

# Reliability Test Report

Product Name: GP-01

Product Model: GPS Series

Test Date: 2021/09/18–2021/09/22

Tested by: Lu Xingui

Reviewed by: Zhou Yuming



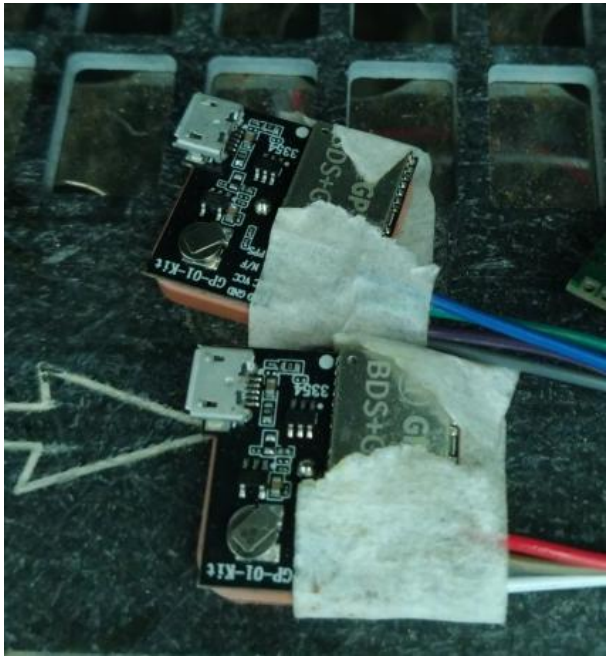
## 1. Inspection Plan

No.	Process Name	Inspection Item	Inspection Equipment	Sampling Level (Refer to GB/T 2828.1-2003)	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	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 Test duration: 8h After restoring to -25°C and a 1-hour soak, perform a cold start test.
2	High temperature storage test	Test conditions: 100°C Test duration: 8h After restoring to 85°C and a 1-hour soak, perform a hot start test.
3	Low temperature operation test	Test conditions: -40°C Test duration: 24h
4	High temperature operation test	Test conditions: 85°C Test duration: 24h
5	AC power on/off test with temperature	A) Temperature: -40°C B) Temperature: 25°C C) Temperature: 85°C 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; B) Operate at 25°C + 93% RH for 4h; 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. Temperature transition time: 50min for heating, 2h for cooling. Test duration: 5 cycles

