



ZigBee Cluster Library

Temperature Measurement Cluster

(0x0402)

Test Specification

Version 1.0

ZigBee Document 16-02817-004

December 19th, 2017

Sponsored by: ZigBee Alliance

Accepted by This document has not yet been accepted for release by the
ZigBee Alliance Board of Directors

Abstract This document describes the certification tests for devices
which implement the ZCL Temperature Measurement
cluster.

Keywords ZCL, Temperature Measurement, cluster

Copyright © ZigBee Alliance, Inc. (1996-2017). All rights reserved.

508 Second Street, Suite 206 Davis, CA 95616 - USA

<http://www.zigbee.org>

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

1

2

This page is intentionally blank

3 Notice of use and disclosure

4 Copyright © ZigBee Alliance, Inc. (1996-2017). All rights Reserved. This
5 information within this document is the property of the ZigBee Alliance and its use
6 and disclosure are restricted.

7 Elements of ZigBee Alliance specifications may be subject to third party intellectual
8 property rights, including without limitation, patent, copyright or trademark rights
9 (such a third party may or may not be a member of ZigBee). ZigBee is not responsible
10 and shall not be held responsible in any manner for identifying or failing to identify
11 any or all such third party intellectual property rights.

12 No right to use any ZigBee name, logo or trademark is conferred herein. Use of any
13 ZigBee name, logo or trademark requires membership in the ZigBee Alliance and
14 compliance with the ZigBee Logo and Trademark Policy and related ZigBee policies.

15 This document and the information contained herein are provided on an “AS IS” basis
16 and ZigBee DISCLAIMS ALL WARRANTIES EXPRESS OR IMPLIED,
17 INCLUDING BUT NOT LIMITED TO (A) ANY WARRANTY THAT THE USE
18 OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OF
19 THIRD PARTIES (INCLUDING WITHOUT LIMITATION ANY
20 INTELLECTUAL PROPERTY RIGHTS INCLUDING PATENT, COPYRIGHT OR
21 TRADEMARK RIGHTS) OR (B) ANY IMPLIED WARRANTIES OF
22 MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE OR
23 NONINFRINGEMENT. IN NO EVENT WILL ZIGBEE BE LIABLE FOR ANY
24 LOSS OF PROFITS, LOSS OF BUSINESS, LOSS OF USE OF DATA,
25 INTERRUPTION OF BUSINESS, OR FOR ANY OTHER DIRECT, INDIRECT,
26 SPECIAL OR EXEMPLARY, INCIDENTAL, PUNITIVE OR CONSEQUENTIAL
27 DAMAGES OF ANY KIND, IN CONTRACT OR IN TORT, IN CONNECTION
28 WITH THIS DOCUMENT OR THE INFORMATION CONTAINED HEREIN,
29 EVEN IF ADVISED OF THE POSSIBILITY OF SUCH LOSS OR DAMAGE. All
30 Company, brand and product names may be trademarks that are the sole property of
31 their respective owners.

32 The above notice and this paragraph must be included on all copies of this document
33 that are made.

34

35

36

37

This page is intentionally blank

38

Revision history

Revision	Date	Details	Editor
000	July 11 th , 2016	First draft.	Phil Jamieson
001	July 11 th , 2016	Updated with the number.	Phil Jamieson
002	October 7 th , 2016	Added a default reporting test in TM-TC-03S.	Phil Jamieson
003	October 11 th , 2016	Clarified the reporting test case TM-TC-03S to remove the <= tests as this would allow a report at less than the minimal interval and to add further default reporting configuration tests.	Phil Jamieson
004	December 19 th , 2017	Updated from errata 17-02807-003: Resolved CCBs 2284, 2285 and 2293.	Phil Jamieson

39

40

41

42

This page is intentionally blank

43

44	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	4.3	Client 13
56	4.3.1	Attributes..... 13
57	5	Test specification 14
58	5.1	Introduction 14
59	5.1.1	Test case overview 14
60	5.1.2	Testing tolerances 14
61	5.1.3	Client DUTs 14
62	5.1.4	Test steps manipulating attributes..... 14
63	5.2	Generic test cases 15
64	5.2.1	TM-TC-01G: Global attributes 15
65	5.3	Server test cases..... 19
66	5.3.1	TM-TC-01S: Attributes with server as DUT 19
67	5.3.2	TM-TC-02S: Primary functionality with server as DUT..... 24
68	5.3.3	TM-TC-03S: Reporting functionality with server as DUT..... 27
69	5.4	Client test cases 33
70	5.4.1	TM-TC-01C: Functionality with client as DUT 33
71	6	Annex A: PICS to test case cross reference..... 36
72	6.1	Server..... 36
73	6.2	Client 36
74		
75		

76

77

This page is intentionally blank

1 Introduction

This document contains the PICS, test specification and PICS/test case cross reference for the ZCL *temperature measurement* 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 [R4].

