




# FCC Test Report

FCC EVALUATION REPORT FOR CERTIFICATE	
Project Reference No.	281775
Product	Purekey Wireless Keyboard
Brand Name	Purekeys
Model	PK-KRF-01
Alternate Model	N/A
Tested according to	FCC Rules and Regulations Part 15 Subpart C 2013, 15.249 ANSI C63.4-2009 and ANSI C63.10:2013

Tested in period	2015-04-10 to 2015-04-19	
Issued date	2015-04-21	
Name and address of the Test House	 Nemko Shanghai Ltd. Shenzhen Branch Unit CD, Floor 10, Tower 2, Kefa Road 8#, Hi-Technology Park, Nanshan District, Shenzhen, China Phone : +86 755 8221 0420      Fax : +86 755 8221 3363	
Tested by	 <hr/> <b>Juno Wong</b>	2015-04-21 <hr/> <b>date</b>
Verified by	 <hr/> <b>Zone Peng</b>	2015-04-22 <hr/> <b>date</b>

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## 1. Client Information

### 1.1 Applicant

Company Name: Purekeys BV  
Company Address: Rouaanstraat 23 C, 9723 CC Groningen, The Netherlands

### 1.2 Manufacturer

Company Name: Zhuhai Heng Yu New Technology Company Limited  
Company Address: Heng Ke Technology Campus, Jin Hai Avenue, Sanzao, Jinwan District, Zhuhai, Guangdong, PRC

### 1.3 Scope

• Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission under FCC part 15.249.



## 2. Equipment under Test (EUT)

### 2.1 Identification of EUT

Category: DXX  
Name: Purekeys Wireless Keyboard  
Model Name: PK-KRF-01  
Alternate model: N/A  
Brand name: Purekeys

### 2.2 Detail spec:

Operation Frequency: **2404 MHz -2480MHz**

Type of Modulation : **GFSK**

Antenna Type: **Integral Antenna**

Antenna Number : **1**

Antenna gain: **0dBi**

Channel number: **77**

Data rate: **1Mbps**

Rating(s): **4X1.5VDC AAA battery 4pcs**

### 2.3 Additional Information Related to Testing

**CH LOW:2404MHz**

**CH MID:2442MHz**

**CH HIGH:2480MHz**

**Remark: Only the worse case found by prescan is listed**

### 3. General Test Conditions

#### 3.1 Location

Global United Technology Services Co., Ltd. -- Nemko ELA 632

2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China

FCC Registration No.:600491

Note: all test are witnessed by NEMKO engineer

#### 3.2 Operating Environment

All tests and measurements were performed in a shielded enclosure or a controlled environment suitable for the tests conducted. The climatic conditions in the test area are automatically controlled and recorded continuously.

Parameters	Recording during test	Accepted deviation
Ambient temperature	24-25°C	15 – 35 °C
Relative humidity	50-55%	30 - 60%
Atmospheric pressure	101.2 kPa -101.3kPa	86-106kPa

#### 3.3 Operating During Test

Test mode

TM1 : TX MODE continuous transmitter

Remark : New batteries used during testing.

#### 3.4 Test Equipment

The test equipments used in testing are calibrated on a regular basis. For most of the testing equipments accredited calibration is conducted once a year. For certain equipment the calibration interval is longer. Between the calibrations all test equipment are controlled and verified on a regular basis. The test equipments used are defined in each test section of this report.

### 4. Measurement Uncertainty

The Measurement Uncertainties stated were calculated in accordance with the requirements of NIST Technical Note 1297 with the confidence level of 95 %.

Conducted Emission : 0.15~30MHz	3.45dB
Radiated Emission: 30MHz~1000MHz	4.50dB
1GHz-18GHz	4.70dB

## 5. Radiated Electromagnetic Disturbances Test

### 5.1 Test Procedure

#### **For below 1GHz:**

The EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber. An antenna was located 3m from the EUT on an adjustable mast.

The EUT were rotated 0 to 360 degree and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. The test result are reported as below.

RBW=120 kHz; VBW=300KHz QP detector, The frequency range from 30MHz to 1000MHz is checked.

#### **For above 1GHz:**

The EUT was placed on a non-metallic table, 150 cm above the ground plane inside a full-anechoic chamber. An antenna was located 3m from the EUT on an adjustable mast.

The EUT were rotated 0 to 360 degree and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. The test result are reported as below.

The frequency range from 1GHz to 25GHz(10<sup>th</sup> harmonics) is checked.

RBW=1MHz ; VBW=3MHz, PK detector for peak emissions measurement above 1GHz

RBW=1MHz ; VBW=3MHz, RMS detector for average emissions measurement above 1GHz.

#### **For fundamental:**

RBW=3MHz, VBW=10MHz, PK Detector for peak emissions measurement.

RBW=3MHz; VBW=10MHz, RMS detector for average emissions measurement.

### 5.2 Measurement Equipment

	Equipment	Calibration due	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	EMI Test Receiver	Jul. 04 2015	ESU26	GTS203	R&S
<input checked="" type="checkbox"/>	BiConiLog Antenna	Feb. 26 2016	VULB9163	GTS214	SCHWARZBECK
<input checked="" type="checkbox"/>	Horn Antenna	Feb. 26 2016	BBHA9120D	GTS215	SCHWARZBECK
<input checked="" type="checkbox"/>	Horn Antenna	Feb. 26 2016	BBHA9170	GTS216	SCHWARZBECK
<input checked="" type="checkbox"/>	Coaxial Cable	Apr. 01 2016	N/A	GTS213	GTS
<input checked="" type="checkbox"/>	Coaxial Cable	Apr. 01 2016	N/A	GTS211	GTS
<input checked="" type="checkbox"/>	Coaxial cable	Apr. 01 2016	N/A	GTS210	GTS
<input checked="" type="checkbox"/>	Coaxial Cable	Apr. 01 2016	N/A	GTS212	GTS
<input checked="" type="checkbox"/>	Amplifier	Jul. 04 2015	8347A	GTS204	HP

### 5.3 Test Result

Remark: If PK value is lower than AV limit , only show PK diagram as below.

From 18GHz to 25GHz, No Emission found .

For Radiated emission test : The EUT have been tested at X,Y,Z axial direction, Only list the Worst case.

Test Mode	Freq range	Channel	Test ANT. polarity	Diagram	Test Result
TX mode: GFSK	30MHz-1GHz	CH LOW	H	5-1	Pass
	30MHz-1GHz	CH LOW	V	5-2	Pass
	30MHz-1GHz	CH MID	H	5-3	Pass
	30MHz-1GHz	CH MID	V	5-4	Pass
	30MHz-1GHz	CH HIGH	H	5-5	Pass
	30MHz-1GHz	CH HIGH	V	5-6	Pass
TX mode: GFSK	1GHz-18GHz:	CH LOW	H	5-7	Pass
	1GHz-18GHz:	CH LOW	V	5-8	Pass
	1GHz-18GHz:	CH MID	H	5-9	Pass
	1GHz-18GHz:	CH MID	V	5-10	Pass
	1GHz-18GHz:	CH HIGH	H	5-11	Pass
	1GHz-18GHz:	CH HIGH	V	5-12	Pass

NOTES:

- All modes were measured and only the worst case emission was reported.
- H =Horizontal V=Vertical
- Emission = Reading +Antenna Factor + Cable Loss –Amp Factor
- Emission level  $\text{dB } \mu\text{V} = 20 \log \text{ Emission level } \mu\text{V/m}$
- The lower limit shall apply at the transition frequencies.
- The fundamental and harmonics field strength emission from intentional radiators within the frequency band 2400-2483.5 MHz should comply with:

Field strength of Fundamental	94dBuV/m for AV (@3m) 114dBuV/m for peak (@3m)
Field strength of Harmonics	54dBuV/m for AV (@3m) 74dBuV/m for peak (@3m)

- Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209<sup>#</sup>, whichever is the lesser attenuation.

Remark : The limit of “#” of 3 meter distance is

Frequency MHz	Distance m	Field strength		Distance m	Field strength $\text{dB}\mu\text{V/m(QP)}$
		$\mu\text{V/m}$	$\text{dB}\mu\text{V/m(QP)}$		
30-88	3	100	40.0	10	30.0
88-216	3	150	43.5	10	33.5
216-960	3	200	46.0	10	36.0
960-1000	3	500	54.0	10	44.0
Above 1000	3	74.0 $\text{dB}\mu\text{V/m (PK)}$ 54.0 $\text{dB}\mu\text{V/m (AV)}$		/	/

15.205 Restricted bands:

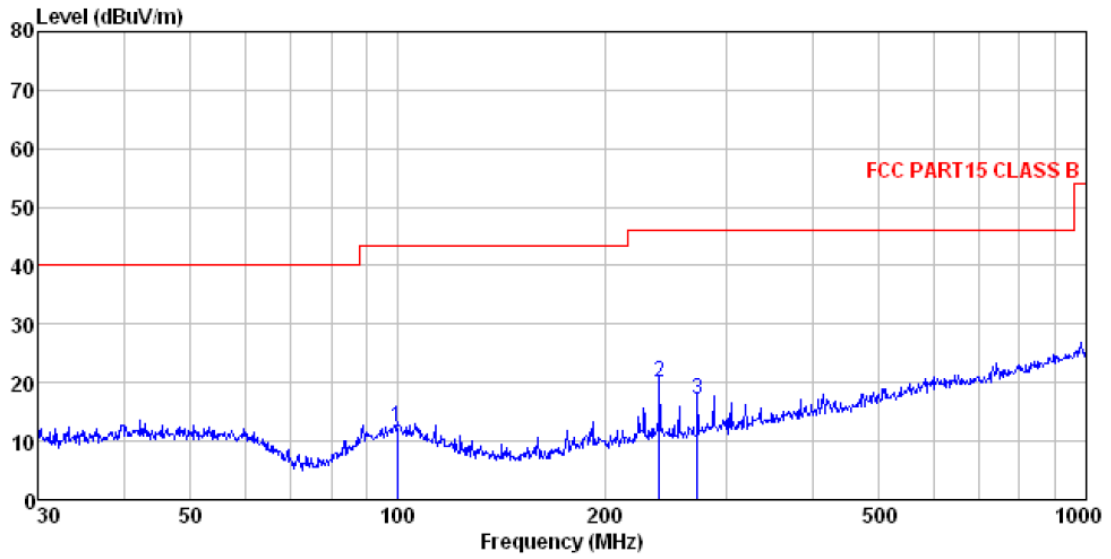
MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	( <sup>2</sup> )
13.36 - 13.41			

