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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

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Conformance of ITU-T H.810 personal health devices: PAN/LAN/TAN interface Part 8: Bluetooth low energy (BLE): Manager

Recommendation ITU-T H.848

International Telecommunication Union

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Recommendation ITU-T H.848

Conformance of ITU-T H.810 personal health devices: PAN/LAN/TAN interface Part 8: Bluetooth low energy (BLE): Manager

Summary

Recommendation ITU-T H.848 is a transposition of Continua Health Alliance Test Tool DG2013, Test Suite Structure & Test Purposes, LP-PAN Interface; Part 8: Continua Design Guidelines. Manager BLE (Version 1.2, 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.848	2015-01-13	16	11.1002/1000/12277

* 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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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/.

Table of Contents

Electronic attachment: 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 Health Alliance Test Tool DG2013, Test Suite Structure & Test Purposes, LP-PAN Interface; Part 8: Continua Design Guidelines. Manager BLE (Version 1.2, 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
1.0	2012-10-05	Initial release for Test Tool DG2011.
1.1	2013-05-24	Initial release for Test Tool DG2012. This uses "TSS&TP_DG2011_LP-PAN_PART_8_v1.0.doc" as a baseline and it adds new features included in [b¬-CDG 2012] (BPM and HR profiles)
1.2	2014-01-24	Initial release for Test Tool DG2013. This uses "TSS&TP_DG2012_LP-PAN PART_8_v1.1.doc" as a baseline and it adds new features included in [ITU-T H.810]: • Adds glucose meter BLE • Adds BLE SSP support • Adds NFC new transport • Adds INR device specialization

Recommendation ITU-T H.848

Conformance of ITU-T H.810 personal health devices conformance: PAN/LAN/TAN interface Part 8: Bluetooth low energy (BLE): Manager

1 Scope

The scope of this Recommendation[1] is to provide 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]. 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 the ten parts specified below. This Recommendation covers Part 8.

– **Part 1:** Optimized exchange protocol [IEEE 11073-20601A] Agent
– **Part 2:** Optimized exchange protocol [IEEE 11073-20601A] Manager
– **Part 3:** Continua design guidelines [ITU-T H.810] Agent
– **Part 4:** Continua design guidelines [ITU-T H.810] Manager
– **Part 5:** Device specializations Agent [ISO/IEEE 11073-104xx]. This document is divided into 14 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 analyser
  - **Part 5M:** Basic electrocardiograph
  - **Part 5N:** International normalized ratio monitor
– **Part 6:** Device specializations [ISO/IEEE 11073-104xx] Manager
– **Part 7:** Continua design guidelines [ITU-T H.810] Agent BLE
– **Part 8:** Continua design guidelines [ITU-T H.810] Manager BLE
– **Part 9:** Personal health devices transcoding Whitepaper [Bluetooth PHDT] Agent
– **Part 10:** Personal health devices transcoding Whitepaper [Bluetooth PHDT] Manager

[1] This Recommendation includes an electronic attachment with 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] Recommendation ITU-T H.810 (2013), *Interoperability design guidelines for personal health systems*.

[Bluetooth PHDT] Bluetooth SIG (2013), *Personal Health Devices Transcoding White Paper, v1.4*.
<https://www.bluetooth.org/DocMan/handlers/DownloadDoc.ashx?doc_id=272346>

[IEEE 11073-20601A] IEEE 11073-20601A-2010, *IEEE Health informatics – Personal health device communication Part 20601: Application profile – Optimized Exchange Protocol Amendment 1*.
<http://standards.ieee.org/findstds/standard/11073-20601a-2010.html>

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

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

3 Definitions

3.1 Terms defined elsewhere

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

3.1.2 manager [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

BLE Bluetooth Low Energy

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
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. Furthermore, the 2013 edition of the Continua design guidelines, which is published as [ITU-T H.810], is designated by "CDG 2013" as an extension of the designations indicated in the bibliography.