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 16-0xxx.
- [R3] ZCL Temperature Measurement Cluster XML PICS, ZigBee Alliance document 16-0xxx.

2.2 IETF documents

- [R4] S. Bradner, Key words for use in RFCs to Indicate Requirement Levels, IETF RFC 2119, March 1997.

3 PIXIT items

Item number	Feature	Support
TM.PIXIT01	What is the reportable change to be used for generating a report for the <i>MeasuredValue</i> attribute?	<i>"Reportable change"</i>
TM.PIXIT.MINRI	What is the minimum reporting interval for reporting attributes?	<i>"Number of seconds, e.g. 30 "</i>
TM.PIXIT.MAXRI	What is the non-zero maximum reporting interval for reporting attributes?	<i>"Number of seconds (>0), e.g. 60 "</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 [R3].

4.1 Usage

Item number	Feature	Reference	Status	Support
TM.S	Does the device implement the <i>temperature measurement</i> cluster as a server?	3.3.2	O	Yes/No
TM.C	Does the device implement the <i>temperature measurement</i> cluster as a client?	3.3.3	O	Yes/No

4.2 Server

4.2.1 Attributes

Item number	Feature	Reference	Status	Support
TM.S.A0000	Does the device implement the <i>MeasuredValue</i> attribute?	Table 4.13, 4.4.2.2.1.1	TM.S: M	Yes/No
TM.S.A0000.Report.Tx	Does the device implement receiving and responding to the global report attribute commands for the <i>MeasuredValue</i> attribute and sending reports?	4.4.2.5	TM.S: M	Yes/No
TM.S.A0001	Does the device implement the <i>MinMeasuredValue</i> attribute?	Table 4.13, 4.4.2.2.1.2	TM.S: M	Yes/No
TM.S.A0002	Does the device implement the <i>MaxMeasuredValue</i> attribute?	Table 4.13, 4.4.2.2.1.3	TM.S: M	Yes/No
TM.S.A0003	Does the device implement the <i>Tolerance</i> attribute?	Table 4.13, 4.4.2.2.1.4	TM.S: O	Yes/No
TM.S.Afffd	Does the device implement the <i>ClusterRevision</i> global attribute?	Table 2-1, 2.3.5.1.1	TM.S: M	Yes/No
TM.S.Afffe	Does the device implement the <i>AttributeReportingStatus</i> global attribute?	Table 2-1, 2.3.5.1.2	TM.S: O	Yes/No

4.3 Client

4.3.1 Attributes

Item number	Feature	Reference	Status	Support
TM.C.A0000.Report.Rsp	Does the device implement sending global report attribute command requests and receiving reports for the <i>MeasuredValue</i> attribute?	4.4.2.5	TM.C: O	Yes /No
TM.C.Afffd	Does the device implement the <i>ClusterRevision</i> global attribute?	Table 2-1, 2.3.5.1.1	TM.C: M	Yes /No
TM.C.Afffe	Does the device implement the <i>AttributeReportingStatus</i> global attribute?	Table 2-1, 2.3.5.1.2	TM.C: O	Yes/ No

5 Test specification

5.1 Introduction

5.1.1 Test case overview

The following test cases are available for the *temperature measurement* cluster:

Test ID	Description	Reference
Global tests		
TM-TC-01G	Global attributes	5.2.1
Server side tests		
TM-TC-01S	Attributes with server as DUT	5.3.1
TM-TC-02S	Primary functionality with server as DUT	5.3.2
TM-TC-03S	Reporting functionality with server as DUT	5.3.3
Client side tests		
TM-TC-01C	Functionality with client as DUT	5.4.1

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 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.

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

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

5.1.4 Test steps manipulating attributes

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

5.2 Generic test cases

5.2.1 TM-TC-01G: Global attributes

This test case verifies the behavior of the global attributes of the *temperature measurement* cluster client and server.

