



FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

802.11n WLAN USB Adapter with 5dBi Antenna

Model: Wi.Queen -U23n

Trade Name: non brand

Issued to

ARGtek Communication Inc.
8F-9, No. 4, Lane 609, Sec. 5, Chung Hsin Rd.,
San Chung City, Taipei Hsien 241, Taiwan, R.O.C

Issued by



Compliance Certification Services Inc.
No. 11, Wu-Gong 6th Rd., Wugu Industrial Park,
Taipei Hsien 248, Taiwan (R.O.C.)
<http://www.ccsemc.com.tw>
service@ccsrf.com



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1. TEST RESULT CERTIFICATION

Applicant: ARGtek Communication Inc.
 8F-9, No. 4, Lane 609, Sec. 5, Chung Hsin Rd.,
 San Chung City, Taipei Hsien 241, Taiwan, R.O.C

Equipment Under Test: 802.11n WLAN USB Adapter with 5dBi Antenna

Trade Name: non brand

Model Number: Wi.Queen -U23n

Date of Test: May 12 ~ 13, 2009

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 15 Subpart C	No non-compliance noted
Deviation from Applicable Standard	
None	

We hereby certify that:

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

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

Approved by:

Reviewed by:

Rex Lai
 Section Manager
 Compliance Certification Services Inc.

Gina Lo
 Section Manager
 Compliance Certification Services Inc.



2. EUT DESCRIPTION

Product	802.11n WLAN USB Adapter with 5dBi Antenna
Trade Name	non brand
Model Number	Wi.Queen -U23n
Model Discrepancy	N/A
Power Supply	Power form host PC.
Frequency Range	IEEE 802.11b/g mode: 2.412~2.462 GHz
Transmit Power	IEEE 802.11b mode: 16.77 dBm IEEE 802.11g mode: 14.23 dBm draft 802.11n Standard-20 MHz Channel mode: 16.06 dBm draft 802.11n Wide-40 MHz Channel mode: 14.74 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 54 Mbps) draft 802.11n Standard-20 MHz Channel mode: OFDM (6.5, 7.2, 13, 14.4, 14.44, 19.5, 21.7, 26, 28.89, 28.9, 39, 43.3, 43.33, 52, 57.78, 57.8, 58.5, 65.0, 72.2, 78, 86.67, 104, 115.56, 117, 130, 144.44 Mbps) draft 802.11n Wide-40 MHz Channel mode: OFDM (13.5, 15, 27, 30, 40.5, 45, 54, 60, 81, 90, 108, 120, 121.5, 135, 150, 162, 180, 216, 240, 243, 270, 300 Mbps)
Number of Channels	IEEE 802.11b/g mode: 11 Channels draft 802.11n Standard-20 MHz Channel mode: 11 Channels draft 802.11n Wide-40 MHz Channel mode: 7 Channels
Antenna Specification	Dipole Antenna / Gain: 5 dBi

Remark:

1. The sample selected for test was production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for FCC ID: VYXARGTEK-U23N 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 Part 15.207, 15.209 and 15.247.

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4: 2003 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4: 2003.



3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

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

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
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
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	(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 EUT (model: Wi.Queen -U23n) had been tested under operating condition.

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

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz and power line conducted emissions below 30MHz, which worst case was in normal link mode only.

IEEE 802.11b mode:

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

IEEE 802.11g mode:

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

draft 802.11n Standard-20 MHz Channel mode:

Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 6.5Mbps data rate were chosen for full testing.

draft 802.11n Wide-40 MHz Channel mode:

Channel Low (2422MHz), Channel Mid (2437MHz) and Channel High (2452MHz) with 13.5Mbps data rate were chosen for full testing.



4. INSTRUMENT CALIBRATION

4.1 MEASURING INSTRUMENT CALIBRATION

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

4.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

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

Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360131	03/05/2010

3M Semi Anechoic Chamber				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US42510252	09/10/2009
Test Receiver	Rohde&Schwarz	ESCI	100064	11/29/2009
Switch Controller	TRC	Switch Controller	SC94050010	05/02/2010
4 Port Switch	TRC	4 Port Switch	SC94050020	05/02/2010
Loop Antenna	EMCO	6502	8905/2356	05/28/2010
Horn-Antenna	TRC	HA-0502	06	06/04/2009
Horn-Antenna	TRC	HA-0801	04	06/18/2009
Horn-Antenna	TRC	HA-1201A	01	08/11/2009
Horn-Antenna	TRC	HA-1301A	01	08/11/2009
Bilog- Antenna	Sunol Sciences	JB3	A030205	03/27/2010
Turn Table	Max-Full	MFT-120S	T120S940302	N.C.R.
Antenna Tower	Max-Full	MFA-430	A440940302	N.C.R.
Controller	Max-Full	MF-CM886	CC-C-1F-13	N.C.R.
Site NSA	CCS	N/A	FCC MRA: TW1039 IC: 2324G-1/-2	10/17/2010 11/04/2010
Test S/W	LABVIEW (V 6.1)			

Conducted Emission Room # 3				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	R&S	ESCS30	847793/012	03/08/2010
LISN	R&S	ENV216	100066	05/10/2010
LISN	R&S	ENV 4200	830326/016	04/09/2010
Test S/W	LabVIEW 6.1 (CCS Conduction Test SW Version_01)			



4.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
Powerline Conducted Emission	+/- 1.7806
3M Semi Anechoic Chamber / 30MHz ~ 1GHz	+/-3.7046
3M Semi Anechoic Chamber / Above 1GHz	+/-3.0958

Remark: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.



5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

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

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

Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029

No.11, Wugong 6th Rd., Wugu Industrial Park, Taipei Hsien 248, Taiwan

Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045

No.81-1, Lane 210, Bade 2nd Rd., Luchu Hsiang, Taoyuan Hsien 338, Taiwan

Tel: 886-3-324-0332 / Fax: 886-3-324-5235

Remark: The powerline conducted emission test items was tested at Compliance Certification Services Inc. (Linkou Lab.) The test equipments were listed in page 9 and the test data, please refer page 163-164.

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

5.2 EQUIPMENT

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




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

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

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

5.3 TABLE OF ACCREDITATIONS AND LISTINGS

* No part of this report may be used to claim or imply product endorsement by A2LA or any agency of the US Government.

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements	 FCC MRA: TW1039
Taiwan	TAF	LP0002, RTTE01, FCC Method-47 CFR Part 15 Subpart C, D, E, RSS-210, RSS-310 IDA TS SRD, AS/NZS 4268, AS/NZS 4771, TS 12.1 & 12.2, ETSI EN 300 440-1, ETSI EN 300 440-2, ETSI EN 300 328, ETSI EN 300 220-1, ETSI EN 300 220-2, ETSI EN 301 893, ETSI EN 301 489-1/3/7/17 FCC OET Bulletin 65 + Supplement C, EN 50360, EN 50361, EN 50371, RSS 102, EN 50383, EN 50385, EN 50392, IEC 62209, CNS 14958-1, CNS 14959 FCC Method -47 CFR Part 15 Subpart B IEC / EN 61000-3-2, IEC / EN 61000-3-3, IEC / EN 61000-4-2/3/4/5/6/8/11	 Testing Laboratory 1309
Canada	Industry Canada	3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform	 IC 2324G-1 IC 2324G-2



6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

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

6.2 SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
1.	Notebook PC	ASUS	M5200AE	5BN0AG019631	PD9WM3B2100	N/A	AC I/P: Unshielded, 1.8m with a core DC O/P: Unshielded, 1.8m
2.	Notebook PC	DELL	PP05L	7T390 A03	E2K5HCKT	N/A	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core
3.	LCD Monitor	SAMSUNG	959NF	AQ19H2RT706126P	FCC DoC	Shielded, 1.8m with 2 cores	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core
4.	USB Mouse	HP	MO19UCA	20440964	FCC DoC	Shielded, 1.8m	N/A
5.	USB 2.0 External HDD	TeraSyS	F12-UF(COMBO)	A0100215- 420014	FCC DoC	Shielded, 1.8m	N/A
6.	Super a/g 108Mbps Wireless Lan Router (Remote)	PLANEX	BLW-04SAG	40DDA0421	SJ9-BLW54SAG	N/A	Unshielded, 1.8m

Remark:

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

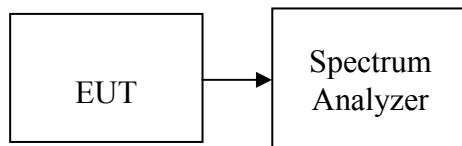
7. FCC PART 15.247 REQUIREMENTS

7.1 6DB BANDWIDTH

LIMIT

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.

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 = 100 kHz, VBW = RBW, Span = 50 MHz, Sweep = auto.
4. Mark the peak frequency and -6dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.



TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	12.17	>500	PASS
Mid	2437	11.42		PASS
High	2462	12.50		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	16.58	>500	PASS
Mid	2437	16.58		PASS
High	2462	16.50		PASS

Test mode: draft 802.11n Standard-20 MHz Channel mode

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	17.42	>500	PASS
Mid	2437	17.42		PASS
High	2462	17.58		PASS

Test mode: draft 802.11n Wide-40 MHz Channel mode

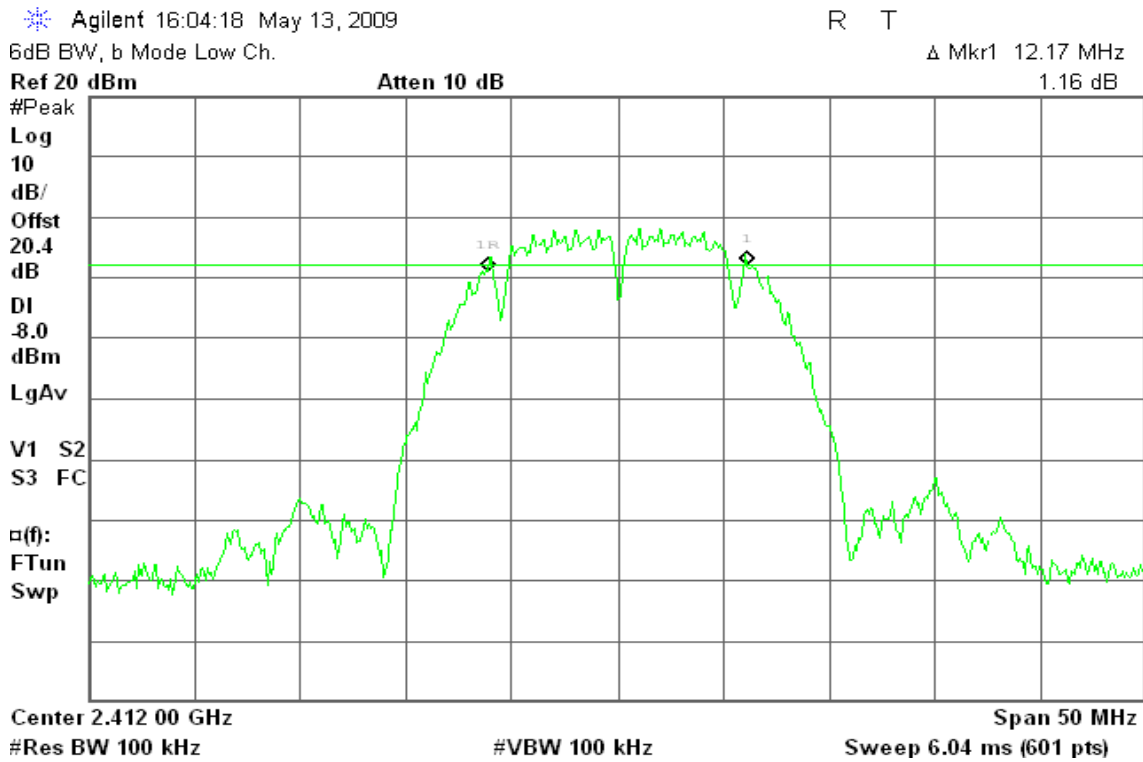
Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2422	35.82	>500	PASS
Mid	2437	36.17		PASS
High	2452	36.40		PASS



