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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)

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

Recommendation ITU-T H.840



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## Recommendation ITU-T H.840

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

#### Summary

Recommendation ITU-T H.840 provides a test suite structure (TSS) and the test purposes (TP) for the universal serial bus (USB) host 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.840 is a transposition of Continua Test Tool DG2016, Test Suite Structure & Test Purposes, Personal Health Devices Interface: USB Host (Version 1.4, 2017-03-14), 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

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#### 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, USB host.

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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>.

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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, Personal Health Devices Interface: USB Host (Version 1.4, 2017-03-14), 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
1.1	2012-10-05	Initial release for Test Tool DG2011. It is the same version as "TSS&TP_1.5_USBHost_v1.1.pdf" because new features included in [b-CDG 2011] do not affect the test procedures specified in this document.
1.1	2013-05-24	Initial release for Test Tool DG2012. It is the same version as "TSS&TP_DG2011_USBHost_v1.1.pdf" because new features included in [b-CDG 2012] do not affect the test procedures specified in this document.
1.1	2014-01-24	Initial release for Test Tool DG2013. It is the same version as "TSS&TP_DG2012_USBHost_v1.1.pdf" because the new features included in [b-CDG 2013] do not affect the test procedures specified in this document.
1.2	2014-04-24	TM Lite & Doc Enhancements (Test Tool v4.0 Maintenance Release 1). It uses "TSS&TP_DG2013_USBHost_v1.1.doc" as a baseline and adds new features included in Documentation Enhancements: <ul style="list-style-type: none"><li>• "Other PICS" row has been added</li></ul>
1.2	2015-07-01	Initial release for Test Tool DG2015. It is the same version as "TSS&TP_DG2013_USBHost_v1.2.pdf" because new features included in [b-ITU-T H.810 (2015)]/[b-CDG 2015] do not affect to Test Procedures specified in this document.
1.3	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.
1.4	2017-03-14	Editorial - missing nomenclature refreshments.

## Recommendation ITU-T H.840

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

#### 1 Scope

The scope of this Recommendation<sup>1</sup> is to provide a test suite structure (TSS) and the test purposes (TP) for the USB host based on the requirements defined in the USB Personal Healthcare Device Class specification that has been selected for use in the Personal Health Device (PHD) interface of the Continua Design Guidelines (CDG) [ITU-T H.810 (2016)].

#### 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 11073-10419] 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 11073-10424] 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>
- [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 11073-20601-2015A] 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-

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<sup>1</sup> 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.

20601:2016/Cor.1:2016.

<https://www.iso.org/standard/66717.html> with  
<https://www.iso.org/standard/71886.html>

[USB DevClass]

USB Implementers Forum (2007-11), *Universal Serial Bus Device Class Definition for Personal Healthcare Devices*, Release 1.0, plus Errata (15 February 2008), Personal Healthcare section.

[http://www.usb.org/developers/docs/devclass\\_docs/Personal\\_Healthcare\\_1.zip](http://www.usb.org/developers/docs/devclass_docs/Personal_Healthcare_1.zip)

[USB 2.0]

USB Implementers Forum (2000), *Universal Serial Bus Specification 2.0*.

[http://www.usb.org/developers/docs/usb20\\_docs/usb\\_20\\_112614.zip](http://www.usb.org/developers/docs/usb20_docs/usb_20_112614.zip)

### 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
CESL	Continua Enabling Software Library
DUT	Device Under Test
GUI	Graphical User Interface
INR	International Normalized Ratio
IP	Insulin Pump
IUT	Implementation Under Test
MDS	Medical Device System
PAN	Personal Area Network
PCT	Protocol Conformance Testing
PCO	Point of Control and Observation
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
SDP	Service Discovery Protocol
SABTE	Sleep Apnoea Breathing Therapy Equipment
SCR	Static Conformance Review
SOAP	Simple Object Access Protocol
SUT	System Under Test
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**

<b>CDG release</b>	<b>Transposed as</b>	<b>Version</b>	<b>Description</b>	<b>Designation</b>
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 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) of this Recommendation are found in Annex A and have been divided into two main groups:

- Group 1: Descriptors (DESC)
- Group 2: Metadata message preamble (MDMP)
  - Subgroup 2.1: Metadata message preamble feature (FEAT)
  - Subgroup 2.2: Get data status before setting/clearing metadata message preamble feature (GDS)
  - Subgroup 2.3: Set/Clear Metadata message preamble feature (SC)
  - Subgroup 2.4: Metadata message preamble transfer (TRANS)
  - Subgroup 2.5: Metadata message preamble feature error conditions (ERR)

## **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.
    - PHDC: USB host personal health device class
  - <DUT>: This is the device under test.
    - HOS: PHDC host
    - DEV: PHDC device (not used because it is out of the scope of the developed test tool)
  - <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 Group 1: Descriptors (DESC)

<b>TP Id</b>		TP/PHDC/HOS/DESC/BV-000_A		
<b>TP label</b>		Device class in interface descriptor		
<b>Coverage</b>	<b>Spec</b>	[USB DevClass]		
	<b>Testable items</b>	DeviceDesc 1; M		
<b>Test purpose</b>		<p>Check that:</p> <p>USB Host acknowledges the simulated device descriptors</p> <p>[AND]</p> <p>It recognizes PHDC device class when it is set in device descriptor</p>		
<b>Applicability</b>		C_MAN_OXP_038 AND C_MAN_OXP_000		
<b>Other PICS</b>				
<b>Initial condition</b>		The simulated device is plugged into the host under test.		
<b>Test procedure</b>		<ol style="list-style-type: none"> <li>1. Connect the host under test and simulated device, then the enumeration process shall start automatically. During this process, the host will issue a <b>GetDescriptor()</b> request to the test tool device. On the test tool device the <b>bDeviceClass</b> field of the device descriptor is set to 00h and <b>InterfaceClass</b> of the interface descriptor is set to 0Fh.</li> <li>2. The simulated device issues an "<b>Association Request</b>" message to the host under test.</li> <li>3. The host under test shall reply with an "<b>Association Response</b>" (accepted, accepted-unknown-config or rejected) or an "<b>Association Abort</b>" message.</li> </ol>		
<b>Pass/Fail criteria</b>		In step 3, the host under test replies with an "Association Response"(accepted, accepted-unknown-config or rejected) or an "Association Abort" message.		
<b>Notes</b>				

<b>TP Id</b>		TP/PHDC/HOS/DESC/BV-000_B		
<b>TP label</b>		Device class in device descriptor		
<b>Coverage</b>	<b>Spec</b>	[USB DevClass]		
	<b>Testable items</b>	DeviceDesc 1; M		
<b>Test purpose</b>		<p>Check that:</p> <p>USB Host acknowledges the simulated device descriptors</p> <p>[AND]</p> <p>It recognizes PHDC device class when it is set in interface descriptor</p>		
<b>Applicability</b>		C_MAN_OXP_038 AND C_MAN_OXP_000		
<b>Other PICS</b>				
<b>Initial condition</b>		The simulated device is plugged into the host under test.		

