



ZigBee Cluster Library Level Control Cluster (0x0008) Test Specification Version 1.0

ZigBee Document 15-0311-006

December 12th, 2017

Sponsored by: ZigBee Alliance

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

Abstract This document describes the certification tests for devices which implement the ZCL Level Control cluster.

Keywords ZCL, Level control, cluster, errata

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Revision history

Revision	Date	Details	Editor
00	April, 2015	Created from the cluster test specification example document 15-0041.	Phil Jamieson
01	August 12 th , 2015	Resolved comments received since the Hull test event in June 2015.	Phil Jamieson
02	September 29 th , 2015	Added a startup test case, a ChangeOff behavior test case and the new mandatory global attributes.	Phil Jamieson
03	October 30 th , 2015	Addressed comments from GTE #3.	Phil Jamieson
04	March 1 st , 2016	Addressed comments from the ZigBee 3.0 SVEs.	Phil Jamieson
05	April 18 th , 2016	Changed status to "approved" and version to 1.0.	Phil Jamieson
006	December 12 th , 2017	Updated from errata 16-02860-005: Resolved CCBs 2151, 2242, 2268, 2269, 2284 and 2285.	Phil Jamieson

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Table of Contents

45	1	Introduction.....	9
46	1.1	Conformance levels.....	9
47	2	References.....	10
48	2.1	ZigBee Alliance documents	10
49	2.2	IETF documents	10
50	3	PIXIT items.....	11
51	4	PICS	12
52	4.1	Usage	12
53	4.2	Server.....	12
54	4.2.1	Attributes.....	12
55	4.2.2	Commands received.....	13
56	4.3	Client	14
57	4.3.1	Attributes.....	14
58	4.3.2	Commands generated.....	14
59	5	Test specification	15
60	5.1	Introduction	15
61	5.1.1	Test case overview	15
62	5.1.2	Testing tolerances	15
63	5.1.3	Variable rate movements	15
64	5.1.4	Client DUTs	15
65	5.1.5	Test steps manipulating attributes.....	16
66	5.2	Generic test cases	17
67	5.2.1	LC-TC-01G: Global attributes	17
68	5.3	Server test cases.....	21
69	5.3.1	LC-TC-01S: Attributes with server as DUT.....	21
70	5.3.2	LC-TC-02S: Primary functionality with server as DUT.....	26
71	5.3.3	LC-TC-03S: Secondary functionality with server as DUT.....	34
72	5.3.4	LC-TC-04S: Scenes functionality with server as DUT	41
73	5.3.5	LC-TC-05S: Reporting functionality with server as DUT	46
74	5.3.6	LC-TC-06S: Startup functionality with server as DUT.....	53
75	5.3.7	LC-TC-07S: ExecuteIfOff behavior with server as DUT.....	58
76	5.4	Client test cases	65
77	5.4.1	LC-TC-01C: Functionality with client as DUT	65
78	6	Annex A: PICS to test case cross reference.....	68
79	6.1	Server.....	68
80	6.2	Client	69

1 Introduction

This document contains the PICS, test specification and PICS/test case cross reference for the ZCL *level control* cluster.

1.1 Conformance levels

The key words "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED" and "MAY" in this document are to be interpreted as described in [R7].

2 References

2.1 ZigBee Alliance documents

- [R1] ZigBee Cluster Library Specification, ZigBee Alliance document 07-5123.
- [R2] ZCL General Test Specification, ZigBee Alliance document 15-0xxx.
- [R3] ZCL Scenes Cluster Test Specification, ZigBee Alliance document 15-0308.
- [R4] ZCL On/Off Cluster Test Specification, ZigBee Alliance document 15-0310.
- [R5] ZCL Level Control Cluster XML PICS, ZigBee Alliance document 15-0xxx.
- [R6] ZigBee Lighting & Occupancy Device Specification, ZigBee Alliance document 15-0014.

2.2 IETF documents

- [R7] S. Bradner, Key words for use in RFCs to Indicate Requirement Levels, IETF RFC 2119, March 1997.

3 PIXIT items

Item number	Feature	Support
LC.PIXIT.MINRI	What is the minimum reporting interval for reporting attributes?	<i>n/a</i>
LC.PIXIT.MAXRI	What is the non-zero maximum reporting interval for reporting attributes?	<i>n/a</i>

4 PICS

All references are for the ZigBee Cluster Library specification [R1] unless otherwise indicated.
An XML version of these PICS is also available in [R5].

4.1 Usage

Item number	Feature	Reference	Status	Support
LC.S	Does the device implement the <i>level control</i> cluster as a server?	3.10.2	O	/No
LC.C	Does the device implement the <i>level control</i> cluster as a client?	3.10.3	O	Yes/

4.2 Server

4.2.1 Attributes

Item number	Feature	Reference	Status	Support
LC.S.A0000	Does the device implement the <i>CurrentLevel</i> attribute?	Table 3.52, 3.10.2.3.1	LC.S: M	/No
LC.S.A0000.Scene	Does the device implement receiving and responding to the scene cluster commands for the <i>CurrentLevel</i> attribute?	3.10.2.6	(LC.S & S.S): M	/No
LC.S.A0000.Report.Tx	Does the device implement receiving and responding to the global report attribute commands for the <i>CurrentLevel</i> attribute and sending reports?	3.10.2.7	LC.S: M	/No
LC.S.A0001	Does the device implement the <i>RemainingTime</i> attribute?	Table 3.52, 3.10.2.3.2	LC.S: O	/No
LC.S.A000f	Does the device implement the <i>Options</i> attribute?	Table 3.52, 3.10.2.3.3	LC.S: M	/No
LC.S.A0010	Does the device implement the <i>OnOffTransitionTime</i> attribute?	Table 3.52, 3.10.2.3.4	LC.S: O	/No
LC.S.A0011	Does the device implement the <i>OnLevel</i> attribute?	Table 3.52, 3.10.2.3.5	LC.S: O	/No
LC.S.A0012	Does the device implement the <i>OnTransitionTime</i> attribute?	Table 3.52, 3.10.2.3.6	LC.S: O	/No
LC.S.A0013	Does the device implement the <i>OffTransitionTime</i> attribute?	Table 3.52, 3.10.2.3.7	LC.S: O	/No

Signify Classified - Internal

Item number	Feature	Reference	Status	Support
LC.S.A0014	Does the device implement the <i>DefaultMoveRate</i> attribute?	Table 3.52, 3.10.2.3.8	LC.S: O	/No
LC.S.A4000	Does the device implement the <i>StartUpCurrentLevel</i> attribute?	[R6] Table 72, 27.4.1.1.1	LC.S: O	/No
LC.S.Afffd	Does the device implement the <i>ClusterRevision</i> global attribute?	Table 2-1, 2.3.5.1.1	LC.S: M	/No
LC.S.Afffe	Does the device implement the <i>AttributeReportingStatus</i> global attribute?	Table 2-1, 2.3.5.1.2	LC.S: O	/No

111

112 4.2.2 Commands received

Item number	Feature	Reference	Status	Support
LC.S.C00.Rsp	Does the device implement receiving the <i>Move to level</i> command?	Table 3.53, 3.10.2.4.1	LC.S: M	/No
LC.S.C01.Rsp	Does the device implement receiving the <i>Move</i> command?	Table 3.53, 3.10.2.4.2	LC.S: M	/No
LC.S.C02.Rsp	Does the device implement receiving the <i>Step</i> command?	Table 3.53, 3.10.2.4.3	LC.S: M	/No
LC.S.C03.Rsp	Does the device implement receiving the <i>Stop</i> command?	Table 3.53, 3.10.2.4.4	LC.S: M	/No
LC.S.C04.Rsp	Does the device implement receiving the <i>Move to level (with on/off)</i> command?	Table 3.53, 3.10.2.4.5	LC.S: M	/No
LC.S.C05.Rsp	Does the device implement receiving the <i>Move (with on/off)</i> command?	Table 3.53, 3.10.2.4.5	LC.S: M	/No
LC.S.C06.Rsp	Does the device implement receiving the <i>Step (with on/off)</i> command?	Table 3.53, 3.10.2.4.5	LC.S: M	/No
LC.S.C07.Rsp	Does the device implement receiving the <i>Stop</i> command?	Table 3.53, 3.10.2.4.5	LC.S: M	/No

113

4.3 Client

4.3.1 Attributes

Item number	Feature	Reference	Status	Support
LC.C.A0000.Report.Rsp	Does the device implement sending global report attribute command requests and receiving reports for the <i>CurrentLevel</i> attribute?	3.10.2.7	LC.C: O	/No
LC.C.Afffd	Does the device implement the <i>ClusterRevision</i> global attribute?	Table 2-1, 2.3.5.1.1	LC.C: M	Yes/
LC.C.Afffe	Does the device implement the <i>AttributeReportingStatus</i> global attribute?	Table 2-1, 2.3.5.1.2	LC.C: O	/No

4.3.2 Commands generated

Item number	Feature	Reference	Status	Support
LC.C.C00.Tx	Does the device implement sending the <i>Move to level</i> command?	Table 3.53, 3.10.2.4.1	LC.C: O	/No
LC.C.C01.Tx	Does the device implement sending the <i>Move</i> command?	Table 3.53, 3.10.2.4.2	LC.C: O	/No
LC.C.C02.Tx	Does the device implement sending the <i>Step</i> command?	Table 3.53, 3.10.2.4.3	LC.C: O	Yes/
LC.C.C03.Tx	Does the device implement sending the <i>Stop</i> command?	Table 3.53, 3.10.2.4.4	LC.C: O	Yes/
LC.C.C04.Tx	Does the device implement sending the <i>Move to level (with on/off)</i> command?	Table 3.53, 3.10.2.4.5	LC.C: O	/No
LC.C.C05.Tx	Does the device implement sending the <i>Move (with on/off)</i> command?	Table 3.53, 3.10.2.4.5	LC.C: O	/No
LC.C.C06.Tx	Does the device implement sending the <i>Step (with on/off)</i> command?	Table 3.53, 3.10.2.4.5	LC.C: O	/No
LC.C.C07.Tx	Does the device implement sending the <i>Stop</i> command?	Table 3.53, 3.10.2.4.5	LC.C: O	/No

5 Test specification

5.1 Introduction

5.1.1 Test case overview

The following test cases are available for the *level control* cluster:

Test ID	Description	Reference
Global tests		
LC-TC-01G	Global attributes	5.2.1
Server side tests		
LC-TC-01S	Attributes with server as DUT	5.3.1
LC-TC-02S	Primary functionality with server as DUT	5.3.2
LC-TC-03S	Secondary functionality with server as DUT	5.3.3
LC-TC-04S	Scenes functionality with server as DUT	5.3.4
LC-TC-05S	Reporting functionality with server as DUT	5.3.5
LC-TC-06S	Startup functionality with server as DUT	5.3.6
LC-TC-07S	ExecuteIfOff behavior with server as DUT	5.3.7
Client side tests		
LC-TC-01C	Functionality with client as DUT	5.4.1

Unless otherwise specified, when the *Move to level*, *Step*, *Move* and *Stop* commands are used, the *OptionsMask* and *OptionsOverride* fields of SHALL NOT be included.