In this test, the PICS notation TM.S.Agm and TM.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 TM.S.Ago and TM.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)



Temperature measurement cluster (0x0402):

- All global attributes

PICS:

- TM.S, TM.C
- TM.S.Agm, TM.C.Agm, TM.S.Ago, TM.C.Ago

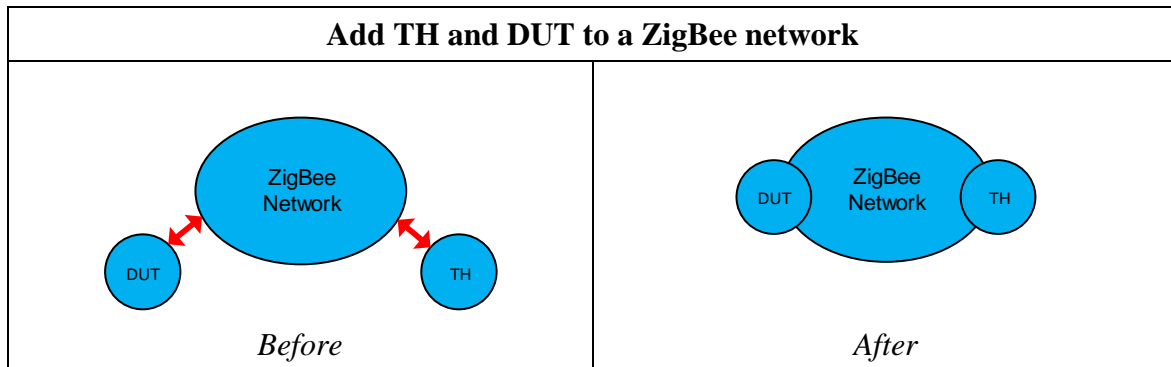
5.2.1.2 Required devices

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

5.2.1.4 Test preparation



TM-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 TM-TC-01G preparation ---

161 **5.2.1.5 Test procedure**

TM-TC-01G: Global attributes			
Item	PICS	Test Harness Step	DUT pass Verification
1	TM.S.Agm, TM.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	TM.S.Agm, TM.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	TM.S.Agm, TM.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...

TM-TC-01G: Global attributes			
Item	PICS	Test Harness Step	DUT pass Verification
3	TM.S.Ago, TM.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	TM.S.Ago, TM.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	TM.S.Ago, TM.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 TM-TC-01G ---

5.3 Server test cases

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

This test case verifies the behavior of the attributes of the *temperature measurement* cluster server.

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



Temperature measurement cluster (0x0402):

- All non-global attributes

PICS:

- TM.S,
- TM.S.Am, TM.S.Ao

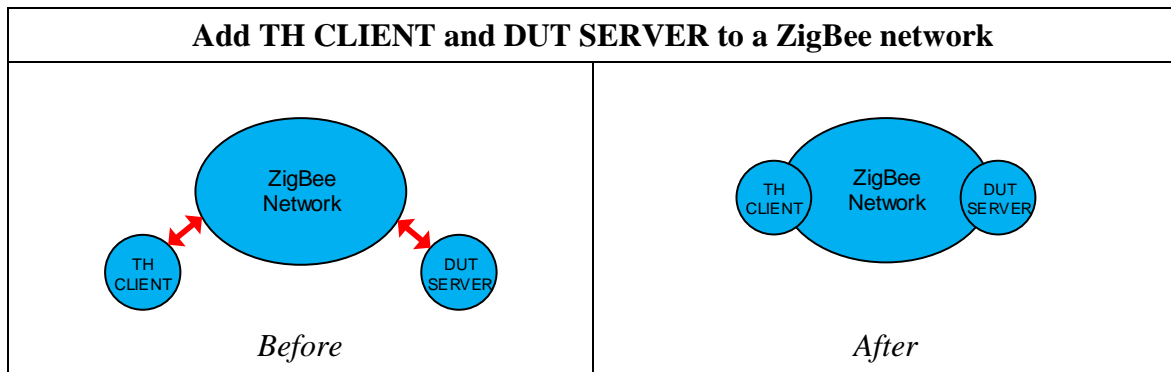
5.3.1.2 Required devices

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



TM-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 TM-TC-01S preparation ---

189 **5.3.1.5 Test procedure**

TM-TC-01S: Attributes with server as DUT			
Item	PICS	Test Harness Step	DUT pass Verification
1	TM.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	TM.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	TM.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...

TM-TC-01S: Attributes with server as DUT			
Item	PICS	Test Harness Step	DUT pass Verification
3	TM.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	TM.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...

