International Telecommunication Union

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

H.845.3

(07/2016)

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 devices: PAN/LAN/TAN interface Part 5C: Pulse oximeter: Agent

Recommendation ITU-T H.845.3

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Recommendation ITU-T H.845.3

Conformance of ITU-T H.810 personal health devices: PAN/LAN/TAN interface Part 5C: Pulse oximeter: Agent

Summary

Recommendation ITU-T H.845.3 is a transposition of Continua Test Tool DG2013, Test Suite Structure & Test Purposes, PAN-LAN-TAN Interface; Part 5C: Device Specializations. Agent (Pulse Oximeter) (Version 1.5, 2014-01-24), that was developed by the Continua 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

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T H.845.3	2015-01-13	16	11.1002/1000/12264
2.0	ITU-T H.845.3	2016-07-14	16	11.1002/1000/12940

* 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 DG2013, Test Suite Structure & Test Purposes, PAN-LAN-TAN Interface; Part 5C: Device Specializations. Agent (Pulse oximeter) (Version 1.5, 2014-01-24), that was developed by the Continua Health Alliance. A number of versions of this specification existed before transposition and these can be found in the table below.

Version	Date	Revision history
1.2	2012-10-05	Initial release for Test Tool DG2011. This is the same version as "TSS&TP_1.5_PAN-LAN_PART_5C_v1.3.doc" because new features included in [b-CDG 2011] do not affect the test procedures specified in this document.
1.3	2013-05-24	Initial release for Test Tool DG2012. This uses "TSS&TP_DG2011_PAN-LAN_PART_5C_v1.3.doc" as a baseline and adds new features included in [b-CDG 2012] (max APDU size for GM, BCA and ECG)
1.4	2014-01-24	Initial release for Test Tool DG2013. This uses "TSS&TP_DG2012_PAN-LAN_PART_5C_v1.4.doc" as baseline and adds new features included in [ITU-T H.810 (2015)]: • Adds glucose meter BLE • Adds BLE SSP support • Adds NFC new transport • Adds INR device specialization

Recommendation ITU-T H.845.3

Conformance of ITU-T H.810 personal health devices: PAN/LAN/TAN interface Part 5C: Pulse oximeter: Agent

1 Scope

The scope of this Recommendation[1] is to provide a test suite structure and the test purposes (TSS & TP) for the PAN/LAN/TAN interface based on the requirements defined in the Continua Design Guidelines (CDG) [ITU-T H.810 (2015)]. The objective of this test specification is to provide a high probability of air interface interoperability between different devices.

The TSS and TP for the PAN/LAN/TAN interface document have been divided into ten parts. Each part is listed below:

– **Part 1**: Optimized exchange protocol [ISO/IEEE 11073-20601A] Agent
– **Part 2**: Optimized exchange protocol [ISO/IEEE 11073-20601A] Manager
– **Part 3**: Continua design guidelines. Agent
– **Part 4**: Continua design guidelines. Manager
– **Part 5**: Device specializations. Agent. This document is divided into 12 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 (Future development)
  - **Part 5K**: Peak flow
  - **Part 5L**: Body composition analyzer
  - **Part 5M**: Basic electrocardiograph
  - **Part 5N**: International normalized ratio monitor
– **Part 6**: Device specializations. Manager
– **Part 7**: Continua design guidelines. Agent BLE
– **Part 8**: Continua design guidelines. Manager BLE
– **Part 9**: Personal health devices transcoding whitepaper. Agent
– **Part 10**: Personal health devices transcoding whitepaper. Manager

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

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 (2015)] Recommendation ITU-T H.810 (2015), *Interoperability design guidelines for personal health systems*.

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

[ISO/IEEE 11073-20601A] ISO/IEEE 11073-20601:2010, *IEEE Health informatics – Personal health device communication – Part 20601: Application profile – Optimized exchange protocol*, including ISO/IEEE 11073-20601:2010 Amd 1:2015.
<http://www.iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=54331>
with
<http://www.iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=63972>

[ISO/IEEE 11073-104xx] ISO/IEEE 11073-104xx (in force), *Health informatics – Personal health device communication – Device specialization*.

NOTE – This is shorthand to refer to the collection of device specialization standards that utilize [ISO/IEEE 11073-20601A], where xx can be any number from 01 to 99, inclusive.

[ISO/IEEE 11073-10404] ISO/IEEE 11073-10404:2008, *Health informatics – Personal health device communication – Device specialization – Pulse oximeter*.

[ISO/IEEE 11073-20601] ISO/IEEE 11073-20601:2010, *Health informatics – Personal health device communication – Part 20601 – Application profile – Optimized exchange protocol*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

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

3.1.2 manager [ISO/IEEE 11073-20601A]: 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

DUT Device Under Test

CDG Continua Design Guidelines

GUI Graphical User Interface

INR International Normalized Ratio

IUT Implementation Under Test

MDS Medical Device System

NFC Near Field Communication

PAN Personal Area Network

PCT Protocol Conformance Testing

PCO Point of Control and Observation

PHD Personal Healthcare Device

PHDC Personal Healthcare Device Class

PHM Personal Health Manager

PICS Protocol Implementation Conformance Statement

PIXIT Protocol Implementation extra Information for Testing

SABTE Sleep Apnoea Breathing Therapy Equipment

SDP Service Discovery Protocol

SOAP Simple Object Access Protocol

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 name	Transposed as	Version	Description	Designation
2016 plus errata	[ITU-T H.810 (2016)]	6.1	Release 2016 plus errata noting all ratified bugs [ITU-T H.810 (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	[ITU-T H.810 (2015)]	5.1	Release 2015 plus errata noting all ratified bugs [ITU-T H.810 (2015)].	–
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-ITU-T H.810 (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 (TSS)

The test purposes (TPs) for the PAN/LAN/TAN interface have been divided into the main subgroups specified below. Annex A describes the TPs for subgroup 1.3.3 (shown in bold).

– Group 1: Agent (AG)

- 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: 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) (Future development)
  - Subgroup 1.3.11: Peak flow (PF)
  - Subgroup 1.3.12: Body composition analyzer (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)
- 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)

– Group 2: Manager (MAN)
  - 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 (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) (Future development)
    - Subgroup 2.3.11: Peak flow (PF)
    - Subgroup 2.3.12: Body composition analyzer (BCA)
    - Subgroup 2.3.13: Basic electrocardiograph (ECG)
    - Subgroup 2.3.14: International normalized ratio (INR)
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    - Subgroup 2.4.3: Whitepaper blood pressure 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)

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_Expression2 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
    - AG: PAN/LAN Agent
    - MAN: PAN/LAN Manager
  - <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 testable items to be checked by the TP.
- **Test purpose**: It is a description about 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**: It 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 1.3.3: Pulse oximeter (PO)

<table>
<tr><td colspan="2">TP Id</td><td colspan="3">TP/PLT/AG/CLASS/PO/BV-000</td></tr>
<tr><td colspan="2">TP label</td><td colspan="3">Get MDS Object for pulse oximeter specialization: Mandatory, Conditional and Optional Attributes</td></tr>
<tr><td rowspan="5">Coverage</td><td>Spec</td><td colspan="3">[ISO/IEEE 11073-10404]</td></tr>
<tr><td rowspan="4">Testable items</td><td>MDSPulseattr1; M</td><td>MDSPulseattr2; C</td><td>MDSPulseattr3; M</td></tr>
<tr><td>MDSPulseattr4; M</td><td>MDSPulseattr5; M</td><td>MDSPulseattr6; R</td></tr>
<tr><td>MDSPulseattr7; R</td><td>MDSPulseattr8; R</td><td>MDSPulseattr9; R</td></tr>
<tr><td>MDSPulseattr10; M</td><td>MDSPulseEvent1 ; M</td><td>PulseOxInfoExt1; M</td></tr>
<tr><td colspan="2">Test purpose</td><td colspan="3">Check that:
The Agent supports a Get command that requests all attributes
[AND]
The MDS Object contains the attributes specified for a Pulse Oximeter Agent.</td></tr>
<tr><td colspan="2">Applicability</td><td colspan="3">C_AG_OXP_173 AND C_AG_OXP_000</td></tr>
<tr><td colspan="2">Other PICS</td><td colspan="3">C_AG_PO_001 , C_AG_PO_003, C_AG_OXP_181</td></tr>
<tr><td colspan="2">Initial condition</td><td colspan="3">The simulated manager and the agent under test are in the operating state.</td></tr>
<tr><td colspan="2">Test procedure</td><td colspan="3">1. The simulated manager issues the "roiv-cmip-get" command with the handle set to 0 (to request for MDS object) and the attribute-id-list set to 0 to indicate all attributes.
2. The agent 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. Mandatory attribute Dev-Configuration-Id:
❑ IF C_AG_PO_001 then attribute-value = 0x01 0x91
❑ IF C_AG_PO_003 then attribute-value = 0x01 0x90
❑ ELSE then attribute-value = < between 0x4000 and 0x7FFF >
b. Attribute System-Type not present.
c. Mandatory attribute System-model
❑ attribute-id = MDC_ATTR_ID_MODEL (0x09 0x28)
❑ attribute-type = SystemModel
❑ attribute-value.length = <Variable>
❑ attribute-value ={Manufacturer, Model}
d. IF Recommended Power-Status attribute is present:
❑ attribute-id = MDC_ATTR_POWER_STAT
❑ attribute-type = PowerStatus
❑ attribute-value.length = 2 bytes
❑ attribute-value = ON_MAINS (0x8000) or ON_BATTERY(0x4000).</td></tr>
</table>

	Only one of the following may be active: 1. chargingFull(8), 2. chargingTrickle(9), 3. chargingOff(10). The rest of the bits must not be set. e. IF Recommended Battery-Level attribute is present: ❑ attribute-id = MDC_ATTR_VAL_BATT_CHARGE ❑ attribute-type = BITS-16 ❑ attribute-value.length = 2 bytes ❑ attribute-value = <value between 0 and 100> If value >100, the meaning of the value is "undefined" f. IF Recommended Remaining-Battery-Time attribute is present: ❑ attribute-id = MDC_ATTR_TIME_BATT_REMAIN ❑ 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), MDC_DIM_DAY (0x08 0xE0) > g. Mandatory attribute System-Type-Spec_List: ❑ attribute-id = MDC_ATTR_SYS_TYPE_SPEC_LIST ❑ attribute-type = TypeVerList ❑ attribute-value.length = length 4 ❑ attribute-value = MDC_DEV_SPEC-PROFILE_PULS_OXIM (0x10 0x04), 1
Pass/Fail criteria	All checked values are as specified in the test procedure.
Notes	

TP Id		TP/PLT/AG/CLASS/PO/BV-001		
TP label		SPO2 Object for Standard Configuration		
Coverage	**Spec**	[ISO/IEEE 11073-10404]		
	Testable items	SpO2NumObjAttr 1; M	SpO2NumObjAttr 2; M	SpO2NumObjAttr 3; M
		SpO2NumObjAttr 4; R	SpO2NumObjAttr 5; M	SpO2NumObjAttr 6; R
		SpO2NumObjAttr 7; R	SpO2NumObjAttr 8; R	SpO2NumObjAttr 9; R
		SpO2NumObjAttr 10; M	SpO2NumObjAttr 11; M	SpO2NumObjAttr 12; R
		SpO2NumObjAttr 13; C	SpO2NumObjAttr 14; R	SpO2NumObjAttr 15; C
		SpO2NumObjAttr 16; C	SpO2NumObjAttr 17; R	SpO2NumObjAttr 18; R
		SpO2NumObjAttr 19; R	SpO2NumObjAttr 20; R	SPO2StandConf 1; C
		SPO2StandConf 2; C	SPO2StandConf 4; M	
Test purpose		Check that: SPO2 Object contains the attributes specified for Standard Configuration		

