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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 1: Optimized Exchange Protocol: Personal Health Device

Recommendation ITU-T H.841



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Recommendation ITU-T H.841

Conformance of ITU-T H.810 personal health system: Personal Health Devices interface Part 1: Optimized Exchange Protocol: Personal Health Device

Summary

Recommendation ITU-T H.841 provides a test suite structure (TSS) and the test purposes (TP) for personal health devices using the IEEE 11073-20601 optimized exchange protocol in the Personal Health Devices (PHD) interface, based on the requirements defined in the Recommendations of the ITU-T H.810 sub-series, 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.841 is a transposition of Continua Test Tool DG2016, Test Suite Structure & Test Purposes, Personal Health Devices Interface; Part 1: Optimized Exchange Protocol. Personal Health Device (Version 1.11, 2017-03-14), 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.

History

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Conformance testing, Continua Design Guidelines, e-health, IEEE 11073-20601 optimized exchange protocol, ITU-T H.810, personal area network, personal connected health devices, Personal Health Devices interface, touch area network.

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

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

Introduction

This Recommendation is a transposition of Continua Test Tool DG2016, Test Suite Structure & Test Purposes, Personal Health Devices Interface; Part 1: Optimized Exchange Protocol. Personal Health Device (Version 1.11, 2017-03-14), 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
1.4	2012-10-05	Initial release for Test Tool DG2011. This uses "TSS&TP_1.5_PAN-LAN_PART_1_v1.3.doc" as a baseline and adds new features included in [b-CDG 2011]: • Person ID and Errata
1.5	2013-05-24	Initial release for Test Tool DG2012. This uses "TSS&TP_DG2011_PAN-LAN_PART_1_v1.4.doc" as a baseline and adds new features included in [b-CDG 2012]: • Adds glucose meter • Adds body composition analyser device specialization • Adds basic electrocardiograph device specialization
1.6	2014-01-24	Initial release for Test Tool DG2013. This uses "TSS&TP_DG2012_PAN-LAN_PART_1_v1.5.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
1.7	2014-04-24	TM Lite & Doc Enhancements (Test Tool v4.0 Maintenance Release 1). It uses "TSS&TP_DG2013_PLT_PART_1_v1.6.doc" as a baseline and adds new features included in Documentation Enhancements: • "Other PICS" row added
1.8	2015-07-01	Initial release for Test Tool DG2015. It uses "TSS&TP_DG2013_PLT_PART_1_v1.7.doc" as a baseline and adds new features included in [b-ITU-T H.810 (2015)]/[b-CDG 2015]
1.9	2016-01-26	First maintenance release for Test Tool DG2015. It uses "TSS&TP_DG2015_LP-PAN_PART_1_v1.8.doc" as a baseline and adds some updates according to the Maintenance 2015 activity.
1.10	2016-09-20	Initial release for Test Tool DG2016. It uses "TSS&TP_DG2015_PLT_PART_1_v1.9.doc" as a baseline and adds new features included in [ITU-T H.810 (2016)]/[b-CDG 2016]
1.11	2017-03-14	Updates the baseline in "TSS&TP_DG2016_PHD_PART_1_v1.10.doc" as part of the Maintenance 2016 activity: • Updates the applicability for TP/PLT/PHD/EXP/COM/BV-054_A

Recommendation ITU-T H.841

Conformance of ITU-T H.810 personal health system: Personal Health Devices interface Part 1: Optimized Exchange Protocol: Personal Health Device

1 Scope

The scope of this Recommendation¹ 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 the parts specified below. This Recommendation covers Part 1.

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

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

- 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

2 References

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

- [ITU-T H.810 (2016)] Recommendation ITU-T H.810 (2016), *Interoperability design guidelines for personal health systems*.
- [IEEE 11073-10406] IEEE 11073-10406-2011, *Health informatics – Personal health device communication Part 10406: Device specialization – Basic electrocardiograph (ECG) (1 to 3-lead ECG)*.
- [ISO/IEEE 11073-20601-2015A] ISO/IEEE 11073-20601:2010, *Health informatics – Personal health device communication – Part 20601: Application profile – Optimized exchange protocol*, including ISO/IEEE 11073-20601:2010 Amd 1:2015.
<https://www.iso.org/standard/54331.html> with
<https://www.iso.org/standard/63972.html>
- [ISO/IEEE 11073-20601-2016C] ISO/IEEE 11073-20601:2016, *Health informatics – Personal health device communication – Part 20601: Application profile – Optimized exchange protocol*, including ISO/IEEE 11073-20601:2016/Cor.1:2016.
<https://www.iso.org/standard/66717.html> with
<https://www.iso.org/standard/71886.html>
- [ISO/IEEE 11073-104xx] ISO/IEEE 11073-104xx (in force), *Health informatics – Personal health device communication – Device specialization*.
 NOTE – This is shorthand used 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 11073-10419] ISO/IEEE 11073-10419:2016, *Health informatics – Personal health device communication – Part 10419: Device specialization - Insulin pump*.
http://www.iso.org/iso/catalogue_detail.htm?csnumber=69528
- [ISO/IEEE 11073-10472] ISO/IEEE 11073-10472:2012, *Health informatics – Personal health device communication – Part 10472: Device specialization – Medication monitor*.
<https://www.iso.org/standard/54364.html>

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
MDS	Medical Device System
NFC	Near Field Communication
PAN	Personal Area Network
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
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 Purpose
TSS	Test Suite Structure
USB	Universal Serial Bus
WDM	Windows Driver Model

5 Conventions

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.

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

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

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

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

CDG release	Transposed as	Version	Description	Designation
2011	–	2.0	Release 2011 of the CDG including maintenance updates of the CDG 2010 and additional guidelines that cover new functionalities [b-CDG 2011].	Adrenaline
2010 plus errata	–	1.6	CDG 2010 integrated with identified errata	–
2010	–	1.5	Release 2010 of the CDG with maintenance updates of the CDG Version 1 and additional guidelines that cover new functionalities [b-CDG 2010].	1.5
1.0	–	1.0	First released version of the CDG [b-CDG 1.0].	–

6 Test suite structure (TSS)

The test purposes (TPs) for the Personal Health Devices interface have been divided into the main subgroups specified below. Annex A describes the TPs for subgroups 1.2.1, 1.2.2 and 1.2.3 (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: Optimized exchange protocol (OXP)
 - **Subgroup 1.2.1: PHD domain information model (DIM)**
 - **Subgroup 1.2.2: PHD service model (SER)**
 - **Subgroup 1.2.3: PHD communication model (COM)**
 - Group 1.3: Devices class specializations (CLASS)
 - Subgroup 1.3.1: Weighing scales (WEG)
 - Subgroup 1.3.2: Glucose meter (GL)
 - Subgroup 1.3.3: Pulse oximeter (PO)
 - Subgroup 1.3.4: Blood pressure monitor (BPM)
 - Subgroup 1.3.5: Thermometer (TH)

- Subgroup 1.3.6: Cardiovascular (CV)
- Subgroup 1.3.7: Strength (ST)
- Subgroup 1.3.8: Activity hub (HUB)
- Subgroup 1.3.9: Adherence monitor (AM)
- Subgroup 1.3.10: Insulin pump (IP)
- Subgroup 1.3.11: Peak flow (PF)
- Subgroup 1.3.12: Body composition analyser (BCA)
- Subgroup 1.3.13: Basic electrocardiograph (ECG)
- Subgroup 1.3.14: International normalized ratio (INR)
- Subgroup 1.3.15: Sleep apnoea breathing therapy equipment (SABTE)
- Subgroup 1.3.16: Continuous glucose monitor (CGM)
- Group 1.4: Personal health device transcoding whitepaper (PHDTW)
 - Subgroup 1.4.1: Whitepaper general requirements (GEN)
 - Subgroup 1.4.2: Whitepaper thermometer requirements (TH)
 - Subgroup 1.4.3: Whitepaper blood pressure requirements (BPM)
 - Subgroup 1.4.4: Whitepaper heart rate requirements (HR)
 - Subgroup 1.4.5: Whitepaper glucose meter requirements (GL)
 - Subgroup 1.4.6: Whitepaper weight scale requirements (WS)
 - Subgroup 1.4.7: Whitepaper pulse oximeter requirements (PLX)
 - Subgroup 1.4.8: Whitepaper continuous glucose monitoring requirements (CGM)

– Group 2: Personal Health Gateway (PHG)

- Group 2.1: Transport (TR)
 - Subgroup 2.1.1: Design guidelines: Common (DGC)
 - Subgroup 2.1.2: USB design guidelines (UDG)
 - Subgroup 2.1.3: Bluetooth design guidelines (BDG)
 - Subgroup 2.1.4: Cardiovascular design guidelines (CVDG)
 - Subgroup 2.1.5: Activity hub design guidelines (HUBDG)
 - Subgroup 2.1.6: ZigBee design guidelines (ZDG)
 - Subgroup 2.1.7: Bluetooth low energy design guidelines (BLEDG)
 - Subgroup 2.1.8: NFC design guidelines (NDG)
- Group 2.2: 20601 Optimized exchange protocol (OXF)
 - Subgroup 2.2.1: General (GEN)
 - Subgroup 2.2.2: PHD domain information model (DIM)
 - Subgroup 2.2.3: PHD service model (SER)
 - Subgroup 2.2.4: PHD communication model (COM)
- Group 2.3: Devices class specializations (CLASS)
 - Subgroup 2.3.1: Weighing scales (WEG)
 - Subgroup 2.3.2: Glucose meter (GL)
 - Subgroup 2.3.3: Pulse oximeter (PO)
 - Subgroup 2.3.4: Blood pressure monitor (BPM)
 - Subgroup 2.3.5: Thermometer (TH)

- Subgroup 2.3.6: Cardiovascular (CV)
- Subgroup 2.3.7: Strength (ST)
- Subgroup 2.3.8: Activity hub (HUB)
- Subgroup 2.3.9: Adherence monitor (AM)
- Subgroup 2.3.10: Insulin pump (IP)
- Subgroup 2.3.11: Peak flow (PF)
- Subgroup 2.3.12: Body composition analyser (BCA)
- Subgroup 2.3.13: Basic electrocardiograph (ECG)
- Subgroup 2.3.14: International normalized ratio (INR)
- Subgroup 2.3.15: Sleep apnoea breathing therapy equipment (SABTE)
- Subgroup 2.3.16: Continuous glucose monitor (CGM)
- Group 2.4: Personal health device transcoding whitepaper (PHDTW)
 - Subgroup 2.4.1: Whitepaper general requirements (GEN)
 - 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)
 - Subgroup 2.4.5: Whitepaper glucose meter requirements (GL)
 - Subgroup 2.4.6: Whitepaper weight scale requirements (WS)
 - Subgroup 2.4.7: Whitepaper pulse oximeter requirements (PLX)
 - Subgroup 2.4.8: Whitepaper continuous glucose monitoring requirements (CGM)

7 Electronic attachment

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

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

Annex A

Test purposes

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

A.1 TP definition conventions

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

- **TP Id:** This is a unique identifier (TP/<TT>/<DUT>/<GR>/<SGR>/<XX> – <NNN>). It is specified according to the naming convention defined below:
 - Each test purpose identifier is introduced by the prefix "TP".
 - <TT>: This is the test tool that will be used in the test case:
 - PAN: Personal area network (Bluetooth or USB)
 - LAN: Local area network (ZigBee)
 - PAN-LAN: Personal area network (Bluetooth or USB) - Local area network (ZigBee)
 - LP-PAN: Low power personal area network (Bluetooth Low Energy)
 - TAN: Touch area network (NFC)
 - PLT: Personal area network (Bluetooth or USB) – Local area network (ZigBee) – Touch area network (NFC)
 - <DUT>: This is the device under test:
 - PHD: Personal Health Device
 - PHG: Personal Health Gateway
 - <GR>: This identifies a group of test cases.
 - <SGR>: This identifies a subgroup of test cases.
 - <XX>: This identifies the type of testing:
 - BV: Valid behaviour test
 - BI: Invalid behaviour test
 - <NNN>: This is a sequential number that identifies the test purpose.
- **TP label:** This is the TP's title.
- **Coverage:** This contains the specification reference and clause to be checked by the TP:
 - Spec: This indicates the earliest version of the specification from which the testable items to be checked by the TP were included.
 - Testable item: This contains the testable items to be checked by the TP.
- **Test purpose:** This is a description of the requirements to be tested.
- **Applicability:** This contains the PICS items that define if the test case is applicable or not for a specific device. When a TP contains an "ALL" in this field it means that it applies to the device under test within that scope of the test (specialization, transport used, etc.).
- **Other PICS:** This contains additional PICS items (apart from the PICS specified in the Applicability row) which are used within the test case implementation and can modify the final verdict. When this row is empty, it means that only the PICS specified in the Applicability row are used within the test case implementation.
- **Initial condition:** This indicates the state to which the DUT needs to be moved at the beginning of TC execution.

