



**FCC 47 CFR PART 15 SUBPART C**

**TEST REPORT**

**For**

**IEEE802.11b/g Wireless Mini-PCI**

**Model: WMP-G07**

**Trade Name: non-brand**

*Issued to*

**Alpha Networks Inc.**  
**No.8, Li-shing Road VII, Science-based Industrial Park,**  
**Hsinchu, Taiwan R.O.C.**

*Issued by*

**Compliance Certification Services Inc.**  
**No. 81-1, Lane 210, Bade Rd. 2, Luchu Hsiang,**  
**Taoyuan Hsien, (338) Taiwan, R.O.C.**  
**TEL: 886-3-324-0332**  
**FAX: 886-3-324-5235**



---

***Note:** This report shall not be reproduced except in full, without the written approval of Compliance Certification Services Inc. This document may be altered or revised by Compliance Certification Services Inc. personnel only, and shall be noted in the revision section of the document.*



# TABLE OF CONTENTS

- 1. TEST RESULT CERTIFICATION.....3**
- 2. EUT DESCRIPTION .....4**
- 3. TEST METHODOLOGY .....5**
  - 3.1 EUT CONFIGURATION .....5
  - 3.2 EUT EXERCISE.....5
  - 3.3 GENERAL TEST PROCEDURES.....5
  - 3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS.....6
  - 3.5 DESCRIPTION OF TEST MODES .....6
- 4. INSTRUMENT CALIBRATION.....7**
- 5. FACILITIES AND ACCREDITATIONS .....8**
  - 5.1 FACILITIES .....8
  - 5.2 EQUIPMENT.....8
  - 5.3 LABORATORY ACCREDITATIONS AND LISTING.....8
  - 5.4 TABLE OF ACCREDITATIONS AND LISTINGS.....9
- 6. SETUP OF EQUIPMENT UNDER TEST .....10**
  - 6.1 SETUP CONFIGURATION OF EUT.....10
  - 6.2 SUPPORT EQUIPMENT .....10
- 7. FCC PART 15.247 REQUIREMENTS.....11**
  - 7.1 6DB BANDWIDTH.....11
  - 7.2 PEAK POWER.....17
  - 7.3 BAND EDGES MEASUREMENT .....23
  - 7.4 PEAK POWER SPECTRAL DENSITY.....48
  - 7.5 RADIO FREQUENCY EXPOSURE .....54
  - 7.6 SPURIOUS EMISSIONS .....57
  - 7.7 POWERLINE CONDUCTED EMISSIONS.....80
- APPENDIX 1 PHOTOGRAPHS OF TEST SETUP .....83**



# 1. TEST RESULT CERTIFICATION

**Applicant:** Alpha Networks Inc.  
 No.8, Li-shing Road VII, Science-based Industrial Park,  
 Hsinchu, Taiwan R.O.C.

**Equipment Under Test:** IEEE802.11b/g Wireless Mini-PCI

**Trade Name:** non-brand

**Model:** WMP-G07

**Date of Test:** March 21 ~ April 14, 2005

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 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:

Reviewed by:

\_\_\_\_\_  
 Harris W. Lai  
 Executive Vice President  
 Compliance Certification Services Inc.

\_\_\_\_\_  
 Gavin Lim  
 Section Manager  
 Compliance Certification Services Inc.



## 2. EUT DESCRIPTION

<b>Product</b>	IEEE802.11b/g Wireless Mini-PCI
<b>Trade Name</b>	Alpha
<b>Model Number</b>	WMP-G07
<b>Model Discrepancy</b>	The EUT have two types, four different gain's antennas for sales, one is Dipole antenna and other one is PIFA Antenna, the detail descriptions please refer antenna specification.
<b>Power Supply</b>	Powered from the host device
<b>Frequency Range</b>	2412 ~ 2462 MHz
<b>Transmit Power</b>	IEEE 802.11b Base mode: 20.94 dBm IEEE 802.11g Turbo mode: 19.61 dBm IEEE 802.11g: Base mode: 20.38 dBm
<b>Modulation Technique</b>	IEEE 802.11b: DSSS (CCK; DQPSK; DBPSK) IEEE 802.11g OFDM (QPSK, BPSK, 16-QAM, 64-QAM)
<b>Transmit Data Rate</b>	IEEE 802.11b Mode: 11, 5.5, 2, 1 Mbps IEEE 802.11g Mode: 54, 48, 36, 24, 18, 12, 11, 9, 6, 5.5, 2, 1Mbps IEEE 802.11g Turbo Mode: 108, 54, 48, 36, 24, 18, 12, 9, 6 Mbps
<b>Number of Channels</b>	11 Channels
<b>Antenna Specification</b>	Dipole Antenna: Model / Gain: SA2-05035-A5 / 5.0 dBi Model / Gain: THW0551A1 / 2.0 dBi Model / Gain: THW0234A / 2.0 dBi PIFA Antenna: Model / Gain: THW1055A1 / 0.0 dBi Model / Gain: THW0354A / -3.0 dBi

**Note:** The sample selected for test was production product and was provided by manufacturer. This submittal(s) (test report) is intended for FCC ID: **RRK2005030148-1** 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 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 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.



### 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: WMP-G07) with 5dBi dipole and 0dBi PIFA had been tested under operating condition.

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

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

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

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

IEEE802.11g Turbo mode: Channel Mid(2437MHz), with 12Mbps data rate was chosen for full testing.



#### **4. 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.



## 5. FACILITIES AND ACCREDITATIONS

### 5.1 FACILITIES

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

No. 81-1, Lane 210, Bade Rd. 2, Luchu Hsiang, Taoyuan Hsien, Taiwan, R.O.C.

No. 199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 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 LABORATORY ACCREDITATIONS AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code: 200600-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government. In addition, the test facilities are listed with Federal Communications Commission (Registration no: 93105 and 90471).



### 5.4 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	NVLAP*	EN 55011, EN 55014-1, AS/NZS 1044, CNS 13783-1, EN 55022, CNS 13438, EN 61000-3-2, EN 61000-3-3, ANSI C63.4, FCC OST/MP-5, AS/NZS CISPR 22, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11	 200600-0
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	 93105, 90471
Japan	VCCI	4 3/10 meter Open Area Test Sites to perform conducted/radiated measurements	 R-393/1066/725/879 C-402/747/912
Norway	NEMKO	EN 50081-1/2, EN 50082-1/2, IEC 61000-6-1/2, EN 50091-2, EN 50130-4, EN 55011, EN 55013, EN 55014-1/2, EN 55015, EN 55022, EN 55024, EN 61000-3-2/3, EN 61326-1, IEC 61000-4-2/3/4/5/6/8/11, EN 60601-1-2, EN 300 328-2, EN 300 422-2, EN 301 419-1, EN 301 489-01/03/07/08/09/17, EN 301 419-2/3, EN 300 454-2, EN 301 357-2	 ELA 124a ELA 124b ELA 124c
Taiwan	CNLA	EN 300 328-1/2, EN 300 220-1/2/3, EN 300 440-1/2, EN 61000-3-2, EN 61000-3-3, 47 CFR FCC Part 15 Subpart C/D/E, EN 55013, CNS 13439, EN 55014-1, CNS 13783-1, EN 55022, CNS 13438, CISPR 22, AS/NZS 3548, EN 61000-4-2/3/4/5/6/8/11, ENV 50204, IEEE Std 1528, FCC OET Bulletin, 65+Supplement C, EN50360, EN50361, EN50371, RSS102	 0 3 6 3 ILAC MRA
Taiwan	BSMI	CNS 13438, CNS 13783-1, CNS 13439, CNS 14115	 SL2-IS-E-0014 SL2-IN-E-0014 SL2-A1-E-0014 SL2-R1-E-0014 SL2-R2-E-0014 SL2-L1-E-0014
Canada	Industry Canada	RSS212, Issue 1	 IC 3991-3 IC 3991-4

\* No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government.



## 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

No.	Device Type	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
1.	Notebook PC	IBM	2672(X31)	99PBTKB	FCC DoC	N/A	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core

**Remark:**

1. *All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*
2. *Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*



## 7. FCC PART 15.247 REQUIREMENTS

### 7.1 6dB BANDWIDTH

#### LIMIT

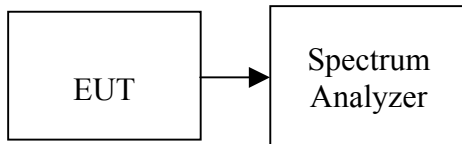
For the direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz.

#### MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360131	01/10/2006

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

#### 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 = RBW, Span = 50MHz, 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 Base mode

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
Low	2412	11500	>500	PASS
Mid	2437	11080		PASS
High	2462	11000		PASS

#### Test mode: IEEE 802.11g Base mode

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
Low	2412	16330	>500	PASS
Mid	2437	16580		PASS
High	2462	16330		PASS

#### Test mode: IEEE 802.11g Turbo mode

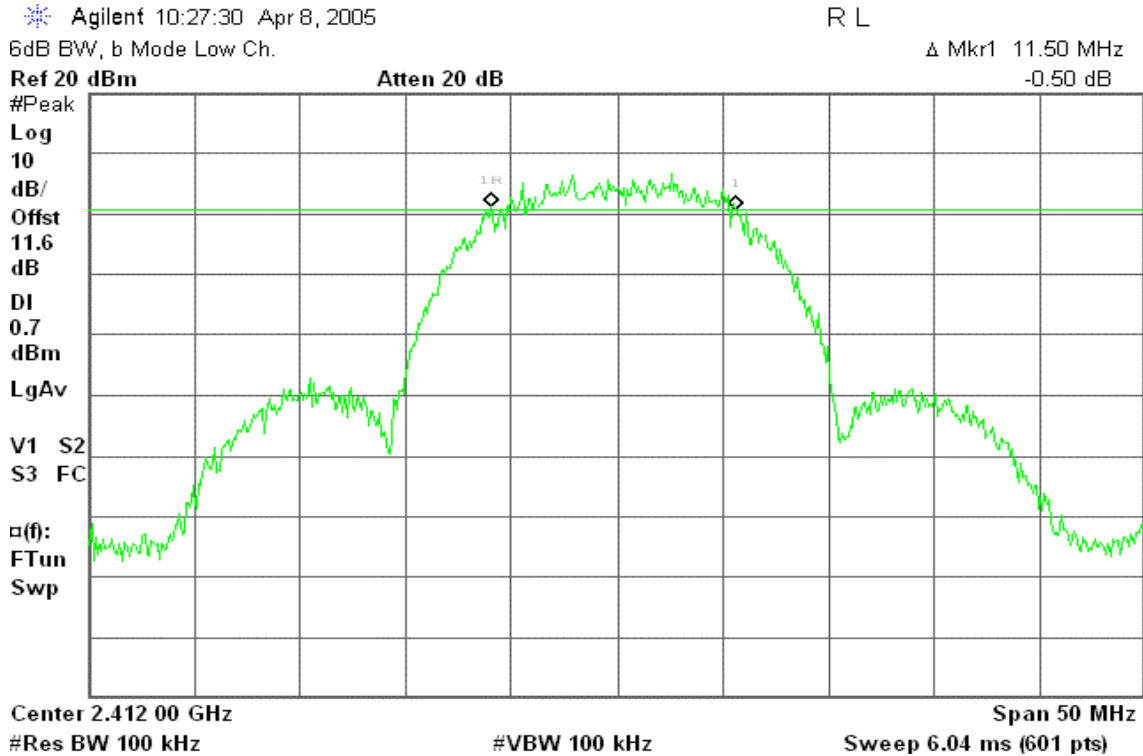
Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
Mid	2437	32920	>500	PASS



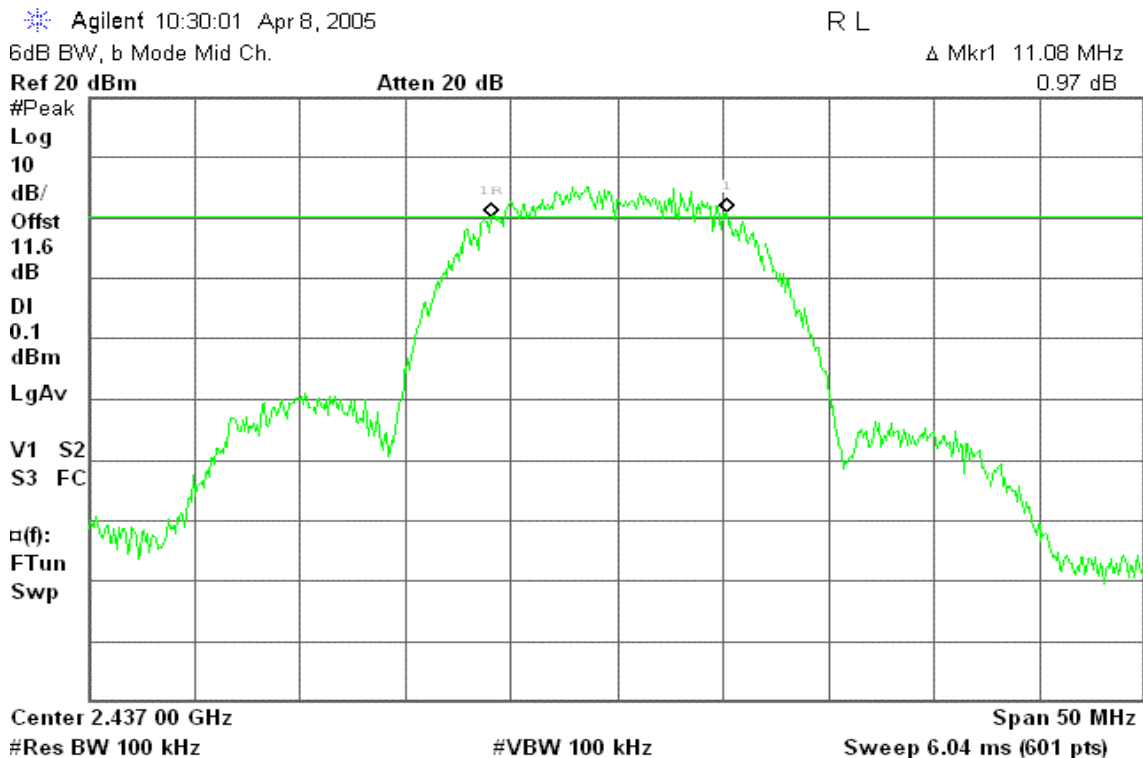
**Test Plot**

**IEEE 802.11b Base mode**

**6dB Bandwidth (CH Low)**



**6dB Bandwidth (CH Mid)**





### 6dB Bandwidth (CH High)

Agilent 10:31:48 Apr 8, 2005

R L

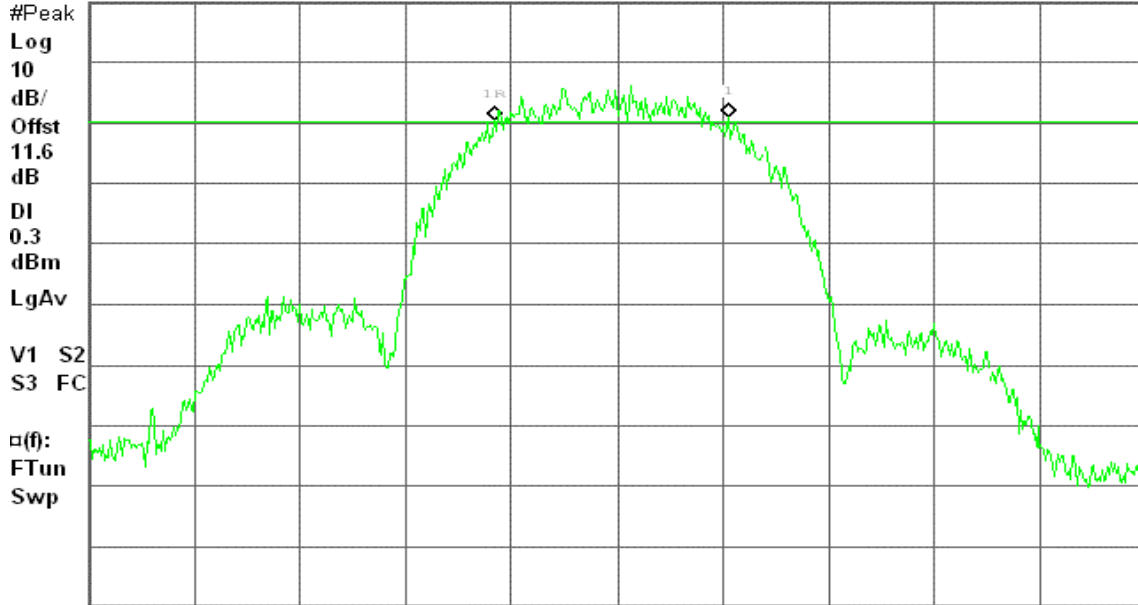
6dB BW, b Mode High Ch.

Δ Mkr1 11.00 MHz

Ref 20 dBm

Atten 20 dB

0.67 dB



Center 2.462 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 6.04 ms (601 pts)

### IEEE 802.11g Base mode

#### 6dB Bandwidth (CH Low)

Agilent 10:33:57 Apr 8, 2005

R T

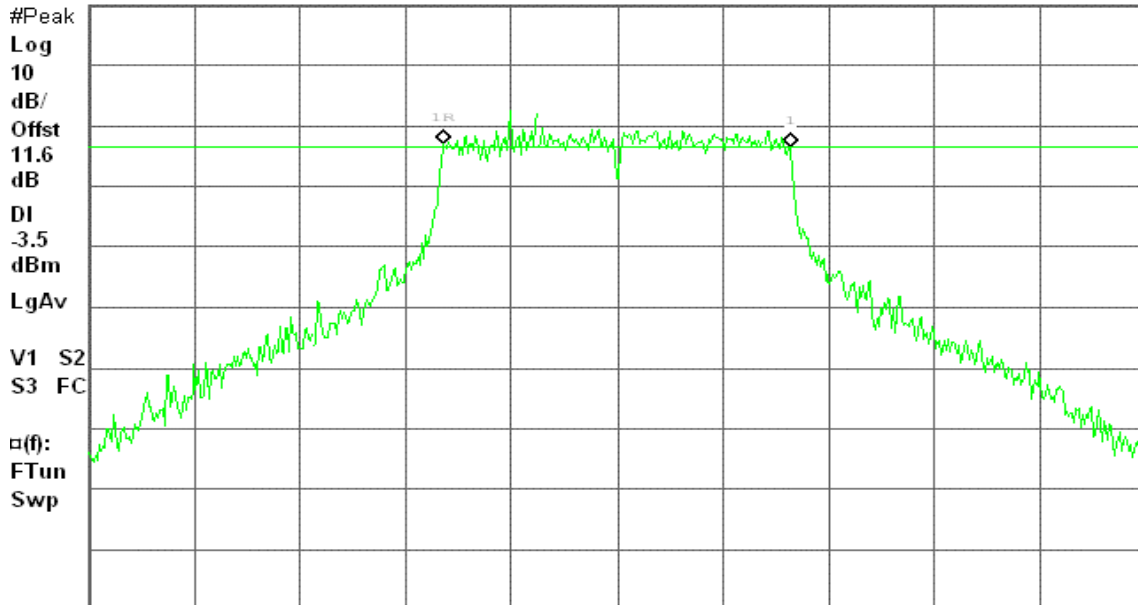
6dB BW, g Mode Low Ch.

Δ Mkr1 16.33 MHz

Ref 20 dBm

Atten 20 dB

-0.45 dB



Center 2.412 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 6.04 ms (601 pts)



### 6dB Bandwidth (CH Mid)

Agilent 10:35:58 Apr 8, 2005

R L

6dB BW, g Mode Mid Ch.

Δ Mkr1 16.58 MHz

Ref 20 dBm

Atten 20 dB

-2.61 dB

#Peak

Log

10

dB/

Offst

11.6

dB

DI

-4.0

dBm

LgAv

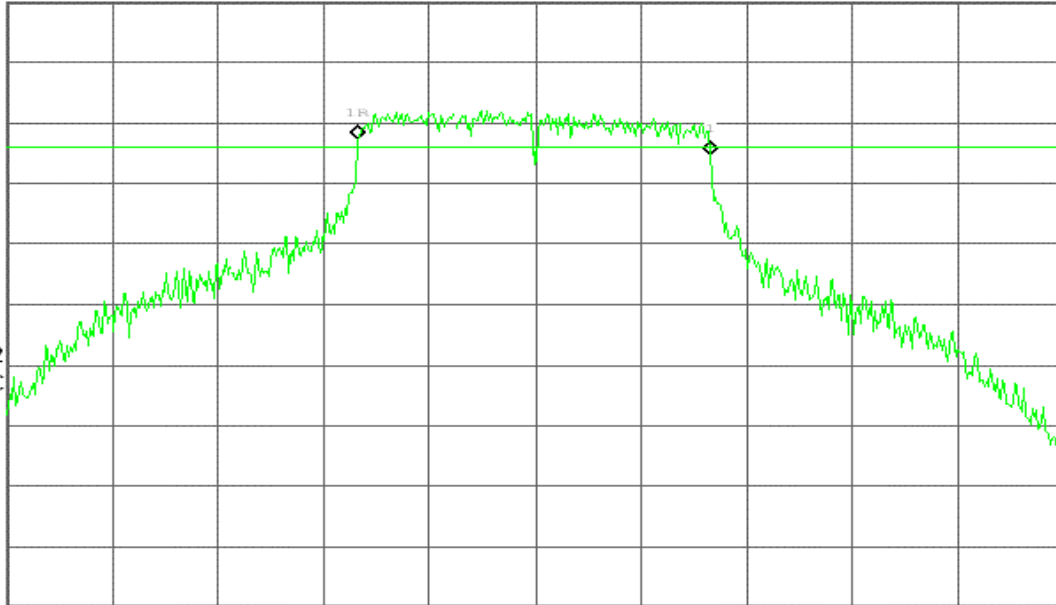
V1 S2

S3 FC

α(f):

FTun

Swp



Center 2.437 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 6.04 ms (601 pts)

### 6dB Bandwidth (CH High)

Agilent 10:38:05 Apr 8, 2005

R L

6dB BW, g Mode High Ch.