5.1.2 Testing tolerances

In test cases where a change in an attribute value is tested over time, it is permitted for the devices involved in the test to be within a tolerance of $\pm 15\%$ of the expected value. As such, these test cases indicate that the attribute value must be approximately equal to an expected value, to which the $\pm 15\%$ tolerance should then be applied. All other attribute values presented are expected to be exact.

5.1.3 Variable rate movements

If the device is not able to move at a variable rate then the transition time and rate fields of the move and move to level commands (and their “with On/off” equivalents) may be ignored and a fixed rate used instead.

5.1.4 Client DUTs

For client test cases only test steps that pertain to commands that are supported on the DUT are required to be executed. All commands in this cluster for which support is indicated in the PICS shall be exercised, using valid, application achievable values.

140 Note that for the client attribute test case, it is permissible for the client not to be able to
141 execute any of the test steps.

142 The client SHALL ensure that an application link, e.g. a binding link, exists between itself and
143 the test harness. This should be configured before starting the test.

144 **5.1.5 Test steps manipulating attributes**

145 In test case steps that require more than one attribute to be manipulated (e.g. read), the tester
146 may decide whether it is appropriate or practical to send a single attribute manipulation
147 command, containing multiple attributes, or multiple attribute manipulation commands, each
148 containing a single attribute. The test case is designed to verify the behavior of the device
149 supporting the attribute rather than verifying the attribute manipulation command in question.
150

5.2 Generic test cases

5.2.1 LC-TC-01G: Global attributes

This test case verifies the behavior of the global attributes of the *level control* cluster client and server.

In this test, the PICS notation LC.S.Agm and LC.C.Agm represents the list of global attributes that are specified as being mandatory for either the server or client, respectively. Similarly, the PICS notation LC.S.Ago and LC.C.Ago represents the list of global attributes that are specified as being optional for either the server or client, respectively.

5.2.1.1 Scope

General:

- *Read attributes* command (0x00)
- *Read attributes response* command (0x01)
- *Write attributes* command (0x02)
- *Write attributes response* command (0x04)



Level control cluster (0x0008):

- All global attributes

PICS:

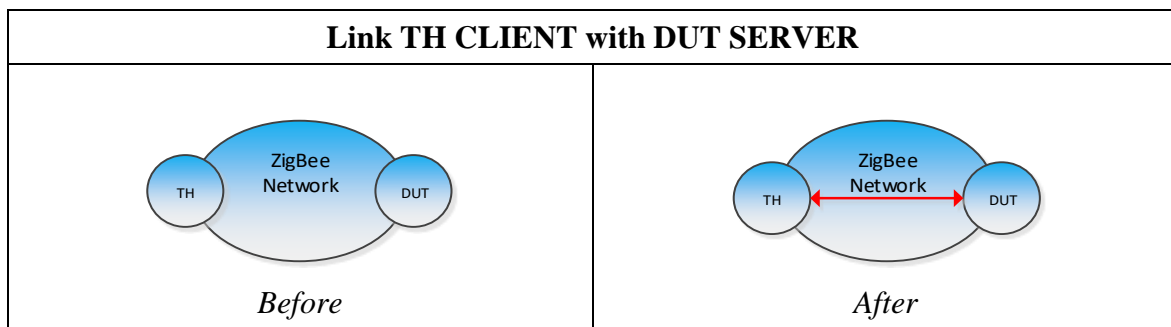
- LC.S, LC.C
- LC.S.Agm, LC.C.Agm, LC.S.Ago, LC.C.Ago

5.2.1.2 Required devices

Designation	Symbol	Description
DUT		Device under test implementing: <ul style="list-style-type: none"> • The <i>level control</i> cluster server or client.
TH		Test harness implementing: <ul style="list-style-type: none"> • The <i>level control</i> cluster client or server, i.e. the opposite cluster instantiation as implemented on the DUT.

5.2.1.3 Initial conditions

Item	Initial Conditions
1	A packet sniffer shall be observing the communication over the air interface.
2	All devices are factory new and powered off until used.

174 **5.2.1.4 Test preparation**

175

LC-TC-01G: Global attributes		
Item	Preparation Step	Observation
P1	Form a ZigBee network.	Observe appropriate command frame to form the network.
P2	Power on TH and DUT.	TH and DUT are powered on.
P3	Join TH and DUT to a ZigBee network.	Observe appropriate communication between TH, DUT and any other relevant node on the ZigBee network.

--- End of test case LC-TC-01G preparation ---

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177 **5.2.1.5 Test procedure**

LC-TC-01G: Global attributes			
Item	PICS	Test Harness Step	DUT pass Verification
1	LC.S.Agm, LC.C.Agm	TH unicasts a ZCL <i>read attributes</i> command frame to DUT to read each mandatory global attribute of this cluster one at a time.	DUT unicasts a ZCL <i>read attributes response</i> command frame to TH containing each requested attribute. The data type in each command must match the value listed in the specification(s). The data value in each command for the attribute must fall within the valid range described in the specification(s).
2a	LC.S.Agm, LC.C.Agm	TH unicasts a ZCL <i>write attributes</i> command frame to DUT to write the respective default value to each mandatory global attribute of this cluster one at a time.	DUT unicasts a ZCL <i>write attributes response</i> command frame to TH for each attribute. If the access control of DUT is set to READ, the DUT response will indicate that the attribute write command was not a SUCCESS. If the access control of DUT is set to READ/WRITE, the DUT response will indicate that the write command was a SUCCESS.
2b	LC.S.Agm, LC.C.Agm	TH unicasts a ZCL <i>read attributes</i> command frame to DUT to read back each attribute written in step 2a.	DUT unicasts a ZCL <i>read attributes response</i> command frame to TH containing the requested attribute. If the <i>Status</i> field of the <i>write attributes response</i> command frame was equal to SUCCESS, the updated value is read back. If the <i>Status</i> field of the <i>write attributes response</i> command frame was not equal to SUCCESS the value is not updated when read back.

Continued...

LC-TC-01G: Global attributes			
Item	PICS	Test Harness Step	DUT pass Verification
3	LC.S.Ago, LC.C.Ago	TH unicasts a ZCL <i>read attributes</i> command frame to DUT to read each optional global attribute of this cluster one at a time.	DUT unicasts a ZCL <i>read attributes response</i> command frame to TH containing each attribute. If the DUT implements the attribute, the <i>Status</i> field will be equal to SUCCESS and the command will contain the requested attribute. If the DUT does not implement the attribute, the <i>Status</i> field will not be equal to SUCCESS. The data type in each command must match the value listed in the specification(s). The data value in each command for the attribute must fall within the valid range described in the specification(s).
4a	LC.S.Ago, LC.C.Ago	TH unicasts a ZCL <i>write attributes</i> command frame to DUT to write the respective default value to each optional global attribute of this cluster one at a time.	DUT unicasts a ZCL <i>write attributes response</i> command frame to TH for each attribute. If the attribute is not implemented or the access control of DUT is set to READ, the DUT response will indicate that the attribute write command was not a SUCCESS. If the attribute is implemented and the access control of DUT is set to READ/WRITE, the DUT response will indicate that the write command was a SUCCESS.
4b	LC.S.Ago, LC.C.Ago	TH unicasts a ZCL <i>read attributes</i> command frame to DUT to read back each attribute written in step 4a.	DUT unicasts a ZCL <i>read attributes response</i> command frame to TH containing the requested attribute. If the <i>Status</i> field of the <i>write attributes response</i> command frame was equal to SUCCESS, the updated value is read back. If the <i>Status</i> field of the <i>write attributes response</i> command frame was not equal to SUCCESS the value is not updated when read back.

--- End of test case LC-TC-01G ---

5.3 Server test cases

5.3.1 LC-TC-01S: Attributes with server as DUT

This test case verifies the behavior of the non-global attributes of the *level control* cluster server.

In this test, the PICS notation LC.S.Am represents the list of non-global attributes that are specified as being mandatory. Similarly, the PICS notation LC.S.Ao represents the list of non-global attributes that are specified as being optional.

5.3.1.1 Scope

General:

- *Read attributes* command (0x00)
- *Read attributes response* command (0x01)
- *Write attributes* command (0x02)
- *Write attributes response* command (0x04)



Level control cluster (0x0008):

- All non-global attributes

PICS:

- LC.S
- LC.S.Am, LC.S.Ao

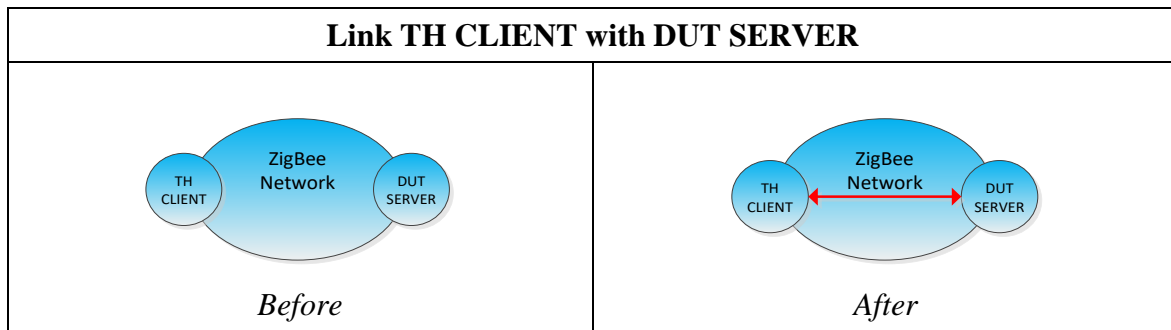
5.3.1.2 Required devices

Designation	Symbol	Description
TH CLIENT		Test harness client implementing: <ul style="list-style-type: none"> • The <i>level control</i> cluster client.
DUT SERVER		Device under test server implementing: <ul style="list-style-type: none"> • The <i>level control</i> cluster server.

5.3.1.3 Initial conditions

Item	Initial Conditions
1	A packet sniffer shall be observing the communication over the air interface.
2	All devices are factory new and powered off until used.