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

A.2 Subgroup 1.2.1 – PHD domain information model (DIM)

TP Id		TP/PLT/PHD/OXP/DIM/BV-000		
TP label		MDS Object: Mandatory, Conditional and Optional Attributes		
Coverage	Spec	[ISO/IEEE 11073-20601-2015A] and [ISO/IEEE 11073-20601-2016C]		
	Testable items	MDSClass 1; M	MDSClass 2; M	MDSClassAttr 2; M
		MDSClassAttr 3; C	MDSClassAttr 4; M	MDSClassAttr 5; M
		MDSClassAttr 6; M	MDSClassAttr 7; C	MDSClassAttr 8; O
		MDSClassAttr 9; C	MDSClassAttr 10; C	MDSClassAttr 11; C
		MDSClassAttr 12; C	MDSClassAttr 13; C	MDSClassAttr 14; O
		MDSClassAttr 15; O	MDSClassAttr 16; O	MDSClassAttr 17; O
		MDSClassAttr 18; C	MDSClassAttr 19; O	MDSService 1; M
		MDSService 4; M	OperNormProc 2; M	OperNormProc 3; M
		ConfNormalProc 21; M	CommonCharac 3; M	ConfNormalProc 1; M
		OperNormProc 6; M	MDSMethod 7; O	ConfEventRep 28; M
		ConfEventRep 33; O	ConfEventRep 34; M	MDSMethod 6; M
		BaseTimOffset3; M		
	Spec	[b-ITU-T H.810 (2015)]		
	Testable items	Regulatory 4; M	Regulatory 5; O	
multi_funct_LAN 1; M				
General 2; M				
Test purpose		Check that: The Personal Health Device (PHD) supports a Get command that requests all attributes [AND] The PHD reports its MDS object attributes to the Personal Health Gateway (PHG) using a Data message with the “Remote Operation Response Get” response. [AND] MDS object contains all mandatory attributes, conditional attributes as required by their conditions and it may contain optional attributes [AND] The total size of the response does not exceed the maximum APDU size established by the specialization [AND] MDS object attributes are static /dynamic or observational. [AND] The handle is entered in the obj-handle field and it is not included in the attribute ID list of the request or in the attribute list of the response. [AND] The MDS object is not considered part of the configuration. [AND] Changes to any non-static attributes values on PM-stores or the MDS may be reported to the PHG in event reports at the discretion of the PHD [AND]		

	A profile is expected to be identified by a name and a nomenclature value [AND] The PHD shall not include the Base Offset Time in any Continua configurations except for Basic electrocardiograph (ECG), Insulin Pump (IP) and Continuous Glucose Monitor (CGM) device specializations. [AND] If the base time (seconds field) is aligned with UTC (with an accuracy appropriate to the application), then this shall be designated by setting the mds-time-bo-time-utc-aligned bit in the Mds-Time-Info attribute.
Applicability	C_AG_OXP_000
Other PICS	C_AG_OXP_006, C_AG_OXP_007, C_AG_OXP_008, C_AG_OXP_009, C_AG_OXP_010, C_AG_OXP_011, C_AG_OXP_014, C_AG_OXP_015, C_AG_OXP_041, C_AG_OXP_071, C_AG_OXP_120, C_AG_OXP_188
Initial condition	The simulated PHG and PHD under test are in the Unassociated state.
Test procedure	1. The simulated PHG receives an association request from the PHD under test. 2. The simulated PHG responds with a result = accepted-unknown-config. 3. The PHD responds with a "Remote Operation Invoke Confirmed Event Report" message with an MDC_NOTI_CONFIG event to send its configuration to the PHG. 4. Check that the MDS object and its attributes are not present in the Configuration Event Report. 5. The simulated PHG issues "roiv-cmip-get" command with the handle set to 0 (to request an MDS object) and an empty attribute-id-list to indicate all attributes. Record the invoke-id of the message sent. 6. The PHD responds with a "rors-cmip-get" service message in which the attribute-list contains a list of all implemented attributes of the MDS object: - Verify that the invoke-id is mirrored from the Get request. - Verify that the DataApdu contains the SEQUENCE GetResultSimple (0x02 0x03) a. Verify that the GetResultSimple.obj-handle = 0x00 0x00 b. The GetResultSimple contains an AttributeList: - AttributeList.count = number of implemented attributes that are included in the GET response. (must be greater than 3) - AttributeList.length = the length of the remainder of the APDU Mandatory Attributes a. Mandatory attribute HANDLE shall not be present. b. Mandatory attribute System-Model - attribute-id = MDC_ATTR_ID_MODEL (0x09 0x28) - attribute-value.length = 0xxx 0xxx - attribute-value = SystemModel - SystemModel.manufacturer = OCTET STRING - length = 0xxx 0xxx, where X is even and equal to the length of the value - value = <Check with PIXITS> - SystemModel.model-number = OCTET STRING - length = 0xxx 0xxx, where X is even and equal to the length of the value - value = <Check with PIXITS> c. Mandatory attribute System-Id - attribute-id = MDC_ATTR_SYS_ID (0x09 0x84) - attribute-type = OCTET STRING - attribute-value.length = 10 bytes

- ☐ attribute-value = OCTET STRING(Size(8))
- ☐ size = 0x00 0x08
- ☐ value = <Check with PIXITS>

d. Mandatory attribute Dev-Configuration-Id

- ☐ attribute-id = MDC_ATTR_DEV_CONFIG_ID (0x0A 0x44)
- ☐ attribute-type = ConfigId
- ☐ attribute-value.length = 2 bytes
- ☐ attribute-value = <between 0x00 0x01 and 0x7F 0xFF>

Conditional and Optional Attributes

e. One and only one of [System-Type-Spec_List] or [System-Type] shall be present.

f. IF System-Type attribute is present:

- ☐ attribute-id = MDC_ATTR_SYS_TYPE (0x09 0x86)
- ☐ attribute-type = TYPE
- ☐ attribute-value.length = 4 bytes
- ☐ attribute-value = One of the supported specializations:
 - MDC_DEV_SPEC_PROFILE_PULSE_OXIM (0x10 0x04)
 - MDC_DEV_SPEC_PROFILE_BP (0x10 0x06)
 - MDC_DEV_SPEC_PROFILE_TEMP (0x10 0x07)
 - MDC_DEV_SPEC_PROFILE_SCALE (0x10 0x0F)
 - MDC_DEV_SPEC_PROFILE_GLUCOSE (0x10 0x11)
 - MDC_DEV_SPEC_PROFILE_HF_CARDIO (0x10 0x29)
 - MDC_DEV_SPEC_PROFILE_HF_STRENGTH (0x10 0x30)
 - MDC_DEV_SPEC_PROFILE_AI_ACTIVITY_HUB (0x10 0x47)
 - MDC_DEV_SPEC_PROFILE_AI_MED_MINDER (0x10 0x48)
 - MDC_DEV_SPEC_PROFILE_PEAK_FLOW (0x10 0x15)
 - MDC_DEV_SPEC_PROFILE_BCA (0x10 0x14)
 - MDC_DEV_SPEC_PROFILE_ECG (0x10 0x06)
 - MDC_DEV_SPEC_PROFILE_COAG (0x10 0x12)
 - MDC_DEV_SPEC_PROFILE_SABTE(0x10 0x19)
 - MDC_DEV_SPEC_PROFILE_INSULIN_PUMP (0x10 0x13)

▪ MDC_DEV_SPEC_PROFILE_CGM (0x10 0x1A)g. IF System-Type-Spec-List attribute is present

- ☐ attribute-id = MDC_ATTR_SYS_TYPE_SPEC_LIST (0x0A 0x5A)
- ☐ attribute-type = TypeVerList
- ☐ attribute-value.count = N (record for next step)
- ☐ attribute-value.length = N*4 bytes
- ☐ attribute-value = N of the following supported specializations:
 - MDC_DEV_SPEC_PROFILE_PULSE_OXIM (0x10 0x04)
 - MDC_DEV_SPEC_PROFILE_BP (0x10 0x06)
 - MDC_DEV_SPEC_PROFILE_TEMP (0x10 0x07)
 - MDC_DEV_SPEC_PROFILE_SCALE (0x10 0x0F)
 - MDC_DEV_SPEC_PROFILE_GLUCOSE (0x10 0x11)
 - MDC_DEV_SPEC_PROFILE_HF_CARDIO (0x10 0x29)
 - MDC_DEV_SPEC_PROFILE_HF_STRENGTH (0x10 0x30)

- MDC_DEV_SPEC_PROFILE_AI_ACTIVITY_HUB (0x10 0x47)
- MDC_DEV_SPEC_PROFILE_AI_MED_MINDER (0x10 0x48)
- MDC_DEV_SPEC_PROFILE_PEAK_FLOW (0x10 0x15)
- MDC_DEV_SPEC_PROFILE_BCA (0x10 0x14)
- MDC_DEV_SPEC_PROFILE_ECG (0x10 0x06)
- MDC_DEV_SPEC_PROFILE_COAG (0x10 0x12)
- MDC_DEV_SPEC_PROFILE_SABTE(0x10 0x19)
- MDC_DEV_SPEC_PROFILE_INSULIN_PUMP (0x10 0x13)
- MDC_DEV_SPEC_PROFILE_CGM (0x10 0x1A)
- Profiles for Cardiovascular fitness and monitor specialization: If the PHD supports Step Counter profile THEN the PHD shall support Cardiovascular specialization
 - MDC_DEV_SUB_SPEC_PROFILE_STEP_COUNTER (0x10 0x68)
- Profiles for Activity Hub specialization: If the PHD supports any of the profiles defined for Activity Hub THEN the PHD shall support Activity Hub specialization:
 - MDC_DEV_SUB_SPEC_PROFILE_FALL_SENSOR (0x10 0x75)
 - MDC_DEV_SUB_SPEC_PROFILE_PERS_SENSOR (0x10 0x76)
 - MDC_DEV_SUB_SPEC_PROFILE_SMOKE_SENSOR (0x10 0x77)
 - MDC_DEV_SUB_SPEC_PROFILE_CO_SENSOR (0x10 0x78)
 - MDC_DEV_SUB_SPEC_PROFILE_WATER_SENSOR (0x10 0x79)
 - MDC_DEV_SUB_SPEC_PROFILE_GAS_SENSOR (0x10 0x7A)
 - MDC_DEV_SUB_SPEC_PROFILE_MOTION_SENSOR (0x10 0x7B)
 - MDC_DEV_SUB_SPEC_PROFILE_PROPEXIT_SENSOR (0x10 0x7C)
 - MDC_DEV_SUB_SPEC_PROFILE_ENURESIS_SENSOR (0x10 0x7D)
 - MDC_DEV_SUB_SPEC_PROFILE_CONTACTCLOSURE_SENSOR (0x10 0x7E)
 - MDC_DEV_SUB_SPEC_PROFILE_USAGE_SENSOR (0x10 0x7F)
 - MDC_DEV_SUB_SPEC_PROFILE_SWITCH_SENSOR (0x10 0x80)
 - MDC_DEV_SUB_SPEC_PROFILE_DOSAGE_SENSOR (0x10 0x81)
 - MDC_DEV_SUB_SPEC_PROFILE_TEMP_SENSOR (0x10 0x82)
- Profiles for Basic Electrocardiograph specialization: If the PHD supports any of the profiles defined for Basic Electrocardiograph THEN the PHD shall support Basic Electrocardiograph specialization:
 - MDC_DEV_SUB_SPEC_PROFILE_ECG (0x10 0x8C)
 - MDC_DEV_SUB_SPEC_PROFILE_HR (0x10 0x8D)
- Profiles for SABTE specialization: If PHD supports any of the profiles defined for SABTE THEN PHD shall support SABTE specialization,
 - MDC_DEV_SUB_SPEC_PROFILE_CPAP (0x10 0x94)
 - MDC_DEV_SUB_SPEC_PROFILE_CPAP_AUTO (0x10 0x95)
 - MDC_DEV_SUB_SPEC_PROFILE_BPAP (0x10 0x96)

h. IF Attribute-Value-Map is present

- ☐ attribute-id = MDC_ATTR_ATTRIBUTE_VAL_MAP (0X0A 0X55)
- ☐ attribute-type = AttrValMap
- ☐ attribute-value.count = M

- ❑ attribute-value.length = M*4 bytes
- ❑ attribute-value = <check that M attributes are defined here>
- i. IF MDS TimeInfo is present
 - ❑ attribute-id = MDC_ATTR_MDS_TIME_INFO (0X0A 0X45)
 - ❑ attribute-type = MdsTimeInfo
 - ❑ attribute-value.length = 16 bytes
 - ❑ attribute-value =
 - mds-time-cap-state:
 - IF (C_AG_OXP_006 = TRUE) THEN mds-time-capab-real-time-clock = 1 ELSE mds-time-capab-real-time-clock = 0
 - IF (C_AG_OXP_008 = TRUE) THEN mds-time-capab-set-clock = 1 ELSE mds-time-capab-set-clock = 0
 - IF (C_AG_OXP_010 = TRUE) THEN mds-time-capab-relative-time = 1 ELSE mds-time-capab-relative-time = 0
 - IF (C_AG_OXP_011 = TRUE) THEN mds-time-capab-high-res-relative-time = 1 ELSE mds-time-capab-high-res-relative-time = 0
 - IF (C_AG_OXP_014 = TRUE) THEN mds-time-capab-bo-time = 1 ELSE mds-time-capab-bo-time = 0
 - IF (C_AG_OXP_015 = TRUE) THEN mds-time-bo-time-utc-aligned(14) = 1 ELSE mds-time-bo-time-utc-aligned(14) = 0
 - IF (C_AG_OXP_007 = TRUE AND C_AG_OXP_009 = TRUE) THEN mds-time-capab-sync-abs-time = 1 or 0 ELSE mds-time-capab-sync-abs-time = 0
 - IF (C_AG_OXP_007 = TRUE AND C_AG_OXP_010 = TRUE) THEN mds-time-capab-sync-rel-time = 1 or 0 ELSE mds-time-capab-sync-rel-time = 0
 - IF (C_AG_OXP_007 = TRUE AND C_AG_OXP_011 = TRUE) THEN mds-time-capab-sync-hi-res-relative-time = 1 or 0 ELSE mds-time-capab-sync-hi-res-relative-time = 0.
 - IF (C_AG_OXP_007 = TRUE AND C_AG_OXP_014 = TRUE) THEN mds-time-capab-sync-bo-time = 1 or 0 ELSE mds-time-capab-sync-bo-time = 0
 - IF (C_AG_OXP_007 = TRUE) THEN mds-time-capab-sync-abs-time = 1 OR mds-time-capab-sync-res-time = 1 OR mds-time-capab-sync-hi-res-relative-time = 1 OR mds-time-capab-sync-bo-time = 1
 - Only one of mds-time-capab-real-time-clock and mds-time-capab-bo-time bits shall be set to 1.
 - Only one of mds-time-capab-sync-abs-time and mds-time-capab-sync-bo-time bits shall be set to 1.
 - Only one of mds-time-state-abs-time-synced and mds-time-state-bo-time-synced shall be set to 1
 - Time-sync-protocol:
 - IF (C_AG_OXP_007 = FALSE) THEN time-sync-protocol = MDC_TIME_SYNC_NONE ELSE time-sync-protocol = (MDC_TIME_SYNC_NTPV3 or MDC_TIME_SYNC_NTPV4 or MDC_TIME_SYNC_SNTPV4 or MDC_TIME_SYNC_SNTPV4330 or MDC_TIME_SYNC_BT1)
 - Time-sync-accuracy:
 - IF (C_AG_OXP_007 = FALSE) THEN time-sync-accuracy = 0xFFFFFFFF
 - Time-resolution-abs-time:
 - IF (C_AG_OXP_009 = FALSE AND C_AG_OXP_014 = FALSE) THEN

