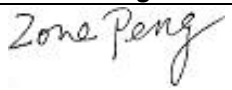
FCC Test Report

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 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	 2015/7/17
	Juno Wong ***date***
Verified by	 2015/7/17
	Zone Peng ***date***

Contents of This Report

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:	DSS
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：79

Output Power：-0.25 dBm

Modulation Type：Bluetooth V2.1+EDR(GFSK, π/4 DQPSK, 8DPSK)

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

CHL : CH 1 2402MHz

CHM : CH 40 2441MHz

CHH : CH 79 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 ºC
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 GFSK CH 1

TM2 : continuance TX MODE GFSK CH 40

TM3: continuance TX MODE GFSK CH 79

TM4: continuance TX MODE 8DPSK CH 1

TM5: continuance TX MODE 8DPSK CH 40

TM6: continuance TX MODE 8DPSK CH 79

TM7: continuance TX MODE π/4 DQPSK CH 1

TM8: continuance TX MODE π/4 DQPSK CH 40

TM9: continuance TX MODE π/4 DQPSK CH 79

TM10: Hopping on CH 1

TM11: Hopping on CH 79

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(10^{th} harmonics) is checked.

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

RBW=1MHz ; VBW=10Hz, PK 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
☒	Spectrum Analyzer	07/06/2016	E4440A	MY46185649	Agilent
☒	Biconilog Antenna	07/06/2016	3142C	00044562	ETS-LINGREN
☒	Multi device Controller	07/06/2016	2090	00057230	ETS-LINGREN
☒	Microwave Preamplifier	07/06/2016	8449B	3008A02425	Agilent
☒	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
☒	EMI Test Receiver	Jul. 04 2016	ESU26	GTS203	R&S
☒	BiConiLog Antenna	Feb. 26 2016	VULB9163	GTS214	SCHWARZBECK
☒	Horn Antenna	Feb. 26 2016	BBHA9120D	GTS215	SCHWARZBECK
☒	Horn Antenna	Feb. 26 2016	BBHA9170	GTS216	SCHWARZBECK
☒	Coaxial Cable	Apr. 01 2016	N/A	GTS213	GTS
☒	Coaxial Cable	Apr. 01 2016	N/A	GTS211	GTS
☒	Coaxial cable	Apr. 01 2016	N/A	GTS210	GTS
☒	Coaxial Cable	Apr. 01 2016	N/A	GTS212	GTS
☒	Amplifier	Jul. 04 2016	8347A	GTS204	HP

5.3 Test Result

Spurious emission worse case:

Below 1G:

Mode	Freq range	Channel	Test ANT polarity	Diagram	Test Result
GFSK	30MHz-1GHz:	CH LOW	H	5-1	Pass
	30MHz-1GHz:	CH LOW	V	5-2	Pass

Above 1G:

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
8DPSK	1GHz-18GHz	CH LOW	H	5-9	Pass
	1GHz-18GHz	CH LOW	V	5-10	Pass
	1GHz-18GHz	CH MID	H	5-11	Pass
	1GHz-18GHz	CH MID	V	5-12	Pass
	1GHz-18GHz	CH HIGH	H	5-13	Pass
	1GHz-18GHz	CH HIGH	V	5-14	Pass
π/4 DQPSK	1GHz-18GHz	CH LOW	H	5-15	Pass
	1GHz-18GHz	CH LOW	V	5-16	Pass
	1GHz-18GHz	CH MID	H	5-17	Pass
	1GHz-18GHz	CH MID	V	5-18	Pass
	1GHz-18GHz	CH HIGH	H	5-19	Pass
	1GHz-18GHz	CH HIGH	V	5-20	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	5-21	Pass
	Vertical	5-22	Pass
GFSK CH HIGH	Horizontal	5-23	Pass
	Vertical	5-24	Pass
8DPSK CH LOW	Horizontal	5-25	Pass
	Vertical	5-26	Pass
8DPSK CH HIGH	Horizontal	5-27	Pass
	Vertical	5-28	Pass
Pi/4 QPSK CH LOW	Horizontal	5-29	Pass
	Vertical	5-30	Pass
Pi/4 QPSK CH HIGH	Horizontal	5-31	Pass
	Vertical	5-32	Pass

Remark: All restriction band have been tested at both CHL, M and H with GFSK ,8DPSK and π/4 DQPSK modulation , only reported the worse case.

NOTES:

1.All modes were measured and the worst case emission was reported.

2. H =Horizontal V=Vertical

3. Emission = Reading +Antenna Factor + Cable Loss –Amp Factor(if exist)

4. Emission level dBμV = 20 log Emission level μV/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,all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

Remark :

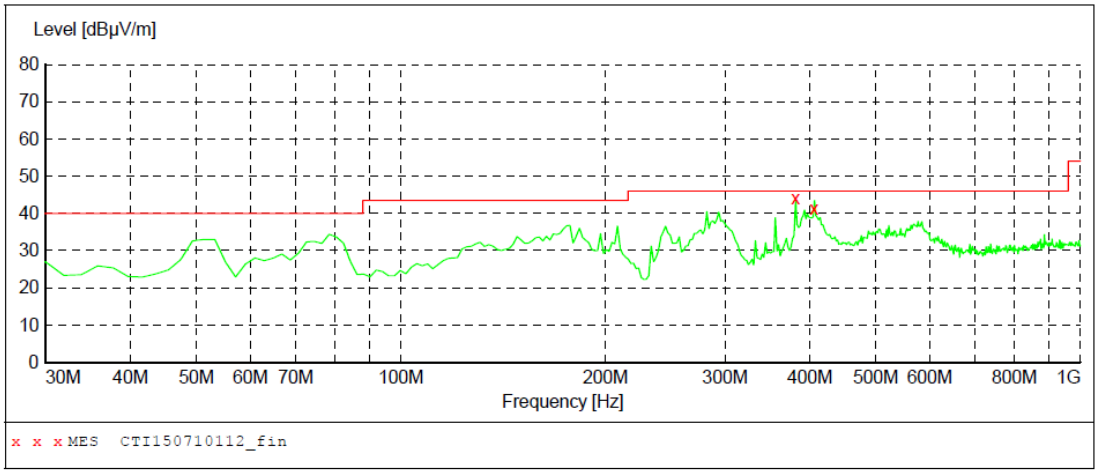
The limit of 15.209 of 3 meter distance is

Frequency MHz	Distance m	Field strength		Distance m	Field strength dBμV/m(QP)
		μV/m	dBμV/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 dBμV/m (PK) 54.0 dBμV/m (AV)		/	/

15.205 Restricted bands of operation:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]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	([2])

5.3.1 Diagram 5-1

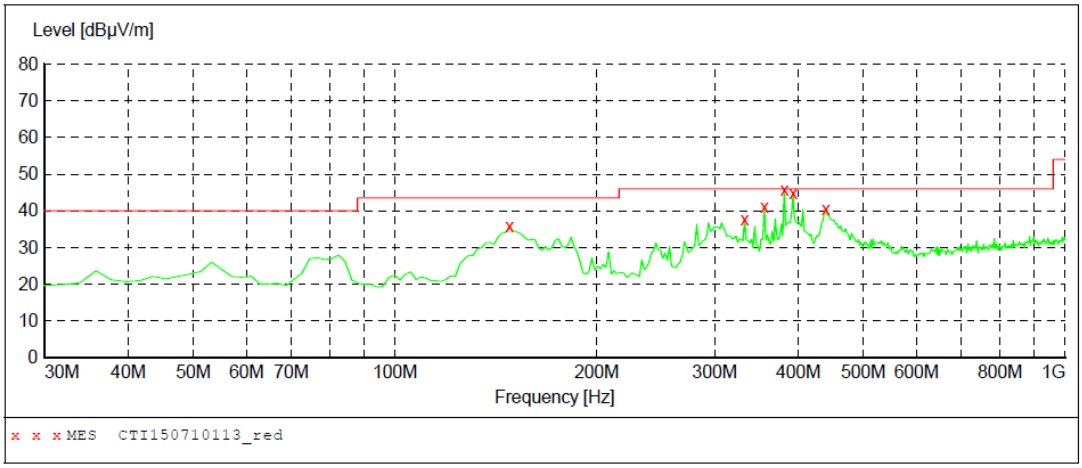


MEASUREMENT RESULT: "CTI150710112_fin"

10/07/2015 16:27

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
380.940000	44.10	18.8	46.0	1.9	QP	122.0	322.00	HORIZONTAL
405.480000	41.30	19.0	46.0	4.7	QP	118.0	315.00	HORIZONTAL

5.3.2 Diagram 5-2



MEASUREMENT RESULT: "CTI150710113_red"

10/07/2015 16:31

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
148.340000	35.70	11.4	43.5	7.8	---	200.0	318.00	VERTICAL
332.640000	37.70	17.0	46.0	8.3	---	100.0	10.00	VERTICAL
355.920000	41.20	17.7	46.0	4.8	---	100.0	364.00	VERTICAL
381.140000	45.80	18.5	46.0	0.2	---	100.0	349.00	VERTICAL
392.780000	44.90	18.9	46.0	1.1	---	100.0	349.00	VERTICAL
439.340000	40.40	19.9	46.0	5.6	---	100.0	364.00	VERTICAL

Remark: Peak detector.

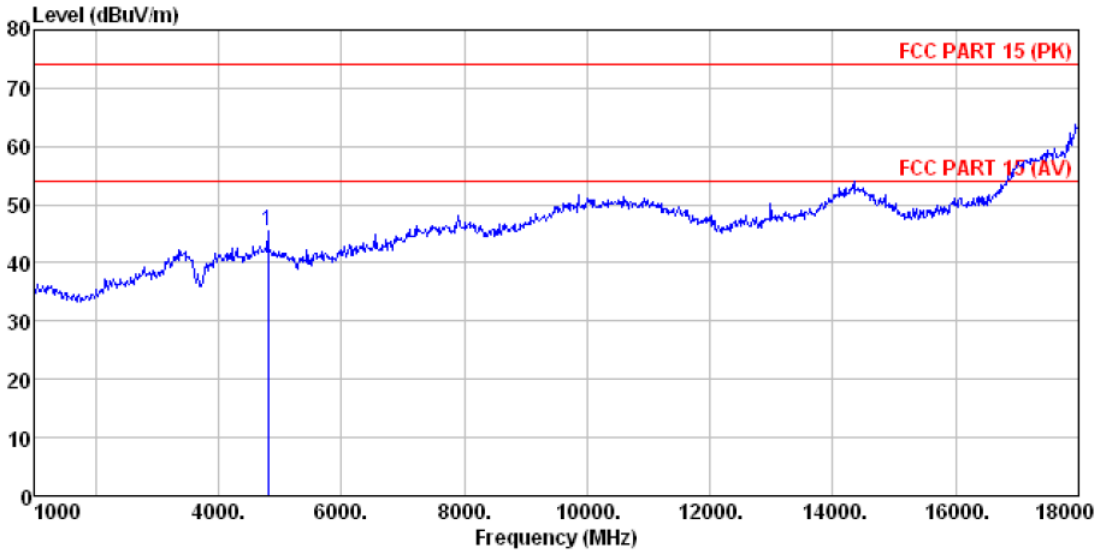
MEASUREMENT RESULT: "CTI150710113_fin"

10/07/2015 16:35

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
380.940000	42.30	18.8	46.0	3.7	QP	112.0	319.00	VERTICAL

Remark: QP detector

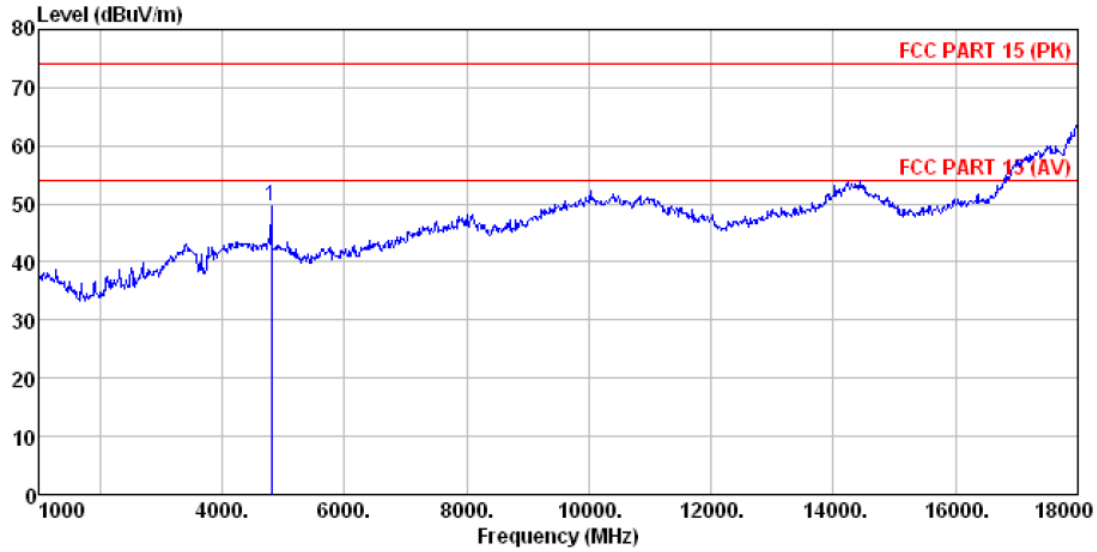
5.3.3 Diagram 5-3



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

	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	4807.000	37.28	31.78	8.60	32.09	45.57	74.00	-28.43	Peak

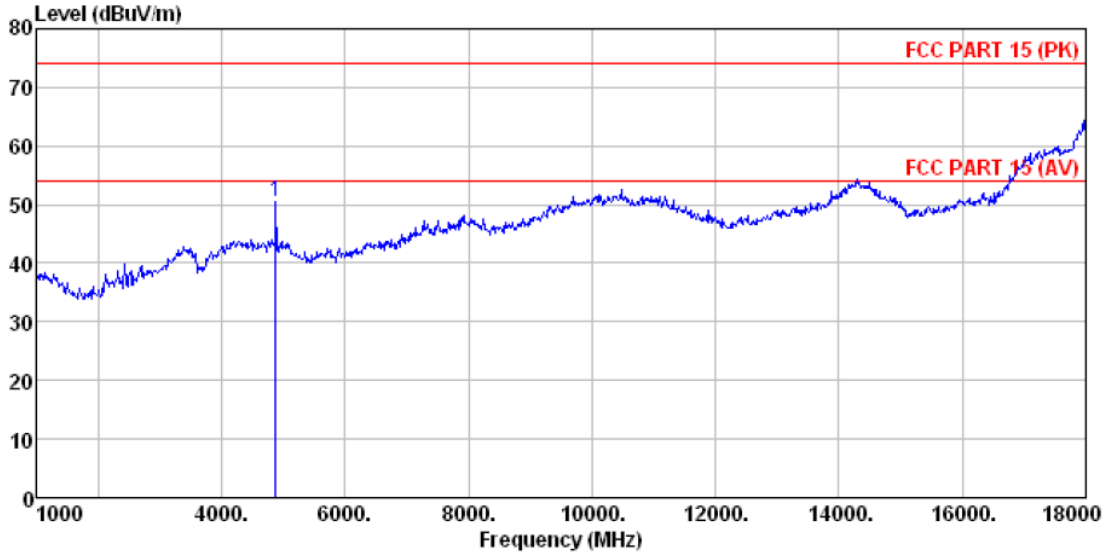
5.3.4 Diagram 5-4



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

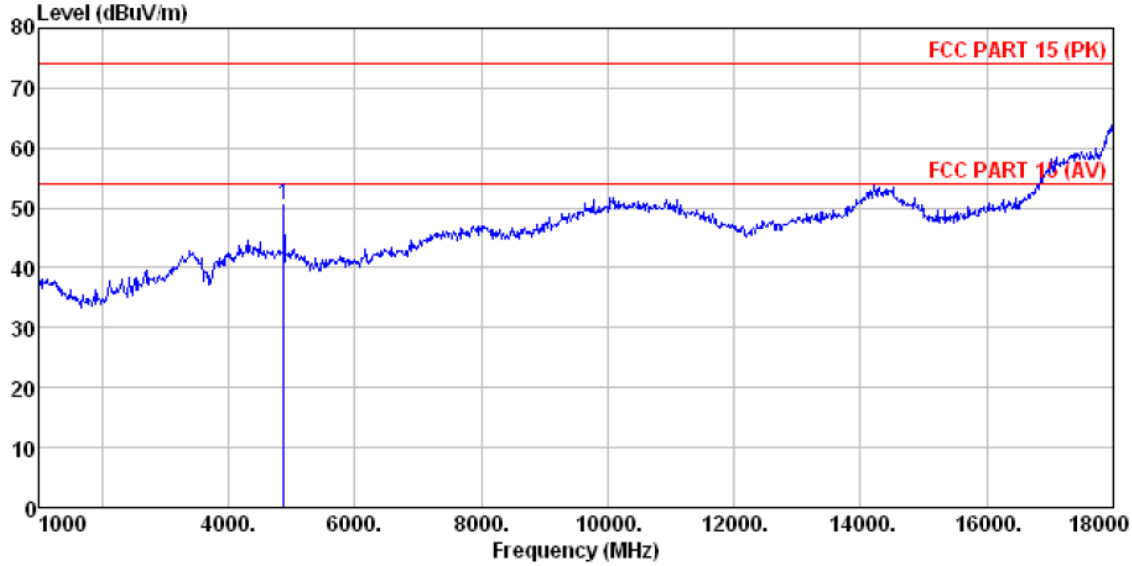
	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	4807.000	41.20	31.78	8.60	32.09	49.49	74.00	-24.51	Peak

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
              : GFSK 2441
                 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   4877.500  42.03  31.85   8.66  32.12  50.42  74.00 -23.58 Peak
```

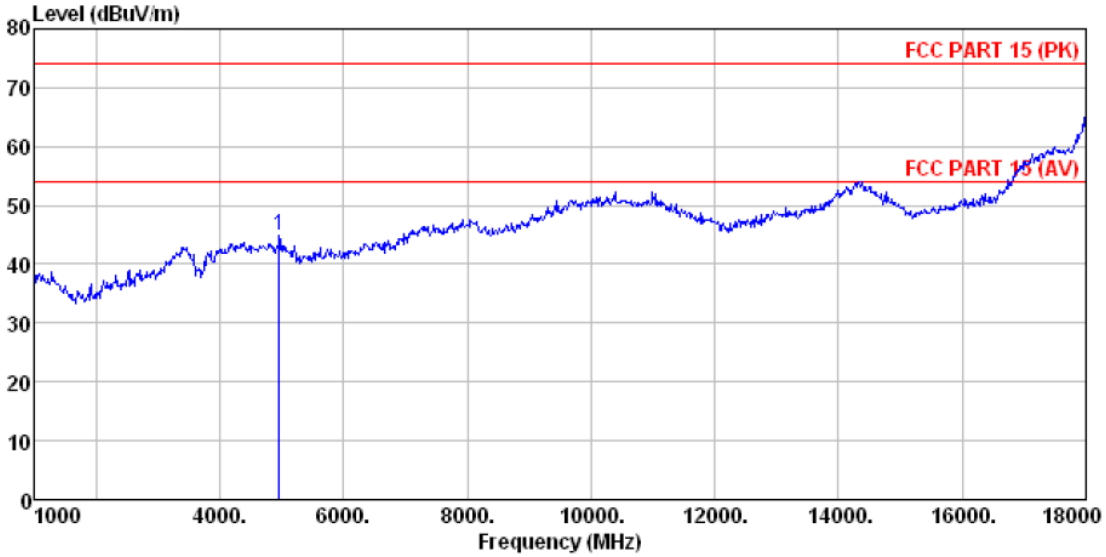
5.3.6 Diagram 5-6



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL
EUT : Bluetooth Speaker
Test Mode : TX mode
Test Engineer: Chen
: GFSK 2441

	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	4877.500	42.03	31.85	8.66	32.12	50.42	74.00	-23.58	Peak

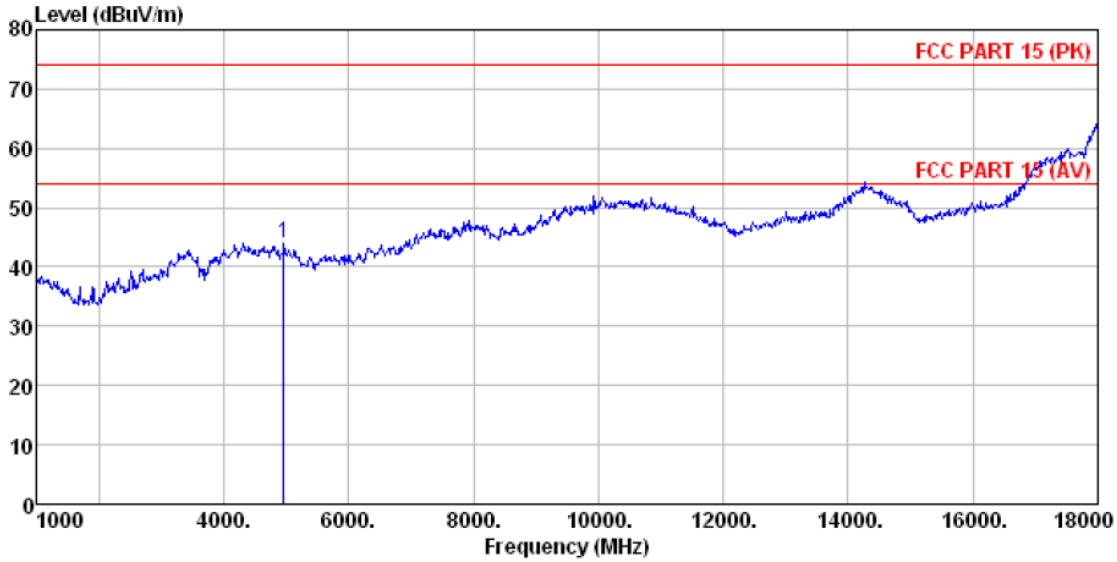
5.3.7 Diagram 5-7



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

	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	4959.750	36.31	31.93	8.73	32.16	44.81	74.00	-29.19	Peak

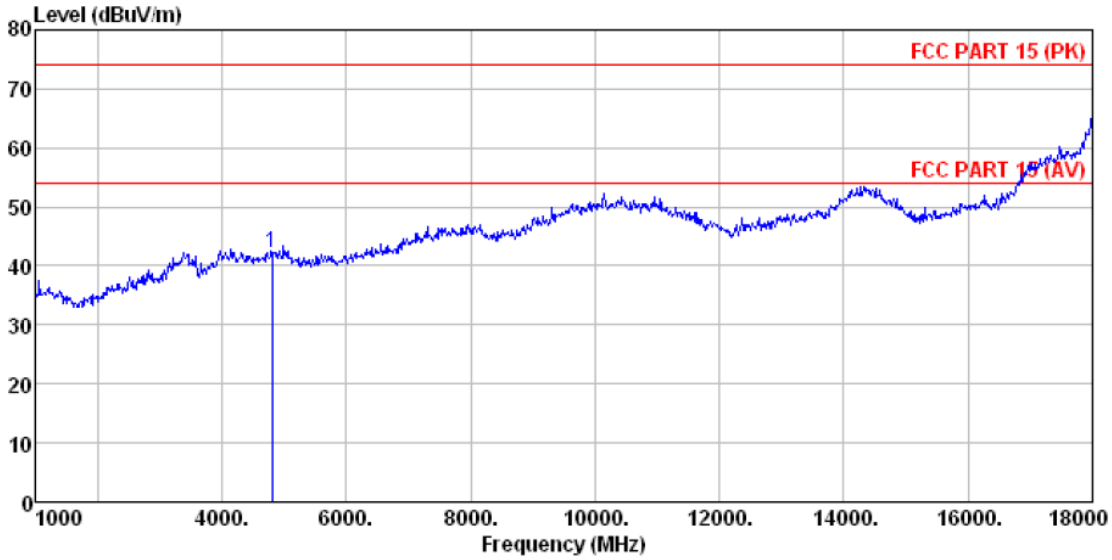
5.3.8 Diagram 5-8



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

	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	4959.750	35.52	31.93	8.73	32.16	44.02	74.00	-29.98	Peak

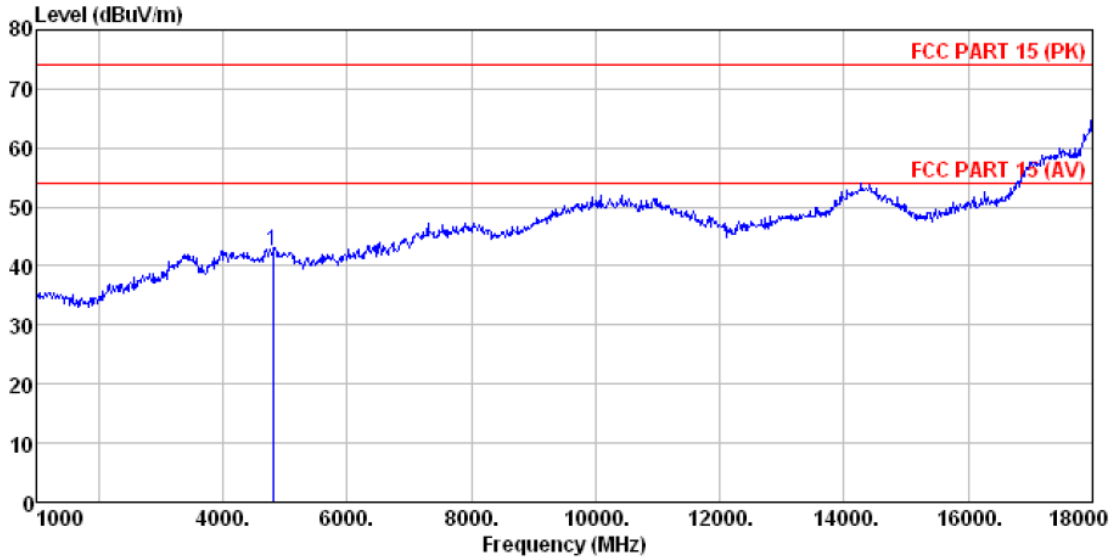
5.3.9 Diagram 5-9



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL
EUT : Bluetooth Speaker
Test Mode : TX mode
Test Engineer: Chen
: 8DPSK 2402

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	4807.000	33.95	31.78	8.60	32.09	42.24	74.00	-31.76	Peak

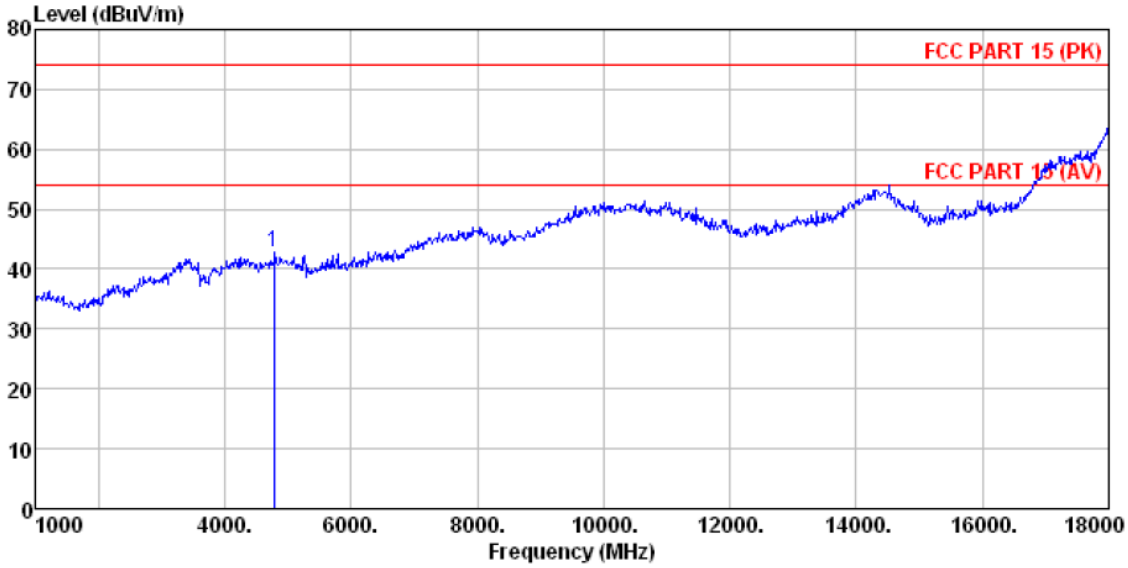
5.3.10 Diagram 5-10



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL
EUT : Bluetooth Speaker
Test Mode : TX mode
Test Engineer: Chen
: 8DPSK 2402

	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	4807.000	34.36	31.78	8.60	32.09	42.65	74.00	-31.35	Peak

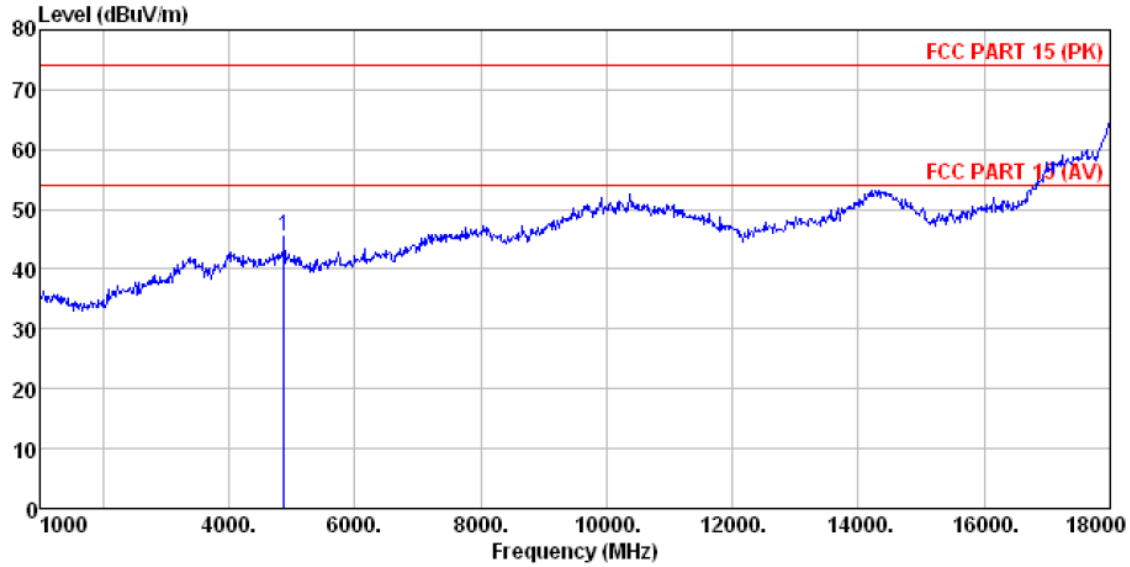
5.3.11 Diagram 5-11



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL
EUT : Bluetooth Speaker
Test Mode : TX mode
Test Engineer: Chen
: 8DPSK 2441

	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	4783.500	34.64	31.75	8.59	32.08	42.90	74.00	-31.10	Peak

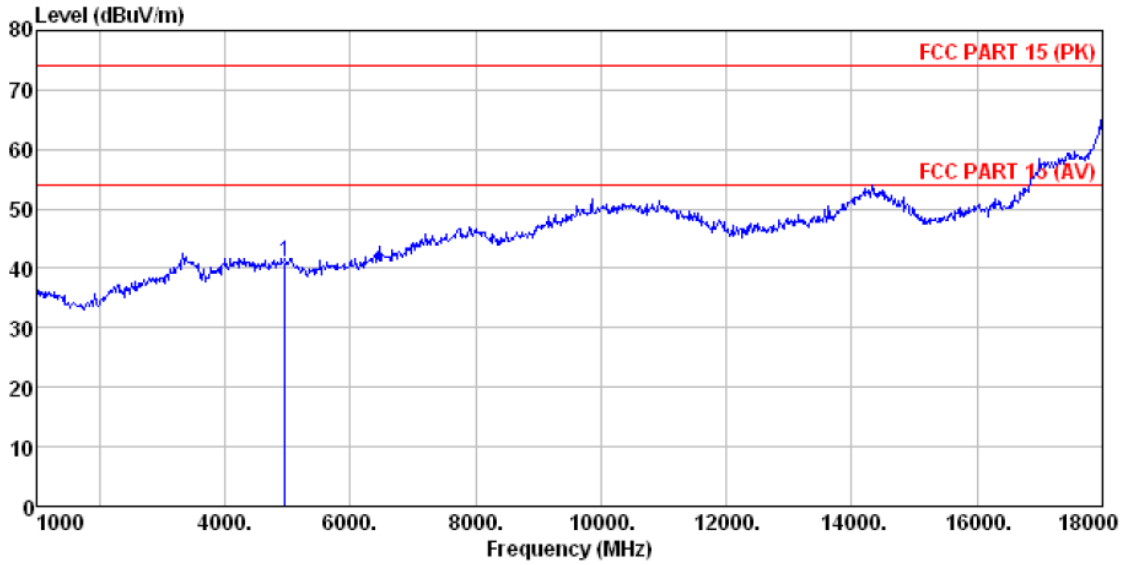
5.3.12 Diagram 5-12



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL
EUT : Bluetooth Speaker
Test Mode : TX mode
Test Engineer: Chen
: 8DPSK 2441

	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	4877.500	37.04	31.85	8.66	32.12	45.43	74.00	-28.57	Peak

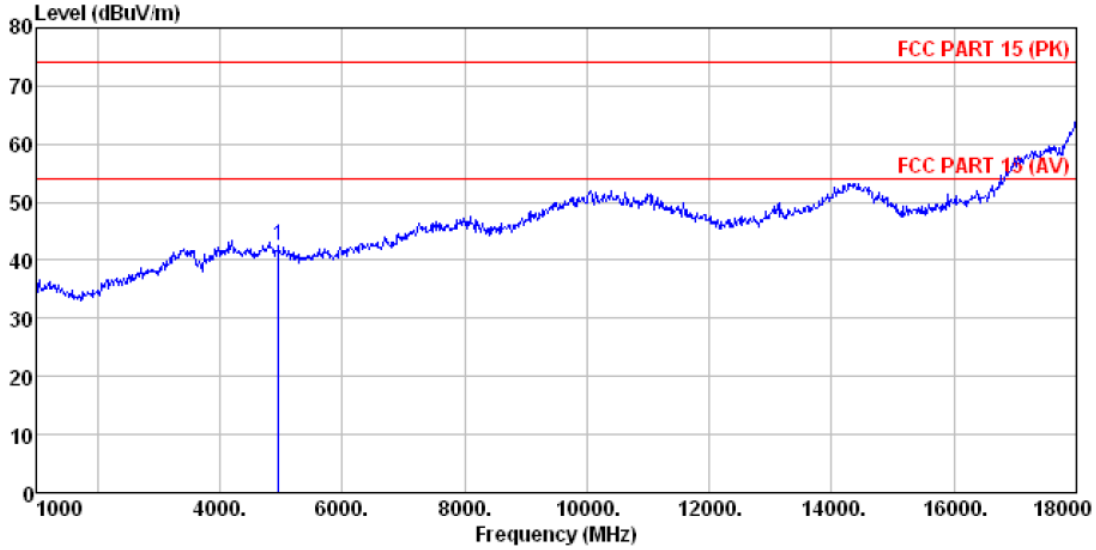
5.3.13 Diagram 5-13



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL
EUT : Bluetooth Speaker
Test Mode : TX mode
Test Engineer: Chen
: 8DPSK 2480

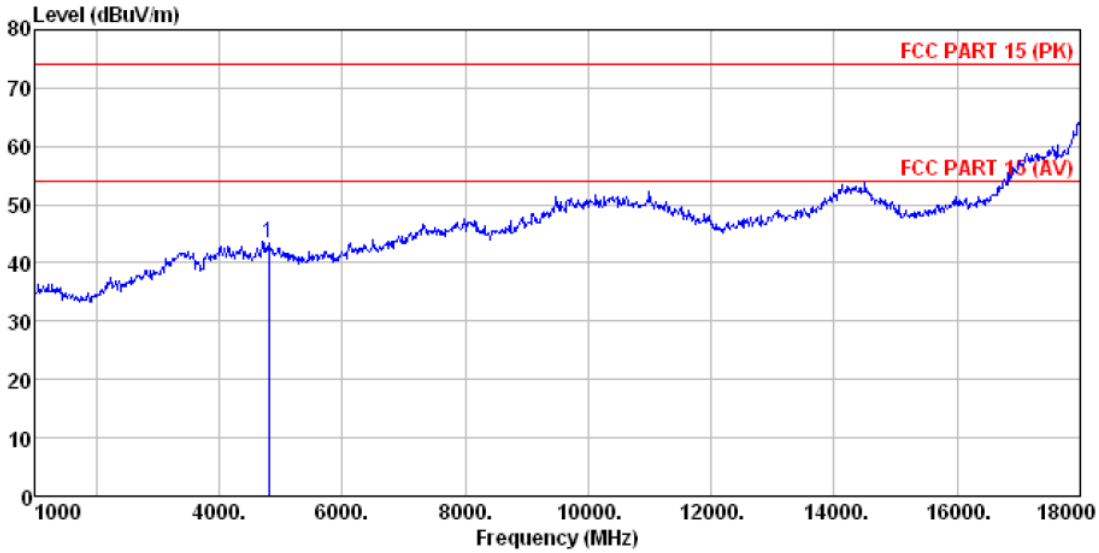
	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	4959.750	32.48	31.93	8.73	32.16	40.98	74.00	-33.02	Peak

5.3.14 Diagram 5-14



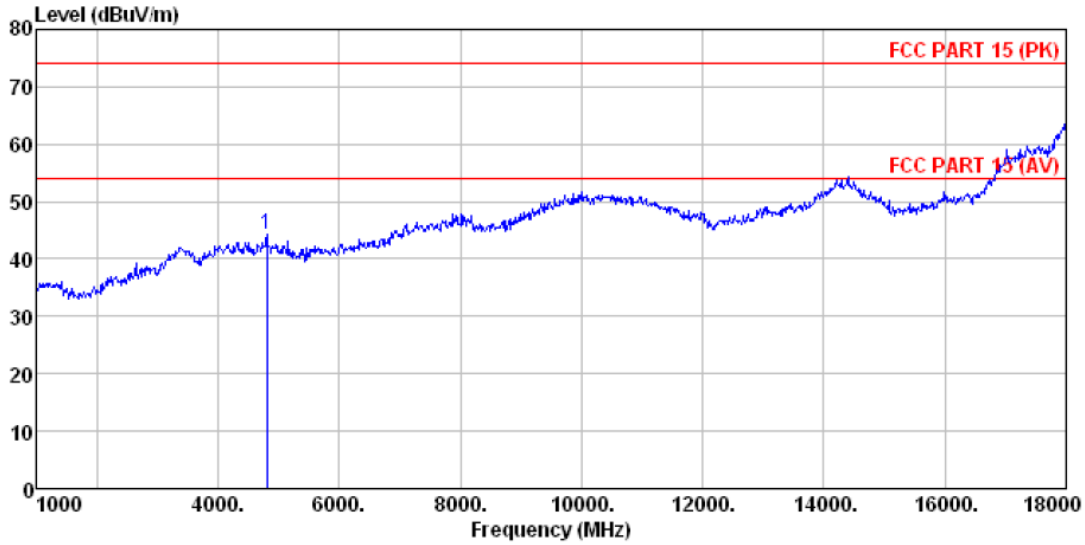

