

# Reliability Test Report

Verified code:104203

Customer: Allwinner Technology Co., Ltd.

Address: No. 9 Technology Road 2, High-Tech Zone, Zhuhai, Guangdong, P. R. C

Sample Name: XR806

Sample Model / Type: XR806

Test Method: R202104168308 Requirement

Date of Receipt: 2021/06/02

Test Period: 2021/06/04~2021/06/05

Test Address: Shanghai FA Laboratory: No. 958, East Kangqiao Rd, Pudong New Area, Shanghai&Shanghai Failure Analysis Laboratory.

Test Result: For further details, please refer to the following page-4 《Test Result Summary》

Prepared by Liu Yonggang Checked by Chen Zhen Authorized by Yue Long

(signature) *Liu Yonggang* (signature) *Chen Zhen* (signature) *Yue Long*  
Director

GUANGZHOU GRG METROLOGY &amp; TEST CO., LTD

Issued Date: 2021/8/10

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# Reliability Test Report

## Statement

1. The report is invalid without "special stamp for inspection and testing".
2. Failure to affix "special seal for inspection and testing" to the copy report is invalid, and some copies are invalid.
3. The report is invalid without the signature and seal of the person preparing, reviewing and approving it.
4. The report is invalid if altered.
5. If there is any objection concerning the report, please inform us within 15 days from the date of receiving the report.
6. This test is only responsible for incoming samples, and the report is only valid for this test.

# Reliability Test Report

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# Reliability Test Report

## 1. Test Result Summary

| # | Test Description                                   | Test Conditions                                                                                                             | Sample Size/lot | # of Lots | Total # Units | # Failed | IV Result     |
|---|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|-----------------|-----------|---------------|----------|---------------|
| 1 | Electrostatic Discharge Human Body Model (ESD-HBM) | a) ANSI/ESDA/JEDEC JS-001 2017;<br>b) Zap 1 pulse with 0.3 sec. interval;<br>c) Stress Voltage: ±2000V~±4000V, Step: ±500V; | 24              | 1         | 24            | 0        | PASS (±4000V) |

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# Reliability Test Report

## 2. Sample Information

Sample name: XR806

Sample model/ type: XR806

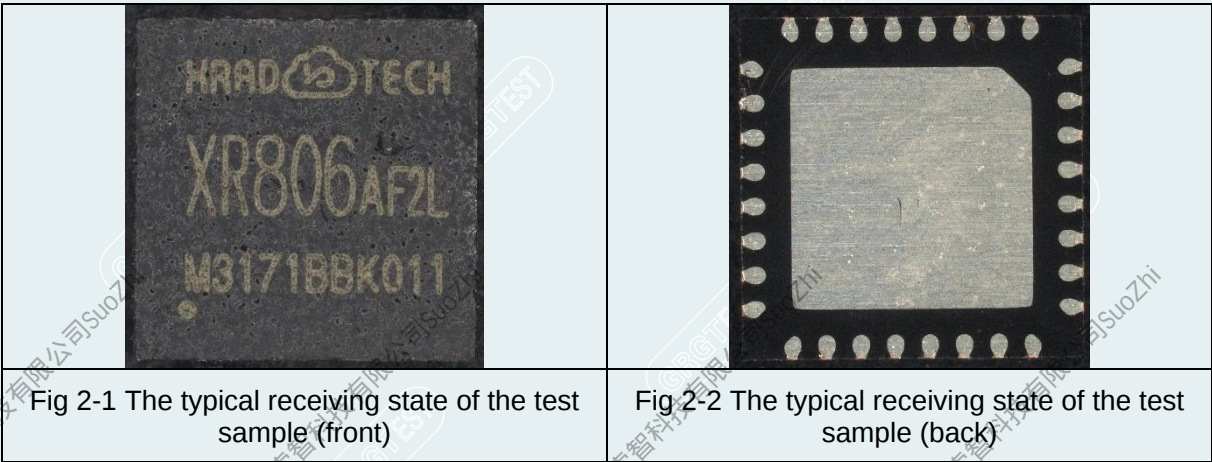
Sample description: QFN chips with 32 pins

Supplier: Allwinner Technology CO., Ltd.

Supplier address No.9 Technology Road 2,High-Tech Zone, Zhuhai, Guangdong, P.R.C

Manufacturer

Manufacturer address /



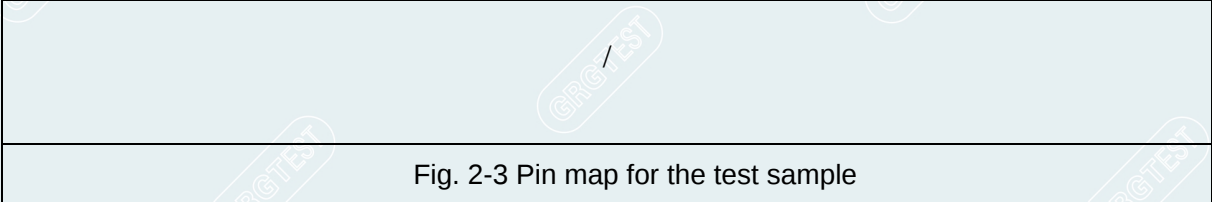
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# Reliability Test Report