TM-TC-01S: Attributes with server as DUT			
Item	PICS	Test Harness Step	DUT pass Verification
4b	TM.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 TM-TC-01S ---

190

191

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

This test case verifies the primary functionality of the *temperature measurement* cluster server in respect to measuring temperature changes.

5.3.2.1 Scope

General:

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



Temperature measurement cluster (0x0402):

- *MeasuredValue* attribute (0x0000)
- *MinMeasuredValue* attribute (0x0001)
- *MaxMeasuredValue* attribute (0x0002)

PICS:

- TM.S
- TM.S.A0000

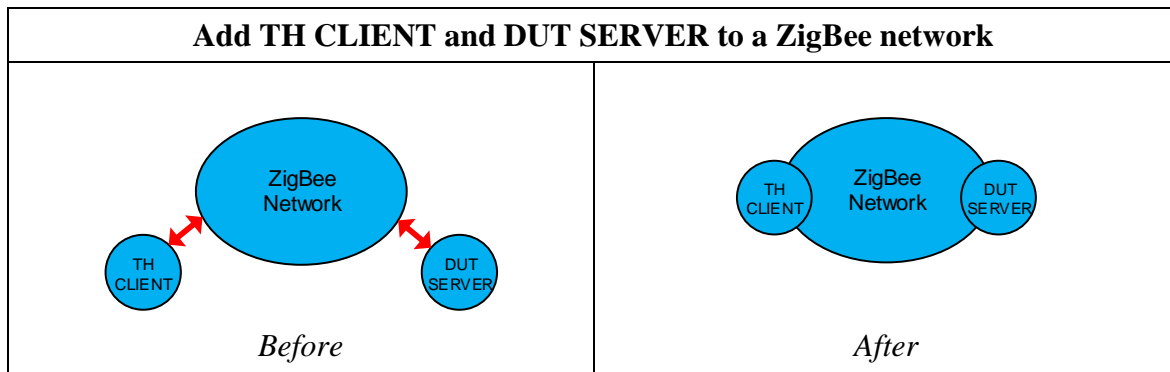
5.3.2.2 Required devices

Designation	Symbol	Description
TH CLIENT		Test harness client implementing: <ul style="list-style-type: none"> • The <i>temperature measurement</i> cluster client.
DUT SERVER		Device under test server: <ul style="list-style-type: none"> • The <i>temperature measurement</i> cluster server.
-	-	An adjustable heat source to adjust the temperature.

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.

210 5.3.2.4 Test preparation



211

TM-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.

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

212

213 **5.3.2.5 Test procedure**

TM-TC-02S: Primary functionality with server as DUT			
Item	PICS	Test Harness Step	DUT pass Verification
0	TM.S.A0001, TM.S.A0002	TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read the <i>MinMeasuredValue</i> and <i>MaxMeasuredValue</i> attributes.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. <i>MinMeasuredValue</i> attribute has a value in the range 0x954d – 0x7ffe. Set V_{min} to the value of the <i>MinMeasuredValue</i> attribute. <i>MaxMeasuredValue</i> attribute has a value in the range 0x954e – 0x7fff. Set V_{max} to the value of the <i>MaxMeasuredValue</i> attribute.
1	TM.S.A0000	TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read the <i>MeasuredValue</i> attribute.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. <i>MeasuredValue</i> attribute has a value in the range $V_{min} - V_{max}$.
2	-	Adjust the temperature of the heat source such that it is different to its starting temperature.	None.
3	TM.S.A0000	TH CLIENT unicasts a ZCL <i>read attributes</i> command frame to DUT SERVER to read the <i>MeasuredValue</i> attribute.	DUT SERVER unicasts a ZCL <i>read attributes response</i> command frame to TH CLIENT. <i>MeasuredValue</i> attribute has a value in the range $V_{min} - V_{max}$, but different to the value returned in step 1.

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

214

215

5.3.3 TM-TC-03S: Reporting functionality with server as DUT

This case test verifies the attribute reporting behavior of the *temperature measurement* cluster server.

NOTE: The PIXIT items TM.PIXIT01, TM.PIXIT.MINRI and TM.PIXIT.MAXRI should be chosen such that a sufficient external change of temperature can be detected by the device within the minimum reporting interval.