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

CDG name	Transposed as	Version	Description	Designation
2013 plus errata	ITU-T H.810	4.1	CDG 2013 plus errata noting all ratified bugs.	–
2013	–	4.0	Release 2013 of CDG including maintenance updates of the CDG 2012 and additional guidelines that cover new functionalities.	Endorphin
2012 plus errata	–	3.1	CDG 2012 plus errata noting all ratified bugs [b-CDG 2012].	–
2012	–	3.0	Release 2012 of the CDG including maintenance updates of 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 CDG including maintenance updates of 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 CDG with maintenance updates of 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 2.1.7 (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 analyser (BCA)
  - Subgroup 1.3.13: Basic electrocardiograph (ECG)
  - Subgroup 1.3.14: International normalized ratio (INR)
- Group 1.4: Personal health device transcoding whitepaper (PHDTW)
  - Subgroup 1.4.1: General requirements (GEN)
  - Subgroup 1.4.2: Thermometer requirements (TH)
  - Subgroup 1.4.3: Blood pressure requirements (BPM)
  - Subgroup 1.4.4: Heart rate requirements (HR)
  - Subgroup 1.4.5: Glucose meter requirements (GL)

– 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 analyser (BCA)
  - Subgroup 2.3.13: Basic electrocardiograph (ECG)
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  - Subgroup 2.4.3: Blood pressure measurement requirements (BPM)
  - Subgroup 2.4.4: Heart rate requirements (HR)
  - Subgroup 2.4.5: Glucose meter requirements (GL)

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 (TP) 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)
    - PAN-LAN-TAN: 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).
- **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 are 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 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.).
- **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 2.1.7: Bluetooth low energy design guidelines (BLEDG)

TP Id		TP/LP-PAN/MAN/TR/BLEDG/BV-000		
TP label		Discovery and pairing process and Pairing/Auth notification		
Coverage	**Spec**	[ITU-T H.810]		
	Testable items	Discovery_Pairing BT LE 1; M	Notify BT LE 2; M	
Applicability		C_MAN_BLE_000		
Initial condition		The manager under test and the simulated agent are in a standby state and they have not been paired before.		
Test procedure		1. Reset the manager under test to default configuration and turn it on. 2. Set the simulated agent in discoverable mode (advertising state). 3. The manager under test initiates a search for discoverable agents (scanning state). 4. Once the simulated agent has been discovered, make the manager under test pair with it as stated in the documentation (initiating state). 5. When the pairing has been completed (connection state), IF PICS C_MAN_BLEDG_001 = TRUE then the manager under test notifies the successful pairing and authentication process.		
Pass/Fail criteria		In step 4, the manager under test completes the pairing process successfully. In step 5, if the manager supports an UI that provides information about the Bluetooth connection (C_MAN_BLEDG_001 = TRUE) then the manager has notified the successful pairing and authentication process.		
Notes				

TP Id		TP/LP-PAN/MAN/TR/BLEDG/BV-001		
TP label		Store pairing data		
Coverage	**Spec**	[ITU-T H.810]		
	Testable items	Discovery_Pairing BT LE 12; M	Discovery_Pairing BT LE 13; R	
Applicability		C_MAN_BLE_000		
Initial condition		The manager under test and the simulated agent are in a standby state and they have not been paired before.		
Test procedure		1. Reset the manager under test to the default configuration and turn it on. 2. Set the simulated agent to discoverable and pairable mode (advertising state). 3. The manager initiates a discovery process (scanning state), it finds the simulated, agent, establishes a pairing with it (initiating state) and starts a Bluetooth connection (connection state). 4. Turn off the manager under test and remove the batteries or unplug the power supply. 5. Turn on the manager under test again (standby state). 6. Set the simulated agent in discoverable and pairable mode (advertising state). 7. The manager under test initiates a discovery process (scanning state), it finds the simulated agent and starts a Bluetooth connection with it (connection state).		

Pass/Fail criteria	In step 7, the pairing process should not be dispatched again because both devices should have stored the pairing data from the previous pairing process. If the pairing process is dispatched again then the test tool gives a WARNING message.
Notes	

TP Id		TP/LP-PAN/MAN/TR/BLEDG/BV-002		
TP label		Discovered devices filter		
Coverage	**Spec**	[ITU-T H.810]		
	Testable items	Notify BT LE 3; R		
Applicability		C_MAN_BLE_000		
Initial condition		The manager under test and the simulated agent are in a standby state and they have not been paired before.		
Test procedure		1. Reset the manager under test to the default configuration and turn it on. 2. Set the simulated agent to discoverable and pairable mode. 3. The manager initiates a discovery process, it finds the simulated agent and establishes a pairing with it.		
Pass/Fail criteria		In step 3, if the manager under test does not filter the discovered devices to include only the test tool simulated agent that supports the supported service/profile, the test tool displays a warning message. In step 3, if the manager supports an UI that provides information about the Bluetooth connection (C_MAN_BLEDG_001= TRUE) check that the manager has notified the successful pairing and authentication process.		
Notes				

