



ZigBee Smart Energy Protocol Implementation Conformance Statement

| | | |
|---|------------------------------------|--|
| Manufacturer: | Digi International, Inc. | |
| Product Type: | Smart Energy Range Extender Device | |
| Product Name: | Smart Energy Wall Router | |
| Firmware Revision: | 3423 | |
| <i>Tested ZigBee Smart Energy Spec version:</i> | 075356r15 | |

Disclaimer:

The information provided in this document can be made available to the general public in order to identify the tested versions, features and options.

By signing this document, the manufacturer confirms that all information provided in this document is correct and the applicable features have been tested.

Manufacturer name: _____ Digi International, Inc. _____

Representative name and title: _____ Robert Byard, Principal Firmware Engineer _____

Signature: _____ *Robert Byard* _____

Date: _____ *June 17, 2010* _____

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 053474r17: ZigBee Specification 2007
- [R2] ZigBee document 064321r08, ZigBee Stack Profile
- [R3] ZigBee document 074855r04, ZigBee PRO Stack Profile
- [R4] ZigBee document 075356r15: ZigBee SE Application Profile Specification
- [R5] ZigBee document 075123r01, ZigBee Cluster Library Specification
- [R6] ZigBee document 04300r08: ZigBee Network Layer PICS
- [R7] ZigBee document 064147r07: ZigBee Application Layer PICS
- [R8] ZigBee document 043171r04: ZigBee Security Layer PICS
- [R9] ZigBee document 064113r07: ZigBee Cluster Library PICS
- [R10] ZigBee document 08006r03: ZigBee 2007 Layer PICS and Stack Profiles

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.

2 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.

3 Identification of the implementation

Device under test (DUT) identification – Device to be certified as ZigBee Smart Energy product

DUT manufacturer: Digi International, Inc.

DUT name: Smart Energy Wall Router

DUT version (Firmware, Hardware): (3423, 1E41)

DUT used ZigBee Compliance Platform (name, version): XBee-PRO S2B, using an Ember Em250

Is this a revision to an existing product (if yes, which product): Yes. We are recertifying the Smart Energy Range Extender with new firmware (3423).

Manufacturer identification

Name: Digi International, Inc.

Address: 11001 Bren Road E., Minnetonka, MN, 55353

Telephone number: (801) 765 9885 (Lindon, UT office)

Fax number: (801) 765 9895 (Lindon, UT office)

Additional information (optional):

Contact information

Name: Robert Byard

Telephone number: (801) 701 4223

Email address: robert.byard@digi.com

System configuration under test (SUT) identification (only if DUT required additional support hardware/software (PC, external drivers, etc.)

SUT name or configuration (e.g. Desktop PC connected via RS-232):

Software Version:

Hardware Version:

Operating system (optional):

Required for final certification:

- Product marketing description for web postings (50 words)

Digi's Smart Energy Wall Router is a certified ZigBee Smart Energy Range Extender Device. It functions as a parent for end devices, routes messages within a Smart Energy network, increases the area over which a network can operate, and supports redundant links which are essential for a healthy mesh network.

- Product picture for website (can be provided later)
- Web link to associate with certified product on website

<http://www.digi.com/Standards/Smart-Energy/>

If you would like to postpone posting your product on the ZigBee Alliance website for a period of time, please fill out the following section.

_____ (Manufacturer) herewith requests that the submitted product shall not be posted on the ZigBee Alliance product web page until _____ (date).

Name: _____

Signature: _____

4 Global statement of conformance

The implementation described in this PICS proforma meets all of the mandatory requirements of the referenced standards:

Application Profile: ZigBee SE – 075356r15

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.

5 Protocol Implementation Conformance Statement

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

8.1 ZigBee Device Types

Table 1 - Functional device types

| Item number | Item description | Reference | Status | Support |
|-------------|---|----------------|------------------|---------|
| FDT1 | Is this device capable of acting as a ZigBee coordinator? | [R1]/2.5.5.5.1 | ¹ O.1 | N |
| FDT2 | Is this device capable of acting as a ZigBee router? | [R1]/2.5.5.5.2 | O.1 | Y |
| FDT3 | Is this a ZigBee end device? | [R1]/2.5.5.5.3 | O.1 | N |

8.2 Stack Profile

Table 2 –Stack Profile

| Item number | Item description | Reference | Status | Support |
|-------------|--|------------------|------------------|---------|
| ZSP1 | Is the device built on a ZigBee Compliant Platform certified for the ZigBee stack profile [R2]? | [R6] [R4]/5.2 | O.2 ² | N |
| ZSP2 | Is the device built on a ZigBee PRO Compliant Platform certified for the ZigBee PRO stack profile [R3] ? | [R3] [R4]/5.2 | O.2 | Y |

¹ O.1 – Device under test must select only one of these options. Devices under test supporting multiple ZigBee device types must serially re-test using each supported ZigBee device type.

