



FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

802.11 b/g/n Mini-PCI Card

Model: WLC-133NA

Trade Name: N/A

Prepared for

**CHUNG NAM ELECTRONICS CO., LTD
12/F, CHUNG NAM BUILDING, NO. 1 LOCKHART ROAD, WANCHAI,
HONG KONG**

Issued by:

COMPLIANCE CERTIFICATION SERVICES (SHENZHEN) INC.

(aka Compliance Engineering Service (China))

**NO. 5, JINAO INDUSTRIAL PARK, NO. 35 JUKENG ROAD,
DASHUIKENG VILLAGE, GUANLAN TOWN, BAOAN
DISTRICT, SHENZHEN, CHINA**

TEL: 86-755-28055000

FAX: 86-755-28055221

Issued Date: March 19, 2008



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 DESCRIPTION4

3. TEST METHODOLOGY5

 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.....8

5. FACILITIES AND ACCREDITATIONS9

 5.1 FACILITIES.....9

 5.2 EQUIPMENT.....9

 5.3 LABORATORY ACCREDITATIONS AND LISTING.....9

6. SETUP OF EQUIPMENT UNDER TEST10

 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.....33

 7.3 AVERAGE POWER.....53

 7.4 BAND EDGES MEASUREMENT.....55

 7.5 PEAK POWER SPECTRAL DENSITY.....72

 7.6 SPURIOUS EMISSIONS.....99

 7.6 POWERLINE CONDUCTED EMISSIONS.....164



1. TEST RESULT CERTIFICATION

Applicant: CHUNG NAM ELECTRONICS CO., LTD
12/F, Chung Nam Building, No. 1 Lockhart Road, Wanchai, Hong Kong

Manufacturer: CHUNG NAM ELECTRONICS CO., LTD
12/F, Chung Nam Building, No. 1 Lockhart Road, Wanchai, Hong Kong

Equipment Under Test: 802.11 b/g/n Mini-PCI Card

Trade Name: N/A

Model: WLC-133NA

Date of Test: April 02-May 04, 2008

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 (Shenzhen) 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:

Clinton Kao
Manager
Compliance Certification Service Inc.

Reviewed by:

Vincent Yao
Assistant manager
Compliance Certification Service Inc.



2. EUT DESCRIPTION

Product	802.11 b/g/n Mini-PCI Card
Trade Name	N/A
Model Number	WLC-133NA
Model Difference	N/A
Power Supply	Powered by Notebook
Frequency Range	2412 ~ 2462 MHz
Transmit Power	IEEE 802.11b mode: 18.53 dBm IEEE 802.11g mode: 15.29 dBm IEEE 802.11n HT20 MHz mode: 18.30 dBm IEEE 802.11n HT40 MHz mode: 15.48 dBm
Modulation Technique	IEEE 802.11b mode: DSSS (1, 2, 5.5 and 11 Mbps) IEEE 802.11g mode: OFDM (6, 9, 12, 18, 24, 36, 48 and 54Mbps) IEEE 802.11n HT20 MHz mode: OFDM (6, 9, 12, 18, 24, 36, 48 and 54Mbps) IEEE 802.11n HT40 MHz mode: OFDM (6, 9, 12, 18, 24, 36, 48 and 54Mbps)
Number of Channels	IEEE 802.11b mode: 11 Channels IEEE 802.11g mode: 11 Channels IEEE 802.11n HT20 MHz mode: 11 Channels IEEE 802.11n HT40 MHz mode: 7 Channels
Antenna Specification	Dipole antenna Gain: 1.80 dBi (Max)

Note: This submittal(s) (test report) is intended for FCC ID: Q72WLC133NA 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 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
¹ 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
2. 17725 – 4.17775	37.5 – 38.25	1435 – 1626.5	9.0 – 9.2
2. 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	(²)
13.36 – 13.41	322 – 335.4		

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² 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 3x3 configuration was used for all testing in this report.

The worst-case data rates are determined to be as follows for each mode based on investigation by measuring the average power, peak power and PPSD across all data rates, bandwidths, and modulations.

The worst-case data rates:

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

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

IEEE 802.11n HT20 MHz mode: Channel Low (2412MHz), Channel Mid



(2437MHz) and Channel High (2462MHz) with 6.5Mbps data rate were chosen for full testing.

IEEE 802.11n HT40 MHz mode: Channel Low (2422MHz), Channel Mid (2437MHz) and Channel High (2452MHz) with 13.5Mbps data rate were chosen for full testing.

All emissions tests were made with the worst-case data rates.



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. 5, Jinao industrial park, No.35 Jukeng Road, Dashuikeng Village, Guanlan Town, Baoan District, Shenzhen, China

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 LABORATORY ACCREDITATIONS AND LISTING

Our laboratories are accredited and approved by the following accreditation body according to ISO/IEC 17025.

Taiwan TAF

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

USA	FCC
Japan	VCCI
Canada	INDUSTRY CANADA
Taiwan	BSMI

Copies of granted accreditation certificates are available for downloading from our web site, <http://www.ccsemc.com.tw>



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

Device Type	Brand	Model	FCC ID	Series No.	Data Cable	Power Cord
Notebook	Lenovo	SOLEIL E260	DoC	EB02929383	N/A	Shielded 2.0m

Notes:

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

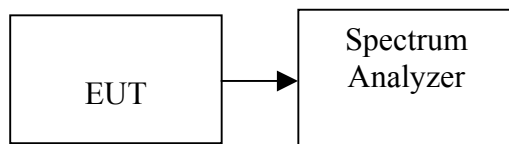
According to §15.247(a)(2), systems using digital modulation techniques may operate in the 902 -928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6dB bandwidth shall be at least 500 kHz.

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US44300399	02/24/2009

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 \geq RBW, Span = 20MHz, 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

Antenna: DCA0

IEEE 802.11b mode

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
Low	2412	12100	>500	PASS
Mid	2437	12070		PASS
High	2462	12070		PASS

IEEE 802.11g mode

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
Low	2412	16400	>500	PASS
Mid	2437	16400		PASS
High	2462	16400		PASS

IEEE 802.11n HT20 MHz mode

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
Low	2412	17630	>500	PASS
Mid	2437	17630		PASS
High	2462	17630		PASS

IEEE 802.11n HT40 MHz mode

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
Low	2422	36470	>500	PASS
Mid	2437	36470		PASS
High	2452	36470		PASS

Antenna: DCA1

IEEE 802.11b mode

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
Low	2412	12100	>500	PASS
Mid	2437	12100		PASS
High	2462	12070		PASS

IEEE 802.11g mode

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
Low	2412	16400	>500	PASS
Mid	2437	16400		PASS
High	2462	16400		PASS

IEEE 802.11n HT20 MHz mode

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
Low	2412	17630	>500	PASS
Mid	2437	17600		PASS
High	2462	17600		PASS

IEEE 802.11n HT40 MHz mode

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
Low	2422	36470	>500	PASS
Mid	2437	36470		PASS
High	2452	36470		PASS



Antenna: DCA2

IEEE 802.11b mode

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
Low	2412	12100	>500	PASS
Mid	2437	12100		PASS
High	2462	12100		PASS

IEEE 802.11g mode

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
Low	2412	16530	>500	PASS
Mid	2437	16400		PASS
High	2462	16400		PASS

IEEE 802.11n HT20 MHz mode

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
Low	2412	17630	>500	PASS
Mid	2437	17670		PASS
High	2462	17630		PASS

IEEE 802.11n HT40 MHz mode

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
Low	2422	36470	>500	PASS
Mid	2437	36470		PASS
High	2452	36530		PASS



Test Plot

Antenna:DCA0

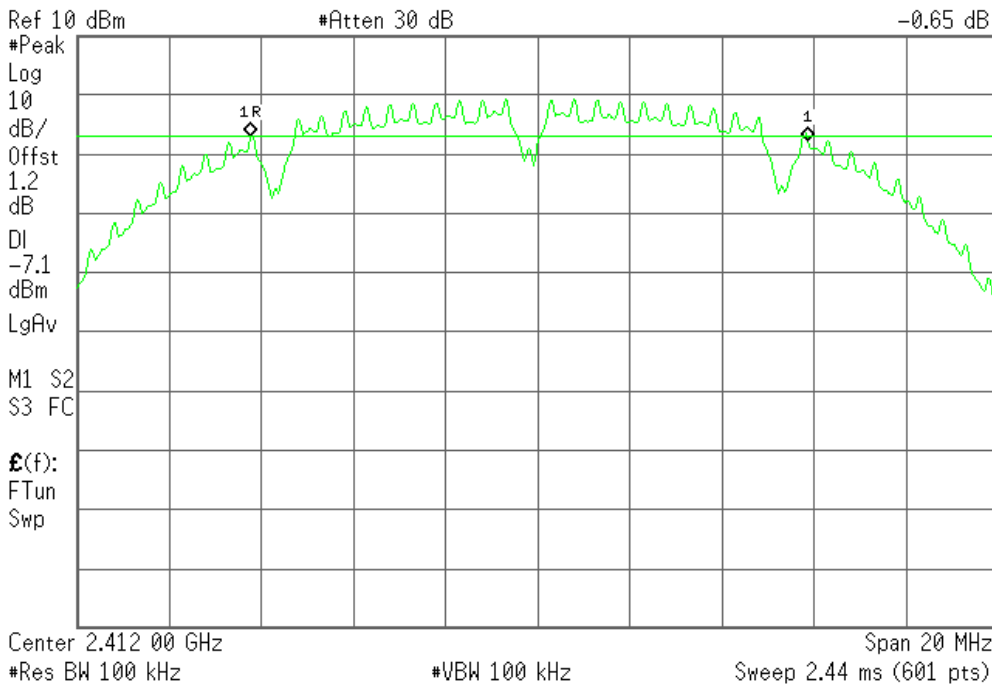
IEEE 802.11b mode

6dB Bandwidth (CH Low)

Agilent 11:23:14 Apr 18, 2008

R T

Mkr1 12.10 MHz
-0.65 dB

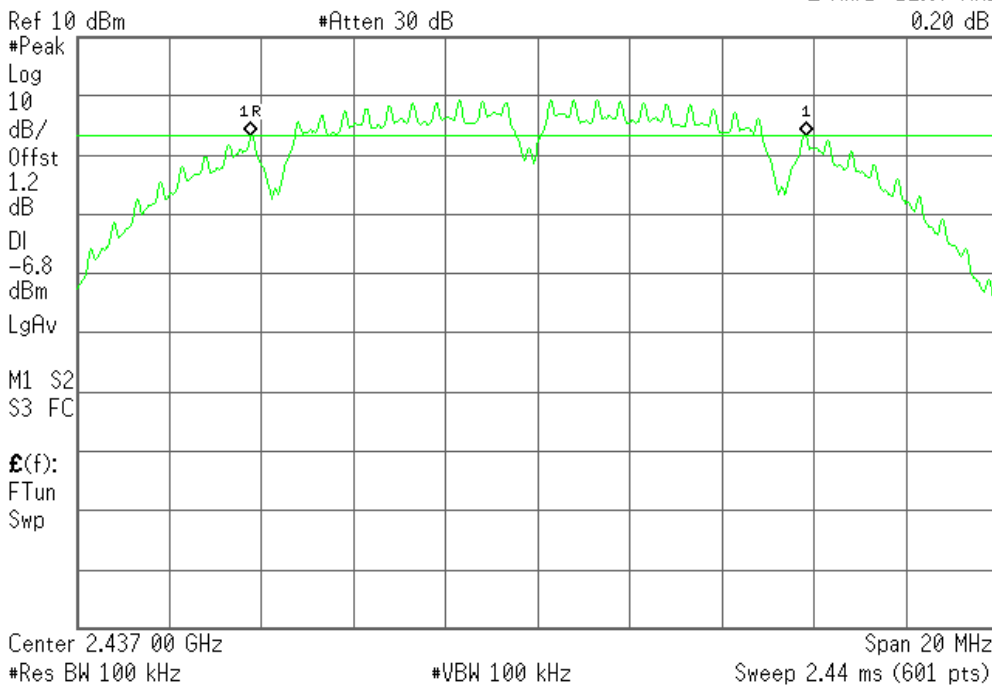


6dB Bandwidth (CH Mid)

Agilent 11:25:34 Apr 18, 2008

R T

Mkr1 12.07 MHz
0.20 dB



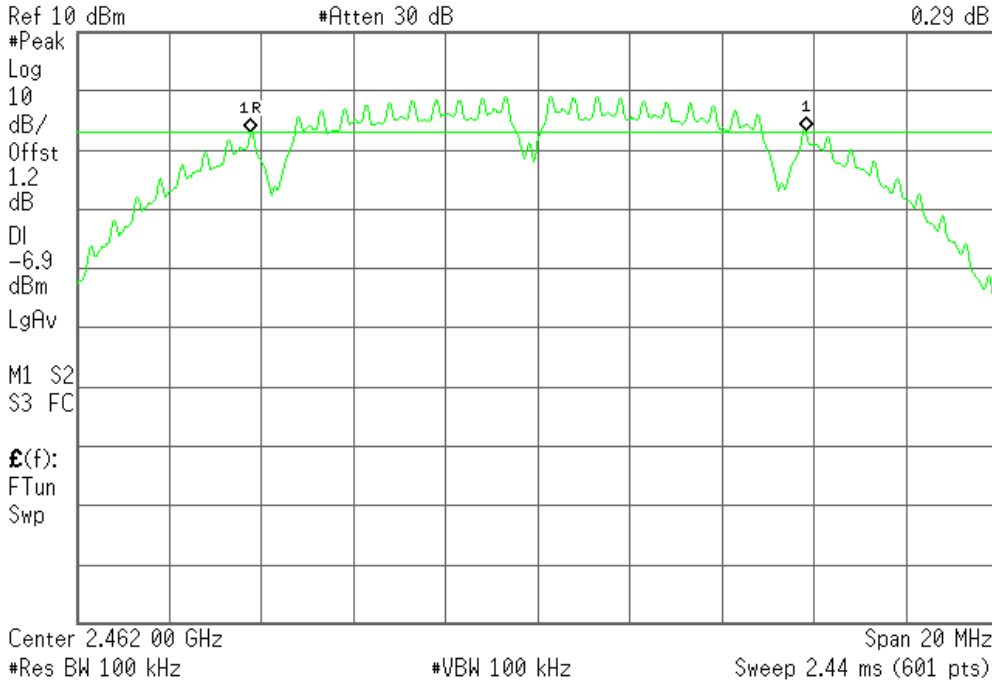


6dB Bandwidth (CH High)

Agilent 11:28:53 Apr 18, 2008

R T

Mkr1 12.07 MHz
0.29 dB



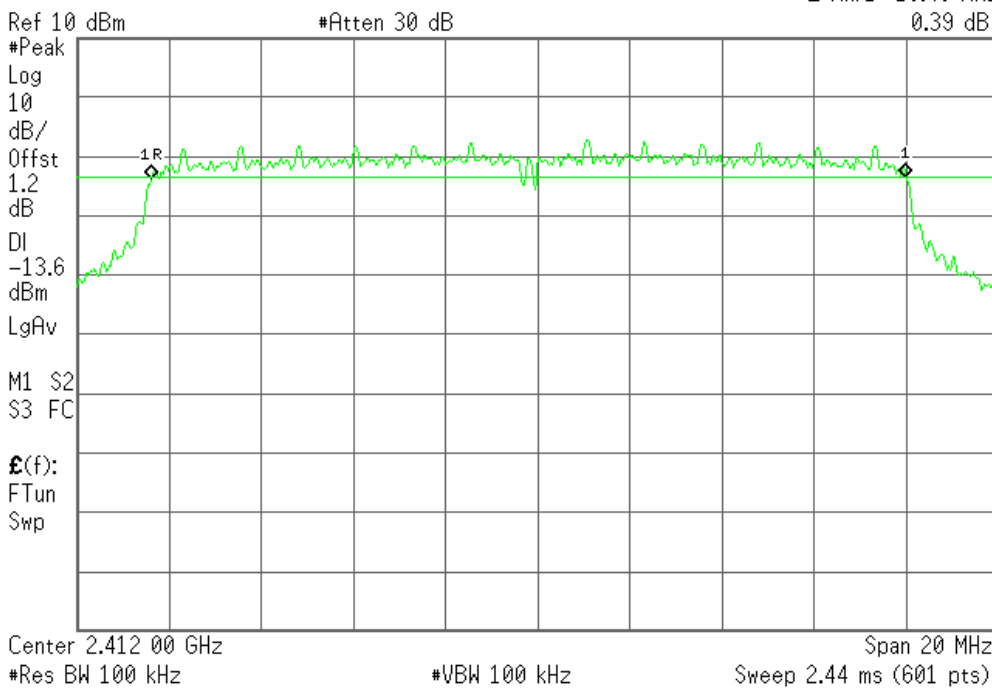
IEEE 802.11g mode

6dB Bandwidth (CH Low)

Agilent 11:35:24 Apr 18, 2008

R T

Mkr1 16.40 MHz
0.39 dB



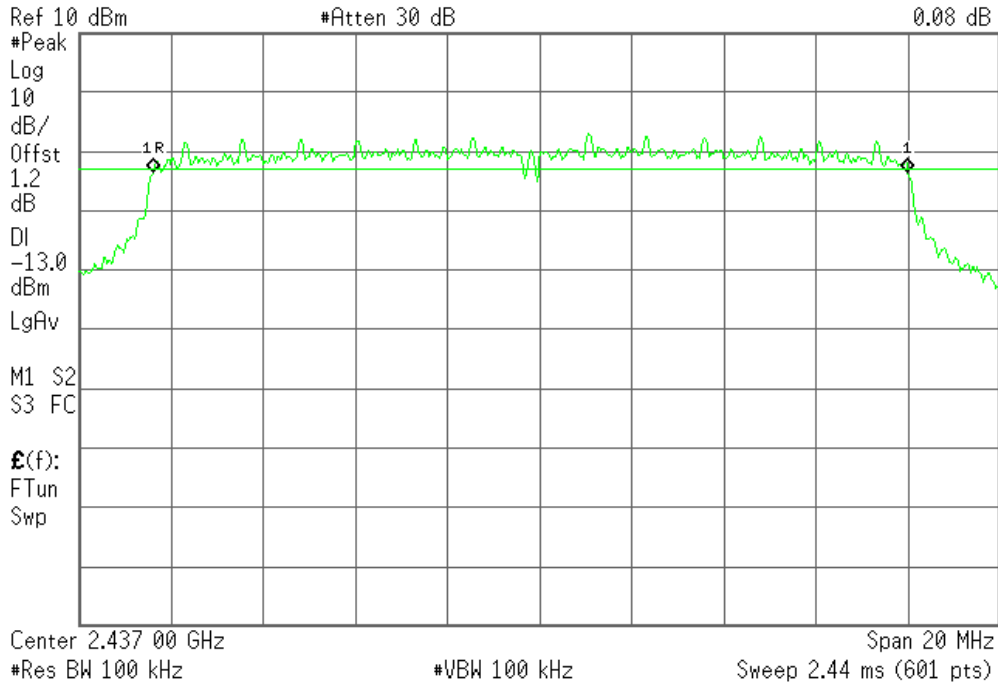


6dB Bandwidth (CH Mid)

Agilent 11:36:49 Apr 18, 2008

R T

Mkr1 16.40 MHz
0.08 dB

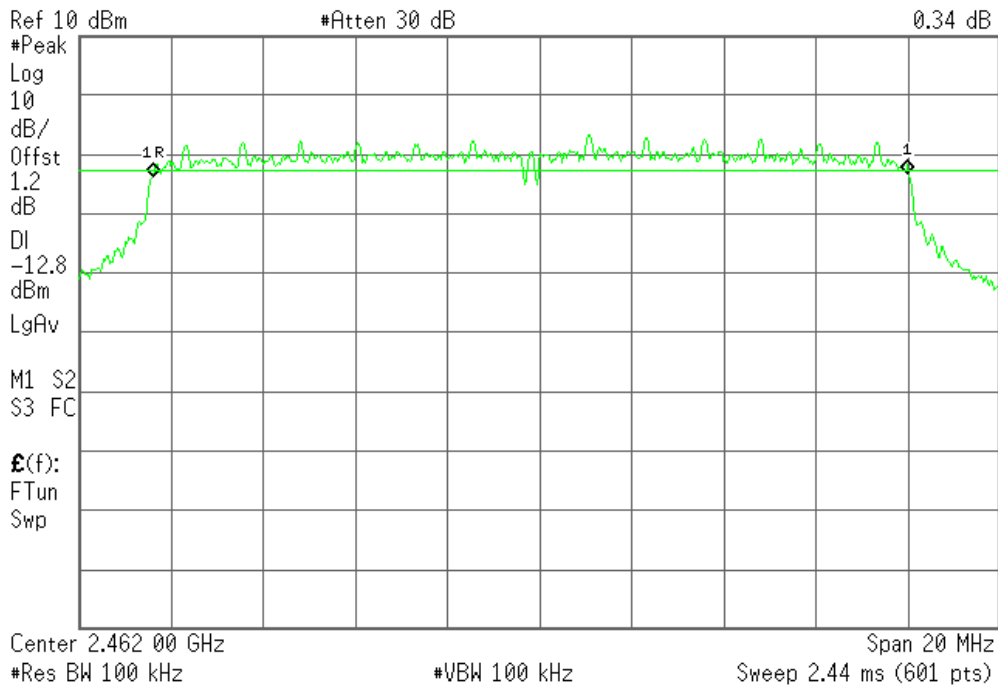


6dB Bandwidth (CH High)

Agilent 11:38:24 Apr 18, 2008

R T

Mkr1 16.40 MHz
0.34 dB





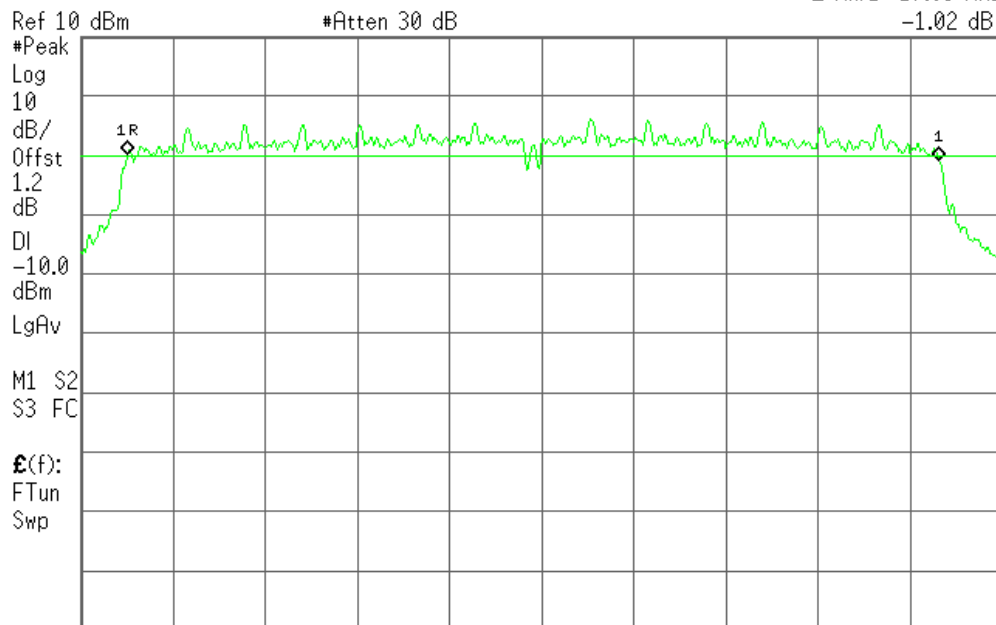
IEEE 802.11n HT20 MHz mode

6dB Bandwidth (CH Low)

Agilent 11:40:53 Apr 18, 2008

R T

Mkr1 17.63 MHz
-1.02 dB

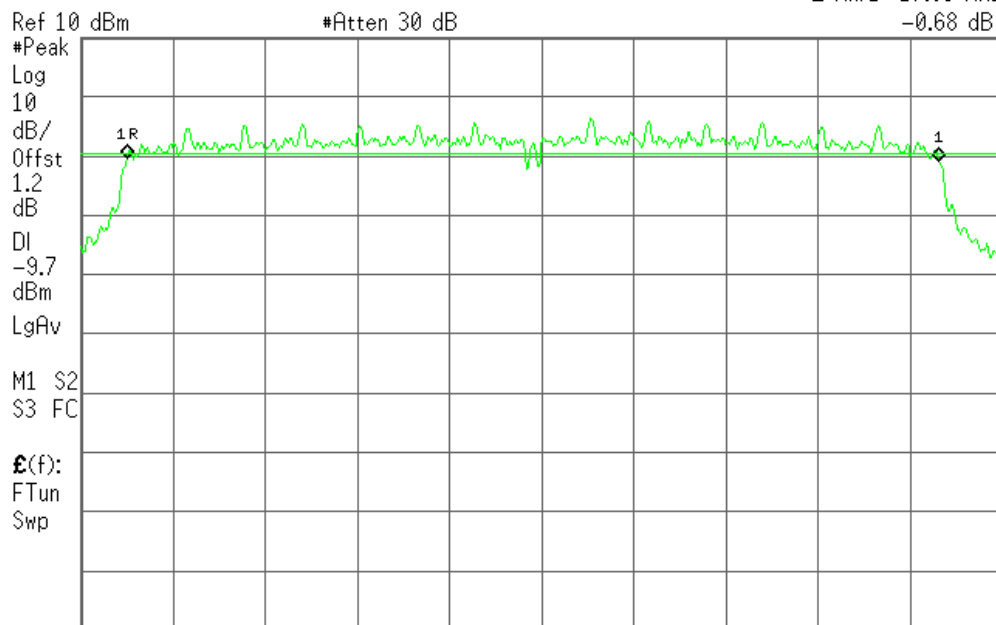


6dB Bandwidth (CH Mid)

Agilent 11:42:26 Apr 18, 2008

R T

Mkr1 17.63 MHz
-0.68 dB



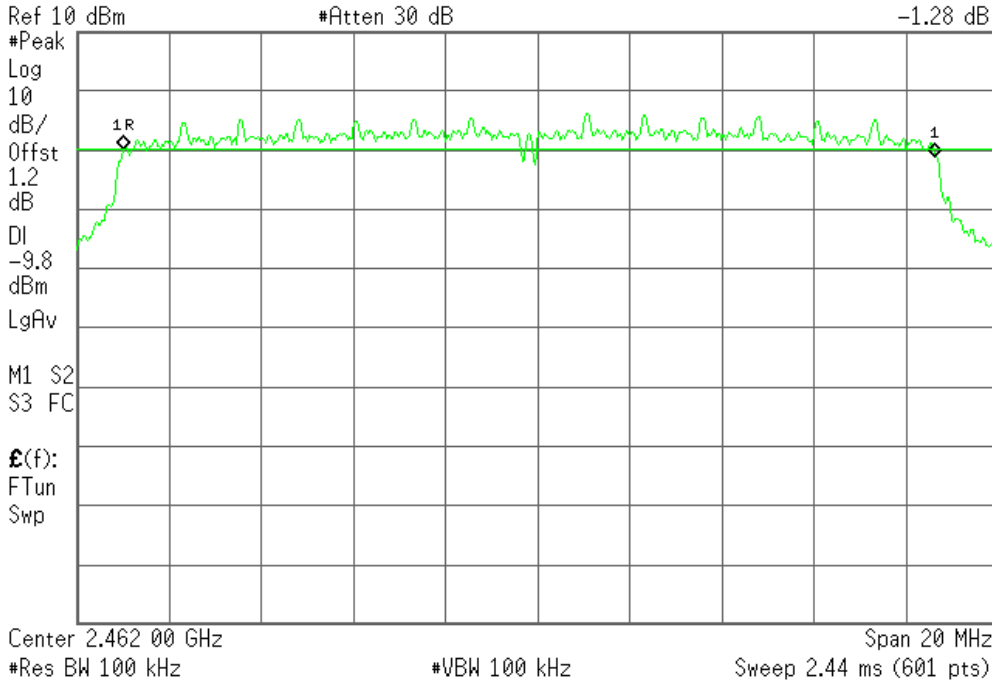


6dB Bandwidth (CH High)

Agilent 11:44:07 Apr 18, 2008

R T

Mkr1 17.63 MHz
-1.28 dB



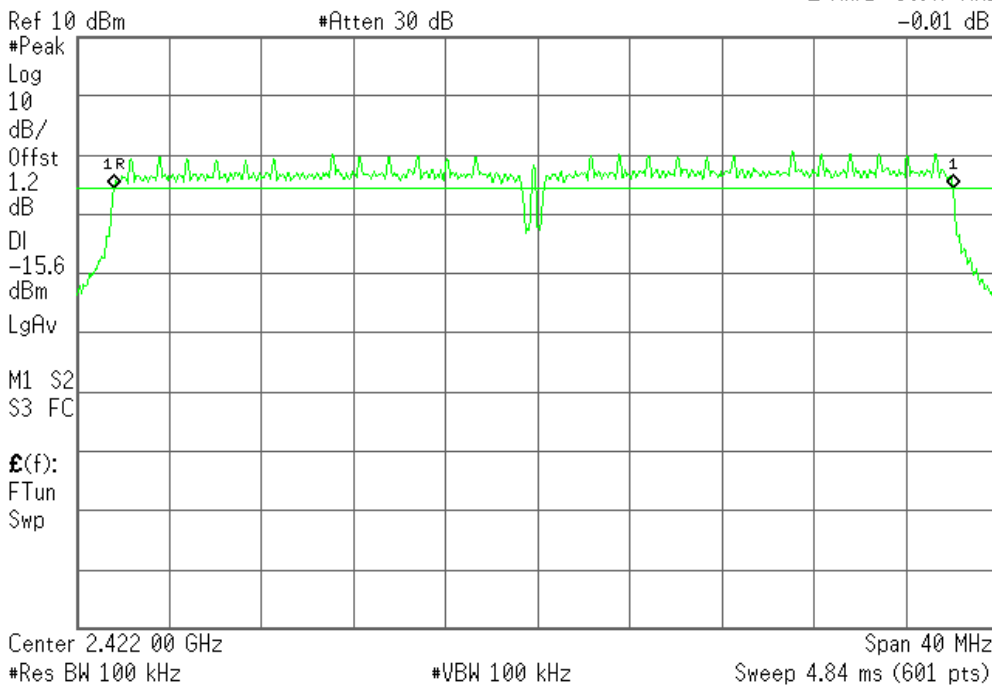
IEEE 802.11n HT40 MHz mode

6dB Bandwidth (CH Low)

Agilent 11:48:11 Apr 18, 2008

R T

Mkr1 36.47 MHz
-0.01 dB



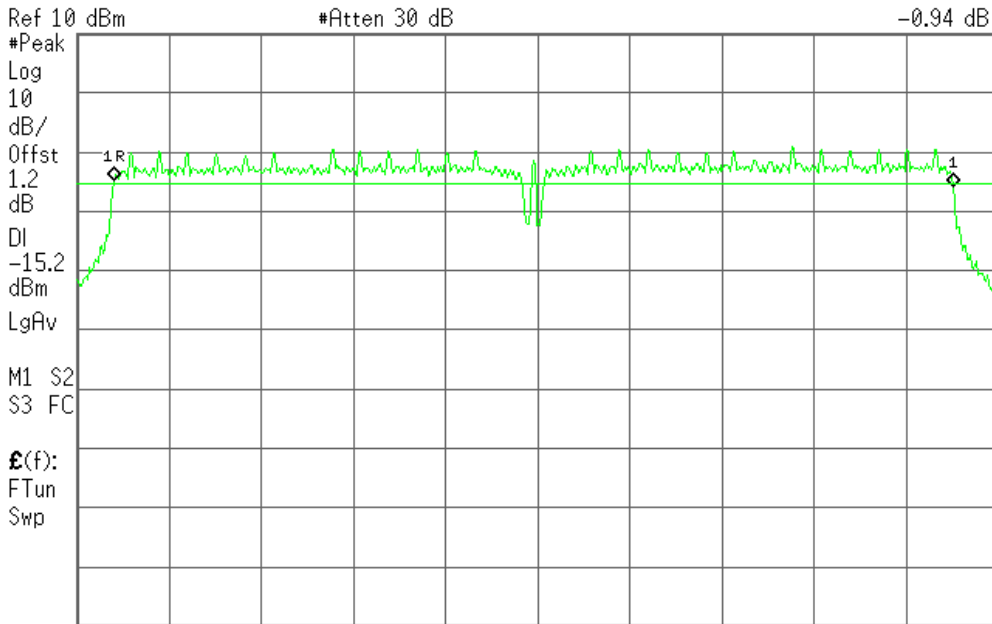


6dB Bandwidth (CH Mid)

Agilent 11:49:39 Apr 18, 2008

R T

Mkr1 36.47 MHz
-0.94 dB



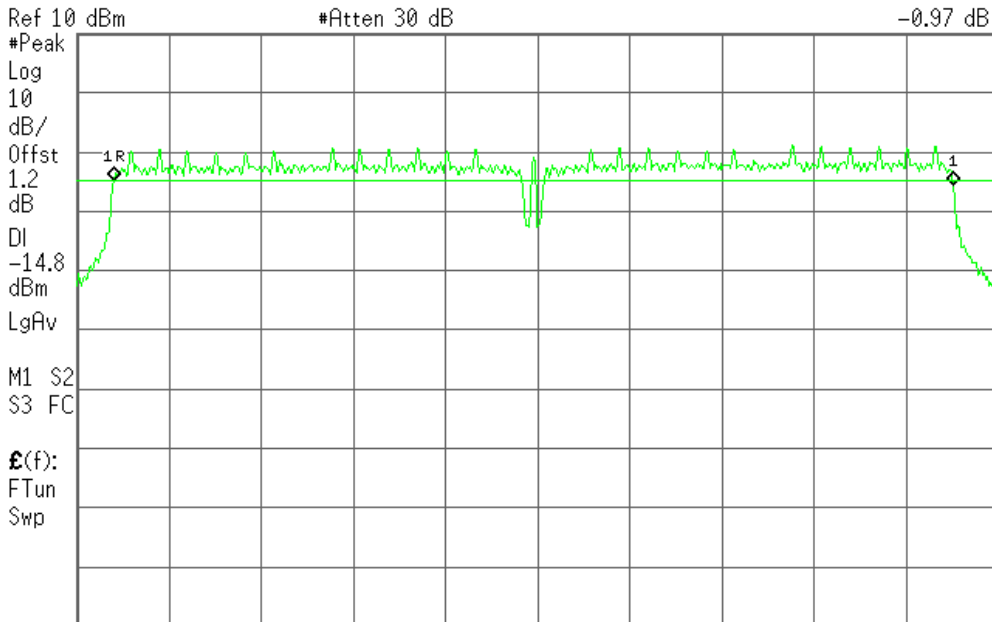
Center 2.437 00 GHz Span 40 MHz
#Res BW 100 kHz #VBW 100 kHz Sweep 4.84 ms (601 pts)

6dB Bandwidth (CH High)

Agilent 11:51:06 Apr 18, 2008

R T

Mkr1 36.47 MHz
-0.97 dB



Center 2.452 00 GHz Span 40 MHz
#Res BW 100 kHz #VBW 100 kHz Sweep 4.84 ms (601 pts)



Antenna :DCA1

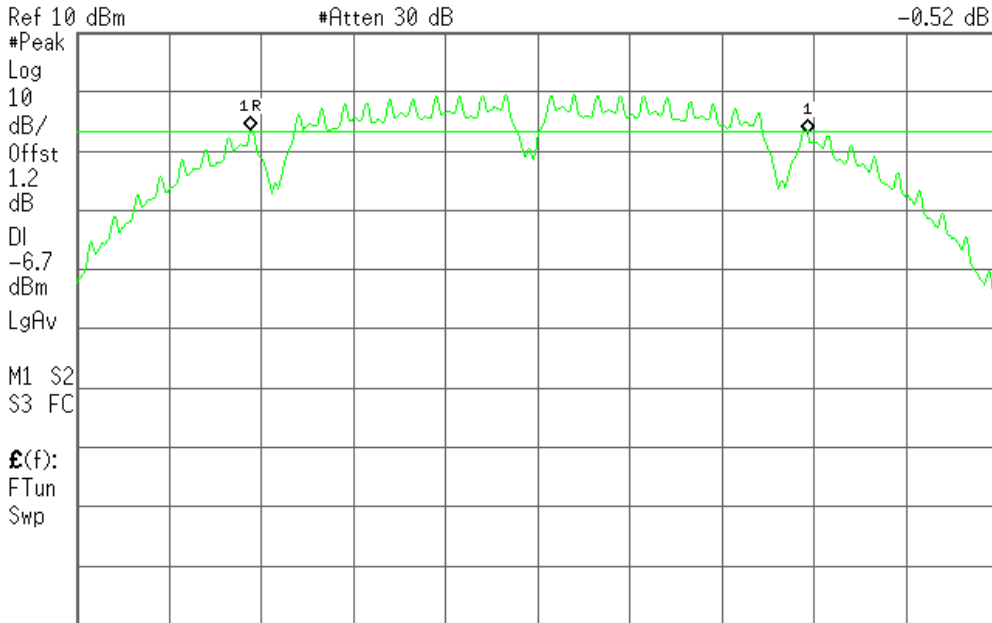
IEEE 802.11b mode

6dB Bandwidth (CH Low)

Agilent 11:56:36 Apr 18, 2008

R T

Mkr1 12.10 MHz
-0.52 dB



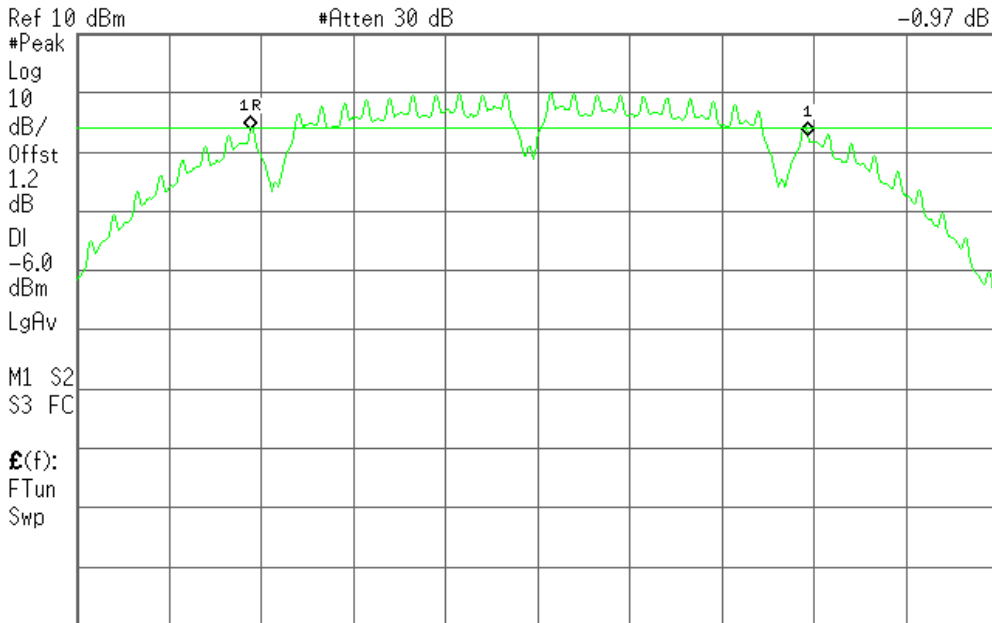
Center 2.412 00 GHz Span 20 MHz
#Res BW 100 kHz #VBW 100 kHz Sweep 2.44 ms (601 pts)

6dB Bandwidth (CH Mid)

Agilent 11:59:09 Apr 18, 2008

R T

Mkr1 12.10 MHz
-0.97 dB



Center 2.437 00 GHz Span 20 MHz
#Res BW 100 kHz #VBW 100 kHz Sweep 2.44 ms (601 pts)



6dB Bandwidth (CH High)

Agilent 12:00:48 Apr 18, 2008

R T

Mkr1 12.07 MHz
0.07 dB



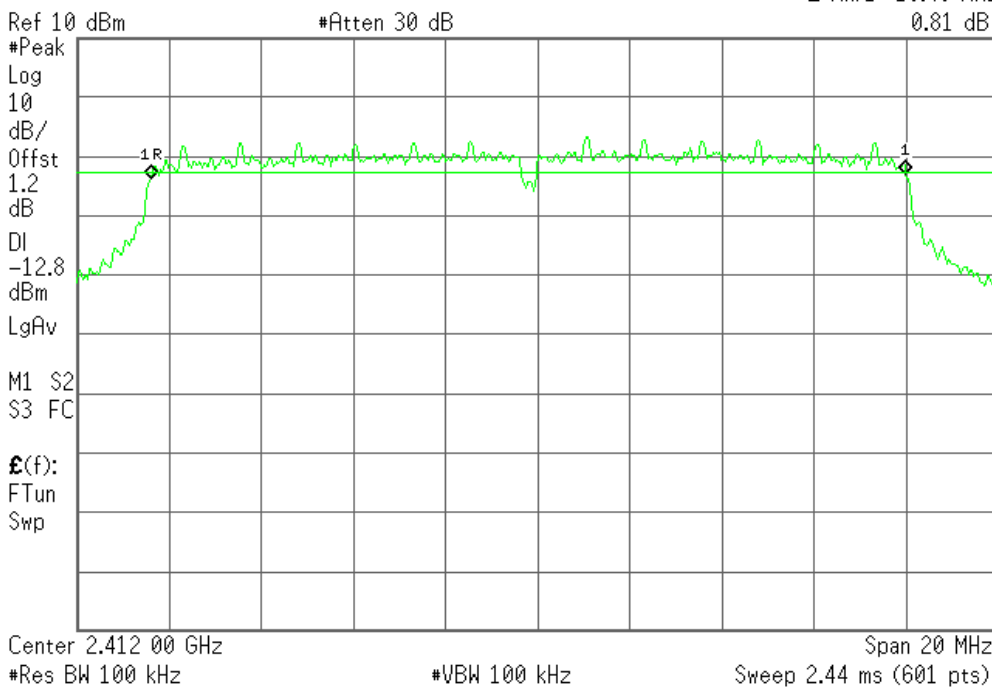
IEEE 802.11g mode

6dB Bandwidth (CH Low)

Agilent 12:02:55 Apr 18, 2008

R T

Mkr1 16.40 MHz
0.81 dB



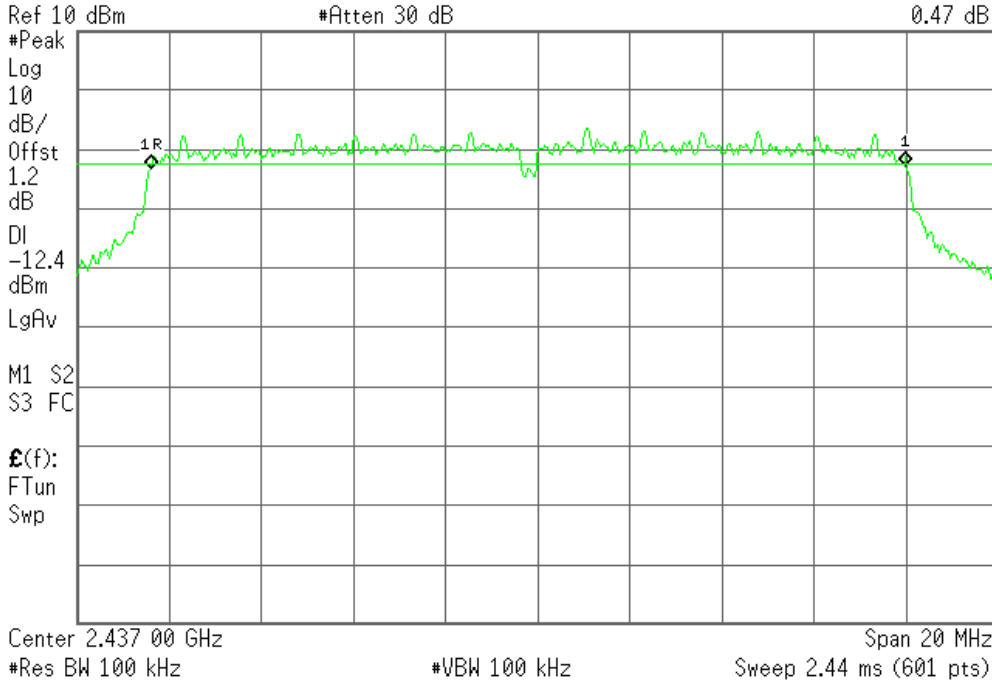


6dB Bandwidth (CH Mid)

Agilent 12:04:39 Apr 18, 2008

R T

Mkr1 16.40 MHz
0.47 dB

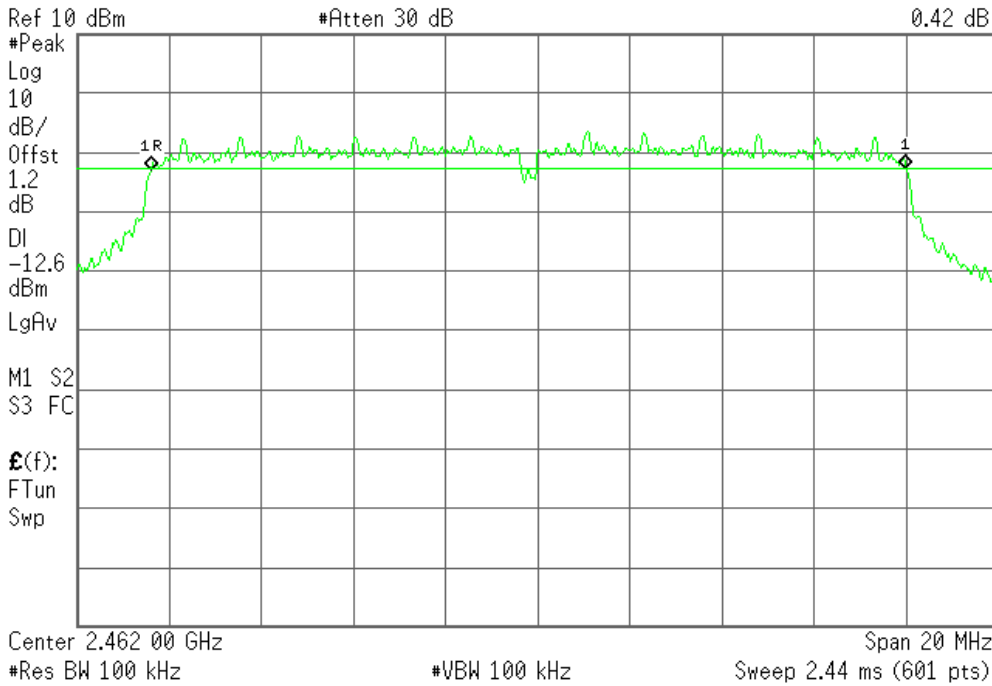


6dB Bandwidth (CH High)

Agilent 12:05:55 Apr 18, 2008

R T

Mkr1 16.40 MHz
0.42 dB



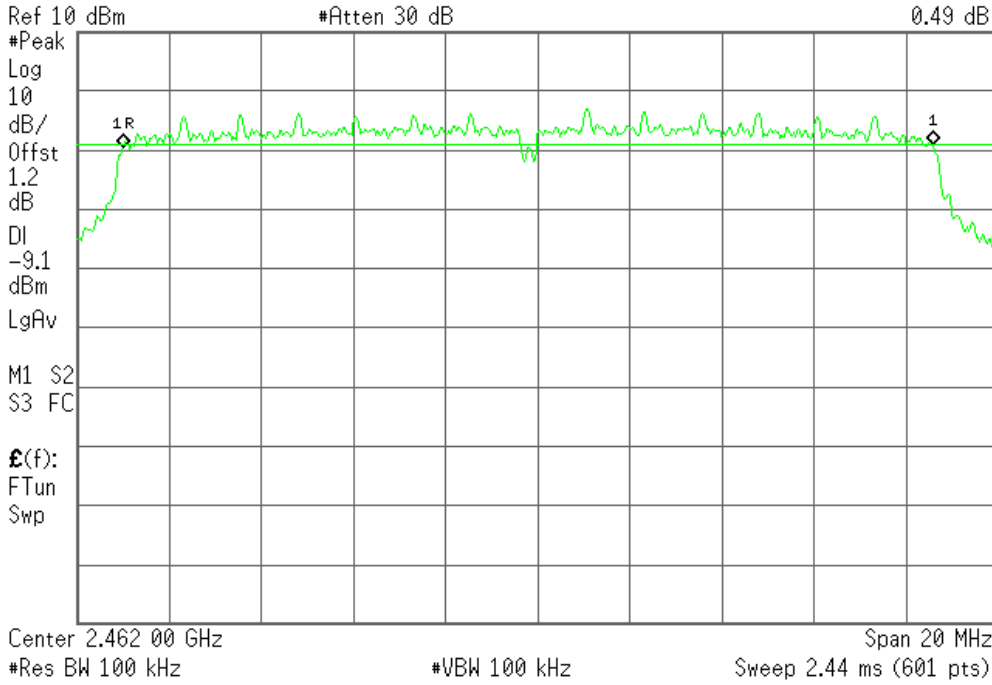


6dB Bandwidth (CH High)

Agilent 12:12:59 Apr 18, 2008

R T

Mkr1 17.60 MHz
0.49 dB



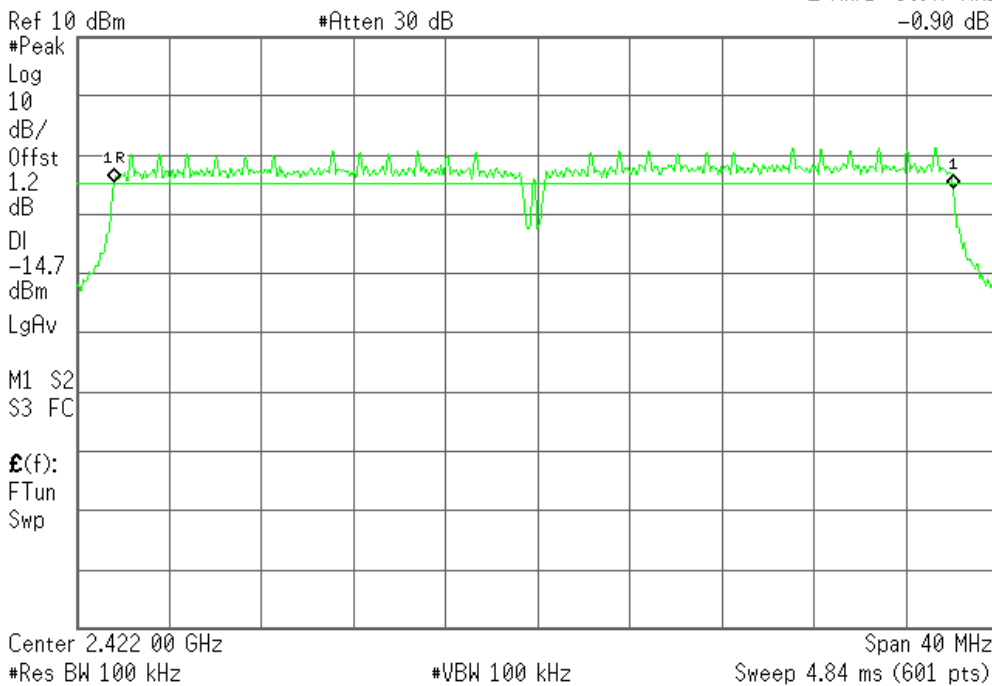
IEEE 802.11n HT40 MHz mode

6dB Bandwidth (CH Low)

Agilent 12:16:30 Apr 18, 2008

R T

Mkr1 36.47 MHz
-0.90 dB



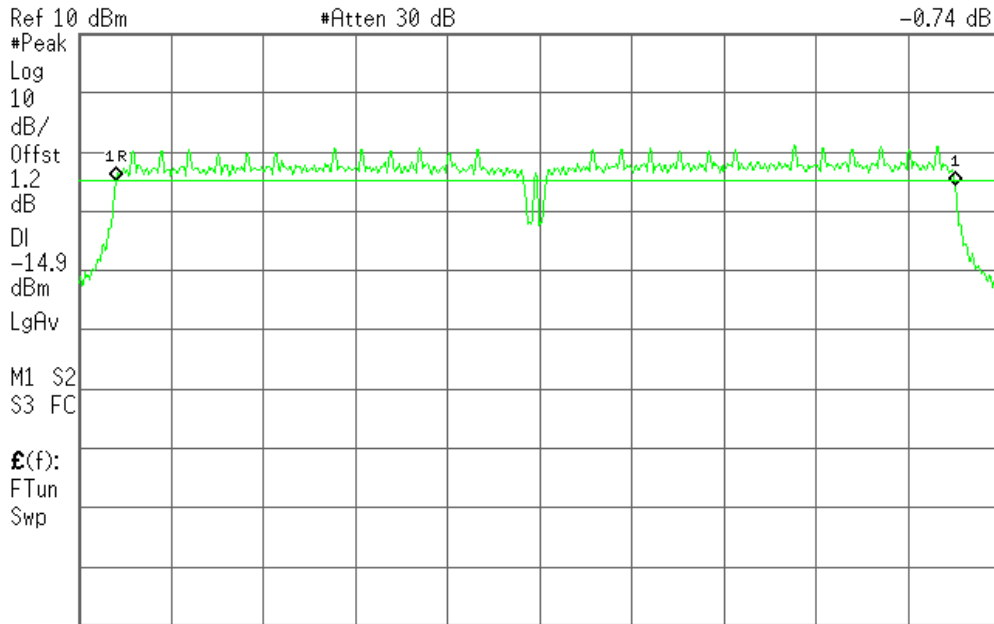


6dB Bandwidth (CH Mid)

Agilent 12:18:36 Apr 18, 2008

R T

Mkr1 36.47 MHz
-0.74 dB



Center 2.437 00 GHz

Span 40 MHz

#Res BW 100 kHz

#VBW 100 kHz

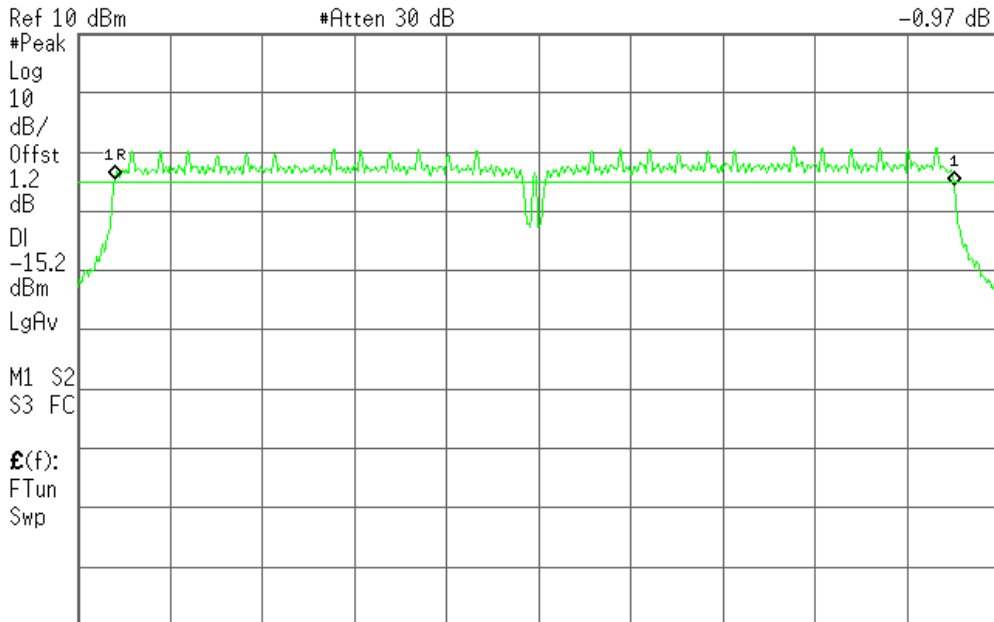
Sweep 4.84 ms (601 pts)

6dB Bandwidth (CH High)

Agilent 12:20:56 Apr 18, 2008

R T

Mkr1 36.47 MHz
-0.97 dB



Center 2.452 00 GHz

Span 40 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 4.84 ms (601 pts)



Antenna:DCA2

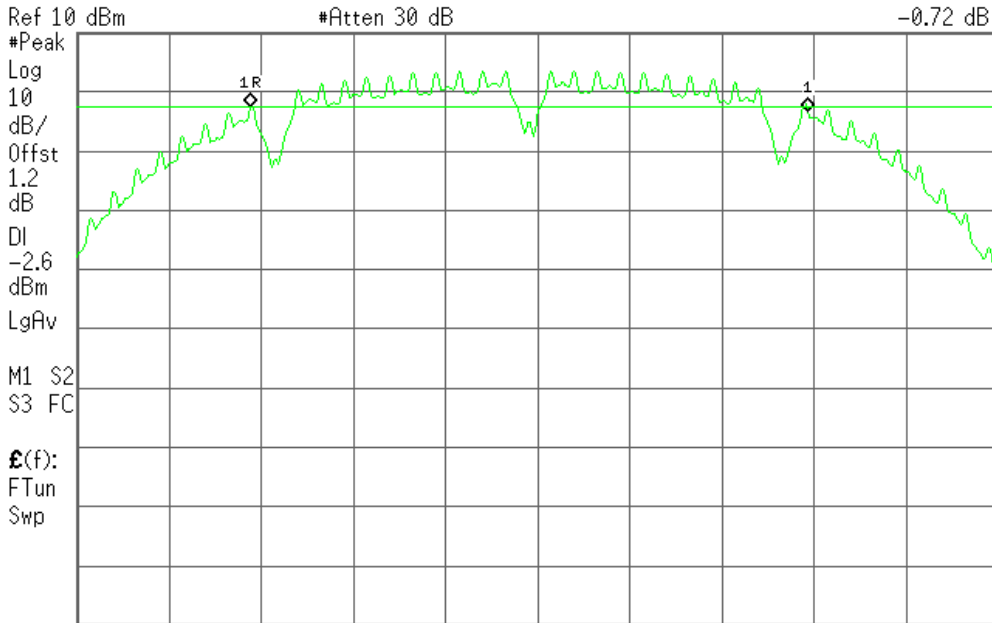
IEEE 802.11b mode

6dB Bandwidth (CH Low)

Agilent 14:05:08 Apr 18, 2008

R T

Mkr1 12.10 MHz
-0.72 dB



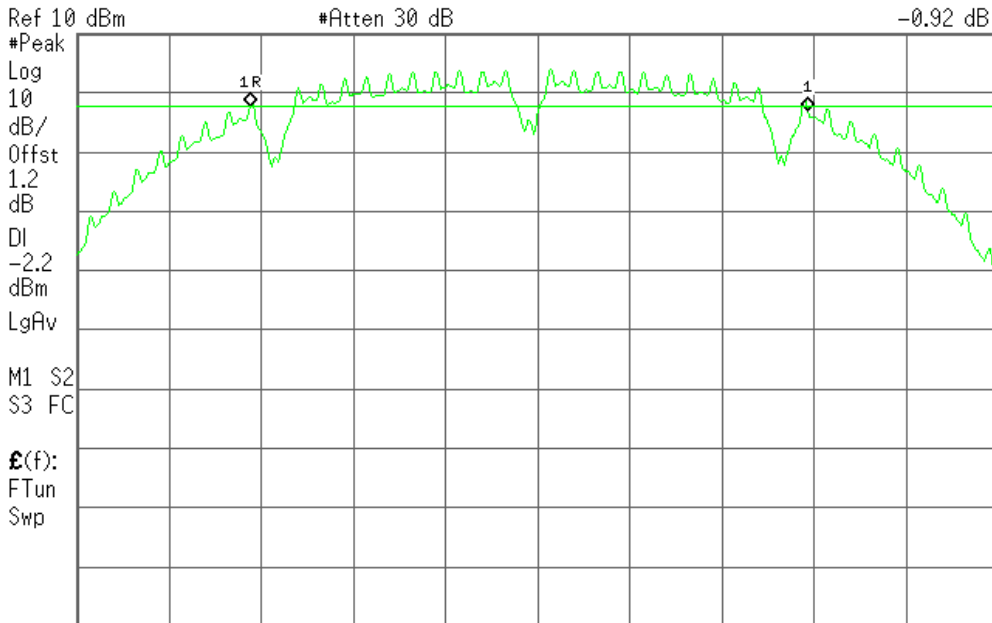
Center 2.412 00 GHz #Res BW 100 kHz #VBW 100 kHz Sweep 2.44 ms (601 pts) Span 20 MHz

6dB Bandwidth (CH Mid)

Agilent 12:25:57 Apr 18, 2008

R T

Mkr1 12.10 MHz
-0.92 dB



Center 2.437 00 GHz #Res BW 100 kHz #VBW 100 kHz Sweep 2.44 ms (601 pts) Span 20 MHz

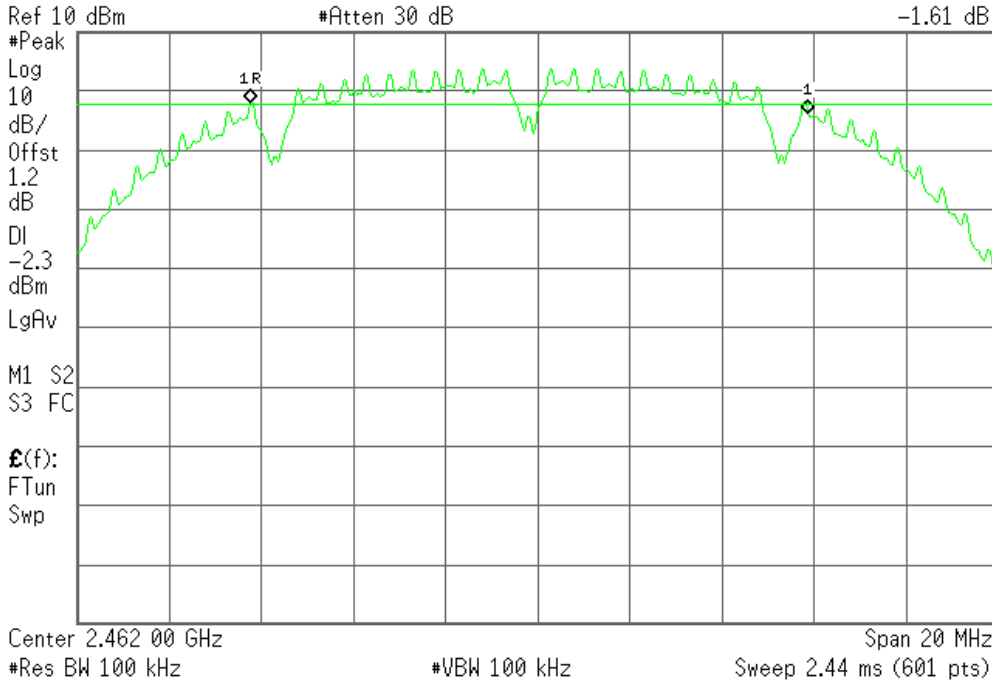


6dB Bandwidth (CH High)

Agilent 12:27:29 Apr 18, 2008

R T

Mkr1 12.10 MHz
-1.61 dB



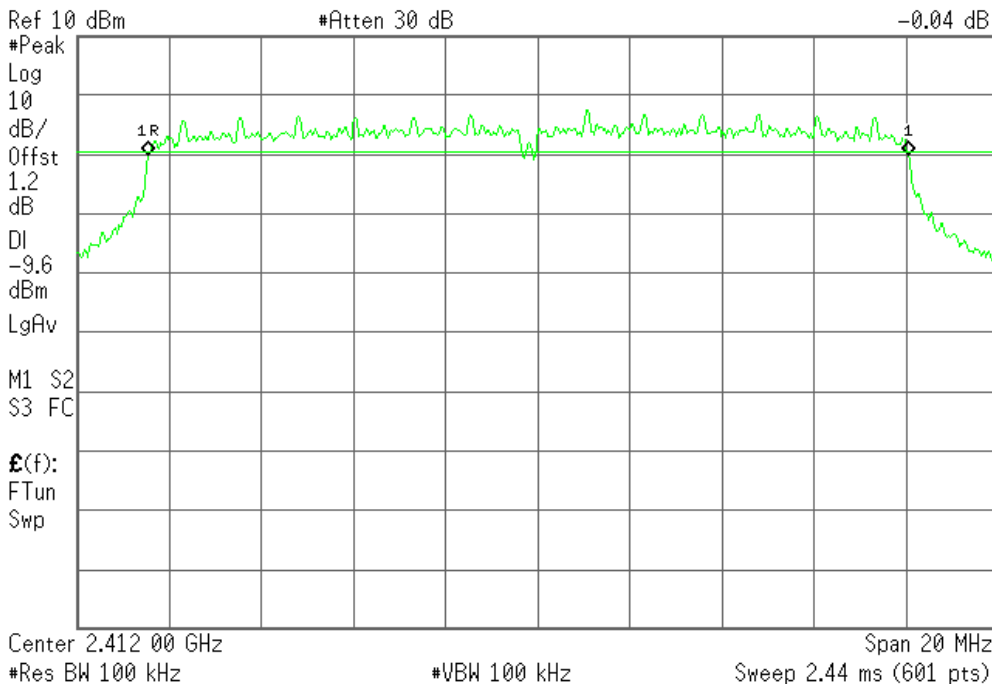
IEEE 802.11g mode

6dB Bandwidth (CH Low)

Agilent 12:29:00 Apr 18, 2008

R T

Mkr1 16.53 MHz
-0.04 dB



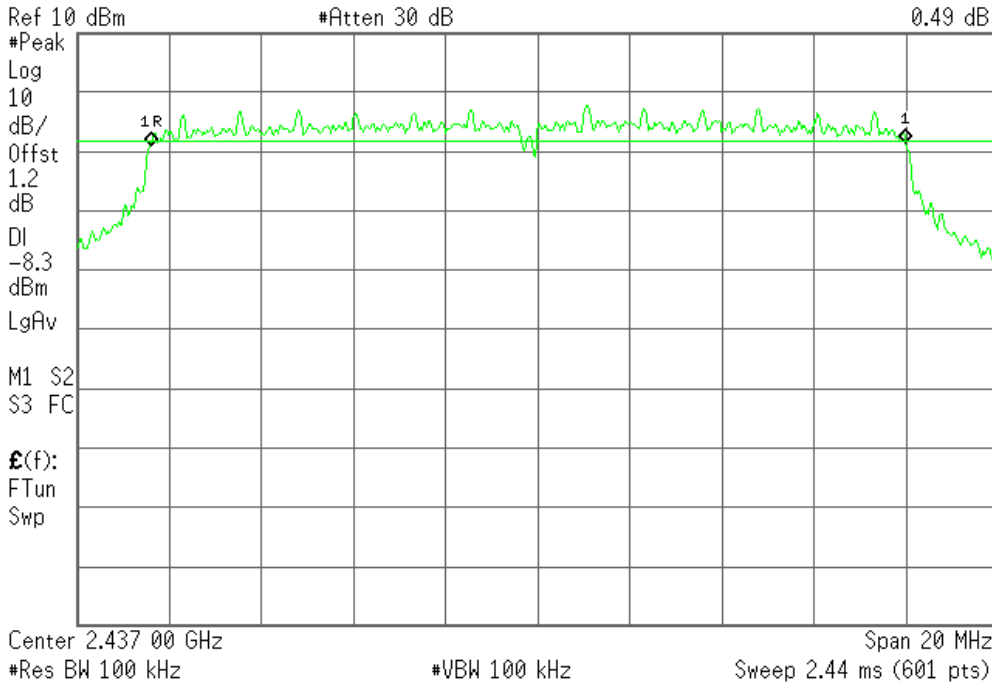


6dB Bandwidth (CH Mid)

Agilent 12:30:25 Apr 18, 2008

R T

Mkr1 16.40 MHz
0.49 dB

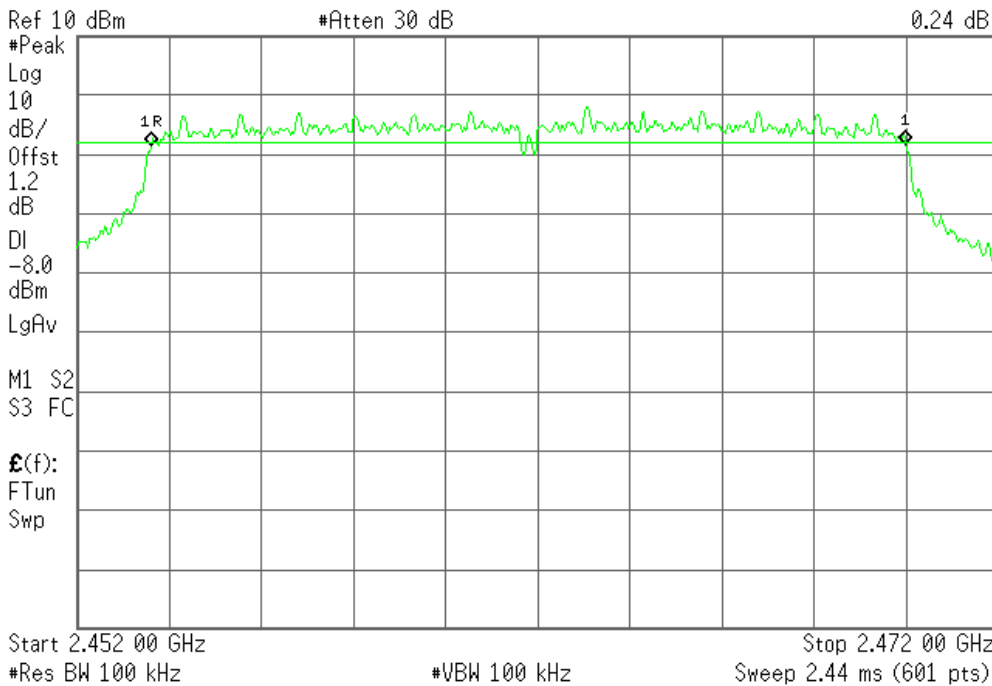


6dB Bandwidth (CH High)

Agilent 12:31:48 Apr 18, 2008

R T

Mkr1 16.40 MHz
0.24 dB





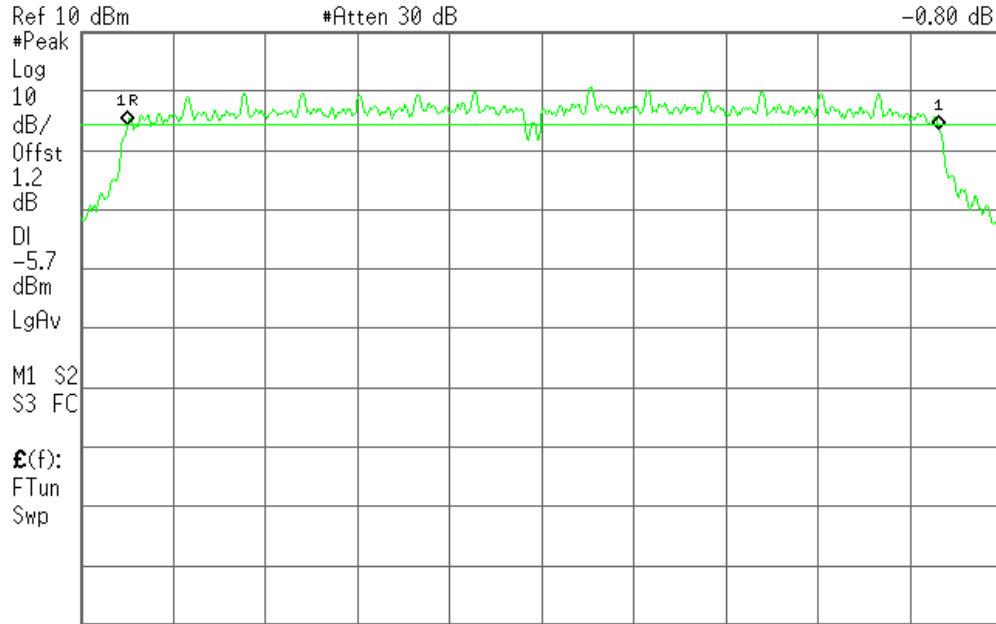
IEEE 802.11n HT20 MHz mode

6dB Bandwidth (CH Low)

Agilent 14:08:35 Apr 18, 2008

R T

Mkr1 17.63 MHz
-0.80 dB



Center 2.412 00 GHz

Span 20 MHz

#Res BW 100 kHz

#VBW 100 kHz

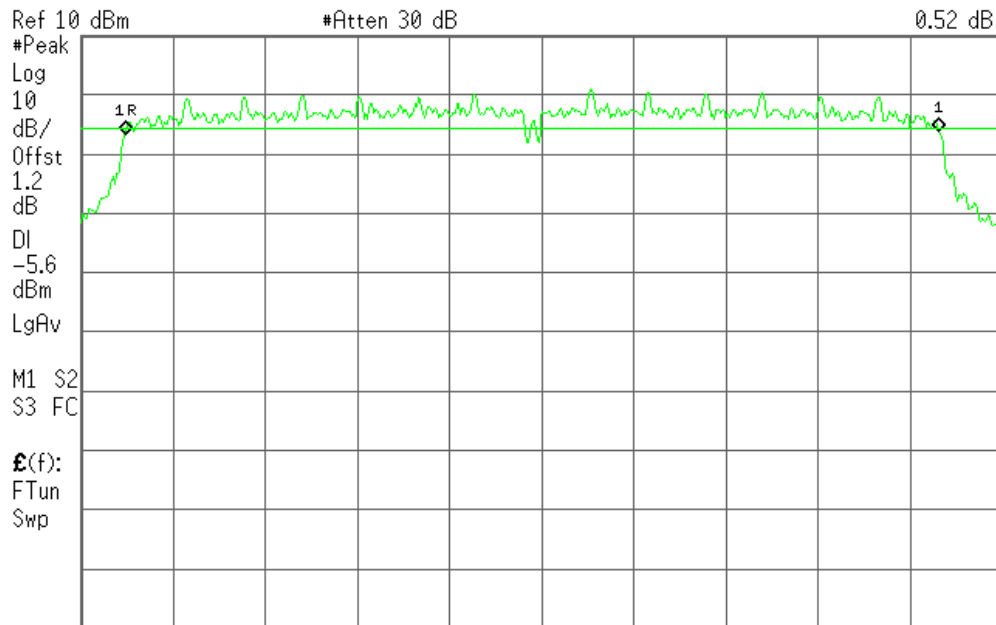
Sweep 2.44 ms (601 pts)

6dB Bandwidth (CH Mid)

Agilent 14:10:11 Apr 18, 2008

R T

Mkr1 17.67 MHz
0.52 dB



Center 2.437 00 GHz

Span 20 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 2.44 ms (601 pts)

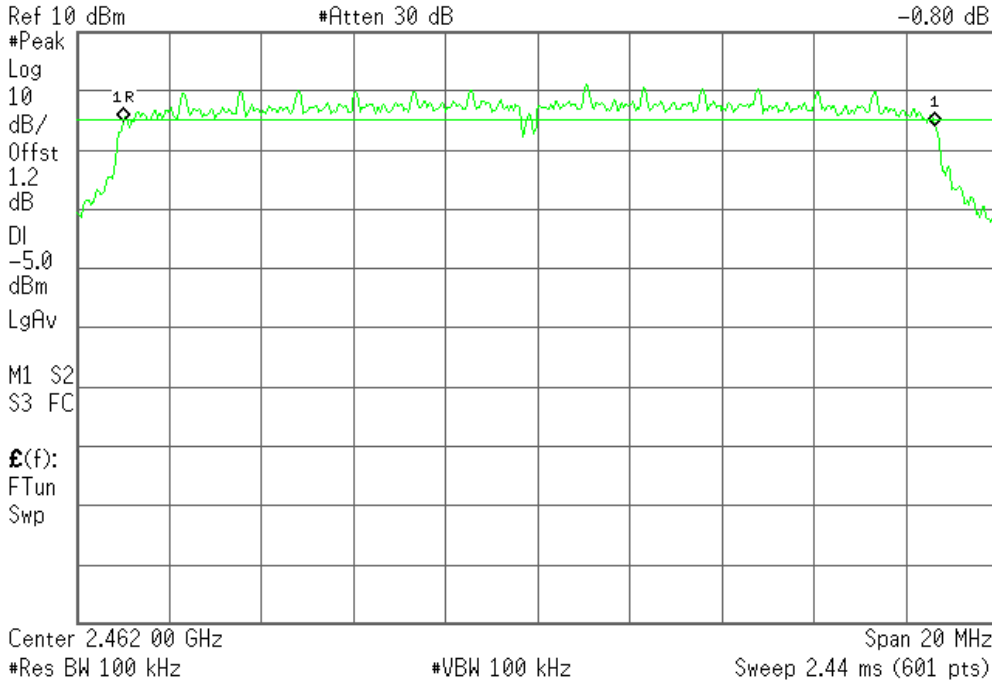


6dB Bandwidth (CH High)

Agilent 14:12:00 Apr 18, 2008

R T

Mkr1 17.63 MHz
-0.80 dB



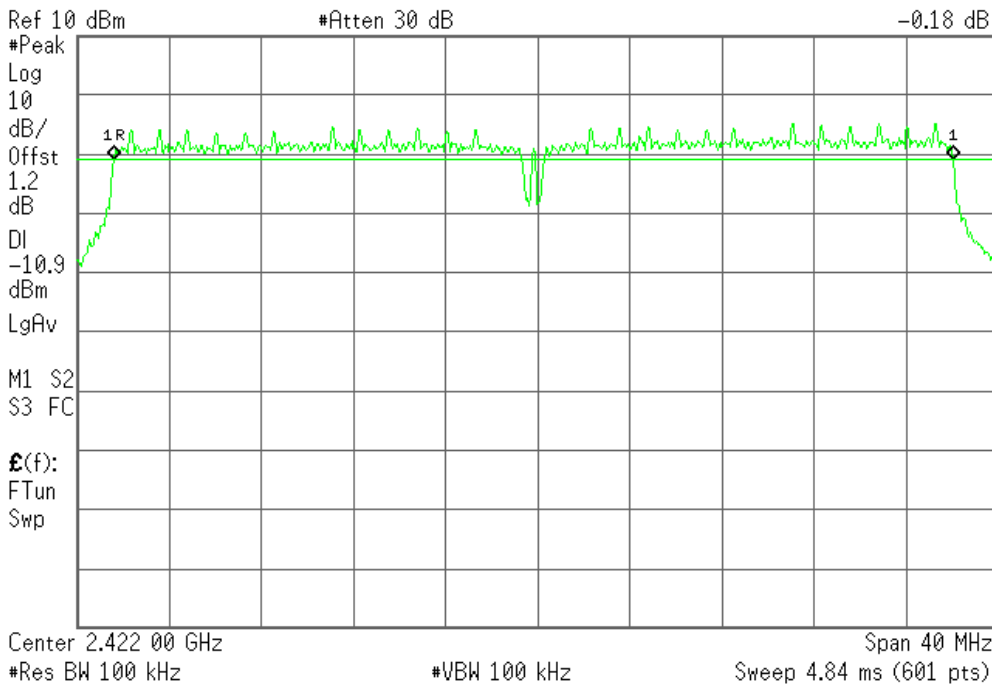
IEEE 802.11n HT40 MHz mode

6dB Bandwidth (CH Low)

Agilent 14:15:26 Apr 18, 2008

R T

Mkr1 36.47 MHz
-0.18 dB



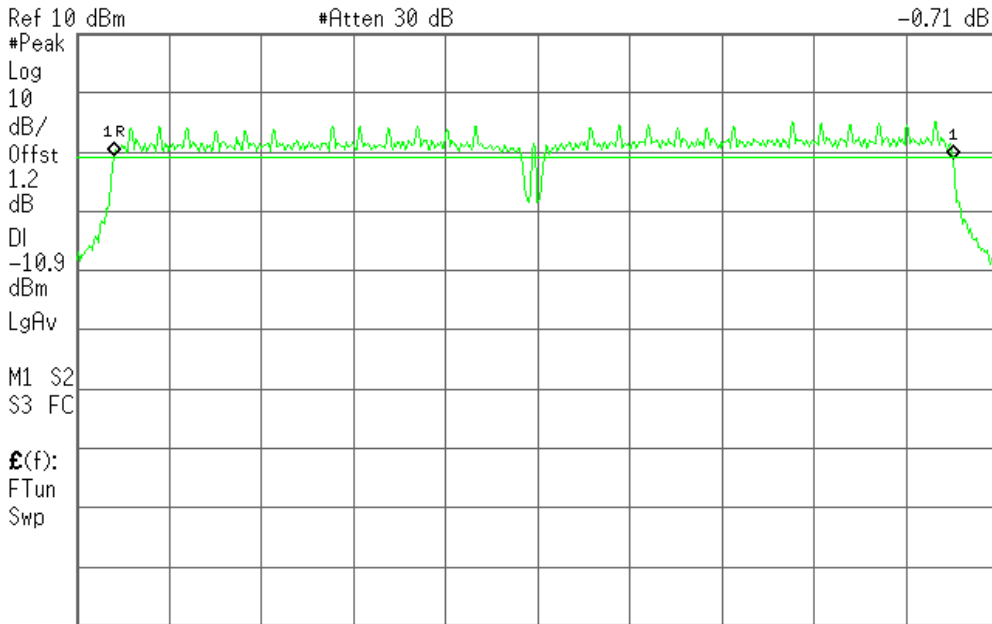


6dB Bandwidth (CH Mid)

Agilent 14:16:59 Apr 18, 2008

R T

Mkr1 36.47 MHz
-0.71 dB



Center 2.437 00 GHz

Span 40 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 4.84 ms (601 pts)

6dB Bandwidth (CH High)

Agilent 14:18:55 Apr 18, 2008

R T

Mkr1 36.53 MHz
0.95 dB



Center 2.452 00 GHz

Span 40 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 4.84 ms (601 pts)

7.2 PEAK POWER

LIMIT

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

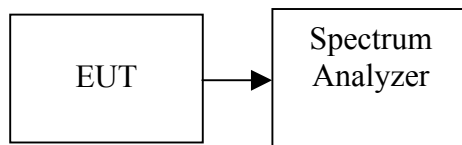
1. For systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 watt.
2. Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional 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	US44300399	02/24/2009

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

Test Configurations



TEST PROCEDURE

- 1 Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2 Set RBW = 1 MHz.
- 3 Set VBW ≥ 3 MHz.
- 4 Use sample detector mode if bin width (i.e., span/number of points in spectrum display) < 0.5 RBW. Otherwise use peak detector mode.
- 5 Use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at full control power for entire sweep of every sweep. If the device transmits continuously, with no off intervals or reduced power intervals, the trigger may be set to “free run”.
- 6 Trace average 100 traces in power averaging mode.
- 7 Compute power by integrating the spectrum across the 26 dB EBW of the signal. The integration can be performed using the spectrum analyzer’s band power measurement function with band limits set equal to the EBW band edges or by summing power levels in each 1 MHz band in linear power terms. The 1 MHz band power levels to be summed can be obtained by averaging, in linear power terms, power levels in each frequency bin across the 1 MHz.

