



# **ZigBee Cluster Library**

## **Temperature Measurement Cluster**

### **(0x0402)**

## **Test Specification**

### **Version 0.9**

ZigBee Document 16-02817-003

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

Keywords                        ZCL, Temperature Measurement, cluster

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## Revision history

| Revision | Date                            | Details   | Editor        |
|----------|---------------------------------|---|---------------|
| 000      | July 11 <sup>th</sup> , 2016    | First draft.  | Phil Jamieson |
| 001      | July 11 <sup>th</sup> , 2016    | Updated with the number.  | Phil Jamieson |
| 002      | October 7 <sup>th</sup> , 2016  | Added a default reporting test in TM-TC-03S.  | Phil Jamieson |
| 003      | October 11 <sup>th</sup> , 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 |

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## 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> |

## 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/ <del>No</del> |
| TM.C        | Does the device implement the <i>temperature measurement</i> cluster as a client? | 3.3.3     | O      | <del>Yes</del> /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/ <del>No</del> |
| 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/ <del>No</del> |
| 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/ <del>No</del> |
| 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/ <del>No</del> |
| TM.S.A0003           | Does the device implement the <i>Tolerance</i> attribute?  | Table 4.13, 4.4.2.2.1.4 | TM.S: O | <del>Yes</del> /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/ <del>No</del> |
| TM.S.Afffe           | Does the device implement the <i>AttributeReportingStatus</i> global attribute?  | Table 2-1, 2.3.5.1.2    | TM.S: O | <del>Yes</del> /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 | <del>Yes</del> /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 | <del>Yes</del> /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 | <del>Yes</del> /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 |
|--------------------------|--|-----------|
| <b>Global tests</b>      |  |           |
| TM-TC-01G                | Global attributes                          | 5.2.1     |
| <b>Server side tests</b> |  |           |
| 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     |
| <b>Client side tests</b> |  |           |
| 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

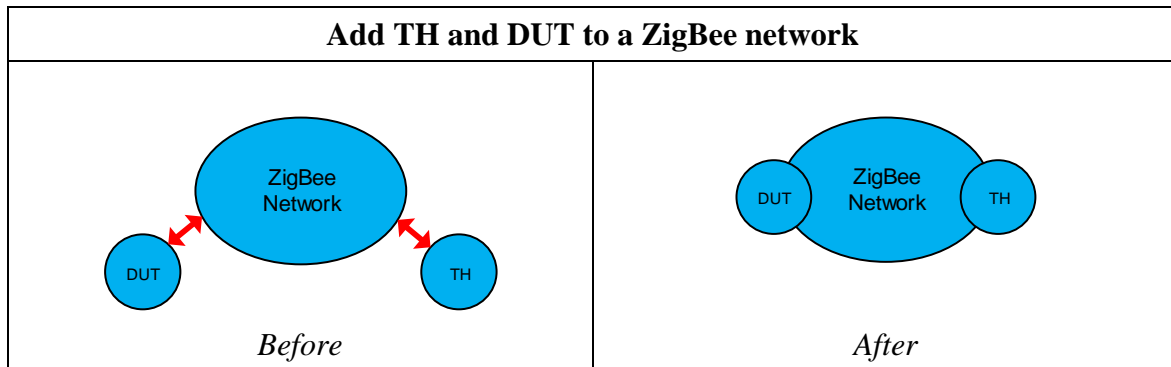
#### 5.2.1.2 Required devices

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

### 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**

| <b>TM-TC-01G: Global attributes</b> |                       |  |   |
|-------------------------------------|-----------------------|--|---|
| <b>Item</b>                         | <b>PICS</b>           | <b>Test Harness Step</b>   | <b>DUT pass Verification</b>  |
| 1                                   | TM.S.Agm,<br>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.<br><br>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,<br>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.<br><br>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,<br>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.<br><br>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,<br>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.<br><br>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.<br><br>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,<br>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.<br><br>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,<br>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.<br><br>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