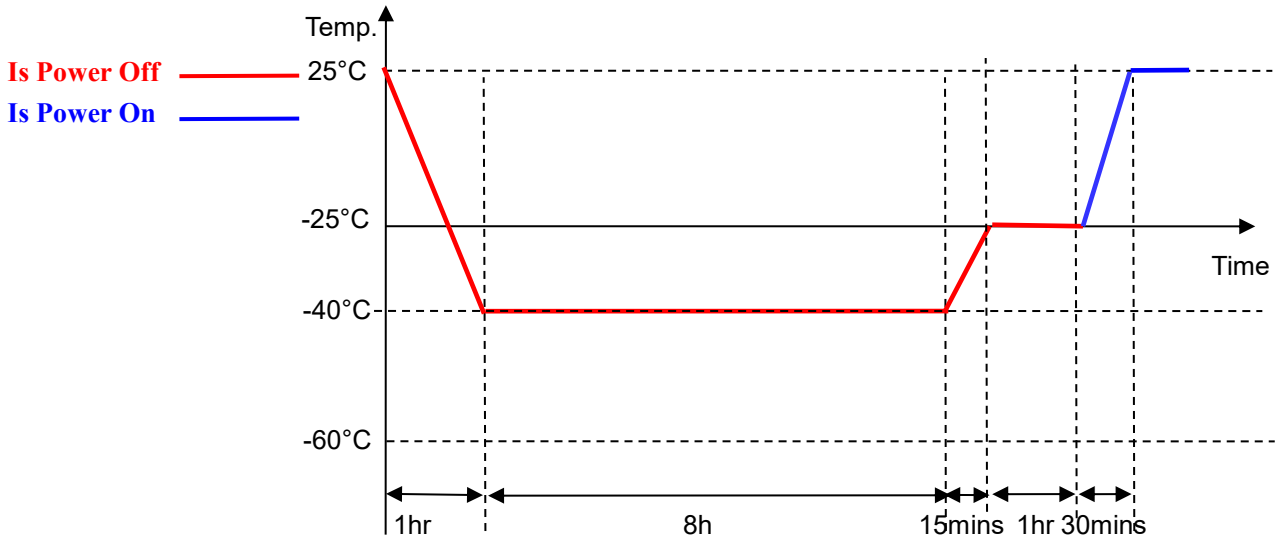
### 3. Test Preparation

No.	Item	Image/Attachment
1	Reliability documentation	 GP-01、GP-02 可靠性测试说明.d
2	Test equipment	
3	Sample placement	
4	Test reason	R&D reconfirmed: re-test required due to insufficient first test item

## 4. Low Temperature Storage Test

**Test Conditions:** Power-off test. Store the product at  $-40^{\circ}\text{C}$  for 8h, then restore it to  $-25^{\circ}\text{C}$  for a 1-hour soak, and perform a cold start test.

**Test Profile:**



**Test Criteria:**

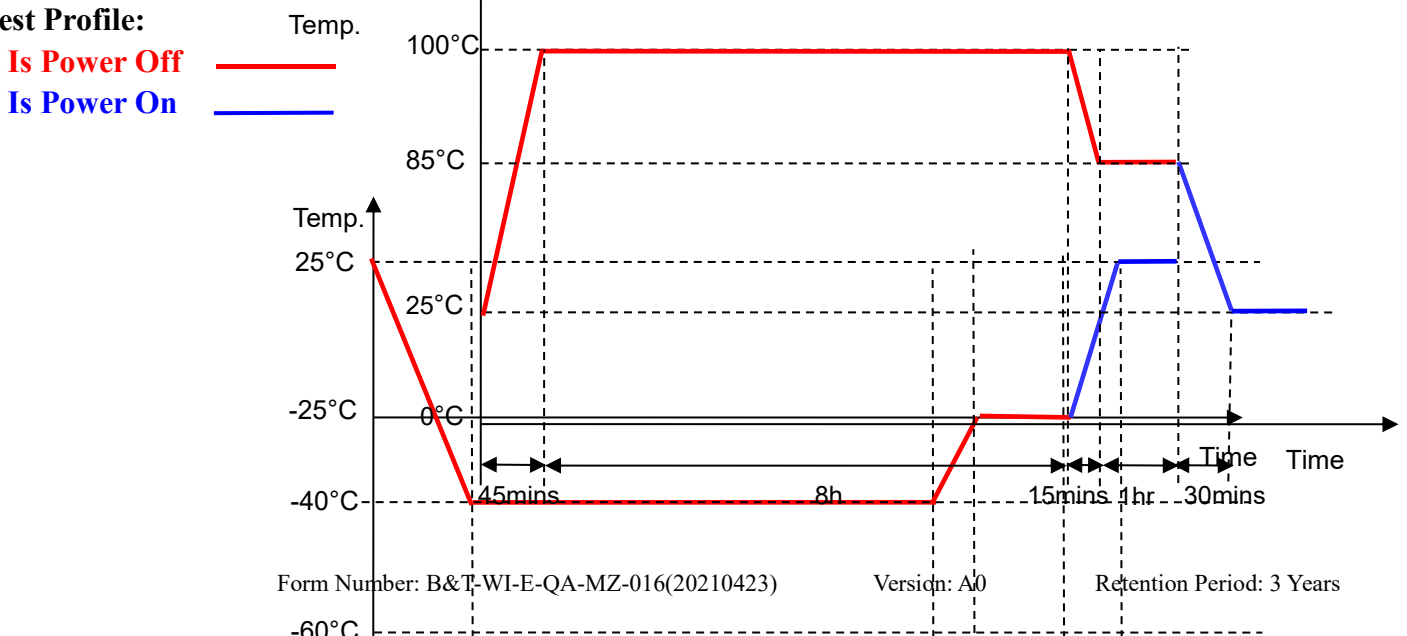
1. If the module functions normally during the cold start test and continuously prints messages, it is considered to be functional.
2. After the test, the product shows no visible damage such as shrinkage, peeling, or discoloration.