TP Id		TP/LP-PAN/MAN/TR/BLEDG/BV-003		
TP label		Failures notification		
Coverage	**Spec**	[ITU-T H.810]		
	Testable items	Notify BT LE 4; M		
Applicability		C_MAN_BLE_000 AND C_MAN_BLEDG_001		
Initial condition		The manager under test and the simulated agent are in a standby state and they have not been paired before.		
Test procedure		1. Disable the simulated agent (it is not discoverable). 2. The manager under test initiates discovery as stated in the product documentation. 3. The simulated agent is not discovered because it has not been initialized yet. Check the manager under test for error messages. 4. Configure the simulated agent with a device specialization not supported by the manager under test. 5. Set the simulated agent to discoverable mode. 6. The manager under test starts a discovery and pairing process with the simulated agent.		

	7. Check the manager under test for error messages. 8. Restart the simulated agent. 9. Restart the manager under test. 10. Configure the simulated agent with a device specialization that is supported by the manager under test. 11. Disable the pairable mode in the simulated agent. 12. The manager under test starts a discovery and pairing process with the simulated agent. 13. Check the manager under test for error messages. 14. Restart the simulated agent. 15. Restart the manager under test. 16. Configure simulated agent with a device specialization that is supported by the manager under test. 17. Set the simulated agent to discoverable and pairable mode. 18. The manager under test starts a discovery and pairing process with the simulated agent. 19. Force the test tool simulated agent not to complete the authentication process. 20. Check the manager under test for error messages.
Pass/Fail criteria	• In step 3, the manager under test shall inform the user that the pairing process cannot be completed (the simulated agent has not been found). • In step 7, the manager under test shall inform the user that the pairing process cannot be completed (the simulated agent implements an unsupported specialization). • In step 13, the manager under test shall inform the user that the pairing process cannot be completed (the simulated agent is not in pairable mode). • In step 20, the manager under test shall inform to the user that authentication process cannot be completed (authentication timeout).
Notes	

TP Id		TP/LP-PAN/MAN/TR/BLEDG/BV-004		
TP label		Secure Simple Pairing with agent with NoInputNoOutput capabilities		
Coverage	**Spec**	[ITU-T H.810]		
	Testable items	Authentication BT LE 2; M		
Applicability		C_MAN_BLE_000		
Initial condition		The manager under test and the simulated agent support the same device specialization, they are in a disconnected state and they have not been paired before.		
Test procedure		1. Check that the manager under test IO capabilities are declared in PIXIT I_MAN_BLEDG_002 and the man in the middle (MITM) protection is declared in PIXIT I_MAN_BLEDG_003 a. IF the manager under test does not support MITM protection (PIXIT I_MAN_BDG_003 = FALSE) THEN the test tool simulated agent is configured with NoInputNoOutput capabilities and without MITM protection and the just works association model shall be used during the pairing process and the generated link key will be unauthenticated (without MITM protection). b. IF the manager under test supports MITM protection (PIXIT I_MAN_BDG_003 = TRUE) THEN		

	• IF the Manager under test supports NoInputNoOutput capabilities (PIXIT I_MAN_BDG_002 = 4) THEN the combination of IO capabilities and MITM support declared by the manager under test in PIXITs is not feasible and the test case ends by giving a FAIL verdict due to inconsistency among the manager under test SSP features declared in PIXITs • IF the manager under test supports other IO capabilities (PIXIT I_MAN_BDG_002 = 0 or 1 or 2 or 3) it will not pair with agents with NoInputNoOutput capabilities because they do not fulfil the security level required (i.e., MITM protection) and the test case execution ends by giving a PASS verdict 2. Set the test tool simulated agent in discoverable and pairable mode. 3. The manager under test initiates a discovery process as stated in the product documentation. 4. Once the simulated agent has been discovered, make the manager under test pair with it as stated in the documentation.
Pass/Fail criteria	In step 4, the manager under test completes the pairing process successfully.
Notes	

