Shenzhen HTT Technology Co., Ltd.

TEST REPORT
FCC PART 15.247
RSS 247 Issue 2, February 2017

Report Reference No.:	**HTT202308014F03**	
IC.:	**28295-PAL**	
FCC ID:	**2A4WP-PAL**	
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Date of issue:	Aug.03,2023	
Testing Laboratory Name:	**Shenzhen HTT Technology Co.,Ltd.**	
Address:	1F, Building B, Huafeng International Robotics Industrial Park, Hangcheng Road,Nanchang Community, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China	
Applicant's name:	**Shenzhen Speediance Living Technology Co., Ltd.**	
Address:	8A-F, Konka R&D Building, No.28, South 12th Road, Science and Technology Park, Nanshan District, Shenzhen, guangdongprovince, China	
Test specification:		
Standard:	**FCC PART 15.247** **RSS 247 Issue 2, February 2017**	

Test item description:	**GYM PAL**
Trade Mark:	N/A
Manufacturer:	Sodan Technology (Huizhou) Co. Ltd.
Model/Type reference:	PAL220A1100C12
Listed Models:	N/A
Modulation Type:	CCK/DSSS/ OFDM
Operation Frequency:	From 2412 - 2462MHz
Rating:	AC 120V
Result:	**PASS**

TEST REPORT

Equipment under Test	:	GYM PAL
Model /Type	:	PAL220A1100C12
HVIN	:	PAL220A1100C12N/A
Applicant	:	Shenzhen Speediance Living Technology Co., Ltd.
Address	:	8A-F, Konka R&D Building, No.28, South 12th Road, Science and Technology Park, Nanshan District, Shenzhen, guangdongprovince, China
Manufacturer	:	Sodan Technology (Huizhou) Co. Ltd.
Address	:	Ganpi Village, Zhenlong Town, Huiyang District, Huizhou City

Test Result:	**PASS**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.
RSS-247-Issue 2: Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices.

ANSI C63.10:2013 : American National Standard for Testing Unlicensed Wireless Devices

ANSI C63.4: 2014: –American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40GHz

RSS-Gen Issue 5, April 2018+Amendment 1, March 2019+Amendment 2, February 2021: General Requirements for Compliance of Radio Apparatus

KDB558074 D01 V03r05: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247

2 SUMMARY

2.1 General Remarks

Date of receipt of test sample	:	Jul.28,2023
Testing commenced on	:	Jul.28,2023
Testing concluded on	:	Aug.03,2023

2.2 Product Description

Product Name:	GYM PAL
Model/Type reference:	PAL220A1100C12
Power supply:	AC 120V
testing sample ID：	HTT202308014-1# (Engineer sample), HTT202308014-2# (Normal sample)
Hardware version:	V001
Software version:	V007-V008-V006
WIFI :	
Supported type:	802.11b/802.11g/802.11n(H20)
Modulation:	802.11b: DSSS 802.11g/802.11n(H20): OFDM
Operation frequency:	802.11b/802.11g/802.11n(H20): 2412MHz~2462MHz
Channel number:	802.11b/802.11g/802.11n(H20): 11
Channel separation:	5MHz
Antenna type:	PCB antenna
Antenna gain:	4.05 dBi

2.3 Equipment Under Test

Power supply system utilised

Power supply voltage	:	○	230V / 50 Hz	●	120V / 60Hz
		○	12 V DC	○	24 V DC
		○	Other (specified in blank below)		

2.4 Short description of the Equipment under Test (EUT)

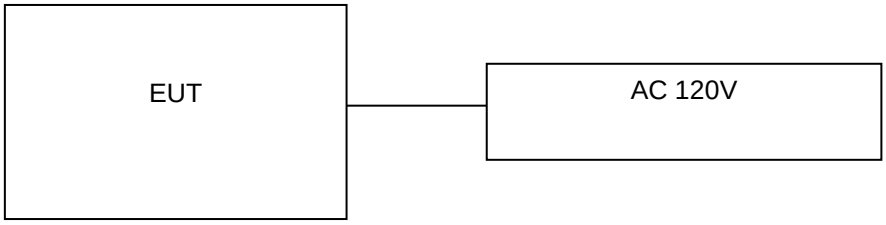
This is a GYM PAL.
For more details, refer to the user's manual of the EUT.

2.5 EUT operation mode

The application provider specific test software(AT command) to control sample in continuous TX and RX (Duty Cycle >98%) for testing meet KDB558074 test requirement.
IEEE 802.11b/g/n: Thirteen channels are provided to the EUT.

Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	2412	8	2447
2	2417	9	2452
3	2422	10	2457
4	2427	11	2462
5	2432		
6	2437		
7	2442		

2.6 Block Diagram of Test Setup



2.7 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

2.8 Modifications

No modifications were implemented to meet testing criteria.

3 TEST ENVIRONMENT

3.1 Address of the test laboratory

Shenzhen HTT Technology Co.,Ltd.
1F, Building B, Huafeng International Robotics Industrial Park, Hangcheng Road,Nanchang Community, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China

3.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 779513 Designation Number: CN1319
Shenzhen HTT Technology Co.,Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

A2LA-Lab Cert. No.: 6435.01
Shenzhen HTT Technology Co.,Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

ISED#: 27952 CAB identifier: CN0128
Shenzhen HTT Technology Co.,Ltd. has been listed by Innovation, Science and Economic Development Canada to perform electromagnetic emission measurement.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010

3.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:
Radiated Emission:

Temperature:	24 ° C
Humidity:	45 %
Atmospheric pressure:	950-1050mbar

AC Power Conducted Emission:

Temperature:	25 ° C
Humidity:	46 %
Atmospheric pressure:	950-1050mbar

Conducted testing:

Temperature:	25 ° C
Humidity:	44 %
Atmospheric pressure:	950-1050mbar

3.4 Test Description

FCC and IC Requirements		
RSS-Gen 8.8 FCC 15.107(a) FCC 15.207	AC Power Conducted Emission	PASS
RSS 247 5.2(a) RSS GEN FCC 15.247(a)(2)	6dB Bandwidth & 99% Bandwidth	PASS
RSS 247 5.5 FCC 15.247(d)	Spurious RF Conducted Emission	PASS
RSS 247 5.4 (d) FCC 15.247(b)(1)	Maximum Conducted Output Power	PASS
RSS 247 5.2(b) FCC 15.247(e)	Power Spectral Density	PASS
FCC Part 15.205/ 15.209 RSS-Gen 8.9	Radiated Emissions	PASS
RSS-Gen 8.10 FCC15.205 FCC 15.247(d)	Band Edge	PASS
FCC 15.203/FCC15.247(c) (1) (I) RSS-Gen 6.8	Antenna Requirement	PASS

Data Rate Used:
Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Data Rate	Channel
Maximum Peak Conducted Output Power Power Spectral Density 6dB Bandwidth Spurious RF conducted emission Radiated Emission 9KHz~1GHz& Radiated Emission 1GHz~10th Harmonic	11b/DSSS	1 Mbps	1/6/11
	11g/OFDM	6 Mbps	1/6/11
	11n(20MHz)/OFDM	6.5Mbps	1/6/11
Band Edge	11b/DSSS	1 Mbps	1/11
	11g/OFDM	6 Mbps	1/11
	11n(20MHz)/OFDM	6.5Mbps	1/11

3.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " and is documented in the Shenzhen HTT Technology Co.,Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen HTT Technology Co.,Ltd. :

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	3.45 dB	(1)
Radiated Emission	1~18GHz	3.54 dB	(1)
Radiated Emission	18-40GHz	5.38 dB	(1)
Conducted Disturbance	0.15~30MHz	2.66 dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

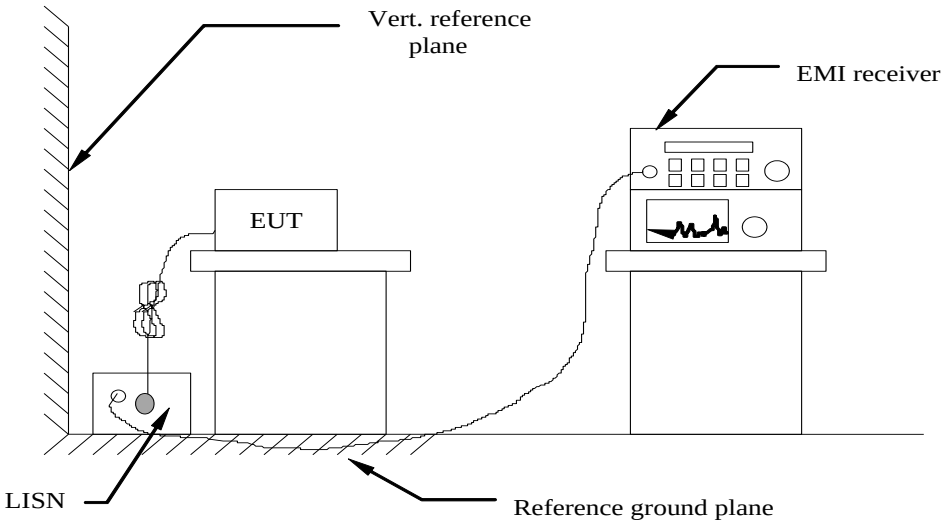
3.6 Equipments Used during the Test

Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	Shenzhen C.R.T technology co., LTD	9*6*6	HTT-E028	Aug. 10 2021	Aug. 09 2024
2	Control Room	Shenzhen C.R.T technology co., LTD	4.8*3.5*3.0	HTT-E030	Aug. 10 2021	Aug. 09 2024
3	EMI Test Receiver	Rohde&Schwar	ESCI7	HTT-E022	Apr. 26 2023	Apr. 25 2024
4	Spectrum Analyzer	Rohde&Schwar	FSP	HTT-E037	Apr. 26 2023	Apr. 25 2024
5	Coaxial Cable	ZDecl	ZT26-NJ-NJ-0.6M	HTT-E018	Apr. 26 2023	Apr. 25 2024
6	Coaxial Cable	ZDecl	ZT26-NJ-SMAJ-2M	HTT-E019	Apr. 26 2023	Apr. 25 2024
7	Coaxial Cable	ZDecl	ZT26-NJ-SMAJ-0.6M	HTT-E020	Apr. 26 2023	Apr. 25 2024
8	Coaxial Cable	ZDecl	ZT26-NJ-SMAJ-8.5M	HTT-E021	Apr. 26 2023	Apr. 25 2024
9	Composite logarithmic antenna	Schwarzbeck	VULB 9168	HTT-E017	May. 21 2023	May. 20 2024
10	Horn Antenna	Schwarzbeck	BBHA9120D	HTT-E016	May. 20 2023	May. 19 2024
11	Loop Antenna	Zhinan	ZN30900C	HTT-E039	Apr. 26 2023	Apr. 25 2024
12	Horn Antenna	Beijing Hangwei Dayang	OBH100400	HTT-E040	Apr. 26 2023	Apr. 25 2024
13	low frequency Amplifier	Sonoma Instrument	310	HTT-E015	Apr. 26 2023	Apr. 25 2024
14	high-frequency Amplifier	HP	8449B	HTT-E014	Apr. 26 2023	Apr. 25 2024
15	Variable frequency power supply	Shenzhen Anbiao Instrument Co., Ltd	ANB-10VA	HTT-082	Apr. 26 2023	Apr. 25 2024
16	EMI Test Receiver	Rohde & Schwarz	ESCS30	HTT-E004	Apr. 26 2023	Apr. 25 2024
17	Artificial Mains	Rohde & Schwarz	ESH3-Z5	HTT-E006	May. 23 2023	May. 22 2024
18	Artificial Mains	Rohde & Schwarz	ENV-216	HTT-E038	May. 23 2023	May. 22 2024
19	Cable Line	Robinson	Z302S-NJ-BNCJ-1.5M	HTT-E001	Apr. 26 2023	Apr. 25 2024
20	Attenuator	Robinson	6810.17A	HTT-E007	Apr. 26 2023	Apr. 25 2024
21	Variable frequency power supply	Shenzhen Yanghong Electric Co., Ltd	YF-650（5KVA）	HTT-E032	Apr. 26 2023	Apr. 25 2024
22	Control Room	Shenzhen C.R.T technology co., LTD	8*4*3.5	HTT-E029	Aug. 10 2021	Aug. 09 2024
23	DC power supply	Agilent	E3632A	HTT-E023	Apr. 26 2023	Apr. 25 2024
24	EMI Test Receiver	Agilent	N9020A	HTT-E024	Apr. 26 2023	Apr. 25 2024
25	Analog signal generator	Agilent	N5181A	HTT-E025	Apr. 26 2023	Apr. 25 2024
26	Vector signal generator	Agilent	N5182A	HTT-E026	Apr. 26 2023	Apr. 25 2024
27	Power sensor	Keysight	U2021XA	HTT-E027	Apr. 26 2023	Apr. 25 2024
28	Temperature and humidity meter	Shenzhen Anbiao Instrument Co., Ltd	TH10R	HTT-074	Apr. 28 2023	Apr. 27 2024
29	Radiated Emission Test Software	Farad	EZ-EMC	N/A	N/A	N/A
30	Conducted Emission Test Software	Farad	EZ-EMC	N/A	N/A	N/A
31	RF Test Software	panshanrf	TST	N/A	N/A	N/A

4 TEST CONDITIONS AND RESULTS

4.1 AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2013.
2 Support equipment, if needed, was placed as per ANSI C63.10-2013
3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2013
4 The EUT received power from adapter, the adapter received AC120V/60Hz and AC 240V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5 All support equipments received AC power from a second LISN, if any.
6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT.The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8 During the above scans, the emissions were maximized by cable manipulation.

