TEST REPORT

OF

FCC Part 22, 24, 15 Subpart B&C §15.247

FCC ID: SS4BIP5XX0

Equipment Under Test	:	PDA
Model Name	:	BIP-5000
Serial No.	:	N/A
Applicant	:	BluebirdSoft., Inc.
Manufacturer	:	BluebirdSoft., Inc.
Date of Test(s)	:	2006-12-26 ~ 2007-01-05
Date of Issue	:	2007-01-08

In the configuration tested, the EUT complied with the standards specified above.

Tested By: **Date** **2007-01-08**

Feel Jeong

Approved By **Date** **2007-01-08**

Albert Lim

INDEX

TABLE OF CONTENTS

1. General Information

1.1. Testing Laboratory

SGS Testing Korea Co., Ltd.
Wireless Div. 2FL, 18-34, Sanbon-dong, Gunpo-Si, Gyeonggi-do, Korea 435-040
www.electrolab.kr.sgs.com
Telephone : +82 +31 428 5700
FAX : +82 +31 427 2371

1.2. Details of Applicant

Applicant : BluebirdSoft., Inc
Address : 558-5, Sinsa-dong, Kangnam-gu, Seoul, Korea
Contact Person : Chan Eung Park
Phone No. : +82 +2 548 0740
Fax No. : +82 +2 548 0870

1.3. Description of EUT

Kind of Product	PDA
Model Name	BIP-5000
Serial Number	N/A
Power Supply	DC 3.7 V(Li-Polymer Battery)
Frequency Range	2412 MHz ~ 2462 MHz(11b/g), 2402 MHz ~ 2480 MHz(Bluetooth) 824.2 MHz ~ 848.8 MHz(GSM 850), 1850.2 MHz ~ 1909.8 MHz(GSM 1900)
Modulation Technique	DSSS(11b), OFDM(11g), FHSS(Bluetooth), GMSK, 8-PSK
Number of Channels	11 CH(11b/g), 79 CH(Bluetooth), 300(GSM 1900), 125(GSM 850)
Operating Conditions	-20 ℃ ~ 55 ℃
Antenna Type	Fixed Type(11b/g, Bluetooth) FPCB Type(GSM)
Antenna Gain	-0.98 dBi(WLAN, Bluetooth)

1.4. Details of modification

-N/A

1.5. Test Equipment List

EQUIPMENT	MANUFACTURER	MODEL	CAL DUE.
Signal Generator	Agilent	E4438C	May 2007
Spectrum Analyzer	Agilent	E4440A	May 2007
Spectrum Analyzer	H.P	8593E	Sep. 2007
Power Meter	Agilent	E4416A	May 2007
Power Sensor	Agilent	E9327A	May 2007
DC Power Supply	Agilent	6674A	May 2007
DC Power Supply	Agilent	E3631A	May 2007
Attenuator	Agilent	8494B	May 2007
Two-Line V-Network	NNB 41	Schaffner	Sep. 2007
Test Receiver	Rohde & Schwarz	ESVS10	May 2007
Test Receiver	Rohde & Schwarz	ESHS10	Aug. 2007
Ultra-Broadband Antenna	Rohde & Schwarz	HL562	Sep. 2007
Horn Antenna	Electro-Metrics	RGA-60	Dec. 2007
Horn Antenna	SCHWARZBECK	BBHA9120D(0600)	Jul. 2007
Dipole Antenna	VHAP/UHAP	975/958	Jun. 2007
Communication Antenna	AR	AT 4002	N.C.R
Band Reject Filter	Wainwright	WRCG824/849-814/85960/10SS	May 2007

EQUIPMENT	MANUFACTURER	MODEL	CAL DUE.
Highpass Filter	Wainwright	WHK3.0/18G-10SS	Dec.2007
Mobile Test Unit	Agilent	E5515C	May 2007
Anechoic Chamber	SY Corporation	L x W x H 9.6 x 6.4 x 6.4	Aug. 2007

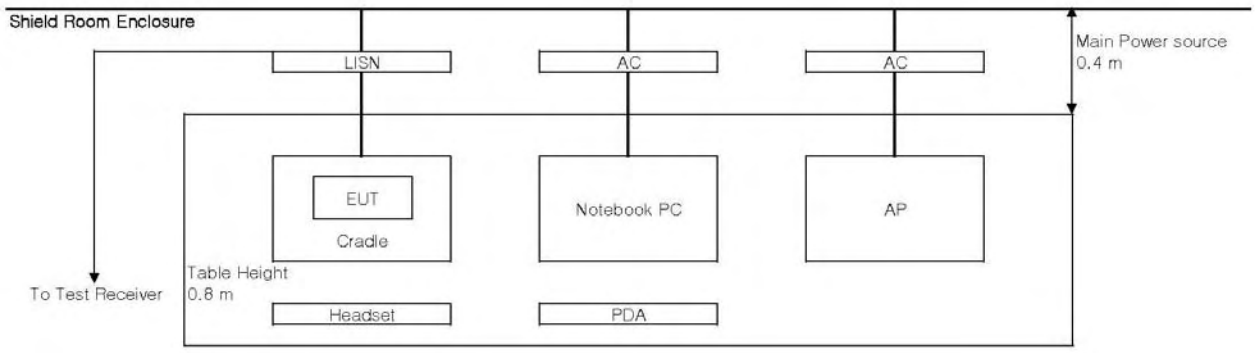
1.6. Summary of Test Results

The EUT has been tested according to the following specifications:

APPLIED STANDARD:FCC Part 22, 24, 15, Subpart B & Subpart C		
Standard Section	**Test Item**	**Result**
15.107(a)	AC Power Conducted Emission	Complied
15.247(a)(2)	6 dB Bandwidth	Complied
15.247(b)	Maximum Peak Output Power	Complied
15.205(a) 15.209(a) 15.247(d)	Spurious Emission, Band Edge and Restricted Bands	Complied
15.247(d)	Power Spectral Density	Complied
22.913(a) 24.232(c)	RF Radiated Output Power	Complied
22.917(a) 24.238(a)	Spurious Radiated Emission	Complied

2. Conducted Power Line Test

2.1. Test Setup



2.2. Limit

According to §15.107(a) for 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 uH/50 ohm line impedance stabilization network(LISN).
Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted limit (dBμV)	
	Qausi-peak	Average
0.15 – 0.50	66-56*	56-46*
0.50 – 5.00	56	46
5.00 – 30.0	60	50

* Decreases with the logarithm of the frequency.

2.3. Test Procedures

Radiated emissions from the EUT were measured according to the dictates of ANSI C63.4:2003

The test procedure is performed in a 6.5m × 3.6m× 3.6m (L×W×H) shielded room. The EUT along with its peripherals were placed on a 1.0m(W)× 1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.
The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room. The excess power cable between the EUT and the LISN was bundled. The power cables of peripherals were unbundled. All connecting cables of EUT and peripherals were moved to find the maximum emission.

2.4. Test Results

The following table shows the highest levels of conducted emissions on both phase of Hot and Neutral line.

Ambient temperature : 22 ℃ Relative humidity : 43 %

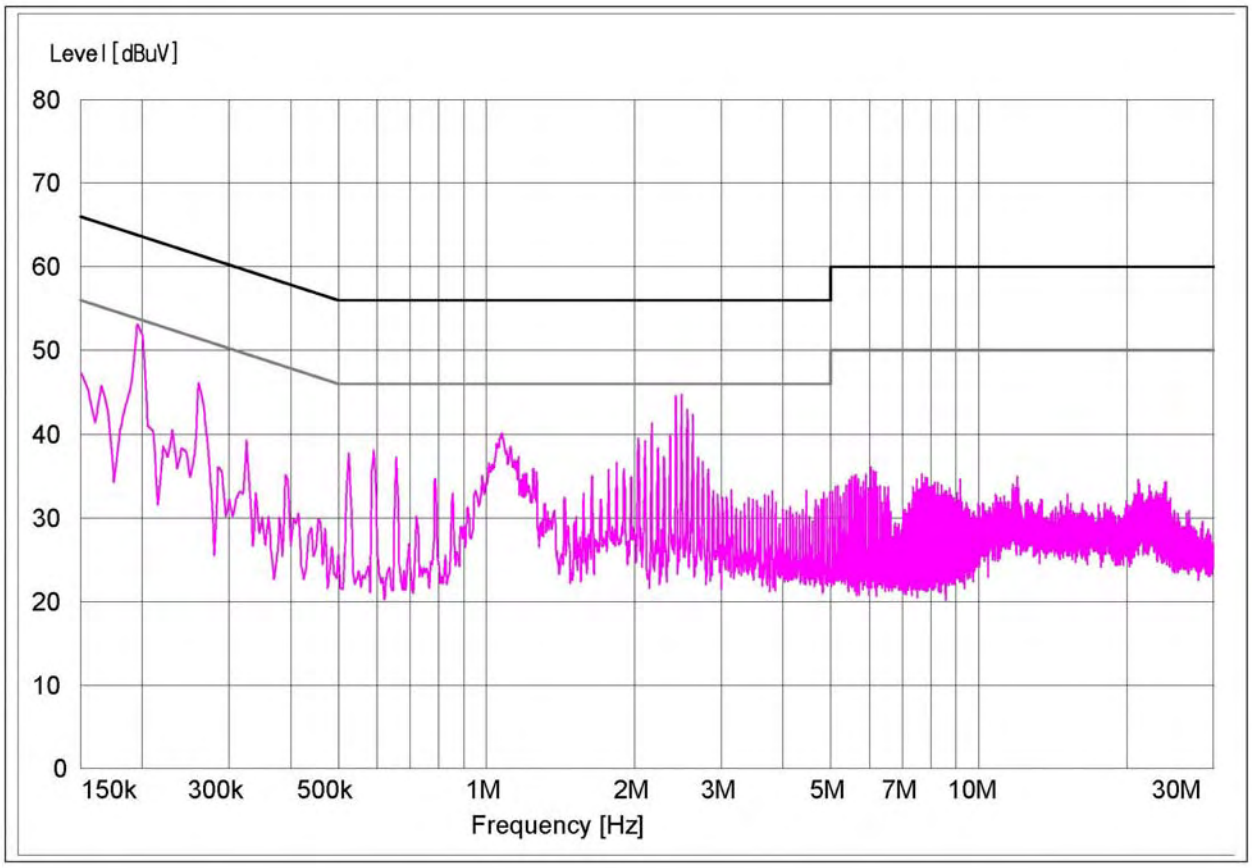
Frequency range : 0.15 MHz – 30 MHz
Measured Bandwidth : 9 kHz

FREQ.	LEVEL(dBuV)		LINE	LIMIT(dBuV)		MARGIN(dB)	
(MHz)	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.196	52.1	40.2	H	63.8	53.8	11.7	13.6
0.262	44.5	33.9	H	61.4	51.4	16.9	17.5
0.526	34.7	31.8	H	56.0	46.0	21.3	14.2
1.049	37.2	29.5	H	56.0	46.0	18.8	16.5
2.162	35.6	30.6	H	56.0	46.0	20.4	15.4
2.492	37.4	26.8	H	56.0	46.0	18.6	19.2
0.195	49.5	40.4	N	63.8	53.8	14.3	13.4
0.260	42.7	36.3	N	61.4	51.4	18.7	15.1
0.521	35.9	33.6	N	56.0	46.0	20.1	12.4
0.591	39.1	35.3	N	56.0	46.0	16.9	10.7
1.150	33.9	23.2	N	56.0	46.0	22.1	22.8
2.425	38.3	30.3	N	56.0	46.0	17.7	15.7

