
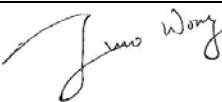
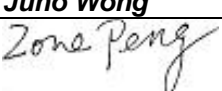


FCC Test Report

FCC EVALUATION REPORT FOR CERTIFICATION	
Project Reference No.	289647
Product	Portable Bluetooth Speaker
Brand Name	N.A
Model	Big Blue Unplugged
Alternate Model	N.A
Tested according to	FCC Rules and Regulations Part 15 Subpart C 2014 15.247, ANSI C63.4-2014

Tested in period	2015-07-10 to 2015-07-15
Issued date	2015-07-16
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	 <div style="text-align: right;">2015/7/17</div> <div style="text-align: right;">Juno Wong <i>date</i></div>
Verified by	 <div style="text-align: right;">2015/7/17</div> <div style="text-align: right;">Zone Peng <i>date</i></div>

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1. Client Information

1.1 Applicant

Company Name:	Plastoform Industries Ltd.
Company Address:	Rm. 902-4 Seapower Center, 73 Lei Muk Road, Kwai Chung, Hong Kong

1.2 Manufacturer

Company Name:	Plastoform Industries Ltd.
Company Address:	Rm. 902-4 Seapower Center, 73 Lei Muk Road, Kwai Chung, Hong Kong

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.



2. Equipment under Test (EUT)

2.1 Identification of EUT

Category:	DTS
Model Name:	Big Blue Unplugged
Alternate model:	N/A
Brand name:	N/A
Technical data (Rating, etc.):	As below

2.2 Detail spec:

Carrier Frequency: 2402MHz~2480MHz

Number of Channel: 40

Output Power: 5.47 dBm

Modulation Type: Bluetooth V4.0 (GFSK)

Mode of operation (duplex, simplex, half duplex) : duplex

Antenna Type: Intergral Antenna

Antenna gain: 0 dBi

Rating(s): Li-ion Rechargeable Battery: 7.4V, 600mAh

Adapter: AC ADAPTER

Model : SHF1500200AWA

Input: 100V-240VAC 50/60Hz 0.8A

Output: 15.0VDC 2.0A

2.3 Additional Information Related to Testing

CH Low: 2402MHz

CH Mid: 2442MHz

CH High: 2480MHz

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

CENTRE TESTING INTERNATIONAL CORPORATION – ELA 503

Build C, Hongwei Industrial Zone, Baoan 70 District, Shenzhen, China

FCC-Registration No.: 510007

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	20-25°C	15 – 35 °C
Relative humidity	45-55%	30 - 60%
Atmospheric pressure	101.2 kPa -101.3kPa	86-106kPa

3.3 Operating During Test

Test mode: 120V 60Hz

TM1 : continuance TX MODE

Remark : When measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, have been performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. No findable change appear.

And only choose the worse mode to be the representative test mode

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

5.1 Test Procedure

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.

For below 1GHz

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

For above 1GHz. The frequency range from 1GHz to 25GHz(10th harmonics) is checked.

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

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

5.2 Measurement Equipment

For below 1G testing in ELA 503:

	Equipment	Calibration Due	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	Spectrum Analyzer	07/06/2016	E4440A	MY46185649	Agilent
<input checked="" type="checkbox"/>	Biconilog Antenna	07/06/2016	3142C	00044562	ETS-LINGREN
<input checked="" type="checkbox"/>	Multi device Controller	07/06/2016	2090	00057230	ETS-LINGREN
<input checked="" type="checkbox"/>	Microwave Preamplifier	07/06/2016	8449B	3008A02425	Agilent
<input checked="" type="checkbox"/>	Log.-per. Antenna	07/06/2016	VUSLP 9111B	9111B-088	schwarzbeck

For above 1G testing in ELA 632:

	Equipment	Calibration Due	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	EMI Test Receiver	Jul. 04 2016	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 2016	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, Spurious Emission can not be found .

For restriction band test :Only list the restriction band test which there found emission.

For other restriction band: no emission found.

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

Mode	Freq range	Test ANT polarity	Diagram	Test Result
TX MODE	30MHz-1GHz:	H	5-1	Pass
	30MHz-1GHz:	V	5-2	Pass

Mode	Freq range	Channel	Test ANT polarity	Diagram	Test Result
GFSK	1GHz-18GHz:	CH LOW	H	5-3	Pass
	1GHz-18GHz:	CH LOW	V	5-4	Pass
	1GHz-18GHz:	CH MID	H	5-5	Pass
	1GHz-18GHz:	CH MID	V	5-6	Pass
	1GHz-18GHz:	CH HIGH	H	5-7	Pass
	1GHz-18GHz:	CH HIGH	V	5-8	Pass

Remark:

1. If PK value is lower than AV limit , then Both PK and AV deem to comply their own limit, and then only list the peak result in the report.
2. All modes of operation were investigated and the worst -case emission mode are reported.
3. 18GHz to 25GHz are tested, but no emission found.

Restriction band worse case :

Connect mode	Antenna Polarity	Diagram	Test Result
GFSK CH LOW	Horizontal	5-9	Pass
	Vertical	5-10	Pass
GFSK CH HIGH	Horizontal	5-11	Pass
	Vertical	5-12	Pass

Remark: All restriction band have been tested at both CHL and H with GFSK modulation , only reported the worse case.

NOTES:

1. All modes were measured and only the worst case emission was reported.
2. H =Horizontal V=Vertical
3. Emission = Reading +Antenna Factor + Cable Loss –Amp Factor
4. Emission level dB μ V = 20 log Emission level μ V/m
5. The lower limit shall apply at the transition frequencies
6. All the emissions appearing within 15.205 Restricted bands shall not exceed the limits shown in (15.209 limit)#.
7. Unwanted emissions not falling within restricted frequency bands shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits;

Remark :

The limit of “ # ” of 3 meter distance is

Frequency MHz	Distance m	Field strength		Distance m	Field strength
		μ V/m	dB μ V/m(QP)		dB μ 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 dB μ V/m (PK) 54.0 dB μ V/m (AV)		/	/

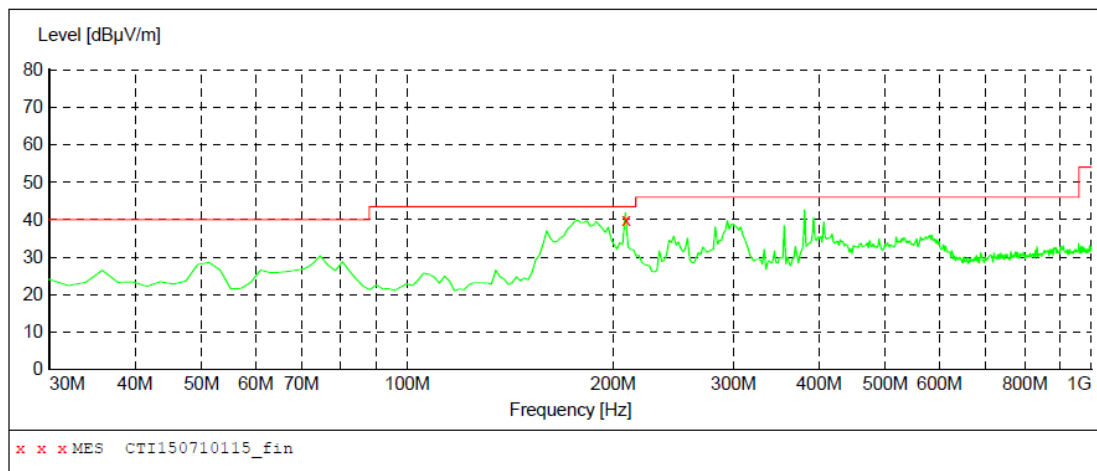
15.205 Restricted bands:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
1.0495-0.505	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	(2)
13.36-13.41			

¹Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

²Above 38.6

5.3.1 Diagram 5-1

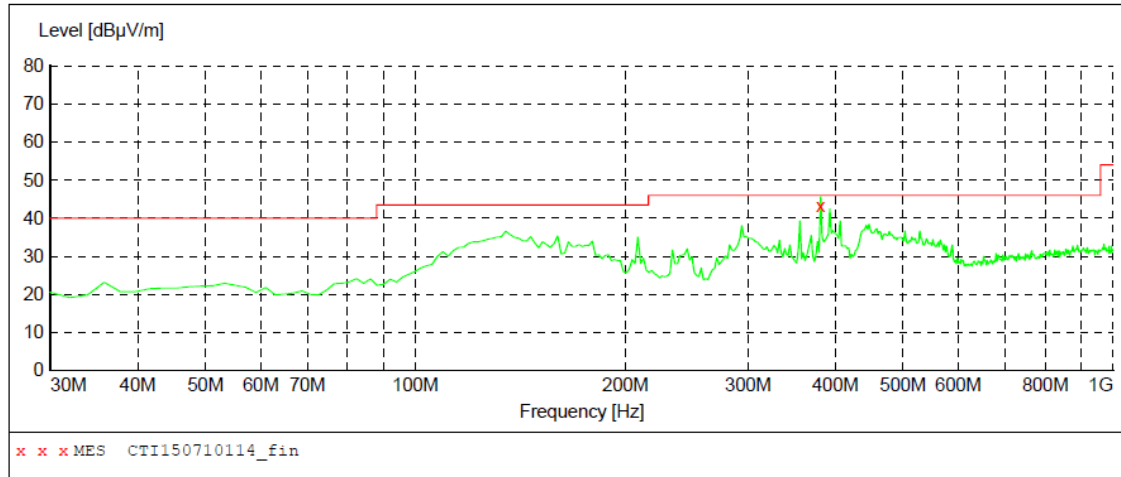


MEASUREMENT RESULT: "CTI150710115_fin"

10/07/2015 16:51

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
208.920000	39.90	14.5	43.5	3.6	QP	100.0	284.00	HORIZONTAL

5.3.2 Diagram 5-2

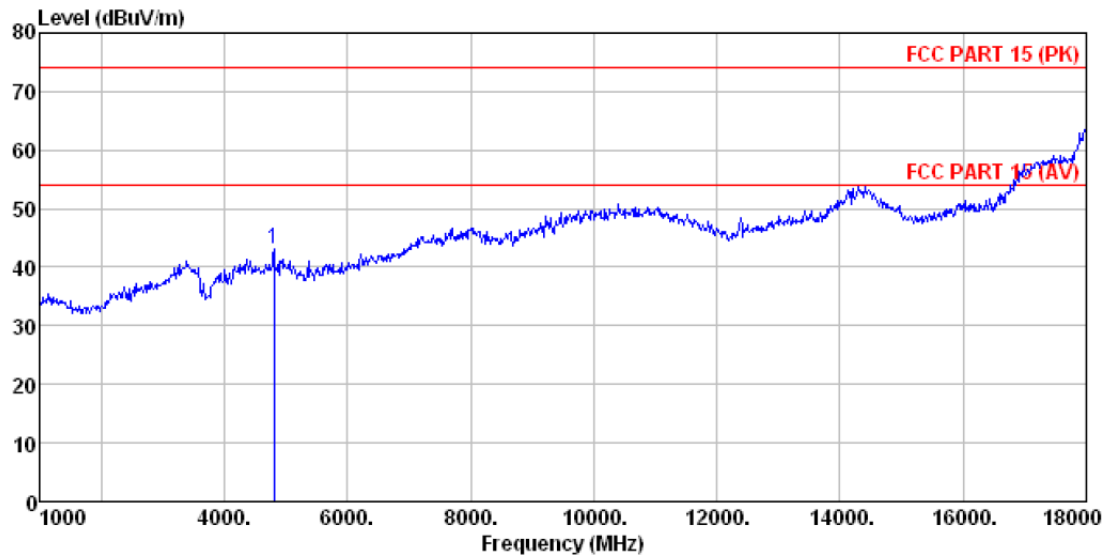


MEASUREMENT RESULT: "CTI150710114_fin"

10/07/2015 16:44

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
380.940000	43.30	18.8	46.0	2.7	QP	100.0	315.00	VERTICAL

