FCC Test Report

FCC EVALUATION REPORT FOR CERTIFICATION	
Project Reference No.	249785
Product	Bluetooth Speaker
Brand Name	aai
Model	BT1130CUS
Alternate Model	BT1140CUS (The two models are electrical identical, except BT1130CUS with integral dipole antenna，but BT1140CUS with integral PCB antenna)
Tested according to	FCC Rules and Regulations Part 15 Subpart C 2013 15.247, ANSI C63.4-2009

Tested in period	2013.02.20 to 2013.03.06	
Issued date	2014.03.07	
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	Zone Peng	2014/03/07
	Zone Peng	***date***
Verified by	Daria Liu	2014/03/07
	Daria Liu	***date***

Contents of This Report

1. Client Information

1.1 Applicant

Company Name:	**Acoustic Arc International Ltd.**
Company Address:	**Unit 311B, 3/F., IC Development Centre,6 Science Park West Avenue, Hong Kong Science Park, Shatin, New Territories, Hong Kong**

1.2 Manufacturer

Company Name:	**Acoustic Arc International Ltd.**
Company Address:	**Unit 311B, 3/F., IC Development Centre,6 Science Park West Avenue, Hong Kong Science Park, Shatin, New Territories, 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:	Bluetooth Speaker
Model Name:	BT1130CUS
	BT1140CUS
Alternate model:	(The two models are electrical identical, except BT1130CUS with integral dipole antenna，but BT1140CUS with integral PCB antenna)
Brand name:	aai
Technical data (Rating, etc.):	As below

2.2 Detail spec:

Carrier Frequency：2402MHz~2480MHz

Number of Channel：79

Output Power：6.00 dBm

Modulation Type：Bluetooth(GFSK, π/4 DQPSK,8DPSK)

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

Antenna Type：Intergral Antenna

Antenna gain：0 dBi

Input: 5VDC 1A

Power output: 1.5W X 2, 5Vdc 1A

Adapter1#: AC ADAPTER

Model : ASUC41a-050100

Input: 100V-240VAC 50/60Hz 0.2A

Output: 5.0VDC 1000mA

Adapter 2#: AC adapter

Model: SP5QF-NA

Input: 100V-240VAC 50/60Hz 0.2A

Output: 5VDC 1A

2.3 Additional Information Related to Testing

CHL : 2402MHz

CHM : 2441MHz

CHH : 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

IC Registration No.9079A-1

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 L

TM2 : continuance TX MODE GFSK CH M

TM3: continuance TX MODE GFSK CH H

TM4: continuance TX MODE 8DPSK CH L

TM5: continuance TX MODE 8DPSK CH M

TM6: continuance TX MODE 8DPSK CH H

TM7: continuance TX MODE π/4 DQPSK CH L

TM8: continuance TX MODE π/4 DQPSK CH M

TM9: continuance TX MODE π/4 DQPSK CH H

TM10: Hopping on

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

Equipment	Model No.	Serial No.	Cal. Due	Manufacturer
EMI Test Receiver	ESU26	GTS203	Jul. 04 2014	R&S
BiConiLog Antenna	VULB9163	GTS214	Feb. 26 2015	SCHWARZBECK
Horn Antenna	BBHA9120D	GTS215	Feb. 26 2015	SCHWARZBECK
Horn Antenna	BBHA9170	GTS216	Feb. 26 2015	SCHWARZBECK
Coaxial Cable	N/A	GTS213	Apr. 01 2014	GTS
Coaxial Cable	N/A	GTS211	Apr. 01 2014	GTS
Coaxial cable	N/A	GTS210	Apr. 01 2014	GTS
Coaxial Cable	N/A	GTS212	Apr. 01 2014	GTS
Amplifier	8347A	GTS204	Jul. 04 2014	HP

5.3 Test Result

Spurious emission worse case:

Models	Connect mode	Antenna Polarity	Remark	Test Data	Test Result
BT1130CUS (with adapter 1#)	TX mode	Horizontal	30-1000MHz	Diagram 5-1	Pass
		Vertical	30-1000MHz	Diagram 5-2	Pass
BT1130CUS (with adapter 2#)	TX mode	Horizontal	30-1000MHz	Diagram 5-3	Pass
		Vertical	30-1000MHz	Diagram 5-4	Pass
BT1130CUS	GFSK CHL	Horizontal	1GHz-18GHz	Diagram 5-5	Pass
		Vertical	1GHz-18GHz	Diagram 5-6	Pass
	GFSK CHM	Horizontal	1GHz-18GHz	Diagram 5-7	Pass
		Vertical	1GHz-18GHz	Diagram 5-8	Pass
	GFSK CHH	Horizontal	1GHz-18GHz	Diagram 5-9	Pass
		Vertical	1GHz-18GHz	Diagram 5-10	Pass

BT1140CUS	GFSK CHL	Horizontal	1GHz-18GHz	Diagram 5-11	Pass
		Vertical	1GHz-18GHz	Diagram 5-12	Pass
	GFSK CHM	Horizontal	1GHz-18GHz	Diagram 5-13	Pass
		Vertical	1GHz-18GHz	Diagram 5-14	Pass
	GFSK CHH	Horizontal	1GHz-18GHz	Diagram 5-15	Pass
		Vertical	1GHz-18GHz	Diagram 5-16	Pass

Remark:

If PK value is lower than QP/AV limit , then PK, QP and AV deem to comply their own limit .

1) **All modes of operation were investigated and the worst -case emission GFSK mode are reported.**
2) **And for 30-1000MHz, GFSK CHL is the worse case and reported .**
3) **No spurious found at 18-25GHz.**
4) **BT1130CUS and BT1140CUS with different adapter are tested, and only list the worse result in the report.**

Restriction band worse case :

Models	Connect mode	Antenna Polarity	Test Data	Test Result
BT1130CUS	GFSK CHL	Horizontal	Diagram 5-17	Pass
		Vertical	Diagram 5-18	Pass
	GFSK CHH	Horizontal	Diagram 5-19	Pass
		Vertical	Diagram 5-20	Pass
	Pi/4 QPSK CHL	Horizontal	Diagram 5-21	Pass
		Vertical	Diagram 5-22	Pass
	Pi/4 QPSK CHH	Horizontal	Diagram 5-23	Pass
		Vertical	Diagram 5-24	Pass
	8DPSK CHL	Horizontal	Diagram 5-25	Pass
		Vertical	Diagram 5-26	Pass
	8DPSK CHH	Horizontal	Diagram 5-27	Pass
		Vertical	Diagram 5-28	Pass
BT1140CUS	GFSK CHL	Horizontal	Diagram 5-29	Pass
		Vertical	Diagram 5-30	Pass
	GFSK CHH	Horizontal	Diagram 5-31	Pass
		Vertical	Diagram 5-32	Pass
	Pi/4 QPSK CHL	Horizontal	Diagram 5-33	Pass
		Vertical	Diagram 5-34	Pass
	Pi/4 QPSK CHH	Horizontal	Diagram 5-35	Pass
		Vertical	Diagram 5-36	Pass
	8DPSK CHL	Horizontal	Diagram 5-37	Pass
		Vertical	Diagram 5-38	Pass
	8DPSK CHH	Horizontal	Diagram 5-39	Pass
		Vertical	Diagram 5-40	Pass

Remark:

1) 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.

2) BT1130CUS and BT1140CUS with different adapter are tested, and only list BT1130CUS data which is the worse in the report.

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 :

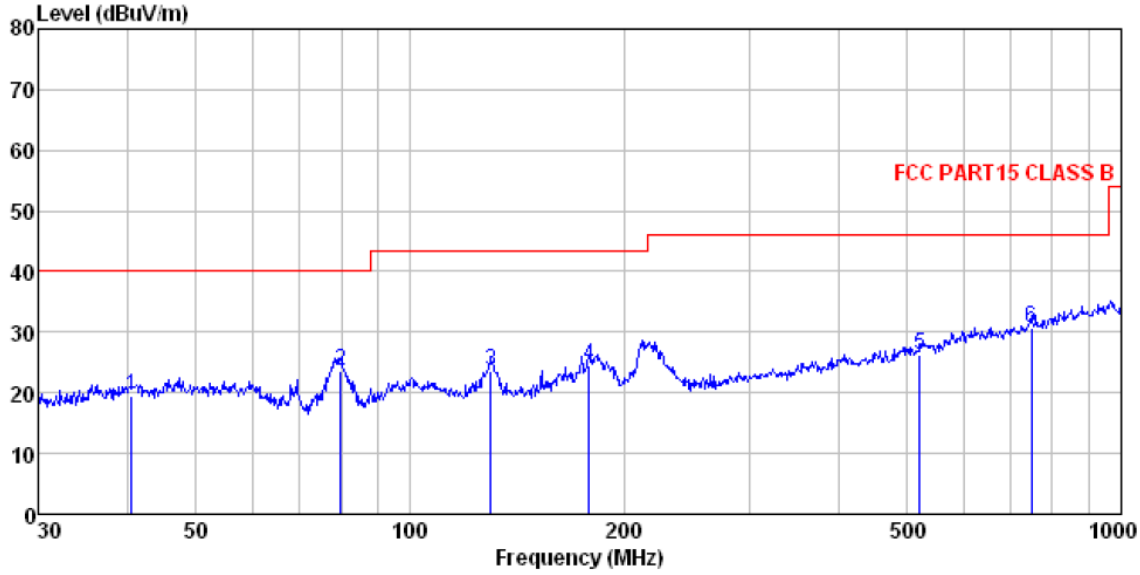
The limit of 15.209 of 3 meter distance is

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:

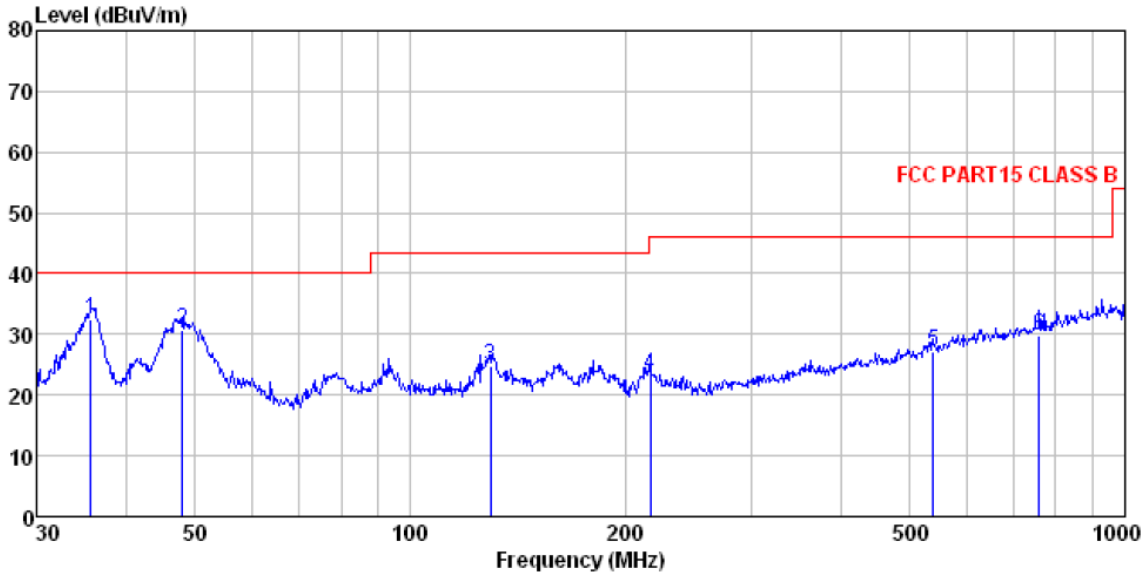
MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 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



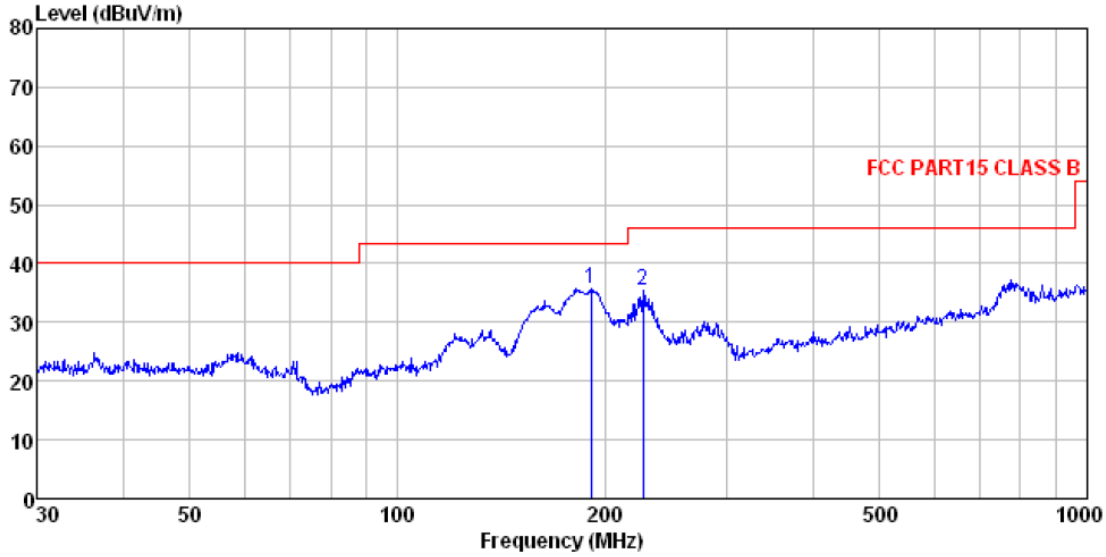
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	40.559	35.26	15.58	0.67	32.05	19.46	40.00	-20.54	QP
2	79.800	43.95	10.54	1.03	31.76	23.76	40.00	-16.24	QP
3	129.923	43.22	10.93	1.44	31.90	23.69	43.50	-19.81	QP
4	178.758	43.13	11.62	1.73	32.08	24.40	43.50	-19.10	QP
5	520.888	35.21	19.00	3.39	31.45	26.15	46.00	-19.85	QP
6	747.483	36.36	21.43	4.27	31.25	30.81	46.00	-15.19	QP

5.3.2 Diagram 5-2



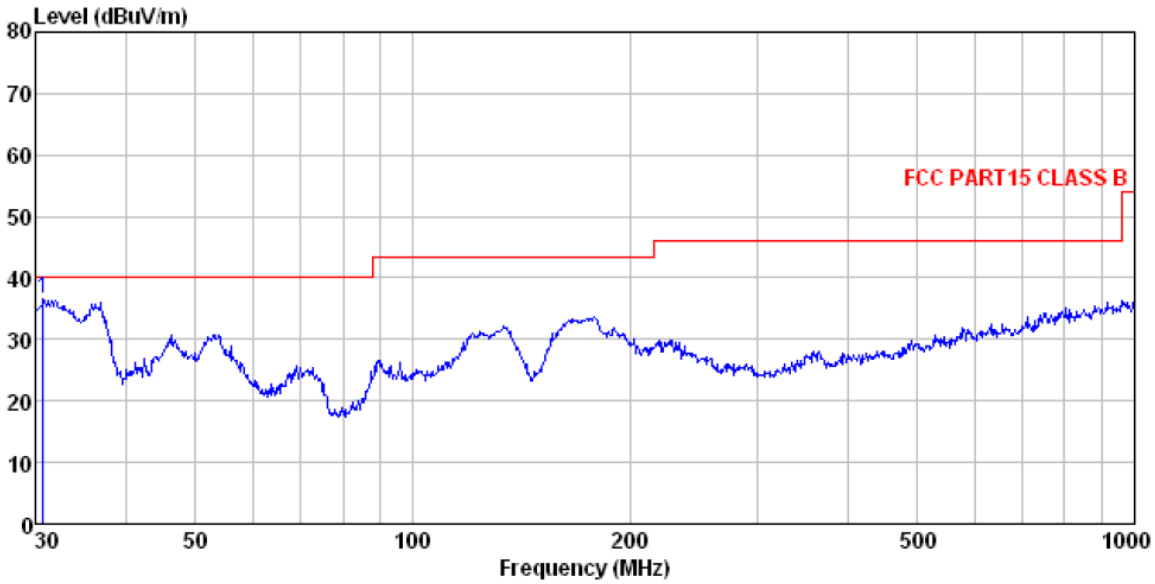
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	35.749	49.40	14.49	0.62	32.06	32.45	40.00	-7.55	QP
2	47.994	46.63	15.36	0.75	31.98	30.76	40.00	-9.24	QP
3	129.468	44.14	11.03	1.43	31.90	24.70	43.50	-18.80	QP
4	216.783	40.33	13.10	1.94	32.15	23.22	46.00	-22.78	QP
5	539.478	35.65	19.36	3.48	31.35	27.14	46.00	-18.86	QP
6	758.041	35.33	21.53	4.31	31.27	29.90	46.00	-16.10	QP

5.3.3 Diagram 5-3



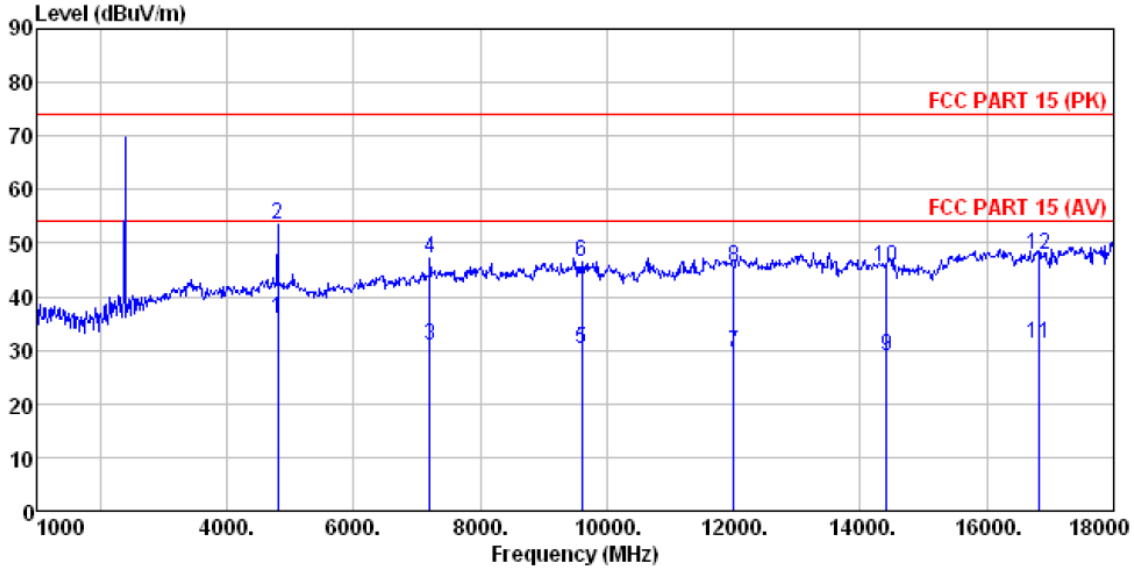
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	191.074	53.46	12.56	1.80	32.11	35.71	43.50	-7.79	Peak
2	226.894	51.96	13.51	2.00	32.15	35.32	46.00	-10.68	Peak

5.3.4 Diagram 5-4



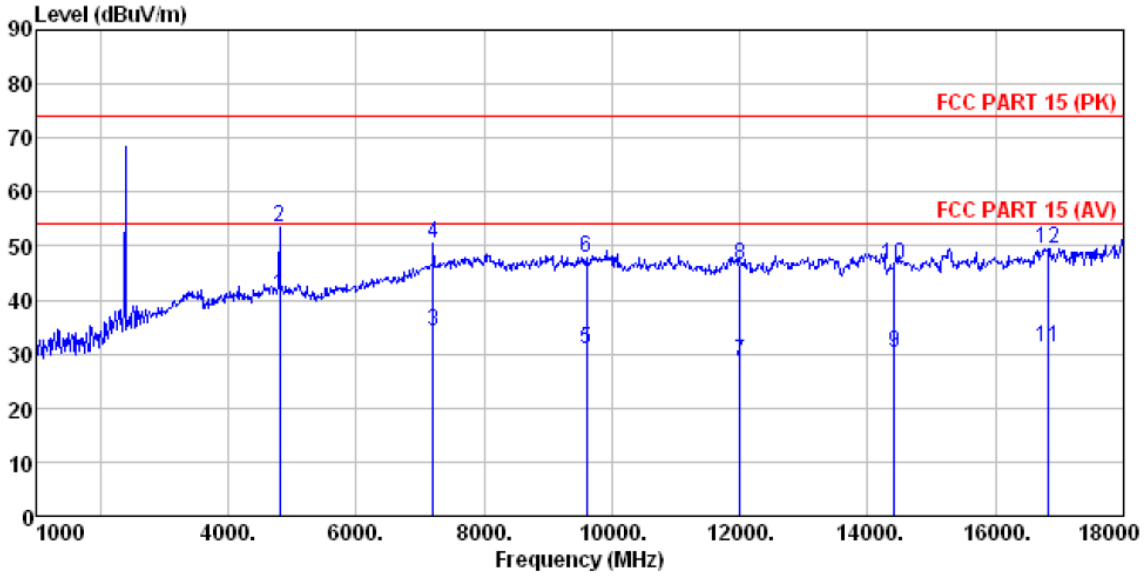
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	30.745	53.92	14.32	0.56	32.06	36.74	40.00	-3.26	Peak

5.3.5 Diagram 5-5



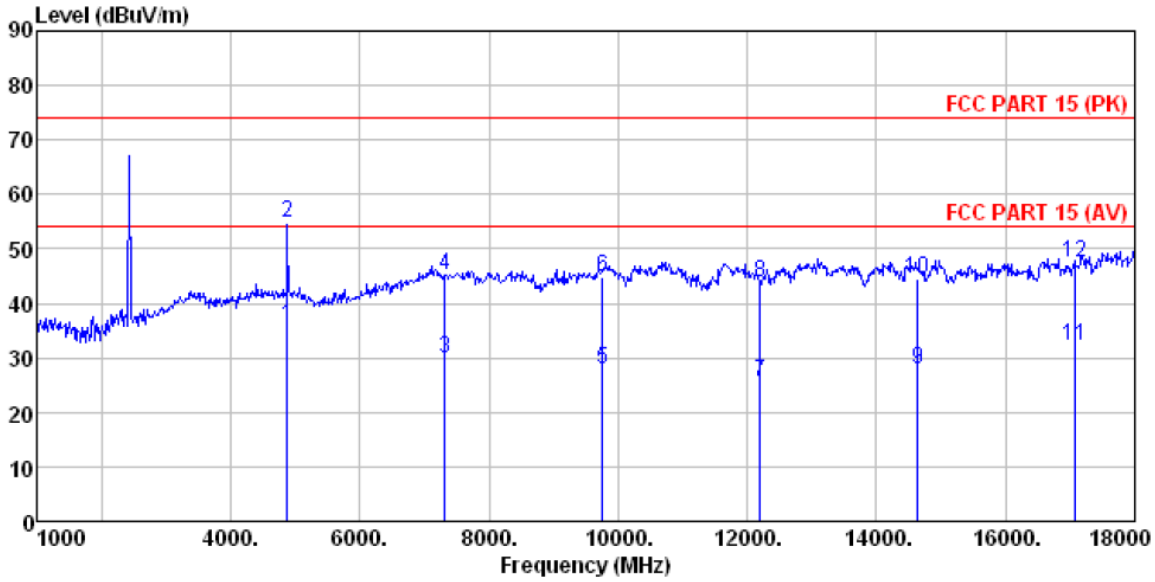
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	4804.028	27.60	31.78	8.60	32.09	35.89	54.00	-18.11	Average
2	4804.028	45.21	31.78	8.60	32.09	53.50	74.00	-20.50	Peak
3	7206.000	15.13	36.15	11.65	32.00	30.93	54.00	-23.07	Average
4	7206.000	31.39	36.15	11.65	32.00	47.19	74.00	-26.81	Peak
5	9608.000	9.84	37.95	14.14	31.62	30.31	54.00	-23.69	Average
6	9608.000	26.04	37.95	14.14	31.62	46.51	74.00	-27.49	Peak
7	12010.000	10.84	39.08	15.03	35.51	29.44	54.00	-24.56	Average
8	12010.000	26.96	39.08	15.03	35.51	45.56	74.00	-28.44	Peak
9	14412.000	2.65	42.41	17.15	33.34	28.87	54.00	-25.13	Average
10	14412.000	19.21	42.41	17.15	33.34	45.43	74.00	-28.57	Peak
11	16814.000	4.56	41.78	18.77	33.82	31.29	54.00	-22.71	Average
12	16814.000	21.12	41.78	18.77	33.82	47.85	74.00	-26.15	Peak

5.3.6 Diagram 5-6



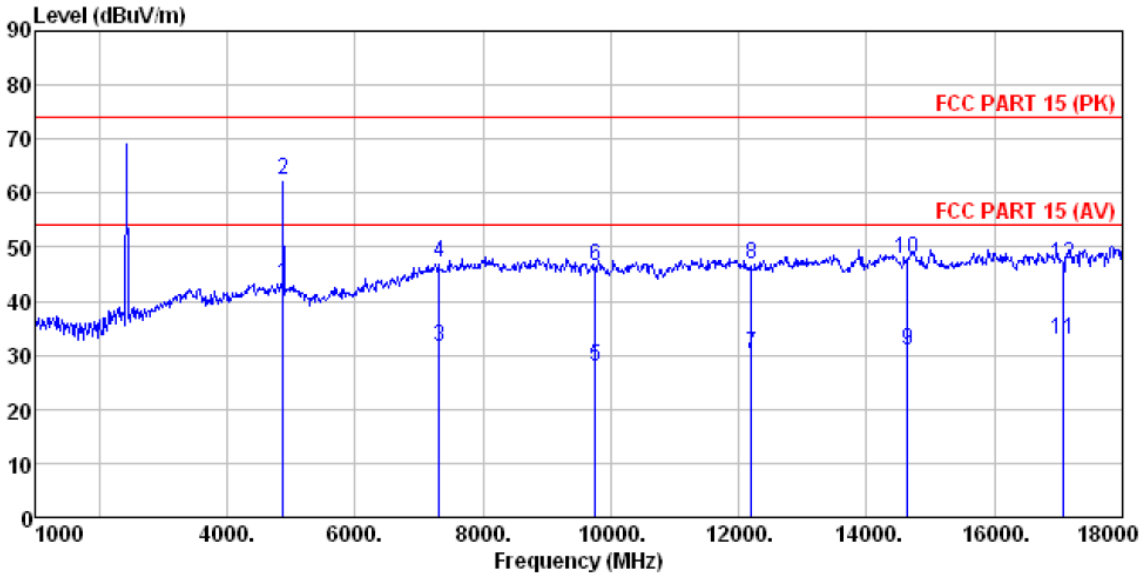
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	4804.000	32.54	31.78	8.60	32.09	40.83	54.00	-13.17	Average
2	4804.000	45.17	31.78	8.60	32.09	53.46	74.00	-20.54	Peak
3	7206.000	18.54	36.15	11.65	32.00	34.34	54.00	-19.66	Average
4	7206.000	34.55	36.15	11.65	32.00	50.35	74.00	-23.65	Peak
5	9608.000	10.40	37.95	14.14	31.62	30.87	54.00	-23.13	Average
6	9608.000	27.51	37.95	14.14	31.62	47.98	74.00	-26.02	Peak
7	12010.000	9.84	39.08	15.03	35.51	28.44	54.00	-25.56	Average
8	12010.000	27.81	39.08	15.03	35.51	46.41	74.00	-27.59	Peak
9	14412.000	3.92	42.41	17.15	33.34	30.14	54.00	-23.86	Average
10	14412.000	20.21	42.41	17.15	33.34	46.43	74.00	-27.57	Peak
11	16810.000	4.54	41.78	18.77	33.82	31.27	54.00	-22.73	Average
12	16814.000	22.86	41.78	18.77	33.82	49.59	74.00	-24.41	Peak

5.3.7 Diagram 5-7



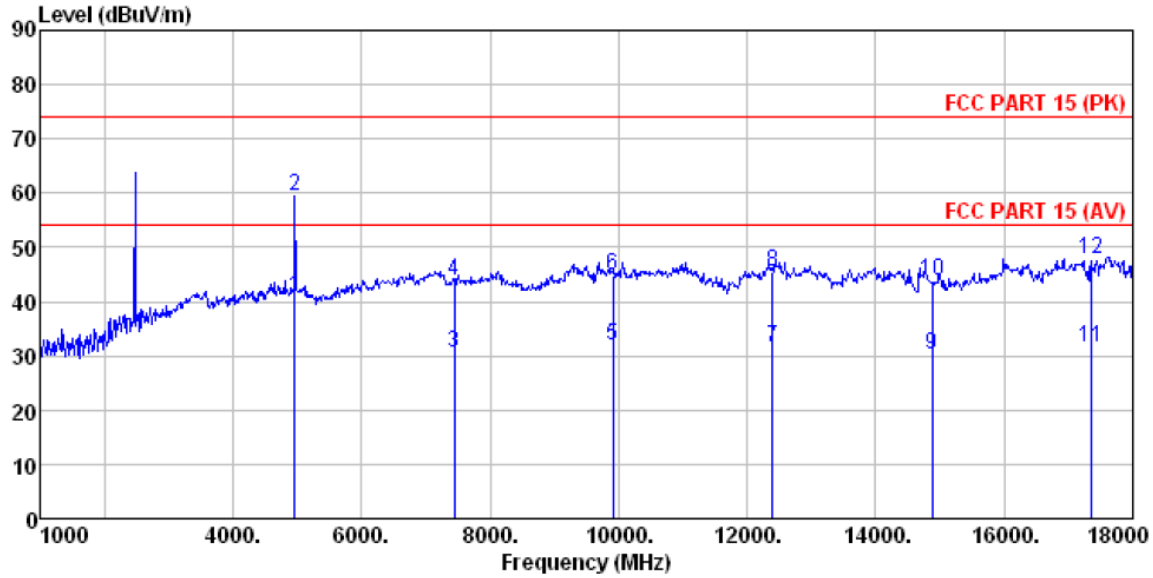
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	4882.000	27.39	31.85	8.67	32.12	35.79	54.00	-18.21	Average
2	4882.000	46.39	31.85	8.67	32.12	54.79	74.00	-19.21	Peak
3	7323.000	13.85	36.37	11.72	31.89	30.05	54.00	-23.95	Average
4	7323.000	28.95	36.37	11.72	31.89	45.15	74.00	-28.85	Peak
5	9764.000	6.84	38.35	14.25	31.62	27.82	54.00	-26.18	Average
6	9764.000	23.84	38.35	14.25	31.62	44.82	74.00	-29.18	Peak
7	12205.000	7.09	38.92	15.16	35.65	25.52	54.00	-28.48	Average
8	12205.000	25.55	38.92	15.16	35.65	43.98	74.00	-30.02	Peak
9	14646.000	2.84	42.21	17.28	34.39	27.94	54.00	-26.06	Average
10	14646.000	19.32	42.21	17.28	34.39	44.42	74.00	-29.58	Peak
11	17087.000	2.31	44.30	18.99	33.31	32.29	54.00	-21.71	Average
12	17087.000	17.59	44.30	18.99	33.31	47.57	74.00	-26.43	Peak

5.3.8 Diagram 5-8



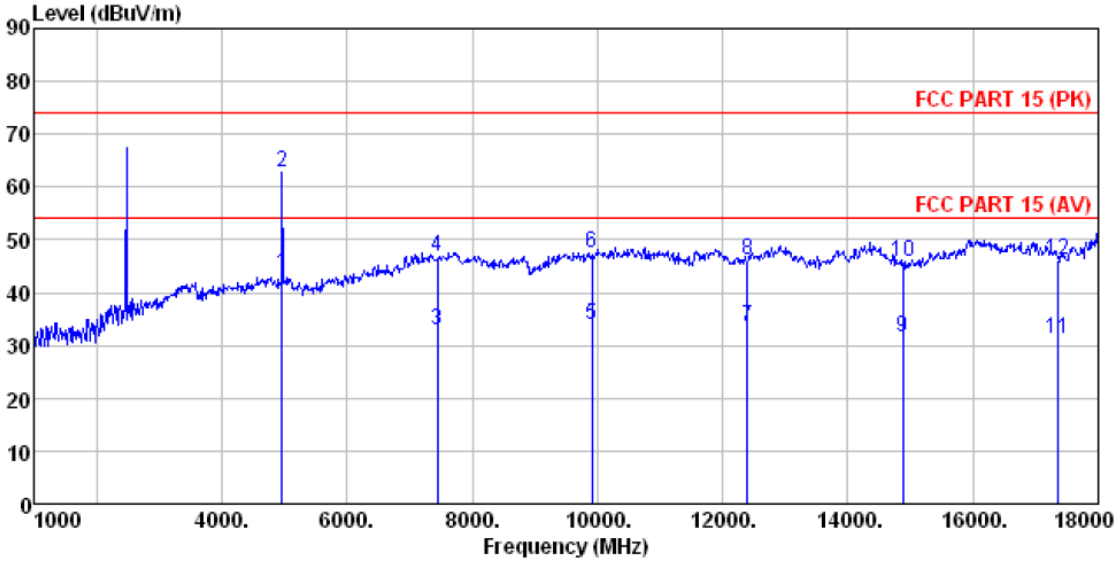
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	4882.000	34.69	31.85	8.67	32.12	43.09	54.00	-10.91	Average
2	4882.000	54.09	31.85	8.67	32.12	62.49	74.00	-11.51	Peak
3	7323.000	15.51	36.37	11.72	31.89	31.71	54.00	-22.29	Average
4	7323.000	30.82	36.37	11.72	31.89	47.02	74.00	-26.98	Peak
5	9764.000	6.94	38.35	14.25	31.62	27.92	54.00	-26.08	Average
6	9764.000	25.46	38.35	14.25	31.62	46.44	74.00	-27.56	Peak
7	12205.000	11.87	38.92	15.16	35.65	30.30	54.00	-23.70	Average
8	12205.000	28.28	38.92	15.16	35.65	46.71	74.00	-27.29	Peak
9	14646.000	5.84	42.21	17.28	34.39	30.94	54.00	-23.06	Average
10	14646.000	22.57	42.21	17.28	34.39	47.67	74.00	-26.33	Peak
11	17087.000	2.94	44.30	18.99	33.31	32.92	54.00	-21.08	Average
12	17087.000	16.90	44.30	18.99	33.31	46.88	74.00	-27.12	Peak