```
Site          : 3m chamber
Condition     : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL
EUT           : Bluetooth Speaker
Test Mode     : TX mode
Test Engineer: Chen
              : 8DPSK 2480
                 ReadAntenna  Cable Preamp          Limit   Over
          Freq   Level Factor   Loss Factor  Level   Line  Limit Remark
        --------- ------ ------ ------ ------ ------ ------ ------ ----------
              MHz  dBuV   dB/m     dB     dB dBuV/m dBuV/m     dB

  1    4959.750  33.92  31.93   8.73  32.16  42.42  74.00 -31.58 Peak
```

5.3.15 Diagram 5-15




```
Site          : 3m chamber
Condition     : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL
EUT           : Bluetooth Speaker
Test Mode     : TX mode
Test Engineer: Chen
              : π/4QPSK 2402
                 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   4807.000  35.16  31.78   8.60  32.09  43.45  74.00 -30.55 Peak
```

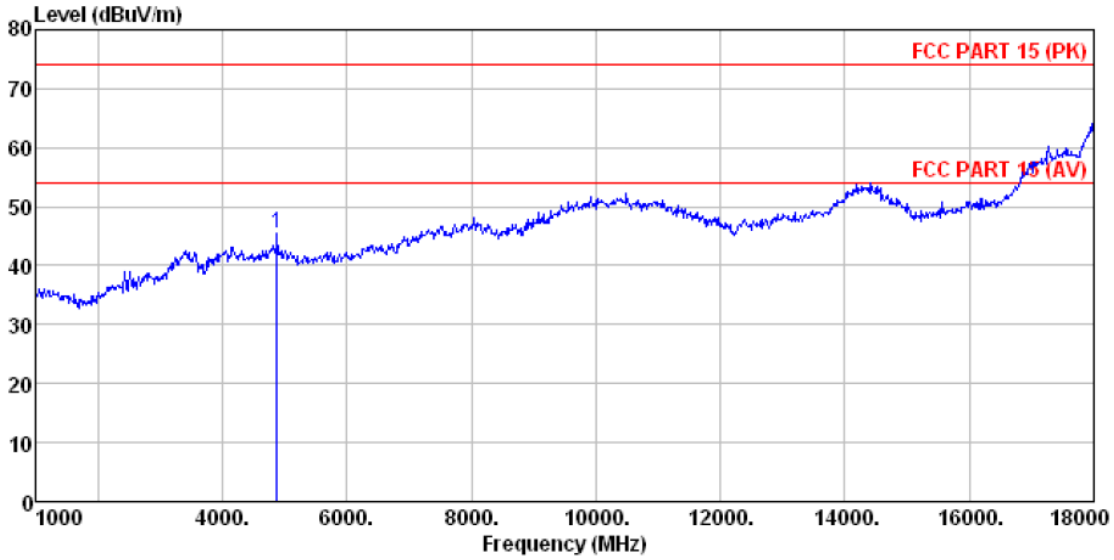
5.3.16 Diagram 5-16



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL
EUT : Bluetooth Speaker
Test Mode : TX mode
Test Engineer: Chen
: π/4QPSK 2402

	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	4807.000	35.95	31.78	8.60	32.09	44.24	74.00	-29.76	Peak

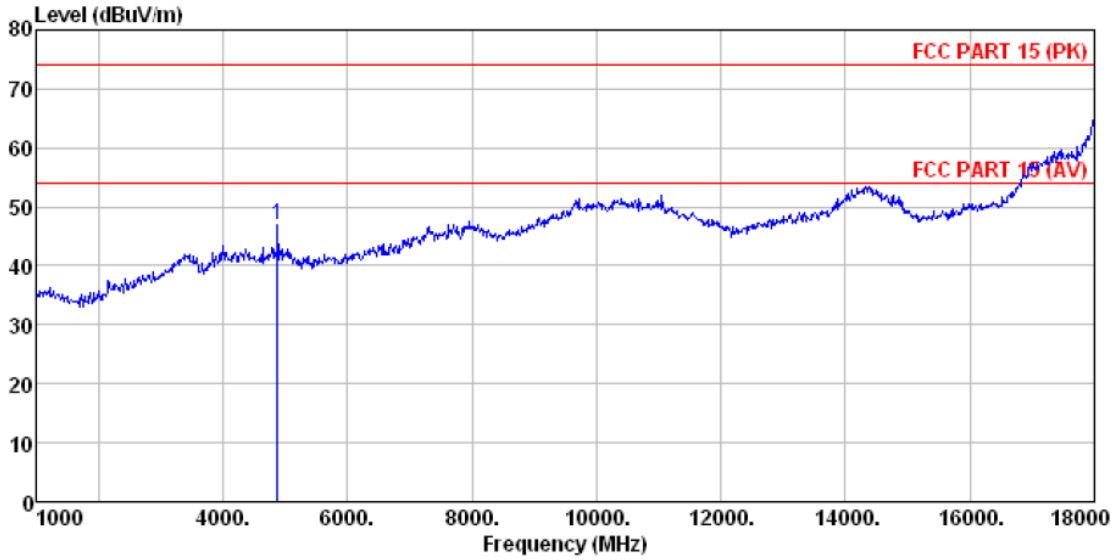
5.3.17 Diagram 5-17



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL
EUT : Bluetooth Speaker
Test Mode : TX mode
Test Engineer: Chen
: π/4QPSK 2441

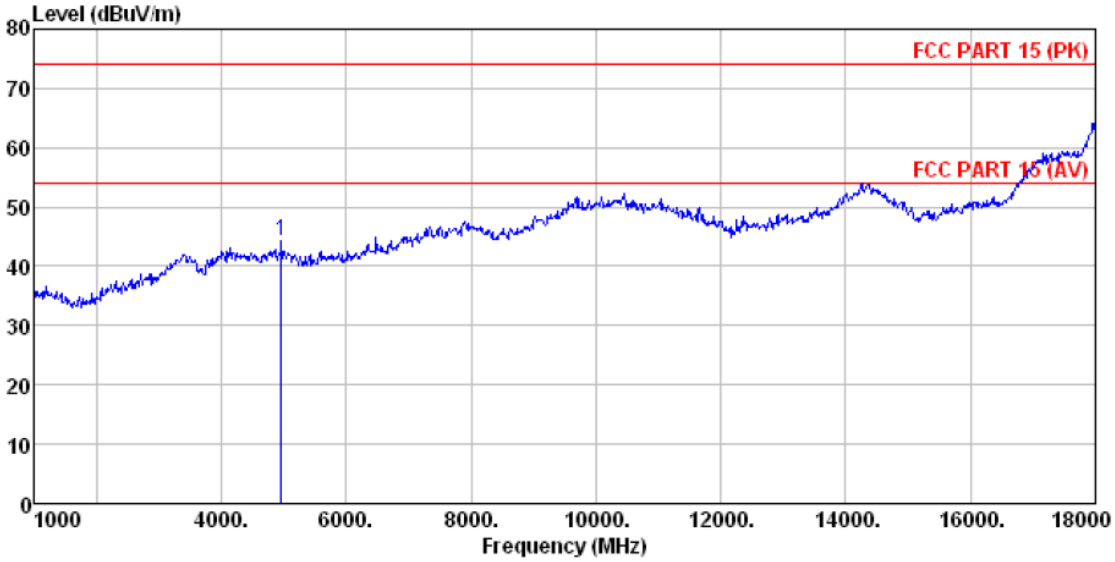
	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	4877.500	37.01	31.85	8.66	32.12	45.40	74.00	-28.60	Peak

5.3.18 Diagram 5-18




```
Site          : 3m chamber
Condition     : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL
EUT           : Bluetooth Speaker
Test Mode     : TX mode
Test Engineer: Chen
              : π/4QPSK 2441
                 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   4877.500  38.65  31.85   8.66  32.12  47.04  74.00 -26.96 Peak
```

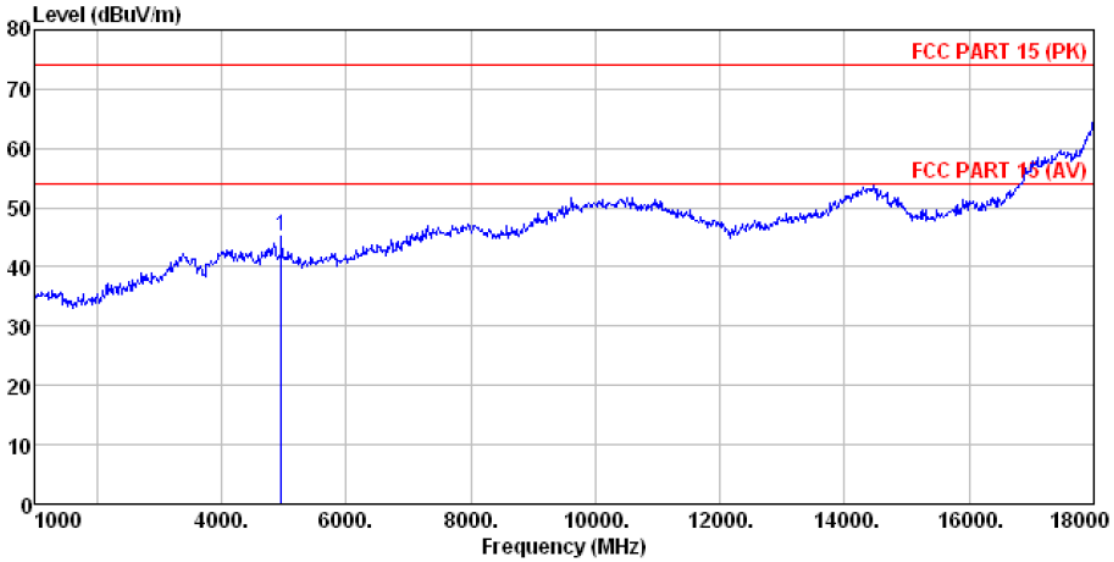
5.3.19 Diagram 5-19



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL
EUT : Bluetooth Speaker
Test Mode : TX mode
Test Engineer: Chen
: π/4QPSK 2480

	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	4959.750	35.75	31.93	8.73	32.16	44.25	74.00	-29.75	Peak

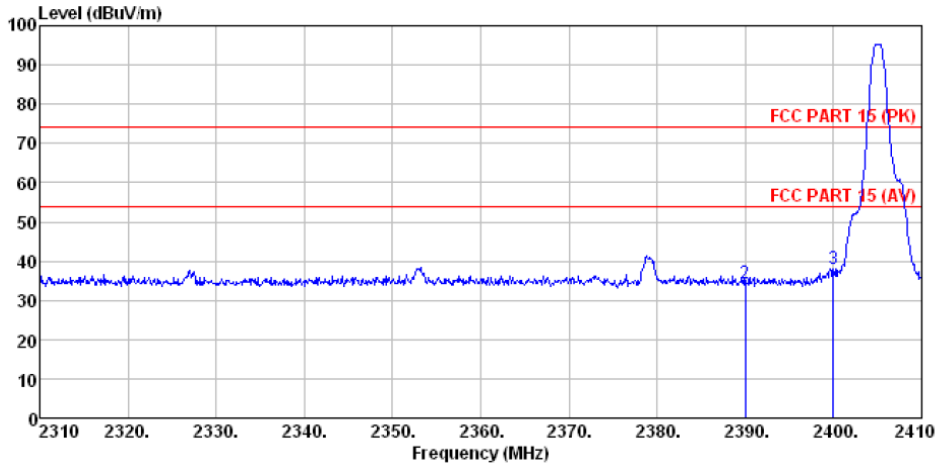
5.3.20 Diagram 5-20



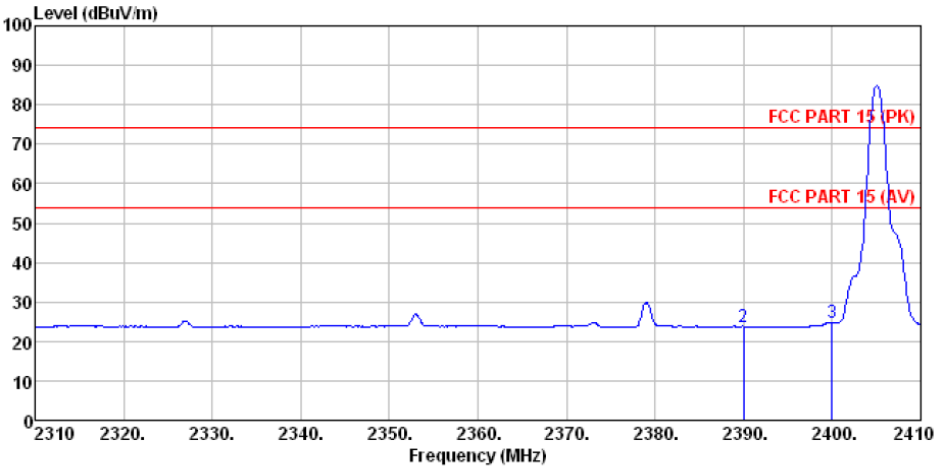
Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL
EUT : Bluetooth Speaker
Test Mode : TX mode
Test Engineer: Chen
: π/4QPSK 2480

	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	4959.750	36.64	31.93	8.73	32.16	45.14	74.00	-28.86	Peak

5.3.21 Diagram 5-21

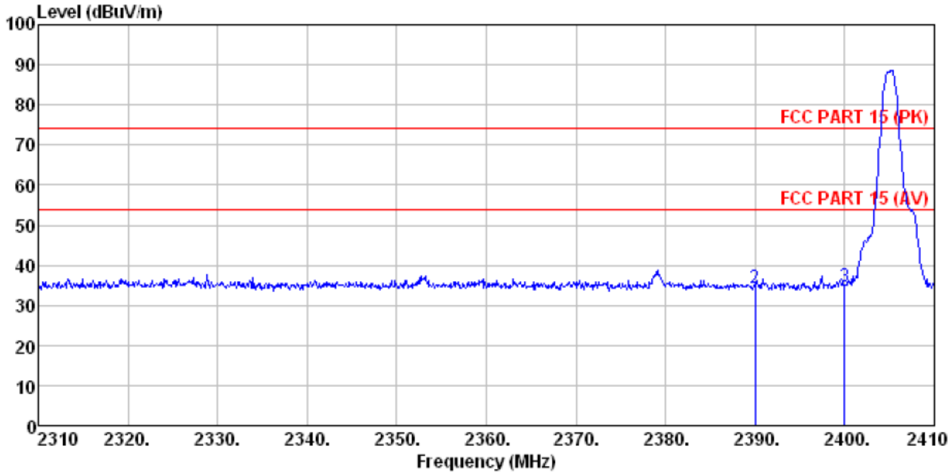



```
Site          : 3m chamber
Condition     : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL
EUT           : Bluetooth Speaker
Test Mode     : TX mode
Test Engineer: Chen
              : GFSK 2402
                 ReadAntenna  Cable Preamp          Limit   Over
          Freq  Level Factor   Loss Factor  Level   Line  Limit Remark
        ------- ------ ------ ------ ------ ------ ------ ------ ----------
           MHz   dBuV   dB/m     dB     dB dBuV/m dBuV/m     dB

  1   2310.000  34.91  27.91   5.30  34.11  34.01  74.00 -39.99 Peak
  2   2390.000  35.32  27.59   5.38  34.01  34.28  74.00 -39.72 Peak
  3   2400.000  38.99  27.58   5.39  34.01  37.95  74.00 -36.05 Peak
```



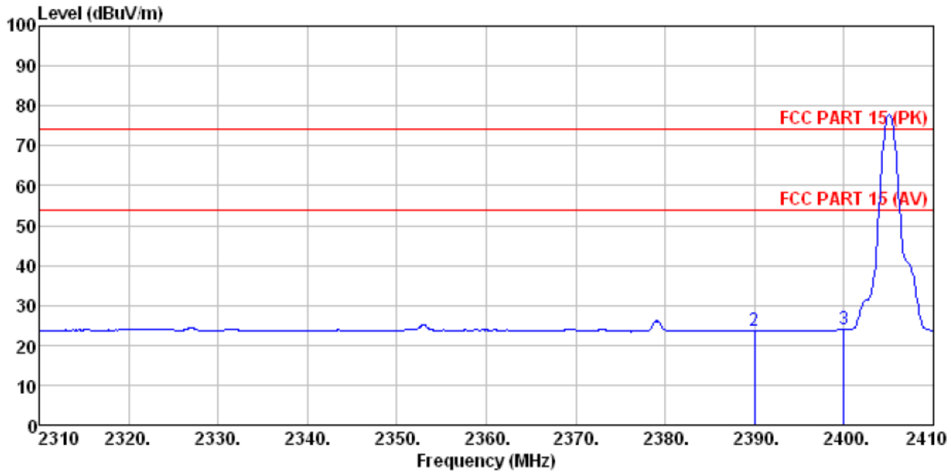

```
Site          : 3m chamber
Condition     : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL
EUT           : Bluetooth Speaker
Test Mode     : TX mode
Test Engineer: Chen
              : GFSK 2402
                 ReadAntenna  Cable Preamp          Limit   Over
          Freq  Level Factor   Loss Factor  Level   Line  Limit Remark
        ------- ------ ------ ------ ------ ------ ------ ------ ----------
           MHz   dBuV   dB/m     dB     dB dBuV/m dBuV/m     dB

  1   2310.000  24.59  27.91   5.30  34.11  23.69  54.00 -30.31 Average
  2   2390.000  24.81  27.59   5.38  34.01  23.77  54.00 -30.23 Average
  3   2400.000  25.73  27.58   5.39  34.01  24.69  54.00 -29.31 Average
```

5.3.22 Diagram 5-22



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

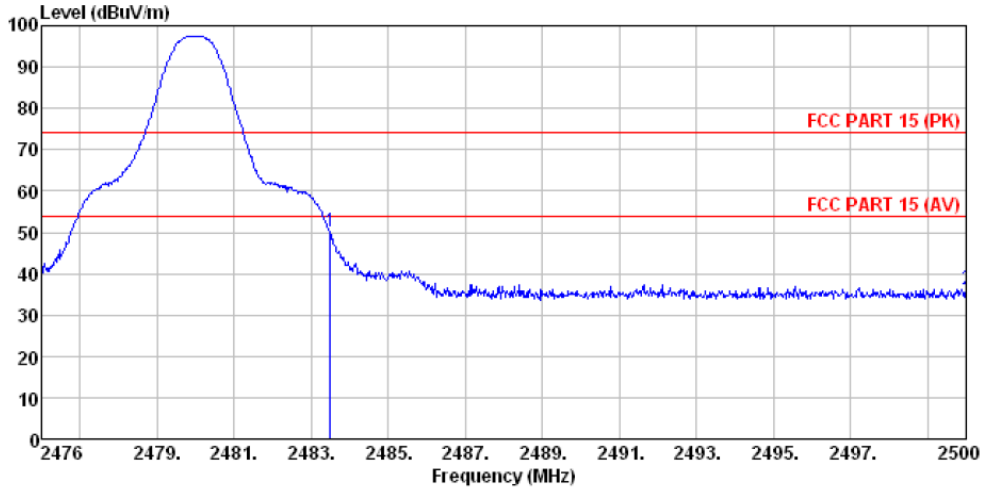
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	35.66	27.91	5.30	34.11	34.76	74.00	-39.24	Peak
2	2390.000	35.34	27.59	5.38	34.01	34.30	74.00	-39.70	Peak
3	2400.000	35.89	27.58	5.39	34.01	34.85	74.00	-39.15	Peak



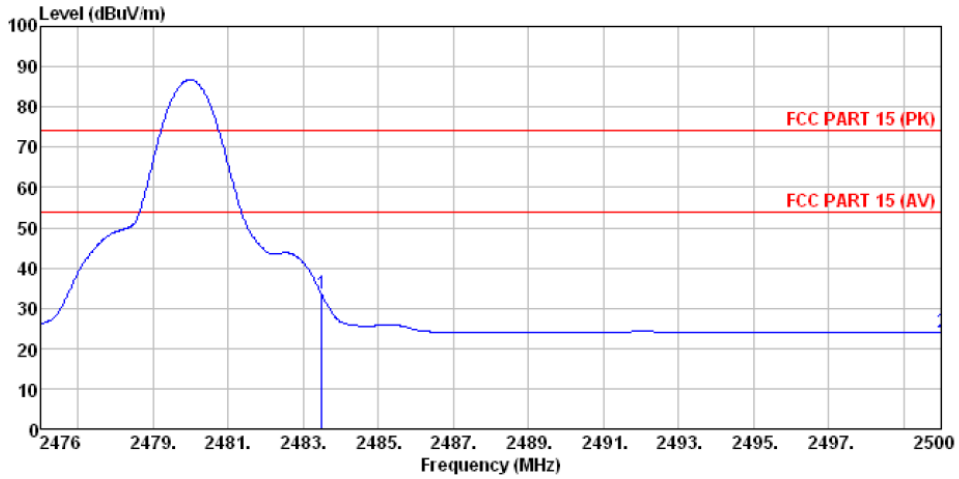
Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL
EUT : Bluetooth Speaker
Test Mode : TX mode
Test Engineer: Chen
: GFSK 2402

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	24.60	27.91	5.30	34.11	23.70	54.00	-30.30	Average
2	2390.000	24.67	27.59	5.38	34.01	23.63	54.00	-30.37	Average
3	2400.000	24.99	27.58	5.39	34.01	23.95	54.00	-30.05	Average

5.3.23 Diagram 5-23

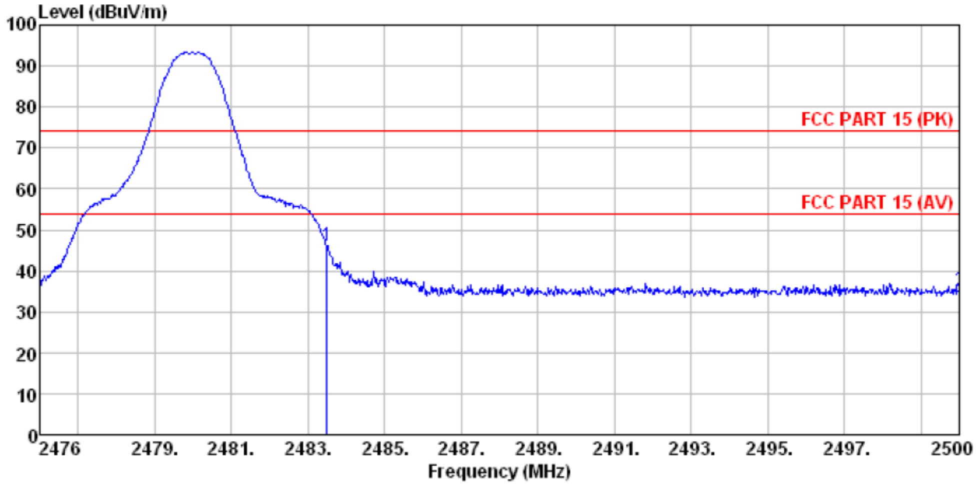



```
Site          : 3m chamber
Condition     : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL
EUT           : Bluetooth Speaker
Test Mode     : TX mode
Test Engineer: Chen
              : GFSK 2480
                 ReadAntenna  Cable Preamp          Limit   Over
          Freq  Level Factor   Loss Factor  Level   Line  Limit Remark
      --------- ------ ------ ------ ------ ------ ------ ------ ----------
            MHz  dBuV   dB/m     dB     dB dBuV/m dBuV/m     dB

  1   2483.500  51.16  27.53   5.47  33.92  50.24  74.00 -23.76 Peak
  2   2500.000  37.08  27.55   5.49  33.90  36.22  74.00 -37.78 Peak
```



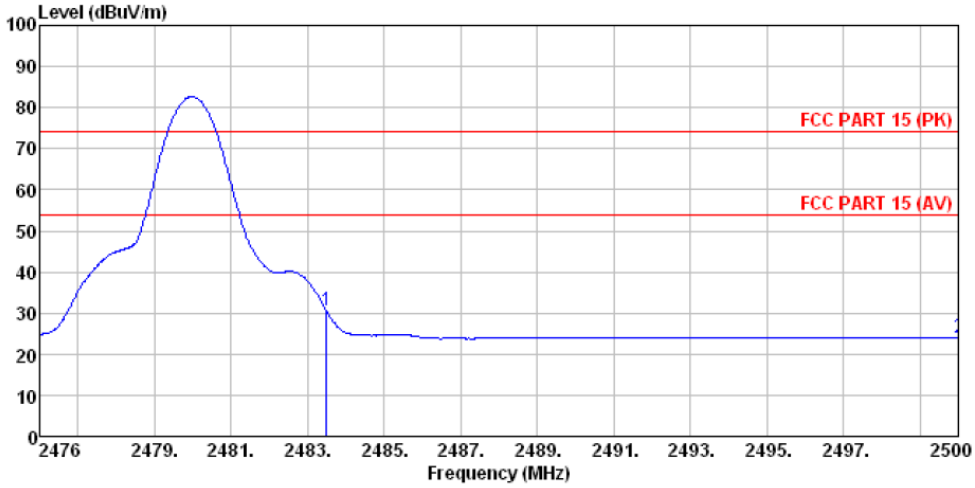

```
Site          : 3m chamber
Condition     : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL
EUT           : Bluetooth Speaker
Test Mode     : TX mode
Test Engineer: Chen
              : GFSK 2480
                 ReadAntenna  Cable Preamp          Limit   Over
          Freq  Level Factor   Loss Factor  Level   Line  Limit Remark
      --------- ------ ------ ------ ------ ------ ------ ------ ----------
            MHz  dBuV   dB/m     dB     dB dBuV/m dBuV/m     dB

  1   2483.500  34.53  27.53   5.47  33.92  33.61  54.00 -20.39 Average
  2   2500.000  24.88  27.55   5.49  33.90  24.02  54.00 -29.98 Average
```

5.3.24 Diagram 5-24



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

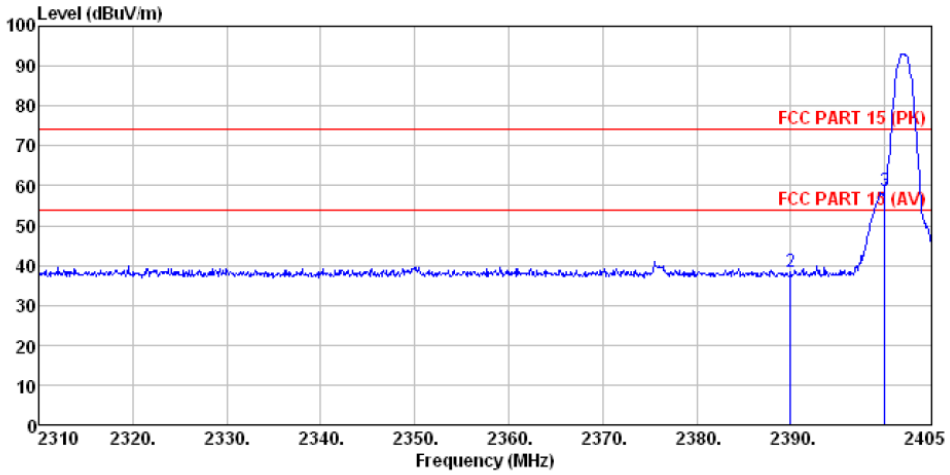
	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	47.12	27.53	5.47	33.92	46.20	74.00	-27.80	Peak
2	2500.000	35.82	27.55	5.49	33.90	34.96	74.00	-39.04	Peak



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

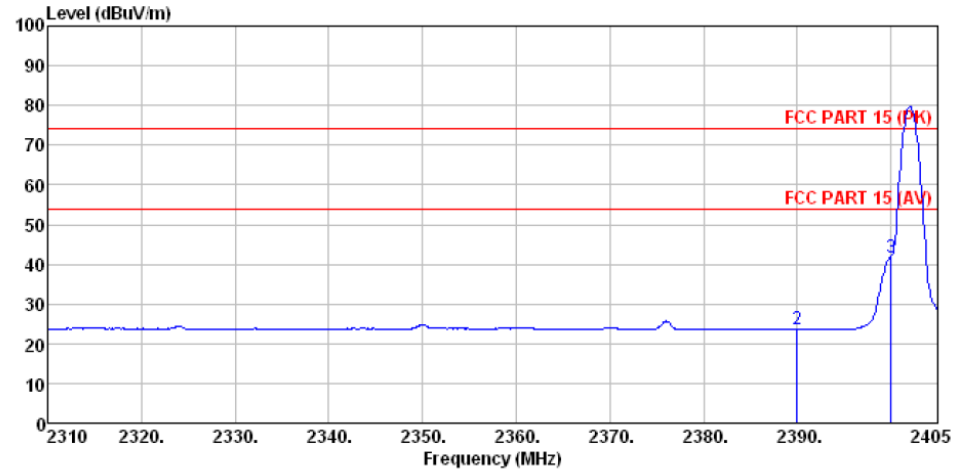
	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	31.61	27.53	5.47	33.92	30.69	54.00	-23.31	Average
2	2500.000	24.78	27.55	5.49	33.90	23.92	54.00	-30.08	Average

5.3.25 Diagram 5-25



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL
EUT : Bluetooth Speaker
Test Mode : TX mode
Test Engineer: Chen
: 8DPSK 2402

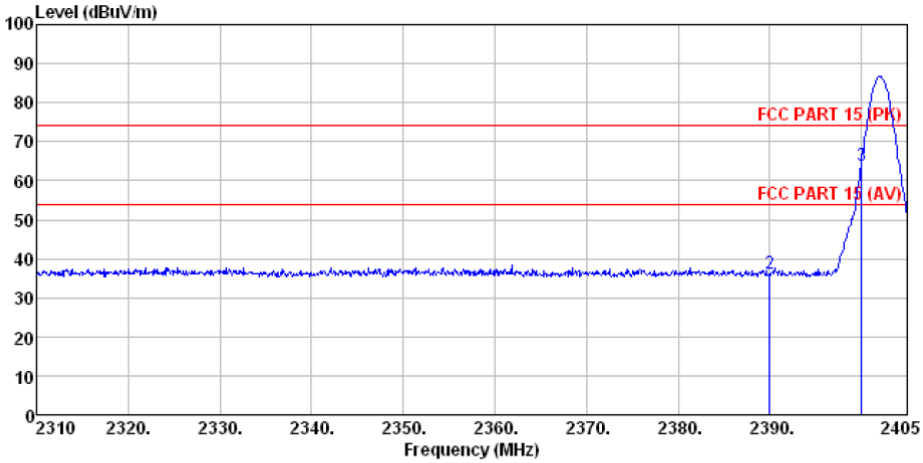
	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	38.68	27.91	5.30	34.11	37.78	74.00	-36.22	Peak
2	2390.000	39.31	27.59	5.38	34.01	38.27	74.00	-35.73	Peak
3	2400.000	59.75	27.58	5.39	34.01	58.71	74.00	-15.29	Peak



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL
EUT : Bluetooth Speaker
Test Mode : TX mode
Test Engineer: Chen
: 8DPSK 2402

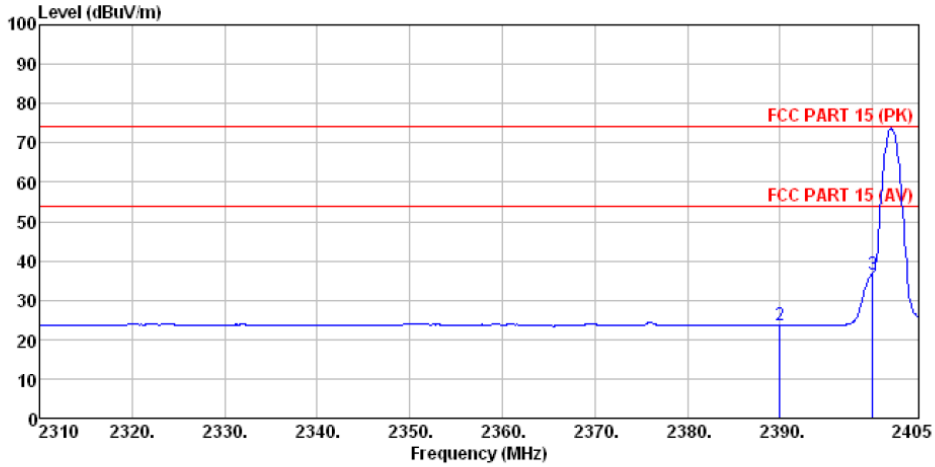
	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	24.65	27.91	5.30	34.11	23.75	54.00	-30.25	Average
2	2390.000	24.81	27.59	5.38	34.01	23.77	54.00	-30.23	Average
3	2400.000	42.92	27.58	5.39	34.01	41.88	54.00	-12.12	Average

5.3.26 Diagram 5-26



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL
EUT : Bluetooth Speaker
Test Mode : TX mode
Test Engineer: Chen
: 8DPSK 2402

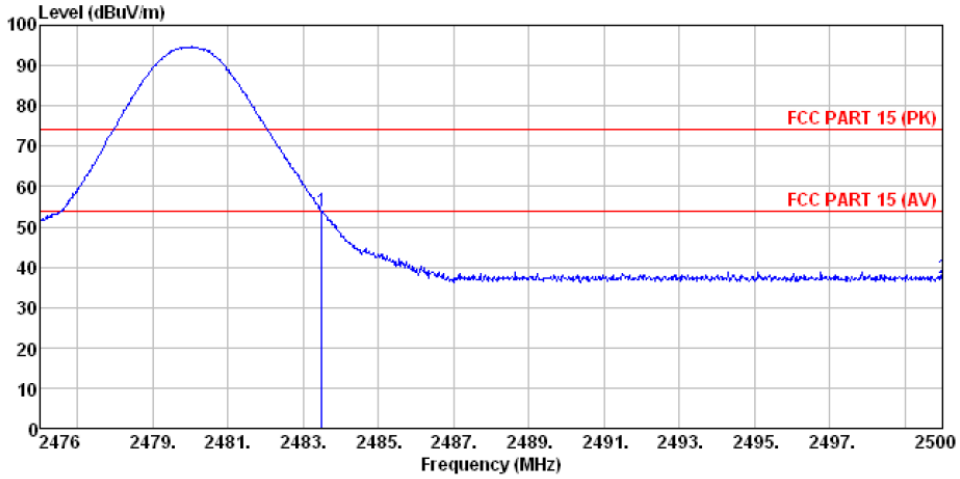
	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	37.25	27.91	5.30	34.11	36.35	74.00	-37.65	Peak
2	2390.000	37.15	27.59	5.38	34.01	36.11	74.00	-37.89	Peak
3	2400.000	64.95	27.58	5.39	34.01	63.91	74.00	-10.09	Peak



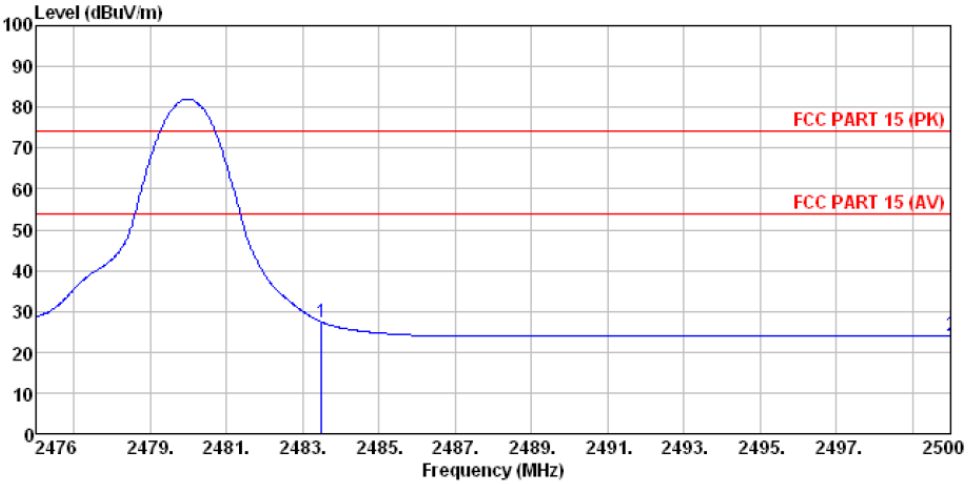
Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL
EUT : Bluetooth Speaker
Test Mode : TX mode
Test Engineer: Chen
: 8DPSK 2402

	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	24.54	27.91	5.30	34.11	23.64	54.00	-30.36	Average
2	2390.000	24.71	27.59	5.38	34.01	23.67	54.00	-30.33	Average
3	2400.000	37.70	27.58	5.39	34.01	36.66	54.00	-17.34	Average

5.3.27 Diagram 5-27

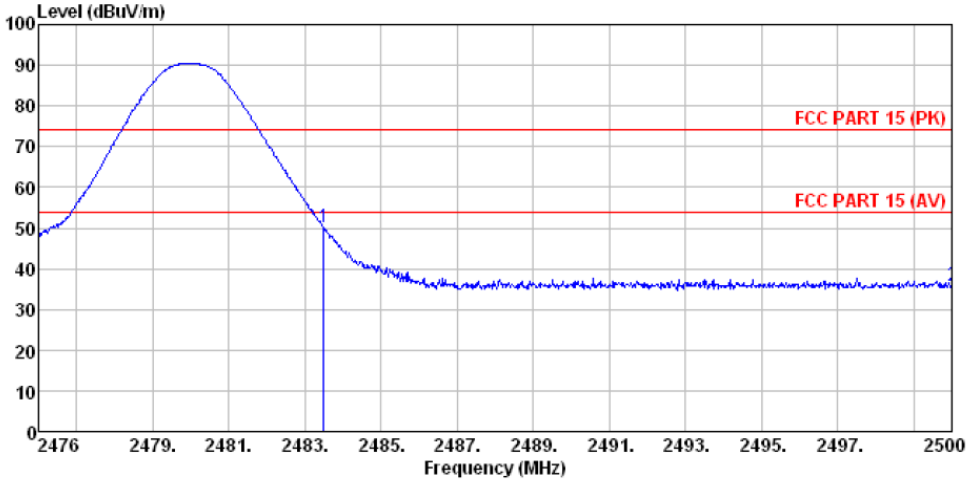



