2_QUAL}				
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040				
Other PICS	i	C_MAN_BLE_042				
Initial condition		The PHG under test and the simulated PHD are in the Standby state.				
Test procedure		<ol> <li>The simulated PHD is configured has a spot-check measurement discoverable). The simulated PH</li> </ol>	ready to be sent and it is	s in the Advertising state (it is		

	identica	l spot	-check measurement temporarily stored.
2.	The sim for this		d PHD implements several BTLE characteristics. The characteristic of interest Case is:
	a. PL)	X Fea	tures (0x2A60)
	i.	Field	d: Supported Features
		•	Format: 16 bit
		•	Value: 0000 0000 0100 1100 (MSB $\rightarrow$ LSB). Pulse Amplitude Index field is supported (bit 6). Measurement Storage for spot-check measurements is supported (bit 2). Timestamp for Spot-Check measurements is supported (bit 3).
	ii.	Field	d: Measurement Status Support
		•	This field is not included
	iii.	Field	d: Device and Sensor Status Support
		•	This field is not included
b.	PLX Sp	ot-Ch	eck Measurement (0x2A5E)
	i.	Field	d: Flags
		•	Format: 8 bit
		•	Value: 0000 1001 (MSB $\rightarrow$ LSB). Timestamp and Pulse Amplitude Index fields are present. Measurement Status and Device and Sensor Status fields are not present. Device Clock is set.
	ii.	Field	d: SpO2PR-Spot-Check - SpO2 (%)
		•	Format: SFLOAT
		•	Value: Not Relevant
	iii.	Field	d: SpO2PR-Spot-Check – PR (bpm)
		•	Format: SFLOAT
		•	Value: Not Relevant
	iv.	Field	d: Time Stamp
		•	Format: Date and Time
		•	Value: Not Relevant
	۷.	Field	d: Measurement Status
		•	This field is not included
	vi.	Field	d: Device and Sensor Status
		•	This field is not included
	vii.	Field	d: Pulse Amplitude Index (%)
		•	Format: SFLOAT
		•	Value: Not Relevant
3.			der test initiates a discovery process (Scanning state), it discovers the ID and it starts a pairing process with the simulated PHD (Initiating state).
4.			ring has been completed (Connection state), force the PHG under test to Features characteristic.
5.	The sim	ulate	d PHD sends the Measurement to the PHG under test.
6.	Check i	n PH(	G transcoder output the Pulsatile Quality Numeric Object – Type attribute
7.	IF C_M	AN_B	LE_042 = TRUE (PHG supports RACP) THEN
	per	formi nulate	G under test requests the Simulated PHD to report stored records by ng a writing operation in the Record Access Control Point (RACP) and the rd PHD sends the temporarily stored spot-check measurement to PHG under

	b) Check in PHG transcoder output the Pulsatile Quality Numeric Object – Type attribute	
Pass/Fail criteria	In Step 6, the Pulsatile Quality Numeric Object – Type attribute is present and its value is {MDC_PART_SCADA, MDC_SAT_O2_QUAL}	
	If the PHG supports RACP, the same criteria applies to Step 7.b.	
Notes (To assist manual	Possible values in typical points of observation after transcoder output are:	
testing)	a) IEEE 11073 Objects and Attributes	
	Type attribute is present:	
	Object: Pulsatile Quality Numeric Object	
	Attribute-id: MDC_ATTR_ID_TYPE (2351)	
	Attribute-type: SEQUENCE {partition (INT-U16), code (INT-U16)}	
	Attribute-value:	
	• partition: MDC_PART_SCADA or 2 (dec) or 00 02 (hex)	
	• code: MDC_SAT_O2_QUAL or 19248(dec) or 4B 30 (hex)	
	b) WAN PCD-01 message	
	PCD-01 message includes a segment like this with Type attribute (check OBX-3):	
	OBX n NM  <b>150320^MDC_SAT_O2_QUAL^MDC</b>  m.0.0.x [value]  262688^MDC_DIM_PERCENT^MDC     R   [current_date_time]	

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-045				
TP label		Whitepaper. Pulsatile Quality Numeric Object (Continuous Measurements) - Type Attribute				
Coverage	Spec	[Bluetooth PHDT v1.6]				
	Testable items	PQ Numeric 10; M				
Test purpo	se	Check that:				
		PHG includes Pulsatile Quality Numeric Object – Type attribute in transcoder output when using continuous measurements.				
		[AND] Type is set to {MDC_PART_SCADA, MDC_SAT_O2_QUAL}				
Applicability C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040				
Other PICS						
Initial condition		The PHG under test and the simulated PHD are in the Standby state.				
Test procedure		<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a continuous measurement (including fast and slow response measurement values) ready to be sent and it is in the Advertising state (it is discoverable).</li> </ol>				
		2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:				
		a. PLX Features (0x2A60)				
		i. Field: Supported Features				
		Format: 16 bit				
		<ul> <li>Value: 0000 0000 0111 0000 (MSB → LSB). Fast and slow response modes are supported (bits 4 and 5). Pulse Amplitude Index is supported (bit 6).</li> </ul>				
		ii. Field: Measurement Status Support				

	This field is not included
	iii. Field: Device and Sensor Status Support
	This field is not included
	b. PLX Continuous Measurement (0x2A5F)
	i. Field: Flags
	Format: 8 bit
	<ul> <li>Value: 0001 0011 (MSB → LSB). SpO2PR–Fast, SpO2PR-Slow and Pulse Amplitude Index fields are present. Measurement Status, and Device and Sensor Status fields are not present.</li> </ul>
	ii. Field: SpO2PR-Normal - SpO2 (%)
	Format: SFLOAT
	Value: Not Relevant
	iii. Field: SpO2PR-Normal – PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	iv. Field: SpO2PR-Fast - SpO2 (%)
	Format: SFLOAT
	Value: Not Relevant
	v. Field: SpO2PR-Fast - PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	vi. Field: SpO2PR-Slow - SpO2 (%)
	Format: SFLOAT
	Value: Not Relevant
	vii. Field: SpO2PR-Slow - PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	viii. Field: Measurement Status
	This field is not included
	ix. Field: Device and Sensor Status
	This field is not included
	x. Field: Pulse Amplitude Index (%)
	Format: SFLOAT
	Value: Not Relevant
	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).
	<ol> <li>When the pairing has been completed (Connection state), force the PHG under test to read the PLX Feature characteristic.</li> </ol>
	5. The simulated PHD sends the Measurement to the PHG under test.
	6. Check in PHG transcoder output the Pulsatile Quality Numeric Object – Type attribute.
Pass/Fail criteria	In Step 6, the Pulsatile Quality Numeric Object – Type attribute is present and its value is {MDC_PART_SCADA, MDC_SAT_O2_QUAL}
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: Pulsatile Quality Numeric Object
Attribute-id: MDC_ATTR_ID_TYPE (2351)
Attribute-type: SEQUENCE {partition (INT-U16), code (INT-U16)}
Attribute-value:
<ul> <li>partition: MDC_PART_SCADA or 2 (dec) or 00 02 (hex)</li> </ul>
<ul> <li>code: MDC_SAT_O2_QUAL or 19248(dec) or 4B 30 (hex)</li> </ul>
b) WAN PCD-01 message
PCD-01 message includes three segments like this with Type attribute (check OBX-3):
OBX n NM  <b>150320^MDC_SAT_O2_QUAL^MDC</b>  m.0.0.x [value]  262688^MDC_DIM_PERCENT^MDC     R   [current_date_time]

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-046					
TP label		Whitepaper. Pulsatile Quality Numeric Object (Spot-Check Measurement) - Metric-Spec-Small Attribute 1					
Coverage	Spec	[Bluetooth PHDT v1.6]					
	Testable items	PQ Numeric 3; M	PQ Numeric 5; M				
Test purpose		Check that:					
			e Quality Numeric Object – Metric-Sp t-check measurement mode.	pec-Small attribute in transcoder			
		[AND]					
		Metric-Spec-Small is set to {0x5040} when the sensor device supports measurement storage.					
Applicabilit	у	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040					
Other PICS		C_MAN_BLE_042					
Initial condi	ition	The PHG under test and the simulated PHD are in the Standby state.					
Test procedure		<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a spot-check measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also supports the RACP characteristic and has an identical spot-check measurement temporarily stored.</li> </ol>					
		2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:					
		a. PLX Spot-Che	eck Measurement (0x2A5E)				
		b. PLX Features	s (0x2A60)				
		i. Field: Su	pported Features				
		• Form	nat: 16 bit				
		supp	e: 0000 0000 0100 1100 (MSB $\rightarrow$ Ls ported (bit 6). Measurement Storage ported (bit 2). Timestamp for Spot-Ch				
		ii. Field: Me	asurement Status Support				
		• This	field is not included				
		iii. Field: De	vice and Sensor Status Support				
		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 PLX Features characteristic.
	5. The simulated PHD sends the Measurement to the PHG under test with the following value:
	a. PLX Spot-Check Measurement (0x2A5E)
	i. Field: Flags
	Format: 8 bit
	<ul> <li>Value: 0000 1001 (MSB → LSB). Timestamp and Pulse Amplitude Index fields are present. Measurement Status, and Device and Sensor Status are not present. Device Clock is set.</li> </ul>
	ii. Field: SpO2PR-Spot-Check - SpO2 (%)
	Format: SFLOAT
	Value: Not Relevant
	iii. Field: SpO2PR-Spot-Check – PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	iv. Field: Time Stamp
	Format: Date and Time
	Value: Not Relevant
	v. Field: Measurement Status
	This field is not included
	vi. Field: Device and Sensor Status
	This field is not included
	vii. Field: Pulse Amplitude Index (%)
	Format: SFLOAT
	Value: Not Relevant
	6. Check in PHG transcoder output the Pulsatile Quality Numeric Object – Metric-Spec-Small attribute
	7. IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	<ul> <li>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 spot-check measurement to the PHG under test</li> </ul>
	<ul> <li>b) Check in PHG transcoder output the Pulsatile Quality Numeric Object – Metric-Spec- Small attribute</li> </ul>
Pass/Fail criteria	In Step 6, the Pulsatile Quality Numeric Object – Metric-Spec-Small attribute is present and its value is {0x5040} (mss-avail-stored-data  mss-msmt-aperiodic  mss-acc-agent-initiated).
	If the PHG supports RACP, the same criteria applies to Step 7.b.
Notes	Possible values in typical points of observation after transcoder output are:
(To assist manual testing)	a) IEEE 11073 Objects and Attributes
	Metric-Spec-Small attribute is present:
	Object: Pulsatile Quality Numeric Object
	Attribute-id: MDC_ATTR_METRIC_SPEC_SMALL (2630)
	Attribute-type: BITS-16
	Attribute-value: 50 40 (hex) or BITS mss-avail-stored-data (1), 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 ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-047					
TP label		Whitepaper. Pulsatile Quality Numeric Object (Spot-Check Measurement) - Metric-Spec-Small Attribute 2					
Coverage Spec		[Bluetooth PHDT v1.6]					
	Testable items	PQ	Numeric	: 3; M	PQ Numeric 4; M		
Test purpos	e	Che	ck that:				
					Numeric Object – Metric-Spec-S neasurement mode.	mall attribute in transcoder	
		[AN	D]				
		Metric-Spec-Small is set to {0x1040} when the sensor device does not support measurement storage.					
Applicabilit	у	C_N	/AN_BL	E_000 AND C_MAI	N_BLE_002 AND C_MAN_BLE_	040	
Other PICS							
Initial condi	tion	The	PHG ur	ider test and the sir	nulated PHD are in the Standby	state.	
Test procedure		<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a spot-check measurement ready to be sent and it is in the Advertising state (it is discoverable).</li> <li>The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:</li> </ol>					
			a. PLX Spot-Check Measurement (0x2A5E)				
				X Features (0x2A60			
			i.	Field: Supported I	Features		
				• Format: 16 bi	t		
				supported (bi	0000 0100 1100 (MSB → LSB). I t 6). Measurement Storage for sp t 2). Timestamp for Spot-Check i	oot-check measurements is	
			ii.	Field: Measureme	ent Status Support		
				• This field is n	ot included		
			iii.	Field: Device and	Sensor Status Support		
				• This field is n	ot included		
		3. The PHG under test initiates a discovery process (Scanning state), it disco simulated PHD and it starts a pairing process with the simulated PHD (Initi					
		4.		ne pairing has been PLX Features cha	completed (Connection state), f aracteristic.	orce the PHG under test to	
			The sim value:	ulated PHD sends	the Measurement to the PHG ur	nder test with the following	
			a. PL	X Spot-Check Meas	surement (0x2A5E)		
			i.	Field: Flags			
				• Format: 8 bit			

<ul> <li>Value: 0000 1001 (MSB → LSB). Timestamp and Pulse Amplitud fields are present. Measurement Status and Device and Sensor S are not present. Device Clock is set.</li> <li>ii. Field: SpO2PR-Spot-Check - SpO2 (%)</li> <li>Format: SFLOAT</li> </ul>	
Format: SFLOAT	
Value: Not Relevant	
iii. Field: SpO2PR-Spot-Check – PR (bpm)	
Format: SFLOAT	
Value: Not Relevant	
iv. Field: Time Stamp	
Format: Date and Time	
Value: Not Relevant	
v. Field: Measurement Status	
This field is not included	
vi. Field: Device and Sensor Status	
This field is not included	
vii. Field: Pulse Amplitude Index (%)	
Format: SFLOAT	
Value: Not Relevant	
6. Check in PHG transcoder output the Pulsatile Quality Numeric Object – Metric- attribute	-Spec-Small
Pass/Fail criteria       In Step 6, the SpO2 Numeric Object – Metric-Spec-Small attribute is present and its {0x1040} (mss-msmt-aperiodic   mss-acc-agent-initiated).	s value is
<b>Notes</b> Possible values in typical points of observation after transcoder output are:	
(To assist manual a) IEEE 11073 Objects and Attributes	
Metric-Spec-Small attribute is present:	
Object: Pulsatile Quality Numeric Object	
Attribute-id: MDC_ATTR_METRIC_SPEC_SMALL (2630)	
Attribute-type: BITS-16	
Attribute-value: 10 40 (hex) or BITS mss-msmt-aperiodic(3), mss-acc-age initiated(9) set to TRUE and remaining BITS set to FALSE	nt-
b) WAN PCD-01 message	
PCD-01 message does not include segments with Metric-Spec-Small attribute	value

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-048		
TP label		Whitepaper. Pulsatile Quality Numeric Object (Continuous Measurements) - Metric-Spec-Small Attribute		
Coverage Spec		[Bluetooth PHDT v1.6]		
	Testable items	PQ Numeric 11; M		
Test purpose		Check that: PHG includes Pulsatile Quality Numeric Object – Metric-Spec-Small attribute in transcoder output when using continuous measurements.		

	[AND]
	Metric-Spec-Small is set to {0x0040} (mss-acc-agent-initiated)
Applicability	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040
Other PICS	
Initial condition	The PHG under test and the simulated PHD are in the Standby state.
Test procedure	<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a continuous measurement (including fast and slow response measurement values) ready to be sent and it is in the Advertising state (it is discoverable).</li> </ol>
	2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:
	a. PLX Features (0x2A60)
	i. Field: Supported Features
	Format: 16 bit
	<ul> <li>Value: 0000 0000 0111 0000 (MSB → LSB). Fast and slow response modes are supported (bits 4 and 5). Pulse Amplitude Index field is supported (bit 6)</li> </ul>
	ii. Field: Measurement Status Support
	This field is not included
	iii. Field: Device and Sensor Status Support
	This field is not included
	b. PLX Continuous Measurement (0x2A5F)
	i. Field: Flags
	Format: 8 bit
	<ul> <li>Value: 0001 0011 (MSB → LSB). SpO2PR–Fast, SpO2PR-Slow and Pulse Amplitude Index fields are present. Measurement Status and Device and Sensor Status fields are not present.</li> </ul>
	ii. Field: SpO2PR-Normal - SpO2 (%)
	Format: SFLOAT
	Value: Not Relevant
	iii. Field: SpO2PR-Normal – PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	iv. Field: SpO2PR-Fast - SpO2 (%)
	Format: SFLOAT
	Value: Not Relevant
	v. Field: SpO2PR-Fast - PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	vi. Field: SpO2PR-Slow - SpO2 (%)
	Format: SFLOAT
	Value: Not Relevant
	vii. Field: SpO2PR-Slow - PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	viii. Field: Measurement Status

Small	
In Step 6, the Pulsatile Quality Numeric Object – Metric-Spec-Small attribute is present and its value is {0x0040} (mss-acc-agent-initiated).	
Possible values in typical points of observation after transcoder output are:	

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-049			
TP label		Whitepaper. Pulsatile Quality Numeric Object (Spot-Check Measurement) – Unit-Code Attribute			
Coverage	Spec	[Bluetooth PHDT v1.6]			
Testable items		PQ Numeric 6; M			
Test purpose		Check that: PHG includes Pulsatile Quality Numeric Object – Unit-Code attribute in transcoder output when using spot-check measurement mode. [AND] Unit-Code is set to MDC DIM PERCENT			
Applicabili	ty	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040			
Other PICS	5	C_MAN_BLE_042			
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 Pulse Oximeter Profile (device specialization), it has a spot-check measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also supports the RACP characteristic and has an identical spot-check measurement temporarily stored.			

