



ZigBee®

Control your world

ZigBee RF4CE ZRC Profile PICS Version 2.0

ZigBee Document 14-0157rZB

Sponsored by: ZigBee Alliance

Accepted by This document has been accepted for release by the ZigBee Alliance Board of Directors

Abstract The ZigBee RF4CE specification describes the protocol infrastructure and services available to applications operating on the ZigBee RF4CE platform

Keywords ZRC, Profile, PICS, Testing

Copyright „ 1996-2015 by the ZigBee Alliance.

2400 Camino Ramon, Suite 375, San Ramon, CA94583, USA

<http://www.zigbee.org>

All rights reserved.

Permission is granted to members of the ZigBee Alliance to reproduce this document for their own use or the use of other ZigBee Alliance members only, provided this notice is included. All other rights reserved. Duplication for sale, or for commercial or for-profit use is strictly prohibited without the prior written consent of the ZigBee Alliance.

This page is intentionally blank

Notice of use and disclosure

The ZigBee Specification is available to individuals, companies and institutions free of charge for all non-commercial purposes (including university research, technical evaluation, and development of non-commercial software, tools, or documentation). No part of this specification may be used in development of a product for sale without becoming a member of ZigBee Alliance.

Copyright © ZigBee Alliance, Inc. (2008-2014). 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 NONINFRINGEMENT. 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

This page is intentionally blank

Revision History

Revision	Date	Details	Editor
00	4th September, 2014	First approved release of Version	Nick Shepherd

This page is intentionally blank

Table of Contents

1	Introduction.....	1
1.1	Scope.....	1
1.2	Purpose.....	1
1.3	References.....	1
1.3.1	ZigBee Alliance documents.....	1
1.3.2	ISO documents.....	1
2	Abbreviations and special symbols.....	2
3	Instructions for completing the PICS proforma.....	3
4	Identification of the implementation.....	4
5	Identification of the protocol.....	6
6	Global statement of conformance.....	7
7	PICS proforma tables.....	8
7.1	Logical device types.....	8
7.2	Network device type.....	8
7.3	Binding.....	8
7.4	Actions.....	9
7.5	Action mapping.....	9
7.6	Home automation.....	10
7.7	Identification.....	10
7.8	Polling.....	10
7.9	Key exchange.....	11
7.10	Notification.....	11
7.11	Device types.....	12
7.12	Mandatory commands.....	13
8	Command function self declaration.....	15

This page is intentionally blank

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).

1.5 Scope

This document provides the protocol implementation conformance statement (PICS) proforma for the ZigBee RF4CE ZRC 2.0 Profile specifications cited in Reference [R1] in compliance with the relevant requirements, and in accordance with the relevant guidance, given in ISO/IEC 9646-7, [R5].

1.6 Purpose

The supplier of a protocol implementation claiming to conform to the ZigBee RF4CE ZRC 2.0 Profile 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. 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.

1.7 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.

1.7.1 ZigBee Alliance documents

- [R1] ZigBee RF4CE ZRC Profile Action Banks, ZigBee Document Number 13-0614r08, September 2014.
- [R2] ZigBee RF4CE Specification, ZigBee Document Number 094945, Version 1.0.1, November, 2010.
- [R3] ZigBee RF4CE GDP 2.0 Profile Specification, ZigBee Document Number 13-0396r29, September 2014.
- [R4] ZigBee RF4CE ZRC 2.0 Profile Specification, ZigBee Document Number 13-0442r23, September 2014.

1.7.2 ISO documents

- [R5] 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

Item Number: :*Status* Status is conditional on support of item number

41

42 “*Item Number*”: Conditional, status dependent upon the support marked for the “*Item Number*”.

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

46

3 Instructions for completing the PICS proforma

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

51 A PICS that conforms to this document shall be a conforming PICS proforma completed in accordance
52 with the instructions for completion given in this annex.