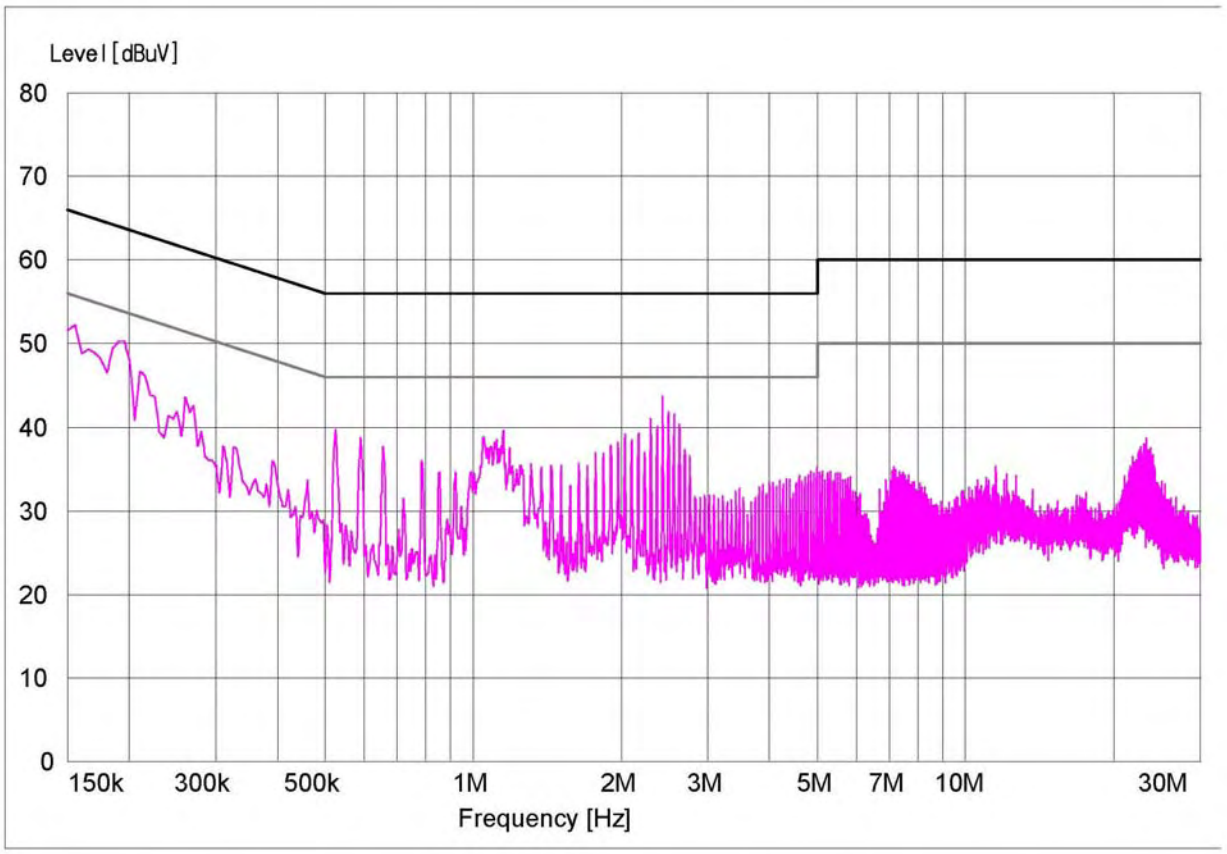
Note ;
Line (H) : Hot
Line (N) : Neutral

Plot of Conducted Power line

Test mode : (Hot)



Test mode : (Neutral)

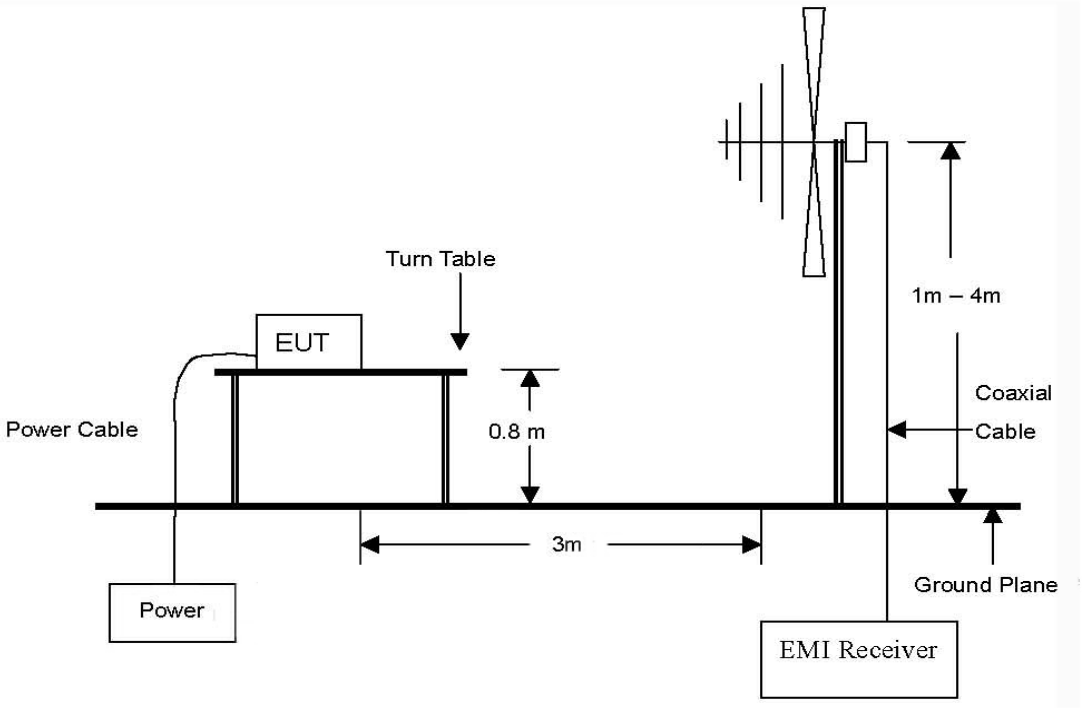


3. Spurious Emission, Band Edge, and Restricted Band Test

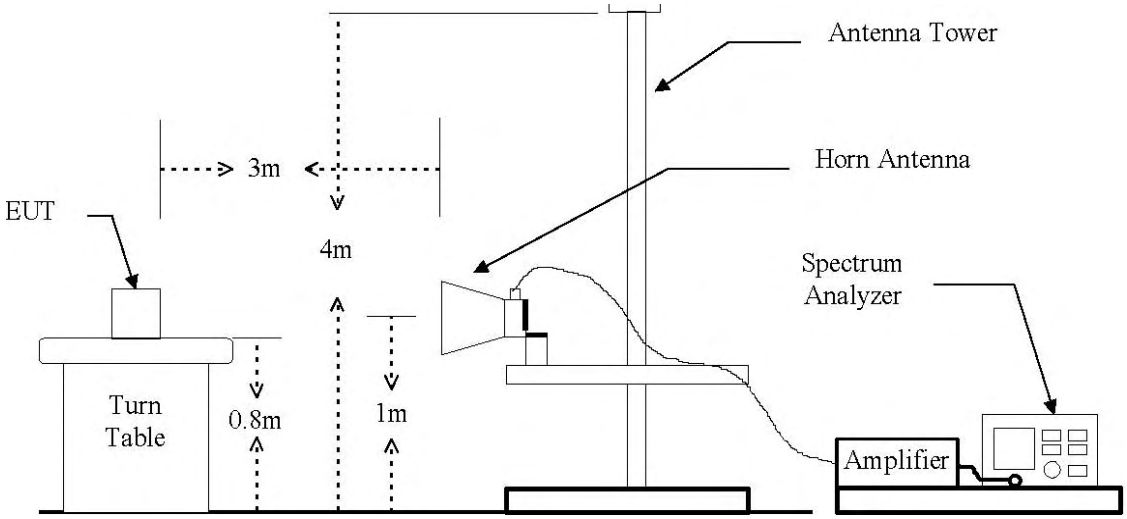
3.1. Test Setup

3.1.1. Spurious Radiated Emissions

The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz Emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 GHz to 18 GHz Emissions.



3.1.2. Spurious RF Conducted Emissions

3.2. Limit

According to §15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement , provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval , as permitted under paragraph(b)(3) of this section , the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in section §15.209(a) is not required. In addition, radiated emission which in the restricted band, as define in section §15.205(a), must also comply the radiated emission limits specified in section §15.209(a) (see section §15.205(c))
According to § 15.209(a), for an intentional radiator devices, the general required of field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values：

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
30 - 88	3	40.0	100
88 – 216	3	43.5	150
216 – 960	3	46.0	200
Above 960	3	54.0	500

According to §15.109(a), for an unintentional device, except for Class A digital devices, the field strength of radiated emission from unintentional radiators at a distance of 3 meters shall not exceed the above table.

3.3. Test Procedures

Radiated emissions from the EUT were measured according to the dictates of ANSI C63.4:2003

3.3.1. Test Procedures for Spurious Radiated Emissions

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. During performing radiated emission below 1 GHz, the EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing radiated emission above 1 GHz, the EUT was set 1 meter away from the interference-receiving antenna.
3. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE ;

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz for Peak detection and frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1 GHz.

3.3.2. Test Procedures for Spurious RF Conducted Emissions

1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using RBW=100 kHz, VBW=100 kHz.

3.4. Test Results

Ambient temperature : 21℃ Relative humidity : 43 %

3.4.1. Spurious Radiated Emission (30 MHz ~ 1000 MHz)

The frequency spectrum from 30 MHz to 1000 MHz was investigated. All emissions are not reported much lower than the prescribed limits. All reading values are quasi-peak values.

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dBuV)	Detect Mode	Pol.	AF/CL (dB/m)/(dB)	Amp Gain (dB)	Actual (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
42.23	13.28	Q.P.	H	12.21 / 1.14	-	26.63	40.0	13.37
109.36	13.34	Q.P.	H	10.53 / 1.64	-	25.51	43.5	17.99
434.08	13.02	Q.P.	H	16.51 / 3.34	-	32.86	46.0	13.14
Above 500	Not Detected							

Remark:

1. All spurious emission at channels are almost the same below 1 GHz, so that the channel was chosen at representative in final test.
2. The RF Chip combined with 802.11b&g mode. It will auto-detect the radio situation then switch the mode. The 802.11g mode is the worse case than the 802.11b mode. So only the 802.11g mode data are recorded in final test report.
3. "*" means the restricted band.
4. Actual = Reading + AF + CL.

3.4.2. Spurious Radiated Emission (Above 1000 MHz)

The frequency spectrum above 1000 MHz was investigated. All emissions are not reported much lower than the prescribed limits. Reading values are both peak and average values.

A. 802.11b Low Channel (2412 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dBuV)	Detect Mode	Pol.	AF (dB/m)	Amp Gain+CL (dB)	Actual (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2390.00*	68.15	P	H	28.06	29.26	66.95	74	7.05
2390.00*	52.04	A	H	28.06	29.26	50.84	54	3.16
4824.00	55.14	P	H	32.90	25.25	62.79	74	11.21
4824.00	41.17	A	H	32.90	25.25	48.82	54	5.18
7236.00	47.50	P	H	35.73	17.59	65.64	74	8.36
7236.00	34.49	A	H	35.73	17.59	52.63	54	1.37
Above 8000	Not Detected							

B. 802.11b Middle Channel (2437 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dBuV)	Detect Mode	Pol.	AF (dB/m)	Amp Gain+CL (dB)	Actual (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1844.00	60.11	P	H	26.50	30.58	56.03	74	17.97
1844.00	50.51	A	H	26.50	30.58	46.43	54	7.57
4874.00	56.09	P	H	32.93	25.29	63.73	74	10.27
4874.00	39.74	A	H	32.93	25.29	47.38	54	6.62
7311.00	49.24	P	H	35.83	16.31	68.76	74	5.24
7311.00	33.12	A	H	35.83	16.31	52.64	54	1.36
Above 8000	Not Detected							

C. 802.11b High Channel (2462 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dBuV)	Detect Mode	Pol.	AF (dB/m)	Amp Gain+CL (dB)	Actual (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2483.50*	69.94	P	H	28.06	29.26	68.74	74	5.26
2483.50*	49.31	A	H	28.06	29.26	48.11	54	5.89
4924.00	53.19	P	H	32.90	25.25	60.84	74	13.16
4924.00	36.30	A	H	32.90	25.25	43.95	54	10.05
7386.00	47.31	P	H	35.94	15.42	67.83	74	6.17
7386.00	31.80	A	H	35.94	15.42	52.32	54	1.68
Above 8000	Not Detected							

D. 802.11g Low Channel (2412 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dBuV)	Detect Mode	Pol.	AF (dB/m)	Amp Gain+CL (dB)	Actual (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2390.00*	69.94	P	H	28.06	29.26	68.74	74	5.26
2390.00*	49.31	A	H	28.06	29.26	48.11	54	5.89
4824.00	53.19	P	H	32.90	25.25	60.84	74	13.16
4824.00	36.30	A	H	32.90	25.25	43.95	54	10.05
7236.00	47.31	P	H	35.73	17.59	65.45	74	8.55
7236.00	34.80	A	H	35.73	17.59	52.94	54	1.06
Above 8000	Not Detected							