5.3.3.1 Scope

General:

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

Temperature measurement cluster (0x0402):

- *MeasuredValue* attribute (0x0000)

PIXIT:

- TM.PIXIT01, TM.PIXIT.MINRI, TM.PIXIT.MAXRI

PICS:

- TM.S
- TM.S.A0000
- TM.S.A0000.Report.Tx

5.3.3.2 Required devices

Designation	Symbol	Description
TH CLIENT		Test harness client implementing: <ul style="list-style-type: none"> • The <i>temperature measurement</i> cluster client.
DUT SERVER		Device under test server implementing: <ul style="list-style-type: none"> • The <i>temperature measurement</i> cluster server.
-	-	An adjustable heat source to adjust the temperature.

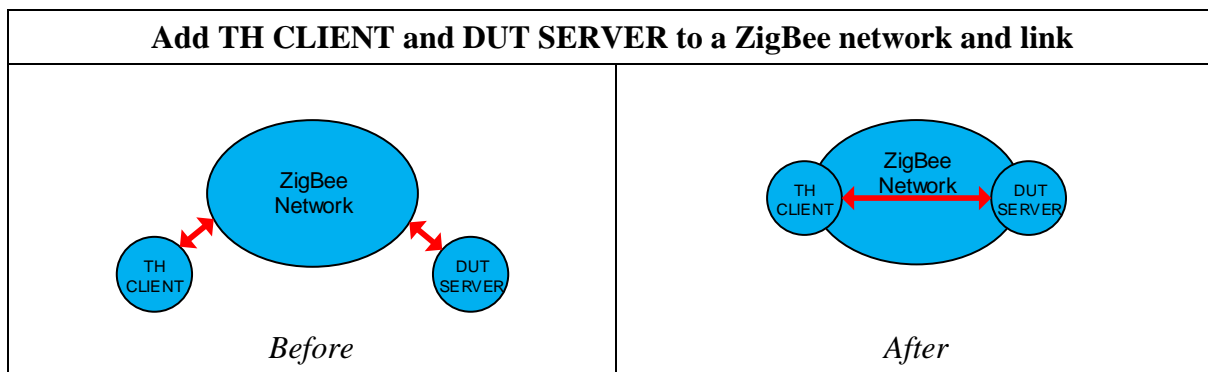
5.3.3.3 Initial conditions

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.

240

241

5.3.3.4 Test preparation



TM-TC-03S: 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>temperature measurement</i> cluster.	Observe appropriate communication between DUT SERVER, TH CLIENT and any other relevant node on the ZigBee network.

--- End of test case TM-TC-03S preparation ---

246 **5.3.3.5 Test procedure**

TM-TC-03S: Reporting functionality with server as DUT			
Item	PICS	Test Harness Step	DUT Pass Verification
1a	TM.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>MeasuredValue</i> attribute.	<p>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>MeasuredValue</i> attribute and the <i>status</i> field set to SUCCESS.</p> <p>Set RI_{max} to the value of the <i>maximum reporting interval</i> field.</p> <p>Store the default report parameters contained in the <i>read reporting configuration response</i> command frame.</p>
1b	TM.S.A0000, TM.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>MeasuredValue</i> attribute.
2a	TM.S.A0000, TM.S.A0000. Report.Tx	TH CLIENT unicasts a ZCL <i>configure reporting</i> command to DUT SERVER for the <i>MeasuredValue</i> attribute with a <i>direction</i> field set to 0x00, the <i>minimum reporting interval</i> field set to TM.PIXIT.MINRI, the <i>maximum reporting interval</i> field set to TM.PIXIT.MAXRI and the <i>reportable change</i> field set equal to TM.PIXIT01.	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.
2b	TM.S.A0000, TM.S.A0000. Report.Tx	None	At a time $\leq (TM.PIXIT.MAXRI + 2)$ seconds after receiving the <i>configure reporting response</i> command frame in step 2a, DUT SERVER unicasts a ZCL <i>report attributes</i> command to TH CLIENT with the <i>MeasuredValue</i> attribute.

Continued...

