

FCC Part 15 Test Report

Industry Canada RSS-210

Product Name : GIS Data collector

Model Name : MG838+(E761), MG858(E761D)

Prepared for:

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Report Number : ZZ20130515002-1

Date of Report : 2013-05-22

Date of Test : 2013-05-16~2013-05-22

Notes :

The test results only relate to these samples which have been tested.

Partly using this report will not be admitted unless been allowed by ZTE.

ZTE is only responsible for the complete report with the reported stamp of ZTE.

Applicant: Beijing Unistrong Science & Technology Co.,Ltd
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Beijing, PRC.

Manufacturer: Beijing Unistrong Science & Technology Co., Ltd
204 Building, #10 Jiuxianqiao North Road, Chaoyang District,
Beijing, PRC.

Product Name: GIS Data collector

Brand Name: UniStrong

Model Name: MG838+(E761), MG858(E761D)

Model Difference: All models are identical except the GPS locator [MG838+(E761) for GPS, MG858(E761D) for GPS and GLONASS]. The model under test is MG838+(E761) and the test results are applicable to the other.

FCC ID: YYE-MG868001

IC ID: 10537A-000002

Serial Number: N/A

Technical Data: AC input: AC 100~240V 50/60Hz
Battery: 3.6V~4.2V

Date of Receipt: 2013-05-16

Test Standard: FCC CFR Title 47 Part 15: 2010
ANSI C 63.4: 2009
ANSI C 63.10: 2009
RSS 210: 2010

Test Result: Complied

Date of Test 2013-05-16~2013-05-22

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1. GENERAL INFORMATION

1.1 EUT DESCRIPTION

Product Name:	GIS Data collector
Model Name:	MG838+(E761)
Hardware Version:	V0.5
Software Version:	V1.0_B1.0_R02.00.06.00
RF Exposure Environment:	Uncontrolled
Bluetooth	
Frequency Range:	2400MHz~2483.5MHz
Type of Modulation:	GFSK(1 Mbps), $\pi/4$ -DQPSK(2 Mbps), 8-DPSK(3 Mbps)
Channel Separation:	1MHz
Channel Number:	79
Antenna Type:	Internal
Antenna Peak Gain:	0.5dBi
WIFI	
Frequency Range:	2400MHz~2483.5MHz
Type of Modulation:	DSSS/OFDM
Channel Separation:	5MHz
Channel Number:	13
Antenna Type:	Internal
Antenna Peak Gain:	1.0dBi
Component	
AC Adapter:	Model Name:P12USB050200
	Input: AC 100-240V 50/60Hz
	Output: DC 5V/2A

1.2 TEST MODE

Unilab has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode
Mode 1: Bluetooth CH0
Mode 2: Bluetooth CH39
Mode 3: Bluetooth CH78
Mode 4: 802.11b CH1
Mode 5: 802.11b CH7
Mode 6: 802.11b CH13
Mode 7: 802.11g CH1
Mode 8: 802.11g CH7
Mode 9: 802.11g CH13
Mode 10: Data exchange

Note:

1. Regards to the frequency band operation: the lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report.
2. For the ERP/EIRP and radiated emission test, every axis (X, Y, Z) was verified, and show the worst result on this report.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4:2009 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, 15.207, 15.209 and 15.247.

2.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application

2.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

2.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.3.2 of ANSI C63.4:2009 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.4.2 of ANSI C63.4:2009.

3. TECHNICAL SUMMARY

3.1 SUMMARY OF STANDARDS AND TEST RESULTS

The EUT have been tested according to the applicable standards as referenced below:

Test Item	FCC	IC	Result
Channel Separation	§15.247 (a)	RSS 210 A8.1	P
Minimum Hopping Channel	§15.247 (a)	RSS 210 A8.1	P
Occupied Bandwidth	§15.247 (a)	RSS 210 GEN 4.6	P
6 dB bandwidth	§15.247 (a)	RSS 210 GEN 4.6	P
Dwell Time	§15.247 (a)	RSS 210 A8.1	P
Power spectral density	§15.247 (e)	RSS 210 A8.2	P
Peak Output Power (Conduction)	§15.247 (b)	RSS 210 A8.4	P
Spurious Emissions (Conduction)	§15.247 (d)	RSS 210 A8.5	P
Band edge measurement	§15.247 (d)	RSS 210 A8.5	P
Spurious Emissions (Radiation)	§15.247 (d) §15.35 (b) §15.209 (a)	RSS 210 A8.5	P
AC Power Line Conducted Emissions	§15.207 (a) §15.107 (a)	RSS 210 GEN 7.2 ICES-003	P
Radiated Emissions	§15.109 (a)	ICES-003	P

Note: P means pass, F means failure, N/A means not applicable

3.2 TEST UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Test item	Value (dB)
Conducted disturbance	3.4
Radiated disturbance	4.2

3.3 TEST EQUIPMENT LIST

Equipment	Manufacturer	Model	Serial No.	Due Date
Receiver	Agilent	N9038A	MY51210142	2013/09/28
Wireless Connectivity Test Set	Agilent	N4010A	MY49080305	2013/09/28
Loop Antenna	Schwarzbeck	FMZB1519	1519-020	2013/09/27

LISN	R&S	ENV216	100069	2013/07/29
3m Chamber & Accessory Equipment	ETS-LINDGREN	FACT-3	CT-0000336	2013/11/27
Microwave Preamplifier	EM Electronics	EM30180	3008A02425	2014/03/01
Power Splitter	Agilent	11667C/ 52401	MY53806148	2014/03/01
Cold-heat climate test chamber	Weiss-Voetsch Environmental Testing Instruments(Taicang) Co., Ltd.	C, 180, -40	546860026200 10	2013.12.4
DC Power Supply	Agilent	6612C	MY43002989	2014.01.16
Bilog Antenna	Schwarzbeck	VULB9160	9160-3316	2013.10.17
VHF-UHF-Biconical Antenna	Schwarzbeck	VUBA9117	9117-263	2013.10.17
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-942	2013.10.17
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-943	2013.10.17

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and has been calibrated by accredited calibration laboratories.

3.4 SUPPORT EQUIPMENT

Equipment	Manufacturer	Model	Serial No.	Due Date
Signal Generator	Agilent	N4010A	MY50140938	2013/08/27
PC	Dell	D5032	/	/
Monitor	Dell	M114	/	/

3.5 TEST FACILITY

All test facilities used to collect the test data are located at 1/F, B2 Wing, ZTE plaza, Keji Road South, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4:2009, CISPR 16-1-1 and other equivalent standards. The laboratory is compliance with the requirements of the ISO/IEC/E 17025.

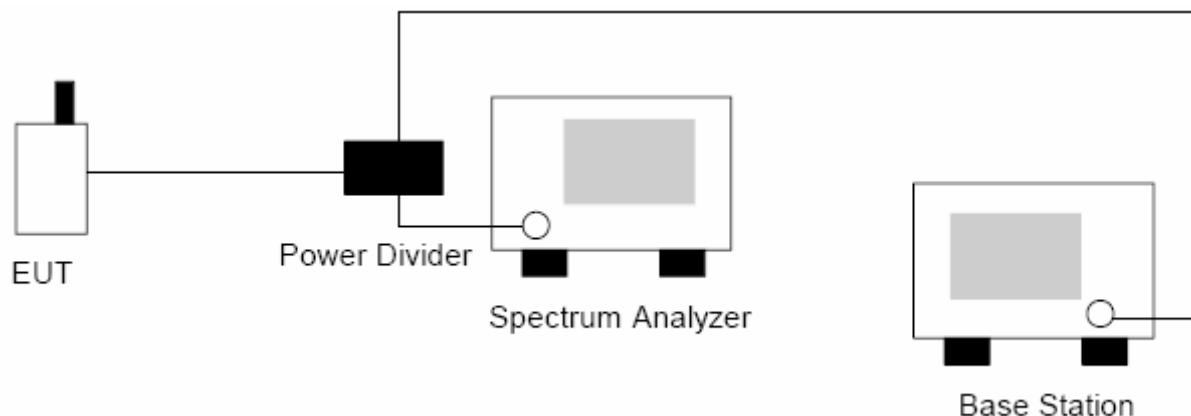
3.6 TEST SETUP CONFIGURATION

The information contained within this report is intended to show verification of compliance of the EUT to the requirements of CFR 47 FCC Part 15.247 and RSS-210. ZTE has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

1. Setup EUT and communication antenna.
2. Power on EUT and establish Bluetooth and WIFI connection by the simulator SG.
3. Perform test. TEST Mode Bluetooth and WIFI (keeping the EUT data transmission with SG).

4. CHANNEL SEPARATION

4.1 TEST SETUP



4.2 LIMITS

Limits	$\geq 25 \text{ kHz}$ or 20 dB bandwidth of hopping channel
--------	---

4.3 TEST PROCEDURE

The EUT have its hopping function enabled. Use the following spectrum analyzer settings:
Span = wide enough to capture the peaks of two adjacent channels

Resolution (or IF) Bandwidth (RBW) $\geq 1\%$ of the span

Video (or Average) Bandwidth (VBW) \geq RBW

Sweep = auto

Detector function = peak

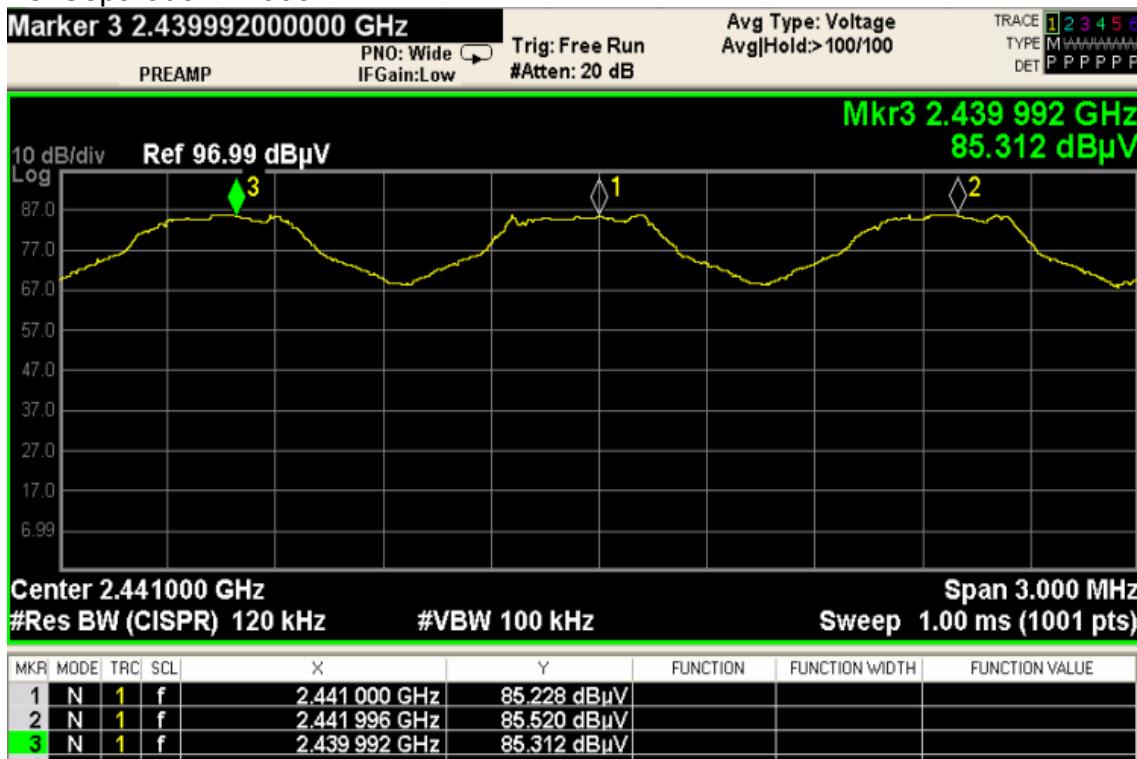
Trace = max hold

Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

4.4 TEST RESULT

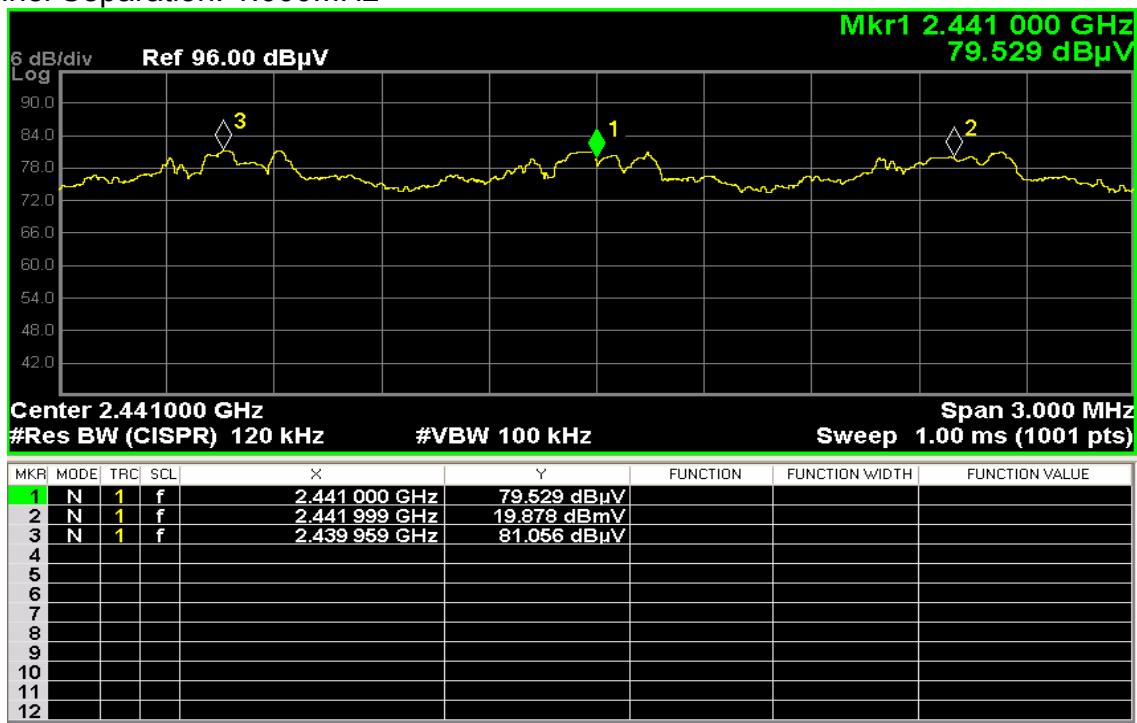
GFSK

Channel Separation: 1.000MHz



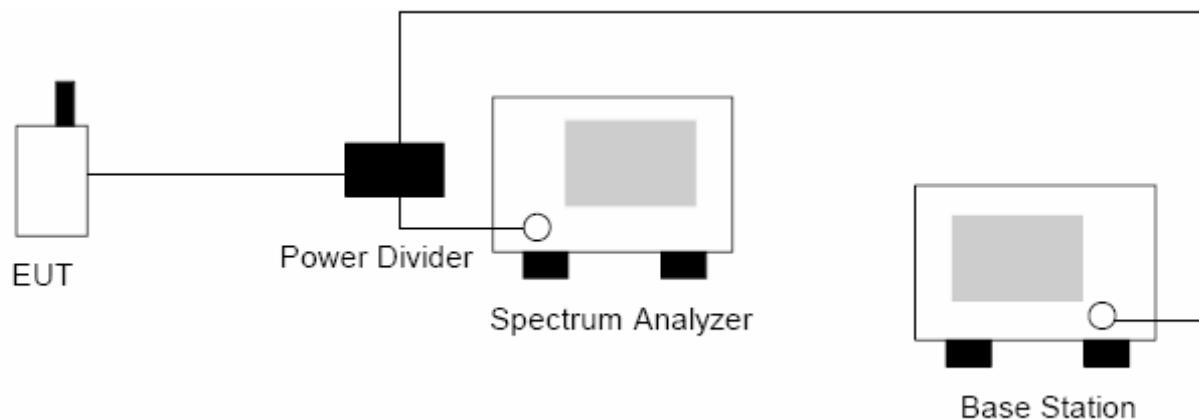
8-DPSK

Channel Separation: 1.000MHz



5. MINIMUM HOPPING CHANNELS

5.1 TEST SETUP



5.2 LIMITS

Limits	≥ 15 Channels
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5.3 TEST PROCEDURE

The EUT have its hopping function enabled.

Use the following spectrum analyzer settings:

Span = the frequency band of operation

RBW $\geq 1\%$ of the span

VBW \geq RBW

Sweep = auto

Detector function = peak

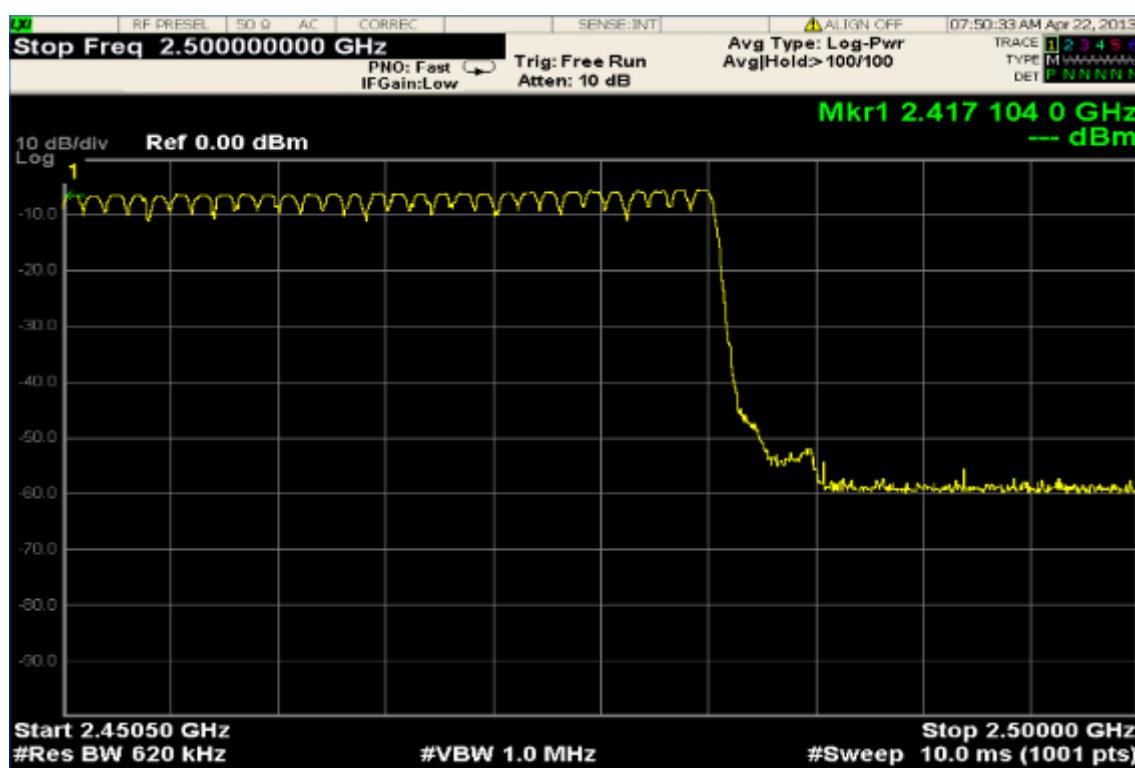
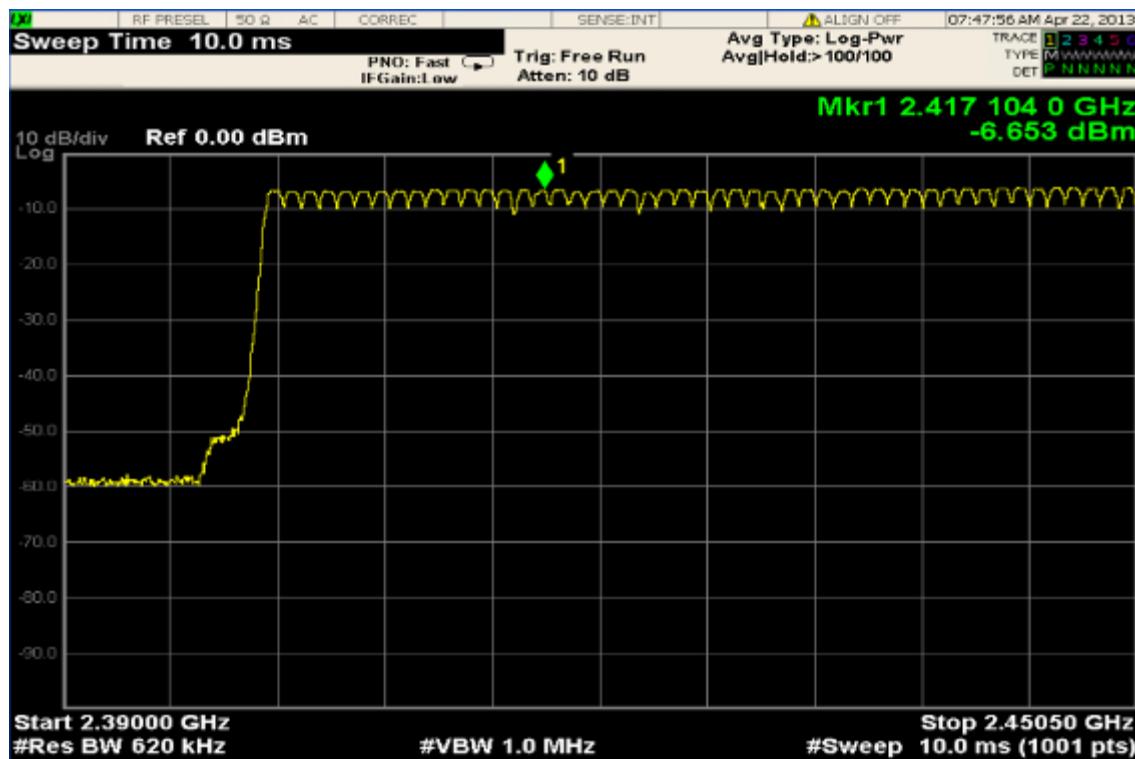
Trace = max hold

Allow the trace to stabilize. It may prove necessary to break the span up to sections, in order to clearly show all of the hopping frequencies.

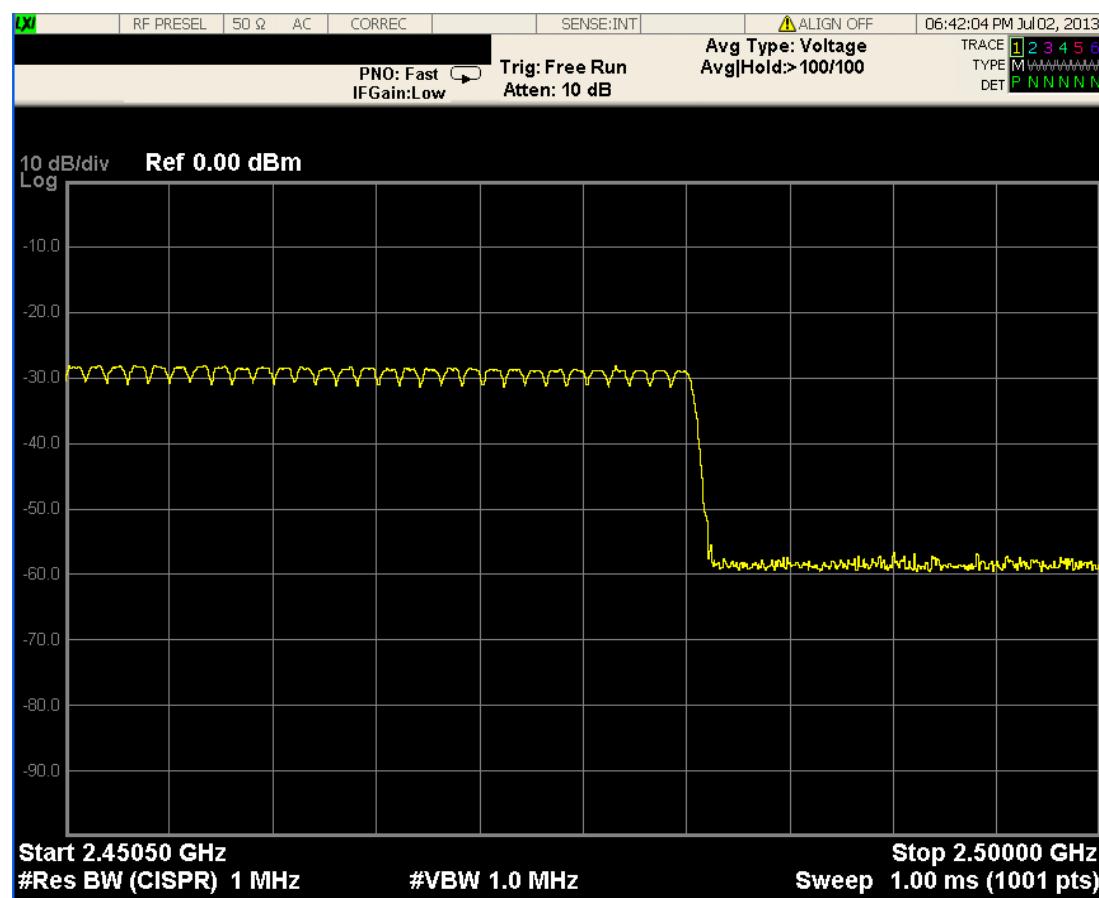
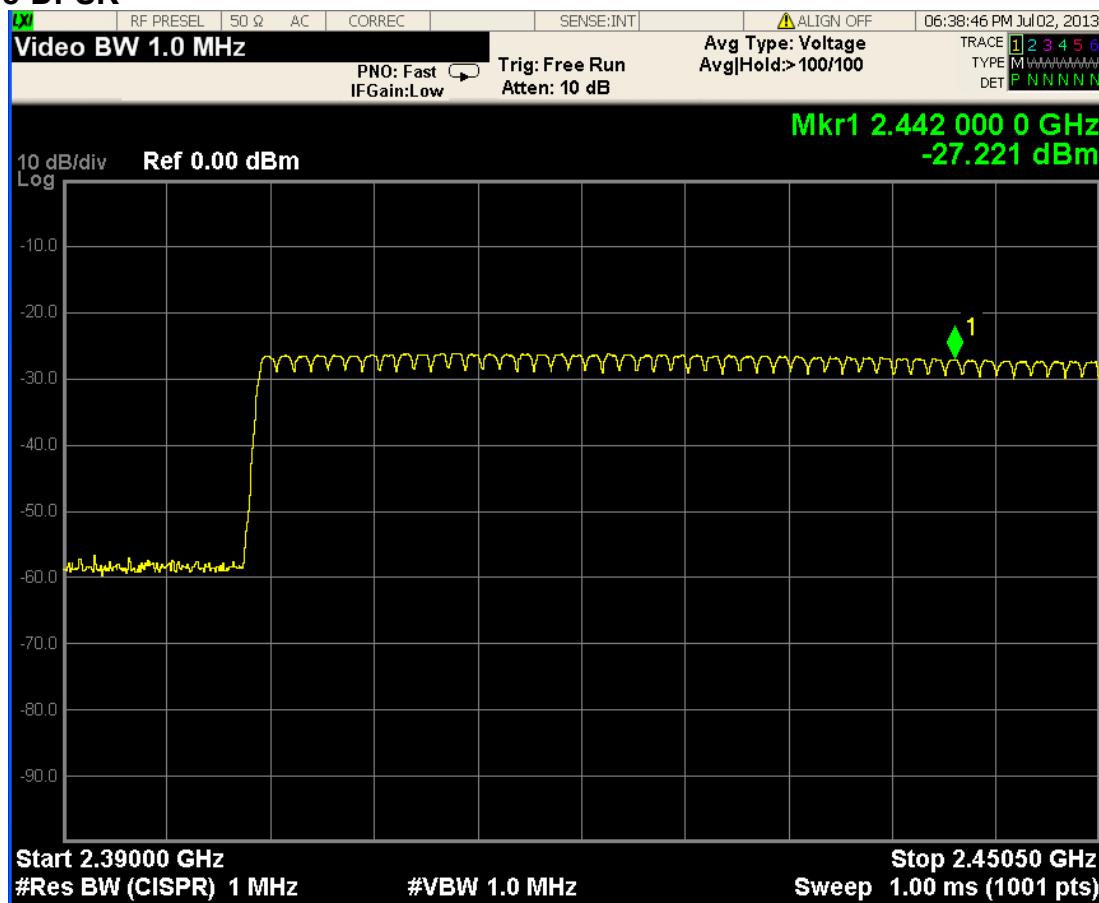
5.4 TEST RESULT

GFSK

Hopping Channel: 79 channels

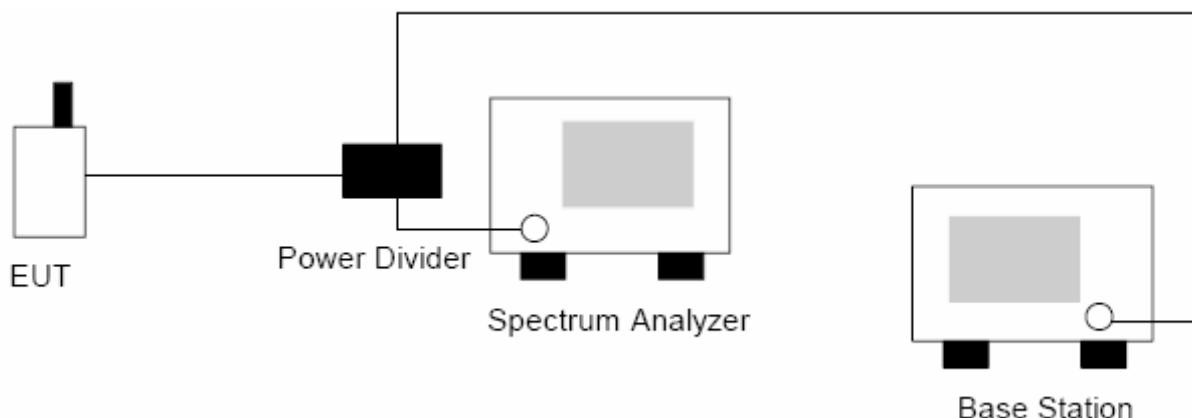


8-DPSK



6. OCCUPIED BANDWIDTH

6.1 TEST SETUP



6.2 LIMITS

Limits	$\geq 25 \text{ kHz}$ or 2 to 3 times the 20 dB bandwidth
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6.3 TEST PROCEDURE

Use the following spectrum analyzer settings:

Span = approximately 2 to 3 times the 6 dB or 20 dB bandwidth, centered on a channel
 $\text{RBW} \geq 1\%$ of the 6 dB or 20 dB bandwidth

$\text{VBW} \geq \text{RBW}$

Sweep = auto

Detector function = peak

Trace = max hold

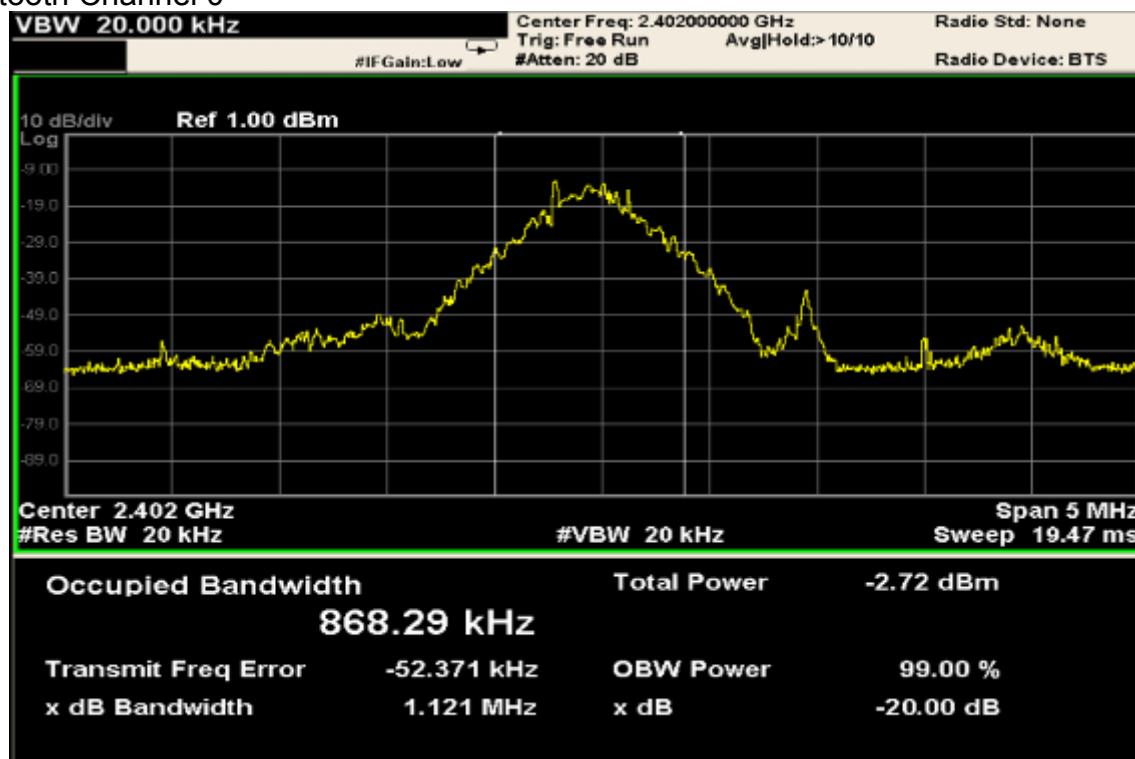
The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 6 dB or 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 6 dB or 20 dB bandwidth of the emission. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation.

6.4 TEST RESULTS

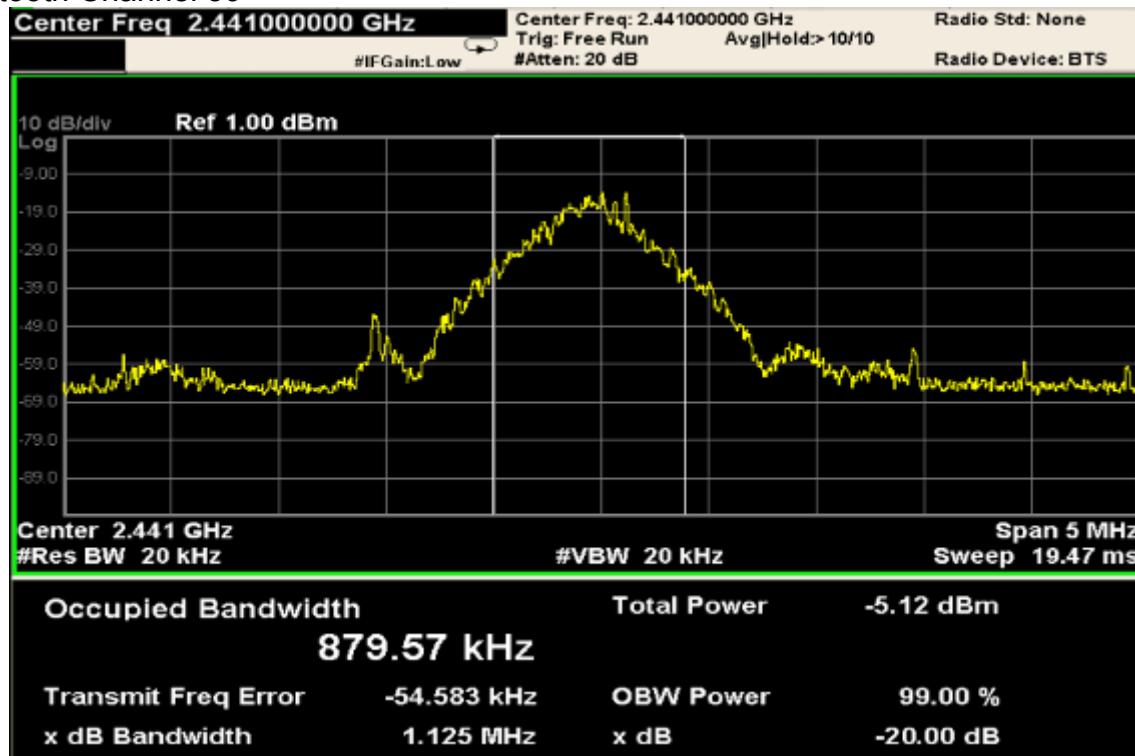
Channel	20dB bandwidth (MHz)	99% bandwidth (MHz)
GFSK		
BT CH0	1.121	0.86829
BT CH39	1.125	0.87957
BT CH79	1.121	0.85767
8-DPSK		
BT CH0	1.287	1.1894
BT CH39	1.282	1.2069
BT CH79	1.309	1.1984
DSSS		
802.11b CH1	17.01	13.743
802.11b CH7	16.72	13.773
802.11b CH13	17.09	13.865
OFDM		
802.11g CH1	19.19	16.425
802.11g CH7	19.69	16.419
802.11g CH13	19.01	16.418

