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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

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

Conformance of ITU-T H.810 personal health system: Services interface Part 9: hData Observation Upload: Health & Fitness Service sender

Recommendation ITU-T H.830.9

ITU International Telecommunication Union

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Recommendation ITU-T H.830.9

Conformance of ITU-T H.810 personal health system: Services interface Part 9: hData Observation Upload: Health & Fitness Service sender

Summary

Recommendation ITU-T H.830.9 provides a test suite structure (TSS) and the test purposes (TP) for hData Observation Upload through the Health & Fitness Service (HFS) sender in the Services 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.830.9 is a transposition of Continua Test Tool DG2016, Test Suite Structure & Test Purposes, Services Interface; Part 9: hData Observation Upload: HFS Sender (Version 1.2, 2017-03-14).

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.830.9	2015-11-29	16	11.1002/1000/12660
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Conformance testing, Continua Design Guidelines, e-health, ITU-T H.810, personal connected health devices, hData Observation Upload, Health & Fitness Service sender, Services interface.

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

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NOTE

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

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

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

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

Introduction

This Recommendation is a transposition of Continua Test Tool DG2016, Test Suite Structure & Test Purposes, Services Interface; Part 9: hData Observation Upload: HFS Sender (Version 1.2, 2017-03-14), that was developed by the Personal Connected Health Alliance. Observation Upload. 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	2015-07-01	Initial release for Test Tool DG2015 based on the requirements in [b-ITU-T H.810 (2015)]/[b-CDG 2015].
1.1	2016-09-20	Initial release for Test Tool DG2016. It implements changes according to [ITU-T H.810 (2016)]/[b-CDG 2016] (Iris + Errata) refreshments.
1.2	2017-03-14	Editorial: added insulin pump and continuous glucose monitor specializations to the TSS list in clause 6.

Recommendation ITU-T H.830.9

Conformance of ITU-T H.810 personal health system: Services interface Part 9: hData Observation Upload: Health & Fitness Service sender

1 Scope

The scope of this Recommendation[1] is to provide test suite structure (TSS) and the test purposes (TP) for the Services 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 Services interface have been divided into the parts specified below. This Recommendation covers Part 9.

– Part 1: Web services interoperability. Health & Fitness Service sender
– Part 2: Web services interoperability. Health & Fitness Service receiver
– Part 3: SOAP/ATNA. Health & Fitness Service sender
– Part 4: SOAP/ATNA. Health & Fitness Service receiver
– Part 5: PCD-01 HL7 messages. Health & Fitness Service sender
– Part 6: PCD-01 HL7 messages. Health & Fitness Service receiver
– Part 7: Consent Management. Health & Fitness Service sender
– Part 8: Consent Management. Health & Fitness Service receiver
– **Part 9: hData Observation Upload. Health & Fitness Service sender**
– Part 10: hData Observation Upload. Health & Fitness Service receiver
– Part 11: Questionnaires. Health & Fitness Service sender
– Part 12: Questionnaires. Health & Fitness Service receiver

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.*

[ITU-T H.811] Recommendation ITU-T H.811 (2016), *Interoperability design guidelines for personal health systems: Personal health devices interface.*

[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.

[ITU-T H.812] Recommendation ITU-T H.812 (2016), *Interoperability design guidelines for personal health systems: Services interface: Common certified capability class.*

[ITU-T H.812.1] Recommendation ITU-T H.812.1 (2016), *Interoperability design guidelines for personal health systems: Services interface: Observation upload certified capability class.*

[ITU-T H.812.2] Recommendation ITU-T H.812.2 (2016), *Interoperability design guidelines for personal health systems: Services interface: Questionnaires certified capability class.*

[ITU-T H.812.3] Recommendation ITU-T H.812.3 (2016), *Interoperability design guidelines for personal health systems: Services interface: Capability exchange certified capability class.*

[ITU-T H.812.4] Recommendation ITU-T H.812.4 (2016), *Interoperability design guidelines for personal health systems: Services interface: Authenticated persistent session certified capability class.*

[ITU-T H.813] Recommendation ITU-T H.813 (2016), *Interoperability design guidelines for personal health systems: Healthcare information system interface.*

[IETF RFC 6749] IETF RFC 6749 (2012), *The OAuth 2.0 Authorization Framework.* http://tools.ietf.org/html/rfc6749

[IETF RFC 6750] IETF RFC 6750 (2012), *The OAuth 2.0 Authorization Framework: Bearer Token Usage.* http://tools.ietf.org/html/rfc6750

3 Definitions

3.1 Terms defined elsewhere

None.

