# **FCC RF Test Report**

APPLICANT : MeiG Smart Technology Co., Ltd

**EQUIPMENT**: Smart Module

BRAND NAME : MEIGLink
MODEL NAME : SLM920

FCC ID : 2APJ4-SLM920

STANDARD : FCC Part 15 Subpart C §15.247

CLASSIFICATION : (DSS) Spread Spectrum Transmitter

TEST DATE(S) : Aug. 03, 2023 ~ Aug. 22, 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.

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.: FR372609A

# Sporton International Inc. (Kunshan)

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

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Report Version : Rev. 01

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# **REVISION HISTORY**

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR372609A	Rev. 01	Initial issue of report	Sep. 06, 2023

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# **SUMMARY OF TEST RESULT**

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(1)	Number of Channels	≥ 15Chs	Pass	-
3.2	15.247(a)(1)	Hopping Channel Separation	≥ 2/3 of 20dB BW	Pass	-
3.3	15.247(a)(1)	Dwell Time of Each Channel	≤ 0.4sec in 31.6sec period	Pass	-
3.4	15.247(a)(1)	20dB Bandwidth	-	Report only	-
3.4	-	99% Bandwidth	-	Report only	-
3.5	15.247(b)(1)	Peak Output Power	≤ 125 mW	Pass	-
3.6	15.247(d)	Conducted Band Edges	≤ 20dBc	Pass	-
3.7	15.247(d)	Conducted Spurious Emission	≤ 20dBc	Pass	-
3.8	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 10.49 dB at 449.040 MHz
3.9	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 18.42 dB at 0.440 MHz
3.10	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.

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# 1 General Description

# 1.1 Applicant

### MeiG Smart Technology Co., Ltd

2nd Floor,Office Building,No.5 Lingxia Road,Fenghuang,Fuyong Street,Bao'an District,Shenzhen City.

### 1.2 Manufacturer

### MeiG Smart Technology Co., Ltd

2nd Floor,Office Building,No.5 Lingxia Road,Fenghuang,Fuyong Street,Bao'an District,Shenzhen City.

# 1.3 Product Feature of Equipment Under Test

Product Feature					
Equipment	Smart Module				
Brand Name	MEIGLink				
Model Name	SLM920				
FCC ID	2APJ4-SLM920				
IMEI Code	Conducted: 860662054883547 Conduction: 860662054883448 Radiation: 860662054882820/860662054883505				
HW Version V1.03					
SW Version	V01-T02				
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	79				
Carrier Frequency of Each Channel	2402+n*1 MHz; n=0~78				
Maximum Output Power to Antenna	Bluetooth BR(1Mbps) : 13.36 dBm (0.0217 W) Bluetooth EDR (2Mbps) : 12.77 dBm (0.0189 W) Bluetooth EDR (3Mbps) : 13.10 dBm (0.0204 W)				
99% Occupied Bandwidth	Bluetooth BR(1Mbps) : 0.857MHz Bluetooth EDR (2Mbps) : 1.169MHz Bluetooth EDR (3Mbps) : 1.157MHz				
Antenna Type / Gain	Glue stick Antenna with gain 0.95 dBi				
Type of Modulation	Bluetooth BR (1Mbps) : GFSK Bluetooth EDR (2Mbps) :π/4-DQPSK Bluetooth EDR (3Mbps) : 8-DPSK				

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# 1.5 Modification of EUT

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

# 1.6 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 Site No.	FCC Designation No.	FCC Test Firm			
Test Site No.	Sporton Site No.	FCC Designation No.	Registration No.			
rest one NO.	CO01-KS 03CH08-KS TH01-KS	CN1257	314309			

# 1.7 Test Software

Item	Site	Manufacturer	Name	Version
1.	TH01-KS	Tonscend	JS1120-3 test system China_210602	3.3.10
2.	03CH08-KS	AUDIX	E3	210616
3.	CO01-KS	AUDIX	E3	6.2009-8-24

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# 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.

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# 2 Test Configuration of Equipment Under Test

# 2.1 Carrier Frequency Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
	0	2402	27	2429	54	2456
	1	2403	28	2430	55	2457
	2	2404	29	2431	56	2458
	3	2405	30	2432	57	2459
	4	2406	31	2433	58	2460
	5	2407	32	2434	59	2461
	6	2408	33	2435	60	2462
	7	2409	34	2436	61	2463
	8	2410	35	2437	62	2464
	9	2411	36	2438	63	2465
	10	2412	37	2439	64	2466
	11	2413	38	2440	65	2467
	12	2414	39	2441	66	2468
2400-2483.5 MHz	13	2415	40	2442	67	2469
	14	2416	41	2443	68	2470
	15	2417	42	2444	69	2471
	16	2418	43	2445	70	2472
	17	2419	44	2446	71	2473
	18	2420	45	2447	72	2474
	19	2421	46	2448	73	2475
	20	2422	47	2449	74	2476
	21	2423	48	2450	75	2477
	22	2424	49	2451	76	2478
	23	2425	50	2452	77	2479
	24	2426	51	2453	78	2480
	25	2427	52	2454	-	-
	26	2428	53	2455	-	-

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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, and the worst mode of radiated spurious emissions is Bluetooth 1Mbps mode, and 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						
	Data Rate / Modulation					
Test Item	Bluetooth BR 1Mbps	Bluetooth EDR 2Mbps	Bluetooth EDR 3Mbps			
	GFSK	π/4-DQPSK	8-DPSK			
Conducted	Mode 1: CH00_2402 MHz	Mode 4: CH00_2402 MHz	Mode 7: CH00_2402 MHz			
Conducted	Mode 2: CH39_2441 MHz	Mode 5: CH39_2441 MHz	Mode 8: CH39_2441 MHz			
Test Cases	Mode 3: CH78_2480 MHz	Mode 6: CH78_2480 MHz	Mode 9: CH78_2480 MHz			
		Bluetooth BR 1Mbps GFSK				
Radiated Mode 1: CH00_2402 MHz						
Test Cases		Mode 2: CH39_2441 MHz				
Mode 3: CH78_2480 MHz						
AC						
Conducted Mode 1 : GSM 850 Idle + Bluetooth Link + WLAN Link (2.4G)						
Emission	` '					

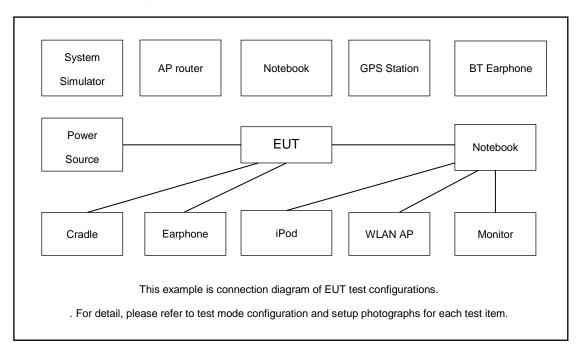
#### Remark:

For radiated test cases, the worst mode data rate 1Mbps was reported only, because this data rate has the highest RF output power at preliminary tests, and no other significantly frequencies found in conducted spurious emission.

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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.	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	G480	QDS-BRCM1050I	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
5.	Test Jig	N/A	N/A	N/A	N/A	N/A

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# 2.5 EUT Operation Test Setup

For Bluetooth function, the engineering test program was provided and enabled to make EUT connect with Bluetooth base station to 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 6.5 dB and 10dB attenuator.

 $Offset(dB) = RF \ cable \ loss(dB) + attenuator \ factor(dB).$ = 6.5 + 10 = 16.5 (dB)

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# 3 Test Result

# 3.1 Number of Channel Measurement

### 3.1.1 Limits of Number of Hopping Frequency

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

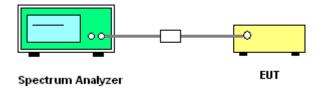
# 3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

#### 3.1.3 Test Procedure

- 1. The testing follows ANSI C63.10-2013 clause 7.8.3.
- 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. Enable the EUT hopping function.
- 5. Use the following spectrum analyzer settings: Span = the frequency band of operation; RBW = 300kHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
- 6. The number of hopping frequency used is defined as the number of total channel.
- 7. Record the measurement data derived from spectrum analyzer.

### 3.1.4 Test Setup



## 3.1.5 Test Result of Number of Hopping Frequency

Please refer to Appendix A.

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# 3.2 Hopping Channel Separation Measurement

## 3.2.1 Limit of Hopping Channel Separation

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

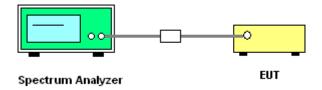
# 3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

#### 3.2.3 Test Procedures

- 1. The testing follows ANSI C63.10-2013 clause 7.8.2.
- 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. Enable the EUT hopping function.
- Use the following spectrum analyzer settings:
   Span = wide enough to capture the peaks of two adjacent channels;
   RBW = 300kHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
- 6. Measure and record the results in the test report.

### 3.2.4 Test Setup



## 3.2.5 Test Result of Hopping Channel Separation

Please refer to Appendix A.

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### 3.3 Dwell Time Measurement

#### 3.3.1 Limit of Dwell Time

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

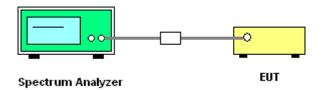
# 3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

#### 3.3.3 Test Procedures

- 1. The testing follows ANSI C63.10-2013 clause 7.8.4.
- 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. Enable the EUT hopping function.
- 5. Use the following spectrum analyzer settings: Span = zero span, centered on a hopping channel; RBW = 1 MHz; VBW ≥ RBW; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold.
- 6. Measure and record the results in the test report.

### 3.3.4 Test Setup



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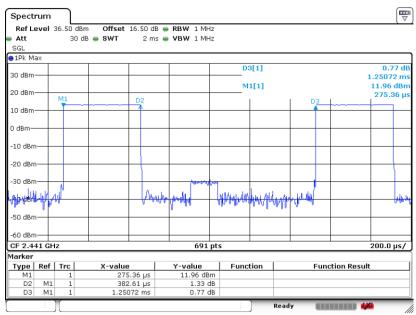
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#### 3.3.5 Test Result of Dwell Time

Please refer to Appendix A.