2.	The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:		
	a.	PL	X Features (0x2A60)
		i.	Field: Supported Features
			Format: 16 bit
			<ul> <li>Value: 0000 0000 0100 1100 (MSB → LSB). Pulse Amplitude Index field is supported (bit 6). Measurement Storage for spot-check measurements is supported (bit 2). Timestamp for Spot-Check measurements is supported (bit 3).</li> </ul>
		ii.	Field: Measurement Status Support
			This field is not included
		iii.	Field: Device and Sensor Status Support
			This field is not included
	b.	PL	X Spot-Check Measurement (0x2A5E)
		i.	Field: Flags
			Format: 8 bit
			<ul> <li>Value: 0000 1001 (MSB → LSB). Timestampo and Pulse Amplitude Index fields are present. Measurement Status and Device and Sensor Status field are not present. Device Clock is set.</li> </ul>
		ii.	Field: SpO2PR-Spot-Check - SpO2 (%)
			Format: SFLOAT
			Value: Not Relevant
		iii.	Field: SpO2PR-Spot-Check – PR (bpm)
			Format: SFLOAT
			Value: Not Relevant
		iv.	Field: Time Stamp
			Format: Date and Time
			Value: Not Relevant
		٧.	Field: Measurement Status
			This field is not included
		vi.	Field: Device and Sensor Status
			This field is not included
		vii.	Field: Pulse Amplitude Index (%)
			Format: SFLOAT
			Value: Not Relevant
3.			IG under test initiates a discovery process (Scanning state), it discovers the ed PHD and it starts a pairing process with the simulated PHD (Initiating state).
4.			he pairing has been completed (Connection state), force the PHG under test to e PLX Features characteristic.
5.	Th	e sim	nulated PHD sends the Measurement to the PHG under test.
6.	att	ribute	
7.	IF		AN_BLE_042 = TRUE (PHG supports RACP) THEN
	a)	per	e PHG under test requests the Simulated PHD to report stored records by forming a writing operation in the Record Access Control Point (RACP) and the nulated PHD sends the temporarily stored spot-check measurement to PHG unde t

	<ul> <li>b) Check in PHG transcoder output the Pulsatile Quality Numeric Object – Unit-Code attribute</li> </ul>		
Pass/Fail criteria	In Step 6, the Pulsatile Quality Numeric Object – Unit-Code attribute is present and its set to MDC_DIM_PERCENT.		
	If the PHG supports RACP, the same criteria applies to Step 7.b.		
Notes (To assist manual	Possible values in typical points of observation after transcoder output are:		
testing)	a) IEEE 11073 Objects and Attributes		
	Unit-Code attribute is present:		
	Object: Pulsatile Quality Numeric Object		
	Attribute-id: MDC_ATTR_UNIT_CODE (2454)		
	□ Attribute-type: INT-U16		
	Attribute-value: MDC_DIM_PERCENT or 544 (dec) or 02 20 (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 150320^MDC_SAT_O2_QUAL^MDC m.0.0.x[[value]] 262688^MDC_DIM_PERCENT^MDC     R   [current_date_time]		

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-050				
TP label		Whitepaper. Pulsatile Quality Numeric Object (Continuous Measurements) – Unit-Code Attribute				
Coverage	Spec	[Bluetooth PHDT v1.6]				
	Testable items	PQ Numeric 12; M				
Test purpo	se	Check that:				
		PHG includes Pulsatile Quality Numeric Object – Unit-Code attribute in transcoder output when using continuous measurements.				
		[AND]				
		Unit-Code is set to MDC_DIM_PERCENT				
Applicabili	y	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040				
Other PICS						
Initial cond	ition	The PHG under test and the simulated PHD are in the Standby state.				
Test procedure		<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a continuous measurement (including fast and slow response measurement values) ready to be sent and it is in the Advertising state (it is discoverable).</li> </ol>				
		2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:				
		a. PLX Features (0x2A60)				
		i. Field: Supported Features				
		Format: 16 bit				
		<ul> <li>Value: 0000 0000 0111 0000 (MSB → LSB). Fast and slow response modes are supported (bits 4 and 5). Pulse Amplitude Index field is supported (bit 6).</li> </ul>				
		ii. Field: Measurement Status Support				

	This field is not included
	iii. Field: Device and Sensor Status Support
	This field is not included
	b. PLX Continuous Measurement (0x2A5F)
	i. Field: Flags
	• Format: 8 bit
	<ul> <li>Value: 0001 0011(MSB → LSB). SpO2PR–Fast, SpO2PR-Slow and Pulse Amplitude Index fields are present. Measurement Status, and Device and Sensor Status fields are not present.</li> </ul>
	ii. Field: SpO2PR-Normal - SpO2 (%)
	Format: SFLOAT
	Value: Not Relevant
	iii. Field: SpO2PR-Normal – PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	iv. Field: SpO2PR-Fast - SpO2 (%)
	Format: SFLOAT
	Value: Not Relevant
	v. Field: SpO2PR-Fast - PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	vi. Field: SpO2PR-Slow - SpO2 (%)
	Format: SFLOAT
	Value: Not Relevant
	vii. Field: SpO2PR-Slow - PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	viii. Field: Measurement Status
	This field is not included
	ix. Field: Device and Sensor Status
	This field is not included
	x. Field: Pulse Amplitude Index (%)
	Format: SFLOAT
	Value: Not Relevant
	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 PLX Features characteristic.
	5. The simulated PHD sends the Measurement to the PHG under test.
	<ol> <li>Check in PHG transcoder output the Pulsatile Quality Numeric Object – Unit-Code attribute.</li> </ol>
Pass/Fail criteria	In Step 6, the Pulsatile Quality Numeric Object – Unit-Code attribute is present and it is set to MDC_DIM_PERCENT.
Notes (To assist manual	Possible values in typical points of observation after transcoder output are:

testing)	a)	IEEE 11073 Objects and Attributes
		Unit-Code attribute is present:
		Object: Pulsatile Quality Numeric Object
		Attribute-id: MDC_ATTR_UNIT_CODE (2454)
		Attribute-type: INT-U16
		Attribute-value: MDC_DIM_PERCENT or 544 (dec) or 02 20 (hex)
	b)	WAN PCD-01 message
		PCD-01 message includes a segment like this for each SpO2 object with Unit-Code attribute value (check OBX-6):
		OBX n NM 150320^MDC_SAT_O2_QUAL^MDC m.0.0.x [value]  262688^MDC_DIM_PERCENT^MDC     R   [current_date_time]

TP ld		TP/LP-PAN/PHG/PH	DTW/PLX/BV-051					
TP label		Whitepaper. Pulsatile Quality Numeric Object (Spot-Check Measurement) – Absolute-Time- Stamp Attribute						
Coverage	Spec	[Bluetooth PHDT v1.	6]					
	Testable	PQ Numeric 7; M	Date-Time Conv 2; M	Date-Time Conv 3; M				
	items	Date-Time Conv 4; M	1 Date-Time Conv 5; M					
Test purpo	se	Check that:						
			e Stamp field of Spot-Check Meas ect - Absolute-Time-Stamp attribu	surement characteristic into Pulsatile te				
		[AND]	[AND]					
		PHG transcodes the	Bluetooth Time Stamp field formation	t to Absolute Time format				
		[AND]	[AND]					
		The fraction of secon	The fraction of seconds in Absolute Time at transcoder output is 0					
Applicabilit	ty	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040						
Other PICS		C_MAN_BLE_042						
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 Pulse Oximeter Profile (device specialization), it has a Spot-Check measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also supports the RACP characteristic and has an identical spot-check measurement temporarily stored.						
		2. The simulated PHD implements several BTLE characteristics. The characteristic of for this Test Case is:						
		a. PLX Feature	es (0x2A60)					
		i. Field: S	supported Features					
		• Fo	rmat: 16 bit					
		su	oported (bit 6). Measurement Stora	→ LSB). Pulse Amplitude Index field is age for spot-check measurements is ot-Check measurements is supported (bit				
		ii. Field: M	leasurement Status Support					
		• Th	s field is not included					
		iii. Field: D	evice and Sensor Status Support					