TM-TC-03S: Reporting functionality with server as DUT			
Item	PICS	Test Harness Step	DUT Pass Verification
3a	-	Adjust the temperature being measured such that it has changed by more than TM.PIXIT01 from its last value.	DUT SERVER does nothing. If the time taken to reach this new temperature is greater than TM.PIXIT.MAXRI, then DUT SERVER sends a report every TM.PIXIT.MAXRI seconds.
3b	TM.S.A0000, TM.S.A0000. Report.Tx	None.	At a time \leq approximately TM.PIXIT.MINRI seconds after the new temperature is reached in step 3a, DUT SERVER unicasts a <i>ZCL report attributes</i> command to TH CLIENT with the <i>MeasuredValue</i> attribute.
3c	TM.S.A0000, TM.S.A0000. Report.Tx	None	At a time \leq approximately TM.PIXIT.MAXRI seconds after sending the report in step 3b, DUT SERVER unicasts a <i>ZCL report attributes</i> command to TH CLIENT with the <i>MeasuredValue</i> attribute.
4a	TM.S.A0000, TM.S.A0000. Report.Tx	TH CLIENT unicasts a <i>ZCL configure reporting</i> command to DUT SERVER for the <i>MeasuredValue</i> attribute the <i>maximum reporting interval</i> field set to 0xffff (do not send reports).	DUT SERVER unicasts a <i>ZCL configure reporting response</i> command to TH CLIENT, confirming the configured attribute and with the <i>status</i> field set to SUCCESS.
4b	TM.S.A0000. Report.Tx	Wait for (TM.PIXIT.MAXRI + 2) seconds after the report sent in step 2b.	DUT SERVER does not send any further reports.
5	TM.S.A0000	TH CLIENT unicasts a <i>ZCL read reporting configuration</i> command frame to DUT SERVER to read the default reporting configuration of the <i>MeasuredValue</i> attribute.	DUT SERVER unicasts a <i>ZCL read reporting configuration response</i> command frame to TH CLIENT with a single attribute reporting configuration record for the <i>MeasuredValue</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...

TM-TC-03S: Reporting functionality with server as DUT			
Item	PICS	Test Harness Step	DUT Pass Verification
6a	TM.S.A0000	TH CLIENT unicasts a ZCL <i>configure reporting</i> command frame to DUT SERVER for the <i>MeasuredValue</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	TM.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>MeasuredValue</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>MeasuredValue</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 1a.
6c	TM.S.A0000, TM.S.A0000. Report.Tx	Wait for the attribute report according to the default configuration.	At a time $\leq (RI_{max} + 2)$ seconds after step 6a, DUT SERVER unicasts a ZCL <i>report attributes</i> command frame to TH CLIENT with the <i>MeasuredValue</i> attribute.

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

5.4 Client test cases

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

This case test verifies the functionality of the *temperature measurement* 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 *temperature measurement* 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 TM.C.CdTx represents the list of commands that are declared as being transmitted by the DUT.

5.4.1.1 Scope

PICS:

- TM.C
- TM.C.A0000.Report.Rsp

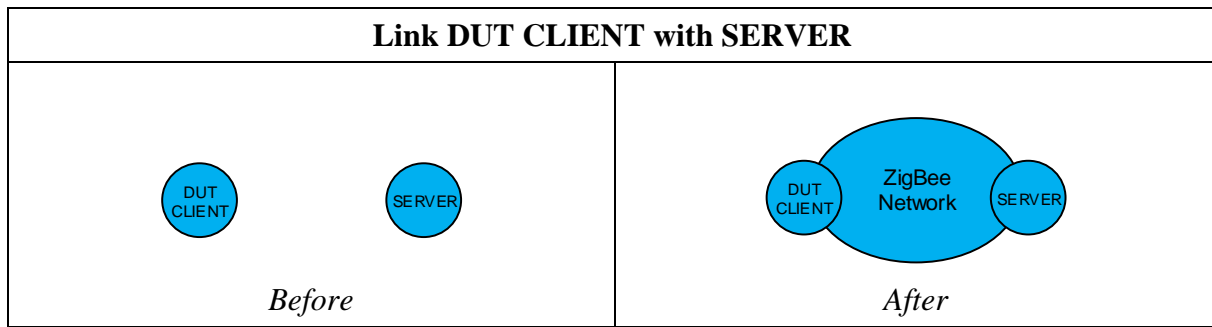
5.4.1.2 Required devices

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



TM-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 TM-TC-01C preparation ---

271 **5.4.1.5 Test procedure**

TM-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	TM.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 TM-TC-01C ---

272
273

6 Annex A: PICS to test case cross reference

6.1 Server

PICS	Test case			
	TM-TC-01G	TM-TC-01S	TM-TC-02S	TM-TC-03S
TM.S	X	X	X	X
TM.S.A0000		X	X	X
TM.S.A0000.Report.Tx				X
TM.S.A0001		X		
TM.S.A0002		X		
TM.S.A0003		X		
TM.S.Afffd	X			
TM.S.Afffe	X			

6.2 Client

PICS	Test case	
	TM-TC-01G	TM-TC-01C
TM.C	X	X
TM.S.A0000.Report.Rsp		X
TM.C.Afffd	X	
TM.C.Afffe	X	