# **Package Transfer Time Plot**



Date: 2.AUG.2023 00:39:03

### Remark:

- In normal mode, hopping rate is 1600 hops/s with 6 slots (5 Transmit and 1 Receive slot)
  in 79 hopping channels.
  - With channel hopping rate (1600 / 6 / 79) in Occupancy Time Limit  $(0.4 \times 79)$  (s), Hops Over Occupancy Time comes to  $(1600 / 6 / 79) \times (0.4 \times 79) = 106.67$  hops.
- 2. In AFH mode, hopping rate is 800 hops/s with 6 slots in 20 hopping channels.
  With channel hopping rate (800 / 6 / 20) in Occupancy Time Limit (0.4 x 20) (s),
  Hops Over Occupancy Time comes to (800 / 6 / 20) x (0.4 x 20) = 53.33 hops.
- 3. Dwell Time(s) = Hops Over Occupancy Time (hops) x Package Transfer Time

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### 3.4 20dB and 99% Bandwidth Measurement

#### 3.4.1 Limit of 20dB and 99% Bandwidth

Reporting only

### 3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

#### 3.4.3 Test Procedures

- 1. The testing follows ANSI C63.10-2013 clause 6.9.2 and 6.9.3.
- 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. Use the following spectrum analyzer settings for 20dB Bandwidth measurement.

Span = approximately 2 to 5 times the 20 dB bandwidth, centered on a hopping channel;

The RBW is set to 1% to 5% of the 99% OBW, the VBW is set to 3 times the RBW;

Sweep = auto; Detector function = peak;

Trace =  $\max$  hold.

5. Use the following spectrum analyzer settings for 99 % Bandwidth measurement.

Span = approximately 1.5 to 5 times the 99% bandwidth, centered on a hopping channel;

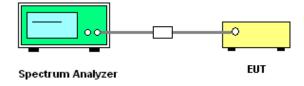
The RBW is set to 1% to 5% of the 99% OBW, the VBW is set to 3 times the RBW;

Sweep = auto; Detector function = peak;

Trace =  $\max$  hold.

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

### 3.4.4 Test Setup



#### 3.4.5 Test Result of 20dB Bandwidth

Please refer to Appendix A.

## 3.4.6 Test Result of 99% Occupied Bandwidth

Please refer to Appendix A.

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# 3.5 Output Power Measurement

# 3.5.1 Limit of Output Power

The maximum peak conducted output power of the intentional radiator shall not exceed the following: (1) For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band 0.125 watts. The power limit for 1Mbps, 2Mbps, 3Mbps and AFH modes are 0.125 watts.

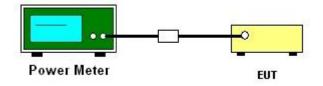
## 3.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

#### 3.5.3 Test Procedures

- 1. The testing follows ANSI C63.10-2013 clause 7.8.5.
- 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 with cable loss and record the results in the test report.
- 5. Measure and record the results in the test report.

### 3.5.4 Test Setup



### 3.5.5 Test Result of Peak Output Power

Please refer to Appendix A.

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

Please refer to Appendix A.

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# 3.6 Conducted Band Edges Measurement

# 3.6.1 Limit of Band Edges

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

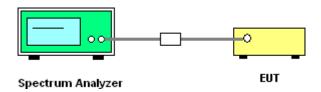
# 3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

#### 3.6.3 Test Procedures

- 1. The testing follows ANSI C63.10-2013 clause 7.8.6.
- 2. Set to the maximum power setting and enable the EUT transmit continuously.
- Set RBW = 100kHz, VBW = 300kHz. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100kHz RBW. The attenuation shall be 30 dB instead of 20 dB when RMS conducted output power procedure is used.
- 4. Enable hopping function of the EUT and then repeat step 2. and 3.
- 5. Measure and record the results in the test report.

### 3.6.4 Test Setup



## 3.6.5 Test Result of Conducted Band Edges

Please refer to Appendix A.

# 3.6.6 Test Result of Conducted Hopping Mode Band Edges

Please refer to Appendix A.

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# 3.7 Conducted Spurious Emission Measurement

## 3.7.1 Limit of Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

# 3.7.2 Measuring Instruments

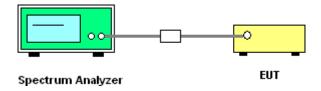
The measuring equipment is listed in the section 4 of this test report.

#### 3.7.3 Test Procedure

- 1. The testing follows ANSI C63.10-2013 clause 7.8.8.
- 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. Set RBW = 100 kHz, VBW = 300kHz, scan up through 10th harmonic. All harmonics / spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.
- 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.

### 3.7.4 Test Setup

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## 3.7.5 Test Result of Conducted Spurious Emission

Please refer to Appendix A.

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# 3.8 Radiated Band Edges and Spurious Emission Measurement

# 3.8.1 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. 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			

# 3.8.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

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## 3.8.3 Test Procedures

- 1. 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.
- 2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
- 3. For each suspected emission, 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 to comply with the guidelines.
- 4. Set to the maximum power setting and enable the EUT transmit continuously.
- 5. 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, RBW=1MHz for f>1GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak
  - (3) For average measurement: use duty cycle correction factor method per 15.35(c).

Duty cycle = On time/100 milliseconds

On time =  $N_1*L_1+N_2*L_2+...+N_{n-1}*LN_{n-1}+N_n*L_n$ 

Where  $N_1$  is number of type 1 pulses,  $L_1$  is length of type 1 pulses, etc.

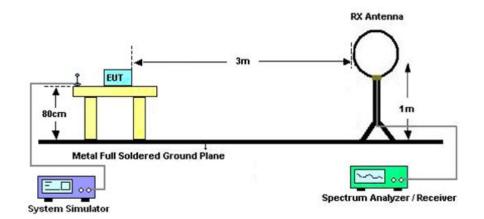
Average Emission Level = Peak Emission Level + 20\*log(Duty cycle)

- 6. Corrected Reading: Antenna Factor + Cable Loss + Read Level Preamp Factor = Level
- 7. 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.
- 8. 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.

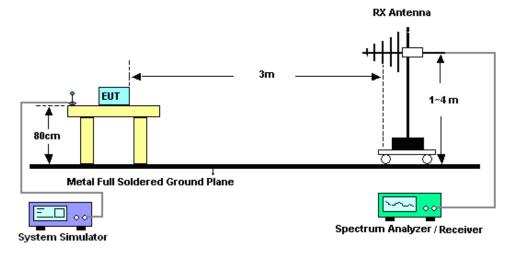
Note: The average levels were calculated from the peak level corrected with duty cycle correction factor (-24.79dB) derived from 20log (dwell time/100ms). This correction is only for signals that hop with the fundamental signal, such as band-edge and harmonic. Other spurious signals that are independent of the hopping signal would not use this correction.

# 3.8.4 Test Setup

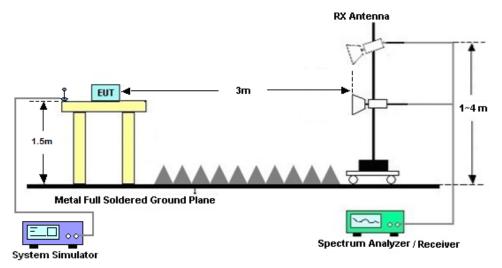
#### For radiated emissions below 30MHz



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



#### For radiated emissions above 1GHz



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## 3.8.5 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.

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

# 3.8.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C

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

Please refer to Appendix C

# 3.8.8 Duty cycle correction factor for average measurement

Please refer to Appendix D.

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### 3.9 AC Conducted Emission Measurement

### 3.9.1 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.

Eroquency of emission (MUz)	Conducted	limit (dΒμV)
Frequency of emission (MHz)	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.

# 3.9.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

### 3.9.3 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.
- 8. 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.

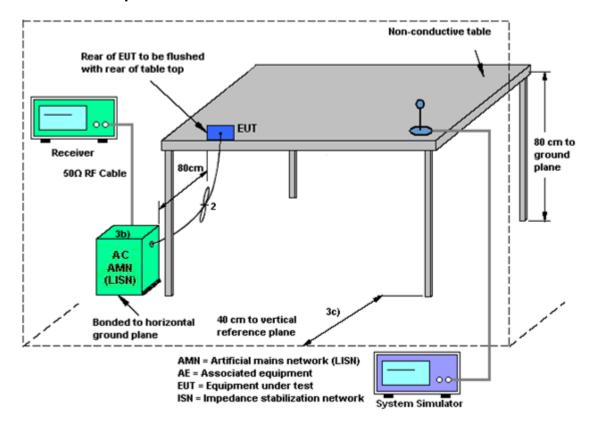
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# 3.9.4 Test Setup



# 3.9.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

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# 3.10 Antenna Requirements

# 3.10.1 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.

# 3.10.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

#### 3.10.3 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	Manufactur er	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Oct. 12, 2022	Aug. 08, 2023 ~Aug. 21, 2023	Oct. 11, 2023	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 05, 2023	Aug. 08, 2023 ~Aug. 21, 2023	Jan. 04, 2024	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 05, 2023	Aug. 08, 2023 ~Aug. 21, 2023	Jan. 04, 2024	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	1339163	300MHz~40GHz	Oct. 12, 2022	Aug. 08, 2023 ~Aug. 21, 2023	Oct. 11, 2023	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY564000 23	3Hz~8.5GHz;Max 30dBm	Jan. 05, 2023	Aug. 03, 2023 ~Aug. 22, 2023	Jan. 04, 2024	Radiation (03CH08-KS)
Spectrum Analyzer	R&S	FSV40	101932	10kHz~40GHz;Ma x 30dBm	Oct. 12, 2022	Aug. 03, 2023 ~Aug. 22, 2023	Oct. 11, 2023	Radiation (03CH08-KS)
Loop Antenna	R&S	HFH2-Z2E	101125	9kHz~30MHz	Sep. 22, 2022	Aug. 03, 2023 ~Aug. 22, 2023	Sep. 21, 2023	Radiation (03CH08-KS)
Bilog Antenna	TESEQ& VGT	CBL 61110	59915	30MHz-1GHz	Aug. 26, 2022	Aug. 03, 2023	Aug. 25, 2023	Radiation (03CH08-KS)
Bilog Antenna	TESEQ& VGT	CBL 61110	59915	30MHz-1GHz	Aug. 12, 2023	~Aug. 22, 2023	Aug. 11, 2024	Radiation (03CH08-KS)
Double Ridge Horn Antenna	ETS-Lindgre n	3117	75959	1GHz~18GHz	Mar. 18, 2023	Aug. 03, 2023 ~Aug. 22, 2023	Mar. 17, 2024	Radiation (03CH08-KS)
high gain Amplifier	EM	EM01G18GA	060845	1Ghz-18Ghz	Jan. 05, 2023	Aug. 03, 2023 ~Aug. 22, 2023	Jan. 04, 2024	Radiation (03CH08-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 08, 2023	Aug. 03, 2023 ~Aug. 22, 2023	Jan. 07, 2024	Radiation (03CH08-KS)
Amplifier	SONOMA	310N	413741	9KHz-1GHz	Jan. 05, 2023	Aug. 03, 2023 ~Aug. 22, 2023	Jan. 04, 2024	Radiation (03CH08-KS)
Amplifier	EM	EM01G18GA	060834	1Ghz-18Ghz	Oct. 12, 2022	Aug. 03, 2023 ~Aug. 22, 2023	Oct. 11, 2023	Radiation (03CH08-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 05, 2023	Aug. 03, 2023 ~Aug. 22, 2023	Jan. 04, 2024	Radiation (03CH08-KS)
AC Power Source	Chroma	61601	61601000 2473	N/A	NCR	Aug. 03, 2023 ~Aug. 22, 2023	NCR	Radiation (03CH08-KS)
Turn Table	EM	EM 1000-T	N/A	0~360 degree	NCR	Aug. 03, 2023 ~Aug. 22, 2023	NCR	Radiation (03CH08-KS)
Antenna Mast	EM	EM 1000-A	N/A	1 m~4 m	NCR	Aug. 03, 2023 ~Aug. 22, 2023	NCR	Radiation (03CH08-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	May 16, 2023	Aug. 10, 2023	May 15, 2024	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 13, 2022	Aug. 10, 2023	Oct. 12, 2023	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060105	9kHz~30MHz	May 16, 2023	Aug. 10, 2023	May 15, 2024	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP00000 0811	AC 0V~300V, 45Hz~1000Hz	Oct. 12, 2022	Aug. 10, 2023	Oct. 11, 2023	Conduction (CO01-KS)

