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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

E-health multimedia systems, 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 5Q: Power status monitor

Recommendation ITU-T H.845.17

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Recommendation ITU-T H.845.17

Conformance of ITU-T H.810 personal health system: Personal Health Devices interface Part 5Q: Power status monitor

Summary

Recommendation ITU-T H.845.17 provides a test suite structure (TSS) and the test purposes (TPs) for the power status monitor (PSM) of personal health devices in the Personal Health Device (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 (2017) is the base Recommendation. The objective of this test specification is to provide a high probability of interoperability at this interface.

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

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T H.845.17	2018-08-29	16	11.1002/1000/13683
2.0	ITU-T H.845.17	2019-11-29	16	11.1002/1000/14118

Keywords

Conformance testing, Continua Design Guidelines, e-health, ITU-T H.810, Personal Health Devices interface, personal area network, personal connected health devices, touch area network, IEEE 11073 device specialization, power status monitor.

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

FOREWORD

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The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

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

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

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

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

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

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

Introduction

Version	Date	Revision history
1.0	2018-02-27	Initial release for the inclusion of the Power Status Monitor of Personal Health Devices device specialization (ISO/IEEE 11073-10427:2018)
1.1	2018-10-17	Updates due to the inclusion of the Power Status Monitor of Personal Health Devices device specialization (ISO/IEEE 11073-10427:2018) test cases
1.2	2019-06-13	Second maintenance release for Test Tool DG2017. It uses ITU-T H.845.17 (08/2018) as a baseline and adds some updates according to the 2018/2019 maintenance activity.

Recommendation ITU-T H.845.17

Conformance of ITU-T H.810 personal health system: Personal Health Devices interface Part 5Q: Power status monitor

1 Scope

The scope of this Recommendation[1] is to provide a test suite structure (TSS) and the test purposes TPs) for the Personal Health Devices interface based on the requirements defined in Continua Design Guidelines (CDG) [ITU-T H.810 (2017)]. The objective of this test specification is to provide a high probability of interoperability at this interface.

The TSS and TPs for the Personal Health Devices interface have been divided into the parts specified below. This Recommendation covers Part 5, subpart 5Q.

– 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 Device. 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 flow
  - 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 5Q: Power status monitor (PSM)**
– Part 6: Device Specializations. Personal Health Gateway
– Part 7: Continua Design Guidelines. Personal Health Device BLE
– Part 8: Continua Design Guidelines. Personal Health Gateway BLE

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

– Part 9: Personal Health Devices Transcoding White paper. Personal Health Device

– Part 10: Personal Health Devices Transcoding White paper. 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 (2017)] Recommendation ITU-T H.810 (2017), *Interoperability design guidelines for personal connected health systems: Introduction.*

[ISO/IEEE 11073-10427] ISO/IEEE 11073-10427:2018, *Health informatics – Personal health device communication – Part 10427: Device specialization – Power status monitor of personal health devices*. https://www.iso.org/standard/73759.html. Same publication as https://standards.ieee.org/findstds/standard/11073-10427-2016.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

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. 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:

CDG Continua Design Guidelines

CGM Continuous Glucose Monitor

DUT Device Under Test

INR International Normalized Ratio

IP Insulin Pump

MDS Medical Device System

NFC Near Field Communication

PAN Personal Area Network

PHD Personal Health Device

PHG Personal Health Gateway

PICS Protocol Implementation Conformance Statement

PIXIT Protocol Implementation extra Information for Testing

PSM Power Status Monitor

SABTE Sleep Apnoea Breathing Therapy Equipment

TCWG Test and Certification Working Group

TP Test Purpose

TSS Test Suite Structure

USB Universal Serial Bus

5 Conventions

The key words "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "MAY", "MAY NOT" in this document 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.

Generic reference to the ITU-T H.810 series is made through the label [ITU-T H.810 series], as listed in clause 2.

Reference is made in the ITU-T H.820-H.850-series of Recommendations to different versions of the 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
2017	-	7.0	Release 2017 of the CDG including maintenance updates of the CDG 2016 and additional guidelines that cover new functionalities.	–
2016 plus errata	[b-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.	–
2011	–	2.0	Release 2011 of the CDG including maintenance updates of the CDG 2010 and additional guidelines that cover new functionalities [b-CDG 2011].	Adrenaline
2010 plus errata	–	1.6	CDG 2010 integrated with identified errata	–
2010	–	1.5	Release 2010 of the CDG with maintenance updates of the CDG Version 1 and additional guidelines that cover new functionalities [b-CDG 2010].	1.5
1.0	–	1.0	First released version of the CDG [b-CDG 1.0].	–

6 Test suite structure

The TPs for the Personal Health Devices interface have been divided into the main subgroups specified below. Annex A describes the TPs for subgroup 1.3.17 (shown in bold):

The TPs have been divided into two main groups:

– Group 1: Personal Health Device (PHD)
  - Group 1.1: Transport (TR)
    - Subgroup 1.1.1: Design guidelines: Common (DGC)
    - Subgroup 1.1.2: USB design guidelines (UDG)
    - Subgroup 1.1.3: Bluetooth design guidelines (BDG)
    - Subgroup 1.1.4: Pulse oximeter design guidelines (PODG)
    - Subgroup 1.1.5: Cardiovascular design guidelines (CVDG)
    - Subgroup 1.1.6: Activity hub design guidelines (HUBDG)
    - Subgroup 1.1.7: ZigBee design guidelines (ZDG)
    - Subgroup 1.1.8: Glucose meter design guidelines (GLDG)
    - Subgroup 1.1.9: Bluetooth low energy design guidelines (BLEDG)
    - Subgroup 1.1.10: Basic electrocardiograph design guidelines (ECGDG)
    - Subgroup 1.1.11: NFC design guidelines (NDG)
  - Group 1.2: IEEE 20601: Optimized exchange protocol (OXP)
    - Subgroup 1.2.1: PHD domain information model (DIM)
    - Subgroup 1.2.2: PHD service model (SER)
    - Subgroup 1.2.3: PHD communication model (COM)
  - Group 1.3: Devices class specializations (CLASS)
    - Subgroup 1.3.1: Weighing scales (WEG)
    - Subgroup 1.3.2: Glucose meter (GL)
    - Subgroup 1.3.3: Pulse oximeter (PO)
    - Subgroup 1.3.4: Blood pressure monitor (BPM)
    - Subgroup 1.3.5: Thermometer (TH)
    - Subgroup 1.3.6: Cardiovascular (CV)
    - Subgroup 1.3.7: Strength (ST)
    - Subgroup 1.3.8: Activity hub (HUB)
    - Subgroup 1.3.9: Adherence monitor (AM)
    - Subgroup 1.3.10: Insulin pump (IP)
    - Subgroup 1.3.11: Peak flow (PF)
    - Subgroup 1.3.12: Body composition analyser (BCA)
    - Subgroup 1.3.13: Basic electrocardiograph (ECG)
    - Subgroup 1.3.14: International normalized ratio (INR)
    - Subgroup 1.3.15: Sleep apnoea breathing therapy equipment (SABTE)
    - Subgroup 1.3.16: Continuous glucose monitor (CGM)
    - **Subgroup 1.3.17: Power status monitor (PSM)**
  - Group 1.4: Personal Health Device transcoding whitepaper (PHDTW)
    - Subgroup 1.4.1: Whitepaper general requirements (GEN)

- Subgroup 1.4.2: Whitepaper thermometer requirements (TH)
- Subgroup 1.4.3: Whitepaper blood pressure requirements (BPM)
- Subgroup 1.4.4: Whitepaper heart rate requirements (HR)
- Subgroup 1.4.5: Whitepaper glucose meter requirements (GL)
- Subgroup 1.4.6: Whitepaper weight scale requirements (WS)
- Subgroup 1.4.7: Whitepaper pulse oximeter requirements (PLX)
- Subgroup 1.4.8: Whitepaper continuous glucose monitoring requirements (CGM)

– Group 2: Personal Health Gateway (PHG)

