

# Reliability Test Report

Product Name: Ai-WB2-01M

Product Model: WB2 Series

Test Date: 2022/07/12–2022/07/18

Tested by: Liu Qun

Reviewed by: Lu Xingui

## 1. Inspection Plan

| No. | Process Name     | Inspection Item  | Inspection Equipment                      | Sampling Level<br>(Refer to GB/T 2828.1-2012)  | Acceptable Quality Level |                   |                   |
|-----|------------------|--|---|--|--------------------------|-------------------|-------------------|
|     |                  |  |   |  | CR (Critical Defect)     | MA (Major Defect) | MI (Minor Defect) |
| 1   | Reliability test | High/low temperature storage; high/room/low temperature power on/off; high/low temperature operation; alternating hot and humid; thermal shock | Constant temperature and humidity chamber | Normal single sampling, special inspection S-1 | 0 accept, 1 reject       |                   |                   |

## 2. Test Items

| No. | Item                                  | Test Conditions   |
|-----|---------------------------------------|---|
| 1   | Low temperature storage test          | Test conditions: -40°C<br>Test duration: 8h<br>After an 8-hour soak at -40°C, perform a cold start test.  |
| 2   | High temperature storage test         | Test conditions: 100°C<br>Test duration: 8h<br>After restoring to 85°C and a 1-hour soak, perform a hot start test.   |
| 3   | Low temperature operation test        | Test conditions: -40°C<br>Test duration: 24h  |
| 4   | High temperature operation test       | Test conditions: 85°C<br>Test duration: 24h   |
| 5   | AC power on/off test with temperature | A) Temperature: -40°C<br>B) Temperature: 25°C<br>C) Temperature: 85°C<br>Cycle each condition 200 times, with 30s ON and 30s OFF                                |
| 6   | Alternating hot and humid test        | A) Operate at 85°C + 93% RH for 4h;<br>B) Operate at 25°C + 93% RH for 4h;<br>Cycle steps A and B for a total of 2 cycles.                                      |
| 7   | Thermal shock test                    | Test conditions: -40°C–100°C, soak for 30min at each temperature.<br>Temperature transition time: 50min for heating, 2h for cooling.<br>Test duration: 5 cycles |

### 3. Test Preparation

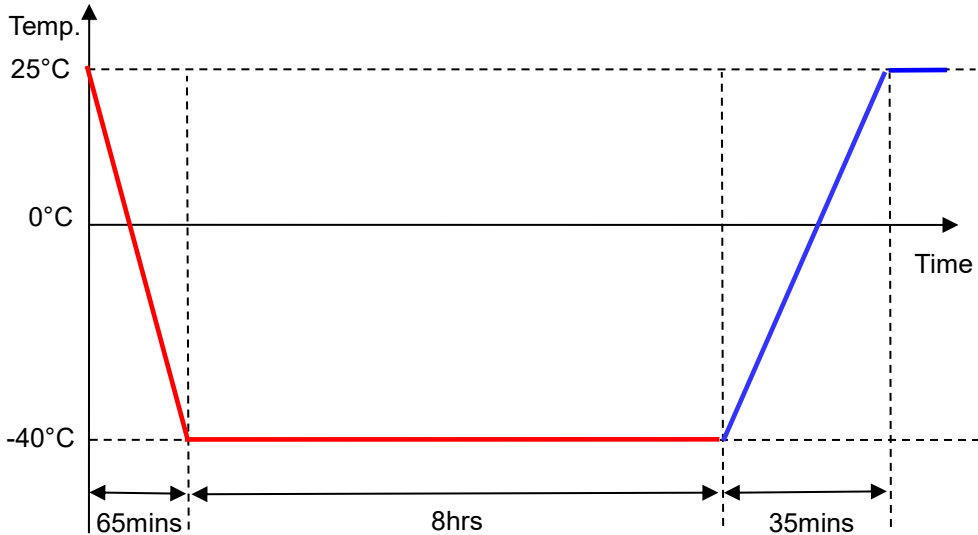
| No. | Item                      | Image/Attachment   |
|-----|---------------------------|--|
| 1   | Reliability documentation | <br>WB2系列模组<br>可靠性WIFI&蓝牙 |
| 2   | Test equipment            |                           |
| 3   | Sample placement          |                          |
| 4   | Test reason               | New product  |

