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Base Device Behavior PICS Proforma Version 1.0

ZigBee Document 15-0283-04

April 18th, 2015

Sponsored by: ZigBee Alliance

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

Abstract This specification defines the base device behavior specification for devices operating on the ZigBee-PRO stack, ensuring profile interoperability between application profiles.

Keywords Base device, profile interoperability, ZigBee-PRO, PICS

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Revision history

Revision	Date	Details	Editor
00	July 14 th , 2015	First draft	Phil Jamieson
01	September 30 th , 2015	Updates in preparation of the v0.9 ballot.	Phil Jamieson
02	October 30 th , 2015	Addressed comments from the v0.9 ballot.	Phil Jamieson
03	March 8 th , 2016	Addressed comments from the ZigBee 3.0 SVEs.	Phil Jamieson
04	April 18 th , 2016	Changed status to “approved” and version to 1.0.	Phil Jamieson

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100 **1 Introduction**

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

105 **1.1 Scope**

106 This document provides the protocol implementation conformance statement (PICS)
 107 proforma for the Base Device Behavior specification [R2] in compliance with the
 108 relevant requirements, and in accordance with the relevant guidance, given in
 109 ISO/IEC 9646-7.

110 **1.2 Purpose**

111 The supplier of a protocol implementation claiming to conform to the Base Device
 112 Behavior specification shall complete the following PICS proforma and accompany it
 113 with the information necessary to identify fully both the supplier and the
 114 implementation.

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

122 **1.3 Abbreviations and special symbols**

123 *Notations for requirement status:*

Symbol	Description
<Item Number>	PICS item reference composed of an item set abbreviation and a numeric item identifier, e.g. ZLT1.
<Status>	Implementation requirement status for this item (see below).
<Item Number>: <Status>	<i>Status</i> is conditional on support of <i>Item Number</i> .
<Item number>.<i>	<i> is a sub-item of <Item number>.
✖	Specific negative test case item.
M	Feature is mandatory.
O	Feature is optional.
R	Feature is optional but recommended.
O.n	Feature is optional, but support of at least one of the group of options labeled O.n is required.

Symbol	Description
N/A	Feature is not applicable.
X	Feature is prohibited.
~	Boolean NOT operator.
&&	Boolean AND operator.
	Boolean OR operator.

124

125 Unless explicitly stated, items that do not match may be considered optional.

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

129

130 **1.4 Instructions for completing the PICS proforma**

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

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

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

141 If an implementation supports multiple application devices on multiple endpoints, a
 142 separate PICS proforma SHALL be completed for each device.

143 **1.5 PICS proforma tables**

144 The tables in clauses 4 onwards are composed of the detailed questions to be
 145 answered, which make up the PICS proforma. References are to the Base Device
 146 Behavior Specification [R2] unless otherwise indicated.

147 **1.6 Errata**

148 Any errata against this specification can be found in [R5].

149

150 **2 References**

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

157 **2.1 ZigBee Alliance documents**

- 158 [R1] ZigBee Specification, ZigBee document 05-3474.
159 [R2] Base Device Behavior Specification, ZigBee document 13-0402.
160 [R3] ZigBee Cluster Library, ZigBee document 07-5123.
161 [R4] ZigBee Application Architecture, ZigBee document 13-0589.
162 [R5] Errata for Base Device Behavior PICS, ZigBee document 16-02010.

163

164 3 Implementation declaration

165 3.1 Identification of the implementation

166

167 Implementation under test (IUT) identification

IUT name	NXP ZLO Dimmable Light
IUT software version	Application : JN-AN-1218-Zigbee-3-0-Light-Bulb (svn 82503 – 6x branch) SDK : JN-SW-4170 Zigbee 3.0 v1396
IUT hardware version	JN5169 on DR1174 1v4 with DR1175 1v1
Operating system (optional)	

168

169 Product supplier

Name	NXP Semiconductors
Address	5th Floor, Synergy Building, Hartshead, Sheffield, S1 2EL, UK
Telephone number	+44 (0)114 281 2655
Fax number	+44 (0)114 281 2951
Email address	simon.wadsworth@nxp.com
Additional information	

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172 **Client**

Name	
Address	
Telephone number	
Fax number	
Email address	
Additional information	

173

174 **PICS contact person**

Name	Richard Clayton
Address	5th Floor, Synergy Building, Hartshead, Sheffield, S1 2EL, UK
Telephone number	+44 (0)114 281 2655
Fax number	+44 (0)114 281 2951
Email address	richard.clayton@nxp.com
Additional information	

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179 **3.2 Identification of the protocol**