Applicability	C_AG_OXP_173 AND (NOT C_AG_OXP_181) AND C_AG_OXP_000
Other PICS	C_AG_PO_001 , C_AG_PO_003, C_AG_PO_010
Initial condition	The simulated manager and the agent under test are in the configuring state.
Test procedure	1. The simulated manager receives an association request from the agent under test. 2. The simulated manager responds with a result = accepted-unknown-config 3. The agent responds with a "Remote Operation Invoke | Confirmed Event Report" message with an MDC_NOTI_CONFIG event to send its configuration to the manager. 4. Check that the field Dev-Config-Id is set to 0x0190 OR 0x0191. If it is not, the manager responds with a "unsupported-config" and waits for a new configuration. Repeat this step until a Dev-config-Id equal to 0x0190 or ox0191 is received. 5. Once the agent under test sends a standard configuration, check the SPO2 object: 6. SPO2 Object contents shall be: a. Mandatory attribute Handle ❑ attribute-id = MDC_ATTR_ID_HANDLE (0x09 0x21) ❑ attribute-type = HANDLE ❑ attribute-value = 0x00 0x01 b. Mandatory attribute Type ❑ attribute-id = MDC_ATTR_ID_TYPE (0x09 0x2F) ❑ attribute-type = TYPE ❑ attribute-value = MDC_PART_SCADA (0x00 0x02), MDC_PULS_OXIM_SAT_O2 (0x4B 0xB8) c. If Conditional attribute Supplemental-Types is present: • IF C_AG_PO_003 then: • Not Recommended attribute Supplemental-Types ❑ attribute-id = MDC_ATTR_SUPPLEMENTAL_TYPES (0x0A 0x61) ❑ attribute-type = SupplementalTypeList ❑ attribute-value.length =Sequence of TYPE (TYPE.length= 4 bytes) ❑ attribute-value: If Agent uses Spot Check Modality the value is MDC_MODALITY_SPOT, otherwise the value is not MDC_MODALITY_SPOT. • IF C_AG_PO_001 then: • Mandatory attribute Supplemental-Types ❑ attribute-id = MDC_ATTR_SUPPLEMENTAL_TYPES (0x0A 0x61) ❑ attribute-type = SupplementalTypeList ❑ attribute-value.length =Sequence of TYPE (TYPE.length= 4 bytes) ❑ attribute-value = MDC_MODALITY_SPOT (0x4C 0x3C) d. Mandatory attribute Metric-Spec-Small ❑ attribute-id = MDC_ATTR_METRIC_SPEC_SMALL (0x0A 0x46) ❑ attribute-type = MetricSpecSmall ❑ attribute-value.length = 2 bytes ❑ attribute-value ≠ 0x00 0x00 ▪ The bit 1 must be set (mss-avail-stored-data(1)) ▪ The bit 9 mustl be set(mss-acc-agent-initiated(9))

	e. Mandatory attribute Unit-Code ❑ attribute-id = MDC_ATTR_UNIT_CODE (0x09 0x96) ❑ attribute-type = OID-Type ❑ attribute-value.length = 2 bytes ❑ attribute-value = 0x02 0x20 (MDC_DIM_PERCENT) f. IF Metric-Structure-Small attribute is present ❑ attribute-id = MDC_ATTR_METRIC_STRUCTURE_SMALL (0x0A 0x73) ❑ attribute-type = MetricStructureSmall ❑ attribute-value.length = 2 bytes ❑ attribute-value = ▪ ms-struct = one of the following: o ms-struct-simple (0x01) o ms-struct-compound (0x02) o ms-struct-reserved (0x03) o ms-struct-compound-simple (0x04) ▪ ms-compound-no = one of the following: o IF ms-struct = ms-struct-simple THEN = 0 o ELSE = maximum number of components in a compound value g. Mandatory attribute Attribute-Value-Map ❑ attribute-id = MDC_ATTR_ATTRIBUTE_VAL_MAP (0x0A 0x55) ❑ attribute-type = AttrValMap ❑ attribute-count = M (record for next step) ❑ attribute-length = M *4 bytes ❑ attribute-value = <check that M attributes are defined here> ❑ IF the Attribute-Value-Map attribute needs to accommodate information pertaining to threshold status information, in addition to other attributes such as the observed value and timestamp information ❑ IF C_AG_PO_003 then ▪ attribute-value.length = N*4 bytes ▪ attribute-value = MDC_ATTR_NU_VAL_OBS_BASIC (0x0A 0x4C), 2 (0x00 0x02) ❑ IF C_AG_PO_001 then ▪ attribute-value.length = N*4 bytes ▪ attribute-value = MDC_ATTR_NU_VAL_OBS_BASIC (0x0A 0x4C), 2 (0x00 0x02) 0x09 0x90 0x00 0x08 MDC_ATTR_TIME_STAMP_ABS
Pass/Fail criteria	All checked values are as specified in the test procedure.
Notes	

TP Id	TP/PLT/AG/CLASS/PO/BV-002
TP label	SPO2 Object for Extended Configuration

<table>
<tr><td rowspan="18">Coverage</td><td>Spec</td><td colspan="3">[ISO/IEEE 11073-10404]</td></tr>
<tr><td rowspan="17">Testable items</td><td>SpO2NumObjAttr 1; M</td><td>SpO2NumObjAttr 22; M</td><td>SpO2NumObjAttr 23; C</td></tr>
<tr><td>SpO2NumObjAttr 24; M</td><td>SpO2NumObjAttr 25; R</td><td>SpO2NumObjAttr 26; C</td></tr>
<tr><td>SpO2NumObjAttr 27; R</td><td>SpO2NumObjAttr 28; R</td><td>SpO2NumObjAttr 29; R</td></tr>
<tr><td>SpO2NumObjAttr 30; M</td><td>SpO2NumObjAttr 31; C</td><td>SpO2NumObjAttr 32; R</td></tr>
<tr><td>SpO2NumObjAttr 33; R</td><td>SpO2NumObjAttr 34; R</td><td>SpO2NumObjAttr 35; O</td></tr>
<tr><td>SpO2NumObjAttr 36; O</td><td>SpO2NumObjAttr 37; O</td><td>SpO2NumObjExt 1; M</td></tr>
<tr><td>SpO2NumObjExt 2; M</td><td>SpO2NumObjExt 3; M</td><td>SpO2NumObjExt 4; M</td></tr>
<tr><td>SpO2NumObjExt 5; M</td><td>SpO2NumObjExt 6; R</td><td>SpO2NumObjExt 7; R</td></tr>
<tr><td>SpO2NumObjExt 8; R</td><td>SpO2NumObjExt 10; C</td><td>SpO2NumObjExt 11; C</td></tr>
<tr><td>SpO2NumObjExt 12; C</td><td>SpO2NumObjExt 13; O</td><td>SpO2NumObjExt 14; C</td></tr>
<tr><td>SpO2NumObjExt 15; C</td><td>SpO2NumObjExt 16; C</td><td>SpO2NumObjExt 19; C</td></tr>
<tr><td>SpO2ThresSetStatAttr 1; M</td><td>SpO2ThresSetStatAttr 2; C</td><td>SpO2ThresSetStatAttr 3; C</td></tr>
<tr><td>SpO2ThresSetStatAttr 4; C</td><td>SpO2ThresSetStatAttr 5; O</td><td>SpO2ThresSetStatAttr 6; C</td></tr>
<tr><td>SpO2ThresSetStatAttr 7; C</td><td>SpO2ThresSetStatAttr 8; C</td><td>SpO2StandConf 4; M</td></tr>
<tr><td>SpO2NumObjAttr 21; M</td><td></td><td></td></tr>
<tr><td colspan="2">Test purpose</td><td colspan="3">Check that:
SPO2 Object contains the attributes specified for Extended Configuration</td></tr>
<tr><td colspan="2">Applicability</td><td colspan="3">C_AG_OXP_173 AND C_AG_OXP_181 AND C_AG_OXP_000</td></tr>
<tr><td colspan="2">Other PICS</td><td colspan="3">C_AG_PO_010, C_AG_PO_011, C_AG_PO_012</td></tr>
<tr><td colspan="2">Initial condition</td><td colspan="3">The simulated manager and the agent under test are in the configuring state.</td></tr>
<tr><td colspan="2">Test procedure</td><td colspan="3">1. The simulated manager receives an association request from the agent under test.
2. The simulated manager responds with a result = accepted-unknown-config
3. The agent responds with a "Remote Operation Invoke | Confirmed Event Report" message with an MDC_NOTI_CONFIG event to send its configuration to the manager.
4. Check that the field Dev-Config-Id is in the extended range. If it is not, the manager responds with a "unsupported-config" and waits for a new configuration. Repeat this step until a Dev-config-Id in the extended range is received.
5. Once the agent under test sends an extended configuration, check the SPO2 object:
6. The SPO2 object contents must be:
a. Mandatory attribute Type
❑ attribute-id = MDC_ATTR_ID_TYPE (0x09 0x2F)
❑ attribute-type = TYPE
❑ attribute-value = MDC_PART_SCADA (0x00 0x02)) , MDC_PULS_OXIM_SAT_O2 (0x4B 0xB8)
b. IF Conditional attribute Supplemental-Types is present:
• IF there is no desire to distinguish modality , this attribute is not used.</td></tr>
</table>

- attribute-id = MDC_ATTR_SUPPLEMENTAL_TYPES (0x0A 0x61)
- attribute-type = SupplementalTypeList
- attribute-count = n
- attribute-value.length =Sequence of TYPE (TYPE.length= 4 bytes then partition (NomPartition 2 bytes) and code (OID-Type))
- IF the modality for SPO2 measurement is 'fast' then attribute-value= MDC_MODALITY_FAST (0x4C 0x34)
- IF the modality for SPO2 is 'slow' then attribute-value= MDC_MODALITY_SLOW (0x4C 0x38)
- IF the modality for SPO2 is 'spot-check' then attribute-value= MDC_MODALITY_SPOT (0x4C 0x3C)
- IF the modality for SpO2 measurement is Fast and Spot Check then attribute-value= MDC_MODALITY_SPOT (0x4C 0x3C) and MDC_MODALITY_FAST (0x4C 0x34)(Recommended)
- IF the modality for SpO2 measurement is Slow and Spot Check then attribute-value= MDC_MODALITY_SPOT (0x4C 0x3C) and MDC_MODALITY_SLOW (0x4C 0x38) (Recommended)
- It is NOT recommended to combine the values MDC_MODALITY_SLOW (0x4C 0x38) and MDC_MODALITY_FAST.

c. Mandatory attribute Metric-Spec_Small

- attribute-id = MDC_ATTR_METRIC_SPEC_SMALL (0x0A 0x46)
- attribute-type = MetricSpecSmall (2 bytes)
- attribute-value ≠ 0x00 0x00
  - IF bit 1 is set(mss-avail-stored-data(1)) is set, Agent may store and send multiple historical values.
  - IF Spot-check modality is used then bit 3 is set(mss-msmt-aperiodic(3)) is set, otherwise, this bit may be set.
  - bit 8 shall NOT set(mss-acc-manager-initiated(8))
  - bit 9 Shall be set(mss-acc-agent-initiated(9))

d. IF Metric-Structure-Small attribute is present for SPO2 object

- attribute-id = MDC_ATTR_METRIC_STRUCTURE_SMALL (0x0A 0x73)
- attribute-type = MetricStructureSmall
- attribute-value.length = 2 bytes

e. Conditional attribute Measurement-Status

- IF thresholding is to be used, this attribute is mandatory.
- attribute-id = MDC_ATTR_MSMT_STAT (0x09 0x47)
- attribute-type = MeasurementStatus
- attribute-value.length = 2 bytes

f. Only one attribute of Metric-Id and Metric-Id-List shall be present

g. IF Metric-Id attribute is present in SPO2 object

- attribute-id = MDC_ATTR_ID_PHYSIO (0x09 0x2B)
- attribute-type = OID-Type
- attribute-value.length =2 bytes
- attribute-value =

h. IF Metric-Id-List attribute is present for SPO2 object

- attribute-id = PHYSIOMDC_ATTR_ID_PHYSIO_LIST (0x0A 0x76)
- attribute-type = MetricIdList
- attribute-value.length= SEQUENCE OF OID-Type (2 bytes)

