



## FCC 47 CFR PART 15 SUBPART C

### TEST REPORT

For

**Network Music Commander**

**Model: MCX-RC100**

**Trade Name: YAMAHA**

*Issued to*

**Yamaha Corporation  
10-1 Nakazawa-cho Naka-ku Hamamatsu 430-8650 Japan**

*Issued by*

**Compliance Certification Services Inc.  
No. 81-1, Lane 210, Pa-De 2nd Rd., Luchu Hsiang,  
Taoyuan Shien, (338) Taiwan, R.O.C.**

**TEL: 886-3-324-0332**

**FAX: 886-3-324-5235**

<http://www.ccsemc.com.tw>

[service@tw.ccsemc.com](mailto:service@tw.ccsemc.com)



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**Revision History**

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	March 11, 2009	Initial Issue	ALL	Celine Chou



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# 1. TEST RESULT CERTIFICATION

**Applicant:** Yamaha Corporation  
 10-1 Nakazawa-cho Naka-ku Hamamatsu 430-8650 Japan

**Equipment Under Test:** Network Music Commander

**Trade Name:** YAMAHA

**Model:** MCX-RC100

**Date of Test:** December 31, 2008 ~ January 6, 2009

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 15 Subpart C	No non-compliance noted

### We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4: 2003 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.207, 15.209, 15.247.

The test results of this report relate only to the tested sample EUT identified in this report.

Approved by:

\_\_\_\_\_  
 Ethan Huang  
 Section Manager  
 Compliance Certification Services Inc.

Reviewed by:

\_\_\_\_\_  
 Julia Wei  
 Senior Specialist  
 Compliance Certification Services Inc.



## 2. EUT DESCRIPTION

<b>Product</b>	Network Music Commander		
<b>Trade Name</b>	YAMAHA		
<b>Model Number</b>	MCX-RC100		
<b>EUT Power Rating</b>	5VDC, 1A		
<b>Power Adapter Manufacturer</b>	YAMAHA	<b>Model</b>	PSAA05A-050
<b>Power Adapter Power Rating</b>	I/P: 100-240VAC, 50-60Hz, 0.2A O/P: 5VDC, 1A		
<b>Operating Frequency Range</b>	2412 ~ 2462 MHz		
<b>Transmit Power</b>	IEEE 802.11b: 20.87 dBm IEEE 802.11g: 23.75 dBm		
<b>Modulation Technique</b>	DSSS, OFDM, DBPSK, DQPSK, CCK, 16-QAM, 64-QAM		
<b>Transmit Data Rate</b>	IEEE 802.11b: 11, 5.5, 2, 1 Mbps IEEE 802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps		
<b>Number of Channels</b>	11 Channels		
<b>Channels Spacing</b>	5MHz		
<b>Antenna Specification</b>	PCB Antenna / Gain: 4.0 dBi		
<b>Temperature Range</b>	0°C ~ +55°C		

**Remark:**

1. The sample selected for test was production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for FCC ID: **A6RMCXRC100A** filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.



### **3. TEST METHODOLOGY**

The tests documented in this report were performed in accordance with ANSI C63.4(2003) 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.

#### **3.1 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.

#### **3.2 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.

#### **3.3 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 13.1.4.1 of ANSI C63.4(2003) 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 13.1.4.1 of ANSI C63.4(2003).



### 3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

(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	( <sup>2</sup> )
13.36 - 13.41	322 - 335.4		

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup> Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.



### **3.5 DESCRIPTION OF TEST MODES**

The EUT (model: MCX-RC100) had been tested under operating condition.

Software used to control the EUT for staying in continuous transmitting mode was programmed.

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz, which worst case was in normal link mode only.

IEEE802.11b: Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 1Mbps data rate were chosen for full testing.

IEEE802.11g: Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 6Mbps data rate were chosen for full testing.

The field strength of spurious emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (Y axis) and the worst case was recorded.





## 4. INSTRUMENT CALIBRATION

### 4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

### 4.2 MEASUREMENT EQUIPMENT USED

#### Equipment Used for Emissions Measurement

*Remark: Each piece of equipment is scheduled for calibration once a year.*

Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	R&S	ESCS30	845552/030	04/08/2009
LISN	R&S	ENV216	100074	12/09/2009
LISN	FCC	FCC-LISN-50/2 50-16-2-07	06013	10/12/2009
Test S/W	LabVIEW 6.1 (CCS Conduction Test SW Version_01)			

3M Semi Anechoic Chamber				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	ADVANTEST	R3271A	85060321	10/22/2009
Bilog Antenna	SCHWAZBECK	VULB9160	3084	N.C.R.
EMI Test Receiver	R&S	ESVS10	834468/006	04/17/2009
Pre-Amplifier	HP	8447D	2944A06530	12/09/2009
Antenna Tower	HD	MA240	240/443	N.C.R
Controller	HD	HD100	100/529	N.C.R
Turn Table	HD	HD320	N/A	N.C.R
Site NSA	SIDT EUROPE	9x6x6	N/A	05/16/2009
Turn Table	HD	DT-K312	N/A	N.C.R
Test S/W	LabVIEW 6.1 (Wugu Chamber EMI Teat V1_4.5.3)			

*Remark: The measurement uncertainty is less than +/-4.0235dB (30MHz ~ 1GHz), +/-3.0958dB (Above 1GHz) which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV.*

Powerline Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	R&S	ESCS30	845552/030	04/08/2009
LISN	R&S	ENV216	100074	12/09/2009
LISN	FCC	FCC-LISN-50/2 50-16-2-07	06013	10/12/2009
Test S/W	LabVIEW 6.1 (CCS Conduction Test SW Version_01)			

*Remark: The measurement uncertainty is less than +/- 1.7806dB, which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV.*



## **5. FACILITIES AND ACCREDITATIONS**

### **5.1 FACILITIES**

All measurement facilities used to collect the measurement data are located at

- No.199, Chungsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.  
Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029
  
- No.11, Wugong 6th Rd., Wugu Industrial Park, Taipei Hsien 248, Taiwan  
Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045
  
- No. 81-1, Lane 210, Pa-De 2nd Rd., Luchu Hsiang, Taoyuan Shien, (338) Taiwan,  
R.O.C.  
Tel: 886-3-324-0332 / Fax: 886-3-324-5235

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4(2003) and CISPR Publication 22.

### **5.2 EQUIPMENT**





Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

### 5.3 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	A2LA	CFR 47, FCC Part15/18, CISPR 22, EN 55022, ICES-003, AS/NZS CISPR 22, VCCI V-3, EN 55011, CISPR 11, IEC/EN 61000-4-2/3/4/5/6/8/11, EN 61000-6-1/2/3/4, EN 55024, CISPR 24, AS/NZS CISPR 24, AS/NZS 61000.6.2, EN 55014-1/-2, ETSI EN 300 386 v1.3.2/v1.3.3, IEC/EN 61000-3-2, AS/NZS 61000.3.2, IEC/EN 61000-3-3, AS/NZS 61000.3.3	 ACCREDITED No. 0824-01
USA	FCC MRA	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	 FC <sub>TW1026</sub>
Japan	VCCI	3/10 meter Open Area Test Sites and conducted test sites to perform radiated/conducted measurements	<b>VCCI</b> R-2882/2541/2798/725/1868 C-402/747/912 T-321/325
Taiwan	TAF	EN 55014-1, CISPR 14, CNS 13781-1, EN 55013, CISPR 13, CNS 13439, EN 55011, CISPR 11, CNS 13803, PLMN09, IS2045-0, LP0002 FCC Part 27/90, Part 15B/C/D/E, RSS-192/193/210/310 ETSI EN 300 328/ 300 220-1/ 300 220-2/ 301 893/ 301 489-01/ 301 489-03/ 301 489-07 / 301 489-17/ 300 440-1/ 300 440-2 AS/NZS 4268, AS/NZS 4771 CISPR 22, EN 55022, CNS 13438, AS/NZS CISPR 22, VCCI, IEC/EN 61000-4-2/3/4/5/6/8/11, CNS 14676-2/3/4/5/6/8, CNS 14934-2/3, CNS 13783-1, CNS 13439, CNS 13803	 ilac-MRA    TAF Testing Laboratory 0363
Taiwan	BSMI	CNS 13438, CNS 13783-1, CNS 13439, CNS 14115	SL2-IS-E-0014 / IN-E-0014 /A1-E-0014 /R1-E-0014 /R2-E-0014 /L1-E-0014
Canada	Industry Canada	RSS212, Issue 1	 IC 2324C-3 IC 2324C-5

**Note:** No part of this report may be used to claim or imply product endorsement by A2LA, TAF or other government agency.



## 6. SETUP OF EQUIPMENT UNDER TEST

### 6.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

### 6.2 SUPPORT EQUIPMENT

*For Radiated Emission and Powerline Conducted Emissions Setup Photos test only*

No.	Device Type	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*For Conducted Emission test only*

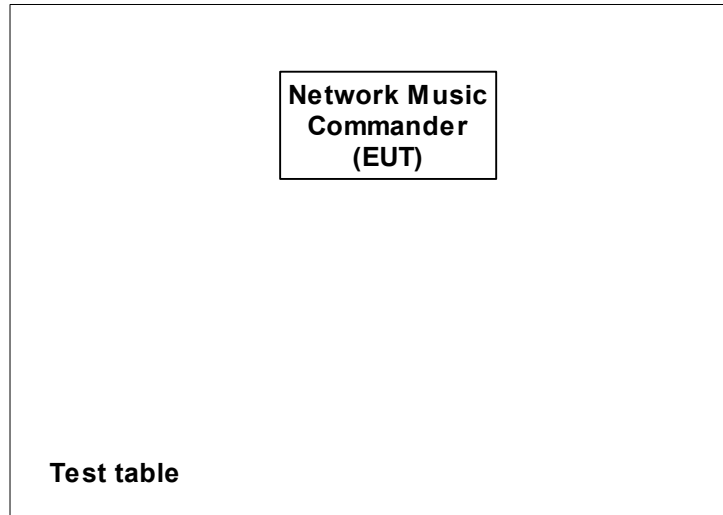
No.	Device Type	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
1.	Notebook PC	HP	COMPAQ NC 4010	CNU441F8LV	FCC DOC	USB Cable: Unshielded, 0.3m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core
2.	Test Jig	N/A	N/A	N/A	N/A	USB Cable: Unshielded, 0.3m	N/A

**Remark:** *Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*

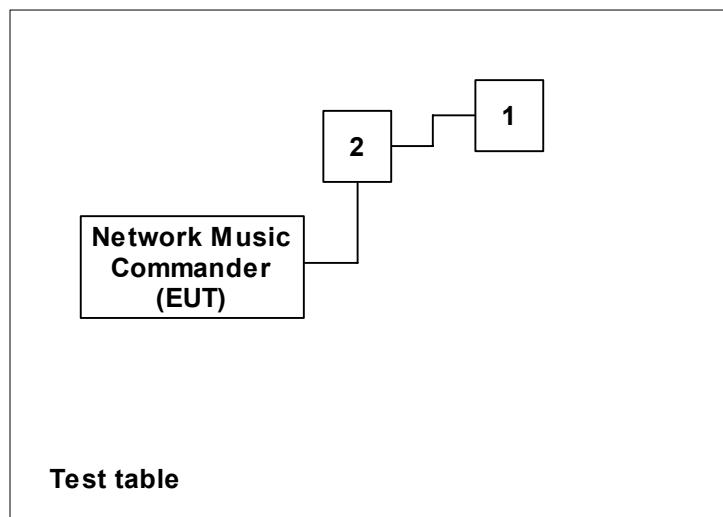


### 6.3 SUPPORT EQUIPMENT

For Radiated Emission and Powerline Conducted Emissions Setup Photos test only		
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For Conducted Emission test only		
1. Notebook PC	2. Test Jig	---





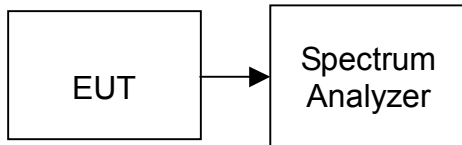
## 7. FCC PART 15.247 REQUIREMENTS

### 7.1 6dB BANDWIDTH

#### 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 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

#### TEST CONFIGURATION



#### 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 = 100kHz, VBW = 300kHz, Span = 30MHz, Sweep = auto.
4. Mark the peak frequency and -6dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

#### TEST RESULTS

*No non-compliance noted*

#### TEST DATA

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
Low	2412	10100	>500	PASS
Mid	2437	10100		PASS
High	2462	10040		PASS

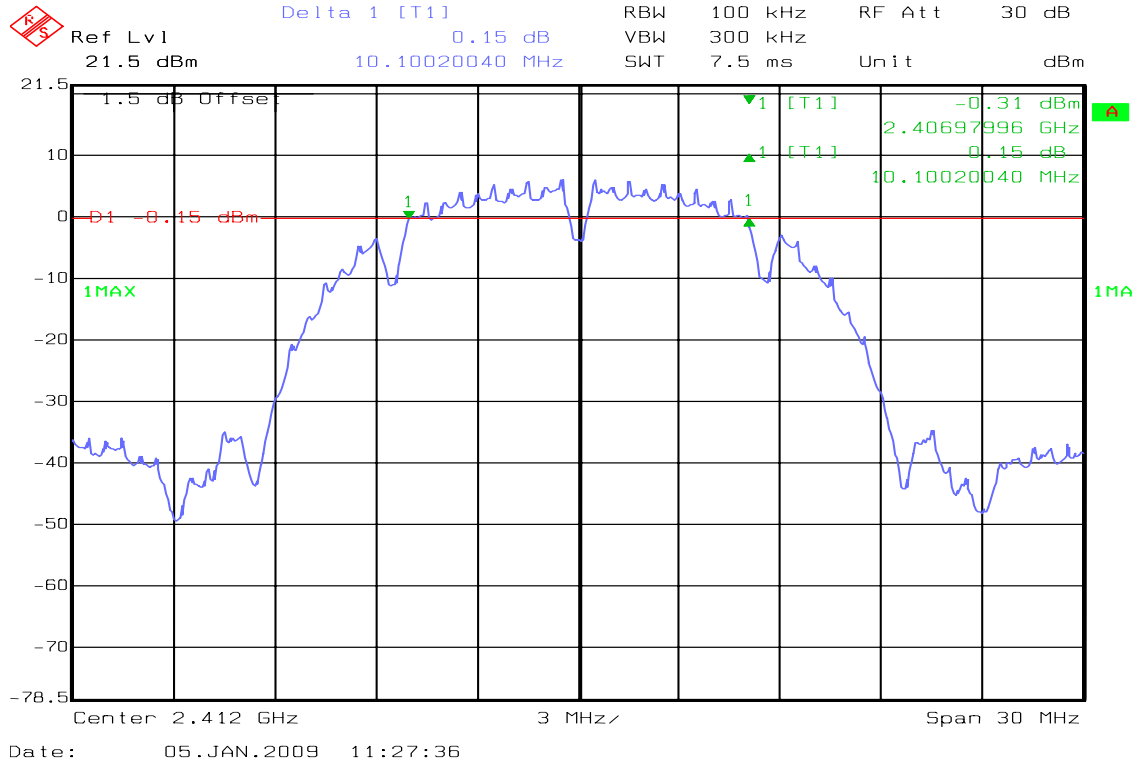
Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
Low	2412	16653	>500	PASS
Mid	2437	16653		PASS
High	2462	16593		PASS