3.2 Terms defined in this Recommendation

None.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

ATNA Audit Trail and Node Authentication

AHD Application Hosting Device

CDA Clinical Document Architecture

CDG Continua Design Guidelines

CGM Continuous Glucose Monitor

DUT Device Under Test

GUI Graphical User Interface

HFS Health & Fitness Service

HFSS Health & Fitness Service Sender

HFSR Health & Fitness Service Receiver

HL7	Health Level 7
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
INR	International Normalized Ratio
IP	Insulin Pump
IUT	Implementation Under Test
MDS	Medical Device System
NFC	Near Field Communication
PCD	Patient Care Device
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
SABTE	Sleep Apnoea Breathing Therapy Equipment
SCR	Static Conformance Review
SOAP	Simple Object Access Protocol
TCRL	Test Case Reference List
TCWG	Test and Certification Working Group
TP	Test Purpose
TLS	Transport Level Security
TSS	Test Suite Structure
USB	Universal Serial Bus
URI	Uniform Resource Identifier
WAN	Wide Area Network
WDM	Windows Driver Model
WS	Web Service
WSI	Web Services Interoperability
WSDL	Web Service Description Language
XDR	Cross-Enterprise Document Reliable Interchange
XML	extensible Markup Language

5 Conventions

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

– SHALL is equivalent to 'must' or 'it is required to'.

– SHALL NOT is equivalent to 'must not' or 'it is not allowed'.

– SHOULD is equivalent to 'it is recommended to'.

– SHOULD NOT is equivalent to 'it is not recommended to'.

– MAY is equivalent to 'is permitted'.

– MAY NOT is equivalent to 'it is not required that'.

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

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

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

CDG release	Transposed as	Version	Description	Designation
2016 plus errata	[ITU-T H.810 (2016)]	6.1	Release 2016 plus errata noting all ratified bugs [b-CDG 2016].	–
2016	–	6.0	Release 2016 of the CDG including maintenance updates of the CDG 2015 and additional guidelines that cover new functionalities.	Iris
2015 plus errata	[b-ITU-T H.810 (2015)]	5.1	Release 2015 plus errata noting all ratified bugs [b-CDG 2015]. The 2013 edition of H.810 is split into eight parts in the H.810-series.	–
2015	–	5.0	Release 2015 of the CDG including maintenance updates of the CDG 2013 and additional guidelines that cover new functionalities.	Genome
2013 plus errata	[b-ITU-T H.810 (2013)]	4.1	Release 2013 plus errata noting all ratified bugs [b-CDG 2013].	–
2013	–	4.0	Release 2013 of the CDG including maintenance updates of the CDG 2012 and additional guidelines that cover new functionalities.	Endorphin
2012 plus errata	–	3.1	Release 2012 plus errata noting all ratified bugs [b-CDG 2012].	–
2012	–	3.0	Release 2012 of the CDG including maintenance updates of the CDG 2011 and additional guidelines that cover new functionalities.	Catalyst
2011 plus errata	–	2.1	CDG 2011 integrated with identified errata.	–
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	1.5

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

CDG release	Transposed as	Version	Description	Designation
			maintenance updates of the CDG Version 1 and additional guidelines that cover new functionalities [b-CDG 2010].	
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 Services interface have been divided into the main subgroups specified below. Annex A describes the TPs for subgroup 1.6.1 (shown in bold):

– Group 1: HFS sender (HFSS)
  - Group 1.1: Web services interoperability (WSI)
    - Subgroup 1.1.1: Basic profile (BP)
    - Subgroup 1.1.2: Basic security profile (BSP)
    - Subgroup 1.1.3: Reliable messaging (RM)
  - Group 1.2: Simple object access protocol (SOAP)
    - Subgroup 1.2.1: SOAP headers (HEAD)
  - Group 1.3: Audit trail and node authentication (ATNA)
    - Subgroup 1.3.1: General (GEN)
    - Subgroup 1.3.2: PCD-01 (PCD-01)
    - Subgroup 1.3.3: Consent Management (CM)
  - Group 1.4: PCD-01 HL7 messages (PCD-01-DATA)
    - Subgroup 1.4.1: General (GEN)
    - Subgroup 1.4.2: Design guidelines (DG)
    - Subgroup 1.4.3: Pulse oximeter (PO)
    - Subgroup 1.4.4: Blood pressure monitor (BPM)
    - Subgroup 1.4.5: Thermometer (TH)
    - Subgroup 1.4.6: Weighing scales (WEG)
    - Subgroup 1.4.7: Glucose meter (GL)
    - Subgroup 1.4.8: Cardiovascular fitness and activity monitor (CV)
    - Subgroup 1.4.9: Strength fitness equipment (ST)
    - Subgroup 1.4.10: Independent living activity hub (HUB)
    - Subgroup 1.4.11: Adherence monitor (AM)
    - Subgroup 1.4.12: Peak expiratory flow monitor (PF)
    - Subgroup 1.4.13: Body composition analyser (BCA)
    - Subgroup 1.4.14: Basic electrocardiograph (ECG)
    - Subgroup 1.4.15: International normalized ratio (INR)
    - Subgroup 1.4.16: Sleep apnoea breathing therapy equipment (SABTE)
    - Subgroup 1.4.17: Insulin pump (IP)

