



# **TEST REPORT**

Applicant Name : Address : Zeeva International Limited Suite 1007B, 10th Floor, Exchange Tower, 33 Wang Chiu Road, Kowloon Bay, Hong Kong RA221222-63223E-RF 2ADM5-HP-0826

Report Number : FCC ID:

**Test Standard (s)** FCC PART 15.247

#### **Sample Description**

Product Type: Model No.: Trade Mark:

Date Received: Date of Test: Report Date: BT KAWAII BUBBLEHP, KAWAII BUBBLE 2 HP-0826, HP-0826B

**D** BASS JAKK 2022-12-22 2022-12-28 to 2023-01-13 2023-01-19

Test Result:

Pass\*

\* In the configuration tested, the EUT complied with the standards above.

#### **Prepared and Checked By:**

Andy. Yu

Audy.Yu EMC Engineer

**Approved By:** 

Candy, Cr

Candy Li EMC Engineer

Note: This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk " $\star$ ".

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#### Shenzhen Accurate Technology Co., Ltd.

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Version 11: 2021-11-09

Page 1 of 64

FCC-BT

# **TABLE OF CONTENTS**

DOCUMENT REVISION HISTORY		4
GENERAL INFORMATION		5
PRODUCT DESCRIPTION FOR EQUIPME	ENT UNDER TEST (EUT)	5
	DN	
SUPPORT EQUIPMENT LIST AND DETA	NILS	7
BLOCK DIAGRAM OF TEST SETUP		8
SUMMARY OF TEST RESULTS		9
TEST EQUIPMENT LIST		10
FCC §1.1307 (b) & §2.1093 – RF EXF	POSURE	
APPLICABLE STANDARD		
TEST RESULT:		
FCC §15.203 – ANTENNA REOUIRI	EMENT	
	DN	
FCC §15.207 (a) – AC LINE CONDU	CTED EMISSIONS	
APPLICABLE STANDARD		
EUT SETUP		
	RADIATED EMISSIONS	
	NALYZER SETUP	
	ARATION TEST	
	N BANDWIDTH & 99% OCCUPIED BANDWIDTH	
	OF HOPPING CHANNEL TEST	
Version 11: 2021-11-09	Page 2 of 64	FCC-BT

Shenzhen Accurate Technology Co., Ltd.	Report No.: RA221222-63223E-RF		
FCC §15.247(a) (1) (iii) - TIME OF OCCUPANCY (DWELL TIME)			
Applicable Standard Test Procedure Test Data			
FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMEN	VT		
APPLICABLE STANDARD			
Test Procedure			
TEST DATA			
FCC §15.247(d) - BAND EDGES TESTING	58		
APPLICABLE STANDARD			
Test Procedure			
TEST DATA			

# **DOCUMENT REVISION HISTORY**

Revision Number	Report Number	Description of Revision	Date of Revision
0	RA221222-63223E-RF	Original Report	2023-01-19

# **GENERAL INFORMATION**

<b>Product Description for Equipment under Test (EUT)</b>
-----------------------------------------------------------

Product	BT KAWAII BUBBLE HP		
Tested Model	HP-0826		
Multiple Product and Model	KAWAII BUBBLE 2	HP-0826B	
SKU* (Barcode of product)	BLACK 7910051, PINK 7910052 WHITE 7910053, GRAY 7910054 (provided by the applicant)		
UPC* (Product code of applicant's internal system)	BLACK 1922349250405, PINK 1922349250412 WHITE 1922349250429, GRAY 1922349250436 (provided by the applicant)		
Model Difference	Please refer to the DOS letter		
Frequency Range	2402~2480MHz		
Maximum conducted Peak output power	-2.25dBm		
Modulation Technique	BDR(GFSK)/EDR(π/4-DQPSK)/EDR(8DPSK)		
Antenna Specification*	Internal Antenna:-0.58dBi(provided by the applicant)		
Voltage Range	DC 3.7V from battery or DC 5V from USB port		
Sample number	RA221222-63223E-RF-S1 (RF Radiated Test) RA221222-63223E-RF-S2 (RF Conducted Test) (Assigned by ATC, Shenzhen)		
Sample/EUT Status	Good condition		

# Objective

This test report is in accordance with Part 2-Subpart J, Part 15-Subparts A and C of the Federal Communication Commission rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

## **Test Methodology**

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

All emissions measurement was performed at Shenzhen Accurate Technology Co., Ltd. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

# **Measurement Uncertainty**

Parameter		Uncertainty
Occupied Channel Bandwidth		5%
RF output power, conducted		0.73dB
Unwanted Emission, conducted		1.6dB
AC Power Lines Conducted Emissions		2.72dB
	30MHz - 1GHz	4.28dB
Emissions, Radiated	1GHz - 18GHz	4.98dB
Rudiated	18GHz - 26.5GHz	5.06dB
Temperature		1°C
Humidity		6%
Supply	voltages	0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

# **Test Facility**

The test site used by Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 708358, the FCC Designation No.: CN1189. Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 429 7.01.

Listed by Innovation, Science and Economic Development Canada (ISEDC), the Registration Number is 5077A.

# SYSTEM TEST CONFIGURATION

## **Description of Test Configuration**

The system was configured for testing in an engineering mode.

## **EUT Exercise Software**

Software "FCC\_assist\_1.0.2.2"\* was used during testing and the power level was default \*.

## **Special Accessories**

No special accessory.

# **Equipment Modifications**

No modification was made to the EUT tested.

# **Support Equipment List and Details**

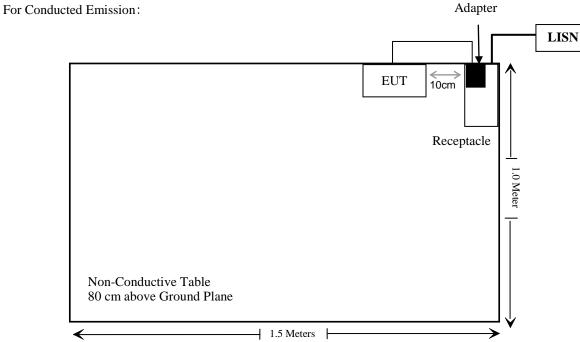
Manufacturer	Description	Model	Serial Number
TECNO	Adapter	U050TSA	AH07015321906

#### External I/O Cable

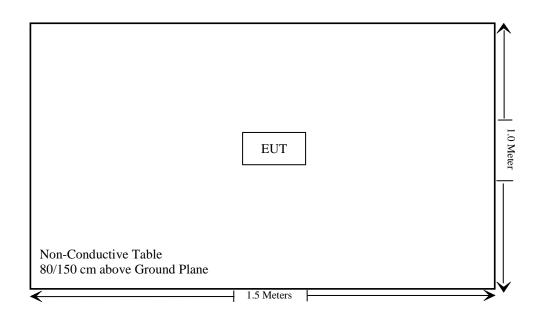
Cable Description	Length (m)	From/Port	То
Un-shielding Detachable USB Cable	0.5	EUT	Adapter
Unshielded Un-detachable AC cable	1.2	LISN	Receptacle

# **Block Diagram of Test Setup**

Shenzhen Accurate Technology Co., Ltd.



For Radiated Emission:



# SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307 (b) & §2.1093	RF Exposure	Compliant
§15.203	Antenna Requirement	Compliant
§15.207(a)	AC Line Conducted Emissions	Compliant
§15.205, §15.209 & §15.247(d)	Radiated Emissions	Compliant
§15.247(a)(1)	20 dB Emission Bandwidth & 99% Occupied Bandwidth	Compliant
§15.247(a)(1)	Channel Separation Test	Compliant
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliant
§15.247(a)(1)(iii)	Quantity of hopping channel Test	Compliant
§15.247(b)(1)	Peak Output Power Measurement	Compliant
§15.247(d)	Band edges	Compliant

# **TEST EQUIPMENT LIST**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date	
	(	Conducted Emis	sions Test			
Rohde& Schwarz	EMI Test Receiver	ESCI	100784	2022/11/25	2023/11/24	
Rohde & Schwarz	L.I.S.N.	ENV216	101314	2022/11/25	2023/11/24	
Anritsu Corp	50 Coaxial Switch	MP59B	6100237248	2022/12/07	2023/12/06	
Unknown	RF Coaxial Cable	No.17	N0350	2022/11/25	2023/11/24	
	Conducted E	mission Test Soft	tware: e3 19821b (	V9)		
		Radiated Emiss	ions Test			
Rohde & Schwarz	Test Receiver	ESR	102725	2022/11/25	2023/11/24	
Rohde & Schwarz	Spectrum Analyzer	FSV40	101949	2022/11/25	2023/11/24	
SONOMA INSTRUMENT	Amplifier	310 N	186131	2022/11/08	2023/11/07	
A.H. Systems, inc.	Preamplifier	PAM-0118P	135	2022/11/08	2023/11/07	
Quinstar	Amplifier	QLW-184055 36-J0	15964001002	2022/11/08	2023/11/07	
Rohde& Schwarz	Test Receiver	ESR	102725	2022/11/25	2023/11/24	
Rohde & Schwarz	Spectrum Analyzer	FSV40	101949	2022/11/25	2023/11/24	
SONOMA INSTRUMENT	Amplifier	310 N	186131	2022/11/08	2023/11/07	
A.H. Systems, inc.	Preamplifier	PAM-0118P	135	2022/11/08	2023/11/07	
Schwarzbeck	HORN ANTENNA	BBHA9170	9170-359	2020/01/05	2023/01/04	
Unknown	RF Coaxial Cable	No.10	N050	2022/11/25	2023/11/24	
Unknown	RF Coaxial Cable	No.11	N1000	2022/11/25	2023/11/24	
Unknown	RF Coaxial Cable	No.12	N040	2022/11/25	2023/11/24	
Unknown	RF Coaxial Cable	No.13	N300	2022/11/25	2023/11/24	
Unknown	RF Coaxial Cable	No.14	N800	2022/11/25	2023/11/24	
Unknown	RF Coaxial Cable	No.15	N600	2022/11/25	2023/11/24	
Unknown	RF Coaxial Cable	No.16	N650	2022/11/25	2023/11/24	
Radiated Emission Test Software: e3 19821b (V9)						
RF Conducted Test						
Rohde & Schwarz	Spectrum Analyzer	FSV-40	101495	2022/11/25	2023/11/24	
Rohde & Schwarz	Open Switch and Control Unit	OSP120 + OSP-B157	101244 + 100866	2022/11/25	2023/11/24	
WEINSCHEL	10dB Attenuator	5324	AU 3842	2022/11/25	2023/11/24	
Unknown	RF Coaxial Cable	No.31	RF-01	Each	time	

\* **Statement of Traceability:** Shenzhen Accurate Technology Co., Ltd. attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Version 11: 2021-11-09

# FCC §1.1307 (b) & §2.1093 – RF EXPOSURE

## **Applicable Standard**

According to FCC §2.1093 and §1.1307(b), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D04 Interim General RF Exposure Guidance v01, clause 2.1.2 – 1-mW test Exemption:

Per § 1.1307(b)(3)(i)(A), a single RF source is exempt RF device (from the requirement to show data demonstrating compliance to RF exposure limits, as previously mentioned) if the available maximum time-averaged power is no more than 1 mW, regardless of separation distance.

