Over-the-air Bootload Cluster

Protocol Implementation Conformance Statement (PICS)

Revision 10

Sponsored by:
ZigBee Alliance

Accepted for release by:
ZigBee Alliance Board of Directors.

Abstract:
This document lists PICS for the Over-the-air Bootload cluster.

Abstract:
Provides a pro-forma on which the capabilities and options of a particular implementation of the Over-the-air Bootload cluster can be stated.

Keywords:
Qualification, Certification, Metering, Energy Management

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References

The following standards contain provisions, which, through reference in this document, constitute provisions of this standard. All the standards listed are normative references. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

1.1 ZigBee Alliance documents

[R1] ZigBee document 053474r21: ZigBee Specification

[R2] ZigBee document 075356r20: ZigBee Smart Energy Standard Specification - Revision 20

[R3] ZigBee document 075123r06, ZigBee Cluster Library Specification

[R4] ZigBee document 04300r08: ZigBee Network Layer PICS

[R5] ZigBee document 064147r07: ZigBee Application Layer PICS

[R6] ZigBee document 043171r04: ZigBee Security Layer PICS

[R7] ZigBee document 064113r07: ZigBee Cluster Library PICS

[R8] ZigBee document 08-0006-06: ZigBee 2015 Layer PICS and Stack Profiles

[R9] ZigBee document number 14-0135-14: ZigBee ZCL Chapter 11 Over-The-Air Upgrading

[R10] ZigBee document number 09-5473-09: ZigBee OTA Upgrade Cluster Test Specification

1.2 IEEE documents

[R11] IEEE Standard for Part 15.4: Wireless Medium Access Control (MAC) and Physical Layer (PHY) specifications for Low Rate Wireless Personal Area Networks (LR-WPANs), 2003.

1.3 ISO documents

[R12] ISO/IEC 9646-1:1991, Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts.

[R13] ISO/IEC 9646-7:1995, Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 7. Implementation conformance statements.

Change history

The following table shows the change history for this specification.

Table 1 – Revision change history

Revision	Version	Description
R00	-	Initial draft
R01	0.1	Added OTA Upgrade Cluster parameters, attributes and functions
R02	0.1	Cleanup typos and fix errors
R03	0.1	Turn on track changes. Added OTA Upgrade Recovery section.
R04	0.1	Updates based on revision 08 of OTA Upgrade cluster specification (095264).
R05	0.1	Updates based on revision 12 of OTA Upgrade cluster specification
R06	0.9	The document is badly out of date and formatted poorly. So I have completely recreated it based off the SE1.1 PICS to insure correct formatting, and then imported the appropriate PICS items. I added, changed, and removed other items that were not up-to-date.
R07		?
R08	1.0	Smart Energy 1.1 Release including support for OTA
R09	1.1	Smart Energy 1.1.1 Release CCB 1454 CCB 1374
R10	1.2	Smart Energy Release 1.2b

2 Introduction

To evaluate conformance of a particular implementation, it is necessary to have a statement of which capabilities and options have been implemented for a given standard. Such a statement is called a protocol implementation conformance statement (PICS).

2.1 Scope

This document provides the protocol implementation conformance statement (PICS) pro-forma for the ZigBee specifications cited in Reference [R2] in compliance with the relevant requirements, and in accordance with the relevant guidance, given in ISO/IEC 9646-7.

This document addresses the ZigBee SE Application Profile.

2.2 Purpose

The supplier of a protocol implementation claiming to conform to the ZigBee SE Application Profile shall complete the following PICS pro-forma and accompany it with the information necessary to identify fully both the supplier and the implementation.

The PICS is in the form of answers to a set of questions in the PICS pro-forma. The questions in a pro-forma consist of a systematic list of protocol capabilities and options as well as their implementation requirements. The implementation requirement indicates whether implementation of a capability is mandatory, optional, or conditional depending on options selected. When a protocol implementer answers questions in a PICS pro-forma, they would indicate whether an item is implemented or not, and provide explanations if an item is not implemented.

3 Abbreviations and special symbols

Notations for requirement status:

M	Mandatory
O	Optional
O.n	Optional, but support of at least one of the group of options labeled O.n is required.
N/A	Not applicable
X	Prohibited
Item Number: :*Status*	Status is conditional on support of item number

"*Item Number*": Conditional, status dependent upon the support marked for the "*Item Number*".

