# **FCC RF Test Report**

APPLICANT : Motorola Mobility LLC EQUIPMENT : Mobile Cellular Phone

BRAND NAME : Motorola

MODEL NAME : XT2341-2

FCC ID : IHDT56AM1

STANDARD : FCC Part 15 Subpart C §15.247

CLASSIFICATION : (DTS) Digital Transmission System

TEST DATE(S) : Apr. 01, 2023 ~ May 12, 2023

We, Sporton International Inc. (Kunshan), 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.

This report contains data that were produced under subcontract by Sporton International Inc. (ShenZhen).

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

JasonJia

Approved by: Jason Jia





Report No.: FR332006B

# Sporton International Inc. (Kunshan)

No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China

Sporton International Inc. (Kunshan)

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Report Issued Date : May 26, 2023

: Rev. 01

Report Template No.: BU5-FR15CBT4.0 Version 2.0

Report Version

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# **REVISION HISTORY**

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR332006B	Rev. 01	Initial issue of report	May 26, 2023

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## SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	6dB Bandwidth	≥ 0.5MHz	Pass	-
3.1	-	99% Bandwidth	-	Report only	-
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 9.74 dB at 2498.840 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 14.80 dB at 0.159 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	15.203 & 15.247(b)	Pass	-

Remark: Not required means after assessing, test items are not necessary to carry out.

#### 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.

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# 1 General Description

# 1.1 Applicant

**Motorola Mobility LLC** 

222 W, Merchandise Mart Plaza, Chicago IL 60654 USA

#### 1.2 Manufacturer

**Motorola Mobility LLC** 

222 W, Merchandise Mart Plaza, Chicago IL 60654 USA

# 1.3 Product Feature of Equipment Under Test

Product Feature					
Equipment Mobile Cellular Phone					
Brand Name	Motorola				
Model Name	XT2341-2				
FCC ID	IHDT56AM1				
IMEI Code	Conducted: 352000530005895/352000530005903 Conduction: 352000530005416/352000530005424 Radiation: 352000530016413/352000530016421				
HW Version	DVT2				
SW Version	TLA33.30				
EUT Stage	Identical Prototype				

**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	BluetoothLE 1Mbps: 1.97 dBm (0.0016 W)			
Maximum Output Power to Antenna	BluetoothLE 2Mbps: 1.90 dBm (0.0015 W)			
99% Occupied Bandwidth	BluetoothLE 1Mbps : 1.011MHz			
99 % Occupied Bandwidth	BluetoothLE 2Mbps : 2.018MHz			
Antenna Type / Gain	PIFA Antenna type with gain -3.00 dBi			
Type of Modulation	Bluetooth LE : GFSK			

Remark: Ant 1 in RSE test data corresponds to BT/WIFI antenna in EP.

#### 1.5 Modification of EUT

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

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# 1.6 Specification of Accessory

Specification of Accessory				
AC Adapter 1 (US)	Brand Name	Motorola (Salcomp)	Model Name	MC-201L
AC Adapter 1 (EU)	Brand Name	Motorola (Salcomp)	Model Name	MC-202L
AC Adapter 1 (AR)	Brand Name	Motorola (Salcomp)	Model Name	MC-206L
AC Adapter 1 (BR)	Brand Name	Motorola (Salcomp)	Model Name	MC-207L
AC Adapter 1 (CHILE)	Brand Name	Motorola (Salcomp)	Model Name	MC-209L
AC Adapter 2 (US)	Brand Name	Motorola (Aohai)	Model Name	MC-201L
AC Adapter 2 (EU)	Brand Name	Motorola (Aohai)	Model Name	MC-202L
AC Adapter 2 (AR)	Brand Name	Motorola (Aohai)	Model Name	MC-206L
AC Adapter 3 (US)	Brand Name	Motorola (Aohai)	Model Name	MC-101
AC Adapter 3 (EU)	Brand Name	Motorola (Aohai)	Model Name	MC-102
AC Adapter 3 (UK)	Brand Name	Motorola (Aohai)	Model Name	MC-103
AC Adapter 3 (AU)	Brand Name	Motorola (Aohai)	Model Name	MC-105
AC Adapter 4 (US)	Brand Name	Motorola (Chenyang)	Model Name	MC-101
AC Adapter 4 (EU)	Brand Name	Motorola (Chenyang)	Model Name	MC-102
AC Adapter 4 (UK)	Brand Name	Motorola (Chenyang)	Model Name	MC-103
AC Adapter 4 (AU)	Brand Name	Motorola (Chenyang)	Model Name	MC-105
AC Adapter 5 (US)	Brand Name	Motorola (Salcomp)	Model Name	MC-101
AC Adapter 5 (EU)	Brand Name	Motorola (Salcomp)	Model Name	MC-102
AC Adapter 5 (UK)	Brand Name	Motorola (Salcomp)	Model Name	MC-103
AC Adapter 5 (AU)	Brand Name	Motorola (Salcomp)	Model Name	MC-105
Battery 1	Brand Name	Motorola (ATL)	Model Name	PC50
Battery 2	Brand Name	Motorola (SCUD)	Model Name	PC50
Earphone 1	Brand Name	Motorola (New leader)	Model Name	NLD-EM313A-20SF
Earphone 2	Brand Name	Motorola (JWELL)	Model Name	JWEP1205-L20H
USB Cable 1	Brand Name	Motorola (SAIBAO)	Model Name	SLQ-A214A
USB Cable 2	Brand Name	Motorola (JWELL)	Model Name	ATOC

# 1.7 Testing Location

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International Inc. (Kunshan)					
	No. 1098, Pengxi North	n Road, Kunshan Econom	ic Development Zone			
Test Site Location	Jiangsu Province 215300 People's Republic of China					
	TEL: +86-512-57900158					
	Sporton Sito No	ECC Designation No.	FCC Test Firm			
Test Site No.	Sporton Site No.	FCC Designation No.	Registration No.			
	CO01-KS TH01-KS	CN1257	314309			

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

Test Firm	Sporton International Inc. (ShenZhen)			
Test Site Location			eng 4th Road, Fenghuang n City Guangdong Province	
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.	
	03CH03-SZ	CN1256	421272	

Test data subcontracted: Radiated Spurious Emission test results in section 3.5 of this report.

### 1.8 Test Software

Item	Site	Manufacturer	Name	Version
1.	CO01-KS	AUDIX	E3	6.2009-8-24
2.	03CH03-SZ	AUDIX	E3	6.2009-8-24

# 1.9 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.

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# 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	-	-

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### 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: conduction emission (150 kHz to 30 MHz), 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 (Y plane) were recorded in this report.
- b. AC power line Conducted Emission was tested under maximum output power.

The following summary table is showing all test modes to demonstrate in compliance with the standard.

	Summary table of Test Cases
Took Itom	Data Rate / Modulation
Test Item	Bluetooth – LE / GFSK
Conducted	Mode 1: Bluetooth Tx CH00_2402 MHz
TCs	Mode 2: Bluetooth Tx CH19_2440 MHz
108	Mode 3: Bluetooth Tx CH39_2480 MHz
	Mode 1: Bluetooth Tx CH00_2402 MHz
Radiated	Mode 2: Bluetooth Tx CH19_2440 MHz
TCs	Mode 3: Bluetooth Tx CH39_2480 MHz
	Mode 4: Bluetooth Tx Ch39 + LTE Band 13_Link (Co-location)
AC	Made 4: CSM 950 Idle : Blueteeth Link : WLANT ink /2 4C\ : LISB Coble 2/Charging
Conducted	Mode 1: GSM 850 Idle + Bluetooth Link + WLAN Link (2.4G) + USB Cable 2(Charging
Emission	from Adapter5) + Earphone 2 + Battery 1

#### Remark:

- For Radiated Test Cases, The tests were performance with Adapter 1, Battery 1, Earphone 1, and USB Cable 1
- 2. The RSE Co-location mode is assessed from the worst BLE TX + WWAN Link mode.

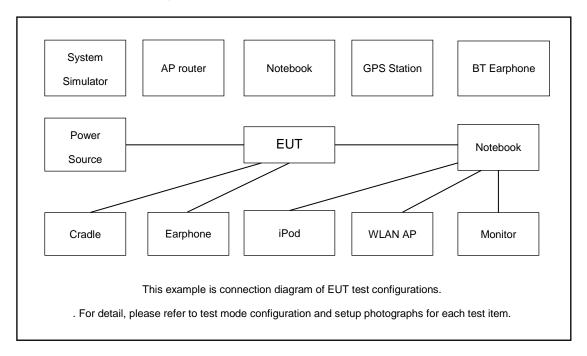
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# 2.3 Connection Diagram of Test System



# 2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	LTE Base Station	Anritus	MT8821C	N/A	N/A	Unshielded,1.8m
2.	WLAN AP	D-link	DIR-655	KA21R655B1	N/A	Unshielded,1.8m
3.	Notebook	Lenovo	V130-15IKB005	N/A	N/A	shielded cable DC O/P 1.8m , Unshielded AC I/P cable 1.8m
4.	Bluetooth Earphone	Lenovo	thinkplus-BH3	N/A	N/A	N/A

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## 2.5 EUT Operation Test Setup

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

For AC power line conducted emissions, the EUT was set to connect with the WLAN AP under large package sizes transmission.

## 2.6 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 6.0 dB

 $Offset(dB) = RF \ cable \ loss(dB)$ = 6.0 (dB)

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## 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

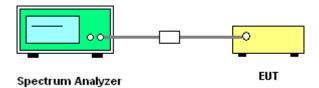
The section 4.0 of List of Measuring Equipment of this test report is used for test.

#### 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.
- 6. Measure and record the results in the test report.

#### 3.1.4 Test Setup

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#### 3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.

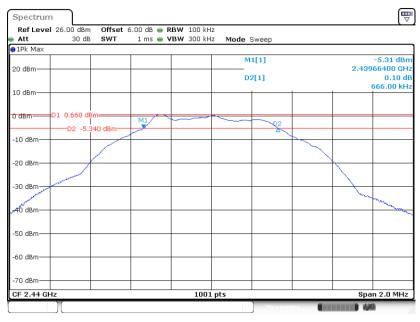
#### **Bluetooth LE 1Mbps**

#### 6 dB Bandwidth Plot on Channel 00



Date: 11.APR.2023 09:48:11

#### 6 dB Bandwidth Plot on Channel 19



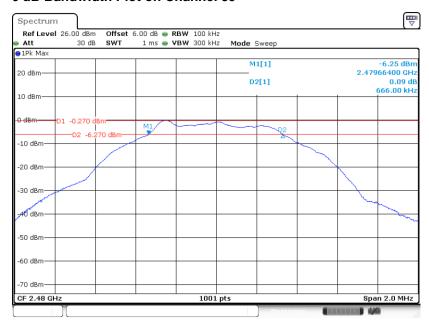
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#### 6 dB Bandwidth Plot on Channel 39



Date: 11.APR.2023 09:53:54

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

#### 6 dB Bandwidth Plot on Channel 00

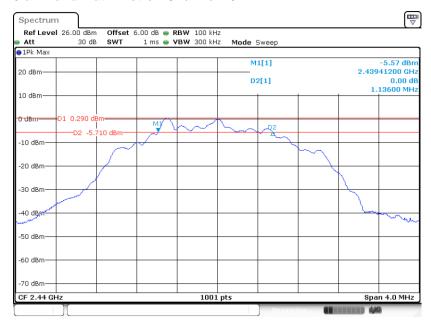


Date: 11.APR.2023 09:57:50

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#### 6 dB Bandwidth Plot on Channel 19



Date: 11.APR.2023 10:00:55

#### 6 dB Bandwidth Plot on Channel 39



Date: 11.APR.2023 10:02:45

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## 3.1.6 Test Result of 99% Occupied Bandwidth

Please refer to Appendix A.

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

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



Date: 11.APR.2023 09:49:57

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



Date: 11.APR.2023 09:53:02

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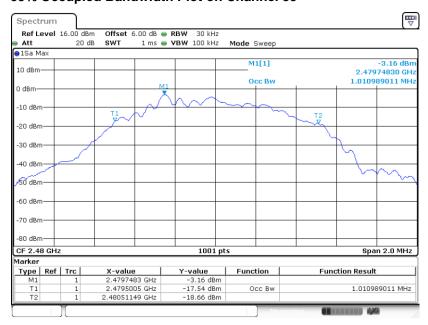
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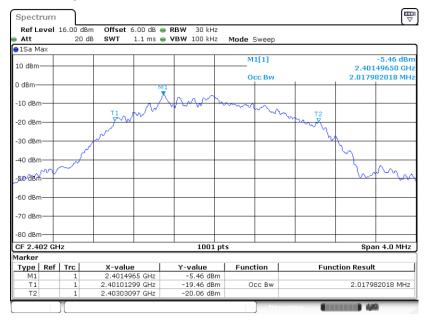
# 99% Occupied Bandwidth Plot on Channel 39



Date: 11.APR.2023 09:55:40

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

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



Date: 11.APR.2023 09:58:37

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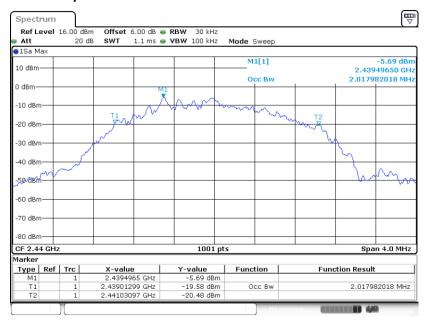
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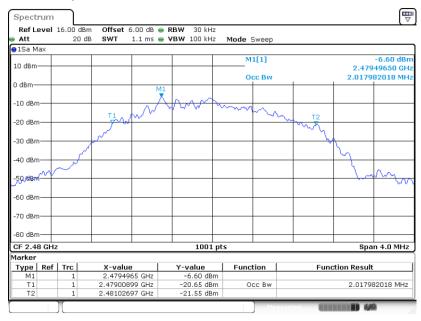
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#### 99% Occupied Bandwidth Plot on Channel 19



Date: 11.APR.2023 10:01:42

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



Date: 11.APR.2023 10:03:31

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

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## 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.