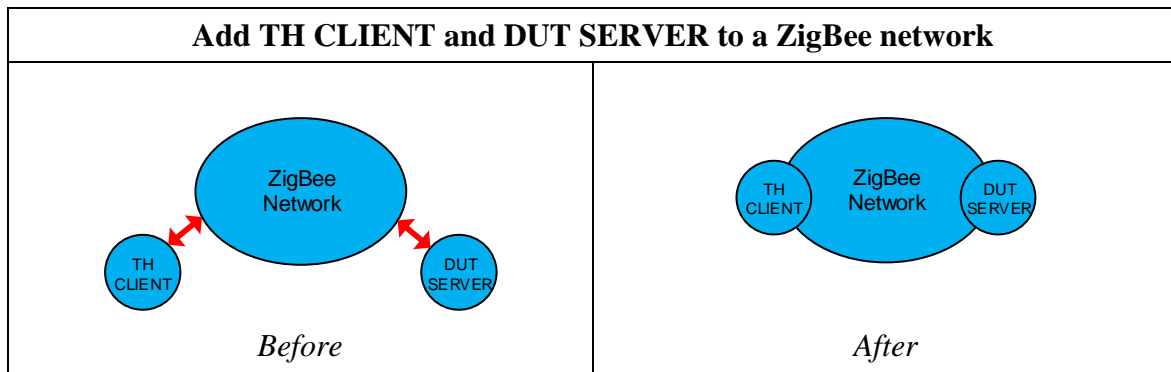
#### 5.3.1.2 Required devices

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

#### 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**

| <b>TM-TC-01S: Attributes with server as DUT</b> |             |   |   |
|---|-------------|---|---|
| <b>Item</b>                                     | <b>PICS</b> | <b>Test Harness Step</b>  | <b>DUT pass Verification</b>  |
| 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.<br><br>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.<br><br>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.<br><br>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...

| <b>TM-TC-01S: Attributes with server as DUT</b> |             |  |   |
|---|-------------|--|---|
| <b>Item</b>                                     | <b>PICS</b> | <b>Test Harness Step</b>   | <b>DUT pass Verification</b>  |
| 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...*

| <b>TM-TC-01S: Attributes with server as DUT</b> |             |   |   |
|---|-------------|---|---|
| <b>Item</b>                                     | <b>PICS</b> | <b>Test Harness Step</b>  | <b>DUT pass Verification</b>  |
| 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.<br><br>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 ---

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### 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)

PICS:

- TM.S
- TM.S.A0000

#### 5.3.2.2 Required devices

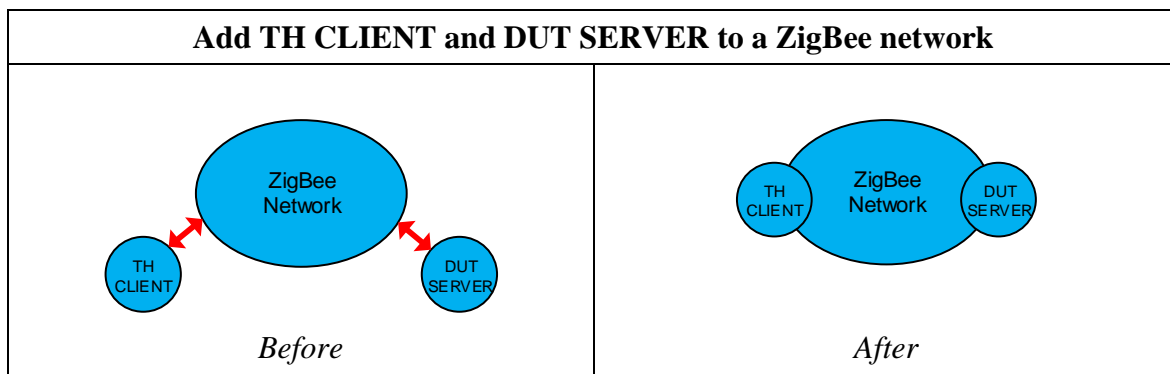
| Designation   | Symbol  | Description  |
|---------------|---|--|
| TH<br>CLIENT  |   | Test harness client implementing: <ul style="list-style-type: none"> <li>• The <i>temperature measurement</i> cluster client.</li> </ul> |
| DUT<br>SERVER |  | Device under test server: <ul style="list-style-type: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



#### 5.3.2.4 Test preparation



| 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 ---

### 5.3.2.5 Test procedure

| TM-TC-02S: Primary functionality with server as DUT |            |   |  |
|---|------------|---|--|
| Item  | PICS       | Test Harness Step   | DUT pass Verification  |
| 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 0x954d – 0x7fff.   |
| 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 0x954d – 0x7fff but different to the value returned in step 1. |

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

### 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.

#### 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)

PICS:

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

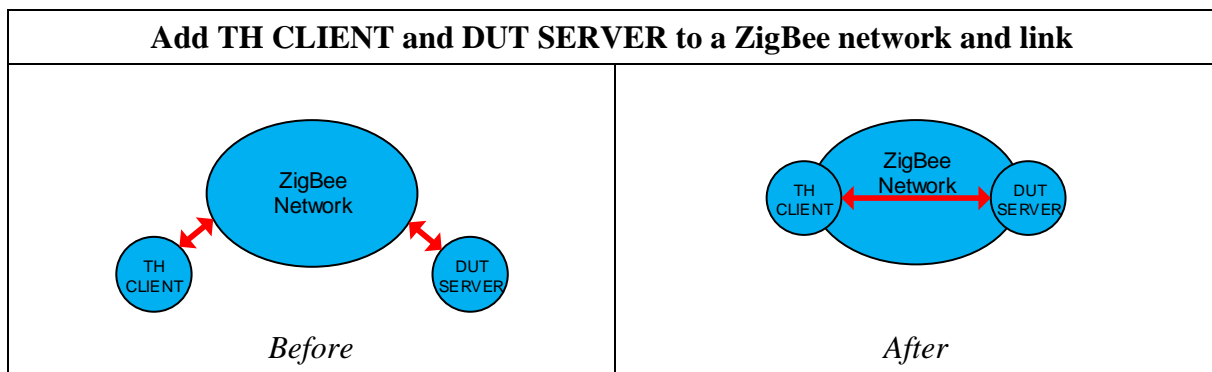
#### 5.3.3.2 Required devices

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

### 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 ---

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| <b>TM-TC-03S: Reporting functionality with server as DUT</b> |                                   |  |  |
|--|-----------------------------------|--|--|
| <b>Item</b>  | <b>PICS</b>                       | <b>Test Harness Step</b>   | <b>DUT Pass Verification</b>   |
| 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.  | 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.<br><br>Set $RI_{max}$ to the value of the <i>maximum reporting interval</i> field.<br><br>Store the default report parameters contained in the <i>read reporting configuration response</i> command frame. |
| 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 0x001e (30 seconds), the <i>maximum reporting interval</i> field set to 0x003c (60 seconds) 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 approximately 60s 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...

| <b>TM-TC-03S: Reporting functionality with server as DUT</b> |   |   |  |
|--|---|---|--|
| <b>Item</b>  | <b>PICS</b>                             | <b>Test Harness Step</b>  | <b>DUT Pass Verification</b>   |
| 3a   | -                                       | Adjust the temperature being measured such that it has changed by more than TM.PIXIT01 from its last value.   | DUT SERVER does nothing.   |
| 3b   | TM.S.A0000,<br>TM.S.A0000.<br>Report.Tx | None.   | At a time approximately 30s after sending the report in step 2b, DUT SERVER unicasts a <i>ZCL report attributes</i> command to TH CLIENT with the <i>MeasuredValue</i> attribute.  |
| 3c   | TM.S.A0000,<br>TM.S.A0000.<br>Report.Tx | None  | At a time approximately 60s 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,<br>TM.S.A0000.<br>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.<br>Report.Tx                | Wait for 62s 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 set to 0x8b (NOT_FOUND). |

*Continued...*

| <b>TM-TC-03S: Reporting functionality with server as DUT</b> |                                  |   |   |
|--|----------------------------------|---|---|
| <b>Item</b>  | <b>PICS</b>                      | <b>Test Harness Step</b>  | <b>DUT Pass Verification</b>  |
| 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.<br><br>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, 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

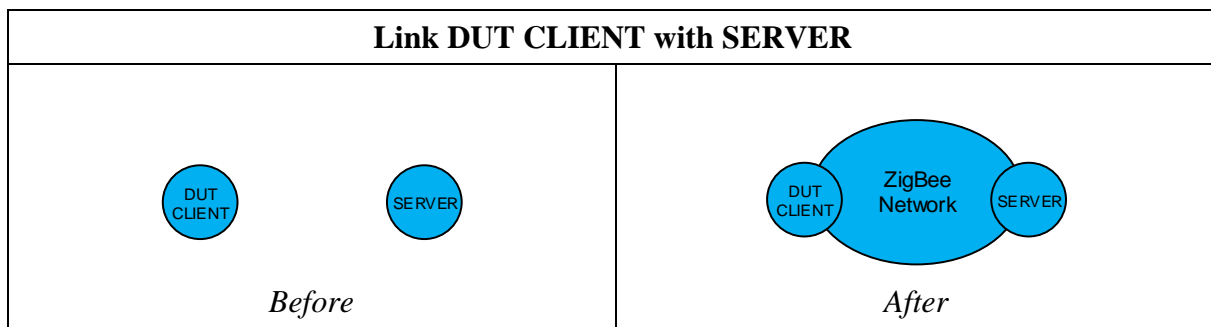
| Designation   | Symbol  | Description   |
|---------------|---|---|
| DUT<br>CLIENT |  | Device under test client implementing: <ul style="list-style-type: none"> <li>• The <i>temperature measurement</i> cluster client.</li> </ul> |
| SERVER        |  | Suitable server device implementing: <ul style="list-style-type: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

#### 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 ---

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| <b>TM-TC-01C: Functionality with client as DUT</b> |             |  |   |
|--|-------------|--|---|
| <b>Item</b>  | <b>PICS</b> | <b>Test Harness Step</b>   | <b>DUT Pass Verification</b>  |
| 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 ---

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## 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         |           |