NCR: No Calibration Required

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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.

#### <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	

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

Measuring Uncertainty for a Level of Confidence	6.20dB
of 95% (U = 2Uc(y))	0.20dB

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

Measuring Uncertainty for a Level of Confidence	4.86dB
of 95% (U = 2Uc(y))	4.00UD

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

Measuring Uncertainty for a Level of Confidence	5.24dB
of 95% (U = 2Uc(y))	3.24ub

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

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# **Appendix A. Conducted Test Results**

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# FCC RF Test Report

Ambient Condition: 25 °C, 45 %RH

According Standard: ■Part15C

Test Date: 2023.8.2~2023.8.21 Test Engineer: <u>Jiang Jun</u>

# 20dB Emission Bandwidth

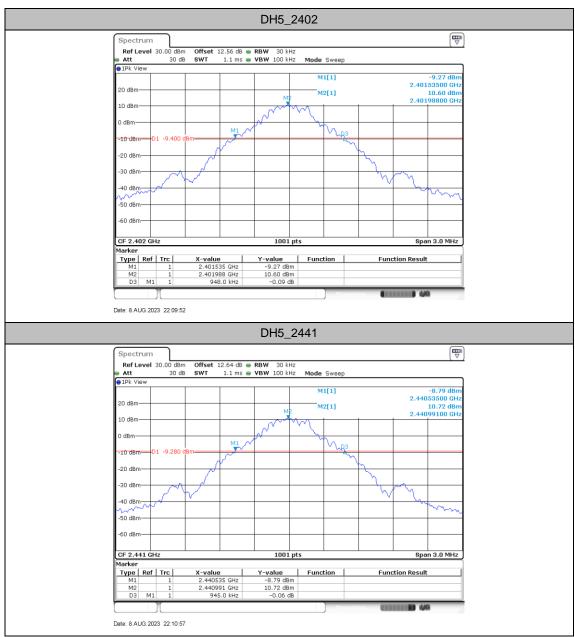
## **Test Result**

TestMode	Antenna	Freq(MHz)	20dB EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.95	2401.54	2402.48		
		2441	0.95	2440.54	2441.48		
		2480	0.95	2479.54	2480.48		
2DH1	Ant1	2402	1.27	2401.36	2402.63		
		2441	1.26	2440.37	2441.63		
		2480	1.28	2479.34	2480.63		
3DH1		2402	1.24	2401.39	2402.63		
	Ant1	2441	141 1.24 2440.39	2441.63			
		2480	1.23	2479.40	2480.63		

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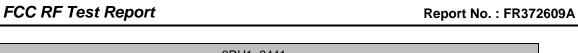
# **Test Graphs**

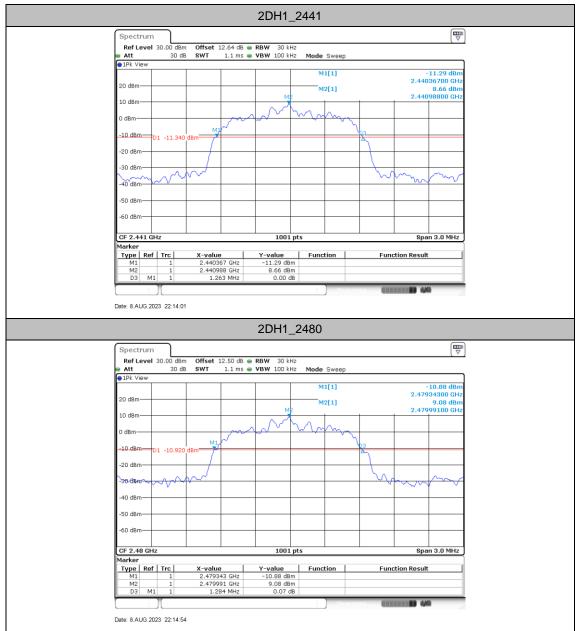


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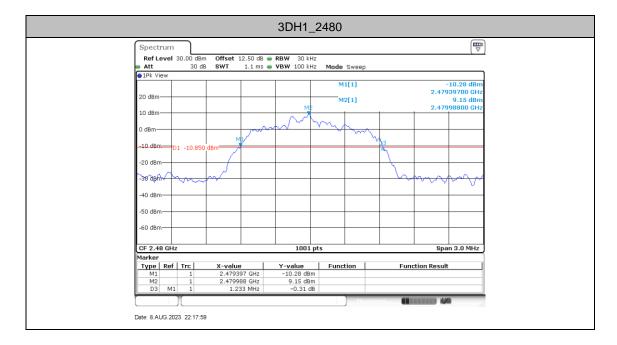














**Occupied Channel Bandwidth** 

# **Test Result**

TestMode	Antenna	Freq(MHz)	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.854	2401.5744	2402.4286		
		2441	0.854	2440.5714	2441.4256		
		2480	0.857	2479.5684	2480.4256		
2DH1	Ant1	2402	1.166	2401.4096	2402.5754		
		2441	1.160	2440.4126	2441.5724		
		2480	1.169	2479.4066	2480.5754		
3DH1	Ant1	2402	1.154	2401.4366	2402.5904		
		2441	1.148	2440.4366	2441.5844		
		2480	1.157	2479.4336	2480.5904		

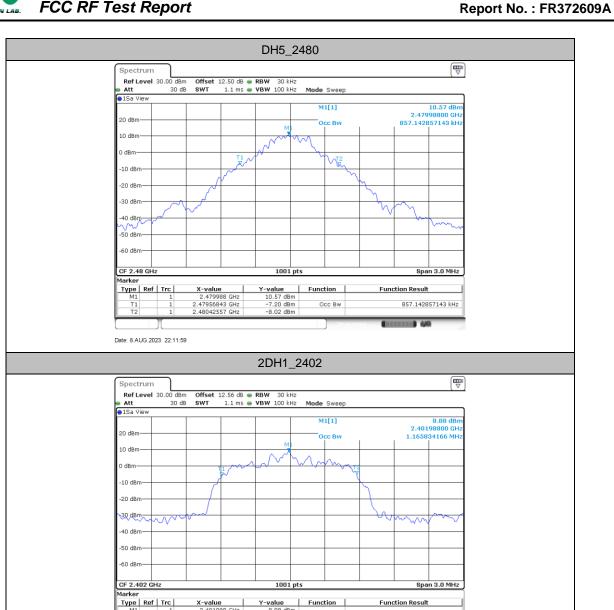
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**Test Graphs** 



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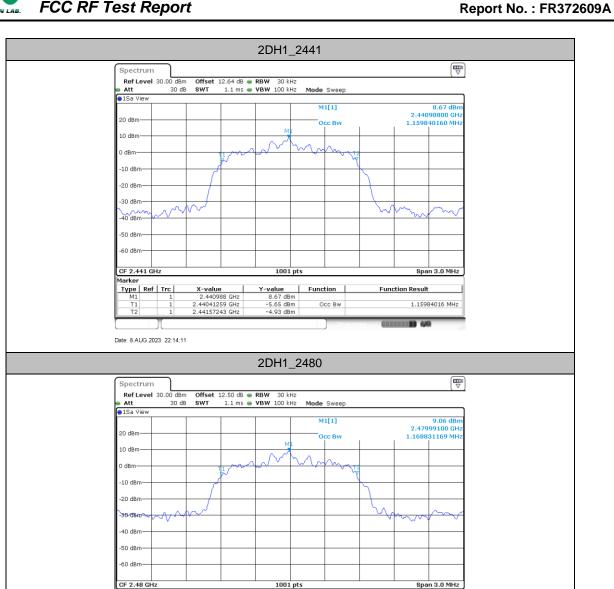
Function