180 This PICS proforma applies to the Base Device Behavior specification [R2].

181 **3.3 Global statement of conformance**

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

184 Base Device Behavior specifications [R2]

185 Yes

186 No

187

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

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

194 **4 Base device PIXIT**195 **4.1 Internal attributes**

196

Item number	Feature	Reference	Status	Support
IA1	<i>bdbCommissioningGroupID:</i> What is the list of groups the node is able to use for finding & binding?	5.3.1	M	<i>0xFFFF</i>
IA2	<i>bdbJoinUsesInstallCodeKey:</i> Does the Trust Center policy require all nodes to join using an install code?	5.3.6	ZLT1: M	<i>NA</i>
IA3	<i>bdbPrimaryChannelSet:</i> What is the primary channel set?	5.3.10	M	<i>0x02108800</i>
IA4	<i>bdbScanDuration:</i> What is the scan duration?	5.3.11	M	<i>0x04</i>
IA5	<i>bdbSecondaryChannelSet:</i> What is the secondary channel set?	5.3.12	M	<i>0x5EF7000</i>
IA6	<i>bdbTCLinkKeyExchangeAttemptsMax:</i> What is the maximum number of attempts a node will try to exchange its Trust Center link key?	5.3.14	ZLT2: M ZLT3: M	<i>0x03</i>
IA7	<i>bdbTCLinkKeyExchangeMethod:</i> What is the Trust Center link key exchange method?	5.3.15	ZLT2: M ZLT3: M	<i>0x00</i>
IA8	<i>bdbTrustCenterNodeJoinTimeout:</i> What is the Trust Center node join timeout?	5.3.16	ZLT1: M	<i>NA</i>
IA9	<i>bdbTrustCenterRequireKeyExchange:</i> Does the Trust Center's policy require a node to exchange its initial link key with a new link key generated by the Trust Center?	5.3.17	ZLT1: M	<i>NA</i>

197

198

199 **4.2 Commissioning combinations**

200 The actions specified in this section serve as a guide for testing the individual
 201 commissioning mechanisms. Verification of commissioning feature support is
 202 covered later in this document.

203 Indicate support of all relevant combinations and add any further combinations
 204 supported by the device.

205

Item number	Feature	Status	Support
CC1	Can the product be stimulated to invoke touchlink commissioning only?	O	No
CC2	Can the product be stimulated to invoke network formation only?	O	No
CC3	Can the product be stimulated to invoke network steering only?	O	Yes
CC4	Can the product be stimulated to invoke finding & binding only?	O	No
CC5	Can the product be stimulated to invoke touchlink commissioning followed by network steering?	O	No
CC6	Can the product be stimulated to invoke network formation followed by network steering?	O	No
CC7	Can the product be stimulated to invoke network steering followed by network formation?	O	No
CC8	Can the product be stimulated to reset before network formation?	O	No
CC9	Can the product be stimulated to automatically form a network upon startup when factory new?	O	No
	... “NXP Dimmable light can be triggered to perform nwkw steering as FN/NFN node. It can acts as Touchlink target. It can also be triggered to act as Find and Bind target once NFN.”		

206

207 **4.3 Miscellaneous**

Item number	Feature	Status	Support
M1	Can the node disable network steering via local application trigger?	O	No <i>(However; a reset can do the trick)</i>
M2	Can the node store more than one NWK outgoing frame counters?	O	No
M3.1	If supported, give the identifier of a cluster that has at least one writable attribute.	O	<i>0x0008 (Level)</i>
M3.2	Give the attribute identifier of a writable attribute.	M3.1: M	<i>0x0010 (OnOffTransitionTime)</i>

208

209 **5 General requirements**210 **5.1 [ZLT] ZigBee logical device types**

Item number	Feature	Reference	Status	Support
ZLT1	Is the logical device type specified as a ZigBee coordinator?	[R1]/2.5.4.5.1	O.1	No
ZLT1.1	Does the node encompass the role of the Trust Center?	6.1	ZLT1: M ZLT2: X ZLT3: X	No
ZLT1.2	Does the node form a centralized security network?	6.1	ZLT1: M ZLT2: X ZLT3: X	No
ZLT1.3	Does the node NOT attempt to join another network?	6.1	ZLT1: M	No
ZLT2	Is the logical device type specified as a ZigBee router?	[R1]/2.5.4.5.2	O.1	Yes
ZLT2.1	Can the router node join another network?	6.1	ZLT2: M	Yes
ZLT2.2	Does the node form a distributed network?	6.1	ZLT1: X ZLT2: O ZLT3: X	No
ZLT3	Is the logical device type specified as a ZigBee end device?	[R1]/2.5.4.5.5	O.1	No
ZLT3.1	Can the end device node join another network?	6.1	ZLT3: M	No
ZLT3.2	Is the end device sleepy?	-	ZLT3: O	No
ZLT4	Can the node switch between ZLT1 and ZLT2 types under application control.	6.1	O.1	No

211 Notes:

212 O.1 A node SHALL support one of ZLT1 or ZLT2 or ZLT3 or (ZLT1 and ZLT2,
213 switchable under application control).

214

215

216 **5.2 [NSM] Network security models**

Item number	Feature	Reference	Status	Support
NSM1	Can the node join a centralized security network?	6.2	ZLT1: X ZLT2: M ZLT3: M	Yes
NSM2	Can the node join a distributed security network?	6.2	ZLT1: X ZLT2: M ZLT3: M	Yes