5.3.9 Diagram 5-9



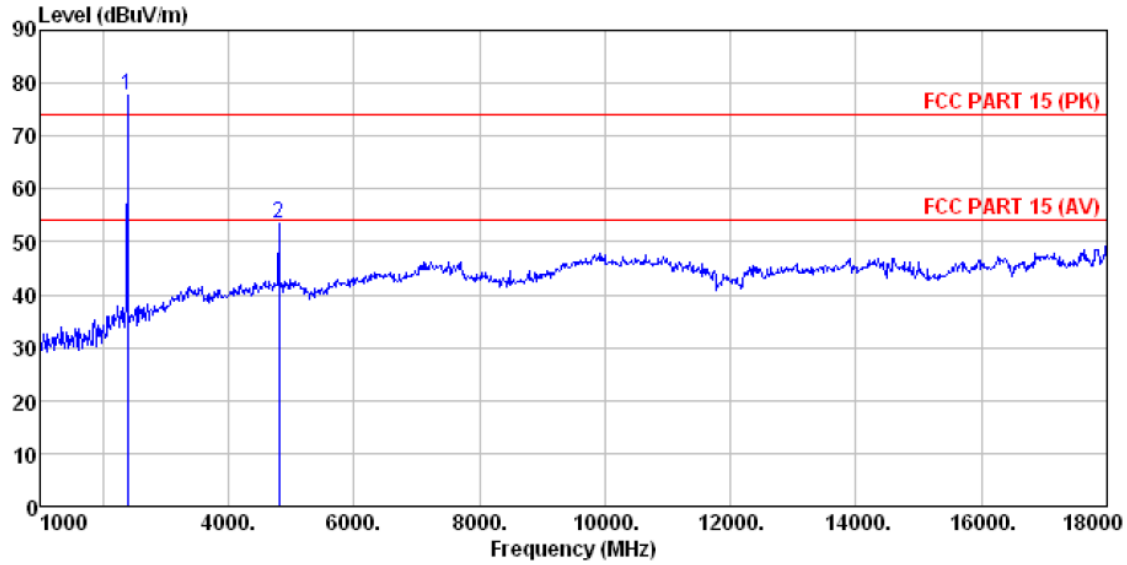
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	4960.000	32.47	31.93	8.73	32.16	40.97	54.00	-13.03	Average
2	4960.000	51.10	31.93	8.73	32.16	59.60	74.00	-14.40	Peak
3	7440.000	13.84	36.59	11.79	31.78	30.44	54.00	-23.56	Average
4	7440.000	27.13	36.59	11.79	31.78	43.73	74.00	-30.27	Peak
5	9920.000	10.54	38.81	14.38	31.88	31.85	54.00	-22.15	Average
6	9920.000	23.45	38.81	14.38	31.88	44.76	74.00	-29.24	Peak
7	12400.000	12.94	38.76	15.27	35.27	31.70	54.00	-22.30	Average
8	12400.000	26.71	38.76	15.27	35.27	45.47	74.00	-28.53	Peak
9	14880.000	6.54	41.52	17.39	35.37	30.08	54.00	-23.92	Average
10	14880.000	20.15	41.52	17.39	35.37	43.69	74.00	-30.31	Peak
11	17360.000	0.84	46.19	18.98	34.45	31.56	54.00	-22.44	Average
12	17360.000	17.04	46.19	18.98	34.45	47.76	74.00	-26.24	Peak

5.3.10 Diagram 5-10



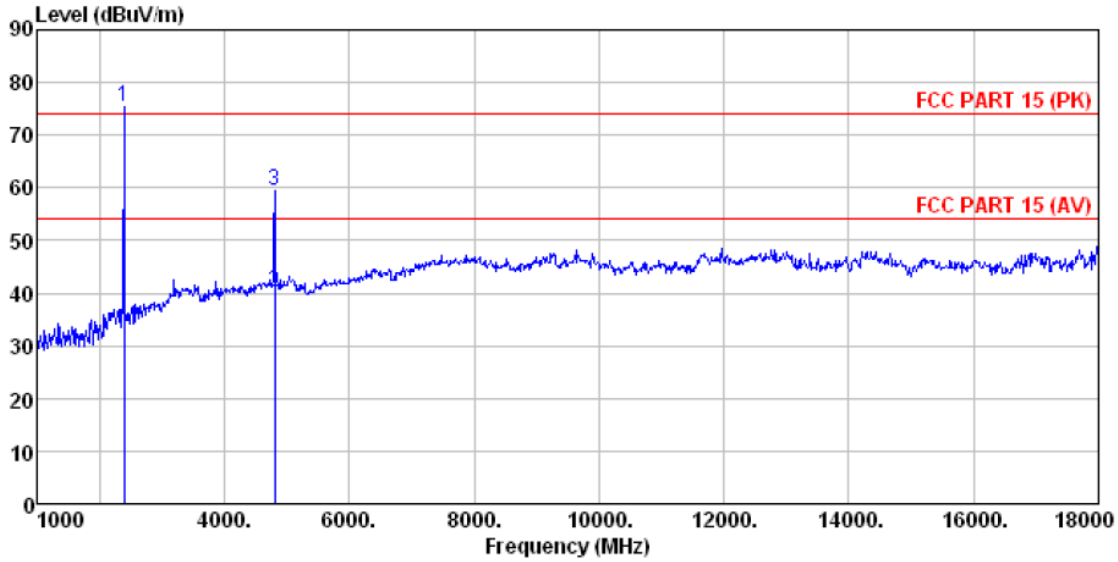
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	4960.000	34.99	31.93	8.73	32.16	43.49	54.00	-10.51	Average
2	4960.000	54.40	31.93	8.73	32.16	62.90	74.00	-11.10	Peak
3	7440.000	16.38	36.59	11.79	31.78	32.98	54.00	-21.02	Average
4	7440.000	30.18	36.59	11.79	31.78	46.78	74.00	-27.22	Peak
5	9920.000	12.64	38.81	14.38	31.88	33.95	54.00	-20.05	Average
6	9920.000	26.05	38.81	14.38	31.88	47.36	74.00	-26.64	Peak
7	12400.000	14.94	38.76	15.27	35.27	33.70	54.00	-20.30	Average
8	12400.000	27.28	38.76	15.27	35.27	46.04	74.00	-27.96	Peak
9	14880.000	7.94	41.52	17.39	35.37	31.48	54.00	-22.52	Average
10	14880.000	22.37	41.52	17.39	35.37	45.91	74.00	-28.09	Peak
11	17360.000	0.53	46.19	18.98	34.45	31.25	54.00	-22.75	Average
12	17360.000	15.35	46.19	18.98	34.45	46.07	74.00	-27.93	Peak

5.3.11 Diagram 5-11



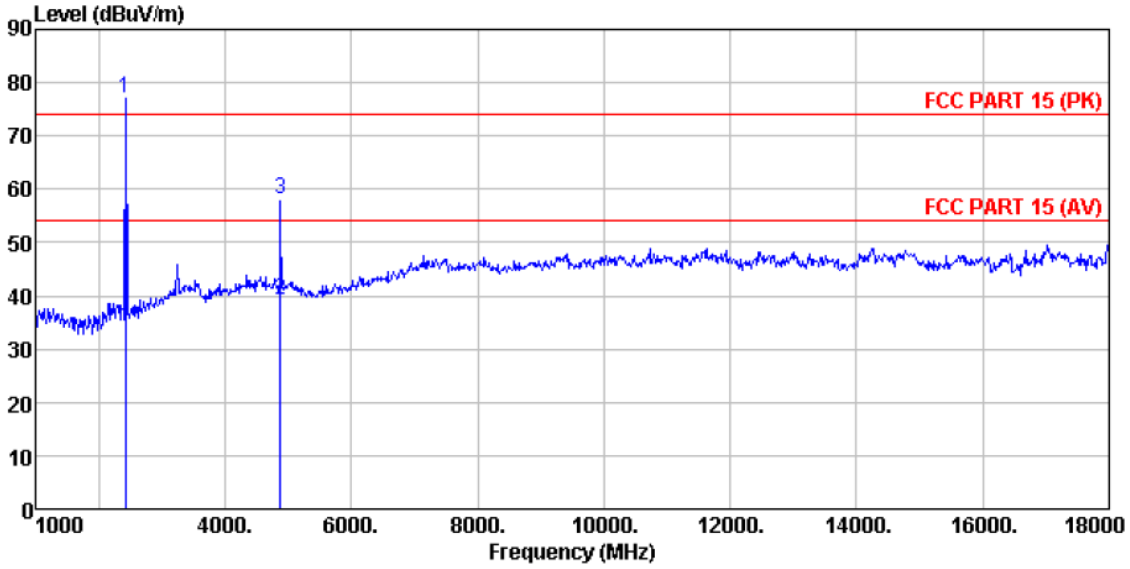
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1 *	2394.000	78.60	27.59	5.39	34.01	77.57			Peak
2	4808.000	45.29	31.78	8.60	32.09	53.58	74.00	-20.42	Peak

5.3.12 Diagram 5-12



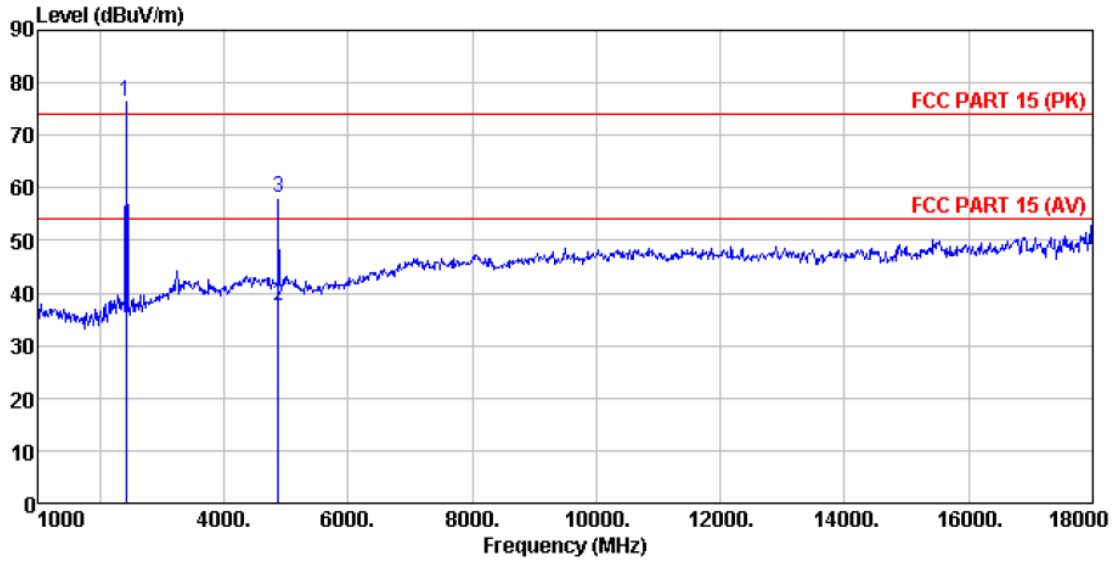
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1 *	2394.000	76.43	27.59	5.39	34.01	75.40			Peak
2	4804.000	32.00	31.78	8.60	32.09	40.29	54.00	-13.71	Average
3	4804.000	51.25	31.78	8.60	32.09	59.54	74.00	-14.46	Peak

5.3.13 Diagram 5-13



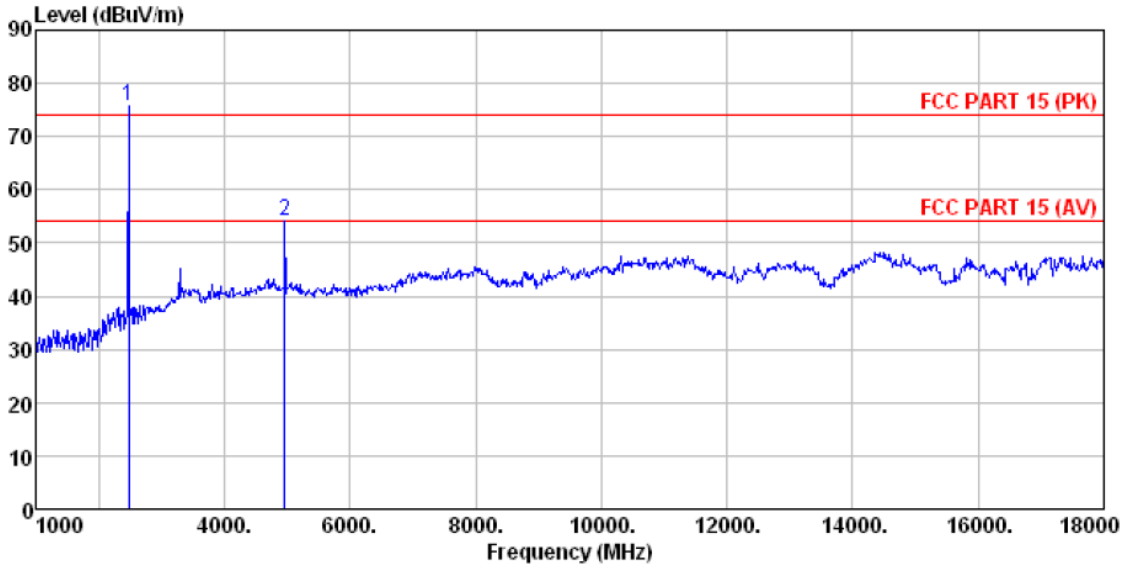
		Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
		MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	*	2428.000	78.20	27.52	5.42	33.97	77.17			Peak
2		4881.995	30.89	31.85	8.67	32.12	39.29	54.00	-14.71	Average
3		4881.995	49.59	31.85	8.67	32.12	57.99	74.00	-16.01	Peak

5.3.14 Diagram 5-14



		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	*	2428.000	77.35	27.52	5.42	33.97	76.32			Peak
2		4881.650	29.29	31.85	8.67	32.12	37.69	54.00	-16.31	Average
3		4881.650	49.79	31.85	8.67	32.12	58.19	74.00	-15.81	Peak

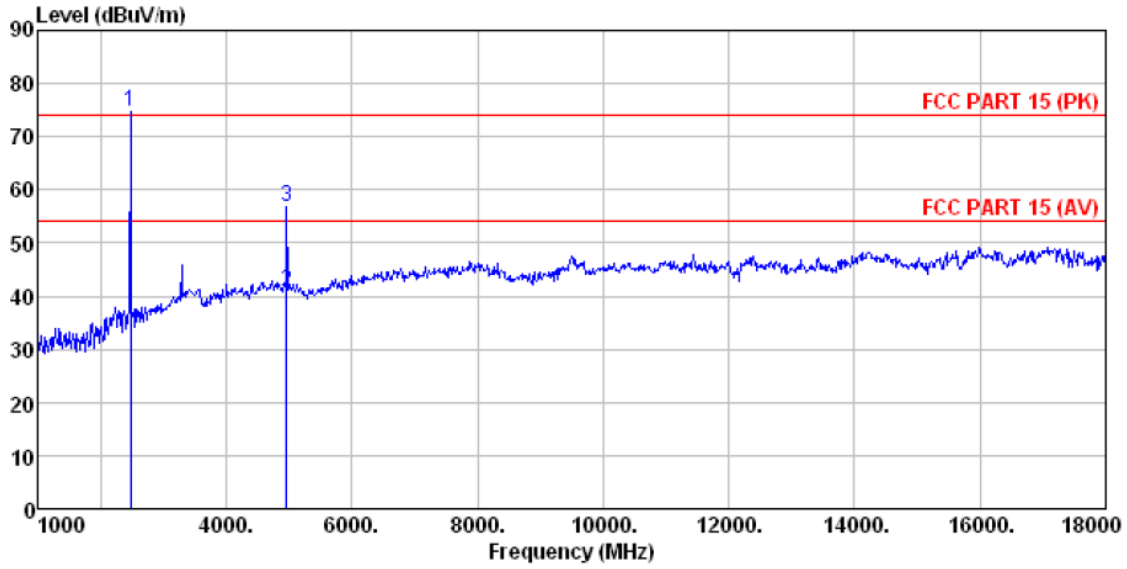
5.3.15 Diagram 5-15



	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 *	2479.000	76.53	27.52	5.47	33.92	75.60			Peak
2	4961.000	45.71	31.93	8.73	32.16	54.21	74.00	-19.79	Peak

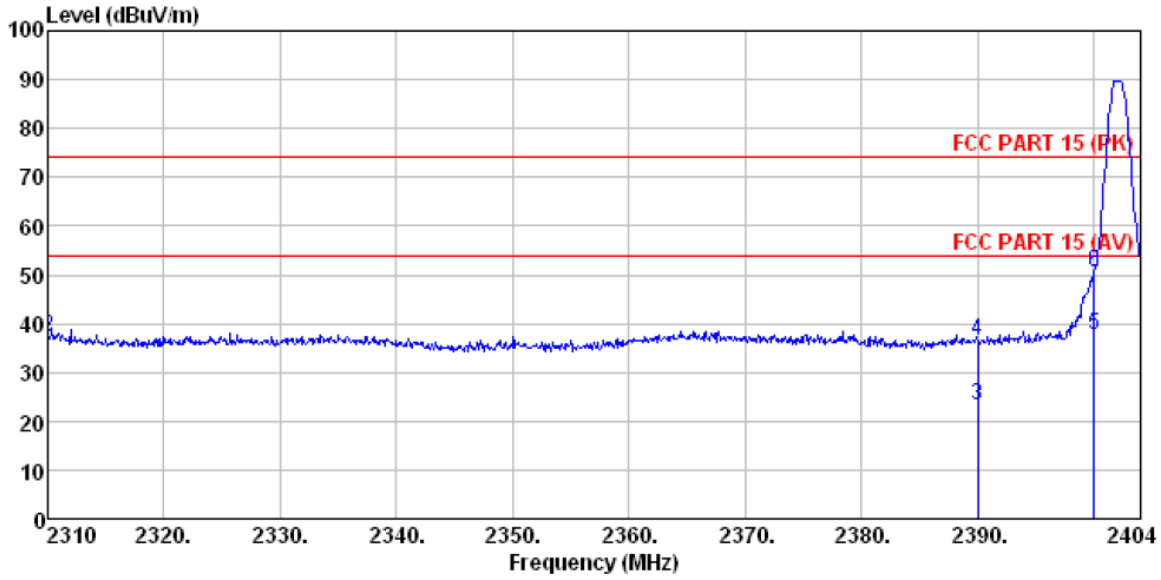
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m		dB	
1	4961.00	37.71	31.93	8.73	32.16	46.21	54.00	-7.79	Average

5.3.16 Diagram 5-16



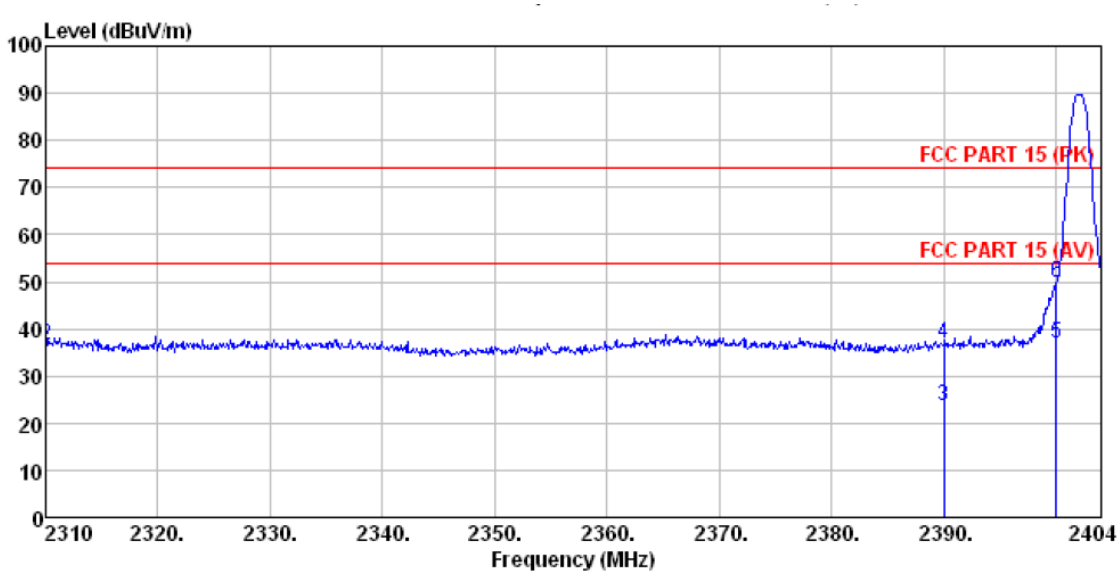
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1 *	2479.000	75.57	27.52	5.47	33.92	74.64			Peak
2	4960.000	32.19	31.93	8.73	32.16	40.69	54.00	-13.31	Average
3	4960.000	48.35	31.93	8.73	32.16	56.85	74.00	-17.15	Peak

5.3.17 Diagram 5-17



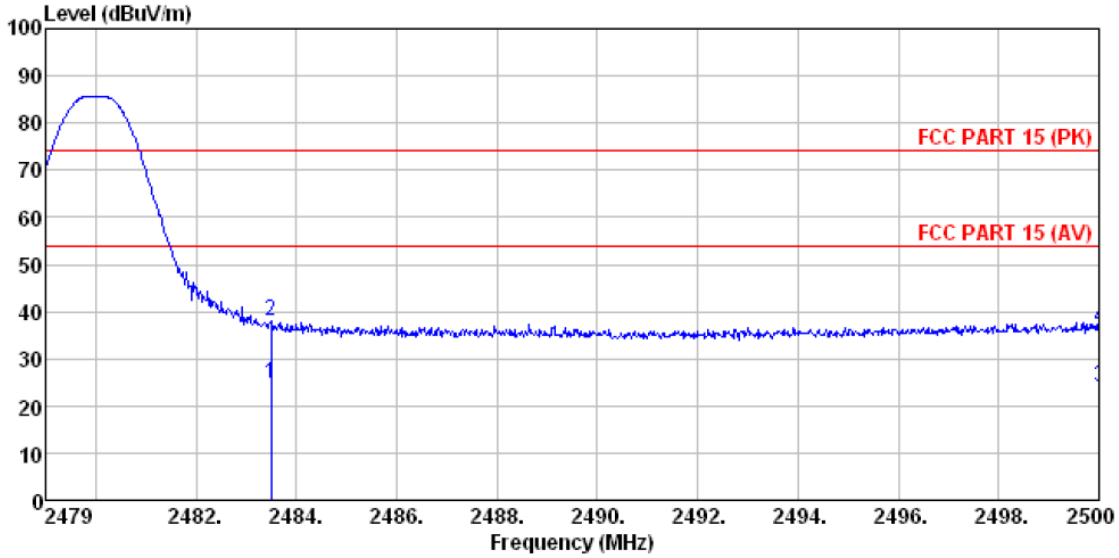
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	25.13	27.91	5.30	34.11	24.23	54.00	-29.77	Average
2	2310.000	38.13	27.91	5.30	34.11	37.23	74.00	-36.77	Peak
3	2390.000	24.12	27.59	5.38	34.01	23.08	54.00	-30.92	Average
4	2390.000	37.49	27.59	5.38	34.01	36.45	74.00	-37.55	Peak
5	2400.000	38.54	27.58	5.39	34.01	37.50	54.00	-16.50	Average
6	2400.000	51.77	27.58	5.39	34.01	50.73	74.00	-23.27	Peak

5.3.18 Diagram 5-18



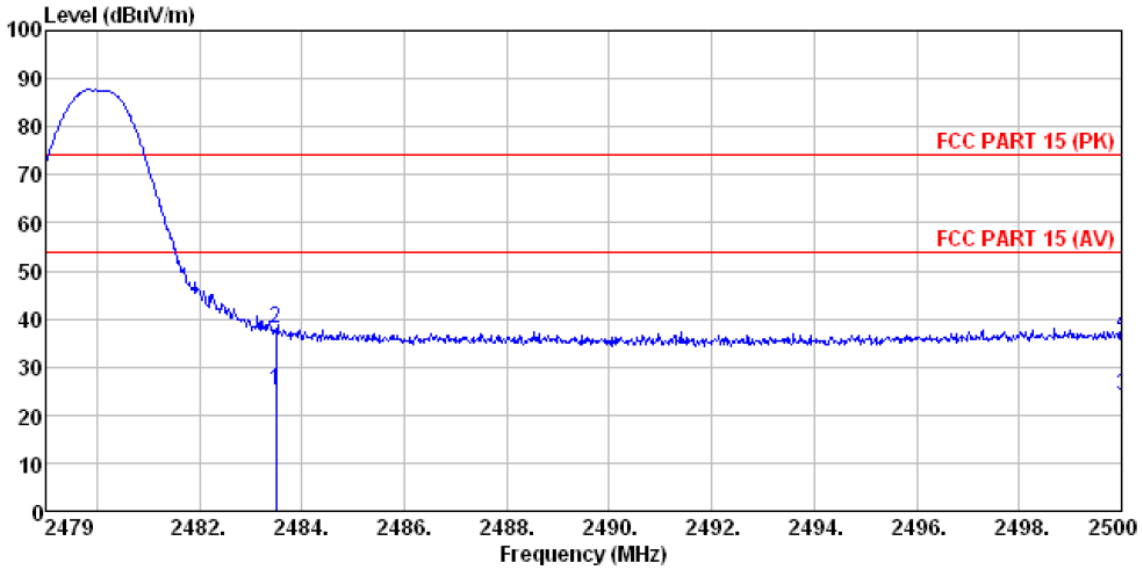
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	24.81	27.91	5.30	34.11	23.91	54.00	-30.09	Average
2	2310.000	37.51	27.91	5.30	34.11	36.61	74.00	-37.39	Peak
3	2390.000	24.84	27.59	5.38	34.01	23.80	54.00	-30.20	Average
4	2390.000	37.93	27.59	5.38	34.01	36.89	74.00	-37.11	Peak
5	2400.000	37.91	27.58	5.39	34.01	36.87	54.00	-17.13	Average
6	2400.000	50.77	27.58	5.39	34.01	49.73	74.00	-24.27	Peak

5.3.19 Diagram 5-19



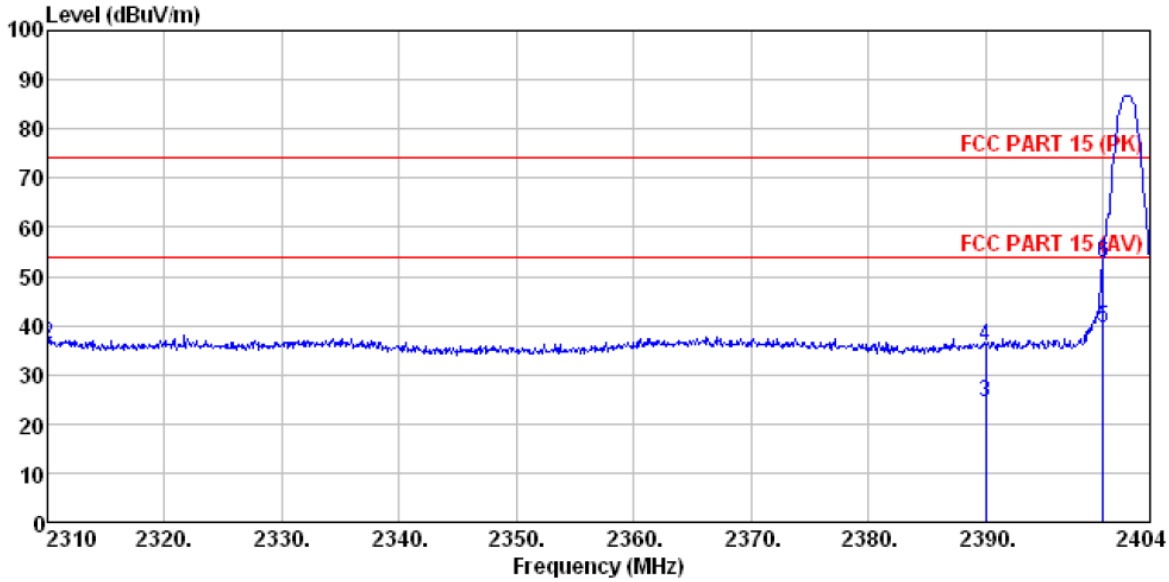
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	25.82	27.53	5.47	33.92	24.90	54.00	-29.10	Average
2	2483.500	38.97	27.53	5.47	33.92	38.05	74.00	-35.95	Peak
3	2500.000	24.91	27.55	5.49	33.90	24.05	54.00	-29.95	Average
4	2500.000	37.54	27.55	5.49	33.90	36.68	74.00	-37.32	Peak

5.3.20 Diagram 5-20



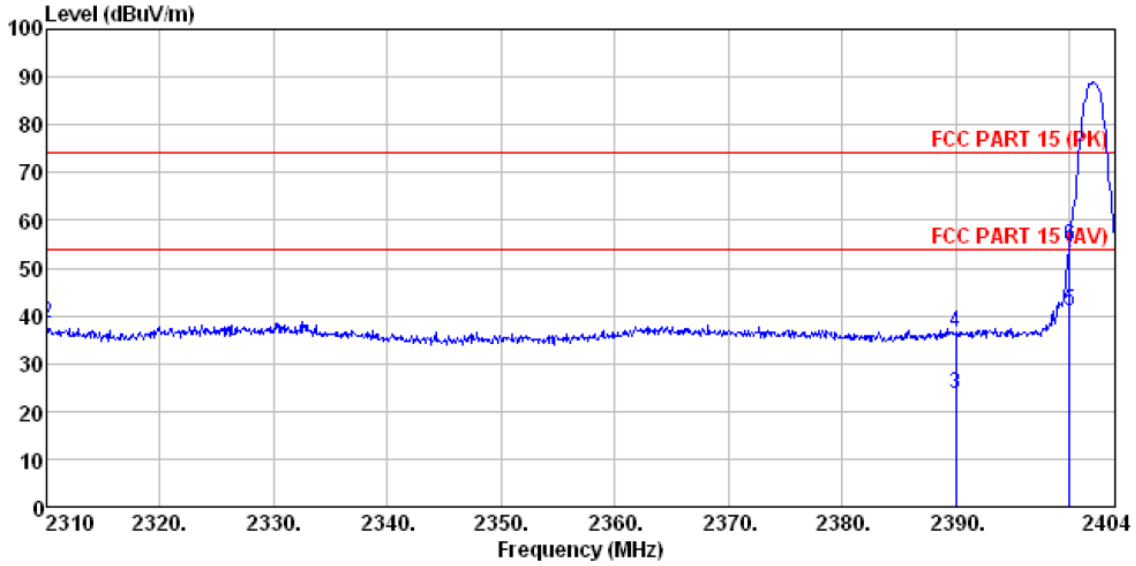
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	25.98	27.53	5.47	33.92	25.06	54.00	-28.94	Average
2	2483.500	38.80	27.53	5.47	33.92	37.88	74.00	-36.12	Peak
3	2500.000	24.80	27.55	5.49	33.90	23.94	54.00	-30.06	Average
4	2500.000	37.63	27.55	5.49	33.90	36.77	74.00	-37.23	Peak

5.3.21 Diagram 5-21



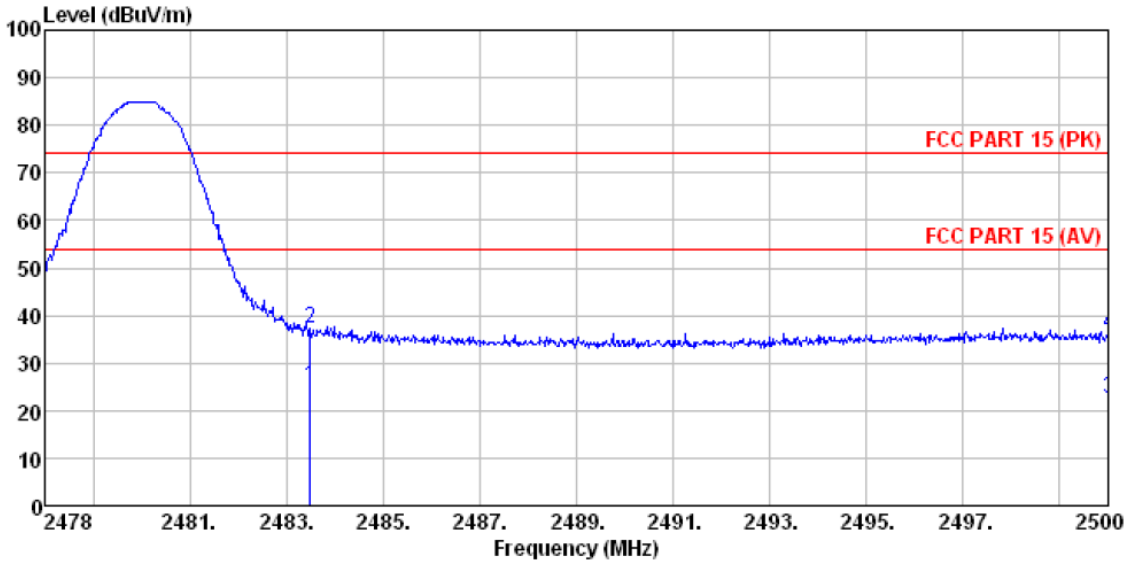
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	25.00	27.91	5.30	34.11	24.10	54.00	-29.90	Average
2	2310.000	36.91	27.91	5.30	34.11	36.01	74.00	-37.99	Peak
3	2390.000	25.50	27.59	5.38	34.01	24.46	54.00	-29.54	Average
4	2390.000	37.00	27.59	5.38	34.01	35.96	74.00	-38.04	Peak
5	2400.000	40.50	27.58	5.39	34.01	39.46	54.00	-14.54	Average
6	2400.000	53.96	27.58	5.39	34.01	52.92	74.00	-21.08	Peak

