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**FEDERAL COMMUNICATIONS COMMISSION**

Registration number: 282399

Report No.: GLEMO081203830RFT

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FCC ID: OJ7VANTAGE

## TEST REPORT

**Application No. :** GLEMO081203830RF

**Applicant:** Victory Concept Industries Ltd

**Address of Applicant:** 4/F., CAC Tower., 165 Hoi Bun Road, Kwun Tong, Kowloon, Hong Kong

**FCC ID:** OJ7VANTAGE

**Frequency Range:** 2.412GHz to 2.462GHz

**Equipment Under Test (EUT):**

**Name:** Internet Radio/WiFi Radio System

**Model No.:** Vantage

**Standards:** FCC PART 15 Subpart C: 2008

**Date of Receipt:** 26 December, 2008

**Date of Test:** 5 January to 15 January 2009

**Date of Issue:** 16 January, 2009

<b>Test Result :</b>	<b>PASS *</b>
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\* In the configuration tested, the EUT detailed in this report complied with the standards specified above. Please refer to section 2 of this report for further detail.

Authorized Signature:

Stephen Guo  
Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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## 2 Test Summary

Test	Test Requirement	Standard Paragraph	Result
Antenna Requirement	FCC PART 15 :2008	Section 15.247(b)(4)	PASS
Conducted Emission	FCC PART 15 :2008	Section 15.207	PASS
6dB Bandwidth	FCC PART 15 :2008	Section 15.247 (a)(2)	PASS
Maximum Peak Output Power	FCC PART 15 :2008	Section 15.247(b)(3)	PASS
Peak Power Spectral Density	FCC PART 15 :2008	Section 15.247(e)	PASS
Conducted Spurious Emission (30MHz to 25GHz)	FCC PART 15 :2008	Section 15.209 &15.247(d)	PASS
Band Edges Measurement	FCC PART 15 :2008	Section 15.247 (d) &15.205	PASS
Radiated Spurious Emission (30MHz to 25GHz)	FCC PART 15 :2008	Section 15.209 &15.247(d)	PASS

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## 4 General Information

### 4.1 Client Information

Applicant: Victory Concept Industries Ltd  
Address of Applicant: 4/F., CAC Tower., 165 Hoi Bun Road, Kwun Tong, Kowloon, Hong Kong

### 4.2 General Description of E.U.T.

Name:	Internet Radio/WiFi Radio System
Model No.:	Vantage
Frequency Range:	802.11b mode:2412MHz to 2462MHz 802.11g mode:2412MHz to 2462MHz
Number of Channels:	11 channels
Type of Modulation	802.11b :DSSS(CCK;DQPSK;DBPSK) 802.11g :OFDM
Transmit Data Rate:	802.11b :1M/2M/5.5M/11M bps 802.11g :6M/9M/12M/18M/24M/36M/48M/54M bps
Antenna Type:	integral
Antenna Gain:	Max 2dBi from 2400MHz to 2483.5MHz
Power supply:	DC 9V by batteries or by AC/DC adapter
	Model:KASD1200150W1UV-1
Adapter:	Input:100-240V~50/60Hz 0.4A Output:12V/1.5A
Power cord:	1.8m x 2 wires unscreened AC Mains cable 1.8m x 2 wires unscreened DC cable

### 4.3 Description of Support Units

The EUT has been tested with PC for fixed frequency by testing lab.

### 4.4 Standards Applicable for Testing

The customer requested FCC tests for the EUT.

The standard used was FCC PART 15 Subpart C: 2008 section 15.247.

### 4.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory. 198 Kezhu Road, Scientech Park, Guangzhou Economic & Technology Development District, Guangzhou, Guangdong, China 510663

Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.

### 4.6 Other Information Requested by the Customer

None.

## 4.7 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **NVLAP – Lab Code: 200611-0**

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is recognized under the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

- **FCC – Registration No.: 282399**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 282399. May 31. 2002. With the above and NVLAP's accreditation. SGS-CSTC is an authorized test laboratory for the DoC process.



## 5 Equipments Used during Test

RE in Chamber						
No:	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
EMC0525	Compact Semi-Anechoic Chamber	ChangZhou ZhongYu	N/A	N/A	N/A	N/A
EMC0522	EMI Test Receiver	Rohde & Schwarz	ESIB26	100249	28-01-2008	28-01-2009
N/A	EMI Test Software	Audix	E3	N/A	N/A	N/A
EMC0514	Coaxial cable	SGS	N/A	N/A	04-12-2008	04-12-2009
EMC0524	Bi-log Type Antenna	Schaffner -Chase	CBL6112B	2966	12-08-2008	12-08-2009
EMC0519	Bilog Type Antenna	Schaffner -Chase	CBL6143	5070	12-08-2008	12-08-2009
EMC0517	Horn Antenna	Rohde & Schwarz	HF906	100095	12-08-2008	12-08-2009
EMC0040	Spectrum Analyzer	Rohde & Schwarz	FSP30	100324	05-12-2008	05-12-2009
EMC0520	0.1-1300 MHz Pre-Amplifier	HP	8447D OPT 010	2944A0625 2	11-03-2008	11-03-2009
EMC0521	1-26.5 GHz Pre-Amplifier	Agilent	8449B	3008A0164 9	11-03-2008	11-03-2009
EMC0075	310N Amplifier	Sonama	310N	272683	10-09-2008	10-09-2009
EMC0523	Active Loop Antenna	EMCO	6502	00042963	09-08-2008	09-08-2010
EMC0530	10m Semi- Anechoic Chamber	ETS	N/A	N/A	10-08-2008	10-08-2009

Conducted Emission						
No:	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
EMC0306	Shielding Room	Zhong Yu	8 x 3 x 3.8 m <sup>3</sup>	N/A	N/A	N/A
EMC0102	LISN	Schaffner Chase	MNZ050D/1	1421	14-12-2008	14-12-2009
EMC0118	Two-line v-netwok	Rohde & Schwarz	ENV216	3560.6550. 02	28-07-2008	28-07-2009
EMC0506	EMI Test Receiver	Rohde & Schwarz	ESCS30	100085	14-12-2008	14-12-2009
EMC0107	Coaxial Cable	SGS	2m	N/A	24-11-2008	26-11-2009
EMC0106	Voltage Probe	SGS	N/A	N/A	N/A	N/A
EMC0120	8 Line LISN	Fischer Custom Communications Inc.	FCC-TLISN-T8-02	20550	21-02-2008	21-02-2009
EMC0121	4 Line LISN	Fischer Custom Communications Inc.	FCC-TLISN-T4-02	20549	21-02-2008	21-02-2009
EMC0122	2 Line LISN	Fischer Custom Communications Inc.	FCC-TLISN-T2-02	20548	21-02-2008	21-02-2009

Reference Equipment					
No:	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date
No. 1	Notebook	IBM	T40	99-FBAF9 03/09	N/A
No. 2	Philips Bluetooth	Philips	N/A	N/A	N/A

## 6 Test Results

### 6.1 E.U.T. test conditions

Power supply:	DC 9V by batteries or by AC/DC adapter
Operating Environment:	
Temperature:	20.0 -25.0 °C
Humidity:	38-52 % RH
Atmospheric Pressure:	992 -1010 mbar
Test frequencies:	According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and, if required, reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:

Frequency range over which device operates	Number of frequencies	Location in the range of operation
1 MHz or less	1	Middle
1 to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

EUT channels and frequencies list:

Channel(802.11b & 802.11g)	Frequency (MHz)
1	2412
2	2417
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2452
10	2457
11	2462

Test frequency is the lowest channel: 1 channel(2412MHz), middle channel: 6 channel(2437MHz) and highest channel: 11 channel(2462MHz)

## 6.2 Antenna Requirement

### 6.2.1 Standard requirement

15.203 requirement:

For intentional device. According to 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.

15.247(b) (4) requirement:

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

### 6.2.2 EUT Antenna

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 2.0dBi.

**Test result: The unit does meet the FCC requirements.**

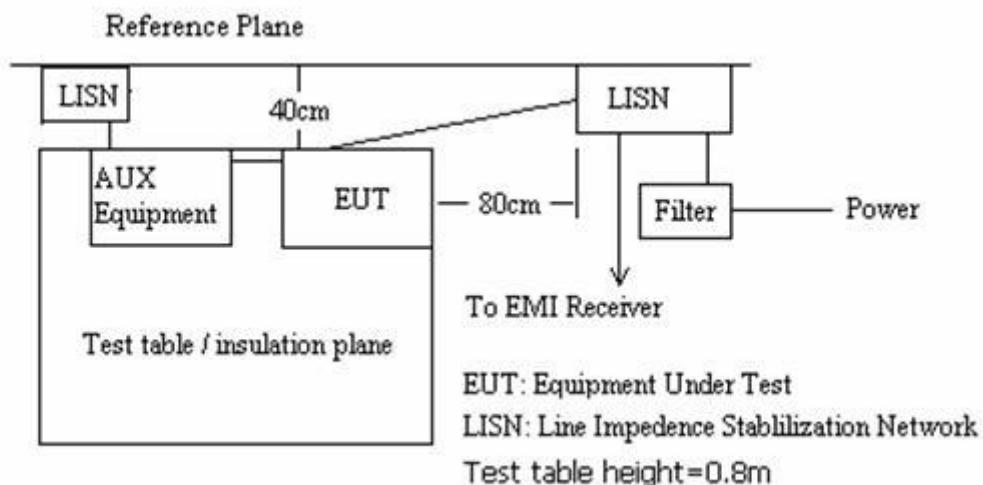
### 6.3 Conducted Emissions at Mains Terminals 150 kHz to 30MHz

Test Requirement: FCC Part 15.207  
Test Method: ANSI C63.4  
Test Date: 8 January 2009  
Frequency Range: 150KHz to 30MHz  
Detector: Peak for pre-scan (9kHz Resolution Bandwidth)  
Quasi-Peak if maximised peak within 6dB of Quasi-Peak limit  
EUT Operation: Test in normal mode. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage.  
Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Plan View of Test Setup

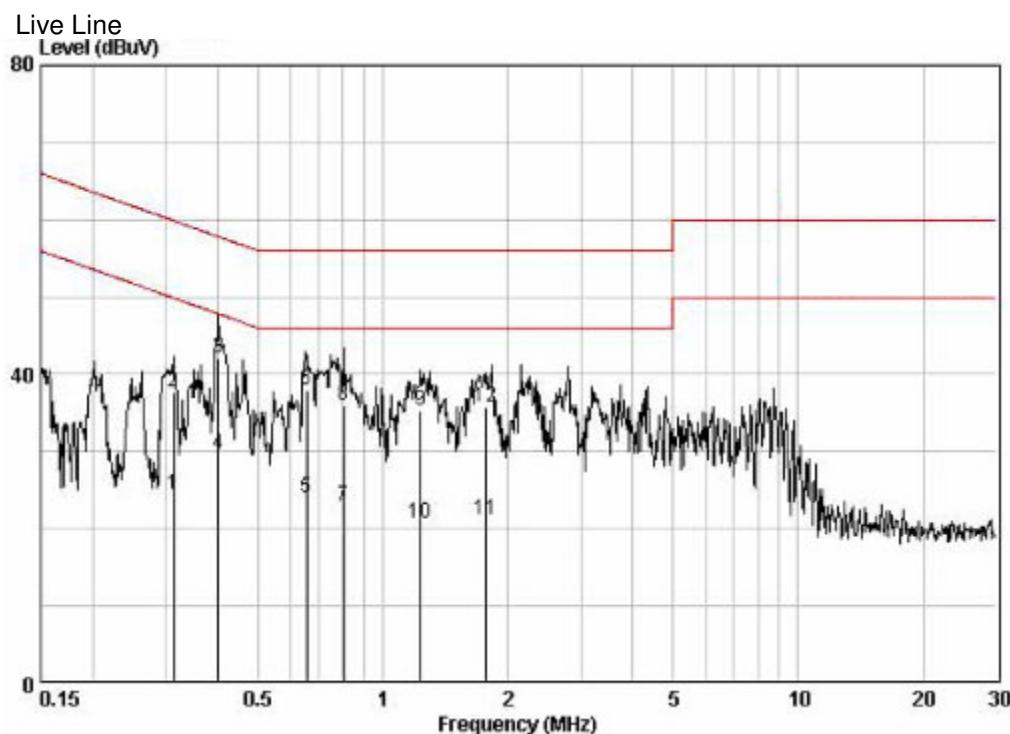


### 6.3.1.1 Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected. For EUT communicating with worst case mode.

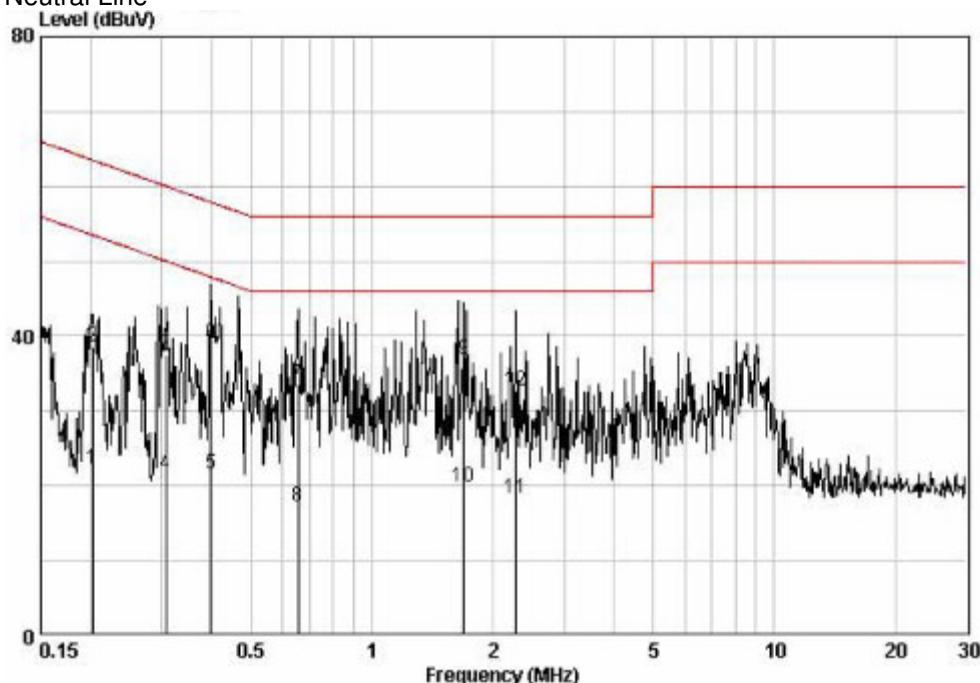
**The following Quasi-Peak and Average measurements were performed on the EUT:**