Δ Mkr1 16.33 MHz

Ref 20 dBm

Atten 20 dB

0.22 dB

#Peak

Log

10

dB/

Offst

11.6

dB

DI

-4.9

dBm

LgAv

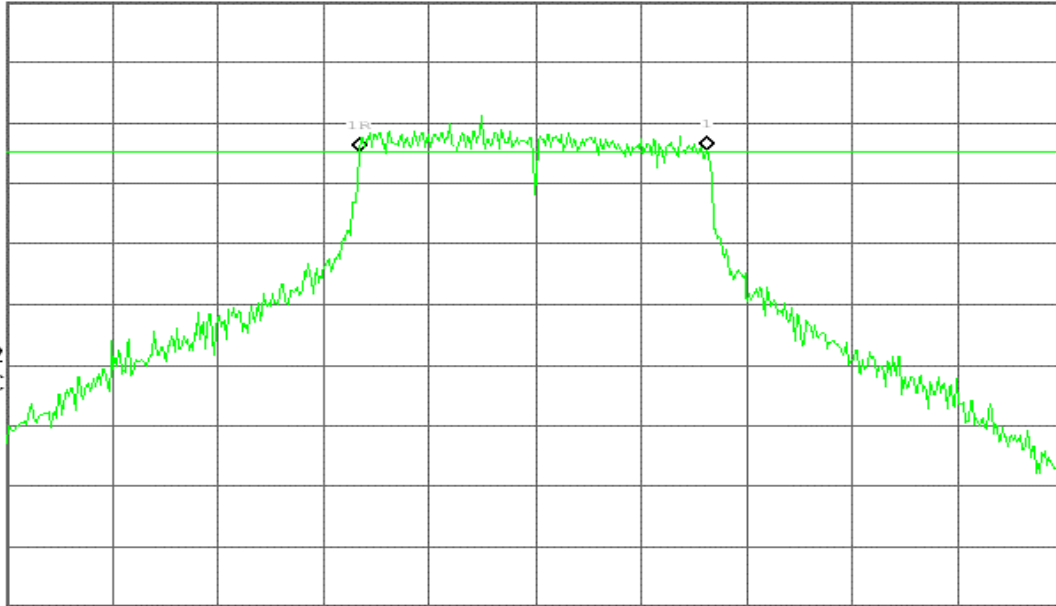
V1 S2

S3 FC

α(f):

FTun

Swp



Center 2.462 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 6.04 ms (601 pts)



**IEEE 802.11g Turbo mode**

**6dB Bandwidth (CH Mid)**

Agilent 10:21:12 Apr 8, 2005

R L

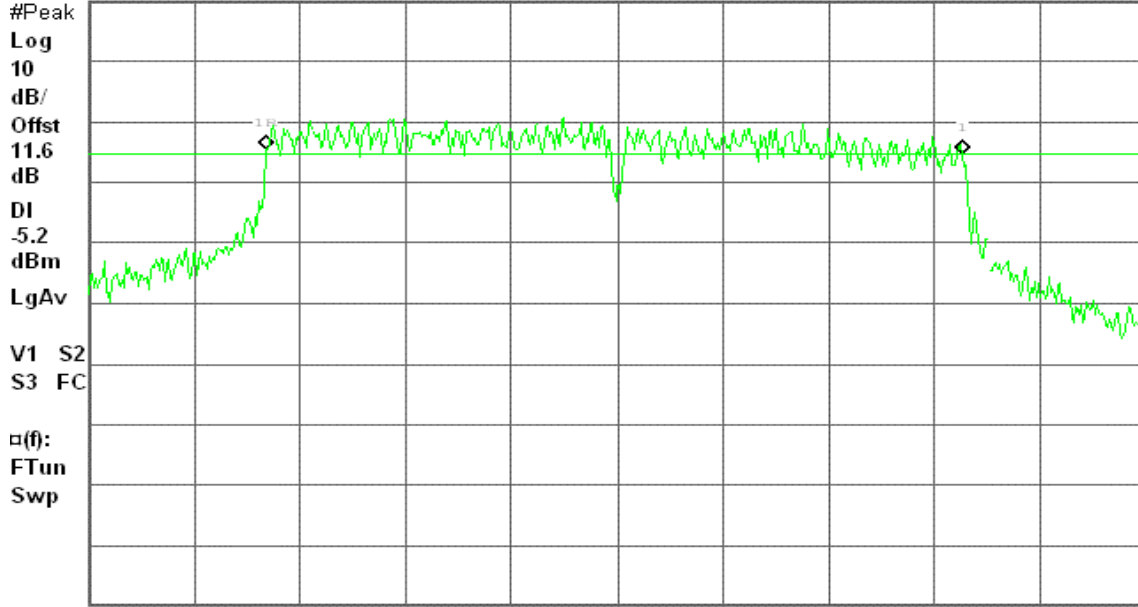
6dB BW, g turbo Mode Mid Ch.

Δ Mkr1 32.92 MHz

Ref 20 dBm

Atten 20 dB

-0.72 dB



Center 2.437 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 6.04 ms (601 pts)





## 7.2 PEAK POWER

### LIMIT

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

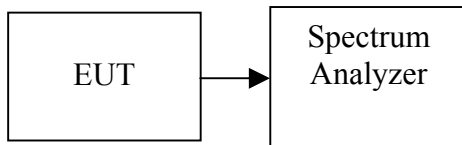
1. For systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 watt.
2. Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360131	01/10/2006

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

### Test Configuration



### TEST PROCEDURE

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



### TEST RESULTS

*No non-compliance noted*

#### Test Data

##### **Test mode: IEEE 802.11b Base mode**

Channel	Frequency (MHz)	Reading Power (dBm)	Factor (dB)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	9.34	11.60	20.94	0.1242	1	PASS
Mid	2437	8.23	11.60	19.83	0.0962		PASS
High	2462	8.33	11.60	19.93	0.0984		PASS

##### **Test mode: IEEE 802.11g Base mode**

Channel	Frequency (MHz)	Reading Power (dBm)	Factor (dB)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	5.95	11.60	17.55	0.0569	1	PASS
Mid	2437	8.78	11.60	20.38	0.1091		PASS
High	2462	5.76	11.60	17.36	0.0545		PASS

##### **Test mode: IEEE 802.11g Turbo mode**

Channel	Frequency (MHz)	Reading Power (dBm)	Factor (dB)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Mid	2437	8.01	11.60	19.61	0.0914	1	PASS



**Test Plot**

**IEEE 802.11b Base mode**

**Peak power (CH Low)**

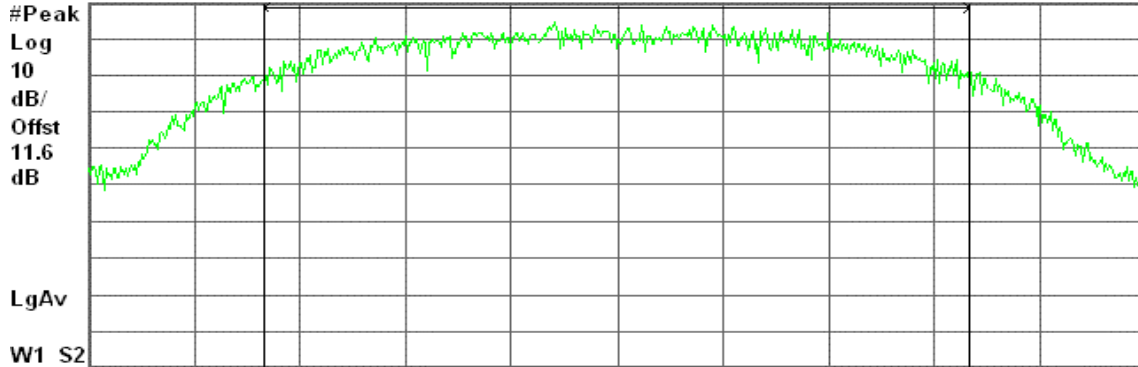
Agilent 10:28:22 Apr 8, 2005

R L

Peak Output Power, b Mode Low Ch.

Ref 20 dBm

Atten 20 dB



Center 2.412 00 GHz

Span 23.05 MHz

#Res BW 1 MHz

#VBW 3 MHz

Sweep 1 ms (601 pts)

Channel Power

Power Spectral Density

20.94 dBm / 15.3700 MHz

-50.92 dBm/Hz

**Peak power (CH Mid)**

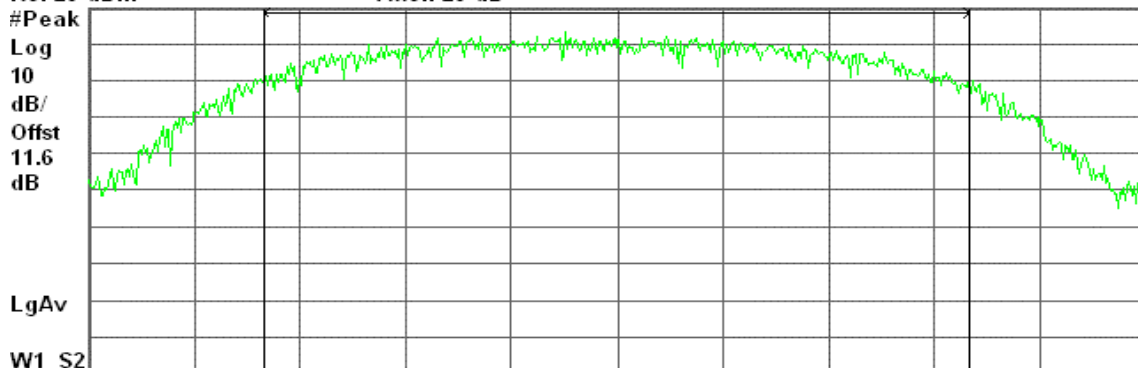
Agilent 10:30:41 Apr 8, 2005

R L

Peak Output Power, b Mode Mid Ch.

Ref 20 dBm

Atten 20 dB



Center 2.437 00 GHz

Span 23 MHz

#Res BW 1 MHz

#VBW 3 MHz

Sweep 1 ms (601 pts)

Channel Power

Power Spectral Density

19.83 dBm / 15.3330 MHz

-52.03 dBm/Hz



### Peak power (CH High)

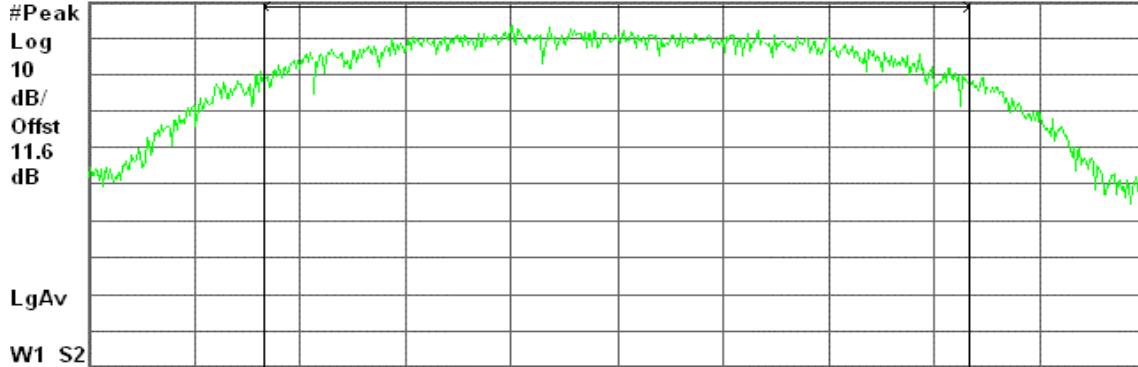
Agilent 10:32:24 Apr 8, 2005

R L

Peak Output Power, b Mode High Ch.

Ref 20 dBm

Atten 20 dB



Center 2.462 00 GHz

Span 22.99 MHz

#Res BW 1 MHz

#VBW 3 MHz

Sweep 1 ms (601 pts)

Channel Power

Power Spectral Density

19.93 dBm / 15.3250 MHz

-51.93 dBm/Hz

### IEEE 802.11g Base mode

#### Peak power (CH Low)

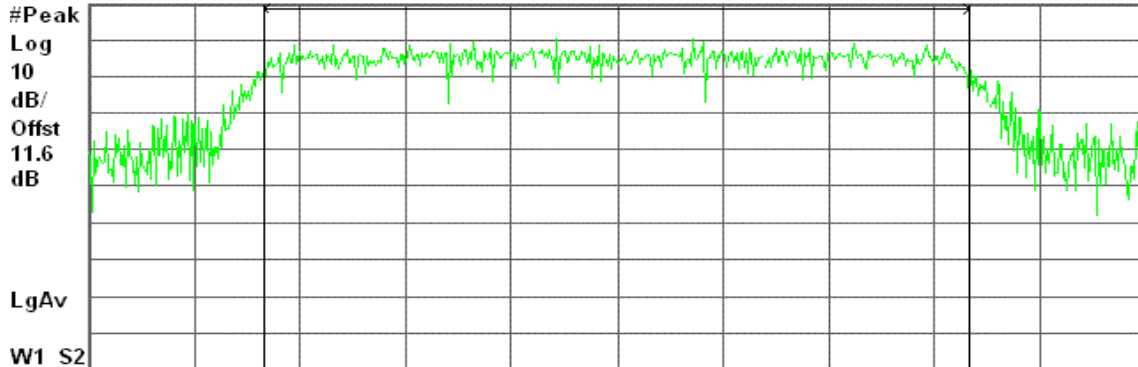
Agilent 10:34:32 Apr 8, 2005

R L

Peak Output Power, g Mode Low Ch.

Ref 20 dBm

Atten 20 dB



Center 2.412 00 GHz

Span 25.08 MHz

#Res BW 1 MHz

#VBW 3 MHz

Sweep 1 ms (601 pts)

Channel Power

Power Spectral Density

17.55 dBm / 16.7170 MHz

-54.68 dBm/Hz



### Peak power (CH Mid)

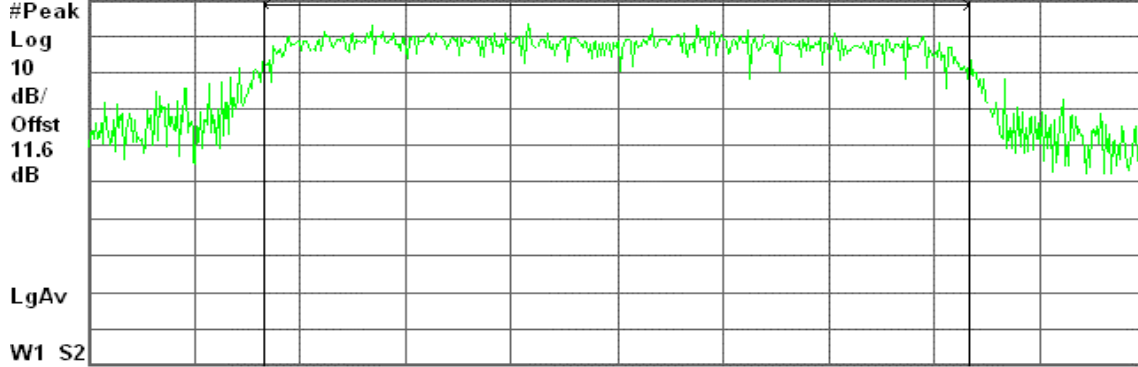
Agilent 10:36:44 Apr 8, 2005

R L

Peak Output Power, g Mode Mid Ch.

Ref 20 dBm

Atten 20 dB



Center 2.437 00 GHz

Span 25.69 MHz

#Res BW 1 MHz

#VBW 3 MHz

Sweep 1 ms (601 pts)

Channel Power

Power Spectral Density

20.38 dBm / 17.1260 MHz

-51.96 dBm/Hz

### Peak power (CH High)

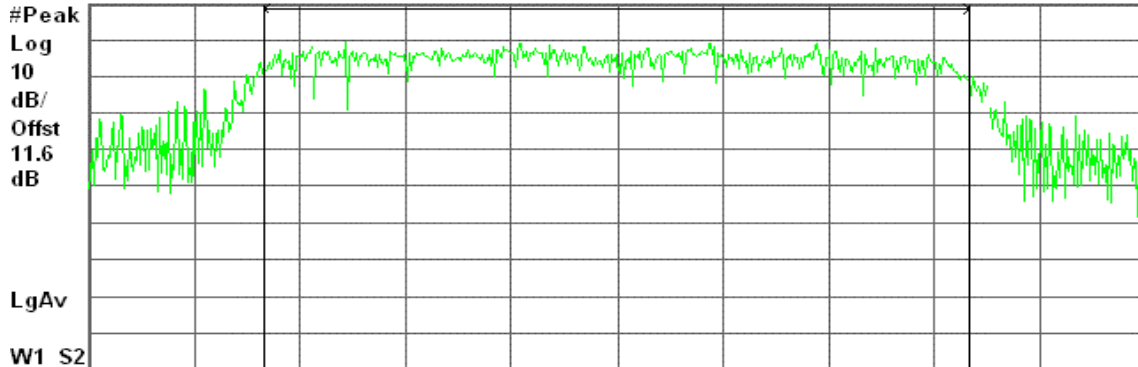
Agilent 10:38:42 Apr 8, 2005

R L

Peak Output Power, g Mode High Ch.

Ref 20 dBm

Atten 20 dB



Center 2.462 00 GHz

Span 25.11 MHz

#Res BW 1 MHz

#VBW 3 MHz

Sweep 1 ms (601 pts)

Channel Power

Power Spectral Density

17.36 dBm / 16.7380 MHz

-54.88 dBm/Hz



### IEEE 802.11g Turbo mode

#### Peak power (CH Mid)

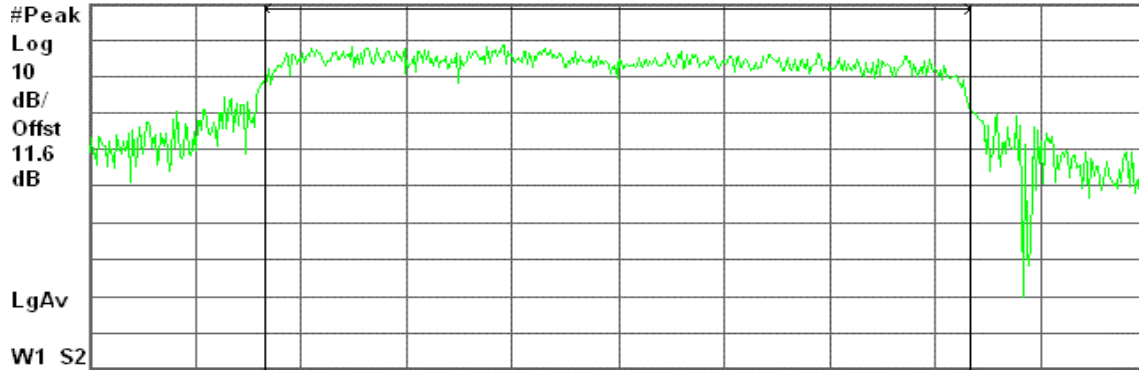
Agilent 10:21:58 Apr 8, 2005

R L

Peak Output Power, g turbo Mode Mid Ch.

Ref 20 dBm

Atten 20 dB



Center 2.437 00 GHz

Span 50.96 MHz

#Res BW 1 MHz

#VBW 3 MHz

Sweep 1 ms (601 pts)

Channel Power

Power Spectral Density

19.61 dBm / 33.9710 MHz

-55.70 dBm/Hz

### 7.3 BAND EDGES MEASUREMENT

#### LIMIT

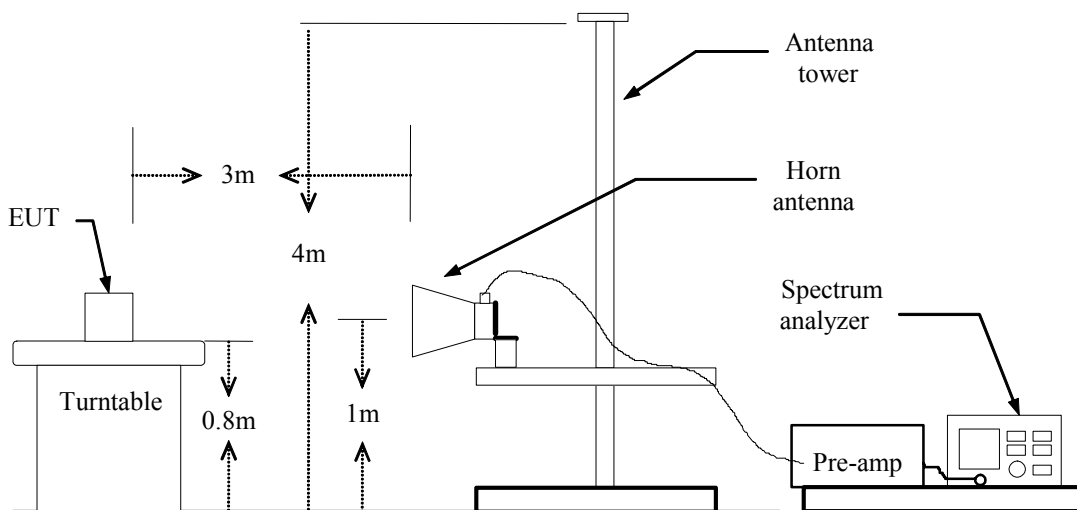
According to §15.247(c), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains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

#### MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360131	01/10/2006

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

#### 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 mode: Dipole Antenna / SA2-05035-A5 / 5.0 dBi

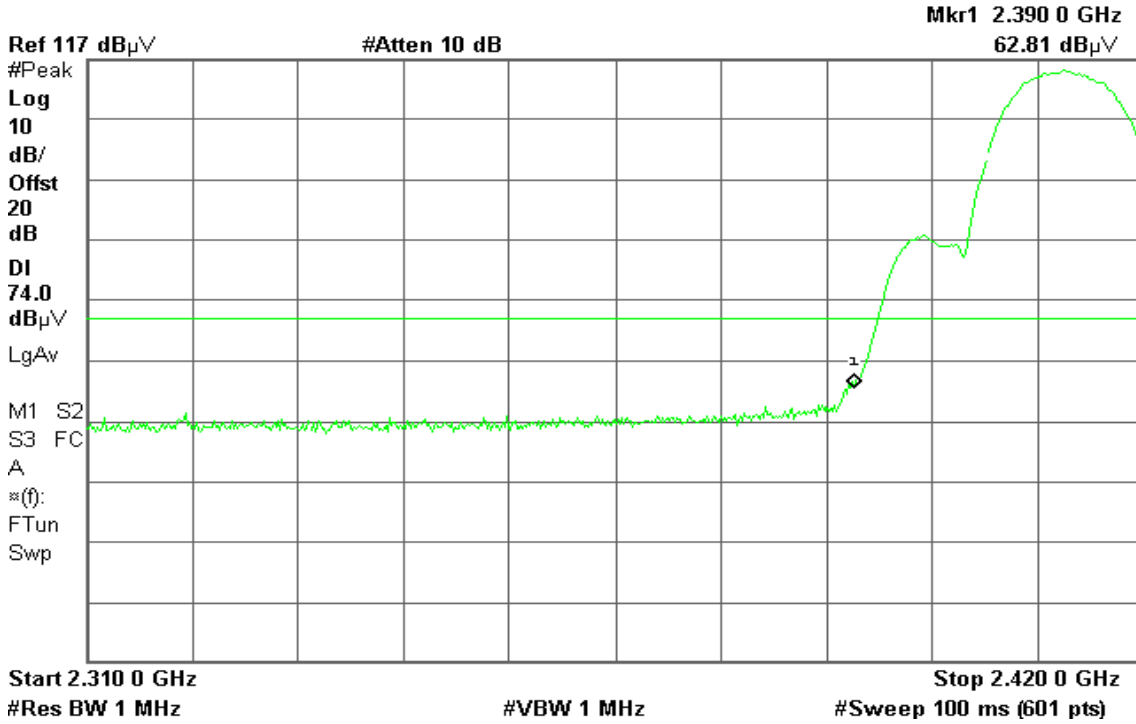
Band Edges (IEEE 802.11b Base mode / CH Low)

Detector mode: Peak

Polarity: Vertical

Agilent 19:19:49 Apr 14, 2005

R T

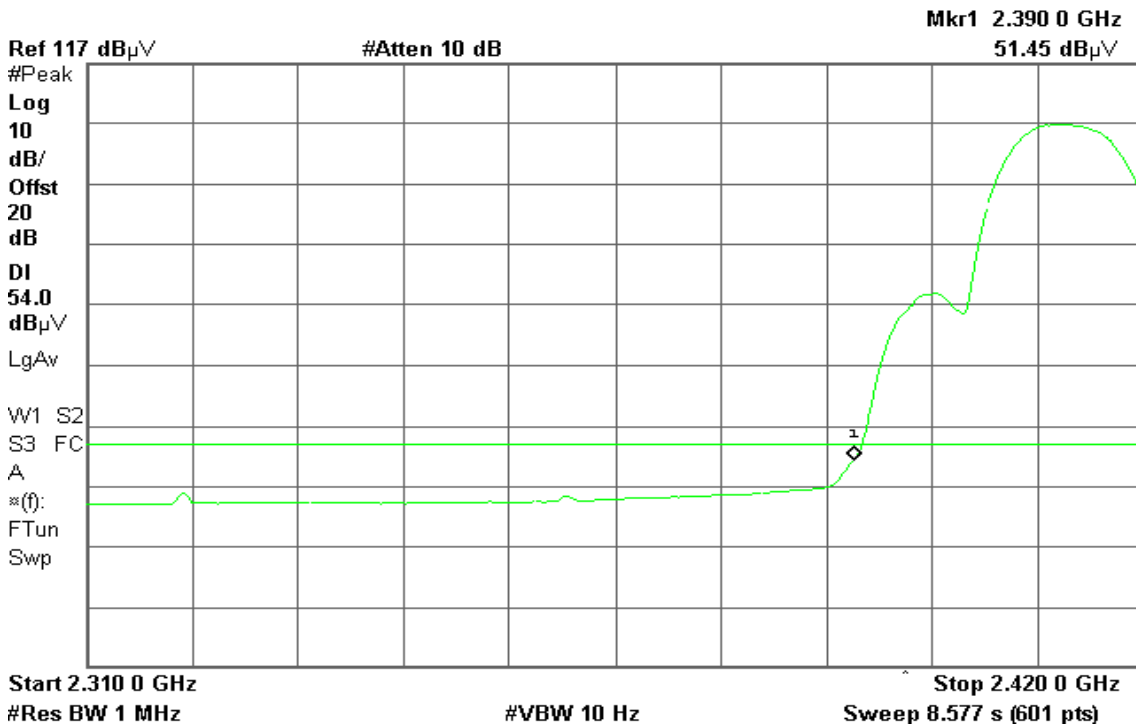


Detector mode: Average

Polarity: Vertical

Agilent 19:19:28 Apr 14, 2005

R T





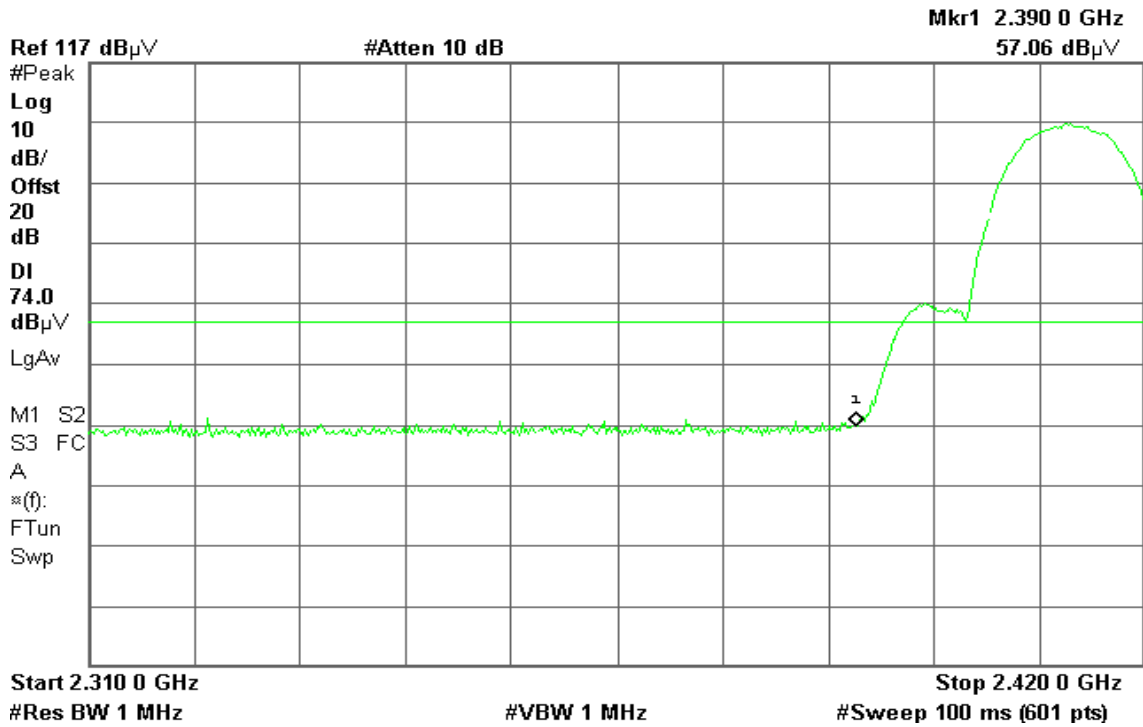


Detector mode: Peak

Polarity: Horizontal

Agilent 19:22:40 Apr 14, 2005

R T



Detector mode: Average

Polarity: Horizontal

Agilent 19:22:15 Apr 14, 2005

R T





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

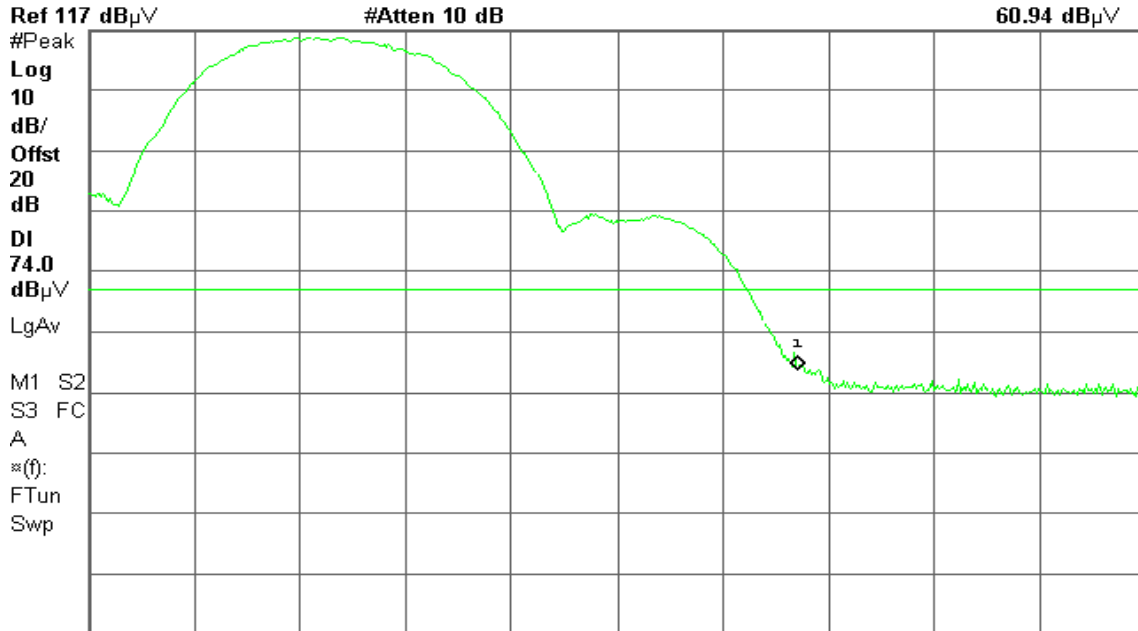
Detector mode: Peak

Polarity: Vertical

Agilent 19:31:24 Apr 14, 2005

R T

Mkr1 2.483 50 GHz  
60.94 dBμV



Start 2.450 00 GHz

#Res BW 1 MHz

#VBW 1 MHz

Stop 2.500 00 GHz

#Sweep 100 ms (601 pts)

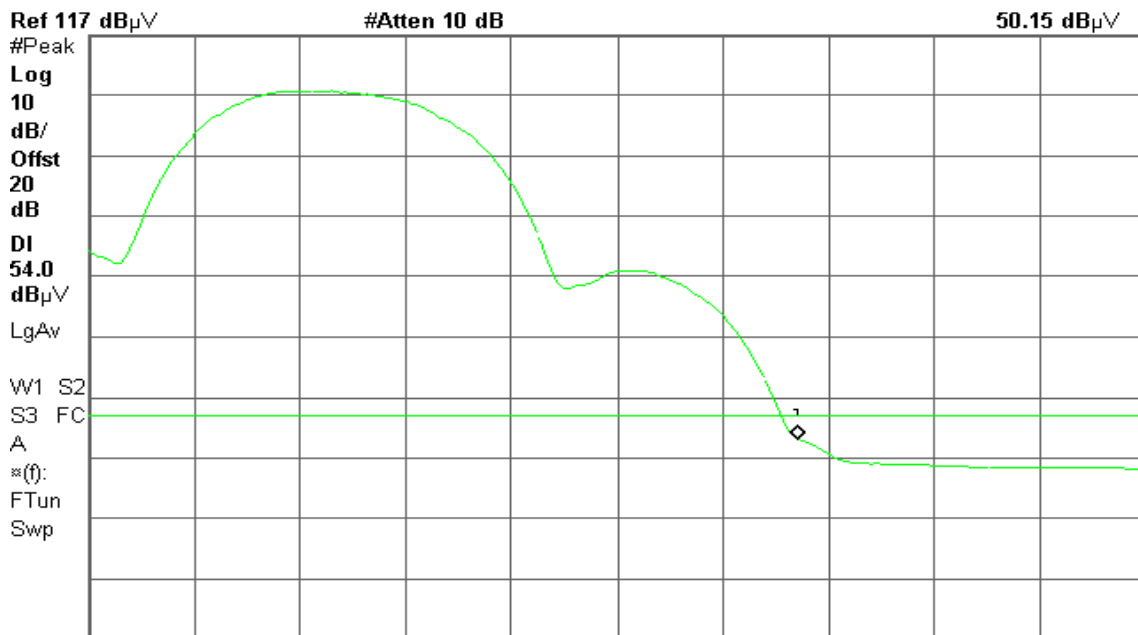
Detector mode: Average

Polarity: Vertical

Agilent 19:30:57 Apr 14, 2005

R T

Mkr1 2.483 50 GHz  
50.15 dBμV



Start 2.450 00 GHz

#Res BW 1 MHz

#VBW 10 Hz

Stop 2.500 00 GHz

Sweep 3.899 s (601 pts)



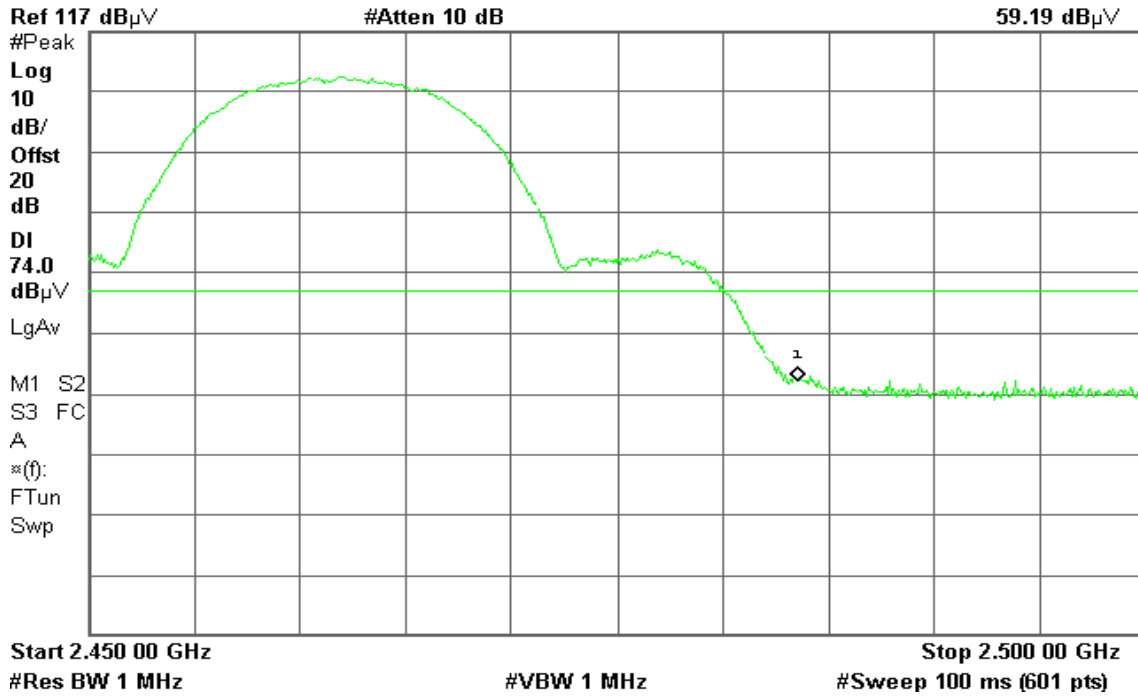
Detector mode: Peak

Polarity: Horizontal

Agilent 19:27:36 Apr 14, 2005

R T

Mkr1 2.483 50 GHz  
59.19 dBμV



Detector mode: Average

Polarity: Horizontal

Agilent 19:27:16 Apr 14, 2005

R T

Mkr1 2.483 50 GHz  
46.92 dBμV





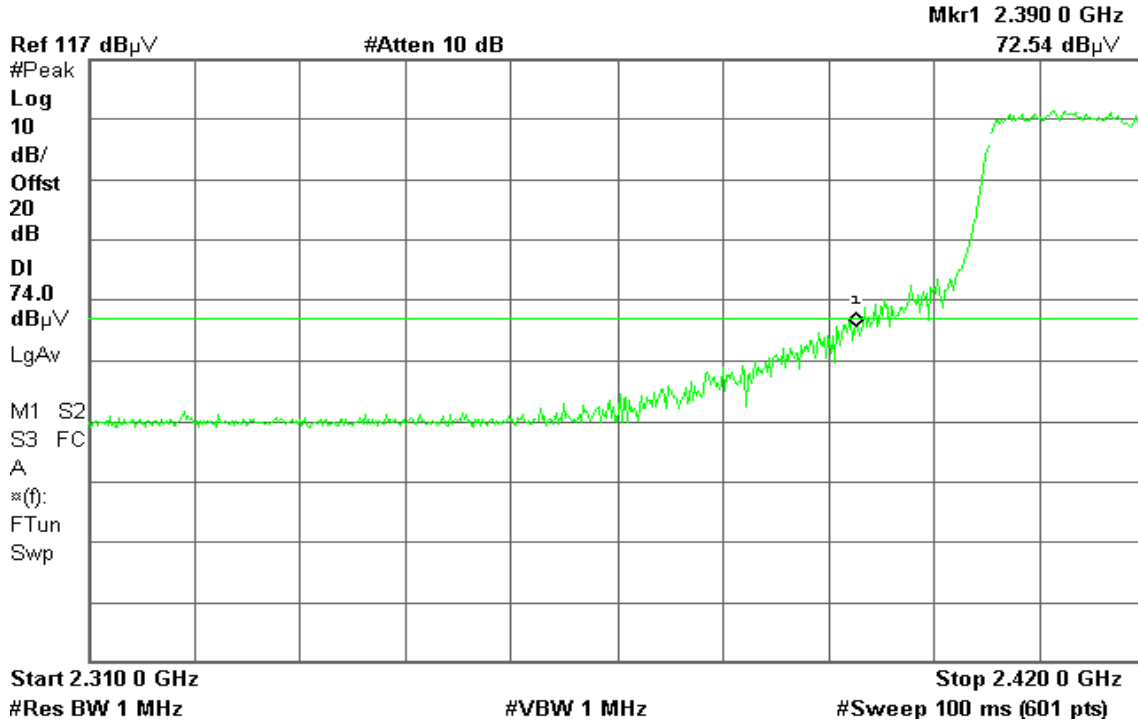
### Band Edges (IEEE 802.11g Base mode / CH Low)

Detector mode: Peak

Polarity: Vertical

Agilent 19:44:04 Apr 14, 2005

R T

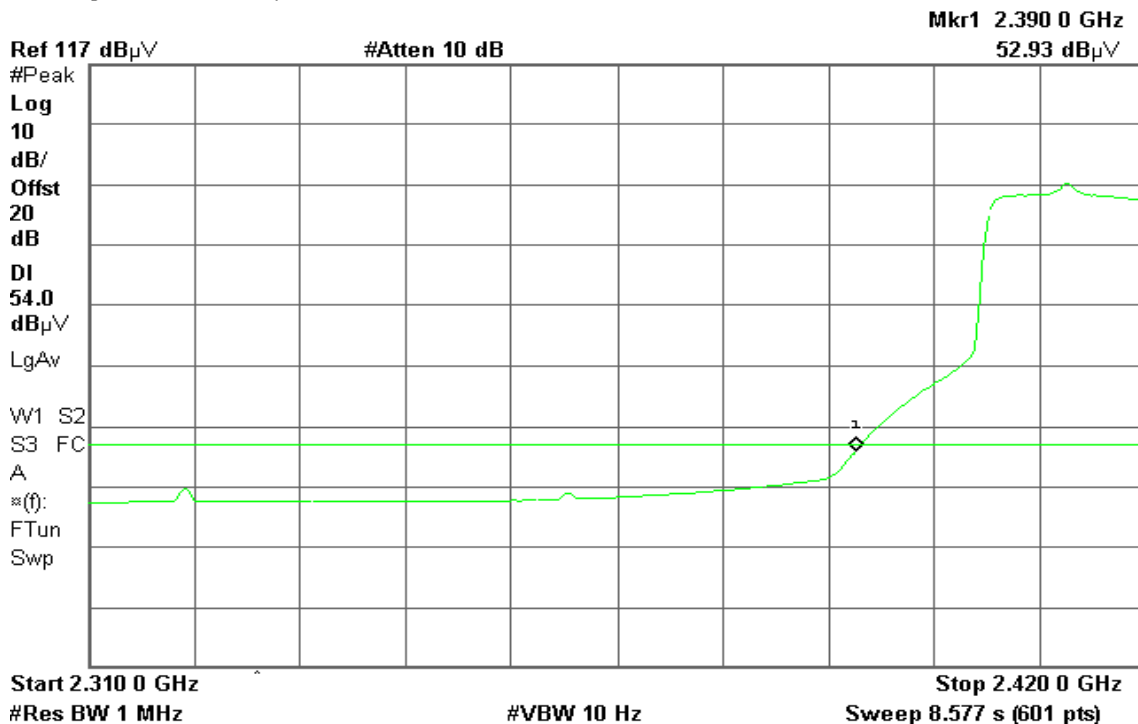


Detector mode: Average

Polarity: Vertical

Agilent 19:37:05 Apr 14, 2005

R T





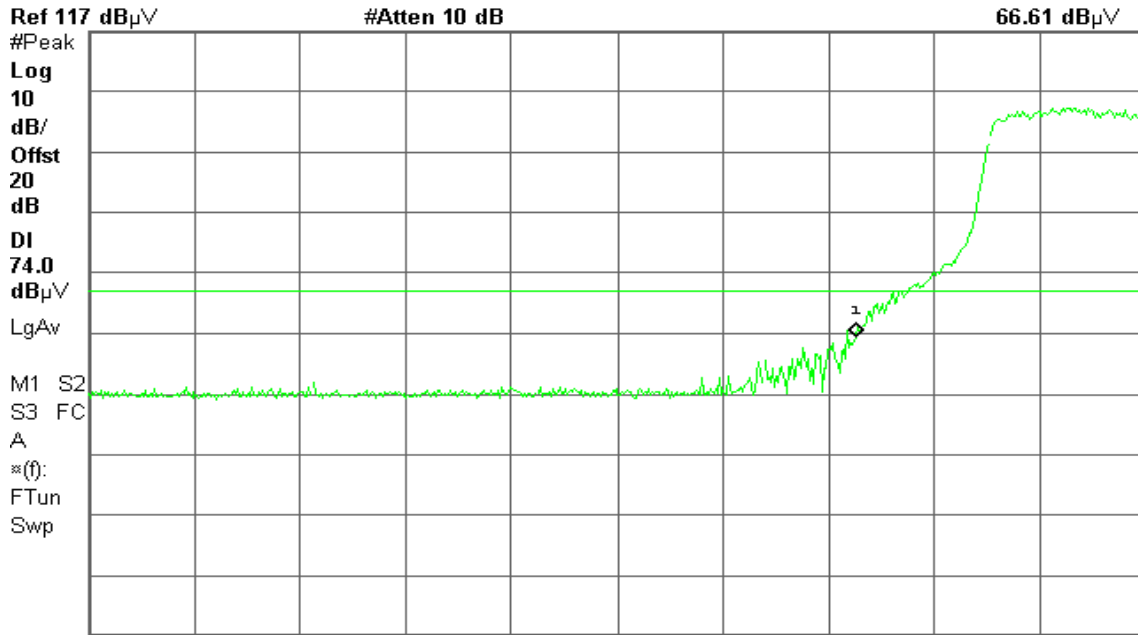
Detector mode: Peak

Polarity: Horizontal

Agilent 19:47:36 Apr 14, 2005

R T

Mkr1 2.390 0 GHz  
66.61 dBμV



Start 2.310 0 GHz #Res BW 1 MHz #VBW 1 MHz Stop 2.420 0 GHz #Sweep 100 ms (601 pts)