This exemption applies to all operating configurations and exposure conditions, for the frequency range 100 kHz to 100 GHz, regardless of fixed, mobile, or portable device exposure conditions. This is a standalone exemption, and it cannot be applied in conjunction with any other test exemption.

## **Test Result:**

For worst case:

Mode	Frequency	Maximum Tune-up Conducted Power		1-mW test
	(MHz)	(dBm)	( <b>mW</b> )	Exemption
BDR/EDR	2402-2480	-2	0.631	Yes

Note: The tune-up power was declared by the applicant.

**Result:** Compliant.

# FCC §15.203 – ANTENNA REQUIREMENT

# **Applicable Standard**

According to FCC § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. 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 provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

# Antenna Connector Construction

The EUT has one internal antenna arrangement, which was permanently attached and the antenna gain is -0.58 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

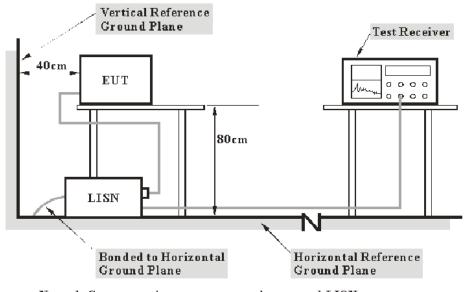
Result: Compliant.

# FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

# **Applicable Standard**

FCC §15.207(a)

# **EUT Setup**



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The measurement procedure of EUT setup is according with ANSI C63.10-2013. The related limit was specified in FCC Part 15.207.

The spacing between the peripherals was 10 cm.

# **EMI Test Receiver Setup**

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W	
150 kHz – 30 MHz	9 kHz	

# **Test Procedure**

During the conducted emission test, the adapter was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All final data was recorded in the Quasi-peak and average detection mode.

# **Factor & Margin Calculation**

The factor is calculated by adding LISN VDF (Voltage Division Factor) and Cable Loss. The basic equation is as follows:

Factor = LISN VDF + Cable Loss

The "**Over limit**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over limit of -7 dB means the emission is 7 dB below the limit. The equation for calculation is as follows:

Over Limit = Level – Limit Level = Read Level + Factor

# **Test Data**

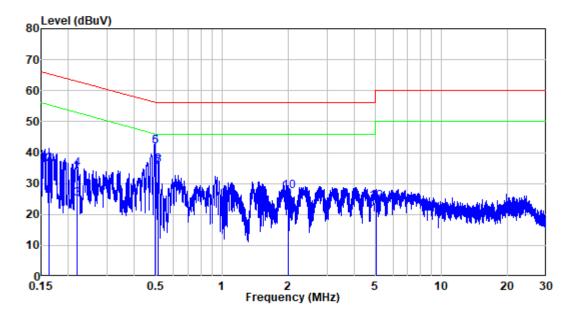
#### **Environmental Conditions**

Temperature:	21 °C
Relative Humidity:	60 %
ATM Pressure:	101.0 kPa

The testing was performed by Chen jie on 2022-12-28.

EUT operation mode: Charging

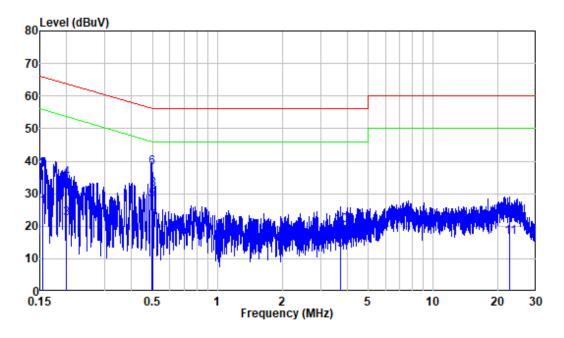
# AC 120V/60 Hz, Line



Site	:	Shielding Room
Condition	:	Line
Job No.	:	RA221222-63223E-RF
Mode	:	Charging
Power	:	AC 120V 60Hz

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.164	9.80	16.08	25.88	55.27	-29.39	Average
2	0.164	9.80	26.36	36.16	65.27	-29.11	QP
3	0.218	9.80	15.24	25.04	52.90	-27.86	Average
4	0.218	9.80	24.77	34.57	62.90	-28.33	QP
5	0.495	9.80	32.21	42.01	46.08	-4.07	Average
6	0.495	9.80	32.07	41.87	56.08	-14.21	QP
7	0.513	9.81	25.39	35.20	46.00	-10.80	Average
8	0.513	9.81	26.06	35.87	56.00	-20.13	QP
9	2.003	9.82	15.05	24.87	46.00	-21.13	Average
10	2.003	9.82	17.56	27.38	56.00	-28.62	QP
11	5.018	9.85	10.16	20.01	50.00	-29.99	Average
12	5.018	9.85	14.28	24.13	60.00	-35.87	QP

# AC 120V/60 Hz, Neutral



Site	:	Shielding Room
Condition	:	Neutral
Job No.	:	RA221222-63223E-RF
Mode	:	Charging
Power	:	AC 120V 60Hz

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.155	9.80	16.04	25.84	55.73	-29.89	Average
2	0.155	9.80	27.77	37.57	65.73	-28.16	QP
3	0.200	9.80	12.57	22.37	53.61	-31.24	Average
4	0.200	9.80	24.90	34.70	63.61	-28.91	QP
5	0.496	9.80	18.33	28.13	46.06	-17.93	Average
6	0.496	9.80	28.35	38.15	56.06	-17.91	QP
7	0.500	9.80	11.74	21.54	46.00	-24.46	Average
8	0.500	9.80	21.70	31.50	56.00	-24.50	QP
9	3.727	9.84	2.73	12.57	46.00	-33.43	Average
10	3.727	9.84	10.40	20.24	56.00	-35.76	QP
11	22.685	10.13	6.43	16.56	50.00	-33.44	Average
12	22.685	10.13	12.54	22.67	60.00	-37.33	QP

Version 11: 2021-11-09

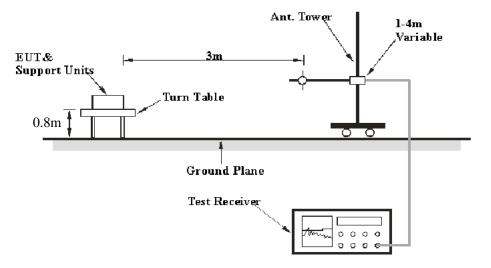
# FCC §15.205, §15.209 & §15.247(d) - RADIATED EMISSIONS

# **Applicable Standard**

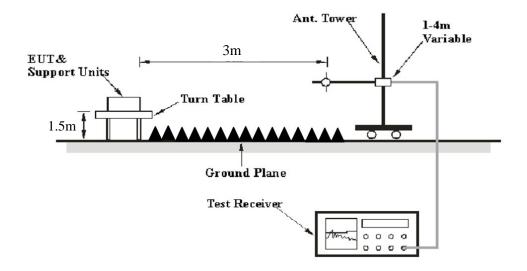
FCC §15.205; §15.209; §15.247(d)

# **EUT Setup**

#### Below 1 GHz:



# Above 1GHz:



The radiated emission performed in the 3 meters, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, FCC 15.247 limits.

# EMI Test Receiver & Spectrum Analyzer Setup

The EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	РК

For average measurement:

Use the duty cycle factor correction factor method per 15.35(c). Duty cycle=On time/100milliseconds, On time=N1\*L1+N2\*L2+...Nn-1\*Ln-1+Nn\*Ln, Where N1 is number of type 1 pulses, L1 is length of type 1 pulse, etc. Average Emission Level=Peak Emission Level+20\*log(Duty cycle)

#### **Test Procedure**

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All final data was recorded in Quasi-peak detection mode for frequency range of 30 MHz -1 GHz and peak and Average detection modes for frequencies above 1 GHz.

If the maximized peak measured value complies with under the QP/Average limit more than 6dB, then it is unnecessary to perform QP/Average measurement.