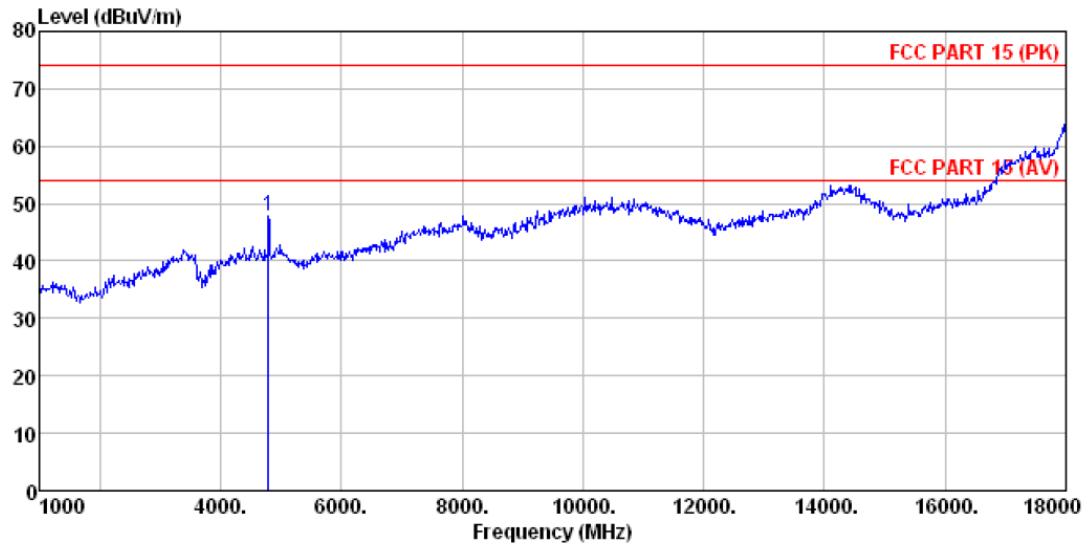
5.3.3 Diagram 5-3



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL
EUT : Bluetooth Speaker
Test Mode : TX mode
Test Engineer: Chen
: BT4.0 2402

Freq	ReadAntenna		Cable Preamp		Limit		Over	Remark
	Level	Factor	Loss	Factor	Level	Line	Limit	
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1 4808.000	34.80	31.78	8.60	32.09	43.09	74.00	-30.91	Peak

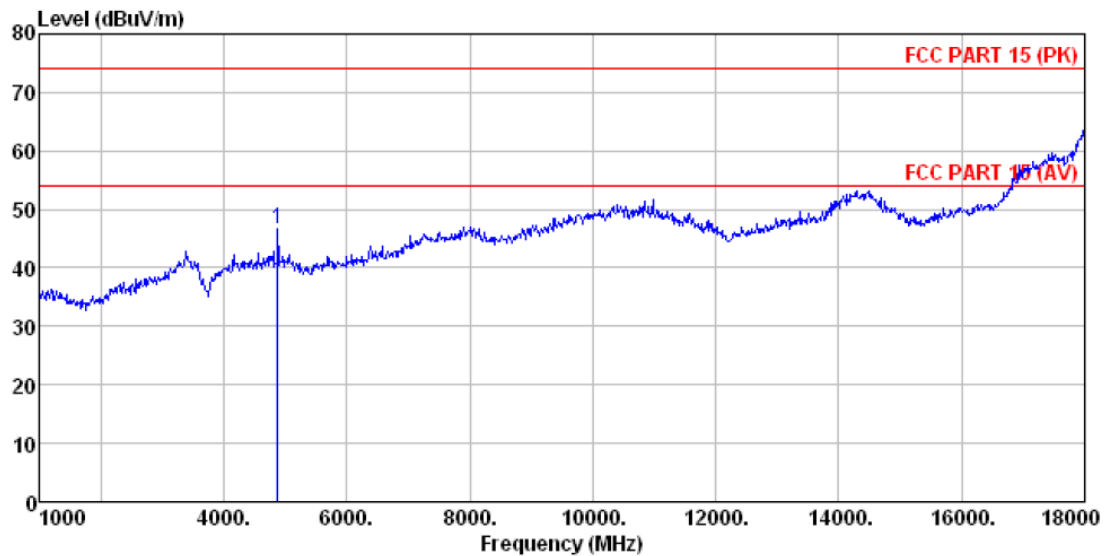
5.3.4 Diagram 5-4



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL
EUT : Bluetooth Speaker
Test Mode : TX mode
Test Engineer: Chen
: BT4.0 2402

	Freq	ReadAntenna		Cable	Preamp		Limit	Over	
		Level	Factor	Loss	Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	4791.000	39.50	31.76	8.59	32.08	47.77	74.00	-26.23	Peak

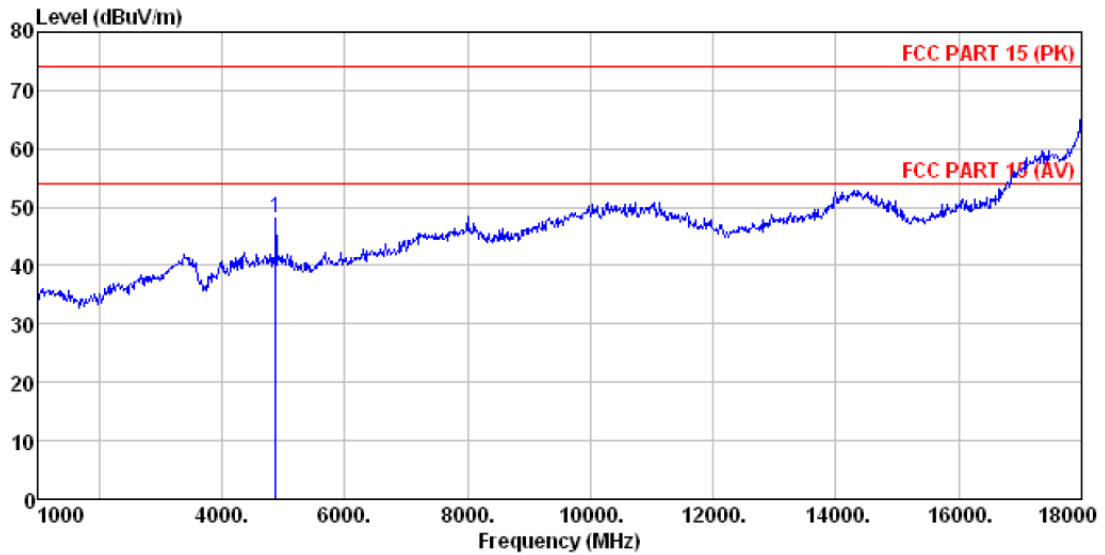
5.3.5 Diagram 5-5



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL
EUT : Bluetooth Speaker
Test Mode : TX mode
Test Engineer: Chen
BT4.0 2442

	ReadAntenna	Cable Preamp	Limit	Over				
Freq	Level Factor	Loss Factor	Level	Line	Limit	Remark		
-----MHz	-----dBuV	-----dB/m	-----dB	-----dB	-----dBuV/m	-----dBuV/m	-----dB	-----
1 4876.000	38.24	31.85	8.66	32.12	46.63	74.00	-27.37	Peak

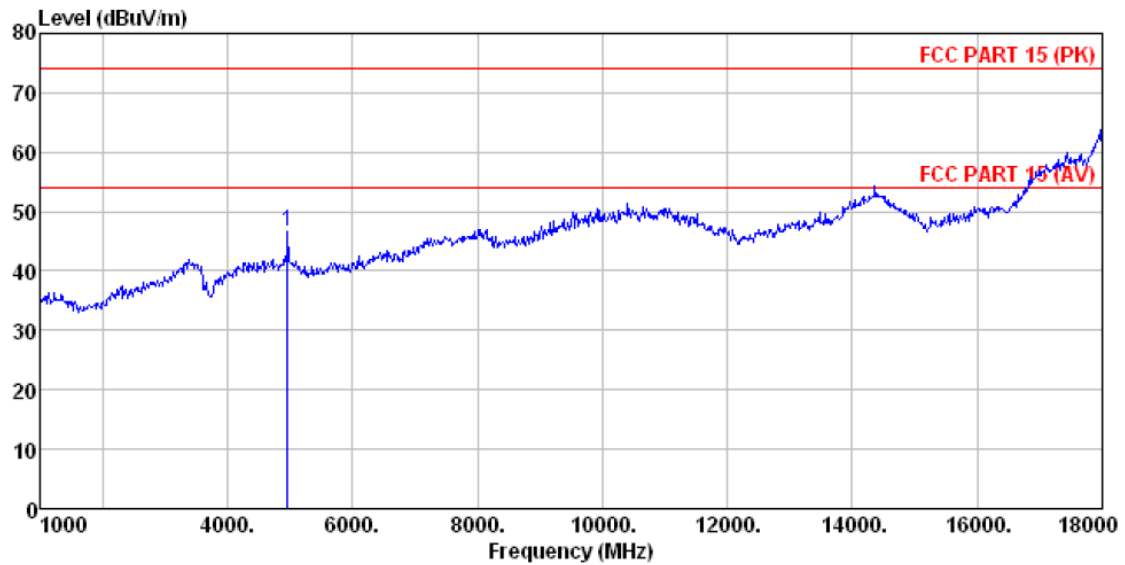
5.3.6 Diagram 5-6



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL
EUT : Bluetooth Speaker
Test Mode : TX mode
Test Engineer: Chen
BT4.0 2442

	ReadAntenna	Cable Preamp	Limit	Over				
Freq	Level Factor	Loss Factor	Level	Line	Limit	Remark		
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1 4876.000	39.81	31.85	8.66	32.12	48.20	74.00	-25.80	Peak

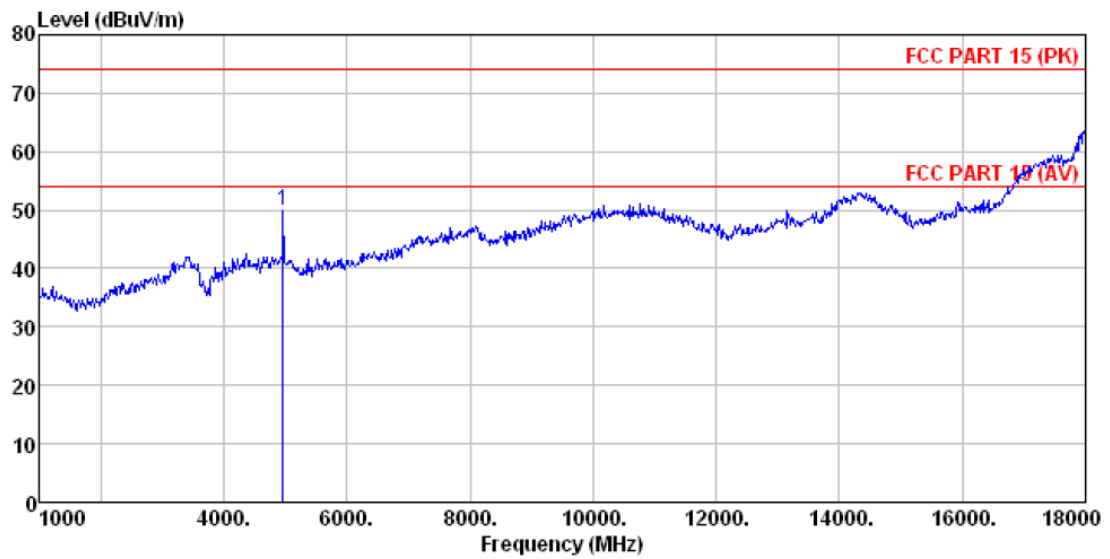
5.3.7 Diagram 5-7



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL
EUT : Bluetooth Speaker
Test Mode : TX mode
Test Engineer: Chen
: BT4.0 2480

	Freq	ReadAntenna		Cable Preamp		Level	Limit	Over	Remark
		Level	Factor	Loss	Factor				
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	4961.000	38.01	31.93	8.73	32.16	46.51	74.00	-27.49	Peak