## 4. Low Temperature Storage Test

**Test Conditions:** Power-off test. Store the product at -40°C for 8h, then perform a cold start test.

**Test Profile:**

Is Power Off —  
Is Power On —



### Test Criteria:

1. During the cold start test, the module functions normally. If ping packets are confirmed not to be lost, the module is considered to be functional.
2. Test the Bluetooth functionality. Send the command AT+BLEINIT=2 to enable Bluetooth and configure the Bluetooth application name. Then open the BLE debugging assistant to search for the Bluetooth name (e.g., BL-AT1/2/3/4/5/6). If the name is not found, the test is considered to be failed.
3. After the test, the product shows no visible damage such as shrinkage, peeling, or discoloration.

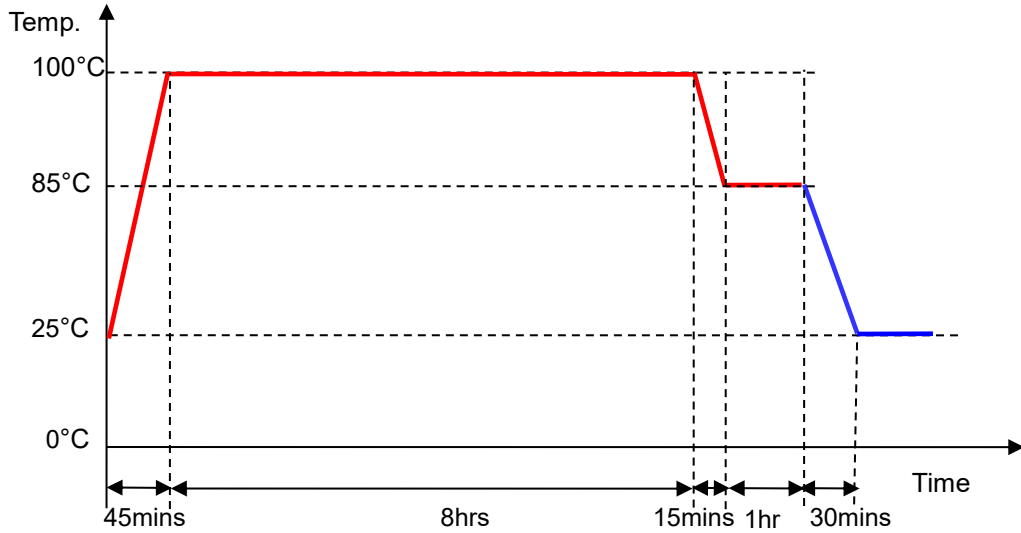
| Sample Quantity   | Test Data  | Test Results                            |
|---|--|---|
| <p style="text-align: center;">6PCS<br/>(BL-AT1-BL-AT6)</p> | <p>The test data shows six screenshots of the ATKEEING software interface. Each screenshot displays ping test results for a specific module (BL-AT1 to BL-AT6). The results indicate that all modules passed the ping test with 0% packet loss. Below the screenshots is a screenshot of the BLE debugging assistant interface, which shows a list of six Bluetooth modules (BL-AT1 to BL-AT6) that are not bonded to the phone.</p> | <p style="text-align: center;">PASS</p> |

## 5. High Temperature Storage Test

**Test Conditions:** Power-off test. Store the product at 100°C for 8h, then restore it to 85°C for a 1-hour soak, and perform a hot start test.