² O.2 – Device under test must be deployed on either of the ZigBee or ZigBee PRO stack profiles.

8.3 Stack Profile extensions for SE

Table 3 – Stack profile extensions for SE

| Item number | Item description | Reference | Status | Support |
|-------------|--|--------------------------------|------------------|---------|
| SPE1 | Does the device support Application Link Keys? | [R4]/5.2 [R8]/ASLS6 | M | Y |
| SPE2 | Does this device use a stack that supports fragmentation? | [R4]/5.2 [R7]/ADF5, ADF6 | M | Y |
| SPE3 | Does this device use any SE Profile Commands that require the use of Fragmentation? | [R4]/5.2 [R7]/ADF5, ADF6 | MC1: M MS1: M | Y |
| SPE4 | Does the device adhere to the polling rate specifications given in [R4]/5.2 (i.e. Does your application poll equal to or less often as called out in the specification)? | [R4]/5.2 | FDT3:M | Y |

8.4 SE general requirements support

Table 4 – SE general requirements support

| Item number | Item description | Reference | Status | Support |
|-------------|--|-------------------------|--------|---------|
| SEG1 | Does the device support the ZigBee Cluster Library? | [R4]/5.10, 5.11 [R5] | M | Y |
| SEG2 | Does the device support the ZigBee Cluster Library List specified for SE including the mandatory/optional clusters detailed in the ZCL PICs? | [R4]/5.10, 5.11 [R9] | M | Y |
| SEG3 | Does the device support the ZigBee Cluster Library with the attribute reporting, reporting configuration and read reporting configuration parameters as detailed in the SE Profile clusters? | [R4]/5.10 [R5] | M | N(1) |

| Item number | Item description | Reference | Status | Support |
|-------------|--|---|---|---------|
| | ED NOTE: Support of attribute reporting is optional. Those devices implementing the attribute reporting mechanism must do so as specified in the ZCL specification. | | | |
| SEG4 | Is the device capable of joining a ZigBee SE network and does it interact with a consumer ZigBee Home Area Network only through a bridge device? | [R4]/5.1 | FDT2: M FDT3: M | Y |
| SEG5 | Does the device support "E-Mode" commissioning? SE Profile requirement: Those devices that will join an existing network must support button pushes or simple documented user interfaces to initiate the joining process. | [R4]/5.1 | FDT2: M FDT3: M For joining devices | Y |
| SEG6 | Deleted | [R4]/5.1 | | |
| SEG7 | Does the device support the compatible Startup Attribute Set, Join Parameters, Security Parameters, End Device Parameters, Link Status Parameters, Concentrator Parameters, APS Transport Parameters and Binding Parameters? | [R4]/5.3, 5.3.1, 5.3.2, 5.3.3, 5.3.4, 5.3.5, 5.3.6, 5.3.7, 5.3.8, 5.3.9 | M | Y |
| SEG8 | Does the device support joining with pre-installed link keys? | [R4]/5.4.1 | FDT2: M FDT3: M | Y |
| SEG9 | Does the device support joining using the key establishment cluster? | [R4]/5.4.7 | FDT2: M FDT3: M | Y |
| SEG10 | Deleted | [R4]/5.5 | | |
| SEG11 | Does the device support the list of SE preferred channels? | [R4]/5.7.1 | O | Y(2) |
| SEG12 | Does the device support the SE broadcast policy? | [R4]/5.7.2 | O | Y |

| Item number | Item description | Reference | Status | Support |
|-------------|--|--------------------------|--------|---------|
| SEG13 | Does the device support the SE frequency agility policy? | [R4]/5.7.3 | O | N |
| SEG14 | Does the device support the security key update policies for SE networks? | [R4]/5.7.4 | M | Y |
| SEG15 | Does the device support the ZCL Time Cluster and SE time synchronization? ED NOTE: Support of the ZCL Time Cluster is not mandatory for all SE devices. The SE device description define the required Time cluster support. | [R4]/5.11.1.1 | O | N |
| SEG16 | Does the device support discovery of optional attributes? | [R4]/5.11 | M | Y |
| SEG17 | Does the device application discover and handle unsupported attributes in other devices? | [R4]/5.11 | M | Y |
| SEG18 | Does the device support an indication to the user that the network has formed properly? | [R4]/5.5.1 | O | Y |
| SEG19 | Does the device support an indication to the user that a device has joined a network successfully? | [R4]/5.5.1 | O | Y |
| SEG20 | Does the device support the commissioning modes and provide supporting commissioning documentation according to network type? | [R4]/5.5.2, 5.5.3, 5.5.4 | M | Y |
| SEG21 | Does the device use the appropriate security key per cluster? | [R4]/5.4.6 | M | Y |
| SEG22 | Does the device support the SE Mirrored Device Capacity – Service Discovery? | [R4]/5.7.5 | O | N |