	time-resolution-abs-time = 0x0000 ▪ Time-resolution-rel-time: • IF (C_AG_OXP_010= FALSE) THEN time-resolution-rel-time = 0x0000 ▪ Time-resolution-high-res-time: • IF (C_AG_OXP_011 = FALSE) THEN time-resolution-high-res-time = 0x0000 j. IF attribute Date-and-Time is present ☐ attribute-id = MDC_ATTR_TIME_ABS (0x09 0x87) ☐ attribute-type = AbsoluteTime ☐ attribute-value.length = 8 bytes ☐ attribute-value = ▪ century = ▪ year ≤ 99 ▪ month ≤ 12 ▪ day ≤ 31 ▪ hour ≤ 24 ▪ minute ≤ 60 ▪ second ≤ 60 ▪ sec-fractions ≤ 100 ☐ If Date-and-Time is present THEN Base-Offset-Time shall not be present. k. IF (C_AG_OXP_014 = TRUE) THEN Base-Offset-Time attribute shall be present ELSE Base-Offset-Time attribute shall not be present ☐ attribute-id = MDC_ATTR_TIME_BO (0x0A 0x81) ☐ attribute-type = BaseOffsetTime ☐ attribute-value.length = 8 bytes ☐ If Base-Offset-Time is present THEN Date-and-Time shall not be present. l. IF Relative-Time attribute is present ☐ attribute-id = MDC_ATTR_TIME_REL (0x09 0x8F) ☐ attribute-type = RelativeTime ☐ attribute-value.length = 4 bytes ☐ Verify that C_AG_OXP_010 is set to True m. IF HiRes-Relative-Time attribute is present ☐ attribute-id = MDC_ATTR_TIME_REL_HI_RES (0x09 0xE9) ☐ attribute-type = HighResRelativeTime ☐ attribute-value.length = 8 bytes n. IF Date-and-Time-Adjustment attribute is present ☐ attribute-id = MDC_ATTR_TIME_ABS_ADJUST (0x0A 0X62)_ ☐ attribute-type = AbsoluteTimeAdjust ☐ attribute-value.length = 6 bytes ☐ attribute-value = 0 ☐ Note: If queried with Get MDS command, this attribute shall be not present or 0. o. IF Production-Specification attribute is present ☐ attribute-id = MDC_ATTR_ID_PROD_SPECN (0X09 0X2D) ☐ attribute-type = ProductionSpec ☐ attribute-value.length = <even>
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	☐ attribute-value = <Vendor specific> p. IF Power-Status attribute is present ☐ attribute-id = MDC_ATTR_POWER_STAT (0X09 0X55) ☐ attribute-type = PowerStatus ☐ attribute-value.length = 2 bytes ☐ attribute-value = <not relevant for this test> q. IF Battery-Level attribute is present ☐ attribute-id = MDC_ATTR_VAL_BATT_CHARGE (0X09 0X9C) ☐ attribute-type = INT-U16 ☐ attribute-value.length = 2 bytes ☐ attribute-value = <value between 0 and 100> If value >100, the meaning of the value is "undefined" r. IF Remain-Battery-Time attribute is present ☐ attribute-id = MDC_ATTR_TIME_BATT_REMAIN (0X09 0X88) ☐ attribute-type = BatMeasure ☐ attribute-value.length = 6 bytes ☐ attribute-value = <4 bytes to define the value. 2 remaining bytes to define the units, which shall be set to one of: MDC_DIM_MIN (0x08 0xA0), MDC_DIM_HR (0x08 0xC0) or MDC_DIM_DAY (0x08 0xE0) > s. IF attribute Reg Cert Data List is present ☐ attribute-id = MDC_ATTR_REG_CERT_DATA_LIST (0X0A 0X4B) ☐ attribute-type = RegCertDataList ☐ attribute-value.length = < Variable to be checked> ☐ attribute-value = <Depends on the Autorization body, checked on the Design GuideLines> t. IF Confirm Timeout attribute is present: ☐ attribute-id = MDC_ATTR_CONFIRM-TIMEOUT (0x09 0x14) ☐ attribute-type = RelativeTime ☐ attribute-value.length = 4 bytes Furthermore, if MDS Scan Event Reports are sent by the PHD to report data for MDS object: 7. Wait for a Scan Event Report from the PHD. a. If the PHD sends Fixed Format Event Report for an MDS object, an Attribute-Value-Map has to be received in the GET response. b. If the PHD sends Variable Format Event Report for an MDS object, the attributes whose values can be reported will be the attributes defined as dynamic\observational: Attribute-Value-Map, Mds-Time-Info, Date-and-Time or Base-Offset-Time, Relative-Time, HiRes-Relative-Time, Date-and-Time-Adjustment, Power-Status, Battery-Level, Remaining-Battery-Time. Dynamic attribute Confirm-Timeout is recommended not to be present. If Static attributes are present, the value shall remain unchanged. Handle, System-Type, System-Model, System-Id, Dev-Configuration-Id, Production-Specification, Reg-Cert-Data-List, System-Type-Spec-List.
Pass/Fail criteria	• All checked values are as specified in the test procedure. • The total size of the response cannot exceed the sum of the APDU sizes of the supported specializations (limited to an absolute limit of 64512 octets): ○ Pulse oximeter → 9216 octets ○ Weighing scales → 896 octets ○ Glucose meter → 5120 octets or 64512 octets if the PHD supports PM-Store ○ Blood pressure → 896 octets

	○ Thermometer → 896 octets ○ Independent activity hub → 5120 octets ○ Cardiovascular → 64512 octets or 6624 octets if it supports Step Counter Profile ○ Strength → 64512 octets ○ Adherence monitor → 1024 octets ○ Peak flow → 2030 octets ○ Body composition analyser → 7730 octets ○ Basic ECG/Simple ECG → 7168 octets or 64512 octets if the PHD supports PM-Store ○ Basic ECG/Heart rate → 1280 octets or 64512 octets if the PHD supports PM-Store ○ International normalized ratio → 896 octets or 64512 if the PHD supports PM-Store ○ Insulin Pump → 7168 octets or 5120 if PHD supports PM-Store ○ Sleep Apnoea Breathing Therapy Equipment → 64512 octets ○ Continuous Glucose Monitor → 896 octets or 5120 if PHD supports PM-Store
Notes	

TP Id		TP/PLT/PHD/EXP/DIM/BV-000_B		
TP label		MDS Object: Dev-Configuration-Id and System-Id semantic feature		
Coverage	Spec	[ISO/IEEE 11073-20601-2015A] and [ISO/IEEE 11073-20601-2016C]		
	Testable items	MDSClassAttr 6; M	ConfNormalProc 2; M	ConfNormalProc 7 ; M
Test purpose		Check that: The Dev-Configuration-Id is consistent between the Configuring state and the Operating state. [AND] The PHD uses a "Remote Operation Invoke Confirmed Event Report" data message with an event-type of MDC_NOTI_CONFIG to send its configuration to the PHG		
Applicability		C_AG_EXP_000		
Other PICS		C_AG_EXP_009, C_AG_EXP_014, C_AG_EXP_291, C_AG_EXP_292, C_AG_EXP_293		
Initial condition		The simulated PHG and PHD under test are in the Unassociated state.		
Test procedure		1. The simulated PHG receives an association request from the PHD under test with a dev-config-id and a system-id. 2. The simulated PHG responds with a result = accepted-unknown-config. 3. The PHD responds with a roiv-cmip-confirmed-event report message with an MDC_NOTI_CONFIG event to send its configuration to the PHG. 4. Record the field config-report-id. 5. If the config-report-id is that of the configuration being tested, the simulated PHG responds with a rors-cmip-confirmed-event-report with result "accepted", else the PHG responds with result "unsupported-config". 6. Repeat step 5 until the config-report-id is set to the configuration being tested. 7. IF C_AG_EXP_293 THEN: a. Once in Configuring/Sending GetMDS substate simulated PHG issues roiv-cmip-get command with handle set to 0 (to request for MDS object) and attribute-id-list set to 0 to indicate all attributes. b. The PHD responds with a rors-cmip-get service message in which the attribute-list contains a list of all implemented attributes of the MDS object. c. IF the mds-time-mgr-set-time bit is set:		

	❑ The PHG moves to Configuring/Sending Set Time substate and: • IF C_AG_OXP_009 THEN it issues the Set-Time action command. • IF C_AG_OXP_014 THEN it issues the Set-Base-Offset-Time action command. ❑ Once its internal time setting operation is completed, the PHD responds to the PHG. d. Operating state is reached. 8. ELSE IF C_AG_OXP_291 OR C_AG_OXP_292 THEN: a. Once in Operating state, simulated PHG issues roiv-cmip-get command with handle set to 0 (to request for MDS object) and attribute-id-list set to 0 to indicate all attributes. b. The PHD responds with with a "rors-cmip-get" service message in which the attribute-list contains a list of all implemented attributes of the MDS object. 9. Disconnect the device and conect it again. The simulated PHG receives an association request from the PHD. Check the system-id.
Pass/Fail criteria	• Dev-Config-Id must be the same in step 1 and step 4 • Dev-Config-Id must be the same in step 6 and in step 9 • System-Id must be the same in steps 1, 7 or 8, and 9
Notes	

TP Id		TP/PLT/PHD/EXP/DIM/BV-000_C		
TP label		MDS Object: Confirm-Timeout attribute, semantic feature		
Coverage	Spec	[ISO/IEEE 11073-20601-2015A] and [ISO/IEEE 11073-20601-2016C]		
	Testable items	MDSClassAttr 19; M	OperErrorCond 5; M	OperErrorCond 6; M
		TimeOutVar 1; C		
Test purpose		Check that: If the attribute Confirm-Timeout is supported, then its value matches with the actual timeout value that the PHD uses for the Confirmed Event Report generated from the MDS object. [AND] If the attribute is not present, the PHD shall use the value 3 s		
Applicability		(C_AG_OXP_182 OR C_AG_OXP_183 OR C_AG_OXP_184 OR C_AG_OXP_189) AND C_AG_OXP_053 AND C_AG_OXP_000		
Other PICS				
Initial condition		The simulated PHG and PHD under test are in the Operating state.		
Test procedure		1. Record the Confirm-Timeout value from the Get MDS operation. If the attribute is not present in the MDS its value shall be TO _{cer-mds} (3s). 2. Take a measurement with the PHD under test that will provoke an MDS event report to be sent. 3. The PHD sends a "Remote Operation Invoke Confirmed Event Report". 4. The simulated PHG does not respond for at least the time specified in the field Confirm-Timeout or 3 s if Confirm-Timeout is not supported.		
Pass/Fail criteria		The PHD must wait the specied time before unassociating.		
Notes				

TP Id		TP/PLT/PHD/EXP/DIM/BV-001_A		
TP label		Static Numeric attributes derived from Metrics class and Dynamic Numeric attributes		
Coverage	Spec	[ISO/IEEE 11073-20601-2015A] and [ISO/IEEE 11073-20601-2016C]		

	Testable items	MetricClassAttr 1; M	MetricClassAttr 2; M	MetricClassAttr 3; O
		MetricClassAttr 4; M	MetricClassAttr 5; O	MetricClassAttr 7; O
		MetricClassAttr 8; O	MetricClassAttr 9; C	MetricClassAttr 10; O
		MetricClassAttr 11; O	MetricClassAttr 12; C	MetricClassAttr 13; O
		MetricClassAttr 14; O	MetricClassAttr 15; O	MetricClassAttr 16; C
		MetricClassAttr 17; C	MetricClassAttr 18; C	MetricClassAttr 19; O
		NumClass 1; M	NumClass 2; M	NumClassAttr 1; M
		NumClassAttr 2; C	NumClassAttr 3; C	NumClassAttr 4; C
		NumClassAttr 5; C	NumClassAttr 6; C	NumClassAttr 7; C
		NumClassAttr 8; O	ConfNormalProc 1;M	ConfEventRep 29; M
		ConfEventRep 30; M	ConfEventRep 31; C	ConfEventRep 33; O
		ConfEventRep 33; O		
	Spec	[b-ITU-T H.810 (2015)]		
	Testable items	Communication 6; M	General 2; M	
Test purpose		Check that: Numeric class is derived from the Metric base class. It inherits all mandatory attributes and conditional attributes as required by their conditions and it may import optional attributes. [AND] The nomenclature code to identify the Numeric class is MDC_MOC_VMO_METRIC_NU [AND] Static, dynamic and observational attributes. [AND] Changes to any attribute values of metric and scanner objects shall be reported to the PHG in scan event reports prior to sending event reports that depend on those values (e.g. scan-handle-attr-val-map and a group format event report or unit-code and the observed value). [AND] Continua PAN service components shall not include the Base Offset Time in any Continua configurations except for Basic electrocardiograph (ECG) device specialization.		
Applicability		C_AG_OXP_040 AND C_AG_OXP_000		
Other PICS		C_AG_OXP_009, C_AG_OXP_014, C_AG_OXP_041, C_AG_OXP_046, C_AG_OXP_047, C_AG_OXP_182, C_AG_OXP_183, C_AG_OXP_184, C_AG_OXP_189, C_AG_OXP_190, C_AG_OXP_192, C_AG_OXP_193, C_AG_OXP_194, C_AG_OXP_195, C_AG_OXP_196, C_AG_OXP_197, C_AG_OXP_198, C_AG_OXP_199, C_AG_OXP_200, C_AG_OXP_201, C_AG_OXP_202, C_AG_OXP_203, C_AG_OXP_230, C_AG_OXP_231, C_AG_OXP_232, C_AG_OXP_293		
Initial condition		The simulated PHG and PHD under test are in the Unassociated state.		
Test procedure		1. The PHD under test sends and the simulated PHG receives an association request from the PHD under test. 2. The simulated PHG responds with a result = accepted-unknown-config. 3. The PHD responds with a "Remote Operation Invoke Confirmed Event Report" message with an MDC_NOTI_CONFIG event to send its configuration to the PHG. 4. Numeric class attributes must be (ConfigReport -> ConfigObject-> AttributeList): a. Mandatory attribute Handle shall be present. ☐ attribute-type = HANDLE ☐ attribute-length = 2 bytes ☐ attribute-value = must be unique and non-zero. Actual value may be specified by the Device Specilization. b. Mandatory attribute Type shall be present in ConfigReport		