#### **Factor & Margin Calculation**

The Factor is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain. The basic equation is as follows:

Factor = Antenna Factor + Cable Loss - Amplifier Gain

The "**Over Limit/Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over Limit/margin of -7dB means the emission is 7dB below the limit. The equation for calculation is as follows:

Over Limit/Margin = Level / Corrected Amplitude – Limit Level / Corrected Amplitude = Read Level + Factor

#### **Test Data**

#### **Environmental Conditions**

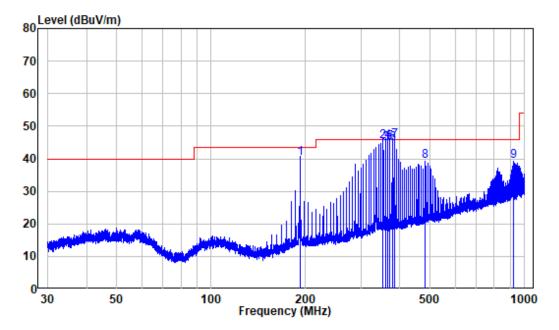
Temperature:	24-25 °C
<b>Relative Humidity:</b>	55-62 %
ATM Pressure:	101.0 kPa

*The testing was performed by Jimi Zheng on 2023-01-13 for below 1GHz and on 2022-12-29 for above 1GHz.* 

EUT operation mode: Transmitting

(Scan with GFSK,  $\pi/4$ -DQPSK, 8DPSK mode at X axis, Y axis, Z axis, the worst case is 8DPSK Mode at Y axis)

# Below 1GHz: 8DPSK Mode, Low Channel

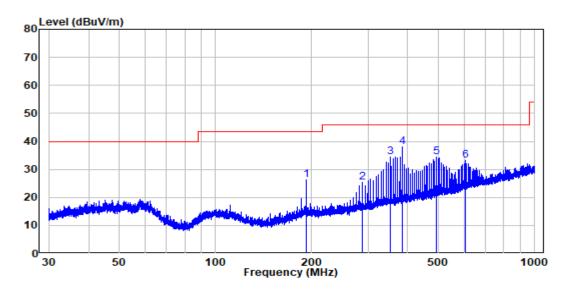


## Horizontal

Site :	chamber
Condition:	3m HORIZONTAL
Job No. :	RA221222-63223E-RF
Test Mode:	BT Transmitting

	Freq	Factor			Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	191.997	-11.25	51.40	40.15	43.50	-3.35	QP
2	354.028	-7.46	52.60	45.14	46.00	-0.86	QP
3	359.974	-7.68	52.30	44.62	46.00	-1.38	QP
4	366.020	-7.50	52.80	45.30	46.00	-0.70	QP
5	372.005	-7.29	52.29	45.00	46.00	-1.00	QP
6	378.087	-7.20	51.81	44.61	46.00	-1.39	QP
7	384.100	-7.08	52.60	45.52	46.00	-0.48	QP
8	480.107	-5.00	44.13	39.13	46.00	-6.87	Peak
9	924.135	1.76	37.37	39.13	46.00	-6.87	Peak





Site : chamber Condition: 3m VERTICAL Job No. : RA221222-63223E-RF Test Mode: BT Transmitting

	Freq	Factor			Limit Line		Remark
-	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	191.997	-11.25	37.37	26.12	43.50	-17.38	Peak
2	287.990	-9.36	34.85	25.49	46.00	-20.51	Peak
3	354.028	-7.46	41.77	34.31	46.00	-11.69	Peak
4	384.100	-7.08	45.01	37.93	46.00	-8.07	Peak
5	492.037	-4.59	38.97	34.38	46.00	-11.62	Peak
6	606.190	-2.32	35.39	33.07	46.00	-12.93	Peak

Frequency	Receiver		Turntable Angle	Rx An	tenna	Factor	Corrected Amplitude	Limit	Margin	
(MHz)	Reading	PK/AV	Degree	Height	Polar	(dB/m)	(dBuV/m)	(dBuV/m)	( <b>dB</b> )	
	(dBuV)	ΓΛ/Αν	Degree	( <b>m</b> )	(H/V)					
	Low Channel									
2310	46.96	PK	329	1.6	Н	-7.23	39.73	74	-34.27	
2310	47.2	РК	135	1.4	V	-7.23	39.97	74	-34.03	
2390	48.25	РК	46	1.7	Н	-7.21	41.04	74	-32.96	
2390	50.22	РК	342	1.1	V	-7.21	43.01	74	-30.99	
4804	50.87	PK	7	1.2	Н	-3.52	47.35	74	-26.65	
4804	48.71	РК	288	2.2	V	-3.52	45.19	74	-28.81	
				Middle C	hannel					
4882	49.72	РК	181	1.1	Н	-3.37	46.35	74	-27.65	
4882	48.48	РК	196	1.7	V	-3.37	45.11	74	-28.89	
				High Cł	annel					
2483.5	49.52	РК	142	1.9	Н	-7.2	42.32	74	-31.68	
2483.5	47.04	РК	181	1.8	V	-7.2	39.84	74	-34.16	
2500	47.66	РК	48	1.4	Н	-7.18	40.48	74	-33.52	
2500	46.98	РК	330	1.3	V	-7.18	39.8	74	-34.2	
4960	49.63	РК	262	1.6	Н	-3.01	46.62	74	-27.38	
4960	50.81	PK	136	1.1	V	-3.01	47.8	74	-26.2	

Note:

Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor Corrected Amplitude = Factor + Reading

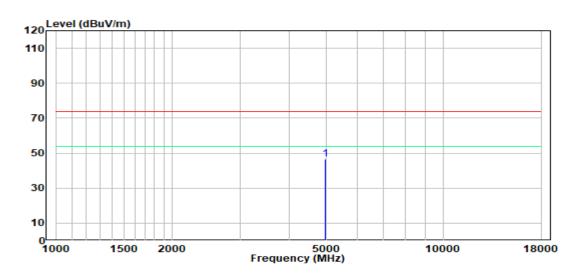
Margin = Corrected Amplitude - Limit

The other spurious emission which is in the noise floor level was not recorded.

For above 1GHz, the test result of peak was 20dB below to the limit of peak, which can be compliant to the average limit, so just peak value was recorded.

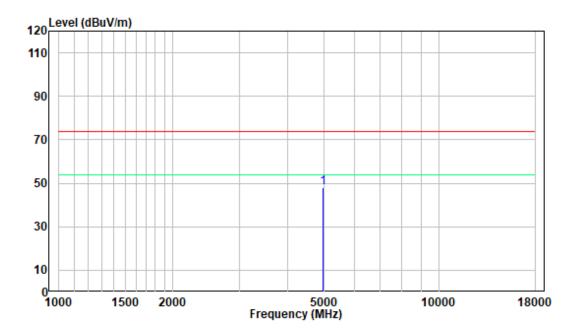
#### 1 GHz - 18 GHz: (Pre-Scan plots)

# Worst case for 8DPSK, High Channel



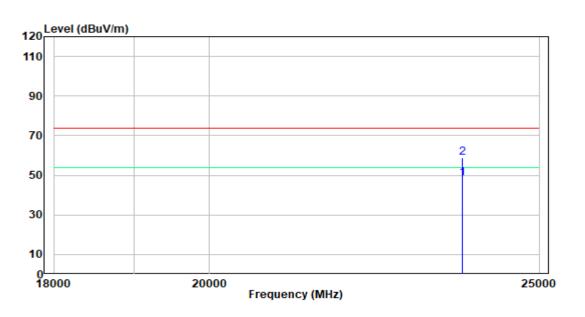
Horizontal

## Vertical



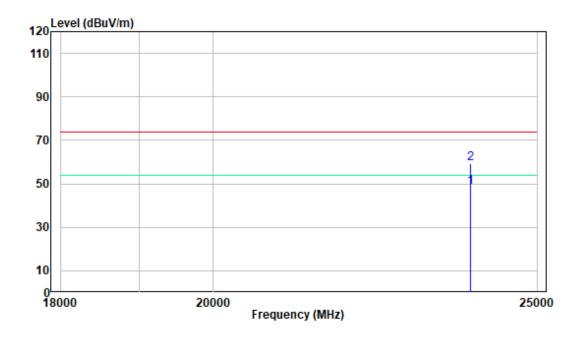
# 18-25GHz: (Pre-Scan plots)

# Worst case for 8DPSK, High Channel



Horizontal

#### Vertical



Version 11: 2021-11-09

# FCC §15.247(a) (1)-CHANNEL SEPARATION TEST

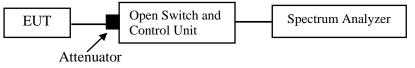
# Applicable Standard

Frequency hopping systems shall have hoping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, 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 provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

# **Test Procedure**

According to ANSI C63.10-2013 section 7.8.2

- 1. Set the EUT in transmitting mode, maxhold the channel.
- 2. Set the adjacent channel of the EUT and maxhold another trace.
- 3. Measure the channel separation.



# Test Data

#### **Environmental Conditions**

Temperature:	22 °C	
Relative Humidity:	56 %	
ATM Pressure:	101.0 kPa	

The testing was performed by Glenn Jiang on 2022-12-29.

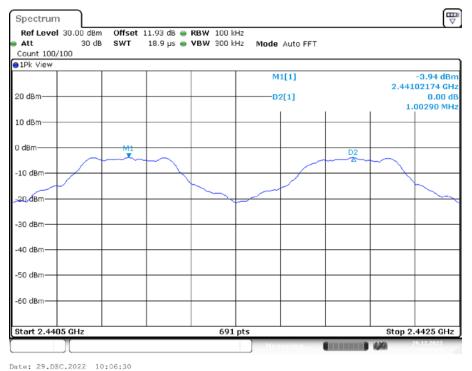
EUT operation mode: Transmitting

Test Result: Compliant.

Test Mode	Antenna	Channel	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Нор	1.003	>=0.576	PASS
2DH5	Ant1	Нор	1	>=0.820	PASS
3DH5	Ant1	Нор	1	>=0.834	PASS

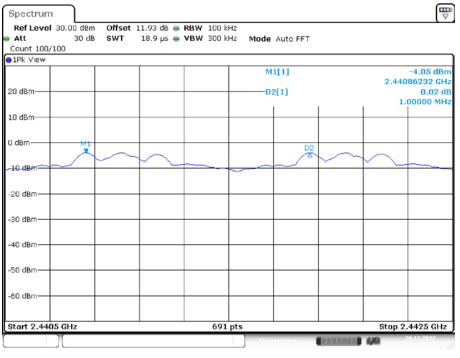
Note: The limit = (2/3) \* 20dB bandwidth

Please refer to the below plots:

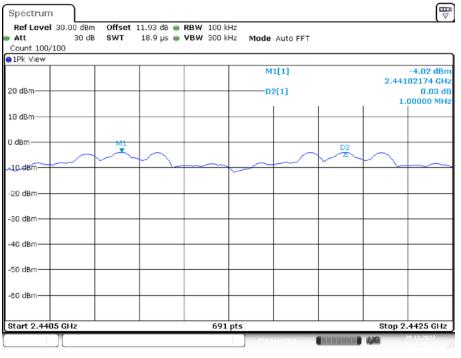


DH5\_Ant1\_Hop

#### 2DH5\_Ant1\_Hop



Date: 29.DEC.2022 10:30:56



3DH5\_Ant1\_Hop

Date: 29.DEC.2022 10:16:11

# FCC §15.247(a) (1) – 20 dB EMISSION BANDWIDTH & 99% OCCUPIED BANDWIDTH

# **Applicable Standard**

Alternatively, 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, provided the systems operate with an output power no greater than 125 mW.

# **Test Procedure**

According to ANSI C63.10-2013 section 6.9.2

The following conditions shall be observed for measuring the occupied bandwidth and 20 dB bandwidth:

• The transmitter shall be operated at its maximum carrier power measured under normal test conditions.