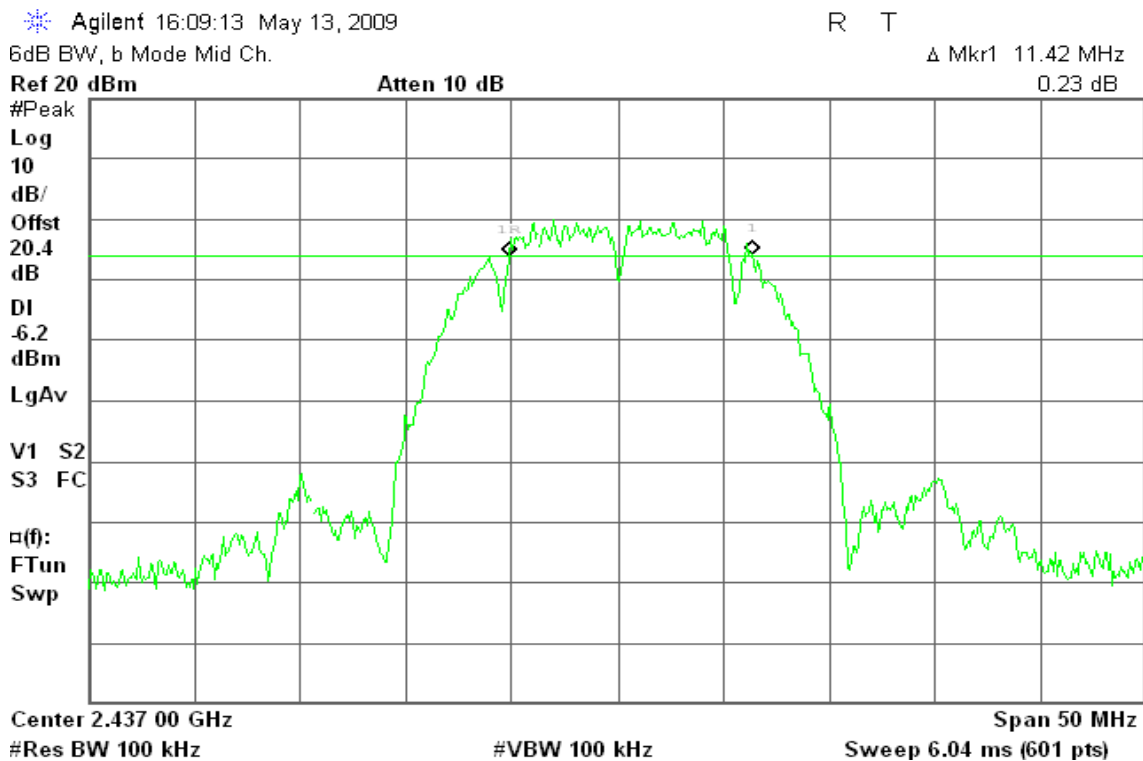
Test Plot

IEEE 802.11b mode

6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)





6dB Bandwidth (CH High)

Agilent 16:21:48 May 13, 2009

R T

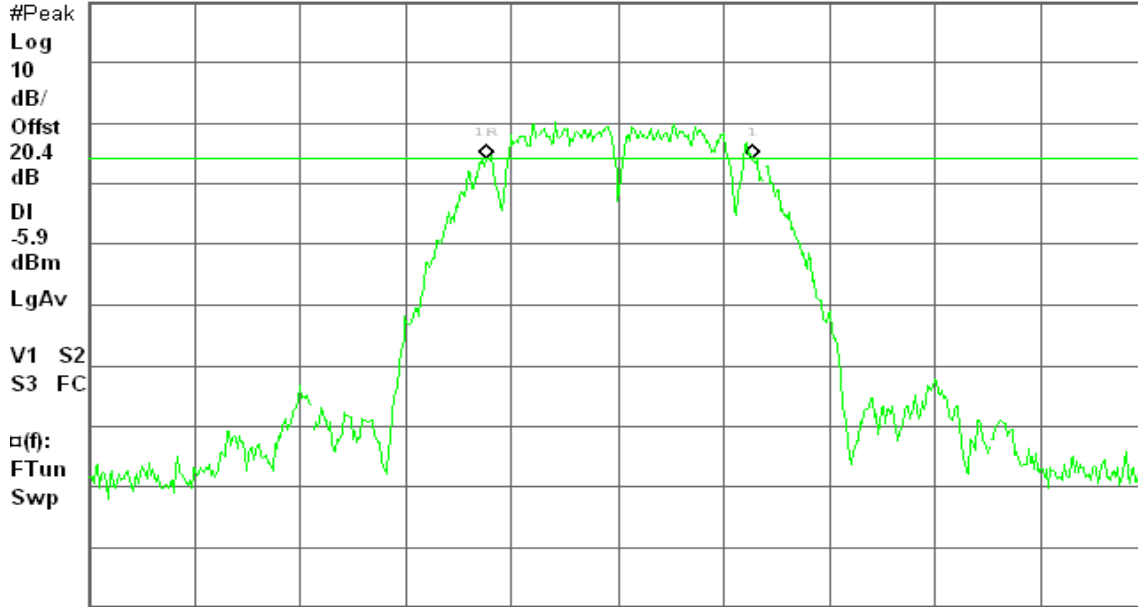
6dB BW, b Mode High Ch.

Δ Mkr1 12.50 MHz

Ref 20 dBm

Atten 10 dB

-0.01 dB



Center 2.462 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 6.04 ms (601 pts)

IEEE 802.11g mode

6dB Bandwidth (CH Low)

Agilent 15:26:32 May 13, 2009

R T

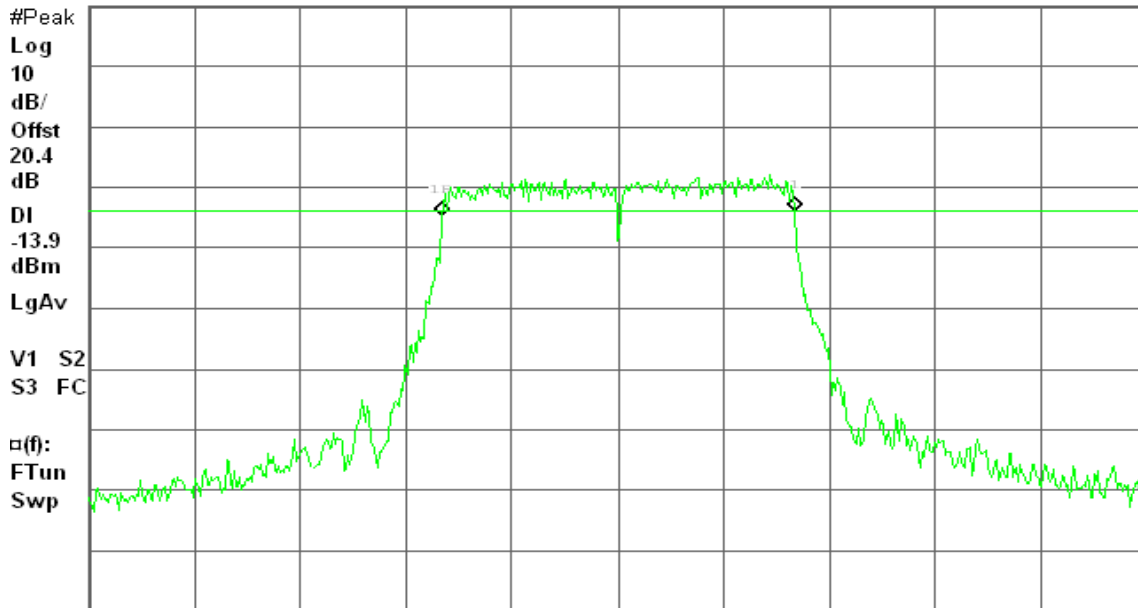
6dB BW, g Mode Low Ch.

Δ Mkr1 16.58 MHz

Ref 20 dBm

Atten 10 dB

0.80 dB



Center 2.412 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 6.04 ms (601 pts)



6dB Bandwidth (CH Mid)

Agilent 15:31:12 May 13, 2009

R T

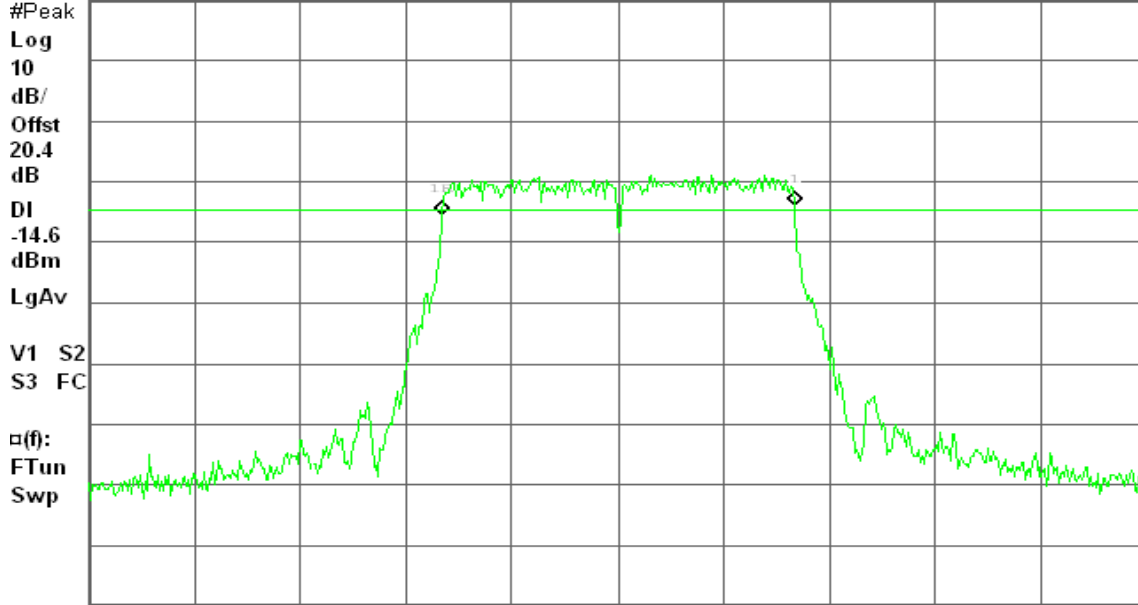
6dB BW, g Mode Mid Ch.