- Group 2.1: Transport (TR)
  - Subgroup 2.1.1: Design guidelines: Common (DGC)
  - Subgroup 2.1.2: USB design guidelines (UDG)
  - Subgroup 2.1.3: Bluetooth design guidelines (BDG)
  - Subgroup 2.1.4: Cardiovascular design guidelines (CVDG)
  - Subgroup 2.1.5: Activity hub design guidelines (HUBDG)
  - Subgroup 2.1.6: ZigBee design guidelines (ZDG)
  - Subgroup 2.1.7: Bluetooth low energy design guidelines (BLEDG)
  - Subgroup 2.1.8: NFC design guidelines (NDG)
- Group 2.2: IEEE 20601: Optimized exchange protocol (OXP)
  - Subgroup 2.2.1: General (GEN)
  - Subgroup 2.2.2: PHD domain information model (DIM)
  - Subgroup 2.2.3: PHD service model (SER)
  - Subgroup 2.2.4: PHD communication model (COM)
- Group 2.3: Devices class specializations (CLASS)
  - Subgroup 2.3.1: Weighing scales (WEG)
  - Subgroup 2.3.2: Glucose meter (GL)
  - Subgroup 2.3.3: Pulse oximeter (PO)
  - Subgroup 2.3.4: Blood pressure monitor (BPM)
  - Subgroup 2.3.5: Thermometer (TH)
  - Subgroup 2.3.6: Cardiovascular (CV)
  - Subgroup 2.3.7: Strength (ST)
  - Subgroup 2.3.8: Activity hub (HUB)
  - Subgroup 2.3.9: Adherence monitor (AM)
  - Subgroup 2.3.10: Insulin pump (IP)
  - Subgroup 2.3.11: Peak flow (PF)
  - Subgroup 2.3.12: Body composition analyser (BCA)
  - Subgroup 2.3.13: Basic electrocardiograph (ECG)
  - Subgroup 2.3.14: International normalized ratio (INR)
  - Subgroup 2.3.15: Sleep apnoea breathing therapy equipment (SABTE)
  - Subgroup 2.3.16: Continuous glucose monitor (CGM)
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  - 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 (PICSs) 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. See [b-PHD PICS & PIXIT], [b-PHG PICS & PIXIT] and [b-TI].

In the electronic attachment, letters "C" and "I" in the column labelled "Mandatory" are used to distinguish between "PICSs" 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 PICSs, 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 Test purpose definition conventions

The 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 TP 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 TP.
- **TP label**: This is the title of the TP.
- **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 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 a 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 DUT within that scope of the test (specialization, transport used, etc.).
- **Other PICSs**: 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 is 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 1.3.17: Power status monitor (PSM)

<table>
<tr><td colspan="2">TP Id</td><td colspan="3">TP/PLT/PHD/CLASS/PSM/BV-000_A</td></tr>
<tr><td colspan="2">TP label</td><td colspan="3">Get MDS Object for Power Status Monitor specialization: Mandatory, Conditional and Optional Attributes.</td></tr>
<tr><td rowspan="7">Coverage</td><td>Spec</td><td colspan="3">[ISO/IEEE 11073-10427]</td></tr>
<tr><td rowspan="6">Testable items</td><td>MDSAttrPSM 2; NR</td><td>MDSAttrPSM 3; M</td><td>MDSAttrPSM 4; M</td></tr>
<tr><td>MDSAttrPSM 6; M</td><td>MDSAttrPSM 7; M</td><td>MDSAttrPSM 12; M</td></tr>
<tr><td>MDSAttrPSM 16; M</td><td>MDSAttrPSM 17; M</td><td>MDSAttrPSM 18; M</td></tr>
<tr><td>Capacity 55; M</td><td>Capacity 56; M</td><td>SimplePSMProf 1; M</td></tr>
<tr><td>SimplePSMProf 2; M</td><td>SimplePSMProf 3; M</td><td>SimplePSMProf 4; M</td></tr>
<tr><td>AdvPSMProf 4; M</td><td>AdvPSMProf 5; M</td><td></td></tr>
<tr><td colspan="2">Test purpose</td><td colspan="3">Check that:
The MDS Object contains the attributes specified for a Power Status Monitor agent</td></tr>
<tr><td colspan="2">Applicability</td><td colspan="3">C_AG_OXP_000 AND (C_AG_OXP_155 OR C_AG_OXP_156)</td></tr>
<tr><td colspan="2">Other PICSs</td><td colspan="3">C_AG_OXP_181</td></tr>
<tr><td colspan="2">Initial condition</td><td colspan="3">The simulated Personal Health Gateway (PHG) and Personal Health Device (PHD) under test are in Operating State.</td></tr>
<tr><td colspan="2">Test procedure</td><td colspan="3">1. The PHD reports values of its objects as a new association has already been established.
2. The PHG saves the value of the [Compound-Nu-Observed-Value] of all the Battery Capacity objects of the PHD.
3. The 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.
4. 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:
MDS Attributes:
a. System-Type attribute shall not be present (as System-Type-Spec-List attribute is mandatory)
b. Mandatory attribute System-Type-Spec-List
❑ attribute-id = MDC_ATTR_SYS_TYPE_SPEC_LIST
❑ attribute-type = TypeVerList
❑ attribute-value.length = 4 bytes for each configuration supported
❑ attribute-value = {MDC_DEV_SPEC_PROFILE_PSM, 1} and
• IF C_AG_OXP_155 THEN {MDC_DEV_SUB_SPEC_PROFILE_ EIGHT_OR_LESS_BATTERIES, 1}
• IF C_AG_OXP_156 THEN {MDC_DEV_SUB_SPEC_PROFILE_ MORE_THAN_EIGHT_BATTERIES, 1}
c. Mandatory attribute System-model
❑ attribute-id = MDC_ATTR_ID_MODEL (0x09 0x28)
❑ attribute-type = SystemModel
❑ atribute-value.length = <Variable></td></tr>
</table>

	❑ attribute-value = • Manufacturer = Check against PIXIT I_AG_OXP_003 • Model = Check against PIXIT I_AG_OXP_004 d. Mandatory attribute Dev-Configuration-Id ❑ attribute-id = MDC_ATTR_DEV_CONFIG_ID ❑ attribute-type = ConfigId ❑ attribute-value.length = 2 bytes ❑ attribute-value = • IF (NOT C_AG_OXP_181) AND (C_AG_OXP_155) then attribute-value = 0x0A8C OR 0x0A8D OR 0x0A8E OR 0x0A8F OR 0x0A90 OR 0x0A91 OR 0x0A92 OR 0x0A93 • ELSE attribute-value = < between 0x4000 and 0x7FFF> e. If recommended attribute Base-Offset-Time is present ❑ attribute-id = MDC_ATTR_TIME_BO (0x0A 0x81) ❑ attribute-type = BaseOffsetTime ❑ attribute-value.length = 8 bytes ❑ attribute-value = <not relevant> f. Mandatory attribute Power-Status ❑ attribute-id = MDC_ATTR_POWER_STAT ❑ attribute-type = PowerStatus (BITS-16) ❑ attribute-value.length = 2 bytes ❑ attribute-value = • ON_BATTERY(0x4000) • ON_MAINS (0x8000) g. Mandatory attribute Battery-Level ❑ attribute-id = MDC_ATTR_VAL_BATT_CHARGE (0X09 0X9C) ❑ attribute-type = INT-U16 ❑ attribute-value.length = 2 bytes ❑ attribute-value = the summation of the remaining capacities of each battery (obtained in step 2) divided by the summation of the current full charge capacities of each battery expressed as a percentage h. Mandatory Remain-Battery-Time ❑ attribute-id = MDC_ATTR_TIME_BATT_REMAIN (0X09 0X88) ❑ attribute-type = BatMeasure ❑ attribute-value.length = 6 bytes ❑ attribute-value = the sum of the remaining battery time of all the batteries of the device, obtained in step 2.
Pass/Fail criteria	All checked values are as specified in the test procedure.
Notes	

TP Id		TP/PLT/PHD/CLASS/PSM/BV-000_B
TP label		MDS Configuration objects events for Power Status Monitor specialization.
Coverage	**Spec**	[ISO/IEEE 11073-10427]