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

4 Identification of the implementation

56

57

Implementation under test (IUT) identification

59 IUT name:

60 TelinkZRC2.0Controller

61 IUT version:

62 1.0

63

System under test (SUT) identification

65 SUT name:

66 TelinkZRC2.0Controller

67 Software Version:

68 1.0

69 Hardware Version:

70 1.0

71 Operating system (optional):

72

73

Product supplier

75 Name:

76 TELINK SEMICONDUCTOR CO, LTD

77 Address:

78 Bldg 3, No .1500, Zuchongzhi Rd, Zhangjiang Hi-tech Park, Shanghai 201203, China

79 Telephone number:

80 02120281118

81 Facsimile number:

82

83 Email address:

84 cheng.jiang@telink-semi.com

85 Additional information:

86

87

88

89

90 **Client**

91 Name:

92 _____

93 Address:

94 _____

95 _____

96 _____

97 Telephone number:

98 _____

99 Facsimile number:

100 _____

101 Email address:

102 _____

103 Additional information:

104 _____

105 _____

106 _____

107 **PICS contact person**

108 Name:

109 Cheng Jiang _____

110 Address:

111 Bldg 3, No .1500, Zuchongzhi Rd, Zhangjiang Hi-tech Park, Shanghai 201203, China _____

112 Telephone number:

113 (+86) 18581831537 _____

114 Facsimile number:

115 _____

116 Email address:

117 cheng.jiang@telink-semi.com _____

118 Additional information:

119 _____

120 _____

121 _____

122 _____

123 _____

124 **5 Identification of the protocol**

125

126 This PICS proforma applies to the ZigBee RF4CE ZRC 2.0 Profile Specification [R4].

127 **6 Global statement of conformance**

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

130 Yes

131 No

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

135 The supplier will have fully complied with the requirements for a statement of conformance by
136 completing the statement contained in this sub-clause. That means, by clicking the above, the statement
137 of conformance is complete. However, the supplier may find it helpful to continue to completethe
138 detailed tabulations in the sub-clauses that follow.

139

140 7 PICS proforma tables

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

143

144 7.5 Logical device types

Item number	Item description	Reference	Status	Support
LDT1	Is this device capable of operating in the role of a ZRC Originator?	[R4]	O.1	Y
LDT2	Is this device capable of operating in the role of a ZRC Recipient?	[R4]	O.1	N

145 Note that a product may incorporate functionality of both the ZRC Originator and ZRC Recipient
146 device types. However, on a given RF4CE link, it must operate in a single role only. The feature
147 requirements in this section apply to the device operation on a given RF4CE link. A product that is
148 capable of acting in either role should fill out separate PICS statement for each role.

149 7.6 Network device type

Item number	Item description	Reference	Status	Support
NDT1	Does the device operate as an RF4CE Controller?	[R2]	LDT1: O.2 LDT2: X	Y
NDT2	Does the device operate as an RF4CE Target?	[R2]	LDT1: O.2 LDT2:M	N

150

151 7.7 Binding

Item number	Item description	Reference	Status	Support
BD1	Does the device function as a Binding Originator?	[R3]	LDT1: M LDT2: X	Y
BD2	Does the device function as a Binding Recipient?	[R3]	LDT1: X LDT2:M	N
BD3	Does the device function as a Proxy Binding Originator?	[R3]	LDT1: O LDT2: X	N
BD4	Does the device function as a Proxy Binding Recipient?	[R3]	LDT1: X LDT2: O	N

Item number	Item description	Reference	Status	Support
BD5	Does the device support Interactive Validation functionality	[R3]	LDT1: N/A LDT2: O	N/A

152

153

154 **7.8 Actions**

Item number	Item description	Reference	Status	Support
ACT1	Does the device function as an Action Originator?	[R4]	LDT1: M LDT2: O	Y
ACT2	Does the device function as an Action Recipient?	[R4]	LDT1: (NDT1: X NDT2: O) LDT2:M	N

155

156 **7.9 Action mapping**

Item number	Item description	Reference	Status	Support
AM1	Does the device function as an Action Mapping client?	[R4]	LDT1: O LDT2: (ACT1: O Else X)	N
AM2	Does the device function as an Action Mapping server?	[R4]	LDT1: (NDT1: X NDT2: O) LDT2: O	N
AM3	Does the device support the transmission of IR frames with at least one vendor specific IRDB format?	[R4]	LDT1: (AM1: O Else X) LDT2: (AM1: O Else X)	N