8.5 ZigBee SE device description support

Table 5 – SE device description support

| Item number | Item description | Reference | Status | Support |
|-------------|---|------------|------------------|---------|
| SED1 | Is the product programmed as an Energy Service Portal? | [R4]/6.3.1 | O.3 ³ | N |
| SED2 | Is the product programmed as a Metering Device? | [R4]/6.3.2 | O.3 | N |
| SED3 | Is the product programmed as an In-Premise Display? | [R4]/6.3.3 | O.3 | N |
| SED4 | Is the product programmed as a Programmable Communicating Thermostat (PCT)? | [R4]/6.3.4 | O.3 | N |
| SED5 | Is the product programmed as a Load Control? | [R4]/6.3.5 | O.3 | N |
| SED6 | Is the product programmed as a Range Extender? | [R4]/6.3.6 | O.3 | Y |
| SED7 | Is the product programmed as a Smart Appliance? | [R4]/6.3.7 | O.3 | N |
| SED8 | Is the product programmed as a Prepayment Terminal? | [R4]/6.3.8 | O.3 | N |

8.6 SE common clusters

The common cluster ZCL PICS restrictions/requirements are obtained from [R4]/5.10, 5.11.

Table 6 – Common cluster ZCL PICS restrictions/requirements

| ZCL PICS Item number [R9] | Status | Additional Constraints | Support |
|---------------------------|--------|---|---------|
| FC100 | M | ZCL Cluster ID enumeration is mandatory | Y |
| FC1 | M | General ZCL Frame Format is mandatory | Y |

³ O.3 – Device under test must select at least one and may select more than one of the SE device descriptions. If multiple SE device descriptions are supported in the same device then each of the supported device descriptions must be deployed on individual endpoints within the device under test.

| ZCL PICS Item number [R9] | Status | Additional Constraints | Support |
|---------------------------|--------|---|---------|
| BCC1 | O | Does the device support the Basic Cluster as a client? | N |
| BCS1 | M | Does the device support the Basic Cluster as a server? | Y |
| GCC1 | O | Deleted | |
| GCS1 | O | Deleted | |
| ACC1 | O | Does the device support the Alarms Cluster as a client? | N |
| ACS1 | O | Does the device support the Alarms Cluster as a server? | N |
| TCS1 | | Deleted | |
| TCC1 | | Deleted | |

Table 7 – Common cluster support

| Item number | Item description | Reference | Status | Support |
|-------------|---|----------------|--------|---------|
| ASDC1 | Deleted | [R4]/5.10 | | |
| ASDC2 | Deleted | [R4]/5.10 | | |
| ASDC3 | Deleted | [R4]/5.10 | | |
| ASDS1 | Deleted | | O | |
| ASDS2 | Does the device support the server Price Cluster sent via the Anonymous Inter-PAN transmission mechanism? | [R4]/Annex D.4 | O | N |
| ASDS3 | Does the device support the server Message Cluster sent via the Anonymous Inter-PAN transmission mechanism? | [R4]/Annex D.5 | O | N |
| KEC1 | Does the device support the Key Establishment | [R4]/Annex | FTD2:M | Y |