Channel power.

Total peak power calculation formula:

$$10 \log (10^{\text{Chain 0 Power} / 10} + 10^{\text{Chain1 Power} / 10} + 10^{\text{Chain2 Power} / 10}).$$

**TEST RESULTS***No non-compliance noted***Test Data****IEEE 802.11b mode**

Channel	Frequency (MHz)	Output Power(dBm)			Output Power Total(dBm)	Output Power (W)	Limit (W)	Result
		Chain0	Chain 1	Chain 2				
Low	2412	11.15	11.72	15.81	18.20	0.06600	1	PASS
Md	2437	11.33	12.08	16.18	18.53	0.07122		PASS
High	2462	10.98	11.73	15.97	18.26	0.06696		PASS

IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power(dBm)			Output Power Total(dBm)	Output Power (W)	Limit (W)	Result
		Chain0	Chain 1	Chain 2				
Low	2412	7.90	7.92	12.43	14.75	0.02986	1	PASS
Md	2437	7.89	8.31	12.73	15.01	0.03168		PASS
High	2462	8.10	8.58	13.04	15.29	0.03380		PASS

IEEE 802.11n HT20 MHz mode

Channel	Frequency (MHz)	Output Power(dBm)			Output Power Total(dBm)	Output Power (W)	Limit (W)	Result
		Chain0	Chain 1	Chain 2				
Low	2412	10.45	11.40	15.32	17.70	0.05894	1	PASS
Md	2437	10.79	11.54	15.71	18.03	0.06349		PASS
High	2462	10.87	11.88	16.02	18.30	0.06763		PASS

IEEE 802.11n HT40 MHz mode

Channel	Frequency (MHz)	Output Power(dBm)			Output Power Total(dBm)	Output Power (W)	Limit (W)	Result
		Chain0	Chain 1	Chain 2				
Low	2422	8.26	9.12	13.11	15.48	0.03533	1	PASS
Md	2437	8.18	9.19	13.08	15.47	0.03520		PASS
High	2452	8.05	9.06	13.05	15.39	0.03462		PASS



Test Plot

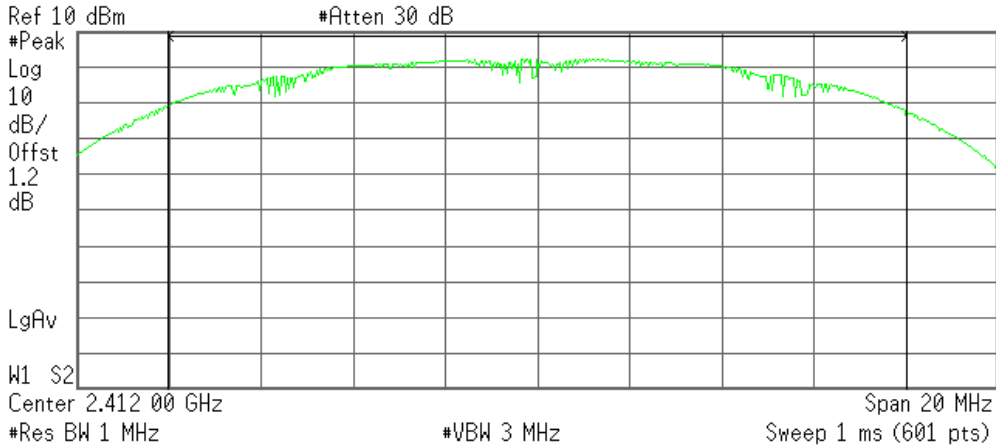
Antenna: DAC0

IEEE 802.11b mode

Peak power (CH Low)

Agilent 14:39:38 Apr 18, 2008

R T



Channel Power

11.15 dBm /16.0000 MHz

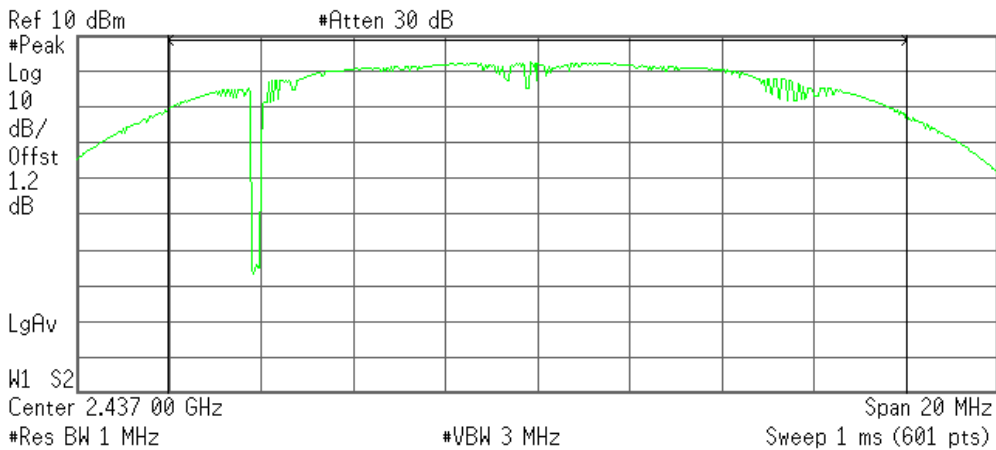
Power Spectral Density

-60.89 dBm/Hz

Peak power (CH Mid)

Agilent 14:41:40 Apr 18, 2008

R T



Channel Power

11.33 dBm /16.0000 MHz

Power Spectral Density

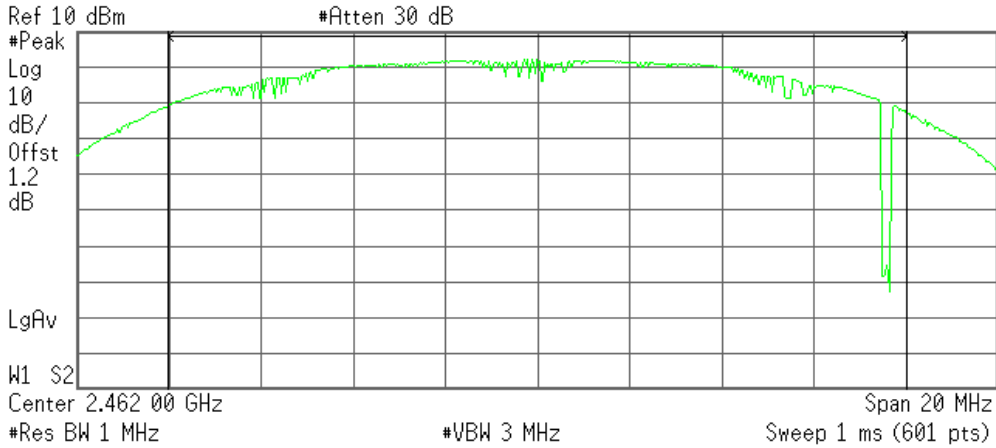
-60.71 dBm/Hz



Peak power (CH High)

Agilent 14:47:03 Apr 18, 2008

R T



Channel Power

10.98 dBm /16.0000 MHz

Power Spectral Density

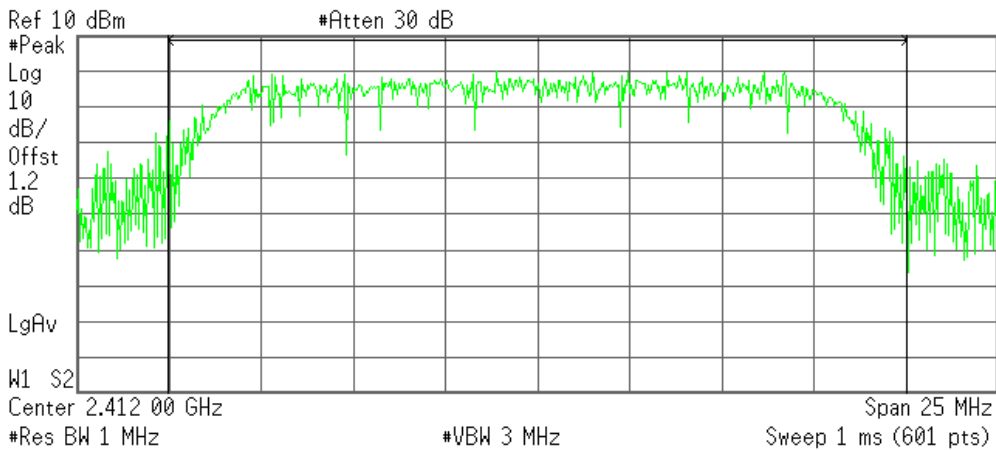
-61.06 dBm/Hz

IEEE 802.11g mode

Peak power (CH Low)

Agilent 14:49:19 Apr 18, 2008

R T



Channel Power

7.90 dBm /20.0000 MHz

Power Spectral Density

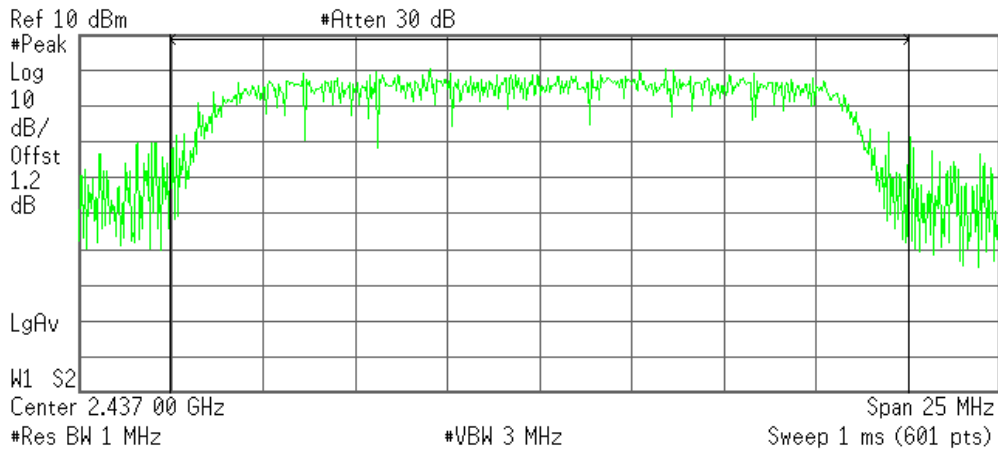
-65.11 dBm/Hz



Peak power (CH Mid)

Agilent 14:49:57 Apr 18, 2008

R T



Channel Power

7.89 dBm /20.0000 MHz

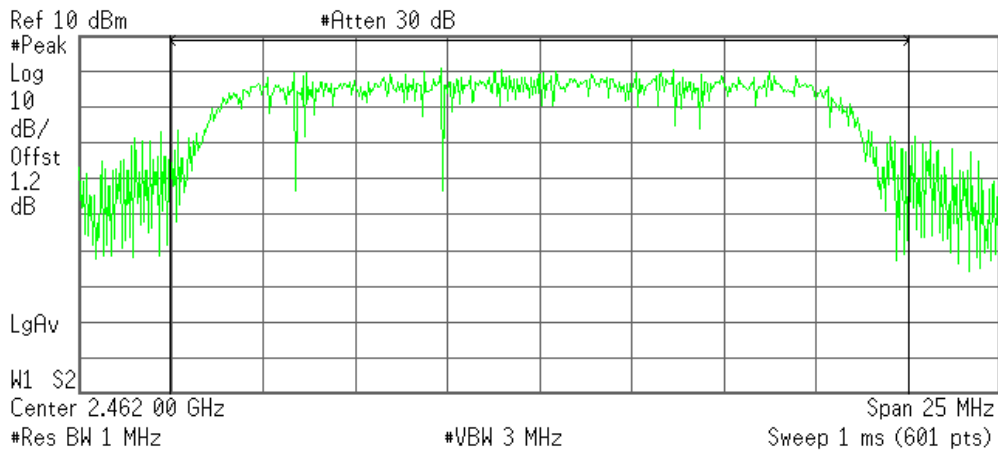
Power Spectral Density

-65.12 dBm/Hz

Peak power (CH High)

Agilent 14:53:58 Apr 18, 2008

R T



Channel Power

8.10 dBm /20.0000 MHz

Power Spectral Density

-64.91 dBm/Hz

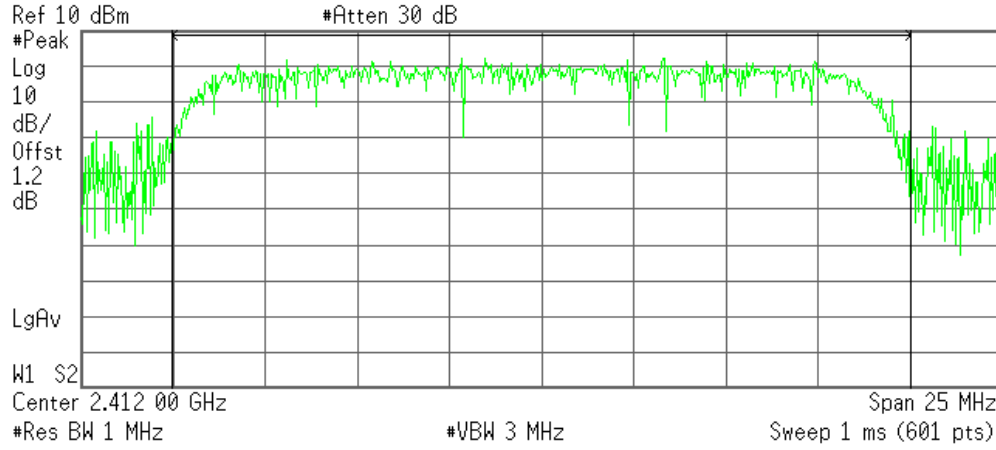


IEEE 802.11n HT20 MHz mode

Peak power (CH Low)

Agilent 15:32:04 Apr 18, 2008

R T



Channel Power

10.45 dBm /20.0000 MHz

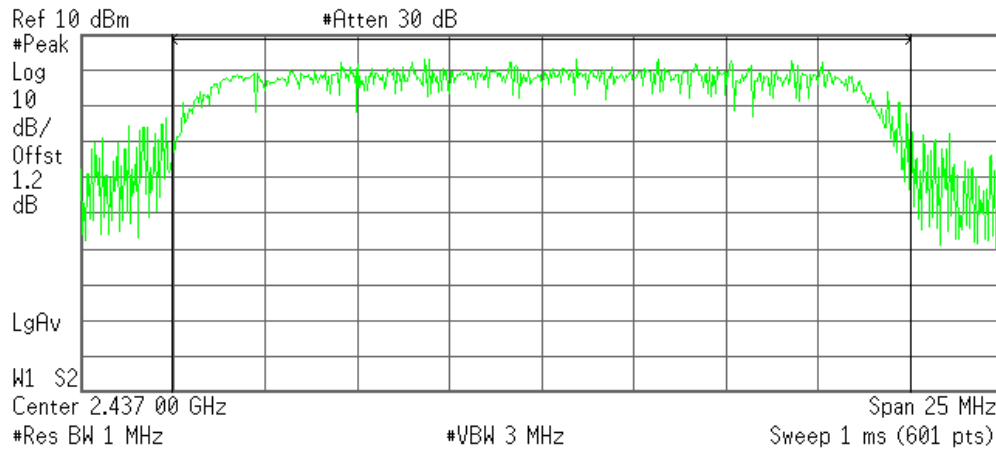
Power Spectral Density

-62.56 dBm/Hz

Peak power (CH Mid)

Agilent 15:33:39 Apr 18, 2008

R T



Channel Power

10.79 dBm /20.0000 MHz

Power Spectral Density

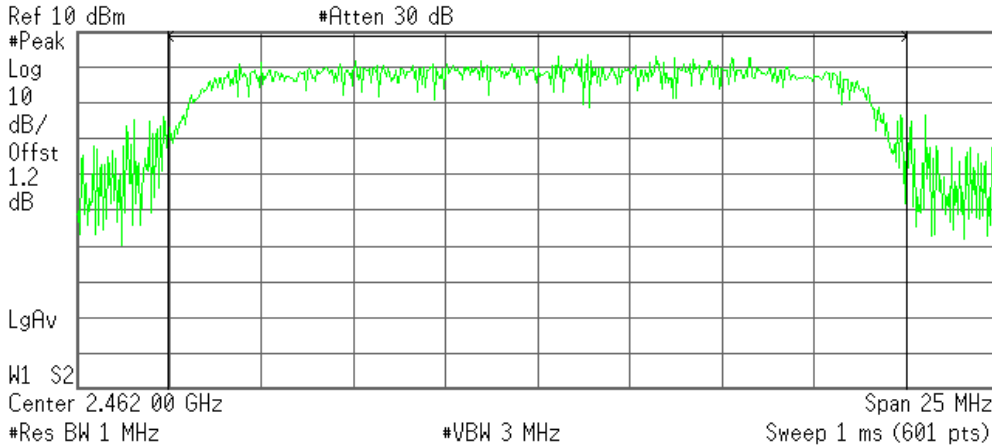
-62.22 dBm/Hz



Peak power (CH High)

Agilent 15:34:08 Apr 18, 2008

R T



Channel Power

10.87 dBm /20.0000 MHz

Power Spectral Density

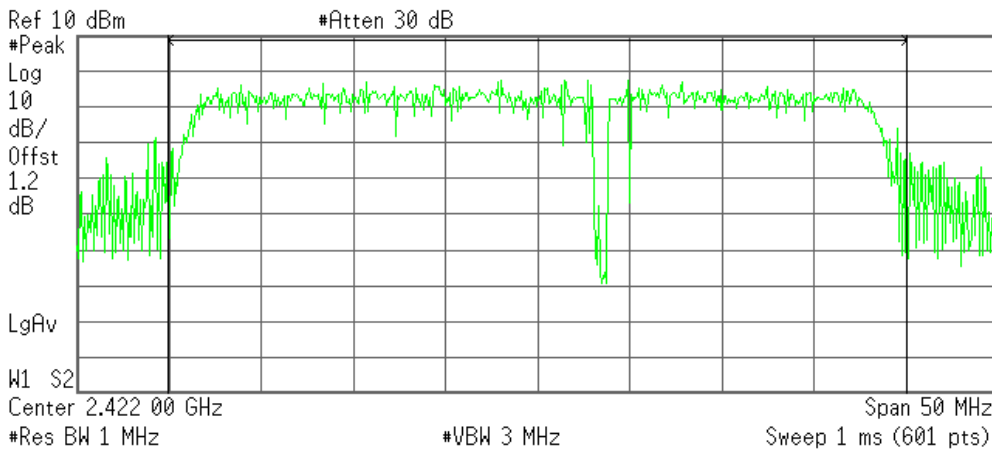
-62.14 dBm/Hz

IEEE 802.11n HT40 MHz mode

Peak power (CH Low)

Agilent 15:35:44 Apr 18, 2008

R T



Channel Power

8.26 dBm /40.0000 MHz

Power Spectral Density

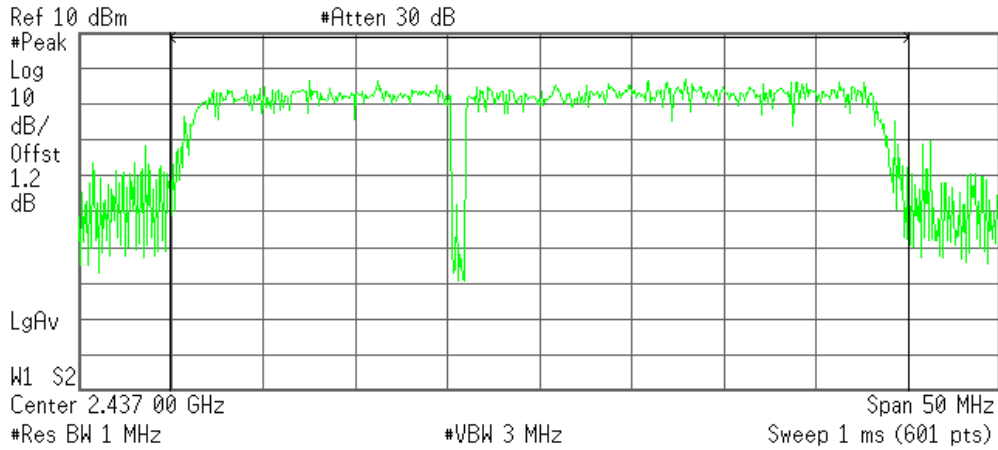
-67.76 dBm/Hz



Peak power (CH Mid)

Agilent 15:36:38 Apr 18, 2008

R T



Channel Power

8.18 dBm /40.0000 MHz

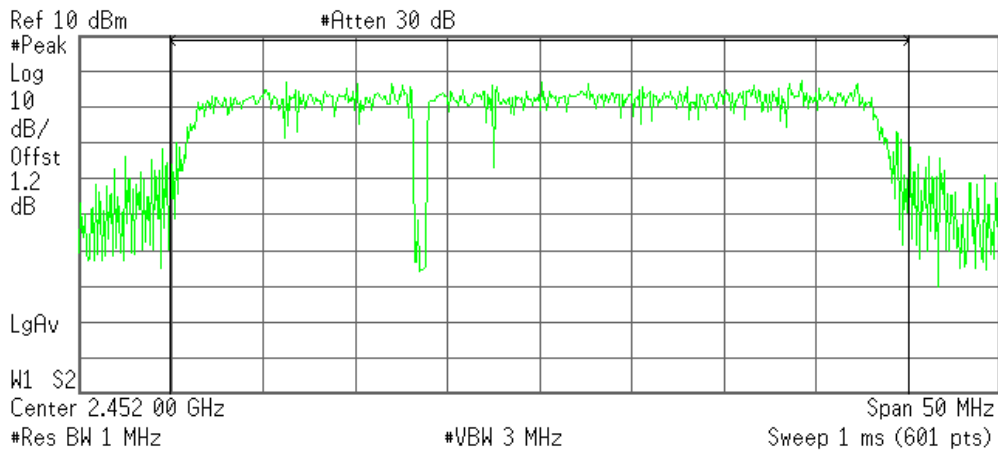
Power Spectral Density

-67.84 dBm/Hz

Peak power (CH High)

Agilent 15:37:08 Apr 18, 2008

R T



Channel Power

8.05 dBm /40.0000 MHz

Power Spectral Density

-67.97 dBm/Hz



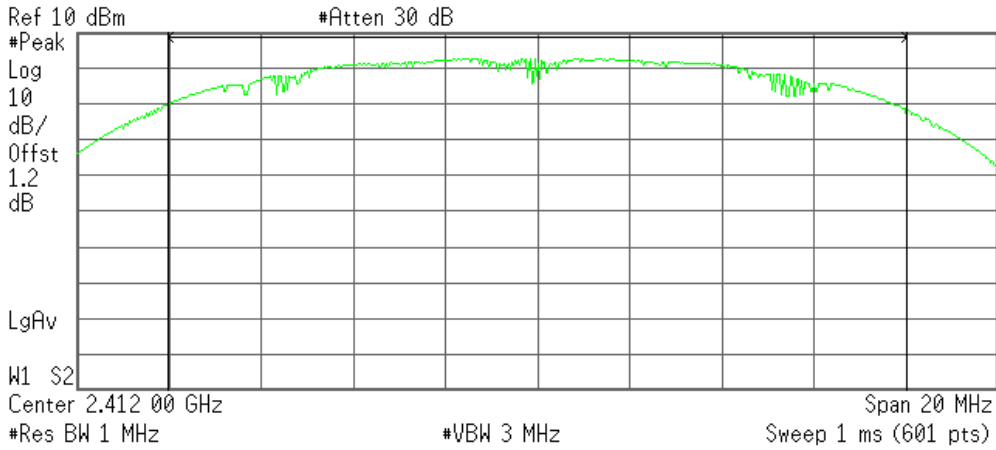
Antenna: DCA1

IEEE 802.11b mode

Peak power (CH Low)

Agilent 15:39:40 Apr 18, 2008

R T



Channel Power

11.72 dBm /16.0000 MHz

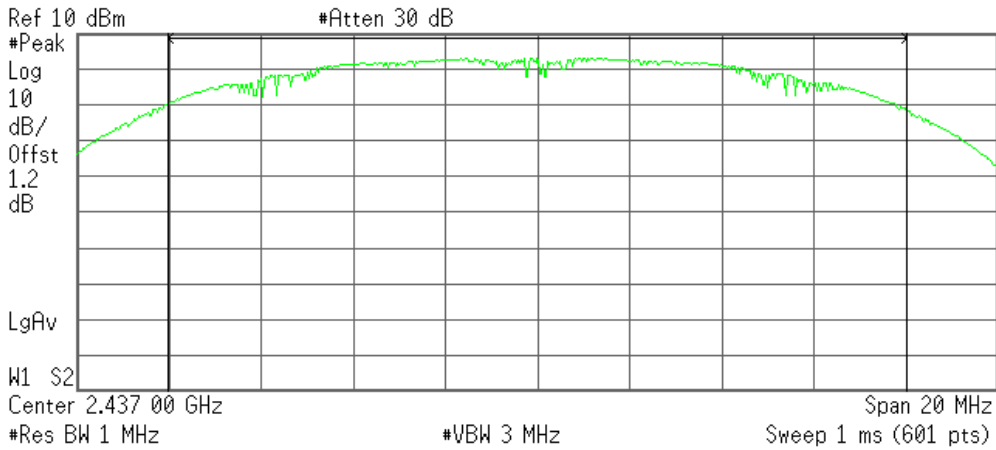
Power Spectral Density

-60.32 dBm/Hz

Peak power (CH Mid)

Agilent 15:40:11 Apr 18, 2008

R T



Channel Power

12.08 dBm /16.0000 MHz

Power Spectral Density

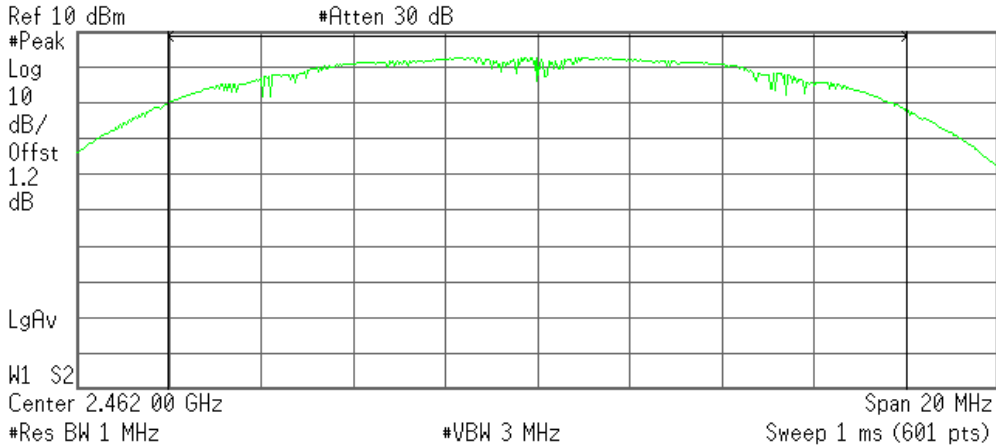
-59.96 dBm/Hz



Peak power (CH High)

Agilent 15:40:49 Apr 18, 2008

R T



Channel Power

11.73 dBm /16.0000 MHz

Power Spectral Density

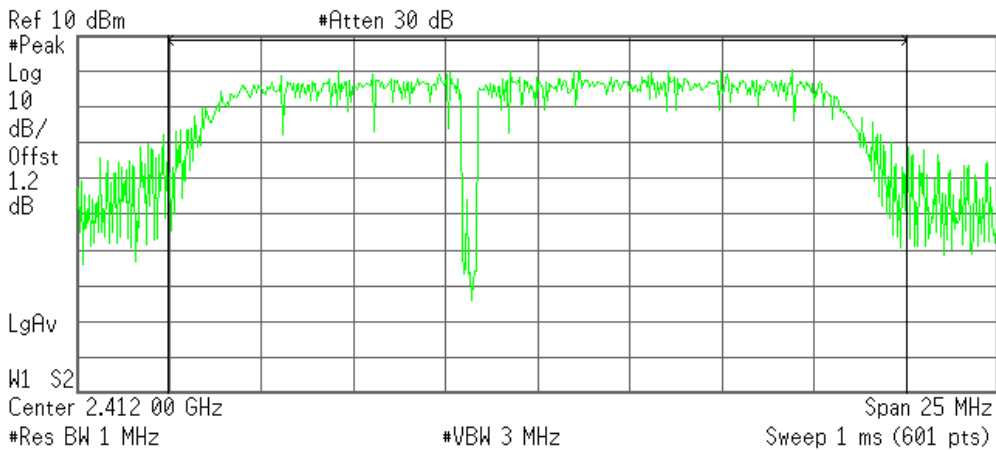
-60.31 dBm/Hz

IEEE 802.11g mode

Peak power (CH Low)

Agilent 15:42:29 Apr 18, 2008

R T



Channel Power

7.92 dBm /20.0000 MHz

Power Spectral Density

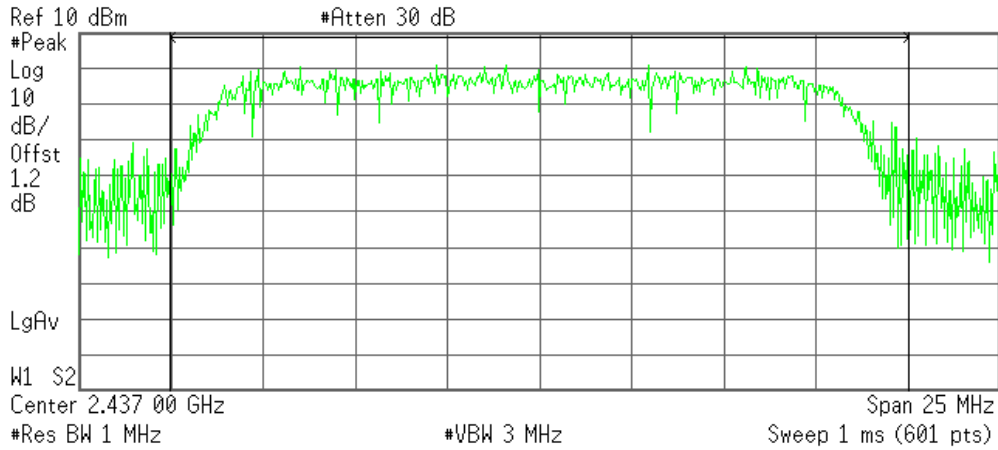
-65.09 dBm/Hz



Peak power (CH Mid)

Agilent 15:43:05 Apr 18, 2008

R T



Channel Power

8.31 dBm /20.0000 MHz

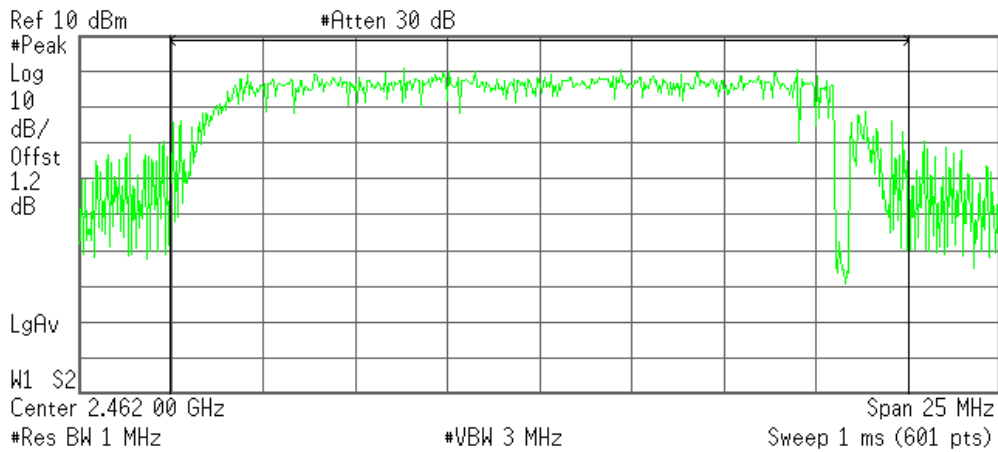
Power Spectral Density

-64.70 dBm/Hz

Peak power (CH High)

Agilent 15:43:35 Apr 18, 2008

R T



Channel Power

8.58 dBm /20.0000 MHz

Power Spectral Density

-64.43 dBm/Hz

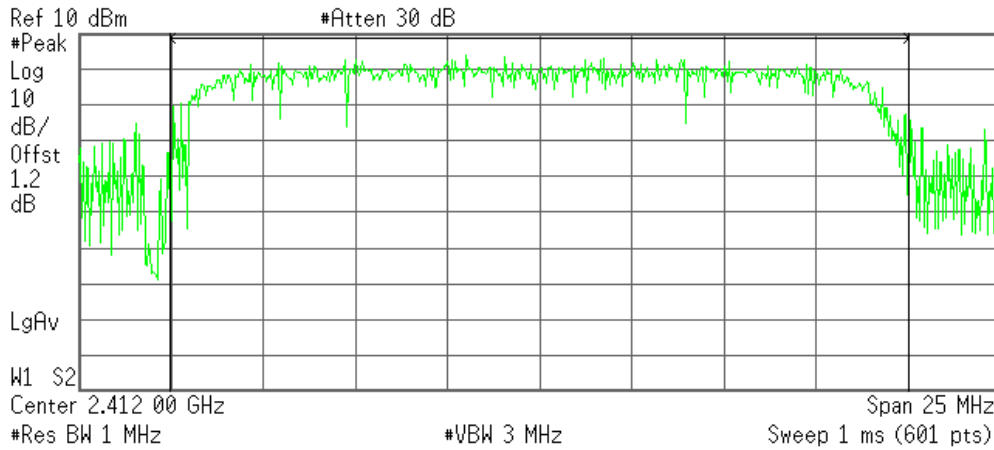


IEEE 802.11n HT20 MHz mode

Peak power (CH Low)

Agilent 15:46:08 Apr 18, 2008

R T



Channel Power

11.40 dBm /20.0000 MHz

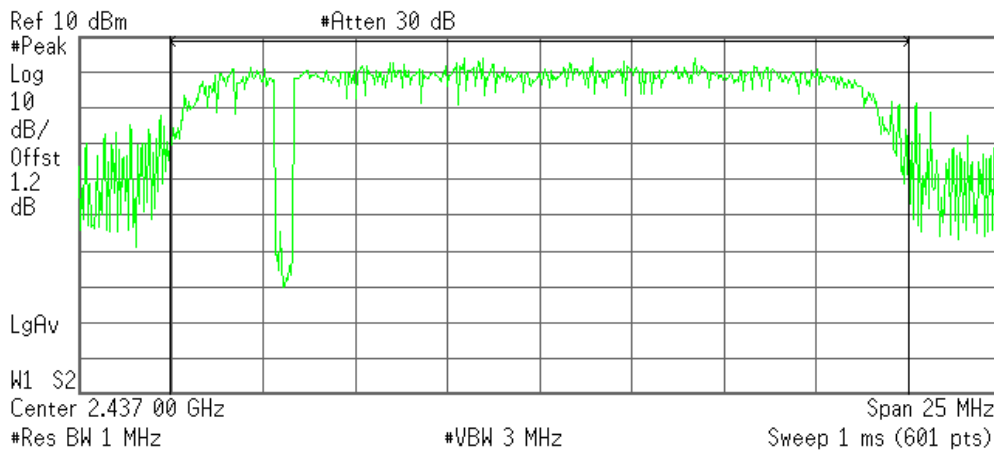
Power Spectral Density

-61.61 dBm/Hz

Peak power (CH Mid)

Agilent 15:46:38 Apr 18, 2008

R T



Channel Power

11.54 dBm /20.0000 MHz

Power Spectral Density

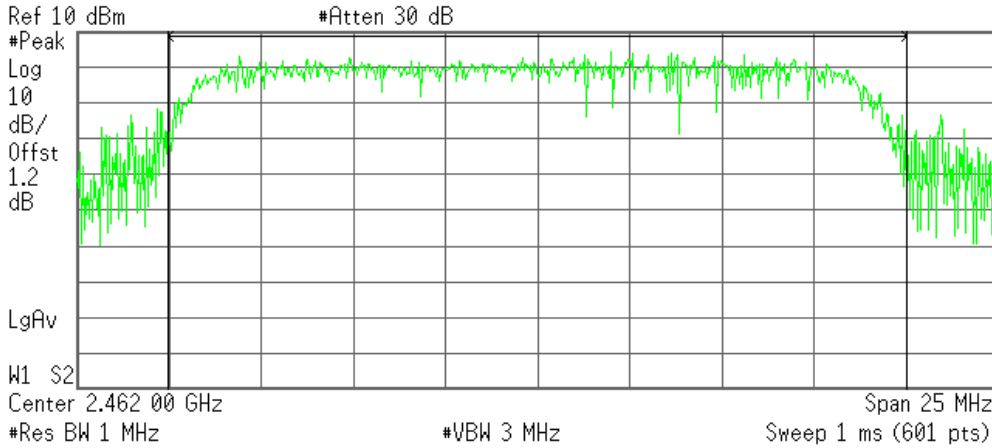
-61.47 dBm/Hz



Peak power (CH High)

Agilent 15:47:12 Apr 18, 2008

R T



Channel Power

11.88 dBm /20.0000 MHz

Power Spectral Density

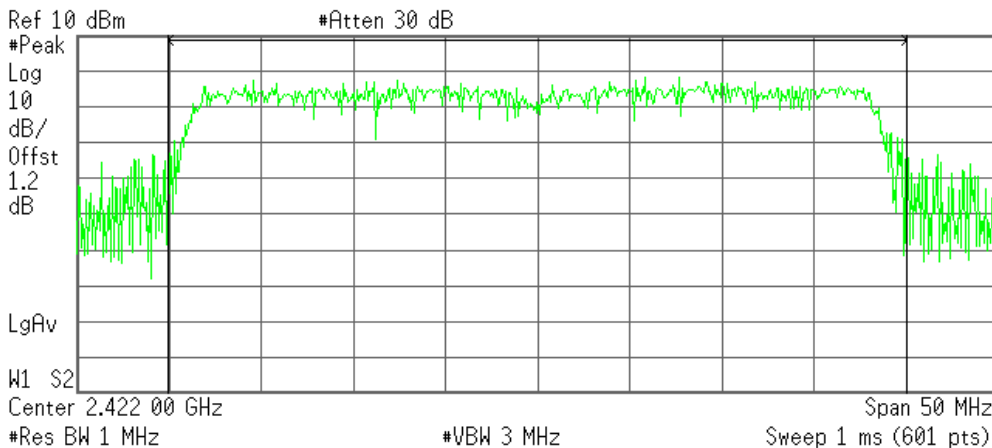
-61.13 dBm/Hz

IEEE 802.11n HT40 MHz mode

Peak power (CH Low)

Agilent 15:49:21 Apr 18, 2008

R T



Channel Power

9.12 dBm /40.0000 MHz

Power Spectral Density

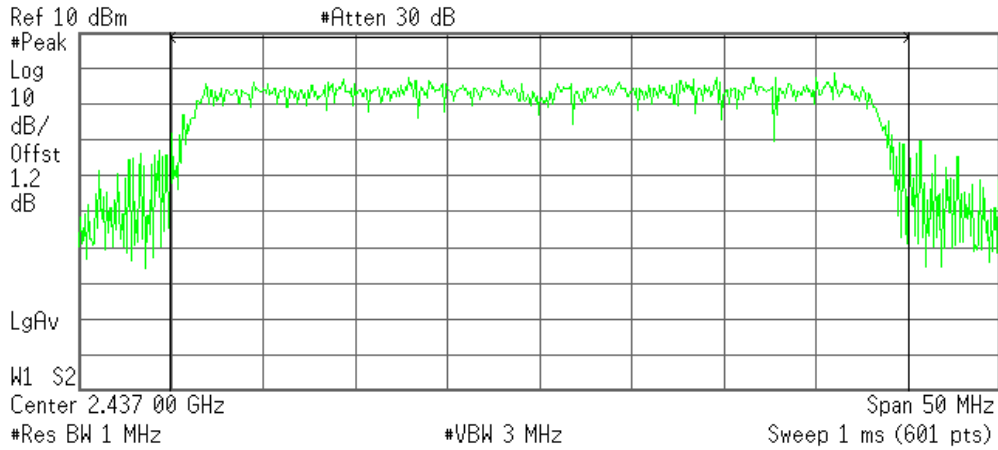
-66.90 dBm/Hz



Peak power (CH Mid)

Agilent 15:49:54 Apr 18, 2008

R T



Channel Power

9.19 dBm /40.0000 MHz

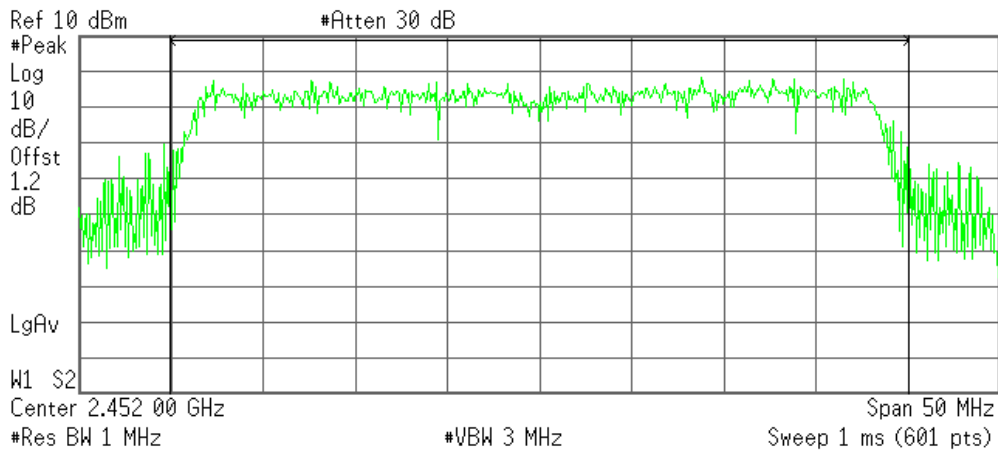
Power Spectral Density

-66.83 dBm/Hz

Peak power (CH High)

Agilent 15:50:29 Apr 18, 2008

R T



Channel Power

9.06 dBm /40.0000 MHz

Power Spectral Density

-66.96 dBm/Hz



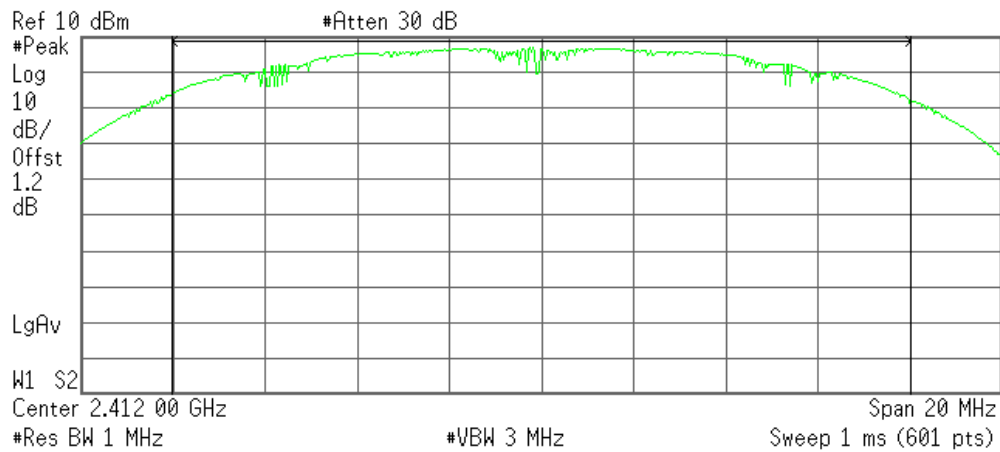
Antenna: DCA2

IEEE 802.11b mode

Peak power (CH Low)

Agilent 16:00:05 Apr 18, 2008

R L



Channel Power

15.81 dBm /16.0000 MHz

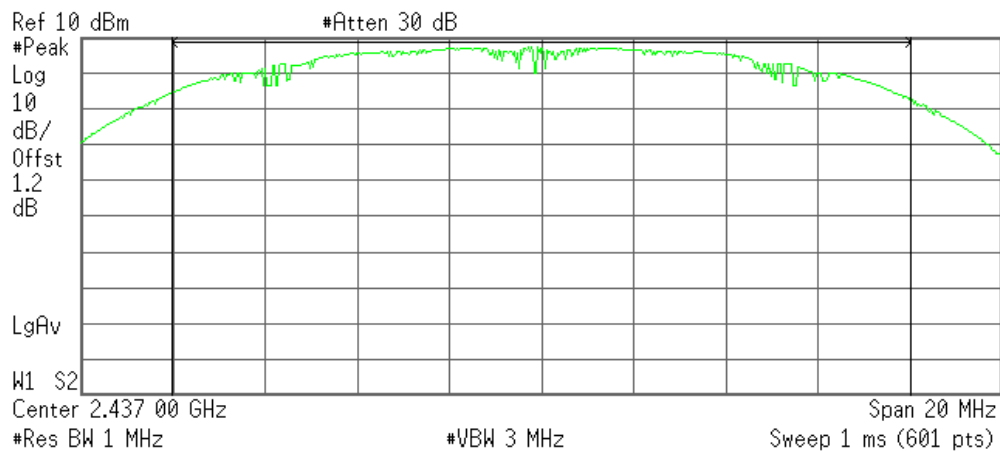
Power Spectral Density

-56.23 dBm/Hz

Peak power (CH Mid)

Agilent 16:00:36 Apr 18, 2008

R T



Channel Power

16.18 dBm /16.0000 MHz

Power Spectral Density

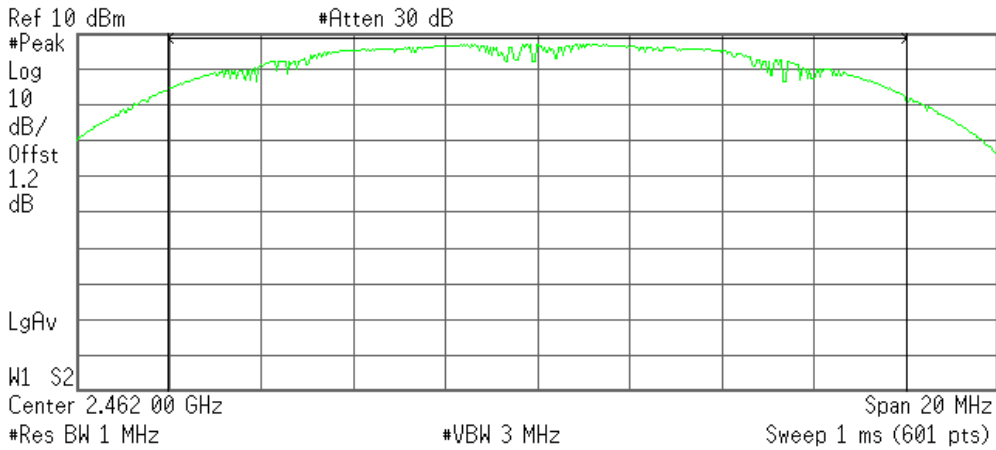
-55.86 dBm/Hz



Peak power (CH High)

Agilent 16:01:08 Apr 18, 2008

R T



Channel Power

15.97 dBm /16.0000 MHz

Power Spectral Density

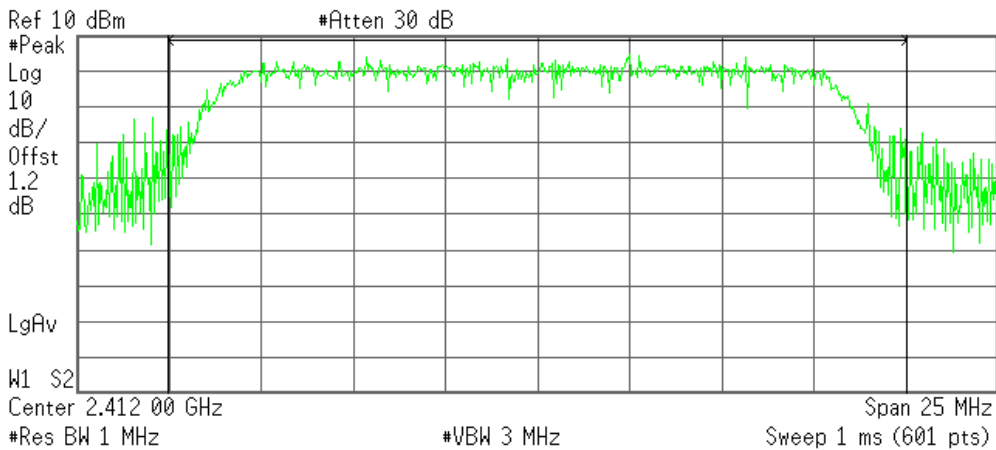
-56.07 dBm/Hz

IEEE 802.11g mode

Peak power (CH Low)

Agilent 16:02:18 Apr 18, 2008

R T



Channel Power

12.43 dBm /20.0000 MHz

Power Spectral Density

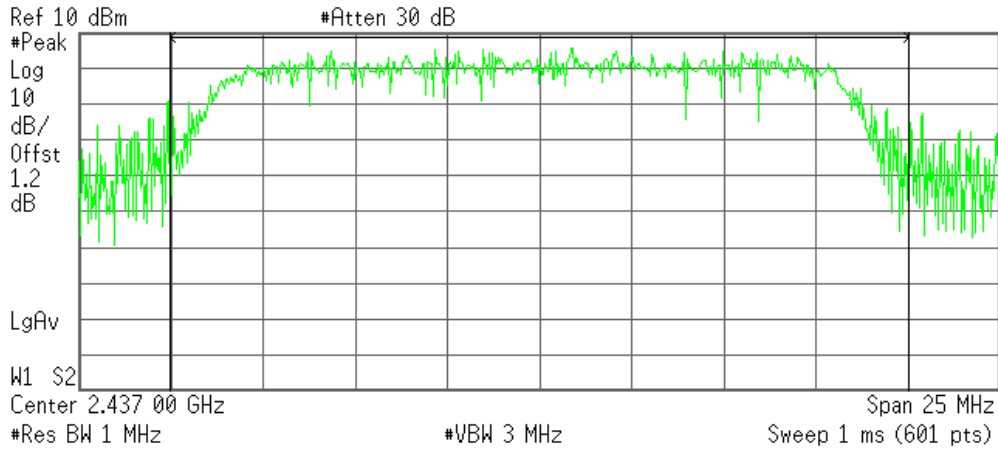
-60.58 dBm/Hz



Peak power (CH Mid)

Agilent 16:03:13 Apr 18, 2008

R T



Channel Power

12.73 dBm /20.0000 MHz

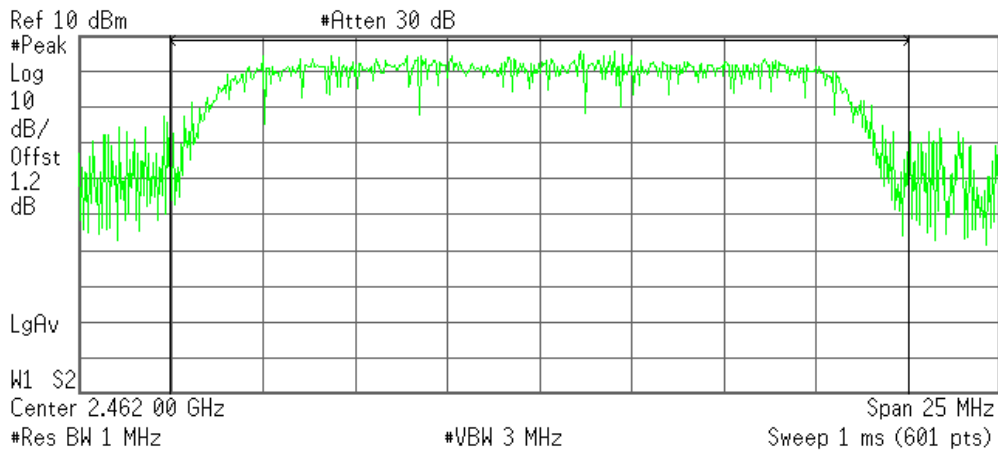
Power Spectral Density

-60.28 dBm/Hz

Peak power (CH High)

Agilent 16:03:43 Apr 18, 2008

R T



Channel Power

13.04 dBm /20.0000 MHz

Power Spectral Density

-59.97 dBm/Hz

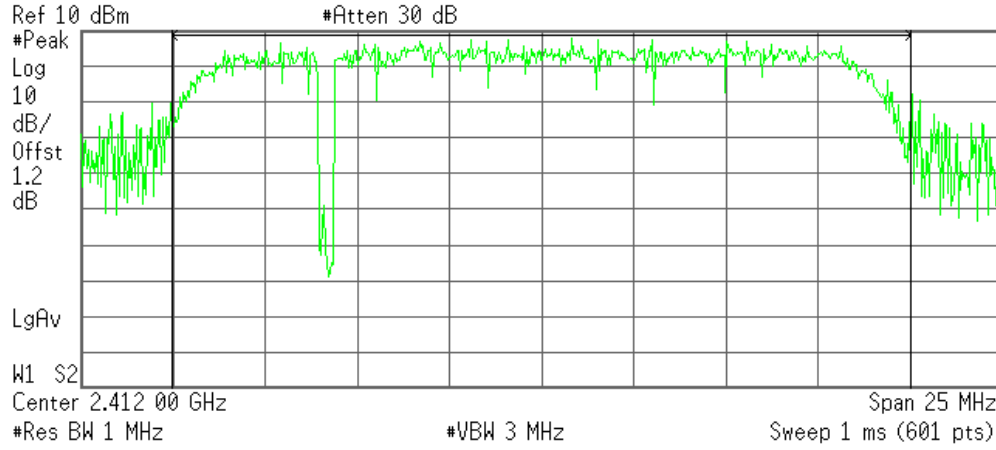


IEEE 802.11n HT20 MHz mode

Peak power (CH Low)

Agilent 16:04:52 Apr 18, 2008

R T



Channel Power

15.32 dBm /20.0000 MHz

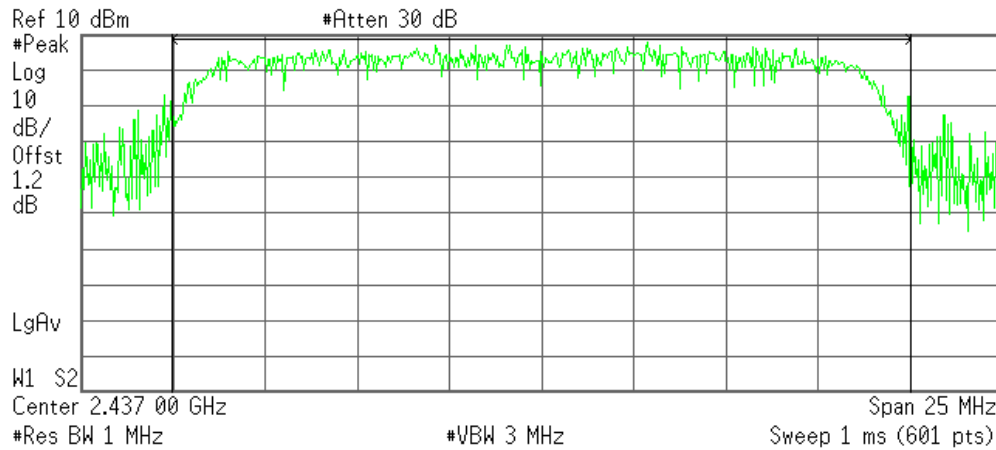
Power Spectral Density

-57.69 dBm/Hz

Peak power (CH Mid)

Agilent 16:05:33 Apr 18, 2008

R T



Channel Power

15.71 dBm /20.0000 MHz

Power Spectral Density

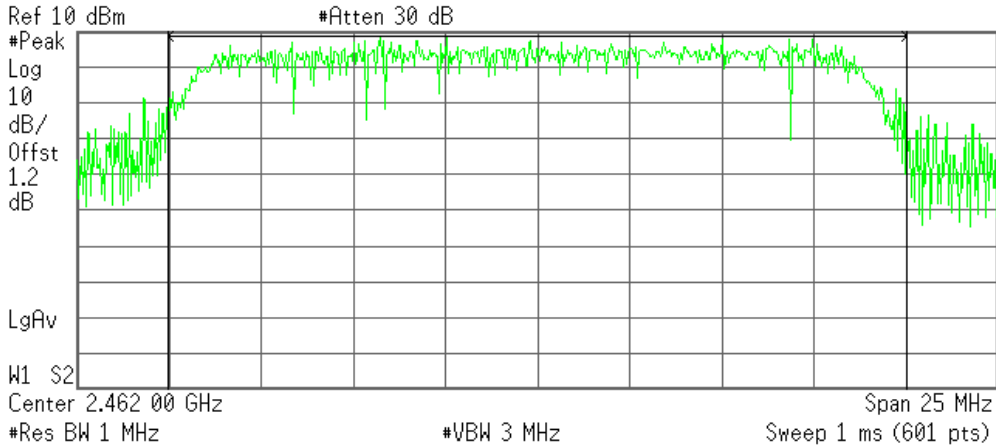
-57.30 dBm/Hz



Peak power (CH High)

Agilent 16:06:09 Apr 18, 2008

R T



Channel Power

16.02 dBm /20.0000 MHz

Power Spectral Density

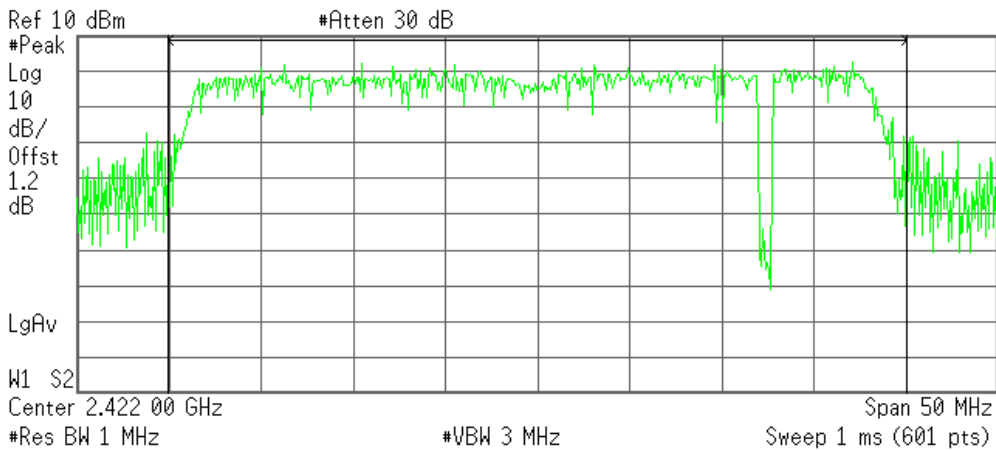
-56.99 dBm/Hz

IEEE 802.11n HT40 MHz mode

Peak power (CH Low)

Agilent 16:07:40 Apr 18, 2008

R T



Channel Power

13.11 dBm /40.0000 MHz

Power Spectral Density

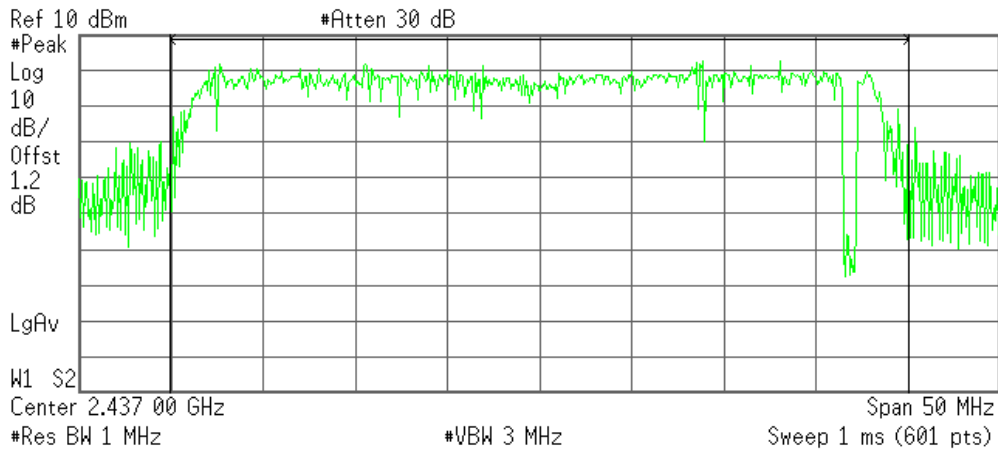
-62.91 dBm/Hz



Peak power (CH Mid)

Agilent 16:08:09 Apr 18, 2008

R T



Channel Power

13.08 dBm /40.0000 MHz

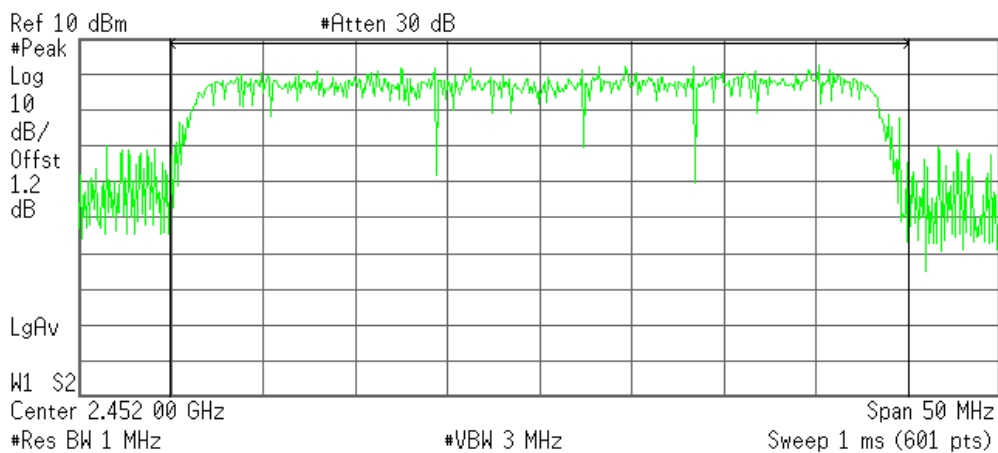
Power Spectral Density

-62.94 dBm/Hz

Peak power (CH High)

Agilent 16:09:12 Apr 18, 2008

R T



Channel Power

13.05 dBm /40.0000 MHz

Power Spectral Density

-62.97 dBm/Hz



7.3 AVERAGE POWER

LIMIT

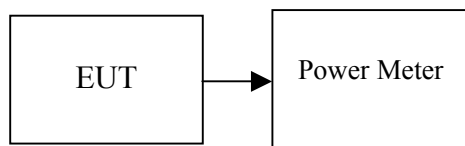
None; for reporting purposes only.