GFSK

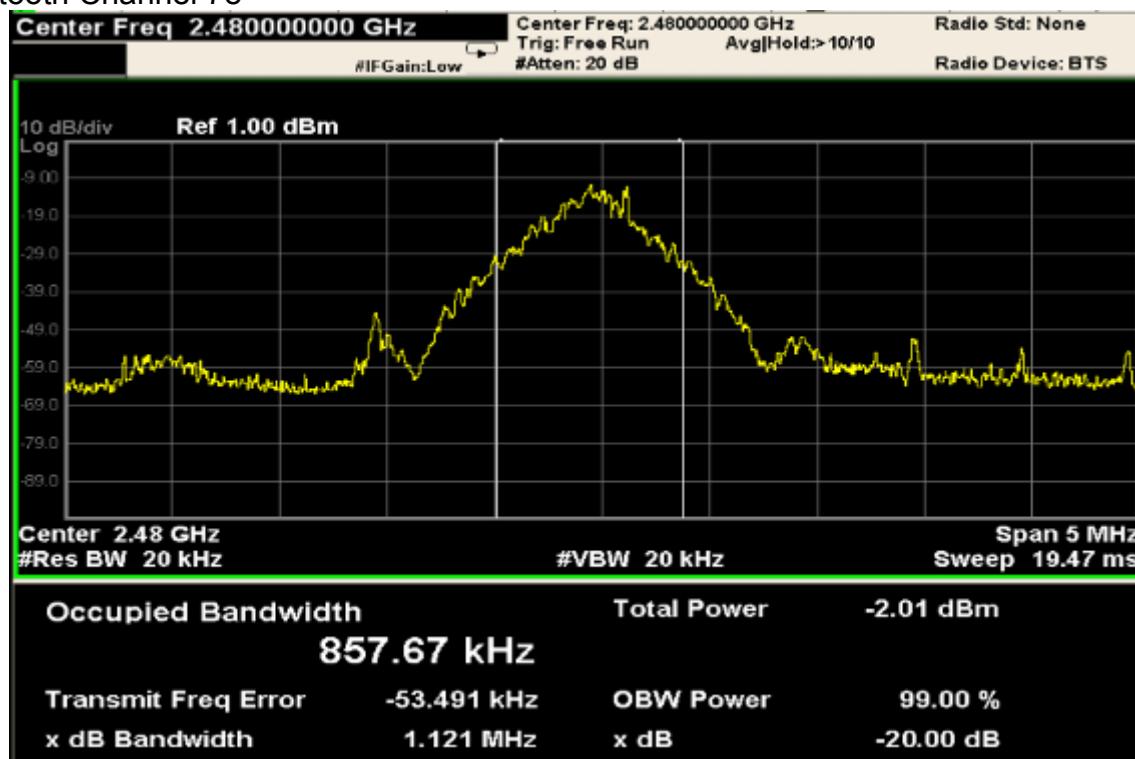
Bluetooth Channel 0



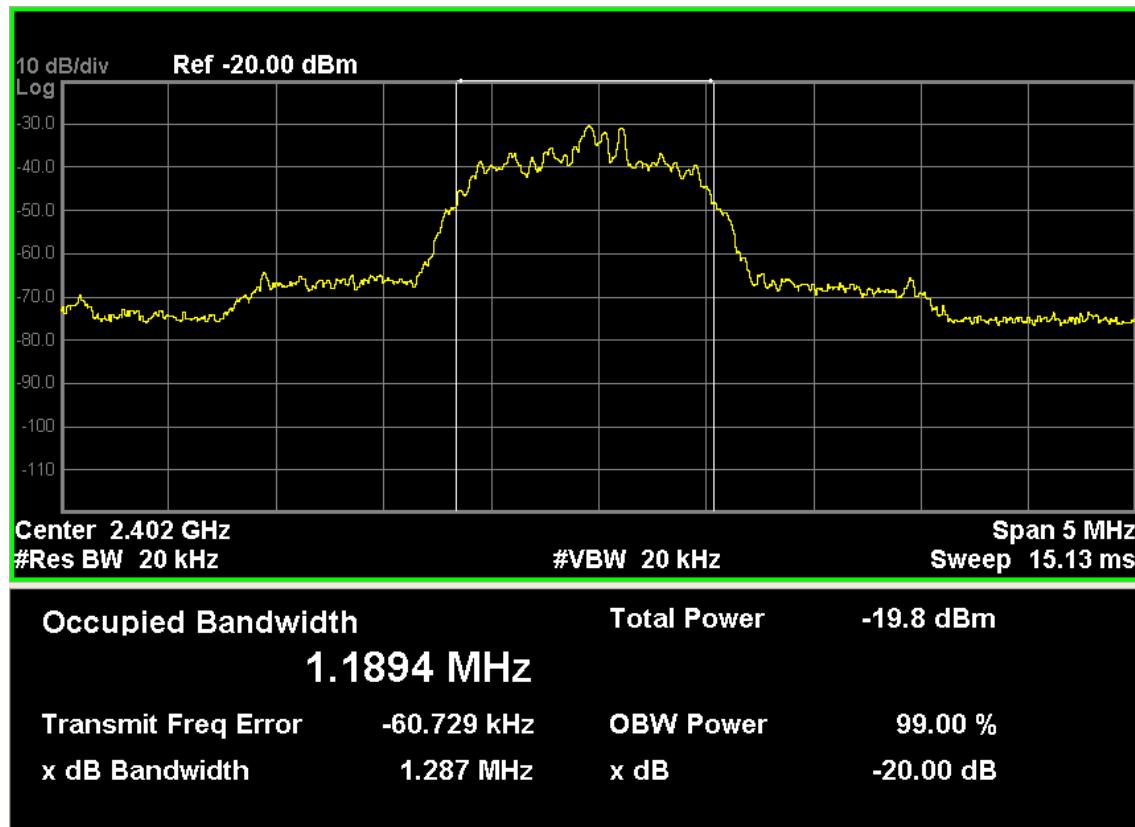
Bluetooth Channel 39



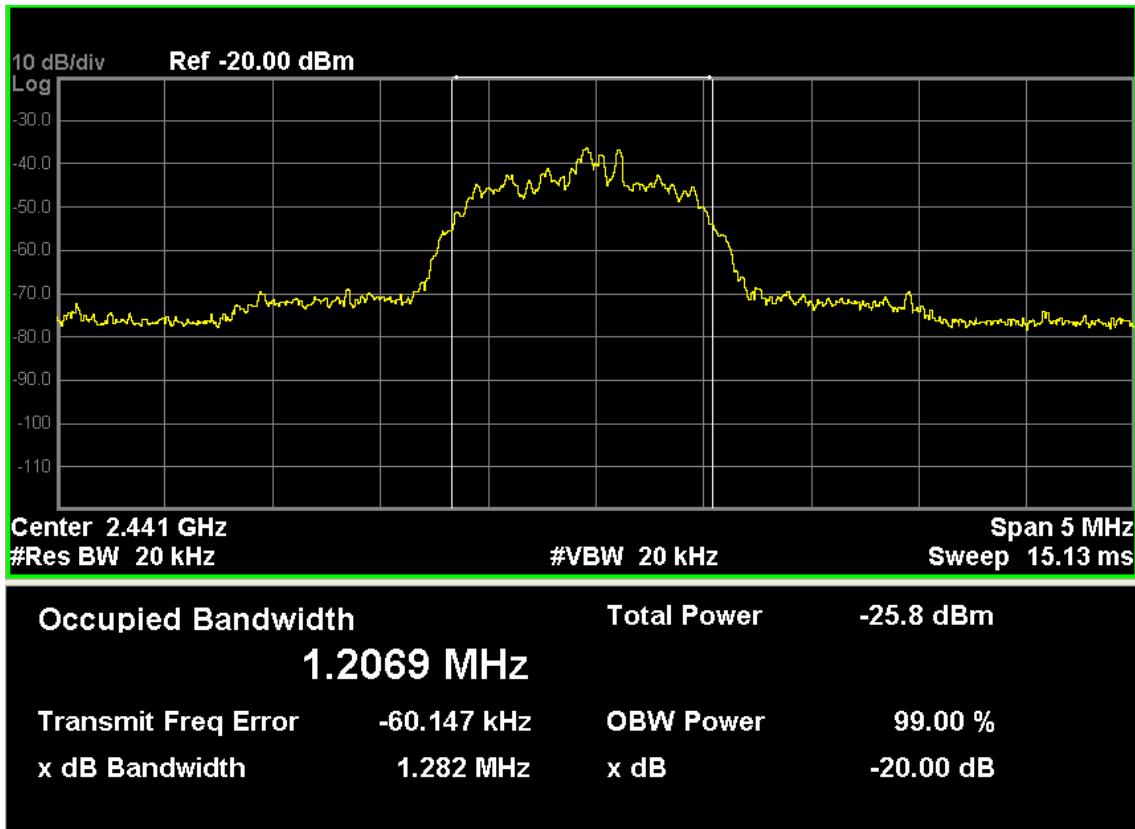
Bluetooth Channel 78



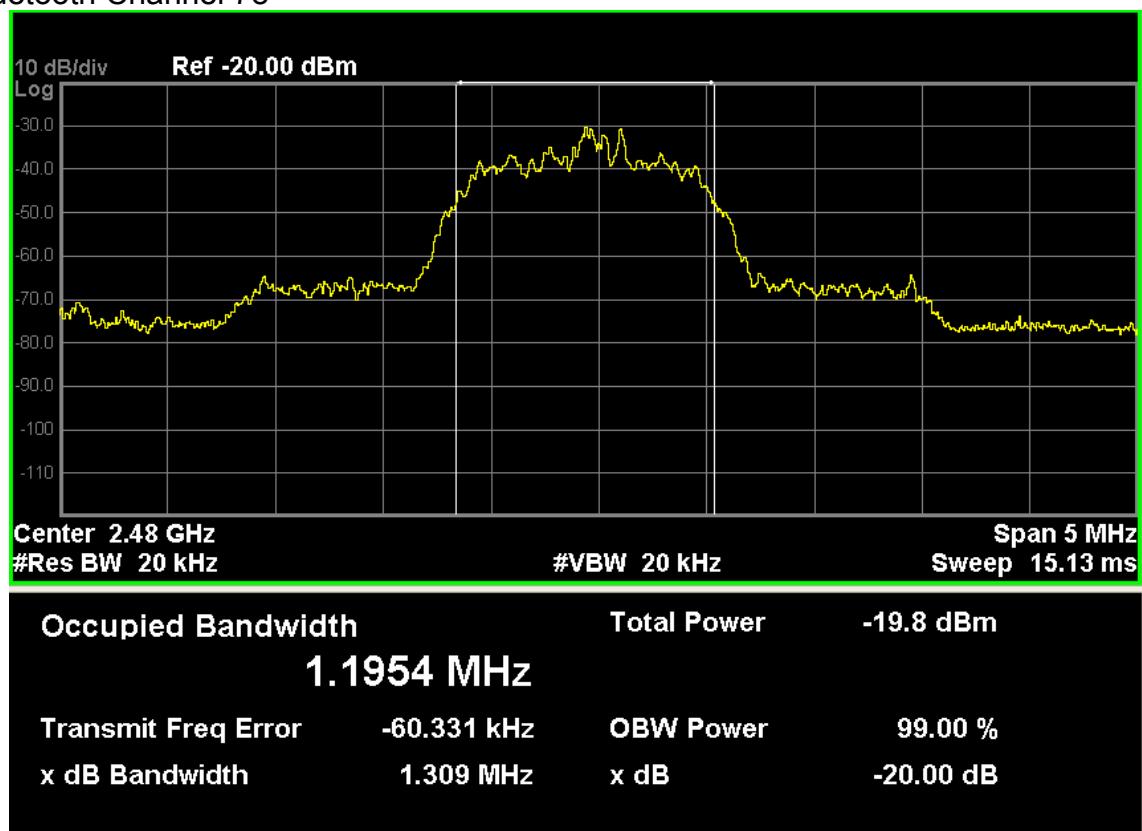
Bluetooth Channel 0



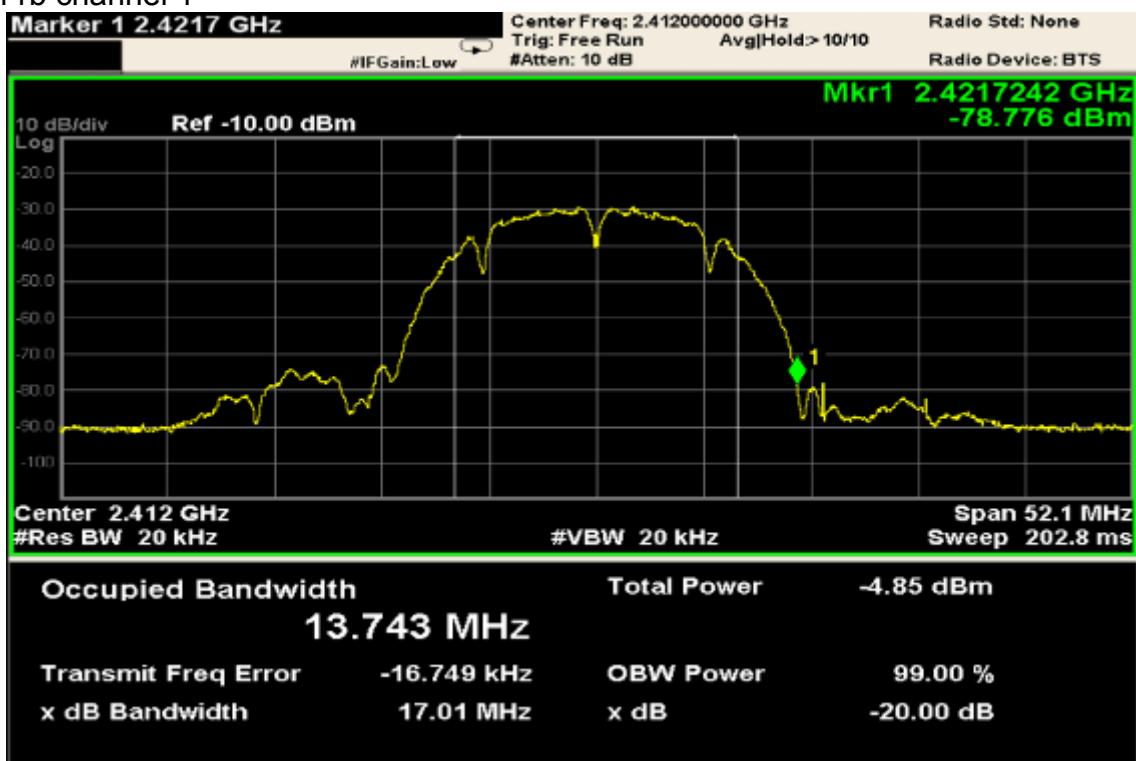
Bluetooth Channel 39



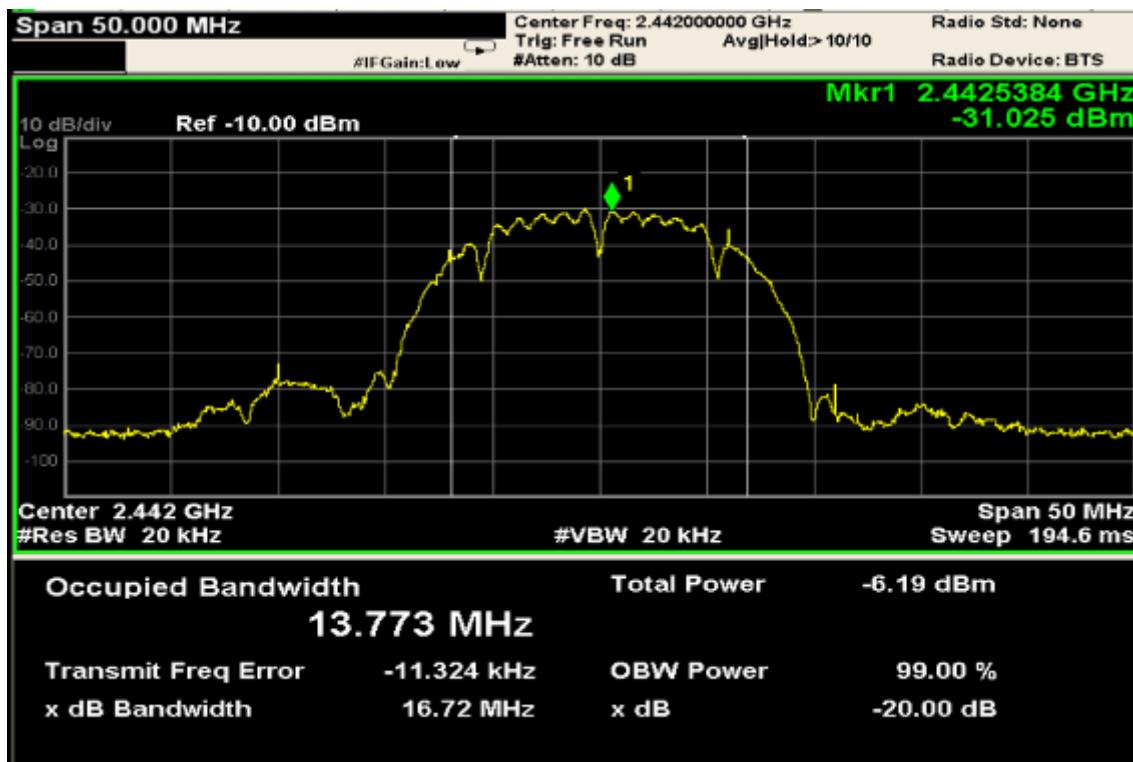
Bluetooth Channel 78



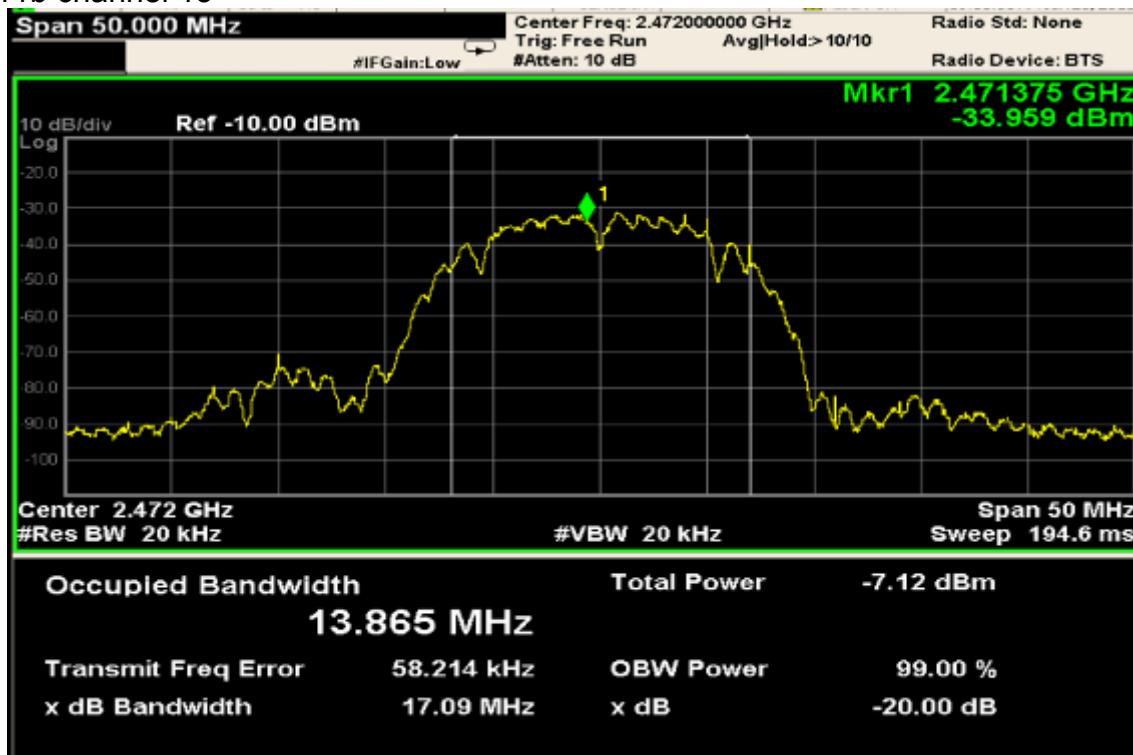
802.11b channel 1



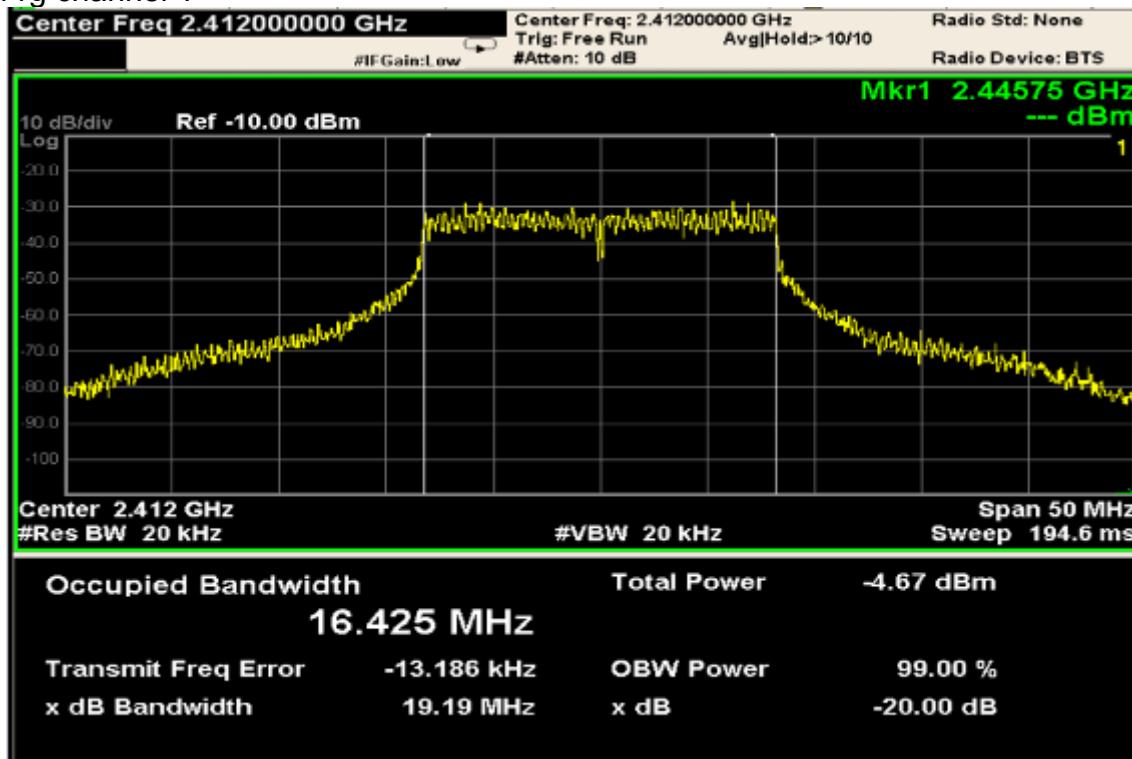
802.11b channel 7



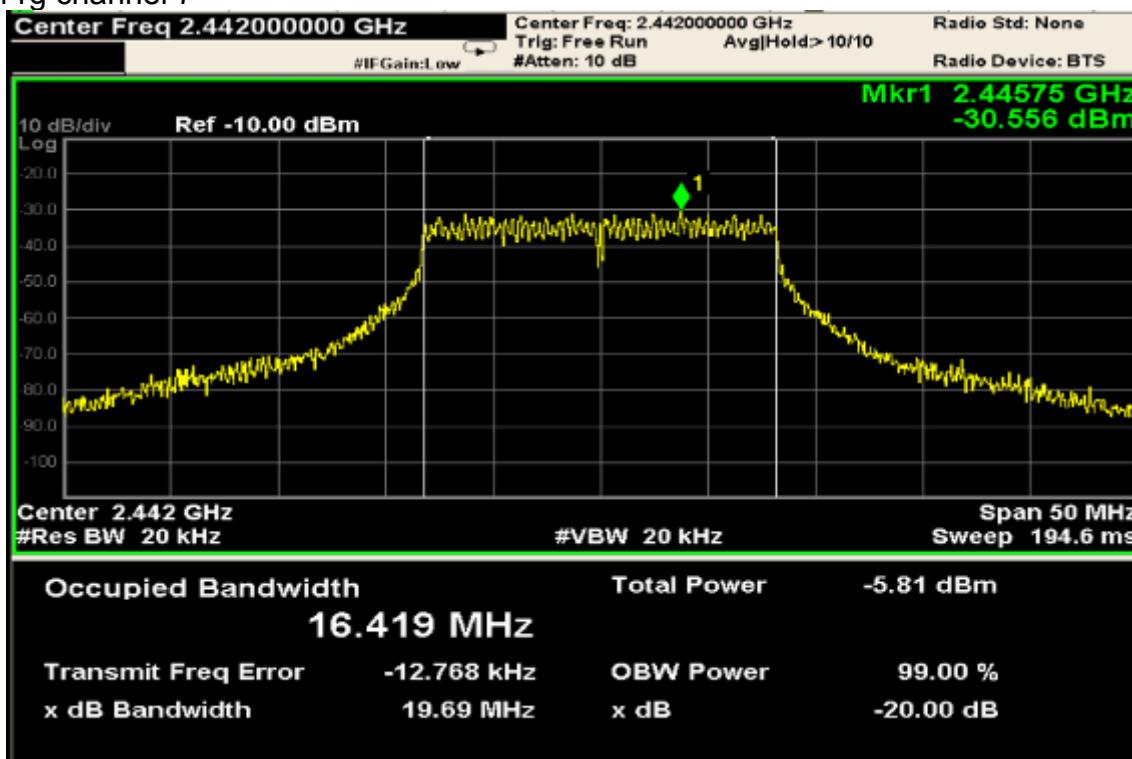
802.11b channel 13



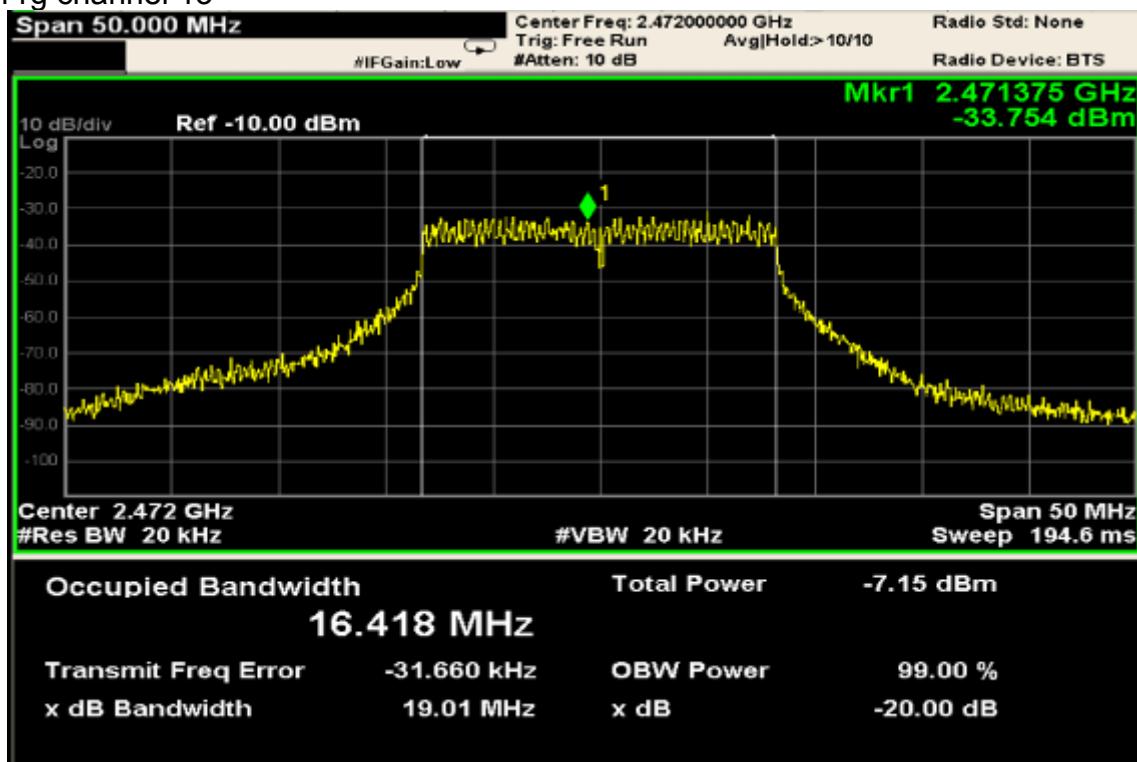
802.11g channel 1



802.11g channel 7

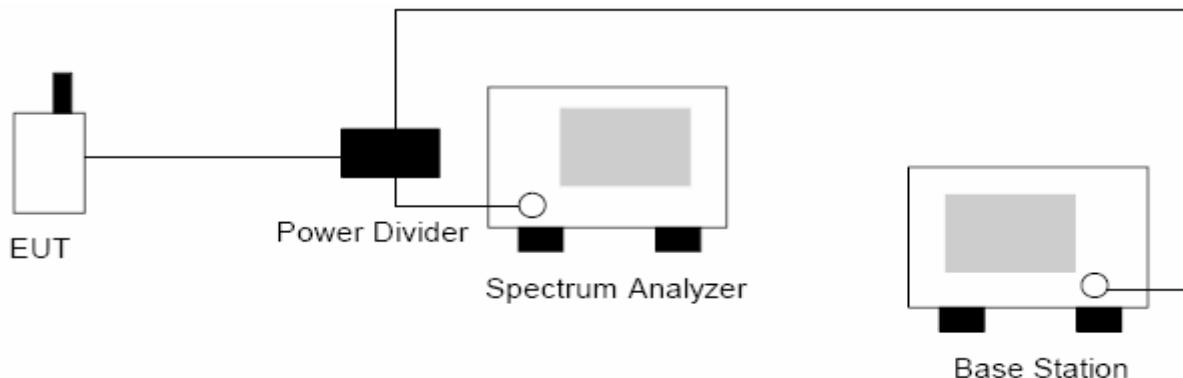


802.11g channel 13



7. 6 DB BANDWIDTH

7.1 TEST SETUP



7.2 LIMITS

Limit	$\geq 500 \text{ kHz}$
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7.3 TEST PROCEDURE

KDB 558074 D01 DTS Measurement Guidance V03 r01 April 9, 2013

Use the following spectrum analyzer settings:

Span = approximately 2 to 3 times the 6 dB bandwidth, centered on a channel

RBW=100KHz

VBW $\geq 3 \times$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 6 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 6 dB bandwidth of the emission.

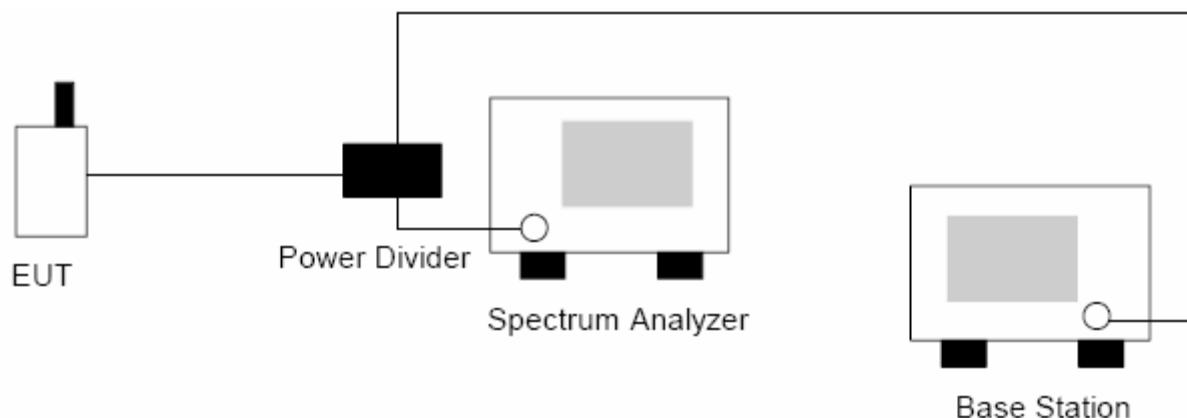
If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation.

7.4 RESULTS & PERFORMANCE

Channel	Mode	Measured 6dB bandwidth (MHz)	Limit (kHz)	Result
1 (2412MHz)	802.11b	10.02	≥ 500	Pass
	802.11g	16.14	≥ 500	Pass
7 (2442 MHz)	802.11b	10.16	≥ 500	Pass
	802.11g	16.58	≥ 500	Pass
13 (2472 MHz)	802.11b	9.86	≥ 500	Pass
	802.11g	16.35	≥ 500	Pass

8. DWELL TIME

8.1 TEST SETUP



8.2 LIMITS

Limits	<400.00ms
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8.3 TEST PROCEDURE

The EUT must have its hopping function enabled.

Use the following spectrum analyzer settings:

Span = zero span, centered on a hopping channel

RBW ≤ Channel Separation

VBW ≥ RBW

Sweep = as necessary to capture the entire dwell time per hopping channel

Detector function = peak

Trace = max hold

If possible, use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation.

8.4 TEST RESULTS

GFSK

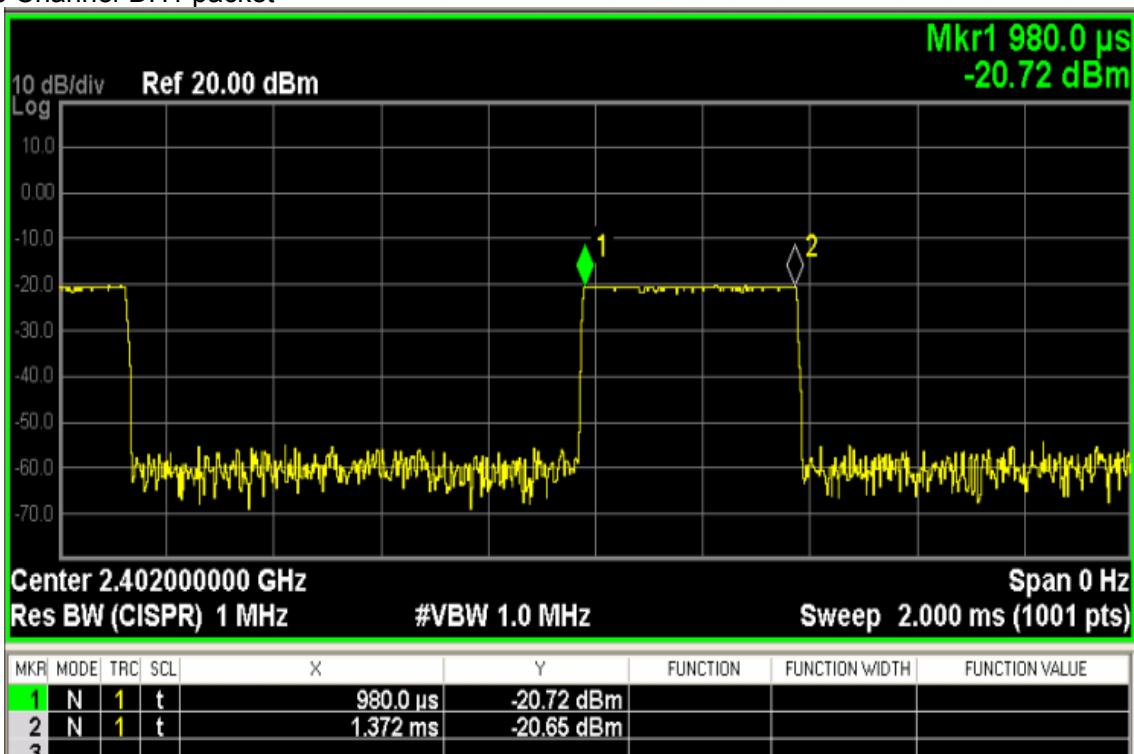
Packet	N	x(ms)	Calculation formula	Result(T)(ms)
DH1	2	0.392	$T = \frac{1600}{79 \times N} \times x \times (0.4 \times 79) = \frac{1600}{79 \times N} \times x \times 31.6$ DH1, N=2; DH3, N=4; DH5, N=6	125.4
DH3	4	1.648		263.68
DH5	6	2.9		309.33

8-DPSK

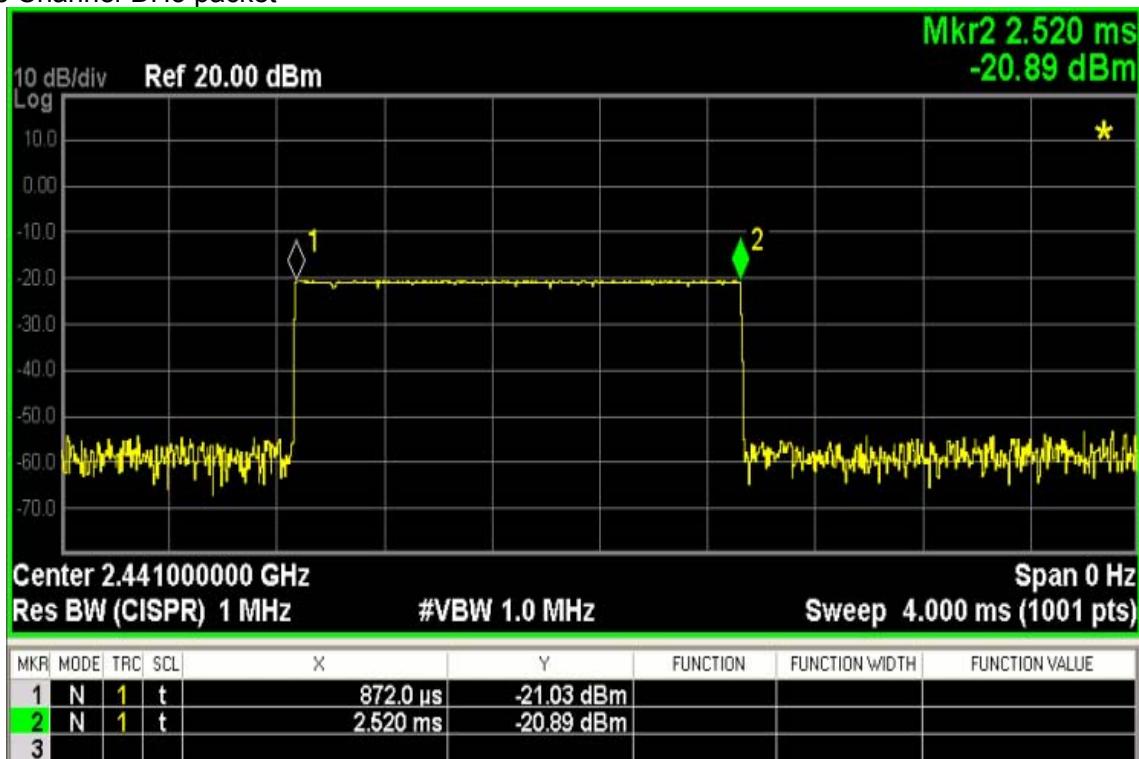
Packet	N	x(ms)	Calculation formula	Result(T)(ms)
DH1	2	0.408	$T = \frac{1600}{79 \times N} \times x \times (0.4 \times 79) = \frac{1600}{79 \times N} \times x \times 31.6$ DH1, N=2; DH3, N=4; DH5, N=6	130.56
DH3	4	1.660		265.6
DH5	6	2.91		310.4

GFSK

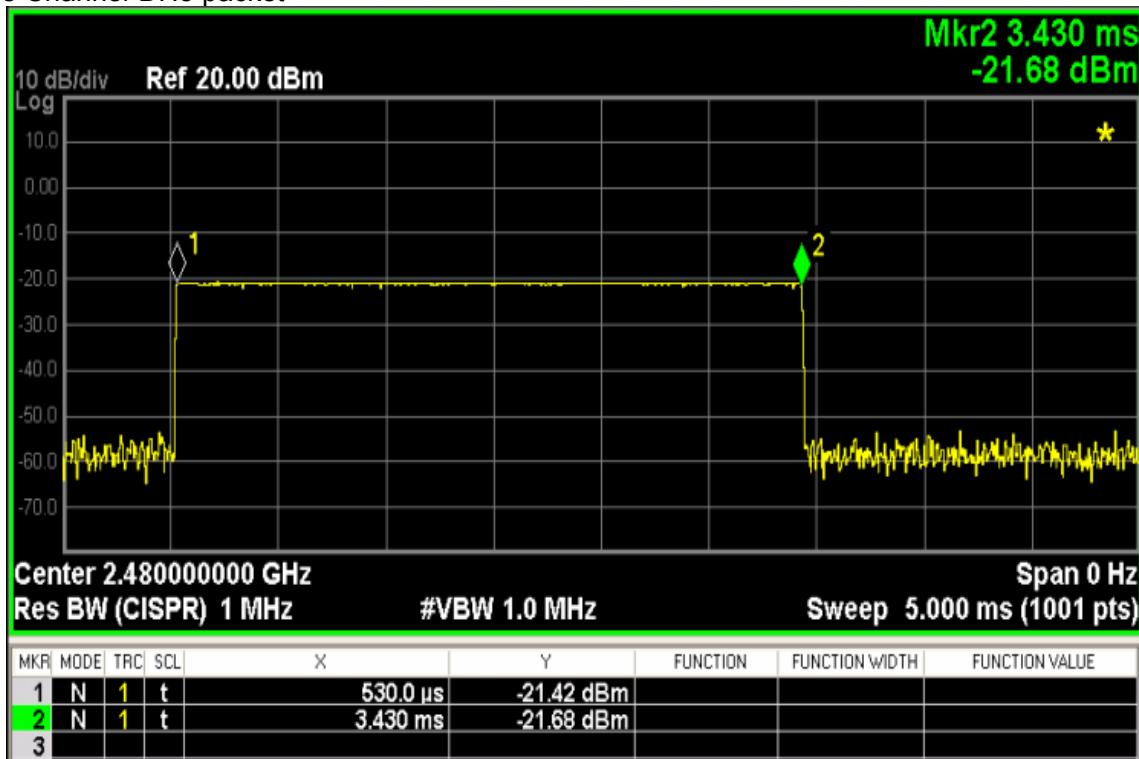
Single Channel-DH1 packet



Single Channel-DH3 packet

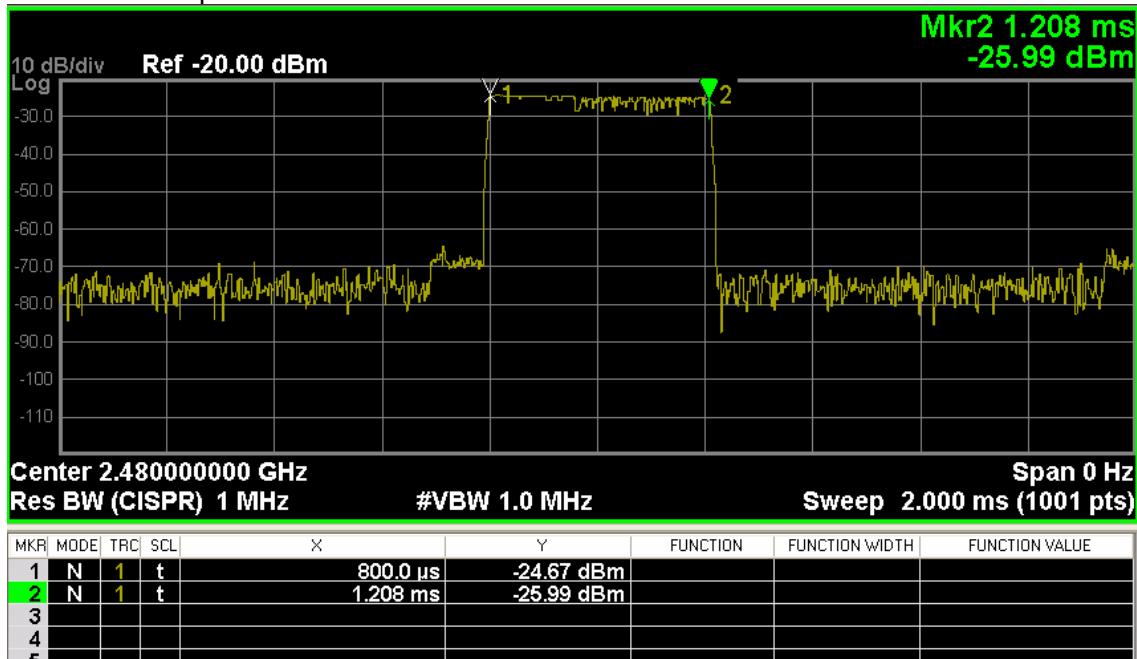


Single Channel-DH5 packet

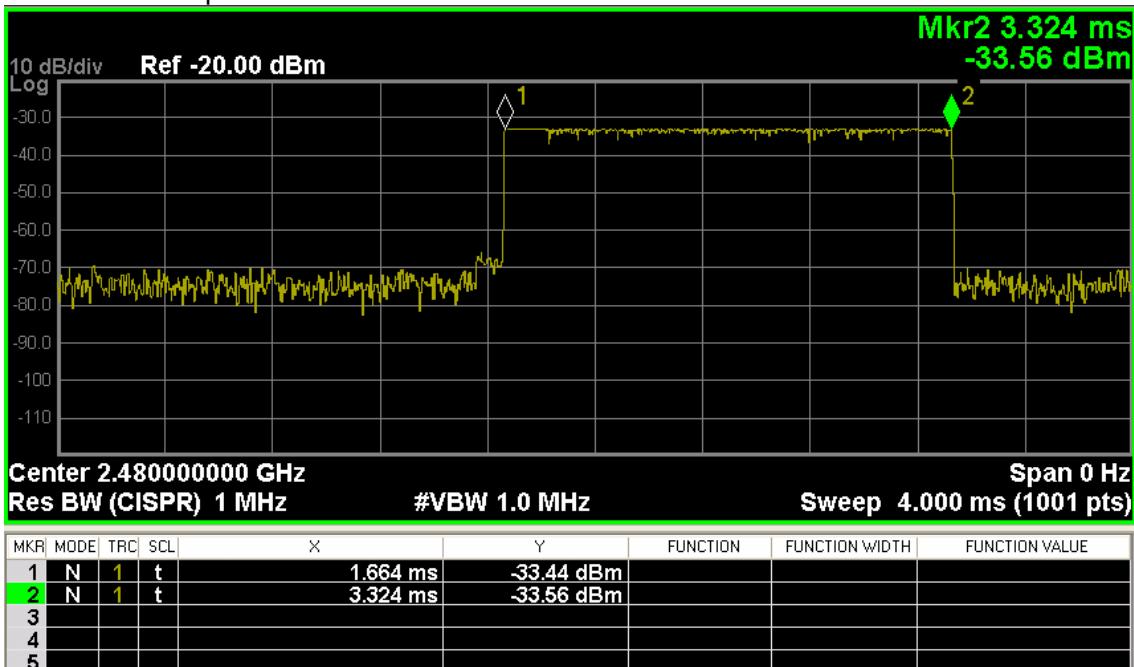


8-DPSK

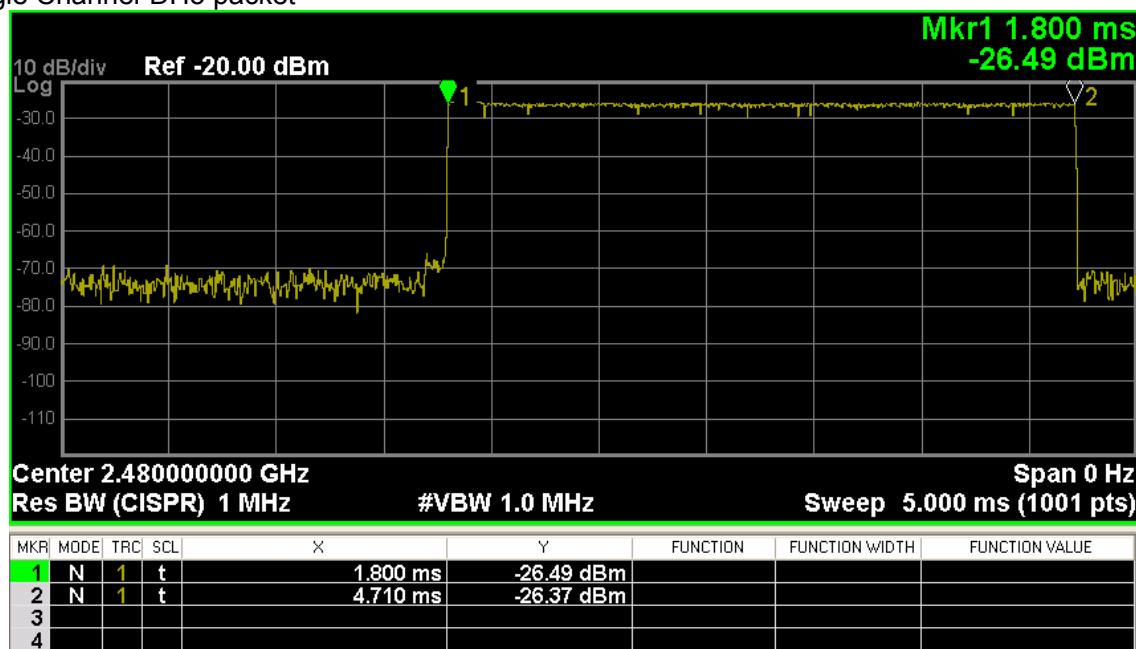
Single Channel-DH1 packet



Single Channel-DH3 packet

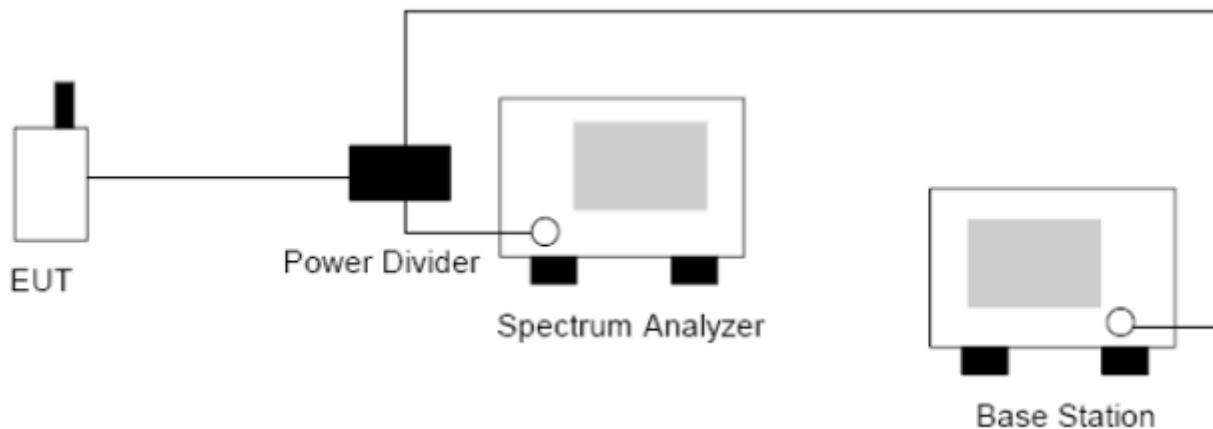


Single Channel-DH5 packet



9. POWER SPECTRAL DENSITY

9.1 TEST SETUP



9.2 LIMITS

Limits	$\leq 8\text{dBm}$
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9.3 TEST PROCEDURE

KDB 558074 D01 DTS Measurement Guidance V03 r01 April 9, 2013

Set analyzer center frequency to DTS channel center frequency.

