



# **TEST REPORT**

Applicant Name : Address : Zeeva International Limited Suite 1007B, 10th Floor, Exchange Tower, 33 Wang Chiu Road, Kowloon Bay, Hong Kong RA221110-53015E-RF 2ADM5-GA-0071

Report Number : FCC ID:

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

#### **Sample Description**

Product Type:
Test Model:
Trade Mark:
Date Received:
Date of Test:
Report Date:

GAMING SOUNDBAR GA-0071 N/A 2022-11-10 2022-11-14 to 2022-11-17 2022-11-20

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:** 

Candry . Li

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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FCC-BT

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# **GENERAL INFORMATION**

Product	GAMING SOUNDBAR
Tested Model	GA-0071
SKU	BLACK – 7415081
UPC	BLACK - 1922343650508
Frequency Range	2402~2480MHz
Maximum conducted Peak output power	-2.15dBm
Modulation Technique	BDR(GFSK)/EDR( <sup>π</sup> /4-DQPSK)/EDR(8DPSK)
Antenna Specification*	Internal Antenna: 1.7dBi(provided by the applicant)
Voltage Range	DC 3.7V from battery or DC 5V from USB port
Sample number	RA221110-53015E-RF-S1(RF Radiated Test) RA221110-53015E-RF-S2(RF Conducted Test) (Assigned by ATC, Shenzhen)
Sample/EUT Status	Good condition

#### **Product Description for Equipment under Test (EUT)**

# 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**

Para	meter	Uncertainty
Occupied Cha	nnel Bandwidth	5%
RF Fre	equency	$0.082*10^{-7}$
RF output po	wer, conducted	0.73dB
Unwanted Emi	ssion, conducted	1.6dB
AC Power Lines C	onducted Emissions	2.72dB
	9kHz - 30MHz	2.66dB
	30MHz - 1GHz	4.28dB
Emissions, Radiated	1GHz - 18GHz	4.98dB
Radiated	18GHz - 26.5GHz	5.06dB
	26.5GHz - 40GHz	4.72dB
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 4297.01

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0016. 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 "BT\_Tool"\* was used during testing and the power level was Default Power level 7\*.

# **Special Accessories**

N/A.

# **Equipment Modifications**

No modification was made to the EUT tested.

# **Support Equipment List and Details**

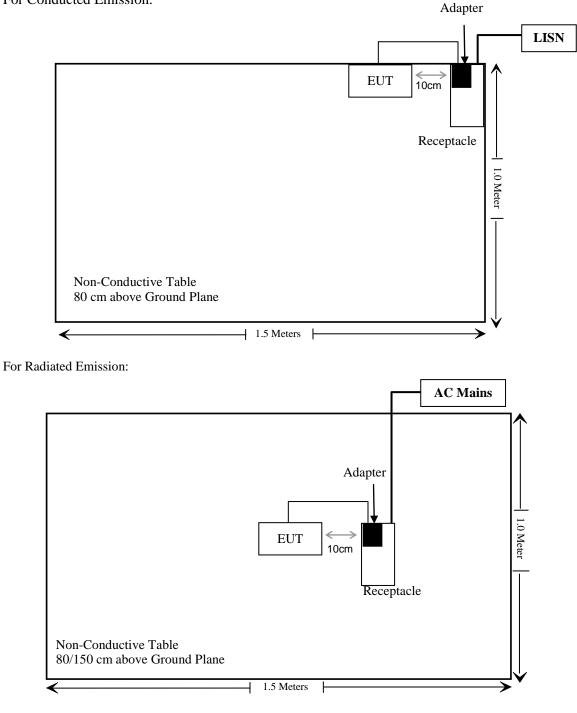
Manufacturer	Description	Model	Serial Number
TECNO	Adapter	U050TSA	AH07015321906

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**

For Conducted Emission:



# SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i) §1.1307 (b)	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	2021/12/13	2022/12/12
Rohde & Schwarz	L.I.S.N.	ESH3-Z5	100305	2021/12/13	2022/12/12
Anritsu Corp	50 Coaxial Switch	MP59B	6100237248	2021/12/13	2022/12/12
Unknown	RF Coaxial Cable	No.17	N0350	2021/12/14	2022/12/13
			tware: e3 19821b (	V9)	
		Radiated Emiss	ions Test		
Rohde & Schwarz	Test Receiver	ESR	102725	2021/12/13	2022/12/12
Rohde & Schwarz	Spectrum Analyzer	FSV40	101949	2021/12/13	2022/12/12
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
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2021/07/06	2024/07/05
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-1067	2020/01/05	2023/01/04
Schwarzbeck	HORN ANTENNA	BBHA9170	9170-359	2020/01/05	2023/01/04
Wainwright	High Pass Filter	WHKX3.6/18 G-10SS	5	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.10	N050	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.11	N1000	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.12	N040	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.13	N300	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.14	N800	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.15	N600	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.16	N650	2021/12/14	2022/12/13
	Radiated Emission Test Software: e3 19821b (V9)				
		RF Conducte	d Test		
Rohde & Schwarz	Spectrum Analyzer	FSV-40	101495	2021/12/13	2022/12/12
Rohde & Schwarz	Open Switch and Control Unit	OSP120 + OSP-B157	101244 + 100866	2021/12/13	2022/12/12
WEINSCHEL	10dB Attenuator	5324	AU 3842	2021/12/14	2022/12/13
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).

# FCC§15.247 (i) §1.1307 (b) – 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	0.63	Yes

Note 1: 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 1.7 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

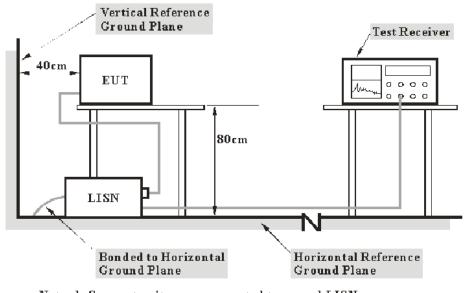
**Result:** Compliant.

# 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**

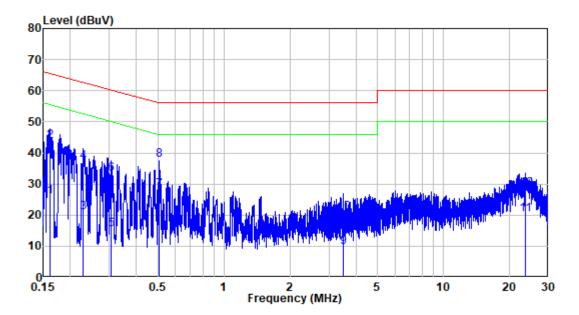
#### **Environmental Conditions**

Temperature:	23 °C
<b>Relative Humidity:</b>	60 %
ATM Pressure:	101.0 kPa

The testing was performed by Lipa Wu on 2022-11-14.

*EUT operation mode: Charging + BT Transmitting (worst case is 8DPSK, low channel)* 

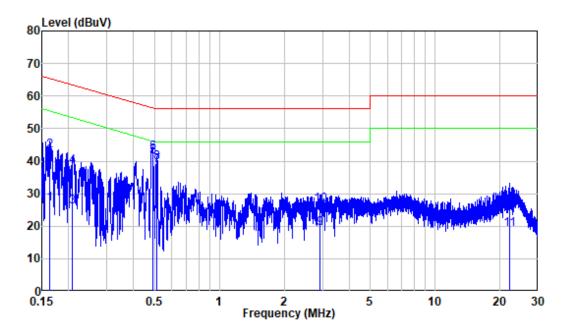
# AC 120V/60 Hz, Line



Site	:	Shielding Room
Condition	:	Line
Job No.	:	RA221110-53015E-RF
Mode	:	Charging+BT Transmitting
Power	:	AC 120V 60Hz

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.161	9.80	16.28	26.08	55.42	-29.34	Average
2	0.161	9.80	33.85	43.65	65.42	-21.77	QP
3	0.229	9.80	11.05	20.85	52.48	-31.63	Average
4	0.229	9.80	27.18	36.98	62.48	-25.50	QP
5	0.307	9.80	5.69	15.49	50.06	-34.57	Average
6	0.307	9.80	23.37	33.17	60.06	-26.89	QP
7	0.509	9.81	18.38	28.19	46.00	-17.81	Average
8	0.509	9.81	27.91	37.72	56.00	-18.28	QP
9	3.479	9.83	-0.05	9.78	46.00	-36.22	Average
10	3.479	9.83	10.89	20.72	56.00	-35.28	QP
11	23.589	10.04	10.09	20.13	50.00	-29.87	Average
12	23.589	10.04	18.27	28.31	60.00	-31.69	QP -