217

218 **5.3 [LK] Link keys**

Item number	Feature	Reference	Status	Support
LK1	Does the node contain the default global Trust Center link key?	6.3	M	Yes
LK2	Does the node contain the distributed security global link key?	6.3	M	Yes
LK3	Does the node contain an install code derived preconfigured link key?	6.3	M	Yes
LK4	Does the node contain the touchlink preconfigured link key?	6.3	GRC5: M	Yes

219

220 **5.4 [UIC] Use of install codes**

Item number	Feature	Reference	Status	Support
UIC1	Does the node support install codes?	6.4	M	Yes
UIC2	Will the node not be available via retail channels and be professionally installed?	6.4	O.2	No
UIC3	Will the node be available via retail channels?	6.4	O.2	Yes
UIC4	Is the node configured to only require the use of install codes on joining?	6.4	UIC2: O UIC3: X	No
UIC5	Does the node have a user configuration mechanism?	6.4	UIC3: O.3	Yes

Item number	Feature	Reference	Status	Support
UIC6	Does the node not have a user configuration mechanism?	6.4	UIC3: O.3	Yes
UIC7	Does the node default to requiring potential networks to use of install codes on joining?	6.4	UIC5: O UIC6: X	No
UIC8	Can the node be switched into a mode whereby all networks are considered for joining?	6.4	UIC5: M	Yes
UIC9	Can the node join all types of networks?	6.4	UIC6: M	Yes
UIC10	Does the Trust Center require the use of install codes for all joining nodes?	6.4	ZLT1: O	NA

221

222 Notes:

223 O.2 One of the items marked O.2 SHALL be supported.

224 O.3 One of the items marked O.3 SHALL be supported.

225

226 **5.5 [GRC] Commissioning**

Item number	Feature	Reference	Status	Support
GRC1	Does the node support network steering?	6.5	M	Yes
GRC2.1	Is the device implemented as having a simple device class (see [R4])?	6.5	O.4	Yes
GRC2.2	Is the device implemented as having a dynamic device class (see [R4])?	6.5	O.4	No
GRC2.3	Is the device implemented as having a node device class (see [R4])?	6.5	O.4	No
GRC4	Does the device support finding & binding as either an initiator or a target?	6.5	GRC2.1: M GRC2.2: O GRC2.3: O	Yes
GRC5	Does the device support touchlink commissioning as either an initiator or a target or both?	6.5	O	Yes

Item number	Feature	Reference	Status	Support
GRC5.1	Does the device support touchlink commissioning as an initiator.	6.5	GRC5: O.5	No
GRC5.2	Does the device support touchlink commissioning as a target.	6.5	GRC5: O.5	Yes
GRC6	If touchlink commissioning as an initiator is attempted and is successful does the device not attempt any further commissioning operations?	6.5	GRC5.1: M	NA
GRC7	If network steering is attempted does the node follow the correct steering procedure dependent on whether the node is joined to a network or not?	6.5	M	Yes
GRC8	Does the node only form a network if the node is not yet joined to a network?	6.5	ZLT1.2: M ZLT2.2: M	NA
GRC9	Can the node form a centralized network?	6.5	ZLT1.2: M	No
GRC10	Can the node form a distributed network?	6.5	ZLT2.2: M	No
GRC11	Does the node skip network formation?	6.5	ZLT3: M	Yes
GRC12	Does the node attempt finding & binding only if it is joined to a network?	6.5	ZLT2: M ZLT3: M	Yes
GRC13	Does the node instigate finding & binding on one or more endpoints implemented on the node?	6.5	GRC4: O	Yes
GRC14	Does the node attempt finding & binding as an initiator endpoint if the endpoint supports a type 1 client or type 2 server cluster?	6.5	GRC4: M	No
GRC15	Does the node attempt finding & binding as a target endpoint if the endpoint supports a type 1 server or type 2 client cluster?	6.5	GRC4: M	Yes
GRC16	Is the node capable of binding to a group during finding & binding?		GRC4: O	No

Item number	Feature	Reference	Status	Support
GRC17	Is the device able to transmit groupcast messages?		O	No

227

228 Notes:

229 O.4 One of the items marked O.4 SHALL be supported.

230 O.5 One of the items marked O.5 SHALL be supported.

231

232 **5.6 [MRD] Minimum requirements for all devices**

Item number	Feature	Reference	Status	Support
MRD1	Can the node process the ZDO <i>Active_EP_req</i> command and respond with the ZDO <i>Active_EP_rsp</i> command?	6.6	M	Yes
MRD1.1	Can the node process the ZDO <i>Node_Desc_req</i> command and respond with the ZDO <i>Node_Desc_rsp</i> command?	6.6	M	Yes
MRD2	Can the node process the ZDO <i>Simple_Desc_req</i> command and respond with the ZDO <i>Simple_Desc_rsp</i> command?	6.6	M	Yes
MRD3	Can the node process the ZDO <i>IEEE_Addr_req</i> command and respond with the ZDO <i>IEEE_Addr_rsp</i> command?	6.6	M	Yes
MRD4	Can the node process the ZDO <i>NWK_Addr_req</i> command and respond with the ZDO <i>NWK_Addr_rsp</i> command?	6.6	M	Yes
MRD5	Can the node process the ZDO <i>Match_Desc_req</i> command and respond with the ZDO <i>Match_Desc_rsp</i> command?	6.6	M	Yes
MRD6	Can the node process the ZDO <i>Mgmt_Bind_req</i> command and respond with the ZDO <i>Mgmt_Bind_rsp</i> command?	6.6	M	Yes
MRD7	Can the node process the ZDO <i>Mgmt_Lqi_req</i> command and respond with the ZDO <i>Mgmt_Lqi_rsp</i> command?	6.6	M	Yes