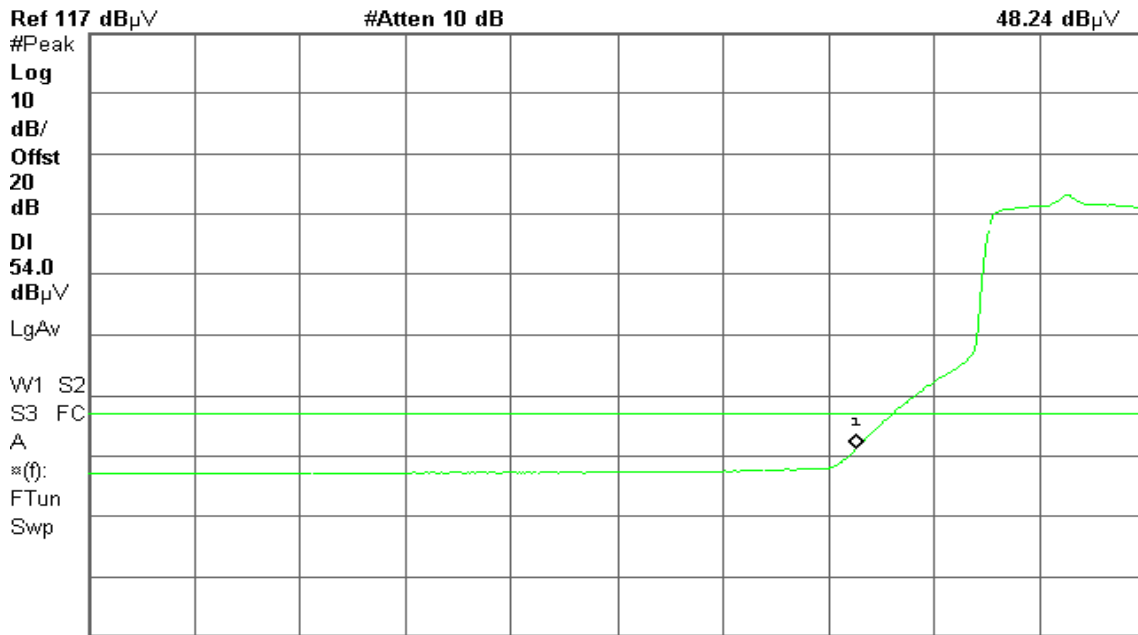
Detector mode: Average

Polarity: Horizontal

Agilent 19:48:08 Apr 14, 2005

R T

Mkr1 2.390 0 GHz  
48.24 dBμV



Start 2.310 0 GHz #Res BW 1 MHz #VBW 10 Hz Stop 2.420 0 GHz Sweep 8.577 s (601 pts)



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

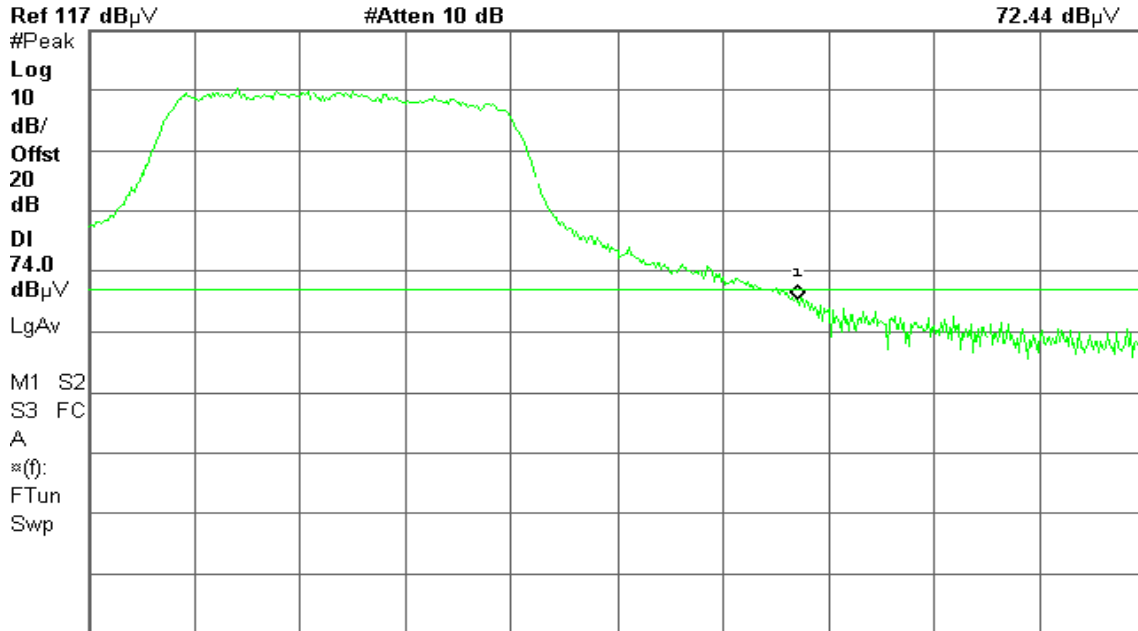
Detector mode: Peak

Polarity: Vertical

Agilent 19:52:50 Apr 14, 2005

R T

Mkr1 2.483 50 GHz  
72.44 dB $\mu$ V



#Res BW 1 MHz #VBW 1 MHz #Sweep 100 ms (601 pts)

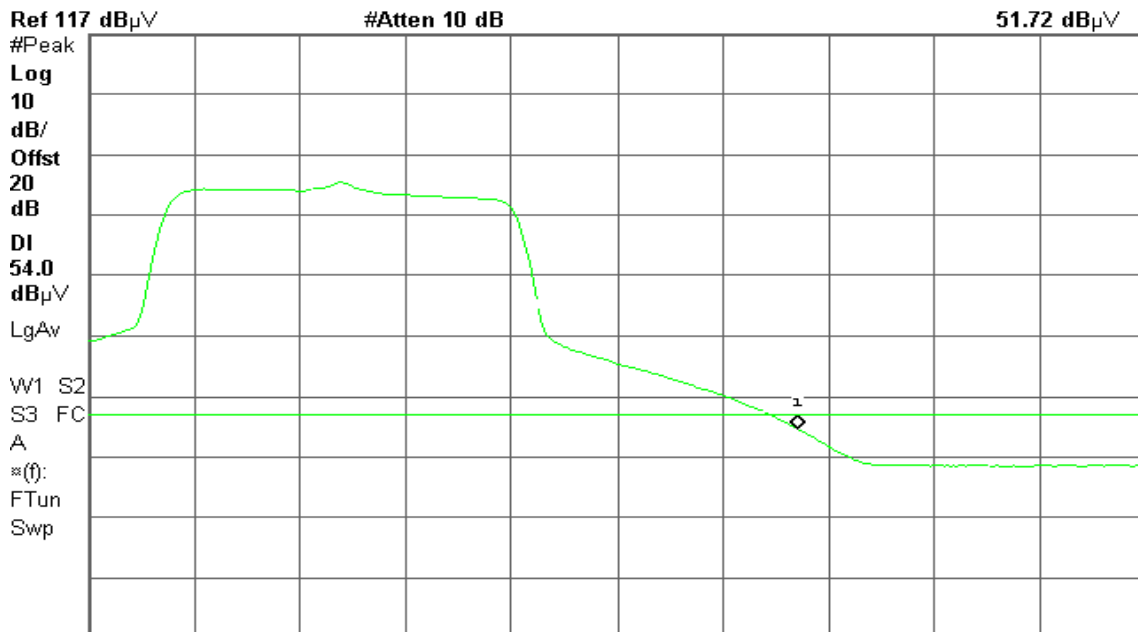
Detector mode: Average

Polarity: Vertical

Agilent 19:51:51 Apr 14, 2005

R T

Mkr1 2.483 50 GHz  
51.72 dB $\mu$ V



#Res BW 1 MHz #VBW 10 Hz Sweep 3.899 s (601 pts)



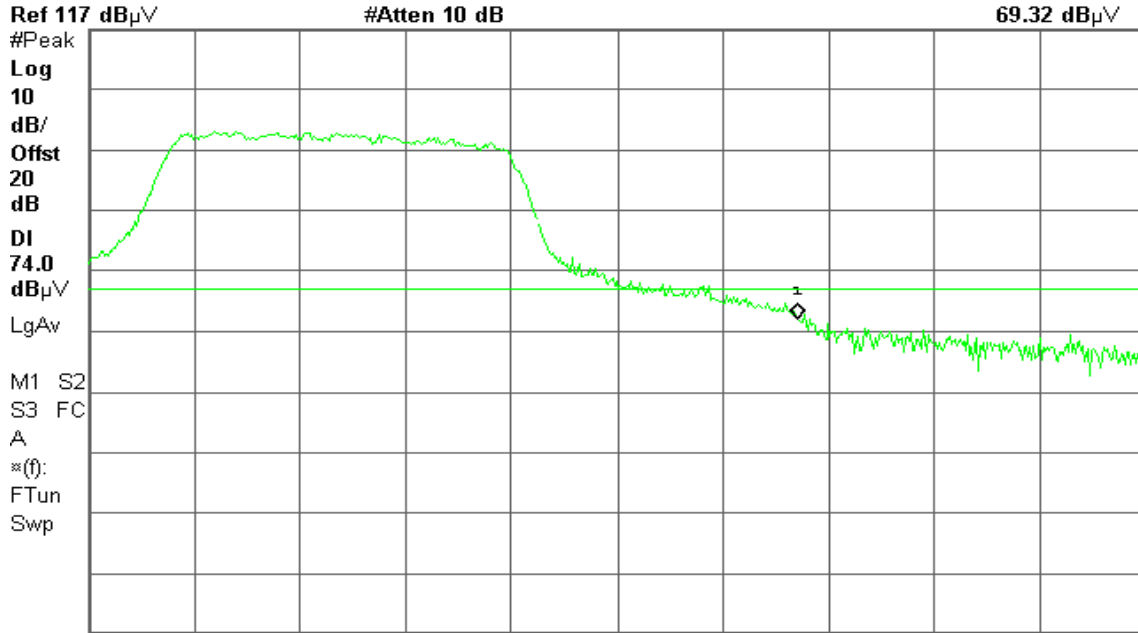
Detector mode: Peak

Polarity: Horizontal

Agilent 19:55:27 Apr 14, 2005

R T

Mkr1 2.483 50 GHz  
69.32 dBμV



Start 2.450 00 GHz #Res BW 1 MHz #VBW 1 MHz Stop 2.500 00 GHz #Sweep 100 ms (601 pts)

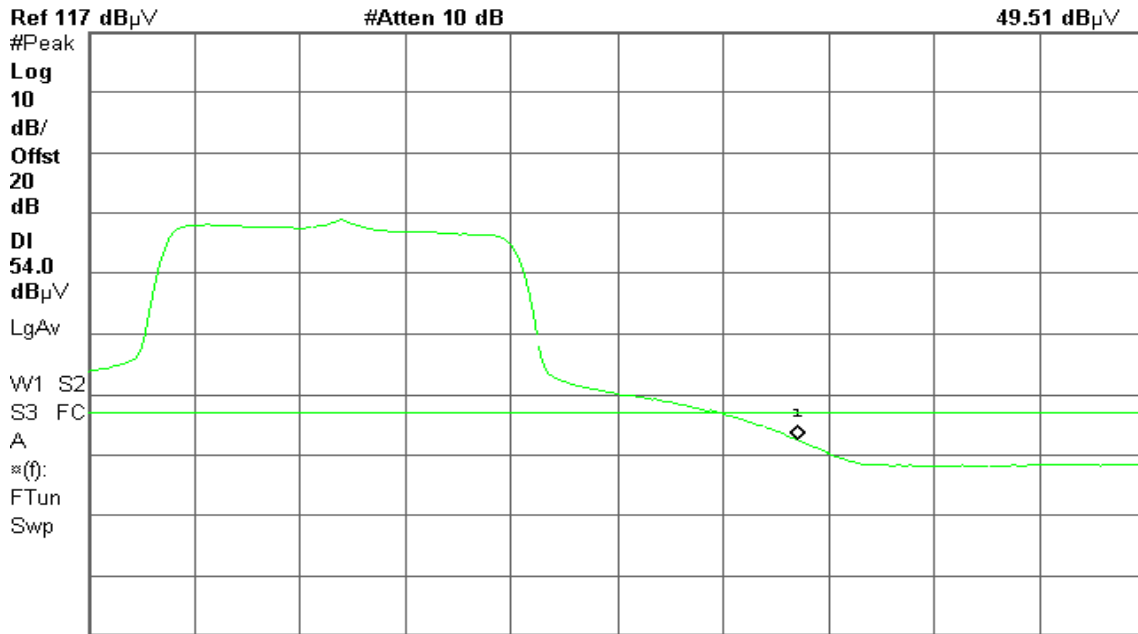
Detector mode: Average

Polarity: Horizontal

Agilent 19:54:15 Apr 14, 2005

R T

Mkr1 2.483 50 GHz  
49.51 dBμV



Start 2.450 00 GHz #Res BW 1 MHz #VBW 10 Hz Sweep 3.899 s (601 pts)



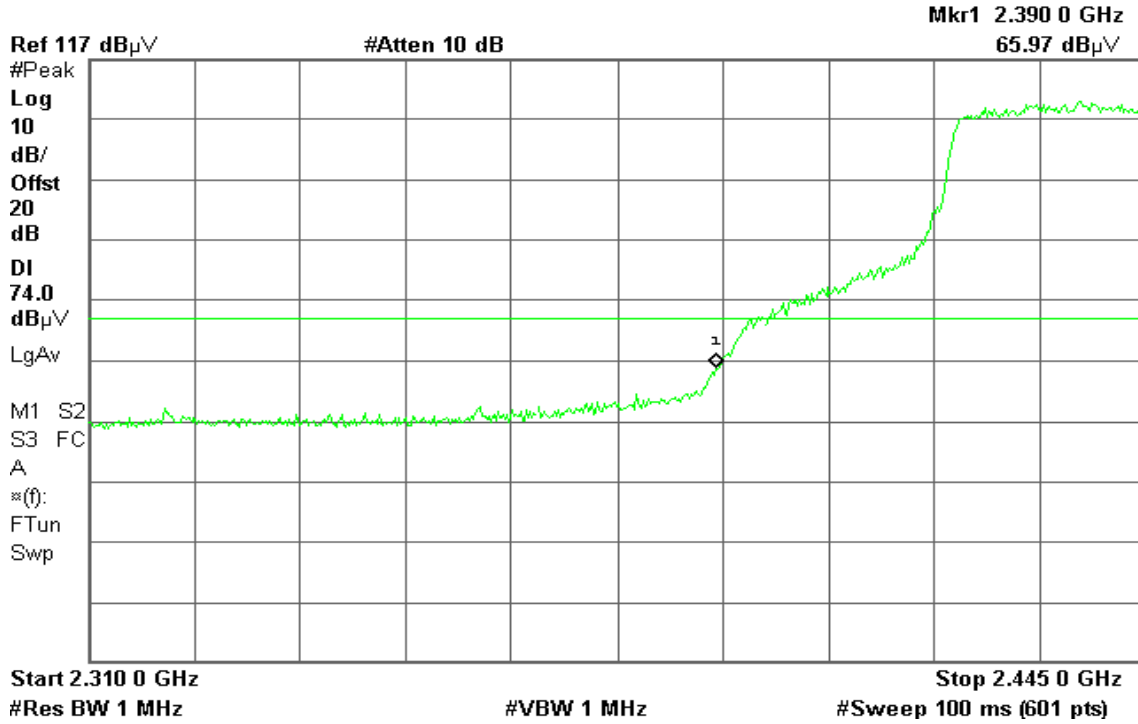
### Band Edges (IEEE 802.11g Turbo mode / CH Mid)