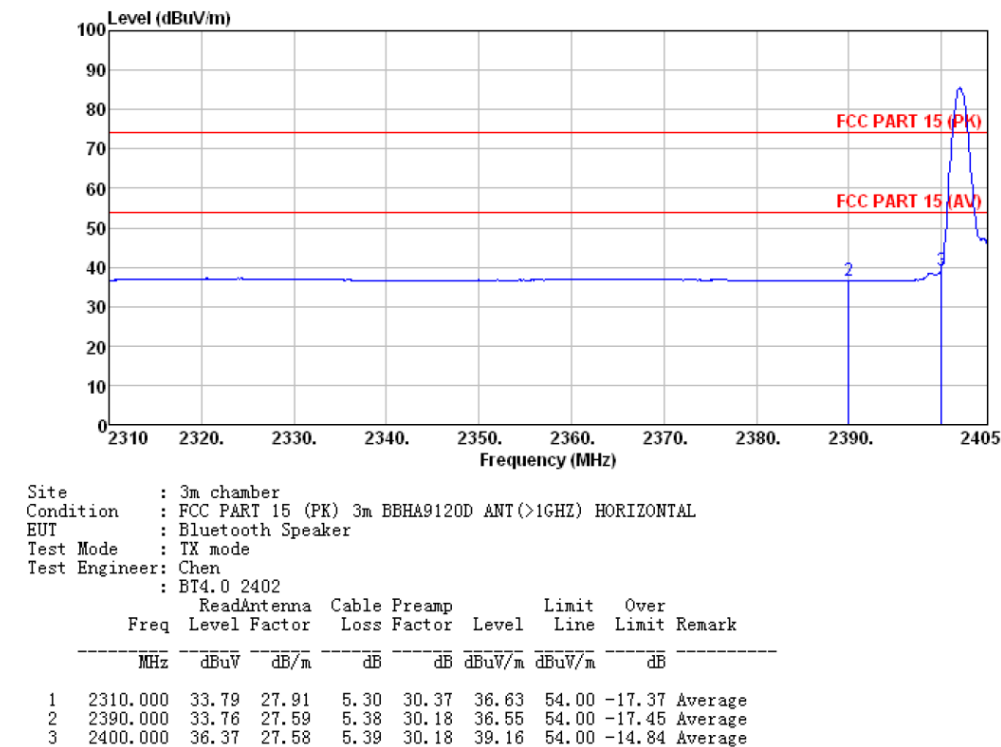
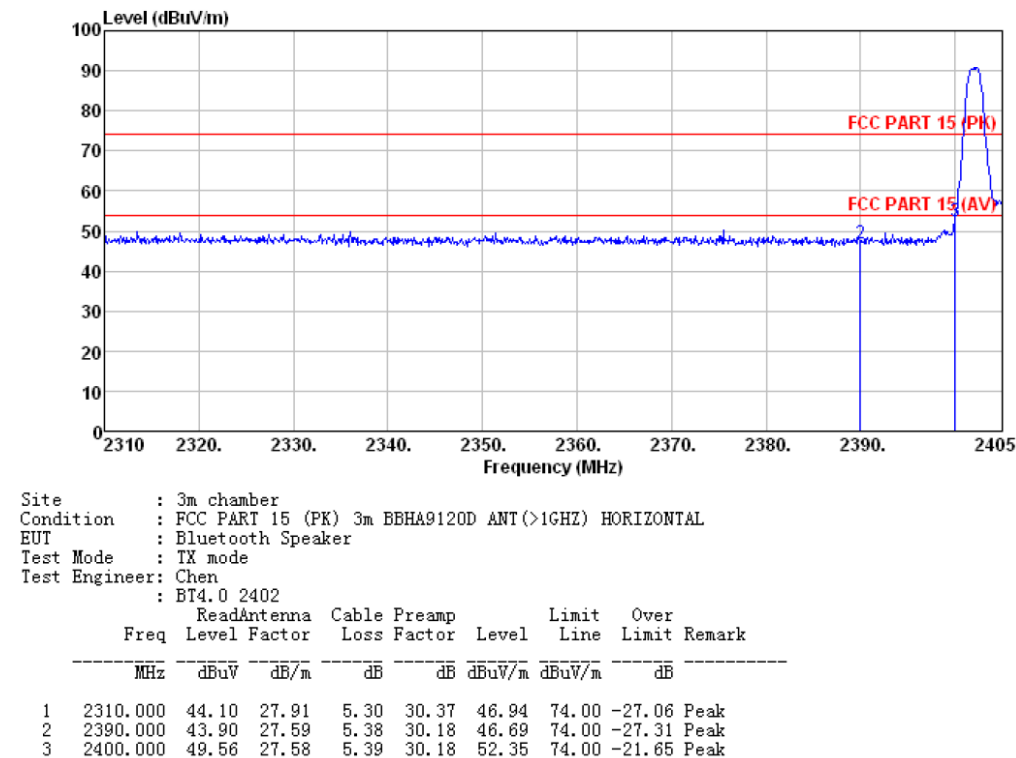
5.3.8 Diagram 5-8



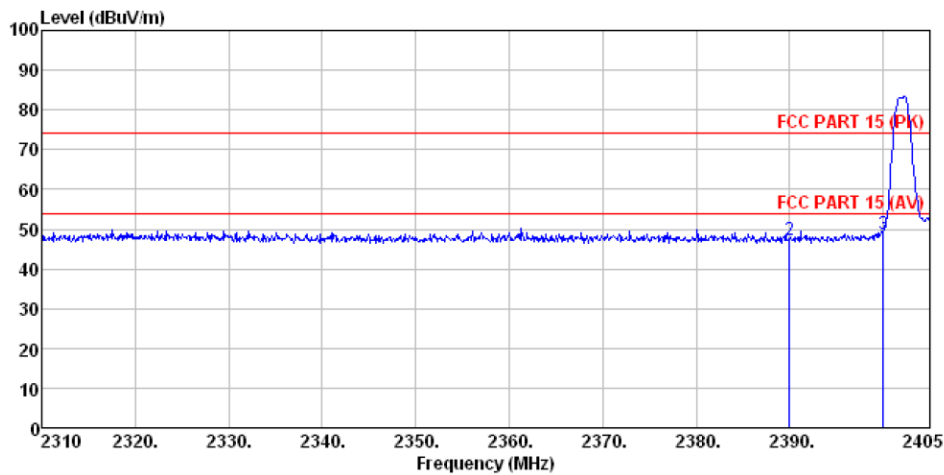
Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL
EUT : Bluetooth Speaker
Test Mode : TX mode
Test Engineer: Chen
: BT4.0 2480

	ReadAntenna	Cable Preamp	Limit	Over				
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
-----	-----	-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1 4961.000	41.51	31.93	8.73	32.16	50.01	74.00	-23.99	Peak

5.3.9 Diagram 5-9

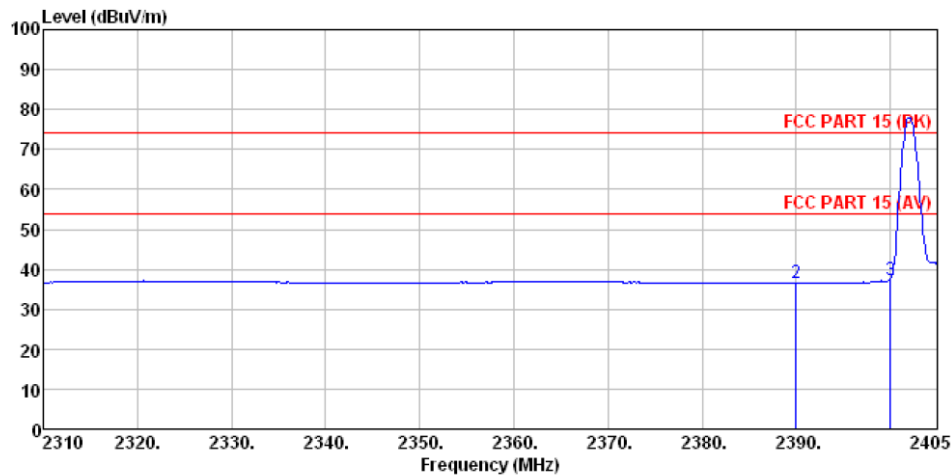


5.3.10 Diagram 5-10



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL
EUT : Bluetooth Speaker
Test Mode : TX mode
Test Engineer: Chen
BT4.0 2402

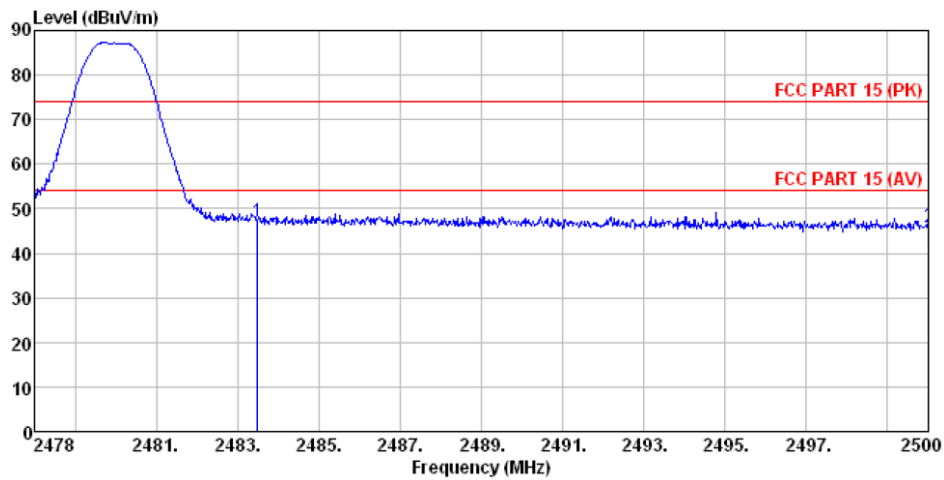
	ReadAntenna	Cable Preamp	Limit	Over	
Freq	Level Factor	Loss Factor	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dBuV/m	dB
1 2310.000	44.49	27.91	5.30	30.37	47.33
2 2390.000	44.44	27.59	5.38	30.18	47.23
3 2400.000	46.08	27.58	5.39	30.18	48.87



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL
EUT : Bluetooth Speaker
Test Mode : TX mode
Test Engineer: Chen
BT4.0 2402

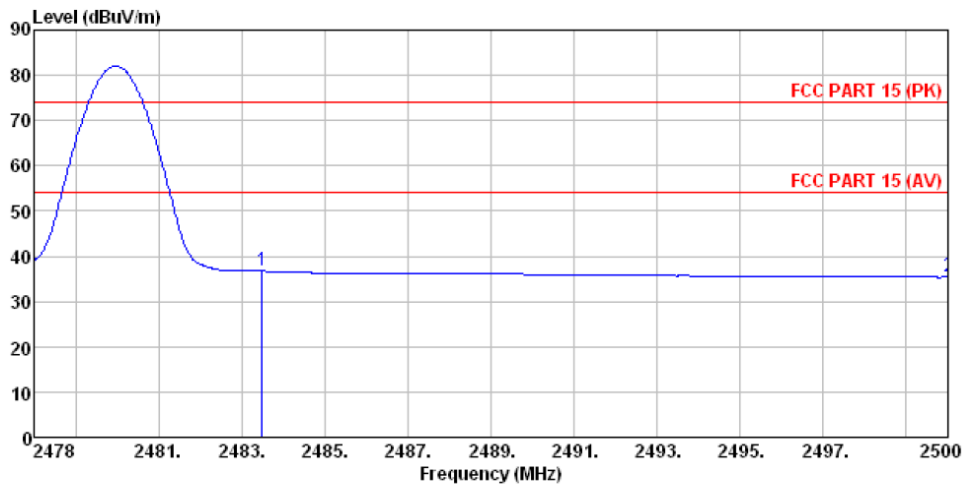
	ReadAntenna	Cable Preamp	Limit	Over	
Freq	Level Factor	Loss Factor	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dBuV/m	dB
1 2310.000	33.83	27.91	5.30	30.37	36.67
2 2390.000	33.80	27.59	5.38	30.18	36.59
3 2400.000	34.52	27.58	5.39	30.18	37.31

5.3.11 Diagram 5-11



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL
EUT : Bluetooth Speaker
Test Mode : TX mode
Test Engineer: Chen
BT4.0 2480

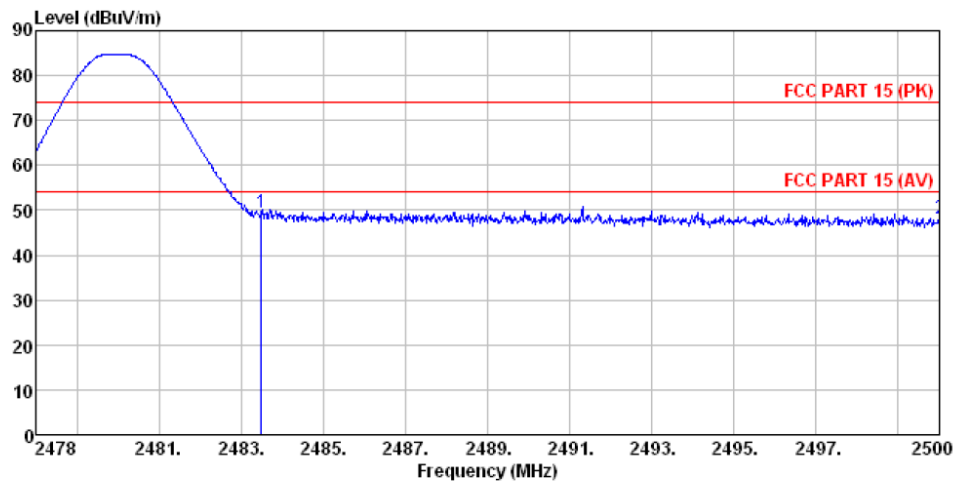
	ReadAntenna	Cable	Preamp	Level	Limit	Over	
Freq	Level	Factor	Loss	Factor	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1 2483.500	43.97	27.53	5.47	29.93	47.04	74.00	-26.96 Peak
2 2500.000	42.57	27.55	5.49	29.93	45.68	74.00	-28.32 Peak