```
Site          : 3m chamber
Condition     : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL
EUT           : Bluetooth Speaker
Test Mode     : TX mode
Test Engineer: Chen
              : 8DPSK 2480
                 ReadAntenna  Cable Preamp         Limit   Over
          Freq  Level Factor   Loss Factor  Level   Line  Limit Remark
      --------- ------ ------ ------ ------ ------ ------ ------ ----------
            MHz   dBuV   dB/m     dB     dB dBuV/m dBuV/m     dB

  1   2483.500  54.93  27.53   5.47  33.92  54.01  74.00 -19.99 Peak
  2   2500.000  38.24  27.55   5.49  33.90  37.38  74.00 -36.62 Peak
```

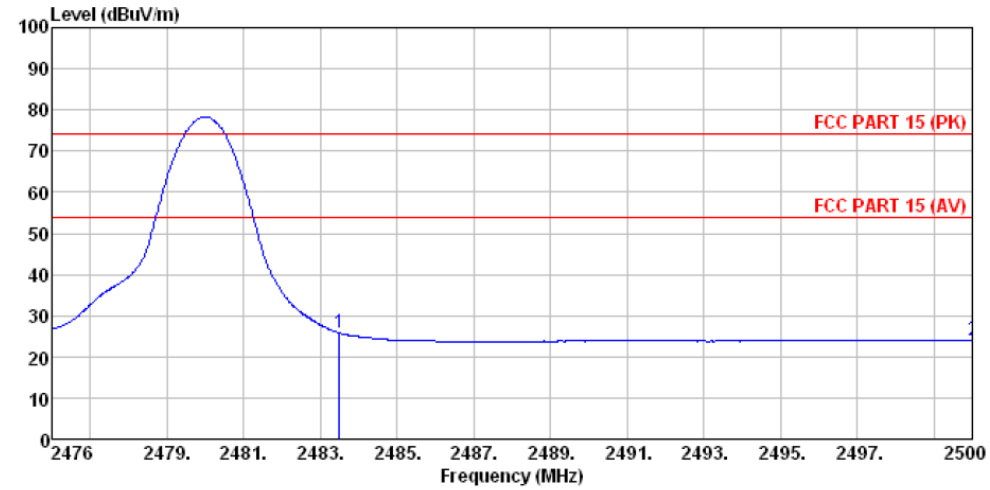



```
Site          : 3m chamber
Condition     : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL
EUT           : Bluetooth Speaker
Test Mode     : TX mode
Test Engineer: Chen
              : 8DPSK 2480
                 ReadAntenna  Cable Preamp         Limit   Over
          Freq  Level Factor   Loss Factor  Level   Line  Limit Remark
      --------- ------ ------ ------ ------ ------ ------ ------ ----------
            MHz   dBuV   dB/m     dB     dB dBuV/m dBuV/m     dB

  1   2483.500  28.34  27.53   5.47  33.92  27.42  54.00 -26.58 Average
  2   2500.000  24.83  27.55   5.49  33.90  23.97  54.00 -30.03 Average
```

5.3.28 Diagram 5-28

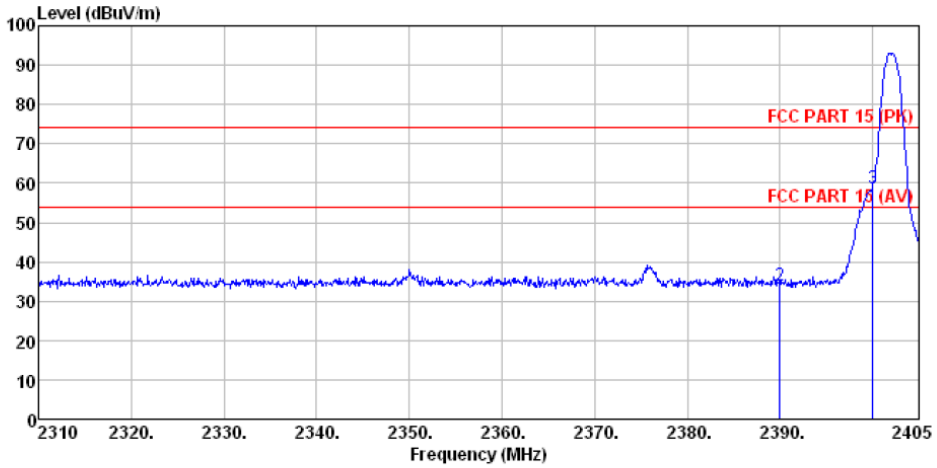



```
Site          : 3m chamber
Condition     : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL
EUT           : Bluetooth Speaker
Test Mode     : TX mode
Test Engineer: Chen
              : 8DPSK 2480
                 ReadAntenna  Cable Preamp          Limit   Over
          Freq  Level Factor   Loss Factor  Level   Line  Limit Remark
       --------- ------ ------ ------ ------ ------ ------ ------ ----------
              MHz  dBuV   dB/m     dB     dB dBuV/m dBuV/m     dB

  1    2483.500  51.13  27.53   5.47  33.92  50.21  74.00 -23.79 Peak
  2    2500.000  36.69  27.55   5.49  33.90  35.83  74.00 -38.17 Peak
```



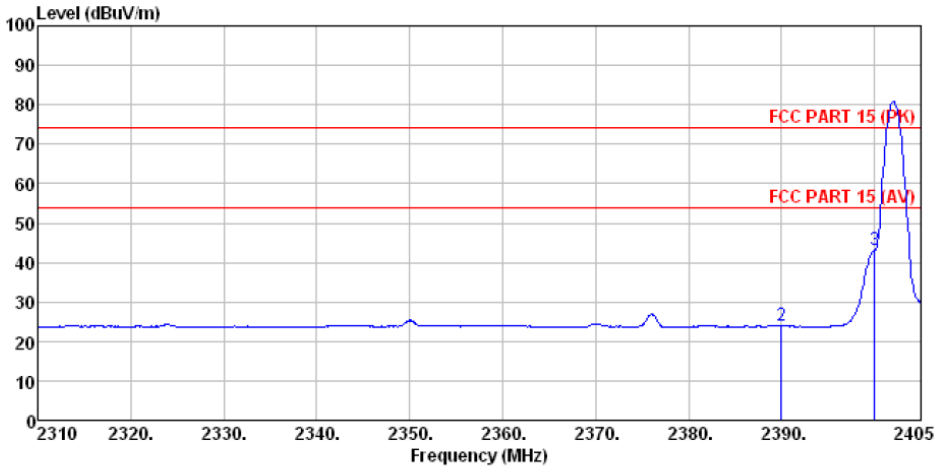

```
Site          : 3m chamber
Condition     : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL
EUT           : Bluetooth Speaker
Test Mode     : TX mode
Test Engineer: Chen
              : 8DPSK 2480
                 ReadAntenna  Cable Preamp          Limit   Over
          Freq  Level Factor   Loss Factor  Level   Line  Limit Remark
       --------- ------ ------ ------ ------ ------ ------ ------ ----------
              MHz  dBuV   dB/m     dB     dB dBuV/m dBuV/m     dB

  1    2483.500  26.71  27.53   5.47  33.92  25.79  54.00 -28.21 Average
  2    2500.000  24.74  27.55   5.49  33.90  23.88  54.00 -30.12 Average
```

5.3.29 Diagram 5-29



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL
EUT : Bluetooth Speaker
Test Mode : TX mode
Test Engineer: Chen
: π/4QPSK 2402

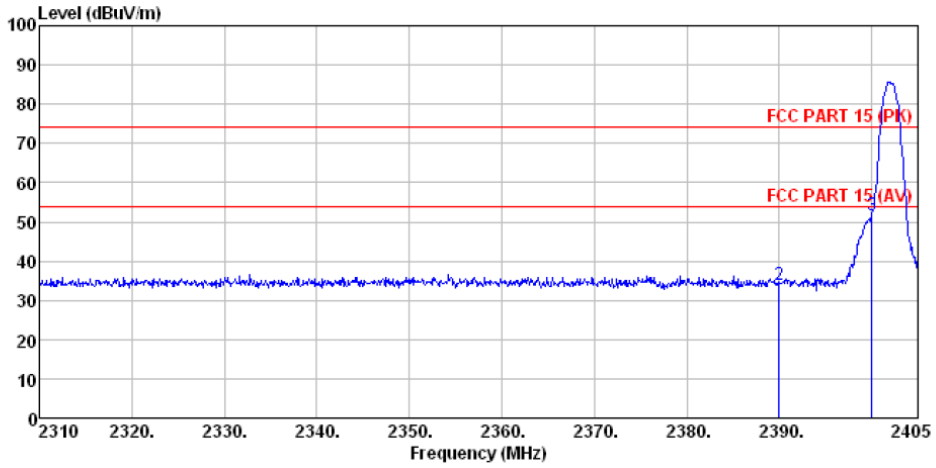
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	35.29	27.91	5.30	34.11	34.39	74.00	-39.61	Peak
2	2390.000	34.94	27.59	5.38	34.01	33.90	74.00	-40.10	Peak
3	2400.000	59.89	27.58	5.39	34.01	58.85	74.00	-15.15	Peak



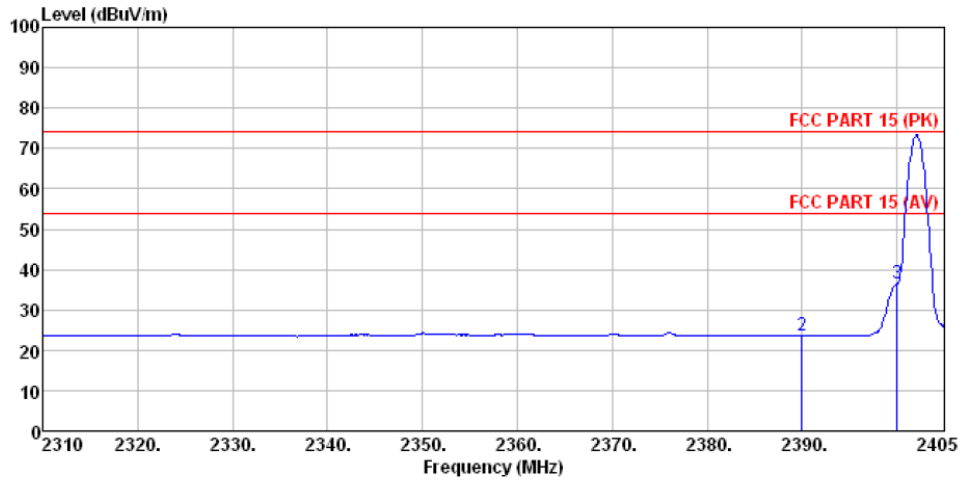
Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL
EUT : Bluetooth Speaker
Test Mode : TX mode
Test Engineer: Chen
: π/4QPSK 2402

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	24.62	27.91	5.30	34.11	23.72	54.00	-30.28	Average
2	2390.000	24.89	27.59	5.38	34.01	23.85	54.00	-30.15	Average
3	2400.000	44.05	27.58	5.39	34.01	43.01	54.00	-10.99	Average

5.3.30 Diagram 5-30

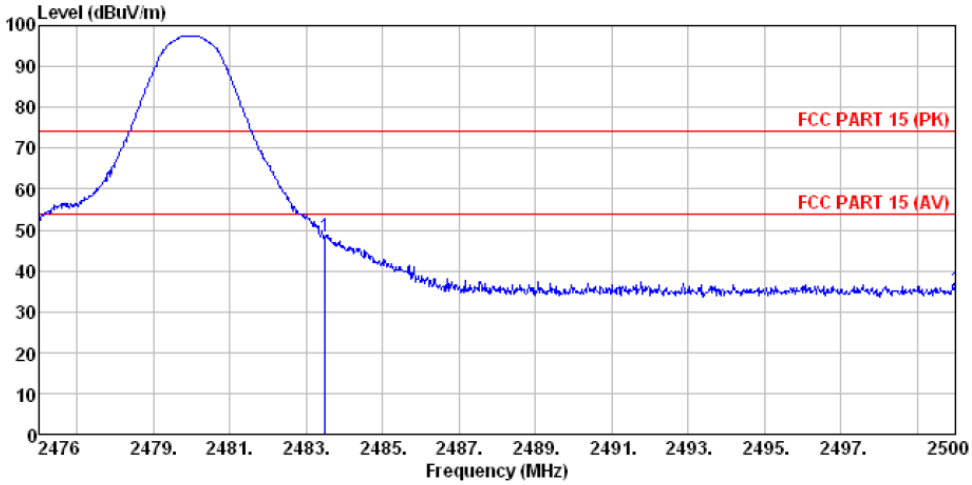



```
Site          : 3m chamber
Condition     : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL
EUT           : Bluetooth Speaker
Test Mode     : TX mode
Test Engineer: Chen
              : π/4QPSK 2402
                 ReadAntenna  Cable Preamp          Limit   Over
          Freq  Level Factor   Loss Factor  Level   Line  Limit Remark
        ------- ------ ------ ------ ------ ------ ------ ------ ----------
           MHz   dBuV   dB/m     dB     dB dBuV/m dBuV/m     dB

  1   2310.000  35.29  27.91   5.30  34.11  34.39  74.00 -39.61 Peak
  2   2390.000  34.87  27.59   5.38  34.01  33.83  74.00 -40.17 Peak
  3   2400.000  52.88  27.58   5.39  34.01  51.84  74.00 -22.16 Peak
```

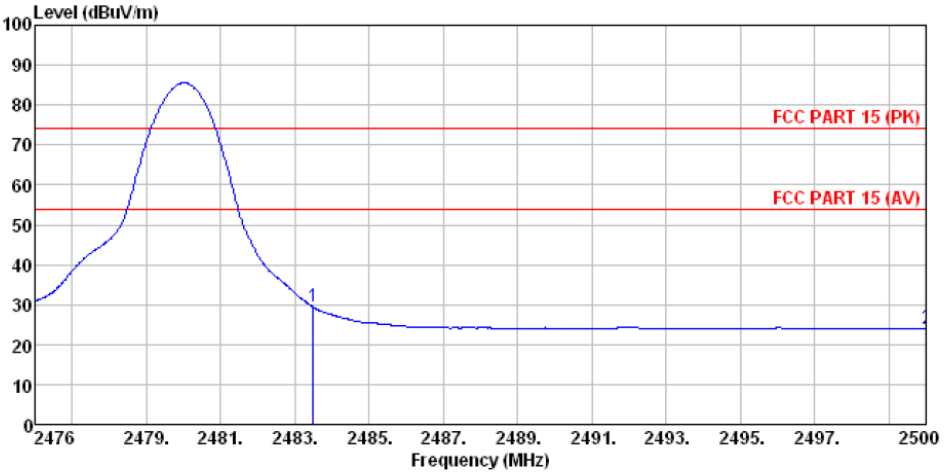



```
Site          : 3m chamber
Condition     : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL
EUT           : Bluetooth Speaker
Test Mode     : TX mode
Test Engineer: Chen
              : π/4QPSK 2402
                 ReadAntenna  Cable Preamp          Limit   Over
          Freq  Level Factor   Loss Factor  Level   Line  Limit Remark
        ------- ------ ------ ------ ------ ------ ------ ------ ----------
           MHz   dBuV   dB/m     dB     dB dBuV/m dBuV/m     dB

  1   2310.000  24.54  27.91   5.30  34.11  23.64  54.00 -30.36 Average
  2   2390.000  24.69  27.59   5.38  34.01  23.65  54.00 -30.35 Average
  3   2400.000  37.40  27.58   5.39  34.01  36.36  54.00 -17.64 Average
```

5.3.31 Diagram 5-31

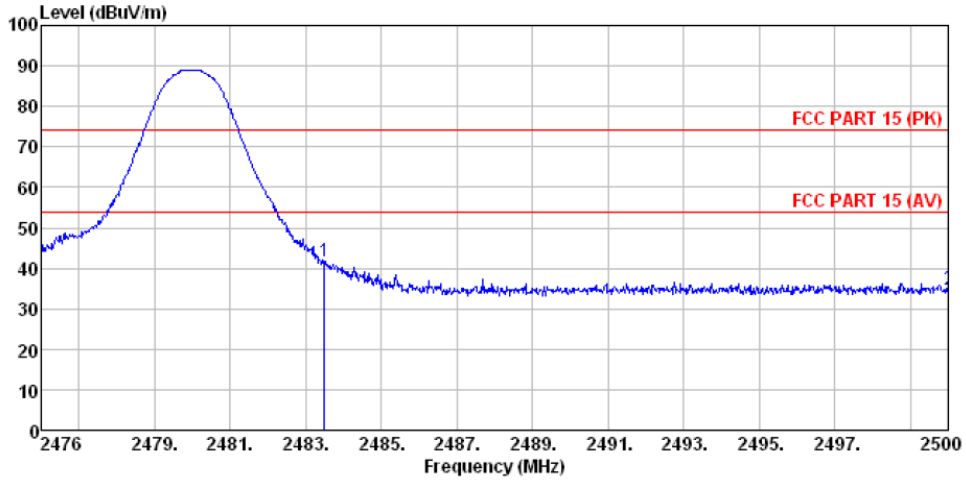



```
Site          : 3m chamber
Condition     : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL
EUT           : Bluetooth Speaker
Test Mode     : TX mode
Test Engineer: Chen
              : π/4QPSK 2480
                 ReadAntenna  Cable Preamp          Limit   Over
          Freq  Level Factor   Loss Factor  Level   Line  Limit Remark
        ------- ------ ------ ------ ------ ------ ------ ------ ----------
            MHz  dBuV   dB/m     dB     dB dBuV/m dBuV/m     dB

  1   2483.500  49.08  27.53   5.47  33.92  48.16  74.00 -25.84 Peak
  2   2500.000  35.76  27.55   5.49  33.90  34.90  74.00 -39.10 Peak
```

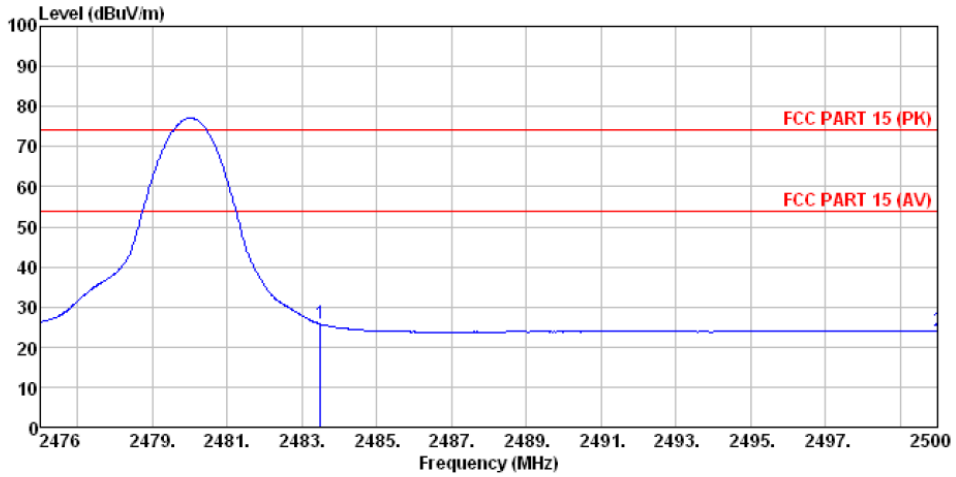



```
Site          : 3m chamber
Condition     : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) HORIZONTAL
EUT           : Bluetooth Speaker
Test Mode     : TX mode
Test Engineer: Chen
              : π/4QPSK 2480
                 ReadAntenna  Cable Preamp          Limit   Over
          Freq  Level Factor   Loss Factor  Level   Line  Limit Remark
        ------- ------ ------ ------ ------ ------ ------ ------ ----------
            MHz  dBuV   dB/m     dB     dB dBuV/m dBuV/m     dB

  1   2483.500  30.38  27.53   5.47  33.92  29.46  54.00 -24.54 Average
  2   2500.000  24.93  27.55   5.49  33.90  24.07  54.00 -29.93 Average
```

5.3.32 Diagram 5-32




```
Site          : 3m chamber
Condition     : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL
EUT           : Bluetooth Speaker
Test Mode     : TX mode
Test Engineer: Chen
              : π/4QPSK 80
                 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   2483.500  42.79  27.53  5.47  33.92  41.87  74.00 -32.13 Peak
  2   2500.000  35.47  27.55  5.49  33.90  34.61  74.00 -39.39 Peak
```