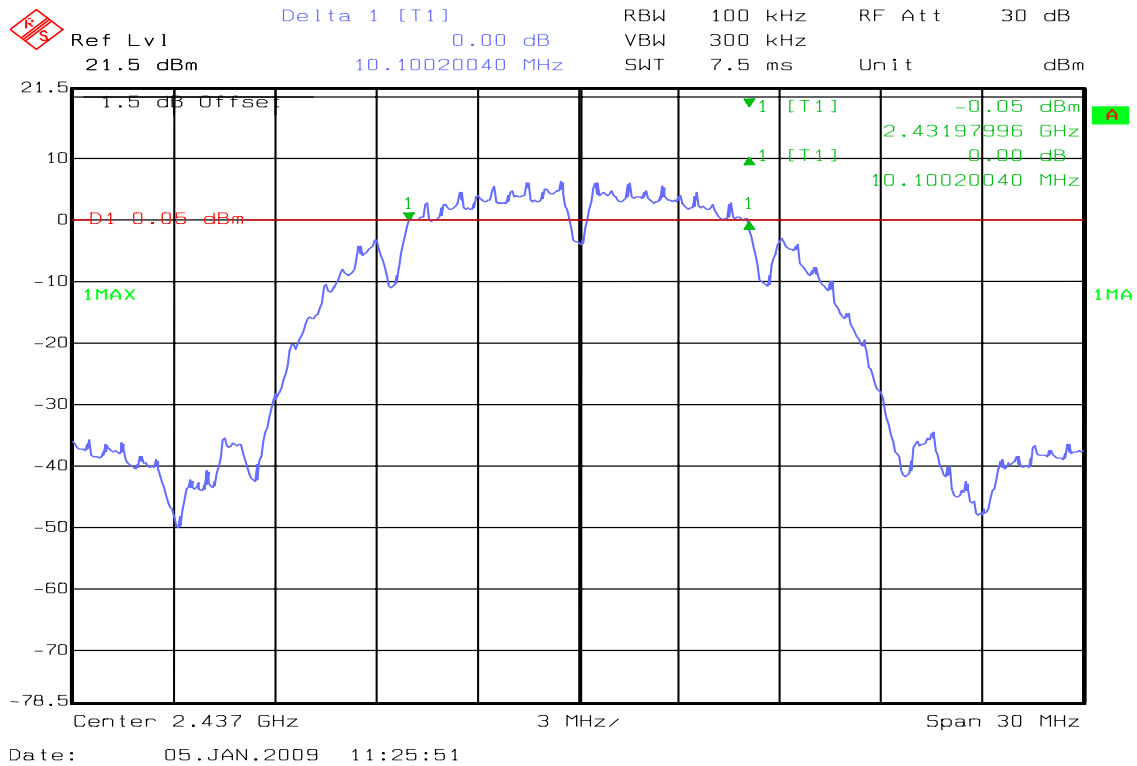


### Test Plot

#### 6dB Bandwidth (IEEE 802.11b / CH Low)

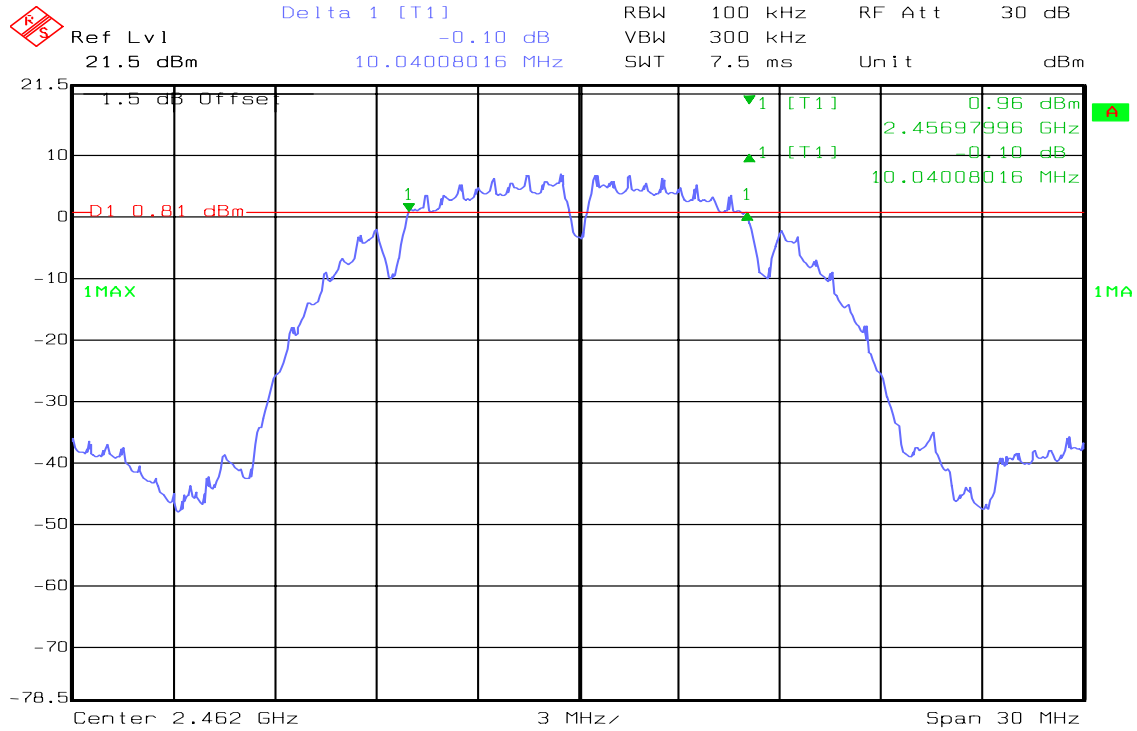


#### 6dB Bandwidth (IEEE 802.11b / CH Mid)



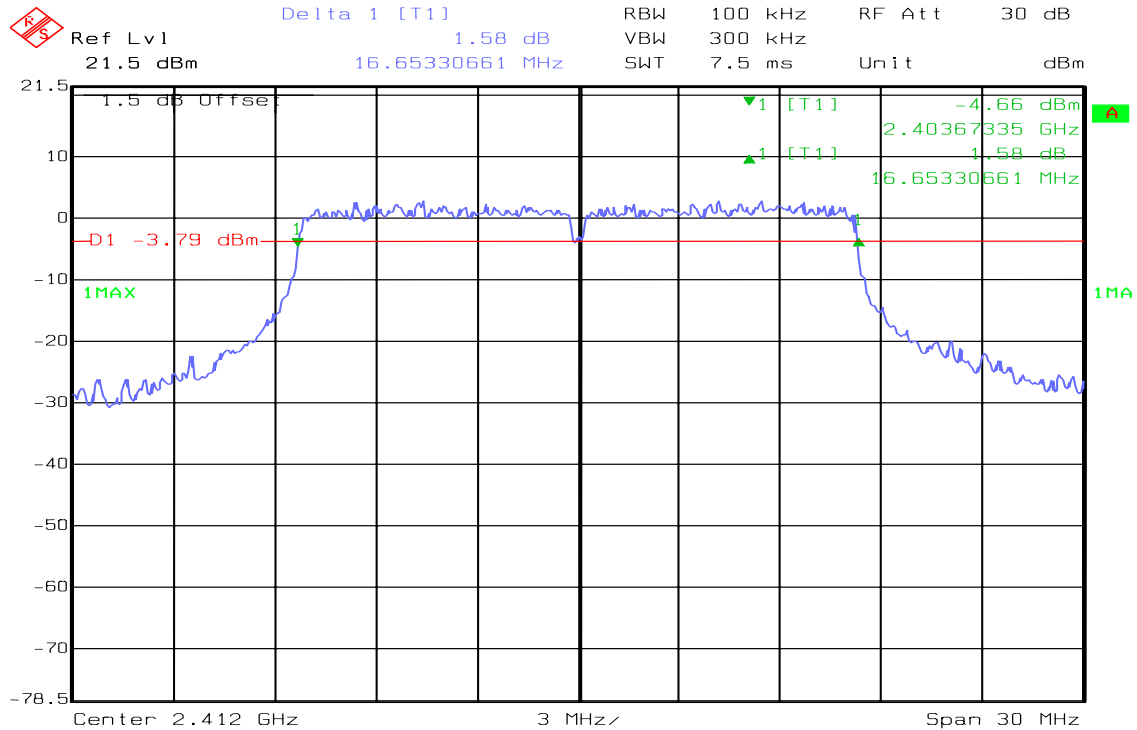


### 6dB Bandwidth (IEEE 802.11b / CH High)



Date: 05.JAN.2009 11:24:12

### 6dB Bandwidth (IEEE 802.11g / CH Low)

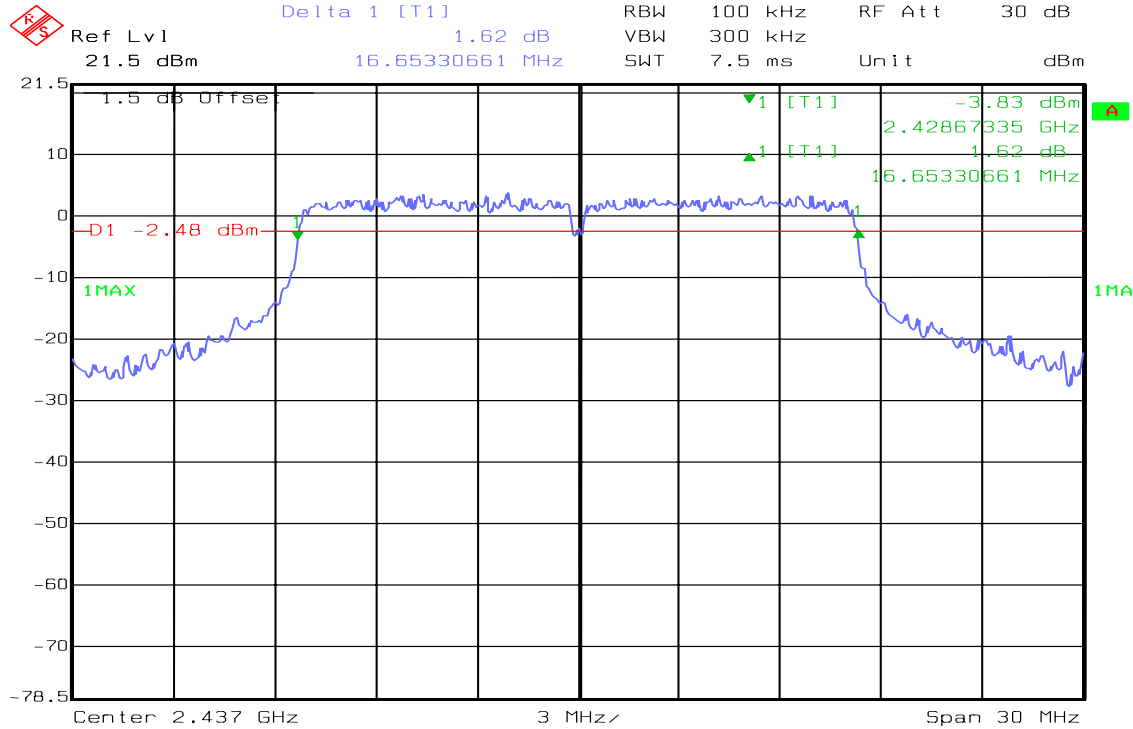


Date: 05.JAN.2009 11:07:22



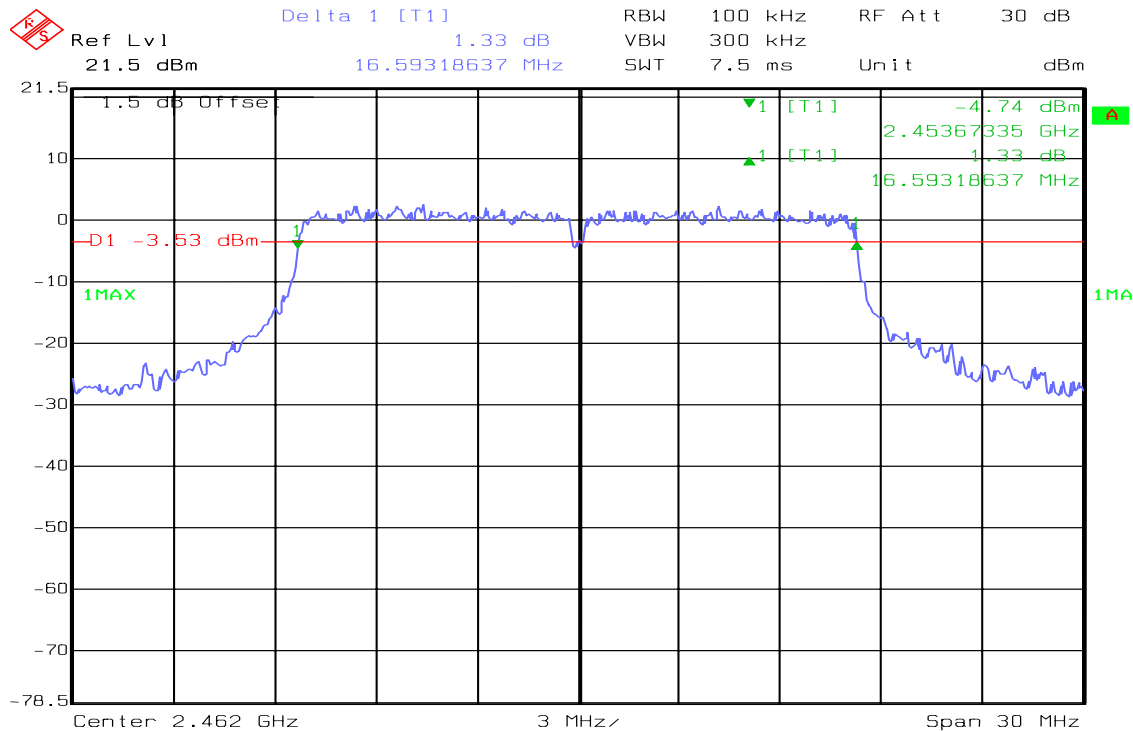


### 6dB Bandwidth (IEEE 802.11g / CH Mid)



Date: 05.JAN.2009 11:09:43

### 6dB Bandwidth (IEEE 802.11g / CH High)



Date: 05.JAN.2009 11:14:05



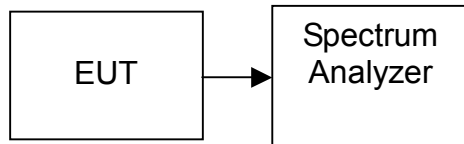
## 7.2 PEAK POWER

### LIMIT

The maximum peak output power of the intentional radiator shall not exceed the following:

1. According to §15.247(b)(3), for systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 Watt.
2. According to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values 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 CONFIGURATION



### TEST PROCEDURE

The transmitter output is connected to the Spectrum analyzer. The Spectrum analyzer is set to the peak power detection.

*Remark: 1. Result = Reading Value + Cable Loss + Attenuator Loss*  
 2. Cable Loss =0.5 dB ; Attenuator Loss=1 dB

### TEST RESULTS

*No non-compliance noted*

### TEST DATA

#### IEEE 802.11b

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Test Result
Low	2412	20.87	0.12218	1	PASS
Mid	2437	20.62	0.11535		PASS
High	2462	20.17	0.10399		PASS

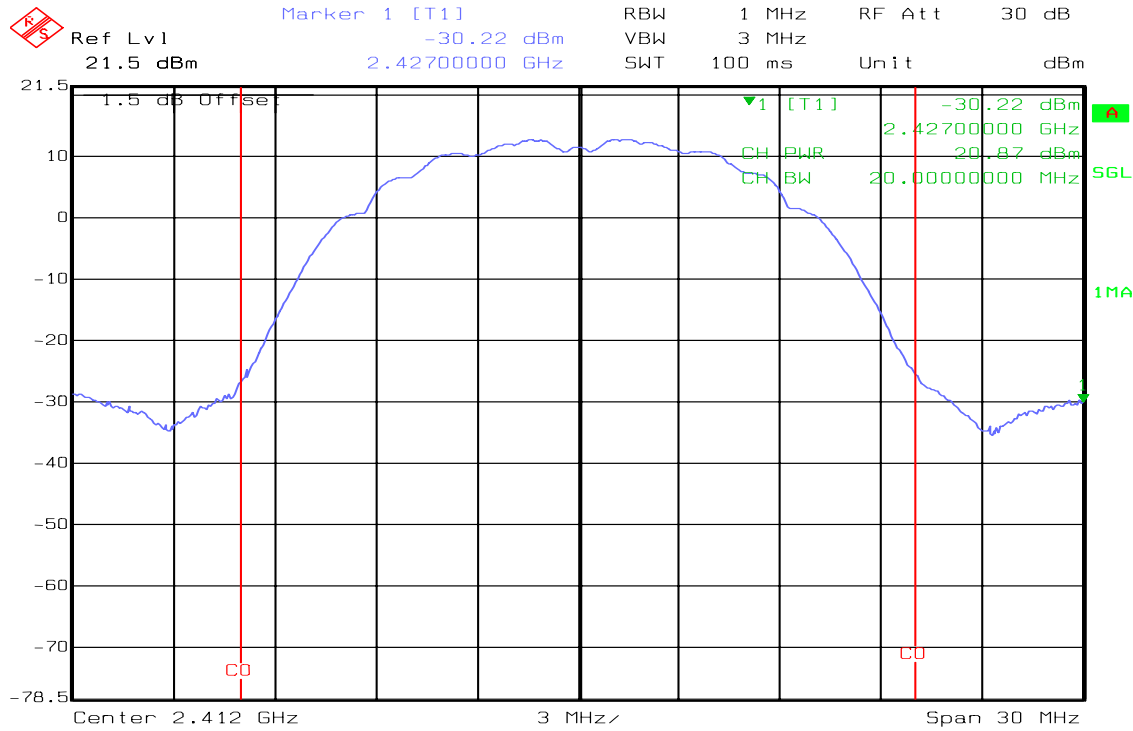
#### IEEE 802.11g

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Test Result
Low	2412	23.75	0.23714	1	PASS
Mid	2437	23.13	0.20559		PASS
High	2462	21.51	0.14158		PASS