<b>Test procedure</b>	<ol style="list-style-type: none"> <li>1. Connect the host under test and simulated device, then the enumeration process shall start automatically. During this process, the host will issue a <b>GetDescriptor()</b> request to the test tool device. On the test tool device the <b>bDeviceClass</b> field of the device descriptor is set to 0Fh and <b>InterfaceClass</b> of the interface descriptor is set to 00h.</li> <li>2. The simulated device issues an "<b>Association Request</b>" message to the host under test.</li> <li>3. The host under test shall reply with an "<b>Association Response</b>" (accepted, accepted-unknown-config or rejected) or an "<b>Association Abort</b>" message.</li> </ol>
<b>Pass/Fail criteria</b>	In step 3, the host under test replies with an "Association Response" (accepted, accepted-unknown-config or rejected) or an "Association Abort" message.
<b>Notes</b>	

<b>TP Id</b>	TP/PHDC/HOS/DESC/BV-001_A			
<b>TP label</b>	Verify class-defined USB descriptors (no PHDC metadata descriptor, data format code defined by vendor)			
<b>Coverage</b>	<b>Spec</b>	[USB DevClass]		
	<b>Testable items</b>	ClassFunDesc 1; M	ClassFunDesc 2; M	ClassFunDesc 3; M
		ClassFunDesc 4; M	ClassFunDesc 6; M	ClassFunExtDesc 1; M
		ClassFunExtDesc 3; M	ClassFunExtDesc 4; M	ClassFunExtDesc 5; M
		ClassFunExtDesc 7; M	ClassFunExtDesc 8; M	ClassFunExtDesc 9; M
		MetaDataDesc 1; M	MetaDataDesc 2; M	MetaDataDesc 3; M
		MetaDataDesc 4; M		
<b>Test purpose</b>	<p>Check that:</p> <p>USB Host acknowledges the simulated device descriptors</p> <p>[AND]</p> <p>It recognizes PHDC device class if PHDC Meta-Data Descriptor is not sent and data format code is defined by vendor.</p>			
<b>Applicability</b>	C_MAN_OXP_038 AND C_MAN_OXP_000			
<b>Other PICS</b>				
<b>Initial condition</b>	The simulated device is plugged into the host under test.			
<b>Test procedure</b>	<ol style="list-style-type: none"> <li>1. Connect the host under test and simulated device, then the enumeration process shall start automatically. During this process, the host will issue a GetDescriptor() request to the test tool device. On the test tool device the PHDC Metadata descriptor will not be included because it is optional and the bPHDCDataCode field of the PHDC class function descriptor will be set to 01h (PHDC_VENDOR).</li> <li>2. The test tool shows a pop-up message asking the test operator to verify that the host continues to function normally (i.e., keyboard and mouse still function, system still up and running).</li> </ol>			
<b>Pass/Fail criteria</b>	In step 2, the host does not shut down or stop accepting input from other USB devices (keyboard, mouse).			
<b>Notes</b>				

<b>TP Id</b>		TP/PHDC/HOS/DESC/BV-001_B		
<b>TP label</b>		Verify class-defined USB descriptors (PHDC Metadata descriptor, data format code following ISO/IEEE 11073-20601)		
<b>Coverage</b>	<b>Spec</b>	[USB DevClass]		
	<b>Testable items</b>	ClassFunDesc 1; M	ClassFunDesc 2; M	ClassFunDesc 3; M
		ClassFunDesc 4; M	ClassFunDesc 6; M	ClassFunExtDesc 1; M
		ClassFunExtDesc 3; M	ClassFunExtDesc 4; M	ClassFunExtDesc 5; M
		ClassFunExtDesc 7; M	ClassFunExtDesc 8; M	ClassFunExtDesc 9; M
		MetaDataDesc 1; M	MetaDataDesc 2; M	MetaDataDesc 3; M
MetaDataDesc 4; M				
<b>Test purpose</b>		<p>Check that:</p> <p>USB Host acknowledges the simulated device descriptors</p> <p>[AND]</p> <p>It recognizes PHDC device class if PHDC Meta-Data Descriptor is sent and data format code follows ISO/IEEE 11073-20601.</p>		
<b>Applicability</b>		C_MAN_OXP_038 AND C_MAN_OXP_000		
<b>Other PICS</b>				
<b>Initial condition</b>		The simulated device is plugged into the host under test.		
<b>Test procedure</b>		<ol style="list-style-type: none"> <li>1. Connect the host under test and simulated device, then the enumeration process shall start automatically. During this process, the host will issue a <b>GetDescriptor()</b> request to the test tool device. On the test tool device the PHDC Metadata descriptor <b>will be included</b> because it is optional and the <b>bPHDCDataCode</b> field of the PHDC class function descriptor will be set to 02h (PHDC_11073_20601).</li> <li>2. The simulated device issues an "<b>Association Request</b>" message to the host under test.</li> <li>3. The host under test shall reply with an "<b>Association Response</b>" (accepted, accepted-unknown-config or rejected) or an "<b>Association Abort</b>" message.</li> </ol>		
<b>Pass/Fail criteria</b>		In step 3, the host under test replies with an "Association Response" (accepted, accepted-unknown-config or rejected) or an "Association Abort" message.		
<b>Notes</b>				

<b>TP Id</b>		TP/PHDC/HOS/DESC/BV-001_C		
<b>TP label</b>		Verify class-defined USB descriptors (no PHDC Metadata descriptor, data format code following ISO/IEEE 11073-20601)		
<b>Coverage</b>	<b>Spec</b>	[USB DevClass]		
	<b>Testable items</b>	ClassFunDesc 1; M	ClassFunDesc 2; M	ClassFunDesc 3; M
		ClassFunDesc 4; M	ClassFunDesc 6; M	ClassFunExtDesc 1; M
		ClassFunExtDesc 3; M	ClassFunExtDesc 4; M	ClassFunExtDesc 5; M
		ClassFunExtDesc 7; M	ClassFunExtDesc 8; M	ClassFunExtDesc 9; M
		MetaDataDesc 1; M	MetaDataDesc 2; M	MetaDataDesc 3; M
MetaDataDesc 4; M				