157

158 **7.10 Home automation**

Item number	Item description	Reference	Status	Support
HA1	Does the device function as an HA Actions Originator?	[R4]	LDT1: O LDT2: (ACT1: O Else X)	N
HA2	Does the device function as an HA Actions Recipient?	[R4]	LDT1: (ACT2: O Else X) LDT2: O	N
HA3	Does the device support HA Attributes?	[R4]	LDT1: (HA1: O Else X) LDT2: (HA1: O Else X)	N

159

160 **7.11 Identification**

Item number	Item description	Reference	Status	Support
ID1	Does the device function as an Identify Client?	[R3]	LDT1: O LDT2: O	Y
ID2	Does the device function as an Identify Server?	[R3]	LDT1: (NDT1: X NDT2: O) LDT2:M	N

161

162 **7.12 Polling**

Item number	Item description	Reference	Status	Support
PL1	Does the device function as a Poll Client?	[R3]	LDT1: (NDT1: O NDT2: X) LDT2: X	Y

Item number	Item description	Reference	Status	Support
PL2	Does the device function as a Poll Server?	[R3]	LDT1: (NDT1: X NDT2: O) LDT2: M	N

163

164 **7.13 Key exchange**

Item number	Item description	Reference	Status	Support
KE1	Does the device function as a Key Exchange Initiator?	[R3]	LDT1: O LDT2: O	Y
KE2	Does the device function as a Key Exchange Responder?	[R3]	LDT1: (NDT1: O NDT2: M) LDT2:M	N
KE3	Does the device support key exchange using the default shared secret	[R3]	LDT1: (KE1: M KE2: M Else N/A) LDT2: M	Y

165

166 **7.14 Notification**

Item number	Item description	Reference	Status	Support
NT1	Does the device function as a Notification Client?	[R3]	LDT1: (PL1: M HA3: M AM1: M Else: O) LDT2: (HA3: M AM1: M Else: O)	Y

Item number	Item description	Reference	Status	Support
NT2	Does the device function as a Notification Server?	[R3]	LDT1: (HA2: M AM2: M ID2: M Else: (NDT1: X NDT2: O)) LDT2: M	N

167

168 **7.15 Device types**

Item number	Item description	Reference	Status	Support
DT1	Does the device support the functionality of a TV?	[R1]/A	O	N
DT2	Does the device support the functionality of a projector?	[R1]/A	O	N
DT3	Does the device support the functionality of a player?	[R1]/A	O	N
DT4	Does the device support the functionality of a recorder?	[R1]/A	O	N
DT5	Does the device support the functionality of a video player/recorder?	[R1]/A	O	N
DT6	Does the device support the functionality of an audio player/recorder?	[R1]/A	O	N
DT7	Does the device support the functionality of an audio video recorder?	[R1]/A	O	N
DT8	Does the device support the functionality of a set top box?	[R1]/A	O	N
DT9	Does the device support the functionality of a home theatre system?	[R1]/A	O	N
DT10	Does the device support the functionality of a media centre/PC?	[R1]/A	O	N
DT11	Does the device support the functionality of a game console?	[R1]/A	O	N

Item number	Item description	Reference	Status	Support
DT12	Does the device support the functionality of a satellite radio receiver?	[R1]/A	O	N
DT13	Does the device support the functionality of an IR extender?	[R1]/A	O	N
DT14	Does the device support the functionality of a monitor?	[R1]/A	O	N

169

170

171 **7.16 Mandatory commands**

Item number	Item description	Reference	Status	Support
MC1	Does the TV device support all of the following commands: select, up, down, left, right, root menu, exit, channel up, channel down, volume up, volume down, power toggle function, power off function and power on function?	[R1]/A	DT1: M	n/a
MC2	Does the projector device support all of the following commands: select, up, down, left, right, root menu, exit, input select, power off function and power on function?	[R1]/A	DT2: M	n/a
MC3	Does the player device support all of the following commands: select, up, down, left, right, root menu, exit, play, stop, pause, rewind, fast forward, power toggle function, power off function and power on function?	[R1]/A	DT3: M	n/a
MC4	Does the recorder device support all of the following commands: select, up, down, left, right, root menu, exit, play, stop, pause, record, rewind, fast forward, power toggle function, power off function and power on function?	[R1]/A	DT4: M	n/a
MC5	Does the video player/recorder device support all of the following commands: select, up, down, left, right, root menu, exit, play, stop, pause, record, rewind, fast forward, power toggle function, power off function and power on function?	[R1]/A	DT5: M	n/a