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup> Above 38.6



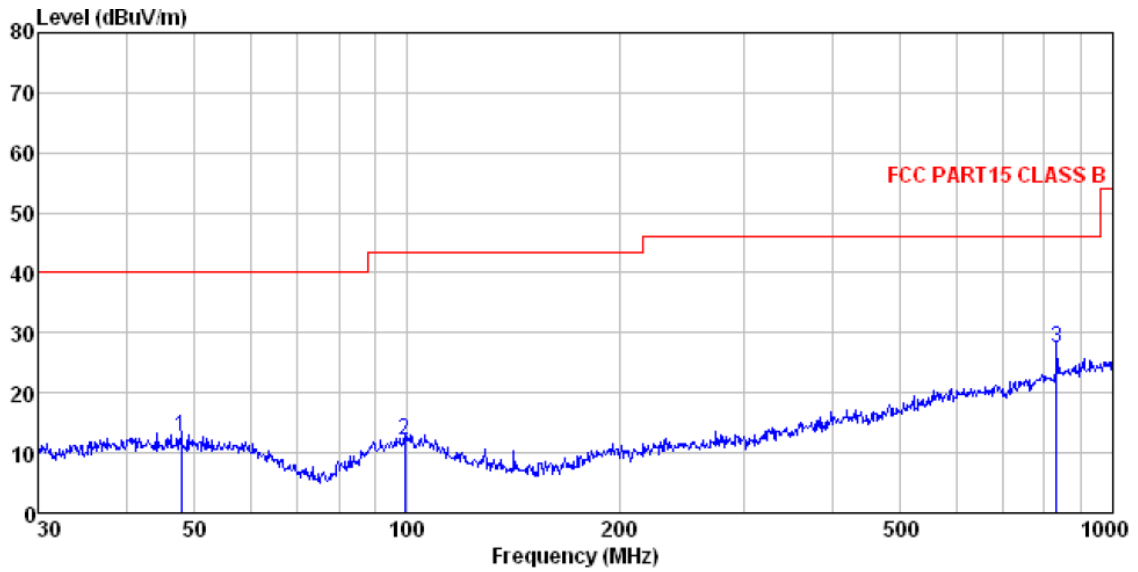
5.3.1 Diagram 5-1



Site : 3m chamber  
 Condition : FCC PART15 CLASS B 3m VULB9163-2013M HORIZONTAL  
 Job No. : 0276RF  
 Test Mode : TX-2404MHz  
 Test Engineer: Chen

	Read	Antenna	Cable	Preamp	Limit	Over		
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB	
1	99.878	25.70	15.16	1.19	29.70	12.35	43.50	-31.15 QP
2	239.987	33.33	14.09	2.07	29.56	19.93	46.00	-26.07 QP
3	272.278	30.11	14.46	2.24	29.81	17.00	46.00	-29.00 QP

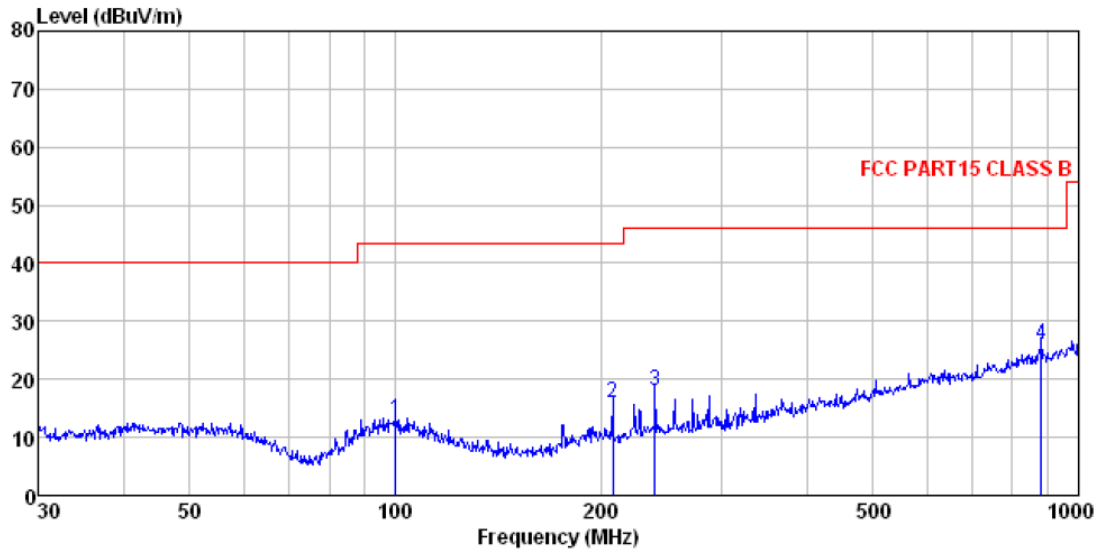
5.3.2 Diagram 5-2



Site : 3m chamber  
 Condition : FCC PART15 CLASS B 3m VULB9163-2013M VERTICAL  
 Job No. : 0276RF  
 Test Mode : TX-2404MHz  
 Test Engineer: Chen

	Read	Antenna	Cable	Preamp	Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line	Limit Remark
MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB
1	47.826	26.45	15.38	0.75	30.01	12.57	40.00 -27.43 QP
2	99.180	25.56	15.13	1.18	29.70	12.17	43.50 -31.33 QP
3	833.317	29.75	22.42	4.58	29.17	27.58	46.00 -18.42 QP

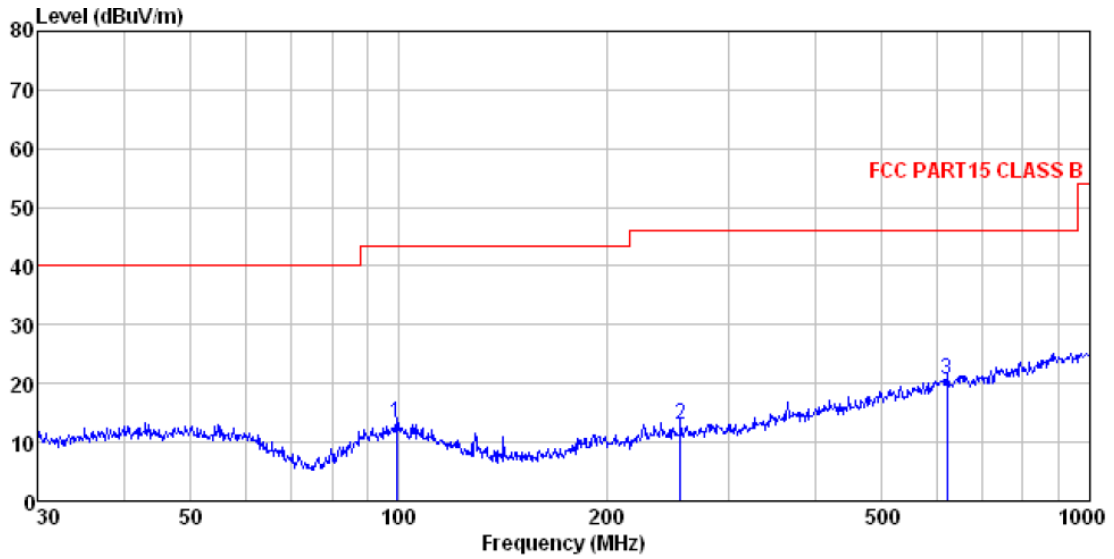
5.3.3 Diagram 5-3



Site : 3m chamber  
 Condition : FCC PART15 CLASS B 3m WULB9163-2013M HORIZONTAL  
 Job No. : 0276RF  
 Test Mode : TX-2442MHz  
 Test Engineer: Chen

	Read	Antenna	Cable	Preamp	Limit	Over	
Freq	Level	Factor	Loss	Factor	Line	Limit	Remark
MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB
1	100.229	26.31	15.11	1.19	29.70	12.91	43.50 -30.59 QP
2	207.850	30.43	12.80	1.89	29.28	15.84	43.50 -27.66 QP
3	239.987	31.37	14.09	2.07	29.56	17.97	46.00 -28.03 QP
4	881.407	27.44	22.91	4.79	29.12	26.02	46.00 -19.98 QP

