

International Telecommunication Union

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

H.843

(04/2017)

SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

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

Conformance of ITU-T H.810 personal health system: Personal Health Devices interface Part 3: Continua Design Guidelines: Personal Health Device

Recommendation ITU-T H.843



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Recommendation ITU-T H.843

Conformance of ITU-T H.810 personal health system: Personal Health Devices interface Part 3: Continua Design Guidelines: Personal Health Device

Summary

Recommendation ITU-T H.843 provides a test suite structure (TSS) and the test purposes (TP) for personal health devices in the Personal Health Devices (PHD) interface, based on the requirements defined in the Recommendations of the ITU-T H.810 sub-series, of which Recommendation ITU-T H.810 (2016) is the base Recommendation. The objective of this test specification is to provide a high probability of interoperability at this interface.

Recommendation ITU-T H.843 is a transposition of Continua Test Tool DG2016, Test Suite Structure & Test Purposes, Personal Health Devices Interface; Part 3: Continua Design Guidelines. Personal Health Device (Version 1.11, 2017-07-18), that was developed by the Personal Connected Health Alliance. A number of versions of this specification existed before transposition.

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

History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T H.843	2015-01-13	16	11.1002/1000/12260
2.0	ITU-T H.843	2016-07-14	16	11.1002/1000/12936
3.0	ITU-T H.843	2017-04-13	16	11.1002/1000/13217

Keywords

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

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

FOREWORD

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NOTE

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Electronic attachment with the protocol implementation conformance statements (PICS) and the protocol implementation extra information for testing (PIXIT) required for the implementation of Annex A.

Introduction

This Recommendation is a transposition of Continua Test Tool DG2016, Test Suite Structure & Test Purposes, Personal Health Devices Interface; Part 3: Continua Design Guidelines. Personal Health Device (Version 1.11, 2017-07-18), that was developed by the Personal Connected Health Alliance. The table below shows the revision history of this test specification; it may contain versions that existed before transposition.

Version	Date	Revision history
1.4	2012-10-05	Initial release for Test Tool DG2011. This uses "TSS&TP_1.5_PAN-LAN_PART_3_v1.3.doc" as a baseline and adds new features included in [b-CDG 2011]: • ZigBee One-to-Many and Errata
1.5	2013-05-24	Initial release for Test Tool DG2012. This uses "TSS&TP_1.5_PAN-LAN_PART_3_v1.4.doc" as a baseline and adds new features included in [b-CDG 2012]: • Updates test procedures according to new requirements included in [b-CDG 2012] (e.g., SSP requirements) • Adds body composition analyser device specialization • Adds basic electrocardiograph device specialization
1.6	2014-01-24	Initial release for Test Tool DG2013. This uses "TSS&TP_DG2012_PAN-LAN_PART_3_v1.5.doc" as a baseline and adds new features included in [b-ITU-T H.810 (2013)]/[b-CDG 2013]: • Adds glucose meter BLE • Adds BLE SSP support • Adds NFC new transport • Adds INR device specialization
1.7	2014-04-24	TM Lite & Doc Enhancements (Test Tool v4.0 Maintenance Release 1). It uses "TSS&TP_DG2013_PLT_PART_3_v1.6.doc" as a baseline and adds new features included in Documentation Enhancements: • "Other PICS" row has been added
1.8	2015-07-01	Initial Release for Test Tool DG2015. It uses "TSS&TP_DG2013_PLT_PART_3_v1.7.doc" as a baseline and adds new features included in [b-ITU-T H.810 (2015)]/[b-CDG 2015]
1.9	2016-01-26	First Maintenance Release for Test Tool DG2015. It uses "TSS&TP_DG2015_LP-PAN_PART_3_v1.8.doc" as a baseline and adds some updates according to the Maintenance 2015 activity.
1.10	2016-09-20	Initial release for Test Tool DG2016. It uses "TSS&TP_DG2015_PLT_PART_3_v1.9.doc" as a baseline and adds new features included in [ITU-T H.810 (2016)]/[b-CDG 2016]
1.11	2017-07-18	Second maintenance release for Test Tool DG2016. It uses "TSS&TP_DG2015_PLT_PART_3_v1.10.doc" as a baseline to correct minor typos.