## 2.1 Pin Definition

| Pin Group       | Type   | Pin(s) |
|-----------------|--------|--------|
| EPAD            | GROUND | 33     |
| VDD_DIG(1.4)    | POWER  | 14     |
| VDD_PA(3.6)     | POWER  | 2      |
| VDD_TX(3.6)     | POWER  | 3      |
| VDD_TX(3.6) (2) | POWER  | 32     |
| VDD_IO(3.6)     | POWER  | 12     |
| VDD_EXT(3.6)    | POWER  | 17     |
| VDD_LX(3.6)     | POWER  | 18     |
| VDD_SENSE(3.6)  | POWER  | 19     |
| VDD_IO_5V(5.5)  | POWER  | 13     |
| VBAT(5.5)       | POWER  | 16     |
| ANT             | OUTPUT | 1      |
| HXTAL1(1.4)     | OUTPUT | 30     |
| HXTAL2(1.4)     | OUTPUT | 31     |
| PA11(3.6)       | OUTPUT | 4      |
| PA12(3.6)       | OUTPUT | 5      |
| PA13(3.6)       | OUTPUT | 6      |
| PA19(3.6)       | OUTPUT | 7      |
| PA20(3.6)       | OUTPUT | 8      |
| PA21(3.6)       | OUTPUT | 9      |
| PA22(3.6)       | OUTPUT | 10     |
| PA23(3.6)       | OUTPUT | 11     |
| PB06(3.6)       | OUTPUT | 20     |
| PB05(3.6)       | OUTPUT | 21     |
| PB04(3.6)       | OUTPUT | 22     |
| PB07(3.6)       | OUTPUT | 23     |
| PB03(3.6)       | OUTPUT | 24     |
| PB02(3.6)       | OUTPUT | 25     |
| CHIP_PWD(5.5)   | OUTPUT | 15     |
| PB15(5.5)       | OUTPUT | 26     |
| PB14(5.5)       | OUTPUT | 27     |
| PB01(5.5)       | OUTPUT | 28     |
| PB00(5.5)       | OUTPUT | 29     |

## 2.2 Pin Categorization



Note:

1. The sample information in section 2 were submitted and confirmed completely by the client. GRGTEST assumes no responsibility for the accuracy, completeness or authenticity of any sample information provided by Client.

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# Reliability Test Report

## 3. Acceptance Criteria

### 3.1 Final Electrical Test

| Test item | Acceptance criteria                                        |
|-----------|------------------------------------------------------------|
| ESD-HBM   | All the test samples should pass the Final electrical test |

Note: The Final electrical test (initial and final ATE verification) is performed by Client and the result is Un-known(No results is provided by Client). GRGTEST assumes no responsibility for the accuracy, completeness or authenticity of the result.

### 3.2 Acceptance Criteria for Other Test Item

| Test item | Acceptance criteria                                                                                                             |
|-----------|---------------------------------------------------------------------------------------------------------------------------------|
| ESD-HBM   | Voltage shift shall be small than 30% at reference point and I-V curve compliance of $\pm 10\%$ envelope before / after zapping |

Note: Acceptance criteria above were confirmed by Client.

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# Reliability Test Report

## 4. Electrostatic Discharge Human Body Model (ESD-HBM)

### 4.1 Test Information

|                       |                                                |
|-----------------------|------------------------------------------------|
| Sample size:          | 1 lot 24 pcs each                              |
| Test period:          | 2021/06/04~2021/06/05                          |
| Reference document:   | ANSI/ESDA/JEDEC JS-001 2017                    |
| Number of pulses:     | 1 time (s)                                     |
| Pulse interval:       | 0.3 s                                          |
| Test voltage:         | $\pm 2000V \sim \pm 4000V$ , Step: $\pm 5000V$ |
| Classification Level: | Pass Level 3A( $\pm 4000V$ )                   |
| Test duration:        | Not applicable                                 |
| Test point:           | Final electrical test                          |
| Acceptance criteria:  | Per Section 3                                  |

### 4.2 Environmental Conditions

|                            |                 |
|----------------------------|-----------------|
| Environmental temperature: | (20.3~25.0)°C   |
| Environmental humidity:    | (49.8~52.3)% RH |

### 4.3 Equipment and Instrument

| No. | Equipment and instrument | Serial No. | Due date   | Test item |
|-----|--------------------------|------------|------------|-----------|
| 1   | ZapMaster Mk.2 TE        | 1911214    | 2022/01/10 | ESD-HBM   |