Occ Bw

Function Result

1.165834166 MHz

Date: 8.AUG.2023 22:13:05



Function

Occ Bw

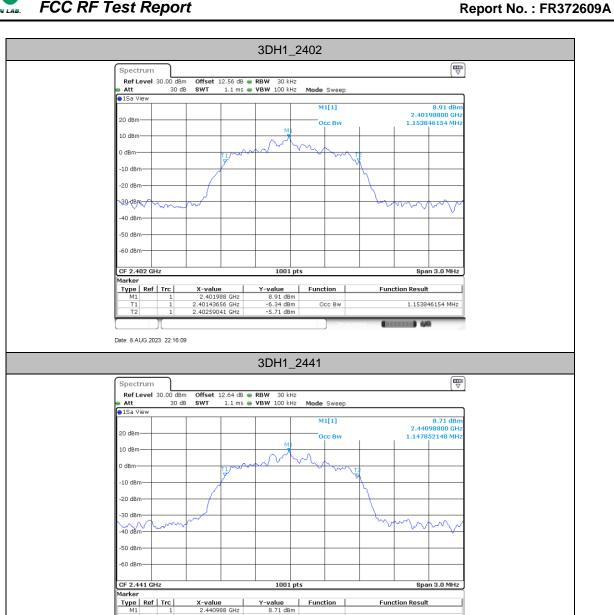
Function Result

1.168831169 MHz

Marker
Type Ref Trc

Date: 8.AUG.2023 22:15:03

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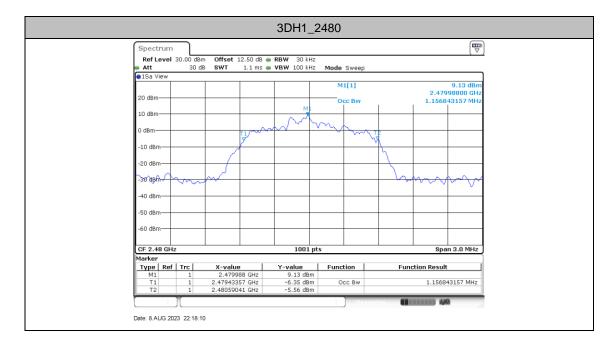
Date: 8.AUG.2023 22:17:17

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1.147852148 MHz

Occ Bw

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# Maximum conducted output power

#### **Test Result Peak**

			Peak	Power	
TestMode	Antenna	CH.	Power	Limit	Pass/Fail
			(dBm)	(dBm)	
	Ant1	0	13.22	20.97	Pass
DH5		39	13.36	20.97	Pass
		78	12.98	20.97	Pass
2DH5	Ant1	0	12.77	20.97	Pass
		39	12.75	20.97	Pass
		78	78 12.68 2	20.97	Pass
3DH5	Ant1	0	13.06	20.97	Pass
		39	13.10	20.97	Pass
		78	12.90	20.97	Pass



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# **Carrier frequency separation**

#### **Test Result**

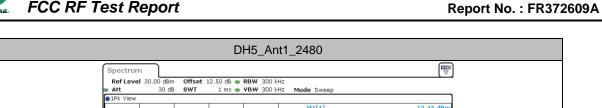
TestMode	Antenna	Freq(MHz)	Result[MHz]	Limit[MHz]	Verdict
	Ant1	2402	0.848	≥0.633	PASS
DH5		2441	1.004	≥0.633	PASS
		2480	1.139	≥0.633	PASS
	Ant1	2402	1	≥0.847	PASS
2DH1		2441	0.996	≥0.840	PASS
		2480	1	≥0.853	PASS
3DH1	Ant1	2402	1.026	≥0.827	PASS
		2441	1	≥0.827	PASS
		2480	1.013	≥0.820	PASS



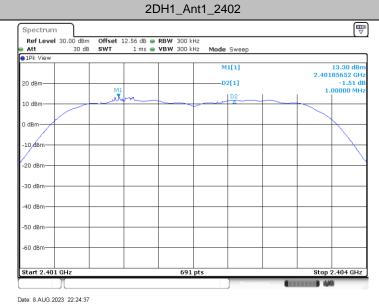
### **Test Graphs**



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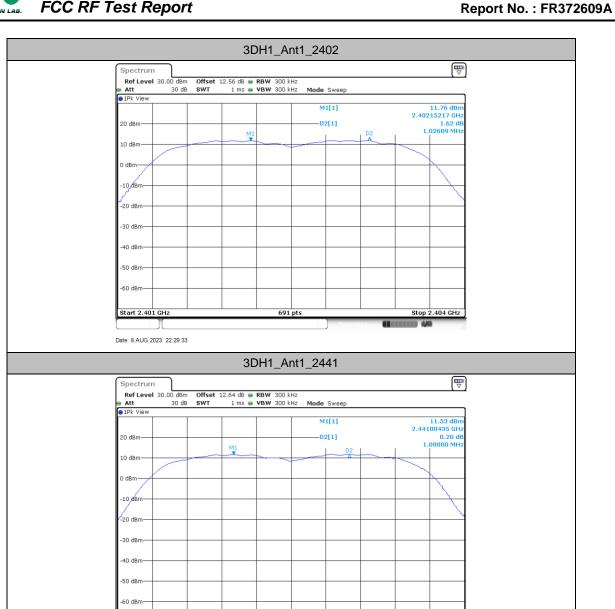












691 pts

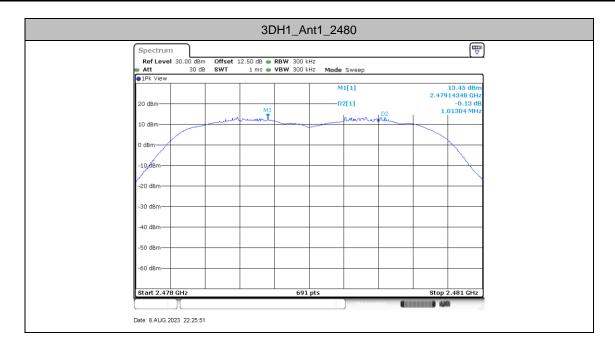
Date: 8.AUG.2023 22:25:36

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Stop 2.443 GHz



### FCC RF Test Report



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### **Dwell Time**

#### **Test Result**

TestMode	Antenna	Hopping Channel Number Rate	Hops Over Occupancy Time(hops)	Package Transfer Time (msec) (MHz)	Dwell Time (sec)	Limits (sec)	Pass/Fail
Normal	Ant1	79	106.67	2.91	0.31	0.4	Pass
AFH	Ant1	20	53.33	2.91	0.16	0.4	Pass

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# Number of hopping channels

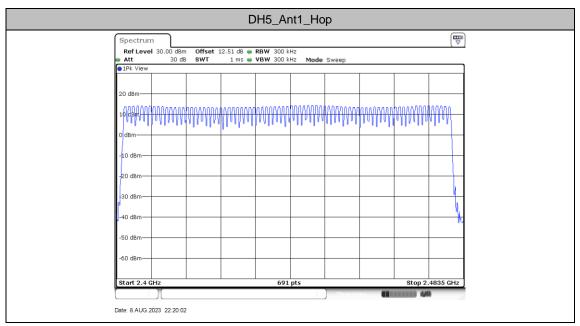
#### **Test Result**

TestMode	Antenna	Freq(MHz)	Result[Num]	Limit[Num]	Verdict
DH5	Ant1	Нор	79	≥15	PASS

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### **Test Graphs**



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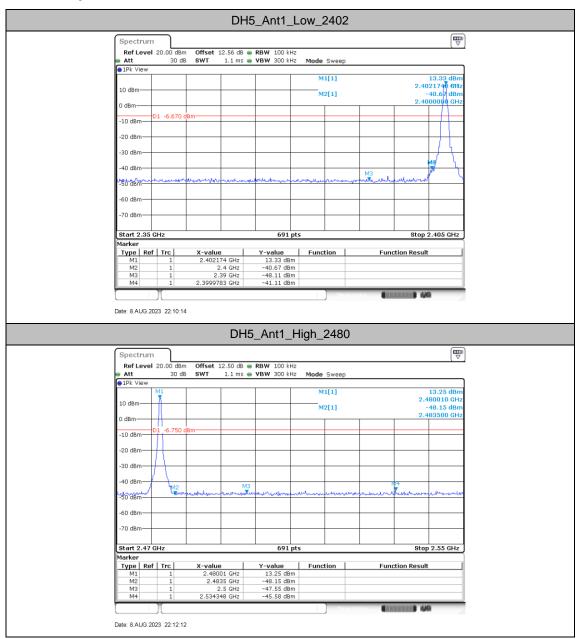
### **Band edge measurements**

#### **Test Result**

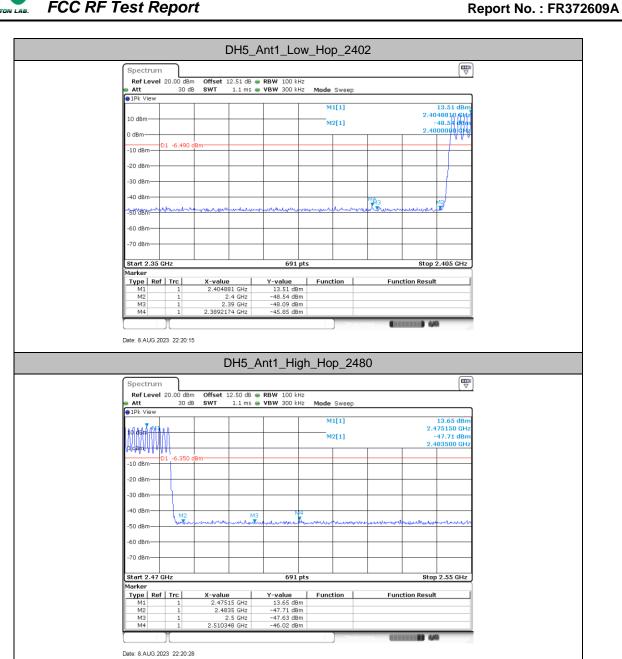
TestMode Antenna	Antonno	a ChName	Гла «/N/I I=)	RefLevel	Result	Limit	Verdict	
	Antenna	Chiname	Freq(MHz)	[dBm]	[dBm]	[dBm]	verdict	
DH5 Ar		Low	2402	13.33	-41.11	≤-6.67	PASS	
	A n+1	High	2480	13.25	-45.58	≤-6.75	PASS	
	Anti	Low	Hop_2402	13.51	-45.85	≤-6.49	PASS	
		High	Hop_2480	13.65	-46.02	≤-6.35	PASS	
		Low	2402	11.58	-41.87	≤-8.42	PASS	
2DH1	Ant1	High	2480	11.78	-45.58	≤-8.22	PASS	
2DH1	Anti	Low	Hop_2402	11.67	-45.4	≤-8.33	PASS	
		High	Hop_2480	11.98	-45.79	≤-8.02	PASS	
3DH1		Low	2402	11.60	-41.96	≤-8.4	PASS	
	Ant1	High	2480	11.80	-46.17	≤-8.2	PASS	
	AIILI	Low	Hop_2402	11.37	-45.39	≤-8.63	PASS	
		High	Hop_2480	11.92	-46.04	≤-8.08	PASS	