Recommendation ITU-T H.843

Conformance of ITU-T H.810 personal health system: Personal Health Devices interface

1 Scope

The scope of this Recommendation¹ is to provide a test suite structure (TSS) and the test purposes (TP) for the Personal Health Devices interface based on the requirements defined in the Continua Design Guidelines (CDG) [ITU-T H.810 (2016)]. The objective of this test specification is to provide a high probability of interoperability at this interface.

The TSS and TP for the Personal Health Devices interface have been divided into the parts specified below. This Recommendation covers Part 3.

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

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

- Part 9: Personal Health Devices Transcoding Whitepaper. Personal Health Devices
- Part 10: Personal Health Devices Transcoding Whitepaper. Personal Health Gateway

2 References

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

- [ITU-T H.810 (2016)] Recommendation ITU-T H.810 (2016), *Interoperability design guidelines for personal health systems*.
- [ISO/IEEE 11073-20601-2015A] ISO/IEEE 11073-20601:2010, *Health informatics – Personal health device communication – Part 20601: Application profile – Optimized exchange protocol*, including ISO/IEEE 11073-20601:2010 Amd 1:2015.
<https://www.iso.org/standard/54331.html> with
<https://www.iso.org/standard/63972.html>
- [ISO/IEEE 11073-20601-2016C] ISO/IEEE 11073-20601:2016, *Health informatics – Personal health device communication – Part 20601: Application profile – Optimized exchange protocol*, including ISO/IEEE 11073-20601:2016/Cor.1:2016.
<https://www.iso.org/standard/66717.html> with
<https://www.iso.org/standard/71886.html>
- [ISO/IEEE 11073-104xx] ISO/IEEE 11073-104xx (in force), *Health informatics – Personal health device communication – Device specialization*.
 NOTE – This is shorthand used to refer to the collection of device specialization standards that utilize [ISO/IEEE 11073-20601-2015A], where xx can be any number from 01 to 99, inclusive.
- [ISO/IEEE 11073-10404] ISO/IEEE 11073-10404:2010, *Health informatics – Personal health device communication – Part 10404: Device specialization – Pulse oximeter*.
<https://www.iso.org/standard/54572.html>
- [ISO/IEEE 11073-10406] ISO/IEEE 11073-10406-2012, *Health informatics – Personal health device communication – Part 10406: Device specialization – Basic electrocardiograph (ECG) (1- to 3-lead ECG)*.
<https://www.iso.org/standard/61876.html>
- [ISO/IEEE 11073-10407] ISO/IEEE 11073-10407:2010, *Health informatics – Personal health device communication – Device specialization – Blood pressure monitor, version 1.0*.
<https://www.iso.org/standard/54573.html>
- [ISO/IEEE 11073-10408] ISO/IEEE 11073-10408:2010, *Health informatics – Personal health device communication – Part 10408: Device specialization – Thermometer*.
<https://www.iso.org/standard/54310.html>