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL
EUT : Bluetooth Speaker
Test Mode : TX mode
Test Engineer: Chen
BT4.0 2480

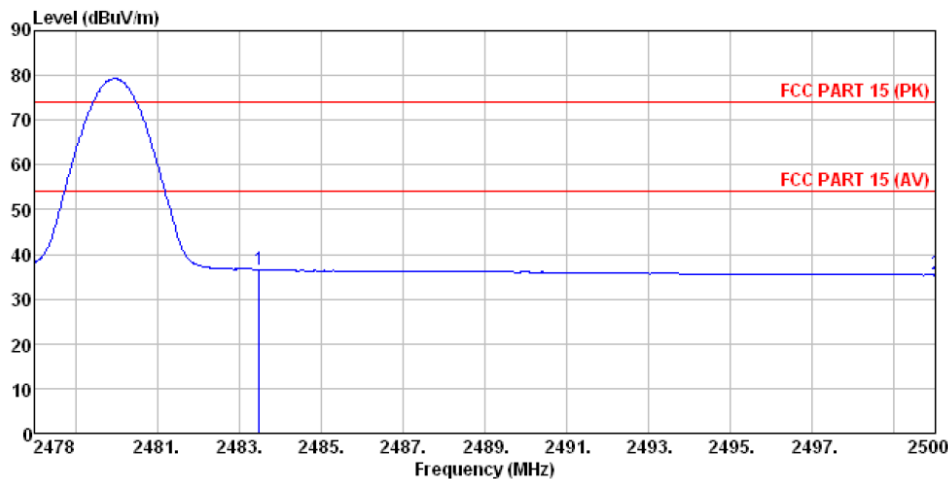
	ReadAntenna	Cable	Preamp	Level	Limit	Over	
Freq	Level	Factor	Loss	Factor	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1 2483.500	33.72	27.53	5.47	29.93	36.79	54.00	-17.21 Average
2 2500.000	32.29	27.55	5.49	29.93	35.40	54.00	-18.60 Average

5.3.12 Diagram 5-12



```
Site      : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL
EUT       : Bluetooth Speaker
Test Mode  : TX mode
Test Engineer: Chen
           : BT4.0 2480
```

	Freq	Read Antenna Level Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
1	2483.500	46.29	27.53	5.47	29.93	49.36	74.00	-24.64 Peak
2	2500.000	44.89	27.55	5.49	29.93	48.00	74.00	-26.00 Peak



```
Site       : 3m chamber
Condition  : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL
EUT        : Bluetooth Speaker
Test Mode   : TX mode
Test Engineer: Chen
           : BT4.0 2480
```

	Freq	Read Antenna Level Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
1	2483.500	33.57	27.53	5.47	29.93	36.64	54.00	-17.36 Average
2	2500.000	32.29	27.55	5.49	29.93	35.40	54.00	-18.60 Average

6. 6dB and 99% Bandwidth test

6.1 Test Procedure

6dB Bandwidth:

Systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

The transmitter output was connected to a spectrum analyzer. 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 with the power of which is lower than peak power for 6dB.

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 6 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 2016	FSP30	GTS208	RS

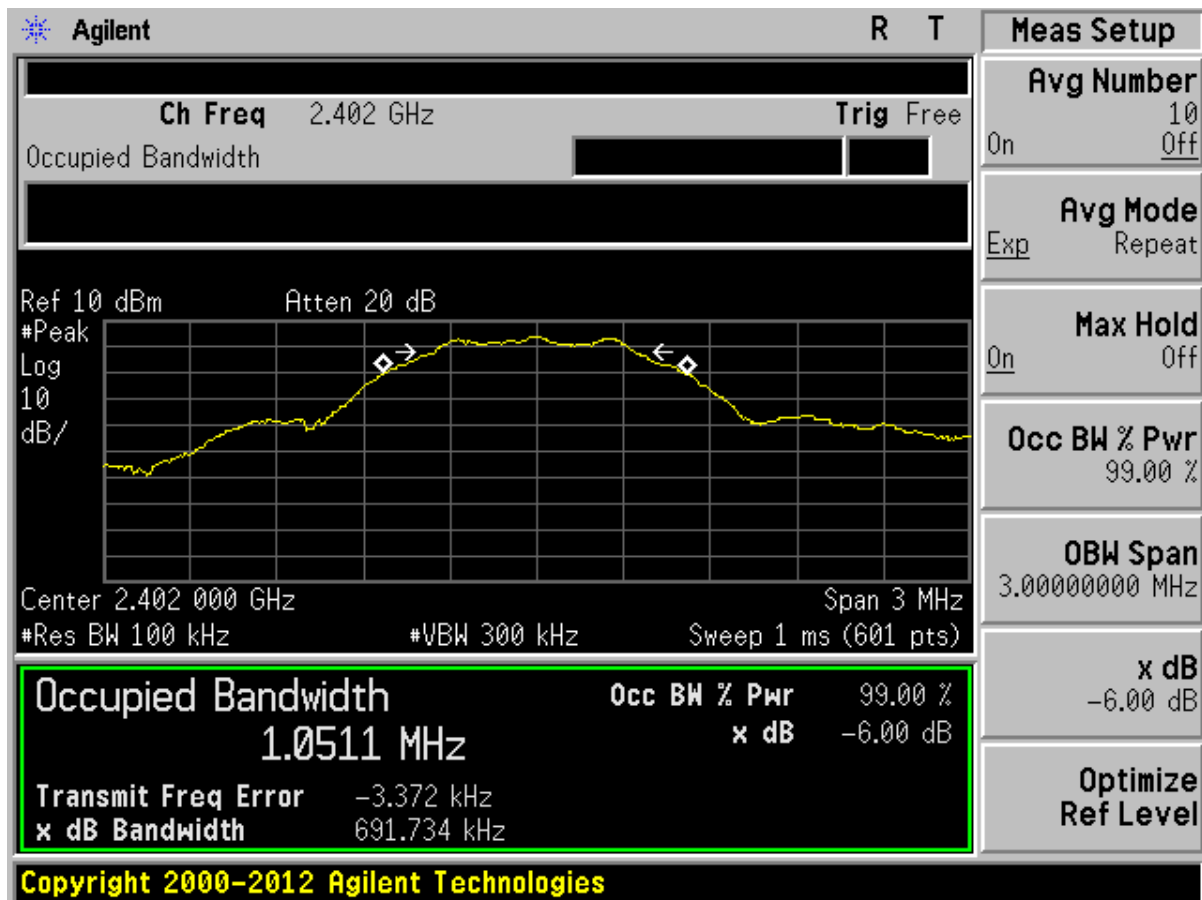
6.3 Test Result

Remark : Conducted measurement.

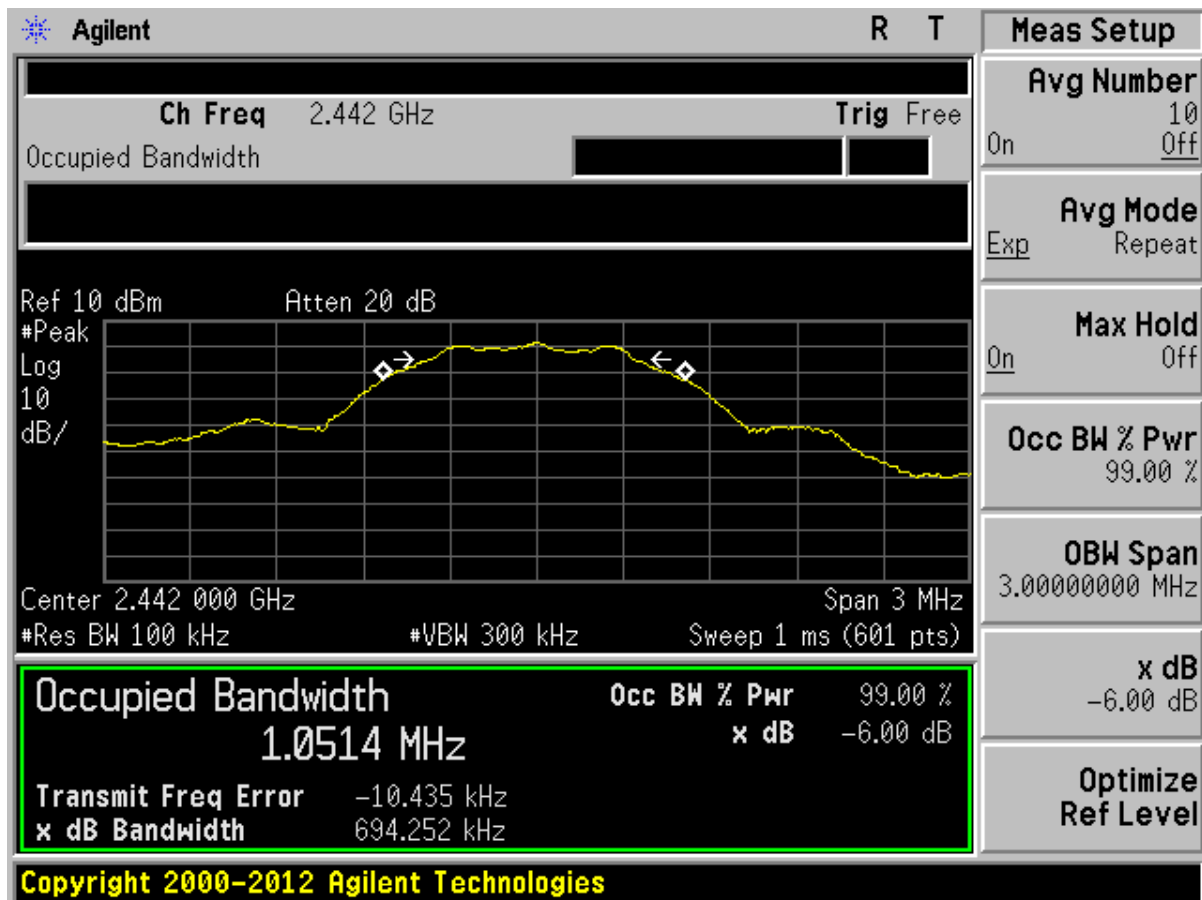
6dB Bandwidth:

GFSK					
Channel	Diagram	6dB bandwidth (MHz)	99% bandwidth (MHz)	>Limit kHz	Result
CH LOW	6-1	0.691734	1.0511	500	PASS
CH MID	6-2	0.694252	1.0514	500	PASS
CH HIGH	6-3	0.699522	1.0475	500	PASS

