Zigbee Direct PICS (Platform Implementation Conformance Statement)

Version 1.0

Connectivity Standards Alliance Document 21-27038-005

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Accepted by	This document has been accepted for release by the Connectivity Standards Alliance Board of Directors
Abstract	This is the manufacturer's Protocol Implementation Conformance Statement (PICS) for the Zigbee Direct platform. This document is an attestation to the implementation meeting the mandatory requirements of the specification and a declaration of any optional features that are also supported.
Keywords	Zigbee Direct

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Notice and disclaimer

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Revision history

Revision	Date	Details	Editor
000	January 21, 2021	Initial revision	Rob Alexander
001	June 17, 2021	Added Component Details	Marius Munder
002	November, 15, 2021	Version for recirculation ballot 0.9	Sander Raaijmakers
003	December, 8, 2021	Version after recirculation ballot 0.9	Sander Raaijmakers
004	March, 1, 2022	Added r23 PICS item	Marius Munder
005	November, 30, 2022	Editorial updates for publication	Sander Raaijmakers

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1. Introduction

1.1. Purpose

The supplier of a protocol implementation claiming to conform to the Zigbee Direct specification shall complete the following PICS proforma 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 proforma. The questions in a proforma consist of a systematic list of protocol capabilities and options as well as their implementation requirements.

1.2. Abbreviations

Abbreviation	Description
BLE	Bluetooth Low Energy
ECDHE	Elliptic Curve Diffie-Hellman
HMAC	Hashed Message Authentication Code
IUT	Implementation Under Test
PICS	Protocol Implementation Conformance Statement
SHA-256	Secure Hash Algorithm 256 bit
ZVD	Zigbee Virtual Device. A device that sends Zigbee messages over BLE and does not have IEEE 802.15.4.
ZDD	Zigbee Direct Device. A device that can send Zigbee messages over BLE or IEEE 802.15.4

1.3. References

[R0] Zigbee 3.0/BLE Proxying Technical Requirements Document (TRD) 19-75233-002

[R1] Zigbee Direct Specification 20-27688-<…>

[R2] Zigbee Direct Test Specification 20-27538<…>

[R4] Zigbee Core Specification 05-3474-23

[R5] 21-76501-001_DRAFT App Certification Program incl. Component

[R6] Zigbee Core Specification 05-3474-22

2. Identification

2.1. Implementation Under Test (IUT) Identification

IUT Name	ZBOSS
IUT Software Version	4.0.1
IUT Hardware Version (Leave blank in case of Component)	nRF52 family
Operating System (optional)	

2.1.1. Details of Component IUTs

This table is only relevant in case the IUT is a software component as defined in [R5].

Software Component Name	
Software Component Type	[] Zigbee stack Component [] Zigbee Direct Commissioning Component [] ZCL Component [] BDB Component [] Commissioning ZVD Component [] ZVD-TS Component
User Interface Component (UIC) (Yes/No)	
User Interface Component type (Type 1/2 if applicable)	
Next Higher Layer Interface type (leave blank for UIC)	
Next higher layer interface specification (reference external document, leave blank for UIC)	
Dependencies (reference external document in case of many dependencies)	
Are any mandatory dependencies defined by this document or [R1] met? Must answer YES.	[] Yes [] No

Exemplary Test Platform	
IUT Supported Operating Environment(s) (reference external document in case of many dependencies)	

2.2. Product Supplier

Name	DSR Corporation
Address	1536 Cole Blvd Suite 325 Golden CO 80401 USA
Telephone Number	+1 720 962 9525
Email address	contact@dsr-corporation.com
Additional Contact Information	

2.3. Client

Name	
Address	
Telephone Number	
Email address	
Additional Contact Information	

2.4. PICS Contact Person

Name	Anatoli Pechkov
Address	1536 Cole Blvd Suite 325 Golden CO 80401 USA
Telephone Number	+1 720 962 9525
Email address	contact@dsr-corporation.com
Additional Contact Information	

3. Feature Declaration

All features are enumerated with a short abbreviation in the Item column. Unless otherwise noted, features listed in this document are optional. Where dependencies exist on whether the implementor MAY make a choice, these will be enumerated in a dependency column as follows.

Example 1. Dependency Column Definition

```
<Dependent Item Number> : <Optionality>
```

Optionality may be one of the following

Symbol	Explanation
M	Mandatory
O	Optional
M.<num>	Mandatory with a note.
O.<num>	Optional with a note.
X	Prohibitted
N/A	Not Applicable
~	Boolean NOT operator
&&	Boolean AND operator
||	Boolean OR operator

For example a hypothetical feature Disco Ball may be enumerated as follows:

Item	Feature	Yes/No
DB	Disco Ball. Does the implementation support a Disco Ball?	

There are no dependencies on the feature, it is up to the implementor to decide whether to support it. A hypothetical set of sub-features may be enumerated as follows.

Item	Feature	Dependency	Yes/No
DM	Dance Music. Does the implementation support Dance Music?	DB: M	
DF	Dance Floor. Does the implementation support a Dance Floor?	DM: M, ~DM: X	
PL	Purple lights. Does the implementation have Purple lights?	DF: M.1	
RL	Red Lights. Does the implementation have Red lights?	DF: M.1	

Note 1: A device MUST implement at least one of the options.

The "DB: M" for the Dance Music feature indicates that if an implementation supports a Disco Ball it MUST also support Dance Music. An implementation without a Disco Ball MAY support Dance Music. The "~DM:X" for the Dance Floor feature indicates that if Dance Music is NOT supported then the implementation MUST NOT implement a Dance Floor.