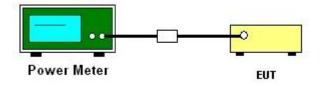
#### 3.2.2 Measuring Instruments

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.

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# 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.

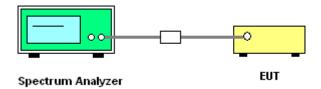
### 3.3.2 Measuring Instruments

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.

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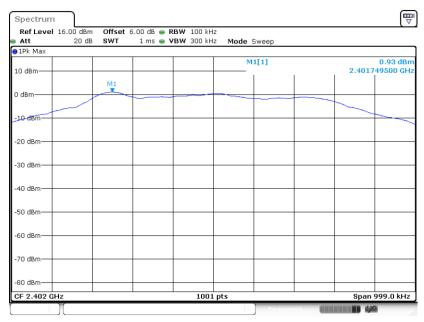
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## 3.3.6 Test Result of Power Spectral Density Plots (100kHz)

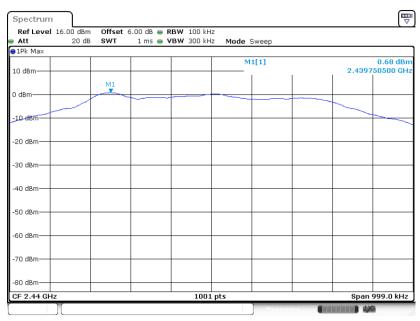
#### **Bluetooth LE 1Mbps**

#### PSD 100kHz Plot on Channel 00



Date: 11.APR.2023 09:48:49

#### PSD 100kHz Plot on Channel 19



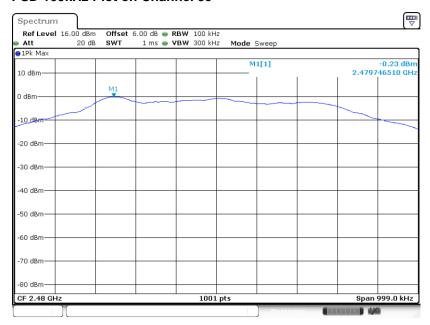
Date: 11.APR.2023 09:52:13

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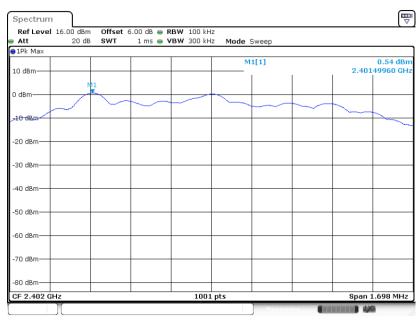
#### PSD 100kHz Plot on Channel 39



Date: 11.APR.2023 09:54:32

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

#### PSD 100kHz Plot on Channel 00

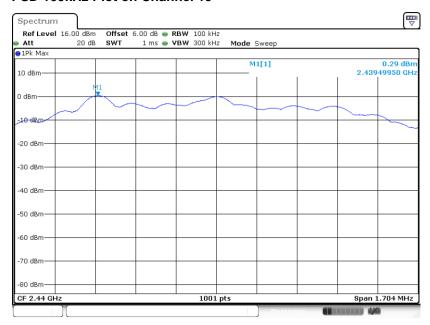


Date: 11.APR.2023 09:58:28

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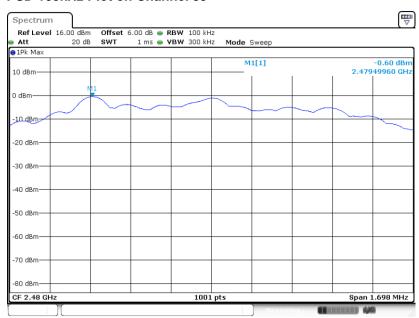
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#### **PSD 100kHz Plot on Channel 19**



Date: 11.APR.2023 10:01:33

#### PSD 100kHz Plot on Channel 39



Date: 11.APR.2023 10:03:22

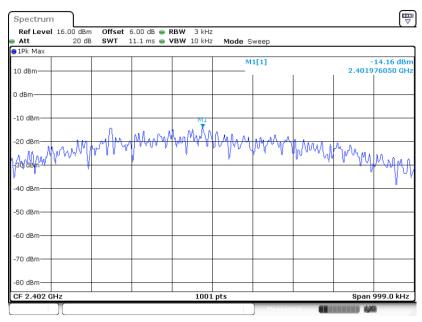
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# 3.3.7 Test Result of Power Spectral Density Plots (3kHz)

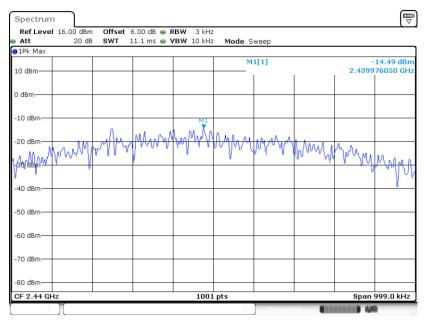
#### **Bluetooth LE 1Mbps**

#### PSD 3kHz Plot on Channel 00



Date: 11.APR.2023 09:48:30

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

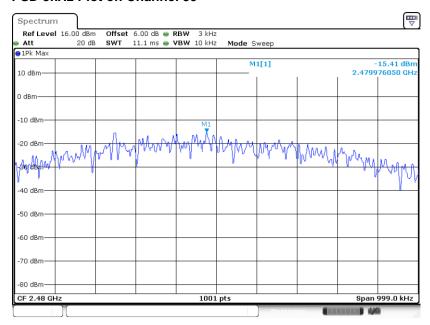


Date: 11.APR.2023 09:51:54

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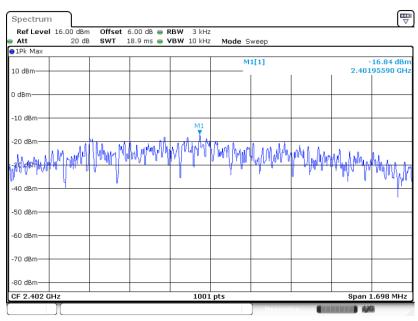
#### PSD 3kHz Plot on Channel 39



Date: 11.APR.2023 09:54:13

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

#### PSD 3kHz Plot on Channel 00



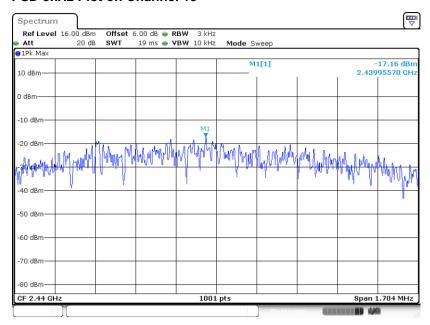
Date: 11.APR.2023 09:58:09

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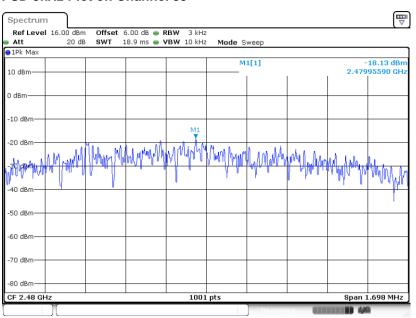
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#### **PSD 3kHz Plot on Channel 19**



Date: 11.APR.2023 10:01:14

#### PSD 3kHz Plot on Channel 39



Date: 11.APR.2023 10:03:03

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## 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.

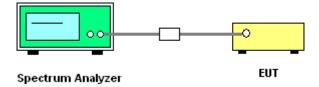
### 3.4.2 Measuring Instruments

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



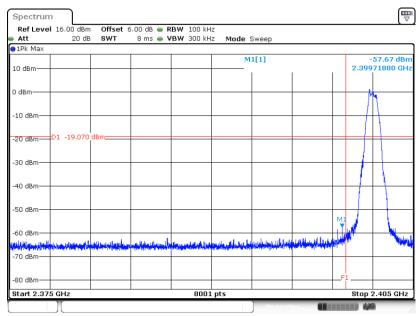
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# 3.4.5 Test Result of Conducted Band Edges Plots

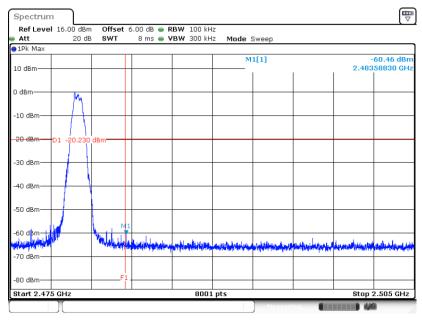
#### **Bluetooth LE 1Mbps**

### Low Band Edge Plot on Channel 00



Date: 11.APR.2023 09:49:08

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



Date: 11.APR.2023 09:56:19

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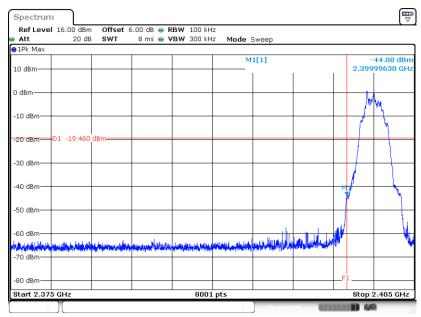
Report Issued Date : May 26, 2023

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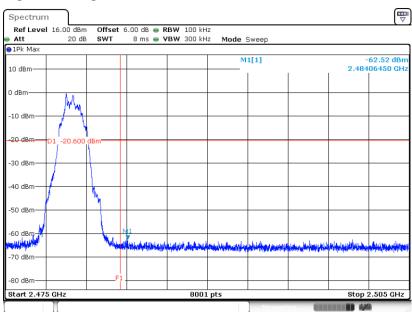
#### **Bluetooth LE 2Mbps**

#### Low Band Edge Plot on Channel 00



Date: 11.APR.2023 09:59:20

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



Date: 11.APR.2023 10:05:17

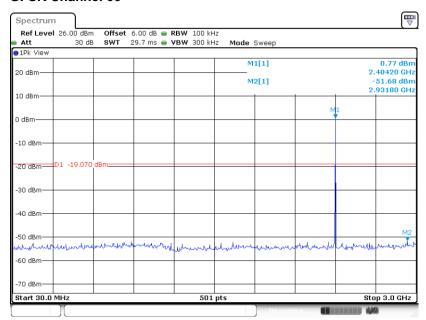
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## 3.4.6 Test Result of Conducted Spurious Emission Plots

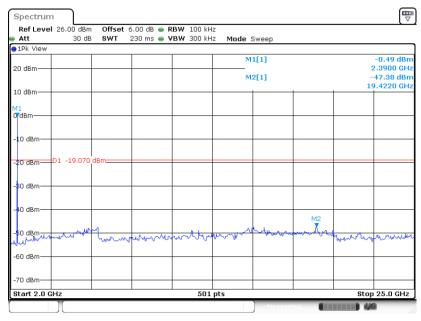
#### **Bluetooth LE 1Mbps**

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



Date: 11.APR.2023 09:50:27

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



Date: 11.APR.2023 09:50:39

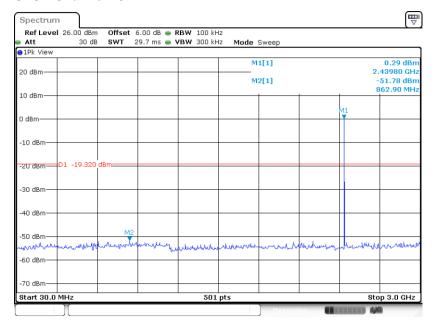
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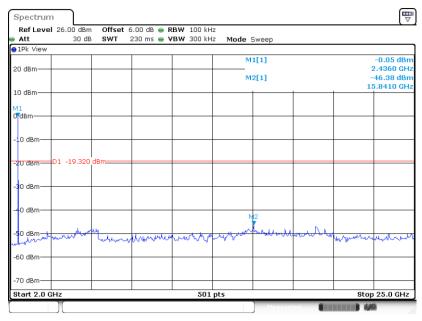
Report Template No.: BU5-FR15CBT4.0 Version 2.0