Measure data:

Freq	Read	Cable	LISN	Limit	Over	Remark
	Level	Loss	Factor			
MHz	dBuV	dB	dB	dBuV	dBuV	dB
0.313	14.65	0.18	9.58	24.41	49.88	-25.47 AVERAGE
0.313	27.98	0.18	9.58	37.74	59.88	-22.14 QP
0.402	32.26	0.20	9.59	42.05	57.81	-15.76 QP
0.402	19.91	0.20	9.59	29.70	47.81	-18.11 AVERAGE
0.654	14.17	0.26	9.58	24.01	46.00	-21.99 AVERAGE
0.654	28.02	0.26	9.58	37.86	56.00	-18.14 QP
0.804	13.12	0.28	9.58	22.98	46.00	-23.02 AVERAGE
0.804	26.14	0.28	9.58	36.00	56.00	-20.00 QP
1.229	25.54	0.27	9.60	35.41	56.00	-20.59 QP
1.229	10.79	0.27	9.60	20.66	46.00	-25.34 AVERAGE
1.762	11.26	0.23	9.61	21.09	46.00	-24.91 AVERAGE
1.762	25.92	0.23	9.61	35.75	56.00	-20.25 QP

## Neutral Line



## Measure result:

Freq	Read	Cable	LISN	Level	Limit	Over	Remark
	Level	Loss	Factor		Level	Line	
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
0.202	12.48	0.13	9.59	22.20	53.54	-31.33	AVERAGE
0.202	28.92	0.13	9.59	38.64	63.54	-24.89	QP
0.307	27.74	0.18	9.59	37.51	60.06	-22.55	QP
0.307	11.86	0.18	9.59	21.63	50.06	-28.43	AVERAGE
0.398	11.78	0.20	9.59	21.57	47.90	-26.33	AVERAGE
0.398	29.26	0.20	9.59	39.05	57.90	-18.85	QP
0.654	23.72	0.26	9.58	33.56	56.00	-22.44	QP
0.654	7.47	0.26	9.58	17.31	46.00	-28.69	AVERAGE
1.689	27.02	0.23	9.60	36.85	56.00	-19.15	QP
1.689	10.01	0.23	9.60	19.84	46.00	-26.16	AVERAGE
2.285	8.52	0.19	9.60	18.32	46.00	-27.68	AVERAGE
2.285	22.96	0.19	9.60	32.76	56.00	-23.24	QP

Remark: Level = Real Level + Cable loss + LISN factor

**TEST RESULTS: The unit does meet the FCC requirements.**

## 6.4 6dB Bandwidth

Test Requirement:

FCC Part 15.247(a)(2)

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

Test Method:

ANSI C63.4:2003 and KDB558074

Remark: KDB558074, DTS test procedure of Oct 2002 KDB558074

Test Date:

9 January,2009

Test Status:

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.

Test Procedure:

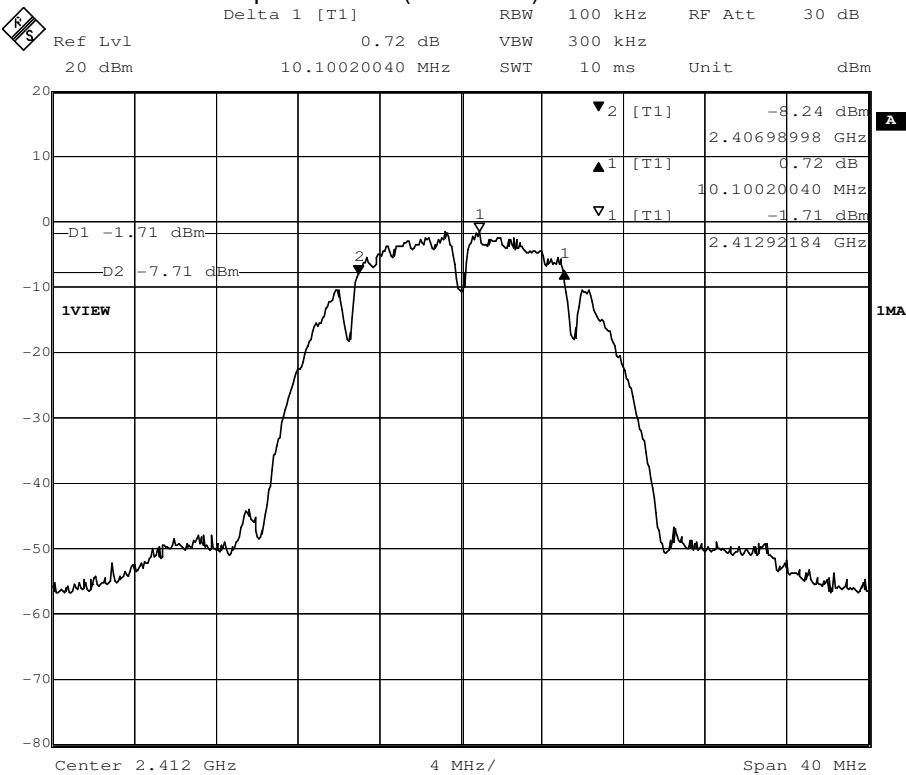
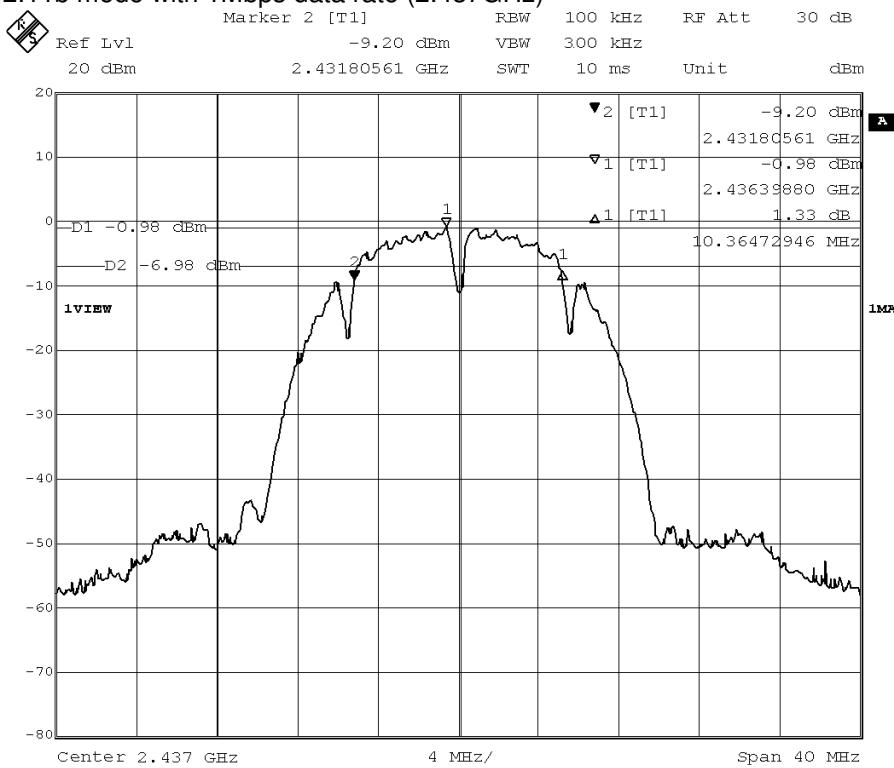
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer;
2. Set the spectrum analyzer: RBW=100KHz. VBW = 300KHz. Sweep = auto; Detector Function = Peak. Trace = Max Hold, Set span to encompass the entire emission bandwidth of the signal.
3. Mark the peak power frequency and -6dB(upper and lower) power frequency.
4. Repeat until all the test status are investigated.
5. Report the worse case.

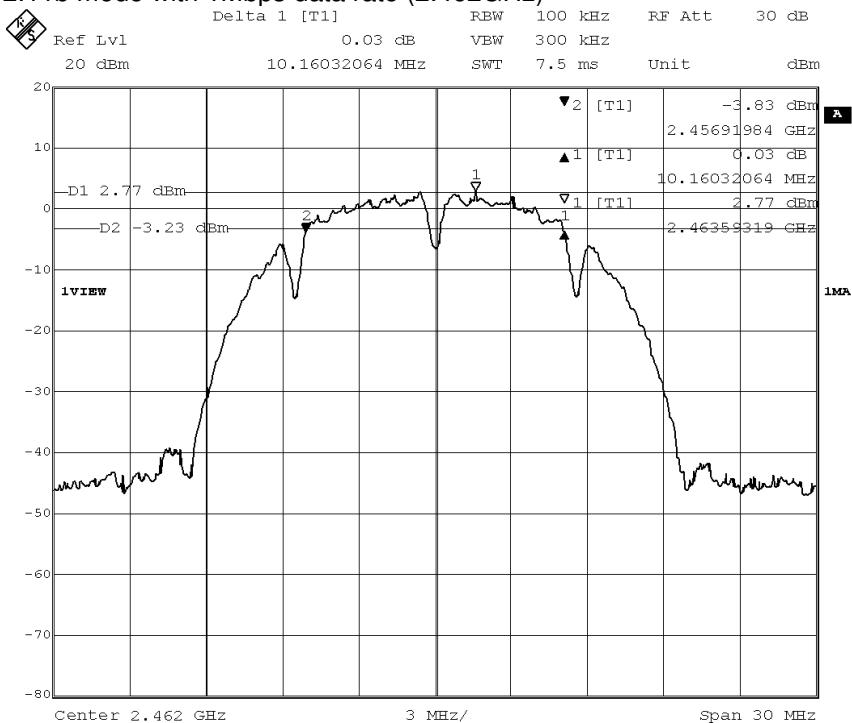
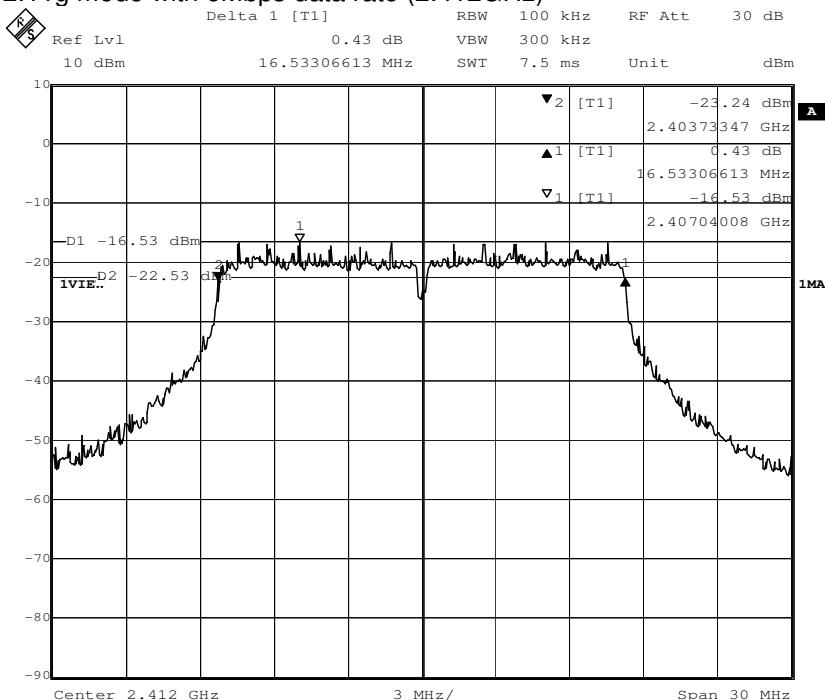
**Test result:**

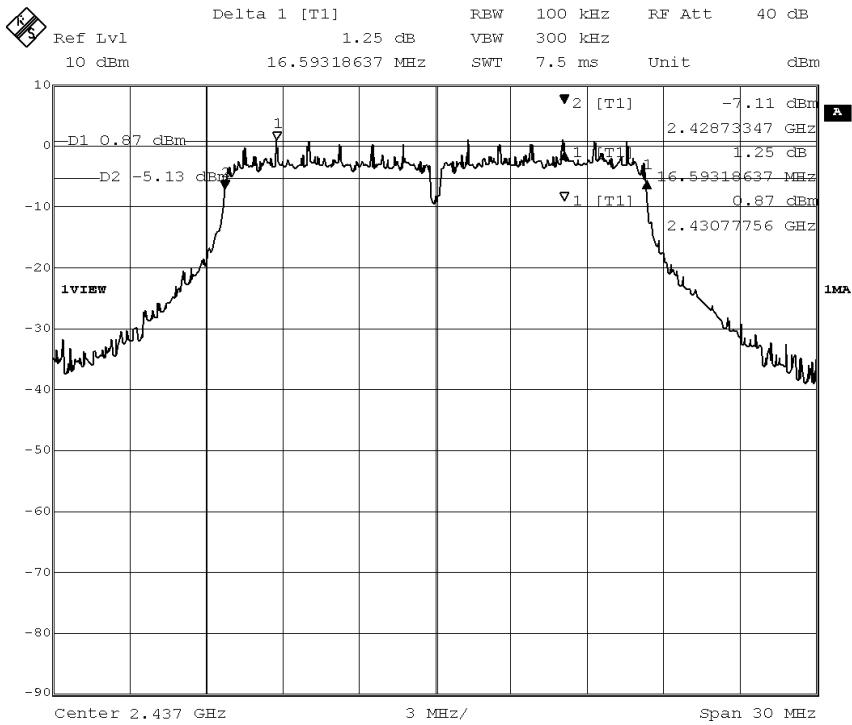
Channel No.	Frequency (MHz)	Mode	Data Rate	Measured 6dB bandwidth (MHz)	Limit	Result
1	2412	802.11b	1Mbps	10.10	≥500KHz	Pass
6	2437			10.36		Pass
11	2462			10.16		Pass
1	2412	802.11g	6Mbps	16.53	≥500KHz	Pass
6	2437			16.59		Pass
11	2462			16.53		Pass