	Testable items	MDSEventsPSM 1; M		
Test purpose		Check that: A Power Status Monitor agent shall send the [MDS-Configuration-Event] using a [Confirmed] event report. The [MDS-Configuration-Event] shall include the event-info [ConfigReport]		
Applicability		C_AG_OXP_000 AND (C_AG_OXP_155 OR C_AG_OXP_156)		
Other PICSs		C_AG_OXP_010, C_AG_OXP_181		
Initial condition		The simulated PHG and PHD under test are in 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: a. APDU Type ❑ field- type = PrstApdu ❑ field-length =2 bytes ❑ field-value =0xE7 0x00 b. invoke-id ❑ field- type = InvokeIDType ❑ field-length =INT-U16 ❑ field- value =<Not relevant for this test> c. message ❑ field- type = roiv-cmip-confirmed-event-report ❑ field-length =two bytes ❑ field- value =0x01 0x01 (EventReportArgumentSimple) d. obj-handle (EventReportArgumentSimple) ❑ field- type = HANDLE ❑ field-length =INT-U16 e. event-time (EventReportArgumentSimple) ❑ field- type = Relative Time ❑ field-length =INT-U32 ❑ field-value = • IF NOT C_AG_OXP_010 THEN value = 0xFF 0xFF 0xFF 0xFF f. event-type (EventReportArgumentSimple) ❑ field- type = OID-Type ❑ field-length =INT-U16 ❑ field- value=0x0D 0x1C (MDC_NOTI_CONFIG) g. config-report-id (ConfigReport) ❑ field- type = ConfigId ❑ field-length = INT-U16 ❑ field value = <It matches the tested configuration> • IF NOT C_AG_OXP_181 THEN attribute-value = 0x0A8C (2700) OR 0x0A8D (2701) OR 0x0A8E (2702) OR 0x0A8F (2703) OR 0x0A90 (2704) OR 0x0A91 (2705) OR 0x0A92 (2706) OR 0x0A93 (2707)		

	• ELSE attribute-value = <between 0x40 0x00 and 0x7F 0xFF > for extended configuration. h. obj-class (ConfigReport → ConfigObjectList (ConfigObject)) ❑ field- type = OID-Type ❑ field-length = INT-U16 ❑ field- value = At least one MDC_MOC_VMO_METRIC_NU
Pass/Fail criteria	All checked values are as specified in the test procedure.
Notes	

TP Id		TP/PLT/PHD/CLASS/PSM/BV-000_C		
TP label		MDS objects events for Power Status Monitor specialization.		
Coverage	**Spec**	[ISO/IEEE 11073-10427]		
	Testable items	MDSEventsPSM 3; M	MDSEventsPSM 4; M	MDSEventsPSM 5; M
		MDSEventsPSM 6; M	ObjAccServPSM 1; M	ObjAccServPSM 2; M
Test purpose		Check that: MDS Event reports shall be used in confirmed mode [AND] Agent-initiated mode shall be supported for measurement data transmission [AND] A Power Status Monitor PHD shall send the [MDS-Dynamic-Data-Update-Fixed] using a [Confirmed] event report. The [MDS-Dynamic-Data-Update-Fixed] shall include the event-info [ScanReportInfoFixed] [AND] A Continuous Glucose Monitor PHD shall send the [MDS-Dynamic-Data-Update-Var] using a [Confirmed] event report. The [MDS-Dynamic-Data-Update-Var] shall include the event-info [ScanReportInfoVar]		
Applicability		C_AG_OXP_000 AND (C_AG_OXP_155 OR C_AG_OXP_156) AND (C_AG_OXP_182 OR C_AG_OXP_183 OR C_AG_OXP_189)		
Other PICS				
Initial condition		The simulated PHG and PHD under test are in Operating State.		
Test procedure		1. The PHD reports values of its objects as a new association has been established. 2. Check: a. APDU Type ❑ field- type = Event Report ❑ field-length = 2 bytes ❑ field- value=0x01 0x01 (EventReportArgumentSimple, confirmed) This field identifies the type of message sent by the PHD, for the confirmed event configuration, roiv-cmip-confirmed-event-report.		
Pass/Fail criteria		Check that every received report is one of the following confirmed Data APDU • MDC_NOTI_SCAN_REPORT_FIXED • MDC_NOTI_SCAN_REPORT_VAR		

Notes	

TP Id		TP/PLT/PHD/CLASS/PSM/BV-001		
TP label		Objects for Power Status Monitor specialization - Standard Configurations		
Coverage	**Spec**	[ISO/IEEE 11073-10427]		
	Testable items	Capacity 1; M	BattStatus 1; M	
Test purpose		Check that: The Battery Capacity Numeric object with Type {MDC_PART_PHD_DM | MDC_BATTERY_CAPACITY} is supported by a Power Status Monitor PHD with Standard Configurations 0x0A8C (2700) OR 0x0A8D (2701) OR 0x0A8E (2702) OR 0x0A8F (2703) OR 0x0A90 (2704) OR 0x0A91 (2705) OR 0x0A92 (2706) OR 0x0A93 (2707). [AND] The Battery Capacity Numeric object is present as many times as required by the [Dev-Configuration-Id] attribute value [AND] The Battery Status Enumeration object with Type {MDC_PART_PHD_DM | MDC_BATTERY_STATUS} is supported by a Power Status Monitor PHD with Standard Configurations 0x0A8C (2700) OR 0x0A8D (2701) OR 0x0A8E (2702) OR 0x0A8F (2703) OR 0x0A90 (2704) OR 0x0A91 (2705) OR 0x0A92 (2706) OR 0x0A93 (2707). [AND] The Battery Status Enumeration object is present as many times as required by the [Dev-Configuration-Id] attribute value [AND] No more objects are supported by a Power Status Monitor (PSM) PHD with Standard Configurations 0x0A8C (2700) OR 0x0A8D (2701) OR 0x0A8E (2702) OR 0x0A8F (2703) OR 0x0A90 (2704) OR 0x0A91 (2705) OR 0x0A92 (2706) OR 0x0A93 (2707).		
Applicability		C_AG_OXP_000 AND C_AG_OXP_155 AND (NOT_C_AG_OXP_181)		
Other PICSs				
Initial condition		The simulated PHG and PHD are in 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 field Dev-Config-Id is set to 0x0A8C (2700) OR 0x0A8D (2701) OR 0x0A8E (2702) OR 0x0A8F (2703) OR 0x0A90 (2704) OR 0x0A91 (2705) OR 0x0A92 (2706) OR 0x0A93 (2707). if it is not, PHG responds with a "unsupported-config" and waits for a new configuration 5. Once the PHD under test sends a standard configuration, Check that: Attribute-List: a. attribute-value (ConfigReport → ConfigObjectList (ConfigObject) → Attribute List), this value depends on the attribute Type. Values to be checked are: ❑ The Battery Capacity Numeric object is present → MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_CAPACITY (0x74 0xCC), and • IF the [Dev-Configuration-Id] attribute is 0x0A8C (2700) the Battery Capacity Numeric object is present once • IF the [Dev-Configuration-Id] attribute is 0x0A8D (2701) the Battery		

	Capacity Numeric object is present twice • IF the [Dev-Configuration-Id] attribute is 0x0A8E (2702) the Battery Capacity Numeric object is present three times • IF the [Dev-Configuration-Id] attribute is 0x0A8F (2703) the Battery Capacity Numeric object is present four times • IF the [Dev-Configuration-Id] attribute is 0x0A90 (2704) the Battery Capacity Numeric object is present five times • IF the [Dev-Configuration-Id] attribute is 0x0A91 (2705) the Battery Capacity Numeric object is present six times • IF the [Dev-Configuration-Id] attribute is 0x0A92 (2706) the Battery Capacity Numeric object is present seven times • IF the [Dev-Configuration-Id] attribute is 0x0A93 (2707) the Battery Capacity Numeric object is present eight times ❑ The Battery Status Enumeration object is present → MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_STATUS (0x74 0xD0), and • IF the [Dev-Configuration-Id] attribute is 0x0A8C (2700) the Battery Status Enumeration object is present once • IF the [Dev-Configuration-Id] attribute is 0x0A8D (2701) the Battery Status Enumeration object is present twice • IF the [Dev-Configuration-Id] attribute is 0x0A8E (2702) the Battery Status Enumeration object is present three times • IF the [Dev-Configuration-Id] attribute is 0x0A8F (2703) the Battery Status Enumeration object is present four times • IF the [Dev-Configuration-Id] attribute is 0x0A90 (2704) the Battery Status Enumeration object is present five times • IF the [Dev-Configuration-Id] attribute is 0x0A91 (2705) the Battery Status Enumeration object is present six times • IF the [Dev-Configuration-Id] attribute is 0x0A92 (2706) the Battery Status Enumeration object is present seven times • IF the [Dev-Configuration-Id] attribute is 0x0A93 (2707) the Battery Status Enumeration object is present eight times
Pass/Fail criteria	All checked values are as specified in the test procedure and no other object is listed.
Notes	

