# **FCC RF Test Report**

APPLICANT : CHEP

**EQUIPMENT**: Asset Tracker

BRAND NAME : CHEP

MODEL NAME : Gen 4 Ultra Short

FCC ID : 2APRD-GEN4SHORT

STANDARD : FCC Part 15 Subpart C §15.247

CLASSIFICATION : (DTS) Digital Transmission System

TEST DATE(S) : Jul. 29, 2024 ~ Jul. 30, 2024

We, Sporton International Inc. (Shenzhen), would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Shenzhen), the test report shall not be reproduced except in full.

JasonJia

Approved by: Jason Jia





Report No.: FR470213A

# Sporton International Inc. (ShenZhen)

1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055

People's Republic of China

Sporton International Inc. (ShenZhen)

TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number : 1 of 40
Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

# **TABLE OF CONTENTS**

RE۱	/ISIOI	N HISTORY	3
SUI	MMAR	Y OF TEST RESULT	4
1	GENE	ERAL DESCRIPTION	5
	1.1	Applicant	5
	1.2	Manufacturer	5
	1.3	Product Feature of Equipment Under Test	5
	1.4	Product Specification of Equipment Under Test	5
	1.5	Modification of EUT	5
	1.6	Testing Location	6
	1.7	Test Software	6
	1.8	Applicable Standards	6
2	TEST	CONFIGURATION OF EQUIPMENT UNDER TEST	7
	2.1	Carrier Frequency Channel	7
	2.2	Test Mode	8
	2.3	Connection Diagram of Test System	9
	2.4	EUT Operation Test Setup	9
	2.5	Measurement Results Explanation Example	9
3	TEST	RESULT	10
	3.1	6dB and 99% Bandwidth Measurement	10
	3.2	Output Power Measurement	17
	3.3	Power Spectral Density Measurement	18
	3.4	Conducted Band Edges and Spurious Emission Measurement	25
	3.5	Radiated Band Edges and Spurious Emission Measurement	34
	3.6	Antenna Requirements	38
4	LIST	OF MEASURING EQUIPMENT	39
5	MEAS	SUREMENT UNCERTAINTY	40
APF	PENDI	IX A. CONDUCTED TEST RESULTS	
APF	PENDI	IX B. RADIATED SPURIOUS EMISSION	
APF	PENDI	IX C. DUTY CYCLE PLOTS	
APF	PENDI	IX D. SETUP PHOTOGRAPHS	

TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number : 2 of 40
Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

Report No. : FR470213A

# **REVISION HISTORY**

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR470213A	Rev. 01	Initial issue of report	Aug. 23, 2024

Sporton International Inc. (ShenZhen)

TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number : 3 of 40
Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

Report No. : FR470213A

### SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	1 15.247(a)(2) 6dB Bandwidth		≥ 0.5MHz	Pass	-
3.1	-	99% Bandwidth	-	Pass	-
3.2	15.247(b)(3)	Peak Output Power	≤ 30dBm	Pass	-
3.3	15.247(e)	Power Spectral Density	≤ 8dBm/3kHz	Pass	-
3.4	15.247(d)	Conducted Band Edges and Spurious Emission	≤ 20dBc	Pass	-
3.5	15.247(d)	Radiated Band Edges and Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 11.78 dB at 2496.12 MHz
-	15.207	AC Conducted Emission	15.207(a)	Not Applicable	Not connect to AC Mains
3.6	15.203 & 15.247(b)	Antenna Requirement	15.203 & 15.247(b)	Pass	-

#### **Conformity Assessment Condition:**

- The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or
  in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of
  non-compliance that may potentially occur if measurement uncertainty is taken into account.
- 2. The measurement uncertainty please refer to each test result in the section "Measurement Uncertainty"

#### Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

Sporton International Inc. (ShenZhen)

TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number : 4 of 40
Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

Report No.: FR470213A

# 1 General Description

# 1.1 Applicant

#### **CHEP**

2901 Tasman Drive Suite 101 Santa Clara, CA 95054

#### 1.2 Manufacturer

#### MINEWING VIET NAM ELECTRONICS CO., LTD

Lot CN2, Yen Phong industrial park, Dong Phong commune and, Long Chau commune, Yen Phong District, Bac Ninh province, Vietnam

Report No.: FR470213A

# 1.3 Product Feature of Equipment Under Test

Product Feature				
Equipment	Asset Tracker			
Brand Name	CHEP			
Model Name	Gen 4 Ultra Short			
FCC ID	2APRD-GEN4SHORT			
IMEI Code	Conducted: 866901063561692 Radiation: 866901066268204			
HW Version	v14			
SW Version	v10.00.0002			
EUT Stage	Production Unit			

**Remark:** The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

# 1.4 Product Specification of Equipment Under Test

Standards-related Product Specification			
Tx/Rx Frequency Range	2402 MHz ~ 2480 MHz		
Number of Channels	40		
Carrier Frequency of Each Channel	40 Channel (37 hopping + 3 advertising channel)		
Maximum Output Power to Antenna	BLE 1Mbps: -8.86 dBm (0.0001 W)		
Maximum Output Fower to Antenna	BLE 2Mbps: -8.88 dBm (0.0001 W)		
99% Occupied Bandwidth	BLE 1Mbps: 1.045 MHz		
39 % Occupied Baildwidth	BLE 2Mbps: 2.042 MHz		
Antenna Type / Gain	Chip Antenna with gain 2.8 dBi		
Type of Modulation	Bluetooth LE : GFSK		

### 1.5 Modification of EUT

No modifications are made to the EUT during all test items.

 Sporton International Inc. (ShenZhen)
 Page Number
 : 5 of 40

 TEL: +86-755-8637-9589
 Report Issued Date
 : Aug. 23, 2024

 FAX: +86-755-8637-9595
 Report Version
 : Rev. 01

FCC ID: 2APRD-GEN4SHORT Report Template No.: BU5-FR15CBT4.0 Version 2.0

# 1.6 Testing Location

Sporton International Inc. (ShenZhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Report No.: FR470213A

Test Firm	Sporton International Inc. (ShenZhen)				
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595				
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.		
	TH01-SZ	CN1256	421272		

Test Firm	Sporton International Inc. (ShenZhen)			
Test Site Location	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City, Guangdong Province 518103 People's Republic of China TEL: +86-755-86066985			
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.	
	03CH03-SZ	CN1256	421272	

#### 1.7 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH03-SZ	AUDIX	E3	6.2009-8-24

# 1.8 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 15 Subpart C §15.247
- FCC KDB 558074 D01 15.247 Meas Guidance v05r02
- ANSI C63.10-2013

#### Remark:

- All test items were verified and recorded according to the standards and without any deviation during the test.
- 2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

 Sporton International Inc. (ShenZhen)
 Page Number
 : 6 of 40

 TEL: +86-755-8637-9589
 Report Issued Date
 : Aug. 23, 2024

 FAX: +86-755-8637-9595
 Report Version
 : Rev. 01

FCC ID: 2APRD-GEN4SHORT Report Template No.: BU5-FR15CBT4.0 Version 2.0

# 2 Test Configuration of Equipment Under Test

# 2.1 Carrier Frequency Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
	0	2402	21	2444
	1	2404	22	2446
	2	2406	23	2448
	3	2408	24	2450
	4	2410	25	2452
	5	2412	26	2454
	6	2414	27	2456
	7	2416	28	2458
	8	2418	29	2460
	9	2420	30	2462
2400-2483.5 MHz	10	2422	31	2464
	11	2424	32	2466
	12	2426	33	2468
	13	2428	34	2470
	14	2430	35	2472
	15	2432	36	2474
	16	2434	37	2476
	17	2436	38	2478
	18	2438	39	2480
	19	2440	-	-
	20	2442	-	-

TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number : 7 of 40
Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

Report No.: FR470213A

### 2.2 Test Mode

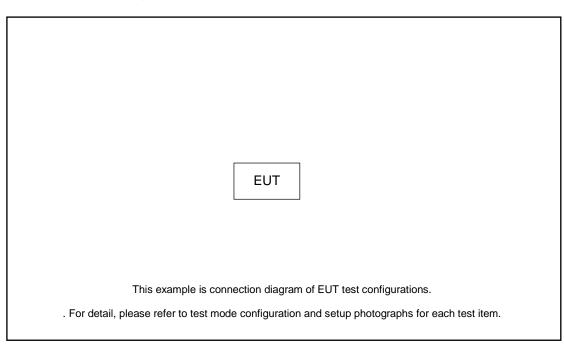
- a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (X plane) were recorded in this report.
- b. The following summary table is showing all test modes to demonstrate in compliance with the standard.

	Summary table of Test Cases				
Test Item	Data Rate / Modulation				
rest item	Bluetooth – LE / GFSK				
	Mode 1: Bluetooth Tx CH00_2402 MHz_BLE 1Mbps				
	Mode 2: Bluetooth Tx CH19_2440 MHz_BLE 1Mbps				
Conducted	Mode 3: Bluetooth Tx CH39_2480 MHz_BLE 1Mbps				
TCs	Mode 4: Bluetooth Tx CH00_2402 MHz _BLE 2Mbps				
	Mode 5: Bluetooth Tx CH19_2440 MHz _BLE 2Mbps				
	Mode 6: Bluetooth Tx CH39_2480 MHz _BLE 2Mbps				
	Mode 1: Bluetooth Tx CH00_2402 MHz_BLE 1Mbps				
	Mode 2: Bluetooth Tx CH19_2440 MHz_BLE 1Mbps				
Radiated	Mode 3: Bluetooth Tx CH39_2480 MHz_BLE 1Mbps				
TCs	Mode 4: Bluetooth Tx CH00_2402 MHz _BLE 2Mbps				
	Mode 5: Bluetooth Tx CH19_2440 MHz _BLE 2Mbps				
	Mode 6: Bluetooth Tx CH39_2480 MHz _BLE 2Mbps				

TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number : 8 of 40
Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

Report No.: FR470213A

# 2.3 Connection Diagram of Test System



## 2.4 EUT Operation Test Setup

For BLE function, the engineering test program was provided and enabled to make EUT continuous transmit.