	☐ attribute-id = MDC_ATTR_ID_TYPE (0X09 0X2F) ☐ attribute-type = TYPE ☐ attribute-value = SEQUENCE OF (SIZE 6) ☐ attribute-value = <Not relevant in this test> c. Mandatory attribute Metric-Spec-Small should be present ☐ attribute-id = MDC_ATTR_METRIC_SPEC_SMALL ☐ attribute-type = MetricSpecSmall ☐ attribute-value.length = 2 bytes ☐ attribute-value = ▪ IF C_AG_OXP_201=TRUE and C_AG_OXP_041=FALSE THEN mss-avail-stored-data(1)=1(There is at least one object that has mss-avail.stored-data(1)=1) ▪ IF C_AG_OXP_201=TRUE and C_AG_OXP_041=TRUE THEN mss-avail-stored-data(1)=1 or 0 d. Only one attribute of Metric-Id and Metric-Id-List shall be present. e. If Metric-Id-List attribute is supported, it should be present in ConfigReport ☐ attribute-id = MDC_ATTR_ID_PHYSIO_LIST ☐ attribute-type = MetricIdList ☐ attribute-value.length = SEQUENCE OF (SIZE 2) ☐ attribute-value = ☐ The [Metric-Id-List] attribute shall be used if a compound observed value is used, which does not incorporate the Metric-Id directly. The order of the Metric-Id-List shall correspond to the order of the elements in the compound observed value. ☐ IF the PHD supports Metric-Id-List at least for a Numeric object (C_AG_OXP_190 =TRUE) THEN this attribute shall be present at least for one object, ELSE this attribute is not present. f. IF Metric-Id attribute is supported, it should be present in ConfigReport ☐ attribute-id = MDC_ATTR_ID_PHYSIO ☐ attribute-type = OID-Type ☐ attribute-value.length = 2 bytes g. IF Attribute-Value-Map is supported, it should be present in ConfigReport ☐ attribute-id = MDC_ATTR_ATTRIBUTE_VAL_MAP (0X0A 0X5A) ☐ attribute-type = AttrValMap ☐ attribute-count = n (record for next attribute field) ☐ attribute-value.length = n*4 bytes ☐ attribute-value = <n attributes will be declared, each one will have 4 bytes composed of: ▪ attribute-id = 2 bytes (MDC_ATTR_*). ▪ Attribute-length = 0x00 0x02: (2 bytes to declare the length of the attribute, but the contents of the attribute in the event report is not these 2 bytes length) h. IF Supplemental-Types attribute is supported, it shall be present in ConfigReport: ☐ attribute-id = MDC_ATTR_SUPPLEMENTAL_TYPES ☐ attribute-type = SupplementalTypeList ☐ attribute-value.length = SEQUENCE OF (SIZE (4)) ☐ attribute-value = <Not relevant in this test> i. IF attribute Metric-Structure-Small is supported, it should be present in ConfigReport:
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- ☐ attribute-id = MDC_ATTR_METRIC_STRUCTURE_SMALL
- ☐ attribute-type = MetricStructureSmall
- ☐ attribute-value.length = 2 bytes
- ☐ attribute-value =
 - ms-struct = one of the following:
 - ms-struct-simple (0x00)
 - ms-struct-compound (0x01)
 - ms-struct-reserved (0x02)
 - ms-struct-compound-simple (0x03)
 - ms-compound-no = one of the following:
 - IF ms-struct = ms-struct-simple THEN = 0
 - ELSE = maximum number of components in a compound value
- j. IF attribute Metric-Id-Partition is supported, it should be present in ConfigReport
 - ☐ attribute-id = MDC_ATTR_METRIC_ID_PART
 - ☐ attribute-type = NomPartition
 - ☐ attribute-value.length = 2 bytes
 - ☐ attribute-value = one of the next
 - nom-part-unspec (0x00 0x00)
 - nom-part-obj (0x00 0x01)
 - nom-part-metric (0x00 0x02)
 - nom-part-alert (0x00 0x03)
 - nom-part-dim (0x00 0x04)
 - nom-part-vattr (0x00 0x05)
 - nom-part-pgrp (0x00 0x06)
 - nom-part-sites (0x00 0x07)
 - nom-part-infrastuc (0x00 0x08)
 - nom-part-fef (0x00 0x09)
 - nom-part-ecg-extn (0x00 0x0A)
 - nom-part-phd-dm (0x00 0x80)
 - nom-part-phd-hf (0x00 0x81)
 - nom-part-phd-ai (0x00 0x82)
 - nom-part-ret-code(0x00 0xFF)
 - nom-part-ext-nom (0x01 0x00)
 - nom-part-priv (0x04 0x00)
- k. IF attribute Unit-Code is supported, it should be present in ConfigReport:
 - ☐ attribute-id = MDC_ATTR_UNIT_CODE
 - ☐ attribute-type = OID-Type
 - ☐ attribute-value.length = 2 bytes
 - ☐ attribute-value = One of MDC_PART_DIM (may be defined in the specialization)
- l. IF attribute Source-Handle-Reference is supported, it should be present in ConfigReport:
 - ☐ attribute-id = MDC_ATTR_SOURCE_HANDLE_REF
 - ☐ attribute-type = HANDLE
 - ☐ attribute-value.length = 2 bytes

	☐ attribute-value = < The value of an existing object's handle > m. IF attribute Label-String is supported, it should be present in ConfigReport: ☐ attribute-id = MDC_ATTR_ID_LABEL_STRING ☐ attribute-type = OCTET STRING ☐ attribute-value.length = ☐ attribute-value = <Textual representation of attribute Type, Printable ASCII> n. IF attribute Unit-Label-String is supported, it should be present in ConfigReport: ☐ attribute-id = MDC_ATTR_UNIT_LABEL_STRING ☐ attribute-type = OCTET STRING ☐ attribute-value.length = ☐ attribute-value = <Textual representation of attribute Unit-Code, Printable ASCII> o. IF attribute Accuracy is supported, it shall be present in ConfigReport: ☐ attribute-id = MDC_ATTR_NU_ACCUR_MSMT ☐ attribute-type = FLOAT-Type ☐ attribute-value.length = 4 bytes ☐ attribute-value = <Not relevant in this test> p. IF attribute Measure-Active-Period is supported, it should be present in ConfigReport: ☐ attribute-id = MDC_ATTR_TIME_PD_MSMT_ACTIVE ☐ attribute-type = FLOAT-Type ☐ attribute-value.length = 4 bytes ☐ attribute-value = <Not relevant in this test> q. Time-stamp attributes (Absolute-Time-Stamp, Base-Offset-Time, Relative-Time-Stamp and HiRes-Time-Stamp), observed values attributes (Simple-Nu-Observed-Value, Basic-Nu-Observed-Value, Nu-Observed-Value, Compound-Simple-Nu-Observed-Value, Compound-Basic-Nu-Observed-Value, Compound-Nu-Observed-Value) and Measurement-Status shall not be present if mss-cat-setting and/or mss-cat-manual bit of the Metric-Spec-Small attribute is set to 0. If any of these bits is set to 1, observational attributes may be present in ConfigReport. Furthermore if MDS event reports are sent by the PHD, (the PHD sends fixed format value messages to report dynamic data for Numeric Objects or uses variable format event report, C_AG_OXP_182 = TRUE or C_AG_OXP_189 = TRUE): 5. IF C_AG_OXP_293 THEN: a. Once in Configuring/Sending GetMDS substate simulated PHG issues roiv-cmip-get command with handle set to 0 (to request for MDS object) and attribute-id-list set to 0 to indicate all attributes. b. The PHD responds with a rors-cmip-get service message in which the attribute-list contains a list of all implemented attributes of the MDS object. c. IF the mds-time-mgr-set-time bit is set: ☐ The PHG moves to Configuring/Sending Set Time substate and: - IF C_AG_OXP_009 THEN it issues the Set-Time action command. - IF C_AG_OXP_014 THEN it issues the Set-Base-Offset-Time action command. ☐ Once its internal time setting operation is completed, the PHD responds to the PHG. 6. Take a measurement with the PHD 7. Wait for an event report from the PHD a. One of {Simple-Nu-Observed-Value, Basic-Nu-Observed-Value, Nu-Observed-Value, Compound-Nu-Observed-Value, Compound-Simple-Nu-Observed-Value,
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	Compound-Basic-Nu-Observed-Value} shall be present
	b. IF attribute Simple-Nu-Observed-Value is present ☐ attribute-id = MDC_ATTR_NU_VAL_OBS_SIMP ☐ attribute-type = SimpleNuObsValue ☐ attribute-value.length = 4 bytes ☐ attribute-value = <Not relevant in this test> c. IF attribute Basic-Nu-Observed-Value is present ☐ attribute-id = MDC_ATTR_NU_VAL_OBS_BASIC ☐ attribute-type = BasicNuObsValue ☐ attribute-value.length = 2 bytes ☐ attribute-value = <Not relevant in this test> d. IF attribute Nu-Observed-Value is present ☐ attribute-id = MDC_ATTR_NU_VAL_OBS ☐ attribute-type = NuObsValue ☐ attribute-value.length = 10 bytes ☐ attribute-value = <Not relevant in this test> e. IF attribute Compound-Simple-Nu-Observed-Value is present ☐ attribute-id = MDC_ATTR_NU_CMPD_VAL_OBS_SIMP ☐ attribute-type = SimpleNuObsValueCmp ☐ attribute-value.length = SEQUENCE OF (SIZE (4)) ☐ attribute-value = <Not relevant in this test> f. IF attribute Compound-Basic-Nu-Observed-Value is present ☐ attribute-id = MDC_ATTR_NU_CMPD_VAL_OBS_BASIC ☐ attribute-type = BasicNuObsValueCmp ☐ attribute-value.length = SEQUENCE OF (SIZE(4)) ☐ attribute-value = <Not relevant in this test> g. IF attribute Compound-Nu-Observed-Value is present ☐ attribute-id = MDC_ATTR_NU_CMPD_VAL_OBS ☐ attribute-type = NuObsValueCmp ☐ attribute-value.length = SEQUENCE OF (SIZE (10)) ☐ attribute-value = <Not relevant in this test> h. IF attribute Measure-Active-Period is present ☐ attribute-id = MDC_ATTR_TIME_PD_MSMT_ACTIVE ☐ attribute-type = FLOAT-Type ☐ attribute-value.length = 4 bytes ☐ attribute-value = <Not relevant in this test> i. IF attribute Absolute-Time-Stamp is present ☐ attribute-id = MDC_ATTR_TIME_STAMP_ABS ☐ attribute-type = AbsoluteTime ☐ attribute-value.length = 8 bytes ☐ attribute-value = <Not relevant in this test> ▪ century = ▪ year ≤ 99 ▪ month ≤ 12

	▪ day ≤ 31 ▪ hour ≤ 24 ▪ minute ≤ 60 ▪ second ≤ 60 ▪ sec-fractions ≤ 100 ☐ If an PHD stores data, it shall associate a time stamp with the data. ☐ If an PHD supports Absolute-Time-Stamp, Base-Offset-Time-Stamp attribute shall not be supported. j. IF (C_AG_OXP_014 = TRUE) THEN Attribute Base-Offset-Time-Stamp may be present ELSE it shall not be present ☐ attribute-id = MDC_ATTR_TIME_STAMP_BO ☐ attribute-type = BaseOffsetTime ☐ attribute-value.length = 8 bytes ☐ attribute-value = <Not relevant in this test> ☐ If an PHD stores data, it shall associate a time stamp with the data. ☐ If an PHD supports Base-Offset-Time-Stamp, Absolute-Time-Stamp attribute shall not be supported. k. IF attribute Relative-Time-Stamp is present ☐ attribute-id = MDC_ATTR_TIME_STAMP_REL ☐ attribute-type = RelativeTime ☐ attribute-value.length = 4 bytes ☐ attribute-value = <Not relevant in this test> ☐ If a PHD stores data, it shall associate a time stamp with the data l. IF attribute HiRes-Time-Stamp is present ☐ attribute-id = MDC_ATTR_TIME_STAMP_REL_HI_RES ☐ attribute-type = HighResRelativeTime ☐ attribute-value.length = 8 bytes ☐ attribute-value =<Not relevant in this test> m. IF attribute Measurement Status is present ☐ attribute-id = MDC_ATTR_MSMT_STAT ☐ attribute-type = MeasurementStatus ☐ attribute-value.length = 2 bytes ☐ attribute-value = <not relevant for this test> n. Check dynamic attributes that can be present: Metric-Structure-Small, Metric-Id, Metric-Id-List, Metric-Id-Partition, Unit-Code,Source-Handle-Reference, Label-String, Unit-Label-String, Measure-Active-Period
Pass/Fail criteria	All checked values are as specified in the test procedure.
Notes	Checking that "IF C_AG_OXP_201=FALSE THEN mss-avail-stored data(1)=0" for MetricSpecSmall attribute has been removed because [ISO/IEEE 11073-20601-2015A] has specified (subsection A.11.3) that "The setting of bits 0 to 5 is primarily informational and shall be set if the condition is true but- a PHG cannot assume that if they are set the behavior will be observed". According to Device Specialization spec, standard configurations (most of them) state the value for bit mss-avail-stored-data to 1, even if the PHD cannot store measurements. So, if the test procedure checks that if C_AG_OXP_201=FALSE then mss-avail-stored-data = 0 the test case will give a FAIL verdict and it would not be correct according to what [ISO/IEEE 11073-20601-2015A] states in clause A.11.3.