AC Power Conducted Emission Limit

For intentional device, according to RSS–Gen 8.8. AC Power Conducted Emission Limits is as following：

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
* Decreases with the logarithm of the frequency.		

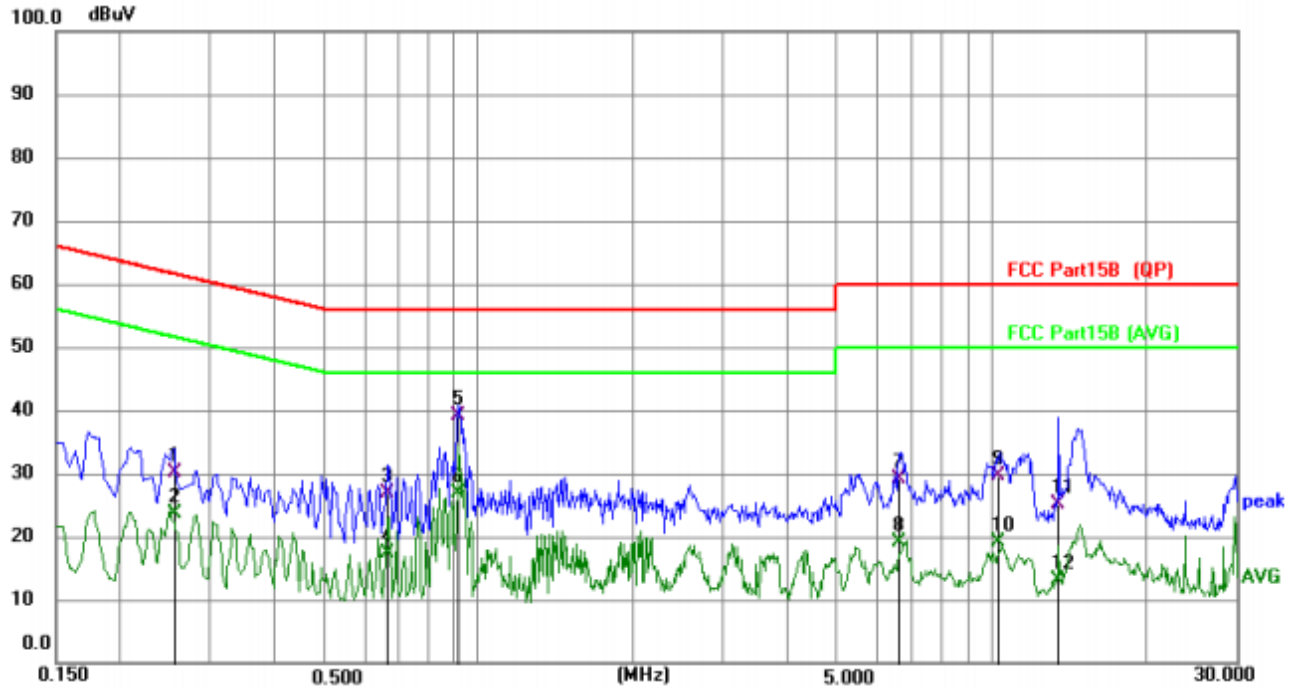
TEST RESULTS

Remark:

1. All modes of 802.11b/g/n were tested at Low, Middle, and High channel; only the worst result of 802.11b CH11 was reported as below:

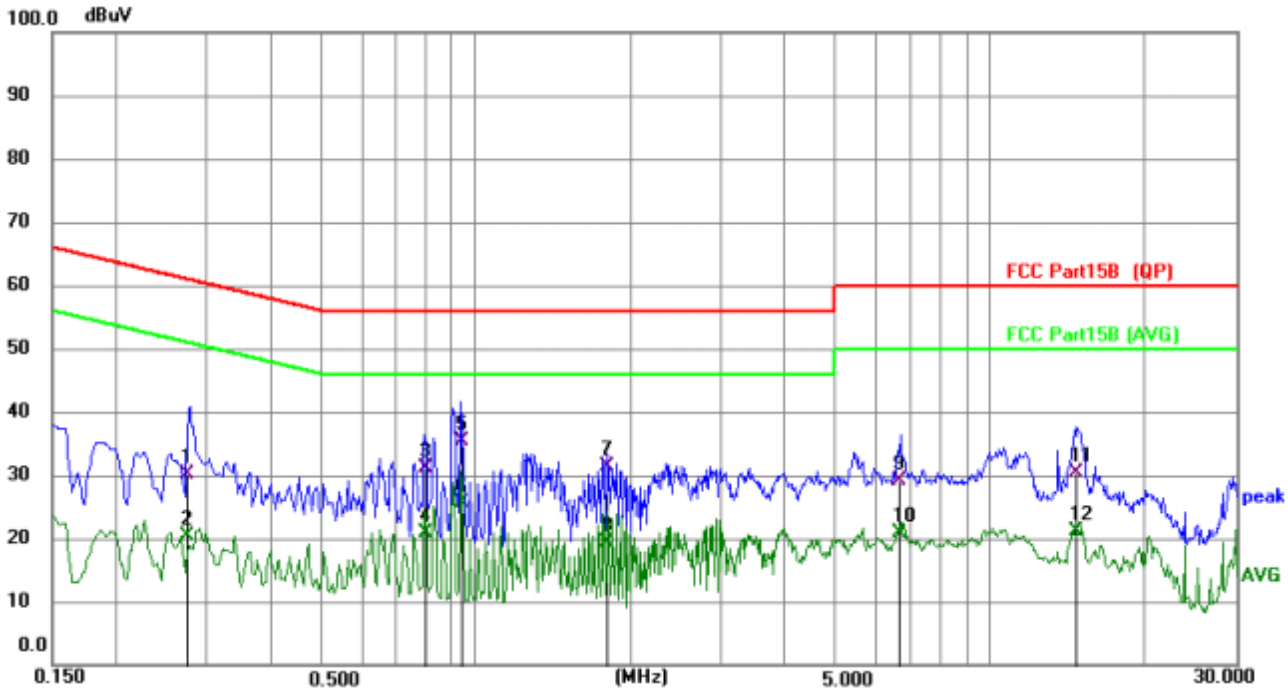
2. Both 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz power supply have been tested, only the worst result of 120 VAC, 60 Hz was reported as below:

Power supply:	AC 120V/60Hz	Polarization	L



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz		dB	dBuV	dBuV	dB	Detector
1		0.2549	19.82	10.22	30.04	61.60	-31.56	QP
2		0.2549	13.48	10.22	23.70	51.60	-27.90	AVG
3		0.6650	16.52	10.33	26.85	56.00	-29.15	QP
4		0.6650	7.13	10.33	17.46	46.00	-28.54	AVG
5	*	0.9164	28.66	10.39	39.05	56.00	-16.95	QP
6		0.9164	16.56	10.39	26.95	46.00	-19.05	AVG
7		6.6478	18.39	10.62	29.01	60.00	-30.99	QP
8		6.6478	8.51	10.62	19.13	50.00	-30.87	AVG
9		10.3612	18.98	10.72	29.70	60.00	-30.30	QP
10		10.3612	8.43	10.72	19.15	50.00	-30.85	AVG
11		13.5410	14.20	10.95	25.15	60.00	-34.85	QP
12		13.5410	2.18	10.95	13.13	50.00	-36.87	AVG

Power supply:	AC 120V/60Hz	Polarization	N



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz		dB	dBuV	dBuV	dB	Detector
1		0.2744	19.86	10.23	30.09	60.98	-30.89	QP
2		0.2744	10.27	10.23	20.50	50.98	-30.48	AVG
3		0.8009	20.84	10.37	31.21	56.00	-24.79	QP
4		0.8009	10.60	10.37	20.97	46.00	-25.03	AVG
5		0.9437	25.04	10.33	35.37	56.00	-20.63	QP
6	*	0.9437	15.37	10.33	25.70	46.00	-20.30	AVG
7		1.8018	20.89	10.38	31.27	56.00	-24.73	QP
8		1.8018	9.03	10.38	19.41	46.00	-26.59	AVG
9		6.6838	18.50	10.67	29.17	60.00	-30.83	QP
10		6.6838	10.24	10.67	20.91	50.00	-29.09	AVG
11		14.7530	19.14	11.15	30.29	60.00	-29.71	QP
12		14.7530	10.04	11.15	21.19	50.00	-28.81	AVG

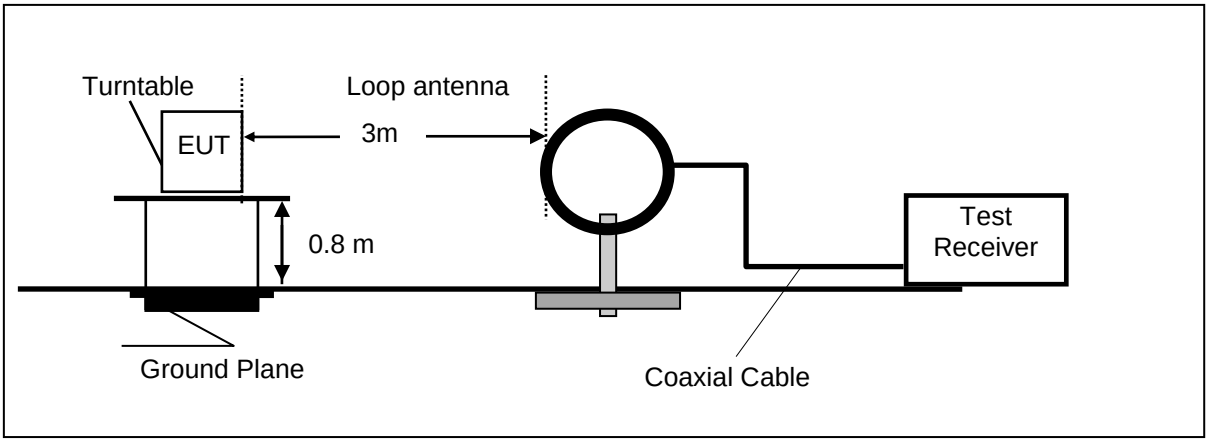
Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level =Receiver Read level + LISN Factor + Cable Los