Item number	Feature	Reference	Status	Support
MRD8	Can the node process the ZDO <i>Bind_req</i> command and respond with the ZDO <i>Bind_rsp</i> command?	6.6	M	Yes
MRD9	Can the node process the ZDO <i>Unbind_req</i> command and respond with the ZDO <i>Unbind_rsp</i> command?	6.6	M	Yes
MRD10	Can the node process the ZDO <i>Mgmt_Leave_req</i> command and respond with the ZDO <i>Mgmt_Leave_rsp</i> command?	6.6	M	Yes
MRD11	Can the node process at least one <i>identify</i> cluster, <i>identify query response</i> command after broadcasting an <i>identify</i> cluster, <i>identify query</i> command?	6.6	M	Yes
MRD12	Can the node process more than one <i>identify</i> cluster, <i>identify query response</i> command after broadcasting an <i>identify</i> cluster, <i>identify query</i> command?	6.6	O	No
MRD13	Does the node implement a binding table whose number of entries is \geq the sum of cluster instances supported on each device?	6.6	M	Yes
MRD14	Regardless of the commissioning mechanism, is the binding table consistent such that its contents can be retrieved using the ZDO <i>Mgmt_Bind_req</i> command?	6.6	M	Yes
MRD15	Does the node have a default reporting configuration for every implemented attribute that is specified as mandatory and reportable?	6.6	DRC1: M	Yes
MRD16	Does the node have a cluster which is the target of an operational transaction?	6.6	O	Yes
MRD17	Does the node support group addressing and at least 8 memberships in the group table?	6.6	MRD16: M	Yes

234 **5.7 [DRC] Default reporting configuration**

Item number	Feature	Reference	Status	Support
DRC1	Does the node have at least one attribute that is specified as reportable?	6.7	O	Yes
DRC2	Does the node have a default reporting configuration for every attribute that is specified as reportable?	6.7	DRC1: M	Yes
DRC3	Does the node automatically send reports to a node that binds with a cluster containing an attribute that is specified as reportable?	6.7	DRC2: M	Yes
DRC4	If any default reporting configuration is overwritten, is the updated reporting configuration used instead?	6.7	DRC1: M	Yes
DRC5	If the maximum reporting interval of an attribute is greater than 0x0000, is a report generated when the time that has elapse since the previous report of the same attribute is equal to the maximum reporting interval for that attribute?	6.7	DRC1: M	Yes
DRC6	If the maximum reporting interval of an attribute is equal to 0x0000, is a report generated when the attribute value changes?	6.7	DRC1: M	Yes

235

236 **5.8 [MDP] MAC data polling**

Item number	Feature	Reference	Status	Support
MDP1	Is the MAC data polling rate dynamic based on the operating state of the node?	6.8	ZLT3: R	NA
MDP2	Does the node have at least a fast and a slow MAC data polling rate?	6.8	ZLT3: R	NA
MDP3	Does the device poll more frequently than once per 7.5 seconds?	6.8	ZLT3: R	NA

Item number	Feature	Reference	Status	Support
MDP4	While waiting for an active response message, does the node poll at its fast rate?	6.8	MDP2: R	NA
MDP5	Is the fast poll rate at least once every 3 seconds?	6.8	MDP2: R	NA
MDP6	While not actively waiting for messages, does the node poll at its slow rate?	6.8	MDP2: O	NA
MDP7	Does the node poll at its fast rate during commissioning?	6.8	MDP2: R	NA

237

238 **5.9 [ZPD] ZigBee persistent data**

Item number	Feature	Reference	Status	Support
ZPD1	Does the node preserve the value of the <i>bdbNodeIsOnANetwork</i> attribute across resets?	6.9	M	Yes

239

240 **6 Initialization**241 **6.1 [INP] Initialization procedure**

Item number	Feature	Reference	Status	Support
INP1	Does the node support the initialization procedure?	7.1	M	Yes
INP2	Does the node restore its persistent ZigBee data?	7.1	M	Yes
INP3	If the node is a ZigBee End Device and was previously on a network, does it attempt to rejoin the network?	7.1	ZLT3: M	NA
INP4	On successful rejoining, does the node broadcast a <i>device_annce</i> ZDO command?	7.1	M	Yes
INP5	If the node is a ZigBee Router and supports touchlink but was not previously on a network, does it switch to a touchlink primary channel?	7.1	(ZLT2 && GRC5): M	Yes