E. 802.11g Middle Channel (2437 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dBuV)	Detect Mode	Pol.	AF (dB/m)	Amp Gain+CL (dB)	Actual (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1841.00	60.55	P	H	26.36	30.59	56.32	74	17.68
1841.00	45.28	A	H	26.36	30.59	41.05	54	12.95
4874.00	52.91	P	H	32.93	25.29	60.55	74	13.45
4874.00	36.50	A	H	32.93	25.29	44.14	54	9.86
7311.00	47.17	P	H	35.83	16.31	66.69	74	7.31
7311.00	33.30	A	H	35.83	16.31	52.82	54	1.18
Above 8000	Not Detected							

F. 802.11g High Channel (2462 MHz)

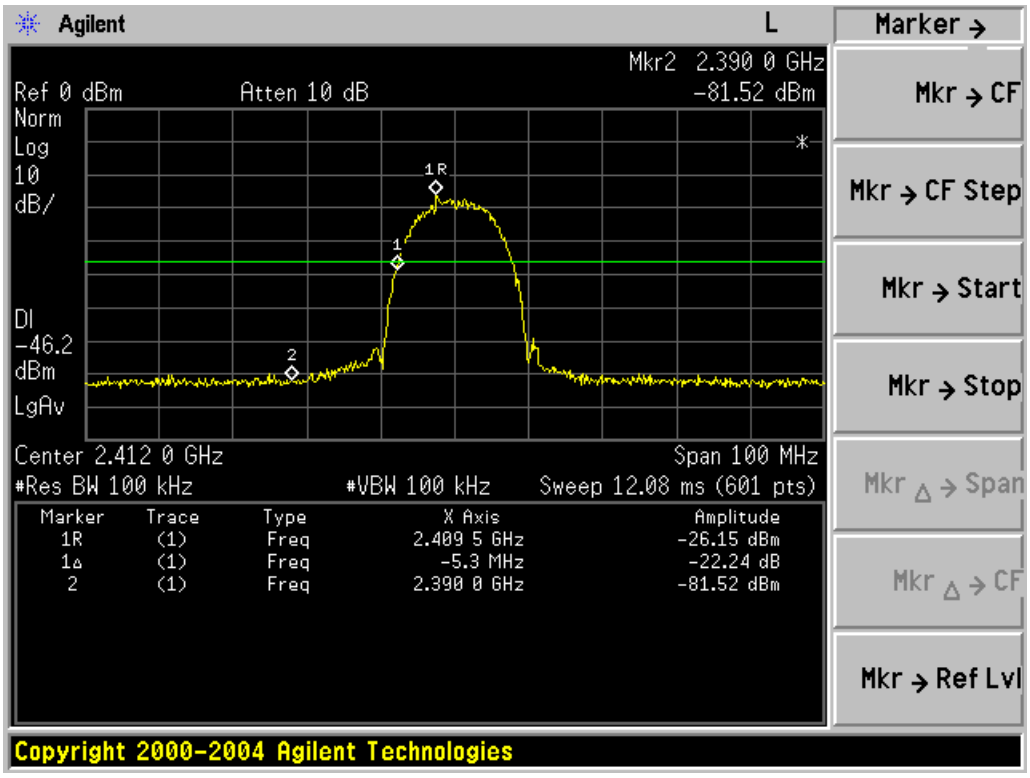
Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dBuV)	Detect Mode	Pol.	AF (dB/m)	Amp Gain+CL (dB)	Actual (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2483.50*	69.71	P	H	28.06	29.26	68.51	74	5.49
2483.50*	49.50	A	H	28.06	29.26	48.30	54	5.70
4824.00	51.02	P	H	32.90	25.25	58.67	74	15.33
4824.00	33.77	A	H	32.90	25.25	41.42	54	12.58
7386.00	48.24	P	H	35.94	15.42	68.76	74	5.24
7386.00	31.79	A	H	35.94	15.42	52.31	54	1.69
Above 8000	Not Detected							

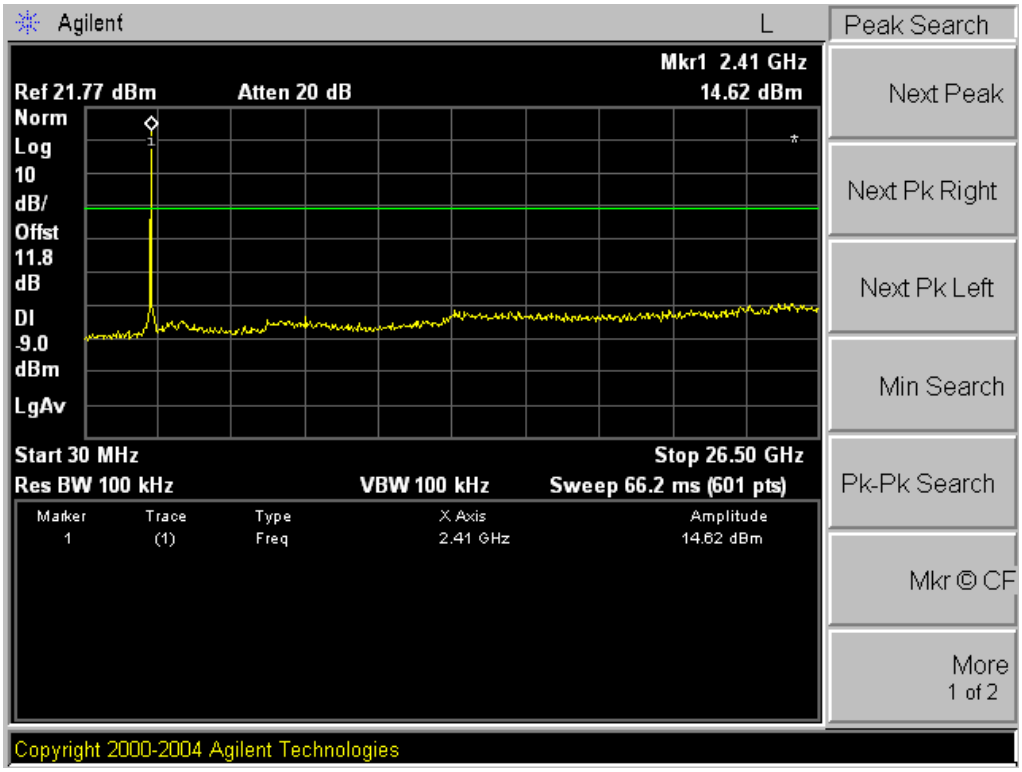
Remark:

1. "*" means the restricted band.
2. Measuring frequencies from 1 GHz to the 10^{th} harmonic of highest fundamental Frequency.
3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using peak/average detector mode.
4. Average test would be performed if the peak result were greater than the average limit.
5. Actual = Reading + AF – Amp Gain + CL

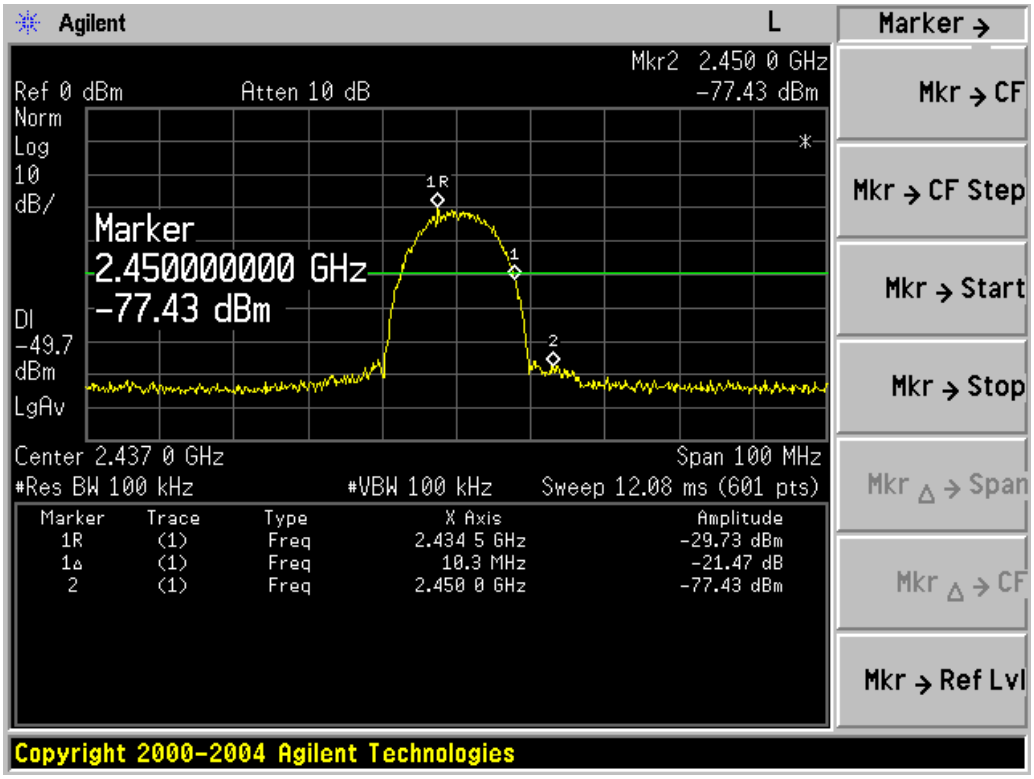
3.4.3. Spurious RF Conducted Emissions: Plot of Spurious RF Conducted Emission