# AC 120V/60 Hz, Neutral



Site :	Shielding Room
Condition:	Neutral
Job No. :	RA221110-53015E-RF
Mode :	Charging+BT Transmitting
Power :	AC 120V 60Hz

	Fred	Factor	Read	Level	Limit Line	Over	Remark
	iicq	1 ac coi	Level	Level	CINC	CIMIC	Kelliar K
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.163	9.80	17.17	26.97	55.30	-28.33	Average
2	0.163	9.80	33.36	43.16	65.30	-22.14	QP
3	0.209	9.80	16.24	26.04	53.26	-27.22	Average
4	0.209	9.80	28.63	38.43	63.26	-24.83	QP
5	0.491	9.80	31.61	41.41	46.15	-4.74	Average
6	0.491	9.80	32.66	42.46	56.15	-13.69	QP
7	0.512	9.81	28.71	38.52	46.00	-7.48	Average
8	0.512	9.81	29.78	39.59	56.00	-16.41	QP
9	2.929	9.83	9.57	19.40	46.00	-26.60	Average
10	2.929	9.83	16.61	26.44	56.00	-29.56	QP
11	22.107	10.12	8.79	18.91	50.00	-31.09	Average
12	22.107	10.12	15.77	25.89	60.00	-34.11	QP

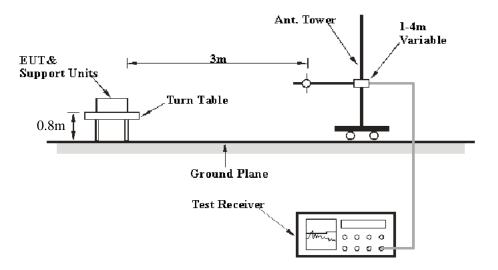
# FCC §15.205, §15.209 & §15.247(d) – RADIATED EMISSIONS

# **Applicable Standard**

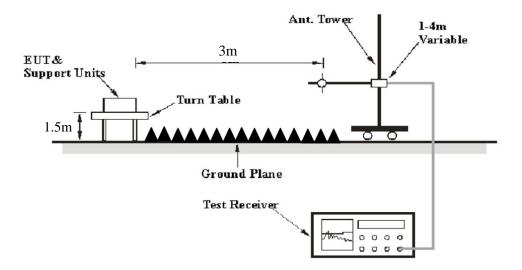
FCC §15.205; §15.209; §15.247(d)

# **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	uency Range RBW		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 the limit, 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

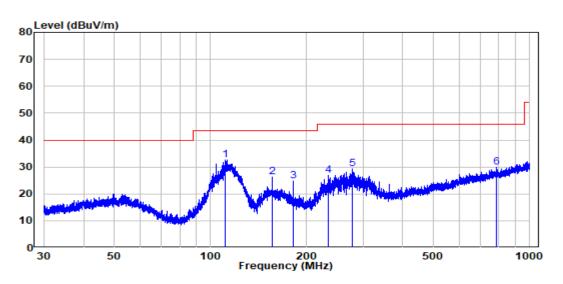
#### Test Data

#### **Environmental Conditions**

Temperature:	25 °C		
<b>Relative Humidity:</b>	60 %		
ATM Pressure:	101.0 kPa		

The testing was performed by Jimi Zheng on 2022-11-17. EUT operation mode: Charging + BT 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)

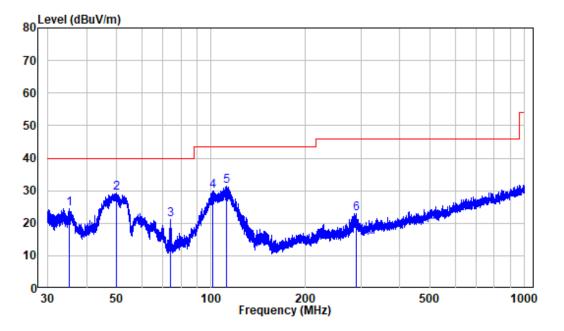
# Below 1GHz: 8DPSK, Low Channel



## Horizontal

Site : chamber Condition: 3m HORIZONTAL Job No. : RA221110-53015E-RF Test Mode: Charging+BT Transmitting

	Freq	Factor			Limit Line		Remark
-	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	111.445	-12.16	44.79	32.63	43.50	-10.87	Peak
2	156.047	-14.81	41.20	26.39	43.50	-17.11	Peak
3	182.000	-12.54	37.26	24.72	43.50	-18.78	Peak
4	233.861	-11.00	37.78	26.78	46.00	-19.22	Peak
5	277.458	-9.74	38.90	29.16	46.00	-16.84	Peak
6	784.406	-0.01	29.85	29.84	46.00	-16.16	Peak



Vertical

Site : chamber Condition: 3m VERTICAL Job No. : RA221110-53015E-RF Test Mode: Charging+BT Transmitting

	Freq	Factor			Limit Line		Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	35.143	-11.50	36.09	24.59	40.00	-15.41	Peak
2	49.925	-9.91	39.31	29.40	40.00	-10.60	Peak
3	74.396	-16.13	37.30	21.17	40.00	-18.83	Peak
4	101.422	-11.64	41.52	29.88	43.50	-13.62	Peak
5	111.934	-12.23	43.56	31.33	43.50	-12.17	Peak
6	290.526	-9.30	32.23	22.93	46.00	-23.07	Peak

## Above 1GHz (worst case for 8DPSK):

Frequency	Receiver		Turntable Angle	Rx An	Rx Antenna		Absolute Level	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	45.67	РК	259	1.2	Н	-7.23	38.44	74	-35.56	
2310	50.15	РК	311	1.1	V	-7.23	42.92	74	-31.08	
2390	54.16	РК	99	1.6	Н	-7.21	46.95	74	-27.05	
2390	54.01	РК	145	2.0	V	-7.21	46.8	74	-27.2	
4804	71.38	РК	101	1.2	Н	-3.52	67.86	74	-6.14	
4804	68.05	РК	192	1.4	V	-3.52	64.53	74	-9.47	
				Middle C	hannel					
4882	72.84	РК	183	1.3	Н	-3.37	69.47	74	-4.53	
4882	69.6	РК	207	1.0	V	-3.37	66.23	74	-7.77	
				High Ch	annel					
2483.5	52.97	РК	222	1.9	Н	-7.2	45.77	74	-28.23	
2483.5	48.31	РК	77	1.0	V	-7.2	41.11	74	-32.89	
2500	46.86	РК	156	1.3	Н	-7.18	39.68	74	-34.32	
2500	48.44	РК	256	1.7	V	-7.18	41.26	74	-32.74	
4960	71.9	РК	313	1.6	Н	-3.01	68.89	74	-5.11	
4960	69.6	РК	158	1.1	V	-3.01	66.59	74	-7.41	

#### Note:

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

Absolute Level (Corrected Amplitude) = Factor + Reading

Margin = Absolute Level (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.

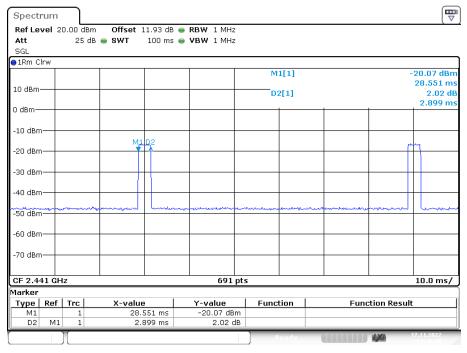
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	Field Strength of Average											
Frequency	Peak Measurement	Polar	Duty Cycle Correction	Corrected		Part 15.247						
(MHz)	@3m (dBµV/m)	(H/V)	Factor (dB)	Ampitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Comment					
Low Channel												
4804	67.86	Н	-24.73	43.13	54	-10.87	Harmonic					
4804	64.53	V	-24.73	39.80	54	-14.2	Harmonic					
			Middle C	Channel								
4882	69.47	Н	-24.73	44.74	54	-9.26	Harmonic					
4882	66.23	V	-24.73	41.50	54	-12.5	Harmonic					
			High Cl	nannel								
4960	68.89	Н	-24.73	44.16	54	-9.84	Harmonic					
4960	66.59	V	-24.73	41.86	54	-12.14	Harmonic					

#### Note:

Average (Corrected Ampitude) = Peak + Duty cycle factor Margin = Corrected Ampitude - Limit