value matches with Time Stamp field of Spot-Check Measurement characteristic and fraction of seconds is set to 0.         If the PHG supports RACP, the same criteria applies to Step 7.b.         Notes       Possible values in typical points of observation after transcoder output are:					
i. Field: Flags         ii. Field: Sp02PR-Spot-Check - Sp02 (%)         iii. Field: Sp02PR-Spot-Check - Sp02 (%)         iii. Field: Sp02PR-Spot-Check - Sp02 (%)         iiii. Field: Sp02PR-Spot-Check - Sp02 (%)         iiii. Field: Sp02PR-Spot-Check - Sp02 (%)         iiiiiiii: Field: Sp02PR-Spot-Check - PR (bpm)         iiii: Field: Sp02PR-Spot-Check - PR (bpm)         iiii: Field: Sp02PR-Spot-Check - PR (bpm)         iiii: Field: Sp02PR-Spot-Check - PR (bpm)         iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii		This field is not included			
<ul> <li>Format: 8 bit</li> <li>Value: 0000 1001 (MSB -&gt; LSB). Pulse Amplitude Index and Timestamp fields are present. Measurement Status and Device and Sensor Status fields are not present. Device Clock is sat.</li> <li>Field: Sp02PR-Spot-Check - Sp02 (%)         <ul> <li>Format: SFLOAT</li> <li>Value: Not Relevant</li> <li>Field: Sp02PR-Spot-Check - PR (bpm)</li> <li>Format: SFLOAT</li> <li>Value: Not Relevant</li> <li>Field: Time Stamp</li> <li>Format: Date and Time</li> <li>Value: Not Relevant</li> <li>Field: Time Stamp</li> <li>Format: Date and Time</li> <li>Value: October 12nd, 2015, 10:39:27</li> <li>Field: Device and Sensor Status</li> <li>This field is not included</li> <li>Viii Field: Device and Sensor Status</li> <li>This field is not included</li> <li>Viii Field: Device and Sensor Status</li> <li>This field is not included</li> <li>Viii Field: Pulse Amplitude Index (%)</li> <li>Format: SFLOAT</li> <li>Value: Not Relevant</li> </ul> </li> <li>When the paining has been completed (Connection state), force the PHG under test to rad the PHD and it starts a paining process with the simulated PHD (mitating state).</li> <li>When the paining has been completed (Connection state), force the PHG under test to rad the PHZ Features characteristic.</li> </ul> <li>The PHG under test intilates a discovery process (Scanning state). It discovers the simulated PHD is and its that a paining process with the simulated PHD (mitating state).</li> <li>When the paining has been completed (Connection state), force the PHG under test to rad the PLX Features characteristic.</li> <li>The PHG under test inquests the Simulated PHD to report stored records by performing a writing operation in the Record Access Control Point (RACP) and</li>		b. PLX Spot-Check Measurement (0x2A5E)			
• Value: 0000 1001 (MSB → LSB). Pulse Amplitude Index and Timestamp fields are present. Measurement Status and Device and Sensor Status fields are not present. Device Clock is set.         ii.       Field: Sp02PR-Spot-Check - Sp02 (%)         • Format: SFL0AT       • Value: Not Relevant         iii.       Field: Sp02PR-Spot-Check - PR (bpm)         • Value: Not Relevant       • Value: Not Relevant         iiv.       Field: Time Stamp         • Value: October 12nd, 2015, 10:39:27       • Vialue: Clock and Time         • Value: October 12nd, 2015, 10:39:27       • Field: Measurement Status         • This field is not included       • This field is not included         vii. Field: Pulse Amplitude Index (%)       • Format: SFLOAT         • Value: Not Relevant       • This field is not included         vii. Field: Pulse Amplitude Index (%)       • Format: SFLOAT         • Value: Not Relevant       • 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 paing process with the simulated PHD onder test to read the PLX Features characteristic.         4.       When the pairing has been completed (Connection state), force the PHG under test to read the PLX Features characteristic.         5.       The simulated PHD and the Measurement to the PHG under test.         6.       Check in PHG stranscoder output the Pulsatile Quality Numeric Obje		i. Field: Flags			
fields are present. Measurement Status and Device and Sensor Status fields are not present. Device Clock is set.         ii. Field: Sp02PR-Spot-Check - Sp02 (%)         · Format: SFLOAT         · Value: Not Relevant         iii. Field: Sp02PR-Spot-Check – PR (bpm)         · Format: SFLOAT         · Value: Not Relevant         iii. Field: Time Stamp         · Format: SFLOAT         · Value: Not Relevant         iv. Field: Time Stamp         · Format: SFLOAT         · Value: October 12nd, 2015, 10:39:27         v. Field: Device and Sensor Status         · This field is not included         vii. Field: Device and Sensor Status         · This field is not included         vii. Field: Puise Amplitude Index (%)         · Format: SFLOAT         · Value: Not Relevant         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 PLX Features characteristic.         5. The simulated PHD sends the Measurement to the PHG under test.         6. Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time- Stamp attribute         7. IF C MAN BLE 042 = TRUE (PHG supports RACP) THEN         a) The PHG under test re		Format: 8 bit			
Pormat: SFLOAT     Value: Not Relevant     Value: October 12nd, 2015, 10:39:27     V. Field: Time Stamp     Format: SFLOAT     Value: October 12nd, 2015, 10:39:27     V. Field: Measurement Status     Value: October 12nd, 2015, 10:39:27     V. Field: Measurement Status     This field is not included     vi. Field: Device and Sensor Status     This field is not included     vi. Field: Pulse Amplitude Index (%)     Value: Not Relevant     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).     Value: Not Relevant     The PHG under test Initiates a Completed (Connection state), force the PHG under test to     read the PLX Features characteristic.     The simulated PHD sends the Measurement to the PHG under test.     Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-     Stamp attribute     Time-Stamp attribute     viting operation in the Record Access Control Point (RACP) and the     simulated PHD sends the temporarily stored spot-check measurement to PHG under     test     value matches with Time Stamp field of Spot-Check Measurement characteristic and fraction of     seconds is set to 0.     If the PHG supports RACP, the same criteria applies to Step 7.b.     Possible values in typical points of observation after transcoder output are:		fields are present. Measurement Status and Device and Sensor Status fields			
• Value: Not Relevant         iii. Field: SpO2PR-Spot-Check – PR (bpm)         • Format: SFLOAT         • Value: Not Relevant         iv. Field: Time Stamp         • Format: Date and Time         • Value: October 12nd, 2015, 10:39:27         v. Field: Measurement Staus         • This field is not included         vi. Field: Device and Sensor Status         • This field is not included         vii. Field: Pulse Amplitude Index (%)         • Format: SFLOAT         • Value: Not Relevant         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 PLX Features characteristic.         5. The simulated PHD sends the Measurement to the PHG under test.         6. Check in PHC transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute         7. IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN         a) 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 lemporarily stored spot-check measurement to PHG under test         b) Check in PHG stanscoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute         value matches with Time Stamp field of Spot-Check		ii. Field: SpO2PR-Spot-Check - SpO2 (%)			
iii. Field: Sp02PR-Spot-Check – PR (bpm) <ul> <li>Format: SFLOAT</li> <li>Value: Not Relevant</li> <li>Field: Time Stamp</li> <li>Format: Date and Time</li> <li>Value: October 12nd, 2015, 10:39:27</li> <li>Field: Measurement Status</li> <li>This field is not included</li> <li>Vii. Field: Device and Sensor Status</li> <li>This field is not included</li> <li>Vii. Field: Pulse Amplitude Index (%)</li> <li>Format: SFLOAT</li> <li>Value: Not Relevant</li> </ul> <li>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).</li> <li>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).</li> <li>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).</li> <li>When the pairing has been completed (Connection state), force the PHG under test to read the PLX Features characteristic.</li> <li>The Simulated PHD sends the Measurement to the PHG under test.</li> <li>Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute</li> <li>The C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN</li> <li>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 spot-check measurement to PHG under test</li> <li>Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute is present.</li>		Format: SFLOAT			
• Format: SFLOAT         • Value: Not Relevant         iv. Field: Time Stamp         • Format: Date and Time         • Value: October 12nd, 2015, 10:39:27         • Field: Measurement Status         • This field is not included         vi. Field: Pulse Amplitude Index (%)         • Format: SFLOAT         • Value: October 12nd, 2015, 10:39:27         • This field is not included         vii. Field: Device and Sensor Staus         • This field is not included         vii. Field: Pulse Amplitude Index (%)         • Format: SFLOAT         • Value: Not Relevant         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 PLX Features characteristic.         5. The simulated PHD sends the Measurement to the PHG under test.         6. Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute         7. IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN         9. 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 spot-check measurement to PHG under test.         9. Check in PHG transcoder output the Pulsatile Quality Nu		Value: Not Relevant			
• Value: Not Relevant         iv. Field: Time Stamp         • Format: Date and Time         • Value: October 12nd, 2015, 10:39:27         v. Field: Measurement Status         • This field is not included         vii. Field: Device and Sensor Status         • This field is not included         vii. Field: Pulse Amplitude Index (%)         • Format: SFLOAT         • Value: Not Relevant         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 PLX Features characteristic.         5. The simulated PHD sends the Measurement to the PHG under test.         6. Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute         7. IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN         a) The PHG under test requests the Simulated PHD to report stord records by performing a writing operation in the Record Access Control Point (RACP) and the Simulated PHD sends the temporarily stored spot-check measurement to PHG under test test         b) Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute         b) Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute         b) Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-S		iii. Field: SpO2PR-Spot-Check – PR (bpm)			
iv. Field: Time Stamp         iv. Field: Time Stamp         iv. Format: Date and Time         iv. Value: October 12nd, 2015, 10:39:27         iv. Field: Measurement Status         iv. This field is not included         vit. Field: Device and Sensor Status         iv. Field: Pulse Amplitude Index (%)         iv. Field: Pulse Amplitude Index (%)         iv. Field: Pulse Amplitude Index (%)         iv. Format: SELOAT         iv. Value: Not Relevant         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 PLX Features characteristic.         5. The simulated PHD sends the Measurement to the PHG under test.         6. Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute         7. IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN         a) The PHG under test requests the Simulated PHD to report stored records by performing a viting operation in the Record Access Control Point (RACP) and the Simulated PHD sends the temporarily stored spot-check measurement to PHG under test         b) Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute         b) Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute is present, its value matches with Tim		Format: SFLOAT			
• Format: Date and Time         • Value: October 12nd, 2015, 10:39:27         • Field: Measurement Status         • This field is not included         vi. Field: Device and Sensor Status         • This field is not included         vii. Field: Device and Sensor Status         • This field is not included         vii. Field: Device and Sensor Status         • This field is not included         vii. Field: Device and Sensor Status         • This field is not included         vii. Field: Device and Sensor Status         • This field is not included         vii. Field: Device and Sensor Status         • This field is not included         vii. Field: Device and Sensor Status         • This field is not included         vii. Field: Device and Sensor Status         • The PHG under test initiates a discovery process (Scanning state), it discovers the simulated PHD and it starts a pairing process with the simulated PHG under test to read the PLX Features characteristic.         • When the pairing has been completed (Connection state), force the PHG under test to read the PLX Features characteristic.         • The simulated PHD sends the Measurement to the PHG under test.         • Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute         * IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN         a) The PHG under test requests th		Value: Not Relevant			
<ul> <li>Value: October 12nd, 2015, 10:39:27</li> <li>Field: Measurement Status         <ul> <li>This field is not included</li> <li>Field: Device and Sensor Status</li> <li>This field is not included</li> <li>Field: Pulse Amplitude Index (%)</li> <li>Format: SFLOAT                 <ul> <li>Value: Not Relevant</li> </ul> </li> </ul> </li> <li>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).</li> <li>When the pairing has been completed (Connection state), force the PHG under test to read the PLX Features characteristic.</li> <li>The simulated PHD sends the Measurement to the PHG under test.</li> <li>Check in PHG ranscoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute</li> <li>IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN</li></ul>		iv. Field: Time Stamp			
v.       Field: Measurement Status         •       This field is not included         vi.       Field: Device and Sensor Status         •       This field is not included         vii.       Field: Pulse Amplitude Index (%)         •       Format: SFLOAT         •       Value: Not Relevant         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 PHG under test to read the PLX Features characteristic.         4.       When the pairing has been completed (Connection state), force the PHG under test to read the PLX Features characteristic.         5.       The simulated PHD sends the Measurement to the PHG under test.         6.       Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute         7.       IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN         a)       The PHG under test requests the Simulated PHD to report stored records by performing a writing operation in the Record Access Cortol Point (RACP) and the Simulated PHD sends the temporarily stored spot-check measurement to PHG under test         b)       Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute is present, its value matches with Time Stamp field of Spot-Check Measurement characteristic and fraction of seconds is set to 0.         If the PHG supports RACP, the same criteria applies to Step 7.b.         No		Format: Date and Time			
• This field is not included         vi. Field: Device and Sensor Status         • This field is not included         vii. Field: Pulse Amplitude Index (%)         • Format: SFLOAT         • Value: Not Relevant         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 PLX Features characteristic.         5. The simulated PHD sends the Measurement to the PHG under test.         6. Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute         7. IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN         a) 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 spot-check measurement to PHG under test         b) Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute         b) Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute         Pass/Fail criteria       In Step 6, the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute is present, its value matches with Time Stamp field of Spot-Check Measurement characteristic and fraction of seconds is set to 0.         If the PHG supports RACP, the same criteria applies to Step 7.b.         Notes		• Value: October 12nd, 2015, 10:39:27			
vi.       Field: Device and Sensor Status         •       This field is not included         vii.       Field: Pulse Amplitude Index (%)         •       Format: SFLOAT         •       Value: Not Relevant         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 PLX Features characteristic.         5.       The simulated PHD sends the Measurement to the PHG under test.         6.       Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute         7.       IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN         a)       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 spot-check measurement to PHG under test         b)       Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute         Pass/Fail criteria       In Step 6, the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute is present, its value matches with Time Stamp field of Spot-Check Measurement characteristic and fraction of seconds is set to 0.         If the PHG supports RACP, the same criteria applies to Step 7.b.       Possible values in typical points of observation after trans		v. Field: Measurement Status			
This field is not included     vii. Field: Pulse Amplitude Index (%)         Format: SFLOAT         Value: Not Relevant     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 PLX Features characteristic.     5. The simulated PHD sends the Measurement to the PHG under test.     6. Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute     7. IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN     a) 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 spot-check measurement to PHG under test     b) Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute     Pass/Fail criteria     In Step 6, the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute     possible values in typical points of observation after transcoder output are:         a) IEEE 11073 Objects and Attributes         Absolute-Time-Stamp attribute is present:         a) Object: Pulsatile Quality Numeric Object		This field is not included			
vii. Field: Pulse Amplitude Index (%)         • Format: SFLOAT         • Value: Not Relevant         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 PLX Features characteristic.         5. The simulated PHD sends the Measurement to the PHG under test.         6. Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute         7. IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN         a) 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 spot-check measurement to PHG under test         b) Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute         In Step 6, the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute         Pass/Fail criteria         In Step 6, the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute is present, its value matches with Time Stamp field of Spot-Check Measurement characteristic and fraction of seconds is set to 0.         If the PHG supports RACP, the same criteria applies to Step 7.b.         Notes         Object: Pulsatile Quality Numeric Object         a) IEEE 11073 Objects and Attributes       Absolute-Time-Stam		vi. Field: Device and Sensor Status			
<ul> <li>Format: SFLOAT         <ul> <li>Value: Not Relevant</li> </ul> </li> <li>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).</li> <li>When the pairing has been completed (Connection state), force the PHG under test to read the PLX Features characteristic.</li> <li>The simulated PHD sends the Measurement to the PHG under test.</li> <li>Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute</li> <li>IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN         <ul> <li>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 spot-check measurement to PHG under test             <ul></ul></li></ul></li></ul>		This field is not included			
<ul> <li>Value: Not Relevant</li> <li>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).</li> <li>When the pairing has been completed (Connection state), force the PHG under test to read the PLX Features characteristic.</li> <li>The simulated PHD sends the Measurement to the PHG under test.</li> <li>Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute</li> <li>IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN         <ul> <li>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 spot-check measurement to PHG under test</li> <li>Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute</li> </ul> </li> <li>Pass/Fail criteria         <ul> <li>In Step 6, the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute is present, its value matches with Time Stamp field of Spot-Check Measurement characteristic and fraction of seconds is set to 0.</li> <li>If the PHG supports RACP, the same criteria applies to Step 7.b.</li> </ul> </li> <li>Possible values in typical points of observation after transcoder output are:         <ul> <li>IEEE 11073 Objects and Attributes</li> <li>Absolute-Time-Stamp attribute is present:                 <ul> <li>Object: Pulsatile Quality Numeric Object</li> </ul> </li> </ul></li></ul>					
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 PLX Features characteristic.         5. The simulated PHD sends the Measurement to the PHG under test.         6. Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute         7. IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN         a) 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 spot-check measurement to PHG under test         b) Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute         Pass/Fail criteria       In Step 6, the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute is present, its value matches with Time Stamp field of Spot-Check Measurement characteristic and fraction of seconds is set to 0.         If the PHG supports RACP, the same criteria applies to Step 7.b.         Notes       Possible values in typical points of observation after transcoder output are:         a) IEEE 11073 Objects and Attributes       Absolute-Time-Stamp attribute is present:         I Object: Pulsatile Quality Numeric Object       Object		Format: SFLOAT			
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 PLX Features characteristic.         5.       The simulated PHD sends the Measurement to the PHG under test.         6.       Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute         7.       IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN         a)       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 spot-check measurement to PHG under test         b)       Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute         Pass/Fail criteria       In Step 6, the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute is present, its value matches with Time Stamp field of Spot-Check Measurement characteristic and fraction of seconds is set to 0.         If the PHG supports RACP, the same criteria applies to Step 7.b.       Possible values in typical points of observation after transcoder output are:         a)       IEEE 11073 Objects and Attributes       Absolute-Time-Stamp attribute is present:         II       Object: Pulsatile Quality Numeric Object       III Colicit Pulsatile Quality Numeric Object					
read the PLX Features characteristic.         5. The simulated PHD sends the Measurement to the PHG under test.         6. Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute         7. IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN         a) 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 spot-check measurement to PHG under test         b) Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute         Pass/Fail criteria       In Step 6, the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute         Notes       Possible values in typical points of observation after transcoder output are:         a) IEEE 11073 Objects and Attributes       Absolute-Time-Stamp attribute is present:         a) Object: Pulsatile Quality Numeric Object       0		simulated PHD and it starts a pairing process with the simulated PHD (Initiating state).			
6. Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute         7. IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN         a) 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 spot-check measurement to PHG under test         b) Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute         Pass/Fail criteria       In Step 6, the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute is present, its value matches with Time Stamp field of Spot-Check Measurement characteristic and fraction of seconds is set to 0.         If the PHG supports RACP, the same criteria applies to Step 7.b.         Notes       Possible values in typical points of observation after transcoder output are:         a) IEEE 11073 Objects and Attributes       Absolute-Time-Stamp attribute is present:         D) Object: Pulsatile Quality Numeric Object       Object					
Stamp attribute         7.       IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN         a)       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 spot-check measurement to PHG under test         b)       Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute         Pass/Fail criteria       In Step 6, the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute is present, its value matches with Time Stamp field of Spot-Check Measurement characteristic and fraction of seconds is set to 0.         If the PHG supports RACP, the same criteria applies to Step 7.b.         Notes         (To assist manual testing)         a)       IEEE 11073 Objects and Attributes         Absolute-Time-Stamp attribute is present:         a)       Object: Pulsatile Quality Numeric Object		5. The simulated PHD sends the Measurement to the PHG under test.			
a) 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 spot-check measurement to PHG under test         b) Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute         Pass/Fail criteria       In Step 6, the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute is present, its value matches with Time Stamp field of Spot-Check Measurement characteristic and fraction of seconds is set to 0.         If the PHG supports RACP, the same criteria applies to Step 7.b.         Notes         (To assist manual testing)         Possible values in typical points of observation after transcoder output are:         a) IEEE 11073 Objects and Attributes         Absolute-Time-Stamp attribute is present:         D) Object: Pulsatile Quality Numeric Object					
performing a writing operation in the Record Access Control Point (RACP) and the Simulated PHD sends the temporarily stored spot-check measurement to PHG under test         b)       Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute         Pass/Fail criteria       In Step 6, the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute is present, its value matches with Time Stamp field of Spot-Check Measurement characteristic and fraction of seconds is set to 0.         If the PHG supports RACP, the same criteria applies to Step 7.b.         Notes (To assist manual testing)       Possible values in typical points of observation after transcoder output are:         a)       IEEE 11073 Objects and Attributes         Absolute-Time-Stamp attribute is present:       Diffect: Pulsatile Quality Numeric Object		7. IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN			
Time-Stamp attribute         Pass/Fail criteria       In Step 6, the Pulsatile Quality Numeric Object – Absolute-Time-Stamp attribute is present, its value matches with Time Stamp field of Spot-Check Measurement characteristic and fraction of seconds is set to 0.         If the PHG supports RACP, the same criteria applies to Step 7.b.         Notes       Possible values in typical points of observation after transcoder output are:         (To assist manual testing)       IEEE 11073 Objects and Attributes         Absolute-Time-Stamp attribute is present:       Object: Pulsatile Quality Numeric Object		performing a writing operation in the Record Access Control Point (RACP) and the Simulated PHD sends the temporarily stored spot-check measurement to PHG under			
value matches with Time Stamp field of Spot-Check Measurement characteristic and fraction of seconds is set to 0.         If the PHG supports RACP, the same criteria applies to Step 7.b.         Notes (To assist manual testing)       Possible values in typical points of observation after transcoder output are:         a)       IEEE 11073 Objects and Attributes         Absolute-Time-Stamp attribute is present:       Object: Pulsatile Quality Numeric Object		<ul> <li>b) Check in PHG transcoder output the Pulsatile Quality Numeric Object – Absolute- Time-Stamp attribute</li> </ul>			
Notes (To assist manual testing)       Possible values in typical points of observation after transcoder output are:         a)       IEEE 11073 Objects and Attributes Absolute-Time-Stamp attribute is present:         I       Object: Pulsatile Quality Numeric Object	Pass/Fail criteria	value matches with Time Stamp field of Spot-Check Measurement characteristic and fraction of			
(To assist manual testing)       a) IEEE 11073 Objects and Attributes         Absolute-Time-Stamp attribute is present:         Object: Pulsatile Quality Numeric Object		If the PHG supports RACP, the same criteria applies to Step 7.b.			
(To assist manual testing)       a) IEEE 11073 Objects and Attributes         Absolute-Time-Stamp attribute is present:         Object: Pulsatile Quality Numeric Object	Notes	Possible values in typical points of observation after transcoder output are:			
Absolute-Time-Stamp attribute is present:	(To assist manual				
Object: Pulsatile Quality Numeric Object	lesiliy)				
Attribute-id: MDC_ATTR_TIME_STAMP_ABS (2448)					
		Attribute-id: MDC_ATTR_TIME_STAMP_ABS (2448)			