- ❑ 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.

i. IF Metric-Id-Partition is present in SPO2 object

- ❑ attribute-id = MDC_ATTR_METRIC_ID_PART (0x0A 0x5F)
- ❑ attribute-type = NomPartition
- ❑ attribute-value.length = 2 bytes
- ❑ attribute-value =

j. Mandatory attribute Unit-Code

- ❑ attribute-id = MDC_ATTR_UNIT_CODE (0x09 0x96)
- ❑ attribute-type = OID-Type
- ❑ attribute-value.length = 2 bytes
- ❑ attribute-value = 0x02 0x20 (MDC_DIM_PERCENT)

k. IF Attribute-Value-Map attribute is present in SPO2 object

- ❑ attribute-id = MDC_ATTR_ATTRIBUTE_VAL_MAP (0x0A 0x55)
- ❑ attribute-type = AttrValMap
- ❑ attribute-count = M (record for next step)
- ❑ attribute-length = M *4 bytes
- ❑ attribute-value = <check that M attributes are defined here>
- ❑ IF thresholding is to be used, the Attribute-Value-Map attribute needs to accommodate information pertaining to threshold status information, in addition to other attributes such as the observed value and timestamp information

l. IF Source-Handle-Reference attribute is present for the SPO2 object

- ❑ attribute-id = MDC_ATTR_SOURCE_HANDLE_REF (0x4A 0x47)
- ❑ attribute-type = HANDLE
- ❑ attribute-value.length = 2 bytes
- ❑ attribute-value = <not relevant for this test>

m. IF Measure-Active-Period attribute is present in the SPO2 object

- ❑ attribute-id = MDC_ATTR_TIME_PD_MSMT_ACTIVE (0x0A 0x59)
- ❑ attribute-type = FLOAT-Type
- ❑ attribute-value.length = 4 bytes
- ❑ attribute-value = <Period of time that the measure is active>

n. IF C_AG_PO_011 then

1. Alert-Op-State is mandatory
   - ❑ attribute-id = MDC_ATTR_AL_OP_STAT (0x09 0x06)
   - ❑ attribute-type = CurLimAlStat
   - ❑ attribute-value.length = 2 bytes
   - ❑ attribute-value = One of the following:`1110000000000000´ B or `0000000000000000´ B or `0100000000000000´ B or `0010000000000000´ B
     - lim-alert-off (0)
     - lim-low-off (1)
     - lim-high-off (2)

	2. Optional attribute Current-Limits ❑ attribute-id = MDC_ATTR_LIMIT_CURR (0x09 0x34) ❑ attribute-type = CurLimAlVal ❑ attribute-value = <limits of the Threshold> ❑ IF Basic-Nu-Observed value is used the precision for CurrentLimit will be SFLOAT (2 bytes) .Basic-Nu-observed-Value is mandatory 3. Optional attribute Alert-Op-text-String ❑ attribute-id = MDC_ATTR_AL_OP_TEXT_STRING (0x09 0xAE) ❑ attribute-type = AlertOpTextString ❑ attribute-value.length = <Variable> ❑ attribute-value = <Two fields with printable ASCII> o. IF Accuracy attribute is present in SPO2 object ❑ attribute-id = MDC_ATTR_NU_ACCUR_MSMT (0x09 0x4A) ❑ attribute-type = FLOAT-Type (4 bytes) ❑ attribute-value.length = 4 bytes ❑ attribute-value = <Maximum deviation> p. IF Spot-Check modality is used then Conditional attribute Absolute-Time-Stamp: ❑ attribute-id = MDC_ATTR_TIME_STAMP_ABS ❑ attribute-type = AbsoluteTime ❑ attribute-value.length = 8 bytes
Pass/Fail criteria	All checked values are as specified in the test procedure. If the agent uses Spot Check Modality (C_AG_PO_010=TRUE) Supplemental-Type value is MDC_MODALITY_SPOT at least for one object, ELSE the value is not MDC_MODALITY_SPOT.
Notes	

TP Id		TP/PLT/AG/CLASS/PO/BV-003		
TP label		Pulse Rate Object for Standard Configuration		
Coverage	**Spec**	[ISO/IEEE 11073-10404]		
	Testable items	PulseRateNumObjAttr 1; M	PulseRateNumObjAttr 2; M	PulseRateNumObjAttr 3; M
		PulseRateNumObjAttr 4; R	PulseRateNumObjAttr 12 ; M	PulseRateNumObjAttr 18 ; M
		PulseRateNumObjAttr 23; R	PulseRateNumObjAttr 24; R	PulseRateNumObjAttr 25; R
		PulseRateNumObjAttr 26; R	PulseRateNumObjAttr 27; M	PulseRateNumObjAttr 28; M
		PulseRateNumObjAttr 29; R	PulseRateNumObjAttr 30; C	PulseRateNumObjAttr 31; R
		PulseRateNumObjAttr 32; C	PulseRateNumObjAttr 33; C	PulseRateNumObjAttr 34; R
		PulseRateNumObjAttr 35; R	PulseRateNumObjAttr 36; R	PulseRateNumObjAttr 37; R
		PulseRateStandConf 1; C	PulseRateStandConf 2; C	PulseRateStandConf 4; M

Test purpose	Check that: Pulse Rate Object contains the attributes specified for Standard Configuration
Applicability	C_AG_OXP_173 AND (NOT C_AG_OXP_181) AND C_AG_OXP_000
Other PICS	C_AG_PO_001, C_AG_PO_003, C_AG_PO_010
Initial condition	The simulated manager and the agent under test are in the configuring state.
Test procedure	1. The simulated manager receives an association request from the agent under test. 2. The simulated manager responds with a result = accepted-unknown-config 3. The agent responds with a "Remote Operation Invoke | Confirmed Event Report" message with an MDC_NOTI_CONFIG event to send its configuration to the manager. 4. Check that the field Dev-Config-Id is set to 0x0190 OR 0x0191. If it is not, the manager responds with a "unsupported-config" and waits for a new configuration. Repeat this step until a Dev-config-Id equal to 0x0190 or ox0191 is received. 5. Once the agent under test sends a standard configuration, check the Pulse Rate object: 6. Pulse Rate Object contents shall be: a. Mandatory attribute Handle ❑ attribute-id = MDC_ATTR_ID_HANDLE (0x09 0x21) ❑ attribute-type = HANDLE ❑ attribute-value = 0x00 0x0A(10) b. Mandatory attribute Type ❑ attribute-id = MDC_ATTR_ID_TYPE (0x09 0x2F) ❑ attribute-type = TYPE ❑ attribute-value = 0x00 0x02(MDC_PART_SCADA) , 0x48 0x1A(MDC_PULS_OXIM_PULSE_RATE) c. If conditional attribute Supplemental–Types is present • IF C_AG_PO_003 then: • Not Recommended attribute Supplemental-Types ❑ attribute-id = MDC_ATTR_SUPPLEMENTAL_TYPES (0x0A 0x61) ❑ attribute-type = SupplementalTypeList ❑ attribute-value.length =Sequence of TYPE (TYPE.length= 4 bytes) ❑ attribute-value= If Agent uses Spot Check Modality the value is MDC_MODALITY_SPOT, otherwise the value is not MDC_MODALITY_SPOT. • IF C_AG_PO_001 Then: • Mandatory attribute Supplemental-Types ❑ attribute-id = MDC_ATTR_SUPPLEMENTAL_TYPES (0x0A 0x61) ❑ attribute-type = SupplementalTypeList ❑ attribute-value.length =Sequence of TYPE (TYPE.length= 4 bytes) ❑ attribute-value = MDC_MODALITY_SPOT (0x4C 0x3C) d. Mandatory attribute Metric-Spec-Small ❑ attribute-id = MDC_ATTR_METRIC_SPEC_SMALL (0x0A 0x46) ❑ attribute-type = MetricSpecSmall ❑ attribute-value.length = 2 bytes ❑ attribute-value ≠ 0x00 0x00

	▪ IF bit 1 is set(mss-avail-stored-data(1)) is set, Agent may store and send multiple historical values. ▪ bit 9 must be set(mss-acc-agent-initiated(9)) e. Mandatory attribute Unit-Code ❑ attribute-id = MDC_ATTR_UNIT_CODE (0x09 0x96) ❑ attribute-type = OID-Type ❑ attribute-value.length = 2 bytes ❑ attribute-value = 0x0A 0xA0 (MDC_DIM_BEAT_PER_MIN) f. Mandatory attribute Attribute-Value-Map ❑ attribute-id = MDC_ATTR_ATTRIBUTE_VAL_MAP (0x0A 0x55) ❑ attribute-type = AttrValMap ❑ attribute-count = M (record for next step) ❑ attribute-length = M *4 bytes ❑ attribute-value = <check that M attributes are defined here> ❑ IF the Attribute-Value-Map attribute needs to accommodate information pertaining to threshold status information, in addition to other attributes such as the observed value and timestamp information ❑ IF C_AG_PO_003 then ▪ attribute-value.length = N*4 bytes ▪ attribute-value = MDC_ATTR_NU_VAL_OBS_BASIC (0x0A 0x4C), 2 (0x00 0x02) ❑ IF C_AG_PO_001 then ▪ attribute-value.length = N*4 bytes ▪ attribute-value = MDC_ATTR_NU_VAL_OBS_BASIC (0x0A 0x4C), 2 (0x00 0x02) 0x09 0x90 0x00 0x08 MDC_ATTR_TIME_STAMP_ABS, 8
Pass/Fail criteria	All checked values are as specified in the test procedure.
Notes	

TP Id		TP/PLT/AG/CLASS/PO/BV-004		
TP label		Pulse Rate Object for Extended Configuration		
Coverage	**Spec**	[ISO/IEEE 11073-10404]		
	Testable items	PulseRateNumObjAttr 1; M	PulseRateNumObjAttr 3; M	PulseRateNumObjAttr 5; C
		PulseRateNumObjAttr 6; C	PulseRateNumObjAttr 7; C	PulseRateNumObjAttr 8; M
		PulseRateNumObjAttr 9; R	PulseRateNumObjAttr 10; R	PulseRateNumObjAttr 11; R
		PulseRateNumObjAttr 14; C	PulseRateNumObjAttr 15; M	PulseRateNumObjAttr 16; C
		PulseRateNumObjAttr 17; M	PulseRateNumObjAttr 18; M	PulseRateNumObjAttr 19; M
		PulseRateNumObjAttr 20; M	PulseRateNumObjAttr 23; R	PulseRateNumObjAttr 24; R
		PulseRateNumObjAttr 25; R	PulseRateNumObjAttr 26; R	PulseRateNumObjAttr 27; M
		PulseRateNumObjAttr 29; R	PulseRateNumObjAttr 31; R	PulseRateNumObjAttr 34; R
		PulseRateNumObjAttr 38; O	PulseRateNumObjAttr 39; O	PulseRateNumObjAttr 40; O