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



Date: 11.APR.2023 09:52:33

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



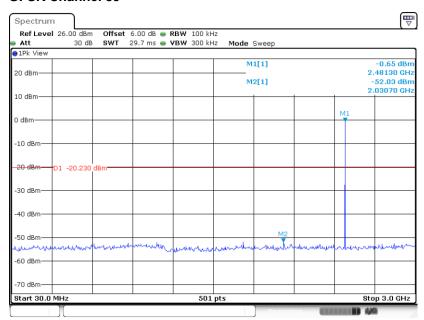
Date: 11.APR.2023 09:52:53

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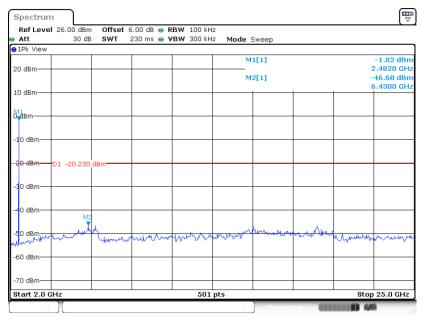
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# Conducted Spurious Emission Plot on Bluetooth LE 1Mbps GFSK Channel 39



Date: 11.APR.2023 09:55:11

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



Date: 11.APR.2023 09:55:31

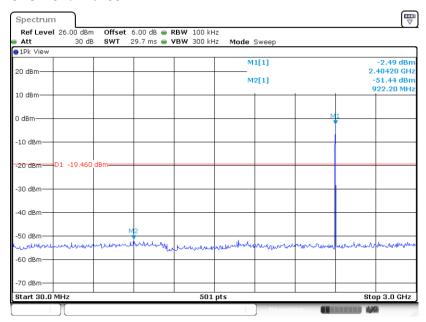
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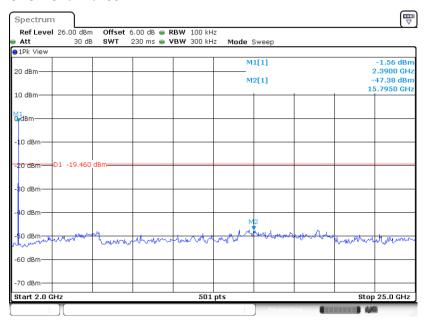
#### **Bluetooth LE 2Mbps**

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



Date: 11.APR.2023 10:00:05

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



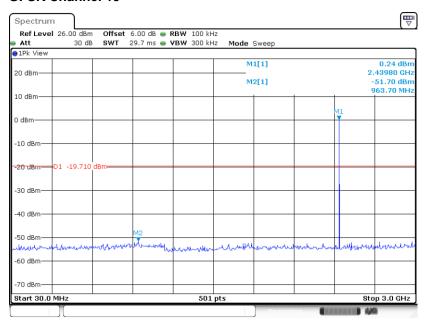
Date: 11.APR.2023 10:00:16

Sporton International Inc. (Kunshan)

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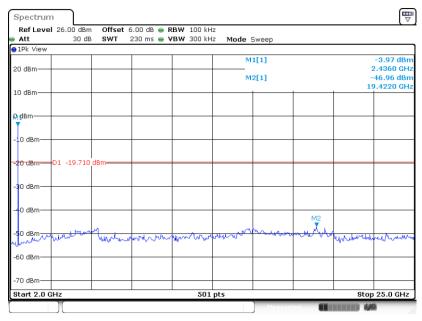
Report No.: FR332006B

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



Date: 11.APR.2023 10:02:03

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



Date: 11.APR.2023 10:02:14

Sporton International Inc. (Kunshan)

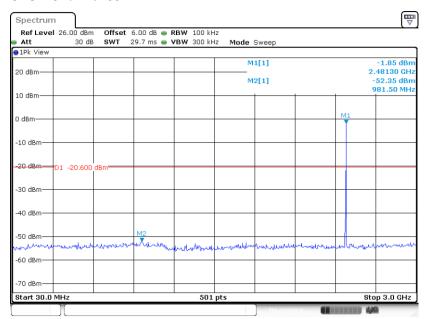
TEL: +86-512-57900158 FCC ID: IHDT56AM1

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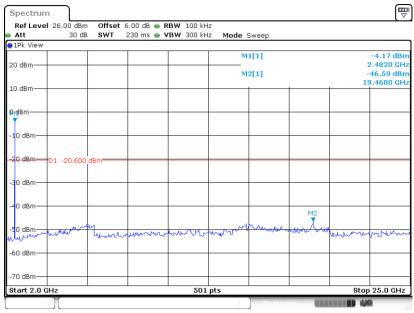
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# Conducted Spurious Emission Plot on Bluetooth LE 2Mbps GFSK Channel 39



Date: 11.APR.2023 10:04:41

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



Date: 11.APR.2023 10:04:53

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# 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.

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#### 3.5.3 Test Procedures

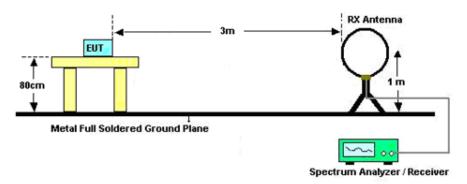
- 1. The testing follows ANSI C63.10-2013 clause 11.11 & 11.12
- 2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get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

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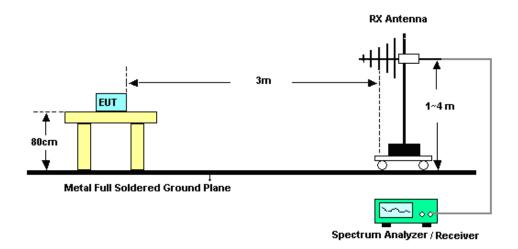
Report Template No.: BU5-FR15CBT4.0 Version 2.0

### 3.5.4 Test Setup

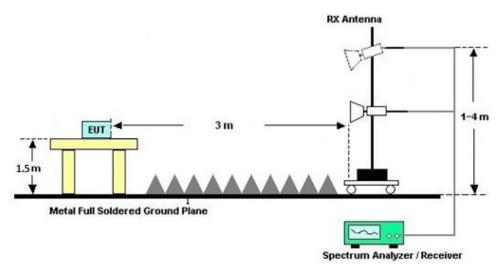
### For radiated emissions below 30MHz



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



### For radiated emissions above 1GHz



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### 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.

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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 C

### 3.5.7 Duty Cycle

Please refer to AppendixD.

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

Please refer to Appendix C

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### 3.6 AC Conducted Emission Measurement

### 3.6.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBμV)				
Frequency of emission (MH2)	Quasi-peak	Average			
0.15-0.5	66 to 56*	56 to 46*			
0.5-5	56	46			
5-30	60	50			

<sup>\*</sup>Decreases with the logarithm of the frequency.

### 3.6.2 Measuring Instruments

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

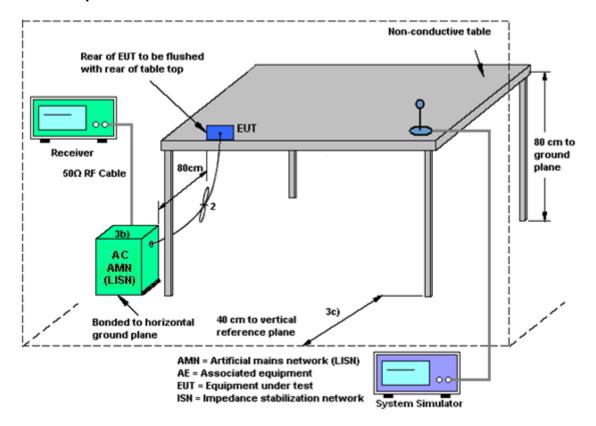
### 3.6.3 Test Procedures

- 1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- 2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- 3. All the support units are connecting to the other LISN.
- 4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- 5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
- 6. Both sides of AC line were checked for maximum conducted interference.
- 7. The frequency range from 150 kHz to 30 MHz was searched.
- Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

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### 3.6.4 Test Setup



### 3.6.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

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### 3.7 Antenna Requirements

### 3.7.1 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.

### 3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

### 3.7.3 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.

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# 4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV30	101338	10Hz~30GHz	May 24, 2022	Apr. 11, 2023 ~Apr .23, 2023	May 23, 2023	Conducted (TH01-KS)
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Oct. 12, 2022	Apr. 11, 2023 ~Apr .23, 2023	Oct. 11, 2023	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GH z	Jan. 05, 2023	Apr. 11, 2023 ~Apr .23, 2023	Jan. 04, 2024	Conducted (TH01-KS)
EMI Test Receiver&SA	KEYSIGHT	N9038A	MY544500 83	20Hz~8.4GHz	Apr. 06, 2022	Apr. 01, 2023	Apr. 05, 2023	Radiation (03CH03-SZ)
EMI Test Receiver&SA	KEYSIGHT	N9038A	MY544500 83	20Hz~8.4GHz	Apr. 04, 2023	~May 12, 2023	Apr. 03, 2024	Radiation (03CH03-SZ)
EXA Spectrum Anaiyzer	KEYSIGHT	N9010A	MY551502 46	10Hz~44GHz;	Apr. 06, 2022	Apr. 01, 2023	Apr. 05, 2023	Radiation (03CH03-SZ)
EXA Spectrum Anaiyzer	KEYSIGHT	N9010A	MY551502 46	10Hz~44GHz;	Apr. 04, 2023	~May 12, 2023	Apr. 03, 2024	Radiation (03CH03-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	Jul. 28, 2022	Apr. 01, 2023 ~May 12, 2023	Jul. 27, 2024	Radiation (03CH03-SZ)
Bilog Antenna	TeseQ	CBL6112D	35408	30MHz-2GHz	Aug. 09, 2021	Apr. 01, 2023 ~May 12, 2023	Aug. 08, 2023	Radiation (03CH03-SZ)
Double Ridge Horn Antenna	SCHWARZBE CK	BBHA9120D	9120D-135 5	1GHz~18GHz	Apr. 08, 2022	Apr. 01, 2023	Apr. 07, 2023	Radiation (03CH03-SZ)
Double Ridge Horn Antenna	SCHWARZBE CK	BBHA9120D	9120D-135 5	1GHz~18GHz	Apr. 08, 2023	~May 12, 2023	Apr. 07, 2024	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	TTA1840-35- HG	1871923	18GHz~40GHz	Jul. 06, 2022	Apr. 01, 2023 ~May 12, 2023	Jul.05, 2023	Radiation (03CH03-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Apr. 10, 2022	Apr. 01, 2023	Apr. 09, 2023	Radiation (03CH03-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Apr. 08, 2023	~May 12, 2023	Apr. 07, 2024	Radiation (03CH03-SZ)
Amplifier	Burgeon	BPA-530	102211	0.01Hz ~3000MHz	Oct. 19, 2022	Apr. 01, 2023 ~May 12, 2023	Oct. 18, 2023	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	AMF-7D-0010 1800-30-10P- R	1943528	1GHz~18GHz	Oct. 19, 2022	Apr. 01, 2023 ~May 12, 2023	Oct. 18, 2023	Radiation (03CH03-SZ)
Amplifier	Agilent Technologies	83017A	MY395013 02	500MHz~26.5G Hz	Dec. 26, 2022	Apr. 01, 2023 ~May 12, 2023	Dec. 25, 2023	Radiation (03CH03-SZ)
AC Power Source	Chroma	61601	616010002 729	1 N/A	Nov. 10, 2022	Apr. 01, 2023 ~May 12, 2023	Nov. 09, 2023	Radiation (03CH03-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Apr. 01, 2023 ~May 12, 2023	NCR	Radiation (03CH03-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Apr. 01, 2023 ~May 12, 2023	NCR	Radiation (03CH03-SZ)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	May 24, 2022	Apr. 19, 2023	May 23, 2023	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 13, 2022	Apr. 19, 2023	Oct. 12, 2023	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060105	9kHz~30MHz	May 24, 2022	Apr. 19, 2023	May 23, 2023	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP00000 0811	AC 0V~300V, 45Hz~1000Hz	Oct. 12, 2022	Apr. 19, 2023	Oct. 11, 2023	Conduction (CO01-KS)

NCR: No Calibration Required

Sporton International Inc. (Kunshan)

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### 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 Power	±0.46 dB
Conducted Emissions	±0.48 dB
Occupied Channel Bandwidth	±0.001 %
Conducted Power Spectral Density	±0.40 dB

### <u>Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)</u>

Measuring Uncertainty for a Level of Confidence	2.94dB
of 95% (U = 2Uc(y))	2.94uB

### <u>Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)</u>

Measuring Uncertainty for a Level of Confidence	5.0dB
of 95% (U = 2Uc(y))	3.0GB

### Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

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

### Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence	5.0dB
of 95% (U = 2Uc(y))	3.0dB

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

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# **Appendix A. Conducted Test Results**

Sporton International Inc. (Kunshan)

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### **Bluetooth Low Energy**