```
Site          : 3m chamber
Condition     : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL
EUT           : Bluetooth Speaker
Test Mode     : TX mode
Test Engineer: Chen
              : π/4QPSK 80
                 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   2483.500  26.64  27.53  5.47  33.92  25.72  54.00 -28.28 Average
  2   2500.000  24.71  27.55  5.49  33.90  23.85  54.00 -30.15 Average
```

6. 20 dB bandwidth Test

6.1 Test Procedure

Clause 15.215(c) 20dB Bandwidth:

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in15.217 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.

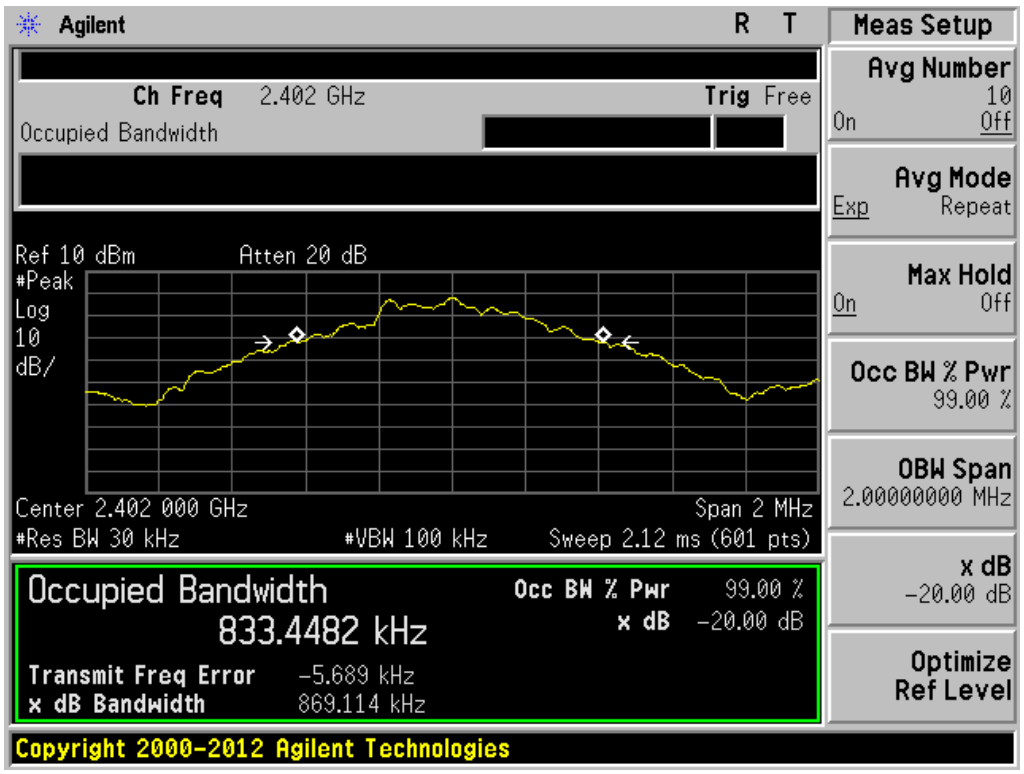
6.2 Measurement Equipment

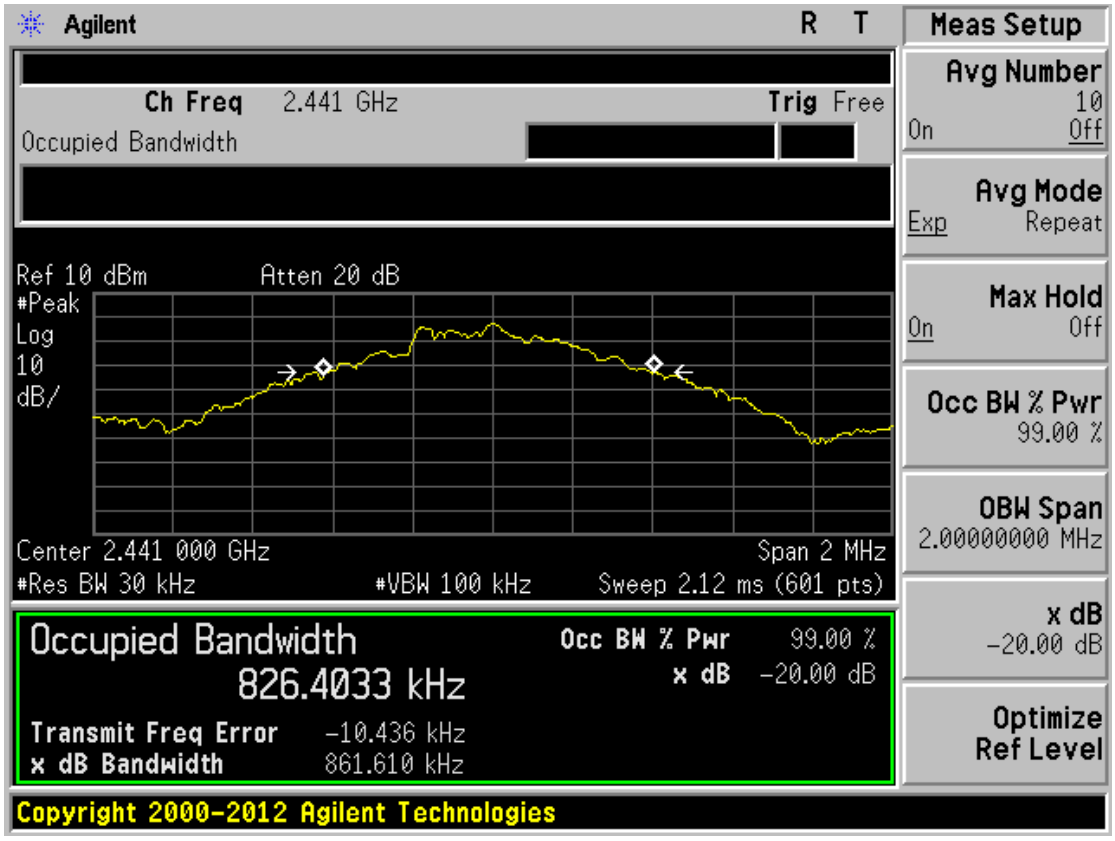
	Equipment	Calibration Due	Type	Serial No.	Manufacturer
☒	Spectrum	Jul. 04 2016	FSP30	GTS208	RS

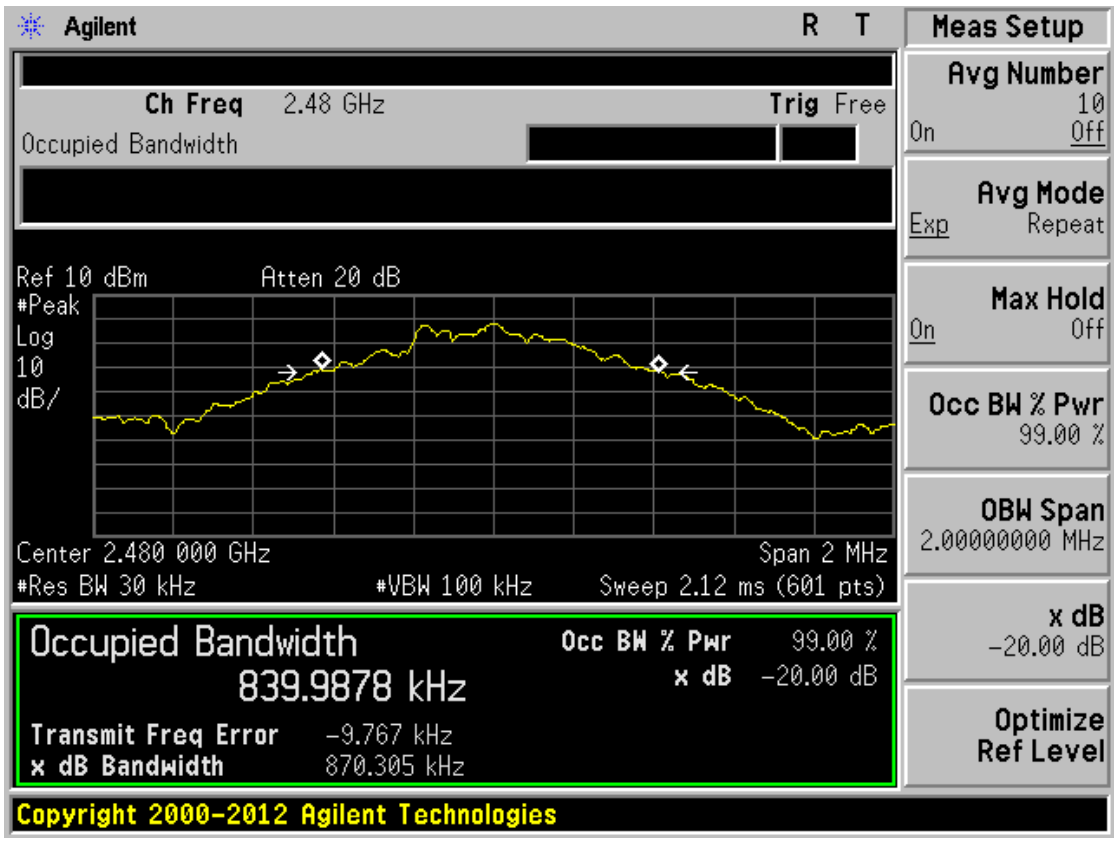
6.3 Test Result:

Modulation	Channel	99% bandwidth	20dB bandwidth
GFSK	CHL	833.4482KHz	869.114KHz
	CHM	826.4033KHz	861.610KHz
	CHH	839.9878KHz	870.305KHz

GFSK diagrams are as below:

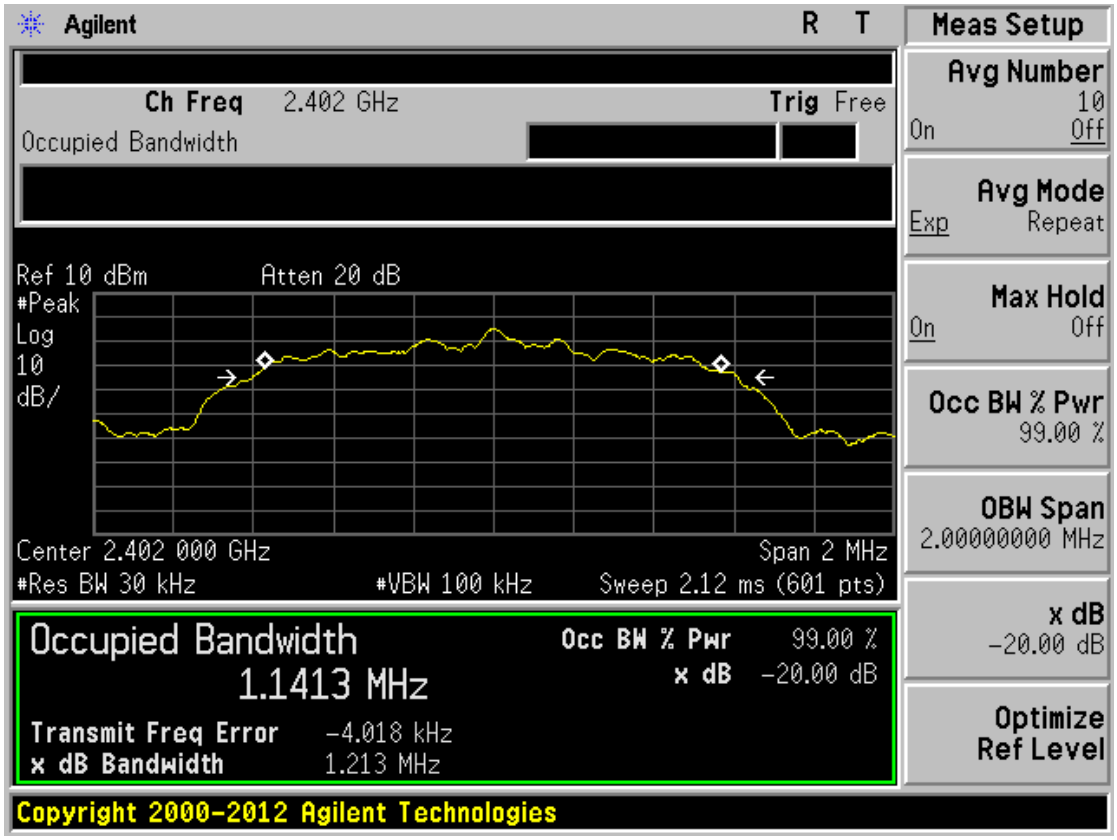


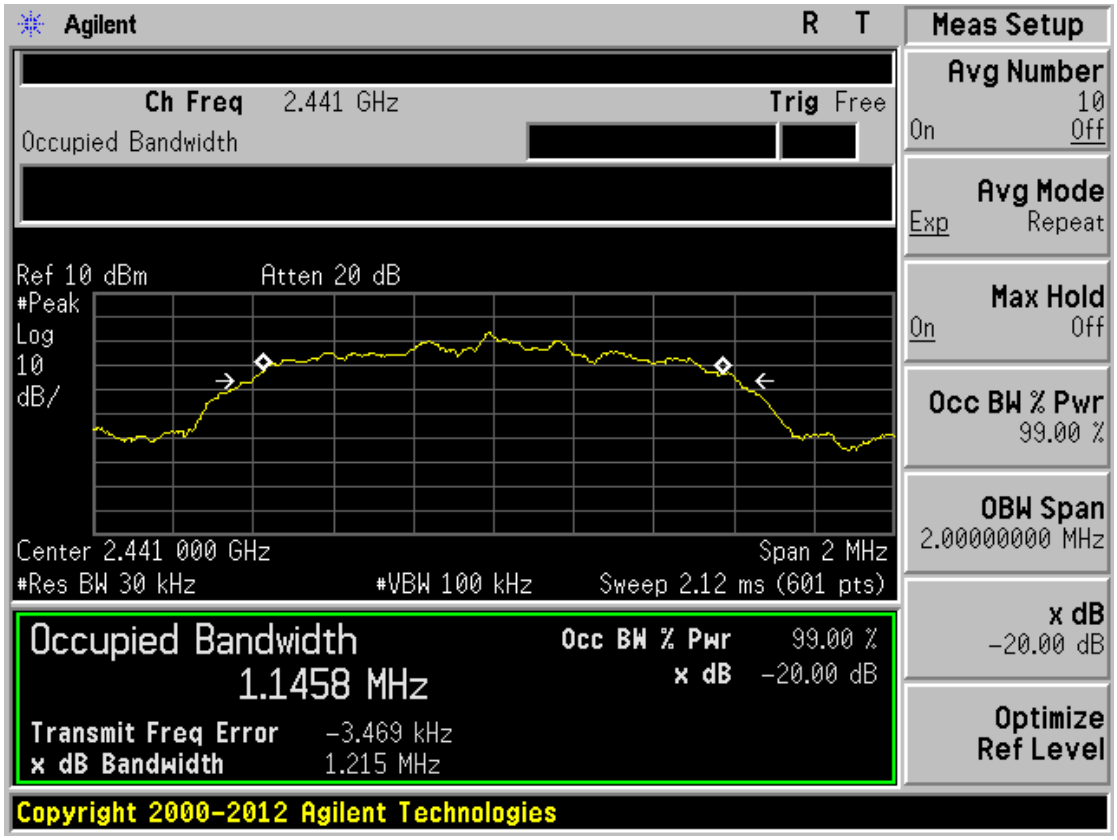

Agilent
R T
Meas Setup
Ch Freq 2.441 GHz
Trig Free
Occupied Bandwidth
Avg Number
10
On Off
Avg Mode
Exp Repeat
Ref 10 dBm
Atten 20 dB
#Peak
Log
10
dB/
Max Hold
On Off
Occ BW % Pwr
99.00 %
OBW Span
2.00000000 MHz
Center 2.441 000 GHz
Span 2 MHz
#Res BW 30 kHz
#VBW 100 kHz
Sweep 2.12 ms (601 pts)
x dB
-20.00 dB
Occupied Bandwidth
826.4033 kHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Transmit Freq Error -10.436 kHz
x dB Bandwidth 861.610 kHz
Optimize
Ref Level
Copyright 2000-2012 Agilent Technologies

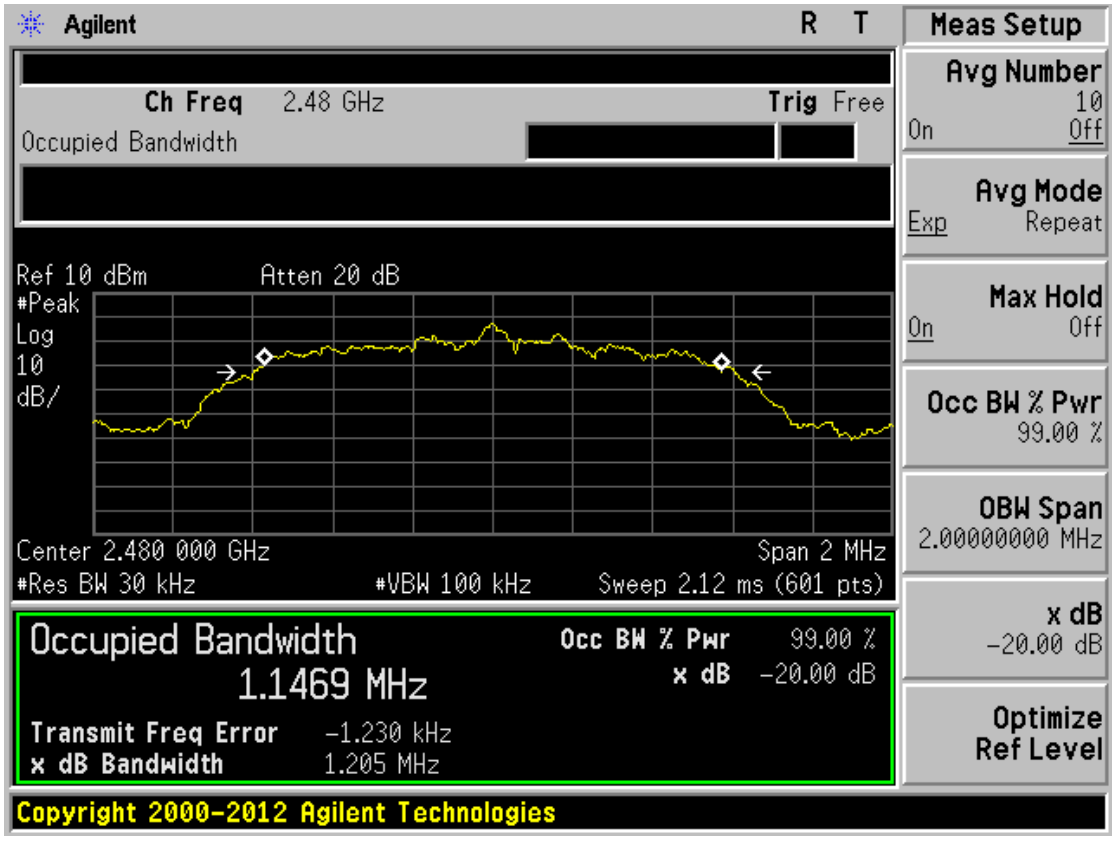

Agilent
R T
Meas Setup
Ch Freq 2.48 GHz
Trig Free
Occupied Bandwidth
Avg Number
10
On Off
Avg Mode
Exp Repeat
Ref 10 dBm
Atten 20 dB
#Peak
Log
10
dB/
Max Hold
On Off
Occ BW % Pwr
99.00 %
OBW Span
2.00000000 MHz
Center 2.480 000 GHz
Span 2 MHz
#Res BW 30 kHz
#VBW 100 kHz
Sweep 2.12 ms (601 pts)
x dB
-20.00 dB
Occupied Bandwidth
839.9878 kHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Transmit Freq Error -9.767 kHz
x dB Bandwidth 870.305 kHz
Optimize
Ref Level
Copyright 2000-2012 Agilent Technologies

Modulation	Channel	99% bandwidth	20dB bandwidth
8DPSK	CHL	1.1413MHz	1.213MHz
	CHM	1.1458MHz	1.215MHz
	CHH	1.1469MHz	1.205MHz

8DPSK diagrams are as below:

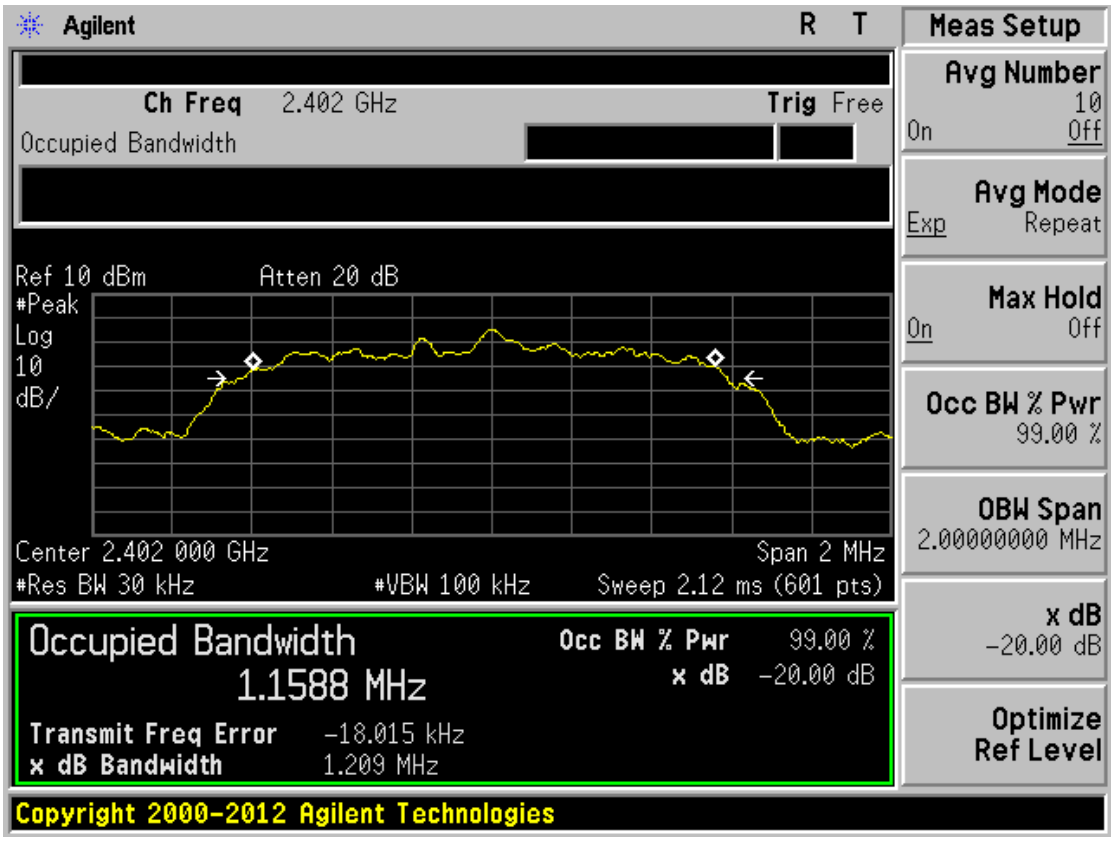


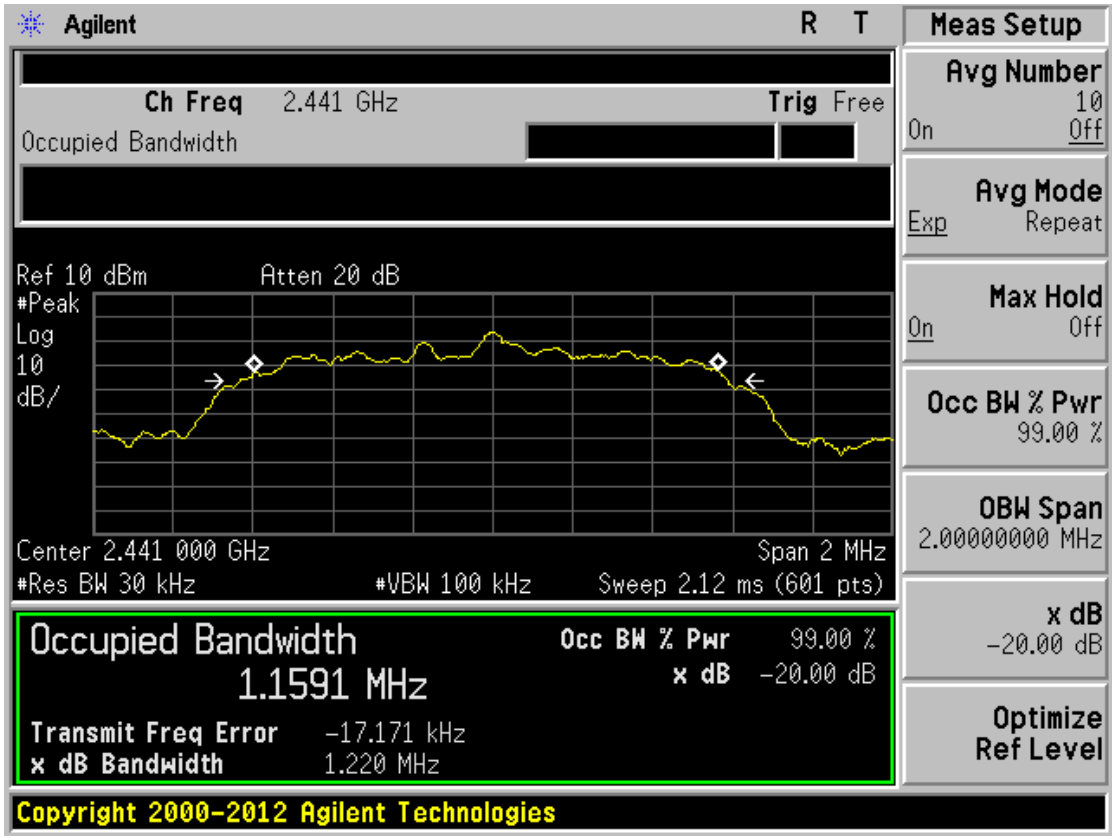

Agilent
R T
Meas Setup
Ch Freq 2.441 GHz
Trig Free
Occupied Bandwidth
Avg Number
10
On Off
Avg Mode
Exp Repeat
Ref 10 dBm
Atten 20 dB
#Peak
Log
10
dB/
Max Hold
On Off
Occ BW % Pwr
99.00 %
OBW Span
2.00000000 MHz
Center 2.441 000 GHz
Span 2 MHz
#Res BW 30 kHz
#VBW 100 kHz
Sweep 2.12 ms (601 pts)
x dB
-20.00 dB
Occupied Bandwidth
1.1458 MHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Transmit Freq Error -3.469 kHz
x dB Bandwidth 1.215 MHz
Optimize
Ref Level
Copyright 2000-2012 Agilent Technologies

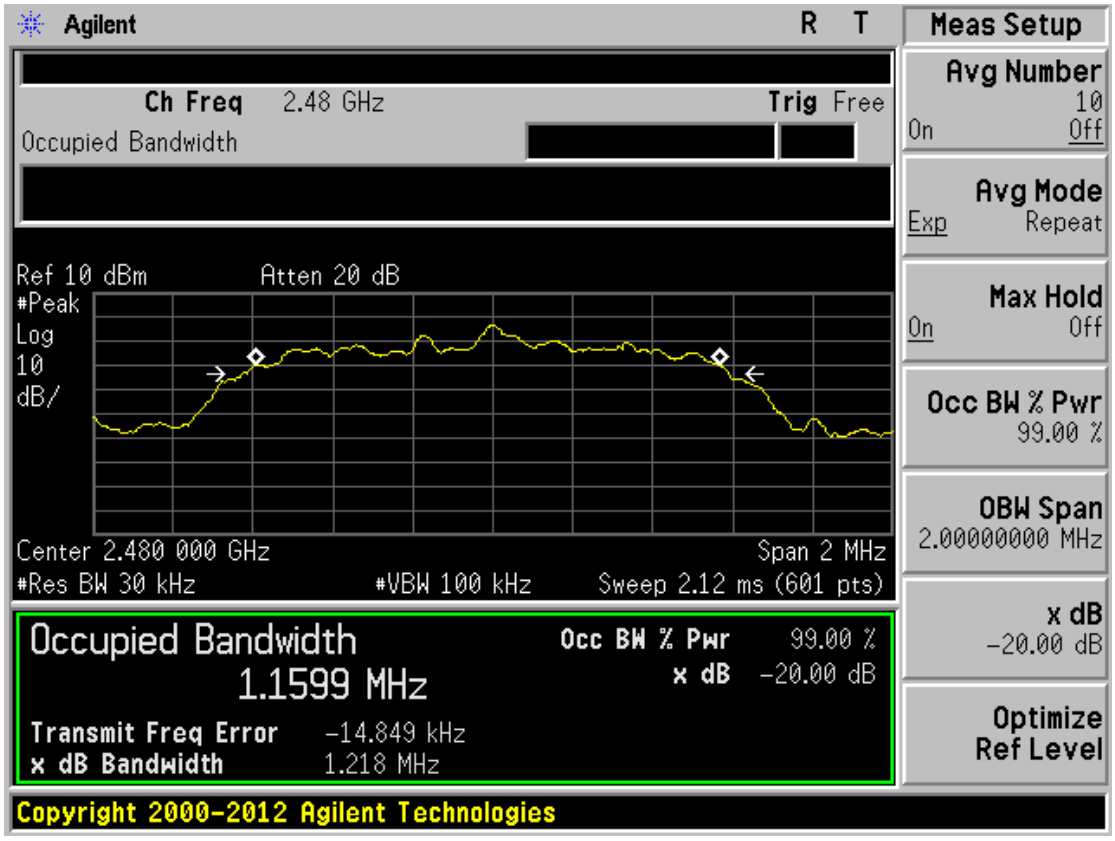

Agilent
R T
Meas Setup
Ch Freq 2.48 GHz
Trig Free
Occupied Bandwidth
Avg Number
10
On Off
Avg Mode
Exp Repeat
Ref 10 dBm
Atten 20 dB
#Peak
Log
10
dB/
Max Hold
On Off
Occ BW % Pwr
99.00 %
OBW Span
2.00000000 MHz
Center 2.480 000 GHz
Span 2 MHz
#Res BW 30 kHz
#VBW 100 kHz
Sweep 2.12 ms (601 pts)
x dB
-20.00 dB
Occupied Bandwidth
1.1469 MHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Transmit Freq Error -1.230 kHz
x dB Bandwidth 1.205 MHz
Optimize
Ref Level
Copyright 2000-2012 Agilent Technologies

Modulation	Channel	99% bandwidth	20dB bandwidth