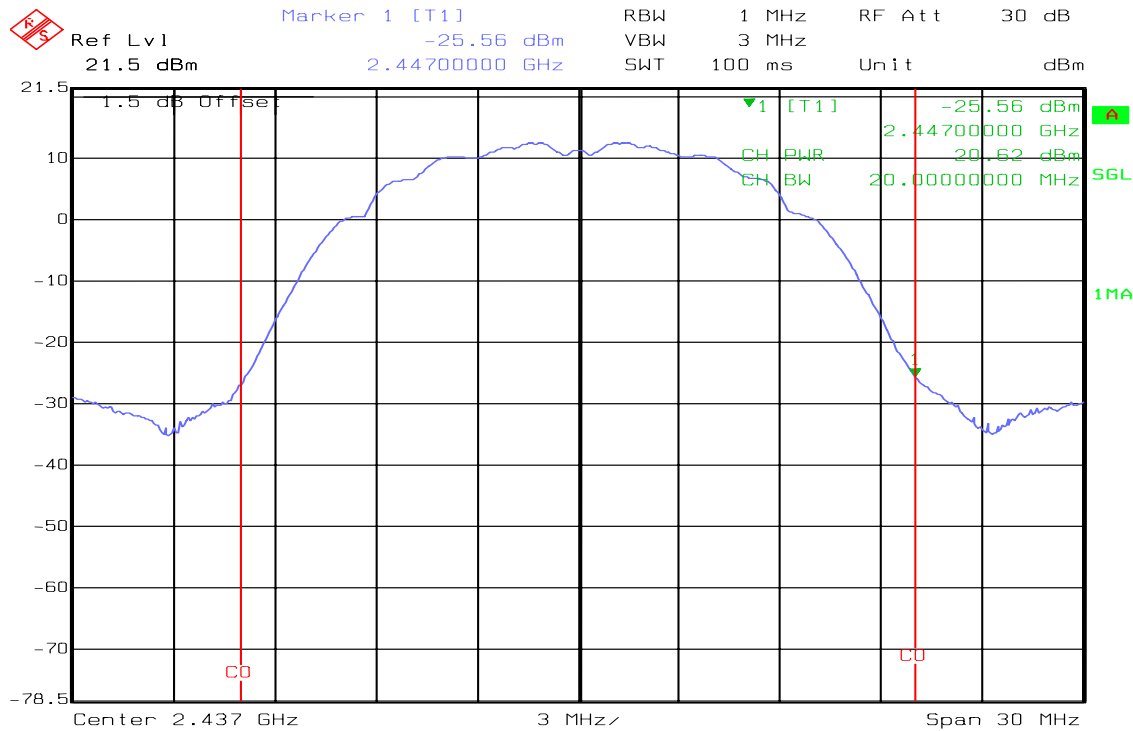


### Test Plot

#### Peak Power (IEEE 802.11b / CH Low)

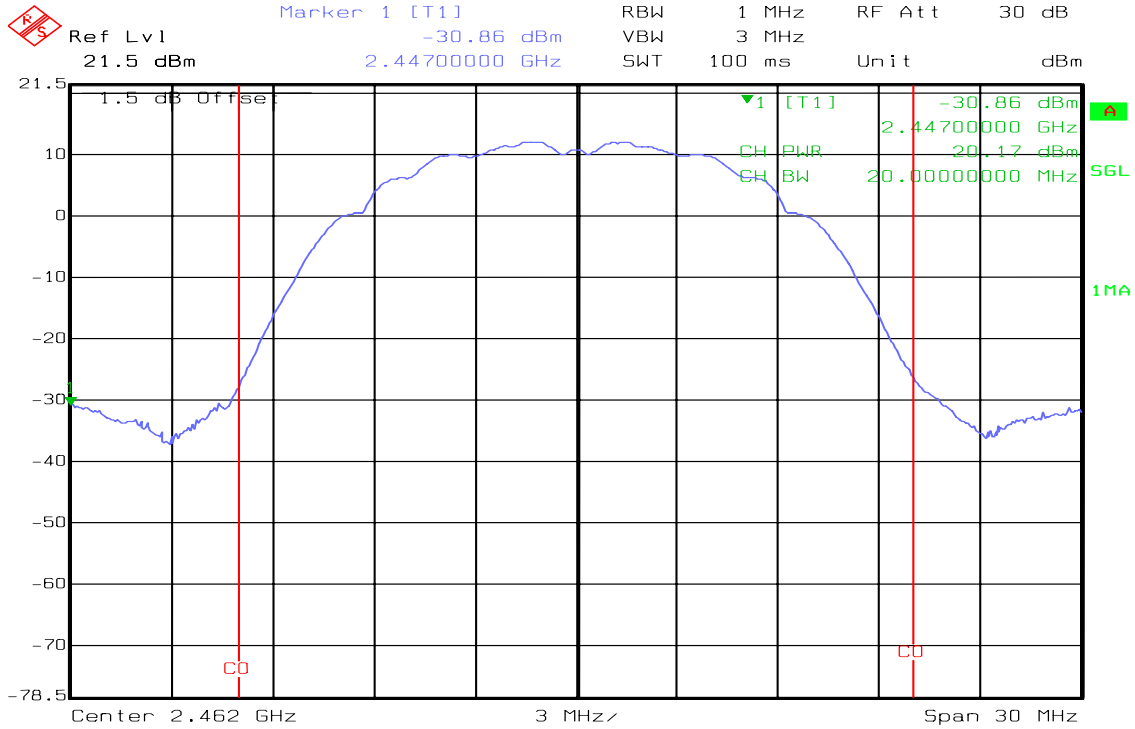


#### Peak Power (IEEE 802.11b / CH Mid)



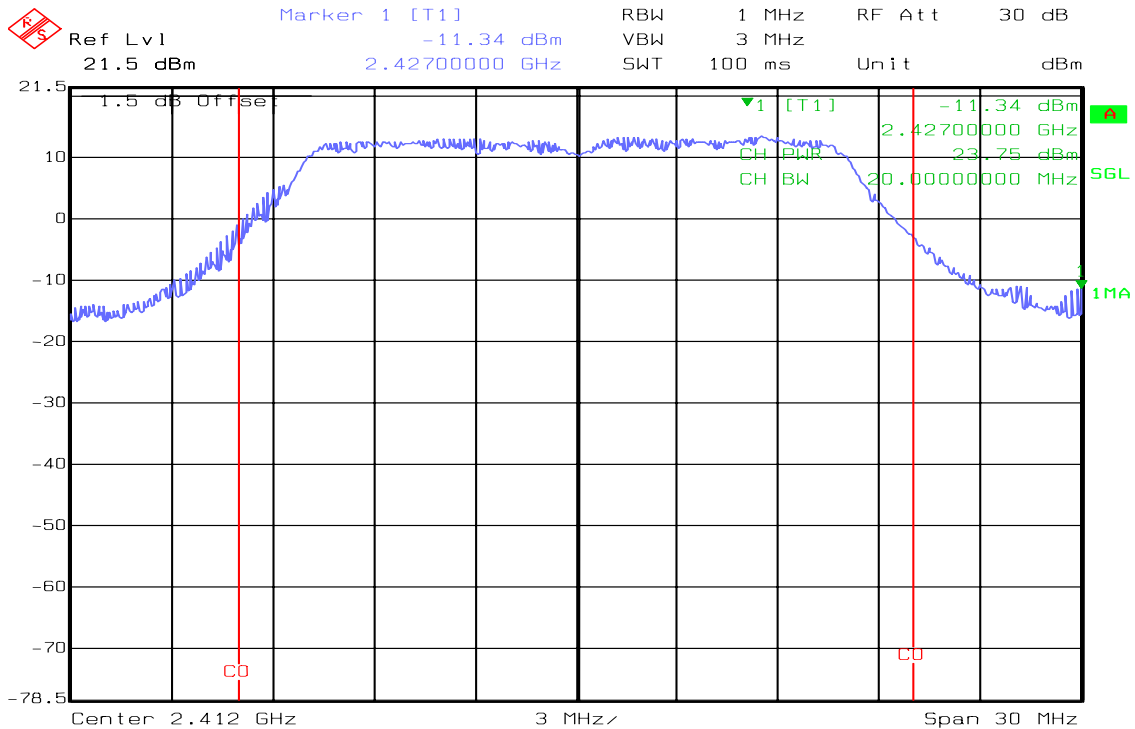


### Peak Power (IEEE 802.11b / CH High)



Date: 05.JAN.2009 10:41:22

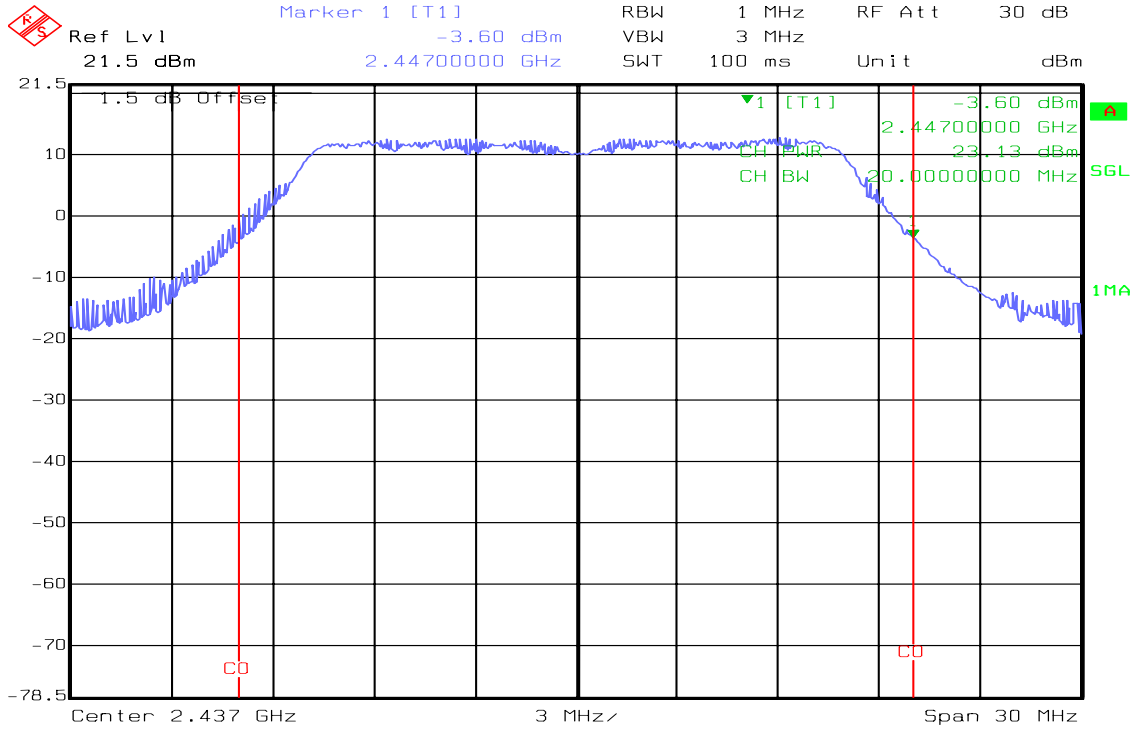
### Peak Power (IEEE 802.11g / CH Low)



Date: 05.JAN.2009 11:03:20

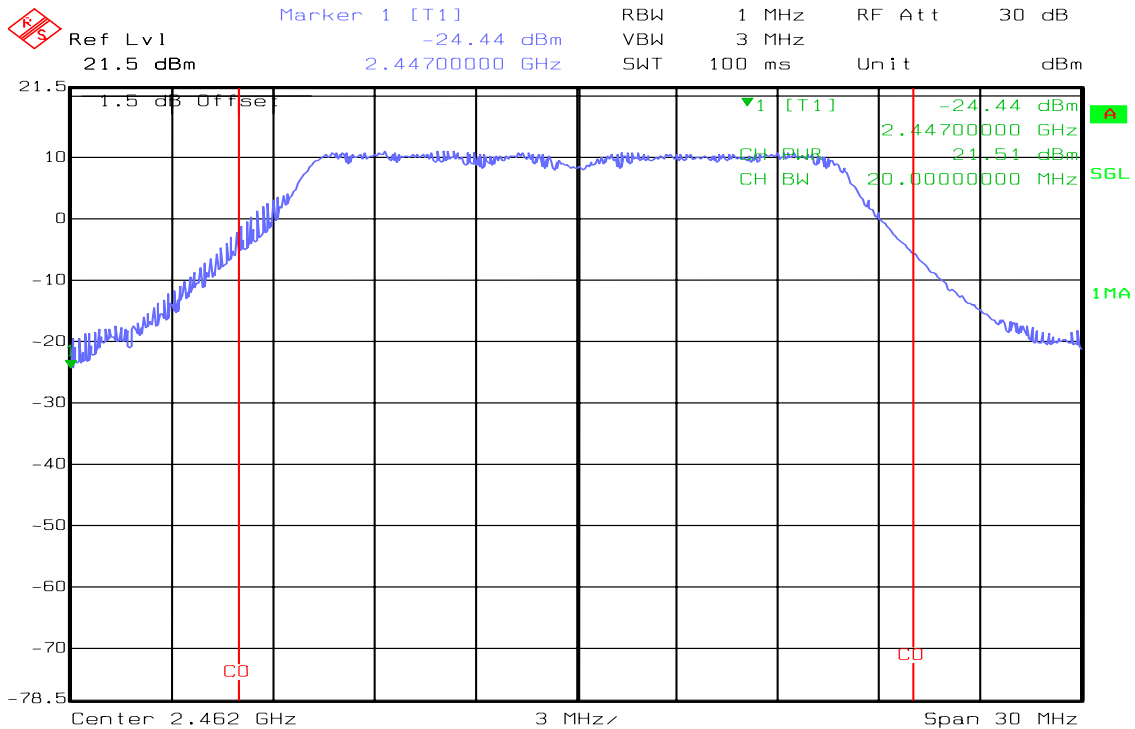


### Peak Power (IEEE 802.11g / CH Mid)



Date: 05.JAN.2009 10:48:56

### Peak Power (IEEE 802.11g / CH High)



Date: 05.JAN.2009 10:39:02

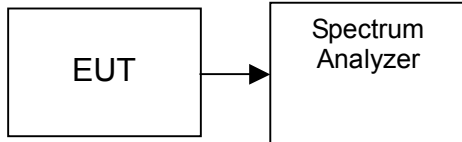


### 7.3 AVERAGE POWER

#### LIMIT

None; for reporting purposes only.

#### TEST CONFIGURATION



#### TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer. The Spectrum Analyzer is set to the average power detection.

#### TEST RESULTS

*No non-compliance noted*

#### TEST DATA

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	Output Power (dBm)
Low	2412	17.66
Mid	2437	17.40
High	2462	17.11

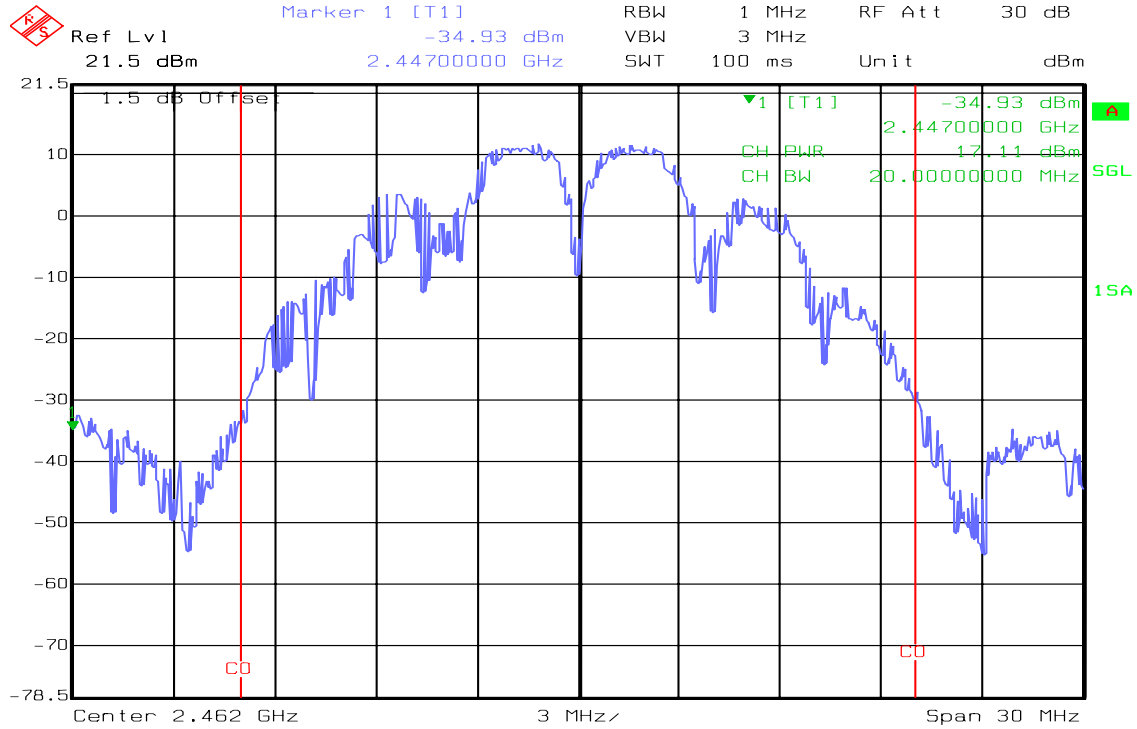
Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power (dBm)
Low	2412	16.40
Mid	2437	16.18
High	2462	14.20





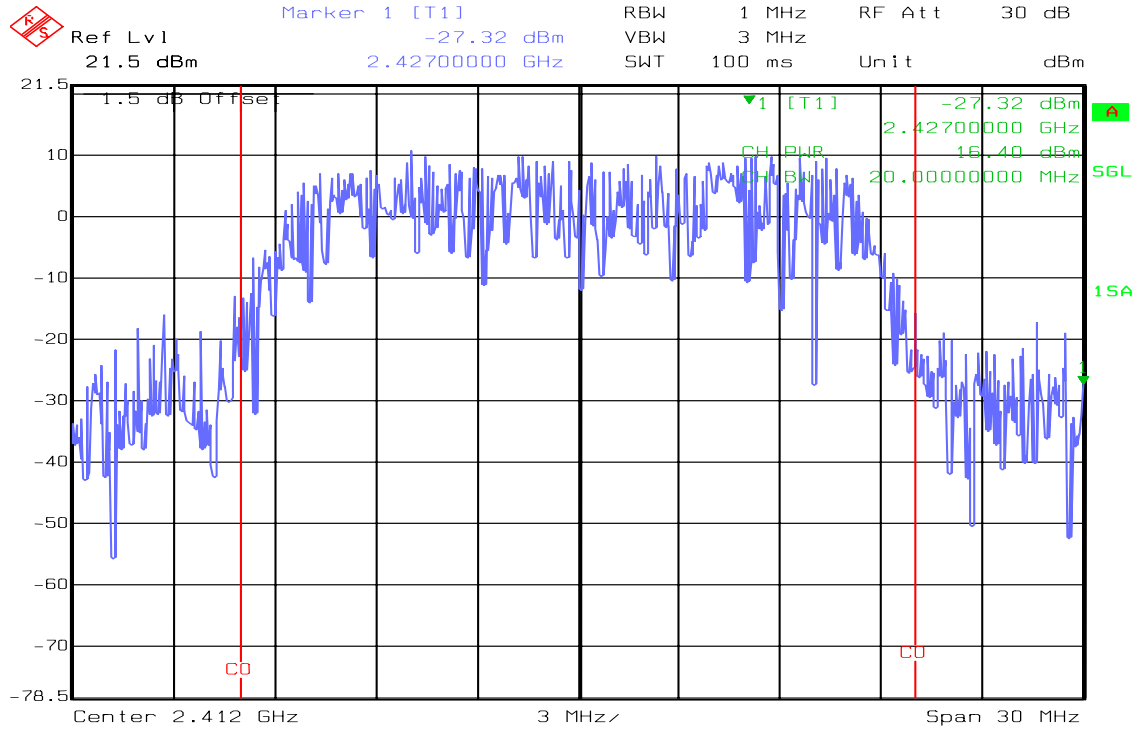
### Average Power (CH High)



Date: 05.JAN.2009 10:42:43

### IEEE 802.11g

### Average Power (CH Low)

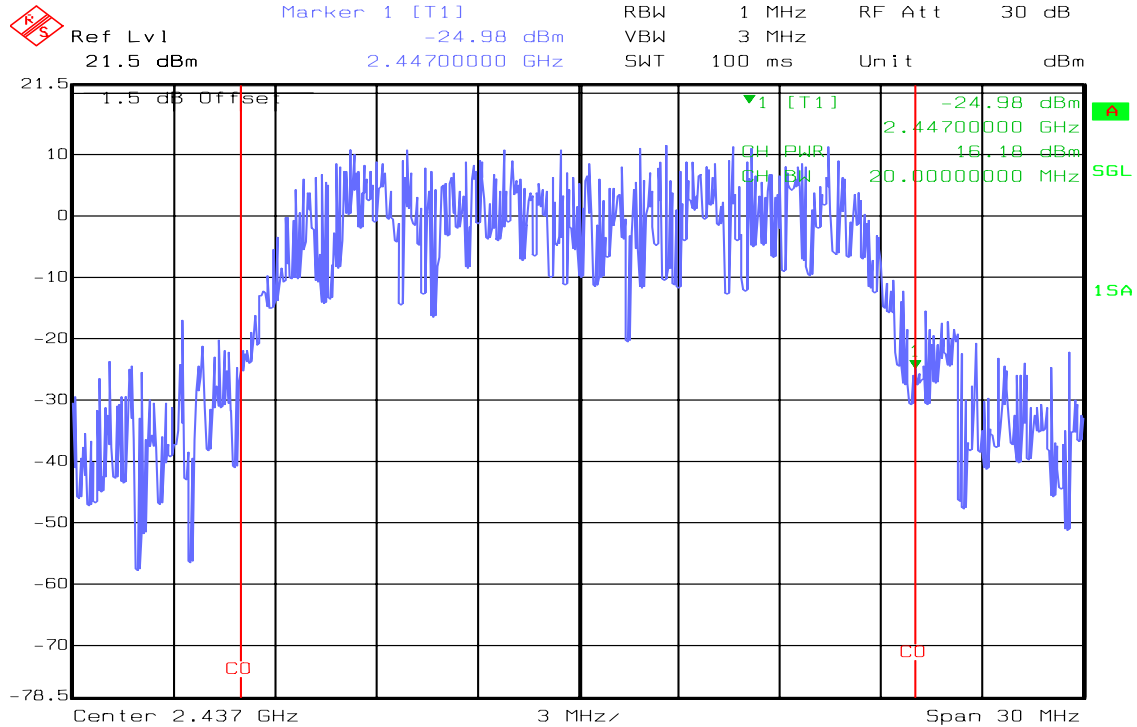


Date: 05.JAN.2009 11:04:02



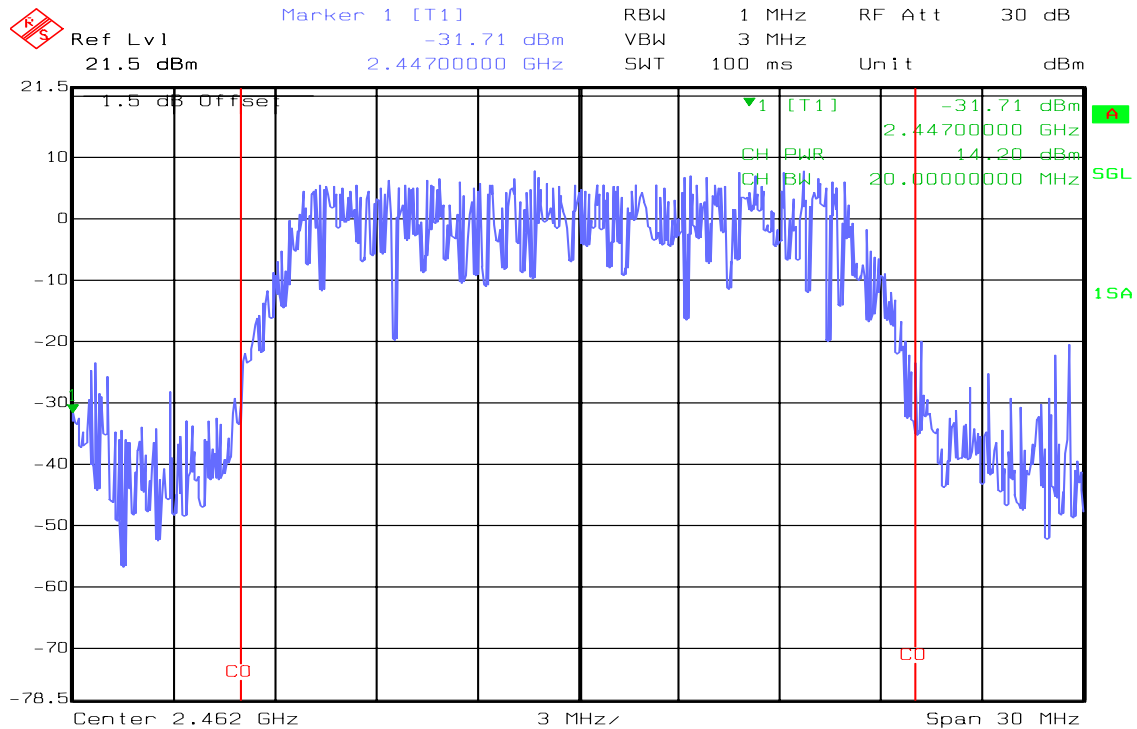


### Average Power (CH Mid)



Date: 05.JAN.2009 10:49:43

### Average Power (CH High)



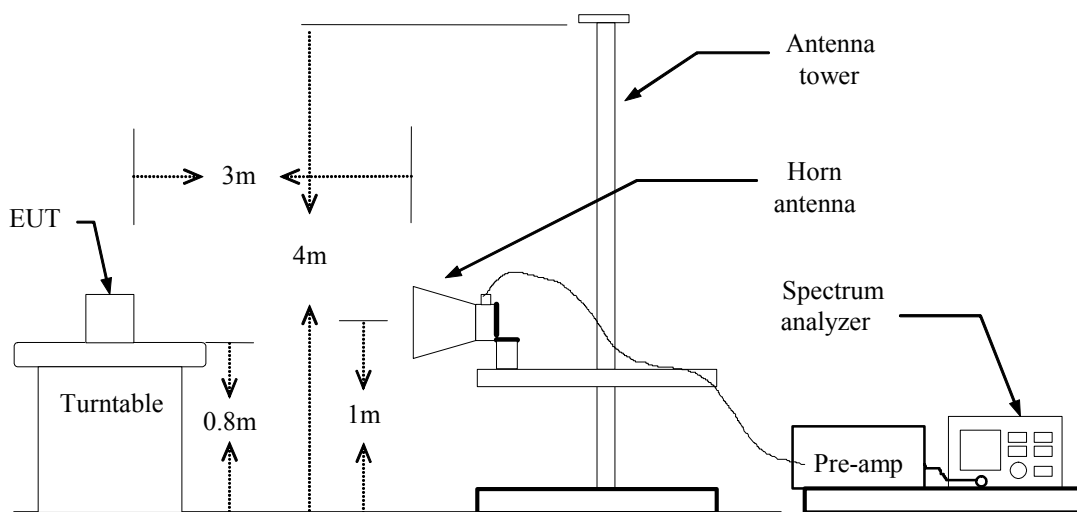
Date: 05.JAN.2009 10:38:08

## 7.4 BAND EDGES MEASUREMENT

### LIMIT

According to §15.247(d), 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 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. 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) (see Section 15.205(c)).