5.3.1.4 Test preparation



LC-TC-01S: Attributes with server as DUT		
Item	Preparation Step	Observation
P1	Form a ZigBee network.	Observe appropriate command frame to form the network.
P2	Power on TH CLIENT and DUT SERVER.	TH CLIENT and DUT SERVER are powered on.
P3	Join TH CLIENT and DUT SERVER to a ZigBee network.	Observe appropriate communication between TH CLIENT, DUT SERVER and any other relevant node on the ZigBee network.

--- End of test case LC-TC-01C preparation ---

205 **5.3.1.5 Test procedure**

LC-TC-01S: Attributes with server as DUT			
Item	PICS	Test Harness Step	DUT pass Verification
1	LC.S.Am	TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read each mandatory attribute of this cluster one at a time.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT containing each requested attribute. The data type in each command must match the value listed in the specification(s). The data value in each command for the attribute must fall within the valid range described in the specification(s).
2a	LC.S.Am	TH CLIENT unicasts a ZCL <i>write attributes</i> command frame to DUT SERVER to write the respective default value to each mandatory attribute of this cluster one at a time.	DUT SERVER unicasts a ZCL <i>write attributes response</i> command frame to TH CLIENT for each attribute. If the access control of DUT SERVER is set to READ, the DUT SERVER response will indicate that the attribute write command was not a SUCCESS. If the access control of DUT SERVER is set to READ/WRITE, the DUT SERVER response will indicate that the write command was a SUCCESS.
2b	LC.S.Am	TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read back each attribute written in step 2a.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT containing the requested attribute. If the <i>Status</i> field of the <i>write attributes response</i> command frame was equal to SUCCESS, the updated value is read back. If the <i>Status</i> field of the <i>write attributes response</i> command frame was not equal to SUCCESS the value is not updated when read back.

Continued...

LC-TC-01S: Attributes with server as DUT			
Item	PICS	Test Harness Step	DUT pass Verification
3	LC.S.Ao	TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read each optional attribute of this cluster one at a time.	<p>DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT containing each attribute.</p> <p>If the DUT SERVER implements the attribute, the <i>Status</i> field will be equal to SUCCESS and the command will contain the requested attribute. If the DUT SERVER does not implement the attribute, the <i>Status</i> field will not be equal to SUCCESS.</p> <p>The data type in each command must match the value listed in the specification(s). The data value in each command for the attribute must fall within the valid range described in the specification(s).</p>
4a	LC.S.Ao	TH CLIENT unicasts a ZCL <i>write attributes</i> command frame to DUT SERVER to write the respective default value to each optional attribute of this cluster one at a time.	<p>DUT SERVER unicasts a ZCL <i>write attributes response</i> command frame to TH CLIENT for each attribute.</p> <p>If the attribute is not implemented or the access control of DUT SERVER is set to READ, the DUT SERVER response will indicate that the attribute write command was not a SUCCESS. If the attribute is implemented and the access control of DUT SERVER is set to READ/WRITE, the DUT response will indicate that the write command was a SUCCESS.</p>

Continued...

LC-TC-01S: Attributes with server as DUT			
Item	PICS	Test Harness Step	DUT pass Verification
4b	LC.S.Ao	TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read back each attribute written in step 4a.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT containing the requested attribute. If the <i>Status</i> field of the <i>write attributes response</i> command frame was equal to SUCCESS, the updated value is read back. If the <i>Status</i> field of the <i>write attributes response</i> command frame was not equal to SUCCESS the value is not updated when read back.

--- End of test case LC-TC-01S ---

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5.3.2 LC-TC-02S: Primary functionality with server as DUT

This test case verifies the primary functionality of the *level control* cluster server.

5.3.2.1 Scope

General:

- *Read attributes* command (0x00)
- *Read attributes response* command (0x01)
- *Default response* command (0x0b)

On/off cluster (0x0006):

- *OnOff* attribute (0x0000)
- *Off* command (0x00)
- *On* command (0x01)
- *Toggle* command (0x02)



Level control cluster (0x0008):

- *CurrentLevel* attribute (0x0000)
- *RemainingTime* attribute (0x0001)
- *Move to level* command (0x00)
- *Step* command (0x01)
- *Move* command (0x02)
- *Stop* command (0x03)
- *Move to level (with on/off)* command (0x04)
- *Move (with on/off)* command (0x05)
- *Step (with on/off)* command (0x06)
- *Stop* command (0x07)

PICS:

- LC.S
- LC.S.A0000, LC.S.A0001
- LC.S.C00-07.Rsp
- OO.S.A0000
- OO.S.C00-02.Rsp

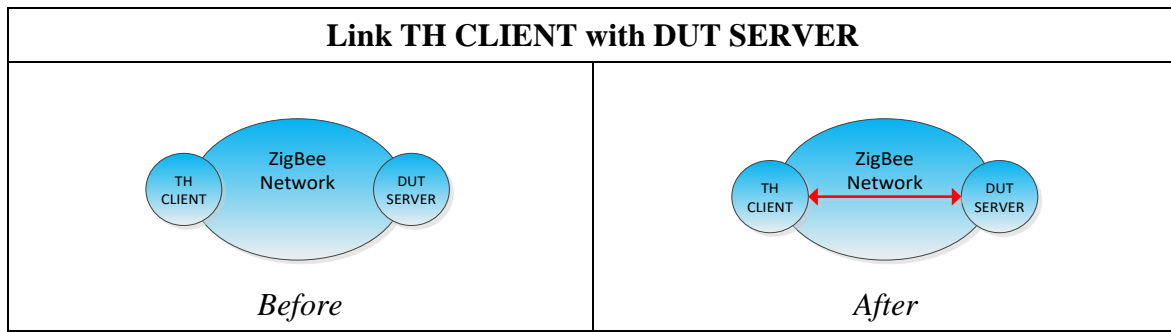
5.3.2.2 Required devices

Designation	Symbol	Description
TH CLIENT		Test harness client implementing: <ul style="list-style-type: none">• The <i>on/off</i> cluster client and• The <i>level control</i> cluster client.
DUT SERVER		Device under test server implementing: <ul style="list-style-type: none">• The <i>on/off</i> cluster server and• The <i>level control</i> cluster server.

5.3.2.3 Initial conditions

Item	Initial Conditions
1	A packet sniffer shall be observing the communication over the air interface.
2	All devices are factory new and powered off until used.

5.3.2.4 Test preparation



LC-TC-02S: Primary functionality with server as DUT		
Item	Preparation Step	Observation
P1	Form a ZigBee network.	Observe appropriate command frame to form the network.
P2	Power on TH CLIENT and DUT SERVER.	TH CLIENT and DUT SERVER are powered on.
P3	Join TH CLIENT and DUT SERVER to a ZigBee network.	Observe appropriate communication between TH CLIENT, DUT SERVER and any other relevant node on the ZigBee network.
P4	TH CLIENT sends an <i>off</i> command to DUT SERVER.	If requested, DUT SERVER unicasts a <i>ZCL default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER turns off.
P5	<i>Conditional on DUT SERVER supporting the OnLevel attribute:</i> TH CLIENT sends a <i>write attributes</i> command to DUT SERVER to write the value of the <i>OnLevel</i> attribute to 0xff.	DUT SERVER unicasts a <i>ZCL write attributes response</i> command frame to TH CLIENT with a status of 0x00 (SUCCESS).

--- End of test case LC-TC-02S preparation ---

247 **5.3.2.5 Test procedure**

LC-TC-02S: Primary functionality with server as DUT			
Item	PICS	Test Harness Step	DUT Pass Verification
0	LC.S.C04.Rsp	TH CLIENT unicasts a ZCL <i>move to level (with on/off)</i> command to DUT SERVER, with the <i>level</i> field set to 0x80 and the <i>transition time</i> field set to 0x0000 (move immediately).	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER turns on and moves to its level to the mid-point.
1	LC.S.A0000	TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read the <i>CurrentLevel</i> attribute.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. <i>CurrentLevel</i> attribute has the value 0x80.
2a	LC.S.C05.Rsp	TH CLIENT unicasts a ZCL <i>move (with on/off)</i> command to DUT SERVER, with the <i>move mode</i> field set to 0x00 (move up) and the <i>rate</i> field set to 0x20 (32 units per second).	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER increases to its maximum level over 4 seconds.
2b	LC.S.A0000	After 6s, TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read the <i>CurrentLevel</i> attribute.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. <i>CurrentLevel</i> attribute has the value 0xfe.
3a	LC.S.C00.Rsp	TH CLIENT unicasts a ZCL <i>move to level</i> command to DUT SERVER, with the <i>level</i> field set to 0x80 and the <i>transition time</i> field set to 0x0000 (move immediately).	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER immediately reduces its level to its mid-point.
3b	LC.S.A0000	TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read the <i>CurrentLevel</i> attribute.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. <i>CurrentLevel</i> attribute has the value 0x80.

Continued...

LC-TC-02S: Primary functionality with server as DUT			
Item	PICS	Test Harness Step	DUT Pass Verification
4a	OO.S.C00.Rsp	TH CLIENT unicasts a ZCL <i>off</i> command to DUT SERVER.	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER turns off.
4b	LC.S.A0000	TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read the <i>CurrentLevel</i> attribute.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. <i>CurrentLevel</i> attribute has the value 0x80.
5a	OO.S.C01.Rsp	TH CLIENT unicasts a ZCL <i>on</i> command to DUT SERVER.	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER turns on.
5b	LC.S.A0000	TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read the <i>CurrentLevel</i> attribute.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. <i>CurrentLevel</i> attribute has the value 0x80.
6a	LC.S.C02.Rsp	TH CLIENT unicasts a ZCL <i>step</i> command to DUT SERVER, with the <i>step mode</i> field set to 0x01 (step down), the <i>step size</i> field set to 0x40 (64 units) and the <i>transition time</i> field set to 0x0014 (2s).	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER reduces its level.
6b	LC.S.C02.Rsp	After 2s, TH CLIENT unicasts a ZCL <i>step</i> command to DUT SERVER, with the <i>step mode</i> field set to 0x01 (step down), the <i>step size</i> field set to 0x40 (64 units) and the <i>transition time</i> field set to 0x0014 (2s).	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER reduces its level to its minimum level.

Continued...