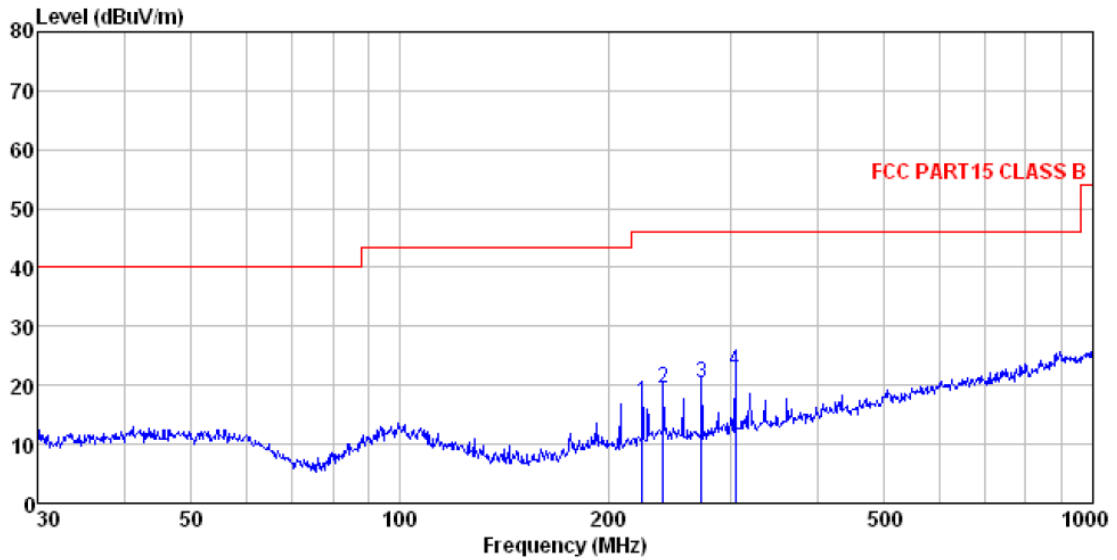
5.3.4 Diagram 5-4



Site : 3m chamber  
 Condition : FCC PART15 CLASS B 3m VULB9163-2013M VERTICAL  
 Job No. : 0276RF  
 Test Mode : TX-2442MHz  
 Test Engineer: Chen

	Read	Antenna	Cable	Preamp	Level	Limit	Over	
Freq	Level	Factor	Loss	Factor	Line	Line	Limit	Remark
MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB	
1	99.180	26.68	15.13	1.18	29.70	13.29	43.50	-30.21 QP
2	255.623	26.47	14.06	2.15	29.68	13.00	46.00	-33.00 QP
3	620.710	25.61	20.53	3.80	29.28	20.66	46.00	-25.34 QP

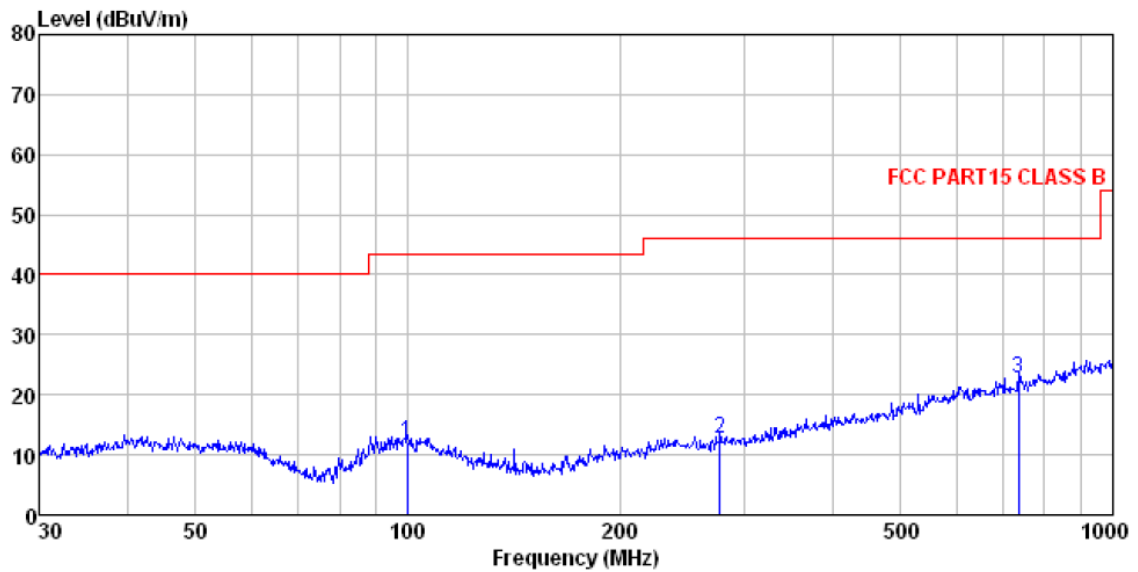
5.3.5 Diagram 5-5



Site : 3m chamber  
 Condition : FCC PART15 CLASS B 3m VULB9163-2013M HORIZONTAL  
 Job No. : 0276RF  
 Test Mode : TX-2480MHz  
 Test Engineer: Chen

	ReadAntenna	Cable	Preamp	Limit	Over			
Freq	Level	Loss	Factor	Line	Limit	Remark		
MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB	
1	223.733	31.18	13.36	1.98	29.43	17.09	46.00	-28.91 QP
2	239.987	32.84	14.09	2.07	29.56	19.44	46.00	-26.56 QP
3	272.278	33.48	14.46	2.24	29.81	20.37	46.00	-25.63 QP
4	304.610	34.94	15.13	2.38	29.97	22.48	46.00	-23.52 QP

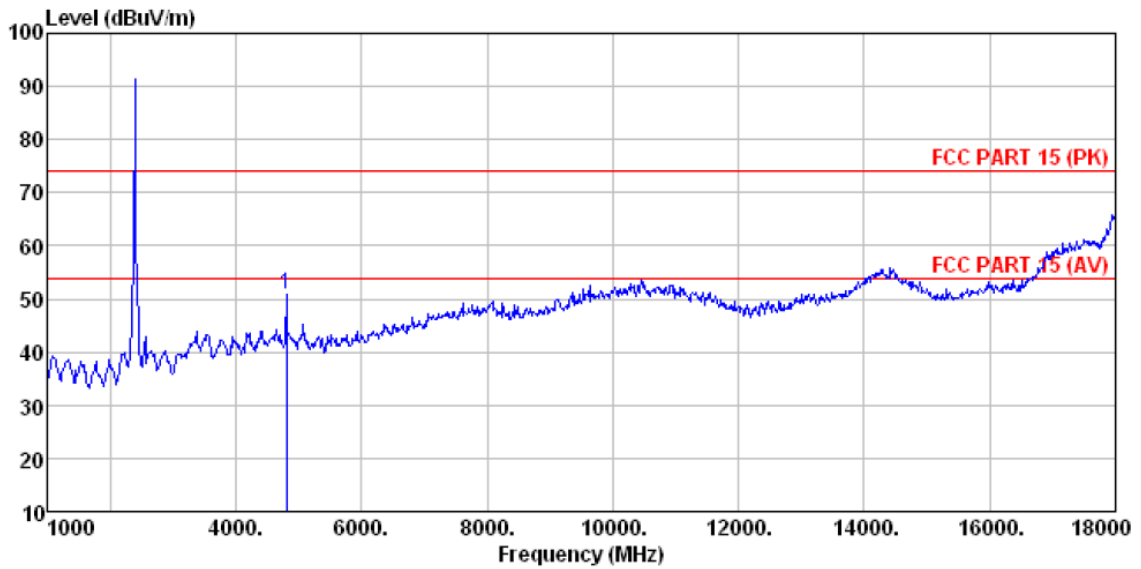
### 5.3.6 Diagram 5-6



Site : 3m chamber  
 Condition : FCC PART15 CLASS B 3m VULB9163-2013M VERTICAL  
 Job No. : 0276RF  
 Test Mode : TX-2480MHz  
 Test Engineer: Chen

	Read	Antenna	Cable	Preamp	Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line	Limit Remark
MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB
1	99.878	25.52	15.16	1.19	29.70	12.17	43.50 -31.33 QP
2	277.094	25.68	14.59	2.25	29.84	12.68	46.00 -33.32 QP
3	734.491	26.44	21.24	4.22	29.20	22.70	46.00 -23.30 QP

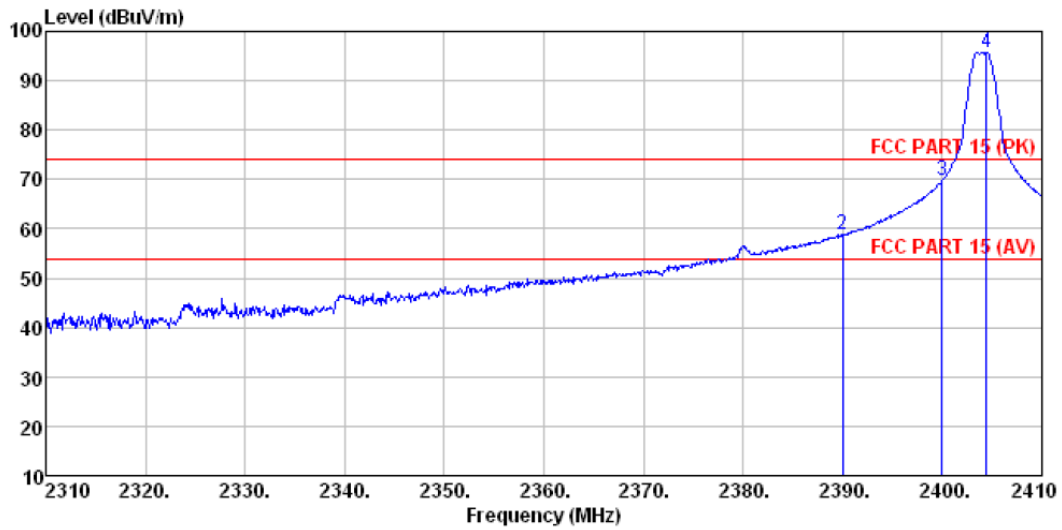
5.3.7 Diagram 5-7



Site : 3m chamber  
 Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL  
 Job No. : 0276RF  
 Test Mode : TX-2404MHz  
 Test Engineer: Chen