The "DF: M.1" for the Purple Lights and Red Lights features indicates that if the device supports a Dance Floor, it MUST support one of the lights features. It can also support both.

3.1. Global Conformance Statement

Item	Feature	Yes/No
GC	The implementation described in this PICS proforma meets all of the mandatory requirements of the referenced standards. Must Answer YES.	Y

3.2. Zigbee Direct Device or Component Types

The implementation MUST indicate YES to one, and only one, from the list below.

Item	Feature	Yes/No
ZDD	Zigbee Direct Device. Does the implementation support a Zigbee Direct Device?	Y
ZVDCC	Zigbee Direct Commissioning Component. Does the implementation consist of a Zigbee Direct Commissioning Component?	
ZVDSC	Zigbee Stack Component. Does the implementation consist of a Zigbee Stack Component?	
ZVDZCL	ZCL Component. Does the implementation consist of a ZCL Component?	
ZVDBDB	BDB Component. Does the implementation consist of a BDB Component?	
ZDZVD-C	Commissioning ZVD Component. Does the implementation consist of Commissioning ZVD Component?	
ZDZVD-F	ZVD-TS Component. Does the implementation consist of a ZVD-TS Component?	

3.3. Zigbee Direct Stack Component Type

In case the implementation is a Zigbee Stack Component (ZVDSC) the implementation MUST indicate YES to one, and only one, from the list below.

Item	Feature	Yes/No
ZVDSC-I	Zigbee Stack Component build on an eligible Zigbee PRO stack with existing ZCP certification	
ZVDSC-N	New Zigbee Stack Component	

3.4. Zigbee Direct Stack Version

In case the implementation is a Zigbee Stack Component (ZVDSC) the implementation MUST indicate YES or NO to the item.

Item	Feature	Yes/No
ZVDSC-22	Zigbee Stack Component on the basis of the r22 Zigbee PRO specification [R6]	

3.5. BLE Radio Hardware

Item	Feature	Yes/No
BLER	The implementation described in this PICS proforma is either directly or via stated dependencies build upon a BLE interface with the functionality defined in section 7.4 of [R1]. Must state YES	Y

3.6. Zigbee Virtual Device Type

The implementation MUST indicate YES to one, and only one, from the list below in case the Zigbee Direct Device or Component Type is not ZDD.

Item	Feature	Dependency	Yes/No
ZVDC1	Top Level Component type 1. Does the implementation consist of a TLC of type 1?	ZDZVD-C: O ZDZVD-F: O ZVDCC: X ZVDSC: X ZVDZCL: X	
ZVDC2	Top Level Component type 2. Does the implementation consist of a TLC of type 2?	ZDZVD-C: O ZDZVD-F: O ZVDCC: X ZVDSC: X ZVDZCL: X	

ZVDC3	Component. Does the implementation consist of a (non-top-level) component?	ZDZVD-C: X ZDZVD-F: O ZVDCC: M ZVDSC: M ZVDZCL: M	

3.7. Zigbee Core Device Types

The implementation MUST indicate YES to at least one, and MAY also indicate YES to multiple items in case the Zigbee direct Device Type is ZDD or ZDZVD-F.

Item	Feature	Dependency	Yes/No
ZC	Zigbee Coordinator Device Type	ZDD: O, ZDZVD-F: O	Y
ZR	Zigbee Router Device Type	ZDD: O, ZDZVD-F: O	Y
ZED	Zigbee End Device Device Type	ZDD: O, ZDZVD-F: O	Y

3.8. Zigbee Direct Base Features

Item	Feature	Dependency	Yes/No
ZDCS	Zigbee Direct Commissioning Service. Does the implementation support all Zigbee Direct Commissioning Service characteristics?	ZDD:M	Y
ZVDCC	Zigbee Direct Commissioning Client. Does the implementation support writing BLE GATT attributes of the Zigbee Direct Commissioning Service?	ZDZVD-C: M ZDZVD-F: M	
ZDTS	Zigbee Direct Tunneling Service. Does the implementation support the Zigbee Direct Tunneling GATT Service?	ZDD: O	Y
ZDTC	Zigbee Direct Tunneling Client. Does the implementation support writing Tunneling Service characteristics in order to tunnel Zigbee messages?	ZDZVD-C: X ZDZVD-F: M	

3.9. Zigbee Direct Security Features

Item	Feature	Dependency	Yes/No
CRYPTO 1	Crypto Option 1. Does the device support authentication using ECDHE-PSK/P-256/SHA-256/HMAC-SHA-256-128?	ZVD: M, ZDD: M.1	Y
CRYPTO 2	Crypto Option 2. Does the device support authentication using SPEKE/Curve25519/AES-MMO-128/HMAC-AES-MMO-128?	ZVD: M, ZDD: M.1	Y

Note 1: The ZDD MUST select at least one of the two options, but may select both.

3.10. Zigbee Direct Commissioning Features

Item	Feature	Dependency	Yes/No
ZBCMJ	Zigbee Direct Manage Joiners. Does the device support Manage Joiners commands using Manage Joiners commissioning characteristic?	ZVD: O, ZDD: O	Y
ZBCFB	Zigbee Direct Finding&Binding. Does the device support Finding&Binding commands using Finding&Binding commissioning characteristic?	ZVD: O, ZDD: O	Y
ZBCID	Zigbee Direct Identify. Does the device support the Identify commands using the Identify commissioning characteristic ?	ZVD: O, ZDD: M	Y