**Test Profile:**

**Is Power Off** —  
**Is Power On** —



**Test Criteria:**

1. During the hot start test, the module functions normally. If ping packets are confirmed not to be lost, the module is considered to be functional.
2. Test the Bluetooth functionality. Send the command AT+BLEINIT=2 to enable Bluetooth and configure the Bluetooth application name. Then open the BLE debugging assistant to search for the Bluetooth name (e.g., BL-AT1/2/3/4/5/6). If the name is not found, the test is considered to be failed.
3. After the test, the product shows no visible damage such as shrinkage, peeling, or discoloration.

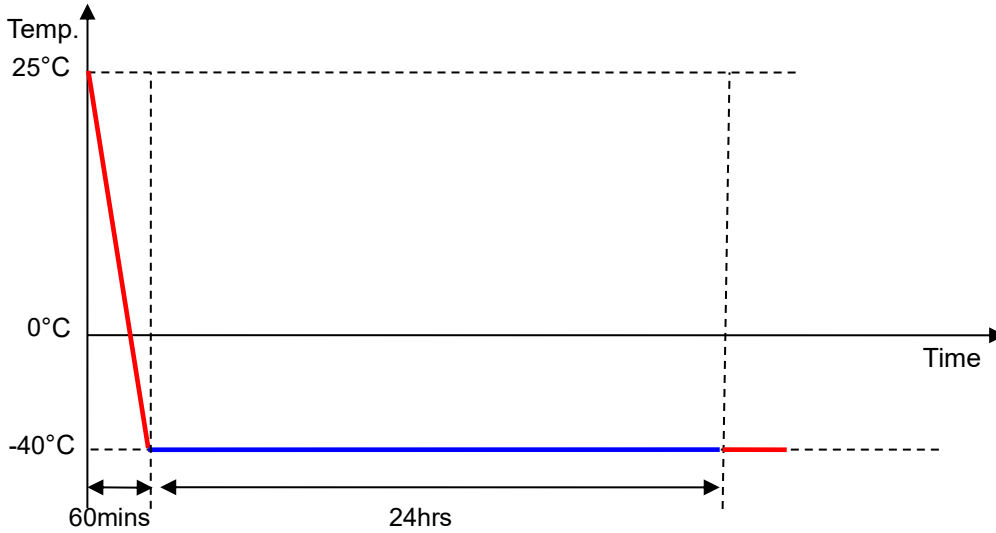
| Sample Quantity                 | Test Data | Test Results |
|---------------------------------|-----------|--------------|
| <p>6PCS<br/>(BL-AT1-BL-AT6)</p> |           | <p>PASS</p>  |

## 6. Low Temperature Operation Test

Test Conditions: Power-on test. Operate at -40°C for 24h.

Test Profile:

Is Power Off —  
Is Power On —



Test Criteria:

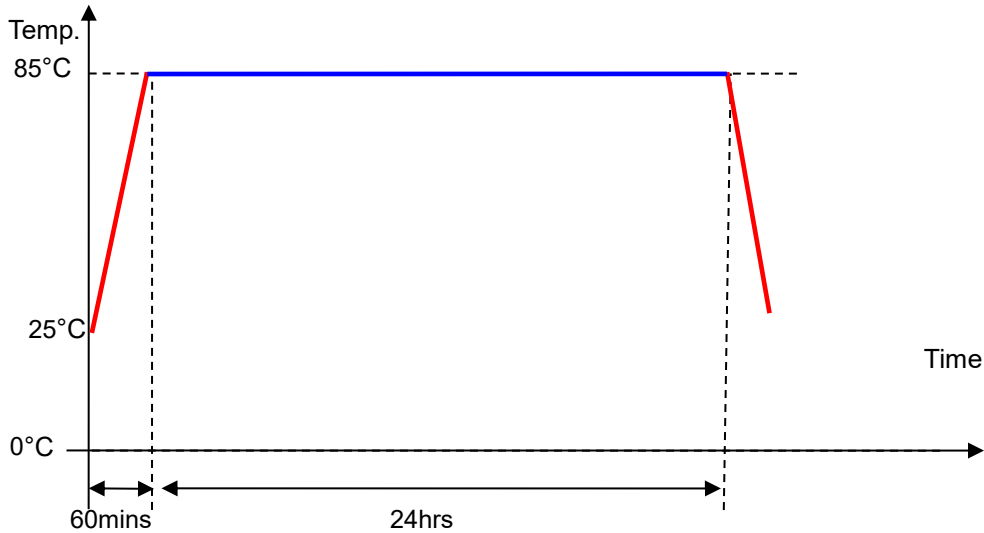
1. No network disconnections occurred during the test. If ping packets are confirmed not to be lost, the module is considered to be functional.
2. During the test, open the BLE debugging assistant to search for the Bluetooth name (e.g., BL-AT1/2/3/4/5/6). If the name is not found, the test is considered to be failed.
3. After the test, the product shows no visible damage such as shrinkage, peeling, or discoloration.