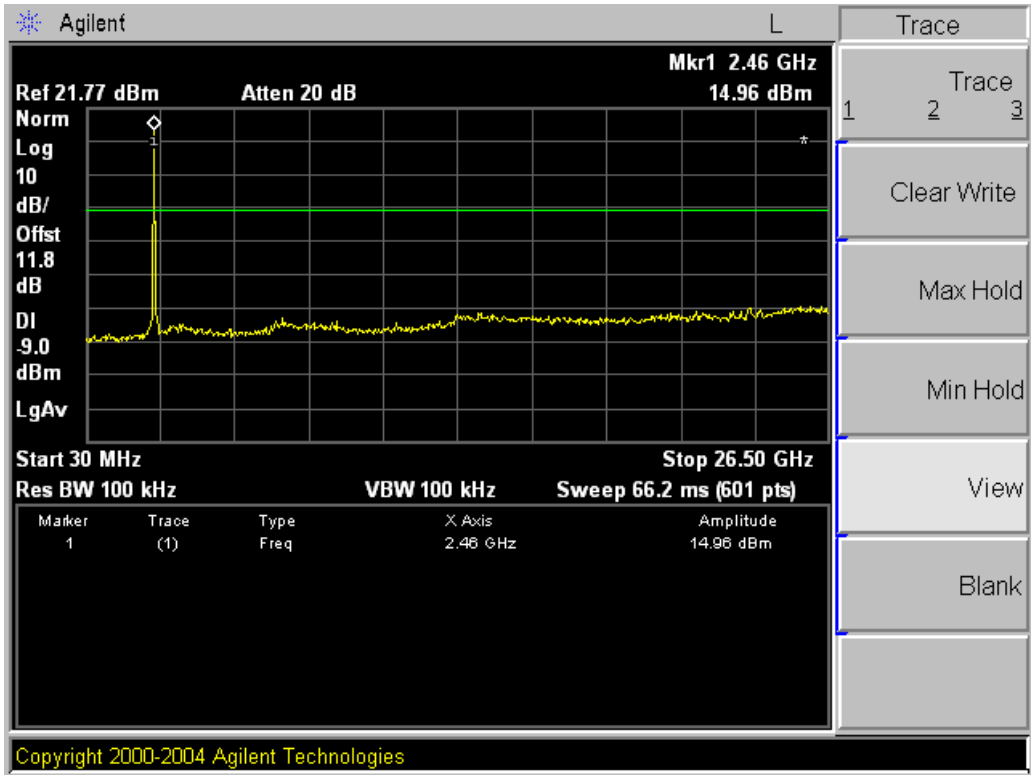
802.11b Mode: Low Channel



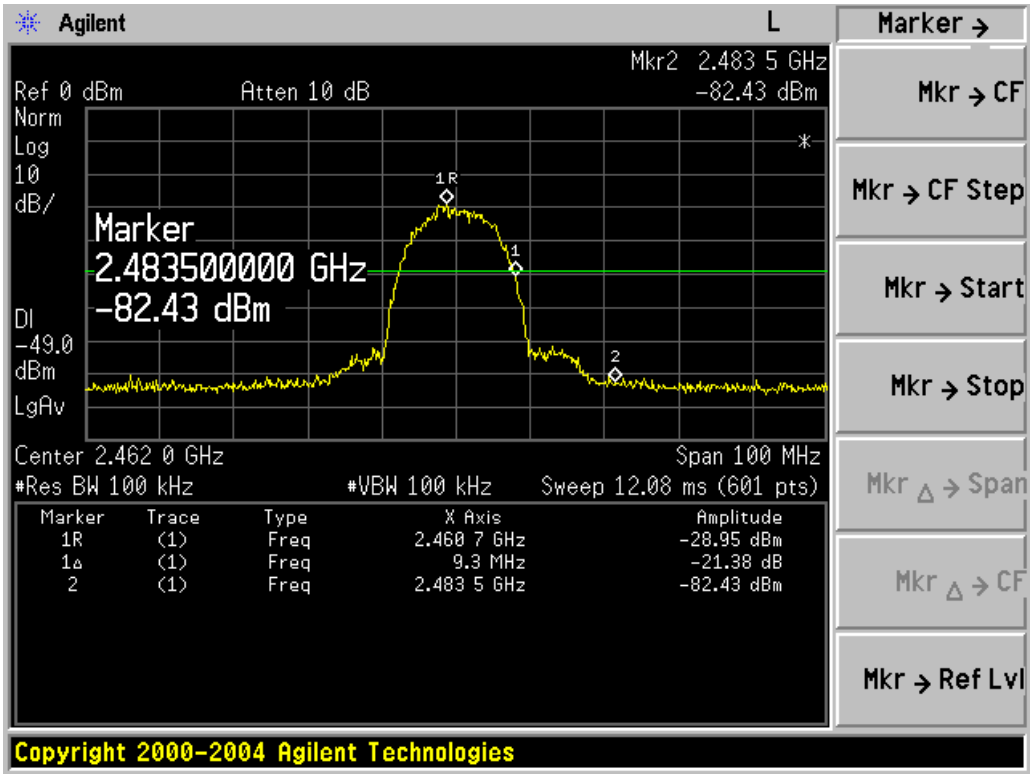


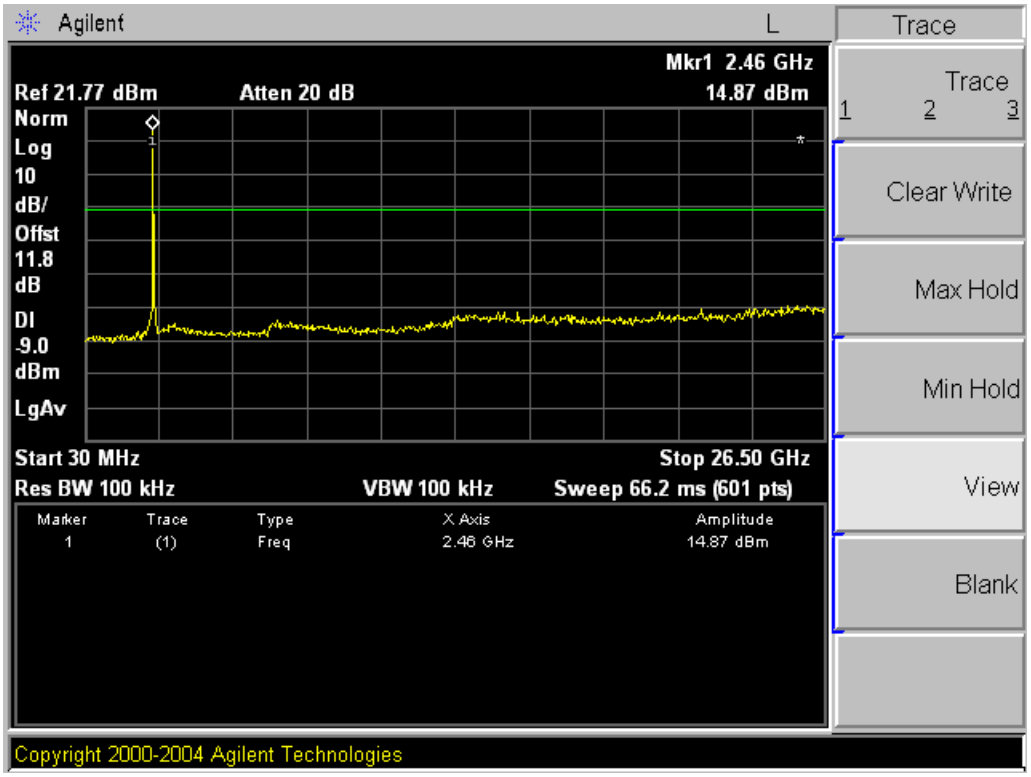
802.11b Mode: Middle Channel



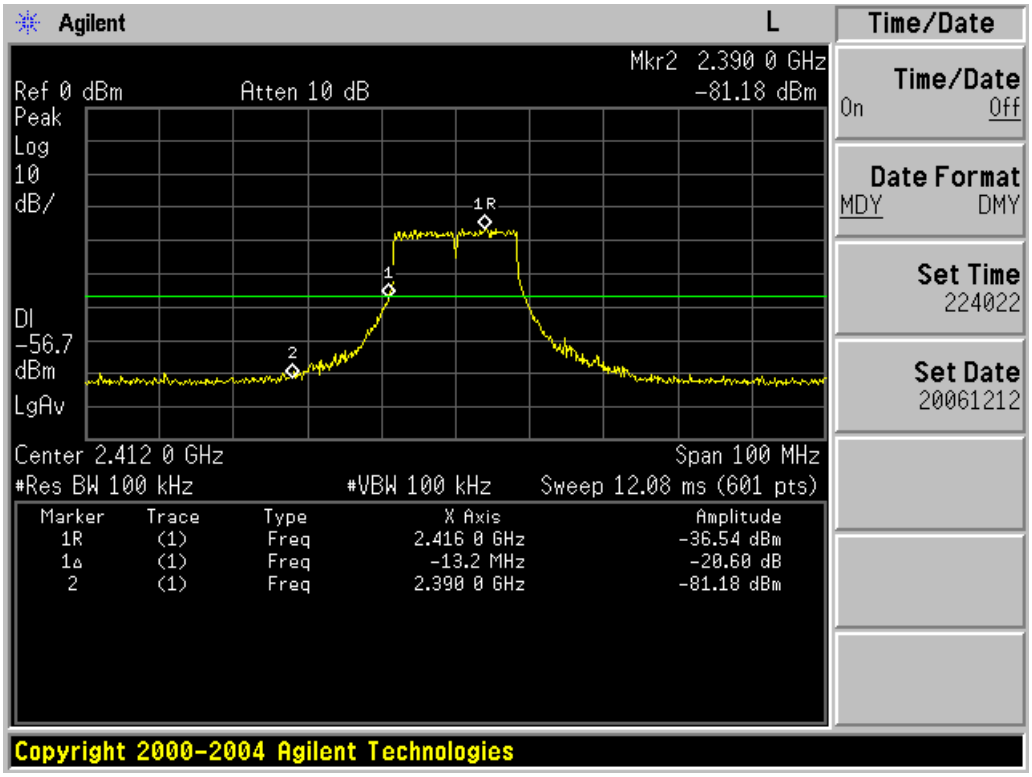


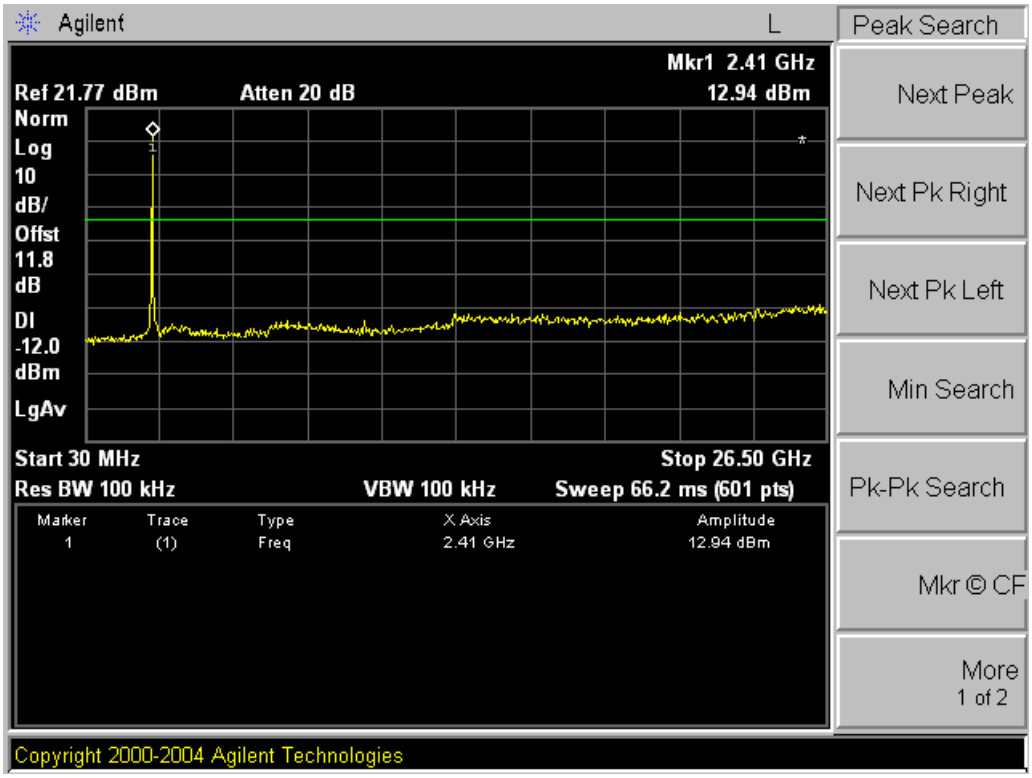
802.11b Mode: High Channel



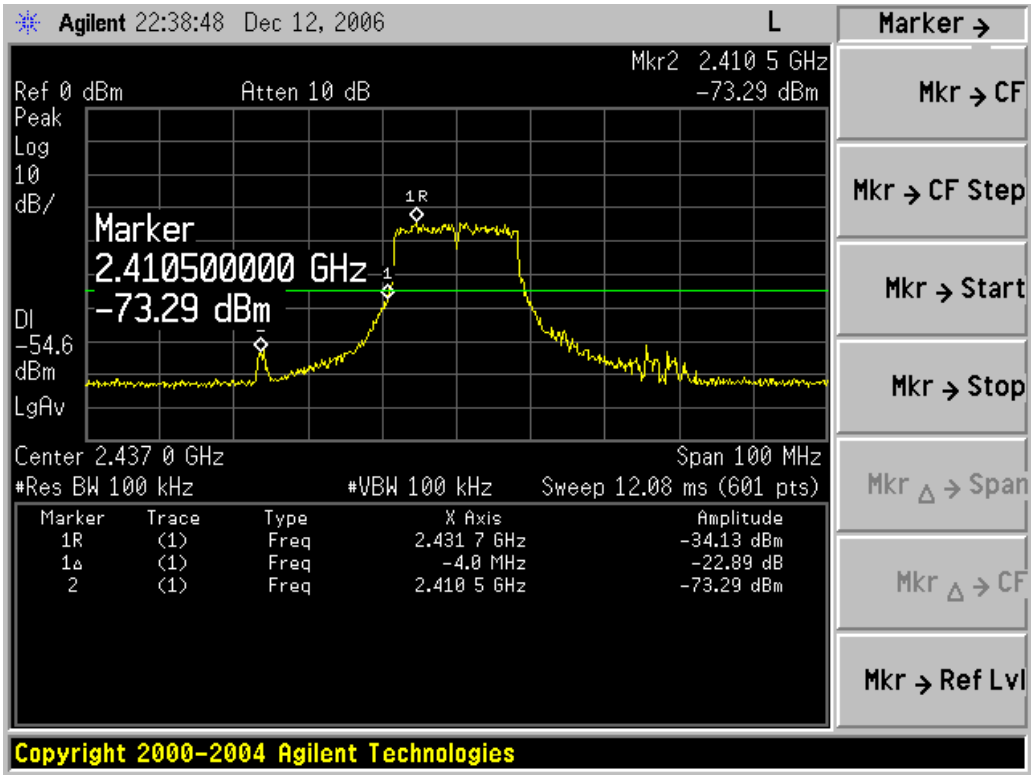


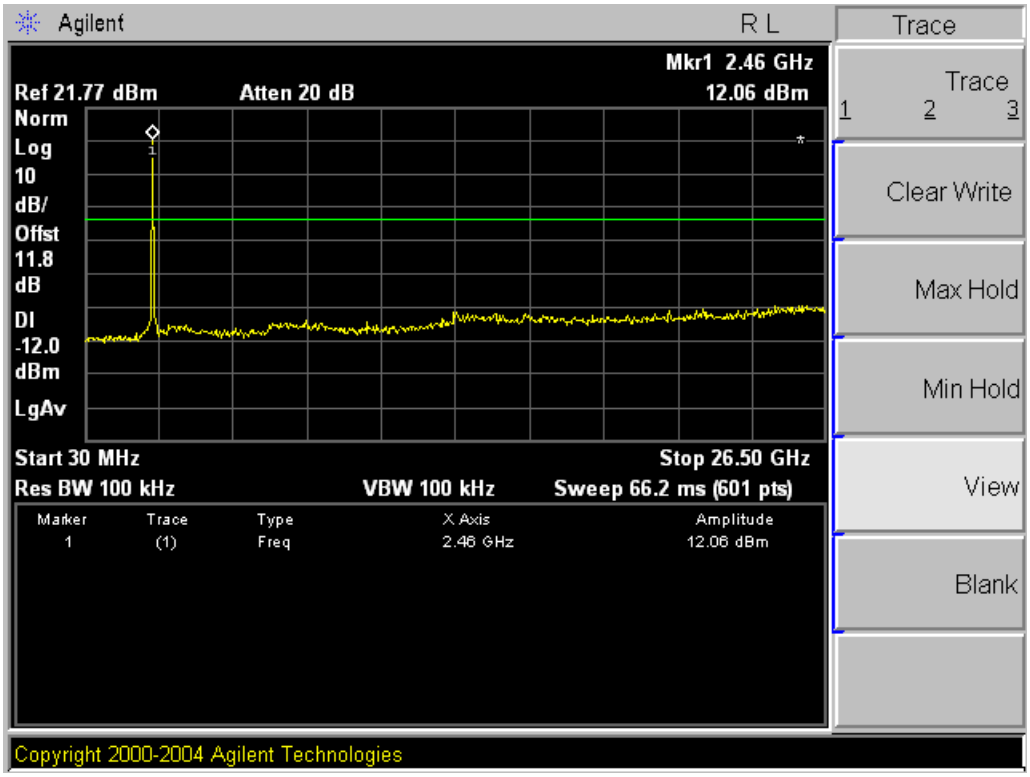
802.11g Mode: Low Channel



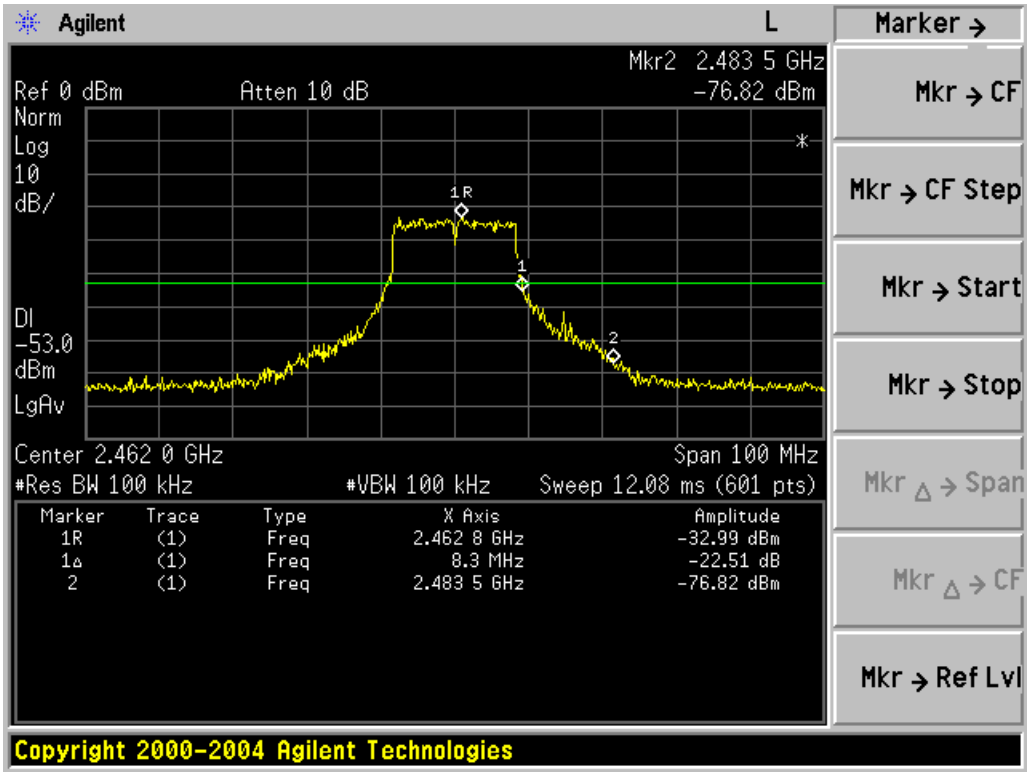


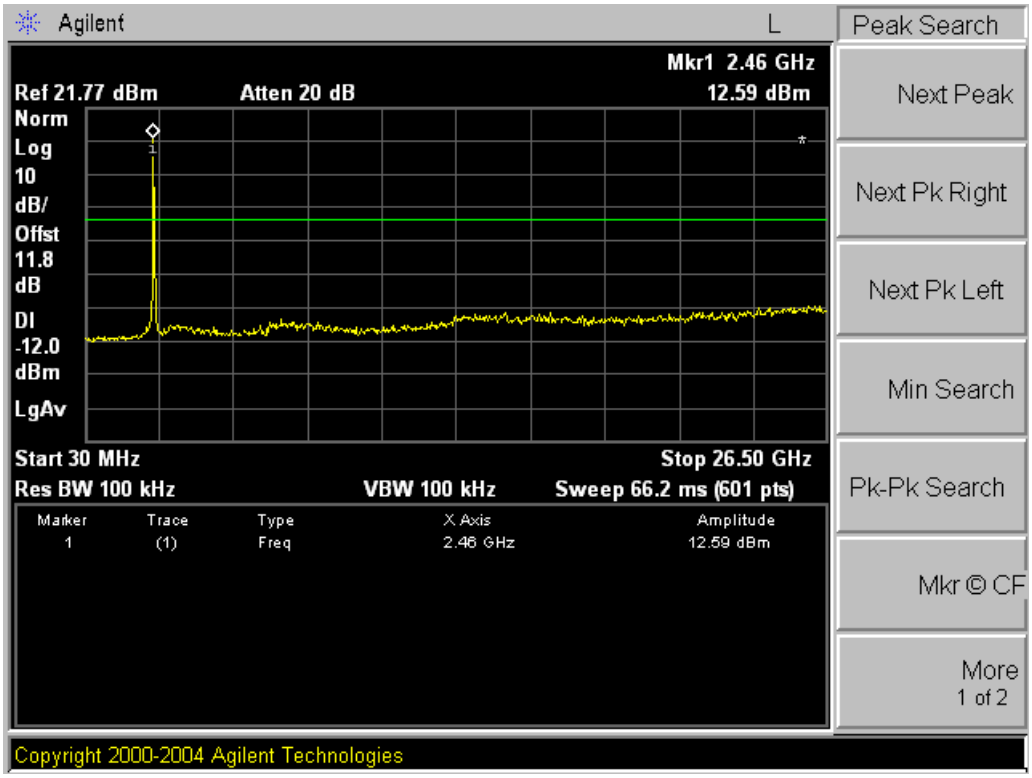
802.11g Mode: Middle Channel





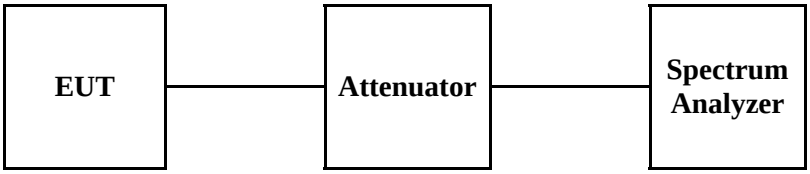
802.11g Mode: High Channel





4. 6 dB Bandwidth

4.1. Test Setup



4.2. Limit