For example, FD1: O.1 indicates that the status is optional but at least one of the features described in FD1 is required to be implemented, if this implementation is to follow the standard of which this PICS Pro-forma is a part.

4 Instructions for completing the PICS pro-forma

If a given implementation is claimed to conform to this standard, the actual PICS pro-forma to be filled in by a supplier shall be technically equivalent to the text of the PICS pro-forma in this annex, and shall preserve the numbering and naming and the ordering of the PICS pro-forma.

A PICS which conforms to this document shall be a conforming PICS pro-forma completed in accordance with the instructions for completion given in this annex.

The main part of the PICS is a fixed-format questionnaire, divided into five tables. Answers to the questionnaire are to be provided in the rightmost column, either by simply marking an answer to indicate a restricted choice (such as Yes or No), or by entering a value, set, or range of values.

5 Identification of the implementation

Implementation under test (IUT) identification

IUT name:
_____

IUT version:
_____

_____

System under test (SUT) identification

SUT name:
_____

Software Version:
_____

Hardware Version:

_____

Operating system (optional):
_____

Specification Versions Implemented

OTA Specification Document Number (include revision): _____

OTA Test Specification Document (include revision): _____

Product supplier

Name: [Submission company name]

Address: _____

_____

Telephone number: _____

Facsimile number: _____

Email address: _____

Additional information: _____

Client

Name: _____

Address: _____

_____

Telephone number: _____

Facsimile number: _____

Email address: _____

Additional information: _____

PICS contact person

Name: _____

Address: _____

_____

Telephone number:
_____

Facsimile number:
_____

Email address: _____

Additional information:
_____

PICS/System conformance statement

6 Identification of the protocol

This PICS pro-forma applies to ZigBee SE Application Standard, cited in Reference [R2].

7 Global statement of conformance

The implementation described in this PICS pro-forma meets all of the mandatory requirements of the referenced standards:

Application Profile: ZigBee SE – 075356r20
Cluster Profile : Over-the-air Bootload – 14-0135-14

- (•) Yes
- ( ) No

Note -- Answering 'No' indicates non-conformance to the specified protocol standard. Non-supported mandatory capabilities are to be identified in the following tables, with an explanation by the implementer explaining why the implementation is non-conforming.

The supplier will have fully complied with the requirements for a statement of conformance by completing the statement contained in this sub-clause. That means, by clicking the above, the statement of conformance is complete.

8 PICS pro-forma tables

The following tables are composed of the detailed questions to be answered, which make up the PICS pro-forma.

8.1 OTA Upgrade Device Classes

Table 2 - OTA Upgrade Device Classes

Item number	Item description	Reference	Status	Support
OUDC1	Is the OTA upgrade cluster supported as an upgrade client?	[R9]	O	Y
OUDC2	Is the OTA upgrade cluster supported as an upgrade server?	[R9]	O	Y

Table 3 - ZigBee Device Classes

Item number	Item description	Reference	Status	Support
ZDC1	Is the device capable of acting as a ZigBee Coordinator (ZC) or a ZigBee Router (ZR)?	[R1]	O	Y
ZDC2	Is the device capable of acting as a ZigBee End Device (ZED)?	[R1]	O	Y

8.2 OTA Upgrade Image

Table 4 - OTA Upgrade Image

Item number	Item description	Reference	Status	Support
OUI1	Is the OTA upgrade file format supported?	[R9] 11.4	**M**	Y

Item number	Item description	Reference	Status	Support
OUI2a	Is the OTA upgrade file format supported with the ECDSA Crypto Suite 1 signature tag?	[R2] D.8.1	**O.1**[1]	N
OUI2b	Is the OTA upgrade file format supported with the ECDSA Crypto Suite 2 signature tag?	[R2] D.8.1	**O.1**[1]	N

8.3 OTA Upgrade Server Discovery

Table 5 - OTA Upgrade Server Discovery

Item number	Item description	Reference	Status	Support
OUSD1	Is Upgrade Server Discovery supported?	[R9] 11.8	OUDC1:**M**	Y