5.3.22 Diagram 5-22



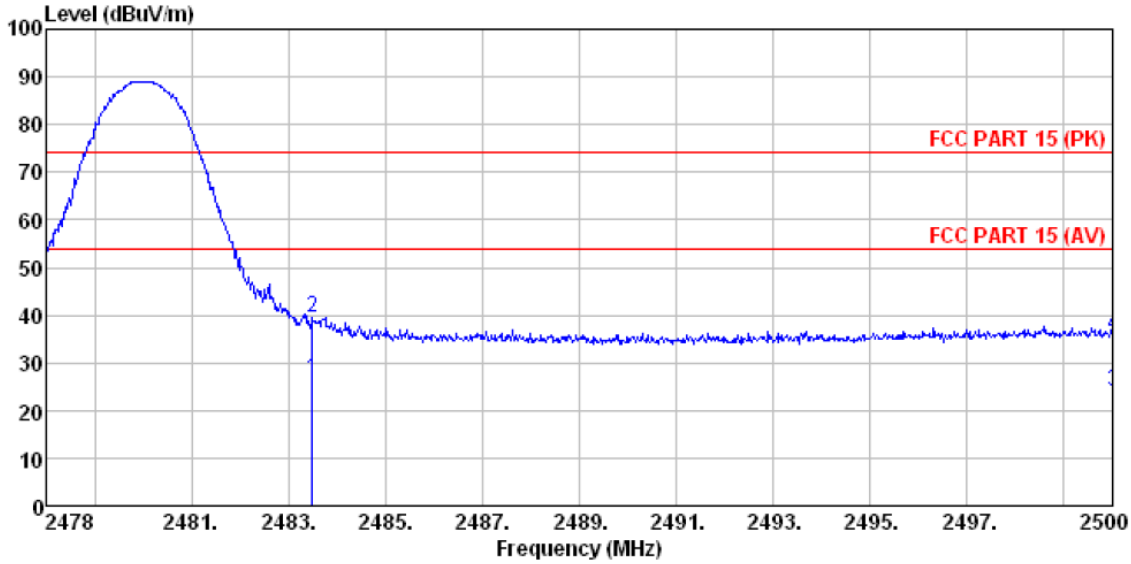
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	26.50	27.91	5.30	34.11	25.60	54.00	-28.40	Average
2	2310.000	39.28	27.91	5.30	34.11	38.38	74.00	-35.62	Peak
3	2390.000	24.50	27.59	5.38	34.01	23.46	54.00	-30.54	Average
4	2390.000	37.72	27.59	5.38	34.01	36.68	74.00	-37.32	Peak
5	2400.000	42.10	27.58	5.39	34.01	41.06	54.00	-12.94	Average
6	2400.000	55.61	27.58	5.39	34.01	54.57	74.00	-19.43	Peak

5.3.23 Diagram 5-23



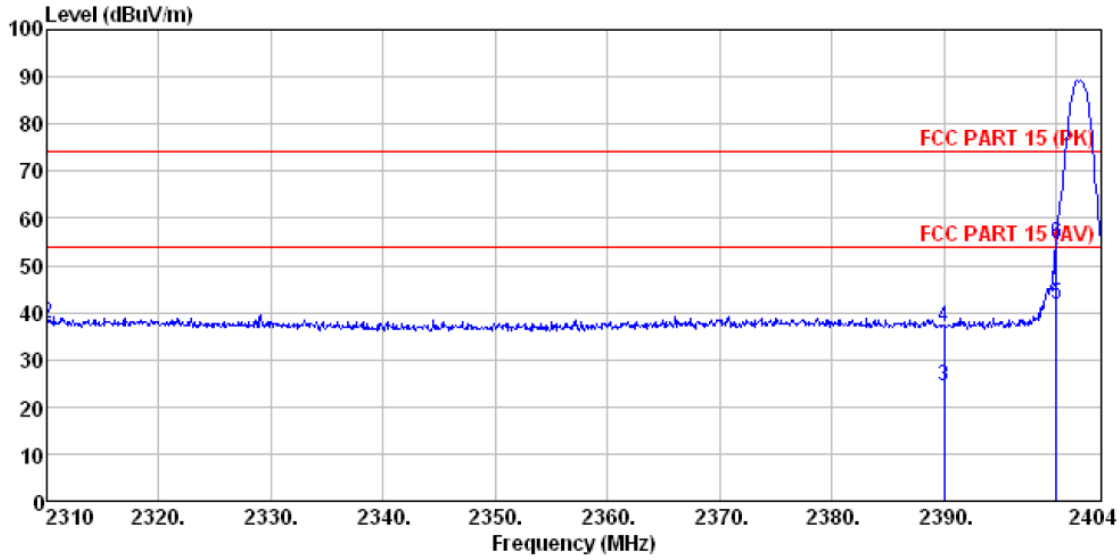
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	26.11	27.53	5.47	33.92	25.19	54.00	-28.81	Average
2	2483.500	38.01	27.53	5.47	33.92	37.09	74.00	-36.91	Peak
3	2500.000	23.50	27.55	5.49	33.90	22.64	54.00	-31.36	Average
4	2500.000	36.88	27.55	5.49	33.90	36.02	74.00	-37.98	Peak

5.3.24 Diagram 5-24



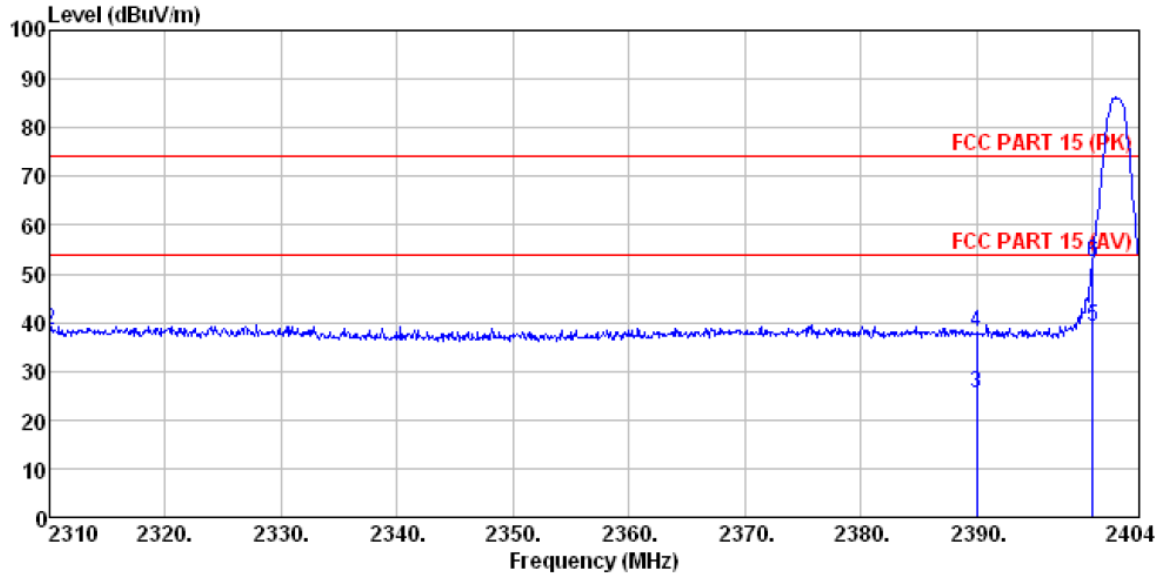
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	27.51	27.53	5.47	33.92	26.59	54.00	-27.41	Average
2	2483.500	40.33	27.53	5.47	33.92	39.41	74.00	-34.59	Peak
3	2500.000	24.80	27.55	5.49	33.90	23.94	54.00	-30.06	Average
4	2500.000	36.66	27.55	5.49	33.90	35.80	74.00	-38.20	Peak

5.3.25 Diagram 5-25



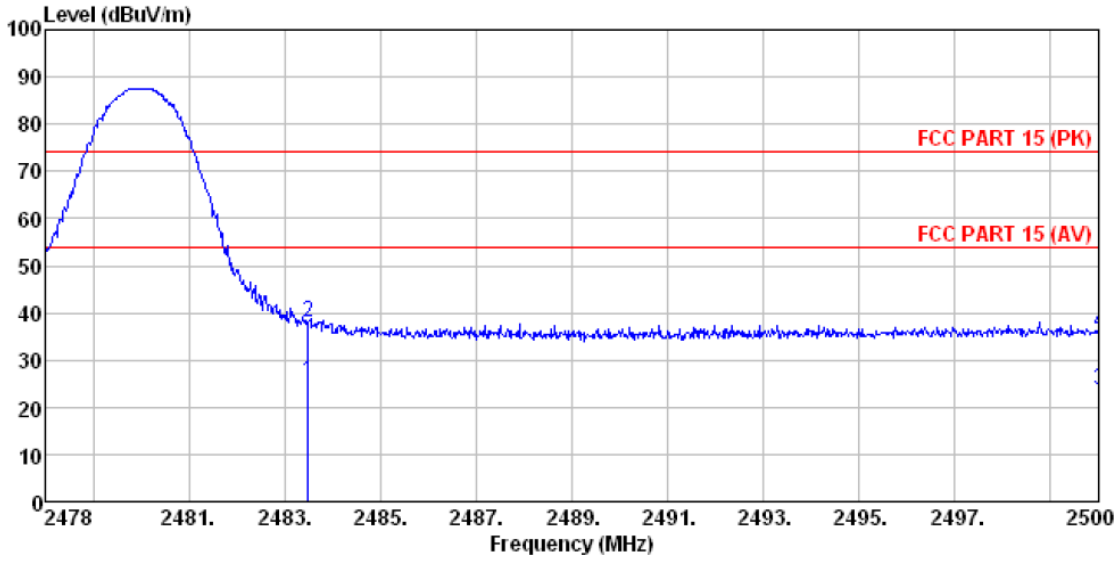
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	25.60	27.91	5.30	34.11	24.70	54.00	-29.30	Average
2	2310.000	38.61	27.91	5.30	34.11	37.71	74.00	-36.29	Peak
3	2390.000	25.30	27.59	5.38	34.01	24.26	54.00	-29.74	Average
4	2390.000	38.10	27.59	5.38	34.01	37.06	74.00	-36.94	Peak
5	2400.000	42.80	27.58	5.39	34.01	41.76	54.00	-12.24	Average
6	2400.000	55.54	27.58	5.39	34.01	54.50	74.00	-19.50	Peak

5.3.26 Diagram 5-26



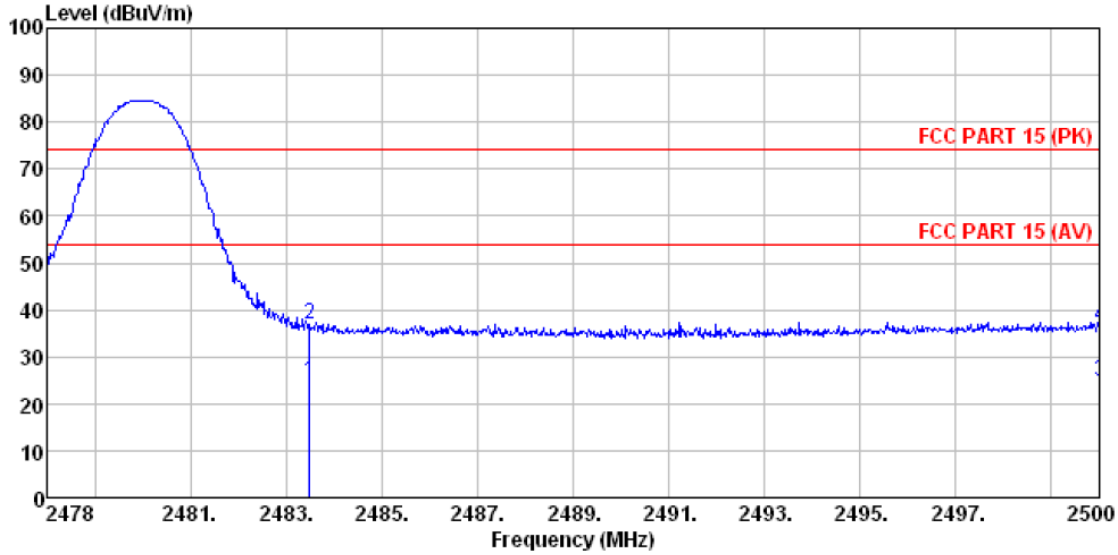
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	26.10	27.91	5.30	34.11	25.20	54.00	-28.80	Average
2	2310.000	39.14	27.91	5.30	34.11	38.24	74.00	-35.76	Peak
3	2390.000	26.50	27.59	5.38	34.01	25.46	54.00	-28.54	Average
4	2390.000	39.15	27.59	5.38	34.01	38.11	74.00	-35.89	Peak
5	2400.000	40.20	27.58	5.39	34.01	39.16	54.00	-14.84	Average
6	2400.000	53.52	27.58	5.39	34.01	52.48	74.00	-21.52	Peak

5.3.27 Diagram 5-27



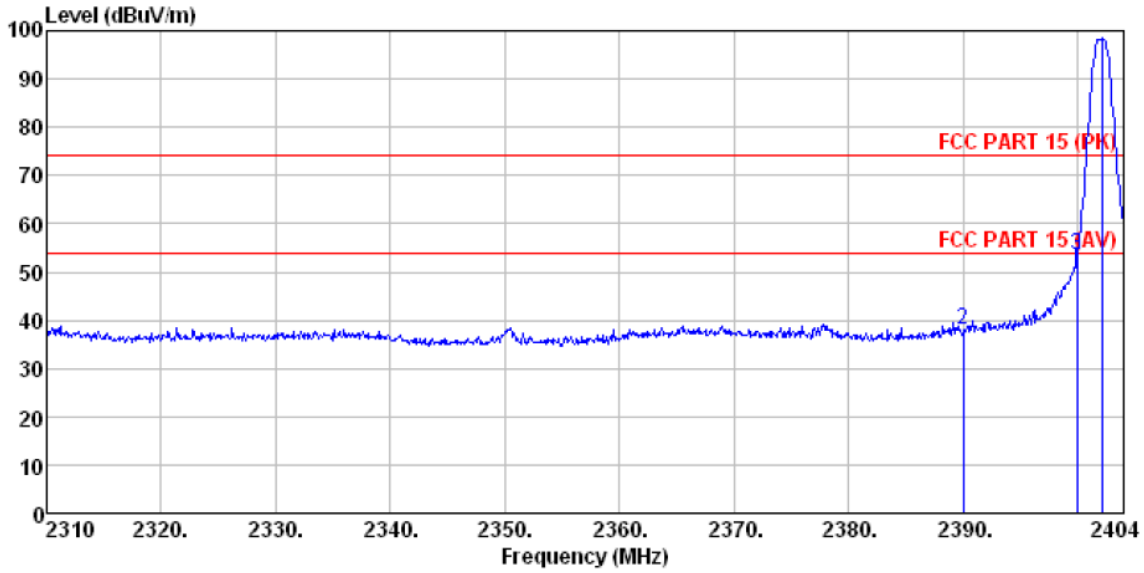
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	26.51	27.53	5.47	33.92	25.59	54.00	-28.41	Average
2	2483.500	38.89	27.53	5.47	33.92	37.97	74.00	-36.03	Peak
3	2500.000	24.40	27.55	5.49	33.90	23.54	54.00	-30.46	Average
4	2500.000	36.59	27.55	5.49	33.90	35.73	74.00	-38.27	Peak

5.3.28 Diagram 5-28



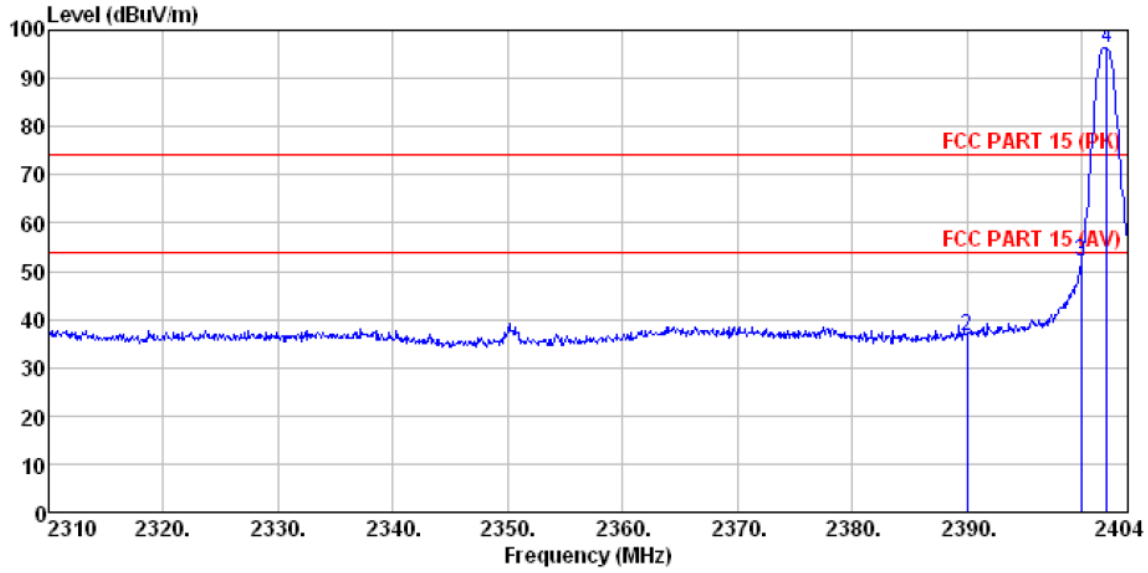
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	25.51	27.53	5.47	33.92	24.59	54.00	-29.41	Average
2	2483.500	37.90	27.53	5.47	33.92	36.98	74.00	-37.02	Peak
3	2500.000	25.60	27.55	5.49	33.90	24.74	54.00	-29.26	Average
4	2500.000	37.44	27.55	5.49	33.90	36.58	74.00	-37.42	Peak

5.3.29 Diagram 5-29



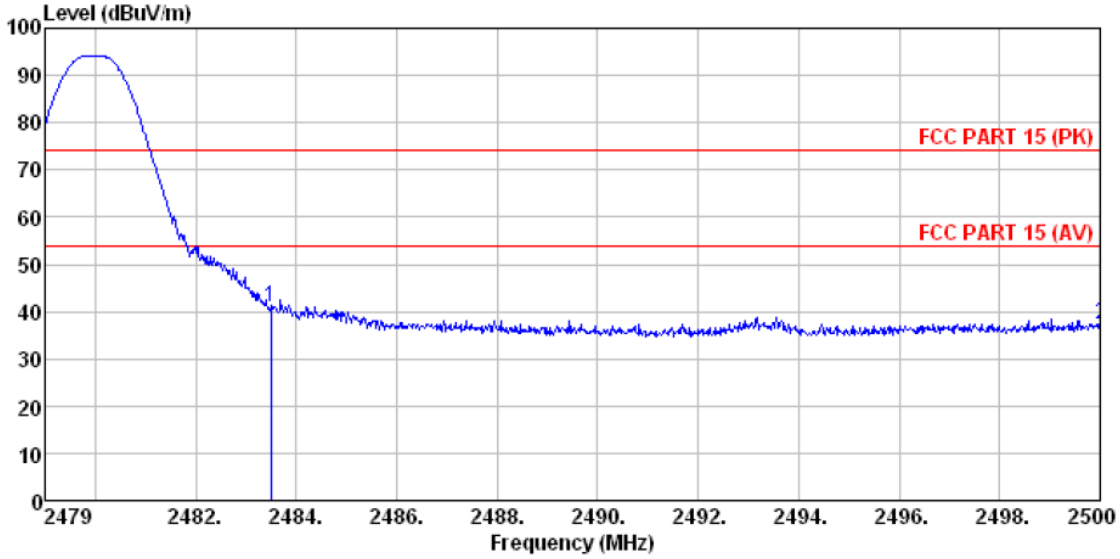
	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	37.78	27.91	5.30	34.11	36.88	74.00	-37.12	Peak
2	2389.994	39.06	27.59	5.38	34.01	38.02	74.00	-35.98	Peak
3	2399.958	54.44	27.58	5.39	34.01	53.40	74.00	-20.60	Peak

5.3.30 Diagram 5-30



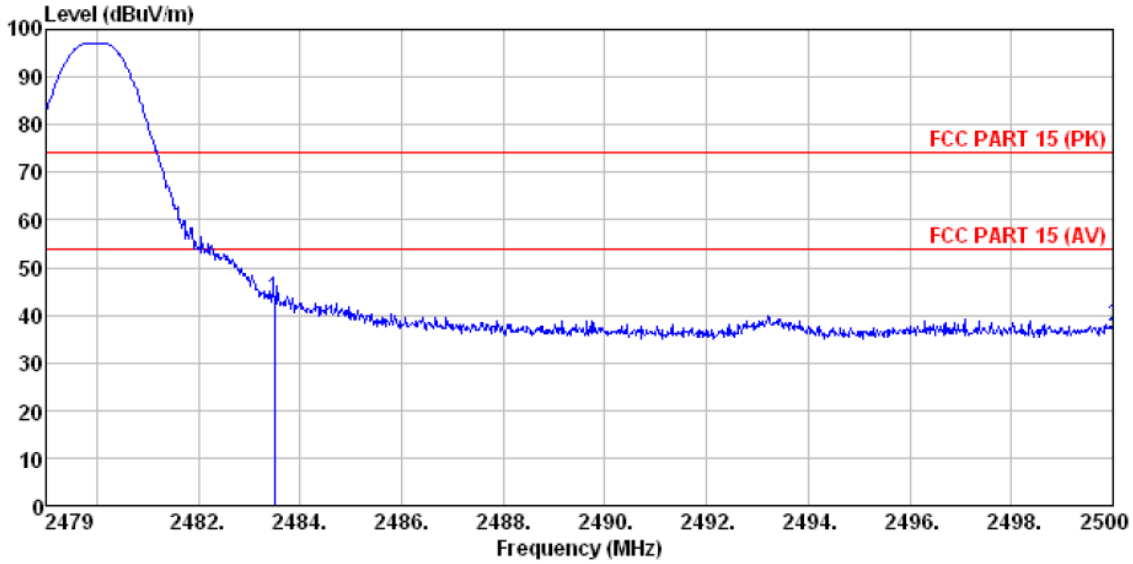
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2310.000	37.28	27.91	5.30	34.11	36.38	74.00	-37.62	Peak
2	2389.994	37.61	27.59	5.38	34.01	36.57	74.00	-37.43	Peak
3	2399.958	53.19	27.58	5.39	34.01	52.15	74.00	-21.85	Peak

5.3.31 Diagram 5-31



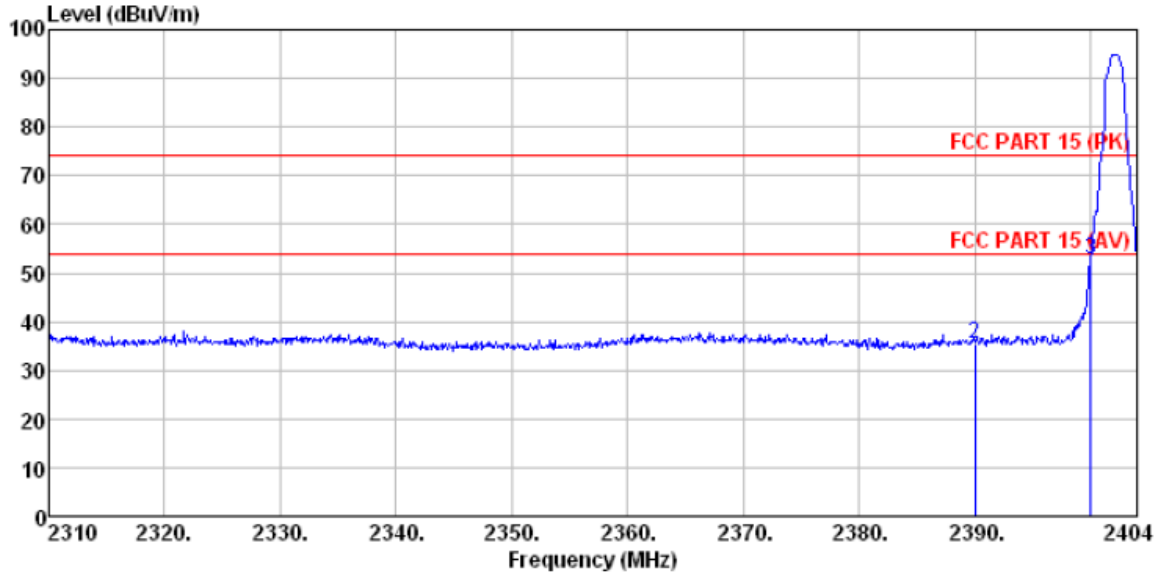
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.494	41.97	27.53	5.47	33.92	41.05	74.00	-32.95	Peak
2	2500.000	38.12	27.55	5.49	33.90	37.26	74.00	-36.74	Peak

5.3.32 Diagram 5-32



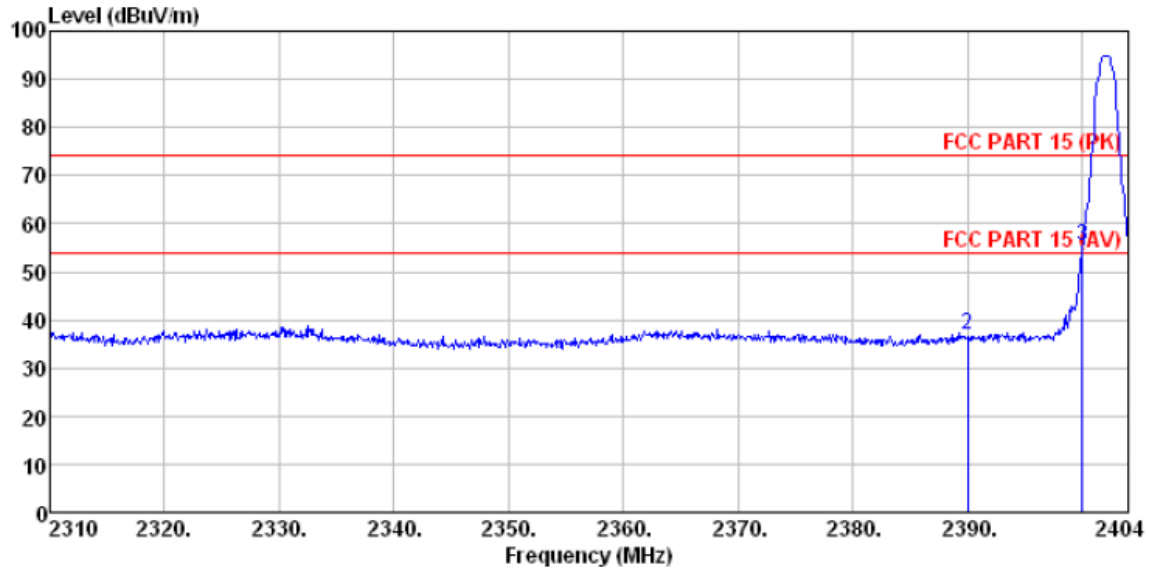
	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.494	44.48	27.53	5.47	33.92	43.56	74.00	-30.44	Peak
2	2500.000	38.56	27.55	5.49	33.90	37.70	74.00	-36.30	Peak

5.3.33 Diagram 5-33



	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	37.07	27.91	5.30	34.11	36.17	74.00	-37.83	Peak
2	2390.000	36.45	27.59	5.38	34.01	35.41	74.00	-38.59	Peak
3	2400.000	53.64	27.58	5.39	34.01	52.60	74.00	-21.40	Peak

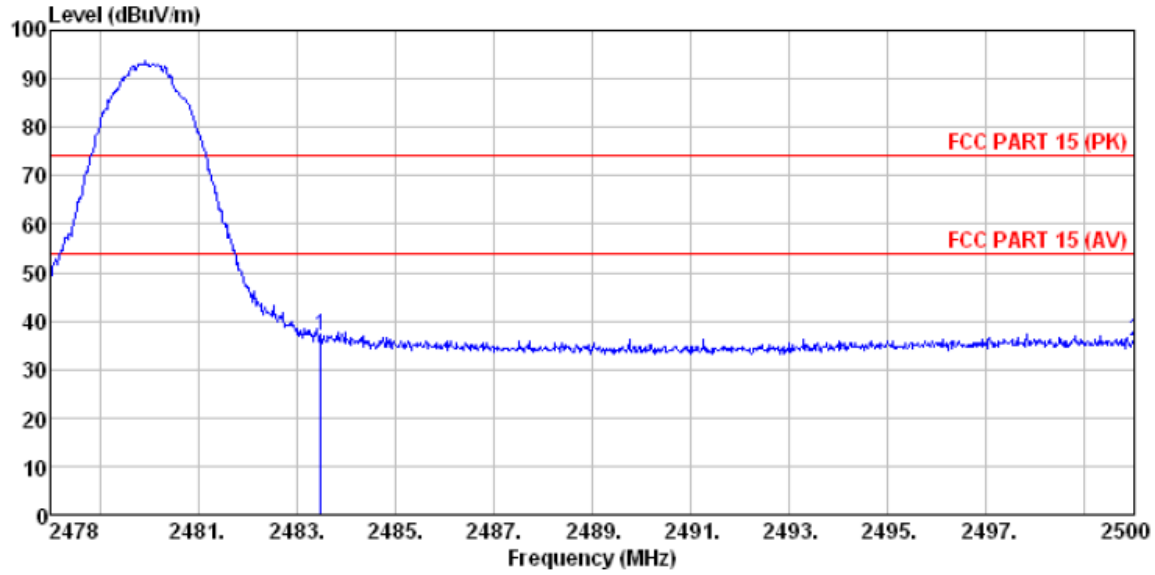
5.3.34 Diagram 5-34



	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	40.32	27.91	5.30	34.11	39.42	74.00	-34.58	Peak
2	2390.000	38.03	27.59	5.38	34.01	36.99	74.00	-37.01	Peak
3	2400.000	56.46	27.58	5.39	34.01	55.42	74.00	-18.58	Peak

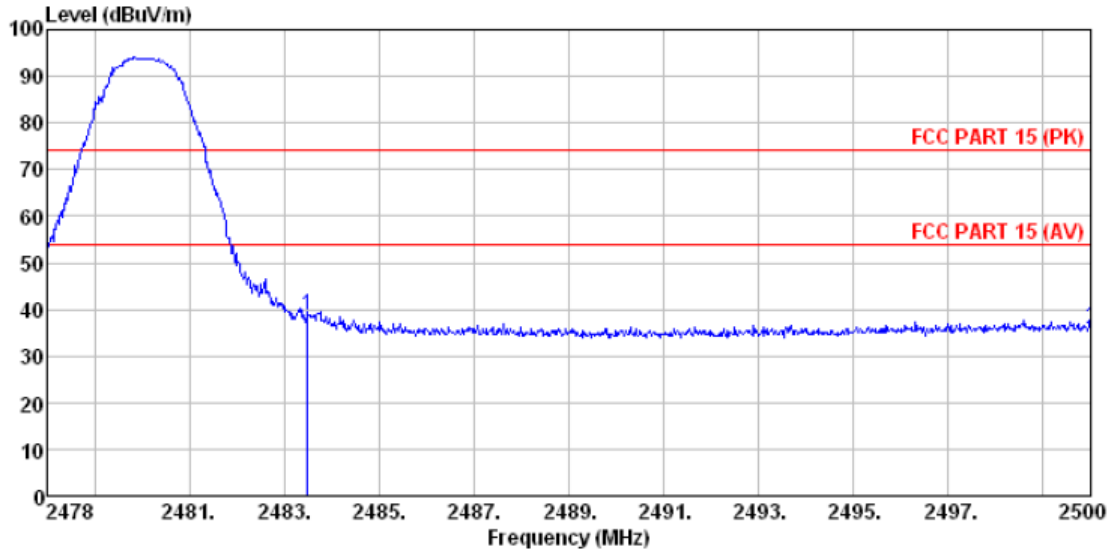
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m		dB	
1	2400.00	48.46	27.58	5.39	34.01	47.42	54.00	-6.58	Average