Set the span to 1.5 times the DTS bandwidth.

Set the RBW to: $3\text{ kHz} \leq \text{RBW} \leq 100\text{ kHz}$.

Set the VBW $\geq 3 \times \text{RBW}$.

Detector = peak.

Sweep time = auto couple.

Trace mode = max hold.

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum amplitude level within the RBW.

If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

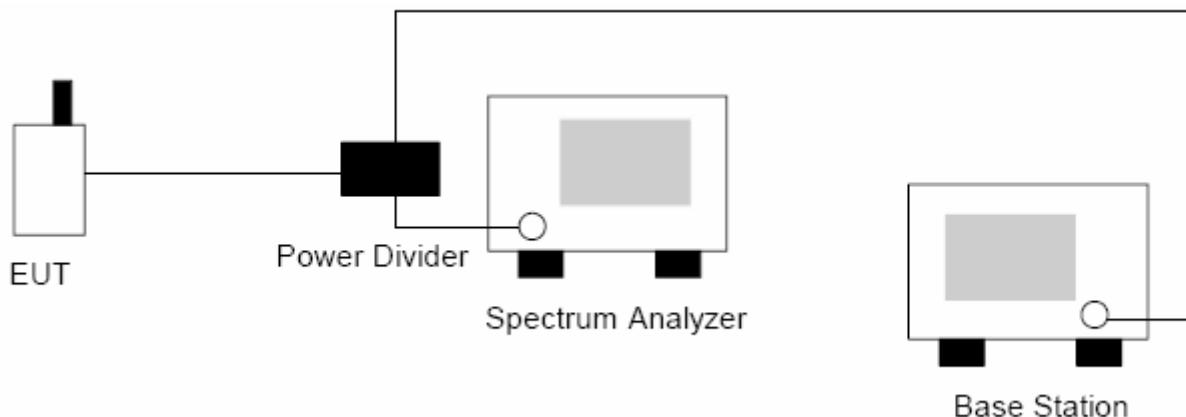
9.4 RESULTS & PERFORMANCE

Channel	Mode	Measured level (dBm)	Limit (dBm)	Result
1 (2412MHz)	802.11b	-1.04	≤ 8.00	Pass
	802.11g	-10.24	≤ 8.00	Pass
7 (2442 MHz)	802.11b	-0.58	≤ 8.00	Pass
	802.11g	-11.37	≤ 8.00	Pass
13 (2472 MHz)	802.11b	1.25	≤ 8.00	Pass
	802.11g	-12.28	≤ 8.00	Pass

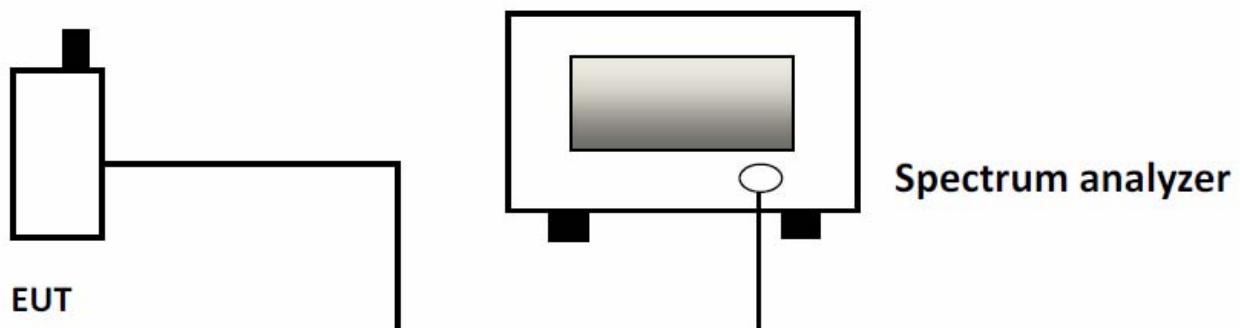
10. PEAK OUTPUT POWER (CONDUCTION)

10.1 TEST SETUP

BT:



WIFI:



10.2 LIMITS

Limits	<30dBm
--------	--------

10.3 TEST PROCEDURE

BT:

After a radio link has been established between EUT and Base station, using spectrum analyzer to measure the output power of the cell signal of the EUT, and record the max. The loss between RF output port of the EUT and the input port of the tester will be taken into consideration.

The measurement will be conducted at three channels:

Bluetooth: Low(0), middle(39) and High (78),

Set the spectrum analyzer as RBW = 3MHz, VBW = 3MHz, Span = 10MHz, Sweep = auto
Detector = Peak, Trace mode = max hold

WIFI:

Place the EUT on the table and set it in transmitting mode. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to spectrum analyzer. The loss between RF output port of the EUT and the input port of the tester will be taken into consideration.

The measurement will be conducted at three channels.

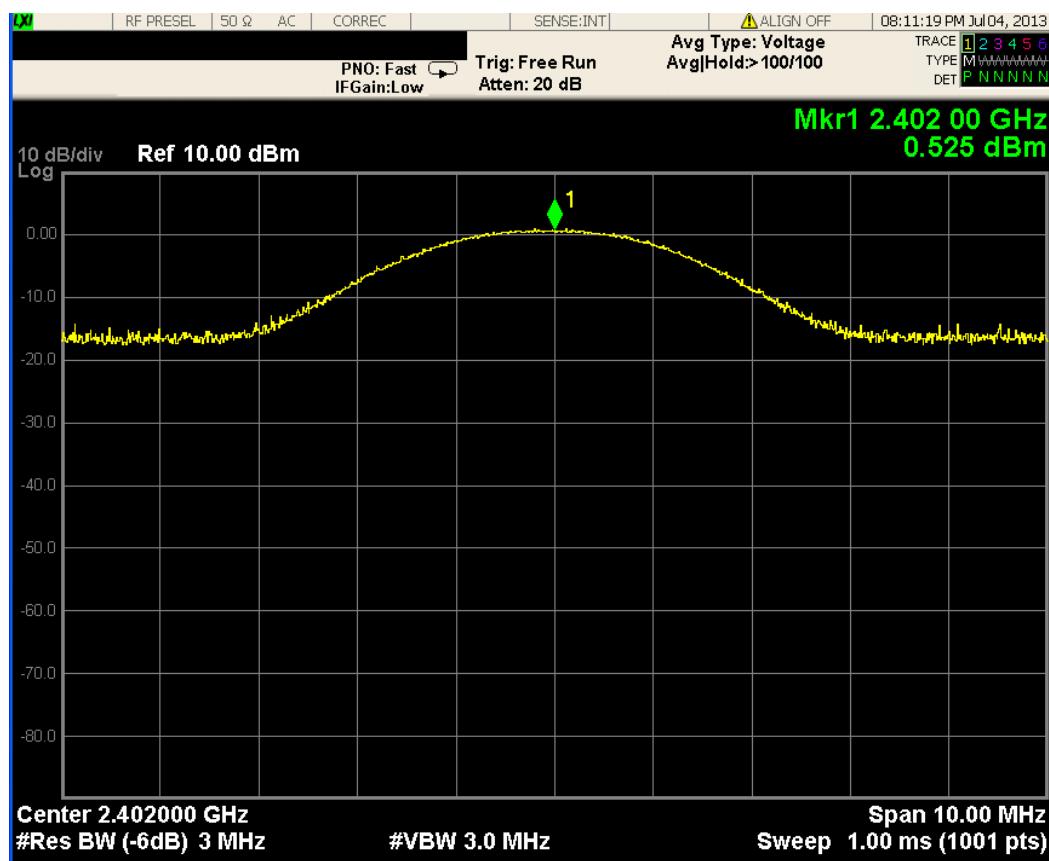
WIFI: Low(1), middle(7) and High (13).

Using Channel power measurement function of spectrum analyzer
and settings are: Integ BW = 20MHz RBW = 1MHz and VBW = 3MHz Trace = max hold

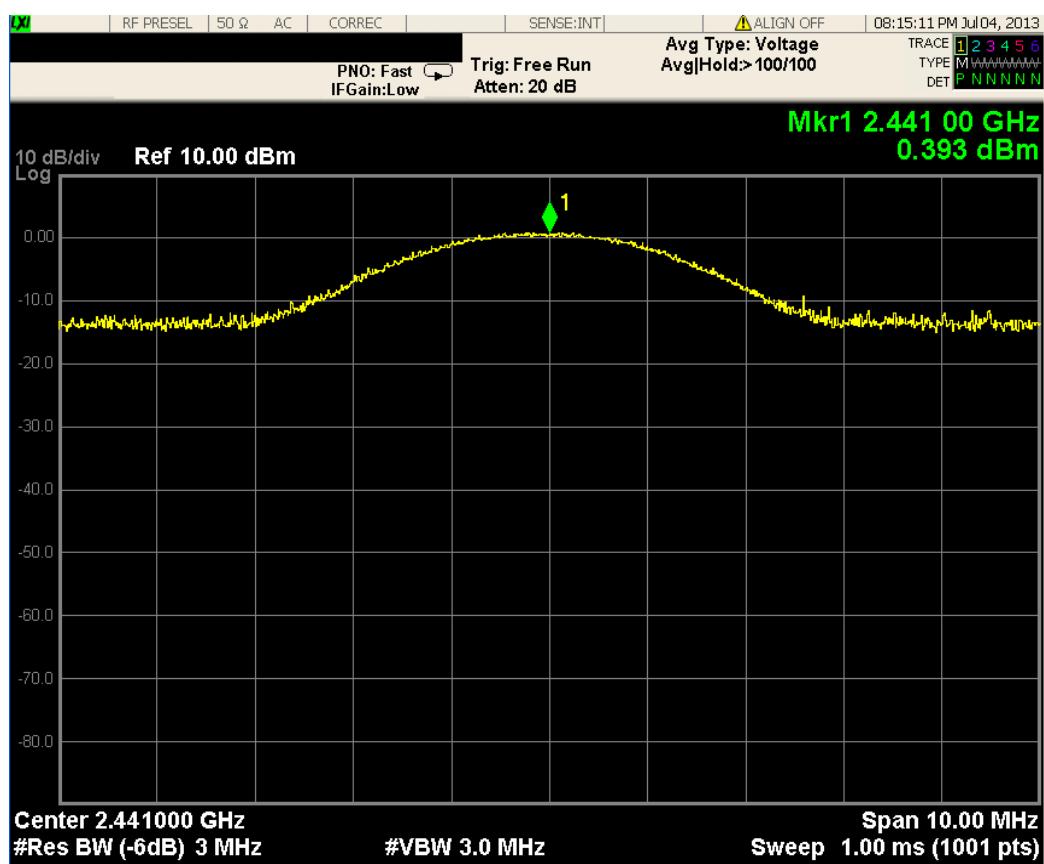
10.4 RESULTS & PERFORMANCE

Bluetooth			
Channel	Peak power (dBm)	Limit (dBm)	Margin (dB)
GFSK			
0 (2402MHz)	0.53	30	29.47
39 (2441MHz)	0.39	30	29.61
78 (2480MHz)	0.34	30	29.66
8-DPSK			
0 (2402MHz)	0.24	30	29.76
39 (2441MHz)	0.32	30	29.68
78 (2480MHz)	0.31	30	29.69
802.11b			
Channel	Peak power (dBm)	Limit (dBm)	Margin (dB)
1 (2412MHz)	4.61	30	25.39
7 (2442MHz)	4.75	30	25.25
13 (2472MHz)	5.10	30	24.9
802.11g			
Channel	Peak power (dBm)	Limit (dBm)	Margin (dB)
1 (2412MHz)	4.73	30	25.27
7 (2442MHz)	5.00	30	25
13 (2472MHz)	5.37	30	24.63

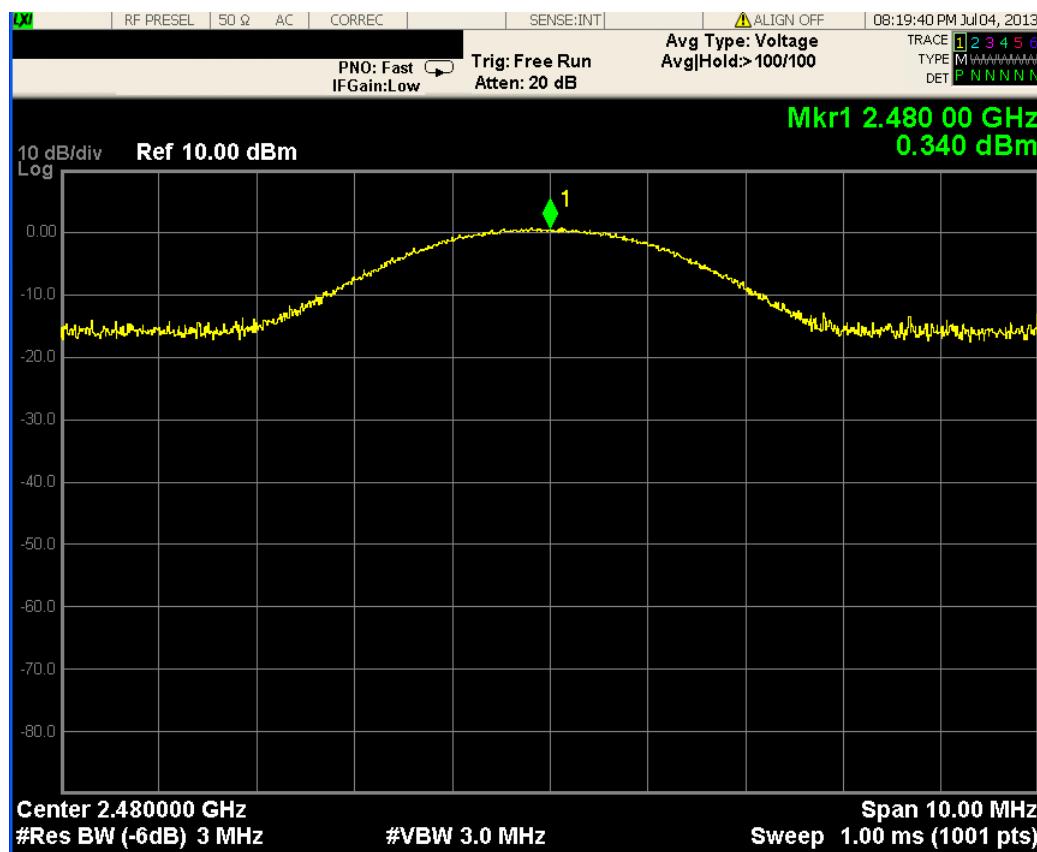
Bluetooth GFSK Channel 0



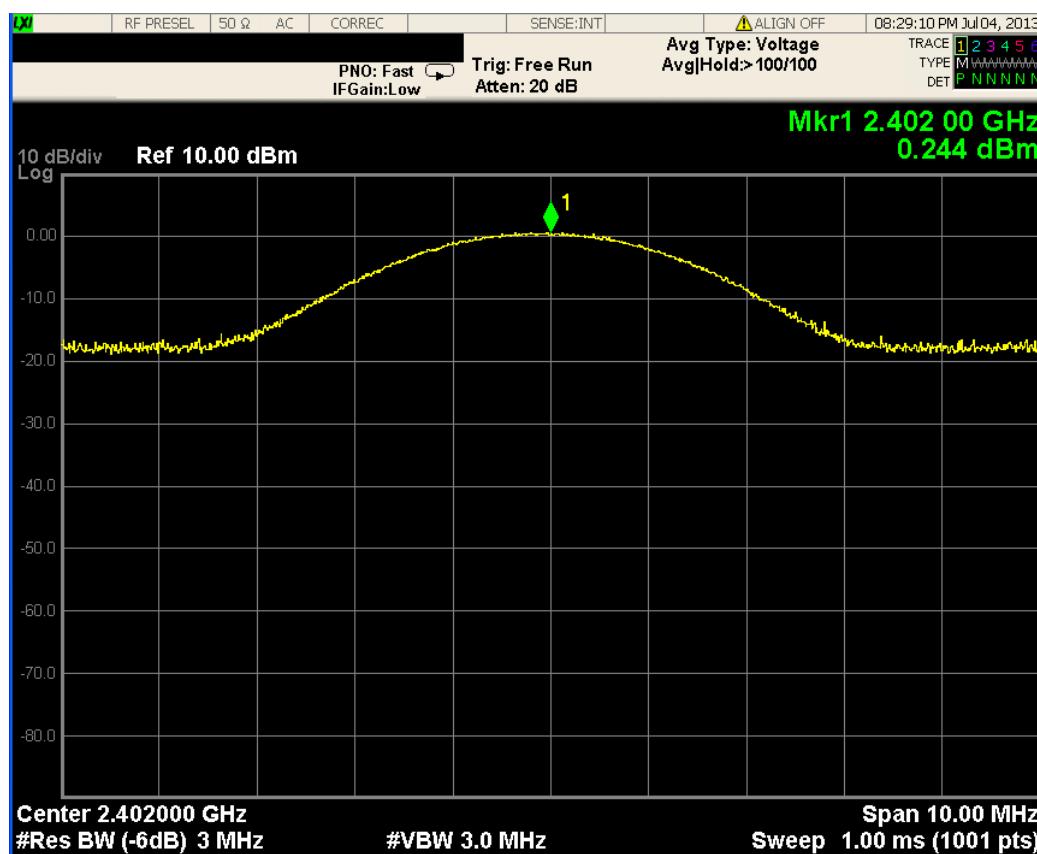
Bluetooth GFSK Channel 39



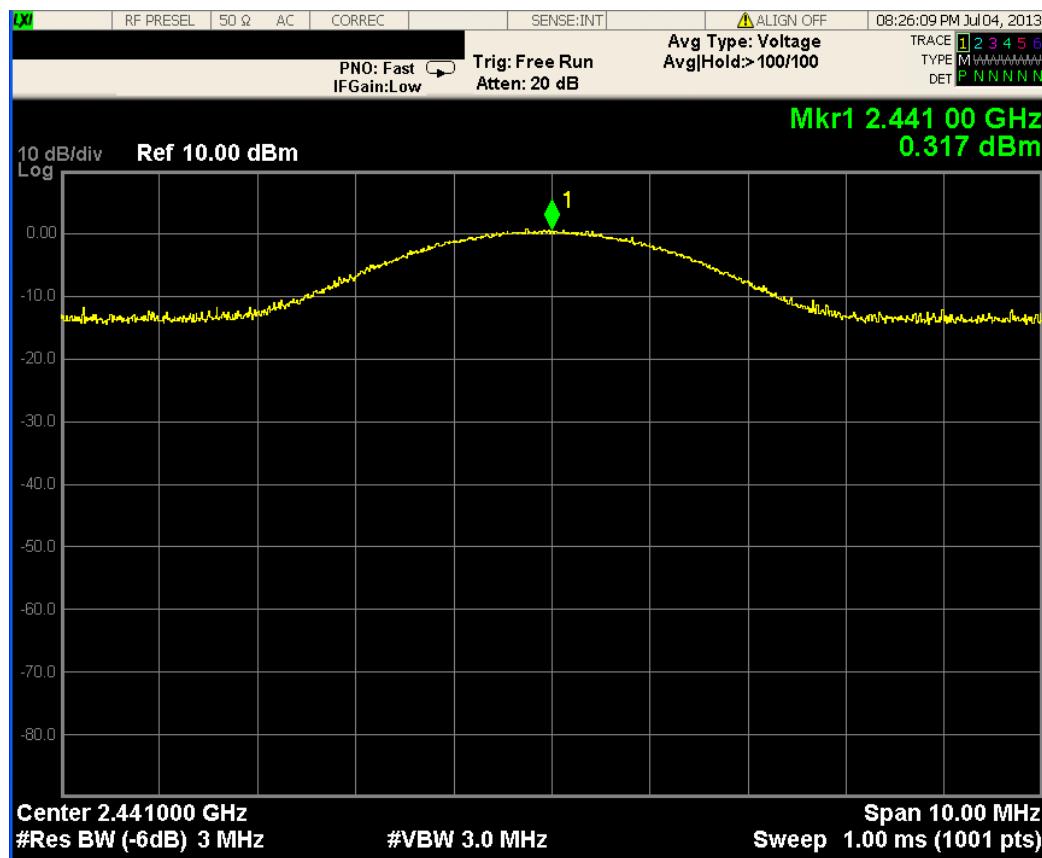
Bluetooth GFSK Channel 78



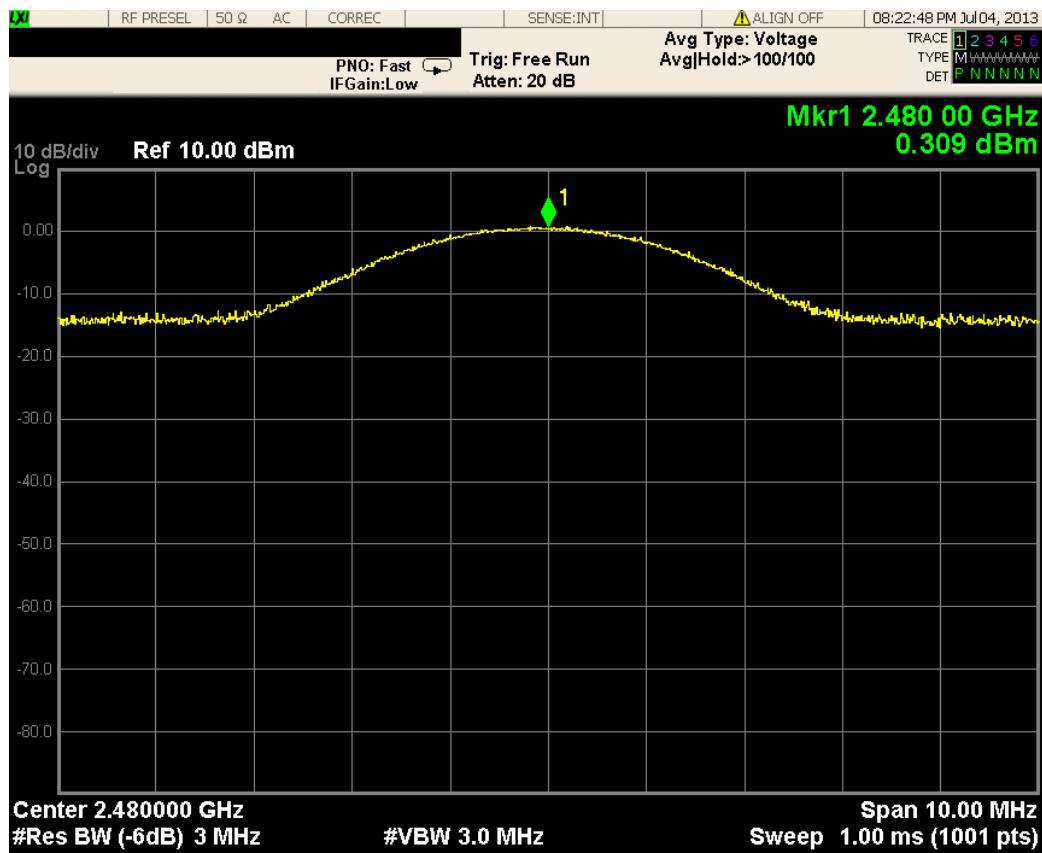
Bluetooth 8-DPSK Channel 0



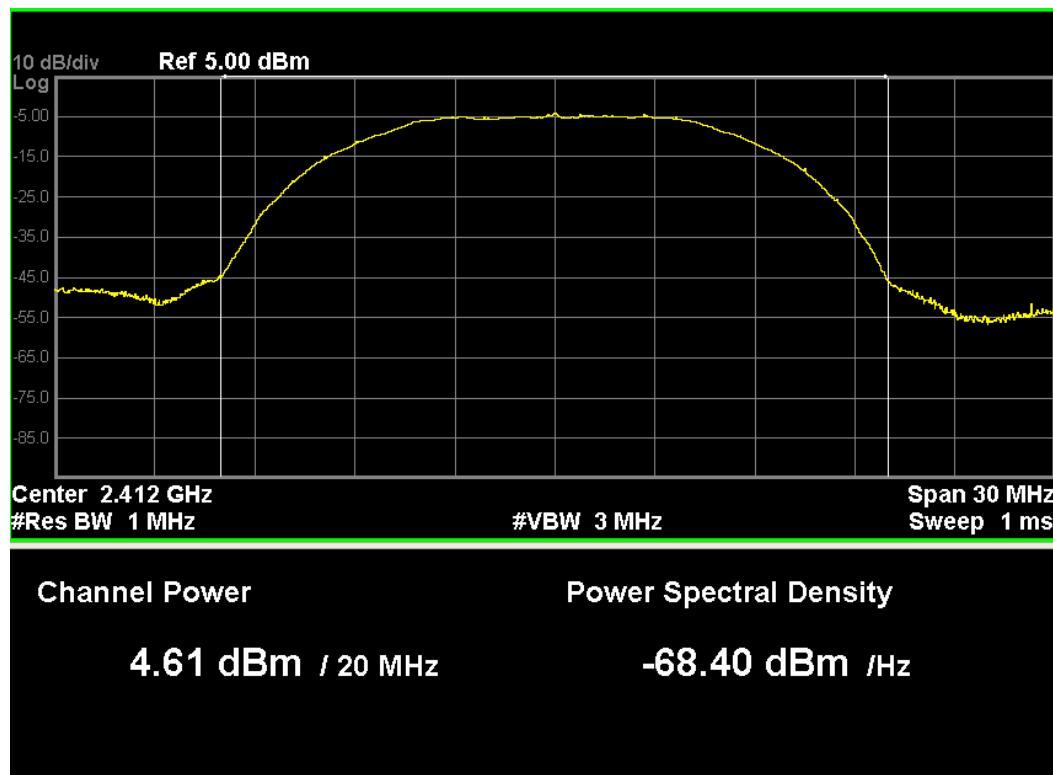
Bluetooth 8-DPSK Channel 39



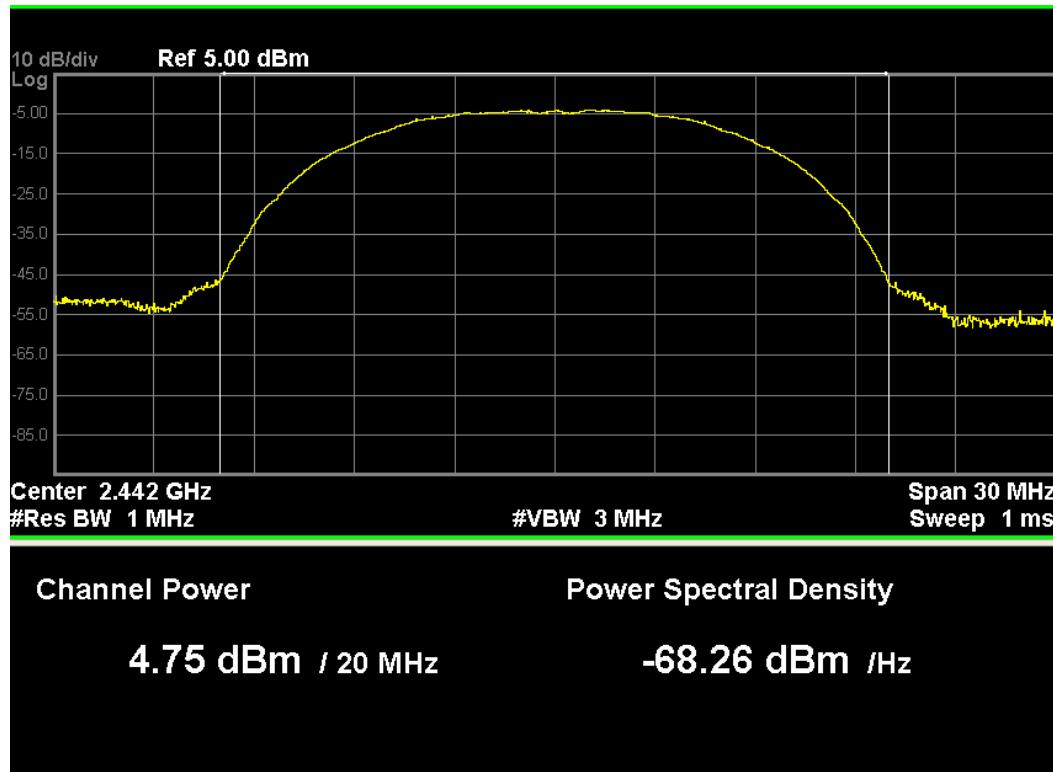
Bluetooth 8-DPSK Channel 78



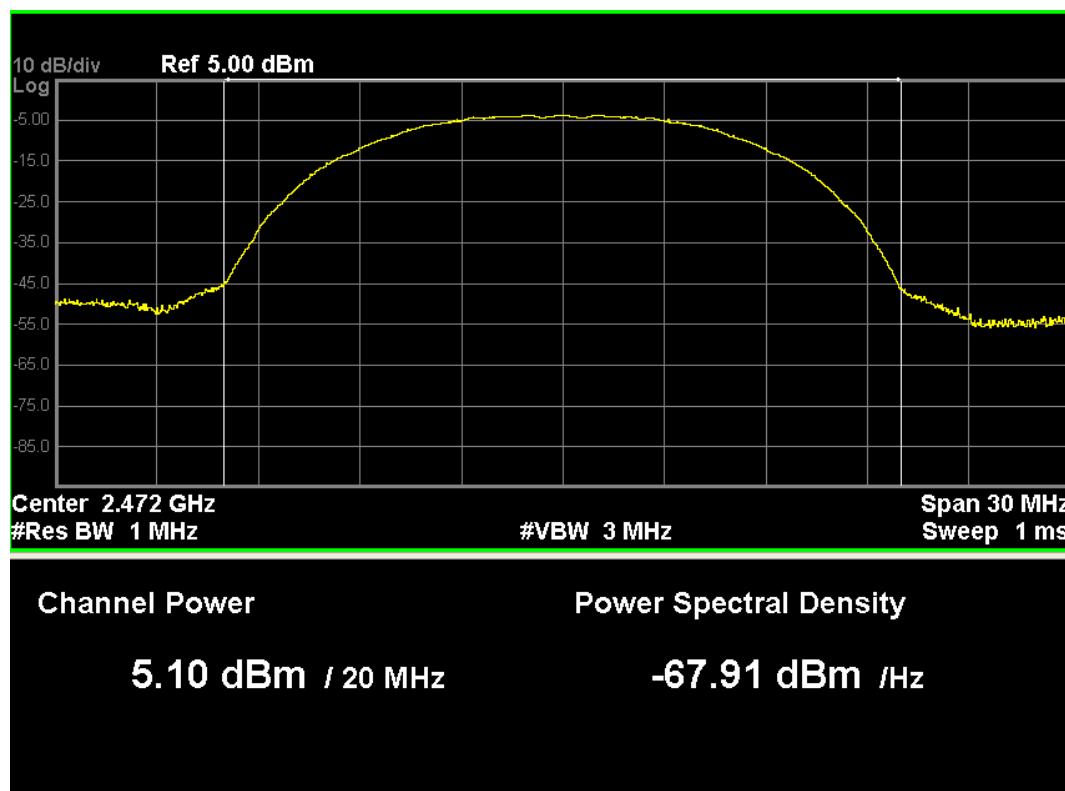
802.11b channel 1



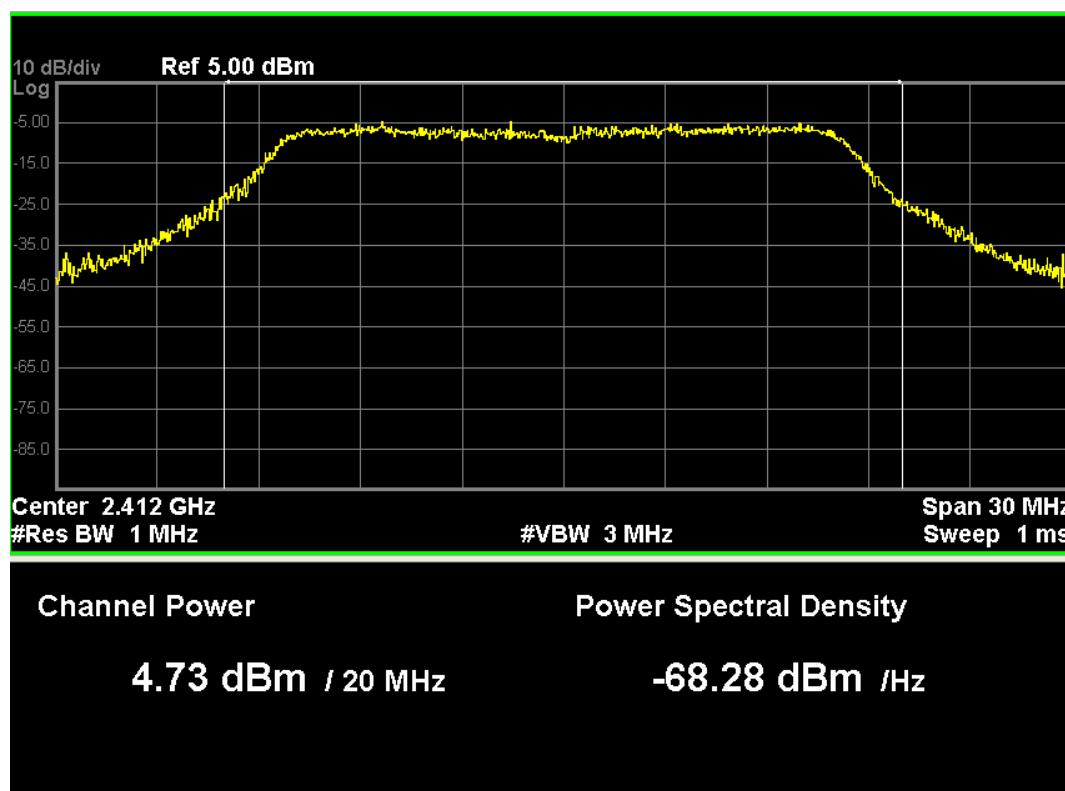
802.11b channel 7



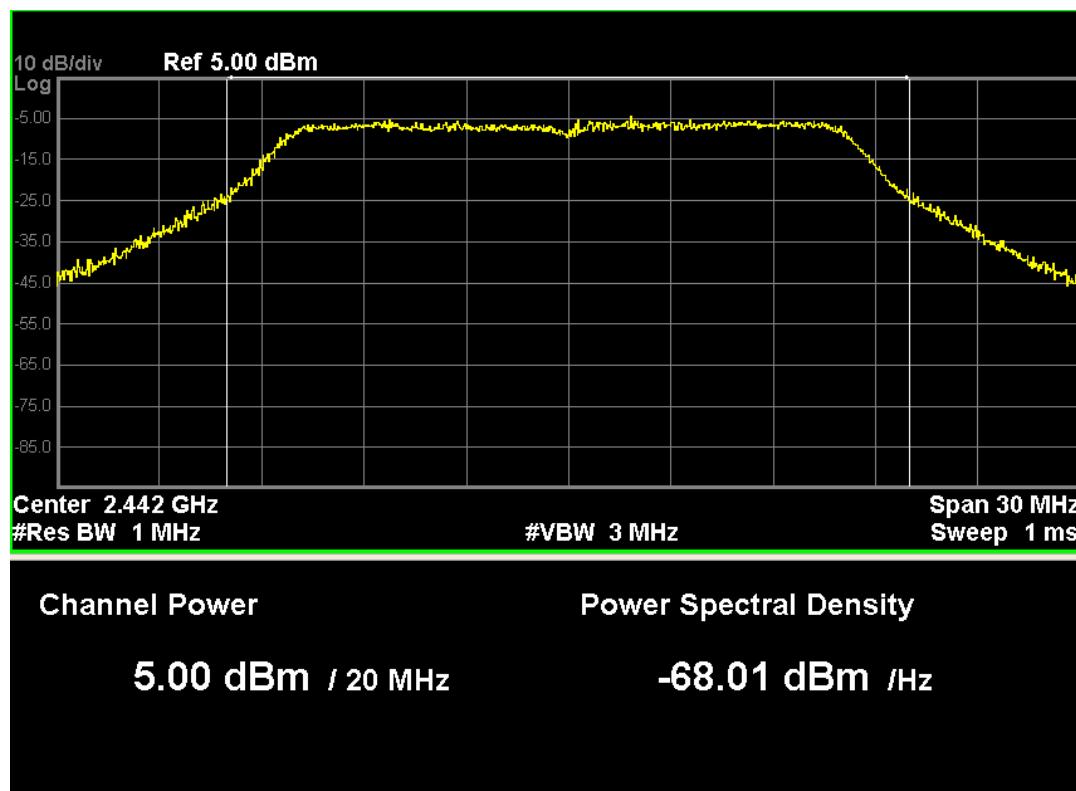
802.11b channel 13



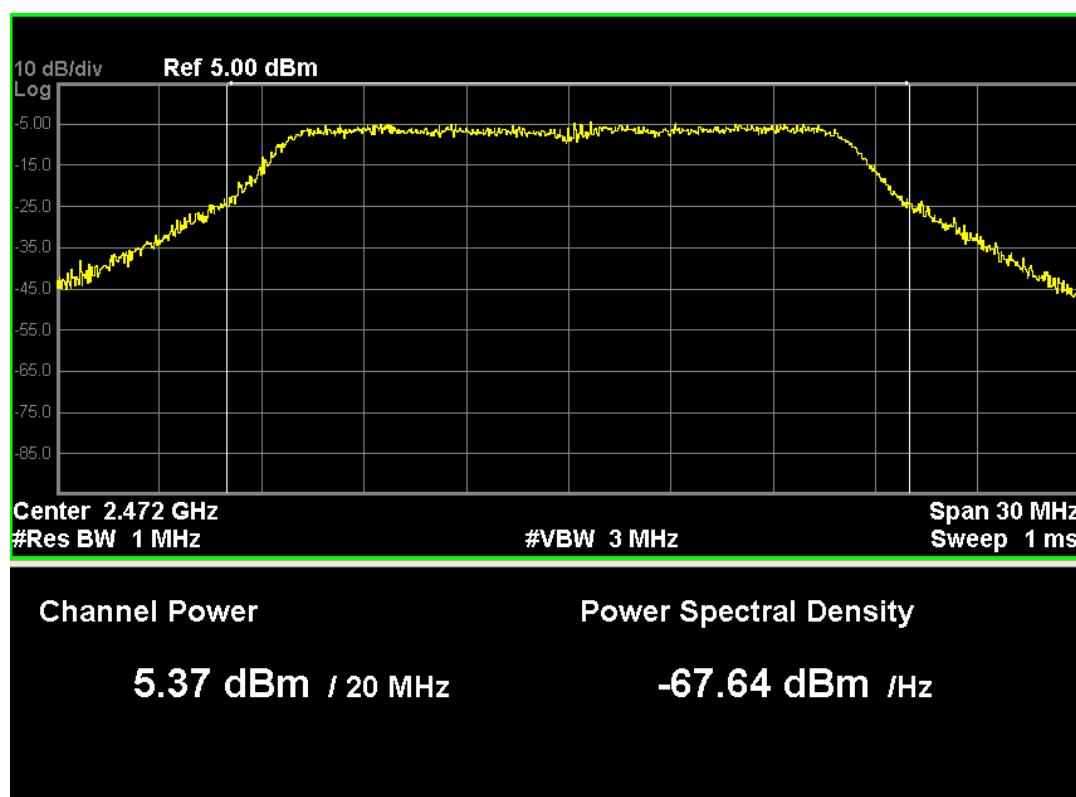
802.11g channel 1



802.11g channel 7

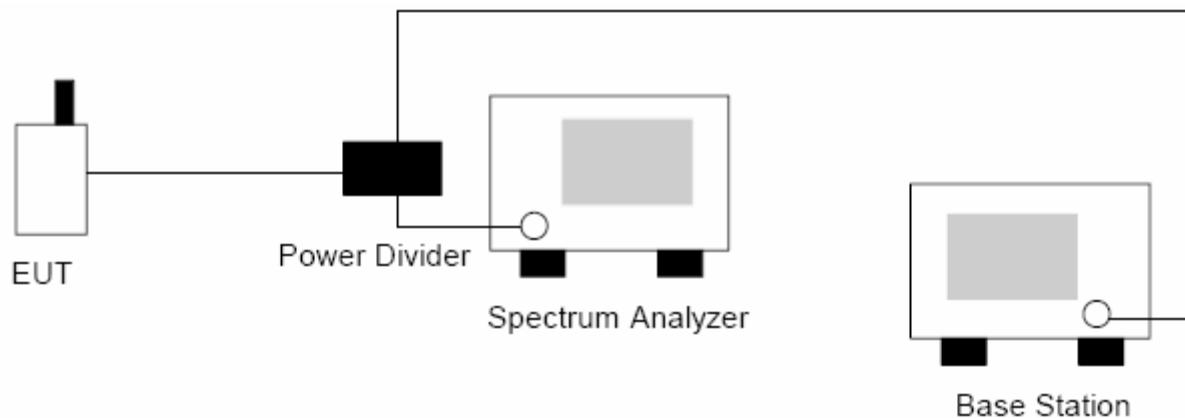


802.11g channel 13



11. SPURIOUS EMISSIONS (CONDUCTION)

11.1 TEST SETUP



11.2 LIMITS

Limit	$<(P-20\text{dB})$
Note: P is the highest level of the desired power	

11.3 TEST PROCEDURE

The EUT was connected to Spectrum Analyzer and Base Station via power divider. Use the following spectrum analyzer settings:

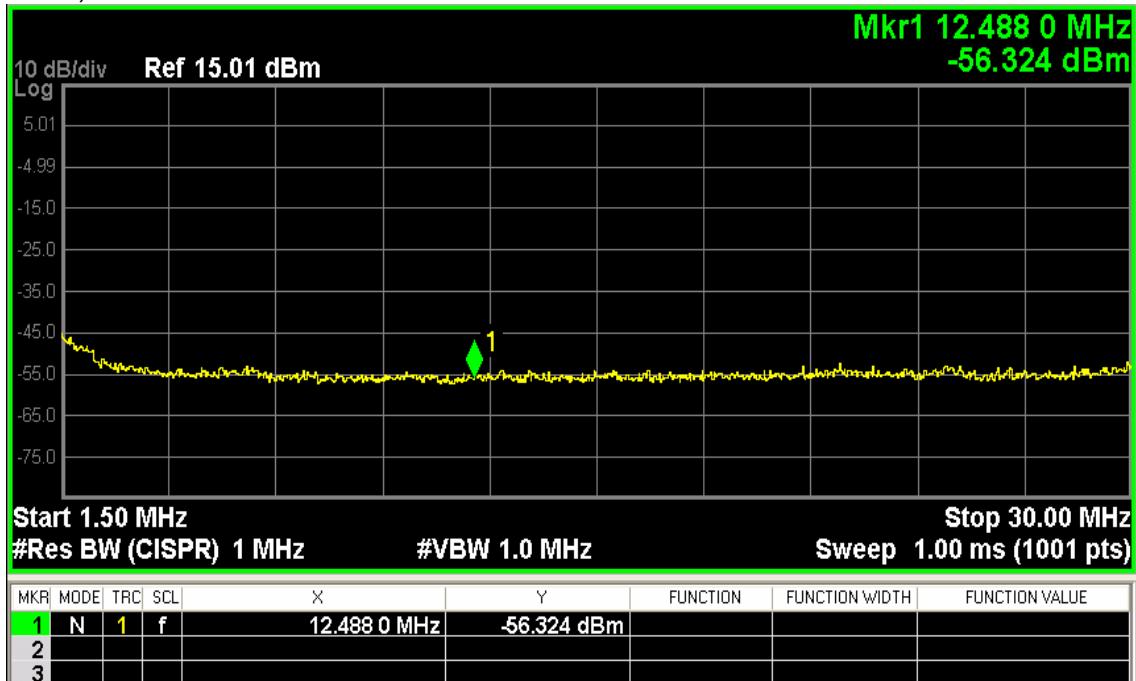
Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.