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Power Meter	Anritsu	ML2487A	6K00001491	06/07/2008

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

Test Configuration



TEST PROCEDURE

The transmitter output is connected to the Power meter.

$$\text{Output Power} = 10 \log (10^{(\text{Chain 0 Output Power} / 10)} + 10^{(\text{Chain 1 Output Power} / 10)} + 10^{(\text{Chain 1 Output Power} / 10)})$$

**TEST RESULTS***No non-compliance noted***Test Data****IEEE 802.11b mode**

Channel	Frequency (MHz)	Output Power(dBm)			Output Power Total(dBm)	Output Power (W)
		Chain0	Chain 1	Chain 2		
Low	2412	10.02	10.05	14.84	17.05	0.05064
Md	2437	9.65	10.53	14.92	17.12	0.05157
High	2462	8.26	10.02	14.58	16.58	0.04545

IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power(dBm)			Output Power Total(dBm)	Output Power (W)
		Chain0	Chain 1	Chain 2		
Low	2412	6.25	6.47	10.58	13.03	0.02008
Md	2437	6.14	6.51	10.95	13.23	0.02103
High	2462	6.48	6.28	11.02	13.29	0.02134

IEEE 802.11n HT20 MHz mode

Channel	Frequency (MHz)	Output Power(dBm)			Output Power Total(dBm)	Output Power (W)
		Chain0	Chain 1	Chain 2		
Low	2412	8.95	8.92	14.87	16.66	0.04634
Md	2437	8.93	9.55	13.81	16.11	0.04088
High	2462	8.28	10.01	14.58	16.58	0.04546

IEEE 802.11n HT40 MHz mode

Channel	Frequency (MHz)	Output Power(dBm)			Output Power Total(dBm)	Output Power (W)
		Chain0	Chain 1	Chain 2		
Low	2422	6.38	7.99	11.67	14.04	0.02533
Md	2437	6.84	7.02	11.63	13.88	0.02442
High	2452	7.58	7.41	12.02	14.34	0.02716

7.4 BAND EDGES MEASUREMENT

LIMIT

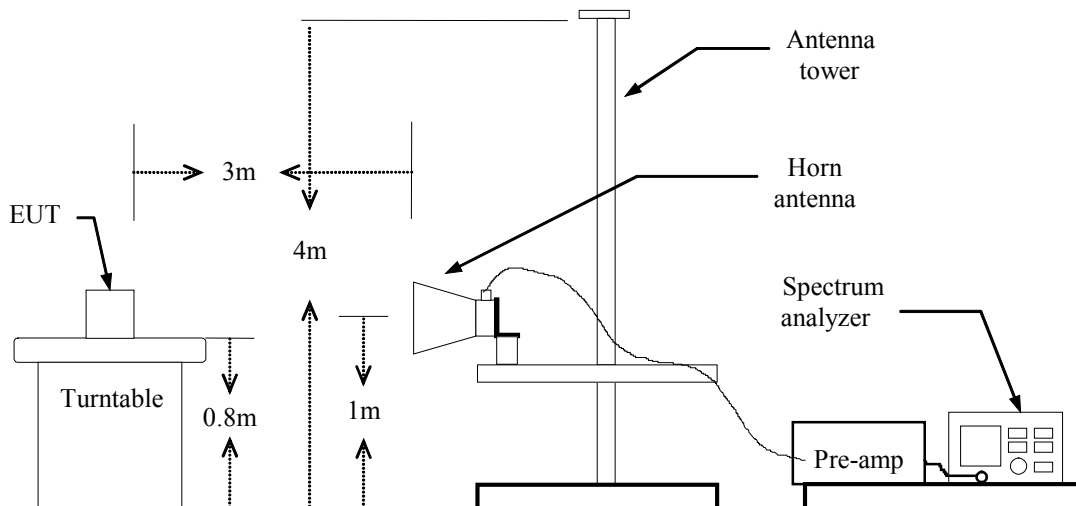
According to §15.247(c), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains 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	US44300399	02/24/2009

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.



Band Edges (IEEE 802.11b mode / CH Low)

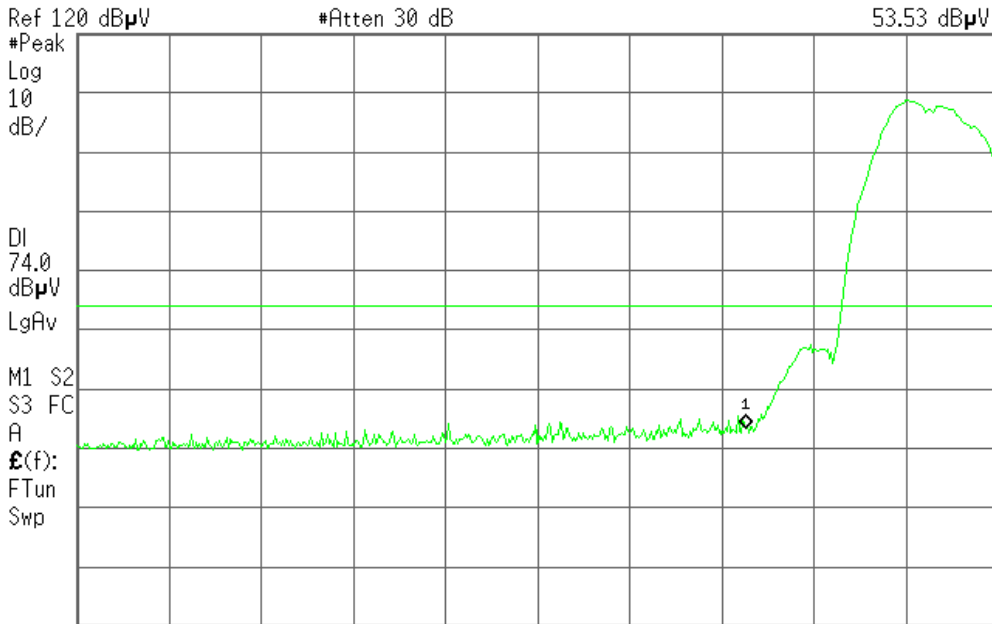
Detector mode: Peak

Polarity: Vertical

Agilent 16:11:50 Apr 15, 2008

R T

Mkr1 2.390 0 GHz
53.53 dBμV



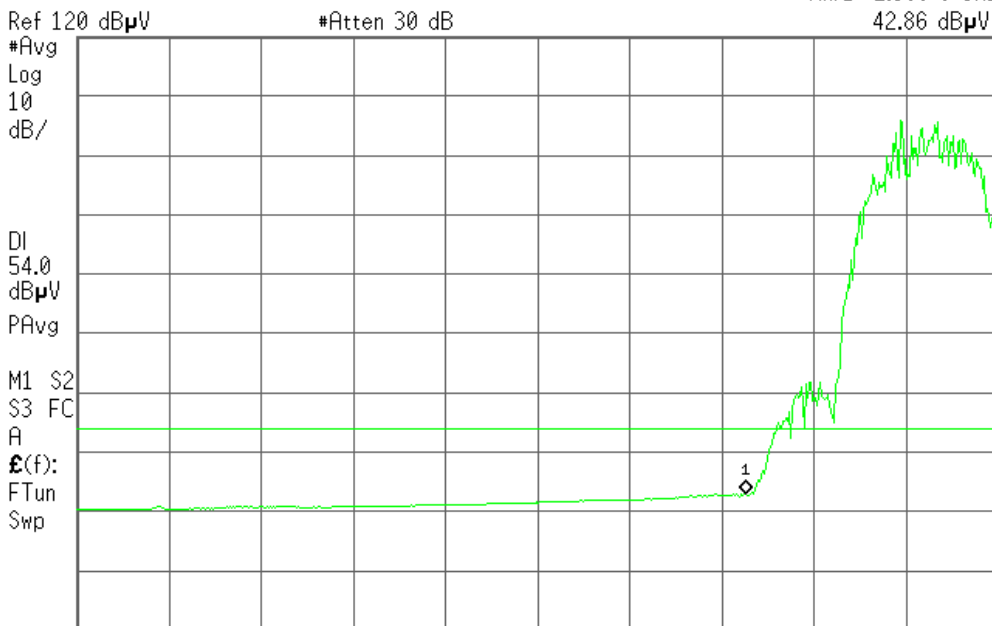
Detector mode: Average

Polarity: Vertical

Agilent 16:12:51 Apr 15, 2008

R T

Mkr1 2.390 0 GHz
42.86 dBμV





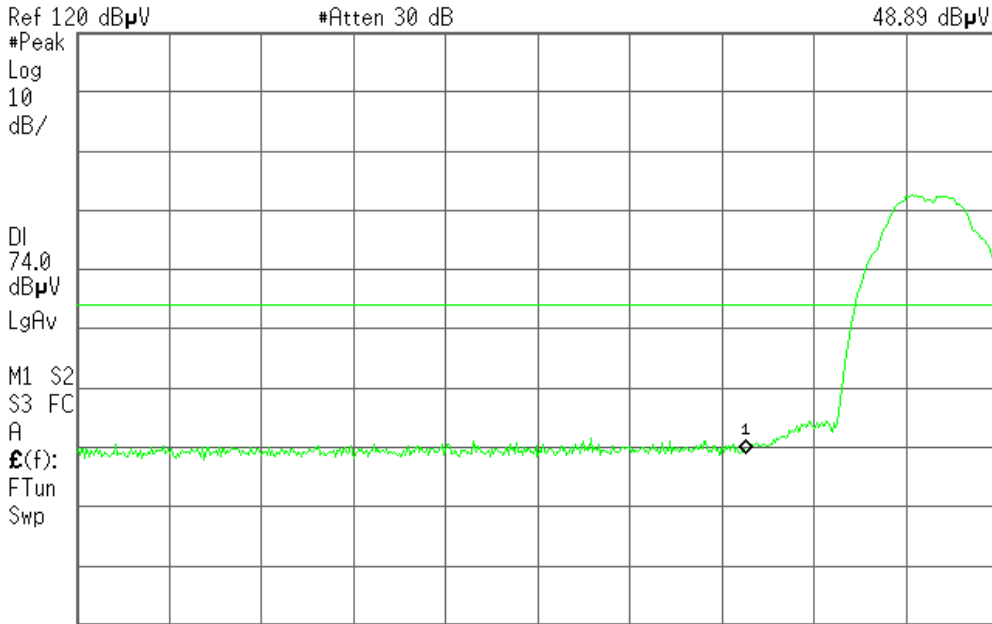
Detector mode: Peak

Polarity: Horizontal

Agilent 16:17:48 Apr 15, 2008

R L T

Mkr1 2.390 0 GHz
48.89 dBµV



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

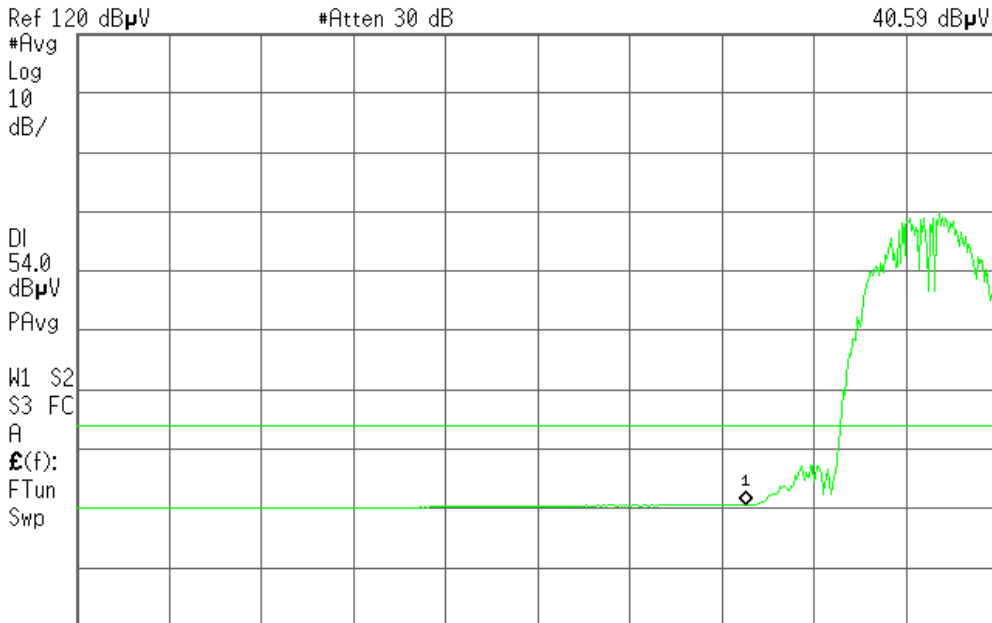
Detector mode: Average

Polarity: Horizontal

Agilent 16:18:40 Apr 15, 2008

R T

Mkr1 2.390 0 GHz
40.59 dBµV



Start 2.310 0 GHz Stop 2.420 0 GHz
Res BW 1 MHz #VBW 10 Hz Sweep 27.12 s (601 pts)



Band Edges (IEEE 802.11b mode/ CH High)

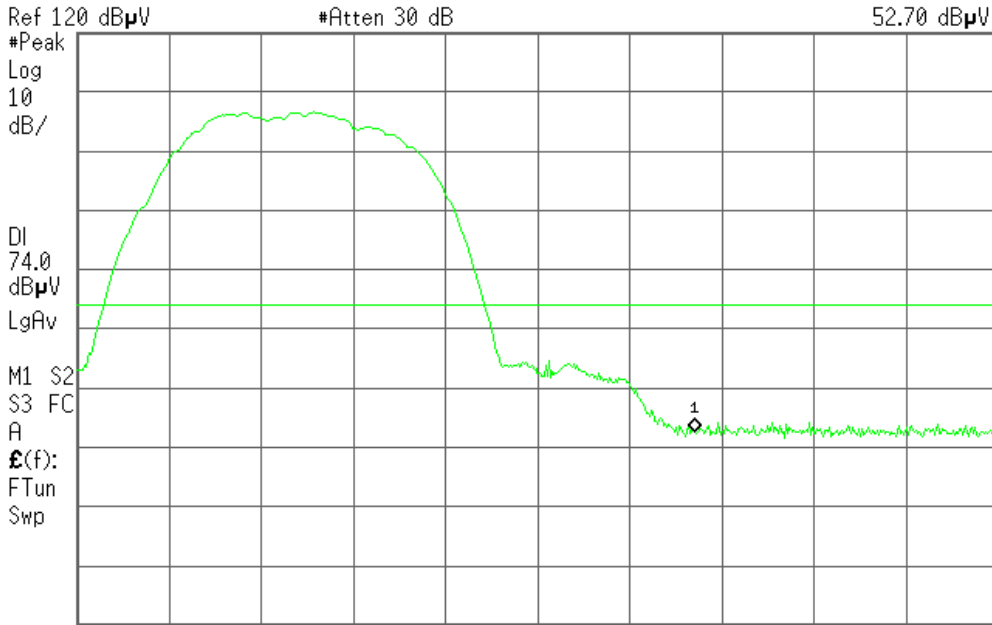
Detector mode: Peak

Polarity: Vertical

Agilent 16:31:43 Apr 15, 2008

R T

Mkr1 2.483 50 GHz
52.70 dB μ V



Start 2.450 00 GHz

Stop 2.500 00 GHz

#Res BW 1 MHz

#VBW 1 MHz

Sweep 20 ms (601 pts)

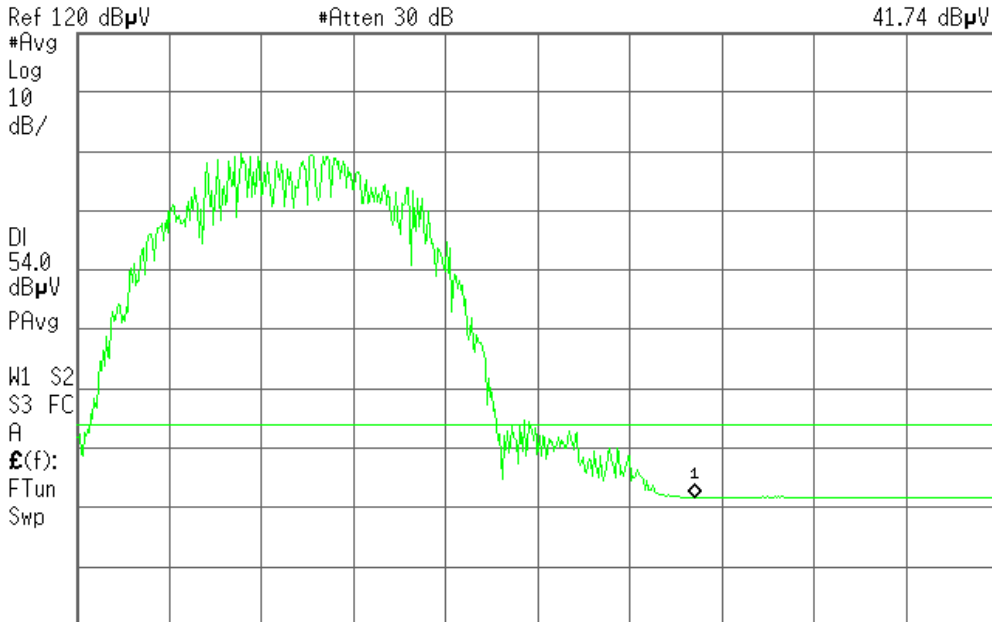
Detector mode: Average

Polarity: Vertical

Agilent 16:32:26 Apr 15, 2008

R T

Mkr1 2.483 50 GHz
41.74 dB μ V



Start 2.450 00 GHz

Stop 2.500 00 GHz

#Res BW 1 MHz

#VBW 10 Hz

Sweep 12.33 s (601 pts)



Detector mode: Peak

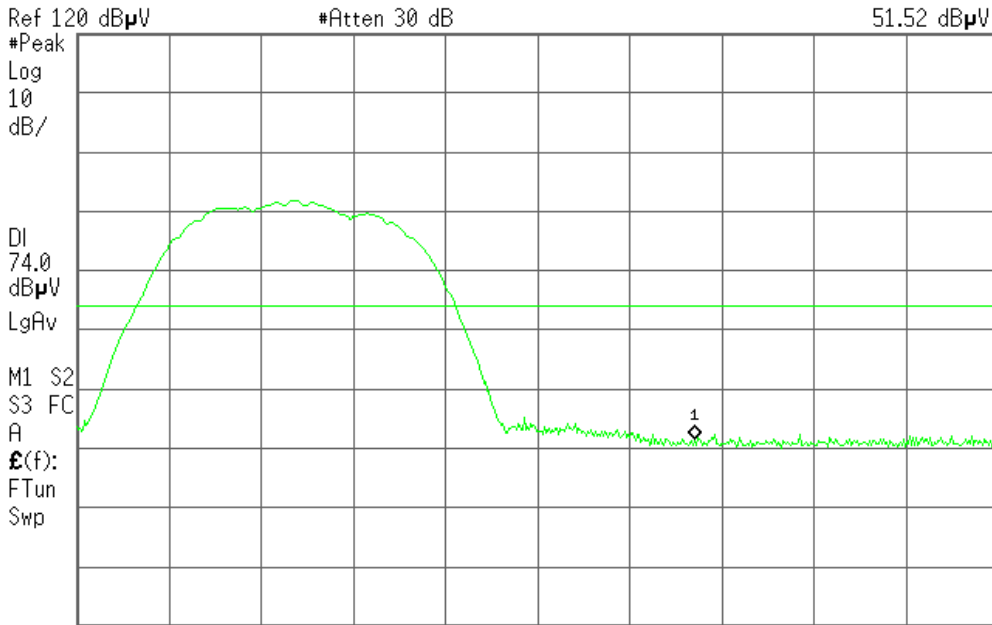
Polarity: Horizontal

Agilent 16:26:36 Apr 15, 2008

R T

Mkr1 2.483 50 GHz

51.52 dBμV



Start 2.450 00 GHz

Stop 2.500 00 GHz

#Res BW 1 MHz

#VBW 1 MHz

Sweep 20 ms (601 pts)

Detector mode: Average

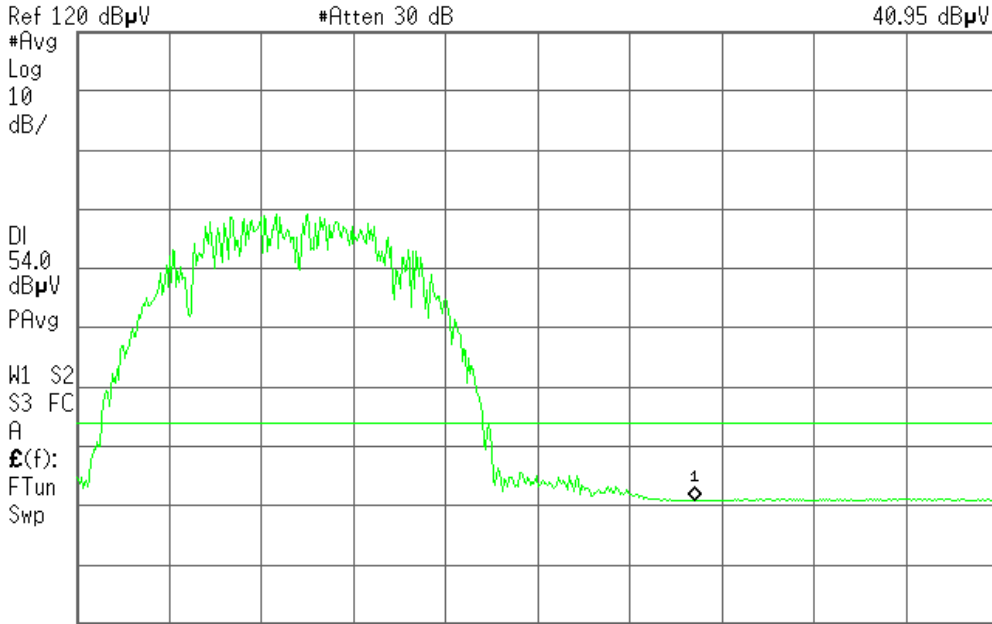
Polarity: Horizontal

Agilent 16:27:17 Apr 15, 2008

R T

Mkr1 2.483 50 GHz

40.95 dBμV



Start 2.450 00 GHz

Stop 2.500 00 GHz

#Res BW 1 MHz

#VBW 10 Hz

Sweep 12.33 s (601 pts)



Band Edges (IEEE 802.11g mode / CH Low)

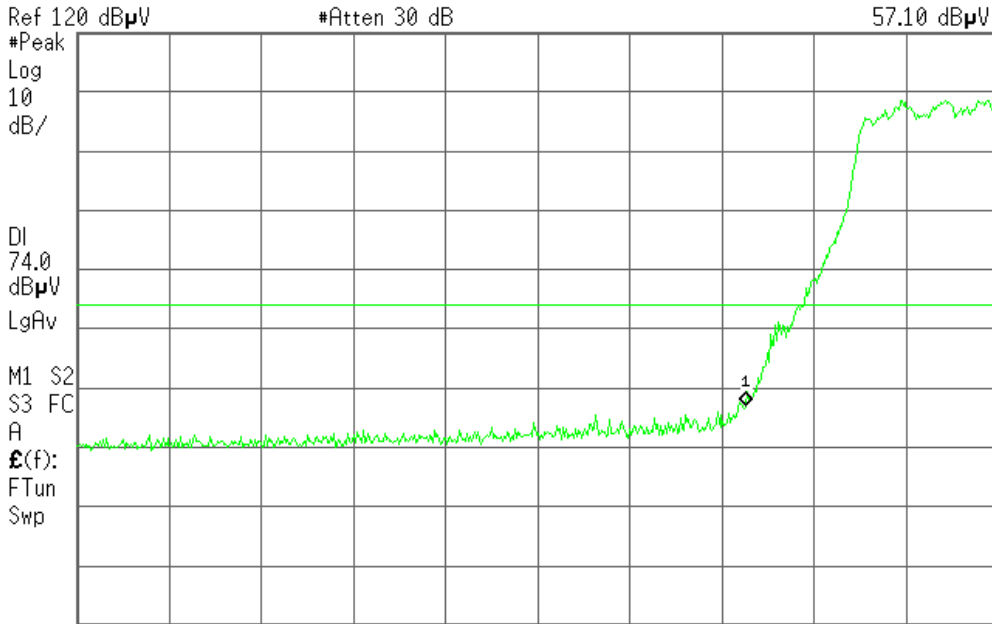
Detector mode: Peak

Polarity: Vertical

Agilent 16:38:11 Apr 15, 2008

R T

Mkr1 2.390 0 GHz
57.10 dBμV



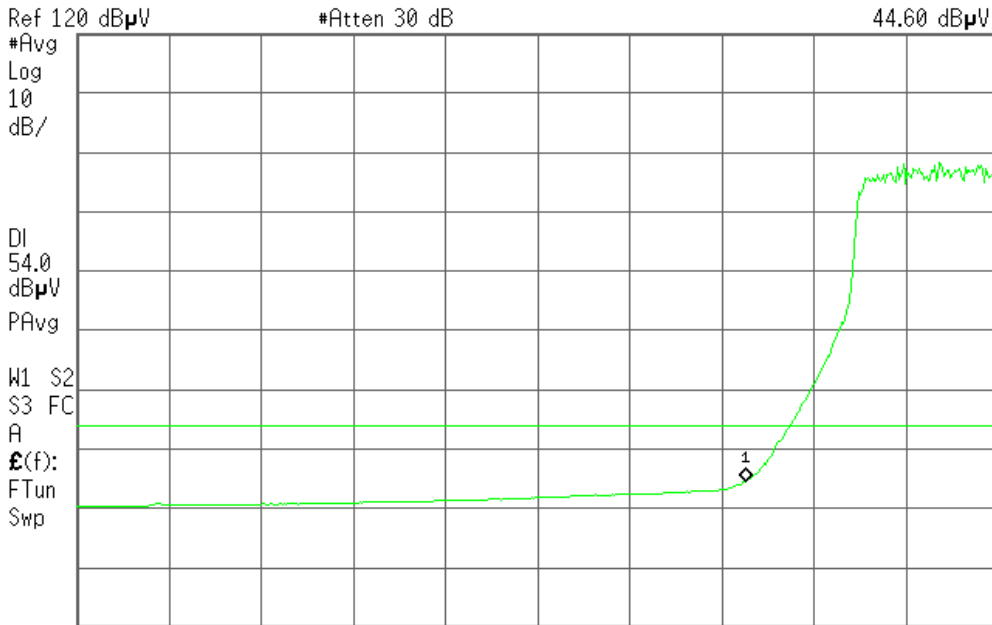
Detector mode: Average

Polarity: Vertical

Agilent 16:38:59 Apr 15, 2008

R T

Mkr1 2.390 0 GHz
44.60 dBμV



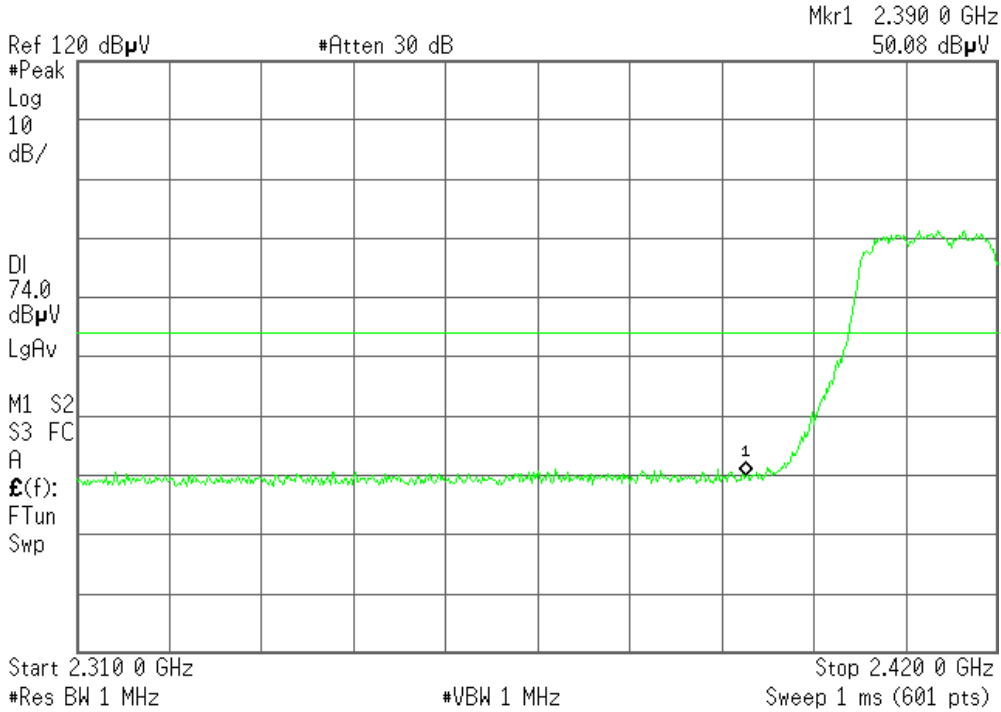


Detector mode: Peak

Polarity: Horizontal

Agilent 16:42:52 Apr 15, 2008

R T

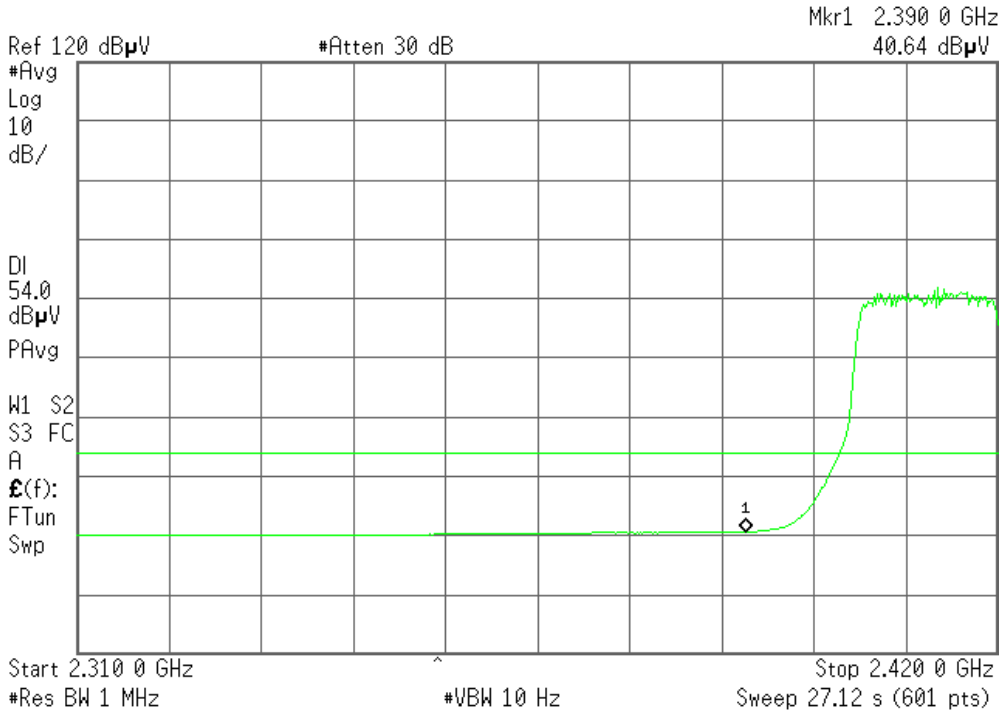


Detector mode: Average

Polarity: Horizontal

Agilent 16:43:53 Apr 15, 2008

R T





Band Edges (IEEE 802.11g mode / CH High)

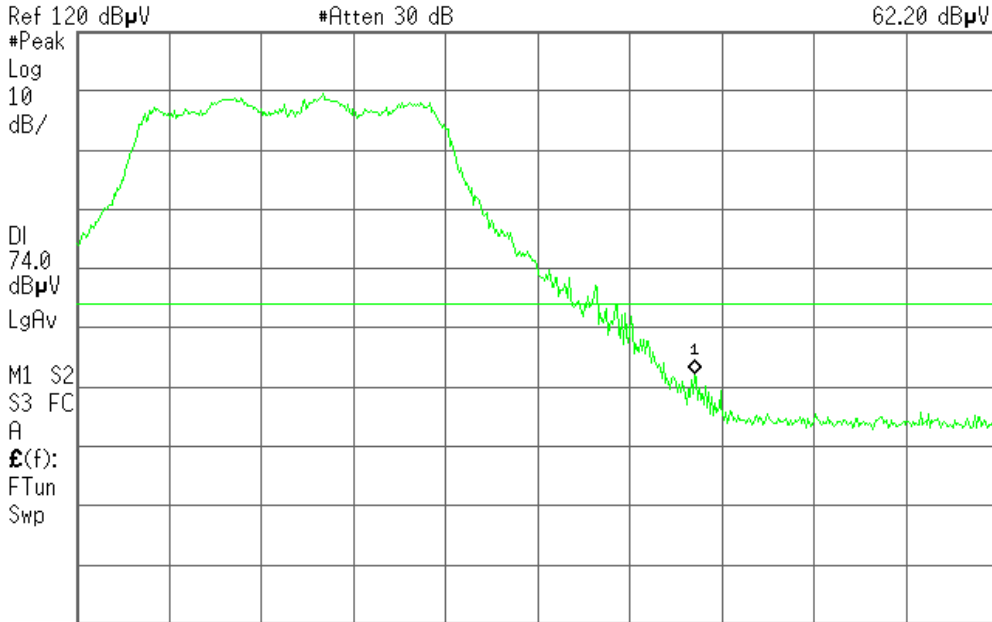
Detector mode: Peak

Polarity: Vertical

Agilent 16:52:29 Apr 15, 2008

R T

Mkr1 2.483 50 GHz
62.20 dB μ V



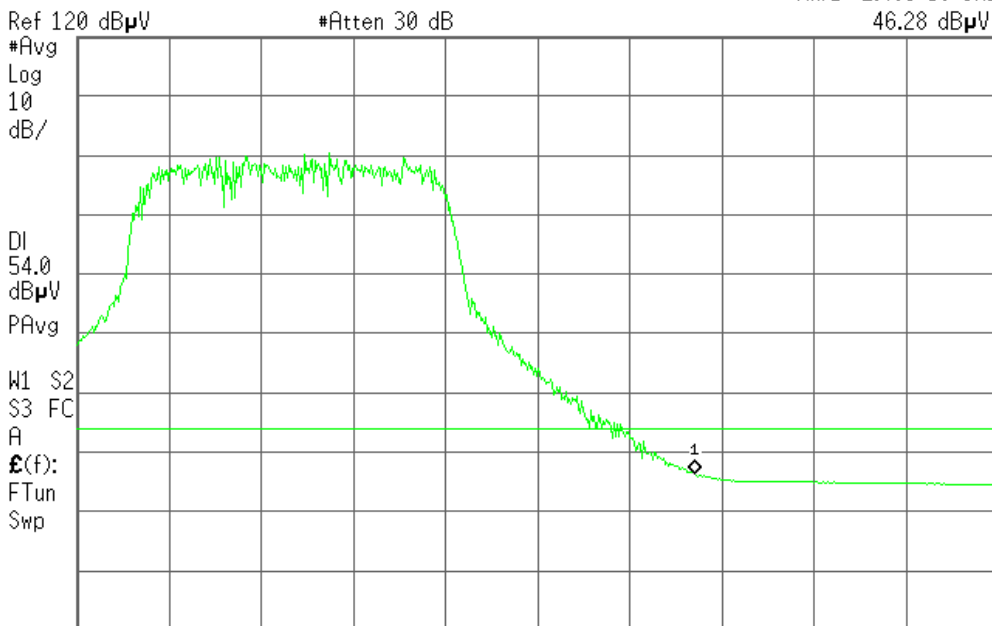
Detector mode: Average

Polarity: Vertical

Agilent 16:53:24 Apr 15, 2008

R T

Mkr1 2.483 50 GHz
46.28 dB μ V





Detector mode: Peak

Polarity: Horizontal

Agilent 16:47:37 Apr 15, 2008

R T

Mkr1 2.483 50 GHz

49.44 dBμV

Ref 120 dBμV

#Atten 30 dB

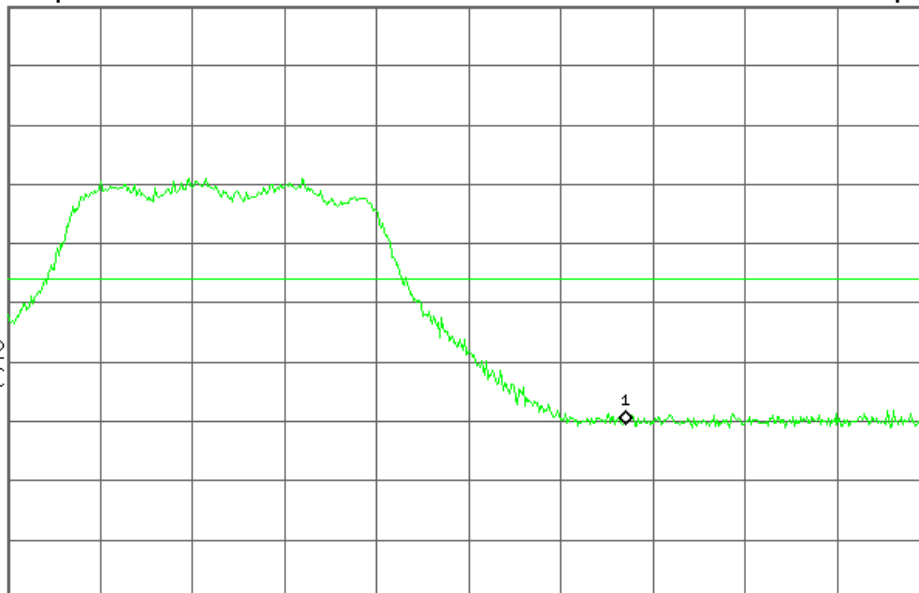
#Peak
Log
10
dB/

DI
74.0
dBμV

LgAv

M1 S2
S3 FC
A

£(f):
FTun
Swp



Start 2.450 00 GHz

Stop 2.500 00 GHz

#Res BW 1 MHz

#VBW 1 MHz

Sweep 1 ms (601 pts)

Detector mode: Average

Polarity: Horizontal

Agilent 16:48:13 Apr 15, 2008

R T

Mkr1 2.483 50 GHz

41.00 dBμV

Ref 120 dBμV

#Atten 30 dB

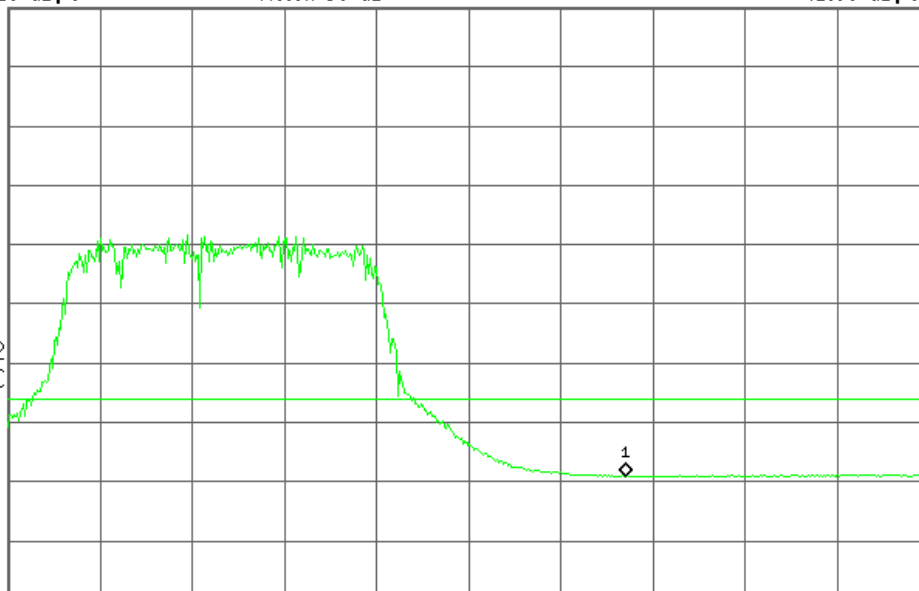
#Avg
Log
10
dB/

DI
54.0
dBμV

PAvg

M1 S2
S3 FC
A

£(f):
FTun
Swp



Start 2.450 00 GHz

Stop 2.500 00 GHz

#Res BW 1 MHz

#VBW 10 Hz

Sweep 12.33 s (601 pts)



Band Edges (IEEE 802.11n HT20 MHz mode / CH Low)

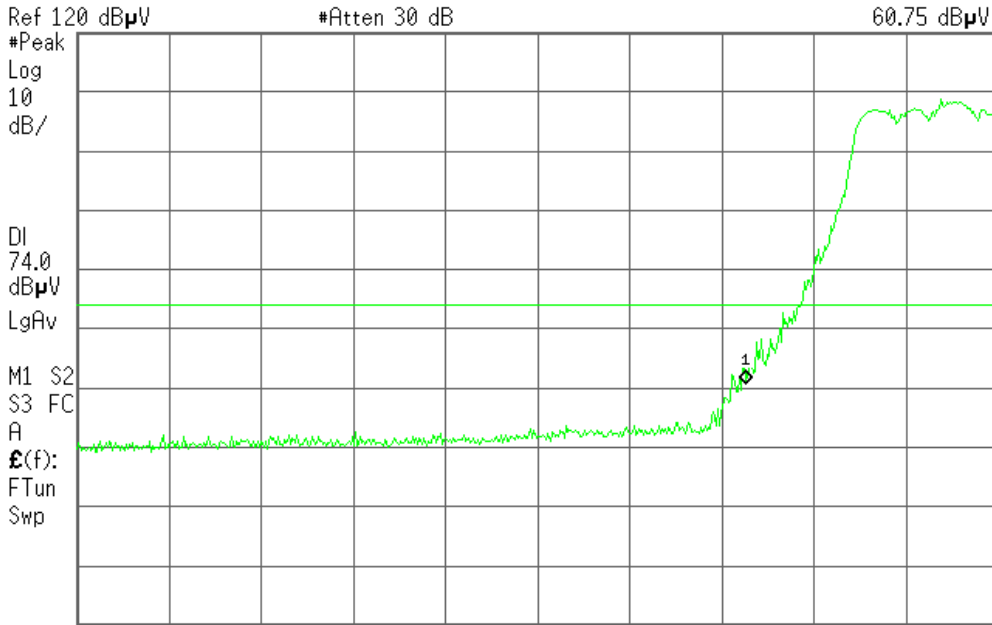
Detector mode: Peak

Polarity: Vertical

Agilent 17:00:14 Apr 15, 2008

R T

Mkr1 2.390 0 GHz
60.75 dB μ V



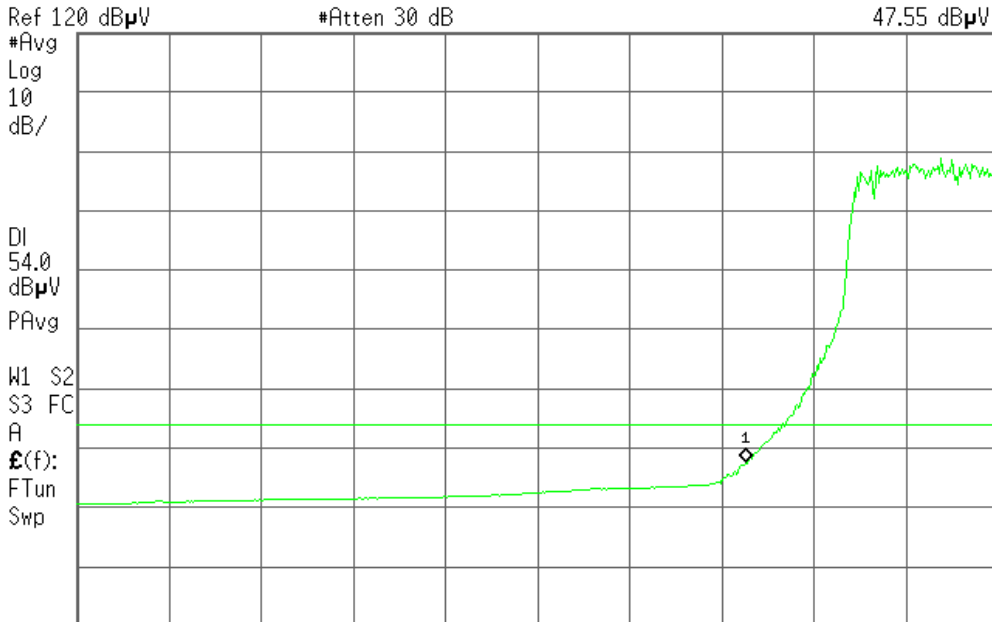
Detector mode: Average

Polarity: Vertical

Agilent 17:01:03 Apr 15, 2008

R T

Mkr1 2.390 0 GHz
47.55 dB μ V





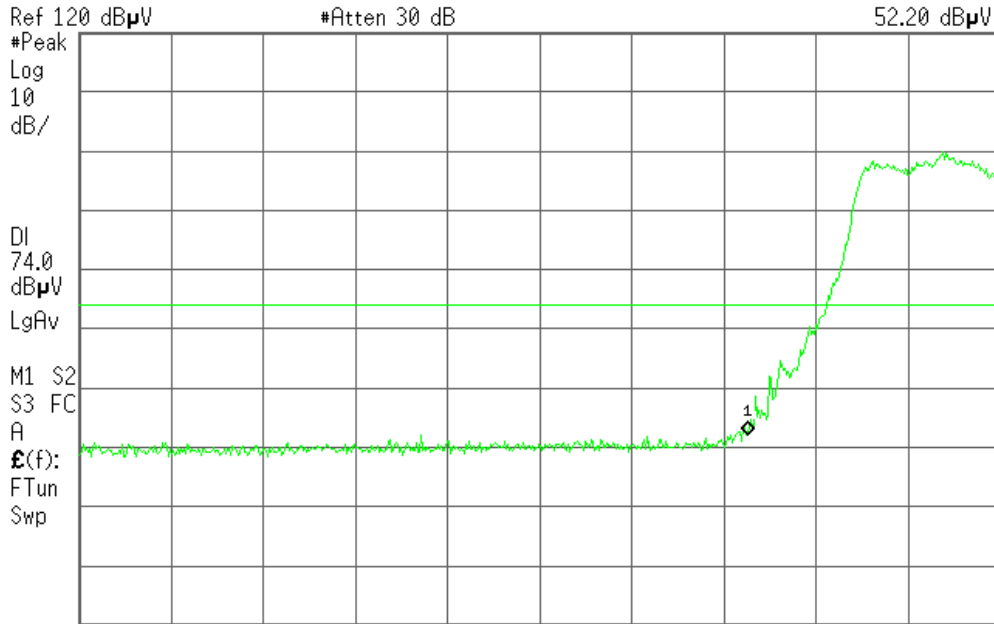
Detector mode: Peak

Polarity: Horizontal

Agilent 17:04:48 Apr 15, 2008

R T

Mkr1 2.390 0 GHz
52.20 dBμV



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

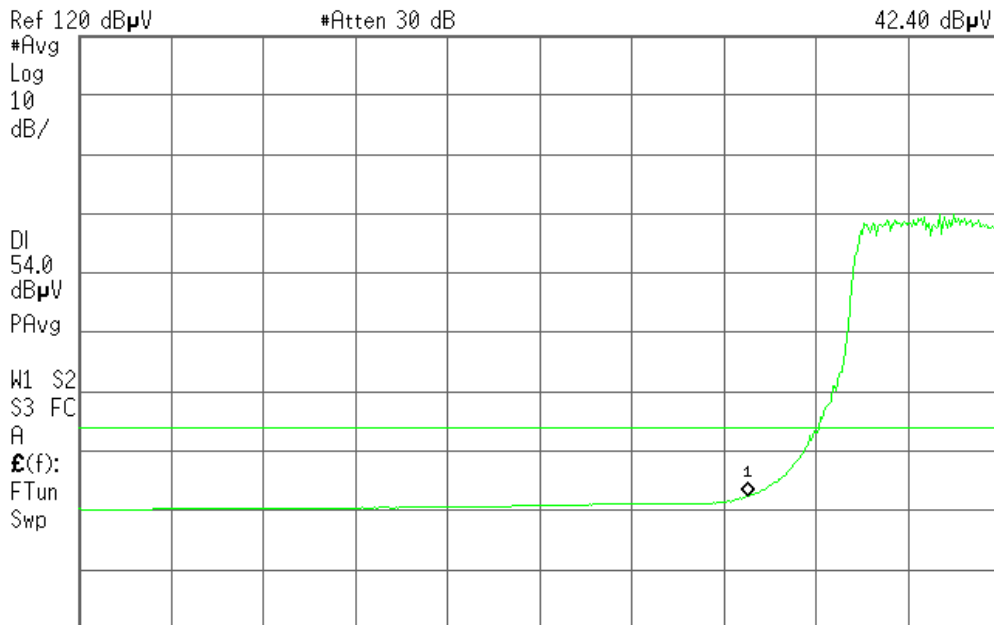
Detector mode: Average

Polarity: Horizontal

Agilent 17:07:10 Apr 15, 2008

R T

Mkr1 2.390 0 GHz
42.40 dBμV



Start 2.310 0 GHz #Res BW 1 MHz #VBW 10 Hz Stop 2.420 0 GHz Sweep 27.12 s (601 pts)



Band Edges (IEEE 802.11n HT20 MHz mode/ CH High)

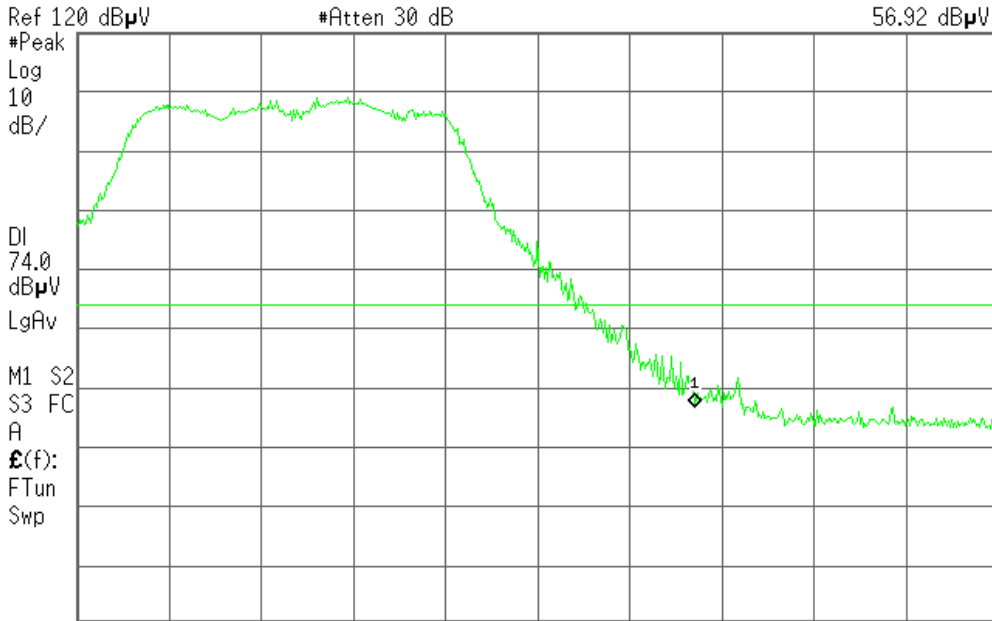
Detector mode: Peak

Polarity: Vertical

Agilent 17:18:05 Apr 15, 2008

R T

Mkr1 2.483 50 GHz
56.92 dB μ V



Start 2.450 00 GHz Stop 2.500 00 GHz
#Res BW 1 MHz #VBW 1 MHz Sweep 20 ms (601 pts)

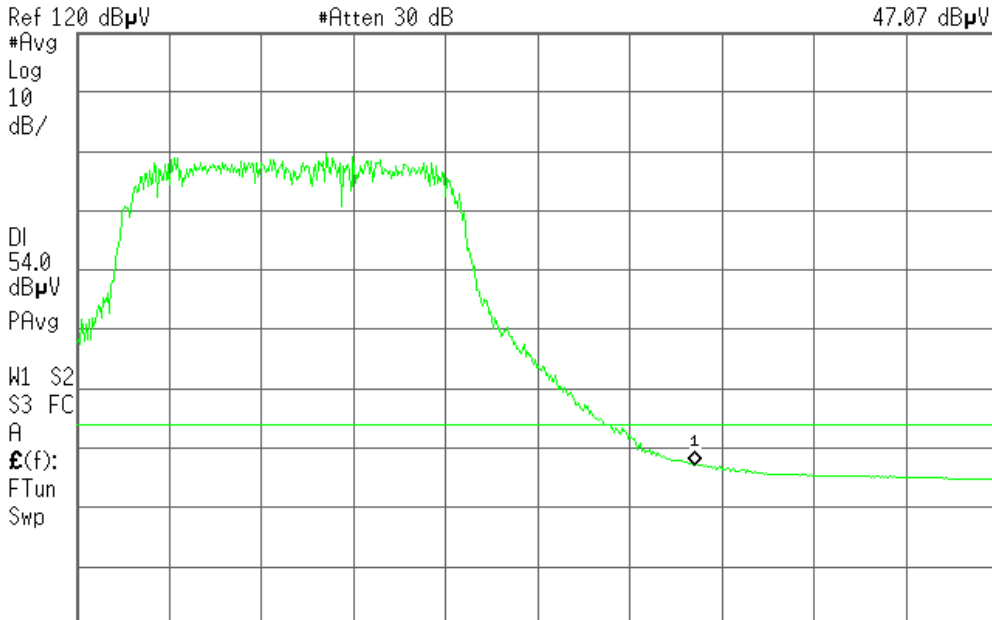
Detector mode: Average

Polarity: Vertical

Agilent 17:18:49 Apr 15, 2008

R T

Mkr1 2.483 50 GHz
47.07 dB μ V



Start 2.450 00 GHz Stop 2.500 00 GHz
#Res BW 1 MHz #VBW 10 Hz Sweep 12.33 s (601 pts)



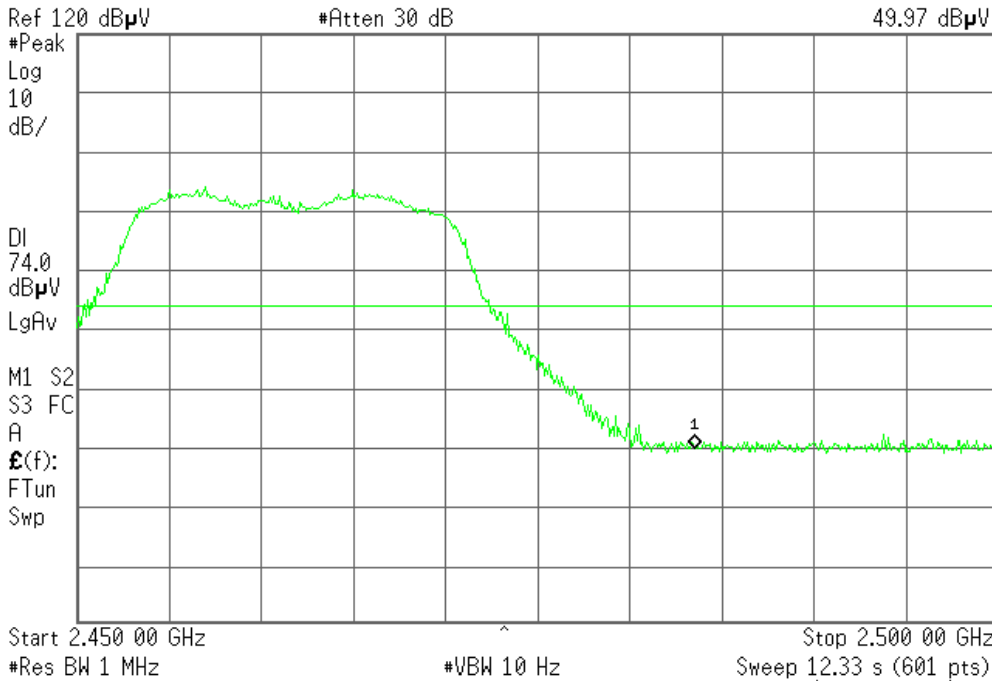
Detector mode: Peak

Polarity: Horizontal

Agilent 17:12:55 Apr 15, 2008

R T

Mkr1 2.483 50 GHz
 49.97 dBμV



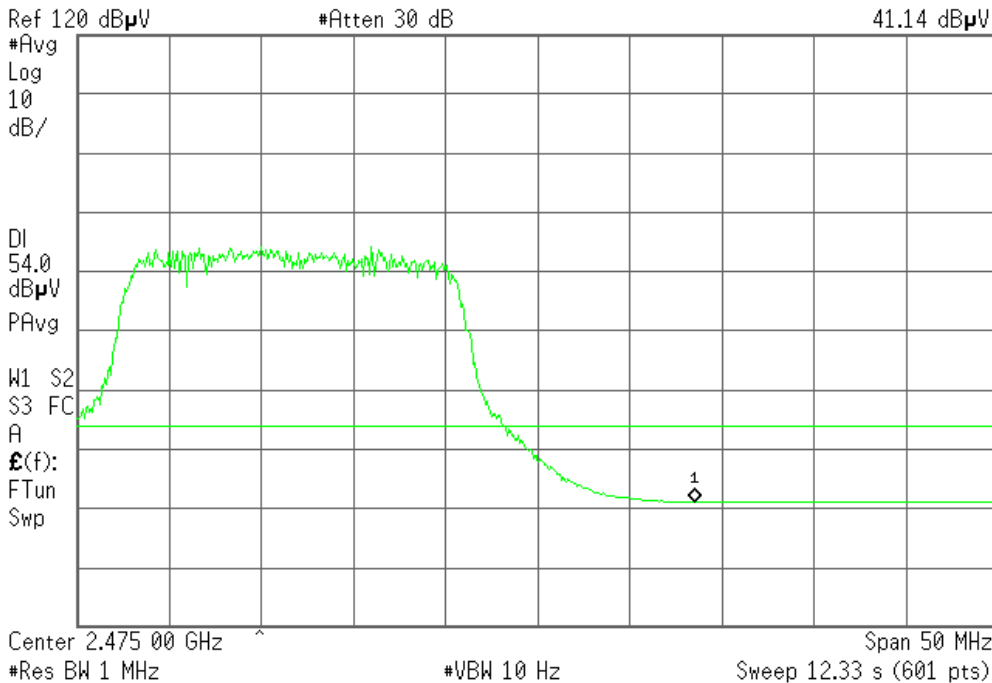
Detector mode: Average

Polarity: Horizontal

Agilent 17:13:51 Apr 15, 2008

R T

Mkr1 2.483 50 GHz
 41.14 dBμV





Band Edges (IEEE 802.11n HT40 MHz mode / CH Low)

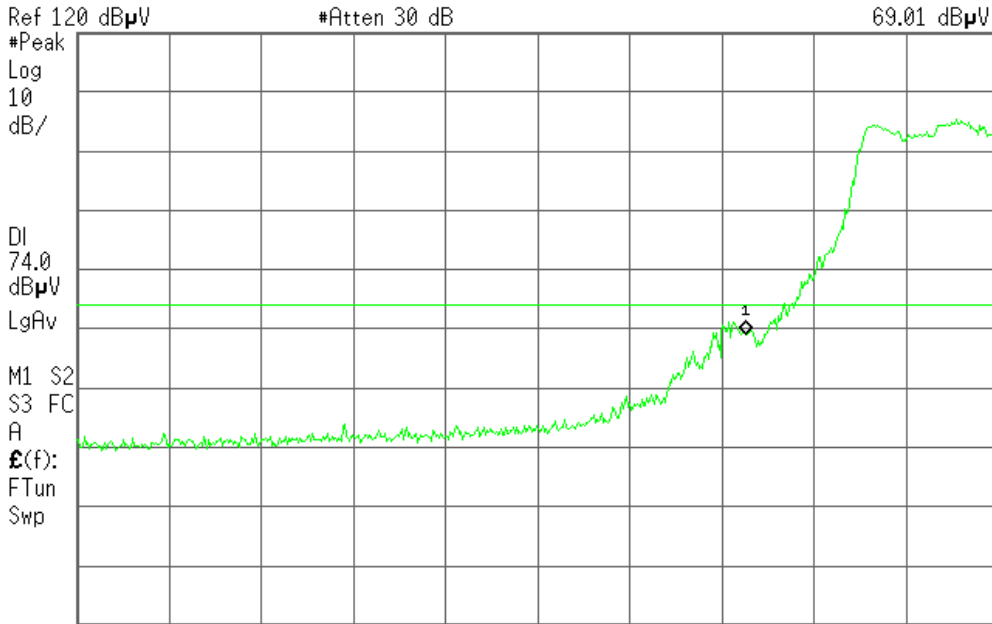
Detector mode: Peak

Polarity: Vertical

Agilent 17:26:21 Apr 15, 2008

R T

Mkr1 2.390 0 GHz
69.01 dBμV



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

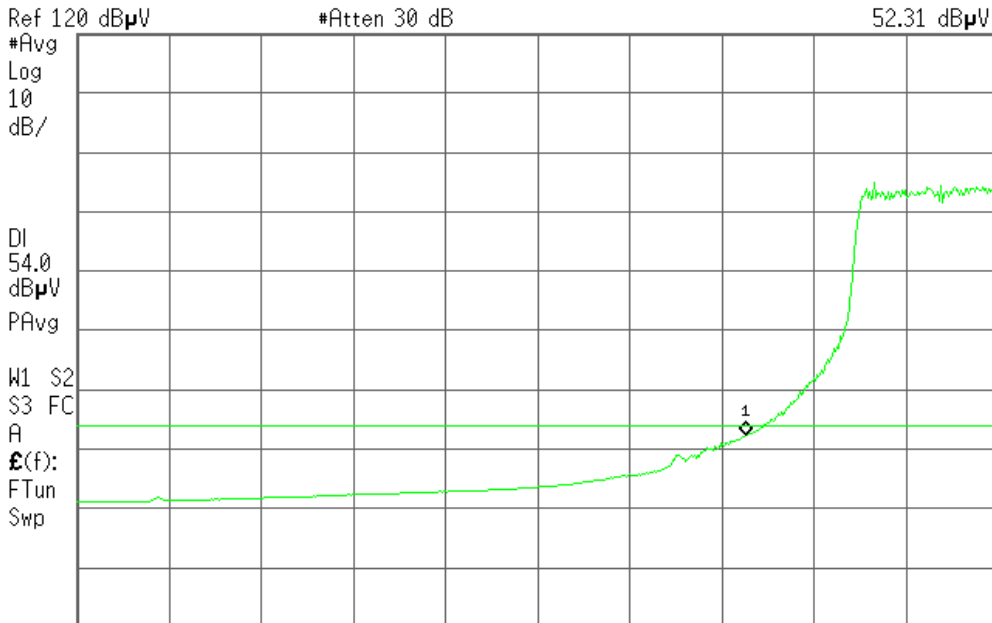
Detector mode: Average

Polarity: Vertical

Agilent 17:28:02 Apr 15, 2008

R T

Mkr1 2.390 0 GHz
52.31 dBμV



Start 2.310 0 GHz #Res BW 1 MHz #VBW 10 Hz Stop 2.420 0 GHz Sweep 27.12 s (601 pts)

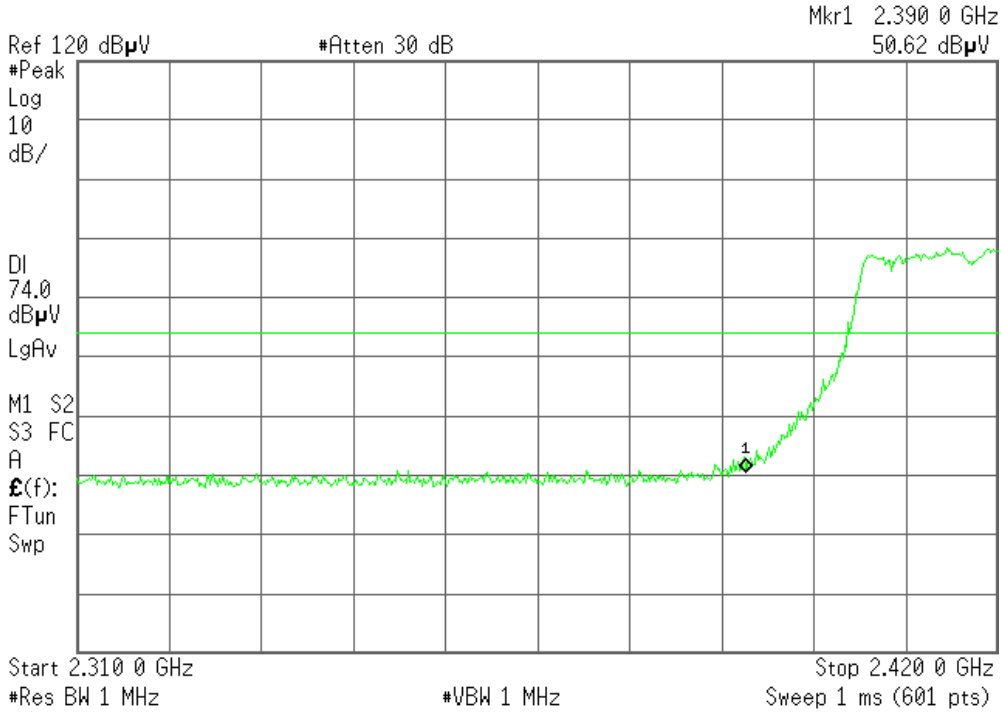


Detector mode: Peak

Polarity: Horizontal

Agilent 17:30:52 Apr 15, 2008

R T

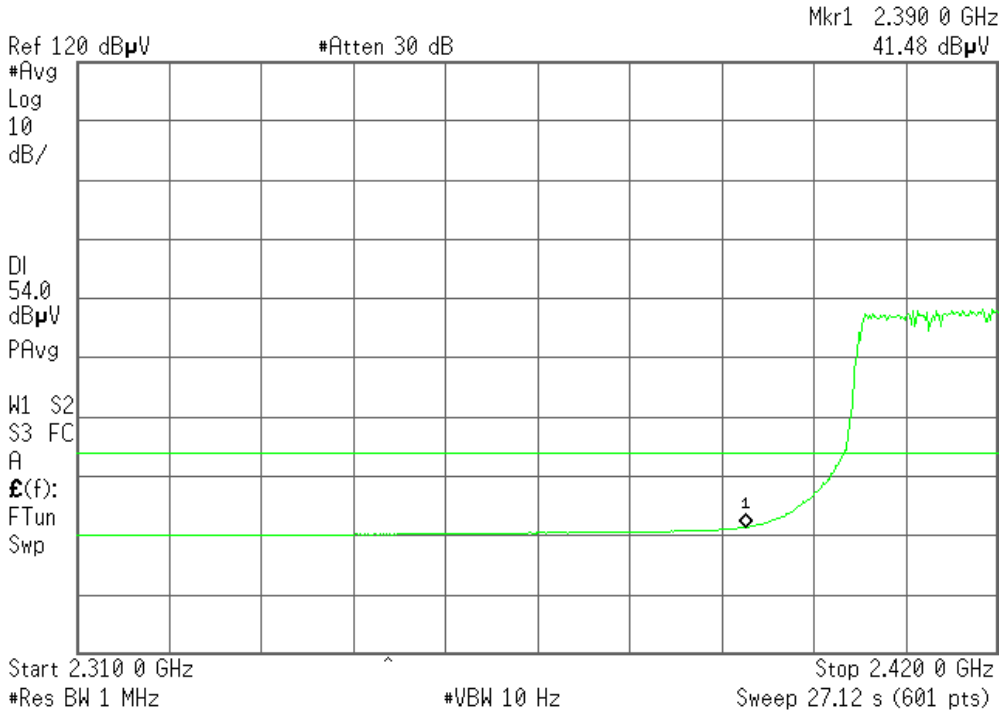


Detector mode: Average

Polarity: Horizontal

Agilent 17:31:44 Apr 15, 2008

R T





Band Edges (IEEE 802.11n HT40 MHz mode / CH High)

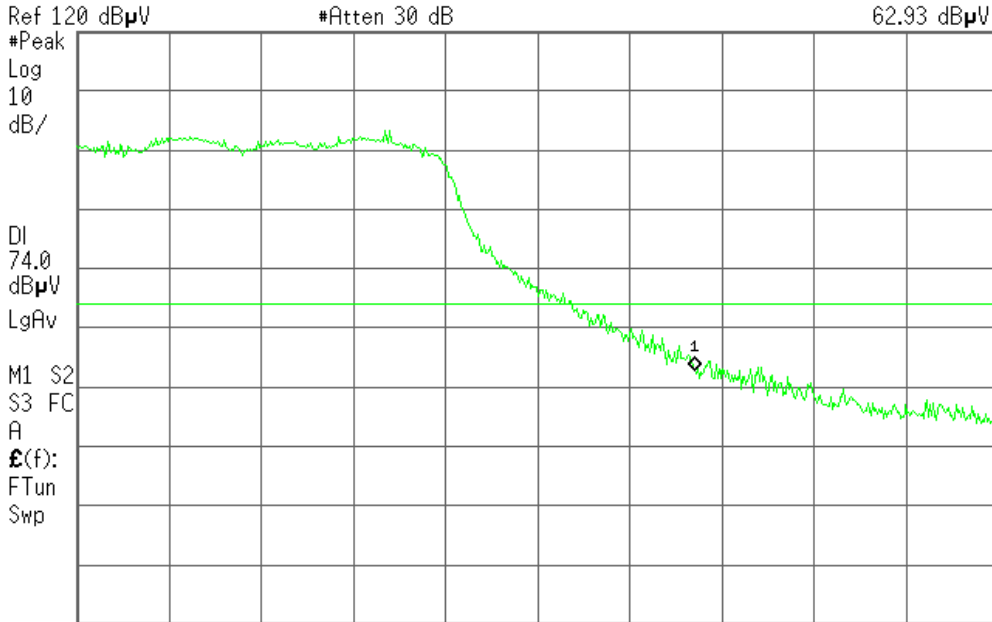
Detector mode: Peak

Polarity: Vertical

Agilent 17:40:54 Apr 15, 2008

R T

Mkr1 2.483 50 GHz
62.93 dB μ V



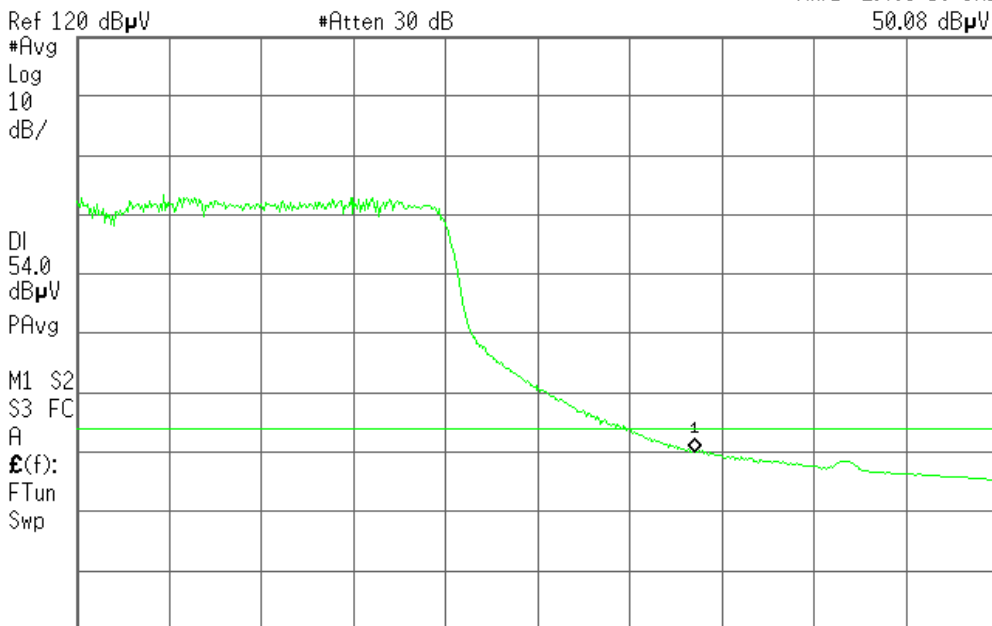
Detector mode: Average

Polarity: Vertical

Agilent 17:41:33 Apr 15, 2008

R T

Mkr1 2.483 50 GHz
50.08 dB μ V





Detector mode: Peak

Polarity: Horizontal

Agilent 17:36:07 Apr 15, 2008

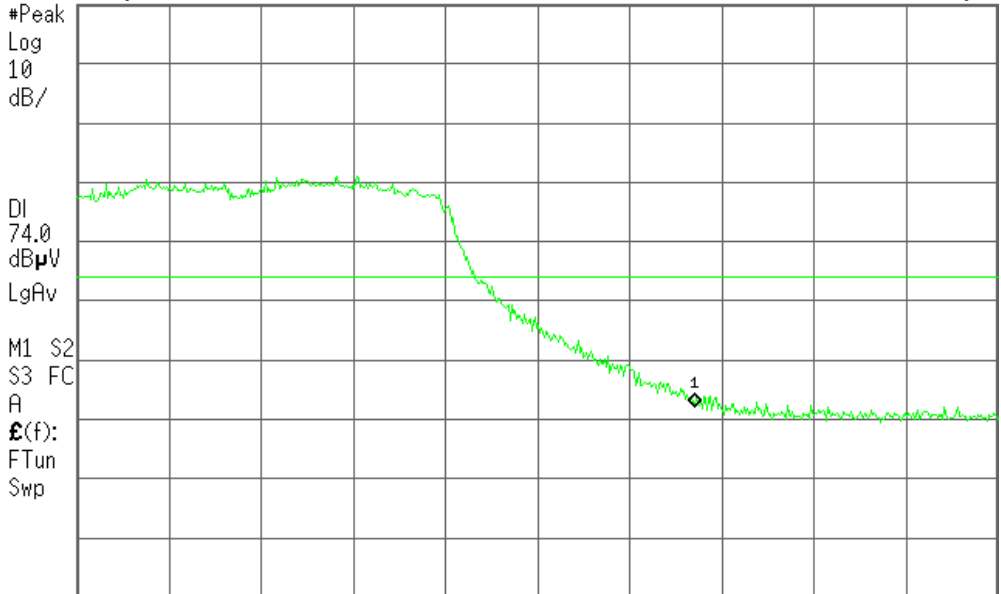
R T

Mkr1 2.483 50 GHz

52.18 dBμV

Ref 120 dBμV

#Atten 30 dB



Start 2.450 00 GHz

Stop 2.500 00 GHz

#Res BW 1 MHz

#VBW 1 MHz

Sweep 1 ms (601 pts)

Detector mode: Average

Polarity: Horizontal

Agilent 17:37:04 Apr 15, 2008

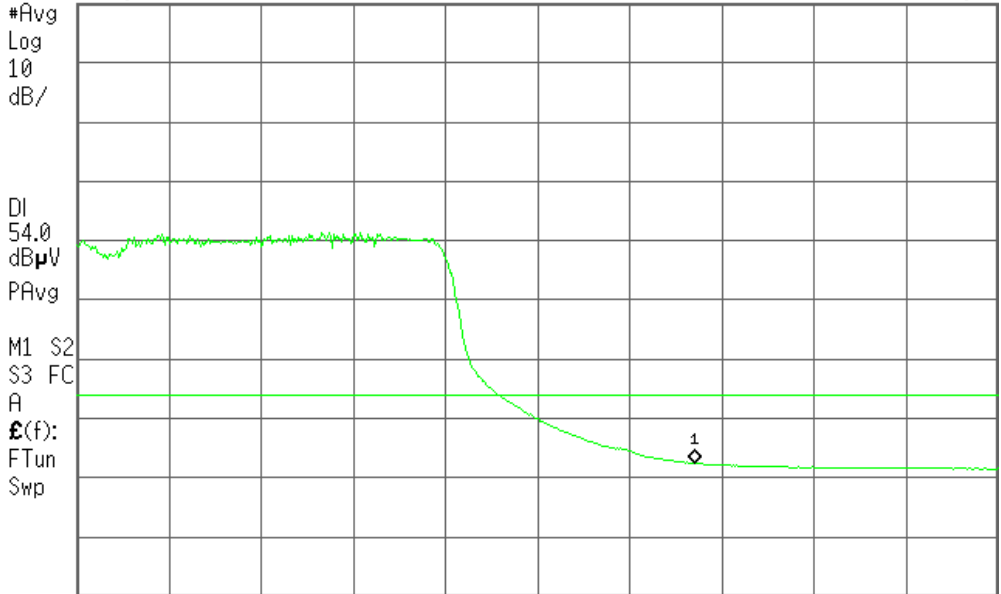
R T

Mkr1 2.483 50 GHz

42.43 dBμV

Ref 120 dBμV

#Atten 30 dB



Start 2.450 00 GHz

Stop 2.500 00 GHz

#Res BW 1 MHz

#VBW 10 Hz

Sweep 12.33 s (601 pts)

7.5 PEAK POWER SPECTRAL DENSITY

LIMIT

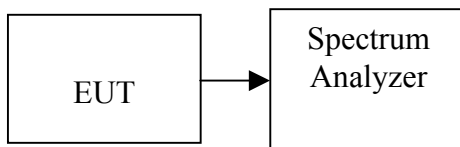
1. According to §15.247(e), for digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.
2. According to §15.247(f), the digital modulation operation of the hybrid system, with the frequency hopping turned off, shall comply with the power density requirements of paragraph (d) of this section.