Item number	Item description	Reference	Status	Support
MC6	Does the audio player/recorder device support all of the following commands: play, stop, pause, record, power toggle function, power off function and power on function?	[R1]/A	DT6: M	n/a
MC7	Does the audio/video recorder device support all of the following commands: select, up, down, left, right, root menu, exit, play, stop, pause, record, rewind, fast forward, power toggle function, power off function and power on function?	[R1]/A	DT7: M	n/a
MC8	Does the set top box device support all of the following commands: select, up, down, left, right, root menu, exit, channel up, channel down, volume up, volume down, power toggle function, power off function and power on function?	[R1]/A	DT8: M	n/a
MC9	Does the home theatre system device support all of the following commands: select, up, down, left, right, root menu, exit, volume up, volume down, power toggle function, power off function and power on function?	[R1]/A	DT9: M	n/a
MC10	Does the media centre/PC device support all of the following commands: select, up, down, left, right, root menu, exit, volume up, volume down, play, stop, pause, rewind, fast forward, power toggle function, power off function and power on function?	[R1]/A	DT10: M	n/a

173

8 Command function self declaration

174

175

176

177

The table below lists the mandatory functions for the devices identified in section 7.11. To allow the test house to effectively observe behavior, enter the expected results in the “Functional declaration” column. If non mandatory commands are to be tested, enter command and behavior in the rows labeled “Other commands...”.

178

Note that not all commands are supported by all devices – see section 7.12 for details.

ID	User operation	Function declaration
0x00	Select	<i>E.g. Menu item is activated.</i>
0x01	Up	<i>E.g. Menu cursor is moved one place upwards.</i>
0x02	Down	<i>E.g. Menu cursor is moved one place downwards.</i>
0x03	Left	<i>E.g. Cursor is moved one place to the left.</i>
0x04	Right	<i>E.g. Cursor is moved one place to the right.</i>
0x09	Root menu	<i>E.g. “Home” menu is displayed.</i>
0x0d	Exit	<i>E.g. Takes user out of menu system.</i>
0x30	Channel up	<i>E.g. Channel number is incremented by 1 and new channel is displayed.</i>
0x31	Channel down	<i>E.g. Channel number is decremented by 1 and new channel is displayed.</i>
0x41	Volume up	<i>E.g. Volume level is incremented by 1 (as indicated by OSD).</i>
0x42	Volume down	<i>E.g. Volume level is decremented by 1 (as indicated by OSD).</i>
0x44	Play	<i>E.g. Playback is started or resumed if paused.</i>
0x45	Stop	<i>E.g. Playback is stopped and screen goes blank.</i>

ID	User operation	Function declaration
0x46	Pause	<i>E.g. Playback is temporarily halted, leaving current frame on screen.</i>
0x47	Record	<i>E.g. The currently displayed content is recorded to the hard drive.</i>
0x48	Rewind	<i>E.g. If playback is active, playback is played backwards at twice normal speed. If playback is not active, fast rewind begins.</i>
0x49	Fast forward	<i>E.g. If playback is active, playback is played forwards at twice normal speed. If playback is not active, fast forward begins.</i>
0x6b	Power toggle function	<i>E.g. Toggles the devices power state.</i>
0x6c	Power off function	<i>E.g. Puts the device into inactive (standby) state. If repeated the device stays in the inactive state.</i>
0x6d	Power on function	<i>E.g. Puts the device into active (non standby) state. If repeated the device stays in the active state.</i>
		<i>Other commands...</i>
		<i>Other commands...</i>
		<i>Other commands...</i>
		<i>Other commands...</i>