# 2.5 Measurement Results Explanation Example

#### For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

#### Example:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 1.30 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).  
= 
$$1.30 + 10 = 11.30$$
 (dB)

Report No.: FR470213A

## 3 Test Result

#### 3.1 6dB and 99% Bandwidth Measurement

#### 3.1.1 Limit of 6dB and 99% Bandwidth

The minimum 6 dB bandwidth shall be at least 500 kHz.

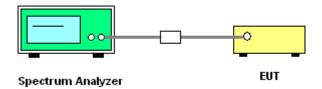
### 3.1.2 Measuring Instruments

The section 4.0 of List of Measuring Equipment of this test report is used for test.

#### 3.1.3 Test Procedures

- 1. The testing follows ANSI C63.10-2013 clause 11.8
- 2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 3. Set to the maximum power setting and enable the EUT transmit continuously.
- 4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 kHz.
- 5. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1% to 5% of the 99% OBW and the VBW is set to 3 times of the RBW.
- Measure and record the results in the test report.

#### 3.1.4 Test Setup



TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number : 10 of 40
Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

Report No.: FR470213A

#### 3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.

#### **BLE 1Mbps**

#### 6 dB Bandwidth Plot on Channel 00



Date: 30.JUL.2024 15:38:33

#### 6 dB Bandwidth Plot on Channel 19



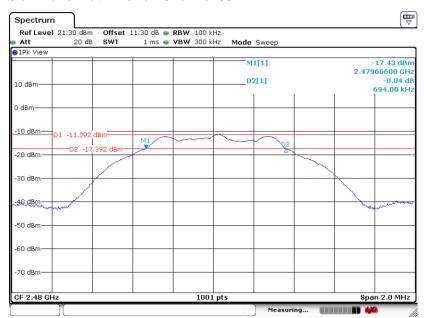
Date: 30.JUL.2024 15:36:05

Sporton International Inc. (ShenZhen)

TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number : 11 of 40
Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

Report No.: FR470213A

#### 6 dB Bandwidth Plot on Channel 39



Date: 30.JUL.2024 15:34:20

#### **BLE 2Mbps**

#### 6 dB Bandwidth Plot on Channel 00



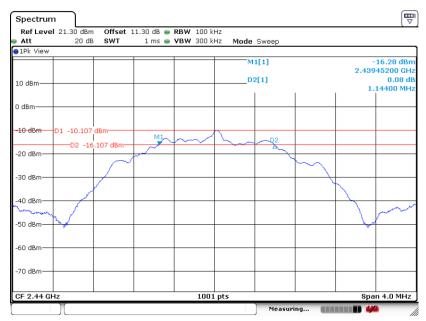
Date: 30.JUL.2024 15:30:31

Sporton International Inc. (ShenZhen)

TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number : 12 of 40
Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

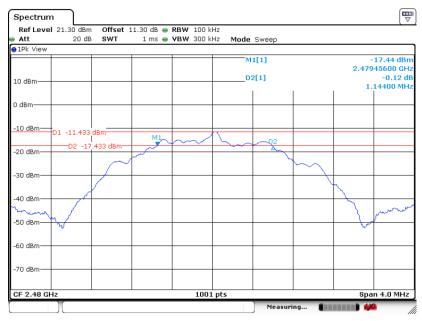
Report No.: FR470213A

#### 6 dB Bandwidth Plot on Channel 19



Date: 30.JUL.2024 15:24:53

#### 6 dB Bandwidth Plot on Channel 39



Date: 30.JUL.2024 15:02:24

Sporton International Inc. (ShenZhen)

TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number : 13 of 40
Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

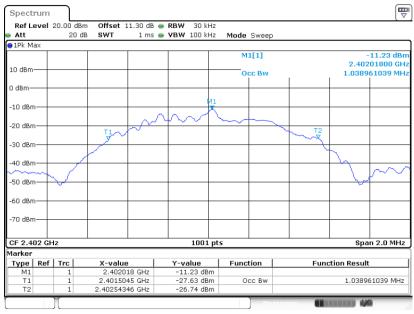
Report No.: FR470213A

#### 3.1.6 Test Result of 99% Occupied Bandwidth

Please refer to Appendix A.

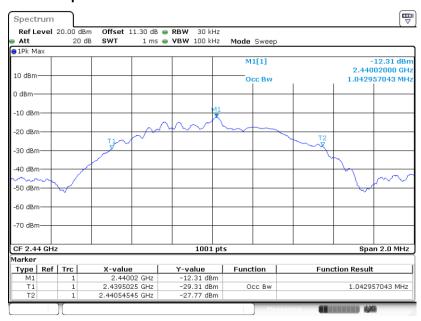
#### **BLE 1Mbps**

#### 99% Occupied Bandwidth Plot on Channel 00



Date: 30.JUL.2024 15:38:23

#### 99% Occupied Bandwidth Plot on Channel 19



Date: 30.JUL.2024 15:35:55

Sporton International Inc. (ShenZhen)

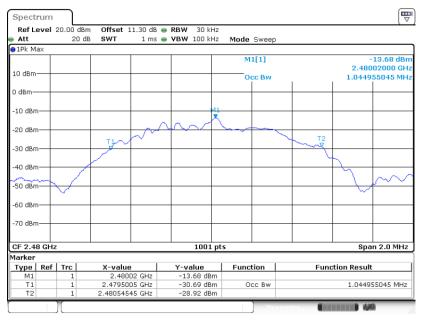
TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number : 14 of 40 Report Issued Date: Aug. 23, 2024

Report No.: FR470213A

: Rev. 01 Report Version



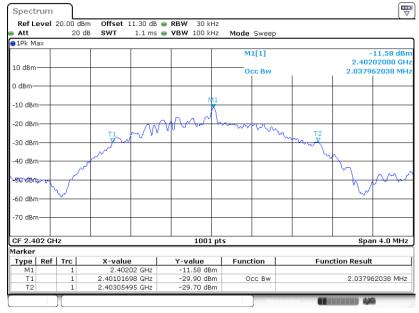
#### 99% Occupied Bandwidth Plot on Channel 39



Date: 30.JUL.2024 15:34:10

#### **BLE 2Mbps**

#### 99% Occupied Bandwidth Plot on Channel 00



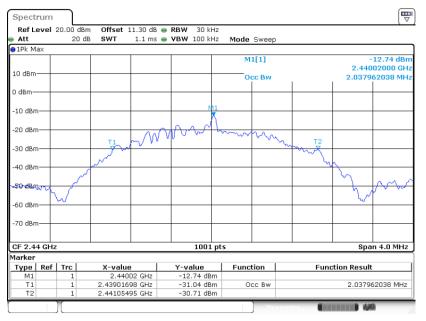
Date: 30.JUL.2024 15:30:16

Sporton International Inc. (ShenZhen)

TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number : 15 of 40 Report Issued Date: Aug. 23, 2024 Report Version : Rev. 01

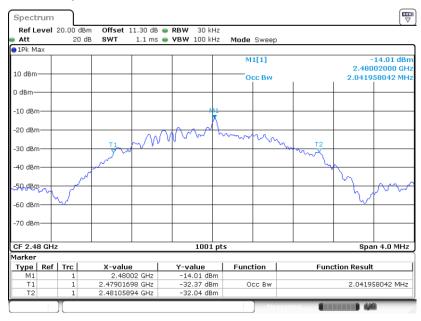
Report No.: FR470213A

#### 99% Occupied Bandwidth Plot on Channel 19



Date: 30.JUL.2024 15:04:38

#### 99% Occupied Bandwidth Plot on Channel 39



Date: 30.JUL.2024 15:02:13

Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

Sporton International Inc. (ShenZhen)

TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number : 16 of 40
Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

Report No.: FR470213A

# 3.2 Output Power Measurement

### 3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna of directional gain greater than 6dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

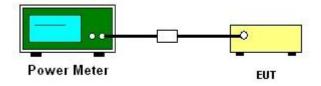
#### 3.2.2 Measuring Instruments

The section 4.0 of List of Measuring Equipment of this test report is used for test.

#### 3.2.3 Test Procedures

- The testing follows the Measurement Procedure of ANSI C63.10-2013 clause 11.9.1.3 PKPM1 Peak power meter or ANSI C63.10-2013 clause 11.9.2.3.1 Method AVGPM method.
- 2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 3. Set to the maximum power setting and enable the EUT transmit continuously.
- 4. Measure the conducted output power and record the results in the test report.

#### 3.2.4 Test Setup



#### 3.2.5 Test Result of Peak Output Power

Please refer to Appendix A.

#### 3.2.6 Test Result of Average Output Power (Reporting Only)

Please refer to Appendix A.

TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number : 17 of 40 Report Issued Date: Aug. 23, 2024 Report Version : Rev. 01

Report No.: FR470213A

## 3.3 Power Spectral Density Measurement

### 3.3.1 Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.

### 3.3.2 Measuring Instruments

The section 4.0 of List of Measuring Equipment of this test report is used for test.

#### 3.3.3 Test Procedures

- The testing follows Measurement Procedure of ANSI C63.10-2013 clause 11.10.2 Method PKPSD.
- 2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 3. Set to the maximum power setting and enable the EUT transmit continuously.
- 4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)
- 5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.
- 6. Measure and record the results in the test report.
- 7. The Measured power density (dBm)/ 100kHz is a reference level and used as 20dBc down limit line for Conducted Band Edges and Conducted Spurious Emission.