Test Engineer:	ai kun	Temperature:	20~26	°C
Test Date:	2023/4/11~2023/4/23	Relative Humidity:	40~51	%

#### BLE 1M

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

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE	1Mbps	1	0	2402	1.009	0.67	0.50	Pass
BLE	1Mbps	1	19	2440	1.011	0.67	0.50	Pass
BLE	1Mbps	1	39	2480	1.011	0.67	0.50	Pass

### TEST RESULTS DATA

### Peak Power Table

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE	1Mbps	1	0	2402	1.97	30.00	-3.00	-1.03	36.00	Pass
BLE	1Mbps	1	19	2440	1.56	30.00	-3.00	-1.44	36.00	Pass
BLE	1Mbps	1	39	2480	0.91	30.00	-3.00	-2.09	36.00	Pass

# TEST RESULTS DATA Average Power Table

### (Reporting Only)

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)
BLE	1Mbps	1	0	2402	4.99	1.41
BLE	1Mbps	1	19	2440	4.99	1.36
BLE	1Mbps	1	39	2480	4.99	0.71

# TEST RESULTS DATA Peak Power Density

#### Peak PSD Peak PSD Peak PSD Freq. DG Limit Data CH. Pass/Fail Mod. NTX (dBm (dBm (dBm (MHz) Rate (dBi) /100kHz) /3kHz) /3kHz) 2402 0.93 -14.16 -3.00 Pass BLE 1Mbps 0 8.00 Pass 1Mbps 2440 -14.49 -3.00 BLE 19 0.68 8.00 -15.41 -3.00 1Mbps 2480 Pass BLE 39 -0.23 8.00

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

Report Number : FR332006B

### **Bluetooth Low Energy**

Test Engineer:	ai kun	Temperature:	20~26	°C
Test Date:	2023/4/11~2023/4/23	Relative Humidity:	40~51	%

### BLE 2M

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

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE	1Mbps	1	0	1000	2.018	1.13	0.50	Pass
BLE	1Mbps	1	19	2440	2.018	1.14	0.50	Pass
BLE	1Mbps	1	39	2480	2.018	1.13	0.50	Pass

### TEST RESULTS DATA

### Peak Power Table

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE	1Mbps	1	0	2402	1.90	30.00	-3.00	-1.10	36.00	Pass
BLE	1Mbps	1	19	2440	1.51	30.00	-3.00	-1.49	36.00	Pass
BLE	1Mbps	1	39	2480	0.88	30.00	-3.00	-2.12	36.00	Pass

# TEST RESULTS DATA Average Power Table

(Reporting Only)

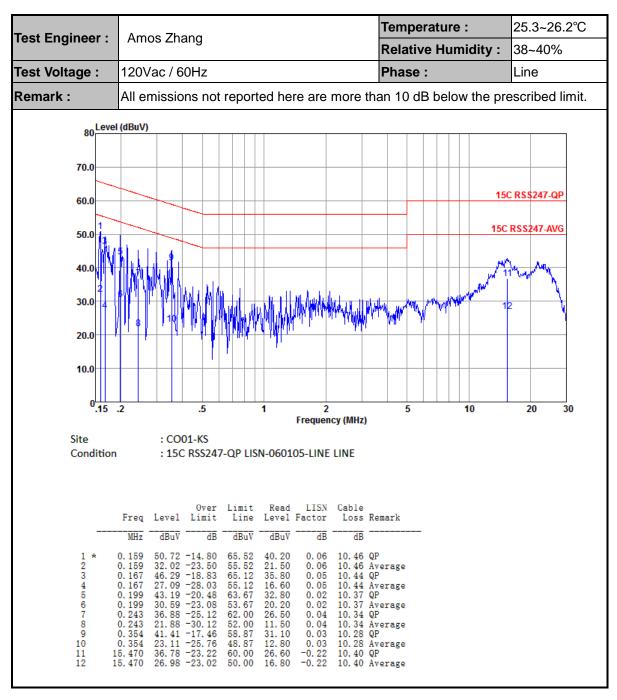
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)
BLE	1Mbps	1	0	2402	4.89	1.57
BLE	1Mbps	1	19	2440	4.89	1.24
BLE	1Mbps	1	39	2480	4.89	0.47

# 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	0.54	-16.84	-3.00	8.00	Pass
BLE	1Mbps	1	19	2440	0.29	-17.16	-3.00	8.00	Pass
BLE	1Mbps	1	39	2480	-0.60	-18.13	-3.00	8.00	Pass

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

### **Appendix B. AC Conducted Emission Test Results**



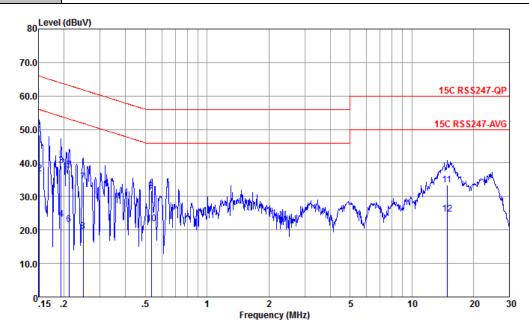
TEL: +86-512-57900158 FCC ID: IHDT56AM1

Test Voltage:

Test Engineer : Amos Zhang

Temperature : 25.3~26.2°C

Remark: All emissions not reported here are more than 10 dB below the prescribed limit.



Site : CO01-KS

120Vac / 60Hz

Condition : 15C RSS247-QP LISN-060105-NEUTRAL NEUTRAL

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1 * 23 4 5 6 7 8 9 10 11 12	0. 152 0. 152 0. 193 0. 193 0. 212 0. 212 0. 248 0. 248 0. 535 0. 535 14. 907	36. 81 39. 33 23. 23 37. 89 21. 59 34. 23 19. 63 31. 65 21. 75 33. 41	-17. 60 -19. 10 -24. 56 -30. 66 -25. 25 -31. 55 -27. 59 -32. 19 -24. 35 -24. 25 -26. 59 -25. 19	63. 14 53. 14 61. 82 51. 82 56. 00	37. 80 26. 30 28. 90 12. 80 27. 49 11. 19 23. 90 9. 30 21. 49 11. 59 23. 20 14. 60	0. 04 0. 04 0. 00 0. 00 -0. 08	10. 38 10. 36 10. 36 10. 33 10. 33 10. 24 10. 24 10. 39	Average QP Average QP Average QP Average QP Average

### Note:

- 1. Level( $dB\mu V$ ) = Read Level( $dB\mu V$ ) + LISN Factor(dB) + Cable Loss(dB)
- 2. Over Limit(dB) = Level(dB $\mu$ V) Limit Line(dB $\mu$ V)

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38~40%

Neutral

Relative Humidity:

Phase:

## **Appendix C. Radiated Spurious Emission Test Data**

Toot Engineer	HuaCong Liang	Relative Humidity :	50%
Test Engineer :	HuaCong Liang	Temperature :	20~22℃

## **Radiated Spurious Emission Test Modes**

Mode	Band (MHz)	Modulation	Channel	Frequency	Data Rate	RU	Remark
Mode 1	2400-2483.5	Bluetooth-LE_GSFK	00	2402	1Mbps		
Mode 2	2400-2483.5	Bluetooth-LE_GSFK	19	2440	1Mbps	-	-
Mode 3	2400-2483.5	Bluetooth-LE_GSFK	39	2480	1Mbps	-	-
Mode 4	2400-2483.5	Bluetooth-LE_GSFK	00	2402	2Mbps	-	-
Mode 5	2400-2483.5	Bluetooth-LE_GSFK	19	2440	2Mbps	-	-
Mode 6	2400-2483.5	Bluetooth-LE_GSFK	39	2480	2Mbps	-	-
Mode 7	2400-2483.5	Bluetooth-LE_GSFK	39	2480	2Mbps	-	LF

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Sporton International Inc. (Kunshan)

# 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	2383.97	41.58	54.00	-12.42	٧	AVERAGE	Pass	Band Edge
1	Bluetooth-LE_GSFK	00	4804.00	44.37	74.00	-29.63	Н	Peak	Pass	Harmonic
	Bluetooth-LE_GSFK	19	2489.38	42.03	54.00	-11.97	Н	AVERAGE	Pass	Band Edge
2	Bluetooth-LE_GSFK	19	7320.00	45.25	74.00	-28.75	V	Peak	Pass	Harmonic
	Bluetooth-LE_GSFK	39	2498.26	42.24	54.00	-11.76	٧	AVERAGE	Pass	Band Edge
3	Bluetooth-LE_GSFK	39	7440.00	45.08	74.00	-28.92	Н	Peak	Pass	Harmonic
	Bluetooth-LE_GSFK	00	2385.99	43.48	54.00	-10.52	٧	AVERAGE	Pass	Band Edge
4	Bluetooth-LE_GSFK	00	4804.00	45.22	74.00	-28.78	Н	Peak	Pass	Harmonic
_	Bluetooth-LE_GSFK	19	2483.86	43.79	54.00	-10.21	V	AVERAGE	Pass	Band Edge
5	Bluetooth-LE_GSFK	19	7320.00	45.58	74.00	-28.42	Н	Peak	Pass	Harmonic
	Bluetooth-LE_GSFK	39	2495.96	44.16	54.00	-9.84	V	AVERAGE	Pass	Band Edge
6	Bluetooth-LE_GSFK	39	7440.00	45.47	74.00	-28.53	٧	Peak	Pass	Harmonic
7	Bluetooth-LE_GSFK	39	261.83	34.50	46.00	-11.50	Н	Peak	Pass	LF

FCC ID: IHDT56AM1

### **Co-location**

### 2.4GHz 2400~2483.5MHz

### BLE CH39 2480MHz+Band13 (Band Edge @ 3m)

BLE	Note	Frequency	Level	Margin	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	( dBµV/m )	(dB)	(dBµV/m)	( dBµV )	( dB/m )	(dB)	(dB)	( cm )	( deg )	(P/A)	(H/V)
	*	2480	92.14	-	-	88.32	32.45	4.99	33.62	148	152	Р	Н
	*	2480	90.7	-	-	86.88	32.45	4.99	33.62	148	152	Α	Н
BLE		2483.52	52.55	-21.45	74	48.72	32.46	4.99	33.62	148	152	Р	Н
CH 39		2498.84	44.26	-9.74	54	40.35	32.5	5.01	33.6	148	152	Α	Н
2480MHz +Band13	*	2480	88.29	-	-	84.47	32.45	4.99	33.62	145	186	Р	٧
Co-location	*	2480	86.74	-	-	82.92	32.45	4.99	33.62	145	186	Α	٧
		2493.16	51.89	-22.11	74	48.01	32.48	5	33.6	145	186	Р	V
		2488.08	43.59	-10.41	54	39.74	32.47	5	33.62	145	186	Α	٧

### 2.4GHz 2400~2483.5MHz

### (Harmonic @ 3m)

BLE	Note	Frequency	Level	Margin	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	( dBµV/m )	(dB)	( dBµV/m )	(dBµV)	( dB/m )	(dB)	(dB)	( cm )	( deg )	(P/A)	(H/V)
BLE		4960	43.44	-30.56	74	53.75	34.62	7.81	52.74	-	-	Р	Н
CH 39		7440	43.36	-30.64	74	51.67	36.54	9.19	54.04	-	-	Р	Н
+Band13		4960	42.57	-31.43	74	52.88	34.62	7.81	52.74	-	-	Р	V
Co-location		7440	43.82	-30.18	74	52.13	36.54	9.19	54.04	-	ı	Р	V