Worst case Duty Cycle: Ton1 =2.899\*2=5.798ms Tp = 100ms Duty Cycle = Ton/Tp = 5.798/100=0.0580Duty Cycle Corrected Factor = 20lg (Duty cycle) = 20lg0.0580 = -24.73

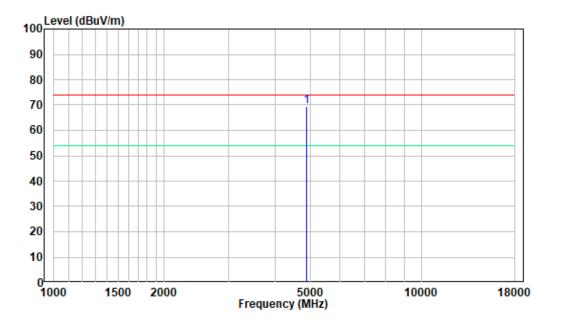


Date: 17.NOV.2022 14:46:49

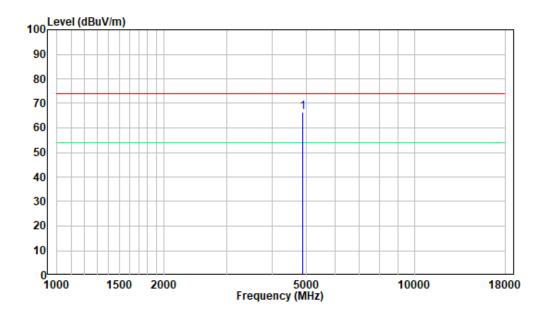
#### 1 GHz - 18 GHz: (Pre-Scan plots)

Worst case for 8DPSK Middle Channel:

#### Horizontal



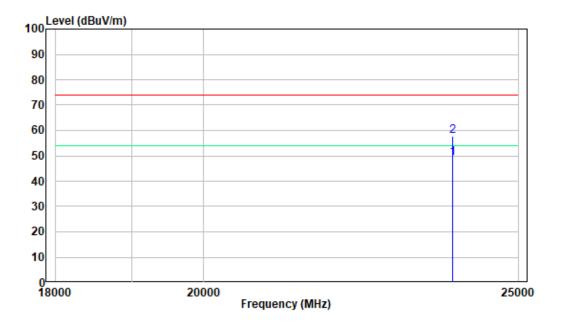
#### Vertical



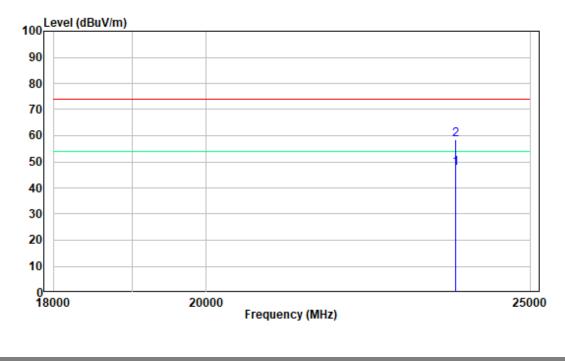
# 18-25GHz: (Pre-Scan plots)

# Worst case for 8DPSK Middle Channel:

Horizontal



Vertical



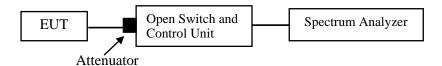
# FCC §15.247(a) (1)-CHANNEL SEPARATION TEST

#### **Applicable Standard**

Frequency hopping systems shall have hopping 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**

- 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:	24 °C		
Relative Humidity:	48 %		
ATM Pressure:	101.0 kPa		

The testing was performed by Glenn Jiang on 2022-11-17.

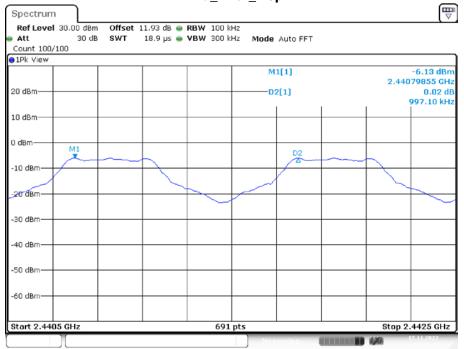
EUT operation mode: Transmitting

Test Result: Compliant.

Test Mode	Antenna	Channel	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Нор	0.997	>=0.621	PASS
2DH5	Ant1	Нор	1.003	>=0.856	PASS
3DH5	Ant1	Нор	1.003	>=0.858	PASS

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

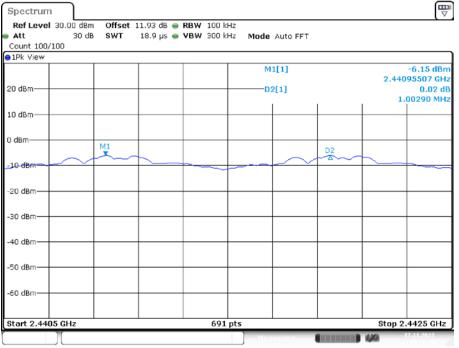
Please refer to the below plots:



#### DH5\_Ant1\_Hop

Date: 17.NOV.2022 13:42:30

#### 2DH5\_Ant1\_Hop



Date: 17.NOV.2022 13:56:41

Spectrum				E ↓	
Ref Level 30.00 dBn	n Offset 11.93 dB 👄	RBW 100 kHz		<b>`</b>	
Att 30 da	8 SWT 18.9 µs 👄	VBW 300 kHz Mode Auto	D FFT		
Count 100/100					
1Pk View	,				
		M1[1]		-6.04 dBn	
0 dBm		00(1)		2.44095507 GH: 0.00 dB	
0 ubiii		D2[1]		1.00290 MH	
0 dBm					
dBm-	M1				
-	ľ.				
10 dBm					
20 dBm					
30 dBm					
40 dBm					
50 dBm					
50 dBm					
tart 2.4405 GHz		691 pts		Stop 2.4425 GHz	
		Measurin		a 17.11.2022	

3DH5\_Ant1\_Hop

Date: 17.NOV.2022 14:15:42

# 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**

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.

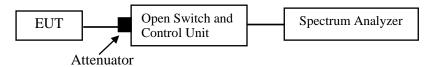
• The span of the spectrum analyzer shall be set large enough to capture all products of the modulation process, including the emission skirts, around the carrier frequency, but small enough to avoid having other emissions (e.g. on adjacent channels) within the span.

• 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:	24 °C
<b>Relative Humidity:</b>	48 %
ATM Pressure:	101.0 kPa

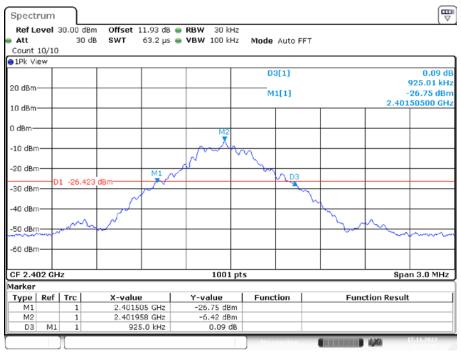
The testing was performed by Glenn Jiang on 2022-11-17.

EUT operation mode: Transmitting

Test Result: Compliant.

Test Mode	Antenna	Channel	20db EBW[MHz]	99% OCCUPIED BANDWIDTH[MHz]	Verdict
DH5	Ant1	2402	0.925	0.863	PASS
		2441	0.924	0.863	PASS
		2480	0.931	0.863	PASS
2DH5	Ant1	2402	1.284	1.181	PASS
		2441	1.284	1.184	PASS
		2480	1.284	1.184	PASS
3DH5	Antl	2402	1.287	1.184	PASS
		2441	1.287	1.184	PASS
		2480	1.287	1.187	PASS

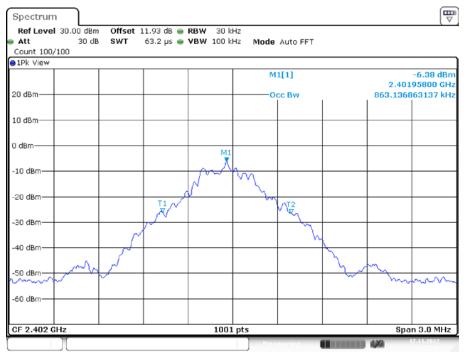
Please refer to the below plots:



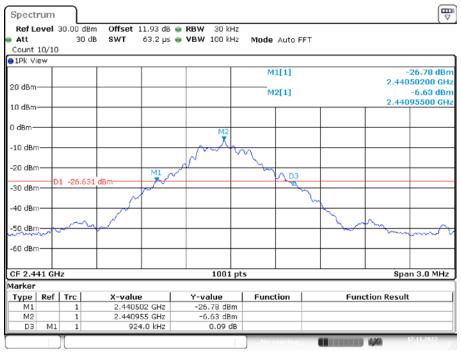
#### 20 dB EMISSION BANDWIDTH\_DH5\_Ant1\_2402

Date: 17.NOV.2022 13:27:25





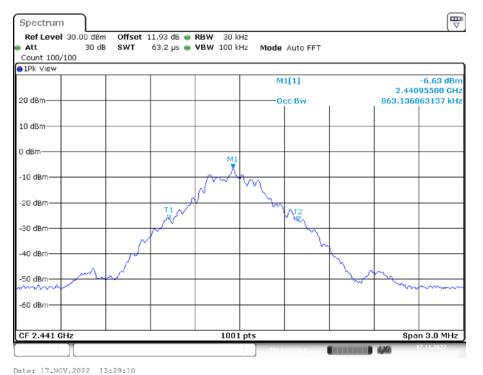
Date: 17.NOV.2022 13:27:42

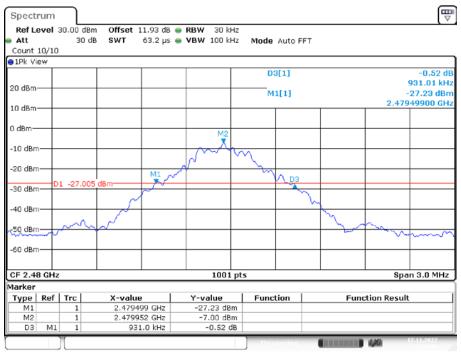


#### 20 dB EMISSION BANDWIDTH\_DH5 \_Ant1\_2441

Date: 17.NOV.2022 13:28:53



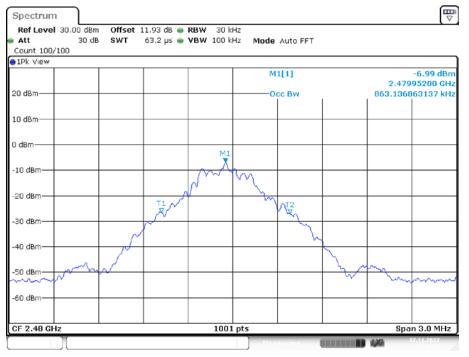




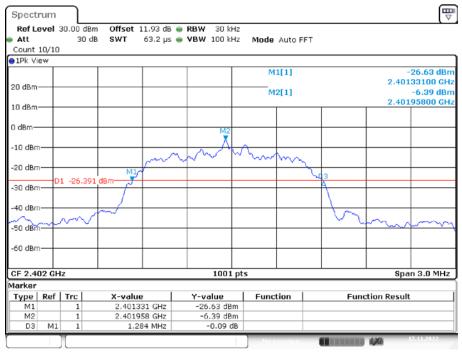
#### 20 dB EMISSION BANDWIDTH\_DH5 \_Ant1\_2480

Date: 17.NOV.2022 13:30:00





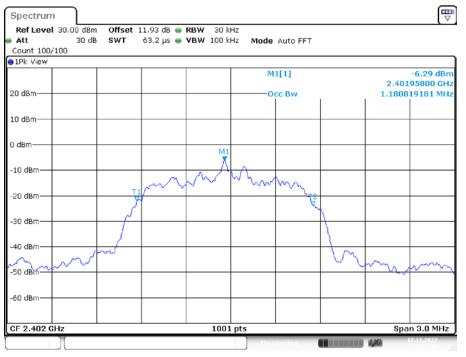
Date: 17.NOV.2022 13:30:17



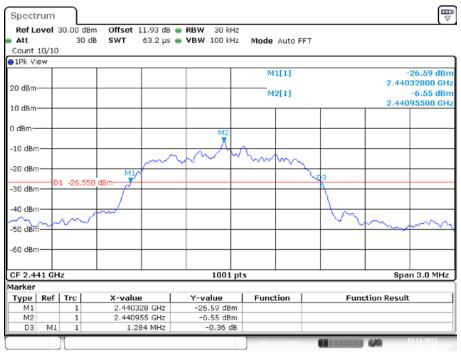
#### 20 dB EMISSION BANDWIDTH\_2DH5 \_Ant1\_2402

Date: 17.NOV.2022 13:31:08





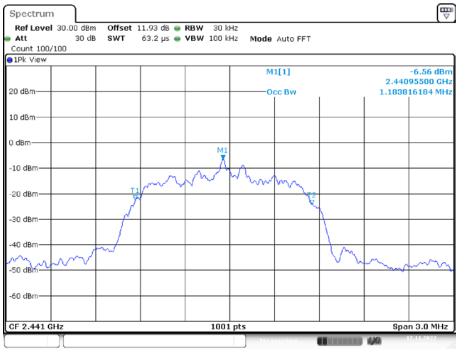
Date: 17.NOV.2022 13:31:25



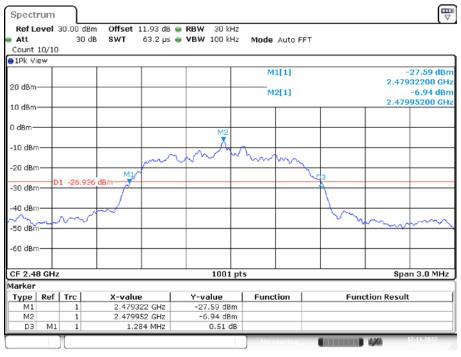
#### 20 dB EMISSION BANDWIDTH\_2DH5 \_Ant1\_2441

Date: 17.NOV.2022 13:32:17





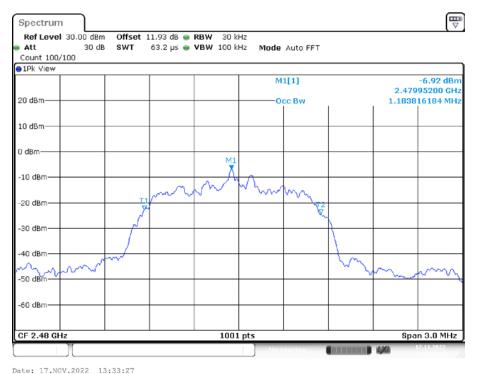
Date: 17.NOV.2022 13:32:34

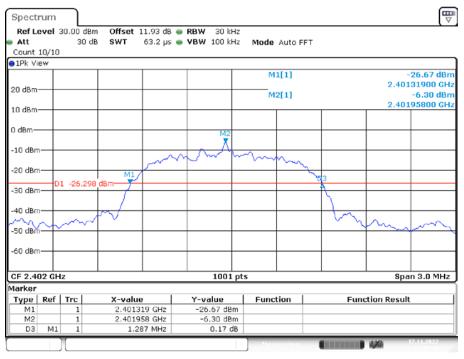


#### 20 dB EMISSION BANDWIDTH \_2DH5\_Ant1\_2480

Date: 17.NOV.2022 13:33:10



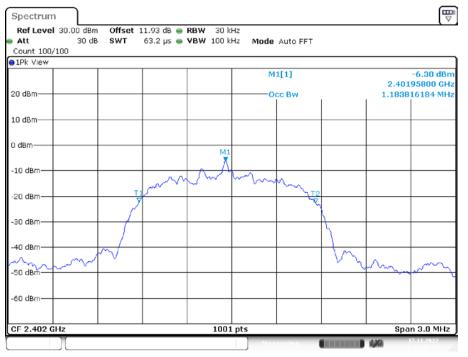




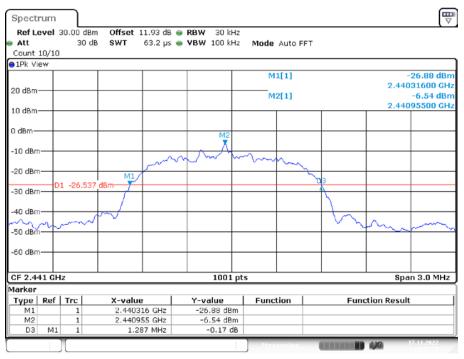
#### 20 dB EMISSION BANDWIDTH\_3DH5\_Ant1\_2402