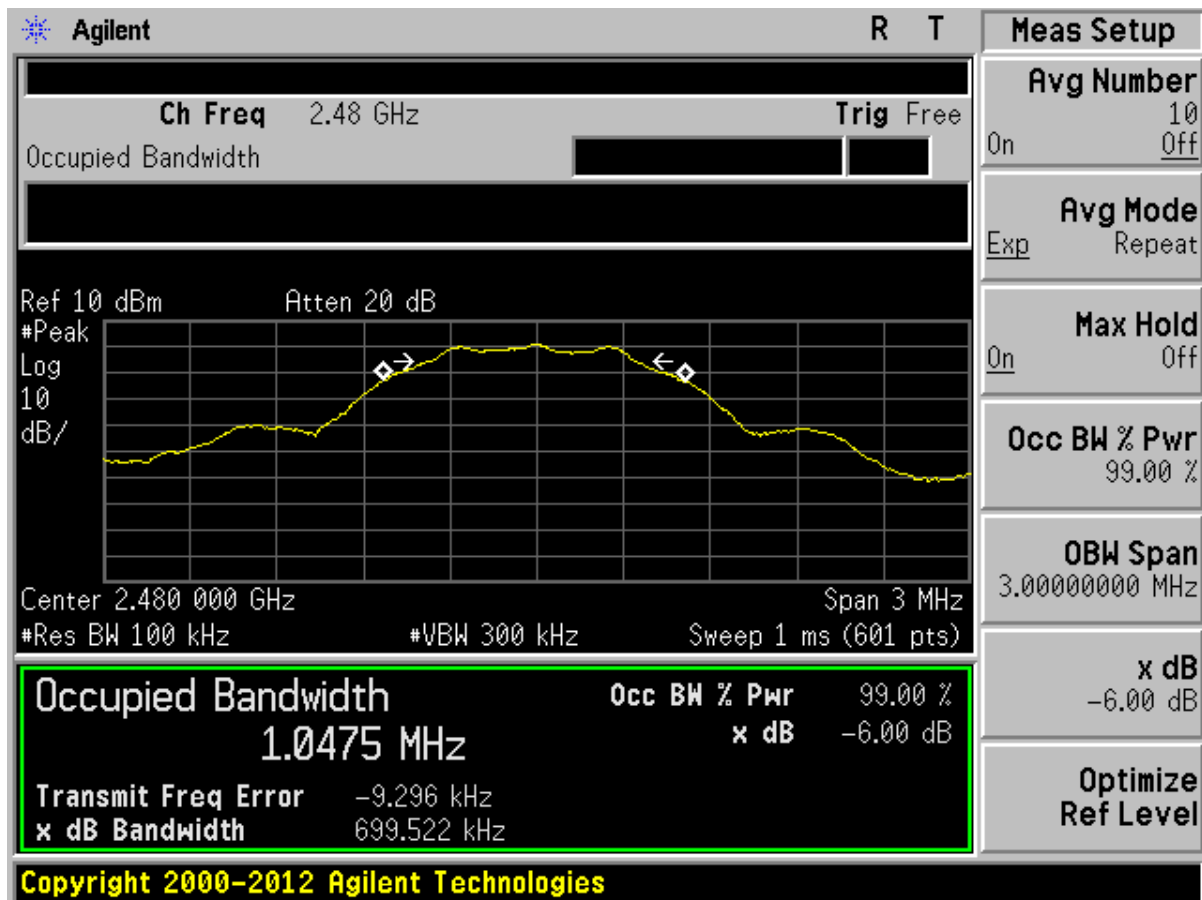
6.3.1 Diagram 6-1



6.3.2 Diagram 6-2



6.3.3 Diagram 6-3



7. Band Edge Compliance Test

7.1 Test Procedure

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

7.2 Measurement Equipment

	Equipment	Calibration Due	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	Spectrum	Jul. 04 2016	FSP30	GTS208	RS

7.3 Test Result

Conducted measurement

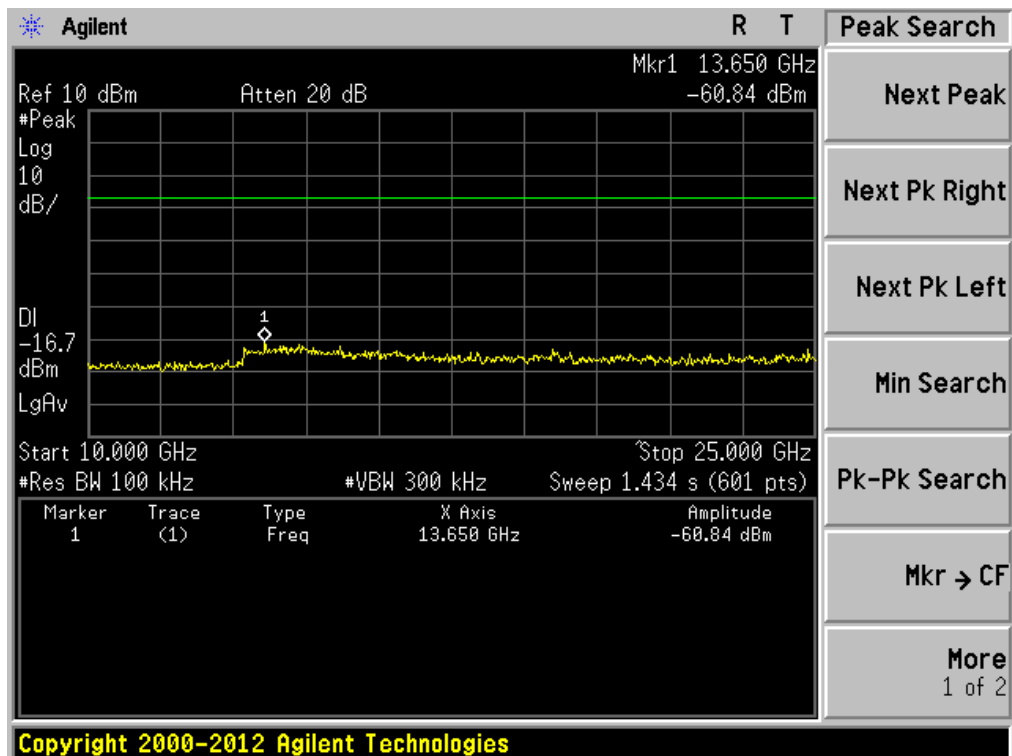
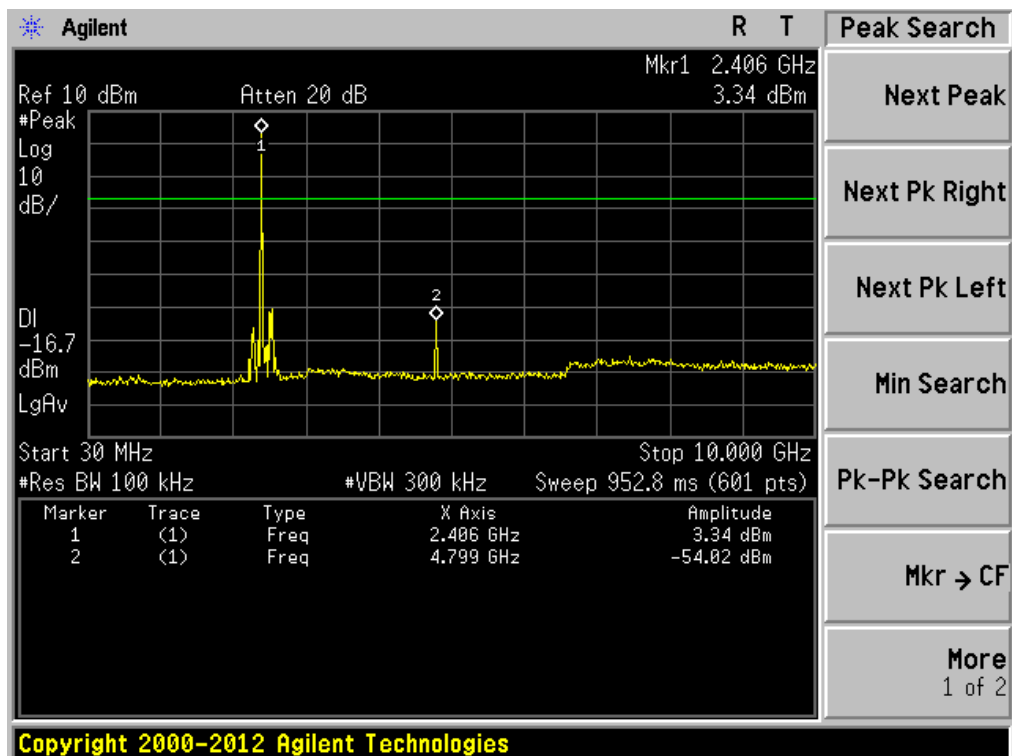
PK detector