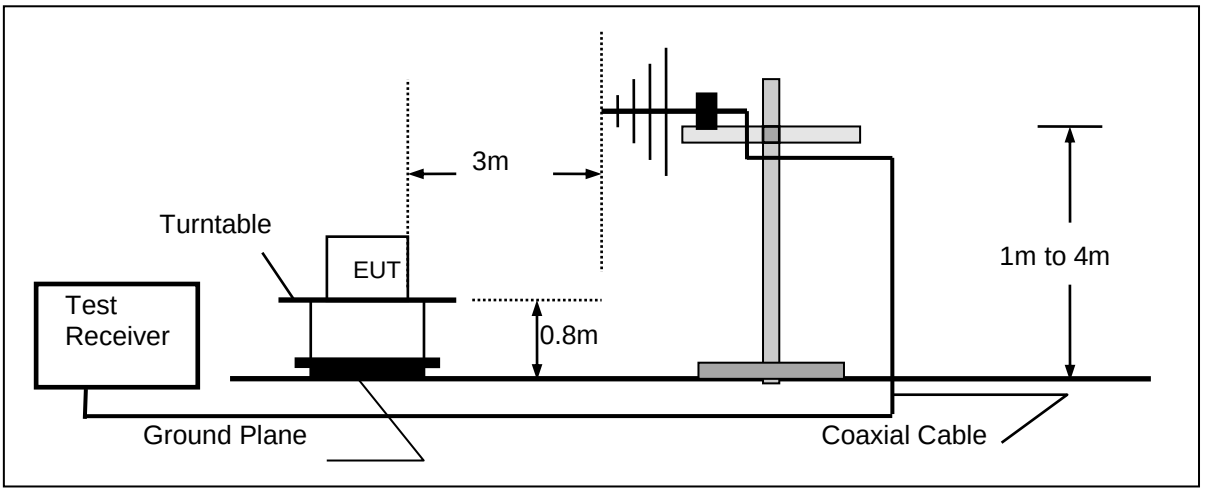
4.2 Radiated Emission

TEST CONFIGURATION

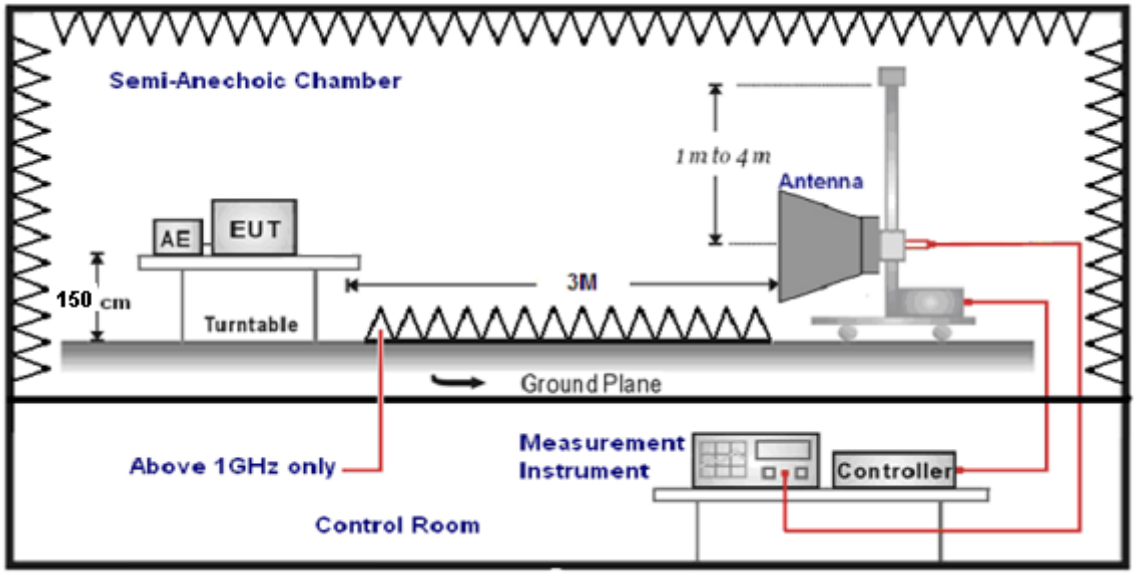
Frequency range 9 KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



TEST PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane when testing frequency range 9 KHz –1GHz;the EUT was placed on a turn table which is 1.5m above ground plane when testing frequency range 1GHz – 25GHz.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. Radiated emission test frequency band from 9KHz to 25GHz.
6. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Ultra-Broadband Antenna	3
1GHz-18GHz	Double Ridged Horn Antenna	3
18GHz-25GHz	Horn Anternna	1

7. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz,Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz,Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz,Sweep time=Auto	QP
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

Transd=AF +CL-AG

RADIATION LIMIT

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission out of authorized band shall not exceed the following table at a 3 meters measurement distance.

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)

Except when the requirements applicable to a given device state otherwise, emissions from licence‑exempt transmitters shall comply with the field strength limits shown in table below. Additionally, the level of any transmitter emission shall not exceed the level of the transmitter's fundamental emission

Unwanted emissions that fall into restricted bands shall comply with the limits specified in RSS-Gen; and Unwanted emissions that do not fall within the restricted frequency bands shall comply either with the limits specified in the applicable RSS or with those specified in this RSS-Gen.

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)

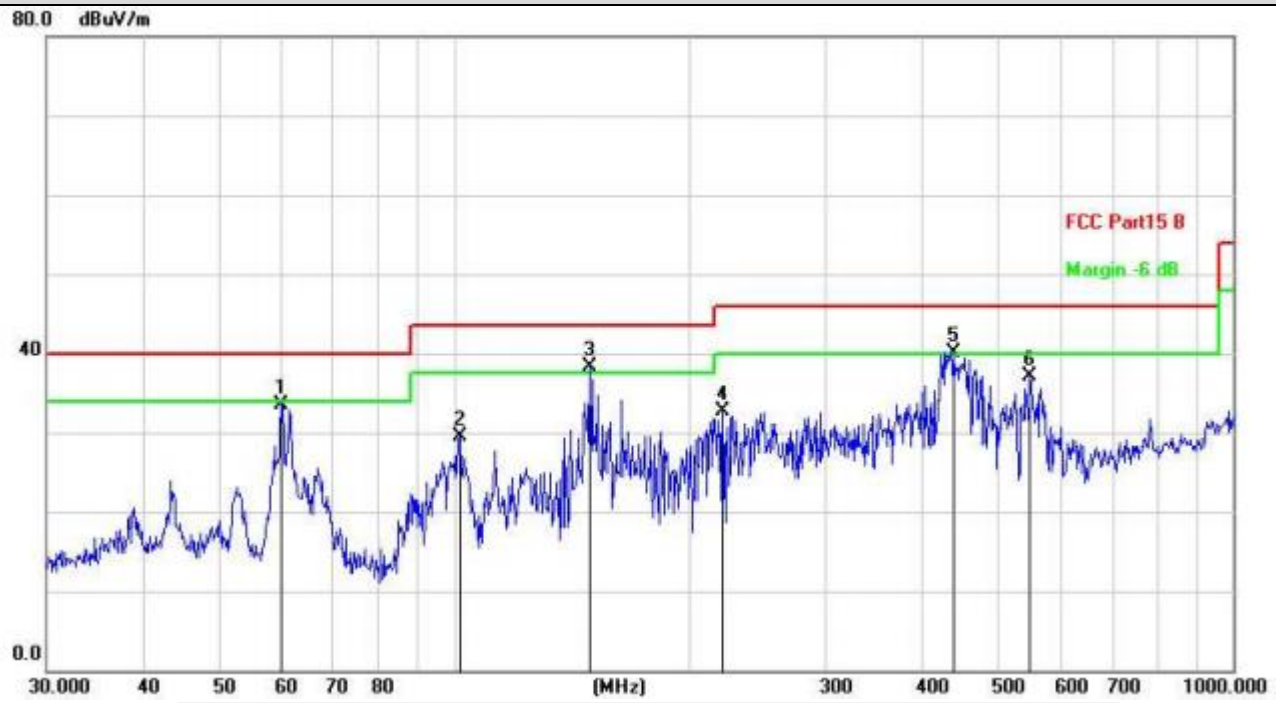
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST RESULTS

Remark:
1. This test was performed with EUT in X, Y, Z position and the worse case was found when EUT in X position.
2. All three channels (lowest/middle/highest) of each mode were measured below 1GHz and recorded worst case at 802.11b low channel.
3. Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9 KHz to 30MHz and not recorded in this report.

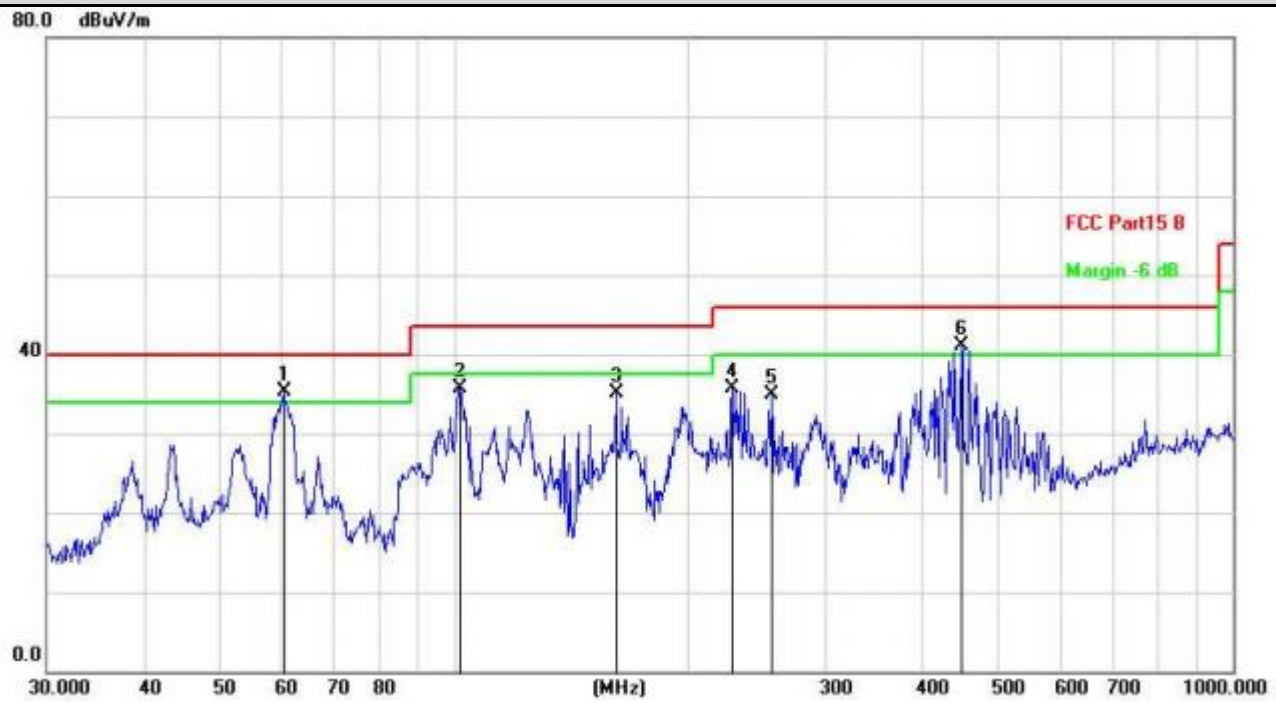
For 30MHz-1GHz

Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dB/m	dB	Detector
1		60.0691	45.19	-11.62	33.57	40.00	-6.43	QP
2		102.0014	44.13	-14.67	29.46	43.50	-14.04	QP
3	*	149.4857	48.90	-10.63	38.27	43.50	-5.23	QP
4		221.3921	45.80	-13.19	32.61	46.00	-13.39	QP
5	!	438.6554	46.78	-6.62	40.16	46.00	-5.84	QP
6		549.0195	41.47	-4.31	37.16	46.00	-8.84	QP

Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dB/m	dB	Detector
1	*	60.4919	46.90	-11.69	35.21	40.00	-4.79	QP
2		101.6443	50.42	-14.69	35.73	43.50	-7.77	QP
3		161.4742	45.83	-10.65	35.18	43.50	-8.32	QP
4		227.6906	48.54	-12.75	35.79	46.00	-10.21	QP
5		255.6231	46.49	-11.50	34.99	46.00	-11.01	QP
6	!	447.9822	47.37	-6.32	41.05	46.00	-4.95	QP

Final Level =Receiver Read level + Correct Factor

For 1GHz to 25GHz

Note: 802.11b/802.11g/802.11n (H20) Mode all have been tested, only worse case 802.11b mode is reported

(above 1GHz)

Frequency(MHz):			**2412**		**Polarity:**		**HORIZONTAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4824.00	58.53	PK	74	15.47	52.71	31.05	6.52	31.75	5.82
4824.00	43.40	AV	54	10.60	37.58	31.05	6.52	31.75	5.82
7236.00	56.85	PK	74	17.15	44.04	36.08	8.18	31.45	12.81
7236.00	46.20	AV	54	7.80	33.39	36.08	8.18	31.45	12.81