TP Id		TP/PLT/PHD/CLASS/PSM/BV-002		
TP label		Objects for Power Status Monitor specialization - Extended Configuration		
Coverage	**Spec**	[ISO/IEEE 11073-10427]		
	Testable items	Capacity 3; M	BattStatus 2; M	BattStatus 6; R
		AdvPSMProf 2; M	AdvPSMProf 6; M	AdvPSMProf 7; M
		MDSAttrPSM 3; M	Capacity 8; M	
Test purpose		Check that: The Battery Capacity Numeric object with Type {MDC_PART_PHD_DM | MDC_BATTERY_CAPACITY} is supported by a Power Status Monitor PHD with Extended Configuration. [AND] The Battery Status Enumeration object with Type {MDC_PART_PHD_DM | MDC_BATTERY_STATUS} is supported by a Power Status Monitor PHD with Extended		

	Configuration [AND] There are the same number of Battery Capacity and Battery Status objects, which ranges from 1 to 16 [AND] The number of Battery Capacity and Battery Status objects is coherent with the device profile and the MDS System-Type-Spec-List attribute [AND] If a Battery Status Enumeration object is placed in recommended handle (2i), where "i" is the battery number, then it is recommended that its Supplemental Type attribute value is the same to that in the Battery Capacity Numeric object in recommended handle (2i-1)
Applicability	C_AG_OXP_000 AND (C_AG_OXP_155 OR C_AG_OXP_156) AND C_AG_OXP_181
Other PICSs	C_AG_OXP_155, C_AG_OXP_156
Initial condition	The simulated PHG and PHD are in 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 field Dev-Config-Id is in the extended range; if it is not, PHG responds with a "unsupported-config" and waits for a new configuration 5. Once the PHD under test sends an extended configuration and a measurement, Check that: Attribute-List: a. attribute-value(ConfigReport → ConfigObjectList (ConfigObject)→Attribute List), this value depends on the attribute type. The values we have to check are: ❑ The Battery Capacity object is present at least once→ MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_CAPACITY (0x74 0xCC). ❑ The Battery Status enumeration object is present at least once→ MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_STATUS (0x74 0xD0) ❑ There is the same number of Battery Capacity and Battery Status object, equal to the number of supported batteries. 6. 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. 7. 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. 8. IF the mds-time-mgr-set-time bit is set: ❑ The PHG moves to Configuring/Sending Set Time substate and it issues the Set-Base-Offset-Time action command. ❑ Once its internal time setting operation is completed, the PHD responds to the PHG. 9. IF C_AG_OXP_155, check that: ❑ The number of supported batteries is equal or less than eight ❑ System-Type-Spec-List MDS attribute is {MDC_DEV_SPEC_PROFILE_PSM, 1} and {MDC_DEV_SUB_SPEC_PROFILE_EIGHT_OR_LESS_BATTERIES, 1} IF C_AG_OXP_156, check that: ❑ The number of supported batteries is more than eight and less than sixteen ❑ System-Type-Spec-List MDS attribute is {MDC_DEV_SPEC_PROFILE_PSM, 1} and {MDC_DEV_SUB_SPEC_PROFILE_EIGHT_OR_LESS_BATTERIES, 1} 10. Check if the Supplemental-Types attribute values of Battery Capacity objects with handle

	(2i) matches those of Battery Status objects with handle (2i-1)
Pass/Fail criteria	All checked values are as specified in the test procedure.
Notes	

TP Id		TP/PLT/PHD/CLASS/PSM/BV-003		
TP label		Battery Capacity Numeric Object - Standard configurations		
Coverage	**Spec**	[ISO/IEEE 11073-10427]		
	Testable items	Capacity 2; M	Capacity 5; M	Capacity 7; M
		Capacity 9; M	Capacity 11; NR	Capacity 13; NR
		Capacity 15; NR	Capacity 17; NR	Capacity 19; NR
		Capacity 21; NR	Capacity 23; NR	Capacity 25; NR
		Capacity 27; NR	Capacity 31; NR	Capacity 33; NR
		Capacity 35; M	Capacity 37; NR	Capacity 39; NR
		Capacity 41; NR	Capacity 43; NR	Capacity 45; NR
		Capacity 47; NR	Capacity 49; NR	Capacity 51; M
		Capacity 53; NR	Capacity 57; M	Capacity 58; M
Test purpose		Check that: The Battery Capacity Numeric object contains the attributes specified for the Standard Configurations.		
Applicability		C_AG_OXP_000 AND C_AG_OXP_155 AND (NOT C_AG_OXP_181)		
Other PICS				
Initial condition		The simulated PHG and PHD under are in 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. 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 3. Check that the field Dev-Config-Id is set to 0x0A8C (2700) OR 0x0A8D (2701) OR 0x0A8E (2702) OR 0x0A8F (2703) OR 0x0A90 (2704) OR 0x0A91 (2705) OR 0x0A92 (2706) OR 0x0A93 (2707). If it is not, PHG responds with a "unsupported-config" and waits for a new configuration 4. 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. 5. 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. 6. IF the mds-time-mgr-set-time bit is set: ❑ The PHG moves to Configuring/Sending Set Time substate and it issues the Set-Base-Offset-Time action command. ❑ Once its internal time setting operation is completed, the PHD responds to the PHG. 7. The PHD under test sends an Event Report to the simulated PHG including a measurement reported by the object under test using MDS-Dynamic-Data-Update-Var		

8. Once the PHD under test sends a standard configuration and a measurement, check that the Battery Capacity Numeric Object attributes are:

   a. Mandatory attribute Handle

      - ❑ attribute-id = MDC_ATTR_ID_HANDLE
      - ❑ attribute-type = HANDLE
      - ❑ attribute-value =
        - IF the Dev-Config-Id is 0x0A8C (2700): 0x00 0x01
        - IF the Dev-Config-Id is 0x0A8D (2701): 0x00 0x01 OR 0x00 0x03
        - IF the Dev-Config-Id is 0x0A8E (2702): 0x00 0x01 OR 0x00 0x03 OR 0x00 0x05
        - IF the Dev-Config-Id is 0x0A8F (2703): 0x00 0x01 OR 0x00 0x03 OR 0x00 0x05 OR 0x00 0x07
        - IF the Dev-Config-Id is 0x0A90 (2704): 0x00 0x01 OR 0x00 0x03 OR 0x00 0x05 OR 0x00 0x07 OR 0x00 0x09
        - IF the Dev-Config-Id is 0x0A91 (2705): 0x00 0x01 OR 0x00 0x03 OR 0x00 0x05 OR 0x00 0x07 OR 0x00 0x09 OR 0x00 0x0B
        - IF the Dev-Config-Id is 0x0A92 (2706): 0x00 0x01 OR 0x00 0x03 OR 0x00 0x05 OR 0x00 0x07 OR 0x00 0x09 OR 0x00 0x0B OR 0x00 0x0D
        - IF the Dev-Config-Id is 0x0A93 (2707): 0x00 0x01 OR 0x00 0x03 OR 0x00 0x05 OR 0x00 0x07 OR 0x00 0x09 OR 0x00 0x0B OR 0x00 0x0D OR 0x00 0x0F

   b. Mandatory attribute Type

      - ❑ attribute-id = MDC_ATTR_ID_TYPE
      - ❑ attribute-type = TYPE
      - ❑ attribute-value = MDC_PART_PHD_DM (128 / 0x0080) | MDC_BATTERY_CAPACITY (29900 / 0x74CC)