π/4 DQPSK	CHL	1.1588MHz	1.209MHz
	CHM	1.1591MHz	1.220MHz
	CHH	1.1599MHz	1.218MHz

π/4 DQPSK diagrams are as below:




Agilent
R T
Meas Setup
Ch Freq 2.441 GHz
Trig Free
Occupied Bandwidth
Avg Number
10
On Off
Avg Mode
Exp Repeat
Ref 10 dBm
Atten 20 dB
#Peak
Log
10
dB/
Max Hold
On Off
Occ BW % Pwr
99.00 %
OBW Span
2.00000000 MHz
Center 2.441 000 GHz
Span 2 MHz
#Res BW 30 kHz
#VBW 100 kHz
Sweep 2.12 ms (601 pts)
x dB
-20.00 dB
Occupied Bandwidth
1.1591 MHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Transmit Freq Error -17.171 kHz
x dB Bandwidth 1.220 MHz
Optimize
Ref Level
Copyright 2000-2012 Agilent Technologies


Agilent
R T
Meas Setup
Ch Freq 2.48 GHz
Trig Free
Occupied Bandwidth
Avg Number
10
On Off
Avg Mode
Exp Repeat
Ref 10 dBm
Atten 20 dB
#Peak
Log
10
dB/
Max Hold
On Off
Occ BW % Pwr
99.00 %
OBW Span
2.00000000 MHz
Center 2.480 000 GHz
Span 2 MHz
#Res BW 30 kHz
#VBW 100 kHz
Sweep 2.12 ms (601 pts)
x dB
-20.00 dB
Occupied Bandwidth
1.1599 MHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Transmit Freq Error -14.849 kHz
x dB Bandwidth 1.218 MHz
Optimize
Ref Level
Copyright 2000-2012 Agilent Technologies

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 in 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.

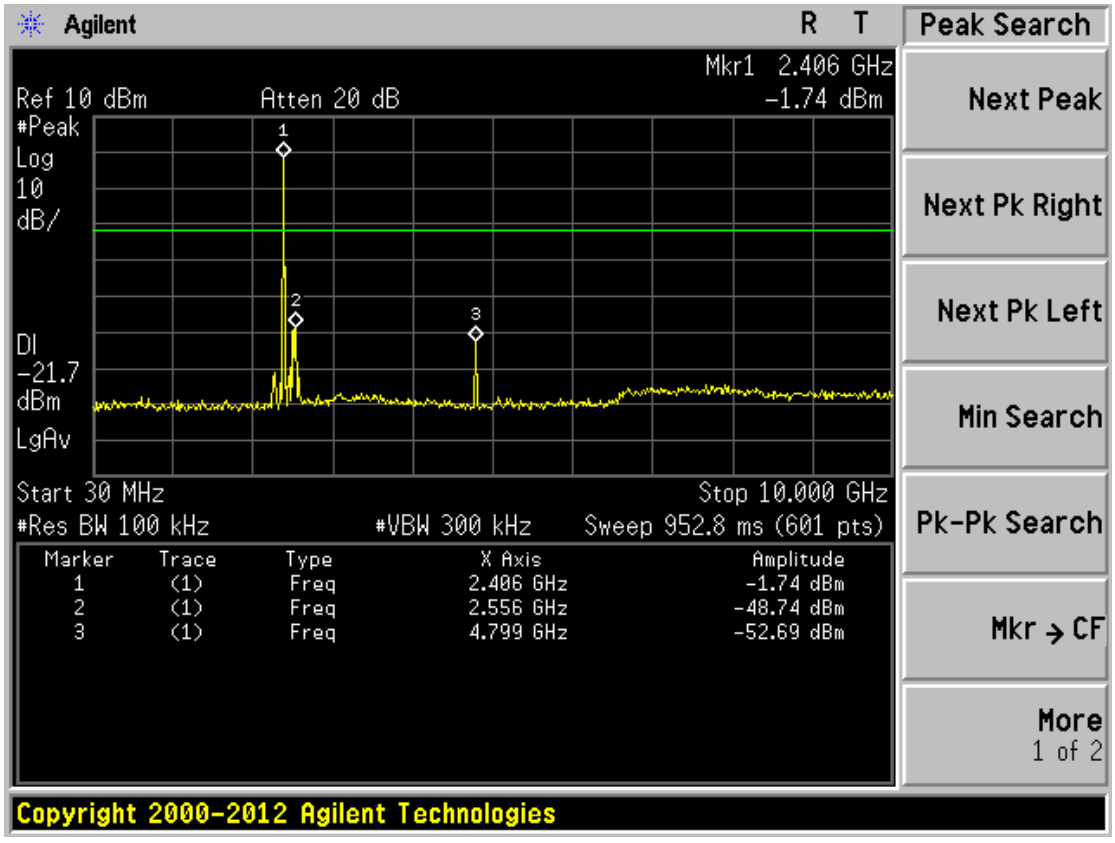
7.2 Measurement Equipment

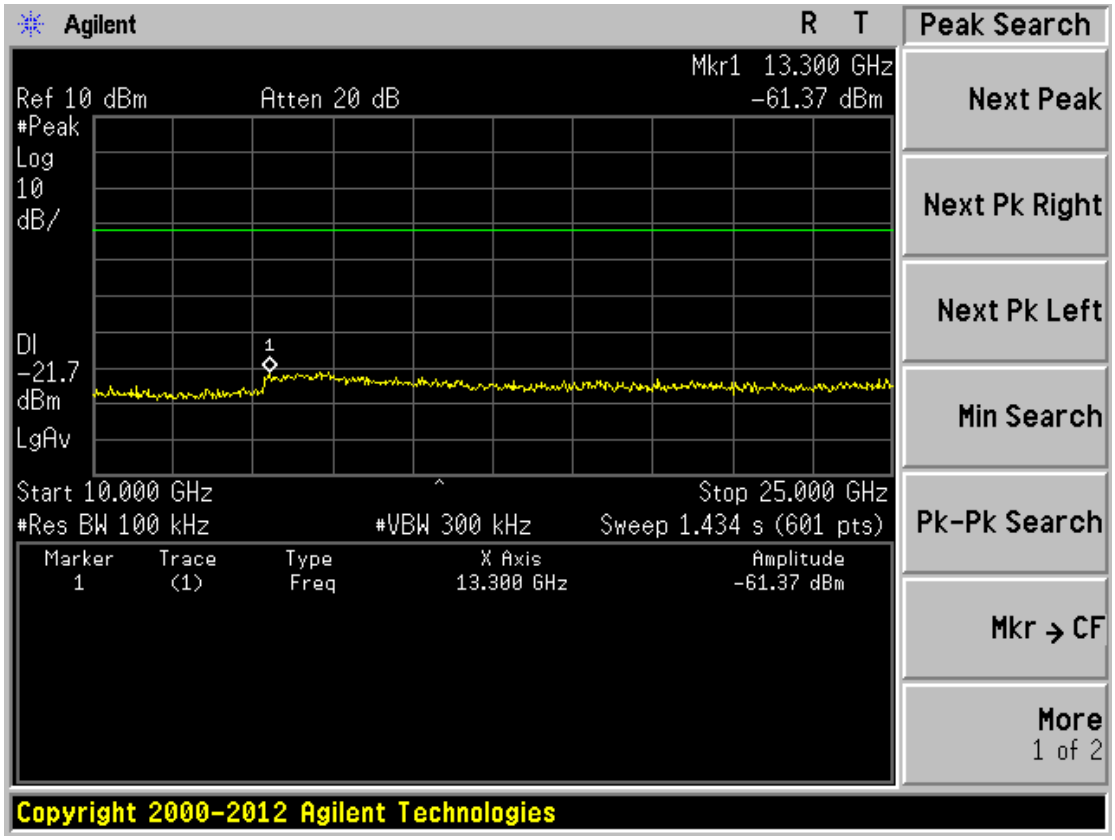
	Equipment	Calibration Due	Type	Serial No.	Manufacturer
☒	Spectrum	Jul. 04 2016	FSP30	GTS208	RS

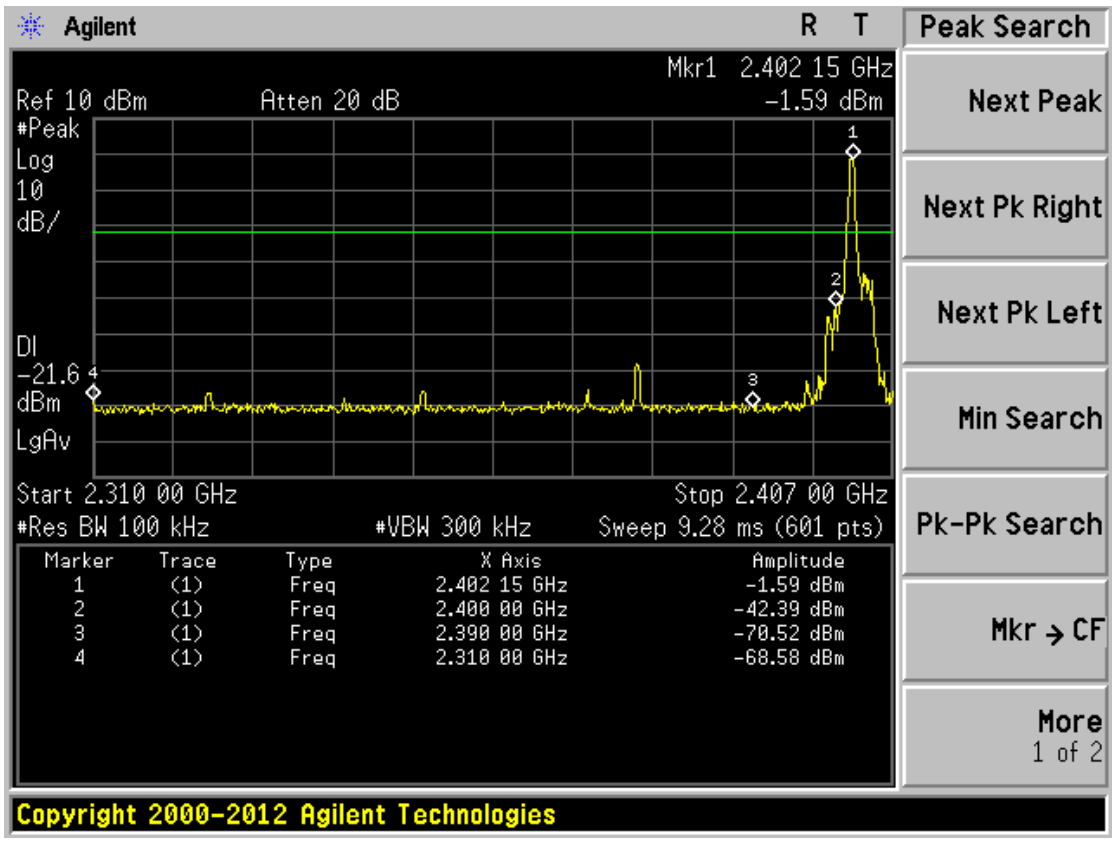
7.3 Test Result

Remark: Worse case is reported as below:

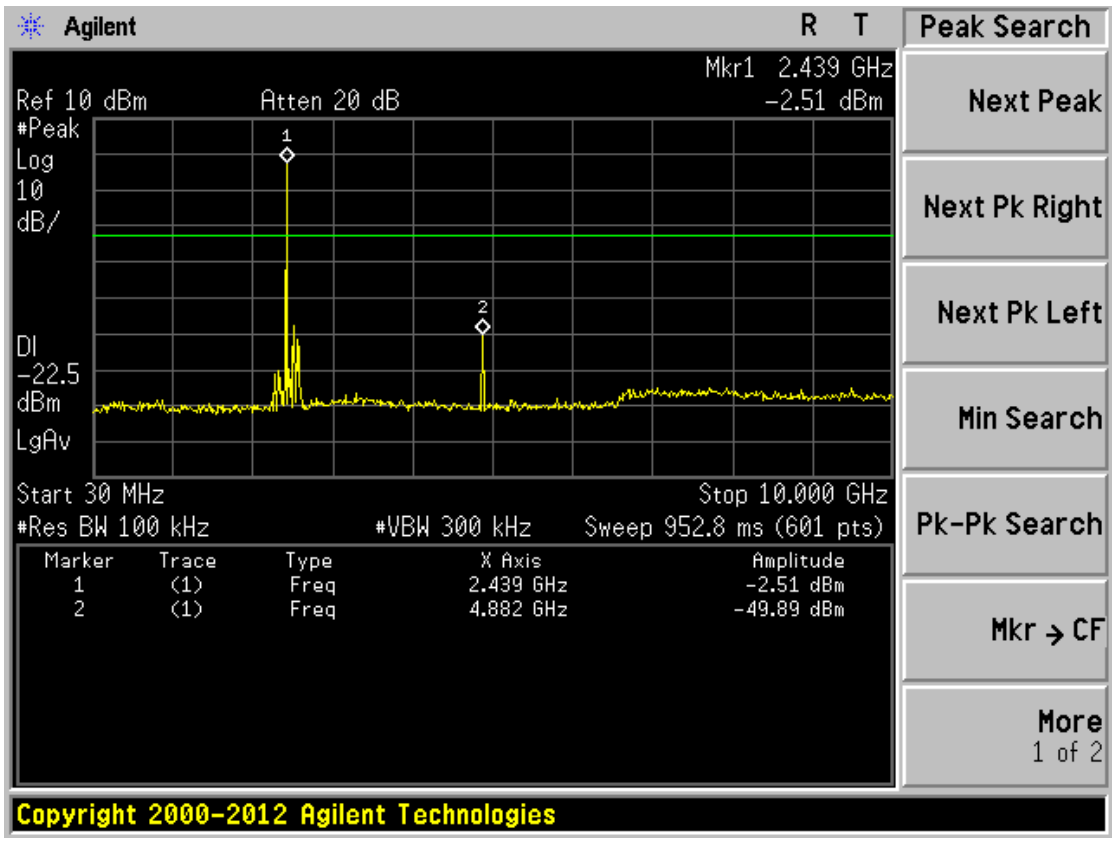
GFSK Hopping off CHL :

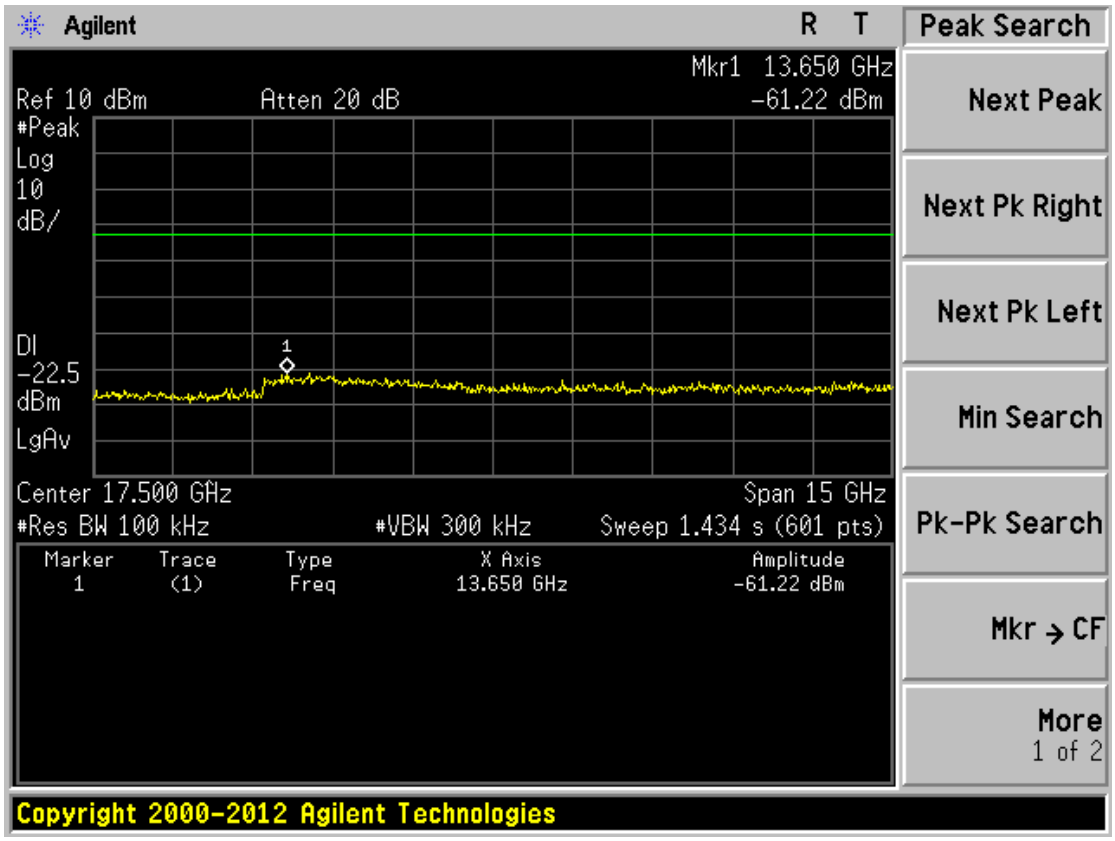



Agilent
R T
Peak Search
Mkr1 13.300 GHz
Ref 10 dBm
Atten 20 dB
-61.37 dBm
#Peak
Log
10
dB/
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Dl
-21.7
dBm
LgAv
Start 10.000 GHz
Stop 25.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 1.434 s (601 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 13.300 GHz -61.37 dBm
Copyright 2000-2012 Agilent Technologies

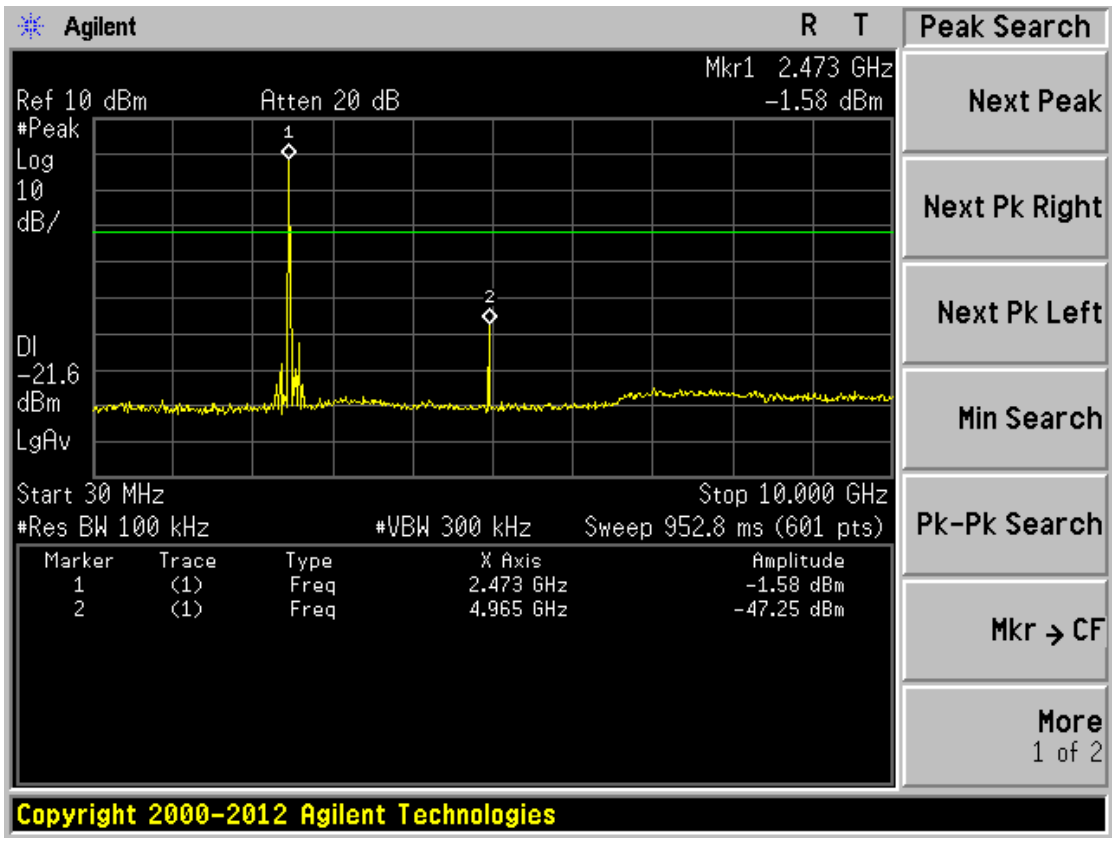

Agilent
R T
Peak Search
Mkr1 2.402 15 GHz
Ref 10 dBm
Atten 20 dB
-1.59 dBm
#Peak
Log
10
dB/
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Dl
-21.6
dBm
LgAv
Start 2.310 00 GHz
Stop 2.407 00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 9.28 ms (601 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.402 15 GHz -1.59 dBm
2 (1) Freq 2.400 00 GHz -42.39 dBm
3 (1) Freq 2.390 00 GHz -70.52 dBm
4 (1) Freq 2.310 00 GHz -68.58 dBm
Copyright 2000-2012 Agilent Technologies

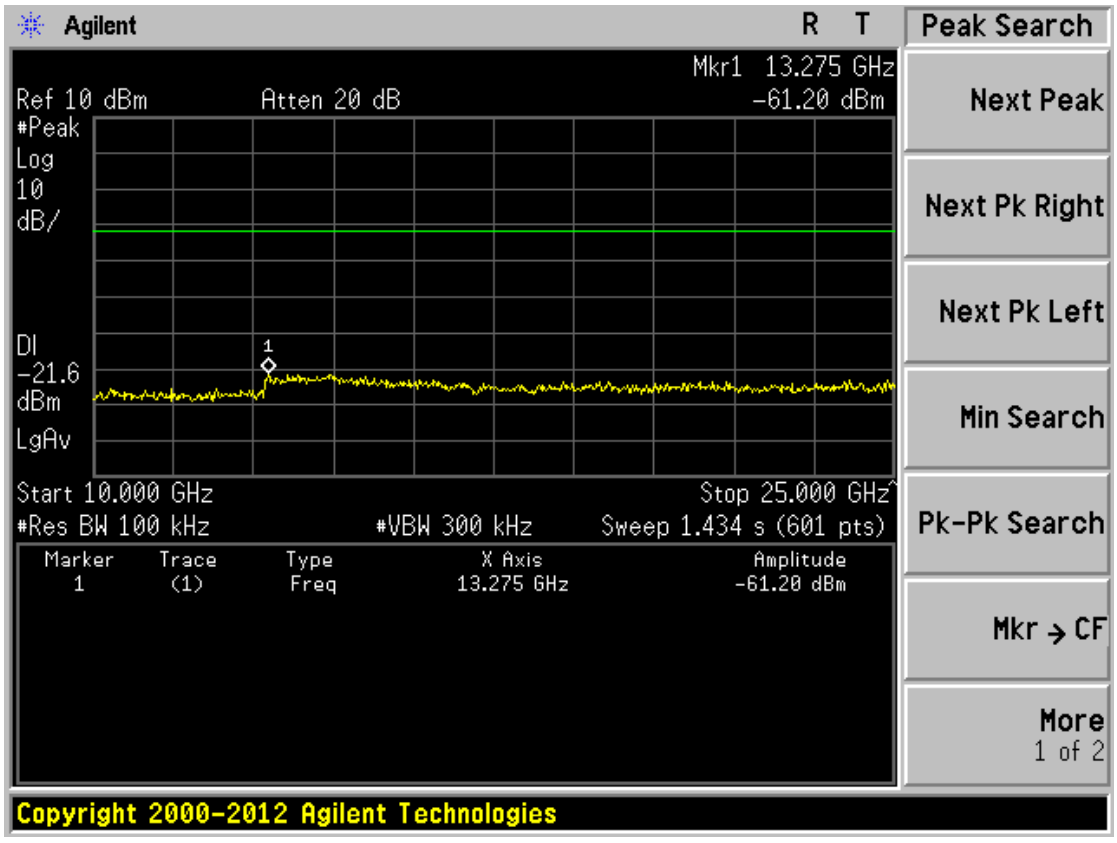
GFSK Hopping off CHM :

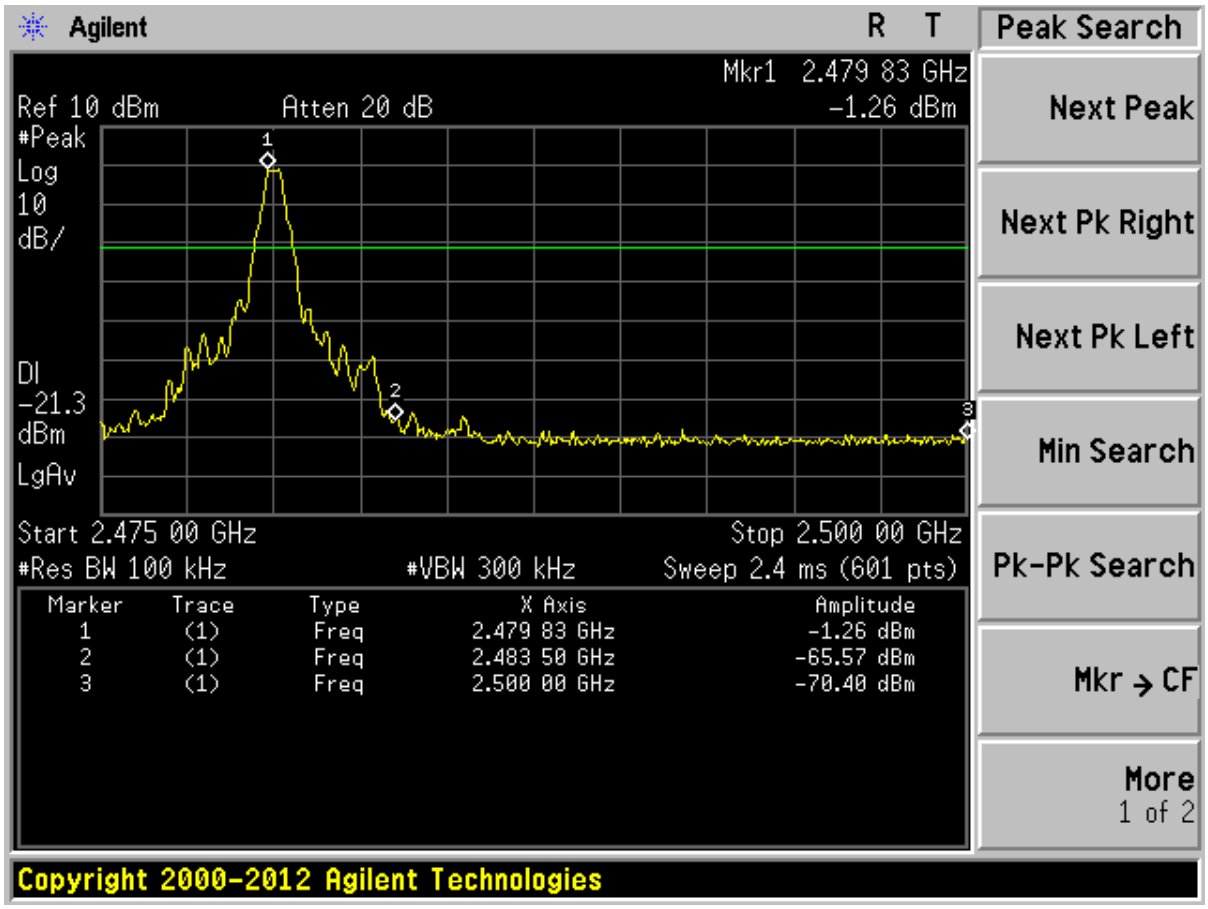




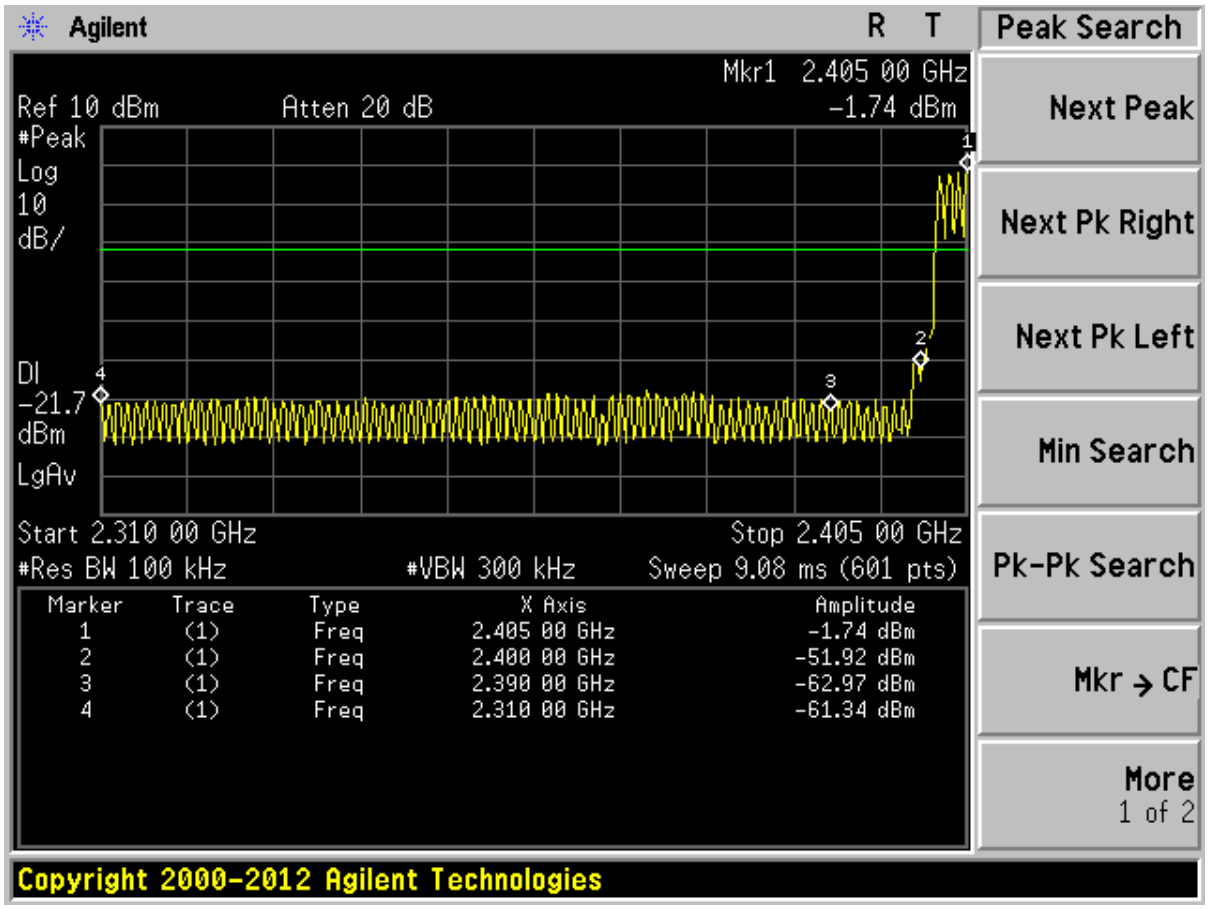
GFSK Hopping off CHH :



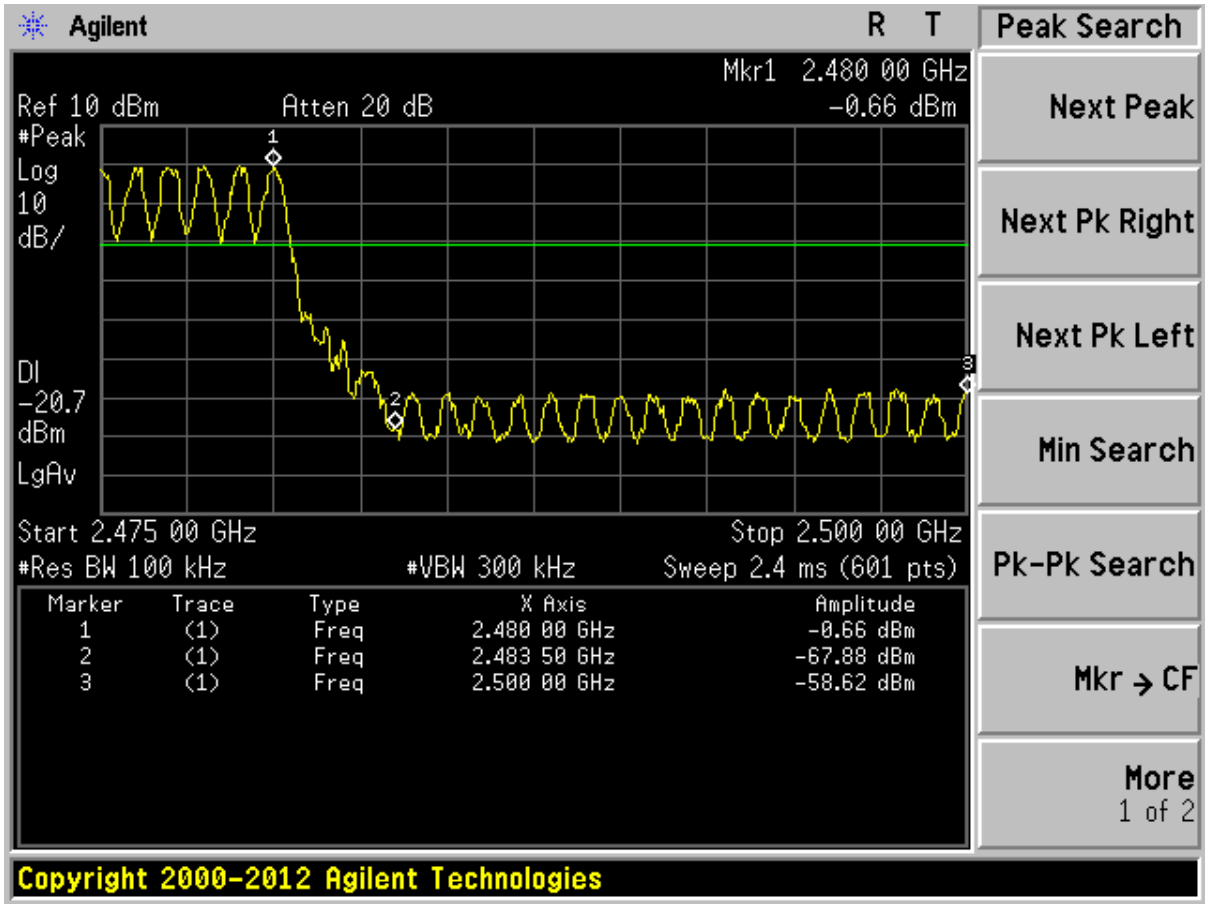



Agilent
R T
Mkr1 2.479 83 GHz
-1.26 dBm
Ref 10 dBm
Atten 20 dB
#Peak
Log
10
dB/
Dl
-21.3
dBm
LgAv
Start 2.475 00 GHz
Stop 2.500 00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 2.4 ms (601 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.479 83 GHz -1.26 dBm
2 (1) Freq 2.483 50 GHz -65.57 dBm
3 (1) Freq 2.500 00 GHz -70.40 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Copyright 2000-2012 Agilent Technologies

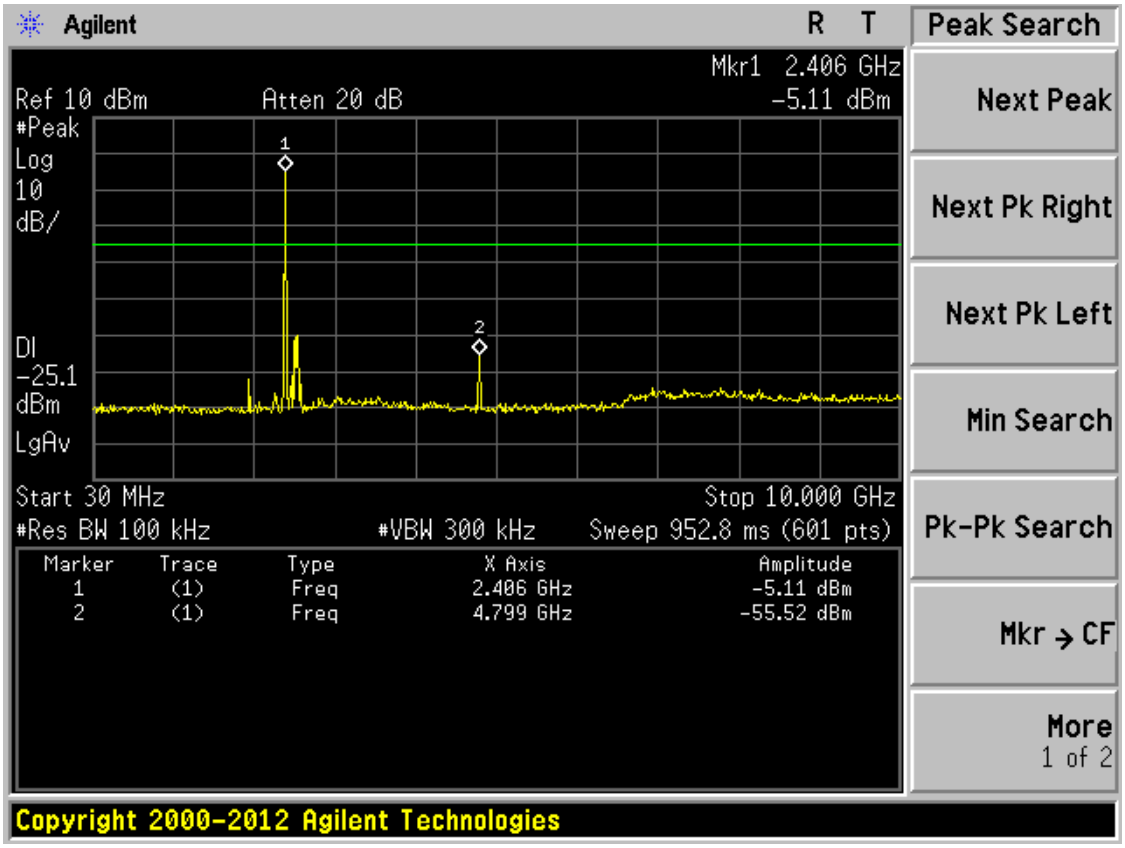
GFSK Hopping on CHL:

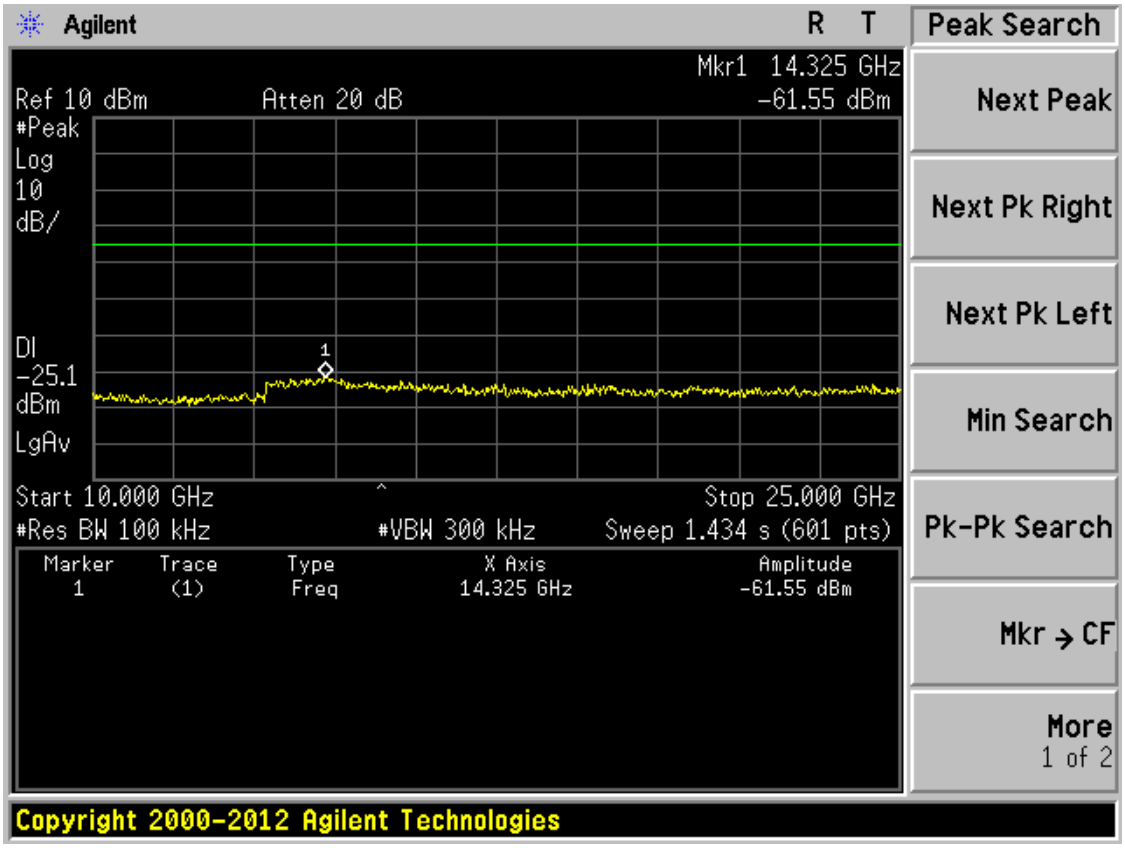


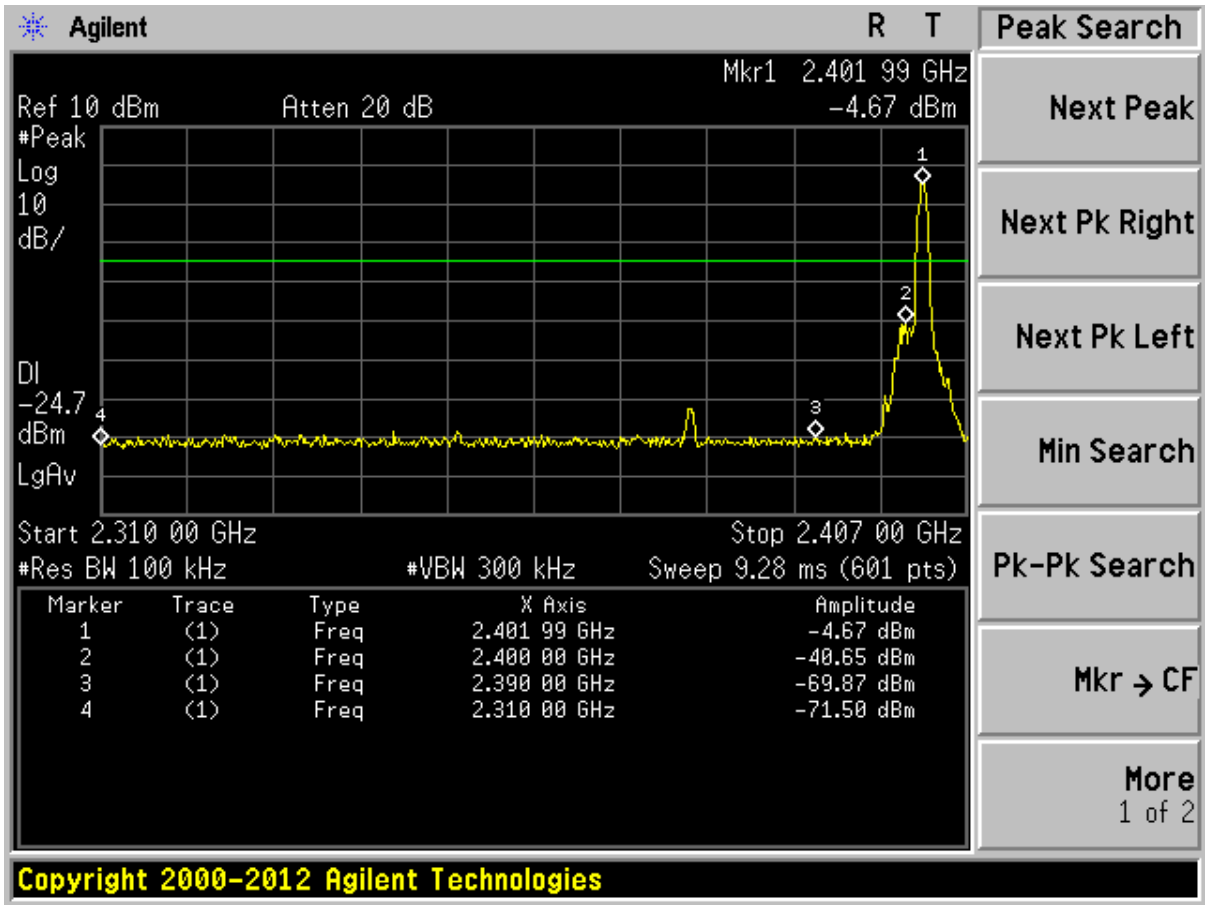
GFSK Hopping on CHH:



8DPSK Hopping off CHL :






Agilent
R T
Mkr1 2.401 99 GHz
-4.67 dBm
Ref 10 dBm
Atten 20 dB
#Peak
Log
10
dB/
Dl
-24.7
dBm
LgAv
Start 2.310 00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.407 00 GHz