8.4 OTA Upgrade Attributes

Table 6 - OTA Upgrade Cluster Client Attributes

Item number	Item description	Reference	Status	Support
OUA1	Does the device support the *UpgradeServerID* attribute?	[R9] 11.10.1	OUDC1:**M**	Y
OUA2	Does the device support the *FileOffset* attribute?	[R9] 11.10.2	OUDC1:O	Y
OUA3	Does the device support the *CurrentFileVersion* attribute?	[R9] 11.10.3	OUDC1:O	Y
OUA4	Does the device support the *CurrentZigbeeStackVersion* attribute?	[R9] 11.10.4	OUDC1:O	Y
OUA5	Does the device support the *DownloadFileVersion* attribute?	[R9] 11.10.5	OUDC1:O	Y

[1] Device must support OUA2a and/or OUA2b

Item number	Item description	Reference	Status	Support
OUA6	Does the device support the *DownloadZigbeeStackVersion* attribute?	[R9] 11.10.6	OUDC1:O	Y
OUA7	Does the device support the *ImageUpgradeStatus* attribute?	[R9] 11.10.7	OUDC1:**M**	Y
OUA8	Does the device support the *ManufacturerID* attribute?	[R9] 11.10.8	OUDC1:O	Y
OUA9	Does the device support the *ImageTypeID* attribute?	[R9] 11.10.9	OUDC1:O	Y
OUA10	Does the device support the *MinimumBlockPeriod* attribute?	[R9] 11.10.10	OUDC1:O	Y
OUA11	Does the device support the *Image Stamp* attribute?	[R9] 11.10.11	OUDC1:O	Y
OUA12	Does the device support the *UpgradeActivationPolicy* attribute?	[R9] 11.10.12	OUDC1:O	N
OUA13	Does the device support the *UpgradeTimeoutPolicy* attribute?	[R9] 11.10.13	OUDC1:O	N

8.5 OTA Incoming Message Processing

Table 7 – OTA Incoming Message Processing Client

Item number	Item description	Reference	Status	Support
OIMPC1	Does the device support reception and processing of the *Image Notify* message?	[R9] 11.13.3	OUDC1:**O** [2]	Y
OIMPC2	Does the device support reception and processing of the *Query Next Image Response* message?	[R9]11.13.5	OUDC1:**M**	Y
OIMPC3	Does the device support reception and processing of the *Image Block Response* message?	[R9] 11.13.8	OUDC1:**M**	Y

[2] CCB 1454 and 1374

Item number	Item description	Reference	Status	Support
OIMPC4	Does the device support reception and processing of the *Upgrade End Response* message?	[R9] 11.13.9.6	OUDC1:**M**	Y
OIMPC5	Does the device support reception and processing of the *Query Specific File Response* message?	[R9] 11.13.11	OUDC1:O	Y

Table 8 - OTA Incoming Message Processing Server

Item number	Item description	Reference	Status	Support
OIMPS1	Does the device support reception and processing of the *Query Next Image Request* message?	[R9] 11.13.4	OUDC2:**M**	Y
OIMPS2	Does the device support reception and processing of the *Image Block Request* message?	[R9] 11.13.6	OUDC2:**M**	Y
OIMPS3	Does the device support reception and processing of the *Upgrade End Request* message?	[R9] 11.13.9	OUDC2:**M**	Y
OIMPS4	Does the device support reception and processing of the *Image Page Request* message?	[R9] 11.13.7	OUDC2:O	N
OIMPS5	Does the device support reception and processing of the *Query Specific File Request* message?	[R9] 11.13.10	OUDC2:O	Y

8.6 OTA Outgoing Message Transmission

Table 9 - OTA Outgoing Message Transmission Client

Item number	Item description	Reference	Status	Support
OOMTC1	Does the device support transmission of the *Query Next Image Request* message?	[R9] 11.13.4	OUDC1:**M**	Y
OOMTC2	Does the device support transmission of the *Image Block Request* message?	[R9] 11.13.6	OUDC1:**M**	Y
OOMTC3	Does the device support transmission of the *Upgrade End Request* message?	[R9] 11.13.9	OUDC1:**M**	Y
OOMTC4	Does the device support transmission of the *Image Page Request* message?	[R9] 11.13.7	OUDC1:O	N
OOMTC5	Does the device support transmission of the *Query Specific File Request* message?	[R9] 11.13.10	OUDC1:O	Y
OOMTS6	Does the device send all supported OTA messages using APS encryption (except broadcast messages)?	[R2] D.8.1	OUDC1:**M**	N