LC-TC-02S: Primary functionality with server as DUT			
Item	PICS	Test Harness Step	DUT Pass Verification
6c	LC.S.A0000	After 2s, TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read the <i>CurrentLevel</i> attribute.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. <i>CurrentLevel</i> attribute has the value 0x01.
7a	OO.S.C02.Rsp	TH CLIENT unicasts a ZCL <i>toggle</i> command to DUT SERVER.	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER turns off.
7b	LC.S.A0000, OO.S.A0000	TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read the <i>CurrentLevel</i> and <i>OnOff</i> attributes.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. <i>CurrentLevel</i> attribute has the value 0x01. <i>OnOff</i> attribute has the value 0x00.
8a	OO.S.C02.Rsp	TH CLIENT unicasts a ZCL <i>toggle</i> command to DUT SERVER.	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER turns on.
8b	LC.S.A0000, OO.S.A0000	TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read the <i>CurrentLevel</i> and <i>OnOff</i> attributes.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. <i>CurrentLevel</i> attribute has the value 0x01. <i>OnOff</i> attribute has the value 0x01.
9a	LC.S.C01.Rsp	TH CLIENT unicasts a ZCL <i>move</i> command to DUT SERVER, with the <i>move mode</i> field set to 0x00 (move up) and the <i>rate</i> field set to 0x0a (10 units per second).	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER begins to increase its level.

Continued...

LC-TC-02S: Primary functionality with server as DUT			
Item	PICS	Test Harness Step	DUT Pass Verification
9b	LC.S.C03.Rsp	After 10s, TH CLIENT unicasts a ZCL <i>stop</i> [0x03] command to DUT SERVER.	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER stops adjusting its level.
9c	LC.S.A0000	TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read the <i>CurrentLevel</i> attribute.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. <i>CurrentLevel</i> attribute has the value 0x65.
10a	LC.S.C01.Rsp	TH CLIENT unicasts a ZCL <i>move</i> command to DUT SERVER, with the <i>move mode</i> field set to 0x01 (move down) and the <i>rate</i> field set to 0x04 (4 units per second).	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER begins to decrease its level.
10b	LC.S.C07.Rsp	After 10s, TH CLIENT unicasts a ZCL <i>stop</i> [0x07] command to DUT SERVER.	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER stops adjusting its level.
10c	LC.S.A0000	TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read the <i>CurrentLevel</i> attribute.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. <i>CurrentLevel</i> attribute has the value 0x3d.
11a	LC.S.C04.Rsp	TH CLIENT unicasts a ZCL <i>move to level (with on/off)</i> command to DUT SERVER, with the <i>level</i> field set to 0x00 and the <i>transition time</i> field set to 0x0258 (60s).	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER immediately begins to decrease its level.

Continued...

LC-TC-02S: Primary functionality with server as DUT			
Item	PICS	Test Harness Step	DUT Pass Verification
11b	LC.S.A0001	After 10s, TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read the <i>RemainingTime</i> attribute.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. <i>RemainingTime</i> attribute has a value approximately equal to 0x01f4. DUT SERVER continues to decrease its level to its minimum level and turns off.
11c	LC.S.A0000, OO.S.A0000	After 60s, TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read the <i>CurrentLevel</i> and <i>OnOff</i> attributes.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. <i>CurrentLevel</i> attribute has the value 0x01. <i>OnOff</i> attribute has the value 0x00.
12a	LC.S.C06.Rsp	TH CLIENT unicasts a ZCL <i>step (with on/off)</i> command to DUT SERVER, with the <i>step mode</i> field set to 0x00 (step up), the <i>step size</i> field set to 0x01 (1 unit) and the <i>transition time</i> field set to 0xffff (as fast as possible).	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER turns on at its minimum level.
12b	LC.S.A0000, OO.S.A0000	After 60s, TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read the <i>CurrentLevel</i> and <i>OnOff</i> attributes.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. <i>CurrentLevel</i> attribute has the value 0x02. <i>OnOff</i> attribute has the value 0x01.

--- End of test case LC-TC-02S ---

248
249

5.3.3 LC-TC-03S: Secondary functionality with server as DUT

This test case verifies the secondary functionality of the *level control* cluster server.

5.3.3.1 Scope

General:

- *Read attributes* command (0x00)
- *Read attributes response* command (0x01)
- *Write attributes* command (0x02)
- *Write attributes response* command (0x04)
- *Default response* command (0x0b)

On/off cluster (0x0006):

- *Off* command (0x00)
- *On* command (0x01)



Level control cluster (0x0008):

- *OnOffTransitionTime* attribute (0x0010)
- *OnLevel* attribute (0x0011)
- *OnTransitionTime* attribute (0x0012)
- *OffTransitionTime* attribute (0x0013)
- *DefaultMoveRate* attribute (0x0014)
- *Move (with on/off)* command (0x05)

PICS:

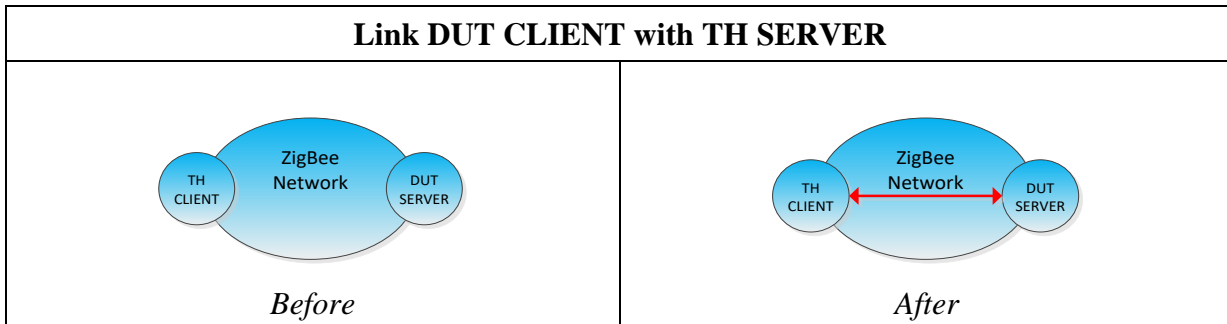
- LC.S
- LC.S.A0010-0014
- LC.S.C05.Rsp
- OO.S.C00-01.Rsp

5.3.3.2 Required devices

Designation	Symbol	Description
TH CLIENT		Test harness client implementing: <ul style="list-style-type: none"> • The <i>on/off</i> cluster client and • The <i>level control</i> cluster client.
DUT SERVER		Device under test server implementing: <ul style="list-style-type: none"> • The <i>on/off</i> cluster server and • The <i>level control</i> cluster server.

5.3.3.3 Initial conditions

Item	Initial Conditions
1	A packet sniffer shall be observing the communication over the air interface.
2	All devices are factory new and powered off until used.

5.3.3.4 Test preparation

LC-TC-03S: Secondary functionality with server as DUT		
Item	Preparation Step	Observation
P1	Form a ZigBee network.	Observe appropriate command frame to form the network.
P2	Power on TH CLIENT and DUT SERVER.	TH CLIENT and DUT SERVER are powered on.
P3	Join TH CLIENT and DUT SERVER to a ZigBee network.	Observe appropriate communication between TH CLIENT, DUT SERVER and any other relevant node on the ZigBee network.

--- End of test case LC-TC-03C preparation ---

283 **5.3.3.5 Test procedure**

LC-TC-03S: Secondary functionality with server as DUT			
Item	PICS	Test Harness Step	DUT Pass Verification
1	OO.S.C00.Rsp	TH CLIENT unicasts a ZCL <i>OnOff</i> cluster, <i>off</i> command to DUT SERVER.	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER turns off.
2a	LC.S.A0011	<i>Conditional on OnLevel attribute being supported on the DUT:</i> TH CLIENT unicasts a ZCL <i>write attributes</i> command to set the <i>OnLevel</i> attribute to 0xfe.	DUT SERVER unicasts a ZCL <i>write attributes response</i> command frame to TH CLIENT.
2b	LC.S.A0011	TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read the <i>OnLevel</i> attribute.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. <i>OnLevel</i> attribute has the value 0xfe.
3a	LC.S.A0010	<i>Conditional on the OnOffTransitionTime attribute being supported on the DUT:</i> TH CLIENT unicasts a ZCL <i>write attributes</i> command to set the <i>OnOffTransitionTime</i> attribute to 0x003c (6 seconds).	DUT SERVER unicasts a ZCL <i>write attributes response</i> command frame to TH CLIENT.
3b	LC.S.A0010	<i>Conditional on the OnOffTransitionTime attribute being supported on the DUT:</i> TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read the <i>OnOffTransitionTime</i> attribute.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT with a <i>Status</i> of SUCCESS. <i>OnOffTransitionTime</i> attribute has the value 0x003c.
3c	LC.S.A0012	<i>Conditional on the OnTransitionTime attribute being supported on the DUT:</i> TH CLIENT unicasts a ZCL <i>write attributes</i> command to set the <i>OnTransitionTime</i> attribute to 0x001e (3 seconds).	DUT SERVER unicasts a ZCL <i>write attributes response</i> command frame to TH CLIENT.

Continued...

LC-TC-03S: Secondary functionality with server as DUT			
Item	PICS	Test Harness Step	DUT Pass Verification
3d	LC.S.A0012	<p>Conditional on the <i>OnTransitionTime</i> attribute being supported on the DUT:</p> <p>TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read the <i>OnTransitionTime</i> attribute.</p>	<p>DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT with a <i>Status</i> of SUCCESS.</p> <p><i>OnTransitionTime</i> attribute has the value 0x001e.</p>
3e	LC.S.A0013	<p>Conditional on the <i>OffTransitionTime</i> attribute being supported on the DUT:</p> <p>TH CLIENT unicasts a ZCL <i>write attributes</i> command to set the <i>OffTransitionTime</i> attribute to 0x001e (3 seconds).</p>	<p>DUT SERVER unicasts a ZCL <i>write attributes response</i> command frame to TH CLIENT.</p>
3f	LC.S.A0013	<p>Conditional on the <i>OffTransitionTime</i> attribute being supported on the DUT:</p> <p>TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read the <i>OffTransitionTime</i> attribute.</p>	<p>DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT with a <i>Status</i> of SUCCESS.</p> <p><i>OffTransitionTime</i> attribute has the value 0x001e.</p>
4a	OO.S.C01.Rsp	<p>TH CLIENT unicasts a ZCL <i>OnOff</i> cluster, <i>on</i> command to DUT SERVER.</p>	<p>If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS).</p> <p>If the <i>OnTransitionTime</i> attribute is supported, DUT SERVER turns on over 3 seconds. Otherwise, if the <i>OnOffTransitionTime</i> attribute is supported, DUT SERVER turns on over 6 seconds. Otherwise, DUT SERVER turns on immediately.</p>

Continued...

