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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

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

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

Recommendation ITU-T H.850

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Recommendation ITU-T H.850

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

Summary

Recommendation ITU-T H.850 provides a test suite structure (TSS) and the test purposes (TP) for the general requirements when transcoding by personal health gateways in the Personal Health Devices (PHD) interface of application-level data between the Bluetooth Low Energy Bluetooth Generic Attribute Profile (GATT) format and the IEEE 11073-20601 data format, of which Recommendation ITU-T H.810 (2016) is the base Recommendation. The objective of this test specification is to provide a high probability of interoperability at this interface.

Recommendation ITU-T H.850 is a transposition of clause 3.2 of Continua Test Tool DG2016, Test Suite Structure & Test Purposes, Personal Health Devices Interface; Part 10: PHD Transcoding Whitepaper. Personal Health Gateway (Version 1.7, 2017-07-18), that was developed by the Personal Connected Health Alliance. A number of versions of this specification existed before transposition.

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

This Recommendation was originally approved as a single part, but due to its large size it was split at publication time into eight sub-parts for easier use, maintenance and expandability:

- ITU-T H.850 with the general requirements;
- ITU-T H.850.1 with thermometer PHD requirements;
- ITU-T H.850.2 with blood pressure PHD requirements;
- ITU-T H.850.3 with heart rate PHD requirements;
- ITU-T H.850.4 with glucose meter PHD requirements;
- ITU-T H.850.5 with weighing scales PHD requirements;
- ITU-T H.850.6 with pulse oximeter PHD requirements;
- ITU-T H.850.7 with continuous glucose monitoring PHD requirements.

History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T H.850	2015-01-13	16	11.1002/1000/12279
2.0	ITU-T H.850	2016-07-14	16	11.1002/1000/12957
3.0	ITU-T H.850	2017-04-29	16	11.1002/1000/13239
4.0	ITU-T H.850	2019-11-29	16	11.1002/1000/14120

Keywords

Bluetooth Generic Attribute Profile, Bluetooth Low Energy (BLE), Conformance testing, Continua Design Guidelines, data format transcoding, e-health, IEEE 11073-20601, ITU-T H.810, personal area network, personal connected health devices, personal health devices interface, personal health gateway, 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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In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

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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 clause 3.2 of Continua Test Tool DG2016, Test Suite Structure & Test Purposes, Personal Health Devices Interface; Part 10: PHD Transcoding Whitepaper. Personal Health Gateway (Version 1.7, 2017-07-18), that was developed by the Personal Connected Health Alliance. The table below shows the revision history of this test specification; it may contain versions that existed before transposition.

Version	Date	Revision history
1.0	2012-10-05	Initial release for Test Tool DG2011 based on the requirements in [b-CDG 2011]
1.1	2013-05-24	Initial release for Test Tool DG2012. It uses "TSS&TP_DG2011_LP-PAN_PART_10_v1.0.doc" as a baseline and adds new features included in [b-CDG 2012] (BPM and HR profiles).
1.2	2014-01-24	Initial release for Test Tool DG2013. It uses "TSS&TP_DG2012_LP-PAN_PART_10_v1.1.doc" as a baseline and adds new features included in [b-ITU-T H.810 (2013)]/[b-CDG 2013]: • Adds glucose meter BLE • Adds BLE SSP support • Adds NFC new transport • Adds INR device specialization
1.3	2014-04-24	TM Lite & Doc Enhancements (Test Tool v4.0 Maintenance Release 1). It uses "TSS&TP_DG2013_LP-PAN_PART_10_v1.2.doc" as a baseline and adds new features included in Documentation Enhancements: • "Other PICS" row has been added
1.4	2015-07-01	Initial release for Test Tool DG2015. It uses "TSS&TP_DG2013_LP-PAN_PART_10_v1.3.doc" as a baseline and adds new features included in [b-ITU-T H.810 (2015)]/[b-CDG 2015]: • Adds WS/BCA BLE device specialization • Adds SABTE IEEE device specialization
1.5	2016-01-26	First maintenance release for Test Tool DG2015. It uses "TSS&TP_DG2015_LP-PAN_PART_10_v1.4.doc" as a baseline and adds some updates according to the Maintenance 2015 activity.
1.6	2016-09-20	Initial release for Test Tool DG2016. It uses "TSS&TP_DG2016_LP-PAN_PART_10_v1.5.doc" as a baseline and adds new features included in [ITU-T H.810 (2016)]/[b-CDG 2016]: • Adds PLX BLE device specialization • Adds PLX CGM device specialization
1.7	2017-07-18	Second Maintenance Release for Test Tool DG2016. It uses "TSS&TP_DG2016_LP-PAN_PART_10_v1.6.doc" as baseline and corrects minor typos.
1.8	2018-10-17	It uses version 1.7 as a baseline and adds updates due to the inclusion of CGM & PLX BLE profile test cases.