- [ISO/IEEE 11073-10415] ISO/IEEE 11073-10415:2010, *Health informatics – Personal health device communication – Part 10415: Device specialization – Weighing scale*.
<https://www.iso.org/standard/54310.html>
- [ISO/IEEE 11073-10417] ISO/IEEE 11073-10417:2014, *Health informatics – Personal health device communication – Part 10417: Device specialization – Glucose meter*.
<https://www.iso.org/standard/61896.html>
- [ISO/IEEE 11073-10418C] ISO/IEEE 11073-10418-2014, *Health informatics – Personal health device communication – Part 10418: Device specialization – International Normalized Ratio (INR) monitor*, including ISO/IEEE 11073-10418:2014/Cor 1:2016.
<https://www.iso.org/standard/61897.html> with
<https://www.iso.org/standard/70740.html>
- [ISO/IEEE 11073-10419] ISO/IEEE 11073-10419:2016, *Health informatics – Personal health device communication – Part 10419: Device specialization – Insulin pump*.
<https://www.iso.org/standard/69528.html>
- [ISO/IEEE 11073-10420] ISO/IEEE 11073-10420-2012, *Health informatics – Personal health device communication – Part 10420: Device specialization – Body composition analyzer*.
<https://www.iso.org/standard/61055.html>
- [ISO/IEEE 11073-10421] ISO/IEEE 11073-10421:2012, *Health informatics – Personal health device communication – Part 10421: Device specialization – Peak expiratory flow monitor (peak flow)*.
<https://www.iso.org/standard/61056.html>
- [ISO/IEEE 11073-10424] ISO/IEEE 11073-10424:2016, *Health informatics – Personal health device communication – Part 10424: Device specialization – Sleep apnoea breathing therapy equipment (SABTE)*.
<https://www.iso.org/standard/68906.html>
NOTE – equivalent to IEEE 11073-10424-2014, *Health informatics – Personal health device communication – Part 10424: Device Specialization – Sleep Apnoea Breathing Therapy Equipment (SABTE)*.
<http://dx.doi.org/10.1109/IEEESTD.2014.6911927>
- [ISO/IEEE 11073-10425] ISO/IEEE 11073-10425:2016, *Health informatics – Personal health device communication – Part 10425: Device specialization – Continuous glucose monitor (CGM)*.
<https://www.iso.org/standard/67821.html>
- [ISO/IEEE 11073-10441] ISO/IEEE 11073-10441-2015, *Health informatics – Personal Health Device Communication – Part 10441: Device Specialization – Cardiovascular fitness and activity monitor*.
<https://www.iso.org/standard/64868.html>
- [ISO/IEEE 11073-10442] ISO/IEEE 11073-10442:2015, *Health informatics – Personal health device communication – Part 10442: Device specialization – Strength fitness equipment*.
<http://standards.ieee.org/findstds/standard/11073-10442-2008.html>
- [ISO/IEEE 11073-10471] ISO/IEEE 11073-10471:2010, *Health informatics – Personal health device communication – Part 10471: Device*

specialization – Independent living activity hub.
<https://www.iso.org/standard/54328.html>

[ISO/IEEE 11073-10472] ISO/IEEE 11073-10472:2012, *Health informatics – Personal health device communication – Part 10472: Device specialization – Medication monitor.*
<https://www.iso.org/standard/54364.html>

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

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

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

3.2 Terms defined in this Recommendation

None.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

ATS	Abstract Test Suite
CDG	Continua Design Guidelines
CGM	Continuous Glucose Monitor
CESL	Continua Enabling Software Library
DUT	Device Under Test
GUI	Graphical User Interface
INR	International Normalized Ratio
IP	Insulin Pump
MDS	Medical Device System
NFC	Near Field Communication
PAN	Personal Area Network
PCO	Point of Control and Observation
PCT	Protocol Conformance Testing
PHD	Personal Health Device
PHDC	Personal Healthcare Device Class
PHG	Personal Health Gateway
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation extra Information for Testing
SABTE	Sleep Apnoea Breathing Therapy Equipment

SCR	Static Conformance Review
SDP	Service Discovery Protocol
SOAP	Simple Object Access Protocol
TCRL	Test Case Reference List
TCWG	Test and Certification Working Group
TP	Test Purpose
TSS	Test Suite Structure
USB	Universal Serial Bus
WDM	Windows Driver Model

5 Conventions

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

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

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

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

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

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

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

CDG release	Transposed as	Version	Description	Designation
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 Personal Health Devices interface have been divided into the main subgroups specified below. Annex A describes the TPs for subgroups 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.1.6, 1.1.7, 1.1.10, 1.1.11 (shown in bold).