Frequency(MHz):			**2412**		**Polarity:**		**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4824.00	60.55	PK	74	13.45	54.73	31.05	6.52	31.75	5.82
4824.00	44.70	AV	54	9.30	38.88	31.05	6.52	31.75	5.82
7236.00	57.72	PK	74	16.28	44.91	36.08	8.18	31.45	12.81
7236.00	45.86	AV	54	8.14	33.05	36.08	8.18	31.45	12.81

Frequency(MHz):			**2437**		**Polarity:**		**HORIZONTAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4874.00	61.28	PK	74	12.72	54.84	31.25	6.7	31.51	6.44
4874.00	45.30	AV	54	8.70	38.86	31.25	6.7	31.51	6.44
7311.00	54.42	PK	74	19.58	41.28	36.25	8.31	31.42	13.14
7311.00	46.77	AV	54	7.23	33.63	36.25	8.31	31.42	13.14

Frequency(MHz):			**2437**		**Polarity:**		**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4874.00	61.65	PK	74	12.35	55.21	31.25	6.7	31.51	6.44
4874.00	45.57	AV	54	8.43	39.13	31.25	6.7	31.51	6.44
7311.00	56.37	PK	74	17.63	43.23	36.25	8.31	31.42	13.14
7311.00	46.48	AV	54	7.52	33.34	36.25	8.31	31.42	13.14

Frequency(MHz):			**2462**		**Polarity:**		**HORIZONTAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4924.00	60.93	PK	74	13.07	54.06	31.52	6.8	31.45	6.87
4924.00	45.42	AV	54	8.58	38.55	31.52	6.8	31.45	6.87
7386.00	55.79	PK	74	18.21	42.23	36.51	8.4	31.35	13.56
7386.00	45.66	AV	54	8.34	32.10	36.51	8.4	31.35	13.56

Frequency(MHz):			**2462**		**Polarity:**		**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4924.00	60.81	PK	74	13.19	53.94	31.52	6.8	31.45	6.87
4924.00	44.31	AV	54	9.69	37.44	31.52	6.8	31.45	6.87
7386.00	55.70	PK	74	18.30	42.14	36.51	8.4	31.35	13.56
7386.00	47.01	AV	54	6.99	33.45	36.51	8.4	31.35	13.56

1) Emission level (dBuV/m) = Meter Reading+ antenna Factor+ cable loss- preamp factor.
2) Margin value = Limits-Emission level.
3) -- Mean the PK detector measured value is below average limit.
4) The other emission levels were very low against the limit.
5) RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.

Results of Band Edges Test (Radiated)

Note: 802.11b/802.11g/802.11n (H20) MIMO Mode all have been tested, only worse case 802.11b mode is reported

Frequency(MHz):			**2412**		**Polarity:**		**HORIZONTAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2390.00	62.32	PK	74	11.68	63.71	27.2	4.31	32.9	-1.39
2390.00	43.85	AV	54	10.15	45.24	27.2	4.31	32.9	-1.39
Frequency(MHz):			**2412**		**Polarity:**		**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2390.00	59.20	PK	74	14.80	60.59	27.2	4.31	32.9	-1.39
2390.00	46.02	AV	54	7.98	47.41	27.2	4.31	32.9	-1.39
Frequency(MHz):			**2462**		**Polarity:**		**HORIZONTAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2483.50	56.97	PK	74	17.03	57.90	27.4	4.47	32.8	-0.93
2483.50	44.72	AV	54	9.28	45.65	27.4	4.47	32.8	-0.93
Frequency(MHz):			**2462**		**Polarity:**		**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2483.50	55.93	PK	74	18.07	56.86	27.4	4.47	32.8	-0.93
2483.50	43.87	AV	54	10.13	44.80	27.4	4.47	32.8	-0.93

Note：

1) Emission level (dBuV/m) = Meter Reading+ antenna Factor+ cable loss- preamp factor.
2) Margin value = Limits-Emission level.
3) -- Mean the PK detector measured value is below average limit.
4) The other emission levels were very low against the limit.
5) RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.

4.3 Maximum Peak Conducted Output Power

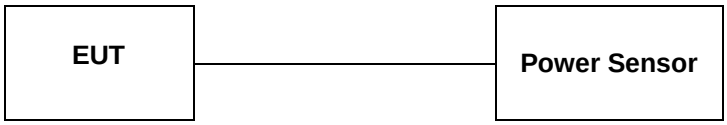
Limit

The Maximum Peak Output Power Measurement is 30dBm.

Test Procedure

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power sensor.

Test Configuration



Test Results

Type	Channel	Output power PK (dBm)	Limit (dBm)	Result
802.11b	01	3.69	30.00	Pass
	06	3.63		
	11	2.38		
802.11g	01	7.16	30.00	Pass
	06	7.19		
	11	6.18		
802.11n(HT20)	01	6.62	30.00	Pass
	06	6.29		
	11	5.19		

Note:
1) Measured output power at difference data rate for each mode and recorded worst case for each mode.
2) Test results including cable loss.
3) Worst case data at 1Mbps at IEEE 802.11b; 6Mbps at IEEE 802.11g; 6.5Mbps at IEEE 802.11n HT20;

4.4 Power Spectral Density

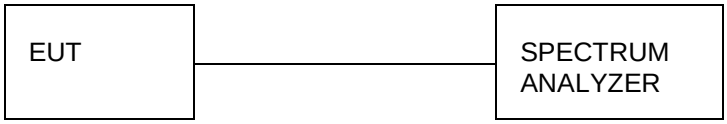
Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Test Procedure

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW ≥ 3 kHz.
3. Set the VBW ≥ 3× RBW.
4. Set the span to 1.5 times the DTS channel bandwidth.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum power level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.
11. The resulting peak PSD level must be 8dBm.

Test Configuration

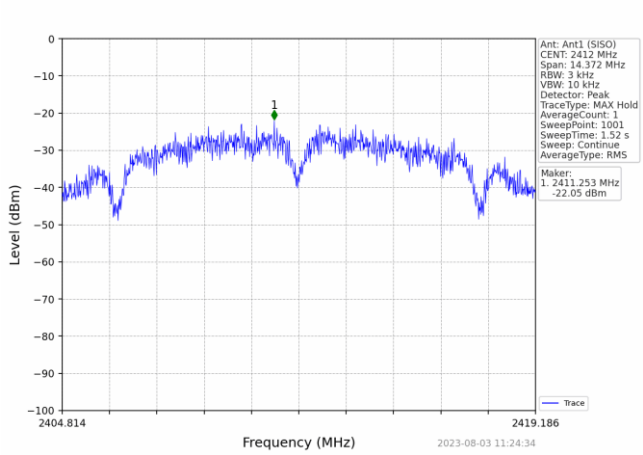
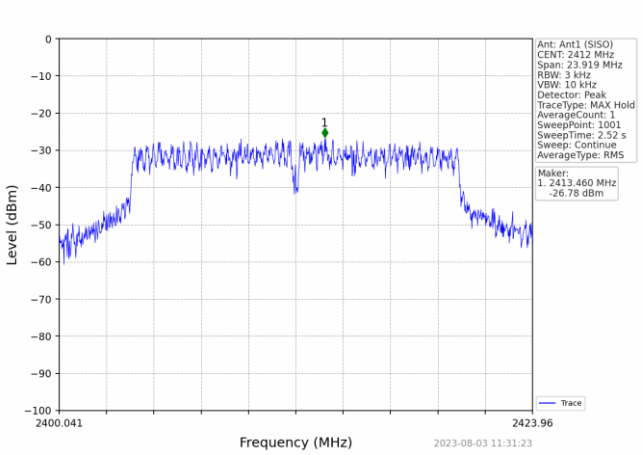
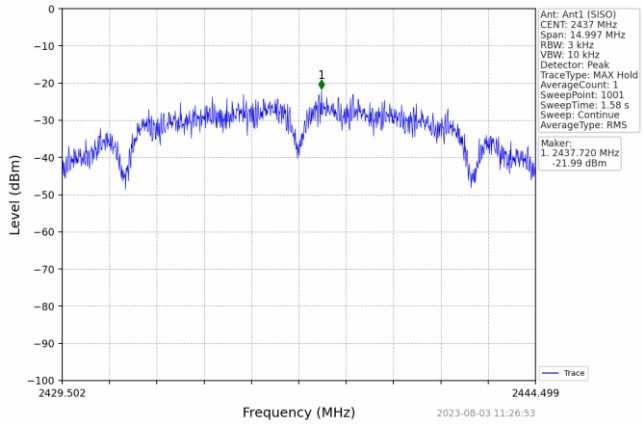
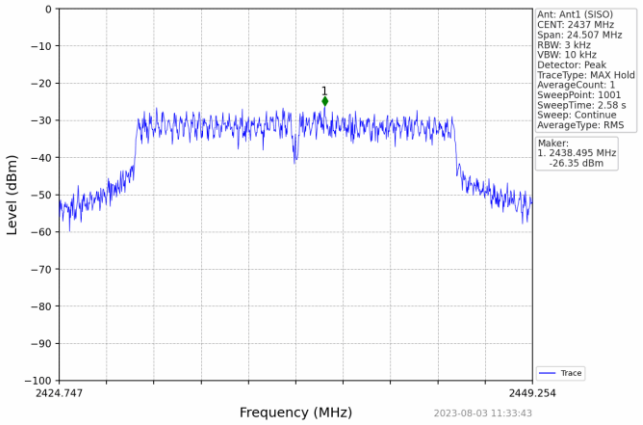
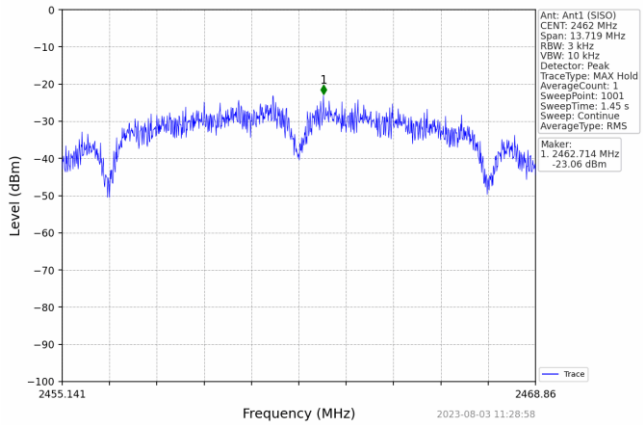
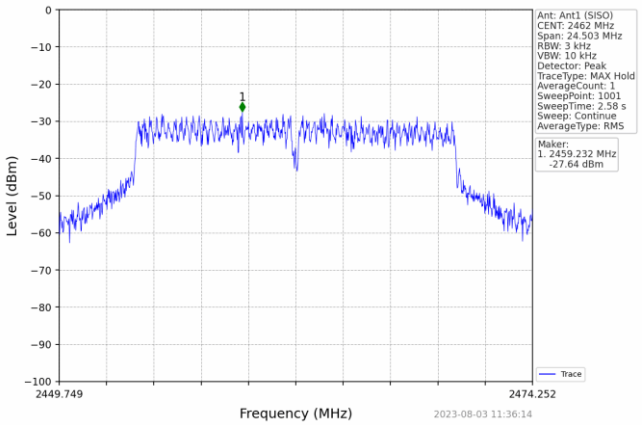