5.3.35 Diagram 5-35



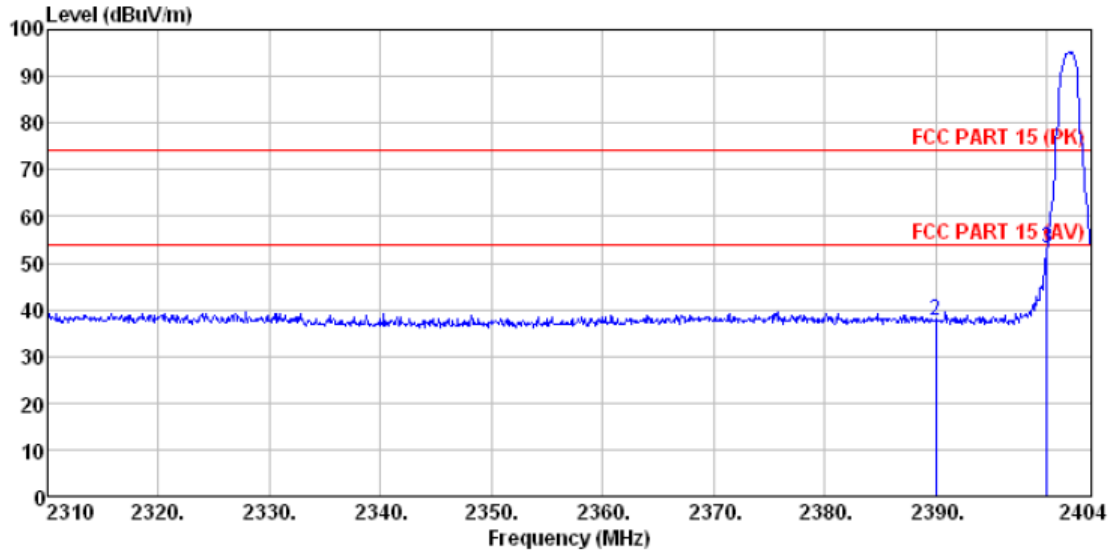
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	37.65	27.53	5.47	33.92	36.73	74.00	-37.27	Peak
2	2500.000	36.65	27.55	5.49	33.90	35.79	74.00	-38.21	Peak

5.3.36 Diagram 5-36



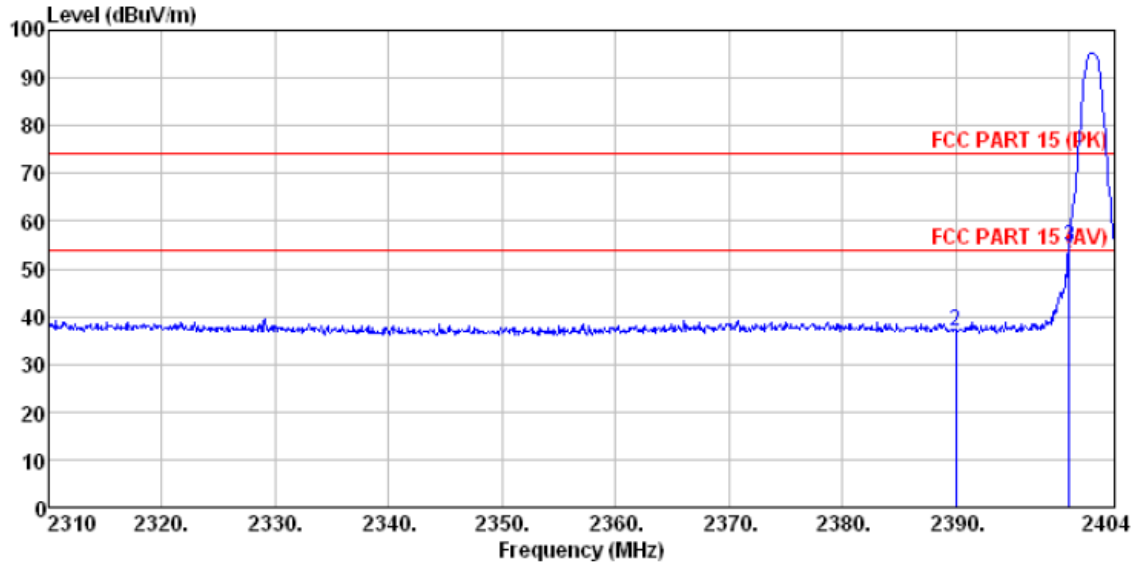
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	39.51	27.53	5.47	33.92	38.59	74.00	-35.41	Peak
2	2500.000	36.76	27.55	5.49	33.90	35.90	74.00	-38.10	Peak

5.3.37 Diagram 5-37



	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	38.95	27.91	5.30	34.11	38.05	74.00	-35.95	Peak
2	2390.000	38.61	27.59	5.38	34.01	37.57	74.00	-36.43	Peak
3	2400.000	54.02	27.58	5.39	34.01	52.98	74.00	-21.02	Peak

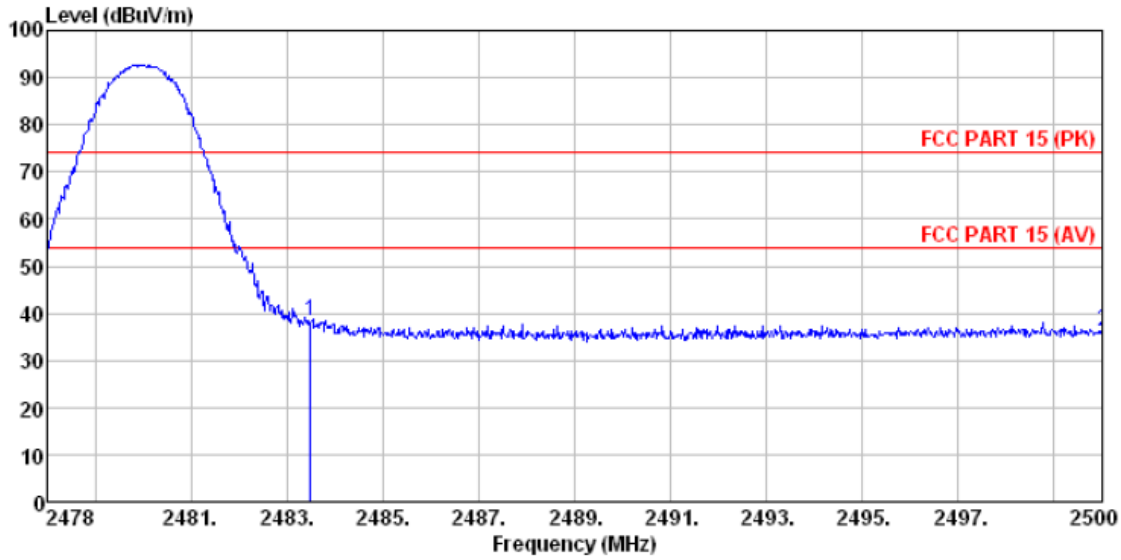
5.3.38 Diagram 5-38



	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	38.61	27.91	5.30	34.11	37.71	74.00	-36.29	Peak
2	2390.000	38.10	27.59	5.38	34.01	37.06	74.00	-36.94	Peak
3	2400.000	55.54	27.58	5.39	34.01	54.50	74.00	-19.50	Peak

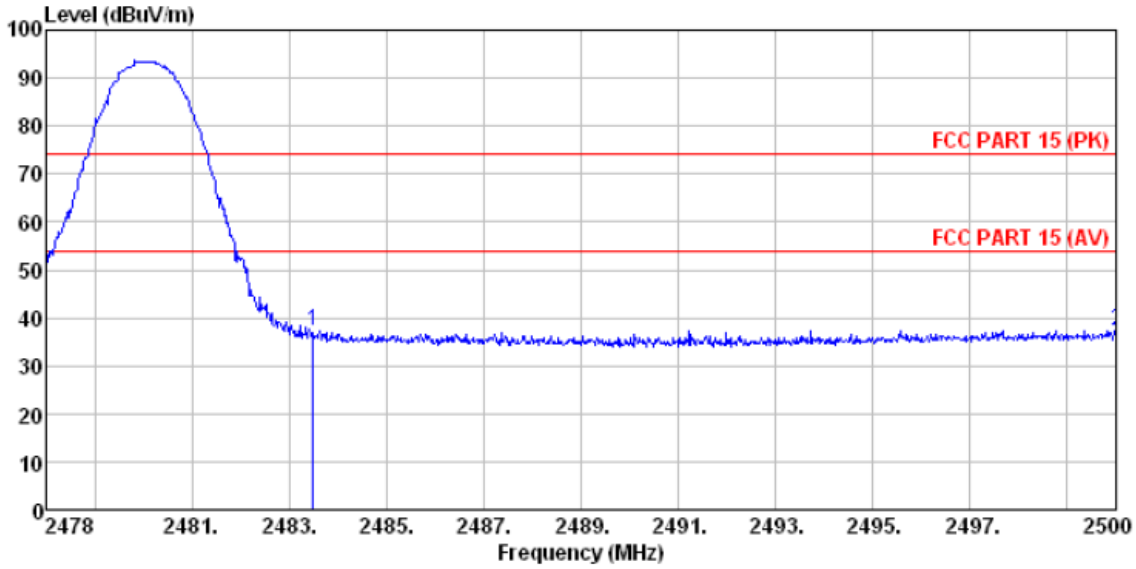
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m		dB	
1	2400.00	47.54	27.58	5.39	34.01	46.5	54.00	-7.5	Average

5.3.39 Diagram 5-39



	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	2483.500	39.13	27.53	5.47	33.92	38.21	74.00	-35.79	Peak
2	2500.000	36.97	27.55	5.49	33.90	36.11	74.00	-37.89	Peak

5.3.40 Diagram 5-40



	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	2483.500	38.04	27.53	5.47	33.92	37.12	74.00	-36.88	Peak
2	2500.000	37.97	27.55	5.49	33.90	37.11	74.00	-36.89	Peak

6. 20 dB and 99% 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

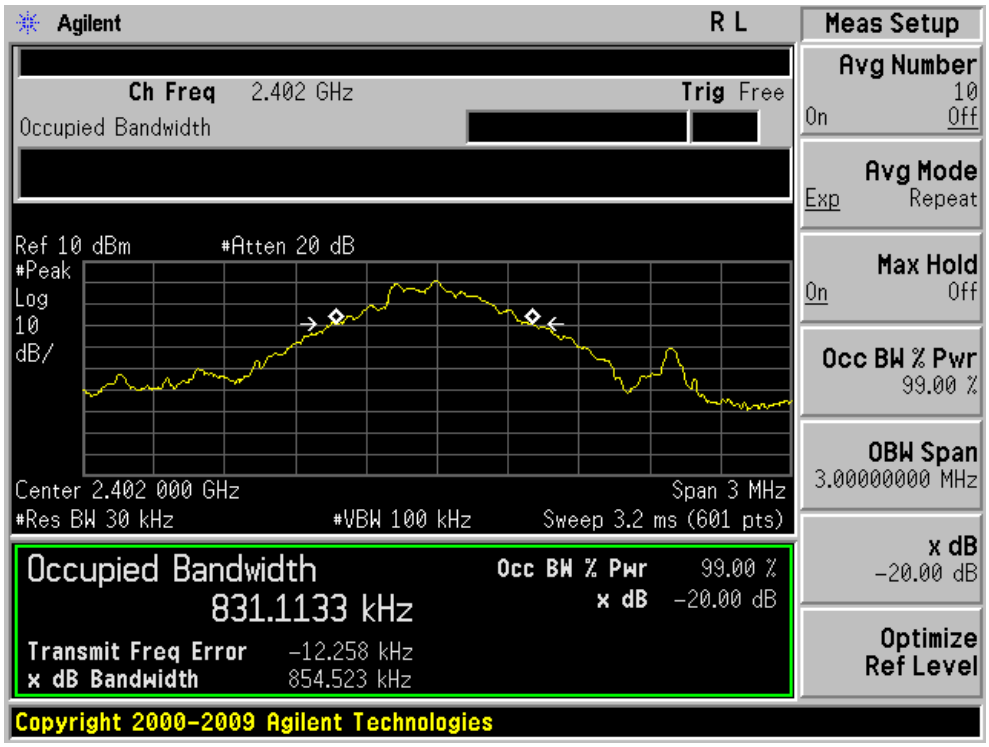
	Equipment	Last Calibration	Type	Serial No.	Manufacturer
☒	Spectrum	Jul. 04 2013	FSP30	GTS208	RS

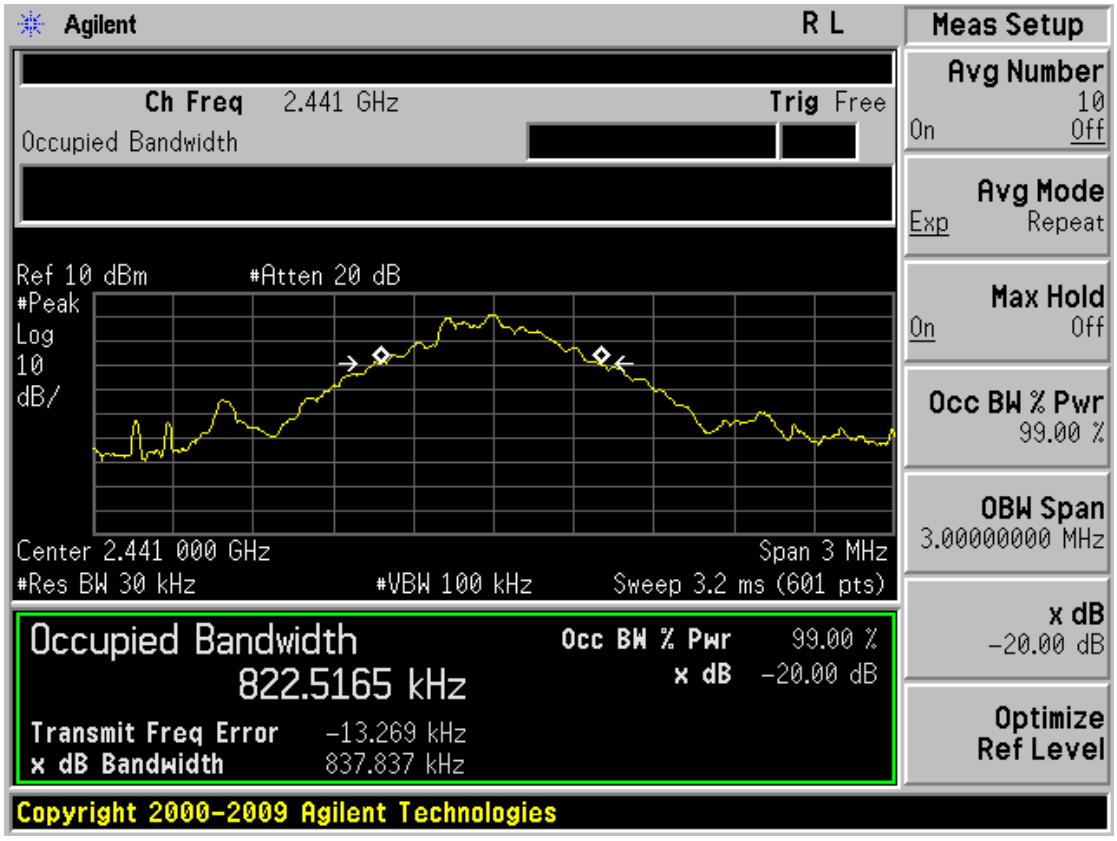
6.3 Test Result:

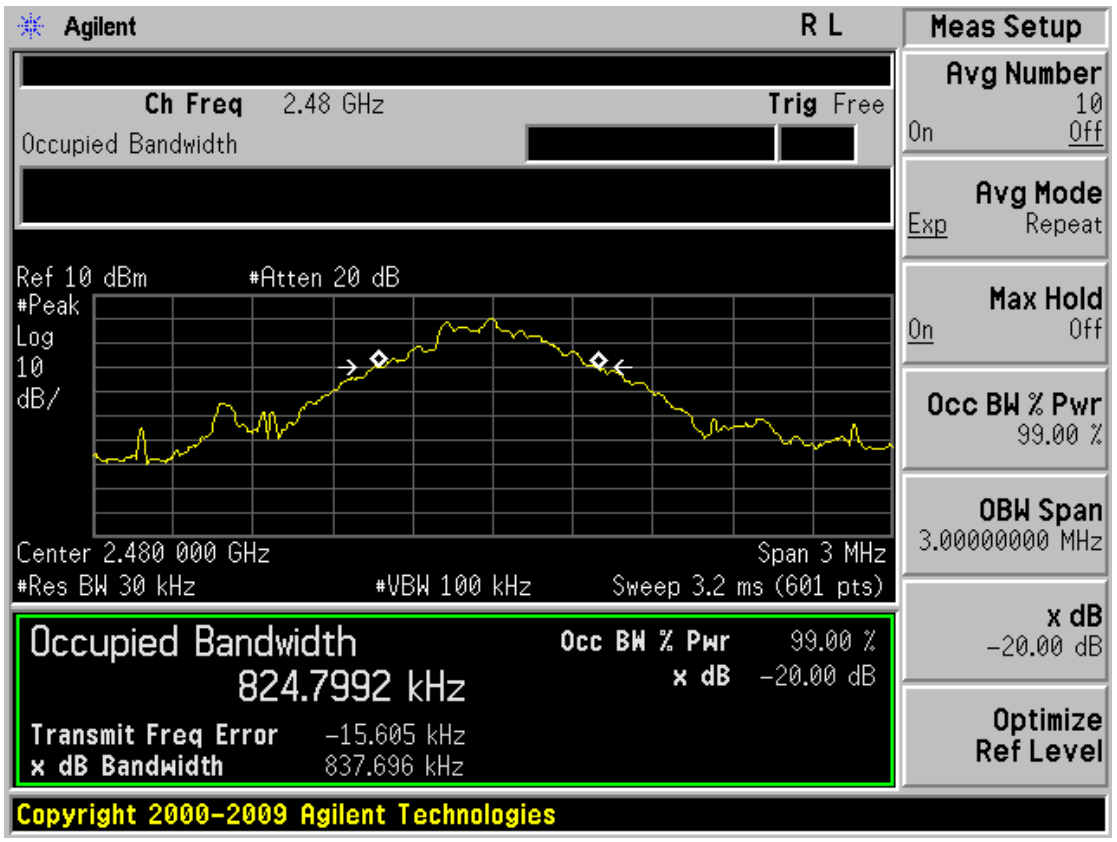
BT1130CUS and BT1140CUS with different adapter are tested, and only list BT1130CUS data which is the worse in the report.

Models	Modulation	Channel	99% bandwidth	20dB bandwidth
BT1130CUS	GFSK	CHL	831.1133KHz	854.523KHz
		CHM	822.5165KHz	837.837KHz
		CHH	824.7992KHz	837.696KHz

GFSK diagrams are as below:

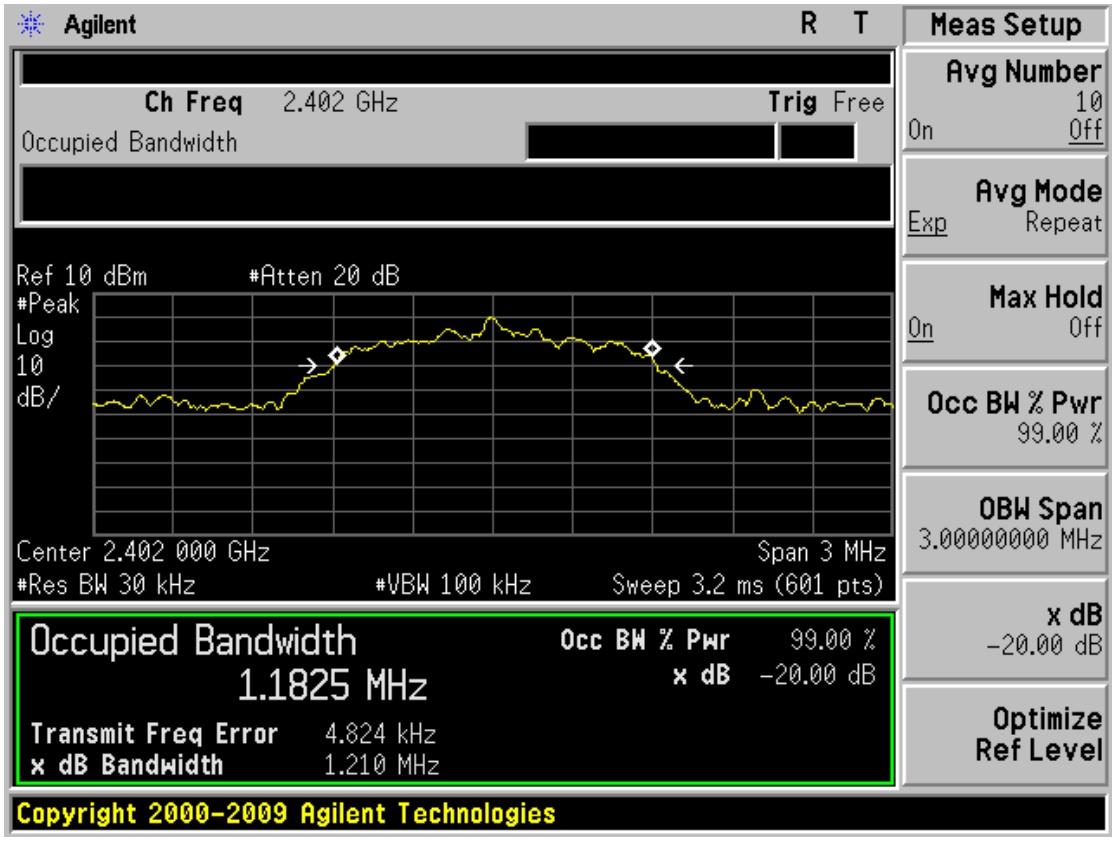


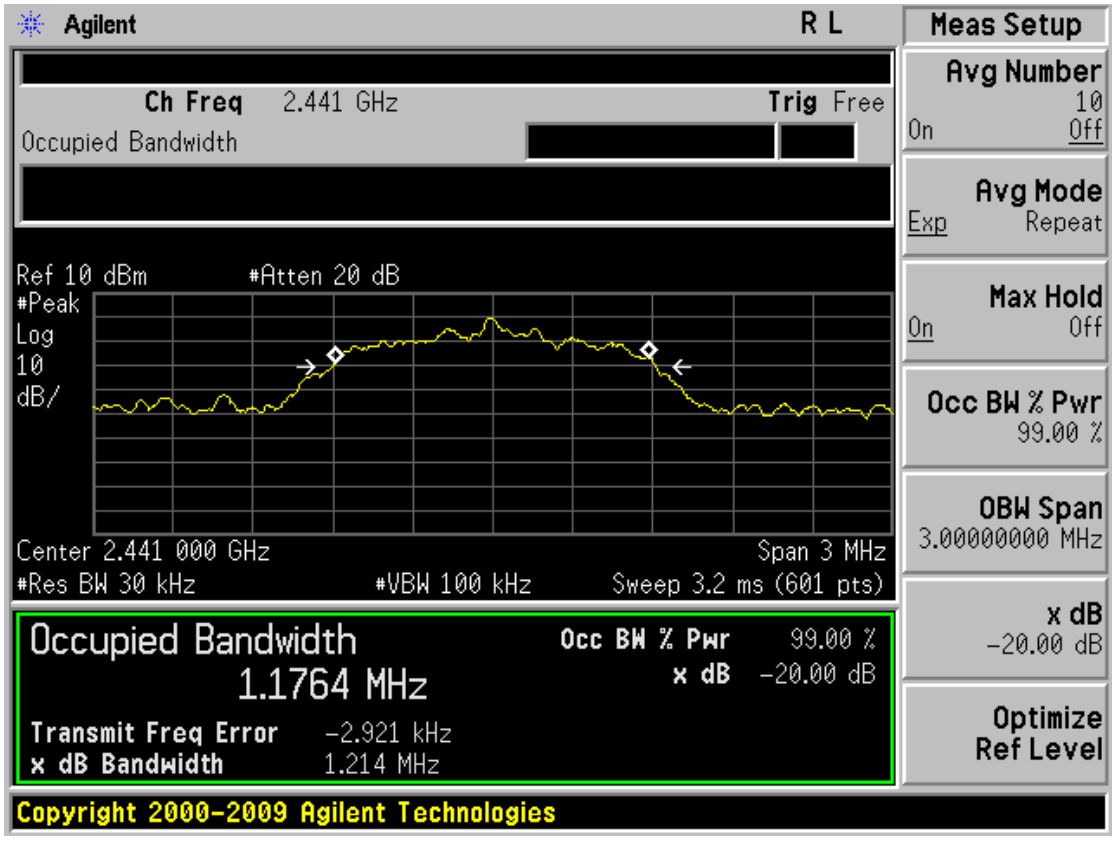

Agilent
R L
Meas Setup
Ch Freq 2.441 GHz
Trig Free
Occupied Bandwidth
Avg Number
10
On Off
Avg Mode
Exp Repeat
Ref 10 dBm
#Atten 20 dB
#Peak
Log
10
dB/
Max Hold
On Off
Occ BW % Pwr
99.00 %
OBW Span
3.00000000 MHz
Center 2.441 000 GHz
Span 3 MHz
#Res BW 30 kHz
#VBW 100 kHz
Sweep 3.2 ms (601 pts)
x dB
-20.00 dB
Occupied Bandwidth
822.5165 kHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Transmit Freq Error -13.269 kHz
x dB Bandwidth 837.837 kHz
Optimize
Ref Level
Copyright 2000-2009 Agilent Technologies

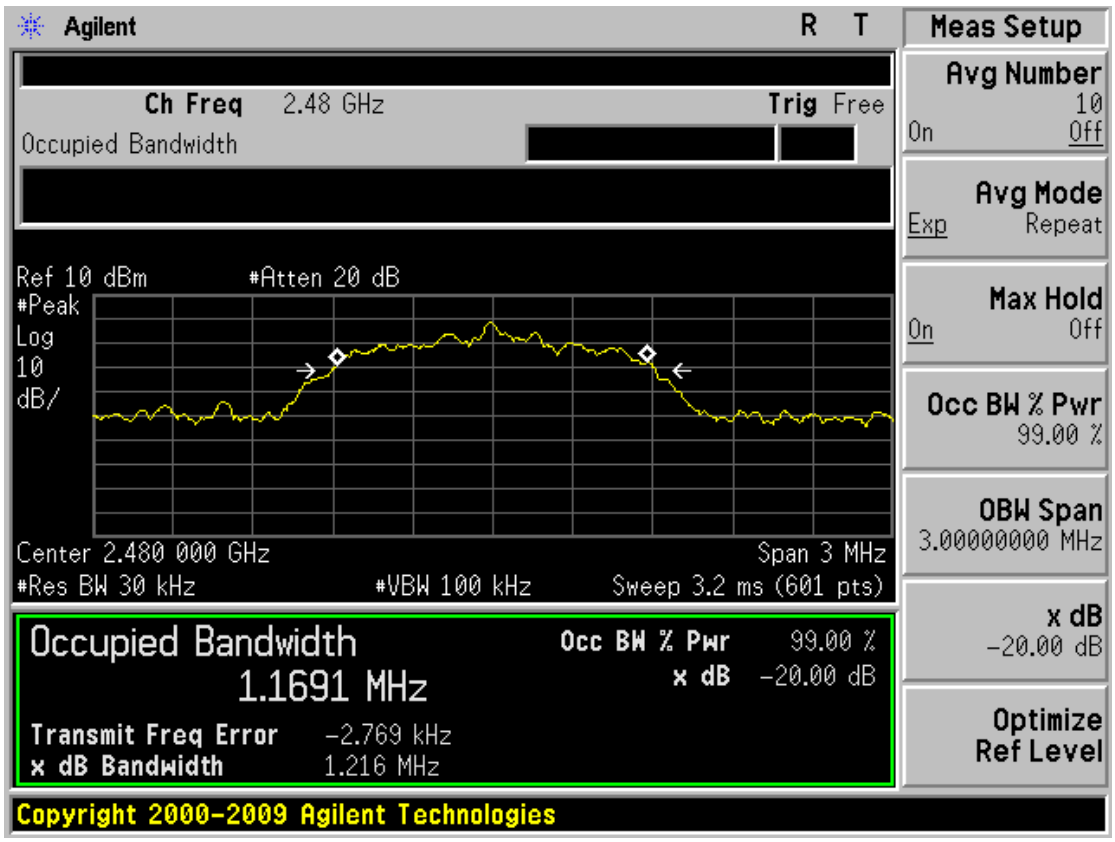

Agilent
R L
Meas Setup
Ch Freq 2.48 GHz
Trig Free
Occupied Bandwidth
Avg Number
10
On Off
Avg Mode
Exp Repeat
Ref 10 dBm
#Atten 20 dB
#Peak
Log
10
dB/
Max Hold
On Off
Occ BW % Pwr
99.00 %
OBW Span
3.00000000 MHz
Center 2.480 000 GHz
Span 3 MHz
#Res BW 30 kHz
#VBW 100 kHz
Sweep 3.2 ms (601 pts)
x dB
-20.00 dB
Occupied Bandwidth
824.7992 kHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Transmit Freq Error -15.605 kHz
x dB Bandwidth 837.696 kHz
Optimize
Ref Level
Copyright 2000-2009 Agilent Technologies

Models	Modulation	Channel	99% bandwidth	20dB bandwidth
BT1130CUS	8DPSK	CHL	1.1825MHz	1.210MHz
		CHM	1.1764MHz	1.214MHz
		CHH	1.1691MHz	1.216MHz

8DPSK diagrams are as below:

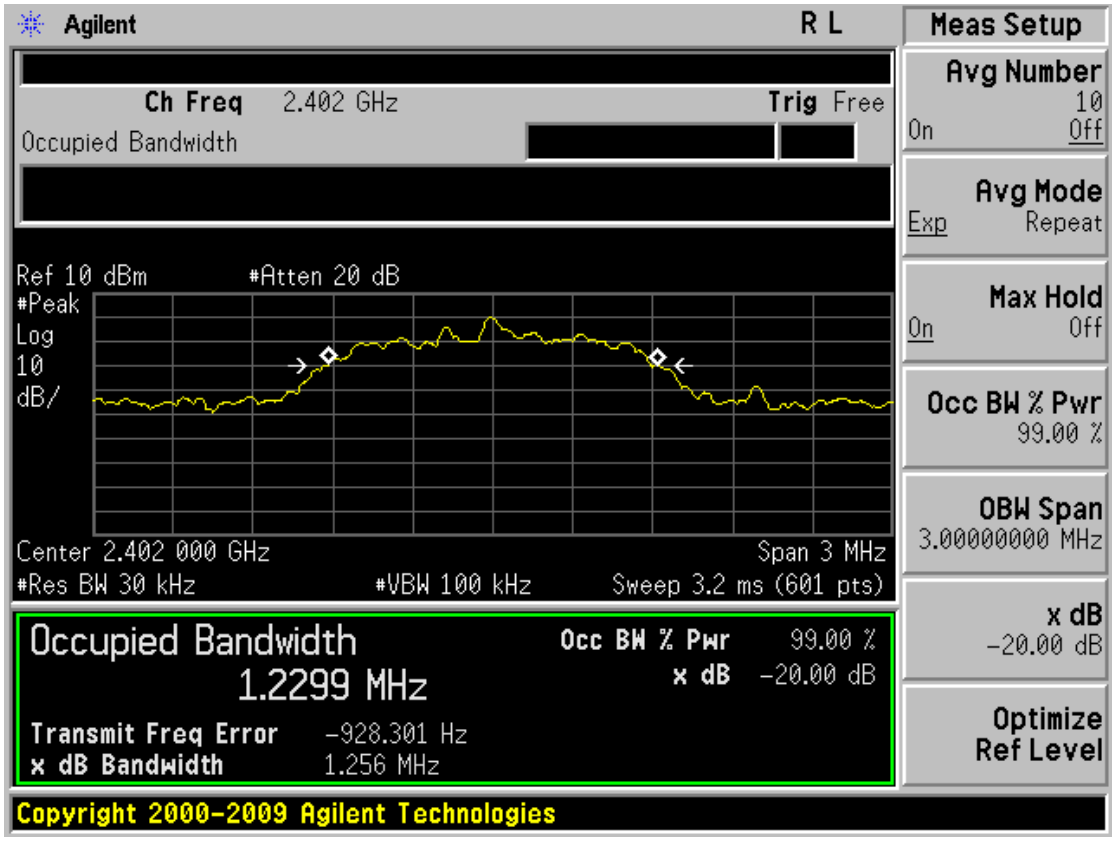


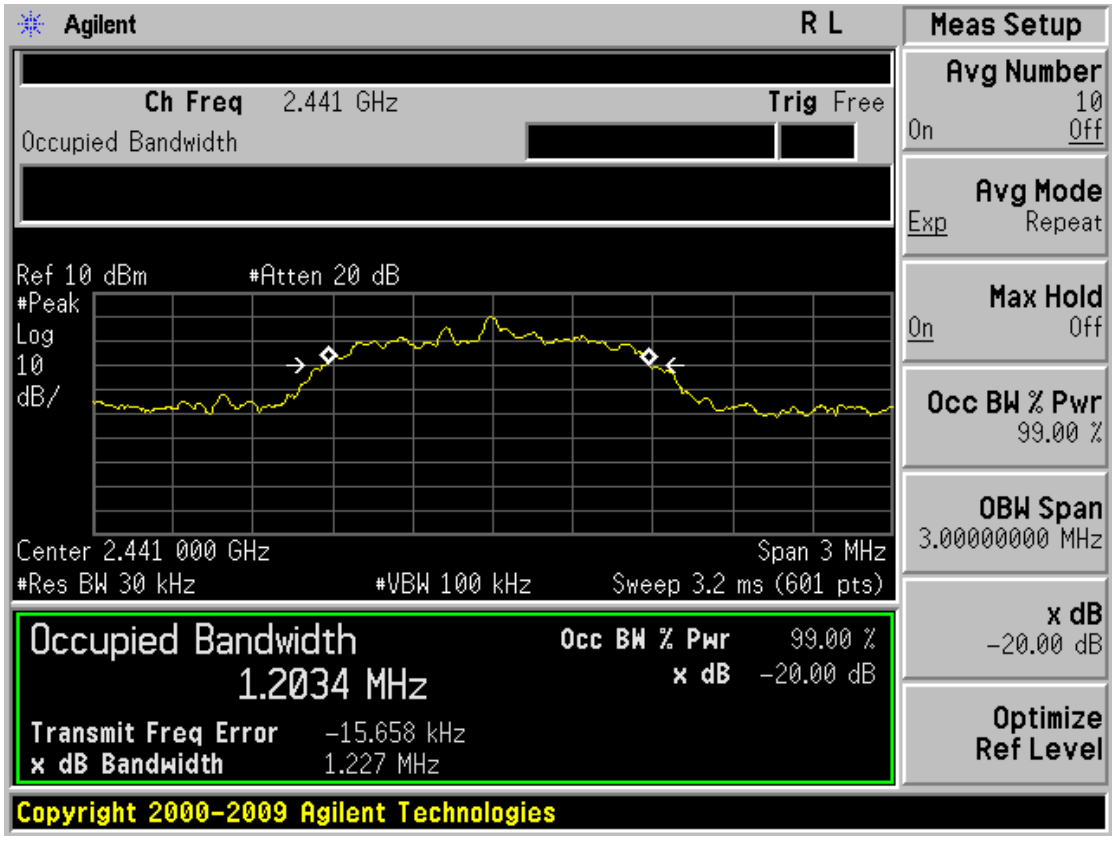

Agilent
R L
Meas Setup
Avg Number
10
On Off
Avg Mode
Exp Repeat
Max Hold
On Off
Occ BW % Pwr
99.00 %
OBW Span
3.00000000 MHz
x dB
-20.00 dB
Optimize
Ref Level
Ch Freq 2.441 GHz
Trig Free
Occupied Bandwidth
Ref 10 dBm
#Atten 20 dB
#Peak
Log
10
dB/
Center 2.441 000 GHz
Span 3 MHz
#Res BW 30 kHz
#VBW 100 kHz
Sweep 3.2 ms (601 pts)
Occupied Bandwidth
1.1764 MHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Transmit Freq Error -2.921 kHz
x dB Bandwidth 1.214 MHz
Copyright 2000-2009 Agilent Technologies