- Group 1: Personal Health Device (PHD)
 - Group 1.1: Transport (TR)
 - **Subgroup 1.1.1: Design guidelines: common (DGC)**
 - **Subgroup 1.1.2: USB design guidelines (UDG)**
 - **Subgroup 1.1.3: Bluetooth design guidelines (BDG)**
 - **Subgroup 1.1.4: Pulse oximeter design guidelines (PODG)**
 - **Subgroup 1.1.5: Cardiovascular design guidelines (CVDG)**
 - **Subgroup 1.1.6: Activity hub design guidelines (HUBDG)**
 - **Subgroup 1.1.7: ZigBee design guidelines (ZDG)**
 - Subgroup 1.1.8: Glucose meter design guidelines (GLDG)
 - Subgroup 1.1.9: Bluetooth low energy design guidelines (BLEDG)
 - **Subgroup 1.1.10: Basic electrocardiograph design guidelines (ECGDG)**
 - **Subgroup 1.1.11: NFC design guidelines (NDG)**
 - Group 1.2: Optimized exchange protocol (OXP)

- Subgroup 1.2.1: PHD domain information model (DIM)
- Subgroup 1.2.2: PHD service model (SER)
- Subgroup 1.2.3: PHD communication model (COM)
- Group 1.3: Devices class specializations (CLASS)
 - Subgroup 1.3.1: Weighing scales (WEG)
 - Subgroup 1.3.2: Glucose meter (GL)
 - Subgroup 1.3.3: Pulse oximeter (PO)
 - Subgroup 1.3.4: Blood pressure monitor (BPM)
 - Subgroup 1.3.5: Thermometer (TH)
 - Subgroup 1.3.6: Cardiovascular (CV)
 - Subgroup 1.3.7: Strength (ST)
 - Subgroup 1.3.8: Activity hub (HUB)
 - Subgroup 1.3.9: Adherence monitor (AM)
 - Subgroup 1.3.10: Insulin pump (IP)
 - Subgroup 1.3.11: Peak flow (PF)
 - Subgroup 1.3.12: Body composition analyser (BCA)
 - Subgroup 1.3.13: Basic electrocardiograph (ECG)
 - Subgroup 1.3.14: International normalized ratio (INR)
 - Subgroup 1.3.15: Sleep apnoea breathing therapy equipment (SABTE)
 - Subgroup 1.3.16: Continuous glucose monitor (CGM)
- Group 1.4: Personal health device transcoding whitepaper (PHDTW)
 - Subgroup 1.4.1: Whitepaper general requirements (GEN)
 - Subgroup 1.4.2: Whitepaper thermometer requirements (TH)
 - Subgroup 1.4.3: Whitepaper blood pressure requirements (BPM)
 - Subgroup 1.4.4: Whitepaper heart rate requirements (HR)
 - Subgroup 1.4.5: Whitepaper glucose meter requirements (GL)
 - Subgroup 1.4.6: Whitepaper weight scale requirements (WS)
 - Subgroup 1.4.7: Whitepaper pulse oximeter requirements (PLX)
 - Subgroup 1.4.8: Whitepaper continuous glucose monitoring requirements (CGM)

– Group 2: Personal Health Gateway (PHG)

- Group 2.1: Transport (TR)
 - Subgroup 2.1.1: Design guidelines: Common (DGC)
 - Subgroup 2.1.2: USB design guidelines (UDG)
 - Subgroup 2.1.3: Bluetooth design guidelines (BDG)
 - Subgroup 2.1.4: Cardiovascular design guidelines (CVDG)
 - Subgroup 2.1.5: Activity hub design guidelines (HUBDG)
 - Subgroup 2.1.6: ZigBee design guidelines (ZDG)
 - Subgroup 2.1.7: Bluetooth low energy design guidelines (BLEDG)
 - Subgroup 2.1.8: NFC design guidelines (NDG)
- Group 2.2: 20601 Optimized exchange protocol (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)
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- Group 2.4: Personal health device transcoding whitepaper (PHDTW)
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 - Subgroup 2.4.2: Whitepaper thermometer requirements (TH)
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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 (PICS) and the protocol implementation extra information for testing (PIXIT) required for the implementation of Annex A can be downloaded from <http://handle.itu.int/11.1002/2000/12067>.