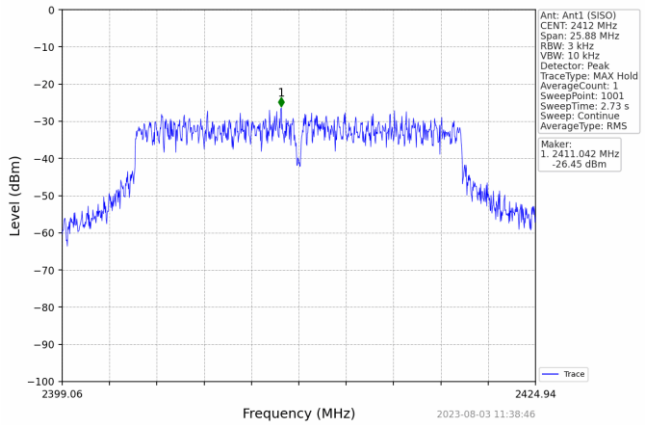
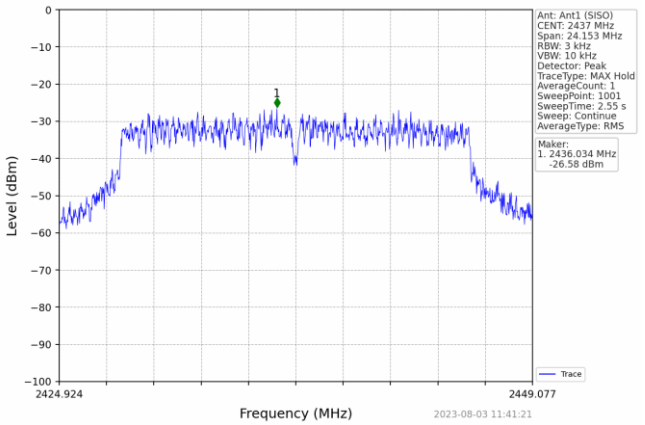
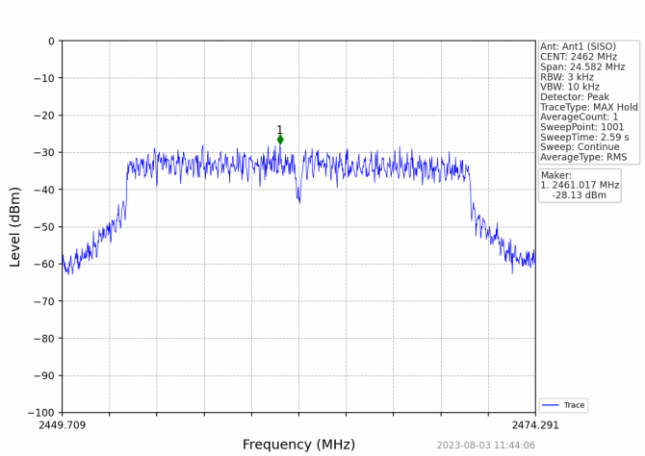
Test Results

Type	Channel	Power Spectral Density (dBm/3KHz)	Limit (dBm/3KHz)	Result
802.11b	01	-22.05	8.00	Pass
	06	-21.99		
	11	-23.06		
802.11g	01	-26.78	8.00	Pass
	06	-26.35		
	11	-27.64		
802.11n(HT20)	01	-26.45	8.00	Pass
	06	-26.58		
	11	-28.13		

Note:
1) Measured peak power spectrum density at difference data rate for each mode and recorded worst case for each mode.
2) Test results including cable loss;
3) Worst case data at 1Mbps at IEEE 802.11b; 6Mbps at IEEE 802.11g; 6.5Mbps at IEEE 802.11n HT20;

Please refer to following plots;

802.11b	*802.11g*
	
CH01	*CH01*
	
CH06	*CH06*
	
CH11	*CH11*

802.11n(HT20)	
	
CH01	*CH06*
	
CH11	

4.5 6dB Bandwidth and 99% Bandwidth

Limit

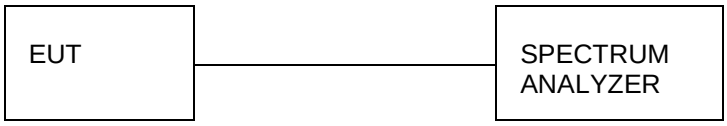
For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz

Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 KHz RBW and 300 KHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 430 KHz RBW and 1.3MHz VBW record the 99% bandwidth.

Test Configuration



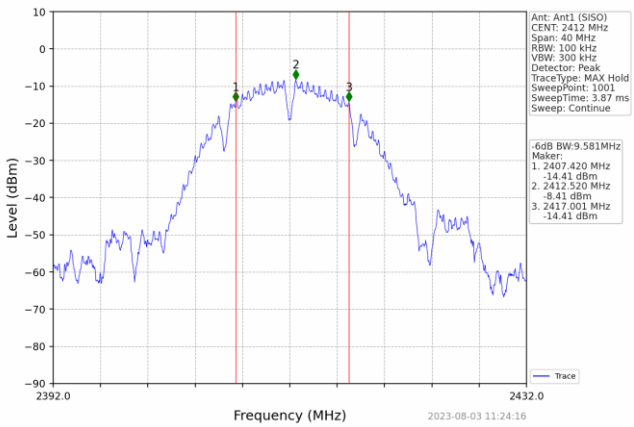
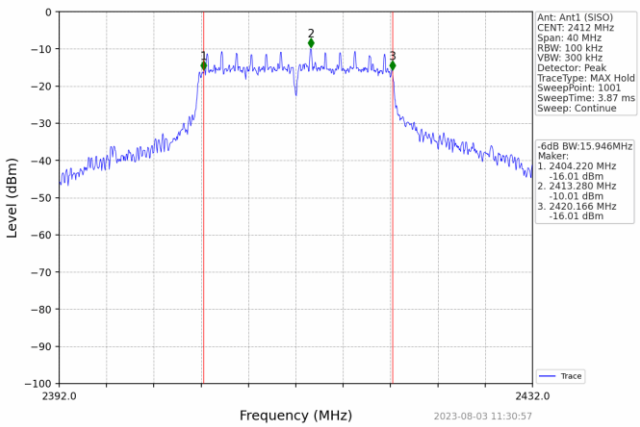
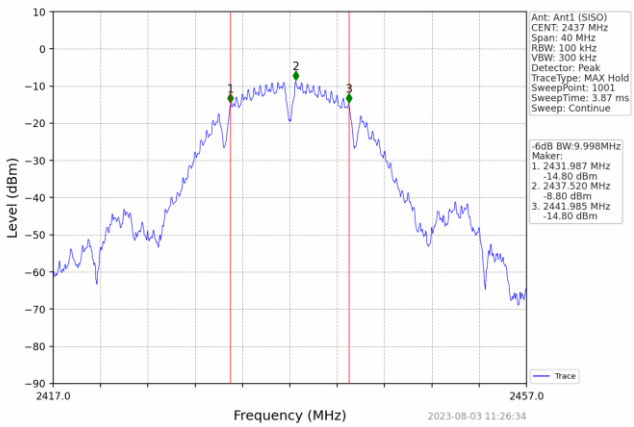
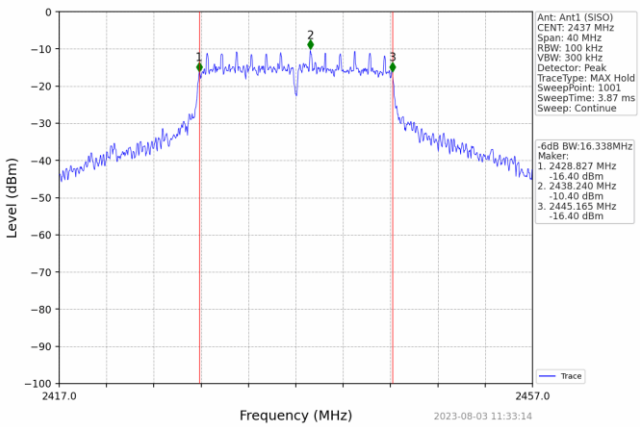
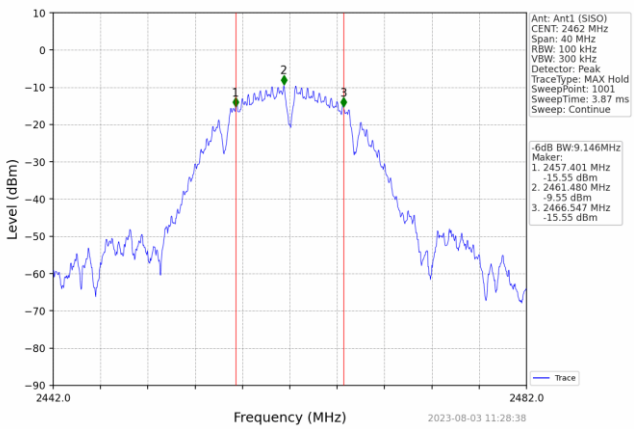
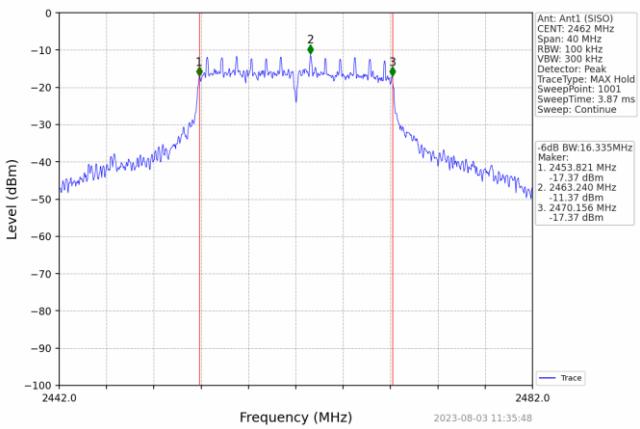
Test Results

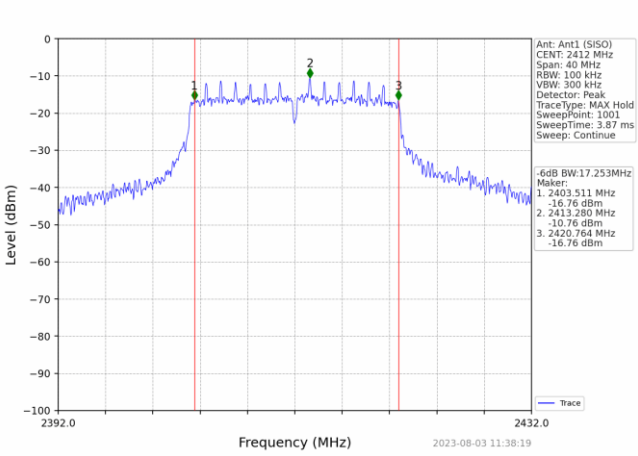
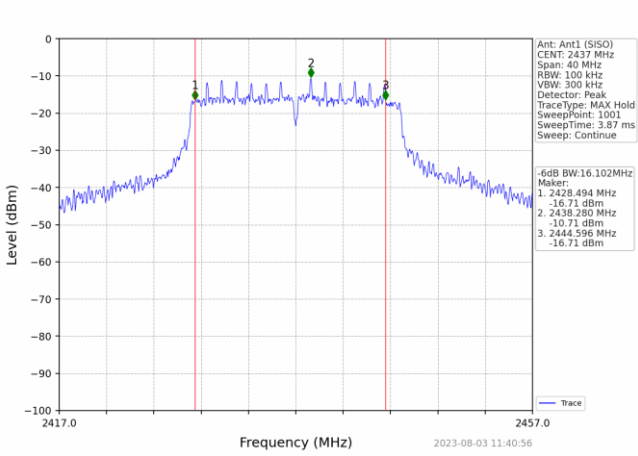
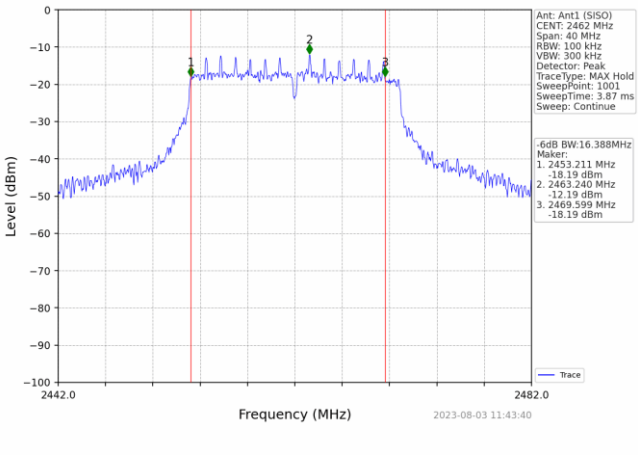
Type	Channel	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (KHz)	Result
802.11b	01	9.581	13.940	≥500	Pass
	06	9.998	14.169		
	11	9.146	13.731		
802.11g	01	15.946	21.510	≥500	Pass
	06	16.338	21.522		
	11	16.335	19.336		
802.11n(HT20)	01	17.253	20.416	≥500	Pass
	06	16.102	20.297		
	11	16.388	19.466		