LC-TC-03S: Secondary functionality with server as DUT			
Item	PICS	Test Harness Step	DUT Pass Verification
4b	OO.S.C00.Rsp	TH CLIENT unicasts a ZCL <i>OnOff</i> cluster, <i>off</i> command to DUT SERVER.	<p>If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS).</p> <p>If the <i>OffTransitionTime</i> attribute is supported, DUT SERVER turns off over 3 seconds. Otherwise, if the <i>OnOffTransitionTime</i> attribute is supported, DUT SERVER turns off over 6 seconds. Otherwise, DUT SERVER turns off immediately.</p>
5a	LC.S.A0012	<p>Conditional on the <i>OnTransitionTime</i> attribute being supported on the DUT:</p> <p>TH CLIENT unicasts a ZCL <i>write attributes</i> command to DUT SERVER to set the <i>OnTransitionTime</i> attribute to 0xffff.</p>	DUT SERVER unicasts a ZCL <i>write attributes response</i> command frame to TH CLIENT.
5b	OO.S.C01.Rsp	TH CLIENT unicasts a ZCL <i>OnOff</i> cluster, <i>on</i> command to DUT SERVER.	<p>If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS).</p> <p>If the <i>OnOffTransitionTime</i> attribute is supported, DUT SERVER turns on over 6 seconds. Otherwise, DUT SERVER turns on immediately.</p>
6a	LC.S.A0013	<p>Conditional on the <i>OffTransitionTime</i> attribute being supported on the DUT:</p> <p>TH CLIENT unicasts a ZCL <i>write attributes</i> command to DUT SERVER to set the <i>OffTransitionTime</i> attribute to 0xffff.</p>	DUT SERVER unicasts a ZCL <i>write attributes response</i> command frame to TH CLIENT.

Continued...

LC-TC-03S: Secondary functionality with server as DUT			
Item	PICS	Test Harness Step	DUT Pass Verification
6b	OO.S.C00.Rsp	TH CLIENT unicasts a ZCL <i>OnOff</i> cluster, <i>off</i> command to DUT SERVER.	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). If the <i>OnOffTransitionTime</i> attribute is supported, DUT SERVER turns off over 6 seconds. Otherwise, DUT SERVER turns off immediately.
7a	LC.S.A0014	Conditional on <i>DefaultMoveRate</i> attribute being supported on the DUT: TH CLIENT unicasts a ZCL <i>write attributes</i> command to set the <i>DefaultMoveRate</i> attribute to 0xff.	DUT SERVER unicasts a ZCL <i>write attributes response</i> command frame to TH CLIENT.
7b	LC.S.A0014	Conditional on <i>DefaultMoveRate</i> attribute being supported on the DUT: TH CLIENT sends a <i>read attributes</i> command to DUT SERVER to read the <i>DefaultMoveRate</i> attribute.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. <i>DefaultMoveRate</i> attribute has the value 0xff.
8a	LC.S.C05.Rsp	TH CLIENT unicasts a ZCL <i>move (with on/off)</i> command to DUT SERVER, with the <i>move mode</i> field set to 0x00 (move up) and the <i>rate</i> field set to 0xff (move as fast as it is able).	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER turns on and moves to its maximum level as fast as it is able.
8b	LC.S.C05.Rsp	TH CLIENT unicasts a ZCL <i>move (with on/off)</i> command to DUT SERVER, with the <i>move mode</i> field set to 0x01 (move down) and the <i>rate</i> field set to 0x1e (30 units per second).	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER turns off over 9 seconds.

Continued...

LC-TC-03S: Secondary functionality with server as DUT			
Item	PICS	Test Harness Step	DUT Pass Verification
9a	LC.S.A0014	<p>Conditional on <i>DefaultMoveRate</i> attribute being supported on the DUT:</p> <p>TH CLIENT unicasts a ZCL <i>write attributes</i> command to DUT SERVER, to set the <i>DefaultMoveRate</i> attribute to the value 0x3c (60 units per second).</p>	DUT SERVER unicasts a ZCL <i>write attributes response</i> command frame to TH CLIENT.
9b	LC.S.A0014	<p>Conditional on <i>DefaultMoveRate</i> attribute being supported on the DUT:</p> <p>TH CLIENT unicasts a ZCL <i>read attributes</i> command frame for the <i>DefaultMoveRate</i> attribute to DUT SERVER.</p>	<p>DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT.</p> <p><i>DefaultMoveRate</i> attribute has the value 0x3c.</p>
10a	LC.S.C05.Rsp	TH CLIENT unicasts a ZCL <i>move (with on/off)</i> command to DUT SERVER, with the <i>move mode</i> field set to 0x00 (move up) and the <i>rate</i> field set to 0xff (as fast as it is able).	<p>If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS).</p> <p>If the <i>DefaultMoveRate</i> attribute is supported, DUT SERVER turns on and moves to its maximum level over 5 seconds. Otherwise, DUT SERVER turns on and moves to its maximum level as fast as it is able.</p>
10b	LC.S.C05.Rsp	TH CLIENT unicasts a ZCL <i>move (with on/off)</i> command to DUT SERVER, with the <i>move mode</i> field set to 0x01 (move down) and the <i>rate</i> field set to 0x64 (100 units per second).	<p>If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS).</p> <p>DUT SERVER turns off over 3 seconds.</p>

--- End of test case LC-TC-03S ---

284

285

5.3.4 LC-TC-04S: Scenes functionality with server as DUT

This test case verifies the scenes functionality of the *level control* cluster server.

5.3.4.1 Scope

General:

- *Read attributes* command (0x00)
- *Read attributes response* command (0x01)
- *Default response* command (0x0b)

Groups cluster (0x0004):

- *Add group* command (0x00)
- *Add group response* command (0x00)
- *Get group membership* command (0x02)
- *Get group membership response* command (0x02)
- *Remove all groups* command (0x04)

Scenes cluster (0x0005):

- *Remove all scenes* command (0x03)
- *Remove all scenes response* command (0x03)
- *Store scene* command (0x04)
- *Store scene response* command (0x04)
- *Recall scene* command (0x05)



Level control cluster (0x0008):

- *CurrentLevel* attribute (0x0000)
- *Move to level (with on/off)* command (0x04)

PICS:

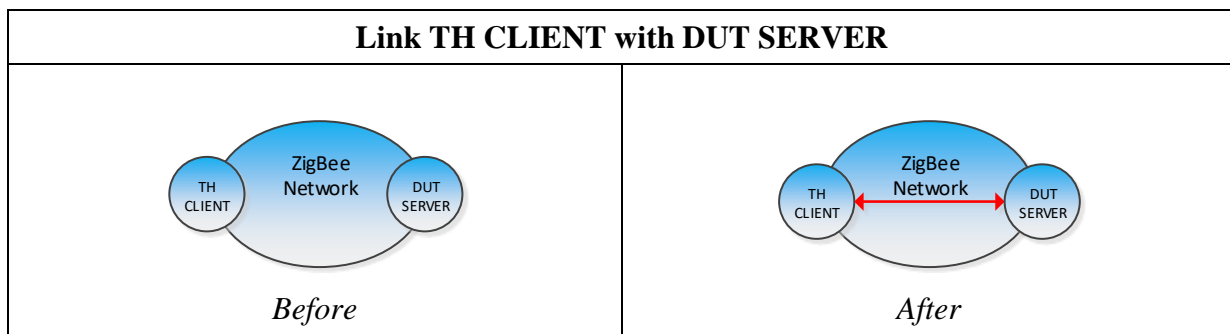
- G.S, S.S, CC.S
- G.S.C00.Rsp, G.S.C02.Rsp-G.S.C04.Rsp
- G.S.C00.Tx, G.S.C02.Tx, G.S.C03.Tx
- S.S.C04.Rsp, S.S.C05.Rsp
- S.S.C04.Tx
- LC.S.A0000, LC.S.A0000.Scenes
- LC.S.C04.Rsp

5.3.4.2 Required devices

Designation	Symbol	Description
TH CLIENT		Test harness client implementing: <ul style="list-style-type: none">• The <i>groups</i> cluster client,• The <i>scenes</i> cluster client and• The <i>level control</i> cluster client.
DUT SERVER		Device under test server implementing: <ul style="list-style-type: none">• The <i>groups</i> cluster server,• The <i>scenes</i> cluster server and• The <i>level control</i> cluster server.

5.3.4.3 Initial conditions

Item	Initial Conditions
1	A packet sniffer shall be observing the communication over the air interface.
2	All devices are factory new and powered off until used.

321 **5.3.4.4 Test preparation**

322

LC-TC-04S: Scenes functionality with server as DUT		
Item	Preparation Step	Observation
P1	Form a ZigBee network.	Observe appropriate command frame to form the network.
P2	Power on TH CLIENT and DUT SERVER.	TH CLIENT and DUT SERVER are powered on.
P3	Join TH CLIENT and DUT SERVER to a ZigBee network.	Observe appropriate communication between TH CLIENT, DUT SERVER and any other relevant node on the ZigBee network.

--- End of test case LC-TC-04S preparation ---

323

324

5.3.4.5 Test procedure

LC-TC-04S: Scene functionality with server as DUT			
Item	PICS	Test Harness Step	DUT Pass Verification
1a	G.S.C04.Rsp	TH CLIENT unicasts a ZCL <i>remove all groups</i> command frame to DUT SERVER.	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS).
1b	G.S.C02.Rsp, G.S.C02.Tx	TH CLIENT unicasts a ZCL <i>get group membership</i> command frame to DUT SERVER with the <i>group count</i> field set to 0x00.	DUT SERVER unicasts a ZCL <i>get group membership response</i> command frame with the <i>group count</i> field equal to 0x00.
1c	G.S.C00.Rsp, G.S.C00.Tx	TH CLIENT unicasts ZCL <i>add group</i> command to DUT SERVER, with the <i>group ID</i> field set to 0x0001.	DUT SERVER unicasts a ZCL <i>add group response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS) and the <i>group ID</i> field equal to 0x0001.
2	S.S.C03.Rsp, S.S.C03.Tx	TH CLIENT unicasts a ZCL <i>remove all scenes</i> command frame to DUT SERVER with the <i>group ID</i> field set to 0x0001.	DUT SERVER unicasts a ZCL <i>remove all scenes response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS) and the <i>group ID</i> field equal to 0x0001.
3a	LC.S.A0000, LC.S.C04.Rsp	TH CLIENT unicasts a ZCL <i>move to level (with on/off)</i> command frame to DUT SERVER with the <i>Level</i> field set to 0x7f and the <i>transition time</i> field set to 0x0000.	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER turns on if necessary and changes its level to the mid-point.
3b	S.S.C04.Rsp, S.S.C04.Tx	TH CLIENT unicasts a ZCL <i>store scene</i> command frame to DUT SERVER with the <i>group ID</i> field set to 0x0001 and the <i>scene ID</i> field set to 0x01.	DUT SERVER unicasts a ZCL <i>store scene response</i> command frame to TH CLIENT with the <i>status</i> field set to 0x00 (SUCCESS), the <i>group ID</i> field set to 0x0000 and the <i>scene ID</i> field set to 0x01.