• The span of the spectrum analyzer shall be set large enough to capture all products of the modulation process, including the emission skirts, around the carrier frequency, but small enough to avoid having other emissions (e.g. on adjacent channels) within the span.

• The detector of the spectrum analyzer shall be set to "Sample". However, a peak, or peak hold, may be used in place of the sampling detector since this usually produces a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold (or "Max Hold") may be necessary to determine the occupied / 20 dB bandwidth if the device is not transmitting continuously.

• The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the actual occupied / 20 dB bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value. Video averaging is not permitted.

Note: It may be necessary to repeat the measurement a few times until the RBW and VBW are in compliance with the above requirement.

For the 99% emission bandwidth, the trace data points are recovered and directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached, and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded. The difference between the two recorded frequencies is the occupied bandwidth (or the 99% emission bandwidth).



# **Test Data**

# **Environmental Conditions**

Temperature:	22 °C	
<b>Relative Humidity:</b>	56 %	
ATM Pressure:	101.0 kPa	

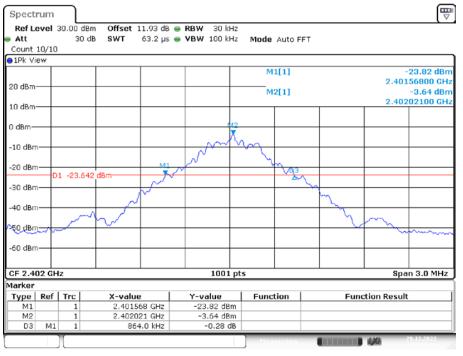
The testing was performed by Glenn Jiang on 2022-12-29.

EUT operation mode: Transmitting

Test Result: Compliant.

Test Mode	Antenna	Channel	20db EBW[MHz]	OCB [MHz]	Verdict
DH5	Ant1	2402	0.864	0.857	PASS
		2441	0.864	0.857	PASS
		2480	0.864	0.857	PASS
2DH5	Ant1	2402	1.230	1.166	PASS
		2441	1.227	1.166	PASS
		2480	1.230	1.166	PASS
3DH5	Ant1	2402	1.251	1.169	PASS
		2441	1.251	1.172	PASS
		2480	1.251	1.172	PASS

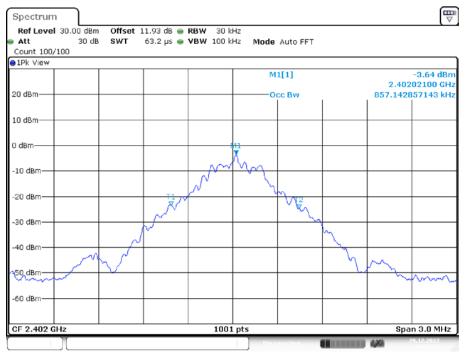
Please refer to the below plots:



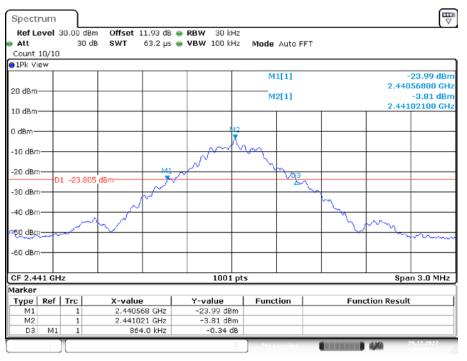
#### 20 dB EMISSION BANDWIDTH\_DH5\_Ant1\_2402

Date: 29.DEC.2022 09:51:11

# 99% OCCUPIED BANDWIDTH\_DH5 \_Ant1\_2402



Date: 29.DEC.2022 09:51:28



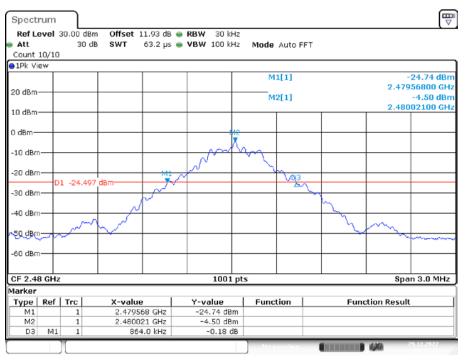
20 dB EMISSION BANDWIDTH\_DH5 \_Ant1\_2441

Date: 29.DEC.2022 09:52:27

# 99% OCCUPIED BANDWIDTH\_DH5 \_Ant1\_2441



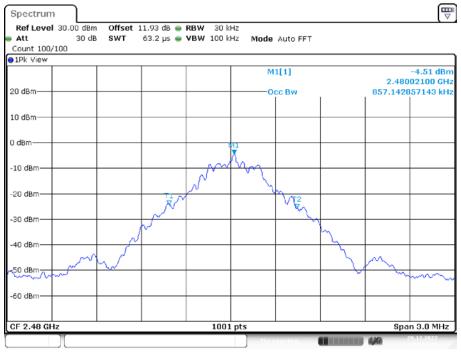
Date: 29.DEC.2022 09:52:44



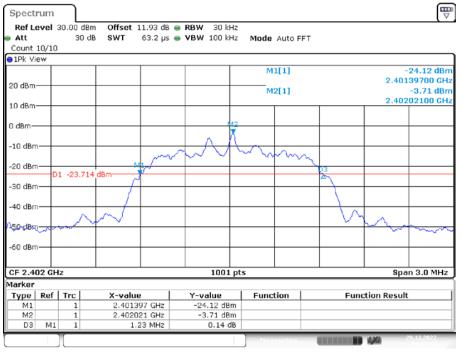
20 dB EMISSION BANDWIDTH\_DH5 \_Ant1\_2480

Date: 29.DEC.2022 09:53:19

#### 99% OCCUPIED BANDWIDTH\_DH5 \_Ant1\_2480



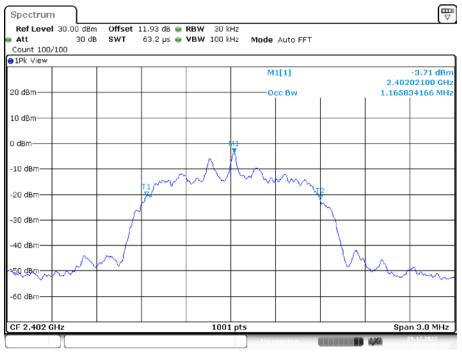
Date: 29.DEC.2022 09:53:35



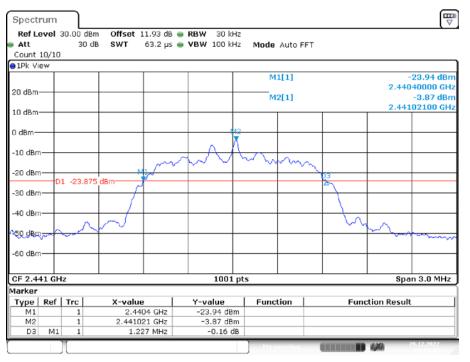
#### 20 dB EMISSION BANDWIDTH\_2DH5 \_Ant1\_2402

Date: 29.DEC.2022 09:57:46

#### 99% OCCUPIED BANDWIDTH\_2DH5 \_Ant1\_2402



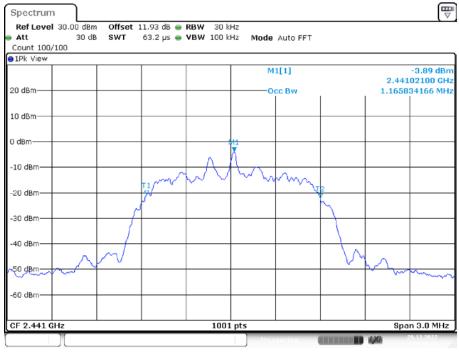
Date: 29.DEC.2022 09:58:03



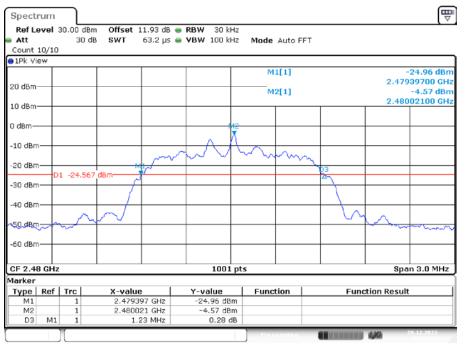
#### 20 dB EMISSION BANDWIDTH\_2DH5 \_Ant1\_2441

Date: 29.DEC.2022 09:59:04

# 99% OCCUPIED BANDWIDTH\_2DH5 \_Ant1\_2441



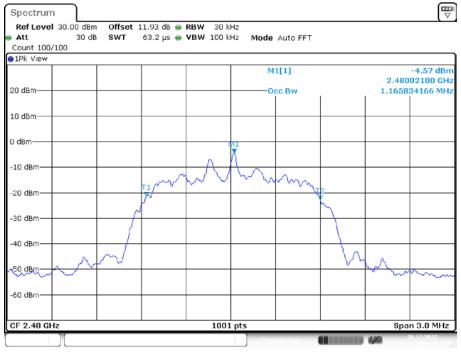
Date: 29.DEC.2022 09:59:21



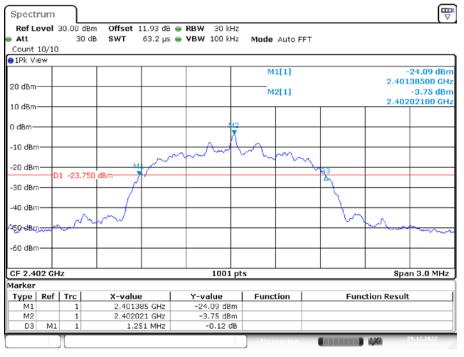
## 20 dB EMISSION BANDWIDTH \_2DH5\_Ant1\_2480