According to §15.247(a)(2), systems using digital modulation techniques may operate in the 902 ~928 MHz , 2400 ~ 2483.5 MHz, and 5725 ~ 5825 MHz bands. The minimum of 6dB Bandwidth shall be at least 500 kHz

4.3. Test Procedure

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 100 kHz, VBW = RBW, Span = 50 MHz, Sweep = auto.
4. Mark the peak frequency and –6dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

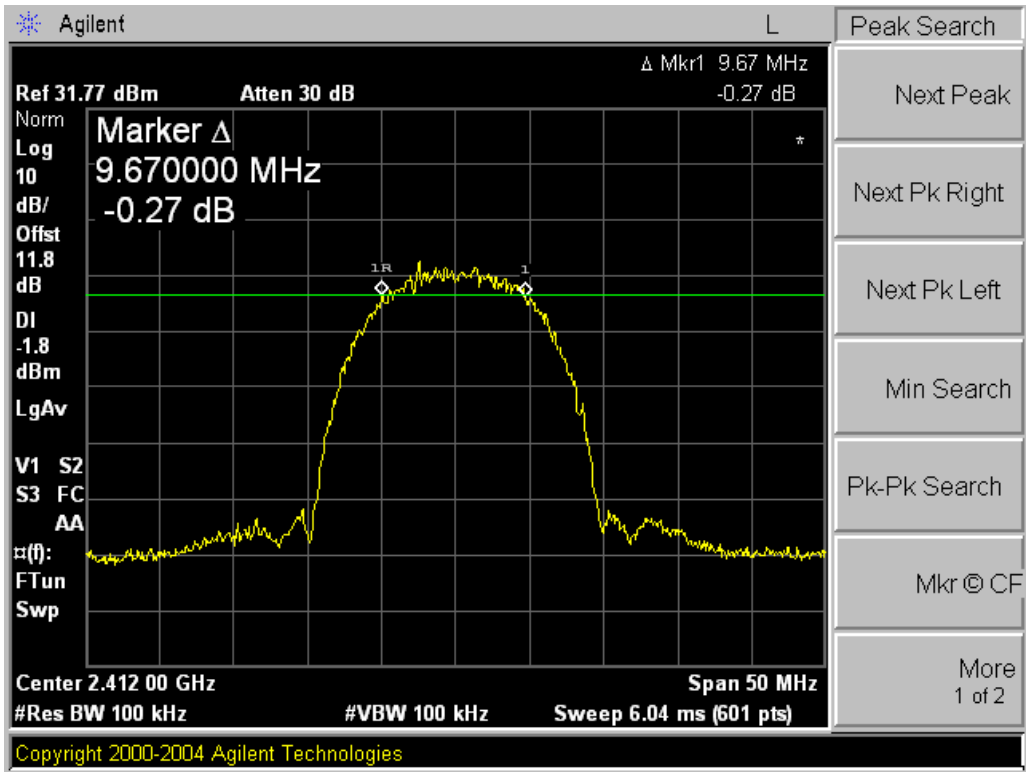
4.4. Test Results

Ambient temperature : 21 ℃ Relative humidity : 42 %

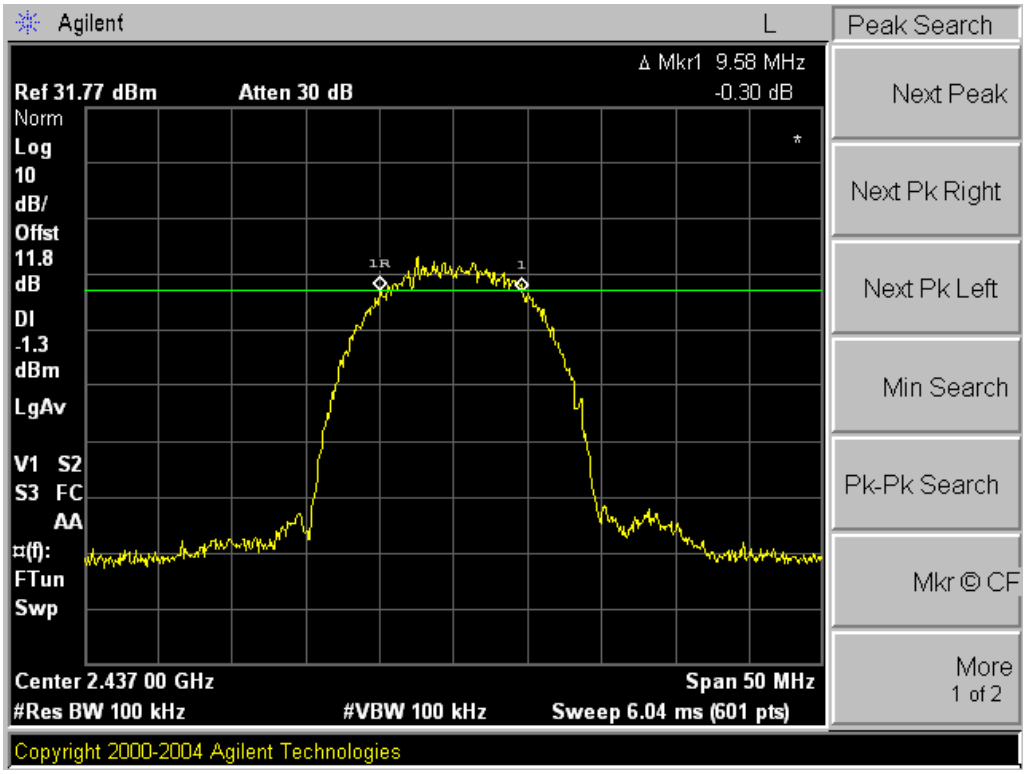
4.4.1. 802.11b

Channel	Channel Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	9.67	0.5
Middle	2437	9.58	
High	2462	9.75	