242

243 **7 [COM] Commissioning**

Item number	Feature	Reference	Status	Support
COM1	Does the implementation provide a mechanism to invoke network steering?	8	M	Yes
COM2	Does the implementation provide a mechanism to invoke finding & binding?	8	GRC4: M	Yes

244

245 **7.1 [TLC] Top level commissioning procedure**

Item number	Feature	Reference	Status	Support
TLC1	If touchlink commissioning is requested, does the node follow the <i>touchlink for initiator</i> procedure?	8.1	GRC5.1: M	NA
TLC2	If network steering is requested when <i>bdbNodeIsOnANetwork</i> is equal to TRUE, does the node follow the <i>network steering for a node on a network</i> procedure?	8.1	M	Yes
TLC3	If network steering is requested when <i>bdbNodeIsOnANetwork</i> is equal to FALSE, does the node follow the <i>network steering for a node not on a network</i> procedure?	8.1	M	Yes
TLC4	If network formation is requested when <i>bdbNodeIsOnANetwork</i> is equal to FALSE, does the node follow the <i>network formation</i> procedure?	8.1	ZLT1: M ZLT2: M	No
TLC5*	If network formation is requested when <i>bdbNodeIsOnANetwork</i> is equal to TRUE, does the node follow the <i>network formation</i> procedure?	8.1	X	No
TLC6	If finding & binding is requested when <i>bdbNodeIsOnANetwork</i> is equal to TRUE, does the node follow the <i>finding & binding</i> procedure according to cluster class?	8.1	GRC4: M	Yes

Item number	Feature	Reference	Status	Support
TLC7*	If finding & binding is requested when <i>bdbNodeIsOnANetwork</i> is equal to FALSE, does the node follow the <i>finding & binding</i> procedure according to cluster class?	8.1	X	No

246

247 **7.2 [NSO] Network steering procedure for a node on a network**

Item number	Feature	Reference	Status	Support
NSO1	Is the <i>network steering for a node on a network</i> procedure supported?	8.2	M	Yes
NSO2	Does the node first broadcast the <i>Mgmt_Permit_Joining_req</i> ZDO command?	8.2	M	Yes
NSO3	If the node is a ZigBee Coordinator or a ZigBee Router, does the node activate its permit joining flag for \geq <i>bdbcMinCommissioningTime</i> ?	8.2	(ZLT1 ZLT2): M	Yes

248

249 **7.3 [NSN] Network steering procedure for a node not on a network**
250

Item number	Feature	Reference	Status	Support
NSN1	Is the <i>network steering for a node not on a network</i> procedure supported?	8.3	ZLT1: X ZLT2: M ZLT3: M	Yes
NSN2	Does the node attempt to discover networks over a set of channels?	8.3	NSN1: M	Yes
NSN3	If suitable networks were found, does the node attempt to join one of them using MAC association?	8.3	NSN1: M	Yes
NSN4	If the join was not successful and there are more suitable networks to join, does the node attempt to join another network?	8.3	NSN1: M	Yes

Item number	Feature	Reference	Status	Support
NSN5	If the join was successful, does the node wait <i>apsSecurityTimeOutPeriod</i> milliseconds to receive the network key?	8.3	NSN1: M	Yes
NSN6	If the network key is not received within <i>apsSecurityTimeOutPeriod</i> milliseconds, the network key is received but could not be decrypted or the authentication fails does the node reset its network parameters?	8.3	NSN1: M	Yes
NSN7	Does the node broadcast a <i>Device_annce</i> ZDO command?	8.3	NSN1: M	Yes
NSN9	If the TC link key exchange is not successful, does the node reset its network parameters and remove itself from the network?	8.3	NSN1: M	Yes
NSN10	If the TC link key exchange is successful, does the node broadcast the <i>Mgmt_Permit_Joining_req</i> ZDO command?	8.3	NSN1: M	Yes
NSN11	Does the node activate its permit joining flag if new nodes can join this node?	8.3	(ZLT1 ZLT2): M	Yes

251

252 7.4 [NFP] Network formation procedure

Item number	Feature	Reference	Status	Support
NFP1	Is the <i>network formation</i> procedure supported?	8.4	ZLT1: M ZLT2: O	No
NFP2	Does the node attempt to form a network over a set of channels?	8.4	NFP1: M	NA
NFP3	If formation is successful and the node is a ZigBee Coordinator, does it initiate its Trust Center functionality?	8.4	(NFP1 && ZLT1): M	NA

253

254 **7.5 [FBT] Finding & binding procedure for a target endpoint**

Item number	Feature	Reference	Status	Support
FBT1	Is the <i>finding & binding for a target endpoint</i> procedure supported?	8.5	GRC15: M	Yes
FBT2	Does the target identify itself for at least <i>bdbMinCommissioningTime</i> seconds?	8.5	FBT1: M	Yes
FBT3	Does the target respond to <i>Identify</i> cluster <i>Identify Query</i> commands?	8.5	FBT1: M	Yes