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US44300399	02/24/2009
Power Splitter	Mini-Circuits	ZN2PD-9G	SF078500430	07/30/2008

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

Test Configuration



Combiner mode



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.

Total power spectral density calculation formula:

$$10 \log (10^{\text{Chain 0 PPSD} / 10} + 10^{\text{Chain1 PPSD} / 10} + 10^{\text{Chain2 PPSD} / 10}).$$



TEST RESULTS

No non-compliance noted

Test Data

IEEE 802.11b mode

Channel	Frequency (MHz)	PPSD(dBm)			PPSD Total (dBm)	Limit (dBm)	Result
		Chain 0	Chain 1	Chain 2			
Low	2412	-18.53	-18.22	-14.63	-11.97	8.00	PASS
Mid	2437	-18.75	-17.53	-13.87	-11.43		PASS
High	2462	-18.59	-18.38	-14.17	-11.76		PASS

IEEE 802.11g mode

Channel	Frequency (MHz)	PPSD(dBm)			PPSD Total (dBm)	Limit (dBm)	Result
		Chain 0	Chain 1	Chain 2			
Low	2412	-21.07	-20.49	-16.42	-14.03	8.00	PASS
Mid	2437	-20.82	-20.15	-15.97	-13.64		PASS
High	2462	-20.48	-19.97	-15.78	-13.42		PASS

IEEE 802.11n HT20 MHz mode

Channel	Frequency (MHz)	PPSD(dBm)			PPSD Total (dBm)	Limit (dBm)	Result
		Chain 0	Chain 1	Chain 2			
Low	2412	-17.53	-17.14	-13.29	-10.76	8.00	PASS
Mid	2437	-17.33	-16.69	-12.78	-10.33		PASS
High	2462	-17.18	-16.62	-12.57	-10.17		PASS

IEEE 802.11n HT40 MHz mode

Channel	Frequency (MHz)	PPSD(dBm)			PPSD Total (dBm)	Limit (dBm)	Result
		Chain 0	Chain 1	Chain 2			
Low	2422	-35.37	-34.71	-30.72	-28.31	8.00	PASS
Mid	2437	-35.42	-34.71	-30.80	-28.37		PASS
High	2452	-35.53	-34.87	-30.79	-28.42		PASS

IEEE 802.11b Combined mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-11.08	8.00	PASS
Mid	2437	-9.53		PASS
High	2462	-9.00		PASS

IEEE 802.11g Combined mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-14.88	8.00	PASS
Mid	2437	-11.45		PASS
High	2462	-11.38		PASS

IEEE 802.11n HT20 Combined mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-9.81	8.00	PASS
Mid	2437	-8.77		PASS
High	2462	-7.28		PASS

IEEE 802.11n HT40 Combined mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2422	-29.33	8.00	PASS
Mid	2437	-27.63		PASS
High	2452	-27.28		PASS



Test Plot

Antenna: DCA 0

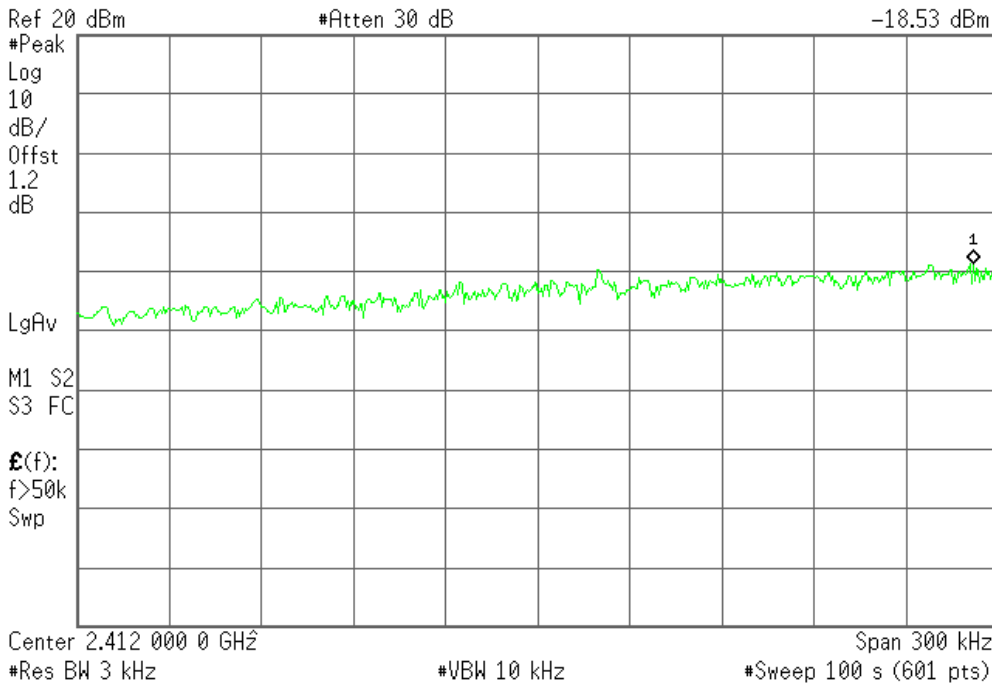
IEEE 802.11b mode

PPSD (CH Low)

Agilent 15:36:15 Apr 26, 2008

R T

Mkr1 2.412 142 0 GHz
-18.53 dBm

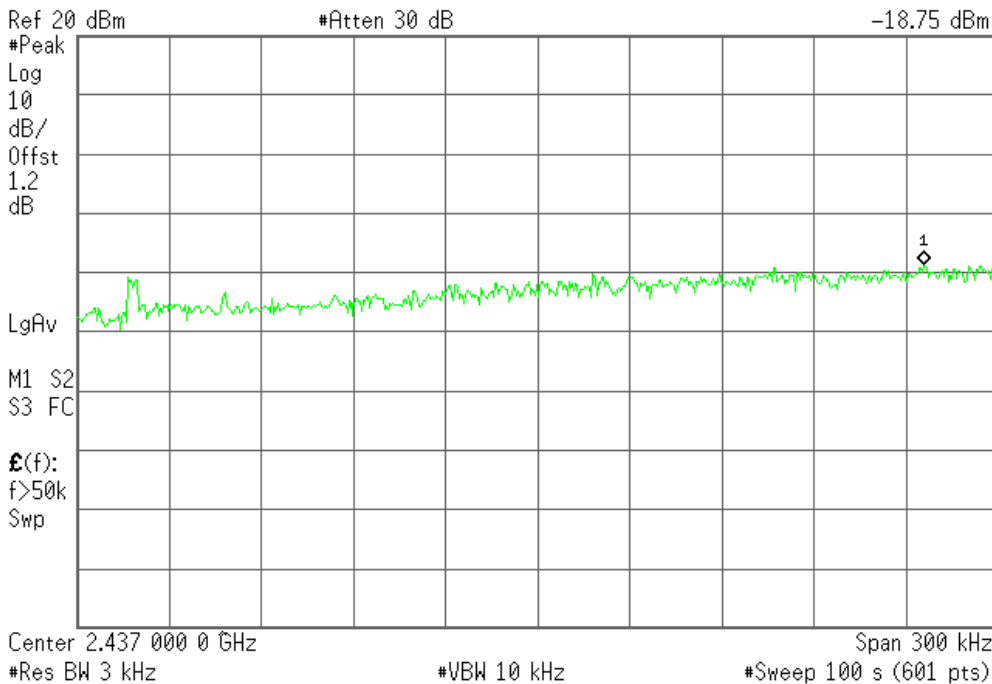


PPSD (CH Mid)

Agilent 15:38:33 Apr 26, 2008

R T

Mkr1 2.437 126 1 GHz
-18.75 dBm





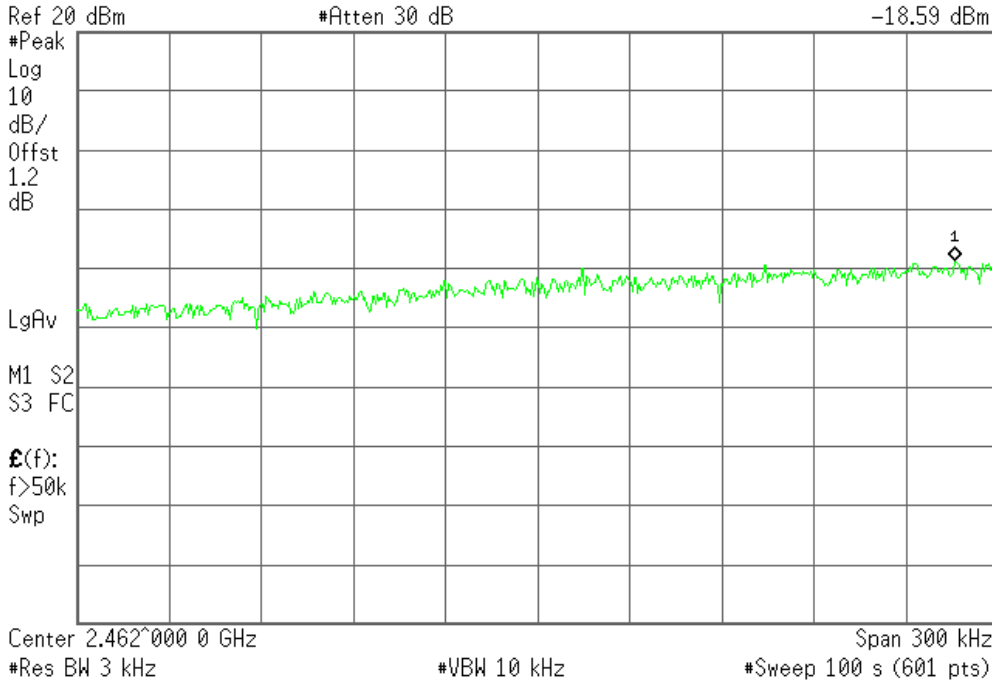
PPSD (CH High)

Agilent 15:44:40 Apr 26, 2008

R T

Mkr1 2.462 137 1 GHz

-18.59 dBm



IEEE 802.11g mode

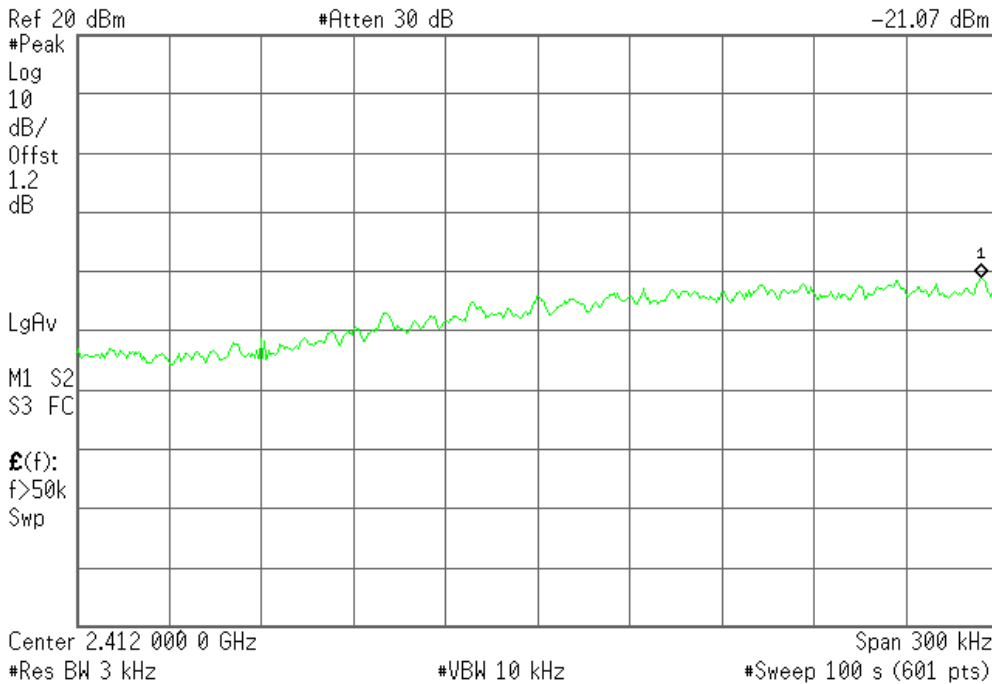
PPSD (CH Low)

Agilent 15:47:24 Apr 26, 2008

R T

Mkr1 2.412 144 5 GHz

-21.07 dBm



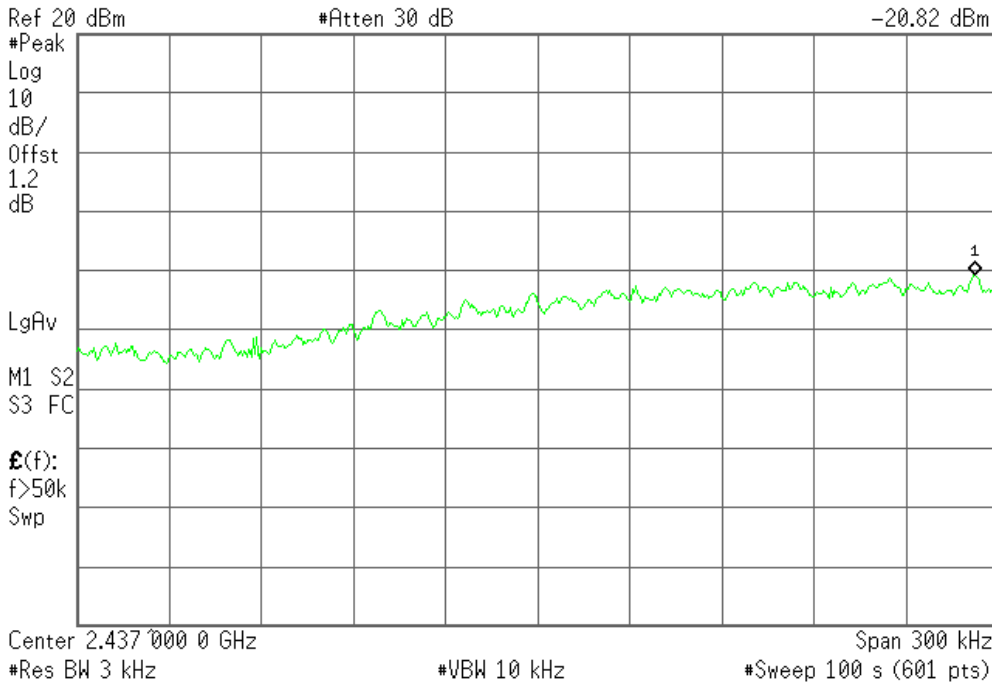


PPSD (CH Mid)

Agilent 15:49:37 Apr 26, 2008

R T

Mkr1 2.437 142 5 GHz
-20.82 dBm

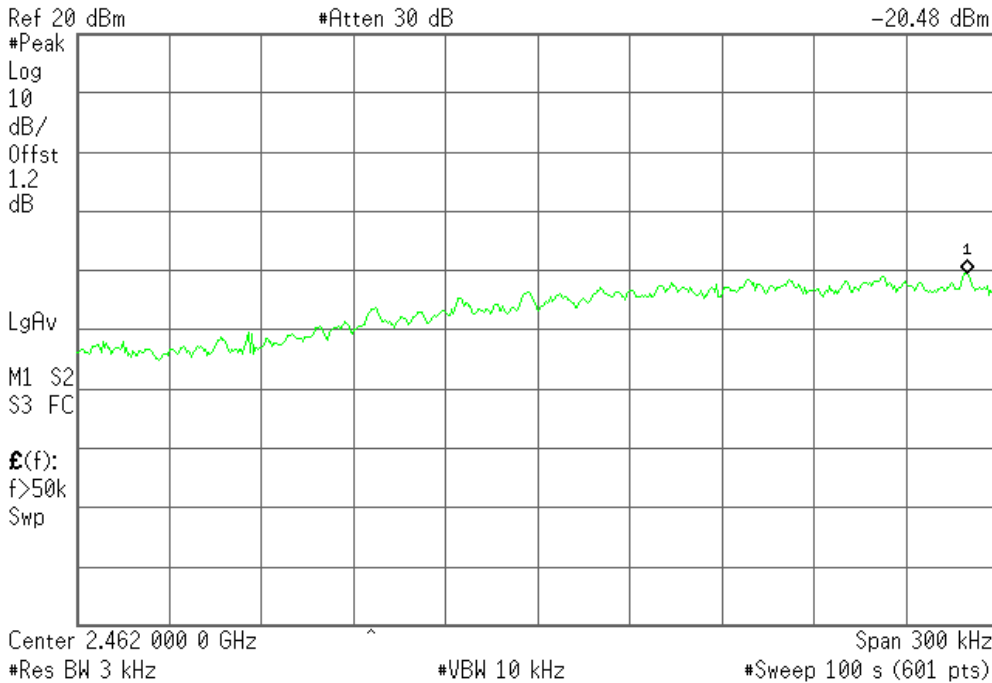


PPSD (CH High)

Agilent 15:52:20 Apr 26, 2008

R T

Mkr1 2.462 141 1 GHz
-20.48 dBm





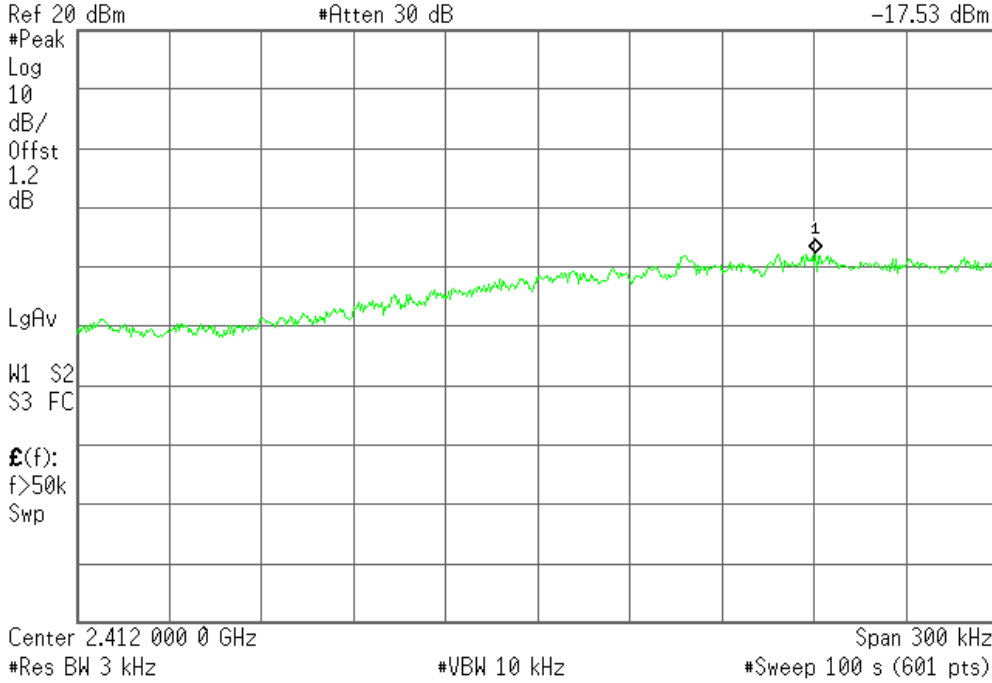
IEEE 802.11n HT20 MHz mode

PPSD (CH Low)

Agilent 15:55:27 Apr 26, 2008

R T

Mkr1 2.412 090 6 GHz
-17.53 dBm

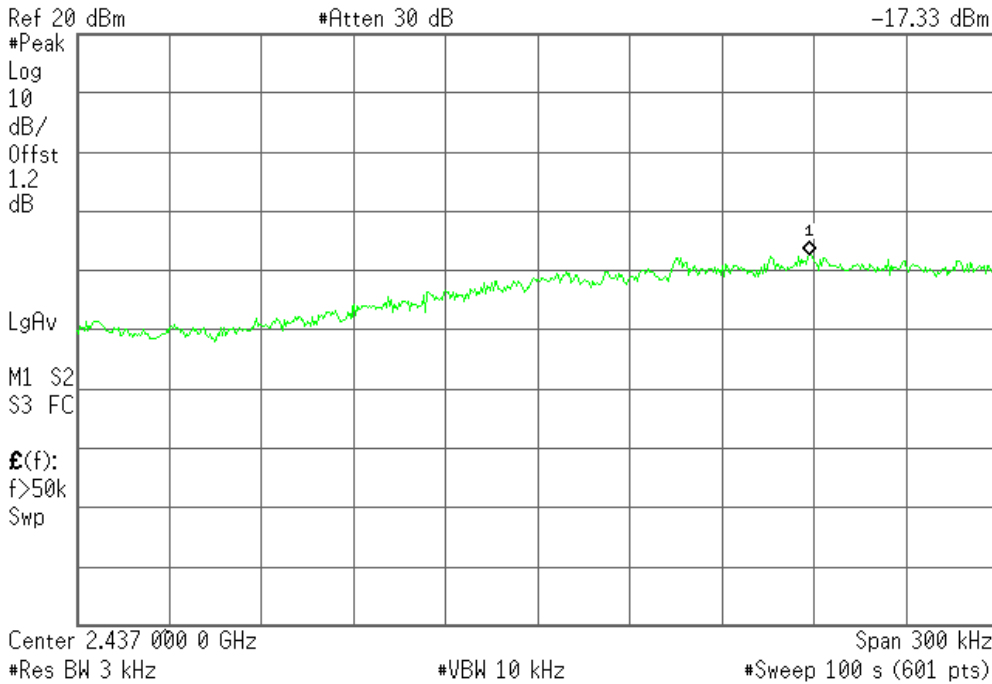


PPSD (CH Mid)

Agilent 15:58:13 Apr 26, 2008

R T

Mkr1 2.437 088 7 GHz
-17.33 dBm





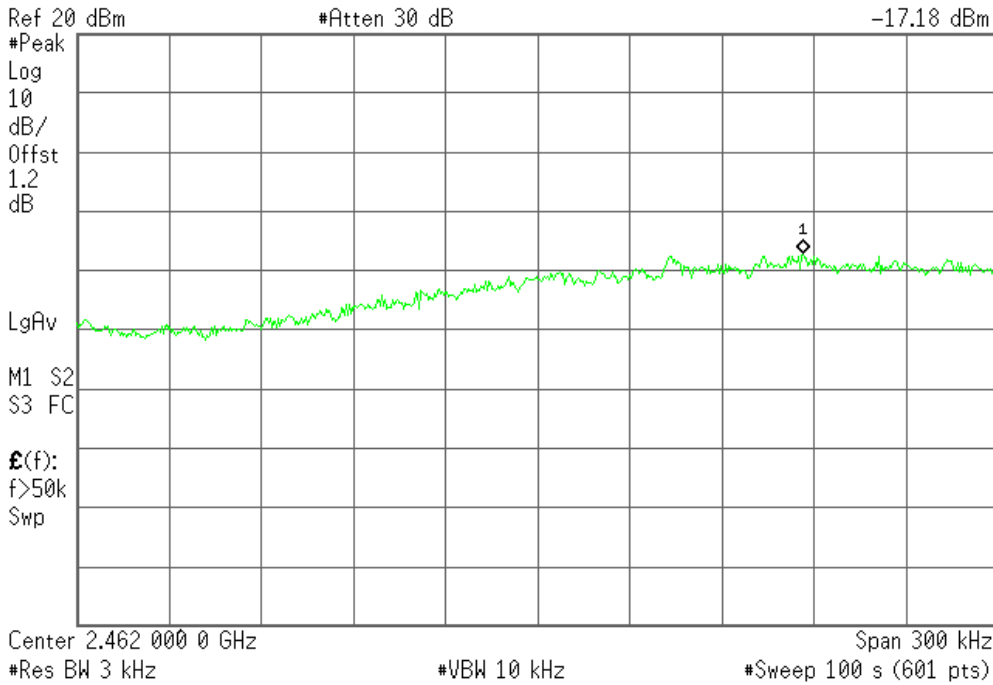
PPSD (CH High)

Agilent 16:00:30 Apr 26, 2008

R T

Mkr1 2.462 087 1 GHz

-17.18 dBm



IEEE 802.11n HT40 MHz mode

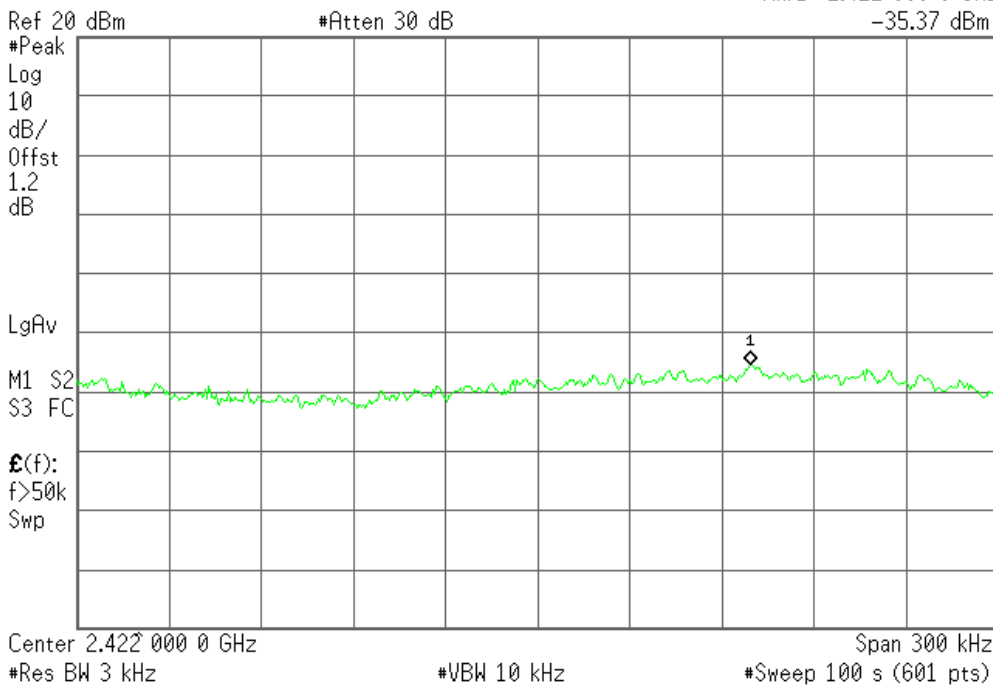
PPSD (CH Low)

Agilent 16:03:09 Apr 26, 2008

R T

Mkr1 2.422 069 9 GHz

-35.37 dBm



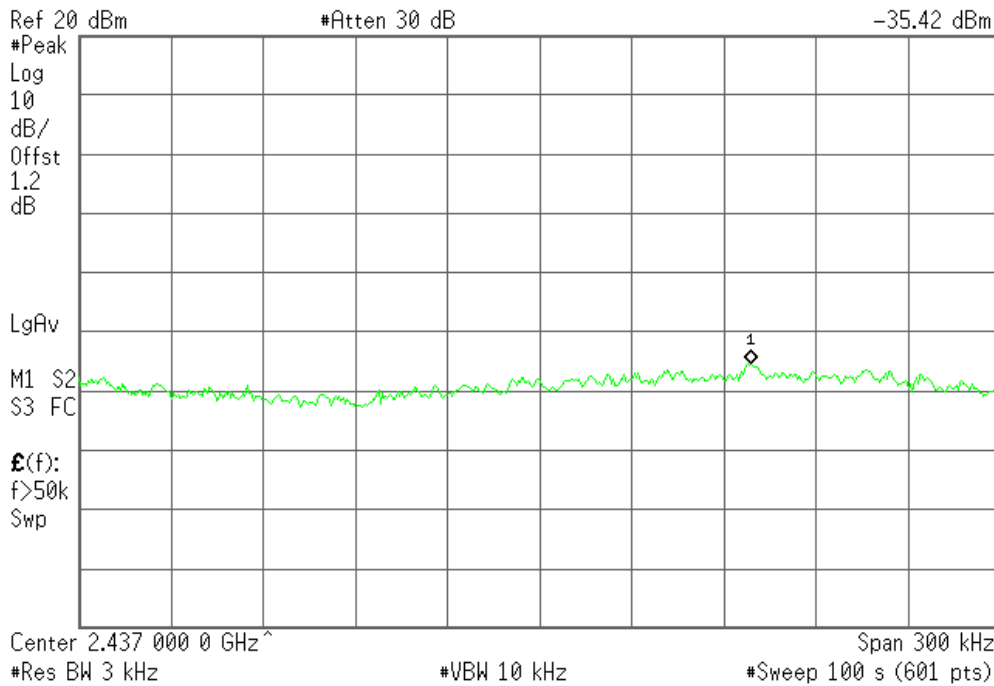


PPSD (CH Mid)

Agilent 16:05:37 Apr 26, 2008

R T

Mkr1 2.437 069 2 GHz
-35.42 dBm

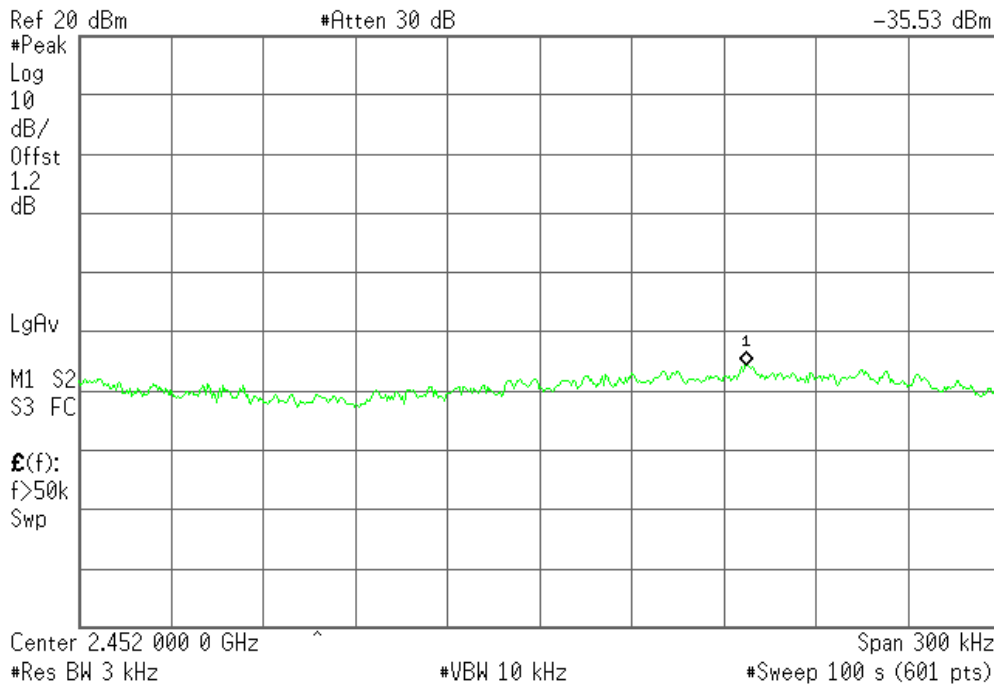


PPSD (CH High)

Agilent 16:08:21 Apr 26, 2008

R T

Mkr1 2.452 067 6 GHz
-35.53 dBm





Antenna:DCA 1

IEEE 802.11b mode

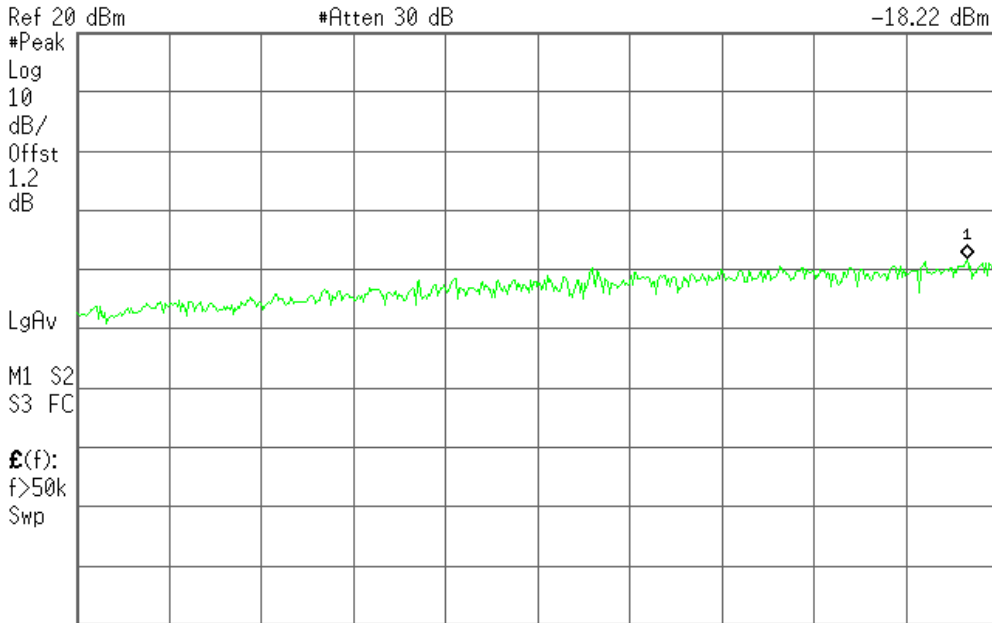
PPSD (CH Low)

Agilent 16:19:13 Apr 26, 2008

R T

Mkr1 2.412 140 0 GHz

-18.22 dBm



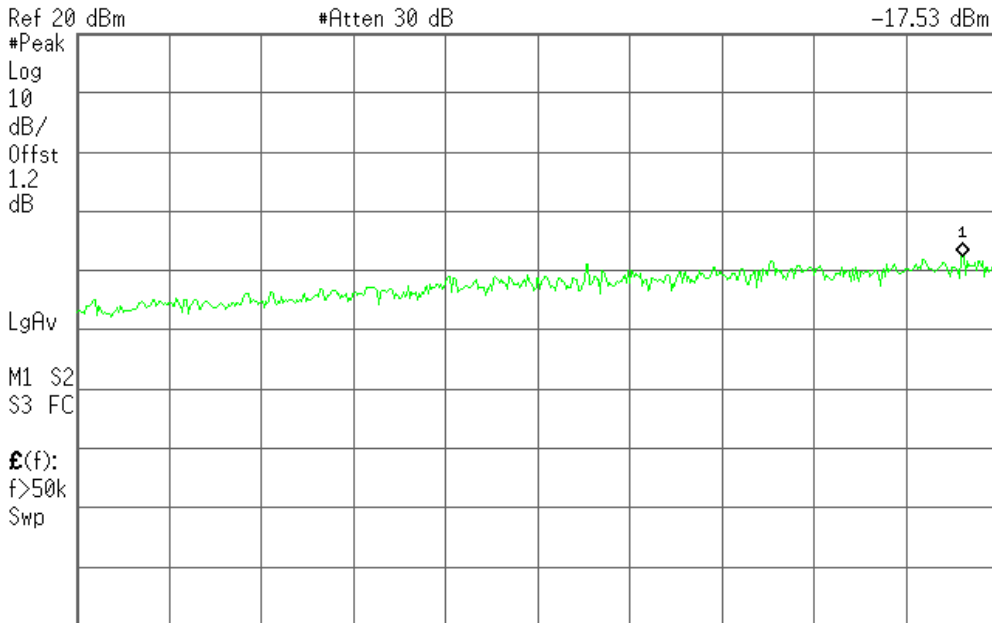
PPSD (CH Mid)

Agilent 16:22:00 Apr 26, 2008

R T

Mkr1 2.437 138 5 GHz

-17.53 dBm





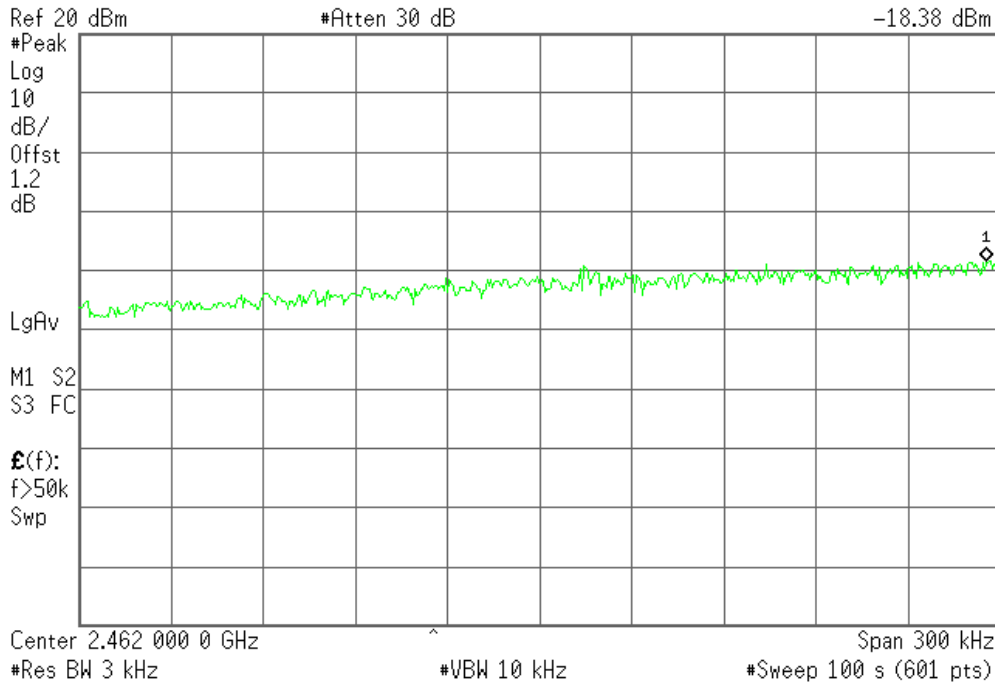
PPSD (CH High)

Agilent 16:24:46 Apr 26, 2008

R T

Mkr1 2.462 146 7 GHz

-18.38 dBm



IEEE 802.11g mode

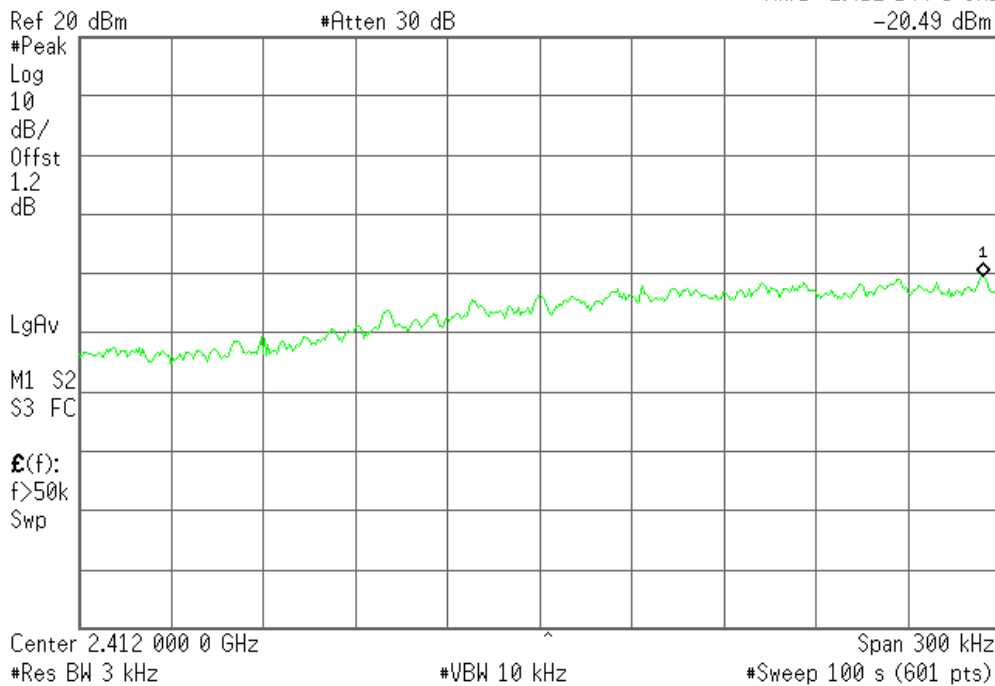
PPSD (CH Low)

Agilent 16:28:07 Apr 26, 2008

R T

Mkr1 2.412 144 5 GHz

-20.49 dBm



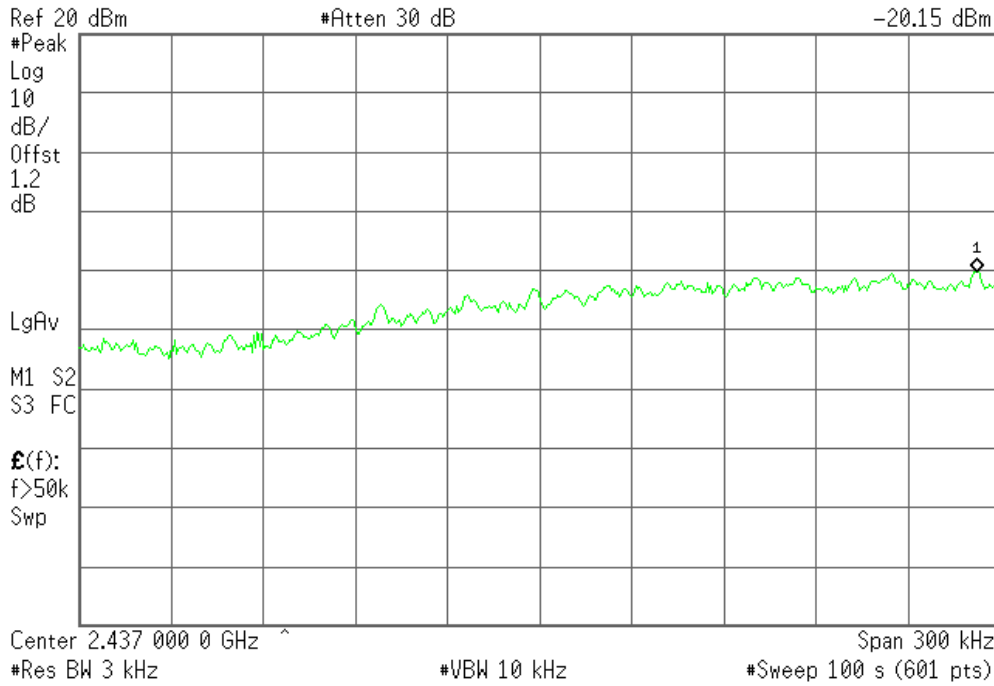


PPSD (CH Mid)

Agilent 16:30:38 Apr 26, 2008

R T

Mkr1 2.437 142 5 GHz
-20.15 dBm

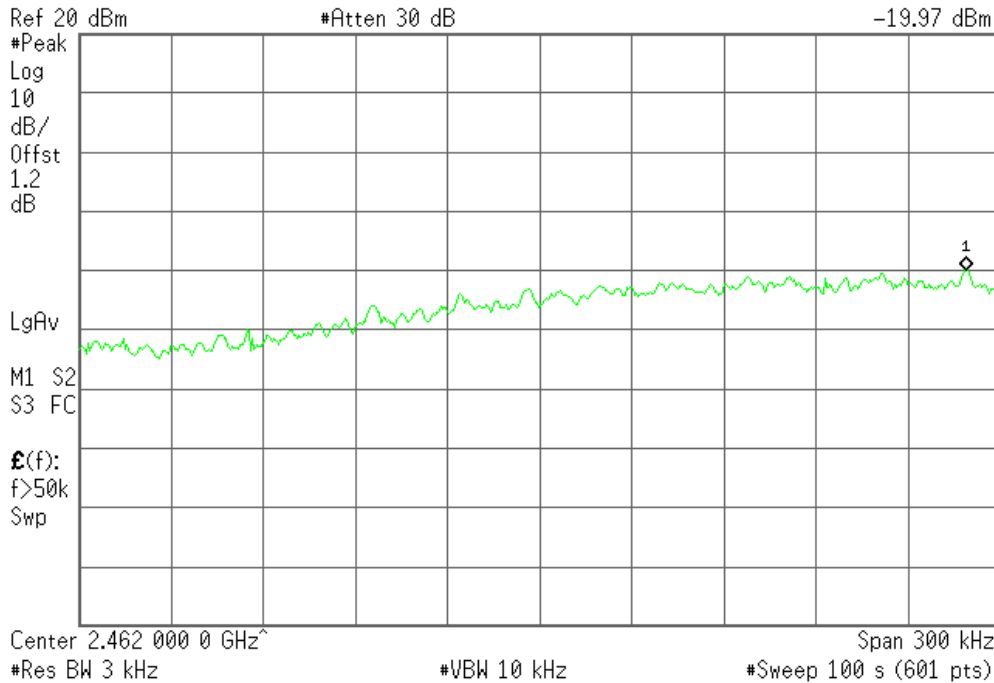


PPSD (CH High)

Agilent 16:33:00 Apr 26, 2008

R T

Mkr1 2.462 140 1 GHz
-19.97 dBm





IEEE 802.11n HT20 MHz mode

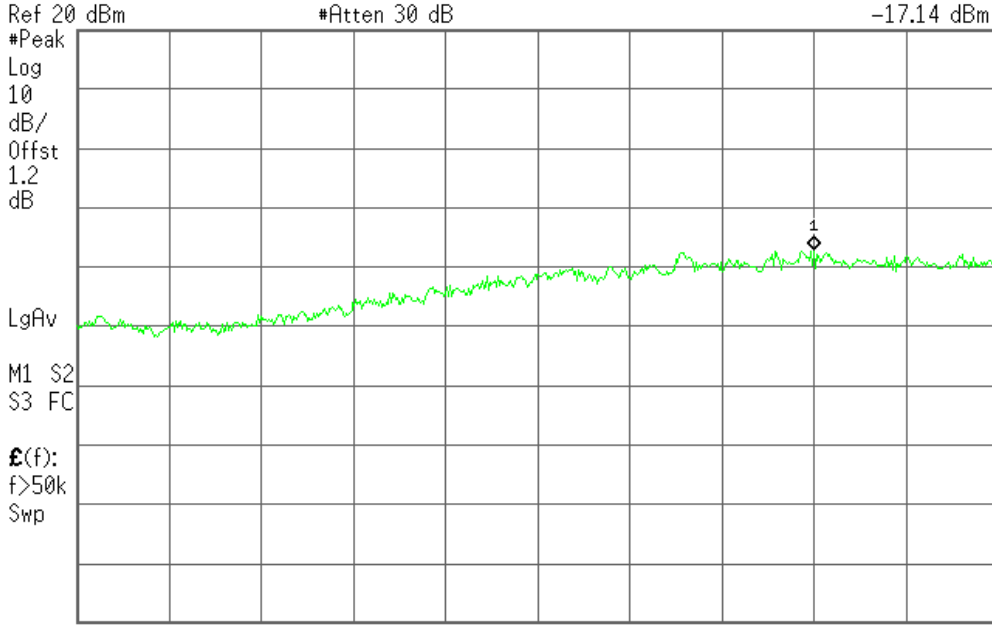
PPSD (CH Low)

Agilent 16:35:54 Apr 26, 2008

R T

Mkr1 2.412 090 1 GHz

-17.14 dBm



Center 2.412 000 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)

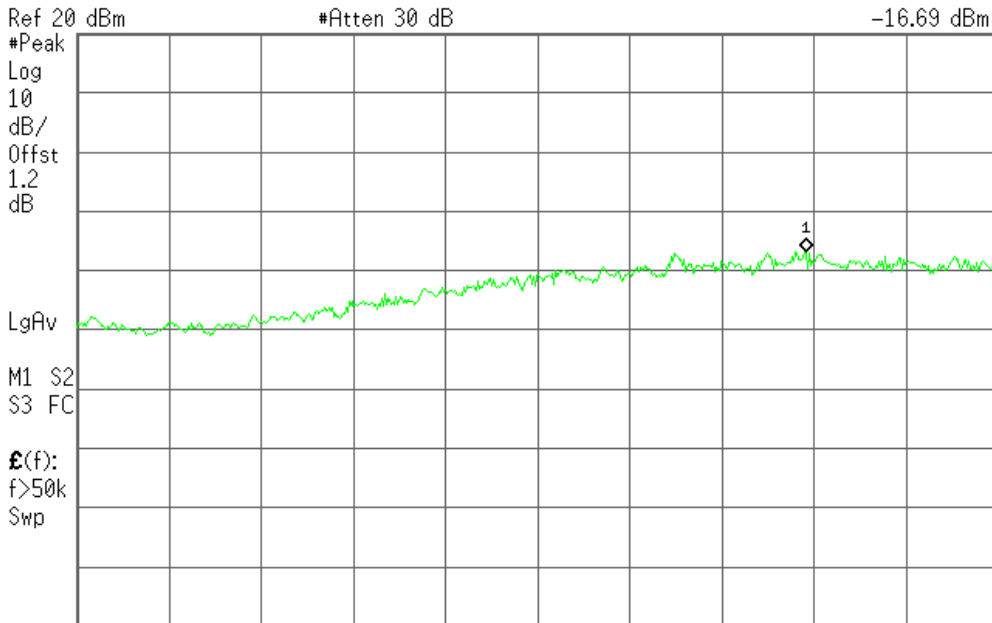
PPSD (CH Mid)

Agilent 16:38:16 Apr 26, 2008

R T

Mkr1 2.437 087 7 GHz

-16.69 dBm



Center 2.437 000 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)



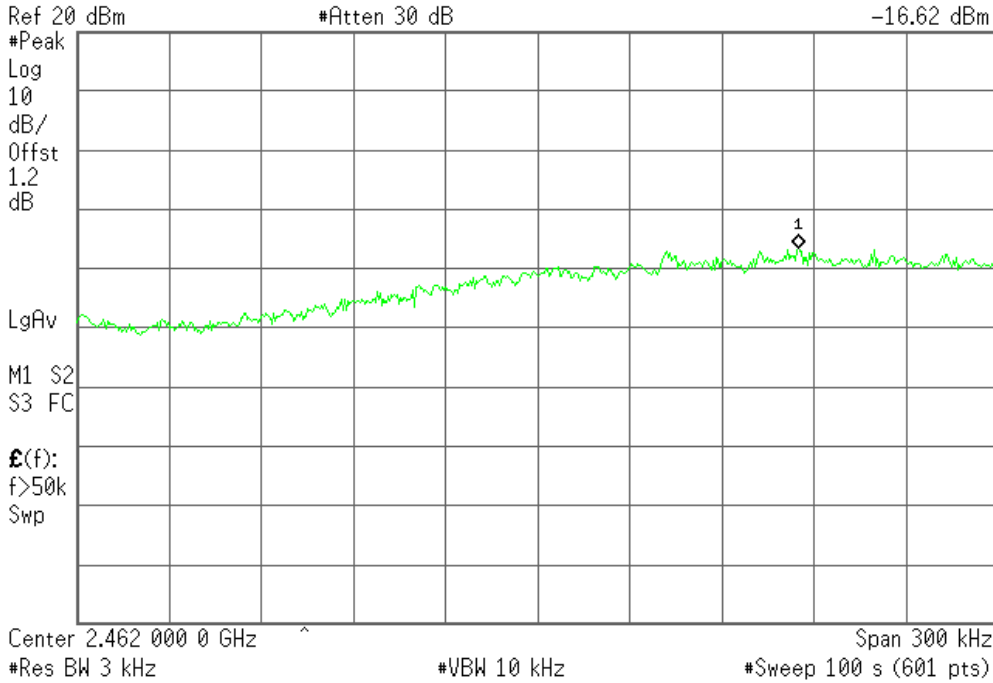
PPSD (CH High)

Agilent 16:40:44 Apr 26, 2008

R T

Mkr1 2.462 085 5 GHz

-16.62 dBm



IEEE 802.11n HT40 MHz mode

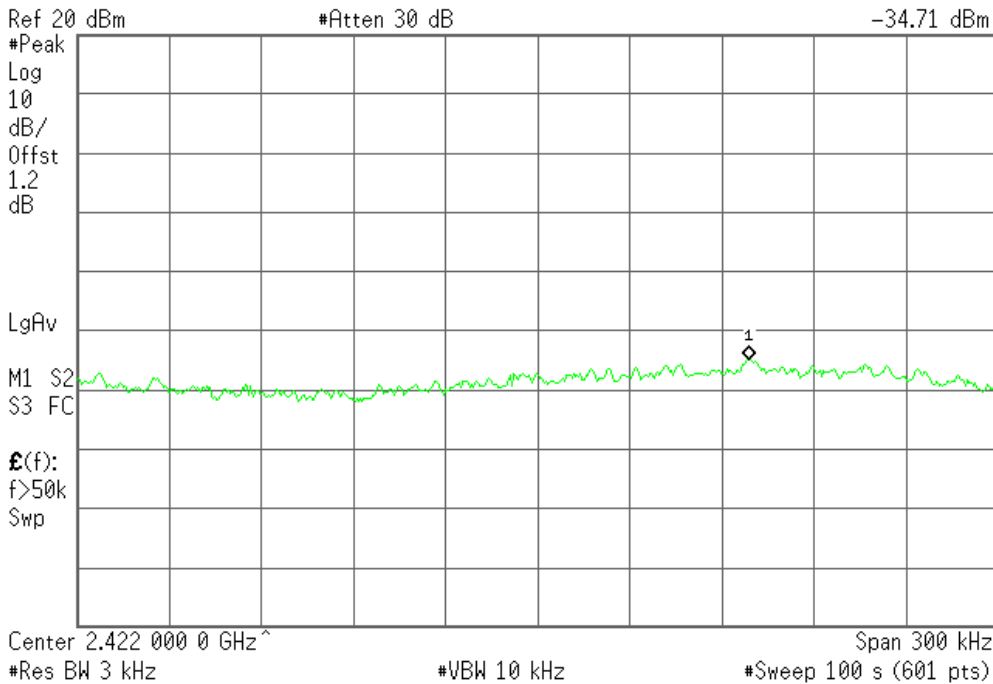
PPSD (CH Low)

Agilent 16:43:29 Apr 26, 2008

R T

Mkr1 2.422 069 4 GHz

-34.71 dBm



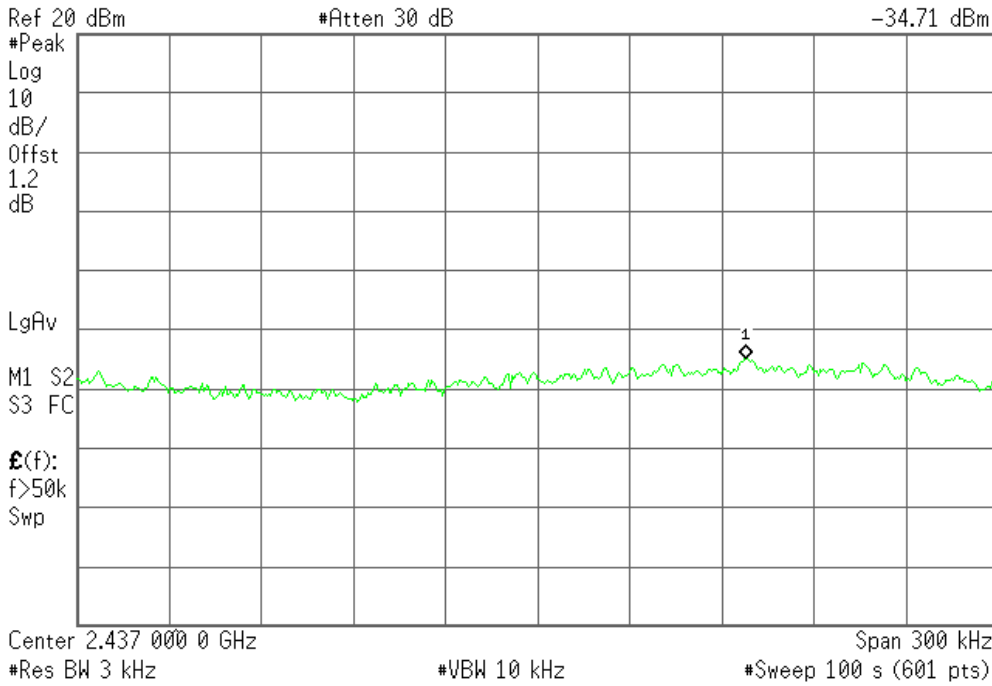


PPSD (CH Mid)

Agilent 16:45:44 Apr 26, 2008

R T

Mkr1 2.437 068 2 GHz
-34.71 dBm

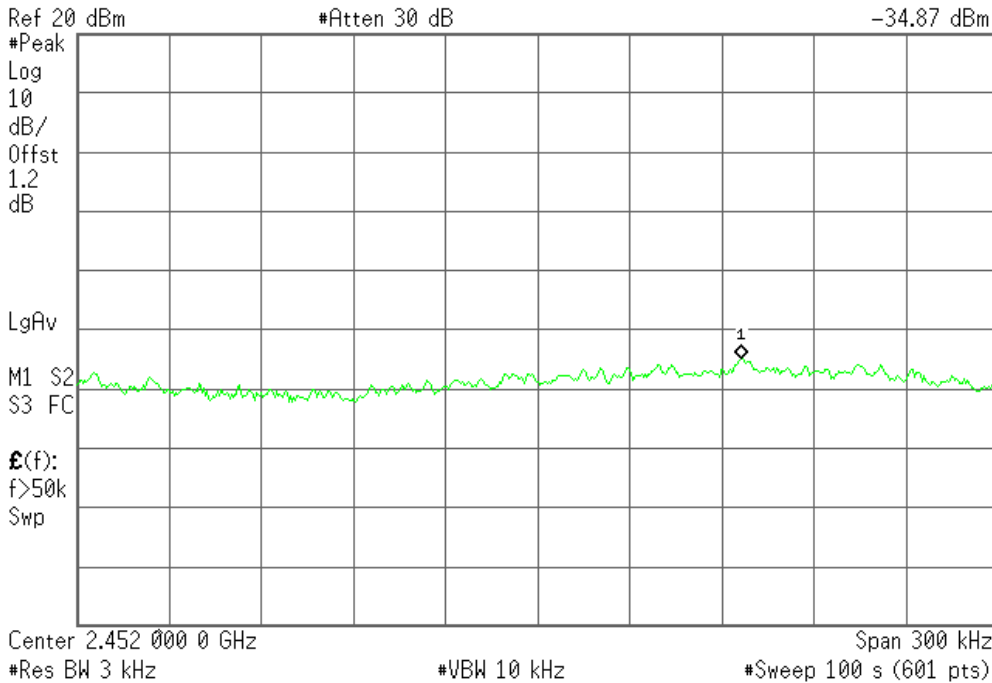


PPSD (CH High)

Agilent 16:47:56 Apr 26, 2008

R T

Mkr1 2.452 066 6 GHz
-34.87 dBm





Antenna:DCA 2

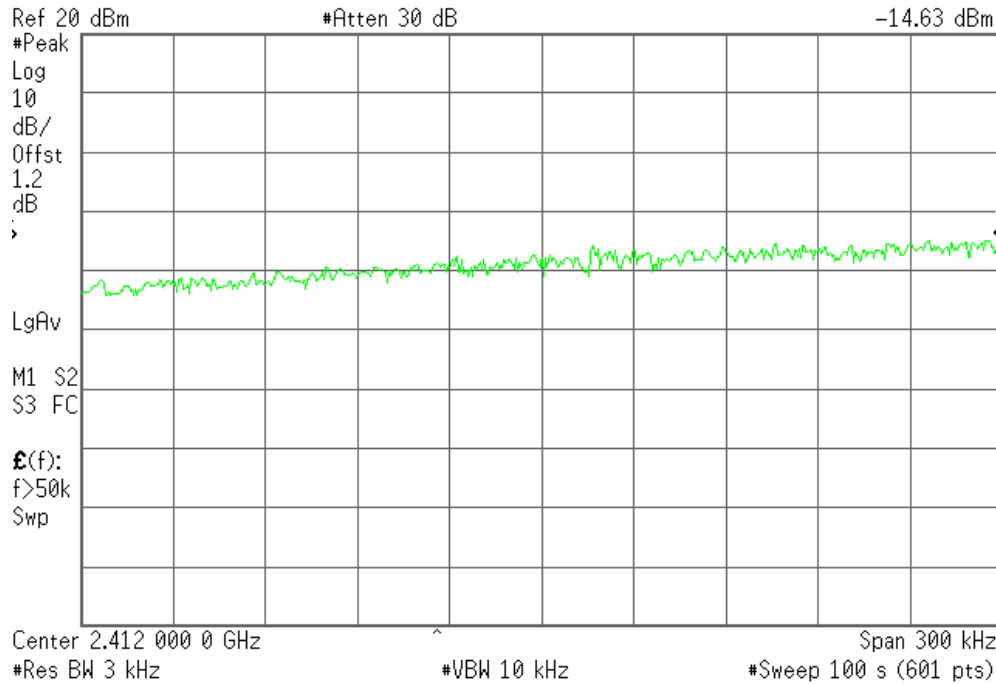
IEEE 802.11b mode

PPSD (CH Low)

Agilent 16:52:46 Apr 26, 2008

R T

Mkr1 2.412 149 5 GHz
-14.63 dBm

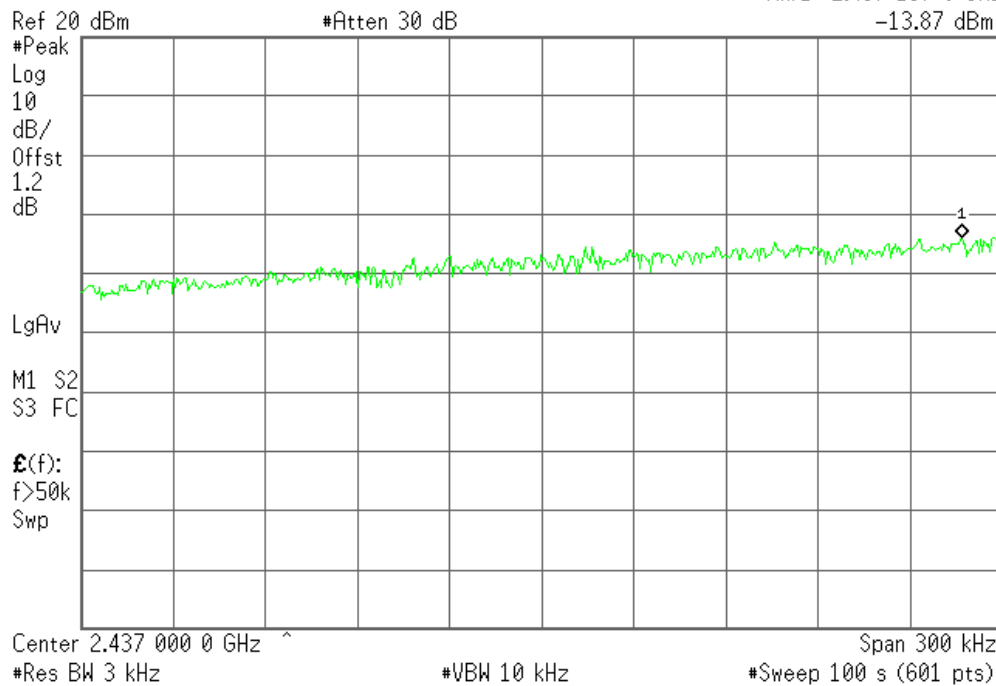


PPSD (CH Mid)

Agilent 16:55:15 Apr 26, 2008

R T

Mkr1 2.437 137 0 GHz
-13.87 dBm





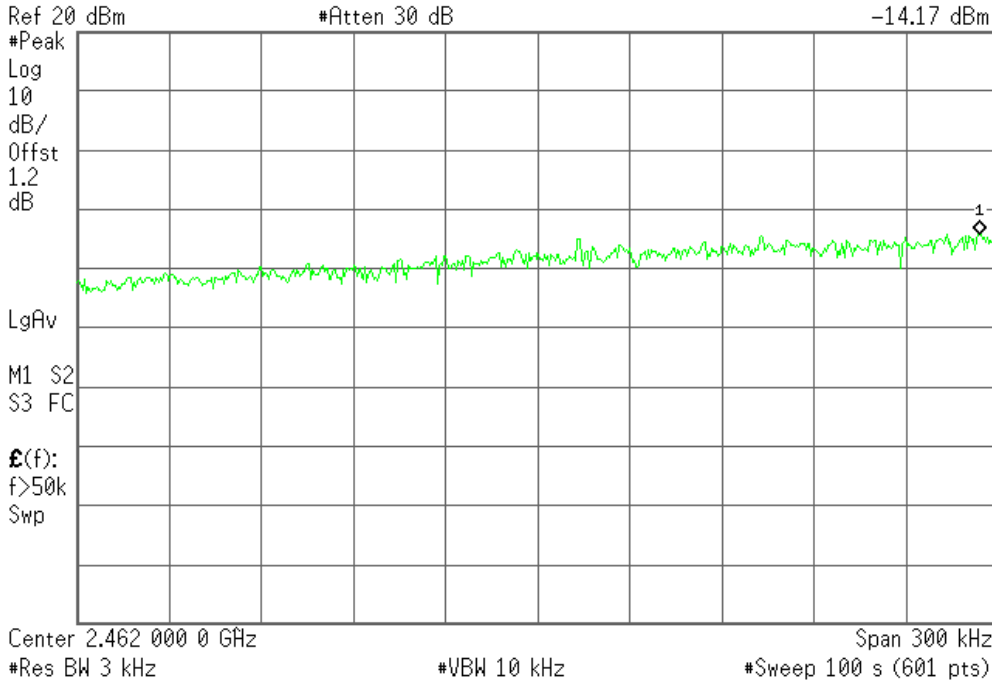
PPSD (CH High)

Agilent 16:57:37 Apr 26, 2008

R T

Mkr1 2.462 145 2 GHz

-14.17 dBm



IEEE 802.11g mode

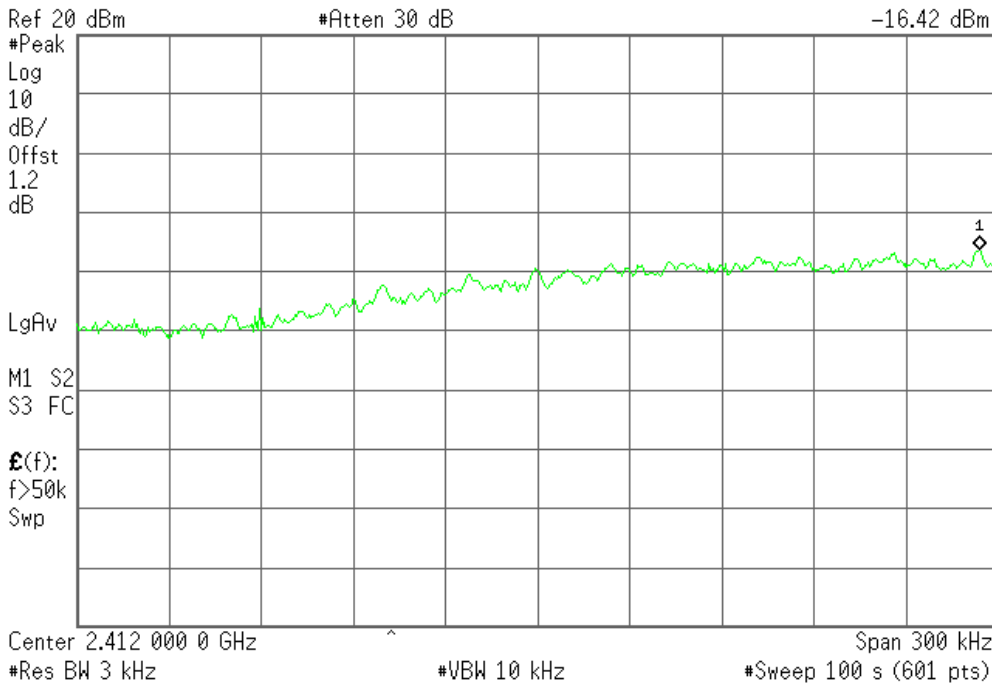
PPSD (CH Low)

Agilent 17:00:32 Apr 26, 2008

R T

Mkr1 2.412 144 0 GHz

-16.42 dBm



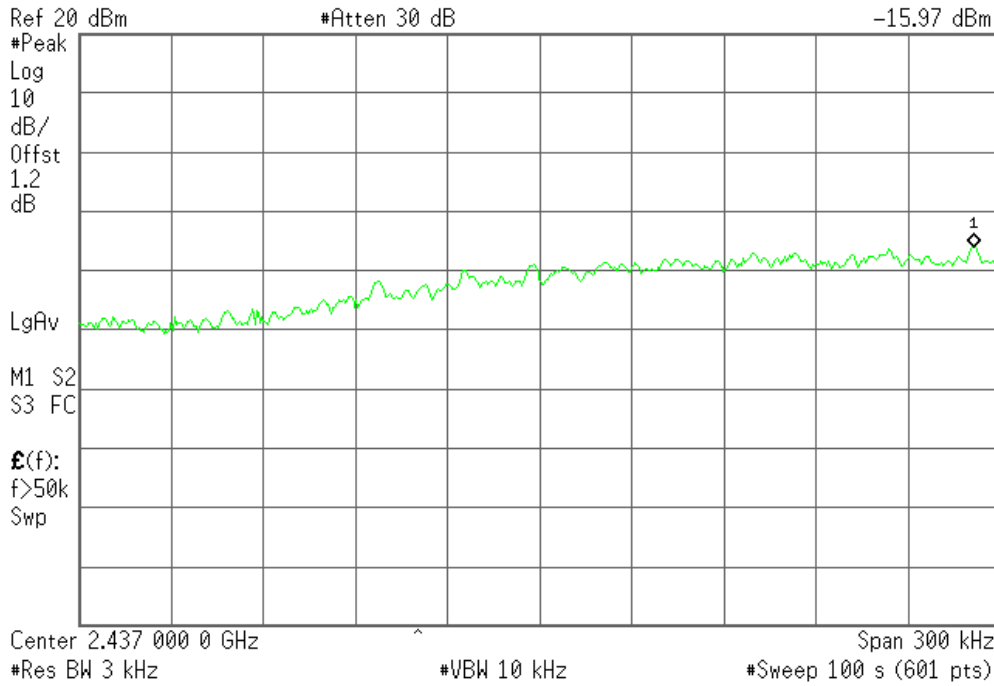


PPSD (CH Mid)

Agilent 17:03:24 Apr 26, 2008

R T

Mkr1 2.437 141 5 GHz
-15.97 dBm

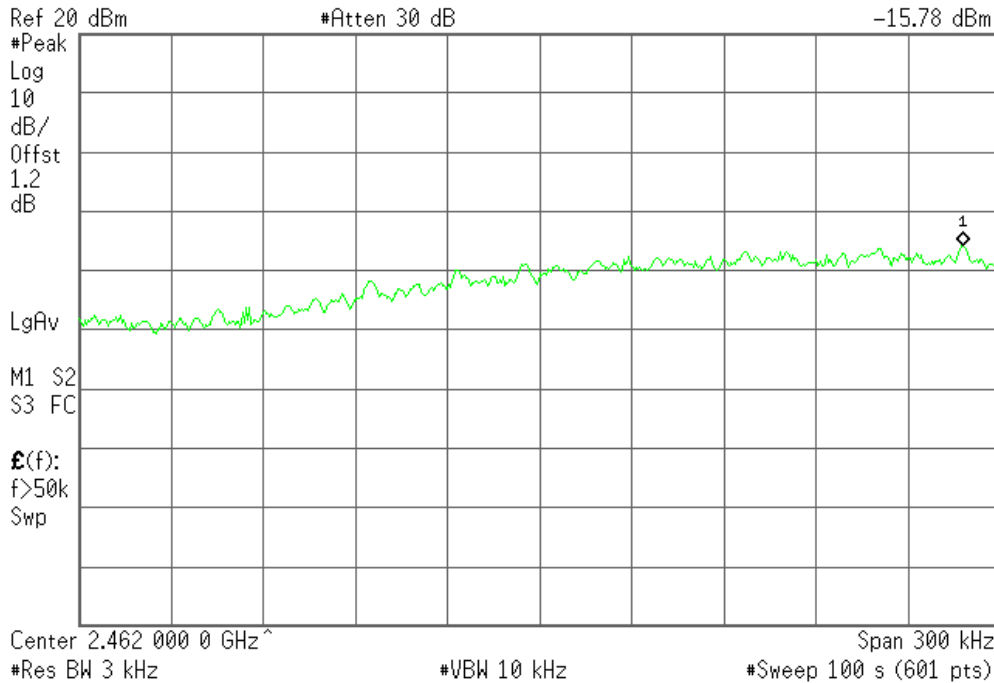


PPSD (CH High)