### TEST CONFIGURATION



### TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
  - (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
  - (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

### TEST RESULTS

Refer to attach spectrum analyzer data chart.

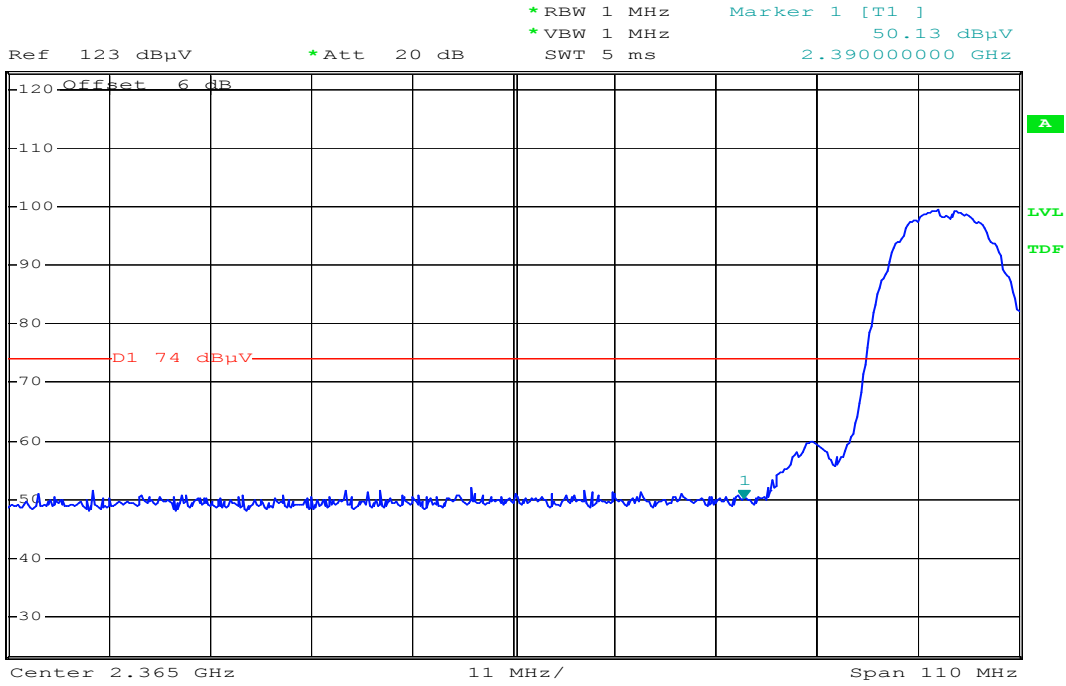


### Test Plot

### Band Edges (IEEE 802.11b / CH Low)

Detector mode: Peak

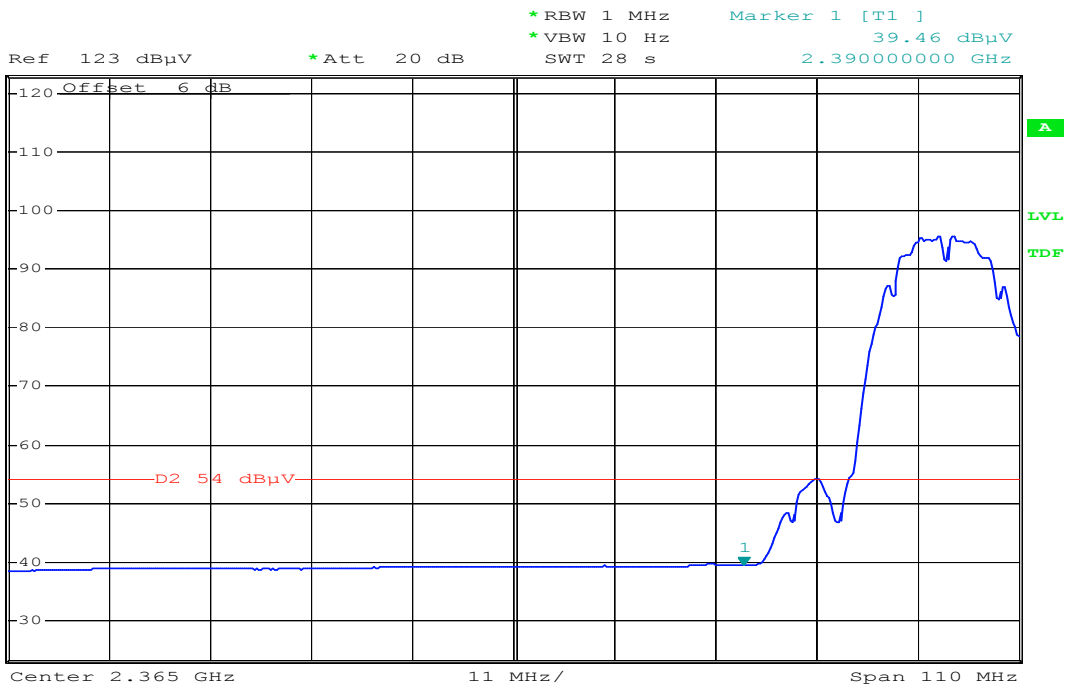
Polarity: Vertical



Date: 1.JAN.2009 08:06:33

Detector mode: Average

Polarity: Vertical



Date: 1.JAN.2009 08:07:18

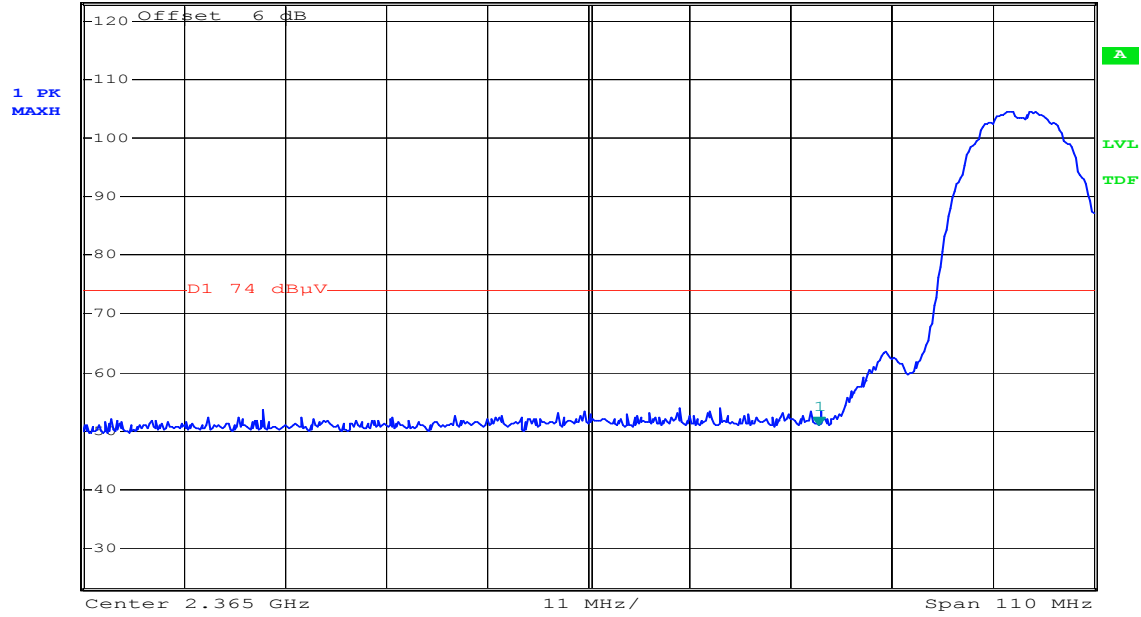


Detector mode: Peak

Polarity: Horizontal



Ref 123 dB $\mu$ V \*Att 20 dB \*RBW 1 MHz Marker 1 [T1 ] 50.92 dB $\mu$ V  
\*VBW 1 MHz 2.390000000 GHz  
SWT 5 ms



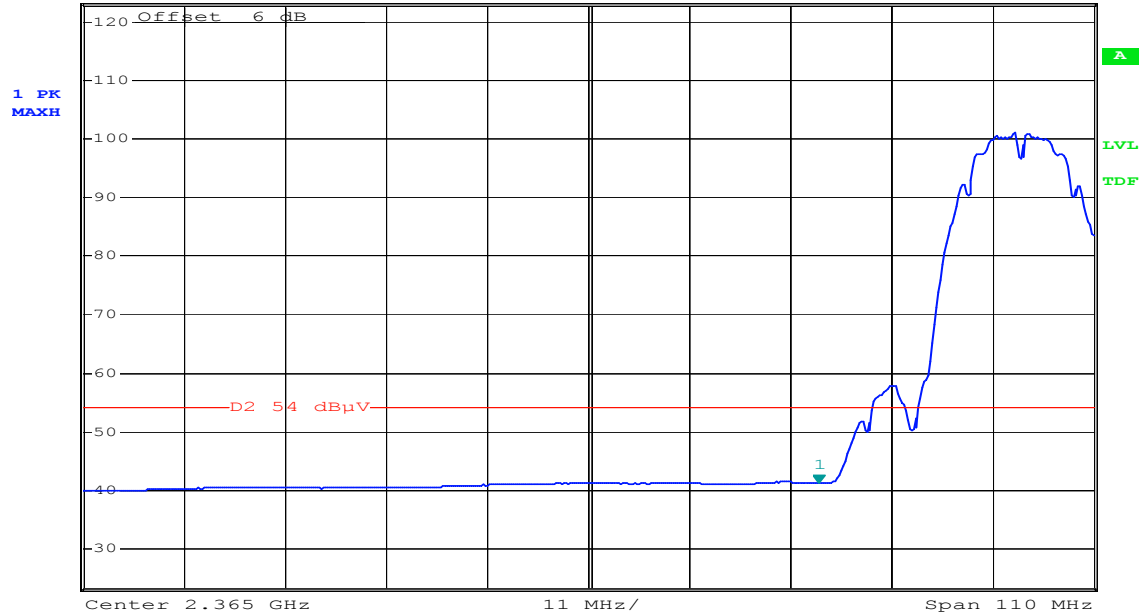
Date: 1.JAN.2009 08:09:09

Detector mode: Average

Polarity: Horizontal



Ref 123 dB $\mu$ V \*Att 20 dB \*RBW 1 MHz Marker 1 [T1 ] 41.25 dB $\mu$ V  
\*VBW 10 Hz 2.390000000 GHz  
SWT 28 s



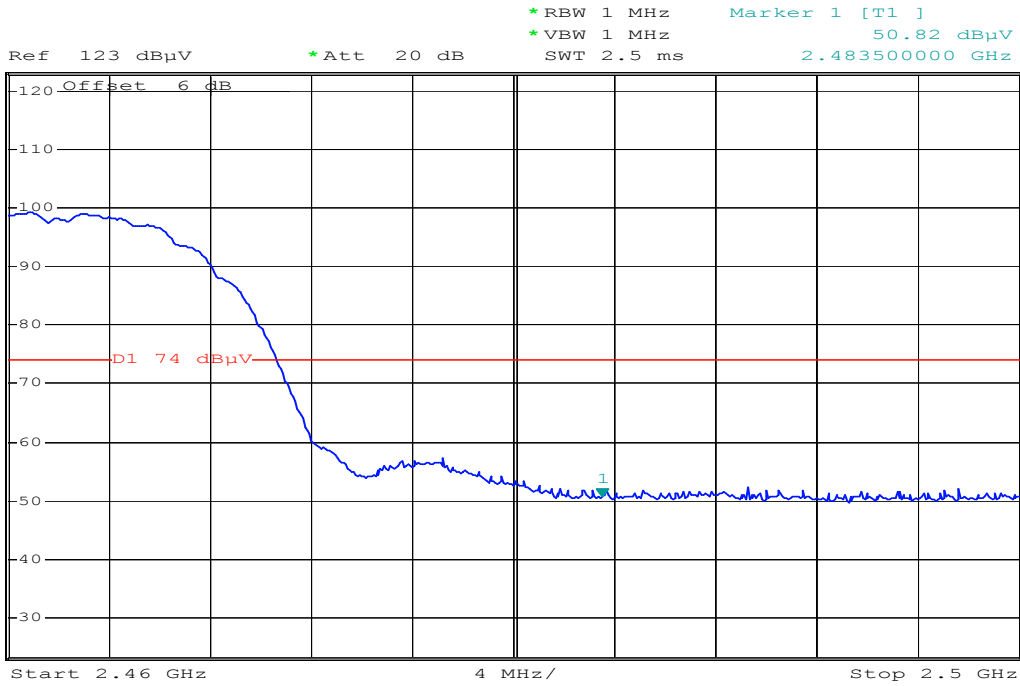
Date: 1.JAN.2009 08:09:56



### Band Edges (IEEE 802.11b / CH High)

Detector mode: Peak

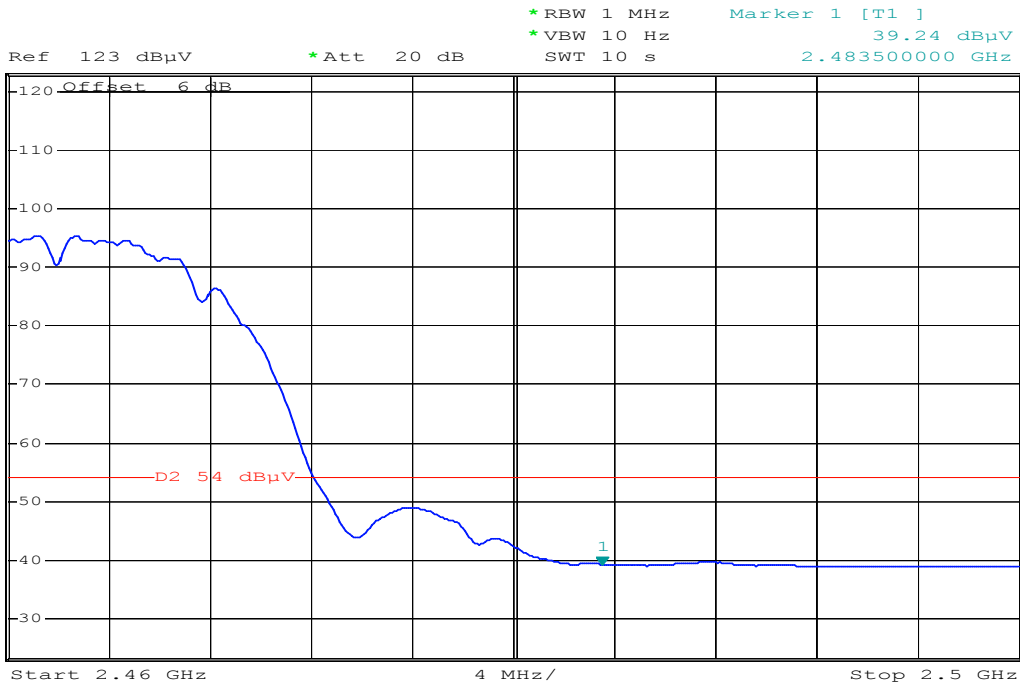
Polarity: Vertical



Date: 1.JAN.2009 08:20:00

Detector mode: Average

Polarity: Vertical



Date: 1.JAN.2009 08:20:30

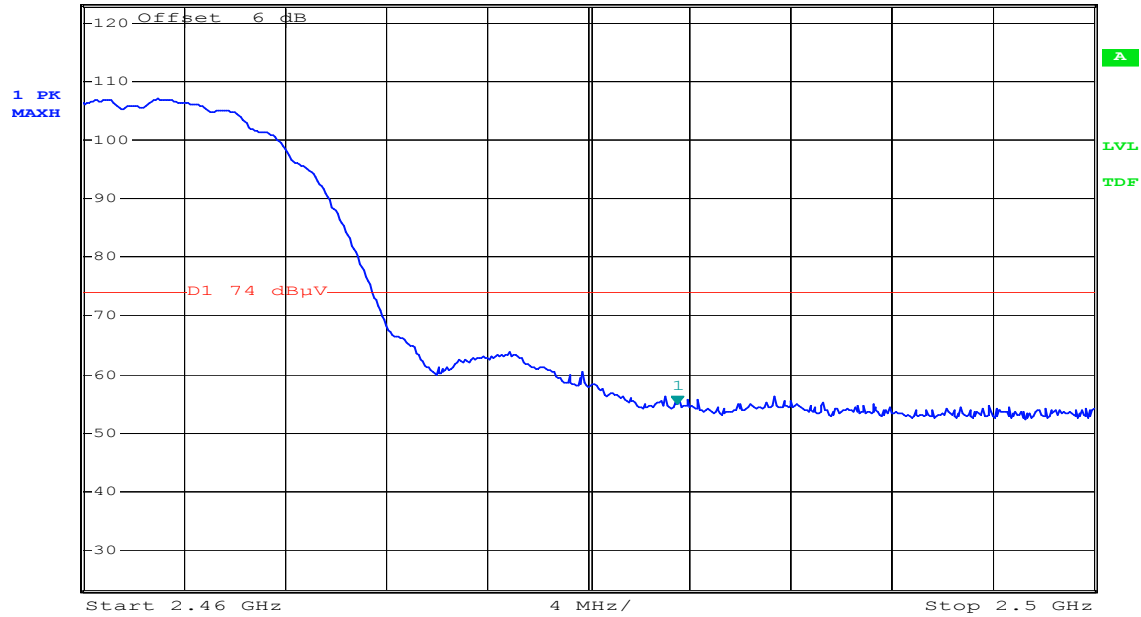


Detector mode: Peak

Polarity: Horizontal



Ref 123 dB $\mu$ V \*Att 20 dB \*RBW 1 MHz Marker 1 [T1] 54.77 dB $\mu$ V  
\*VBW 1 MHz 2.483500000 GHz  
SWT 2.5 ms