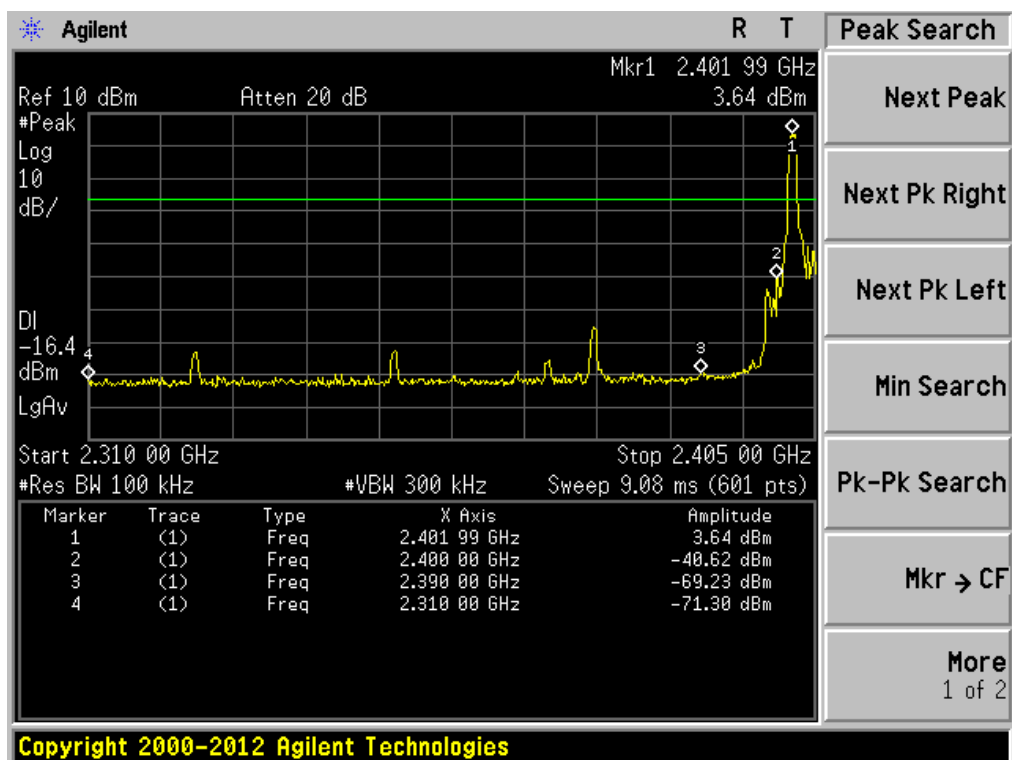
Max hold

RMB=100kHz VBW=300kHz

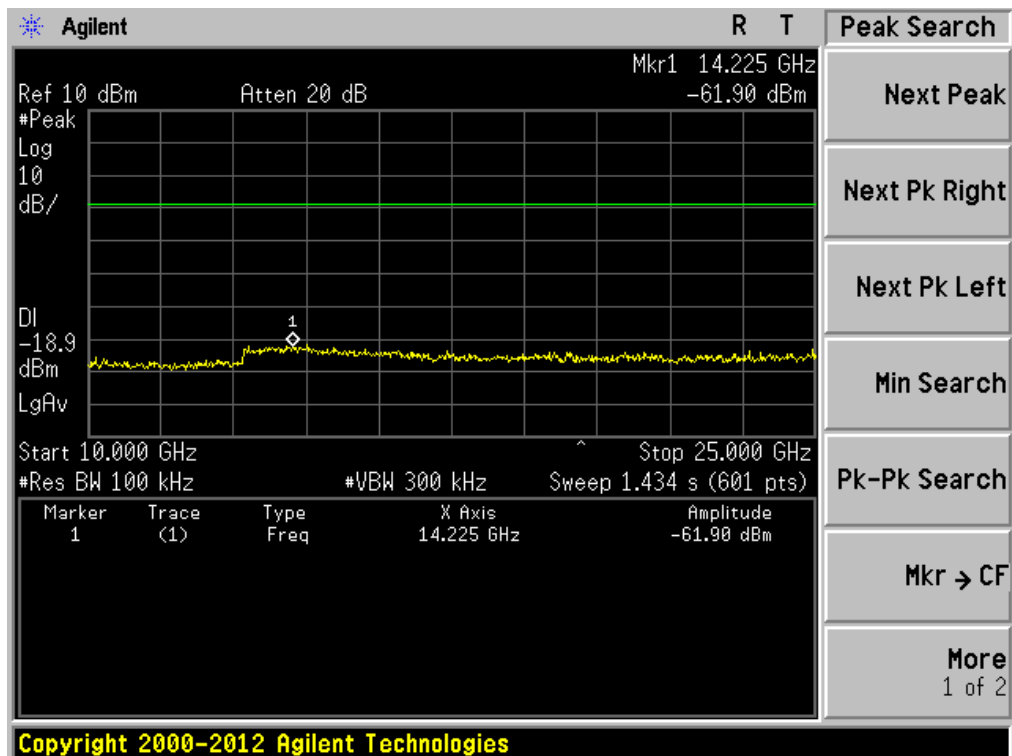
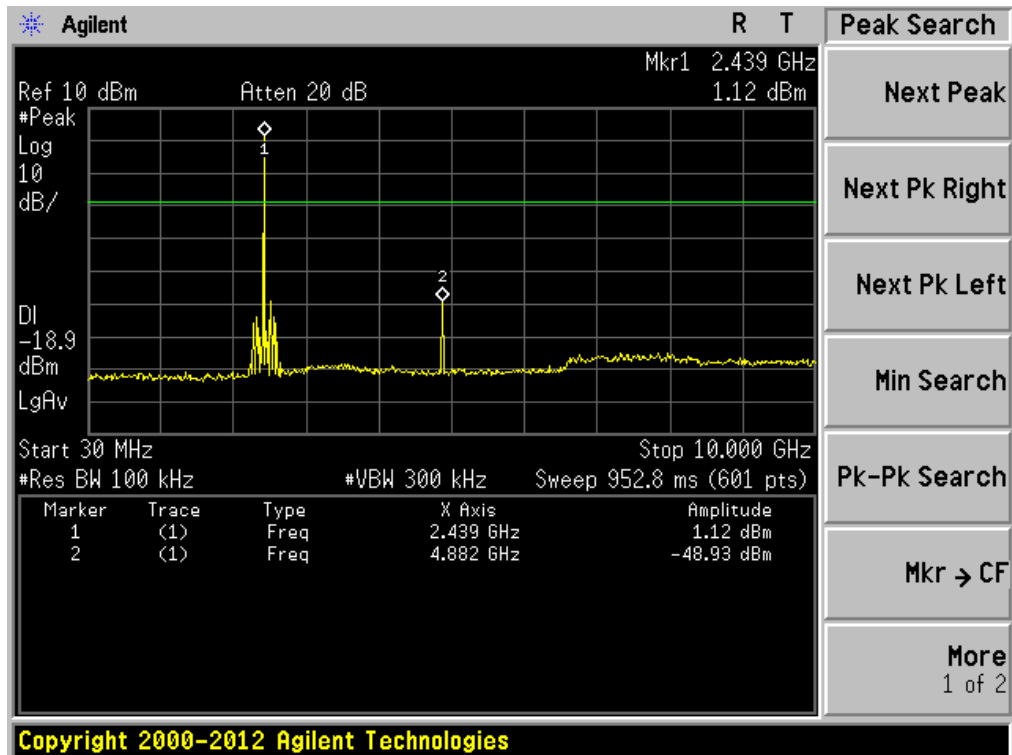
Mode	Channel	Test Data	Test Result
GFSK	CH LOW	Diagram 7-1	Pass
	CH MID	Diagram 7-2	Pass
	CH HIGH	Diagram 7-3	Pass

7.3.1 Diagram 7-1

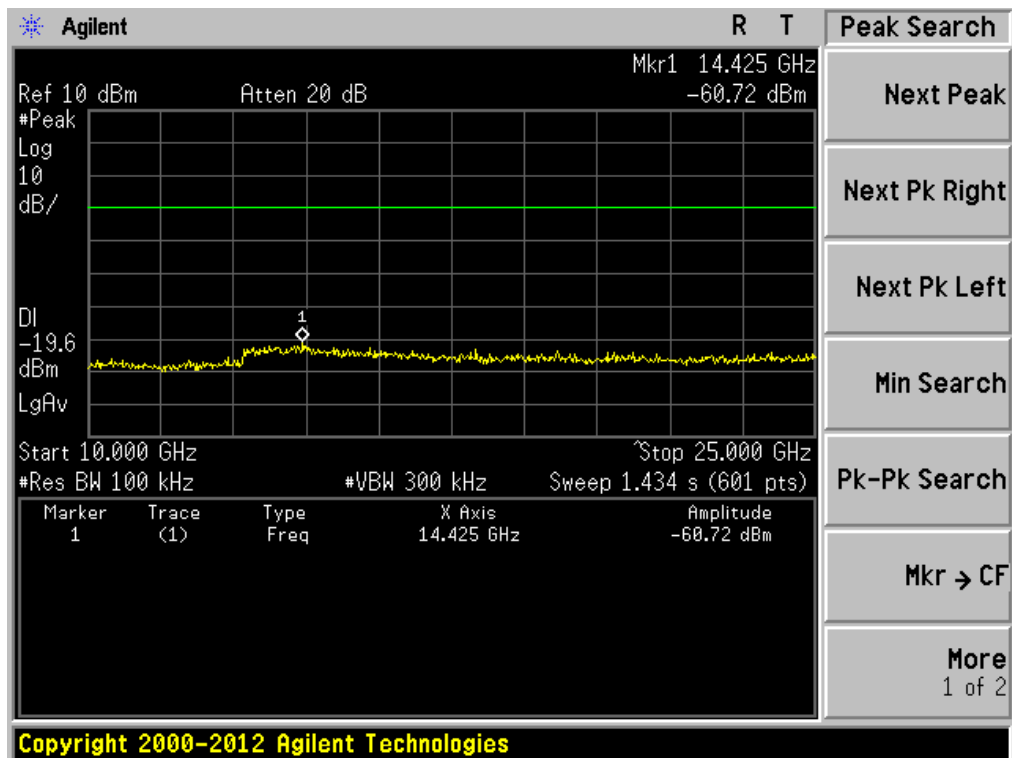
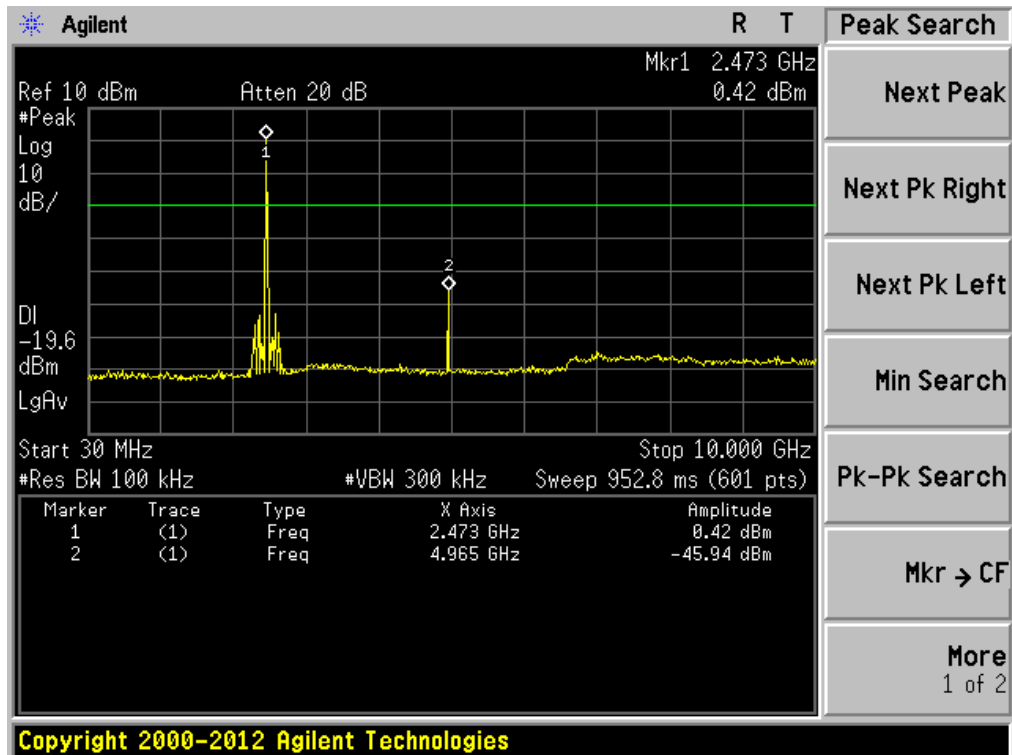


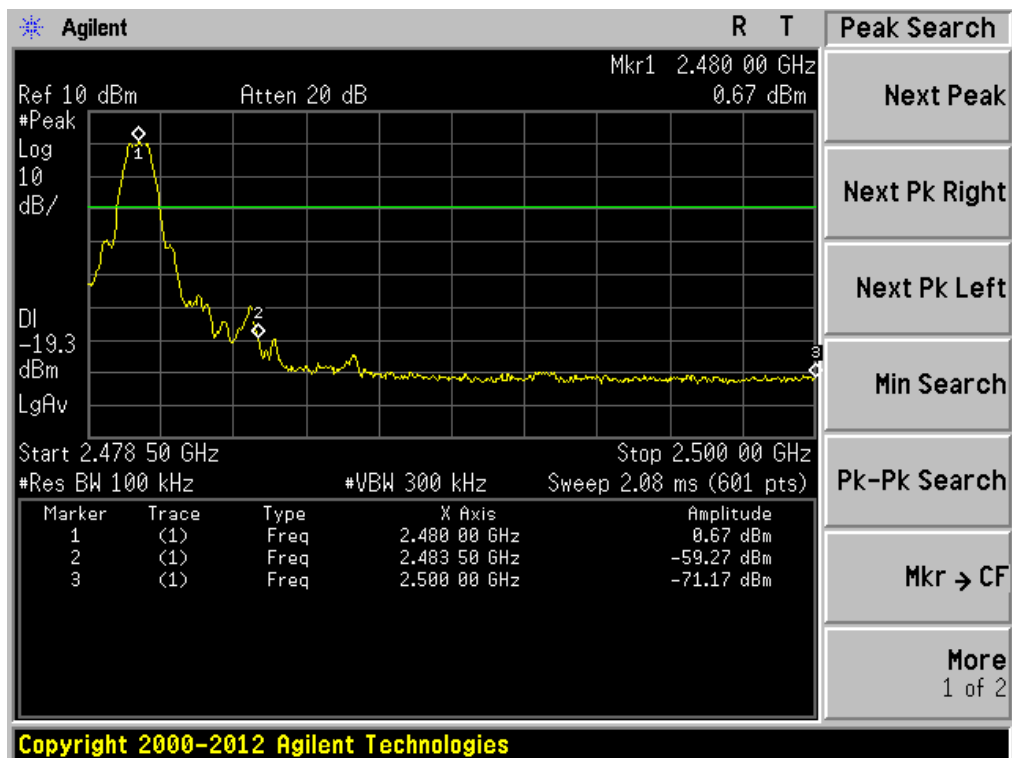


7.3.2 Diagram 7-2



7.3.3 Diagram 7-3





8. Output Power Test

8.1 Test Procedure

The maximum peak conducted output power of the intentional radiator shall not exceed the following:

(1) For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 W. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 W.