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## 4.4 Test Photo

### 4.4.1 Test Setup Photo

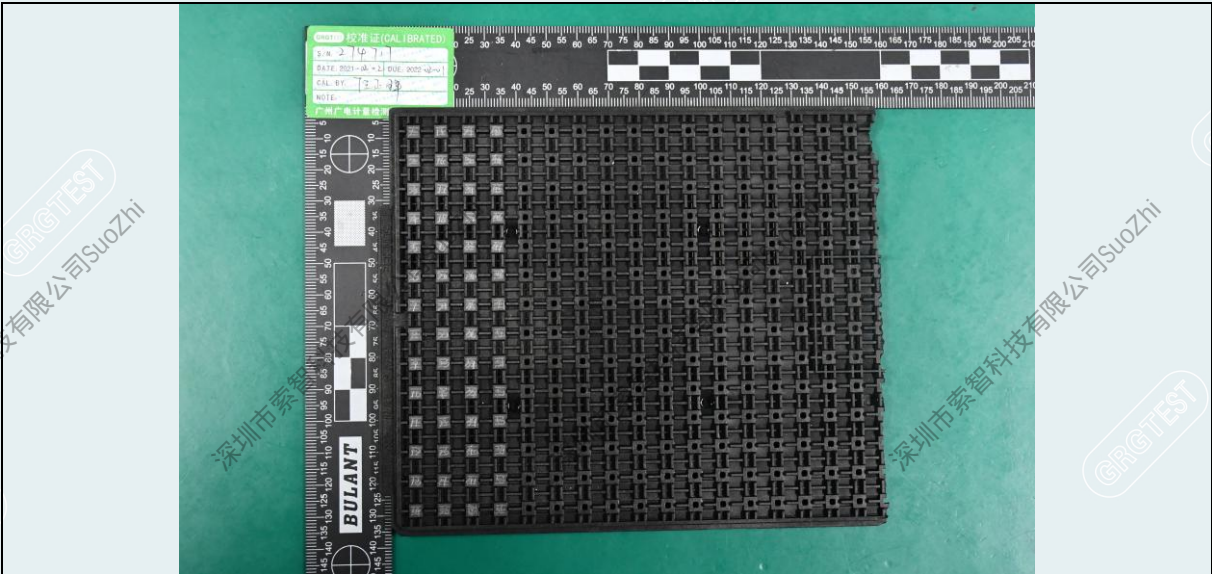


Fig. 4-1 The receiving state of test samples



Fig. 4-2 The test samples in the chamber

# Reliability Test Report

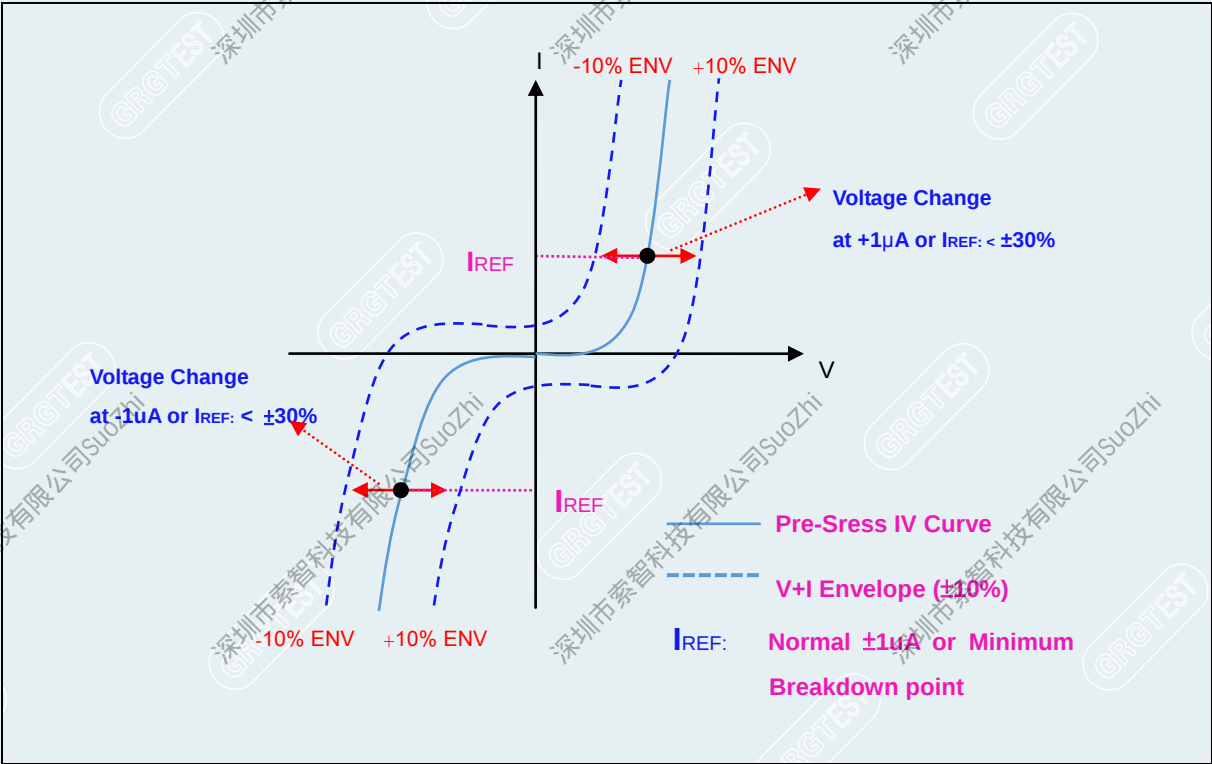


Fig. 4-3 Voltage shift for Failure criteria (Schematic Diagram)

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# Reliability Test Report

## 4.5 ESD-HBM Component Classification Levels

| Classification Levels | Voltage Range (V) |
|-----------------------|-------------------|
| 0Z                    | < 50              |
| 0A                    | 50 to < 125       |
| 0B                    | 125 to < 250      |
| 1A                    | 250 to < 500      |
| 1B                    | 500 to < 1000     |
| 1C                    | 1000 to < 2000    |
| 2                     | 2000 to < 4000    |
| 3A                    | 4000 to < 8000    |
| 3B                    | ≥ 8000            |

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# Reliability Test Report

## 4.6 Pin Group Definition

Refer to Section 2.1.