Detector mode: Peak

Polarity: Vertical

Agilent 20:01:23 Apr 14, 2005

R T

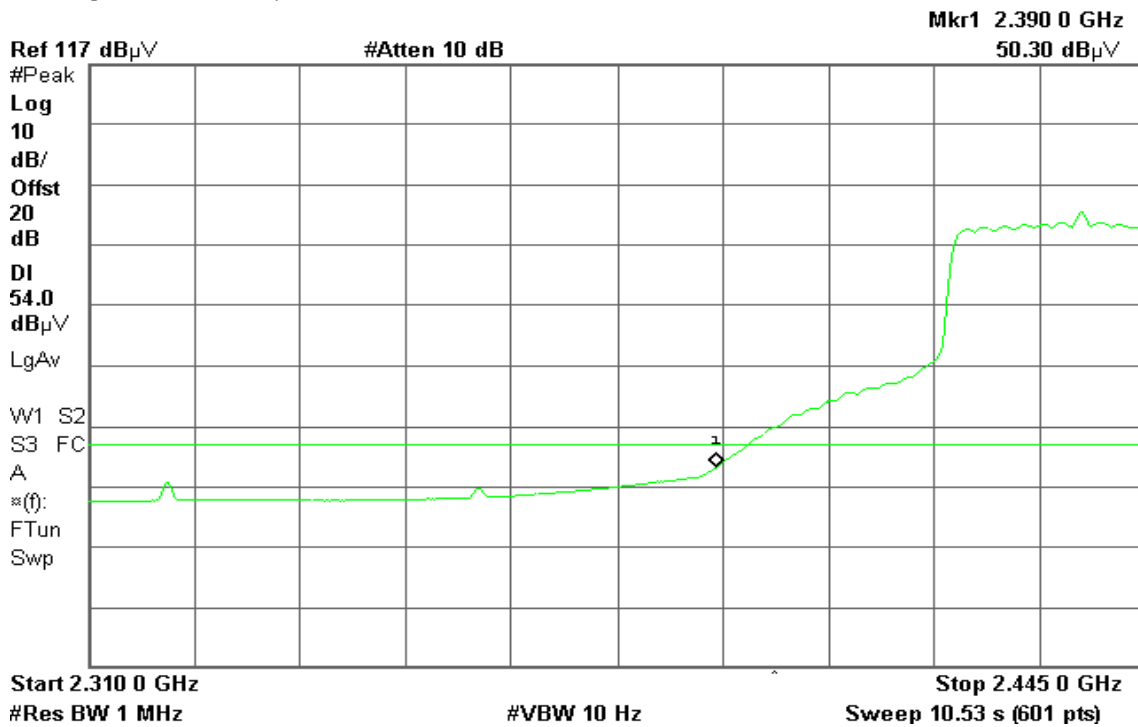


Detector mode: Average

Polarity: Vertical

Agilent 20:00:31 Apr 14, 2005

R T





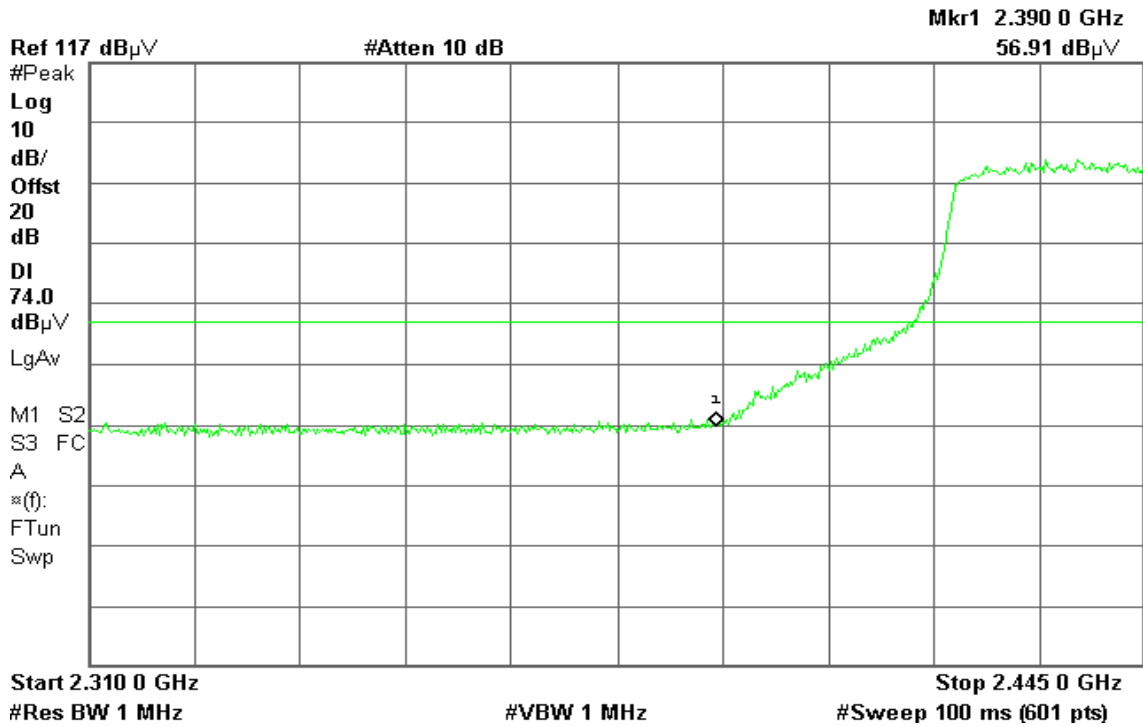


Detector mode: Peak

Polarity: Horizontal

Agilent 20:08:19 Apr 14, 2005

R T

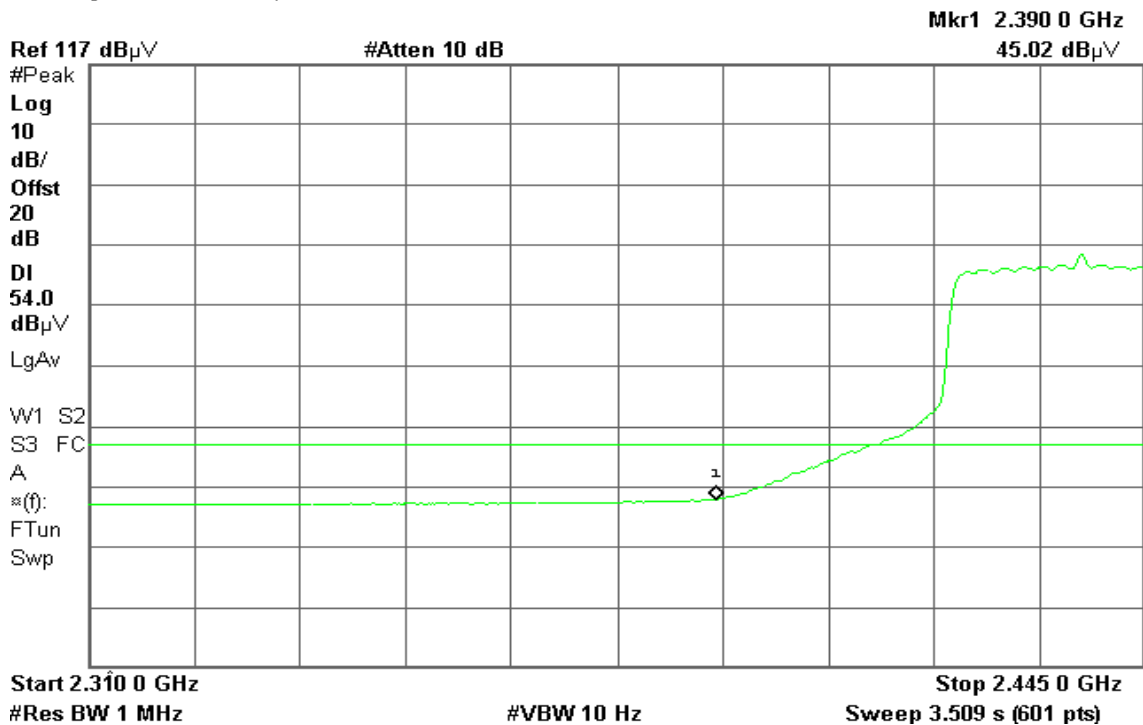


Detector mode: Average

Polarity: Horizontal

Agilent 20:07:53 Apr 14, 2005

R T





### Band Edges (IEEE 802.11g Turbo mode / CH Mid)

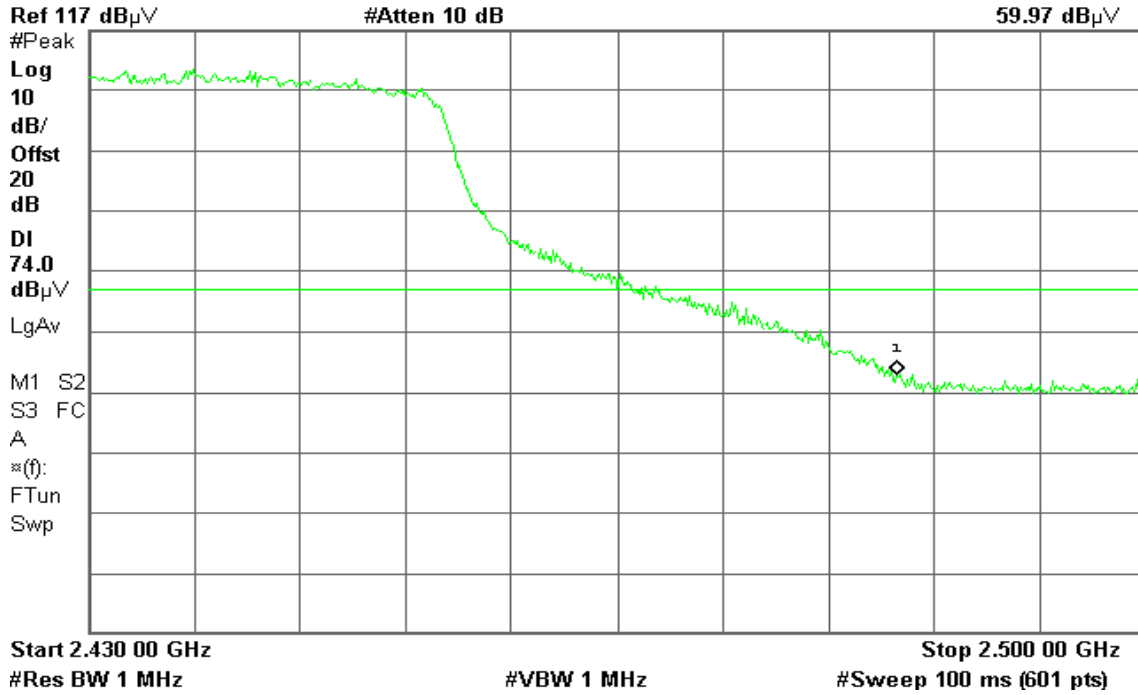
Detector mode: Peak

Polarity: Vertical

Agilent 20:03:01 Apr 14, 2005

R T

Mkr1 2.483 50 GHz  
59.97 dBμV



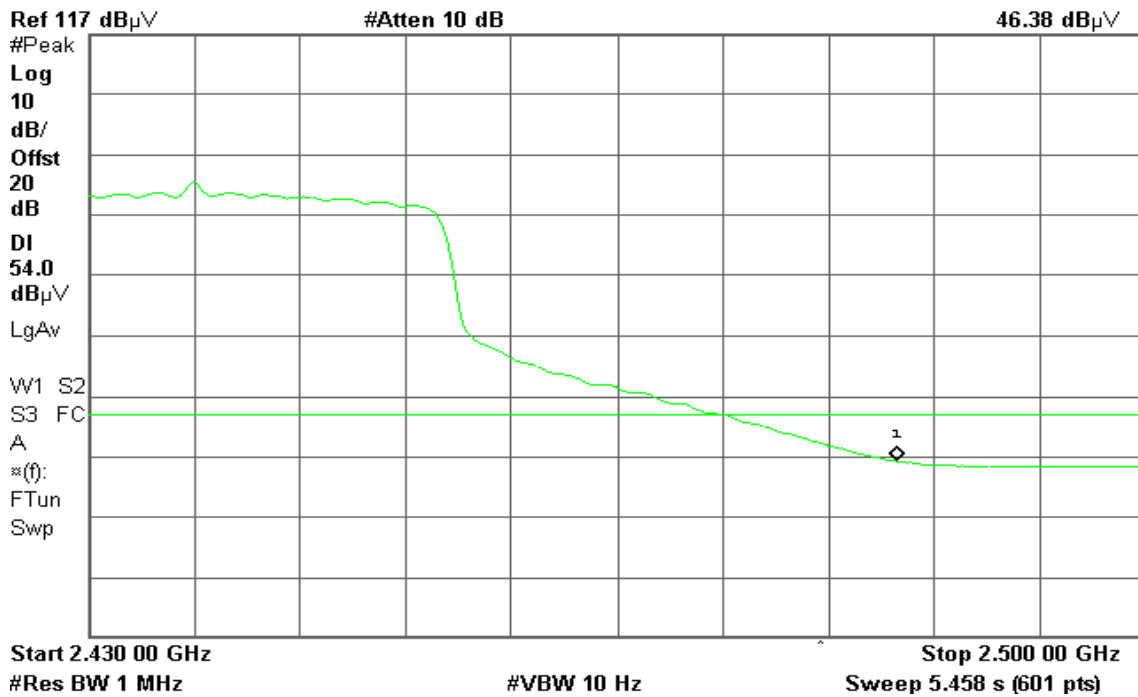
Detector mode: Average

Polarity: Vertical

Agilent 20:02:23 Apr 14, 2005

R T

Mkr1 2.483 50 GHz  
46.38 dBμV





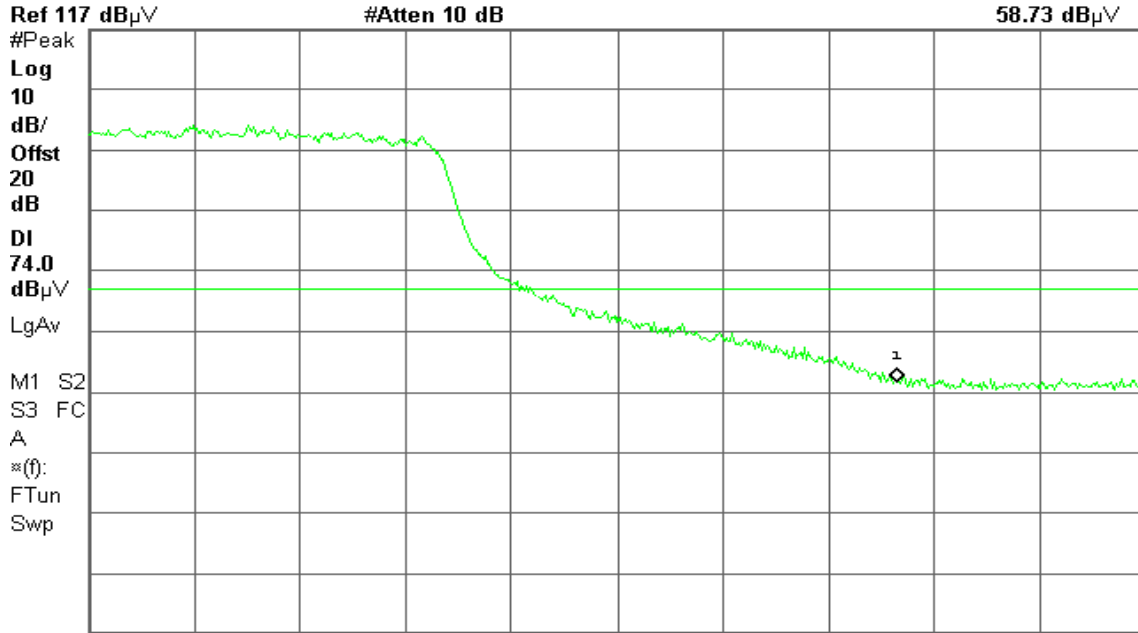
Detector mode: Peak

Polarity: Horizontal

Agilent 20:05:08 Apr 14, 2005

R T

Mkr1 2.483 50 GHz  
58.73 dBμV



#Res BW 1 MHz #VBW 1 MHz #Sweep 100 ms (601 pts)

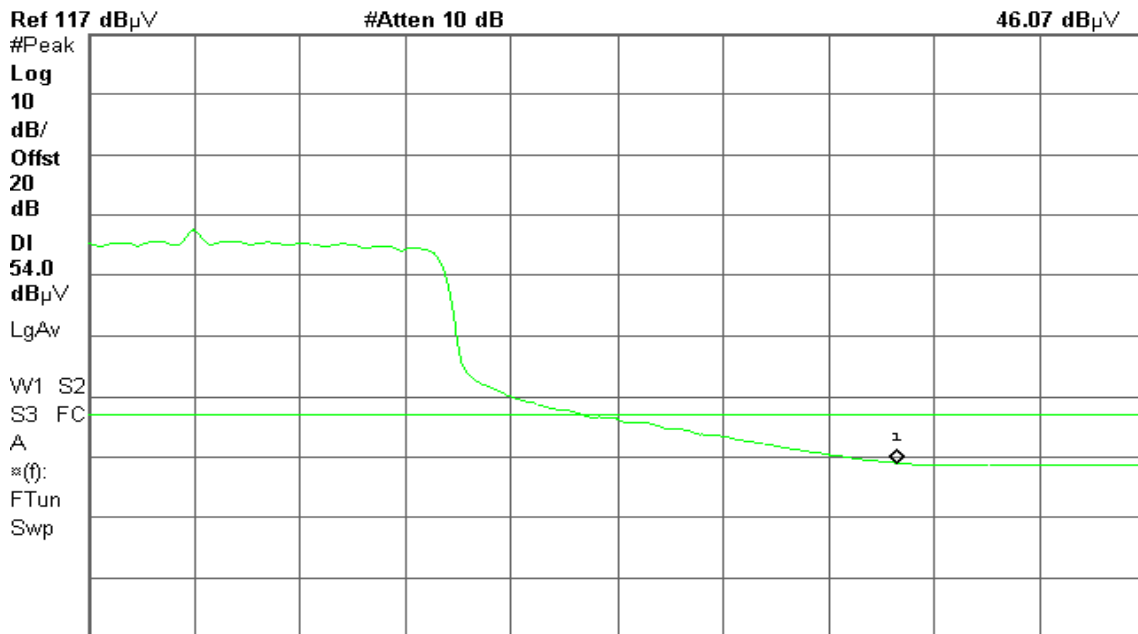
Detector mode: Average

Polarity: Horizontal

Agilent 20:05:35 Apr 14, 2005

R T

Mkr1 2.483 50 GHz  
46.07 dBμV



#Res BW 1 MHz #VBW 10 Hz Sweep 5.458 s (601 pts)



Test mode: PIFA Antenna / THW1055A1 / 0.0 dBi

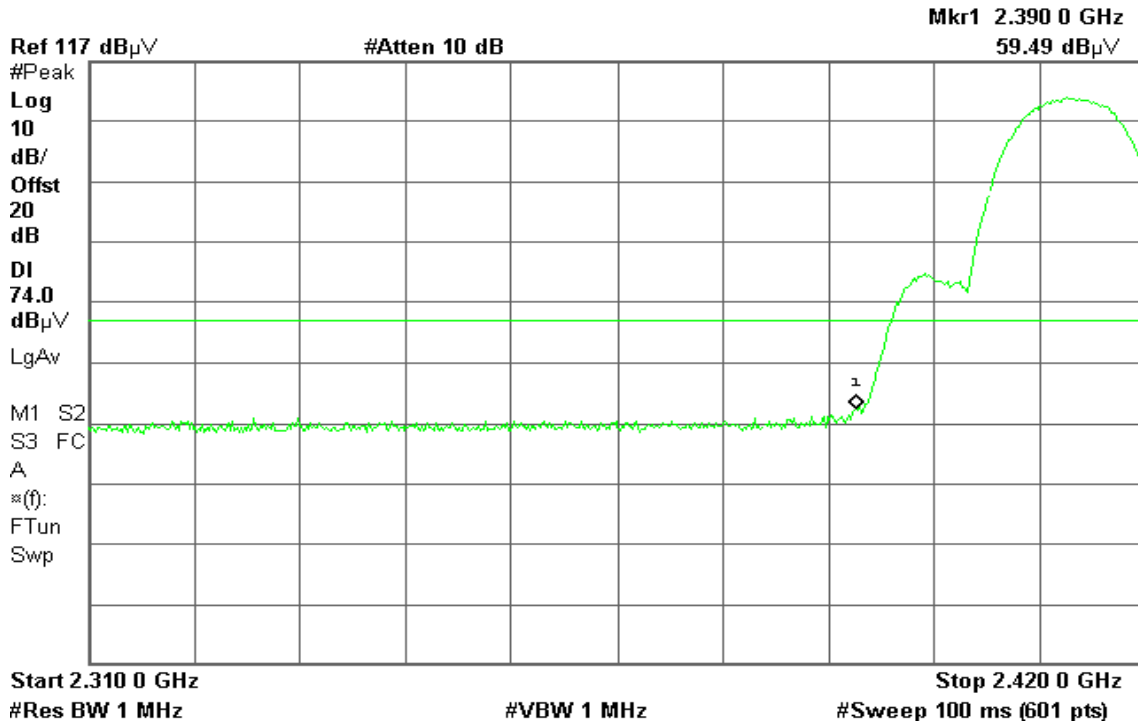
Band Edges (IEEE 802.11b Base mode / CH Low)