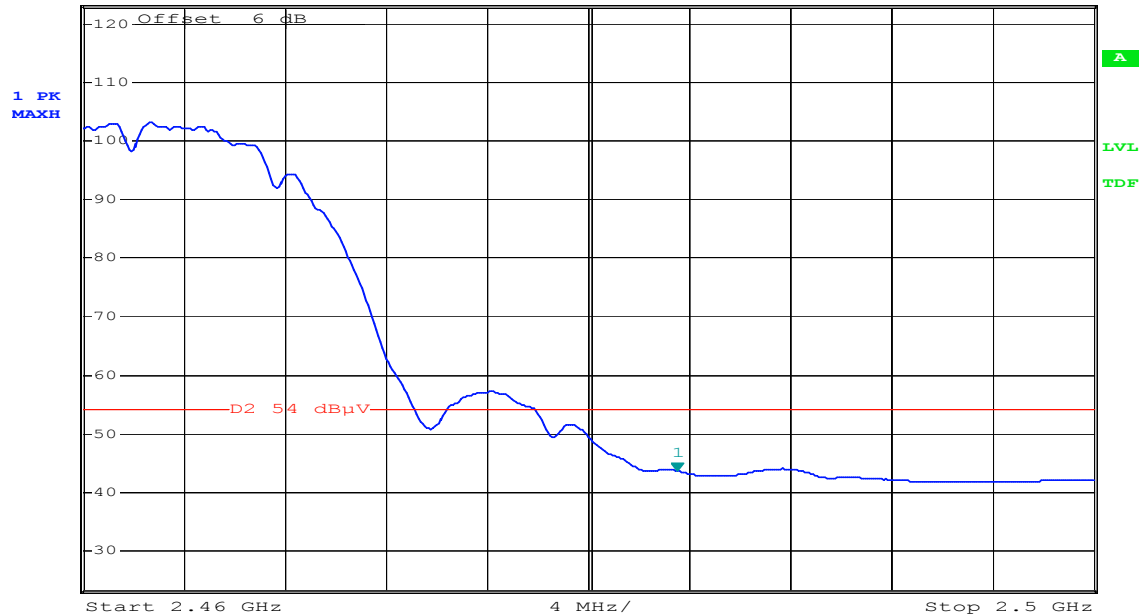
Date: 1.JAN.2009 08:16:04

Detector mode: Average

Polarity: Horizontal



Ref 123 dB $\mu$ V \*Att 20 dB \*RBW 1 MHz Marker 1 [T1] 43.64 dB $\mu$ V  
\*VBW 10 Hz 2.483500000 GHz  
SWT 10 s



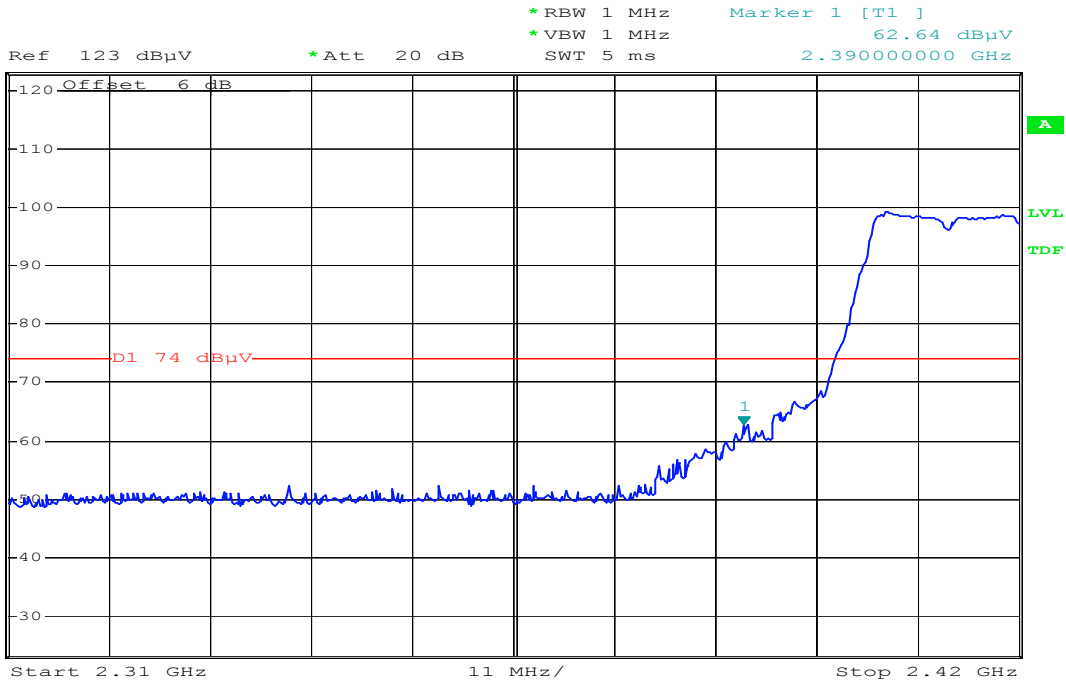
Date: 1.JAN.2009 08:16:37



### Band Edges (IEEE 802.11g / CH Low)

Detector mode: Peak

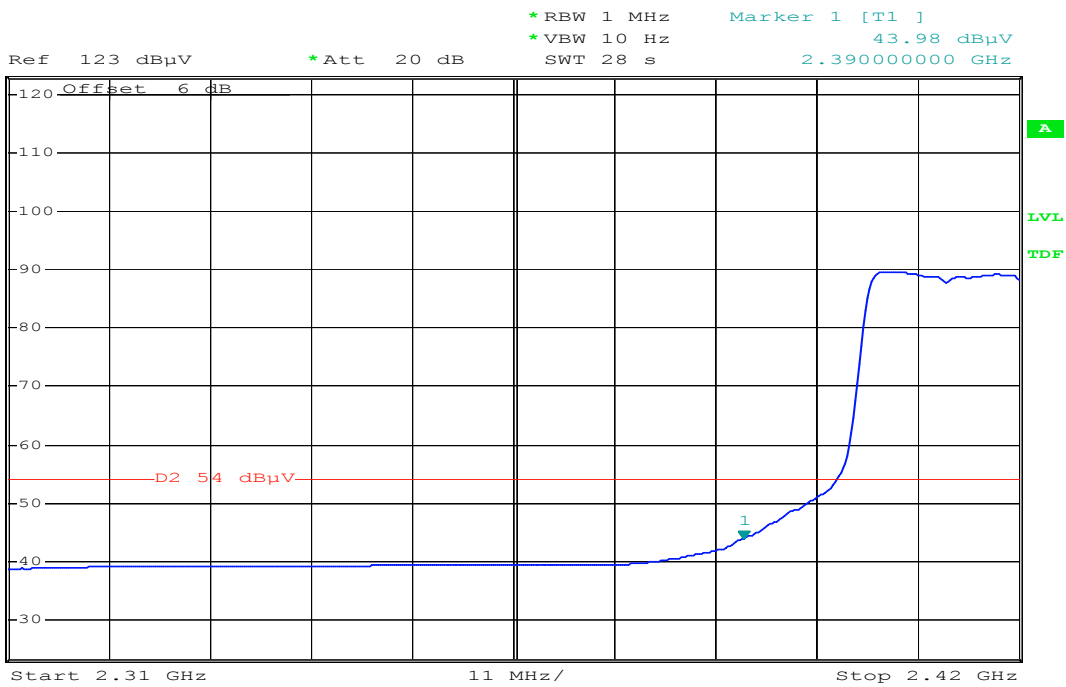
Polarity: Vertical



Date: 1.JAN.2009 07:46:01

Detector mode: Average

Polarity: Vertical



Date: 1.JAN.2009 07:47:52

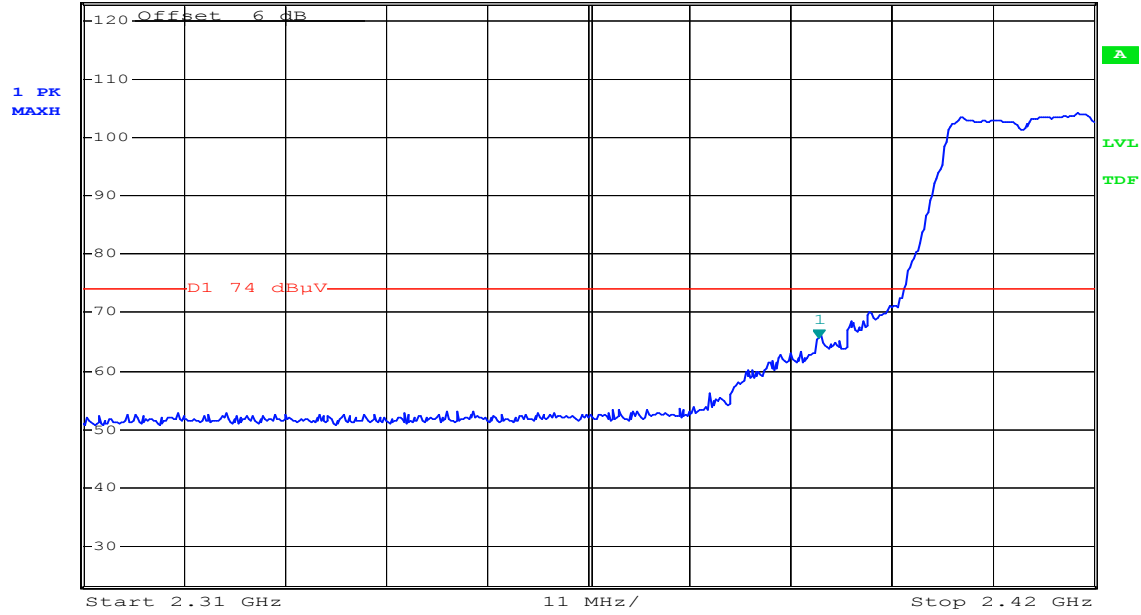


Detector mode: Peak

Polarity: Horizontal



Ref 123 dB $\mu$ V \*Att 20 dB \*RBW 1 MHz Marker 1 [T1] 65.71 dB $\mu$ V  
 \*VBW 1 MHz 2.390000000 GHz  
 SWT 5 ms



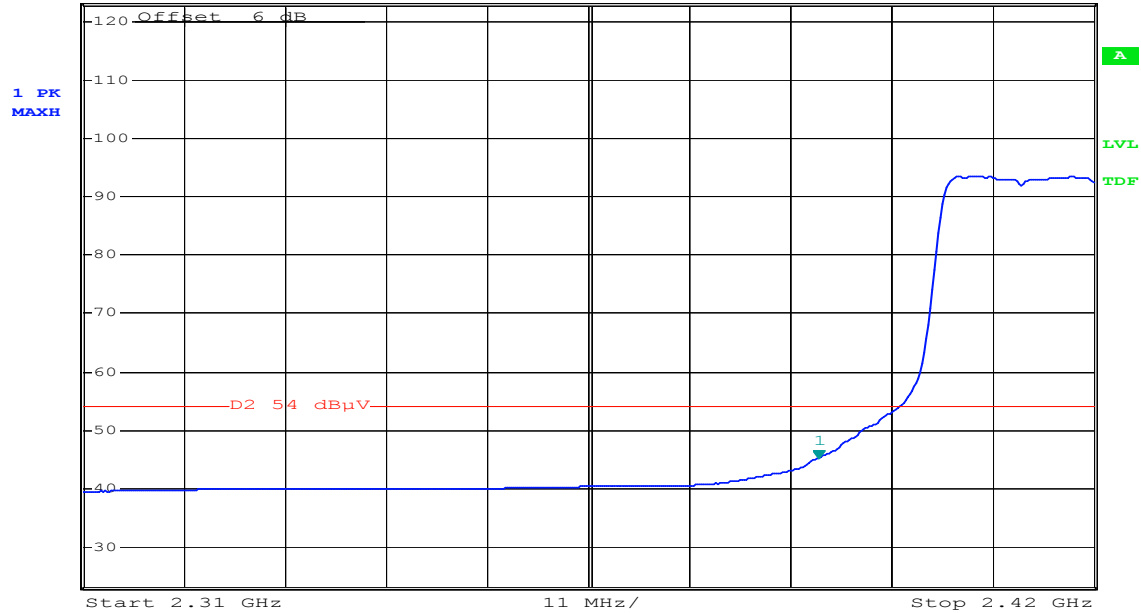
Date: 1.JAN.2009 07:50:26

Detector mode: Average

Polarity: Horizontal



Ref 123 dB $\mu$ V \*Att 20 dB \*RBW 1 MHz Marker 1 [T1] 45.31 dB $\mu$ V  
 \*VBW 10 Hz 2.390000000 GHz  
 SWT 28 s



Date: 1.JAN.2009 07:51:16

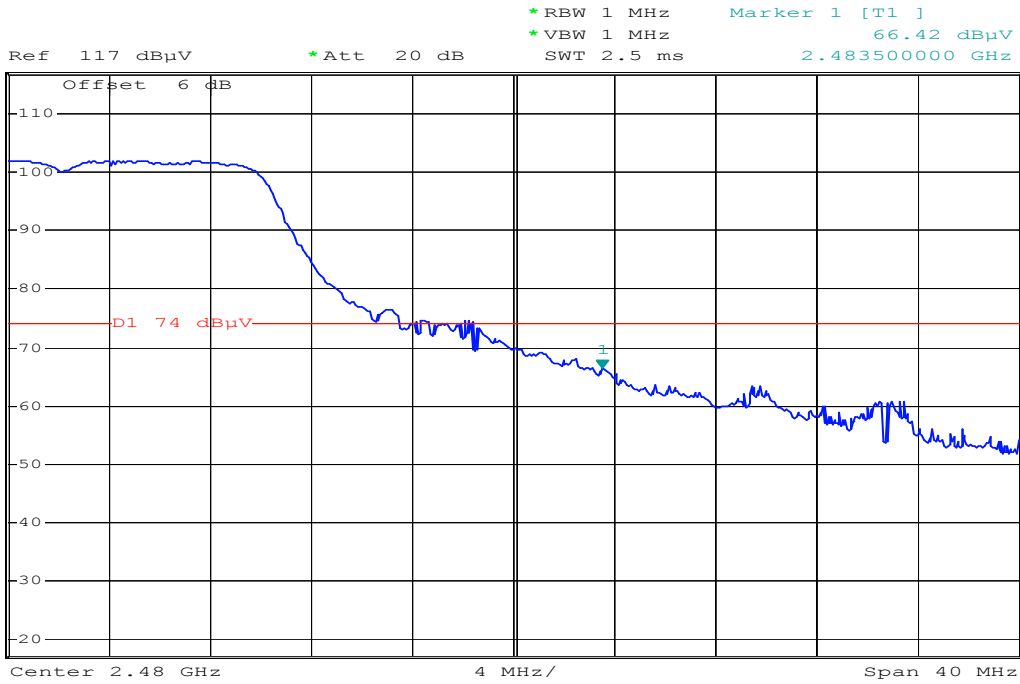




### Band Edges (IEEE 802.11g / CH High)

Detector mode: Peak

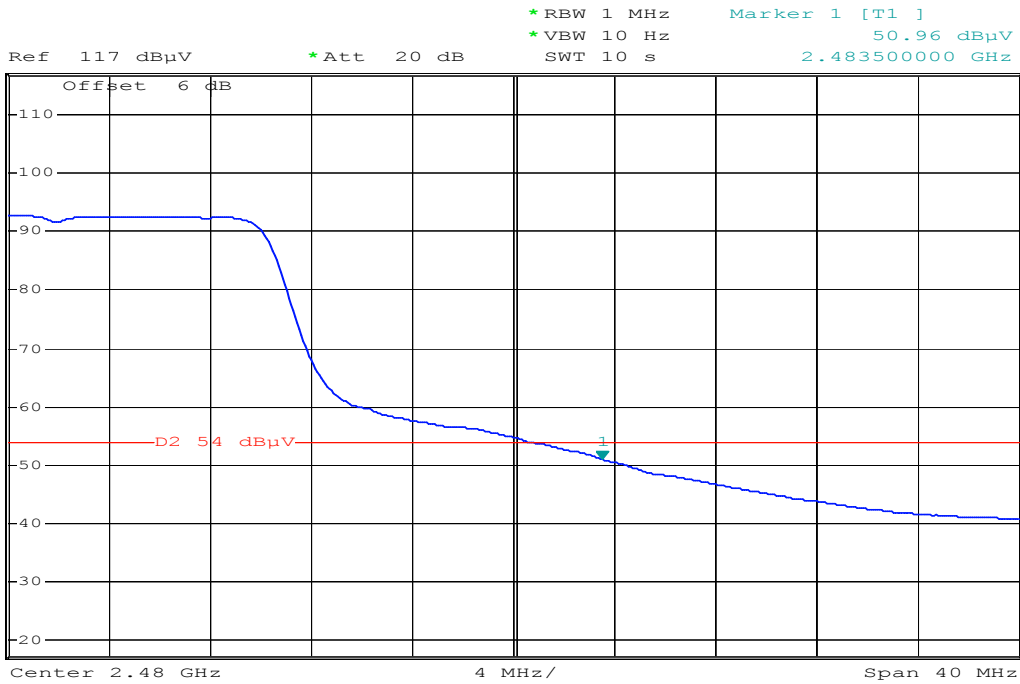
Polarity: Vertical



Date: 1.JAN.2009 08:48:28

Detector mode: Average

Polarity: Vertical

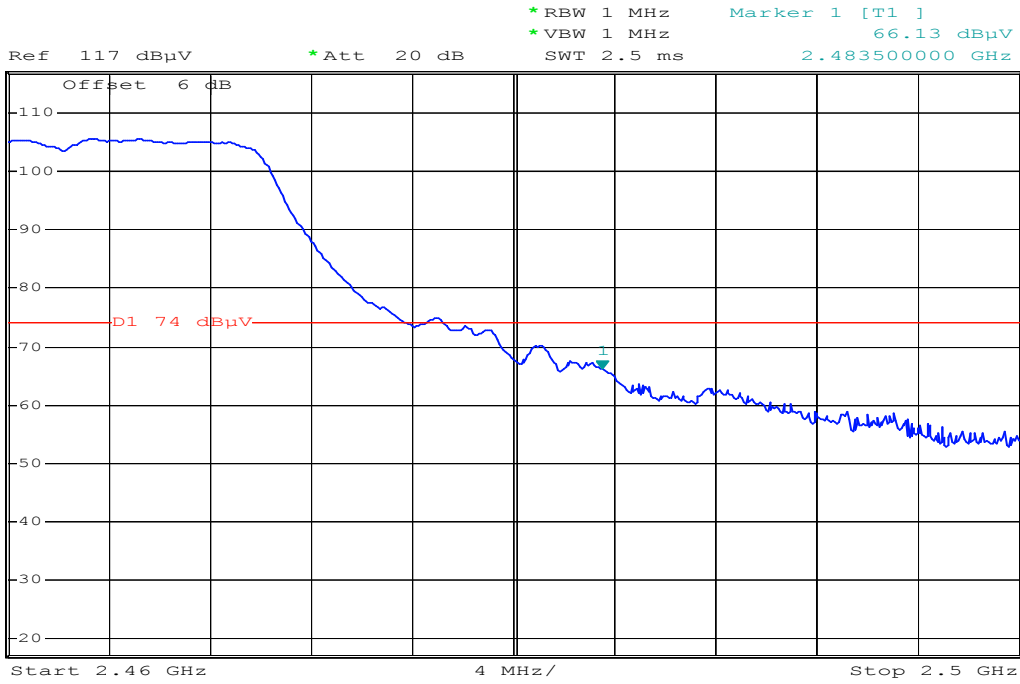


Date: 1.JAN.2009 08:49:07



Detector mode: Peak

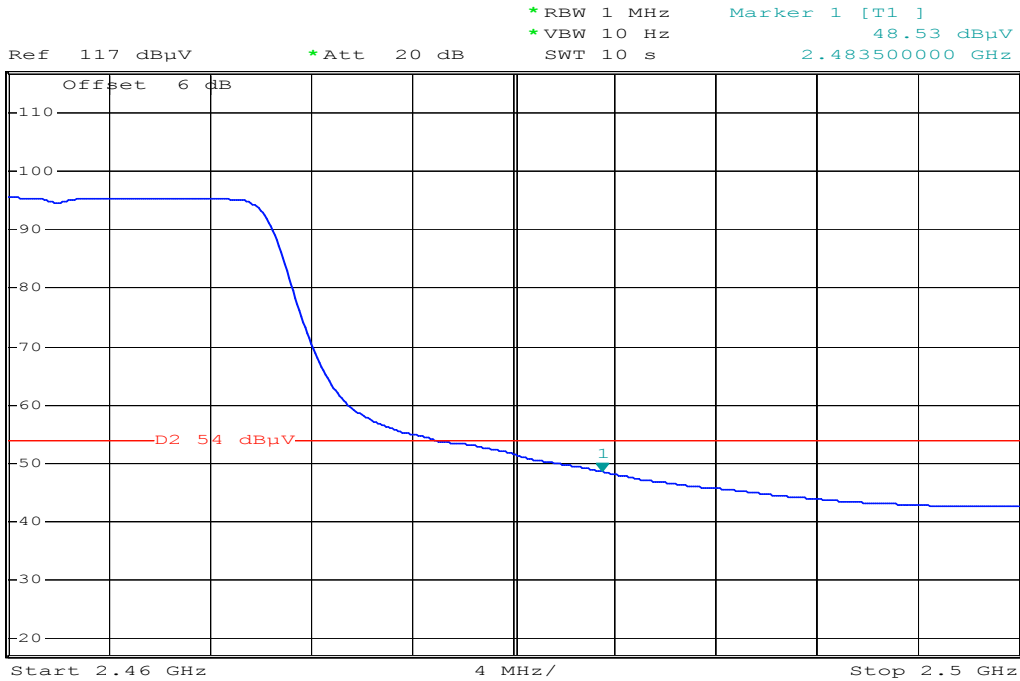
Polarity: Horizontal



Date: 1.JAN.2009 09:14:57

Detector mode: Average

Polarity: Horizontal



Date: 1.JAN.2009 09:16:17

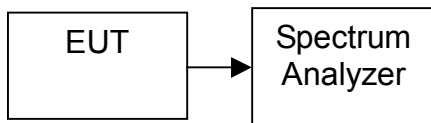


## 7.5 PEAK POWER SPECTRAL DENSITY

### LIMIT

1. According to §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.
2. According to §15.247(f), the digital modulation operation of the hybrid system, with the frequency hopping turned off, shall comply with the power density requirements of paragraph (d) of this section.