<b>Test purpose</b>	Check that: USB Host acknowledges the simulated device descriptors [AND] It recognizes PHDC device class if PHDC Meta-Data Descriptor is not sent and data format code follows ISO/IEEE 11073-20601.
<b>Applicability</b>	C_MAN_OXP_038 AND C_MAN_OXP_000
<b>Other PICS</b>	
<b>Initial condition</b>	The simulated device is plugged into the host under test.
<b>Test procedure</b>	<ol style="list-style-type: none"> <li>1. Connect the host under test and simulated device, then the enumeration process shall start automatically. During this process, the host will issue a <b>GetDescriptor()</b> request to the test tool device. On the test tool device the PHDC Metadata descriptor <b>will not be included</b> because it is optional and the <b>bPHDCDataCode</b> field of the PHDC class function descriptor will be set to 02h (PHDC_11073_20601).</li> <li>2. The simulated device issues an "<b>Association Request</b>" message to the host under test.</li> <li>3. The host under test shall reply with an "<b>Association Response</b>" (accepted, accepted-unknown-config or rejected) or an "<b>Association Abort</b>" message.</li> </ol>
<b>Pass/Fail criteria</b>	In step 3, the host under test replies with an "Association Response" (accepted, accepted-unknown-config or rejected) or an "Association Abort" message.
<b>Notes</b>	

<b>TP Id</b>	TP/PHDC/HOS/DESC/BV-002		
<b>TP label</b>	Verify Valid bQoSEncoding Version		
<b>Coverage</b>	<b>Spec</b>	[USB DevClass]	
	<b>Testable items</b>	QoSDesc 1; M	QoSDesc 2; M
		QoSDesc 4; M	QoSDesc 5; M
	QoSDesc 7; M		QoSDesc 6; M
<b>Test purpose</b>	Check that: If a USB Host implementing 01h QoS information encoding receives a bQoSEncodingVersion that is not 01h, then it ignores the descriptor.		
<b>Applicability</b>	C_MAN_OXP_038 AND C_MAN_OXP_000		
<b>Other PICS</b>			
<b>Initial condition</b>	The simulated device is plugged into the host under test.		
<b>Test procedure</b>	<ol style="list-style-type: none"> <li>1. Connect the host under test and simulated device, then the enumeration process shall start automatically. During this process, the host will issue a <b>GetDescriptor()</b> request to the test tool device. On the test tool device there will be one QoS descriptor with <b>bQoSEncodingVersion=02h</b>. The host under test shall ignore the descriptor.</li> <li>2. The simulated device issues an "<b>Association Request</b>" message to the host under test.</li> <li>3. The host under test shall reply with an "<b>Association Response</b>" (accepted, accepted-unknown-config or rejected) or an "<b>Association Abort</b>" message.</li> </ol>		
<b>Pass/Fail criteria</b>	In step 3, the host under test replies with an "Association Response" (accepted, accepted-unknown-config or rejected) or an "Association Abort" message.  If there are issues when running this test procedure, see bugzilla 55 and potentially issue a waiver. <a href="http://continua.plugfests.com/show_bug.cgi?id=55">http://continua.plugfests.com/show_bug.cgi?id=55</a> .		
<b>Notes</b>			

<b>TP Id</b>	TP/PHDC/HOS/DESC/BV-003
<b>TP label</b>	Verify communication on bulk endpoints

<b>Coverage</b>	<b>Spec</b>	[USB DevClass]		
	<b>Testable items</b>	Arch 1; M	Arch 2; M	Arch 4; M
		Arch 5; M		
<b>Test purpose</b>	Check that: USB Host and simulated device send information over endpoints declared in endpoint descriptors.			
<b>Applicability</b>	C_MAN_OXP_038 AND C_MAN_OXP_000			
<b>Other PICS</b>				
<b>Initial condition</b>	The simulated device is plugged into the host under test.			
<b>Test procedure</b>	<ol style="list-style-type: none"> <li>1. Connect the host under test and simulated device, then the enumeration process shall start automatically. During this process, the host will issue a <b>GetDescriptor()</b> request to the test tool device. On the test tool device there will be 3 endpoint descriptors: <b>BULK IN, BULK OUT</b> and <b>INTERRUPT IN</b>.</li> <li>2. The simulated device issues an "<b>Association Request</b>" message to the host under test via the <b>BULK IN</b> endpoint.</li> <li>3. The host under test shall reply with an "<b>Association Response</b>" (accepted, accepted-unknown-config or rejected) or an "<b>Association Abort</b>" message over the <b>BULK OUT</b> endpoint.</li> </ol>			
<b>Pass/Fail criteria</b>	In step 3, the host under test replies with an "Association Response" (accepted, accepted-unknown-config or rejected) or an "Association Abort" in BULK OUT endpoint number.			
<b>Notes</b>				

<b>TP Id</b>	TP/PHDC/HOS/DESC/BV-004			
<b>TP label</b>	PHD with two interfaces. Connect it after PHG application is running and USB Transport is activated			
<b>Coverage</b>	<b>Spec</b>	[USB DevClass]		
	<b>Testable items</b>	DeviceDesc 2; M		
	<b>Spec</b>	[b-CDG 2012]		
	<b>Testable items</b>	Wired_PAN_USB_USB_2.0		
	<b>Spec</b>	[USB 2.0]		
	<b>Testable items</b>	USB 2.0 ch 9.2.1		
<b>Test purpose</b>	Check that: The Personal Health Gateway (PHG) under test recognizes PHDC device class if simulated Personal Health Device (PHD) has two interfaces: PHDC and another one (such HID) and the simulated PHD is connected to the PHG under test after the PHG under test application is running and USB Transport is activated			
<b>Applicability</b>	C_MAN_OXP_038 AND C_MAN_OXP_000			
<b>Other PICS</b>				
<b>Initial condition</b>	The PHG under test application has just been restarted (computer rebooted or application exited and opened) and USB Transport is activated. The simulated device is *not* plugged into the PHG under test.			

<b>Test procedure</b>	<ol style="list-style-type: none"> <li>1. Connect the host under test and simulated device, then the enumeration process shall start automatically. During this process, the host will issue a <b>GetDescriptor()</b> request to the test tool device. On the test tool device the <b>bNumInterfaces</b> field of the configuration descriptor is set to 02h; two interface descriptors will be sent: PHDC and HID, where the HID interface is sent first.</li> <li>2. The simulated device issues an "<b>Association Request</b>" message to the host under test.</li> <li>3. The host under test shall reply with an "<b>Association Response</b>" message if it recognizes the PHDC interface.</li> </ol>
<b>Pass/Fail criteria</b>	In step 3, the host under test replies with an "Association Response" or another valid response to an "Association Request" message.
<b>Notes</b>	Due to CESL restrictions, this test case has to be executed manually using a real PHD with two interfaces.