Detector mode: Peak

Polarity: Vertical

Agilent 20:41:51 Apr 14, 2005

R T



Detector mode: Average

Polarity: Vertical

Agilent 20:41:29 Apr 14, 2005

R T



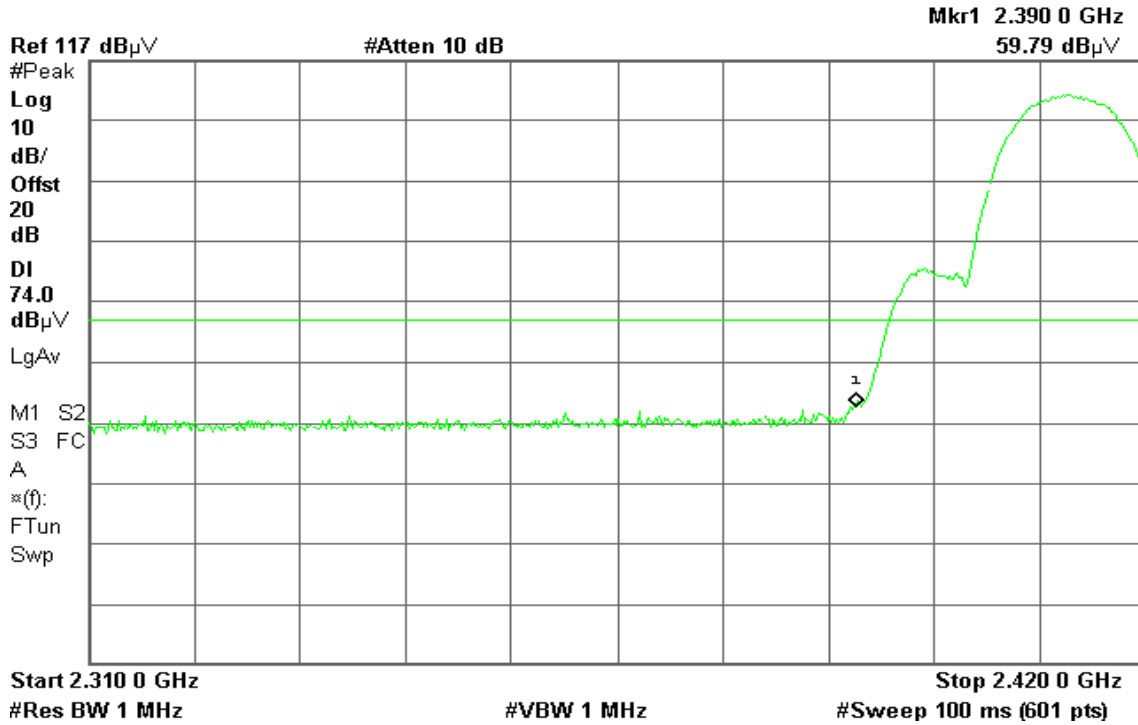


Detector mode: Peak

Polarity: Horizontal

Agilent 20:39:37 Apr 14, 2005

R T



Detector mode: Average

Polarity: Horizontal

Agilent 20:39:05 Apr 14, 2005

R T





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

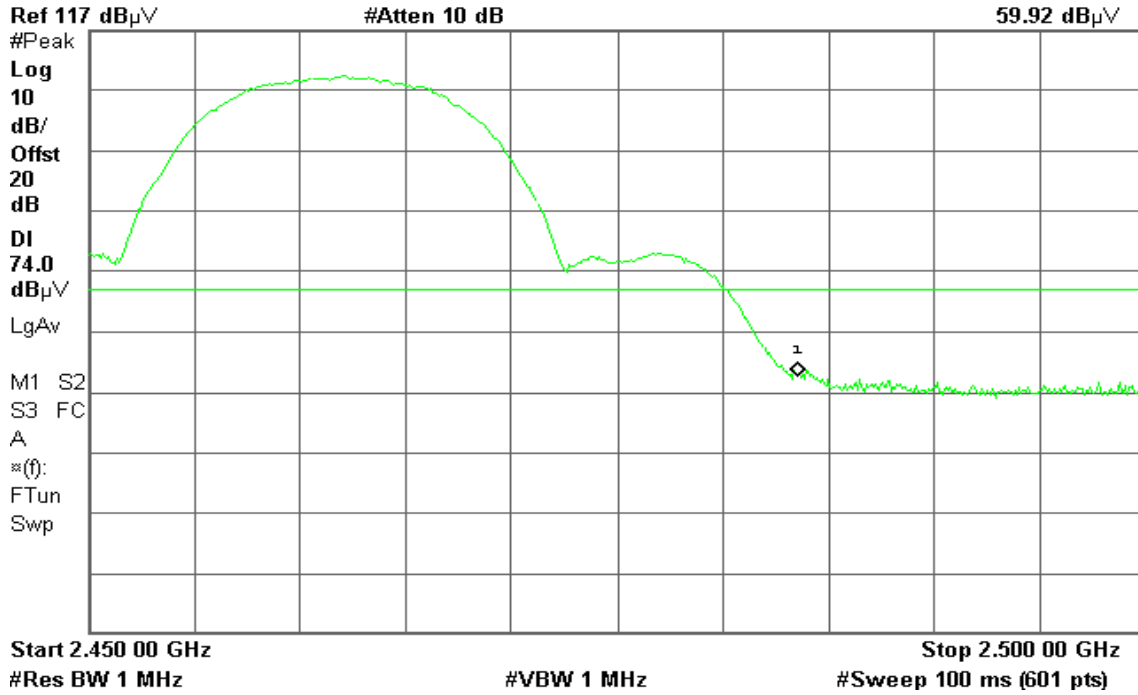
Detector mode: Peak

Polarity: Vertical

Agilent 20:44:17 Apr 14, 2005

R T

Mkr1 2.483 50 GHz  
59.92 dB $\mu$ V



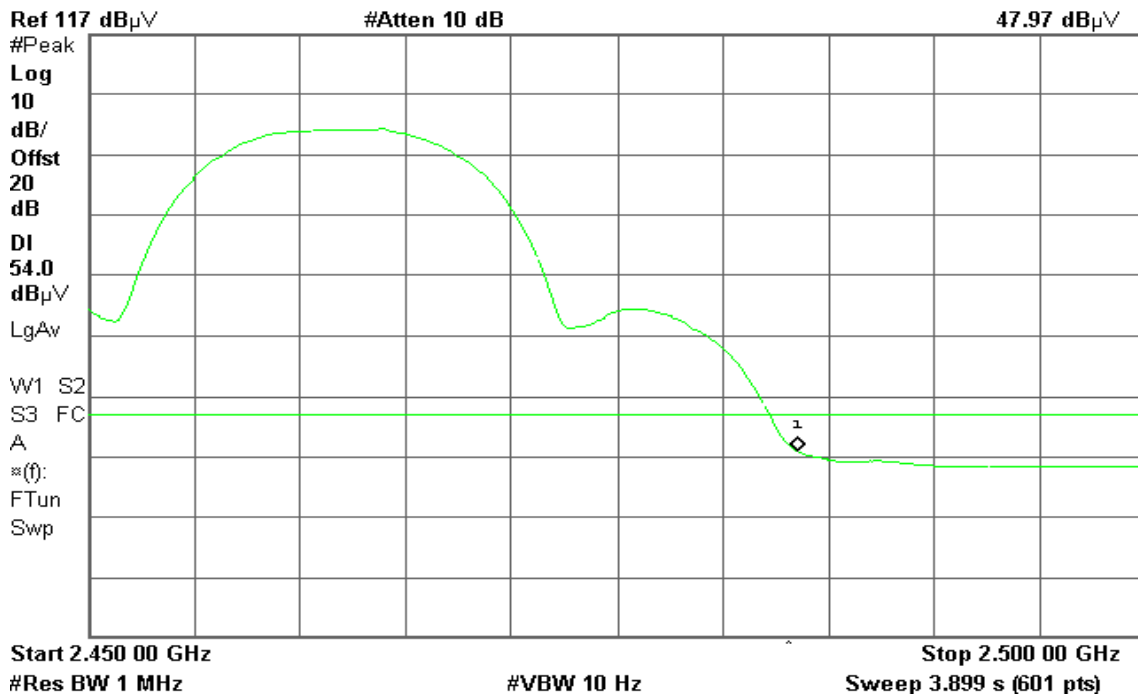
Detector mode: Average

Polarity: Vertical

Agilent 20:43:56 Apr 14, 2005

R T

Mkr1 2.483 50 GHz  
47.97 dB $\mu$ V





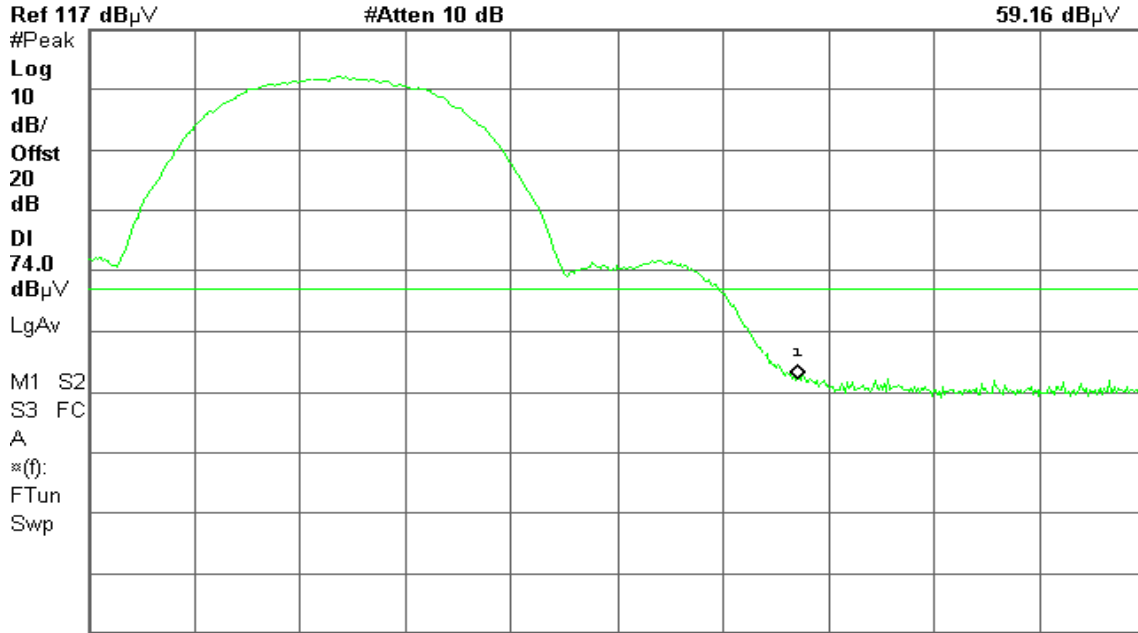
Detector mode: Peak

Polarity: Horizontal

Agilent 20:46:29 Apr 14, 2005

R T

Mkr1 2.483 50 GHz  
59.16 dBμV



Start 2.450 00 GHz #Res BW 1 MHz #VBW 1 MHz Stop 2.500 00 GHz #Sweep 100 ms (601 pts)

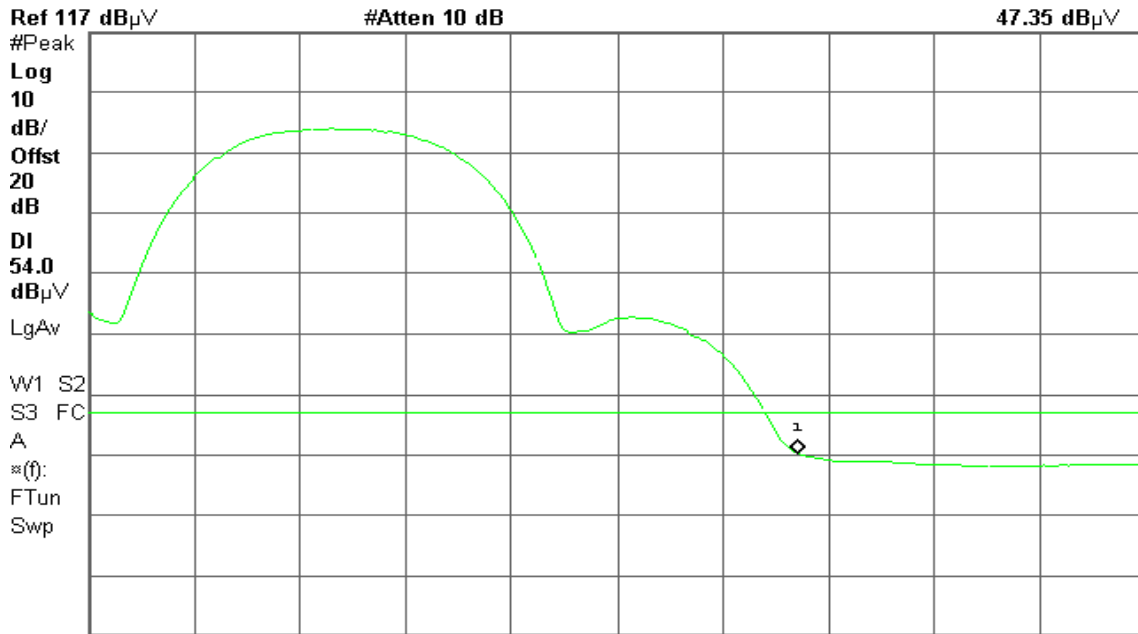
Detector mode: Average

Polarity: Horizontal

Agilent 20:46:06 Apr 14, 2005

R T

Mkr1 2.483 50 GHz  
47.35 dBμV



Start 2.450 00 GHz #Res BW 1 MHz #VBW 10 Hz Stop 2.500 00 GHz #Sweep 3.899 s (601 pts)



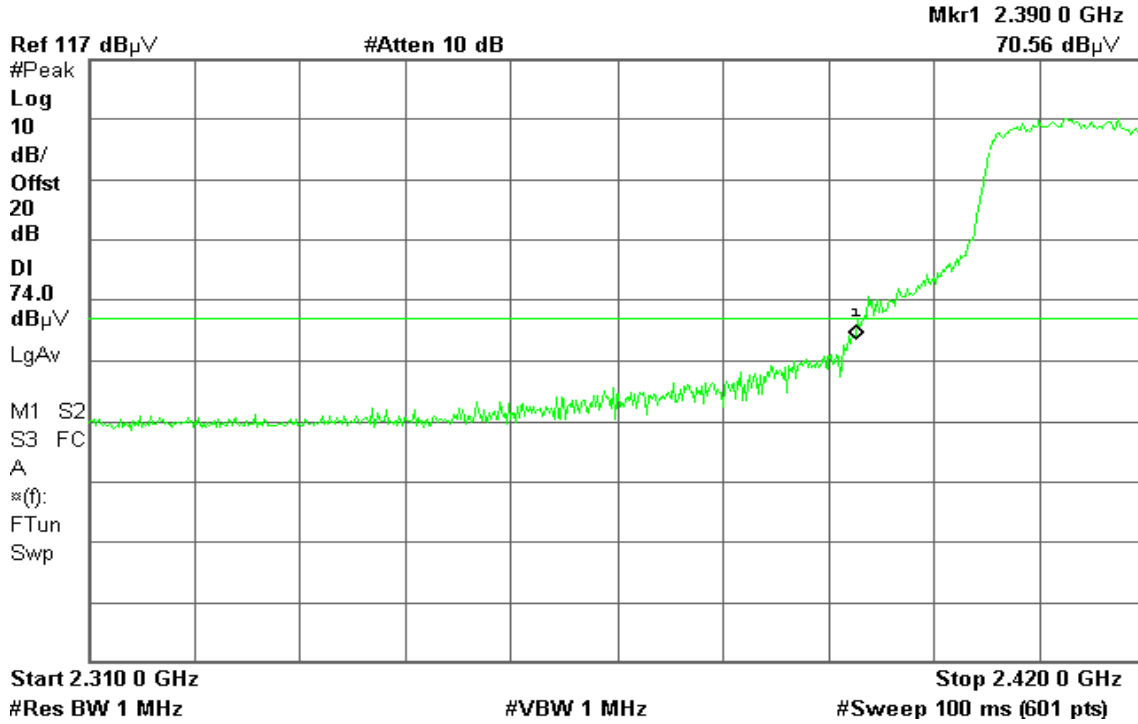
### Band Edges (IEEE 802.11g Base mode / CH Low)

Detector mode: Peak

Polarity: Vertical

Agilent 20:56:38 Apr 14, 2005

R T

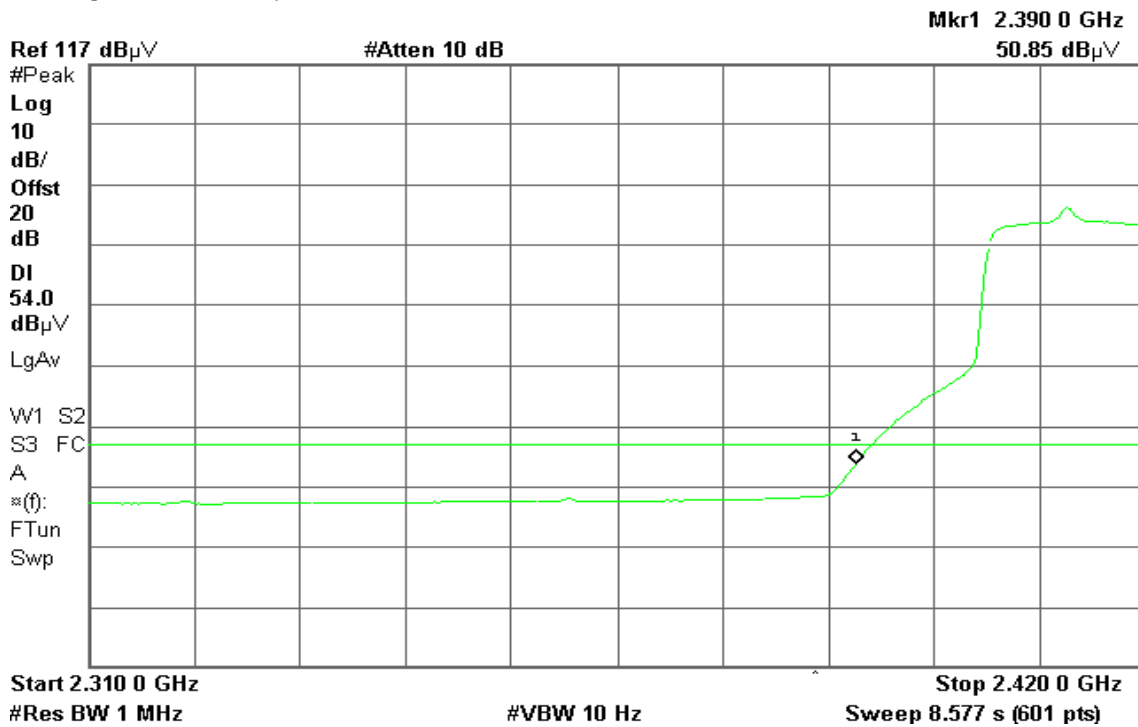


Detector mode: Average

Polarity: Vertical

Agilent 20:57:01 Apr 14, 2005

R T





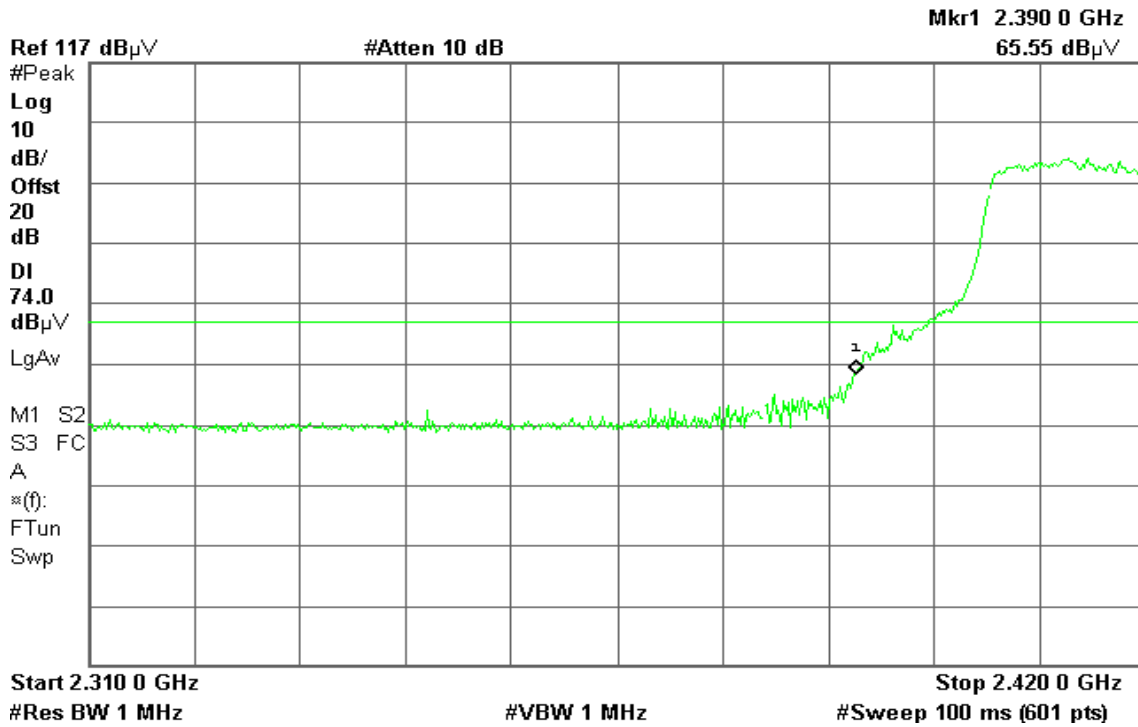


Detector mode: Peak

Polarity: Horizontal

Agilent 20:58:19 Apr 14, 2005

R T

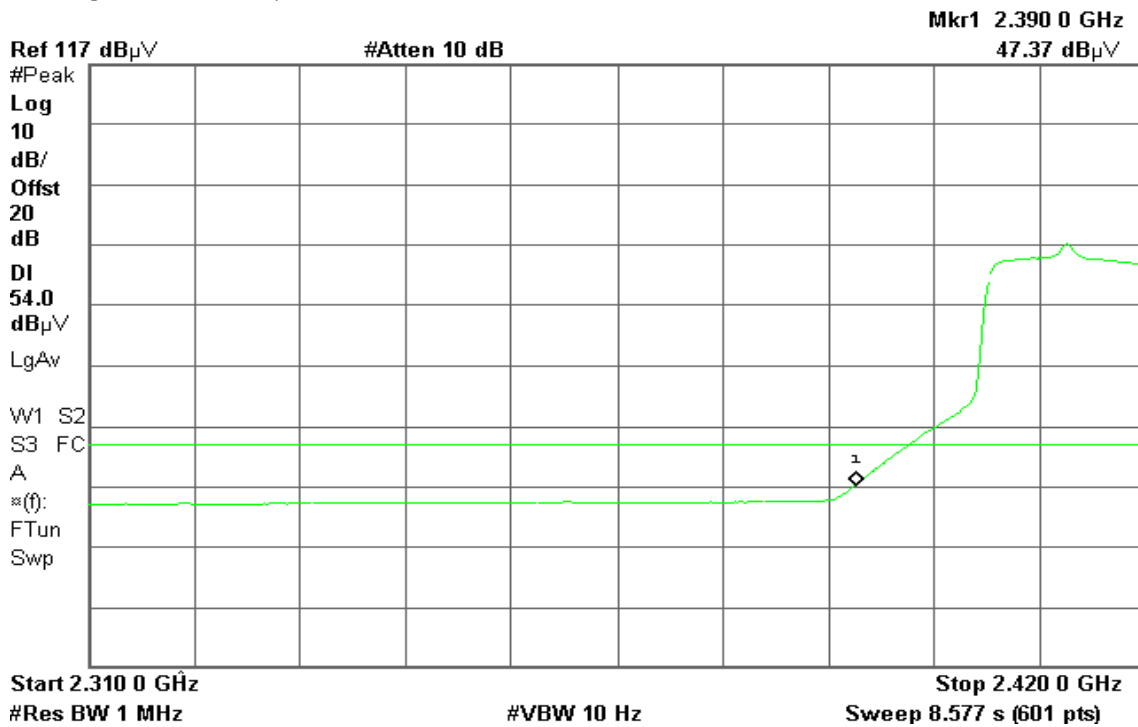


Detector mode: Average

Polarity: Horizontal

Agilent 20:58:46 Apr 14, 2005

R T





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

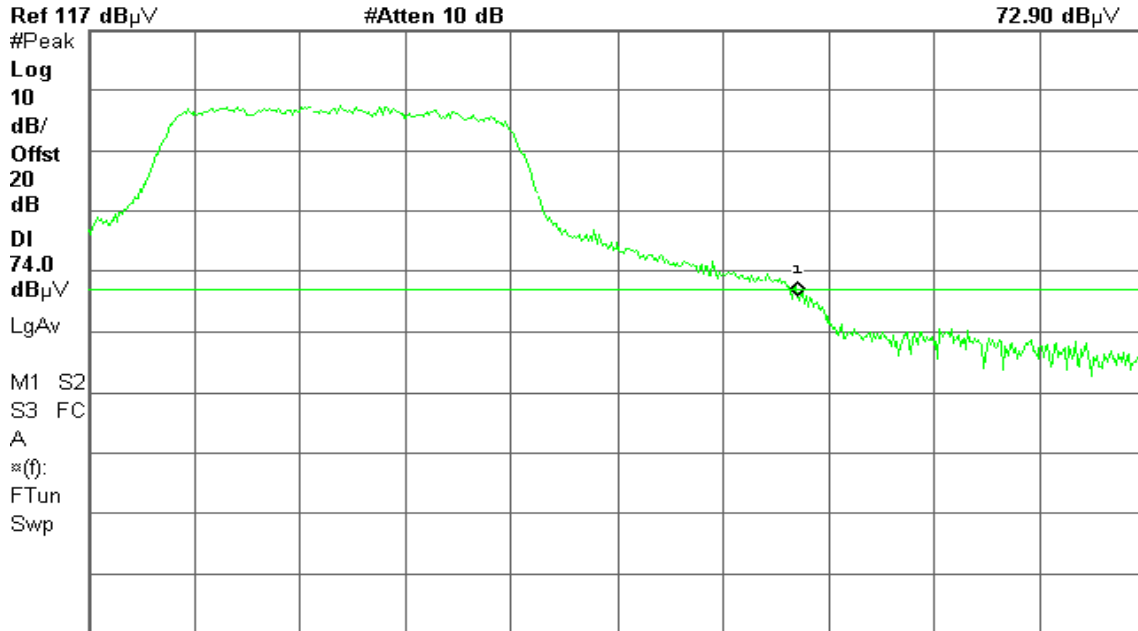
Detector mode: Peak

Polarity: Vertical

Agilent 20:54:21 Apr 14, 2005

R T

Mkr1 2.483 50 GHz  
72.90 dB $\mu$ V



Start 2.450 00 GHz Stop 2.500 00 GHz  
#Res BW 1 MHz #VBW 1 MHz #Sweep 100 ms (601 pts)

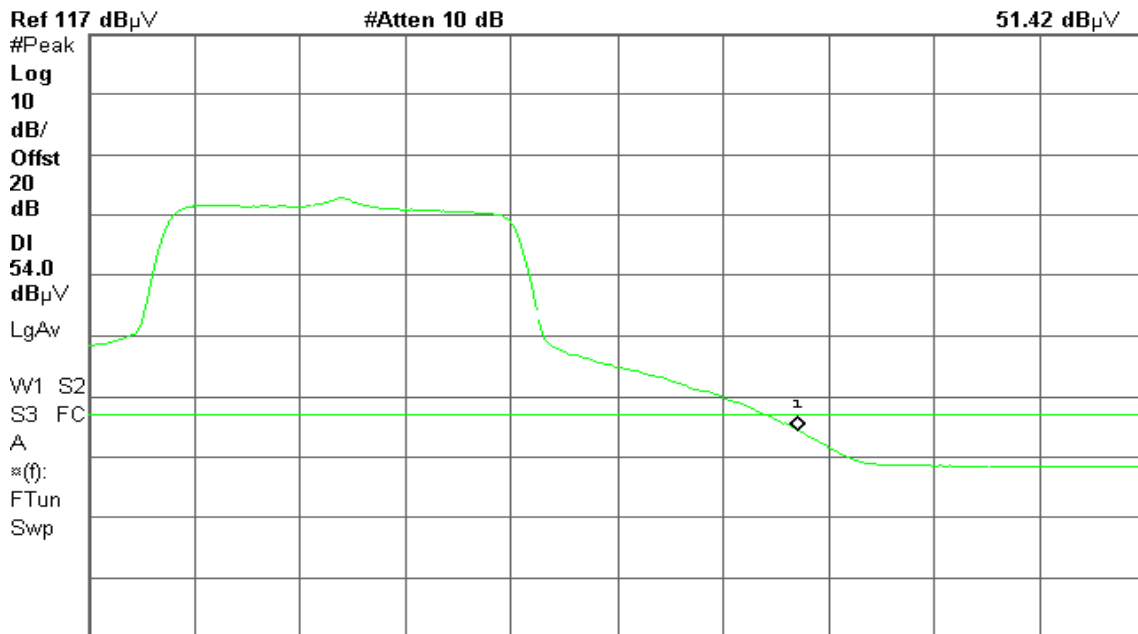
Detector mode: Average

Polarity: Vertical

Agilent 20:53:10 Apr 14, 2005

R T

Mkr1 2.483 50 GHz  
51.42 dB $\mu$ V



Start 2.450 00 GHz Stop 2.500 00 GHz  
#Res BW 1 MHz #VBW 10 Hz Sweep 3.899 s (601 pts)