### TEST CONFIGURATION



### 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 = 3kHz, VBW = 10kHz, Span = 300kHz, Sweep=100s
3. Record the max. reading.
4. Repeat the above procedure until the measurements for all frequencies are completed.

**Remark: 1. Result = Reading Value + Cable Loss + Attenuator Loss**

**2. Cable Loss =0.5 dB ; Attenuator Loss=1 dB**

### TEST RESULTS

*No non-compliance noted*

### TEST DATA

#### IEEE 802.11b

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-13.14	8.00	PASS
Mid	2437	-12.28		PASS
High	2462	-11.77		PASS

#### IEEE 802.11g

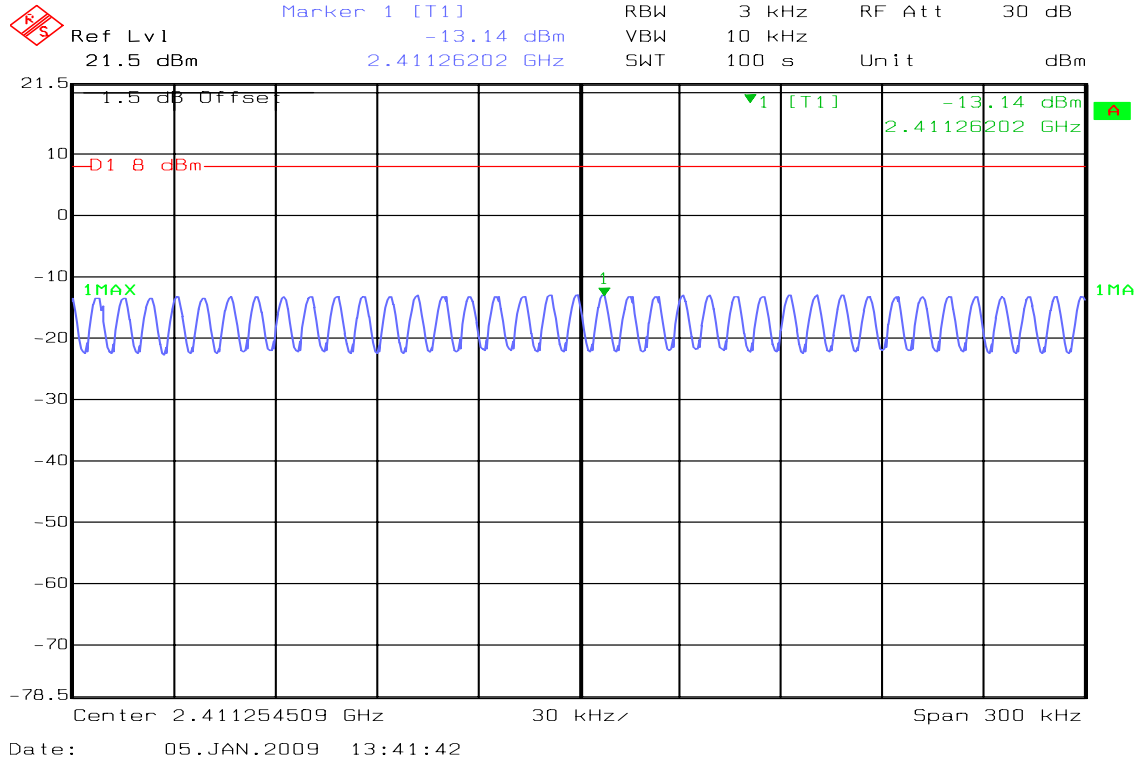
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-15.85	8.00	PASS
Mid	2437	-14.42		PASS
High	2462	-14.58		PASS



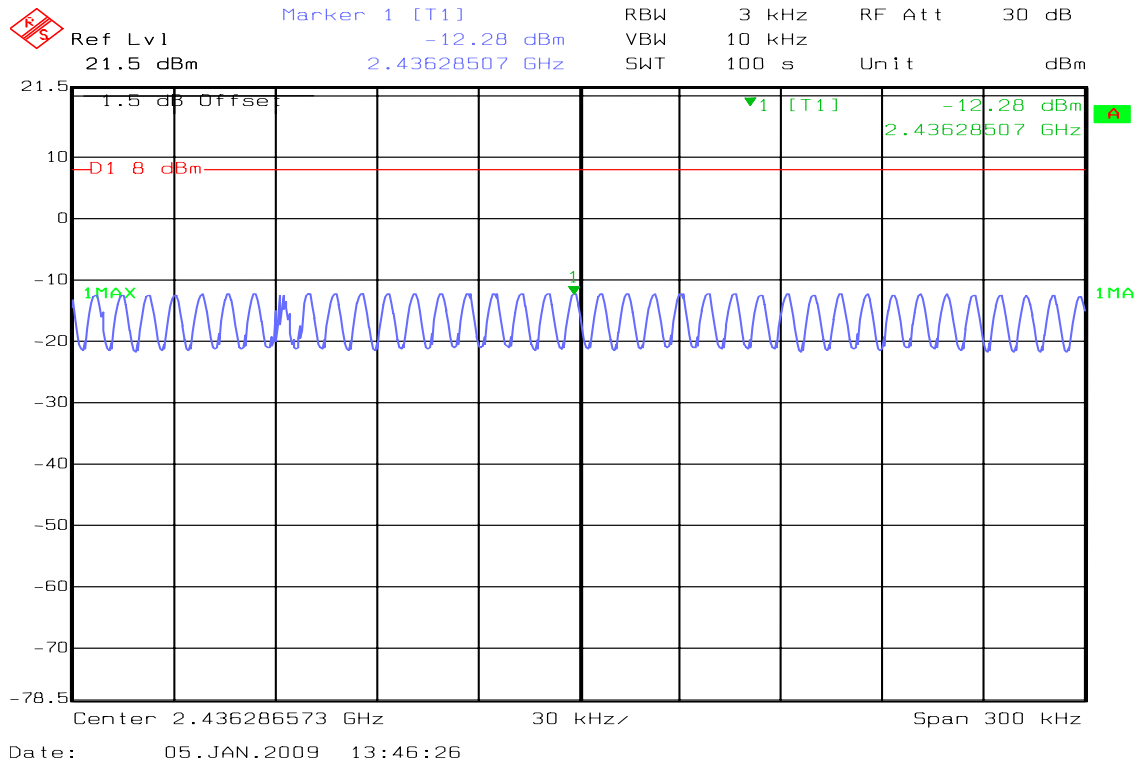
### Test Plot

### IEEE 802.11b

### PPSD (CH Low)

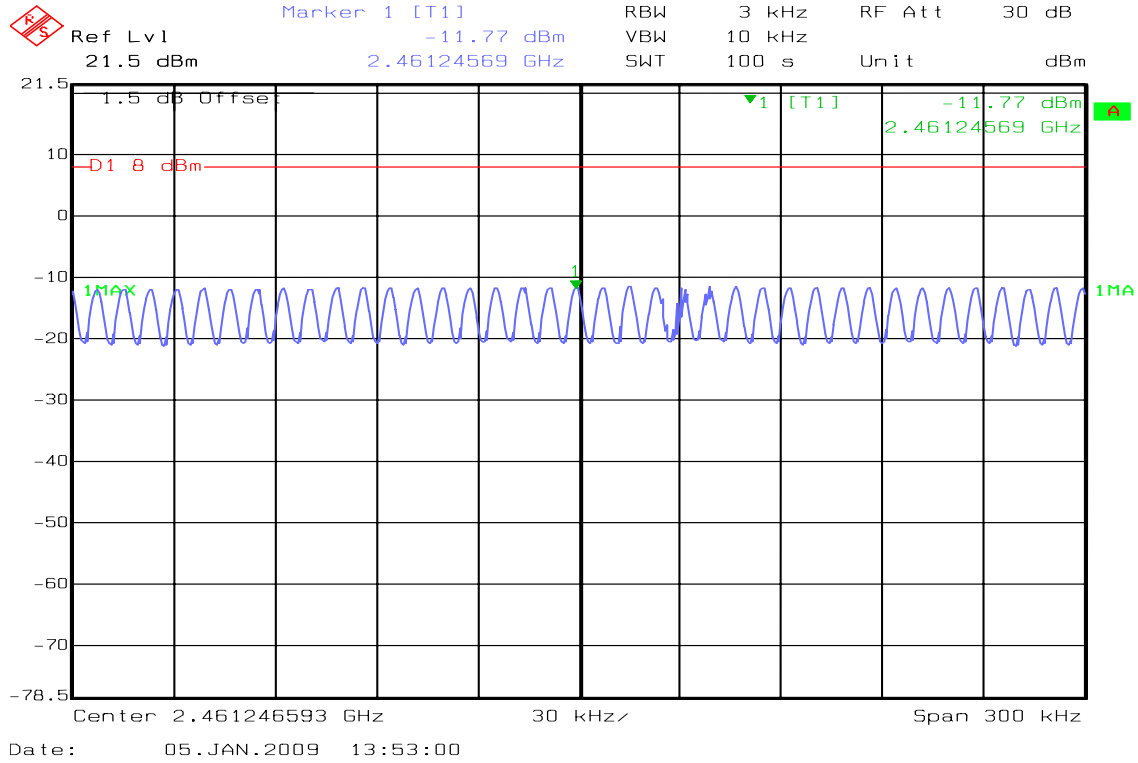


### PPSD (CH Mid)



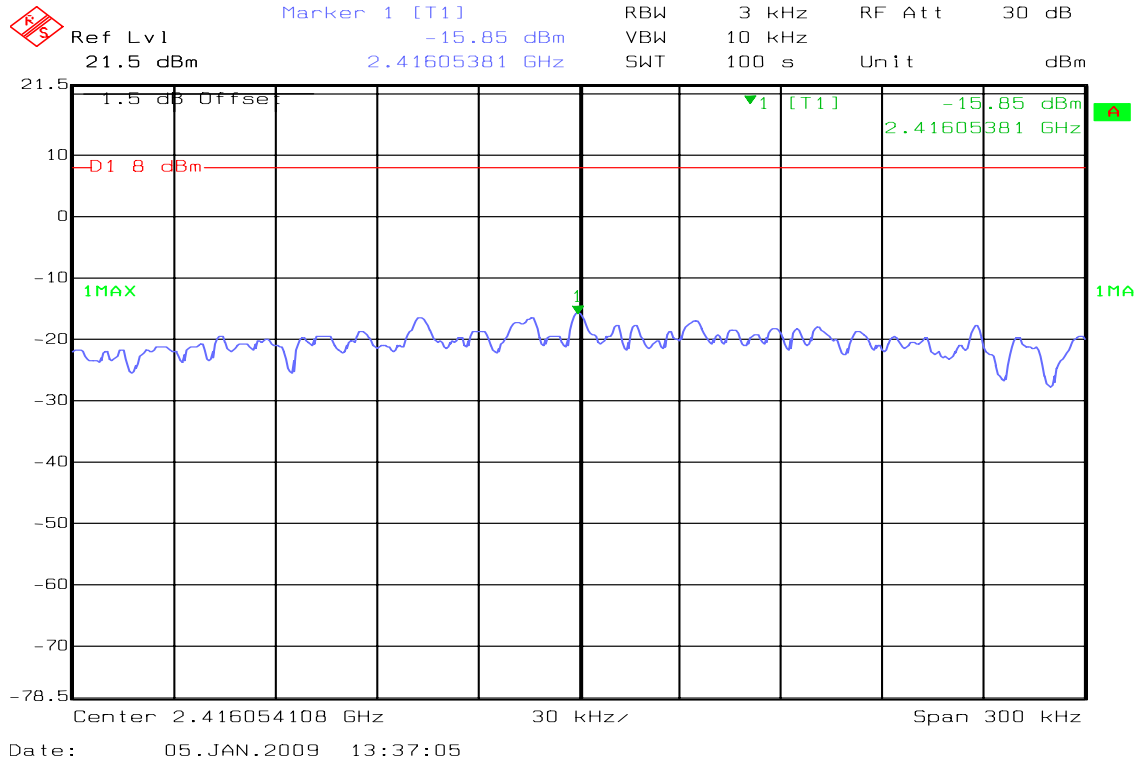


### PPSD (CH High)



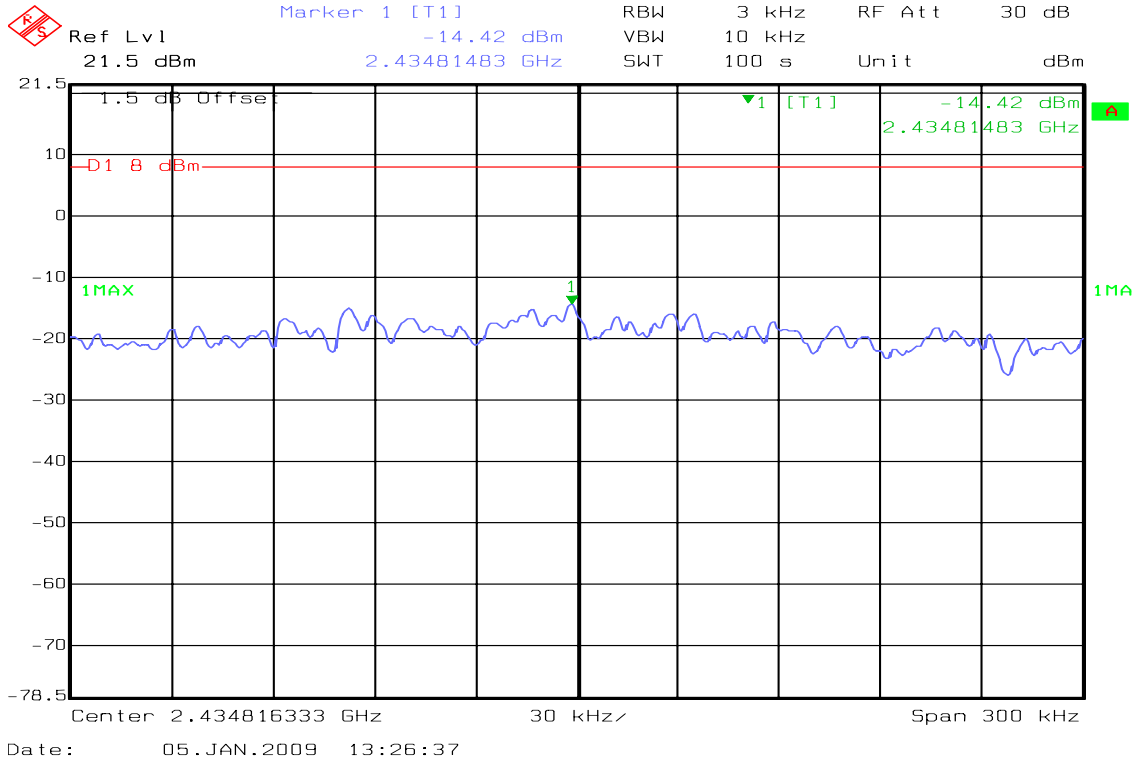
### IEEE 802.11g

### PPSD (CH Low)

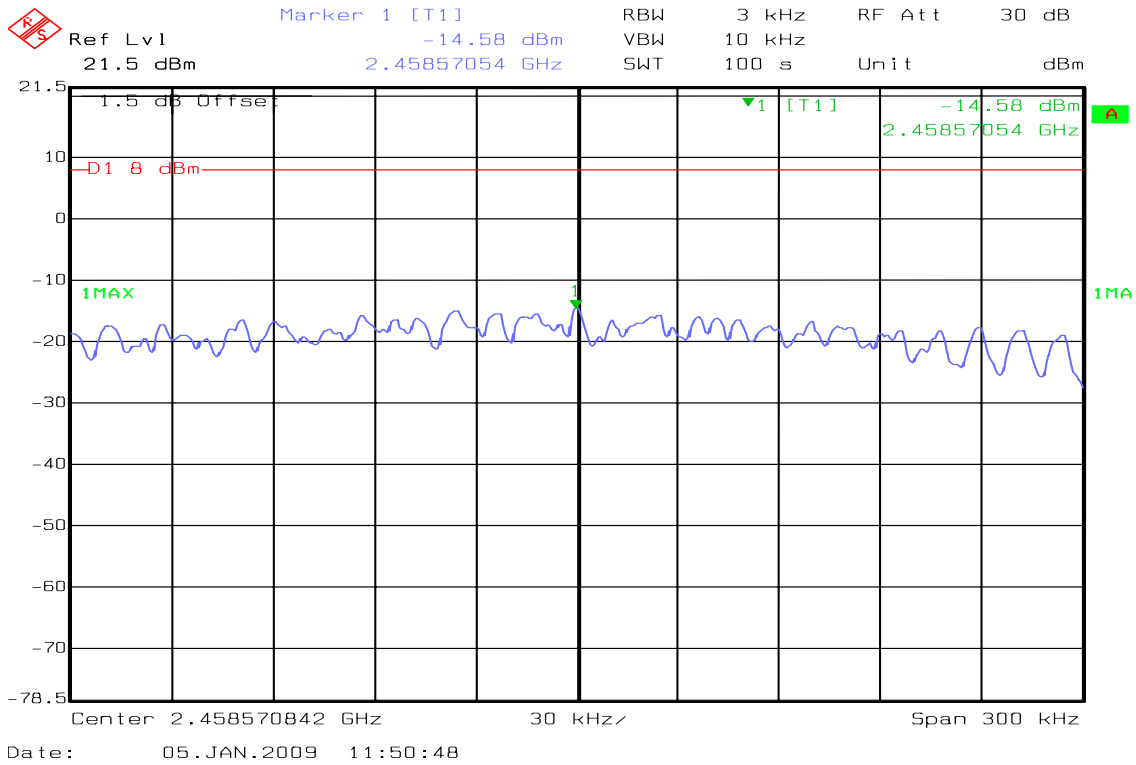




### PPSD (CH Mid)



### PPSD (CH High)





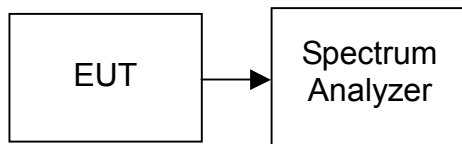
## 7.6 SPURIOUS EMISSIONS

### 7.6.1 CONDUCTED MEASUREMENT

#### LIMIT

According to §15.247(d), 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 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. 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) (see Section 15.205(c)).