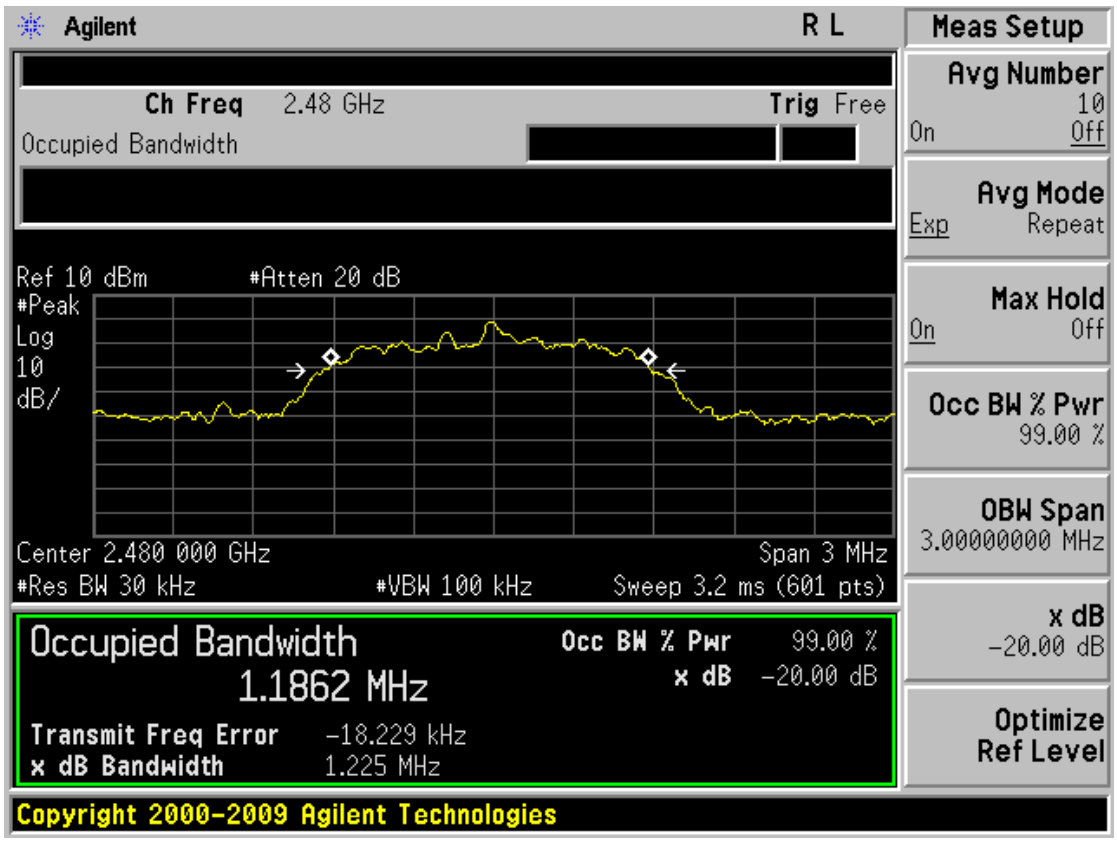

Agilent
R T
Meas Setup
Avg Number
10
On Off
Avg Mode
Exp Repeat
Max Hold
On Off
Occ BW % Pwr
99.00 %
OBW Span
3.00000000 MHz
x dB
-20.00 dB
Optimize
Ref Level
Ch Freq 2.48 GHz
Trig Free
Occupied Bandwidth
Ref 10 dBm
#Atten 20 dB
#Peak
Log
10
dB/
Center 2.480 000 GHz
Span 3 MHz
#Res BW 30 kHz
#VBW 100 kHz
Sweep 3.2 ms (601 pts)
Occupied Bandwidth
1.1691 MHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Transmit Freq Error -2.769 kHz
x dB Bandwidth 1.216 MHz
Copyright 2000-2009 Agilent Technologies

Models	Modulation	Channel	99% bandwidth	20dB bandwidth
BT1130CUS	π/4 DQPSK	CHL	1.2299MHz	1.256MHz
		CHM	1.2034MHz	1.227MHz
		CHH	1.1862MHz	1.225MHz

π/4 DQPSK diagrams are as below:




Agilent
R L
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
3.00000000 MHz
Center 2.441 000 GHz
Span 3 MHz
#Res BW 30 kHz
#VBW 100 kHz
Sweep 3.2 ms (601 pts)
x dB
-20.00 dB
Occupied Bandwidth
1.2034 MHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Transmit Freq Error -15.658 kHz
x dB Bandwidth 1.227 MHz
Optimize
Ref Level
Copyright 2000-2009 Agilent Technologies


Agilent
R L
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
3.00000000 MHz
Center 2.480 000 GHz
Span 3 MHz
#Res BW 30 kHz
#VBW 100 kHz
Sweep 3.2 ms (601 pts)
x dB
-20.00 dB
Occupied Bandwidth
1.1862 MHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Transmit Freq Error -18.229 kHz
x dB Bandwidth 1.225 MHz
Optimize
Ref Level
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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.

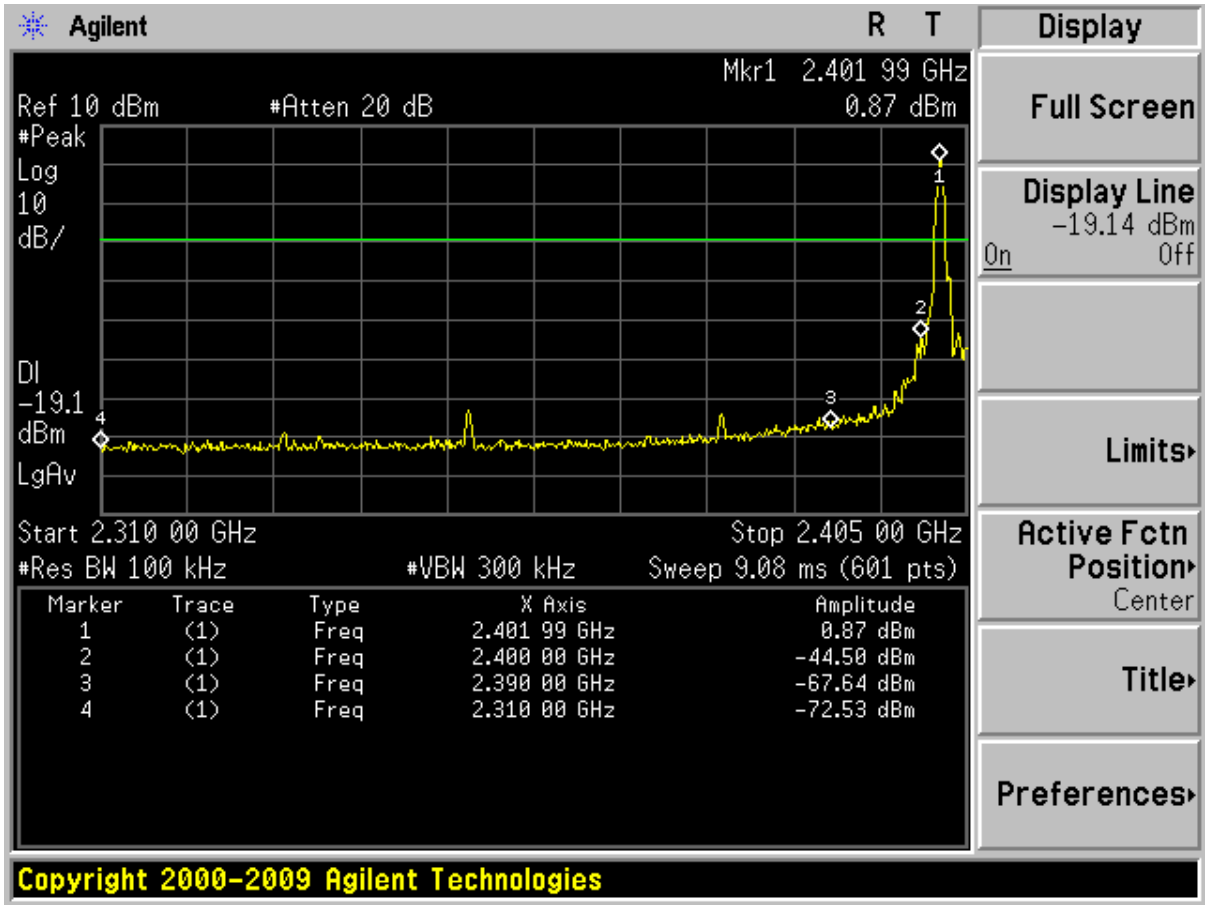
7.2 Measurement Equipment

	Equipment	Last Calibration	Type	Serial No.	Manufacturer
☒	Spectrum	Jul. 04 2013	FSP30	GTS208	RS

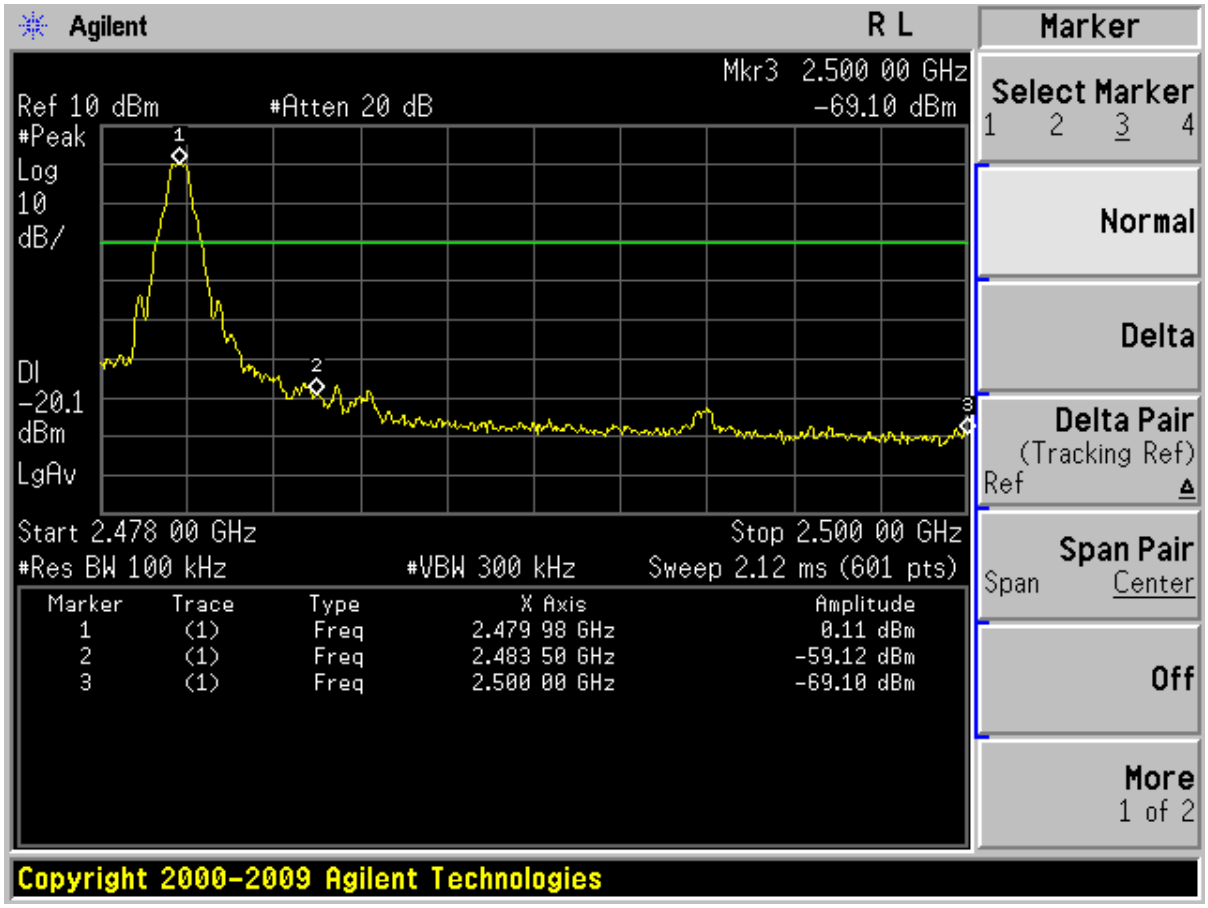
7.3 Test Result

Remark: BT1130CUS and BT1140CUS with different adapter are tested, and only list BT1130CUS data which is the worse in the report.

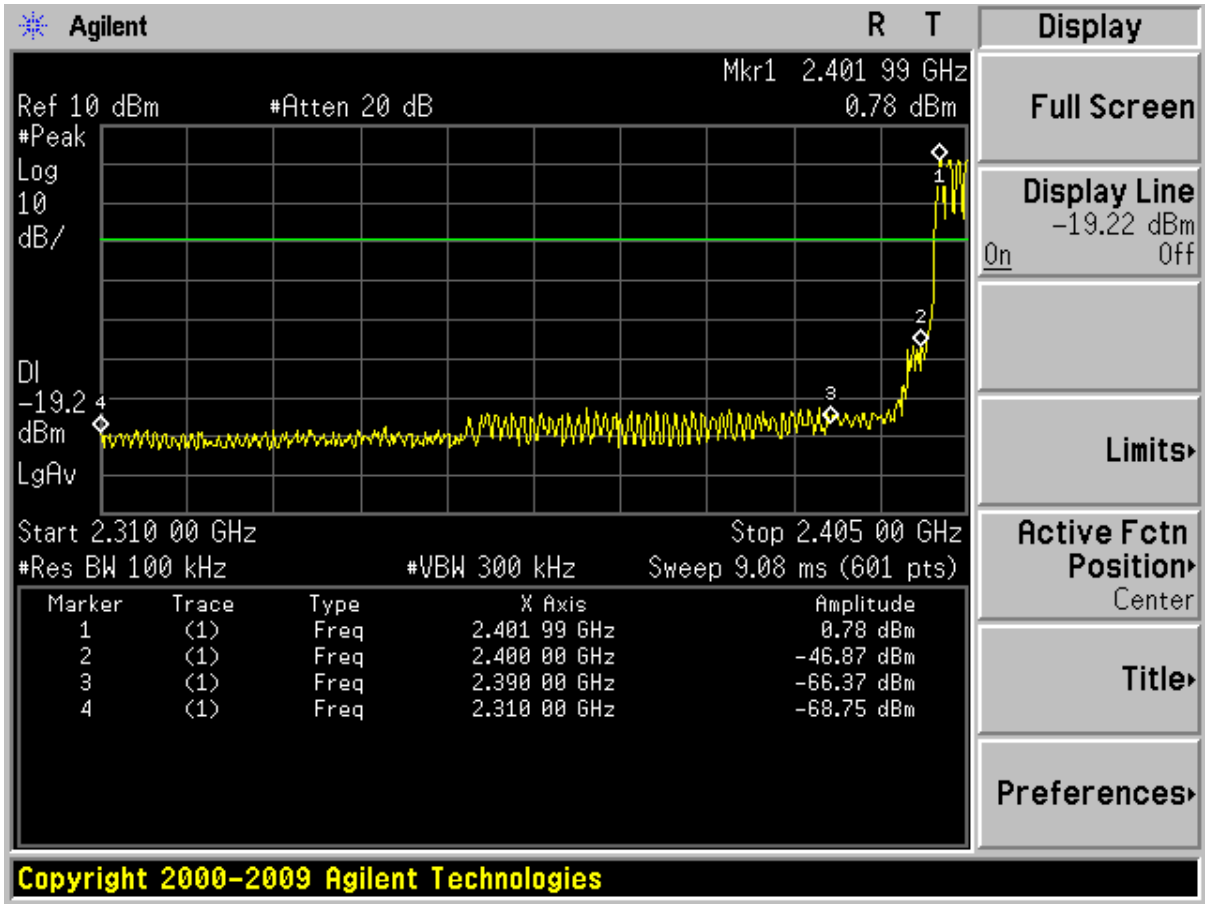
Worse case is reported as below:
GFSK Hopping off CHL :



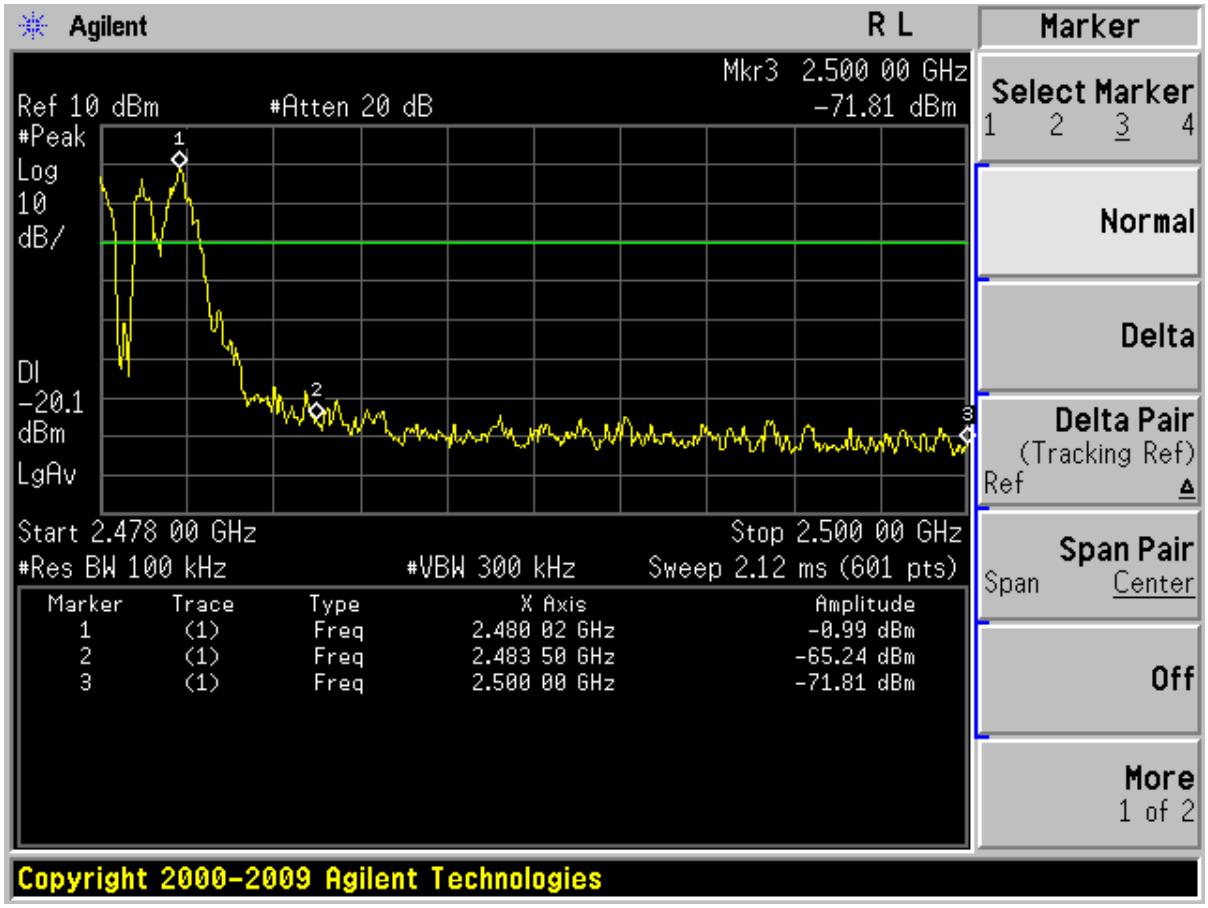
GFSK Hopping off CHH :



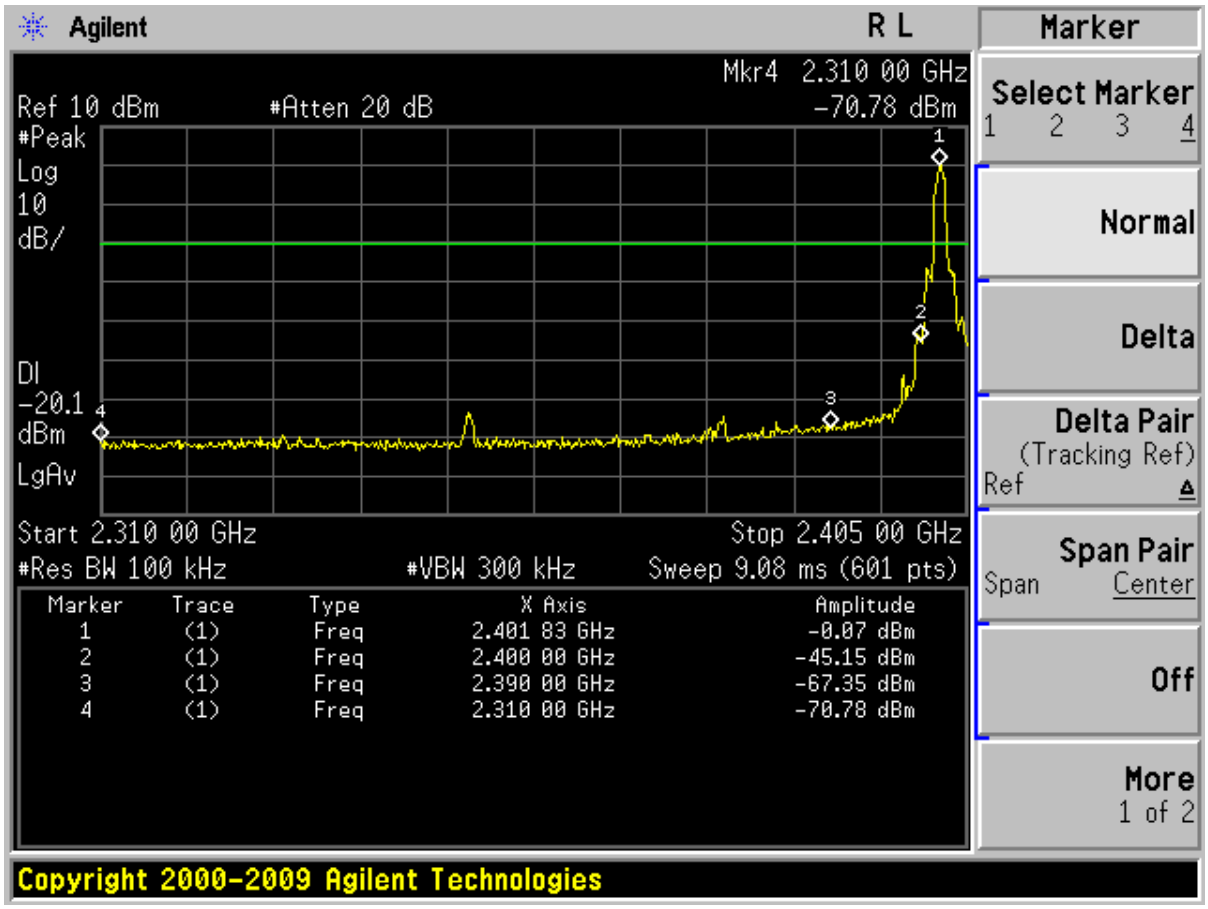
GFSK Hopping on CHL:



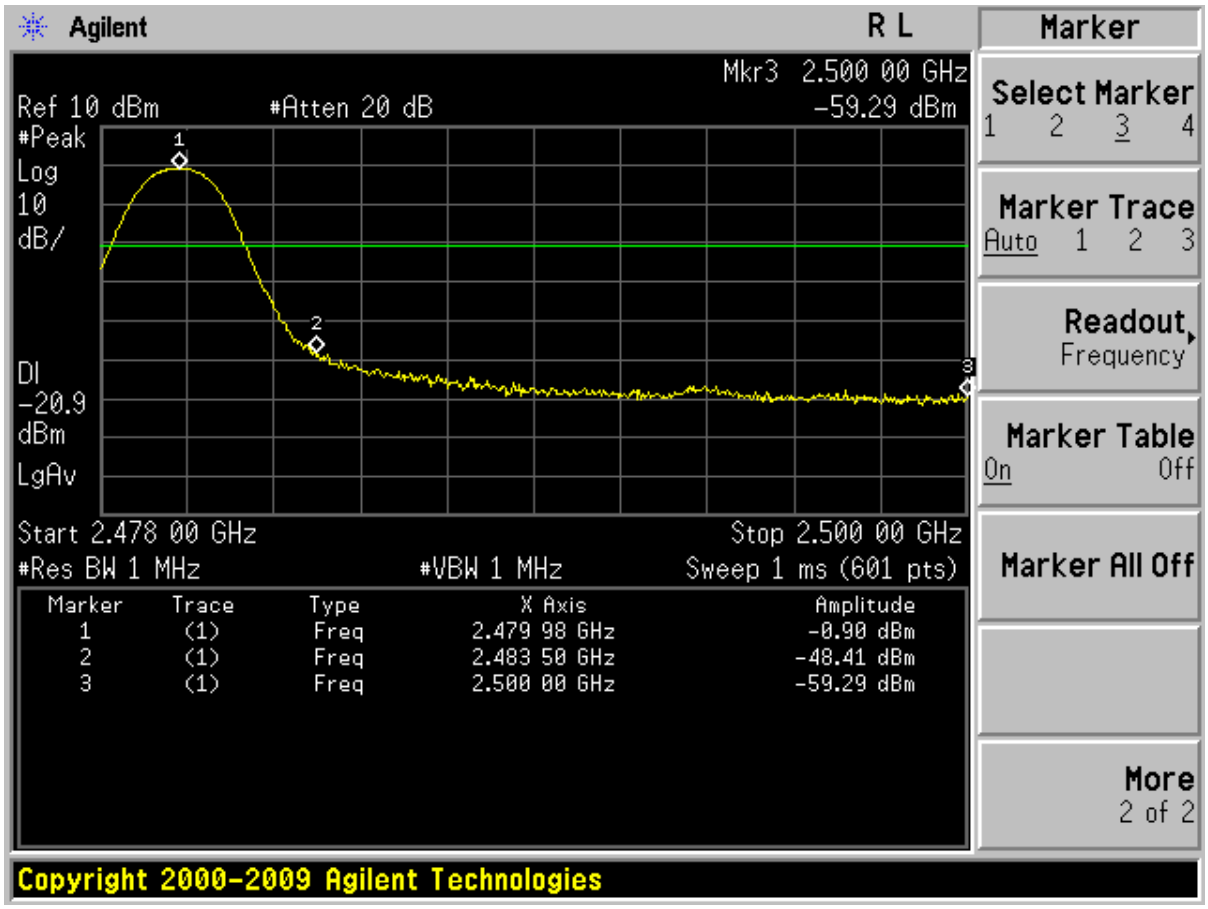
GFSK Hopping on CHH:



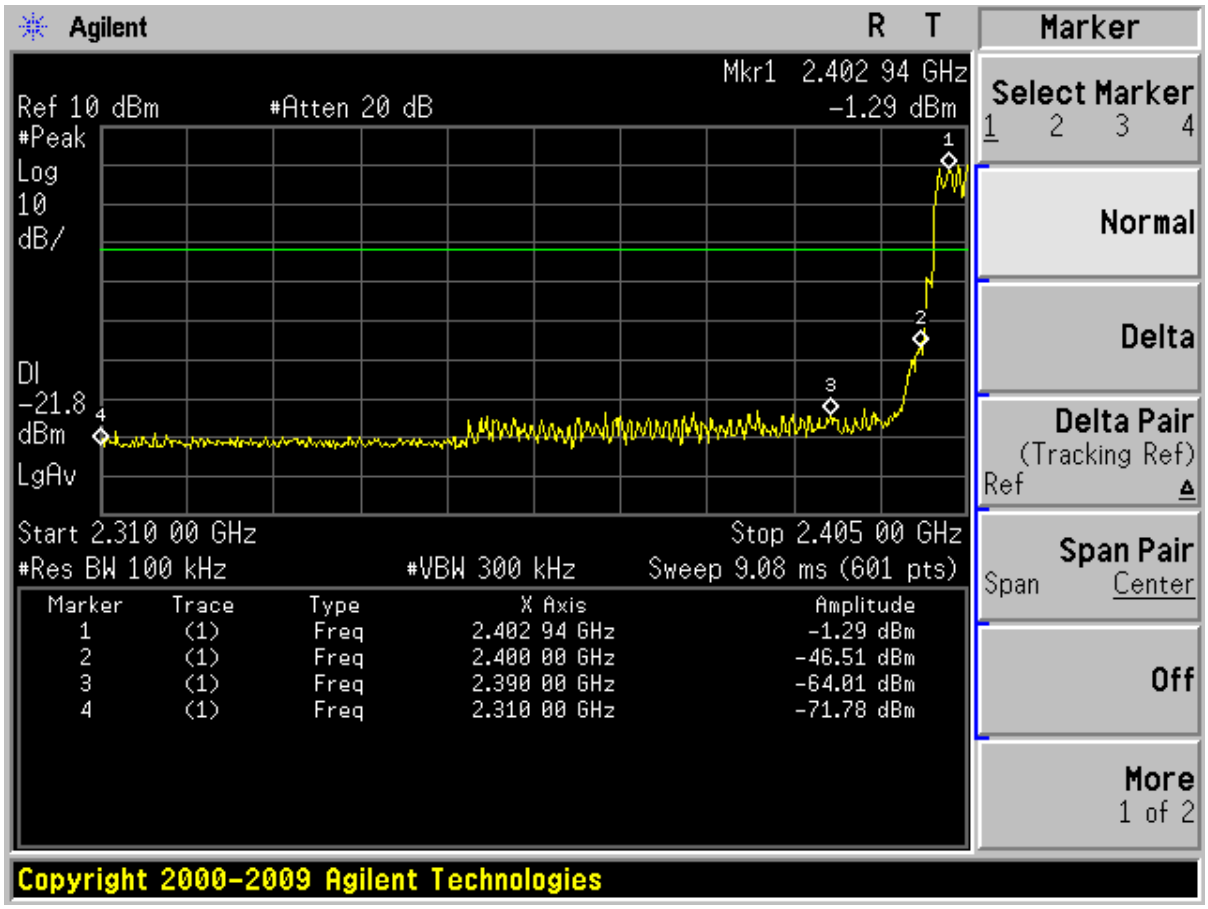
8DPSK Hopping off CHL :



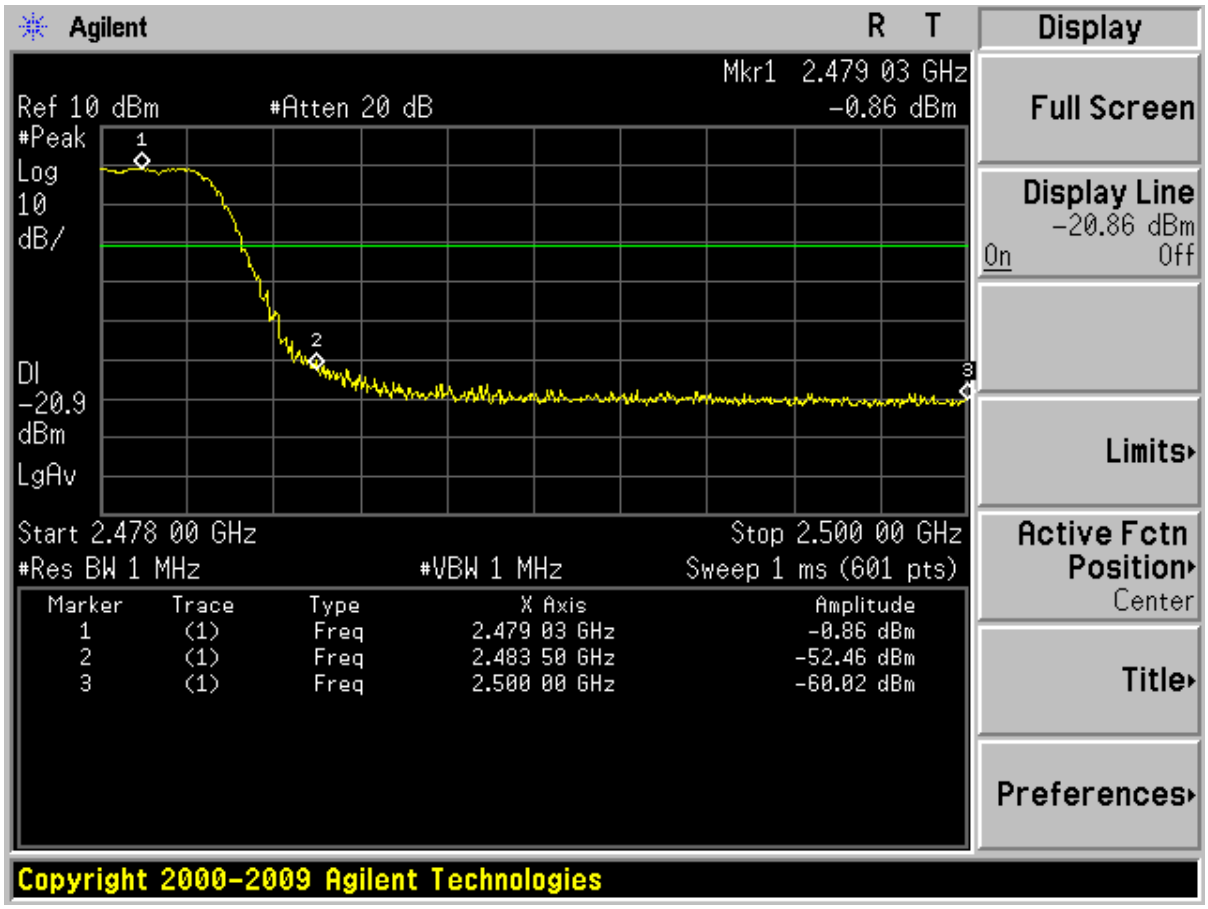
8DPSK Hopping off CHH :