TP Id		TP/PLT/PHD/EXP/DIM/BV-001_B		
TP label		Static Enumerated attributes derived from Metrics class and Dynamic Enumerated attributes		
Coverage	Spec	[ISO/IEEE 11073-20601-2015A] and [ISO/IEEE 11073-20601-2016C]		
	Testable items	MetricClassAttr 1; M	MetricClassAttr 2; M	MetricClassAttr 3; O
		MetricClassAttr 4; M	MetricClassAttr 5; O	MetricClassAttr 7; O
		MetricClassAttr 8; O	MetricClassAttr 9; C	MetricClassAttr 10; O
		MetricClassAttr 11; O	MetricClassAttr 12; C	MetricClassAttr 13; O
		MetricClassAttr 14; O	MetricClassAttr 15; O	MetricClassAttr 16; C
		MetricClassAttr 17; C	MetricClassAttr 18; C	MetricClassAttr 19; O
		EnumClass 2; M	EnumClass 3; M	EnumClassAttr 1; M
		EnumClassAttr 2; C	EnumClassAttr 3; C	EnumClassAttr 4; C
		EnumClassAttr 5; C	EnumClassAttr 6; C	EnumClassAttr 7; O
		ConfNormalProc 1; M	ConfEventRep 29; M	ConfEventRep 30; M
		ConfEventRep 31; C	ConfEventRep 33; O	
	Spec	[b-ITU-T H.810 (2015)]		
	Testable items	Communication 6; M	General 2; M	
Test purpose		Check that: Enumerated class is derived from the Metric base class. It inherits all mandatory attributes and conditional attributes as required by their conditions and it may import optional attributes. [AND] The nomenclature code to identify the Enumerated class is MDC_MOC_VMO_METRIC_ENUM. [AND] Static, dynamic and observational attributes. [AND] Changes to any attribute values of metric and scanner objects shall be reported to the PHG in scan event reports prior to sending event reports that depend on those values (e.g. scan-handle-attr-val-map and a group format event report or unit-code and the observed value). [AND] Continua PAN service components shall not include the Base Offset Time in any Continua configurations except for Basic electrocardiograph (ECG) device specialization.		
Applicability		C_AG_OXP_043 AND C_AG_OXP_000		
Other PICS		C_AG_OXP_009, C_AG_OXP_014, C_AG_OXP_041, C_AG_OXP_046, C_AG_OXP_047, C_AG_OXP_182, C_AG_OXP_183, C_AG_OXP_184, C_AG_OXP_189, C_AG_OXP_190, C_AG_OXP_192, C_AG_OXP_193, C_AG_OXP_194, C_AG_OXP_195, C_AG_OXP_196, C_AG_OXP_197, C_AG_OXP_198, C_AG_OXP_199, C_AG_OXP_200, C_AG_OXP_201, C_AG_OXP_202, C_AG_OXP_203, C_AG_OXP_230, C_AG_OXP_231, C_AG_OXP_232, C_AG_OXP_293		
Initial condition		The simulated PHG and PHD under test are in the Unassociated state.		
Test procedure		1. The simulated PHG receives an association request from the PHD under test. 2. The simulated PHG responds with a result = accepted-unknown-config. 3. The PHD responds with a "Remote Operation Invoke Confirmed Event Report" message with an MDC_NOTI_CONFIG event to send its configuration to the PHG. 4. Enumeration object attributes must be (ConfigReport -> ConfigObject-> AttributeList): a. Mandatory attribute Handle shall not be present ☐ attribute-type = HANDLE ☐ attribute-value = 2 bytes		

	☐ attribute-value = must be unique and non-zero. Actual value may be specified by the Device Specilization. b. Mandatory attribute Type shall be present in ConfigReport: ☐ attribute-id = MDC_ATTR_ID_TYPE (0X09 0X2F) ☐ attribute-type = TYPE ☐ attribute-value = SEQUENCE OF (SIZE 6) ☐ attribute-value = <Not relevant in this test> c. Mandatory attribute Metric-Spec-Small should be present ☐ attribute-id = MDC_ATTR_METRIC_SPEC_SMALL ☐ attribute-type = MetricSpecSmall ☐ attribute-value.length = 2 bytes ☐ attribute-value = <Checked in the specializations > ▪ IF C_AG_OXP_202=TRUE and C_AG_OXP_041=FALSE THEN mss-avail-stored-data(1)=1 (There is at least one object that has mss-avail-stored-data(1) = 1) ▪ IF C_AG_OXP_202=TRUE and C_AG_OXP_041=TRUE THEN mss-avail-stored-data(1)=1 or 0 d. Only one attribute of Metric-Id and Metric-Id-List shall be present. e. IF Metric-Id-List attribute is supported, it should be present in ConfigReport: ☐ attribute-id = MDC_ATTR_ID_PHYSIO_LIST ☐ attribute-type = MetricIdList ☐ attribute-value.length = SEQUENCE OF (SIZE 2) ☐ attribute-value = ☐ The [Metric-Id-List] attribute shall be used if a compound observed value is used, which does not incorporate the Metric-Id directly. The order of the Metric-Id-List shall correspond to the order of the elements in the compound observed value. f. IF Metric-Id attribute is supported, it should be present in ConfigReport: ☐ attribute-id = MDC_ATTR_ID_PHYSIO ☐ attribute-type = OID-Type ☐ attribute-value.length = 2 bytes g. IF Attribute-Value-Map is supported, it should be present in ConfigReport: ☐ attribute-id = MDC_ATTR_ATTRIBUTE_VAL_MAP (0X0A 0X55) ☐ attribute-type = AttrValMap ☐ attribute-count = n (record for next attribute field) ☐ attribute-value.length = n*4 bytes ☐ attribute-value = <n attributes will be declared, each one will have 4 bytes composed of: ▪ attribute-id = 2 bytes (MDC_ATTR_*) ▪ Attribute-length = 0x00 0x02: (2 bytes to declare the length of the attribute, but the contents of the attribute in the event report is not these 2 bytes length h. IF Supplemental-Types attribute is supported, it shall be present in ConfigReport: ☐ attribute-id = MDC_ATTR_SUPPLEMENTAL_TYPES ☐ attribute-type = SupplementalTypeList ☐ attribute-value.length = SEQUENCE OF (SIZE (4)) ☐ attribute-value = <Not relevant in this test> i. IF attribute Metric-Structure-Small is supported, it should be present in
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ConfigReport:

- ☐ attribute-id = MDC_ATTR_METRIC_STRUCTURE_SMALL
- ☐ attribute-type = MetricStructureSmall
- ☐ attribute-value.length = 2 bytes
- ☐ attribute-value =
 - ms-struct = one of the following:
 - ms-struct-simple (0x01)
 - ms-struct-compound (0x02)
 - ms-struct-reserved (0x03)
 - ms-struct-compound-simple (0x04)
 - ms-compound-no = one of the following:
 - IF ms-struct = ms-struct-simple THEN = 0
 - ELSE = maximum number of components in a compound value

j. IF attribute Metric-Id-Partition is supported, it should be present in ConfigReport:

- ☐ attribute-id = MDC_ATTR_METRIC_ID_PART
- ☐ attribute-type = NomPartition
- ☐ attribute-value.length = 2 bytes
- ☐ attribute-value = one of the next
 - nom-part-unspec (0x00 0x00)
 - nom-part-obj (0x00 0x01)
 - nom-part-metric (0x00 0x02)
 - nom-part-alert (0x00 0x03)
 - nom-part-dim (0x00 0x04)
 - nom-part-vattr (0x00 0x05)
 - nom-part-pgrp (0x00 0x06)
 - nom-part-sites (0x00 0x07)
 - nom-part-infrastruc (0x00 0x08)
 - nom-part-fef (0x00 0x09)
 - nom-part-ecg-extn (0x00 0x0A)
 - nom-part-phd-dm (0x00 0x80)
 - nom-part-phd-hf (0x00 0x81)
 - nom-part-phd-ai (0x00 0x82)
 - nom-part-ret-code(0x00 0xFF)
 - nom-part-ext-nom (0x01 0x00)
 - nom-part-priv (0x04 0x00)

k. IF attribute Unit-Code is supported, it should be present in ConfigReport:

- ☐ attribute-id = MDC_ATTR_UNIT_CODE
- ☐ attribute-type = OID-Type
- ☐ attribute-value.length = 2 bytes
- ☐ attribute-value = One of MDC_PART_DIM (may be defined in the specialization)

l. IF attribute Source-Handle-Reference is supported, it should be present in ConfigReport:

- ☐ attribute-id = MDC_ATTR_SOURCE_HANDLE_REF
- ☐ attribute-type = HANDLE
- ☐ attribute-value.length = 2 bytes

	☐ attribute-value = < The value of an existing object's handle > m. IF attribute Label-String is supported, it should be present in ConfigReport ☐ attribute-id = MDC_ATTR_ID_LABEL_STRING ☐ attribute-type = OCTET STRING ☐ attribute-value.length = ☐ attribute-value = <Textual representation of attribute Type, Printable ASCII> n. IF attribute Unit-Label-String is supported, it should be present in ConfigReport: ☐ attribute-id = MDC_ATTR_UNIT_LABEL_STRING ☐ attribute-type = OCTET STRING ☐ attribute-value.length = ☐ attribute-value = <Textual representation of attribute Unit-Code, Printable ASCII> o. IF attribute Measure-Active-Period is supported, it should be present in ConfigReport: ☐ attribute-id = MDC_ATTR_TIME_PD_MSMT_ACTIVE ☐ attribute-type = FLOAT-Type ☐ attribute-value.length = 4 bytes ☐ attribute-value =<Not relevant for this test> p. IF attribute Enum-Observed-Value-Partition is supported it should be present in ConfigReport: ☐ attribute-id = MDC_ATTR_ENUM_OBS_VAL_PART ☐ attribute-type = NomPartition ☐ attribute-value.length = 2 bytes ☐ attribute-value = one of the next ▪ nom-part-unspec (0x00 0x00) ▪ nom-part-obj (0x00 0x01) ▪ nom-part-metric (0x00 0x02) ▪ nom-part-alert (0x00 0x03) ▪ nom-part-dim (0x00 0x04) ▪ nom-part-vattr (0x00 0x05) ▪ nom-part-pgrp (0x00 0x06) ▪ nom-part-sites (0x00 0x07) ▪ nom-part-infrastuc (0x00 0x08) ▪ nom-part-fef (0x00 0x09) ▪ nom-part-ecg-extn (0x00 0x0A) ▪ nom-part-phd-dm (0x00 0x80) ▪ nom-part-phd-hf (0x00 0x81) ▪ nom-part-phd-ai (0x00 0x82) ▪ nom-part-ret-code(0x00 0xFF) ▪ nom-part-ext-nom (0x01 0x00) ▪ nom-part-priv (0x04 0x00) q. Time-stamp attributes (Absolute-Time-Stamp, Base-Offset-Time, Relative-Time-Stamp and HiRes-Time-Stamp), observed values attributes (Enum-Observed-Value-Simple-OID, Enum-Observed-Value-Simple-Bit-Str, Enum-Observed-Value-Simple-Str, Enum-Observed-Value-Basic-Bit-Str, Enum-Observed-Value) and Measurement-Status shall not be present if mss-cat-setting and/or mss-cat-manual bit of the Metric-Spec-Small attribute is set to 0. If any of these bits is set to 1,
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observational attributes may be present in ConfigReport.

Furthermore if MDS event reports are sent by the PHD (the PHD sends fixed format value messages to report dynamic data for Enumeration Objects or uses variable format event report, C_AG_OXP_183=TRUE or C_AG_OXP_189=TRUE):

5. IF C_AG_OXP_293 THEN:
 - a. Once in Configuring/Sending GetMDS substate simulated PHG issues roiv-cmip-get command with handle set to 0 (to request for MDS object) and attribute-id-list set to 0 to indicate all attributes.
 - b. The PHD responds with a rors-cmip-get service message in which the attribute-list contains a list of all implemented attributes of the MDS object.
 - c. IF the mds-time-mgr-set-time bit is set:
 - ☐ The PHG moves to Configuring/Sending Set Time substate and:
 - IF C_AG_OXP_009 THEN it issues the Set-Time action command.
 - IF C_AG_OXP_014 THEN it issues the Set-Base-Offset-Time action command.
 - ☐ Once its internal time setting operation is completed, the PHD responds to the PHG.
6. Take a measurement with the PHD.
7. Wait for an event report from the PHD:
 - a. One of Enum-Observed-Value-Simple-OID, Enum-Observed-Value-Simple-Bit-Str, Enum-Observed-Value-Simple-Str, Enum-Observed-Value-Basic-Bit-Str, Enum-Observed-Value shall be present.
 - b. IF attribute Measure-Active-Period is present
 - ☐ attribute-id = MDC_ATTR_TIME_PD_MSMT_ACTIVE
 - ☐ attribute-type = FLOAT-Type
 - ☐ attribute-value.length = 4 bytes
 - ☐ attribute-value = <Not relevant for this test>
 - c. IF attribute Enum-Observed-Value-Simple-OID is present
 - ☐ attribute-id = MDC_ATTR_ENUM_OBS_VAL_SIMP_OID
 - ☐ attribute-type = OID-Type
 - ☐ attribute-value.length = 2 bytes
 - ☐ attribute-value = <Not relevant in this test>
 - d. IF attribute Enum-Observed-Value-Simple-Bit-Str is present
 - ☐ attribute-id = MDC_ATTR_ENUM_OBS_VAL_SIMP_BIT_STR
 - ☐ attribute-type = BITS-32
 - ☐ attribute-value.length = 4 bytes
 - ☐ attribute-value = <Not relevant in this test>
 - e. IF attribute Enum-Observed-Value-Basic-Bit-Str is present
 - ☐ attribute-id = MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR
 - ☐ attribute-type = BITS-16
 - ☐ attribute-value.length = 2 bytes
 - ☐ attribute-value = <Not relevant in this test>
 - f. IF attribute Enum-Observed-Value-Simple-Str is present
 - ☐ attribute-id = MDC_ATTR_ENUM_OBS_VAL_SIMP_STR
 - ☐ attribute-type = EnumPrintableString
 - ☐ attribute-value.length = <Variable>
 - ☐ attribute-value = <ASCII printable>
 - g. IF attribute Enum-Observed-Value is present