**Test result: The unit does meet the FCC requirements.**

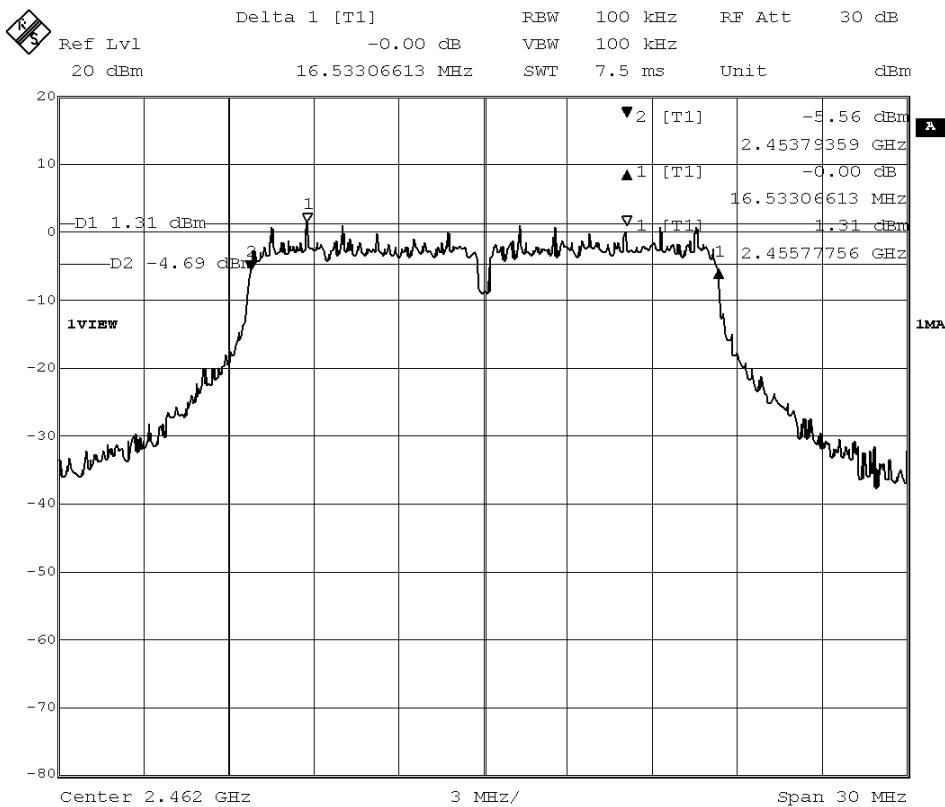
Result plot as follows:

**802.11b mode with 1Mbps data rate (2.412GHz)**

**802.11b mode with 1Mbps data rate (2.437GHz)**


**802.11b mode with 1Mbps data rate (2.462GHz)**

**802.11g mode with 6Mbps data rate (2.412GHz)**

**802.11g mode with 6Mbps data rate (2.437GHz)**



802.11g mode with 6Mbps data rate (2.462GHz)



## 6.5 Maximum Peak Output Power

Test Requirement:	FCC Part 15.247(b)(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (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.
Test Method:	ANSI C63.4:2003 and KDB558074. Remark: KDB558074, DTS test procedure of Oct 2002 KDB558074
Test Date:	9 January,2009
Test Status:	Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.
Test Procedure:	<ol style="list-style-type: none"><li>1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.</li><li>2. Measure the channel power(11MHz for 802.11b mode, 22MHz for 802.11g mode) of the test frequency with special test status.</li><li>3. Repeat until all the test status are investigated.</li><li>4. Report the worse case.</li></ol>

**Test result:**
**802.11b mode**

Channel No.	Frequency (MHz)	Mode	Data Rate	Measured Channel Power (dBm)	Limit	Result
1	2412	802.11b	1Mbps	19.45	1W(30dbm)	Pass
6	2437			19.98		Pass
11	2462			20.49		Pass
1	2412		2Mbps	19.26		Pass
6	2437			19.38		Pass
11	2462			20.03		Pass
1	2412		5.5Mbps	19.03		Pass
6	2437			18.89		Pass
11	2462			19.65		Pass
1	2412		11Mbps	18.97		Pass
6	2437			18.69		Pass
11	2462			19.11		Pass

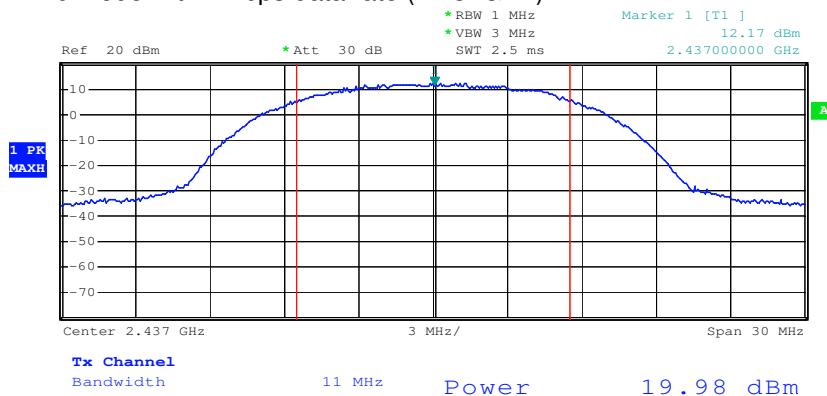
**Test result:**
**802.11g mode**

Channel No.	Frequency (MHz)	Mode	Data Rate	Measured Channel Power (dBm)	Limit	Result
1	2412	802.11g	6Mbps	20.27	1W(30dbm)	Pass
6	2437			20.76		Pass
11	2462			21.30		Pass
1	2412		9Mbps	20.01		Pass
6	2437			20.23		Pass
11	2462			20.55		Pass
1	2412		12Mbps	19.89		Pass
6	2437			19.97		Pass
11	2462			20.19		Pass
1	2412		18Mbps	19.44		Pass
6	2437			19.32		Pass
11	2462			19.29		Pass
1	2412		24Mbps	18.69		Pass
6	2437			19.35		Pass
11	2462			19.22		Pass
1	2412		36Mbps	19.00		Pass
6	2437			19.21		Pass
11	2462			19.12		Pass
1	2412		48Mbps	18.84		Pass
6	2437			18.95		Pass
11	2462			18.66		Pass
1	2412		54Mbps	17.86		Pass
6	2437			17.69		Pass
11	2462			17.99		Pass

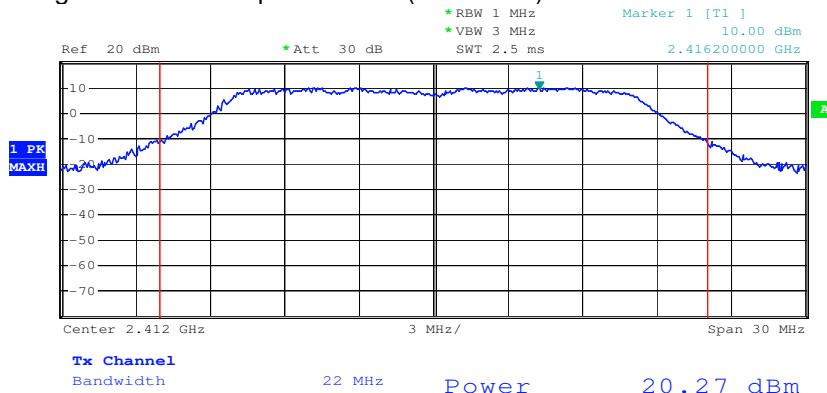
**Test result: The unit does meet the FCC requirements.**

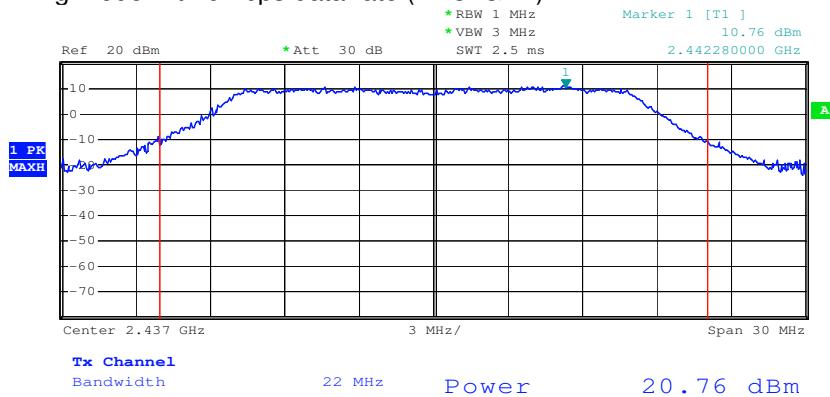
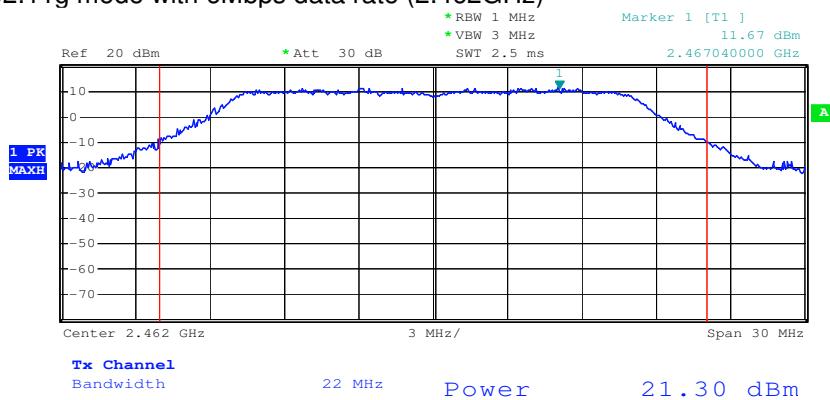
Max power result plots as follows:

**802.11b mode with 1Mbps data rate (2.412GHz)**

**802.11b mode with 1Mbps data rate (2.437GHz)**


**802.11b mode with 1Mbps data rate (2.462GHz)**

**802.11g mode with 6Mbps data rate (2.412GHz)**


**802.11g mode with 6Mbps data rate (2.437GHz)**

**802.11g mode with 6Mbps data rate (2.462GHz)**


## 6.6 Peak Power Spectral Density

Test Requirement: FCC Part 15.247(e)  
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during 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.

Test Method: ANSI C63.4:2003 and KDB558074.  
Remark: KDB558074, DTS test procedure of Oct 2002 KDB558074

Test Date: 14 January 2009

Test Status: Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.

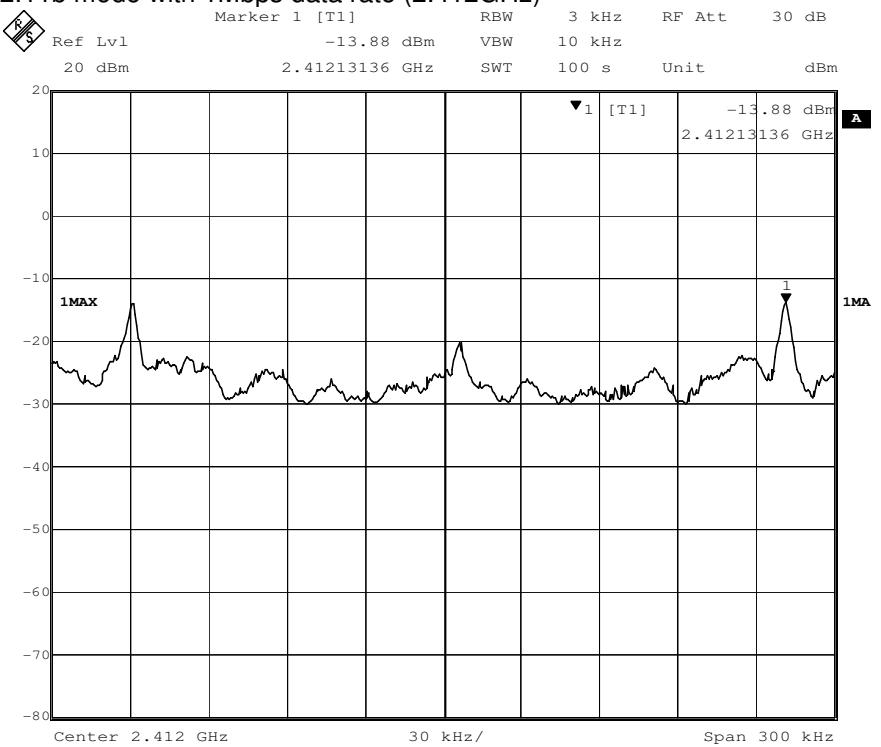
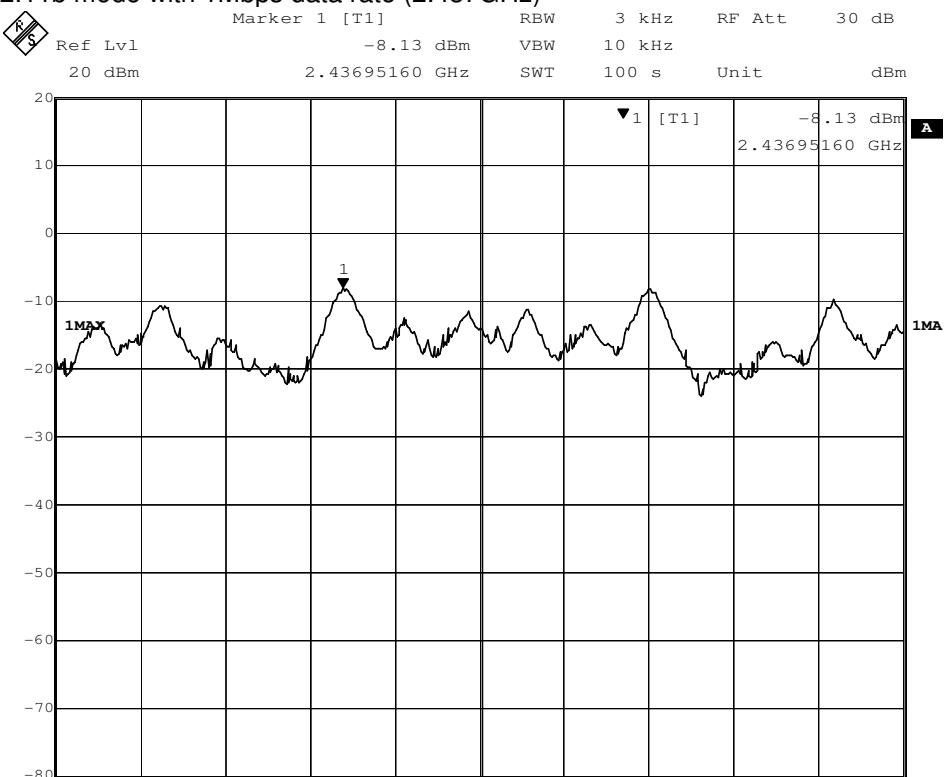
Test Procedure:

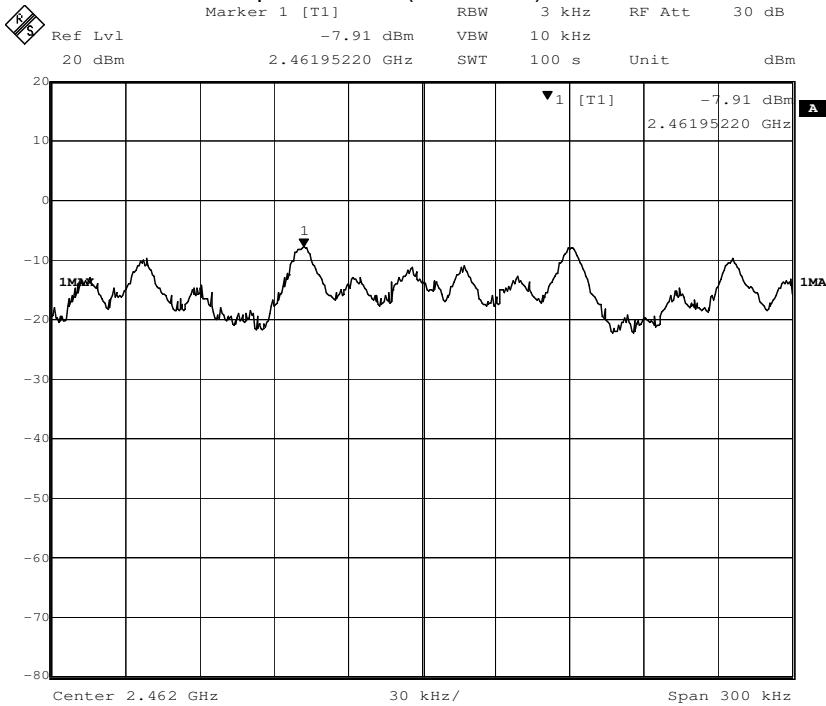
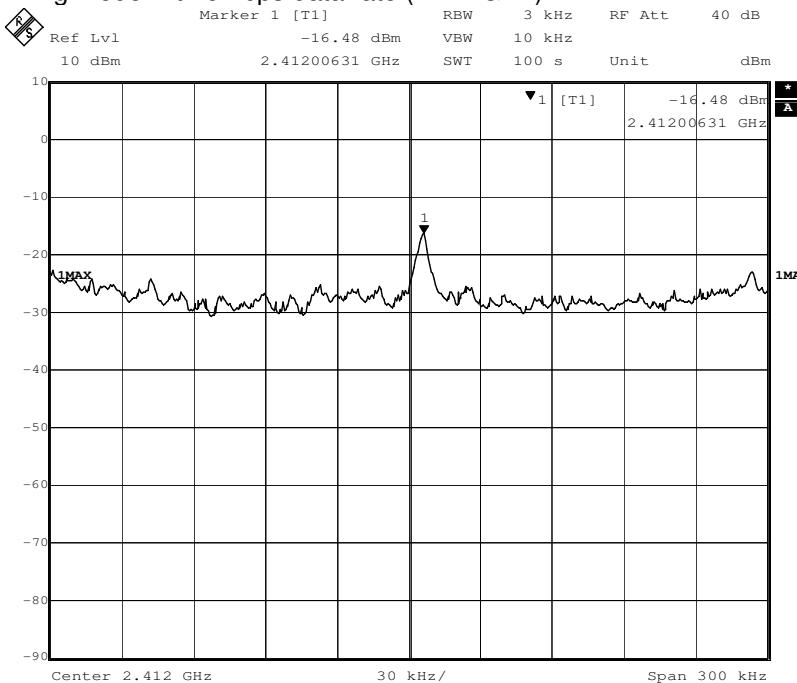
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer or power meter.
2. Set the spectrum analyzer: RBW=3KHz. VBW = 10KHz. sweep= (SPAN/3 kHz); Detector Function = Peak. Trace = Max Hold, Centre = the Peak Power of the signal.
3. Measure the Power Spectral Density of the test frequency with special test status.
4. Repeat until all the test status are investigated.
5. Report the worse case.

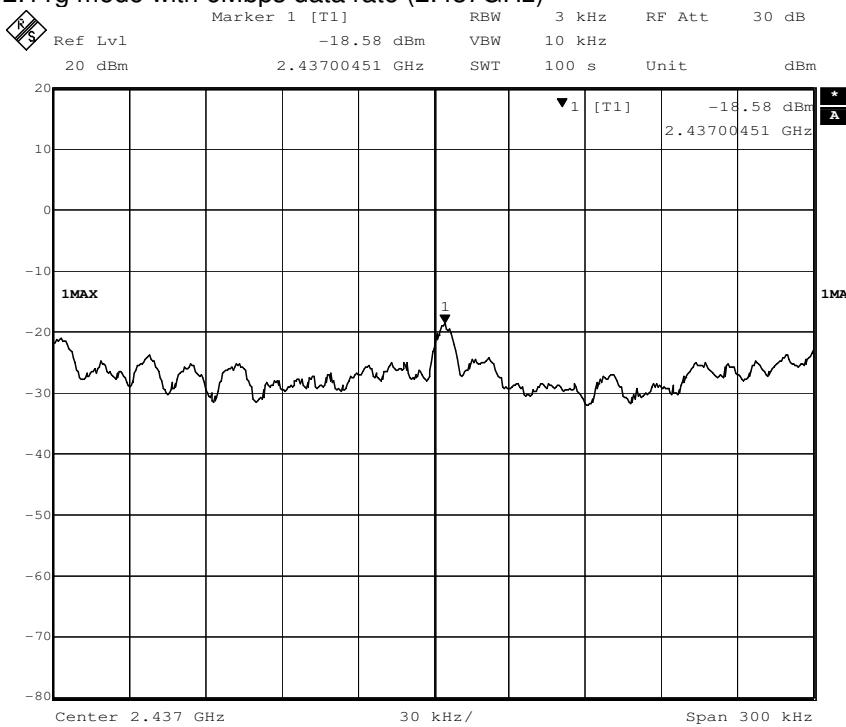
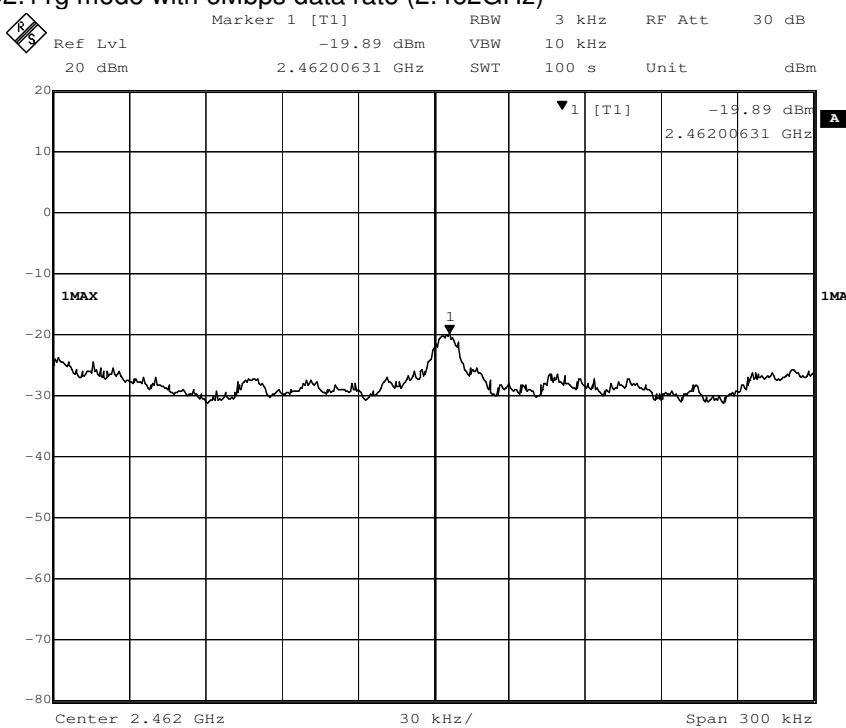
Channel No.	Frequency (MHz)	Mode	Data Rate	Measured Peak Power Spectral Density (dBm/3KHz)	Limit	Result
1	2412	802.11b	1Mbps	-13.88	8dBm/3KHz	Pass
6	2437			-8.13		Pass
11	2462			-7.91		Pass
1	2412	802.11g	6Mbps	-16.48	8dBm/3KHz	Pass
6	2437			-18.38		Pass
11	2462			-19.89		Pass

**Test result: The unit does meet the FCC requirements.**

Result plots as follows:

**802.11b mode with 1Mbps data rate (2.412GHz)**

**802.11b mode with 1Mbps data rate (2.437GHz)**


**802.11b mode with 1Mbps data rate (2.462GHz)**

**802.11g mode with 6Mbps data rate (2.412GHz)**


**802.11g mode with 6Mbps data rate (2.437GHz)**

**802.11g mode with 6Mbps data rate (2.462GHz)**


## 6.7 Conducted Spurious Emissions

Test Requirement: FCC Part 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.

Test Method: ANSI C63.4:2003 and KDB558074.

Test Date: 13 January 2009

Test Status: Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.

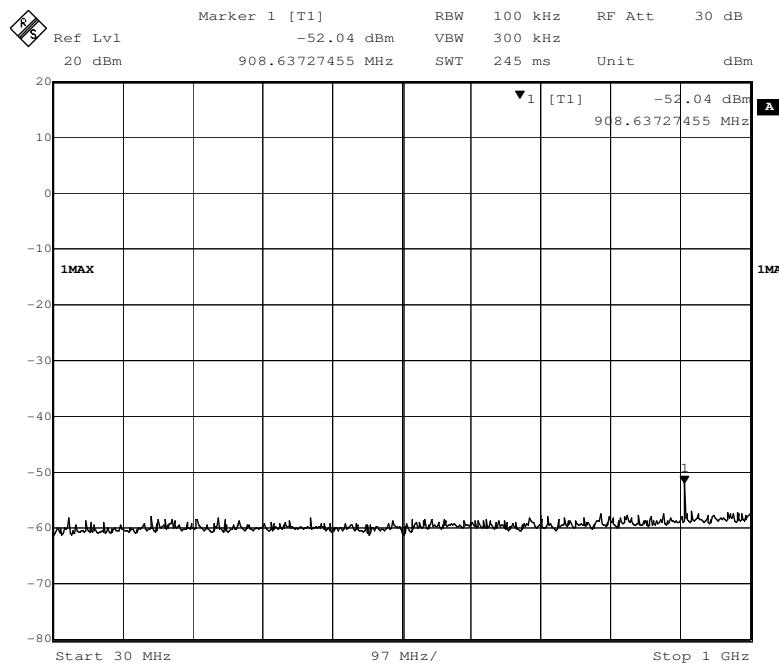
Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer or power meter.
2. Set the spectrum analyzer: RBW=100KHz, VBW = 300KHz. Sweep = auto; Detector Function = Peak. Trace = Max Hold, Scan up through 10th harmonic..
3. Measure the Conducted Spurious Emissions of the test frequency with special test status.
4. Repeat until all the test status are investigated.
5. Report the worse case.