Δ Mkr1 16.58 MHz

Ref 20 dBm

Atten 10 dB

1.73 dB



Center 2.437 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 6.04 ms (601 pts)

6dB Bandwidth (CH High)

Agilent 15:43:50 May 13, 2009

R T

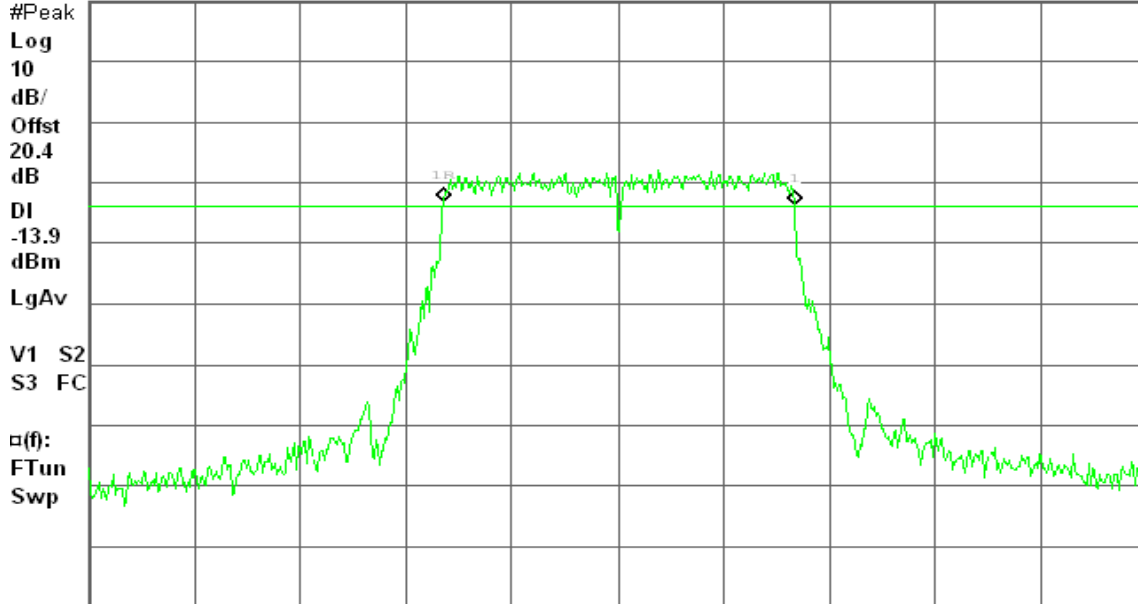
6dB BW, g Mode High Ch.

Δ Mkr1 16.50 MHz

Ref 20 dBm

Atten 10 dB

-0.44 dB



Center 2.462 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 6.04 ms (601 pts)



draft 802.11n Standard-20 MHz Channel mode

6dB Bandwidth (CH Low)

Agilent 15:08:22 May 13, 2009

R T

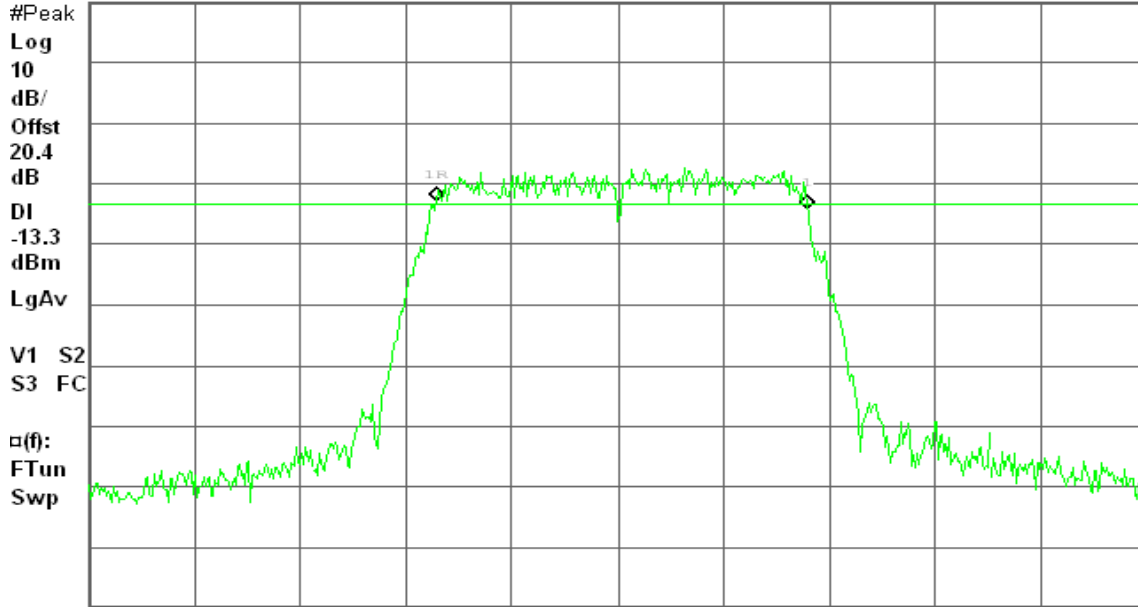
6dB BW, g Mode Low Ch.

Δ Mkr1 17.42 MHz

Ref 20 dBm

Atten 10 dB

-1.43 dB



Center 2.412 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 6.04 ms (601 pts)

6dB Bandwidth (CH Mid)

Agilent 15:12:53 May 13, 2009

R T

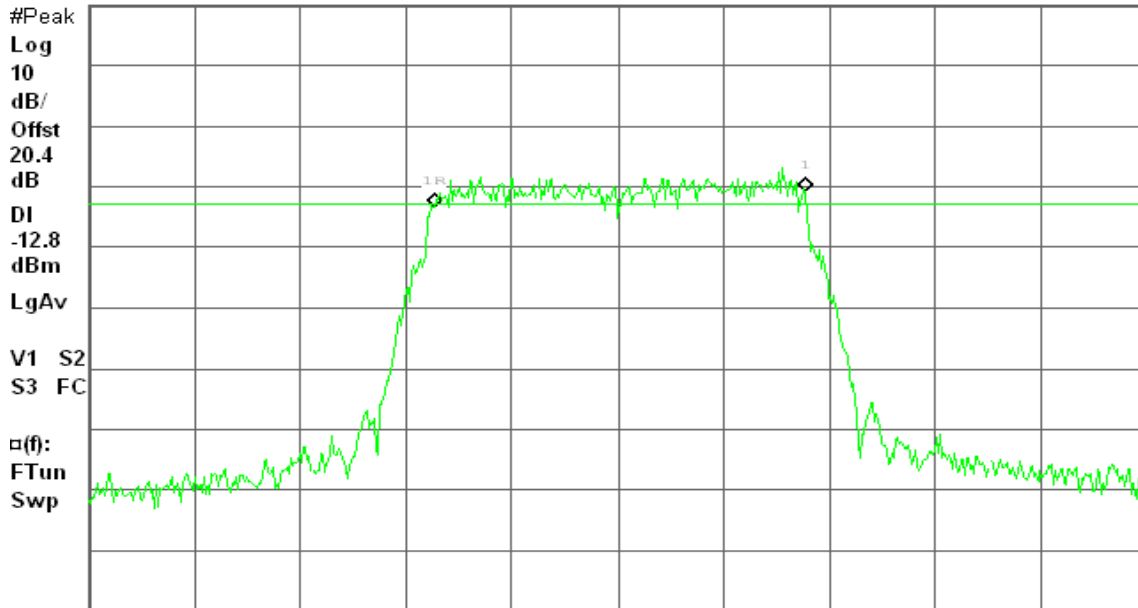
6dB BW, g Mode Mid Ch.

Δ Mkr1 17.42 MHz

Ref 20 dBm

Atten 10 dB

2.35 dB



Center 2.437 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 6.04 ms (601 pts)



6dB Bandwidth (CH High)

Agilent 15:17:35 May 13, 2009

R L

6dB BW, g Mode High Ch.

Δ Mkr1 17.58 MHz

Ref 20 dBm

Atten 10 dB

0.66 dB

#Peak

Log

10

dB/

Offst

20.4

dB

DI

-13.8

dBm

LgAv

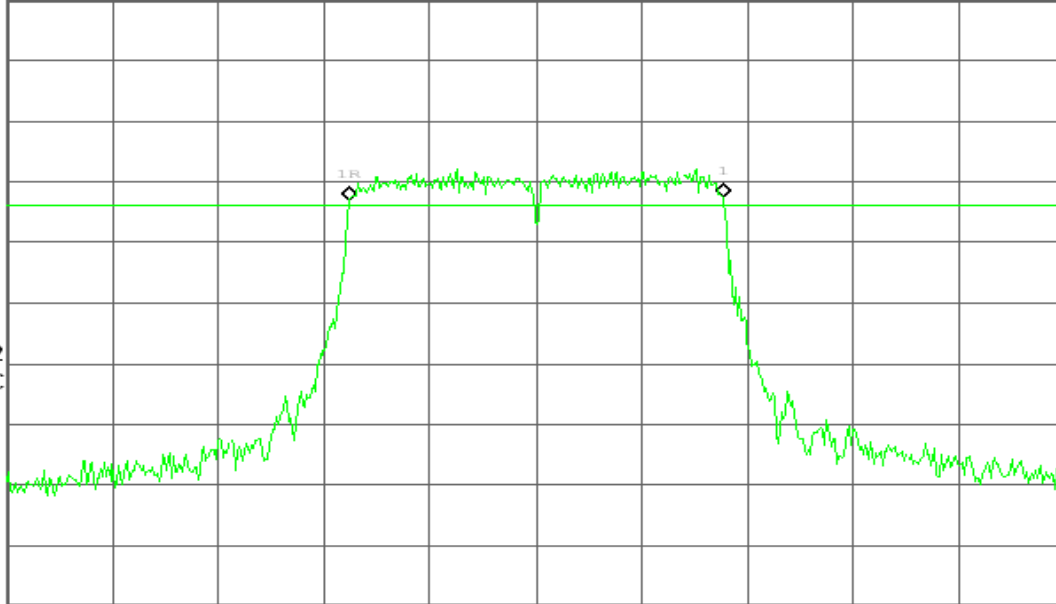
V1 S2

S3 FC

□(f):

FTun

Swp



Center 2.462 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 6.04 ms (601 pts)

draft 802.11n Wide-40 MHz Channel mode

6dB Bandwidth (CH Low)

Agilent 15:02:05 May 13, 2009

R T

6dB BW, g Mode Low Ch.