| Sample Quantity                 | Test Data  | Test Results |
|---------------------------------|--|--------------|
| <p>6PCS<br/>(BL-AT1-BL-AT6)</p> | <p>The test data section contains two main parts. The top part shows three screenshots of the ATKPPING application's ping test results. Each screenshot displays a 'Ping 统计信息' (Ping Statistics) section with fields for 'Ping 最小值' (Ping Min), 'Ping 最大值' (Ping Max), 'Ping 平均值' (Ping Avg), and 'Ping 成功率' (Ping Success Rate). The bottom part shows a screenshot of the 'BLE调试助手' (BLE Debugging Assistant) application. The 'Scanner' tab is active, displaying a list of discovered Bluetooth devices with their names, MAC addresses, and signal strengths. The devices listed are BL-AT6, BL-AT2, BL-AT4, N/A, BL-AT1, BL-AT5, and BL-AT3.</p> | <p>PASS</p>  |

## 7. High Temperature Operation Test

Test Conditions: Operate at 85°C for 24hrs.

Test Profile:



### Test Criteria:

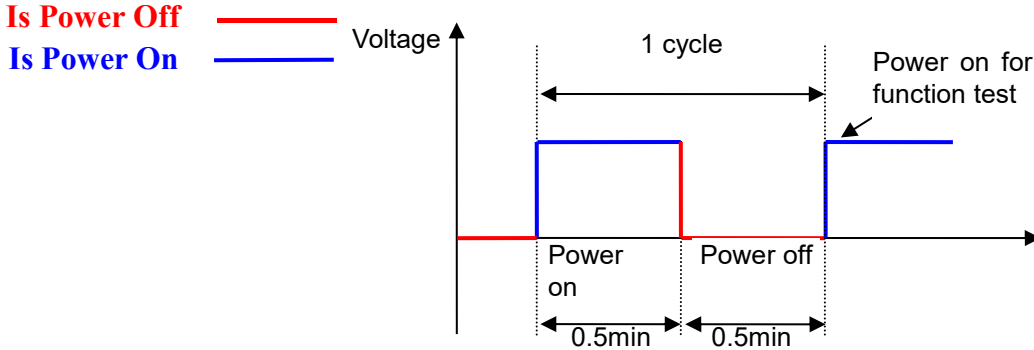
1. No network disconnections occurred during the test. If ping packets are confirmed not to be lost, the module is considered to be functional.
2. During the test, open the BLE debugging assistant to search for the Bluetooth name (e.g., BL-AT1/2/3/4/5/6). If the name is not found, the test is considered to be failed.
3. After the test, the product shows no visible damage such as shrinkage, peeling, or discoloration.

| Sample Quantity                 | Test Data | Test Results |
|---------------------------------|-----------|--------------|
| <p>6PCS<br/>(BL-AT1-BL-AT6)</p> |           | <p>PASS</p>  |

## 8. AC Power On/Off Test with Temperature

- Test Conditions:**
1. Power on: 30s; power off: 30s.
  2. Temperature: -40°C, 25°C, 85°C.
  3. Cycle: Each test condition cycles 200 times.