#### 3.3.4 Test Setup



#### 3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

Sporton International Inc. (ShenZhen)

TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number : 18 of 40
Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

Report No.: FR470213A

## 3.3.6 Test Result of Power Spectral Density Plots (100kHz)

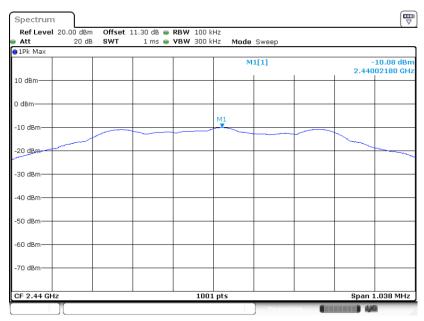
#### **BLE 1Mbps**

#### PSD 100kHz Plot on Channel 00



Date: 30.JUL.2024 15:38:58

#### PSD 100kHz Plot on Channel 19



Date: 30.JUL.2024 15:36:38

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TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number : 19 of 40
Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

Report No.: FR470213A

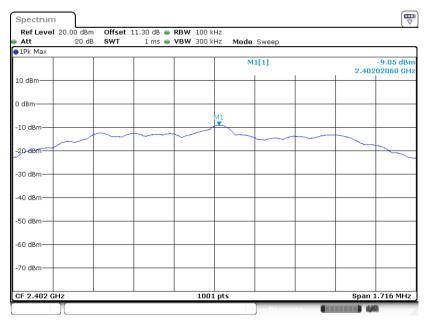
#### PSD 100kHz Plot on Channel 39



Date: 30.JUL.2024 15:34:45

#### **BLE 2Mbps**

#### PSD 100kHz Plot on Channel 00



Date: 30.JUL.2024 15:31:00

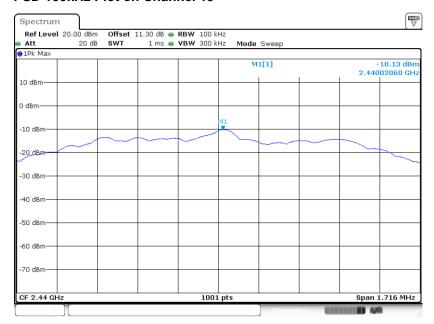
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TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number : 20 of 40 Report Issued Date: Aug. 23, 2024

Report No.: FR470213A

Report Version : Rev. 01

#### **PSD 100kHz Plot on Channel 19**



Date: 30.JUL.2024 15:25:27

#### PSD 100kHz Plot on Channel 39



Date: 30.JUL.2024 15:02:51

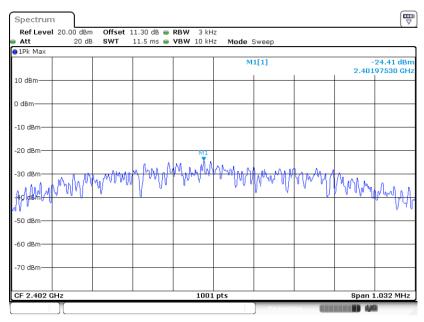
TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number : 21 of 40
Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

Report No.: FR470213A

## 3.3.7 Test Result of Power Spectral Density Plots (3kHz)

### **BLE 1Mbps**

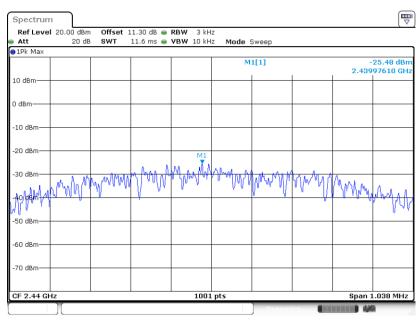
#### PSD 3kHz Plot on Channel 00



Report No.: FR470213A

Date: 30.JUL.2024 15:38:42

#### **PSD 3kHz Plot on Channel 19**



Date: 30.JUL.2024 15:36:18

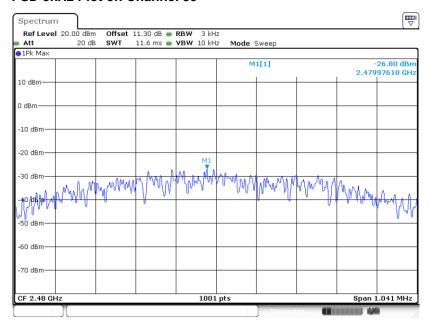
 Sporton International Inc. (ShenZhen)
 Page Number
 : 22 of 40

 TEL: +86-755-8637-9589
 Report Issued Date
 : Aug. 23, 2024

 FAX: +86-755-8637-9595
 Report Version
 : Rev. 01

FCC ID: 2APRD-GEN4SHORT Report Template No.: BU5-FR15CBT4.0 Version 2.0

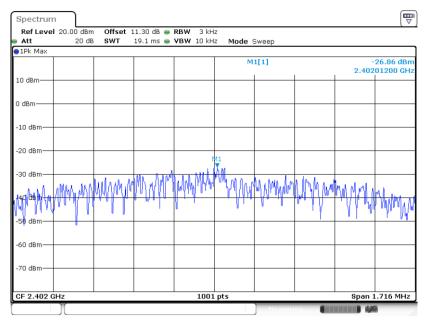
#### PSD 3kHz Plot on Channel 39



Date: 30.JUL.2024 15:34:29

#### **BLE 2Mbps**

#### PSD 3kHz Plot on Channel 00



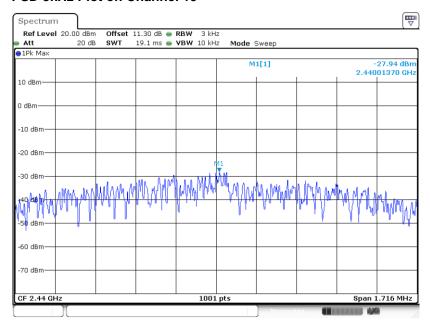
Date: 30.JUL.2024 15:30:41

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Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

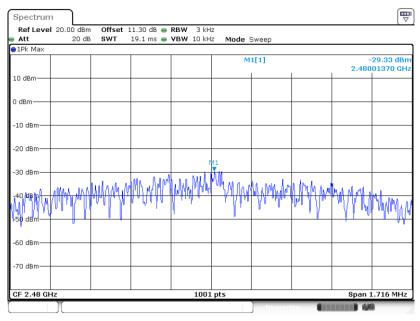
Report No.: FR470213A

#### **PSD 3kHz Plot on Channel 19**



Date: 30.JUL.2024 15:25:08

#### PSD 3kHz Plot on Channel 39



Date: 30.JUL.2024 15:02:35

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TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number : 24 of 40
Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

Report No.: FR470213A

# 3.4 Conducted Band Edges and Spurious Emission Measurement

#### 3.4.1 Limit of Conducted Band Edges and Spurious Emission

All harmonics/spurious must be at least 20 dB down from the highest emission level within the authorized band.

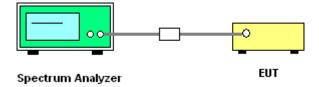
### 3.4.2 Measuring Instruments

The section 4.0 of List of Measuring Equipment of this test report is used for test.

#### 3.4.3 Test Procedure

- 1. The testing follows ANSI C63.10-2013 clause 11.13
- 2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 3. Set to the maximum power setting and enable the EUT transmit continuously.
- 4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
- 5. Measure and record the results in the test report.
- 6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

#### 3.4.4 Test Setup



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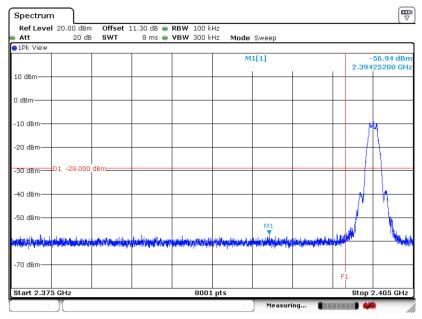
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Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

Report No.: FR470213A

## 3.4.5 Test Result of Conducted Band Edges Plots

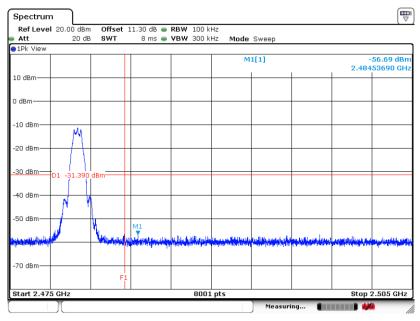
## **BLE 1Mbps**

#### Low Band Edge Plot on Channel 00



Date: 30.JUL.2024 15:39:50

#### **High Band Edge Plot on Channel 39**



Date: 30.JUL.2024 15:35:32

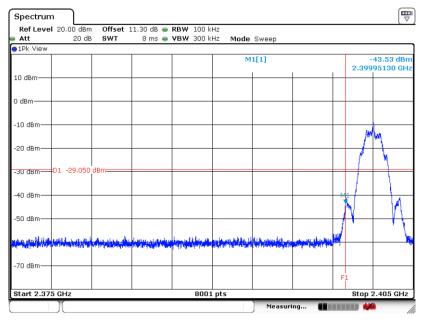
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Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