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

Annex A

Test purposes

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

A.1 TP definition conventions

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

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

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

A.2 Subgroup 1.1.1 – Design guidelines: Common (DGC)

TP Id		TP/PLT/PHD/TR/DGC/BI-000		
TP label		PAN Device AHD Linkage		
Coverage	Spec	[b-ITU-T H.810 (2015)]		
	Testable items	Linkage 1; M	NFCDev 1; M	
Test purpose		Check that: Device cannot actively communicate with a second AHD		
Applicability		C_AG_OXP_000		
Other PICS				
Initial condition		The Personal Health Device (PHD) under test and simulated Personal Health Gateway (PHG) are in the Operating state.		
Test procedure		- IF the PHD is currently using a USB as a connection mode: - If the device allows for a second type-B connector, connect the device to a new simulated PHG using that connector and attempt to associate it. - If the device allows for a Bluetooth connection (in addition to the currently used USB connection), attempt to associate it to a new simulated PHG using the Bluetooth connection. - If the device allows for an NFC connection (in addition to the currently used USB connection), attempt to associate it with a new simulated PHG using the NFC connection. - IF the device is currently using a Bluetooth as a connection mode: - If the device allows for a Bluetooth connection, attempt to associate it with a new simulated PHG using the BT connection. - If the device allows for a USB connector, connect the device to a new simulated PHG using that connector and attempt to associate it. - If the device allows for an NFC connection, attempt to associate it with a new simulated PHG using the NFC connection. - IF the device is currently using an NFC as a connection mode: - If the device allows for a Bluetooth connection, attempt to associate it with a new simulated PHG using the BT connection. - If the device allows for a USB connector, connect the device to a new simulated PHG using that connector and attempt to associate it. - If the device allows for a NFC connection, attempt to associate it with a new simulated PHG using the NFC connection.		
Pass/Fail criteria		The PHD shall not be able to associate with a second AHD in any of the cases tested.		
Notes				

TP Id		TP/PLT/PHD/TR/DGC/BI-001		
TP label		Manager-initiated communications		
Coverage	Spec	[b-ITU-T H.810 (2015)]		
	Testable items	Communication 3; M		
Test purpose		Check that: Service component does not support manager-initiated event reporting as a mechanism of measurement transfer		
Applicability		C_AG_OXP_000		
Other PICS				

Initial condition	The service under test and the simulated PHG are in the Unassociated state.
Test procedure	1. The simulated PHG receives an Association request from the PHD under test. 2. The simulated PHG sends an Association Response 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 type to send its configuration to the PHG. 4. The PHG sends a Remote Operation Response Confirmed Event report to accept the configuration. 5. The attributes of interest for this test are: a. In the Association request message: Data-Req-Mode-Capab: ☐ field- type = DataReqModeCapab ☐ field-length = 4 bytes ☐ data-req-init-manager-count = 0 b. In the Configuration report message: Check the mss-acc-manager-initiated parameter in the Metric-Spec-Small attribute for every metric derived object declared in the configuration report 6. The simulated PHG issues an MDS-Data-Req to the PHD, with any metric-derived data attribute supported by the PHD.
Pass/Fail criteria	• mss-acc-manager-initiated (bit 8) must be set to 0 in the Metric-Spec-Small field of all the metric derived objects and • the PHD must respond with an error to step 6 (roer message = 0x0300, RoerErrorValue = no-such-action), indicating this procedure is not supported.
Notes	

TP Id	TP/PLT/PHD/TR/DGC/BV-002		
TP label	DataReqMode Alignment		
Coverage	Spec	[b-ITU-T H.810 (2015)]	
	Testable items	Communication 4; M	
Test purpose	Check that: The fields in the Metric-Spec-Small attribute of metric objects are aligned with what was declared in the DataReqModeCapab structure during Association for the Service		
Applicability	C_AG_OXP_000 AND (C_AG_OXP_040 OR C_AG_OXP_042 OR C_AG_OXP_043)		
Other PICS			
Initial condition	The service under test and the simulated PHG are in the Unassociated state.		
Test procedure	1. The simulated PHG receives an association request from the PHD under test. 2. The simulated PHG sends an Association Response 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 PHG sends a Remote Operation Response Confirmed Event report to accept the configuration. 5. The attributes of interest for this test are: a. In the Association request message:Data-Req-Mode-Capab: ☐ field- type = DataReqModeCapab ☐ field-length = 2 bytes ☐ field- value =SEQUENCE { data-req-mode-flags DataReqModeFlags,		