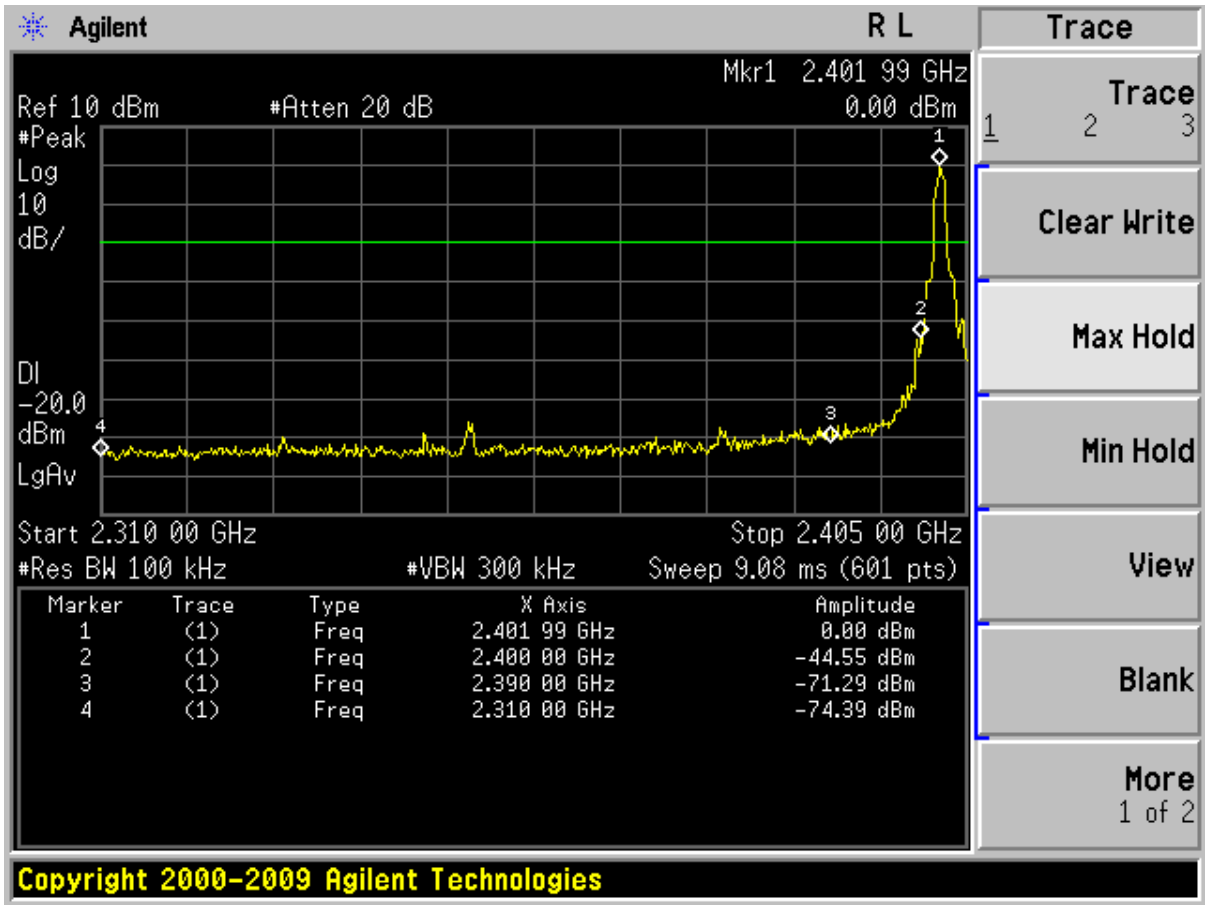
8DPSK Hopping on CHL :



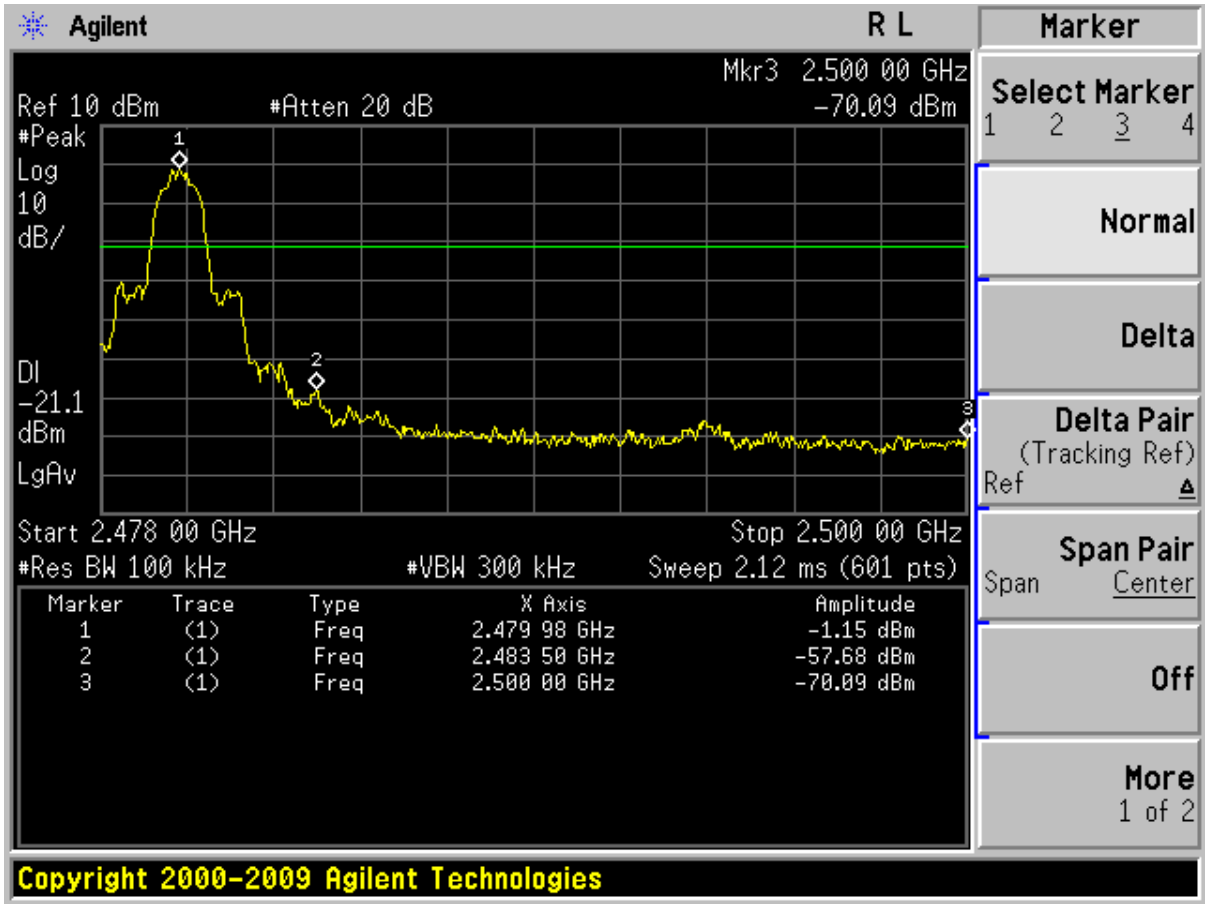
8DPSK Hopping on CHH :



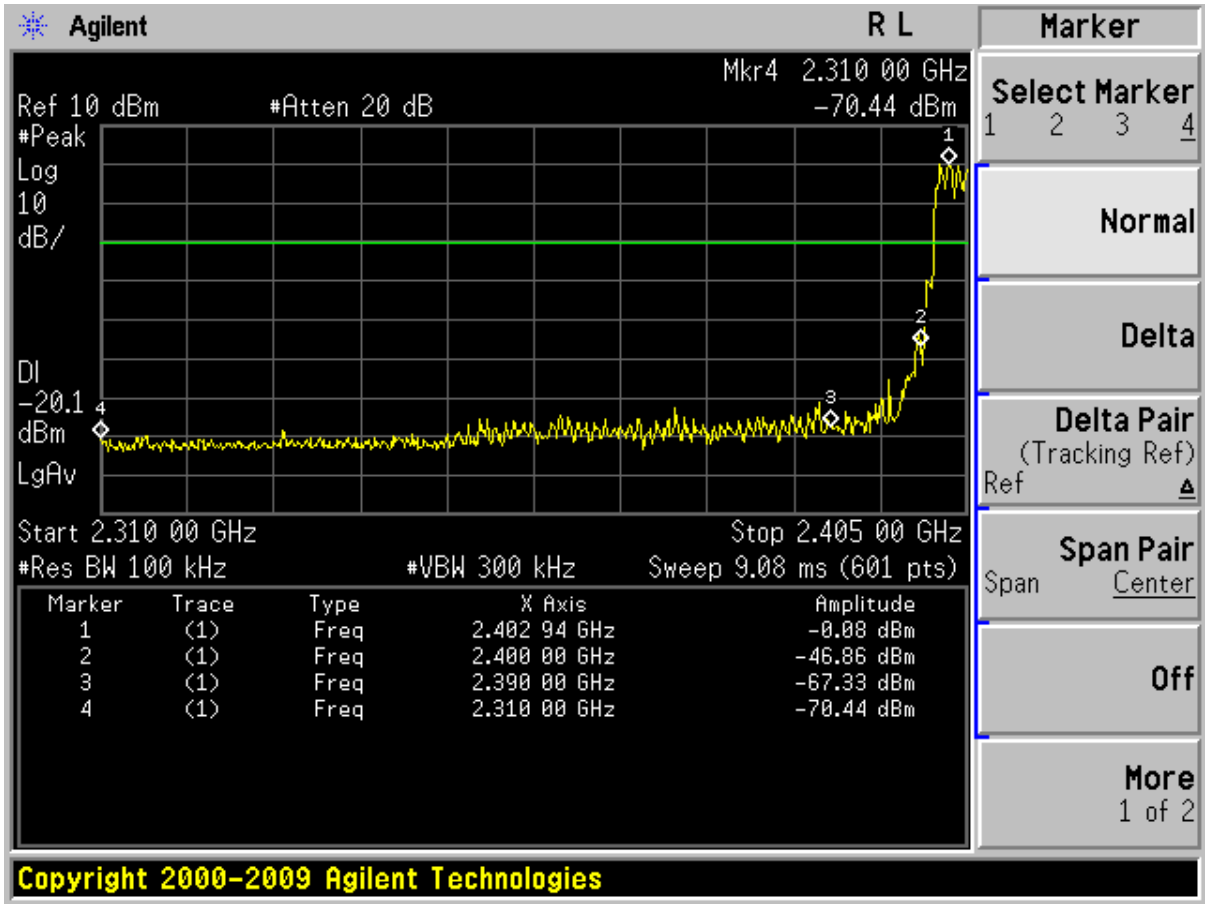
π/4 DQPSK Hopping off CHL :



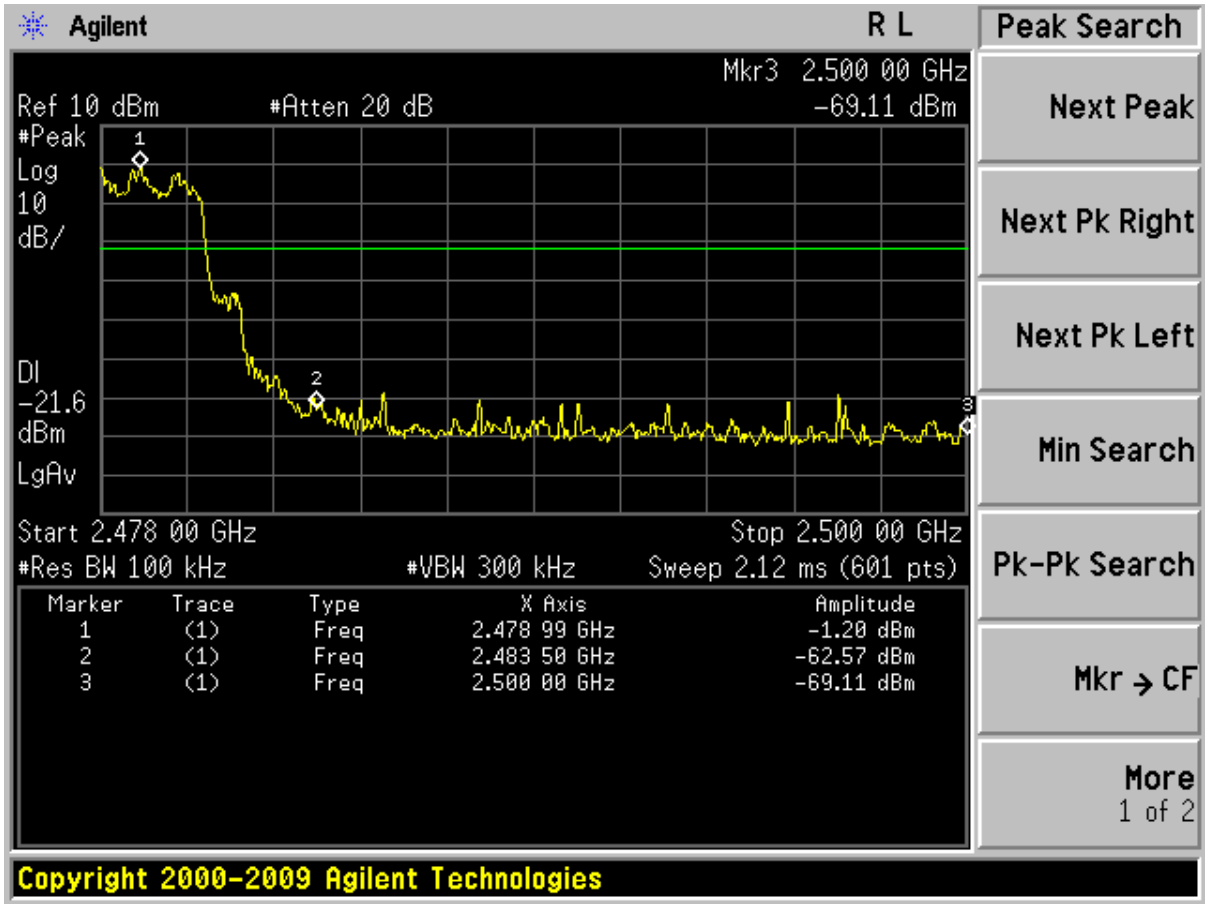
π/4 DQPSK Hopping off CHH :



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	Last Calibration	Type	Serial No.	Manufacturer
☒	Spectrum	Jul. 04 2013	FSP30	GTS208	RS

8.3 Test Result

BT1130CUS and BT1140CUS with different adapter are tested, and only list BT1130CUS data which is the worse in the report.

Channel separation is refered to 8.3.1 to 8.3.3

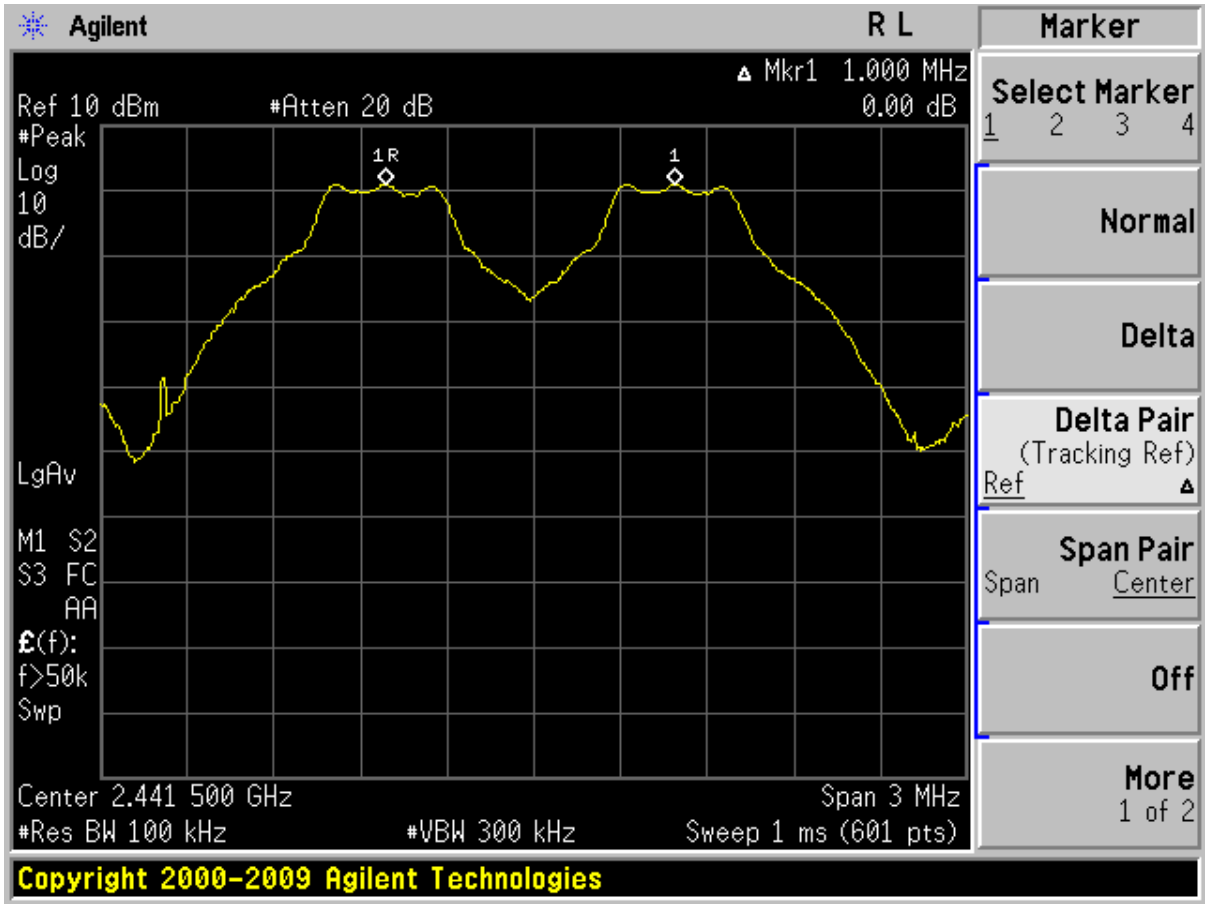
Widest channel bandwidth was 1.256MHz.

Two-thirds of Bandwidth is 0.837MHz and greater than 25kHz .

Model	Modulation	Channel separation, kHz	Minimum limit, kHz	Result
BT1130CUS	GFSK	1MHz	837kHz	Pass
	8DPSK	1MHz	837kHz	Pass
	π/4 DQPSK	1MHz	837kHz	Pass

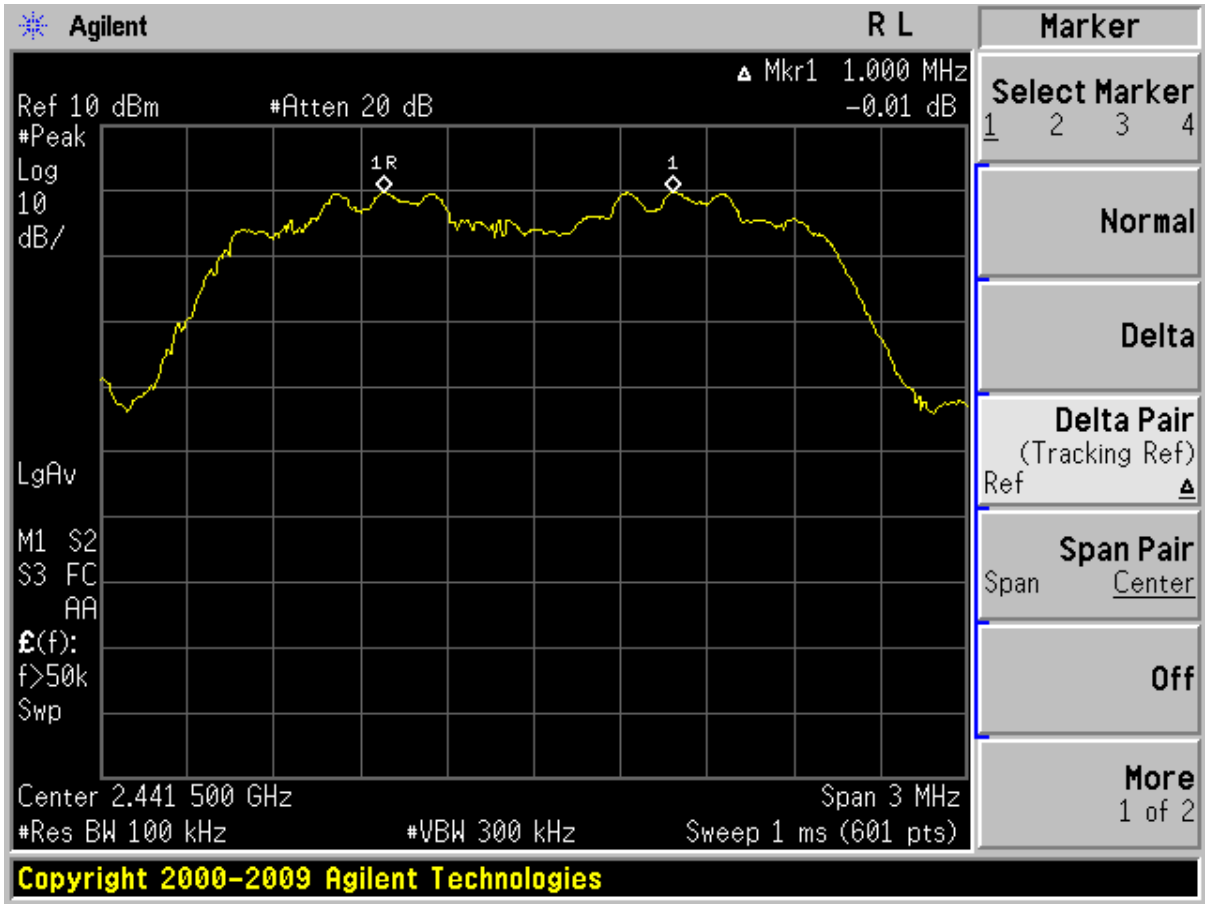
8.3.1 Diagram 8-1

GFSK :



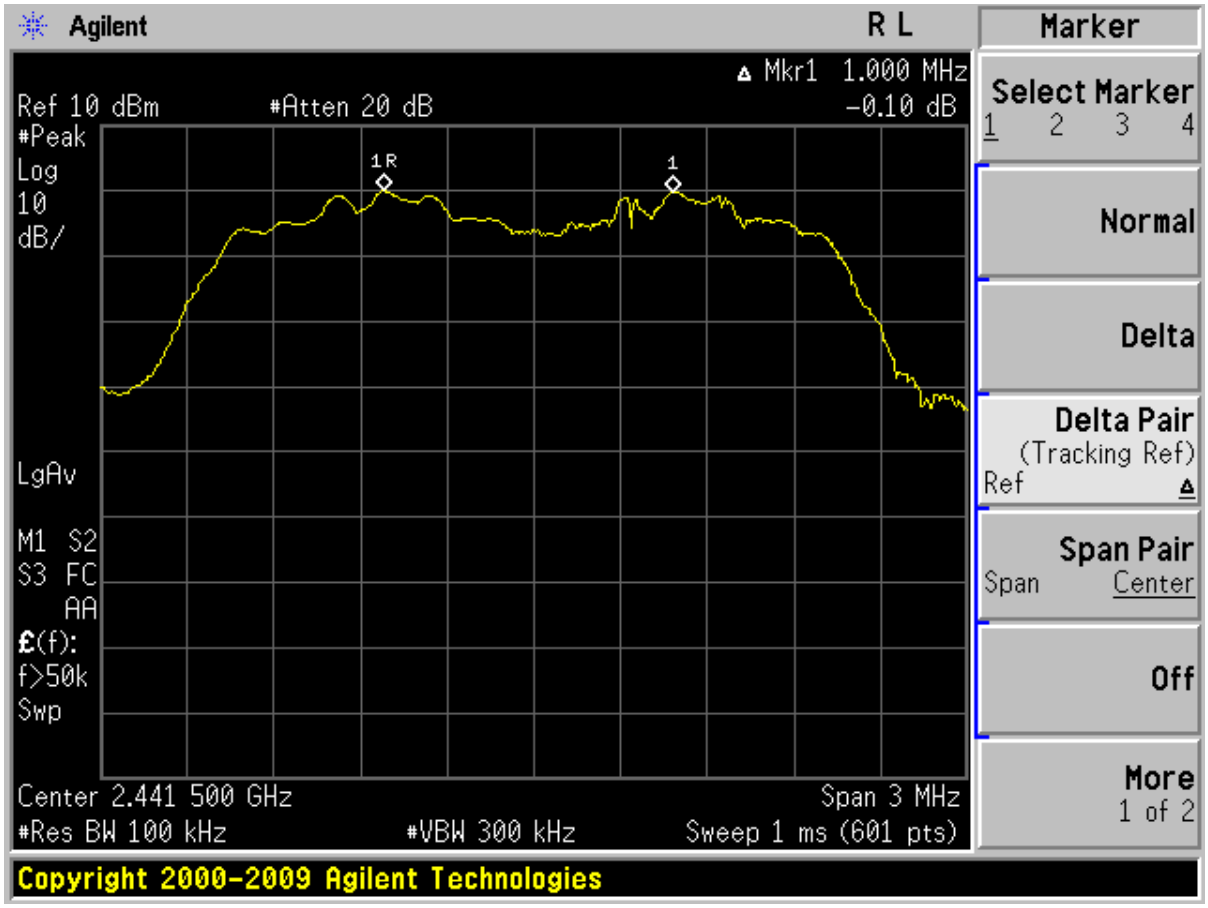
8.3.2 Diagram 8-2

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	Last Calibration	Type	Serial No.	Manufacturer
☒	Spectrum	Jul. 04 2013	FSP30	GTS208	RS

9.3 Test Result

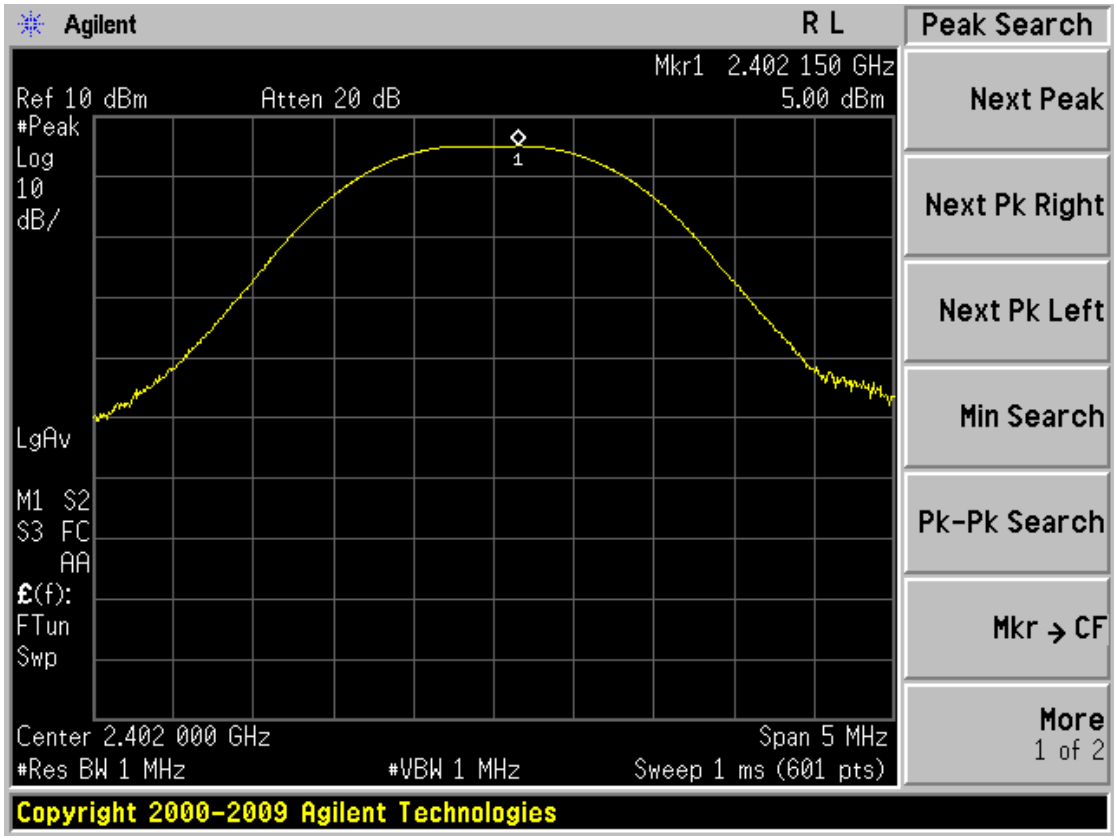
Remark : 1:RBW>=20dB Bandwidth VBW>=RBW PK detector

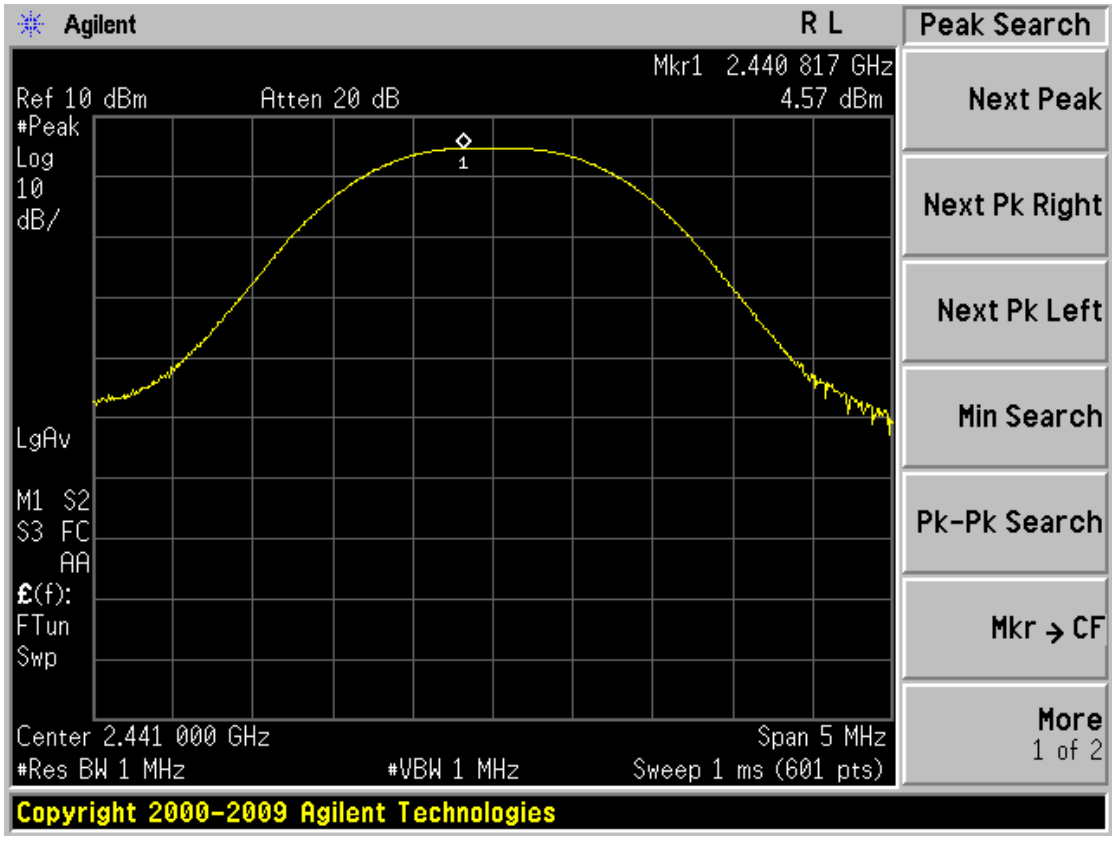
BT1130CUS and BT1140CUS with different adapter are tested, and only list BT1130CUS data which is the worse in the report.