Date: 17.NOV.2022 13:35:15





Date: 17.NOV.2022 13:35:32



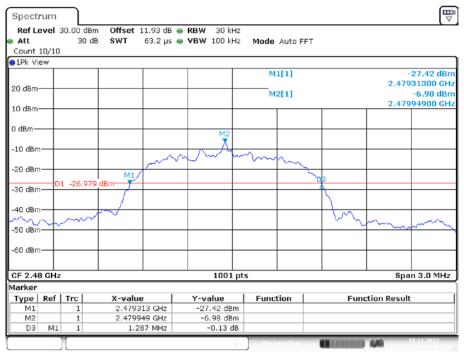
# 20 dB EMISSION BANDWIDTH\_3DH5\_Ant1\_2441

Date: 17.NOV.2022 13:37:57





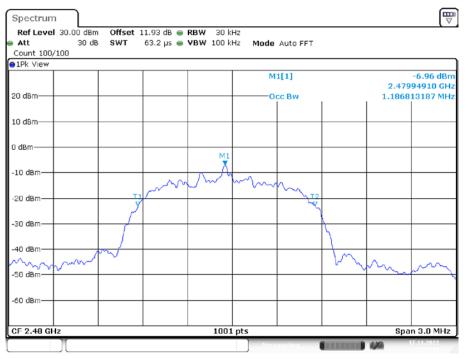
Date: 17.NOV.2022 13:38:14



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

Date: 17.NOV.2022 13:38:50





Date: 17.NOV.2022 13:39:07

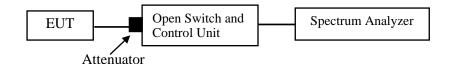
## FCC §15.247(a) (1) (iii)-QUANTITY OF HOPPING CHANNEL TEST

### **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**

- 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:	24 °C
Relative Humidity:	48 %
ATM Pressure:	101.0 kPa

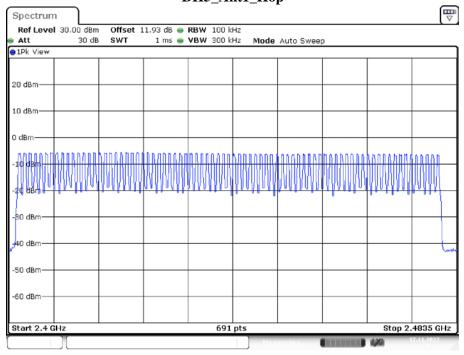
The testing was performed by Glenn Jiang on 2022-11-17.

EUT operation mode: Transmitting

Test Result: Compliant.

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

Please refer to the below plots:



DH5\_Ant1\_Hop

Date: 17.NOV.2022 13:45:14

## 2DH5\_Ant1\_Hop

Ref Level Att	30.00 dBm 30 dB		11.93 dB 👄 1 ms 👄		100 kH 300 kH		Auto Swee	0		
1Pk View						- 11040	Hato office	-		
20 dBm										
l0 dBm				-						
) dBm										
<sup>1</sup> 9/18/17/14	wwww	www	umma	NAAAA	ann	AAAAAA	ANAAAAA	MAAAAAA	MAAAAA	uvva
20 dBm										
30 dBm										
40 dBm										- <b>L</b>
50 dBm										
-60 dBm										
start 2.4 Gl	lz				691 p	ts			Stop 2.	4835 GHz

Date: 17.NOV.2022 13:58:36

### Report No.: RA221110-53015E-RF

### Shenzhen Accurate Technology Co., Ltd.

					<u>_</u>		P			_
Spectrum										
Ref Level Att	30.00 dBm 30 dB		11.93 dB 👄 1 ms 👄		100 kHz 300 kHz	Mode	Auto Swee	0		
1Pk View								F		
20 dBm										
l0 dBm										
) dBm										
MBWW	www.	wuw	um	rm	www	WYYV	mman	hungan	mann	unna
20 dBm				-						
30 dBm										
40 dBm										ų
50 dBm										
60 dBm										
Start 2.4 GI	Hz				691 pt	5				.4835 GHz
						Me	suring		4,00	17.11.2022

### 3DH5\_Ant1\_Hop

Date: 17.NOV.2022 14:16:39

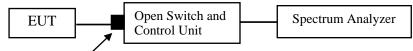
## FCC §15.247(a) (1) (iii) - TIME OF OCCUPANCY (DWELL TIME)

### **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**

- 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 = auto couple.
- 7. Trace mode = max hold.
- 8. Allow trace to fully stabilize.
- 9. Recorded the time of single pulses



Attenuator

### **Test Data**

#### **Environmental Conditions**

Temperature:	24 °C
Relative Humidity:	48 %
ATM Pressure:	101.0 kPa

The testing was performed by Glenn Jiang on 2022-11-17.

EUT operation mode: Transmitting

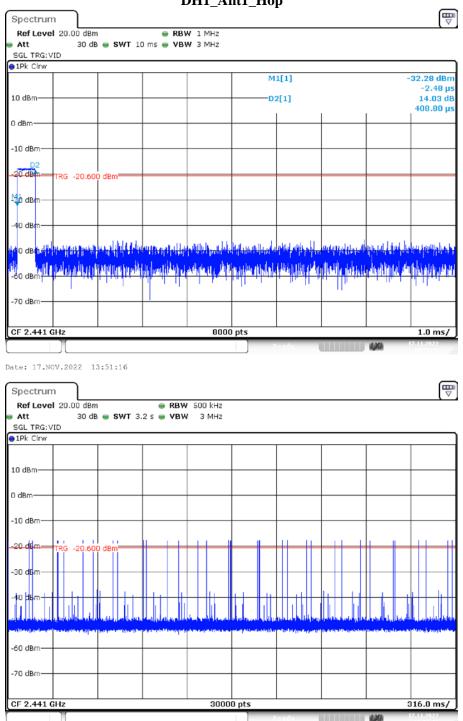
Test Result: Compliant.

Test Mode	Antenna	Channel	Burst Width [ms]	Total Hops [Num]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Нор	0.41	330	0.135	<=0.4	PASS
DH3	Ant1	Нор	1.66	170	0.282	<=0.4	PASS
DH5	Ant1	Нор	2.90	130	0.377	<=0.4	PASS
2DH1	Ant1	Нор	0.42	330	0.138	<=0.4	PASS
2DH3	Ant1	Нор	1.66	170	0.283	<=0.4	PASS
2DH5	Ant1	Нор	2.90	130	0.377	<=0.4	PASS
3DH1	Ant1	Нор	0.42	320	0.134	<=0.4	PASS
3DH3	Ant1	Нор	1.66	170	0.283	<=0.4	PASS
3DH5	Ant1	Нор	2.91	120	0.349	<=0.4	PASS

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

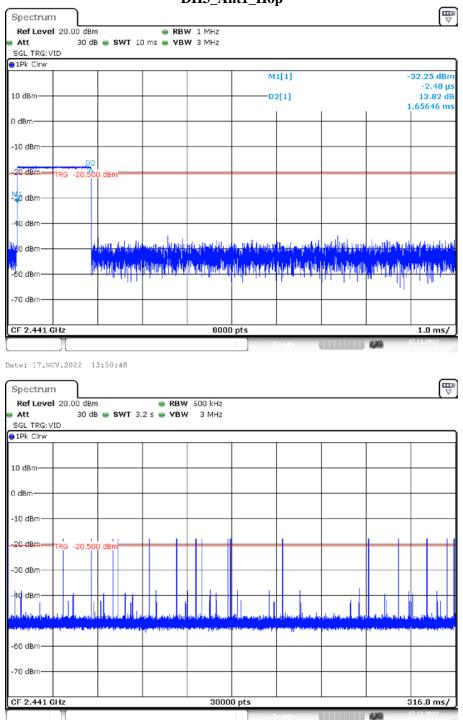
Note 2: Total Hops =Hopping Number in 3.16s\*10

