International Telecommunication Union

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

H.830.9

(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: WAN interface Part 9: hData
observation upload: Sender**

Recommendation ITU-T H.830.9

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Recommendation ITU-T H.830.9

Conformance of ITU-T H.810 personal health devices: WAN interface
Part 9: hData observation upload: Sender

Summary

Recommendation ITU-T H.830.9 provides a test suite structure (TSS) and the test purposes (TPs) for the WAN interface (consent management; sender) based on the requirements defined in Recommendation ITU-T H.810 (2015). The objective of this test specification is to provide a high probability of air interface interoperability between different devices.

This Recommendation is a transposition of Continua Test Tool DG2015, Test Suite Structure (TSS) & Test Procedures, WAN Interface; Part 9: hData observation upload: Sender (Version 1.0, 2015-07-01).

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
2.0	ITU-T H.830.9	2016-07-14	16	11.1002/1000/12929

Keywords

Conformance testing, continua design guidelines, e-health, H.810, WAN interface, personal connected health devices, wide area network.

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

FOREWORD

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

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As of the date of approval of this Recommendation, 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/.

Table of Contents

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 DG2015, Test Suite Structure (TSS) & Test Procedures, WAN interface; Part 9: hData observation upload: Sender (Version 1.0, 2015-07-01), that was developed by the Continua Health Alliance. A version of this specification that existed before transposition is indicated in the table below.

Version	Date	Revision history
1.0	2015-07-01	Initial release for Test Tool DG2015

Recommendation ITU-T H.830.9

Conformance of ITU-T H.810 personal health devices: WAN interface Part 9: hData observation upload: sender

1 Scope

The scope of this Recommendation[1] is to provide test suite structure and test purposes (TSS & TP) for the WAN interface based on the requirements defined in the Continua specifications. The objective of this test specification is to provide a high probability of air interface interoperability between different devices

The TSS & TP for the WAN interface have been divided into the 12 parts specified below. This Recommendation covers Part 9.

– **Part 1:** Web Services Interoperability. Sender

– **Part 2:** Web Services Interoperability. Receiver

– **Part 3:** SOAP/ATNA. Sender

– **Part 4:** SOAP/ATNA. Receiver

– **Part 5:** PCD-01 HL7 messages. Sender

– **Part 6:** PCD-01 HL7 messages. Receiver

– **Part 7:** Consent Management. Sender

– **Part 8:** Consent Management. Receiver

– **Part 9: hData Observation Upload. Sender**

– **Part 10:** hData Observation Upload. Receiver

– **Part 11:** Questionnaires. Sender

– **Part 12:** Questionnaires. 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 (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.*

[ITU-T H.811]   Recommendation ITU-T H.811 (2015), *Interoperability design guidelines for personal health systems: PAN/LAN/TAN interface.*

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[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 (2015), *Interoperability design guidelines for personal health systems: WAN interface: Common certified device class.*
[ITU-T H.812.1]	Recommendation ITU-T H.812.1 (2015), *Interoperability design guidelines for personal health systems: WAN interface: Observation upload certified device class.*
[ITU-T H.812.2]	Recommendation ITU-T H.812.2 (2015), *Interoperability design guidelines for personal health systems: WAN interface: Questionnaires.*
[ITU-T H.812.3]	Recommendation ITU-T H.812.3 (2015), *Interoperability design guidelines for personal health systems: WAN interface: Capability exchange device class.*
[ITU-T H.812.4]	Recommendation ITU-T H.812.4 (2015), I*nteroperability design guidelines for personal health systems: WAN interface: Authenticated persistent session device class.*
[ITU-T H.813]	Recommendation ITU-T H.813 (2015), *Interoperability design guidelines for personal health systems: Health record network (HRN) 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