TP Id		TP/LP-PAN/MAN/TR/BLEDG/BV-005		
TP label		Secure Simple Pairing with agent with DisplayOnly capabilities		
Coverage	**Spec**	[ITU-T H.810]		
	Testable items	Authentication BT LE 2; M		
Applicability		C_MAN_BLE_000		
Initial condition		The manager under test and the simulated agent support the same device specialization, they are in a disconnected state and they have not been paired before.		
Test procedure		1. Check that manager under test IO capabilities are declared in PIXIT I_MAN_BDG_002 and that the MITM protection is declared in PIXIT I_MAN_BDG_003 a. IF the manager under test does not support MITM protection (PIXIT I_MAN_BDG_003 = FALSE) THEN the test tool simulated agent is configured with secure simple pairing, NoInputNoOutput capabilities and without MITM protection in addition the just works association model shall be used during the pairing process and the generated link key will be unauthenticated (without MITM protection) b. IF the manager under test supports MITM protection (PIXIT I_MAN_BDG_003 = TRUE) THEN • IF the manager under test supports KeyboardOnly or KeyboardDisplaycapabilities (PIXIT I_MAN_BDG_002 = 2 or 3) THEN the test tool simulated agent is configured with secure simple pairing, DisplayOnly capabilities and MITM protection in addition the passkey entry association model shall be used during the pairing process and the generated link key will be authenticated (with MITM protection) • IF the manager under test supports DisplayOnly or DisplayYesNo capabilities (PIXIT I_MAN_BDG_002 = 0 or 1) THEN it will not pair with agents with DisplayOnly capabilities because they do not fulfil the security level required (i.e., MITM protection) and the test case execution ends by giving a PASS verdict • IF manager under test supports NoInputNoOutput capabilities (PIXIT I_MAN_BDG_002 = 4) THEN the combination of IO capabilities and MITM support declared by the manager under test in PIXITs is not feasible and the test case ends by giving a FAIL verdict due to inconsistency among the agent under test SSP features declared in PIXITs		

	2. Set the test tool simulated agent in discoverable and pairable mode. 3. The manager under test initiates a discovery process as stated in the product documentation. 4. Once the simulated agent has been discovered, make the manager under test pair with it as stated in the documentation.
Pass/Fail criteria	In step 4, the manager under test completes the pairing process successfully.
Notes	

TP Id		TP/LP-PAN/MAN/TR/BLEDG/BV-006		
TP label		Secure Simple Pairing with agent with DisplayYesNo capabilities		
Coverage	**Spec**	[ITU-T H.810]		
	Testable items	Authentication BT LE 2; M		
Applicability		C_MAN_BLE_000		
Initial condition		The manager under test and the simulated agent support the same device specialization, they are in a disconnected state and they have not been paired before.		
Test procedure		1. Check that the manager under test IO capabilities are declared in PIXIT I_MAN_BDG_002 and that the MITM protection is declared in PIXIT I_MAN_BDG_003 a. IF the manager under test does not support MITM protection (PIXIT I_MAN_BDG_003 = FALSE) THEN the test tool simulated agent is configured with secure simple pairing, NoInputNoOutput capabilities and without MITM protection in addition the just works association model shall be used during the pairing process and the generated link key will be unauthenticated (without MITM protection) b. IF the manager under test supports MITM protection (PIXIT I_MAN_BDG_003 = TRUE) THEN • IF the manager under test supports KeyboardOnly or KeyboardDisplay capabilities (PIXIT I_MAN_BDG_002 = 2 or 3) THEN the test tool simulated agent is configured with secure simple pairing, DisplayYesNo capabilities and with MITM protection in addition the passkey entry association model shall be used during the pairing process and the generated link key will be authenticated (with MITM protection) • IF the manager under test supports DisplayOnly or DisplayYesNocapabilities (PIXIT I_MAN_BDG_002 = 0 or 1) THEN it will not pair with agents with DisplayYesNo capabilities because they do not fulfil the security level required (i.e., MITM protection) and the test case execution ends by giving a PASS verdict • IF the manager under test supports NoInputNoOutput capabilities (PIXIT I_MAN_BDG_002 = 4) THEN the combination of IO capabilities and MITM support declared by the manager under test in PIXITs is not feasible and the test case ends by giving a FAIL verdict due to inconsistency among the agent under test SSP features declared in PIXITs 2. Set the test tool simulated agent in discoverable and pairable mode. 3. The manager under test initiates a discovery process as stated in the product documentation. 4. Once the simulated agent has been discovered, make the manager under test pair with it as stated in the documentation.		
Pass/Fail criteria		In step 4, the manager under test completes the pairing process successfully.		
Notes				