(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

8.2 Measurement Equipment

	Equipment	Calibration Due	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	Spectrum	Jul. 04 2016	FSP30	GTS208	RS

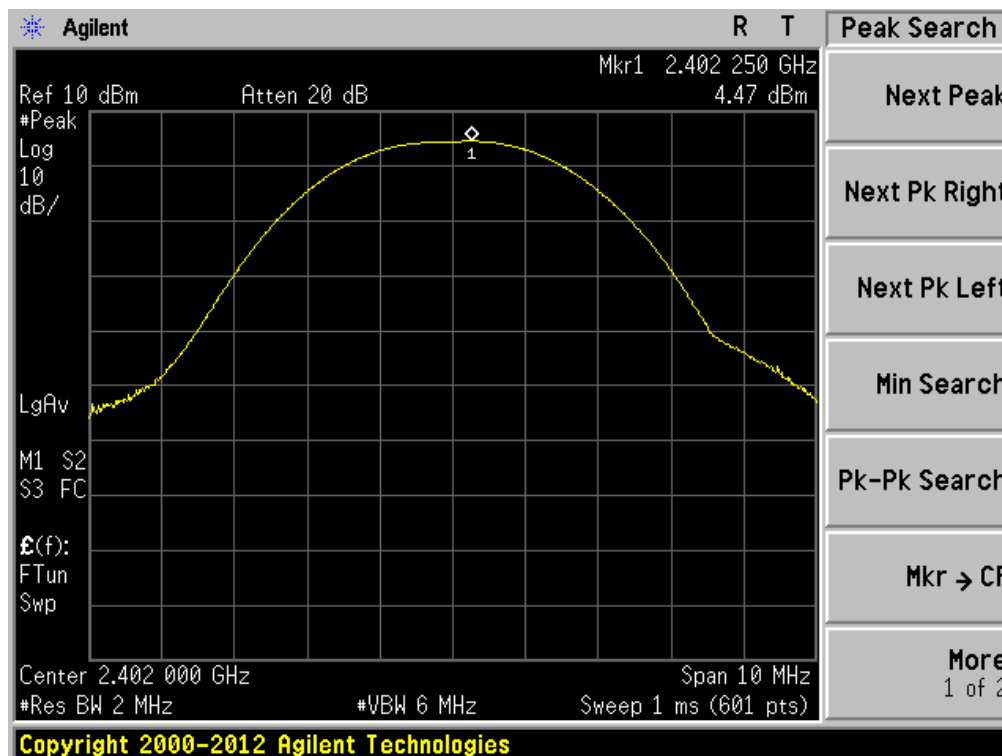
8.3 Test Result

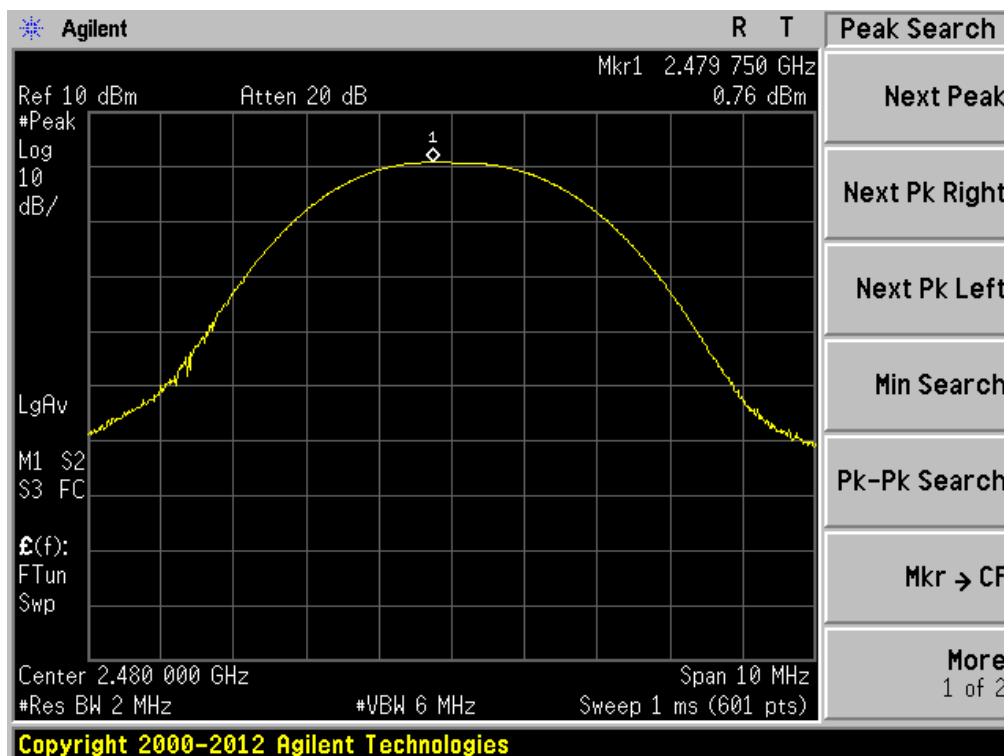
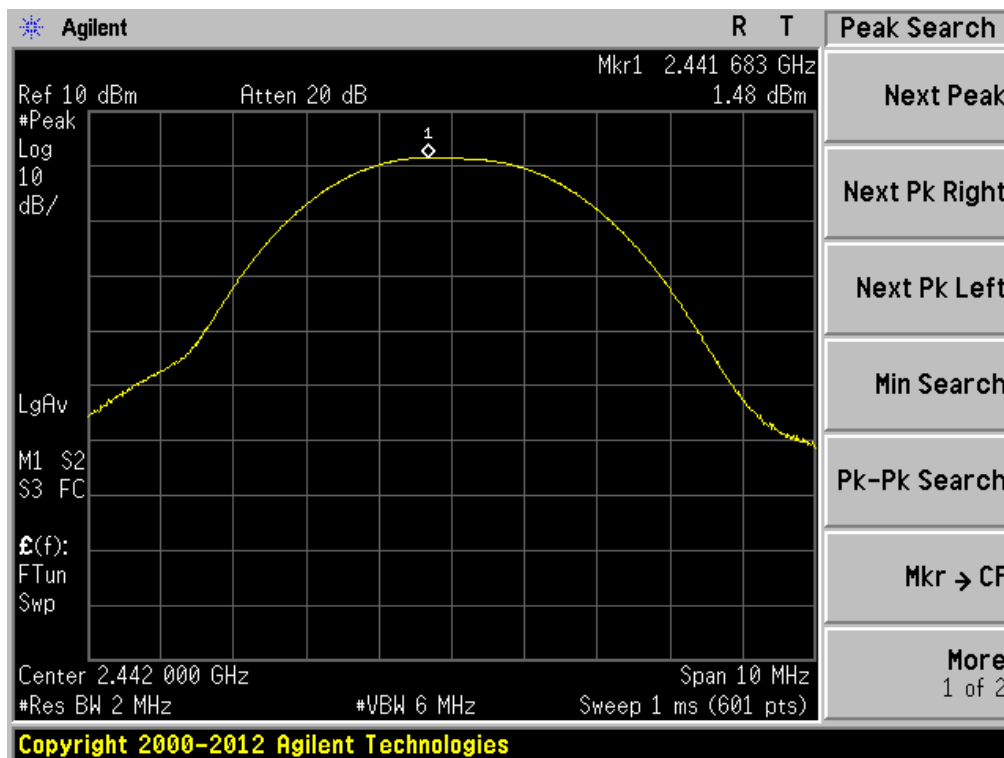
Remark : 1:RBW>=20dB Bandwidth VBW>=RBW PK detector

GFSK:

Frequency, MHz	Reading dBm	Cable loss dB	Peak Output power, dBm	Power Limit, dBm
2402	4.47	1	5.47	30.00
2442	1.48	1	2.48	30.00
2480	0.76	1	1.76	30.00

Diagram is as below:





9. Power Spectral Density Test

9.1 Test Procedure

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

The transmitter output was connected to a spectrum analyzer. The maximum power density level was measured by spectrum analyzer with RBW >3kHz and Detector: PK
Cable loss and attenuator loss have been added in Spectrum setting offset .

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW >=3 kHz.
4. Set the VBW >= 3 x RBW.
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 amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

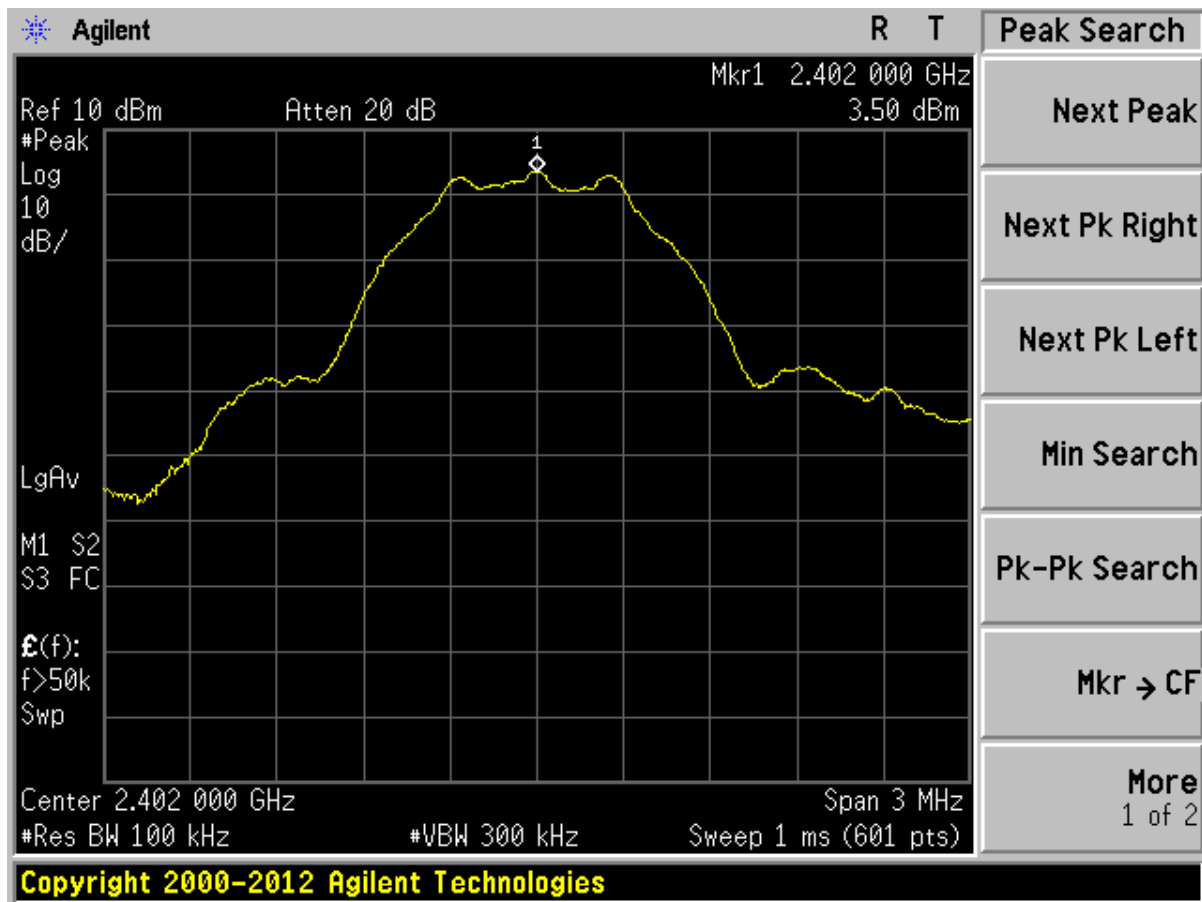
9.2 Measurement Equipment

	Equipment	Calibration due	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	Spectrum	Jul. 04 2016	FSP30	GTS208	RS

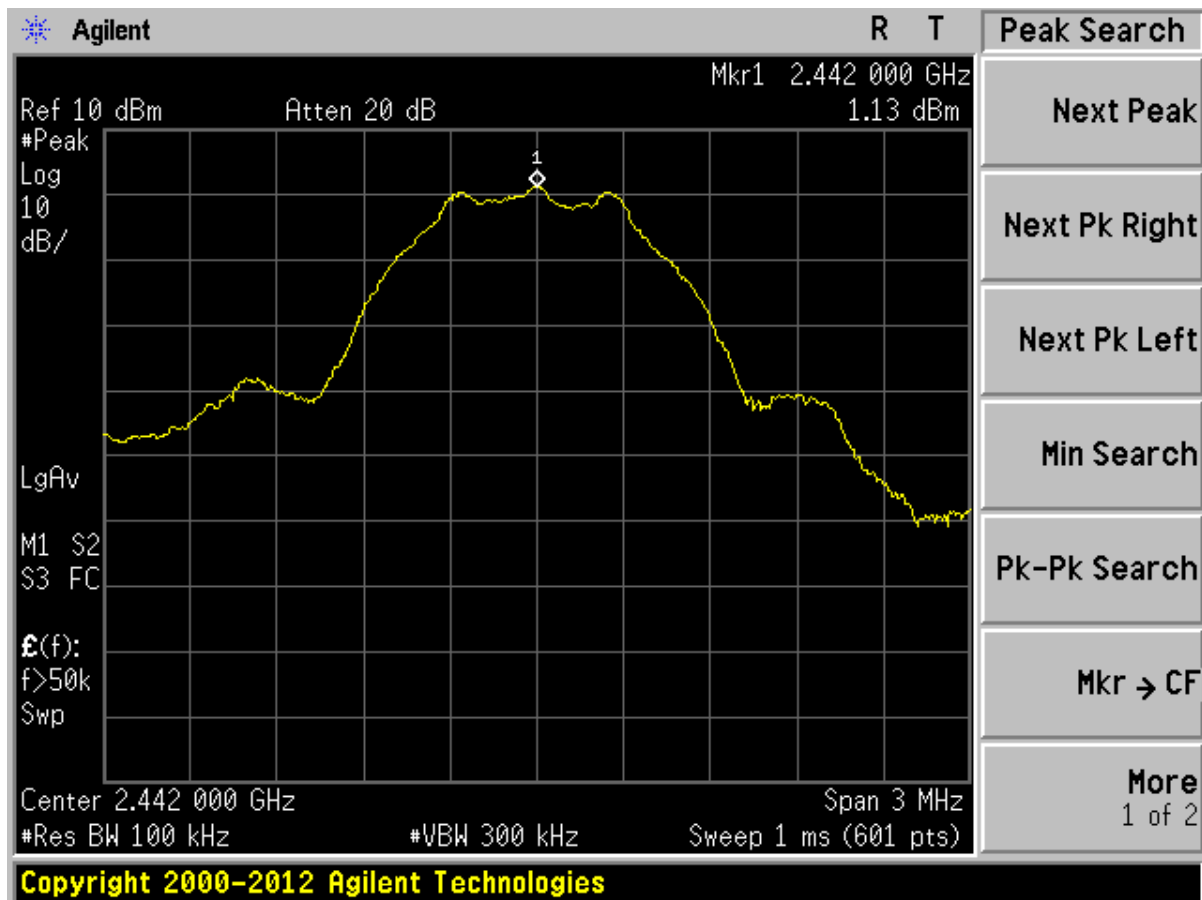
9.3 Test Result

Mode	Channel	Diagram	Reading (dBm)	Cable loss dB	Result (dBm)	<Limit (dBm)	Result
GFSK	CH LOW	9-1	3.5	1	4.5	8	Pass
GFSK	CH MID	9-2	1.13	1	2.13	8	Pass
GFSK	CH HIGH	9-3	0.55	1	1.55	8	Pass