Sweep 9.28 ms (601 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.401 99 GHz -4.67 dBm
2 (1) Freq 2.400 00 GHz -40.65 dBm
3 (1) Freq 2.390 00 GHz -69.87 dBm
4 (1) Freq 2.310 00 GHz -71.50 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
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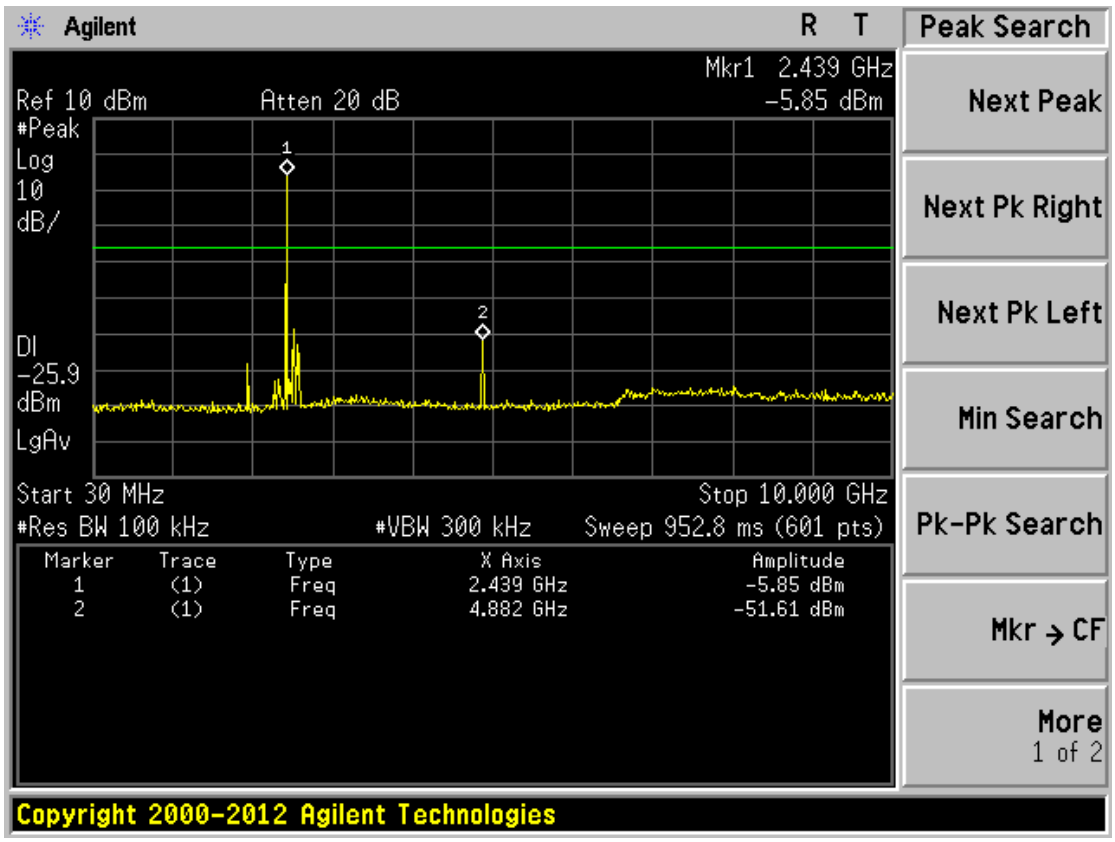
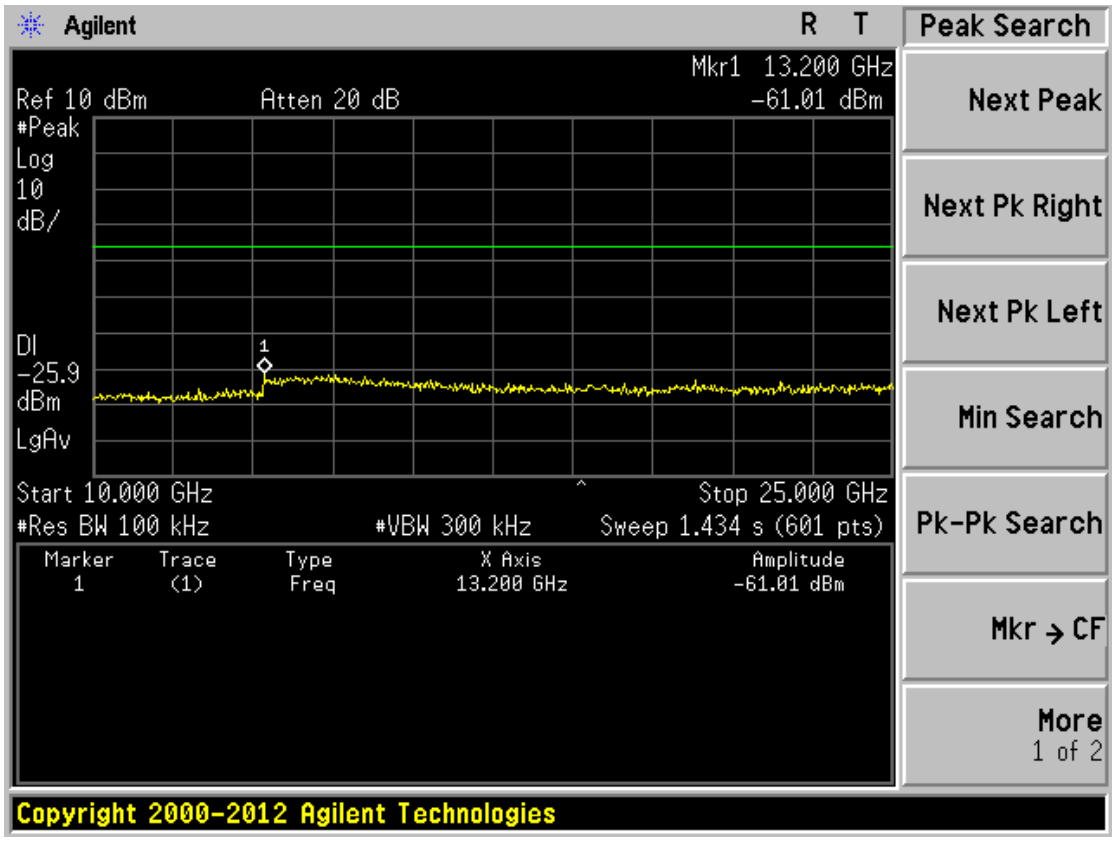
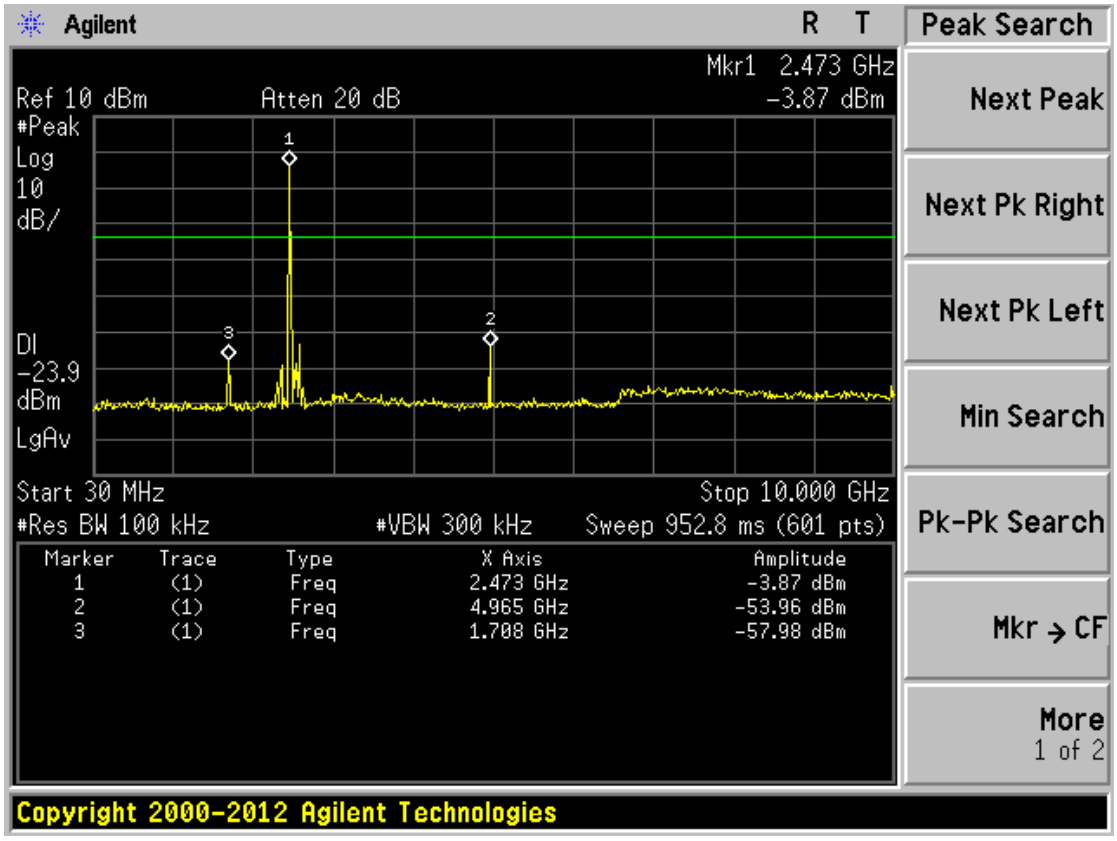
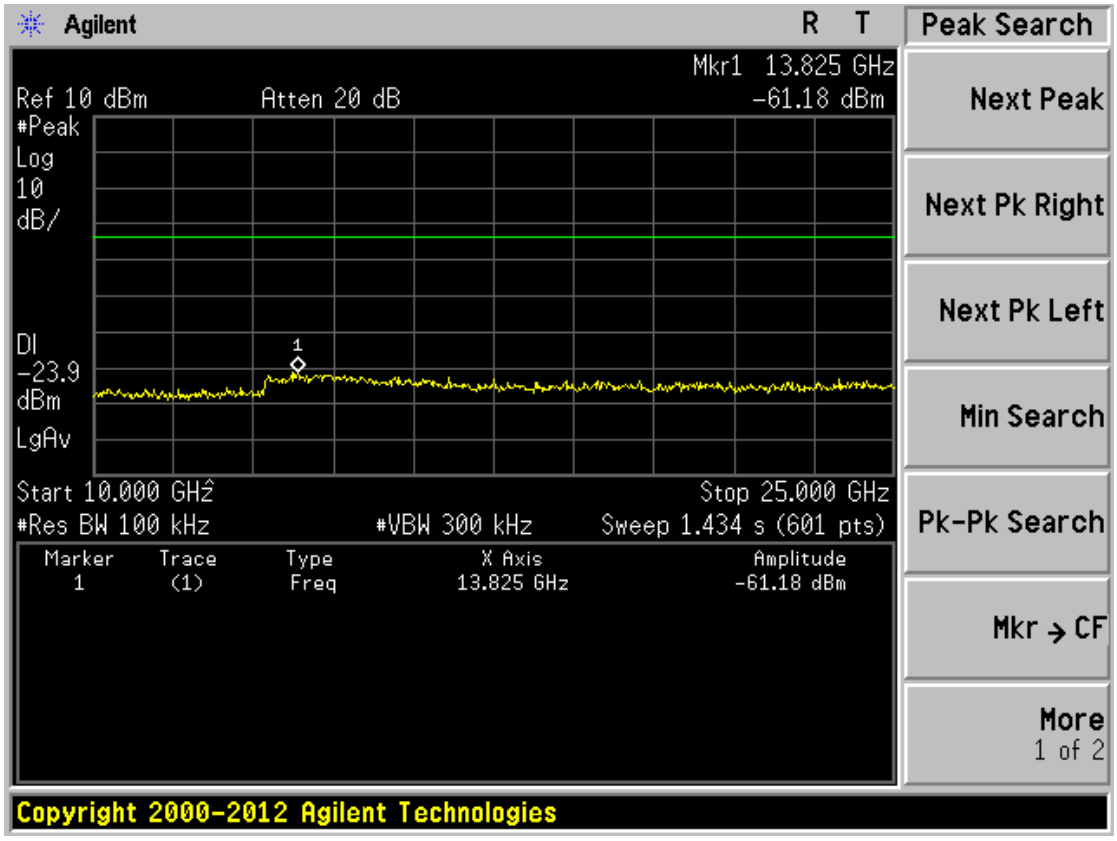
8DPSK Hopping off CHM :

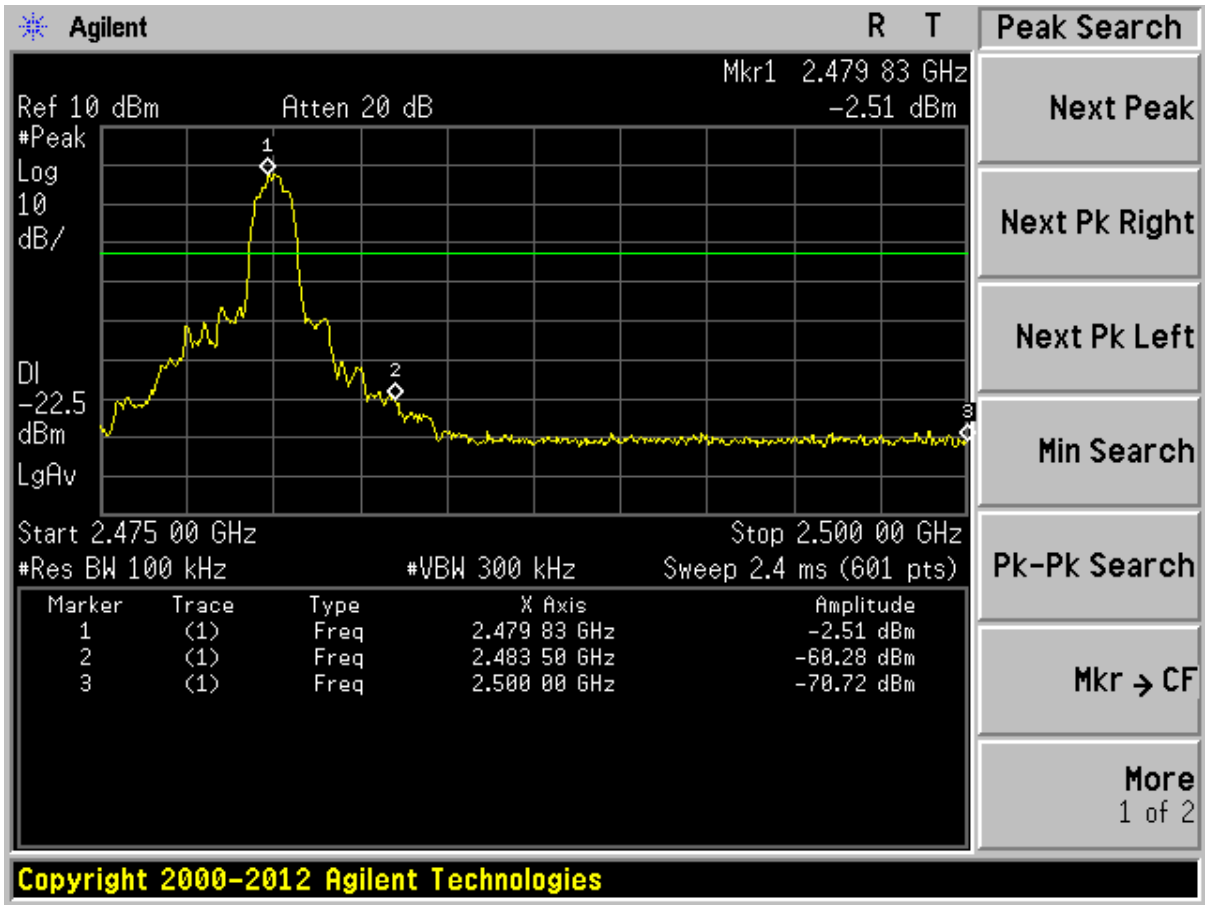




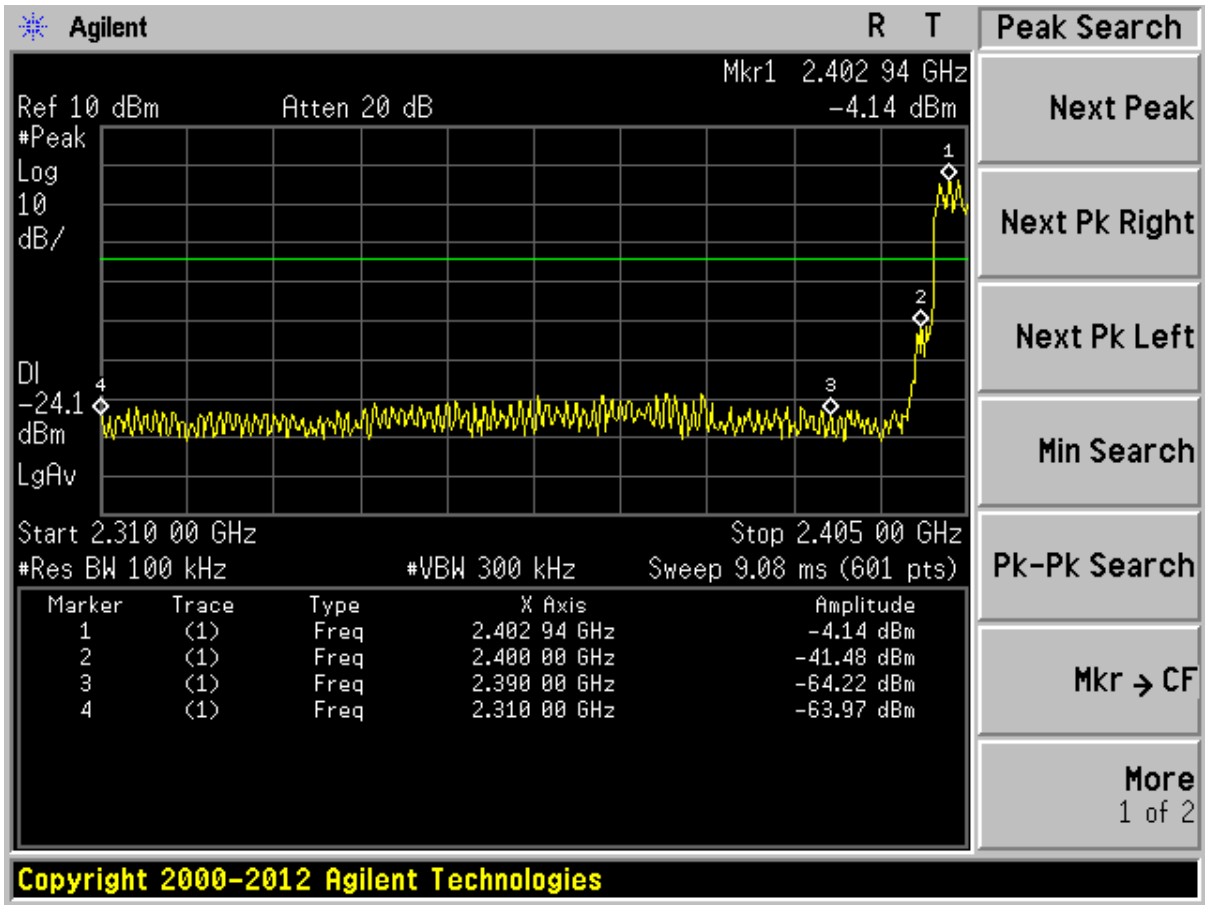
8DPSK Hopping off CHH :



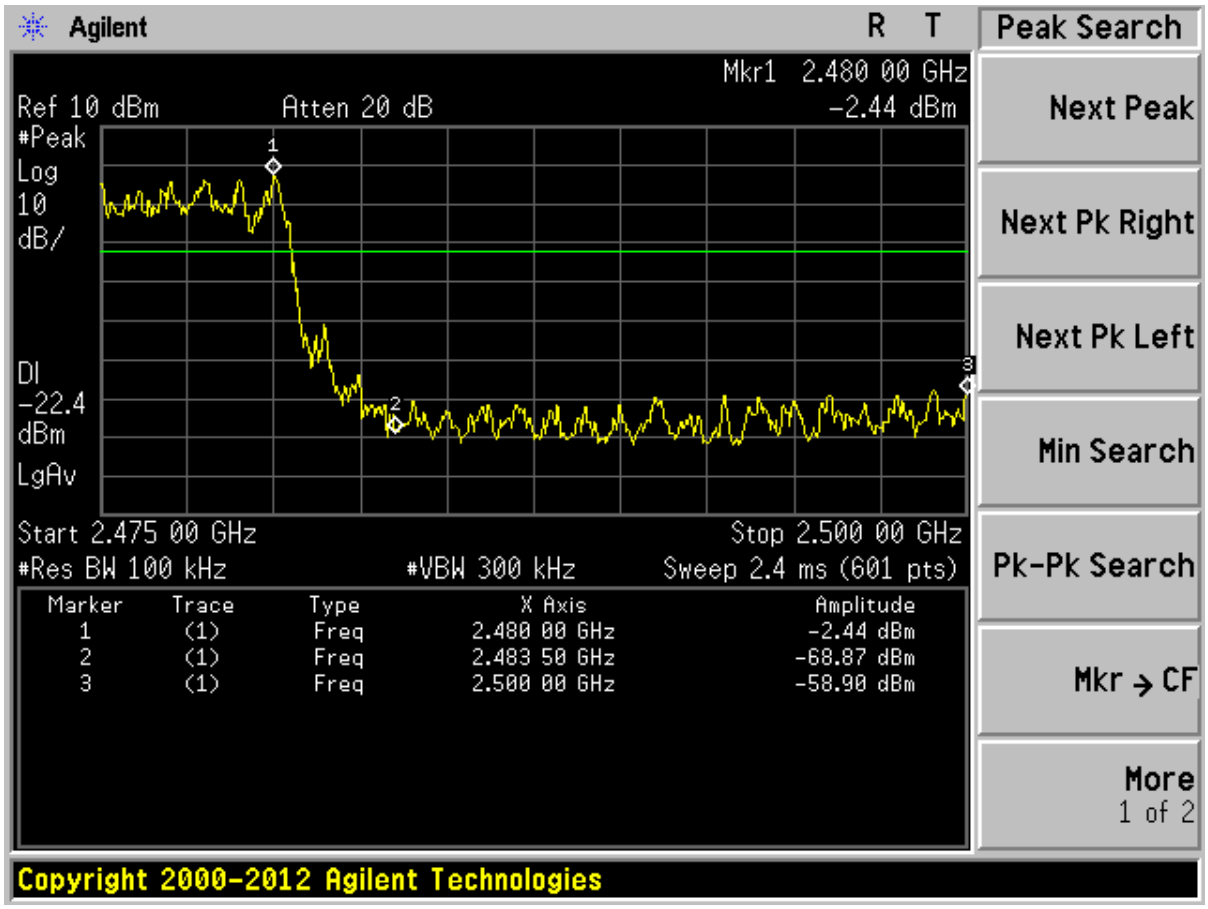



Agilent
R T
Mkr1 2.479 83 GHz
-2.51 dBm
Ref 10 dBm
Atten 20 dB
#Peak
Log
10
dB/
Dl
-22.5
dBm
LgAv
Start 2.475 00 GHz
Stop 2.500 00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 2.4 ms (601 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.479 83 GHz -2.51 dBm
2 (1) Freq 2.483 50 GHz -60.28 dBm
3 (1) Freq 2.500 00 GHz -70.72 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Copyright 2000-2012 Agilent Technologies

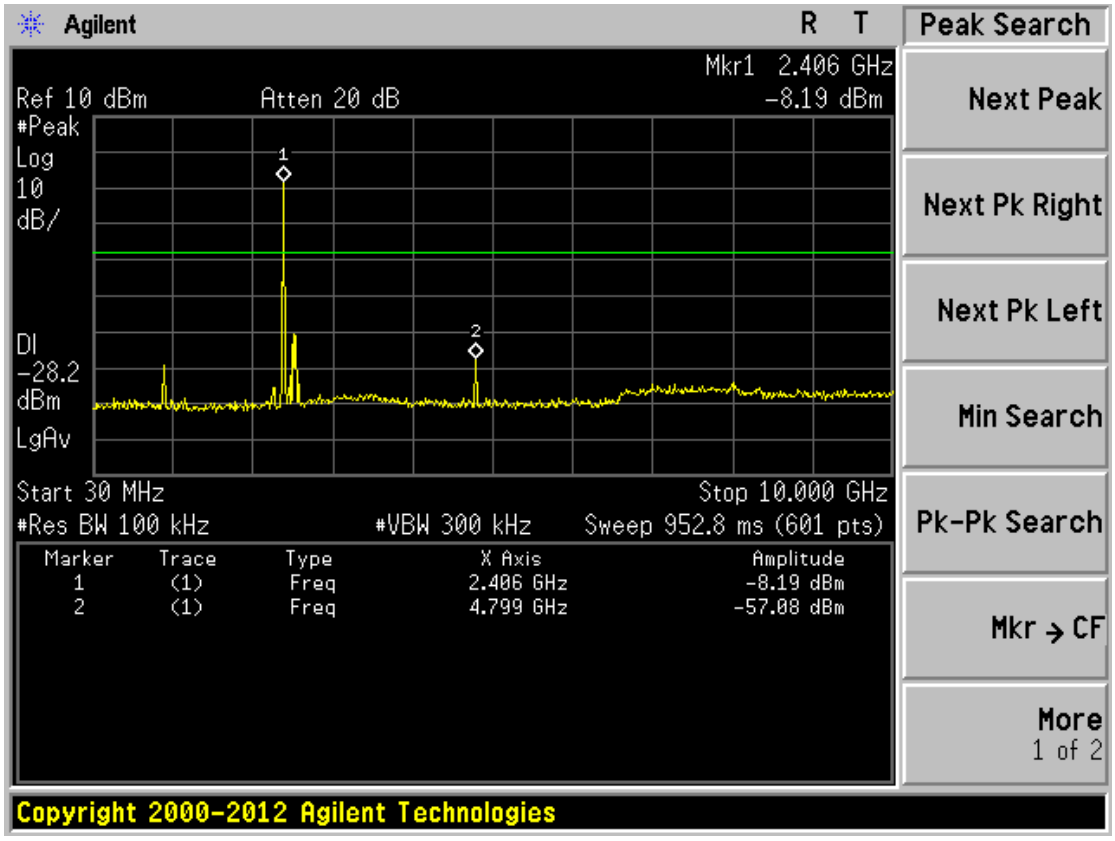
8DPSK Hopping on CHL :

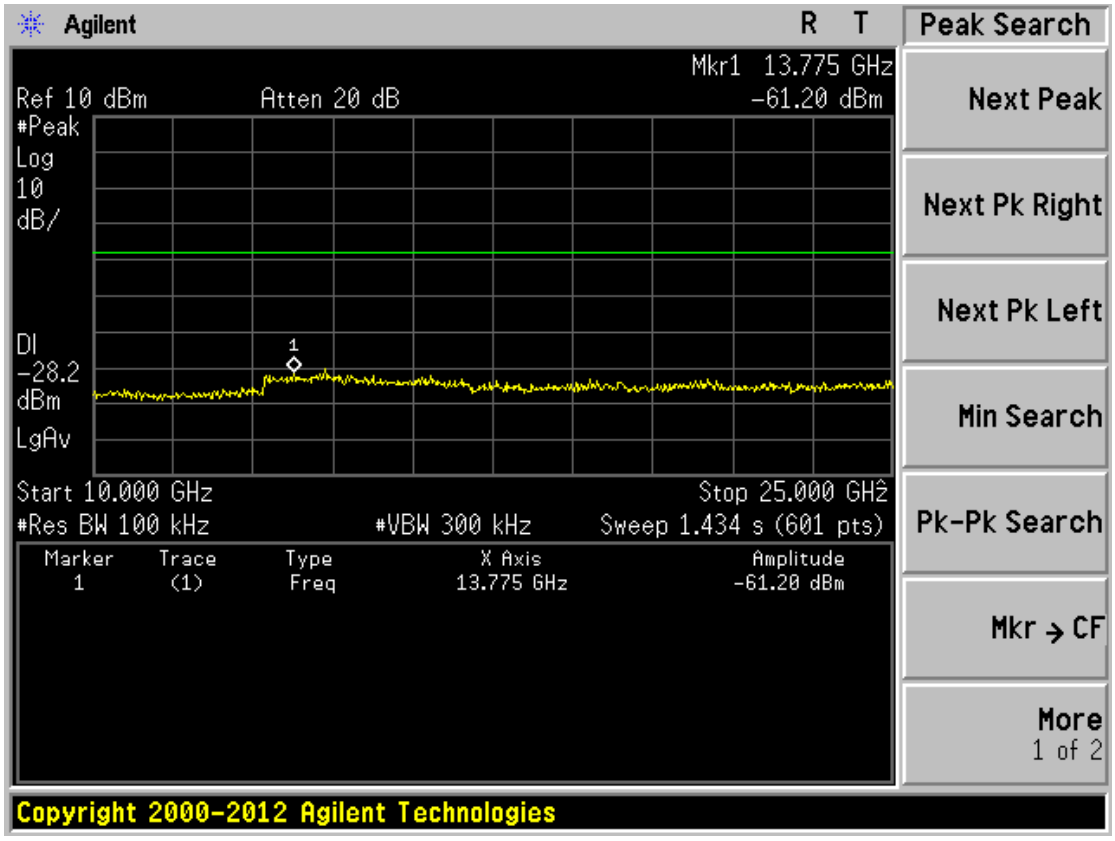


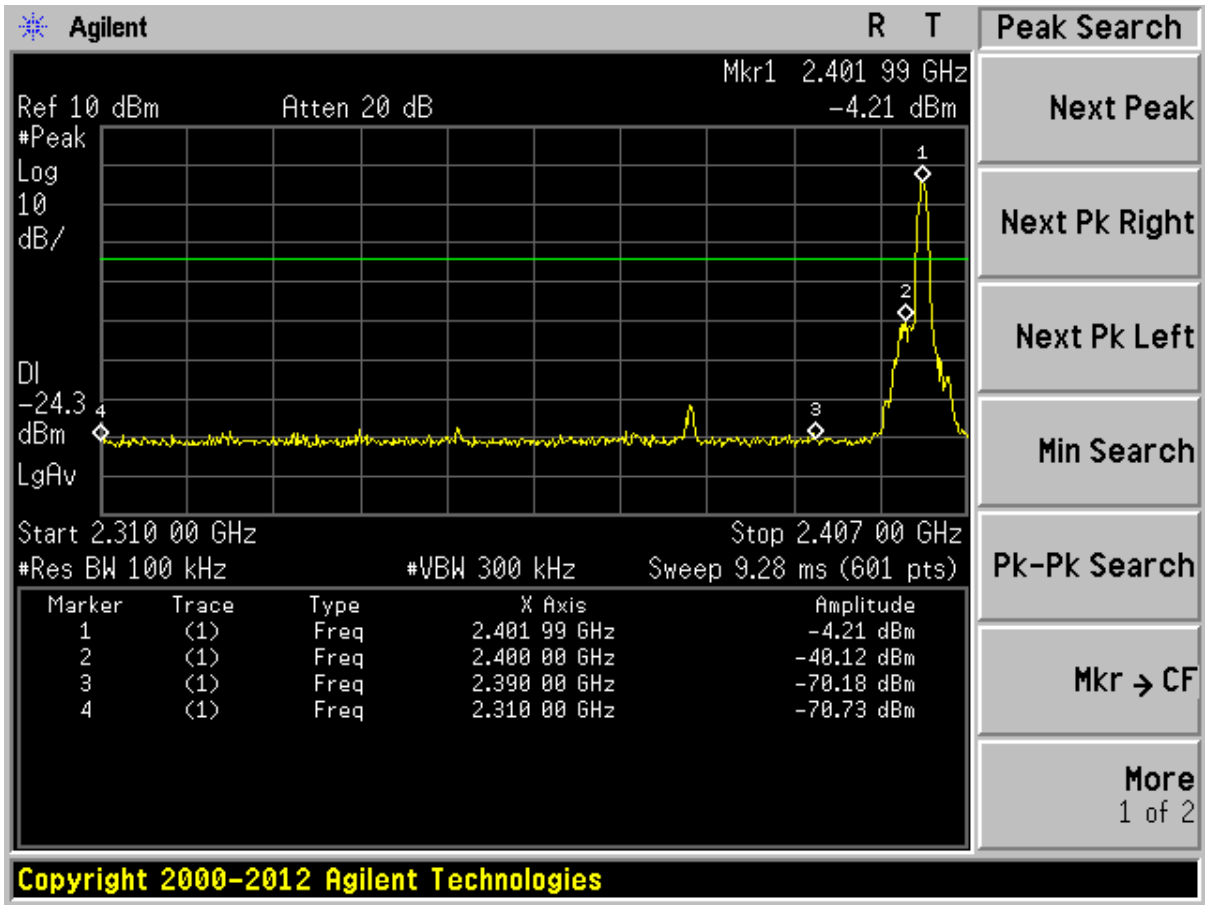
8DPSK Hopping on CHH :



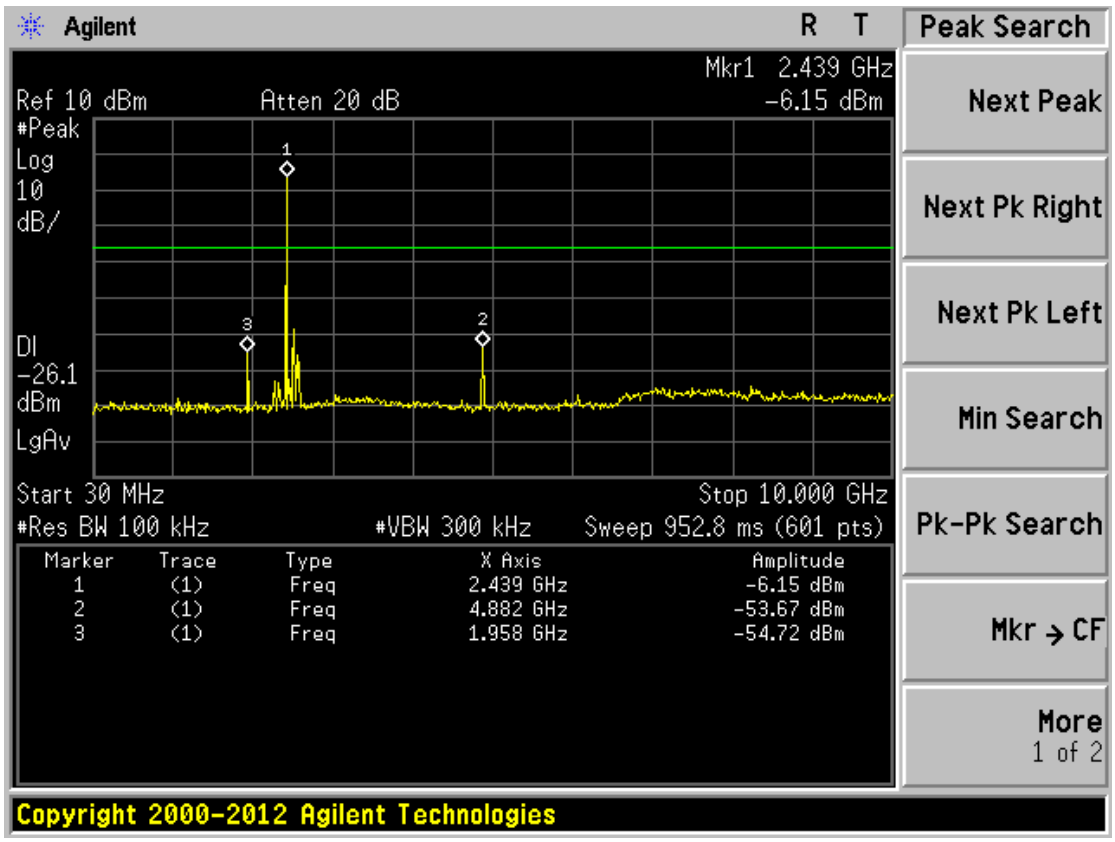
π/4 DQPSK Hopping off CHL :

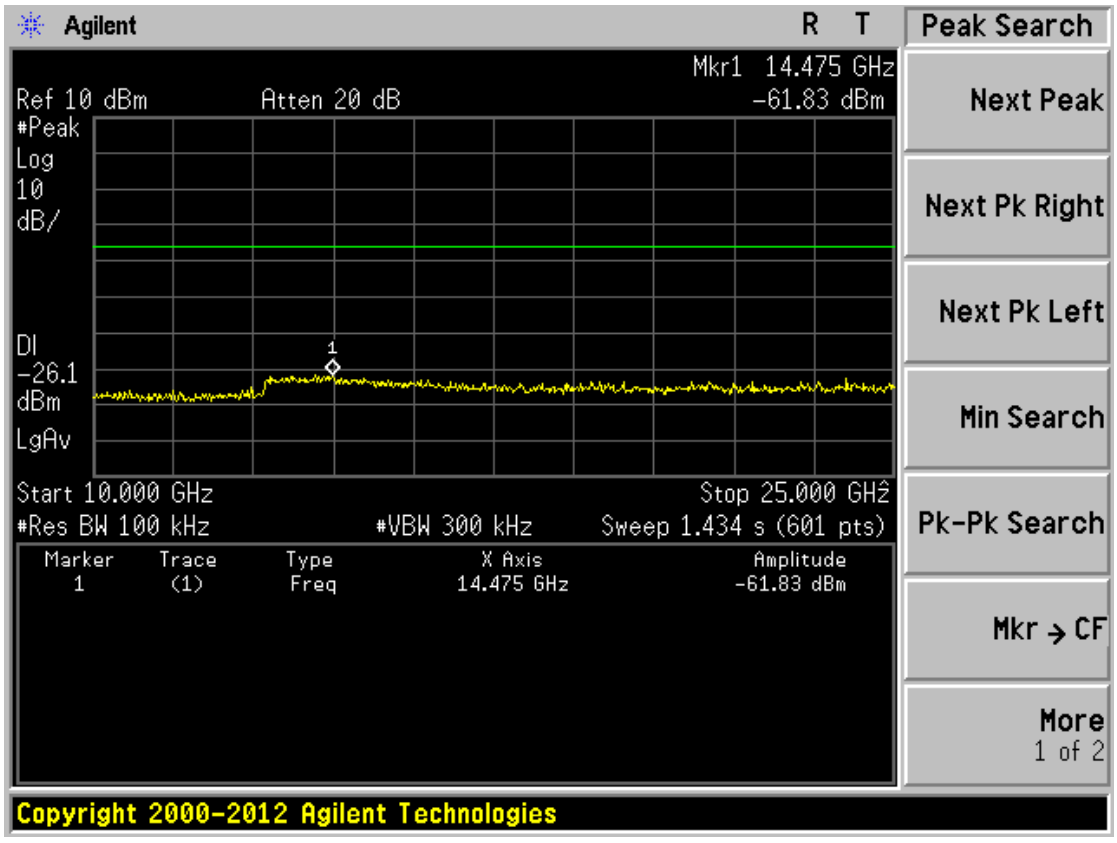




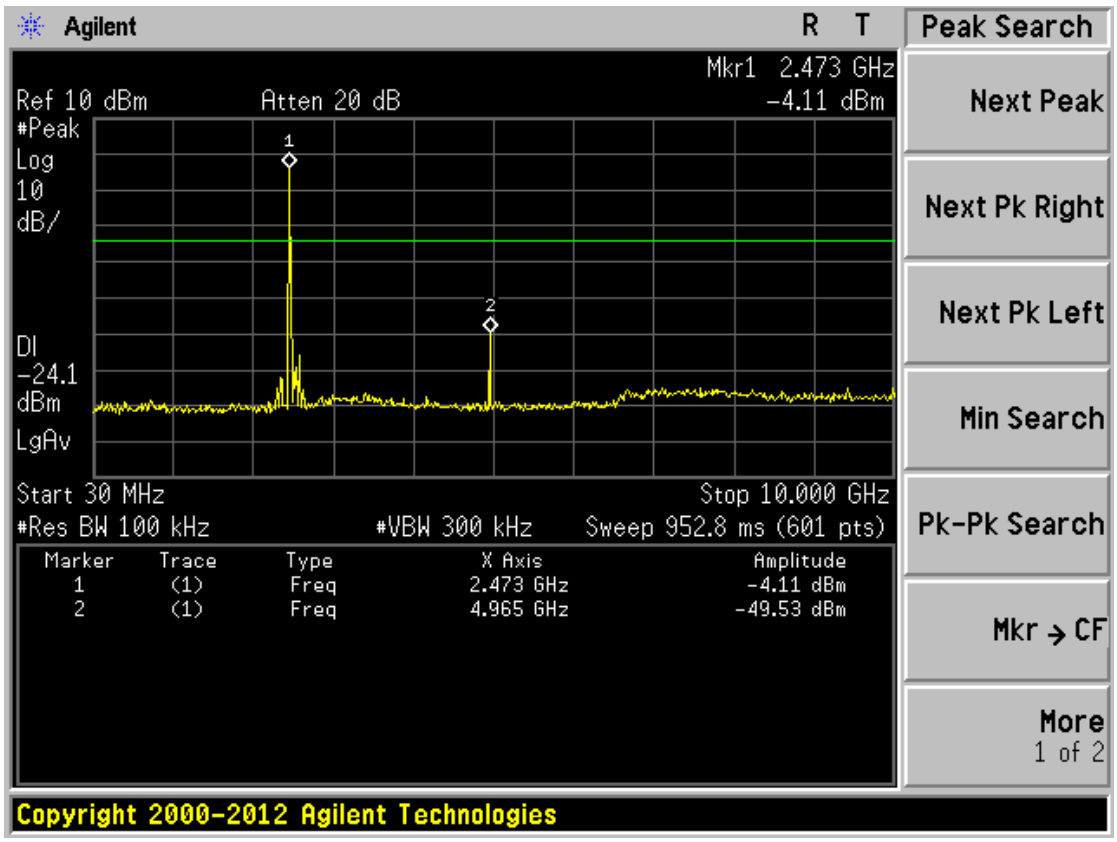

Agilent
R T
Mkr1 2.401 99 GHz
Ref 10 dBm
Atten 20 dB
-4.21 dBm
#Peak
Log
10
dB/
Dl
-24.3
dBm
LgAv
Start 2.310 00 GHz
Stop 2.407 00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 9.28 ms (601 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.401 99 GHz -4.21 dBm
2 (1) Freq 2.400 00 GHz -40.12 dBm
3 (1) Freq 2.390 00 GHz -70.18 dBm
4 (1) Freq 2.310 00 GHz -70.73 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Copyright 2000-2012 Agilent Technologies

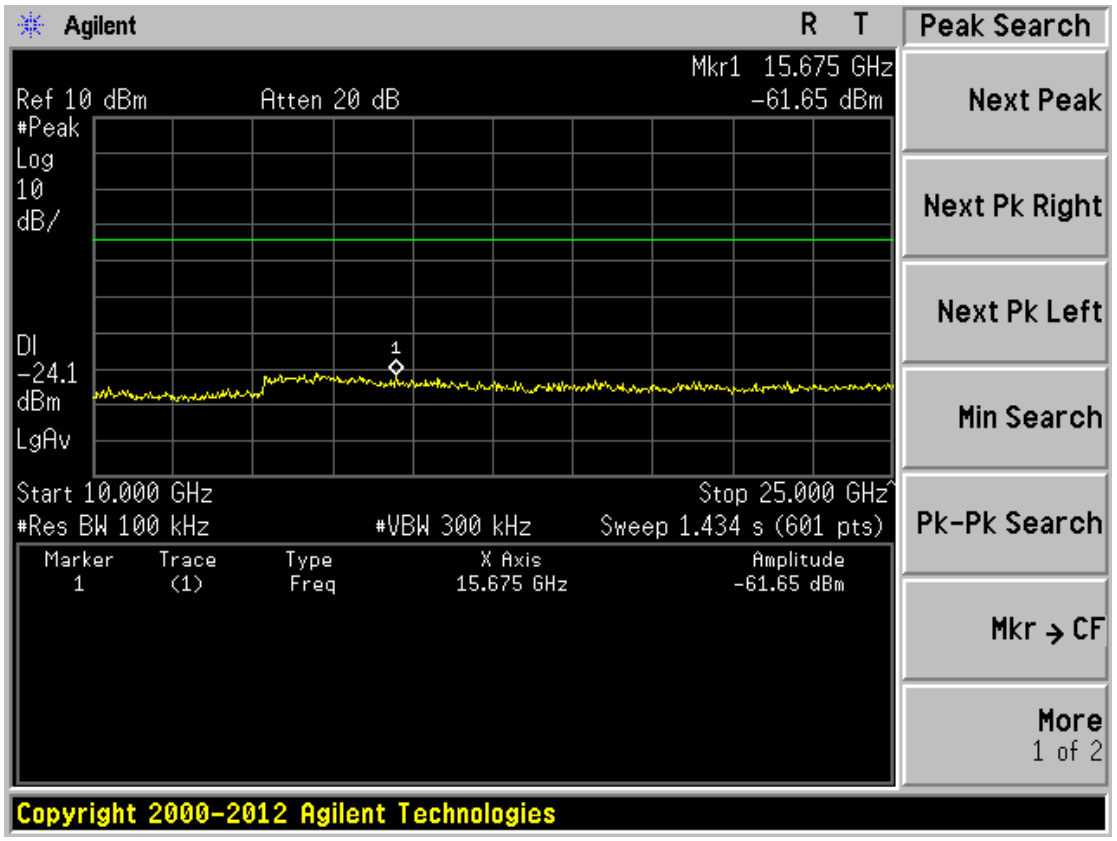
π/4 DQPSK Hopping off CHM :

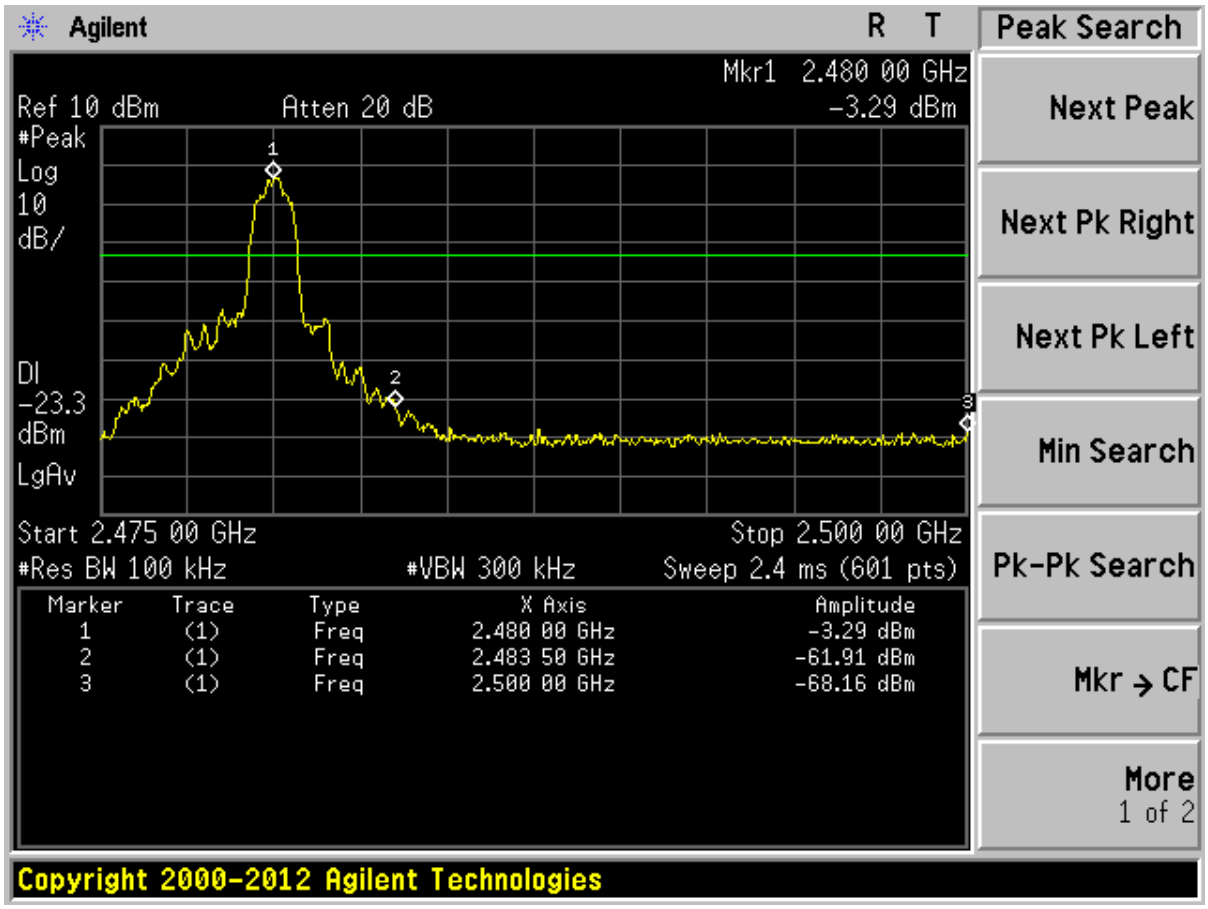




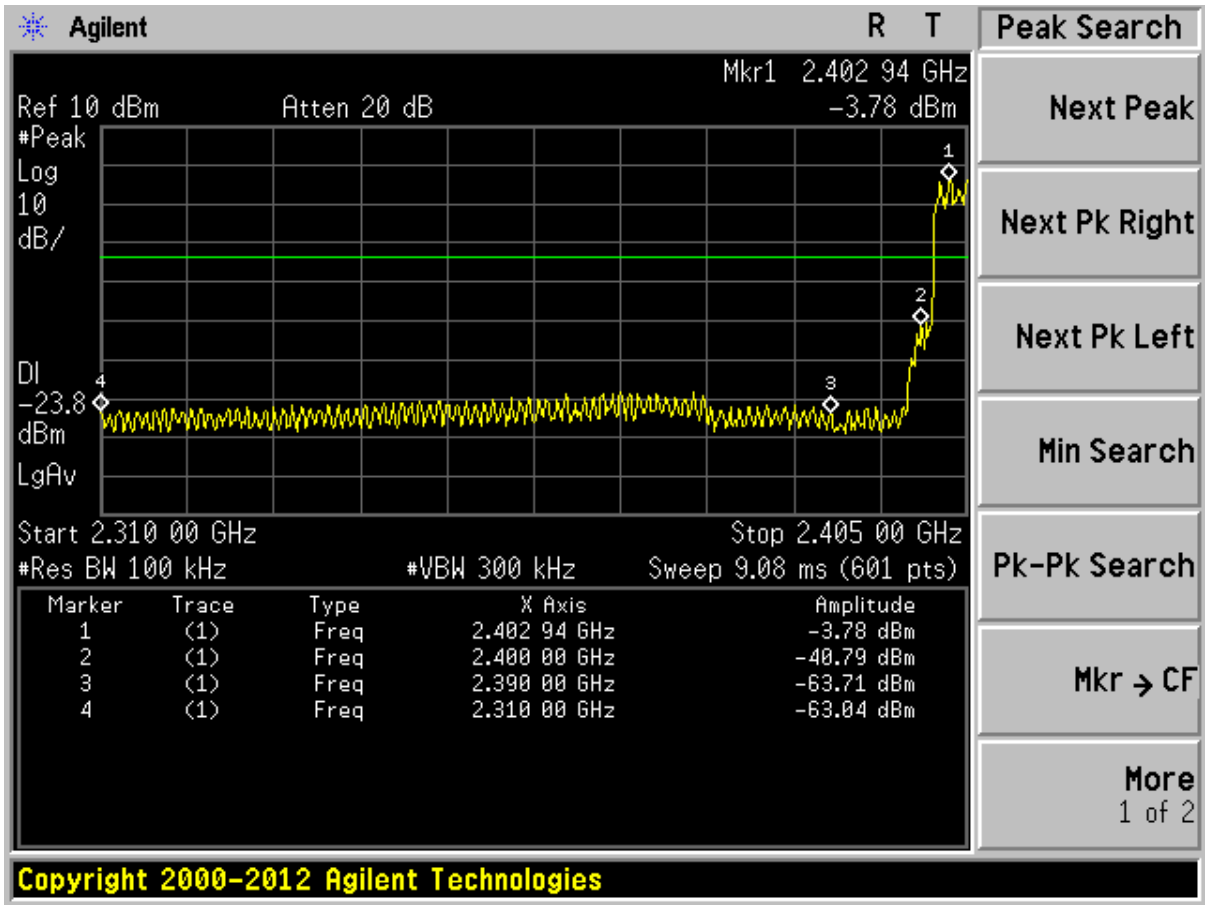
π/4 DQPSK Hopping off CHH :



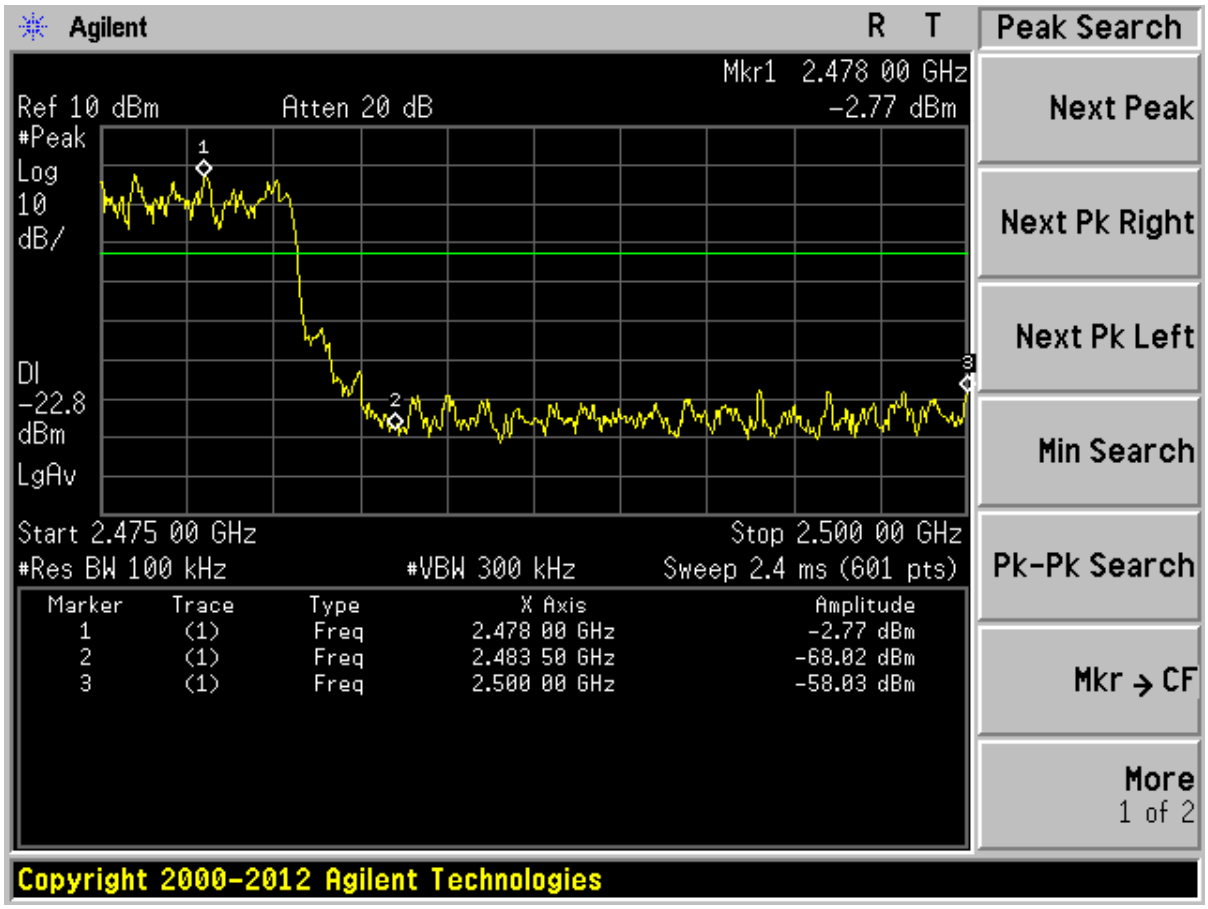



Agilent
R T
Peak Search
Mkr1 2.480 00 GHz
Ref 10 dBm
Atten 20 dB
-3.29 dBm
Next Peak
#Peak
Log
10
dB/
Next Pk Right
Next Pk Left
Dl
-23.3
dBm
LgAv
Min Search
Start 2.475 00 GHz
Stop 2.500 00 GHz
Pk-Pk Search
#Res BW 100 kHz
#VBW 300 kHz
Sweep 2.4 ms (601 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.480 00 GHz -3.29 dBm
2 (1) Freq 2.483 50 GHz -61.91 dBm
3 (1) Freq 2.500 00 GHz -68.16 dBm
Mkr → CF
More
1 of 2
Copyright 2000-2012 Agilent Technologies

π/4 DQPSK Hopping on CHL :



π/4 DQPSK Hopping on CHH:



8. Carrier Frequency Separation Test

8.1 Test Procedure

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, freq hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

The peak detector was used with 100 kHz/300 kHz RBW/VBW

8.2 Measurement Equipment

	Equipment	Calibration Due	Type	Serial No.	Manufacturer
☒	Spectrum	Jul. 04 2016	FSP30	GTS208	RS

8.3 Test Result

Channel separation is refered to 8.3.1 to 8.3.3

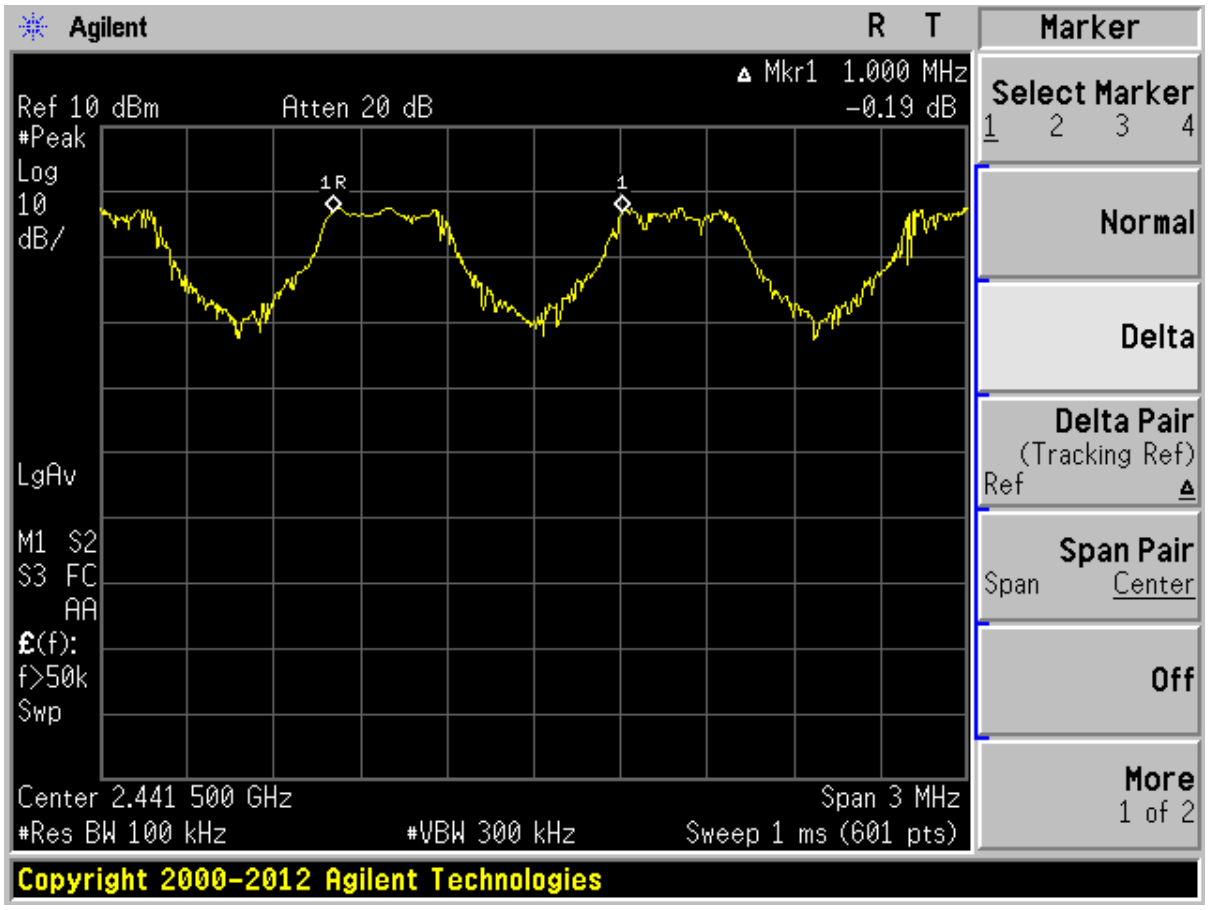
Widest channel bandwidth was 1.220MHz.

Two-thirds of Bandwidth is 0.813MHz and greater than 25kHz .

Modulation	Channel separation, kHz	Minimum limit, kHz	Result
GFSK	1MHz	813kHz	Pass
8DPSK	1MHz	813kHz	Pass
π/4 DQPSK	1MHz	813kHz	Pass

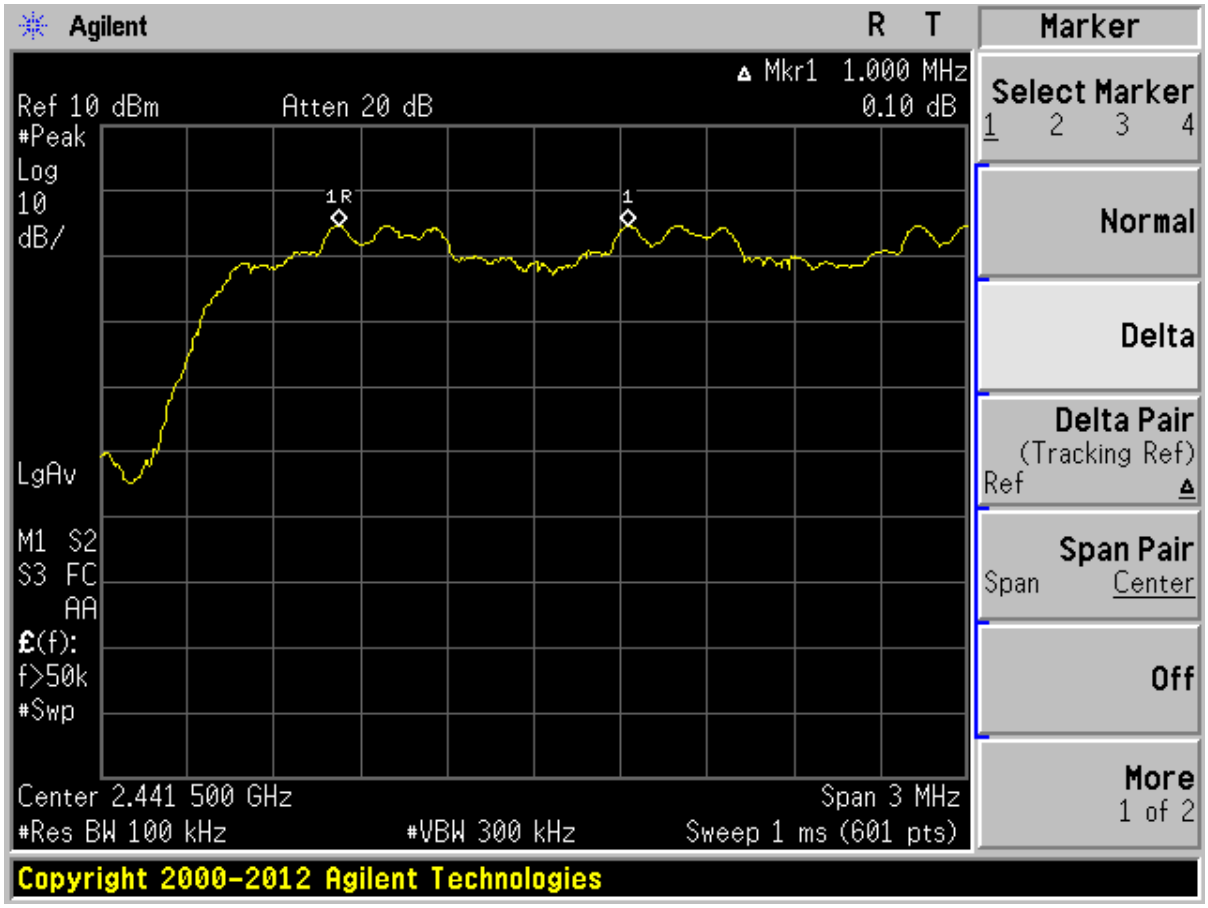
8.3.1 Diagram 8-1

GFSK :



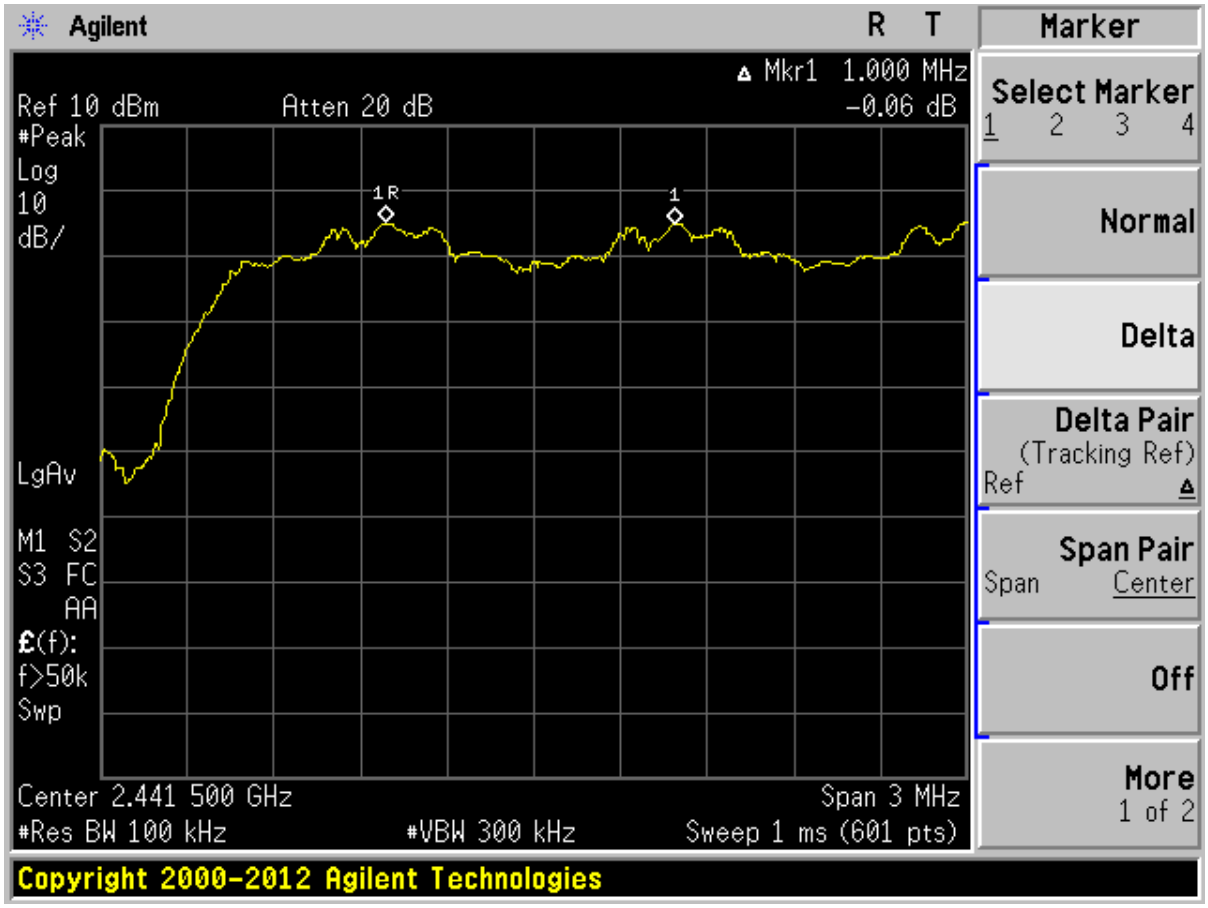
8.3.2 Diagram 8-2

8DPSK :



8.3.3 Diagram 8-3

π/4 DQPSK :



9. Output Power Test