<b>TP Id</b>	TP/PHDC/HOS/DESC/BV-005		
<b>TP label</b>	PHD with two interfaces. Connect it before the PHG application is running and USB Transport is activated		
<b>Coverage</b>	<b>Spec</b>	[USB DevClass]	
	<b>Testable items</b>	DeviceDesc 2; M	
	<b>Spec</b>	[b-CDG 2012]	
	<b>Testable items</b>	Wired_PAN_USB_USB_2.0	
	<b>Spec</b>	[USB 2.0]	
	<b>Testable items</b>	USB 2.0 ch 9.2.1	
<b>Test purpose</b>	<p>Check that:</p> <p>The PHG under test recognizes a PHDC device when the simulated PHD has two interfaces: PHDC and another one (such HID) and the simulated PHD is connected to the PHG under test before the PHG under test application is running and USB Transport is activated</p>		
<b>Applicability</b>	C_MAN_OXP_038 AND C_MAN_OXP_000		
<b>Other PICS</b>			
<b>Initial condition</b>	<p>The PHG under test application is stopped and USB Transport is deactivated.</p> <p>The simulated device is *not* plugged into the PHG under test.</p>		
<b>Test procedure</b>	<ol style="list-style-type: none"> <li>1. Plug simulated device into the PHG under test. The enumeration process should start automatically. The host should issue a <b>GetDescriptor()</b> request to the test tool device. On the test tool device the <b>bNumInterfaces</b> field of configuration descriptor is set to 02h; two interface descriptors will be sent: PHDC and HID, where the HID interface is sent first.</li> <li>2. Start the PHG under test application and activate USB Transport.</li> <li>3. The simulated device issues an "<b>Association Request</b>" message to the host under test.</li> <li>4. The host under test shall reply with an "<b>Association Response</b>" message if it recognizes the PHDC interface.</li> </ol>		
<b>Pass/Fail criteria</b>	In step 4, the host under test replies with an "Association Response" or another valid response to an "Association Request" message.		
<b>Notes</b>	Due to CESL restrictions, this test case has to be executed manually using a real PHD with two interfaces.		

### A.3 Subgroup 2.1: Metadata message preamble feature (FEAT)

<b>TP Id</b>	TP/PHDC/HOS/MDMP/FEAT/BV-000		
<b>TP label</b>	Metadata Message Preamble feature is supported and it shall initially be disabled.		
<b>Coverage</b>	<b>Spec</b>	[USB DevClass]	
	<b>Testable items</b>	SendMetaData 1; M	SendMetaData 2; M
		ReqMetaDataPream 3; M	DetQoS 1; M
<b>Test purpose</b>	<p>Check that:</p> <p>USB Host supports Meta-Data Message Preamble feature</p> <p>[AND]</p> <p>Initially, Meta-Data Message Preamble feature is disabled</p>		
<b>Applicability</b>	C_MAN_OXP_038 AND C_MAN_OXP_000		
<b>Other PICS</b>			
<b>Initial condition</b>	The simulated device is plugged into the host under test.		
<b>Test procedure</b>	<ol style="list-style-type: none"> <li>1. Connect the host under test and simulated device, then the enumeration process shall start automatically. The simulated device will inform the host under test that it supports the Metadata message preamble feature setting bit0 of the <b>bmCapability</b> field of the PHDC class function descriptor to 1.</li> <li>2. Upon the reception and confirmation of descriptors, if the host under test recognizes the PHDC device class, it shall send a <b>SET_CONFIGURATION</b> request to the simulated device as the last step of the enumeration process.</li> <li>3. The simulated device issues an "<b>Association Request</b>" without a preceding Metadata message preamble to the host under test.</li> <li>4. The host under test could reply with an "<b>Association Response</b>" (accepted, accepted-unknown-config or rejected) or an "<b>Association Abort</b>" message without a preceding Metadata message preamble or with a SET_FEATURE(META-DATA); it will mean that the Metadata message preamble is not yet enabled.</li> </ol>		
<b>Pass/Fail criteria</b>	In step 4, the host under test replies with an "Association Response" (accepted, accepted-unknown-config or rejected) or an "Association Abort" message without a preceding Metadata message preamble or a SET_FEATURE(META-DATA).		
<b>Notes</b>			

#### A.4 Subgroup 2.2: Get Data Status before setting / clearing (GDS)

<b>TP Id</b>		TP/PHDC/HOS/MDMP/GDS/BV-000		
<b>TP label</b>		USB Host supports the class-defined Get Data Status Request		
<b>Coverage</b>	<b>Spec</b>	[USB DevClass]		
	<b>Testable items</b>	ReqGetDataStatus 1; M	ReqGetDataStatus 2; M	
<b>Test purpose</b>		<p>Check that:</p> <p>USB Host supports the class-defined Get Data Status request</p> <p>[AND]</p> <p>Get Data Status request fulfils the right syntax.</p>		
<b>Applicability</b>		C_HOST_PHDC_002 AND C_MAN_OXP_038 AND C_MAN_OXP_000		
<b>Other PICS</b>				
<b>Initial condition</b>		The simulated device is plugged into the host under test.		
<b>Test procedure</b>		<ol style="list-style-type: none"> <li>1. Connect the host under test and simulated device, then the enumeration process shall start automatically. The simulated device will inform the host under test that it supports the Metadata message preamble feature setting bit0 of the <b>bmCapability</b> field of the PHDC class function descriptor to 1.</li> <li>2. Upon the reception and confirmation of descriptors, if the host under test recognizes the PHDC device class, it shall send a <b>SET_CONFIGURATION</b> request to the simulated device as the last step of the enumeration process.</li> <li>3. Follow the instructions given by the vendor in PIXIT I_HOST_PHDC_003 to cause the SUT to send a Get Data Status request.</li> <li>4. The host under test shall send a Get Data Status request.</li> <li>5. The simulated device responds with the correct status.</li> </ol>		
<b>Pass/Fail criteria</b>		In step 4, the host under test replies with a Get Data Status message with the right syntax fields of the Get Data Status message, which will be listed as bmRequestType (A1h), bRequest (00h), wValue (0000h), wIndex (PHDC Interface), wLength (0002h).		
<b>Notes</b>				