Note:
1) Measured peak power spectrum density at difference data rate for each mode and recorded worst case for each mode.
2) Test results including cable loss;
3) Worst case data at 1Mbps at IEEE 802.11b; 6Mbps at IEEE 802.11g; 6.5Mbps at IEEE 802.11n HT20;

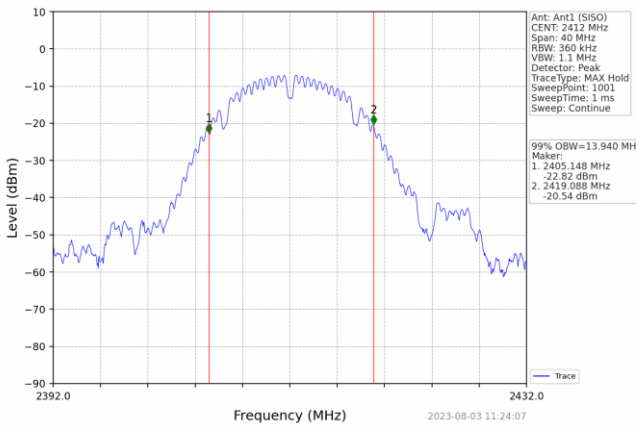
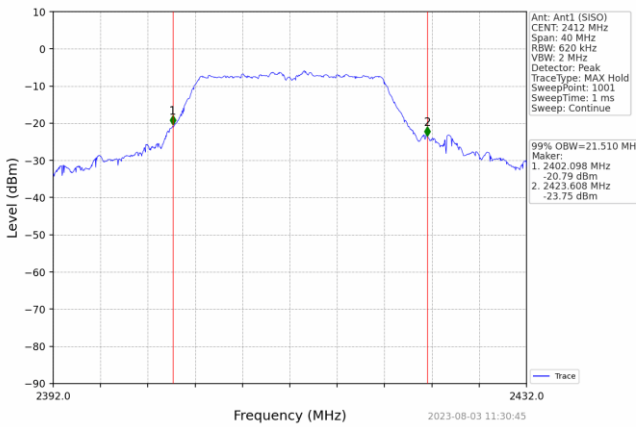
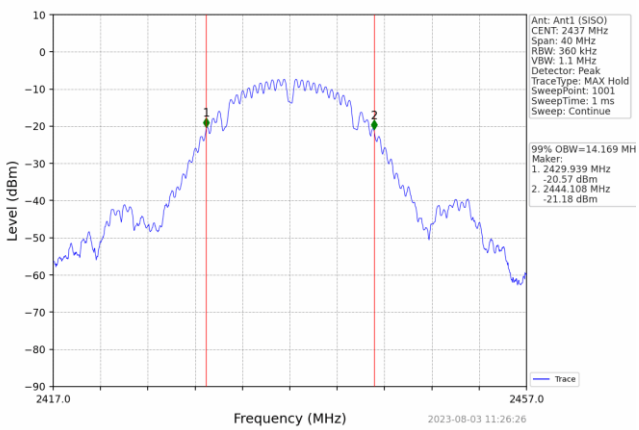
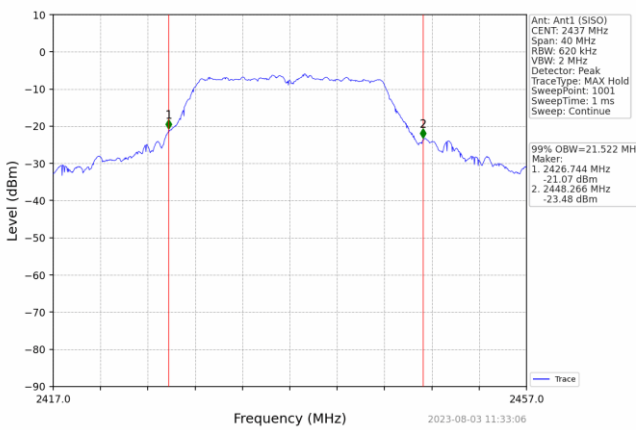
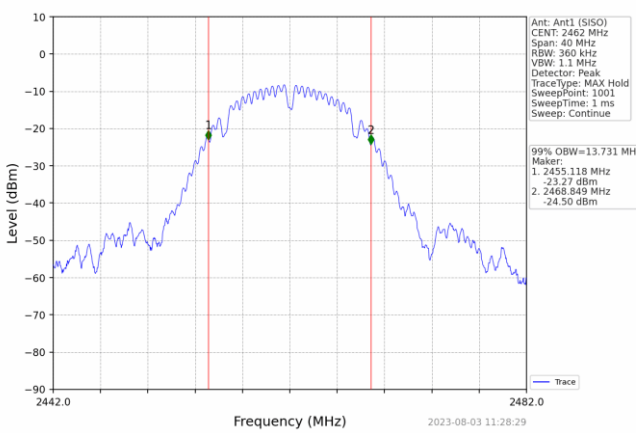
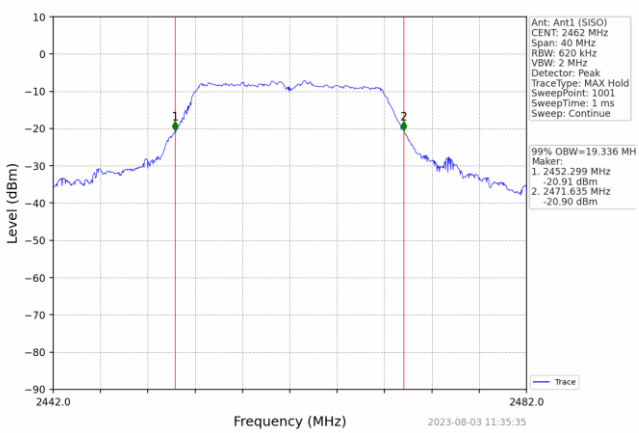
Please refer to following plots;

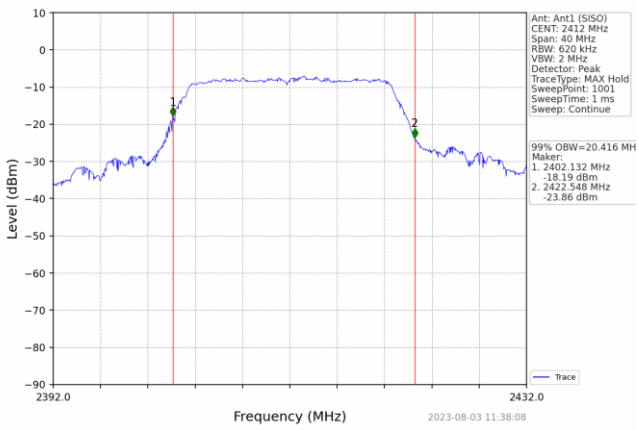
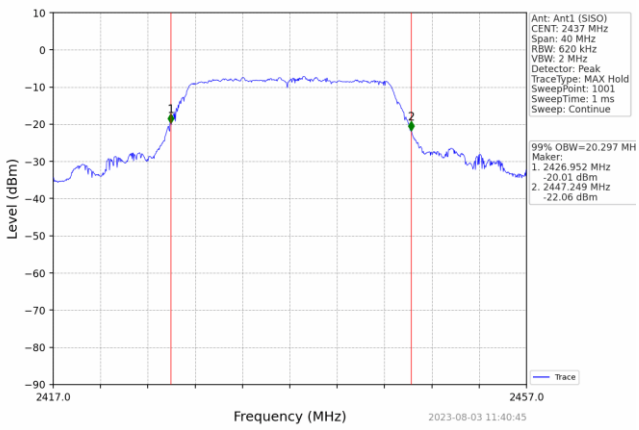
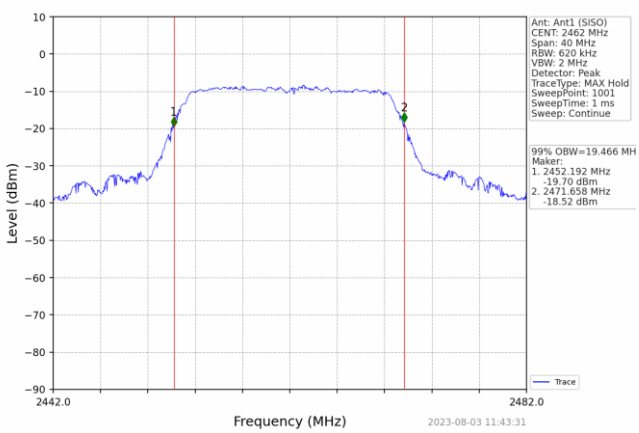
For 6dB Bandwidth:

802.11b	*802.11g*
	
CH01	*CH01*
	
CH06	*CH06*
	
CH11	*CH11*

802.11n(HT20)	*802.11n(HT20)*
	
CH01	*CH06*
	/
CH11	

For 99% Bandwidth:

802.11b	*802.11g*
	
CH01	*CH01*
	
CH06	*CH06*
	
CH11	*CH11*

802.11n(HT20)	*802.11n(HT20)*
	
CH01	*CH06*
	/
CH11	

4.6 Out-of-band Emissions

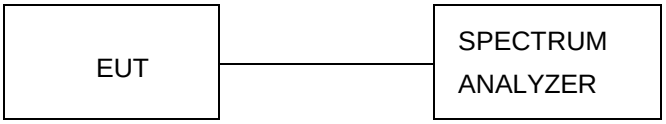
Limit

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 con-ducted or a radiated measurement, pro-vided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter com-plies 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.

Test Procedure

Connect the transmitter output to spectrum analyzer using a low loss RF cable, and set the spectrum analyzer to RBW=100 kHz, VBW= 300 kHz, peak detector , and max hold. Measurements utilizing these setting are made of the in-band reference level, bandedge and out-of-band emissions.

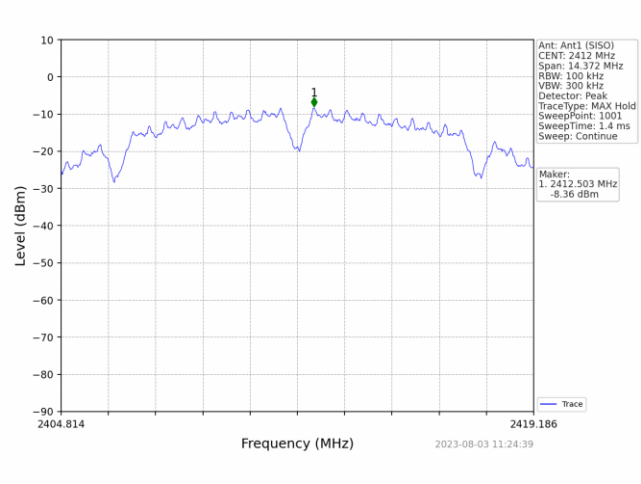
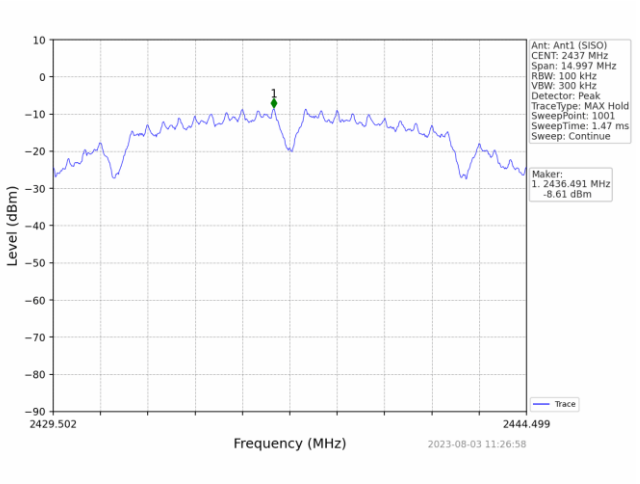
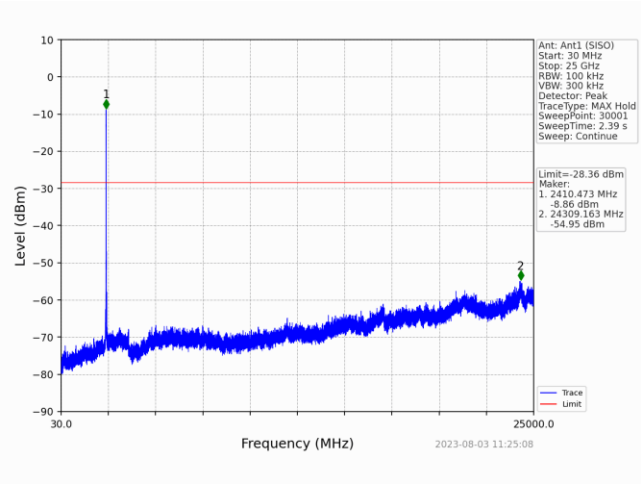
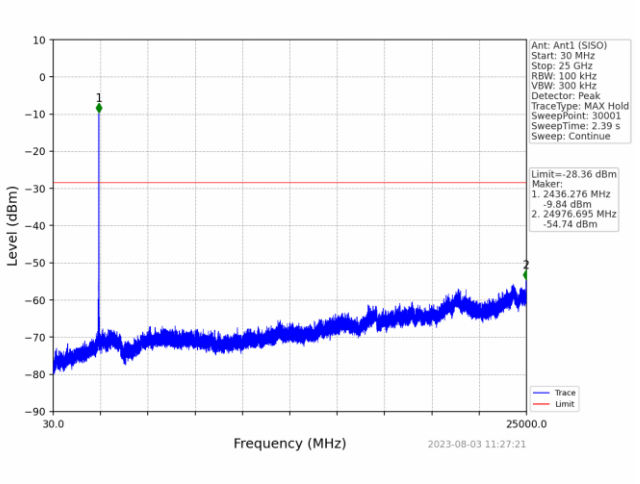
Test Configuration