RBW = 100 kHz; VBW \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold
Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded. The level displayed must comply with the limit specified in this Section.

11.4 RESULTS & PERFORMANCE

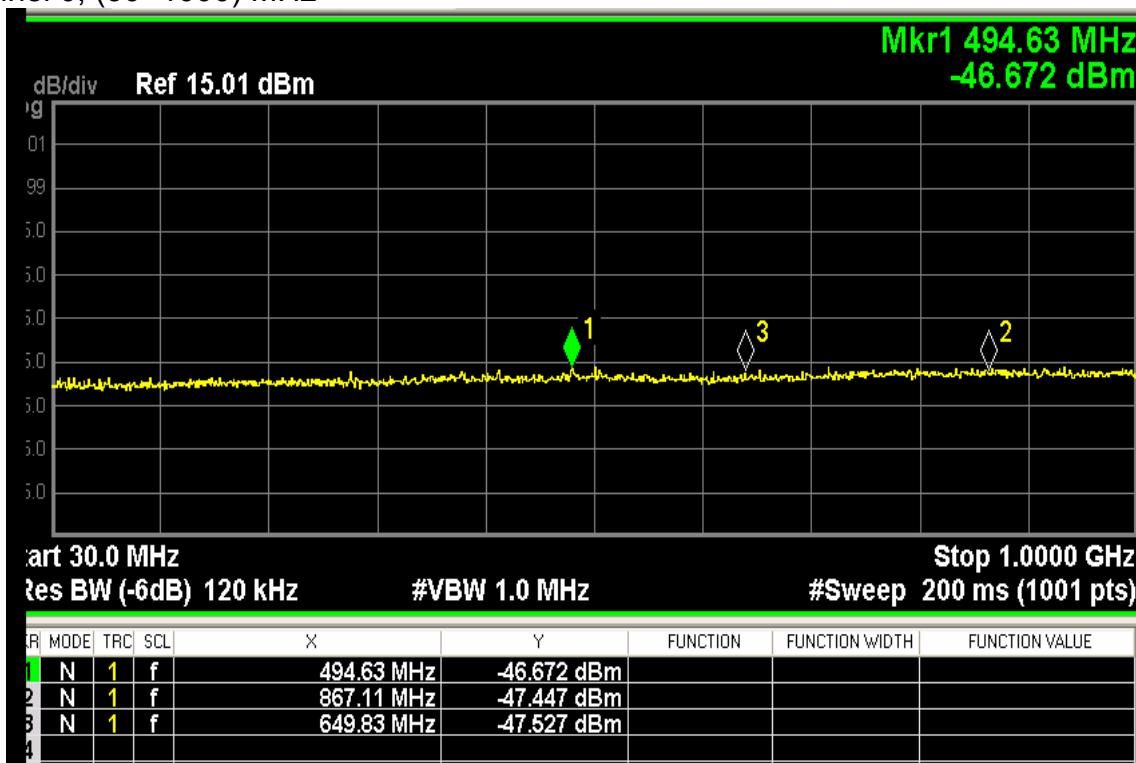
Bluetooth traffic mode GFSK

Channel 0; Below 30 MHz

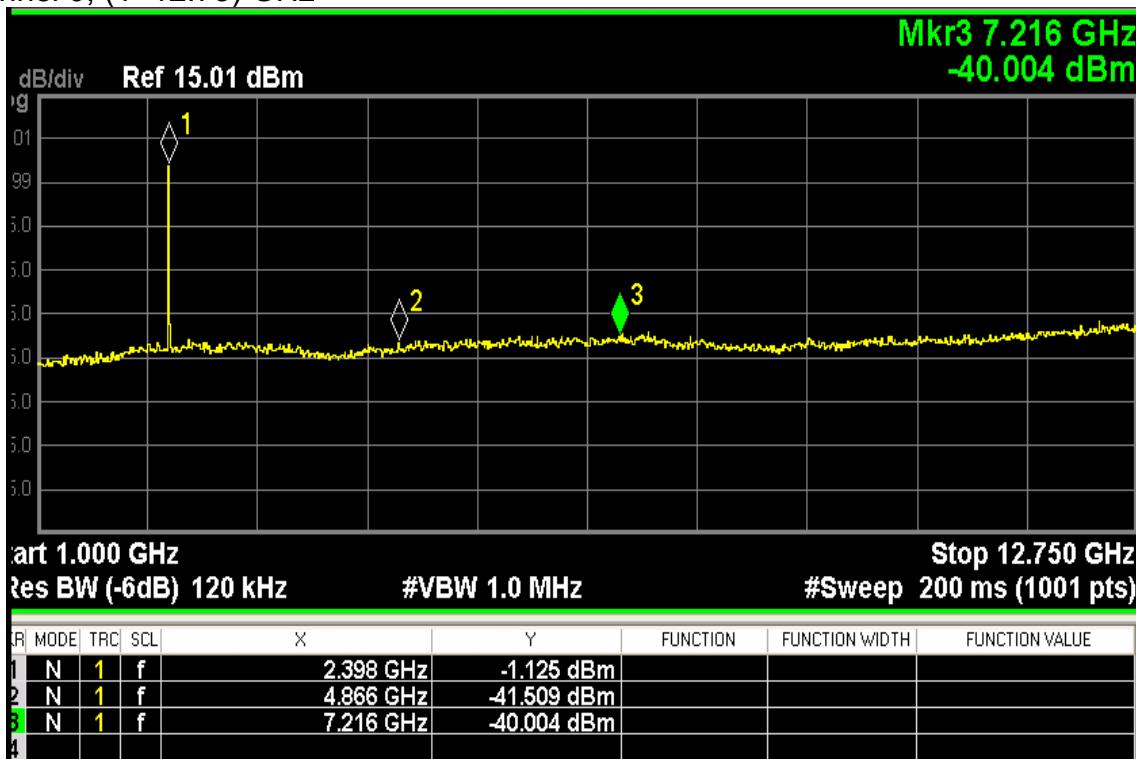


Note: There is not any harmonic but for background noise below 30 MHz.

Channel 0; (30~1000) MHz

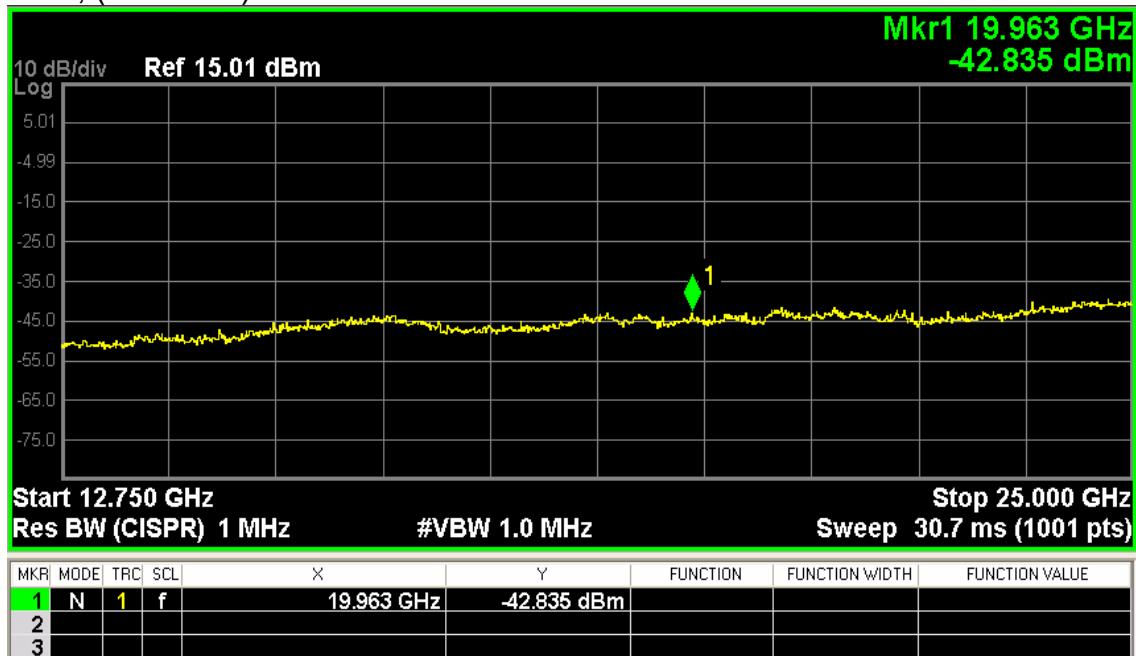


Channel 0; (1~12.75) GHz



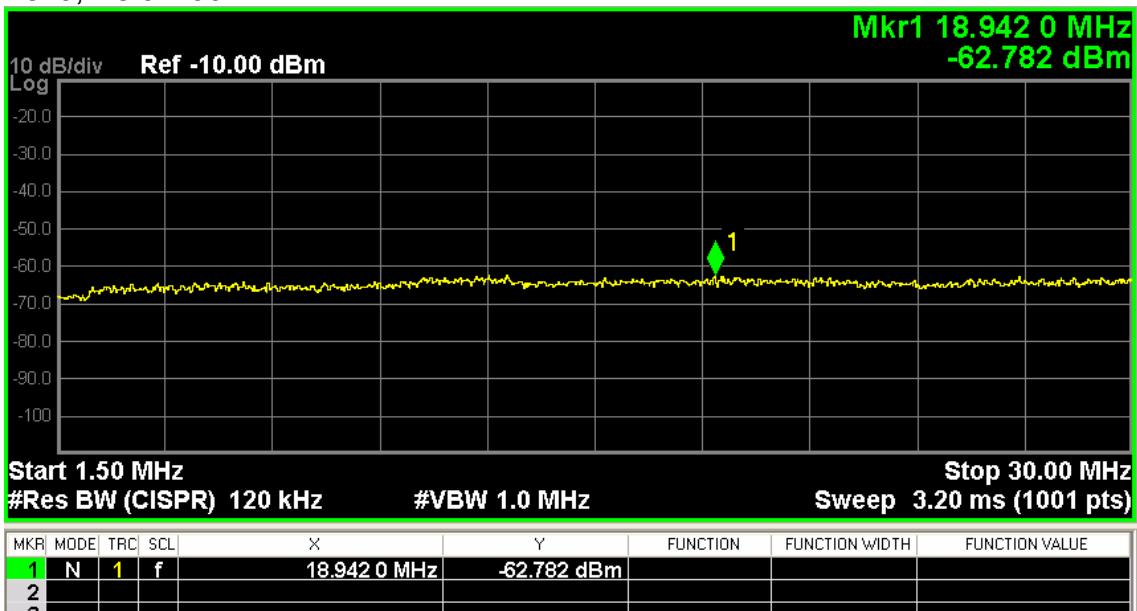
Note: The Mark1 point is carrier.

Channel 0; (12.75~25) GHz



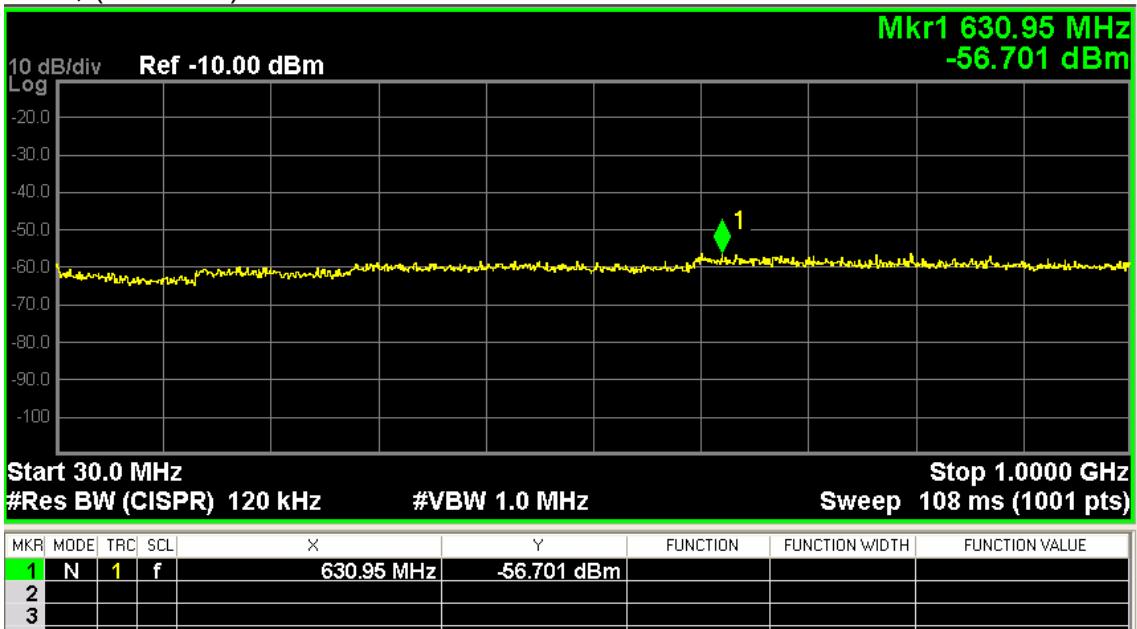
Bluetooth traffic mode 8-DPSK

Channel 0; Below 30 MHz

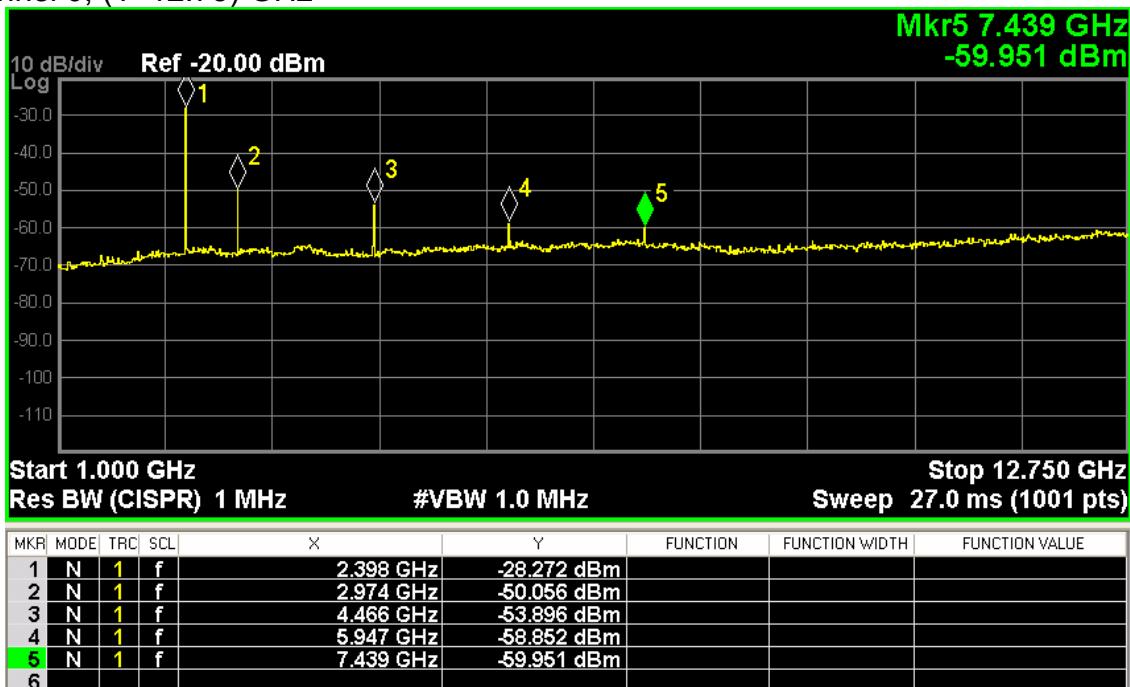


Note: There is not any harmonic but for background noise below 30 MHz.

Channel 0; (30~1000) MHz

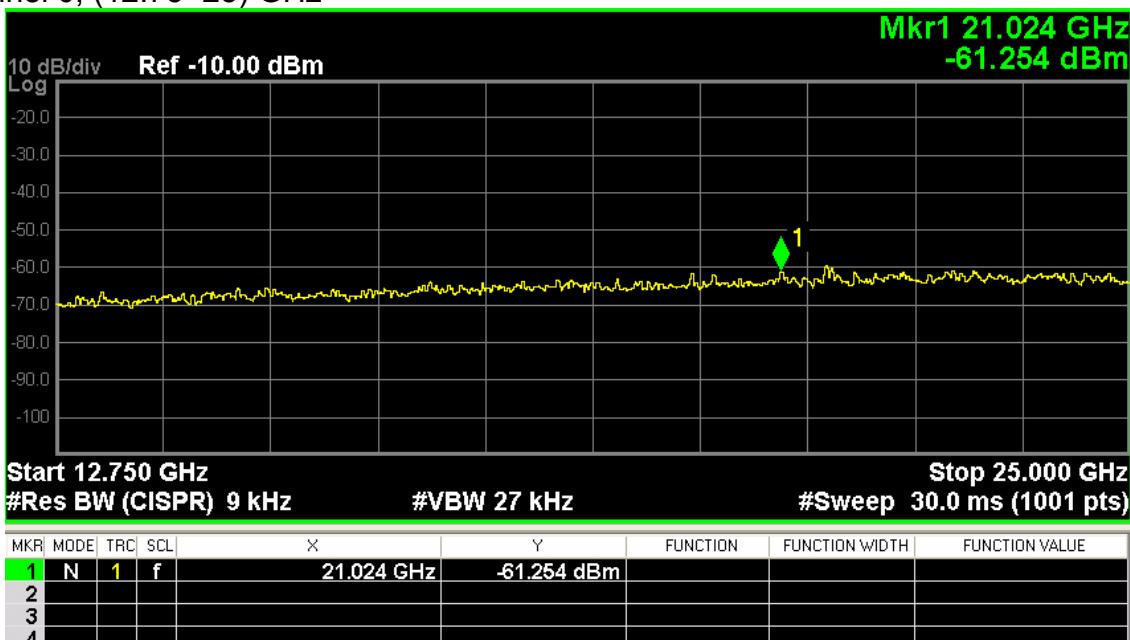


Channel 0; (1~12.75) GHz

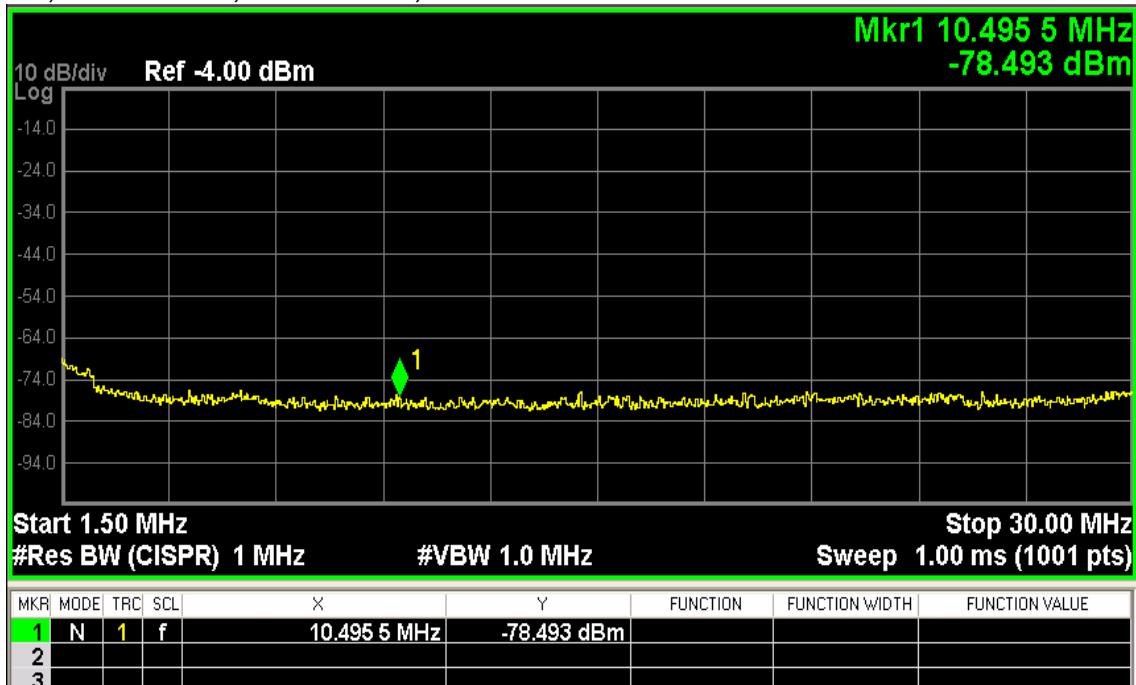


Note: The Mark1 point is carrier.

Channel 0; (12.75~25) GHz

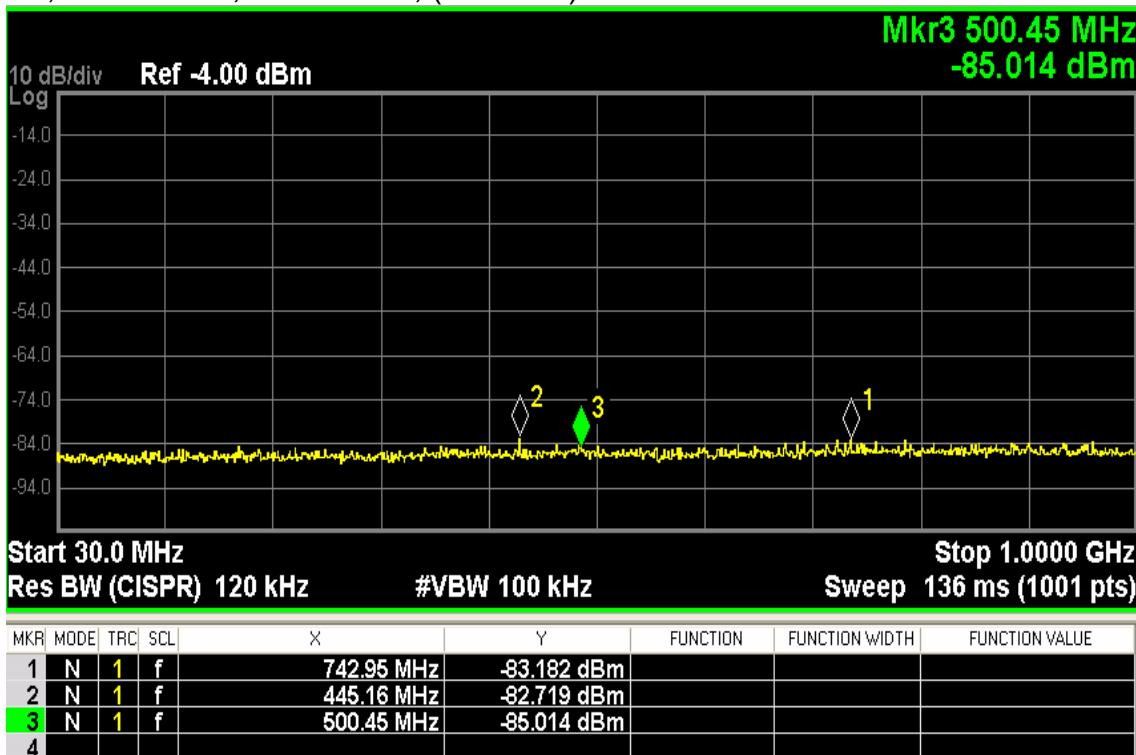


802.11b, traffic mode; Channel 01; Below 30 MHz

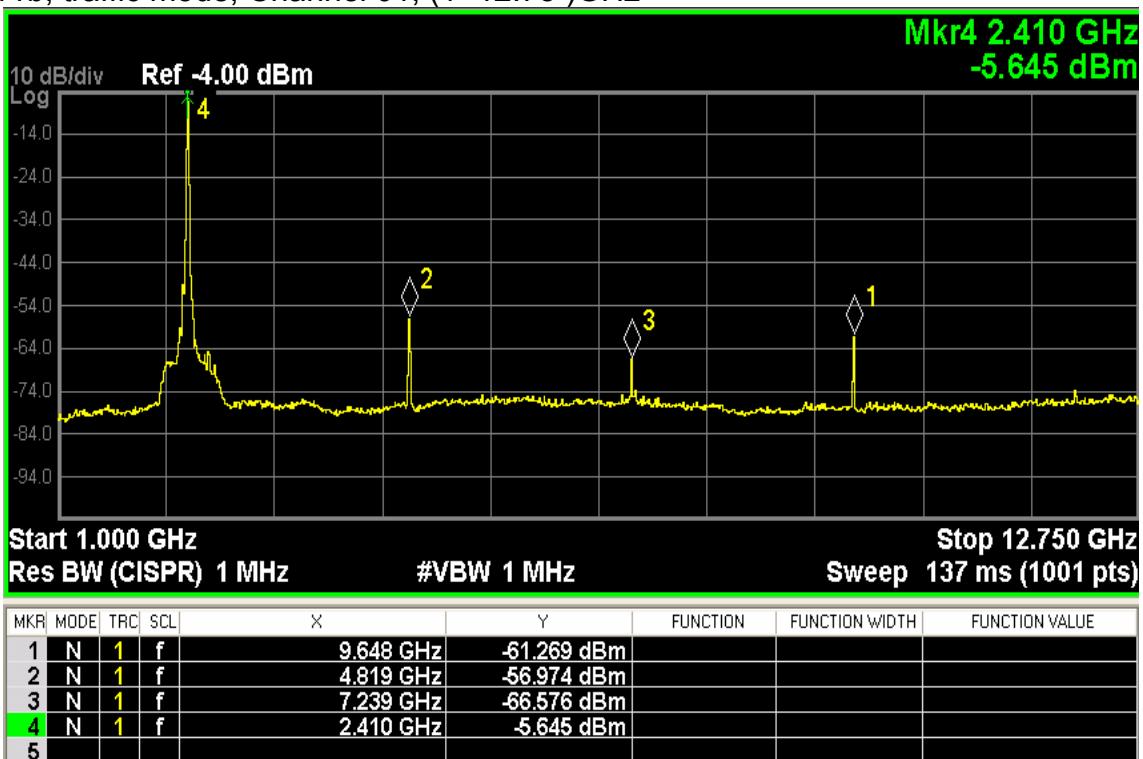


Note: There is not any harmonic but for background noise below 30 MHz.

802.11b, traffic mode; Channel 01; (30~1000) MHz



802.11b, traffic mode; Channel 01; (1~12.75)GHz

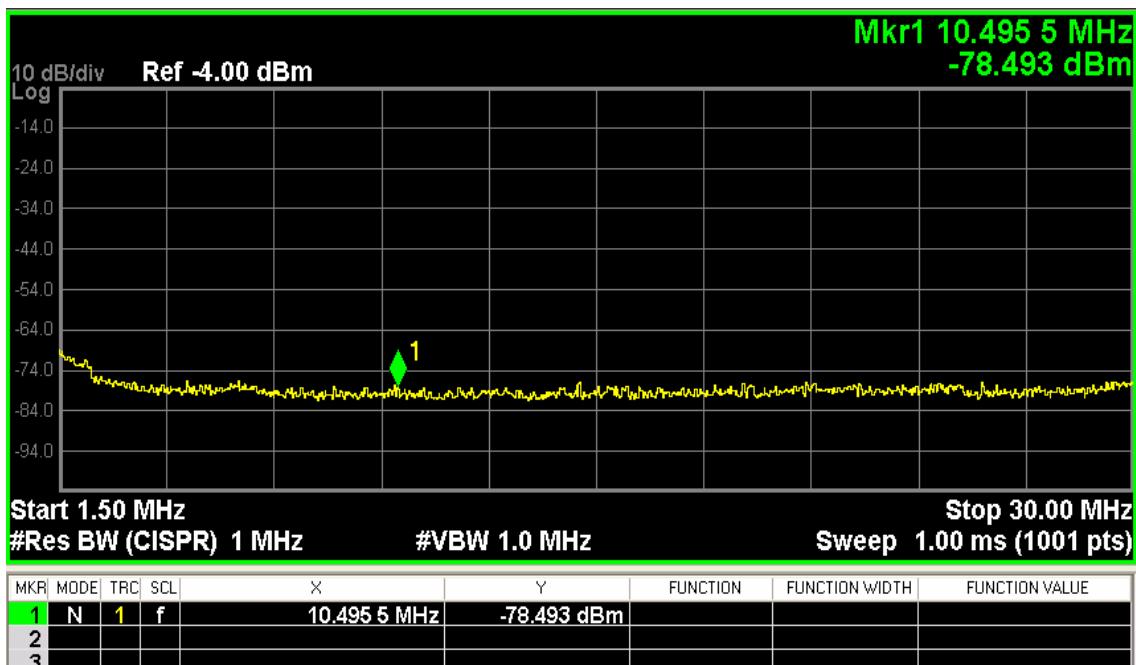


Note: The Mark4 point is carrier.

802.11b, traffic mode; Channel 01; (12.75~25)GHz

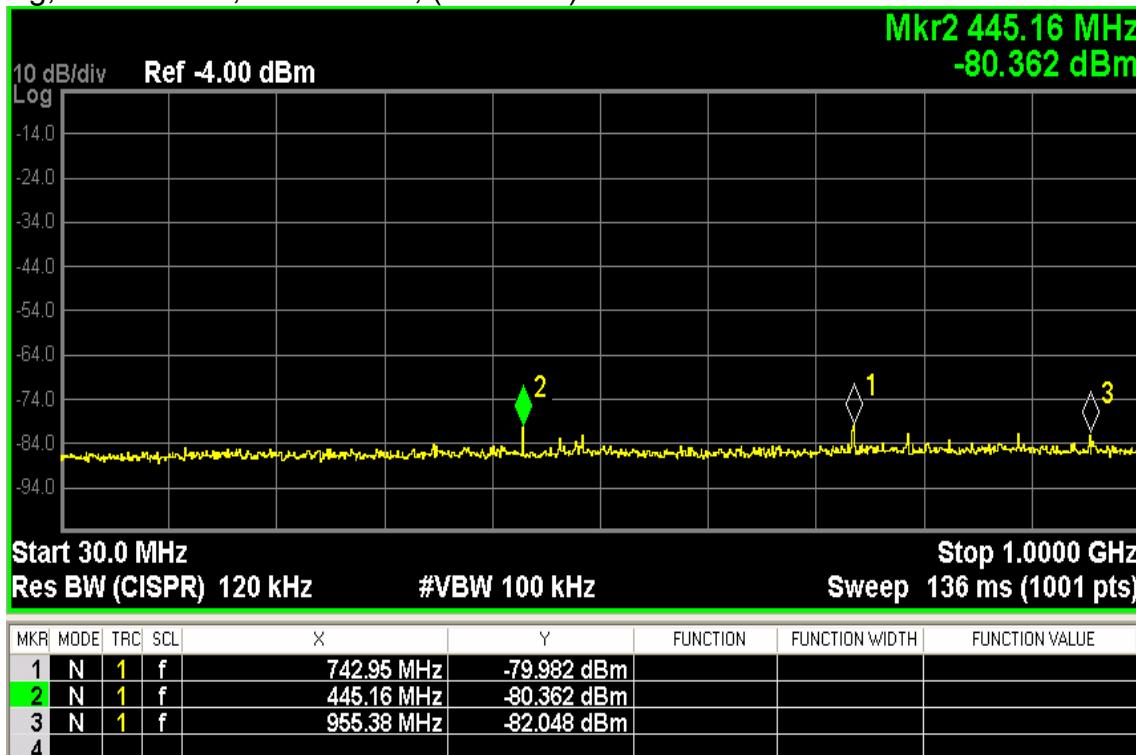


802.11g, traffic mode; Channel 01; Below 30 MHz

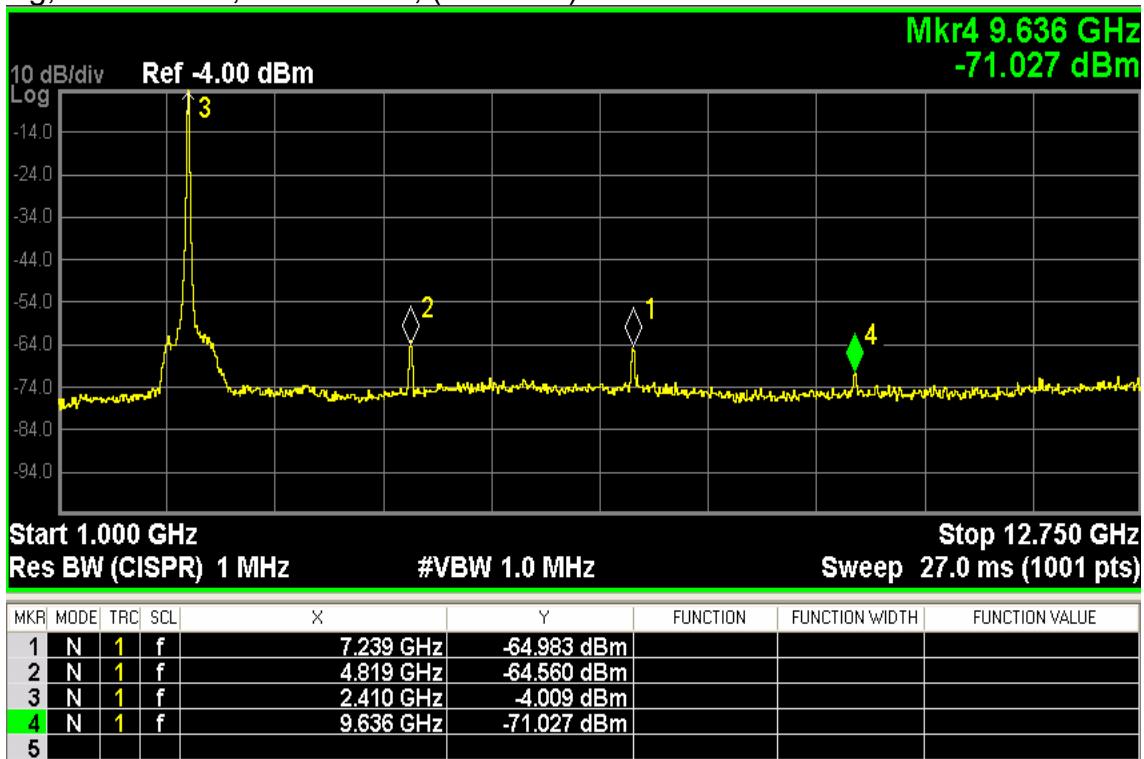


Note: There is not any harmonic but for background noise below 30 MHz.

