

1

2



ZigBee[®] Alliance

3

4

5 **ZigBee Document 10-5468-05**
6 **ZigBee IP Platform PICS**

7

8 **Revision 05**

9

10 January 2013

11 **Sponsored by:**
12 ZigBee Alliance

13 **Accepted for release by:**
14 This document has not yet been accepted for release by the ZigBee Alliance Board of
15 Directors.

16

17 **Abstract:**

18

19 **Keywords:**
20 ZigBee IP

21

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23

Copyright © ZigBee Alliance, Inc. (2008-2013). All rights Reserved. This information within this document is the property of the ZigBee Alliance and its use and disclosure are restricted. Elements of ZigBee Alliance specifications may be subject to third party intellectual property rights, including without limitation, patent, copyright or trademark rights (such a third party may or may not be a member of ZigBee). ZigBee is not responsible and shall not be held responsible in any manner for identifying or failing to identify any or all such third party intellectual property rights. This document and the information contained herein are provided on an "AS IS" basis and ZigBee DISCLAIMS ALL WARRANTIES EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO (A) ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OF THIRD PARTIES (INCLUDING WITHOUT LIMITATION ANY INTELLECTUAL PROPERTY RIGHTS INCLUDING PATENT, COPYRIGHT OR TRADEMARK RIGHTS) OR (B) ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE OR NON-INFRINGEMENT. IN NO EVENT WILL ZIGBEE BE LIABLE FOR ANY LOSS OF PROFITS, LOSS OF BUSINESS, LOSS OF USE OF DATA, INTERRUPTION OF BUSINESS, OR FOR ANY OTHER DIRECT, INDIRECT, SPECIAL OR EXEMPLARY, INCIDENTAL, PUNITIVE OR CONSEQUENTIAL DAMAGES OF ANY KIND, IN CONTRACT OR IN TORT, IN CONNECTION WITH THIS DOCUMENT OR THE INFORMATION CONTAINED HEREIN, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH LOSS OR DAMAGE. All Company, brand and product names may be trademarks that are the sole property of their respective owners. The above notice and this paragraph must be included on all copies of this document that are made.

ZigBee Alliance, Inc.
2400 Camino Ramon, Suite 375
San Ramon, CA 94583, USA



1 **Contact information**

2 Much of the information in this document is preliminary and subject to change. Members of the ZigBee
3 Working Group are encouraged to review and provide inputs for this proposal. For document status
4 updates, please contact:

5 Joseph Reddy
6 Texas Instruments
7 9276 Scranton Rd
8 San Diego, CA 92121
9 jreddy@ti.com

10
11

12 You can also submit comments using the ZigBee Alliance reflector. Its web site address is:

13 www.zigbee.org

14 The information on this page should be removed when this document is accepted.

1 **Participants**

2 The following is a list of those who were members of the ZigBee Alliance Core Stack Working Group
3 leadership when this document was released:

4 **Don Sturek:** *Chair*

5 **Daniel Gavelle:** *Vice Chair*

6 **Tim Gilman:** *Secretary*

7

8

9 The editing team was composed of the following members:

10

11

12

13

14

15

16

Joseph Reddy – TI, Technical Editor ZigBee IP

Robert Cragie – Grid2Home, Technical Editor ZigBee IP

Rob Alexander: Silicon Labs, Technical Editor ZigBee/ZigBee PRO

Mads Westergreen – Ubilogix, Technical Editor ZigBee/ZigBee PRO

Nicolas Cochard – Schneider, Technical Editor Greenpower

Bozena Erdmann – Philips, Technical Editor Greenpower

1 **Table of Contents**

2 1 Introduction 8

3 1.1 Scope 8

4 1.2 Purpose 8

5 2 References 9

6 2.1 ZigBee Alliance documents 9

7 2.2 IEEE documents 9

8 2.3 ISO documents 9

9 3 Abbreviations and special symbols 10

10 4 Instructions for completing the PICS proforma 11

11 5 Identification of the implementation 12

12 6 PICS proforma tables 13

13 6.1 Physical Layer Interface 13

14 6.2 Network Device Types 13

15 6.3 IEEE 802.15.4-2006 MAC Support 14

16 6.4 6LowPAN Adaptation Layer Support 15

17 6.5 Network Layer Support 15

18 6.6 Transport Layer 16

19 6.7 Network Authentication 17

20 6.8 Mesh Link Establishment 18

21 6.9 Device Functional Compliance 19

22

1 List of Tables

2	Table 1 – Document revision change history	vii
3	Table 2 – Physical Layer Interface	13
4	Table 3 - Network Device Types.....	13
5	Table 4 – IEEE 802.15.4-2006 MAC Compliance.....	14
6	Table 5 – IETF 6LoWPAN Adaptation Layer Compliance	15
7	Table 6 –Network Layer Compliance	15
8		

1 **Change history**

2 Table 1 shows the change history for this specification.

3

Table 1 – Document revision change history

Revision	Description
00	Initial outline of document
01	Initial draft of document
02	Updated with changes corresponding to r23 of ZigBee IP specification
03	Updated format to follow ZigBee Pro PICS document, add reference to MAC/PHY test plan and changes from certification event
04	Modify header
05	Convert to pdf

1 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).

1.1 Scope

This document provides the protocol implementation conformance statement (PICS) proforma for ZigBee IP specification in compliance with the relevant requirements, and in accordance with the relevant guidance, given in ISO/IEC 9646-7.

1.2 Purpose

The supplier of a protocol implementation claiming to conform to the ZigBee IP specification shall complete the following PICS proforma and accompany it with the information necessary to identify fully both the supplier and the implementation.

The protocol implementation conformance statement (PICS) of a protocol implementation is a statement of which capabilities and options of the protocol have been implemented. The statement is in the form of answers to a set of questions in the PICS proforma. The questions in a proforma 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 proforma, they would indicate whether an item is implemented or not, and provide explanations if an item is not implemented.

2 References

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

2.1 ZigBee Alliance documents

- [R1] ZigBee IP Specification, ZigBee Document Number 095023r29, January 2013
- [R2] ZigBee IEEE 802.15.4 PHY & MAC Layer Test Specification release r01, ZigBee document 04-0319r01

2.2 IEEE documents

- [R3] 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), 2006.

2.3 ISO documents

- [R4] ISO/IEC 9646-1:1991, Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts.
- [R5] ISO/IEC 9646-7:1995, Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 7. Implementation conformance statements.

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
<i>Item Number</i> : : <i>Status</i>	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 Proforma is a part.

4 Instructions for completing the PICS proforma

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

A PICS which conforms to this document shall be a conforming PICS proforma completed in accordance with the instructions for completion given in this section.

The main part of the PICS is a fixed-format questionnaire, divided. 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

System under test (SUT) identification

SUT name: Q70

Software Version: 0.5

Hardware Version: 6

Operating system (optional): _____

Specification Version Numbers at time of certification

ZigBee IP Specification Revision: 12-0572-09 *sh*

Approved Errata Text to the ZigBee IP Specification (if any): —

ZigBee IP Test Plan Revision: 12-0227-09

Approved Errata Text to the ZigBee IP Test Plan (if any): —

Product supplier Contact Information

Company Name: Exegin Technologies Limited

Contact Name: Leslie Mulder

Address: 401-2071, Kingsway Ave
Port Courtenay, BC, CANADA, V3C 6N2

Telephone number: 616 604 468 2552

Facsimile number: _____

Email address: l.m@exegin.com

Additional information: _____

Signature 

6 PICS proforma tables

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

6.1 Physical Layer Interface

Table 2 – Physical Layer Interface

Item number	Item description	Reference	Status	Support
PHY1	Does the device employ: A 2450 MHz DSSS PHY employing O-QPSK modulation	[R1]/5.1 [R3]/6.1	O.1	Yes
PHY2	Does the device employ: An 868/915 MHz direct sequence spread spectrum (DSSS) PHY employing binary phase-shift keying (BPSK) modulation	[R1]/5.1 [R3]/6.1	O.1	
PHY3	Does the device employ: An 868/915 MHz DSSS PHY employing offset quadrature phase-shift keying (O-QPSK) modulation	[R1]/5.1 [R3]/6.1	O.1	
PHY4	Does the device employ: An 868/915 MHz parallel sequence spread spectrum (PSSS) PHY employing BPSK and amplitude shift keying (ASK) modulation	[R1]/5.1 [R3]/6.1	O.1	

