GR5526 Reliability Test Report

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Preface

Purpose

This document introduces GR5526 reliability qualification results, providing users with product reliability performance and reference standard, including device level and package level reliability test results.

Audience

This document is intended for:

- GR5526 user
- GR5526 developer
- Bluetooth product engineer
- Bluetooth system designer

Release Notes

This document is the initial release of *GR5526 Reliability Test Report*, corresponding to GR5526 System-on-Chip (SoC) series.

Revision History

Version	Date	Description
1.0	2023-01-10	Initial release

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1 Overview

The Goodix GR5526 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 the product under test meets Goodix stringent quality and reliability requirements. Each test is described and the results are presented in the following chapter.

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2 Reliability Test Items and Results

2.1 High Temperature Operating Lifetime (HTOL)

Table 2-1 High temperature operating lifetime test requirements

Reference Standard	JESD22-A108
Test Parameter	Function test
Model	Arrhenius model for temperature acceleration factor and voltage $$AF = \exp\left[\beta * \left(V_{stress} - V_{op}\right)\right] * \exp\left[\frac{Ea}{K}\left(\frac{1}{T_{op}} - \frac{1}{T_{stress}}\right)\right]$$
Test Conditions	Tj = 125°C, 1000 hrs, VCCmax
Sample Size	77 ea x 2 lots
Criteria	Pass/Fail = 0/1

Table 2-2 Test results

Test Point	**Result**	
	Lot 1	**Lot 2**
168 hrs	Pass	Pass
500 hrs	Pass	Pass
1000 hrs	Pass	Pass

2.2 Electrostatic Discharge: Human Body Model (HBM)

Table 2-3 ESD human body model test requirements

Reference Standard	ESDA/JEDEC JS-001
Test Parameter	I-V curve/Function test
Model	Human body model
Test Conditions	RP = 1.5 kΩ, C = 100 pF
Sample Size	3 ea. per mode
Criteria	Pass/Fail = 0/1

Table 2-4 Test results

HBM Sensitivity	**Class**	**All Pin Combination**
+/-2000 V	2	Power to power (+/-) IO to power (+/-) IO to IO (+/-)

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2.3 Electrostatic Discharge: Charged Device Model (CDM)

Table 2-5 ESD charged device model test requirements

Reference Standard	ESDA/JEDEC JS-002
Test Parameter	I-V curve/Function test
Model	Charged device model
Test Conditions	RP = 0 Ω, C = 0 pF
Sample Size	3 ea. per mode
Criteria	Pass/Fail = 0/1

Table 2-6 Test results

CDM Sensitivity	Class	All Pin Combination
+/- 500 V	C2a	All pins (+/-) to common ground

2.4 Latch Up (LU)

Table 2-7 Latch up test requirements

Reference Standard	JESD-78
Test Parameter	I-V curve/Function test
Model	Current/Voltage trigger
Test Conditions	+/-200 mA trigger/over voltage
Sample Size	3 ea. per mode
Criteria	Pass/Fail = 0/1

Table 2-8 Test results

Latch Up Sensitivity	Class	All Pin Combination
+/-200 mA trigger	I	I trigger
1.5 VCC over voltage		Over voltage test

2.5 Pre-Conditioning (Pre-Con)

Table 2-9 Pre-conditioning test requirements

Reference Standard	JESD22-A113
Test Parameter	Function test/Appearance inspection
Model	None
Test Conditions	3x reflow, 30°C/60% RH, 192 hrs.
Sample Size	154 ea x 1 lot, 50 ea x 2 lots

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Criteria	Pass/Fail = 0/1

Table 2-10 Test results

Test Point	Result		
	Lot 1	Lot 2	Lot 3
Pre-con	Pass	Pass	Pass

2.6 Temperature Cycling Test (TCT)

Table 2-11 Temperature cycling 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	77 ea x 1 lot, 25 ea x 2 lots
Criteria	Pass/Fail = 0/1

Table 2-12 Test results

Test Point	Result		
	Lot 1	Lot 2	Lot 3
500 cycles	Pass	Pass	Pass

2.7 High Temperature Storage Test (HTST)

Table 2-13 High temperature storage test requirements

Reference Standard	JESD22-A103
Test Parameter	Function test
Model	None
Test Conditions	150°C, 500 hrs.
Sample Size	77 ea x 1 lot, 25 ea x 2 lots
Criteria	Pass/Fail = 0/1

Table 2-14 Test results

Test Point	Result		
	Lot 1	Lot 2	Lot 3
500 hrs	Pass	Pass	Pass

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

Table 2-15 Unbiased highly accelerated temperature and humidity stress test requirements

Reference Standard	JESD22-A118
Test Parameter	Function test/Appearance inspection
Model	None
Test Conditions	130°C, 85% RH, 96 hrs
Sample Size	77 ea x 1 lot, 25 ea x 2 lots
Criteria	Pass/Fail = 0/1

Table 2-16 Test results

Test Point	**Result**		
	Lot 1	**Lot 2**	**Lot 3**
96 hrs	Pass	Pass	Pass

2.9 Biased Highly Accelerated Temperature and Humidity Stress Test (BHAST)

Table 2-17 Biased highly accelerated temperature and humidity stress test requirements

Reference Standard	JESD22-A118
Test Parameter	Function test/Appearance inspection
Model	None
Test Conditions	130°C, 85% RH, VCCmax, 96 hrs
Sample Size	77 ea x 1 lot, 25 ea x 2 lots
Criteria	Pass/Fail = 0/1

Table 2-18 Test results

Test Point	**Result**		
	Lot 1	**Lot 2**	**Lot 3**
96 hrs	Pass	Pass	Pass

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