<table>
<tr><td></td><td></td><td>PulseRateNumObjAttr 41; C</td><td>PulseRateNumObjAttr 42; C</td><td>PulseRateNumObjAttr 43; O</td></tr>
<tr><td></td><td></td><td>PulseRateNumObjAttr 44; C</td><td>PulseRateThresSetStatAttr 1; M</td><td>PulseRateThresSetStatAttr 2; C</td></tr>
<tr><td></td><td></td><td>PulseRateThresSetStatAttr 3; C</td><td>PulseRateThresSetStatAttr 4; C</td><td>PulseRateThresSetStatAttr 5; C</td></tr>
<tr><td colspan="2">Test purpose</td><td colspan="3">Check that:
Pulse Rate Object contains the attributes specified for Extended Configuration</td></tr>
<tr><td colspan="2">Applicability</td><td colspan="3">C_AG_OXP_173 AND C_AG_OXP_181 AND C_AG_OXP_000</td></tr>
<tr><td colspan="2">Other PICS</td><td colspan="3">C_AG_PO_010, C_AG_PO_011, C_AG_PO_012</td></tr>
<tr><td colspan="2">Initial condition</td><td colspan="3">The simulated manager and the agent under test are in the configuring state.</td></tr>
<tr><td colspan="2">Test procedure</td><td colspan="3">1. The simulated manager receives an association request from the agent under test.
2. The simulated manager responds with a result = accepted-unknown-config
3. The agent responds with a "Remote Operation Invoke | Confirmed Event Report" message with an MDC_NOTI_CONFIG event to send its configuration to the manager.
4. Check that the field Dev-Config-Id is in the extended range. If it is not, the manager responds with a "unsupported-config" and waits for a new configuration. Repeat this step until a Dev-config-Id in the extended range is received.
5. Once the agent under test sends an extended configuration, check Pulse Rate object:
6. Pulse Rate Object contents must be:
a. Mandatory attribute Type
❑ attribute-id = MDC_ATTR_ID_TYPE (0x09 0x2F)
❑ attribute-type = TYPE
❑ attribute-value = MDC_PART_SCADA (0x00 0x02) , MDC_PULS_OXIM_PULSE_RATE (0x48 0x1A)
b. IF Conditional Supplemental–Types Attribute is present:
▪ IF there is no desire to distinguish modality, this attribute is not used.
❑ attribute-id = MDC_ATTR_SUPPLEMENTAL_TYPES (0x0A 0x61)
❑ attribute-type = SupplementalTypeListq
❑ attribute-count = n
❑ attribute-value.length =Sequence of TYPE (TYPE.length= 4 bytes) then partition (NomPartition 2 bytes) and code (OID-Type))
❑ IF the modality for Pulse Rate measurement is ‘fast’ then attribute-value= MDC_MODALITY_FAST (0x4C 0x34)
❑ IF the modality for Pulse Rate measurement is ‘slow’ then attribute-value= MDC_MODALITY_SLOW (0x4C 0x38)
❑ IF the modality for Pulse Rate measurement is ‘Spot Check’ then attribute-value= MDC_MODALITY_SPOT (0x4C 0x3C)
❑ IF the modality for SpO2 measurement is Fast and Spot Check then attribute-value= MDC_MODALITY_SPOT (0x4C 0x3C) and MDC_MODALITY_FAST (0x4C 0x34)(Recommended)
❑ IF the modality for SpO2 measurement is Slow and Spot Check then attribute-value= MDC_MODALITY_SPOT (0x4C 0x3C) and MDC_MODALITY_SLOW (0x4C 0x38) (Recommended)
❑ It is NOT recommended to combine the values MDC_MODALITY_SLOW (0x4C 0x38) and MDC_MODALITY_FAST.
c. Mandatory attribute Metric-Spec_Small
❑ attribute-id = MDC_ATTR_METRIC_SPEC_SMALL (0x0A 0x46)</td></tr>
</table>

- ❑ attribute-type = MetricSpecSmall
- ❑ attribute-value.length = 2 bytes
- ❑ attribute-value ≠ 0x00 0x00
  - IF bit 1 is set(mss-avail-stored-data(1)) is set, the agent may store and send multiple historical values.
  - bit 8 shall NOT beset(mss-acc-manager-initiated(8))
  - bit 9 shall be set(mss-acc-agent-initiated(9))
  - IF Spot-Check modality is used, then bit 3 (mss-msmt-aperiodic(3)) has to be set

d. IF Metric-Structure-Small attribute is present for Pulse Rate object

- ❑ attribute-id = MDC_ATTR_METRIC_STRUCTURE_SMALL (0x0A 0x73)
- ❑ attribute-type = MetricStructureSmall
- ❑ attribute-value.length = 2 bytes
- ❑ attribute-value =<Not relevant for this test>

e. Conditional attribute Measurement-Status

- IF thresholding is to be used, this attribute is mandatory.
  - ❑ attribute-id = MDC_ATTR_MSMT_STAT (0x09 0x47)
  - ❑ attribute-type = MeasurementStatus
  - ❑ attribute-value.length = 2 bytes

f. Only one attribute of Metric-Id and Metric-Id-List shall be present

g. IF Metric-Id attribute is present in Pulse Rate object

- ❑ attribute-id = MDC_ATTR_ID_PHYSIO (0x09 0x2B)
- ❑ attribute-type = OID-Type
- ❑ attribute-value.length =2 bytes
- ❑ attribute-value =

h. IF Metric-Id-List attribute is present for Pulse Rate object

- ❑ attribute-id = PHYSIOMDC_ATTR_ID_PHYSIO_LIST (0x0A 0x76)
- ❑ attribute-type = MetricIdList
- ❑ attribute-value.length= SEQUENCE OF OID-Type (2 bytes)
- ❑ 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.

i. IF Metric-Id-Partition is present in Pulse Rate object

- ❑ attribute-id = MDC_ATTR_METRIC_ID_PART (0x0A 0x5F)
- ❑ attribute-type = NomPartition
- ❑ attribute-value.length = 2 bytes
- ❑ attribute-value =

j. Mandatory attribute Unit-Code

- ❑ attribute-id = MDC_ATTR_UNIT_CODE (0x09 0x96)
- ❑ attribute-type = OID-Type
- ❑ attribute-value.length = 2 bytes
- ❑ attribute-value = 0x0A 0xA0 (MDC_DIM_BEAT_PER_MIN)

k. IF Attribute-Value-Map attribute is present in Pulse Rate object

- ❑ attribute-id = MDC_ATTR_ATTRIBUTE_VAL_MAP (0x0A 0x55)
- ❑ attribute-type = AttrValMap
- ❑ attribute-count = M (record for next step)
- ❑ attribute-length = M *4 bytes
- ❑ attribute-value = <check that M attributes are defined here>
- ❑ IF thresholding is to be used, the Attribute-Value-Map attribute needs to accommodate information pertaining to threshold status information, in addition to other attributes such as the observed value and timestamp information

l. IF Source-Handle-Reference attribute is present for Pulse Rate object

- ❑ attribute-id = MDC_ATTR_SOURCE_HANDLE_REF (0x4A 0x47)
- ❑ attribute-type = HANDLE
- ❑ attribute-value.length = 2 bytes
- ❑ attribute-value = <Period of time that the measure is active>

m. IF Measure-Active-Period attribute is present in Pulse Rate object

- ❑ attribute-id = MDC_ATTR_TIME_PD_MSMT_ACTIVE (0x0A 0x59)
- ❑ attribute-type = FLOAT-Type
- ❑ attribute-value.length = 4 bytes
- ❑ attribute-value = <Period of time that the measure is active>

n. IF C_AG_PO_012 then:

- ❑ Alert-Op-State is mandatory
  - attribute-id = MDC_ATTR_AL_OP_STAT (0x09 0x06)
  - attribute-type = CurLimAlStat
  - attribute-value.length = 2 bytes
  - attribute-value = One of the following: 1110000000000000´ B or `0000000000000000´ B or `0100000000000000´ B or `0010000000000000´ B
    - lim-alert-off (0)
    - lim-low-off (1)
    - lim-high-off (2)
- ❑ Optional attribute Current-Limits
  - attribute-id = MDC_ATTR_LIMIT_CURR (0x09 0x34)
  - attribute-type = CurLimAlVal
  - attribute-value = <limits of the Threshold>
  - IF Basic-Nu-Observed value is used the precision for CurrentLimit will be SFLOAT (2 bytes) .Basic-Nu-observed-Value is mandatory
- ❑ Optional attribute Alert-Op-text-String
  - attribute-id = MDC_ATTR_AL_OP_TEXT_STRING (0x09 0xAE)
  - attribute-type = AlertOpTextString
  - attribute-value.length = <Variable>
  - attribute-value = <Two fields with printable ASCII>

o. IF Accuracy attribute is present in Pulse Rate object

- ❑ attribute-id = MDC_ATTR_NU_ACCUR_MSMT (0x09 0x4A)
- ❑ attribute-type = FLOAT-Type (4 bytes)
- ❑ attribute-value.length = 4 bytes
- ❑ attribute-value = <Maximum deviation>

	p. IF Spot-check modality is used, then Conditional attribute Absolute-Time-Stamp: ❑ attribute-id = MDC_ATTR_TIME_STAMP_ABS ❑ attribute-type = AbsoluteTime ❑ attribute-value.length = 8 bytes ❑ attribute-value =
Pass/Fail criteria	All checked values are as specified in the test procedure. If the agent uses Spot Check Modality (C_AG_PO_010=TRUE) Supplemental-Type value is MDC_MODALITY_SPOT at least for one object, ELSE the value is not MDC_MODALITY_SPOT.
Notes	

TP Id		TP/PLT/AG/CLASS/PO/BV-005		
TP label		Pulsatile Quality Object for Extended Configuration		
Coverage	**Spec**	[ISO/IEEE 11073-10404]		
	Testable items	PulseQualNumObjAttr1; M	PulseQualNumObjAttr2; R	PulseQualNumObjAttr3; M
		PulseQualNumObjAttr4; R	PulseQualNumObjAttr5; R	PulseQualNumObjAttr6; R
		PulseQualNumObjAttr7; R	PulseQualNumObjAttr8; R	PulseQualNumObjAttr9; R
		PulseQualNumObjAttr10; O	PulseQualNumObjAttr11; O	PulseQualNumObjAttr12; O
		PulseQualNumObjAttr13; O		
Test purpose		Check that: Pulsatile Quality Object contains the attributes specified for Extended Configuration		
Applicability		C_AG_OXP_173 AND C_AG_PO_098 AND C_AG_OXP_181 AND C_AG_OXP_000		
Other PICS		C_AG_OXP_098		
Initial condition		The simulated manager and the agent under test are in the configuring state.		
Test procedure		1. The simulated manager receives an association request from the agent under test. 2. The simulated manager responds with a result = accepted-unknown-config 3. The agent responds with a "Remote Operation Invoke | Confirmed Event Report" message with an MDC_NOTI_CONFIG event to send its configuration to the manager. 4. Check that the field Dev-Config-Id is in the extended range. If it is not, the manager responds with a "unsupported-config" and waits for a new configuration. Repeat this step until a Dev-config-Id in the extended range is received. 5. Once the agent under test sends an extended configuration, check the Pulsatile Quality object. 6. Pulsatile Quality Object must be: a. Mandatory attribute Type ❑ attribute-id = MDC_ATTR_ID_TYPE (0x09 0x2F) ❑ attribute-type = TYPE ❑ attribute-value = (0x00 0x02(MDC_PART_SCADA), 0x4B 0xB0 (MDC_PULS_OXIM_PERF_REL)) OR (0x00 0x02(MDC_PART_SCADA) , 0x4B 0x30(MDC_SAT_O2_QUAL))		

b. If Not Recommended attribute Supplemental-Types

- ❑ attribute-id = MDC_ATTR_SUPPLEMENTAL_TYPES (0x0A 0x61)
- ❑ attribute-type = SupplementalTypeList
  - attribute-value.length =Sequence of TYPE (TYPE.length= 4 bytes)
- ❑ attribute-value = <Not relevant for this test>

c. Mandatory attribute Metric-Spec_Small

- ❑ attribute-id = MDC_ATTR_METRIC_SPEC_SMALL (0x0A 0x46)
- ❑ attribute-type = MetricSpecSmall (2 bytes)
- ❑ attribute-value ≠ 0x00 0x00
  - bit 8 shall be set to 1, mss-acc-manager-initiated(8))
  - bit 9 shall be set to 1,mss-acc-agent-initiated(9))