Date: 29.DEC.2022 09:59:57





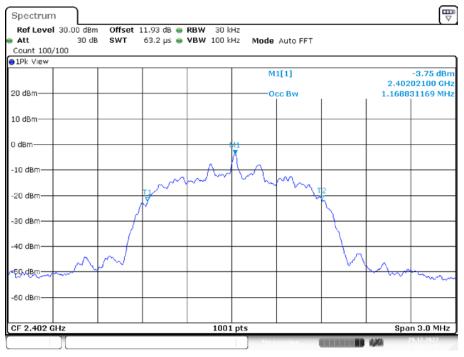
Date: 29.DEC.2022 10:00:14



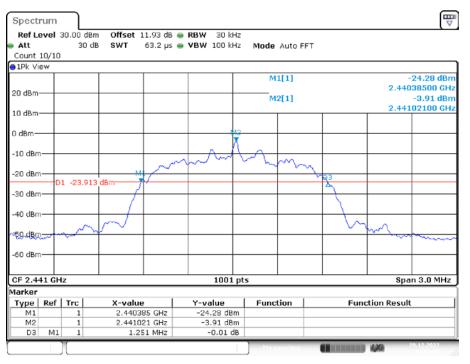
#### 20 dB EMISSION BANDWIDTH\_3DH5 \_Ant1\_2402

Date: 29.DEC.2022 10:01:22

#### 99% OCCUPIED BANDWIDTH\_3DH5 \_Ant1\_2402



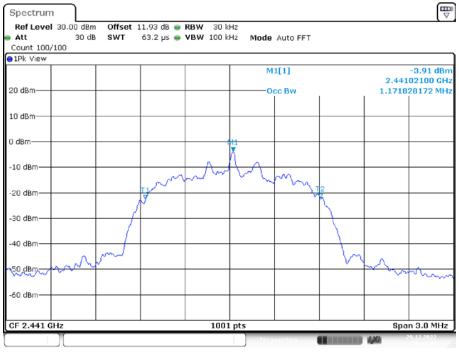
Date: 29.DEC.2022 10:01:39



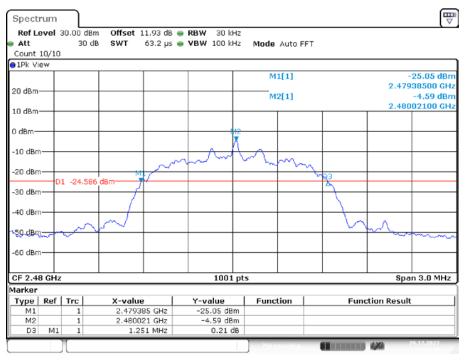
## 20 dB EMISSION BANDWIDTH\_3DH5 \_Ant1\_2441

Date: 29.DEC.2022 10:02:45

# 99% OCCUPIED BANDWIDTH\_3DH5 \_Ant1\_2441



Date: 29.DEC.2022 10:03:02



### 20 dB EMISSION BANDWIDTH \_3DH5\_Ant1\_2480

Date: 29.DEC.2022 10:03:40

#### 99% OCCUPIED BANDWIDTH \_3DH5\_Ant1\_2480



Date: 29.DEC.2022 10:03:57

# FCC §15.247(a) (1) (iii)-QUANTITY OF HOPPING CHANNEL TEST

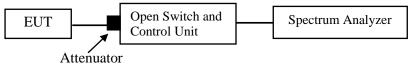
# **Applicable Standard**

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. 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. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

# **Test Procedure**

According to ANSI C63.10-2013 section 7.8.3

- 1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
- 2. Set the EUT in hopping mode from first channel to last.
- 3. By using the max-hold function record the quantity of the channel.



# **Test Data**

#### **Environmental Conditions**

Temperature:	22 °C
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

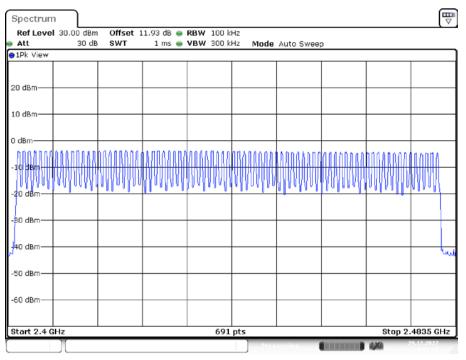
The testing was performed by Glenn Jiang on 2022-12-29.

EUT operation mode: Transmitting

Test Result: Compliant.

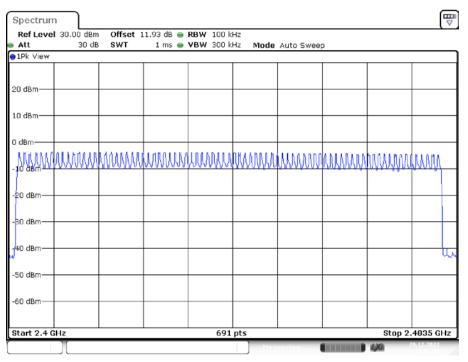
Test Mode	Antenna	Channel	Result[Num]	Limit[Num]	Verdict
DH5	Ant1	Нор	79	>=15	PASS
2DH5	Ant1	Нор	79	>=15	PASS
3DH5	Ant1	Нор	79	>=15	PASS





Date: 29.DEC.2022 10:07:51

#### 2DH5\_Ant1\_Hop



Date: 29.DEC.2022 10:12:47

# 3DH5\_Ant1\_Hop

	30.00 dBm		11.93 dB 👄		100 kHz					$\nabla$
Att	30 dB	SWT	1 ms 👄	VBW	300 kHz	Mode	Auto Swee	0		
1Pk View										
20 dBm										
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20 dBm										
30 dBm										
40 dBm										- lu
50 dBm										
I										
60 dBm										

Date: 29.DEC.2022 10:17:34

# FCC §15.247(a) (1) (iii) - TIME OF OCCUPANCY (DWELL TIME)

# **Applicable Standard**

Frequency hopping systems in the 2400-2483.5 MHz shall use at least 15 channels. 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. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

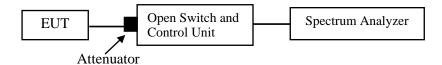
## **Test Procedure**

According to ANSI C63.10-2013 section 7.8.4

- 1. The EUT was worked in channel hopping.
- 2. Set the RBW to: 1MHz.
- 3. Set the VBW  $\geq$  3×RBW.
- 4. Set the span to 0Hz.
- 5. Detector = peak.
- 6. Sweep time = As necessary to capture the entire dwell time per hopping channel
- 7. Trace mode = max hold.
- 8. Allow trace to fully stabilize.
- 9. Recorded the time of single pulses
- 10. Repeat the measurement using a longer sweep time to determine the number of hops over the period specified in the requirements. The sweep time shall be equal to, or less than, the period specified in the requirements. Determine the number of hops over the sweep time and calculate the total number of hops in the period specified in the requirements, using the following equation:

(Number of hops in the period specified in the requirements) = (number of hops on spectrum analyzer) × (period specified in the requirements / analyzer sweep time)

11. The average time of occupancy is calculated from the transmit time per hop multiplied by the number of hops in the period specified in the requirements. If the number of hops in a specific time varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation.



#### **Test Data**

#### **Environmental Conditions**

Temperature:	22 °C	
Relative Humidity:	56 %	
ATM Pressure:	101.0 kPa	

The testing was performed by Glenn Jiang on 2022-12-29.

EUT operation mode: Transmitting

Test Result: Compliant.

#### Shenzhen Accurate Technology Co., Ltd.

Test Mode	Antenna	Channel	Burst Width [ms]	Total Hops[Num]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Нор	0.42	320	0.134	<=0.4	PASS
DH3	Ant1	Нор	1.67	160	0.267	<=0.4	PASS
DH5	Ant1	Нор	2.91	120	0.349	<=0.4	PASS
2DH1	Ant1	Нор	0.43	320	0.138	<=0.4	PASS
2DH3	Ant1	Нор	1.67	170	0.284	<=0.4	PASS
2DH5	Ant1	Нор	2.92	110	0.321	<=0.4	PASS
3DH1	Ant1	Нор	0.43	330	0.142	<=0.4	PASS
3DH3	Ant1	Нор	1.67	170	0.284	<=0.4	PASS
3DH5	Ant1	Нор	2.92	130	0.380	<=0.4	PASS

 Note 1: A period time=0.4\*79=31.6(s), Result=Burst Width\*Total Hops

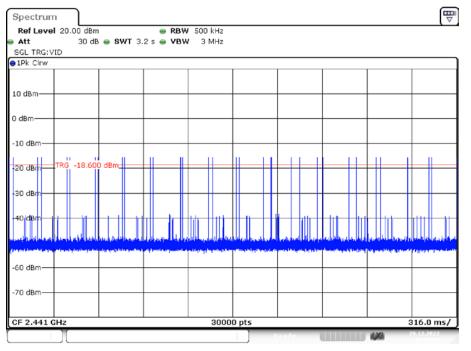
 Note 2: Total Hops =Hopping Number in 3.16s\*10

 Note 3: Hoping Number in 3.16s=Total of highest signals in 3.16s (Second high signals were other channel)

Att 30 dB  SWT	10 ms 😑 <b>VBW</b> 3 MHz			
1Pk Cirw				
		M1[1]		-17.30 dBn 25 n:
0 dBm		D2[1]		1.53 di
		1	1 1	417.55 μ
dBm-				
10 dBm				
0 dBm TRG -18.600 dBm				
0 dBm				
0 dBm				
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	11 . I. I. I.	Le la de la de		· · · ·
70 dBm				
F 2.441 GHz	800	0 pts		1.0 ms/

DH1\_Ant1\_Hop

Date: 29.DEC.2022 10:09:26



Date: 29.DEC.2022 10:09:31

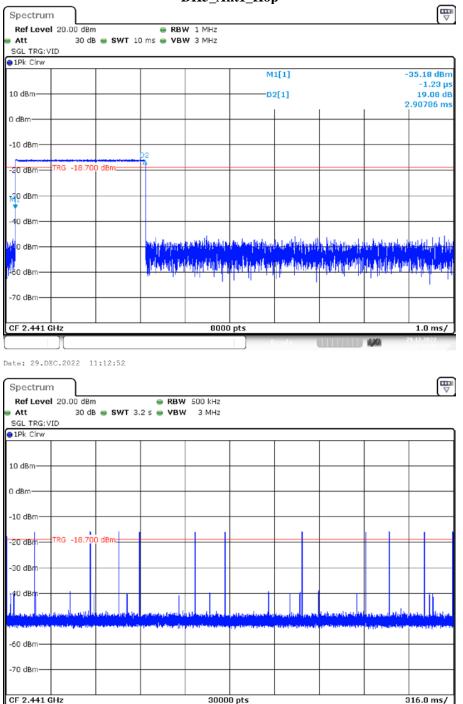
1Pk Cirw				м	1[1]			-21.51 dBm
.0 dBm				D	2[1]		:	-1.23 µs 5.62 dE 1.66646 ms
I dBm								
10 dBm								
0 dBm TRG	-18.600 dBm							
30 dBm								
10 dBm								
0 dBm		. Ill stales poly	an all many by	n dut, salata data ya	When the second	Ադսիթիկ	Intel i contra	And the property of the second se
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		1			Lond Con-	1.00	י ויין י	k na sina ka
60 dBm								