        - Subgroup 1.4.18: Continuous glucose monitor (CGM)
    - Group 1.5: Consent Management (CM)
        - Subgroup 1.5.1: HFS XDR transaction (TRANS)
        - Subgroup 1.5.2: HFS metadata validation (META)
        - Subgroup 1.5.3: HFS consent directive validation (CDV)
    - Group 1.6: hData Observation Upload (HDATA)
        - **Subgroup 1.6.1: General (GEN)**
    - Group 1.7: Questionnaires (QUE)
        - Subgroup 1.7.1: General (GEN)
        - Subgroup 1.7.2: CDA validation (CDA)
- Group 2: HFS receiver (HFSR)
    - Group 2.1: Web service interoperability (WSI)
        - Subgroup 2.1.1: Basic profile (BP)
        - Subgroup 2.1.2: Basic security profile (BSP)
        - Subgroup 2.1.3: Reliable messaging (RM)
    - Group 2.2: SOAP (SOAP)
        - Subgroup 2.2.1: SOAP headers (HEAD)
    - Group 2.3: Audit (ATNA)
        - Subgroup 2.3.1: General (GEN)
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  - Subgroup 2.7.2: CDA validation (CDA)
  - Subgroup 2.7.3: hData record format (HRF)

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>). 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.
    - HFS: Health & Fitness Services Interface
  - <DUT>: This is the device under test.
    - SEN: HFS sender
    - REC: HFS receiver
  - <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 title of the TP.
- **Coverage:** This contains the specification reference and clause to be checked by the TP.
  - Spec: This indicates the earliest version of the specification from which the testable items to be checked by the TP were included.
  - Testable item: This contains testable items to be checked by the TP.
- **Test purpose:** This is a description of the requirements to be tested.
- **Applicability:** This contains the protocol implementation conformance statement (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 device under test (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 1.6.1: General (GEN)

TP Id		TP/HFS/SEN/HDATA/GEN/BV-000		
TP label		hData Observation Upload. HFS Sender Application		
Coverage	**Spec**	[ITU-T H.812]		
	Testable items	RESTSec 3;M	RESTSec 4;M	RESTSec 5;M
		CommonReq 5;M		
	Spec	[ITU-T H.812.1]		
	Testable items	hData 2;M	hData 4;M	
Test purpose		Check that: SUT uses hData observation upload to send a PCD-01 message using TLS 1.1 and Oauth v2.0 bearer token.		
Applicability		C_SEN_000 AND C_SEN_GEN_004		
Other PICS		C_SEN_GEN_005		
Initial condition		Simulated HFS receiver has an hData WebService that requires TLS 1.1 and Oauth v2.0 authorization token enabled and ready to receive a PCD-01 message. Simulated HFS receiver also provides an Oauth v2.0 token for authorization using resource owner password credentials grant type that requires TLS 1.1.		
Test procedure		1 HFS application under test using hData observation upload has a PCD-01 message ready to be sent. 2 HFS application uses provided client_id, client_secret, username and password parameters to obtain an Oauth v2.0 bearer token from the test tool using resource owner password credentials grant type and TLS 1.1 security. 3 HFS application uses the authorization request header field method as defined in Section 2.1 of RFC6750 [IETF RFC 6749] to send the obtained bearer token with the PCD-01 message to the test tool according to RFC6750 and using TLS 1.1 security.		
Pass/fail criteria		• HFS application under test supports capability exchange as specified in [ITU-T H.812.3]. • Observation upload enabled HFS application uses HTTP POST with the provided URL for uploading the PCD-01 payload. • HFS application under test uses the provided “bearer” token according to RFC6750 to request access to upload an observation to the Simulated HFS Device [IETF RFC 6750]. • HFS application uses TLS 1.1 and Oauth v2.0 bearer token using authorization request header field method to send a PCD-01 message to the test tool.		
Notes				

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