IF the object is scanned only by a Scanner object then this bit will not be set (the manager will control the dataflow using the Operational State attribute (scanner object).

d. IF Not Recommended attribute Metric-Structure-Small is present

- ❑ attribute-id = MDC_ATTR_METRIC_STRUCTURE_SMALL (0x0A 0x73)
- ❑ attribute-type = MetricStructureSmall
- ❑ attribute-value.length = 2 bytes
- ❑ attribute-value = <not relevant in this test>

e. IF Not Recommended attribute Metric-Id-List is present in the Pulsatile quality object

- ❑ attribute-id = MDC_ATTR_ID_PHYSIO_LIST (0x0A 0x76)
- ❑ attribute-type = MetricIdList
- ❑ attribute-value.length= SEQUENCE OF OID-Type (2 bytes)
- ❑ 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. Only one attribute of Metric-Id and Metric-Id-List shall be present.

f. IF Not Recommended attribute Metric-Id-Partition is present in Pulsatile quality object

- ❑ attribute-id = MDC_ATTR_METRIC_ID_PART (0x0A 0x5F)
- ❑ attribute-type = NomPartition
- ❑ attribute-value.length = 2 bytes

g. IF attribute Unit-Code is present in Pulsatile quality object

- ❑ attribute-id = MDC_ATTR_UNIT_CODE (0x09 0x96)
- ❑ attribute-type = OID-Type
- ❑ attribute-value.length = 2 bytes
- ❑ IF Type-value = 0x4B 0xB0 (MDC_PULS_OXIM_PERF_REL)THEN
  - attribute-value = 0x02 0x00 (MDC_DIM_DIMLESS)(recommended
- ❑ IF Type-value = 0x4B 0x30(MDC_SAT_O2_QUAL)THEN
  - attribute-value = 0x02 0x20 (MDC_DIM_PERCENT)(recommended)
- ❑ Vendor may use private Unit-Code, in this case, then attribute-value given by the vendor

h. IF attribute Attribute-Val-Map is present in Pulsatile quality object

- ❑ attribute-id = MDC_ATTR_ATTRIBUTE_VAL_MAP (0x0A 0x55)
- ❑ attribute-type = AttrValMap

	❑ attribute-count = M (record for next step) ❑ attribute-length = M *2 bytes ❑ attribute-value = <check that M attributes are defined here> i. IF Recommended attribute Label-String is present in Pulsatile quality object ❑ attribute-id = MDC_ATTR_ID_LABEL_STRING ❑ attribute-type = OCTET STRING ❑ attribute-value.length = <Variable> ❑ attribute-value = <ASCII Printable> j. IF Recommended attribute Unit-Label-String is present in Pulsatile quality object ❑ attribute-id = MDC_ATTR_UNIT_LABEL_STRING ❑ attribute-type = OCTET STRING ❑ attribute-value.length = < Variable> ❑ attribute-value = <ASCII Printable> k. IF Absolute-Time-Stamp attribute is present in Pulsatile quality object ❑ attribute-id = MDC_ATTR_TIME_STAMP_ABS ❑ attribute-type = AbsoluteTime (sequence of :century, year, month,day, hour, minute, second, sec-fractions) ❑ attribute-value.length = 8 bytes ❑ attribute-value = <Not relevant for this test> l. IF Relative-Time-Stamp attribute is present in Pulsatile quality object ❑ attribute-id = MDC_ATTR_TIME_STAMP_REL ❑ attribute-type = RelativeTime ❑ attribute-value.length = 4 bytes ❑ attribute-value = <Not relevant for this test> m. IF HiResRelative-Time-Stamp attribute is present in Pulsatile quality object ❑ attribute-id = MDC_ATTR_TIME_STAMP_REL_HI_RES ❑ attribute-type = HighResRelativeTime ❑ attribute-value.length = 8 bytes ❑ attribute-value = <Not relevant for this test>
Pass/Fail criteria	All checked values are as specified in the test procedure.
Notes	Observed value attributes are checked in the manual test procedures for [ISO/IEEE 11073-20601].

TP Id		TP/PLT/AG/CLASS/PO/BV-006		
TP label		Plethysmogram Object for Extended Configuration		
Coverage	**Spec**	[ISO/IEEE 11073-10404]		
	Testable items	PlethyObjAttr 1; M	PlethyObjAttr 2; R	PlethyObjAttr 3; R
		PlethyObjAttr 4; R	PlethyObjAttr 5; R	PlethyObjAttr 6; R
		PlethyObjAttr 7; O		

Test purpose	Check that: Plethysmogram Object contains the attributes specified for Extended Configuration
Applicability	C_AG_OXP_173 AND C_AG_PO_099 AND C_AG_OXP_000
Other PICS	
Initial condition	The simulated manager and the agent under test are in the configuring state.
Test procedure	1. The simulated manager receives an association request from the agent under test. 2. The simulated manager responds with a result = accepted-unknown-config 3. The agent responds with a "Remote Operation Invoke | Confirmed Event Report" message with an MDC_NOTI_CONFIG event to send its configuration to the manager. 4. Check that the field Dev-Config-Id is in the extended range. If it is not, the manager responds with an "unsupported-config" and waits for a new configuration. Repeat this step until a Dev-config-Id in the extended range is received. 5. Once the agent under test sends an extended configuration, check Plethysmogram object. 6. Plethysmogram Object must be: a. Mandatory attribute Type ❑ attribute-id = MDC_ATTR_ID_TYPE (0x09 0x2F) ❑ attribute-type = TYPE ❑ attribute-value = 0x00 0x02 (MDC_PART_SCADA) , 0x4B 0xB4 (MDC_PULS_OXIM_PLETH) b. If Not Recommended attribute Supplemental-Types ❑ attribute-id = MDC_ATTR_SUPPLEMENTAL_TYPES (0x0A 0x61) ❑ attribute-type = SupplementalTypeList ❑ attribute.value.lenngth= Sequence of TYPE (TYPE.length= 4 bytes) ❑ attribute-value = <Nor relevant for this test> c. Mandatory attribute Metric-Spec-Small ❑ attribute-id = MDC_ATTR_METRIC_SPEC_SMALL (0x0A 0x46) ❑ attribute-type = MetricSpecSmall (2 bytes) ❑ attribute-value ≠ 0x00 0x00 ▪ mss-acc-manager-initiated(8)=0 ▪ mss-acc-agent-initiated bit is not recommended as this implies that this object's data is transmitted via MDS Event Reports, and this object data is transmitted only through Scanner object. d. IF Not Recommended attribute Metric-Id is present in Plethysmogram Object ❑ attribute-id = MDC_ATTR_METRIC_STRUCTURE_SMALL (0x0A 0x73) ❑ attribute-type = MetricStructureSmall ❑ attribute-value.length = 2 bytes ❑ attribute-value = <Not relevant for this test> e. IF attribute Unit-Code is present in Plethysmogram Object ❑ attribute-id = MDC_ATTR_UNIT_CODE (0x09 0x96) ❑ attribute-type = OID-Type ❑ attribute-value.length = 2 bytes ❑ attribute-value = 0x02 0x00 (MDC_DIM_DIMLESS) (Recommended value)
Pass/Fail criteria	All checked values are as specified in the test procedure.

Notes	Label-String, Time-Stamp, Sample-Period, Simple-Sa-Observed-Value, Scale-and-Range-Spec and SA-Specification do not change from the ones defined in [ISO/IEEE 11073-20601], so they are tested in RT-SA test procedure for [ISO/IEEE 11073-20601]

TP Id		TP/PLT/AG/CLASS/PO/BV-007		
TP label		Pulsatile Occurrence Object for Extended Configuration		
Coverage	**Spec**	[ISO/IEEE 11073-10404]		
	Testable items	PulseOccObjAttr2; M	PulseOccObjAttr3; M	PulseOccObjAttr4; R
		PulseOccObjAttr5; R	PulseOccObjAttr6; R	PulseOccObjAttr7; R
		PulseOccObjAttr8; R	PulseOccObjAttr9; O	PulseOccObjAttr10; R
		PulseOccObjAttr11; R	PulseOccObjAttr12; R	PulseOccObjAttr13; R
		PulseOccObjAttr14; R	PulseOccObjAttr15; R	PulseOccObjAttr16; R
		PulseOccObjAttr17; R		
Test purpose		Check that: Pulsatile Occurrence Object contains the attributes specified for Extended Configuration		
Applicability		C_AG_OXP_173 AND C_AG_PO_140 AND C_AG_OXP_181 AND C_AG_OXP_000		
Other PICS				
Initial condition		The simulated manager and the agent under test have been associated, but the Agent configuration is unknown for the simulated manager, so the agent and the simulated manager will be in the configuring state.		
Test procedure		1. The simulated manager receives an association request from the agent under test. 2. The simulated manager responds with a result = accepted-unknown-config 3. The agent responds with a "Remote Operation Invoke | Confirmed Event Report" message with an MDC_NOTI_CONFIG event to send its configuration to the manager. 4. Check that the field Dev-Config-Id is in the extended range. If it is not the manager responds with a "unsupported-config" and waits for a new configuration. Repeat this step until a Dev-config-Id in the extended range is received. 5. Once the agent under test sends an extended configuration, check the Pulsatile Occurrence object. 6. Pulsatile Occurrence Object must be: a. Mandatory attribute Type ❑ attribute-id = MDC_ATTR_ID_TYPE (0x09 0x2F) ❑ attribute-type = TYPE ❑ attribute-value = 0x00 0x02 (MDC_PART_SCADA) , 0xD0 0x02 (MDC_TRIG) b. Mandatory attribute Metric-Spec_Small ❑ attribute-id = MDC_ATTR_METRIC_SPEC_SMALL (0x0A 0x46) ❑ attribute-type = MetricSpecSmall (2 bytes) ❑ attribute-value ≠ 0x00 0x00 ▪ bit 8 (mss-acc-manager-initiated(8)) must be set to 1. ▪ IF bit 9 is set(mss-acc-agent-initiated(9)) is set, the object value is updated using Agent-initiated measurement transmission.		

c. IF Not Recommended attribute Metric-Structure-Small is present in Pulsatile Occurrence object

- ❑ attribute-id = MDC_ATTR_METRIC_STRUCTURE_SMALL (0x0A 0x73)
- ❑ attribute-type = MetricStructureSmall
- ❑ attribute-value.length = 2 bytes
- ❑ attribute-value =

d. IF Not Recommended attribute Metric-Id is present in Pulsatile Occurrence object

- ❑ attribute-id = MDC_ATTR_ID_PHYSIO (0x09 0x2B)
- ❑ attribute-type = OID-Type
- ❑ attribute-value.length =2 bytes
- ❑ attribute-value =

e. IF Not Recommended attribute Metric-Id-List is present in Pulsatile Occurrence objet