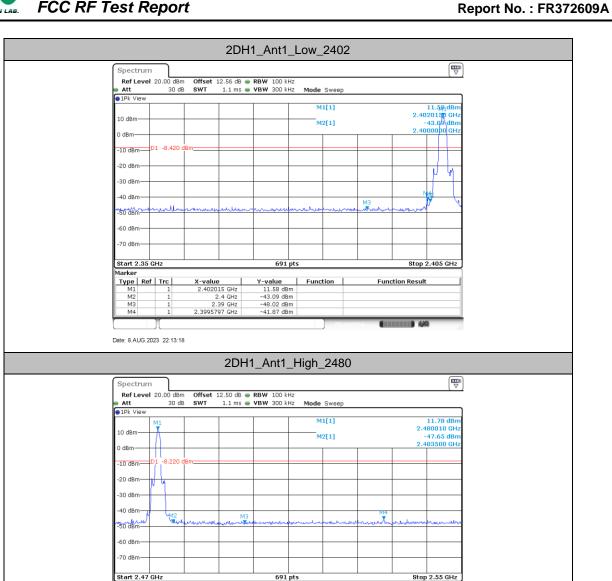
**Test Graphs** 



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Function

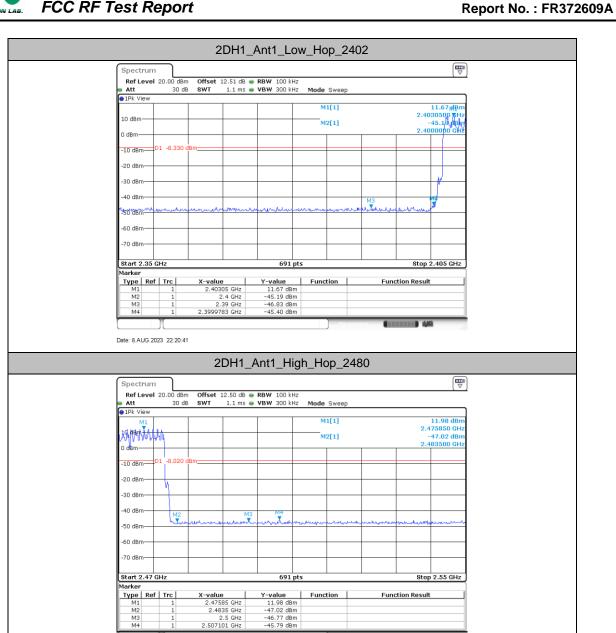
Function Result

Start 2.47 GHz Marker Type Ref Trc

Date: 8.AUG.2023 22:15:16

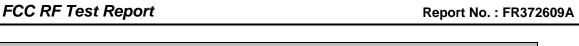
X-value 2.48001 GHz 2.4835 GHz 2.5 GHz 2.532029 GHz

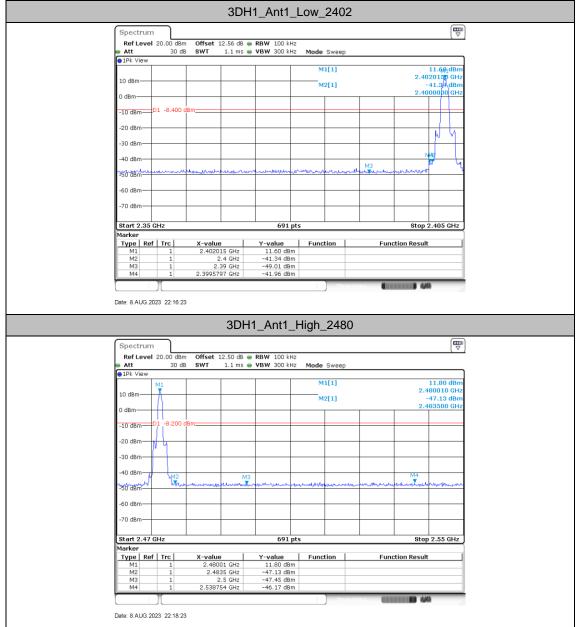
: A26 of A44



Date: 8.AUG.2023 22:20:56

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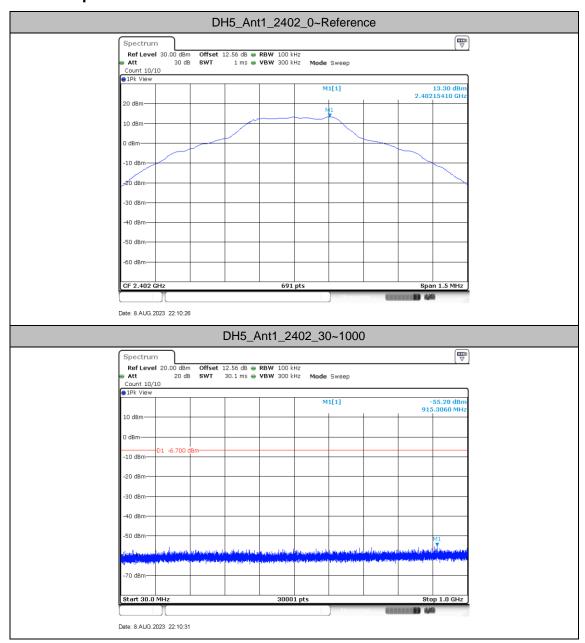
# **Conducted Spurious Emission**

#### **Test Result**

TostMode Antonn	Antonna	tenna Freq(MHz)	FreqRange	RefLevel	Result	Limit	\/a valiat		
TestMode	Antenna		[MHz]	[dBm]	[dBm]	[dBm]	Verdict		
			Reference	13.30	13.30				
		2402	30~1000	13.30	-55.28	≤-6.7	PASS		
			1000~26500	13.30	-38.99	≤-6.7	PASS		
			Reference	13.48	13.48				
DH5	Ant1	2441	30~1000	13.48	-54.62	≤-6.52	PASS		
			1000~26500	13.48	-42.87	≤-6.52	PASS		
			Reference	13.13	13.13				
		2480	30~1000	13.13	-55.85	≤-6.87	PASS		
			1000~26500	13.13	-40.14	≤-6.87	PASS		
		2402	Reference	11.50	11.50				
			30~1000	11.50	-55.61	≤-8.5	PASS		
			1000~26500	11.50	-44.61	≤-8.5	PASS		
		2441	Reference	11.34	11.34				
2DH1	Ant1		30~1000	11.34	-55.36	≤-8.66	PASS		
			1000~26500	11.34	-48.81	≤-8.66	PASS		
			Reference	11.68	11.68				
		2480	30~1000	11.68	-55.24	≤-8.32	PASS		
					1000~26500	11.68	-44.06	≤-8.32	PASS
					Reference	11.52	11.52		
		2402 Ant1 2441 2480	30~1000	11.52	-54.73	≤-8.48	PASS		
			1000~26500	11.52	-45.45	≤-8.48	PASS		
3DH1	3DH1 Ant1		Reference	11.36	11.36				
			30~1000	11.36	-55.85	≤-8.64	PASS		
			1000~26500	11.36	-46.56	≤-8.64	PASS		
			Reference	11.76	11.76				
			30~1000	11.76	-55.73	≤-8.24	PASS		
			1000~26500	11.76	-39.89	≤-8.24	PASS		

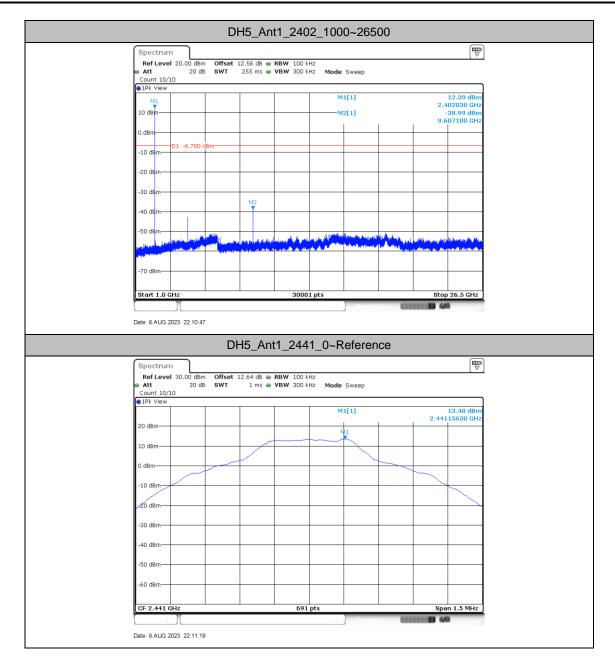


**Test Graphs** 

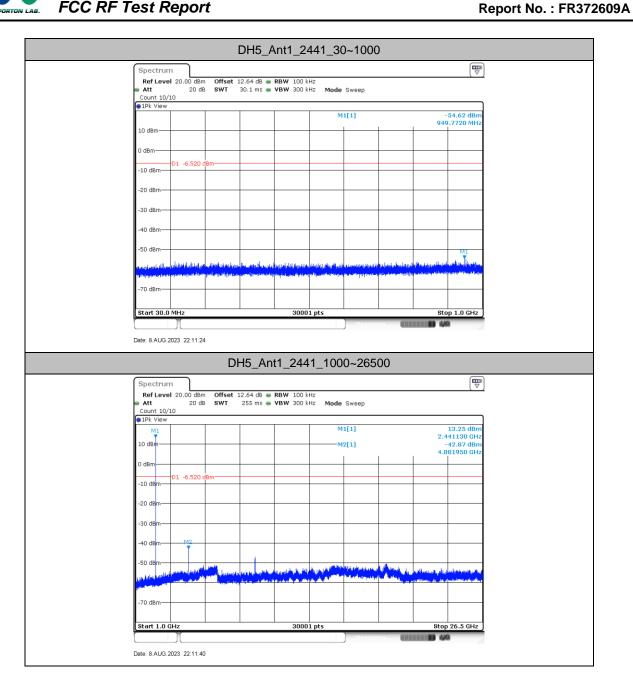


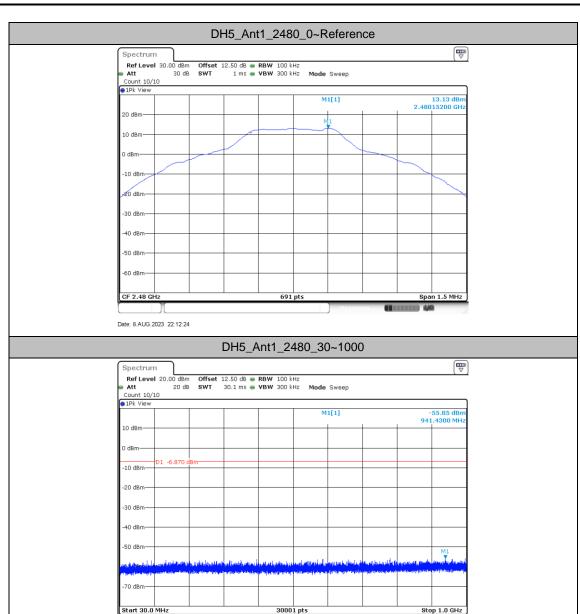
TEL: +86-512-57900158 FCC ID: 2APJ4-SLM920