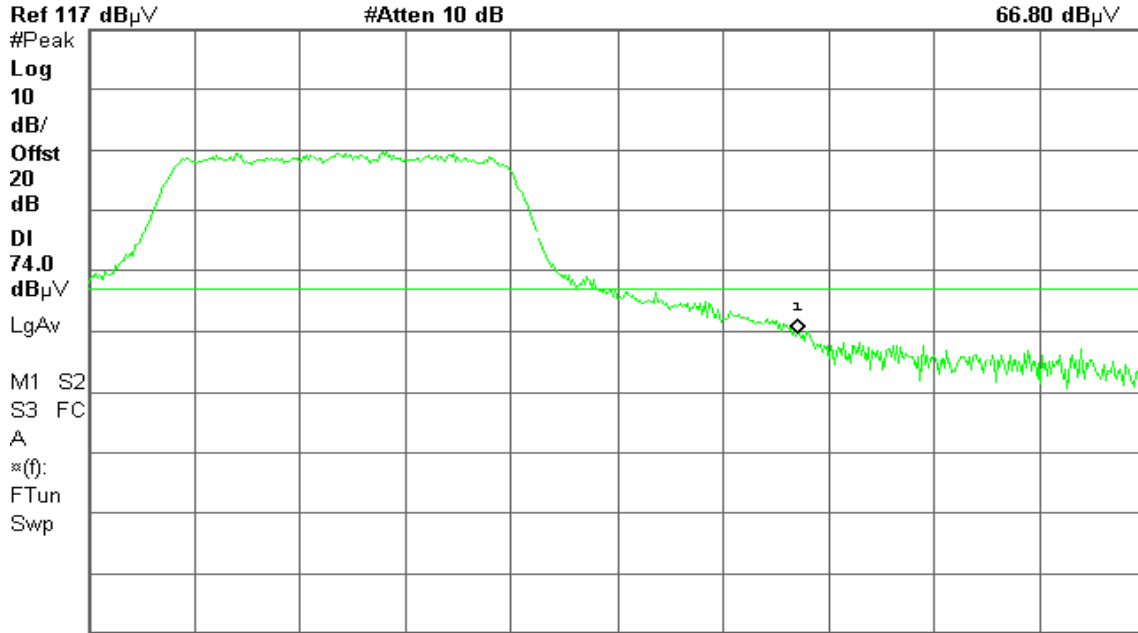
Detector mode: Peak

Polarity: Horizontal

Agilent 20:49:26 Apr 14, 2005

R T

Mkr1 2.483 50 GHz  
66.80 dBμV



Start 2.450 00 GHz #Res BW 1 MHz #VBW 1 MHz Stop 2.500 00 GHz #Sweep 100 ms (601 pts)

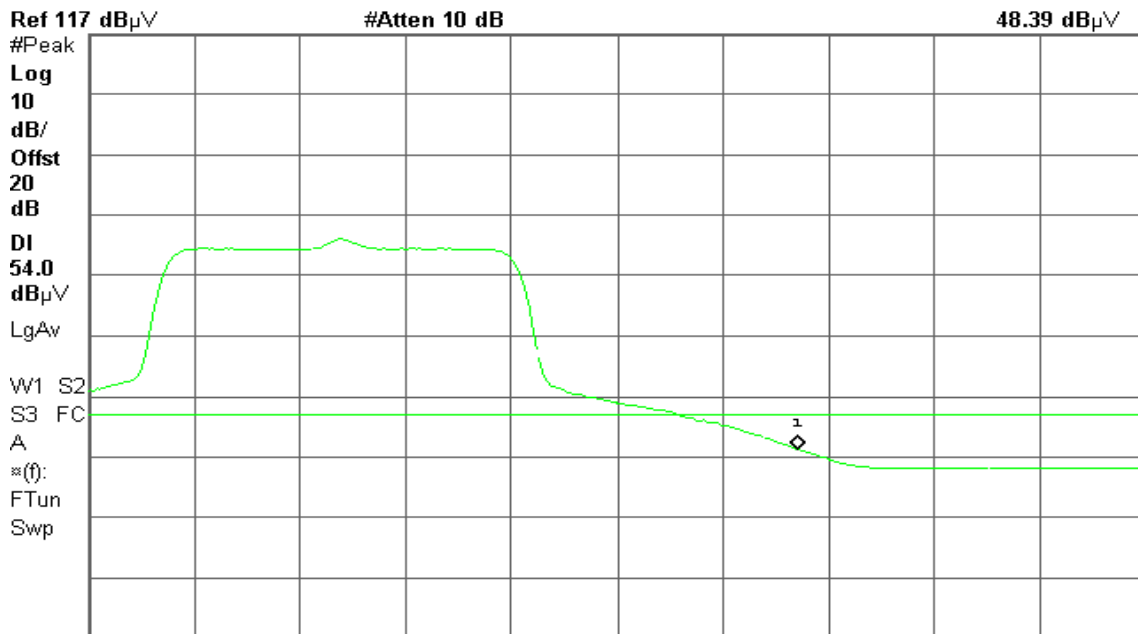
Detector mode: Average

Polarity: Horizontal

Agilent 20:49:51 Apr 14, 2005

R T

Mkr1 2.483 50 GHz  
48.39 dBμV



Start 2.450 00 GHz #Res BW 1 MHz #VBW 10 Hz Sweep 3.899 s (601 pts)



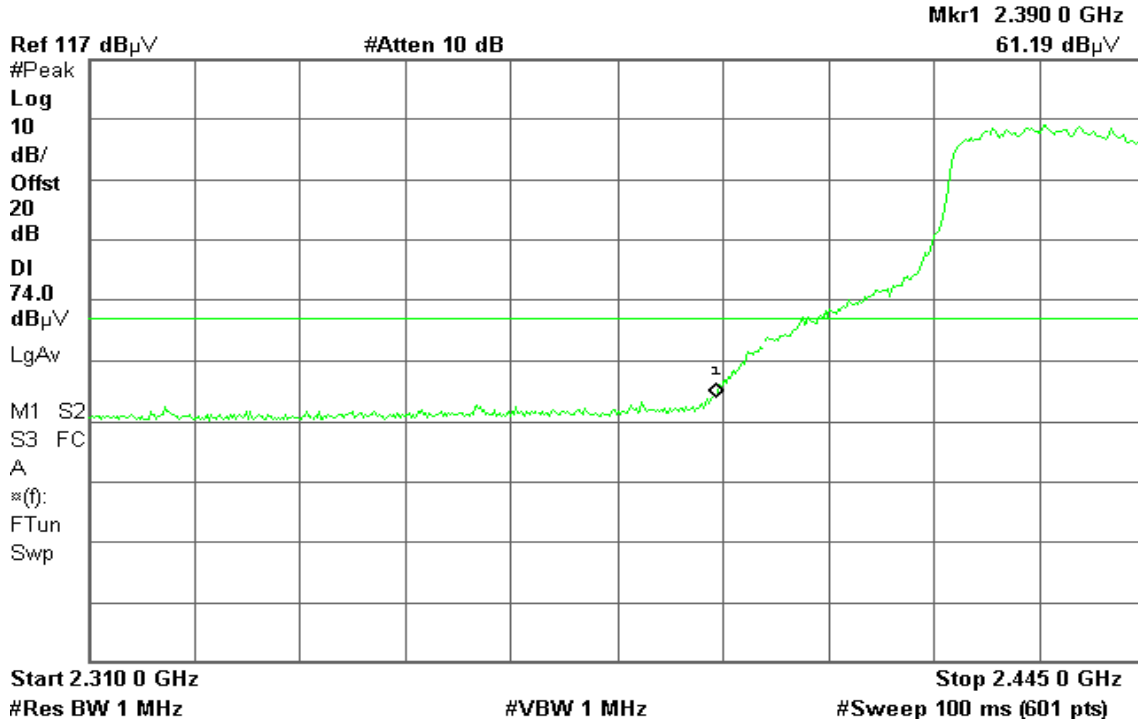
### Band Edges (IEEE 802.11g Turbo mode / CH Mid)

Detector mode: Peak

Polarity: Vertical

Agilent 20:29:48 Apr 14, 2005

R T

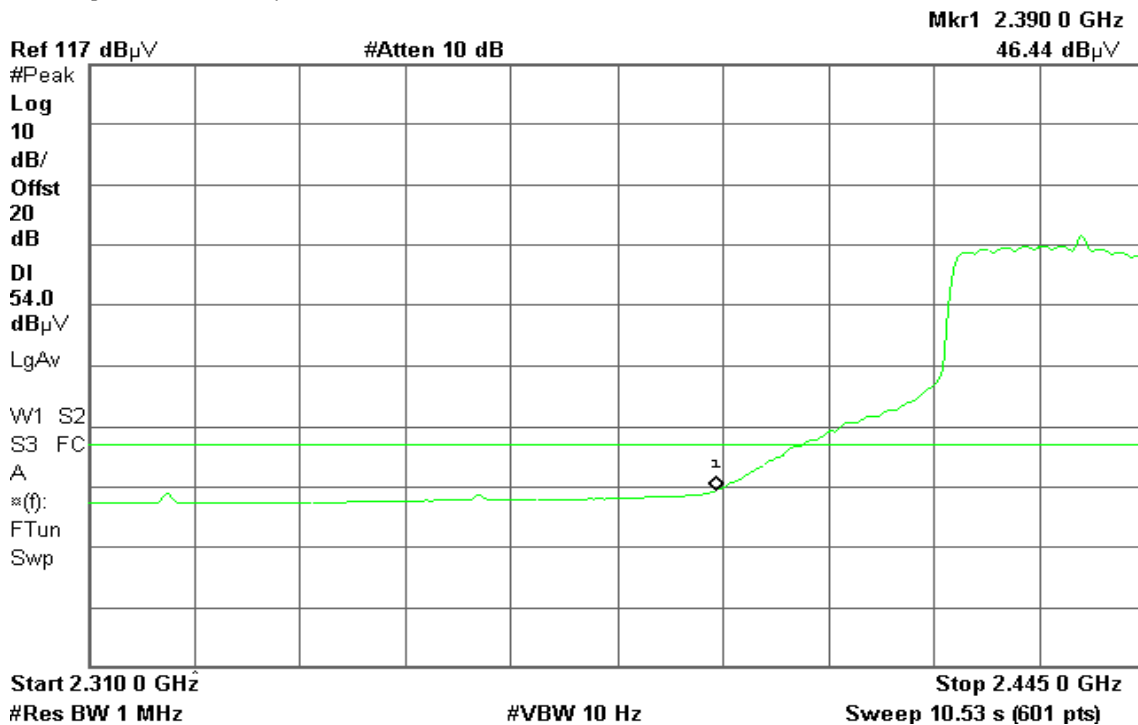


Detector mode: Average

Polarity: Vertical

Agilent 20:30:24 Apr 14, 2005

R T



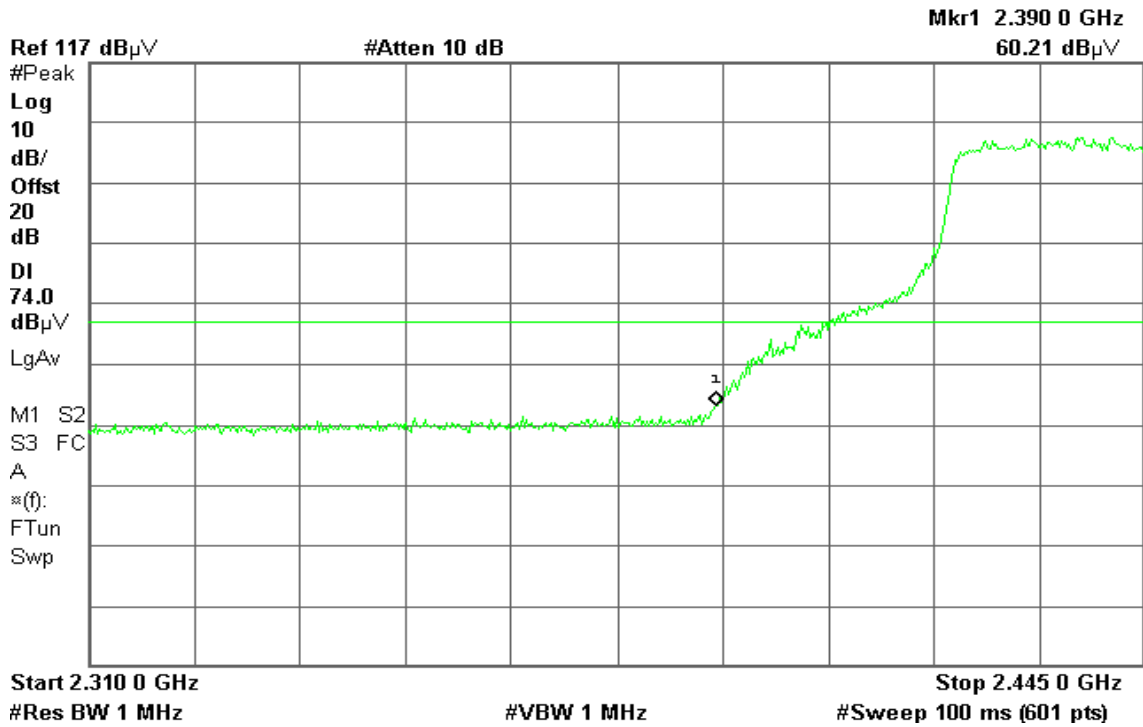


Detector mode: Peak

Polarity: Horizontal

Agilent 20:35:36 Apr 14, 2005

R T



Detector mode: Average

Polarity: Horizontal

Agilent 20:35:11 Apr 14, 2005

R T





### Band Edges (IEEE 802.11g Turbo mode / CH Mid)

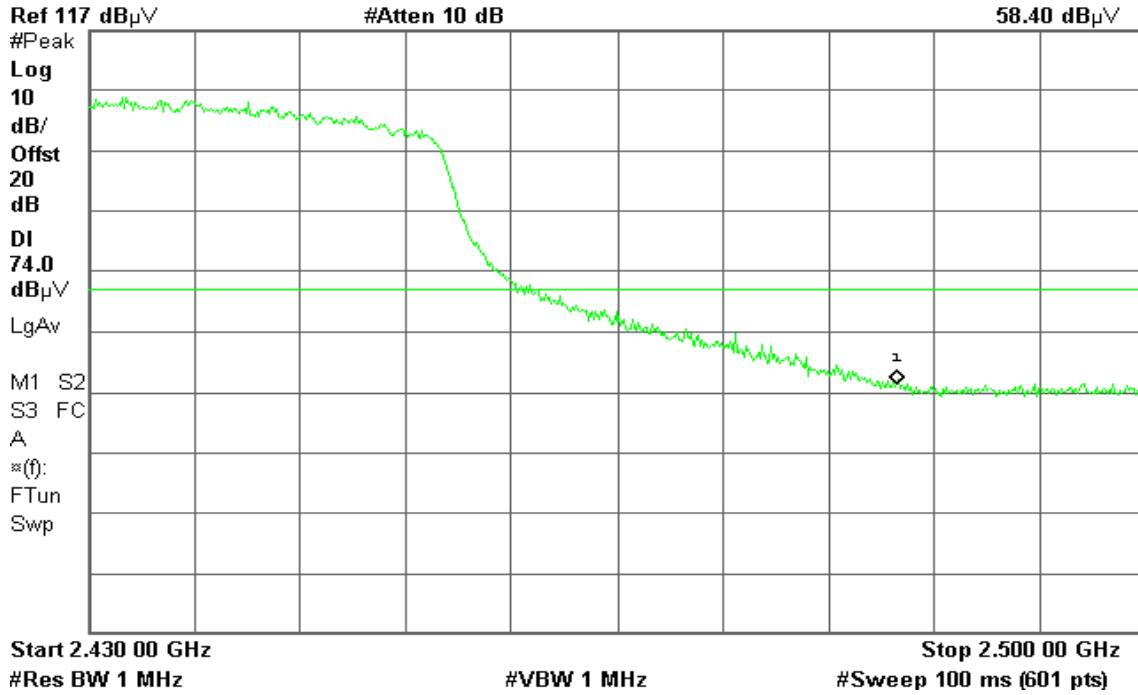
Detector mode: Peak

Polarity: Vertical

Agilent 20:32:05 Apr 14, 2005

R T

Mkr1 2.483 50 GHz  
58.40 dBμV



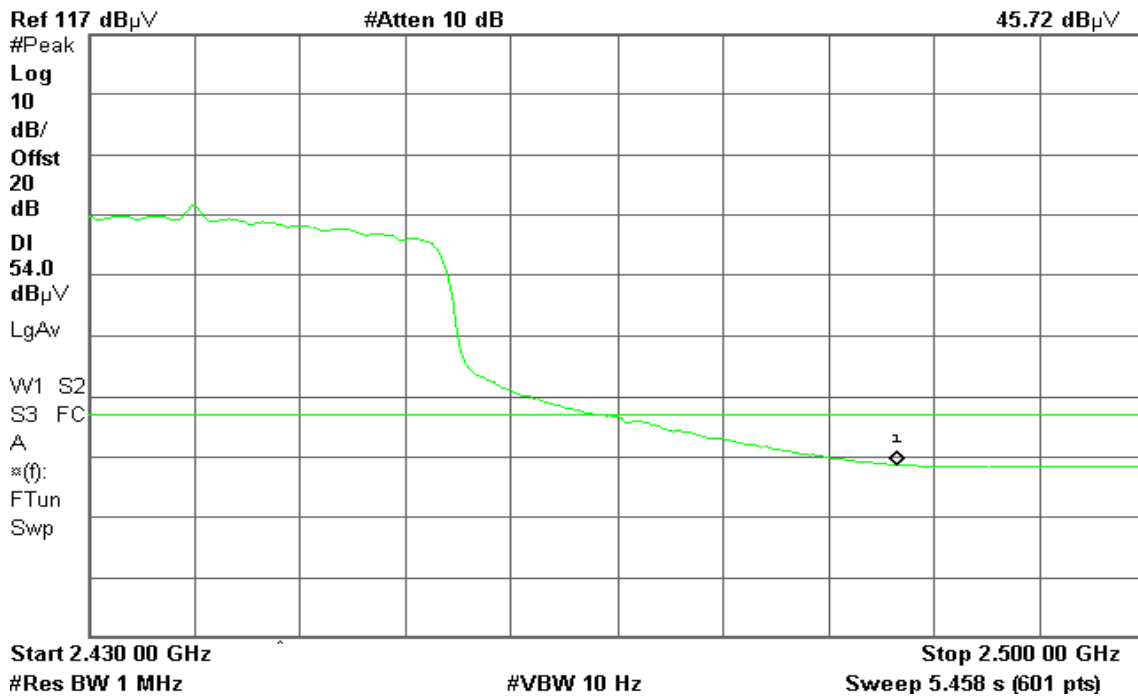
Detector mode: Average

Polarity: Vertical

Agilent 20:31:46 Apr 14, 2005

R T

Mkr1 2.483 50 GHz  
45.72 dBμV





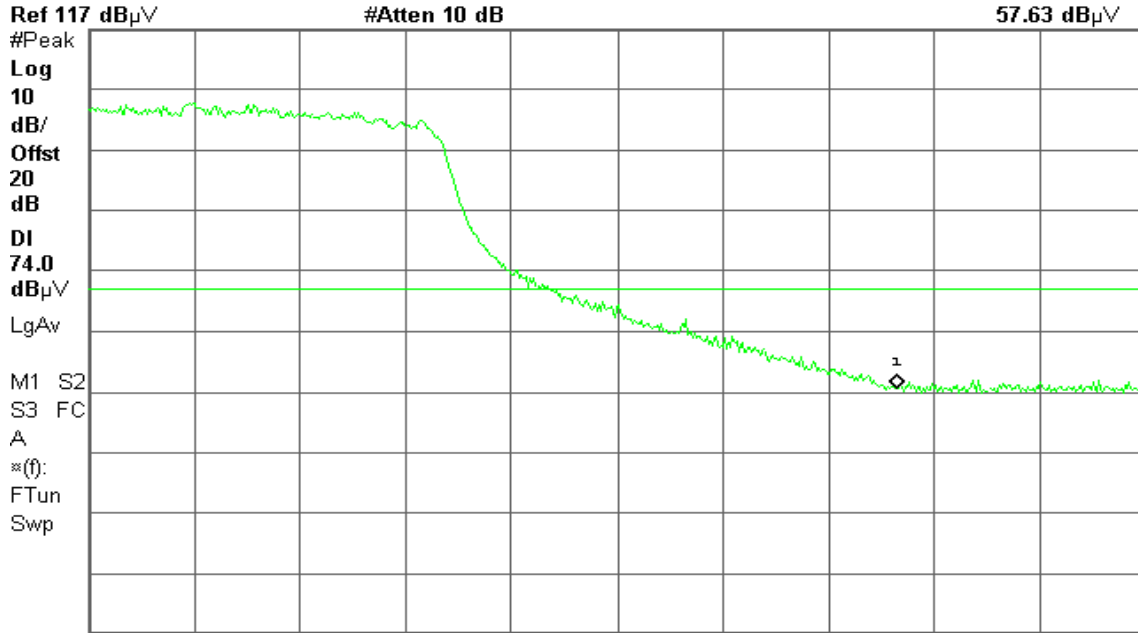
Detector mode: Peak

Polarity: Horizontal

Agilent 20:33:14 Apr 14, 2005

R T

Mkr1 2.483 50 GHz  
57.63 dBμV



Start 2.430 00 GHz  
#Res BW 1 MHz

#VBW 1 MHz

Stop 2.500 00 GHz  
#Sweep 100 ms (601 pts)

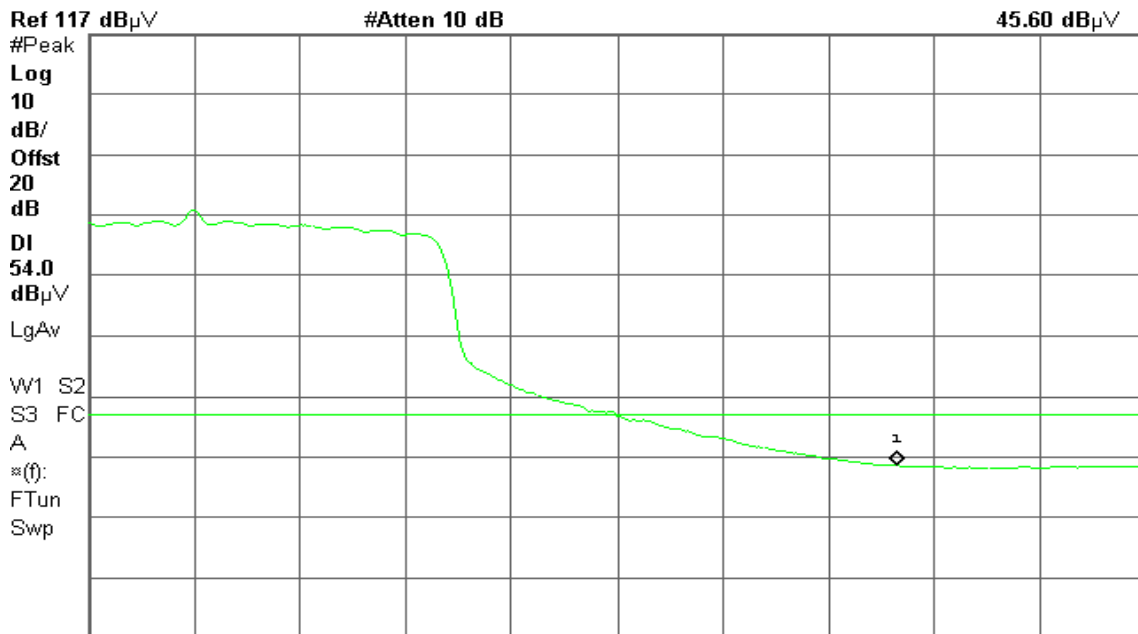
Detector mode: Average

Polarity: Horizontal

Agilent 20:33:34 Apr 14, 2005

R T

Mkr1 2.483 50 GHz  
45.60 dBμV



Start 2.430 00 GHz  
#Res BW 1 MHz

#VBW 10 Hz

Stop 2.500 00 GHz  
Sweep 5.458 s (601 pts)

## 7.4 PEAK POWER SPECTRAL DENSITY

### LIMIT

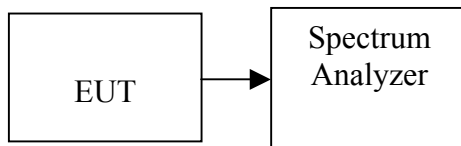
1. For direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.
2. The direct sequence operating of the hybrid system, with the frequency hopping operation turned off, shall comply with the power density requirements of paragraph (d) of this section.

### MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360131	01/10/2006

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

### 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.





### TEST RESULTS

*No non-compliance noted*

#### Test Data

**Test mode: IEEE 802.11b Base mode**

Channel	Frequency	Reading (dBm)	Factor (dB)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-21.29	11.60	-9.69	8.00	PASS
Mid	2437	-17.56	11.60	-5.96		PASS
High	2462	-17.18	11.60	-5.58		PASS

**Test mode: IEEE 802.11g Base mode**

Channel	Frequency	Reading (dBm)	Factor (dB)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-21.39	11.60	-9.79	8.00	PASS
Mid	2437	-18.20	11.60	-6.60		PASS
High	2462	-22.46	11.60	-10.86		PASS

**Test mode: IEEE 802.11g Turbo mode**

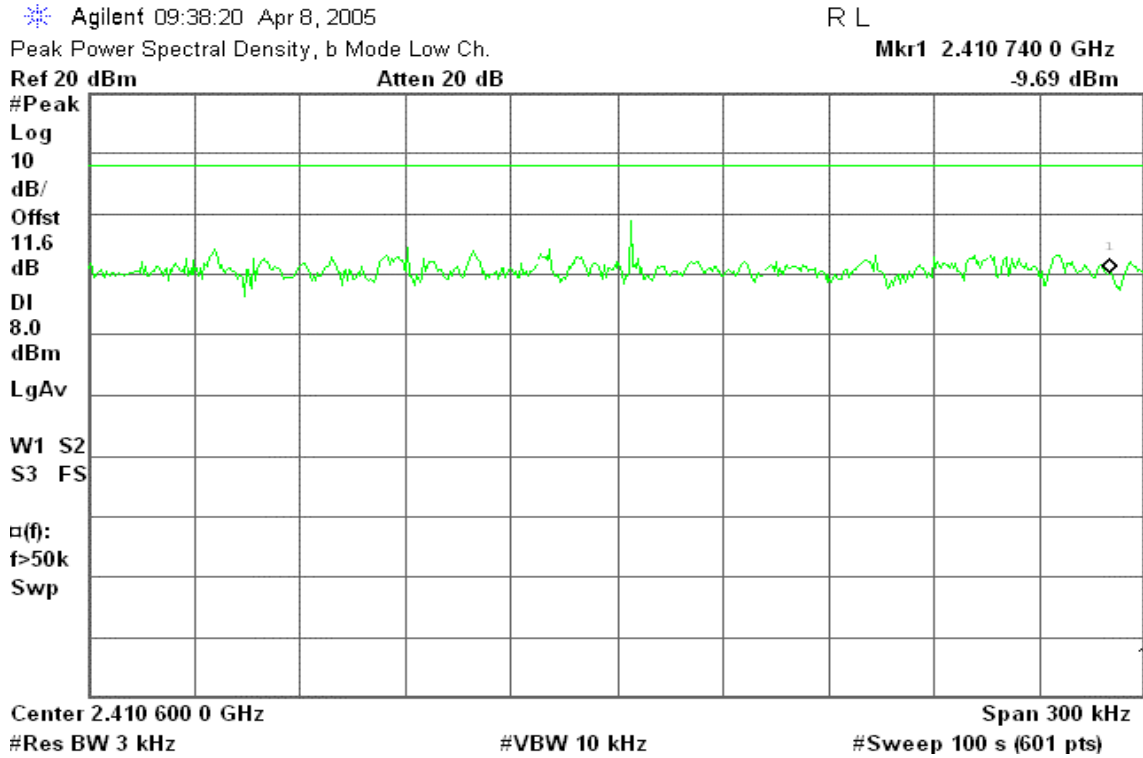
Channel	Frequency	Reading (dBm)	Factor (dB)	PPSD (dBm)	Limit (dBm)	Result
Mid	2437	-23.22	11.60	-11.62	8.00	PASS



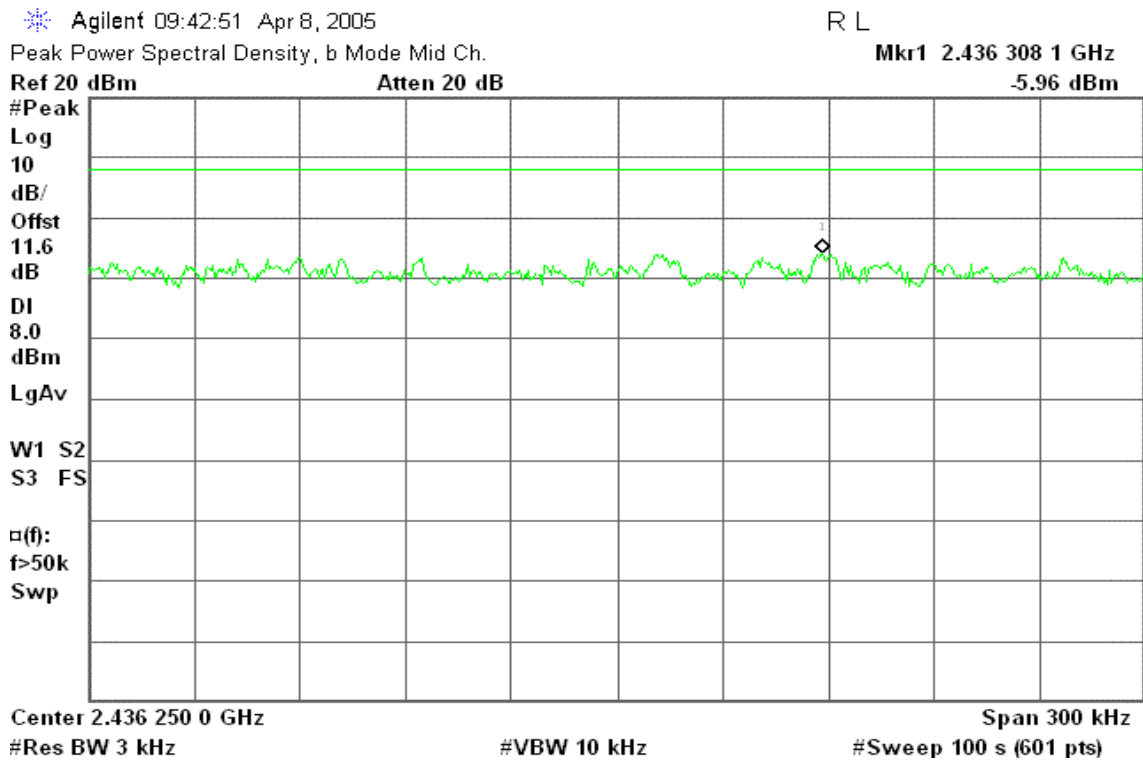
**Test Plot**

**IEEE 802.11b Base mode**

**PPSD (CH Low)**



**PPSD (CH Mid)**





### PPSD (CH High)

Agilent 09:50:04 Apr 8, 2005

R L

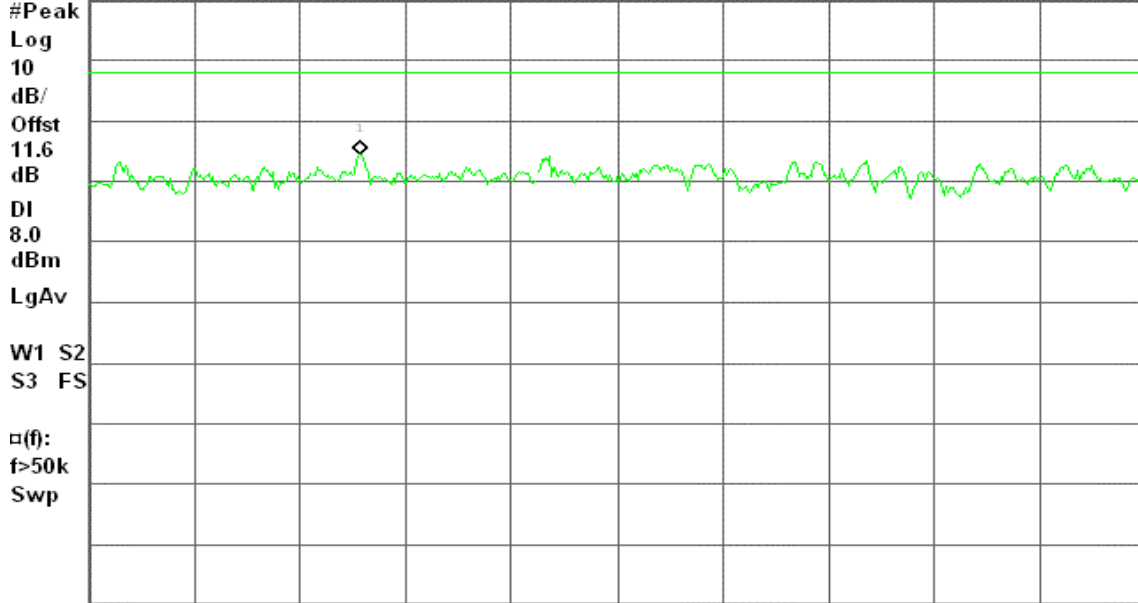
Peak Power Spectral Density, b Mode High Ch.

Mkr1 2.461 926 8 GHz

Ref 20 dBm

Atten 20 dB

-5.58 dBm



Center 2.462 000 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)

### IEEE 802.11g Base mode

#### PPSD (CH Low)

Agilent 09:55:10 Apr 8, 2005

R L

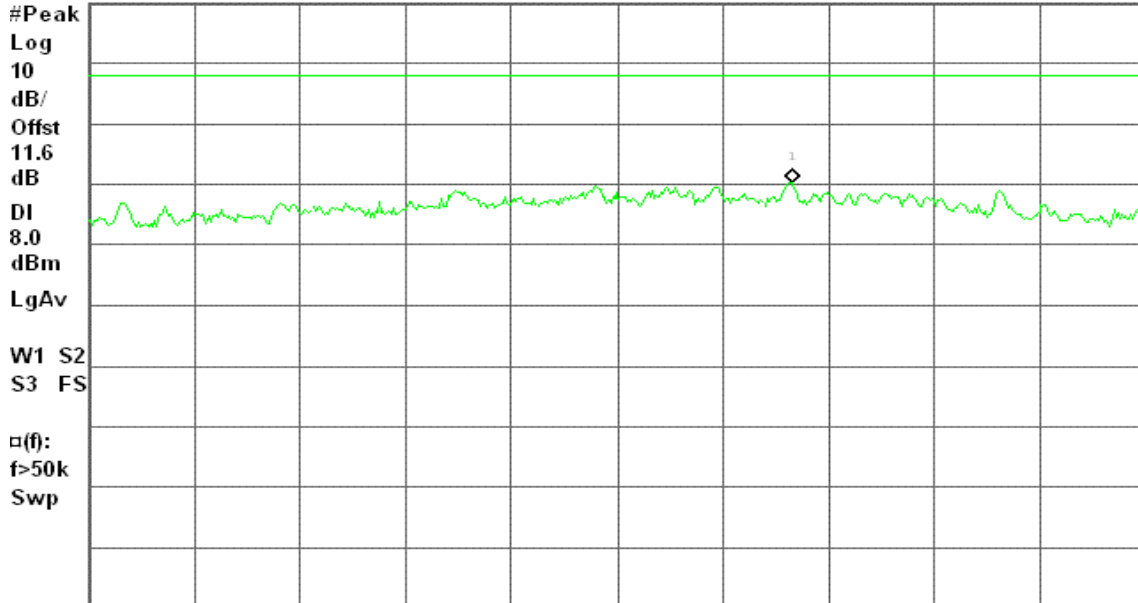
Peak Power Spectral Density, g Mode Low Ch.

Mkr1 2.409 199 6 GHz

Ref 20 dBm

Atten 20 dB

-9.79 dBm



Center 2.409 150 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)



### PPSD (CH Mid)

Agilent 10:00:32 Apr 8, 2005

R L

Peak Power Spectral Density, g Mode Mid Ch.

Mkr1 2.436 652 5 GHz

Ref 20 dBm

Atten 20 dB

-6.60 dBm

#Peak

Log

10

dB/

Offst

11.6

dB

DI

8.0

dBm

LgAv

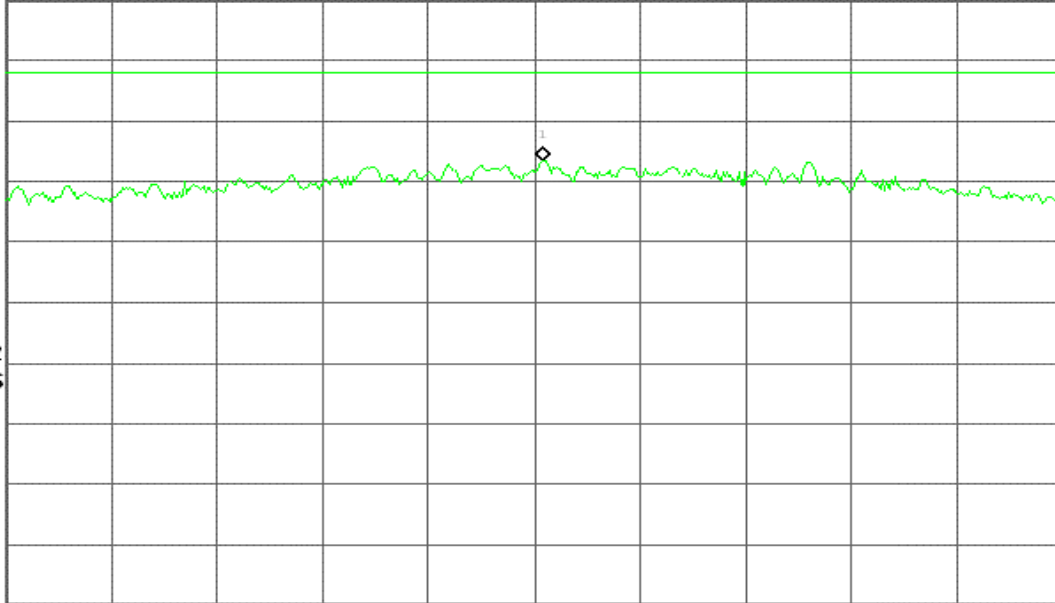
W1 S2

S3 FS

α(f):

f>50k

Swp



Center 2.436 650 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)

### PPSD (CH High)

Agilent 10:13:56 Apr 8, 2005

R L

Peak Power Spectral Density, g Mode High Ch.

Mkr1 2.466 677 6 GHz

Ref 20 dBm

Atten 20 dB

-10.86 dBm

#Peak

Log

10

dB/

Offst

11.6

dB

DI

8.0

dBm

LgAv

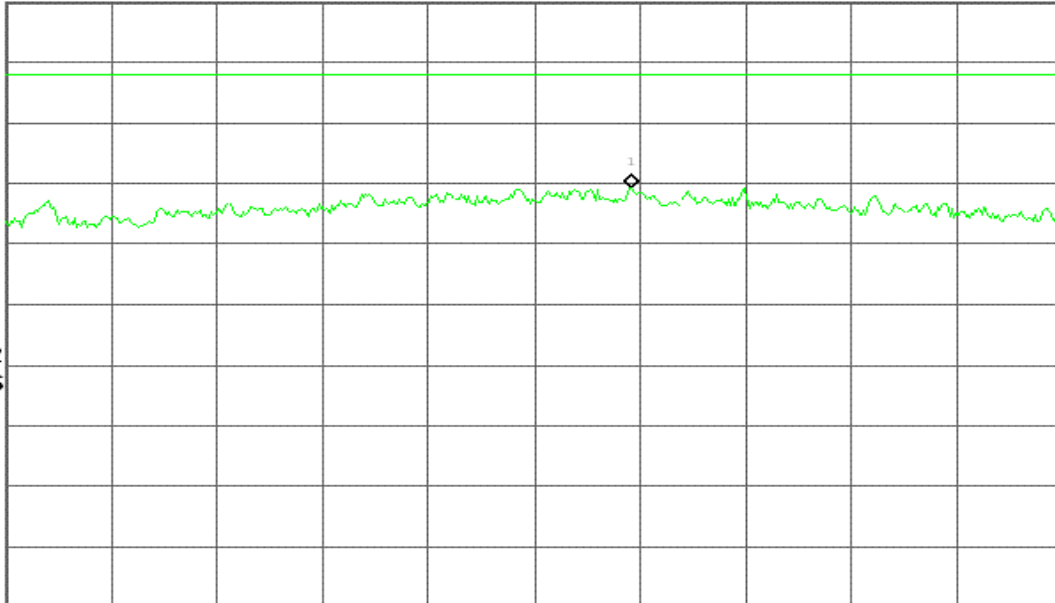
W1 S2

S3 FS

α(f):

f>50k

Swp



Center 2.466 650 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)



### IEEE 802.11g Turbo mode

### PPSD (CH Mid)

Agilent 10:24:41 Apr 8, 2005

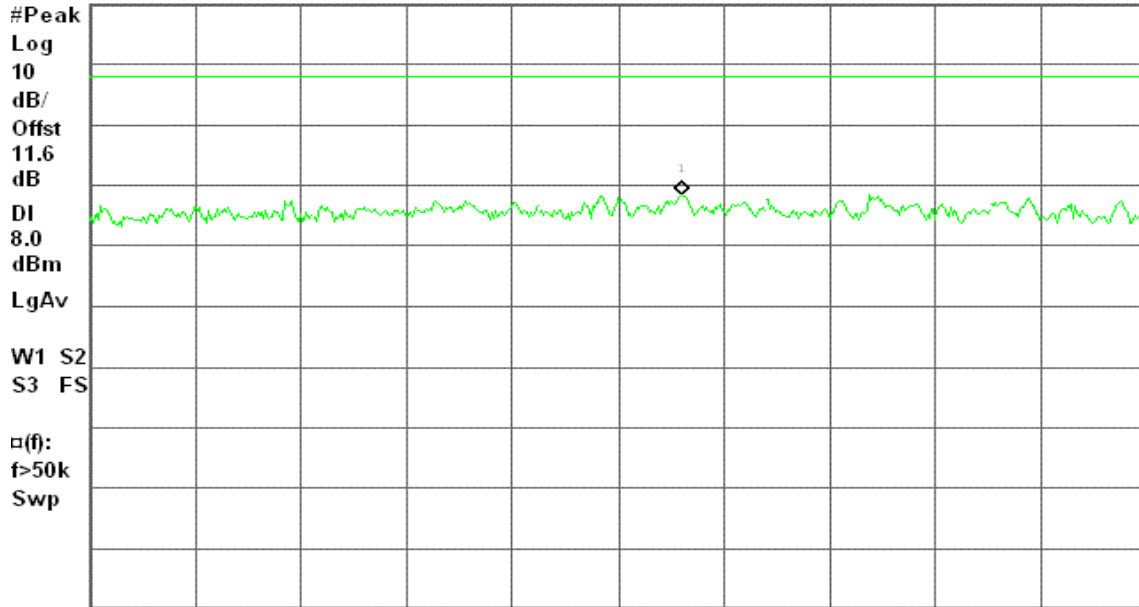
R L

Mkr1 2.437 618 1 GHz

-11.62 dBm

Ref 20 dBm

Atten 20 dB



Center 2.437 600 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)