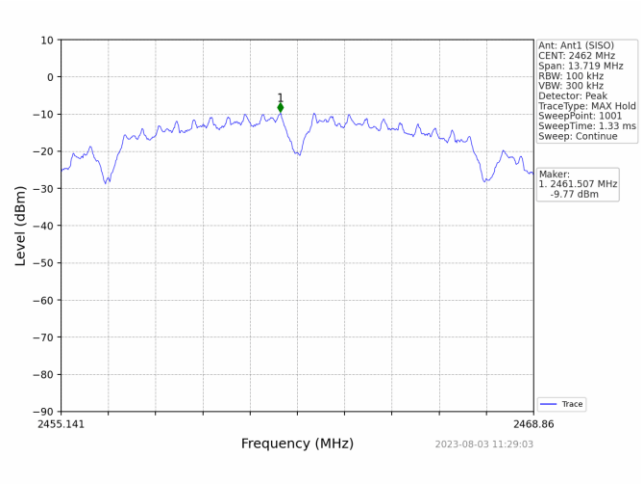
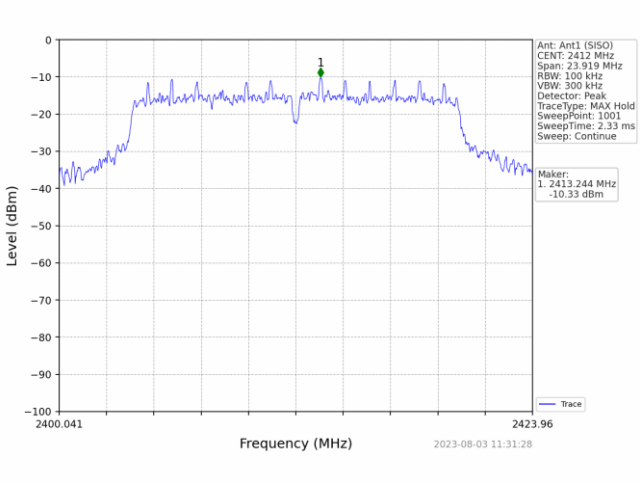
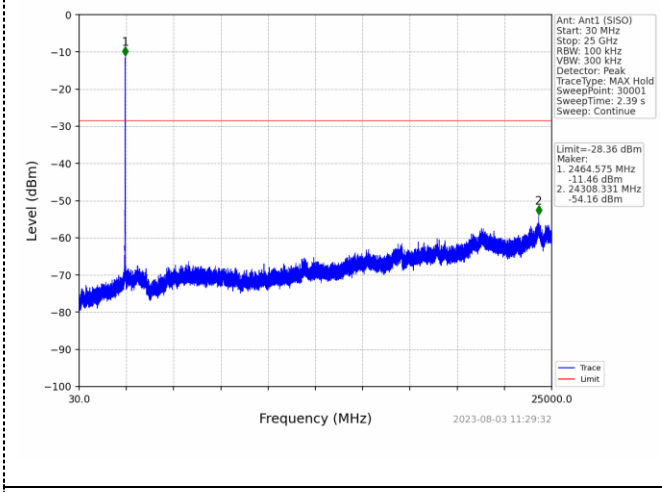
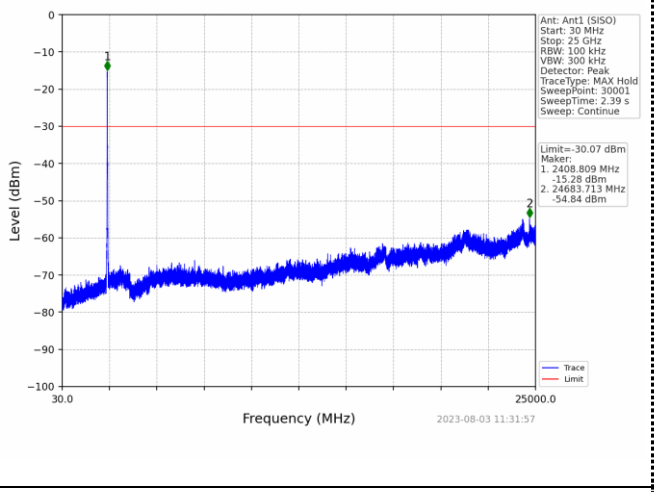


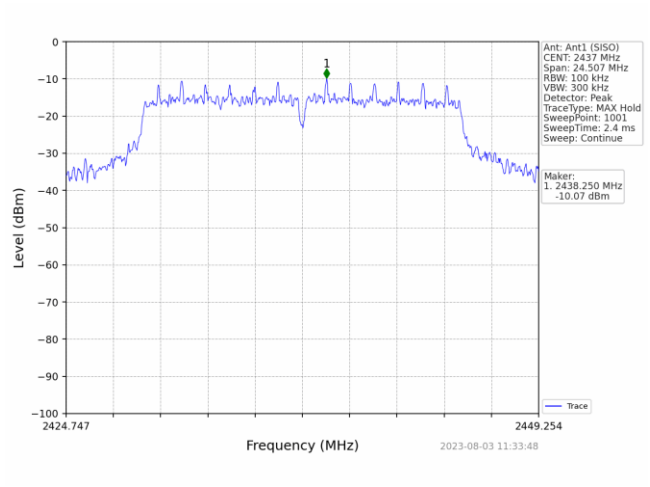
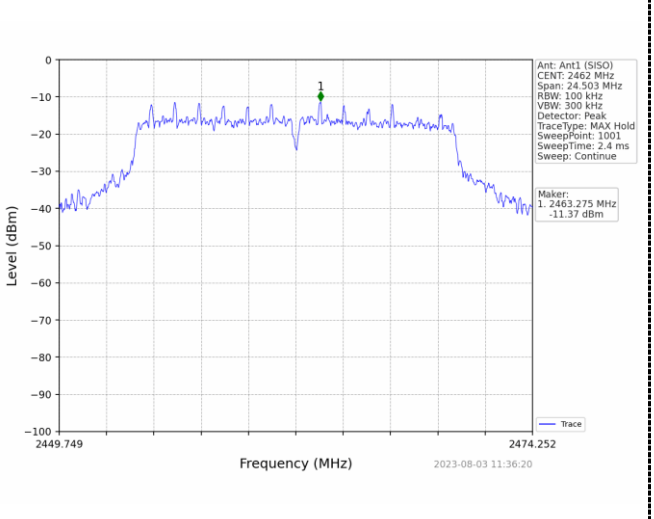
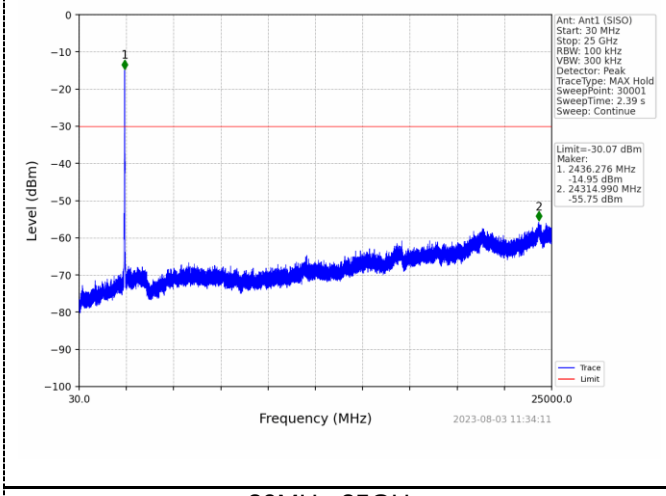
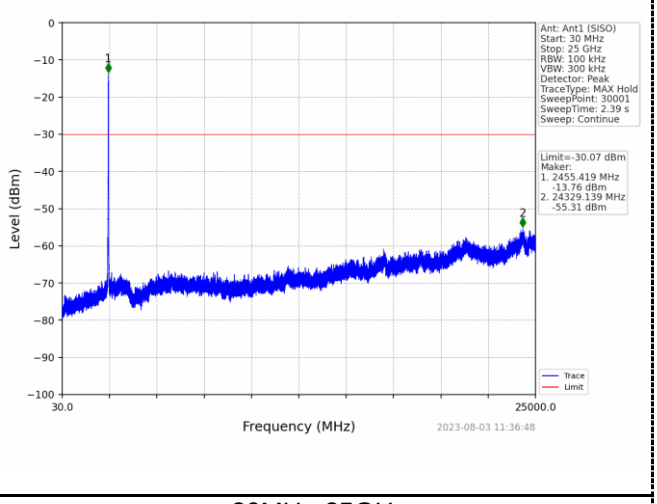
Test Results