Δ Mkr1 35.82 MHz

Ref 20 dBm

Atten 10 dB

1.93 dB

#Peak

Log

10

dB/

Offst

20.4

dB

DI

-15.4

dBm

LgAv

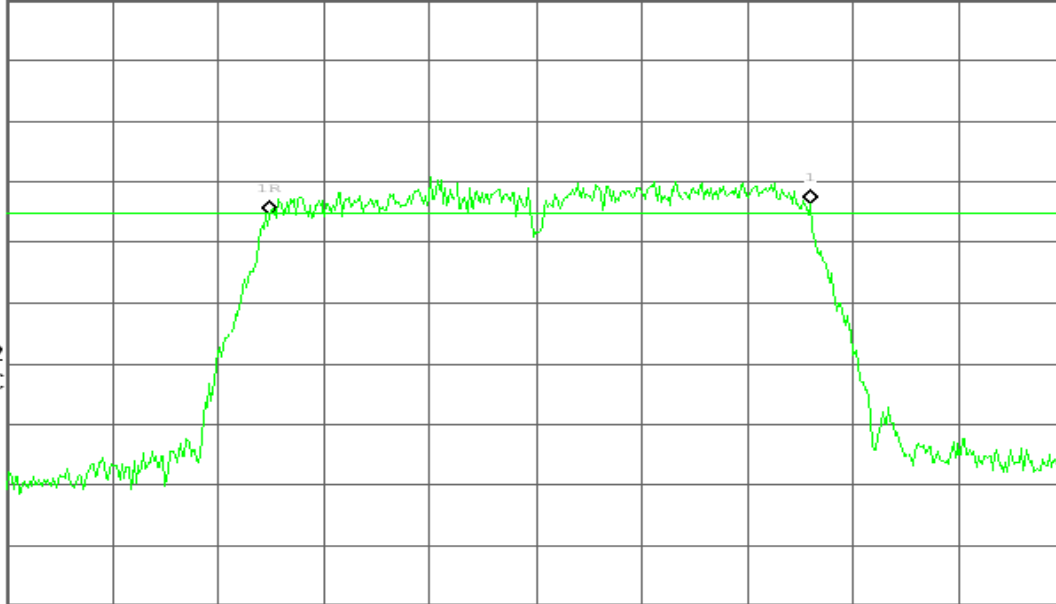
V1 S2

S3 FC

□(f):

FTun

Swp



Center 2.422 00 GHz

Span 70 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 8.44 ms (601 pts)



6dB Bandwidth (CH Mid)

Agilent 14:57:59 May 13, 2009

R T

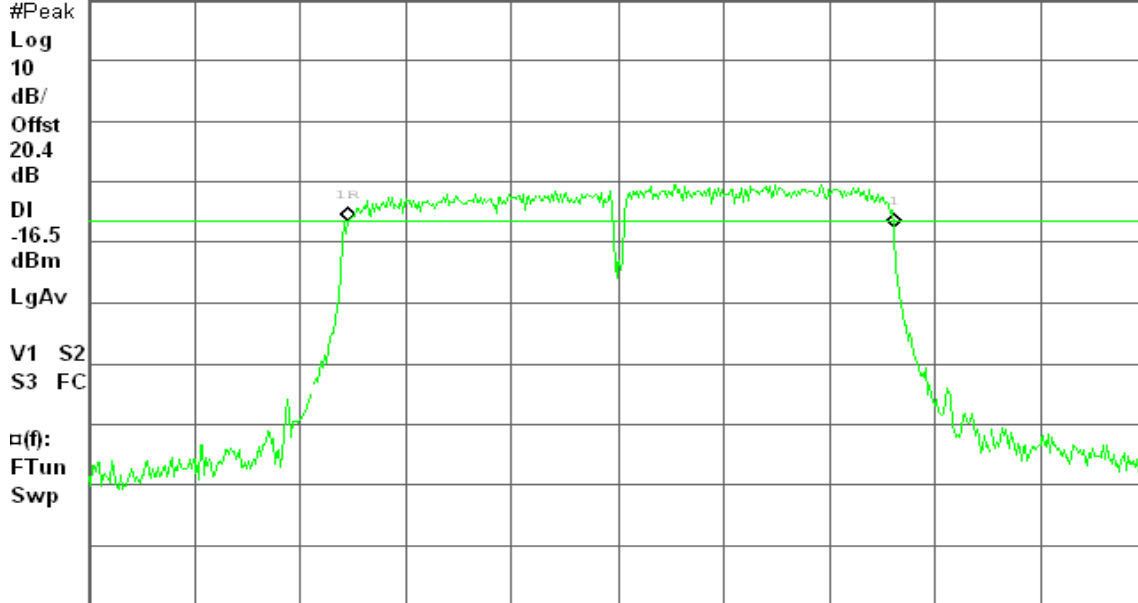
6dB BW, g Mode Mid Ch.

Δ Mkr1 36.17 MHz

Ref 20 dBm

Atten 10 dB

-1.05 dB



Center 2.437 00 GHz

Span 70 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 8.44 ms (601 pts)

6dB Bandwidth (CH High)

Agilent 14:52:04 May 13, 2009

R T

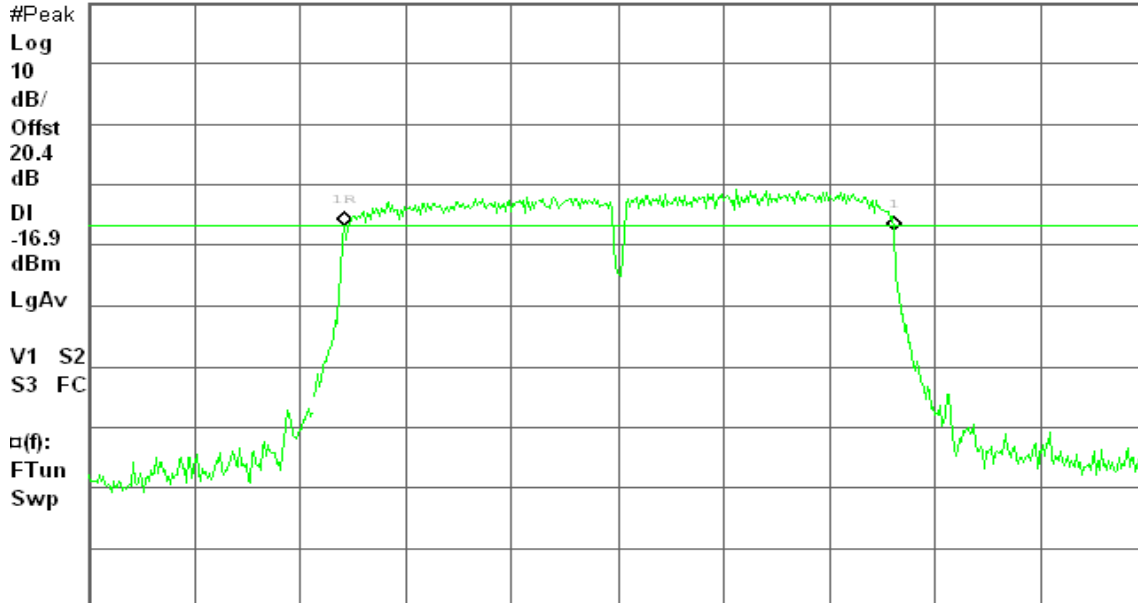
6dB BW, g Mode High Ch.

Δ Mkr1 36.40 MHz

Ref 20 dBm

Atten 10 dB

-0.63 dB



Center 2.452 00 GHz

Span 70 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 8.44 ms (601 pts)

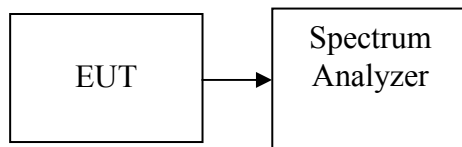
7.2 PEAK POWER

LIMIT

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

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

Test Configuration



TEST PROCEDURE

1. Peak power is measured using the spectrum analyzer's internal channel power integration function.
2. Power is integrated over a bandwidth greater than or equal to the 99% bandwidth.

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

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	13.38	0.02178	1.00	PASS
Mid	2437	15.67	0.03690		PASS
High	2462	16.77	0.04753		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	14.10	0.02570	1.00	PASS
Mid	2437	13.50	0.02239		PASS
High	2462	14.23	0.02649		PASS

Test mode: draft 802.11n Standard-20 MHz Channel mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	14.07	0.02553	1.00	PASS
Mid	2437	16.00	0.03981		PASS
High	2462	16.06	0.04036		PASS

Test mode: draft 802.11n Wide-40 MHz Channel mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2422	14.11	0.02576	1.00	PASS
Mid	2437	14.74	0.02979		PASS
High	2452	14.35	0.02723		PASS



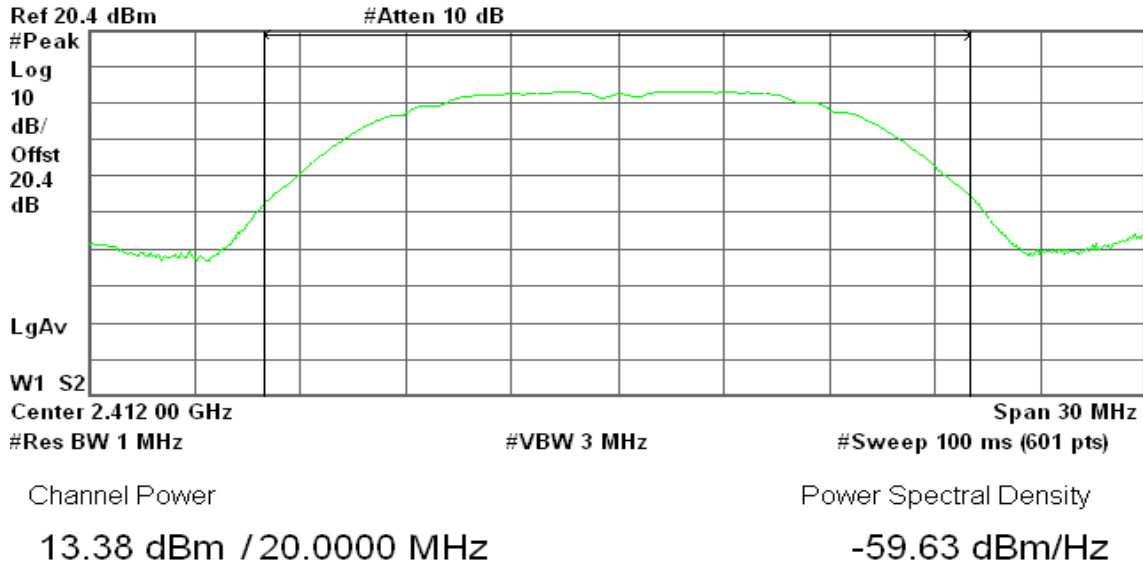
Test Plot

IEEE 802.11b mode

Peak Power (CH Low)