255

256 **7.6 [FBI] Finding & binding procedure for an initiator endpoint**

Item number	Feature	Reference	Status	Support
FBI1	Is the <i>finding & binding for an initiator endpoint</i> procedure supported?	8.6	GRC14: M	No
FBI2	Is the <i>Identify</i> cluster <i>Identify Query</i> command broadcast supported?	8.6	FBI1: M	NA
FBI3	Is the simple descriptor of each respondent obtained with the <i>Simple_Desc_req</i> ZDO command?	8.6	FBI1: M	NA
FBI4	Does the initiator create a binding table entry for each matching cluster to the respondent?	8.6	FBI1: M	NA
FBI5	If a group binding is requested, does the initiator add the respondent to an appropriate group?	8.6	(FBI1 && GRC16): M	NA

257

258 **7.7 [TLI] Touchlink procedure for an initiator**

Item number	Feature	Reference	Status	Support
TLI1	Is the <i>touchlink for an initiator</i> procedure supported?	8.7	GRC5.1: M	No
TLI2	Does the initiator broadcast 5 <i>scan request</i> inter-PAN command frames on the first primary touchlink channel and then once for each remaining primary channel?	8.7	TLI1: M	NA

Item number	Feature	Reference	Status	Support
TLI3	Does the initiator broadcast a <i>scan request</i> inter-PAN command frames on each secondary touchlink channel when using touchlink for formation or joining?	8.7	TLI1: O	NA
TLI4	If the initiator is not on a network, does it ignore any <i>scan request</i> command frames from other factory new initiators?	8.7	TLI1: M	NA
TLI5	If the initiator is not on a network, does it switch into a target mode if any <i>scan request</i> command frames are received from other non-factory new initiators?	8.7	TLI1: O	NA
TLI6	If a target is found, does the initiator transmit a <i>device information request</i> inter-PAN command frame to the selected target?	8.7	TLI1: O	NA
TLI7	If a target is found, does the initiator transmit one or more <i>identify request</i> inter-PAN command frame to the selected target?	8.7	TLI1: O	NA
TLI8	If a <i>scan request</i> command frame is received from a target on the same network as the initiator with the <i>network update identifier</i> field lower than <i>nwkUpdateId</i> , does the initiator transmit a <i>network update request</i> inter-PAN command frame to the selected target and then terminate the touchlink procedure?	8.7	TLI1: M	NA
TLI9	If a target is found on a different network to the initiator and the initiator is on a centralized network, does it terminate the touchlink procedure?	8.7	TLI1: M	NA
TLI10	If the initiator is not on a network and the target is a ZigBee Router, does the initiator transmit a <i>network start request</i> inter-PAN command frame to the selected target?	8.7	TLI1: M	NA

Item number	Feature	Reference	Status	Support
TLI11	If the initiator is on a network and the target is a ZigBee Router, does the initiator transmit a <i>network join router request</i> inter-PAN command frame to the selected target?	8.7	TLI1: M	NA
TLI12	If the initiator is on a network and the target is a ZigBee End Device, does the node transmit a <i>network join end device request</i> inter-PAN command frame to the selected target?	8.7	TLI1: M	NA
TLI13	If the initiator is an end device and a <i>network start request</i> inter-PAN command frame was sent to the selected target, does the node rejoin the network?	8.7	(ZLT3 && TLI1): M	NA

259

260 7.8 [TLT] Touchlink procedure for an target

Item number	Feature	Reference	Status	Support
TLT1	Is the <i>touchlink for a target</i> procedure supported?	8.8	GRC5.2: M	Yes
TLT2	Does the target discard any touchlink commissioning command other than a <i>scan request</i> command and terminate the procedure?	8.8	TLT1: M	Yes
TLT3	Does the target discard <i>scan request</i> command frames with an RSSI lower than a product specific threshold and terminate the procedure?	8.8	TLT1: M	Yes
TLT4	Does the target respond to a <i>scan request</i> command frame with a <i>scan response</i> command frame?	8.8	TLT1: M	Yes
TLT5	Does the target respond to a <i>device information request</i> command frame with a <i>device information response</i> command frame?	8.8	TLT1: M	Yes
TLT6	Does the target identify itself on receipt of a <i>identify request</i> command frame?	8.8	TLT1: M	Yes

Item number	Feature	Reference	Status	Support
TLT7	If the target receives a <i>network start request</i> command frame, is a ZigBee Router and decides to start a network, does it perform a network discovery?	8.8	(TLT1 && ZLT2): M	Yes
TLT8	If the target receives a <i>network join router request</i> command frame, is a ZigBee Router and decides to join the network of the initiator, does it respond with a <i>network join router response</i> command frame?	8.8	(TLT1 && ZLT2): M	Yes
TLT9	If the target receives a <i>network join end device request</i> command frame, is a ZigBee End Device and decides to join the network of the initiator, does it respond with a <i>network join end device response</i> command frame?	8.8	(TLT1 && ZLT3): M	NA
TLT10	If target is already part of a network, does it leave its current network?	8.8	TLT1: M	Yes
TLT11	If requested by the initiator, does the target start a new network and respond with a <i>network start response</i> command frame?	8.8	TLT1: M	Yes
TLT12	After starting a new network, does the target direct join the initiator to its new network?	8.8	TLT1: M	Yes