	☐ attribute-id = MDC_ATTR_VAL_ENUM_OBS ☐ attribute-type = EnumObsValue ☐ attribute-value.length = <Variable> ☐ attribute-value = <Checked in each specialization> h. IF attribute Enum-Observed-Value-Partition is present ☐ attribute-id = MDC_ATTR_ENUM_OBS_VAL_PART ☐ attribute-type = NomPartition ☐ attribute-value.length = 2 bytes ☐ attribute-value = one of the next ▪ nom-part-unspec (0x00 0x00) ▪ nom-part-obj (0x00 0x01) ▪ nom-part-metric (0x00 0x02) ▪ nom-part-alert (0x00 0x03) ▪ nom-part-dim (0x00 0x04) ▪ nom-part-vattr (0x00 0x05) ▪ nom-part-pgrp (0x00 0x06) ▪ nom-part-sites (0x00 0x07) ▪ nom-part-infrastuc (0x00 0x08) ▪ nom-part-fef (0x00 0x09) ▪ nom-part-ecg-extn (0x00 0x0A) ▪ nom-part-phd-dm (0x00 0x80) ▪ nom-part-phd-hf (0x00 0x81) ▪ nom-part-phd-ai (0x00 0x82) ▪ nom-part-ret-code (0x00 0xFF) ▪ nom-part-ext-nom (0x01 0x00) ▪ nom-part-priv (0x04 0x00) i. IF attribute Absolute-Time-Stamp is present ☐ attribute-id = MDC_ATTR_TIME_STAMP_ABS ☐ attribute-type = AbsoluteTime ☐ attribute-value.length = 8 bytes ☐ attribute-value = ▪ century = ▪ year ≤ 99 ▪ month ≤ 12 ▪ day ≤ 31 ▪ hour ≤ 24 ▪ minute ≤ 60 ▪ second ≤ 60 ▪ sec-fractions ≤ 100 ☐ If an PHD stores data, it shall associate a time stamp with the data (This case will be tested in TP/PLT/PHD/SER/BV-007) ☐ If an PHD supports Absolute-Time-Stamp, Base-Offset-Time-Stamp attribute shall not be supported. j. IF (C_AG_OXP_014 = TRUE) THEN Attribute Base-Offset-Time-Stamp may be present ELSE it shall not be present
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	☐ attribute-id = MDC_ATTR_TIME_STAMP_BO ☐ attribute-type = BaseOffsetTime ☐ attribute-value.length = 8 bytes ☐ attribute-value = <Not relevant in this test> ☐ If a PHD stores data, it shall associate a time stamp with the data. ☐ If a PHD supports Base-Offset-Time-Stamp, Absolute-Time-Stamp attribute shall not be supported. k. IF attribute Relative-Time-Stamp is present ☐ attribute-id = MDC_ATTR_TIME_STAMP_REL ☐ attribute-type = RelativeTime ☐ attribute-value.length = 4 bytes ☐ attribute-value = <Not relevant in this test> l. If a PHD stores data, it shall associate a time stamp with the data m. IF attribute HiResRelative-Time-Stamp is present ☐ attribute-id = MDC_ATTR_TIME_STAMP_REL_HI_RES ☐ attribute-type = HighResRelativeTime ☐ attribute-value.length = 8 bytes ☐ attribute-value = <Not relevant in this test> n. IF attribute Measurement Status is present ☐ attribute-id = MDC_ATTR_MSMT_STAT ☐ attribute-type = MeasurementStatus ☐ attribute-value.length = 2 bytes ☐ attribute-value = <not relevant for this test> o. Check dynamic attributes that can be present: Metric-Structure-Small, Metric-Id, Metric-Id-List, Metric-Id-Partition, Unit-Code,Source-Handle-Reference, Label-String, Unit-Label-String, Measure-Active-Period
Pass/Fail criteria	All checked values are as specified in the test procedure.
Notes	Checking that "IF C_AG_OXP_202=FALSE THEN mss-avail-stored data(1)=0" for MetricSpecSmall attribute has been removed because [ISO/IEEE 11073-20601-2015A] has specified (clause A.11.3) that "The setting of bits 0 to 5 is primarily informational and shall be set if the condition is true but-- a PHG cannot assume that if they are set the behavior will be observed". According to the Device Specialization spec, standard configurations (most of them) state the value for bit mss-avail-stored-data to 1, even if the PHD cannot store measurements. So if test procedure checks that if C_AG_OXP_202=FALSE then mss-avail-stored-data =0 the test case will give a FAIL verdict, and it would not be correct according to what [ISO/IEEE 11073-20601-2015A] states (clause A.11.3).

TP Id		TP/PLT/PHD/OXP/DIM/BV-001_C		
TP label		Static RealTime-SA attributes derived from Metrics class and and Dynamic RealTime-SA attributes.		
Coverage	Spec	[ISO/IEEE 11073-20601-2015A] and [ISO/IEEE 11073-20601-2016C]		
	Testable items	MetricClassAttr 1; M	MetricClassAttr 2; M	MetricClassAttr 3; O
		MetricClassAttr 4; M	MetricClassAttr 5; O	MetricClassAttr 7; O
		MetricClassAttr 8; O	MetricClassAttr 9; C	MetricClassAttr 10; O
		MetricClassAttr 11; O	MetricClassAttr 12; C	MetricClassAttr 13; O
		MetricClassAttr 14; O	MetricClassAttr 15; O	MetricClassAttr 16; C
		MetricClassAttr 17; C	MetricClassAttr 18; C	MetricClassAttr 19; O

		ArrayClass 1; M	ArrayClass 2; M	ArrayClassAttr 1; M
		ArrayClassAttr 2; M	ArrayClassAttr 3; M	ArrayClassAttr 4; M
		ConfNormalProc 1; M	ConfEventRep 29; M	ConfEventRep 30; M
		ConfEventRep 31; C	ConfEventRep 33; O	
	Spec	[b-ITU-T H.810 (2015)]		
	Testable items	Communication 6; M	General 2; M	
Test purpose	Check that: RT-SA class is derived from the Metric base class. It inherits all mandatory attributes and conditional attributes as required by their conditions and it may import optional attributes. [AND] The nomenclature code to identify the RT-SA class is MDC_MOC_VMO_METRIC_SA_RT. [AND] Static, dynamic and observational attributes. [AND] Changes to any attribute values of metric and scanner objects shall be reported to the PHG in scan event reports prior to sending event reports that depend on those values (e.g. scan-handle-attr-val-map and a group format event report or unit-code and the observed value). [AND] Continua PAN service components shall not include the Base Offset Time in any Continua configurations except for Basic electrocardiograph (ECG) device specialization.			
Applicability	C_AG_OXP_042 AND C_AG_OXP_000			
Other PICS	C_AG_OXP_009, C_AG_OXP_014, C_AG_OXP_041, C_AG_OXP_046, C_AG_OXP_047, C_AG_OXP_182, C_AG_OXP_183, C_AG_OXP_184, C_AG_OXP_189, C_AG_OXP_190, C_AG_OXP_192, C_AG_OXP_193, C_AG_OXP_194, C_AG_OXP_195, C_AG_OXP_196, C_AG_OXP_197, C_AG_OXP_198, C_AG_OXP_199, C_AG_OXP_200, C_AG_OXP_201, C_AG_OXP_202, C_AG_OXP_203, C_AG_OXP_230, C_AG_OXP_231, C_AG_OXP_232, C_AG_OXP_293			
Initial condition	The simulated PHG and PHD under test are in the Unassociated state.			
Test procedure	- The simulated PHG receives an association request from the PHD under test. - The simulated PHG responds with a result = accepted-unknown-config. - The PHD responds with a "Remote Operation Invoke Confirmed Event Report" message with an MDC_NOTI_CONFIG event to send its configuration to the PHG. - RealTime-SA object attributes must be(ConfigReport -> ConfigObject-> AttributeList): - Mandatory attribute Handle shall not be present ☐ attribute-type = HANDLE ☐ attribute-length = 2 bytes ☐ attribute-value = must be unique and non-zero. Actual value may be specified by the Device Specilization. - Mandatory attribute Type shall be present in ConfigReport: ☐ attribute-id = MDC_ATTR_ID_TYPE (0X09 0X2F) ☐ attribute-type = TYPE ☐ attribute-value = SEQUENCE OF (SIZE 6) ☐ attribute-value = <Not relevant in this test> - Mandatory attribute Metric-Spec-Small should be present ☐ attribute-id = MDC_ATTR_METRIC_SPEC_SMALL ☐ attribute-type = MetricSpecSmall ☐ attribute-value.length = 2 bytes			

- ☐ attribute-value = <Checked in the specializations>
 - Bit mss-avail-store-data must be set to 0
- d. Only one attribute of Metric-Id and Metric-Id-List shall be present.
- e. If Metric-Id-List attribute is supported, it should be present in ConfigReport:
 - ☐ attribute-id = MDC_ATTR_ID_PHYSIO_LIST
 - ☐ attribute-type = MetricIdList
 - ☐ attribute-value.length = SEQUENCE OF (SIZE 2)
 - ☐ attribute-value =
 - ☐ The [Metric-Id-List] attribute shall be used if a compound observed value is used, which does not incorporate the Metric-Id directly. The order of the Metric-Id-List shall correspond to the order of the elements in the compound observed value.
- f. IF Metric-Id attribute is supported, it should be present in ConfigReport:
 - ☐ attribute-id = MDC_ATTR_ID_PHYSIO
 - ☐ attribute-type = OID-Type
 - ☐ attribute-value.length = 2 bytes
- g. IF Attribute-Value-Map is supported, it should be present in ConfigReport:
 - ☐ attribute-id = MDC_ATTR_ATTRIBUTE_VAL_MAP (0X0A 0X55)
 - ☐ attribute-type = AttrValMap
 - ☐ attribute-count = n (record for next attribute field)
 - ☐ attribute-value.length = n*4 bytes
 - ☐ attribute-value = <n attributes will be declared, each one will have 4 bytes composed of:
 - attribute-id = 2 bytes (MDC_ATTR_*)
 - Attribute-length = 0x00 0x02: (2 bytes to declare the length of the attribute, but the contents of the attribute in the event report is not these 2 bytes length)
- h. IF Supplemental-Types attribute is supported, it shall be present in ConfigReport:
 - ☐ attribute-id = MDC_ATTR_SUPPLEMENTAL_TYPES
 - ☐ attribute-type = SupplementalTypeList
 - ☐ attribute-value.length = SEQUENCE OF (SIZE (4))
 - ☐ attribute-value = <Not relevant in this test>
- i. IF attribute Metric-Structure-Small is supported, it should be present in ConfigReport:
 - ☐ attribute-id = MDC_ATTR_METRIC_STRUCTURE_SMALL
 - ☐ attribute-type = MetricStructureSmall
 - ☐ attribute-value.length = 2 bytes
 - ☐ attribute-value =
 - ms-struct = one of the following:
 - ms-struct-simple (0x01)
 - ms-struct-compound (0x02)
 - ms-struct-reserved (0x03)
 - ms-struct-compound-simple (0x04)
 - ms-compound-no = one of the following:
 - IF ms-struct = ms-struct-simple THEN = 0
 - ELSE = maximum number of components in a compound value

- j. IF attribute Metric-Id-Partition is supported, it should be present in ConfigReport:
 - ☐ attribute-id = MDC_ATTR_METRIC_ID_PART
 - ☐ attribute-type = NomPartition
 - ☐ attribute-value.length = 2 bytes
 - ☐ attribute-value = one of the next
 - nom-part-unspec (0x00 0x00)
 - nom-part-obj (0x00 0x01)
 - nom-part-metric (0x00 0x02)
 - nom-part-alert (0x00 0x03)
 - nom-part-dim (0x00 0x04)
 - nom-part-vattr (0x00 0x05)
 - nom-part-pgrp (0x00 0x06)
 - nom-part-sites (0x00 0x07)
 - nom-part-infrac (0x00 0x08)
 - nom-part-fef (0x00 0x09)
 - nom-part-ecg-extn (0x00 0x0A)
 - nom-part-phd-dm (0x00 0x80)
 - nom-part-phd-hf (0x00 0x81)
 - nom-part-phd-ai (0x00 0x82)
 - nom-part-ret-code(0x00 0xFF)
 - nom-part-ext-nom (0x01 0x00)
 - nom-part-priv (0x04 0x00)
- k. IF attribute Unit-Code is supported, it should be present in ConfigReport:
 - ☐ attribute-id = MDC_ATTR_UNIT_CODE
 - ☐ attribute-type = OID-Type
 - ☐ attribute-value.length = 2 bytes
 - ☐ attribute-value = One of MDC_PART_DIM (may be defined in the specialization)
- l. IF attribute Source-Handle-Reference is supported, it should be present in ConfigReport:
 - ☐ attribute-id = MDC_ATTR_SOURCE_HANDLE_REF
 - ☐ attribute-type = HANDLE
 - ☐ attribute-value.length = 2 bytes
 - ☐ attribute-value = < The value of an existing object's handle >
- m. IF attribute Label-String is supported, it should be present in ConfigReport:
 - ☐ attribute-id = MDC_ATTR_ID_LABEL_STRING
 - ☐ attribute-type = OCTET STRING
 - ☐ attribute-value.length =
 - ☐ attribute-value = <Textual representation of attribute Type, Printable ASCII>
- n. IF attribute Unit-Label-String is supported, it should be present in ConfigReport:
 - ☐ attribute-id = MDC_ATTR_UNIT_LABEL_STRING
 - ☐ attribute-type = OCTET STRING
 - ☐ attribute-value.length =
 - ☐ attribute-value = <Textual representation of attribute Unit-Code, Printable ASCII>
- o. IF attribute Measure-Active-Period is supported, it should be present in