Agilent 13:28:57 May 13, 2009

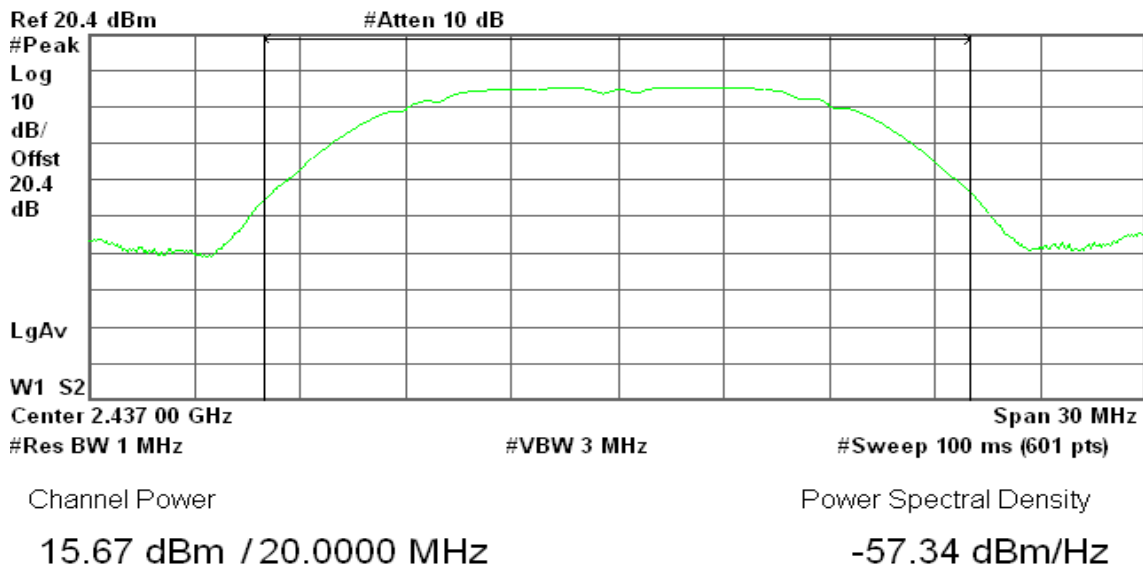
R T



Peak Power (CH Mid)

Agilent 13:27:31 May 13, 2009

R T

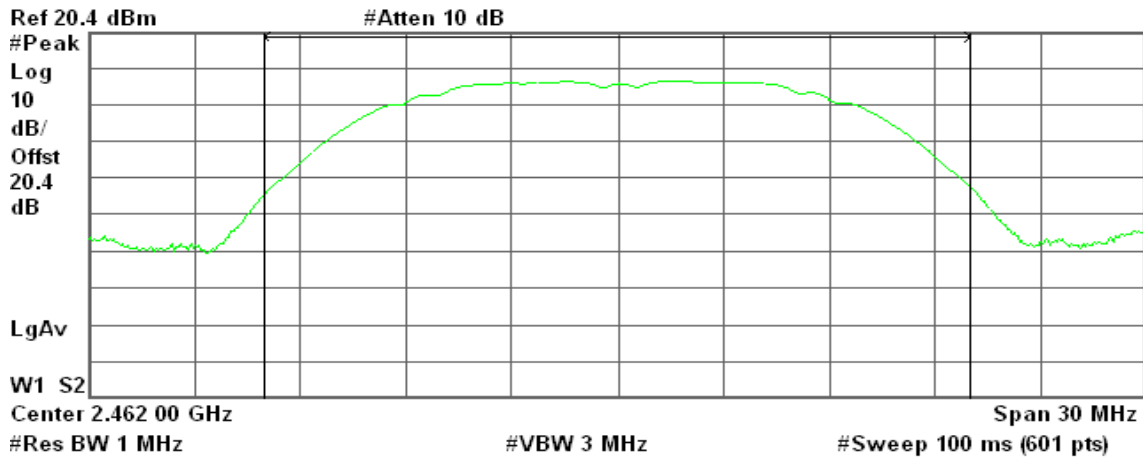




Peak Power (CH High)

Agilent 13:26:05 May 13, 2009

R T



Channel Power

16.77 dBm / 20.0000 MHz

Power Spectral Density

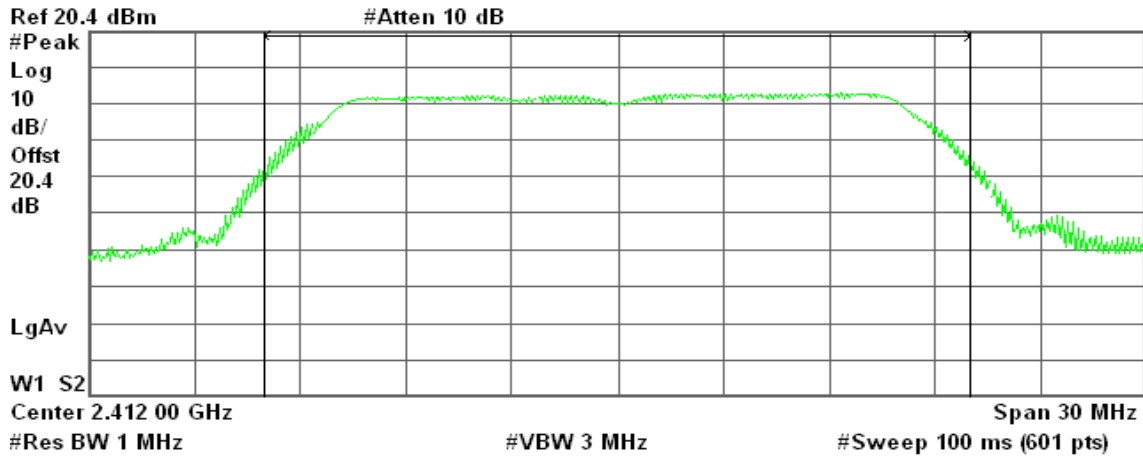
-56.25 dBm/Hz

IEEE 802.11g mode

Peak Power (CH Low)

Agilent 13:32:03 May 13, 2009

R T



Channel Power

14.10 dBm / 20.0000 MHz

Power Spectral Density

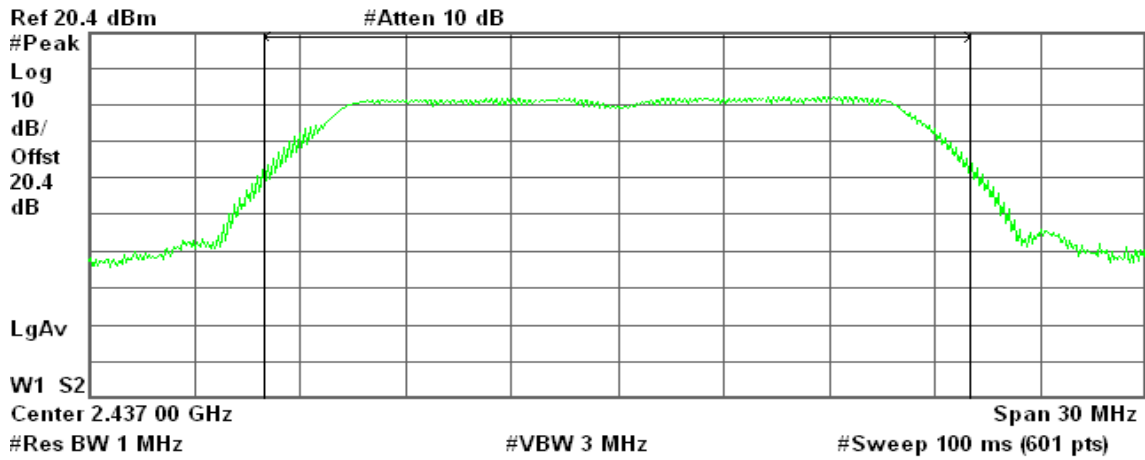
-58.91 dBm/Hz



Peak Power (CH Mid)

Agilent 13:35:08 May 13, 2009

R T



Channel Power

13.50 dBm / 20.0000 MHz

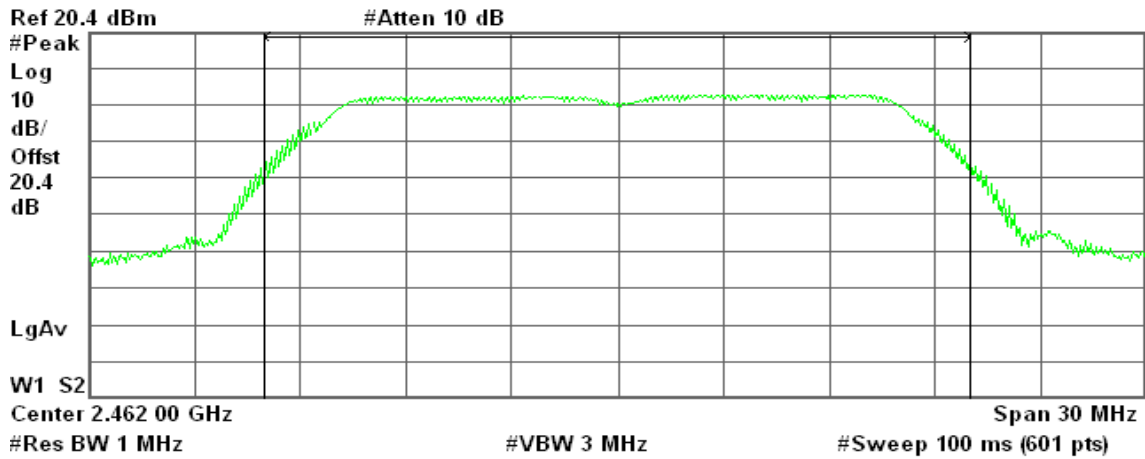
Power Spectral Density

-59.51 dBm/Hz

Peak Power (CH High)