## 4.7. Test data

### 4.7.1 Summary

| Sample No.                             | Test condition                                                                                                                                                | Sample Size | Passed Volts | IV Results Description |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------------|------------------------|
| R202104168308-01#<br>R202104168308-02# | GRP_IO_A, GRP_IO_D1, GRP_IO_D2, GRP_PIN1, GRP_PIN8, GRP_PIN15, GRP_PIN17, GRP_PIN24, GRP_3V6, GRP_3V3, GRP_1V8, GRP_1V2 to EPAD_GND(+2000V~+4000V, Step:500V) | 2           | Pass +4000V  | IV Pass                |
| R202104168308-03#<br>R202104168308-04# | GRP_IO_A, GRP_IO_D1, GRP_IO_D2, GRP_PIN1, GRP_PIN8, GRP_PIN15, GRP_PIN17, GRP_PIN24, GRP_3V6, GRP_3V3, GRP_1V8, GRP_1V2 to EPAD_GND(-2000V~-4000V, Step:500V) | 2           | Pass -4000V  | IV Pass                |
| R202104168308-05#<br>R202104168308-06# | GRP_IO_A, GRP_IO_D1, GRP_IO_D2, GRP_PIN8, GRP_PIN15, GRP_PIN17, GRP_PIN24, GRP_3V6, GRP_3V3, GRP_1V8, GRP_1V2 to PIN1(+2000V~+4000V, Step:500V)               | 2           | Pass +4000V  | IV Pass                |
| R202104168308-07#<br>R202104168308-08# | GRP_IO_A, GRP_IO_D1, GRP_IO_D2, GRP_PIN8, GRP_PIN15, GRP_PIN17, GRP_PIN24, GRP_3V6, GRP_3V3, GRP_1V8, GRP_1V2 to PIN1(-2000V~-4000V, Step:500V)               | 2           | Pass -4000V  | IV Pass                |
| R202104168308-09#<br>R202104168308-10# | GRP_IO_A, GRP_IO_D1, GRP_IO_D2, GRP_PIN15, GRP_PIN17, GRP_PIN24, GRP_3V6, GRP_3V3, GRP_1V8, GRP_1V2 to PIN8(+2000V~+4000V, Step:500V)                         | 2           | Pass +4000V  | IV Pass                |
| R202104168308-11#<br>R202104168308-12# | GRP_IO_A, GRP_IO_D1, GRP_IO_D2, GRP_PIN15, GRP_PIN17, GRP_PIN24, GRP_3V6, GRP_3V3, GRP_1V8, GRP_1V2 to PIN8(-2000V~-4000V, Step:500V)                         | 2           | Pass -4000V  | IV Pass                |
| R202104168308-13#<br>R202104168308-14# | GRP_IO_A, GRP_IO_D1, GRP_IO_D2, GRP_PIN15, GRP_PIN24, GRP_3V6, GRP_3V3, GRP_1V8, GRP_1V2 to PIN17(+2000V~+4000V, Step:500V)                                   | 2           | Pass +4000V  | IV Pass                |
| R202104168308-15#<br>R202104168308-16# | GRP_IO_A, GRP_IO_D1, GRP_IO_D2, GRP_PIN15, GRP_PIN24, GRP_3V6, GRP_3V3, GRP_1V8, GRP_1V2 to PIN17(-2000V~-4000V, Step:500V)                                   | 2           | Pass -4000V  | IV Pass                |
| R202104168308-17#<br>R202104168308-18# | GRP_IO_A, GRP_IO_D1, GRP_IO_D2, GRP_PIN15, GRP_3V6, GRP_3V3, GRP_1V8, GRP_1V2 to PIN24(+2000V~+4000V, Step:500V)                                              | 2           | Pass +4000V  | IV Pass                |
| R202104168308-19#<br>R202104168308-20# | GRP_IO_A, GRP_IO_D1, GRP_IO_D2, GRP_PIN15, GRP_3V6, GRP_3V3, GRP_1V8, GRP_1V2 to PIN24(-2000V~-4000V, Step:500V)                                              | 2           | Pass -4000V  | IV Pass                |

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|                                        |                                                                                                                |   |                |         |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------|---|----------------|---------|
| R202104168308-21#<br>R202104168308-22# | GRP_IO_A, GRP_IO_D1, GRP_IO_D2, GRP_PIN15,<br>GRP_3V3, GRP_1V8, GRP_1V2 to<br>GRP_3V6(+2000V~+4000V,Step:500V) | 2 | Pass<br>+4000V | IV Pass |
| R202104168308-23#<br>R202104168308-24# | GRP_IO_A, GRP_IO_D1, GRP_IO_D2, GRP_PIN15,<br>GRP_3V3, GRP_1V8, GRP_1V2 to<br>GRP_3V6(-2000V~-4000V,Step:500V) | 2 | Pass<br>-4000V | IV Pass |

## 4. 7.2 Test content

| Table 4-1 ESD-HBM test Results                                                                                                                                  |           |                   |         |                   |         |           |         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------|---------|-------------------|---------|-----------|---------|
| GRP_IO_A, GRP_IO_D1, GRP_IO_D2, GRP_PIN1, GRP_PIN8, GRP_PIN15, GRP_PIN17, GRP_PIN24, GRP_3V6,<br>GRP_3V3, GRP_1V8, GRP_1V2 to EPAD_GND(+2000V~+4000V,Step:500V) |           |                   |         |                   |         |           |         |
| Pin No.                                                                                                                                                         | Pin Name  | R202104168308-01# |         | R202104168308-02# |         | /         |         |
|                                                                                                                                                                 |           | Zap Level         | Results | Zap Level         | Results | Zap Level | Results |
| 33                                                                                                                                                              | EPAD      | +2.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 14                                                                                                                                                              | VDD_DIG   | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 2                                                                                                                                                               | VDD_PA    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 3                                                                                                                                                               | VDD_TX    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 32                                                                                                                                                              | VDD_TX    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 12                                                                                                                                                              | VDD_IO    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 17                                                                                                                                                              | VDD_EXT   | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 18                                                                                                                                                              | VDD_LX    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 19                                                                                                                                                              | VDD_SENSE | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 13                                                                                                                                                              | VDD_IO_5V | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 16                                                                                                                                                              | VBAT      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 1                                                                                                                                                               | ANT       | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 30                                                                                                                                                              | HXTAL1    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 31                                                                                                                                                              | HXTAL2    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 4                                                                                                                                                               | PA11      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 5                                                                                                                                                               | PA12      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 6                                                                                                                                                               | PA13      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 7                                                                                                                                                               | PA19      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 8                                                                                                                                                               | PA20      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 9                                                                                                                                                               | PA21      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 10                                                                                                                                                              | PA22      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 11                                                                                                                                                              | PA23      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 20                                                                                                                                                              | PB06      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 21                                                                                                                                                              | PB05      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 22                                                                                                                                                              | PB04      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 23                                                                                                                                                              | PB07      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 24                                                                                                                                                              | PB03      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 25                                                                                                                                                              | PB02      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 15                                                                                                                                                              | CHIP_PWD  | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 26                                                                                                                                                              | PB15      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 27                                                                                                                                                              | PB14      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 28                                                                                                                                                              | PB01      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 29                                                                                                                                                              | PB00      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |

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| Table 4-2 ESD-HBM test Results                                                                                                                               |           |                   |         |                   |         |           |         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------|---------|-------------------|---------|-----------|---------|
| GRP_IO_A, GRP_IO_D1, GRP_IO_D2, GRP_PIN1, GRP_PIN8, GRP_PIN15, GRP_PIN17, GRP_PIN24, GRP_3V6, GRP_3V3, GRP_1V8, GRP_1V2 to EPAD_GND(-2000V~-4000V,Step:500V) |           |                   |         |                   |         |           |         |
| Pin No.                                                                                                                                                      | Pin Name  | R202104168308-03# |         | R202104168308-04# |         | /         |         |
|                                                                                                                                                              |           | Zap Level         | Results | Zap Level         | Results | Zap Level | Results |
| 33                                                                                                                                                           | EPAD      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 14                                                                                                                                                           | VDD_DIG   | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 2                                                                                                                                                            | VDD_PA    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 3                                                                                                                                                            | VDD_TX    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 32                                                                                                                                                           | VDD_TX    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 12                                                                                                                                                           | VDD_IO    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 17                                                                                                                                                           | VDD_EXT   | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 18                                                                                                                                                           | VDD_LX    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 19                                                                                                                                                           | VDD_SENSE | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 13                                                                                                                                                           | VDD_IO_5V | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 16                                                                                                                                                           | VBAT      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 1                                                                                                                                                            | ANT       | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 30                                                                                                                                                           | HXTAL1    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 31                                                                                                                                                           | HXTAL2    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 4                                                                                                                                                            | PA11      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 5                                                                                                                                                            | PA12      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 6                                                                                                                                                            | PA13      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 7                                                                                                                                                            | PA19      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 8                                                                                                                                                            | PA20      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 9                                                                                                                                                            | PA21      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 10                                                                                                                                                           | PA22      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 11                                                                                                                                                           | PA23      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 20                                                                                                                                                           | PB06      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 21                                                                                                                                                           | PB05      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 22                                                                                                                                                           | PB04      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 23                                                                                                                                                           | PB07      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 24                                                                                                                                                           | PB03      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 25                                                                                                                                                           | PB02      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 15                                                                                                                                                           | CHIP_PWD  | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 26                                                                                                                                                           | PB15      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 27                                                                                                                                                           | PB14      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 28                                                                                                                                                           | PB01      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 29                                                                                                                                                           | PB00      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |

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| Table 4-3 ESD-HBM test Results                                                                                                                 |           |                   |         |                   |         |           |         |
|------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------|---------|-------------------|---------|-----------|---------|
| GRP_IO_A, GRP_IO_D1, GRP_IO_D2, GRP_PIN8, GRP_PIN15, GRP_PIN17, GRP_PIN24, GRP_3V6, GRP_3V3, GRP_1V8, GRP_1V2 to PIN1(+2000V~+4000V,Step:500V) |           |                   |         |                   |         |           |         |
| Pin No.                                                                                                                                        | Pin Name  | R202104168308-05# |         | R202104168308-06# |         | /         |         |
|                                                                                                                                                |           | Zap Level         | Results | Zap Level         | Results | Zap Level | Results |
| 33                                                                                                                                             | EPAD      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 14                                                                                                                                             | VDD_DIG   | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 2                                                                                                                                              | VDD_PA    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 3                                                                                                                                              | VDD_TX    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 32                                                                                                                                             | VDD_TX    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 12                                                                                                                                             | VDD_IO    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 17                                                                                                                                             | VDD_EXT   | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 18                                                                                                                                             | VDD_LX    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 19                                                                                                                                             | VDD_SENSE | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 13                                                                                                                                             | VDD_IO_5V | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 16                                                                                                                                             | VBAT      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 1                                                                                                                                              | ANT       | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 30                                                                                                                                             | HXTAL1    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 31                                                                                                                                             | HXTAL2    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 4                                                                                                                                              | PA11      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 5                                                                                                                                              | PA12      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 6                                                                                                                                              | PA13      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 7                                                                                                                                              | PA19      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 8                                                                                                                                              | PA20      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 9                                                                                                                                              | PA21      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 10                                                                                                                                             | PA22      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 11                                                                                                                                             | PA23      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 20                                                                                                                                             | PB06      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 21                                                                                                                                             | PB05      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 22                                                                                                                                             | PB04      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 23                                                                                                                                             | PB07      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 24                                                                                                                                             | PB03      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 25                                                                                                                                             | PB02      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 15                                                                                                                                             | CHIP_PWD  | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 26                                                                                                                                             | PB15      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 27                                                                                                                                             | PB14      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 28                                                                                                                                             | PB01      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 29                                                                                                                                             | PB00      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |

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| Table 4-4 ESD-HBM test Results                                                                                                                 |           |                   |         |                   |         |           |         |
|------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------|---------|-------------------|---------|-----------|---------|
| GRP_IO_A, GRP_IO_D1, GRP_IO_D2, GRP_PIN8, GRP_PIN15, GRP_PIN17, GRP_PIN24, GRP_3V6, GRP_3V3, GRP_1V8, GRP_1V2 to PIN1(-2000V~-4000V,Step:500V) |           |                   |         |                   |         |           |         |
| Pin No.                                                                                                                                        | Pin Name  | R202104168308-07# |         | R202104168308-08# |         | /         |         |
|                                                                                                                                                |           | Zap Level         | Results | Zap Level         | Results | Zap Level | Results |
| 33                                                                                                                                             | EPAD      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 14                                                                                                                                             | VDD_DIG   | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 2                                                                                                                                              | VDD_PA    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 3                                                                                                                                              | VDD_TX    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 32                                                                                                                                             | VDD_TX    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 12                                                                                                                                             | VDD_IO    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 17                                                                                                                                             | VDD_EXT   | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 18                                                                                                                                             | VDD_LX    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 19                                                                                                                                             | VDD_SENSE | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 13                                                                                                                                             | VDD_IO_5V | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 16                                                                                                                                             | VBAT      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 1                                                                                                                                              | ANT       | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 30                                                                                                                                             | HXTAL1    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 31                                                                                                                                             | HXTAL2    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 4                                                                                                                                              | PA11      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 5                                                                                                                                              | PA12      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 6                                                                                                                                              | PA13      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 7                                                                                                                                              | PA19      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 8                                                                                                                                              | PA20      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 9                                                                                                                                              | PA21      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 10                                                                                                                                             | PA22      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 11                                                                                                                                             | PA23      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 20                                                                                                                                             | PB06      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 21                                                                                                                                             | PB05      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 22                                                                                                                                             | PB04      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 23                                                                                                                                             | PB07      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 24                                                                                                                                             | PB03      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 25                                                                                                                                             | PB02      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 15                                                                                                                                             | CHIP_PWD  | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 26                                                                                                                                             | PB15      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 27                                                                                                                                             | PB14      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 28                                                                                                                                             | PB01      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 29                                                                                                                                             | PB00      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |

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| Table 4-5 ESD-HBM test Results                                                                                                       |           |                   |         |                   |         |           |         |
|--------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------|---------|-------------------|---------|-----------|---------|
| GRP_IO_A, GRP_IO_D1, GRP_IO_D2, GRP_PIN15, GRP_PIN17, GRP_PIN24, GRP_3V6, GRP_3V3, GRP_1V8, GRP_1V2 to PIN8(+2000V~+4000V,Step:500V) |           |                   |         |                   |         |           |         |
| Pin No.                                                                                                                              | Pin Name  | R202104168308-09# |         | R202104168308-10# |         | /         |         |
|                                                                                                                                      |           | Zap Level         | Results | Zap Level         | Results | Zap Level | Results |
| 33                                                                                                                                   | EPAD      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 14                                                                                                                                   | VDD_DIG   | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 2                                                                                                                                    | VDD_PA    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 3                                                                                                                                    | VDD_TX    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 32                                                                                                                                   | VDD_TX    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 12                                                                                                                                   | VDD_IO    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 17                                                                                                                                   | VDD_EXT   | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 18                                                                                                                                   | VDD_LX    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 19                                                                                                                                   | VDD_SENSE | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 13                                                                                                                                   | VDD_IO_5V | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 16                                                                                                                                   | VBAT      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 1                                                                                                                                    | ANT       | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 30                                                                                                                                   | HXTAL1    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 31                                                                                                                                   | HXTAL2    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 4                                                                                                                                    | PA11      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 5                                                                                                                                    | PA12      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 6                                                                                                                                    | PA13      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 7                                                                                                                                    | PA19      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 8                                                                                                                                    | PA20      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 9                                                                                                                                    | PA21      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 10                                                                                                                                   | PA22      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 11                                                                                                                                   | PA23      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 20                                                                                                                                   | PB06      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 21                                                                                                                                   | PB05      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 22                                                                                                                                   | PB04      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 23                                                                                                                                   | PB07      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 24                                                                                                                                   | PB03      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 25                                                                                                                                   | PB02      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 15                                                                                                                                   | CHIP_PWD  | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 26                                                                                                                                   | PB15      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 27                                                                                                                                   | PB14      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 28                                                                                                                                   | PB01      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 29                                                                                                                                   | PB00      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |

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| Table 4-6 ESD-HBM test Results                                                                                                       |           |                   |         |                   |         |           |         |
|--------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------|---------|-------------------|---------|-----------|---------|
| GRP_IO_A, GRP_IO_D1, GRP_IO_D2, GRP_PIN15, GRP_PIN17, GRP_PIN24, GRP_3V6, GRP_3V3, GRP_1V8, GRP_1V2 to PIN8(-2000V~-4000V,Step:500V) |           |                   |         |                   |         |           |         |
| Pin No.                                                                                                                              | Pin Name  | R202104168308-11# |         | R202104168308-12# |         | /         |         |
|                                                                                                                                      |           | Zap Level         | Results | Zap Level         | Results | Zap Level | Results |
| 33                                                                                                                                   | EPAD      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 14                                                                                                                                   | VDD_DIG   | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 2                                                                                                                                    | VDD_PA    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 3                                                                                                                                    | VDD_TX    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 32                                                                                                                                   | VDD_TX    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 12                                                                                                                                   | VDD_IO    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 17                                                                                                                                   | VDD_EXT   | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 18                                                                                                                                   | VDD_LX    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 19                                                                                                                                   | VDD_SENSE | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 13                                                                                                                                   | VDD_IO_5V | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 16                                                                                                                                   | VBAT      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 1                                                                                                                                    | ANT       | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 30                                                                                                                                   | HXTAL1    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 31                                                                                                                                   | HXTAL2    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 4                                                                                                                                    | PA11      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 5                                                                                                                                    | PA12      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 6                                                                                                                                    | PA13      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 7                                                                                                                                    | PA19      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 8                                                                                                                                    | PA20      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 9                                                                                                                                    | PA21      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 10                                                                                                                                   | PA22      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 11                                                                                                                                   | PA23      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 20                                                                                                                                   | PB06      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 21                                                                                                                                   | PB05      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 22                                                                                                                                   | PB04      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 23                                                                                                                                   | PB07      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 24                                                                                                                                   | PB03      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 25                                                                                                                                   | PB02      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 15                                                                                                                                   | CHIP_PWD  | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 26                                                                                                                                   | PB15      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 27                                                                                                                                   | PB14      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 28                                                                                                                                   | PB01      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 29                                                                                                                                   | PB00      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |

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| Table 4-7 ESD-HBM test Results                                                                                             |           |                   |         |                   |         |           |         |
|----------------------------------------------------------------------------------------------------------------------------|-----------|-------------------|---------|-------------------|---------|-----------|---------|
| GRP_IO_A, GRP_IO_D1, GRP_IO_D2, GRP_PIN15, GRP_PIN24, GRP_3V6, GRP_3V3, GRP_1V8, GRP_1V2 to PIN17(+2000V~+4000V,Step:500V) |           |                   |         |                   |         |           |         |
| Pin No.                                                                                                                    | Pin Name  | R202104168308-13# |         | R202104168308-14# |         | /         |         |
|                                                                                                                            |           | Zap Level         | Results | Zap Level         | Results | Zap Level | Results |
| 33                                                                                                                         | EPAD      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 14                                                                                                                         | VDD_DIG   | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 2                                                                                                                          | VDD_PA    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 3                                                                                                                          | VDD_TX    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 32                                                                                                                         | VDD_TX    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 12                                                                                                                         | VDD_IO    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 17                                                                                                                         | VDD_EXT   | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 18                                                                                                                         | VDD_LX    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 19                                                                                                                         | VDD_SENSE | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 13                                                                                                                         | VDD_IO_5V | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 16                                                                                                                         | VBAT      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 1                                                                                                                          | ANT       | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 30                                                                                                                         | HXTAL1    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 31                                                                                                                         | HXTAL2    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 4                                                                                                                          | PA11      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 5                                                                                                                          | PA12      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 6                                                                                                                          | PA13      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 7                                                                                                                          | PA19      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 8                                                                                                                          | PA20      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 9                                                                                                                          | PA21      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 10                                                                                                                         | PA22      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 11                                                                                                                         | PA23      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 20                                                                                                                         | PB06      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 21                                                                                                                         | PB05      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 22                                                                                                                         | PB04      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 23                                                                                                                         | PB07      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 24                                                                                                                         | PB03      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 25                                                                                                                         | PB02      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 15                                                                                                                         | CHIP_PWD  | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 26                                                                                                                         | PB15      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 27                                                                                                                         | PB14      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 28                                                                                                                         | PB01      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 29                                                                                                                         | PB00      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |

# Reliability Test Report

Table 4-8 ESD-HBM test Results

GRP\_IO\_A, GRP\_IO\_D1, GRP\_IO\_D2, GRP\_PIN15, GRP\_PIN24, GRP\_3V6, GRP\_3V3, GRP\_1V8, GRP\_1V2 to PIN17(-2000V~-4000V, Step:500V)

| Pin No. | Pin Name  | R202104168308-15# |         | R202104168308-16# |         | /         |         |
|---------|-----------|-------------------|---------|-------------------|---------|-----------|---------|
|         |           | Zap Level         | Results | Zap Level         | Results | Zap Level | Results |
| 33      | EPAD      | A                 | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 14      | VDD_DIG   | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 2       | VDD_PA    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 3       | VDD_TX    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 32      | VDD_TX    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 12      | VDD_IO    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 17      | VDD_EXT   | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 18      | VDD_LX    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 19      | VDD_SENSE | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 13      | VDD_IO_5V | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 16      | VBAT      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 1       | ANT       | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 30      | HXTAL1    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 31      | HXTAL2    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 4       | PA11      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 5       | PA12      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 6       | PA13      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 7       | PA19      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 8       | PA20      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 9       | PA21      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 10      | PA22      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 11      | PA23      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 20      | PB06      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 21      | PB05      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 22      | PB04      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 23      | PB07      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 24      | PB03      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 25      | PB02      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 15      | CHIP_PWD  | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 26      | PB15      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 27      | PB14      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 28      | PB01      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 29      | PB00      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |

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| Table 4-9 ESD-HBM test Results                                                                                  |           |                   |         |                   |         |           |         |
|-----------------------------------------------------------------------------------------------------------------|-----------|-------------------|---------|-------------------|---------|-----------|---------|
| GRP_IO_A, GRP_IO_D1, GRP_IO_D2, GRP_PIN15, GRP_3V6, GRP_3V3, GRP_1V8, GRP_1V2 to PIN24(+2000V~+4000V,Step:500V) |           |                   |         |                   |         |           |         |
| Pin No.                                                                                                         | Pin Name  | R202104168308-17# |         | R202104168308-18# |         | /         |         |
|                                                                                                                 |           | Zap Level         | Results | Zap Level         | Results | Zap Level | Results |
| 33                                                                                                              | EPAD      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 14                                                                                                              | VDD_DIG   | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 2                                                                                                               | VDD_PA    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 3                                                                                                               | VDD_TX    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 32                                                                                                              | VDD_TX    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 12                                                                                                              | VDD_IO    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 17                                                                                                              | VDD_EXT   | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 18                                                                                                              | VDD_LX    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 19                                                                                                              | VDD_SENSE | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 13                                                                                                              | VDD_IO_5V | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 16                                                                                                              | VBAT      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 1                                                                                                               | ANT       | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 30                                                                                                              | HXTAL1    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 31                                                                                                              | HXTAL2    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 4                                                                                                               | PA11      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 5                                                                                                               | PA12      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 6                                                                                                               | PA13      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 7                                                                                                               | PA19      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 8                                                                                                               | PA20      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 9                                                                                                               | PA21      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 10                                                                                                              | PA22      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 11                                                                                                              | PA23      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 20                                                                                                              | PB06      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 21                                                                                                              | PB05      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 22                                                                                                              | PB04      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 23                                                                                                              | PB07      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 24                                                                                                              | PB03      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 25                                                                                                              | PB02      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 15                                                                                                              | CHIP_PWD  | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 26                                                                                                              | PB15      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 27                                                                                                              | PB14      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 28                                                                                                              | PB01      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 29                                                                                                              | PB00      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |

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Table 4-10 ESD-HBM test Results