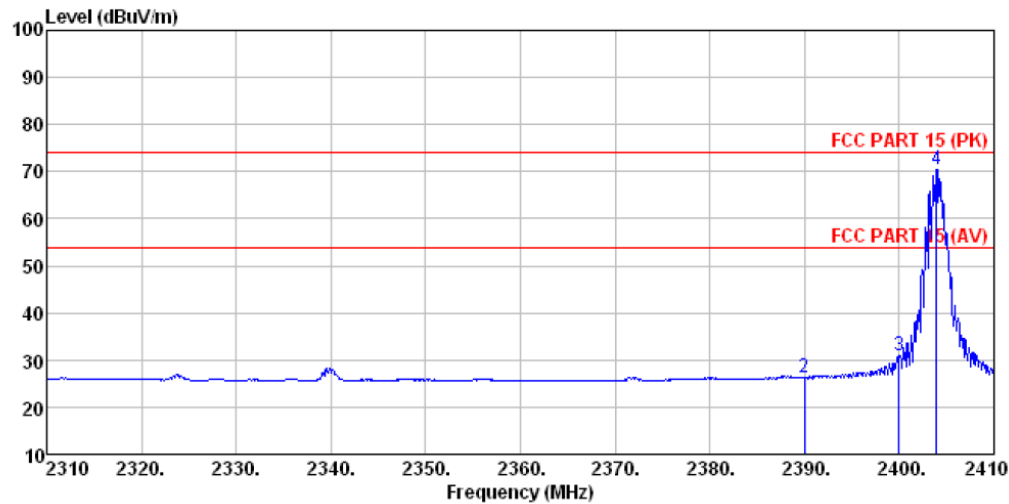
	Read	Antenna	Cable	Preamp	Limit	Over	
Freq	Level	Factor	Loss	Factor	Line	Limit	Remark
MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB
1 4808.000	42.43	31.78	8.60	32.09	50.72	74.00	-23.28 Peak

Remark: Peak result is less than AV limit, then only peak result is reported.



Site : 3m chamber  
 Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL  
 Job No. : 0276RF  
 Test Mode : TX-2404MHz  
 Test Engineer: Chen

	ReadAntenna	Cable Preamp	Limit	Over					
Freq	Level	Loss	Line	Limit	Remark				
MHz	dBm	dB/m	dB	dBm/m	dBm/m				
1	2310.000	39.61	27.91	5.30	34.11	38.71	74.00	-35.29	Peak
2	2390.000	59.93	27.59	5.38	34.01	58.89	74.00	-15.11	Peak
3	2400.000	70.93	27.58	5.39	34.01	69.89	74.00	-4.11	Peak
4 *	2404.400	96.75	27.57	5.40	33.99	95.73	114.00	-18.27	Peak

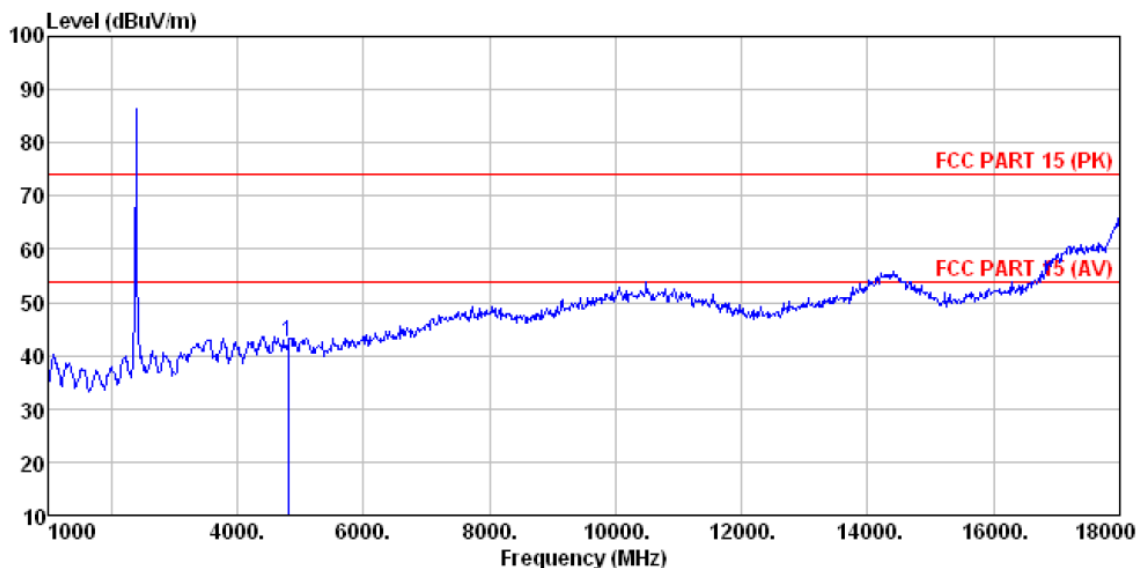


Site : 3m chamber  
 Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL  
 Job No. : 0276RF  
 Test Mode : TX-2404MHz  
 Test Engineer: Chen

	ReadAntenna	Cable Preamp	Limit	Over					
Freq	Level	Loss	Line	Limit	Remark				
MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m				
1	2310.000	26.84	27.91	5.30	34.11	25.94	54.00	-28.06	Average
2	2390.000	27.15	27.59	5.38	34.01	26.11	54.00	-27.89	Average
3	2400.000	31.90	27.58	5.39	34.01	30.86	54.00	-23.14	Average
4 *	2403.900	71.61	27.57	5.39	33.99	70.58	94.00	-23.42	Average



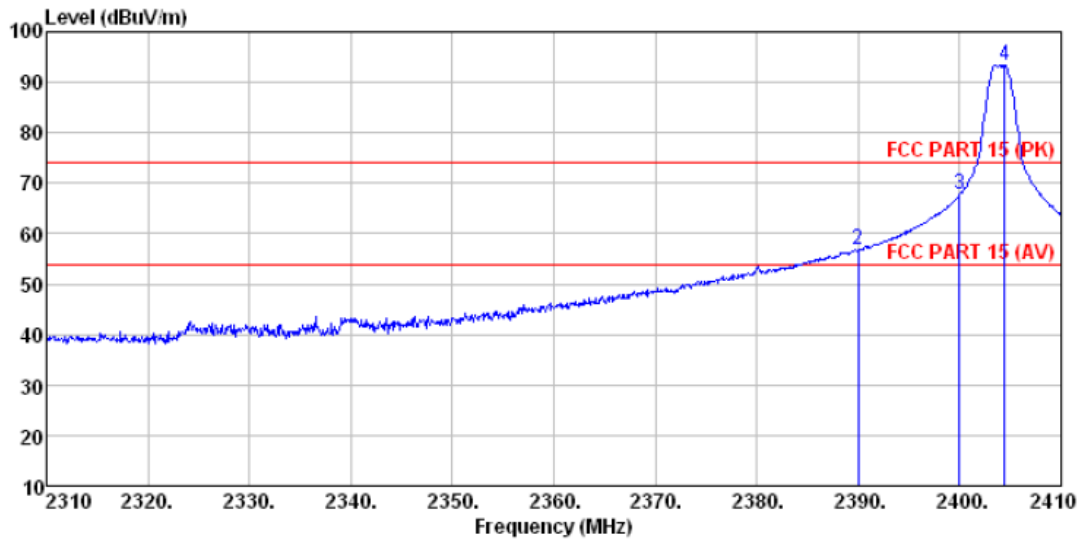
5.3.8 Diagram 5-8



Site : 3m chamber  
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL  
Job No. : 0276RF  
Test Mode : TX-2404MHz  
Test Engineer: Chen

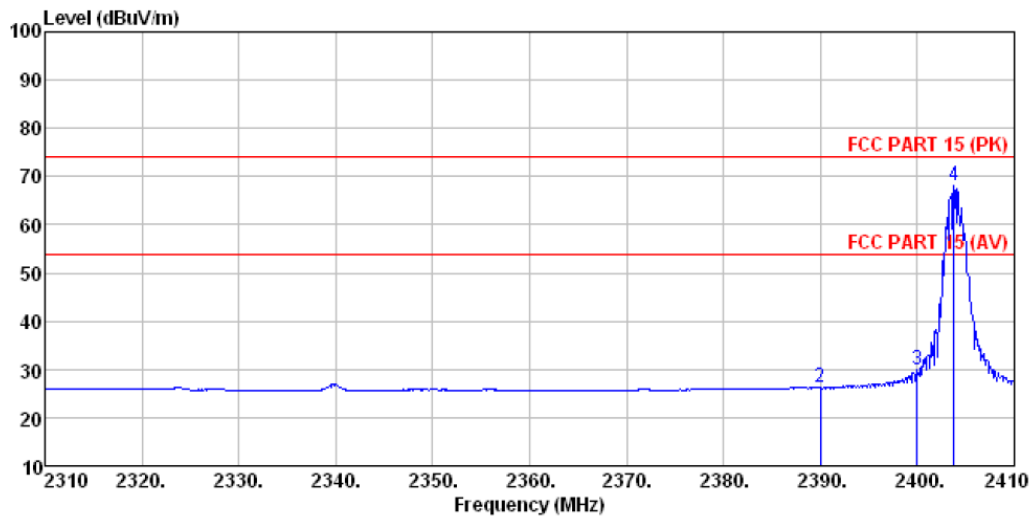
	Read	Antenna	Cable	Preamp	Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line	Limit
MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB
1 4808.000	34.24	31.78	8.60	32.09	42.53	74.00	-31.47 Peak

Remark: Peak result is less than AV limit, then only peak result is reported.