| Item number | Item description | Reference | Status | Support |
|-------------|---|------------------|--------|---------|
| | cluster as a client? | C.3.1 | FTD3:M | |
| KES1 | Does the device support the Key Establishment cluster as a server? | [R4]/Annex C.3.1 | FTD1:M | Y |
| PC1 | Does the device support the Price cluster as a client? | [R4]/5.10 | O | N |
| PS1 | Does the device support the Price cluster as a server? | [R4]/5.10 | O | N |
| DRLC1 | Does the device support the Demand Response and Load Control cluster as a client? | [R4]/5.10 | O | N |
| DRLS1 | Does the device support the Demand Response and Load Control cluster as a server? | [R4]/5.10 | O | N |
| SMC1 | Does the device support the Metering cluster as a client? | [R4]/5.10 | O | N |
| SMS1 | Does the device support the Metering cluster as a server? | [R4]/5.10 | O | N |
| MC1 | Does the device support the Message cluster as a client? | [R4]/5.10 | O | N |
| MS1 | Does the device support the Message cluster as a server? | [R4]/5.10 | O | N |
| CMC1 | | [R4]/5.10 | O | |
| CMS1 | | [R4]/5.10 | O | |
| PPC1 | | [R4]/5.10 | O | |
| PPS1 | | [R4]/5.10 | O | |
| SECC1 | Does the device support clusters with Reporting Capability? | [R4]/6.1.1 | O | N |
| SECC2 | Are any manufacturer-specific cluster(s) supported? | [R4]/6.1.2 | O | N |
| SECC3 | Are any non-SE ZCL or other application cluster(s) supported? | [R4]/6.1.3 | O | N |

| Item number | Item description | Reference | Status | Support |
|-------------|--|-----------|--------|---------|
| ICS1 | Does the device support the Identify cluster? | | O | N |
| PCCS1 | Does the device support the Power Configuration cluster? | | O | N |

8.7 ZigBee SE Device Description Capabilities

Tables in the following sub-clauses detail the capabilities specific to a device description.

8.7.1 Energy Service Portal device functions

Table 8 – Energy Service Portal ZCL PICS restrictions/requirements

| ZCL PICS Item number [R9] | Status | Additional Constraints | Support |
|---------------------------|--------|----------------------------------|---------|
| TCS1 | M | Time Cluster server is mandatory | N/A |

Table 9 provides the SE PICS restrictions based on requirements in [R4]/6.3.1.1.

Table 9 – Energy Service Portal SE PICS restrictions/requirements

| SE PICS Item number | Status | Additional Constraints | Support |
|---------------------|--------|--|---------|
| SMC1 | O | Metering Cluster client is optional | N/A |
| SMS1 | O | Metering Cluster server is optional | N/A |
| MS1 | M | Message Cluster server is mandatory | N/A |
| PS1 | M | Price Cluster server is mandatory | N/A |
| DRLS1 | M | Demand Response and Load Cluster server is mandatory | N/A |
| PC1 | O | Price Cluster client is optional | N/A |
| MS1 | O | Message Cluster client is optional | N/A |
| PPC1 | O | Pre-payment Cluster client is optional | N/A |
| PPS1 | O | Pre-payment Cluster server is optional | N/A |

8.7.2 Metering device functions

Table 10 – Metering device ZCL PICS restrictions/requirements

| ZCL PICS Item number [R9] | Status | Additional Constraints | Support |
|---------------------------|--------|---------------------------------|---------|
| TCC1 | O | Time Cluster client is optional | N/A |

Table 11 provides the SE PICS restrictions based on requirements in [R4]/6.3.2.1.

Table 11 – Metering device SE PICS restrictions/requirements

| SE PICS Item number | Status | Additional Constraints | Support |
|---------------------|--------|--|---------|
| SMS1 | M | Metering Cluster server is mandatory | N/A |
| CMS1 | O | SE Tunneling (Complex Metering) Cluster server is optional | N/A |
| PPC1 | O | Pre-payment Cluster client is optional | N/A |
| PC1 | O | Price Cluster client is optional | N/A |
| MC1 | O | Message Cluster client is optional | N/A |

8.7.3 In-Premise display device functions

Table 12 – In-Premise display device ZCL PICS restrictions/requirements

| ZCL PICS Item number [R9] | Status | Additional Constraints | Support |
|---------------------------|--------|---------------------------------|---------|
| TCC1 | O | Time Cluster client is optional | N/A |

Table 13 provides the SE PICS restrictions based on requirements in [R4]/6.3.3.1.

Table 13 – In-Premise display device SE PICS restrictions/requirements

| SE PICS Item number | Status | Additional Constraints | Support |
|---------------------|--------|---|---------|
| DRLC1 | O | Demand Response and Load Cluster client is optional | N/A |
| PC1 | O | Price Cluster client is optional | N/A |
| SMC1 | O | Metering Cluster client is optional | N/A |
| PPC1 | O | Pre-payment Cluster client is optional | N/A |
| MC1 | O | Message Cluster client is optional | N/A |

8.7.4 Programmable Communicating Thermostat (PCT) device functions

Table 14 Programmable Communicating Thermostat (PCT) ZCL PICS restrictions/requirements

| ZCL PICS Item number [R9] | Status | Additional Constraints | Support |
|---------------------------|--------|----------------------------------|---------|
| TCC1 | M | Time Cluster client is mandatory | N/A |

Table 15 provides the SE PICS restrictions based on requirements in [R4]/6.3.4.1.