Report No.: FR470213A

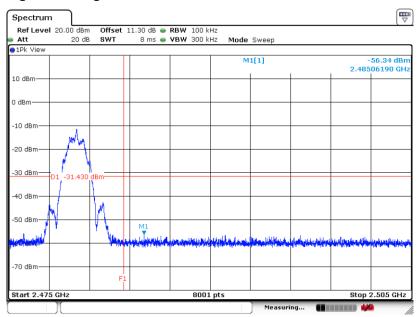
#### **BLE 2Mbps**

#### Low Band Edge Plot on Channel 00



Date: 30.JUL.2024 15:33:09

#### **High Band Edge Plot on Channel 39**



Date: 30.JUL.2024 15:04:04

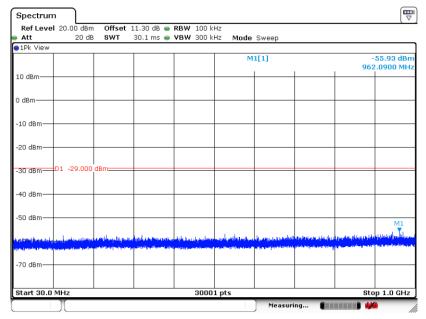
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TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number : 27 of 40
Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

Report No.: FR470213A

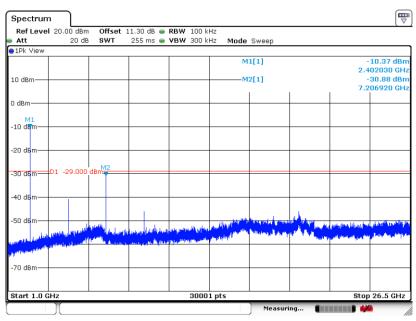
### 3.4.6 Test Result of Conducted Spurious Emission Plots

# Conducted Spurious Emission Plot on Bluetooth LE 1Mbps GFSK Channel 00



Date: 30.JUL.2024 15:39:15

# Conducted Spurious Emission Plot on Bluetooth LE 1Mbps GFSK Channel 00



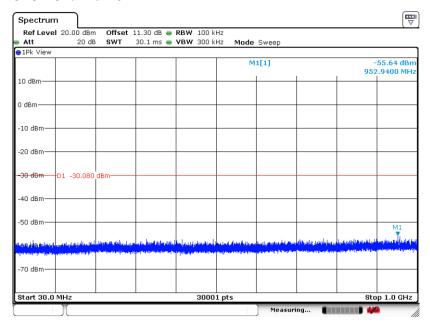
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TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number : 28 of 40
Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

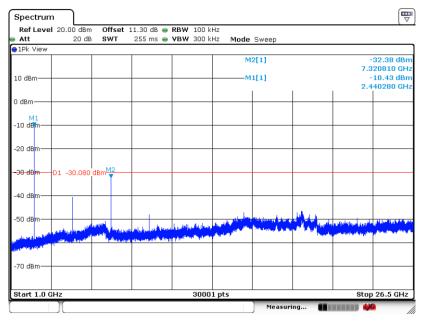
Report No.: FR470213A

# Conducted Spurious Emission Plot on Bluetooth LE 1Mbps GFSK Channel 19



Date: 30.JUL.2024 15:36:57

# Conducted Spurious Emission Plot on Bluetooth LE 1Mbps GFSK Channel 19



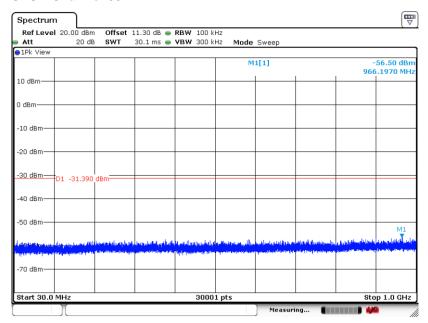
Date: 30.JUL.2024 15:37:43

Sporton International Inc. (ShenZhen)

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Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

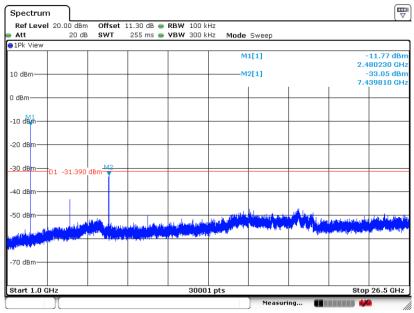
Report No.: FR470213A

# Conducted Spurious Emission Plot on Bluetooth LE 1Mbps GFSK Channel 39



Date: 30.JUL.2024 15:35:01

# Conducted Spurious Emission Plot on Bluetooth LE 1Mbps GFSK Channel 39



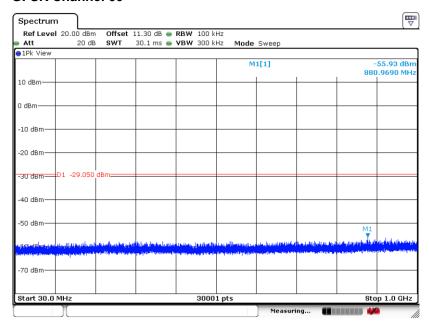
Date: 30.JUL.2024 15:35:20

Sporton International Inc. (ShenZhen)

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Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

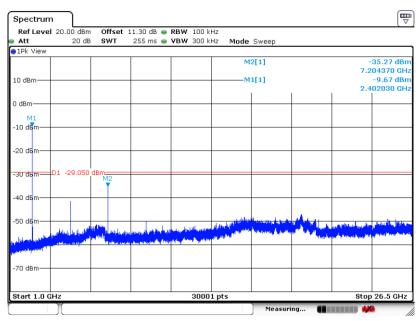
Report No.: FR470213A

# Conducted Spurious Emission Plot on Bluetooth LE 2Mbps GFSK Channel 00



Date: 30.JUL.2024 15:31:17

# Conducted Spurious Emission Plot on Bluetooth LE 2Mbps GFSK Channel 00



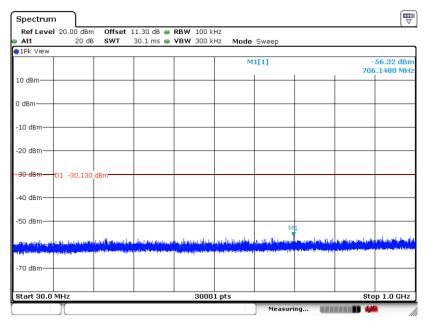
Date: 30.JUL.2024 15:32:59

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TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number : 31 of 40
Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

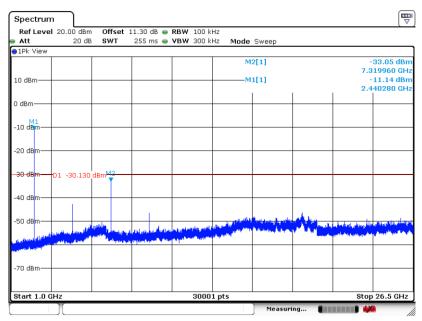
Report No.: FR470213A

# Conducted Spurious Emission Plot on Bluetooth LE 2Mbps GFSK Channel 19



Date: 30.JUL.2024 15:28:48

## Conducted Spurious Emission Plot on Bluetooth LE 2Mbps GFSK Channel 19



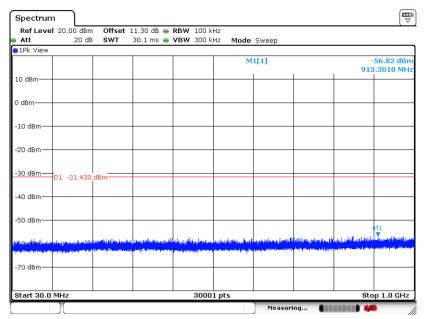
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Sporton International Inc. (ShenZhen)

TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number : 32 of 40
Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

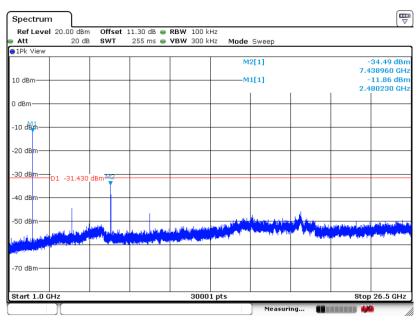
Report No.: FR470213A

# Conducted Spurious Emission Plot on Bluetooth LE 2Mbps GFSK Channel 39



Date: 30.JUL.2024 15:03:07

## Conducted Spurious Emission Plot on Bluetooth LE 2Mbps GFSK Channel 39



Date: 30.JUL.2024 15:03:54

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TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number : 33 of 40
Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

Report No.: FR470213A

# 3.5 Radiated Band Edges and Spurious Emission Measurement

#### 3.5.1 Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

Frequency	Field Strength	Measurement Distance
(MHz)	(microvolts/meter)	(meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

### 3.5.2 Measuring Instruments

The section 4.0 of List of Measuring Equipment of this test report is used for test.

Sporton International Inc. (ShenZhen)

TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number : 34 of 40
Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

Report No.: FR470213A

#### 3.5.3 Test Procedures

- 1. The testing follows ANSI C63.10-2013 clause 11.11 & 11.12
- 2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.