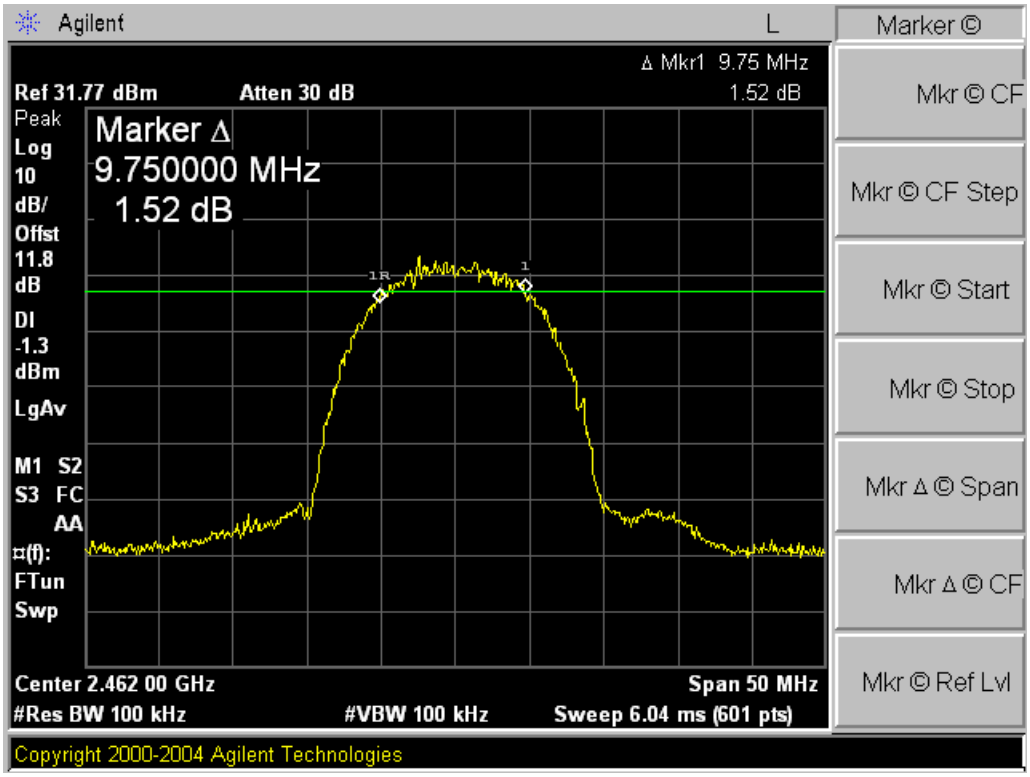
Low Channel



Middle Channel



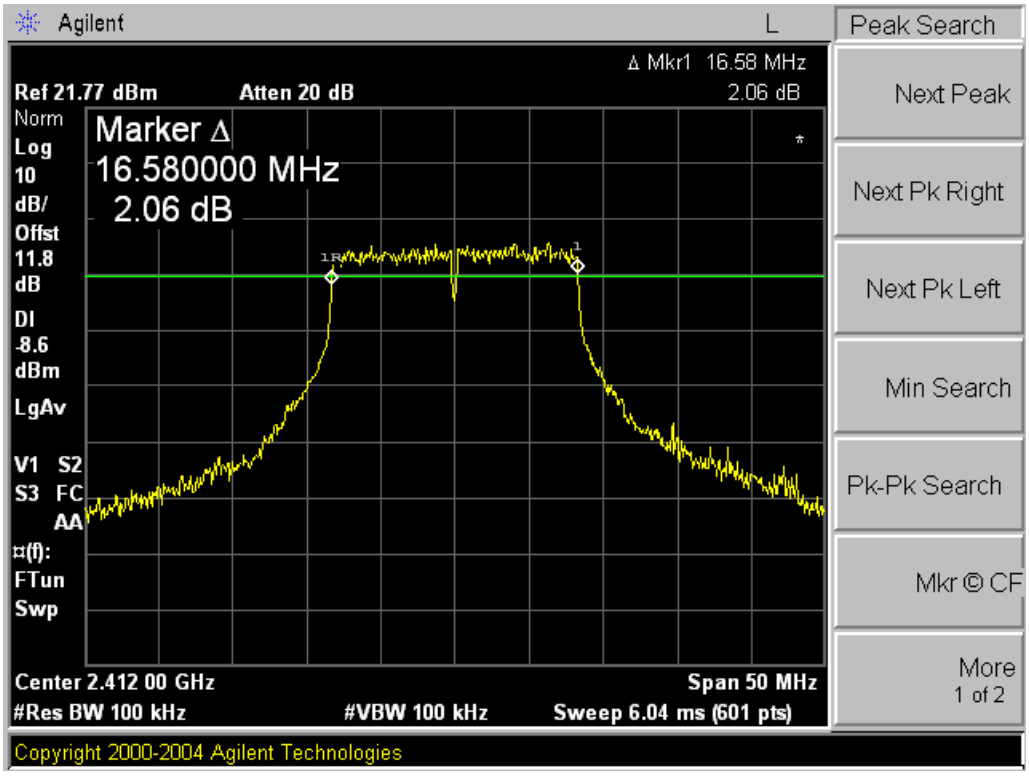
High Channel



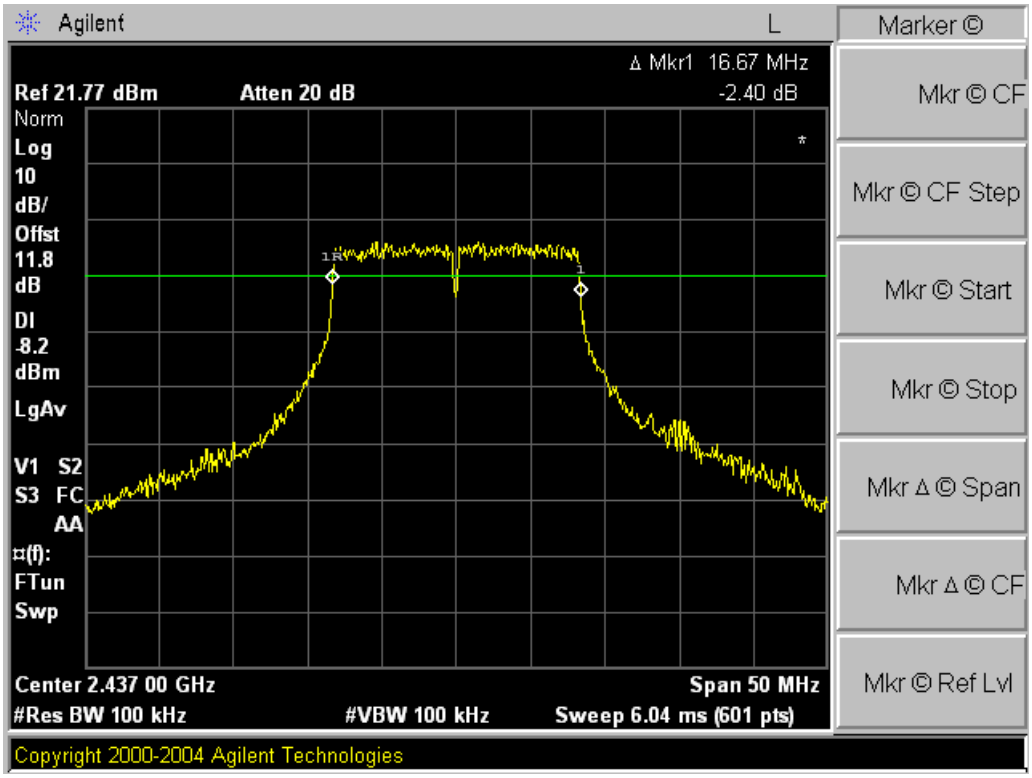
4.4.2. 802.11g

Channel	Channel Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	16.58	0.5
Middle	2437	16.67	
High	2462	16.67	

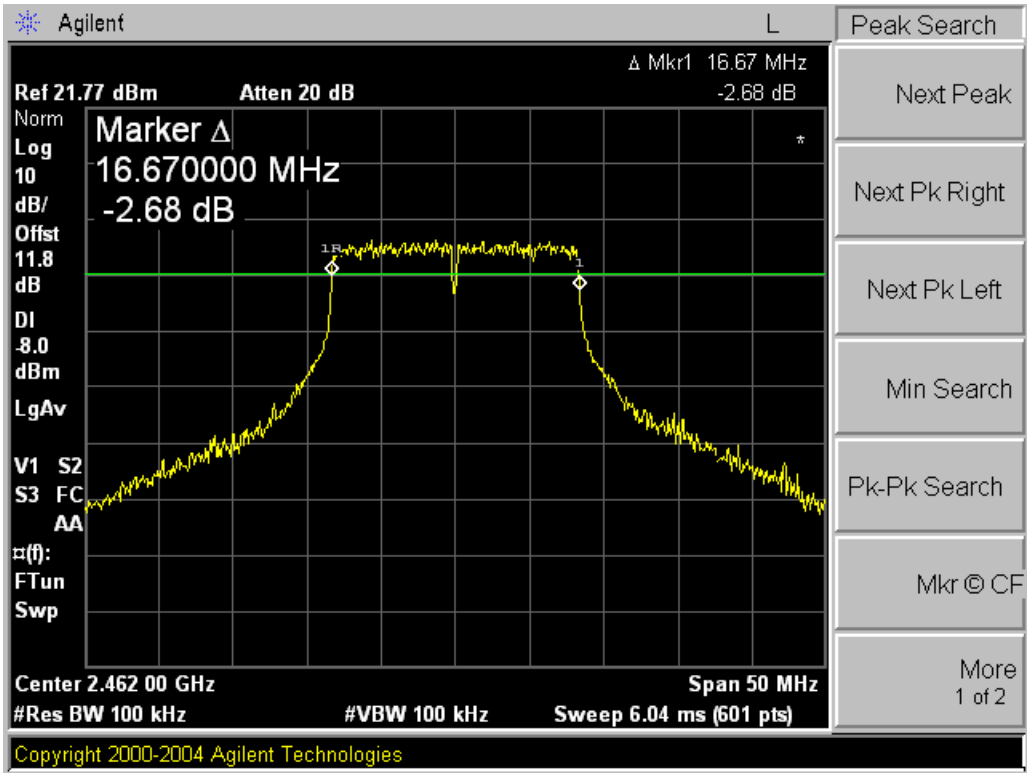
Low Channel



Middle Channel

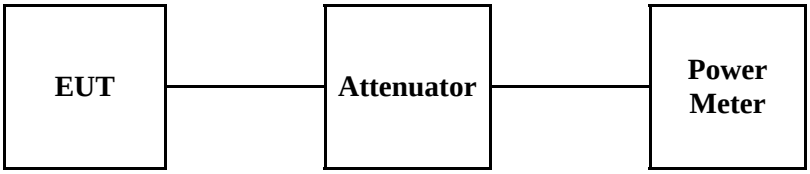


High Channel



5. Maximum Peak Output Power Measurement

5.1. Test Setup



5.2. Limit

According to §15.247(b)(3), for systems using digital modulation in the 902 ~ 928 MHz, 2400 ~2483.5 MHz, and 5725 ~ 5850 MHz band: 1 Watt. As an alternative to a peak power measurement, compliance with the one watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antenna elements. The average must not include any intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.
According to §15.247(b)(4), the conducted output power limit specified in paragraph(b) of this section is based on the use of antenna with directional gains that do not exceed 6 dBi. Except as shown in paragraph(c) of this section, if transmitting antenna of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraph (b)(1), (b)(2), and (b)(3) of this section , as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi

5.3. Test Procedure

The RF Power output was measured with a Power Meter connected to the antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate center frequency.