Site : 3m chamber  
 Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL  
 Job No. : 0276RF  
 Test Mode : TX-2404MHz  
 Test Engineer: Chen

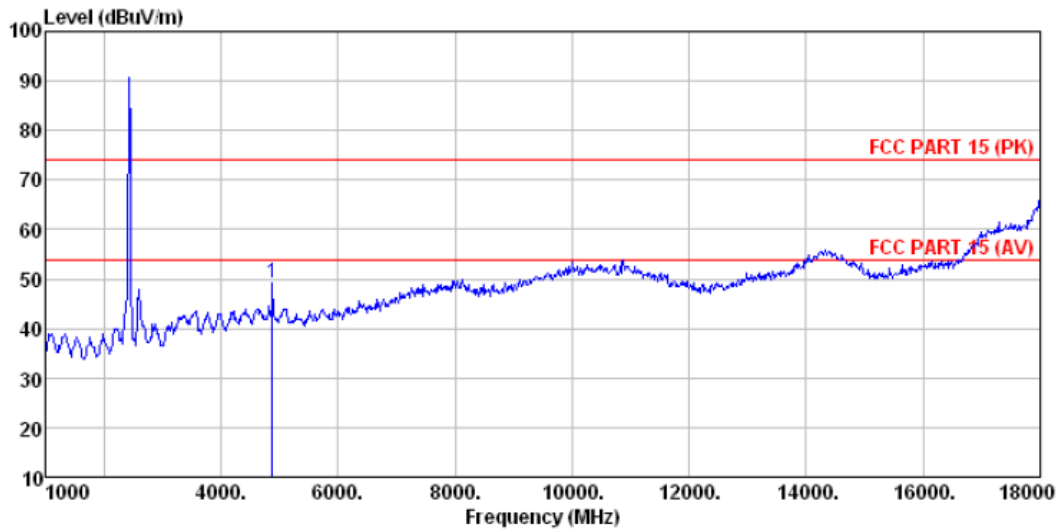
	ReadAntenna	Cable Preamp	Limit	Over					
Freq	Level Factor	Loss Factor	Line	Limit	Remark				
MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB		
1	2310.000	39.97	27.91	5.30	34.11	39.07	74.00	-34.93	Peak
2	2390.000	57.75	27.59	5.38	34.01	56.71	74.00	-17.29	Peak
3	2400.000	68.74	27.58	5.39	34.01	67.70	74.00	-6.30	Peak
4 *	2404.400	94.29	27.57	5.40	33.99	93.27	114.00	-20.73	Peak



Site : 3m chamber  
 Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL  
 Job No. : 0276RF  
 Test Mode : TX-2404MHz  
 Test Engineer: Chen

	ReadAntenna	Cable Preamp	Limit	Over					
Freq	Level Factor	Loss Factor	Line	Limit	Remark				
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2310.000	26.90	27.91	5.30	34.11	26.00	54.00	-28.00	Average
2	2390.000	27.35	27.59	5.38	34.01	26.31	54.00	-27.69	Average
3	2400.000	31.04	27.58	5.39	34.01	30.00	54.00	-24.00	Average
4 *	2403.800	69.14	27.57	5.39	33.99	68.11	94.00	-25.89	Average

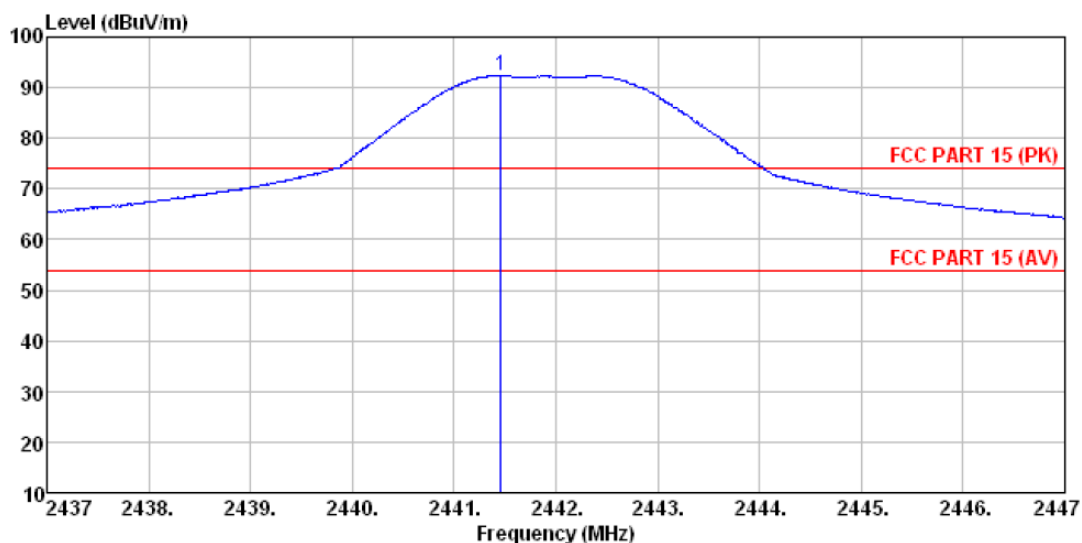
### 5.3.9 Diagram 5-9



Site : 3m chamber  
 Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL  
 Job No. : 0276RF  
 Test Mode : TX-2442MHz  
 Test Engineer: Chen

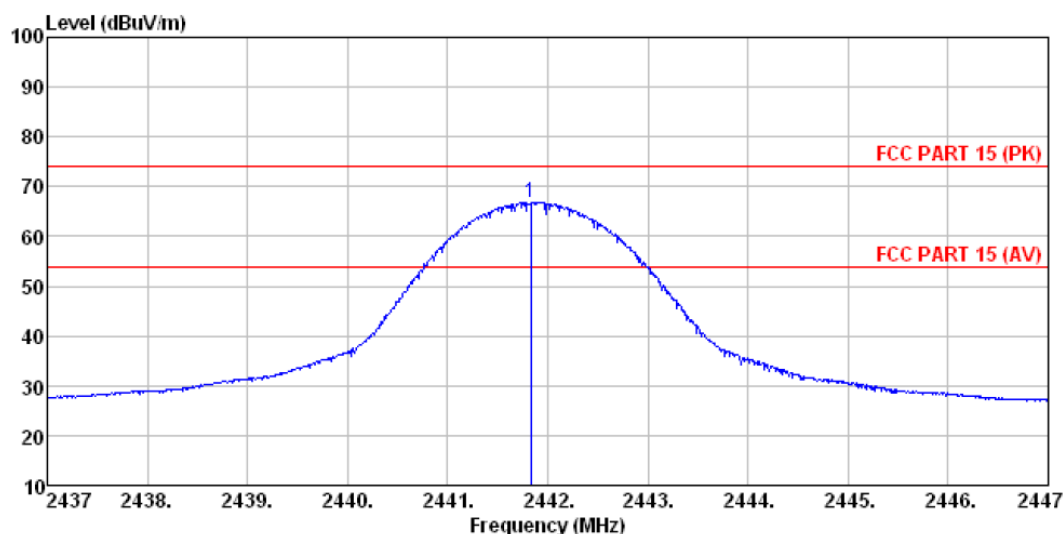
	Read	Antenna	Cable	Preamp	Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line	Limit Remark
MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB
1 4876.000	40.68	31.85	8.66	32.12	49.07	74.00	-24.93 Peak

Remark: Peak result is less than AV limit, then only peak result is reported.



Site : 3m chamber  
 Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL  
 Job No. : 0276RF  
 Test Mode : TX-2442MHz  
 Test Engineer: Chen

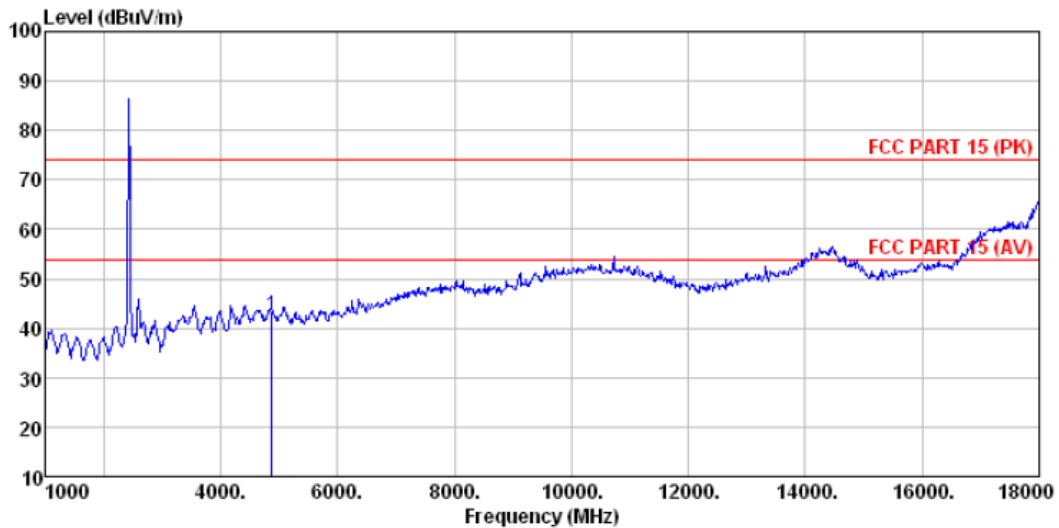
Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1 * 2441.460	93.39	27.48	5.43	33.96	92.34	114.00	-21.66	Peak



Site : 3m chamber  
 Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL  
 Job No. : 0276RF  
 Test Mode : TX-2442MHz  
 Test Engineer: Chen

Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1 * 2441.830	67.90	27.48	5.43	33.96	66.85	94.00	-27.15	Average