Report No.: FR470213A

- 3. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
- 4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
- 5. Corrected Reading: Antenna Factor + Cable Loss + Read Level Preamp Factor = Level
- 6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
- 7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than peak limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
- 8. Use the following spectrum analyzer settings:
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Set RBW=100 kHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
  - (3) Set RBW = 1 MHz, VBW= 3MHz for  $f \ge 1$  GHz for peak measurement. For average measurement:
    - VBW = 10 Hz, when duty cycle is no less than 98 percent.
    - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

 Sporton International Inc. (ShenZhen)
 Page Number
 : 35 of 40

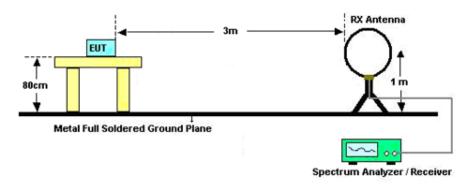
 TEL: +86-755-8637-9589
 Report Issued Date
 : Aug. 23, 2024

 FAX: +86-755-8637-9595
 Report Version
 : Rev. 01

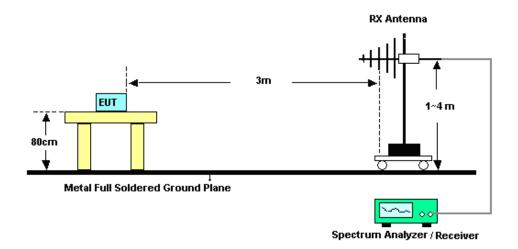
FCC ID: 2APRD-GEN4SHORT Report Template No.: BU5-FR15CBT4.0 Version 2.0

## 3.5.4 Test Setup

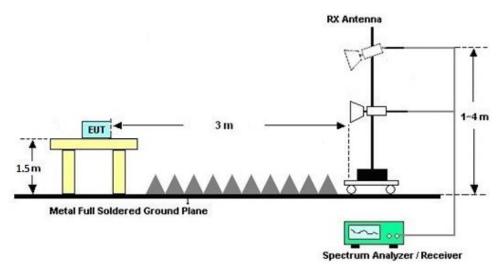
#### For radiated emissions below 30MHz



#### For radiated emissions from 30MHz to 1GHz



#### For radiated emissions above 1GHz



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TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number : 36 of 40
Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

Report No.: FR470213A

#### 3.5.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

Report No.: FR470213A

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

#### 3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix B.

#### 3.5.7 Duty Cycle

Please refer to Appendix C.

# 3.5.8 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic or 40GHz, whichever is lower)

Please refer to Appendix B.

Sporton International Inc. (ShenZhen)

TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number : 37 of 40
Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

#### 3.6 Antenna Requirements

#### 3.6.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

#### 3.6.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

#### 3.6.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

Sporton International Inc. (ShenZhen)

TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number : 38 of 40
Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

Report No.: FR470213A

## 4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Test Receiver&SA	KEYSIGHT	N9038A	MY54450083	20Hz~8.4GHz	Apr. 09, 2024	Jul. 29, 2024~ Jul. 30, 2024	Apr. 08, 2025	Radiation (03CH03-SZ)
EXA Spectrum Anaiyzer	KEYSIGHT	N9010A	MY55150246	10Hz~44GHz;	Apr. 09, 2024	Jul. 29, 2024~ Jul. 30, 2024	Apr. 08, 2025	Radiation (03CH03-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	Jul. 28, 2024	Jul. 29, 2024~ Jul. 30, 2024	Jul. 27, 2025	Radiation (03CH03-SZ)
Bilog Antenna	TeseQ	CBL6112D	35408	30MHz-2GHz	Aug. 20, 2023	Jul. 29, 2024~ Jul. 30, 2024	Aug. 19, 2025	Radiation (03CH03-SZ)
Double Ridge Horn Antenna	SCHWARZBE CK	BBHA9120D	9120D-1355	1GHz~18GHz	Apr. 09, 2024	Jul. 29, 2024~ Jul. 30, 2024	Apr. 08, 2025	Radiation (03CH03-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Apr. 09, 2024	Jul. 29, 2024~ Jul. 30, 2024	Apr. 08, 2025	Radiation (03CH03-SZ)
Amplifier	Burgeon	BPA-530	102211	0.01Hz ~3000MHz	Oct. 18, 2023	Jul. 29, 2024~ Jul. 30, 2024	Oct. 17, 2024	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	AMF-7D-0010 1800-30-10P- R	1943528	1GHz~18GHz	Oct. 18, 2023	Jul. 29, 2024~ Jul. 30, 2024	Oct. 17, 2024	Radiation (03CH03-SZ)
Amplifier	Agilent Technologies	83017A	MY39501302	500MHz~26.5GH z	Dec. 27, 2023	Jul. 29, 2024~ Jul. 30, 2024	Dec. 26, 2024	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	TTA1840-35- HG	1871923	18GHz~40GHz	Jul. 03, 2024	Jul. 29, 2024~ Jul. 30, 2024	Jul. 02, 2025	Radiation (03CH03-SZ)
AC Power Source	Chroma	61601	6160100027 29	N/A	Oct. 18, 2023	Jul. 29, 2024~ Jul. 30, 2024	Oct. 17, 2024	Radiation (03CH03-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Jul. 29, 2024~ Jul. 30, 2024	NCR	Radiation (03CH03-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Jul. 29, 2024~ Jul. 30, 2024	NCR	Radiation (03CH03-SZ)
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	Apr. 09, 2024	Jul. 30, 2024	Apr. 08, 2025	Conducted (TH01-SZ)
Pulse Power Senor	Anritsu	MA2411B	1339473	30MHz~40GHz	Dec. 29, 2023	Jul. 30, 2024	Dec. 28, 2024	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	50MHz Bandwidth	Aug. 21, 2023	Jul. 30, 2024	Aug. 20, 2024	Conducted (TH01-SZ)
Thermo meter	Anymetre	JR593	#7	- 10℃ ~ 50℃ 10%RH~99%RH	Apr. 09, 2024	Jul. 30, 2024	Apr. 08, 2025	Conducted (TH01-SZ)

NCR: No Calibration Required

Sporton International Inc. (ShenZhen)

TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number : 39 of 40
Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

Report No.: FR470213A

### 5 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

#### **Uncertainty of Conducted Measurement**

Test Item	Uncertainty
Conducted Spurious Emission & Bandedge	±1.34 dB
Occupied Channel Bandwidth	±0.012 MHz
Conducted Power	±1.34 dB
Conducted Power Spectral Density	±1.32 dB
Frequency	±1.3 Hz

#### <u>Uncertainty of Radiated Emission Measurement (9 KHz ~ 30 MHz)</u>

Measuring Uncertainty for a Level of Confidence	5.0 dB
of 95% (U = 2Uc(y))	5.0 dB

#### **Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)**

Measuring Uncertainty for a Level of Confidence	
of 95% (U = 2Uc(y))	5.0 dB

#### Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence	4.0.40
of 95% (U = 2Uc(y))	4.9 dB

#### **Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)**

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.0 dB
0. 00% (C = 200(J))	

----- THE END -----

Sporton International Inc. (ShenZhen)

TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number : 40 of 40
Report Issued Date : Aug. 23, 2024
Report Version : Rev. 01

Report No.: FR470213A

### **Appendix A. Conducted Test Results**

Sporton International Inc. (ShenZhen)

TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT Page Number

: A1 of A1

Report Number : FR470213A

#### Appendix A. Test Result of Conducted Test Items

Test Engineer:	Sam Zheng	Temperature:	21~25	°C
Test Date:	2024/7/30	Relative Humidity:	51~54	%

#### TEST RESULTS DATA 6dB and 99% Occupied Bandwidth

Mod.	Data Rate	NTX	СН.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE	1Mbps	1	0	2402	1.039	0.688	0.50	Pass
BLE	1Mbps	1	19	2440	1.043	0.692	0.50	Pass
BLE	1Mbps	1	39	2480	1.045	0.694	0.50	Pass

## TEST RESULTS DATA Peak Power Table

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak Conducted Power (dBm)	Power Setting	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE	1Mbps	1	0	2402	-8.86	2.00	30.00	2.80	-6.06	36.00	Pass
BLE	1Mbps	1	19	2440	-9.55	2.00	30.00	2.80	-6.75	36.00	Pass
BLE	1Mbps	1	39	2480	-10.78	2.00	30.00	2.80	-7.98	36.00	Pass

# TEST RESULTS DATA Average Power Table (Reference Only)

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	Power Setting	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE	1Mbps	1	0	2402	2.04	-9.30	2.00	30.00	2.80	-6.50	36.00	Pass
BLE	1Mbps	1	19	2440	2.04	-10.70	2.00	30.00	2.80	-7.90	36.00	Pass
BLE	1Mbps	1	39	2480	2.04	-11.90	2.00	30.00	2.80	-9.10	36.00	Pass

## TEST RESULTS DATA Peak Power Density

Mod.	Data Rate	<b>N</b> TX	CH.	Freq. (MHz)	Peak PSD (dBm /100kHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
BLE	1Mbps	1	0	2402	-9.00	-24.41	2.80	8.00	Pass
BLE	1Mbps	1	19	2440	-10.08	-25.48	2.80	8.00	Pass
BLE	1Mbps	1	39	2480	-11.39	-26.80	2.80	8.00	Pass

Note: PSD (dBm/ 100kHz) is a reference level used for Conducted Band Edges and Conducted Spurious Emission 20dBc limit.

Report Number : FR470213A

#### TEST RESULTS DATA 6dB and 99% Occupied Bandwidth

Mod.	Data Rate	<b>N</b> TX	CH.	Freq. Occupied BW (MHz)		6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE	2Mbps	1	0	2402	2.038	1.144	0.50	Pass
BLE	2Mbps	1	19	2440	2.038	1.144	0.50	Pass
BLE	2Mbps	1	39	2480	2.042	1.144	0.50	Pass

# TEST RESULTS DATA Peak Power Table

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak Conducted Power (dBm)	Power Setting	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE5.0	2Mbps	1	0	2402	-8.88	2.00	30.00	2.80	-6.08	36.00	Pass
BLE5.0	2Mbps	1	19	2440	-9.64	2.00	30.00	2.80	-6.84	36.00	Pass
BLE5.0	2Mbps	1	39	2480	-10.83	2.00	30.00	2.80	-8.03	36.00	Pass

# TEST RESULTS DATA Average Power Table (Reference Only)

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	Power Setting	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE	2Mbps	1	0	2402	4.83	-9.40	2.00	30.00	2.80	-6.60	36.00	Pass
BLE	2Mbps	1	19	2440	4.83	-10.80	2.00	30.00	2.80	-8.00	36.00	Pass
BLE	2Mbps	1	39	2480	4.83	-12.00	2.00	30.00	2.80	-9.20	36.00	Pass

# TEST RESULTS DATA Peak Power Density

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm /100kHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
BLE	2Mbps	1	0	2402	-9.05	-26.86	2.80	8.00	Pass
BLE	2Mbps	1	19	2440	-10.13	-27.94	2.80	8.00	Pass
BLE	2Mbps	1	39	2480	-11.43	-29.33	2.80	8.00	Pass

Note: PSD (dBm/ 100kHz) is a reference level used for Conducted Band Edges and Conducted Spurious Emission 20dBc limit.