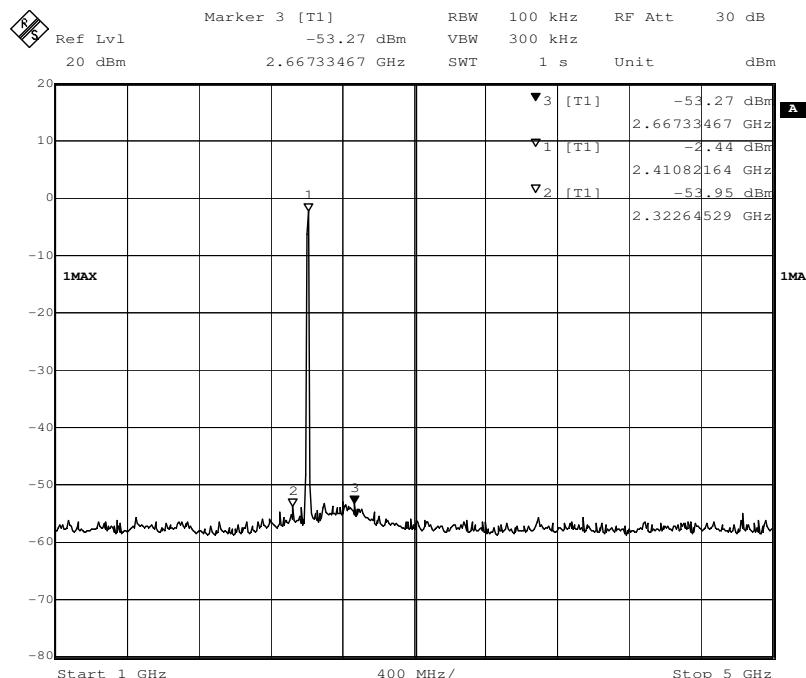
Test result plot as follows:

Lowest Channel 2412MHz-802.11b mode with 1Mbps data rate:

30M to 1GHz

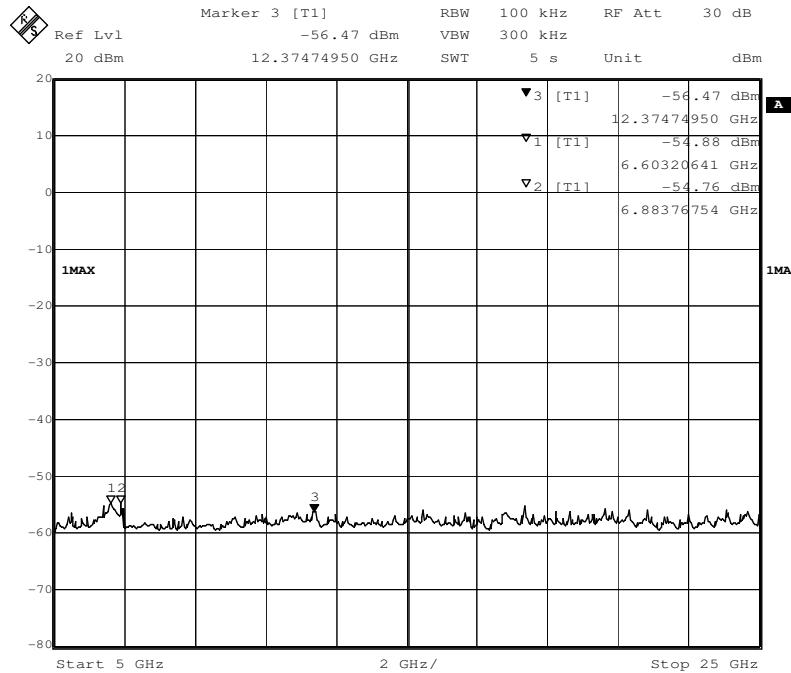


1G to 5GHz



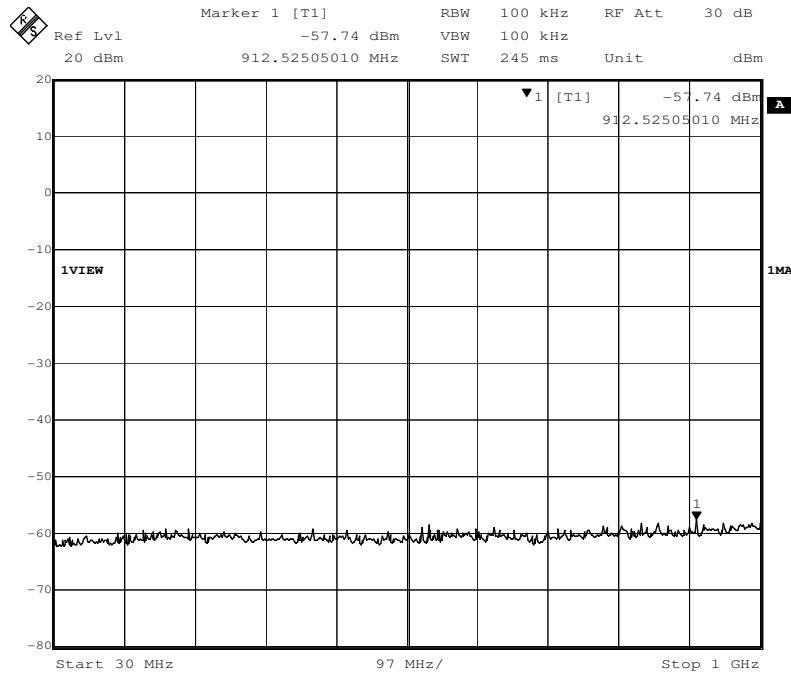
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### 5G to 25GHz



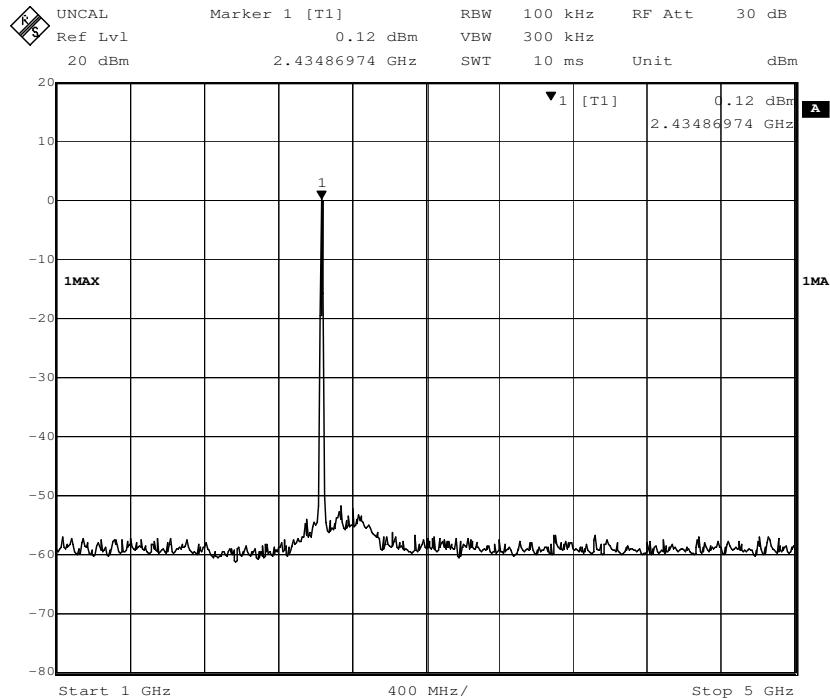
Middle Channel 2437MHz-802.11b mode with 1Mbps data rate:

### 30MHz to 1GHz

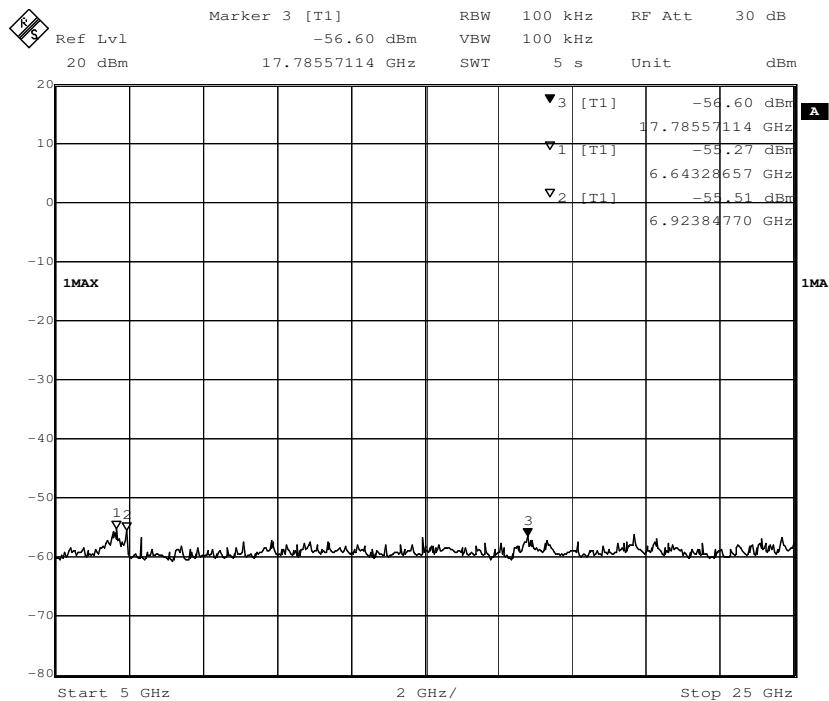


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### 1G to 5GHz



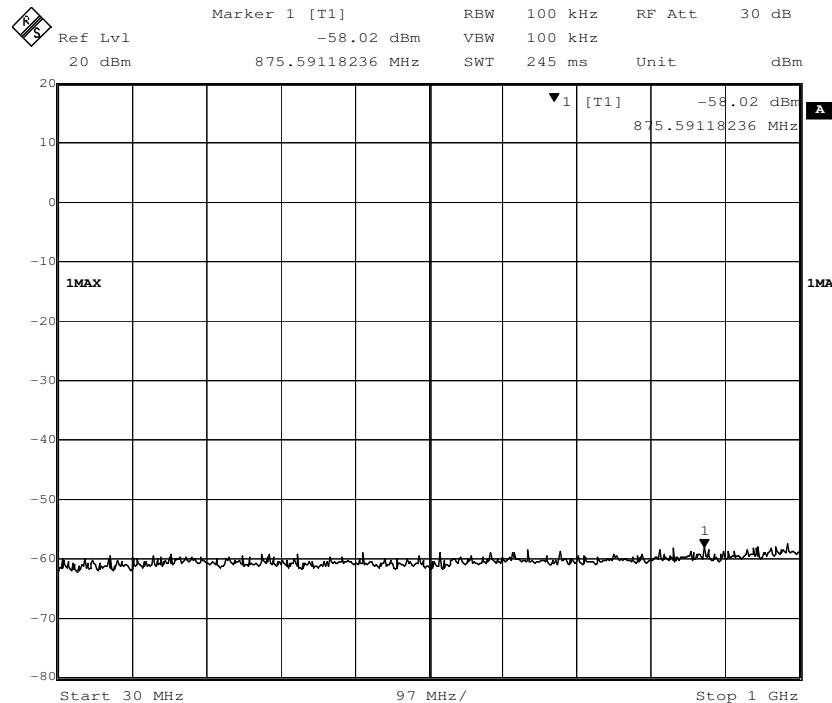
### 5G to 25GHz



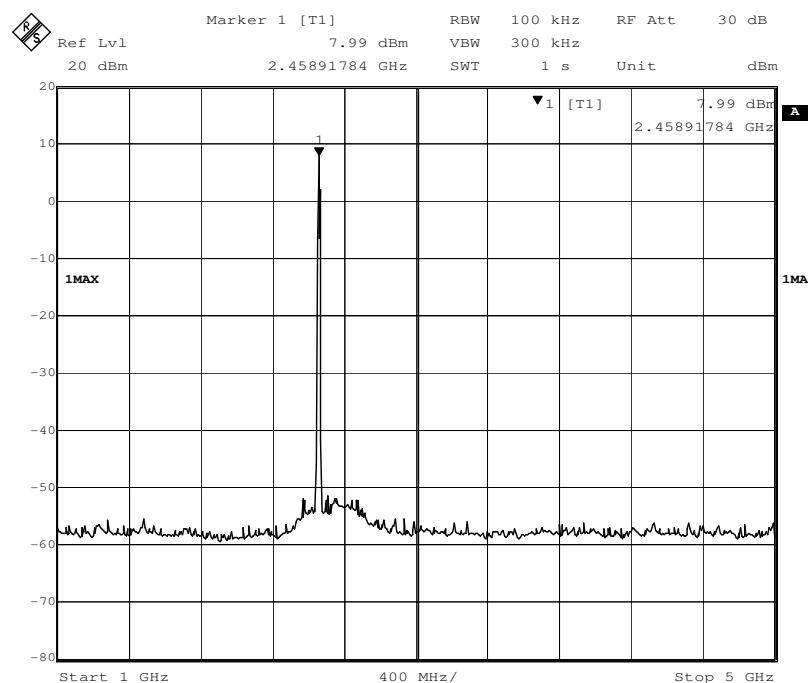
Report No.: GLEMO081203830RFT  
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Highest Channel 2462MHz-802.11b mode with 1Mbps data rate:

30MHz to 1GHz

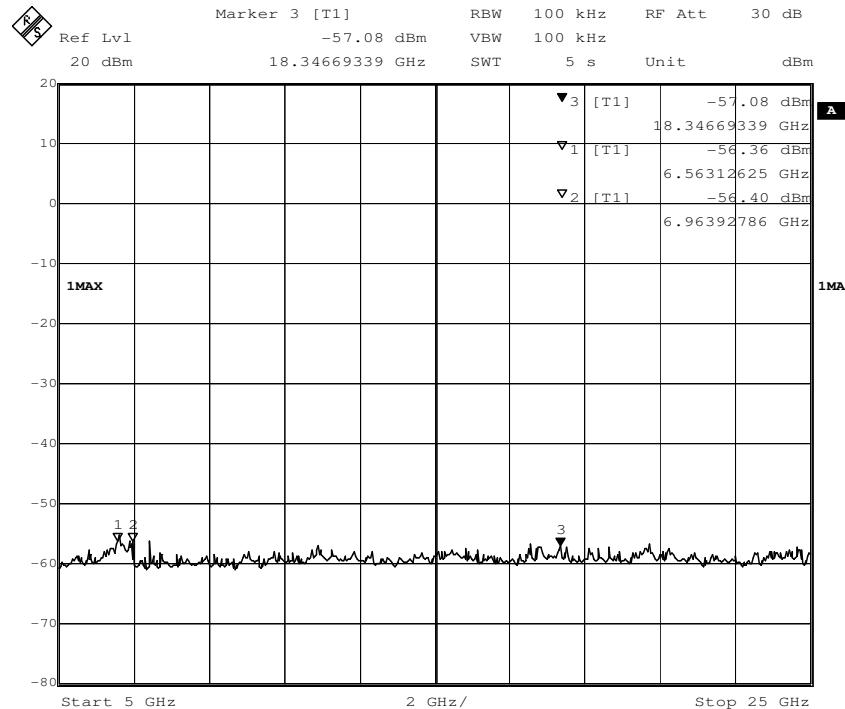


1G to 5GHz



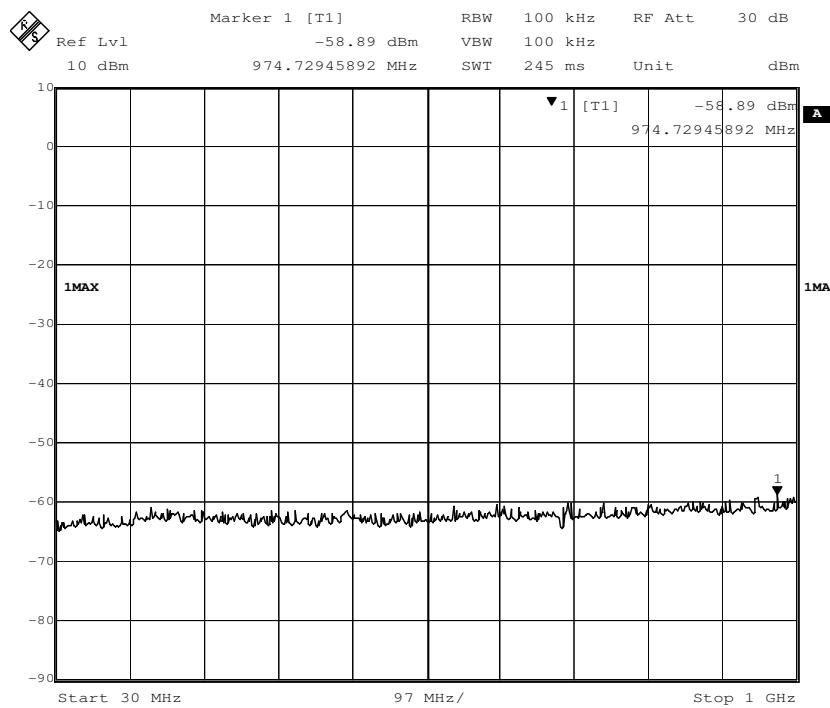
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 FCC ID: OJ7VANTAGE

### 5G to 25GHz



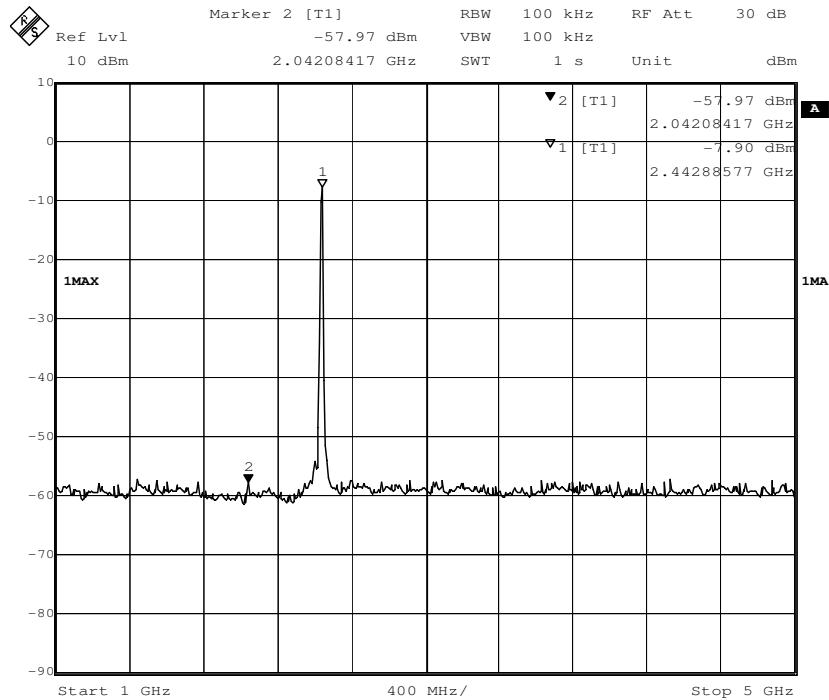
Lowest Channel 2412MHz-802.11g mode with 6Mbps data rate:

### 30M to 1GHz

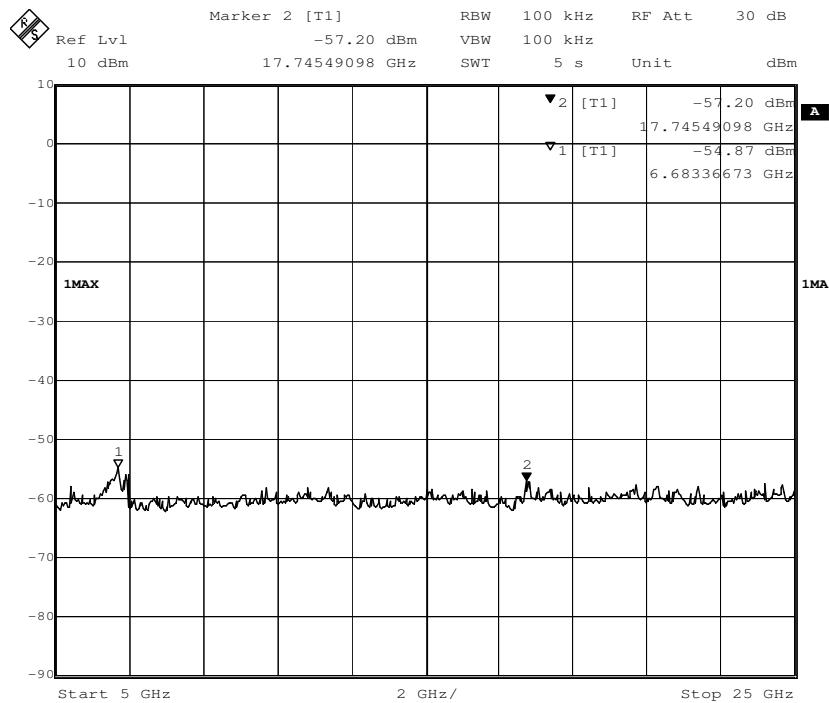


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### 1G to 5GHz

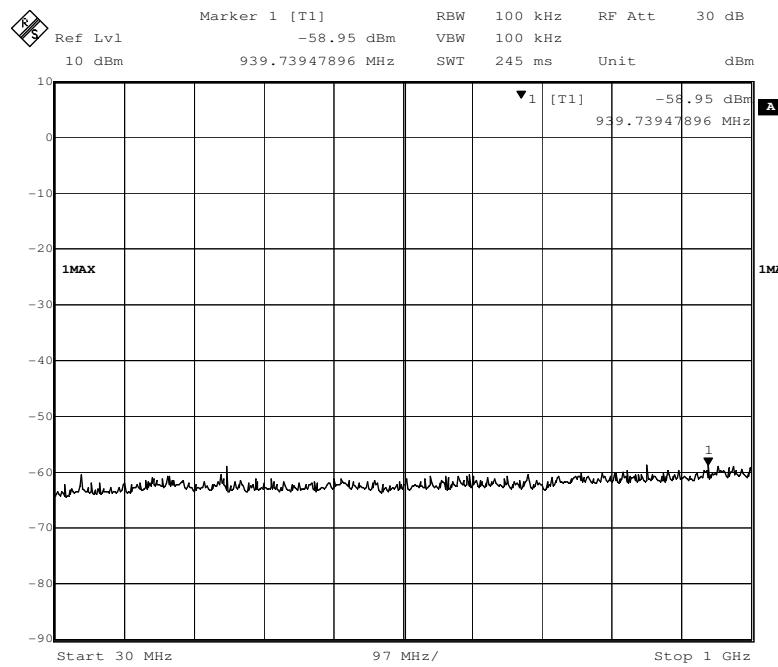


### 5G to 25GHz

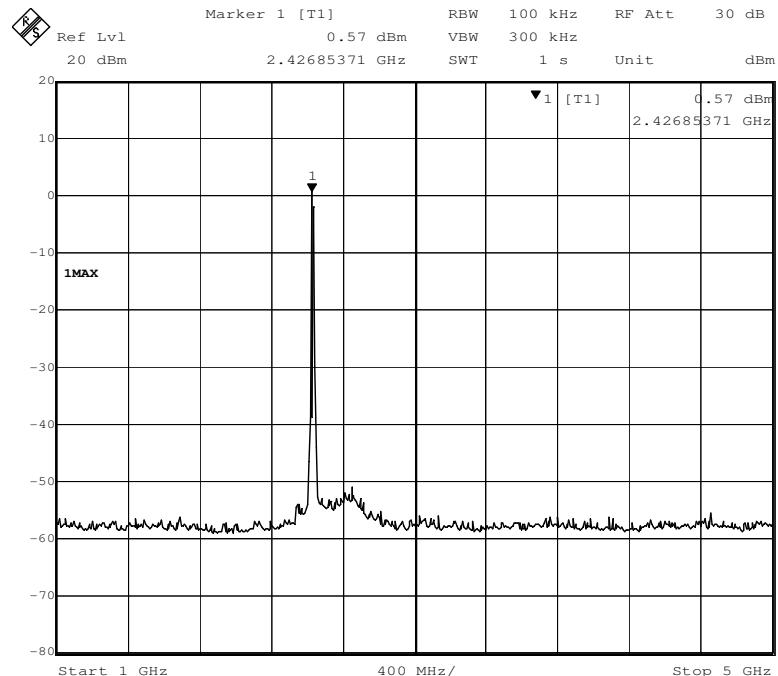


Middle Channel 2437MHz-802.11g mode with 6Mbps data rate:

30MHz to 1GHz

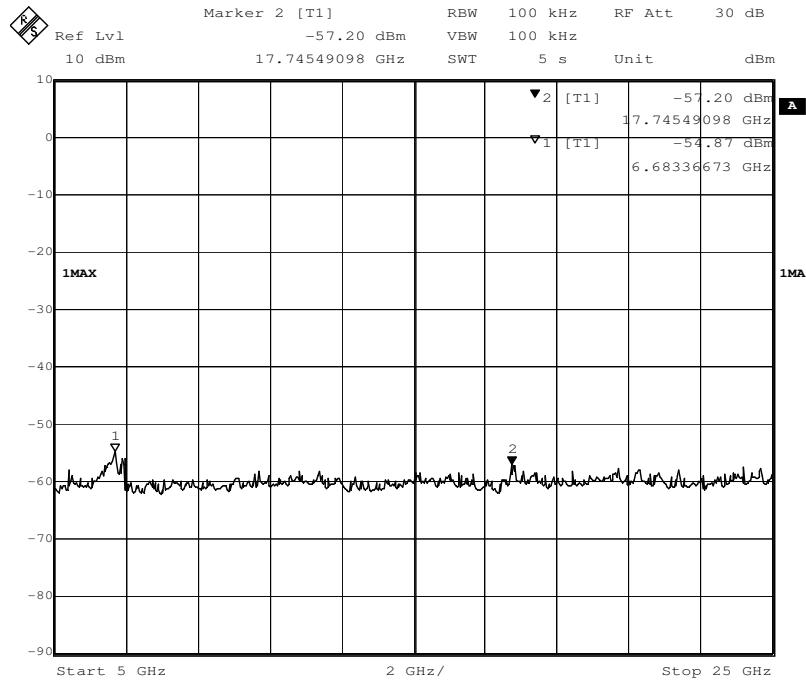


1G to 5GHz



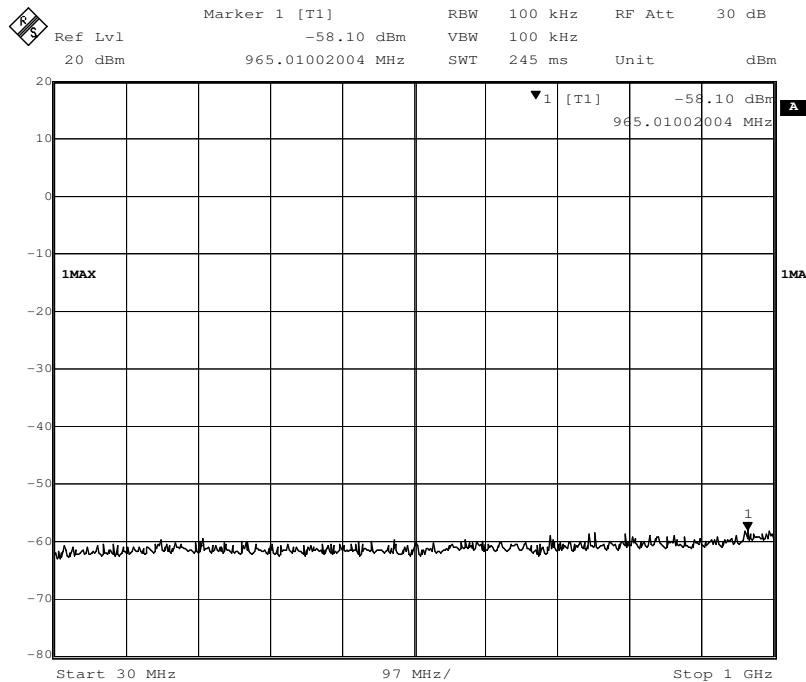
Report No.: GLEMO081203830RFT  
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 FCC ID: OJ7VANTAGE