   c. Mandatory attribute Supplemental-Types

      - ❑ attribute-id = MDC_ATTR_ID_TYPE
      - ❑ attribute-type = MDC_ATTR_SUPPLEMENTAL_TYPES
      - ❑ attribute-value.length = SEQUENCE OF (SIZE (4))
      - ❑ attribute-value =
        - IF Handle value= 1 { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_1 (29912 / 0x74D8) }
        - IF Handle value= 3 { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_2 (29920 / 0x74E0)}
        - IF Handle value= 5 { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_3 (29928 / 0x74E8)}
        - IF Handle value= 7 { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_4 (29936 / 0x74F0)}
        - IF Handle value= 9 { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_5 (29944 / 0x74F8)}
        - IF Handle value= 11 { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_6 (29952 / 0x7500)}
        - IF Handle value= 13 { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_7 (29960 / 0x7508)}
        - IF Handle value= 15 { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_8 (29968 / 0x7510)}

   d. Mandatory attribute Metric-Spec-Small

      - ❑ attribute-id = MDC_ATTR_METRIC_SPEC_SMALL

	❑ attribute-type = MetricSpecSmall (BITS-16) ❑ attribute-value.length = 2 bytes ❑ attribute-value ≠ 0x00 0x00 • Bit 0 (mss-avail-intermittent(0)) must be set • Bit 2 (mss-upd-aperiodic(2)) must be set • Bit 3 (mss-msmt-aperiodic(3)) must be set • Bit 9 (mss-acc-agent-initiated(9)) must be set • Rest shall be set to 0. e. Mandatory attribute Base-Offset-Time-Stamp ❑ attribute-id = MDC_ATTR_TIME_STAMP_BO ❑ attribute-type = BaseOffsetTime ❑ attribute-value.length = 8 bytes f. Mandatory attribute Compound-Nu-Observed-Value ❑ attribute-id = MDC_ATTR_NU_CMPD_VAL_OBS ❑ attribute-type = NuObsValueCmp ❑ attribute-value.length = <not relevant in this test> ❑ attribute-value = <not relevant in this test> g. Not recommended attributes should not be present at configuration h. No other attribute shall be present at configuration
Pass/Fail criteria	All checked values are as specified in the test procedure.
Notes	

TP Id		TP/PLT/PHD/CLASS/PSM/BV-004		
TP label		Battery Capacity Numeric Object - Extended configuration		
Coverage	**Spec**	[ISO/IEEE 11073-10427]		
	Testable items	Capacity 4; R	Capacity 6; M	Capacity 8; M
		Capacity 12; NR	Capacity 14; NR	Capacity 16; NR
		Capacity 18; NR	Capacity 20; NR	Capacity 22; NR
		Capacity 24; NR	Capacity 26; NR	Capacity 28; NR
		Capacity 32; NR	Capacity 34; NR	Capacity 36; NR
		Capacity 38; NR	Capacity 40; NR	Capacity 42; NR
		Capacity 42; NR	Capacity 46; NR	Capacity 48; NR
		Capacity 50; NR	Capacity 52; M	Capacity 54; NR
		Capacity 57; M	Capacity 58; M	
Test purpose		Check that: The Battery Capacity Numeric object contains the attributes specified for the Standard Configurations.		
Applicability		C_AG_OXP_000 AND (C_AG_OXP_155 OR C_AG_OXP_156) AND C_AG_OXP_181		

Other PICSs	
Initial condition	The simulated PHG and PHD under are in 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. 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 3. Check that the field Dev-Config-Id is set in the extended range; if it is not, PHG responds with "unsupported-config" and waits for a new configuration. 4. 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. 5. 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. 6. IF the mds-time-mgr-set-time bit is set: ❑ The PHG moves to Configuring/Sending Set Time substate and it issues the Set-Base-Offset-Time action command. ❑ Once its internal time setting operation is completed, the PHD responds to the PHG. 7. The PHD under test sends an Event Report to the simulated PHG including a measurement reported by the object under test using MDS-Dynamic-Data-Update-Var. 8. Once the PHD under test sends a standard configuration and a measurement, check that the Battery Capacity Numeric Object attributes are: a. Mandatory attribute Handle ❑ attribute-id = MDC_ATTR_ID_HANDLE ❑ attribute-type = HANDLE b. attribute-value = recommended value is (2i−1) for each battery i, where i can take on value 1…n where n is the maximum number of batteries that can be present in the agent c. Mandatory attribute Type ❑ attribute-id = MDC_ATTR_ID_TYPE ❑ attribute-type = TYPE ❑ attribute-value = MDC_PART_PHD_DM (128 / 0x0080) | MDC_BATTERY_CAPACITY (29900 / 0x74CC) d. Mandatory attribute Supplemental-Types ❑ attribute-id = MDC_ATTR_ID_TYPE ❑ attribute-type = MDC_ATTR_SUPPLEMENTAL_TYPES ❑ attribute-value.length = SEQUENCE OF (SIZE (4)) attribute-value = { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_1 (29912 / 0x74D8)} OR { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_2 (29920 / 0x74E0)} OR { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_3 (29928 / 0x74E8)} OR { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_4 (29936 / 0x74F0)} OR { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_5 (29944 / 0x74F8)} OR { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_6 (29952 / 0x7500)} OR { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_7 (29960 / 0x7508)} OR { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_8 (29968 / 0x7510)} OR { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_9 (29976/ 0x7518)}

	OR { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_10 (29984/ 0x7520)} OR { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_11 (29992/ 0x7528)} OR { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_12 (30000/ 0x7530)} OR { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_13 (30008/ 0x7438)} OR { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_14 (30016/ 0x7540)} OR { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_15 (30024/ 0x7548)} OR { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_16 (30032/ 0x7550)} The "i" in MDC_BATTERY_i shall be ((value of the handle attribute)+1)/2 e. Mandatory attribute Base-Offset-Time-Stamp ❑ attribute-id = MDC_ATTR_TIME_STAMP_BO ❑ attribute-type = BaseOffsetTime ❑ attribute-value.length = 8 bytes f. Mandatory attribute Compound-Nu-Observed-Value ❑ attribute-id = MDC_ATTR_NU_CMPD_VAL_OBS ❑ attribute-type = NuObsValueCmp ❑ attribute-value.length = <not relevant in this test> ❑ attribute-value = <not relevant in this test> g. Not recommended attributes should not be present at configuration h. No other attribute shall be present at configuration
Pass/Fail criteria	All checked values are as specified in the test procedure.
Notes	

TP Id		TP/PLT/PHD/CLASS/PSM/BV-005		
TP label		Battery Status Enumeration Object - Standard configurations		
Coverage	**Spec**	[ISO/IEEE 11073-10427]		
	Testable items	BattStatus 3; M	BattStatus 7; M	BattStatus 9; M
		BattStatus 11; M	BattStatus 17; NR	BattStatus 19; NR
		BattStatus 21; NR	BattStatus 23; NR	BattStatus 25; M
		BattStatus 27; NR	BattStatus 29; NR	BattStatus 35; NR
		BattStatus 37; M	BattStatus 39; NR	BattStatus 41; NR
		BattStatus 43; NR	BattStatus 45; NR	BattStatus 47; NR
		BattStatus 49; M	BattStatus 51; NR	BattStatus 53; NR
		BattStatus 55; NR	BattStatus 57; M	BattStatus 59; M
		BattStatus 61; M	BattStatus 62; M	
Test purpose		Check that: The Battery Status Enumeration Object contains the attributes specified for Standard Configurations.		