Continued...

LC-TC-04S: Scene functionality with server as DUT			
Item	PICS	Test Harness Step	DUT Pass Verification
3c	LC.S.A0000	TH CLIENT unicasts a ZCL <i>read attributes</i> command frame for the <i>CurrentLevel</i> attribute to DUT SERVER.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. The <i>CurrentLevel</i> attribute is set to 0x7f.
3d	LC.S.A0000, LC.S.C00.Rsp	TH CLIENT unicasts a ZCL <i>move to level</i> command frame to DUT SERVER with the <i>Level</i> field set to 0xfe and the <i>transition time</i> field set to 0x0000.	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER changes the maximum value.
3e	LC.S.A0000	TH CLIENT unicasts a ZCL <i>read attributes</i> command frame for the <i>CurrentLevel</i> attribute to DUT SERVER.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. Verify that the values of the <i>CurrentLevel</i> attribute are different to those returned in step 3c.
3f	S.S.C05.Rsp	TH CLIENT unicasts a ZCL <i>recall scene</i> command frame to DUT SERVER with the <i>group ID</i> field set to 0x0001 and the <i>scene ID</i> field set to 0x01.	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER changes to the mid-point.
3g	LC.S.A0000	TH CLIENT unicasts a ZCL <i>read attributes</i> command frame for the <i>CurrentLevel</i> attribute to DUT SERVER.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. Verify that the values of the <i>CurrentLevel</i> attribute are the same as were returned in step 3c.

--- End of test case LC-TC-04S ---

326
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328

5.3.5 LC-TC-05S: Reporting functionality with server as DUT

This case test verifies the attribute reporting behavior of the *level control* cluster server.

5.3.5.1 Scope

General:

- *Configure reporting* command (0x06)
- *Configure reporting response* command (0x07)
- *Report attributes* command (0x0a)
- *Default response* command (0x0b)

Level control cluster (0x0008):

- *CurrentLevel* attribute (0x0000)
- *Move to level* command (0x00)

PIXIT:

- LC.PIXIT.MINRI, LC.PIXIT.MAXRI

PICS:

- LC.S
- LC.S.A0000
- LC.S.A0000.Report.Tx
- LC.S.C00.Rsp

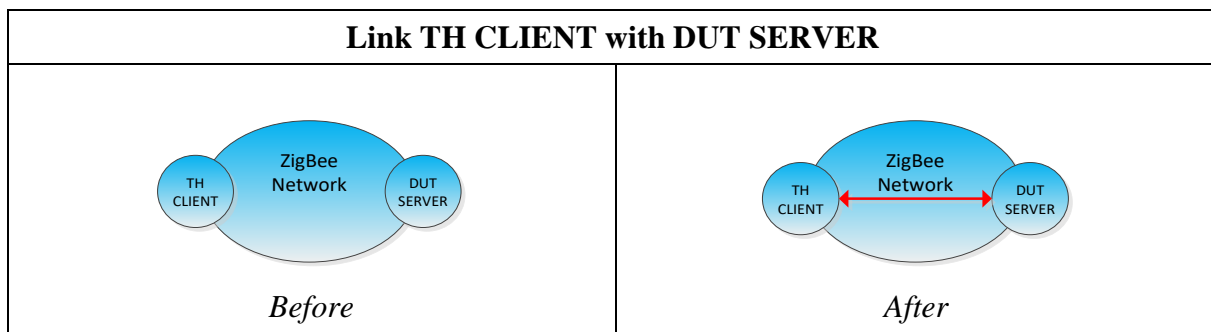
5.3.5.2 Required devices

Designation	Symbol	Description
TH CLIENT		Test harness client implementing: <ul style="list-style-type: none"> • The <i>level control</i> cluster client.
DUT SERVER		Device under test server implementing: <ul style="list-style-type: none"> • The <i>level control</i> cluster server.

5.3.5.3 Initial conditions

Item	Initial Conditions
1	A packet sniffer shall be observing the communication over the air interface.
2	All devices are factory new and powered off until used.

5.3.5.4 Test preparation



LC-TC-05S: Reporting functionality with server as DUT		
Item	Preparation Step	Observation
P1	Form a ZigBee network.	Observe appropriate command frame to form the network.
P2	Power on TH CLIENT and DUT SERVER.	TH CLIENT and DUT SERVER are powered on.
P3	Join TH CLIENT and DUT SERVER to a ZigBee network.	Observe appropriate communication between TH CLIENT, DUT SERVER and any other relevant node on the ZigBee network.
P5	Establish a binding link in the reverse direction from an endpoint on DUT SERVER to a corresponding endpoint on TH CLIENT that both support the <i>level control</i> cluster.	Observe appropriate communication between DUT SERVER, TH CLIENT and any other relevant node on the ZigBee network.

--- End of test case LC-TC-05S preparation ---

357 **5.3.5.5 Test procedure**

LC-TC-05S: Reporting functionality with server as DUT			
Item	PICS	Test Harness Step	DUT Pass Verification
0a	LC.S.C04.Rsp	TH CLIENT unicasts a ZCL <i>move to level (with on/off)</i> command to DUT SERVER, with the <i>level</i> field set to 0x80 and the <i>transition time</i> field set to 0x0000 (move immediately).	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER moves to its level to the mid-point.
0b	LC.S.A0000	TH CLIENT unicasts a ZCL <i>read reporting configuration</i> command frame to DUT SERVER to read the default reporting configuration of the <i>CurrentLevel</i> attribute.	DUT SERVER unicasts a ZCL <i>read reporting configuration response</i> command frame to TH CLIENT with a single attribute reporting configuration record for the <i>CurrentLevel</i> attribute and the <i>status</i> field set to SUCCESS. Set RI_{max} to the value of the <i>maximum reporting interval</i> field. RI_{max} is set to either 0x0000 or a value in the range 0x003d to 0xfffe. Store the default report parameters contained in the <i>read reporting configuration response</i> command frame.
0c	LC.S.A0000, LC.S.A0000.Report.Tx	Wait for the attribute report according to the default configuration.	At a time $\leq (RI_{max} + 2)$ seconds, DUT SERVER unicasts a ZCL <i>report attributes</i> command frame to TH CLIENT with the <i>CurrentLevel</i> attribute.

Continued...

LC-TC-05S: Reporting functionality with server as DUT			
Item	PICS	Test Harness Step	DUT Pass Verification
1a	LC.S.A0000, LC.S.A0000.R eport.Tx	TH CLIENT unicasts a ZCL <i>configure reporting</i> command to DUT SERVER for the <i>CurrentLevel</i> attribute with a <i>direction</i> field set to 0x00, the <i>minimum reporting interval</i> field set to LC.PIXIT.MINRI, the <i>maximum reporting interval</i> field set to LC.PIXIT.MAXRI and the <i>reportable change</i> field set equal to or less than 25% of the device's valid value range (if valid range is between 0 – 100 with a resolution of 1, set the <i>reportable change</i> field to 0x0a (10%)).	DUT SERVER unicasts a ZCL <i>configure reporting response</i> command to TH CLIENT, confirming the configured attribute and with the <i>status</i> field set to SUCCESS.
1b	LC.S.A0000, LC.S.A0000.R eport.Tx	None	At a time \leq (LC.PIXIT.MAXRI + 2) seconds after step 1a, DUT SERVER unicasts a ZCL <i>report attributes</i> command to TH CLIENT with the <i>CurrentLevel</i> attribute.
2a	LC.S.C00.Rsp	TH CLIENT unicasts a ZCL <i>move to level</i> command to DUT SERVER with the <i>level</i> field set to a value such that the <i>CurrentLevel</i> attribute is changed by a value less than the <i>reportable change</i> field (from the <i>configure reporting</i> command) and the <i>transition time</i> field set to 0x0000.	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER increases its level accordingly.
2c	LC.S.A0000, LC.S.A0000.R eport.Tx	None	At a time approximately LC.PIXIT.MAXRI seconds after sending the report in step 1b, DUT SERVER unicasts a ZCL <i>report attributes</i> command to TH CLIENT with the <i>CurrentLevel</i> attribute.

Continued...

LC-TC-05S: Reporting functionality with server as DUT			
Item	PICS	Test Harness Step	DUT Pass Verification
3a	LC.S.C00.Rsp	TH CLIENT unicasts a ZCL <i>move to level</i> command to DUT SERVER with the <i>level</i> field set to a value such that the <i>CurrentLevel</i> attribute is changed by a value equal to or greater than the <i>reportable change</i> field (from the <i>configure reporting</i> command) and the <i>transition time</i> field set to 0x0000.	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER decreases its level accordingly.
3b	LC.S.A0000, LC.S.A0000.R eport.Tx	None	At a time approximately LC.PIXIT.MINRI seconds after sending the report in step 2c, DUT SERVER unicasts a ZCL <i>report attributes</i> command to TH CLIENT with the <i>CurrentLevel</i> attribute.
3c	LC.S.A0000, LC.S.A0000.R eport.Tx	None	At a time approximately LC.PIXIT.MAXRI seconds after sending the report in step 3b, DUT SERVER unicasts a ZCL <i>report attributes</i> command to TH CLIENT with the <i>CurrentLevel</i> attribute.
4a	LC.S.A0000, LC.S.A0000.R eport.Tx	TH CLIENT unicasts a ZCL <i>configure reporting</i> command to DUT SERVER for the <i>CurrentLevel</i> attribute the <i>maximum reporting interval</i> field set to 0xffff (do not send reports).	DUT SERVER unicasts a ZCL <i>configure reporting response</i> command to TH CLIENT, confirming the configured attribute and with the <i>status</i> field set to SUCCESS.
4b	LC.S.A0000.R eport.Tx	Wait for (LC.PIXIT.MAXRI + 2) seconds after the report sent in step 3c.	DUT SERVER does not send any further reports.

LC-TC-05S: Reporting functionality with server as DUT			
Item	PICS	Test Harness Step	DUT Pass Verification
5	LC.S.A0000	TH CLIENT unicasts a ZCL <i>read reporting configuration</i> command frame to DUT SERVER to read the default reporting configuration of the <i>CurrentLevel</i> attribute.	DUT SERVER unicasts a ZCL <i>read reporting configuration response</i> command frame to TH CLIENT with a single attribute reporting configuration record for the <i>CurrentLevel</i> attribute and the <i>status</i> field equal to either 0x8b (NOT_FOUND) or 0x00 (SUCCESS). If the <i>status</i> field is equal to 0x00, the <i>maximum reporting interval</i> field is equal to 0xffff.