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Report No.: FR332006B 1 **Band Edge** Mode 2400-2483.5\_Bluetooth-LE\_GSFK\_CH00\_2402MHz **ANT** 1 Pol. Horizontal **Fundamental** Date: 2023-05-06 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81. 81.3 PEAK\_74 65.0 65.0 48.8 48.8 32.5 32.5 16.3 16.3 **Peak** 1800. Frequency (MHz) 0 2310 2346.8 2 Frequency (MHz) 1000 2328.4 2365.2 2383.6 2402 1400. 2200. 2600. 3000 : 03CH03-SZ : 03CH03-SZ Condition: PEAK\_74 3m ANT3117\_0057 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz Condition: PEAK\_BE\_74 3m ANT3117\_0057 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz Mode Setting : Default Setting : Default Plane : Y with accessories Plane : Y with accessories : 352000530016413/352000530016421 : 352000530016413/352000530016421 Limit Read Ant Cable Preamp APos TPos
Freq Level Line Margin Level Factor Loss Factor Remark Limit Margin Read Ant Cable Preamp APos TPos Freq Level Line (dB) Level Factor Loss Factor Remark MHz dBuV/m dBuV/m dBuV/m dB/m dB dBuV dB/m dB dB MHz dBuV/m dBuV/m 1 2402.00 93.64 ----- 90.24 32.25 4.81 33.66 149 159 PEAK Date: 2023-05-06 Date: 2023-05-06 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 81.3 65.0 65.0 AVG\_5 48.8 48.8 32.5 32.5 16.3 16.3 Avg 2310 1000 2346.8 2365.2 Frequency (MHz) 1800. 2200. Frequency (MHz) 2328.4 2383.6 2402 1400. 2600. 3000 : 03CH03-SZ : 03CH03-SZ Condition: AVG\_BE\_54 3m ANT3117\_0057 HORIZONTAL Condition: AVG\_54 3m ANT3117\_0057 HORIZONTAL : RBW:1000.000kHz VBW:3.000kHz : RBW:1000.000kHz VBW:3.000kHz Mode Setting : Default
Plane : Y with accessories Setting : Default
Plane : Y with accessories : 352000530016413/352000530016421 : 352000530016413/352000530016421 Limit Read Ant Cable Preamp APos TPos Freq Level Line Margin Level Factor Loss Factor Limit Margin Read Ant Cable Preamp APos TPos Freq Level Line (dB) Level Factor Loss Factor

dBuV dB/m

1 2389.40 41.41 54.00 -12.59 38.07 32.21 4.80 33.67 149 159 AVERAGE

TEL: +86-512-57900158 FCC ID: IHDT56AM1 1 2402.00 92.84 ----- 89.44 32.25 4.81 33.66 149 159 AVERAGE

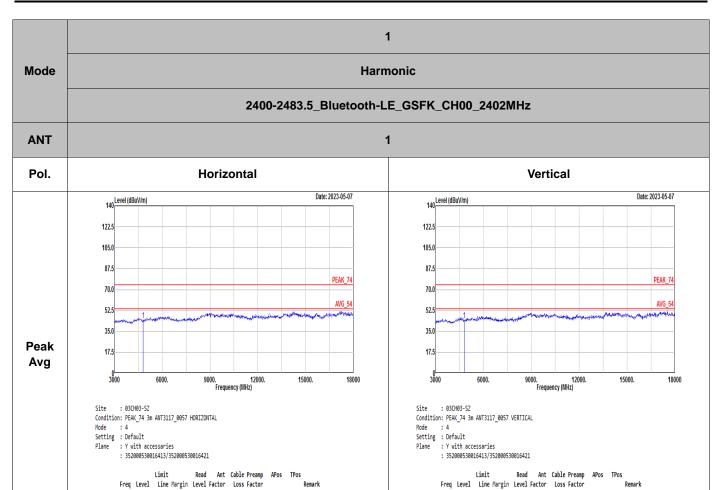
Report No.: FR332006B 1 **Band Edge** Mode 2400-2483.5\_Bluetooth-LE\_GSFK\_CH00\_2402MHz **ANT** 1 Pol. Vertical **Fundamental** Date: 2023-05-06 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81. 81.3 PEAK\_74 65.0 65.0 48.9 48.8 32.5 32.5 16.3 16.3 **Peak** 1800. Frequency (MHz) 0 2310 2346.8 2 Frequency (MHz) 1000 2328.4 2365.2 2383.6 2402 1400. 2200. 2600. 3000 : 03CH03-SZ : 03CH03-SZ Condition: PEAK\_74 3m ANT3117\_0057 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz Condition: PEAK\_BE\_74 3m ANT3117\_0057 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz Mode Setting : Default Setting : Default Plane : Y with accessories Plane : Y with accessories : 352000530016413/352000530016421 : 352000530016413/352000530016421 Limit Read Ant Cable Preamp APos TPos
Freq Level Line Margin Level Factor Loss Factor Remark Limit Margin Read Ant Cable Preamp APos TPos Freq Level Line (dB) Level Factor Loss Factor Remark MHz dBuV/m dBuV/m dBuV/m dBuV/m dBuV dB/m dB dB cm deg 1 2328.31 53.19 74.00 -20.81 50.12 32.05 4.73 33.71 143 171 PEAK dBuV dB/m dB dB MHz dBuV/m dBuV/m 1 2402.00 91.56 ----- 88.16 32.25 4.81 33.66 143 171 PEAK Date: 2023-05-06 Date: 2023-05-06 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 81.3 65.0 65.0 AVG\_5 48.8 48.8 32.5 32.5 16.3 16.3 Avg 2310 1000 2346.8 2365.2 Frequency (MHz) 1800. 2200. Frequency (MHz) 2328.4 2383.6 2402 1400. 2600. 3000 : 03CH03-SZ : 03CH03-SZ Condition: AVG\_BE\_54 3m ANT3117\_0057 VERTICAL Condition: AVG\_54 3m ANT3117\_0057 VERTICAL : RBW:1000.000kHz VBW:3.000kHz : RBW:1000.000kHz VBW:3.000kHz Mode Setting : Default
Plane : Y with accessories Setting : Default
Plane : Y with accessories : 352000530016413/352000530016421 : 352000530016413/352000530016421 Limit Read Ant Cable Preamp APos TPos Freq Level Line Margin Level Factor Loss Factor Limit Margin Read Ant Cable Preamp APos TPos Freq Level Line (dB) Level Factor Loss Factor

MHz dBuV/m dBuV/m

dBuV dB/m

1 2383.97 41.58 54.00 -12.42 38.26 32.20 4.79 33.67 143 171 AVERAGE

1 2402.00 90.53 ----- 87.13 32.25 4.81 33.66 143 171 AVERAGE



MHz dBuV/m dBuV/m dB dBuV dB/m dB dB 1 4804.00 44.37 74.00 -29.63 54.88 34.68 7.74 52.93

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 MHz
 dBuV/m
 dBuV/m
 dB
 dBuV/m
 dB/m
 dB
 dB
 cm
 deg

 1
 4804.00
 44.28
 74.00
 -29.72
 54.79
 34.68
 7.74
 52.93
 -- -- Peak

Report No.: FR332006B 2 Band Edge - L Mode 2400-2483.5\_Bluetooth-LE\_GSFK\_CH19\_2440MHz **ANT** Pol. Horizontal **Fundamental** Date: 2023-05-06 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81. 81.3 PEAK\_74 65.0 65.0 48.9 48.8 32.5 32.5 16.3 16.3 **Peak** 1800. Frequency (MHz) 0 2310 2362. Frequency (MHz) 1000 2336. 2388. 2414. 2440 1400. 2200. 2600. 3000 : 03CH03-SZ : 03CH03-SZ Condition: PEAK\_BE\_74 3m ANT3117\_0057 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz Condition: PEAK\_74 3m ANT3117\_0057 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz Mode Setting : Default
Plane : Y with accessories Setting : Default Plane : Y with accessories Plane : 352000530016413/352000530016421 : 352000530016413/352000530016421 Limit Read Ant Cable Preamp APos TPos
Freq Level Line Margin Level Factor Loss Factor Remark Limit Margin Read Ant Cable Preamp APos TPos Freq Level Line (dB) Level Factor Loss Factor Remark MHz dBuV/m dBuV/m dBuV dB/m dB dBuV dB/m dB dB MHz dBuV/m dBuV/m 1 2440.00 92.98 ----- 89.42 32.34 4.86 33.64 145 149 PEAK Date: 2023-05-06 Date: 2023-05-06 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 81.3 65.0 65.0 AVG\_5 48.8 48.8 32.5 32.5 16.3 16.3 Avg 2310 1000 2362. 2388. Frequency (MHz) 1800. 2200. Frequency (MHz) 2336. 2414. 2440 1400. 2600. 3000 Site : 03CH03-SZ Condition: AVG\_BE\_54 3m ANT3117\_0057 HORIZONTAL : 03CH03-SZ Condition: AVG\_54 3m ANT3117\_0057 HORIZONTAL : RBW:1000.000kHz VBW:3.000kHz : RBW:1000.000kHz VBW:3.000kHz Mode Setting : Default
Plane : Y with accessories Setting : Default
Plane : Y with accessories : 352000530016413/352000530016421 : 352000530016413/352000530016421 Limit Read Ant Cable Preamp APos TPos Freq Level Line Margin Level Factor Loss Factor Limit Margin Read Ant Cable Preamp APos TPos Freq Level Line (dB) Level Factor Loss Factor

MHz dBuV/m dBuV/m

dBuV dB/m

1 2370.06 41.61 54.00 -12.39 38.35 32.16 4.78 33.68 145 149 AVERAGE

TEL: +86-512-57900158 FCC ID: IHDT56AM1 1 2440.00 91.85 ----- 88.29 32.34 4.86 33.64 145 149 AVERAGE

2 Mode Band Edge - R 2400-2483.5\_Bluetooth-LE\_GSFK\_CH19\_2440MHz **ANT** 1 Pol. Horizontal **Fundamental** Date: 2023-05-06 130 Level (dBuV/m) 113.8 97.5 81.3 PEAK\_BE\_74 65.0 48.8 32.5 16.3 **Peak** Blank 0 2440 2452. 2464. 2476. Frequency (MHz) 2488. 2500 : 03CH03-SZ Condition: PEAK\_BE\_74 3m ANT3117\_0057 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz Setting : Default
Plane : Y with accessories
: 352000530016413/352000530016421 Limit Read Ant Cable Preamp APos TPos
Freq Level Line Margin Level Factor Loss Factor Remark 
 MHz
 dBuV/m
 dBuV/m
 dBuV
 dBuV
 dB
 dB
 cm
 deg

 1
 2489.38
 53.60
 74.00
 -20.40
 49.81
 32.47
 4.93
 33.61
 145
 149
 PEAK
 Date: 2023-05-06 130 Level (dBuV/m) 113.8 97.5 81.3 65.0 AVG\_BE\_54 48.8 32.5 16.3 Blank Avg 2440 2464. 2476. Frequency (MHz) 2452. 2488. 2500 Site : 03CH03-SZ Condition: AVG\_BE\_54 3m ANT3117\_0057 HORIZONTAL : RBW:1000.000kHz VBW:3.000kHz Freq Level Limit Read Ant Cable Preamp APos TPos
Freq Level Lime Margin Level Factor Loss Factor Remark 

TEL: +86-512-57900158 FCC ID: IHDT56AM1

Report No.: FR332006B 2 Mode Band Edge - L 2400-2483.5\_Bluetooth-LE\_GSFK\_CH19\_2440MHz **ANT** 1 Pol. Horizontal **Fundamental** Date: 2023-05-18 130 Level (dBuV/m) Date: 2023-05-18 130 Level (dBuV/m) 113.8 113.8 97. 97.5 PEAK\_74 65.0 65.0 48.8 48.8 32.5 32 5 **Peak** 2310 1000 2336. 2362. 2388. Frequency (MHz) 2414. 1400. 1800. 2200. Frequency (MHz) 2600. Site : 03CH03-SZ Condition: PEAK\_BE\_74 3m ANT3117\_0057 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz Site : 03CH03-SZ Condition: PEAK\_74 3m ANT3117\_0057 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz Mode : 5
Setting : Default
Plane : Y with accessories
: 352000530016413/352000530016421 Mode : 5
Setting : Default
Plane : Y with accessories
: 352000530016413/352000530016421 Freq Level Line Margin Level Factor Loss Factor Remark Limit Margin Read Ant Cable Preamp APos TPos
Freq Level Line (dB) Level Factor Loss Factor Remark | MHz | dBuV/m | dBuV/m | dBuV | dB/m | dB | dB | dB | 1 | 2353.42 | 53.62 | 74.00 | -20.38 | 50.43 | 32.12 | 4.76 | 33.69 | MHz dBuV/m dBuV/m dBuV/m dBuV dB/m dB dB 1 2440.00 92.85 ----- 89.29 32.34 4.86 33.64 cm deg 100 84 PEAK deg 84 PEAK Date: 2023-05-18 Date: 2023-05-18 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 81.3 65.0 65.0 AVG\_5 48.8 48.8 32.5 32.5 16.3 16.3 Avg 2310 1000 2362. 2388. Frequency (MHz) 1800. 2200. Frequency (MHz) 2336. 2414. 2440 1400. 2600. 3000 Site : 03CH03-SZ Condition: AVG\_BE\_54 3m ANT3117\_0057 VERTICAL : 03CH03-SZ Condition: AVG\_54 3m ANT3117\_0057 VERTICAL : RBW:1000.000kHz VBW:3.000kHz : RBW:1000.000kHz VBW:3.000kHz Mode Setting : Default
Plane : Y with accessories Setting : Default
Plane : Y with accessories Plane : 352000530016413/352000530016421 : 352000530016413/352000530016421 Limit Margin Read Ant Cable Preamp APos TPos Freq Level Line (dB) Level Factor Loss Factor Limit Margin Read Ant Cable Preamp APos TPos Freq Level Line (dB) Level Factor Loss Factor

MHz dBuV/m dBuV/m dBuV dB/m dB dB cm 1 2387.48 41.21 54.00 -12.79 37.88 32.21 4.79 33.67 100