Applicability	C_AG_OXP_000 AND C_AG_OXP_155 AND NOT C_AG_OXP_181
Other PICS	C_AG_OXP_183, C_AG_OXP_189
Initial condition	The simulated PHG and PHD under test are in 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. 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 3. Check that the field Dev-Config-Id is set to 0x0A8C (2700) OR 0x0A8D (2701) OR 0x0A8E (2702) OR 0x0A8F (2703) OR 0x0A90 (2704) OR 0x0A91 (2705) OR 0x0A92 (2706) OR 0x0A93 (2707). If it is not, PHG responds with a "unsupported-config" and waits for a new configuration 4. 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. 5. 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. 6. IF the mds-time-mgr-set-time bit is set: ❑ The PHG moves to Configuring/Sending Set Time substate and it issues the Set-Base-Offset-Time action command. ❑ Once its internal time setting operation is completed, the PHD responds to the PHG. 7. The PHD under test sends an Event Report to the simulated PHG including a measurement reported by the object under test using MDS-Dynamic-Data-Update-Var or MDS-Dynamic-Data-Update-Fixed 8. Once the PHD under test sends an extended configuration and a measurement, check that the Battery Status Enumeration Object attributes are: a. Mandatory attribute Handle ❑ attribute-id = MDC_ATTR_ID_HANDLE ❑ attribute-type = HANDLE ❑ attribute-value = • IF the Dev-Config-Id is 0x0A8C (2700): 0x00 0x02 • IF the Dev-Config-Id is 0x0A8D (2701): 0x00 0x02 OR 0x00 0x04 • IF the Dev-Config-Id is 0x0A8E (2702): 0x00 0x02 OR 0x00 0x04 OR 0x00 0x06 • IF the Dev-Config-Id is 0x0A8F (2703): 0x00 0x02 OR 0x00 0x04 OR 0x00 0x06 OR 0x00 0x08 • IF the Dev-Config-Id is 0x0A90 (2704): 0x00 0x02 OR 0x00 0x04 OR 0x00 0x06 OR 0x00 0x08 OR 0x00 0x0A • IF the Dev-Config-Id is 0x0A91 (2705): 0x00 0x02 OR 0x00 0x04 OR 0x00 0x06 OR 0x00 0x08 OR 0x00 0x0A OR 0x00 0x0C • IF the Dev-Config-Id is 0x0A92 (2706): 0x00 0x02 OR 0x00 0x04 OR 0x00 0x06 OR 0x00 0x08 OR 0x00 0x0A OR 0x00 0x0C OR 0x00 0x0E • IF the Dev-Config-Id is 0x0A93 (2707): 0x00 0x02 OR 0x00 0x04 OR 0x00 0x06 OR 0x00 0x08 OR 0x00 0x0A OR 0x00 0x0C OR 0x00 0x0E OR 0x00 0x10 b. Mandatory attribute Type ❑ attribute-id = MDC_ATTR_ID_TYPE ❑ attribute-type = TYPE ❑ attribute-value = MDC_PART_PHD_DM (128 / 0x0080) | MDC_BATTERY_STATUS (29904 / 0x74D0) c. Mandatory attribute Supplemental-Types

- ❑ attribute-id = MDC_ATTR_SUPPLEMENTAL_TYPES
- ❑ attribute-type = SupplementalTypeList
- ❑ attribute-value.length = SEQUENCE OF (SIZE (4))
- ❑ attribute-value =
  - IF Handle value= 2 { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_1 (29912 / 0x74D8) }
  - IF Handle value= 4 { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_2 (29920 / 0x74E0)}
  - IF Handle value= 6 { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_3 (29928 / 0x74E8)}
  - IF Handle value= 8 { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_4 (29936 / 0x74F0)}
  - IF Handle value= 10 { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_5 (29944 / 0x74F8)}
  - IF Handle value= 12 { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_6 (29952 / 0x7500)}
  - IF Handle value= 14 { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_7 (29960 / 0x7508)}
  - IF Handle value= 16 { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_8 (29968 / 0x7510)}

d. Mandatory attribute Metric-Spec-Small

- ❑ attribute-id = MDC_ATTR_METRIC_SPEC_SMALL
- ❑ attribute-type = MetricSpecSmall (BITS-16)
- ❑ attribute-value.length = 2 bytes
- ❑ attribute-value ≠ 0x00 0x00
  - Bit 0 (mss-avail-intermittent(0)) must be set
  - Bit 2 (mss-upd-aperiodic (2)) must be set
  - Bit 3 (mss-msmt-aperiodic(3)) must be set
  - Bit 9 (mss-acc-agent-initiated(9)) must be set

e. Mandatory attribute Attribute-Value-Map

- ❑ attribute-id = MDC_ATTR_ATRIBUTE_VAL_MAP
- ❑ attribute-type = AttrValMap (sequence of attribute-id(OID-Type) and attribute-length(INT-U16))
- ❑ attribute-value.length = <variable>
- ❑ attribute-value = MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR, then MDC_ATTR_TIME_STAMP_BO

f. Mandatory attribute Base-Offset-Time-Stamp

- ❑ attribute-id = MDC_ATTR_TIME_STAMP_BO
- ❑ attribute-type = BaseOffsetTime
- ❑ attribute-value.length = 8 bytes

g. Mandatory attribute Enum-Observed-Value-Simple-Bit-Str

- ❑ attribute-id = MDC_ATTR_ENUM_OBS_VAL_SIMP_BIT_STR
- ❑ attribute-type = BITS-32
- ❑ attribute-value.length = 4 bytes
- ❑ attribute-value =
  - Battery-statusUndetermined (Bit 0) may be set
  - Battery-present (Bit 1) may be set

	▪ Battery-active (Bit 2) may be set ▪ Battery-charging (Bit 3) may be set ▪ Battery-fullyCharged (Bit 4) may be set ▪ Battery-disposable (Bit 5) may be set ▪ Battery-rechargeable (Bit 6) may be set ▪ Battery-overTemperature (Bit 7) may be set ▪ Battery-faulty (Bit 8) may be set ▪ Battery-incompatible (Bit 9) may be set ▪ Bits 10 to 15 are reserved for future extension h. Mandatory attribute Capability-Mask-Basic ❑ attribute-id = MDC_ATTR_ENUM_CAPABILITY_MASK_BASIC ❑ attribute-type = CapabMaskBasic (BITS-16) ❑ attribute-value.length = 2 bytes ❑ attribute-value = <not relevant in this test> i. Mandatory attribute State-Flag-Basic ❑ attribute-id = MDC_ATTR_ENUM_STATE_FLAG_BASIC ❑ attribute-type = StateFlagBasic (BITS-16) ❑ attribute-value.length = 2 bytes ❑ attribute-value = <not relevant in this test> j. Not recommended attributes should not be present at configuration k. No other attribute shall be present at configuration
Pass/Fail criteria	All checked values are as specified in the test procedure.
Notes	

TP Id		TP/PLT/PHD/CLASS/PSM/BV-006		
TP label		Battery Status Enumeration Object - Extended configuration		
Coverage	**Spec**	[ISO/IEEE 11073-10427]		
	Testable items	BattStatus 4; M	BattStatus 5; M	BattStatus8; M
		BattStatus 10; M	BattStatus 18; NR	BattStatus 29; NR
		BattStatus 22; NR	BattStatus 24; NR	BattStatus 28; M
		BattStatus 30; NR	BattStatus 36; NR	BattStatus 38; M
		BattStatus 40; M	BattStatus 42; NR	BattStatus 44; NR
		BattStatus 46; NR	BattStatus 48; NR	BattStatus 52; NR
		BattStatus 54; NR	BattStatus 56; NR	BattStatus 58; M
		BattStatus 60; M	BattStatus 61; M	BattStatus 62; M
Test purpose		Check that: The Battery Status Enumeration Object contains the attributes specified for Extended Configuration.		
Applicability		C_AG_OXP_000 AND (C_AG_OXP_155 OR C_AG_OXP_156) AND C_AG_OXP_181		

Other PICS	C_AG_OXP_183, C_AG_OXP_189
Initial condition	The simulated PHG and PHD under test are in 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. 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 3. Check that the field Dev-Config-Id is set in the extended range; if it is not, PHG responds with "unsupported-config" and waits for a new configuration. 4. 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. 5. 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. 6. IF the mds-time-mgr-set-time bit is set: ❑ The PHG moves to Configuring/Sending Set Time substate and it issues the Set-Base-Offset-Time action command. ❑ Once its internal time setting operation is completed, the PHD responds to the PHG. 7. The PHD under test sends an Event Report to the simulated PHG including a measurement reported by the object under test using MDS-Dynamic-Data-Update-Var or MDS-Dynamic-Data-Update-Fixed 8. Once the PHD under test sends an extended configuration and a measurement, check that the Battery Status Enumeration Object attributes are: a. Mandatory attribute Handle ❑ attribute-id = MDC_ATTR_ID_HANDLE ❑ attribute-type = HANDLE ❑ attribute-value = recommended values are (2i) for each battery i, where i can take on value 1…n, where n is the maximum number of batteries that can be present in the agent. b. Mandatory attribute Type ❑ attribute-id = MDC_ATTR_ID_TYPE ❑ attribute-type = TYPE ❑ attribute-value = MDC_PART_PHD_DM (128 / 0x0080) | MDC_BATTERY_STATUS (29904 / 0x74D0) c. Mandatory attribute Supplemental-Types ❑ attribute-id = MDC_ATTR_SUPPLEMENTAL_TYPES ❑ attribute-type = SupplementalTypeList ❑ attribute-value.length = SEQUENCE OF (SIZE (4)) ❑ attribute-value = • IF Handle value= 2 { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_1 (29912 / 0x74D8) } • IF Handle value= 4 { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_2 (29920 / 0x74E0)} • IF Handle value= 6 { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_3 (29928 / 0x74E8)} • IF Handle value= 8 { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_4 (29936 / 0x74F0)} • IF Handle value= 10 { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_5 (29944 / 0x74F8)} • IF Handle value= 12 { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_6 (29952 / 0x7500)}