DUT   Device Under Test

GUI   Graphical User Interface

HL7   Health Level 7

HTTP   Hypertext Transfer Protocol

HTTPS   Hypertext Transfer Protocol Secure

INR   International Normalized Ratio

PCHA   Personal Connected Health Alliance

PCD   Patient Care Device

PICS   Protocol Implementation Conformance Statement

SABTE   Sleep Apnoea Breathing Therapy Equipment

SOAP   Simple Object Access Protocol

TP   Test Purpose

TLS   Transport Level Security

TSS   Test Suite Structure

WAN   Wide Area Network

WS   Web Service

WSI   Web Service Interoperability

XDR   Cross-Enterprise Document Reliable Interchange

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 [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	[ITU-T H.810 (2013)]	4.1	Release 2013 plus errata noting all ratified bugs [b-ITU-T H.810 (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 WAN 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: Sender (SEN)

  •   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)
- Group 1.5: Consent management (CM)
  - Subgroup 1.5.1: WAN XDR transaction (TRANS)
  - Subgroup 1.5.2: WAN metadata validation (META)
  - Subgroup 1.5.3: WAN 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: Receiver (REC)
  - 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)
    - Subgroup 2.3.2: PCD-01 (PCD-01)
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  - Group 2.4: PCD-01 HL7 messages (PCD-01-DATA)
    - Subgroup 2.4.1: General (GEN)
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    - Subgroup 2.4.8: Cardiovascular fitness and activity monitor (CV)

- Subgroup 2.4.9: Strength fitness equipment (ST)
- Subgroup 2.4.10: Independent living activity hub (HUB)
- Subgroup 2.4.11: Adherence monitor (AM)
- Subgroup 2.4.12: Peak expiratory flow monitor (PF)
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- Subgroup 2.4.14: Basic electrocardiograph (ECG)
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- 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.
    - WAN: Wide area network
  - <DUT>: This is the device under test.
    - SEN: WAN observation sender
    - REC: WAN observation 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 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 escribes 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/WAN/SEN/HDATA/GEN/BV-000		
TP label	hData Observation Upload. AHD Sender Application		
Coverage	**Spec**	[ITU-T H.812]	
	Testable items	RESTSec 3	RESTSec 4	RESTSec 5
		CommonReq 5		
	Spec	[ITU-T H.812.1]	
	Testable items	hData 2	hData 4	
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 WAN 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 WAN 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. AHD application under test using hData observation upload has a PCD-01 message ready to be sent. 2. AHD 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. AHD 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	• AHD application under test supports capability exchange as specified in [ITU-T H.812.3]. • Observation upload enabled AHD application uses HTTP POST with the provided URL for uploading the PCD-01 payload. • AHD application under test uses the provided "bearer" token according to RFC6750 to request access to upload an observation to the Simulated WAN Device [IETF RFC 6750]. • AHD 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			

Bibliography

[b-ITU-T H.810 (2013)]   Recommendation ITU-T H.810 (2013), *Interoperability design guidelines for personal health systems*.

[b-CDG 1.0]   Continua Health Alliance, Continua Design Guidelines v1.0 (2008), *Continua Design Guidelines*.

[b-CDG 2010]   Continua Health Alliance, Continua Design Guidelines v1.5 (2010), *Continua Design Guidelines*.

[b-CDG 2011]   Continua Health Alliance, Continua Design Guidelines (2011), "Adrenaline", *Continua Design Guidelines*.

[b-CDG 2012]   Continua Health Alliance, Continua Design Guidelines (2012), "Catalyst", *Continua Design Guidelines*.

[b-CDG 2013]   Continua Health Alliance, Continua Design Guidelines (2013), "Endorphin", *Continua Design Guidelines.*

[b-CDG 2015]   Continua Health Alliance, Continua Design Guidelines (2015), "Genome", *Continua Design Guidelines*.

[b-ETSI SR 001 262]   ETSI SR 001 262 v1.8.1 (2003), *ETSI drafting rules.* https://docbox.etsi.org/MTS/MTS/10-PromotionalMaterial/MBS-20111118/Referenced%20Documents/Drafting%20Rules.pdf

[b-Receiver PICS & PIXIT]   WAN Receiver DG2013 *PICS and PIXIT excel sheet v1.2*. http://handle.itu.int/11.1002/2000/12067

[b-Sender PICS & PIXIT]   WAN Sender DG2013 *PICS and PIXIT excel sheet v1.3*. http://handle.itu.int/11.1002/2000/12067

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