- ❑ attribute-id = PHYSIOMDC_ATTR_ID_PHYSIO_LIST (0x0A 0x76)
- ❑ attribute-type = MetricIdList
- ❑ attribute-value.length= SEQUENCE OF OID-Type (2 bytes)
- ❑ attribute-value =

f. IF Not Recommended attribute Metric-Id-Partition is present in Pulsatile Occurrence objet

- ❑ attribute-id = MDC_ATTR_METRIC_ID_PART (0x0A 0x5F)
- ❑ attribute-type = NomPartition
- ❑ attribute-value.length = 2 bytes
- ❑ attribute-value =

g. IF Not Recommended attribute Unit-Code is present in Pulsatile Occurrence object

- ❑ attribute-id = MDC_ATTR_UNIT_CODE (0x09 0x96)
- ❑ attribute-type = OID-Type
- ❑ attribute-value.length = 2 bytes

h. IF Not Recommended attribute Source-Handle-Reference is present in Pulsatile Occurrence objet

- ❑ attribute-id = MDC_ATTR_SOURCE_HANDLE_REF (0x4A 0x47)
- ❑ attribute-type = HANDLE
- ❑ attribute-value.length = 2 bytes
- ❑ attribute-value =
- ❑ IF the Source-Handle-Reference is defined, it should point to either the Pulsatile Quality numeric object or the Plethysmogram Real-Time Sample Array object

i. IF Not Recommended attribute Enum-Observed-Value-Simple-Bit-Str is present in Pulsatile Occurrence object

- ❑ attribute-id= MDC_ATTR_ENUM_OBS_VAL_SIM_BIT_STR
- ❑ attribute-type = BITS-32
- ❑ attribute-value.length = BITS-32
- ❑ attribute-value=

j. IF Not Recommended attribute Enum-Observed-Value-Basic-Bit-Str is present in Pulsatile Occurrence object

- ❑ attribute-id= MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR

	❑ attribute-type = BITS-16 ❑ attribute-value.length = 2 bytes ❑ attribute-value = k. IF Not Recommended attribute Enum-Observed-Value-Simple-Str is present in Pulsatile Occurrence object ❑ attribute-id= MDC_ATTR_ENUM_OBS_VAL_SIM_STR ❑ attribute-type = EnumPrintableString ❑ attribute-value.length = ❑ attribute-value = l. IF Not Recommended attribute Enum-Observed-Value-Simple-Bit-Str is present in Pulsatile Occurrence object ❑ attribute-id= MDC_ATTR_VAL_ENUM_OBS ❑ attribute-type = EnumObsValue ❑ attribute-value.length = ❑ attribute-value = 5. Take a measurement with the agent 6. Wait for the Agent to send an event report nad check: a. IF Recommended attribute Enum-Observed-Value-Simple-OID ❑ attribute-id= MDC_ATTR_ENUM_OBS_VAL_SIM_OID ❑ attribute-type = OID-Type ❑ attribute-value.length = 2 bytes ❑ IF it is reporting that a pulsatile occurrence has occurred then attribute-value = MDC_TRIG_BEAT ❑ IF it is reporting that the maximal inrush of the pulsatile wave has occurred, then attribute-value = MDC_TRIG_BEAT_MAX_INRUSH (Maximal inrush has to be defined by the vendor , ICS)
Pass/Fail criteria	All checked values are as specified in the test procedure.
Notes	

TP Id		TP/PLT/AG/CLASS/PO/BV-008		
TP label		Pulse Characteristic Object for Extended Configuration		
Coverage	**Spec**	[ISO/IEEE 11073-10404]		
	Testable items	PulseCharacEnumAttr2; M	PulseCharacEnumAttr3; M	PulseCharacEnumAttr4; R
		PulseCharacEnumAttr5; R	PulseCharacEnumAttr6; R	PulseCharacEnumAttr7; R
		PulseCharacEnumAttr8; R	PulseCharacEnumAttr9; O	PulseCharacEnumAttr10; R
		PulseCharacEnumAttr11; R	PulseCharacEnumAttr12; R	PulseCharacEnumAttr13; R
		PulseCharacEnumAttr14; R	PulseCharacEnumAttr15; R	
Test purpose		Check that: Pulse Characteristic Object contains the attributes specified for Extended Configuration		
Applicability		C_AG_OXP_173 AND C_AG_PO_144 AND C_AG_OXP_181 AND C_AG_OXP_000		
Other PICS		C_AG_OXP_098		

Initial condition	The simulated manager and the agent under test are in the configuring state.
Test procedure	1. The simulated manager receives an association request from the agent under test. 2. The simulated manager responds with a result = accepted-unknown-config 3. The agent responds with a "Remote Operation Invoke | Confirmed Event Report" message with an MDC_NOTI_CONFIG event to send its configuration to the manager. 4. Check that the field Dev-Config-Id is in the extended range. If it is not the manager responds with an "unsupported-config" and waits for a new configuration. Repeat this step until a Dev-config-Id in the extended range is received. 5. Once the agent under test sends an extended configuration, check the Pulsatile Characteristic object. 6. Pulsatile Characteristic Object must be: a. Mandatory attribute Type ❑ attribute-id = MDC_ATTR_ID_TYPE (0x09 0x2F) ❑ attribute-type = TYPE ❑ attribute-value = 0x00 0x02 (MDC_PART_SCADA) , 0x4C 0x38 (MDC_PULS_OXIM_PULS_CHAR) b. Mandatory attribute Metric-Spec-Small ❑ attribute-id = MDC_ATTR_METRIC_SPEC_SMALL (0x0A 0x46) ❑ attribute-type = MetricSpecSmall (2 bytes) ❑ attribute-value ≠ 0x00 0x00 ▪ bit 8 (mss-acc-manager-initiated(8)) must be set ▪ bit 9 (mss-acc-agent-initiated(9)) must be set c. IF Not Recommended attribute Metric-Structure-Small is present in Pulsatile Characteristic object ❑ attribute-id = MDC_ATTR_METRIC_STRUCTURE_SMALL (0x0A 0x73) ❑ attribute-type = MetricStructureSmall ❑ attribute-value.length = Sequence of (ms-struct.length =1byte(INT-U8) + ms-comp-no =1byte(INT-U8)) ▪ attribute-value = d. IF Not Recommended attribute Metric-Id is present in Pulsatile Characteristic object. ❑ attribute-id = MDC_ATTR_ID_PHYSIO (0x09 0x2B) ❑ attribute-type = OID-Type ❑ attribute-value.length =2 bytes ❑ attribute-value = e. IF Not Recommended Metric-Id-List is present in Pulsatile Characteristic object ❑ attribute-id = PHYSIOMDC_ATTR_ID_PHYSIO_LIST (0x0A 0x76) ❑ attribute-type = MetricIdList ❑ attribute-value.length= SEQUENCE OF OID-Type (2 bytes) ❑ attribute-value = f. IF Not Recommended attribute Metric-Id-Part is present in Pulsatile Characteristic object ❑ attribute-id = MDC_ATTR_METRIC_ID_PART (0x0A 0x5F) ❑ attribute-type = NomPartition ❑ attribute-value.length = 2 bytes

	❑ attribute-value = g. IF Not Recommended attribute Metric-Id-Partition is present in Pulsatile Characteristic object ❑ attribute-id = MDC_ATTR_UNIT_CODE (0x09 0x96) ❑ attribute-type = OID-Type ❑ attribute-value.length = 2 bytes ❑ attribute-value = h. IF Not Recommended attribute Source-Handle-Reference is present in Pulsatile Characteristic object ❑ attribute-id = MDC_ATTR_SOURCE_HANDLE_REF (0x4A 0x47) ❑ attribute-type = HANDLE ❑ attribute-value.length = 2 bytes ❑ attribute-value = ❑ IF the Source-Handle-Reference is defined, it should point to either the Pulse Amplitude numeric object or the Plethysmogram Real-Time Sample Array object. i. IF attribute Enum-Observed-Value-Simple-OID is present in Pulsatile Characteristic object ❑ attribute-id= MDC_ATTR_ENUM_OBS_VAL_SIM_OID ❑ attribute-type = OID-Type ❑ attribute-value.length = 2 bytes ❑ attribute-value= j. IF Not Recommended Enum-Observed-Value-Simple-Bit-Str is present in Pulsatile Characteristic object_ ❑ attribute-id= MDC_ATTR_ENUM_OBS_VAL_SIM_BIT_STR ❑ attribute-type = BITS-32 ❑ attribute-value.length = 4 bytes ❑ attribute-value= k. IF Not Recommended Enum-Observed-Value-Simple-Str is present in Pulsatile Characteristic object ❑ attribute-id= MDC_ATTR_ENUM_OBS_VAL_SIM_STR ❑ attribute-type = EnumPrintableString ❑ attribute-value.length = ❑ attribute-value = l. IF Not Recommended attribute Enum-Observed-Value is present in Pulsatile Characteristic object ❑ attribute-id= MDC_ATTR_VAL_ENUM_OBS ❑ attribute-type = EnumObsValue ❑ attribute-value.length = ❑ attribute-value = ❑ It complicates the modeling of the object. m. IF Recommended attribute Enum-Observed-Value-Basic-Bit-Str is present in Pulsatile Characteristic object ❑ attribute-id= MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR ❑ attribute-type = BITS-16 bytes ❑ attribute-value.length = 2 bytes

Pass/Fail criteria	All checked values are as specified in the test procedure.
Notes	

TP Id		TP/PLT/AG/CLASS/PO/BV-009		
TP label		Device and Sensor Object for Extended Configuration		
Coverage	**Spec**	[ISO/IEEE 11073-10404]		
	Testable items	DeviceAndSensorObjAttr1; C	DeviceAndSensorObjAttr3; M	DeviceAndSensorObjAttr4; M
		DeviceAndSensorObjAttr5; R	DeviceAndSensorObjAttr6; R	DeviceAndSensorObjAttr7; R
		DeviceAndSensorObjAttr8; R	DeviceAndSensorObjAttr9; M	DeviceAndSensorObjAttr10; R
		DeviceAndSensorObjAttr11; R	DeviceAndSensorObjAttr12; R	DeviceAndSensorObjAttr16; O
		DeviceAndSensorObjAttr17; R	DeviceAndSensorObjAttr18; R	
Test purpose		Check that: Device and Sensor Object contains the attributes specified for Extended Configuration		
Applicability		C_AG_OXP_173 AND C_AG_PO_104 AND C_AG_OXP_181 AND C_AG_OXP_000		
Other PICS		C_AG_OXP_098, C_AG_PO_145		
Initial condition		The simulated manager and the agent under test are in the unassociated state.		
Test procedure		1. The simulated manager receives an association request from the agent under test. 2. The simulated manager responds with a result = accepted-unknown-config 3. The agent responds with a "Remote Operation Invoke | Confirmed Event Report" message with an MDC_NOTI_CONFIG event to send its configuration to the manager. 4. Check that the field Dev-Config-Id is in the extended range. If it is not the manager responds with a "unsupported-config" and waits for a new configuration. Repeat this step until a Dev-config-Id in the extended range is received. 5. Once the agent under test sends an extended configuration, check the Device and Sensor object. 6. Device and Sensor object must be: a. Mandatory attribute Type ❑ attribute-id = MDC_ATTR_ID_TYPE (0x09 0x2F) ❑ attribute-type = TYPE ❑ attribute-value = 0x00 0x02 (MDC_PART_SCADA) , 0x4C 0x4C (MDC_PULS_OXIM_DEV_STATUS) b. Mandatory attribute Metric-Spec-Small ❑ attribute-id = MDC_ATTR_METRIC_SPEC_SMALL (0x0A 0x46) ❑ attribute-type = MetricSpecSmall (2 bytes) ❑ attribute-value ≠ 0x00 0x00 ▪ bit 8 shall be set (mss-acc-manager-initiated(8)) ▪ bit 9 shall be set(mss-acc-agent-initiated(9)) c. IF Metric-Structure-Small attribute is present ❑ attribute-id = MDC_ATTR_METRIC_STRUCTURE_SMALL (0x0A 0x73) ❑ attribute-type = MetricStructureSmall		