**Test Profile:**



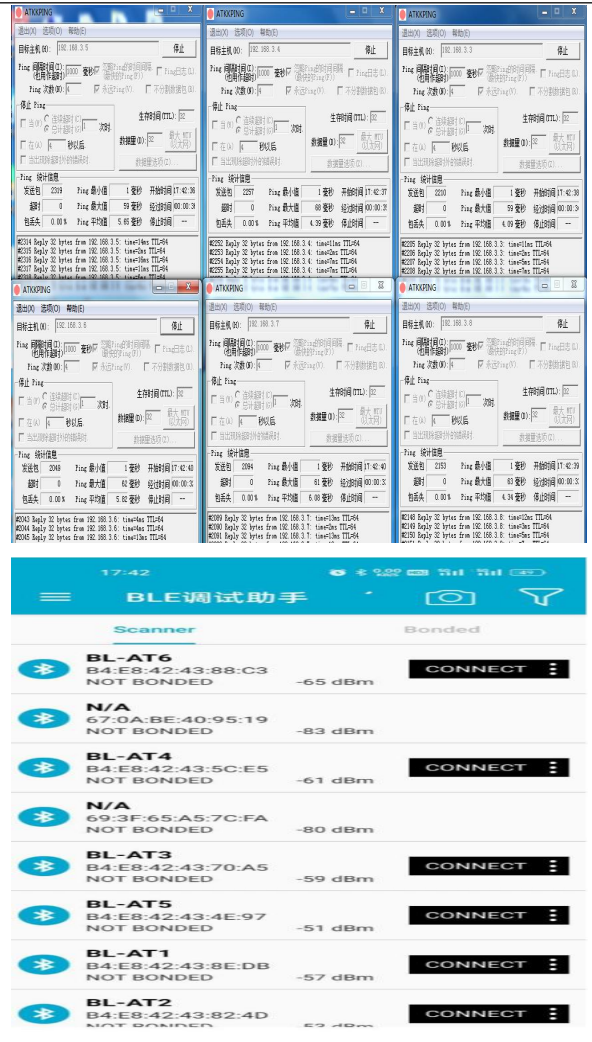
**Test Criteria:**

1. After power-up, the module boots normally. During the test, if the module boots normally and there is connectivity for every ping packet, the module is considered to be functional.
2. Test the Bluetooth functionality. Send the command AT+BLEINIT=2 to enable Bluetooth and configure the Bluetooth application name. Then open the BLE debugging assistant to search for the Bluetooth name (e.g., BL-AT1/2/3/4/5/6). If the name is not found, the test is considered to be failed.
3. After the test, the product shows no visible damage such as shrinkage, peeling, or discoloration.

| Item                             | Sample Quantity         | Test Data | Test Results |
|----------------------------------|-------------------------|-----------|--------------|
| Power on/off at room temperature | 6PCS<br>(BL-AT1-BL-AT6) |           | PASS         |