802.11g, traffic mode; Channel 01; (30~1000) MHz

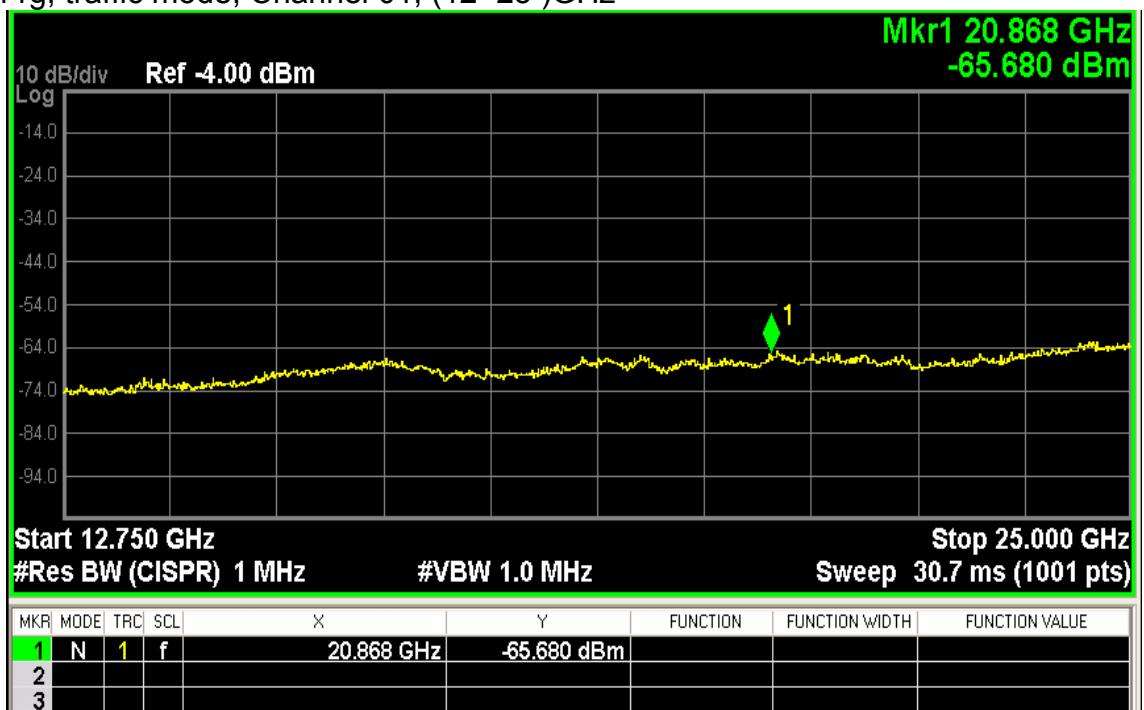


802.11g, traffic mode; Channel 01; (1~12.75)GHz



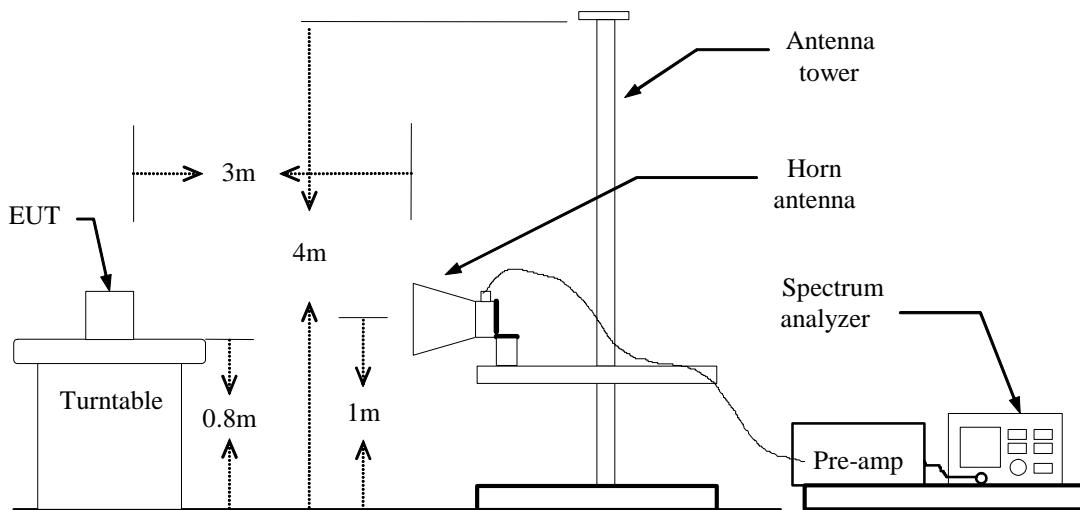
Note: The Mark3 point is carrier.

802.11g, traffic mode; Channel 01; (12~25)GHz



12. BAND EDGE MEASUREMENT

12.1 TEST SETUP



12.2 LIMITS

According to §15.247(c), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

12.3 TEST PROCEDURE

The EUT is placed on a turntable, which is 0.8m above the ground plane.

The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.

EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.

Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:

PEAK: RBW=VBW=1MHz / Sweep=AUTO

AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO

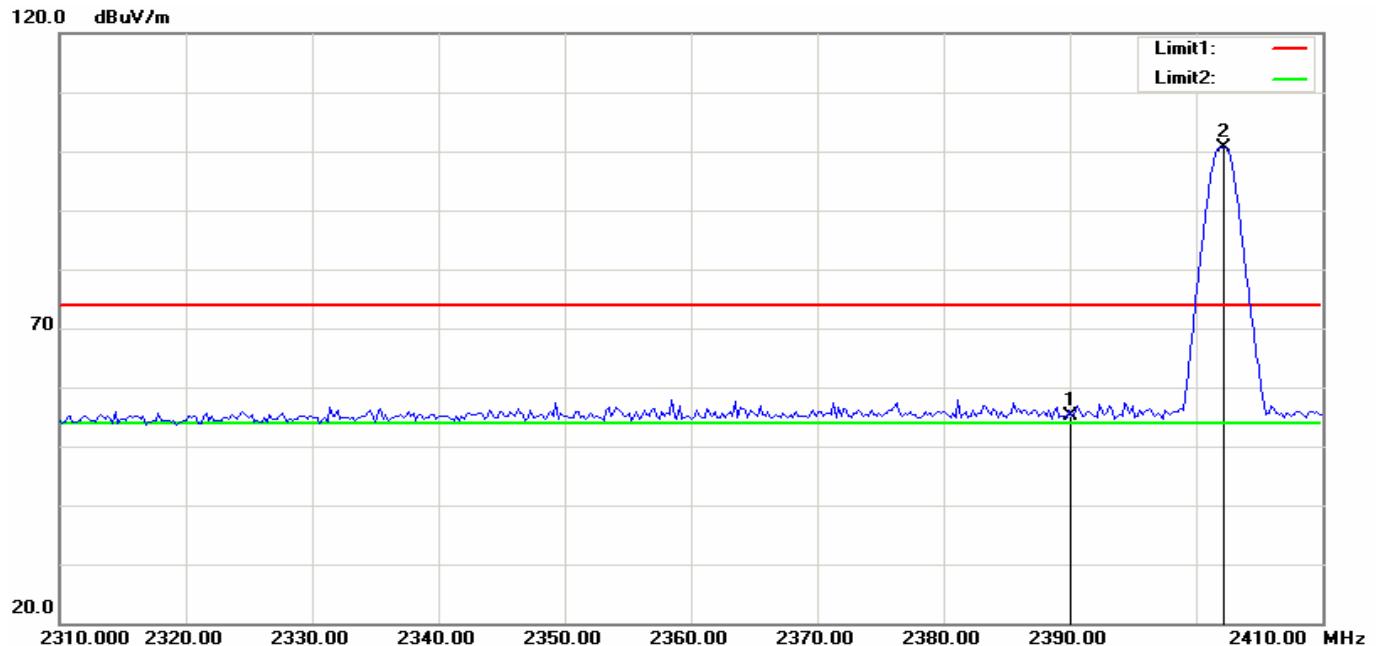
Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

12.4 RESULTS & PERFORMANCE

BT GFSK (Low Channel)

Detector mode: Peak

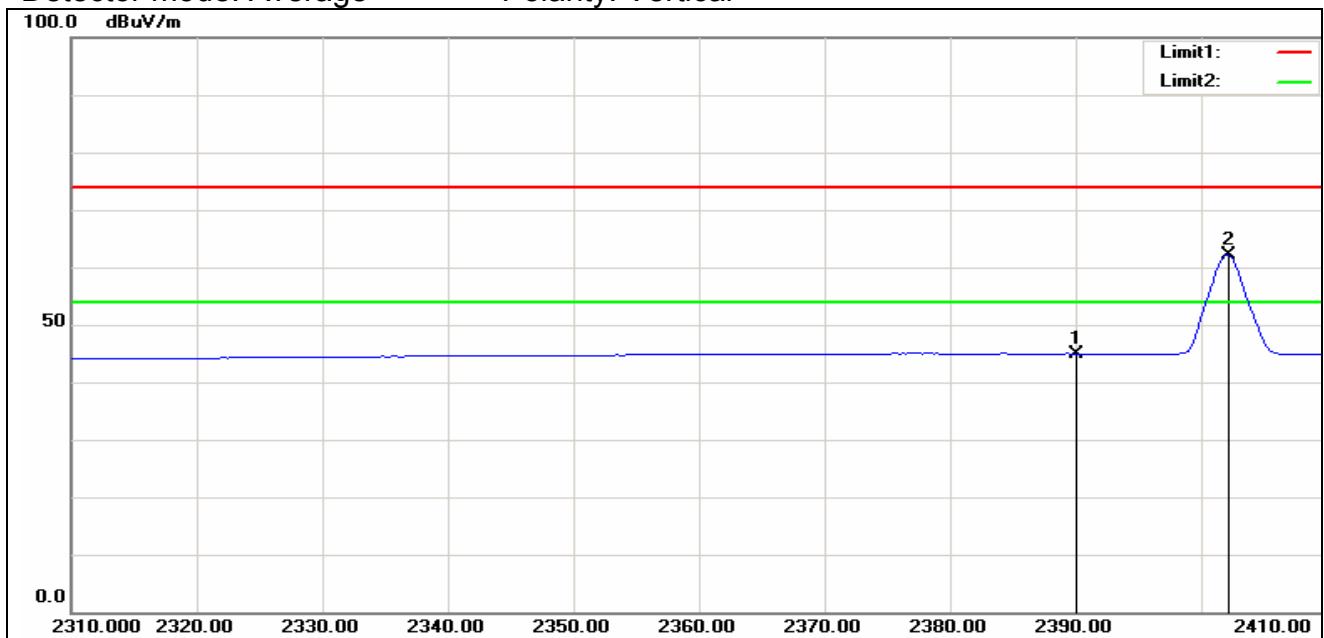
Polarity: Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2390.000	24.54	30.80	55.34	74.00	-18.66	100	107	peak
2	2402.184	69.96	30.85	100.81	74.00	26.81	100	107	peak

Detector mode: Average

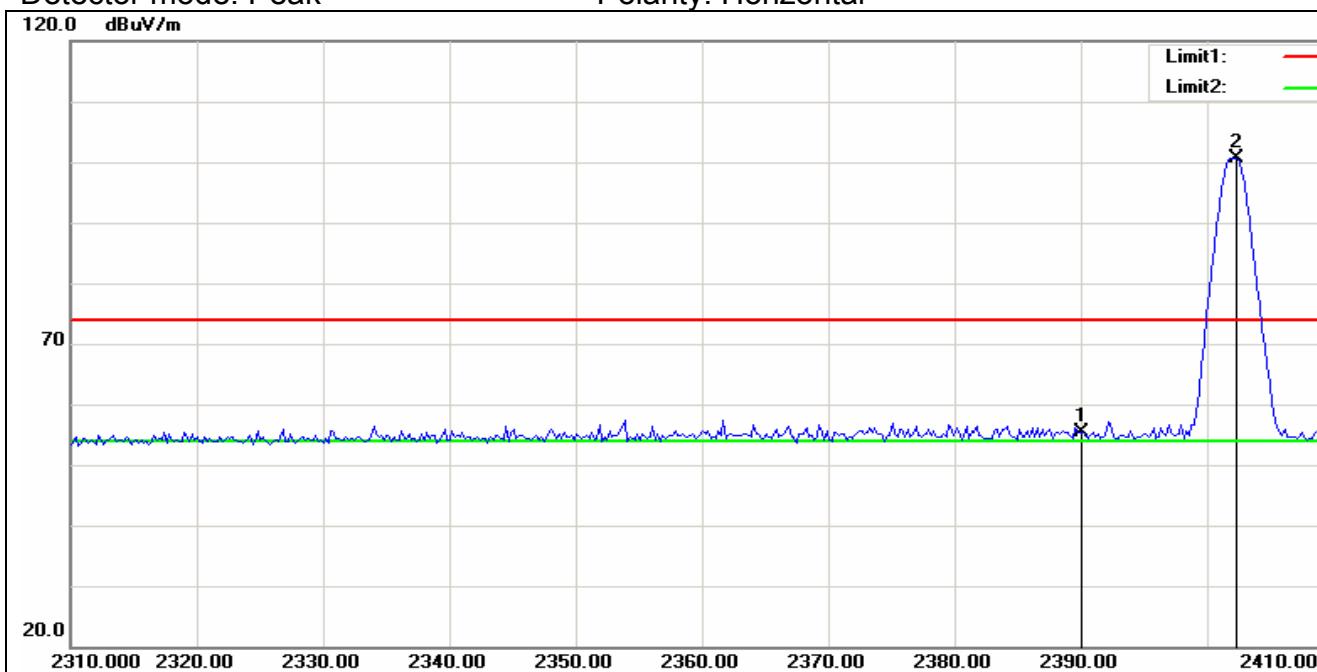
Polarity: Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2390.000	14.32	30.80	45.12	54.00	-8.88	100	113	AVG
2	2402.184	31.28	30.85	62.08	54.00	8.08	100	113	AVG

Detector mode: Peak

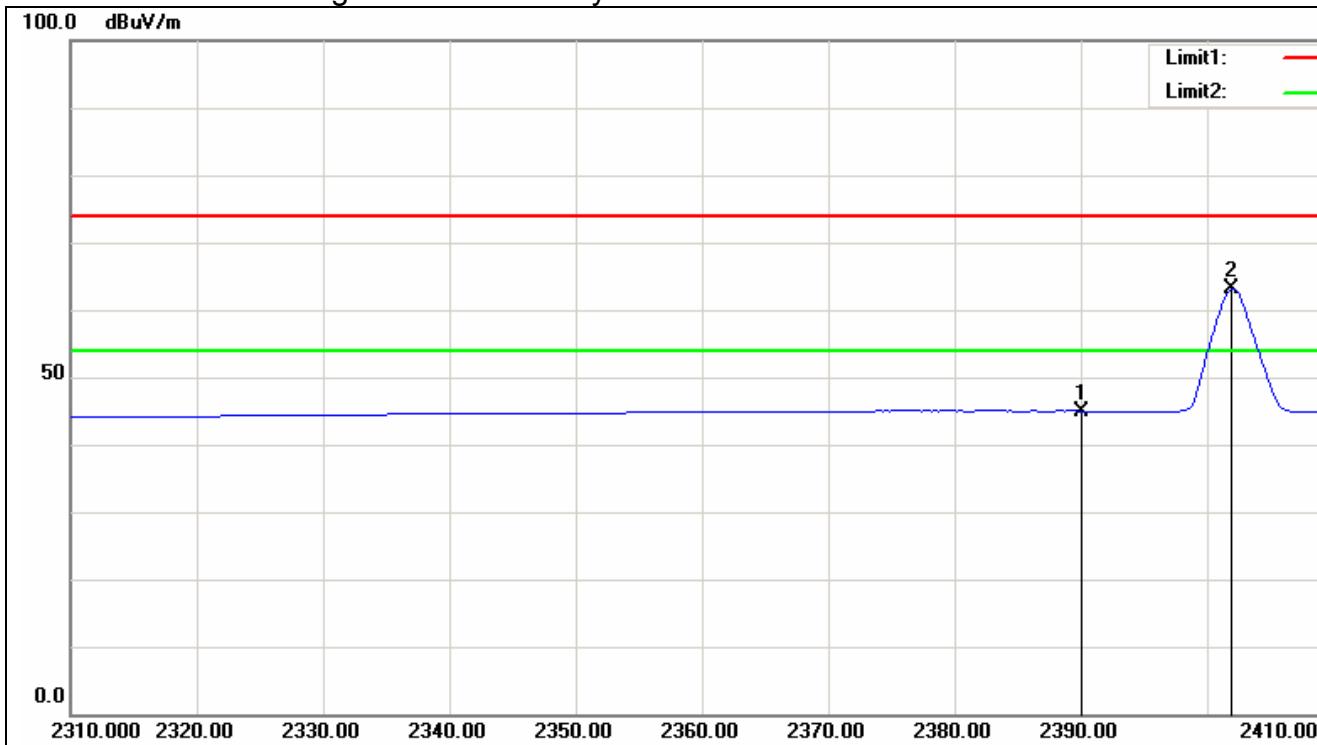
Polarity: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2390.000	24.60	30.80	55.4	74.00	-18.6	100	126	peak
2	2402.385	69.34	30.85	100.19	74.00	26.19	100	126	peak

Detector mode: Average

Polarity: Horizontal

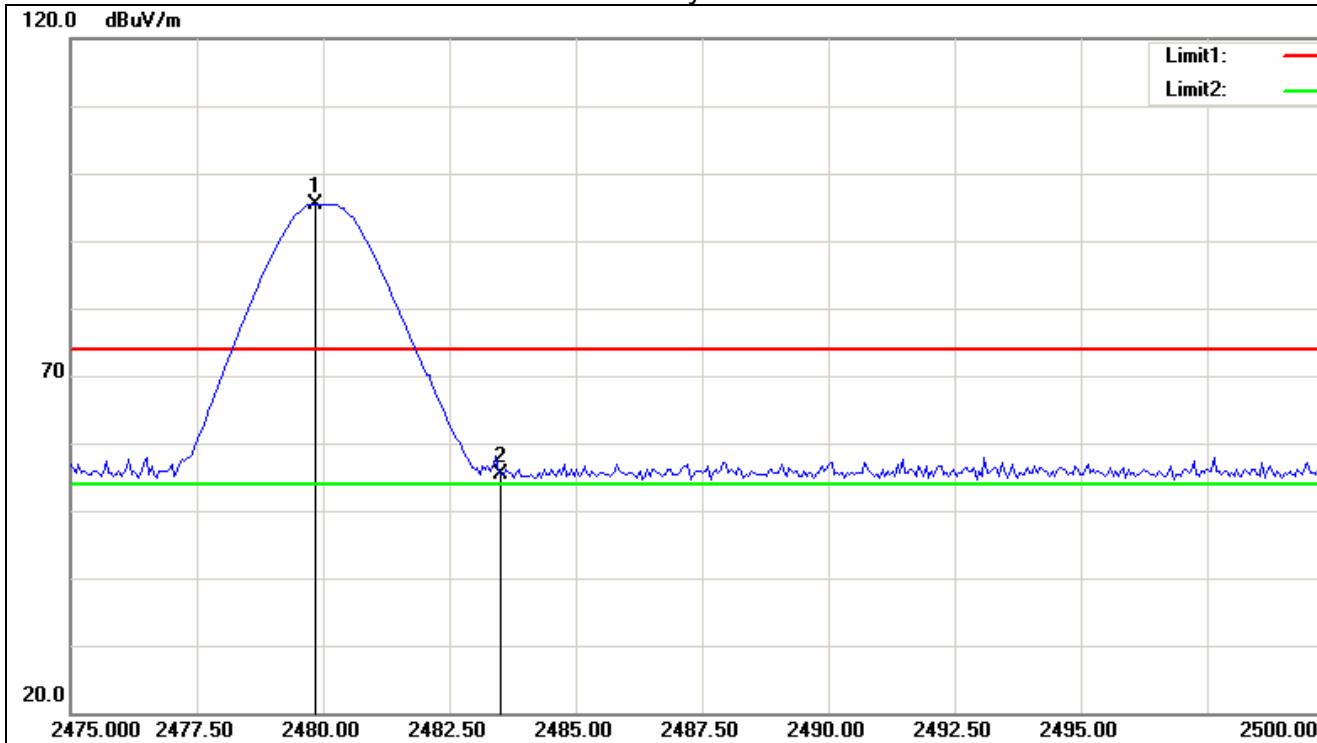


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2390.000	14.24	30.80	44.24	54.00	-9.76	100	110	AVG
2	2401.984	32.11	30.85	62.96	54.00	8.96	100	110	AVG

BT GFSK (High Channel)

Detector mode: Peak

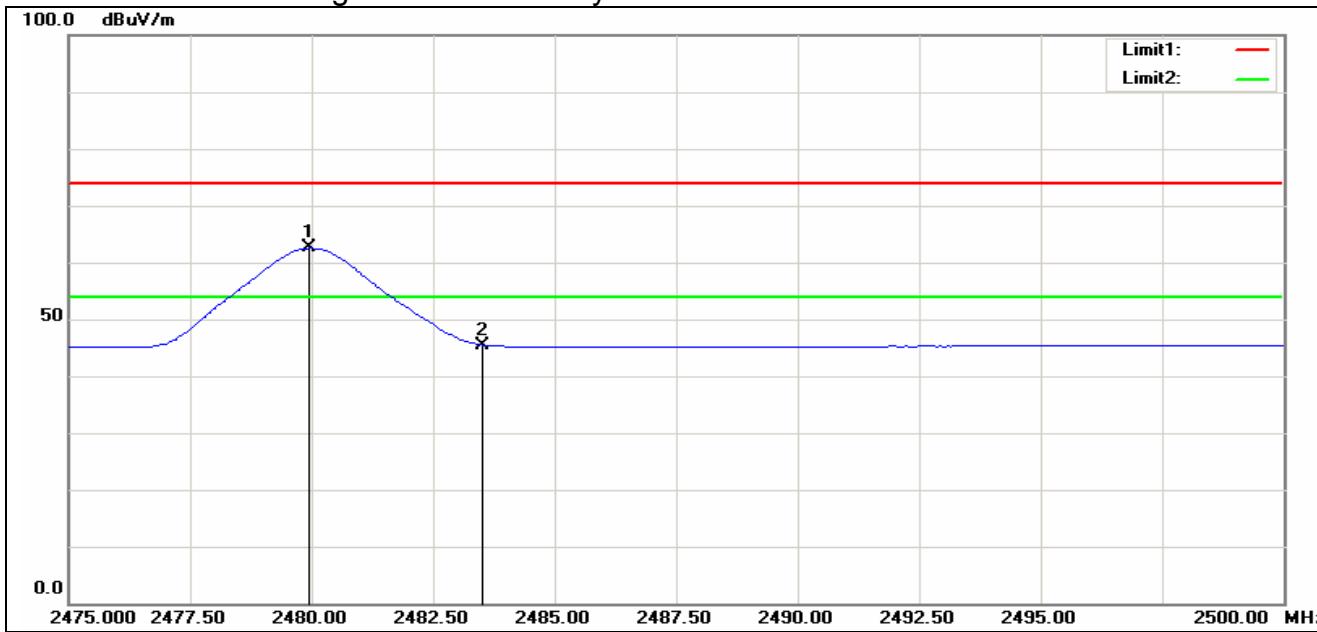
Polarity: Vertical



No.	Frequency (MHz)	Reading (dB _{uV})	Correct Factor(dB/m)	Result (dB _{uV/m})	Limit (dB _{uV/m})	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2479.860	64.35	31.12	95.47	74.00	21.47	100	122	peak
2	2483.500	24.29	31.13	55.42	74.00	-18.58	100	122	peak

Detector mode: Average

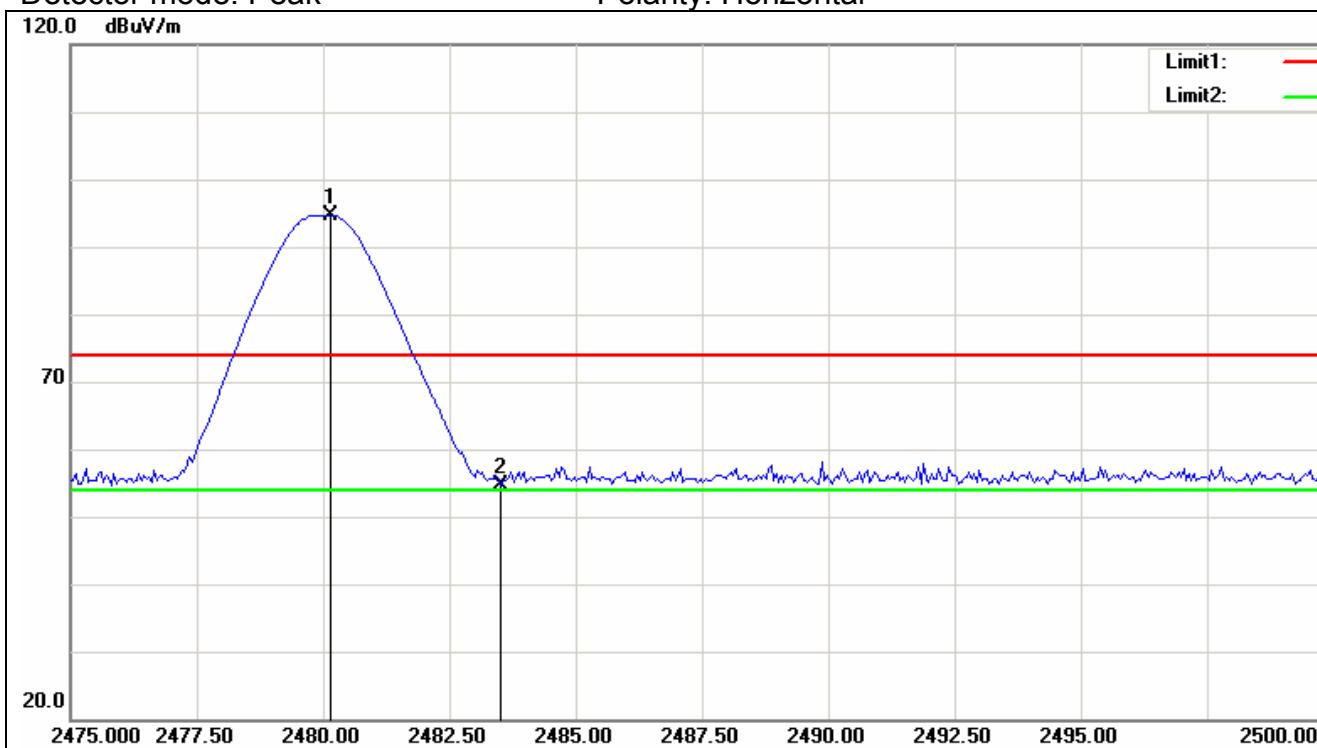
Polarity: Vertical



No.	Frequency (MHz)	Reading (dB _{uV})	Correct Factor(dB/m)	Result (dB _{uV/m})	Limit (dB _{uV/m})	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2479.960	31.35	31.12	62.42	54.00	8.42	100	102	AVG
2	2483.500	14.26	31.13	45.39	54.00	-4.61	100	104	AVG

Detector mode: Peak

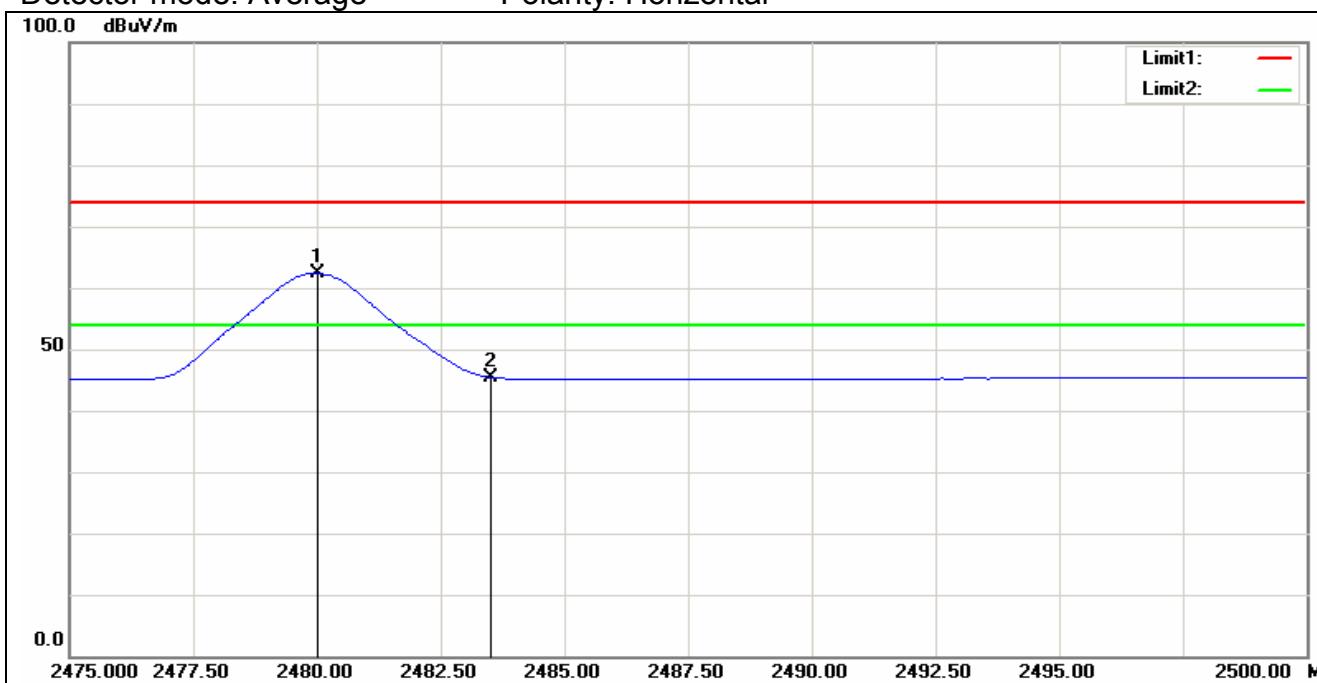
Polarity: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2480.160	63.46	31.12	94.58	74.00	20.58	100	102	peak
2	2483.500	23.53	31.13	54.66	74.00	-19.34	100	102	peak

Detector mode: Average

Polarity: Horizontal

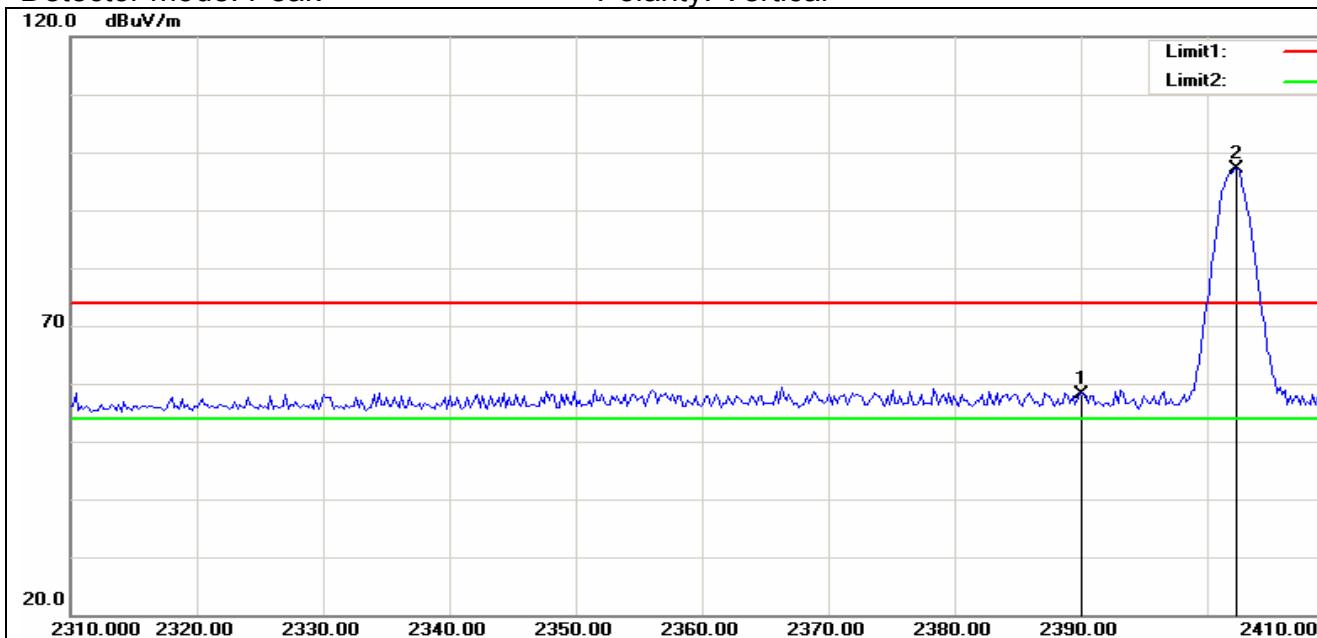


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2480.010	31.21	31.12	62.33	54.00	8.33	100	102	AVG
2	2483.500	14.23	31.13	45.36	54.00	-8.64	100	102	AVG

BT 8-DPSK (Low Channel)

Detector mode: Peak

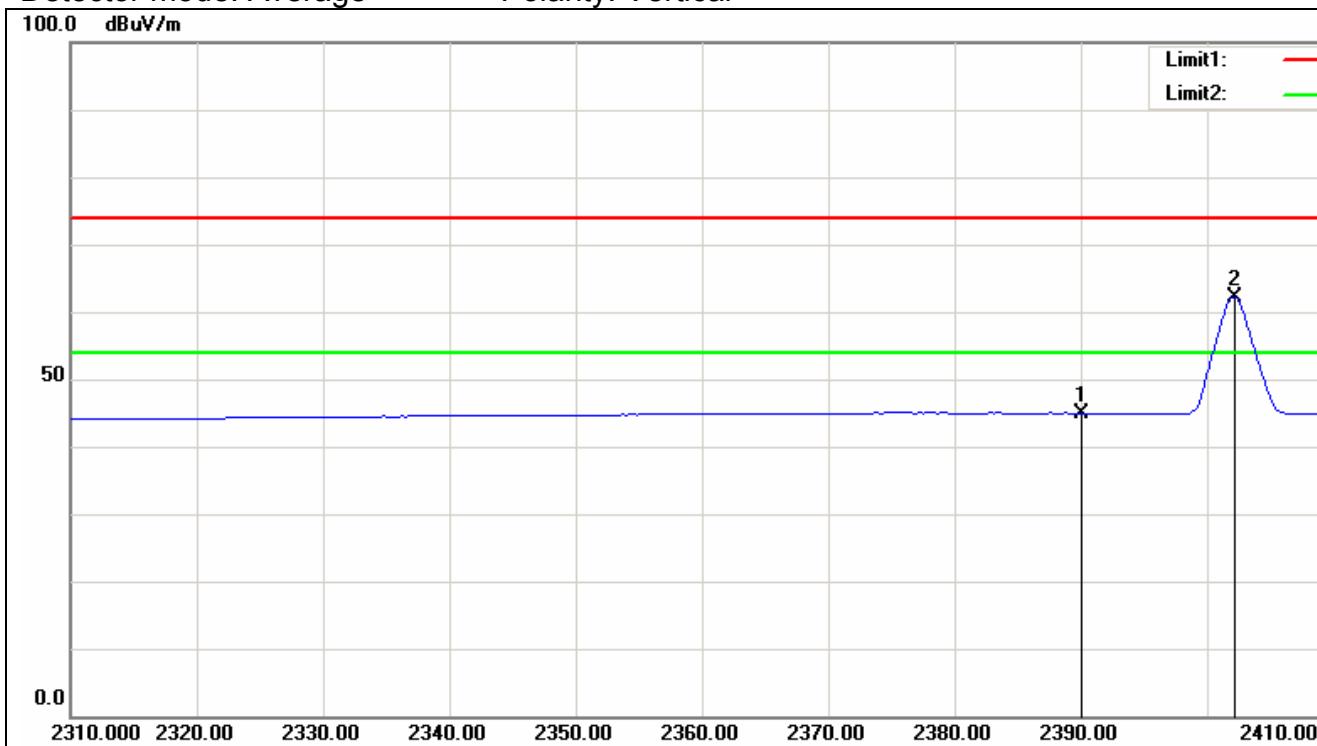
Polarity: Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2390.000	27.31	30.80	58.11	74.00	-16.89	100	123	peak
2	2402.385	66.28	30.85	97.13	74.00	23.13	100	123	peak

Detector mode: Average

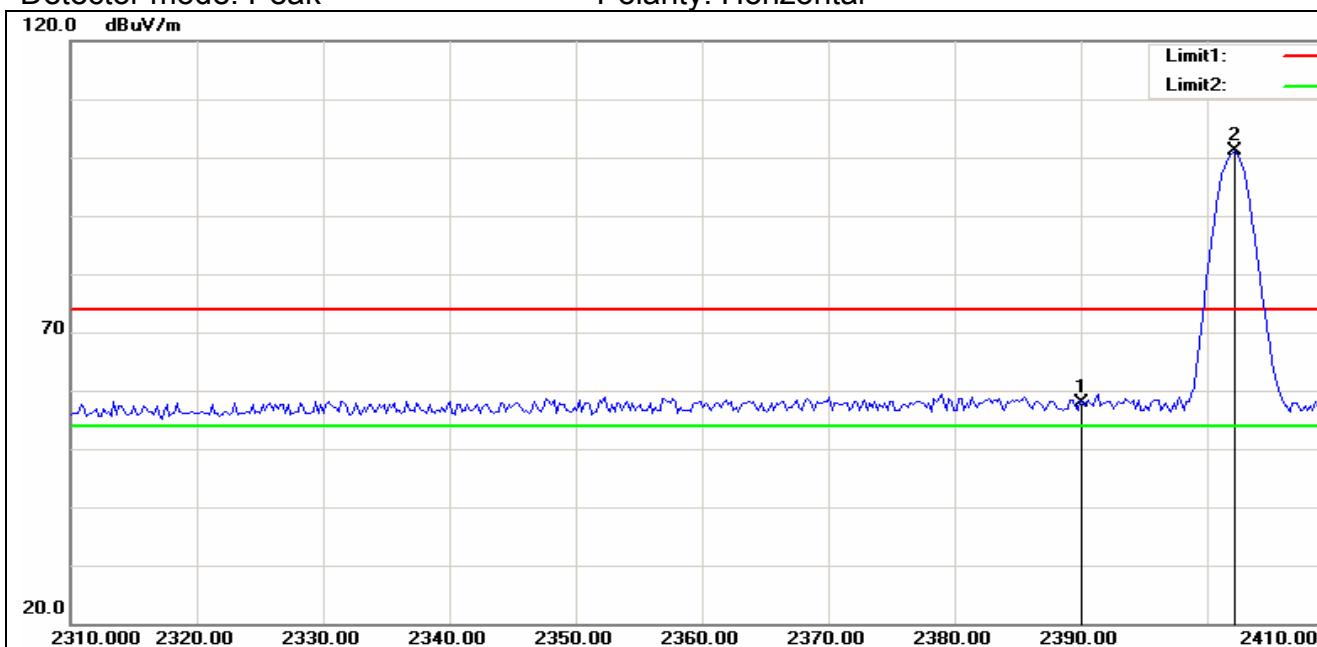
Polarity: Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2390.000	14.12	30.80	44.92	54.00	-10.08	100	123	AVG
2	2402.184	31.23	30.85	62.08	54.00	8.08	100	123	AVG

Detector mode: Peak

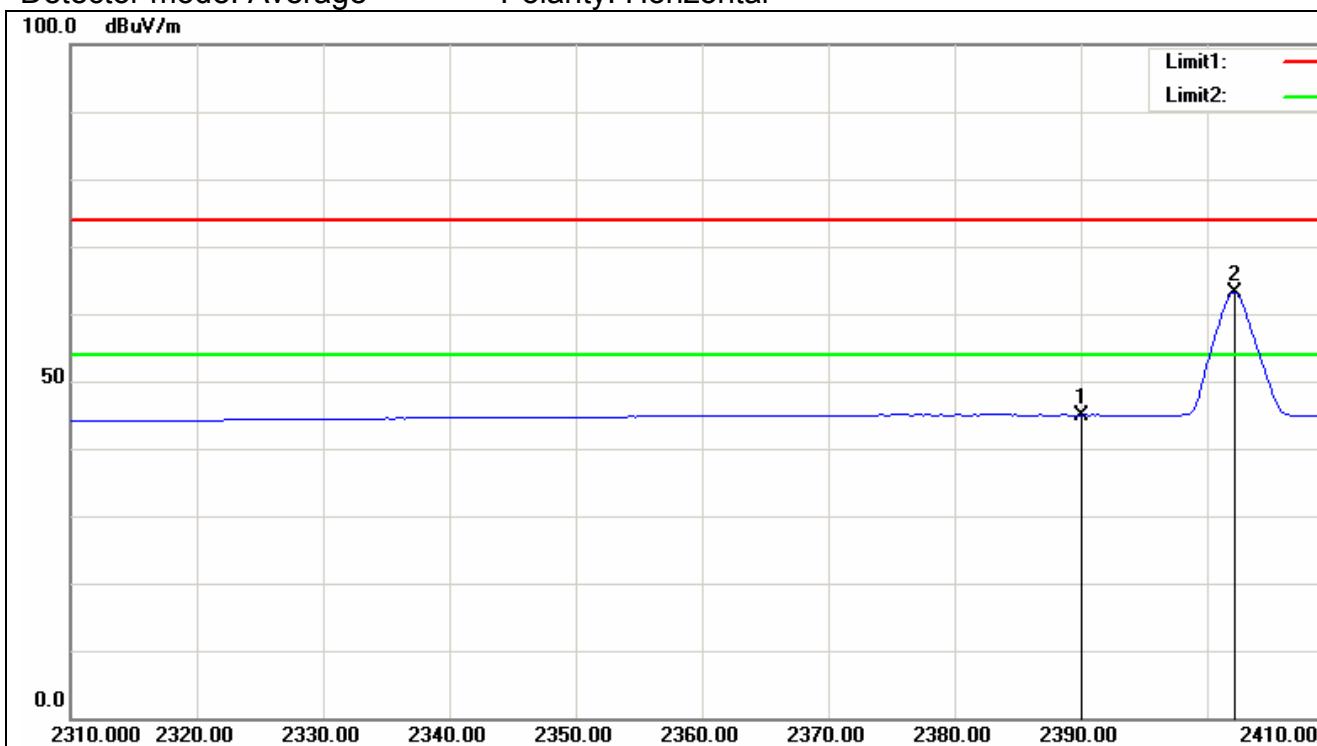
Polarity: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2390.000	27.00	30.75	57.75	74.00	-16.25	100	245	peak
2	2402.184	70.17	30.74	100.91	74.00	26.91	100	245	peak