- IF Handle value= 14 { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_7 (29960 / 0x7508)}
- IF Handle value= 16 { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_8 (29968 / 0x7510)}
- IF Handle value= 18 { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_9 (29976 / 0x7518) }
- IF Handle value= 20{ MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_10 (29984 / 0x7520)}
- IF Handle value= 22 { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_11 (29992 / 0x7528)}
- IF Handle value= 24 { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_12 (30000 / 0x7530)}
- IF Handle value= 26 { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_13 (30008 / 0x7538)}
- IF Handle value= 28 { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_14 (30016 / 0x7540)}
- IF Handle value= 30 { MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_15 (30024 / 0x7548)}
- IF Handle value= 32{ MDC_PART_PHD_DM (0x00 0x80), MDC_BATTERY_16 (30032 / 0x7550)}

d. Mandatory attribute Base-Offset-Time-Stamp is present
   - ❑ attribute-id = MDC_ATTR_TIME_STAMP_BO
   - ❑ attribute-type = BaseOffsetTime
   - ❑ attribute-value.length = 8 bytes

e. Mandatory attribute Enum-Observed-Value-Simple-Bit-Str
   - ❑ attribute-id = MDC_ATTR_ENUM_OBS_VAL_SIMP_BIT_STR
   - ❑ attribute-type = BITS-32
   - ❑ attribute-value.length = 4 bytes
   - ❑ attribute-value =
     - Battery-statusUndetermined (Bit 0) may be set
     - Battery-present (Bit 1) may be set
     - Battery-active (Bit 2) may be set
     - Battery-charging (Bit 3) may be set
     - Battery-fullyCharged (Bit 4) may be set
     - Battery-disposable (Bit 5) may be set
     - Battery-rechargeable (Bit 6) may be set
     - Battery-overTemperature (Bit 7) may be set
     - Battery-faulty (Bit 8) may be set
     - Battery-incompatible (Bit 9) may be set
     - Bits 10 to 15 are reserved for future extension

f. Mandatory attribute Capability-Mask-Basic
   - ❑ attribute-id = MDC_ATTR_ENUM_CAPABILITY_MASK_BASIC
   - ❑ attribute-type = CapabMaskBasic (BITS-16)
   - ❑ attribute-value.length = 2 bytes
   - ❑ attribute-value = <not relevant in this test>

g. Mandatory attribute State-Flag-Basic
   - ❑ attribute-id = MDC_ATTR_ENUM_STATE_FLAG_BASIC

	❑ attribute-type = StateFlagBasic (BITS-16) ❑ attribute-value.length = 2 bytes ❑ attribute-value = <not relevant in this test> h. Not recommended attributes should not be present at configuration i. No other attribute shall be present at configuration
Pass/Fail criteria	All checked values are as specified in the test procedure.
Notes	

TP Id		TP/PLT/PHD/CLASS/PSM/BV-007		
TP label		PM-Store Attributes for Extended Configuration		
Coverage	**Spec**	[ISO/IEEE 11073-10427]		
	Testable items	PMStrObjAttPSM 2; M	PMStrObjAttPSM 4; M	PMStrObjAttPSM 5; M
		PMStrObjAttPSM 6; M	PMStrObjAttPSM 8; NR	PMStrObjAttPSM 9; M
		PMStrObjAttPSM 10; M	PMStrObjAttPSM 11; C	PMStrObjAttPSM 12; M
		PMStrObjAttPSM 13; M		
Test purpose		Check that: PM-Store Object contains the attributes specified for Extended Configuration.		
Applicability		C_AG_OXP_000 AND C_AG_OXP_156 AND C_AG_OXP_041 AND C_AG_OXP_181		
Other PICS				
Initial condition		The simulated PHG and PHD under test are in 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. 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. 5. The PHD issues a GET response with the PM-Store attributes it supports: 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 (bit 0) shall be set If the agent creates new segments either due to storing data of multiple sessions or due to time changes ▪ pmsc-epi-seg-entries (bit 4) shall be set ▪ pmsc-peri-seg-entries (bit 5) shall not be set ▪ All other bits are agent-specific b. Mandatory Store-Capacity-Count ❑ attribute-id = MDC_ATTR_METRIC_STORE_CAPAC_CNT ❑ attribute-type = INT-U32		

	❑ attribute-value.length = 4 bytes ❑ attribute-value = See relation with next attribute c. Mandatory attribute Store-Usage-Count ❑ attribute-id = MDC_ATTR_METRIC_STORE_USAGE_CNT ❑ attribute-type = INT-U32 ❑ attribute-value.length = 4 bytes ❑ attribute-value = consistent with actual number of segments present and always less than or equa to Storage-Capacity-Count 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. If NOT RECOMMENDED 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> f. Mandatory attribute Number-Of-Segments ❑ attribute-id = MDC_ATTR_NUM_SEG ❑ attribute-type = INT-U16 ❑ attribute-value.length = 2 bytes ❑ attribute-value = <Not relevant in this test> g. Mandatory attribute Clear-Timeout ❑ attribute-id = MDC_ATTR_CLEAR_TIMEOUT ❑ attribute-type = RelativeTime ❑ attribute-value.length = 4 bytes ❑ attribute-value = <Not relevant in this test>
Pass/Fail criteria	All checked values are as specified in the test procedure
Notes	

TP Id		TP/PLT/PHD/CLASS/PSM/BV-008		
TP label		PM-Segment Attributes for Extended Configuration		
Coverage	**Spec**	[ISO/IEEE 11073-10427]		
	Testable items	PMStoreObjPSM 3; M	PMSegObjPSM 2; M	PMSegObjPSM 4; M
		PMSegObjPSM 10; M	PMSegObjPSM 11; M	PMSegObjPSM 12; M
Test purpose		Check that: PM-Segment objects contain the attributes specified for Extended Configuration.		

	[AND] The Battery Capacity and Battery Status PM-segments shall be implemented.
Applicability	C_AG_OXP_000 AND C_AG_OXP_156 AND C_AG_OXP_041 AND C_AG_OXP_181
Other PICS	
Initial condition	The simulated PHG and PHD under test are in Operating State.
Test procedure	1. 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. 2. The simulated PHG shall send a Get-Segment-Info object action for the PM-Store object with SegmSelection = all-segments to indicate the PM-Segments attributes of all available PM-Segments. 3. The PHD issues a response with the PM-Segment attributes it supports: a. Mandatory attribute PM-Segment-Entry-Map ❑ SegmentEntryHeader.value = One of the next must be set: • seg-elem-hdr-relative-time(1) • seg-elem-hdr-hires-relative-time(2) • seg-elem-hdr-bo-time(3) ❑ SegmEntryElem: <Record the fields for later comparison> b. Mandatory attribute Operational-State ❑ attribute-id = MDC_ATTR_OP_STAT ❑ attribute-type = OperationalState ❑ attribute-value.length 2 bytes ❑ attribute-value = One of: • disabled (0x00 0x00) • enabled (0x00 0x01) • notAvailable (0x00 0x02) c. Recommended attribute Segment-Start-BO-Time ❑ attribute-id = MDC_ATTR_TIME_START_SEG_BO ❑ attribute-type = BaseOffsetTime ❑ attribute-value.length = 8 bytes ❑ attribute-value = <Not relevant for this test> d. Recommended attribute Segment-End-BO-Time ❑ attribute-id = MDC_ATTR_TIME_END_SEG_BO ❑ attribute-type = BaseOffsetTime ❑ attribute-value.length = 8 bytes ❑ attribute-value = <Not relevant for this test> e. Mandatory attribute Segment-Usage-Count ❑ attribute-id = MDC_ATTR_SEG_USAGE_CNT ❑ attribute-type = INT-U32 ❑ attribute-value.length = 4 bytes ❑ attribute-value = <not relevant in this test> 4. Repeat for every PM-Segment object
Pass/Fail criteria	• All checked values are as specified in the test procedure • The Battery Capacity PM-Segment and Battery Status PM-Segment are present