Power on/off at low temperature

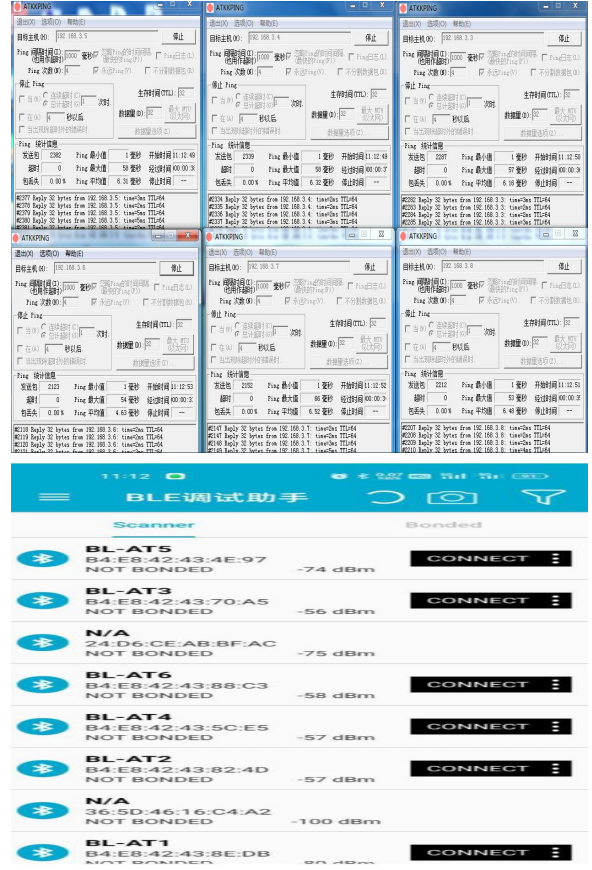
6PCS  
(BL-AT1-BL-AT6)



PASS

Power on/off at high temperature

6PCS  
(BL-AT1-BL-AT6)