#### TEST CONFIGURATION



#### TEST PROCEDURE

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 100 kHz.

Measurements are made over the 30MHz to 26GHz range with the transmitter set to the lowest, middle, and highest channels.

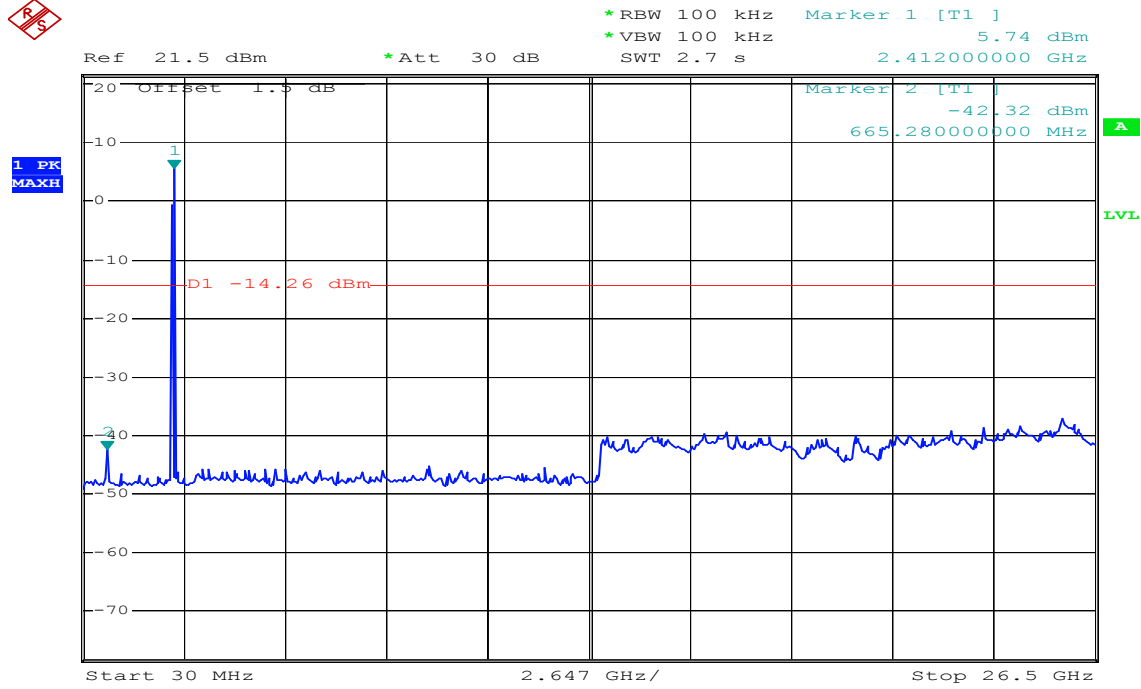
#### TEST RESULTS

*No non-compliance noted.*



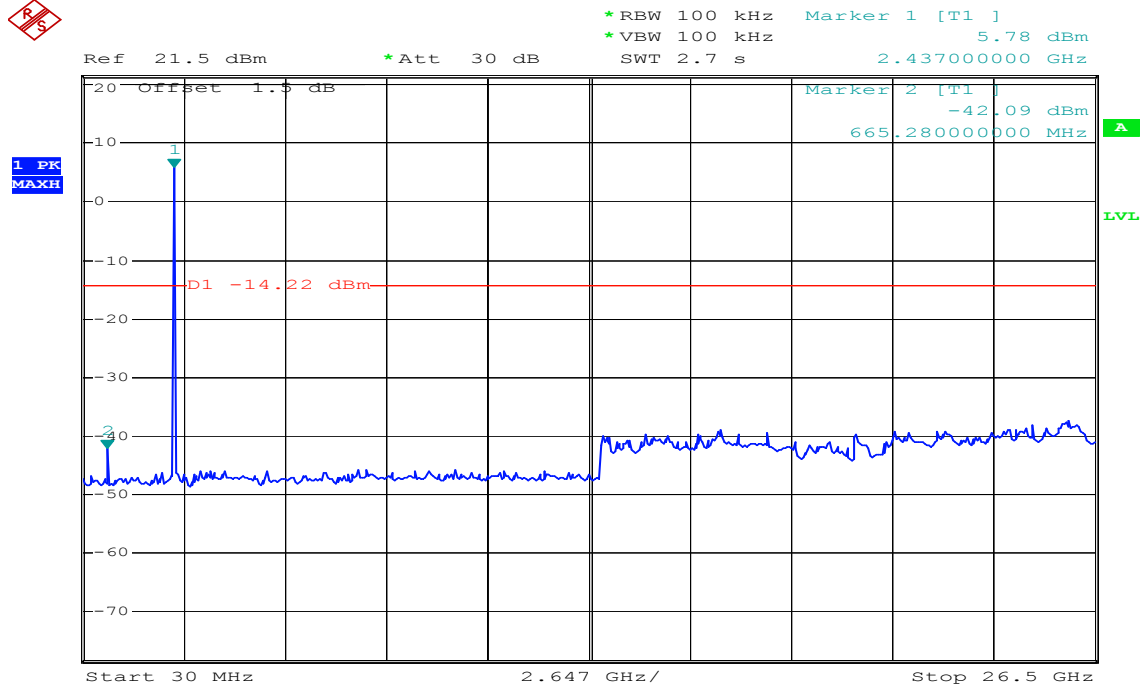
### Test Plot

### IEEE 802.11b / CH Low



Date: 6.JAN.2009 12:36:19

### IEEE 802.11b / CH Mid

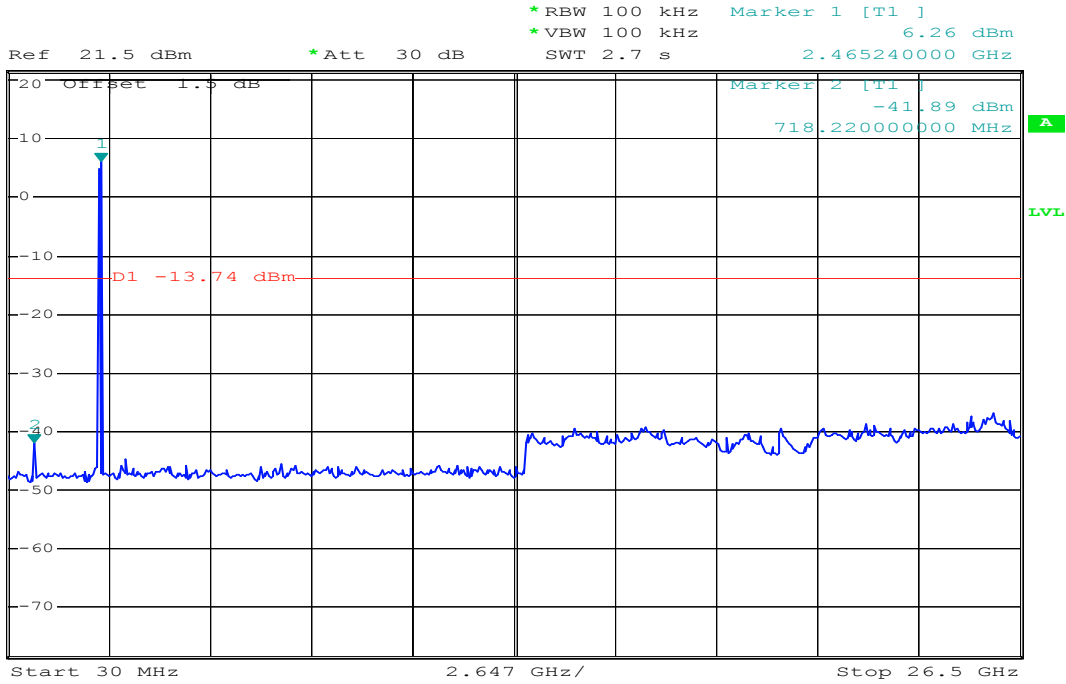


Date: 6.JAN.2009 12:34:12



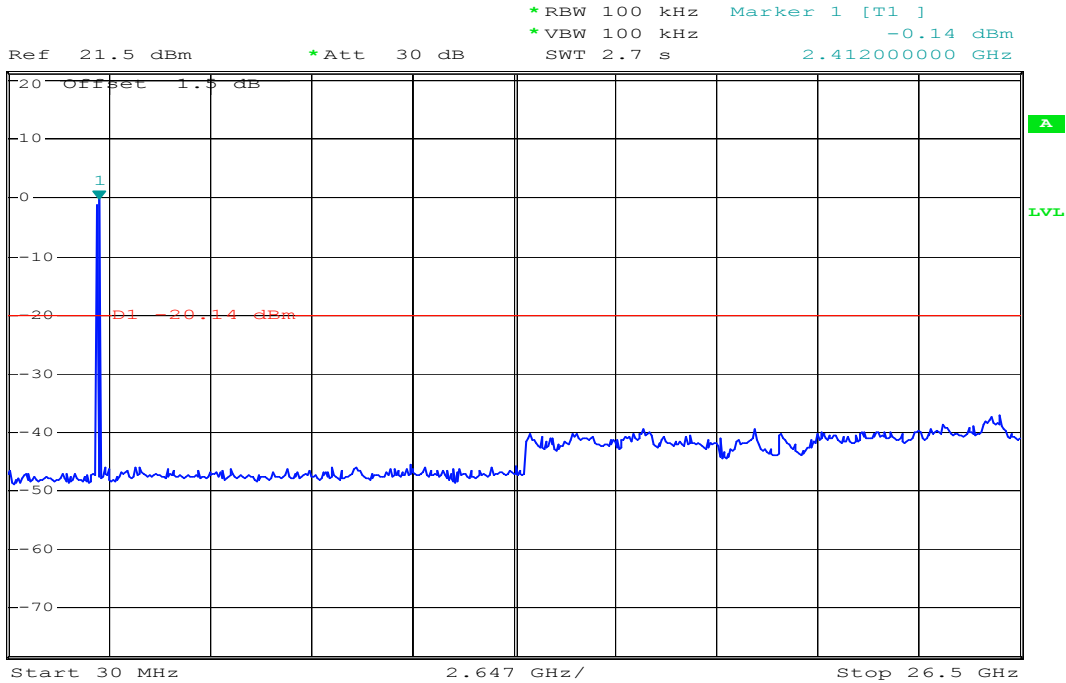


### IEEE 802.11b / CH High



Date: 6.JAN.2009 12:30:00

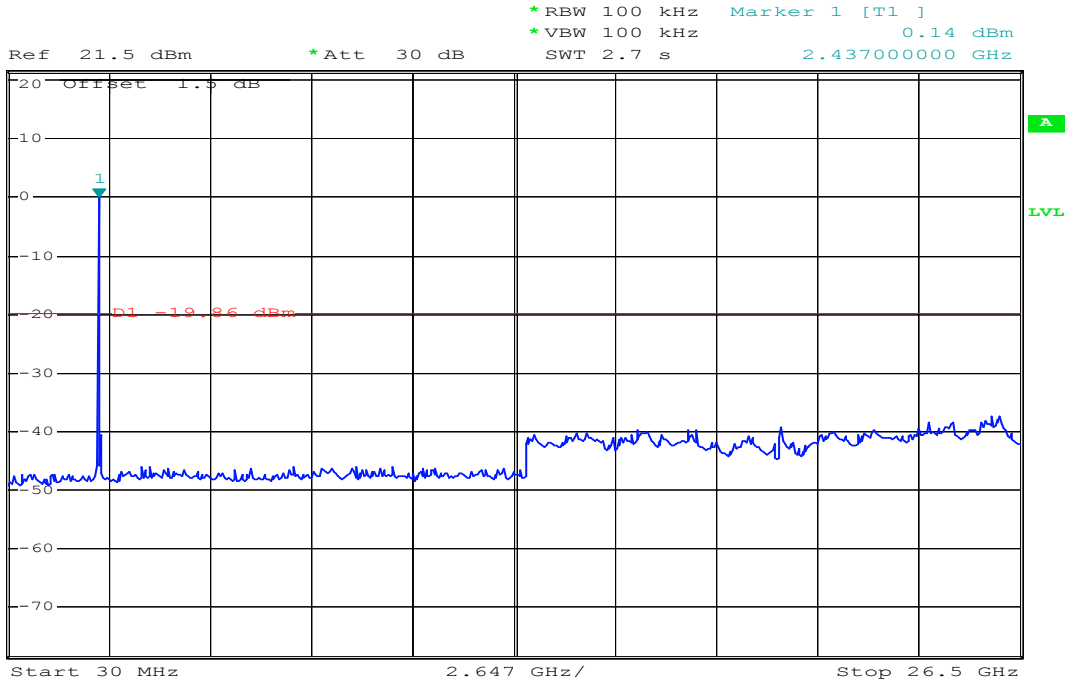
### IEEE 802.11g / CH Low



Date: 6.JAN.2009 12:39:02

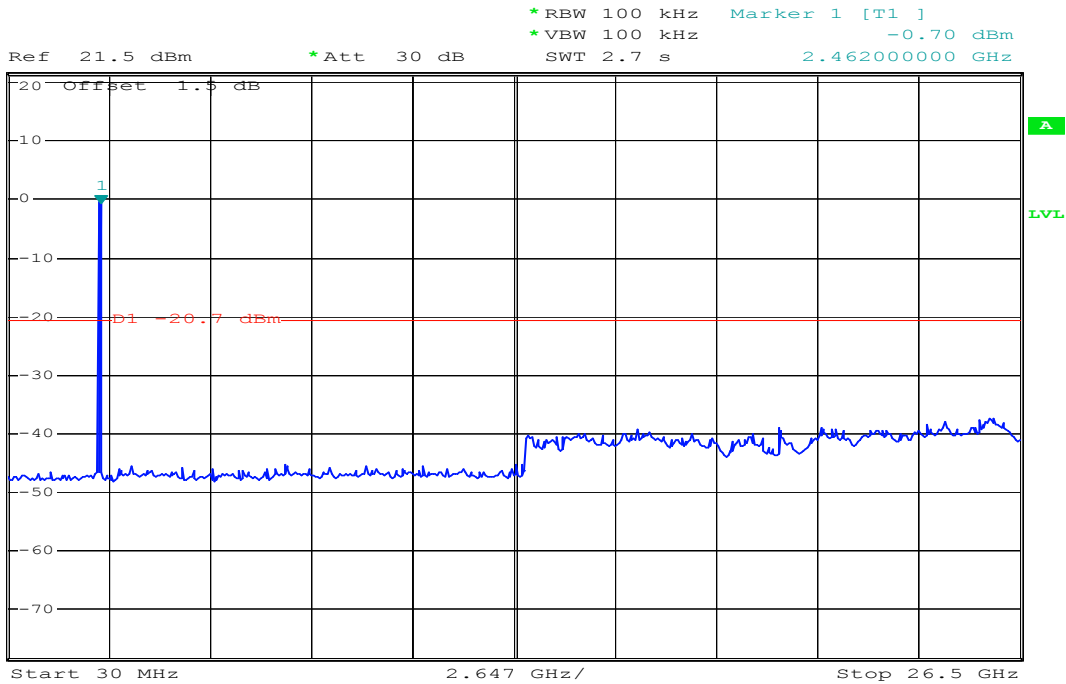


### IEEE 802.11g / CH Mid



Date: 6.JAN.2009 12:40:42

### IEEE 802.11g / CH High



Date: 6.JAN.2009 12:44:38



### 7.6.2 RADIATED EMISSIONS

#### LIMIT

1. According to §15.209(a), except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (µV/m)	Measurement Distance (m)
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

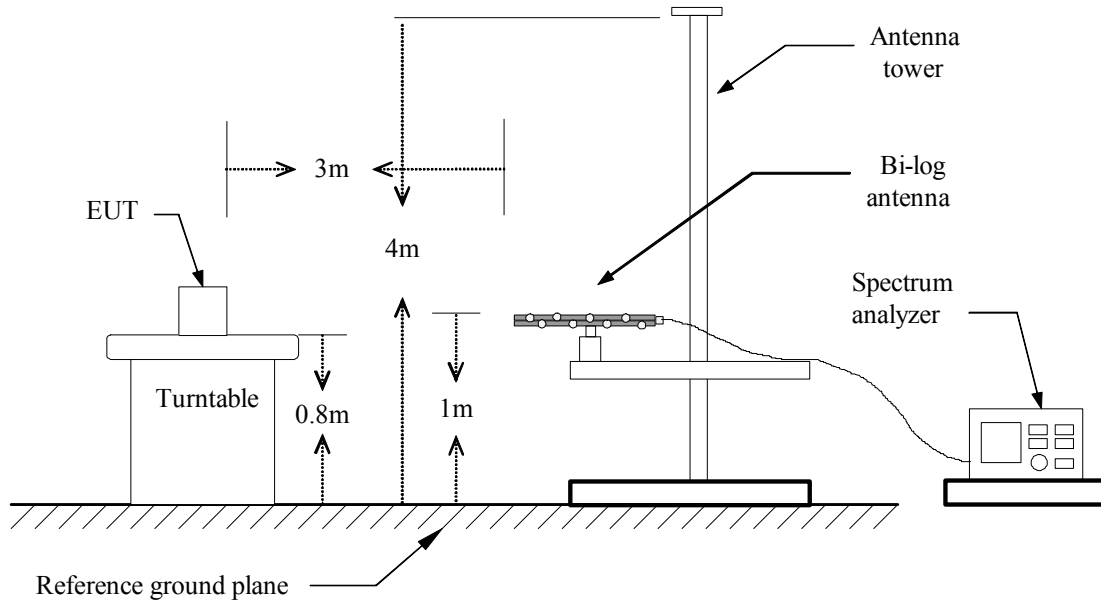
*Remark: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.*

2. In the emission table above, the tighter limit applies at the band edges.

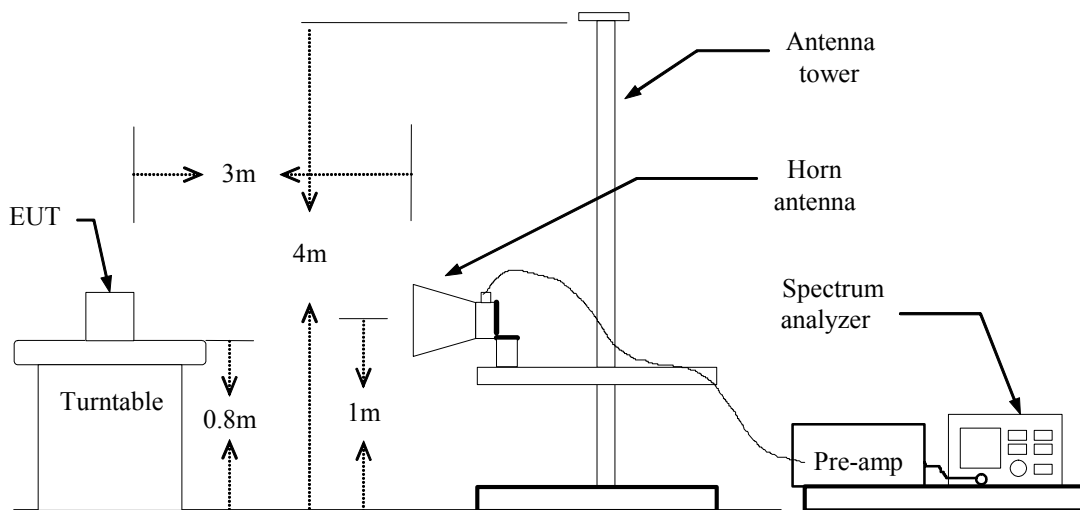
Frequency (MHz)	Field Strength (µV/m at 3-meter)	Field Strength (dBµV/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