	❑ attribute-value.length = Sequence of (ms-struct.length =1byte(INT-U8) + ms-comp-no =1byte(INT-U8)) ❑ attribute-value = d. IF Metric-Id attribute is present ❑ attribute-id = MDC_ATTR_ID_PHYSIO (0x09 0x2B) ❑ attribute-type = OID-Type ❑ attribute-value.length =2 bytes ❑ attribute-value = <Not relevant for this Test> e. IF Metric-Id-List attribute is present ❑ attribute-id = PHYSIOMDC_ATTR_ID_PHYSIO_LIST (0x0A 0x76) ❑ attribute-type = MetricIdList ❑ attribute-value.length= SEQUENCE OF OID-Type (2 bytes) ❑ 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. Only one attribute of Metric-Id and Metric-Id-List shall be present g. IF Metric-Id-Partition attribute is present ❑ attribute-id = MDC_ATTR_METRIC_ID_PART (0x0A 0x5F) ❑ attribute-type = NomPartition ❑ attribute-value.length = 2 bytes ❑ attribute-value = <Not relevant for this Test> h. IF Unit-code attribute is present ❑ attribute-id = MDC_ATTR_UNIT_CODE (0x09 0x96) ❑ attribute-type = OID-Type ❑ attribute-value.length = 2 bytes ❑ attribute-value = <Not relevant for this Test> i. IF Source-Handle-Reference attribute is present ❑ attribute-id = MDC_ATTR_SOURCE_HANDLE_REF (0x4A 0x47) ❑ attribute-type = HANDLE ❑ attribute-value.length = 2 bytes ❑ attribute-value = <Not relevant for this Test>
Pass/Fail criteria	All checked values are as specified in the test procedure.
Notes	

TP Id		TP/PLT/AG/CLASS/PO/BV-009_A		
TP label		Semantic of Device and Sensor Object		
Coverage	**Spec**	[ISO/IEEE 11073-10404]		
	Testable items	DeviceAndSensorObjAttr 11;R		

<table>
<tr><td>Test purpose</td><td>Check that:
Check the semantic of Device and Sensor Object.</td></tr>
<tr><td>Applicability</td><td>C_AG_OXP_173 AND C_AG_PO_104 AND C_AG_OXP_181 AND C_AG_OXP_000</td></tr>
<tr><td>Other PICS</td><td></td></tr>
<tr><td>Initial condition</td><td>The simulated manager and the agent under test are in the operating state.</td></tr>
<tr><td>Test procedure</td><td>1. Disconnect the sensor from any person and wait for the event report.
2. Wait for the agent to send an event report and check:
a. IF Enum-Observed-Value-Basic-Bit-Str attribute or Enum-Observed-Value-Simple-Bit-Str is present
❑ attribute-id= MDC_ATTR_ENUM_OBS_VAL_BASIC_BIT_STR or MDC_ATTR_ENUM_OBS_VAL_SIMPL_BIT_STR
❑ attribute-type = 2 bytes
❑ attribute-value.length = 2 bytes
❑ attribute-value = See next sub-table:
<table>
<tr><th>Device or sensor condition</th><th>PulseOxDevStat bits</th></tr>
<tr><td>The agent reports that the sensor is disconnected from the instrument.</td><td>sensor-disconnected (0)</td></tr>
<tr><td>The agent reports that the sensor is malfunctioning or faulty.</td><td>sensor-malfunction (1)</td></tr>
<tr><td>The agent reports that the sensor is not properly attached or has been dislodged, preventing accurate measurement.</td><td>sensor-displaced (2)</td></tr>
<tr><td>An unsupported sensor is connected to the agent.</td><td>sensor-unsupported (3)</td></tr>
<tr><td>The agent reports that sensor is not connected to the user.</td><td>sensor-off (4)</td></tr>
<tr><td>The agent reports that there is interference due to ambient light or electrical phenomena.</td><td>sensor-interference (5)</td></tr>
<tr><td>Signal analysis is currently in progress prior to measurement availability.</td><td>signal-searching (6)</td></tr>
<tr><td>The agent determines that a questionable pulse is detected</td><td>signal-pulse-questionable (7)</td></tr>
<tr><td>The agent detects a non-pulsatile signal.</td><td>signal-non-pulsatile (8)</td></tr>
<tr><td>The agent reports that the signal is erratic or is not plausible.</td><td>signal-erratic (9)</td></tr>
<tr><td>The agent reports a consistently low perfusion condition exists.</td><td>signal-low-perfusion (10)</td></tr>
<tr><td>The agent reports a poor signal exists, possibly affecting accuracy.</td><td>signal-poor (11)</td></tr>
<tr><td>The agent reports that the incoming signal cannot be analysed or is inadequate for producing a meaningful result.</td><td>signal-inadequate (12)</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><td></td><td>
<table>
<tr><td>The agent has determined that some irregularity has been detected while processing the signal.</td><td>signal-processing-irregularity (13)</td></tr>
<tr><td>A general device fault has occurred in the agent.</td><td>device-equipment-malfunction (14)</td></tr>
</table>
Bit 4 (sensor-off) must be set
3. Detach the sensor from the device and wait for an event report from the agent under test:
Bit 0 (sensor-disconnected) must be set.
</td></tr>
<tr><td>Pass/Fail criteria</td><td>All checked values are as specified in the test procedure.</td></tr>
<tr><td>Notes</td><td></td></tr>
</table>

<table>
<tr><td colspan="2">TP Id</td><td colspan="3">TP/PLT/AG/CLASS/PO/BV-011</td></tr>
<tr><td colspan="2">TP label</td><td colspan="3">PM Segment Object for Extended Configuration</td></tr>
<tr><td rowspan="2">Coverage</td><td>Spec</td><td colspan="3">[ISO/IEEE 11073-10404]</td></tr>
<tr><td>Testable items</td><td>PMSegObj 1; M</td><td>PMSegObj 2; M</td><td></td></tr>
<tr><td colspan="2">Test purpose</td><td colspan="3">Check that:
PM Segment Object contains the attributes specified for Extended Configuration</td></tr>
<tr><td colspan="2">Applicability</td><td colspan="3">C_AG_OXP_173 AND C_AG_OXP_141AND C_AG_OXP_181 AND C_AG_OXP_000</td></tr>
<tr><td colspan="2">Other PICS</td><td colspan="3"></td></tr>
<tr><td colspan="2">Initial condition</td><td colspan="3">The simulated manager and the agent under test are in the operating state.</td></tr>
<tr><td colspan="2">Test procedure</td><td colspan="3">1. The simulated manager requests PM-Segment attributes using Get-Segment-Info, (MDC_ACT_SEG_GET_INFO) using the parameter SegmSelection:
SegmSelection ::= all-segments [1]
2. The response sent by the agent : SegmentInfoList
SegmentInfoList ::= SEQUENCE OF SegmentInfo
SegmentInfo ::= SEQUENCE { seg-inst-no InstNumber, seg-info AttributeList }
3. The attributes for the PM-Segment must be:
a. Mandatory attribute Segment-Start-Abs-Time
❑ attribute-id = MDC_ATTR_TIME_START_SEG
❑ attribute-type = AbsoluteTime
❑ attribute-length = 8 bytes
❑ attribute-value =
b. Mandatory attribute Segment-End-Abs-Time
❑ attribute-id = MDC_ATTR_TIME_END_SEG
❑ attribute-type = AbsoluteTime
❑ attribute-length = 8 bytes
❑ attribute-value = <Not relevant for this test></td></tr>
<tr><td colspan="2">Pass/Fail criteria</td><td colspan="3">All checked values are as specified in the test procedure.</td></tr>
<tr><td colspan="2">Notes</td><td colspan="3"></td></tr>
</table>

TP Id		TP/PLT/AG/CLASS/PO/BV-012_A		
TP label		Scanner Object 1		
Coverage	**Spec**	[ISO/IEEE 11073-10404]		
	Testable items	ScanObj 1; M	ScanObj 3; C	
		ScanObj 6; O		
Test purpose		Check that: Periodic Configurable Scanner Object contains the attributes specified for Extended Configuration.		
Applicability		C_AG_OXP_173 AND C_AG_OXP_046 AND C_AG_OXP_000		
Other PICS				
Initial condition		The simulated manager and the agent under test are in the configuring state.		
Test procedure		1. The simulated manager receives an association request from the agent under test. 2. The simulated manager responds with a result = accepted-unknown-config 3. The agent responds with a "Remote Operation Invoke | Confirmed Event Report" message with an MDC_NOTI_CONFIG event to send its configuration to the manager. 4. The Scanner object must be: a. Object Class id = MDC_MOC_SCAN_CFG_PERI b. Conditional attribute Transmit-Window ❑ attribute-id= MDC_ATTR_TX_WIND ❑ attribute-type = TransmitWindows ❑ attribute-value.length = 2 bytes ❑ attribute-value = <Not relevant for this test variable>		
Pass/Fail criteria		All checked values are as specified in the test procedure.		
Notes				

TP Id		TP/PLT/AG/CLASS/PO/BV-012_B		
TP label		Scanner Object 2		
Coverage	**Spec**	[ISO/IEEE 11073-10404]		
	Testable items	ScanObj 1; M	ScanObj 7; C	ScanObj 8; M
		ScanObj 11; O		
Test purpose		Check that: Episodic Configurable Scanner Object contains the attributes specified for Extended Configuration.		
Applicability		C_AG_OXP_173 AND C_AG_OXP_047 AND C_AG_OXP_000		
Other PICS				

Initial condition	The simulated manager and the agent under test are in the configuring state.
Test procedure	1. The simulated manager receives an association request from the agent under test. 2. The simulated manager responds with a result = accepted-unknown-config 3. The agent responds with a "Remote Operation Invoke | Confirmed Event Report" message with an MDC_NOTI_CONFIG event to send its configuration to the manager. 4. The Scanner object must be: a. Object Class id = MDC_MOC_SCAN_CFG_EPI b. IF attribute Transmit Window is present ❑ attribute-id= MDC_ATTR_TX_WIND ❑ attribute-type = U-INT16 ❑ attribute-value.length = 2 bytes ❑ attribute. value = <Not relevant for this test> c. Mandatory attribute Min-Reporting-Interval ❑ attribute-id= MDC_ATTR_SCAN_REP_PD_MIN ❑ attribute-type = RelativeTime ❑ attribute-value.length = 4 bytes ❑ attribute. value = <Not relevant for this test>
Pass/Fail criteria	All checked values are as specified in the test procedure.
Notes	