	<ul> <li>Attribute-type: SEQUENCE {century (INT-U8), year (INT-U8), month (INT-U8), day (INT-U8), hour (INT-U8), minute (INT-U8), second (INT-U8), sec-fractions (INT-U8)} (BCD encoding)</li> </ul>
	Attribute-value:
	• century: 20 (hex) or 32 (dec)
	• year: 15 (hex) or 21 (dec)
	• month: 10 (hex) or 16 (dec)
	• day: 12 (hex) or 18 (dec)
	• hour: 10 (hex) or 16 (dec)
	• minute: 39 (hex) or 57 (dec)
	• second: 27 (hex) or 39 (dec)
	<ul> <li>sec-fractions: 00 (hex) or 0 (dec)</li> </ul>
b)	WAN PCD-01 message
	PCD-01 message includes a segment like this with Absolute-Time-Stamp attribute value (check OBX-14):
	OBX n NM 150320^MDC_SAT_O2_QUAL^MDC m.0.0.x [value]  262688^MDC_DIM_PERCENT^MDC     R    <b>20151012103927+0000</b>

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-052				
TP label		Pulsatile Quality Numeric Object (Spot-Check Measurement) – Basic-Nu-Observed-Value Attribute 1				
Coverage	Spec	[Bluetooth PHDT v1.6]				
	Testable items	PQ Numeric 8; M	Short Float Type 1; C			
Test purpos	se	Check that:				
			e Amplitude Index value of the PLX Spo Isatile Quality Numeric Object - Basic-I			
Applicabilit	у	C_MAN_BLE_000 AN	D C_MAN_BLE_002 AND C_MAN_BL	E_040		
Other PICS		C_MAN_BLE_042				
Initial cond	ition	The PHG under test and the simulated PHD are in the Standby state.				
Test procedure		has a Spot-Check discoverable). Th	D is configured with a Pulse Oximeter measurement ready to be sent and it i e simulated PHD also supports the RAC ck measurement temporarily stored.	s in the Advertising state (it is		
		2. The simulated PH for this Test Case	D implements several BTLE characteri is:	stics. The characteristic of interest		
		a. PLX Features	s (0x2A60)			
		i. Field: Su	pported Features			
		• Forr	nat: 16 bit			
		sup	te: 0000 0000 0100 1100 (MSB $\rightarrow$ LSB ported (bit 6). Measurement Storage for ported (bit 2). Timestamp for Spot-Chec	spot-check measurements is		
		ii. Field: Me	easurement Status Support			
		• This	field is not included			

	iii. Field: Device and Sensor Status Support
	This field is not included
	b. PLX Spot-Check Measurement (0x2A5E)
	i. Field: Flags
	Format: 8 bit
	<ul> <li>Value: 0000 1001 (MSB → LSB). Timestamp and Pulse Amplitude Index fields are present. Measurement Status and Device and Sensor Status fields are not present. Device Clock is set.</li> </ul>
	ii. Field: SpO2PR-Spot-Check - SpO2 (%)
	Format: SFLOAT
	Value: Not Relevant
	iii. Field: SpO2PR-Spot-Check – PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	iv. Field: Time Stamp
	Format: Date and Time
	Value: Not Relevant
	v. Field: Measurement Status
	This field is not included
	vi. Field: Device and Sensor Status
	This field is not included
	vii. Field: Pulse Amplitude Index (%)
	Format: SFLOAT
	• Value: 70 (%)
	<ol> <li>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).</li> </ol>
	<ol> <li>When the pairing has been completed (Connection state), force the PHG under test to read the PLX Features characteristic.</li> </ol>
	5. The simulated PHD sends the Measurement to PHG under test.
	<ol> <li>Check in PHG transcoder output the Pulsatile Quality Numeric Object – Basic-Nu- Observed-Value attribute</li> </ol>
	7. IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	<ul> <li>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 spot-check measurement to the PHG under test</li> </ul>
	<ul> <li>b) Check in PHG transcoder output the Pulsatile Quality Numeric Object – Basic-Nu- Observed-Value attribute</li> </ul>
Pass/Fail criteria	In Step 6, the Pulsatile Quality Numeric Object – Basic-Nu-Observed-Value attribute is present and its value matches with the value of the Pulse Amplitude Index of the PLX Spot-Check Measurement chactacteristic (70%).
	If the PHG supports RACP, the same criteria applies to Step 7.b.
Notes	Possible values in typical points of observation after transcoder output are:
(To assist manual testing)	a) IEEE 11073 Objects and Attributes
costing/	Basic-Nu-Observed-Value attribute is present:
	Object: Pulsatile Quality Numeric Object

Attribute-id: MDC_ATTR_NU_VAL_OBS_BASIC (2636)
Attribute-type: SFLOAT
Attribute-value: 00 46 (hex) or 1007 (hex) or F2BC (hex) or 70 (dec)
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 150320^MDC_SAT_O2_QUAL^MDC m.0.0.x  <b>70</b>   262688^MDC_DIM_PERCENT^MDC    R   [current_date_time]

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-053						
TP label		Whitepaper. Pulsatile Quality Numeric Object (Spot-Check Measurement) – Basic-Nu- Observed-Value Attribute 2						
Coverage	Spec	[Blueto	oth PHE	DT v1.6]				
	Testable items	PQ Nur	meric 8;	М	PQ Numeric 14; M	S	Short Float Type 2; M	
Test purpose		PHG tra chactad [AND]	Check that: PHG transcodes Pulse Amplitude Index value of the PLX Spot-Check Measurement chactacteristic into Pulsatile Quality Numeric Object - Basic-Nu-Observed-Value attribute [AND]					
		PHG as	PHG assigns special value NaN (0x07FF) when SpO2 value is unavailable.					
Applicabili	ty	C_MAN	N_BLE_	000 AND C_MA	N_BLE_002 AND C_MA	N_BLE_0	40	
Other PICS	6	C_MAN	N_BLE_	042				
Initial conc	lition	The PH	The PHG under test and the simulated PHD are in the Standby state.					
Test procedure		<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a Spot-Check measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also supports the RACP characteristic and has an identical spot-check measurement temporarily stored.</li> <li>The simulated PHD implements several BTLE characteristics. The characteristics of</li> </ol>						
				this Test Case		ractenstics	s. The characteristics of	
		a.	PLX F	eatures (0x2A6	0)			
			i. F	ield: Supported	Features			
		Format: 16 bit						
			•	supported (b	it 6). Measurement Stora	age for spo	ulse Amplitude Index field is ot-check measurements is leasurements is supported (bit	
			ii. F	ield: Measurem	ent Status Support			
			•	This field is r	not included			
			iii. F	ield: Device and	Sensor Status Support			
			•	This field is r	not included			
		b.	PLX S	Spot-Check Mea	surement (0x2A5E)			
			i. F	ield: Flags				
			•	Format: 8 bit	:			
			•				nd Pulse Amplitude Index evice and Sensor Status fields	

	are not present. Device Clock is set.
	ii. Field: SpO2PR-Spot-Check - SpO2 (%)
	Format: SFLOAT
	Value: Not Relevant
	iii. Field: SpO2PR-Spot-Check – PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	iv. Field: Time Stamp
	Format: Date and Time
	Value: Not Relevant
	v. Field: Measurement Status
	This field is not included
	vi. Field: Device and Sensor Status
	This field is not included
	vii. Field: Pulse Amplitude Index (%)
	Format: SFLOAT
	Value: 07 FF (hex). Special value: NaN
	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 PLX Features characteristic.
	5. The simulated PHD sends the Measurement to the PHG under test.
	<ol> <li>Check in PHG transcoder output the Pulsatile Quality Numeric Object – Basic-Nu- Observed-Value attribute</li> </ol>
	7. IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	<ul> <li>a) 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 spot-check measurement to PHG under test</li> </ul>
	<ul> <li>b) Check in PHG transcoder output the Pulsatile Quality Numeric Object – Basic-Nu- Observed-Value attribute</li> </ul>
Pass/Fail criteria	In Step 6, the Pulsatile Quality Numeric Object – Basic-Nu-Observed-Value attribute is present and its value is is 0x07FF (NaN).
	If the PHG supports RACP, the same criteria applies to Step 7.b.
Notes	Possible values in typical points of observation after transcoder output are:
(To assist manual	a) IEEE 11073 Objects and Attributes
testing)	Basic-Nu-Observed-Value attribute is present:
	<ul> <li>Object: Pulsatile Quality Numeric Object</li> </ul>
	<ul> <li>Attribute-id: MDC_ATTR_NU_VAL_OBS_BASIC (2636)</li> </ul>
	<ul> <li>Attribute-type: SFLOAT</li> </ul>
	<ul> <li>Attribute-value: 07 FF (hex) or NaN (note that a decimal value is not allowed)</li> </ul>
	b) WAN PCD-01 message
	PCD-01 message does not include special values

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-054					
TP label		Whitepaper. Pulsatile Quality Numeric Object (Continuous Measurements) – Basic-Nu- Observed-Value Attribute 1					
Coverage	Spec	[Bluetooth PHDT v1.6]					
	Testable items	PQ Numeric 13; M Short Float Type 1; C					
Test purpos	se	Check that: PHG transcodes Pulse Amplitude Index value of the PLX Continuous Measurement chactacteristic into Pulsatile Quality Numeric Object - Basic-Nu-Observed-Value attribute					
Applicabilit	у	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040					
Other PICS							
Initial cond	ition	The PHG under test and the simulated PHD are in the Standby state.					
Test proced		<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a continuous measurement (including fast and slow response measurement values) ready to be sent and it is in the Advertising state (it is discoverable).</li> </ol>					
		<ul> <li>2. The simulated PHD implements several BTLE characteristics. The characteristic of interest for this Test Case is:</li> <li>a. PLX Features (0x2A60)</li> </ul>					
		i. Field: Supported Features					
		Format: 16 bit					
		<ul> <li>Value: 0000 0000 0111 0000 (MSB → LSB). Fast and slow response modes and Pulse Amplitude Index fields are supported (bits 4, 5 and 6).</li> </ul>					
		ii. Field: Measurement Status Support					
		This field is not included					
		iii. Field: Device and Sensor Status Support					
		This field is not included					
		b. PLX Continuous Measurement (0x2A5F)					
		i. Field: Flags					
		Format: 8 bit					
		<ul> <li>Value: 0001 0011 (MSB → LSB). SpO2PR–Fast, SpO2PR-Slow and Pulse Amplitude Index fields are present. Measurement Status and Device and Sensor Status fields are not present.</li> </ul>					
		ii. Field: SpO2PR-Normal - SpO2 (%)					
		Format: SFLOAT					
		• Value: 96 (%)					
		iii. Field: SpO2PR-Normal - PR (bpm)					
		Format: SFLOAT					
		Value: Not Relevant					
		iv. Field: SpO2PR-Fast - SpO2 (%)					
		Format: SFLOAT					
		• Value: 98 (%)					
		v. Field: SpO2PR-Fast - PR (bpm)					
		Format: SFLOAT					
		Value: Not Relevant					

	vi. Field: SpO2PR-Slow - SpO2 (%)
	Format: SFLOAT
	• Value: 94 (%)
	vii. Field: SpO2PR-Slow - PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	viii. Field: Measurement Status
	This field is not included
	ix. Field: Device and Sensor Status
	This field is not included
	x. Field: Pulse Amplitude Index (%)
	Format: SFLOAT
	• Value: 70 (%)
	<ol> <li>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).</li> </ol>
	<ol> <li>When the pairing has been completed (Connection state), force the PHG under test to read the PLX Features characteristic.</li> </ol>
	5. The simulated PHD sends the Measurement to the PHG under test.
	<ol> <li>Check in PHG transcoder output the Pulsatile Quality Numeric Object – Basic-Nu- Observed-Value attribute.</li> </ol>
Pass/Fail criteria	In Step 6, the Pulsatile Quality Numeric object – Basic-Nu-Observed-Value attribute is present and its value matches with the value of the Pulse Amplitude Index field of the PLX Continuous Measurement chactacteristic (70%).
Notes	Possible values in typical points of observation after transcoder output are:
(To assist manual	a) IEEE 11073 Objects and Attributes
testing)	Basic-Nu-Observed-Value attribute is present:
	Object: Pulsatile Quality Numeric Object
	Attribute-id: MDC_ATTR_NU_VAL_OBS_BASIC (2636)
	Attribute-type: SFLOAT
	Attribute-value: 00 46 (hex) or 1007 (hex) or F2BC (hex) or 70 (dec)
	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 150320^MDC_SAT_O2_QUAL^MDC m.0.0.x  <b>70</b>   262688^MDC_DIM_PERCENT^MDC     R   [current_date_time]

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-055				
TP label		Whitepaper. Pulsatile Quality Numeric Object (Continuous Measurements) – Basic-Nu- Observed-Value Attribute 2				
Coverage Spec		[Bluetooth PHDT v1.6]				
	Testable items	PQ Numeric 13; M	PQ Numeric 14; M	Short Float Type 2; M		
Test purpose		Check that:				
		PHG transcodes Pulse Arr	plitude Index value of the PLX	Continuous Measurement		

	chactacteristic into Pulsatile Quality Numeric Object - Basic-Nu-Observed-Value attribute [AND] PHG assings special value NaN (0x07FF) when Pulsatile Quality value is unavailable.							
Applicability	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040							
Other PICS								
Initial condition	The PHG under test and the simulated PHD are in the Standby state.							
Test procedure	<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a continuous measurement (including fast and slow response measurement values) ready to be sent and it is in the Advertising state (it is discoverable).</li> </ol>							
	2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:							
	a. PLX Features (0x2A60)							
	i. Field: Supported Features							
	Format: 16 bit							
	<ul> <li>Value: 0000 0000 0111 0000 (MSB → LSB). Fast and slow response modes are supported (bits 4 and 5). Pulse Amplitude Index field is supported (bit 6).</li> </ul>							
	ii. Field: Measurement Status Support							
	This field is not included							
	iii. Field: Device and Sensor Status Support							
	This field is not included							
	b. PLX Continuous Measurement (0x2A5F)							
	i. Field: Flags							
	Format: 8 bit							
	<ul> <li>Value: 0001 0011 (MSB → LSB). SpO2PR–Fast, SpO2PR-Slow and Pulse Amplitude Index fields are present. Measurement Status and Device and Sensor Status fields are not present.</li> </ul>							
	ii. Field: SpO2PR-Normal - SpO2 (%)							
	Format: SFLOAT							
	<ul> <li>Value: 07 FF (hex). Special value: NaN</li> </ul>							
	iii. Field: SpO2PR-Normal - PR (bpm)							
	Format: SFLOAT							
	Value: Not Relevant							
	iv. Field: SpO2PR-Fast - SpO2 (%)							
	Format: SFLOAT							
	Value: 07 FF (hex). Special value: NaN							
	v. Field: SpO2PR-Fast - PR (bpm)							
	Format: SFLOAT							
	Value: Not Relevant							
	vi. Field: SpO2PR-Slow - SpO2 (%)							
	Format: SFLOAT							
	<ul> <li>Value: 07 FF (hex). Special value: NaN</li> </ul>							
	vii. Field: SpO2PR-Slow - PR (bpm)							
	Format: SFLOAT							
	Value: Not Relevant							

	viii. Field: Measurement Status						
	This field is not included						
	ix. Field: Device and Sensor Status						
	This field is not included						
	x. Field: Pulse Amplitude Index (%)						
	Format: SFLOAT						
	Value: 07 FF (hex). Special value: NaN						
	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).						
	<ol> <li>When the pairing has been completed (Connection state), force the PHG under test to read the PLX Features characteristic.</li> </ol>						
	The simulated PHD sends the Measurement to the PHG under test.						
	Check in PHG transcoder output the Pulsatile Quality Numeric Object – Basic-Nu- Observed-Value attribute.						
Pass/Fail criteria	n Step 6, the Pulsatile Quality Numeric Object – Basic-Nu-Observed-Value attribute is present and its value is is 0x07FF (NaN).						
Notes	Possible values in typical points of observation after transcoder output are:						
(To assist manual testing)	a) IEEE 11073 Objects and Attributes						
tootingy	Basic-Nu-Observed-Value attribute is present:						
	Object: Pulsatile Quality Numeric Object						
	Attribute-id: MDC_ATTR_NU_VAL_OBS_BASIC (2636)						
	Attribute-type: SFLOAT						
	Attribute-value: 07 FF (hex) or NaN (note that a decimal value is not allowed)						
	b) WAN PCD-01 message						
	PCD-01 message does not include special values						