DH3\_Ant1\_Hop

Date: 29.DEC.2022 10:08:55

Spectrum			
Ref Level 20.00 dBm	😑 RBW 500 kHz		
Att 30 dB 🖷 SWT 3.2	s 🥌 VBW 3 MHz		
SGL TRG: VID			
1Pk Cirw			
10 dBm			
) dBm			
-10 dBm			
-20 dBmTRG -18.600 dBm			
-20 dBm			
-30 dBm			
-40 dBm			
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-60 dBm			
-70 dBm		1 1 1	
CF 2.441 GHz	30000 pts	· · · · · ·	316.0 ms/
		ke a div	29.12.2022

Date: 29.DEC.2022 10:09:01



DH5\_Ant1\_Hop

Date: 29.DEC.2022 11:12:58

Version 11: 2021-11-09

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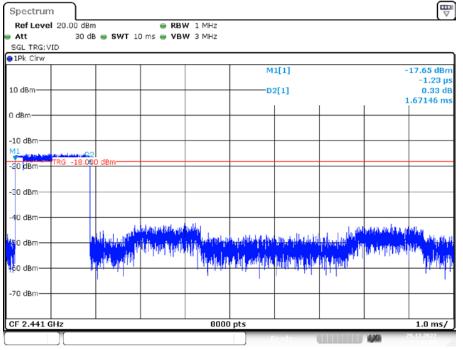
Ref Level 20.00 dBm 🛛 🖷 RB	W 1 MHz					
Att 30 dB 🖷 SWT 10 ms 🖷 VB	SW 3 MHz					
BGL TRG: VID						
1Pk Clrw						
		м	1[1]		-	21.90 dBn
0 dBm		D'	2[1]			-1.23 μ 4.48 di
			2[1]			427.55 μ
dBm-						
dom						
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0 dBm TRG -18.200 dBm						
0 dBm						
10 dBm						
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70 dBm						
F 2.441 GHz	8000	pts	1			1.0 ms/
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2DH1\_Ant1\_Hop

Date: 29.DEC.2022 10:14:09

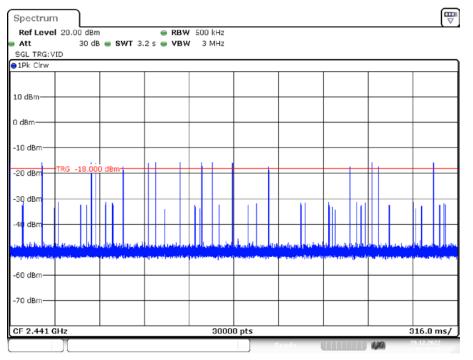
Spectrum				
Ref Level 20.00 dBm		₩ 500 kHz		•
Att 30 dB SGL TRG: VID	9 🖷 SWT 3.2 s 🖷 VB1	W 3 MHz		
1Pk Cirw				
10 dBm				
) dBm				
-10 dBm				
20 dBm TRG -18.20	0 dBm			
30 dBm	1 11 11	dh dh dh		
40 dBm				
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and the second	and a data big properties, a notable second part of pro-			
-60 dBm				
70 dBm				
CF 2.441 GHz		30000 pts		316.0 ms/
			Ready	29.12.2022

Date: 29.DEC.2022 10:14:14

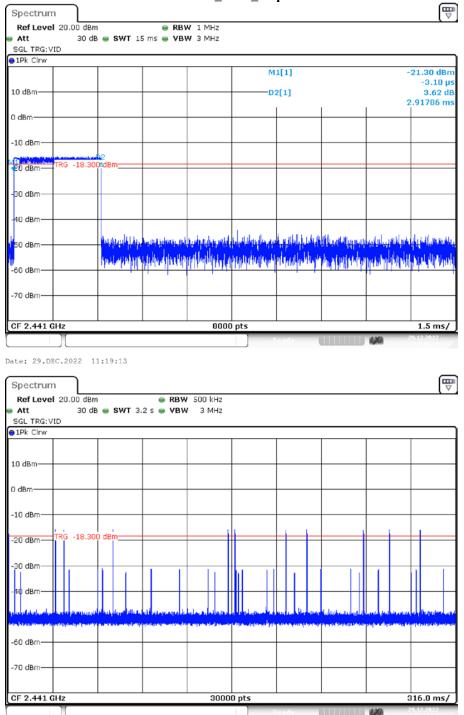


2DH3\_Ant1\_Hop

Date: 29.DEC.2022 11:16:06

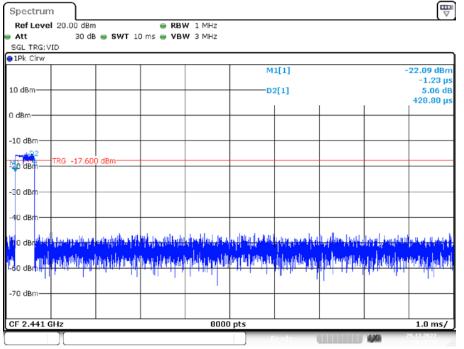


Date: 29.DEC.2022 11:16:11



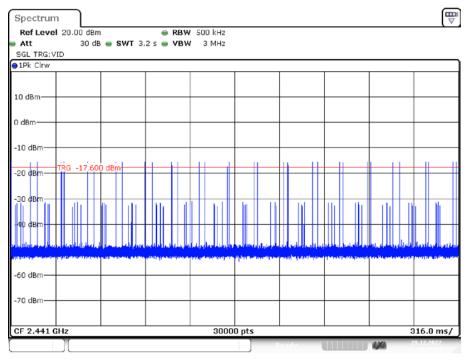
2DH5\_Ant1\_Hop

Date: 29.DEC.2022 11:19:19

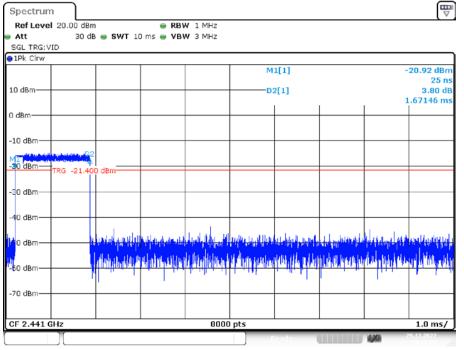


3DH1\_Ant1\_Hop

Date: 29.DEC.2022 10:18:59

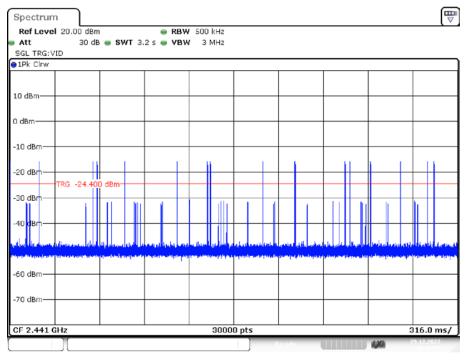


Date: 29.DEC.2022 10:19:05

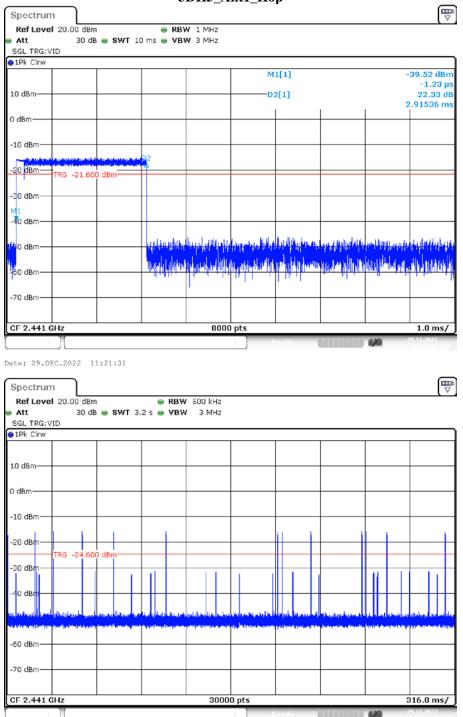


3DH3\_Ant1\_Hop

Date: 29.DEC.2022 10:18:21



Date: 29.DEC.2022 10:18:26



3DH5\_Ant1\_Hop

Date: 29.DEC.2022 11:21:37

# FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT

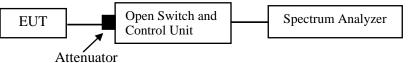
# **Applicable Standard**

According to §15.247(b) (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. And for all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

# **Test Procedure**

According to ANSI C63.10-2013 section 7.8.5

- 1. Place the EUT on a bench and set in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.
- 3. Add a correction factor to the display.



# **Test Data**

#### **Environmental Conditions**

Temperature:	22 °C
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

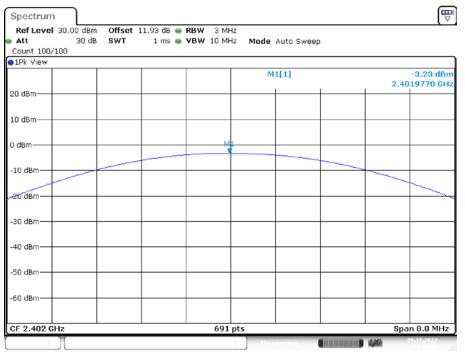
The testing was performed by Glenn Jiang on 2022-12-29.

EUT operation mode: Transmitting

Test Result: Compliant.

Test Mode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
		2402	-3.23	<=20.97	PASS
DH5	DH5 Ant1	2441	-3.44	<=20.97	PASS
		2480	-4.12	<=20.97	PASS
		2402	-2.68	<=20.97	PASS
2DH5	H5 Ant1	2441	-2.85	<=20.97	PASS
		2480	-3.45	<=20.97	PASS
		2402	-2.25	<=20.97	PASS
3DH5	Ant1	2441	-2.43	<=20.97	PASS
		2480	-3.09	<=20.97	PASS

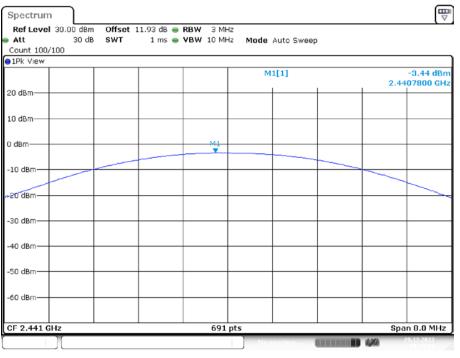
#### Shenzhen Accurate Technology Co., Ltd.