TP Id		TP/PLT/AG/CLASS/PO/BV-017		
TP label		Communication Model: Association Procedure		
Coverage	**Spec**	[ISO/IEEE 11073-10404]		
	Testable items	PulseAssocReq 1; M	PulseAssocReq 2; M	PulseAssocReq 3; M
		PulseAssocReq 4; M	PulseAssocReq 5; M	PulseAssocReq 6; M
		PulseAssocReq 7; M	PulseAssocReq 8; M	PulseAssocReq 9; M
		PulseAssocReq 10; M	PulseAssocReq 12; C	PulseAssocReq 13; C
		PulseAssocReq 14; C	PulseAssocReq 15; M	PulseAssocReq 16; M
		PulseAssocReq X; M		
Test purpose		Check that: The association procedure data exchange is correct		
Applicability		C_AG_OXP_173 AND C_AG_OXP_000		
Other PICS		C_AG_OXP_002, C_AG_OXP_017		
Initial condition		The agent under test and the simulated manager are in the unassociated state.		
Test procedure		1. The agent sends a message to associate with the simulated manager, the expected fields sent by the Agent are: a. APDU Type ❑ field- type = AarqApdu		

- field-length =2 bytes
- field-value =0xE2 0x00
- This value is for association request "aarq".

b. The following two bytes indicate the length of the message (could be helpful to analyse the fields)

c. assoc-version

- field- type = AssociationVersion
- field-length =BITS-32
- field- value=0x80 0x00 0x00 0x00
- assoc-version = 0x80 0x00 0x00 0x00 (asassoc-version1(0) set) indicates that version 1 of the association protocol is supported.

d. The following four bytes indicate:

- data-proto-list.count (two bytes) = 0x00 0x01 (1))
- Length of the message (two bytes)

e. data-proto-id

- field- type = DataProtoId
- field-length =2 bytes
- field- value=0x50 0x79 (20601)
- data-proto-id=20601 indicates exchange protocol follows this standard,
- data-proto-info = PhdAssociationInformation.

f. protocol-version

- field- type = Protocol Version
- field-length =BITS-32
- field- value=0x80 0x00 0x00 0x00
- This value shows that version 1 of the data exchange protocol is supported (assoc-version1(0)=1)

g. encoding rules

- field- type = EncodingRules
- field-length = 2 bytes
- field- value=
  - Bit 0 (MDER) must be set

h. nomenclature version

- field- type = NomenclatureVersion
- field-length =BITS-32
- field- value=0x80 0x00 0x00 0x00
- This value indicates version1 is supported (nom-version1(0) is set).

i. functional – units

- field- type = FunctionalUnits
- field-length = BITS-32
- If Agent has no Test Association capalities:

  field- value= 0x00 0x00 0x00 0x00
- If the agent has tested capabilities that can be used within the Test Association: field- value= 0x40 0x00 0x00 0x00
- If the agent has tested capabilities that can be used within the Test Association and requires that the manager establish a Test Association: field- value= 0x60 0x00 0x00 0x00

	j. system type ❑ field- type = SystemType ❑ field-length = BITS-32 ❑ field- value = 0x00 0x80 0x00 0x00 (sys-type-agent) k. system-id ❑ field- type = OCTET STRING ❑ field-length = 0x00 0x0A ❑ field- value = 0x00 0x08 0xXX 0xXX 0xXX 0xXX 0xXX 0xXX 0xXX 0xXX (octet string length = 8 | EUI-64 manufacturer and device) ❑ This value will be System Id attribute of MDS Object. l. dev-config-id ❑ field- type = ConfigId ❑ field-length = 2 bytes ❑ field- value = ▪ 0x01 0x90 or 0x01 0x91 for standard configuration. ▪ <between 0x40 0x00 and 0x7F 0xFF > for extended configuration. m. data-req-mode-flags (DataReqModeCapab) ❑ field- type = DataReqModeFlags ❑ field-length = 2 bytes ❑ Bit 15 shall be set (data-req-supp-init-agent(15)) ❑ Bits 0, 6, 8,10 shall NOT be set. n. data-req-init-agent-count (DataReqModeCapab) ❑ field- type = INT-U8 ❑ field-length = 1 byte ❑ field.value = 0x00 or 0x01 o. data-req-init-manager-count (DataReqModeCapab) ❑ field- type = INT-U8 ❑ field-length = 1 byte ❑ field.value = maximum number of concurrent manager-initiated flows supported by the agent.
Pass/Fail criteria	All checked values are as specified in the test procedure.
Notes	

TP Id		TP/PLT/AG/CLASS/PO/BV-023		
TP label		Numeric Class general for pulse oximeter agent.		
Coverage	**Spec**	[ISO/IEEE 11073-10404]		
	Testable items	NumericClassGen 1; M	NumericClassGen 2; M	NumericClassGen 3; O
		PulseOccObjAttr19; M	PulseCharacEnumAttr 19; M	DeviceAndSensorObjAttr 19; M
Test purpose		Check that: Agent contains one mandatory numeric object for expressing SpO2, one mandatory Numeric Object for Pulse Rate, and several optional numeric objects for additional SpO2 and Pulse Rate modalities, Pulse Amplitude and reporting current settings of Physiological Threshold.		

	[AND] Pulsatile Quality, Plethysmographic waveform, Pulsatile Occurrence, Pulsatile Characteristic and Device and sensor annunciation status object attributes are instantiated only in Extended configurations.
Applicability	C_AG_OXP_173 AND C_AG_OXP_000
Other PICS	C_AG_OXP_010, C_AG_OXP_041, C_AG_OXP_046, C_AG_OXP_047, C_AG_OXP_181, C_AG_PO_001, C_AG_PO_003, C_AG_PO_098, C_AG_PO_099, C_AG_PO_104, C_AG_PO_140, C_AG_PO_144
Initial condition	The simulated manager and the agent under test are in the configuring state.
Test procedure	1. The agent under test sends its configuration to the simulated manager. It must contain a. APDU Type ❑ field- type = PrstApdu ❑ field-length =2 bytes ❑ field-value =0xE7 0x00 ❑ This value is for presentation APDU "prst" (PrstApdu). b. The following two bytes indicate the length of the message (could be helpful to analyse the fields). c. The following two bytes indicate the length of the OCTET STRING that contains the DataApdu (could be helpful to analyse the fields). d. invoke-id ❑ field- type = InvokeIDType ❑ field-length =2 bytes ❑ field- value= ❑ This value identifies the message; the confirmed response that will be sent by the simulated manager shall have the same invoke-id. e. message ❑ field- type = ❑ field-length =two bytes ❑ field- value=0x01 0x01 (EventReportArgumentSimple) ❑ This field identifies the type of message sent by the Agent, for the confirmed event configuration, roiv-cmip-confirmed-event-report. f. The following two bytes indicate the length of the fields that make up the EventReportArgumentSimple. g. obj-handle (EventReportArgumentSimple) ❑ field- type = HANDLE ❑ field-length =2 bytes ❑ If Agent does not support relative time : ❑ field- value=0x 00 ❑ This obj-handle represents MDS-Object. h. event-time (EventReportArgumentSimple) ❑ field- type = Relative Time ❑ field-length =4 bytes ❑ If Agent does not support relative time: field- value=0x FF 0x FF 0x FF 0x FF i. event-type (EventReportArgumentSimple)

- field- type = OID-Type
- field-length =2 bytes
- field- value=0x 0D 0x 1C (MDC_NOTI_CONFIG)

j. The following two bytes indicate the length for event-info (ConfigReport). This value shall not be 0. This is the start of ConfigReport.

ConfigReport ::= SEQUENCE {

config-report-id ConfigId,

config-obj-list ConfigObjectList }

k. config-report-id (ConfigReport)

- field- type = ConfigId
- field-length = 2 bytes
- field- value= 0x0190 or 0x0191 for standard configuration and a value between 0x4000 and 0x7FFF for extended configuration.

l. The following two bytes indicate the number of ConfigObjectList, this value shall not be 0. (The agent will have at least 2 ObjectList)

m. The following two bytes indicate the length for ConfigObjectList, this value shall not be 0. (If we have more than one object, we have to analyse every object in one loop) then the fields that are relevant are attribute value for attribute id = MDC_ATTR_ID_TYPE (0x09 0x2F)

n. obj-class (ConfigReport then ConfigObjectList (ConfigObject))

- field- type = OID-Type
- field-length = 2 bytes
- field- value=

o. obj-handle (ConfigReport then ConfigObjectList (ConfigObject))

- field- type = HANDLE
- field-length = 2 bytes
- field- value=

p. The following two bytes indicate the number of Attributes, this value shall not be 0. (ConfigReport then ConfigObjectList (ConfigObject)then AttributeList)

q. The following two bytes indicate the length (bytes) for the Attributes List, this value shall not be 0.

r. *attribute-id* (ConfigReport then ConfigObjectList (ConfigObject) then Attribute List)

- field- type = OID-Type
- field-length = 2 bytes
- field- value= MDC_ATTR_ID_TYPE (0x09 0x2F) then This attribute let us know the type of measurement

s. *attribute-value(*ConfigReport then ConfigObjectList (ConfigObject) then Attribute List), this value depends on the attribute type. The values to be checked are:

- SpO2: 0x00 0x02(MDC_PART_SCADA) , 0x4B 0xB8(MDC_PULS_OXIM_SAT_O2)
- Pulse rate: 0x00 0x02(MDC_PART_SCADA) , 0x48 0x1A(MDC_PULS_OXIM_PULSE_RATE)
- Only for extended configuration:
  - IF C_AG_PO_098 THEN Pulsatile Quality numeric Object is present.
  - IF C_AG_PO_099 THEN Plethysmographic waveform RT-SA Object is present.
  - IF C_AG_PO_104 THEN Device and Sensor enumeration Object is present.

	▪ IF C_AG_PO_140 THEN Pulsatile Occurrence enumeration Object is present. ▪ IF C_AG_PO_144 THEN Pulsatile Characteristic enumeration Object is present.
Pass/Fail criteria	All checked values are as specified in the test procedure.
Notes	

TP Id		TP/PLT/AG/CLASS/PO/BV-024		
TP label		Operating State. Manager to Agent Maximum APDU Size		
Coverage	**Spec**	[ISO/IEEE 11073-20601A]		
	Testable items	CommonCharac 3; M		
	Spec	[ISO/IEEE 11073-10404]		
	Testable items	PulseComMod 3; M		
Test purpose		Check that: The total size of the response do not exceed of the maximum APDU size established by the specialization [AND] An Agent according to this definition shall be capable of receiving an APDU up to the size of at least Nrx. For this standard it is Nrx = 256 octets		
Applicability		C_AG_OXP_000 AND C_AG_OXP_173		
Other PICS		C_AG_OXP_041, C_AG_OXP_100		
Initial condition		The simulated manager and the agent are in the operating state.		
Test procedure		1. The simulated manager issues a "Remote Operation Invoke | Get" command with: a. Obj-handle set to 0 (to request for MDS object) b. attribute-id-list.count = 119 c. attribute-id-list: (MDC_ATTR_ID_MODEL, MDC_ATTR_SYS_ID, MDC_ATTR_DEV_CONFIG_ID) repeated 39 times followed by an additional MDC_ATTR_ID_MODEL and MDC_ATTR_SYS_ID 2. Check the response of the agent. 3. The simulated manager issues a "Remote Operation Invoke | Get" command with the 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 agent.		
Pass/Fail criteria		• In step 2, the agent 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 the agent does not respond with a rors-cmip-get message, or it responds with a roer message or a 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 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 agent supports PM-Store ▪ Blood pressure -> 896 octets ▪ Thermometer -> 896 octets ▪ Independent activity hub -> 5120 octets ▪ Cardiovascular -> 64512 octets or 6624 octets the agent under test only 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 agent supports PM-Store ▪ Basic ECG/Heart rate -> 1280 octets or 64512 octets if the agent supports PM-Store ▪ International normalized ratio -> 896 octets or 64512 if the agent supports PM-Store o In the case where the agent responds with a roer, the reason must not be protocol-violation (23) • In step 4, the agent must respond with a rors-cmip-get message.
Notes	

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Printed in Switzerland
Geneva, 2016