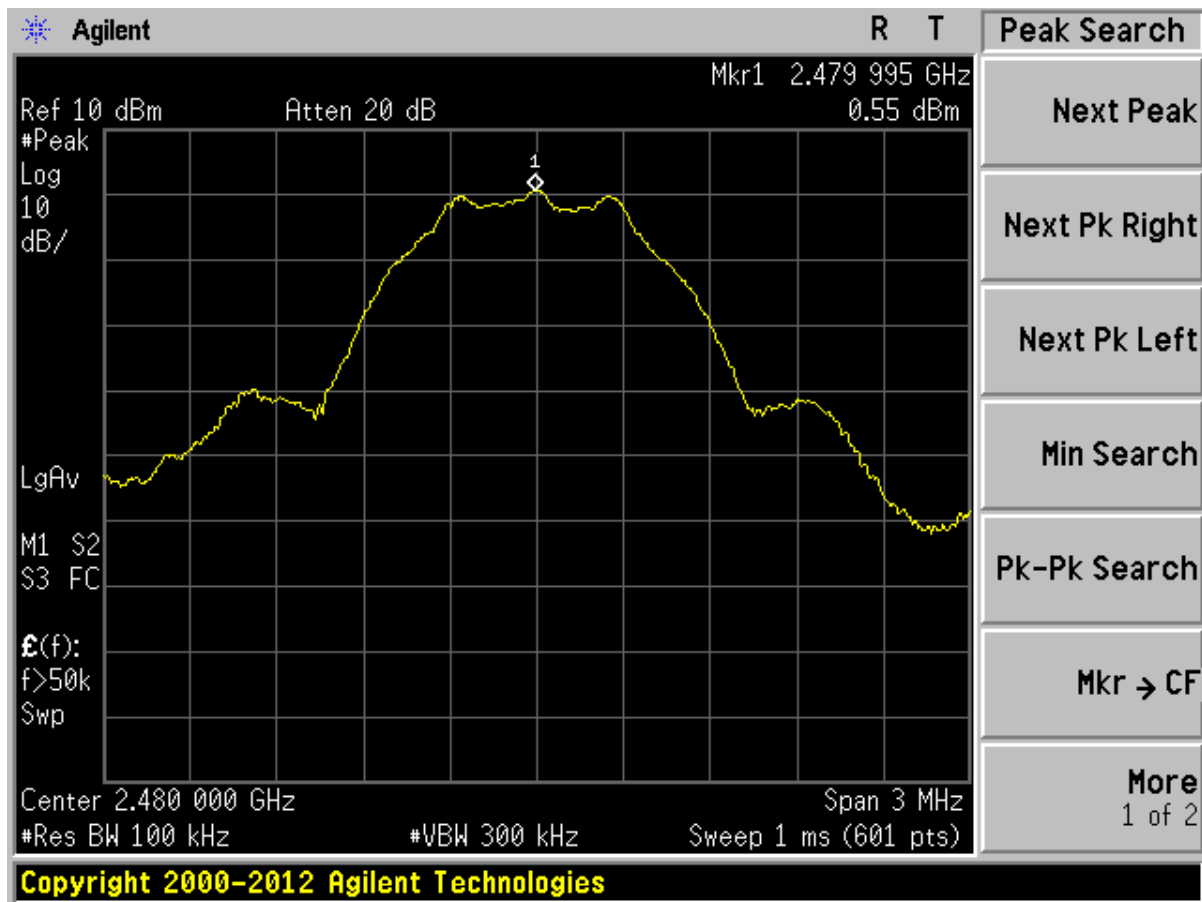
9.3.1 Diagram 9-1



9.3.2 Diagram 9-2



9.3.3 Diagram 9-3



10 POWER LINE CONDUCTED EMISSION TEST

10.1 Test Procedure

An intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 Ω line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	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.		

10.2 Measurement Equipment

	Equipment	Calibration Due	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	Shielding Room	Jul. 04 2016	7.0(L)x3.0(W)x3.0(H)	GTS252	ZhongYu Electron
<input checked="" type="checkbox"/>	EMI Test Receiver	Jul. 04 2016	ESCS30	1102.4500K30	Rohde & Schwarz
<input checked="" type="checkbox"/>	10dB Pulse Limita	Jul. 04 2016	N/A	GTS224	Rohde & Schwarz
<input checked="" type="checkbox"/>	LISN	Jul. 04 2016	NSLK 8127	8127549	SCHWARZBECK MESS-ELEKTRONIK
<input checked="" type="checkbox"/>	Coaxial Cable	Apr. 01 2016	N/A	N/A	GTS

10.3 Test Result

The EUT was placed on a non-metallic table, 80cm above the ground plane. The other peripheral devices power cord connected to the power mains through another line impedance stabilization network. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4-2014 on conducted Emission test.

Preview measurements:

0.15 MHz to 30 MHz

Receiver settings: PK&AV detector

RBW:9 kHz

TX MODE

Final measurement:

0.15 MHz to 30 MHz

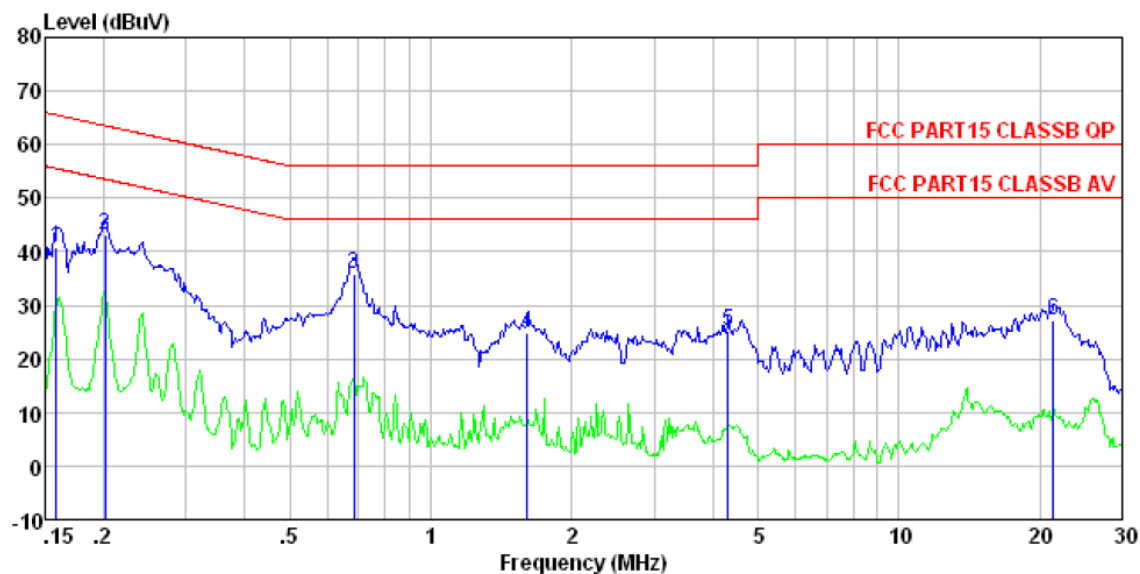
Receiver settings:QP&AV detector

Power Line	Test Data	Test Result
Line	Diagram 10-1	Pass
Neutral	Diagram 10-2	Pass

NOTES:

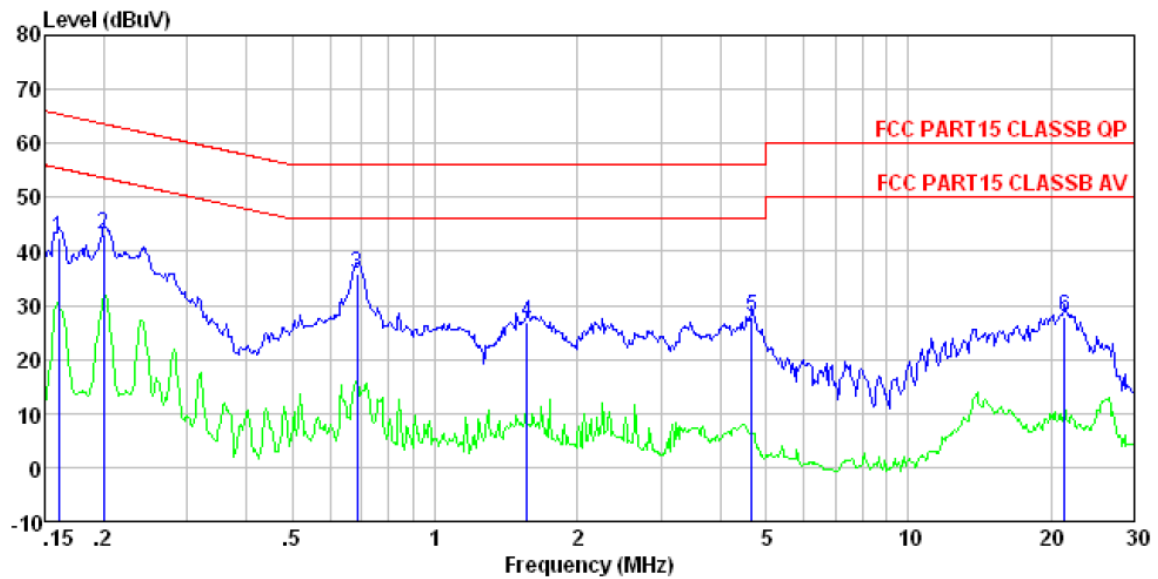
1. Measurements using CISPR quasi-peak mode & average mode.
2. All modes of operation were investigated and the worst -case emission are reported.
- 3: If PK value is lower than AV limit then no reading value listed in report .If QP value is Lower than AV limit ,then AV value don't listed in report.

10.3.1 Diagram 10-1



	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.158	40.40	0.15	0.12	40.67	65.56	-24.89	QP
2	0.202	42.76	0.14	0.13	43.03	63.54	-20.51	QP
3	0.686	35.58	0.14	0.13	35.85	56.00	-20.15	QP
4	1.610	24.47	0.12	0.14	24.73	56.00	-31.27	QP
5	4.315	24.75	0.20	0.15	25.10	56.00	-30.90	QP
6	21.373	26.15	0.73	0.22	27.10	60.00	-32.90	QP

10.3.2 Diagram 10-2



	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.161	42.31	0.07	0.12	42.50	65.43	-22.93	QP
2	0.200	42.78	0.07	0.13	42.98	63.62	-20.64	QP
3	0.686	35.74	0.07	0.13	35.94	56.00	-20.06	QP
4	1.568	26.68	0.09	0.14	26.91	56.00	-29.09	QP
5	4.672	27.64	0.15	0.15	27.94	56.00	-28.06	QP
6	21.373	27.15	0.65	0.22	28.02	60.00	-31.98	QP

11 Antenna requirement

11.1 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. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

11.2 Result

The antenna used for this product is Internal Patch 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.

Appendix A Sample Label

Labelling Requirements

The sample label shown shall be permanently affixed at a conspicuous location on the device and be readily visible to the user at the time of purchase.

*** The following paragraph specified in the label.

FCC ID: VL5-BBUNPLUGGED

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