Agilent 17:05:51 Apr 26, 2008

R T

Mkr1 2.462 139 1 GHz
-15.78 dBm





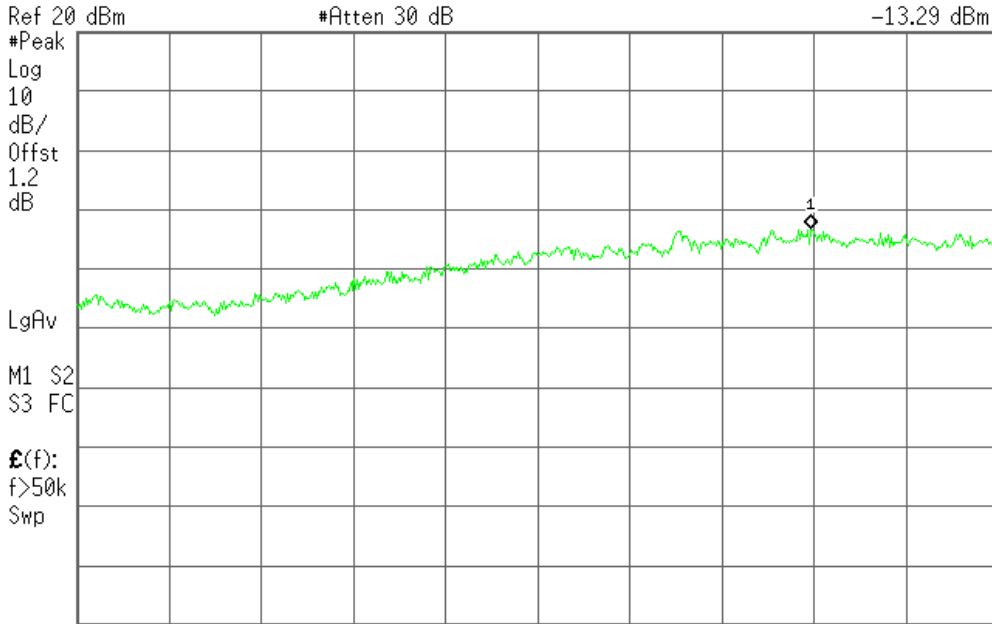
IEEE 802.11n HT20 MHz mode

PPSD (CH Low)

Agilent 17:08:20 Apr 26, 2008

R T

Mkr1 2.412 089 1 GHz
-13.29 dBm



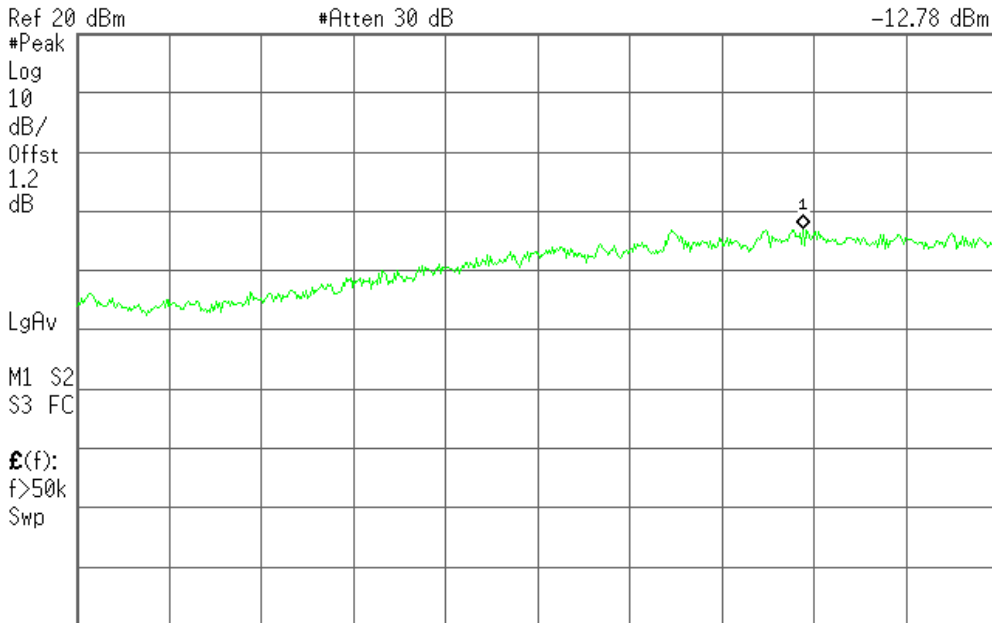
Center 2.412 000 0 GHz Span 300 kHz
#Res BW 3 kHz #VBW 10 kHz #Sweep 100 s (601 pts)

PPSD (CH Mid)

Agilent 17:10:34 Apr 26, 2008

R T

Mkr1 2.437 086 7 GHz
-12.78 dBm



Center 2.437 000 0 GHz Span 300 kHz
#Res BW 3 kHz #VBW 10 kHz #Sweep 100 s (601 pts)



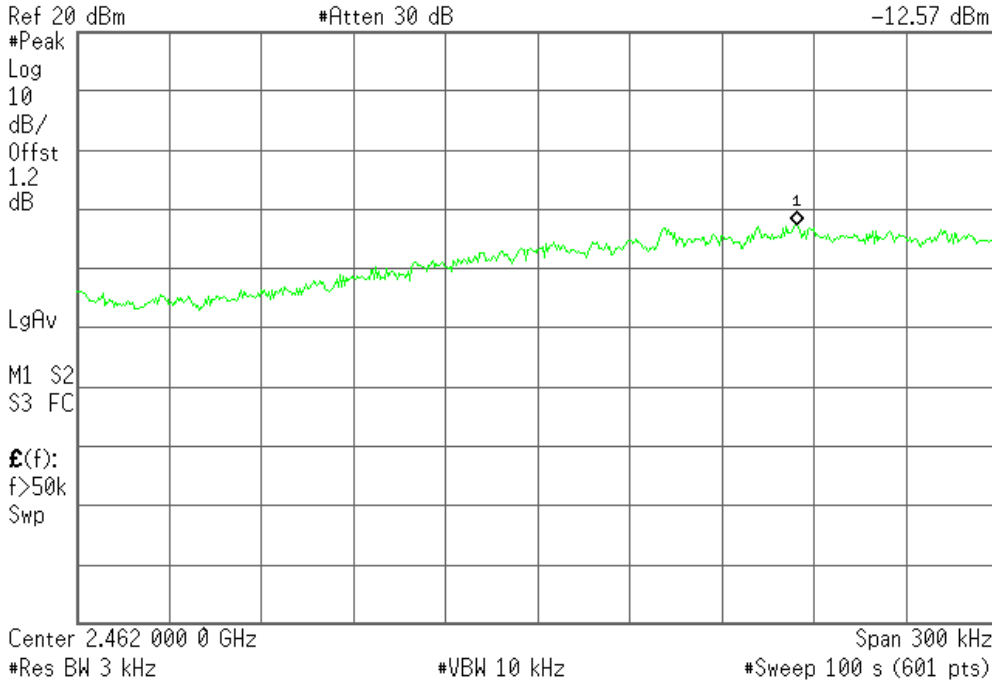
PPSD (CH High)

Agilent 17:12:52 Apr 26, 2008

R T

Mkr1 2.462 085 0 GHz

-12.57 dBm



IEEE 802.11n HT40 MHz mode

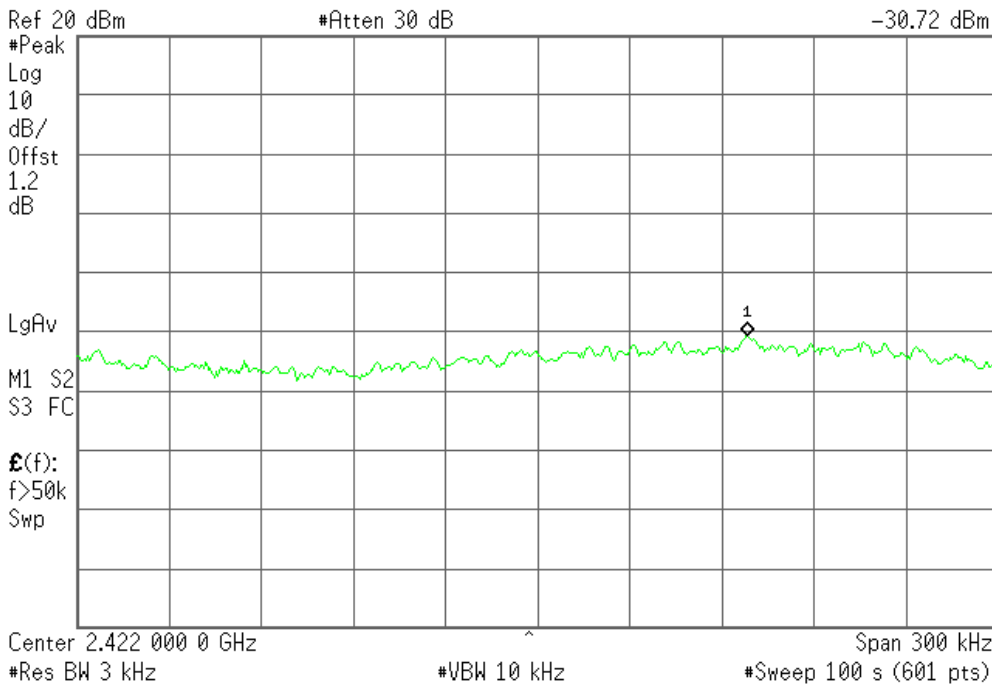
PPSD (CH Low)

Agilent 17:16:27 Apr 26, 2008

R T

Mkr1 2.422 068 9 GHz

-30.72 dBm



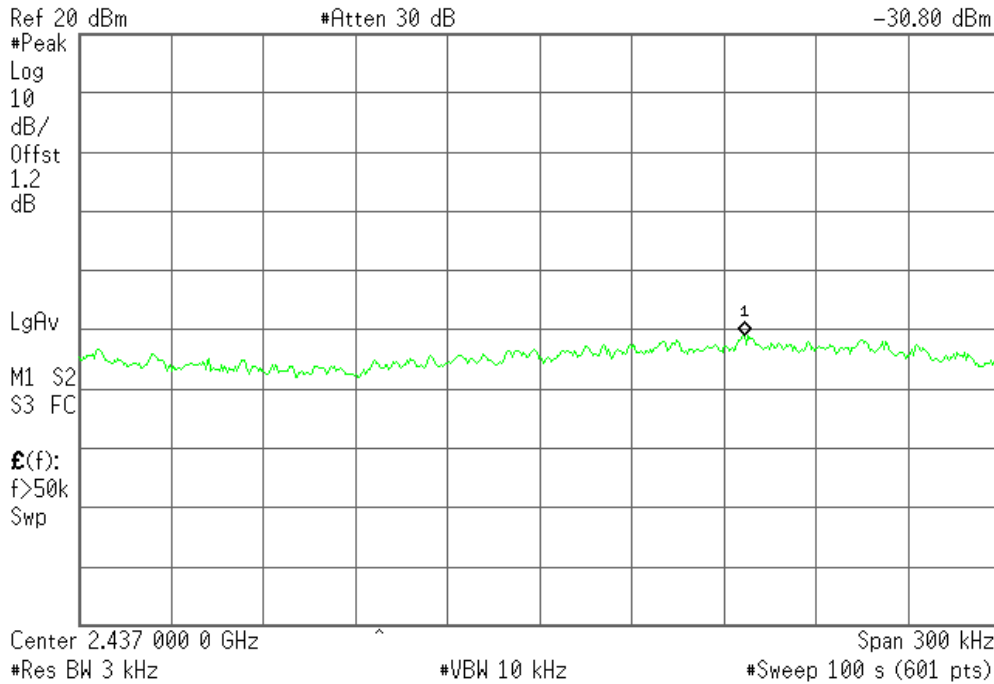


PPSD (CH Mid)

Agilent 17:19:05 Apr 26, 2008

R T

Mkr1 2.437 067 2 GHz
-30.80 dBm

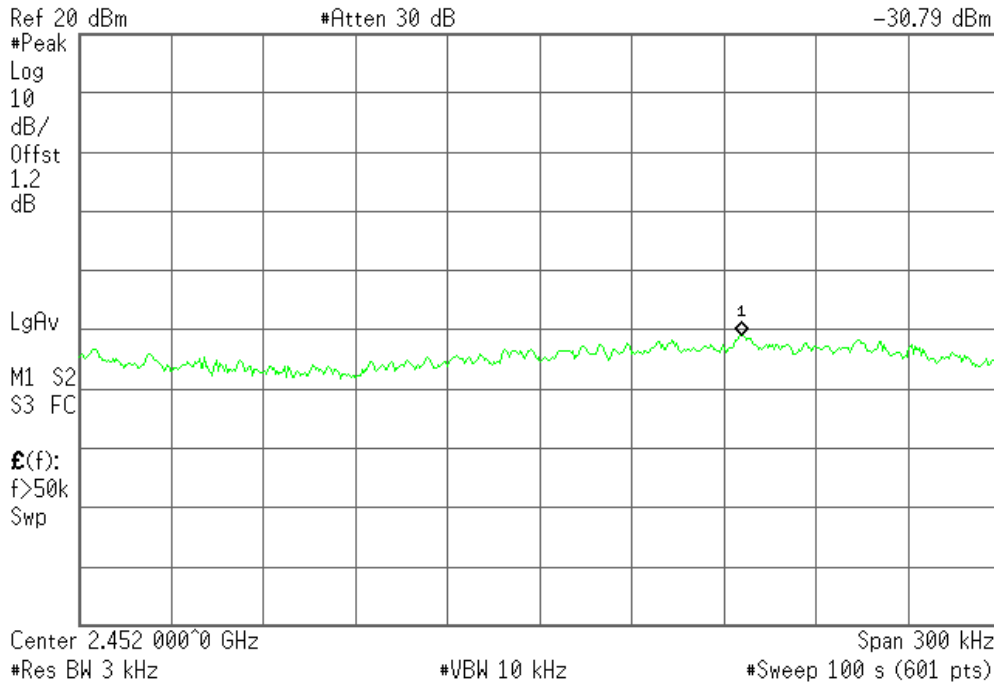


PPSD (CH High)

Agilent 17:21:21 Apr 26, 2008

R L

Mkr1 2.452 066 1 GHz
-30.79 dBm





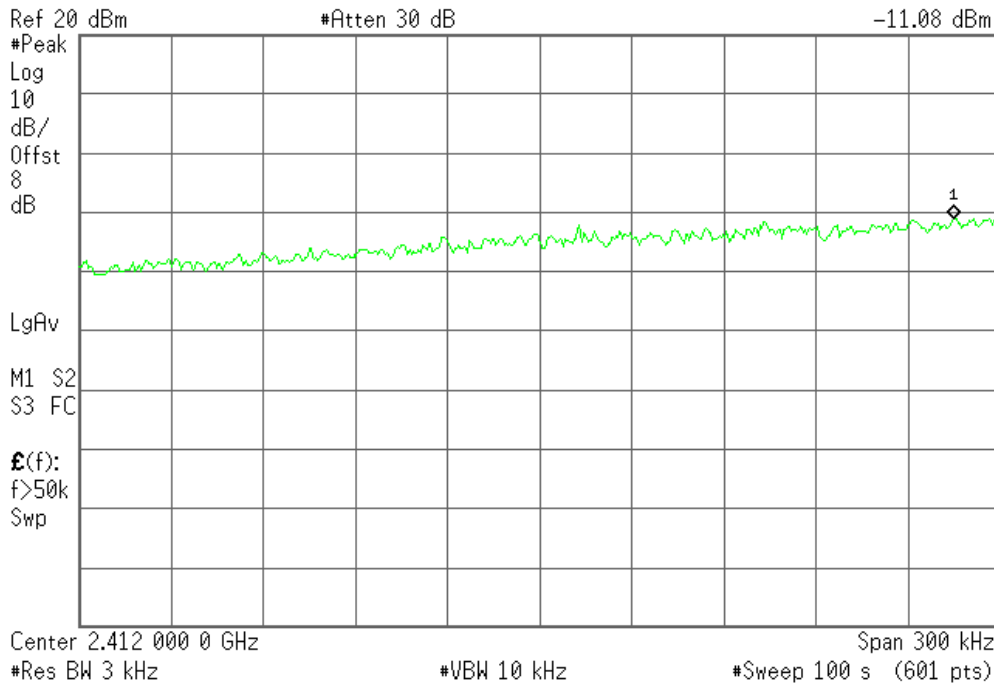
IEEE 802.11b Combined mode

PPSD (CH Low)

Agilent 14:13:38 Apr 26, 2008

R T

Mkr1 2.412 135 1 GHz
-11.08 dBm

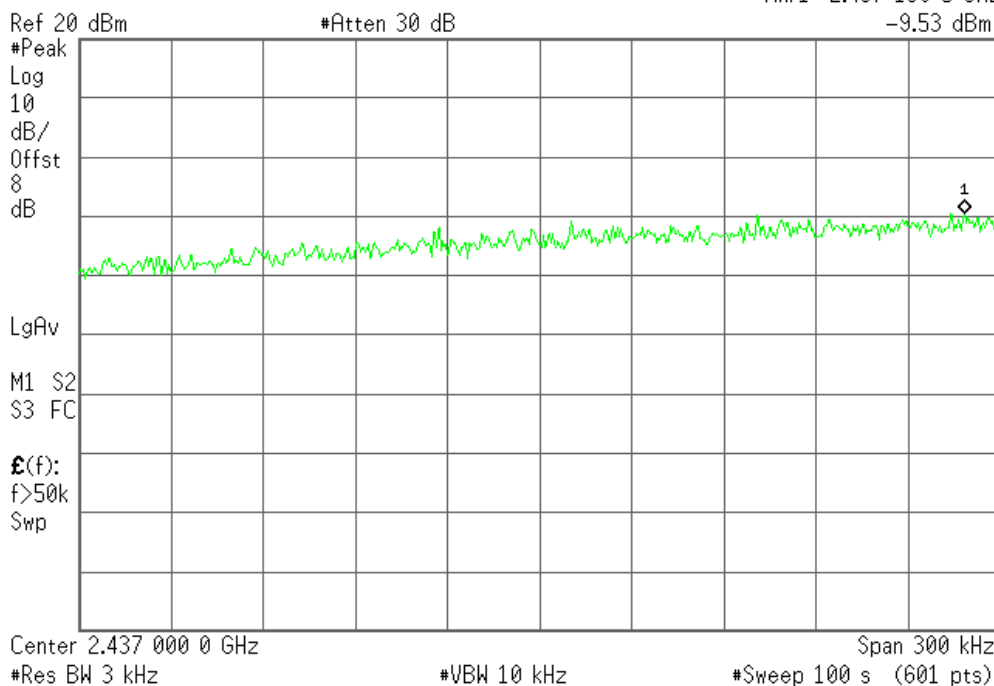


PPSD (CH Mid)

Agilent 14:14:33 Apr 26, 2008

R T

Mkr1 2.437 138 5 GHz
-9.53 dBm





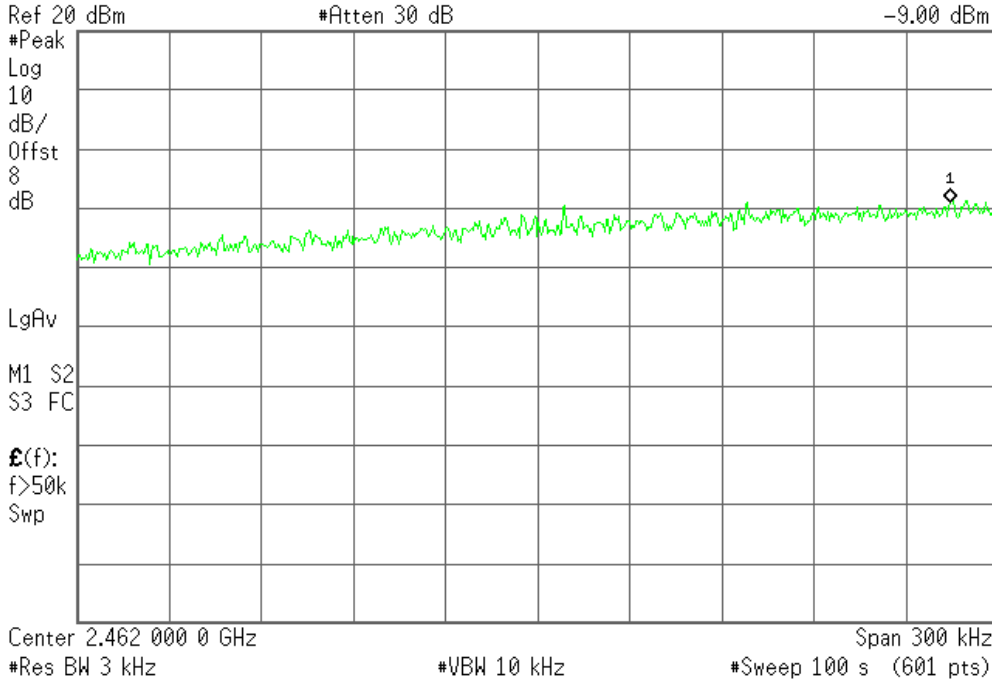
PPSD (CH High)

Agilent 14:16:16 Apr 26, 2008

R T

Mkr1 2.462 135 5 GHz

-9.00 dBm



IEEE 802.11g Combined mode

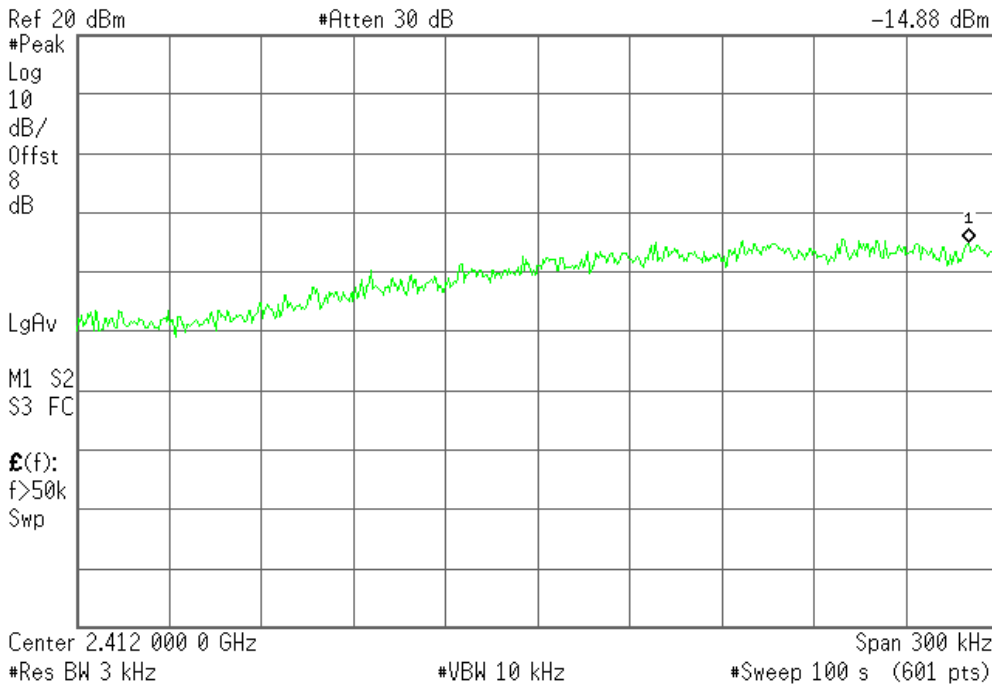
PPSD (CH Low)

Agilent 14:17:21 Apr 26, 2008

R T

Mkr1 2.412 140 5 GHz

-14.88 dBm





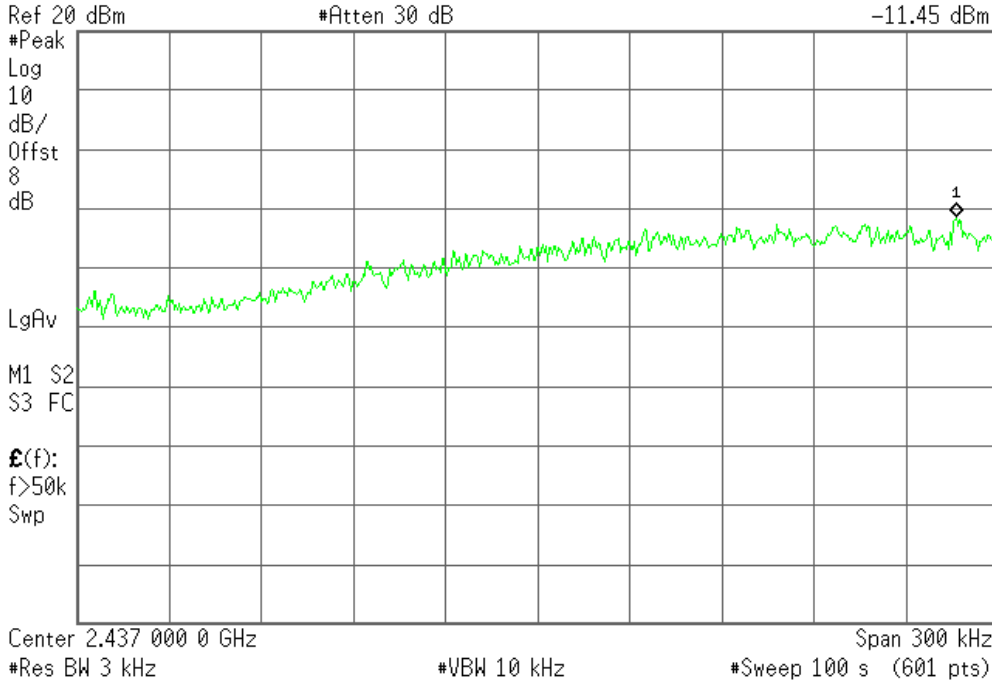
PPSD (CH Mid)

Agilent 14:18:08 Apr 26, 2008

R T

Mkr1 2.437 136 6 GHz

-11.45 dBm



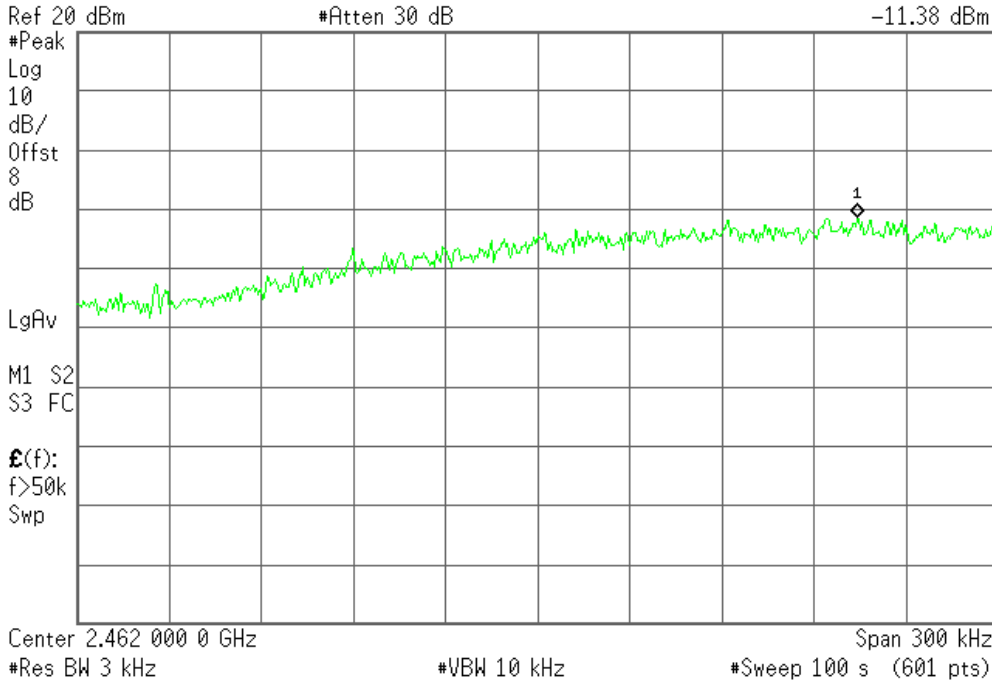
PPSD (CH High)

Agilent 14:18:44 Apr 26, 2008

R T

Mkr1 2.462 104 7 GHz

-11.38 dBm





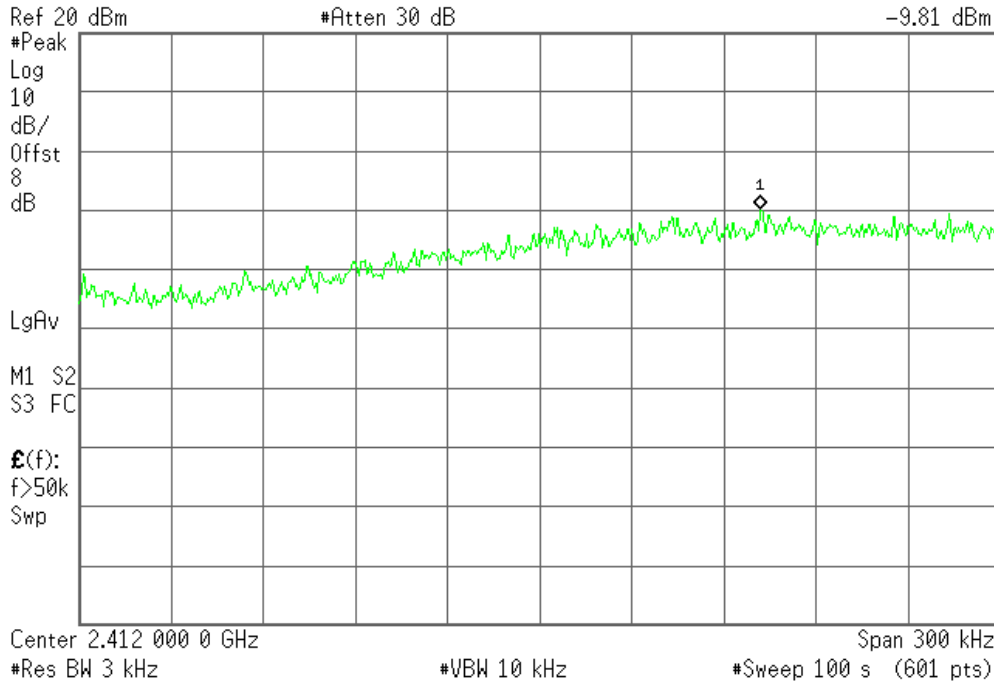
IEEE 802.11n HT20 Combined mode

PPSD (CH Low)

Agilent 14:20:07 Apr 26, 2008

R T

Mkr1 2.412 072 1 GHz
-9.81 dBm

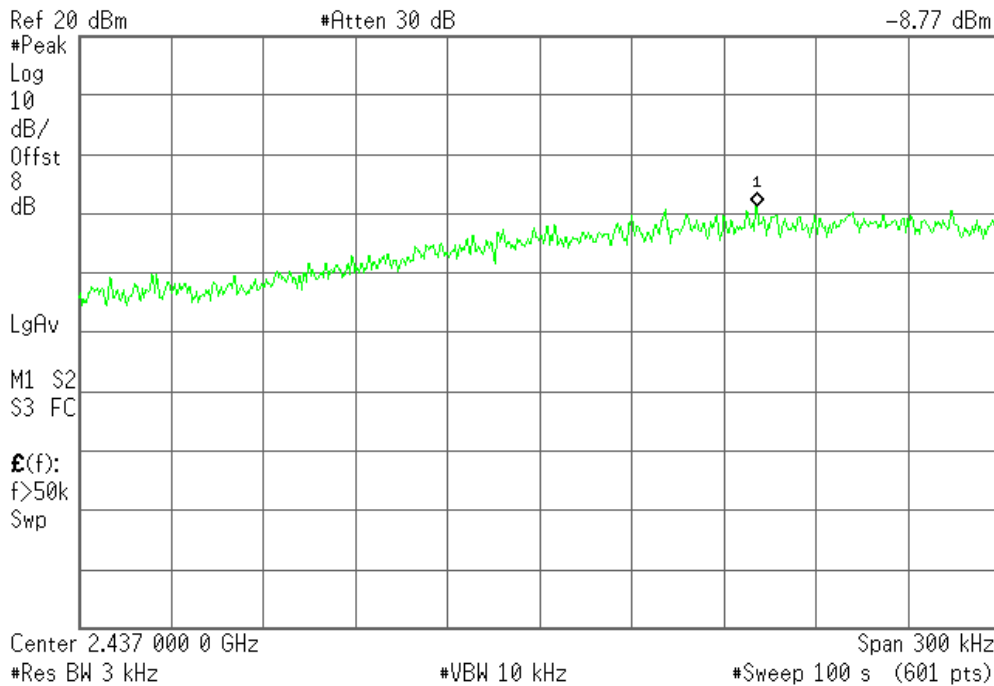


PPSD (CH Mid)

Agilent 14:20:48 Apr 26, 2008

R T

Mkr1 2.437 071 2 GHz
-8.77 dBm





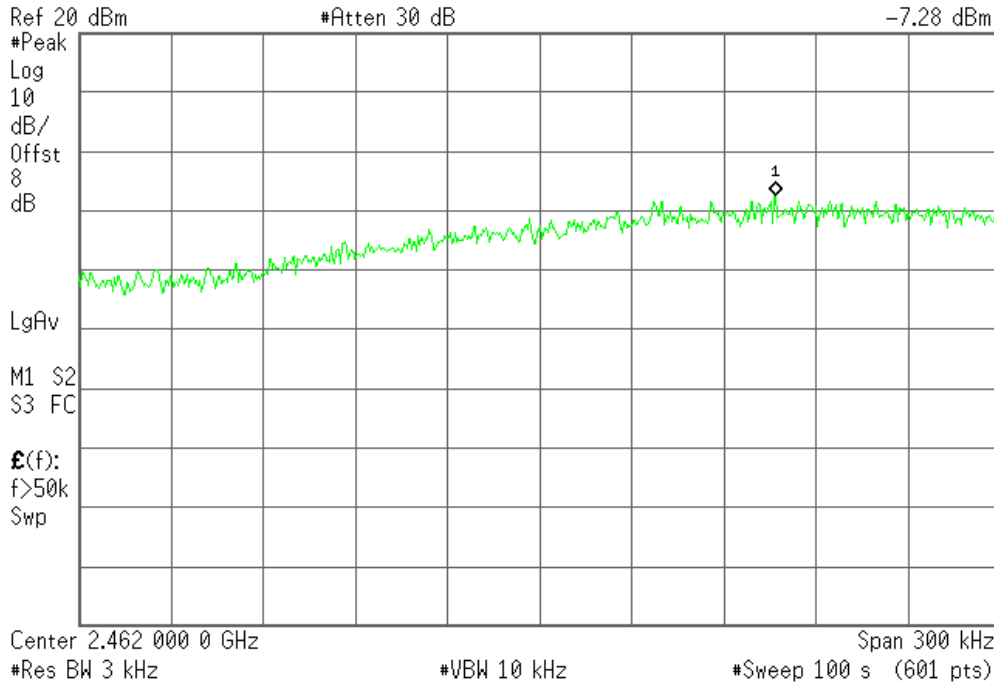
PPSD (CH High)

Agilent 14:21:30 Apr 26, 2008

R T

Mkr1 2.462 077 5 GHz

-7.28 dBm



IEEE 802.11n HT40 Combined mode

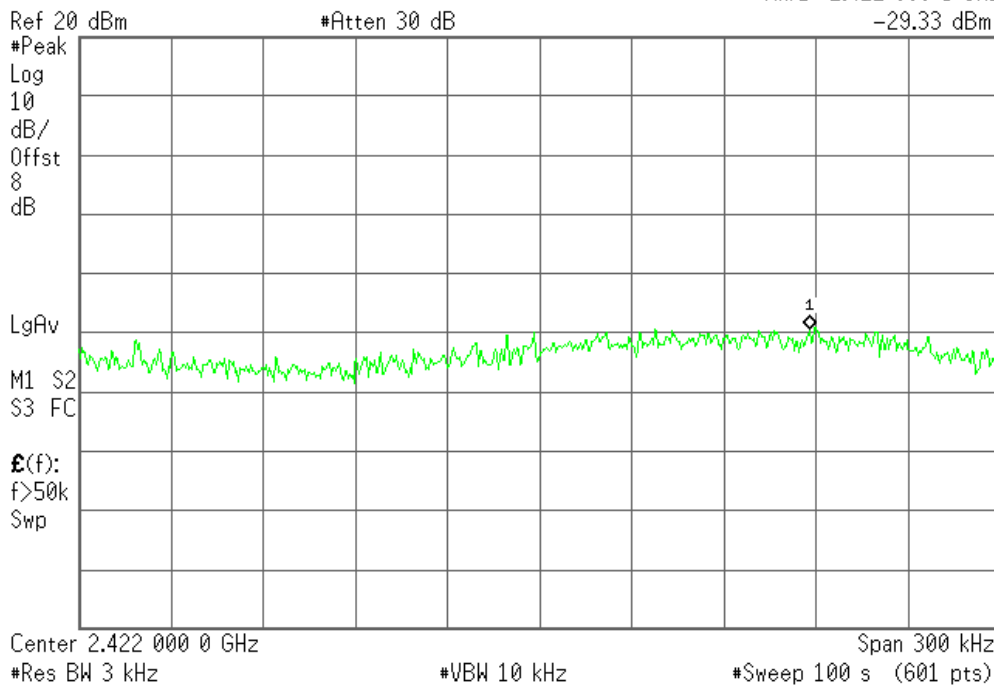
PPSD (CH Low)

Agilent 14:23:50 Apr 26, 2008

R T

Mkr1 2.422 088 5 GHz

-29.33 dBm



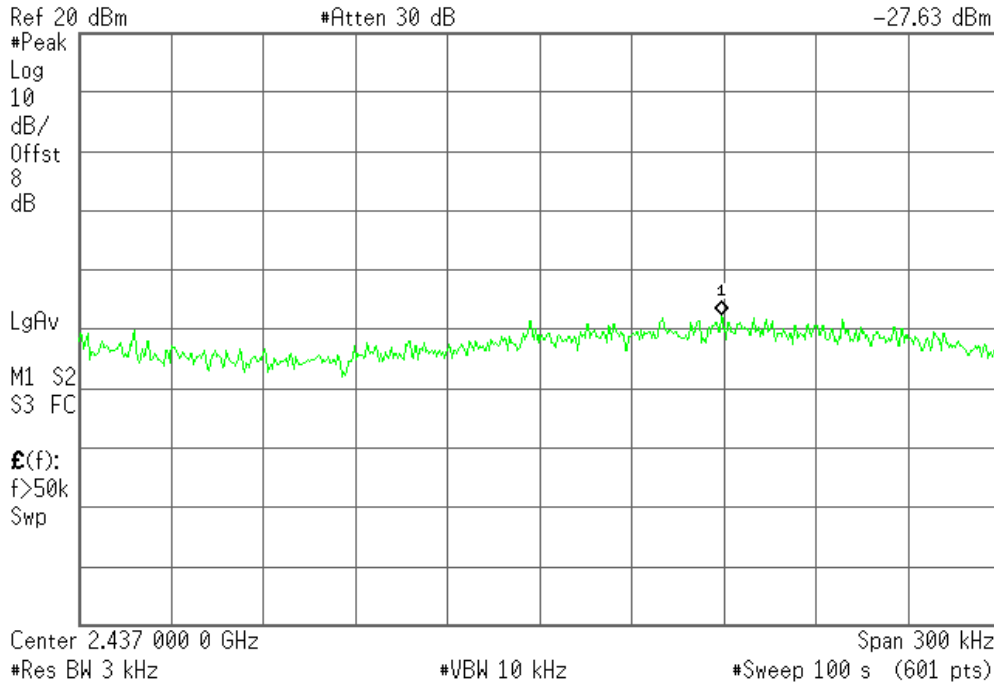


PPSD (CH Mid)

Agilent 14:24:33 Apr 26, 2008

R T

Mkr1 2.437 059 1 GHz
-27.63 dBm

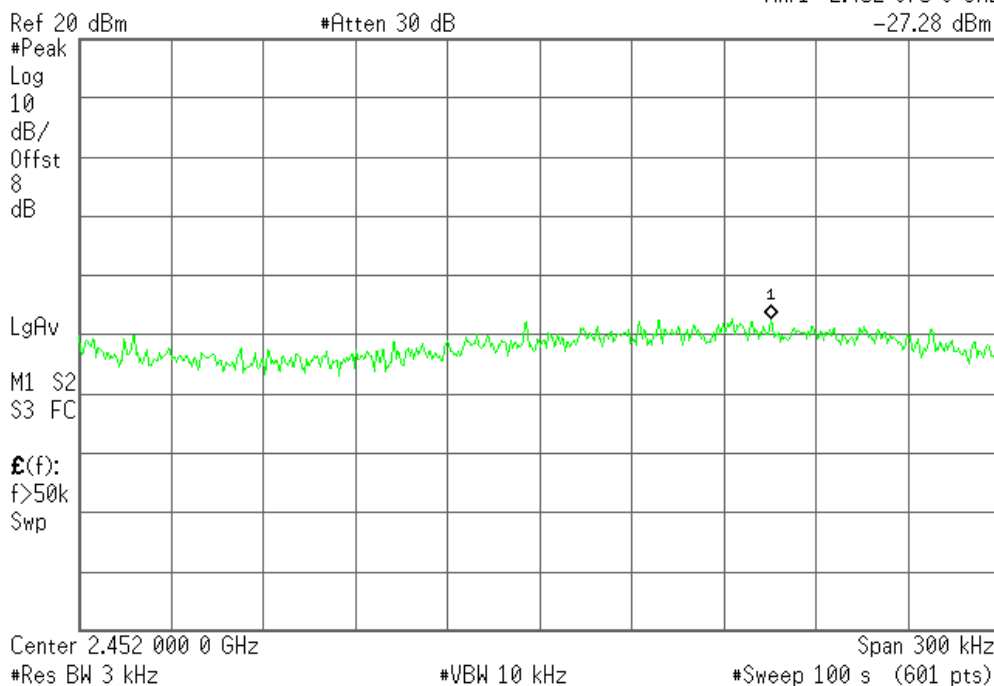


PPSD (CH High)

Agilent 14:25:16 Apr 26, 2008

R T

Mkr1 2.452 075 6 GHz
-27.28 dBm



7.6 SPURIOUS EMISSIONS

7.6.1 Conducted Measurement

LIMIT

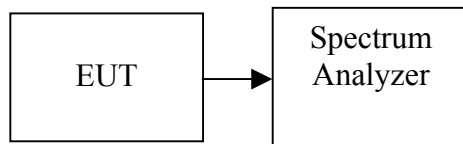
According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains 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)).

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US44300399	02/24/2009
Power Splitter	Mini-Circuits	ZN2PD-9G	SF078500430	07/30/2008