| GRP_IO_A, GRP_IO_D1, GRP_IO_D2, GRP_PIN15, GRP_3V6, GRP_3V3, GRP_1V8, GRP_1V2 to<br>PIN24(-2000V~-4000V, Step:500V) |           |                   |         |                   |         |           |         |
|---------------------------------------------------------------------------------------------------------------------|-----------|-------------------|---------|-------------------|---------|-----------|---------|
| Pin No.                                                                                                             | Pin Name  | R202104168308-19# |         | R202104168308-20# |         | /         |         |
|                                                                                                                     |           | Zap Level         | Results | Zap Level         | Results | Zap Level | Results |
| 33                                                                                                                  | EPAD      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 14                                                                                                                  | VDD_DIG   | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 2                                                                                                                   | VDD_PA    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 3                                                                                                                   | VDD_TX    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 32                                                                                                                  | VDD_TX    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 12                                                                                                                  | VDD_IO    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 17                                                                                                                  | VDD_EXT   | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 18                                                                                                                  | VDD_LX    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 19                                                                                                                  | VDD_SENSE | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 13                                                                                                                  | VDD_IO_5V | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 16                                                                                                                  | VBAT      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 1                                                                                                                   | ANT       | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 30                                                                                                                  | HXTAL1    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 31                                                                                                                  | HXTAL2    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 4                                                                                                                   | PA11      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 5                                                                                                                   | PA12      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 6                                                                                                                   | PA13      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 7                                                                                                                   | PA19      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 8                                                                                                                   | PA20      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 9                                                                                                                   | PA21      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 10                                                                                                                  | PA22      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 11                                                                                                                  | PA23      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 20                                                                                                                  | PB06      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 21                                                                                                                  | PB05      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 22                                                                                                                  | PB04      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 23                                                                                                                  | PB07      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 24                                                                                                                  | PB03      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 25                                                                                                                  | PB02      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 15                                                                                                                  | CHIP_PWD  | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 26                                                                                                                  | PB15      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 27                                                                                                                  | PB14      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 28                                                                                                                  | PB01      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 29                                                                                                                  | PB00      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |

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| Table 4-11 ESD-HBM test Results                                                                          |           |                   |         |                   |         |           |         |
|----------------------------------------------------------------------------------------------------------|-----------|-------------------|---------|-------------------|---------|-----------|---------|
| GRP_IO_A, GRP_IO_D1, GRP_IO_D2, GRP_PIN15, GRP_3V3, GRP_1V8, GRP_1V2 to GRP_3V6(+2000V~+4000V,Step:500V) |           |                   |         |                   |         |           |         |
| Pin No.                                                                                                  | Pin Name  | R202104168308-21# |         | R202104168308-22# |         | /         |         |
|                                                                                                          |           | Zap Level         | Results | Zap Level         | Results | Zap Level | Results |
| 33                                                                                                       | EPAD      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 14                                                                                                       | VDD_DIG   | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 2                                                                                                        | VDD_PA    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 3                                                                                                        | VDD_TX    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 32                                                                                                       | VDD_TX    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 12                                                                                                       | VDD_IO    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 17                                                                                                       | VDD_EXT   | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 18                                                                                                       | VDD_LX    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 19                                                                                                       | VDD_SENSE | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 13                                                                                                       | VDD_IO_5V | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 16                                                                                                       | VBAT      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 1                                                                                                        | ANT       | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 30                                                                                                       | HXTAL1    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 31                                                                                                       | HXTAL2    | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 4                                                                                                        | PA11      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 5                                                                                                        | PA12      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 6                                                                                                        | PA13      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 7                                                                                                        | PA19      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 8                                                                                                        | PA20      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 9                                                                                                        | PA21      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 10                                                                                                       | PA22      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 11                                                                                                       | PA23      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 20                                                                                                       | PB06      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 21                                                                                                       | PB05      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 22                                                                                                       | PB04      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 23                                                                                                       | PB07      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 24                                                                                                       | PB03      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 25                                                                                                       | PB02      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 15                                                                                                       | CHIP_PWD  | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 26                                                                                                       | PB15      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 27                                                                                                       | PB14      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 28                                                                                                       | PB01      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |
| 29                                                                                                       | PB00      | +4.0kV            | IV Pass | +4.0kV            | IV Pass | /         | /       |

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| Table 4-12 ESD-HBM test Results                                                                             |           |                   |         |                   |         |           |         |
|-------------------------------------------------------------------------------------------------------------|-----------|-------------------|---------|-------------------|---------|-----------|---------|
| GRP_IO_A, GRP_IO_D1, GRP_IO_D2, GRP_PIN15, GRP_3V3, GRP_1V8, GRP_1V2 to<br>GRP_3V6(-2000V~-4000V,Step:500V) |           |                   |         |                   |         |           |         |
| Pin No.                                                                                                     | Pin Name  | R202104168308-23# |         | R202104168308-24# |         | /         |         |
|                                                                                                             |           | Zap Level         | Results | Zap Level         | Results | Zap Level | Results |
| 33                                                                                                          | EPAD      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 14                                                                                                          | VDD_DIG   | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 2                                                                                                           | VDD_PA    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 3                                                                                                           | VDD_TX    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 32                                                                                                          | VDD_TX    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 12                                                                                                          | VDD_IO    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 17                                                                                                          | VDD_EXT   | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 18                                                                                                          | VDD_LX    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 19                                                                                                          | VDD_SENSE | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 13                                                                                                          | VDD_IO_5V | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 16                                                                                                          | VBAT      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 1                                                                                                           | ANT       | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 30                                                                                                          | HXTAL1    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 31                                                                                                          | HXTAL2    | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 4                                                                                                           | PA11      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 5                                                                                                           | PA12      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 6                                                                                                           | PA13      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 7                                                                                                           | PA19      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 8                                                                                                           | PA20      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 9                                                                                                           | PA21      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 10                                                                                                          | PA22      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 11                                                                                                          | PA23      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 20                                                                                                          | PB06      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 21                                                                                                          | PB05      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 22                                                                                                          | PB04      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 23                                                                                                          | PB07      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 24                                                                                                          | PB03      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 25                                                                                                          | PB02      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 15                                                                                                          | CHIP_PWD  | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 26                                                                                                          | PB15      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 27                                                                                                          | PB14      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 28                                                                                                          | PB01      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |
| 29                                                                                                          | PB00      | -4.0kV            | IV Pass | -4.0kV            | IV Pass | /         | /       |

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# Reliability Test Report

## Appendix 1 Equipment List

| No. | Equipment and instrument | Serial No. | Due date   | Test item |
|-----|--------------------------|------------|------------|-----------|
| 1   | ZapMaster Mk.2 TE        | 1911214    | 2022/01/10 | ESD-HBM   |

-----End of Report-----