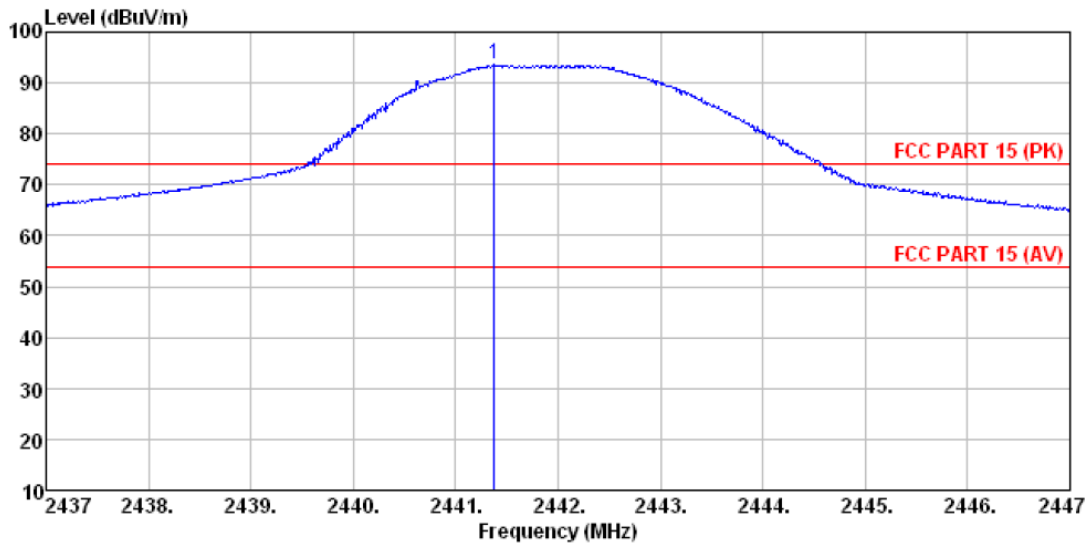
### 5.3.10 Diagram 5-10



Site : 3m chamber  
 Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL  
 Job No. : 0276RF  
 Test Mode : TX-2442MHz  
 Test Engineer: Chen

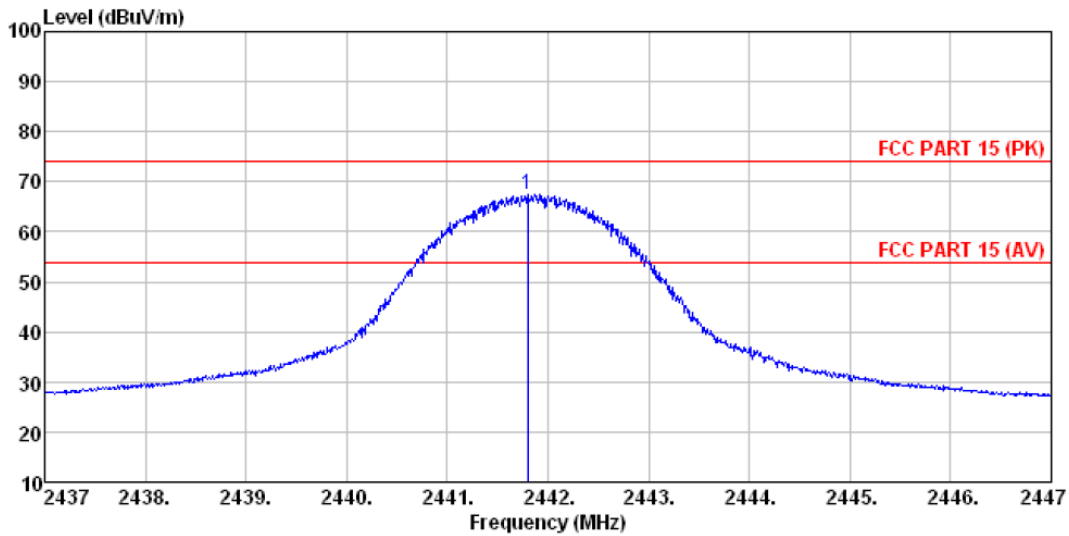
	Read	Antenna	Cable	Preamp	Level	Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB	
1	4876.000	34.13	31.85	8.66	32.12	42.52	74.00	-31.48 Peak

Remark: Peak result is less than AV limit, then only peak result is reported.



Site : 3m chamber  
 Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL  
 Job No. : 0276RF  
 Test Mode : TX-2442MHz  
 Test Engineer: Chen

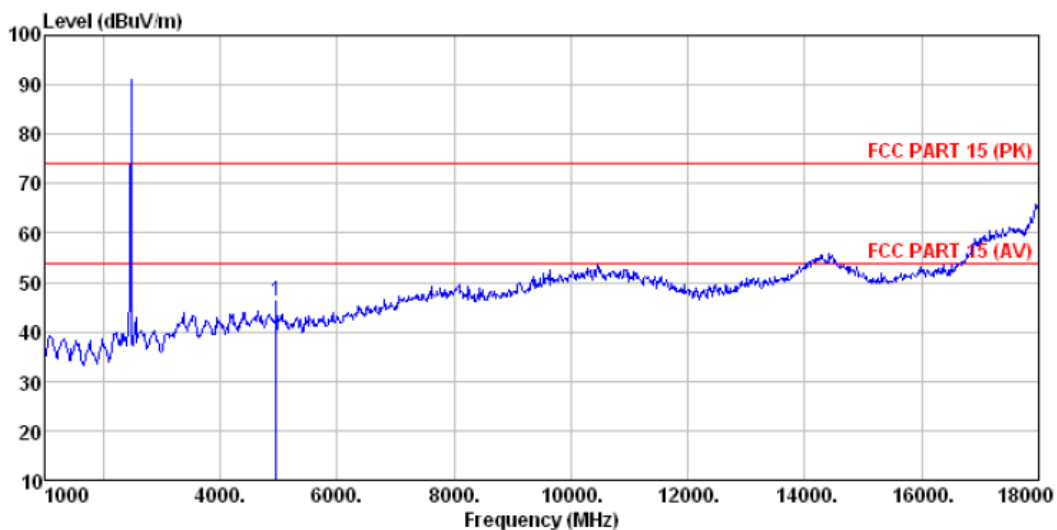
Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Loss	Level	Limit	Over	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1 * 2441.380	94.61	27.48	5.43	33.96	93.56	114.00	-20.44	Peak



Site : 3m chamber  
 Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL  
 Job No. : 0276RF  
 Test Mode : TX-2442MHz  
 Test Engineer: Chen

Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Loss	Level	Limit	Over	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1 * 2441.800	68.49	27.48	5.43	33.96	67.44	94.00	-26.56	Average

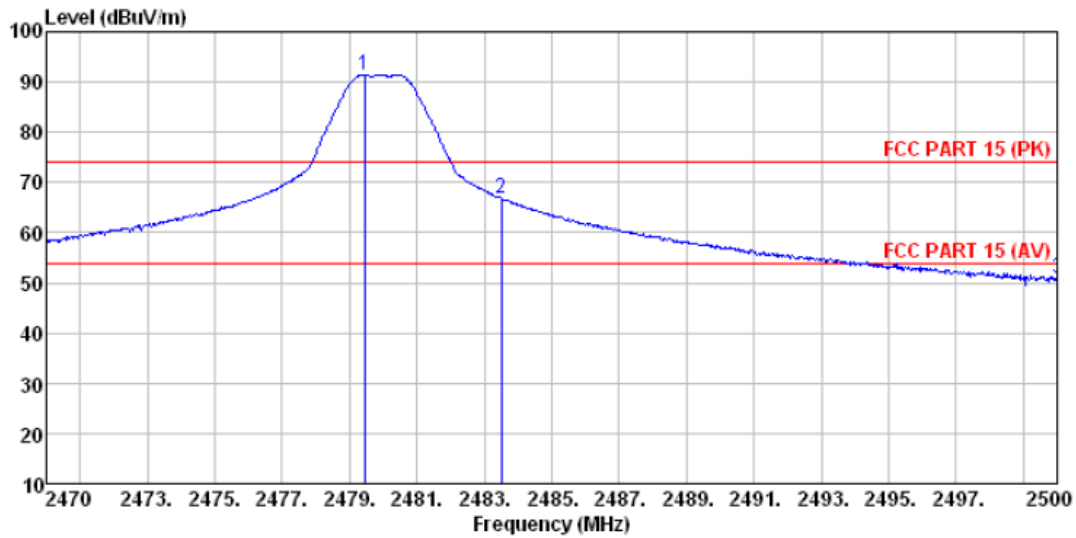
### 5.3.11 Diagram 5-11



Site : 3m chamber  
 Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL  
 Job No. : 0278RF  
 Test Mode : TX-2480MHz  
 Test Engineer: Chen

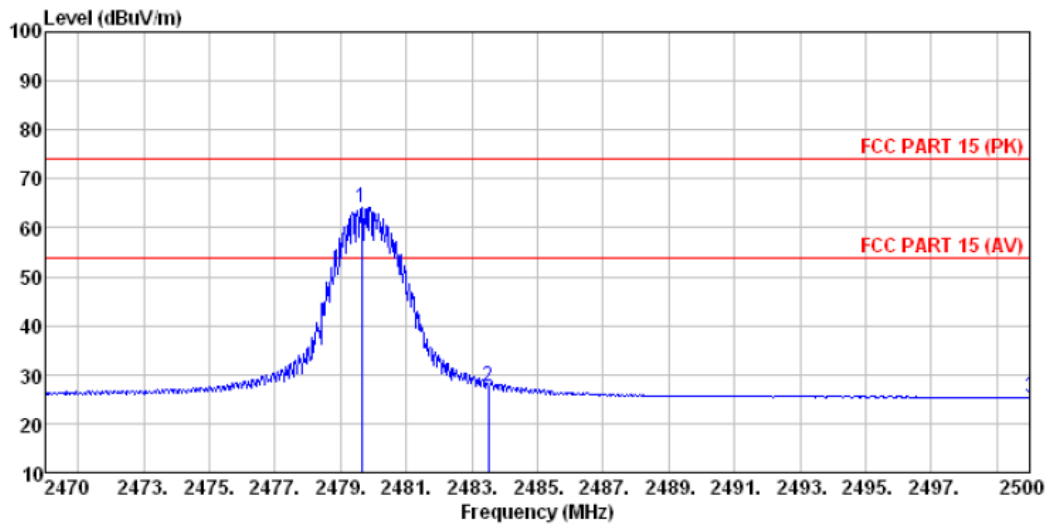
	Read	Antenna	Cable	Preamp	Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line	Limit Remark
MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB
1 4961.000	37.82	31.93	8.73	32.16	46.32	74.00	-27.68 Peak

Remark: Peak result is less than AV limit, then only peak result is reported.