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

Test Configuration



Combiner mode



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

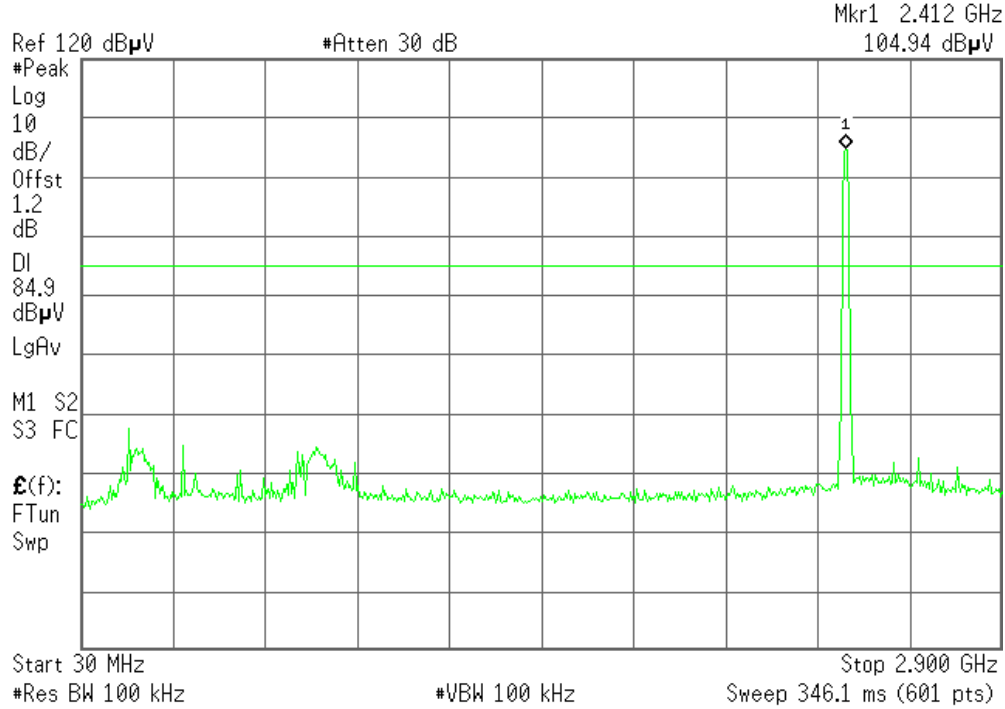
Antenna: DCA0

IEEE 802.11b mode / CH Low

30MHz ~ 2.9GHz

Agilent 15:49:43 Apr 28, 2008

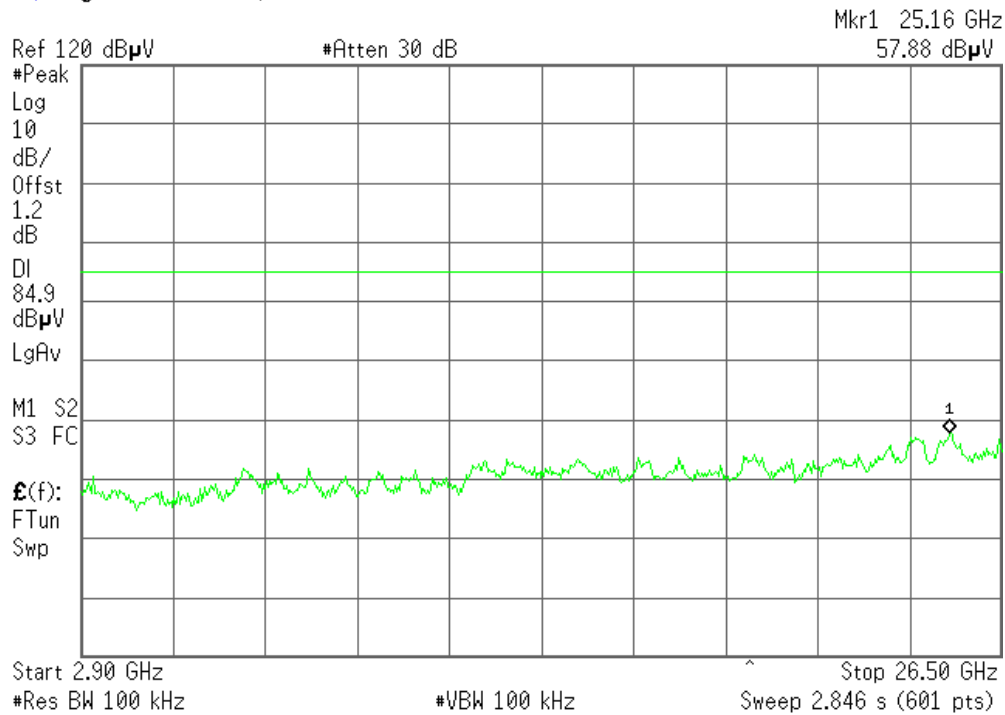
T



2.9GHz ~ 26.5GHz

Agilent 15:50:14 Apr 28, 2008

T



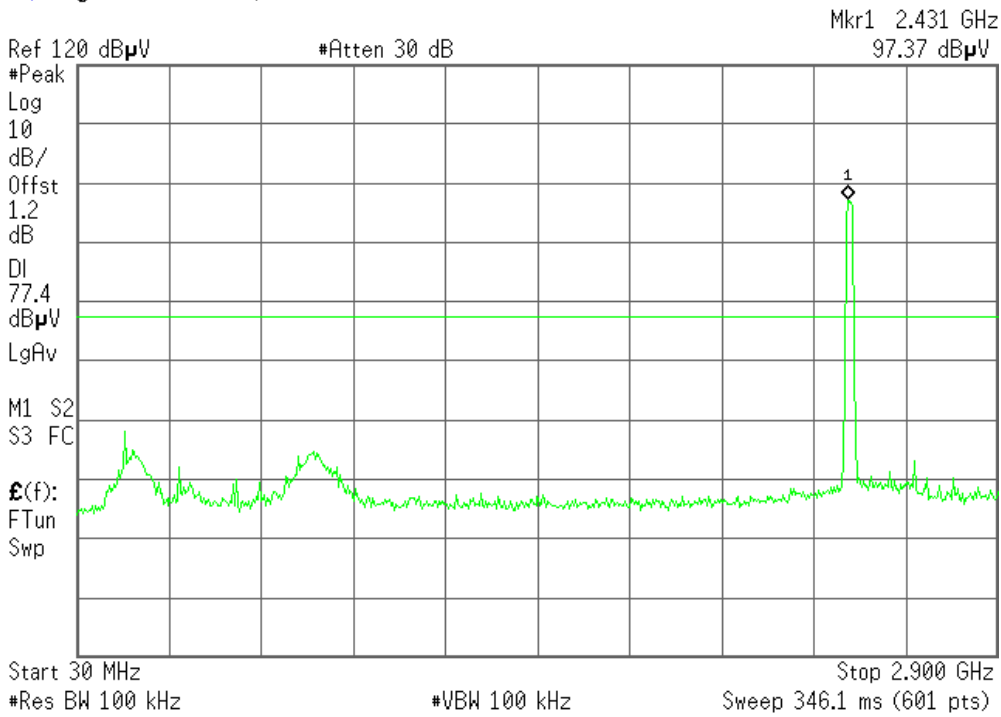


IEEE 802.11b mode / CH Mid

30MHz ~ 2.9GHz

Agilent 16:00:37 Apr 28, 2008

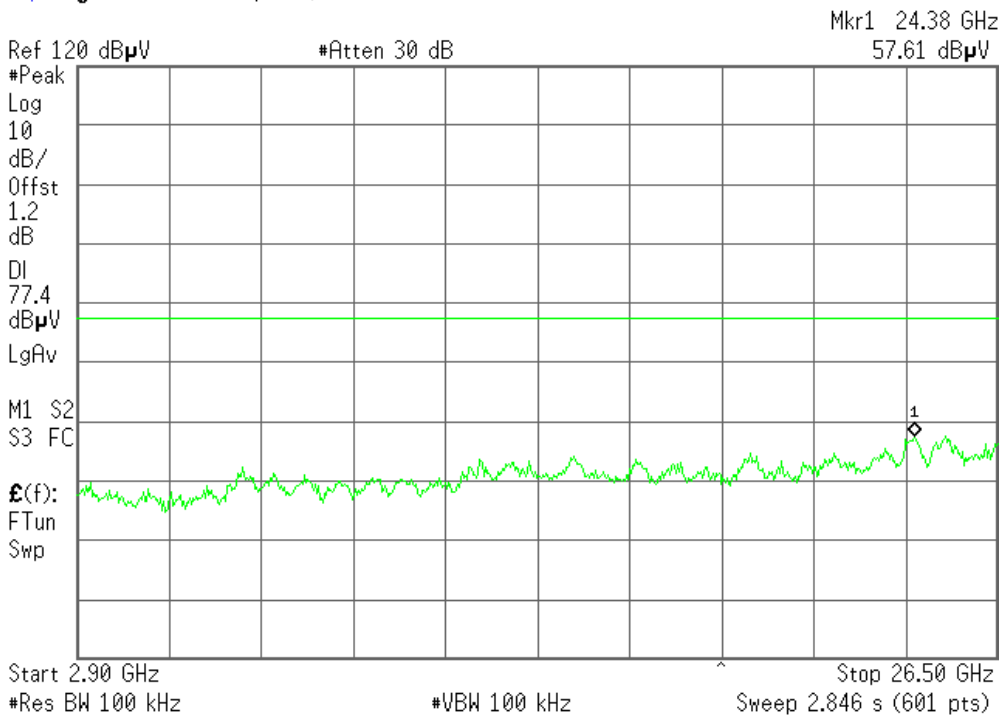
T



2.9GHz ~ 26.5GHz

Agilent 16:01:17 Apr 28, 2008

T



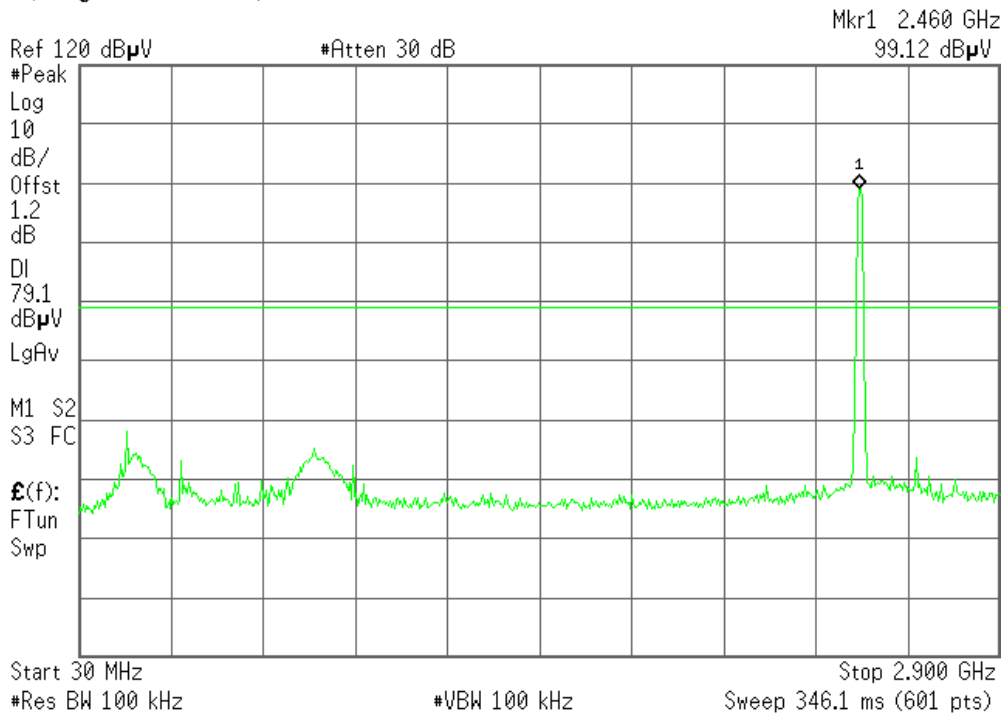


IEEE 802.11b mode / CH High

30MHz ~ 2.9GHz

Agilent 16:02:36 Apr 28, 2008

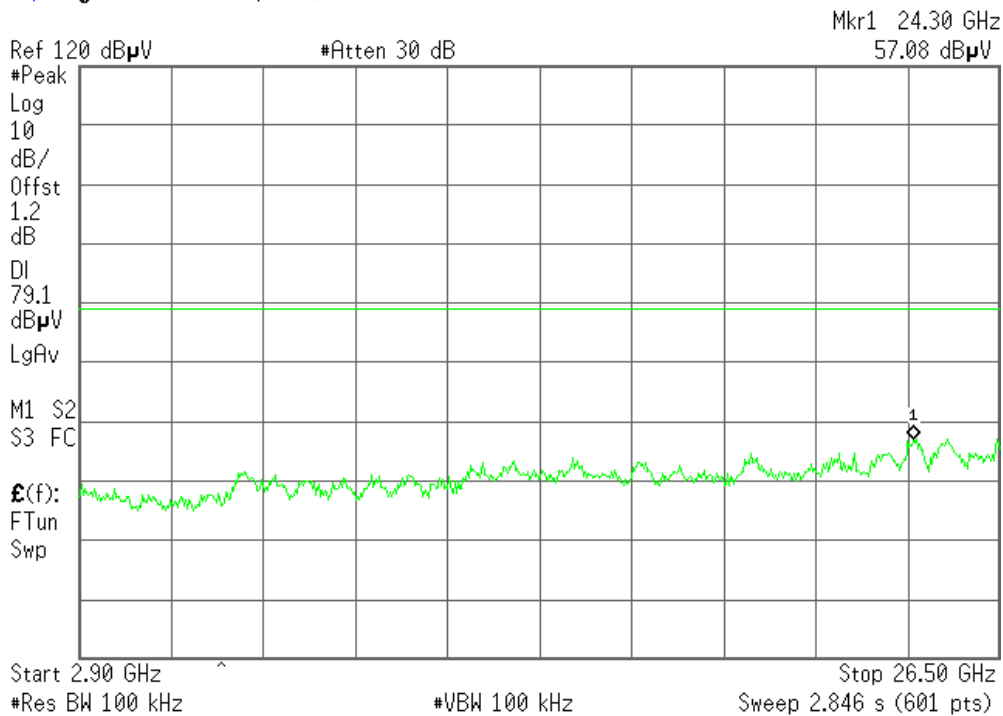
T



2.9GHz ~ 26.5GHz

Agilent 16:02:58 Apr 28, 2008

T



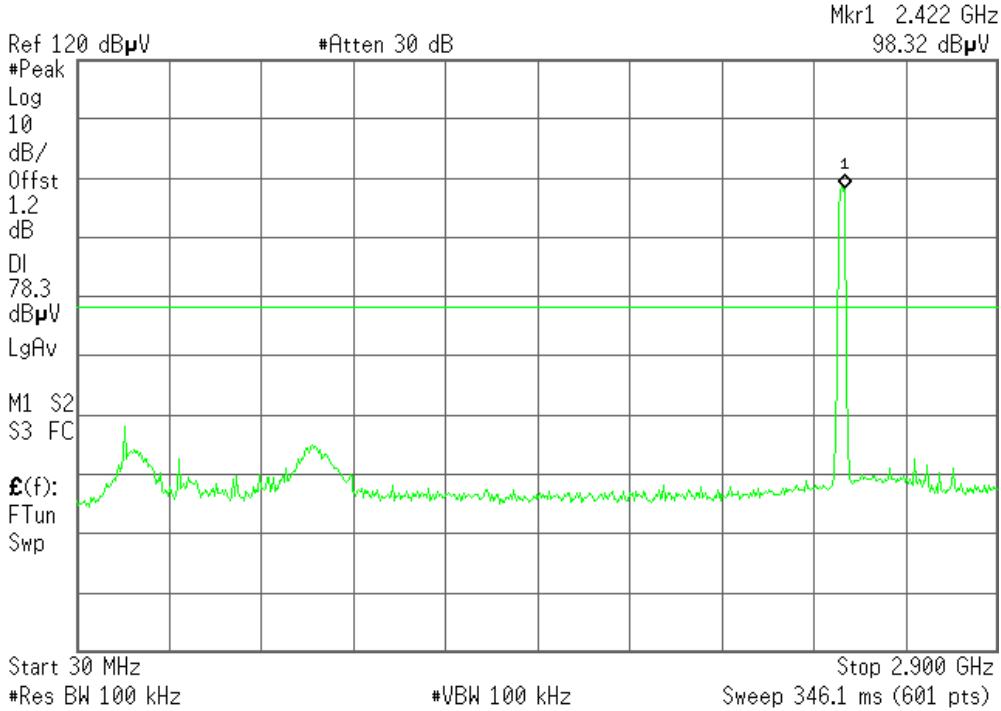


IEEE 802.11g mode/ CH Low

30MHz ~ 2.9GHz

Agilent 15:56:52 Apr 28, 2008

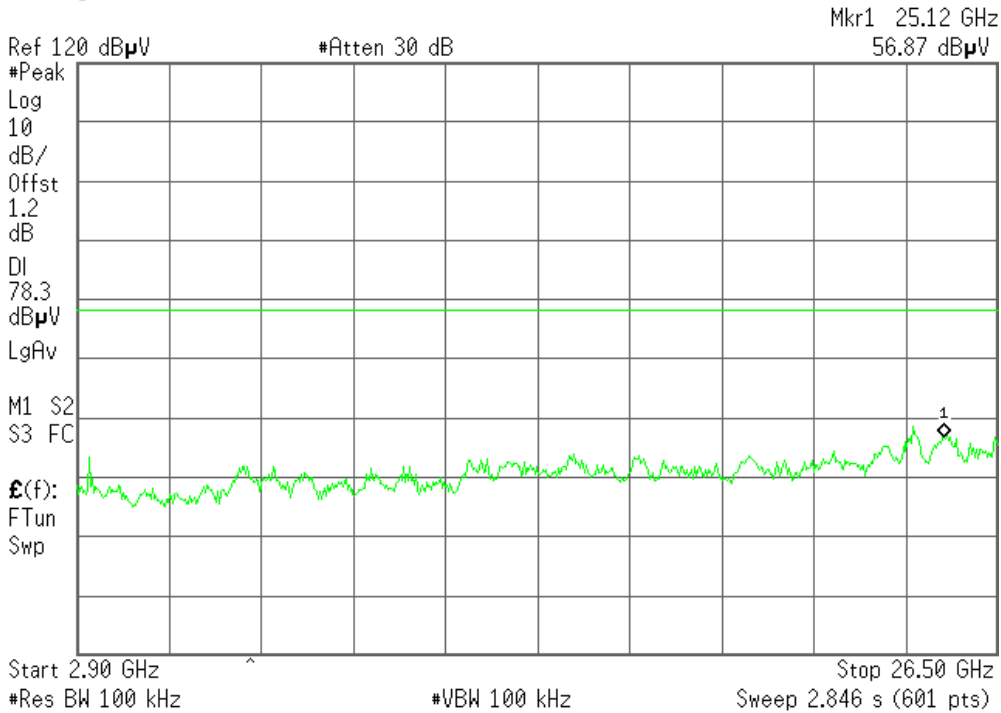
T



2.9GHz ~ 26.5GHz

Agilent 15:57:16 Apr 28, 2008

T



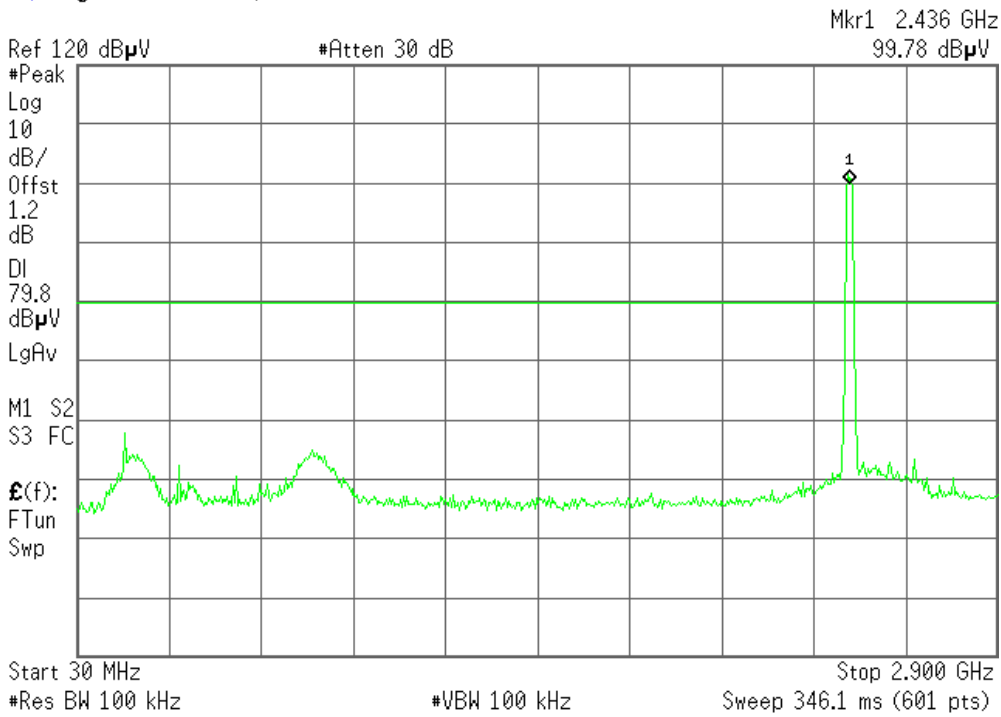


IEEE 802.11g / CH Mid

30MHz ~ 2.9GHz

Agilent 16:06:08 Apr 28, 2008

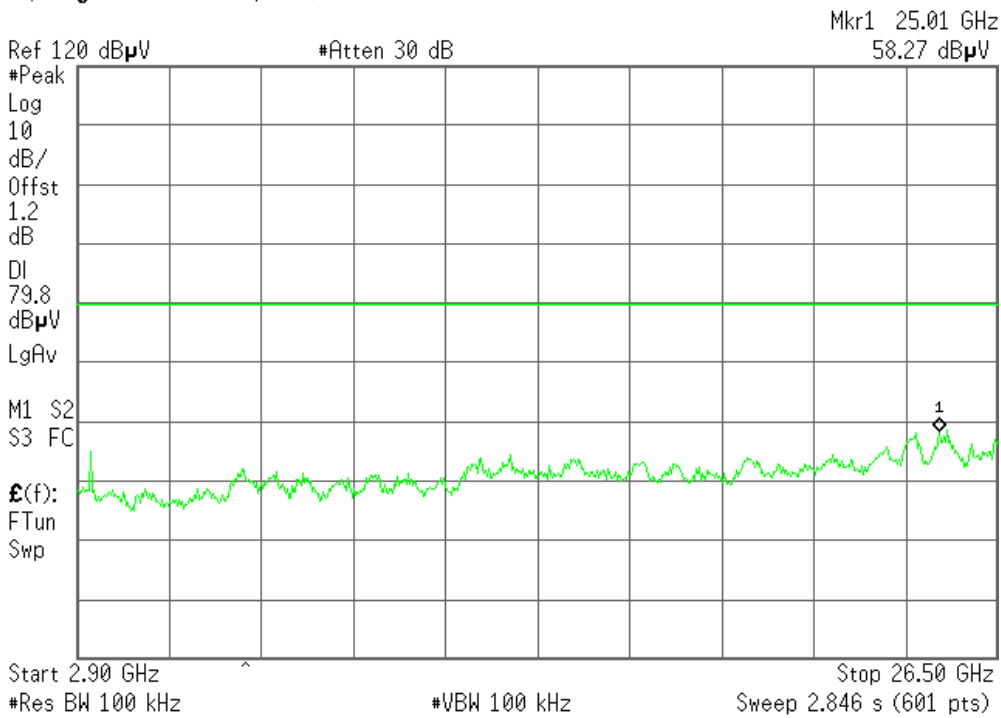
T



2.9GHz ~ 26.5GHz

Agilent 16:06:42 Apr 28, 2008

T



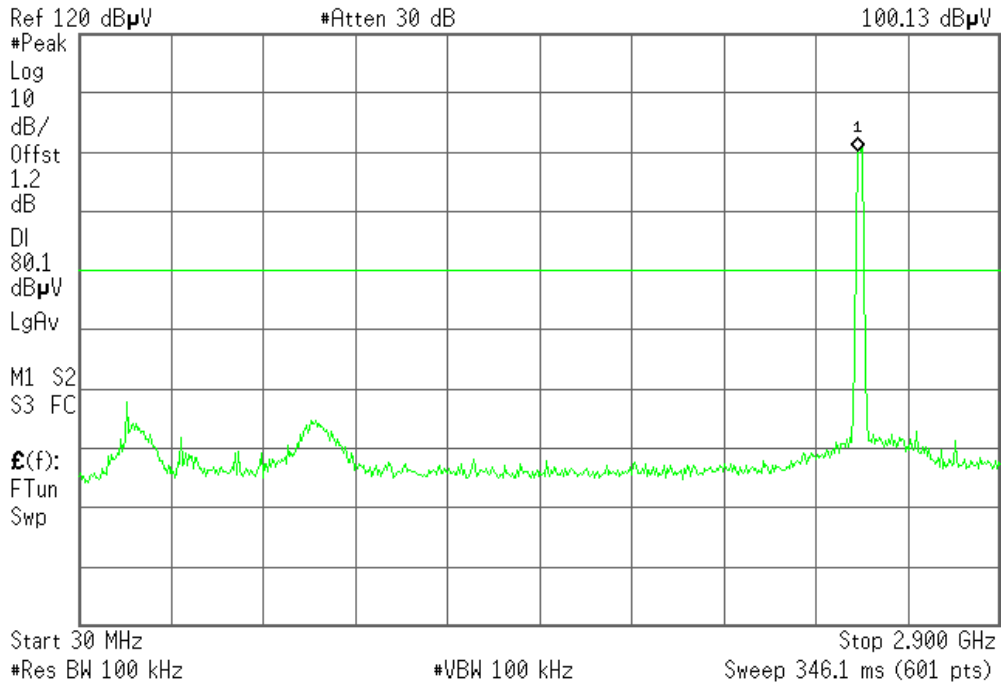


IEEE 802.11g / CH High

30MHz ~ 2.9GHz

Agilent 16:07:48 Apr 28, 2008

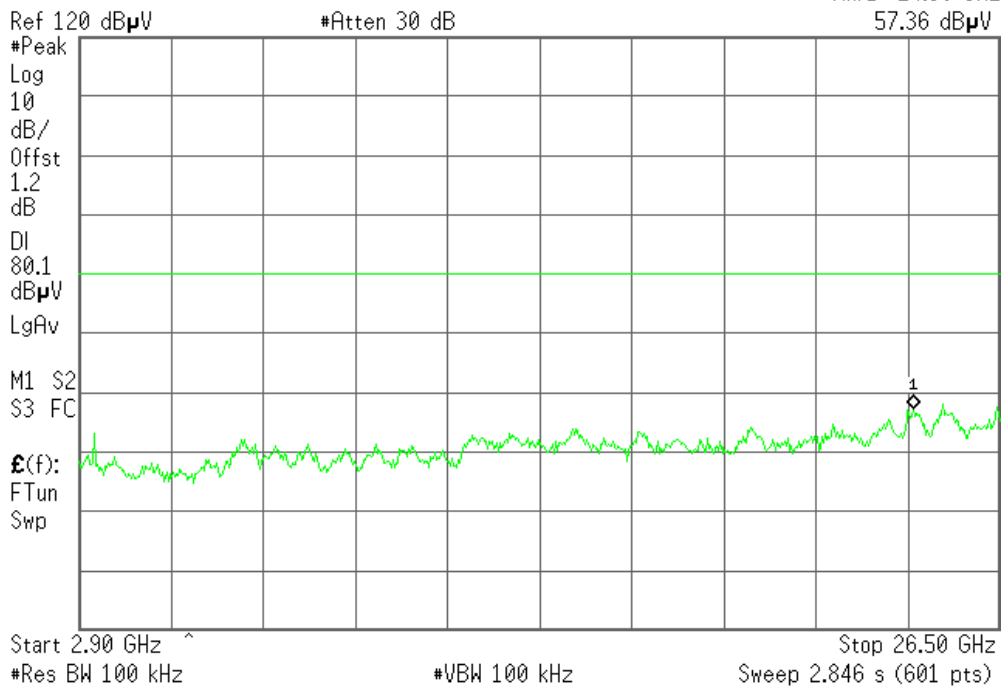
T



2.9GHz ~ 26.5GHz

Agilent 16:08:29 Apr 28, 2008

T



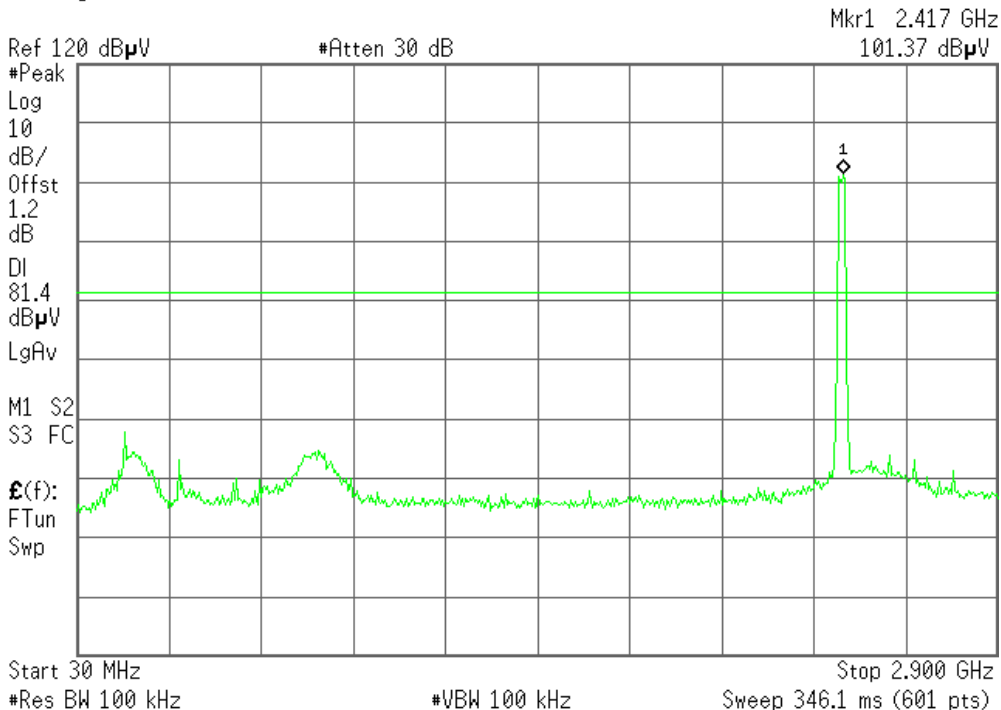


IEEE 802.11n HT20 MHz mode / CH Low

30MHz ~ 2.9GHz

Agilent 16:04:29 Apr 28, 2008

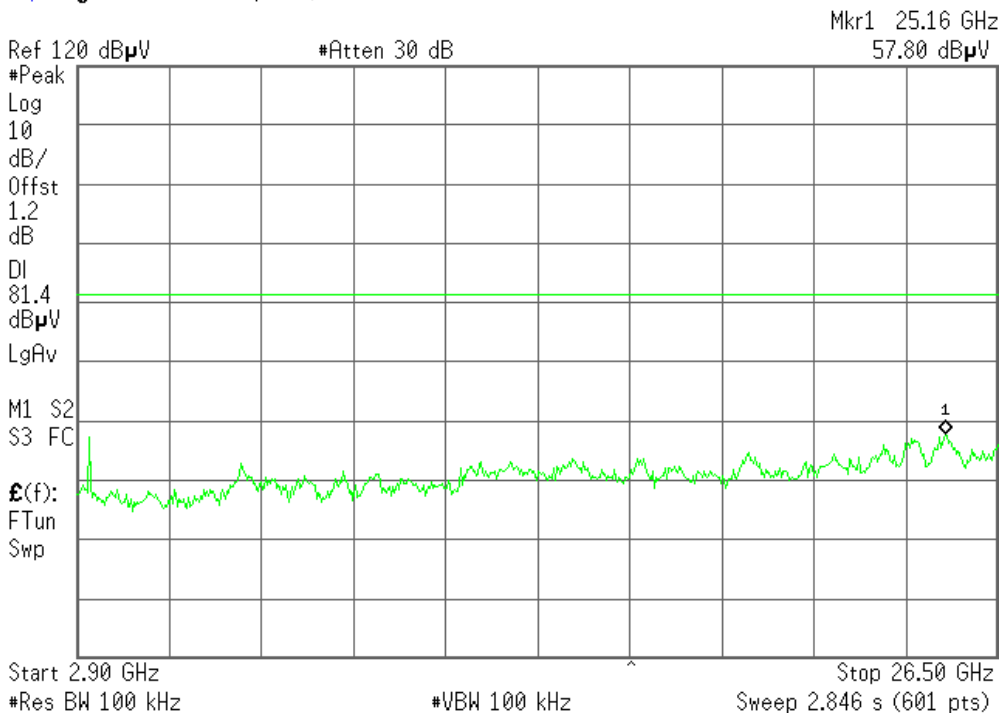
T



2.9GHz ~ 26.5GHz

Agilent 16:04:57 Apr 28, 2008

T



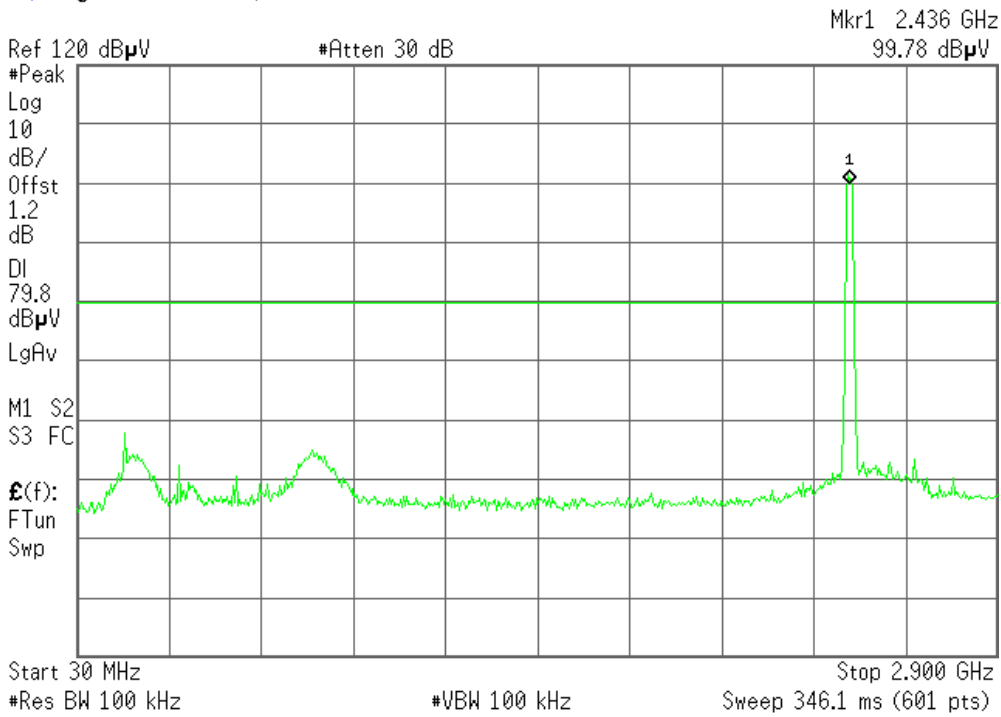


IEEE 802.11n HT20 MHz mode / CH Mid

30MHz ~ 2.9GHz

Agilent 16:06:08 Apr 28, 2008

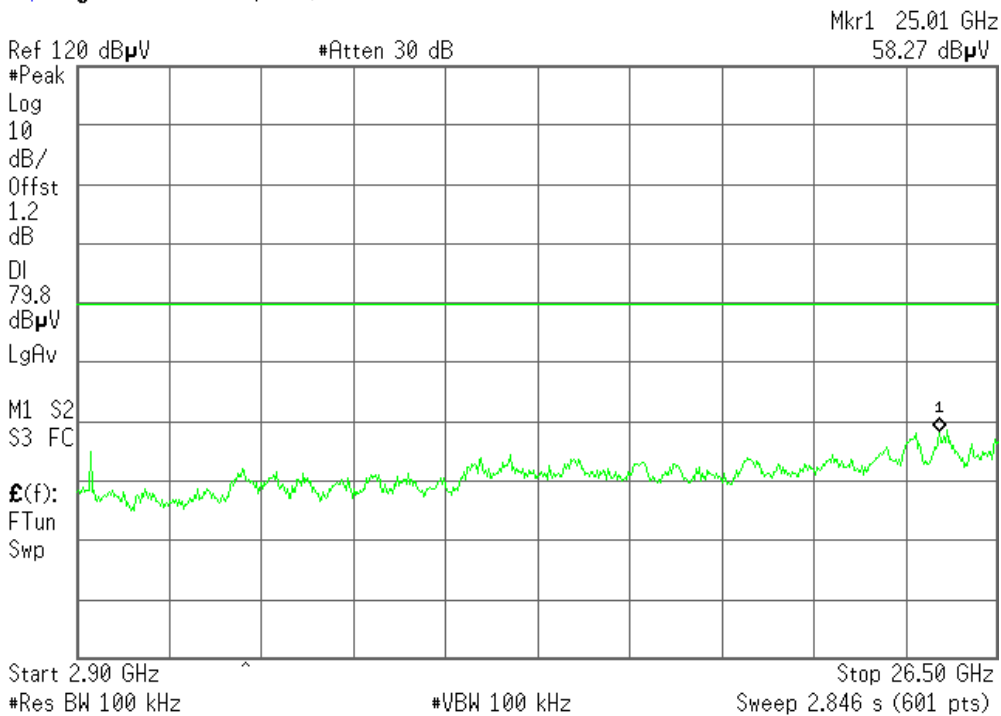
T



2.9GHz ~ 26.5GHz

Agilent 16:06:42 Apr 28, 2008

T



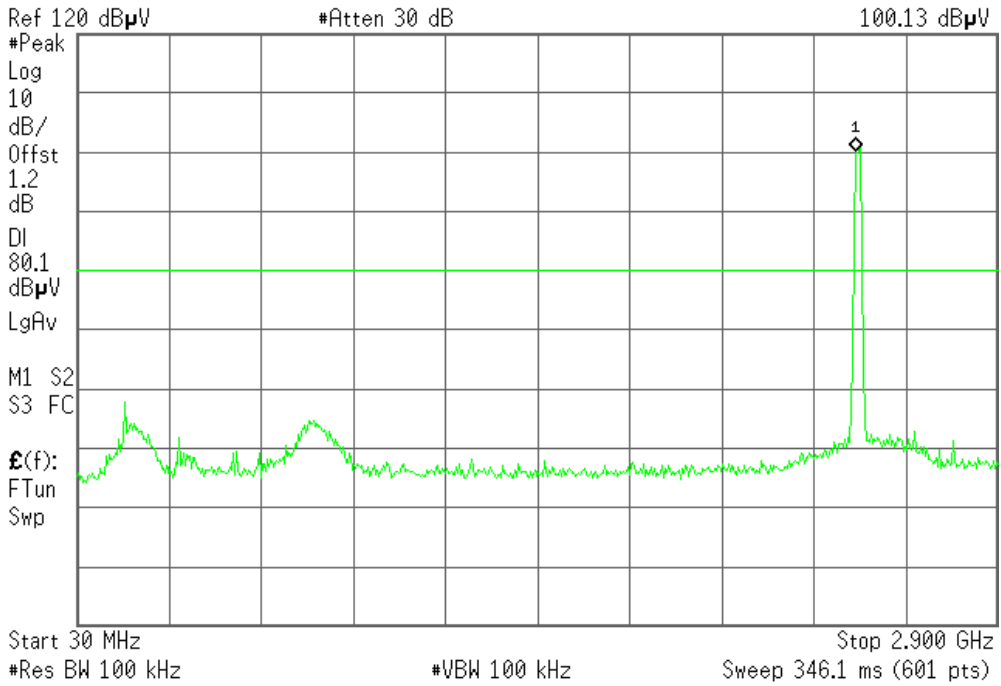


IEEE 802.11n HT20 MHz mode / CH High

30MHz ~ 2.9GHz

Agilent 16:07:48 Apr 28, 2008

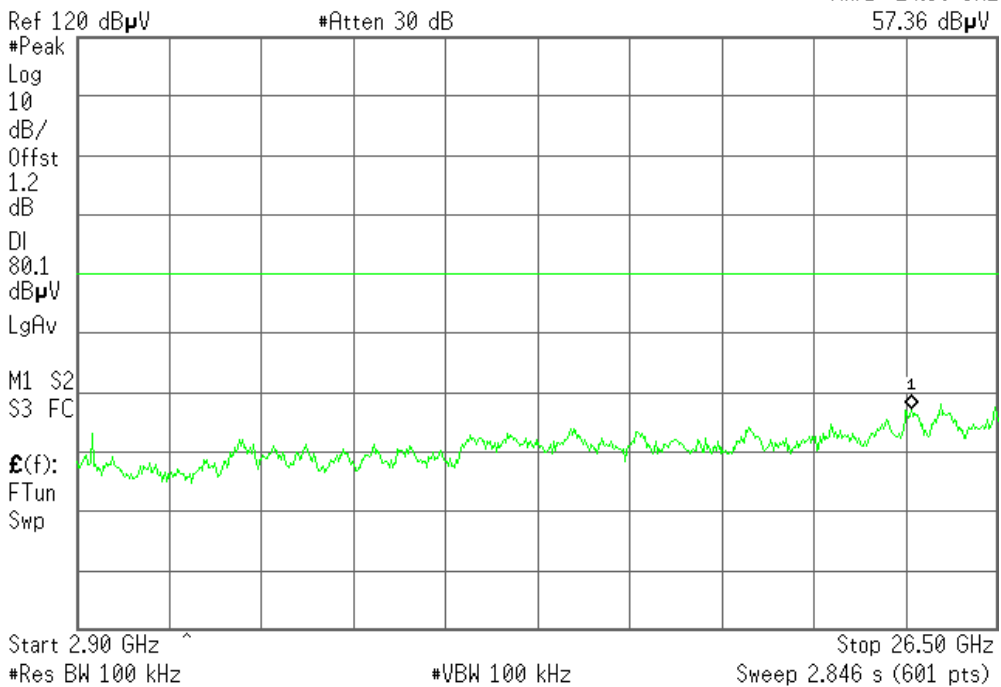
T



2.9GHz ~ 26.5GHz

Agilent 16:08:29 Apr 28, 2008

T



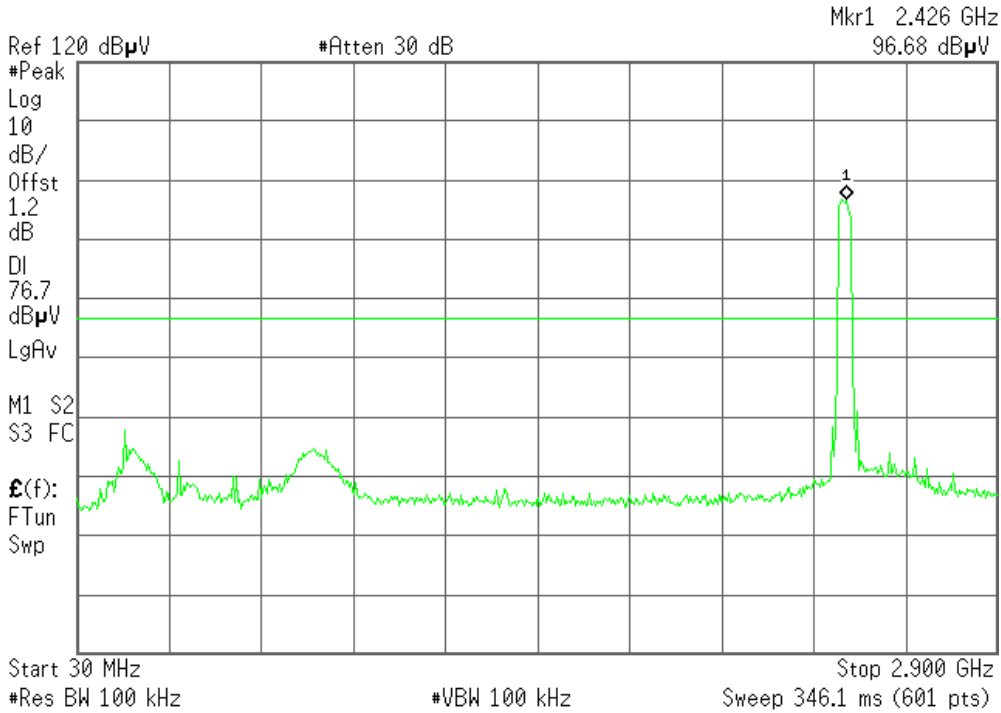


IEEE 802.11n HT40 MHz mode/ CH Low

30MHz ~ 2.9GHz

Agilent 16:09:48 Apr 28, 2008

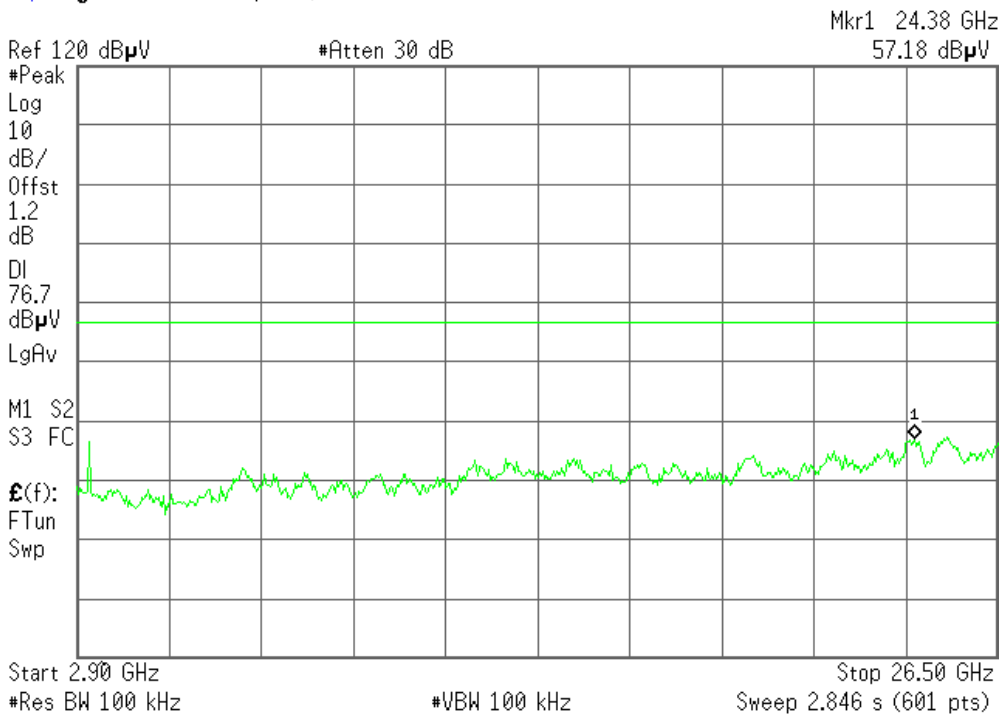
T



2.9GHz ~ 26.5GHz

Agilent 16:10:13 Apr 28, 2008

T



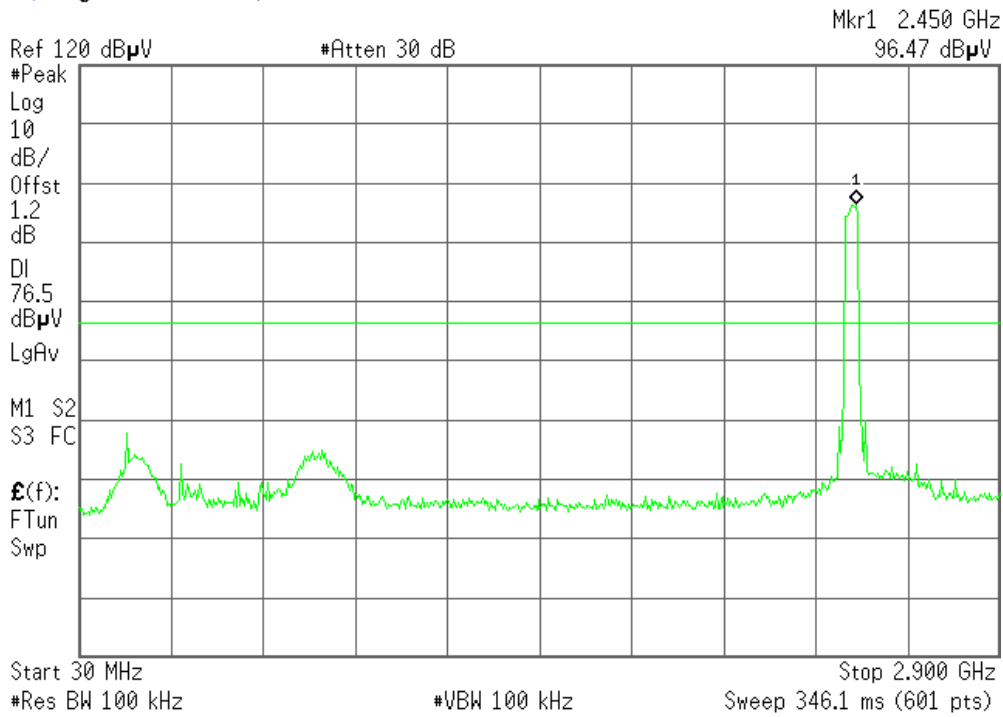


IEEE 802.11n HT40 MHz mode/ CH Mid

30MHz ~ 2.9GHz

Agilent 16:11:03 Apr 28, 2008

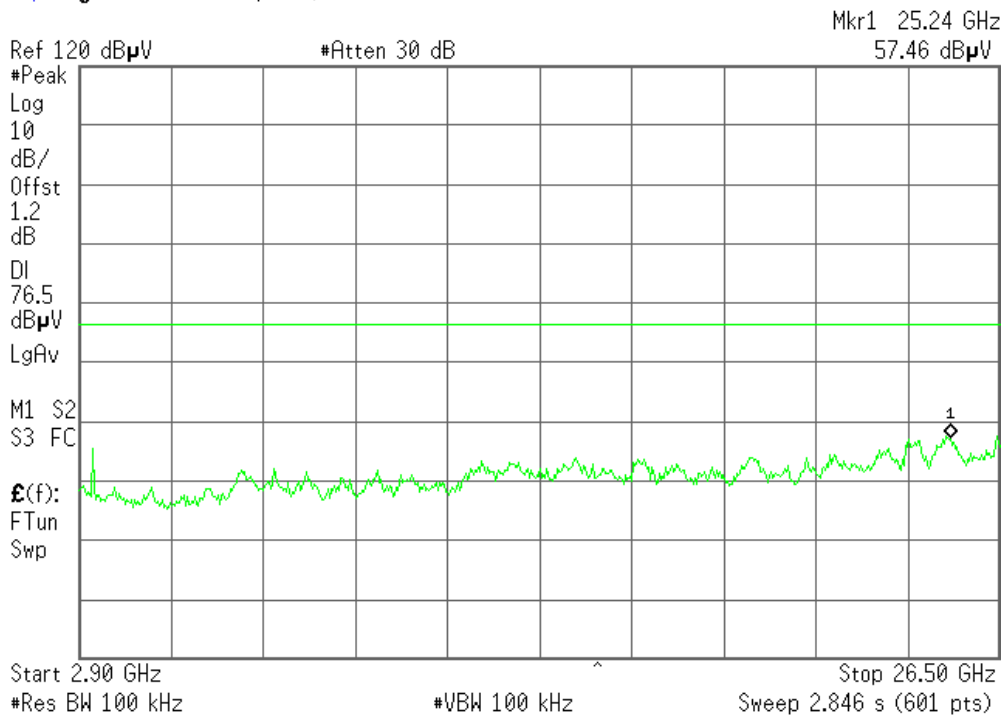
T



2.9GHz ~ 26.5GHz

Agilent 16:11:32 Apr 28, 2008

T



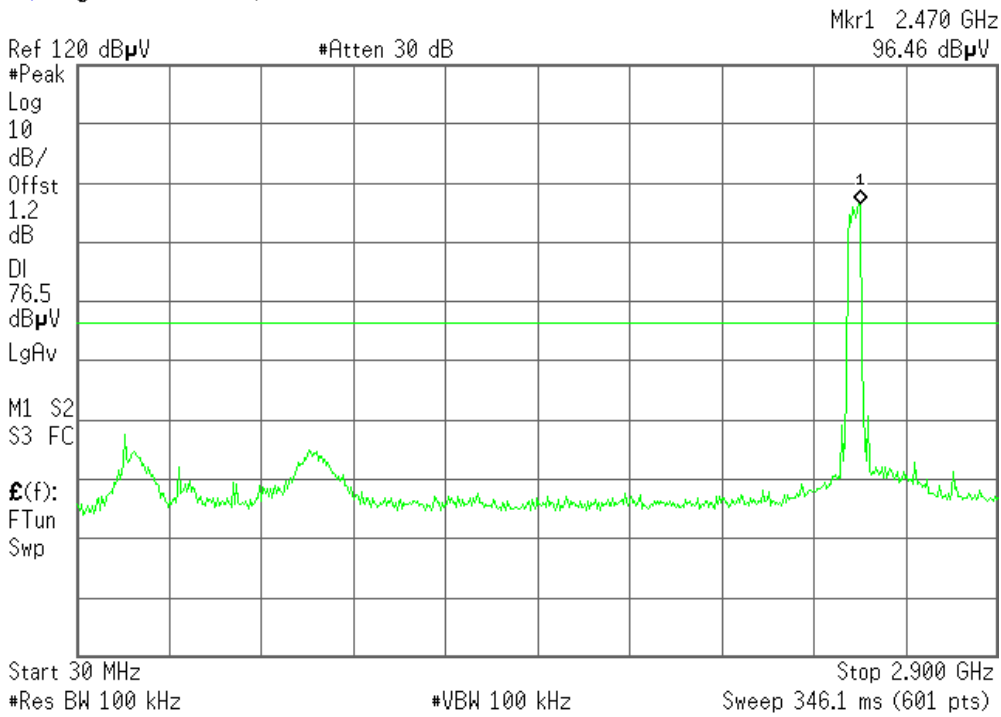


IEEE 802.11n HT40 MHz mode/ CH High

30MHz ~ 2.9GHz

Agilent 16:12:22 Apr 28, 2008

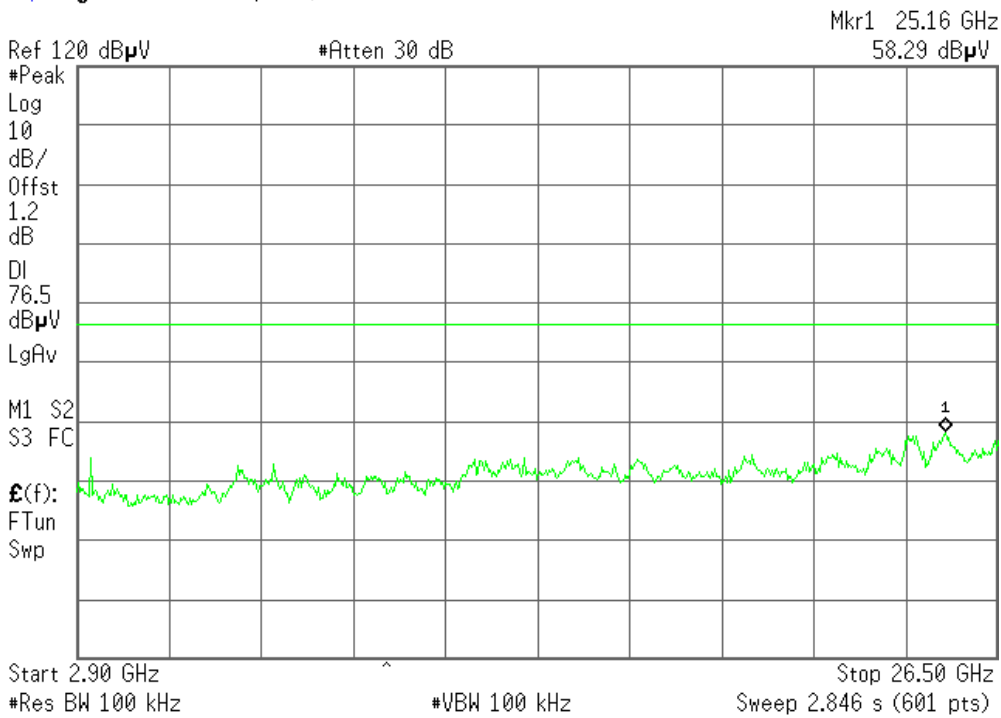
T



2.9GHz ~ 26.5GHz

Agilent 16:12:59 Apr 28, 2008

T





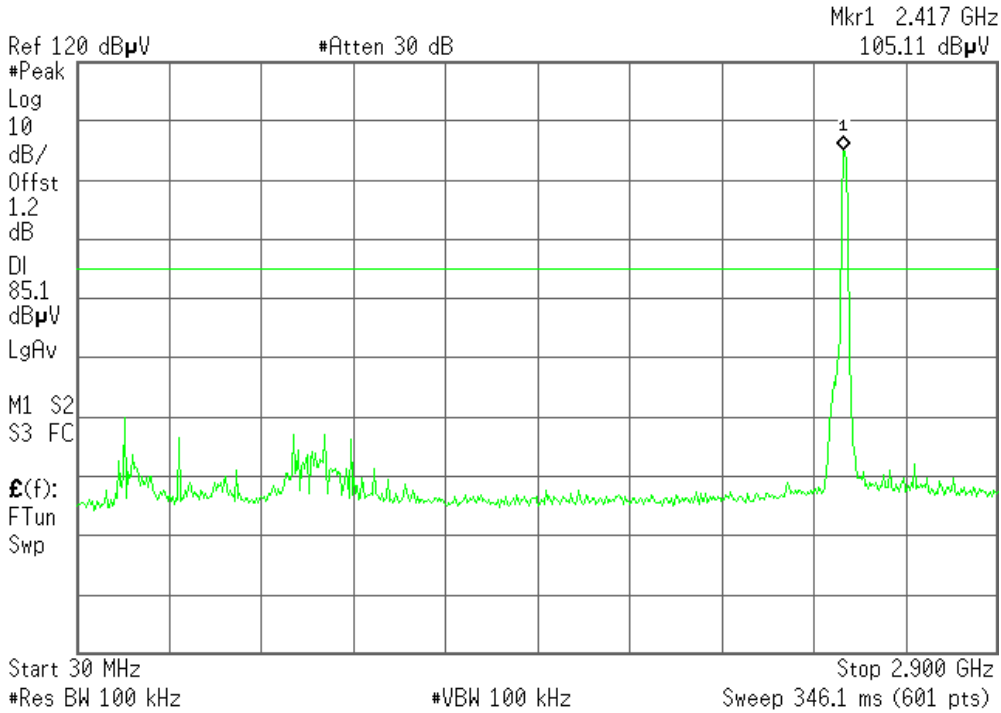
Antenna: DCA1

IEEE 802.11b mode / CH Low

30MHz ~ 2.9GHz

Agilent 16:15:45 Apr 28, 2008

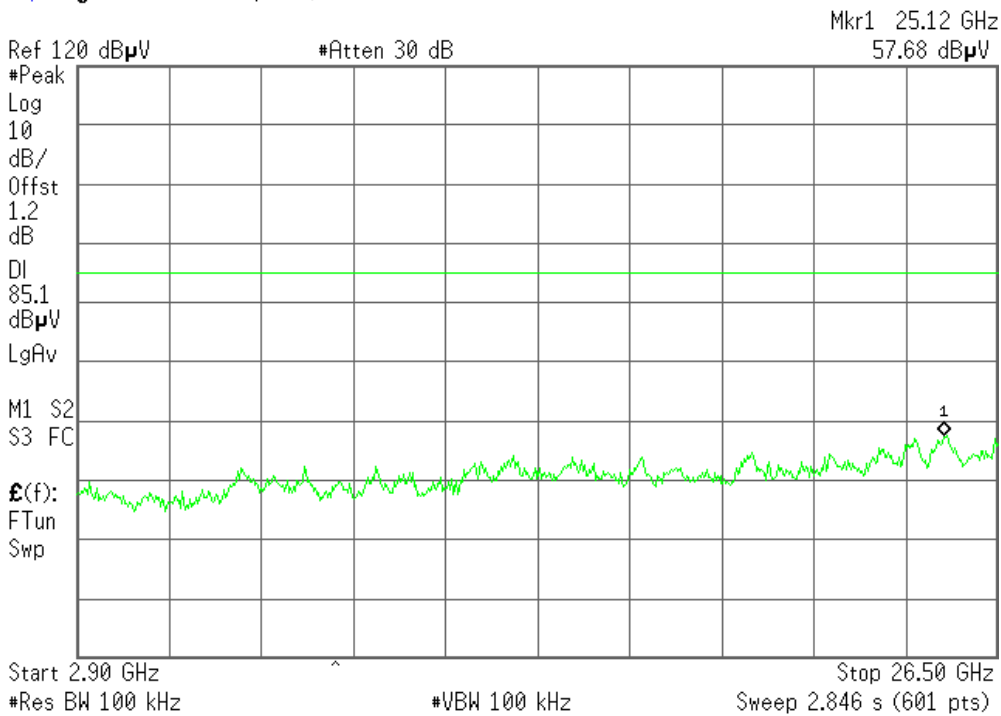
T



2.9GHz ~ 26.5GHz

Agilent 16:16:08 Apr 28, 2008

T



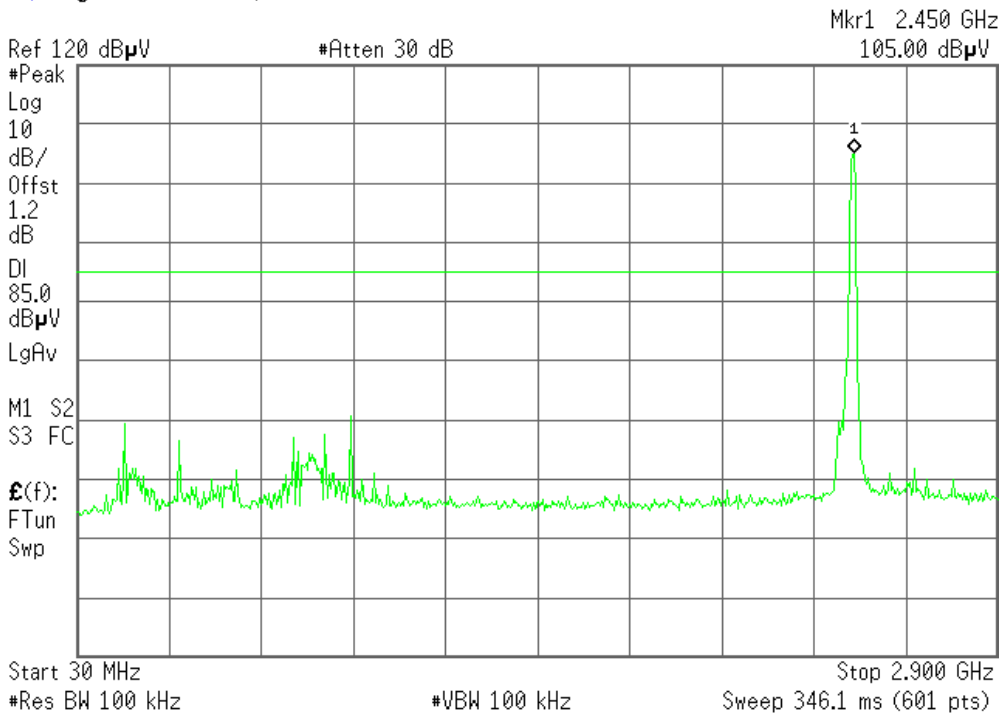


IEEE 802.11b mode / CH Mid

30MHz ~ 2.9GHz

Agilent 16:16:57 Apr 28, 2008

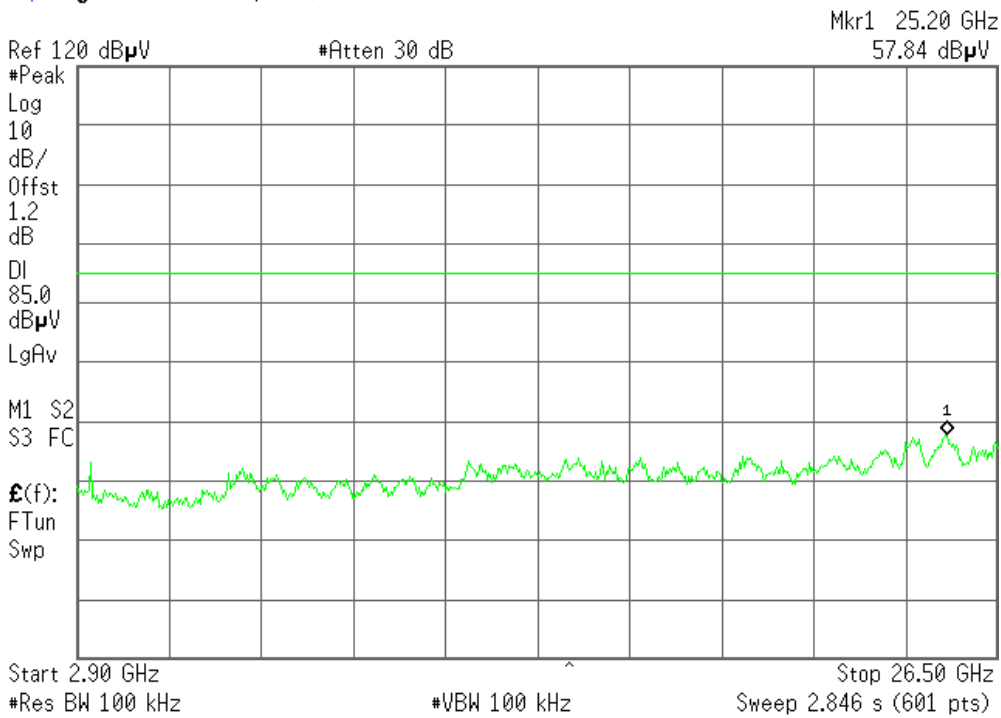
T



2.9GHz ~ 26.5GHz

Agilent 16:17:34 Apr 28, 2008

T



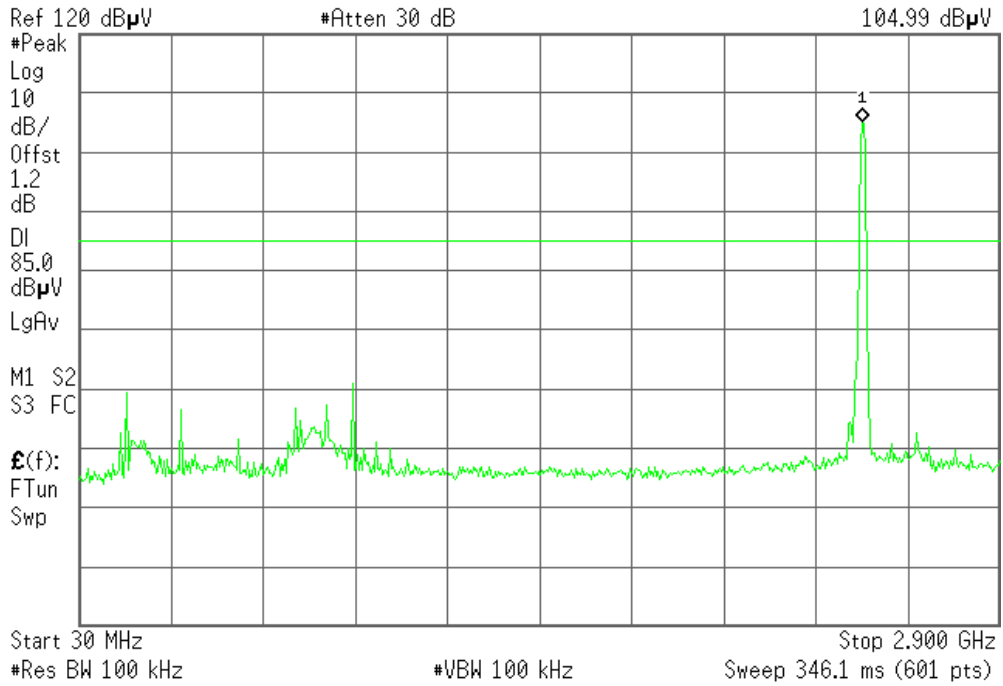