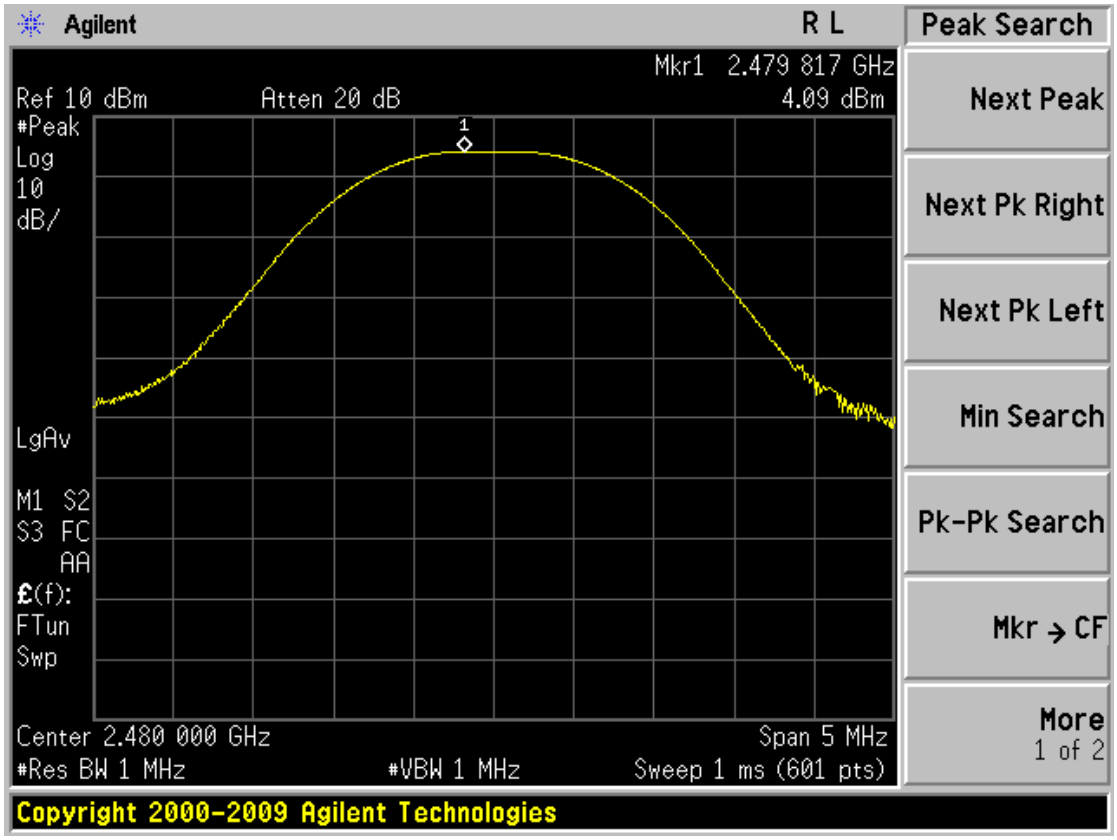
GFSK:

Frequency, MHz	Reading dBm	Cable loss dB	Output power, dBm	Power Limit, dBm
2402	5.00	1	6.00	30.00
2441	4.57	1	5.57	30.00
2480	4.09	1	5.09	30.00

Diagram of GFSK is as below:


Agilent
R L
Peak Search
Mkr1 2.402 150 GHz
Ref 10 dBm
Atten 20 dB
5.00 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 2.402 000 GHz
Span 5 MHz
#Res BW 1 MHz
#VBW 1 MHz
Sweep 1 ms (601 pts)
Copyright 2000-2009 Agilent Technologies

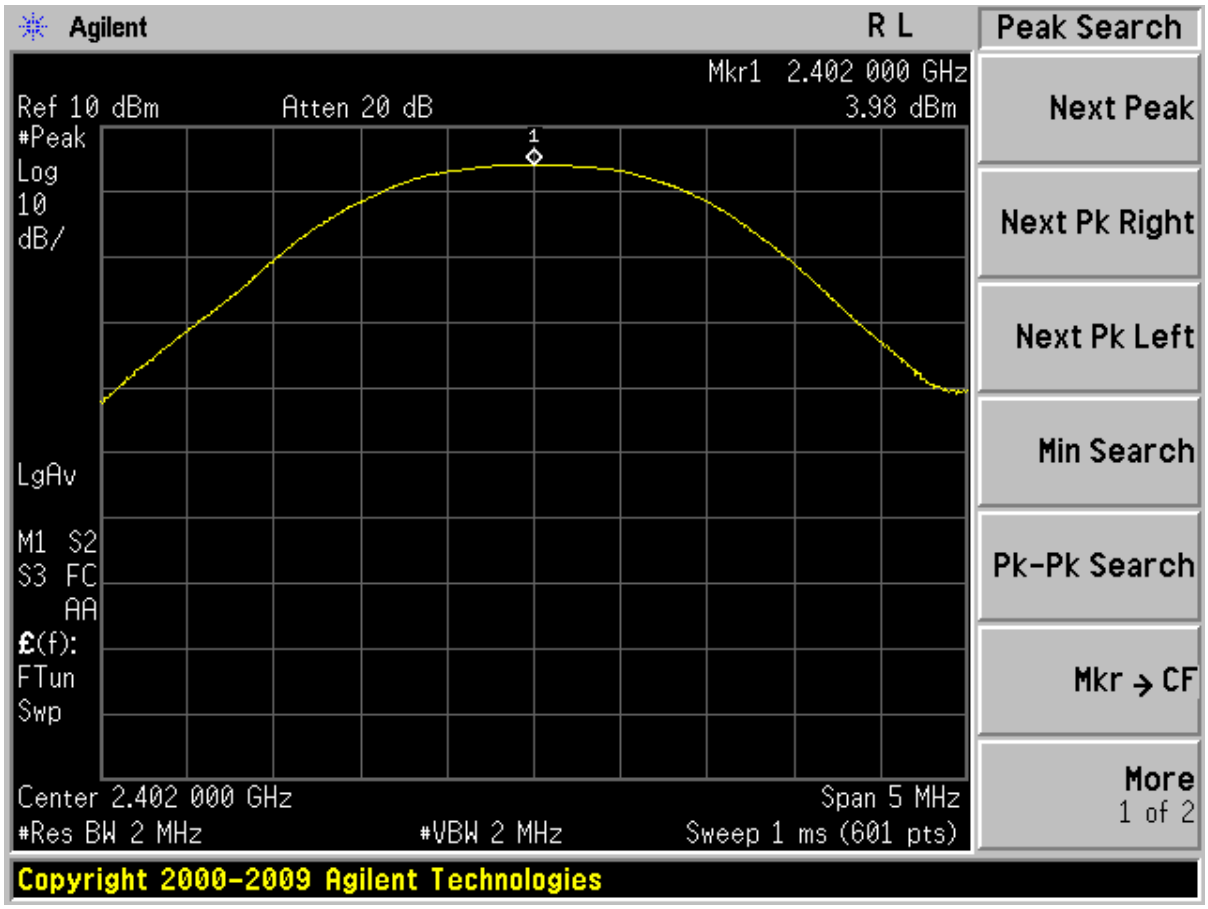

Agilent
R L
Peak Search
Mkr1 2.440 817 GHz
Ref 10 dBm
Atten 20 dB
4.57 dBm
#Peak
Log
10
dB/
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Center 2.441 000 GHz
Span 5 MHz
#Res BW 1 MHz
#VBW 1 MHz
Sweep 1 ms (601 pts)
Copyright 2000-2009 Agilent Technologies

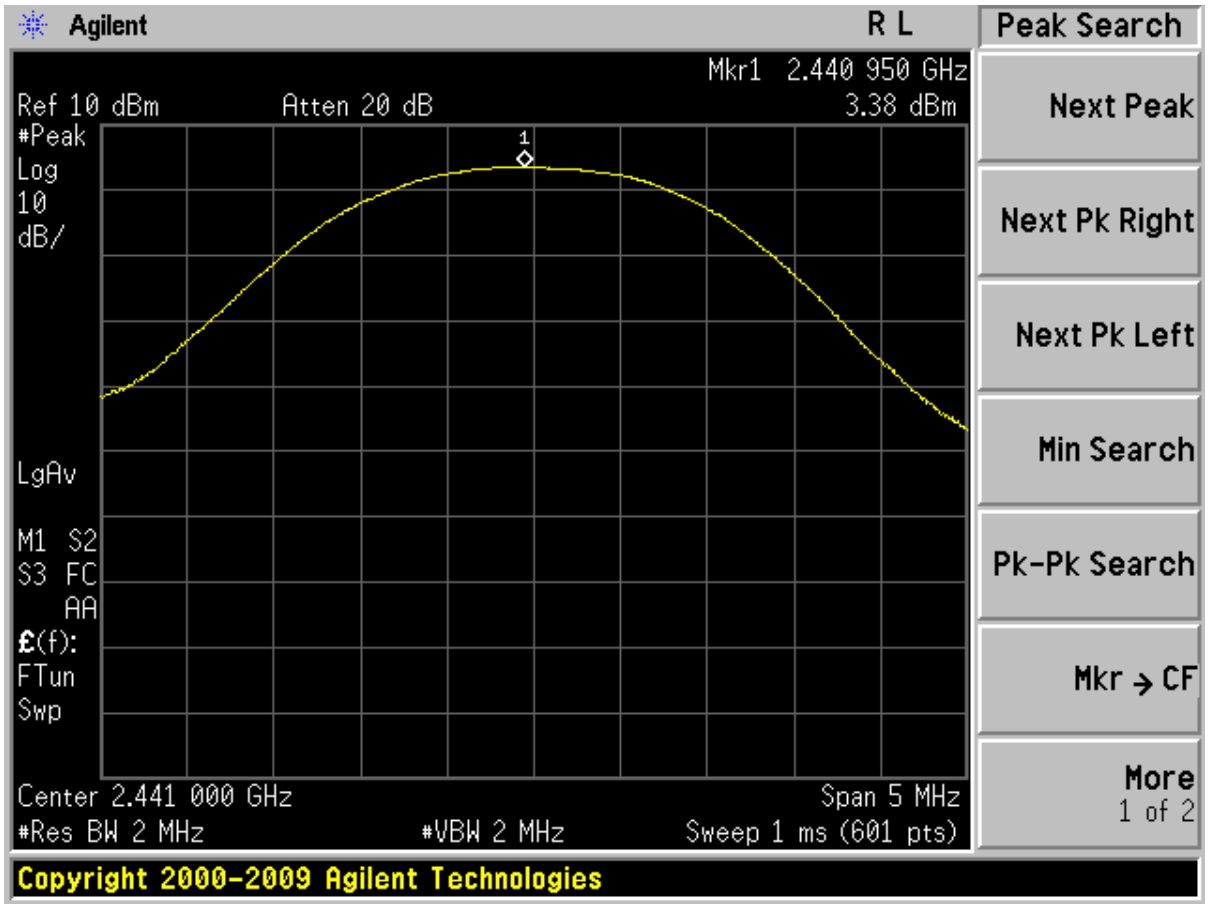

Agilent
R L
Peak Search
Mkr1 2.479 817 GHz
Ref 10 dBm
Atten 20 dB
4.09 dBm
#Peak
Log
10
dB/
Next Peak
Next Pk Right
Next Pk Left
Min Search
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Pk-Pk Search
Mkr → CF
More
1 of 2
Center 2.480 000 GHz
Span 5 MHz
#Res BW 1 MHz
#VBW 1 MHz
Sweep 1 ms (601 pts)
Copyright 2000-2009 Agilent Technologies

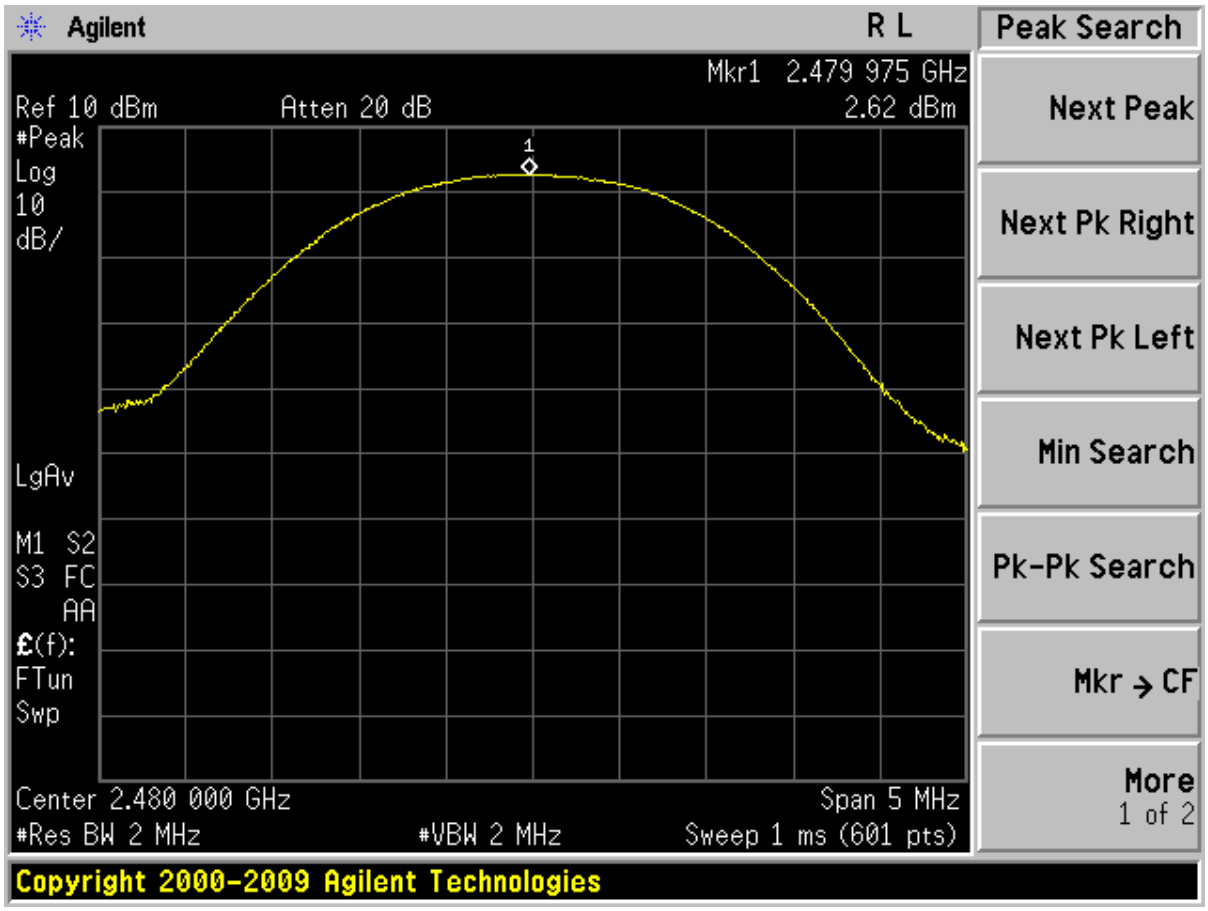
8DPSK:

Frequency, MHz	Reading dBm	Cable loss	Output power, dBm	Power Limit, dBm
2402	3.98	1	4.98	30.00
2441	3.38	1	4.38	30.00
2480	2.62	1	3.62	30.00

Diagram of 8DPSK is as below:



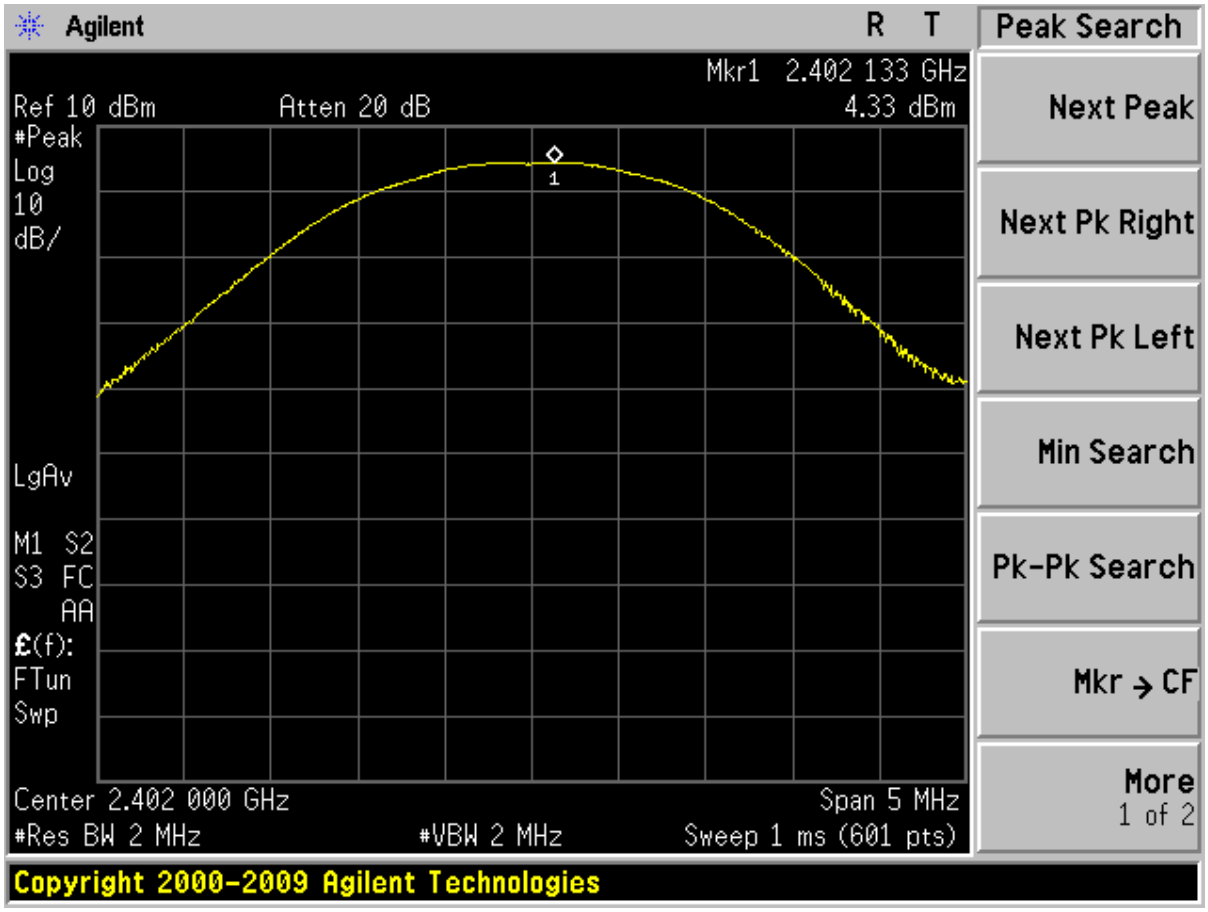

Agilent
R L
Peak Search
Mkr1 2.440 950 GHz
Ref 10 dBm
Atten 20 dB
3.38 dBm
#Peak
Log
10
dB/
1
Next Peak
Next Pk Right
Next Pk Left
Min Search
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Pk-Pk Search
Mkr → CF
More
1 of 2
Center 2.441 000 GHz
Span 5 MHz
#Res BW 2 MHz
#VBW 2 MHz
Sweep 1 ms (601 pts)
Copyright 2000-2009 Agilent Technologies

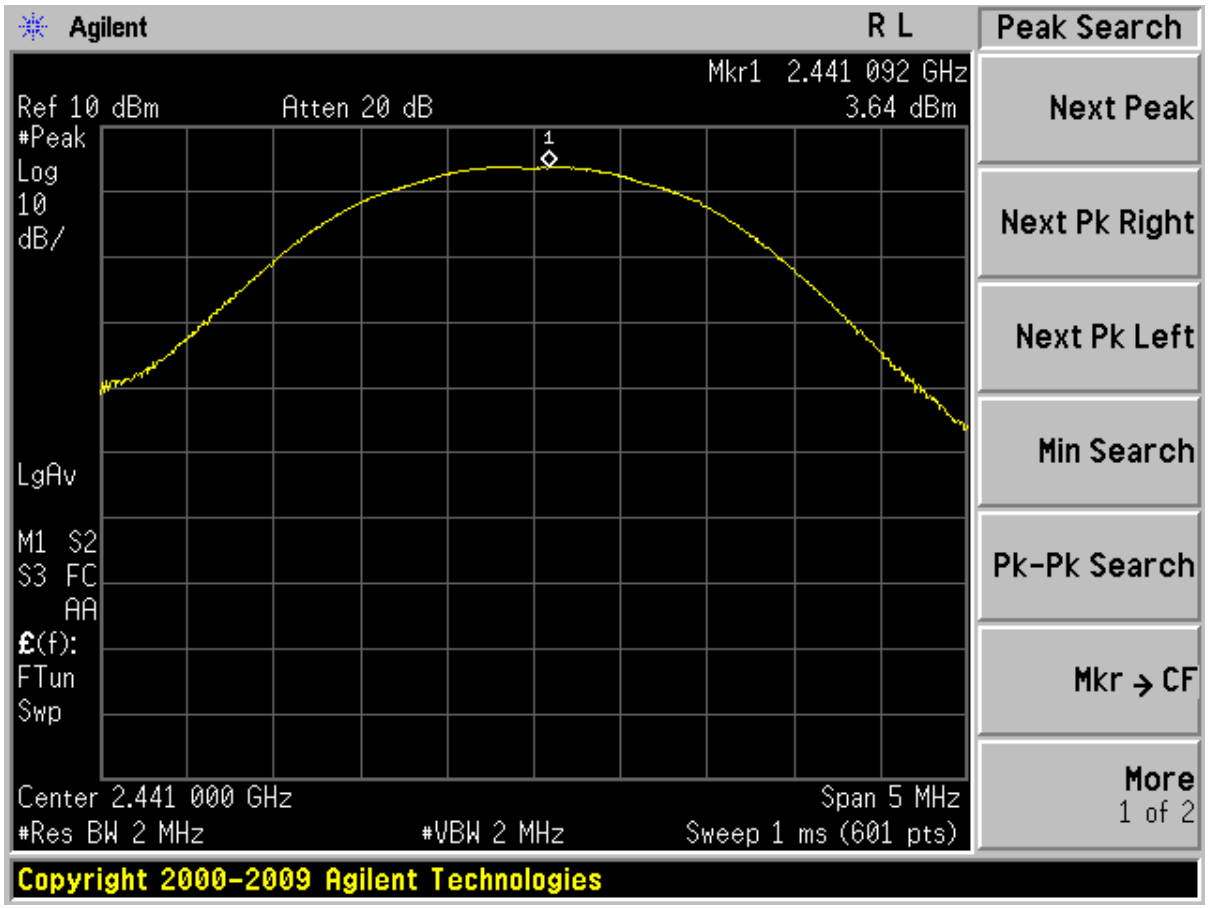


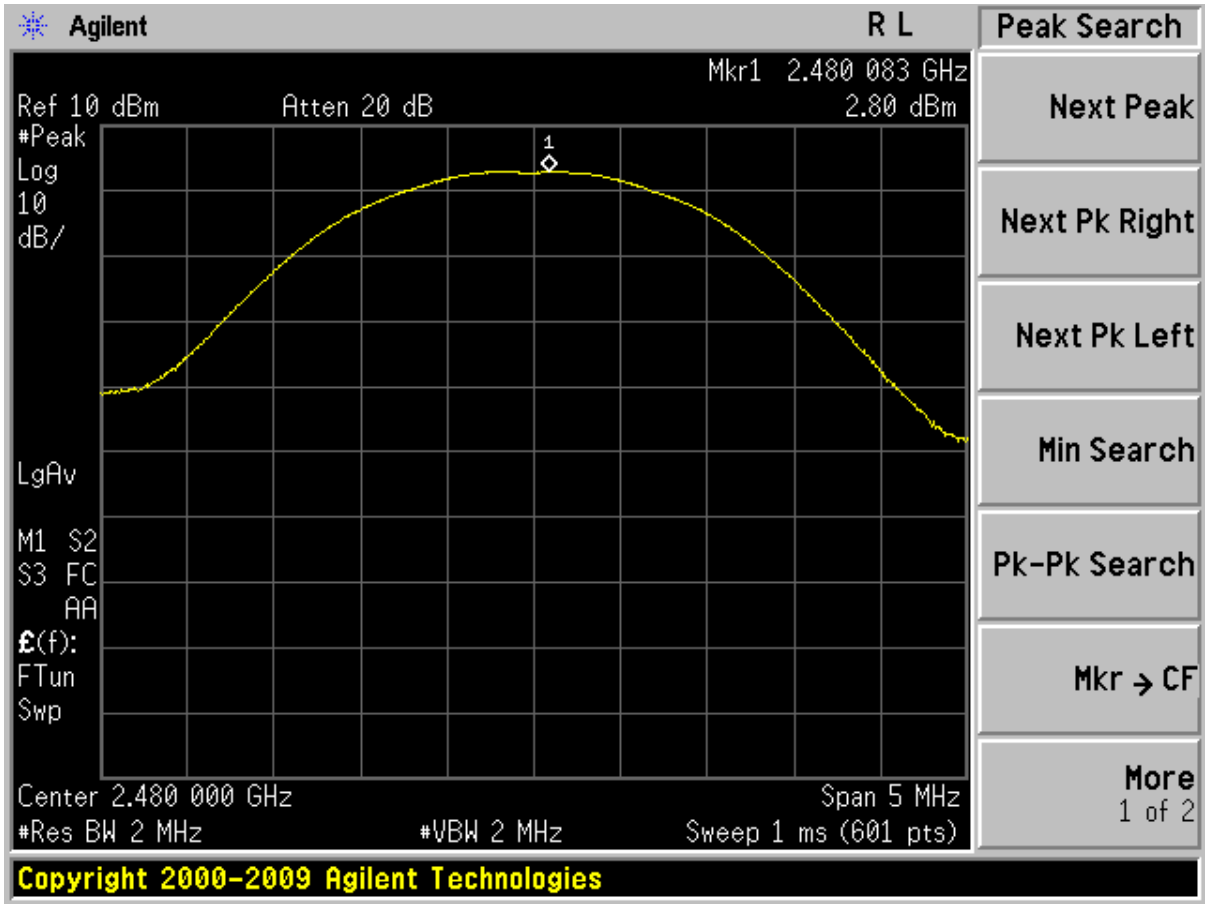
π/4 DQPSK:

Frequency, MHz	Reading dBm	Cable loss	Output power dBm	Power Limit, dBm
2402	4.33	1	5.33	30.00
2441	3.64	1	4.64	30.00
2480	2.80	1	3.80	30.00

Diagram of π/4 DQPSK is as below:


Agilent
R T
Mkr1 2.402 133 GHz
Ref 10 dBm
Atten 20 dB
4.33 dBm
#Peak
Log
10
dB/
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Center 2.402 000 GHz
Span 5 MHz
#Res BW 2 MHz
#VBW 2 MHz
Sweep 1 ms (601 pts)
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Copyright 2000-2009 Agilent Technologies


Agilent
R L
Peak Search
Mkr1 2.441 092 GHz
3.64 dBm
Ref 10 dBm
Atten 20 dB
#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 5 MHz
#Res BW 2 MHz
#VBW 2 MHz
Sweep 1 ms (601 pts)
Copyright 2000-2009 Agilent Technologies


Agilent
R L
Peak Search
Mkr1 2.480 083 GHz
Ref 10 dBm
Atten 20 dB
2.80 dBm
#Peak
Log
10
dB/
Next Peak
Next Pk Right
Next Pk Left
Min Search
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Pk-Pk Search
Mkr → CF
More
1 of 2
Center 2.480 000 GHz
Span 5 MHz
#Res BW 2 MHz
#VBW 2 MHz
Sweep 1 ms (601 pts)
Copyright 2000-2009 Agilent Technologies

EIRP measurement

GFSK:

Frequency, MHz	Output power dBm	Antenna gain, dBi	EIRP dBm	EIRP Limit, dBm
2402	6.00	0	6.00	36.00

EIRP [dBm] = Output power [dBm] max + antenna gain [dBi]

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

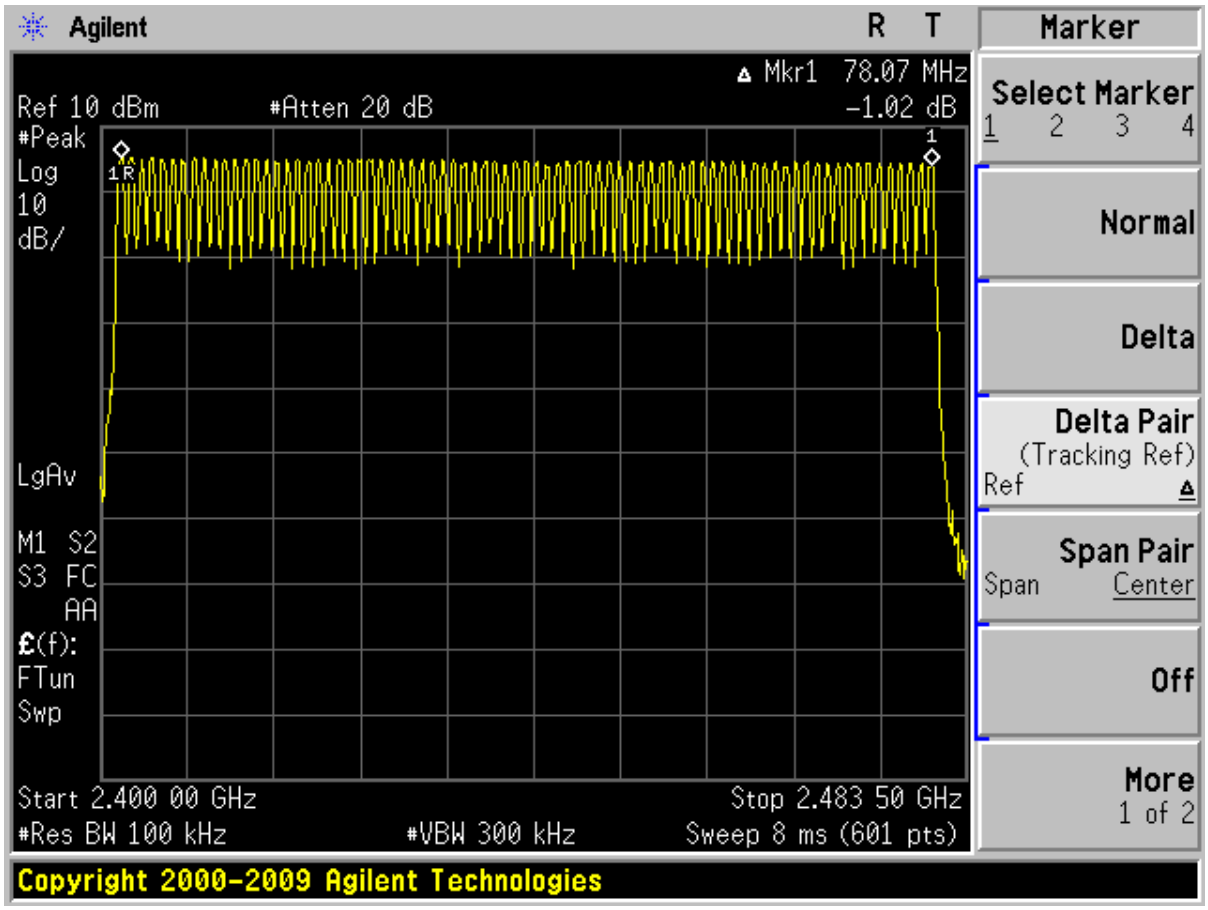
	Equipment	Last Calibration	Type	Serial No.	Manufacturer
☒	Spectrum	Jul. 04 2013	FSP30	GTS208	RS

10.3 Test Result

Test mode: Transmitter Hopping on

Number of channels used	Minimum number of channels limit	Margin
79	15	64

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	Last Calibration	Type	Serial No.	Manufacturer
☒	Spectrum	Jul. 04 2013	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

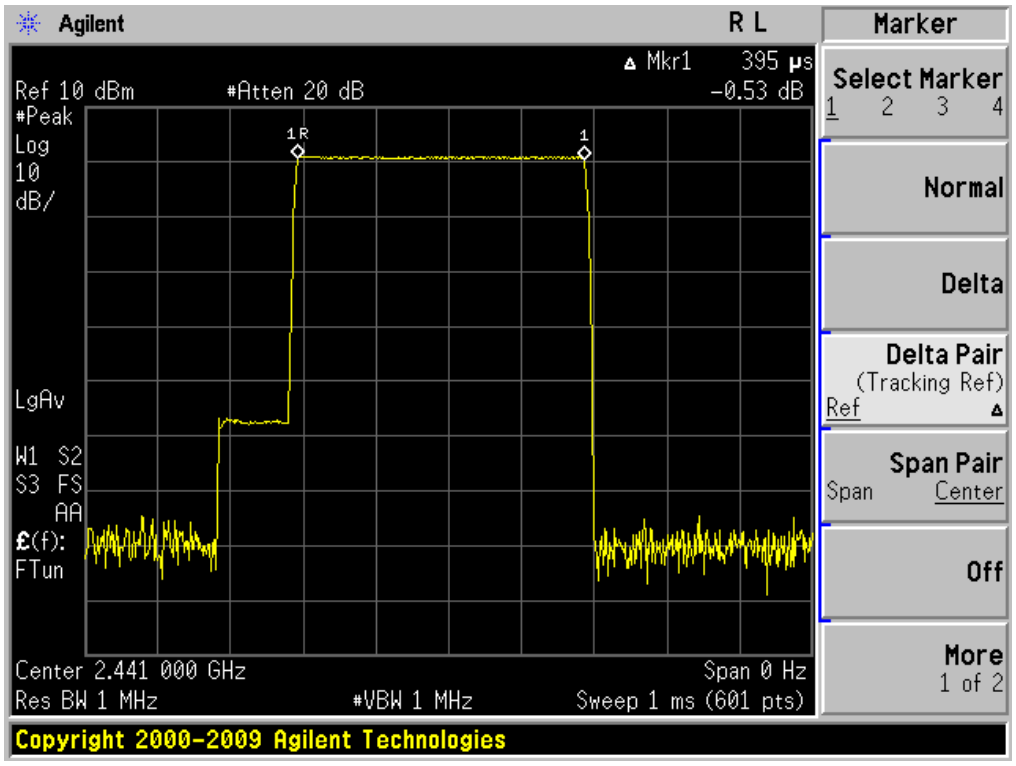
DH5 Packet permit maximum 1600/ 79 / 6 = 3.37 hops per second in each channel (5 time slots RX, 1 time slot TX). So, total hops is 3.37 x 31.6 = 106.6

BT1130CUS and BT1140CUS with different adapter are tested, and only list BT1130CUS data which is the worse in the report.