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-056				
TP label		Whitepaper. Pulsatile Quality measurement value (Spot-Check Measurement)				
Coverage	Spec	[Bluetooth PHDT v1.6]				
	Testable	Short Float Type 1; C	Date-Time Conv 1; M	PQ Numeric 7; M		
	items	PQ Numeric 8; M				
Test purpose		Check that: PHG processes correctly the Pulse Amplitude Index value (%) and and the value of the Time Stamp field of the PLX Spot-Check characteristic				
Applicability	/	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040				
Other PICS		C_MAN_BLE_042				
Initial condi	tion	The PHG under test and the simulated PHD are in the Standby state.				
Test procedure		has a Spot-Check measure discoverable). The simulat identical spot-check measu	figured with a Pulse Oximeter Preement ready to be sent and it is ed PHD also supports the RACF urement temporarily stored.	in the Advertising state (it is		

	for t	his T	est Case is:
	a.	PLX	Features (0x2A60)
		i.	Field: Supported Features
			Format: 16 bit
			<ul> <li>Value: 0000 0000 0100 1100 (MSB → LSB). Pulse Amplitude Index field is supported (bit 6). Measurement Storage for spot-check measurements is supported (bit 2). Timestamp for Spot-Check measurements is supported (bit 3).</li> </ul>
		ii.	Field: Measurement Status Support
			This field is not included
		iii.	Field: Device and Sensor Status Support
			This field is not included
	b.	PLX	Spot-Check Measurement (0x2A5E)
		i.	Field: Flags
			• Format: 8 bit
			<ul> <li>Value: 0000 1001 (MSB → LSB). Pulse Amplitude Index and Timestamp fields are present. Measurement Status and Device and Sensor Status fields are not present. Device Clock is set.</li> </ul>
		ii.	Field: SpO2PR-Spot-Check - SpO2 (%)
			Format: SFLOAT
			Value: Not Relevant
		iii.	Field: SpO2PR-Spot-Check – PR (bpm)
			Format: SFLOAT
			Value: Not Relevant
		iv.	Field: Time Stamp
			Format: Date and Time
			• Value: October 12nd, 2015, 10:39:27
		۷.	Field: Measurement Status
			This field is not included
		vi.	Field: Device and Sensor Status
			This field is not included
		vii.	Field: Pulse Amplitude Index (%)
			Format: SFLOAT
			• Value: 70 (%)
3.			G under test initiates a discovery process (Scanning state), it discovers the d PHD and it starts a pairing process with the simulated PHD (Initiating state).
4.			e pairing has been completed (Connection state), force the PHG under test to (Features characteristic.
5.	The	simu	lated PHD sends the Measurement to the PHG under test.
6.			at the PHG accepts the measurement and decodes its value properly (Pulse e Index value, units and time stamp).
7.	IF C	_MA	N_BLE_042 = TRUE (PHG supports RACP) THEN
	a)	perfo	PHG under test requests the Simulated PHD to report stored records by orming a writing operation in the Record Access Control Point (RACP) and the ulated PHD sends the temporarily stored spot-check measurement to PHG under
	b)		ck that PHG accepts the measurement and decodes its value properly (Pulse litude Index value, units and time stamp)

	In Step 6, the PHG under test shows the following measurement Pulsatile Quality = 70(%) with timestamp '2015-10-12 10:39:27'.			
	If the PHG supports RACP, the same criteria applies to Step 7.b			
Notes				

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-057					
TP label		Whitepaper. Device and Sensor Status Enumeration Object (Spot-Check Measurement) - Handle Attribute					
Coverage	Spec	[Bluetooth PHDT v1.6]					
	Testable items	DSS Enumeration 1; O					
Test purpose		Check that:					
		PHG does not include Device and Sensor Status Enumeration Object – Handle Attribute in transcoder output when using spot-check measurement mode.					
		[OR]					
		If PHG includes Device and Sensor 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_040 AND C_MAN_BLE_041					
Other PICS		C_MAN_BLE_042					
Initial condition		The PHG under test and the simulated PHD are in the Standby state.					
Test procedure		<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a spot-check measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also supports the RACP characteristic and has an identical spot-check measurement temporarily stored.</li> <li>The simulated PHD implements several BTLE characteristics. The characteristics of</li> </ol>					
		interest for this Test Case are:					
		a. PLX Features (0x2A60)					
		i. Field: Supported Features					
		<ul> <li>Format: 16 bit</li> <li>Value: 0000 0000 0000 1110 (MSB → LSB). Device and Sensor Status field is supported (bit 1). Measurement Storage for spot-check measurements is supported (bit 2). Timestamp for Spot-Check measurements is supported (bit 3).</li> </ul>					
		ii. Field: Measurement Status Support					
		This field is not included					
		iii. Field: Device and Sensor Status Support					
		Format: 24 bit					
		Value: Not Relevant					
		b. PLX Spot-Check Measurement (0x2A5E)					
		i. Field: Flags					
		Format: 8 bit					
		<ul> <li>Value: 0000 0101 (MSB → LSB). Timestamp and Device and Sensor Status fields are present. Pulse Amplitude Index and Measurement Status fields are not present. Device Clock is set.</li> </ul>					
		ii. Field: SpO2PR-Spot-Check - SpO2 (%)					

	Format: SFLOAT
	Value: Not Relevant
	iii. Field: SpO2PR-Spot-Check – PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	iv. Field: Time Stamp
	Format: Date and Time
	Value: Not Relevant
	v. Field: Measurement Status
	This field is not included
	vi. Field: Device and Sensor Status
	Format: 24 bit
	Value: Not Relevant
	vii. Field: Pulse Amplitude Index (%)
	This field is not included.
	<ol><li>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).</li></ol>
	<ol> <li>When the pairing has been completed (Connection state), force the PHG under test to read the PLX Features characteristic.</li> </ol>
	5. The simulated PHD sends the measurement to the PHG under test.
	6. Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Handle attribute
	7. IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	<ul> <li>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 spot-check measurement to PHG under test</li> </ul>
	<ul> <li>b) Check in PHG transcoder output the Device and Sensor Status Enumeration Object – Handle attribute</li> </ul>
Pass/Fail criteria	In Step 6, the Device and Sensor Status Enumeration Object – Handle attribute is not present or, if it is present then its value is different than 0
	If the PHG supports RACP, the same criteria applies to Step 7.b.
Notes	Possible values in typical points of observation after transcoder output are:
(To assist manual testing)	a) IEEE 11073 Objects and Attributes
testing)	Handle attribute is not present, or if it is present then:
	Object: Device and Sensor 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 ld	TP/LP-PAN/PHG/PHDTW/PLX/BV-058
TP label	Whitepaper. Device and Sensor Status Enumeration Object (Continuous Measurements) - Handle Attribute

<b>C</b>	<b>C</b> maa	Diveteet						
Coverage	Spec	IBINGtootu	[Bluetooth PHDT v1.6]					
	Testable items	DSS Enui	meration 5; O					
Test purpose		Check that	at:					
		PHG does not include Device and Sensor Status Enumeration Object – Handle Attribute in transcoder output when using continuous measurements						
		[OR]						
		If PHG includes Device and Sensor 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_040 AND C_MAN_BLE_041						
Other PICS								
Initial condit	ion		under test and	tho cir	mulated PHD are in the Standby	ctato		
		перпо			nulated PHD are in the Standby	Sidie.		
Test procedure		has a	a continuous me	asure	igured with a Pulse Oximeter Pr ment (including fast and slow re the Advertising state (it is disco	sponse measurement values)		
			simulated PHD est for this Test		nents several BTLE characterist are:	ics. The characteristics of		
		a. F	PLX Features (0	x2A6(	))			
		i	. Field: Supp	orted I	Features			
			Format	: 16 bi	it			
			<ul> <li>Value: is supp</li> </ul>		0000 0000 0010 (MSB → LSB). (bit 1).	Device and Sensor Status field		
		i	i. Field: Meas	ureme	ent Status Support			
			This fie	ld is n	ot included			
		i	ii. Field: Devid	e and	Sensor Status Support			
			Formation	: 24 bi	it			
			Value:	Not Re	elevant			
		b. F	PLX Continuous	Meas	surement (0x2A5F)			
		i	. Field: Flags					
			Formation	: 8 bit				
			and Se	nsor S	1011 (MSB → LSB). SpO2PR–F Status fields are present. Measu dex fields are not present.			
		i	i. Field: SpO2	PR-N	ormal - SpO2 (%)			
			Format	: SFLO	TAC			
			Value:	Not Re	elevant			
		i	ii. Field: SpO2	PR-N	ormal – PR (bpm)			
			Format	: SFLO	ТАС			
			Value:	Not Re	elevant			
		i	v. Field: SpO2	PR-Fa	ast - SpO2 (%)			
			• Forma	: SFLO	ТАС			
			Value:	Not Re	elevant			
		\ \	v. Field: SpO2	PR-Fa	ast - PR (bpm)			
			Format	: SFLO	ТАС			

	Value: Not Relevant					
	vi. Field: SpO2PR-Slow - SpO2 (%)					
	Format: SFLOAT					
	Value: Not Relevant					
	vii. Field: SpO2PR-Slow - PR (bpm)					
	Format: SFLOAT					
	Value: Not Relevant					
	viii. Field: Measurement Status					
	This field is not included					
	ix. Field: Device and Sensor Status					
	Format: 24 bit					
	Value: Not Relevant.					
	x. Field: Pulse Amplitude Index (%)					
	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 PLX Features characteristic.					
	5. The simulated PHD sends the Measurement to the PHG under test.					
	<ol> <li>Check in PHG transcoder output the Device and Sensor Status Enumeration Object – Handle attribute.</li> </ol>					
Pass/Fail criteria	In Step 6, the Device and Sensor Status Enumeration Object – Handle attribute is not present or, if it is present then its value is different than 0					
Notes	Possible values in typical points of observation after transcoder output are:					
(To assist manual testing)	a) IEEE 11073 Objects and Attributes					
(coung)	Handle attribute is not present, or if it is present then:					
	Object: Device and Sensor 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 label		TP/LP-PAN/PHG/PHDTW/PLX/BV-059         Whitepaper. Device and Sensor Status Enumeration Object (Spot-Check Measurement) - Type Attribute		
	Testable items	DSS Enumeration 2; M		
Test purpose		Check that: PHG includes Device and Sensor Status Enumeration Object – Type attribute in transcoder output when using spot-check measurement mode.		
		[AND]		

	Type is set to {MDC_PART_SCADA, MDC_PULS_OXIM_DEV_STATUS}			
Applicability	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040 AND C_MAN_BLE_041			
Other PICS	C_MAN_BLE_042			
Initial condition				
	The PHG under test and the simulated PHD are in the Standby state.			
Test procedure	<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a spot-check measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also supports the RACP characteristic and has an identical spot-check measurement temporarily stored.</li> </ol>			
	2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:			
	a. PLX Features (0x2A60)			
	i. Field: Supported Features			
	Format: 16 bit			
	<ul> <li>Value: 0000 0000 0000 1110 (MSB → LSB). Device and Sensor Status field is supported (bit 1). Measurement Storage for spot-check measurements is supported (bit 2). Timestamp for Spot-Check measurements is supported (bit 3).</li> </ul>			
	ii. Field: Measurement Status Support			
	This field is not included			
	iii. Field: Device and Sensor Status Support			
	Format: 24 bit			
	Value: Not Relevant			
	b. PLX Spot-Check Measurement (0x2A5E)			
	i. Field: Flags			
	Format: 8 bit			
	<ul> <li>Value: 0000 0101 (MSB → LSB). Timestamp and Device and Sensor Status fields are present. Pulse Amplitude Index and Measurement Status fields are not present. Device Clock is set.</li> </ul>			
	ii. Field: SpO2PR-Spot-Check - SpO2 (%)			
	Format: SFLOAT			
	Value: Not Relevant			
	iii. Field: SpO2PR-Spot-Check – PR (bpm)			
	Format: SFLOAT			
	Value: Not Relevant			
	iv. Field: Time Stamp			
	Format: Date and Time			
	Value: Not Relevant			
	v. Field: Measurement Status			
	This field is not included			
	vi. Field: Device and Sensor Status			
	Format: 24 bit			
	Value: Not Relevant			
	vii. Field: Pulse Amplitude Index (%)			
	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 PLX Features characteristics.				
	5. The simulated PHD sends the Measurement to the PHG under test.				
	6. Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Type attribute				
	7. IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN				
	a) 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 spot-check measurement to the PHG under test				
	<ul> <li>b) Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Type attribute</li> </ul>				
Pass/Fail criteria	In Step 6, the the Device and Sensor Status Enumeration Object – Type attribute				
	is present and its value is {MDC_PART_SCADA, MDC_PULS_OXIM_DEV_STATUS}				
	If the PHG supports RACP, the same criteria applies to Step 7.b.				
Notes	Possible values in typical points of observation after transcoder output are:				
(To assist manual testing)	a) IEEE 11073 Objects and Attributes				
testing)	Type attribute is present:				
	Object: Device and Sensor Status Enumeration Object				
	Attribute-id: MDC_ATTR_ID_TYPE (2351)				
	Attribute-type: SEQUENCE {partition (INT-U16), code (INT-U16)}				
	Attribute-value:				
	<ul> <li>partition: MDC_PART_SCADA or 2 (dec) or 00 02 (hex)</li> </ul>				
	code: MDC_PULS_OXIM_DEV_STATUS or 19532 (dec) or 4C 4C (hex)				
	b) WAN PCD-01 message				
	PCD-01 message includes a segment like this with Type attribute (check OBX-3):				
	OBX n CWE  <b>150604^MDC_PULS_OXIM_DEV_STATUS^MDC</b>  m.0.0.x [value]     R				

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-060				
TP label		Whitepaper. Device and Sensor Status Enumer Type Attribute	ration Object (Continuous Measurements) -			
Coverage Spec [Bluetooth PHDT v1.6]						
	Testable items	DSS Enumeration 6; M				
Test purpose		Check that: PHG includes Device and Sensor Status Enumeration Object – Type attribute in transcoder output when using continuous measurements.				
		[AND] Type is set to {MDC_PART_SCADA, MDC_PULS_OXIM_DEV_STATUS}				
Applicabili	ity	C_MAN_BLE_000 AND C_MAN_BLE_002 AND	D C_MAN_BLE_040 AND C_MAN_BLE_041			
Other PICS						
Initial condition		The PHG under test and the simulated PHD are	e in the Standby state.			