PASS

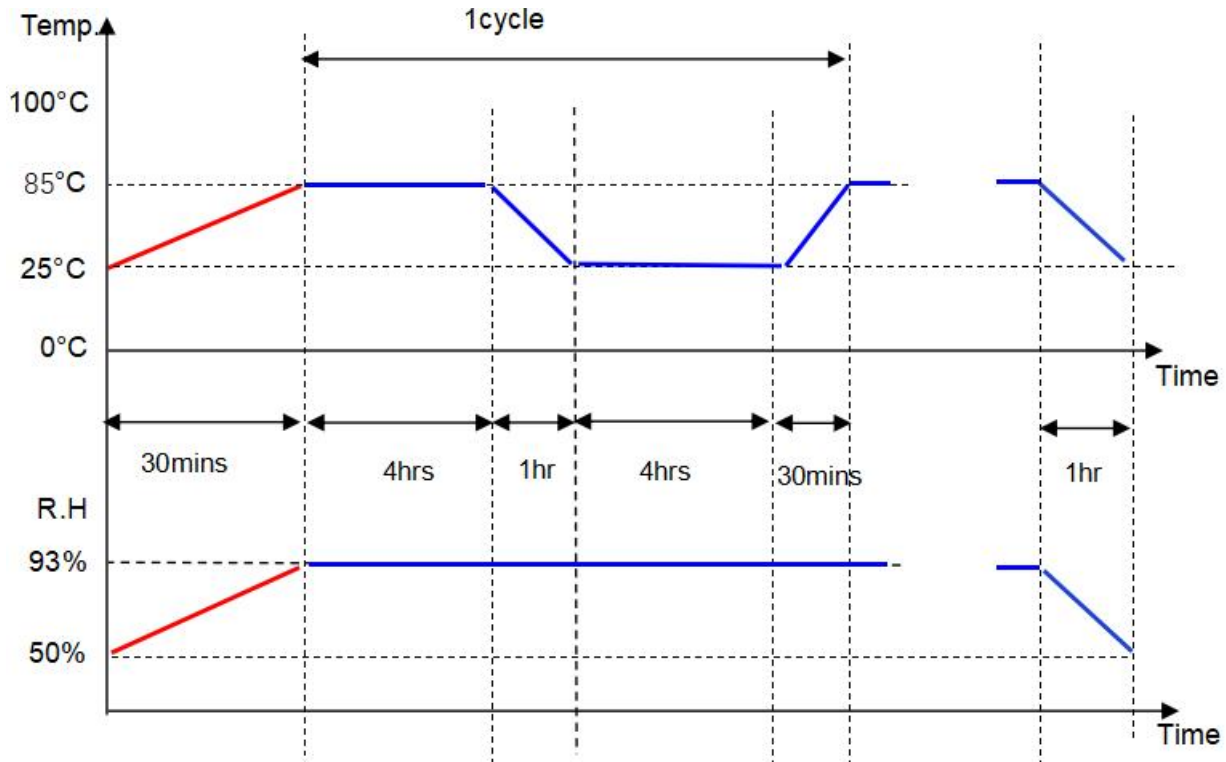
## 9. Alternating Hot and Humid Test

### Test Conditions:

1. Operate at 85°C + 93% RH for 4h;
  2. Operate at 25°C + 93% RH for 4h;
- Cycle step 1 and step 2, a total of 2 cycles.

### Test Profile:

Is Power Off —  
Is Power On —



### Test Criteria:

1. If the module operates normally and no ping packet loss is confirmed, the module is considered to be functional.
2. During the test, open the BLE debugging assistant to search for the Bluetooth name (e.g., BL-AT1/2/3/4/5/6). If the name is not found, the test is considered to be failed.
3. After the test, the product shows no visible damage such as shrinkage, peeling, or discoloration.

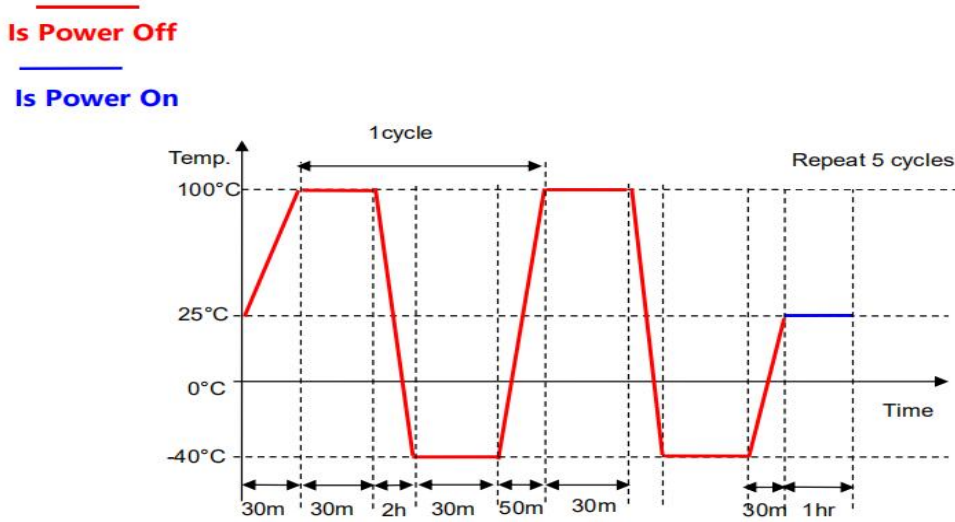
| Sample Quantity                 | Test Data | Test Results |
|---------------------------------|-----------|--------------|
| <p>6PCS<br/>(BL-AT1-BL-AT6)</p> |           | <p>PASS</p>  |

# 10. Thermal Shock Test

## Test Conditions:

Power-off test. Temperature cycling between -40~100°C, with a heating time of 50min and a cooling time of 2h. Each stage is held for 30min, for a total of 5 cycles.

## Test Profile:



## Test Criteria:

1. After power-up, the module boots normally. During the test, if the module boots normally and ping packets are confirmed not to be lost, the module is considered to be functional.
2. During the test, open the BLE debugging assistant to search for the Bluetooth name (e.g., BL-AT1/2/3/4/5/6). If the name is not found, the test is considered to be failed.
3. After the test, the product shows no visible damage such as shrinkage, peeling, or discoloration.

| Sample Quantity                 | Test Data | Test Results |
|---------------------------------|-----------|--------------|
| <p>6PCS<br/>(BL-AT1-BL-AT6)</p> |           | <p>PASS</p>  |