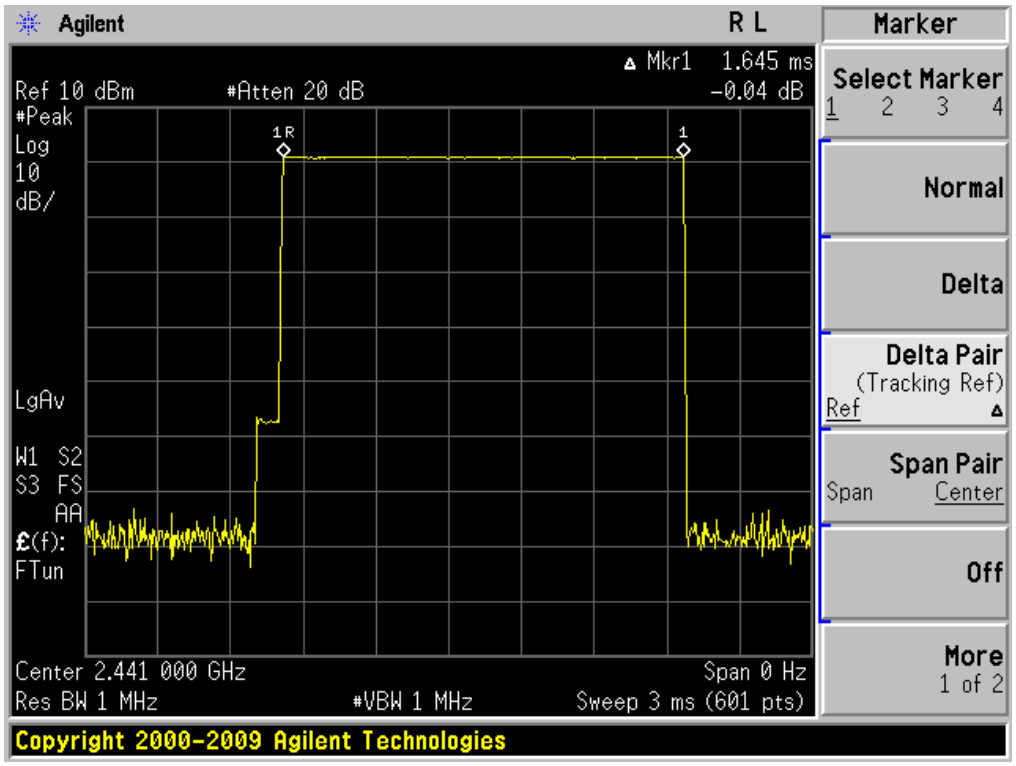
GFSK

Grouping	Diagram	Time of occupancy ms	Limit ms	Remark
DH1	11-1	126.4	400	320x 0.395
DH3	11-2	263.2	400	160x 1.645
DH5	11-3	309.14	400	106.6x 2.9

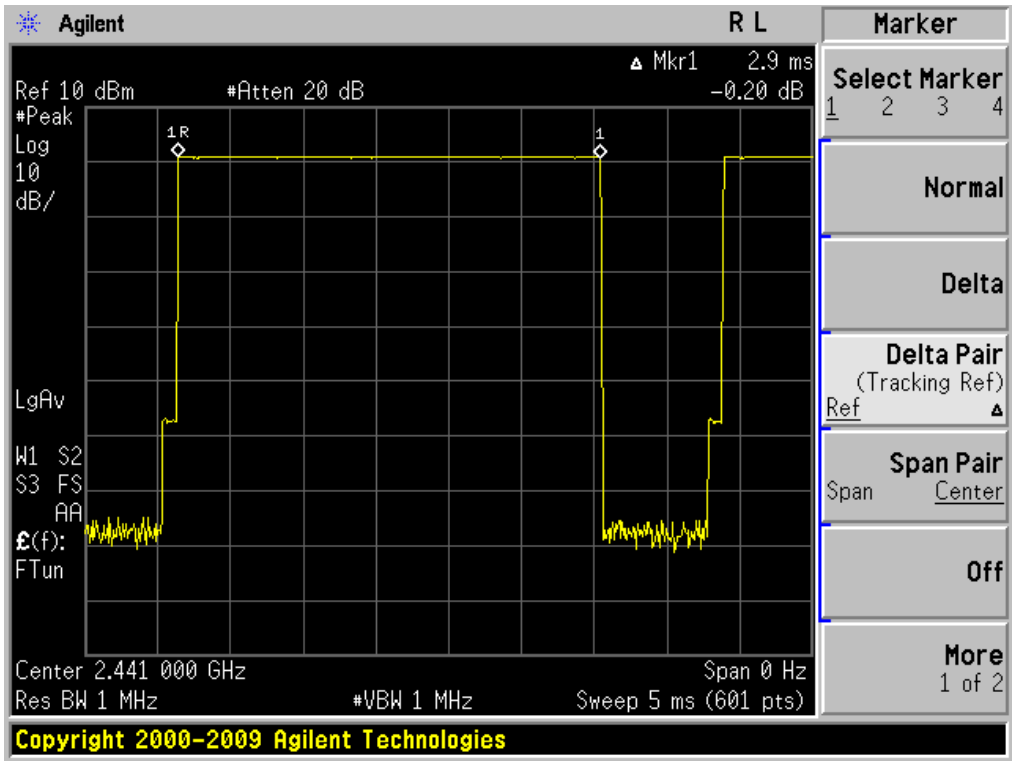
11.3.1 Diagram 11-1



11.3.2 Diagram 11-2



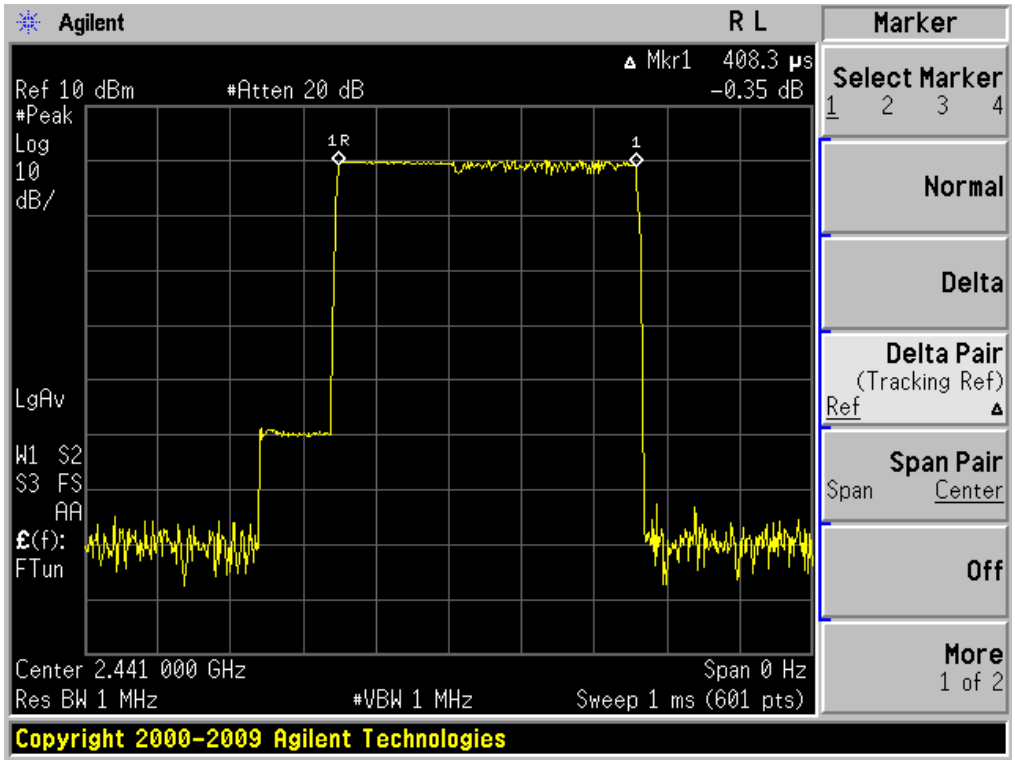
11.3.3 Diagram 11-3



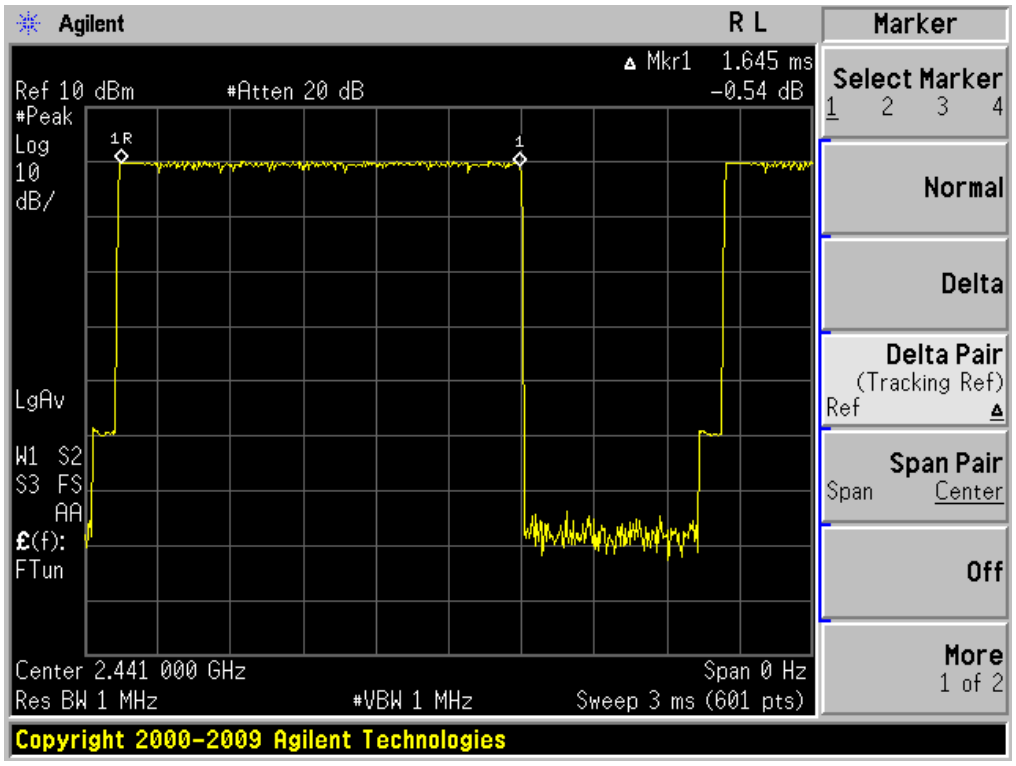
8DPSK

Grouping	Diagram	Time of occupancy ms	Limit ms	Remark
DH1	11-4	130.656	400	320x 0.4083
DH3	11-5	263.2	400	160x 1.645
DH5	11-6	309.9928	400	106.6x 2.908

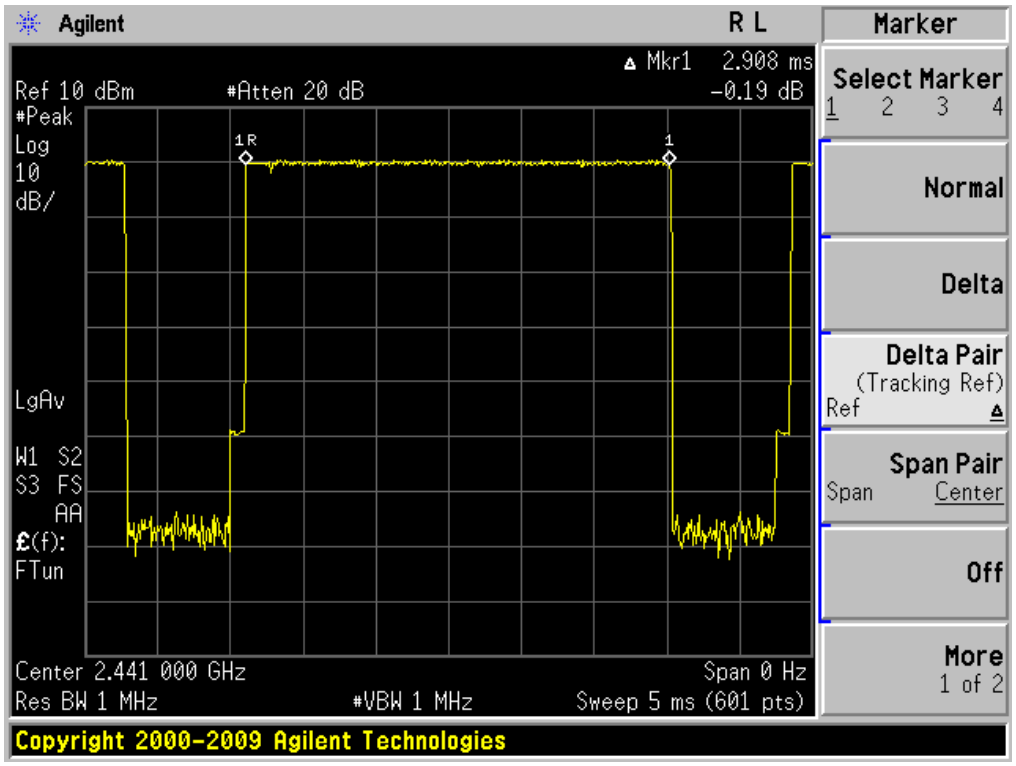
11.3.1 Diagram 11-4



11.3.2 Diagram 11-5



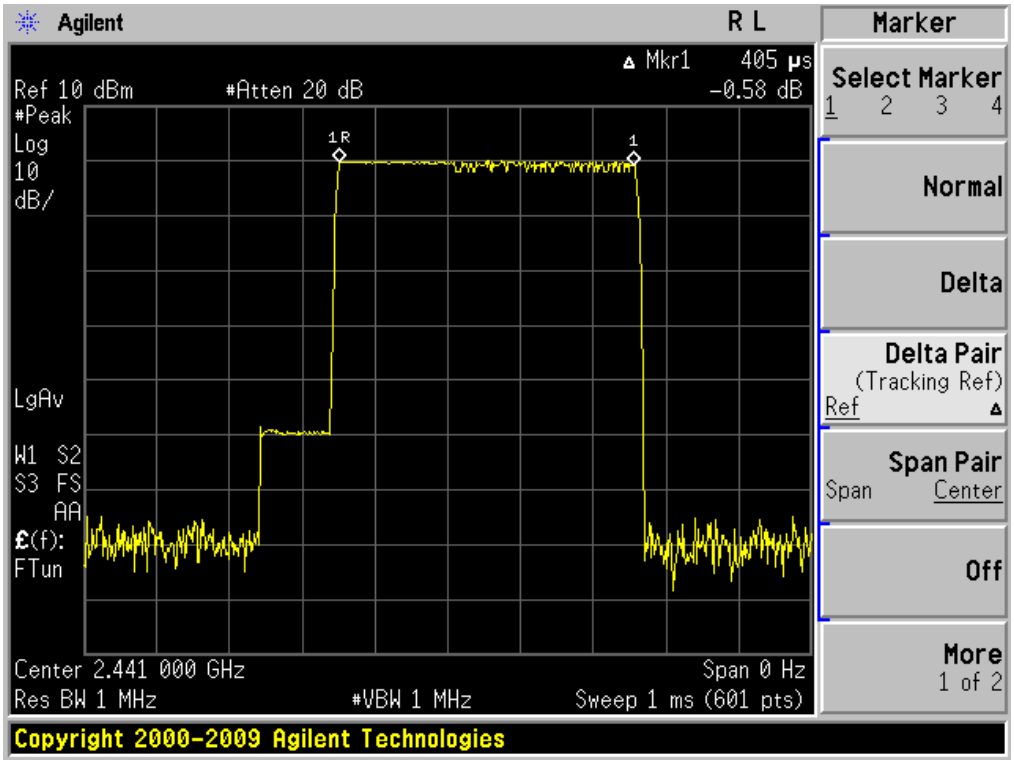
11.3.3 Diagram 11-6



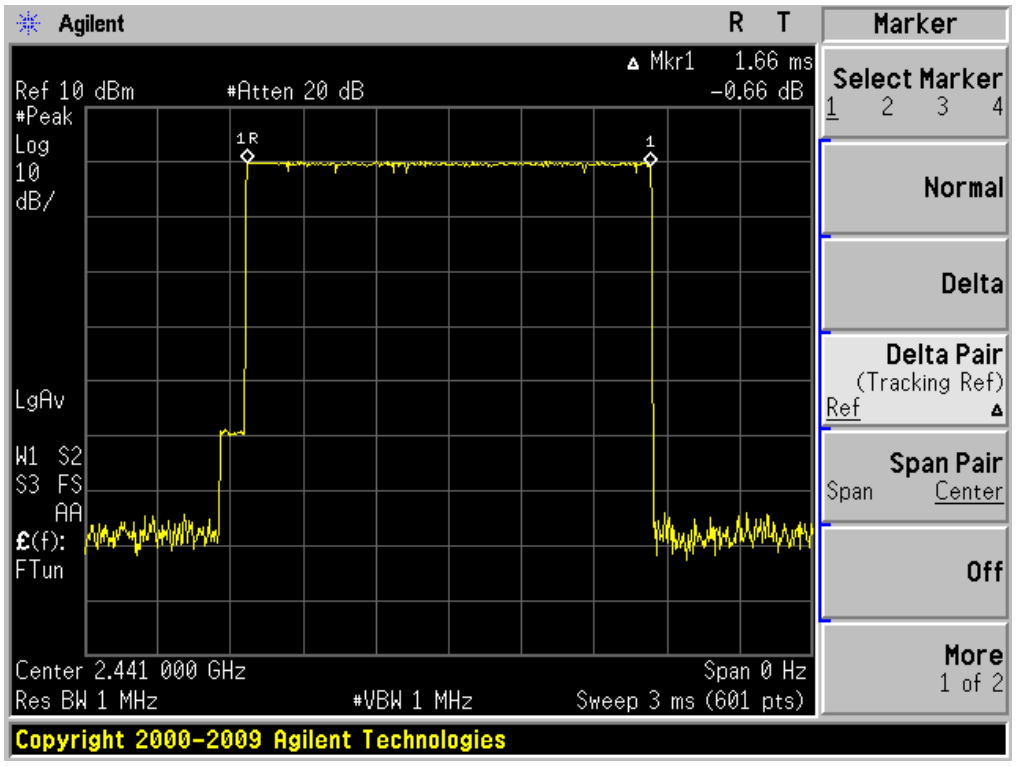
π /4 DQPSK

Grouping	Diagram	Time of occupancy ms	Limit ms	Remark
DH1	11-7	129.6	400	320x 0.405
DH3	11-8	265.6	400	160x 1.66
DH5	11-9	309.9928	400	106.6x 2.908

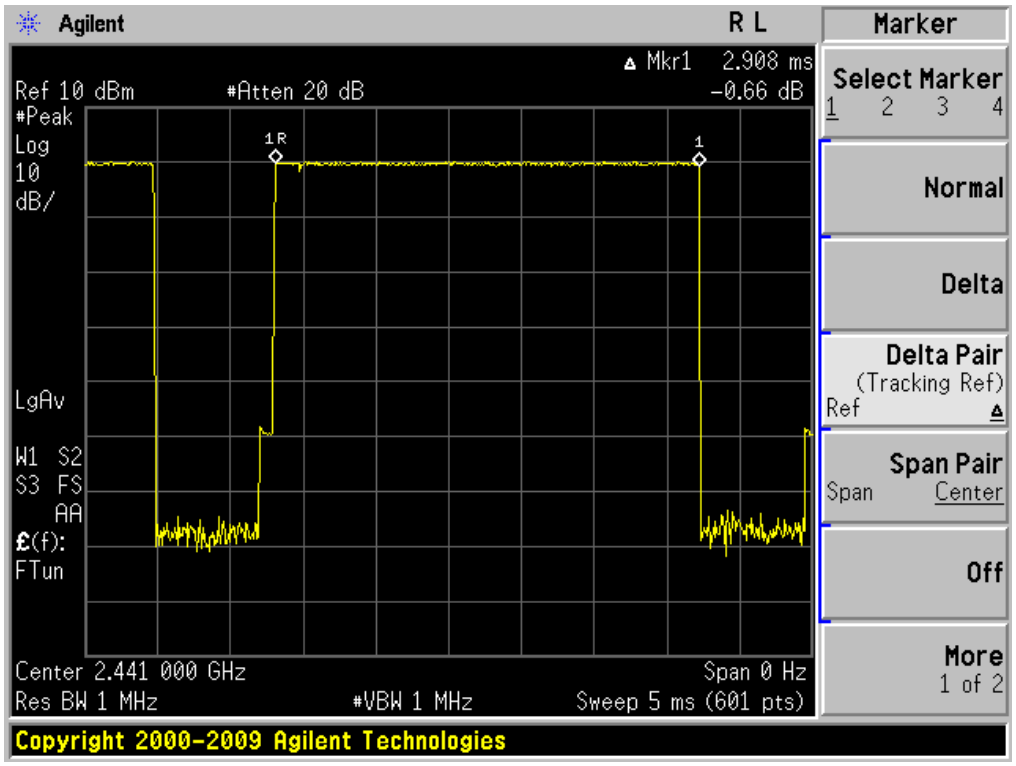
11.3.1 Diagram 11-7



11.3.2 Diagram 11-8



11.3.3 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	Last Calibration	Type	Serial No.	Manufacturer
☒	Shielding Room	Jul. 04 2013	7.0(L)x3.0(W)x3.0(H)	GTS252	ZhongYu Electron
☒	EMI Test Receiver	Jul. 04 2013	ESCS30	1102.4500K30	Rohde & Schwarz
☒	10dB Pulse Limita	Jul. 04 2013	N/A	GTS224	Rohde & Schwarz
☒	LISN	Jul. 04 2013	NSLK 8127	8127549	SCHWARZBECK MESS-ELEKTRONIK
☒	Coaxial Cable	Apr. 01 2013	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 C63.4-2009 on conducted Emission test.

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

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

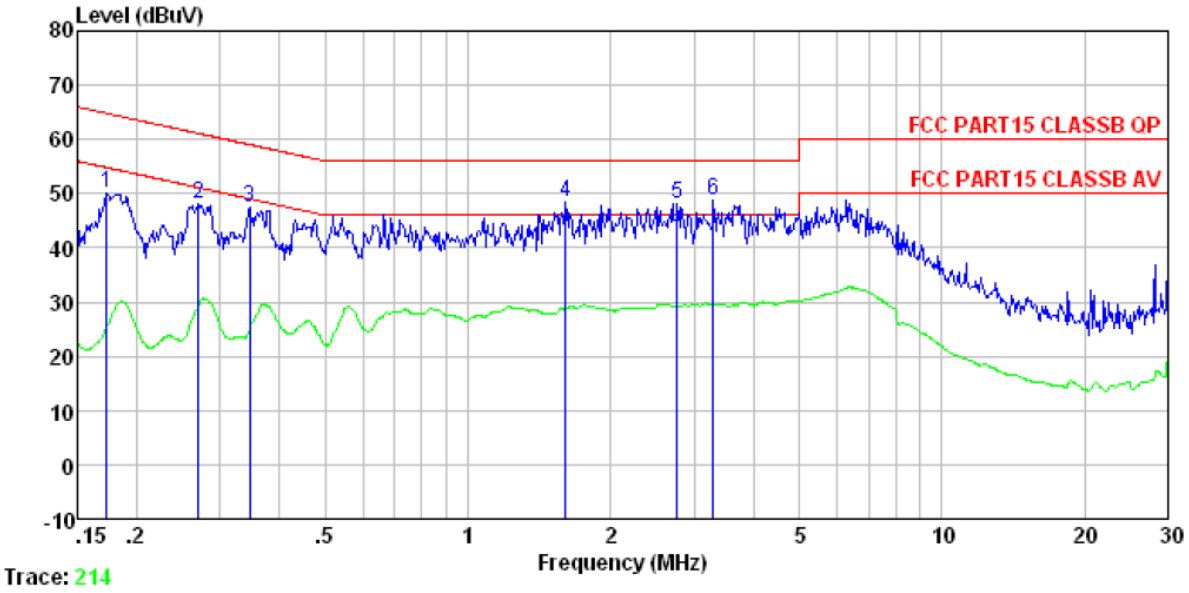
TX MODE

Models	Power Line	Test Data	Test Result
BT1130CUS With adapter 1#	Line	Diagram 12-1	Pass
	Neutral	Diagram 12-2	Pass
BT1130CUS With adapter 2#	Line	Diagram 12-3	Pass
	Neutral	Diagram 12-4	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.
4. BT1130CUS and BT1140CUS with different adapter are tested, and only list BT1130CUS data which is the worse in the report.

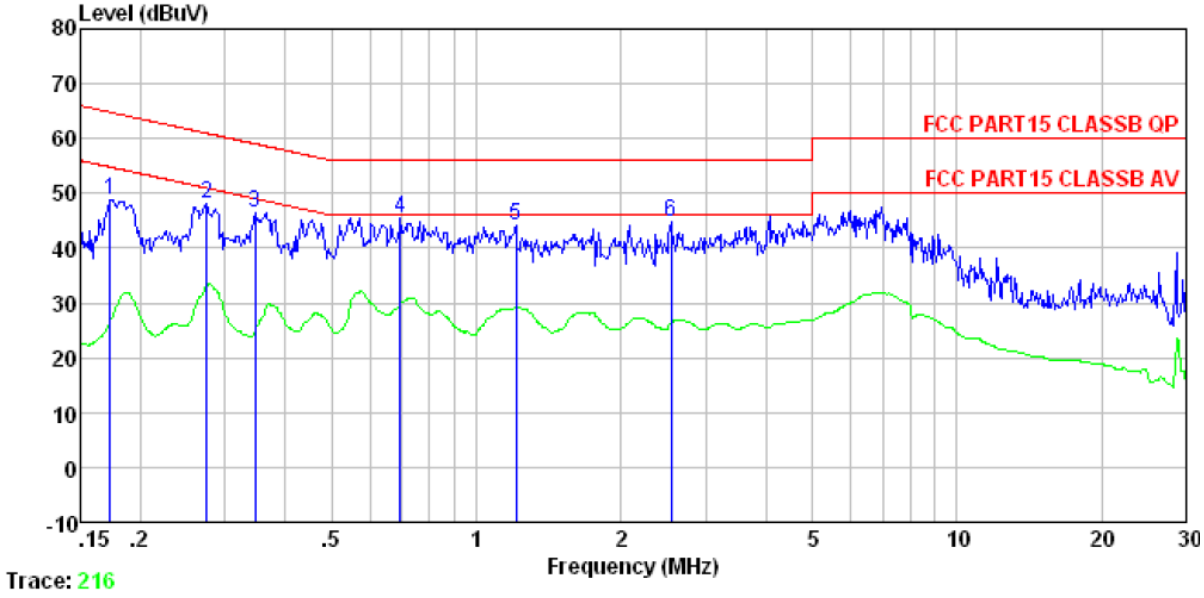
12.3.1 Diagram 12-1



Trace: 214

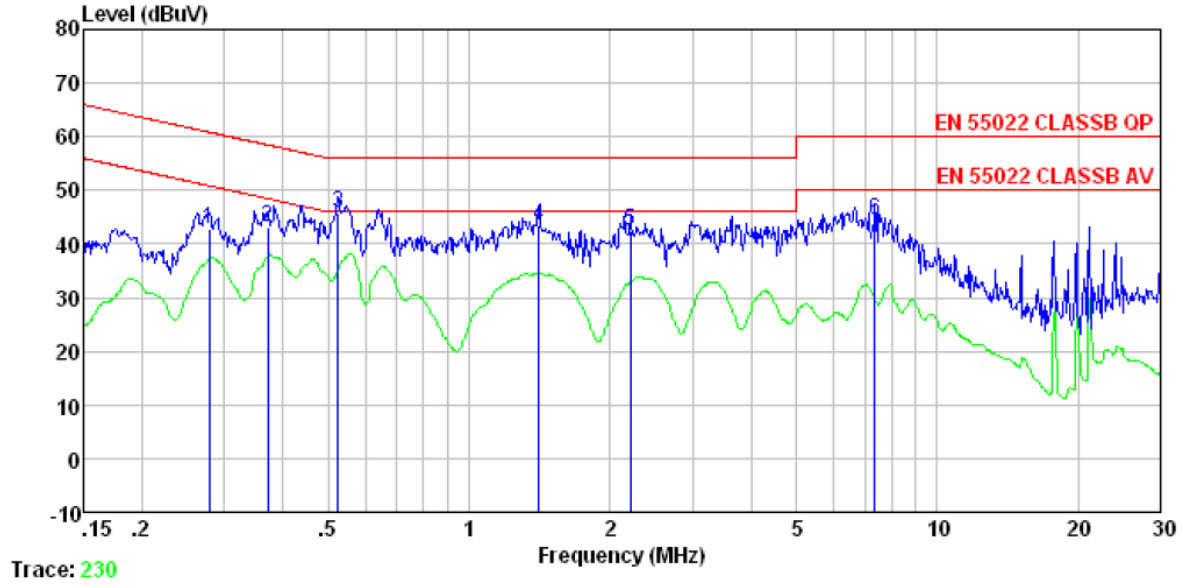
	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.173	49.87	0.15	0.12	50.14	64.81	-14.67	QP
2	0.270	47.87	0.11	0.11	48.09	61.12	-13.03	QP
3	0.346	47.17	0.11	0.10	47.38	59.05	-11.67	QP
4	1.610	48.19	0.12	0.14	48.45	56.00	-7.55	QP
5	2.765	47.73	0.14	0.15	48.02	56.00	-7.98	QP
6	3.293	48.56	0.18	0.15	48.89	56.00	-7.11	QP

12.3.2 Diagram 12-2



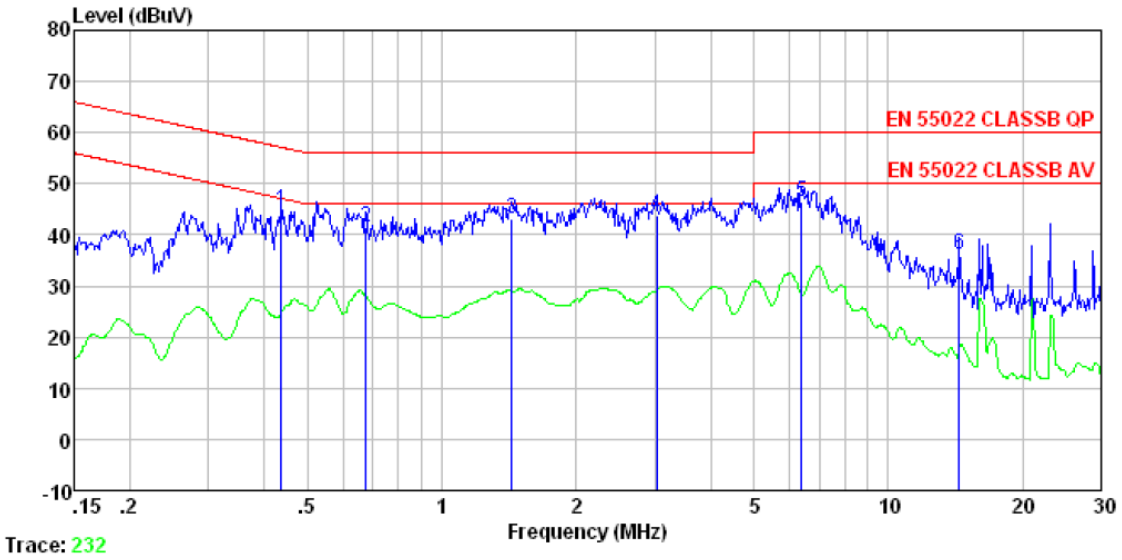
	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.173	48.73	0.07	0.12	48.92	64.81	-15.89	QP
2	0.274	48.10	0.06	0.10	48.26	60.98	-12.72	QP
3	0.346	46.28	0.06	0.10	46.44	59.05	-12.61	QP
4	0.694	45.38	0.07	0.13	45.58	56.00	-10.42	QP
5	1.210	44.04	0.08	0.13	44.25	56.00	-11.75	QP
6	2.540	44.53	0.10	0.15	44.78	56.00	-11.22	QP

12.3.3 Diagram 12-3



	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.279	42.73	0.06	0.10	42.89	60.85	-17.96	QP
2	0.371	43.00	0.06	0.10	43.16	58.47	-15.31	QP
3	0.524	45.76	0.07	0.11	45.94	56.00	-10.06	QP
4	1.411	43.22	0.09	0.13	43.44	56.00	-12.56	QP
5	2.213	42.20	0.09	0.15	42.44	56.00	-13.56	QP
6	7.368	44.17	0.19	0.17	44.53	60.00	-15.47	QP

12.3.4 Diagram 12-4



	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.437	44.48	0.12	0.11	44.71	57.11	-12.40	QP
2	0.675	41.21	0.14	0.13	41.48	56.00	-14.52	QP
3	1.433	43.05	0.12	0.13	43.30	56.00	-12.70	QP
4	3.025	43.39	0.16	0.15	43.70	56.00	-12.30	QP
5	6.386	46.05	0.23	0.16	46.44	60.00	-13.56	QP
6	14.440	35.82	0.28	0.22	36.32	60.00	-23.68	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: VHC-AAI-BT1130C-0
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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