Test procedure	1.	has	a co	ulated PHD is configured with a Pulse Oximeter Profile (device specialization), it ntinuous measurement (including fast and slow response measurement values) be sent and it is in the Advertising state (it is discoverable).	
	2.	The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:			
		a. PLX Features (0x2A60)			
			i.	Field: Supported Features	
				Format: 16 bit	
				<ul> <li>Value: 0000 0000 0011 0010 (MSB → LSB). Device and Sensor Status is supported (bit 1). Fast and slow response modes are supported (bits 4 and 5).</li> </ul>	
			ii.	Field: Measurement Status Support	
				This field is not included	
			iii.	Field: Device and Sensor Status Support	
				Format: 24 bit	
				Value: Not Relevant	
		b.	PLX	Continuous Measurement (0x2A5F)	
			i.	Field: Flags	
				Format: 8 bit	
				• Value: 0000 1011 (MSB → LSB). SpO2PR–Fast, SpO2PR-Slow and Device and Sensor Status fields are present. Measurement Status and Pulse Amplitude Index fields are not present.	
			ii.	Field: SpO2PR-Normal - SpO2 (%)	
				Format: SFLOAT	
				Value: Not Relevant	
			iii.	Field: SpO2PR-Normal – PR (bpm)	
				Format: SFLOAT	
				Value: Not Relevant	
			iv.	Field: SpO2PR-Fast - SpO2 (%)	
				Format: SFLOAT	
				Value: Not Relevant	
			v.	Field: SpO2PR-Fast - PR (bpm)	
				Format: SFLOAT	
				Value: Not Relevant	
			vi.	Field: SpO2PR-Slow - SpO2 (%)	
				Format: SFLOAT	
				Value: Not Relevant	
			vii.	Field: SpO2PR-Slow - PR (bpm)	
				Format: SFLOAT	
				Value: Not Relevant	
			viii.	Field: Measurement Status	
				This field is not included	
			ix.	Field: Device and Sensor Status	
				Or Format: 24 bit	
				Value: Not Relevant.	

	x. Field: Pulse Amplitude Index (%)				
	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 PLX Features characteristic.				
	5. The simulated PHD sends the Measurement to the PHG under test.				
	<ol> <li>Check in PHG transcoder output the Device and Sensor Status Enumeration Object – Type attribute.</li> </ol>				
Pass/Fail criteria	In Step 6, the Pulsatile Quality Numeric Object – Type attribute is present and its value is {MDC_PART_SCADA, MDC_PULS_OXIM_DEV_STATUS}				
Notes	Possible values in typical points of observation after transcoder output are:				
(To assist manual testing)	a) IEEE 11073 Objects and Attributes				
testing)	Type attribute is present:				
	Object: Device and Sensor Status Enumeration Object				
	Attribute-id: MDC_ATTR_ID_TYPE (2351)				
	Attribute-type: SEQUENCE {partition (INT-U16), code (INT-U16)}				
	Attribute-value:				
	• partition: MDC_PART_SCADA or 2 (dec) or 00 02 (hex)				
	code: MDC_PULS_OXIM_DEV_STATUS or 19532 (dec) or 4C 4C (hex)				
	b) WAN PCD-01 message				
	PCD-01 message includes a segment like this with Type attribute (check OBX-3):				
	OBX n CWE  <b>150604^MDC_PULS_OXIM_DEV_STATUS^MDC</b>  m.0.0.x [value]     R				

TP Id TP label		TP/LP-PAN/PHG/PHDTW/PLX/BV-061 Whitepaper. Device and Sensor Status Enumeration Object (Spot-Check Measurement) - Metric-Spec-Small Attribute					
	Testable items	DSS Enumeration 3; M					
Test purpose		Check that:					
		PHG includes Device and Sensor Status Enumeration Object – Metric-Spec-Small attribute in transcoder output when using spot-check measurement mode.					
		[AND]					
		Metric-Spec-Small is set to {0x0040} (mss-acc-agent-initiated)					
Applicabili	ty	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040 AND C_MAN_BLE_041					
Other PICS		C_MAN_BLE_042					
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 Pulse Oximeter Profile (device specialization), it has a spot-check measurement ready to be sent and it is in the Advertising state (it is discoverable). The Simulated PHD also supports the RACP characteristic and has an identical spot-check measurement temporarily stored.					
		2. The simulated PHD implements several BTLE characteristics. The characteristics of					

	inte	interest for this Test Case are:				
	a.		Features (0x2A60)			
		i.	Field: Supported Features			
			Format: 16 bit			
			<ul> <li>Value: 0000 0000 0000 1110 (MSB → LSB). Device and Sensor Status field is supported (bit 1). Measurement Storage for spot-check measurements is supported (bit 2). Timestamp for Spot-Check measurements is supported (bit 3).</li> </ul>			
		ii.	Field: Measurement Status Support			
			This field is not included			
		iii.	Field: Device and Sensor Status Support			
			Format: 24 bit			
			Value: Not Relevant			
	b.	PLX	Spot-Check Measurement (0x2A5E)			
		i.	Field: Flags			
			Format: 8 bit			
			<ul> <li>Value: 0000 0101 (MSB → LSB). Timestamp and Device and Sensor Status fields are present. Pulse Amplitude Index and Measurement Status fields are not present. Device Clock is set.</li> </ul>			
		ii.	Field: SpO2PR-Spot-Check - SpO2 (%)			
			Format: SFLOAT			
			Value: Not Relevant			
		iii.	Field: SpO2PR-Spot-Check – PR (bpm)			
			Format: SFLOAT			
			Value: Not Relevant			
		iv.	Field: Time Stamp			
			Format: Date and Time			
			Value: Not Relevant			
		v.	Field: Measurement Status			
			This field is not included			
		vi.	Field: Device and Sensor Status			
			Format: 24 bit			
			Value: Not Relevant			
		vii.	Field: Pulse Amplitude Index (%)			
			This field is not included			
3.			G under test initiates a discovery process (Scanning state), it discovers the d PHD and it starts a pairing process with the simulated PHD (Initiating state).			
4.			e pairing has been completed (Connection state), force the PHG under test to PLX Features characteristics.			
5.			lated PHD sends the Measurement to the PHG under test.			
6.	<ol> <li>Check in the PHG transcoder output the Device and Sensor Status Enumeration Obje Metric-Spec-Small attribute</li> </ol>					
7.	IF C	C_MA	N_BLE_042 = TRUE (PHG supports RACP) THEN			
	a)	perf	PHG under test requests the Simulated PHD to report stored records by orming a writing operation in the Record Access Control Point (RACP) and the ulated PHD sends the temporarily stored spot-check measurement to PHG under			

	<ul> <li>b) Check in PHG transcoder output the Device and Sensor Status Enumeration Object – Metric-Spec-Small attribute</li> </ul>
Pass/Fail criteria	In Step 6, the Device and Sensor Status Enumeration Object – Metric-Spec-Small attribute is present and its value is {0x0040} (mss-acc-agent-initiated).
	If the PHG supports RACP, the same criteria applies to Step 7.b.
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 and Sensor Status Enumeration Object
	Attribute-id: MDC_ATTR_METRIC_SPEC_SMALL (2630)
	□ Attribute-type: BITS-16
	Attribute-value: 00 40 (hex) or BITS 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 ld TP label		TP/LP-PAN/PHG/PHDTW/PLX/BV-062 Whitepaper. Device and Sensor Status Enumeration Object (Continuous Measurements) - Metric-Spec-Small Attribute				
	Testable items	DSS Enumeration 7; M				
Test purpos	e	Check that:				
		PHG includes Device and Sensor Status Enumeration Object – Metric-Spec-Small attribute in transcoder output when using continuous measurements. [AND]				
		Metric-Spec-Small is set to {0x0040} (mss-acc-agent-initiated)				
Applicability		C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040 AND C_MAN_BLE_041				
Other PICS						
Initial condition		The PHG under test and the simulated PHD are in the Standby state.				
Test procedure		<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a continuous measurement (including fast and slow response measurement values) ready to be sent and it is in the Advertising state (it is discoverable).</li> </ol>				
		2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:				
		a. PLX Features (0x2A60)				
		i. Field: Supported Features				
		Format: 16 bit				
		<ul> <li>Value: 0000 0000 0011 0010 (MSB → LSB). Device and Sensor Status is supported. Fast and slow response modes are supported (bits 4 and 5).</li> </ul>				
		ii. Field: Measurement Status Support				
		This field is not included				
		iii. Field: Device and Sensor Status Support				

	Format: 24 bit
	Value: Not Relevant
	b. PLX Continuous Measurement (0x2A5F)
	i. Field: Flags
	Format: 8 bit
	<ul> <li>Value: 0000 1011 (MSB → LSB). SpO2PR–Fast, SpO2PR-Slow and Device and Sensor Status fields are present. Measurement Status and Pulse Amplitude Index fields are not present.</li> </ul>
	ii. Field: SpO2PR-Normal - SpO2 (%)
	Format: SFLOAT
	Value: Not Relevant
	iii. Field: SpO2PR-Normal – PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	iv. Field: SpO2PR-Fast - SpO2 (%)
	Format: SFLOAT
	Value: Not Relevant
	v. Field: SpO2PR-Fast - PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	vi. Field: SpO2PR-Slow - SpO2 (%)
	Format: SFLOAT
	Value: Not Relevant
	vii. Field: SpO2PR-Slow - PR (bpm)
	Format: SFLOAT
	Value: Not Relevant
	viii. Field: Measurement Status
	This field is not included
	ix. Field: Device and Sensor Status
	Or Format: 24 bit
	Value: Not Relevant.
	x. Field: Pulse Amplitude Index (%)
	This field is not included
	<ol> <li>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).</li> </ol>
	<ol> <li>When the pairing has been completed (Connection state), force the PHG under test to read the PLX Features characteristic.</li> </ol>
	5. The simulated PHD sends the Measurement to the PHG under test.
	<ol> <li>Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Metric-Spec-Small attribute</li> </ol>
Pass/Fail criteria	In Step 6, the the Device and Sensor Status Enumeration Object – Metric-Spec-Small attribute is present and its value is {0x0040} (mss-acc-agent-initiated).
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 and Sensor Status Enumeration Object
	Attribute-id: MDC_ATTR_METRIC_SPEC_SMALL (2630)
	Attribute-type: BITS-16
	Attribute-value: 00 40 (hex) or BITS 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 ld		TP/LP-PAN	/PHG/PHDTW/PLX/	BV-063		
TP label		Whitepaper. Device and Sensor Status Enumeration Object (Spot-Check Measurement) – Enum-Observed-Value-Bit-Str Attribute				
Coverage	Spec	[Bluetooth F	PHDT v1.6]			
	Testable items	DSS Enume	eration 4; M			
Test purpo	se	chactacteris Basic-Bit-St [AND] PHG transc	tic into Device and r attribute odes the Bluetooth	ensor Status field of the PLX Spe Sensor Status Enumeration Obj Device and Sensor Status field o bserved-Value-Basic-Bit-Str att	ect - Enum-Observed-Value-	
Applicabili	-	C_MAN_BL	E_000 AND C_MAN	N_BLE_002 AND C_MAN_BLE_		
Other PICS	5	C_MAN_BL	E_042			
Initial cond	lition	The PHG u	nder test and the sir	nulated PHD are in the Standby	state.	
Test procedure		1. The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a spot-check measurement ready to be sent and it is in the Advertising state (it is discoverable). The simulated PHD also supports the RACP characteristic and has an identical spot-check measurement temporarily stored.				
			nulated PHD implem	nents several BTLE characterist	ics. The characteristics of	
		a. PL	X Spot-Check Meas	surement (0x2A5E)		
		b. PL	X Features (0x2A60	))		
		i.	Field: Supported F	eatures		
			Format: 16 bi	t		
			support is pre measuremen	bood 0000 1110 (MSB $\rightarrow$ LSB). sent (bit 1). Measurement Stora is is supported (bit 2). Tiimestan is is supported (bit 3).	age for spot-check	
		ii.	Field: Measureme	nt Status Support		
			• This field is not	ot included		
		iii.	Field: Device and	Sensor Status Support		
			• Format: 24 bi	t		
				0000 <b>1111 1111 1111 1111</b> (MS s bits are supported	B → LSB). All Device and	

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 PLX Features characteristic.	
5.	The simulated PHD sends the Measurement to the PHG under test with the following value:	
	a. PLX Spot-Check Measurement (0x2A5E)	
	i. Field: Flags	
	• Format: 8 bit	
	<ul> <li>Value: 0000 0101 (MSB → LSB). Device and Sensor Status and Timestar field are present. Measurement Status, and Pulse Amplitude Index fields a not present. Device Clock is set.</li> </ul>	
	ii. Field: SpO2PR-Spot-Check - SpO2 (%)	
	Format: SFLOAT	
	Value: Not Relevant	
	iii. Field: SpO2PR-Spot-Check – PR (bpm)	
	Format: SFLOAT	
	Value: Not Relevant	
	iv. Field: Time Stamp	
	This field is not included	
	v. Field: Measurement Status	
	This field is not included	
	vi. Field: Device and Sensor Status	
	Format: 24 bit	
	<ul> <li>Value: 0000 0000 0000 0000 0000 0001 (MSB → LSB). Extended Display Update Ongoing (bit 0).</li> </ul>	y
	vii. Field: Pulse Amplitude Index (%)	
	This field is not included	
6.	Check in the PHG transcoder output the Device and Sensor Status Enumeration Object Enum-Observed-Value-Basic-Bit-Str attribute	t –
7.	IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN	
	a) 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 spot-check measurement to PHG und test	
	<ul> <li>b) Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute</li> </ul>	
8.	The simulated PHD sends a Measurement to the PHG under test with Measurement Status field set to 0000 0000 0000 0000 0000 0010 (MSB $\rightarrow$ LSB). Equipment Malfunct (bit 1). All remaining fields remain equal to those in step 5. Simulated PHD also deletes stored records in RACP and stores an identical measurement.	
9.	Check in the PHG transcoder output the Device and Sensor Status Enumeration Object Enum-Observed-Value-Basic-Bit-Str attribute	t –
10.	IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN	
	a) 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 spot-check measurement to the PHG under test	
	<ul> <li>b) Check in PHG transcoder output the Device and Sensor Status Enumeration Object Enum-Observed-Value-Basic-Bit-Str attribute</li> </ul>	ct –

11.	The simulated PHD sends a Measurement to the PHG under test with Measurement Status field set to 0000 0000 0000 0000 0100 (MSB $\rightarrow$ LSB). Signal Processing Irregularity Detected (bit 2). All remaining fields remain equal to those in step 5. Simulated PHD also deletes all stored records in RACP and stores an identical measurement.
12.	Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute
13.	IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	a) 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 spot-check measurement to the PHG under test
	<ul> <li>b) Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute</li> </ul>
14.	The simulated PHD sends a Measurement to the PHG under test with Measurement Status field set to 0000 0000 0000 0000 1000 (MSB $\rightarrow$ LSB). Inadequate Signal Detected (bit 3). All remaining fields remain equal to those in step 5. Simulated PHD also deletes all stored records in RACP and stores an identical measurement.
15.	Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute
16.	IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	a) 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 spot-check measurement to PHG under test
	<ul> <li>b) Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute</li> </ul>
17.	The simulated PHD sends a Measurement to the PHG under test with Measurement Status field set to 0000 0000 0000 0000 0001 0000 (MSB $\rightarrow$ LSB). Poor Signal Detected (bit 4). All remaining fields remain equal to those in step 5. The simulated PHD also deletes all stored records in RACP and stores an identical measurement.
18.	Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute
19.	IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	a) 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 spot-check measurement to PHG under test
	<ul> <li>b) Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute</li> </ul>
20.	The simulated PHD sends a Measurement to the PHG under test with Measurement Status field set to 0000 0000 0000 0000 0010 0000 (MSB $\rightarrow$ LSB). Low Perfusion Detected (bit 5). All remaining fields remain equal to those in step 5. Simulated PHD also deletes all stored records in RACP and stores an identical measurement.
21.	Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute
22.	IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	a) 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 spot-check measurement to the PHG under test
	<ul> <li>b) Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute</li> </ul>
23.	The simulated PHD sends a Measurement to the PHG under test with Measurement Status field set to 0000 0000 0000 0100 0000 (MSB $\rightarrow$ LSB). Erratic Signal Detected (bit 6). All remaining fields remain equal to those in step 5. Simulated PHD also deletes all stored records in RACP and stores an identical measurement.
24.	Check in the PHG transcoder output the Device and Sensor Status Enumeration Object –