IEEE 802.11b mode / CH High

30MHz ~ 2.9GHz

Agilent 16:18:33 Apr 28, 2008

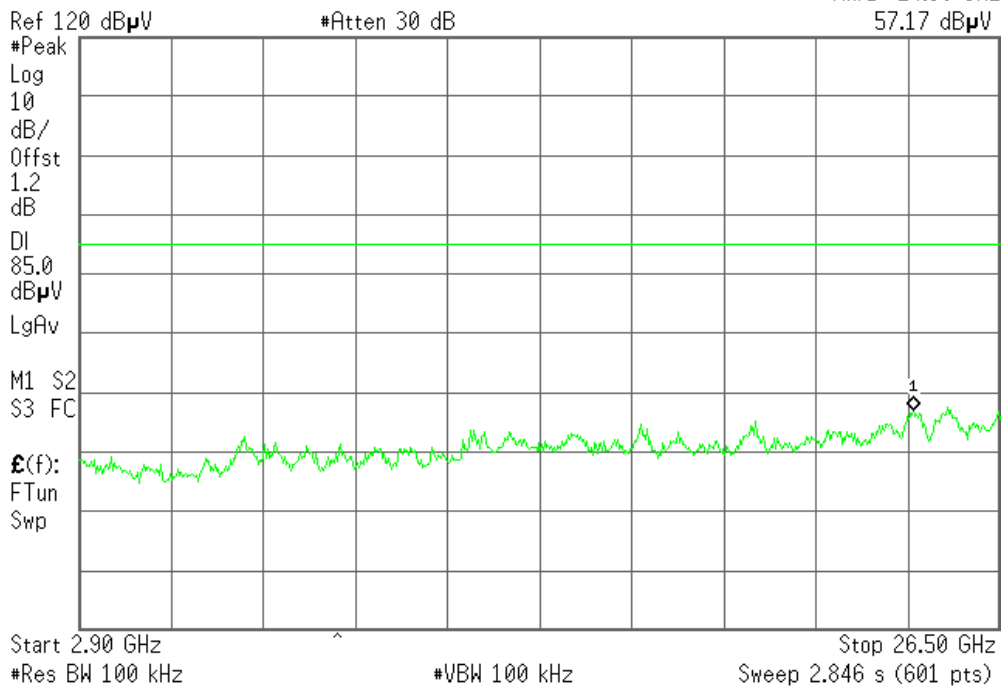
T



2.9GHz ~ 26.5GHz

Agilent 16:19:00 Apr 28, 2008

T



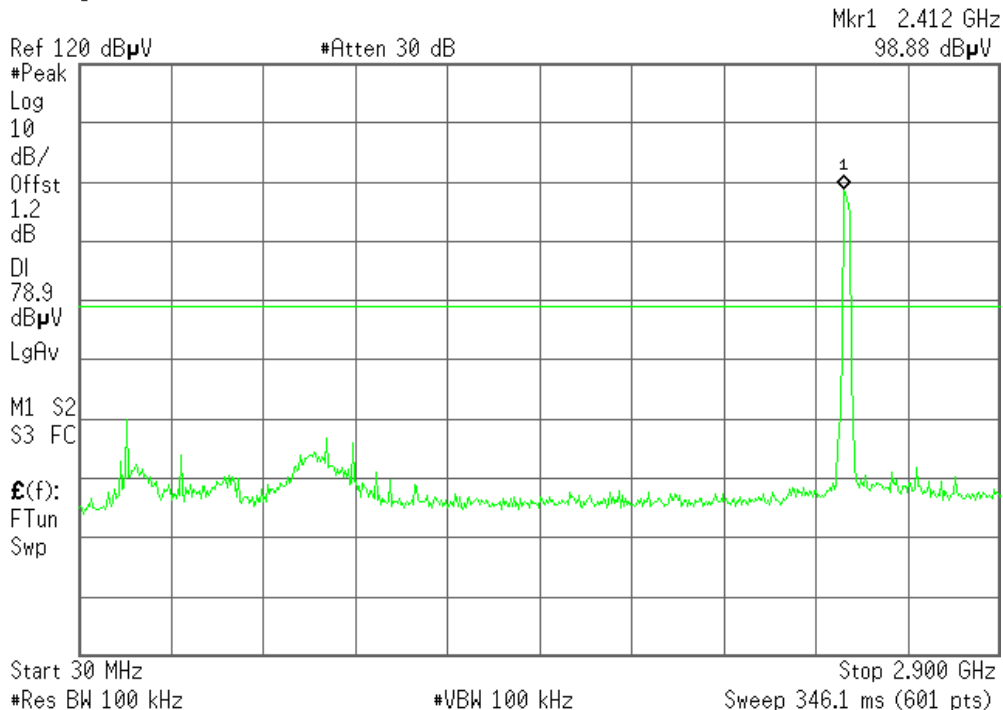


IEEE 802.11g mode/ CH Low

30MHz ~ 2.9GHz

Agilent 16:20:37 Apr 28, 2008

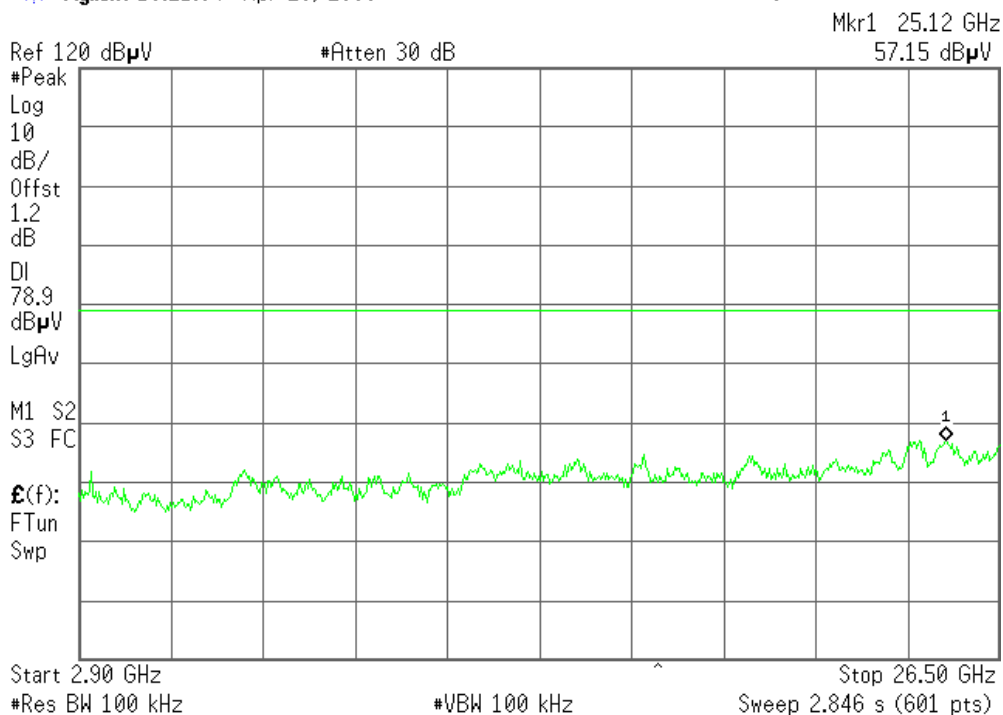
T



2.9GHz ~ 26.5GHz

Agilent 16:21:04 Apr 28, 2008

T



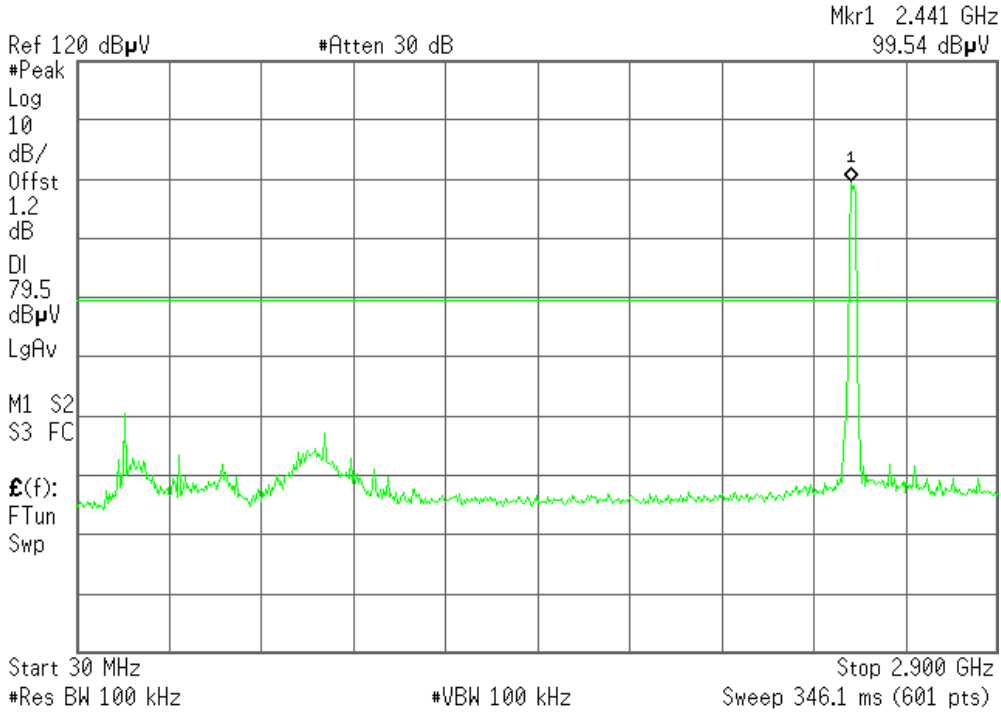


IEEE 802.11g / CH Mid

30MHz ~ 2.9GHz

Agilent 16:22:09 Apr 28, 2008

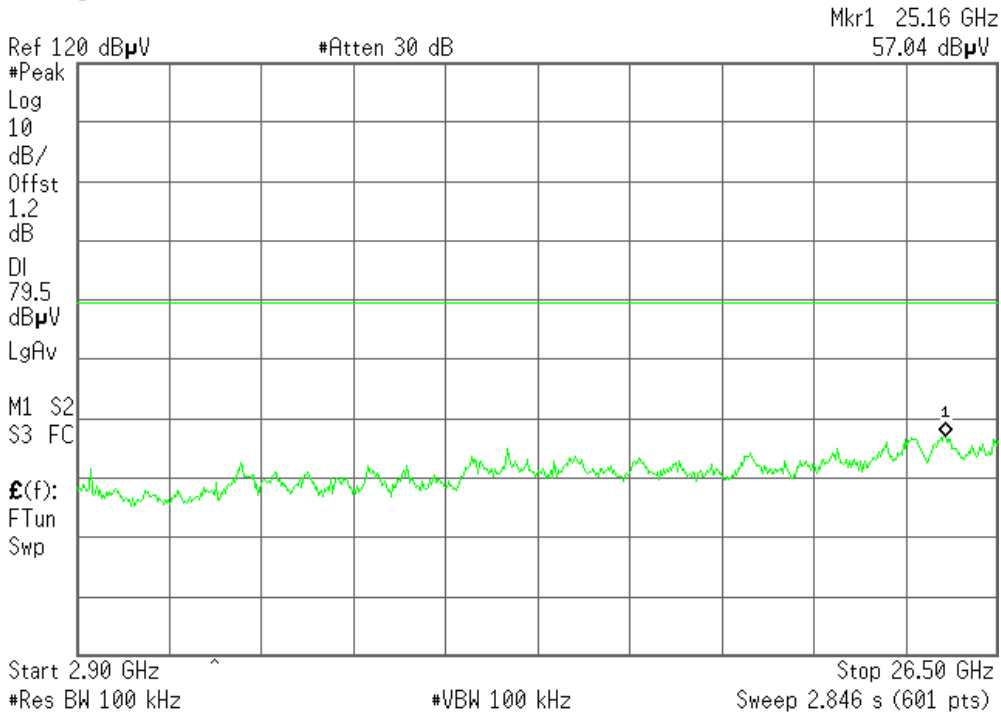
T



2.9GHz ~ 26.5GHz

Agilent 16:22:40 Apr 28, 2008

T



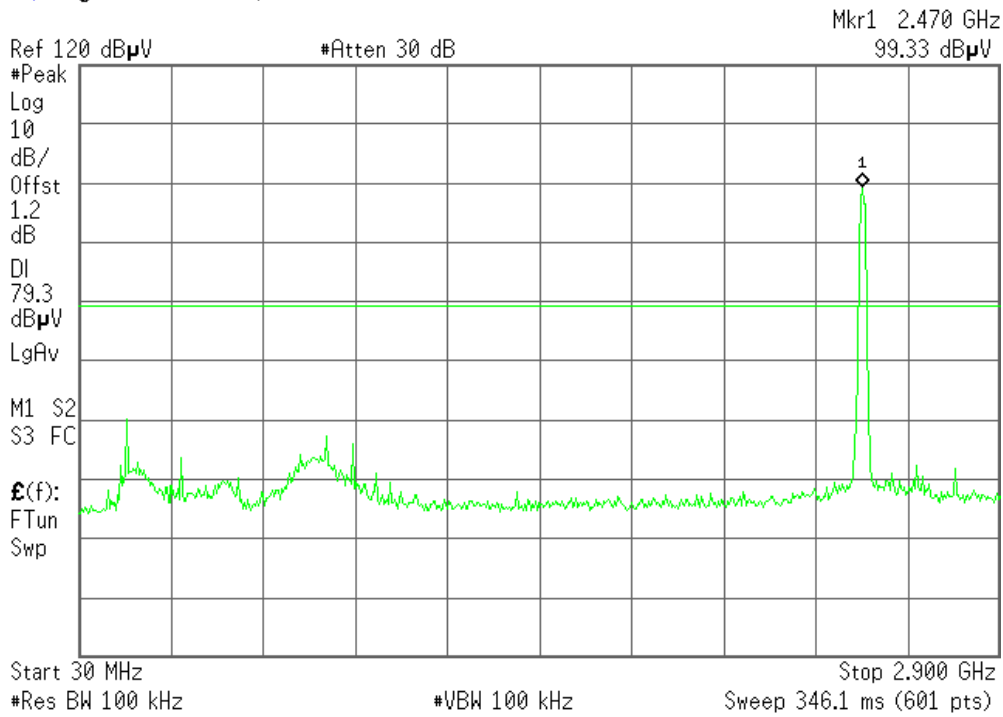


IEEE 802.11g / CH High

30MHz ~ 2.9GHz

Agilent 16:23:30 Apr 28, 2008

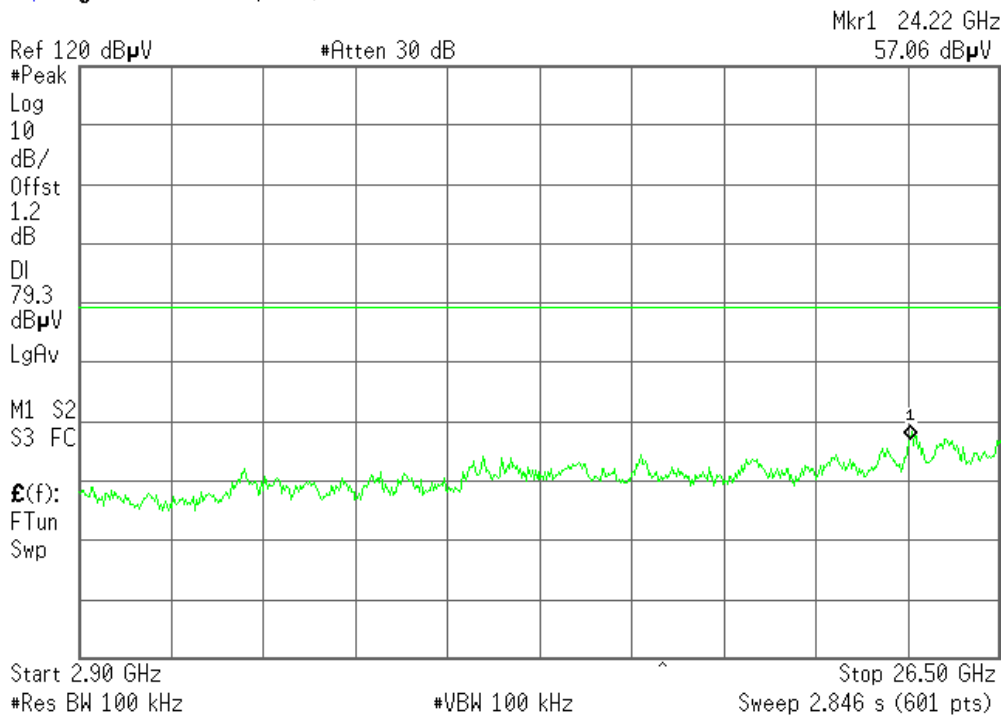
T



2.9GHz ~ 26.5GHz

Agilent 16:23:58 Apr 28, 2008

T



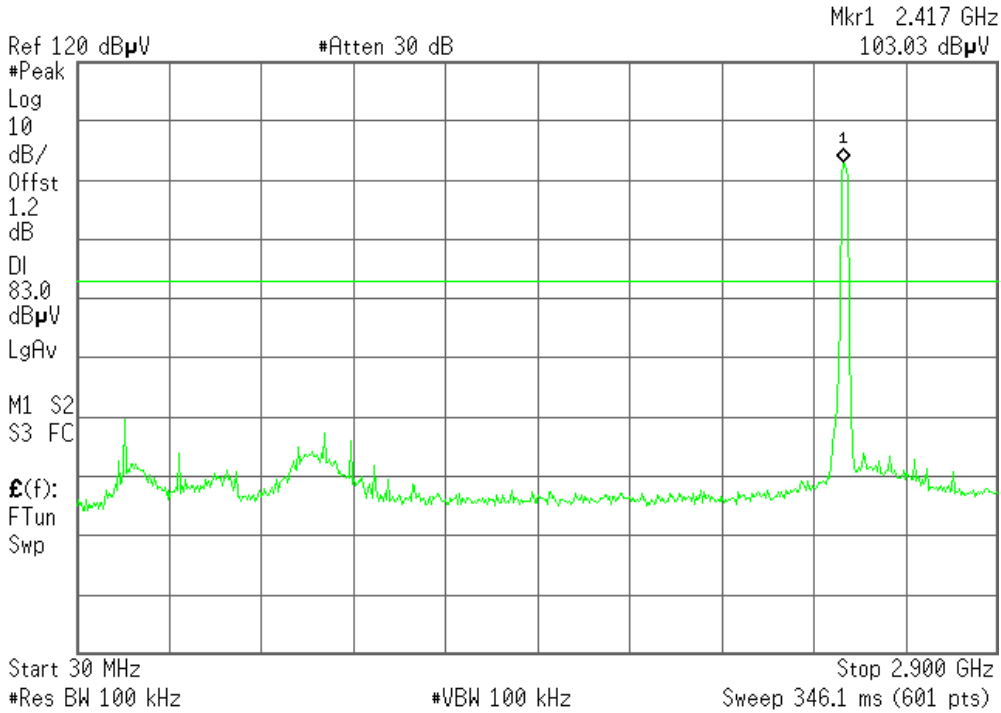


IEEE 802.11n HT20 MHz mode / CH Low

30MHz ~ 2.9GHz

Agilent 16:30:50 Apr 28, 2008

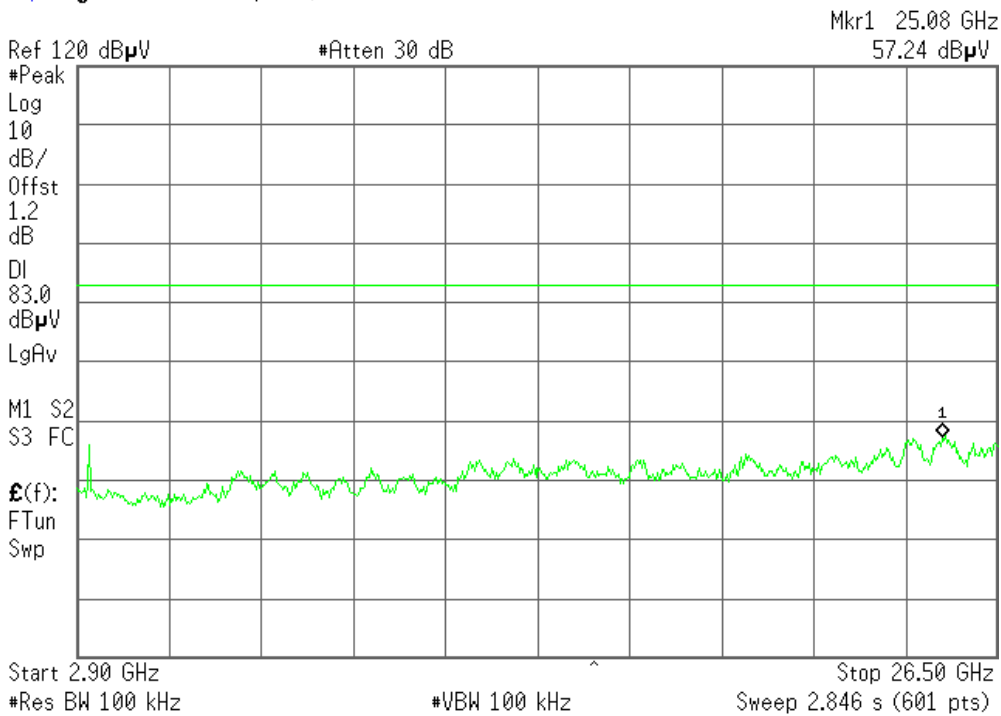
T



2.9GHz ~ 26.5GHz

Agilent 16:31:28 Apr 28, 2008

T



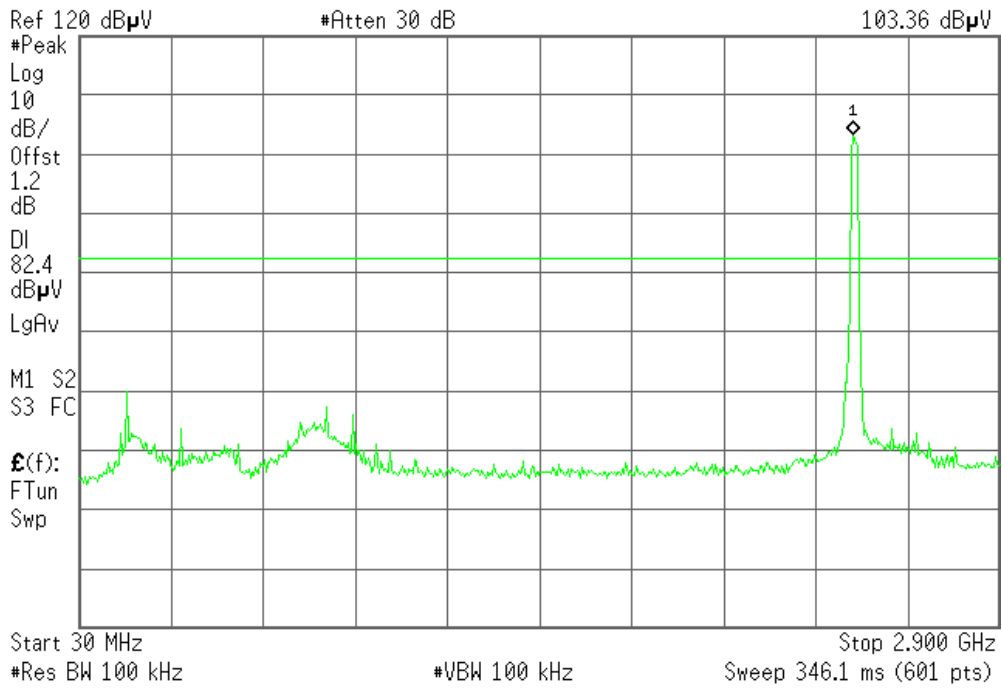


IEEE 802.11n HT20 MHz mode / CH Mid

30MHz ~ 2.9GHz

Agilent 16:33:47 Apr 28, 2008

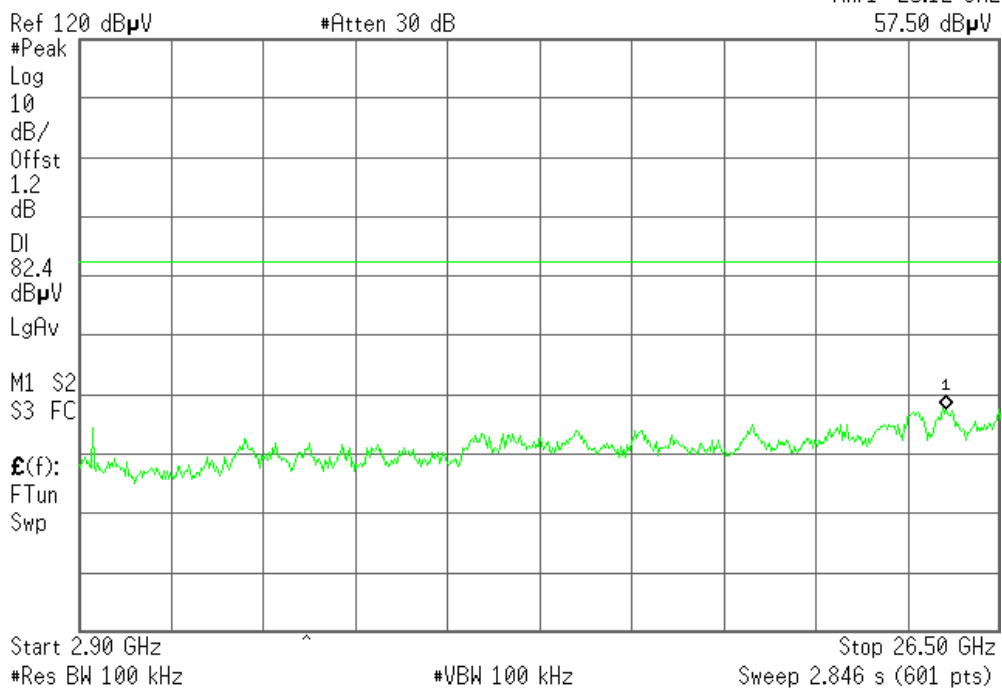
T



2.9GHz ~ 26.5GHz

Agilent 16:34:25 Apr 28, 2008

T



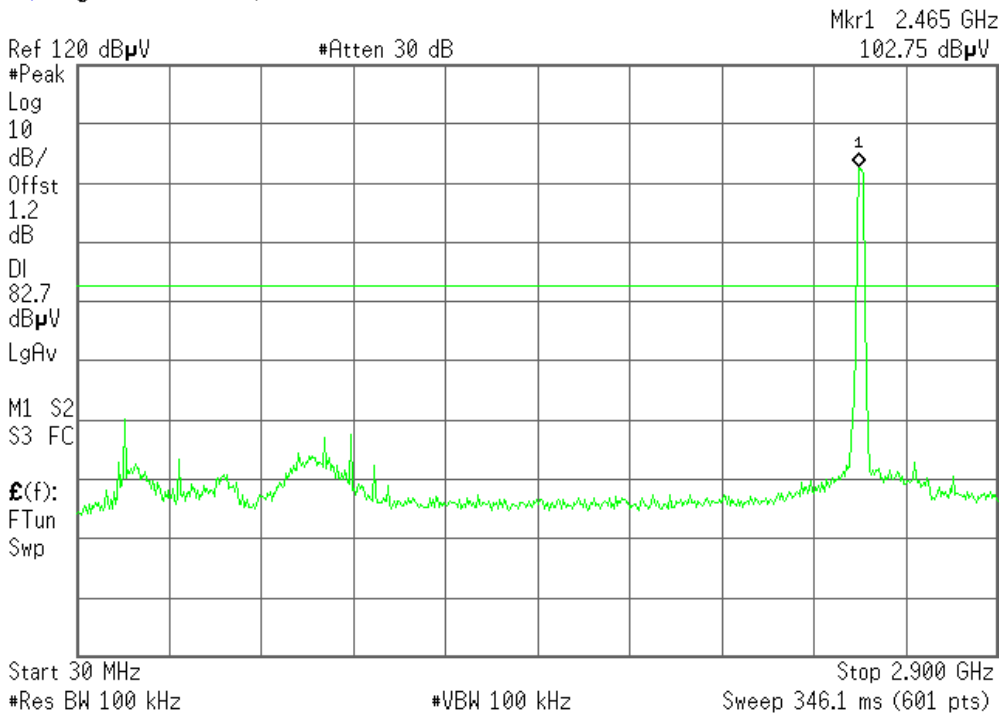


IEEE 802.11n HT20 MHz mode / CH High

30MHz ~ 2.9GHz

Agilent 16:35:18 Apr 28, 2008

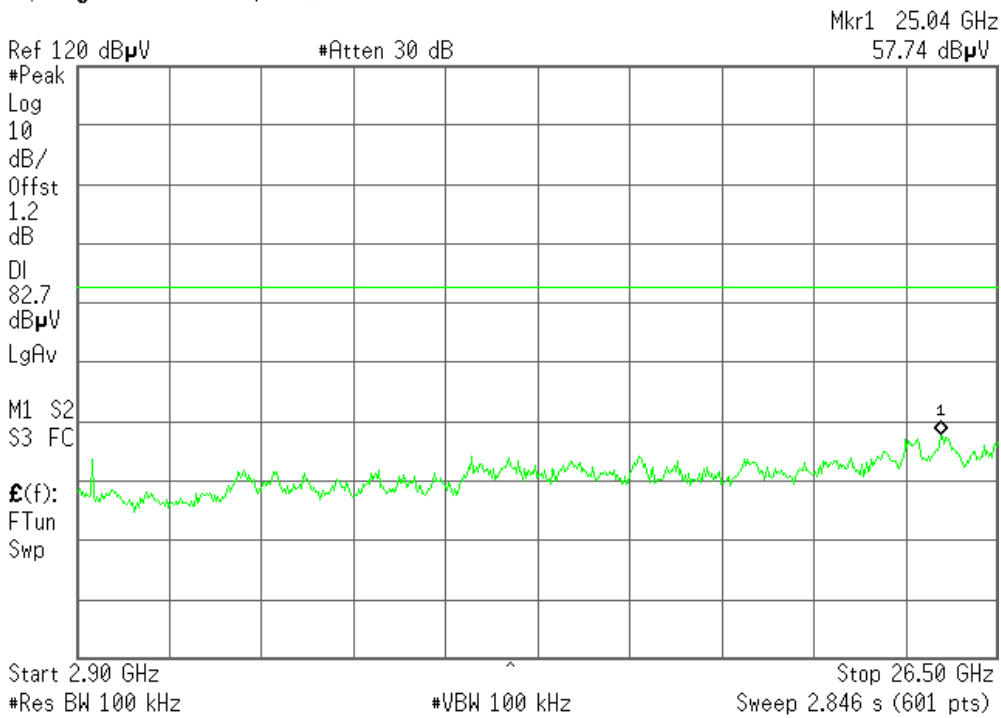
T



2.9GHz ~ 26.5GHz

Agilent 16:36:04 Apr 28, 2008

T



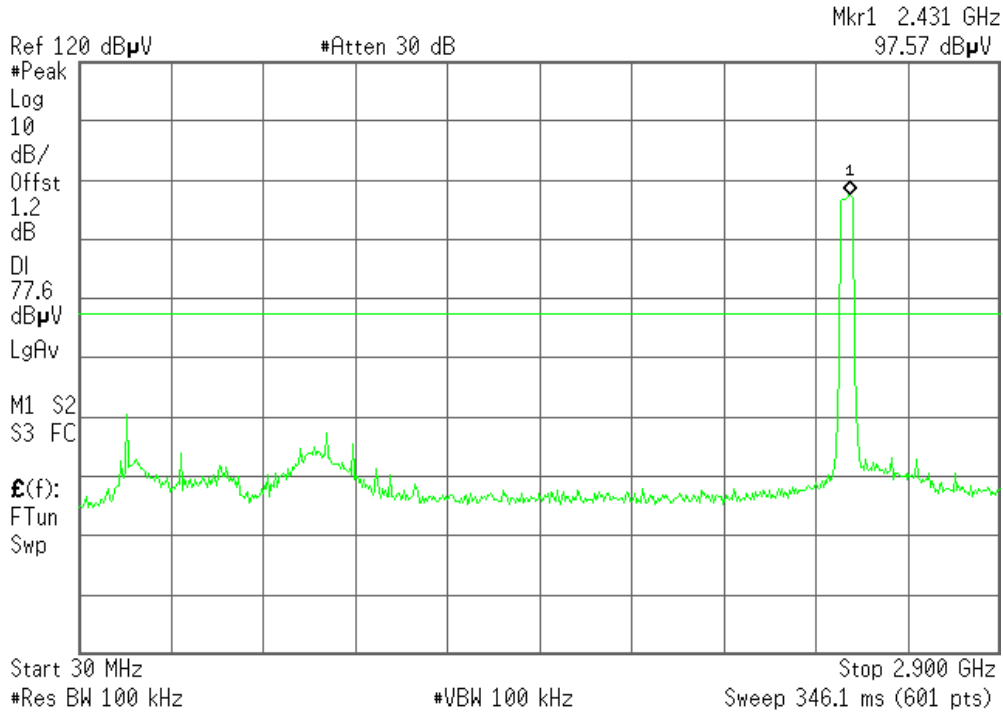


IEEE 802.11n HT40 MHz mode/ CH Low

30MHz ~ 2.9GHz

Agilent 16:39:01 Apr 28, 2008

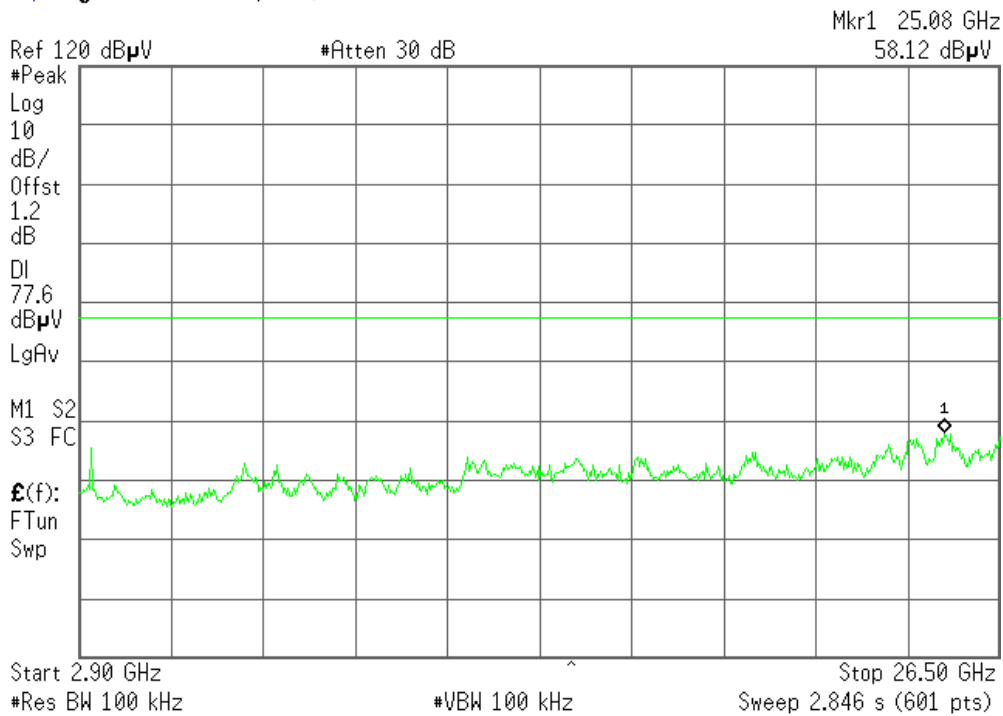
T



2.9GHz ~ 26.5GHz

Agilent 16:39:29 Apr 28, 2008

T



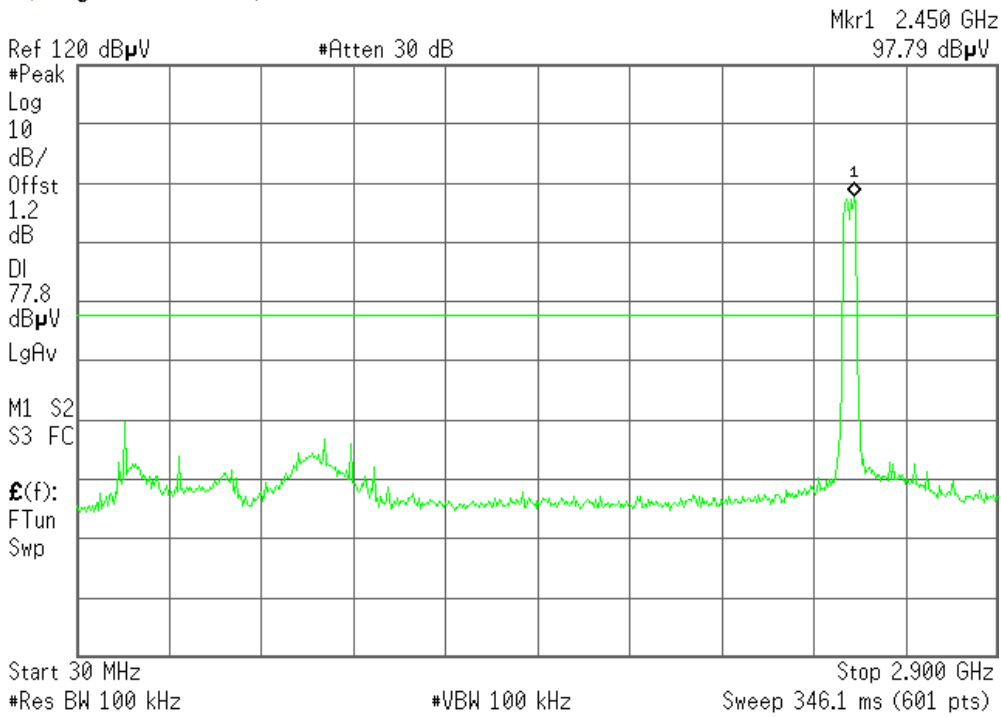


IEEE 802.11n HT40 MHz mode/ CH Mid

30MHz ~ 2.9GHz

Agilent 16:40:52 Apr 28, 2008

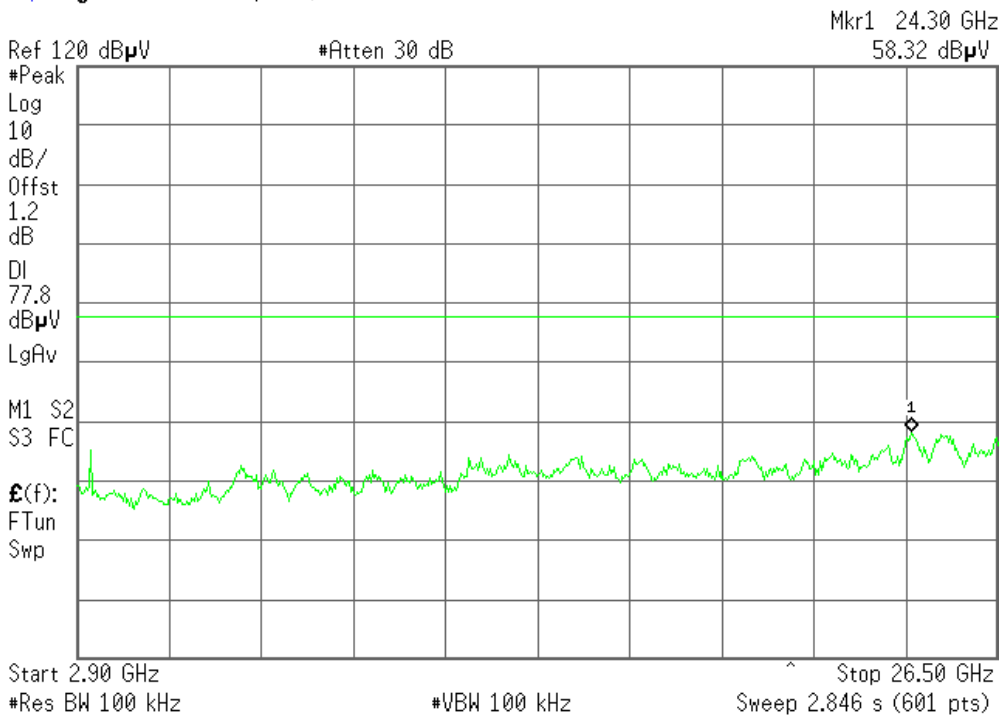
T



2.9GHz ~ 26.5GHz

Agilent 16:41:44 Apr 28, 2008

T



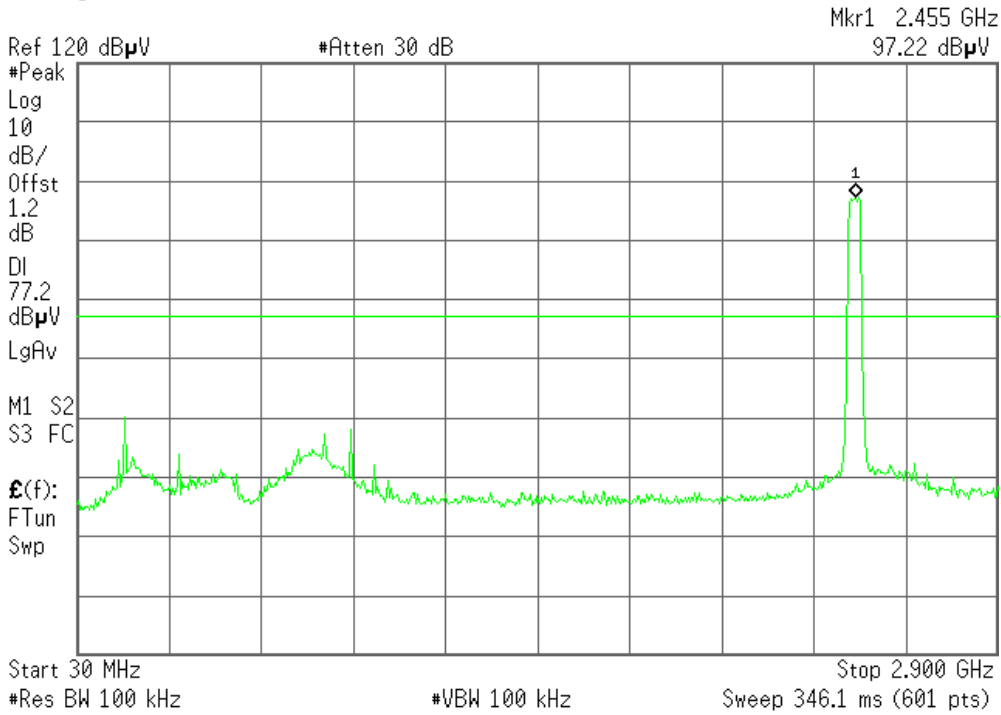


IEEE 802.11n HT40 MHz mode/ CH High

30MHz ~ 2.9GHz

Agilent 16:43:23 Apr 28, 2008

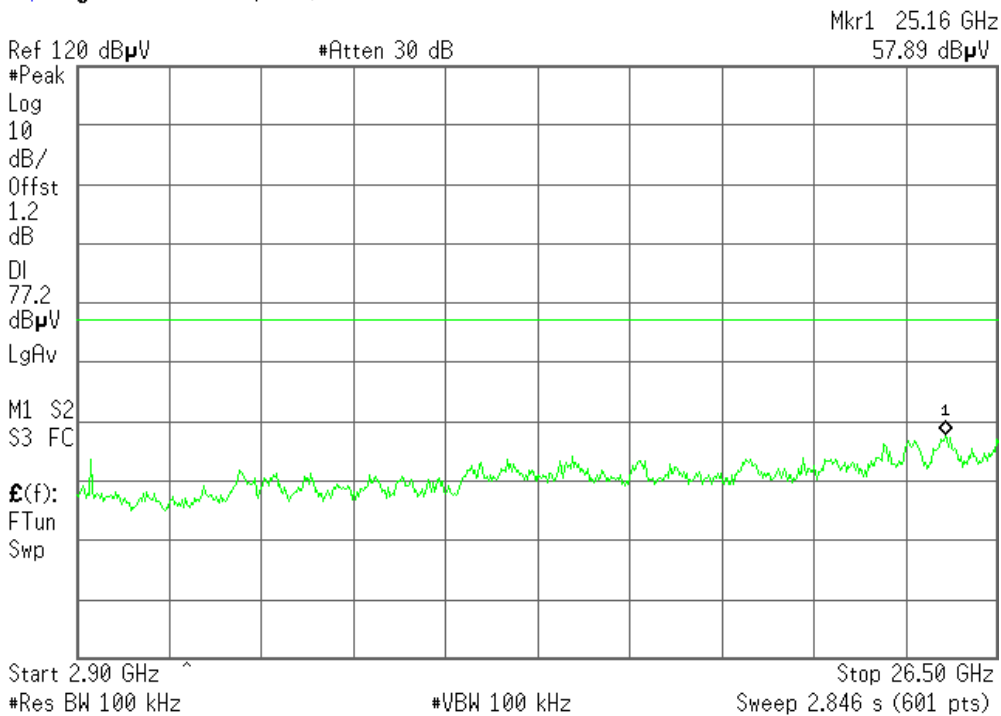
T



2.9GHz ~ 26.5GHz

Agilent 16:43:49 Apr 28, 2008

T





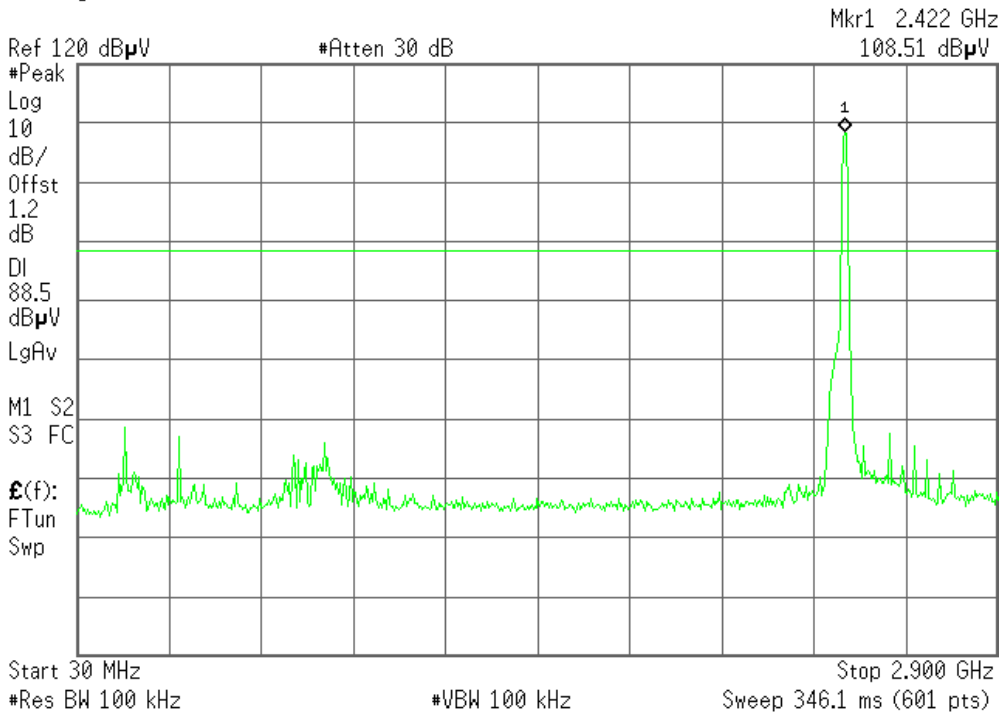
Antenna: DCA2

IEEE 802.11b mode / CH Low

30MHz ~ 2.9GHz

Agilent 16:52:37 Apr 28, 2008

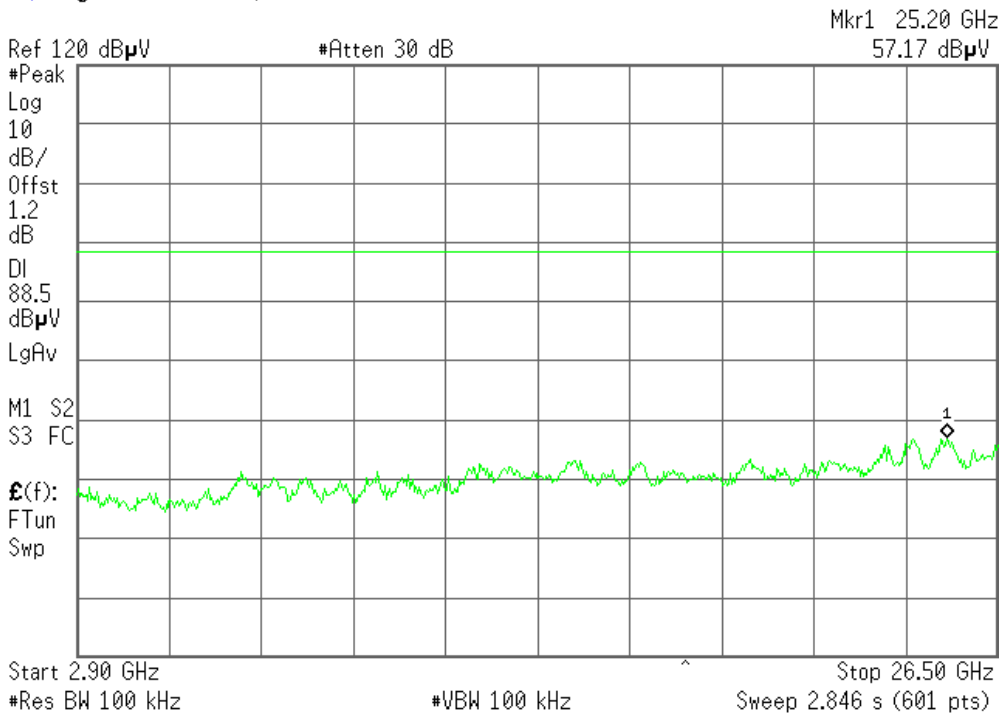
R T



2.9GHz ~ 26.5GHz

Agilent 16:53:04 Apr 28, 2008

R T



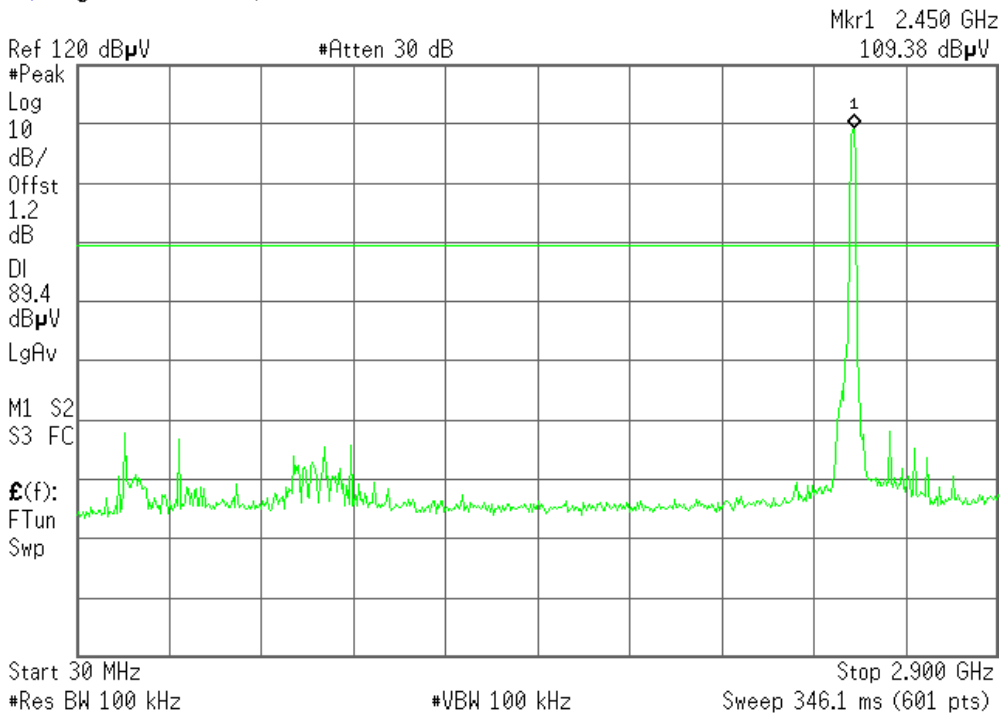


IEEE 802.11b mode / CH Mid

30MHz ~ 2.9GHz

Agilent 16:53:58 Apr 28, 2008

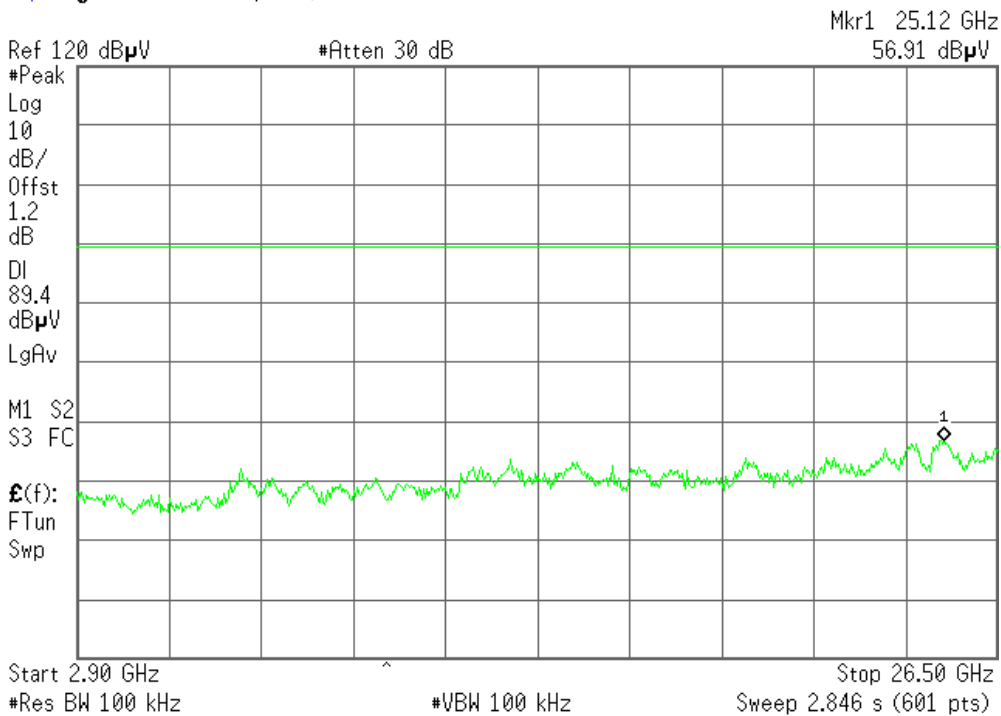
R T



2.9GHz ~ 26.5GHz

Agilent 16:54:24 Apr 28, 2008

R T



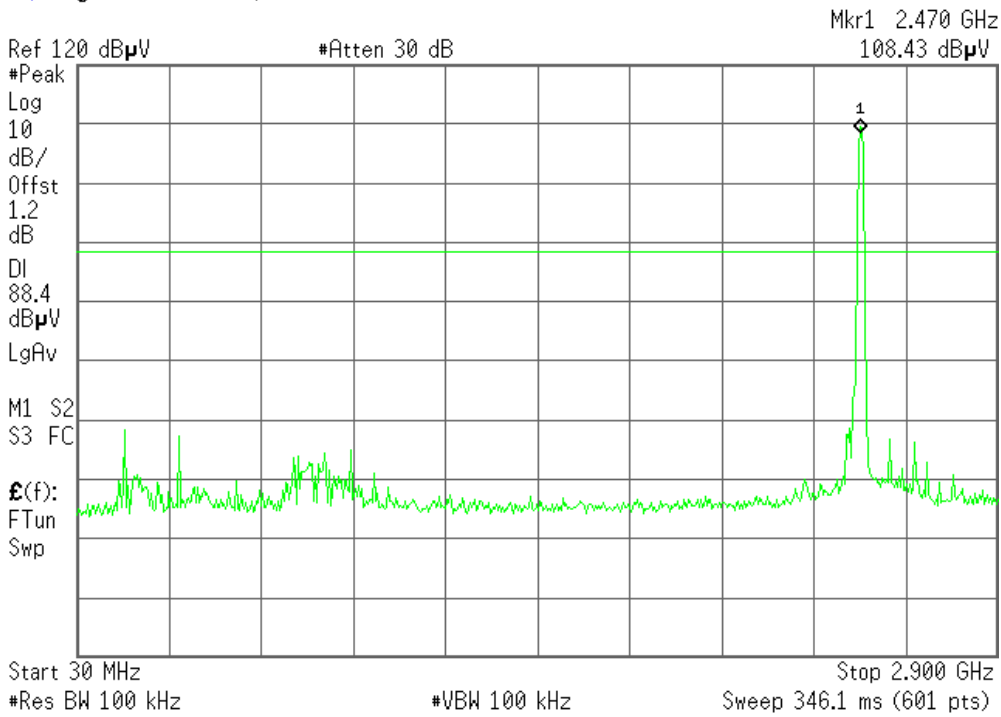


IEEE 802.11b mode / CH High

30MHz ~ 2.9GHz

Agilent 16:55:14 Apr 28, 2008

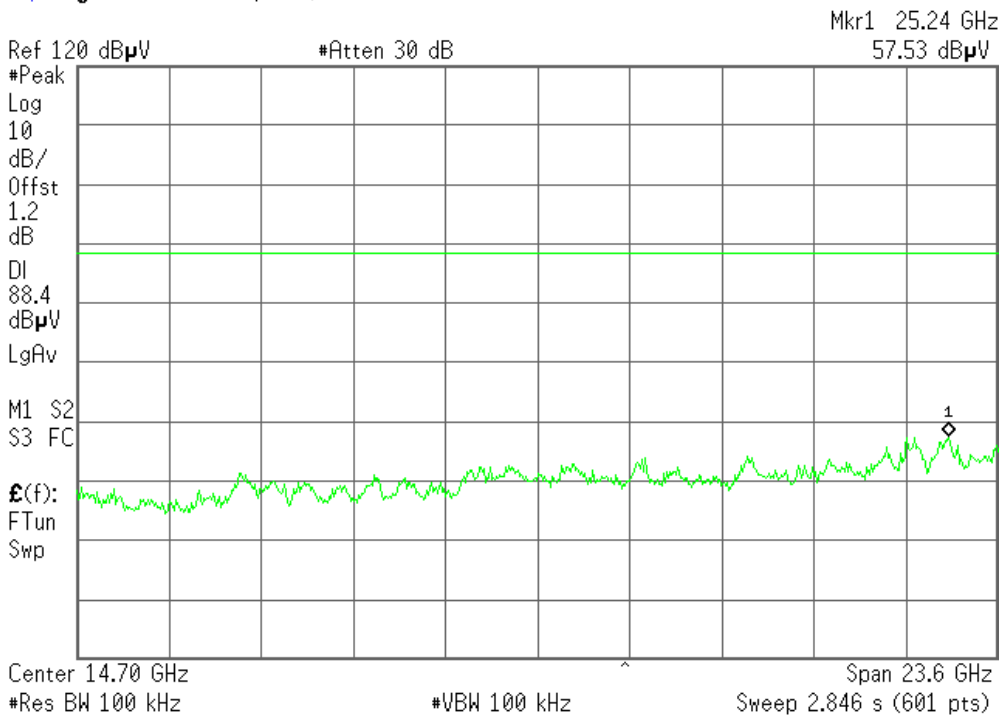
R T



2.9GHz ~ 26.5GHz

Agilent 16:55:43 Apr 28, 2008

R T





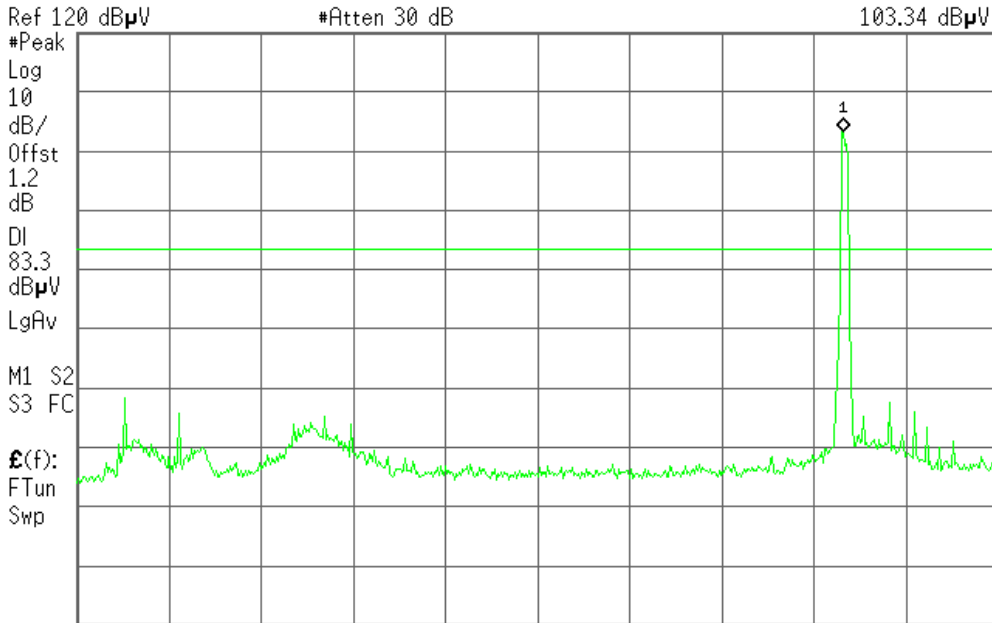
IEEE 802.11g mode/ CH Low

30MHz ~ 2.9GHz

Agilent 16:57:24 Apr 28, 2008

R T

Mkr1 2.417 GHz
103.34 dBμV



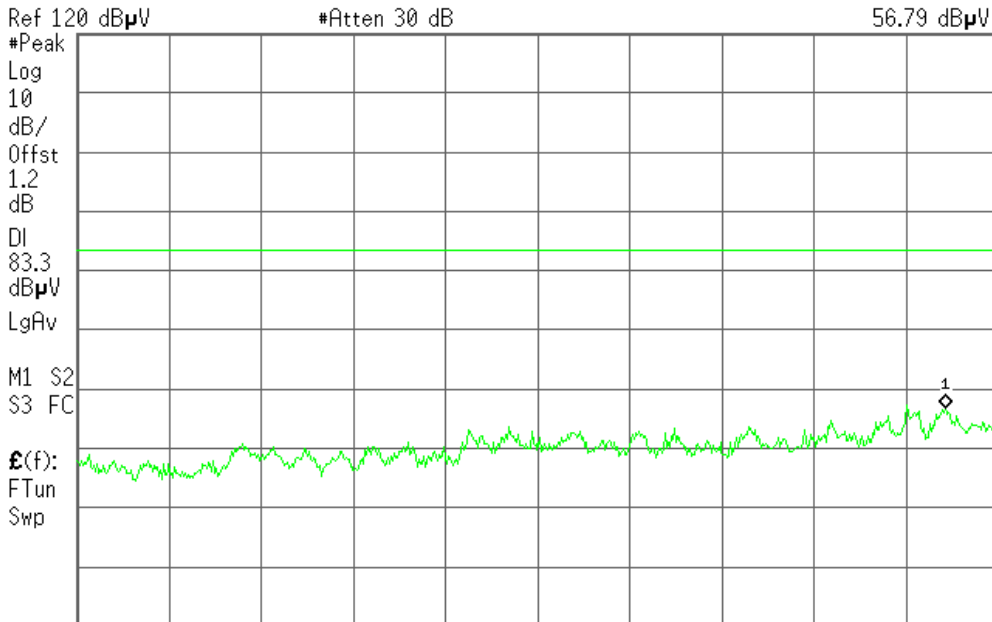
Start 30 MHz Stop 2.900 GHz
#Res BW 100 kHz #VBW 100 kHz Sweep 346.1 ms (601 pts)

2.9GHz ~ 26.5GHz

Agilent 16:57:47 Apr 28, 2008

R T

Mkr1 25.16 GHz
56.79 dBμV



Start 2.90 GHz Stop 26.50 GHz
#Res BW 100 kHz #VBW 100 kHz Sweep 2.846 s (601 pts)