## TEST CONFIGURATION

### Below 1 GHz



### Above 1 GHz





## **TEST PROCEDURE**

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:

Below 1GHz:

RBW=100kHz / VBW=300kHz / Sweep=AUTO

Above 1GHz:

(a) PEAK: RBW=VBW=1MHz / Sweep=AUTO

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

7. Repeat above procedures until the measurements for all frequencies are complete.

## **TEST RESULTS**

*No non-compliance noted.*



**TEST DATA**

**Below 1 GHz**

**Operation Mode:** Normal Link

**Test Date:** January 7, 2009

**Temperature:** 26°C

**Tested by:** Alonso Lu

**Humidity:** 60% RH

**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBUV)	Factor (dB)	Actual FS (dBUV/m)	Limit 3m (dBUV/m)	Safe Margin (dB)
31.3857	V	51.00	-15.13	35.87	40.00	-4.13	QP
81.2714	V	55.98	-18.06	37.92	40.00	-2.08	QP
150.5571	V	44.50	-12.56	31.94	43.50	-11.56	QP
332.0857	V	38.73	-10.96	27.77	46.00	-18.23	QP
398.6000	V	39.73	-9.68	30.05	46.00	-15.95	QP
663.2714	V	37.24	-4.82	32.42	46.00	-13.58	QP
796.3000	V	35.70	-1.88	33.82	46.00	-12.18	QP
39.7000	H	35.74	-14.85	20.89	40.00	-19.11	QP
70.1857	H	40.54	-16.37	24.17	40.00	-15.83	QP
132.5429	H	38.48	-13.55	24.93	43.50	-18.57	QP
151.9429	H	39.22	-12.50	26.72	43.50	-16.78	QP
398.6000	H	46.73	-9.68	37.05	46.00	-8.95	QP
531.6286	H	35.70	-7.68	28.02	46.00	-17.98	QP
663.2714	H	34.74	-4.82	29.92	46.00	-16.08	QP
927.9429	H	37.99	-0.38	37.61	46.00	-8.39	QP

**Remark:**

1. No emission found between lowest internal used / generated frequency to 30 MHz. (9kHz ~ 30MHz)
2. Measuring frequencies from 30 MHz to the 1GHz.
3. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.
6. Factor (dB) = Antenna factor + Cable loss – Amplifier gain
7. Set the spectrum analyzer as Hi-pass filter = 1 dB



Above 1 GHz

Operation Mode: IEEE 802.11b / TX / CH Low

Test Date: December 31, 2008

Temperature: 16°C

Tested by: Alonso Lu

Humidity: 57% RH

Polarity: Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
1016.00	V	56.55	---	-10.63	45.92	---	74.00	54.00	-8.08	Peak
4820.00	V	44.05	---	1.87	45.92	---	74.00	54.00	-8.08	Peak
7240.00	V	44.11	---	6.43	50.55	---	74.00	54.00	-3.45	Peak
N/A										
2056.00	H	53.99	---	-5.40	48.58	---	74.00	54.00	-5.42	Peak
2936.00	H	54.37	---	-2.39	51.98	---	74.00	54.00	-2.02	Peak
4820.00	H	46.95	---	1.87	48.82	---	74.00	54.00	-5.18	Peak
7240.00	H	42.02	---	6.43	48.45	---	74.00	54.00	-5.55	Peak
N/A										

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).
7. Factor (dB) = Antenna factor + Cable loss – Amplifier gain
8. Set the spectrum analyzer as Hi-pass filter = 1 dB



Operation Mode: IEEE 802.11b / TX / CH Mid

Test Date: December 31, 2008

Temperature: 16°C

Tested by: Alonso Lu

Humidity: 57% RH

Polarity: Ver. / Hor.

Frequency (MHz)	Ant.Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
1716.00	V	53.15	---	-7.15	46.00	---	74.00	54.00	-8.00	Peak
4870.00	V	48.69	---	2.02	50.71	---	74.00	54.00	-3.29	Peak
7320.00	V	44.87	---	6.65	51.51	---	74.00	54.00	-2.49	Peak
N/A										
1716.00	H	54.18	---	-7.15	47.02	---	74.00	54.00	-6.98	Peak
2344.00	H	55.61	---	-4.75	50.86	---	74.00	54.00	-3.14	Peak
4870.00	H	52.73	50.76	2.02	54.74	52.78	74.00	54.00	-1.22	AVG
7320.00	H	45.04	---	6.65	51.69	---	74.00	54.00	-2.31	Peak
N/A										

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).
7. Factor (dB) = Antenna factor + Cable loss – Amplifier gain
8. Set the spectrum analyzer as Hi-pass filter = 1 dB





Operation Mode: IEEE 802.11b / TX / CH High

Test Date: December 31, 2008

Temperature: 16°C

Tested by: Alonso Lu

Humidity: 57% RH

Polarity: Ver. / Hor.

Frequency (MHz)	Ant.Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
1024.00	V	56.07	---	-10.59	45.48	---	74.00	54.00	-8.52	Peak
5600.00	V	41.83	---	3.54	45.38	---	74.00	54.00	-8.62	Peak
7390.00	V	46.22	41.69	6.84	53.05	48.53	74.00	54.00	-5.47	AVG
N/A										
1808.00	H	53.13	---	-6.63	46.50	---	74.00	54.00	-7.50	Peak
4920.00	H	42.53	---	2.16	44.70	---	74.00	54.00	-9.30	Peak
7230.00	H	40.86	---	6.41	47.27	---	74.00	54.00	-6.73	Peak
N/A										

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).
7. Factor (dB) = Antenna factor + Cable loss – Amplifier gain
8. Set the spectrum analyzer as Hi-pass filter = 1 dB



Operation Mode: IEEE 802.11g / TX / CH Low

Test Date: December 31, 2008

Temperature: 16°C

Tested by: Alonso Lu

Humidity: 57% RH

Polarity: Ver. / Hor.

Frequency (MHz)	Ant.Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
2016.00	V	53.34	---	-5.49	47.84	---	74.00	54.00	-6.16	Peak
4810.00	V	43.55	---	1.84	45.39	---	74.00	54.00	-8.61	Peak
7240.00	V	50.61	33.76	6.43	57.04	40.19	74.00	54.00	-13.81	AVG
N/A										
2220.00	H	54.61	---	-5.03	49.58	---	74.00	54.00	-4.42	Peak
4820.00	H	48.94	---	1.87	50.81	---	74.00	54.00	-3.19	Peak
7240.00	H	47.91	32.96	6.43	54.35	39.39	74.00	54.00	-14.61	AVG
N/A										

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m)
7. Factor (dB) = Antenna factor + Cable loss – Amplifier gain
8. Set the spectrum analyzer as Hi-pass filter = 1 dB



Operation Mode: IEEE 802.11g / TX / CH Mid

Test Date: December 31, 2008

Temperature: 16°C

Tested by: Alonso Lu

Humidity: 57% RH

Polarity: Ver. / Hor.

Frequency (MHz)	Ant.Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
1556.00	V	53.46	---	-8.07	45.39	---	74.00	54.00	-8.61	Peak
4870.00	V	43.94	---	2.02	45.96	---	74.00	54.00	-8.04	Peak
7310.00	V	52.52	37.16	6.62	59.14	43.78	74.00	54.00	-10.22	AVG
N/A										
1688.00	H	53.67	---	-7.31	46.36	---	74.00	54.00	-7.64	Peak
2640.00	H	54.15	---	-3.76	50.39	---	74.00	54.00	-3.61	Peak
4880.00	H	46.83	---	2.05	48.88	---	74.00	54.00	-5.12	Peak
7320.00	H	50.21	35.47	6.65	56.86	42.12	74.00	54.00	-11.88	AVG
N/A										

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).
7. Factor (dB) = Antenna factor + Cable loss – Amplifier gain
8. Set the spectrum analyzer as Hi-pass filter = 1 dB



Operation Mode: IEEE 802.11g / TX / CH High

Test Date: December 31, 2008

Temperature: 16°C

Tested by: Alonso Lu

Humidity: 57% RH

Polarity: Ver. / Hor.

Frequency (MHz)	Ant.Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
1576.00	V	54.24	---	-7.96	46.28	---	74.00	54.00	-7.72	Peak
2344.00	V	55.34	---	-4.75	50.59	---	74.00	54.00	-3.41	Peak
4930.00	V	44.41	---	2.19	46.60	---	74.00	54.00	-7.40	Peak
7390.00	V	53.60	38.51	6.84	60.44	45.35	74.00	54.00	-8.65	AVG
N/A										
2364.00	H	55.99	---	-4.71	51.28	---	74.00	54.00	-2.72	Peak
4930.00	H	47.37	---	2.19	49.56	---	74.00	54.00	-4.44	Peak
7400.00	H	49.94	36.20	6.86	56.80	43.06	74.00	54.00	-10.94	AVG
N/A										

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).
7. Factor (dB) = Antenna factor + Cable loss – Amplifier gain
8. Set the spectrum analyzer as Hi-pass filter = 1 dB



## 7.7 POWERLINE CONDUCTED EMISSIONS

### LIMIT

According to §15.207(a), except as shown in paragraphs (b) and (c) of this section, 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 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency Range (MHz)	Limits (dBμV)	
	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

\* Decreases with the logarithm of the frequency.

### TEST CONFIGURATION

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.

### TEST PROCEDURE

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

### TEST RESULTS

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.



**TEST DATA**

Operation Mode: Normal Link

Test Date: January 6, 2009

Temperature: 25°C

Tested by: Alonso Lu

Humidity: 57% RH

Freq. (MHz)	QP Reading (dBuV)	AV Reading (dBuV)	Corr. factor (dB)	QP Result (dBuV)	AV Result (dBuV)	QP Limit (dBuV)	AV Limit (dBuV)	QP Margin (dB)	AV Margin (dB)	Note
0.1891	27.02	19.42	9.68	36.70	29.10	64.08	54.08	-27.38	-24.98	L1
0.4586	15.78	5.18	9.62	25.40	14.80	56.72	46.72	-31.32	-31.92	L1
1.9117	26.01	16.11	9.69	35.70	25.80	56.00	46.00	-20.30	-20.20	L1
2.3570	30.60	20.40	9.70	40.30	30.10	56.00	46.00	-15.70	-15.90	L1
4.1109	22.58	13.28	9.72	32.30	23.00	56.00	46.00	-23.70	-23.00	L1
6.8102	24.67	15.47	9.83	34.50	25.30	60.00	50.00	-25.50	-24.70	L1
0.1812	23.02	9.62	9.68	32.70	19.30	64.43	54.43	-31.73	-35.13	L2
0.3258	27.82	17.52	9.68	37.50	27.20	59.56	49.56	-22.06	-22.36	L2
0.5211	22.42	7.52	9.58	32.00	17.10	56.00	46.00	-24.00	-28.90	L2
0.5523	28.72	15.42	9.58	38.30	25.00	56.00	46.00	-17.70	-21.00	L2
0.8648	28.21	12.91	9.59	37.80	22.50	56.00	46.00	-18.20	-23.50	L2
2.2633	26.70	15.30	9.70	36.40	25.00	56.00	46.00	-19.60	-21.00	L2

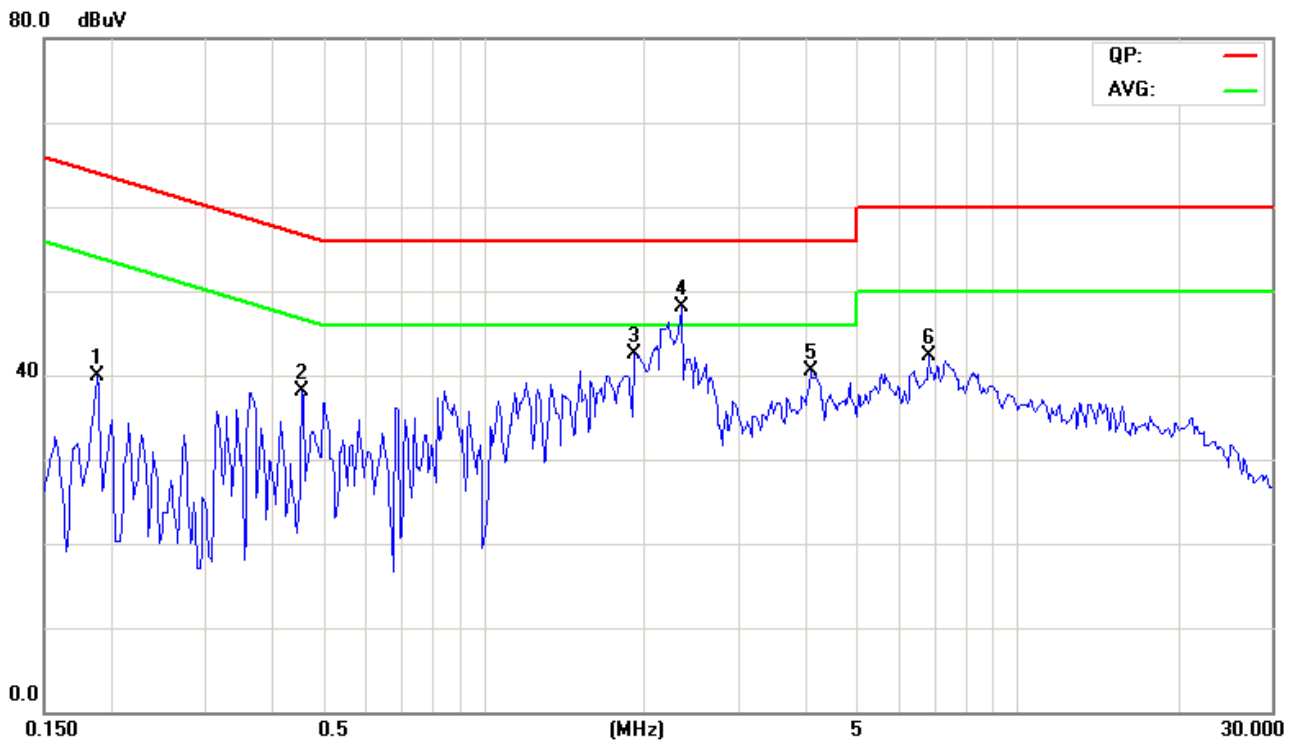
**Remark:**

1. The measuring frequencies range between 0.15 MHz and 30 MHz.
2. The emissions measured in the frequency range between 0.15 MHz and 30MHz were made with an instrument using Quasi-peak detector and Average detector.
3. The IF bandwidth of SPA between 0.15MHz and 30MHz was 10kHz. The IF bandwidth of Test Receiver between 0.15MHz and 30MHz was 9kHz.
4. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)
5. Corr. Factor (dB) = LISN Factor + Cable loss
6. The Hi-pass filter is set forth on the Spectrum analyzer as 1 dB.

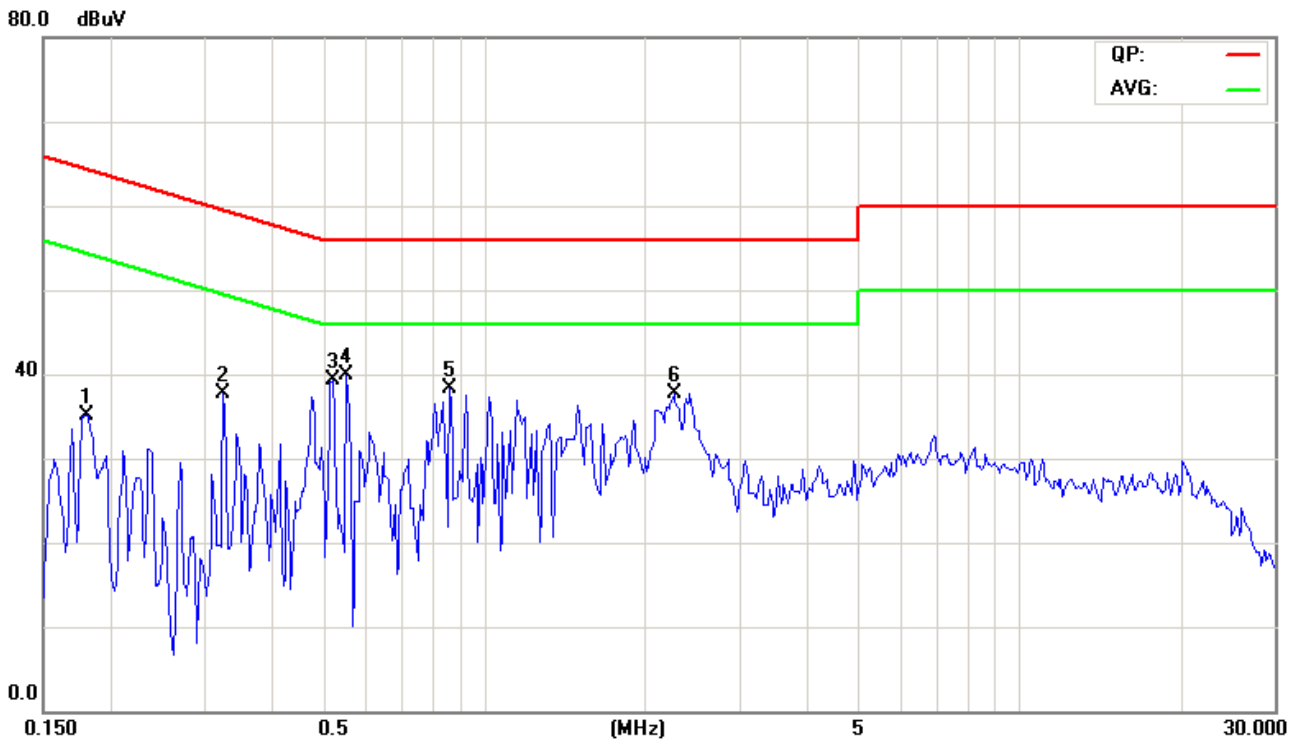


### Test Plot

#### Conducted emissions (Line 1)



#### Conducted emissions (Line 2)





# APPENDIX I RADIO FREQUENCY EXPOSURE

## LIMIT

According to §15.247(i), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See § 1.1307(b)(1) of this chapter.

## EUT Specification

<b>EUT</b>	Network Music Commander
<b>Frequency band (Operating)</b>	<input checked="" type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz <input type="checkbox"/> WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz <input type="checkbox"/> WLAN: 5.745GHz ~ 5.825GHz <input type="checkbox"/> Others
<b>Device category</b>	<input checked="" type="checkbox"/> Portable (<20cm separation) <input type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others
<b>Exposure classification</b>	<input type="checkbox"/> Occupational/Controlled exposure (S = 5mW/cm <sup>2</sup> ) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm <sup>2</sup> )
<b>Antenna diversity</b>	<input checked="" type="checkbox"/> Single antenna <input type="checkbox"/> Multiple antennas <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input type="checkbox"/> Tx/Rx diversity
<b>Max. output power</b>	IEEE 802.11b: 20.87 dBm (122.18mW) IEEE 802.11g: 23.75 dBm (237.14mW)
<b>Antenna gain (Max)</b>	4.0 dBi (Numeric gain: 2.51)
<b>Evaluation applied</b>	<input type="checkbox"/> MPE Evaluation <input checked="" type="checkbox"/> SAR Evaluation <input type="checkbox"/> N/A

### Remark:

1. The maximum output power is 23.75dBm (237.14mW) at 2412MHz (with 2.51 numeric antenna gain.)
2. DTS device is not subject to routine RF evaluation; MPE estimate is used to justify the compliance.
3. For mobile or fixed location transmitters, no SAR consideration applied. The maximum power density is 1.0 mW/cm<sup>2</sup> even if the calculation indicates that the power density would be larger.

## TEST RESULTS

No non-compliance noted.

**Remark:** Please refer to the separated SAR report.