TP Id		TP/LP-PAN/MAN/TR/BLEDG/BV-007		
TP label		Secure Simple Pairing with agent with KeyboardOnly capabilities		
Coverage	**Spec**	[ITU-T H.810]		
	Testable items	Authentication BT LE 2; M		
Applicability		C_MAN_BLE_000		
Initial condition		The manager under test and the simulated agent support the same device specialization, they are in a disconnected state and they have not been paired before.		
Test procedure		1. Check that the manager under test IO capabilities are declared in PIXIT I_MAN_BDG_002 and that the MITM protection is declared in PIXIT I_MAN_BDG_003 a. IF the manager under test does not support MITM protection (PIXIT I_MAN_BDG_003 = FALSE) THEN the test tool simulated agent is configured with secure simple pairing, NoInputNoOutput capabilities and without MITM protection and the just works association model shall be used during the pairing process and the generated link key will be unauthenticated (without MITM protection) b. IF the manager under test supports MITM protection (PIXIT I_MAN_BDG_003 = TRUE) THEN • IF the manager under test supports DisplayOnly or DisplayYesNo or KeyboardOnly or KeyboardDisplay capabilities (PIXIT I_MAN_BDG_002 = 0 or 1 or 2 or 3) THEN the test tool simulated agent is configured with secure simple pairing, KeyboardOnly capabilities and with MITM protection in addition the passkey entry association model shall be used during the pairing process and the generated link key will be authenticated (with MITM protection) • IF the manager under test supports NoInputNoOutput capabilities (PIXIT I_MAN_BDG_002 = 4) THEN the combination of IO capabilities and MITM support declared by the manager under test in PIXITs is not feasible and the test case ends by giving a FAIL verdict due to inconsistency among the agent under test SSP features declared in PIXITs 2. Set the test tool simulated agent in discoverable and pairable mode. 3. The manager under test initiates a discovery process as stated in the product documentation. 4. Once the simulated agent has been discovered, make the manager under test pair with it as stated in the documentation.		
Pass/Fail criteria		In step 4, the manager under test completes the pairing process successfully.		
Notes				

TP Id		TP/LP-PAN/MAN/TR/BLEDG/BV-008		
TP label		Secure Simple Pairing with agent with KeyboardDisplay capabilities		
Coverage	**Spec**	[ITU-T H.810]		
	Testable items	Authentication BT LE 2; M		
Applicability		C_MAN_BLE_000		

Initial condition	The manager under test and the simulated agent support the same device specialization, they are in a disconnected state and they have not been paired before.
Test procedure	1. Check the manager under test IO capabilities declared in PIXIT I_MAN_BDG_002 and the MITM protection declared in PIXIT I_MAN_BDG_003 a. IF the manager under test does not support MITM protection (PIXIT I_MAN_BDG_003 = FALSE) THEN the test tool simulated agent is configured with secure simple pairing, NoInputNoOutput capabilities and without MITM protection in addition the just works association model shall be used during the pairing process and the generated link key will be unauthenticated (without MITM protection) b. IF the manager under test supports MITM protection (PIXIT I_MAN_BDG_003 = TRUE) THEN • IF the manager under test supports DisplayOnly or DisplayYesNo or KeyboardOnly or KeyboardDisplay capabilities (PIXIT I_MAN_BDG_002 = 0 or 1 or 2 or 3) THEN the test tool simulated agent is configured with secure simple pairing, KeyboardDisplay capabilities and with MITM protection in addition the passkey entry association model shall be used during the pairing process and the generated link key will be authenticated (with MITM protection) • IF the manager under test supports NoInputNoOutput capabilities (PIXIT I_MAN_BDG_002 = 4) THEN the combination of IO capabilities and MITM support declared by the Manager under test in PIXITs is not feasible and the test case ends giving a FAIL verdict due to inconsistency among the Agent under test SSP features declared in PIXITs 2. Set the test tool simulated agent in discoverable and pairable mode. 3. The manager under test initiates a discovery process as stated in the product documentation. 4. Once the simulated agent has been discovered, make the manager under test pair with it as stated in the documentation.
Pass/Fail criteria	In step 4, the manager under test completes the pairing process successfully.
Notes	