	data-req-init-agent-count INT-U8, -- maximum number of parallel agent-initiated data requests data-req-init-manager-count INT-U8, -- maximum number of parallel manager-initiated data requests b. In the Configuration report message: Check the mss-acc-manager-initiated parameter in the Metric-Spec-Small attribute for every metric derived object declared in the configuration report.
Pass/Fail criteria	The fields of the attribute must be aligned with what was previously declared. Specifically: In Metric-Spec-Small, the parameter mss-acc-manager-initiated shall be =0, and the parameter mss-acc-agent-initiated shall be =1 for all the metric derived objects, In the Association request message, the field data-req-init-manager-count shall be =0. and the field data-req-init-agent-count shall be =1; In addition, the parameter DataReqModeFlags shall contain the data-req-supp-init-agent (bit 15) set to 1.. All unassigned DataReqModeFlags bit values are reserved for future expansion and shall be set to zero.
Notes	

TP Id		TP/PLT/PHD/TR/DGC/BV-003		
TP label		FIFO store and forward		
Coverage	Spec	[b-ITU-T H.810 (2015)]		
	Testable Items	Communication 5; C		
Test purpose		Check that: Service component designed to store and forward temporary measurements transmits data in a First-In First-Out sequence		
Applicability		C_AG_OXP_000 AND (C_AG_OXP_032 OR C_AG_OXP_041)		
Other PICS		C_AG_DGC_009, C_AG_OXP_009, C_AG_OXP_014, C_AG_OXP_032, C_AG_OXP_041, C_AG_OXP_182, C_AG_OXP_183, C_AG_OXP_184, C_AG_OXP_189, C_AG_OXP_293		
Initial condition		The service under test and the simulated PHG are disconnected. This may be achieved by physically disconnecting the USB cable between the PHD and PHG (USB) or by moving the PHD out of range of the PHG (BT).		
Test procedure		1. Take some measurements of different values with the PHD under test. Record the measurements in order. 2. Connect the PHD under test to the simulated PHG. 3. Wait for the PHD and simulated PHG to associate: a. The simulated PHG receives an association request from the PHD under test. b. The simulated PHG sends an Association Response with a result = accepted-unknown-config. c. The PHD sends a Remote roiv-cmip-confirmed-event-report message with an MDC_NOTI_CONFIG event to send its configuration to the PHG. d. The simulated PHG sends a rors-cmip-confirmed-event-report with reason "accepted" to accept the PHD's configuration. e. IF C_AG_OXP_293 THEN: i. 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. ii. 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. iii. IF the mds-time-mgr-set-time bit is set: The PHG moves to Configuring/Sending Set Time substate and: • IF C_AG_OXP_009 THEN it issues the Set-Time action command.		

	• IF C_AG_OXP_014 THEN it issues the Set-Base-Offset-Time action command. ❑ Once its internal time setting operation is completed, the PHD responds to the PHG. 4. If the PHD under test supports a fixed or variable format MDS event report, the simulated PHG waits to receive the measurements from the PHD under test. The measurements that are transferred through the MDS event report are recorded. 5. If the PHD under test supports PM-Store, the simulated PHG performs a Get-Segment-Info and forces the PHD to send the information stored in the PM-Segments (Trig-Segment-Data-Xfer). The PHD under test sends the measurements stored in the PM-Segment (Segment-Data-Event). The measurements that are transferred through the Segment-Data-Event are recorded. 6. A pop-up shows the stored data in steps 4 and 5. 7. IF C_AG_OXP_032, check that the temporarily stored measurements are sent in a FIFO way. 8. IF NOT C_AG_OXP_032, check that the stored measurements are NOT sent, so the measurements received by the PHG are new measurements.
Pass/Fail criteria	If Store and Forward measurements PICS is supported (C_AG_OXP_032), the temporary stored measurements shall be sent in a FIFO way (in the same order as they were taken). If the PICS (C_AG_OXP_032) is not set, the device shall not be capable of storing temporary measurements, or shall not transmit them, so the first event reports with measurements are with new data (not stored data).
Notes	