	ConfigReport: ☐ attribute-id = MDC_ATTR_TIME_PD_MSMT_ACTIVE ☐ attribute-type = FLOAT-Type ☐ attribute-value.length = 4 bytes ☐ attribute-value = <Not relevant in this test> p. Mandatory attribute Sample-Period shall be present in ConfigReport: ☐ attribute-id = MDC_ATTR_TIME_PD_SAMP ☐ attribute-type = RelativeTime ☐ attribute-value.length = 4 bytes ☐ attribute-value = <Not relevant in this test> q. Mandatory attribute Scale-and-Range-Specification shall be present in ConfigReport: ☐ attribute-id = MDC_ATTR_SCALE_SPECN_I8; MDC_ATTR_SCALE_SPECN_I16; MDC_ATTR_SCALE_SPECN_I32 ☐ attribute-type = ScaleRangeSpec8 OR ScaleRangeSpec16 OR ScaleRangeSpec32 ☐ attribute-value.length = 1, 2 OR 4 bytes, depending of the type ☐ attribute-value = <Not relevant in this test> r. Mandatory attribute Sa-Specification shall be present in ConfigReport: ☐ attribute-id = MDC_ATTR_SA_SPECN ☐ attribute-type = SaSpec ☐ attribute-value.length = 6 bytes ☐ attribute-value = <Not relevant in this test> s. Time-stamp attributes (Absolute-Time-Stamp, Base-Offset-Time, Relative-Time-Stamp and HiRes-Time-Stamp), observed values attributes (Simple-Sa-Observed-Value) and Measurement-Status shall not be present if mss-cat-setting and/or mss-cat-manual bit of the Metric-Spec-Small attribute is set to 0. If any of these bits is set to 1, observational attributes may be present in ConfigReport. Furthermore, if MDS event reports are sent by the PHD (the PHD sends fixed format value messages to report dynamic data for RT-SA Objects or uses variable format event report, C_AG_OXP_184=TRUE or C_AG_OXP_189=TRUE): 5. IF C_AG_OXP_293 THEN: a. Once in Configuring/Sending GetMDS substate simulated PHG issues roiv-cmip-get command with handle set to 0 (to request for MDS object) and attribute-id-list set to 0 to indicate all attributes. b. The PHD responds with a rors-cmip-get service message in which the attribute-list contains a list of all implemented attributes of the MDS object. c. IF the mds-time-mgr-set-time bit is set: ☐ The PHG moves to Configuring/Sending Set Time substate and: • IF C_AG_OXP_009 THEN it issues the Set-Time action command. • IF C_AG_OXP_014 THEN it issues the Set-Base-Offset-Time action command. ☐ Once its internal time setting operation is completed, the PHD responds to the PHG. 6. Take a measurement with the PHD 7. Wait for an event report from the PHD a. IF attribute Absolute-Time-Stamp is present ☐ attribute-id = MDC_ATTR_TIME_STAMP_ABS ☐ attribute-type = AbsoluteTime
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- ☐ attribute-value.length = 8 bytes
- ☐ attribute-value = <Not relevant in this test>
 - century =
 - year ≤ 99
 - month ≤ 12
 - day ≤ 31
 - hour ≤ 24
 - minute ≤ 60
 - second ≤ 60
 - sec-fractions ≤ 100
- ☐ If an PHD stores data, it shall associate a time stamp with the data.
- ☐ If an PHD supports Absolute-Time-Stamp, Base-Offset-Time-Stamp attribute shall not be supported.
- b. IF (C_AG_OXP_014 = TRUE) THEN Attribute Base-Offset-Time-Stamp may be present ELSE it shall not be present
 - ☐ attribute-id = MDC_ATTR_TIME_STAMP_BO
 - ☐ attribute-type = BaseOffsetTime
 - ☐ attribute-value.length = 8 bytes
 - ☐ attribute-value = <Not relevant in this test>
 - ☐ If a PHD stores data, it shall associate a time stamp with the data.
 - ☐ If a PHD supports Base-Offset-Time-Stamp, Absolute-Time-Stamp attribute shall not be supported.
- c. IF attribute Measure-Active-Period is present
 - ☐ attribute-id = MDC_ATTR_TIME_PD_MSMT_ACTIVE
 - ☐ attribute-type = FLOAT-Type
 - ☐ attribute-value.length = 4 bytes
 - ☐ attribute-value = <Not relevant in this test>
- d. IF attribute Relative-Time-Stamp is present
 - ☐ attribute-id = MDC_ATTR_TIME_STAMP_REL
 - ☐ attribute-type = RelativeTime
 - ☐ attribute-value.length = 4 bytes
 - ☐ attribute-value = <Not relevant in this test>
- e. IF a PHD stores data, it shall associate a time stamp with the data
- f. IF attribute HiResRelative-Time-Stamp is present
 - ☐ attribute-id = MDC_ATTR_TIME_STAMP_REL_HI_RES
 - ☐ attribute-type = HighResRelativeTime
 - ☐ attribute-value.length = 8 bytes
 - ☐ attribute-value = <Not relevant in this test>
- g. IF attribute Measurement Status is present
 - ☐ attribute-id = MDC_ATTR_MSMT_STAT
 - ☐ attribute-type = MeasurementStatus
 - ☐ attribute-value.length = 2 bytes
 - ☐ attribute-value = <not relevant for this test>
- h. Mandatory attribute Simple-Sa-Observed-Value
 - ☐ attribute-id = MDC_ATTR_SIMP_SA_OBS_VAL

	☐ attribute-type = OCTET STRING ☐ attribute-value.length = The length shall be even with padding bytes at the end. ☐ attribute-value = <Not relevant in this test> i. Check dynamic attributes that may be present: Metric-Structure-Small, Metric-Id, Metric-Id-List, Metric-Id-Partition, Unit-Code, Source-Handle-Reference, Label-String, Unit-Label-String, Measure-Active-Period
Pass/Fail criteria	All checked values are as specified in the test procedure.
Notes	

TP Id	TP/PLT/PHD/EXP/DIM/BV-001_D		
TP label	RealTime-SA: Sa-Specification semantic		
Coverage	Spec	[ISO/IEEE 11073-20601-2015A] and [ISO/IEEE 11073-20601-2016C]	
	Testable items	ArrayClassAttr 4; M	
Test purpose	Check that: The Sa-Specification attribute is of type SaSpec		
Applicability	C_AG_EXP_042 AND C_AG_EXP_000		
Other PICS	C_AG_EXP_046, C_AG_EXP_047, C_AG_EXP_180		
Initial condition	The simulated PHG and PHD under test are in the Operating state.		
Test procedure	1. Take a measurement with the PHD of a value stored in a RT-SA object. 2. Wait until the PHG receives an event report, the attributes of interest are: - Scale-and-Range-Specification: ☐ Attribute-value = See below ☐ lower-*-value = <Record for comparison> ☐ upper-*-value = <Record for comparison> - Simple-Sa-Observed-Value ☐ Attribute-value = <Record for comparison>		
Pass/Fail criteria	- Upper values must be $\geq$ than the lower values - Measurement Value must be in the allowed range.		
Notes			

TP Id	TP/PLT/PHD/EXP/DIM/BV-001_E		
TP label	Numeric attributes: Metric-Id-List Semantic		
Coverage	Spec	[ISO/IEEE 11073-20601-2015A] and [ISO/IEEE 11073-20601-2016C]	
	Testable items	MetricClassAttr 9; C	
Test purpose	The order of the Metric-Id-List shall correspond to the order of the elements in the compound observed value.		
Applicability	C_AG_EXP_190 AND C_AG_EXP_000		
Other PICS	C_AG_EXP_009, C_AG_EXP_014, C_AG_EXP_071, C_AG_EXP_188, C_AG_EXP_293		
Initial condition	The simulated PHG and PHD under test are in the Unassociated state.		
Test procedure	1. The simulated PHG receives an association request from the PHD under test. 2. The simulated PHG responds with a result = accepted-unknown-config. 3. The PHD responds with a "Remote Operation Invoke Confirmed Event Report" message with an MDC_NOTI_CONFIG event to send its configuration to the PHG.		

	4. IF C_AG_OXP_293 THEN: - Once in Configuring/Sending GetMDS substate simulated PHG issues roiv-cmip-get command with handle set to 0 (to request for MDS object) and attribute-id-list set to 0 to indicate all attributes. - The PHD responds with a rors-cmip-get service message in which the attribute-list contains a list of all implemented attributes of the MDS object. - IF the mds-time-mgr-set-time bit is set: ☐ The PHG moves to Configuring/Sending Set Time substate and: - IF C_AG_OXP_009 THEN it issues the Set-Time action command. - IF C_AG_OXP_014 THEN it issues the Set-Base-Offset-Time action command. ☐ Once its internal time setting operation is completed, the PHD responds to the PHG 5. Make the PHD send measurements for objects that support Metric-Id-List. 6. Wait for event reports. 7. The Compound Simple and Basic Numeric observed value will be taken from the Event Report received in step 4 and this information and the Metric-Id-List will be showed to the operator using a pop-up.
Pass/Fail criteria	The operator checks in step 7 that the order of the Metric-Id-List corresponds to the order of the elements in the compound observed value.
Notes	If the PHD does not send the Metric-Id-List value in the ConfigReport, the PHD will send it in an MDS-Event Report before sending an observation (compound value). SE is allowed for the Metric-Id-List.

TP Id		TP/PLT/PHD/OSP/DIM/BV-002_A		
TP label		PM-Store Object: Mandatory, Conditional and Optional Attributes 1		
Coverage	Spec	[ISO/IEEE 11073-20601-2015A] and [ISO/IEEE 11073-20601-2016C]		
	Testable items	StoreClass 1; M	StoreClassAttr 1; M	StoreClassAttr 2; M
		StoreClassAttr 3; M	StoreClassAttr 4; O	StoreClassAttr 5; O
		StoreClassAttr 6; M	StoreClassAttr 7; O	StoreClassAttr 8; C
		StoreClassAttr 9; M	StoreClassAttr 11; M	PM-StoreService 1; M
		PersStoreMtrDatTransf 25; M		
	Spec	[b-ITU-T H.810 (2015)]		
	Testable items	Communication 6; M		
	Spec	[ISO/IEEE 11073-10472]		
	Testable items	MM_PMStoreAttr6; C		
	Spec	[IEEE 11073-10406]		
	Testable items	PerPMStoreAtt2; M	AperPMStoreAtt2; M	PMStoreServ1; M
		PMStoreServ2; M		
Test purpose		Check that: PM-Store objects contain all mandatory attributes, conditional attributes as required by their conditions and it may contain optional attributes [AND] The nomenclature code to identify the PM-Store class is MDC_MOC_VMO_PMSTORE [AND] The handle value is placed in the obi-handle field of the message and is not present in the		

	attribute-id list of the request or the attribute-list of the response.
Applicability	C_AG_OXP_041 AND C_AG_OXP_000
Other PICS	C_AG_OXP_009, C_AG_OXP_014, C_AG_OXP_071, C_AG_OXP_187, C_AG_OXP_188, C_AG_OXP_293
Initial condition	The simulated PHG and PHD under test are in the Unassociated state.
Test procedure	1. The simulated PHG receives an association request from the PHD under test. 2. The simulated PHG responds with a result = accepted-unknown-config. 3. The PHD responds with a "Remote Operation Invoke Confirmed Event Report" message with an MDC_NOTI_CONFIG event to send its configuration to the PHG. 4. Record the handle for the PM-Store object. 5. The simulated PHG shall send a Get request for the PM-Store object with an attribute-id-list set to 0 to indicate all PM-Store attributes. 6. The PHD issues a GET response with the PM-Store attributes it supports: Verify the invoke-id is mirrored from the Get request. a. Mandatory attribute Handle shall not be present ☐ attribute-type = HANDLE ☐ attribute-value.length = 2 bytes ☐ attribute-value = <Not relevant in this test case> b. Mandatory attribute PM-Store-Capab ☐ attribute-id = MDC_ATTR_PM_STORE_CAPAB ☐ attribute-type = PmStoreCapab ☐ attribute-value.length = 2 bytes ☐ attribute-value = one or more of the following bits may be set: ▪ pmsc-var-no-of-segm (bit 0) ▪ IF C_AG_OXP_187 then bit 4 (pmsec-epi-seg-entries) must be set ▪ IF C_AG_OXP_188 then bit 5 (pmsec-peri-seg-entries) must be set ▪ pmsec-abs-time-select (bit 6) ▪ pmsec-clear-segm-by-list-sup (bit 7) ▪ pmsec-clear-segm-by-time-sup (bit 8) ▪ pmsec-clear-segm-remove (bit 9) ▪ pmsec-multi-person (bit 12) ▪ All other bits shall be set to zero c. Mandatory attribute Store-Sample-Algorithm ☐ attribute-id = MDC_ATTR_METRIC_STORE_SAMPLE_ALG ☐ attribute-type = StoSampleAlg ☐ attribute-value.length = 2 bytes ☐ attribute-value = One of the next ▪ st-alg-nos(0x00 0x00) ▪ st-alg-moving-average(0x00 0x01) ▪ st-alg-recursive(0x00 0x02) ▪ st-alg-min-pick(0x00 0x03) ▪ st-alg-max-pick(0x00 0x04) ▪ st-alg-median(0x00 0x05) ▪ st-alg-trended(0x02 0x00) ▪ st-alg-no-downsampling(0x04 0x00)