Agilent 13:37:00 May 13, 2009

R T



Channel Power

14.23 dBm / 20.0000 MHz

Power Spectral Density

-58.78 dBm/Hz

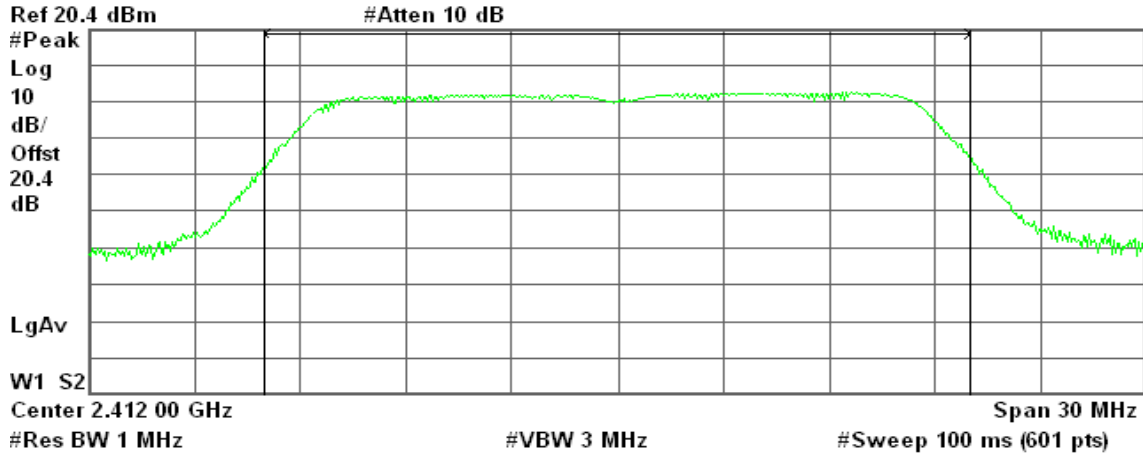


draft 802.11n Standard-20 MHz Channel mode

Peak Power (CH Low)

Agilent 14:46:12 May 13, 2009

R T



Channel Power

14.07 dBm / 20.0000 MHz

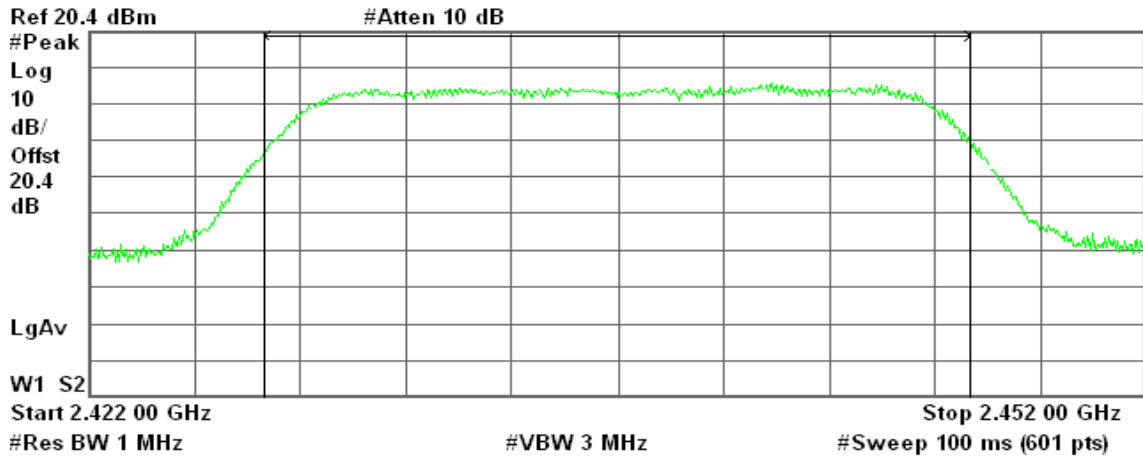
Power Spectral Density

-58.94 dBm/Hz

Peak Power (CH Mid)

Agilent 14:45:33 May 13, 2009

R T



Channel Power

16.00 dBm / 20.0000 MHz

Power Spectral Density

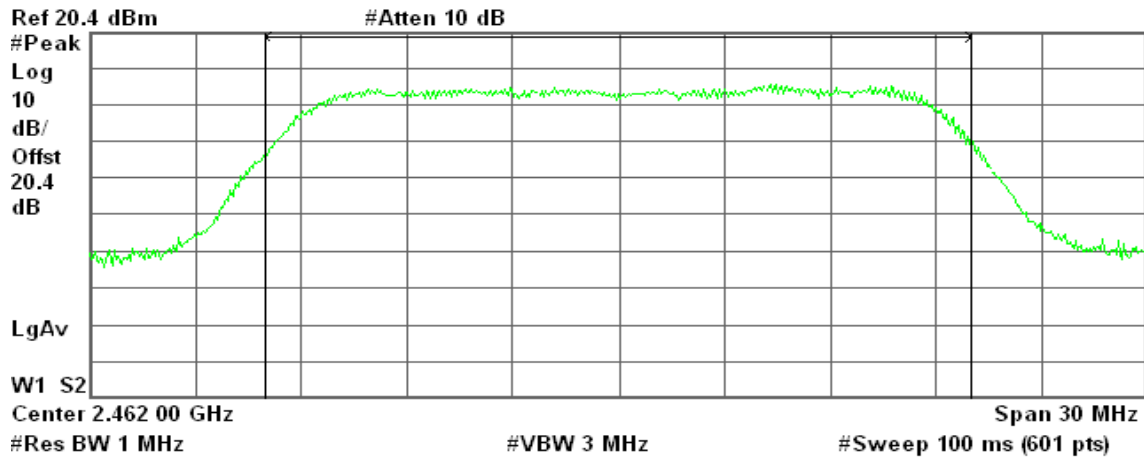
-57.01 dBm/Hz



Peak Power (CH High)

Agilent 14:44:13 May 13, 2009

R T



Channel Power

16.06 dBm / 20.0000 MHz

Power Spectral Density

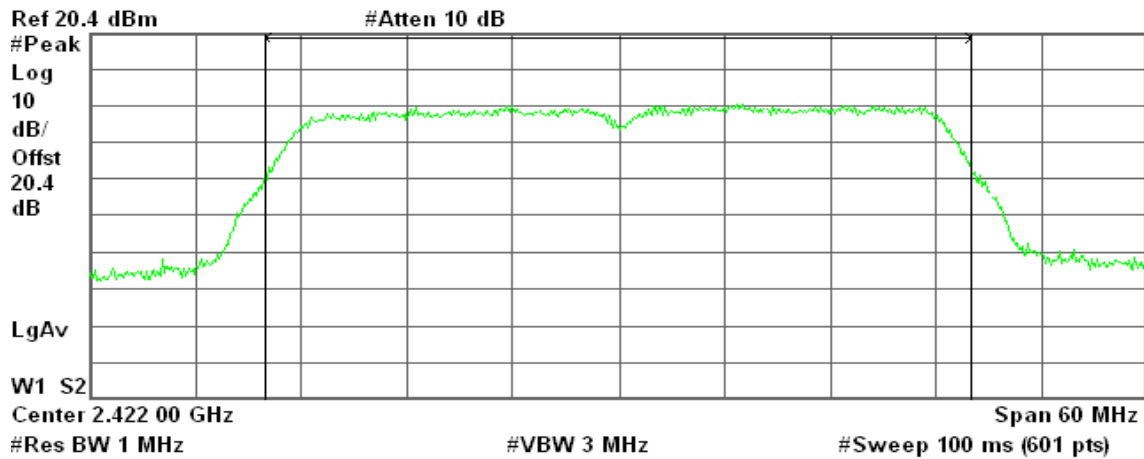
-56.95 dBm/Hz

draft 802.11n Wide-40 MHz Channel mode

Peak Power (CH Low)

Agilent 14:47:22 May 13, 2009

R T



Channel Power

14.11 dBm / 40.0000 MHz

Power Spectral Density

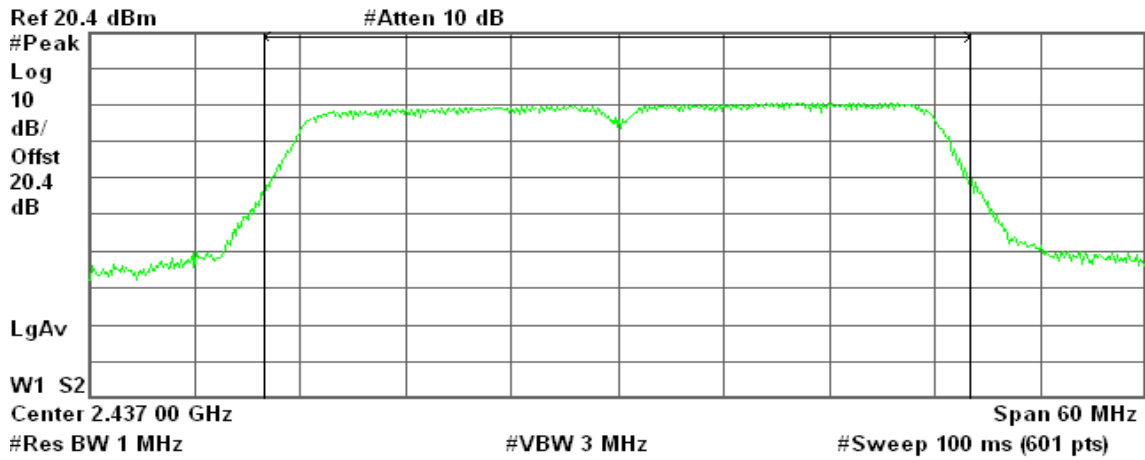
-61.91 dBm/Hz



Peak Power (CH Mid)

Agilent 14:47:48 May 13, 2009

R T



Channel Power

14.74 dBm / 40.0000 MHz

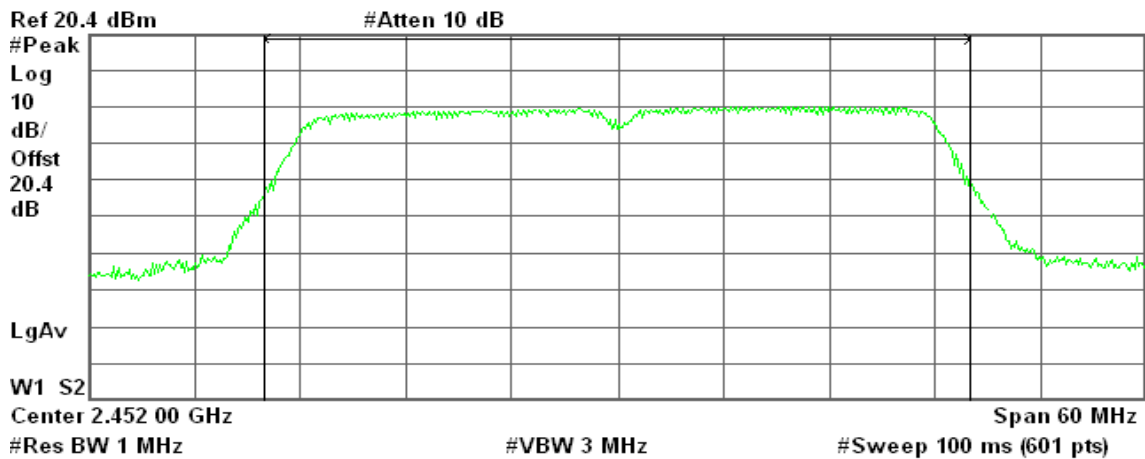
Power Spectral Density

-61.28 dBm/Hz

Peak Power (CH High)

Agilent 14:48:38 May 13, 2009

R T



Channel Power

14.35 dBm / 40.0000 MHz

Power Spectral Density

-61.67 dBm/Hz

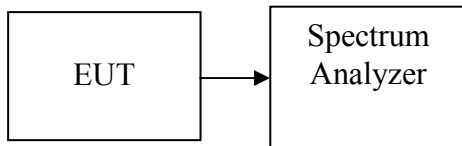


7.3 AVERAGE POWER

LIMIT

None; for reporting purposes only.