Continued...

6a	LC.S.A0000	TH CLIENT unicasts a ZCL <i>configure reporting</i> command frame to DUT SERVER for the <i>CurrentLevel</i> attribute with a <i>direction</i> field set to 0x00, the <i>minimum reporting interval</i> field set to 0xffff and the <i>maximum reporting interval</i> field set to 0x0000 (restore default report configuration).	DUT SERVER unicasts a ZCL <i>configure reporting response</i> command frame to TH CLIENT, confirming the configured attributes and with the <i>status</i> field set to SUCCESS.
6b	LC.S.A0000	TH CLIENT unicasts a ZCL <i>read reporting configuration</i> command frame to DUT SERVER to read the default reporting configuration of the <i>CurrentLevel</i> attribute.	DUT SERVER unicasts a ZCL <i>read reporting configuration response</i> command frame to TH CLIENT with a single attribute reporting configuration record for the <i>CurrentLevel</i> attribute and the <i>status</i> field set to SUCCESS. Verify that the default reporting configuration is commensurate with the parameters stored in step 0b.
6c	LC.S.A0000, LC.S.A0000.Report.Tx	Wait for the attribute report according to the default configuration.	At a time $\leq (RI_{max} + 2)$ seconds, DUT SERVER unicasts a ZCL <i>report attributes</i> command frame to TH CLIENT with the <i>CurrentLevel</i> attribute.

--- End of test case LC-TC-05S ---

359

5.3.6 LC-TC-06S: Startup functionality with server as DUT

This case test verifies the startup functionality of the *level control* cluster server.

5.3.6.1 Scope

General:

- *Read attributes* command (0x00)
- *Read attributes response* command (0x01)
- *Write attributes* command (0x02)
- *Write attributes response* command (0x04)
- *Default response* command (0x0b)

On/off cluster (0x0006):

- *StartUpOnOff* attribute (0x4003)



Level control cluster (0x0008):

- *CurrentLevel* attribute (0x0000)
- *StartUpCurrentLevel* attribute (0x4000)
- *Move to level (with on/off)* command (0x04)

PICS:

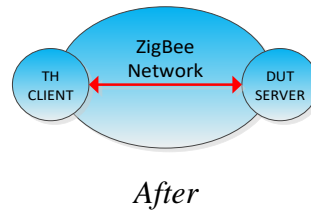
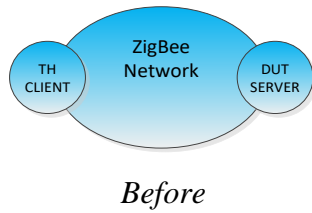
- LC.S
- LC.S.A0000, LC.S.A4000
- LC.S.C04.Rsp

5.3.6.2 Required devices

Designation	Symbol	Description
TH CLIENT		Test harness client implementing: <ul style="list-style-type: none"> • The <i>on/off</i> cluster client and • The <i>level control</i> cluster client.
DUT SERVER		Device under test server implementing: <ul style="list-style-type: none"> • The <i>on/off</i> cluster server and • The <i>level control</i> cluster server.

5.3.6.3 Initial conditions

Item	Initial Conditions
1	A packet sniffer shall be observing the communication over the air interface.
2	All devices are factory new and powered off until used.

5.3.6.4 Test preparation**Link TH CLIENT with DUT SERVER****LC-TC-06S: Startup functionality with server as DUT**

Item	Preparation Step	Observation
P1	Form a ZigBee network.	Observe appropriate command frame to form the network.
P2	Power on TH CLIENT and DUT SERVER.	TH CLIENT and DUT SERVER are powered on.
P3	Join TH CLIENT and DUT SERVER to a ZigBee network.	Observe appropriate communication between TH CLIENT, DUT SERVER and any other relevant node on the ZigBee network.

--- End of test case LC-TC-06S preparation ---

389

5.3.6.5 Test procedure

LC-TC-06S: Startup functionality with server as DUT			
Item	PICS	Test Harness Step	DUT Pass Verification
1a	LC.S.A0000, LC.S.C04.Rsp	TH CLIENT unicasts a ZCL <i>move to level (with on/off)</i> command frame to DUT SERVER with the <i>Level</i> field set to 0x7f.	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER turns on if necessary and changes its level to the mid-point.
1b	-	TH CLIENT unicasts a ZCL <i>write attributes</i> command frame to DUT SERVER to write the value 0xff (startup in the previous state) to the <i>OnOff</i> cluster, <i>StartUpOnOff</i> attribute.	DUT SERVER unicasts a ZCL <i>write attributes response</i> command frame to TH CLIENT.
2a	LC.S.A4000	TH CLIENT unicasts a ZCL <i>write attributes</i> command frame to DUT SERVER to write the value 0xfe to the <i>StartUpCurrentLevel</i> attribute.	DUT SERVER unicasts a ZCL <i>write attributes response</i> command frame to TH CLIENT.
2b	-	Power off DUT SERVER.	None.
2c	-	Power on DUT SERVER.	DUT SERVER is powered at its maximum level.
2d	LC.S.A0000	TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read the <i>CurrentLevel</i> attribute.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. <i>CurrentLevel</i> attribute has the value 0xfe.
3a	LC.S.A4000	TH CLIENT unicasts a ZCL <i>write attributes</i> command frame to DUT SERVER to write the value 0x01 to the <i>StartUpCurrentLevel</i> attribute.	DUT SERVER unicasts a ZCL <i>write attributes response</i> command frame to TH CLIENT.
3b	-	Power off DUT SERVER.	None.
3c	-	Power on DUT SERVER.	DUT SERVER is powered at its minimum level.

Continued...

LC-TC-06S: Startup functionality with server as DUT			
Item	PICS	Test Harness Step	DUT Pass Verification
3d	LC.S.A0000	TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read the <i>CurrentLevel</i> attribute.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. <i>CurrentLevel</i> attribute has the value 0x01.
4a	LC.S.A0000, LC.S.C04.Rsp	TH CLIENT unicasts a ZCL <i>move to level (with on/off)</i> command frame to DUT SERVER with the <i>Level</i> field set to 0x7f.	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER turns on if necessary and changes its level to the mid-point.
4b	LC.S.A4000	TH CLIENT unicasts a ZCL <i>write attributes</i> command frame to DUT SERVER to write the value 0xff (start up at the previous level) to the <i>StartUpCurrentLevel</i> attribute.	DUT SERVER unicasts a ZCL <i>write attributes response</i> command frame to TH CLIENT.
4c	-	Power off DUT SERVER.	None.
4d	-	Power on DUT SERVER.	DUT SERVER is powered at its mid-point level.
4e	LC.S.A0000	TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read the <i>CurrentLevel</i> attribute.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. <i>CurrentLevel</i> attribute has the value 0x7f.

--- End of test case LC-TC-06S ---

390
391

5.3.7 LC-TC-07S: ExecutelfOff behavior with server as DUT

This test case verifies the behavior of the *ExecuteIfOff* option of the *level control* cluster server.

Note: this test case only verifies the *ExecuteIfOff* behavior with the *Move to level* command and it is assumed that the *Step*, *Move* and *Stop* commands exhibit the same behavior. If preferred, the tester can either repeat the test for each command or substitute a random command in place of the *Move to level* command as written.

5.3.7.1 Scope

General:

- *Read attributes* command (0x00)
- *Read attributes response* command (0x01)
- *Write attributes* command (0x02)
- *Write attributes response* command (0x04)
- *Default response* command (0x0b)

On/off cluster (0x0006):

- *Off* command (0x00)



Level control cluster (0x0008):

- *CurrentLevel* attribute (0x0000)
- *Options* attribute (0x000f)
- *Move to level* command (0x00)
- *Move to level (with on/off)* command (0x04)

PICS:

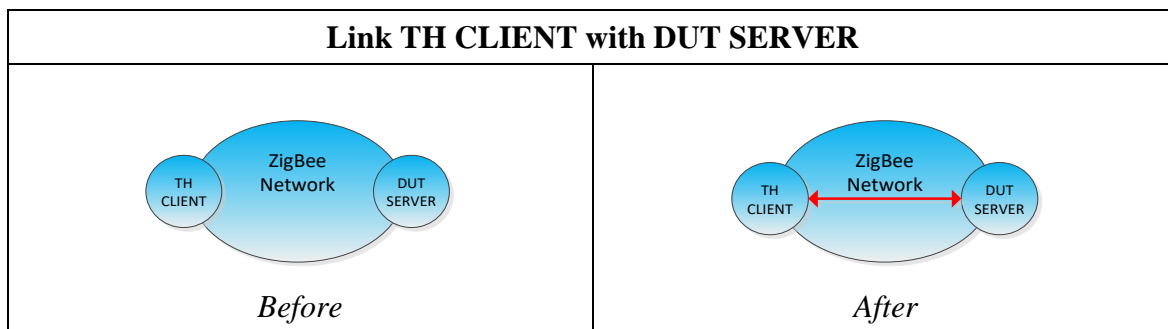
- LC.S
- LC.S.A0000, LC.S.A000f
- LC.S.C00.Rsp, LC.S.C04.Rsp
- OO.S.C00.Rsp

5.3.7.2 Required devices

Designation	Symbol	Description
TH CLIENT		Test harness client implementing: <ul style="list-style-type: none"> • The <i>on/off</i> cluster client and • The <i>level control</i> cluster client.
DUT SERVER		Device under test server implementing: <ul style="list-style-type: none"> • The <i>on/off</i> cluster server and • The <i>level control</i> cluster server.

5.3.7.3 Initial conditions

Item	Initial Conditions
1	A packet sniffer shall be observing the communication over the air interface.
2	All devices are factory new and powered off until used.

423 **5.3.7.4 Test preparation**

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LC-TC-07S: ExecutelfOff behavior with server as DUT		
Item	Preparation Step	Observation
P1	Form a ZigBee network.	Observe appropriate command frame to form the network.
P2	Power on TH CLIENT and DUT SERVER.	TH CLIENT and DUT SERVER are powered on.
P3	Join TH CLIENT and DUT SERVER to a ZigBee network.	Observe appropriate communication between TH CLIENT, DUT SERVER and any other relevant node on the ZigBee network.