Notes	

TP Id		TP/PLT/PHD/CLASS/PSM/BV-009		
TP label		Communication Model: Association Procedure		
Coverage	**Spec**	[ISO/IEEE 11073-10427]		
	Testable items	AgProcAsPSM 1; M	AgProcAsPSM 2; M	AgProcAsPSM 3; M
		AgProcAsPSM 4; M	AgProcAsPSM 5; M	AgProcAsPSM 6; M
		AgProcAsPSM 7; M	AgProcAsPSM 8; M	AgProcAsPSM 9; M
		AgProcAsPSM 10; M	AgProcAsPSM 11; M	AgProcAsPSM 12; M
		AgProcAsPSM 13; O		
Test purpose		Check that: The association procedure data exchange is correct		
Applicability		C_AG_OXP_000 AND (C_AG_OXP_155 OR C_AG_OXP_156)		
Other PICS		C_AG_OXP_002, C_AG_OXP_017		
Initial condition		The simulated PHG and PHD under test are in Unassociated State.		
Test procedure		1. The PHD sends a message to associate to the simulated PHG, the expected fields sent by the PHD are: a. APDU Type ❑ field- type = AarqApdu ❑ field-length =2 bytes ❑ field-value =0xE2 0x00. b. assoc-version ❑ field- type = AssociationVersion ❑ field-length =BITS-32 ❑ field- value=0x80 0x00 0x00 0x00 (assoc-version1) c. data-proto-id ❑ field- type = DataProtoId(INT-U16) ❑ field-length =2 bytes ❑ field- value=0x50 0x79 (20601) d. protocol-version ❑ field- type = Protocol Version ❑ field-length = 4 bytes ❑ field- value= protocol-version2(1) AND protocol-version3(2) are set to 1 (0x60 0x00 0x00 0x00) e. encoding rules ❑ field- type = EncodingRules ❑ field-length = 2 bytes ❑ field- value= • Bit 0 must be set (support for MDER) • Bits 1 (XER) and 2 (PER) may be set		

	• All other bits must be 0. f. nomenclature version ❑ field- type = NomenclatureVersion ❑ field-length = 4 bytes ❑ field- value=0x80 0x00 0x00 0x00 ❑ This value indicates version1 is supported (nom-version1(0) is set). g. functional – units ❑ field- type = FunctionalUnits ❑ field-length = 4 bytes • Bit 0 must be 0. • Bits 1 and 2 may be set • The rest of the bits must not be set h. System type ❑ field- type = SystemType ❑ field-length = 4 bytes ❑ field- value = 0x00 0x80 0x00 0x00 (sys-type-agent) i. System-Id ❑ field- type = OCTET STRING ❑ field-length = 8 bytes ❑ field- value = 0xXX 0xXX 0xXX 0xXX 0xXX 0xXX 0xXX 0xXX (octet string length = 8 | UI-64 manufacturer and device) ❑ This value will be System Id attribute of MDS Object. j. dev-config-id ❑ field- type = ConfigId(INT-U16) ❑ field-length = 2 bytes ❑ field- value = • 0x0A 0x8C (2700) OR 0x0A 0x8D (2701) OR 0x0A 0x8E (2702) OR 0x0A 0x8F (2703) OR 0x0A 0x90 (2704) OR 0x0A 0x91 (2705) OR 0x0A 0x92 (2706) OR 0x0A 0x93 (2707) for standard configurations. • <between 0x40 0x00 and 0x7F 0xFF> for extended configuration. k. data-req-mode-flags (DataReqModeCapab) ❑ field- type = DataReqModeFlags ❑ field-length = 2 bytes ❑ field.value = IF NOT C_AG_OXP_017 -> 0x00 0x01 (data-req-supp-init-agent) l. data-req-init-agent-count (DataReqModeCapab) ❑ field- type = INT-U8 ❑ field-length = 2 bytes ❑ field.value = IF NOT C_AG_OXP_017 -> 0x01 m. data-req-init-manager-count (DataReqModeCapab) ❑ field- type = INT-U8 ❑ field-length = 2 bytes ❑ field.value = IF NOT C_AG_OXP_017 -> 0x00
Pass/Fail criteria	All checked values are as specified in the test procedure
Notes	

TP Id		TP/PLT/PHD/CLASS/PSM/BV-010		
TP label		Operating State. PHG to PHD Maximum APDU Size		
Coverage	**Spec**	[ISO/IEEE 11073-20601-2016C]		
	Testable items	CommonCharac 3; M		
	Spec	[ISO/IEEE 11073-10427]		
	Testable items	ComCharPSM 2; M	SimplePSMProf 7; M	AdvPSMProf 9; M
Test purpose		Check that: Check that the total size of the response does not exceed of the maximum APDU size established by the specialization [AND] A PSM PHD implementing only this device specialization shall be capable of receiving any APDU up to the size of Nrx. For this standard, Nrx shall be 46 octets		
Applicability		C_AG_OXP_000 AND (C_AG_OXP_155 OR C_AG_OXP_156)		
Other PICS		C_AG_OXP_100		
Initial condition		The simulated PHG and PHD are in Operating State		
Test procedure		1. The simulated PHG issues "Remote Operation Invoke | Get" command with: a. Obj-handle set to 0 (to request for MDS object) b. attribute-id-list.count = 28 c. attribute-id-list: (MDC_ATTR_ID_MODEL, MDC_ATTR_SYS_ID, MDC_ATTR_DEV_CONFIG_ID) repeated 9 times followed by an additional MDC_ATTR_ID_MODEL 2. Check the response of the PHD. 3. The simulated PHG issues "Remote Operation Invoke | Get" command with handle set to 0 (to request for MDS object) and an empty attribute-id-list to indicate all attributes 4. Check the response of the PHD.		
Pass/Fail criteria		• In step 2, the PHD under test may respond with a rors-cmip-get listing all the requested attributes, or with a roer message. If PICS C_AG_OXP_100 = TRUE and PHD does not respond with a rors-cmip-get message, and it responds with a roer message or rorj (resource-limitation) message, a WARNING will appear. o If the response is a get response, the total size of the response cannot exceed the following APDU size, given by the formula Ntx(i) = 28 + (102 + S) x i, where "i" is the number of batteries and "S" is the maximally supported OCTET STRING.length for the Label-String attribute of the battery capacity object. ▪ If C_AG_OXP_155 = TRUE (Power Status Monitor with Simple PSM profile) with i=8 and S=12 -> 940 octets ▪ If C_AG_OXP_156 = TRUE (Power Status Monitor with Advanced PSM profile) with i=16 and S=12 -> 1660 octets o In case it responds with a roer, the reason must not be protocol-violation (23) • In step 4, the PHD must respond with a rors-cmip-get message.		
Notes				

TP Id		TP/PLT/PHD/CLASS/PSM/BV-011		
TP label		Set Time (Base Offset Time) Power Status Monitor		
Coverage	**Spec**	[ISO/IEEE 11073-10427]		
	Testable items	MDSMethodsPSM 2; M		
Test purpose		Check that: The Set-Base-Offset-Time method shall be implemented		
Applicability		C_AG_OXP_000 AND (C_AG_OXP_155 OR C_AG_OXP_156)		
Other PICS				
Initial condition		The simulated PHG and PHD under test are in Operating state.		
Test procedure		1. The simulated PHG sends a SET action: ❑ CHOICE = SetBOTimeInvoke ❑ action-type = MDC_ACT_SET_BO_TIME ❑ the action-info-args are SetBOTimeInvoke ▪ date-time = bo-seconds = 0x00 0x00 0x00 0x00, bo-fractions = 0x00 0x00, bo-time-offset = 0x3C 2. The PHD under test response shall be a rors-cmip-confirmed-action: ❑ action-type = MDC_ACT_SET_BO_TIME ❑ action-info-args shall be empty.		
Pass/Fail criteria		All checked values are as specified in the test procedure		
Notes				

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