	▪ st-alg-manuf-specific-start(0xF0 0x0061440) ▪ st-alg-manuf-specific-end(0xFF 0xFF) d. Mandatory attribute Operational-State ☐ attribute-id = MDC_ATTR_OP_STAT ☐ attribute-type = OperationalState ☐ attribute-value.length = 2 bytes ☐ attribute-value = One of the next ▪ disabled (0x00 0x00) ▪ enabled (0x00 0x01) ▪ notAvailable (0x00 0x02) e. Mandatory attribute Number-Of-Segments ☐ attribute-id = MDC_ATTR_NUM_SEG ☐ attribute-type = INT-U16 ☐ attribute-value.length = 2 bytes ☐ attribute-value = <not relevant for this test> f. IF attribute Clear-Timeout ☐ attribute-id = MDC_ATTR_CLEAR_TIMEOUT ☐ attribute-type = RelativeTime ☐ attribute-value.length = 4 bytes ☐ attribute-value = <Not relevant in this test> ☐ IF the PHD supports the clear segment action, Clear-Timeout attribute is mandatory. g. IF attribute Sample-Period is present ☐ attribute-id = MDC_ATTR_TIME_PD_SAMP ☐ attribute-type = RelativeTime ☐ attribute-value.length = 4 bytes ☐ attribute-value = <Not relevant in this test> h. IF Storage-Capacity-Count is present ☐ attribute-id = MDC_ATTR_METRIC_STORE_CAPAC_CNT ☐ attribute-type = INT-U32 ☐ attribute-value.length = 4 bytes ☐ attribute-value = See relation with next attribute i. IF Storage-Usage-Count is present ☐ attribute-id = MDC_ATTR_METRIC_STORE_USAGE_CNT ☐ attribute-type = INT-U32 ☐ attribute-value.length = 4 bytes ☐ attribute-value = always ≤ than Storage-Capacity-Count j. IF attribute PM-Store-Label ☐ attribute-id = MDC_ATTR_PM_STORE_LABEL_STRING ☐ attribute-type = OCTET STRING ☐ attribute-value.length = ☐ attribute-value = Printable ASCII 7. IF C_AG_OXP_293 THEN a. IF the mds-time-mgr-set-time bit is set:
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	☐ The PHG moves to Configuring/Sending Set Time substate and: • IF C_AG_OXP_009 THEN it issues the Set-Time action command. • IF C_AG_OXP_014 THEN it issues the Set-Base-Offset-Time action command. ☐ Once its internal time setting operation is completed, the PHD responds to the PHG. 8. The simulated PHG shall send a Get-Segment-Info object action for the PM-Store object with SegmSelection set to all-segments. 9. The PHD issues a response (rors-cmip-confirmed-action) with the PM-Segment attributes it supports in the SegmentInfoList structure.
Pass/Fail criteria	• All checked values are as specified in the test procedure. • IF in step 6.f the Sample-Period was not present it must be present in each PM-Segment.
Notes	

TP Id		TP/PLT/PHD/OXP/DIM/BV-002_B		
TP label		PM-Store Object: Mandatory, Conditional and Optional Attributes 2		
Coverage	Spec	[ISO/IEEE 11073-20601-2015A] and [ISO/IEEE 11073-20601-2016C]		
	Testable items	StoreClassAttr 9; M	StoreClassAttr 2; M	StoreClassAttr 5; M
	Spec	[ISO/IEEE 11073-10472]		
	Testable items	MM_PMStoreAttr5; C		
Test purpose		Check that: PM-Store object includes the Number-Of-Segments attribute [AND] The Number-Of-Segments attribute is of type INT-U16 [AND] A PM-Store object may include the Store-Usage-Count attribute The Store-Usage-Count attribute shall be of type INT-U32		
Applicability		C_AG_OXP_041 AND C_AG_OXP_000		
Other PICS				
Initial condition		The simulated PHG and PHD under test are in the Operating state.		
Test procedure		1. Make sure there are no measurements being taken. 2. The simulated PHG shall send a Get request for the PM-Store object with an attribute-id-list set to 0 to indicate all PM-Store attributes. 3. The PHD issues a GET response with the PM-Store attributes. The attributes of interest are: a. Mandatory attribute PM-Store-Capab ☐ attribute-id = MDC_ATTR_PM_STORE_CAPAB ☐ attribute-type = PmStoreCapab ☐ attribute-value.length = 2 bytes ☐ attribute-value = ▪ pmsc-var-no-of-segm. Record state for later comparison b. Mandatory attribute Number-Of-Segments ☐ attribute-id = MDC_ATTR_NUM_SEG ☐ attribute-type = INT-U16 ☐ attribute-value.length = 2 bytes		

	☐ attribute-value = <record for later comparison> 4. The simulated PHG shall send a Get-Segment-Info object action for the PM-Store object with SegmSelection set to all-segments: a. Data APDU ☐ Type = Invoke Confirmed Action, ☐ HANDLE = obj-handle ☐ Action = MDC_ACT_SEG_GET_INFO ☐ SegmSelection = all-segments 5. The PHD issues a response (rors-cmip-confirmed-action) with the PM-Segment attributes it supports in the SegmentInfoList structure: a. Verify the invoke-id is mirrored from the Get request a. b. Data APDU ☐ Type = Response Confirmed Action, ☐ HANDLE = obj-handle ☐ Action = MDC_ACT_SEG_GET_INFO ☐ SegmentInfoList = <Attributes of the segments> 6. Record the number of existing Segments. 7. If the PHD can record measurements in PM-Store while it is connected then take measurements whose values are stored in a PM-Segment. 8. Repeat steps 2 through 5.
Pass/Fail criteria	▪ In step 2.a, if bit pmsc-var-no-of-segm is not set, the number of segments stated in step 2.b and checked in step 5.b must remain unchanged. ▪ The PM-Store attribute Number-Of-Segments value must contain the exact number of segments recorded in step 6.
Notes	

TP Id		TP/PLT/PHD/EXP/DIM/BV-002_C		
TP label		PM-Store Object: Clear-Timeout Semantics		
Coverage	Spec	[ISO/IEEE 11073-20601-2015A] and [ISO/IEEE 11073-20601-2016C]		
	Testable items	StoreClassAttr 11; M		
Test purpose		Check that: The value of Clear-Timeout attribute matches with the actual timeout value that the PHD uses to wait for a response to the Clear-Segments action		
Applicability		C_AG_OXP_041 AND C_AG_OXP_000 AND C_AG_OXP_071		
Other PICS				
Initial condition		The simulated PHG and PHD under test are in the Operating state.		
Test procedure		1. Take a measurement that would be placed in the PM-Store. 2. The simulated PHG shall send a Get request for the PM-Store object with an attribute-id-list set to 0 to indicate all PM-Store attributes. 3. The PHD issues a GET response with the PM-Store attributes. 4. Record the value of the Clear-Timeout Attribute (time in seconds = attribute-value*125/1e6). 5. The simulated PHG sends a Segment Clear to one of the PM-Segments: a. Data APDU ☐ Type = Invoke Confirmed Action, ☐ HANDLE = obj-handle		

	☐ Action = MDC_ACT_SEG_CLEAR ☐ SegmSelection = all-segments 6. The PHD under test operation response: Verify the invoke-id is mirrored from the Get request. a. Data APDU ☐ Type = Response Confirmed Action, ☐ HANDLE = obj-handle ☐ Action = MDC_ACT_SEG_CLEAR
Pass/Fail criteria	The PHG has to receive the confirmation in less than the value specified in the Clear-Timeout attribute.
Notes	

TP Id		TP/PLT/PHD/EXP/DIM/BV-002_D		
TP label		PM-Store Object: Episodic Semantics		
Coverage	Spec	[ISO/IEEE 11073-20601-2015A] and [ISO/IEEE 11073-20601-2016C]		
	Testable items	StoreClassAttr 2; M		
Test purpose		Check that: If PM-Store has some or all PM-Segments than contain episodic entries then it has to contain explicit time stamp information		
Applicability		C_AG_OXP_041 AND C_AG_OXP_187 AND C_AG_OXP_000		
Other PICS		C_AG_OXP_009, C_AG_OXP_014, C_AG_OXP_293		
Initial condition		The simulated PHG and PHD under test are in the Unassociated state.		
Test procedure		1. Make sure there are no measurements being taken. 2. The simulated PHG receives an association request from the PHD under test. 3. The simulated PHG responds with a result = accepted-unknown-config. 4. The PHD responds with a "Remote Operation Invoke Confirmed Event Report" message: a. Event-type=MDC_NOTI_CONFIG 5. IF C_AG_OXP_293 THEN: a. Once in Configuring/Sending GetMDS substate simulated PHG issues roiv-cmip-get command with handle set to 0 (to request for MDS object) and attribute-id-list set to 0 to indicate all attributes. b. The PHD responds with a rors-cmip-get service message in which the attribute-list contains a list of all implemented attributes of the MDS object. c. IF the mds-time-mgr-set-time bit is set: ☐ The PHG moves to Configuring/Sending Set Time substate and: • IF C_AG_OXP_009 THEN it issues the Set-Time action command. • IF C_AG_OXP_014 THEN it issues the Set-Base-Offset-Time action command. ☐ Once its internal time setting operation is completed, the PHD responds to the PHG. 6. Check that the PM-Store-Capab attribute has the pmsc-epi-seg-entries bit set. 7. The simulated PHG shall send a Get-Segment-Info object action for the PM-Store object with SegmSelection set to all-segments. 8. The PHD shall respond to the Get-Segment-Info, indicating the attributes of the PM-Segment. 9. Check the PM-Segment-Entry-Map to make sure that a Time-Stamp is associated with		

	the measurement data. 10. Take measurements with the PHD under test. 11. The simulated PHG sends a request for the PM-Segment Data to one of the PM-Segments that contains data (sends the Action MDC_ACT_SEG_TRIG_XFER). 12. The PHD issues an action response. 13. The PHD under test starts Data transfer: a. Data APDU ☐ Invoke CfmEventReport ☐ Action = MDC_NOTI_SEGMENT_DATA ☐ SegmentDataEvent 14. The simulated PHG responds to transferred data APDU's.
Pass/Fail criteria	The PM-Segment-Entry-Map contains a Time-Stamp associated with measurement data and it has the correct format in the SegmentDataEvent received.
Notes	

TP Id	TP/PLT/PHD/EXP/DIM/BV-002_E			
TP label	PM-Store Object: Mandatory, Conditional and Optional Attributes 3 Configuration			
Coverage	Spec	[ISO/IEEE 11073-20601-2015A] and [ISO/IEEE 11073-20601-2016C]		
	Testable items	StoreClass 1; M	StoreClassAttr 1; M	StoreClassAttr 2; M
		StoreClassAttr 3; M	StoreClassAttr 4; O	StoreClassAttr 5; O
		StoreClassAttr 6; M	StoreClassAttr 7; O	StoreClassAttr 8; C
		StoreClassAttr 9; M	StoreClassAttr 11; M	ConfEventRep 29; M
		ConfEventRep 30; M	ConfEventRep 31; C	ConfEventRep 33; O
		PM-StoreService 3; O		
	Spec	[b-ITU-T H.810 (2015)]		
	Testable items	Communication 6; M		
Test purpose	Check that: PM-Store objects contain all mandatory attributes, conditional attributes as required by their conditions and it may contain optional attributes [AND] The nomenclature code to identify the PM-Store class is MDC_MOC_VMO_PMSTORE [AND] Static, dynamic and observational attributes. [AND] A PHD may also send scan event reports providing the PHG with updates of the current attribute values, but this is not a mandated PHD behavior. [AND] Changes to any non-static attributes values on PM-stores or the MDS may be reported to the PHG in event reports at the discretion of the PHD			
Applicability	C_AG_OXP_041 AND C_AG_OXP_000			
Other PICS	C_AG_OXP_009, C_AG_OXP_014, C_AG_OXP_071, C_AG_OXP_293			
Initial condition	The simulated PHG and PHD under test are in the Operating state.			
Test procedure	1. The simulated PHG receives an association request from the PHD under test. 2. The simulated PHG responds with a result = accepted-unknown-config. 3. The PHD responds with a "Remote Operation Invoke Confirmed Event Report"			

	message with an MDC_NOTI_CONFIG event to send its configuration to the PHG. 4. The PM-Store object attributes must be(ConfigReport -> ConfigObject-> AttributeList): - Mandatory attribute Handle shall not be present. ☐ attribute-type = HANDLE ☐ attribute-value.length = 2 bytes ☐ attribute-value = must be unique and non-zero. Actual value may be specified by the Device Specilization. - Mandatory attribute PM-Store-Capab shall be present in ConfigReport: ☐ attribute-id = MDC_ATTR_PM_STORE_CAPAB ☐ attribute-type = PmStoreCapab ☐ attribute-value.length = 2 bytes ☐ attribute-value = <Not relevant in this test> - Mandatory attribute Store-Sample-Algorithm shall be present in ConfigReport: ☐ attribute-id = MDC_ATTR_METRIC_STORE_SAMPLE_ALG ☐ attribute-type = StoSampleAlg ☐ attribute-value.length = 2 bytes ☐ attribute-value = <Not relevant in this test> - IF Storage-Capacity-Count is supported, it shall be present in ConfigReport: ☐ attribute-id = MDC_ATTR_METRIC_STORE_CAPAC_CNT ☐ attribute-type = INT-U32 ☐ attribute-value.length = 4 bytes ☐ attribute-value = <Not relevant in this test> - IF Storage-Usage-Count is supported, it should be present in ConfigReport: ☐ attribute-id = MDC_ATTR_METRIC_STORE_USAGE_CNT ☐ attribute-type = INT-U32 ☐ attribute-value.length = 4 bytes ☐ attribute-value = <Not relevant in this test> - Mandatory attribute Operational-State should be present in ConfigReport: ☐ attribute-id = MDC_ATTR_OP_STAT ☐ attribute-type = OperationalState ☐ attribute-value.length = 2 bytes ☐ attribute-value = <Not relevant in this test> - IF attribute PM-Store-Label is supported, it shall be present in ConfigReport: ☐ attribute-id = MDC_ATTR_PM_STORE_LABEL_STRING ☐ attribute-type = OCTET STRING ☐ attribute-value.length = ☐ attribute-value = <Not relevant in this test> - IF attribute Sample-Period is supported, it shall be present in ConfigReport: ☐ attribute-id = MDC_ATTR_TIME_PD_SAMP ☐ attribute-type = RelativeTime ☐ attribute-value.length = 4 bytes ☐ attribute-value = <Not relevant in this test> - Mandatory attribute Number-Of-Segments should be present in ConfigReport: ☐ attribute-id = MDC_ATTR_NUM_SEG ☐ attribute-type = INT-U16
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