84 AVERAGE

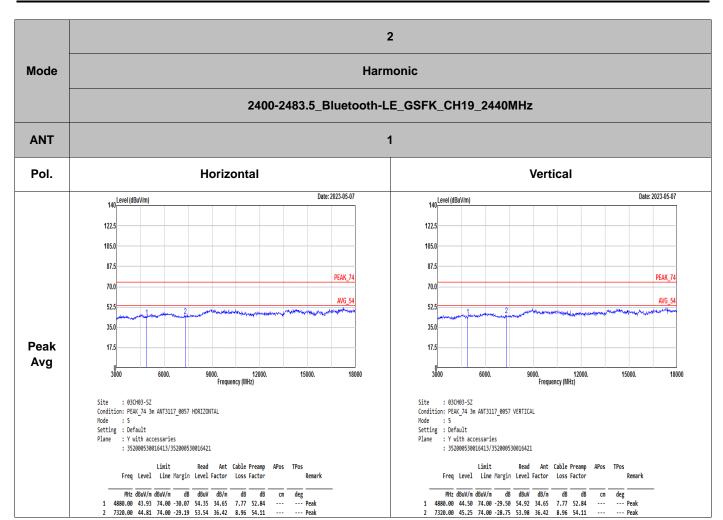
TEL: +86-512-57900158 FCC ID: IHDT56AM1 1 2440.00 91.72 54.00 37.72 88.16 32.34 4.86 33.64 100

84 AVERAGE

2 Mode Band Edge - R 2400-2483.5\_Bluetooth-LE\_GSFK\_CH19\_2440MHz **ANT** 1 Pol. Horizontal **Fundamental** 130 Level (dBuV/m) Date: 2023-05-18 113.8 97. PEAK\_BE\_7 65.0 48.8 32.5 **Peak** Blank 16.3 2440 2452. 2464. 2476. Frequency (MHz) 2488. Site : 03CH03-SZ Condition: PEAK\_BE\_74 3m ANT3117\_0057 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz Mode : 5
Setting : Default
Plane : Y with accessories
: 352000530016413/352000530016421 Freq Level Line Margin Level Factor Loss Factor Remark | MHz | dBuV/m | dBuV/m | dBuV | dB/m | dB | dB | 1 | 2496.58 | 54.27 | 74.00 | -19.73 | 50.44 | 32.49 | 4.94 | 33.60 | cm deg 100 84 PEAK Date: 2023-05-18 130 Level (dBuV/m) 113.8 97.5 81.3 65.0 AVG\_BE\_5 48.8 32.5 16.3 Blank Avg 2440 2464. 2476. Frequency (MHz) 2452. 2488. 2500 Site : 03CH03-SZ Condition: AVG\_BE\_54 3m ANT3117\_0057 VERTICAL : RBW:1000.000kHz VBW:3.000kHz Limit Margin Read Ant Cable Preamp APos TPos
Freq Level Line (dB) Level Factor Loss Factor Remark MHz dBuV/m dBuV/m dBuV/m dBuV dB/m dB dB cm 1 2498.80 41.76 54.00 -12.24 37.92 32.50 4.94 33.60 100

84 AVERAGE

TEL: +86-512-57900158 FCC ID: IHDT56AM1



TEL: +86-512-57900158 FCC ID: IHDT56AM1 : C11 of C28

Report No.: FR332006B 3 **Band Edge** Mode 2400-2483.5\_Bluetooth-LE\_GSFK\_CH39\_2480MHz **ANT** 1 Pol. Horizontal **Fundamental** Date: 2023-05-06 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 PEAK\_BE\_74 PEAK\_74 65.0 65.0 48.8 48.8 32.5 32.5 16.3 16.3 **Peak** 1800. Frequency (MHz) 0 2480 2488. Frequency (MHz) 1000 2484. 2492. 2496. 2500 1400. 2200. 2600. 3000 : 03CH03-SZ : 03CH03-SZ Condition: PEAK\_BE\_74 3m ANT3117\_0057 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz Condition: PEAK\_74 3m ANT3117\_0057 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz Mode Setting : Default Setting : Default Plane : Y with accessories Plane : Y with accessories : 352000530016413/352000530016421 : 352000530016413/352000530016421 Limit Read Ant Cable Preamp APos TPos
Freq Level Line Margin Level Factor Loss Factor Remark Limit Margin Read Ant Cable Preamp APos TPos Freq Level Line (dB) Level Factor Loss Factor Remark MHz dBuV/m dBuV/m dBuV/m dB/m dB dBuV dB/m dB dB MHz dBuV/m dBuV/m cm deg 1 2480.00 92.27 ----- 88.51 32.45 4.92 33.61 186 153 PEAK 1 2491.10 53.69 74.00 -20.31 49.89 32.48 4.93 33.61 186 153 PEAK Date: 2023-05-06 Date: 2023-05-06 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 65.0 65.0 AVG\_BE\_5 AVG\_5 48.8 48.8 32.5 32.5 16.3 16.3 Avg 1000 2480 2488. 2492. Frequency (MHz) 1800. 2200. Frequency (MHz) 2484. 2496. 2500 1400. 2600. 3000 Site : 03CH03-SZ Condition: AVG\_BE\_54 3m ANT3117\_0057 HORIZONTAL : 03CH03-SZ Condition: AVG\_54 3m ANT3117\_0057 HORIZONTAL : RBW:1000.000kHz VBW:3.000kHz : RBW:1000.000kHz VBW:3.000kHz Mode Setting : Default
Plane : Y with accessories Setting : Default
Plane : Y with accessories : 352000530016413/352000530016421 : 352000530016413/352000530016421 Limit Read Ant Cable Preamp APos TPos Freq Level Line Margin Level Factor Loss Factor Limit Margin Read Ant Cable Preamp APos TPos Freq Level Line (dB) Level Factor Loss Factor

dBuV dB/m

1 2487.04 42.16 54.00 -11.84 38.38 32.47 4.92 33.61 186 153 AVERAGE

1 2480.00 91.43 ----- 87.67 32.45 4.92 33.61 186 153 AVERAGE

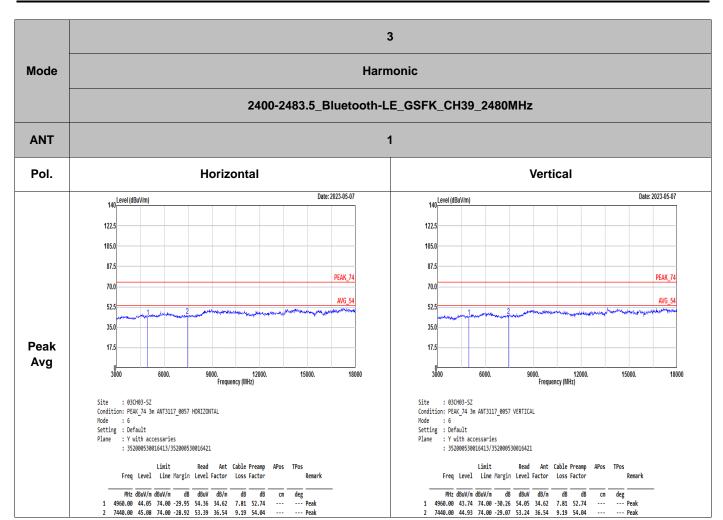
Report No.: FR332006B 3 **Band Edge** Mode 2400-2483.5\_Bluetooth-LE\_GSFK\_CH39\_2480MHz **ANT** 1 Pol. Vertical **Fundamental** Date: 2023-05-06 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 PEAK\_BE\_74 PEAK\_74 65.0 65.0 48.8 48.8 32.5 32.5 16.3 16.3 **Peak** 1800. Frequency (MHz) 0 2480 2488. Frequency (MHz) 1000 2484. 2492. 2496. 2500 1400. 2200. 2600. 3000 : 03CH03-SZ : 03CH03-SZ Condition: PEAK\_BE\_74 3m ANT3117\_0057 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz Condition: PEAK\_74 3m ANT3117\_0057 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz Mode Setting : Default Setting : Default Plane : Y with accessories Plane : Y with accessories : 352000530016413/352000530016421 : 352000530016413/352000530016421 Limit Read Ant Cable Preamp APos TPos
Freq Level Line Margin Level Factor Loss Factor Remark Limit Margin Read Ant Cable Preamp APos TPos Freq Level Line (dB) Level Factor Loss Factor Remark dBuV dB/m dB dBuV dB/m dB dB | MHz dBuV/m dBuV/m dBuV/m dBuV/m dBuV dB/m dB dB cm deg | 1 2497.40 54.40 74.00 -19.60 50.57 32.49 4.94 33.60 146 183 PEAK MHz dBuV/m dBuV/m 1 2480.00 92.73 ----- 88.97 32.45 4.92 33.61 146 183 PEAK Date: 2023-05-06 Date: 2023-05-06 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 65.0 65.0 AVG\_BE\_5 AVG\_5 48.8 48.8 32.5 32.5 16.3 16.3 Avg 1000 2480 2488. 2492. Frequency (MHz) 1800. 2200. Frequency (MHz) 2484. 2496. 2500 1400. 2600. 3000 Site : 03CH03-SZ Condition: AVG\_BE\_54 3m ANT3117\_0057 VERTICAL : 03CH03-SZ Condition: AVG\_54 3m ANT3117\_0057 VERTICAL : RBW:1000.000kHz VBW:3.000kHz : RBW:1000.000kHz VBW:3.000kHz Mode Setting : Default
Plane : Y with accessories Setting : Default
Plane : Y with accessories : 352000530016413/352000530016421 : 352000530016413/352000530016421 Limit Read Ant Cable Preamp APos TPos Freq Level Line Margin Level Factor Loss Factor Limit Margin Read Ant Cable Preamp APos TPos Freq Level Line (dB) Level Factor Loss Factor

MHz dBuV/m dBuV/m

dBuV dB/m

1 2498.26 42.24 54.00 -11.76 38.40 32.50 4.94 33.60 146 183 AVERAGE

1 2480.00 91.85 ----- 88.09 32.45 4.92 33.61 146 183 AVERAGE



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Report No.: FR332006B **Band Edge** Mode 2400-2483.5\_Bluetooth-LE\_GSFK\_CH00\_2402MHz **ANT** 1 Pol. Horizontal **Fundamental** Date: 2023-05-06 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81. 81.3 PEAK\_74 65.0 65.0 48.8 48.8 32.5 32.5 16.3 16.3 **Peak** 1800. Frequency (MHz) 0 2310 2346.8 2 Frequency (MHz) 1000 2328.4 2365.2 2383.6 1400. 2200. 2600. 3000 : 03CH03-SZ : 03CH03-SZ Condition: PEAK\_BE\_74 3m ANT3117\_0057 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz Condition: PEAK\_74 3m ANT3117\_0057 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz Mode Setting : Default
Plane : Y with accessories Setting : Default Plane : Y with accessories Plane : 352000530016413/352000530016421 : 352000530016413/352000530016421 Limit Read Ant Cable Preamp APos TPos
Freq Level Line Margin Level Factor Loss Factor Remark Limit Margin Read Ant Cable Preamp APos TPos Freq Level Line (dB) Level Factor Loss Factor Remark dBuV dB/m dB dB MHz dBuV/m dBuV/m 1 2402.00 93.76 ----- 90.36 32.25 4.81 33.66 125 150 PEAK Date: 2023-05-06 Date: 2023-05-06 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 81.3 65.0 65.0 AVG\_5 48.8 48.8 32.5 32.5 16.3 16.3 Avg 2310 1000 2346.8 2365.2 Frequency (MHz) 1800. 2200. Frequency (MHz) 2328.4 2383.6 2402 1400. 2600. 3000 : 03CH03-SZ : 03CH03-SZ Condition: AVG\_BE\_54 3m ANT3117\_0057 HORIZONTAL Condition: AVG\_54 3m ANT3117\_0057 HORIZONTAL : RBW:1000.000kHz VBW:10.000kHz : RBW:1000.000kHz VBW:10.000kHz Mode Setting : Default
Plane : Y with accessories Setting : Default
Plane : Y with accessories : 352000530016413/352000530016421 : 352000530016413/352000530016421 Limit Read Ant Cable Preamp APos TPos Freq Level Line Margin Level Factor Loss Factor Limit Margin Read Ant Cable Preamp APos TPos Freq Level Line (dB) Level Factor Loss Factor

dBuV dB/m

1 2388.75 43.33 54.00 -10.67 40.00 32.21 4.79 33.67 125 150 AVERAGE

1 2402.00 91.77 ----- 88.37 32.25 4.81 33.66 125 150 AVERAGE

Report No.: FR332006B **Band Edge** Mode 2400-2483.5\_Bluetooth-LE\_GSFK\_CH00\_2402MHz **ANT** 1 Pol. Vertical **Fundamental** Date: 2023-05-06 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81. 81.3 PEAK\_74 65.0 65.0 48.9 48.8 32.5 32.5 16.3 16.3 **Peak** 1800. Frequency (MHz) 0 2310 2346.8 2 Frequency (MHz) 1000 2328.4 2365.2 2383.6 2402 1400. 2200. 2600. 3000 : 03CH03-SZ : 03CH03-SZ Condition: PEAK\_BE\_74 3m ANT3117\_0057 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz Condition: PEAK\_74 3m ANT3117\_0057 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz Mode Setting : Default
Plane : Y with accessories Setting : Default Plane : Y with accessories Plane : 352000530016413/352000530016421 : 352000530016413/352000530016421 Limit Read Ant Cable Preamp APos TPos
Freq Level Line Margin Level Factor Loss Factor Remark Limit Margin Read Ant Cable Preamp APos TPos Freq Level Line (dB) Level Factor Loss Factor Remark MHz dBuV/m dBuV/m dBuV/m dB/m dB dBuV dB/m dB dB MHz dBuV/m dBuV/m | MHz dBuV/m dBuV/m dBuV/m dB/m dB dB cm deg | 1 2362.16 53.47 74.00 -20.53 50.24 32.14 4.77 33.68 184 195 PEAK 1 2402.00 92.59 ----- 89.19 32.25 4.81 33.66 184 195 PEAK Date: 2023-05-06 Date: 2023-05-06 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 81.3 65.0 65.0 AVG\_5 48.8 48.8 32.5 32.5 16.3 16.3 Avg 2310 1000 2346.8 2365.2 Frequency (MHz) 1800. 2200. Frequency (MHz) 2328.4 2383.6 2402 1400. 2600. 3000 : 03CH03-SZ : 03CH03-SZ Condition: AVG\_BE\_54 3m ANT3117\_0057 VERTICAL Condition: AVG\_54 3m ANT3117\_0057 VERTICAL : RBW:1000.000kHz VBW:10.000kHz : RBW:1000.000kHz VBW:10.000kHz Mode Setting : Default
Plane : Y with accessories Setting : Default
Plane : Y with accessories : 352000530016413/352000530016421 : 352000530016413/352000530016421 Limit Read Ant Cable Preamp APos TPos Freq Level Line Margin Level Factor Loss Factor