## A.5 Subgroup 2.3: Set/Clear Metadata message preamble feature (SC)

<b>TP Id</b>		TP/PHDC/HOS/MDMP/SC/BV-000		
<b>TP label</b>		Enabling/Disabling Metadata Message Preamble. Syntax of SET_FEATURE and CLEAR_FEATURE		
<b>Coverage</b>	<b>Spec</b>	[USB DevClass]		
	<b>Testable items</b>	SendMetaData 3; M	ReqMetaDataPream 1; M	ReqMetaDataPream 4; M
		ReqMetaDataPream 6; M	ReqMetaDataPream10; M	FeatTypes 1; M
<b>Test purpose</b>		<p>Check that:</p> <p>USB Host enables Meta-Data Message Preamble sending a SET_FEATURE(META-DATA) message</p> <p>[AND]</p> <p>If USB Host chooses to disable the Meta-Data Message Preamble, it shall send a CLEAR_FEATURE(META-DATA) message.</p> <p>[AND]</p> <p>These messages fulfil the right syntax</p>		
<b>Applicability</b>		C_HOST_PHDC_003 AND C_MAN_OXP_038 AND C_MAN_OXP_000		
<b>Other PICS</b>				
<b>Initial condition</b>		The simulated device is plugged into the host under test.		
<b>Test procedure</b>		<ol style="list-style-type: none"> <li>1. Connect the host under test and simulated device, then the enumeration process shall start automatically. The simulated device will inform the host under test that it supports the Metadata message preamble feature setting bit0 of the <b>bmCapability</b> field of the PHDC class function descriptor to 1.</li> <li>2. Upon the reception and confirmation of descriptors, if the host under test recognizes the PHDC device class, it shall send a <b>SET_CONFIGURATION</b> request to the simulated device as the last step of the enumeration process.</li> <li>3. Perform an action on the host that enables the Metadata message preamble feature (as defined in the PIXIT I_HOST_PHDC_001).</li> <li>4. The simulated device issues an "<b>Association Request</b>" without a preceding Metadata message preamble to the host under test.</li> <li>5. The host under test will send a <b>SET_FEATURE(META-DATA)</b> message. The syntax will be verified.</li> <li>6. The host under test will send a Metadata message preamble because this feature has been enabled.</li> <li>7. After this, the host under test will send an "<b>Association Response</b>" (accepted, accepted-unknown-config or rejected) or an "<b>Association Abort</b>" message.</li> <li>8. The tester inquires operator whether it is possible to disable the Metadata message preamble feature (as defined in the PIXIT I_HOST_PHDC_002).</li> <li>9. The simulated device will send an "<b>Association Abort</b>" message in order to move the host under test to the Unassociated State.</li> <li>10. If the host under test chooses to disable the Metadata message preamble feature, it will send a <b>CLEAR_FEATURE(META-DATA)</b> message. The syntax will be verified.</li> </ol>		
<b>Pass/Fail criteria</b>		<ul style="list-style-type: none"> <li>▪ In step 5, the host under test sends a SET_FEATURE(META-DATA) message with the right syntax in order to enable the Metadata message preamble feature. Fields of this message will be listed as : <ul style="list-style-type: none"> <li>• bmRequestType =21</li> <li>• bRequest = 03</li> <li>• wValue = 0101</li> <li>• wIndex = PHDC interface</li> </ul> </li> </ul>		

	<ul style="list-style-type: none"> <li>• wLength=0000</li> <li>▪ In step 6, the host under test sends a Metadata message preamble; it proves that the feature has been enabled.</li> <li>▪ In step 10, if the host under test chooses to disable the Metadata message preamble, it shall send a CLEAR_FEATURE(META-DATA) message with the right syntax. Fields of this message will be listed as: <ul style="list-style-type: none"> <li>• bmRequestType = 21</li> <li>• bRequest = 01</li> <li>• wValue = 0001</li> <li>• wIndex = PHDC interface</li> <li>• wLength = 0000</li> </ul> </li> </ul>
<b>Notes</b>	

<b>TP Id</b>	TP/PHDC/HOS/MDMP/SC/BV-001		
<b>TP label</b>	If Metadata Preamble Feature is not supported by a PHD, PHG shall not try to enable or disable the feature		
<b>Coverage</b>	<b>Spec</b>	[USB DevClass]	
	<b>Testable items</b>	ReqMetaDataPream 2; M	
<b>Test purpose</b>	<p>Check that:</p> <p>If the simulated device indicates to Host under test that it does not support Meta-Data Message Preamble feature, then the Host should not issue the SET_FEATURE or CLEAR_FEATURE commands</p>		
<b>Applicability</b>	C_MAN_OXP_038 AND C_MAN_OXP_000		
<b>Other PICS</b>			
<b>Initial condition</b>	The simulated device is plugged into the host under test.		
<b>Test procedure</b>	<ol style="list-style-type: none"> <li>1. Connect the host under test and simulated device, then the enumeration process shall start automatically. The simulated device will inform the host under test that it does not support the Metadata message preamble feature setting bit0 of the <b>bmCapability</b> field of the PHDC class function descriptor to 0.</li> <li>2. Upon the reception and confirmation of descriptors, if the host under test recognizes the PHDC device class, it shall send a <b>SET_CONFIGURATION</b> request to the simulated device as the last step of the enumeration process.</li> <li>3. The simulated device issues an "<b>Association Request</b>" without a preceding Metadata message preamble to the host under test.</li> <li>4. The host under test will respond with an "<b>Association Response</b>" (accepted, accepted-unknown-config or rejected) or an "Association Abort". It shall be verified that the host does not send either the <b>SET_FEATURE(META-DATA)</b> message or the Metadata message preamble before.</li> <li>5. The simulated device will send an "<b>Association Abort</b>" message in order to move the host under test to the Unassociated State.</li> <li>6. After this, it shall be verified that the host under test does not send a <b>CLEAR_FEATURE (META-DATA)</b> message.</li> </ol>		
<b>Pass/Fail criteria</b>	<ul style="list-style-type: none"> <li>▪ In step 4, the host under test sends an "Association Response" after receiving the "Association Request".</li> <li>▪ In step 6, the host under test does not send a CLEAR_FEATURE(META-DATA) message.</li> </ul>		
<b>Notes</b>			

<b>TP Id</b>		TP/PHDC/HOS/MDMP/SC/BV-002		
<b>TP label</b>		PHG only supports bQoSEncodingVersion=01h		
<b>Coverage</b>	<b>Spec</b>	[USB DevClass]		
	<b>Testable items</b>	ReqMetaDataPream 7; M	ReqMetaDataPream 8; M	
<b>Test purpose</b>		<p>Check that:</p> <p>If the Host only supports a bQoSEncodingVersion of 01h, then it sets the high-order byte of wValue field of the SET_FEATURE message to 01h in order to enforce this QoS</p>		
<b>Applicability</b>		C_HOST_PHDC_001 AND C_HOST_PHDC_003 AND C_MAN_OXP_038 AND C_MAN_OXP_000		
<b>Other PICS</b>				
<b>Initial condition</b>		The simulated device is plugged into the host under test.		
<b>Test procedure</b>		<ol style="list-style-type: none"> <li>1. Connect the host under test and simulated device, then the enumeration process shall start automatically. The simulated device will inform the host under test that it supports the Metadata message preamble feature setting bit0 of the <b>bmCapability</b> field of the PHDC class function descriptor to 1. Furthermore, it will send one <b>BULK IN</b> endpoint descriptor, followed by a QoS descriptor (field <b>bQoSEncodingVersion=02h</b>).</li> <li>2. Upon the reception and confirmation of descriptors, if the host under test recognizes the PHDC device class, it shall send a <b>SET_CONFIGURATION</b> request to the simulated device as the last step of the enumeration process.</li> <li>3. Perform an action on the host that enables the Metadata message preamble feature (as defined in the PIXIT I_HOST_PHDC_001).</li> <li>4. The simulated device issues an "<b>Association Request</b>" without a preceding Metadata message preamble to the host under test.</li> <li>5. The host under test will send a <b>SET_FEATURE(META-DATA)</b> message. It will be verified that the high-order byte of the wValue field of the SET_FEATURE message is set to 01h.</li> </ol>		
<b>Pass/Fail criteria</b>		<p>In step 5, wValue field of the SET_FEATURE(META-DATA) message is checked:</p> <ul style="list-style-type: none"> <li>• bmRequestType = 21</li> <li>• bRequest = 03</li> <li>• wValue = 0101</li> <li>• wIndex = PHDC interface</li> <li>• wLength = 0000</li> </ul>		
<b>Notes</b>				