Test Configuration



TEST PROCEDURE

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

TEST RESULTS

No non-compliance noted



Test Data

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	Output Power (dBm)
Low	2412	10.22
Mid	2437	12.74
High	2462	13.32

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power (dBm)
Low	2412	7.00
Mid	2437	6.25
High	2462	7.05

Test mode: draft 802.11n Standard-20 MHz Channel mode

Channel	Frequency (MHz)	Output Power (dBm)
Low	2412	6.71
Mid	2437	7.59
High	2462	7.30

Test mode: draft 802.11n Wide-40 MHz Channel mode

Channel	Frequency (MHz)	Output Power (dBm)
Low	2422	6.70
Mid	2437	7.28
High	2452	7.23



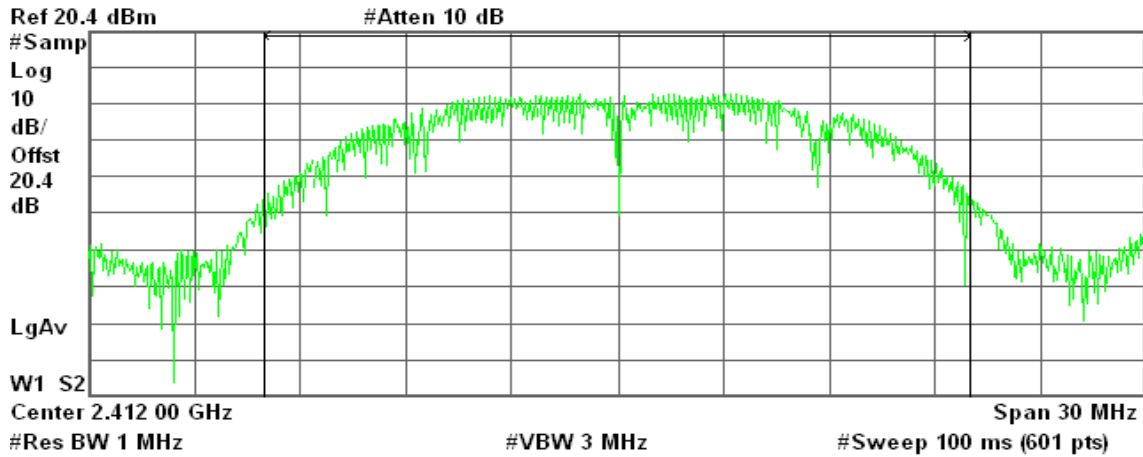
Test Plot

IEEE 802.11b mode

Average Power (CH Low)

Agilent 13:30:27 May 13, 2009

R T



Channel Power

10.22 dBm / 20.0000 MHz

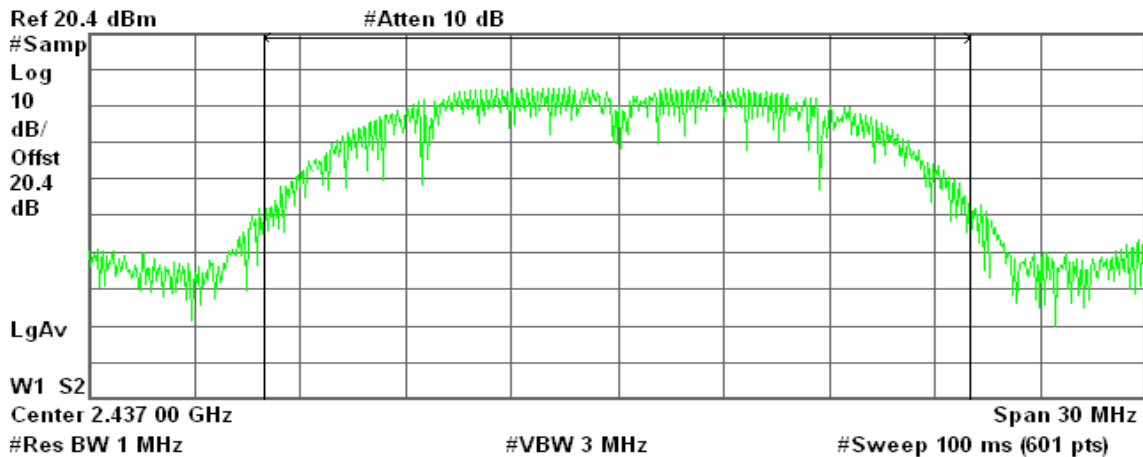
Power Spectral Density

-62.79 dBm/Hz

Average Power (CH Mid)

Agilent 13:27:14 May 13, 2009

R T



Channel Power

12.74 dBm / 20.0000 MHz

Power Spectral Density

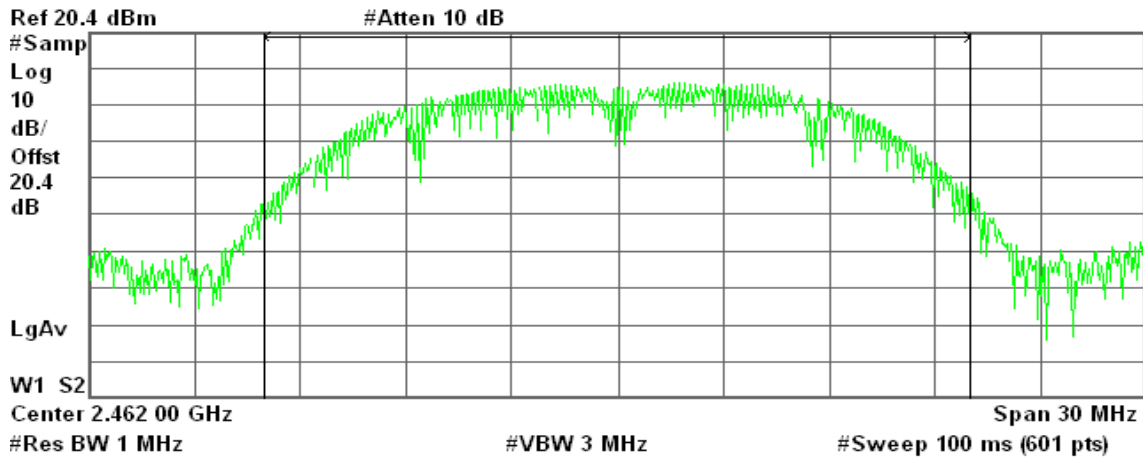
-60.27 dBm/Hz



Average Power (CH High)

Agilent 13:26:23 May 13, 2009

R T



Channel Power

13.32 dBm / 20.0000 MHz

Power Spectral Density

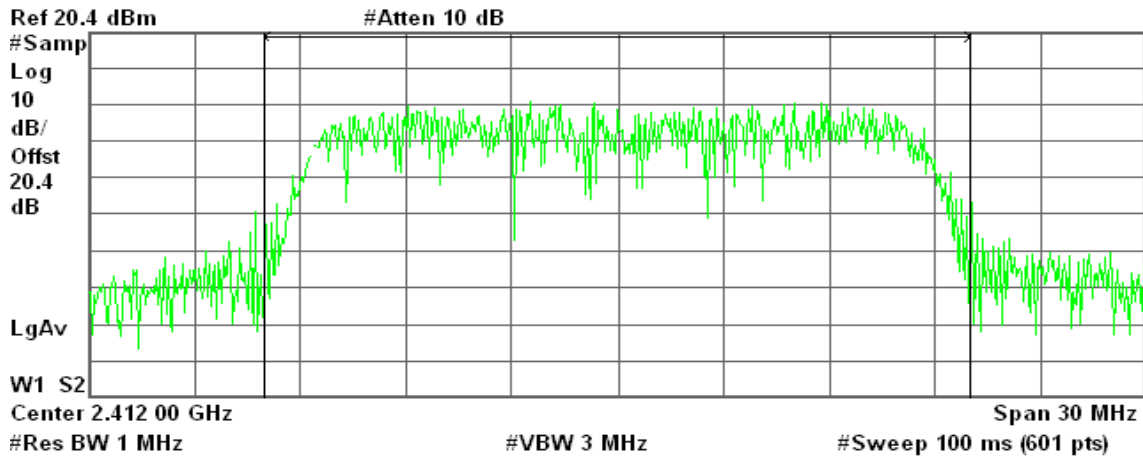
-59.69 dBm/Hz

IEEE 802.11g mode

Average Power (CH Low)

Agilent 13:31:38 May 13, 2009

R T



Channel Power

7.00 dBm / 20.0000 MHz

Power Spectral Density

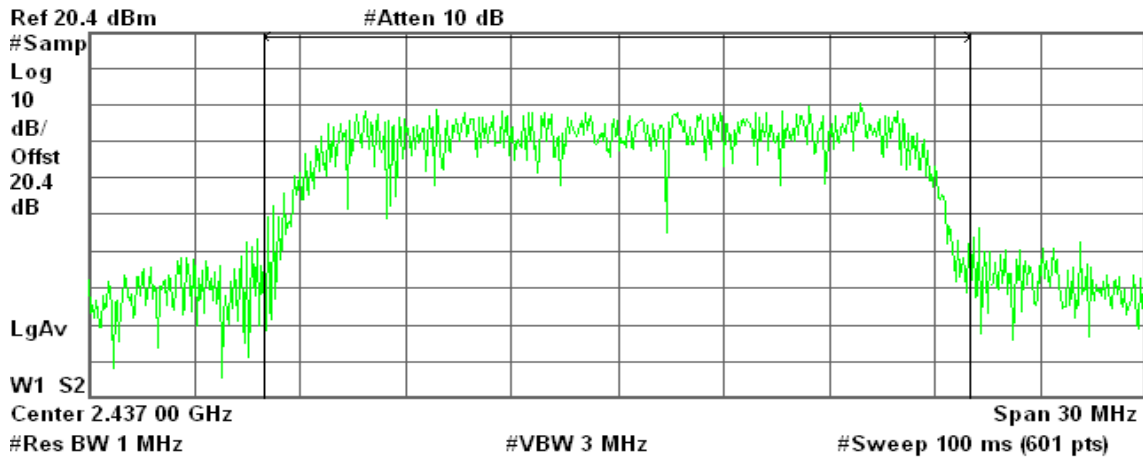
-66.01 dBm/Hz



Average Power (CH Mid)

