



## **GR533x Reliability Test Report**

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# Preface

## Purpose

This document introduces GR533x family reliability qualification results, to help users understand the reliability performance of this product.

## Audience

This document is intended for:

- Device user
- Hardware developer
- Tester

## Release Notes

This document is the second release of *GR533x Reliability Test Report*, corresponding to GR533x SoC.

## Revision History

Version	Date	Description
1.0	2024-04-01	Initial release
1.1	2024-09-18	Added CDM test results for GR5330 SoC.

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## 1 Introduction

The Goodix GR533x family is a single-mode, low-power Bluetooth 5.3 System-on-Chip (SoC). This report aims to provide a detailed description of the methods used to verify that the product under test meets Goodix stringent quality and reliability requirements. Each test is described and the results are presented. The evaluations done for this qualification are included in the following sections.

## 2 Reliability Test Items and Results

### 2.1 Electrostatic Discharge: Human Body Model (HBM)

Table 2-1 Test requirements

<b>Reference Standard</b>	ESDA/JEDEC JS-001
<b>Test Parameter</b>	I-V Curve / Function Test
<b>Model</b>	Human Body Model
<b>Test Conditions</b>	RP=1.5 kΩ, C=100 pF Power to Power (+/-) IO to Power (+/-) IO to IO (+/-)
<b>Sample Size</b>	3 units per mode
<b>Accept Criteria</b>	0 Fail

Table 2-2 Test results

Test Point	Result
±2000 V/Class 2	PASS

### 2.2 Electrostatic Discharge: Charged Device Model (CDM)

Table 2-3 Charged Device Model test requirements

<b>Reference Standard</b>	ESDA/JEDEC JS-002
<b>Test Parameter</b>	I-V Curve / Function Test
<b>Model</b>	Charged Device Model
<b>Test Conditions</b>	RP=0 Ω, C=0 pF All pin (+/-) to common ground
<b>Sample Size</b>	3 units per mode
<b>Accept Criteria</b>	0 Fail

Table 2-4 GR5332 Test results

Test Point	Result
±500 V/ Class C2a	PASS

Table 2-5 GR5331/GR5330 Test results

Test Point	Result
±400 V/ Class C1	PASS

## 2.3 Latch Up (LU)

Table 2-6 Latch up test requirements

Reference Standard	JESD-78
Test Parameter	I-V Curve / Function Test
Model	Current / Voltage Trigger
Test Conditions	I Trigger / Over Voltage, Class I
Sample Size	3 units per mode
Accept Criteria	0 Fail

Table 2-7 Test results

Test Point	Result
±200 mA	PASS
1.5*Vcc Max or MSV	PASS

## 2.4 High Temperature Operating Life Test (HTOL)

Table 2-8 Test requirements

Reference Standard	JESD22-A108
Test Parameter	Function Test
Model	Arrhenius model for temperature acceleration factor and voltage $AF = \exp[\gamma_v * (V_{stress} - V_{op})] * \exp\left[\frac{Ea}{K} \left(\frac{1}{T_{op}} - \frac{1}{T_{stress}}\right)\right]$
Test Conditions	125°C, 1000 hrs., VCCmax
Sample Size	77 units*3 Lot
Accept Criteria	0 Fail

Table 2-9 Test results

Time Point	Result		
	Lot1	Lot2	Lot3
168 hrs.	PASS	PASS	PASS

Time Point	Result		
	Lot1	Lot2	Lot3
500 hrs.	PASS	PASS	PASS
1000 hrs.	PASS	PASS	PASS

## 2.5 Pre-Conditioning (Pre-Con)

Table 2-10 Test requirements

Reference Standard	JESD22-A113
Test Parameter	Function Test / Appearance Inspection
Model	None
Test Conditions	Baking 125°C 24hrs.,Soaking 30°C /60% RH 192 hrs.,3x reflow.
Sample Size	75 units*3 Lot
Accept Criteria	0 Fail

Table 2-11 Test results

Time Point	Result		
	Lot1	Lot2	Lot3
Pre-con Over.	PASS	PASS	PASS

## 2.6 Temperature Cycling Test (TCT)

Table 2-12 Test requirements

Reference Standard	JESD22-A104
Test Parameter	Function Test / Appearance Inspection
Model	None
Test Conditions	-65 °C to 150 °C, 500 cycles
Sample Size	25 units*3 Lot
Accept Criteria	0 Fail

Table 2-13 Test results

Time Point	Result		
	Lot1	Lot2	Lot3
500 cycles	PASS	PASS	PASS

## 2.7 Highly Accelerated Temperature and Humidity Stress Test (HAST)

Table 2-14 Test requirements

<b>Reference Standard</b>	JESD22-A110
<b>Test Parameter</b>	Function Test / Appearance Inspection
<b>Model</b>	None
<b>Test Conditions</b>	130 °C, 85% RH, Vcc Max, 96 hrs.
<b>Sample Size</b>	25 units*3 Lot
<b>Accept Criteria</b>	0 Fail

Table 2-15 Test results

Time Point	Result		
	Lot1	Lot2	Lot3
96 hrs.	PASS	PASS	PASS

## 2.8 Unbiased Highly Accelerated Temperature and Humidity Stress Test (UHAST)

Table 2-16 Test requirements

<b>Reference Standard</b>	JESD22-A118
<b>Test Parameter</b>	Function Test / Appearance Inspection
<b>Model</b>	None
<b>Test Conditions</b>	130 °C, 85% RH, 96 hrs.
<b>Sample Size</b>	25 units*3 Lot
<b>Accept Criteria</b>	0 Fail

Table 2-17 Test results

Time Point	Result		
	Lot1	Lot2	Lot3
96 hrs.	PASS	PASS	PASS

## 2.9 High Temperature Storage Test (HTST)

Table 2-18 Test requirements

<b>Reference Standard</b>	JESD22-A103
<b>Test Parameter</b>	Function Test / Appearance Inspection
<b>Model</b>	None
<b>Test Conditions</b>	150 °C, 1000 hrs.

<b>Sample Size</b>	25 units*3 Lot
<b>Accept Criteria</b>	0 Fail

Table 2-19 Test results

<b>Time Point</b>	<b>Result</b>		
	<b>Lot1</b>	<b>Lot2</b>	<b>Lot3</b>
500 hrs.	PASS	PASS	PASS
1000 hrs.	PASS	PASS	PASS