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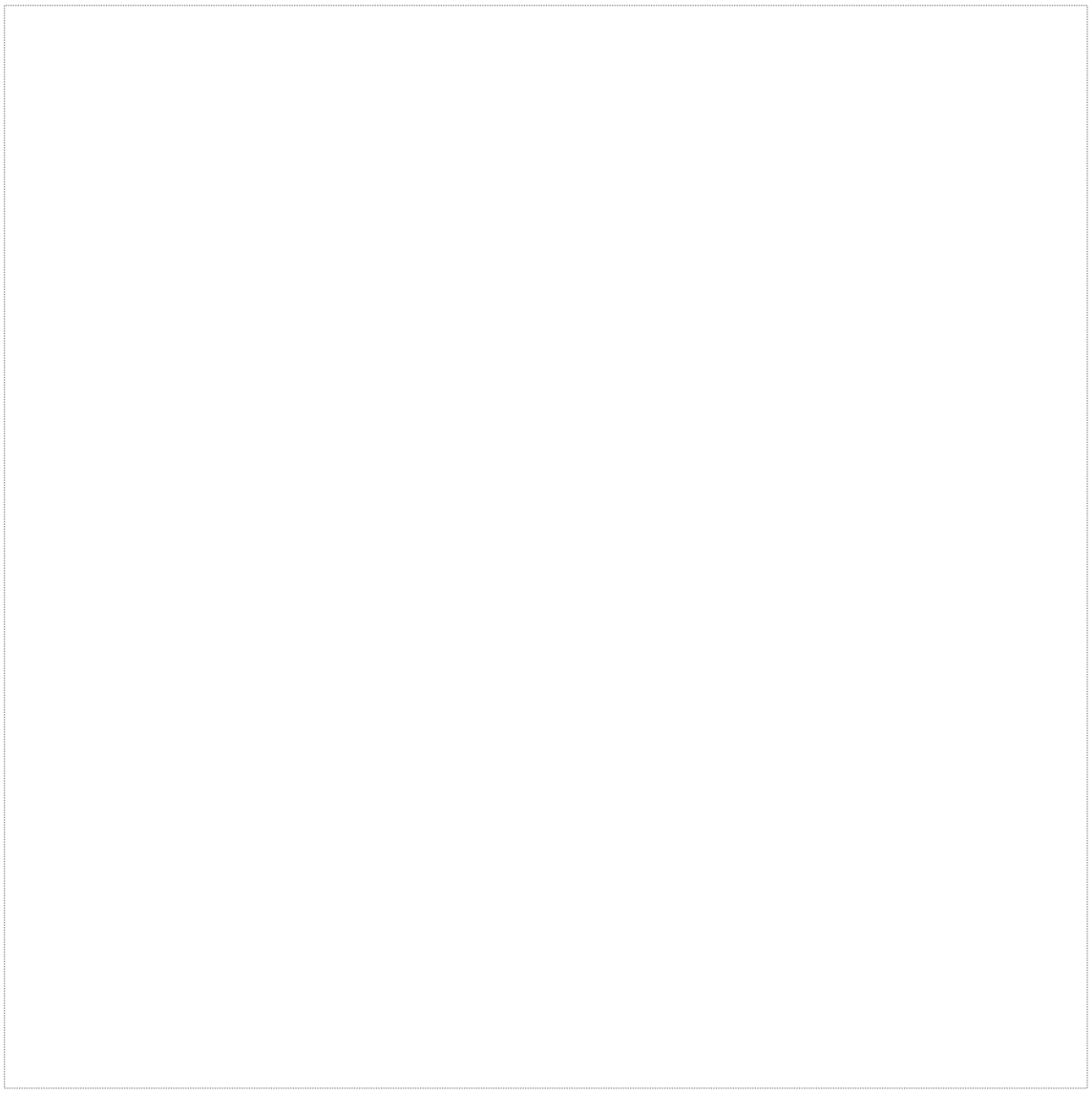

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