--- End of test case LC-TC-07S preparation ---

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427 **5.3.7.5 Test procedure**

LC-TC-07S: ExecuteIfOff behavior with server as DUT			
Item	PICS	Test Harness Step	DUT Pass Verification
1a	LC.S.C04.Rsp	TH CLIENT unicasts a ZCL <i>move to level (with on/off)</i> command to DUT SERVER, with the <i>level</i> field set to 0x80 and the <i>transition time</i> field set to 0x0000 (move immediately).	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER moves to its level to the mid-point.
1b	LC.S.A0000	TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read the <i>CurrentLevel</i> attribute.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. <i>CurrentLevel</i> attribute has the value 0x80.
2	OO.S.C00.Rsp	TH CLIENT unicasts a ZCL <i>off</i> command to DUT SERVER.	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER turns off.
3	OO.S.A000f	TH CLIENT unicasts a ZCL <i>write attributes</i> command frame to DUT SERVER to set the <i>Options</i> attribute to 0x00 (<i>ExecuteIfOff</i> bit not set).	DUT SERVER unicasts a ZCL <i>write attributes response</i> command frame to TH CLIENT.
4a	LC.S.C00.Rsp	TH CLIENT unicasts a ZCL <i>move to level</i> command to DUT SERVER, with the <i>level</i> field set to 0x01, the <i>transition time</i> field set to 0x0000 (move immediately) and the <i>OptionsMask</i> and <i>OptionsOverride</i> fields omitted.	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER does nothing.
4b	LC.S.A0000	TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read the <i>CurrentLevel</i> attribute.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. <i>CurrentLevel</i> attribute has the value 0x80.

Continued...

LC-TC-07S: ExecuteIfOff behavior with server as DUT			
Item	PICS	Test Harness Step	DUT Pass Verification
5a	LC.S.C00.Rsp	TH CLIENT unicasts a ZCL <i>move to level</i> command to DUT SERVER, with the <i>level</i> field set to 0x01, the <i>transition time</i> field set to 0x0000 (move immediately), the <i>OptionsMask</i> field set to 0x01 and the <i>OptionsOverride</i> field set to 0x00 (<i>ExecuteIfOff</i> bit not set).	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER does nothing.
5b	LC.S.A0000	TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read the <i>CurrentLevel</i> attribute.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. <i>CurrentLevel</i> attribute has the value 0x80.
6a	LC.S.C00.Rsp	TH CLIENT unicasts a ZCL <i>move to level</i> command to DUT SERVER, with the <i>level</i> field set to 0x01, the <i>transition time</i> field set to 0x0000 (move immediately), the <i>OptionsMask</i> field set to 0x01 and the <i>OptionsOverride</i> field set to 0x01 (<i>ExecuteIfOff</i> bit set).	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER does nothing.
6b	LC.S.A0000	TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read the <i>CurrentLevel</i> attribute.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. <i>CurrentLevel</i> attribute has the value 0x01.
7	OO.S.A000f	TH CLIENT unicasts a ZCL <i>write attributes</i> command frame to DUT SERVER to set the <i>Options</i> attribute to 0x01 (<i>ExecuteIfOff</i> bit set).	DUT SERVER unicasts a ZCL <i>write attributes response</i> command frame to TH CLIENT.

Continued...

LC-TC-07S: ExecuteIfOff behavior with server as DUT			
Item	PICS	Test Harness Step	DUT Pass Verification
8a	LC.S.C00.Rsp	TH CLIENT unicasts a ZCL <i>move to level</i> command to DUT SERVER, with the <i>level</i> field set to 0x80, the <i>transition time</i> field set to 0x0000 (move immediately) and the <i>OptionsMask</i> and <i>OptionsOverride</i> fields omitted.	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER does nothing.
8b	LC.S.A0000	TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read the <i>CurrentLevel</i> attribute.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. <i>CurrentLevel</i> attribute has the value 0x80.
9a	LC.S.C00.Rsp	TH CLIENT unicasts a ZCL <i>move to level</i> command to DUT SERVER, with the <i>level</i> field set to 0xfe, the <i>transition time</i> field set to 0x0000 (move immediately), the <i>OptionsMask</i> field set to 0x01 and the <i>OptionsOverride</i> field set to 0x00 (<i>ExecuteIfOff</i> bit not set).	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER does nothing.
9b	LC.S.A0000	TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read the <i>CurrentLevel</i> attribute.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. <i>CurrentLevel</i> attribute has the value 0x80.
10a	LC.S.C00.Rsp	TH CLIENT unicasts a ZCL <i>move to level</i> command to DUT SERVER, with the <i>level</i> field set to 0xfe, the <i>transition time</i> field set to 0x0000 (move immediately), the <i>OptionsMask</i> field set to 0x01 and the <i>OptionsOverride</i> field set to 0x01 (<i>ExecuteIfOff</i> bit set).	If requested, DUT SERVER unicasts a ZCL <i>default response</i> command frame to TH CLIENT with the <i>status</i> field equal to 0x00 (SUCCESS). DUT SERVER does nothing.

Continued...

LC-TC-07S: ExecuteIfOff behavior with server as DUT			
Item	PICS	Test Harness Step	DUT Pass Verification
10b	LC.S.A0000	TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read the <i>CurrentLevel</i> attribute.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. <i>CurrentLevel</i> attribute has the value 0xfe.

--- End of test case LC-TC-07S ---

428

5.4 Client test cases

5.4.1 LC-TC-01C: Functionality with client as DUT

This case test verifies the functionality of the *level control* cluster client.

The DUT client SHALL be on the same network as a suitable server, provided by the user, and this device SHALL be used by the client to exercise its functionality. The test case uses the test harness to prompt the user, based on the declared PICS, to exercise the functionality of the *basic* cluster client and to verify the results. A sniffer tool SHALL be used to log the exercised functionality and to determine its validity.

In this test case, the PICS notation LC.C.CdTx represents the list of commands that are declared as being transmitted by the DUT.

5.4.1.1 Scope



Level control cluster (0x0008):

- *Move to level* command (0x00)
- *Move* command (0x01)
- *Step* command (0x02)
- *Stop* command (0x03)
- *Move to level (with on/off)* command (0x04)
- *Move (with on/off)* command (0x05)
- *Step (with on/off)* command (0x06)
- *Stop* command (0x07)

PICS:

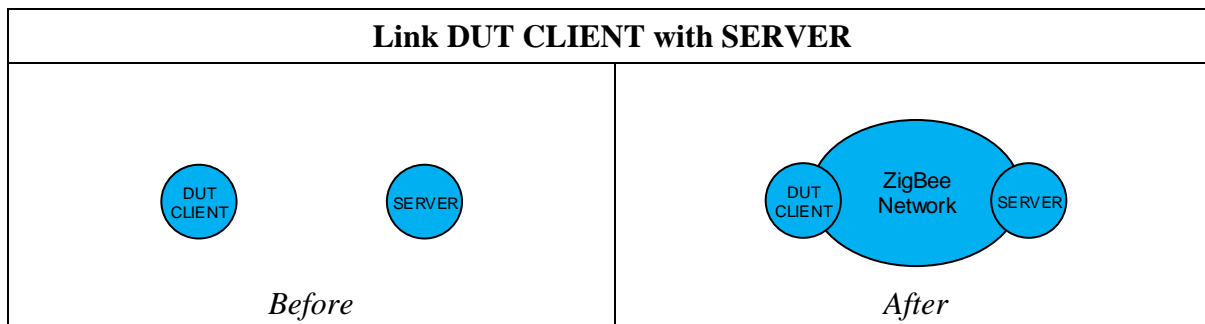
- LC.C
- LC.C.C00-07.Tx

5.4.1.2 Required devices

Designation	Symbol	Description
DUT CLIENT		Device under test client implementing: <ul style="list-style-type: none"> • The <i>level control</i> cluster client.
SERVER		Suitable server device implementing: <ul style="list-style-type: none"> • The <i>level control</i> cluster server.

5.4.1.3 Initial conditions

Item	Initial Conditions
1	A packet sniffer shall be observing the communication over the air interface.
2	All devices are factory new and powered off until used.

5.4.1.4 Test preparation**LC-TC-01C: Functionality with client as DUT**

Item	Preparation Step	Observation
P1	Power on the DUT CLIENT device and the SERVER device.	DUT CLIENT and SERVER are powered on.
P2	Ensure the DUT CLIENT device and the SERVER device are on the same ZigBee network.	Observe appropriate communication between DUT CLIENT, SERVER and any other relevant node on the ZigBee network.

--- End of test case LC-TC-01C preparation ---

461 **5.4.1.5 Test procedure**

LC-TC-01C: Functionality with client as DUT			
Item	PICS	Test Harness Step	DUT Pass Verification
1	-	Test harness prompts the user with a list of commands, based on the declared PICS, which the DUT CLIENT indicates it can transmit.	None.
2	LC.C.Cd.Tx	None.	DUT CLIENT transmits correctly formed commands in any order and with application achievable values. This is verified using the sniffer log.
3	-	Prompt the user to verify that the cluster commands listed in step 1 were transmitted during step 2.	During step 2, DUT CLIENT has transmitted every command listed by the test harness in step 1.
4	-	Prompt the user to verify that the cluster commands not listed in step 1 were not transmitted during step 2.	During step 2, DUT CLIENT has not transmitted any commands from this cluster that were not listed by the test harness in step 1.

--- End of test case LC-TC-01C ---

462
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6 Annex A: PICS to test case cross reference

6.1 Server

PICS	Test case							
	LC-TC-01G	LC-TC-01S	LC-TC-02S	LC-TC-03S	LC-TC-04S	LC-TC-05S	LC-TC-06S	LC-TC-07S
LC.S	X	X	X	X	X	X	X	X
LC.S.A0000		X	X		X	X	X	X
LC.S.A0000.Scene					X			
LC.S.A0000.Report.Tx						X		
LC.S.A0001		X	X					
LC.S.A000f		X						X
LC.S.A0010		X		X				
LC.S.A0011		X		X				
LC.S.A0012		X		X				
LC.S.A0013		X		X				
LC.S.A0014		X		X				
LC.S.A4000		X					X	
LC.S.Afffd	X							
LC.S.Afffe	X							
LC.S.C00.Rsp			X		X	X		X
LC.S.C01.Rsp			X					
LC.S.C02.Rsp			X					
LC.S.C03.Rsp			X					
LC.S.C04.Rsp			X				X	X
LC.S.C05.Rsp			X	X				
LC.S.C06.Rsp			X					
LC.S.C07.Rsp			X					

6.2 Client

PICS	Test case	
	LC-TC-01G	LC-TC-01C
LC.C	X	X
LC.C.A0000.Report.Rsp		X
LC.C.Afffd	X	
LC.C.Affe	X	
LC.C.C00.Tx		X
LC.C.C01.Tx		X
LC.C.C02.Tx		X
LC.C.C03.Tx		X
LC.C.C04.Tx		X
LC.C.C05.Tx		X
LC.C.C06.Tx		X
LC.C.C07.Tx		X