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



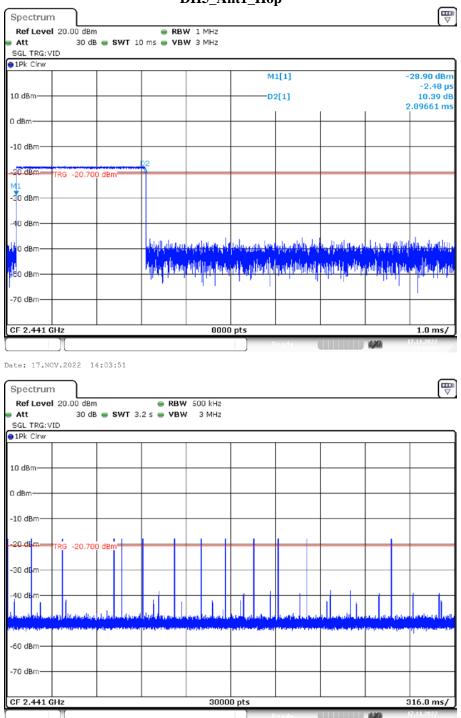
DH1\_Ant1\_Hop

Date: 17.NOV.2022 13:51:21



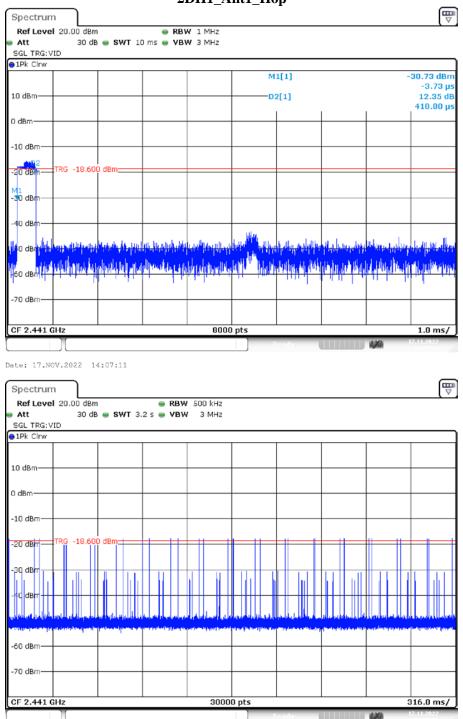
DH3\_Ant1\_Hop

Date: 17.NOV.2022 13:50:53



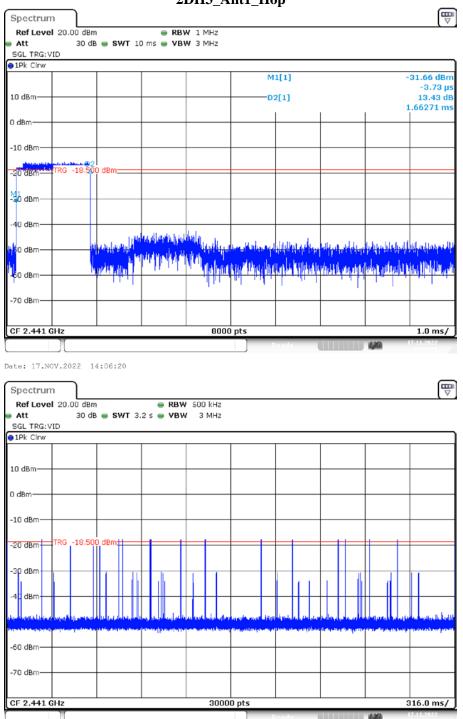
DH5\_Ant1\_Hop

Date: 17.NOV.2022 14:03:57



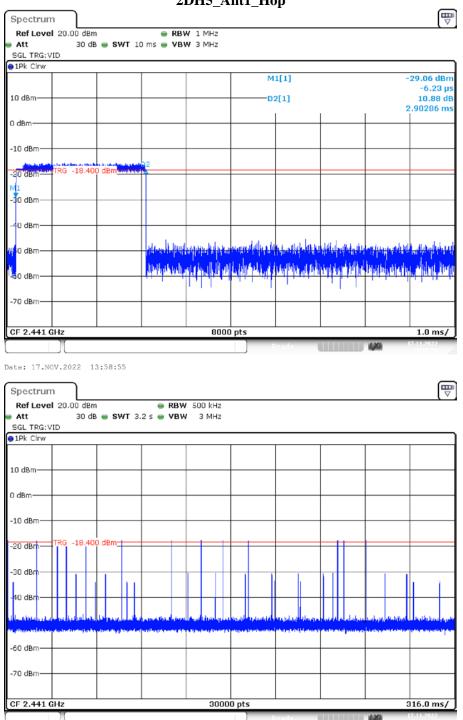
2DH1\_Ant1\_Hop

Date: 17.NOV.2022 14:07:17



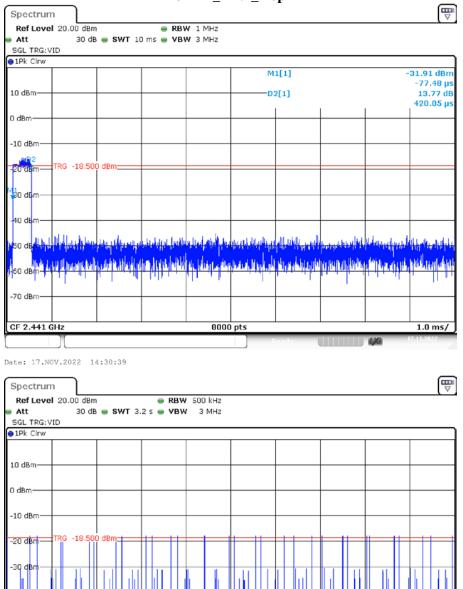
2DH3\_Ant1\_Hop

Date: 17.NOV.2022 14:06:26



2DH5\_Ant1\_Hop

Date: 17.NOV.2022 13:59:00



3DH1\_Ant1\_Hop

Date: 17.NOV.2022 14:30:44

4f

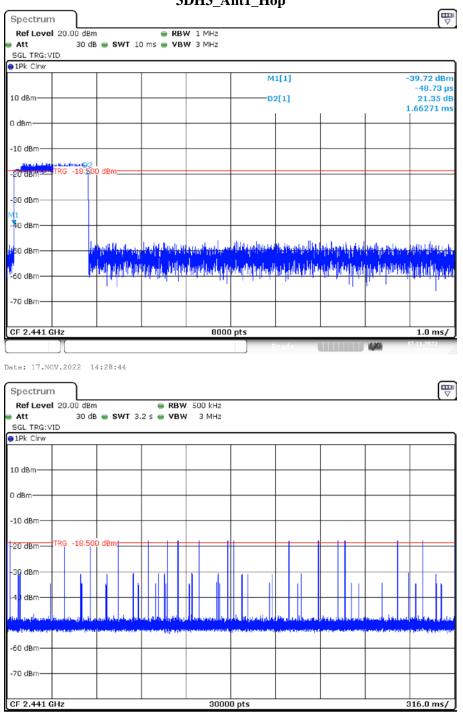
-60 dBm-

CF 2.441 GHz

30000 pts

316.0 ms/

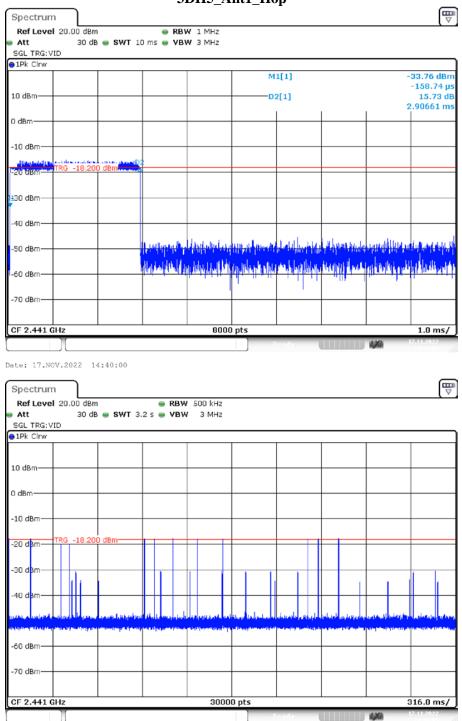
63



3DH3\_Ant1\_Hop

Date: 17.NOV.2022 14:28:50

44



3DH5\_Ant1\_Hop

Date: 17.NOV.2022 14:40:05

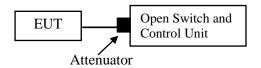
# FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT

### **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**

- 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.



Note: the open switch and control unit has a built-in power sensor.

### **Test Data**

### **Environmental Conditions**

Temperature:	24 °C
Relative Humidity:	48 %
ATM Pressure:	101.0 kPa

The testing was performed by Glenn Jiang on 2022-11-17.

EUT operation mode: Transmitting

Test Result: Compliant.

Test Mode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
		2402	-5.72	<=20.97	PASS
DH5	Ant1	2441	-5.66	<=20.97	PASS
		2480	-6.01	<=20.97	PASS
		2402	-2.89	<=20.97	PASS
2DH5	Ant1	2441	-3.03	<=20.97	PASS
		2480	-3.36	<=20.97	PASS
		2402	-2.15	<=20.97	PASS
3DH5	Ant1	2441	-2.32	<=20.97	PASS
		2480	-2.65	<=20.97	PASS

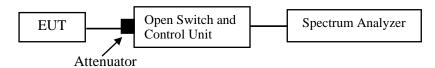
## FCC §15.247(d) - BAND EDGES TESTING

### **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**

- 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:	24 °C
<b>Relative Humidity:</b>	48 %
ATM Pressure:	101.0 kPa

The testing was performed by Glenn Jiang on 2022-11-17.