Site : 3m chamber  
 Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL  
 Job No. : 0276RF  
 Test Mode : TX-2480MHz  
 Test Engineer: Chen

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Gain	Level	Limit	Over	Remark
MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB	
1 *	2479.450	92.43	27.52	5.47	33.92	91.50	114.00	-22.50 Peak
2	2483.500	67.80	27.53	5.47	33.92	66.88	74.00	-7.12 Peak
3	2500.000	51.72	27.55	5.49	33.90	50.86	74.00	-23.14 Peak

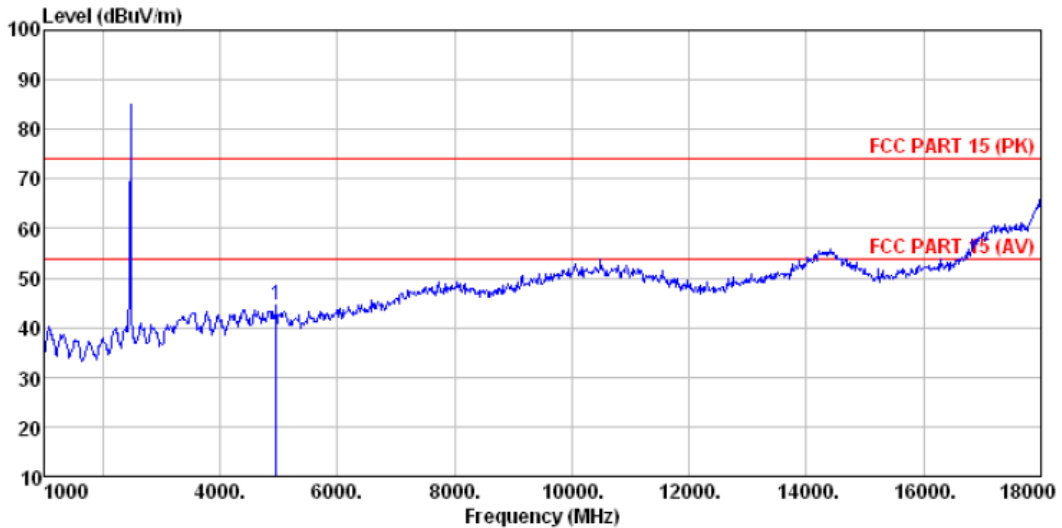


Site : 3m chamber  
 Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL  
 Job No. : 0276RF  
 Test Mode : TX-2480MHz  
 Test Engineer: Chen

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Gain	Level	Limit	Over	Remark
MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB	
1 *	2479.630	65.08	27.52	5.47	33.92	64.15	94.00	-29.85 Average
2	2483.500	28.55	27.53	5.47	33.92	27.63	54.00	-26.37 Average
3	2500.000	26.15	27.55	5.49	33.90	25.29	54.00	-28.71 Average



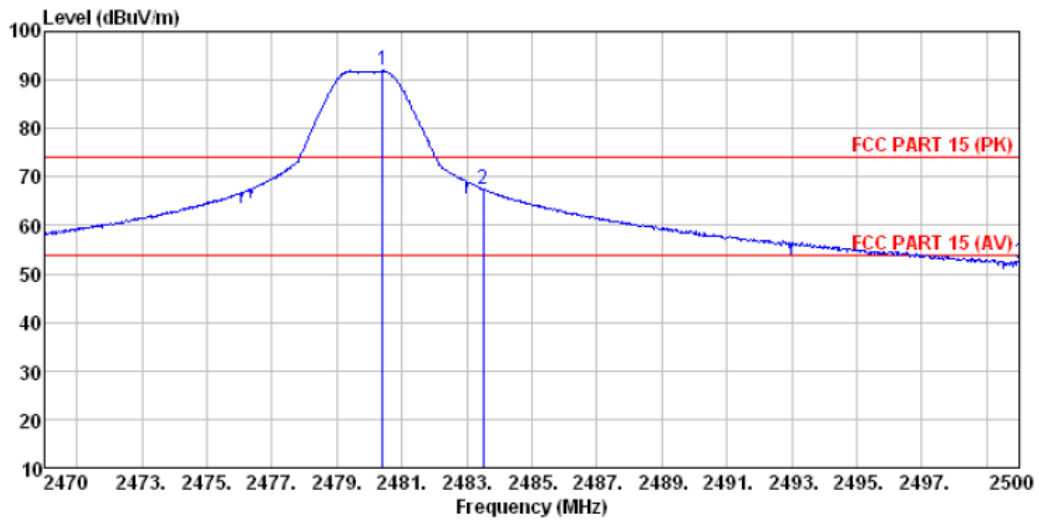
### 5.3.12 Diagram 5-12



Site : 3m chamber  
 Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL  
 Job No. : 0278RF  
 Test Mode : TX-2480MHz  
 Test Engineer: Chen

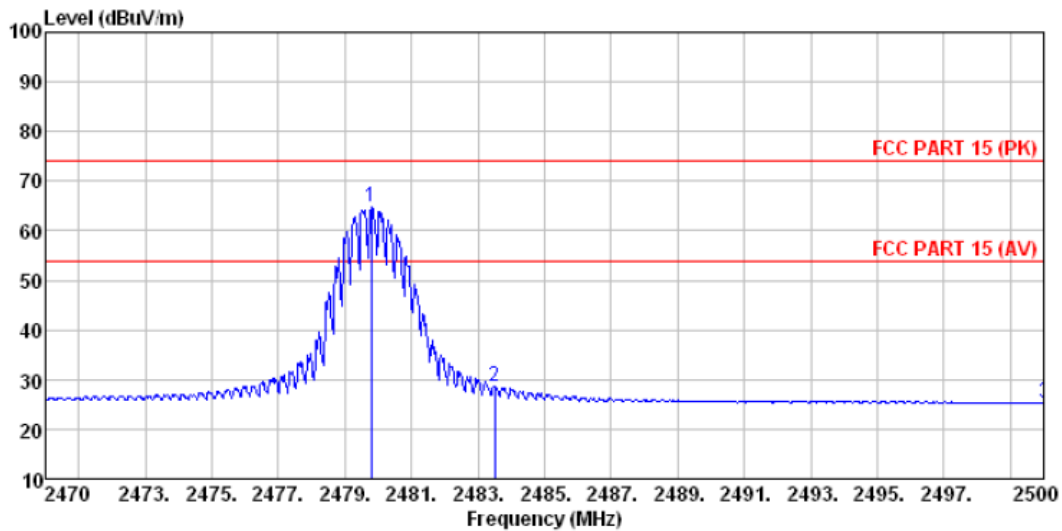
	Read	Antenna	Cable	Preamp	Level	Limit	Over	
Freq	Level	Factor	Loss	Factor	Line	Line	Limit	Remark
MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB	
1	4961.000	35.96	31.93	8.73	32.16	44.46	74.00	-29.54 Peak

Remark: Peak result is less than AV limit, then only peak result is reported.



Site : 3m chamber  
 Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL  
 Job No. : 0276RF  
 Test Mode : TX-2480MHz  
 Test Engineer: Chen

Peak	Freq	ReadAntenna Level	Antenna Factor	Cable Loss Factor	Preamp Loss Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB	
1 *	2480.410	92.81	27.52	5.47	33.92	91.88	114.00	-22.12	Peak
2	2483.500	68.49	27.53	5.47	33.92	67.57	74.00	-6.43	Peak
3	2500.000	53.07	27.55	5.49	33.90	52.21	74.00	-21.79	Peak



Site : 3m chamber  
 Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL  
 Job No. : 0276RF  
 Test Mode : TX-2480MHz  
 Test Engineer: Chen

Peak	Freq	ReadAntenna Level	Antenna Factor	Cable Loss Factor	Preamp Loss Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB	
1 *	2479.780	65.65	27.52	5.47	33.92	64.72	94.00	-29.28	Average
2	2483.500	29.41	27.53	5.47	33.92	28.49	54.00	-25.51	Average
3	2500.000	26.16	27.55	5.49	33.90	25.30	54.00	-28.70	Average

## 6. 20dB Bandwidth Test

### 6.1 Test Procedure

#### Section 15.215 (c):

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

1. Set resolution bandwidth (RBW) = 100 kHz.
2. Set the video bandwidth (VBW) >= RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

### 6.2 Measurement Equipment

	Equipment	Calibration due	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	Spectrum	Jul. 04 2015	FSP30	GTS208	RS