<b>TP Id</b>		TP/PHDC/HOS/MDMP/SC/BV-003		
<b>TP label</b>		PHD only supports bQoSEncodingVersion=01h		
<b>Coverage</b>	<b>Spec</b>	[USB DevClass]		
	<b>Testable items</b>	ReqMetaDataPream 9; M		
<b>Test purpose</b>		<p>Check that:</p> <p>If the simulated device only supports a bQoSEncodingVersion of 01h, then the Host under test sets the high-order byte of wValue field of the SET_FEATURE message to 01h in order to enforce this QoS</p>		
<b>Applicability</b>		C_HOST_PHDC_003 AND C_MAN_OXP_038 AND C_MAN_OXP_000		
<b>Other PICS</b>				
<b>Initial condition</b>		The simulated device is plugged into the host under test.		

<b>Test procedure</b>	<ol style="list-style-type: none"> <li>1. Connect the host under test, simulated device, then the enumeration process shall start automatically. The simulated device will inform the host under test that it supports the Metadata message preamble feature setting bit0 of the <b>bmCapability</b> field of the PHDC class function descriptor to 1. Furthermore, the field <b>bQoSEncodingVersion</b> of the PHDC QoS descriptor will be set to 01h.</li> <li>2. Upon the reception and confirmation of descriptors, if the host under test recognizes the PHDC device class, it shall send a <b>SET_CONFIGURATION</b> request to the simulated device as the last step of the enumeration process.</li> <li>3. Perform an action on the host that enables the Metadata message preamble feature (as defined in the PIXIT I_HOST_PHDC_001).</li> <li>4. The simulated device issues an "<b>Association Request</b>" without a preceding Metadata message preamble to the host under test.</li> <li>5. The host under test will send a <b>SET_FEATURE(META-DATA)</b> message. It will be verified that the high-order byte of the wValue field of the SET_FEATURE message is set to 01h.</li> </ol>
<b>Pass/Fail criteria</b>	<ul style="list-style-type: none"> <li>▪ In step 5, check that the wValue field of the SET_FEATURE(META-DATA) message is as specified in the test procedure. <ul style="list-style-type: none"> <li>• bmRequestType = 21</li> <li>• bRequest = 03</li> <li>• wValue = <b>0101</b></li> <li>• wIndex = PHDC interface</li> <li>• wLength = 0000</li> </ul> </li> </ul>
<b>Notes</b>	

#### A.6 Subgroup 2.4: Metadata message preamble transfer (TRANS)

<b>TP Id</b>	TP/PHDC/HOS/MDMP/TRANS/BV-000_A			
<b>TP label</b>	Number of transfers after a Metadata Message Preamble (PHG to PHD)			
<b>Coverage</b>	<b>Spec</b>	[USB DevClass]		
	<b>Testable items</b>	SendMetaData 4; M	MetaDataPream 1; M	MetaDataPream 2; M
		MetaDataPream 3; M	MetaDataPream 4; M	MetaDataPream 5; M
		MetaDataPream 6; M	MetaDataPream 7; M	MetaDataPream 8; M
MetaDataPream 9; M				
<b>Test purpose</b>	Check that:  After the Host issues a Meta-Data Message Preamble, it sends a count of bNumTransfers data transfers  [AND]  Meta-Data Message Preamble fulfil the right syntax			
<b>Applicability</b>	C_HOST_PHDC_003 AND C_MAN_OXP_038 AND C_MAN_OXP_000			
<b>Other PICS</b>				
<b>Initial condition</b>	The simulated device is plugged into the host under test.			
<b>Test procedure</b>	<ol style="list-style-type: none"> <li>1. Wait until the Metadata message preamble feature is enabled. <ol style="list-style-type: none"> <li>a. Connect the host under test and simulated device.</li> <li>b. Wait until the end of the enumeration process.</li> <li>c. Perform an action on the host that enables the Metadata message preamble feature as defined in the PIXIT I_HOST_PHDC_001.</li> <li>d. The simulated device sends an "<b>Association Request</b>"; it includes a standard configuration supported by the PHG under test (in case of TH, PO, GM, BPM, WS, AM, IP or PF specializations) or an extended configuration with one optional object (in case of HUB, ST or CV specializations)</li> </ol> </li> </ol>			

	<ol style="list-style-type: none"> <li>e. The host under test sends a <b>SET_FEATURE(META-DATA)</b> in order to enable the Metadata message preamble feature.</li> </ol> <ol style="list-style-type: none"> <li>2. The host under test will send an "<b>Association Response</b>" preceded by a Metadata message preamble (the value of the bNumTransfers field is captured). <ol style="list-style-type: none"> <li>a. If the PHG under test replies with an <b>Association Response</b> (accepted), the simulated PHD will start the confirmed data sending. The quantity of confirmed data transfers will be equal to the <b>bNumTransfers</b> field of the Metadata message preamble that the PHG under test sent.</li> <li>b. If the PHG under test replies with an <b>Association Response</b> (accepted-unknown-config), the simulated PHD will send the configuration. This configuration should be accepted by the PHG, and the simulated PHD will start the confirmed data sending. The quantity of confirmed data transfers will be equal to the <b>bNumTransfers</b> field of the Metadata message preamble that the PHG under test sent –1.</li> </ol> </li> <li>3. The PHG under test acknowledges each simulated PHD message by sending a rors-cmip-confirmed-event-report (in case 2.a) or a result = accepted-unknown-config message plus bNumTransfers-1 rors-cmip-confirmed-event-reports (in case 2.b).</li> <li>4. The acknowledging of the last confirmed data will be preceded by a new Metadata message preamble.</li> </ol>
<b>Pass/Fail criteria</b>	<ul style="list-style-type: none"> <li>▪ In step 2, the Metadata message preamble has been sent and the syntax of the Metadata message preamble fulfils the spec: <ul style="list-style-type: none"> <li>• aSignature field: "PhdcQoSSignature" (50 68 64 63 51 6F 53 53 69 67 6E 61 74 75 72 65 in hexadecimal)</li> <li>• bNumtransfers&gt;0</li> <li>• bQoSEncodingVersion=01h</li> <li>• bmLatencyReliability contains 8 (medium.best) since medium.best is required for all transfers from a PHG to a PHD.</li> <li>• bOpaqueDataSize between 0 and EP max packet size minus 21)</li> </ul> </li> <li>▪ In step 4, a new Metadata message preamble is detected after "bNumTransfers" messages are sent by the host.</li> </ul>
<b>Notes</b>	