Sample Quantity	Test Data	Test Results
Unit 1 Unit 2		PASS

## 5. High Temperature Storage Test

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

**Test Profile:**



**Test Criteria:**

1. If the module functions normally during the hot start test and continuously prints messages, it is considered to be functional.
2. After the test, the product shows no visible damage such as shrinkage, peeling, or discoloration.

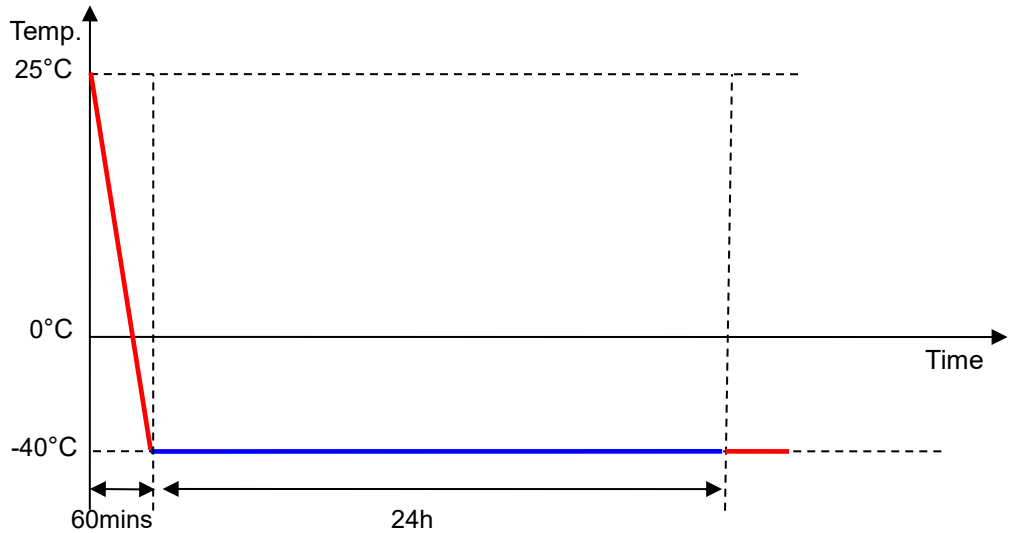
Sample Quantity	Test Data	Test Results
Unit 1 Unit 2		PASS

**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. If no network disconnections occurred during the test and the module continuously prints messages, it is considered to be functional.
2. After the test, the product shows no visible damage such as shrinkage, peeling, or discoloration.

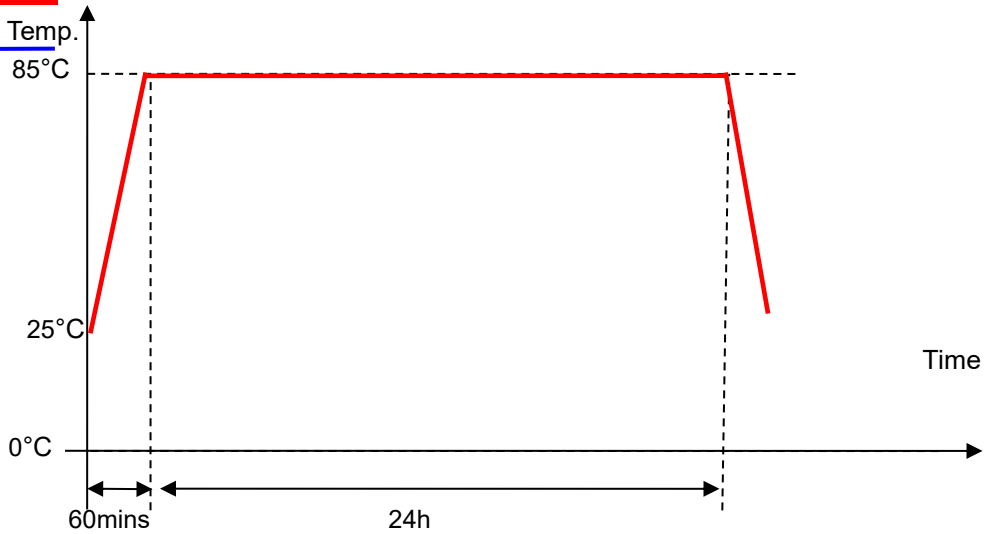
Sample Quantity	Test Data	Test Results
Unit 1 Unit 2		PASS

## 7. High Temperature Operation Test

**Test Conditions:** Operate at 85°C for 24h.

**Test Profile:**

Is Power Off ——— (red line)  
Is Power On ——— (blue line)



**Test Criteria:**

1. If no network disconnections occurred during the test and the module continuously prints messages, it is considered to be functional.
2. After the test, the product shows no visible damage such as shrinkage, peeling, or discoloration.