6.2 Network Device Types

Table 3 - Network Device Types

Item number	Item description	Reference	Status	Support
FDT1	Is this device capable of acting as a ZigBee IP Coordinator?	[R1]/6.1	O.2	Yes
FDT2	Is this device capable of acting as a ZigBee IP Router?	[R1]/6.1	O.2	Yes

Item number	Item description	Reference	Status	Support
FDT3	Is this device capable of acting as a ZigBee IP Host?	[R1]/6.1	O.2	Yes

6.3 IEEE 802.15.4-2006 MAC Support

Table 4 – IEEE 802.15.4-2006 MAC Compliance

Item number	Item description	Reference	Status	Support
MAC1	Does the device support the IEEE 802.15.4-2006 MAC specification as a Full Function Device?	[R1]/5.2	FDT1:M FDT2:M FDT3:O	Yes
MAC2	Does the device support the IEEE 802.15.4-2006 MAC specification as a Reduced Function Device?	[R1]/5.2	FDT1:N/A FDT2:N/A FDT3:M	Yes
MAC3	Does the device have a globally unique EUI-64 address and does the device maintain the address for the lifetime of the device?	[R1]/5.2	M	Yes
MAC4	Does the device support assignment and use of network short addresses (16 bit) that are unique within the personal area network the device is a member?	[R1]/5.2	M	Yes
MAC5	Does the device support the MAC frame security configuration as defined in ZigBee IP specification?	[R1]/5.10	M	Yes

6.4 6LoWPAN Adaptation Layer Support

Table 5 – IETF 6LoWPAN Adaptation Layer Compliance

Item number	Item description	Reference	Status	Support
6LO1	Does the device support the 6LoWPAN header compression?	[R1]/5.3	M	Yes
6LO2	Does the device support the list of IP addressing modes, MAC addressing modes and header compression modes detailed in RFC 6282?	[R1]/5.3	M	Yes
6LO3	Does the device support the default context and upto MIN_6LP_CID_COUNT for the purposes of IP header compression?	[R1]/5.3.2	M	Yes
6LO4	Does the device support 6LoWPAN fragmentation ?	[R1]/5.3	M	Yes

6.5 Network Layer Support

Table 6 –Network Layer Compliance

Item number	Item description	Reference	Status	Support
NET1	Does the device support the IPv6 protocol?	[R1]/5.4	M	Yes
NET3	Does the device support the ICMPv6 protocol including the echo request and echo reply messages?	[R1]/5.4	M	Yes
NET4	Does the device support the neighbor discovery protocol described for 6LoWPAN?	[R1]/5.4	M	Yes
NET5	Does the device support the RPL protocol with configuration defined in ZigBee IP specification?	[R1]/5.4.2	FDT1:M FDT2:M FDT3:X	Yes

Item number	Item description	Reference	Status	Support
NET6	Does the device support the RPL MrHOF Objective Function with configuration defined in ZigBee IP specification?	[R1]/5.4.2.2	FDT1:M FDT2:M FDT3:X	Yes
NET7	Does the device support the RPL DAG configuration provided for ZigBee IP?	[R1]/5.4.2	FDT1:M FDT2:M FDT3:X	Yes
NET8	Is the device capable of joining atleast MIN_RPL_INSTANCE_COUNT number of RPL instances?	[R1]/5.4.2	FDT2:M FDT3: M	Yes
NET9	Is the device capable of starting an RPL Instance and acting as the DoDAG Root?	[R1]/5.4.2	FDT1: M FDT2: O FDT3: X	Yes
NET10	Is the device capable of selecting at least RPL_MIN_DAO_PARENT number of DAO parents for configuration of downward routes?	[R1]/5.4.2	FDT1:N/A FDT2:M FDT3:X	Yes
NET11	Is the device capable of originating IPv6 subnet-local multicast packets?	[R1]/5.4.4.2	FDT1:M FDT2:M FDT3:M	Yes
NET12	Is the device capable of originating IPv6 site-local multicast packets?	[R1]/5.4.4.2	FDT1:M FDT2:M FDT3:M	Yes
NET13	Is the device capable of forwarding IPv6 subnet-local multicast packets using MPL protocol with configuration parameters defined in ZigBee IP specification?	[R1]/5.4.4.2	FDT1:M FDT2:M FDT3:X	Yes