#### DH5\_Ant1\_2402

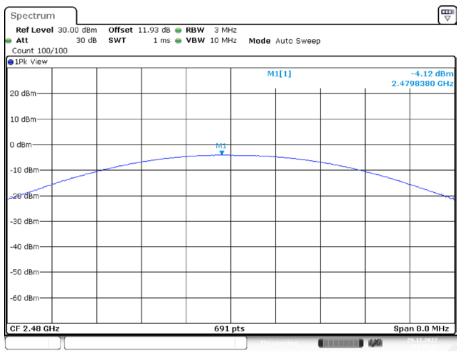
Date: 29.DEC.2022 09:54:26

## DH5\_Ant1\_2441



Date: 29.DEC.2022 09:55:06

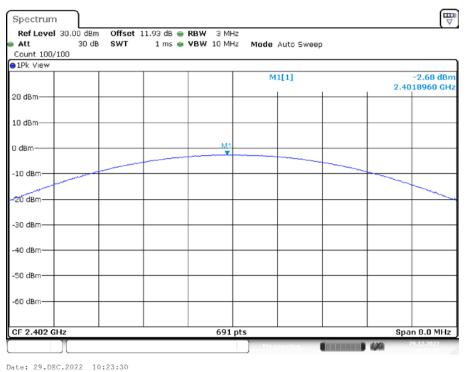
#### Shenzhen Accurate Technology Co., Ltd.

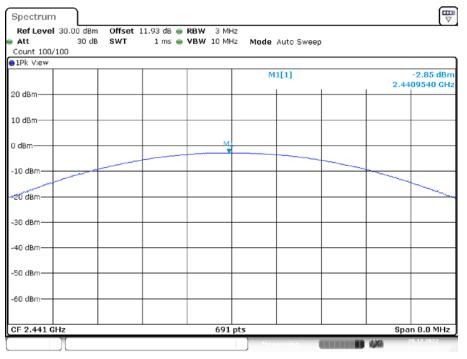


#### DH5\_Ant1\_2480

Date: 29.DEC.2022 09:55:28

#### 2DH5\_Ant1\_2402

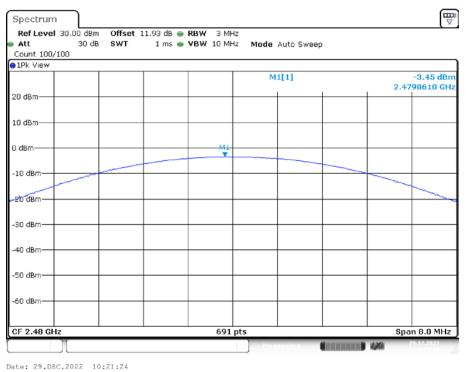




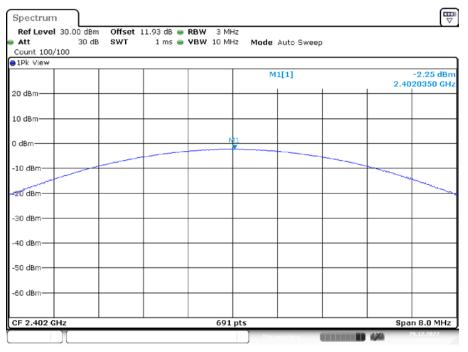
#### 2DH5\_Ant1\_2441

Date: 29.DEC.2022 10:23:47

#### 2DH5\_Ant1\_2480



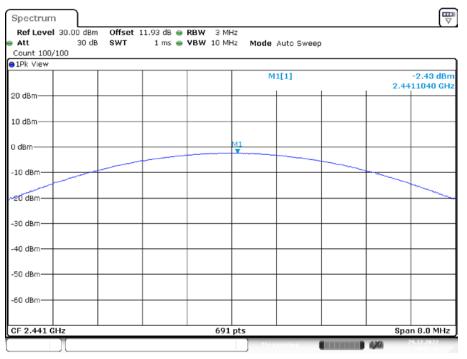
#### Shenzhen Accurate Technology Co., Ltd.



3DH5\_Ant1\_2402

Date: 29.DEC.2022 10:21:52

#### 3DH5\_Ant1\_2441



Date: 29.DEC.2022 10:22:18

## Shenzhen Accurate Technology Co., Ltd.

Spectrum		1								
Ref Level Att Count 100/3		) dBm 30 dB	11.93 dB ( 1 ms (		3 MHz 10 MHz	Mode	Auto Sweep	)		
1Pk View										
						М	1[1]		2.47	-3.09 dBm 98960 GHz
20 dBm				+						
10 dBm		_		_						
0 dBm			 		- 141					
-10 dBm			 							
-20 dBm-										
-30 dBm				-						
-40 dBm		_								
-50 dBm		_								
-60 dBm			 		_					
CF 2.48 GH	z				691 pt	5			Spa	n 8.0 MHz
						Mea	isuring		4,49	29.12.2022

# 3DH5\_Ant1\_2480

Date: 29.DEC.2022 10:22:37

# FCC §15.247(d) - BAND EDGES TESTING

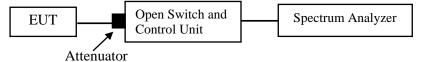
# Applicable Standard

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

# **Test Procedure**

According to ANSI C63.10-2013 section 7.8.6& section 6.10

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
- 3. Set RBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
- 4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
- 5. Repeat above procedures until all measured frequencies were complete.



# **Test Data**

**Environmental Conditions** 

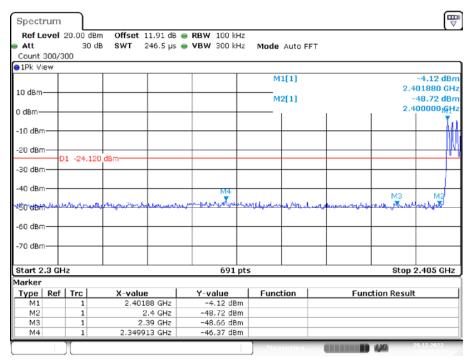
Temperature:	22 °C
<b>Relative Humidity:</b>	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Glenn Jiang on 2022-12-29.

EUT operation mode: Transmitting

Test Result: Compliant.

#### DH5: Band Edge-Left Side Hopping



Date: 29.DEC.2022 10:05:04

#### Single

Ref Le	evel	20.00 dB	m Offset 1	1.93 dB 🍕	• RBW 100 kHz			•
Att		30 0	iB SWT 2	46.5 µs 📢	VBW 300 kHz	Mode Auto F	FFT	
Count :	300/3	00						
1Pk Vie	в₩							
						M1[1]		-3.58 dBr
10 dBm-								2.402040 GH
to asm-						M2[1]		-48.95 dBr
) dBm—								2.400000 GH
J UBIII-								1 I T
-10 dBm	$\rightarrow$							
10 0011								
-20 dBm	$\rightarrow$							
		1 -23.58	0 dBm					
-30 dBm	+							
								1 1 1
-40 dBm	+				+			M3 M4
	Ι.			. 10	mention			
S0 dBm	~ adr	renteren	a post of the second second	you comple	Manager with	wwww	www.www.wala	Contraction and the contraction of the contraction
-60 dBm	+							
-70 dBm								
-70 aBm								
Start 2	.3 GH	z			691 pt	s		Stop 2.405 GHz
larker								
Type	Ref	Trc	X-value		Y-value	Function	Fun	ction Result
M1		1	2.4020	)4 GHz	-3.58 dBm			
M2		1	2.	4 GHz	-48.95 dBm			
140		1	2.3	9 GHz	-47.94 dBm			
M3		1		7 GHz	-45.05 dBm			

Date: 29.DEC.2022 09:51:43

			110	phing			
Spectrum							
Ref Level	20.00 di	Bm Offset 11.93	dB 👄 RBW 100	kHz			
Att	30	dB SWT 1.1	ms 👄 VBW 300	kHz Mode /	Auto Swee	p	
Count 300/3	300						
1Pk View							
				M1	[1]		-4.54 dBn
							2.470060 GH
				M2	[1]		-43.73 dBr
0 dBm				<b></b> .			2.483500 GH
1540508	16			1 1			
10/68/h/ <del>-/</del> -	₩			+ +			
TAAAAAM	n –			1 1			
20 dBrt	)1 -24.54	10 dB					
30 dBm	1 -24.5	to ubiii					
SU UBIII	1						
-40 dBm	M2		M3 M4	++			
	hunto	Almed mar was	malletter	mener	Mahamhiller	whenter	mentingentimes
50 dBm —				+ +			
				1 1			
60 dBm							
70 dBm							
o ubiii							
Start 2.47 0				1 mt c			Stop 9 FF CUIs
	HZ		69	1 pts			Stop 2.55 GHz
larker	1 - 1		1	1	1	-	
	Trc	X-value	Y-value	Functi	on	Fun	ction Result
M1 M2	1	2.47006 Gł 2.4835 Gł					
M2 M3	1	2.4835 G					
M4	1	2.50513 G					

## DH5: Band Edge- Right Side Hopping

Date: 29.DEC.2022 10:10:08

Spectru	m								
Ref Lev Att Count 30		00 dBr 30 d			<ul> <li>RBW 100 kHz</li> <li>VBW 300 kHz</li> </ul>		Sweep		
1Pk View									
10 dBm—						M1[1]			-4.42 dBm 480010 GHz -43.02 dBm
0 dBm	M1							2.	483500 GHz
-10 dBm—	H								
-20 dBm—		24 491	) dBm						
-30 dBm—									
-40 dBm-	$\psi$	M2 NR	montesaure	M4 Mi		manhun	wardende	end the manual and	unun nun
-50 dBm—	+								
-60 dBm—	+								
-70 dBm—	+								
Start 2.4	/ 7 GHz				691 pt	ts		Sto	p 2.55 GHz
Marker									
Type R	ef   Tr		X-value		Y-value	Function		Function Resu	t
M1		1		D1 GHz	-4.42 dBm				
M2 M3		1		35 GHz .5 GHz	-43.02 dBm -44.29 dBm				
M4		1	2.4966		-41.58 dBm				
						Measurin		4/4	29.12.2022