<b>TP Id</b>	TP/PHDC/HOS/MDMP/TRANS/BV-000_B		
<b>TP label</b>	Number of transfers after a Metadata Message Preamble (PHD to PHG)		
<b>Coverage</b>	<b>Spec</b>	[USB DevClass]	
	<b>Testable items</b>	SendMetaData 4; M	MetaDataPream 8; M
<b>Test purpose</b>	Check that: After the simulated device issues a Meta-Data Message Preamble, Host acknowledges the next count of bNumTransfers data transfers and the next Meta-Data Message Preamble		
<b>Applicability</b>	C_HOST_PHDC_003 AND C_MAN_OXP_038 AND C_MAN_OXP_000		
<b>Other PICS</b>			
<b>Initial condition</b>	The simulated device is plugged into the host under test.		
<b>Test procedure</b>	<ol style="list-style-type: none"> <li>1. Wait until the Metadata message preamble feature is enabled <ol style="list-style-type: none"> <li>a. Connect the host under test and simulated device.</li> <li>b. Wait until the end of the enumeration process.</li> <li>c. Perform an action on the host that enables the Metadata message preamble feature as defined in the PIXIT I_HOST_PHDC_001.</li> <li>d. The simulated device sends an "<b>Association Request</b>". It includes a standard configuration supported by the PHG under test (in case of TH, PO, GM, BPM, WS, AM, IP or PF specializations) or an extended configuration with one optional object (in case of HUB, ST or CV specializations).</li> </ol> </li> </ol>		

	<p>e. The host under test sends a <b>SET_FEATURE(META-DATA)</b> in order to enable the Metadata message preamble feature.</p> <p>2. The host under test will send an "<b>Association Response</b>" preceded by a Metadata message preamble.</p> <p>a. If the PHG under test replies with an Association Response (accepted), the simulated PHD will start the confirmed data sending. The first data will be preceded by a Metadata message preamble with <b>bNumTransfers=5</b>.</p> <p>b. If the PHG under test replies with an Association Response (accepted-unknown-config), the simulated PHD will send the configuration preceded by a Metadata message preamble with <b>bNumTransfers=5</b>. This configuration should be accepted by the PHG and the simulated PHD will start the confirmed data sending.</p> <p>3. The PHG under test acknowledges each simulated PHD message by sending a rors-cmip-confirmed-event-report (in cases 2.a and 2.b) or a result = accepted-unknown-config message in case 2.b).</p> <p>4. After the simulated PHD has sent five transfers (i.e., five confirmed data messages (2a) or one configuration plus four confirmed data messages (2b)), the simulated PHD will send a Metadata preamble followed by another confirmed data message.</p> <p>5. The PHG under test shall acknowledge this last confirmed data message that is preceded by a Metadata message preamble by sending a rors-cmip-confirmed-event-report preceded by a Metadata preamble (if bNumTransfers have already been sent by the PHG).</p>
<b>Pass/Fail criteria</b>	<ul style="list-style-type: none"> <li>▪ In step 3, the PHG under test acknowledges each simulated PHD message.</li> <li>▪ In step 5, the PHG under test acknowledges the last message sent by the simulated PHD that is preceded by a Metadata message preamble.</li> </ul>
<b>Notes</b>	

#### A.7 Subgroup 2.5: Metadata message preamble feature error conditions (ERR)

<b>TP Id</b>	TP/PHDC/HOS/MDMP/ERR/BV-000		
<b>TP label</b>	Metadata Message Preamble expected but not received		
<b>Coverage</b>	<b>Spec</b>	[USB DevClass]	
	<b>Testable items</b>	MetaDataPreamError 2; M	MetaDataPreamError 5; M MetaDataPreamError 6; M
<b>Test purpose</b>	<b>Check that</b> if a Meta-Data Message Preamble is expected but not received by Host under test, it shall send a SET_FEATURE ENDPOINT_HALT request and later a CLEAR_FEATURE ENDPOINT_HALT message to the simulated device.		
<b>Applicability</b>	C_HOST_PHDC_003 AND C_MAN_OXP_038 AND C_MAN_OXP_000		
<b>Other PICS</b>			
<b>Initial condition</b>	The simulated device is plugged into the host under test.		
<b>Test procedure</b>	<p>1. Wait until the Metadata message preamble feature is enabled.</p> <p>a. Connect the host under test and simulated device.</p> <p>b. Wait until the end of the enumeration process.</p> <p>c. Perform an action on the Host that enables the Metadata message preamble feature as defined in the PIXIT I_HOST_PHDC_001.</p> <p>d. The simulated device sends an "<b>Association Request</b>".</p> <p>e. The host under test sends a <b>SET_FEATURE(META-DATA)</b> in order to enable the Metadata message preamble.</p> <p>2. The host under test will send an "<b>Association Response</b>" (accepted, accepted-unknown-config or rejected) or an "<b>Association Abort</b>" message preceded by a Metadata message preamble.</p> <p>3. The simulated device will send a message to the host under test. This message should be preceded by a Metadata message preamble, but it will be omitted in order to check the response of the host. The type of message will depend on the Association Response sent by the host:</p>		

	<ol style="list-style-type: none"> <li>a. If the host under test sends an "<b>Association Response (accepted)</b>", then the simulated device will send confirmed data.</li> <li>b. If the host under test sends an "<b>Association Response (accepted-unknown-config)</b>", then the simulated device will send a configuration.</li> </ol> <ol style="list-style-type: none"> <li>4. As the host expects to receive a Metadata message preamble, it shall send 2 messages: <b>SET_FEATURE ENDPOINT_HALT</b> and <b>CLEAR_FEATURE ENDPOINT_HALT</b>.</li> <li>5. Now, the simulated PHD will send a valid Metadata message preamble that precedes confirmed data (if the PHG under test sent an Association Response (accepted) in step 2) or a configuration (if the PHG under test sent an Association Response (accepted-unknown-config) in step 2).</li> <li>6. The host under test shall acknowledge that transmission.</li> </ol>
<b>Pass/Fail criteria</b>	<ul style="list-style-type: none"> <li>▪ In step 4, the host under test sends a SET_FEATURE ENDPOINT_HALT and a CLEAR_FEATURE ENDPOINT_HALT.</li> <li>▪ In step 6, the host acknowledges a new Metadata message preamble after sending a CLEAR_FEATURE ENDPOINT_HALT by sending a data confirmation (if the simulated PHD sent a confirmed data) or a configuration confirmation (if the PHD sent its configuration).</li> </ul>
<b>Notes</b>	