5.4. Test Results

Ambient temperature : 21 ℃ Relative humidity : 42 %

5.4.1. 802.11b Mode

Channel	Channel Frequency (MHz)	Average Power Output (dBm)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Margin (dB)
Low	2412	14.02	15.83	30	14.17
Middle	2437	14.64	16.51		13.49
High	2462	15.33	17.05		12.95

NOTE:
1. At finial test to get the worst-case emission at 11 Mbps

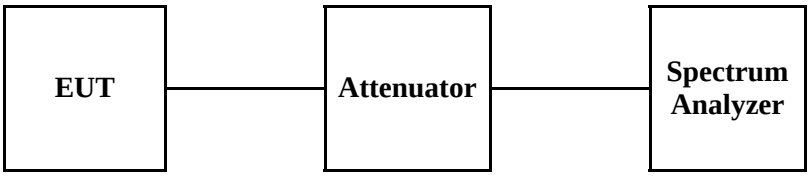
5.4.2. 802.11g Mode

Channel	Channel Frequency (MHz)	Average Power Output (dBm)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Margin (dB)
Low	2412	10.02	17.03	30	12.97
Middle	2437	10.70	17.44		12.56
High	2462	11.39	18.01		11.99

NOTE:
1. At finial test to get the worst-case emission at 54 Mbps

6. Power Spectral Density Measurement

6.1. Test Setup



6.2. Limit

According to §15.247(e), For digitally modulated system, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph(b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density

6.3. Test Procedure

1. 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 the spectrum analyzer.
2. Set the spectrum analyzer as RBW = 3 kHz, VBW = 10 kHz, Span = 300 kHz, Sweep = 100 s
3. Record the max reading.
4. Repeat the above procedure until the measurements for all frequencies are completed.

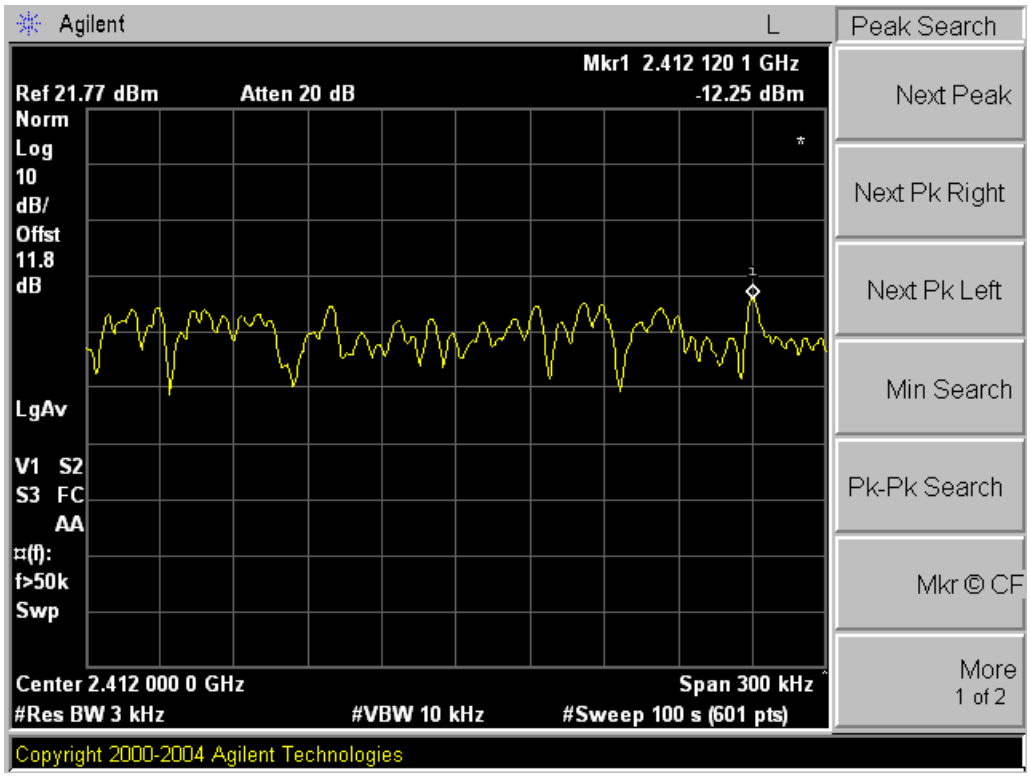
6.4. Test Results

Ambient temperature : 21 ℃ Relative humidity : 42 %

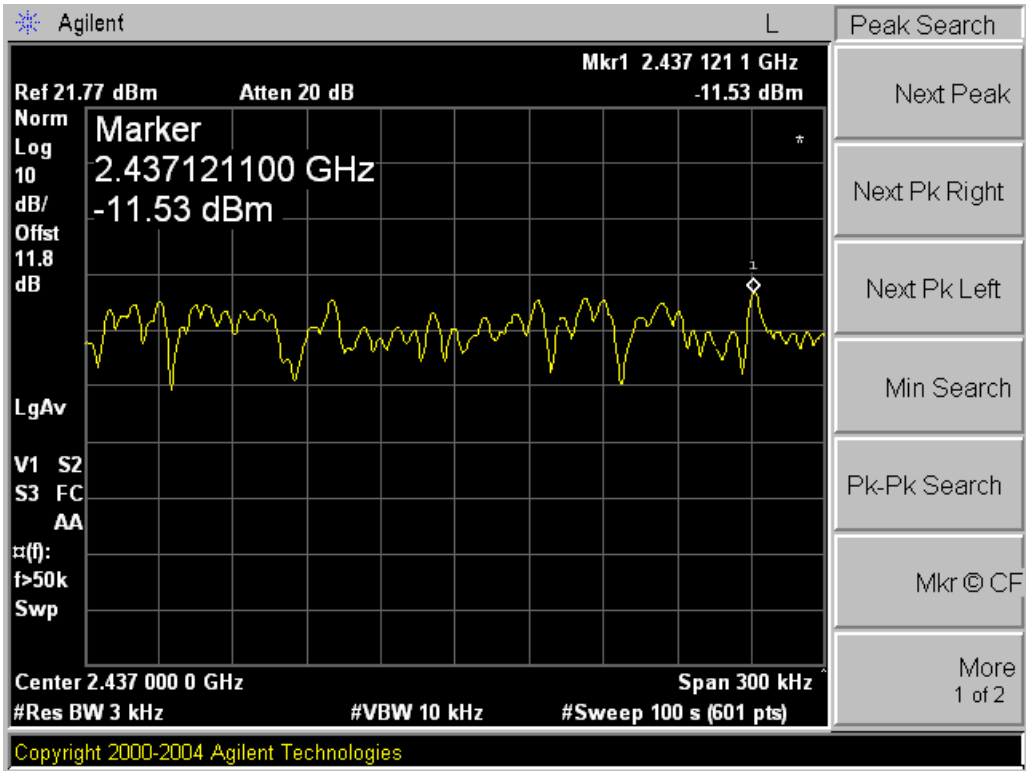
6.4.1. 802.11b

Channel	Channel Frequency (MHz)	Final RF Power Level in 3 kHz BW (dBm)	Maximum Limit (dBm)	Margin (dB)
Low	2412	-12.25	8	20.25
Middle	2437	-11.53		19.53
High	2462	-11.01		19.01