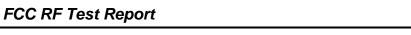


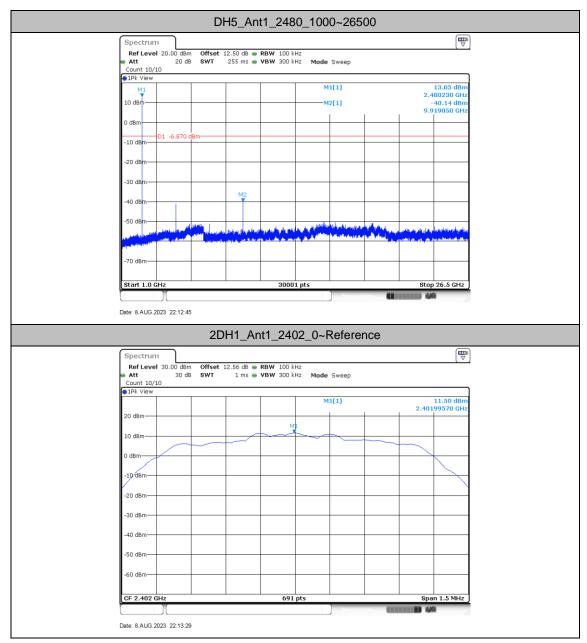




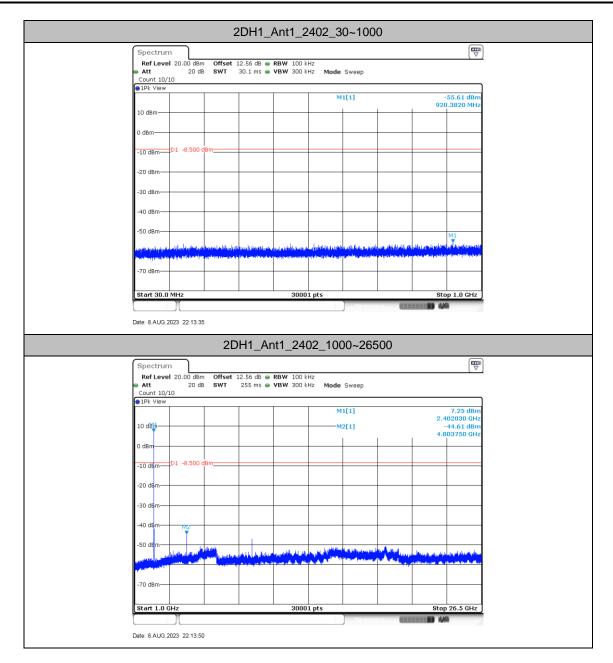


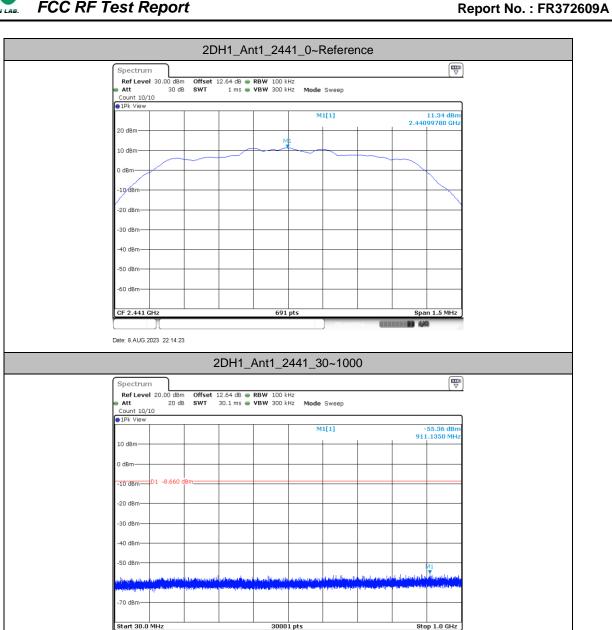
Date: 8.AUG.2023 22:12:29





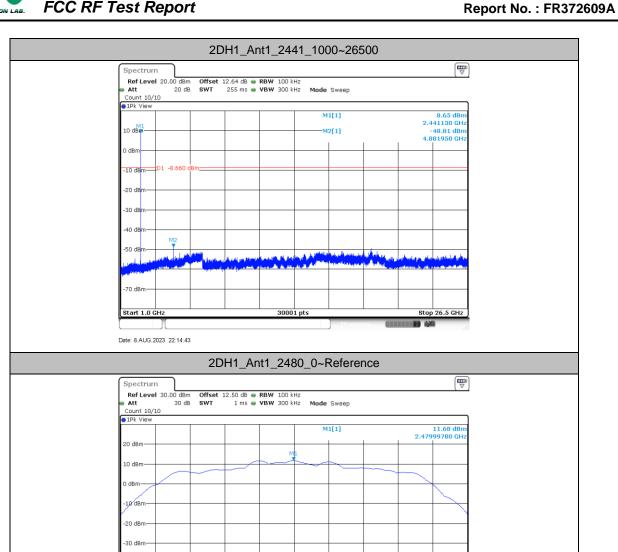






Date: 8.AUG.2023 22:14:28

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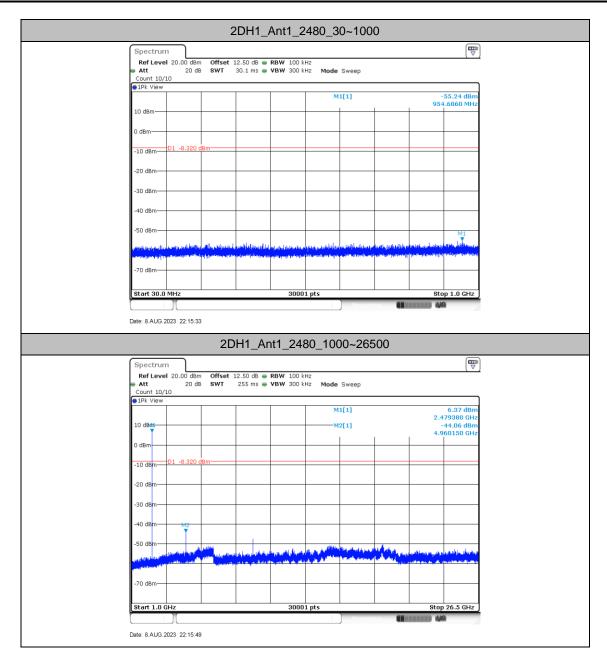