261

262 Add item for being on a centralized network and ignoring the start or join.

263

264

265 **8 Reset**266 **8.1 [RBC] Reset via the basic cluster**

Item number	Feature	Reference	Status	Support
RBC2	Does the initiator transmit a <i>reset to factory defaults</i> command frame to a target?	9.1	O	NA
RBC3	On receipt of a <i>reset to factory defaults</i> command frame, does the target reset all attributes of all clusters to their default values?	9.1	O	Yes
RBC4	On receipt of a <i>reset to factory defaults</i> command frame, does the target not reset its network parameters?	9.1	M	Yes

267

268 **8.2 [RTL] Reset via the touchlink commissioning cluster**

Item number	Feature	Reference	Status	Support
RTL2	Does the initiator transmit a <i>reset to factory new</i> command frame to a target?	9.2	GRC5: M	NA
RTL3	On receipt of a <i>reset to factory new</i> command frame and if the target is on a distributed security network, does it leave the network?	9.2	GRC5: M	Yes
RTL4	On receipt of a <i>reset to factory new</i> command frame and if the target is on a centralized security network, does it ignore the command?	9.2	GRC5: O	No
RTL5	Does the initiator use an extended channel scan during a reset via the touchlink commissioning cluster?	9.2	GRC5: M	NA

269

270 **8.3 [RNL] Reset via network leave command**

Item number	Feature	Reference	Status	Support
RNL1	Does a node transmit a <i>leave</i> NWK command frame to another node to trigger the other node to leave?	9.4	O	NA
RNL2	On receipt of a <i>leave</i> NWK command frame with the <i>request</i> bit set to 1, does the node leave the network?	9.4	M	Yes

271

272 **8.4 [RLZ] Reset via the Mgmt_Leave_req ZDO command**

Item number	Feature	Reference	Status	Support
RLZ1	Does a node transmit an <i>Mgmt_Leave_req</i> ZDO command frame to another node?	9.5	O	NA
RLZ2	On receipt of an <i>Mgmt_Leave_req</i> ZDO command frame, does the node leave the network?	9.5	M	Yes

273

274 **8.5 [RLA] Reset via local action**

Item number	Feature	Reference	Status	Support
RLA1	Does the node provide a local reset mechanism?	9.6	O	Yes
RLA2	On activation of the local reset mechanism, does the node reset itself?	9.6	RLA1: M	Yes

275 **9 Security**276 **9.1 [RLK] Receiving a new Trust Center link key**

Item number	Feature	Reference	Status	Support
RLK0	Does the node exchange its link key during network steering on a centralized security network?	10.2.5	ZLT2: M ZLT3: M	Yes
RLK1a	Does the node execute the appropriate steps defined by the alternative link key exchange mechanism?	10.2.5, step 1	(RLK0 && (IA7!=0x00)): M	NA
RLK1b	If the alternative mechanism is successful, does the node terminate the node link key exchange procedure?	10.2.5, step 1	RLK1a: M	NA
RLK3	If the APS Request Key method is used or the alternative mechanism is not successful, does the node transmit the <i>Node_Desc_req</i> ZDO command to the Trust Center?	10.2.5, step 3	(RLK0 && (IA7==0x00)): M RLK1a: M	Yes
RLK4a	If a <i>Node_Desc_rsp</i> ZDO command is not received within <i>bdbcTCLinkKey-ExchangeTimeout</i> seconds does the node retry up to the maximum attempts permitted?	10.2.5, step 4	RLK3: M	Yes
RLK4b	If a <i>Node_Desc_rsp</i> ZDO command is not received after the maximum number of attempts permitted, does it terminate the node link key exchange procedure?	10.2.5, step 4	RLK3: M	Yes
RLK5	If a <i>Node_Desc_rsp</i> ZDO command is received and the server mask of the node descriptor indicates a core stack of r20 or earlier, does the node terminate the node link key exchange procedure?	10.2.5, step 5	RLK3: M	Yes
RLK7	If a <i>Node_Desc_rsp</i> ZDO command is received and the server mask of the node descriptor indicates a core stack of r21 or later, does the node request a new link key using the <i>Request Key</i> APS command frame to the Trust Center, encrypted with its initial link key?	10.2.5, step 7	RLK3: M	Yes