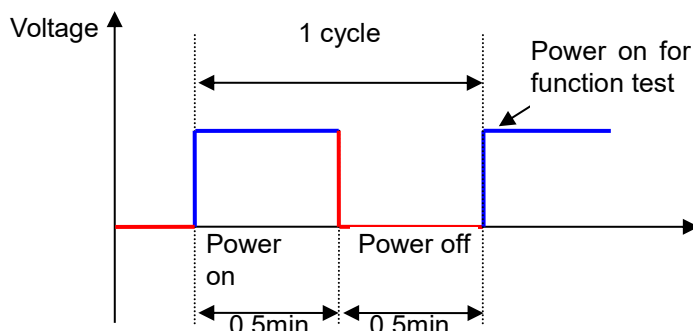
Sample Quantity	Test Data	Test Results
Unit 1 Unit 2		PASS

## 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:**

Is Power Off ——— (red line)  
Is Power On ——— (blue line)



**Test Criteria:**

1. If the module boots normally after power-on and continuously prints messages, it is considered to be functional.
2. 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	Unit 1 Unit 2		PASS
Power on/off at low temperature	Unit 1 Unit 2		PASS
Power on/off at high temperature	Unit 1 Unit 2		PASS

## 9. Alternating Hot and Humid Test

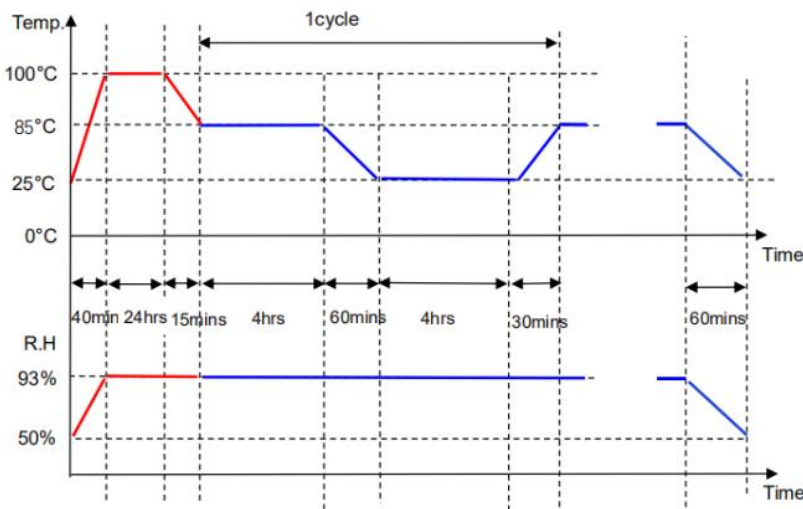
**Test Conditions:**

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:**

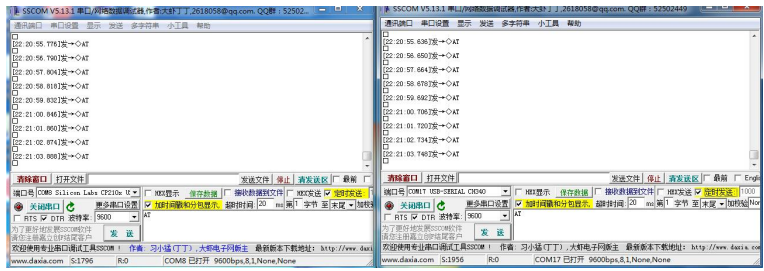
测试曲线:

Is Power Off  
Is Power On



**Test Criteria:**

1. If the module boots normally after power-on and continuously prints messages, it is considered to be functional.
2. After the test, the product shows no visible damage such as shrinkage, peeling, or discoloration.