9.1 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.

9.2 Measurement Equipment

	Equipment	Calibration Due	Type	Serial No.	Manufacturer
☒	Spectrum	Jul. 04 2016	FSP30	GTS208	RS

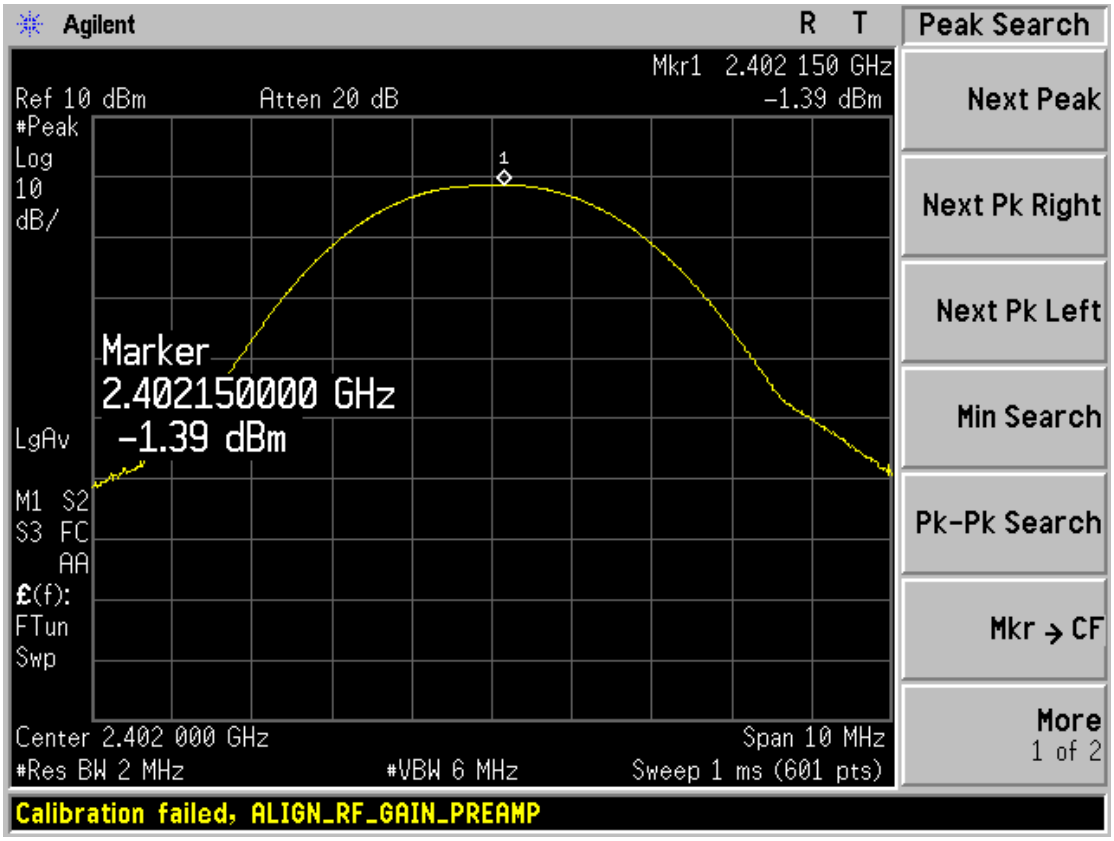
9.3 Test Result

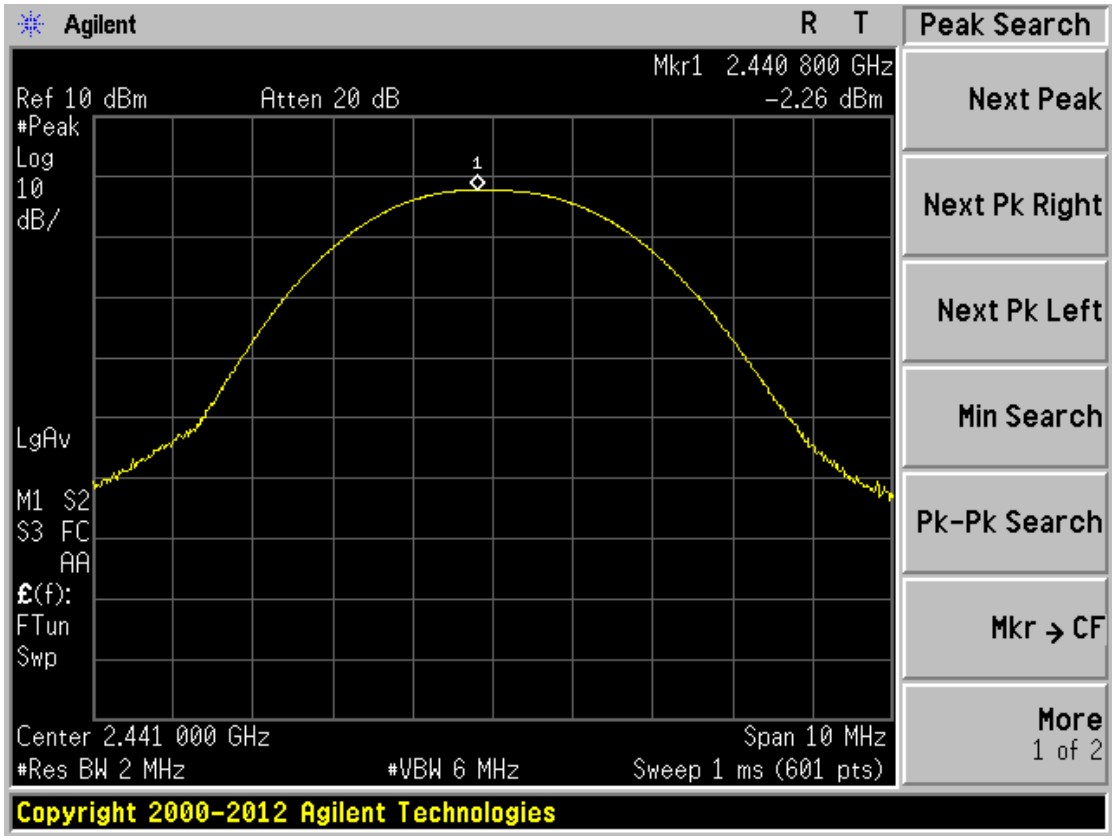
Remark : 1:RBW>=20dB Bandwidth VBW>=RBW PK detector

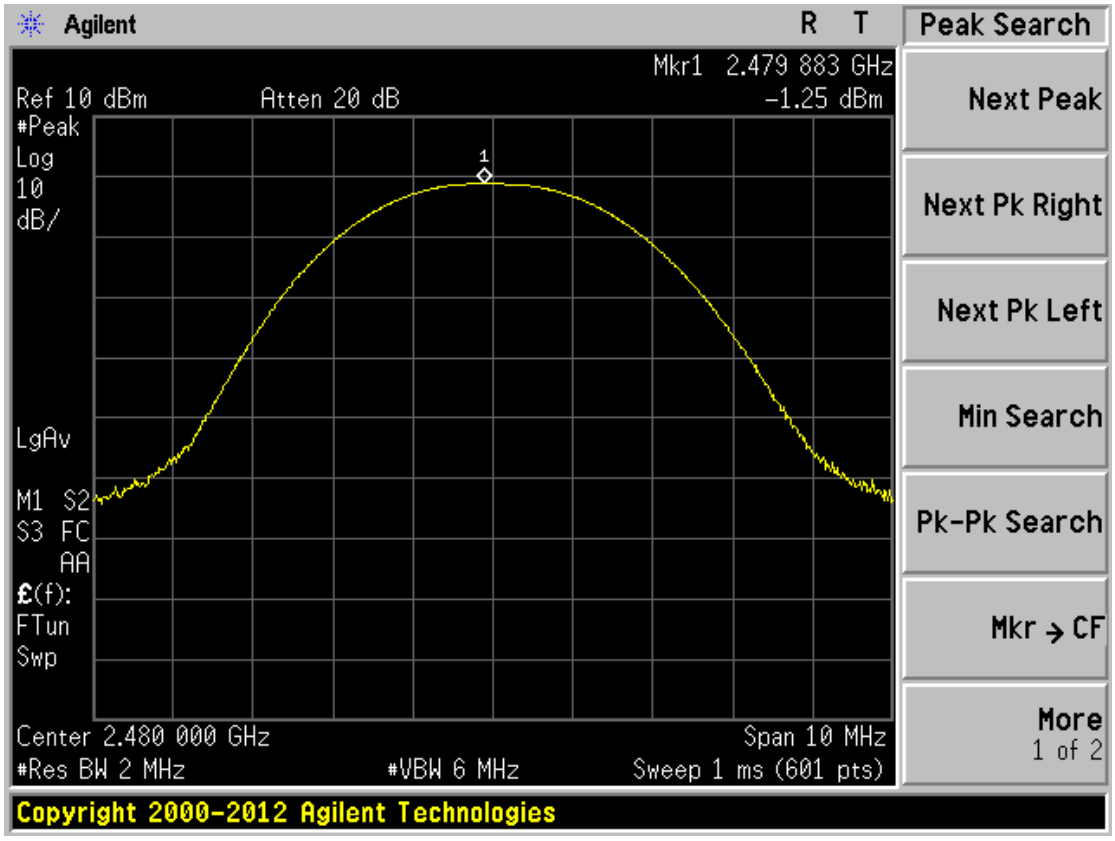
GFSK:

Frequency, MHz	Reading dBm	Cable loss dB	PK Output power, dBm	Power Limit, dBm
2402	-1.39	1	-0.39	30.00
2441	-2.26	1	-1.26	30.00
2480	-1.25	1	-0.25	30.00

Diagram of GFSK is as below:



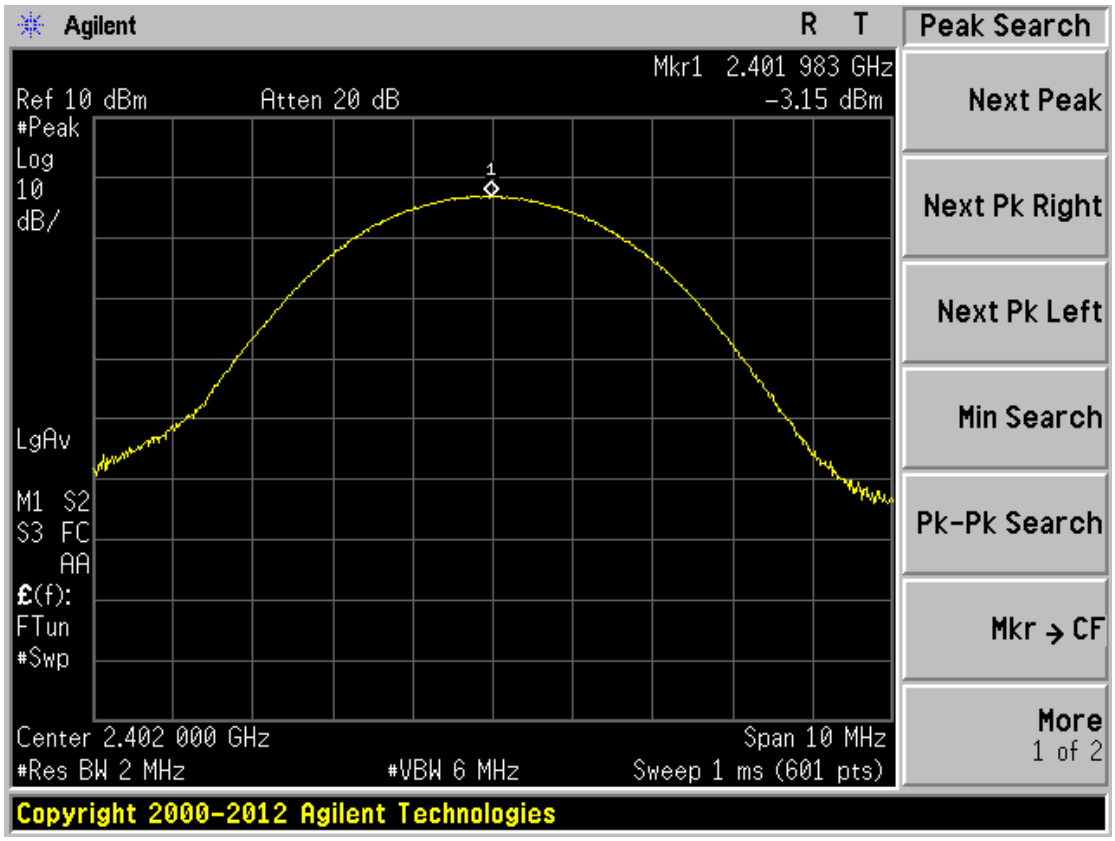

Agilent
R T
Peak Search
Mkr1 2.440 800 GHz
Ref 10 dBm
Atten 20 dB
-2.26 dBm
#Peak
Log
10
dB/
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Center 2.441 000 GHz
Span 10 MHz
#Res BW 2 MHz
#VBW 6 MHz
Sweep 1 ms (601 pts)
Copyright 2000-2012 Agilent Technologies

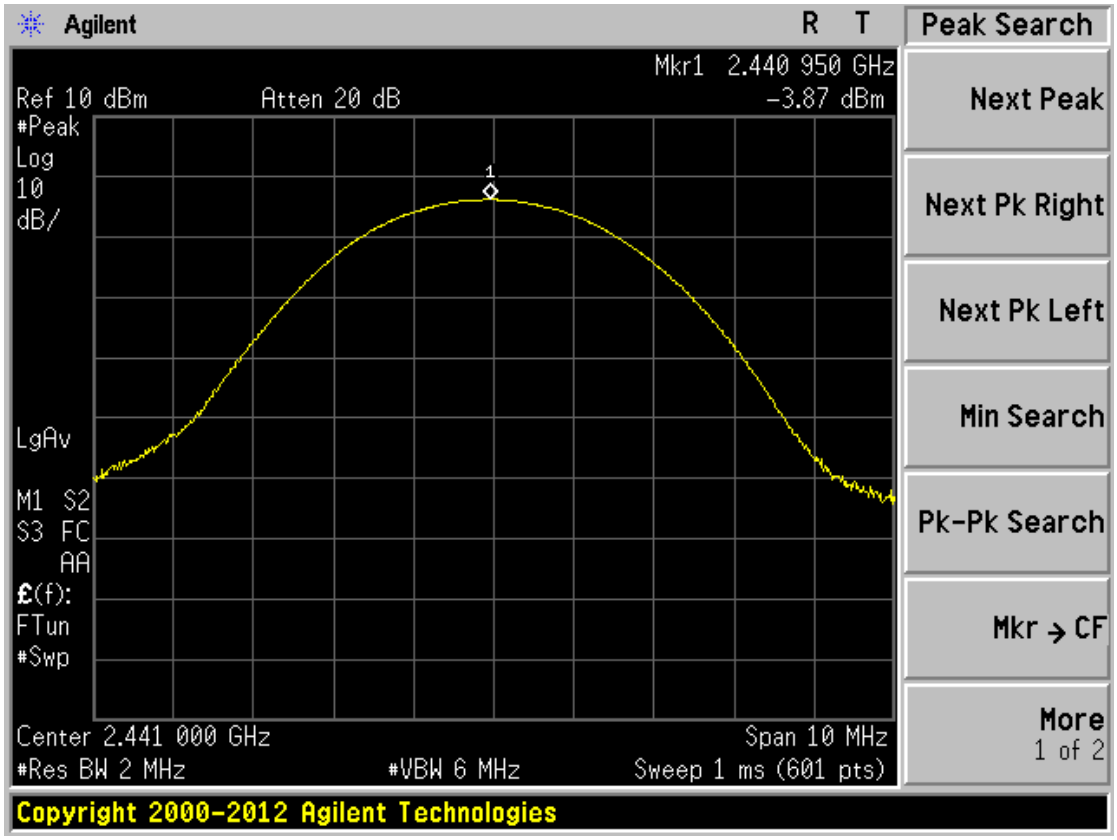

Agilent
R T
Peak Search
Mkr1 2.479 883 GHz
Ref 10 dBm
Atten 20 dB
-1.25 dBm
#Peak
Log
10
dB/
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Center 2.480 000 GHz
Span 10 MHz
#Res BW 2 MHz
#VBW 6 MHz
Sweep 1 ms (601 pts)
Copyright 2000-2012 Agilent Technologies

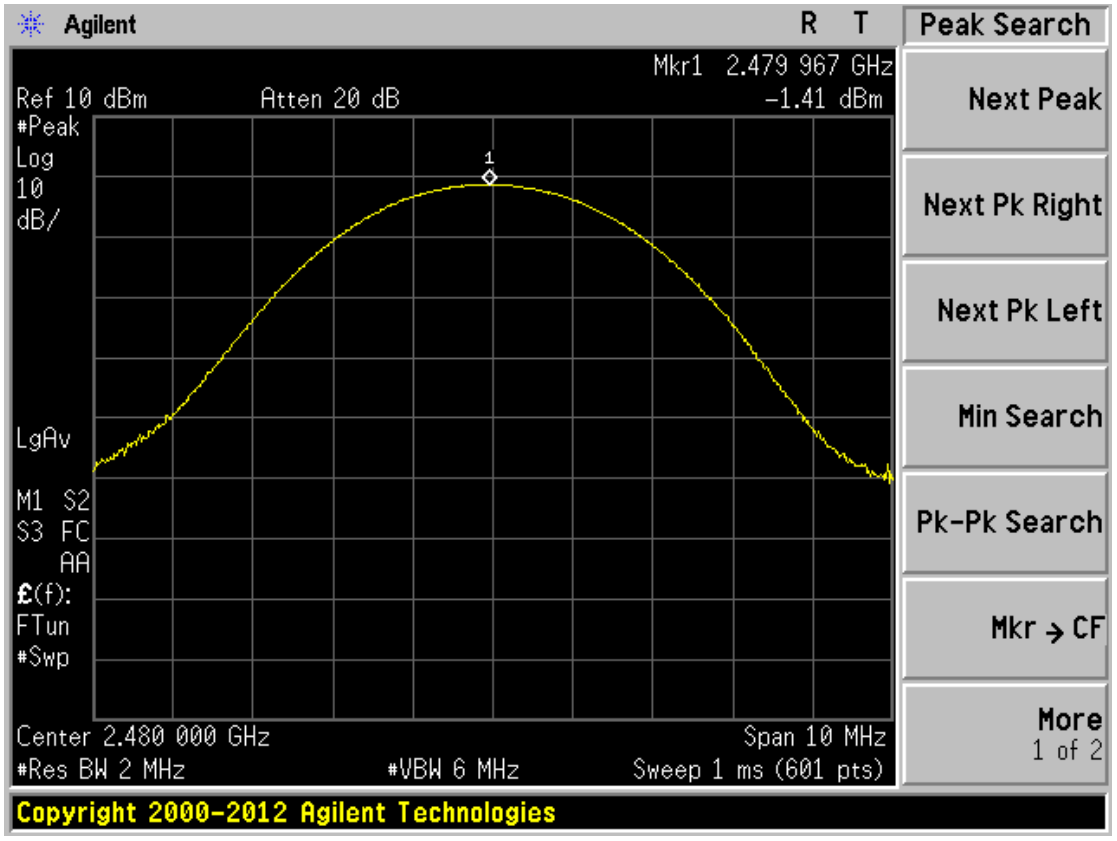
8DPSK:

Frequency, MHz	Reading dBm	Cable loss dB	PK Output power, dBm	Power Limit, dBm
2402	-3.15	1	-2.15	30.00
2441	-3.87	1	-2.87	30.00
2480	-1.41	1	-0.41	30.00

Diagram of 8DPSK is as below:



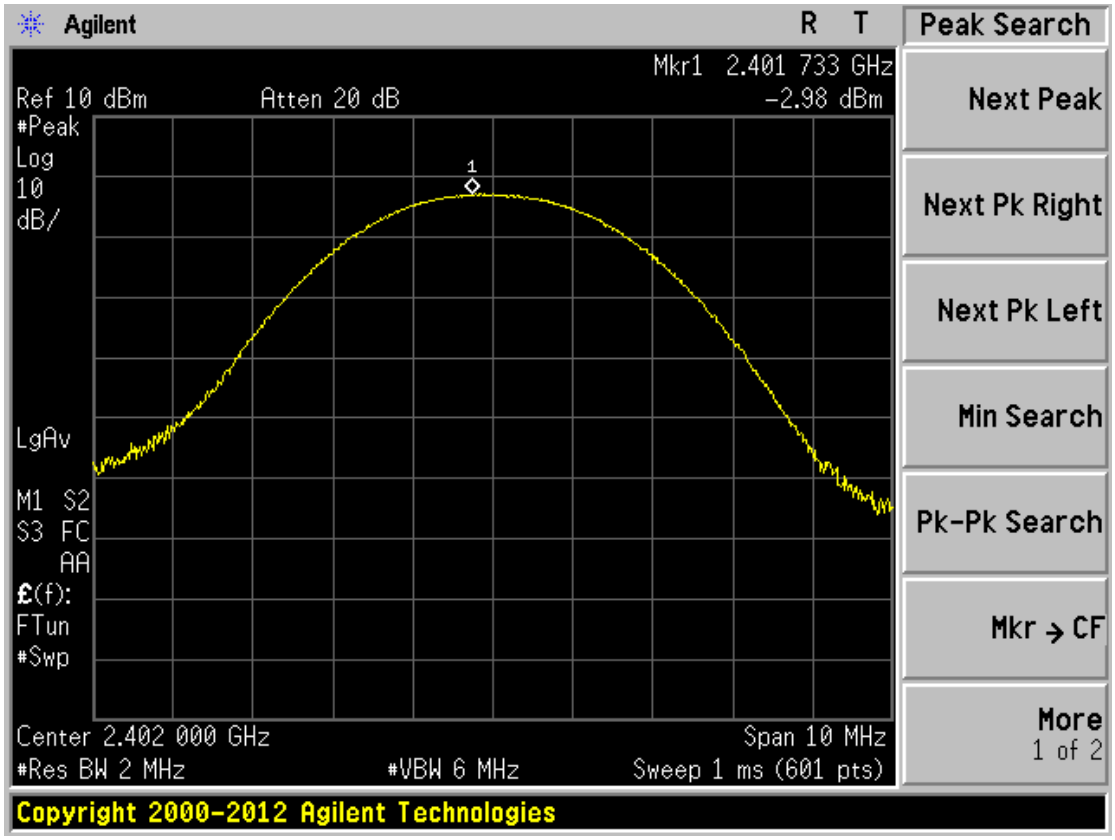

Agilent
R T
Peak Search
Mkr1 2.440 950 GHz
Ref 10 dBm
Atten 20 dB
-3.87 dBm
#Peak
Log
10
dB/
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
#Swp
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Center 2.441 000 GHz
Span 10 MHz
#Res BW 2 MHz
#VBW 6 MHz
Sweep 1 ms (601 pts)
Copyright 2000-2012 Agilent Technologies

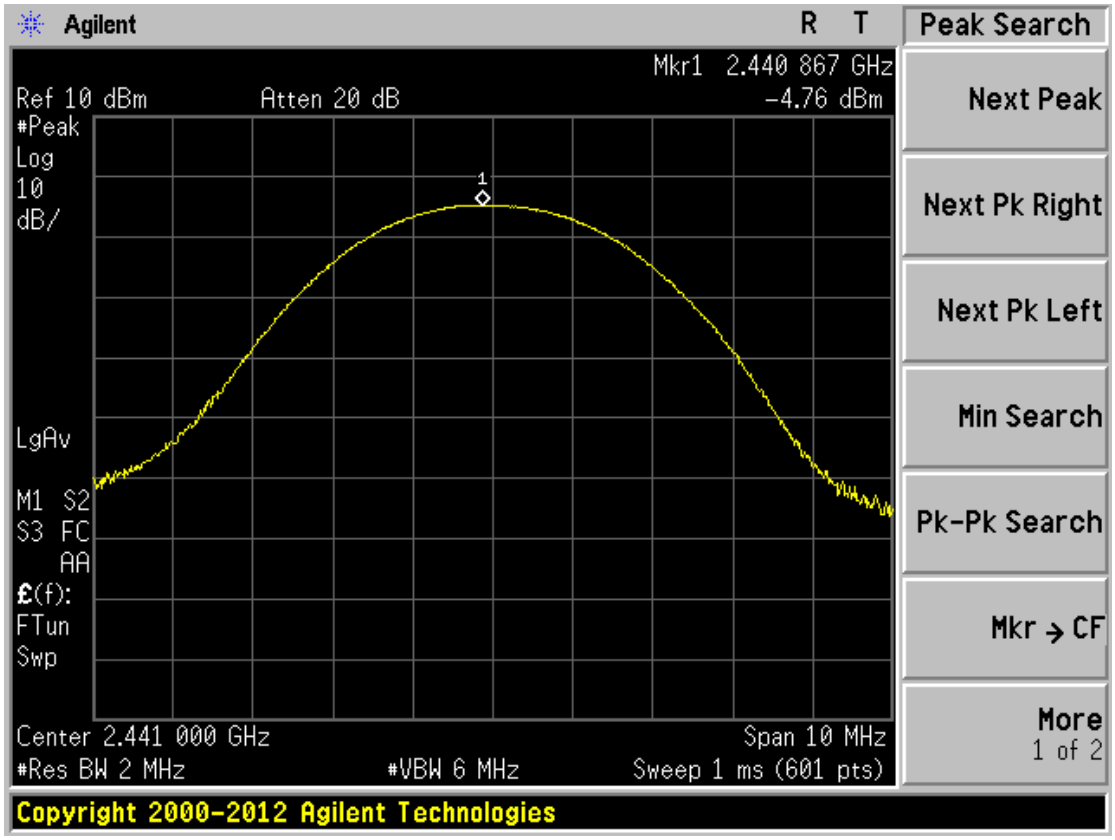

Agilent
R T
Peak Search
Mkr1 2.479 967 GHz
Ref 10 dBm
Atten 20 dB
-1.41 dBm
#Peak
Log
10
dB/
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
#Swp
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Center 2.480 000 GHz
Span 10 MHz
#Res BW 2 MHz
#VBW 6 MHz
Sweep 1 ms (601 pts)
Copyright 2000-2012 Agilent Technologies

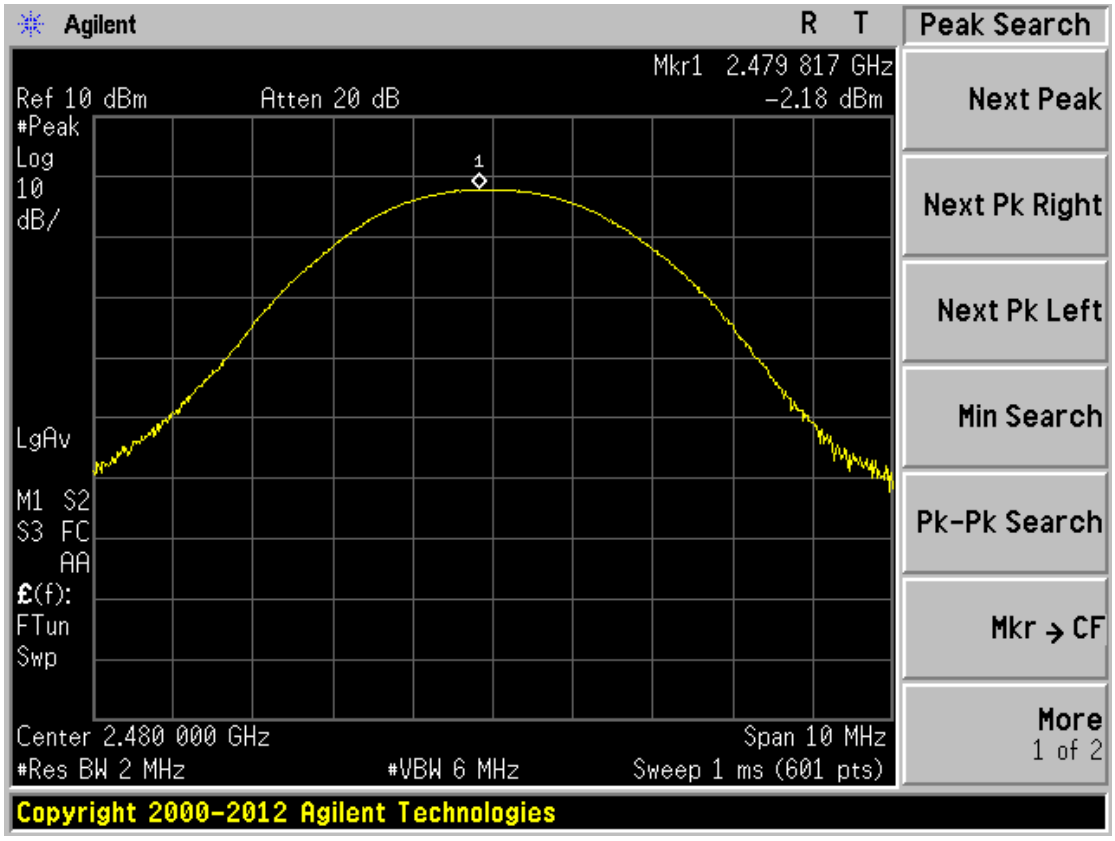
π/4 DQPSK:

Frequency, MHz	Reading dBm	Cable loss dB	PK Output power, dBm	Power Limit, dBm
2402	-2.98	1	-1.98	30.00
2441	-4.76	1	-3.76	30.00
2480	-2.18	1	-1.18	30.00

Diagram of π/4 DQPSK is as below:




Agilent
R T
Peak Search
Mkr1 2.440 867 GHz
Ref 10 dBm
Atten 20 dB
-4.76 dBm
#Peak
Log
10
dB/
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Center 2.441 000 GHz
Span 10 MHz
#Res BW 2 MHz
#VBW 6 MHz
Sweep 1 ms (601 pts)
Copyright 2000-2012 Agilent Technologies


Agilent
R T
Peak Search
Mkr1 2.479 817 GHz
Ref 10 dBm
Atten 20 dB
-2.18 dBm
#Peak
Log
10
dB/
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Center 2.480 000 GHz
Span 10 MHz
#Res BW 2 MHz
#VBW 6 MHz
Sweep 1 ms (601 pts)
Copyright 2000-2012 Agilent Technologies

10. NUMBER OF HOPPING FREQUENCY TEST

10.1 Test Procedure

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

10.2 Measurement Equipment

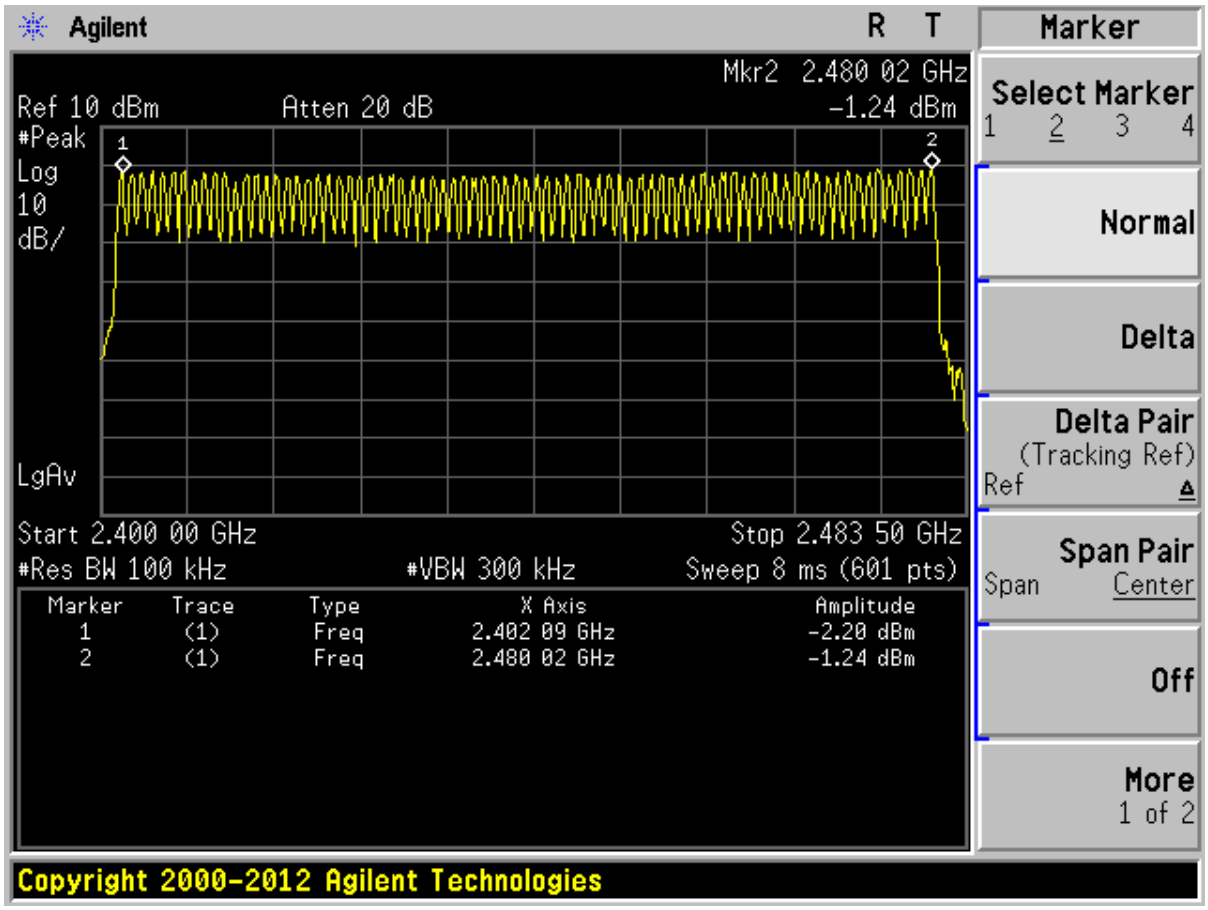
	Equipment	Calibration Due	Type	Serial No.	Manufacturer
☒	Spectrum	Jul. 04 2016	FSP30	GTS208	RS

10.3 Test Result

Test mode: Transmitter Hopping on

Number of channels used	Minimum number of channels limit
79	15

10.3.1 Diagram



11. DWELL TIME TEST

11.1 Test Procedure

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

11.2 Measurement Equipment

	Equipment	Calibration Due	Type	Serial No.	Manufacturer
☒	Spectrum	Jul. 04 2016	FSP30	GTS208	RS