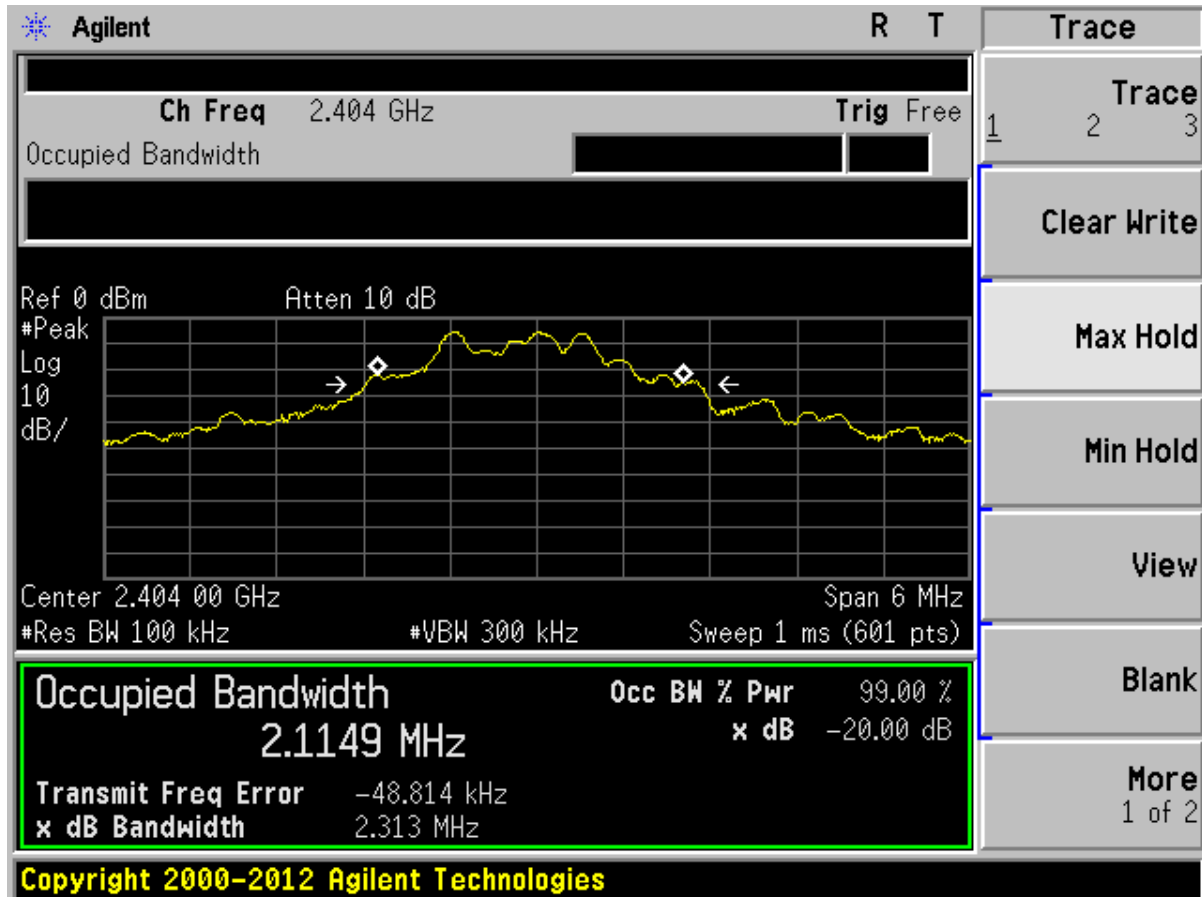
### 6.3 Test Result

Remark : Conducted measurement.

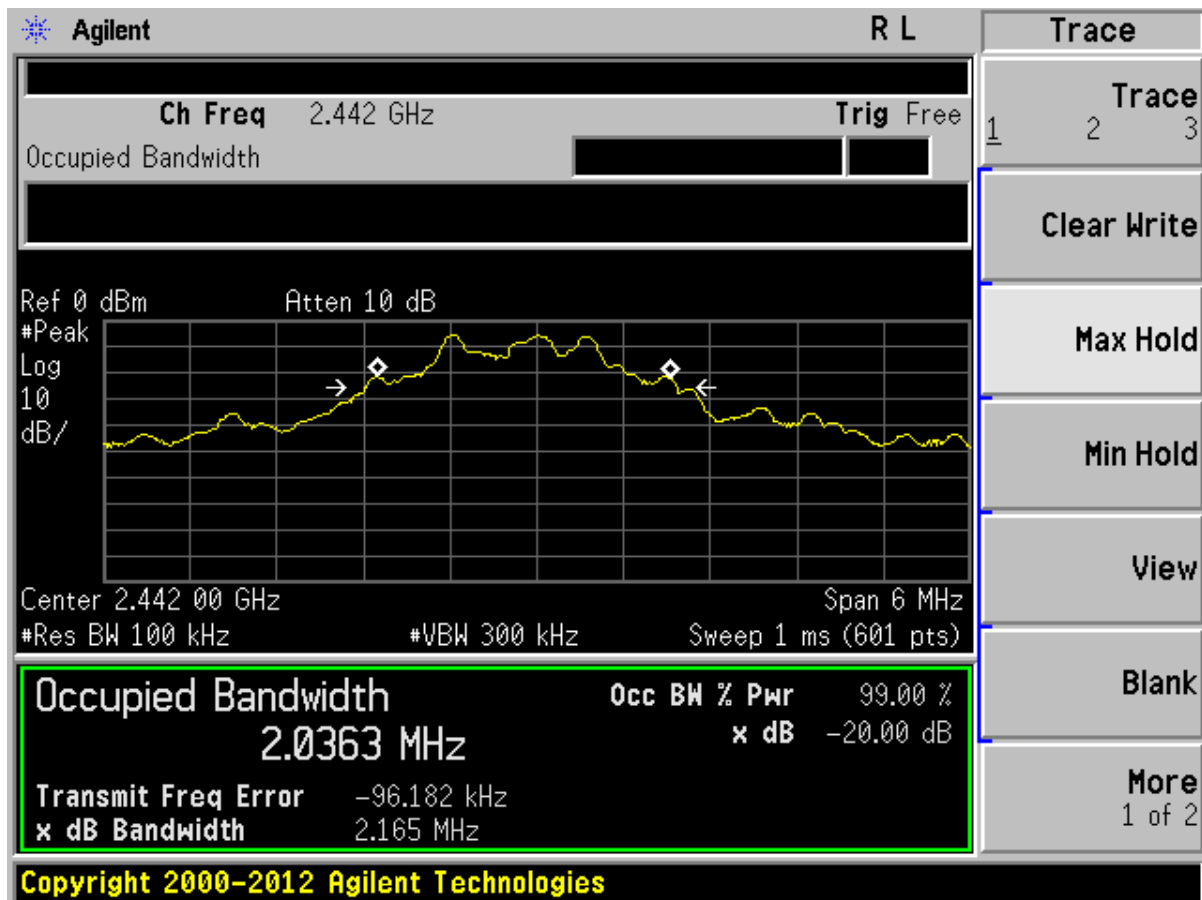
#### 20dB Bandwidth:

GFSK			
Channel	Diagram	20dB bandwidth (MHz)	Result
CH LOW	6-1	2.313	PASS
CH MID	6-2	2.165	PASS
CH HIGH	6-3	2.174	PASS

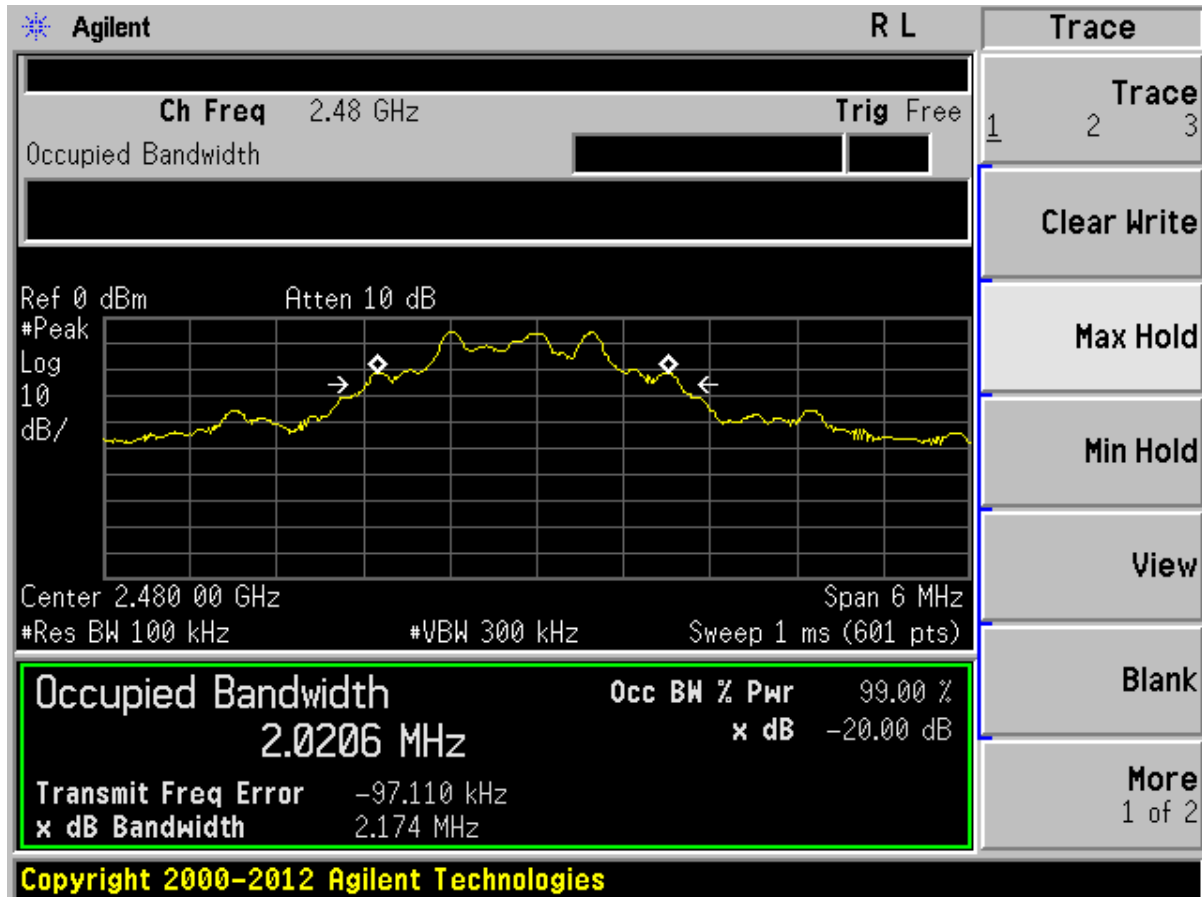
6.3.1 Diagram 6-1



6.3.2 Diagram 6-2



6.3.3 Diagram 6-3



## **7. Antenna requirement**

### **7.1 Requirement**

For intentional device, according to FCC 47 CFR Section 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.

### **7.2 Result**

The antenna used for this product is Internal Print PCB antenna that no antenna other than that furnished by the responsible party shall be used with the device.

The maximum peak gain of this antenna is 0dBi.

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