6.6 Transport Layer

Table 7: Transport Layer Compliance

Item number	Item description	Reference	Status	Support
TRNSPRT1	Does the device support the TCP protocol?	[R1]/5.5	M	Yes
TRNSPRT2	Does the device support the UDP protocol?	[R1]/5.5	M	Yes

6.7 Network Authentication

Table 8: Network Authentication Compliance

Item number	Item description	Reference	Status	Support
AUTH1	Does the device support the PANA network authentication protocol in the role of Authentication Agent?	[R1]/5.6	FDT1:M FDT2:X FDT3:X	Yes
AUTH2	Does the device support the PANA network authentication protocol in the role of client?	[R1]/5.6	FDT1:X FDT2:M FDT3:M	Yes
AUTH3	Does the device support the PANA Relay protocol?	[R1]/5.6	FDT1:X FDT2:M FDT3:X	Yes
AUTH4	Does the device support the EAP authentication framework and EAP-TLS method in the role of EAP Authenticator?	[R1]/5.7	FDT1:M FDT2:X FDT3:X	Yes
AUTH5	Does the device support the EAP authentication framework and EAP-TLS method in the role of EAP Peer?	[R1]/5.7	FDT1:X FDT2:M FDT3:M	Yes
AUTH6	Does the device support the EAP-TLS fragmentation?	[R1]/5.8.2	M	Yes

Item number	Item description	Reference	Status	Support
AUTH7	Does the device support the TLS-PSK ciphersuite with configuration defined in ZigBee IP specification?	[R1]/5.9	O	Yes
AUTH8	Does the device support the TLS-ECC ciphersuite with configuration defined in ZigBee IP specification?	[R1]/5.9	M	Yes
AUTH9	Does the device support the PANA ZigBee Alliance vendor-specific Network key AVP defined in ZigBee IP specification?	[R1]/5.6	M	Yes
AUTH10	Does the device support the PANA ZigBee Alliance vendor-specific Key request AVP defined in ZigBee IP specification?	[R1]/5.6	O	Yes
AUTH11	Does the device support the Enforcement point function?	[R1]/6.9.2	M	Yes

6.8 Mesh Link Establishment

Table 9: MLE Compliance

Item number	Item description	Reference	Status	Support
MLE1	Does the device support the transmission and reception of MLE Link configuration messages?	[R1]/5.11	M	Yes
MLE2	Does the device support the transmission and reception of MLE Link Advertisement messages	[R1]/5.11	FDT1:M FDT2:M FDT3:X	Yes
MLE3	Does the device support the origination of MLE Link Update messages?	[R1]/5.11	FDT1:M FDT2:X FDT3:X	Yes
MLE4	Does the device reception of MLE Link Update messages?	[R1]/5.11	FDT1:N/A FDT2:M FDT3:M	Yes

6.9 Device Functional Compliance

Table 10 – Device Functional Compliance

Item number	Item description	Reference	Status	Support
FNC1	Does the device support the Network Formation procedure described in ZigBee IP specification?	[R1]/6.2	FDT1:M FDT2: FDT3: X	Yes
FNC2	Does the device support the Host bootstrapping procedure defined in ZigBee IP specification?	[R1]/6.5.1	FDT1:X FDT2:X FDT3:M	Yes
FNC3	Does the device support the Router bootstrapping procedure defined in ZigBee IP specification?	[R1]/6.5.2	FDT1:X FDT2:M FDT3:X	Yes
FNC5	Does the device support the configuration and transmission of the beacon payload described in ZigBee IP specification?	[R1]/6.3	FDT1:M FDT2:M FDT3:X	Yes