Table 15 Programmable Communicating Thermostat (PCT) SE PICS restrictions/requirements

| SE PICS Item number | Status | Additional Constraints | Support |
|---------------------|--------|--|---------|
| DRLC1 | M | Demand Response and Load Cluster client is mandatory | N/A |
| PPC1 | O | Pre-payment Cluster client is optional | N/A |

| SE PICS Item number | Status | Additional Constraints | Support |
|---------------------|--------|-------------------------------------|---------|
| PC1 | O | Price Cluster client is optional | N/A |
| SMC1 | O | Metering Cluster client is optional | N/A |
| MC1 | O | Message Cluster client is optional | N/A |

8.7.5 Load Control device functions

Table 16 – Load Control ZCL PICS restrictions/requirements

| ZCL PICS Item number [R9] | Status | Additional Constraints | Support |
|---------------------------|--------|----------------------------------|---------|
| TCC1 | M | Time Cluster client is mandatory | N/A |

Table 17 provides the SE PICS restrictions based on requirements in [R4]/6.3.5.1.

Table 17 – Load Control SE PICS restrictions/requirements

| SE PICS Item number | Status | Additional Constraints | Support |
|---------------------|--------|--|---------|
| DRLC1 | M | Demand Response and Load Cluster client is mandatory | N/A |
| PC1 | O | Price Cluster client is optional | N/A |

8.7.6 Range Extender device functions

Table 18 – Range Extender ZCL PICS restrictions/requirements

| ZCL PICS Item number [R9] | Status | Additional Constraints | Support |
|---------------------------|--------|----------------------------------|---------|
| TCC1 | O | Time Cluster client is optional. | N |

Table 19 provides the SE PICS restrictions based on requirements in [R4]/6.3.6.1.

Table 19 –Range Extender SE PICS restrictions/requirements

| SE PICS Item number | Status | Additional Constraints | Support |
|---------------------|--------|------------------------|---------|
| | | | |

8.7.7 Smart Appliance device functions

Table 20 – Smart Appliance ZCL PICS restrictions/requirements

| ZCL PICS Item number [R9] | Status | Additional Constraints | Support |
|---------------------------|--------|----------------------------------|---------|
| TCC1 | M | Time Cluster client is mandatory | N/A |

Table 21 provides the SE PICS restrictions based on requirements in [R4]/6.3.7.1.

Table 21 –Smart Appliance SE PICS restrictions/requirements

| SE PICS Item number | Status | Additional Constraints | Support |
|---------------------|--------|---|---------|
| DRLC1 | O | Demand Response and Load Cluster client is optional | N/A |

| SE PICS Item number | Status | Additional Constraints | Support |
|---------------------|--------|---|---------|
| PC1 | M | Price Cluster client is mandatory | N/A |
| SMC1 | O | Metering Cluster client is optional ED NOTE: This is not listed in the specification – should it be? | N/A |
| MC1 | O | Message Cluster client is optional | N/A |

8.7.8 Prepayment Terminal device functions

Table 22 – Prepayment Terminal ZCL PICS restrictions/requirements

| ZCL PICS Item number [R9] | Status | Additional Constraints | Support |
|---------------------------|--------|----------------------------------|---------|
| TCC1 | M | Time Cluster client is mandatory | N/A |

Table 23 provides the SE PICS restrictions based on requirements in [R4]/6.3.8.1.

Table 23 – Per-payment Terminal SE PICS restrictions/requirements

| SE PICS Item number | Status | Additional Constraints | Support |
|---------------------|--------|---|---------|
| DRLC1 | O | Demand Response and Load Cluster client is optional | N/A |
| PC1 | M | Price Cluster client is mandatory | N/A |
| SMC1 | O | Metering Cluster client is optional | N/A |
| MC1 | O | Message Cluster client is optional | N/A |

Support Notes:

- (1) [R5]/2.4 – “Implementation of commands to report, configure reporting of, and read reporting configuration of attributes is only mandatory if the cluster has attributes whose reportability is mandatory.” The clusters on this device have no attributes with mandatory reportability.
- (2) The XBee-PRO S2B supports communication on channels 11 through 25 but not channel 26. Channel 26 is not on the preferred list.

End of Document