# Single

Date: 29.DEC.2022 09:53:50

# 2DH5: Band Edge-Left Side Hopping

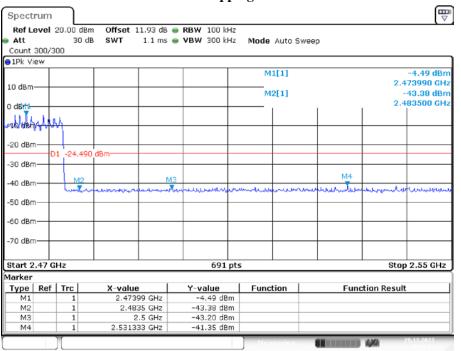
Spectrum									
Ref Level Att Count 300/3	30			RBW 100 kHz VBW 300 kHz	Mode Aut	to FFT			
1Pk View									
10 dBm					M1[1]	1			-5.63 dBn 02950 GH:
					M2[1]	1			48.64 dBm 00000 GHz
-10 dBm									M1
-10 dBm									M
	1 -25.6	530 dBm							
-40 dBm	here M	many	Weber love I	une man	M4	there are a	and the same	M3	M2
-60 dBm	~								
-70 dBm									
Start 2.3 GH	łz			691 pt	s			Stop 2	2.405 GHz
1arker									
Type   Ref	Trc	X-value		Y-value	Function		Fund	tion Result	
M1	1	2.40295	GHz	-5.63 dBm					
M2	1		GHz	-48.64 dBm					
M3	1		GHz	-49.41 dBm					
M4	1	2.357522	GHZ	-46.25 dBm					
					Measuri			4/4	9.12.2022

Date: 29.DEC.2022 10:10:36

# Single

Ref Lo	evel	20.00 dB 30 d		RBW 100 kHz			
Count	200/2		B SWT 246.5 µs	👄 VBW 300 kHz	Mode Auto F	FFT	
1Pk Vi		00					
ртык лі	ew 1		1				0.67.40.
					M1[1]		-3.67 dBn 2.402040 GH
10 dBm·	+				100111		-47.44 dBr
					M2[1]		2.400000 ßH
0 dBm—	+					1 1	2.400000 [4][1
							<u>λ</u>
-10 dBm	1						
20 dBm							
-20 UBII		1 -23.67	0 dBm				
-30 dBm							
00 00.	·						
-40 dBm				1714			
							M3 M2
SO dbh	when	undallindrea.	man was descripted at the	- marine marine	manner	weland and the shall be	Same and have a
-60 dBm	1-						
-70 dBm							
Start 2	.3 GH	z		691 pt	5		Stop 2.405 GHz
1arker							
Type	Ref	Trc	X-value	Y-value	Function	Fund	tion Result
M1		1	2.40204 GHz	-3.67 dBm			
		1	2.4 GHz	-47.44 dBm			
M2		1	2.39 GHz	-48.56 dBm			
M2 M3 M4		-	2.346413 GHz	-45.79 dBm			

Date: 29.DEC.2022 09:58:18



#### 2DH5: Band Edge- Right Side Hopping

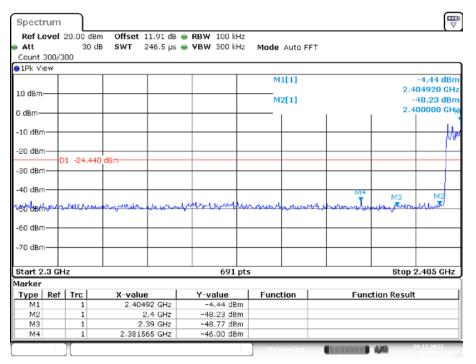
Date: 29.DEC.2022 10:14:53

	evel :	20.00 dBr		11.93 dB (							
Att		30 d	B SWT	1.1 ms (	VBW	300 kHz	Mode	Auto \$	Sweep		
Count		00									
∋1Pk Vi	ew .										
							M	1[1]			4.47 dBn
10 dBm	+										79900 GH
							M	2[1]			2.88 dBn 3500 GH
0 dBm—	-+	41		+				1	1	2.40	53500 GH
-10 dBm		λ									
•10 abri											
-20 dBm	-				_					_	
	— D	1 -24.470	) dBm								
-30 dBm	-	4		+				<u> </u>			
		M2		M	. м	14					
-40 dBm		lamente	hadrenteen	mound		horne	unna	Amer	mound	Manus marine	mulumulu
-50 dBm								· · ·			
00 abii	·										
-60 dBm	-				_					_	
-70 dBm	+										
Start 2	.47 G	Hz				691 pt:	5			Stop	2.55 GHz
Marker											
Type	Ref	Trc	X-valu			alue	Func	tion	F	unction Result	
M1		1		799 GHz		4.47 dBm					
M2		1		335 GHz		2.88 dBm					
M3 M4		1		2.5 GHz 478 GHz		3.70 dBm 1.68 dBm					
1914		1	2.503	1/0 GH2	-4.	1.00 08m	I				

## Single

Date: 29.DEC.2022 10:00:29

# 3DH5: Band Edge-Left Side Hopping



Date: 29.DEC.2022 10:15:30

#### Single

Ref Level						
Att	30 di	B SWT 246.5µs (	VBW 300 kHz	Mode Auto F	FFT	
Count 300/3	00					
1Pk View						
				M1[1]		-3.73 dBr
10 dBm						2.402040 GH
				M2[1]		-48.77 dBr
						2.400000 🕅 H
Jubin						
-10 dBm						
-20 dBm						
D	1 -23,730	) dBm				
-30 dBm —						
		1 1				
		1 1				
						M4-1
	unalinai	nort at another an another a st	Mahmander	Arrivality with	alter handress	M3 M4 M3
	min	m ay any less and here a	ulunnun	Amenderenantes	allangerstand	M3 M4 M3 M4
90-68mm	mun	an ay and the second damage	Juliahan Ambara	Amandelesignetto	altradistantes and	ma a manufa ma
90-68mm	when	an a	Jelin more	Amunikasiyutta	edlangh starters ing	M3 M4
<del>'90 (ዘይነት ፡፡ ^ ኦ.</del> -60 dBm	milan	ant of work the set control success	ulunan maru	Amunikasiyidda	allangh startion ing	M3 M4
50 dBm		an a	J. C. Martine	Amunikasiintik	allengt sources and	Ma Ma Ma Ma Ma Ma
-60 dBm		art og andelse er ansterber og			ciliangi sensionna,	
-60 dBm		art og sonderligten og sonderden og	րությունը 691 pts		collignyth stored to any	M3 M4 mar. 4. us for up on up of the store o
50 dgh 60 dgm 70 dgm Start 2.3 GH larker	łz		691 pts	5		Stop 2.405 GHz
50 dBM	Iz	X-value	691 pts			
-50 dBm -60 dBm -70 dB	IZ	X-value 2.40204 GHz	691 pts 7-value -3.73 dBm	5		Stop 2.405 GHz
GO         GB           -60         dBm           -70         dBm           -70         dBm           Start 2.3         GH           larker         Type           M1         M2	Iz 1 1	X-value 2.40204 GHz 2.4 GHz	691 pts -3.73 dbm -48.77 dbm	5		Stop 2.405 GHz
-60 dBm -70 dBm Start 2.3 GH Marker Type Ref M1	IZ	X-value 2.40204 GHz	691 pts 7-value -3.73 dBm	5		Stop 2.405 GHz

Date: 29.DEC.2022 10:01:54

				TOPPIN	-9				
Spectrum									
Ref Level	20.00 0	iBm Offset 11.93	3 dB 🥃 RBW 🔅	100 kHz					
Att	30	dB SWT 1.1	lms 👄 VBW 3	300 kHz	Mode	Auto S	weep		
Count 300/3	300								
1Pk View									
					M1	[1]			-4.53 dBn
10 dBm								2	.470980 GH
					M2	2[1]			-44.79 dBm
01dBm					<u> </u>			. 2	.483500 GHz
T IL N L	n 1								
lto/darwww.dav	<u>n</u>			$\rightarrow$					
-20 dBm		530 dBm							
-30 dBm	JI -24.5	530 dBm							
-30 ubiii									
-40 dBm		2	M3						M4
	here	manderwar	montaneers	menso	wyellin	سللماليل	lundbrett	manna	بلىسى سالاسىما
-50 dBm									
-60 dBm									
-70 dBm									
-/0 ubiii									
Start 2.47 G	SHZ			691 pts				St	op 2.55 GHz
larker									
	Trc	X-value	Y-va		Funct	ion	F	unction Res	ult
M1	1	2.47098 G		53 dBm					
M2 M3	1	2.4835 G 2.5 G		79 dBm 90 dBm					
	1	2.5 G 2.544667 G		90 dBm 37 dBm					
M4									

## 3DH5: Band Edge- Right Side Hopping

Date: 29.DEC.2022 10:19:36

Spectrum Ref Level			👄 RBW 100 kHz			$\nabla$
Att	20.00 at 30 i		KBW 100 KHz			
Count 300/3		UB SWI 1.1 ms	SUU KHZ	Mode Auto S	weep	
1Pk View	300					
IFK VIEW				M1[1]		-4.51 dBn
				milil		2.480010 GH
10 dBm				M2[1]		-42.84 dBn
) dBm				112[2]		2.483500 GH
	T					
-10 dBm	Λ					
	11					
20 dBm —						
	01 -24.51	LO dBm				
30 dBm —						
	M2		M3 M4			
-40 dBm		and the second second second second		menteren	moundar	newswerkheresunder
50 dBm						
60 dBm						
70 dBm —						
tart 2.47 0	Hz		691 pts			Stop 2.55 GHz
larker						
Type   Ref	Trc	X-value	Y-value	Function	Fund	tion Result
M1	1	2.48001 GHz	-4.51 dBm			
M2	1	2.4835 GHz	-42.84 dBm			
MЗ	1	2.5 GHz	-43.38 dBm			
M4	1	2.509188 GHz	-41.76 dBm			
	1				<b></b>	29.12.2022

# Single

Date: 29.DEC.2022 10:04:12

# \*\*\*\*\* END OF REPORT \*\*\*\*\*