EUT operation mode: Transmitting

Test Result: Compliant

Please refer to the below plots:

## DH5: Band Edge-Left Side Hopping

Spectrum								
Ref Level								
Att		dB SWT 246.5	ha 👄 ABM	300 kHz	Mode Auto F	FT		
Count 300/3	300							
1Pk View								
					M1[1]		-5.81	
10 dBm							2.402040	
					M2[1]		-47.96	
D dBm						1	2.400000	GH M1
								Τ.
-10 dBm-+								-M
-20 dBm								111
	01 -25.8							ייך
30 dBm	JI -25.8	10 dBm						
-40 dBm —				114			M3 M	-
So alim	بعامر إحداثه والمس	monormora	monter	montioned	manyour	and humany	M3 M3	
-50 dBm								
-60 dBm								
-70 dBm		_						
Start 2.3 G	47			691 pts			Stop 2.405 (	GHz
larker	12			051 pt5			0000 2.100 0	3112
	Trc	X-value	Y-V	alue	Function	Eu	nction Result	
M1	1	2.40204 G		.81 dBm	runction	ru Fu	notion Result	
M2	1	2.4 G		.96 dBm				
M3	1	2.39 G		8.61 dBm				
M4	1	2.350826 G	Hz -45	.20 dBm				
	11				)		B 4149 17 11 202	

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## Single

	evel 2	20.00 dB	m Offset 1	1.93 dB 📢	RBW 100 kHz			· · · · · · · · · · · · · · · · · · ·
Att		30 c	ib SWT 2	246.5 µs 🧃	• VBW 300 kHz	Mode Auto F	FT	
Count 3	300/30	00						
1Pk Vie	BW							
						M1[1]		-5.99 dB
								2.402040 GF
10 dBm-						M2[1]		-49.82 dB
) dBm—								2.400000 GH
J UBIII—							1	M1
-10 dBm								(
TO UDIII								
20 dBm	$\rightarrow$							
		L -25.99	0.4800					
30 dBm		1 -20.99	o ubiii					
40 dBm	M4							
	-							M3 M2
	-	-	144-124 article	ljert sintelen ste	monum	~Mullon-Muser	mender Warning	
st døn	N. Marchen	-	914-1916 John and	ljert sinder sk	poundant	- Maille-Mayney	henderthearty	
-40 dBm -50 dBm -60 dBm	N. Marchen	an a	MANA_~~~~	ljert an policitish	pounterregention	- Maillon-Maynoway	hendentheming	
SC dBm 60 dBm	y Northern	an a		lyre under sk	pounterregenere	Muller - Leynowy	pender preserver	
SC dBm 60 dBm	y Northern	an a		lyra under side	renterrenter	~ Mullon-Manage	hendrykening	
st døn	y Northern	an a	944499 getters autor	llyert unter an	patrice and an	yuillingener	hendrykaday	
SC dBm 60 dBm			944-929 JAN 200 200	tyretyrapelaas yk	691 pt		hundr-fleinige	
-60 dBm -70 dBm			38000000000000000000000000000000000000	tyr:tyr:tyr:tyr:tyr:tyr:tyr:tyr:tyr:tyr:			hendreft south,	and marked with the state
50 dBm 60 dBm 70 dBm Start 2. larker	.3 GH:	Z	X-value					and ward had a war at
50 dBm 60 dBm 70 dBm Start 2. larker		Z	X-value		691 pt	s		Stop 2.405 GHz
50 dBm 60 dBm 70 dBm Start 2. Jarker Type	.3 GH:	z Trc	X-value 2.4020		691 pt	s		Stop 2.405 GHz
50 dBm 60 dBm 70 dBm 8tart 2. Iarker Type   M1	.3 GH:	z Trc	X-value 2.4021 2	9 04 GHz	691 pt <u>Y-value</u> -5.99 dBm	s		Stop 2.405 GHz

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			noph	mg				
								E
20.00	dBm Offset 11.	93 dB 😑 F	BW 100 kHz					
					Auto S	Sweep		
300								
				M	1[1]			-6.34 dBm
							2.4	473990 GH
				M	2[1]			-44.49 dBn
	_						2.4	483500 GH2
1							_	
WI -								
"								
01 -26.3	340 dBm							
M	2							
- and	www.hininalan	wanne	wearburnerth	hand	m	barrow	and and the second second	mon and
Hz			691 nt	· <			Sto	p 2.55 GHz
			0020				010	
Tre	X-value	1	Y-value	Euno	tion	Eu	nction Resul	+
			-6.34 dBm					•
1			-44.49 dBm					
1			-42.99 dBm					
	0.510010	CH2	-41.74 dBm					
1	2.510812	GHZ	-41.74 UBIII					
	300 11 -26.3	30 dB SWT 1 1000	30 dB SWT 1.1 ms • 100	20.00 dBm Offset 11.93 dB • RBW 100 kHz 30 dB SWT 1.1 ms • VBW 300 kHz 300	30 dB SWT 1.1 ms ● VBW 300 kHz Mode 30 dB SWT 1.1 ms ● VBW 300 kHz Mode 30 dB SWT 1.1 ms ● VBW 300 kHz Mode 30 dB SWT 1.1 ms ● VBW 300 kHz Mode Md Md Md Md Md Md Md Md Md Md	20.00 dBm Offset 11.93 dB	20.00 dBm Offset 11.93 dB  RBW 100 kHz 30 dB SWT 1.1 ms  VBW 300 kHz Mode Auto Sweep 300  M1[1]  M2[1]  M2[1]  M2[1]  M3 M4 M4 M3 M4 M3 M4	20.00 dBm Offset 11.93 dB   RBW 100 kHz 30 dB SWT 1.1 ms   VBW 300 kHz Mode Auto Sweep 300

### DH5: Band Edge- Right Side Hopping

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Ref L	evel 3	20.00 dB	m Offset 11.93 dB	👄 RBW 100 kHz			
Att		30 d	B SWT 1.1 ms	👄 VBW 300 kHz	Mode Auto S	Sweep	
Count	300/3	00					
1Pk Vi	ew						
					M1[1]		-6.52 dBn
10 dBm							2.480010 GH
to ubiii					M2[1]		-43.44 dBn
) dBm—	$\rightarrow$						2.483500 GH
	r	11					
10 dBm		1					
		11					
20 dBm		1					
aa da -	D	1 -26.52	0 dBm				
30 dBr							
40 dBr		M2		ма		M4	
mound		here	- and an all marked	John marken war	annal mar	respondence	walk many more
50 dBm	∩						
60 dBr	∩ <b>−</b> ⊢						
-70 dBm							
Start 2	.47 G	Hz		691 pt:	5		Stop 2.55 GHz
1arker							
Type	Ref	Trc	X-value	Y-value	Function	Funct	ion Result
M1		1	2.48001 GHz	-6.52 dBm			
M2		1	2.4835 GHz	-43.44 dBm			
M3		1	2.5 GHz	-43.80 dBm			
M4		1	2.530058 GHz	-41.92 dBm			

### Single

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## 2DH5: Band Edge-Left Side Hopping

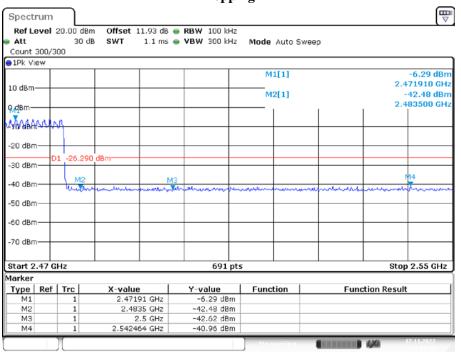
Spectrum							
Ref Level				RBW 100 kHz			
Att Count 300/3	30	dB SWI 2	46.5 µs	• VBW 300 kHz	Mode Auto F	-FT	
1Pk View	300						
					M1[1]		-5.80 dBn
					wittil.		2.402950 GH
10 dBm					M2[1]		-47.87 dBn
0 dBm							2.400000 GH
5 GBIII							MI
-10 dBm		_					N/
I							
-20 dBm							
	01 -25.8	00 dBm					
-30 dBm		MA					
-40 dBm		" <b>V</b>					
		mound		manupan			M3 M2
-50 dBm	mapor		ynemie		Mun and and and and and and and and and an	monter	and a survey was a survey was
-60 dBm							
-70 dBm							
o ubiii							
Start 2.3 GH	13			691 pt	-		Stop 2.405 GHz
larker	12			091 pt	3		3000 2.403 6Hz
	Trc	X-value	1	Y-value	Function	. <b>.</b>	nction Result
Type Ref M1	1	2.4029		-5.80 dBm	Function	Fur	ICTION RESULT
M2	1		4 GHz	-47.87 dBm			
M3	1		39 GHz	-47.06 dBm			
M4	1	2.32	21 GHz	-39.90 dBm			
	1			1		<b>A</b> CONTRACTOR	17.11.2022