### 5G to 25GHz



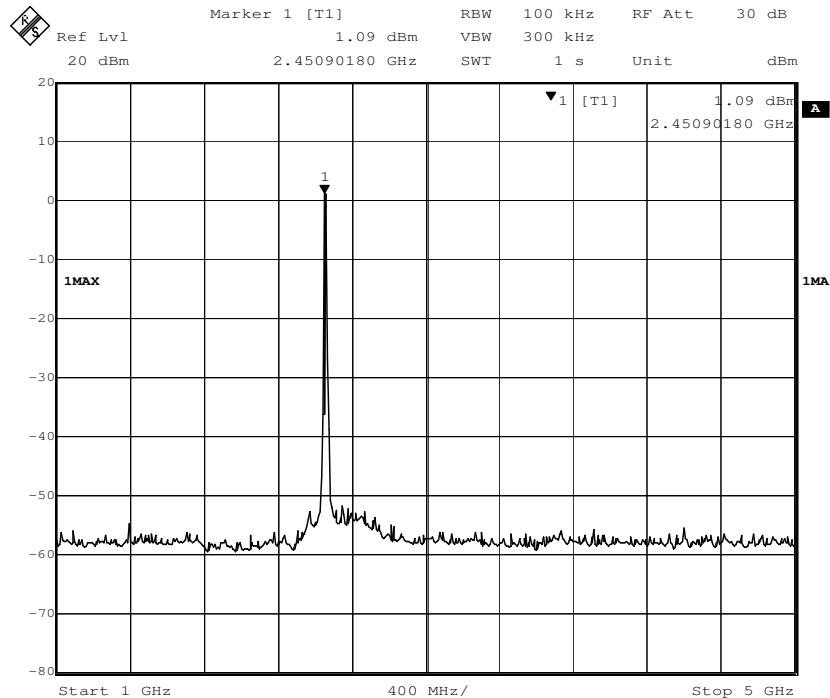
Highest Channel 2462MHz-802.11g mode with 6Mbps data rate:

### 30MHz to 1GHz

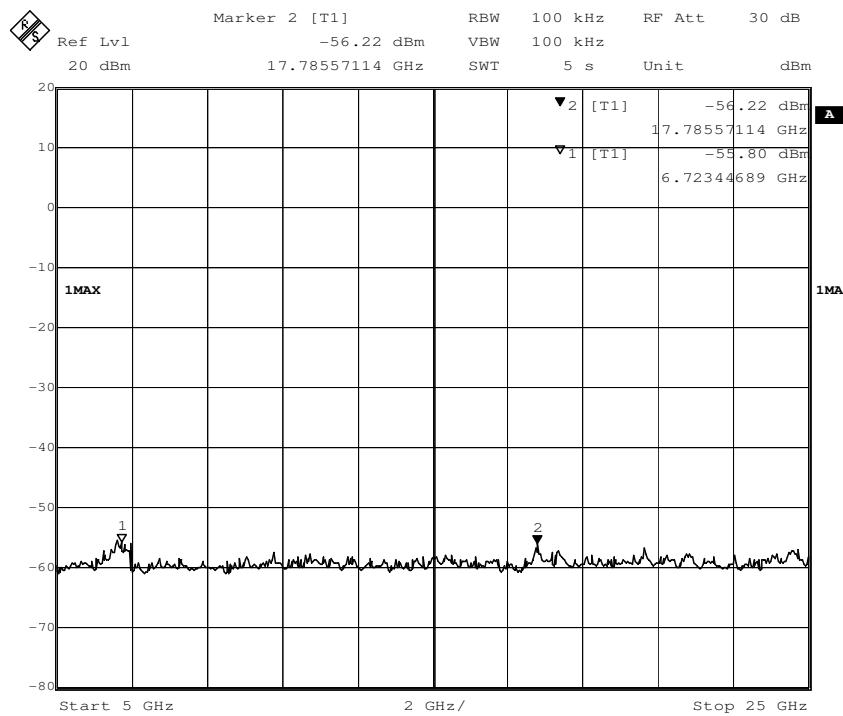


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### 1G to 5GHz



### 5G to 25GHz



## 6.8 Radiated Spurious Emissions

Test Requirement:	FCC Part 15.247(d) & 15.209
15.209 Limit:	40.0 dB $\mu$ V/m between 30MHz & 88MHz 43.5 dB $\mu$ V/m between 88MHz & 216MHz 46.0 dB $\mu$ V/m between 216MHz & 960MHz 54.0 dB $\mu$ V/m above 960MHz
Test Method:	ANSI C63.4:2003 and KDB558074.
Test Date:	13 January 2009
Test Status:	Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)

**Test Procedure:** The procedure used was ANSI Standard C63.4-2003. The receiver was scanned from 30MHz to 25GHz. When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. The worst case emissions were reported.

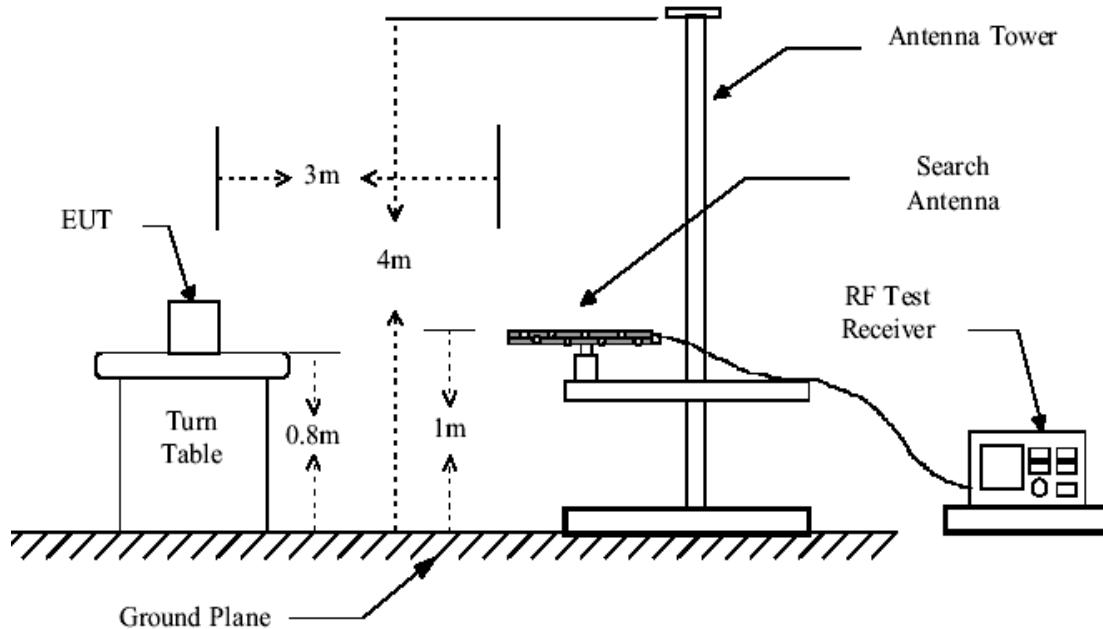
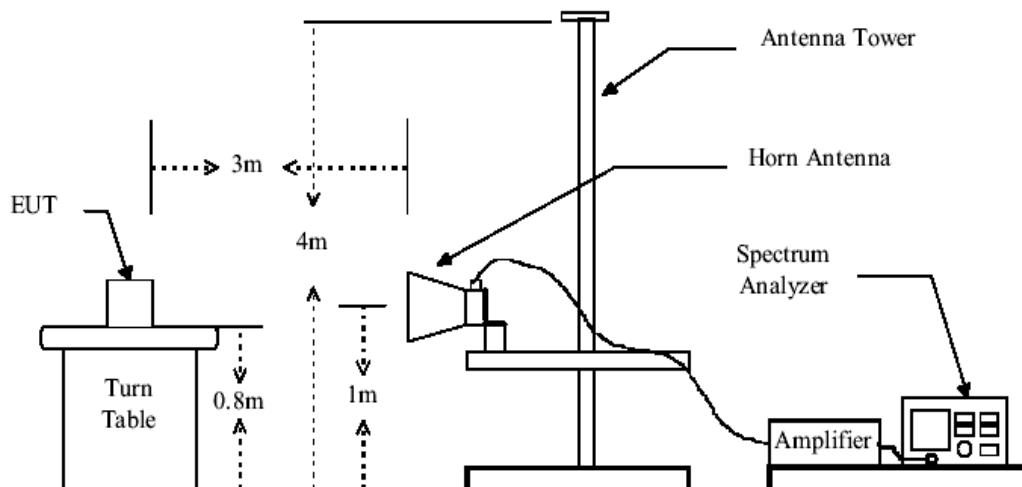
From 30MHz to 1GHz, read the Quasi-Peak field strength of the emissions with receiver QP detector RBW=120KHz.

Above 1GHz, read the Peak field strength and Average field strength.

Read the Peak field strength through RBW=1MHz, VBW=3MHz in spectrum analyzer setting;

Read the Average field strength through RBW=1MHz, VBW=10Hz in spectrum analyzer setting;

While maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the dwell time per channel of the hopping signal is less than 100 ms, then the average field strength reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from  $20\log(\text{dwell time}/100 \text{ ms})$ , in an effort to demonstrate compliance with the 15.209 limit.

**Test Configuration:**

**Figure 1. 30MHz to 1GHz radiated emissions test configuration**

**Figure 2. Above 1GHz radiated emissions test configuration**

## 6.8.1 Harmonic and other spurious emissions

### 6.8.1.1 Test in 802.11b mode lowest channel 2412MHz with 1Mbps data rate:

30MHz~1GHz Spurious Emissions .Quasi-Peak Measurement

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
317.120	14.03	2.17	24.51	39.54	31.23	46.00	Vertical
167.740	10.00	1.40	24.85	50.98	37.53	43.50	Horizontal

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

#### Peak Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
4824.000	33.19	6.90	33.01	51.42	58.50	74.00	Vertical
7236.000	36.00	8.36	32.20	40.51	49.42	74.00	V
9648.000	36.42	8.80	32.50	41.03	53.22	74.00	V
4824.000	33.19	6.90	33.01	44.01	51.09	74.00	Horizontal
7236.000	36.08	8.36	32.20	40.74	49.20	74.00	H
9648.000	36.40	8.80	32.50	35.77	48.50	74.00	H

#### Average Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
4824.000	33.19	6.90	33.01	36.38	43.46	54.00	Vertical
7236.000	36.05	8.36	32.20	23.73	35.94	54.00	V
9648.000	36.40	8.80	32.50	21.97	34.67	54.00	V
4824.000	33.19	6.90	33.01	37.08	44.16	54.00	Horizontal
7236.000	36.11	8.36	32.20	23.27	35.54	54.00	H
9648.000	36.42	8.80	32.50	23.31	36.03	54.00	H

The field strength is calculated by adding the Antenna Factor. Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor –Preamplifier Factor.

**6.8.1.2 Test in 802.11b mode middle channel 2437MHz with 1Mbps data rate:**

30MHz~1GHz Spurious Emissions .Quasi-Peak Measurement

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
408.300	16.45	2.50	25.09	42.03	35.89	46.00	Vertical
191.020	10.10	1.60	24.69	51.01	38.03	43.50	Horizontal

1~25 GHz Harmonics &amp; Spurious Emissions. Peak &amp; Average Measurement

**Peak Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
4874.000	33.27	7.20	32.97	51.05	58.54	74.00	Vertical
7311.000	36.16	6.95	32.29	37.18	48.00	74.00	V
9748.000	36.40	7.20	32.44	38.94	50.10	74.00	V
4874.000	33.27	7.20	32.97	50.81	58.31	74.00	Horizontal
7311.000	36.16	6.95	32.29	37.45	48.27	74.00	H
9748.000	36.40	7.20	32.44	38.69	49.85	74.00	H

**Average Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
4874.000	33.27	7.20	32.97	43.15	50.64	54.00	Vertical
7311.000	36.16	6.95	32.29	22.49	33.31	54.00	V
9748.000	36.40	7.20	32.44	23.96	35.12	54.00	V
4874.000	33.27	7.20	32.97	45.78	53.28	54.00	Horizontal
7311.000	36.16	6.95	32.29	22.95	33.77	54.00	H
9748.000	36.40	7.20	32.44	22.32	33.48	54.00	H

The field strength is calculated by adding the Antenna Factor. Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor –Preamplifier Factor.

**6.8.1.3 Test in 802.11b mode highest channel 2462MHz with 1Mbps data rate:**

30MHz~1GHz Spurious Emissions .Quasi-Peak Measurement

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
157.070	10.44	1.34	24.90	46.86	33.74	46.00	Vertical
325.850	14.00	2.20	24.57	49.70	41.33	46.00	Horizontal

1~25 GHz Harmonics &amp; Spurious Emissions. Peak &amp; Average Measurement

**Peak Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
4924.000	33.36	7.33	32.92	50.62	58.40	74.00	Vertical
7386.000	36.23	6.05	32.37	39.99	49.90	74.00	V
9848.000	36.50	7.04	32.50	40.66	51.70	74.00	V
4924.000	33.36	7.33	32.92	50.93	58.70	74.00	Horizontal
7386.000	36.23	6.05	32.37	40.32	50.23	74.00	H
9848.000	36.50	7.04	32.50	42.03	53.07	74.00	H

**Average Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
4924.000	33.36	7.33	32.92	43.06	50.84	54.00	Vertical
7386.000	36.23	6.05	32.37	24.69	34.60	54.00	V
9848.000	36.50	7.04	32.50	24.02	35.06	54.00	V
4924.000	33.36	7.33	32.92	43.07	50.84	54.00	Horizontal
7386.000	36.23	6.05	32.37	34.85	44.76	54.00	H
9848.000	36.50	7.04	32.50	32.34	43.38	54.00	H

The field strength is calculated by adding the Antenna Factor. Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor -Preamplifier Factor.

**6.8.1.4 Test in 802.11g mode lowest channel 2412MHz with 6Mbps data rate:**

30MHz~1GHz Spurious Emissions .Quasi-Peak Measurement

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
317.120	14.03	2.17	24.51	39.54	31.23	46.00	Vertical
167.740	10.00	1.40	24.85	50.98	37.53	43.50	Horizontal

1~25 GHz Harmonics &amp; Spurious Emissions. Peak &amp; Average Measurement

**Peak Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
4824.000	33.19	6.90	33.01	51.42	58.50	74.00	Vertical
7236.000	36.00	8.36	32.20	40.51	49.42	74.00	V
9648.000	36.42	8.80	32.50	41.03	53.22	74.00	V
4824.000	33.19	6.90	33.01	44.01	51.09	74.00	Horizontal
7236.000	36.08	8.36	32.20	40.74	49.20	74.00	H
9648.000	36.40	8.80	32.50	35.77	48.50	74.00	H

**Average Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
4824.000	33.19	6.90	33.01	36.38	43.46	54.00	Vertical
7236.000	36.05	8.36	32.20	23.73	35.94	54.00	V
9648.000	36.40	8.80	32.50	21.97	34.67	54.00	V
4824.000	33.19	6.90	33.01	37.08	44.16	54.00	Horizontal
7236.000	36.11	8.36	32.20	23.27	35.54	54.00	H
9648.000	36.42	8.80	32.50	23.31	36.03	54.00	H

The field strength is calculated by adding the Antenna Factor. Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor –Preamplifier Factor.