### **Appendix B Radiated Spurious Emission Test Data**

Test Engineer :	Poid Huong	Relative Humidity :	48~49%
rest Engineer.	Reid Huang	Temperature :	<b>24-25</b> ℃

#### **Radiated Spurious Emission Test Modes**

Mode	Band (MHz)	Antenna	Modulation	Channel	Frequency	Data Rate	RU	Remark
Mode 1	2400-2483.5	SISO	Bluetooth-LE_GSFK	00	2402	1Mbps	-	-
Mode 2	2400-2483.5	SISO	Bluetooth-LE_GSFK	19	2440	1Mbps	-	-
Mode 3	2400-2483.5	SISO	Bluetooth-LE_GSFK	39	2480	1Mbps	-	-
Mode 4	2400-2483.5	SISO	Bluetooth-LE_GSFK	00	2402	2Mbps	-	-
Mode 5	2400-2483.5	SISO	Bluetooth-LE_GSFK	39	2480	2Mbps	-	-
Mode 6	2400-2483.5	SISO	Bluetooth-LE_GSFK	39	2480	1Mbps	-	LF

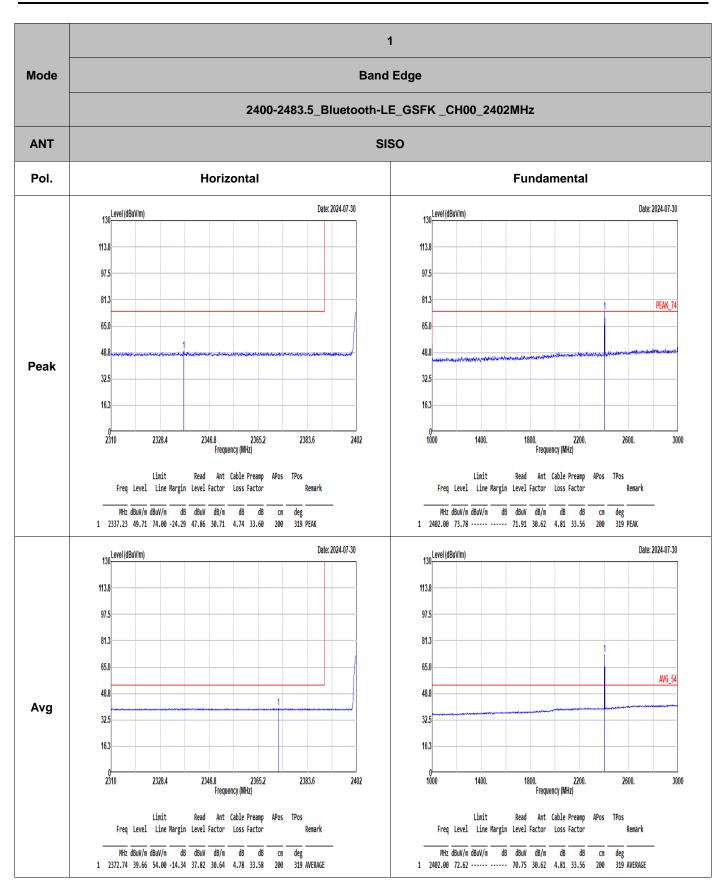
#### Summary of each worse mode

Mode	Modulation	Ch.	Freq. (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol.	Peak Avg.	Result	Remark
1	Bluetooth-LE_GSFK	00	2379.92	39.79	54.00	-14.21	V	AVERAGE	Pass	Band Edge
1	Bluetooth-LE_GSFK	00	4804.00	41.45	74.00	-32.55	Н	Peak	Pass	Harmonic
2	Bluetooth-LE_GSFK	19	-	-	-	-	-	-	-	Band Edge
2	Bluetooth-LE_GSFK	19	7320.00	44.16	74.00	-29.84	Н	Peak	Pass	Harmonic
3	Bluetooth-LE_GSFK	39	2486.40	40.33	54.00	-13.67	V	AVERAGE	Pass	Band Edge
3	Bluetooth-LE_GSFK	39	7440.00	44.53	74.00	-29.47	V	Peak	Pass	Harmonic
4	Bluetooth-LE_GSFK	00	2388.48	41.55	54.00	-12.45	Н	AVERAGE	Pass	Band Edge
4	Bluetooth-LE_GSFK	00	-	-	-	-	-	-	-	Harmonic
5	Bluetooth-LE_GSFK	39	2496.12	42.22	54.00	-11.78	V	AVERAGE	Pass	Band Edge
5	Bluetooth-LE_GSFK	39	7440	44.24	74	-29.76	Н	Peak	Pass	Harmonic
6	Bluetooth-LE_GSFK	39	948.59	31.41	46	-14.59	V	Peak	Pass	LF

Sporton International Inc. (ShenZhen)

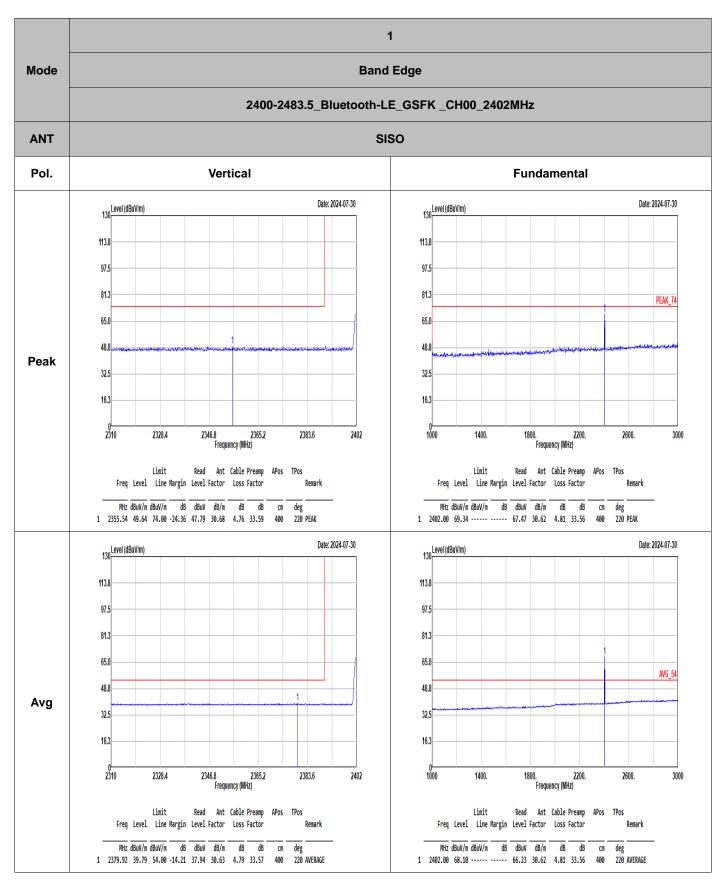
TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT

FCC RF Test Report



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1 Mode Harmonic 2400-2483.5\_Bluetooth-LE\_GSFK \_CH00\_2402MHz ANT SISO Pol. Vertical Horizontal 140 Level (dBuV/m) Date: 2024-07-30 Date: 2024-07-30 140 Level (dBuV/m) 122.5 122.5 105.0 105.0 87.5 87.5 PEAK\_74 PEAK\_74 70.0 70.0 AVG\_54 Peak 52.5 35.0 Avg 35.0 17.5 17.5 3000 3000 0. 12000. Frequency (MHz) 9000. 12000. Frequency (MHz) 6000. 15000. 18000 6000. 15000. 18000

Ant Cable Preamp APos TPos

dB dB

Remark

Limit

MHz dBuV/m dBuV/m

Read

dB dBuV dB/m

Freq Level Line Margin Level Factor Loss Factor

1 4804.00 41.45 74.00 -32.55 64.70 34.23 7.74 65.22

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Read Ant Cable Preamp APos TPos

deg -- Peak

Freq Level Line Margin Level Factor Loss Factor

MHz dBuV/m dBuV/m dB dBuV dB/m dB dB

1 4804.00 40.40 74.00 -33.60 63.65 34.23 7.74 65.22

2 Harmonic Mode 2400-2483.5\_Bluetooth-LE\_GSFK \_CH19\_2440MHz SISO **ANT** Pol. Horizontal Vertical 140 Level (dBuV/m) Date: 2024-07-30 Date: 2024-07-30 140 Level (dBuV/m) 122.5 122.5 105.0 105.0 87.5 87.5 PEAK\_74 PEAK\_74 70.0 70.0 52.5 **Peak** 52.5 35.0 35.0 Avg 17.5 17.5 0<u></u> 3000 6000. 12000. 15000. 18000 3000 6000. 9000. 12000. Frequency (MHz) 15000. 18000 Frequency (MHz) Limit Read Ant Cable Preamp APos TPos Limit Read Ant Cable Preamp APos TPos Freq Level Line Margin Level Factor Loss Factor Freq Level Line Margin Level Factor Loss Factor MHz dBuV/m dBuV/m dB dBuV dB/m dB deg MHz dBuV/m dBuV/m dB dBuV dB/m dB cm deg