Table 10 - OTA Outgoing Message Transmission Server

Item number	Item description	Reference	Status	Support
OOMTS1	Does the device support transmission of the *Image Notify* message?	[R9] 11.13.3	OUDC2:O	Y
OOMTS2	Does the device support transmission of the *Query Next Image Response* message?	[R9] 11.13.5	OUDC2:**M**	Y
OOMTS3	Does the device support transmission of the *Image Block Response* message?	[R9] 11.13.8	OUDC2:**M**	Y
OOMTS4	Does the device support transmission of the *Upgrade End Response* message?	[R9] 11.13.9.6	OUDC2:**M**	Y

Item number	Item description	Reference	Status	Support
OOMTS5	Does the device support transmission of the *Query Specific File Response* message?	[R9] 11.13.11	OUDC2:O	Y
OOMTS6	Does the device send all supported OTA messages using APS encryption (except broadcast messages)?	[R2] D.8.1	OUDC2:**M**	N

8.7 OTA Upgrade Policies

Table 11 - OTA Upgrade Policies Client

Item number	Item description	Reference	Status	Support
OUPC0a	Does the device support an in-band mechanism for image activation	[R9] 11.10.12	OUDC1:**O.1**[3]	Y
OUPC0b	Does the device support an out-of-scope mechanism for image activation	[R9] 11.10.12	OUDC1:**O.1**[3]	N
OUPC1	Does the device support cryptographic verification of images signed using ECDSA?	[R2] D.8.1	OUDC1:**M**	N
OUPC2	Does the device support aborting an active download on reception of an *Image Block Response* with a status of ABORT?	[R9] 11.13.8	OUDC1:**M**	Y
OUPC3	Does the device support an abort after a file has been downloaded on reception of a Default Response with a status of ABORT in response to an *Upgrade End Request*?	[R9] 11.13.9.4	OUPC0a :**M**	N
OUPC4	Does the device support processing an *Image Block Response* with a status of WAIT_FOR_DATA?	[R9] 11.13.8.4	OUDC1:**M**	Y

[3] A client device supporting OTA cluster shall support OUPC0a OR OUPC0b

Item number	Item description	Reference	Status	Support
OUPC5	Does the device support sending REQUIRE_MORE_IMAGE in the *Upgrade End Request* after it has finished a download (i.e. does it require multiple images to upgrade)?	[R9] 11.13.9.3	OUDC1:**O**	Y
OUPC6	Does the device support a time delayed upgrade sent back from the server in the *Upgrade End Response* message?	[R9] 11.13.9.6.8	OUPC0a:**O**	Y
OUPC7	Does the device support waiting for a separate Upgrade End response command from the OTA server at a later time? (i.e. the server initially sends an *Upgrade End Response* with a *UpgradeTime* value of 0xFFFFFFFF and later sends an *Upgrade End Response* with a *UpgradeTime* value other than 0xFFFFFFFF)	[R9] 11.11.4	OUPC0a:**O**	Y
OUPC8	Does the device always respond to a unicast *Image Notification* message from the OTA server?	[R9] 11.13.3.4	ZDC1 & OUDC1:**M** [4]	Y
OUPC9	Does the device support periodic discovery of an OTA server if it has not found one previous in the network, at a rate of at least once per day?	[R2] D.8.1	OUDC1:**M**	N
OUPC10	Does the device support periodic query for a new upgrade image at a rate of at least once per day?	[R2] D.8.1	OUDC1:**M**	Y
OUPC11	Does the device support sending new *Image Block Request* commands when it is downloading a new image at a rate of at least once per hour?	[R2] D.8.1	OUDC1:**M**	Y

Table 12 - OTA Upgrade Policies Server

Item number	Item description	Reference	Status	Support
OUPS1	Does the server support responding to a *Query Next Image Request* with a response that has a version number higher than in the request (upgrade)?	[R9] 11.13.5	OUDC2:**M**	Y

[4] Only devices that are both a ZDC1 and OUDC1 are required to support this.

Item number	Item description	Reference	Status	Support
OUPS2	Does the server support responding to a *Query Next Image Request* with a response that has a version number lower than in the request (downgrade)?	[R9] 11.13.5	OUDC2:**O**	N
OUPS3	Does the server support responding to a *Query Next Image Request* with a response that has a version number the same as in the request (re-install)?	[R9] 11.13.5	OUDC2:**O**	N
OUPS4	Does the server support sending a *Default Response* with status of NO_IMAGE_AVAILABLE when it receives an *Image Block Request* for a file that it does not have?	[R9] 11.13.6.5.2	OUDC2:**M**	N