	Enum-Observed-Value-Basic-Bit-Str attribute
25.	IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	a) 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 spot-check measurement to the PHG under test
	<ul> <li>b) Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute</li> </ul>
26.	The simulated PHD sends a Measurement to the PHG under test with Measurement Status field set to 0000 0000 0000 0000 1000 0000 (MSB $\rightarrow$ LSB). Non-Pulsatile Signal Detected (bit 7). All remaining fields remain equal to those in step 5. The simulated PHD also deletes all stored records in RACP and stores an identical measurement.
27.	Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute
28.	IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	a) 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 spot-check measurement to the PHG under test
	<ul> <li>b) Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute</li> </ul>
29.	The simulated PHD sends a Measurement to the PHG under test with Measurement Status field set to 0000 0000 0000 0001 0000 (MSB $\rightarrow$ LSB). Questionable Signal Detected (bit 8). All remaining fields remain equal to those in step 5. The simulated PHD also deletes all stored records in RACP and stores an identical measurement.
30.	Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute
31.	IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	a) 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 spot-check measurement to PHG under test
	b) Check in PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute
32.	The simulated PHD sends a Measurement to the PHG under test with Measurement Status field set to 0000 0000 0000 0010 0000 (MSB $\rightarrow$ LSB). Signal Analysis Ongoing (bit 9). All remaining fields remain equal to those in step 5. The simulated PHD also deletes all stored records in RACP and stores an identical measurement.
33.	Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute
34.	IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	a) 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 spot-check measurement to the PHG under test
	<ul> <li>b) Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute</li> </ul>
35.	The simulated PHD sends a Measurement to the PHG under test with Measurement Status field set to 0000 0000 0000 0100 0000 (MSB $\rightarrow$ LSB). Sensor Interference Detected (bit 10). All remaining fields remain equal to those in step 5. The simulated PHD also deletes all stored records in RACP and stores an identical measurement.
36.	Check in PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute
37.	IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	a) 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 spot-check measurement to the PHG

	under test
	b) Check in the PHG transcoder output the Device and Sensor Status Enumeration
	Object – Enum-Observed-Value-Basic-Bit-Str attribute
38.	The simulated PHD sends a Measurement to PHG under test with Measurement Status field set to 0000 0000 0000 1000 0000 (MSB $\rightarrow$ LSB). Sensor Unconnected to User (bit 11). All remaining fields remain equal to those in step 5. The simulated PHD also deletes all stored records in RACP and stores an identical measurement.
39.	Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute
40.	IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	a) 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 spot-check measurement to the PHG under test
	<ul> <li>b) Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute</li> </ul>
41.	The simulated PHD sends a Measurement to the PHG under test with Measurement Status field set to 0000 0000 0001 0000 0000 (MSB $\rightarrow$ LSB). Unknown Sensor Connected (bit 12). All remaining fields remain equal to those in step 5. The simulated PHD also deletes all stored records in RACP and stores an identical measurement.
42.	Check in PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute
43.	IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	a) 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 spot-check measurement to the PHG under test
	<ul> <li>b) Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute</li> </ul>
44.	The simulated PHD sends a Measurement to the PHG under test with Measurement Status field set to 0000 0000 0010 0000 0000 (MSB $\rightarrow$ LSB). Sensor Displaced (bit 13). All remaining fields remain equal to those in step 5. The simulated PHD also deletes all stored records in RACP and stores an identical measurement.
45.	Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute
46.	IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	a) 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 spot-check measurement to the PHG under test
	<ul> <li>b) Check in PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute</li> </ul>
47.	The simulated PHD sends a Measurement to the PHG under test with Measurement Status field set to 0000 0000 0100 0000 0000 (MSB $\rightarrow$ LSB). Sensor Malfunctioning (bit 14). All remaining fields remain equal to those in step 5. The simulated PHD also deletes all stored records in RACP and stores an identical measurement.
48.	Check in PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute
49.	IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
	a) 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 spot-check measurement to the PHG under test
	<ul> <li>b) Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute</li> </ul>
50.	The simulated PHD sends a Measurement to the PHG under test with Measurement Status field set to 0000 0000 1000 0000 0000 0000 (MSB $\rightarrow$ LSB). Sensor Disconnected

<ul> <li>(bit 15). All remaining fields remain equal to those in step 5. The simulated PHD also deletes all stored records in RACP and stores an identical measurement.</li> <li>51. Check in PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute</li> </ul>
Enum-Observed-Value-Basic-Bit-Str attribute
52. IF C_MAN_BLE_042 = TRUE (PHG supports RACP) THEN
<ul> <li>a) 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 spot-check measurement to the PHG under test</li> </ul>
<ul> <li>b) Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute</li> </ul>
Pass/Fail criteriaIn Step 6, the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Bas Bit-Str attribute is present and it is set to "device-extended-update" (0x8000). If PHG suppor RACP, same criteria applies to 7.b.
In Step 9, the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Bas Bit-Str attribute is present and it is set to "device-equipment-malfunction" (0x4000). If PHG supports RACP, same criteria applies to 10.b.
In Step 12, the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Ba Bit-Str attribute is present and it is set to "signal-processing-irregularity" (0x2000). If PHG supports RACP, same criteria applies to 13.b.
In Step 15, the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Ba Bit-Str attribute is present and it is set to "signal-inadequate" (0x1000). If PHG supports RAG same criteria applies to 16.b.
In Step 18, the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Ba Bit-Str attribute is present and it is set to "signal-poor" (0x0800). If PHG supports RACP, sat criteria applies to 19.b.
In Step 21, the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Ba Bit-Str attribute is present and it is set to "signal-low-perfusion" (0x0400). If PHG supports RACP, same criteria applies to 22.b.
In Step 24, the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Ba Bit-Str attribute is present and it is set to "signal-erratic" (0x0200). If PHG supports RACP, same criteria applies to 25.b.
In Step 27, the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Ba Bit-Str attribute is present and it is set to "signal-non-pulsatile" (0x0100). If PHG supports RACP, same criteria applies to 28.b.
In Step 30, Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic- Str attribute is present and it is set to "signal-pulse-questionable" (0x0080). If PHG supports RACP, same criteria applies to 31.b.
In Step 33, Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic- Str attribute is present and it is set to "signal-searching" (0x0040). If PHG supports RACP, same criteria applies to 34.b.
In Step 36, Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic- Str attribute is present and it is set to "signal-interference" (0x0020). If PHG supports RACP same criteria applies to 37.b.
In Step 39, Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic- Str attribute is present and it is set to "sensor-off" (0x0010). If PHG supports RACP, same criteria applies to 40.b.
In Step 42, Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic- Str attribute is present and it is set to "sensor-unsupported" (0x0008). If PHG supports RAC same criteria applies to 43.b.
In Step 45, Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-I Str attribute is present and it is set to "sensor-displaced" (0x0004). If PHG supports RACP, same criteria applies to 46.b.
In Step 48, Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic- Str attribute is present and it is set to "sensor-malfunction" (0x0002). If PHG supports RACF same criteria applies to 49.b.
In Step 51, Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-

	Str attribute is present and it is set to "sensor-disconnected" (0x0001). If PHG supports RACP, same criteria applies to 52.b.
Notes (To assist manual	In step 6 (and step 7.b if applicable), possible values in typical points of observation after transcoder output are:
testing)	a) IEEE 11073 Objects and Attributes
	Enum-Observed-Value-Basic-Bit-Str attribute is present:
	Object: Device and Sensor Status Enumeration Object
	Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)
	Attribute-type: BITS16
	Attribute-value: <b>80 00</b> (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):
	OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^device-</b> extended-update(15)      R
	In step 9 (and step 10.b if applicable), possible values in typical points of observation after transcoder output are:
	a) IEEE 11073 Objects and Attributes
	Enum-Observed-Value-Basic-Bit-Str attribute is present:
	Object: Device and Sensor Status Enumeration Object
	Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)
	Attribute-type: BITS16
	Attribute-value: 40 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):
	OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^device-</b> equipment-malfunction(14)      R
	In step 12 (and step 13.b if applicable), possible values in typical points of observation after transcoder output are:
	a) IEEE 11073 Objects and Attributes
	Enum-Observed-Value-Basic-Bit-Str attribute is present:
	Object: Device and Sensor Status Enumeration Object
	Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)
	Attribute-type: BITS16
	Attribute-value: 20 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):
	OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^signal-</b> processing-irregularity(13)     R
	In step 15 (and step 16.b if applicable), possible values in typical points of observation after transcoder output are:
	a) IEEE 11073 Objects and Attributes
	Enum-Observed-Value-Basic-Bit-Str attribute is present:
	Object: Device and Sensor Status Enumeration Object
	Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)
	Attribute-type: BITS16

	Attribute-value: <b>10 00</b> (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):
	OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^signal-</b> inadequate(12)      R
	step 18 (and step 19.b if applicable), possible values in typical points of observation after nscoder output are:
a)	IEEE 11073 Objects and Attributes
	Enum-Observed-Value-Basic-Bit-Str attribute is present:
	Object: Device and Sensor Status Enumeration Object
	Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)
	Attribute-type: BITS16
	Attribute-value: 08 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):
	OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^signal-</b> poor(11)      R
	step 21 (and step 22.b if applicable), possible values in typical points of observation after nscoder output are:
a)	IEEE 11073 Objects and Attributes
	Enum-Observed-Value-Basic-Bit-Str attribute is present:
	Object: Device and Sensor Status Enumeration Object
	Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)
	Attribute-type: BITS16
	Attribute-value: 04 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):
	OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^signal-</b> low-perfusion(10)      R
	step 24 (and step 25.b if applicable), possible values in typical points of observation after nscoder output are:
a)	IEEE 11073 Objects and Attributes
	Enum-Observed-Value-Basic-Bit-Str attribute is present:
	Object: Device and Sensor Status Enumeration Object
	Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)
	Attribute-type: BITS16
	Attribute-value: 02 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):
	OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^signal-</b> erratic(9)     R
In	step 27 (and step 28.b if applicable), possible values in typical points of observation after nscoder output are:
tra	

	Enum-Observed-Value-Basic-Bit-Str attribute is present:		
	Object: Device and Sensor Status Enumeration Object		
	Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)		
	Attribute-type: BITS16		
	Attribute-value: 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):		
	OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^signal-</b> non-pulsatile(8)      R		
	In step 30 (and step 31.b if applicable), possible values in typical points of observation after transcoder output are:		
a)	IEEE 11073 Objects and Attributes		
	Enum-Observed-Value-Basic-Bit-Str attribute is present:		
	Object: Device and Sensor Status Enumeration Object		
	Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)		
	Attribute-type: BITS16		
	Attribute-value: 00 80 (hex)		
b)	WAN PCD-01 message		
	PCD-01 message includes a segment like this with Measurement-Status attribute value (check OBX-5):		
	OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^signal-</b> pulse-questionable(7)      R		
	n step 33 (and step 34.b if applicable), possible values in typical points of observation after ranscoder output are:		
a)	IEEE 11073 Objects and Attributes		
	Enum-Observed-Value-Basic-Bit-Str attribute is present:		
	Object: Device and Sensor Status Enumeration Object		
	Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)		
	Attribute-type: BITS16		
	Attribute-value: 00 40 (hex)		
b)	WAN PCD-01 message		
	PCD-01 message includes a segment like this with Measurement-Status attribute value (check OBX-5):		
	OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^signal-</b> searching(6)     R		
	In step 36 (and step 37.b if applicable), possible values in typical points of observation afte transcoder output are:		
a)	IEEE 11073 Objects and Attributes		
	Enum-Observed-Value-Basic-Bit-Str attribute is present:		
	Object: Device and Sensor Status Enumeration Object		
	Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)		
	<ul> <li>Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)</li> <li>Attribute-type: BITS16</li> </ul>		
b)	Attribute-type: BITS16		

OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^sensor-</b> interference(5)      R			
In step 39 (and step 40.b if applicable), possible values in typical points of observation after transcoder output are:			
a) IEEE 11073 Objects and Attributes			
Enum-Observed-Value-Basic-Bit-Str attribute is present:			
Object: Device and Sensor Status Enumeration Object			
Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)			
Attribute-type: BITS16			
Attribute-value: 00 10 (hex)			
b) WAN PCD-01 message			
PCD-01 message includes a segment like this with Measurement-Status attribute value (check OBX-5):			
OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^sensor- off(4)</b>       R			
In step 42 (and step 43.b if applicable), possible values in typical points of observation after transcoder output are:			
a) IEEE 11073 Objects and Attributes			
Enum-Observed-Value-Basic-Bit-Str attribute is present:			
Object: Device and Sensor Status Enumeration Object			
Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)			
Attribute-type: BITS16			
Attribute-value: 00 08 (hex)			
b) WAN PCD-01 message			
PCD-01 message includes a segment like this with Measurement-Status attribute value (check OBX-5):			
OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^sensor-</b> unsupported(3)      R			
In step 45 (and step 46.b if applicable), possible values in typical points of observation after transcoder output are:			
a) IEEE 11073 Objects and Attributes			
Enum-Observed-Value-Basic-Bit-Str attribute is present:			
Object: Device and Sensor Status Enumeration Object			
Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)			
Attribute-type: BITS16			
Attribute-value: 00 04 (hex)			
b) WAN PCD-01 message			
PCD-01 message includes a segment like this with Measurement-Status attribute value (check OBX-5):			
OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^sensor-</b> displaced(2)      R			
In step 48 (and step 49.b if applicable), possible values in typical points of observation after transcoder output are:			
a) IEEE 11073 Objects and Attributes			
Enum-Observed-Value-Basic-Bit-Str attribute is present:			
Object: Device and Sensor Status Enumeration Object			
Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)			
Attribute-type: BITS16			

[	
	Attribute-value: 00 02 (hex)
b)	WAN PCD-01 message
	PCD-01 message includes a segment like this with Measurement-Status attribute value (check OBX-5):
	OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^sensor-</b> malfunction(1)     R
	step 51 (and step 52.b if applicable), possible values in typical points of observation after nscoder output are:
a)	IEEE 11073 Objects and Attributes
	Enum-Observed-Value-Basic-Bit-Str attribute is present:
	Object: Device and Sensor Status Enumeration Object
	Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)
	Attribute-type: BITS16
	Attribute-value: 00 01 (hex)
b)	WAN PCD-01 message
	PCD-01 message includes a segment like this with Measurement-Status attribute value (check OBX-5):
	OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^sensor-</b> disconnected(0)      R

TP ld		TP/LP-PAN/PHG/PHDTW/PLX/BV-064				
TP label		Whitepaper. Device and Sensor Status Enumeration Object (Continuous Measurements) – Enum-Observed-Value-Bit-Str Attribute				
Coverage	Spec	[Bluetooth PHDT v1.6]				
	Testable items	DSS Enumeration 8; M				
Test purpose		Check that:				
		PHG transcodes Device and Sensor Status field of the PLX Continuous Measurement chactacteristic into Device and Sensor Status Enumeration Object - Enum-Observed-Value-Basic-Bit-Str attribute				
		[AND]				
		PHG transcodes the Bluetooth Device and Sensor Status field of the PLX Continuous characteristic to 11073 Enum-Observed-Value-Basic-Bit-Str attribute properly				
Applicabili	ty	C_MAN_BLE_000 AND C_MAN_BLE_002 AND C_MAN_BLE_040 AND C_MAN_BLE_041				
Other PICS	5					
Initial cond	lition	The PHG under test and the simulated PHD are in the Standby state.				
Test procedure		<ol> <li>The simulated PHD is configured with a Pulse Oximeter Profile (device specialization), it has a continuous measurement (including fast and slow response measurement values) ready to be sent and it is in the Advertising state (it is discoverable).</li> </ol>				
		2. The simulated PHD implements several BTLE characteristics. The characteristics of interest for this Test Case are:				
		a. PLX Continuous Measurement (0x2A5F)				
		b. PLX Features (0x2A60)				
		i. Field: Supported Features				
		Format: 16 bit				