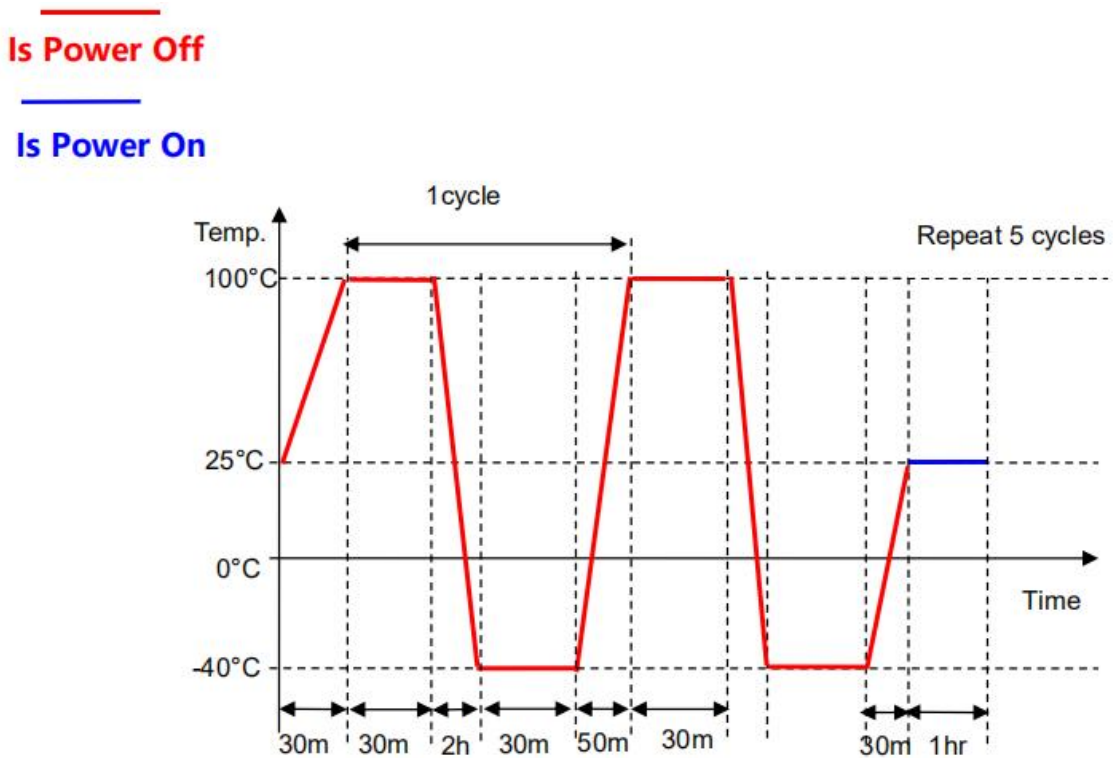
Sample Quantity	Test Data	Test Results
Unit 1 Unit 2		PASS

## 10. Thermal Shock Test

### Test Conditions:

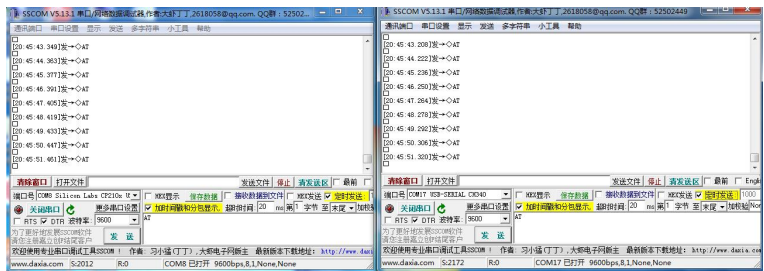
Power-off test. Temperature cycling between -40–100°C, with a heating time of 50min and a cooling time of 2h. Each stage is held for 30min, for a total of 5 cycles.

### Test Profile:



### Test Criteria:

1. If the module boots normally after power-on and continuously prints messages, it is considered to be functional.
2. After the test, the product shows no visible damage such as shrinkage, peeling, or discoloration.

Sample Quantity	Test Data	Test Results
Unit 1 Unit 2		PASS