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## Single

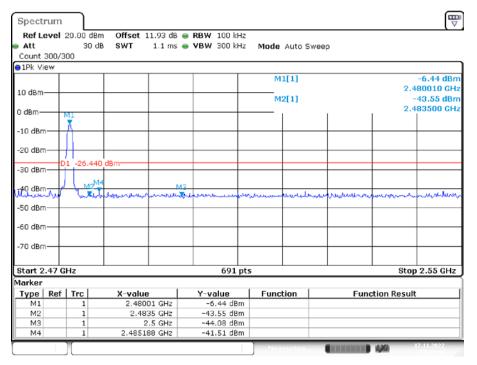
Att	evel	20.00 dB 30 d		B 👄 RBW 100 kHz Is 👄 VBW 300 kHz	Mode tute		
Count	200/2		ль <b>эмі</b> 240.5µ	IS 🖶 VBW 300 KHZ	MODE AUTO I		
1Pk Vi		00					
IFK VI					M1[1]		-5.82 dBr
					wifil		2.402040 GH
10 dBm	+				M2[1]		-49.38 dBr
					matil		
) dBm—	+					1	2.400000 GH
							I I I
10 dBm	די						
20 dBm							
20 0011	·						
30 dBr		1 -25.82					
	' I						1 1 1
40 dBr	∩ <b>_</b>			1714			
				-			man M3 Mt h
50 dBh	hat	بالمتحكم والمسالك	hearten hander beite fin schole	1 marshamper	m mary and the program was	and the state of t	the mark of the second and the second
60 dBr	+-י						
70 dBri	ד-י						
Start 2	.3 GH	z		691 pt	s		Stop 2.405 GHz
larker							
Type	Ref	Trc	X-value	Y-value	Function	Fun	ction Result
		1	2.40204 GHz	-5.82 dBm			
M1		1	2.4 GHz	-49.38 dBm			
			2.39 GHz	-48.57 dBm			
M1		1	2.39 GHZ	-48.57 UBM			

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

Date: 17.NOV.2022 14:08:31



#### Single

Date: 17.NOV.2022 13:33:42

## 3DH5: Band Edge-Left Side Hopping

Spectru		L		11.01.40	-			$\lor$
Ref Lev	el 2				RBW 100 kHz VBW 300 kHz			
Count 30	າດ/ຈ		JUB 3W1	240.5 µs (	• • • • • • • • • • • • • • • • • • •	MODE AUTO P		
1Pk Viev								
	Ť					M1[1]		-5.62 dBn
10 dBm—								2.402950 GH
LO UBIII-						M2[1]		-47.98 dBn
) dBm—	$\perp$							2.400000 GH
								T. T.
-10 dBm-	+							NV
-20 dBm-	+							
30 dBm-	-D:	1 -25.	620 dBm					
SO GDIII								
-40 dBm-	+				M4			
munhamore a	. I	للإستاد	and mandance	mound	mounderen	Manual mark	and however as	M3 M2
-50 dBm-	-					0.00.00		
-60 dBm-								
-00 ubiii-								
-70 dBm-	+			_				
Start 2.3	GH	7			691 pt	· · · · · · · · · · · · · · · · · · ·		Stop 2.405 GHz
1arker								
	Ref	Trc	X-val	ue	Y-value	Function	Eur	ction Result
M1		1		295 GHz	-5.62 dBm	. unocion	1 41	
M2		1		2.4 GHz	-47.98 dBm			
MЗ		1		2.39 GHz	-47.66 dBm			
M4		1	2.349	9152 GHz	-45.01 dBm			

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## Single

	evel :	20.00 dB			RBW 100 kHz				
Att		30 0	IB SWT	246.5 µs (	VBW 300 kHz	Mode Auto F	FFT		
Count		00							
1Pk Vi	ew								
						M1[1]			-5.83 dBr
10 dBm-	$\rightarrow$								01730 GH
						M2[1]			48.52 dBr
) dBm—	$\rightarrow$							2.40	00000 GH
									Y
10 dBm	+-י								
-20 dBm			1						
a da	D	1 -25.83	0 dBm						
30 dBm	די								
					M4				M2 1
		tento	attaine	MUMAN HOUL	MA warmen	madelangam	man	M3 M3	ME
		den les	akananahu	ayor have	MA Manne	mondakanaraan	watulan	Mannandh	ME 1
SC USH	n	ماليمير <del>ا</del> يد	ak ukyawadaki	hy na ha tu dh	In Jan Mary	mudalamiraan		mdan M3	ME 1
SC USH	n	للمرط	aka <sub>ter</sub> andu	hysels to Quill	MA Mannanna	mya chakanang asam	,easter and a second second	moleccemente	ME
50 dBh 60 dBn	р <u>икли</u> 1	<u>ملیمیلیک</u>	nt ni ne mara da	hija Na ka Da <b>ul</b> h	MA In Manno Marrison	madulanizan	,erst. Alson lawy	M3 MANNATIL	ME 1 annen
50 dBH 60 dBm	р <u>икли</u> 1	then the	alt ütigennet die	la porte de Carlo	11th Marine Marine	mya dalama asin	watur dang	M3.du	M2 1 galer
50 dBn 60 dBn 70 dBn	1 <u></u> 1		at un no marke	È,⊨ALEn <b>L</b> È			,ext. Alimitany		ty
-60 dBm -70 dBm Start 2	1 <u></u> 1		at an	Ès,ss∆i, batiµth	691 pt		er furthe strong		M2
-60 dBm -60 dBm -70 dBm <u>Start 2</u> larker	1.3 GH	z			691 pt	5		Stop 2	ty
50'dBir 60 dBm 70 dBm Start 2 Iarker Type	1 <u></u> 1	z	X-valu	e	691 pt		Ft		ty
50 dBm 60 dBm 70 dBm 3tart 2 larker Type   M1	1.3 GH	z Trc 1	X-value 2.401	e   .73 GHz	691 pt Y-value -5.83 dBm	5	Ft	Stop 2	ty
50'dBir 60 dBm 70 dBm Start 2 Iarker Type	1.3 GH	z	X-value 2.401	e	691 pt	5		Stop 2	ty

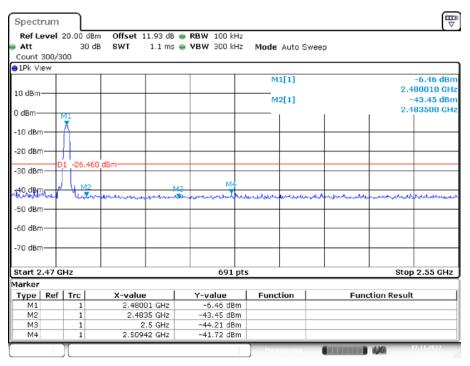
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### 3DH5: Band Edge- Right Side Hopping

			- <b>T</b> , <b>T</b> ,	0		
Spectrum						
Ref Level	20.00 d	Bm Offset 11.93 dB	RBW 100 kHz			
Att	30	dB SWT 1.1 ms	VBW 300 kHz	Mode Auto S	Sweep	
Count 300/3	300					
1Pk View						
				M1[1]		-6.46 dBn
10 dBm						2.470980 GH
				M2[1]		-42.14 dBn
0,dBm				<u> </u>		2.483500 GH
÷ 1						
Yoraanaa						
-20 dBm						
-30 dBm	01 -26.4	60 dBm				
-30 ubiii					M4	
-40 dBm	M2		13			and a literate stranger of the submanifest
		and the second s				
-50 dBm						
-60 dBm						
-60 aBm						
-70 dBm						
Start 2.47 0	GHz		691 pts	;		Stop 2.55 GHz
larker						
Type   Ref	Trc	X-value	Y-value	Function	Fur	nction Result
M1	1	2.47098 GHz	-6.46 dBm			
M2	1	2.4835 GHz	-42.14 dBm			
M3	1	2.5 GHz	-42.79 dBm			
M4	1	2.523797 GHz	-41.27 dBm			
	T T			Measuring.		17.11.2022

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#### Single



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