Detector mode: Average

Polarity: Horizontal

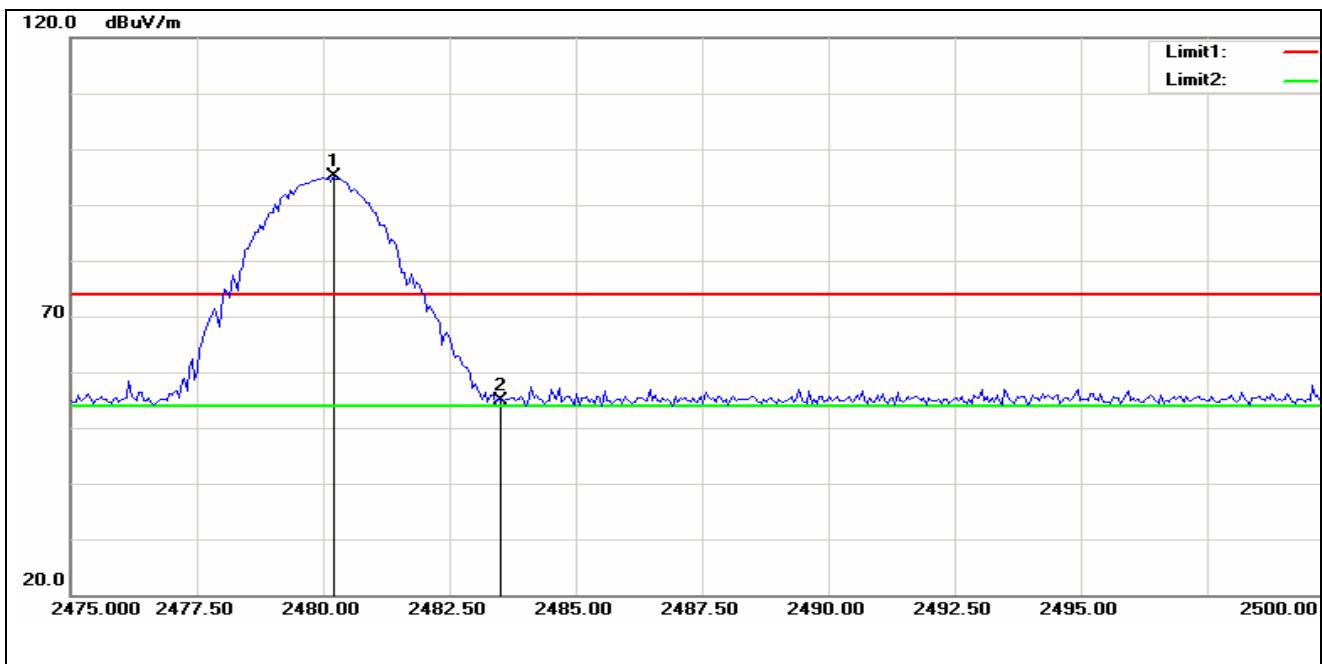


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2390.000	14.15	45.00	59.15	54.00	5.15	100	245	AVG
2	2402.184	32.23	63.11	95.34	54.00	41.34	100	245	AVG

BT 8-DPSK (High Channel)

Detector mode: Peak

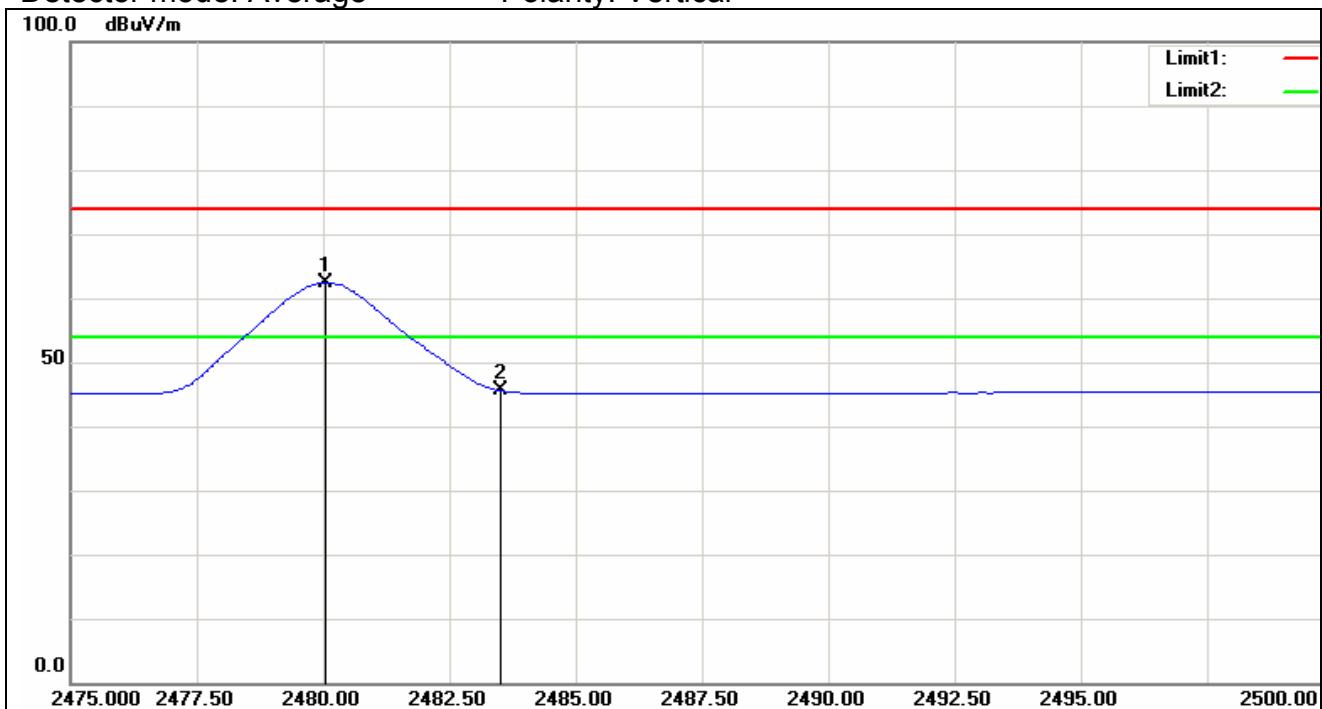
Polarity: Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2480.210	63.73	31.12	94.85	74.00	20.85	100	156	peak
2	2483.500	23.74	31.13	54.87	74.00	-19.13	100	156	peak

Detector mode: Average

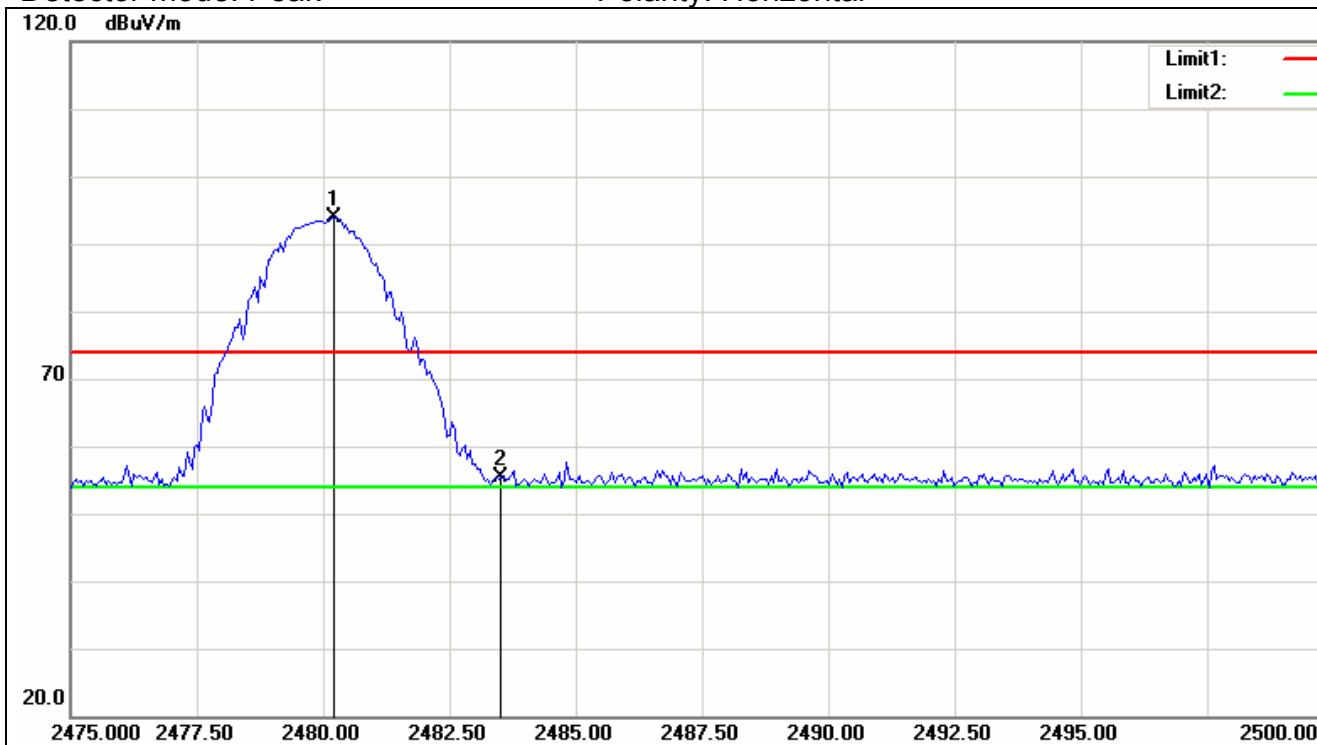
Polarity: Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2480.060	31.24	31.12	62.36	54.00	8.36	100	156	AVG
2	2483.500	14.32	31.13	45.45	54.00	-8.55	100	156	AVG

Detector mode: Peak

Polarity: Horizontal



No.	Frequency (MHz)	Reading (dB _{UV})	Correct Factor(dB/m)	Result (dB _{UV} /m)	Limit (dB _{UV} /m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2480.210	62.73	31.12	93.85	74.00	19.85	100	156	peak
2	2483.500	24.19	31.13	55.32	74.00	-18.68	100	156	peak

Detector mode: Average

Polarity: Horizontal

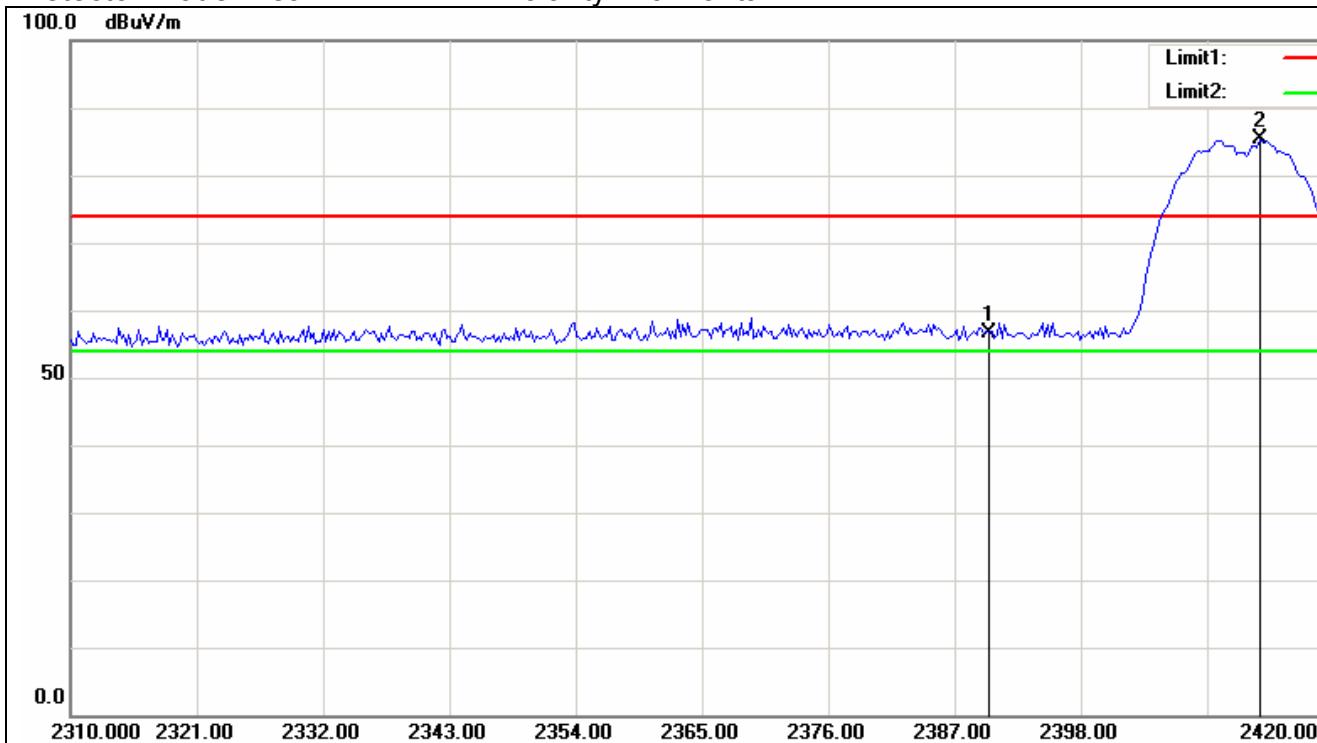


No.	Frequency (MHz)	Reading (dB _{UV})	Correct Factor(dB/m)	Result (dB _{UV} /m)	Limit (dB _{UV} /m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2480.010	31.25	31.12	62.37	54.00	8.37	100	156	AVG
2	2483.500	14.32	31.13	45.45	54.00	-8.55	100	156	AVG

Wifi b Mode (Low Channel)

Detector mode: Peak

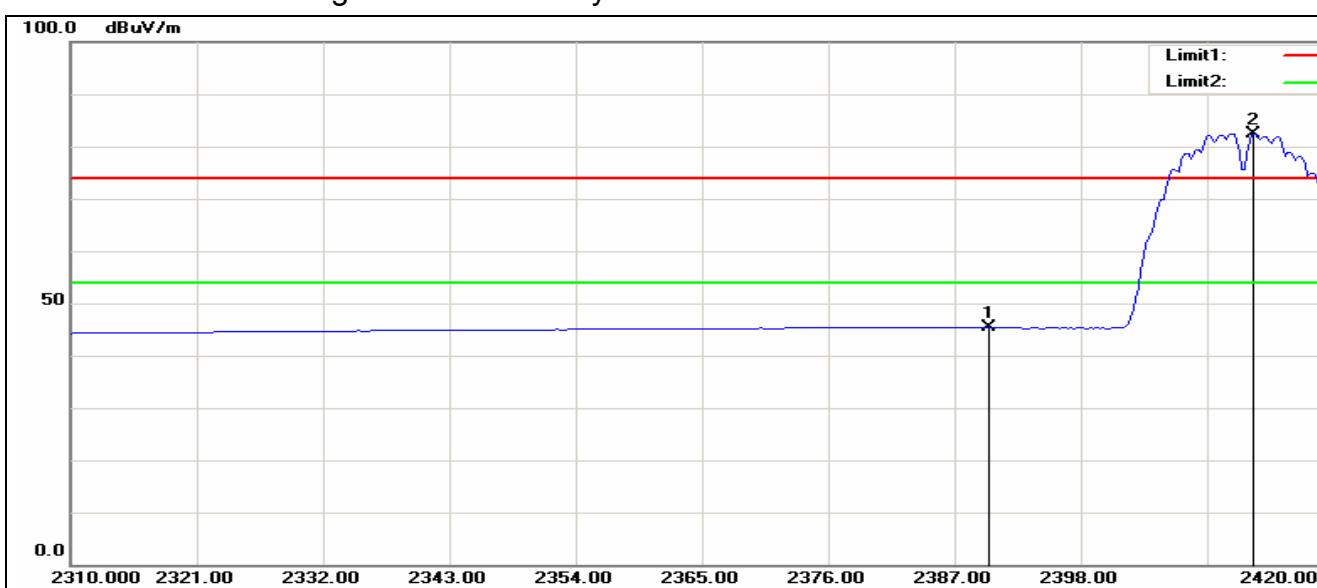
Polarity: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2390.000	25.75	30.80	56.55	74.00	-17.45	100	99	peak
2	2413.607	54.26	30.89	85.15	74.00	11.15	100	99	peak

Detector mode: Average

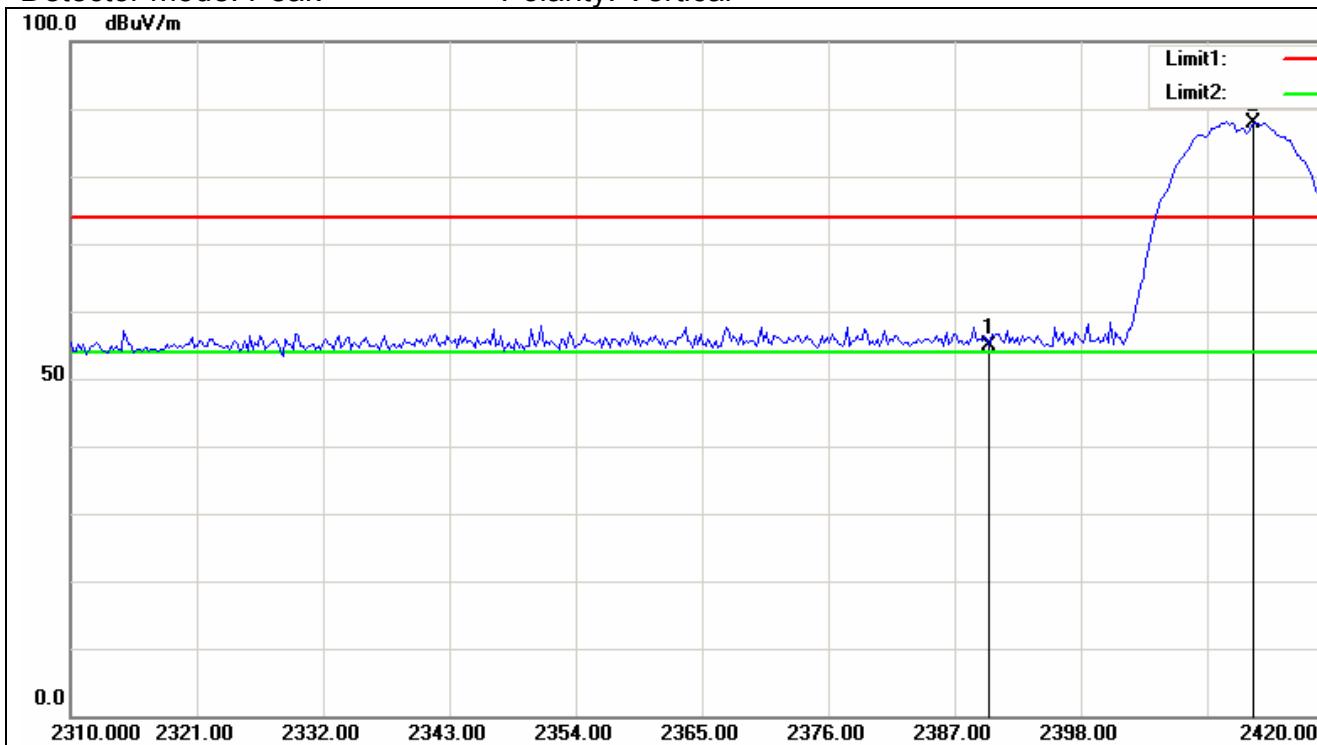
Polarity: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2390.000	14.45	30.80	45.25	54.00	-8.75	100	99	AVG
2	2413.000	51.59	30.88	82.47	54.00	28.47	100	99	AVG

Detector mode: Peak

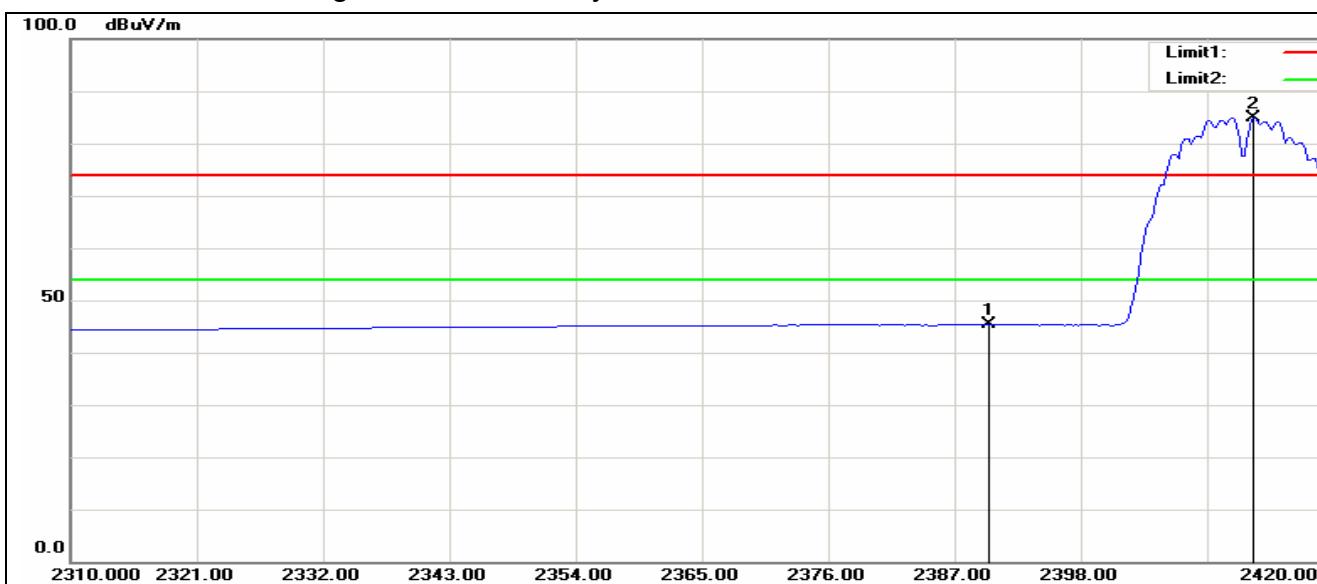
Polarity: Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2390.000	23.96	30.80	54.76	74.00	-19.24	100	199	peak
2	2413.000	56.93	30.88	87.81	74.00	13.81	100	199	peak

Detector mode: Average

Polarity: Vertical

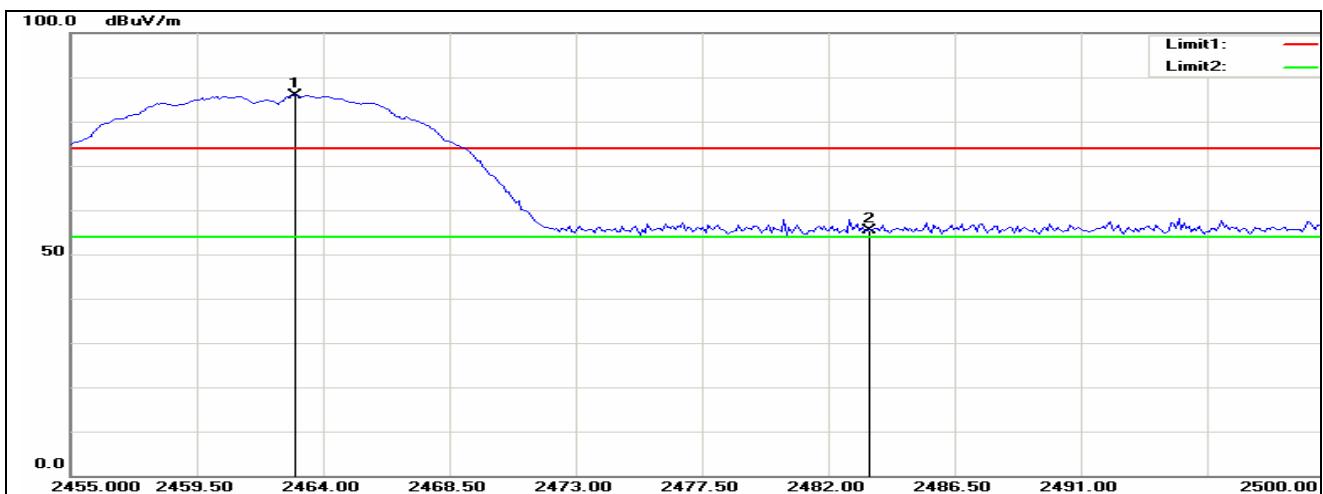


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2390.000	14.43	30.80	45.13	54.00	-8.87	100	199	AVG
2	2413.000	53.56	30.88	84.44	54.00	30.44	100	199	AVG

Wifi b Mode (High Channel)

Detector mode: Peak

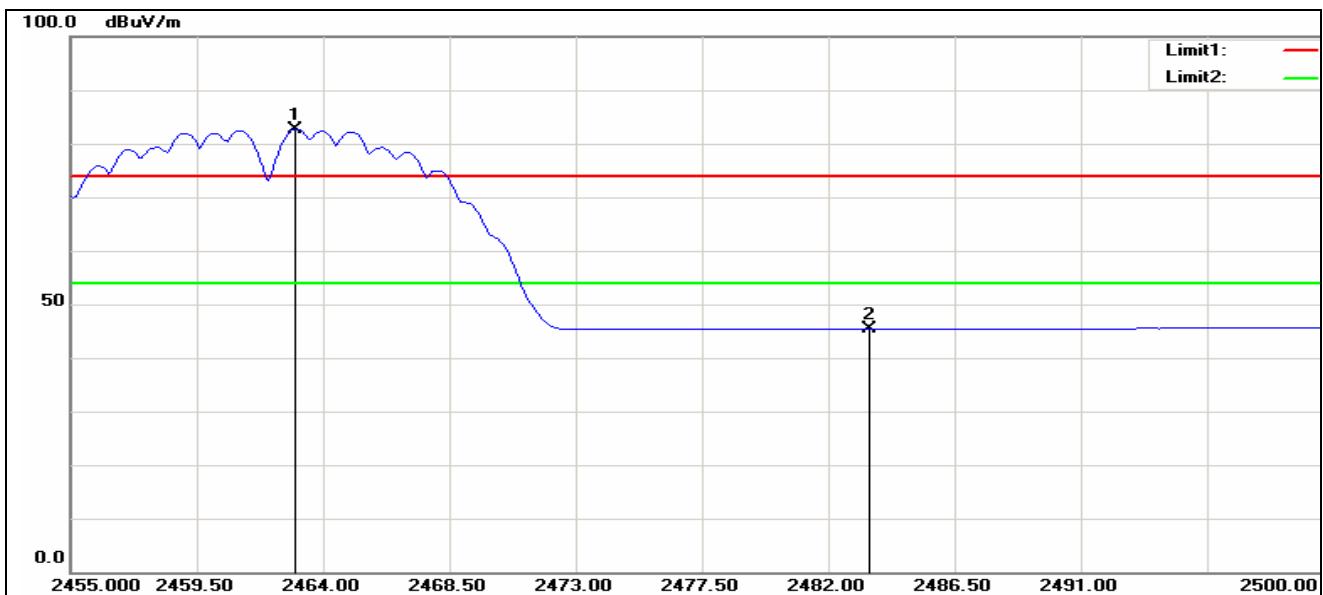
Polarity: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2463.000	54.47	31.06	85.53	74.00	11.53	100	123	peak
2	2483.500	24.15	31.13	55.28	74.00	-18.72	100	123	peak

Detector mode: Average

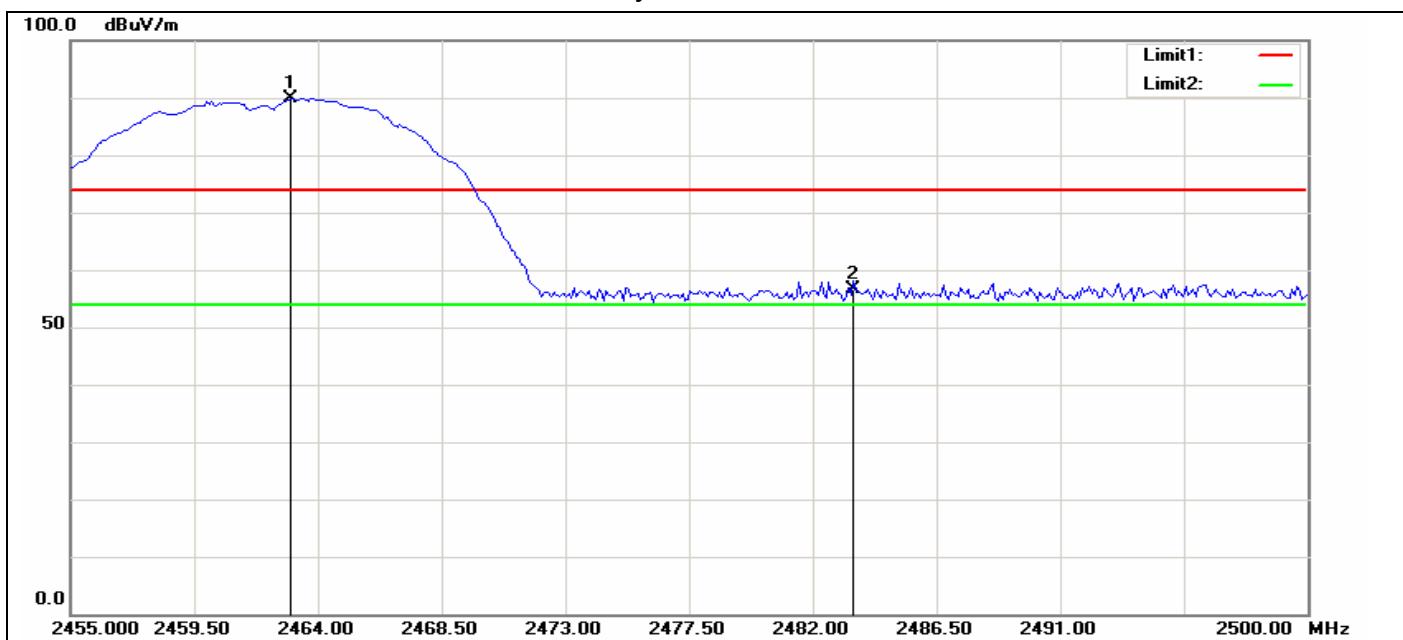
Polarity: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2463.000	51.61	31.06	82.67	54.00	28.67	100	123	AVG
2	2483.500	14.29	31.13	45.42	54.00	-8.58	100	123	AVG

Detector mode: Peak

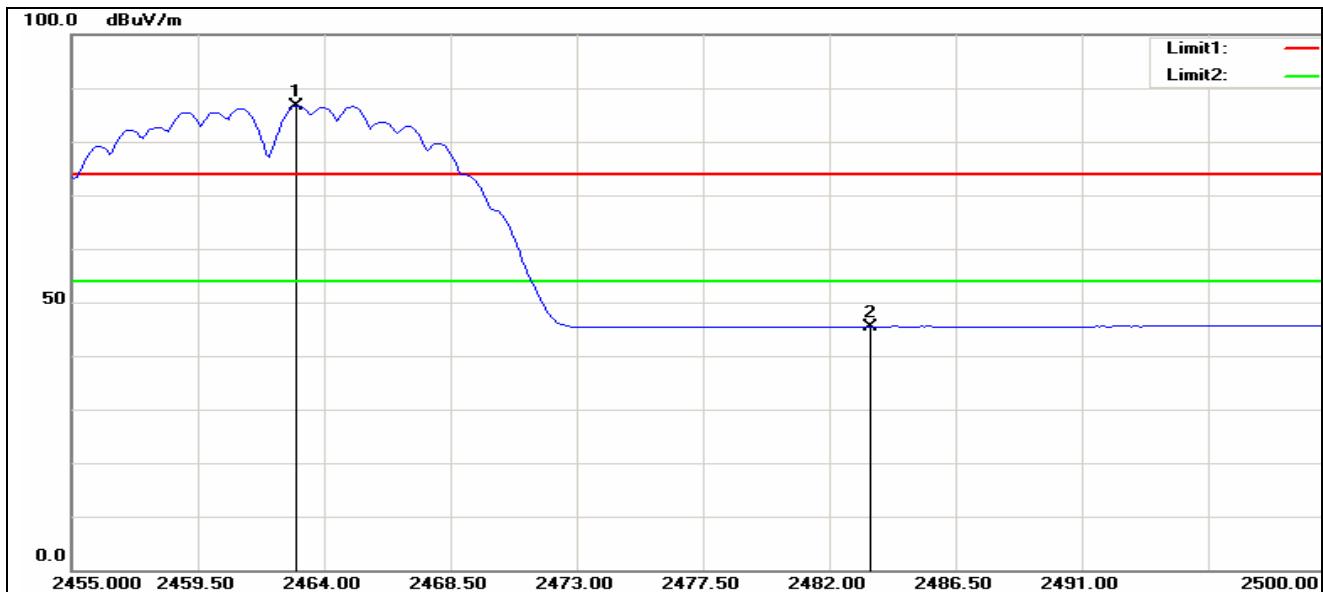
Polarity: Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2463.000	58.65	31.06	89.71	74.00	15.71	100	321	peak
2	2483.500	25.24	31.13	56.37	74.00	-17.63	100	321	peak

Detector mode: Average

Polarity: Vertical

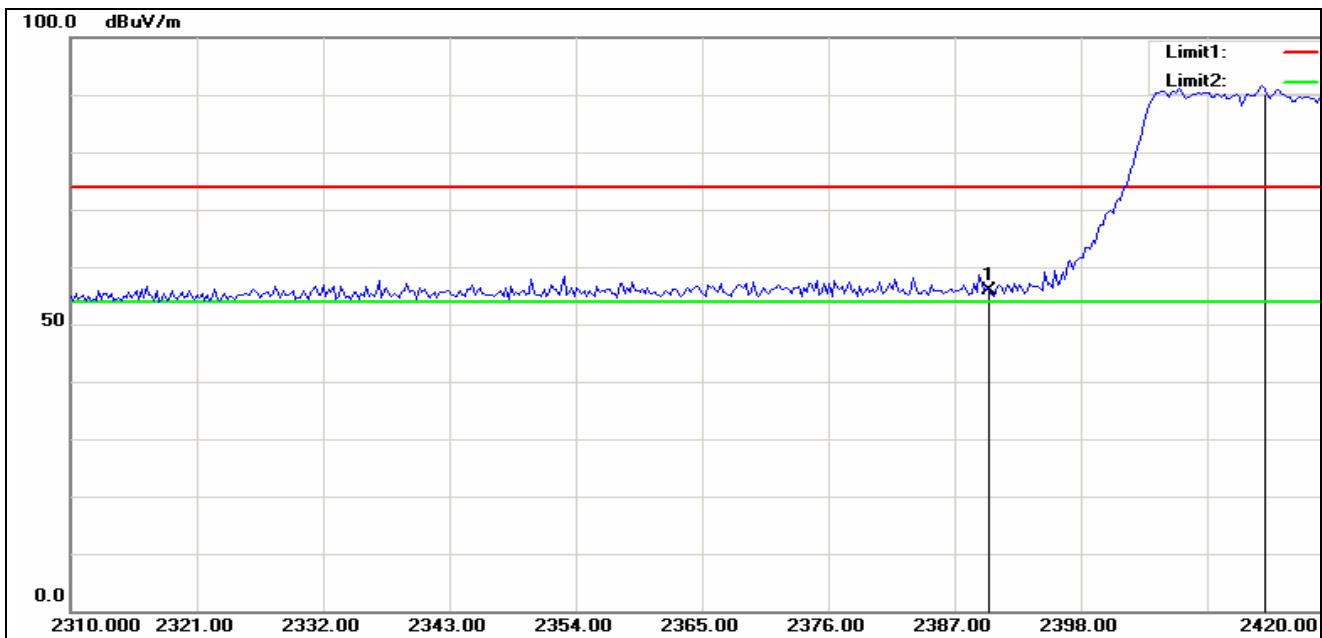


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2463.000	55.59	31.06	86.65	54.00	32.65	100	321	AVG
2	2483.500	14.21	31.13	45.34	54.00	-8.66	100	321	AVG

Wifi g Mode (Low Channel)

Detector mode: Peak

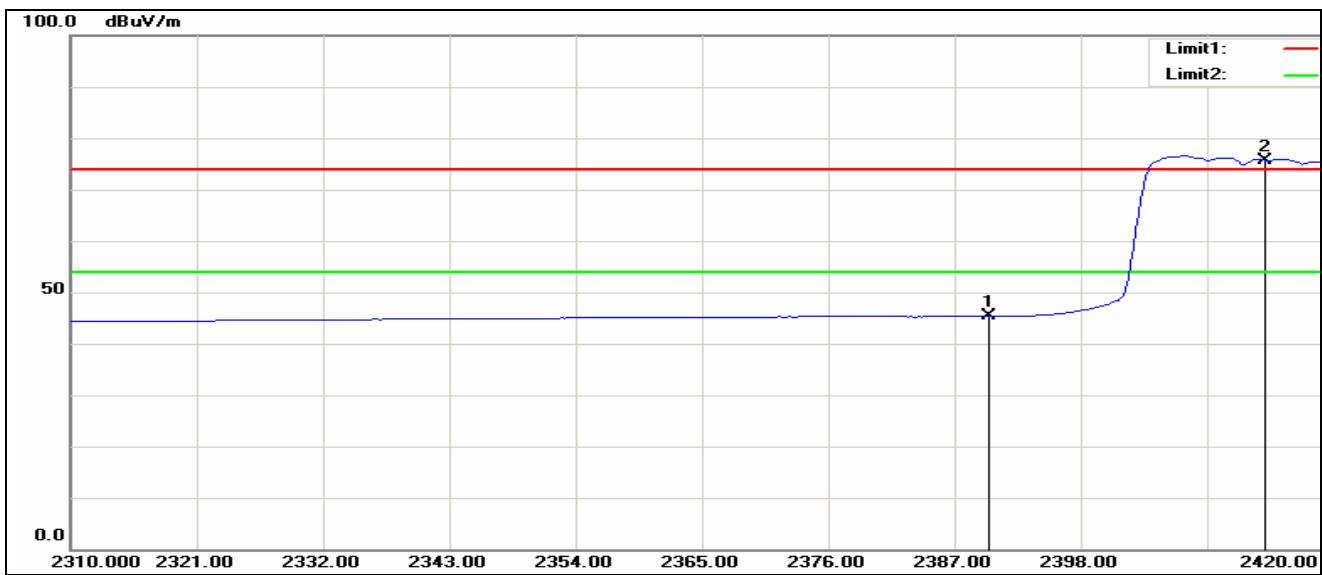
Polarity: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2390.000	25.06	30.80	55.86	74.00	-18.14	100	160	peak
2	2414.000	60.25	30.89	91.14	74.00	17.14	100	160	peak

Detector mode: Average

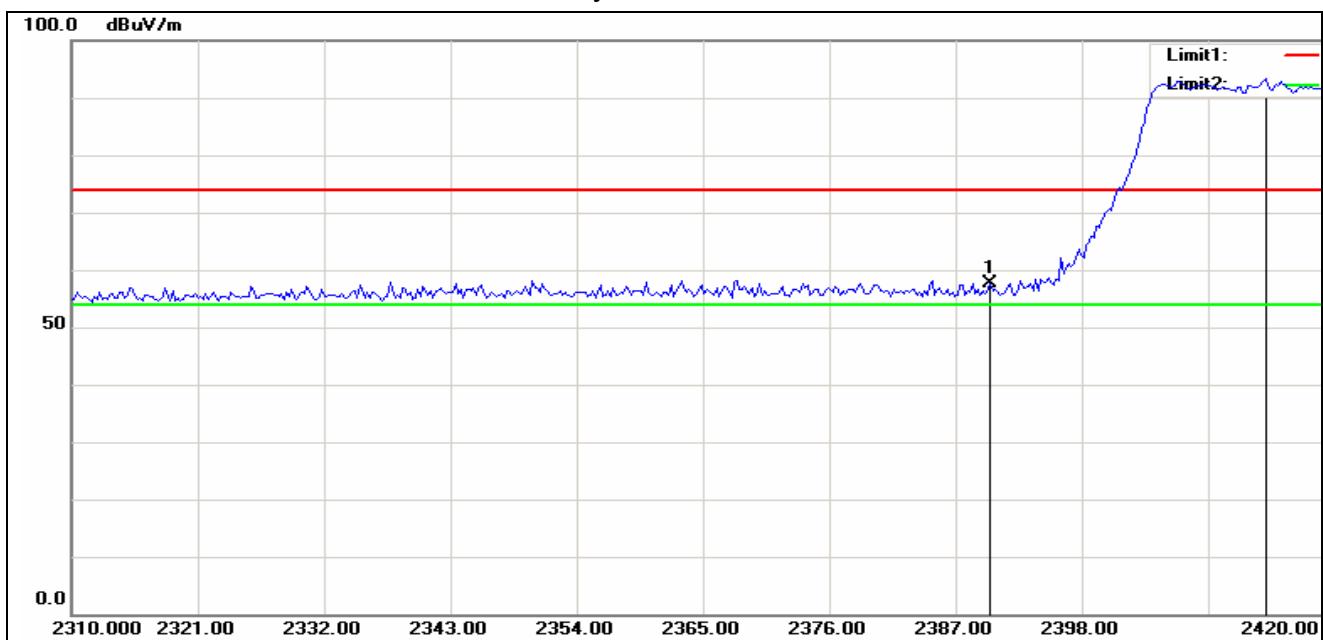
Polarity: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2390.000	14.41	30.80	45.21	54.00	-8.79	100	160	AVG
2	2414.000	44.75	30.89	75.64	54.00	21.64	100	160	AVG