TP Id		TP/PLT/PHD/TR/DGC/BV-008		
TP label		Updating attributes previously defined		
Coverage	Spec	[b-ITU-T H.810 (2015)]		
	Testable items	Communication 11; M		
Test purpose		Check that: Continua PAN/LAN service components shall send changes to any particular attribute via a single Scanner object (if enabled) or the MDS object, but never more than one object (of either MDS or Scanner type)		
Applicability		C_AG_OXP_000 AND (C_AG_OXP_046 OR C_AG_OXP_047)		
Other PICS		C_AG_OXP_180		
Initial condition		The service under test and the simulated PHG are in the Operating state		
Test procedure		1. Make changes to an attribute of any metric that is collected by a scanner object. 2. Check and record the attributes for metric objects that have been reported using MDS event reports. 3. Set the Operational State to 1 for the Scanner object. 4. Wait until the PHD under test starts to send its data using Scanner event reports and record it. 5. Set the Operational State to 0 for the Scanner object. 6. Repeat steps 3 to 5 for all scanner objects.		
Pass/Fail criteria		Check that all attributes for metric objects reported using Scanner event reports in step 4 have not been reported via MDS event reports.		
Notes				

TP Id		TP/PLT/PHD/TR/DGC/BV-009		
TP label		MDS Device and Regulatory information		

Coverage	Spec	[b-ITU-T H.810 (2015)]		
	Testable items	Dev.Information 1; M	Dev.Information 2; O	Dev.Information 3; M
		Dev.Information 4; O	Dev.Information 5; M	Dev.Information 6; M
		Dev.Information 7; M	Dev.Information 8; C	Regulatory 1; M
		Regulatory 2; M	Regulatory 3; M	Regulatory 6; M
		Regulatory 7; M	Regulatory 9; M	Cardio_DG 7; M
		Hub_DG 2; M	Hub_DG 4; M	Hub_DG 6; M
		Hub_DG 8; M	Hub_DG 10; M	Hub_DG 12; M
		Hub_DG 14; M	Hub_DG 16; M	Hub_DG 18; M
		Hub_DG 20; M	Hub_DG 22; M	Hub_DG 24; M
		Hub_DG 26; M	Hub_DG 28; M	Versioning_1; M
	Spec	[ISO/IEEE 11073-20601-2015A] and [ISO/IEEE 11073-20601-2016C]		
	Testable items	MDSCClassAttr 8; O	ConfNormalProc 23; M	
Test purpose	Check that: Device information fields of an Service component's MDS object are correct			
Applicability	C_AG_OXP_000			
Other PICS	C_AG_OXP_185			
Initial condition	The service under test and the simulated PHG are in the Unassociated state.			
Test procedure	1. The simulated PHG receives an association request from the PHD under test. 2. The simulated PHG sends an association response with a result = accepted-unknown-config. 3. The PHD sends 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 issues a remote Operation Response Confirmed Event Report message with result code = "accepted". 5. The simulated PHG issues a roiv-cmip-get with handle=0 and attribute list=empty, to request for all the attributes supported by the PHD. 6. The attributes of interest to be checked (obtained from the Configuration event report and the GET request are): a. Mandatory attribute System-Id ☐ OUI = OUI assigned to the original manufacturer ☐ 40-bit manufacturer part = device ID set by the original manufacturer. Check the value declared by manufacturer in the PIXIT list. b. Mandatory attribute System-Model ☐ Manufacturer = (original manufacturer OR customer facing company). Check the value declared by the manufacturer in the PIXIT list. ☐ Model-number = (original manufacturer OR customer facing company). Check the value declared by the manufacturer in the PIXIT list. c. Mandatory attribute Product-Specification ☐ Spec-type = serial-number ☐ Prod-spec = (serial number of the device). Check the value declared by the manufacturer in the PIXIT list. IF a firmware number is declared in the Product-Specification attribute ☐ Mandatory attribute Product-Specification 1. Spec-type = fw-revision 2. Prod-spec = (firmware revision of the device)			