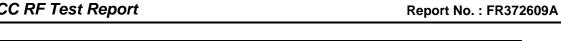
691 pts

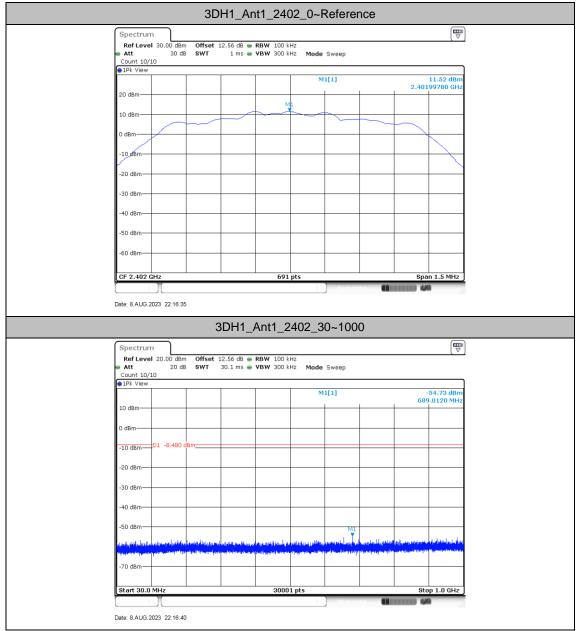
-40 dBm--50 dBm-

Date: 8.AUG.2023 22:15:28

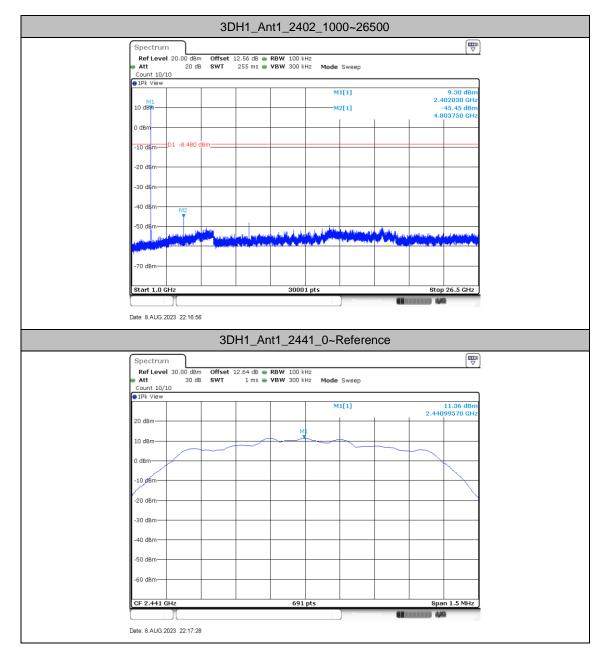




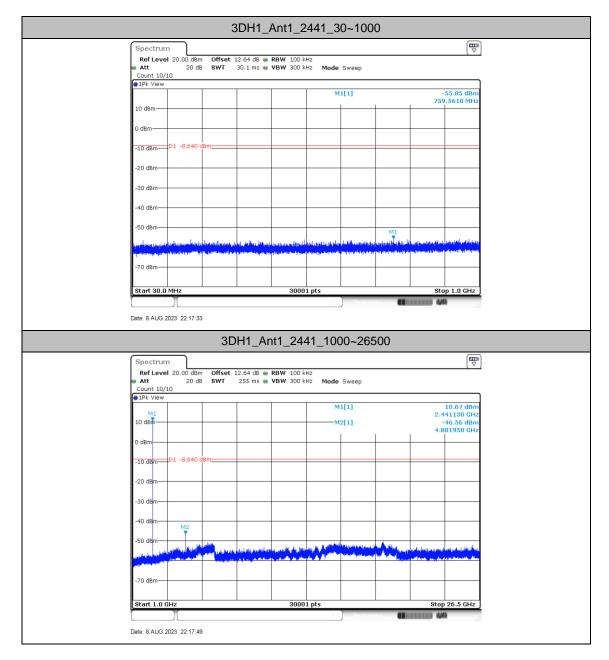


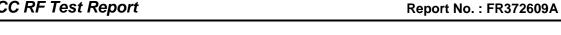


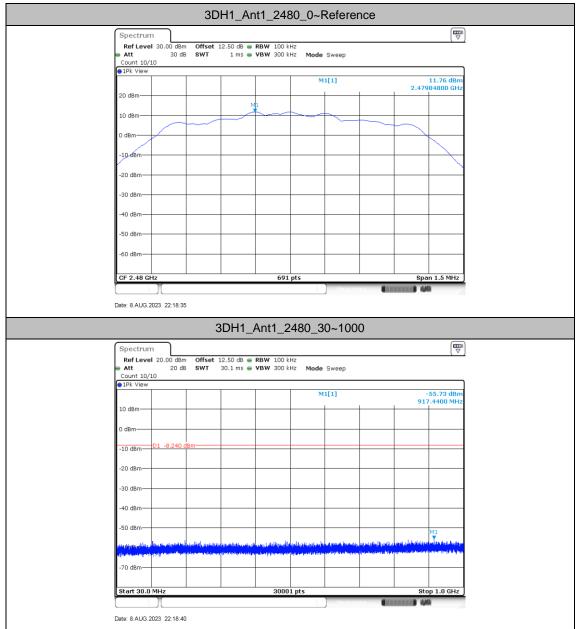




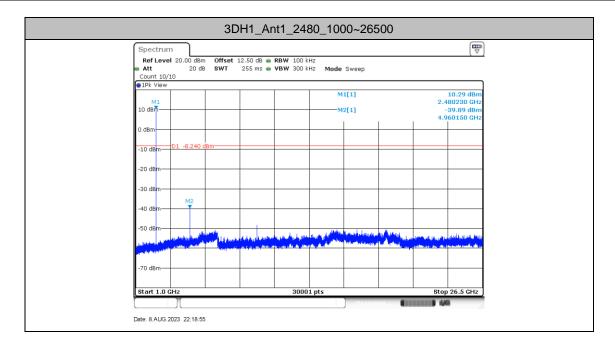






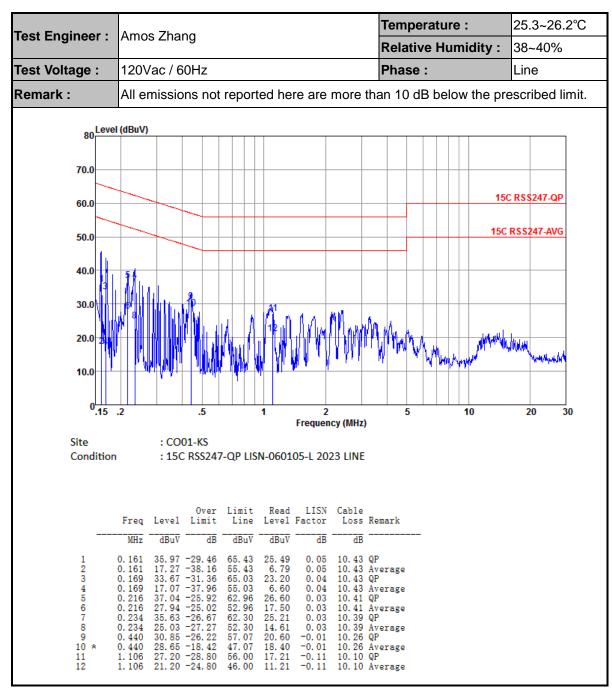


### C RF Test Report Report No.: FR372609A



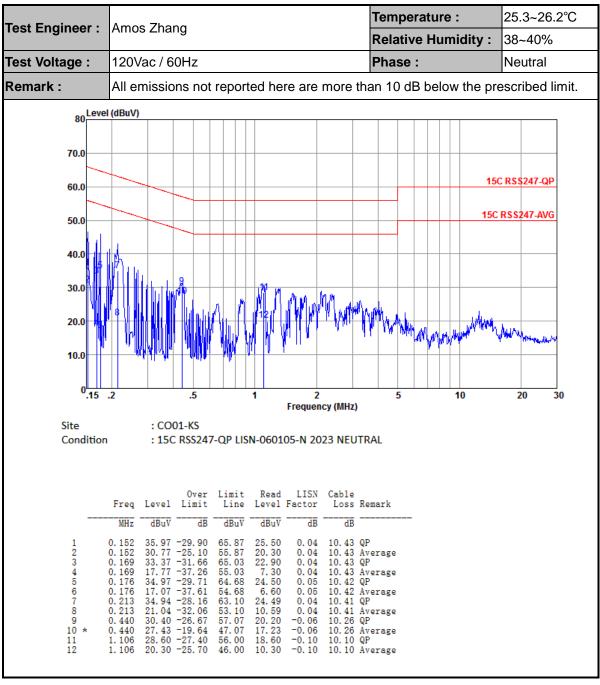
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## **Appendix B. AC Conducted Emission Test Results**



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

Test Engineer :	Koi Ji	Relative Humidity :	41~42%	
		Temperature :	22~23℃	

# **Radiated Spurious Emission Test Modes**

Mode	Band (MHz)	Antenna	Modulation	Channel	Frequency	Data Rate	RU	Remark
Mode 1	2400-2483.5	1	Bluetooth BR_GFSK	00	2402	1Mbps	-	-
Mode 2	2400-2483.5	1	Bluetooth BR_GFSK	39	2441	1Mbps	-	-
Mode 3	2400-2483.5	1	Bluetooth BR_GFSK	78	2480	1Mbps	-	-
Mode 4	2400-2483.5	1	Bluetooth BR_GFSK	39	2441	1Mbps	-	LF-



Summary of each worse mode

Mode	Modulation	Ch.	Freq.	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol.	Peak Avg.	Result	Remark
1	Bluetooth BR_GFSK	00	2388.00	57.51	74.00	-16.49	V	PEAK	Pass	Band Edge
	Bluetooth BR_GFSK	00	4804.00	53.10	74.00	-20.90	V	Peak	Pass	Harmonic
2	Bluetooth BR_GFSK	39	-	-	-	-	-	-	-	Band Edge
	Bluetooth BR_GFSK	39	4882.00	62.06	74.00	-11.94	V	Peak	Pass	Harmonic
3	Bluetooth BR_GFSK	78	2483.54	61.82	74.00	-12.18	V	PEAK	Pass	Band Edge
	Bluetooth BR_GFSK	78	4960.00	61.17	74.00	-12.83	V	PEAK	Pass	Harmonic
4	Bluetooth BR_GFSK	39	449.04	35.51	46.00	-10.49	Н	PEAK	Pass	LF

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1 **Band Edge** Mode 2400-2483.5\_Bluetooth BR\_GFSK\_CH00\_2402MHz **ANT** Pol. Horizontal **Fundamental** 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 81.3 FCC PART 15C FCC PART 15C 65.0 65.0 48.8 48.8 Peak 32.5 32.5 16.3 16.3 2310 1000 2362. 2388. Frequency (MHz) 2414. 1400. 2600. 3000 2336. 2440 1800. 2200. Frequency (MHz) Limit Over Read Ant Cable Preamp Aux APos TPos Limit Over Read Ant Cable Preamp Aux APos TPos Freq Level Line Limit Level Factor Loss Factor Factor Freq Level Line Limit Level Factor Loss Factor Factor MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2402.00 100.48 ----- 84.05 32.40 8.97 30.94 6.00 100 159 PEAK MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2378.77 57.11 74.00 -16.89 40.76 32.36 8.94 30.95 6.00 100 159 PEAK 2 2378.77 32.32 54.00 -21.68 15.97 32.36 8.94 30.95 6.00 100 159 AVERAGE 2 2402.00 75.69 ----- 59.26 32.40 8.97 30.94 6.00 100 159 AVERAGE

TEL: +86-512-57900158 FCC ID: 2APJ4-SLM920



1 **Band Edge** Mode 2400-2483.5\_Bluetooth BR\_GFSK\_CH00\_2402MHz **ANT** 1 Pol. Vertical **Fundamental** 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 81.3 FCC PART 15C FCC PART 15C 65.0 65.0 48.8 48.8 Peak 32.5 32.5 16.3 16.3 2310 1000 2362. 2388. Frequency (MHz) 2414. 1400. 2600. 3000 2336. 2440 1800. 2200. Frequency (MHz) Limit Over Read Ant Cable Preamp Aux APos TPos Limit Over Read Ant Cable Preamp Aux APos TPos Freq Level Line Limit Level Factor Loss Factor Factor Freq Level Line Limit Level Factor Loss Factor Factor MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2402.00 109.32 ----- 92.89 32.40 8.97 30.94 6.00 105 1 2388.00 57.51 74.00 -16.49 41.13 32.38 8.95 30.95 6.00 105 309 PEAK 2 2402.00 84.53 ----- 68.10 32.40 8.97 30.94 6.00 105 2 2388.00 32.72 54.00 -21.28 16.34 32.38 8.95 30.95 6.00 105 309 AVERAGE 309 AVERAGE