Detector mode: Peak

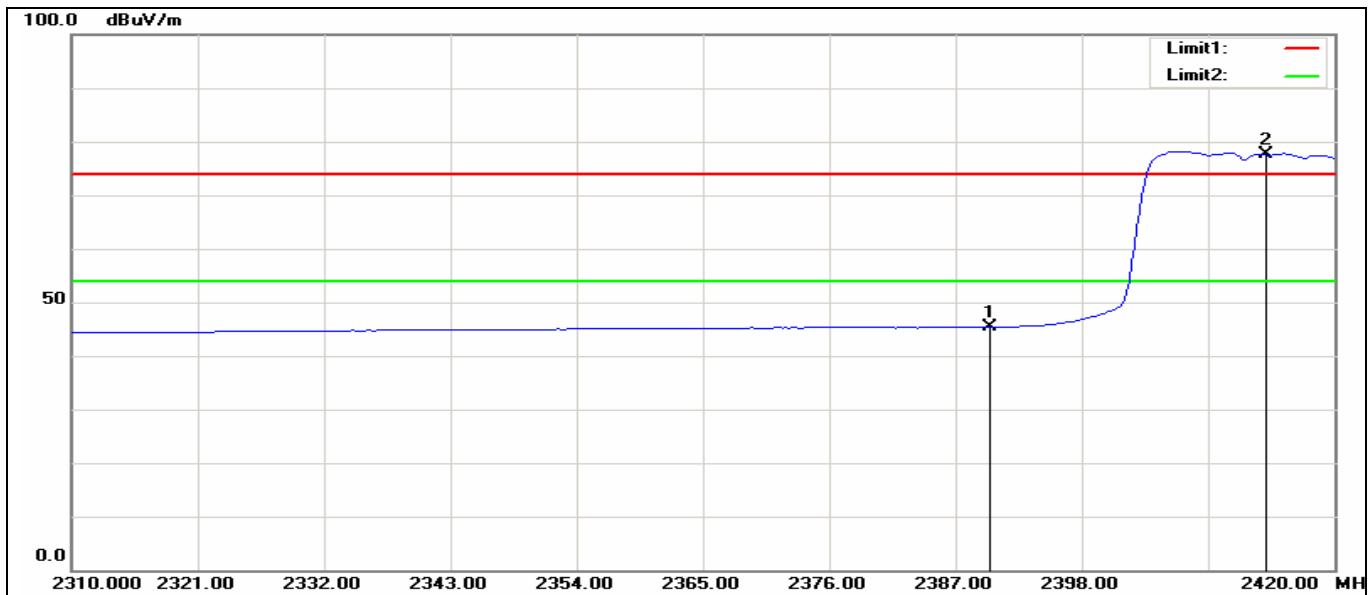
Polarity: Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2390.000	26.69	30.80	57.49	74.00	-16.51	100	126	peak
2	2414.000	62.43	30.89	93.32	74.00	19.32	100	126	peak

Detector mode: Average

Polarity: Vertical

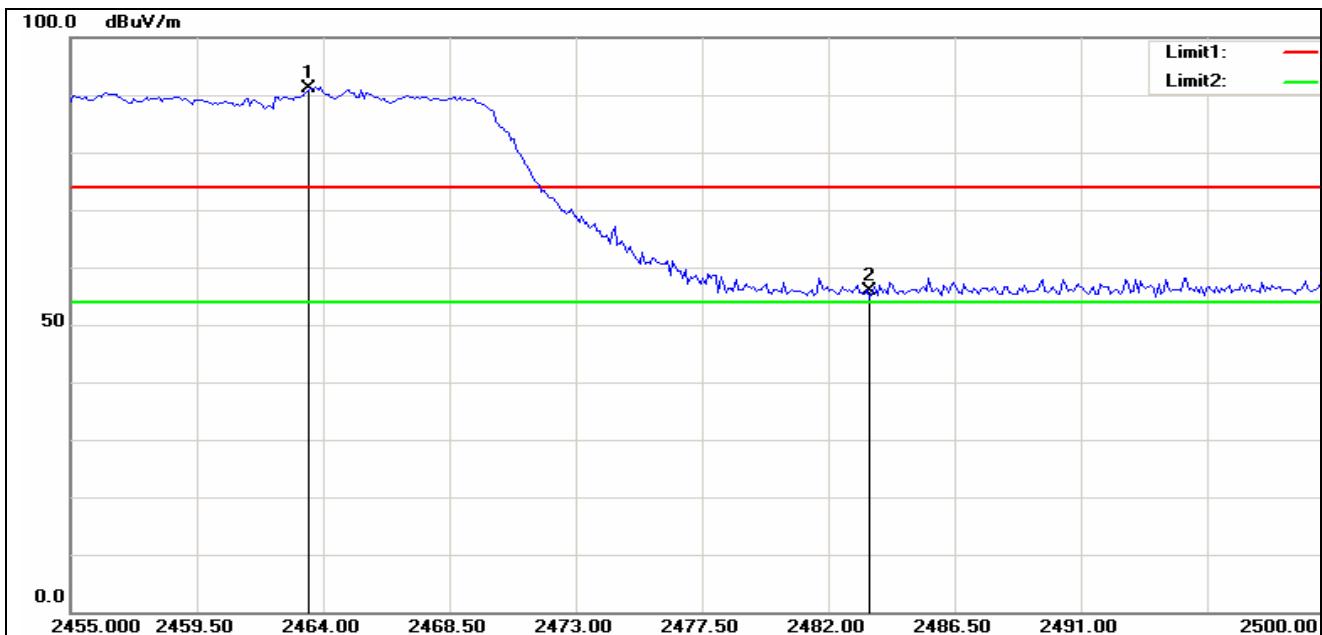


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2390.000	14.43	30.80	45.23	54.00	-8.77	100	126	AVG
2	2414.000	46.55	30.89	77.44	54.00	23.44	100	126	AVG

Wifi g Mode (High Channel)

Detector mode: Peak

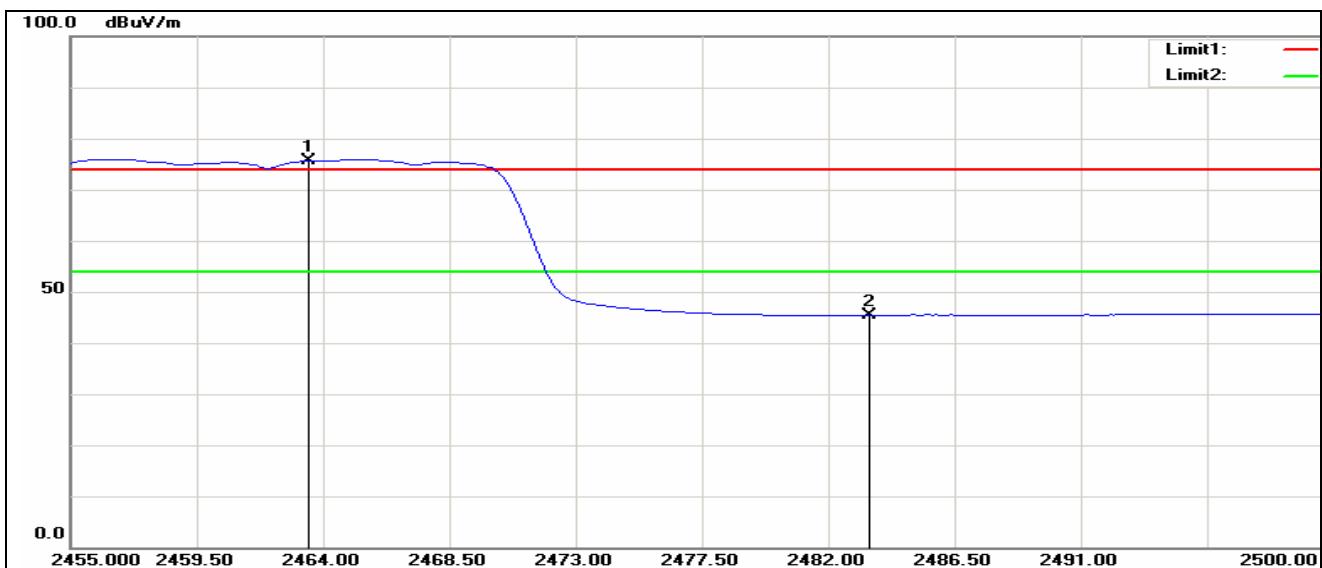
Polarity: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2463.500	59.68	31.07	90.75	74.00	16.75	100	195	peak
2	2483.500	24.58	31.13	55.71	74.00	-18.29	100	195	peak

Detector mode: Average

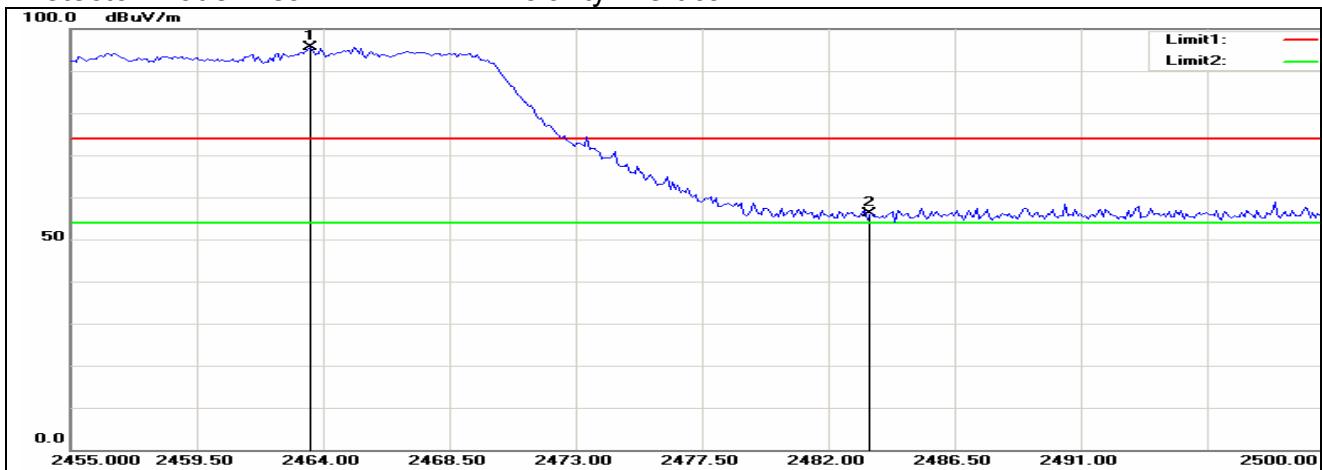
Polarity: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2463.500	44.47	31.07	75.54	54.00	21.54	100	195	AVG
2	2483.500	14.13	31.13	45.26	54.00	-8.74	100	195	AVG

Detector mode: Peak

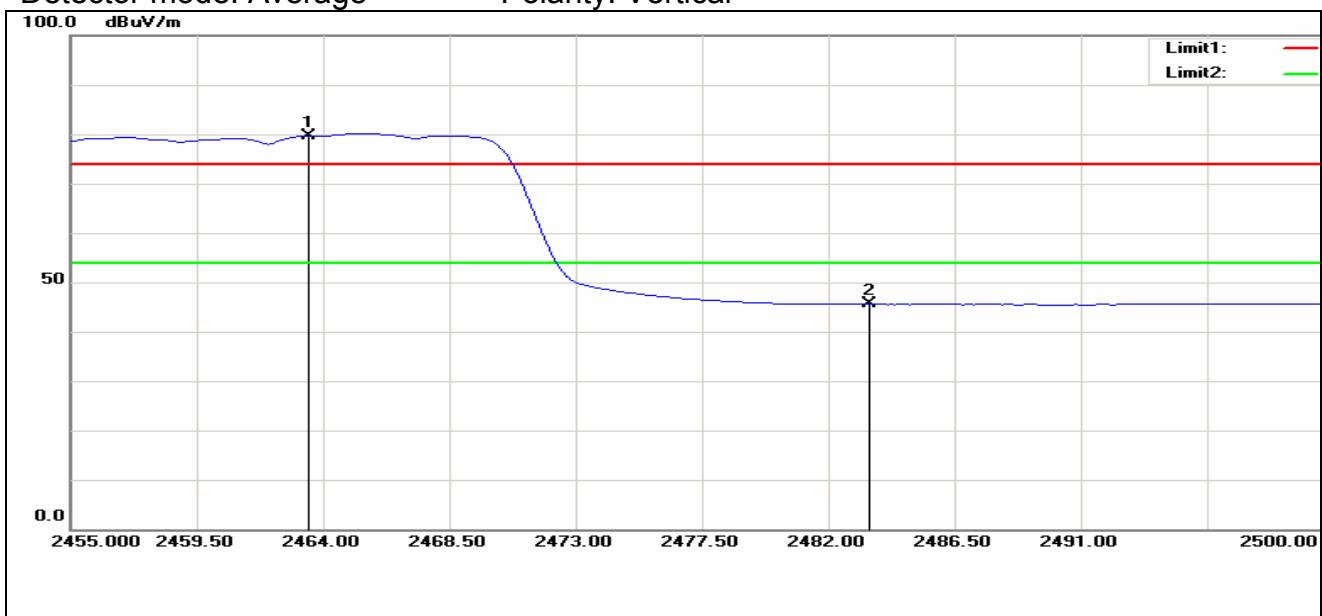
Polarity: Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2463.567	64.59	31.07	95.66	74.00	21.66	100	196	peak
2	2483.500	24.88	31.13	56.01	74.00	-17.99	100	196	peak

Detector mode: Average

Polarity: Vertical

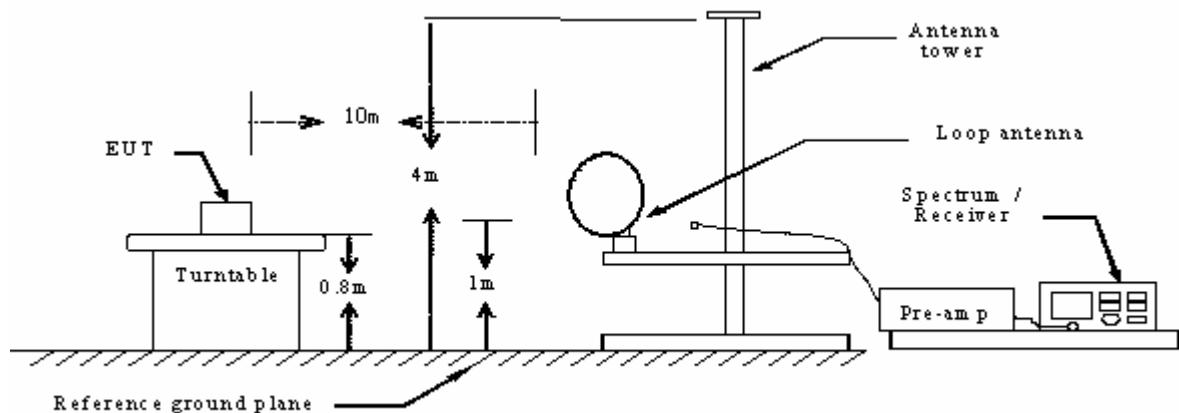


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	2463.500	48.59	31.07	79.66	54.00	25.66	100	196	AVG
2	2483.500	14.29	31.13	45.42	54.00	-8.58	100	196	AVG

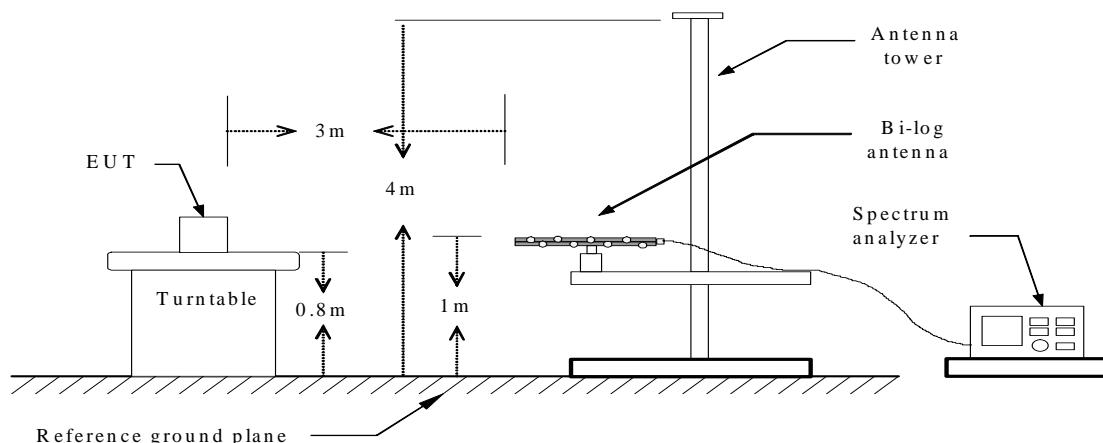
13. SPURIOUS EMISSIONS (RADIATION)

13.1 TEST SETUP

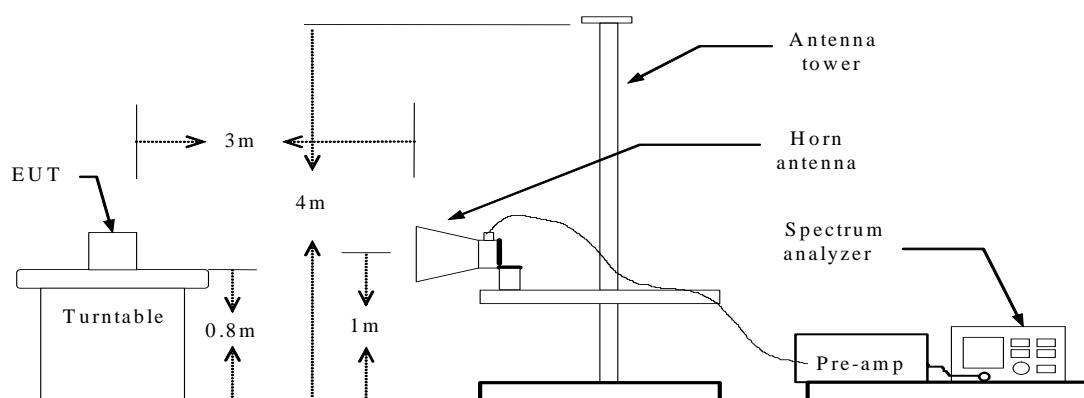
Radiated Spurious Measurement: below 30MHz



Radiated Spurious Measurement: below 1GHz



Radiated Spurious Measurement: above 1GHz



13.2 LIMITS

Frequency (MHz)	Limits (dB μ V/m)	Measured distance (m)
0.009-0.490	107.6-72.9	10
0.490-1.705	52.8-42.1	
1.705-30.0	49	
30~88	40	3
88~216	43.5	
216-960	46	
Above 960	54	

Notes: the calculate formula for below 30MHz

$$L2 = 20\lg(L1) + 40\lg(d1/d2)$$

L2: is the specified limit in dB microvolts per metre at distance d2.

L1: is the specified limit in microvolts per metre at distance d1.

For example:

$L1 = 2400/9 (\mu\text{V}/\text{m})$, $d1 = 300 (\text{m})$, $d2 = 10 (\text{m})$, so L2 as follows:

$$20\lg(2400/9) + 40\lg(300/10) = 107.6(\text{dB}\mu\text{V}/\text{m})$$

13.3 TEST PROCEDURE

Radiated Emission (9 kHz – 30 MHz) :

Spurious emissions from the EUT are measured in the frequency range of 9 kHz to 30 MHz using a tuned receiver and a shielded loop antenna. The antenna was positioned 10 meters horizontally from the EUT. Measurements have been made in all three orthogonal axes and the shielded loop antenna was rotated to locate the maximum of the emissions. The emission limits are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz.

Radiated Emission (30 MHz – 1000 MHz) :

According to description of ANSI C63.4: 2009 sec.13.1.4, the preliminary radiated emissions measurement were carried out. The preliminary radiated measurements were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT. The EUT configuration (in X, Y and Z axis), cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for the final radiated emissions measurements. The measurement is carried out using a spectrum analyzer or receiver. The Quasi-peak detector is used and RBW is set to 120kHz .The antenna height and turn table rotation is adjusted until the maximum power value is founded on spectrum analyzer or receiver.

Radiated Emission (Above 1 GHz) :

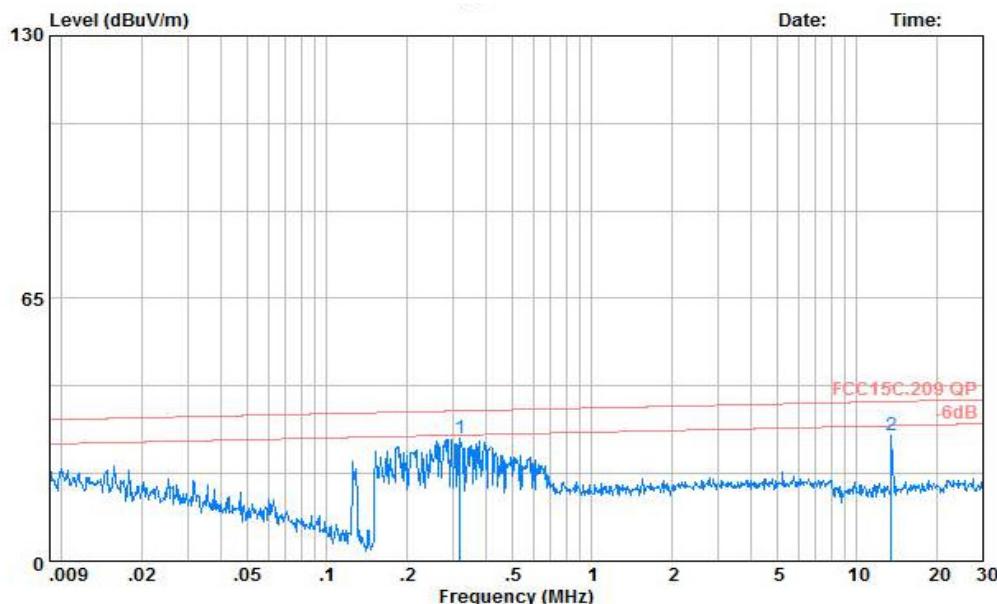
According to description of ANSI C63.4:2009 sec.13.4.2, the preliminary radiated emissions measurement were carried out. The preliminary radiated measurements were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT. The EUT configuration (in X, Y and Z axis), cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for the final radiated emissions measurements. The measurement is carried out using a spectrum analyzer or receiver. The spectrum analyzer scans from 1GHz to 25GHz (higher than the 10th harmonic of the carrier). The peak detector is used for Peak limit and RBW is set to 1MHz ,VBW \geq 3RBW. The peak detector is used for Average limit and RBW is set to 1MHz ,VBW is not smaller than 1/T, T = to the shortest pulse width. The antenna height and turn table rotation is adjusted until the maximum power value is founded on spectrum analyzer or receiver.

13.4 RESULTS & PERFORMANCE

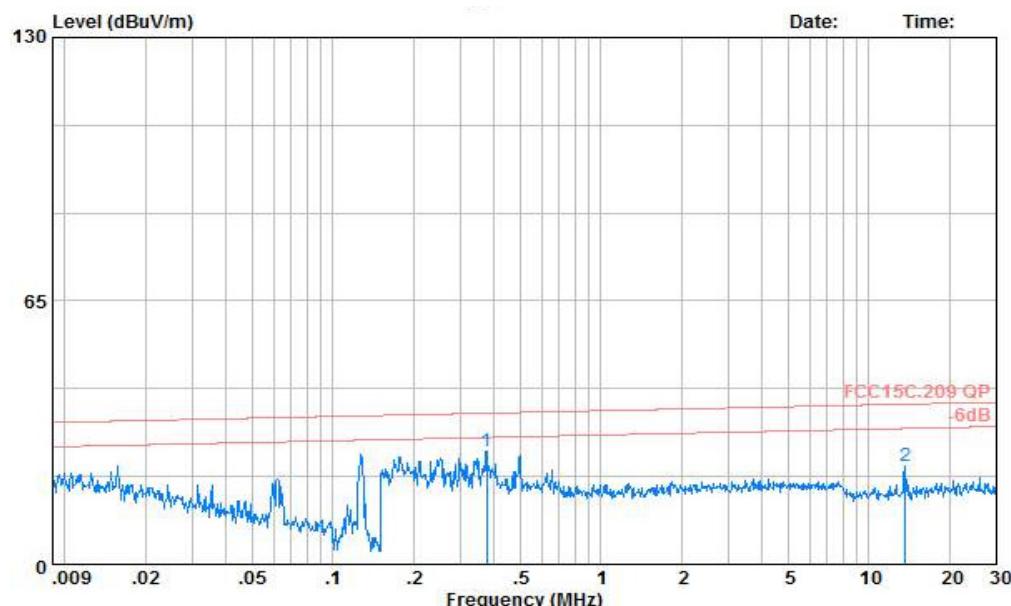
From 9KHz to 30MHz:

Bluetooth GFSK, traffic mode; Channel 0

H:



V:



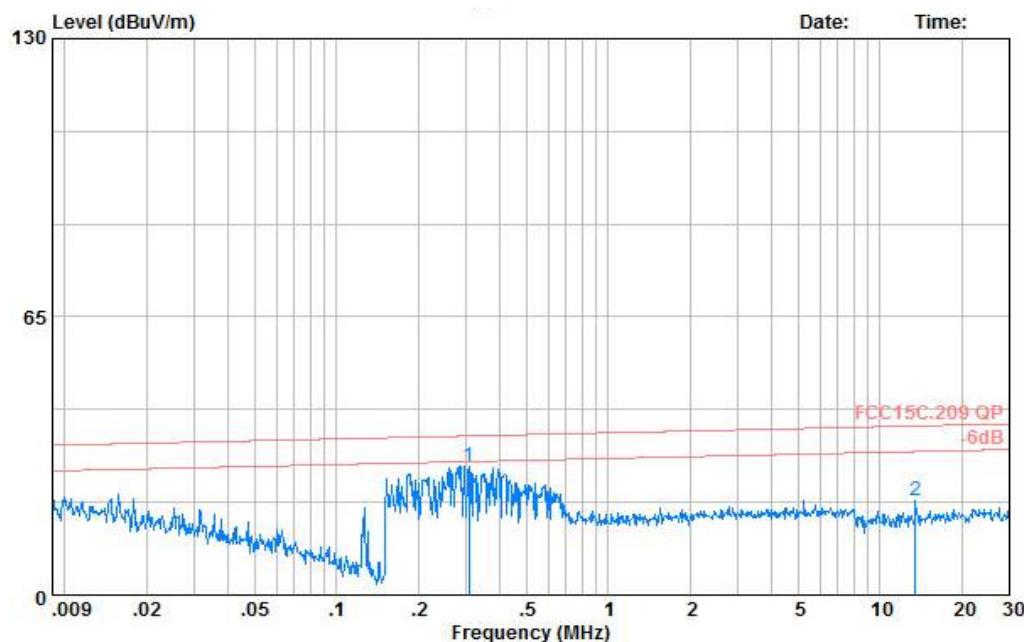
Frequency (MHz)	Polarization (H/V)	Reading (dBuV)	Correction Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector
0.31	H	10.58	19.53	30.11	76.8	-46.69	Peak
0.37	V	8.16	19.66	28.87	75.3	-46.43	Peak
13.54	H	10.76	18.14	28.9	49.0	-20.1	Peak
13.65	V	4.65	18.43	23.08	49.0	-25.92	Peak

H: Horizontal V: Vertical

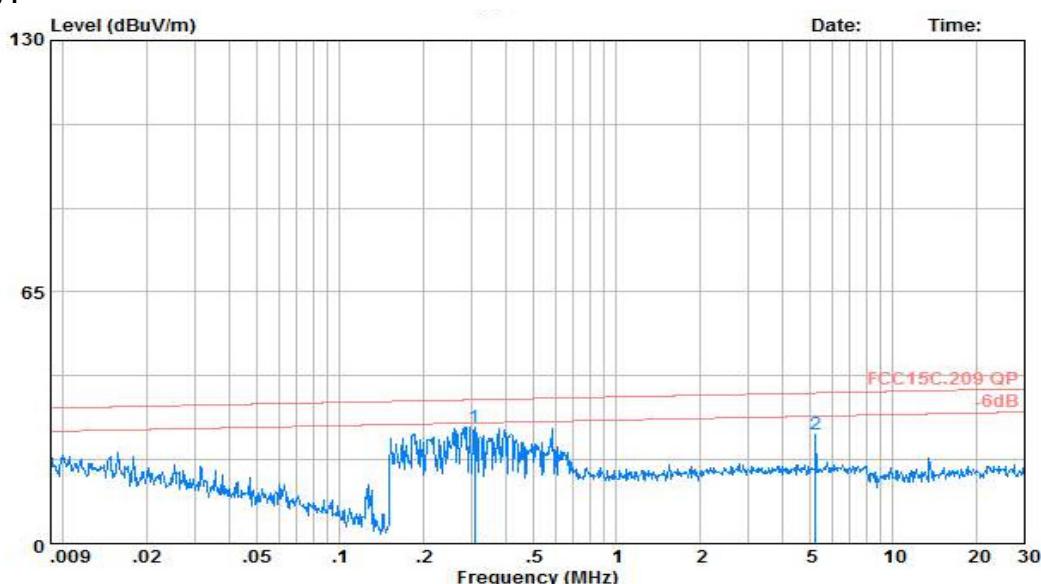
Measure Level(dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)

Bluetooth 8-DPSK, traffic mode; Channel 0

H:



V:



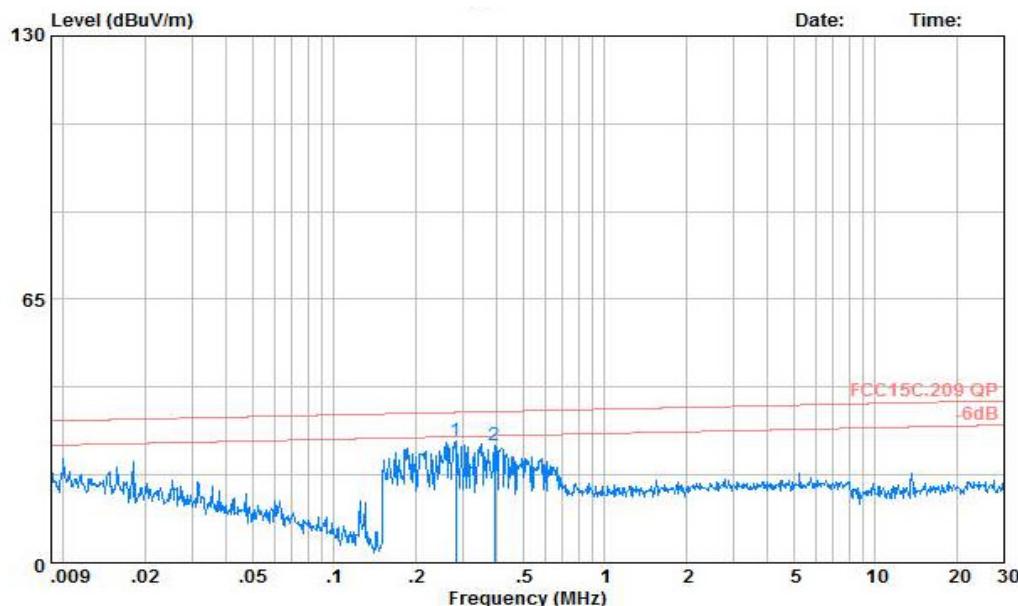
Frequency (MHz)	Polarization (H/V)	Reading (dBuV)	Correction Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector
0.30	H	10.37	16.89	27.26	77.1	-49.84	Peak
0.30	V	10.37	16.34	26.71	77.1	-50.39	Peak
13.54	H	3.52	18.53	22.05	49.0	-26.95	Peak
5.2	V	13.26	13.21	26.47	49.0	-22.53	Peak

H: Horizontal V: Vertical

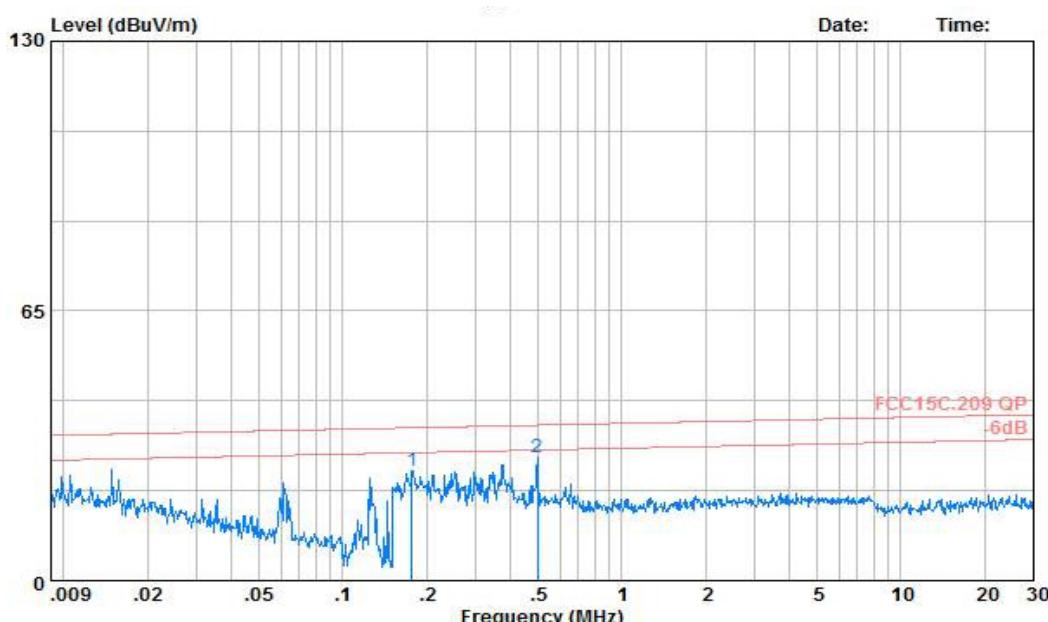
Measure Level(dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)

802.11b, traffic mode; Channel 01

H:



V:



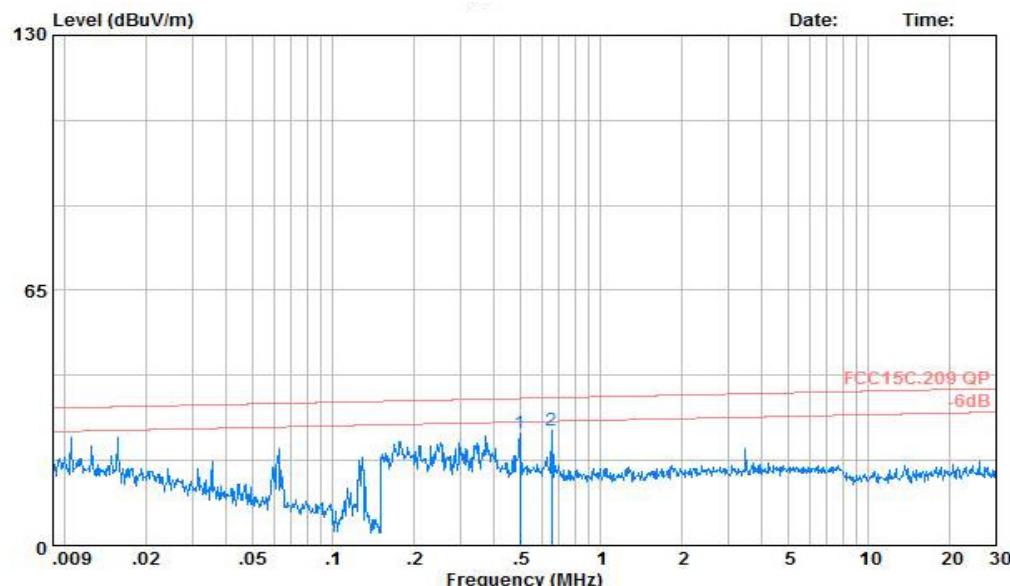
Frequency (MHz)	Polarization (H/V)	Reading (dB _{UV})	Correction Factor (dB/m)	Measure Level (dB _{UV} /m)	Limit (dB _{UV} /m)	Over Limit (dB)	Detector
0.28	H	10.24	18.85	29.09	77.7	-55.61	Peak
0.17	V	6.89	17.92	24.81	82.1	-57.29	Peak
0.39	H	9.22	19.44	28.66	74.9	-46.24	Peak
0.49	V	9.98	18.21	28.19	52.8	-24.61	Peak

H: Horizontal V: Vertical

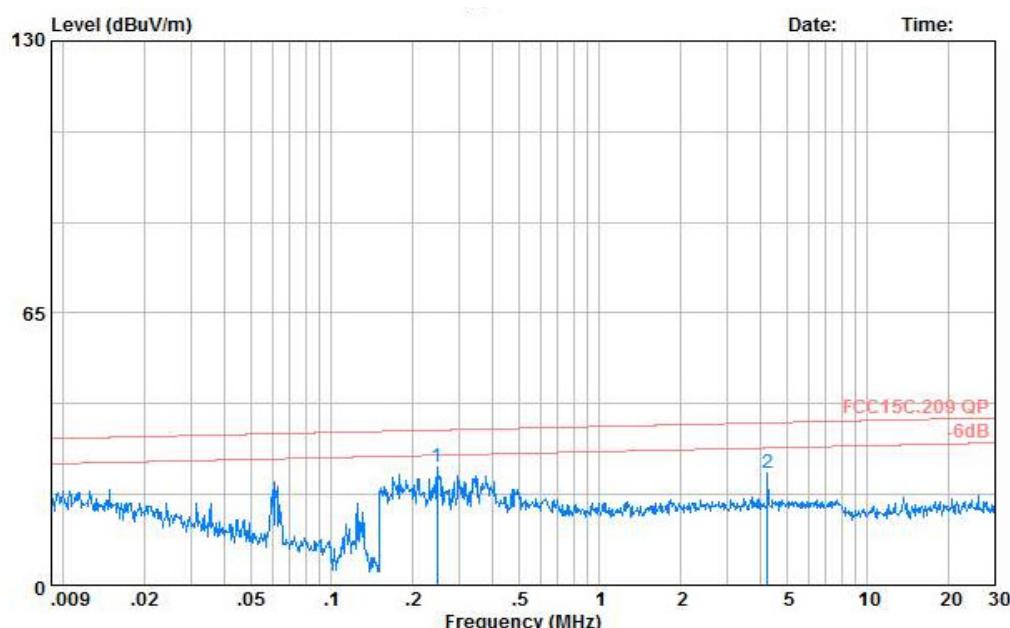
Measure Level(dB_{UV}/m) = Reading (dB_{UV}) + Correction Factor (dB/m)

802.11g, traffic mode; Channel 01

H:



V:



Frequency (MHz)	Polarization (H/V)	Reading (dBuV)	Correction Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector
0.49	H	8.98	19.21	28.19	52.8	-24.61	Peak
0.24	V	8.51	18.48	26.99	79.1	-52.11	Peak
0.65	H	9.47	18.75	28.22	50.4	-22.18	Peak
4.24	V	7.79	17.21	25	49.0	-24	Peak

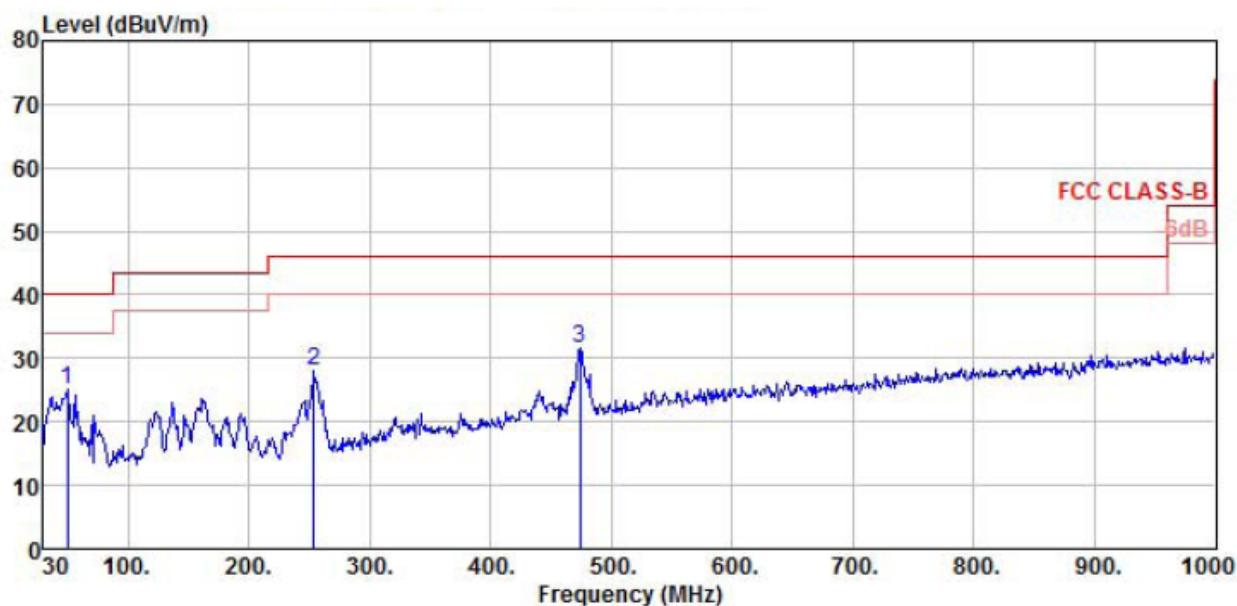
H: Horizontal V: Vertical

Measure Level(dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)

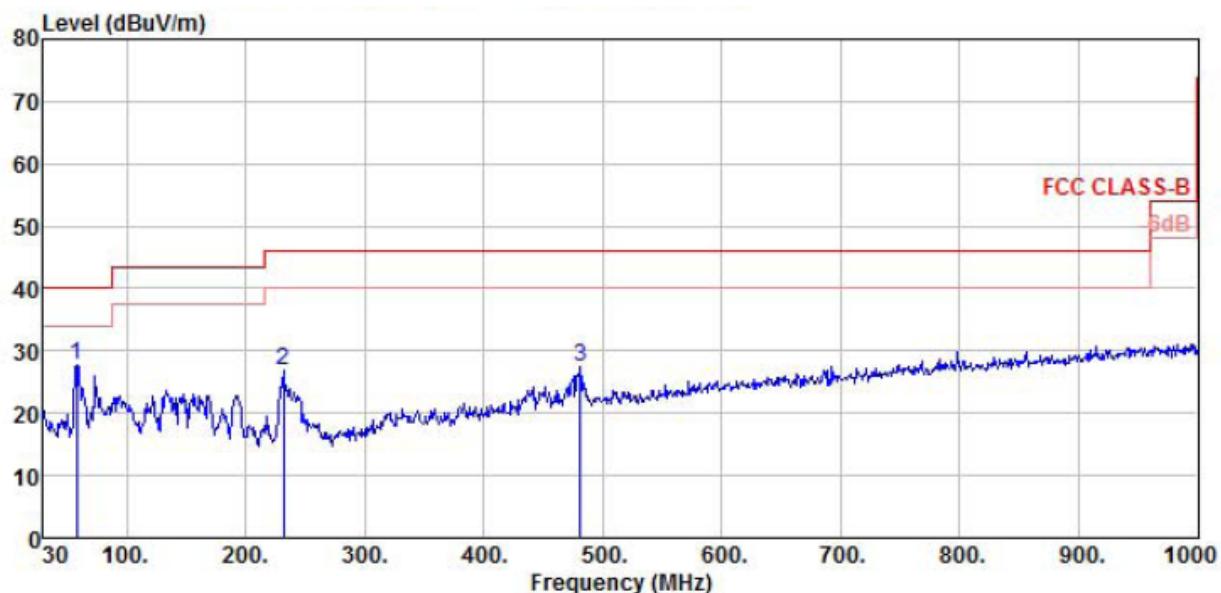
From 30MHz to 1GHz:

Bluetooth GFSK, traffic mode; Channel 0

H:



V



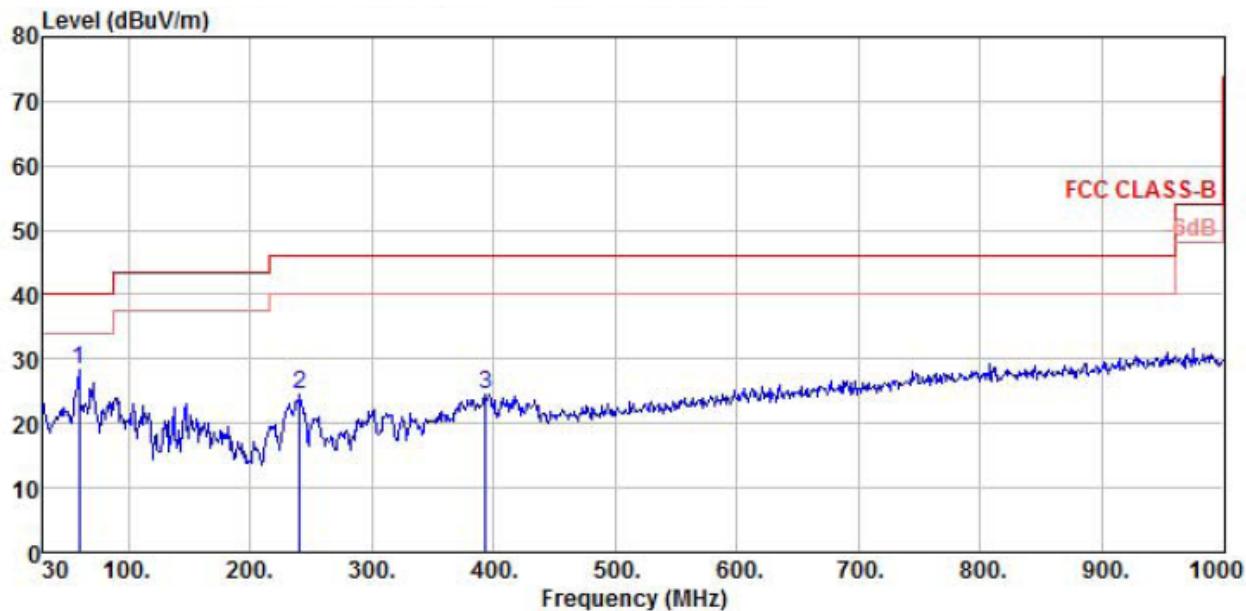
Frequency (MHz)	Polarization (H/V)	Reading (dBuV)	Correction Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector
48.16	H	12.04	12.91	24.95	40.0	-15.05	Peak
50.35	V	17.39	11.48	28.87	40.0	-11.13	Peak
254.63	H	10.76	13.44	24.2	43.5	-19.3	Peak
233.72	V	13.26	13.21	26.47	46.0	-19.53	Peak
469.80	H	8.44	21.78	30.22	46.0	-15.78	Peak
488.40	V	5.82	21.96	27.78	46.0	-18.22	Peak

H: Horizontal V: Vertical

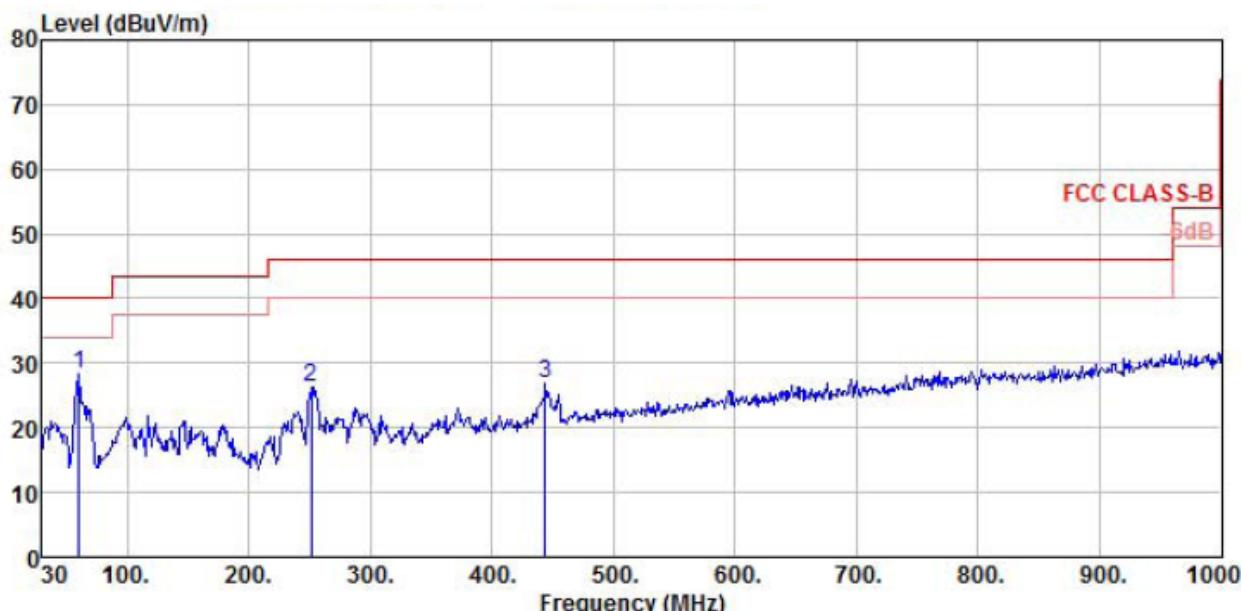
Measure Level(dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)

Bluetooth 8-DPSK, traffic mode; Channel 0

H:



V



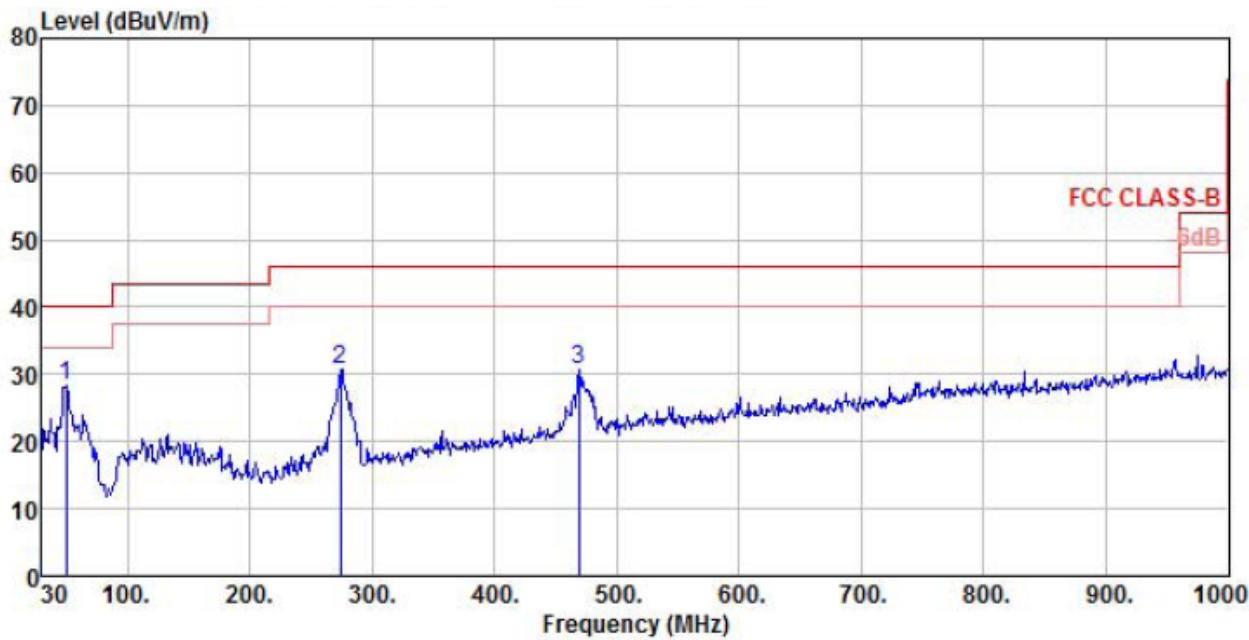
Frequency (MHz)	Polarization (H/V)	Reading (dBuV)	Correction Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector
59.10	H	15.75	12.58	28.33	40.0	-11.67	Peak
60.07	V	16.82	11.48	28.30	40.0	-11.70	Peak
240.49	H	10.30	11.71	22.01	43.5	-21.49	Peak
251.16	V	13.05	13.21	26.26	46.0	-19.74	Peak
393.75	H	9.38	15.19	24.57	46.0	-21.43	Peak
444.19	V	4.97	21.96	26.93	46.0	-19.07	Peak

H: Horizontal V: Vertical

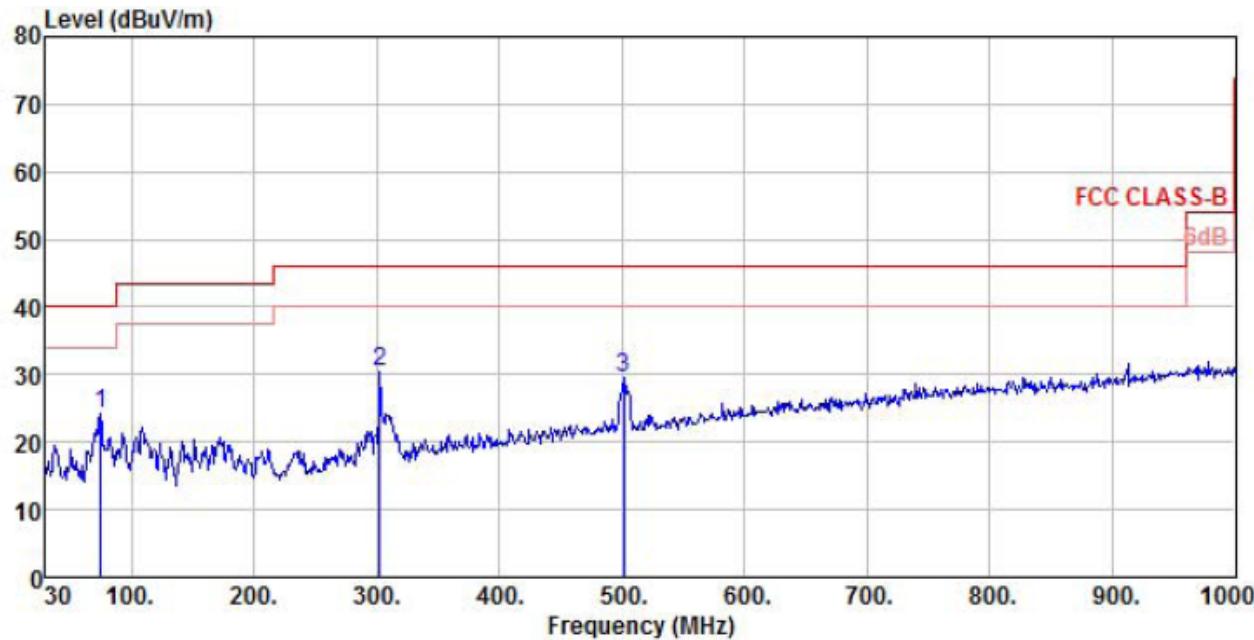
Measure Level(dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)

802.11b, traffic mode; Channel 01

H:



V:



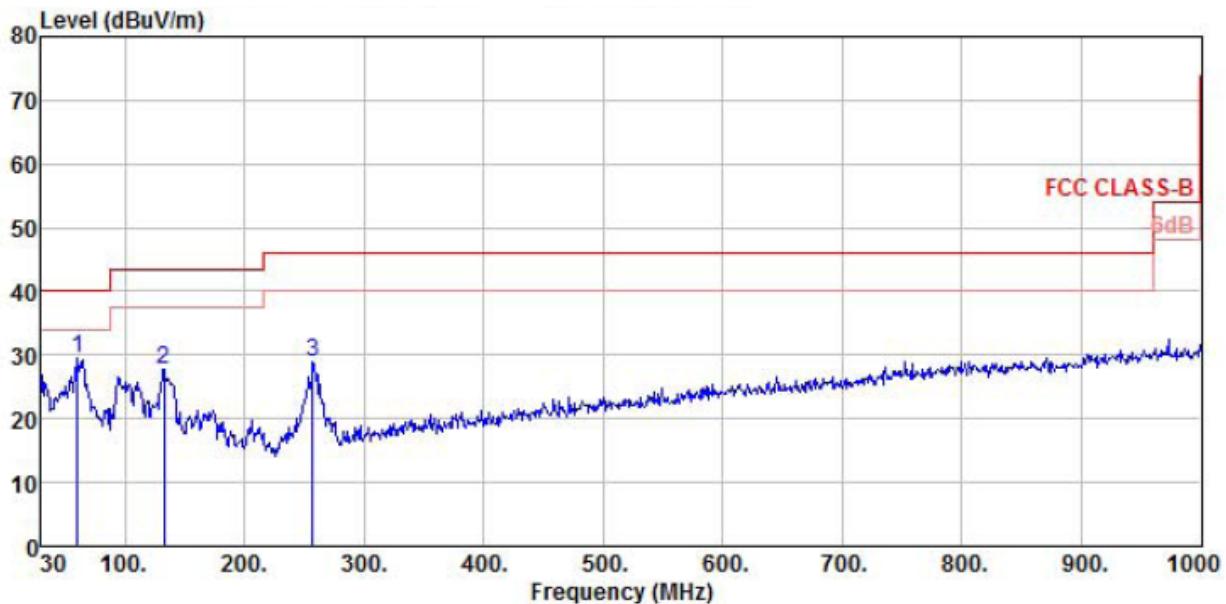
Frequency (MHz)	Polarization (H/V)	Reading (dBuV)	Correction Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector
50.63	H	17.4	11.39	28.79	40.0	-11.21	Peak
77.56	V	13.54	10.87	24.41	40.0	-15.59	Peak
275.24	H	16.34	13.62	29.96	46.0	-16.04	Peak
301.44	V	14.19	15.94	30.13	46.0	-15.87	Peak
469.80	H	9.69	21.75	31.44	46.0	-14.56	Peak
502.55	V	8.19	22.03	30.22	46.0	-15.78	Peak

H: Horizontal V: Vertical

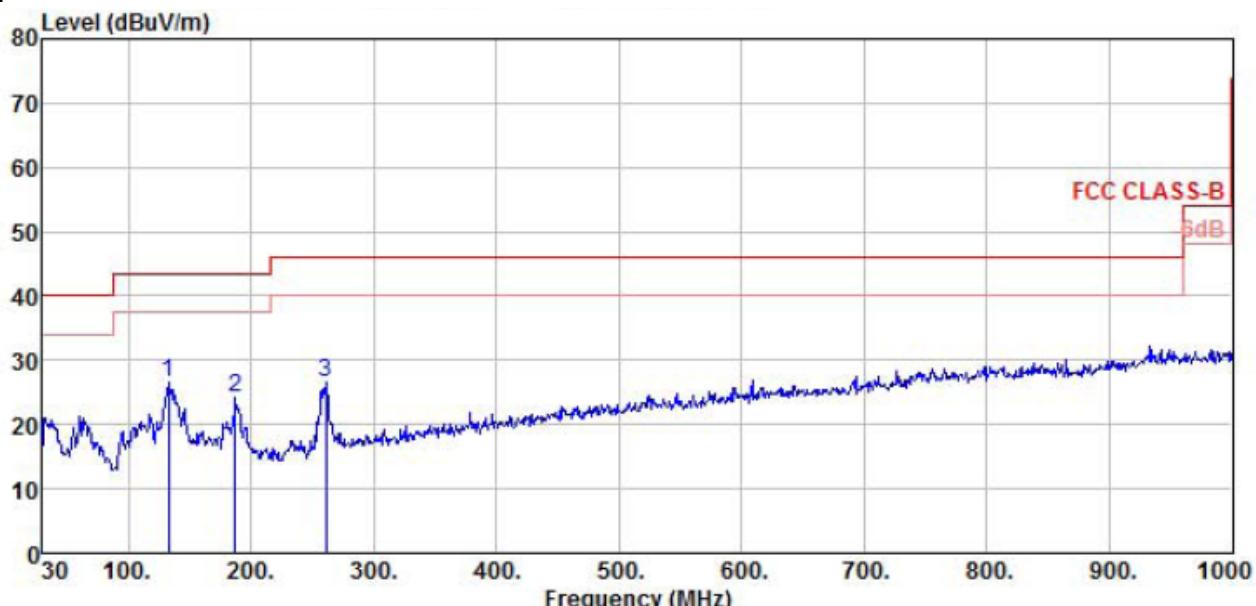
Measure Level(dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)

802.11g, traffic mode; Channel 01

H:



V:



Frequency (MHz)	Polarization (H/V)	Reading (dBuV)	Correction Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector
61.57	H	18.91	11.6	30.51	40.0	-9.49	Peak
143.58	V	13.71	12.65	26.36	43.5	-17.14	Peak
147.48	H	16.44	12.97	29.41	43.5	-14.09	Peak
187.67	V	8.85	13.15	22.0	43.5	-21.5	Peak
254.15	H	15.2	13.68	28.88	46.0	-17.12	Peak
258.45	V	13.59	14.05	27.64	46.0	-18.36	Peak

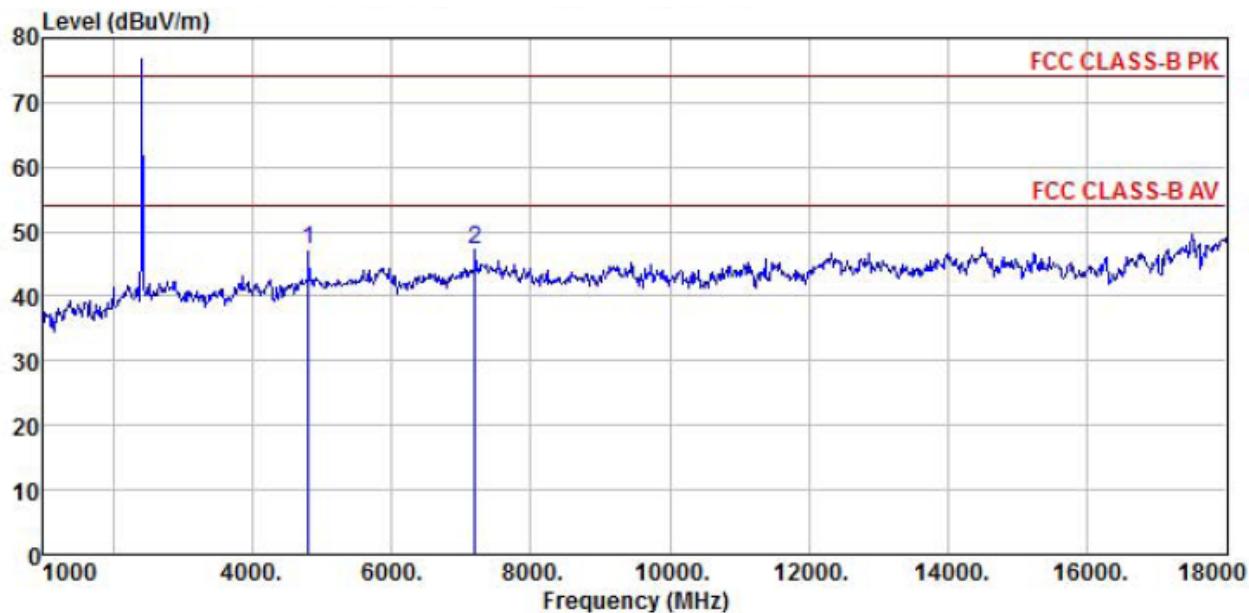
H: Horizontal V: Vertical

Measure Level(dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)

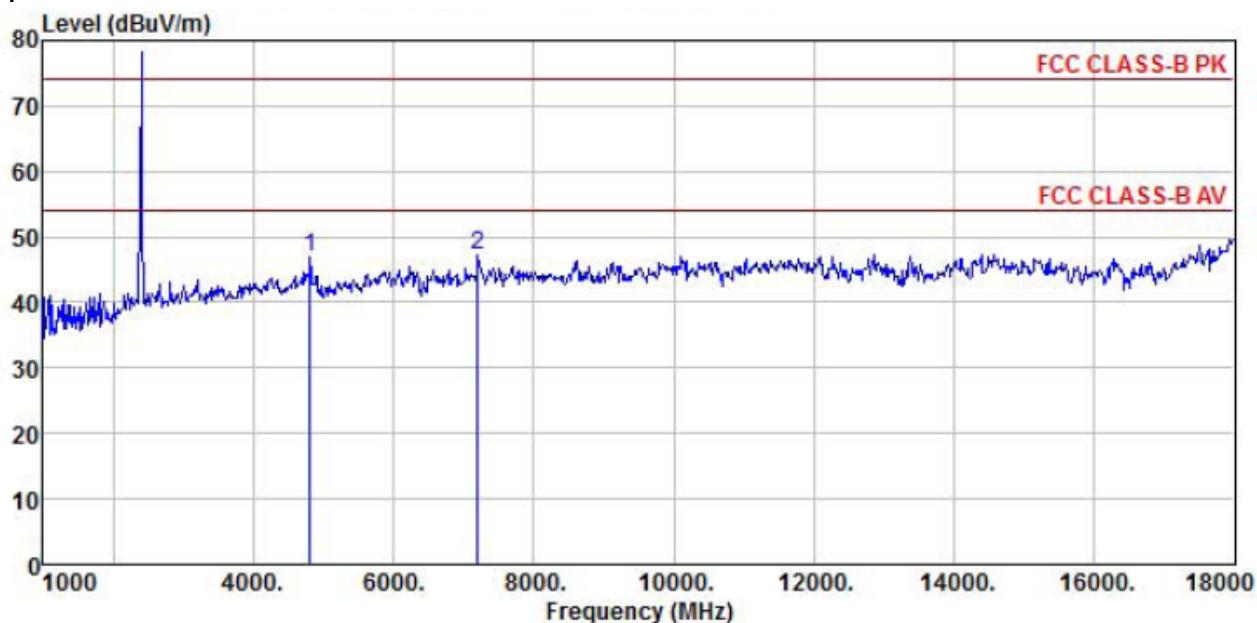
Above 1GHz:

Bluetooth GFSK, traffic mode; Channel 0

H:



V:



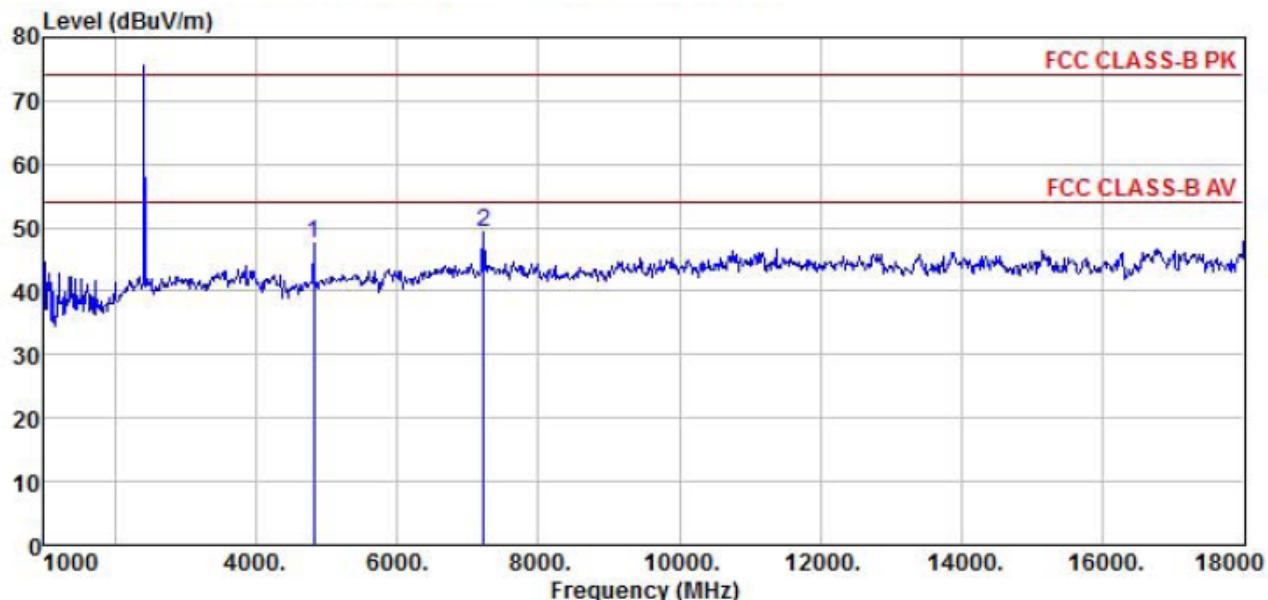
Frequency (MHz)	Polarization (H/V)	Reading (dBuV)	Correction Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector
4805.3	H	34.43	12.93	47.36	74.0	-26.64	Peak
4806.3	V	34.08	12.95	47.03	74.0	-26.97	Peak
7210.1	H	31.22	15.88	47.1	74.0	-26.90	Peak
7209.5	V	31.22	15.88	47.1	74.0	-26.90	Peak
N/A							

H: Horizontal V: Vertical

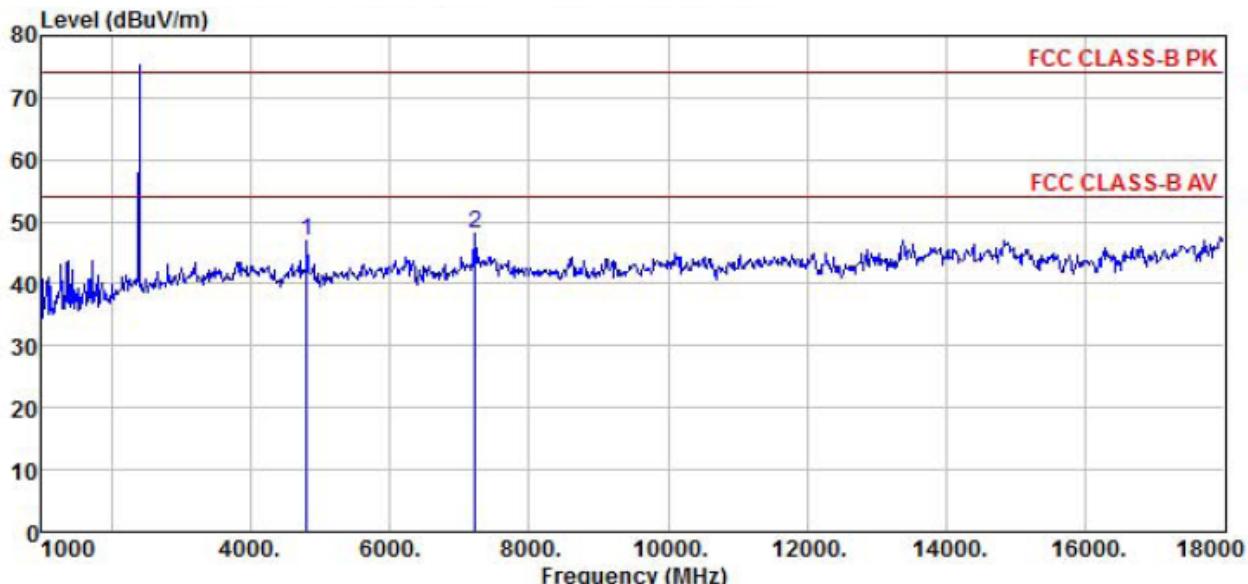
Measure Level(dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)

Bluetooth 8-DPSK, traffic mode; Channel 0

H:



V:



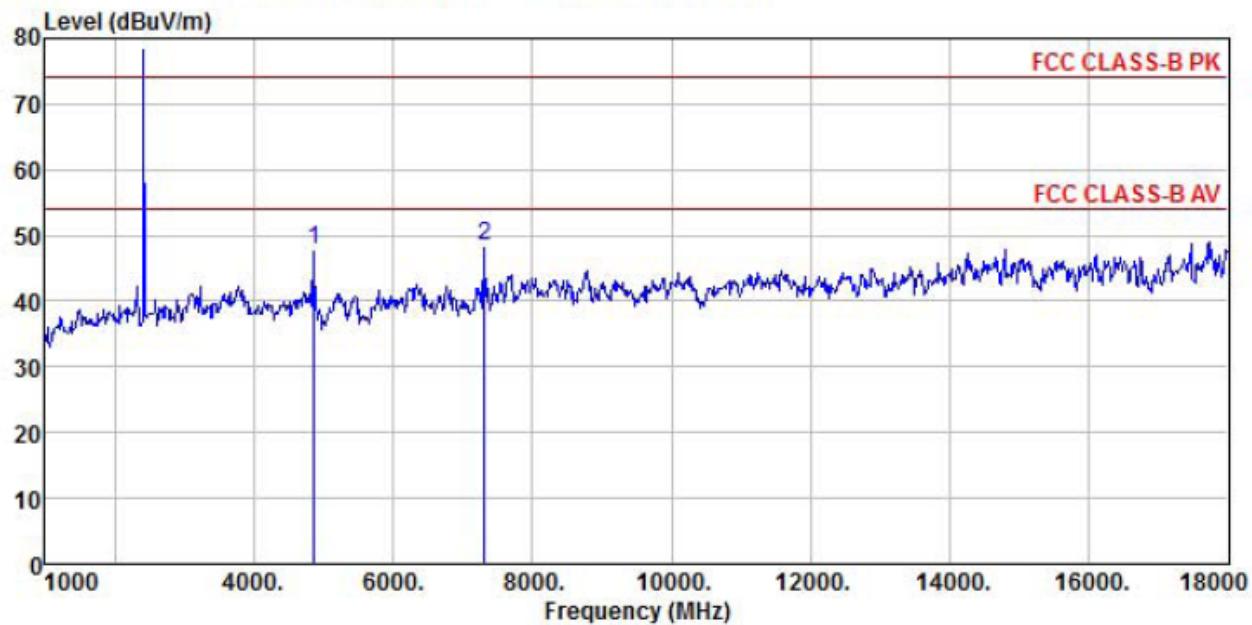
Frequency (MHz)	Polarization (H/V)	Reading (dBuV)	Correction Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector
4825.3	H	34.39	13.24	47.63	74.0	-26.37	Peak
4808.6	V	34.02	13.01	47.03	74.0	-26.97	Peak
7222.1	H	33.05	16.14	49.19	74.0	-24.81	Peak
7222.5	V	31.9	16.14	48.04	74.0	-25.96	Peak
N/A							

H: Horizontal V: Vertical

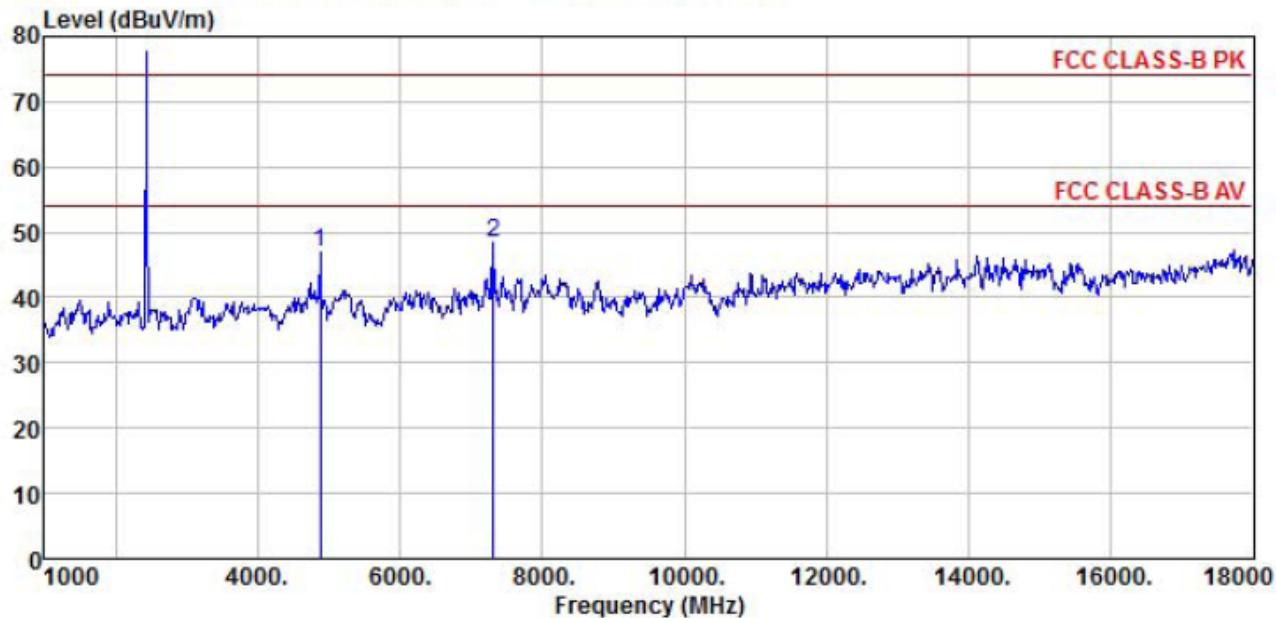
Measure Level(dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)

802.11b, traffic mode; Channel 01

H:



V:



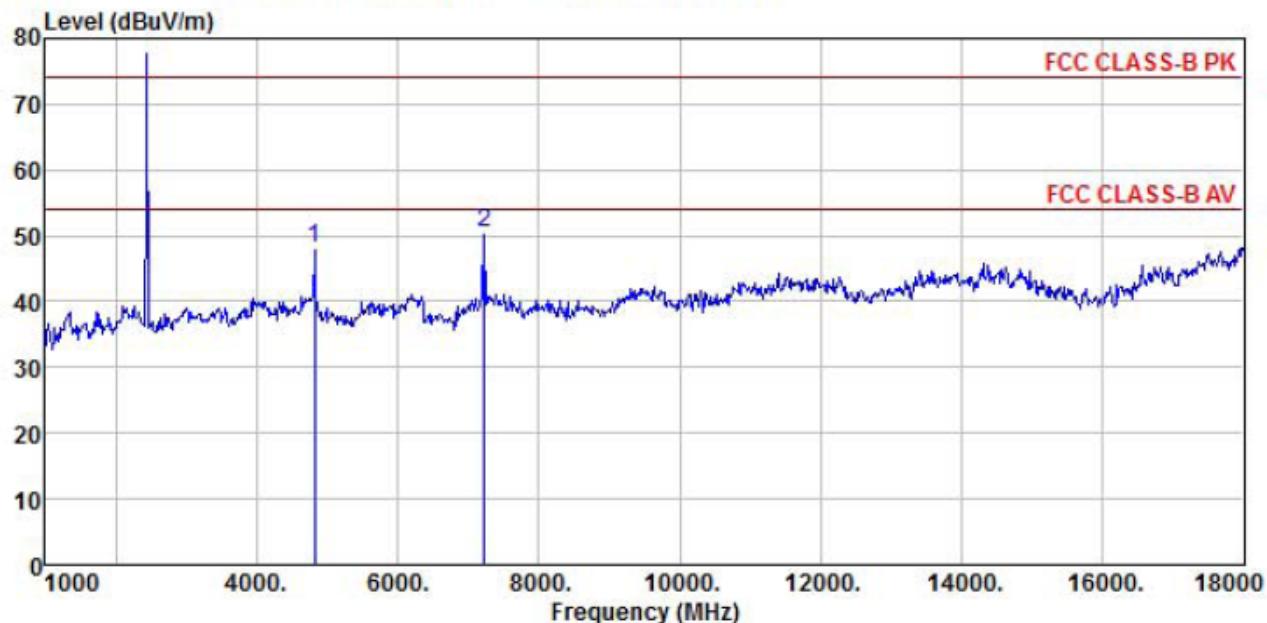
Frequency (MHz)	Polarization (H/V)	Reading (dBuV)	Correction Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector
4864.6	H	35.54	13.08	48.62	74.0	-25.38	Peak
4863.9	V	35.54	13.08	48.62	74.0	-25.38	Peak
7307.7	H	32.61	16.54	49.15	74.0	-24.85	Peak
7308.1	V	33.01	16.62	49.63	74.0	-24.37	Peak
N/A							

H: Horizontal V: Vertical

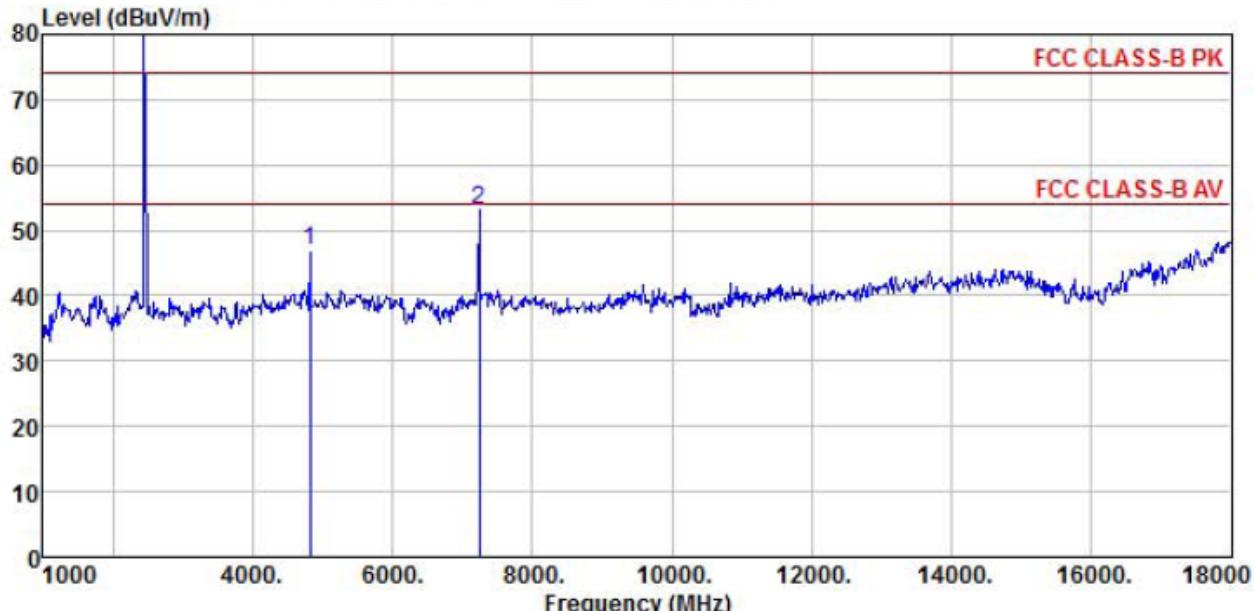
Measure Level(dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)

802.11g, traffic mode; Channel 01

H:



V:



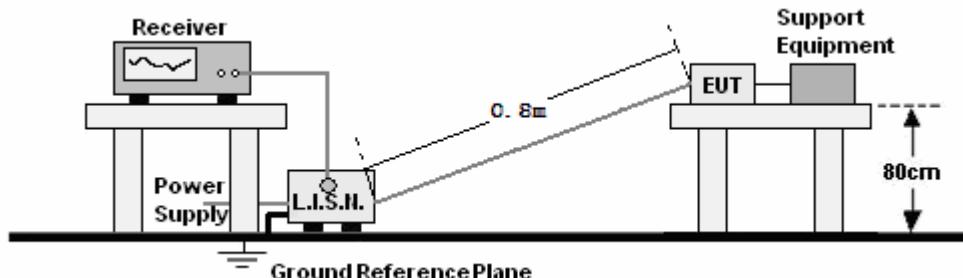
Frequency (MHz)	Polarization (H/V)	Reading (dB _{BuV})	Correction Factor (dB/m)	Measure Level (dB _{BuV/m})	Limit (dB _{BuV/m})	Over Limit (dB)	Detector
4820.5	H	35.96	12.95	48.91	74.0	-25.09	Peak
4820.2	V	33.44	12.95	46.39	74.0	-27.61	Peak
7233.3	H	34.00	16.25	50.25	74.0	-23.75	Peak
7235.2	V	37.16	16.28	53.44	74.0	-20.56	Peak
N/A							

H: Horizontal V: Vertical

Measure Level(dB_{BuV/m}) = Reading (dB_{BuV}) + Correction Factor (dB/m)

14. AC POWER LINE CONDUCTED EMISSIONS

14.1 TEST SETUP



14.2 LIMITS

Frequency range (MHz)	Limits dB(μ V)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50

NOTE: 1. The lower limit shall apply at the transition frequencies.
 2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz.

14.3 TEST PROCEDURE

According to description of ANSI C63.4:2009 sec.13.3.2, the AC power line preliminary conducted emissions measurements were carried out. The preliminary conducted measurements were performed using the spectrum analyzer to observe the emission characteristics of the EUT. The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for final AC power line conducted emissions measurements. The EUT is placed on a non-metallic table 0.8m above the horizontal metal reference ground plane. The EUT is connected to LISN and LISN is connected to the reference ground. All other supplemental devices are connected with EUT through other LISN. The distance between EUT and LISN is 80cm. A radio link is established between EUT and the tester. The output power of the EUT is controlled by the tester and driven to maximum value. An initial pre-scan was performed on the live L line and neutral line with peak detector (9kHz RBW). Both average detector and quasi-peak detector are performed at the frequencies with maximized peak emission.

Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.