11.3 Test Result

Limit:

Total time of occupancy is 0.4 s within a period of time equals number of hopping channels employed multiplied by 0.4 s, which is 0.4 s within the period of time 0.4 × 79 = 31.6 s

Remark:

DH1 Packet permit maximum 1600 / 79 /2 = 10.12 hops per second in each channel (1 time slot RX, 1 time slot TX). So, total hops is 10.12 x 31.6 = 320

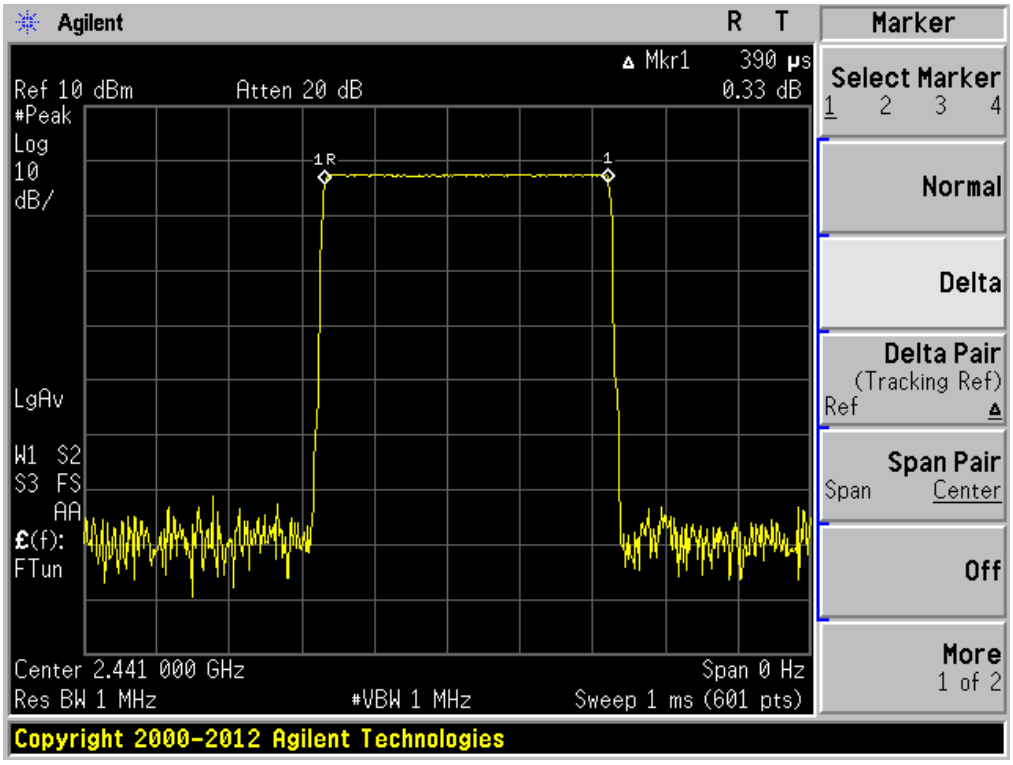
DH3 Packet permit maximum 1600 / 79 / 4 = 5.06 hops per second in each channel (3 time slots RX, 1 time slot TX). So, total hops is 5.06 x 31.6 = 160

DH5 Packet permit maximum 1600/ 79 / 6 = 3.37 hops per second in each channel (5 time slots RX, 1 time slot TX). So, total hops is 3.37 x 31.6 = 106.6

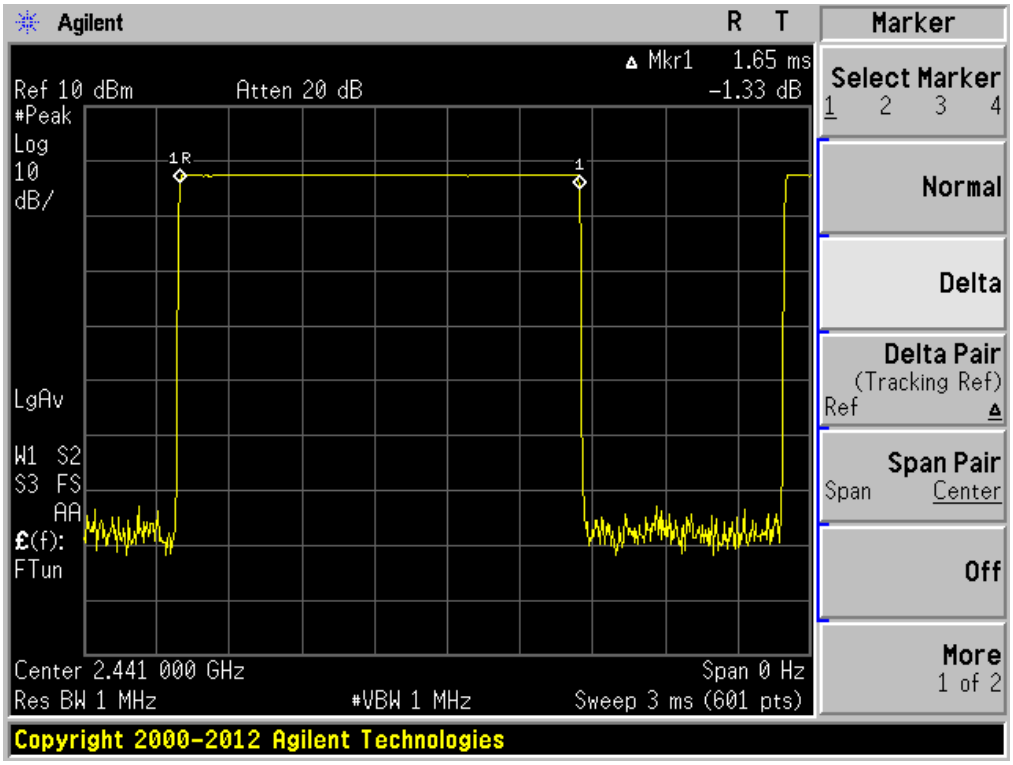
GFSK

Grouping	Diagram	Time of occupancy ms	Limit ms	Remark
DH1	11-1	124.8	400	320x 0.390
DH3	11-2	264.0	400	160x 1.65
DH5	11-3	308.2872	400	106.6x 2.892

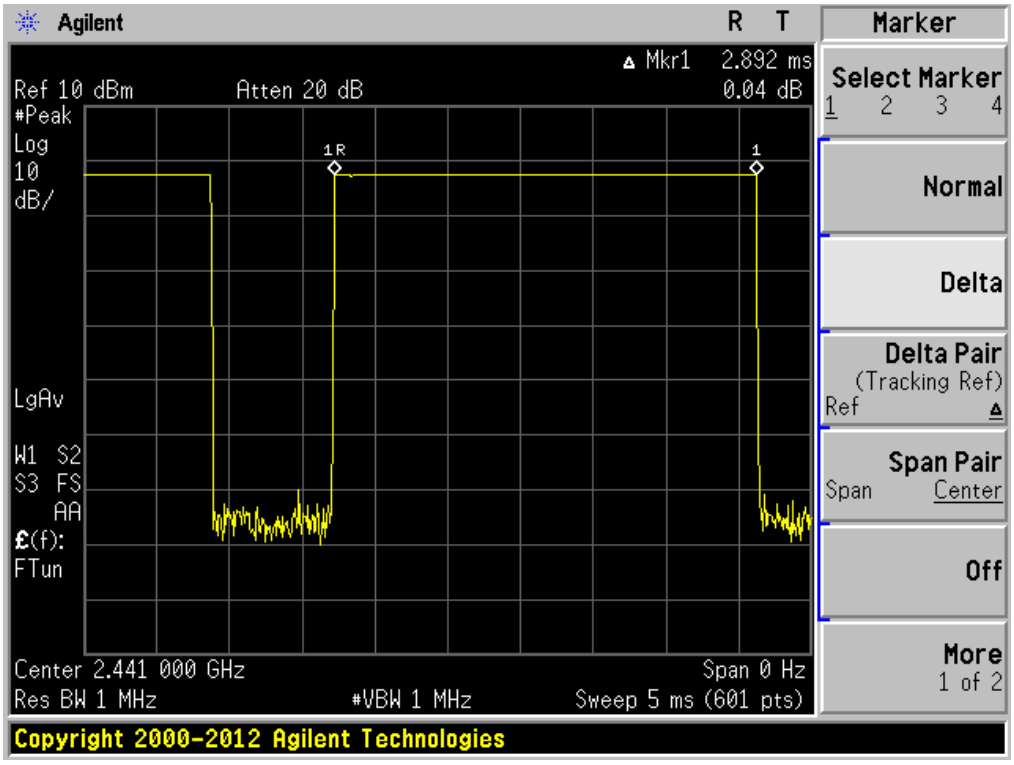
11.3.1 Diagram 11-1



11.3.2 Diagram 11-2



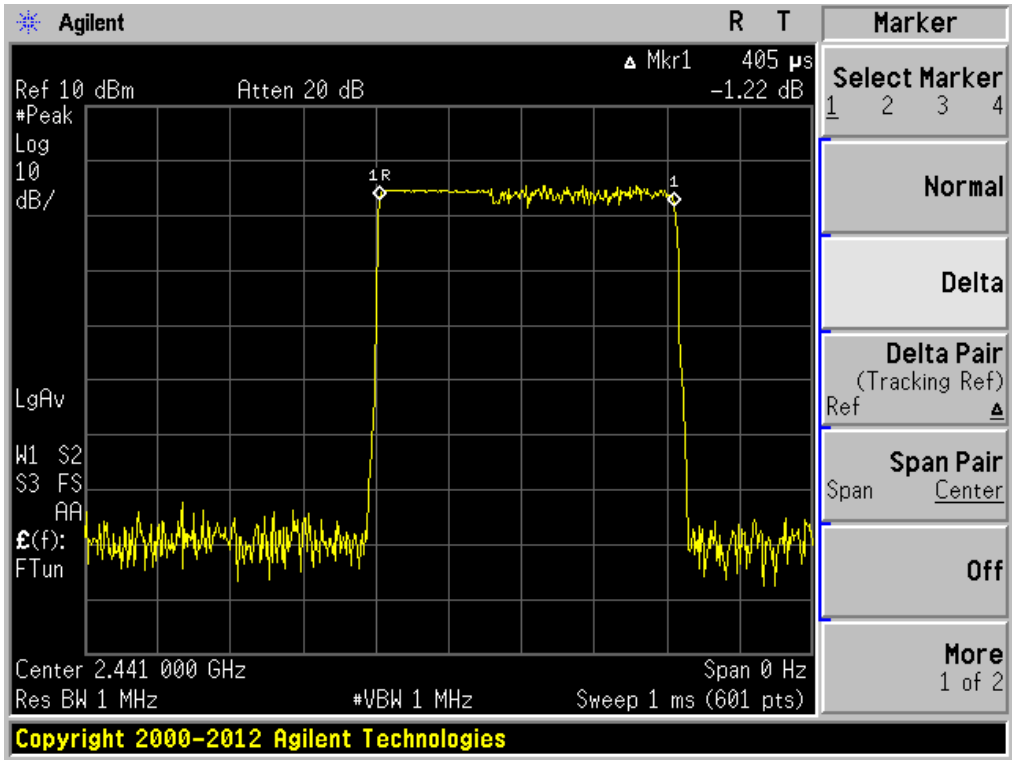
11.3.3 Diagram 11-3



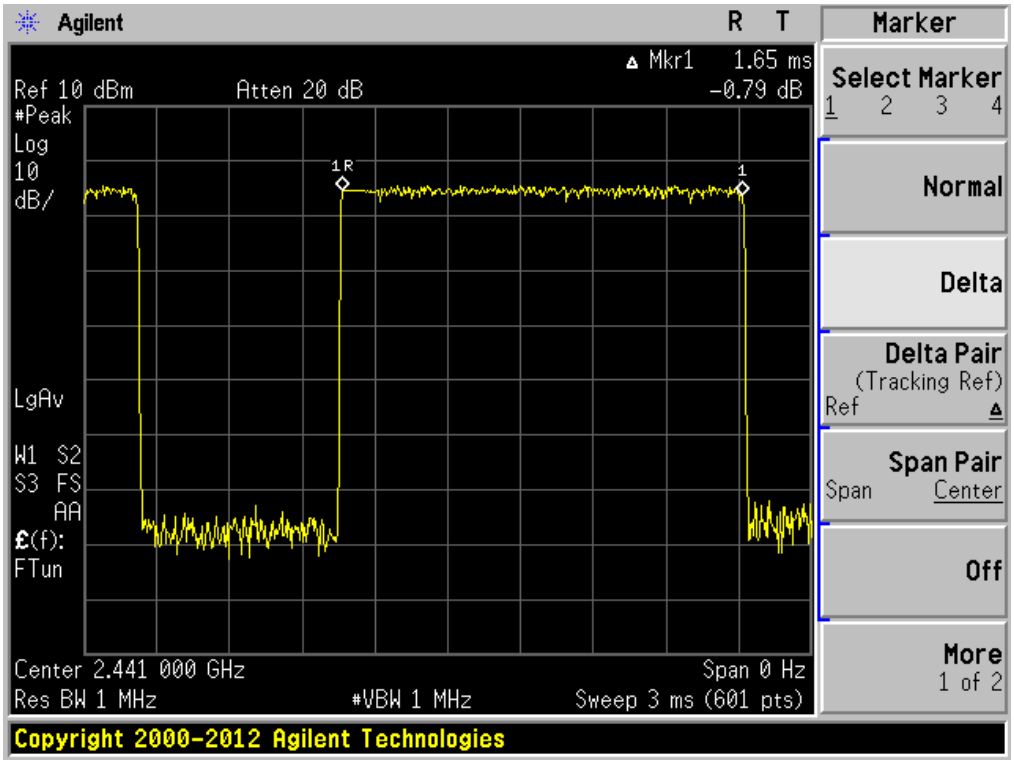
8DPSK

Grouping	Diagram	Time of occupancy ms	Limit ms	Remark
DH1	11-4	129.6	400	320x 0.405
DH3	11-5	264.0	400	160x 1.65
DH5	11-6	309.14	400	106.6x 2.9

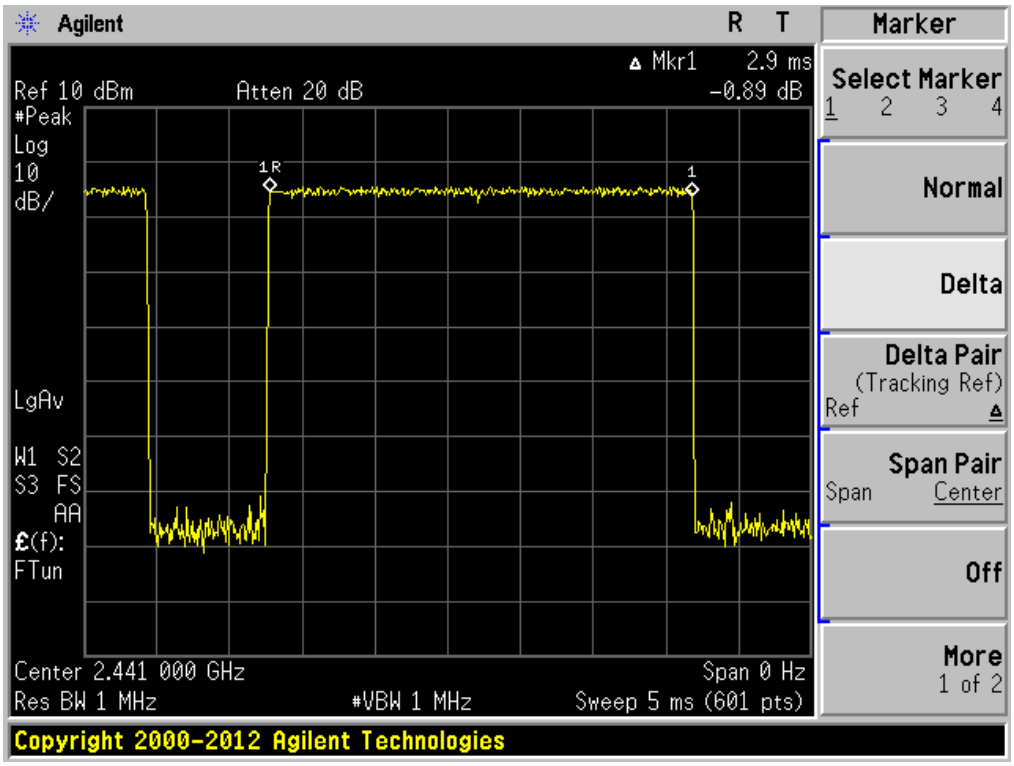
11.3.4 Diagram 11-4



11.3.5 Diagram 11-5



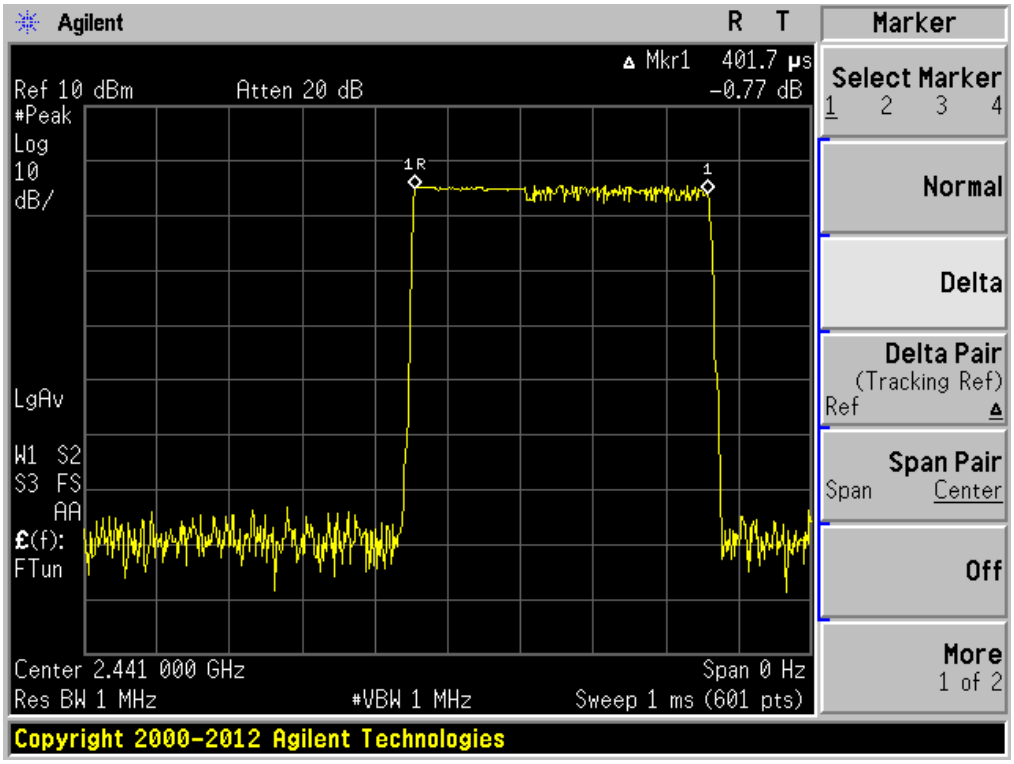
11.3.6 Diagram 11-6



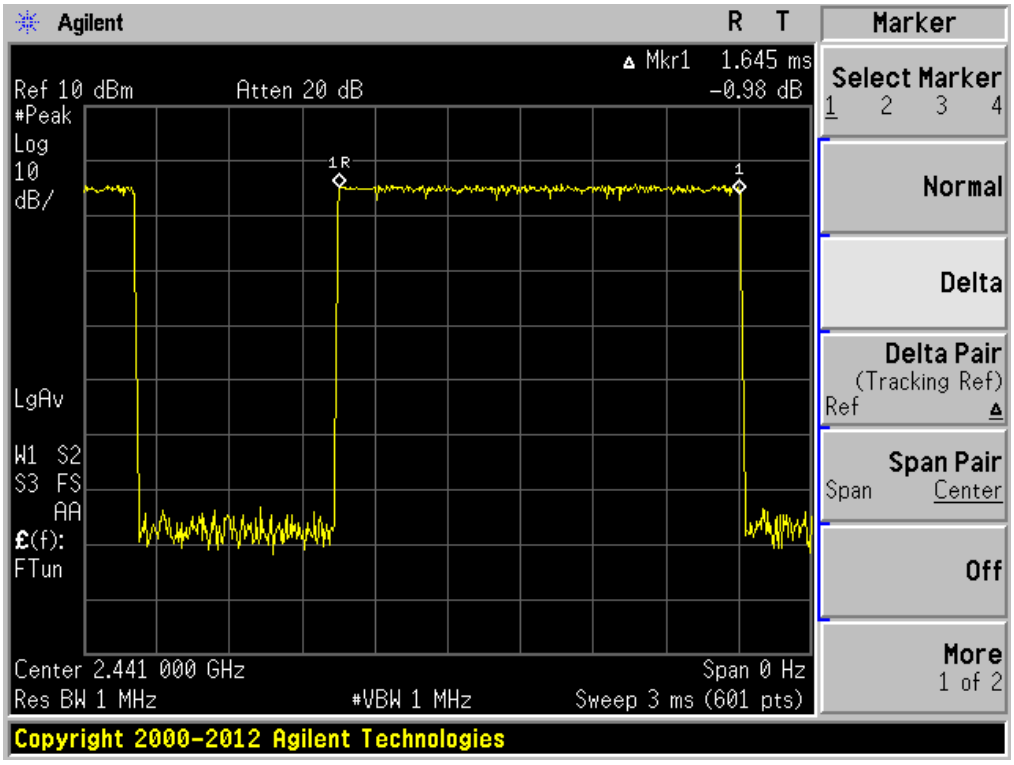
π /4 DQPSK

Grouping	Diagram	Time of occupancy ms	Limit ms	Remark
DH1	11-7	128.544	400	320x 0.4017
DH3	11-8	263.2	400	160x 1.645
DH5	11-9	309.14	400	106.6x 2.9

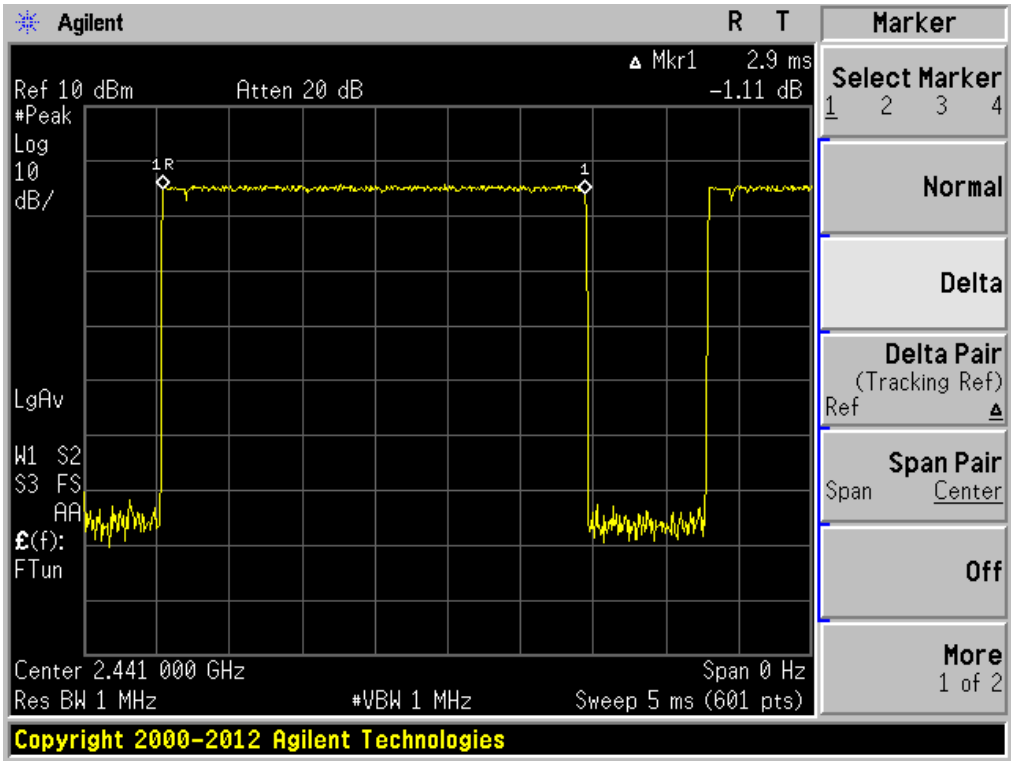
11.3.7 Diagram 11-7



11.3.8 Diagram 11-8



11.3.9 Diagram 11-9



12 POWER LINE CONDUCTED EMISSION TEST

12.1 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 μH/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 (dBμV)	
	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.		

12.2 Measurement Equipment

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

12.3 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.

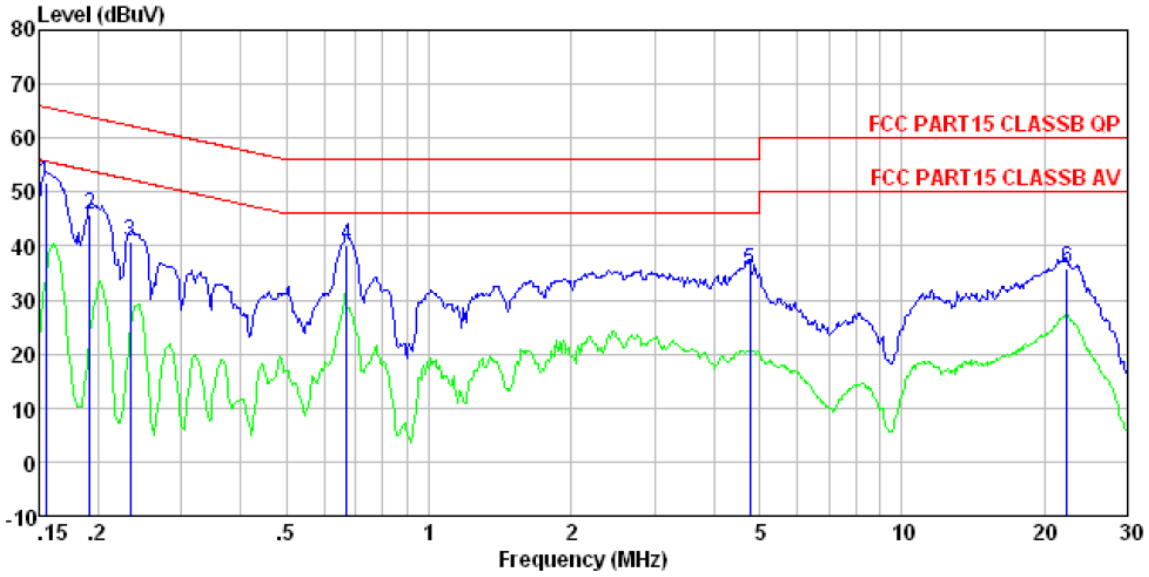
Preview measurements:
0.15 MHz to 30 MHz
Receiver settings: PK&AV detector
RBW:9 kHz
TX MODE

Final measurement:
0.15 MHz to 30 MHz
Receiver settings:QP&AV detector

Power Line	Test Data	Test Result
Line	Diagram 12-1	Pass
Neutral	Diagram 12-2	Pass

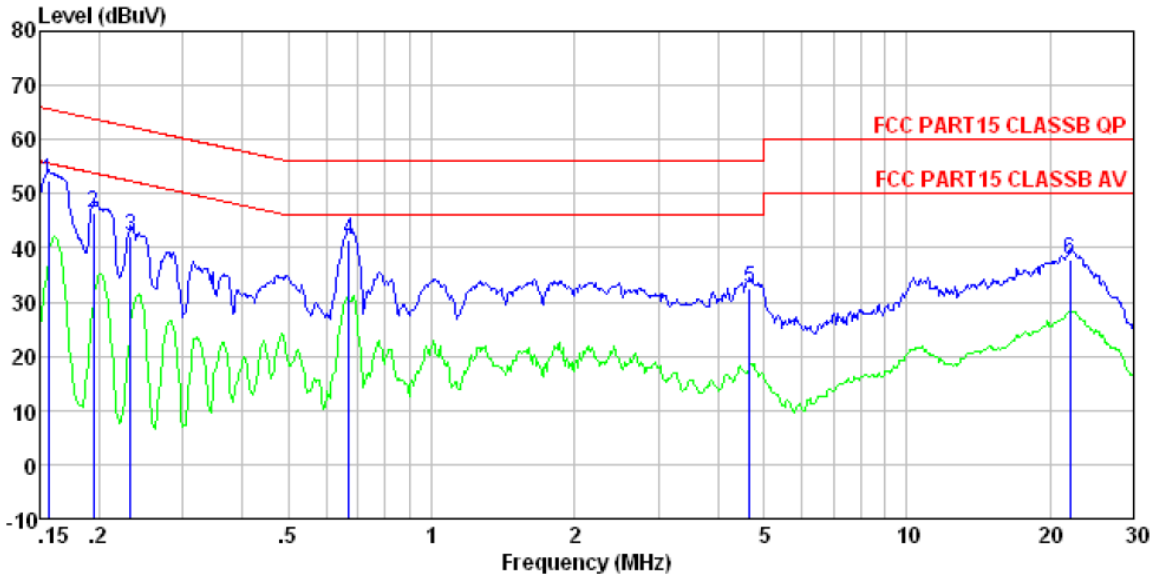
NOTES:
1. Measurements using CISPR quasi-peak mode & average mode.
2. All modes of operation were investigated and the worst -case emission are reported.
3: If PK value is lower than AV limit then no reading value listed in report .If QP value is Lower than AV limit ,then AV value don't listed in report.

12.3.1 Diagram 12-1



	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.155	51.42	0.15	0.12	51.69	65.74	-14.05	QP
2	0.192	45.58	0.14	0.13	45.85	63.93	-18.08	QP
3	0.234	40.54	0.12	0.12	40.78	62.30	-21.52	QP
4	0.672	39.96	0.14	0.13	40.23	56.00	-15.77	QP
5	4.772	35.07	0.21	0.15	35.43	56.00	-20.57	QP
6	22.298	34.86	0.85	0.22	35.93	60.00	-24.07	QP

12.3.2 Diagram 12-2



	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.156	52.14	0.07	0.12	52.33	65.65	-13.32	QP
2	0.194	46.24	0.07	0.13	46.44	63.84	-17.40	QP
3	0.233	41.99	0.06	0.12	42.17	62.35	-20.18	QP
4	0.672	41.25	0.07	0.13	41.45	56.00	-14.55	QP
5	4.672	32.24	0.15	0.15	32.54	56.00	-23.46	QP
6	22.063	36.72	0.74	0.22	37.68	60.00	-22.32	QP

13 Antenna requirement

13.1 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.

13.2 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******