TEL: +86-512-57900158 FCC ID: 2APJ4-SLM920



1 Mode Harmonic 2400-2483.5\_Bluetooth BR\_GFSK\_CH00\_2402MHz **ANT** Pol. Horizontal Vertical 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 81.3 FCC PART 15C FCC PART 15C 65.0 65.0 FCC PART 15C (AVG FCC PART 15C (AVG **Peak** 32.5 32.5 Avg 3000 3000 9000. Frequency (MHz) 6000. 15000. 18000 6000. 15000. 18000 12000. Frequency (MHz) Limit Over Read Ant Cable Preamp Aux APos TPos Limit Over Read Ant Cable Preamp Aux APos TPos Freq Level Line Limit Level Factor Loss Factor Factor Remark Freq Level Line Limit Level Factor Loss Factor Factor MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dBuV dB/m dB dB deg MHz dBuV/m dBuV/m dB dB deg 4804.00 49.25 74.00 -24.75 67.05 34.29 13.60 65.69 0.00  $1 \quad 4804.00 \quad 53.10 \quad 74.00 \quad -20.90 \quad 70.90 \quad 34.29 \quad 13.60 \quad 65.69 \quad 0.00$ 185 Peak 250 Peak 4804.00 24.46 54.00 -29.54 42.26 34.29 13.60 65.69 0.00 185 Average 4804.00 28.31 54.00 -25.69 46.11 34.29 13.60 65.69 0.00 100 250 Average 7206.00 44.03 80.48 -36.45 56.77 35.80 15.99 64.53 0.00 0 Peak 7206.00 47.53 89.32 -41.79 60.27 35.80 15.99 64.53 0.00 100 283 Peak 4 9609.00 51.53 80.48 -28.95 63.19 36.82 17.58 66.06 0.00 64 Peak 4 9607.00 51.17 89.32 -38.15 62.85 36.81 17.58 66.07 0.00 300 101 Peak

TEL: +86-512-57900158 FCC ID: 2APJ4-SLM920

2 Mode Harmonic 2400-2483.5\_Bluetooth BR\_GFSK\_CH39\_2441MHz **ANT** 1 Pol. Horizontal Vertical 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 65.0 65.0 FCC PART 15C (AVG FCC PART 15C (AVG 48.8 **Peak** 32.5 32.5 Avg 16.3 16.3 3000 3000 6000. 18000 6000. 15000. 12000. 15000. 9000. 12000. 18000 Frequency (MHz) Frequency (MHz) Limit Over Read Ant Cable Preamp Aux APos TPos Limit Over Read Ant Cable Preamp Aux APos TPos Freq Level Line Limit Level Factor Loss Factor Factor Freq Level Line Limit Level Factor Loss Factor Factor Remark Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB dB 1 4882.00 56.36 74.00 -17.64 74.16 34.20 13.54 65.54 0.00 MHz dBuV/m dBuV/m dB dBuV dB/m dB cm deg dB dB CM deg 1 4882.00 62.06 74.00 -11.94 79.86 34.20 13.54 65.54 0.00 100 198 Peak 100 249 Peak 4882.00 31.57 54.00 -22.43 49.37 34.20 13.54 65.54 0.00 2 4882.00 37.27 54.00 -16.73 55.07 34.20 13.54 65.54 0.00 249 Average 198 Average 100 100 3 7323.00 43.56 74.00 -30.44 56.77 35.80 15.85 64.86 0.00 3 7323.00 41.98 74.00 -32.02 55.19 35.80 15.85 64.86 0.00 131 Peak 300 268 Peak 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 81.3 FCC PART 150 **Peak** 65.0 65.0 Avg 48.8 48.8 32.5 32.5 16.3 18000 18000 19400. 19400. 20800. 22200. 23600. 25000 20800. 22200. 23600. 25000 Frequency (MHz) Frequency (MHz)

TEL: +86-512-57900158 FCC ID: 2APJ4-SLM920

3 **Band Edge** Mode 2400-2483.5\_Bluetooth BR\_GFSK\_CH78\_2480MHz **ANT** Pol. Horizontal **Fundamental** 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 81.3 FCC PART 15C FCC PART 15C 65.0 65.0 48.8 48.8 Peak 32.5 32.5 16.3 16.3 2441 1000 2452.8 .6 2476.4 Frequency (MHz) 2488.2 1400. 3000 2464.6 2500 1800. 2600. 2200. Frequency (MHz) Limit Over Read Ant Cable Preamp Aux APos TPos Limit Over Read Ant Cable Preamp Aux APos TPos Freq Level Line Limit Level Factor Loss Factor Factor Freq Level Line Limit Level Factor Loss Factor Factor MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg cm deg 1 2493.27 57.80 74.00 -16.20 40.92 32.40 9.35 30.87 6.00 100 218 PEAK 1 2480.00 99.97 ----- 83.15 32.40 9.30 30.88 6.00 100 218 PEAK 2 2480.00 75.18 ----- 58.36 32.40 9.30 30.88 6.00 100 218 AVERAGE 2 2493.27 33.01 54.00 -20.99 16.13 32.40 9.35 30.87 6.00 100 218 AVERAGE

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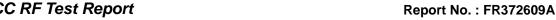
3 **Band Edge** Mode 2400-2483.5\_Bluetooth BR\_GFSK\_CH78\_2480MHz **ANT** Pol. Vertical **Fundamental** 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 81.3 FCC PART 15C FCC PART 15C 65.0 65.0 48.8 48.8 Peak 32.5 32.5 16.3 16.3 2441 1000 2452.8 .6 2476.4 Frequency (MHz) 2488.2 1400. 3000 2464.6 2500 1800. 2600. 2200. Frequency (MHz) Limit Over Read Ant Cable Preamp Aux APos TPos Limit Over Read Ant Cable Preamp Aux APos TPos Freq Level Line Limit Level Factor Loss Factor Factor Freq Level Line Limit Level Factor Loss Factor Factor MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2480.00 109.69 ----- 92.87 32.40 9.30 30.88 6.00 101 269 PEAK MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB cm deg 1 2483.54 61.82 74.00 -12.18 44.99 32.40 9.31 30.88 6.00 101 269 PEAK 2 2480.00 84.90 ----- 68.08 32.40 9.30 30.88 6.00 101 2 2483.54 37.03 54.00 -16.97 20.20 32.40 9.31 30.88 6.00 101 269 AVERAGE 269 AVERAGE

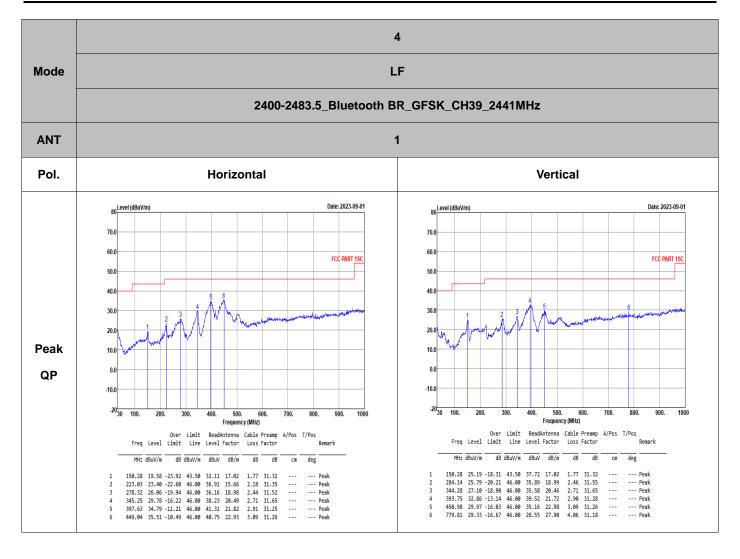
TEL: +86-512-57900158 FCC ID: 2APJ4-SLM920



3 Mode Harmonic 2400-2483.5\_Bluetooth BR\_GFSK\_CH78\_2480MHz **ANT** 1 Pol. Horizontal Vertical 130 Level (dBuV/m) 130 Level (dBuV/m) 113.8 113.8 97.5 97.5 81.3 81.3 FCC PART 150 FCC PART 15C 65.0 65.0 FCC PART 15C (AVG) FCC PART 15C (AVG **Peak** 32.5 Avg 3000 6000. 15000. 18000 12000. 3000 9000. Frequency (MHz) 6000. 15000. 18000 Frequency (MHz) Limit Over Read Ant Cable Preamp Aux APos TPos Limit Over Read Ant Cable Preamp Aux APos TPos Freq Level Limit Level Factor Loss Factor Factor Freq Level Line Limit Level Factor Loss Factor Factor Remark deg 283 PEAK MHz dBuV/m dBuV/m dB dBuV dB/m dB cm MHz dBuV/m dBuV/m dB dBuV dB/m dB dB dB deg 1 4960.00 61.17 74.00 -12.83 78.64 34.24 13.69 65.40 0.00 100 4960.00 55.94 74.00 -18.06 73.41 34.24 13.69 65.40 0.00 195 PEAK 4960.00 36.38 54.00 -17.62 53.85 34.24 13.69 65.40 0.00 100 283 AVERAGE 4960.00 31.15 54.00 -22.85 48.62 34.24 13.69 65.40 0.00 104 195 AVERAGE 7440.00 51.23 74.00 -22.77 64.87 35.80 15.75 65.19 0.00 289 PEAK 7440.00 46.40 74.00 -27.60 60.04 35.80 15.75 65.19 0.00 --- PEAK 7440.00 26.44 54.00 -27.56 40.08 35.80 15.75 65.19 0.00 100 289 AVERAGE 4 9919.00 57.47 89.69 -32.22 68.20 37.20 17.77 65.70 0.00 314 Peak 5 9919.00 58.61 79.97 -21.36 69.34 37.20 17.77 65.70 0.00 300 66 Peak

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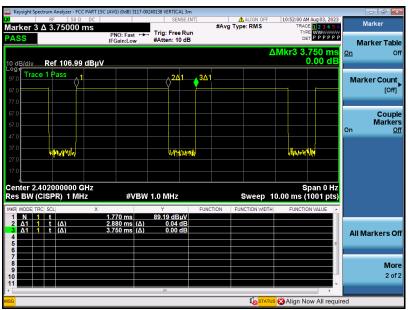
TEL: +86-512-57900158 FCC ID: 2APJ4-SLM920

## Appendix D. Duty Cycle Plots

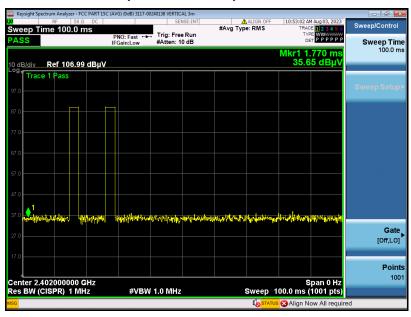
### DH5 on time (One Pulse) Plot on Channel 39

Report No.:

FR372609A



### DH5 on time (Count Pulses) Plot on Channel 39



#### Note:

- 1. Worst case Duty cycle = on time/100 milliseconds =  $2 \times 2.88 / 100 = 5.76 \%$
- 2. Worst case Duty cycle correction factor = 20\*log(Duty cycle) = -24.79 dB
- 3. DH5 has the highest duty cycle worst case and is reported.

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