**6.8.1.5 Test in 802.11g mode middle channel 2437MHz with 6Mbps data rate:**

30MHz~1GHz Spurious Emissions .Quasi-Peak Measurement

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
408.300	16.45	2.50	25.09	42.03	35.89	46.00	Vertical
191.020	10.10	1.60	24.69	51.01	38.03	43.50	Horizontal

1~25 GHz Harmonics &amp; Spurious Emissions. Peak &amp; Average Measurement

**Peak Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
4874.000	33.27	7.20	32.97	51.05	58.54	74.00	Vertical
7311.000	36.16	6.95	32.29	37.18	48.00	74.00	V
9748.000	36.40	7.20	32.44	38.94	50.10	74.00	V
4874.000	33.27	7.20	32.97	50.81	58.31	74.00	Horizontal
7311.000	36.16	6.95	32.29	37.45	48.27	74.00	H
9748.000	36.40	7.20	32.44	38.69	49.85	74.00	H

**Average Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
4874.000	33.27	7.20	32.97	43.15	50.64	54.00	Vertical
7311.000	36.16	6.95	32.29	22.49	33.31	54.00	V
9748.000	36.40	7.20	32.44	23.96	35.12	54.00	V
4874.000	33.27	7.20	32.97	45.78	53.28	54.00	Horizontal
7311.000	36.16	6.95	32.29	22.95	33.77	54.00	H
9748.000	36.40	7.20	32.44	22.32	33.48	54.00	H

The field strength is calculated by adding the Antenna Factor. Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor –Preamplifier Factor.

**6.8.1.6 Test in 802.11g mode highest channel 2462MHz with 6Mbps data rate:**

30MHz~1GHz Spurious Emissions .Quasi-Peak Measurement

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
157.070	10.44	1.34	24.90	46.86	33.74	46.00	Vertical
325.850	14.00	2.20	24.57	49.70	41.33	46.00	Horizontal

1~25 GHz Harmonics &amp; Spurious Emissions. Peak &amp; Average Measurement

**Peak Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
4960.000	33.36	7.33	32.92	50.62	58.40	74.00	Vertical
7440.000	36.23	6.05	32.37	39.99	49.90	74.00	V
9920.000	36.50	7.04	32.50	40.66	51.70	74.00	V
4960.000	33.36	7.33	32.92	50.93	58.70	74.00	Horizontal
7440.000	36.23	6.05	32.37	40.32	50.23	74.00	H
9920.000	36.50	7.04	32.50	42.03	53.07	74.00	H

**Average Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Antenna polarization
4960.000	33.36	7.33	32.92	43.06	50.84	54.00	Vertical
7440.000	36.23	6.05	32.37	24.69	34.60	54.00	V
9920.000	36.50	7.04	32.50	24.02	35.06	54.00	V
4960.000	33.36	7.33	32.92	43.07	50.84	54.00	Horizontal
7440.000	36.23	6.05	32.37	34.85	44.76	54.00	H
9920.000	36.50	7.04	32.50	32.34	43.38	54.00	H

The field strength is calculated by adding the Antenna Factor. Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor –Preamplifier Factor.

Remark: No any other emissions level which are attenuated less than 20dB below the limit.

According to 15.31(o), The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this Part.

Hence there no other emissions have been reported.

Remark:

- 1). N/A: For this intentional radiator operates below 25 GHz. The spectrum shall be investigated to the tenth harmonic of the highest fundamental frequency. And above the third harmonic of this intentional radiator, the disturbance is very low. So the test result only displays to 3<sup>rd</sup> harmonic.
- 2). As shown in Section, for frequencies above 1000 MHz. the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.
- 3). The test only perform the EUT in transmitting status since the test frequencies were over 1GHz only required transmitting status.

**Test result: The unit does meet the FCC requirements.**

## 6.8.2 Radiated Emissions which fall in the restricted bands

Test Requirement:	Section 15.247(d)  In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).
Test Method:	ANSI 63.4:2003
Test Date:	13 January 2009
Test Status:	Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)
Limit:	40.0 dB $\mu$ V/m between 30MHz & 88MHz; 43.5 dB $\mu$ V/m between 88MHz & 216MHz; 46.0 dB $\mu$ V/m between 216MHz & 960MHz; 54.0 dB $\mu$ V/m above 960MHz.

Section 15.205 Restricted bands of operation.

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	
13.36 - 13.41	322 - 335.4		

**Test Result:****1. Low Channel**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss(dB)	Preamp factor(dB)	Peak Reading Level (dB $\mu$ V)	Average Reading Level (dB $\mu$ V)	Peak Emission Level (dB $\mu$ V/m)	Average Emission Level (dB $\mu$ V/m)
2390.000	27.88	4.65	34.30	50.7	31.4	48.9	29.6
2483.500	28.74	4.80	34.73	52.8	34.5	51.6	33.3

**2. Middle Channel**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss(dB)	Preamp factor(dB)	Peak Reading Level (dB $\mu$ V)	Average Reading Level (dB $\mu$ V)	Peak Emission Level (dB $\mu$ V/m)	Average Emission Level (dB $\mu$ V/m)
2390.000	27.88	4.65	34.30	50.6	32.2	48.8	30.5
2483.500	28.74	4.80	34.73	53.1	31.7	51.4	30.0

**3. High Channel**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss(dB)	Preamp factor(dB)	Peak Reading Level (dB $\mu$ V)	Average Reading Level (dB $\mu$ V)	Peak Emission Level (dB $\mu$ V/m)	Average Emission Level (dB $\mu$ V/m)
2390.000	27.88	4.65	34.30	51.6	33.1	49.8	31.4
2483.500	28.74	4.80	34.73	53.5	32.6	51.7	30.8

Remark: No any other emission which falls in restricted bands can be detected and be reported.

**The unit does meet the FCC requirements.**

## 6.9 Band Edges Requirement

Test Requirement:	FCC Part 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.
Frequency Band:	2400MHz to 2483.5MHz
Test Method:	ANSI C63.4:2003 and KDB558074.
Test Date:	13 January 2009
Test Status:	Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.
Test Procedure:	<ol style="list-style-type: none"><li>1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer or power meter.</li><li>2. Set RBW=100 kHz , VBW=100KHz ,suitable frequency span including 100 kHz bandwidth from band edge..</li><li>3. Measure the Conducted Spurious Emissions and Radiated Emissions of the test frequency with special test status.</li><li>4. Repeat until all the test status are investigated.</li><li>5. Report the worse.</li></ol>

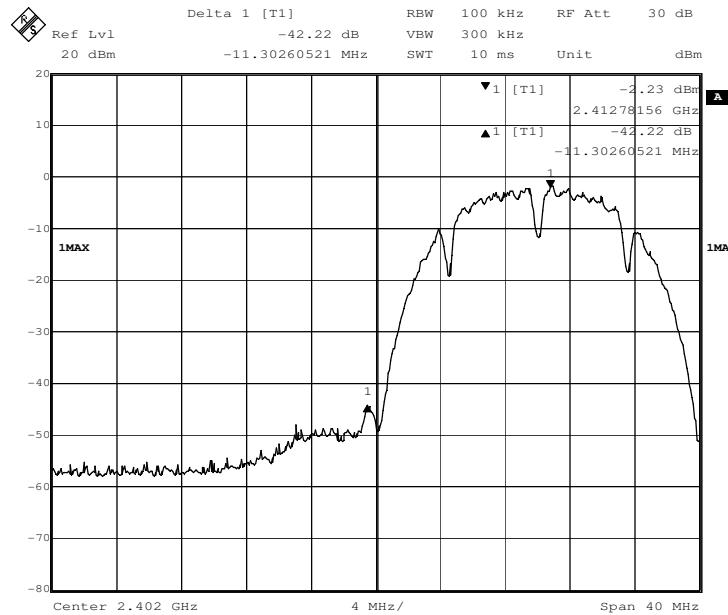
### Test result with plots as follows:

The band edges was measured and recorded Result:

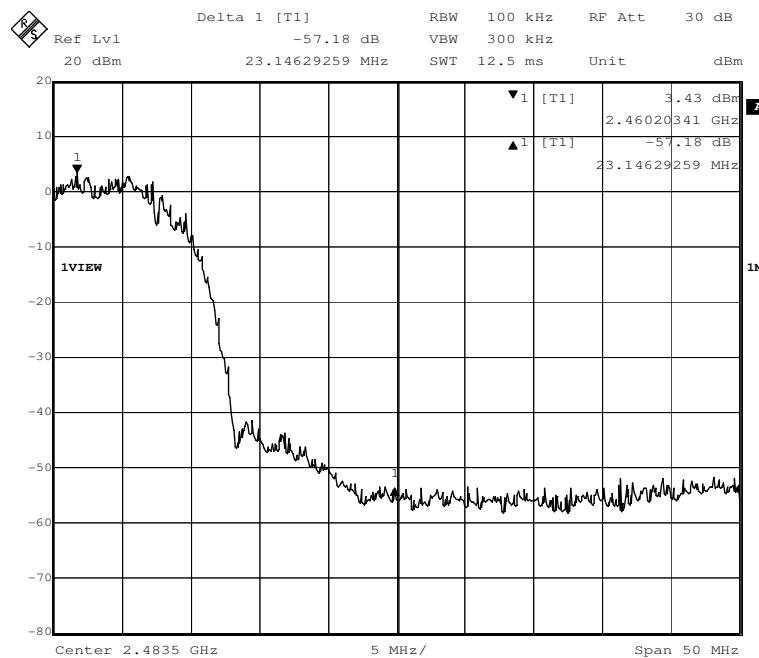
The Lower Edges attenuated more than 20dB.

The Upper Edges attenuated more than 20dB.

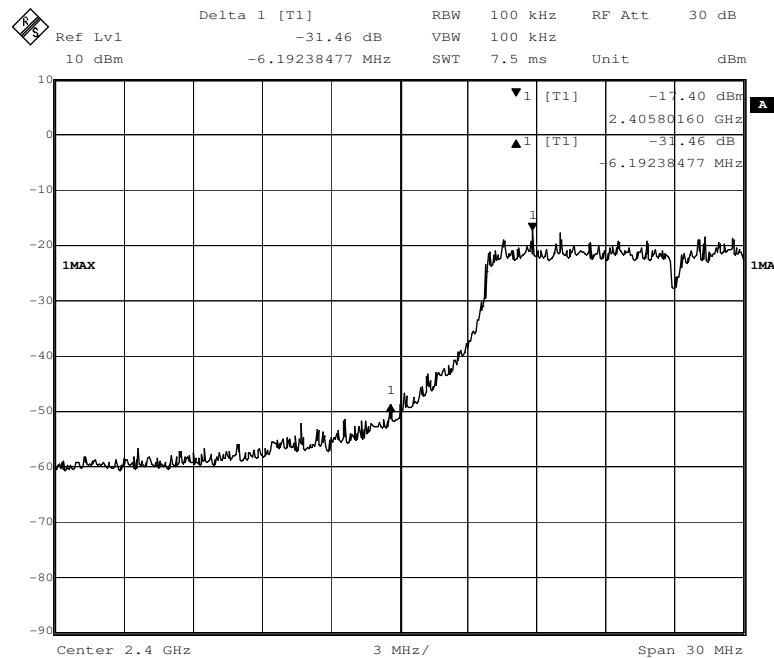
802.11b mode: Lower edge, lowest channel 2412MHz with 1Mbps data rates



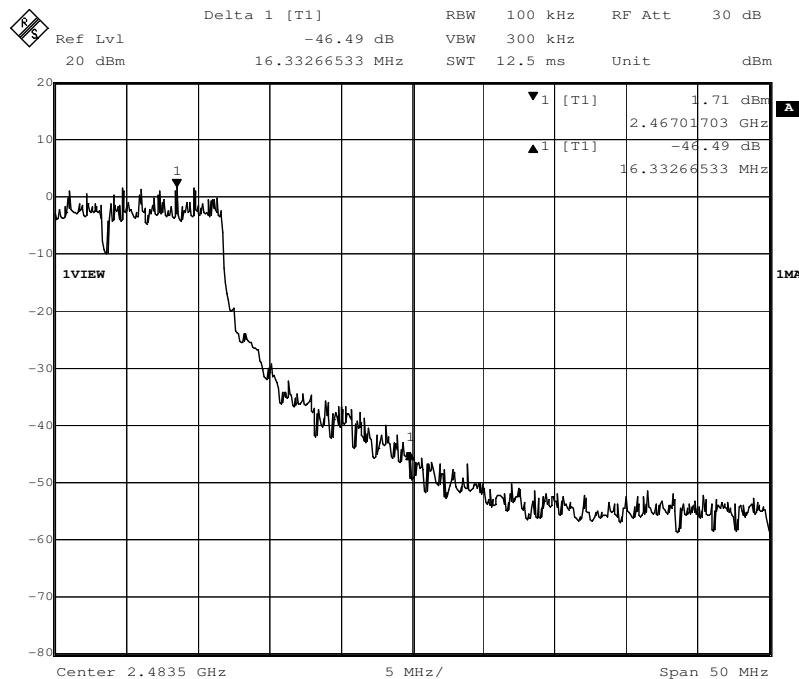
802.11b mode: Higher edge, lowest channel 2462MHz with 1Mbps data rates



802.11g mode: Lower edge, lowest channel 2412MHz with 6Mbps data rates



802.11g mode: Higher edge, lowest channel 2462MHz with 6Mbps data rates



**--- End of the Report---**