MHz dBuV/m dBuV/m

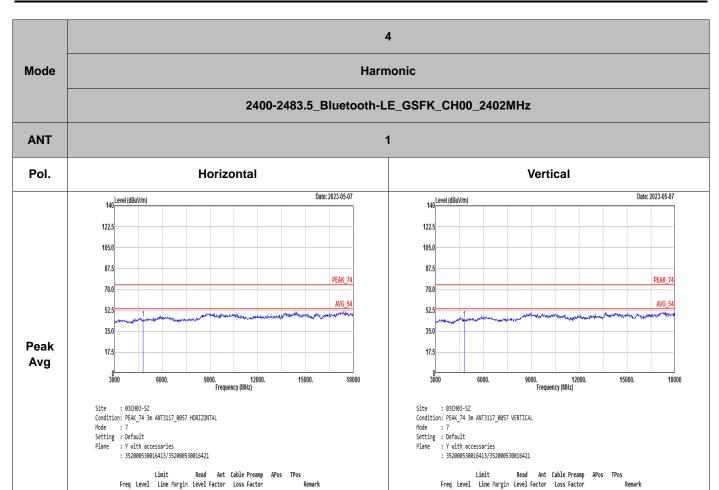
dBuV dB/m

1 2385.99 43.48 54.00 -10.52 40.16 32.20 4.79 33.67 184 195 AVERAGE

TEL: +86-512-57900158 FCC ID: IHDT56AM1

Limit Margin Read Ant Cable Preamp APos TPos Freq Level Line (dB) Level Factor Loss Factor

1 2402.00 90.60 ----- 87.20 32.25 4.81 33.66 184 195 AVERAGE



 MHz
 dBuV/m
 dBuV/m
 dB
 dBuV
 dB/m
 dB
 dB
 cm
 deg

 1
 4804.00
 45.22
 74.00
 -28.78
 55.73
 34.68
 7.74
 52.93
 -- -- Peak

TEL: +86-512-57900158 FCC ID: IHDT56AM1 
 MHz
 dBuV/m
 dBuV/m
 dB
 dBuV/m
 dB/m
 dB
 dB
 cm
 deg

 1
 4804.00
 45.17
 74.00 -28.83
 55.68
 34.68
 7.74
 52.93
 -- -- Peak

Report No.: FR332006B 5 Band Edge - L Mode 2400-2483.5\_Bluetooth-LE\_GSFK\_CH19\_2440MHz **ANT** Pol. Horizontal **Fundamental** Date: 2023-05-06 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81. 81.3 PEAK\_74 65.0 65.0 48.8 48.8 32.5 32.5 16.3 16.3 **Peak** 1800. Frequency (MHz) 0 2310 2362. Frequency (MHz) 1000 2336. 2388. 2414. 2440 1400. 2200. 2600. 3000 : 03CH03-SZ : 03CH03-SZ Condition: PEAK\_74 3m ANT3117\_0057 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz Condition: PEAK\_BE\_74 3m ANT3117\_0057 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz Mode Setting : Default
Plane : Y with accessories Setting : Default Plane : Y with accessories Plane : 352000530016413/352000530016421 : 352000530016413/352000530016421 Limit Read Ant Cable Preamp APos TPos
Freq Level Line Margin Level Factor Loss Factor Remark Limit Margin Read Ant Cable Preamp APos TPos Freq Level Line (dB) Level Factor Loss Factor Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB dBuV dB/m dB dB MHz dBuV/m dBuV/m cm deg 1 2324.82 53.01 74.00 -20.99 49.95 32.04 4.73 33.71 145 155 PEAK 1 2440.00 92.86 ----- 89.30 32.34 4.86 33.64 145 155 PEAK Date: 2023-05-06 Date: 2023-05-06 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 81.3 65.0 65.0 AVG\_5 48.8 48.8 32.5 32.5 16.3 16.3 Avg 2310 1000 2362. 2388. Frequency (MHz) 1800. 2200. Frequency (MHz) 2336. 2414. 2440 1400. 2600. 3000 Site : 03CH03-SZ Condition: AVG\_BE\_54 3m ANT3117\_0057 HORIZONTAL : 03CH03-SZ Condition: AVG 54 3m ANT3117 0057 HORIZONTAL : RBW:1000.000kHz VBW:10.000kHz : RBW:1000.000kHz VBW:10.000kHz Mode Setting : Default
Plane : Y with accessories Setting : Default
Plane : Y with accessories : 352000530016413/352000530016421 : 352000530016413/352000530016421 Limit Read Ant Cable Preamp APos TPos Freq Level Line Margin Level Factor Loss Factor Limit Margin Read Ant Cable Preamp APos TPos Freq Level Line (dB) Level Factor Loss Factor

MHz dBuV/m dBuV/m

dBuV dB/m

1 2369.80 42.91 54.00 -11.09 39.66 32.16 4.77 33.68 145 155 AVERAGE

1 2440.00 90.95 ----- 87.39 32.34 4.86 33.64 145 155 AVERAGE

5 Mode Band Edge - R 2400-2483.5\_Bluetooth-LE\_GSFK\_CH19\_2440MHz **ANT** 1 Pol. Horizontal **Fundamental** Date: 2023-05-06 130 Level (dBuV/m) 113.8 97.5 81.3 PEAK\_BE\_74 65.0 48.8 32.5 16.3 **Peak** Blank 0 2440 2452. 2464. 2476. Frequency (MHz) 2488. 2500 : 03CH03-SZ Condition: PEAK\_BE\_74 3m ANT3117\_0057 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz Limit Read Ant Cable Preamp APos TPos
Freq Level Line Margin Level Factor Loss Factor Remark 
 MHz
 dBuV/m
 dBuV/m
 dBuV
 dBuV
 dB
 dB
 cm
 deg

 1
 2486.74
 53.39
 74.00
 -20.61
 49.61
 32.47
 4.92
 33.61
 145
 155 PEAK
 Date: 2023-05-06 130 Level (dBuV/m) 113.8 97.5 81.3 65.0 AVG\_BE\_5 48.8 32.5 16.3 Blank Avg 2440 2464. 2476. Frequency (MHz) 2452. 2488. 2500 Site : 03CH03-SZ Condition: AVG\_BE\_54 3m ANT3117\_0057 HORIZONTAL : RBW:1000.000kHz VBW:10.000kHz Setting : Default
Plane : Y with accessories
: 352000530016413/352000530016421 Freq Level Limit Read Ant Cable Preamp APos TPos
Freq Level Lime Margin Level Factor Loss Factor Remark 

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Report No.: FR332006B 5 Band Edge - L Mode 2400-2483.5\_Bluetooth-LE\_GSFK\_CH19\_2440MHz **ANT** 1 Pol. Vertical **Fundamental** Date: 2023-05-06 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81. 81.3 PEAK\_74 65.0 65.0 48.8 48.8 32.5 32.5 16.3 16.3 **Peak** 1800. Frequency (MHz) 0 2310 2362. Frequency (MHz) 1000 2336. 2388. 2414. 2440 1400. 2200. 2600. 3000 : 03CH03-SZ : 03CH03-SZ Condition: PEAK\_74 3m ANT3117\_0057 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz Condition: PEAK\_BE\_74 3m ANT3117\_0057 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz Mode Setting : Default
Plane : Y with accessories Setting : Default Plane : Y with accessories Plane : 352000530016413/352000530016421 : 352000530016413/352000530016421 Limit Read Ant Cable Preamp APos TPos
Freq Level Line Margin Level Factor Loss Factor Remark Limit Margin Read Ant Cable Preamp APos TPos Freq Level Line (dB) Level Factor Loss Factor Remark dBuV dB/m dB dBuV dB/m dB dB | MHz dBuV/m dBuV/m dBuV/m dBuV dB/m dB dB cm deg | 1 2387.48 53.61 74.00 -20.39 50.28 32.21 4.79 33.67 203 185 PEAK MHz dBuV/m dBuV/m cm deg 1 2440.00 91.27 ----- 87.71 32.34 4.86 33.64 203 185 PEAK Date: 2023-05-06 Date: 2023-05-06 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 81.3 65.0 65.0 AVG\_5 48.8 48.8 32.5 32.5 16.3 16.3 Avg 2310 1000 2362. 2388. Frequency (MHz) 1800. 2200. Frequency (MHz) 2336. 2414. 2440 1400. 2600. 3000 Site : 03CH03-SZ Condition: AVG\_BE\_54 3m ANT3117\_0057 VERTICAL : 03CH03-SZ Condition: AVG\_54 3m ANT3117\_0057 VERTICAL : RBW:1000.000kHz VBW:10.000kHz : RBW:1000.000kHz VBW:10.000kHz Mode Setting : Default
Plane : Y with accessories Setting : Default
Plane : Y with accessories : 352000530016413/352000530016421 : 352000530016413/352000530016421 Limit Read Ant Cable Preamp APos TPos Freq Level Line Margin Level Factor Loss Factor Limit Margin Read Ant Cable Preamp APos TPos Freq Level Line (dB) Level Factor Loss Factor

MHz dBuV/m dBuV/m

dBuV dB/m

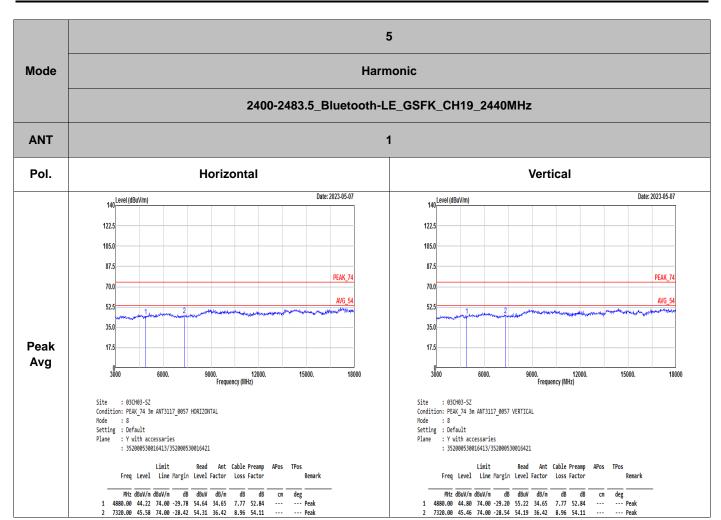
1 2378.25 43.54 54.00 -10.46 40.26 32.18 4.78 33.68 203 185 AVERAGE

1 2440.00 89.29 ----- 85.73 32.34 4.86 33.64 203 185 AVERAGE

5 Mode Band Edge - R 2400-2483.5\_Bluetooth-LE\_GSFK\_CH19\_2440MHz **ANT** 1 Pol. Vertical **Fundamental** Date: 2023-05-06 130 Level (dBuV/m) 113.8 97.5 81.3 PEAK\_BE\_74 65.0 48.8 32.5 16.3 **Peak** Blank 0 2440 2452. 2464. 2476. Frequency (MHz) 2488. 2500 : 03CH03-SZ Condition: PEAK\_BE\_74 3m ANT3117\_0057 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz Limit Read Ant Cable Preamp APos TPos
Freq Level Line Margin Level Factor Loss Factor Remark 
 MHz
 dBuV/m
 dBuV/m
 dBuV
 dBuV
 dB
 dB
 cm
 deg