Item number	Feature	Reference	Status	Support
RLK8a	If a <i>Transport Key</i> APS command is not received within <i>bdbcTCLinkKey-ExchangeTimeout</i> seconds does the node retry up to the maximum attempts permitted?	10.2.5, step 8	RLK7: M	Yes
RLK8b	If a <i>Transport Key</i> APS command is not received after the maximum number of attempts permitted, does it terminate the node link key exchange procedure?	10.2.5, step 8	RLK7: M	Yes
RLK9	If a <i>Transport Key</i> APS command frame is received from the Trust Center, containing a new link key, does the node update its Trust Center link key with the new key?	10.2.5, step 9	RLK7: M	Yes
RLK11	Does the node verify the new key using the <i>Verify Key</i> APS command frame to the Trust Center?	10.2.5, step 11	RLK7: M	Yes
RLK12a	If a <i>Confirm Key</i> APS command is not received within <i>bdbcTCLinkKey-ExchangeTimeout</i> seconds does the node retry up to the maximum attempts permitted?	10.2.5, step 12	RLK11: M	Yes
RLK12b	If a <i>Confirm Key</i> APS command is not received after the maximum number of attempts permitted, does it terminate the node link key exchange procedure?	10.2.5, step 12	RLK11: M	Yes

277

278 **9.2 [AIC] Adding an install code**

Item number	Feature	Reference	Status	Support
AIC0	Does the Trust Center allow the input of an install code?	10.3.1	ZLT1: O	NA
AIC2	On receipt of an installation code, does the Trust Center create an entry in its node/link key mapping table (<i>apsDeviceKeyPairSet</i>) with the installation code derived key?	10.3.1, step 2	(AIC0 && (IA2==True)): M	NA

279

280 **9.3 [ANN] Adding a new node into the network**

Item number	Feature	Reference	Status	Support
ANN1	On receipt of an <i>Update Device</i> APS command frame, does the Trust Center follow the procedure for adding a new node into the network?	10.3.2	ZLT1: M	NA
ANN2	If an install code is required and the new node is not in <i>apsDeviceKeyPairSet</i> , does the Trust Center terminate the Trust Center link key exchange procedure?	10.3.2	(ANN1 && (IA2==True)): M	NA
ANN3	If an install code is not required and the new node is not in <i>apsDeviceKeyPairSet</i> , does the Trust Center create an entry in its <i>apsDeviceKeyPairSet</i> for the joining node?	10.3.2	(ANN1 && (IA2==False)): M	NA
ANN4	Does the Trust Center send the network key to the joining node using a <i>Transport Key</i> APS command frame, encrypted with the entry in <i>apsDeviceKeyPairSet</i> corresponding to the joining node?	10.3.2	ANN1: M	NA
ANN5	If a <i>Request Key</i> APS command frame is not received and the Trust Center requires the new node to exchange its link key, does it request the new node leaves the network?	10.3.2	(IA9==TRUE): M	NA
ANN6	On receipt of a <i>Request Key</i> APS command frame from the joining node, encrypted with its initial link key, does the Trust Center generate a new link key and transport it to the joining node using a <i>Transport Key</i> APS command frame?	10.3.2	ANN5: M	NA
ANN7	If a <i>Verify Key</i> APS command frame is not received by the Trust Center from the joining node, does it request the new node leaves the network?	10.3.2	ANN6: M	NA

Item number	Feature	Reference	Status	Support
ANN8	Does the Trust Center receive a <i>Verify Key</i> APS command frame from the joining node, update the entry in <i>apsDeviceKeyPairSet</i> corresponding to the joining node with the new key and respond with a <i>Confirm Key</i> APS command frame?	10.3.2	ANN7: M	NA

281

282 9.4 [BKN] Behavior when a known node joins

Item number	Feature	Reference	Status	Support
BKN1	Does the Trust Center allow a known node to join but in a fresh state?	10.3.3	ZLT1: M	NA
BKN2	Does the Trust Center store the original install code derived link key for devices that have joined?	10.3.3	ZLT1: O	NA
BKN3	Does the Trust Center overwrite the link key for a joining node with the original install code derived link key?	10.3.3	((IA2==TRUE) && BKN2): M	NA
BKN4	Does the Trust Center overwrite the link key for a joining node with the default global Trust Center link key?	10.3.3	(IA2==FALSE): M	NA

283

284 9.5 [TCP] Trust center policies

Item number	Feature	Reference	Status	Support
TCP1.1	Does the Trust Center allow any nodes to join (Trust Center policy <i>useWhiteList</i>)?	[R1] Table 4.33	ZLT1.1: O.7	NA
TCP1.2	Does the Trust Center allow only known nodes to join (Trust Center policy <i>useWhiteList</i>)?	[R1] Table 4.33	ZLT1.1: O.7	NA

Item number	Feature	Reference	Status	Support
TCP2.1	Does the Trust Center allow a node on the network that transmits a ZDO Mgmt_Permit_Join with a significance set to 1 to affect the Trust Center policy (Trust Center policy <i>allowRemoteTc-PolicyChange</i>)?	[R1] Table 4.33	ZLT1.1: O.8	NA
TCP2.2	Does the Trust Center forbid a node on the network that transmits a ZDO Mgmt_Permit_Join with a significance set to 1 to affect the Trust Center policy (Trust Center policy <i>allowRemoteTc-PolicyChange</i>)?	[R1] Table 4.33	ZLT1.1: O.8	NA

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286 Notes:

287 O.7 One or both of the items marked O.7 SHALL be supported.

288 O.8 One or both of the items marked O.8 SHALL be supported.

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290