-- Peak

-- Peak

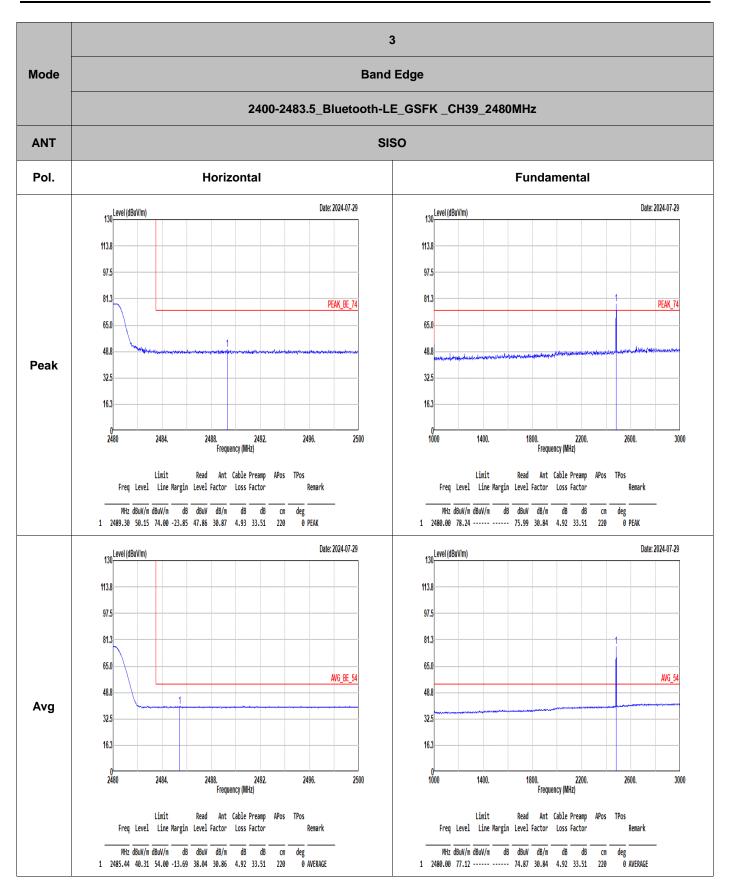
1 4880.00 42.00 74.00 -32.00 65.14 34.34 7.77 65.25

2 7320.00 44.16 74.00 -29.84 64.40 35.44 8.96 64.64

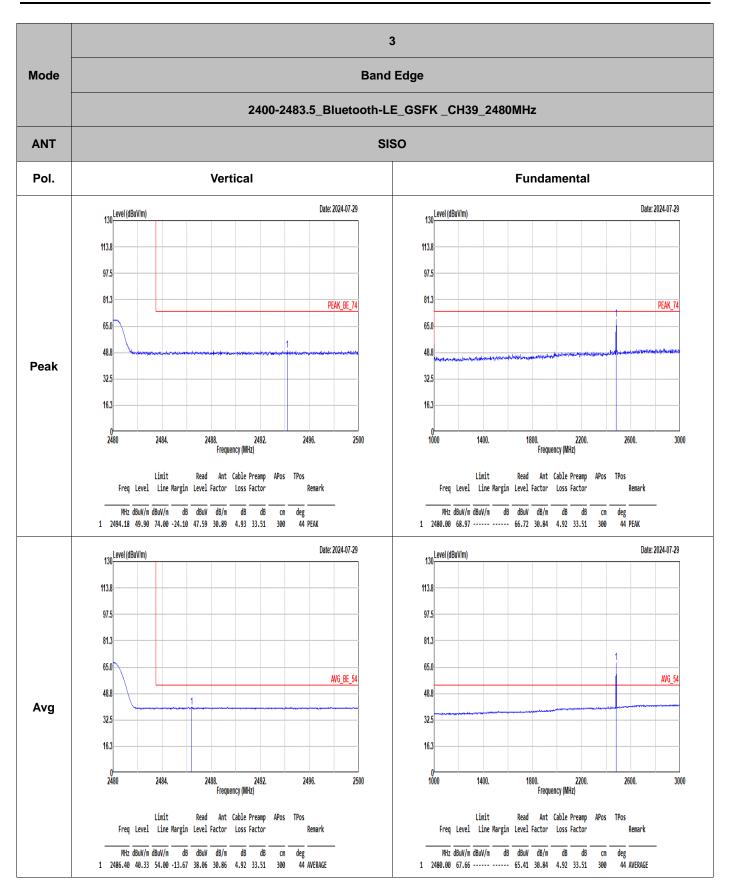
TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT 1 4880.00 41.75 74.00 -32.25 64.89 34.34 7.77 65.25

2 7320.00 43.26 74.00 -30.74 63.50 35.44 8.96 64.64





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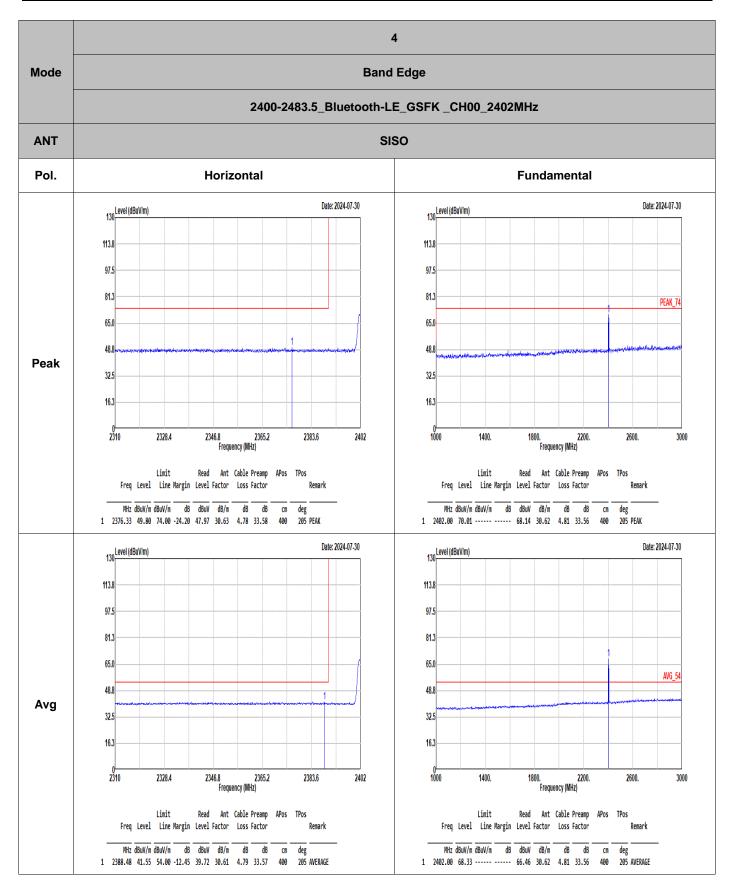
3 Mode Harmonic 2400-2483.5\_Bluetooth-LE\_GSFK \_CH39\_2480MHz SISO **ANT** Pol. Horizontal Vertical 140 Level (dBuV/m) 140 Level (dBuV/m) Date: 2024-07-30 Date: 2024-07-30 122.5 122.5 105.0 105.0 87.5 87.5 PEAK\_74 PEAK\_74 70.0 70.0 52.5 **Peak** 35.0 Avg 17.5 17.5 0<u></u> 3000 Frequency (MHz) 3000 6000. 12000. 15000. 18000 6000. 15000. 18000 9000. Frequency (MHz) Limit Read Ant Cable Preamp APos TPos Limit Read Ant Cable Preamp APos TPos Freq Level Line Margin Level Factor Loss Factor Freq Level Line Margin Level Factor Loss Factor deg -- Peak MHz dBuV/m dBuV/m dB dBuV dB/m dB CM deg MHz dBuV/m dBuV/m dB dBuV dB/m cm 1 4960.00 41.68 74.00 -32.32 64.71 34.45 7.81 65.29 -- Peak 1 4960.00 42.18 74.00 -31.82 65.21 34.45 7.81 65.29

-- Peak

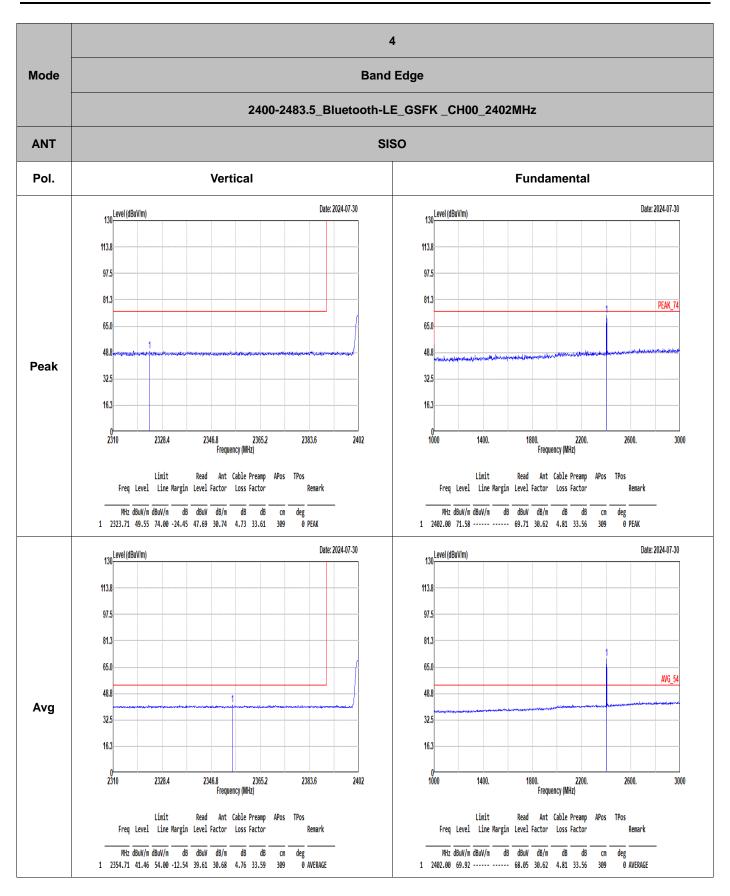
2 7440.00 44.47 74.00 -29.53 64.41 35.41 9.19 64.54

TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT 2 7440.00 44.53 74.00 -29.47 64.47 35.41 9.19 64.54

FCC RF Test Report Report No.: FR470213A



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5 **Band Edge** Mode 2400-2483.5\_Bluetooth-LE\_GSFK \_CH39\_2480MHz **ANT** SISO Pol. Horizontal **Fundamental** Date: 2024-07-30 130 Level (dBuV/m) Date: 2024-07-30 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 81.3 PEAK\_BE\_74 65.0 65.0 48.8 48.8 Peak 32.5 32.5 16.3 16.3 2480 1000 2484. 2500 1400. 3000 2200. Frequency (MHz) Frequency (MHz) Limit Read Ant Cable Preamp APos TPos Limit Read Ant Cable Preamp APos TPos Freq Level Line Margin Level Factor Loss Factor Freq Level Line Margin Level Factor Loss Factor MHz dBuV/m dBuV/m dB dBuV dB/m dB dB MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm cm deg 1 2488.60 50.72 74.00 -23.28 48.43 30.87 4.93 33.51 363 119 PEAK 1 2480.00 65.12 ----- 62.87 30.84 4.92 33.51 363 119 PEAK Date: 2024-07-30 130 Level (dBuV/m) 130 Level (dBuV/m) Date: 2024-07-30 113.8 113.8 97.5 97.5 81.3 81.3 65.0 65.0 AVG 54 48.8 48.8 Avg 32.5 32.5 16.3 16.3 2480 2488. 2492. Frequency (MHz) 2484. 2496. 2500 1400. 1800. 2200. Frequency (MHz) Limit Read Ant Cable Preamp APos Freq Level Line Margin Level Factor Loss Factor Limit Read Ant Cable Preamp APos TPos MHz dBuV/m dBuV/m dB dBuV dB/m dB Freq Level Line Margin Level Factor Loss Factor 119 AVERAGE

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1 2488.88 41.89 54.00 -12.11 39.60 30.87 4.93 33.51

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MHz dBuV/m dBuV/m dB dBuV dB/m dB dB

deg cm

5 **Band Edge** Mode 2400-2483.5\_Bluetooth-LE\_GSFK \_CH39\_2480MHz **ANT SISO** Pol. Vertical **Fundamental** Date: 2024-07-30 Date: 2024-07-30 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 81.3 65.0 65.0 48.8 48.8 Peak 32.5 32.5 16.3 16.3 2480 2484. 2492. 2496. 2500 1400. 3000 2200. Frequency (MHz) Frequency (MHz) Limit Read Ant Cable Preamp APos TPos Limit Read Ant Cable Preamp APos TPos Freq Level Line Margin Level Factor Loss Factor Freq Level Line Margin Level Factor Loss Factor MHz dBuV/m dBuV/m dB dBuV dB/m dB dB MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg CM deg 274 PEAK 274 PEAK 1 2499.44 50.32 74.00 -23.68 47.96 30.92 4.94 33.50 1 2480.00 75.30 ----- 73.05 30.84 4.92 33.51 400 Date: 2024-07-30 Date: 2024-07-30 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 81.3 65.0 65.0 AVG 54 48.8 48.8 Avg 32.5 32.5 16.3 16.3 2480 2484. 1400. 3000 2492. Frequency (MHz) Frequency (MHz) Limit Read Ant Cable Preamp APos TPos Limit Read Ant Cable Preamp APos TPos Freq Level Line Margin Level Factor Loss Factor Freq Level Line Margin Level Factor Loss Factor

MHz dBuV/m dBuV/m dB dBuV dB/m dB dB

1 2496.12 42.22 54.00 -11.78 39.88 30.90 4.94 33.50

deg

400 274 AVERAGE

cm

MHz dBuV/m dBuV/m dB dBuV dB/m dB dB

1 2480.00 73.39 ----- 71.14 30.84 4.92 33.51 400

deg

274 AVERAGE

CM

5 Harmonic Mode 2400-2483.5\_Bluetooth-LE\_GSFK \_CH39\_2480MHz SISO **ANT** Pol. Horizontal Vertical Data: 2 140 Level (dBuV/m) 140 Level (dBuV/m) Date: 2024-08-05 Date: 2024-08-05 122.5 122.5 105.0 105.0 87.5 87.5 PEAK\_74 70.0 70.0 **Peak** AVG 54 52.5 52.5 Avg 35.0 35.0 17.5 17.5 26000 7600. 12200. Frequency (MHz) Frequency (MHz) Over Limit ReadAntenna Cable Preamp A/Pos T/Pos Freq Level Limit Line Level Factor Loss Factor Remark Over Limit ReadAntenna Cable Preamp A/Pos T/Pos
Freq Level Limit Line Level Factor Loss Factor Remark dB dBuV/m dBuV dB/m deg dB dBuV/m dBuV dB/m dB MHz dBuV/m cm deg 4960.00 41.45 -32.55 74.00 64.48 34.45 7.81 65.29 7440.00 44.24 -29.76 74.00 64.18 35.41 9.19 64.54

TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT 4960.00 41.85 -32.15 74.00 64.88 34.45 7.81 65.29 7440.00 44.20 -29.80 74.00 64.14 35.41 9.19 64.54

--- Peak --- Peak

---

6 LF Mode 2400-2483.5\_Bluetooth-LE\_GSFK \_CH00\_2402MHz SISO **ANT** Pol. Horizontal Vertical Date: 2024-08-01 Date: 2024-08-01 80 Level (dBuV/m) 80 Level (dBuV/m) FCC CLASS-B FCC CLASS-B 70.0 60.0 60.0 50.0 50.0 40.0 40.0 30.0 30.0 QP/ 20.0 10.0 **Peak** 224. 418. 612. Frequency (MHz) 806. 1000 224. 418. 806. 1000 Frequency (MHz) Read Ant Cable Preamp Limit Read Ant Cable Preamp APos TPos Freq Level Line Margin Level Factor Loss Factor Limit Freq Level Line Margin Level Factor Loss Factor MHz dBuV/m dBuV/m dB dBuV dB/m deg -- Peak MHz dBuV/m dBuV/m dB dBuV dB/m deg -- Peak dB dB dB 113.42 19.88 43.50 -23.62 37.52 16.00 1.13 34.77 33.88 23.98 40.00 -16.02 39.82 18.46 0.57 34.87 142.52 21.81 43.50 -21.69 36.93 18.35 1.25 34.72 141.55 23.03 43.50 -20.47 38.23 18.27 1.25 34.72 -- Peak -- Peak -- Peak 287.05 23.91 46.00 -22.09 38.06 18.72 1.76 34.63 349.13 25.91 46.00 -20.09 38.37 20.20 1.94 34.60 -- Peak 198.78 20.84 43.50 -22.66 38.01 16.05 1.48 34.70 448.07 22.62 46.00 -23.38 32.19 22.70 2.23 34.50 -- Peak

695.42 26.71 46.00 -19.29 31.30 27.02 2.80 34.41

948.59 31.41 46.00 -14.59 32.71 29.74 3.26 34.30

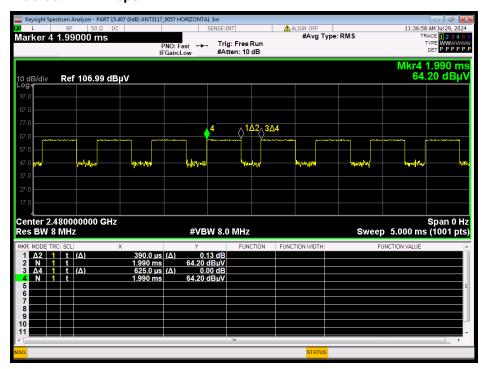
TEL: +86-755-8637-9589 FAX: +86-755-8637-9595 FCC ID: 2APRD-GEN4SHORT 783.69 29.09 46.00 -16.91 32.66 27.76

948.59 30.69 46.00 -15.31 31.99 29.74 3.26 34.30

# **Appendix C. Duty Cycle Plots**

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting		
Bluetooth LE 1Mbps	62.4	0.39	2.564	3KHz		
Bluetooth LE 2Mbps	32.8	0.205	4.878	10KHZ		

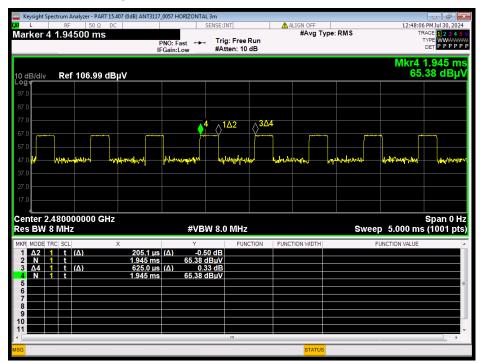
#### **Bluetooth LE 1Mbps**



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#### **Bluetooth LE 2Mbps**



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