 1
 2486.32
 53.94
 74.00
 -20.06
 50.17
 32.46
 4.92
 33.61
 203
 185
 PEAK
 Date: 2023-05-06 130 Level (dBuV/m) 113.8 97.5 81.3 65.0 AVG\_BE\_5 48.8 32.5 16.3 Blank Avg 2440 2464. 2476. Frequency (MHz) 2452. 2488. 2500 Site : 03CH03-SZ Condition: AVG\_BE\_54 3m ANT3117\_0057 VERTICAL : RBW:1000.000kHz VBW:10.000kHz Setting : Default
Plane : Y with accessories
: 352000530016413/352000530016421 Freq Level Limit Read Ant Cable Preamp APos TPos
Freq Level Lime Margin Level Factor Loss Factor Remark 

TEL: +86-512-57900158 FCC ID: IHDT56AM1



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Report No.: FR332006B 6 **Band Edge** Mode 2400-2483.5\_Bluetooth-LE\_GSFK\_CH39\_2480MHz **ANT** 1 Pol. Horizontal **Fundamental** Date: 2023-05-06 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 PEAK\_BE\_74 PEAK\_74 65.0 65.0 48.8 48.8 32.5 32.5 16.3 16.3 **Peak** 1800. Frequency (MHz) 0 2480 2488. Frequency (MHz) 1000 2484. 2492. 2496. 2500 1400. 2200. 2600. 3000 : 03CH03-SZ : 03CH03-SZ Condition: PEAK\_BE\_74 3m ANT3117\_0057 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz Condition: PEAK\_74 3m ANT3117\_0057 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz Mode Setting : Default
Plane : Y with accessories Setting : Default Plane : Y with accessories Plane : 352000530016413/352000530016421 : 352000530016413/352000530016421 Limit Read Ant Cable Preamp APos TPos
Freq Level Line Margin Level Factor Loss Factor Remark Limit Margin Read Ant Cable Preamp APos TPos Freq Level Line (dB) Level Factor Loss Factor Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB dBuV dB/m dB dB MHz dBuV/m dBuV/m | MHz dBuV/m dBuV/m | dBuV/m | dBuV dB/m | dB dB | cm | deg | | 1 2483.72 | 55.49 | 74.00 -18.51 | 51.72 | 32.46 | 4.92 | 33.61 | 137 | 162 PEAK 1 2480.00 92.22 ----- 88.46 32.45 4.92 33.61 137 162 PEAK Date: 2023-05-06 Date: 2023-05-06 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 65.0 65.0 AVG\_BE\_5 AVG\_5 48.8 48.8 32.5 32.5 16.3 16.3 Avg 1000 2480 2488. 2492. Frequency (MHz) 1800. 2200. Frequency (MHz) 2484. 2496. 2500 1400. 2600. 3000 Site : 03CH03-SZ Condition: AVG\_BE\_54 3m ANT3117\_0057 HORIZONTAL : 03CH03-SZ Condition: AVG\_54 3m ANT3117\_0057 HORIZONTAL : RBW:1000.000kHz VBW:10.000kHz : RBW:1000.000kHz VBW:10.000kHz Mode Setting : Default
Plane : Y with accessories Setting : Default
Plane : Y with accessories : 352000530016413/352000530016421 : 352000530016413/352000530016421 Limit Read Ant Cable Preamp APos TPos Freq Level Line Margin Level Factor Loss Factor Limit Margin Read Ant Cable Preamp APos TPos Freq Level Line (dB) Level Factor Loss Factor

MHz dBuV/m dBuV/m

dBuV dB/m

1 2499.28 44.14 54.00 -9.86 40.30 32.50 4.94 33.60 137 162 AVERAGE

TEL: +86-512-57900158 FCC ID: IHDT56AM1 1 2480.00 90.14 ----- 86.38 32.45 4.92 33.61 137 162 AVERAGE

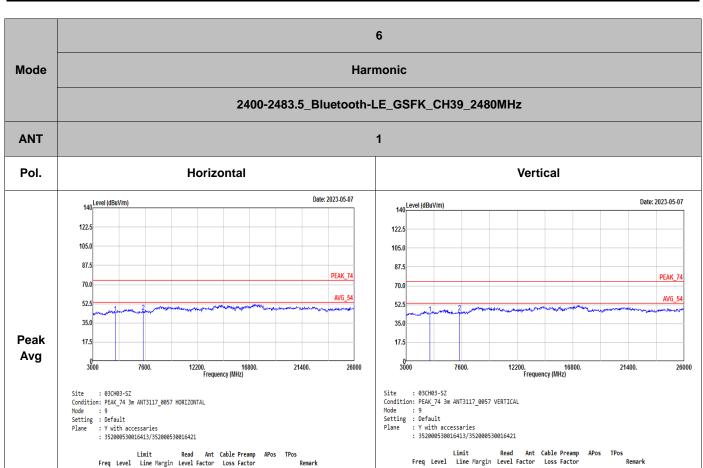
Report No.: FR332006B 6 **Band Edge** Mode 2400-2483.5\_Bluetooth-LE\_GSFK\_CH39\_2480MHz **ANT** 1 Pol. Vertical **Fundamental** Date: 2023-05-06 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 PEAK\_BE\_74 PEAK\_74 65.0 65.0 48.8 48.8 32.5 32.5 16.3 16.3 **Peak** 1800. Frequency (MHz) 0 2480 2488. Frequency (MHz) 1000 2484. 2492. 2496. 2500 1400. 2200. 2600. 3000 : 03CH03-SZ : 03CH03-SZ Condition: PEAK\_BE\_74 3m ANT3117\_0057 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz Condition: PEAK\_74 3m ANT3117\_0057 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz Mode Setting : Default
Plane : Y with accessories Setting : Default Plane : Y with accessories Plane : 352000530016413/352000530016421 : 352000530016413/352000530016421 Limit Read Ant Cable Preamp APos TPos
Freq Level Line Margin Level Factor Loss Factor Remark Limit Margin Read Ant Cable Preamp APos TPos Freq Level Line (dB) Level Factor Loss Factor Remark MHz dBuV/m dBuV/m dBuV dB/m dB dB dBuV dB/m dB dB MHz dBuV/m dBuV/m cm deg 1 2484.18 55.66 74.00 -18.34 51.89 32.46 4.92 33.61 145 188 PEAK 1 2480.00 92.75 ----- 88.99 32.45 4.92 33.61 145 188 PEAK Date: 2023-05-06 Date: 2023-05-06 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 65.0 65.0 AVG\_BE\_54 AVG\_5 48.8 48.8 32.5 32.5 16.3 16.3 Avg 1000 2480 2488. 2492. Frequency (MHz) 1800. 2200. Frequency (MHz) 2484. 2496. 2500 1400. 2600. 3000 Site : 03CH03-SZ Condition: AVG\_BE\_54 3m ANT3117\_0057 VERTICAL : 03CH03-SZ Condition: AVG\_54 3m ANT3117\_0057 VERTICAL : RBW:1000.000kHz VBW:10.000kHz : RBW:1000.000kHz VBW:10.000kHz Mode Setting : Default
Plane : Y with accessories Setting : Default
Plane : Y with accessories : 352000530016413/352000530016421 : 352000530016413/352000530016421 Limit Read Ant Cable Preamp APos TPos Freq Level Line Margin Level Factor Loss Factor Limit Margin Read Ant Cable Preamp APos TPos Freq Level Line (dB) Level Factor Loss Factor

MHz dBuV/m dBuV/m

dBuV dB/m

1 2495.96 44.16 54.00 -9.84 40.33 32.49 4.94 33.60 145 188 AVERAGE

1 2480.00 90.72 ----- 86.96 32.45 4.92 33.61 145 188 AVERAGE



Remark

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: C25 of C28

deg --- Peak --- Peak

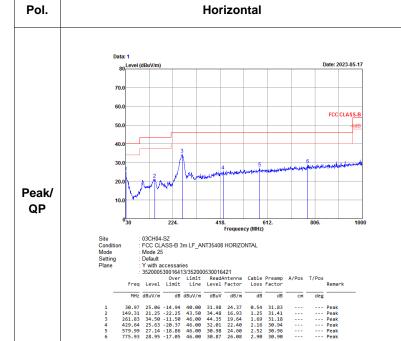
Mode

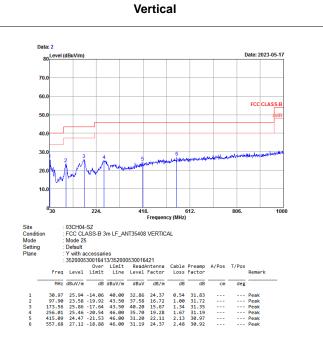
Report No.: FR332006B

### 2400-2483.5\_Bluetooth-LE\_GSFK\_CH39\_2480MHz

LF

ANT 1



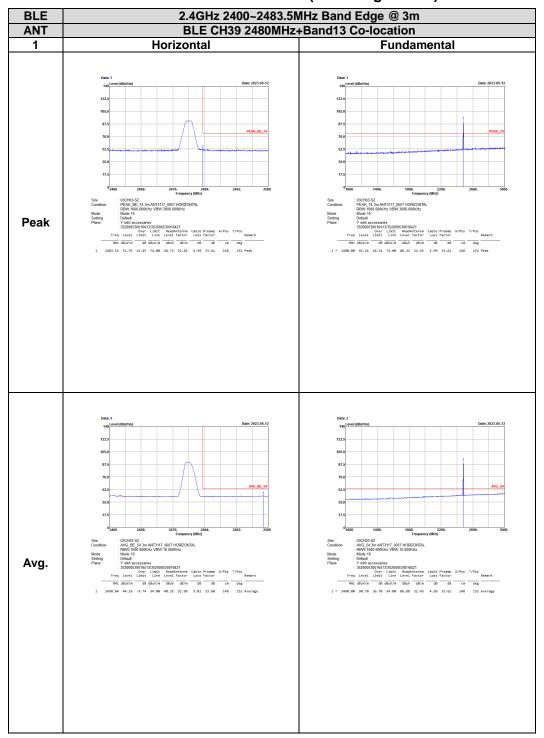


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### **Co-location**

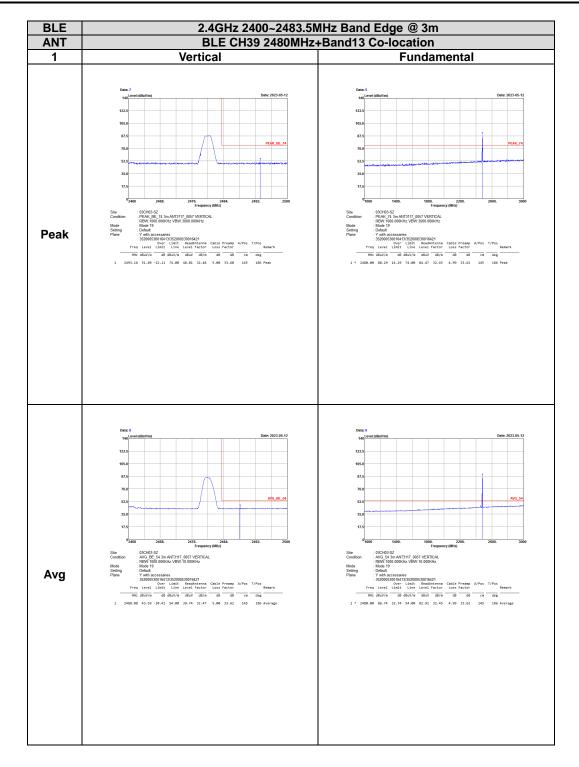
### 2.4GHz 2400~2483.5MHz

### BLE CH39 2480MHz+Band13 (Band Edge @ 3m)



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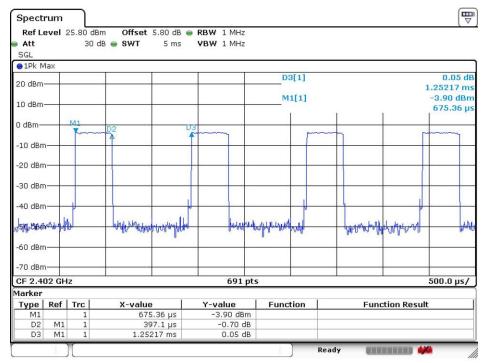


Page Number

### Appendix D. Duty Cycle Plots

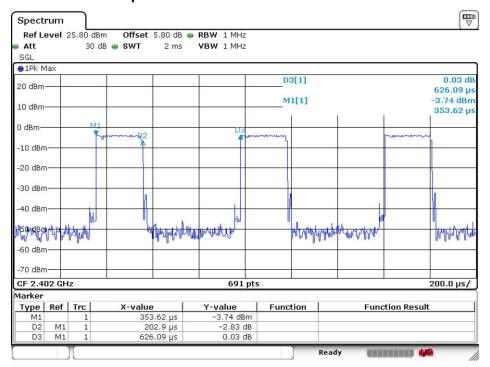
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
Bluetooth LE 1Mbps	31.71	0.397	2.518	3KHz
Bluetooth LE 2Mbps	32.41	0.203	4.929	10KHZ

### **Bluetooth LE 1Mbps**



Date: 1.APR.2023 20:50:19

### **Bluetooth LE 2Mbps**



Date: 1.APR.2023 20:53:41

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