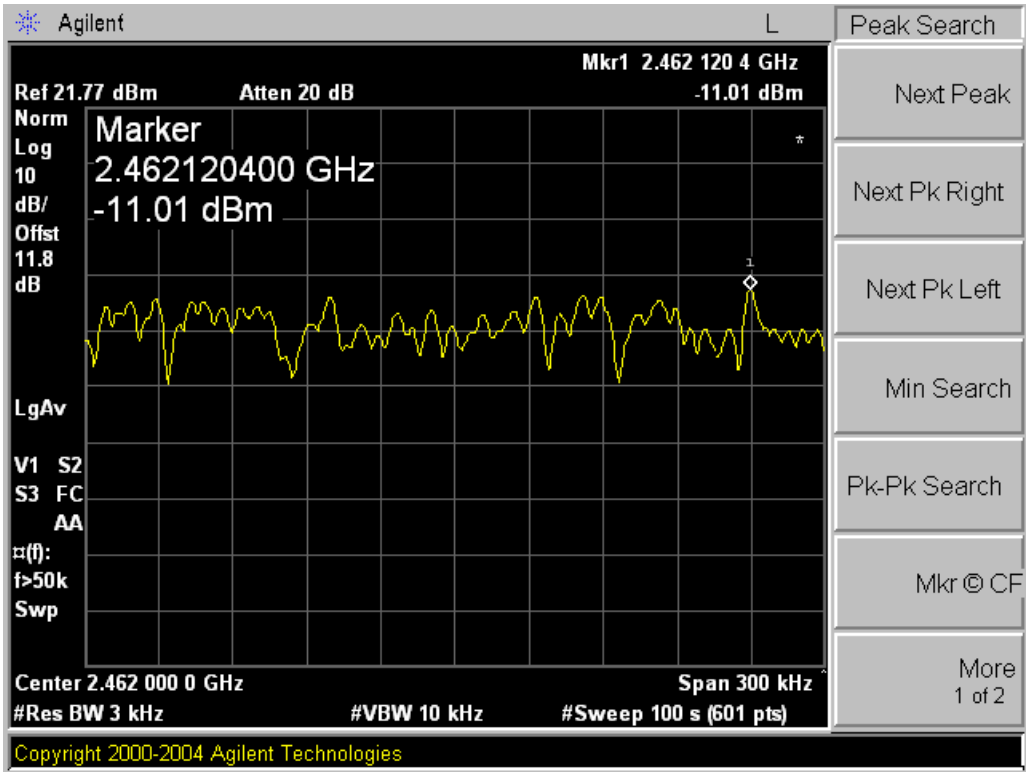
Low Channel



Middle Channel



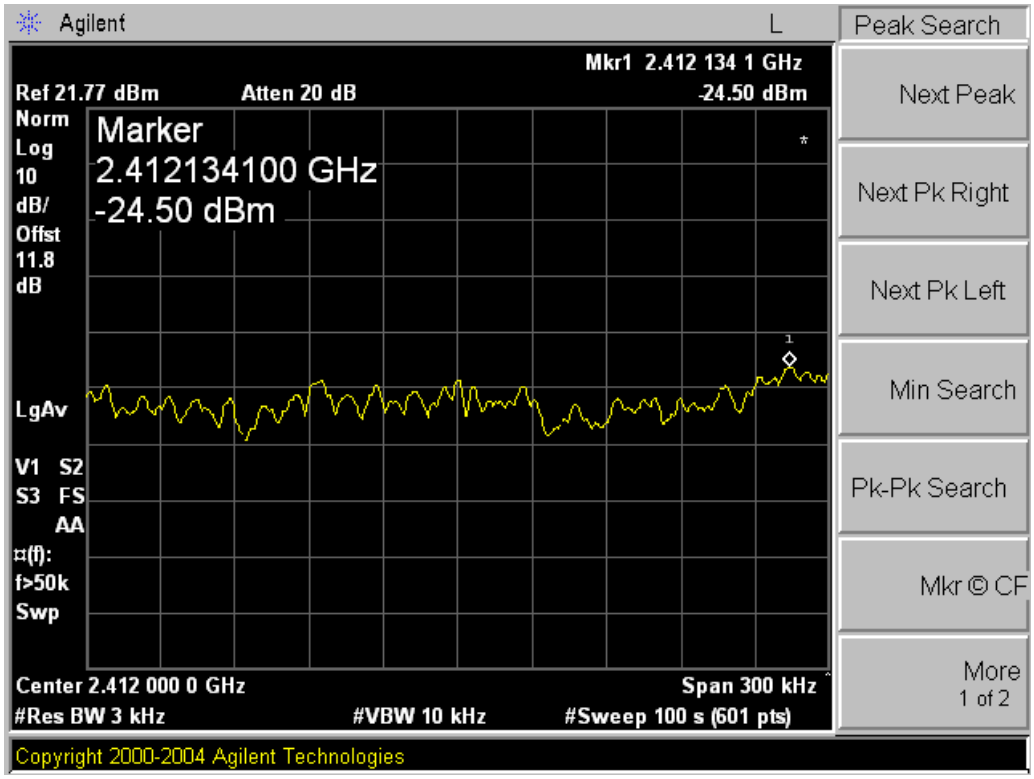
High Channel



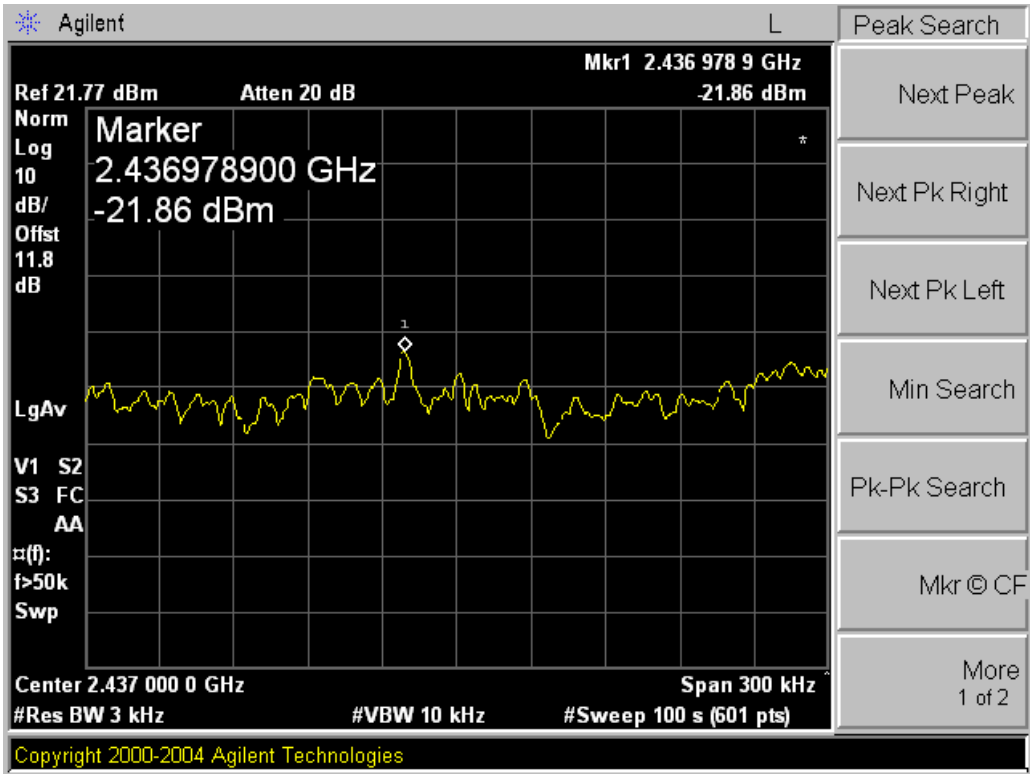
6.4.2. 802.11g

Channel	Channel Frequency (MHz)	Final RF Power Level in 3 kHz BW (dBm)	Maximum Limit (dBm)	Margin (dB)
Low	2412	-24.50	8	32.50
Middle	2437	-21.86		29.86
High	2462	-22.40		30.40

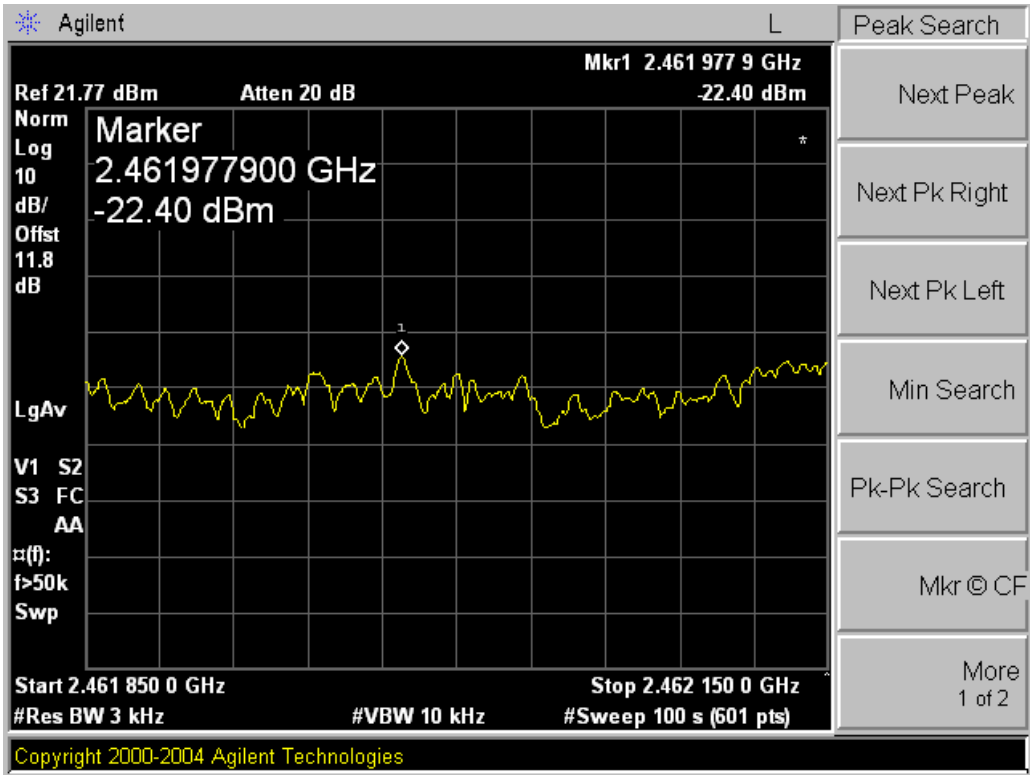
Low Channel



Middle Channel



High Channel



7. RF Radiated Output Power

7.1. Test Setup

Refer to 3.1 Test Setup.

7.2. Limit

FCC §22.913(a), the ERP of mobile transmitters must not exceed 7 watts. FCC §24.232(c) Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

7.3. Test Procedure

1. On a test site, the EUT shall be placed at 80cm height on a turn table, and in the position closest to normal use as declared by the applicant.
2. The test antenna shall be oriented initially for vertical polarization located 3m from EUT to correspond to the frequency of the transmitter.
3. The output of the test antenna shall be connected to the measuring receiver and the peak detector is used for the measurement.
4. The transmitter shall be switched on, the measuring receiver shall be tuned to the frequency of the transmitter under test.
5. The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
6. The transmitter shall then the rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
7. The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
8. The maximum signal level detected by the measuring receiver shall be noted.
9. The transmitter shall be replaced by a horn (substitution antenna).
10. The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
11. The substitution antenna shall be connected to a calibrated signal generator.
12. In necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase he sensitivity of the measuring receiver.
13. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
14. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring received, which is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
15. The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
16. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
17. The measure of the effective radiated power is the large of the two levels recorded, at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.

7.4. Test Results

Ambient temperature : 22 ℃ Relative humidity : 50 %

E.R.P. : GSM 850

Frequency (MHz)	Ant. Pol. (H/V)	Amp-C.L (dB)	S.G Power Level (dBm)	Antenna Gain (dBd)	E. R. P.	
					(dBm)	(W)
824.2	H	28.64	12.08	-8.53	32.19	1.66
836.4	H	28.64	11.91	-8.52	32.03	1.60
848.8	H	28.64	11.80	-8.50	31.94	1.56

Remake: 1. ERP= SG Power Level +Amp-C.L. +Antenna Gain

E.I.R.P. : GSM 1900

Frequency (MHz)	Ant. Pol. (H/V)	Amp-C.L (dB)	S.G Power Level (dBm)	Antenna Gain (dBi)	E. I. R. P.	
					(dBm)	(W)
1850.2	H	33.91	-14.66	9.02	28.27	0.67
1880.0	H	33.91	-14.83	9.06	28.14	0.65
1909.8	H	33.91	-14.19	9.09	28.81	0.76

Remake: 1. E.I.R.P.= S.G. Power Level +Amp-C.L. +Antenna Gain

8. Spurious Radiated Emission

8.1. Test Setup

Refer to 3.1 Test Setup.

8.2. Limit

§ 22.917(a) and §24.238 (a) Out of band emissions. The power of any emission outside of the authorized operating frequency must be attenuated below the transmitting (P) by a factor of at least 43+10log(P)dB.

8.3. Test Procedure

1. On a test site, the EUT shall be placed at 80cm height on a turn table, and in the position closest to normal use as declared by the applicant.
2. The test antenna shall be oriented initially for vertical polarization located 3m from EUT to correspond to the frequency of the transmitter.
3. The output of the test antenna shall be connected to the measuring receiver and the peak detector is used for the measurement.
4. The transmitter shall be switched on, the measuring receiver shall be tuned to the frequency of the transmitter under test.
5. The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
6. The transmitter shall then the rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
7. The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
8. The maximum signal level detected by the measuring receiver shall be noted.
9. The transmitter shall be replaced by a horn (substitution antenna).
10. The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
11. The substitution antenna shall be connected to a calibrated signal generator.
12. In necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase he sensitivity of the measuring receiver.
13. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
14. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring received, which is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
15. The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
16. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
17. The measure of the effective radiated power is the large of the two levels recorded, at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.

8.4. Test Results

Ambient temperature : 22 ℃ Relative humidity : 50 %

GSM 850

Frequency (MHz)	Ant.Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	E.R.P. (dBm)	Limit (dBm)	Margin (dB)
TX LOW channel (824.2 MHz)								
1648.4	H	-54.36	1.02	8.22	6.07	-49.31	-13	36.31
2472.6	H	-64.89	1.06	10.03	7.88	-58.07	-13	45.07
TX MID Channel (836.4 MHz)								
1672.8	H	-60.74	1.02	8.30	6.15	-55.61	-13	42.61
2509.2	H	-66.44	1.06	10.70	8.55	-58.95	-13	45.95
TX HIGH Channel (848.8 MHz)								
1697.6	H	-62.98	1.02	8.39	6.24	-57.76	-13	40.46
2546.4	H	-68.97	1.06	10.11	7.96	-62.07	-13	44.77

Remake: 1. No more harmonic above 3rd harmonic for all channel.
2. E.R.P.= SG Reading –Cable Loss +Gain
3. The effective radiated power record the largest level between the two levels with Ant.Pol.(H/V)

GSM 1900

Frequency (MHz)	Ant.Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	E.R.P. (dBm)	Limit (dBm)	Margin (dB)
TX LOW channel (1850.2 MHz)								
3700.4	H	-70.83	1.53	11.14	8.99	-63.37	-13	50.37
5550.6	H	-63.60	2.20	11.56	9.41	-56.39	-13	43.39
TX MID Channel (1880.0 MHz)								
3760.0	H	-72.13	1.53	11.18	9.03	-64.63	-13	51.63
5640.0	H	-62.95	2.20	11.62	9.47	-55.68	-13	42.68
TX HIGH Channel (1909.8 MHz)								
3819.8	H	-71.51	1.53	11.23	9.08	-63.96	-13	50.96
5729.4	H	-62.01	2.20	11.68	9.53	-54.68	-13	41.68

Remake: 1. No more harmonic above 3rd harmonic for all channel.
2. E.R.P.= SG Reading –Cable Loss +Gain
3. The effective radiated power record the largest level between the two levels with Ant.Pol.(H/V)

9. Antenna Requirement

9.1. Standard Applicable

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 6 dBi are used, the power shall be reduced by the amount in dB that the gain of the antenna exceeds 6 dBi.

9.2. Antenna Connected Construction

Antenna used in this product is Fixed type (Chip Antenna) of -0.98 dBi (2.4 GHz)