<b>TP Id</b>	TP/PHDC/HOS/MDMP/ERR/BV-001		
<b>TP label</b>	Metadata Message Preamble received with invalid bmLatencyReliability value.		
<b>Coverage</b>	<b>Spec</b>	[USB DevClass]	
	<b>Testable items</b>	MetaDataPreamError 3; M	MetaDataPreamError 5; M
<b>Test purpose</b>	<p>Check that:</p> <p>If a Meta-Data Message Preamble with an invalid bmLatencyReliability value is received by Host under test, then it sends a SET_FEATURE ENDPOINT_HALT request and later a CLEAR_FEATURE ENDPOINT_HALT message to the simulated device.</p>		
<b>Applicability</b>	C_HOST_PHDC_003 AND C_MAN_OXP_038 AND C_MAN_OXP_000		
<b>Other PICS</b>			
<b>Initial condition</b>	The simulated device is plugged into the host under test.		
<b>Test procedure</b>	<ol style="list-style-type: none"> <li>1. Wait until the Metadata message preamble feature is enabled. <ol style="list-style-type: none"> <li>a. Connect the host under test and simulated device.</li> <li>b. Wait until the end of the enumeration process.</li> <li>c. Perform an action on the host that enables the Metadata message preamble feature as defined in the PIXIT I_HOST_PHDC_001.</li> <li>d. The simulated device sends an "<b>Association Request</b>".</li> <li>e. The host under test sends a <b>SET_FEATURE(META-DATA)</b> in order to enable the Metadata message preamble.</li> </ol> </li> <li>2. The host under test will send an "<b>Association Response</b>" (accepted, accepted-unknown-config or rejected) or an "<b>Association Abort</b>" message preceded by a Metadata message preamble.</li> <li>3. The simulated device will send a message to the host under test. This message will be preceded by a Metadata message preamble with an invalid bmLatencyReliability value (for example, bit 6 set to 1). The type of message will depend on the Association Response sent by the host: <ol style="list-style-type: none"> <li>a. If the host under test sends an "<b>Association Response (accepted)</b>", then the simulated device will send a confirmed data.</li> <li>b. If the host under test sends an "<b>Association Response (accepted-unknown-config)</b>", then the simulated device will send a configuration.</li> </ol> </li> <li>4. As the host has received a Metadata message preamble with an invalid</li> </ol>		

	<p>bmLatencyReliability value, it shall send 2 messages: <b>SET_FEATURE ENDPOINT_HALT</b> and <b>CLEAR_FEATURE ENDPOINT_HALT</b>.</p> <p>5. Now, the simulated PHD will send a valid Metadata message preamble that precedes confirmed data (if the PHG under test sent an Association Response (accepted) in step 2) or a configuration (if the PHG under test sent an Association Response (accepted-unknown-config) in step 2).</p> <p>6. The host under test shall acknowledge that transmission.</p>
<b>Pass/Fail criteria</b>	<ul style="list-style-type: none"> <li>▪ In step 4, the host under test sends a SET_FEATURE ENDPOINT_HALT and a CLEAR_FEATURE ENDPOINT_HALT.</li> <li>▪ In step 6, the host acknowledges a new Metadata message preamble after sending a CLEAR_FEATURE ENDPOINT_HALT by sending a data confirmation (if the simulated PHD sent a confirmed data) or a configuration confirmation (if the PHD sent its configuration).</li> </ul>
<b>Notes</b>	

<b>TP Id</b>	TP/PHDC/HOS/MDMP/ERR/BV-002		
<b>TP label</b>	Metadata Message Preamble received with invalid bNumTransfers value.		
<b>Coverage</b>	<b>Spec</b>	[USB DevClass]	
	<b>Testable items</b>	MetaDataPreamError 4; M	MetaDataPreamError 5; M
<b>Test purpose</b>	<p>Check that:</p> <p>If a Meta-Data Message Preamble with an invalid bNumTransfers value is received by Host under test, then it sends a SET_FEATURE ENDPOINT_HALT request and later a CLEAR_FEATURE ENDPOINT_HALT message to the simulated device.</p>		
<b>Applicability</b>	C_HOST_PHDC_003 AND C_MAN_OXP_038 AND C_MAN_OXP_000		
<b>Other PICS</b>			
<b>Initial condition</b>	The simulated device is plugged into the host under test.		
<b>Test procedure</b>	<ol style="list-style-type: none"> <li>1. Wait until the Metadata message preamble feature is enabled. <ol style="list-style-type: none"> <li>a. Connect the host under test and simulated device.</li> <li>b. Wait until the end of the enumeration process.</li> <li>c. Perform an action on the host that enables the Metadata message preamble feature as defined in the PIXIT I_HOST_PHDC_001.</li> <li>d. The simulated device sends an "<b>Association Request</b>".</li> <li>e. The host under test sends a <b>SET_FEATURE(META-DATA)</b> in order to enable the Metadata message preamble.</li> </ol> </li> <li>2. The host under test will send an "<b>Association Response</b>" (accepted, accepted-unknown-config or rejected) or an "<b>Association Abort</b>" message preceded by a Metadata message preamble.</li> <li>3. The simulated device will send a message to the host under test. This message will be preceded by a Metadata message preamble with an invalid bNumTransfers value (bNumTransfers = 0). The type of message will depend on the Association Response sent by the host: <ol style="list-style-type: none"> <li>a. If the host under test sends an "<b>Association Response (accepted)</b>", then the simulated device will send a confirmed data.</li> <li>b. If the host under test sends an "<b>Association Response (accepted-unknown-config)</b>", then the simulated device will send a configuration.</li> </ol> </li> <li>4. As the host has received a Metadata message preamble with an invalid bNumTransfers value, it shall send 2 messages: <b>SET_FEATURE ENDPOINT_HALT</b> and <b>CLEAR_FEATURE ENDPOINT_HALT</b>.</li> <li>5. Now, the simulated PHD will send a valid Metadata message preamble that precedes confirmed data (if the PHG under test sent an Association Response (accepted) in step 2) or a configuration (if the PHG under test sent an Association Response (accepted-unknown-config) in step 2).</li> </ol>		

	6. The host under test shall acknowledge that transmission.
<b>Pass/Fail criteria</b>	<ul style="list-style-type: none"> <li>▪ In step 4, the host under test sends a SET_FEATURE ENDPOINT_HALT and a CLEAR_FEATURE ENDPOINT_HALT.</li> <li>▪ In step 6, the host acknowledges a new Metadata message preamble after sending a CLEAR_FEATURE ENDPOINT_HALT by sending a data confirmation (if the simulated PHD sent a confirmed data) or a configuration confirmation (if the PHD sent its configuration).</li> </ul>
<b>Notes</b>	

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