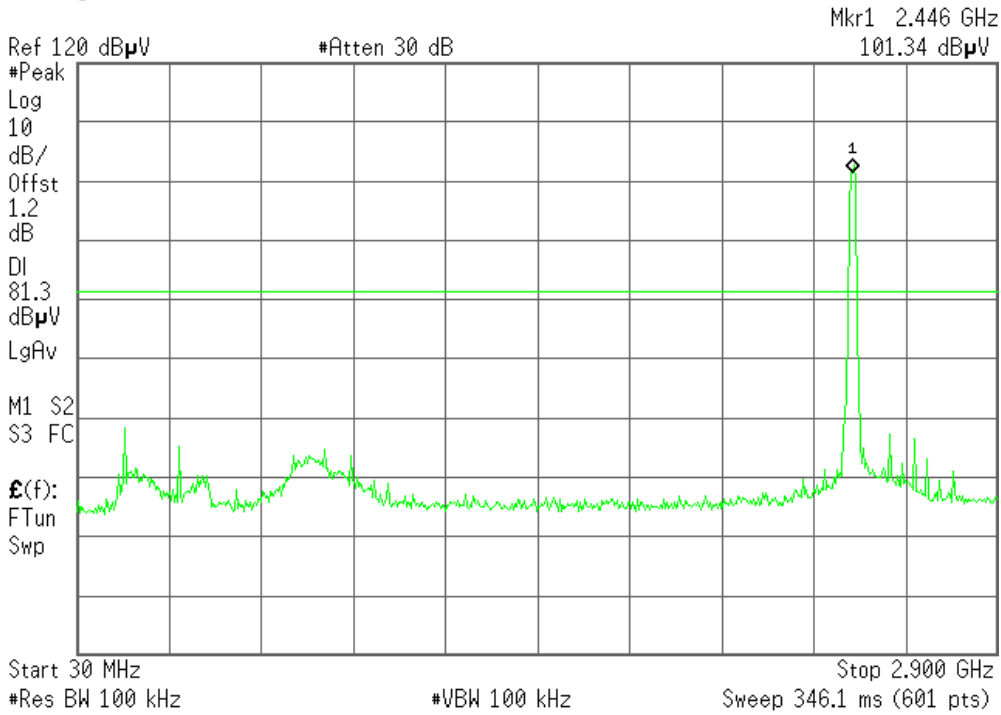


IEEE 802.11g / CH Mid

30MHz ~ 2.9GHz

Agilent 16:58:43 Apr 28, 2008

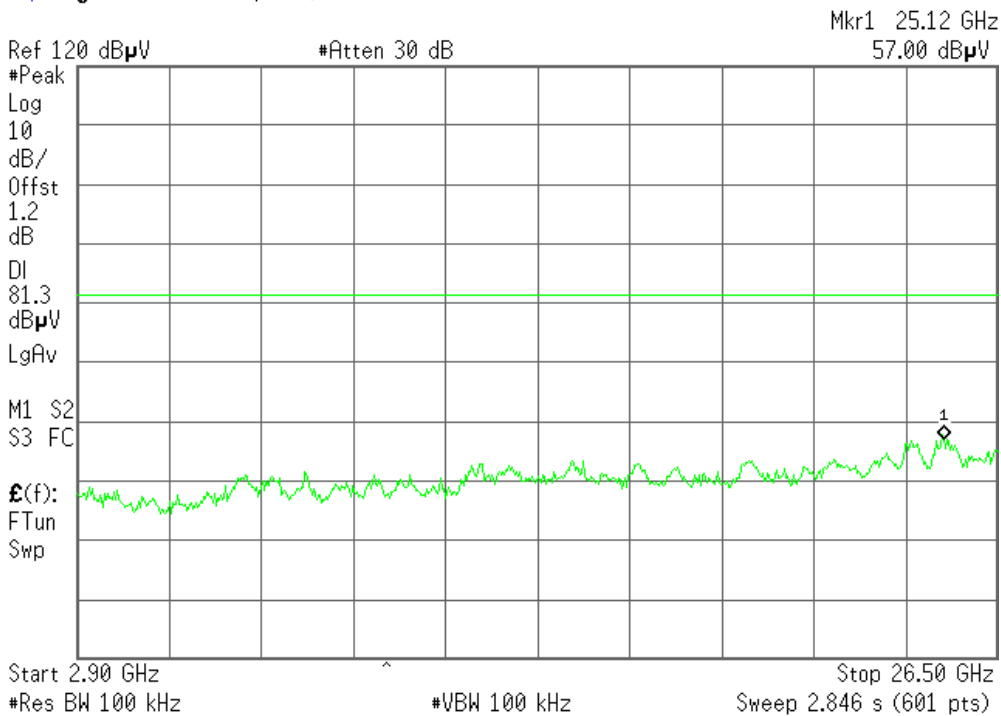
R T



2.9GHz ~ 26.5GHz

Agilent 16:59:13 Apr 28, 2008

R T



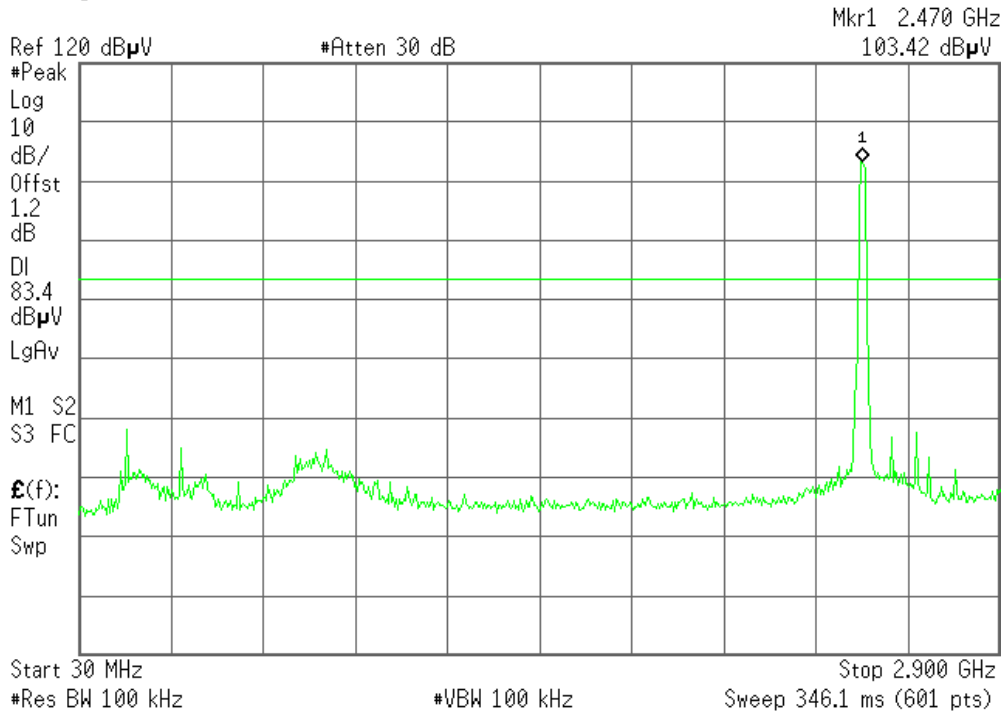


IEEE 802.11g / CH High

30MHz ~ 2.9GHz

Agilent 16:59:58 Apr 28, 2008

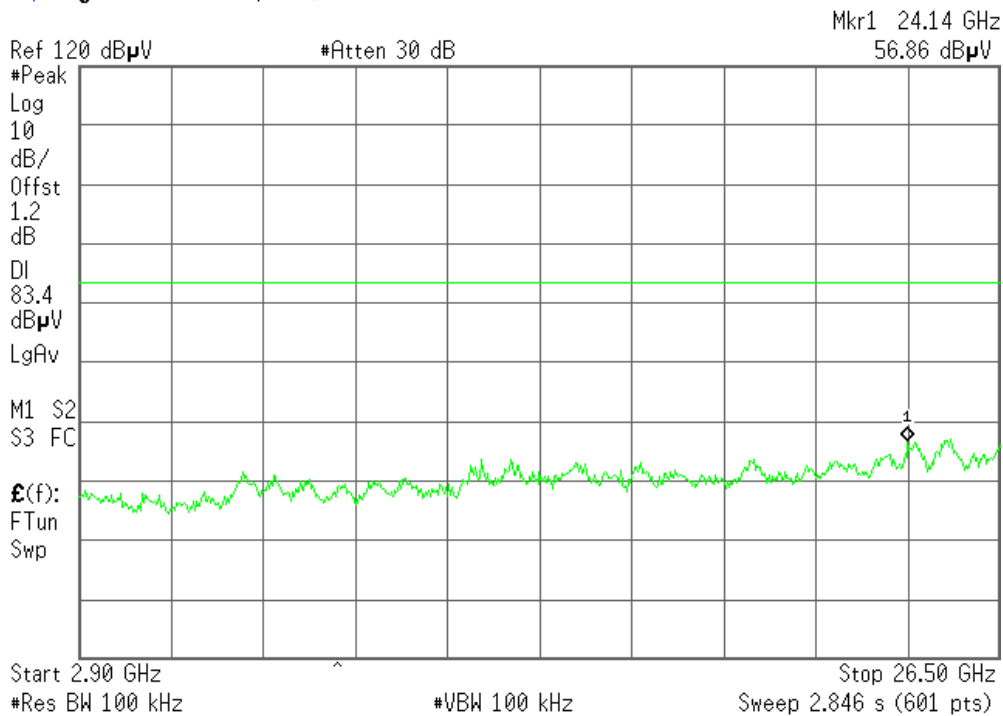
R T



2.9GHz ~ 26.5GHz

Agilent 17:00:23 Apr 28, 2008

R T



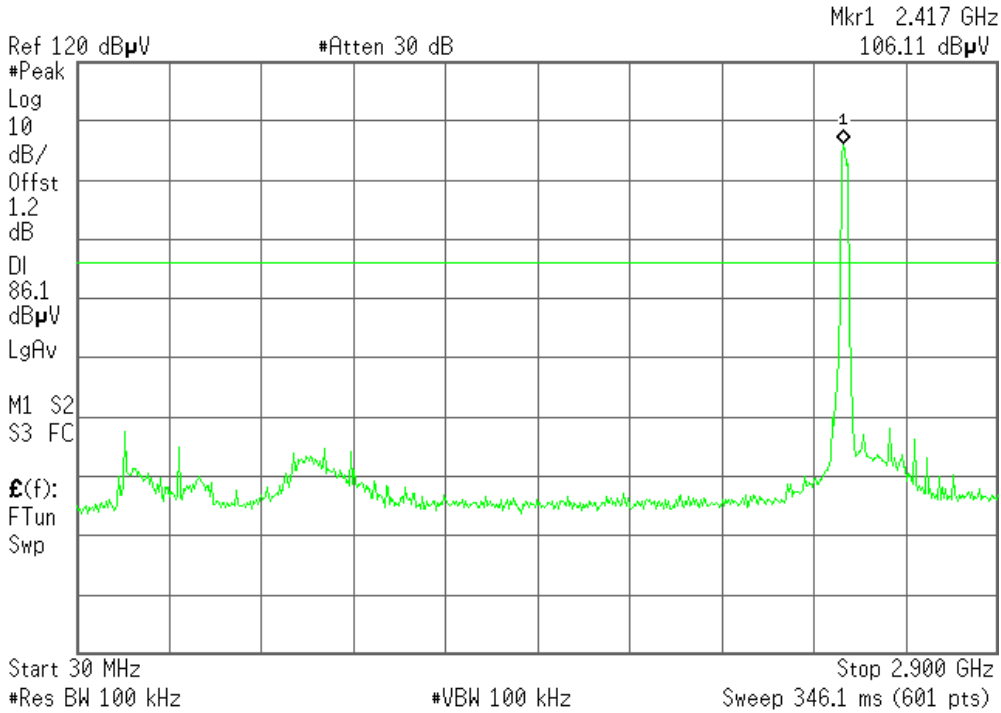


IEEE 802.11n HT20 MHz mode / CH Low

30MHz ~ 2.9GHz

Agilent 17:01:50 Apr 28, 2008

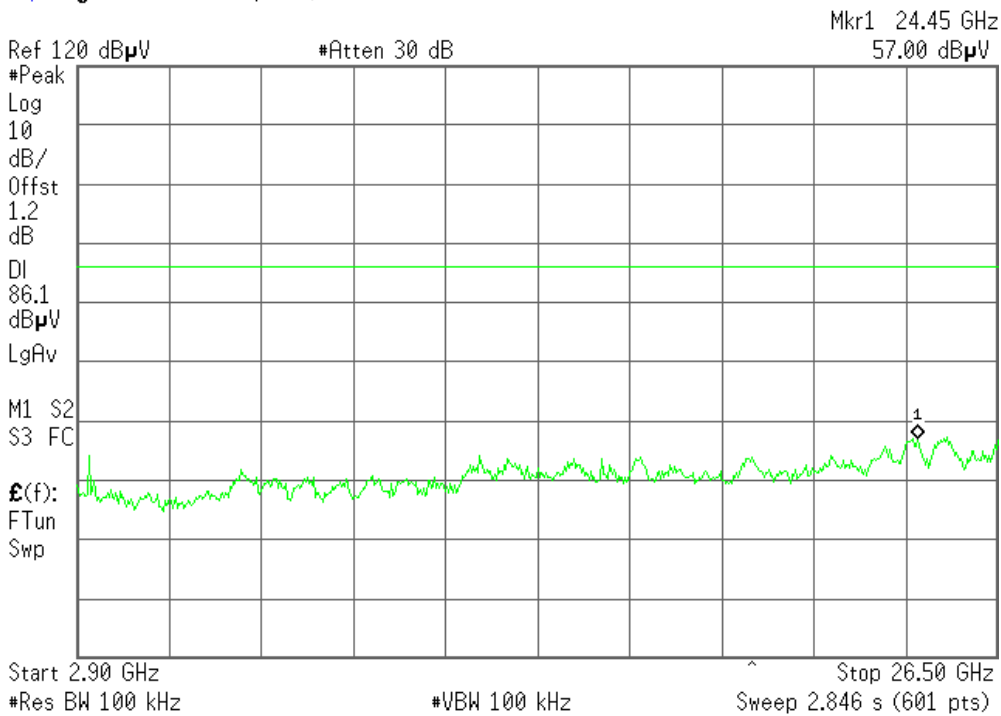
R T



2.9GHz ~ 26.5GHz

Agilent 17:02:29 Apr 28, 2008

R T



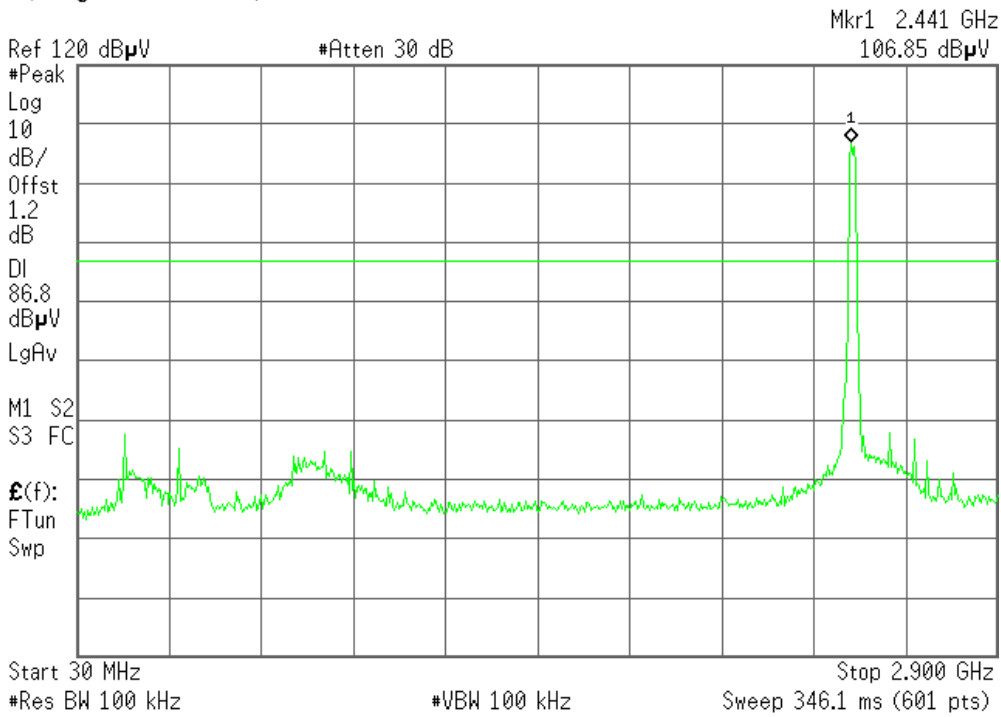


IEEE 802.11n HT20 MHz mode / CH Mid

30MHz ~ 2.9GHz

Agilent 17:03:26 Apr 28, 2008

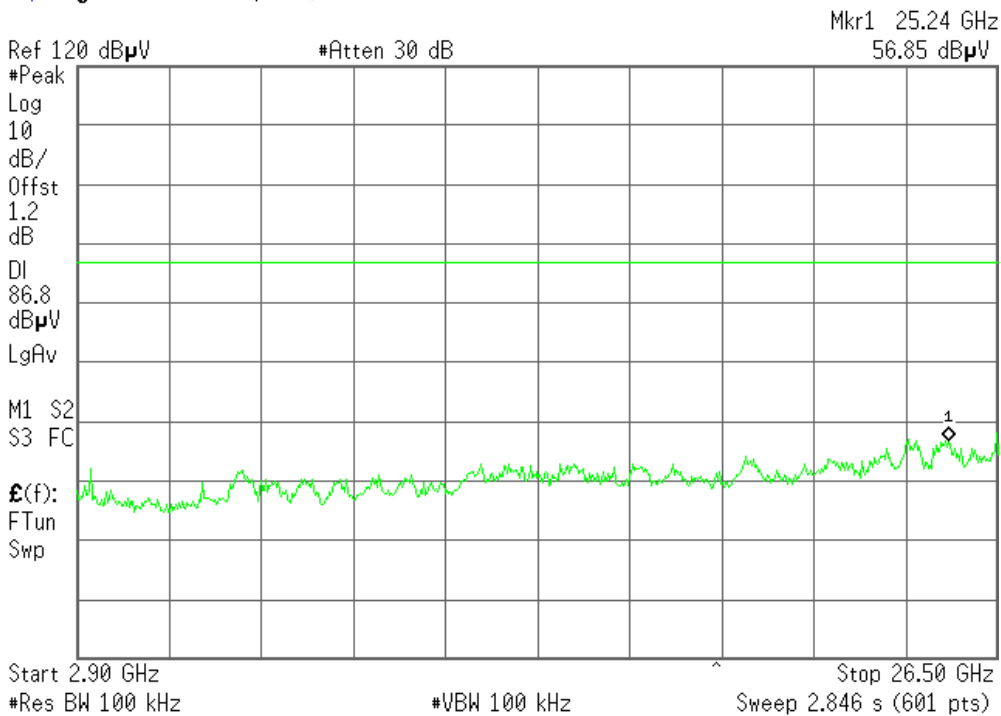
R T



2.9GHz ~ 26.5GHz

Agilent 17:03:54 Apr 28, 2008

R T



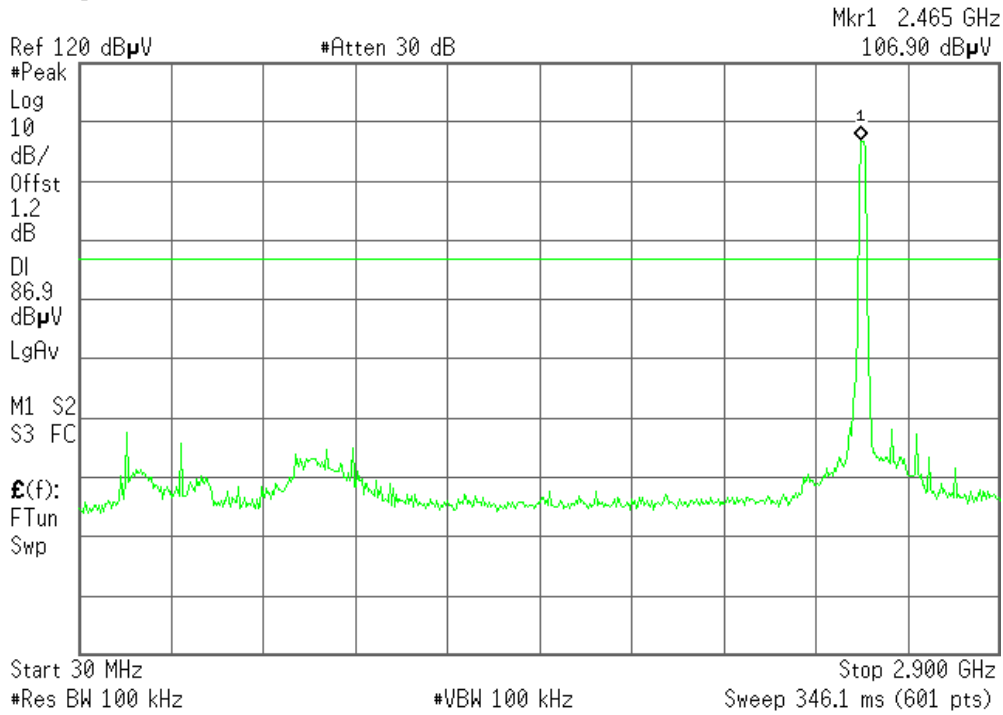


IEEE 802.11n HT20 MHz mode / CH High

30MHz ~ 2.9GHz

Agilent 17:04:53 Apr 28, 2008

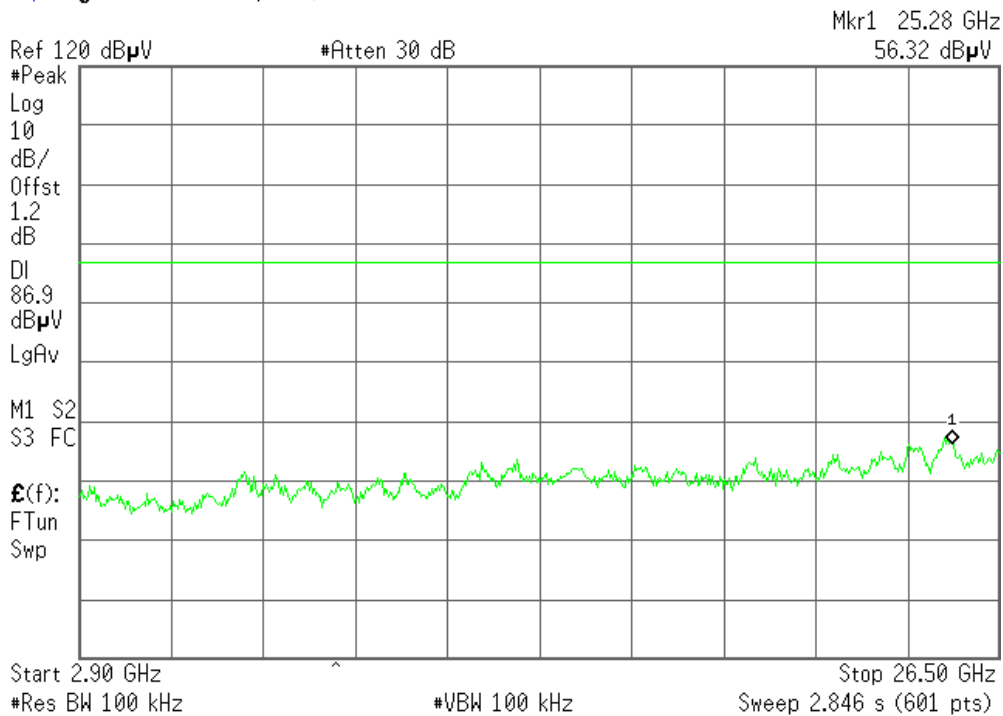
R T



2.9GHz ~ 26.5GHz

Agilent 17:05:17 Apr 28, 2008

R T



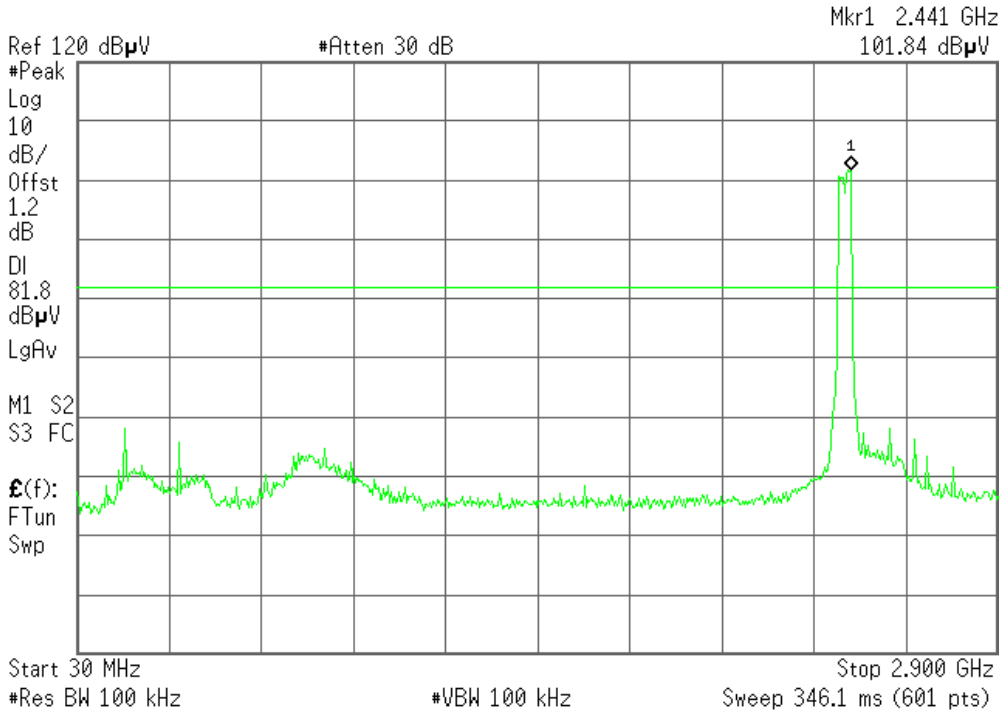


IEEE 802.11n HT40 MHz mode/ CH Low

30MHz ~ 2.9GHz

Agilent 17:06:51 Apr 28, 2008

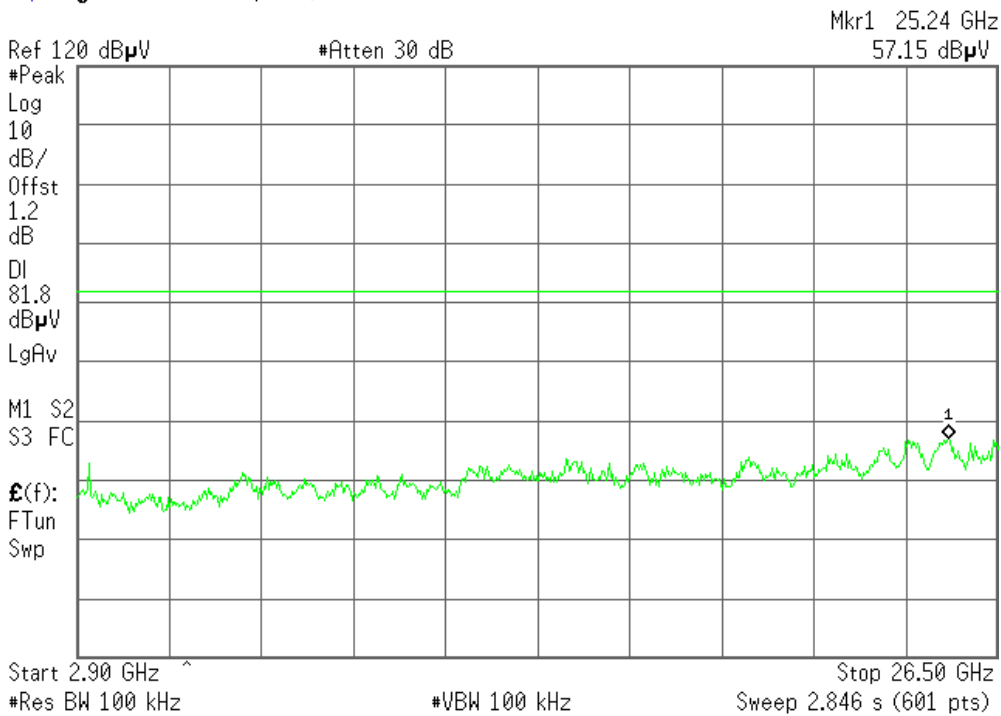
R T



2.9GHz ~ 26.5GHz

Agilent 17:07:21 Apr 28, 2008

R T



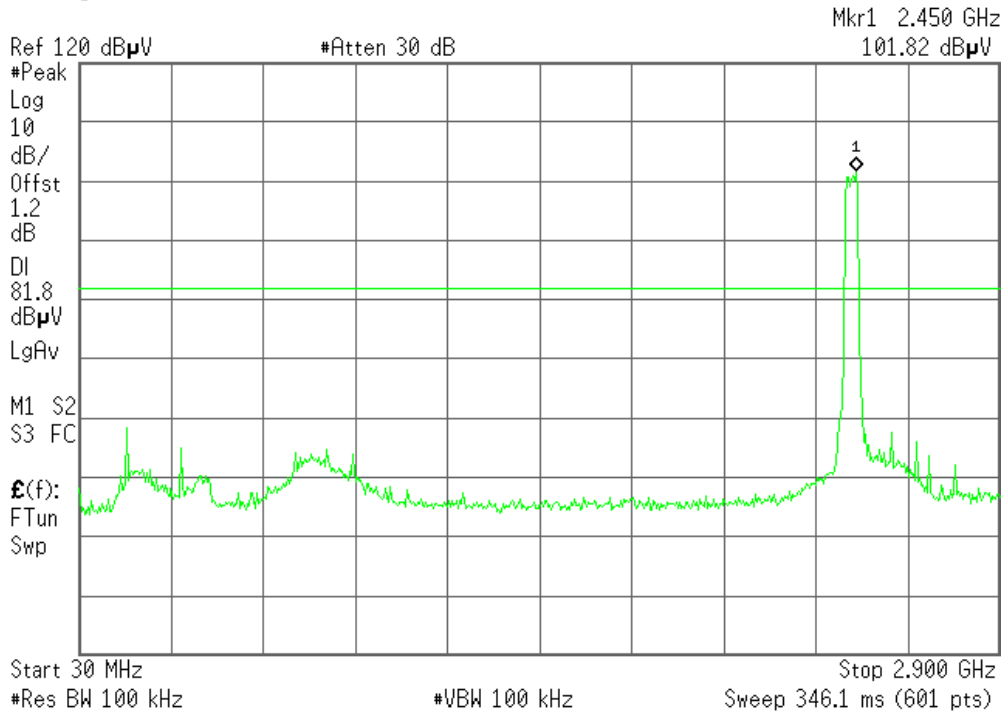


IEEE 802.11n HT40 MHz mode/ CH Mid

30MHz ~ 2.9GHz

Agilent 17:08:13 Apr 28, 2008

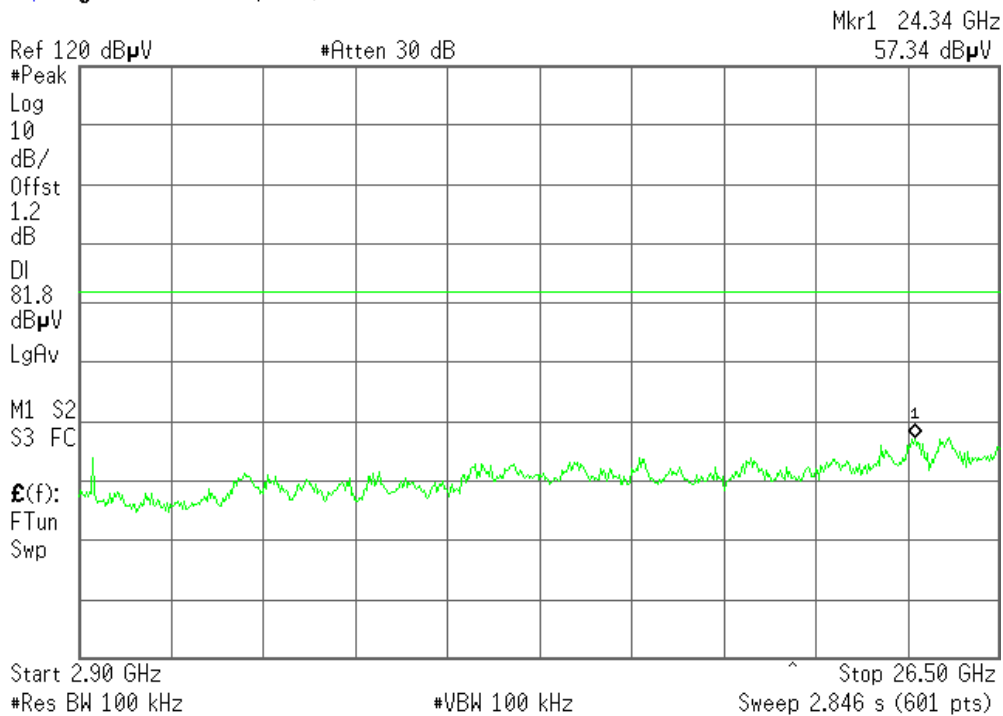
R T



2.9GHz ~ 26.5GHz

Agilent 17:08:47 Apr 28, 2008

R T



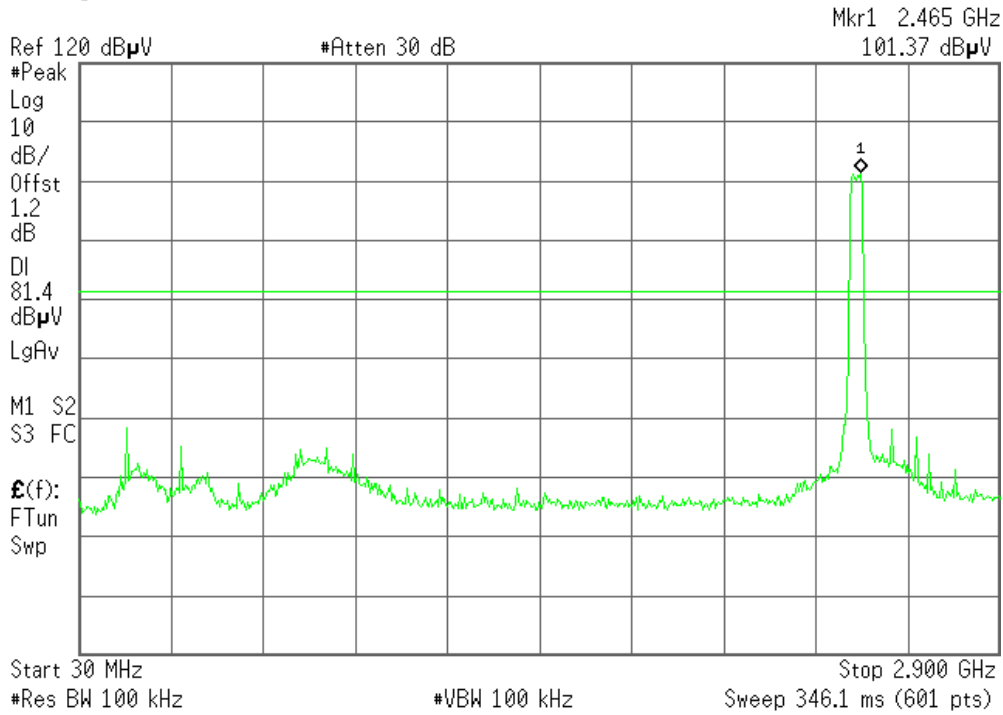


IEEE 802.11n HT40 MHz mode/ CH High

30MHz ~ 2.9GHz

Agilent 17:10:31 Apr 28, 2008

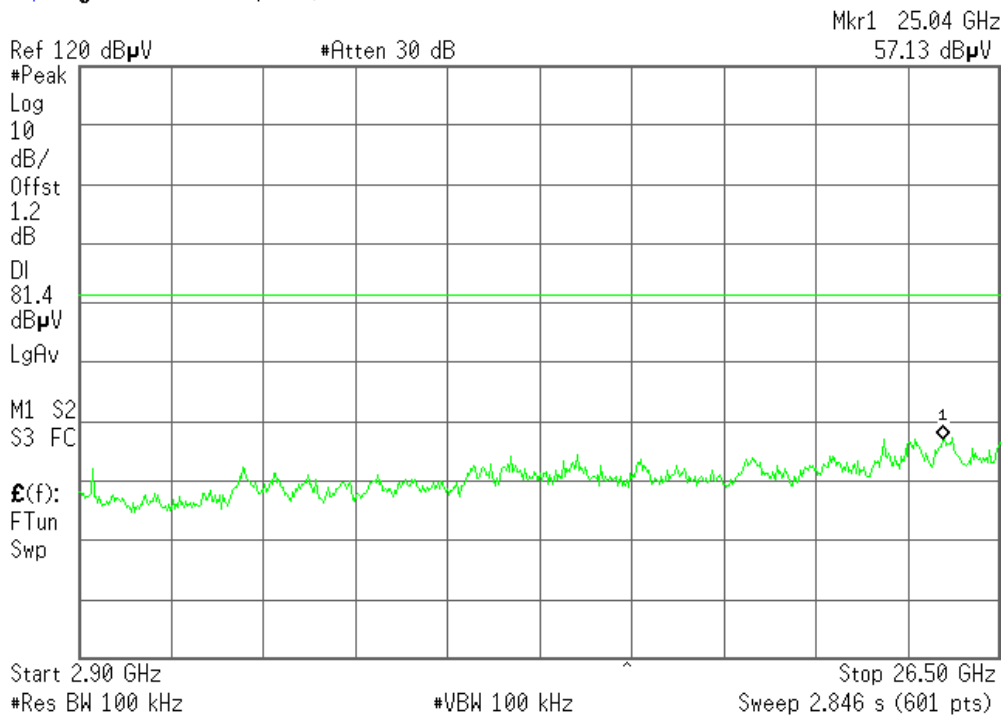
R T



2.9GHz ~ 26.5GHz

Agilent 17:11:00 Apr 28, 2008

R T



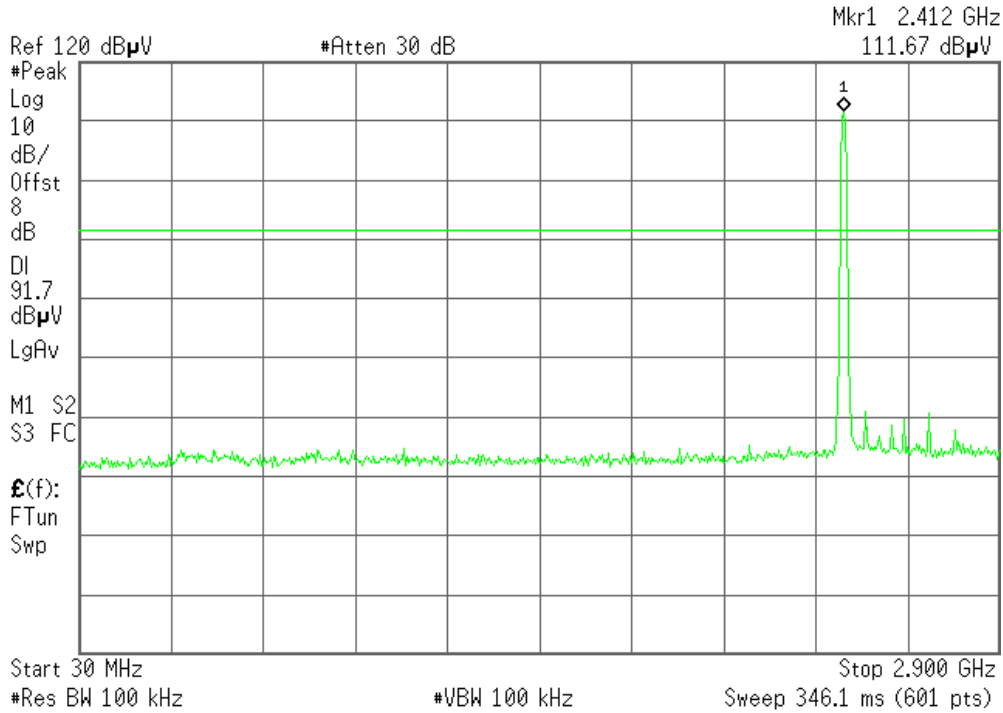


IEEE 802.11b Combined mode / CH Low

30MHz ~ 2.9GHz

Agilent 14:50:05 Apr 28, 2008

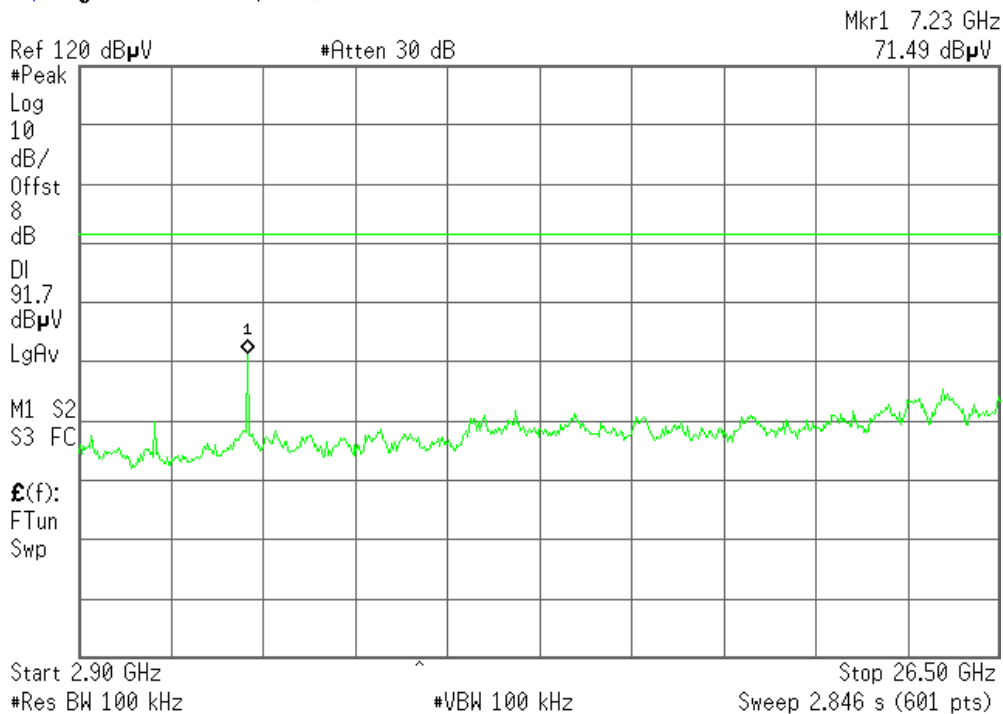
T



2.9GHz ~ 26.5GHz

Agilent 14:51:06 Apr 28, 2008

T



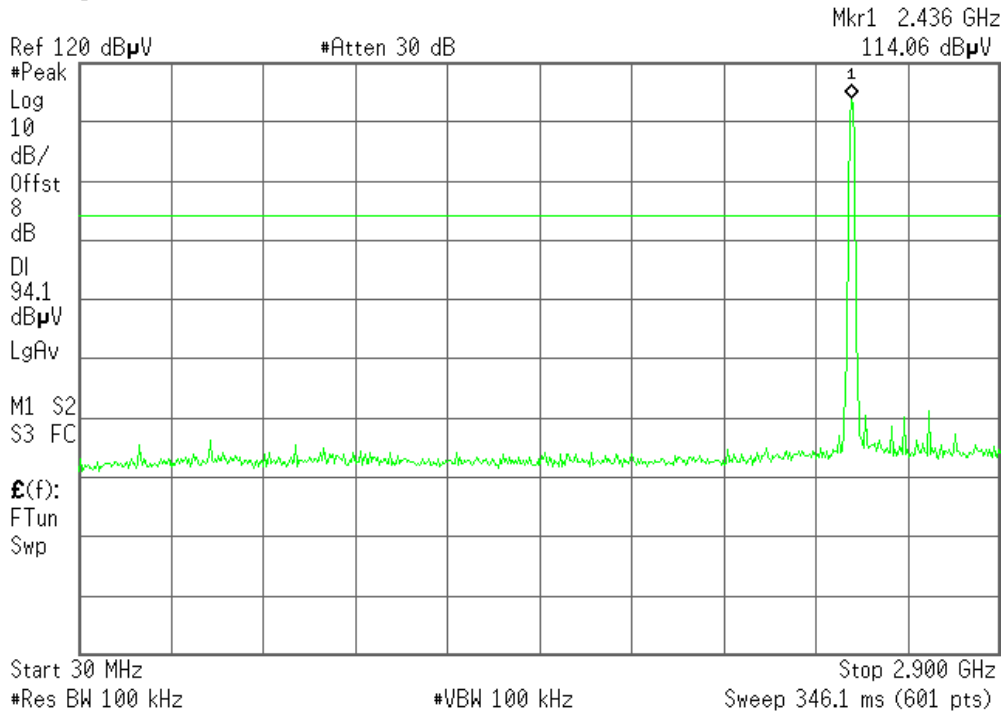


IEEE 802.11b Combined mode / CH Mid

30MHz ~ 2.9GHz

Agilent 14:52:39 Apr 28, 2008

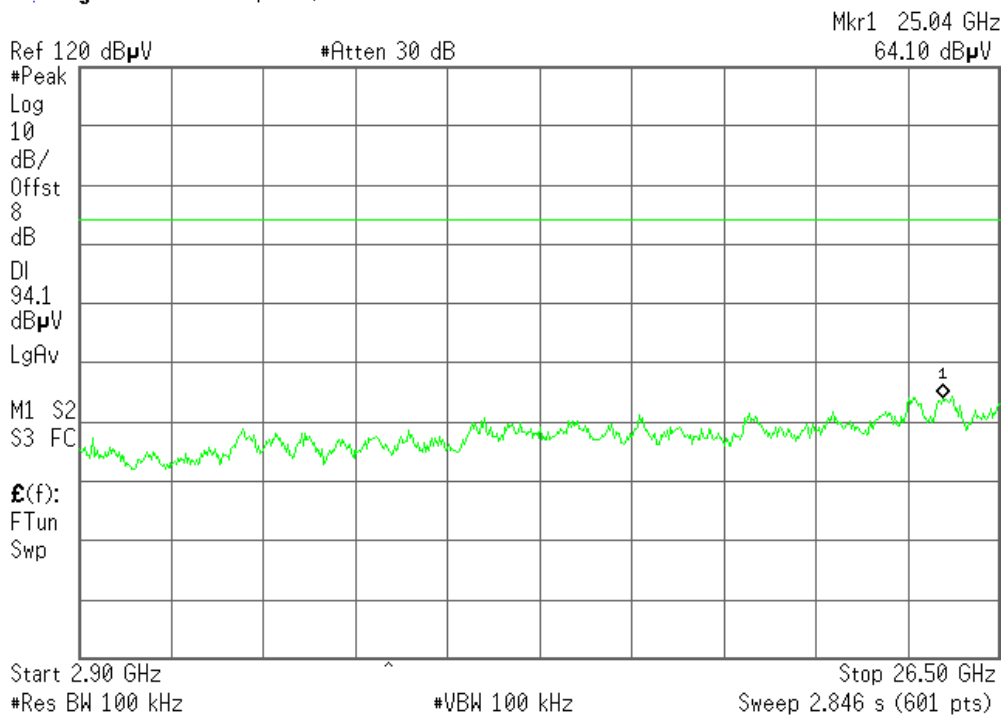
T



2.9GHz ~ 26.5GHz

Agilent 14:53:11 Apr 28, 2008

T



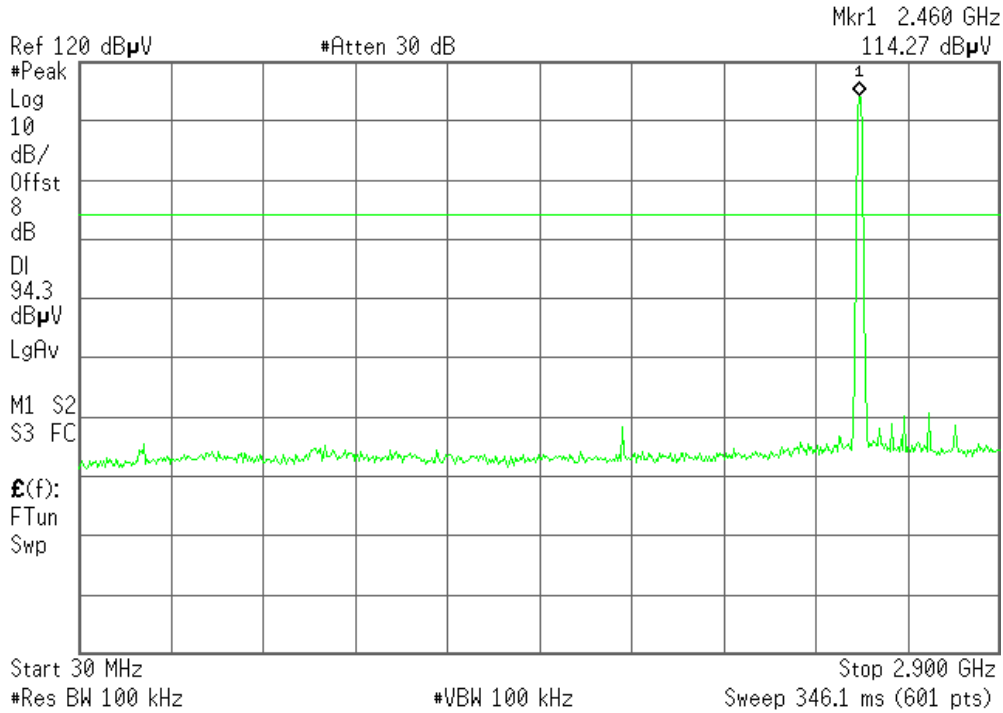


IEEE 802.11b Combined mode / CH High

30MHz ~ 2.9GHz

Agilent 14:55:30 Apr 28, 2008

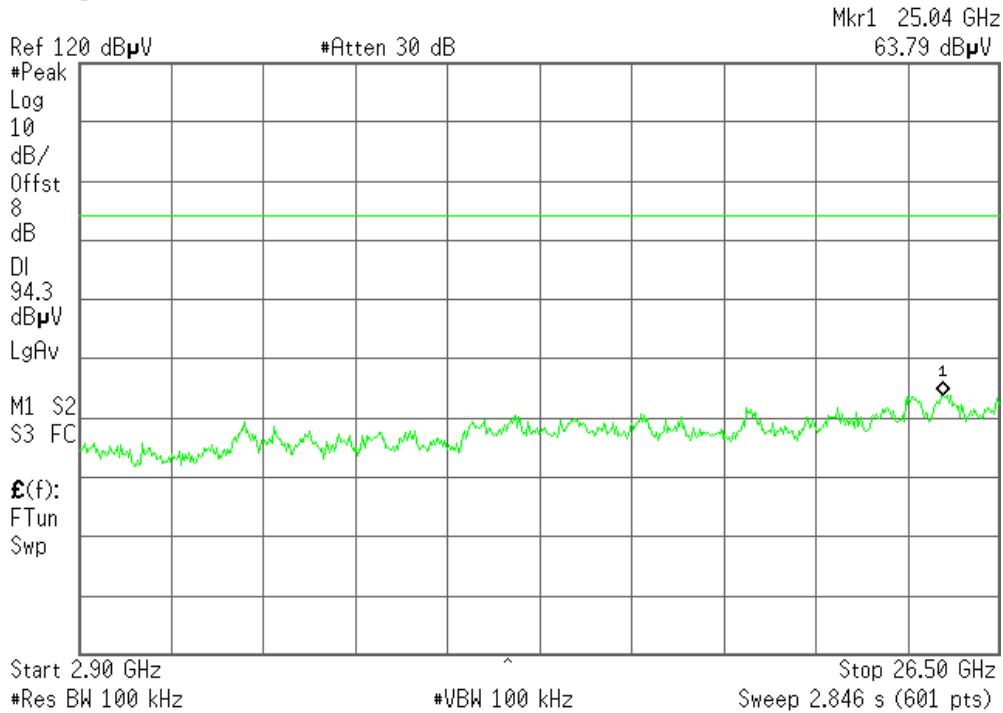
T



2.9GHz ~ 26.5GHz

Agilent 14:55:58 Apr 28, 2008

T



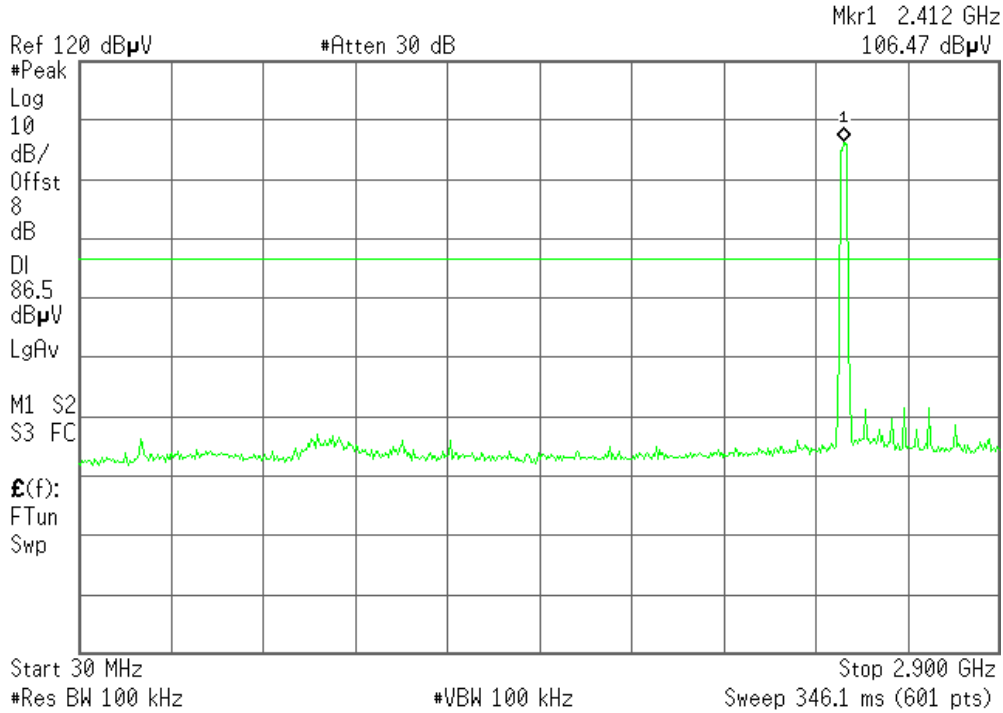


IEEE 802.11g Combined mode / CH Low

30MHz ~ 2.9GHz

Agilent 15:00:54 Apr 28, 2008

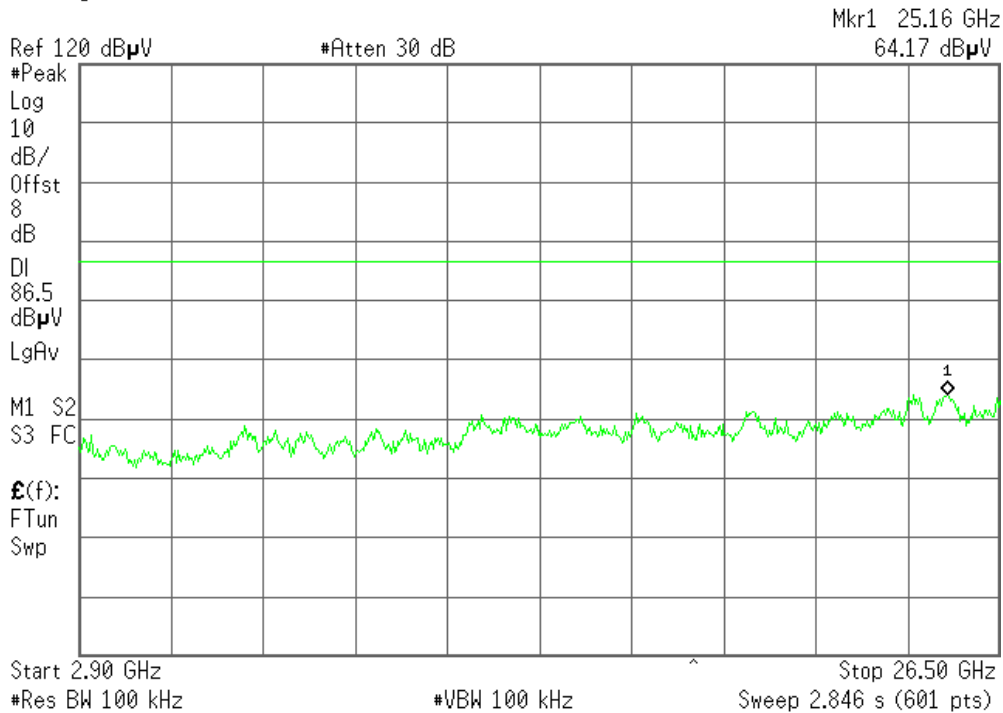
T



2.9GHz ~ 26.5GHz

Agilent 15:01:25 Apr 28, 2008

T



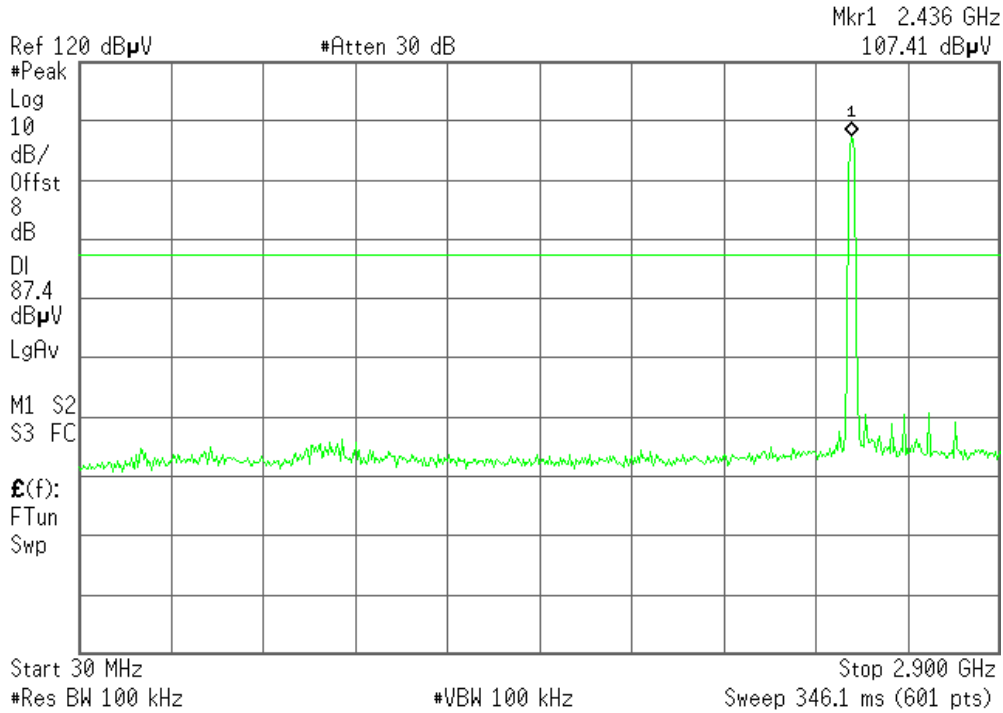


IEEE 802.11g Combined mode/ CH Mid

30MHz ~ 2.9GHz

Agilent 15:02:41 Apr 28, 2008

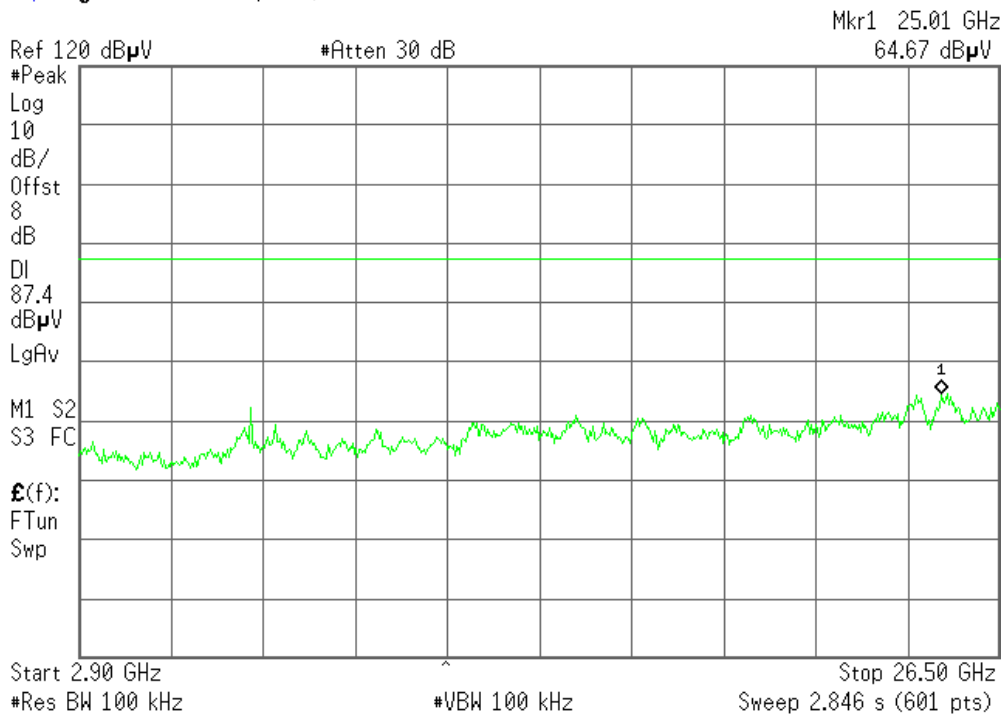
T



2.9GHz ~ 26.5GHz

Agilent 15:03:09 Apr 28, 2008

T



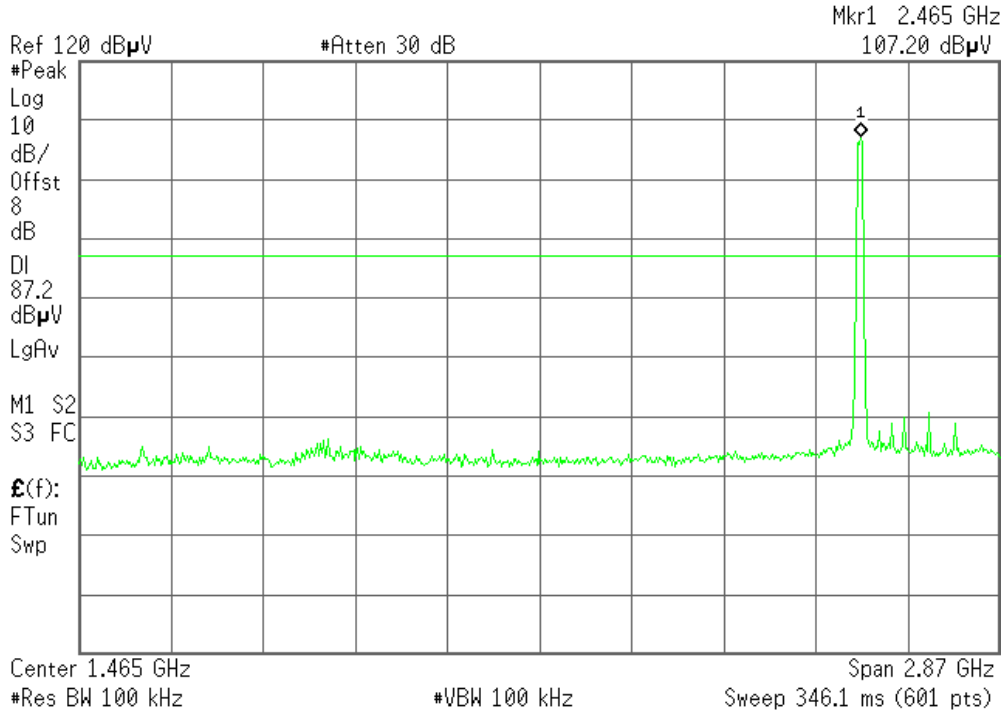


IEEE 802.11g Combined mode / CH High

30MHz ~ 2.9GHz

Agilent 15:04:50 Apr 28, 2008

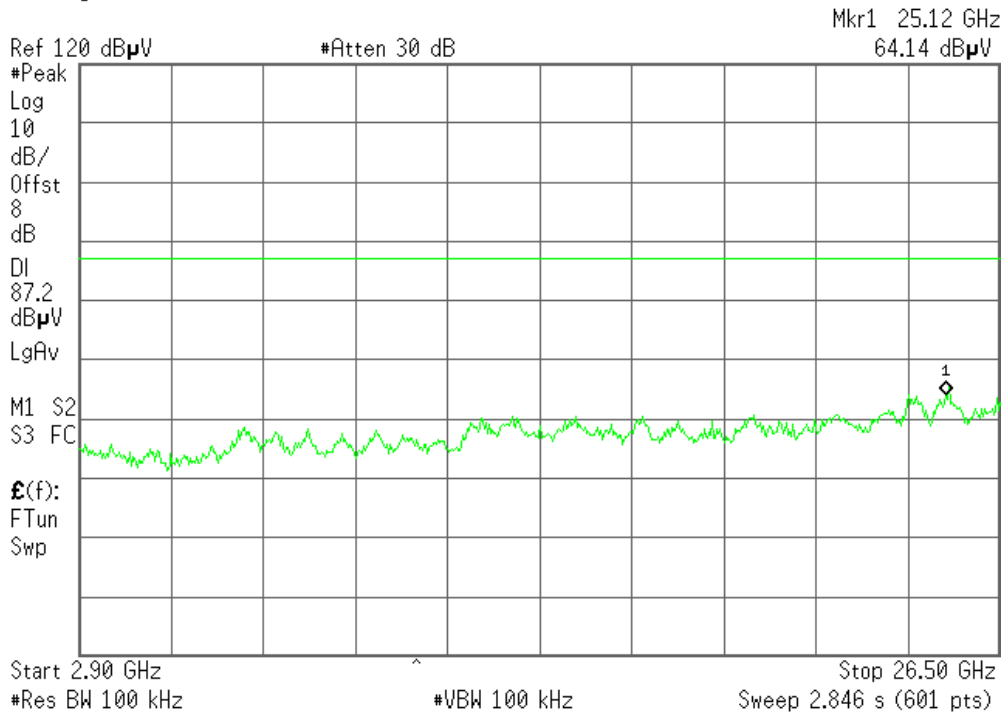
T



2.9GHz ~ 26.5GHz

Agilent 15:05:17 Apr 28, 2008

T



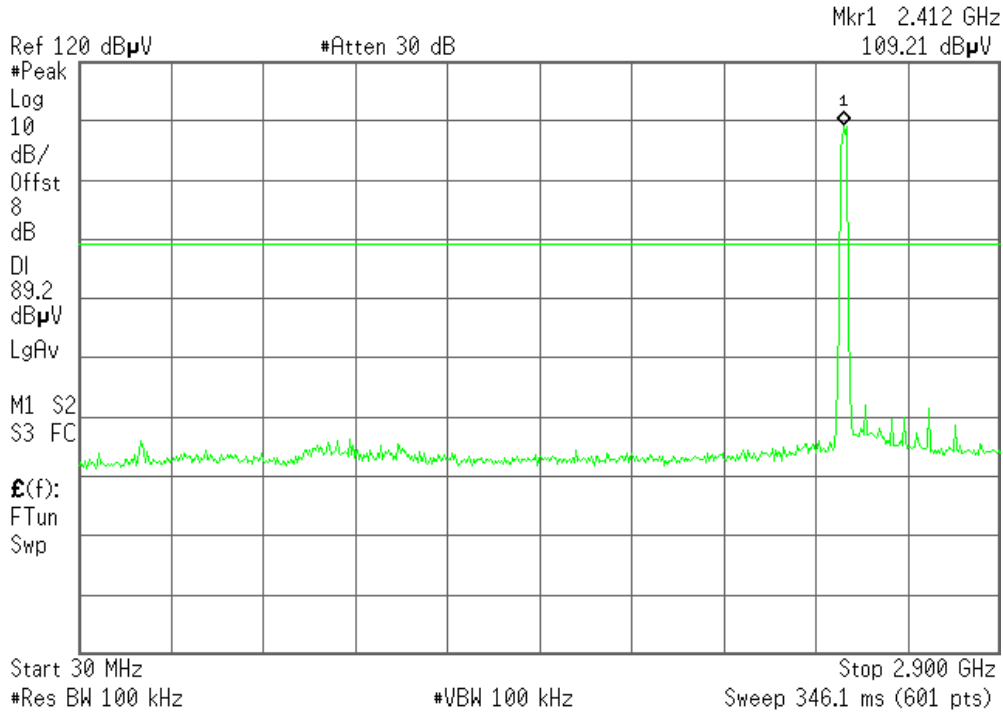


IEEE 802.11n HT20 Combined mode / CH Low

30MHz ~ 2.9GHz

Agilent 15:07:22 Apr 28, 2008

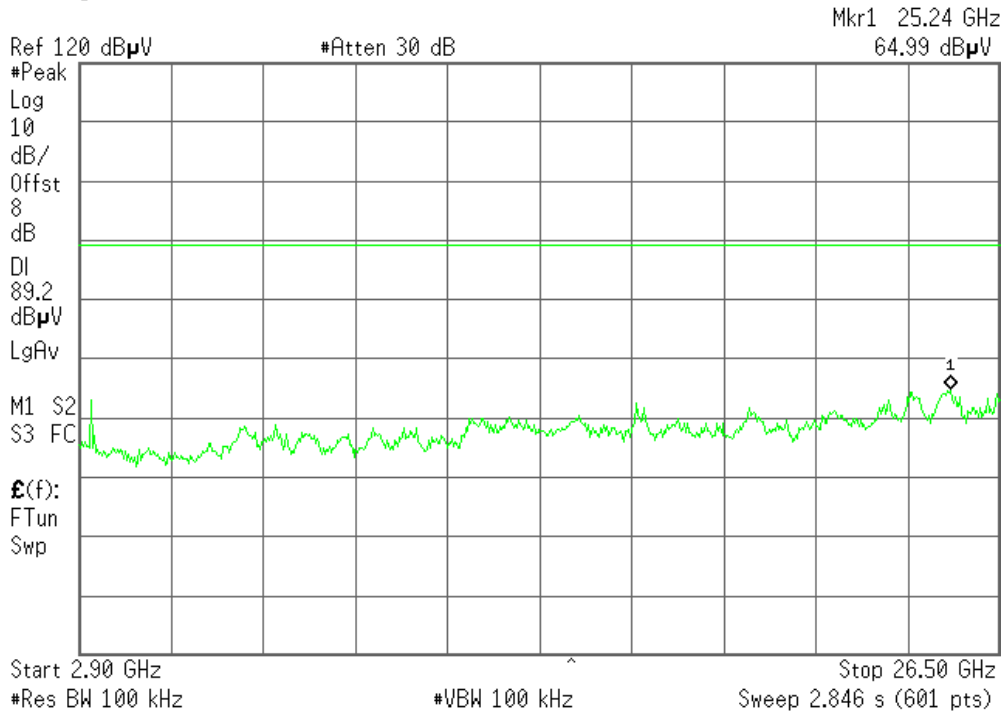
T



2.9GHz ~ 26.5GHz

Agilent 15:08:13 Apr 28, 2008

T



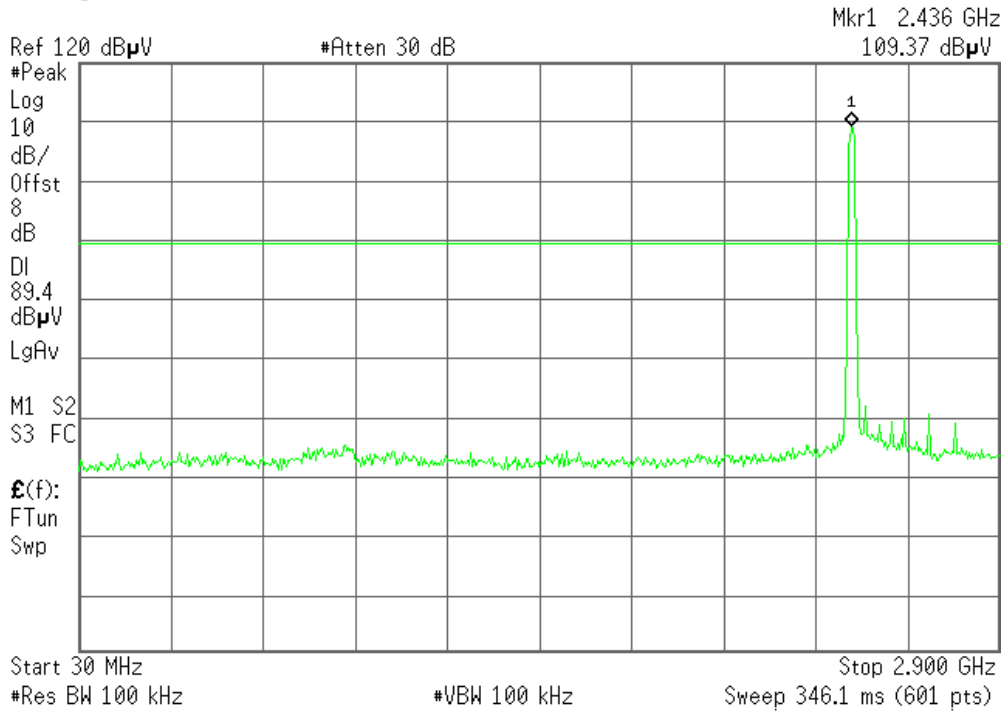


IEEE 802.11n HT20 Combined mode/ CH Mid

30MHz ~ 2.9GHz

Agilent 15:09:23 Apr 28, 2008

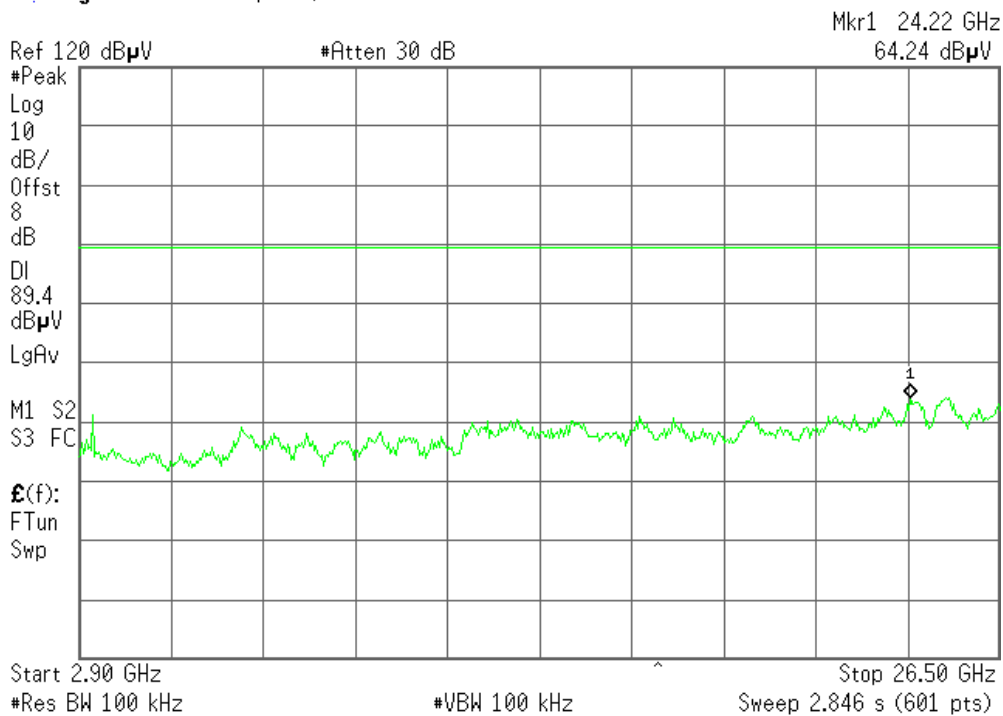
T



2.9GHz ~ 26.5GHz

Agilent 15:09:56 Apr 28, 2008

T



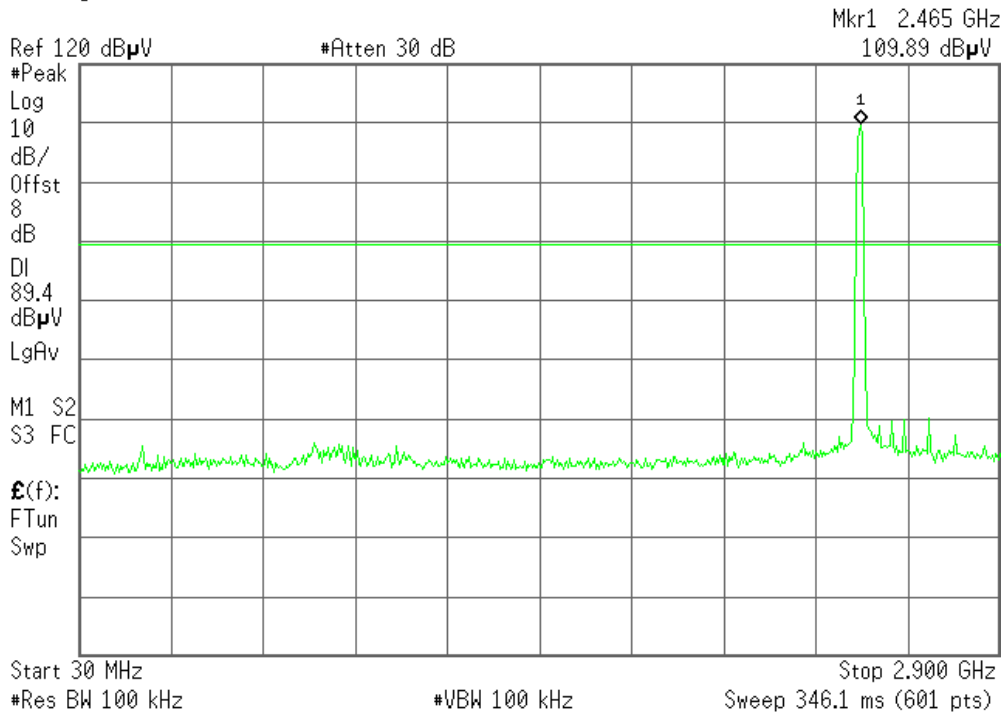


IEEE 802.11n HT20 Combined mode / CH High

30MHz ~ 2.9GHz

Agilent 15:10:50 Apr 28, 2008

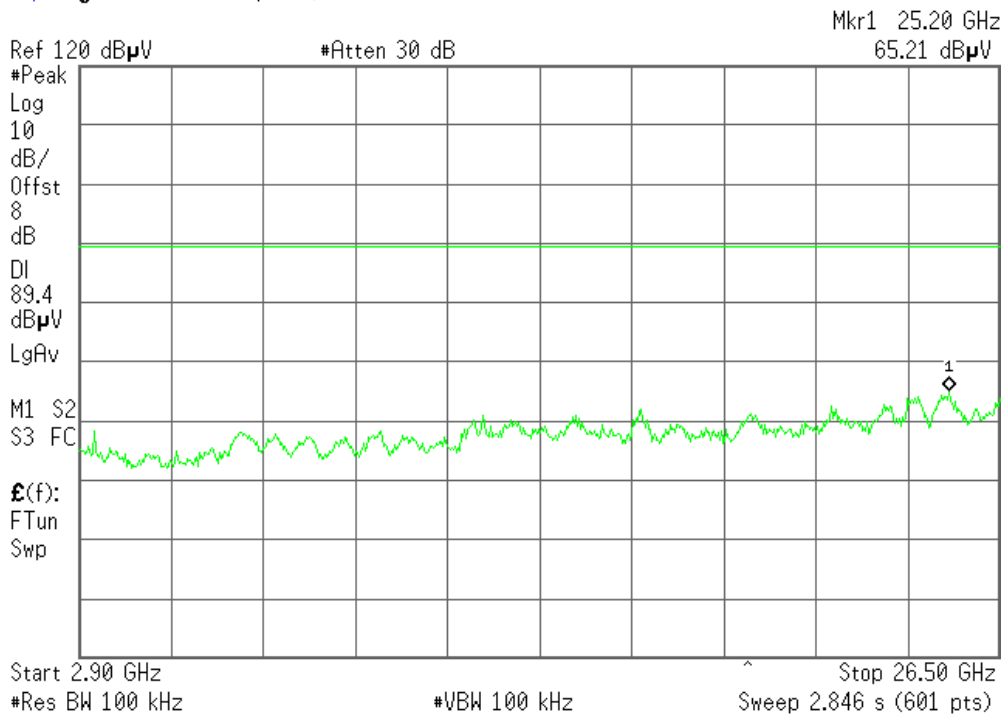
T



2.9GHz ~ 26.5GHz

Agilent 15:11:24 Apr 28, 2008

T



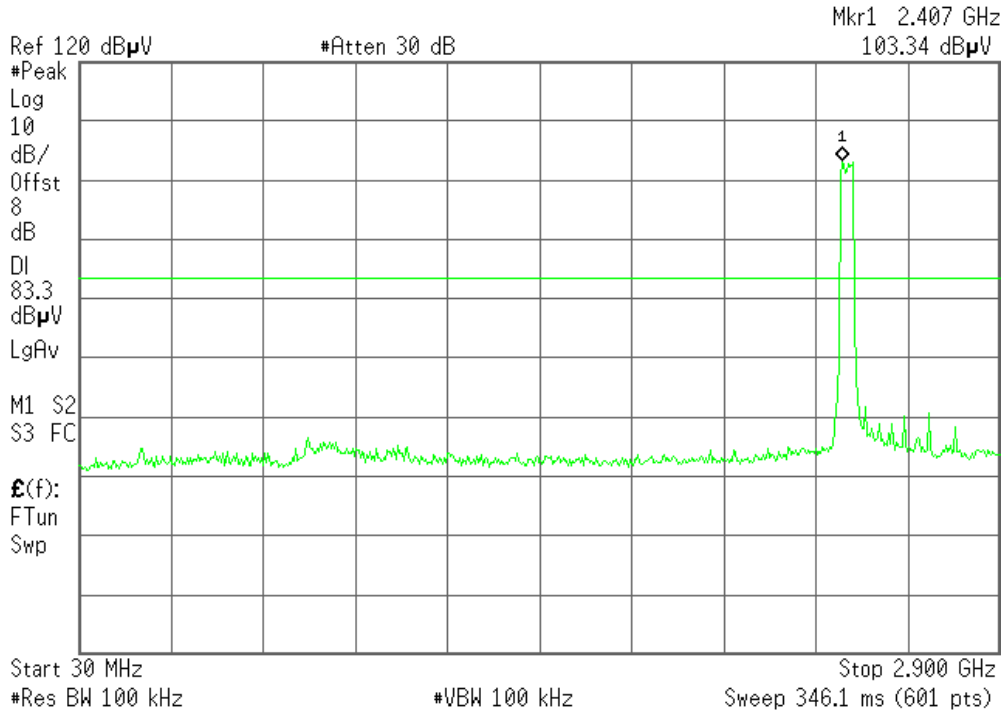


IEEE 802.11n HT40 Combined mode / CH Low

30MHz ~ 2.9GHz

Agilent 15:13:13 Apr 28, 2008

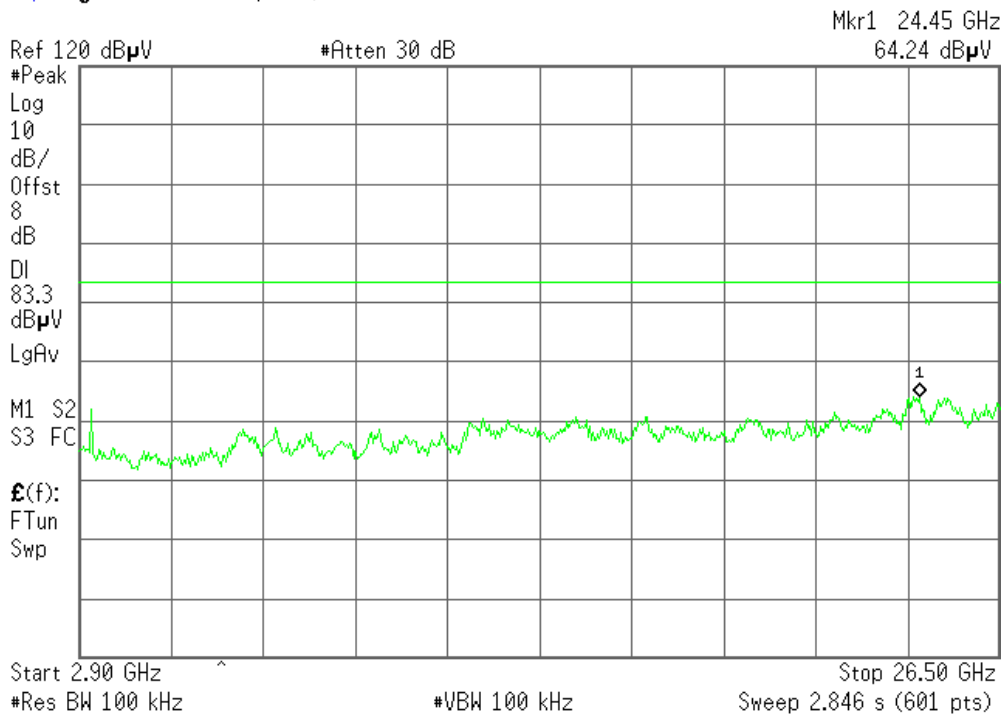
T



2.9GHz ~ 26.5GHz

Agilent 15:13:42 Apr 28, 2008

T



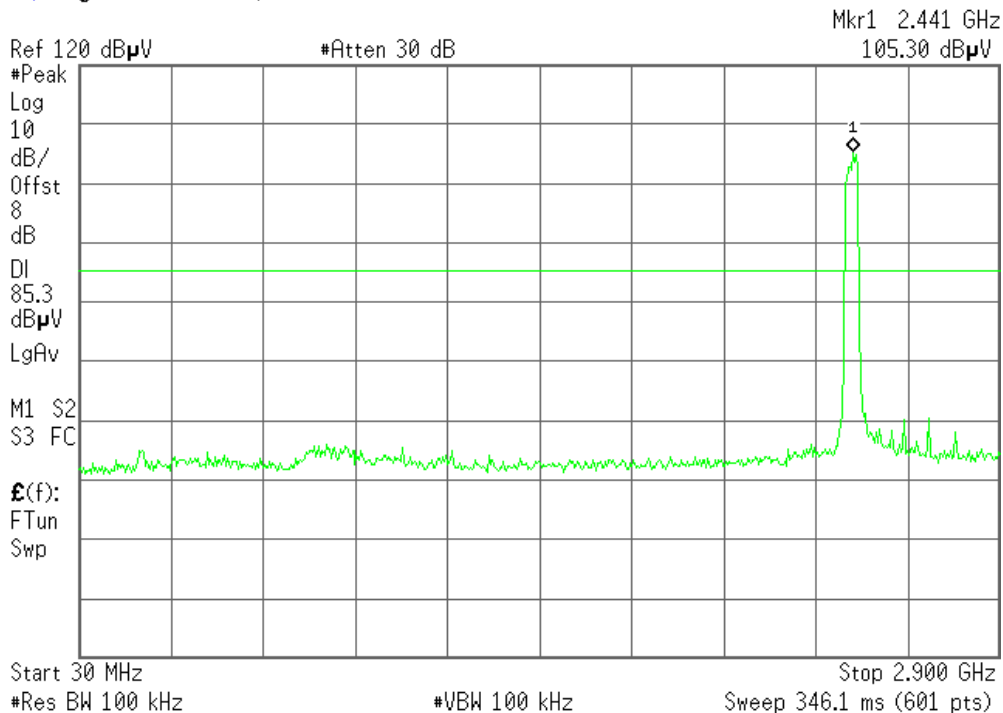


IEEE 802.11n HT40 Combined mode/ CH Mid

30MHz ~ 2.9GHz

Agilent 15:14:50 Apr 28, 2008

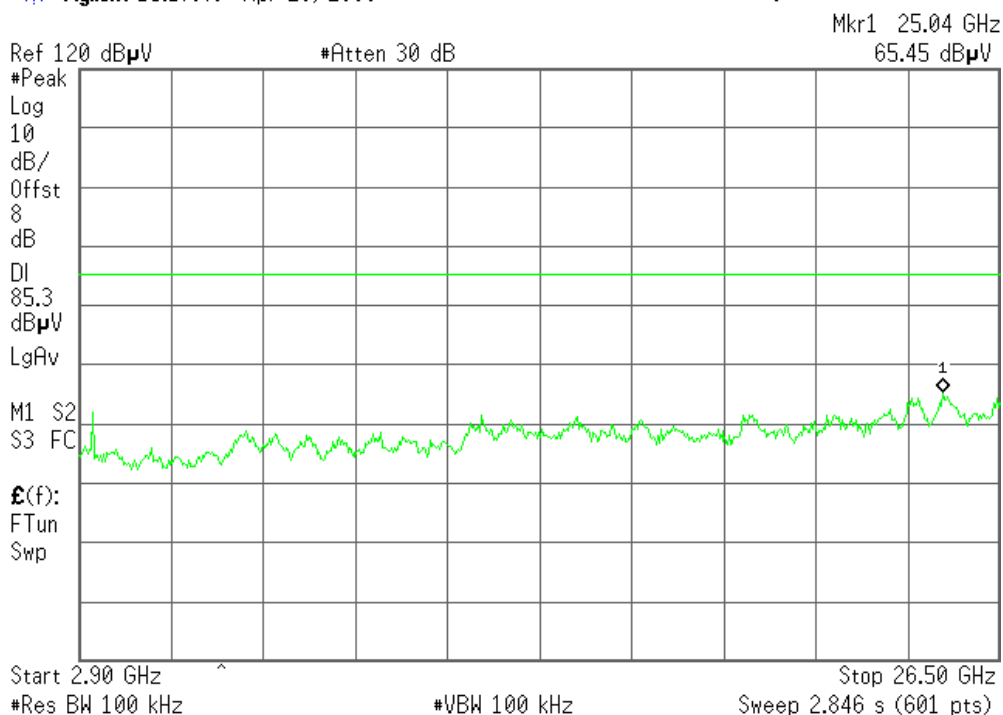
T



2.9GHz ~ 26.5GHz

Agilent 15:17:49 Apr 28, 2008

T



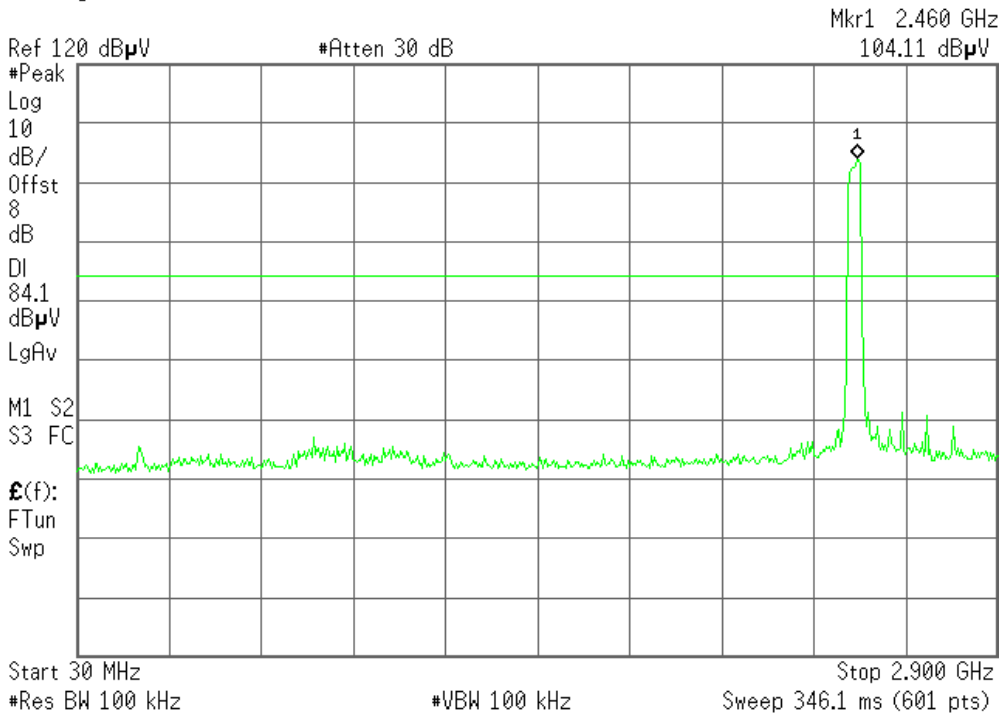


IEEE 802.11n HT40 Combined mode/ CH High

30MHz ~ 2.9GHz

Agilent 15:19:08 Apr 28, 2008

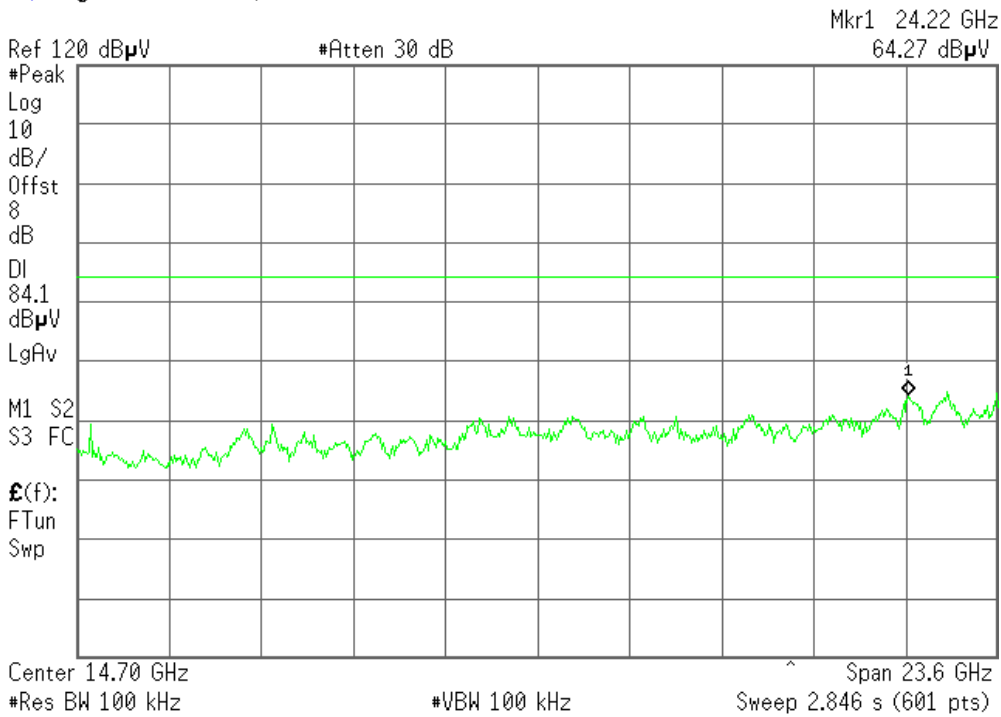
T



2.9GHz ~ 26.5GHz

Agilent 15:19:38 Apr 28, 2008

T



7.6.2 Radiated Emissions

LIMIT

1. 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 (mV/m)	Measurement Distance (m)
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

Note: 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 above emission table, the tighter limit applies at the band edges.

Frequency (Hz)	Field Strength (μ V/m at 3-meter)	Field Strength (dB μ V/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

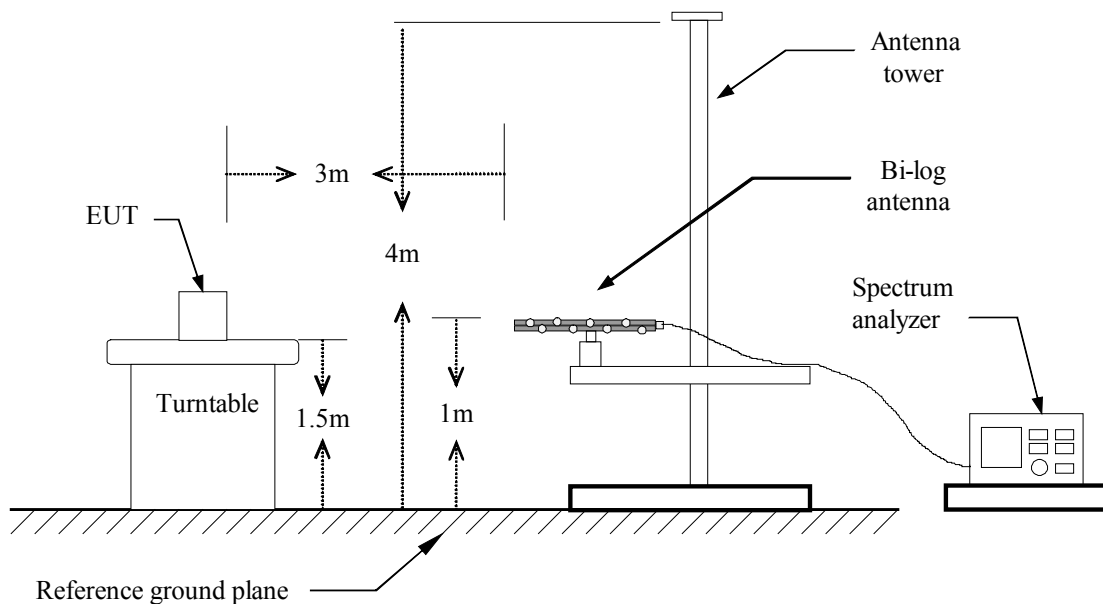
MEASUREMENT EQUIPMENT USED

966 RF CHAMBER 2				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US44300399	02/24/2009
EMI Test Receiver	R&S	ESCI	1166.5950 03	01/13/2009
Pre-Amplifier	MITEQ	N/A	AFS42-00102650-42-10P-42	02/14/2009
Bi-log Antenna	SCHWAZBECK	CBL6143	5082	06/09/2009
Turn Table	EMCO	2081-1.21	N/A	N.C.R
Antenna Tower	CT	N/A	N/A	N.C.R
Controller	CT	N/A	N/A	N.C.R
RF Comm. Test set	HP	8920B	US36142090	N.C.R
Site NSA	C&C	N/A	N/A	06/09/2008
Horn Antenna	TRC	N/A	N/A	03/04/2009
Signal Generator	Anritsu	MG3694A	#050125	02/24/2009

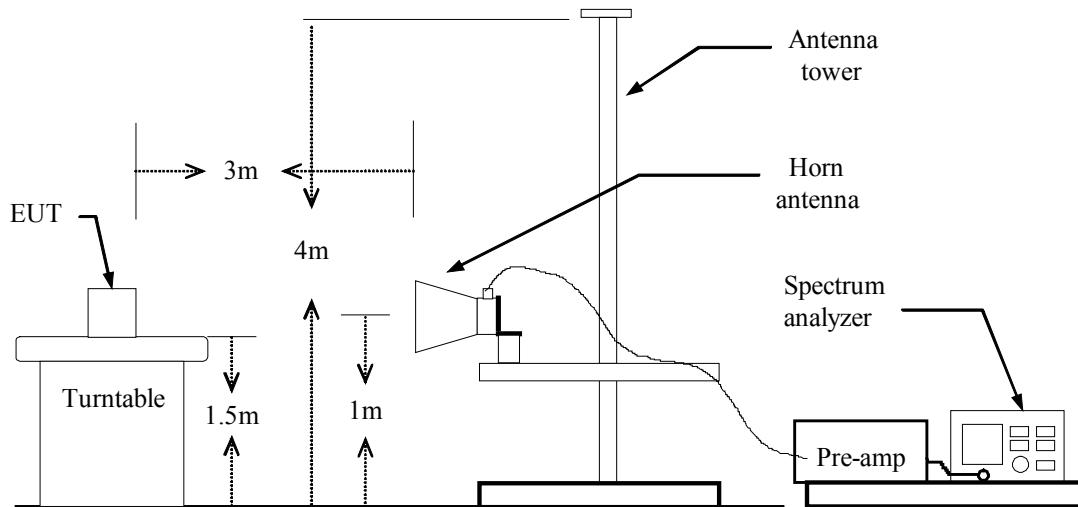
Remark: Each piece of equipment is scheduled for calibration once a year.

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

**TEST RESULTS****Below 1 GHz****Operation Mode:** Normal link**Test Date:** April 26, 2008**Temperature:** 25°C**Tested by:** Tom Gan**Humidity:** 70 % 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)
66.450	V	Peak	50.81	-24.95	25.86	40.00	-14.14
107.625	V	Peak	57.48	-22.56	34.92	43.50	-8.58
183.900	V	Peak	54.20	-21.96	32.24	43.50	-11.26
250.050	V	Peak	55.48	-20.09	35.39	46.00	-10.61
424.250	V	Peak	46.03	-14.53	31.50	46.00	-14.50
720.000	V	Peak	42.78	-8.73	34.05	46.00	-11.95
66.450	H	Peak	53.47	-25.48	27.99	40.00	-12.01
111.000	H	Peak	56.78	-22.47	34.31	43.50	-9.19
206.175	H	Peak	54.88	-21.48	33.40	43.50	-10.10
352.500	H	Peak	50.62	-16.61	34.01	46.00	-11.99
499.500	H	Peak	46.28	-11.83	34.45	46.00	-11.55
704.250	H	Peak	42.15	-8.29	33.86	46.00	-12.14

****Remark:** No emission found between lowest internal used/generated frequency to 30 MHz.**Notes:**

1. Measuring frequencies from 30 MHz to the 1GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/Quasi-peak detector mode.
3. 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.
4. The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.

**Above 1 GHz****Operation Mode:** TX / IEEE 802.11b / CH Low**Test Date:** April 26, 2008**Temperature:** 25°C**Tested by:** Tom Gan**Humidity:** 56 % RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
1123.33	V	62.60	---	-11.49	51.11	---	74.00	54.00	-2.89	Peak
1260.00	V	60.68	---	-10.74	49.94	---	74.00	54.00	-4.06	Peak
1580.00	V	58.43	---	-9.11	49.32	---	74.00	54.00	-4.68	Peak
3933.33	V	47.39	---	-1.83	45.56	---	74.00	54.00	-8.44	Peak
N/A										
1060.00	H	58.41	---	-11.84	46.57	---	74.00	54.00	-7.43	Peak
1116.67	H	57.59	---	-11.53	46.06	---	74.00	54.00	-7.94	Peak
1266.67	H	55.38	---	-10.70	44.68	---	74.00	54.00	-9.32	Peak
4241.67	H	47.39	---	-0.80	46.59	---	74.00	54.00	-7.41	Peak
N/A										

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
 - b. AV Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.



Operation Mode: TX / IEEE 802.11b/ CH Mid

Test Date: April 26, 2008

Temperature: 25°C

Tested by: Tom Gan

Humidity: 70 % RH

Polarity: Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
1113.33	V	62.37	---	-11.55	50.82	---	74.00	54.00	-3.18	Peak
1260.00	V	59.91	---	-10.74	49.17	---	74.00	54.00	-4.83	Peak
1596.67	V	59.72	---	-9.04	50.68	---	74.00	54.00	-3.32	Peak
3883.33	V	47.35	---	-1.97	45.38	---	74.00	54.00	-8.62	Peak
N/A										
1056.67	H	55.43	---	-11.86	43.57	---	74.00	54.00	-10.43	Peak
1093.33	H	59.50	---	-11.66	47.84	---	74.00	54.00	-6.16	Peak
1626.67	H	55.47	---	-8.92	46.55	---	74.00	54.00	-7.45	Peak
4275.00	H	46.85	---	-0.68	46.17	---	74.00	54.00	-7.83	Peak
N/A										

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
 - b. AV Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.



Operation Mode: TX / IEEE 802.11b/ CH High

Test Date: April 26, 2008

Temperature: 25°C

Tested by: Tom Gan

Humidity: 70 % RH

Polarity: Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
1086.66	V	59.93	---	-11.69	48.24	---	74.00	54.00	-5.76	Peak
1250.00	V	60.76	---	-10.79	49.97	---	74.00	54.00	-4.03	Peak
1603.33	V	58.35	---	-9.01	49.34	---	74.00	54.00	-4.66	Peak
4383.33	V	46.46	---	-0.30	46.16	---	74.00	54.00	-7.84	Peak
N/A										
1093.33	H	57.87	---	-11.66	46.21	---	74.00	54.00	-7.79	Peak
1146.66	H	57.27	---	-11.36	45.91	---	74.00	54.00	-8.09	Peak
1603.33	H	56.33	---	-9.01	47.32	---	74.00	54.00	-6.68	Peak
4733.33	H	47.34	---	0.52	47.86	---	74.00	54.00	-6.14	Peak
N/A										

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
 - b. AV Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.



Operation Mode: TX / IEEE 802.11g/ CH Low

Test Date: April 26, 2008

Temperature: 25°C

Tested by: Tom Gan

Humidity: 70 % RH

Polarity: Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
1086.66	V	63.32	---	-11.69	51.63	---	74.00	54.00	-2.37	Peak
1136.66	V	62.78	---	-11.42	51.36	---	74.00	54.00	-2.64	Peak
1280.00	V	60.30	---	-10.69	49.61	---	74.00	54.00	-4.39	Peak
3216.67	V	49.44	---	-3.60	45.84	---	74.00	54.00	-8.16	Peak
N/A										
1093.33	H	60.38	---	-11.66	48.72	---	74.00	54.00	-5.28	Peak
1120.00	H	57.09	---	-11.51	45.58	---	74.00	54.00	-8.42	Peak
1613.33	H	55.60	---	-8.98	46.62	---	74.00	54.00	-7.38	Peak
4183.33	H	46.84	---	-1.01	45.83	---	74.00	54.00	-8.17	Peak
N/A										

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
 - b. AV Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.

**Operation Mode:** TX / IEEE 802.11g / CH Mid**Test Date:** April 26, 2008**Temperature:** 25°C**Tested by:** Tom Gan**Humidity:** 70 % RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
1086.66	V	63.78	---	-11.69	52.09	---	74.00	54.00	-1.91	Peak
1143.33	V	63.85	---	-11.38	52.47	---	74.00	54.00	-1.53	Peak
1590.00	V	59.70	---	-9.07	50.63	---	74.00	54.00	-3.37	Peak
4208.33	V	47.27	---	-0.92	46.35	---	74.00	54.00	-7.65	Peak
N/A										
1090.00	H	59.16	---	-11.68	47.48	---	74.00	54.00	-6.52	Peak
1246.66	H	55.72	---	-10.81	44.91	---	74.00	54.00	-9.09	Peak
1616.66	H	56.19	---	-8.96	47.23	---	74.00	54.00	-6.77	Peak
4025.00	H	47.38	---	-1.57	45.81	---	74.00	54.00	-8.19	Peak
N/A										

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
 - b. AV Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.

**Operation Mode:** TX / IEEE 802.11g / CH High**Test Date:** April 26, 2008**Temperature:** 25°C**Tested by:** Tom Gan**Humidity:** 70 % RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
1073.33	V	63.54	---	-11.77	51.77	---	74.00	54.00	-2.23	Peak
1130.00	V	62.10	---	-11.46	50.64	---	74.00	54.00	-3.36	Peak
1253.33	V	60.99	---	-10.78	50.21	---	74.00	54.00	-3.79	Peak
4291.67	V	47.75	---	-0.62	47.13	---	74.00	54.00	-6.87	Peak
N/A										
1086.66	H	58.93	---	-11.69	47.24	---	74.00	54.00	-6.76	Peak
1626.66	H	55.45	---	-8.92	46.53	---	74.00	54.00	-7.47	Peak
1870.00	H	55.69	---	-7.97	47.72	---	74.00	54.00	-6.28	Peak
4183.33	H	46.66	---	-1.01	45.65	---	74.00	54.00	-8.35	Peak
N/A						---				

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
 - b. AV Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.



Operation Mode: TX / IEEE 802.11n HT20 MHz / CH Low

Test Date: April 26, 2008

Temperature: 25°C

Tested by: Tom Gan

Humidity: 56 % RH

Polarity: Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
1136.66	V	62.92	---	-11.42	51.50	---	74.00	54.00	-2.50	Peak
1256.66	V	59.81	---	-10.76	49.05	---	74.00	54.00	-4.95	Peak
1590.00	V	59.32	---	-9.07	50.25	---	74.00	54.00	-3.75	Peak
3216.67	V	53.31	---	-3.60	49.71	---	74.00	54.00	-4.29	Peak
N/A										
1070.00	H	60.39	---	-11.79	48.60	---	74.00	54.00	-5.40	Peak
1143.33	H	56.92	---	-11.38	45.54	---	74.00	54.00	-8.46	Peak
1620.00	H	56.23	---	-8.95	47.28	---	74.00	54.00	-6.72	Peak
4300.00	H	47.05	---	-0.59	46.46	---	74.00	54.00	-7.54	Peak
N/A										

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
 - b. AV Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.



Operation Mode: TX / IEEE 802.11n HT20 MHz / CH Mid

Test Date: April 26, 2008

Temperature: 25°C

Tested by: Tom Gan

Humidity: 70 % RH

Polarity: Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
1090.00	V	63.25	---	-11.68	51.57	---	74.00	54.00	-2.43	Peak
1133.33	V	62.55	---	-11.44	51.11	---	74.00	54.00	-2.89	Peak
1870.00	V	57.21	---	-7.97	49.24	---	74.00	54.00	-4.76	Peak
3250.00	V	50.11	---	-3.53	46.58	---	74.00	54.00	-7.42	Peak
N/A										
1070.00	H	59.45	---	-11.79	47.66	---	74.00	54.00	-6.34	Peak
1110.00	H	57.35	---	-11.56	45.79	---	74.00	54.00	-8.21	Peak
1633.33	H	55.77	---	-8.90	46.87	---	74.00	54.00	-7.13	Peak
3375.00	H	48.71	---	-3.25	45.46	---	74.00	54.00	-8.54	Peak
N/A										

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
 - b. AV Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.



Operation Mode: TX / IEEE 802.11n HT20 MHz / CH High

Test Date: April 26, 2008

Temperature: 25°C

Tested by: Tom Gan

Humidity: 70 % RH

Polarity: Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
1083.33	V	63.68	---	-11.71	51.97	---	74.00	54.00	-2.03	Peak
1276.66	V	60.35	---	-10.65	49.70	---	74.00	54.00	-4.30	Peak
1596.66	V	58.23	---	-9.04	49.19	---	74.00	54.00	-4.81	Peak
3283.33	V	50.80	---	-3.46	47.34	---	74.00	54.00	-6.66	Peak
N/A										
1060.00	H	59.29	---	-11.84	47.45	---	74.00	54.00	-6.55	Peak
1110.00	H	58.31	---	-11.56	46.75	---	74.00	54.00	-7.25	Peak
1616.66	H	56.49	---	-8.96	47.53	---	74.00	54.00	-6.47	Peak
4200.00	H	47.20	---	-0.95	46.25	---	74.00	54.00	-7.75	Peak
N/A										

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
 - b. AV Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.



Operation Mode: TX / IEEE 802.11n HT40 MHz / CH Low

Test Date: April 26, 2008

Temperature: 25°C

Tested by: Tom Gan

Humidity: 70 % RH

Polarity: Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
1083.33	V	63.81	61.90	-11.71	52.10	50.19	74.00	54.00	-3.81	AVG.
1106.66	V	63.25	---	-11.58	51.67	---	74.00	54.00	-2.33	Peak
1270.00	V	60.96	---	-10.69	50.27	---	74.00	54.00	-3.73	Peak
3233.33	V	51.78	---	-3.57	48.21	---	74.00	54.00	-5.79	Peak
N/A										
1083.33	H	59.78	---	-11.71	48.07	---	74.00	54.00	-5.93	Peak
1113.33	H	58.83	---	-11.55	47.28	---	74.00	54.00	-6.72	Peak
1623.33	H	55.79	---	-8.94	46.85	---	74.00	54.00	-7.15	Peak
3741.67	H	47.81	---	-2.34	45.47	---	74.00	54.00	-8.53	Peak
N/A										

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
 - b. AV Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.

**Operation Mode:** TX / IEEE 802.11n HT40 MHz / CH Mid**Test Date:** April 26, 2008**Temperature:** 25°C**Tested by:** Tom Gan**Humidity:** 70 % RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
1093.33	V	64.54	61.92	-11.66	52.88	50.26	74.00	54.00	-3.74	AVG.
1130.00	V	63.10	---	-11.46	51.64	---	74.00	54.00	-2.36	Peak
1250.00	V	60.29	---	-10.79	49.50	---	74.00	54.00	-4.50	Peak
3250.00	V	51.84	---	-3.53	48.31	---	74.00	54.00	-5.69	Peak
N/A										
1086.66	H	59.57	---	-11.69	47.88	---	74.00	54.00	-6.12	Peak
1606.66	H	55.82	---	-9.00	46.82	---	74.00	54.00	-7.18	Peak
1903.33	H	55.93	---	-7.84	48.09	---	74.00	54.00	-5.91	Peak
3750.00	H	47.11	---	-2.31	44.80	---	74.00	54.00	-9.20	Peak
N/A										

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
 - b. AV Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.



Operation Mode: TX / IEEE 802.11n HT40 MHz / CH High

Test Date: April 26, 2008

Temperature: 25°C

Tested by: Tom Gan

Humidity: 70 % RH

Polarity: Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
1083.33	V	64.40	63.06	-11.71	52.69	51.35	74.00	54.00	-2.65	AVG.
1103.33	V	63.41	---	-11.60	51.81	---	74.00	54.00	-2.19	Peak
1616.66	V	58.55	---	-8.96	49.59	---	74.00	54.00	-4.41	Peak
3266.67	V	51.76	---	-3.49	48.27	---	74.00	54.00	-5.73	Peak
N/A										
1063.33	H	58.68	---	-11.82	46.86	---	74.00	54.00	-7.14	Peak
1113.33	H	58.53	---	-11.55	46.98	---	74.00	54.00	-7.02	Peak
1906.66	H	54.67	---	-7.83	46.84	---	74.00	54.00	-7.16	Peak
3883.33	H	48.18	---	-1.97	46.21	---	74.00	54.00	-7.79	Peak
N/A										

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
 - b. AV Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.

7.6 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 μ H/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 (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

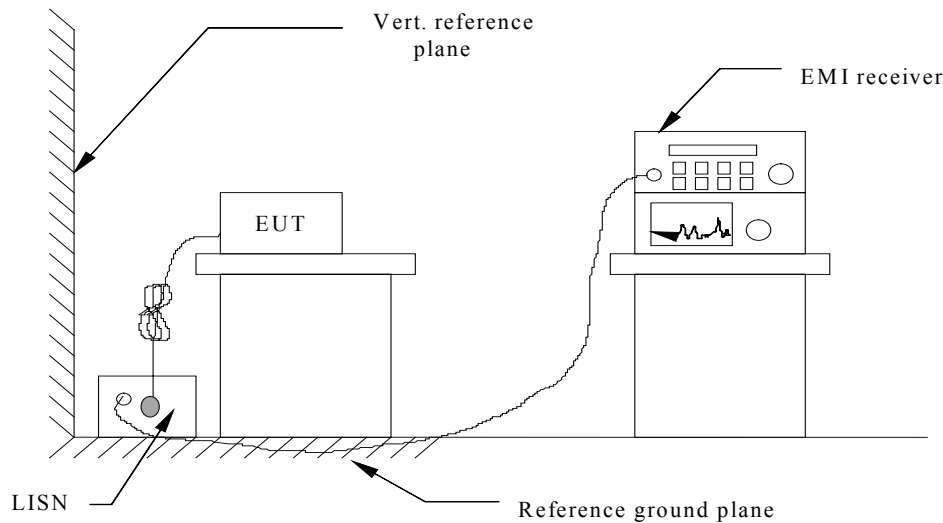
Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power Line (LINE and NEUTRAL) and ground at the power terminals.

MEASUREMENT EQUIPMENT USED

Conducted Emission Test Site G				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI TEST RECEIVR	ROHDE&SCHWARZ	ESCI	100088	02/24/2009
LISN	EMCO	3825/2	1371	02/24/2009
LISN	EMCO	3825/2	8901-1459	02/24/2009

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

Test Configuration



See test photographs attached in Appendix 1 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**

Test Mode: Normal Link	Location: Site G
Model Name: WLC-133NA	Test Date: April 26, 2008
Tested by: Tom Gan	Test Results: Passed

FREQ MHz	PEAK RAW dBuV	Q.P. RAW dBuV	AVG RAW dBuV	Q.P. Limit dBuV	AVG Limit dBuV	Q.P. Margin dB	AVG Margin dB	NOTE
0.172	41.86	---	---	65.36	55.36	---	-13.50	L1
0.365	38.38	---	---	59.86	49.86	---	-11.48	L1
0.802	37.72	---	---	56.00	46.00	---	-8.28	L1
2.208	31.21	---	---	56.00	46.00	---	-14.79	L1
6.769	37.79	---	---	60.00	50.00	---	-12.21	L1
12.621	38.10	---	---	60.00	50.00	---	-11.90	L1
0.153	48.39	---	---	65.89	55.89	---	-7.50	L2
0.353	38.61	---	---	60.17	50.17	---	-11.56	L2
0.817	38.64	---	---	56.00	46.00	---	-7.36	L2
4.925	38.75	---	---	56.00	46.00	---	-7.25	L2
8.789	41.02	---	---	60.00	50.00	---	-8.98	L2
11.210	41.11	---	---	60.00	50.00	---	-8.89	L2

Note: The chart above shows the highest readings taken from the final data.

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. “---” denotes the emission level was or more than 2dB below the Average limit, and no re-check was made.
4. 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.
5. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)

Note:

Freq. = Emission frequency in KHz

Factor (dB) = cable loss + Insertion loss of LISN+ Insertion loss of TRANSIENT LIMITER (The TRANSIENT LIMITER included 10 dB ATTENUATION)

Amptd dBuV = Uncorrected Analyzer/Receiver reading + cable loss + Insertion loss of LISN+ Insertion loss of TRANSIENT LIMITER,

if it > 0.5 dB

Limit dBuV = Limit stated in standard ; Margin dB= Reading in reference to limit

Calculation Formula

Margin (dB) = Amptd (dBuV) – Limit (dBuV)

Common Mode Conducted Emission

Not applicable