Recommendation ITU-T H.850

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

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 10 – General requirements.

- 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

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 7: Continua Design Guidelines. BLE Personal Health Device
- Part 8: Continua Design Guidelines. BLE Personal Health Gateway
- Part 9: Personal Health Devices Transcoding Whitepaper. Personal Health Devices
- **Part 10: Personal Health Devices Transcoding Whitepaper. Personal Health Gateway.**
In addition to the main part, the document is subdivided into the following subparts:
 - Part 10A: Whitepaper Thermometer requirements
 - Part 10B: Whitepaper Blood pressure requirements
 - Part 10C: Whitepaper Heart rate requirements
 - Part 10D: Whitepaper Glucose meter requirements
 - Part 10E: Whitepaper Weighing scales requirements
 - Part 10F: Whitepaper Pulse oximeter requirements
 - Part 10G: Whitepaper Continuous glucose monitoring requirements

2 References

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

[ITU-T H.810 (2016)]	Recommendation ITU-T H.810 (2016), <i>Interoperability design guidelines for personal health systems</i> .
[Bluetooth PHDT v1.4]	Bluetooth SIG (2013), <i>Personal Health Devices Transcoding White Paper</i> , v1.4. https://www.bluetooth.org/DocMan/handlers/DownloadDoc.ashx?doc_id=294539
[Bluetooth PHDT v1.5]	Bluetooth SIG (2014), <i>Personal Health Devices Transcoding White Paper</i> , v1.5. https://www.bluetooth.org/DocMan/handlers/DownloadDoc.ashx?doc_id=272346
[Bluetooth PHDT v1.6]	Bluetooth SIG (2015), <i>Personal Health Devices Transcoding White Paper</i> , v1.6. https://www.bluetooth.org/DocMan/handlers/DownloadDoc.ashx?doc_id=310657
[ISO/IEEE 11073-104xx]	ISO/IEEE 11073-104xx (in force), <i>Health informatics – Personal health device communication – Device specialization</i> . NOTE – Shorthand to refer to the collection of device specialization standards that utilize [ISO/IEEE 11073-20601-2015A], where xx can be any number from 01 to 99, inclusive.
[ISO/IEEE 11073-20601-2015A]	ISO/IEEE 11073-20601:2010, <i>Health informatics – Personal health device communication – Part 20601: Application profile – Optimized exchange protocol</i> , including ISO/IEEE 11073-20601:2010 Amd 1:2015. https://www.iso.org/standard/54331.html with https://www.iso.org/standard/63972.html

- [ISO/IEEE 11073-20601-2016C] ISO/IEEE 11073-20601:2016, *Health informatics – Personal health device communication – Part 20601: Application profile – Optimized exchange protocol*, including ISO/IEEE 11073-20601:2016/Cor.1:2016.
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http://www.ihe.net/Technical_Framework/upload/IHE_PCD_TF_Rev2-0_Vol3_FT_2012-08-16.pdf

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

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

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

3.2 Terms defined in this Recommendation

None.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

ATS	Abstract Test Suite
CDG	Continua Design Guidelines
CGM	Continuous Glucose Monitor
DUT	Device Under Test
GUI	Graphical User Interface
INR	International Normalized Ratio
IP	Insulin Pump
IUT	Implementation Under Test
LSB	Least Significant Bit
MDS	Medical Device System
MSB	Most Significant Bit