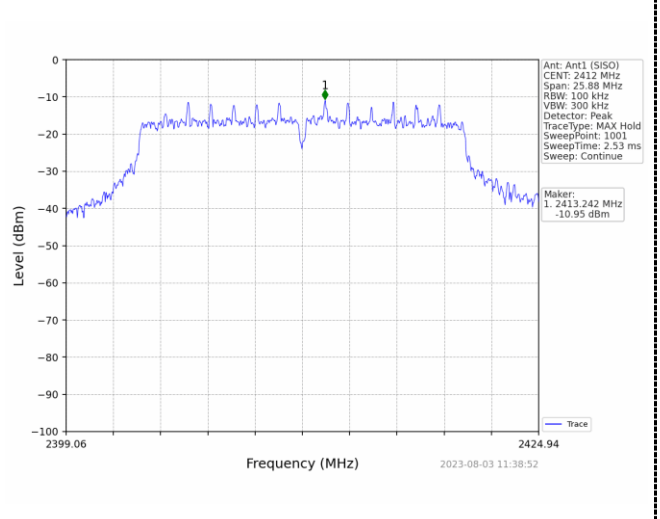
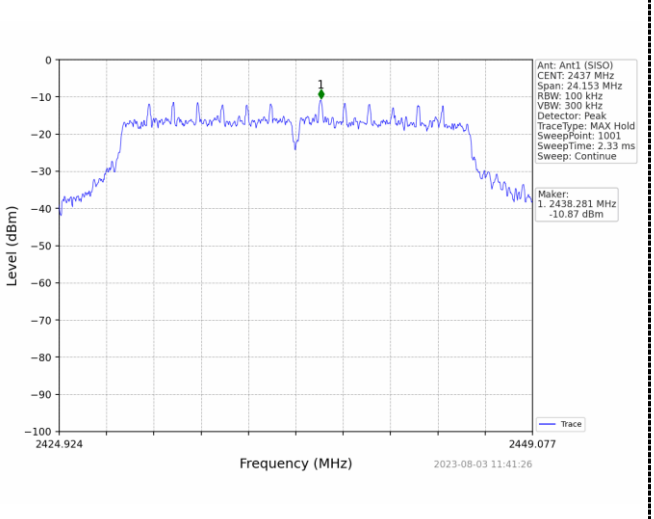
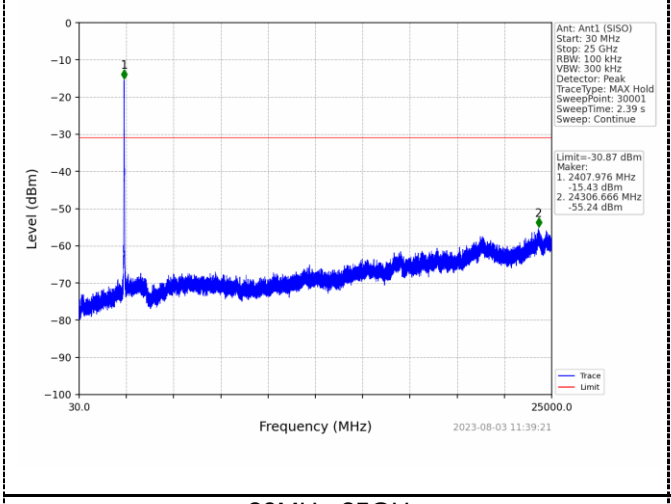
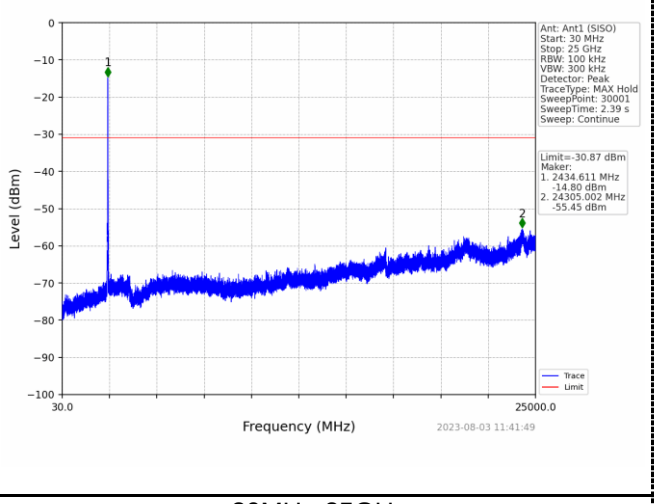
Remark: The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and bandage measurement data. And record the worst data in the report.

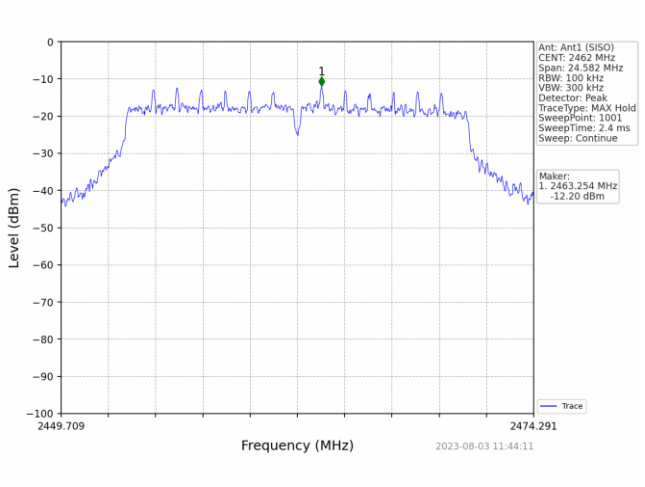
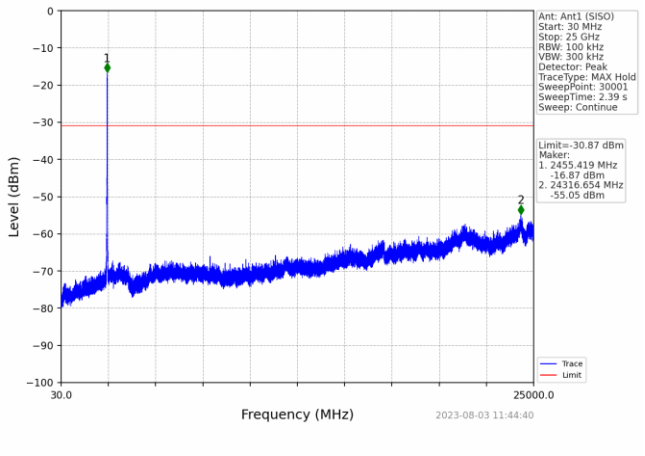
Test plot as follows:

802.11b	
	
Reference	Reference
CH01	***CH06***
	
30MHz-25GHz	30MHz-25GHz

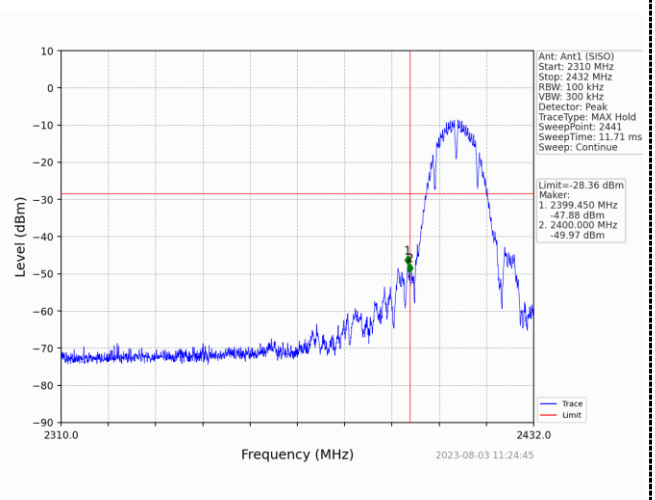
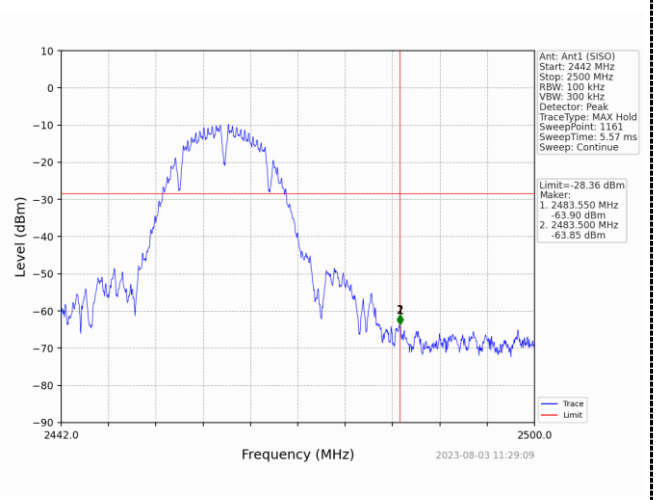
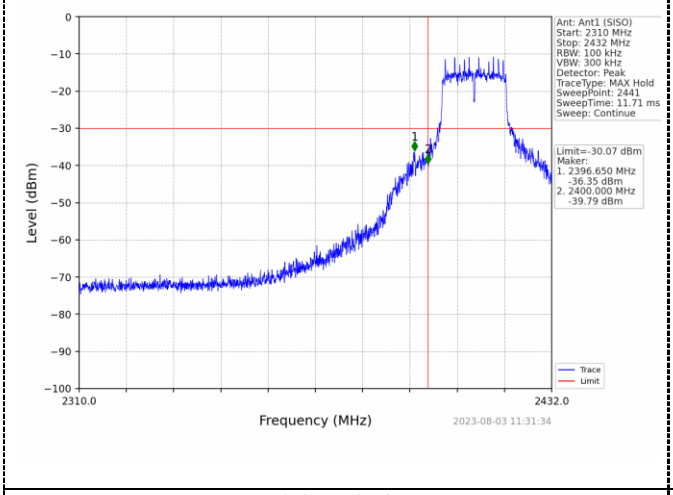
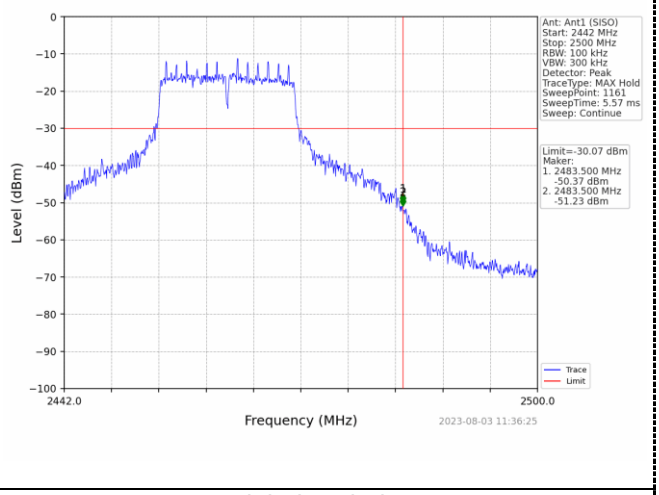
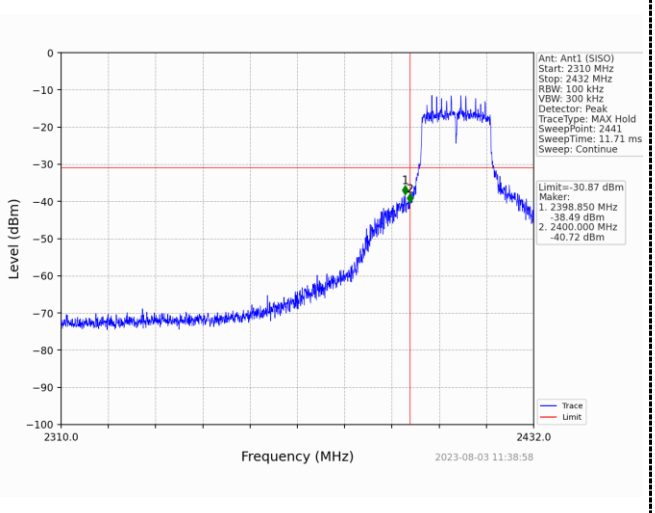
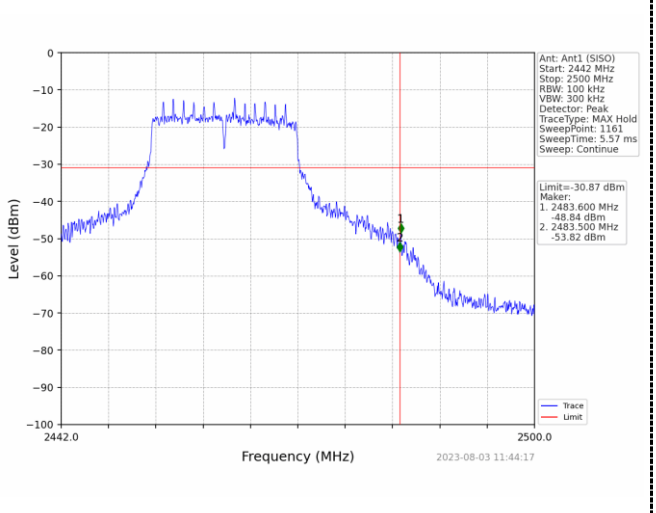
802.11b	***802.11g***
	
Reference	Reference
CH011	***CH01***
	
30MHz-25GHz	30MHz-25GHz

802.11g	
	
Reference	Reference
CH06	***CH11***
	
30MHz-25GHz	30MHz-25GHz

802.11n20	
	
Reference	Reference
CH01	***CH06***
	
30MHz-25GHz	30MHz-25GHz

802.11n20	
	
Reference	
CH11	
	
30MHz-25GHz	

Band-edge Measurements for RF Conducted Emissions:

802.11b	
	
Left bandedge	Right bandedge
802.11g	
	
Left bandedge	Right bandedge
802.11n(HT20)	
	
Left bandedge	Right bandedge

4.7 Antenna Requirement

Standard Applicable

For intentional device, according to RSS-Gen 6.8:

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, 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

Test Result:

The maximum gain of antenna was 4.05 dBi.

Remark:The antenna gain is provided by the customer , if the data provided by the customer is not accurate, Shenzhen HTT Technology Co.,Ltd. does not assume any responsibility.

5 Test Setup Photos of the EUT

Reference to the **appendix I** for details.

6 Photos of the EUT

Reference to the **appendix II** for details.

********** End of Report **********