<ul> <li>Value: 0000 0000 0011 0010 (MSB → LSB). Device and Sensor Status support is present (bit 1). Fast and slow response modes are supported (bits 4 and 5).</li> <li>ii. Field: Measurement Status Support</li> <li>This field is not included</li> <li>iii. Field: Device and Sensor Status Support</li> </ul>
<ul> <li>This field is not included</li> <li>iii. Field: Device and Sensor Status Support</li> </ul>
iii. Field: Device and Sensor Status Support
Format: 24 bit
<ul> <li>Value: 0000 0000 1111 1111 1111 (MSB → LSB). All Device and Sensor Status bits are supported</li> </ul>
<ol> <li>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).</li> </ol>
<ol> <li>When the pairing has been completed (Connection state), force the PHG under test to read the PLX Features characteristic.</li> </ol>
<ol><li>The simulated PHD sends the Measurement to the PHG under test with the following value:</li></ol>
a. PLX Continuous Measurement (0x2A5F)
i. Field: Flags
Format: 8 bit
<ul> <li>Value: 0000 1011 (MSB → LSB). Device and Sensor Status, SpO2PR–Fast and SpO2PR-Slow fields are present. Measurement Status and Pulse Amplitude Index fields are not present.</li> </ul>
ii. Field: SpO2PR-Normal - SpO2 (%)
Format: SFLOAT
Value: Not Relevant
iii. Field: SpO2PR-Normal - PR (bpm)
Format: SFLOAT
Value: Not Relevant
iv. Field: SpO2PR-Fast - SpO2 (%)
Format: SFLOAT
Value: Not Relevant
v. Field: SpO2PR-Fast - PR (bpm)
Format: SFLOAT
Value: Not Relevant
vi. Field: SpO2PR-Slow - SpO2 (%)
Format: SFLOAT
Value: Not Relevant
vii. Field: SpO2PR-Slow - PR (bpm)
Format: SFLOAT
Value: Not Relevant
viii. Field: Measurement Status
This fiels is not included
ix. Field: Device and Sensor Status
Format: 24 bit
<ul> <li>Value: 0000 0000 0000 0000 0001 (MSB → LSB). Extended Display Update Ongoing (bit 0).</li> </ul>
x. Field: Pulse Amplitude Index (%)

1	
	This field is not included
6.	Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute.
7.	The simulated PHD sends a Measurement to the PHG under test with Measurement Status field set to 0000 0000 0000 0000 0010 (MSB $\rightarrow$ LSB). Equipment Malfunction (bit 1). All remaining fields remain equal to those in step 5.
8.	Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute.
9.	The simulated PHD sends a Measurement to the PHG under test with Measurement Status field set to 0000 0000 0000 0000 0100 (MSB $\rightarrow$ LSB). Signal Processing Irregularity Detected (bit 2). All remaining fields remain equal to those in step 5.
10.	Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute.
11.	The simulated PHD sends a Measurement to the PHG under test with Measurement Status field set to 0000 0000 0000 0000 1000 (MSB $\rightarrow$ LSB). Inadequate Signal Detected (bit 3). All remaining fields remain equal to those in step 5.
12.	Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute.
13.	The simulated PHD sends a Measurement to the PHG under test with Measurement Status field set to 0000 0000 0000 0000 0001 0000 (MSB $\rightarrow$ LSB). Poor Signal Detected (bit 4). All remaining fields remain equal to those in step 5.
14.	Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute.
15.	The simulated PHD sends a Measurement to the PHG under test with Measurement Status field set to 0000 0000 0000 0000 0010 0000 (MSB $\rightarrow$ LSB). Low Perfusion Detected (bit 5). All remaining fields remain equal to those in step 5.
16.	Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute.
17.	The simulated PHD sends a Measurement to the PHG under test with Measurement Status field set to 0000 0000 0000 0100 0000 (MSB $\rightarrow$ LSB). Erratic Signal Detected (bit 6). All remaining fields remain equal to those in step 5.
18.	Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute.
19.	The simulated PHD sends a Measurement to the PHG under test with Measurement Status field set to 0000 0000 0000 1000 0000 (MSB $\rightarrow$ LSB). Non-Pulsatile Signal Detected (bit 7). All remaining fields remain equal to those in step 5.
20.	Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute.
21.	The simulated PHD sends a Measurement to the PHG under test with Measurement Status field set to 0000 0000 0000 0001 0000 0000 (MSB $\rightarrow$ LSB). Questionable Signal Detected (bit 8). All remaining fields remain equal to those in step 5.
22.	Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute.
23.	The simulated PHD sends a Measurement to the PHG under test with Measurement Status field set to 0000 0000 0000 0010 0000 (MSB $\rightarrow$ LSB). Signal Analysis Ongoing (bit 9). All remaining fields remain equal to those in step 5.
24.	Check in the PHG transcoder output the Device and Sensor Status Enumeration Object - Enum-Observed-Value-Basic-Bit-Str attribute.
25.	The simulated PHD sends a Measurement to the PHG under test with Measurement Status field set to 0000 0000 0000 0100 0000 (MSB $\rightarrow$ LSB). Sensor Interference Detected (bit 10). All remaining fields remain equal to those in step 5.
26.	Check in the PHG transcoder output the Device and Sensor Status Enumeration Object - Enum-Observed-Value-Basic-Bit-Str attribute.
27.	The simulated PHD sends a Measurement to the PHG under test with Measurement Status field set to 0000 0000 0000 1000 0000 (MSB $\rightarrow$ LSB). Sensor Unconnected to User (bit 11). All remaining fields remain equal to those in step 5.

<ol> <li>Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute.</li> </ol>
29. The simulated PHD sends a Measurement to the PHG under test with Measurement Status field set to 0000 0000 0001 0000 0000 0000 (MSB → LSB). Unknown Sensor Connected (bit 12). All remaining fields remain equal to those in step 5.
<ol> <li>Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute.</li> </ol>
<ol> <li>The simulated PHD sends a Measurement to the PHG under test with Measurement Status field set to 0000 0000 0010 0000 0000 (MSB → LSB). Sensor Displaced (bit 13). All remaining fields remain equal to those in step 5.</li> </ol>
<ol> <li>Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute.</li> </ol>
33. The simulated PHD sends a Measurement to the PHG under test with Measurement Status field set to 0000 0000 0100 0000 0000 0000 (MSB → LSB). Sensor Malfunctioning (bit 14). All remaining fields remain equal to those in step 5.
<ol> <li>Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute.</li> </ol>
35. The simulated PHD sends a Measurement to the PHG under test with Measurement Status field set to 0000 0000 1000 0000 0000 (MSB → LSB). Sensor Disconnected (bit 15). All remaining fields remain equal to those in step 5.
<ol> <li>Check in the PHG transcoder output the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic-Bit-Str attribute.</li> </ol>
In Step 6, the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic- Bit-Str attribute is present and it is set to "device-extended-update" (0x8000).
In Step 8, the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic- Bit-Str attribute is present and it is set to "device-equipment-malfunction" (0x4000).
In Step 10, the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic- Bit-Str attribute is present and it is set to "signal-processing-irregularity" (0x2000).
In Step 12, the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic- Bit-Str attribute is present and it is set to "signal-inadequate" (0x1000).
In Step 14, the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic- Bit-Str attribute is present and it is set to "signal-poor" (0x0800).
In Step 16, the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic- Bit-Str attribute is present and it is set to "signal-low-perfusion" (0x0400).
In Step 18, the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic- Bit-Str attribute is present and it is set to "signal-erratic" (0x0200).
In Step 20, the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic- Bit-Str attribute is present and it is set to "signal-non-pulsatile" (0x0100).
In Step 22, the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic- Bit-Str attribute is present and it is set to "signal-pulse-questionable" (0x0080).
In Step 24, the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic- Bit-Str attribute is present and it is set to "signal-searching" (0x0040).
In Step 26, the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic- Bit-Str attribute is present and it is set to "signal-interference" (0x0020).
In Step 28, the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic- Bit-Str attribute is present and it is set to "sensor-off" (0x0010).
In Step 30, the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic- Bit-Str attribute is present and it is set to "sensor-unsupported" (0x0008).
In Step 32, the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic- Bit-Str attribute is present and it is set to "sensor-displaced" (0x0004).
In Step 34, the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic- Bit-Str attribute is present and it is set to "sensor-malfunction" (0x0002).
In Step 36, the Device and Sensor Status Enumeration Object – Enum-Observed-Value-Basic- Bit-Str attribute is present and it is set to "sensor-disconnected" (0x0001).

Notes	In s	step 6	6, possible values in typical points of observation after transcoder output are:
(To assist manual testing)	a)	IEE	E 11073 Objects and Attributes
		Enu	Im-Observed-Value-Basic-Bit-Str attribute is present:
			Object: Device and Sensor Status Enumeration Object
			Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)
			Attribute-type: BITS16
			Attribute-value: 80 00 (hex)
	b)	WA	N PCD-01 message
			PCD-01 message includes a segment like this with Enum-Observed-Value-Basic-Bit- Str attribute value (check OBX-5):
			OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x 1^device- extended-update(15)      R
	In s	step 8	3, possible values in typical points of observation after transcoder output are:
	a)	IEE	E 11073 Objects and Attributes
		Enu	Im-Observed-Value-Basic-Bit-Str attribute is present:
			Object: Device and Sensor Status Enumeration Object
			Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)
			Attribute-type: BITS16
			Attribute-value: 40 00 (hex)
	b)	WA	N PCD-01 message
			PCD-01 message includes a segment like this with Enum-Observed-Value-Basic-Bit- Str attribute value (check OBX-5):
			OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^device-equipment-malfunction(14)</b>       R
	In s	step 1	0, possible values in typical points of observation after transcoder output are:
	a)	IEE	E 11073 Objects and Attributes
		Enu	Im-Observed-Value-Basic-Bit-Str attribute is present:
			Object: Device and Sensor Status Enumeration Object
			Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)
			Attribute-type: BITS16
			Attribute-value: 20 00 (hex)
	b)	WA	N PCD-01 message
			D-01 message includes a segment like this with Enum-Observed-Value-Basic-Bit-Str ibute value (check OBX-5):
			OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^signal-</b> processing-irregularity(13)      R
	In s	step 1	2, possible values in typical points of observation after transcoder output are:
	a)	IEE	E 11073 Objects and Attributes
		Enu	Im-Observed-Value-Basic-Bit-Str attribute is present:
			Object: Device and Sensor Status Enumeration Object
			Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)
			Attribute-type: BITS16
			Attribute-value: 10 00 (hex)
	b)	WA	N PCD-01 message
			D-01 message includes a segment like this with Enum-Observed-Value-Basic-Bit-Str ibute value (check OBX-5):

	OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^signal-</b> inadequate(12)      R
In s	step 14, possible values in typical points of observation after transcoder output are:
a)	IEEE 11073 Objects and Attributes
	Enum-Observed-Value-Basic-Bit-Str attribute is present:
	Object: Device and Sensor Status Enumeration Object
	Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)
	□ Attribute-type: BITS16
	Attribute-value: 08 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):
	OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^signal-</b> poor(11)     R
In s	step 16, possible values in typical points of observation after transcoder output are:
a)	IEEE 11073 Objects and Attributes
	Enum-Observed-Value-Basic-Bit-Str attribute is present:
	Object: Device and Sensor Status Enumeration Object
	Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)
	□ Attribute-type: BITS16
	Attribute-value: 04 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):
	OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^signal-</b> low-perfusion(10)      R
In s	step 18, possible values in typical points of observation after transcoder output are:
a)	IEEE 11073 Objects and Attributes
	Enum-Observed-Value-Basic-Bit-Str attribute is present:
1	Object: Device and Sensor Status Enumeration Object
	Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)
	Attribute-type: BITS16
	Attribute-value: 02 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):
	OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^signal-</b> erratic(9)      R
In s	step 20, possible values in typical points of observation after transcoder output are:
a)	IEEE 11073 Objects and Attributes
	Enum-Observed-Value-Basic-Bit-Str attribute is present:
	Object: Device and Sensor Status Enumeration Object
	Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)
	Attribute-type: BITS16
	Attribute-value: 01 00 (hex)
b)	WAN PCD-01 message
1 1	

		D-01 message includes a segment like this with Enum-Observed-Value-Basic-Bit-Str ibute value (check OBX-5):
		OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^signal-</b> non-pulsatile(8)      R
1	n step 2	22, possible values in typical points of observation after transcoder output are:
a	a) IEE	E 11073 Objects and Attributes
	En	um-Observed-Value-Basic-Bit-Str attribute is present:
		Object: Device and Sensor Status Enumeration Object
		Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)
		Attribute-type: BITS16
		Attribute-value: 00 80 (hex)
t	) WA	N PCD-01 message
		D-01 message includes a segment like this with Measurement-Status attribute value eck OBX-5):
		OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^signal-</b> pulse-questionable(7)      R
I	n step 2	24, possible values in typical points of observation after transcoder output are:
a	a) IEE	E 11073 Objects and Attributes
	En	um-Observed-Value-Basic-Bit-Str attribute is present:
		Object: Device and Sensor Status Enumeration Object
		Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)
		Attribute-type: BITS16
		Attribute-value: 00 40 (hex)
Ł	b) WA	N PCD-01 message
		D-01 message includes a segment like this with Measurement-Status attribute value eck OBX-5):
		OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^signal-</b> searching(6)      R
I	n step 2	26, possible values in typical points of observation after transcoder output are:
a	a) IEE	E 11073 Objects and Attributes
	En	um-Observed-Value-Basic-Bit-Str attribute is present:
		Object: Device and Sensor Status Enumeration Object
		Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)
		Attribute-type: BITS16
		Attribute-value: 00 20 (hex)
Ł	b) WA	N PCD-01 message
		D-01 message includes a segment like this with Measurement-Status attribute value eck OBX-5):
		OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^sensor</b> - interference(5)      R
I	n step 2	28, possible values in typical points of observation after transcoder output are:
a	a) IEE	E 11073 Objects and Attributes
	En	um-Observed-Value-Basic-Bit-Str attribute is present:
		Object: Device and Sensor Status Enumeration Object
		Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)
		Attribute-type: BITS16
		Attribute-value: 00 10 (hex)
	-	

b)	WAN PCD-01 message
	PCD-01 message includes a segment like this with Measurement-Status attribute value (check OBX-5):
	OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^sensor-off(4)</b>       R
ln s	step 30, possible values in typical points of observation after transcoder output are:
a)	IEEE 11073 Objects and Attributes
	Enum-Observed-Value-Basic-Bit-Str attribute is present:
	Object: Device and Sensor Status Enumeration Object
	Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)
	Attribute-type: BITS16
	Attribute-value: 00 08 (hex)
b)	WAN PCD-01 message
	PCD-01 message includes a segment like this with Measurement-Status attribute value (check OBX-5):
	OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^sensor-</b> unsupported(3)      R
ln s	step 32, possible values in typical points of observation after transcoder output are:
a)	IEEE 11073 Objects and Attributes
	Enum-Observed-Value-Basic-Bit-Str attribute is present:
	Object: Device and Sensor Status Enumeration Object
	Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)
	□ Attribute-type: BITS16
	Attribute-value: 00 04 (hex)
b)	WAN PCD-01 message
	PCD-01 message includes a segment like this with Measurement-Status attribute value (check OBX-5):
	OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^sensor- displaced(2)</b>       R
ln s	step 34, possible values in typical points of observation after transcoder output are:
a)	IEEE 11073 Objects and Attributes
	Enum-Observed-Value-Basic-Bit-Str attribute is present:
	Object: Device and Sensor Status Enumeration Object
	Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)
	Attribute-type: BITS16
	Attribute-value: 00 02 (hex)
b)	WAN PCD-01 message
	PCD-01 message includes a segment like this with Measurement-Status attribute value (check OBX-5):
	OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^sensor-</b> malfunction(1)      R
ln s	step 36, possible values in typical points of observation after transcoder output are:
a)	IEEE 11073 Objects and Attributes
	Enum-Observed-Value-Basic-Bit-Str attribute is present:
	Object: Device and Sensor Status Enumeration Object
	Attribute-id: MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR (2662)
	Attribute-type: BITS16

<ul> <li>Attribute-value: 00 01 (hex)</li> <li>WAN PCD-01 message</li> <li>PCD-01 message includes a segment like this with Measurement-Status attribute value (check OBX-5):</li> </ul>
OBX n CWE 150604^MDC_PULS_OXIM_DEV_STATUS^MDC m.0.0.x  <b>1^sensor-</b> disconnected(0)      R

## Bibliography

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[b-Bluetooth PHDT v1.3]	Bluetooth SIG (2012), <i>Personal Health Devices Transcoding White</i> <i>Paper</i> (version 1.3). <u>https://www.bluetooth.org/docman/handlers/downloaddoc.ashx?doc_id=294540</u>
[b-CDG 1.0]	Continua Health Alliance, Continua Design Guidelines v1.0 (2008), <i>Continua Design Guidelines</i> .
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