Agilent 13:35:48 May 13, 2009

R T



Channel Power

6.25 dBm / 20.0000 MHz

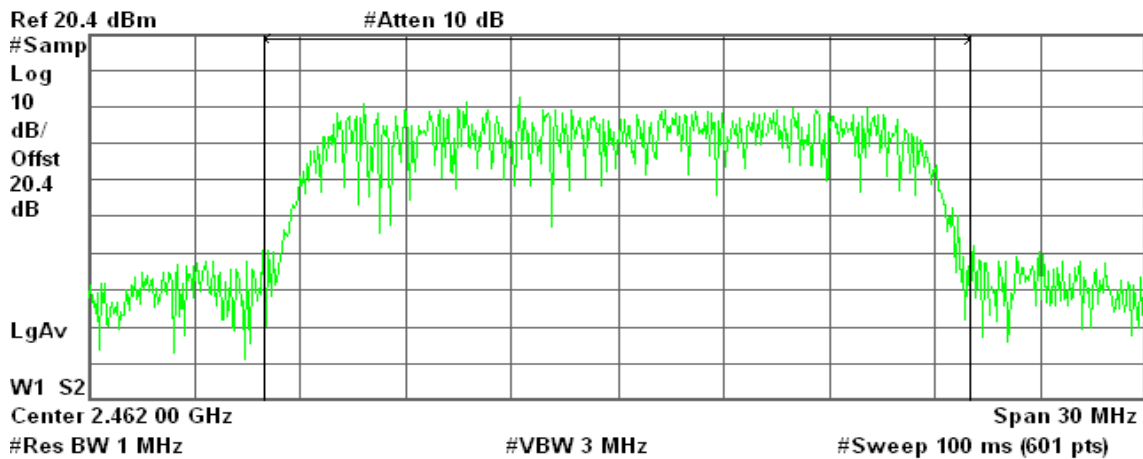
Power Spectral Density

-66.76 dBm/Hz

Average Power (CH High)

Agilent 13:36:35 May 13, 2009

R T



Channel Power

7.05 dBm / 20.0000 MHz

Power Spectral Density

-65.96 dBm/Hz

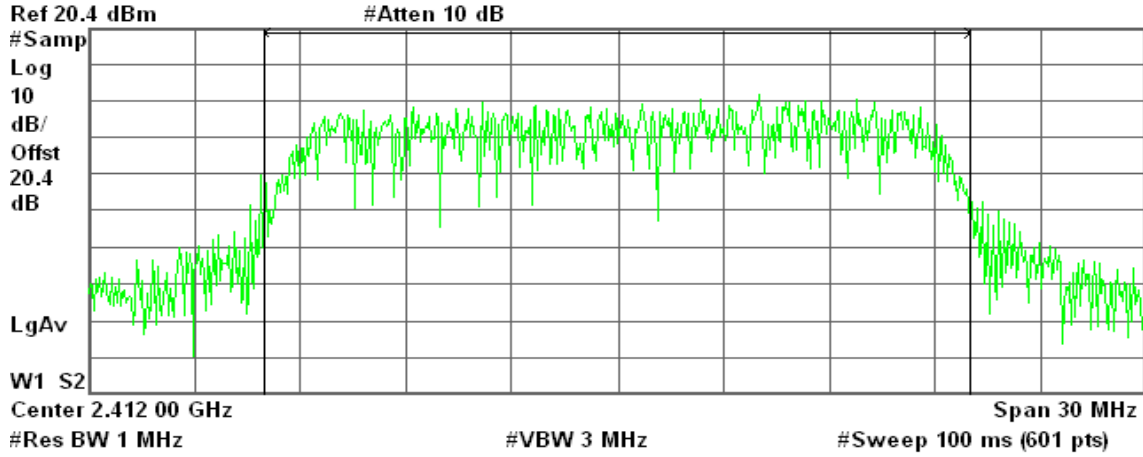


draft 802.11n Standard-20 MHz Channel mode

Average Power (CH Low)

Agilent 14:46:26 May 13, 2009

R T



Channel Power

6.71 dBm / 20.0000 MHz

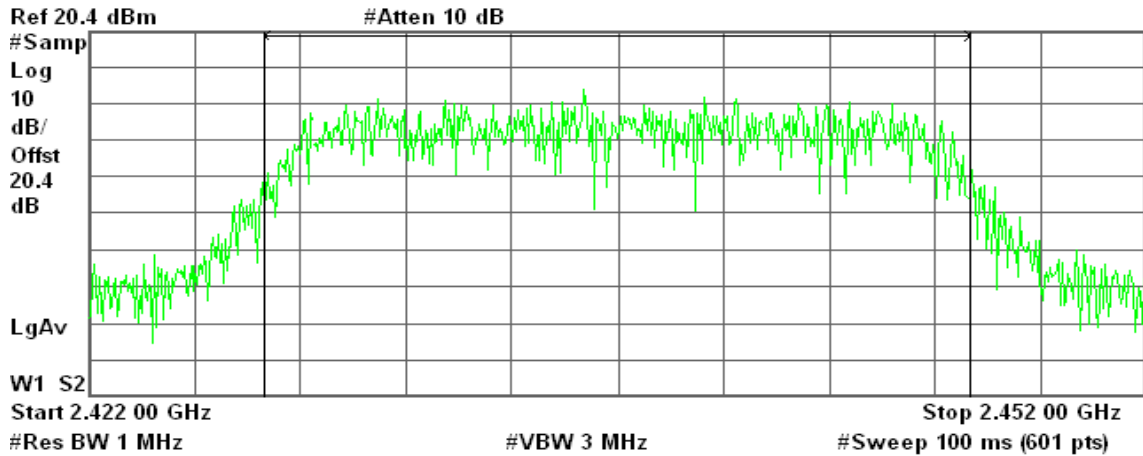
Power Spectral Density

-66.30 dBm/Hz

Average Power (CH Mid)

Agilent 14:45:19 May 13, 2009

R T



Channel Power

7.59 dBm / 20.0000 MHz

Power Spectral Density

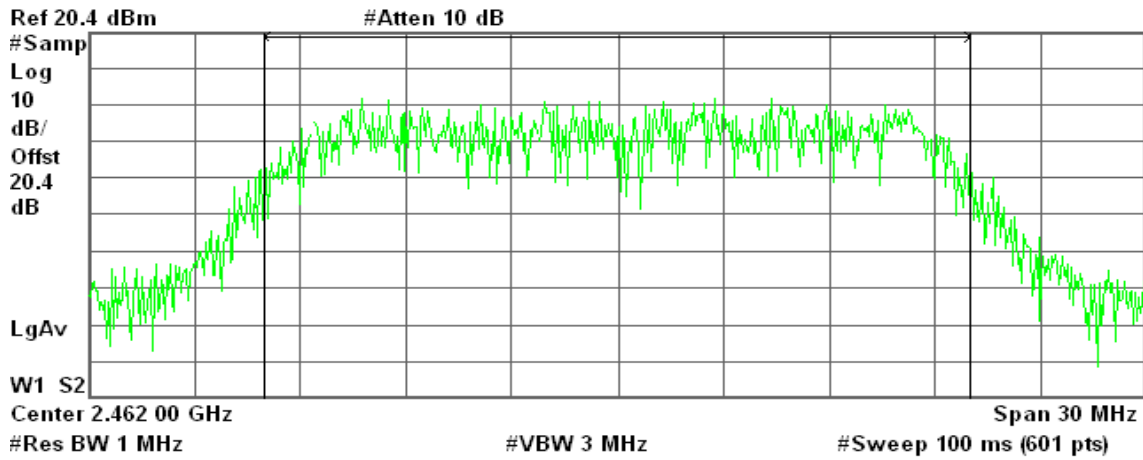
-65.42 dBm/Hz



Average Power (CH High)

Agilent 14:44:30 May 13, 2009

R T



Channel Power

7.30 dBm / 20.0000 MHz

Power Spectral Density

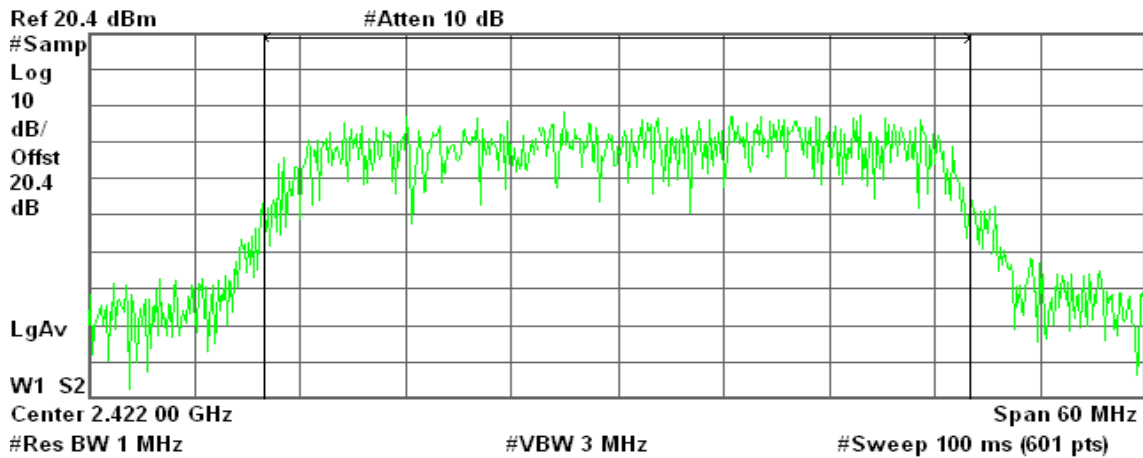
-65.71 dBm/Hz

draft 802.11n Wide-40 MHz Channel mode

Average Power (CH Low)

Agilent 14:47:08 May 13, 2009

R T



Channel Power

6.70 dBm / 40.0000 MHz

Power Spectral Density

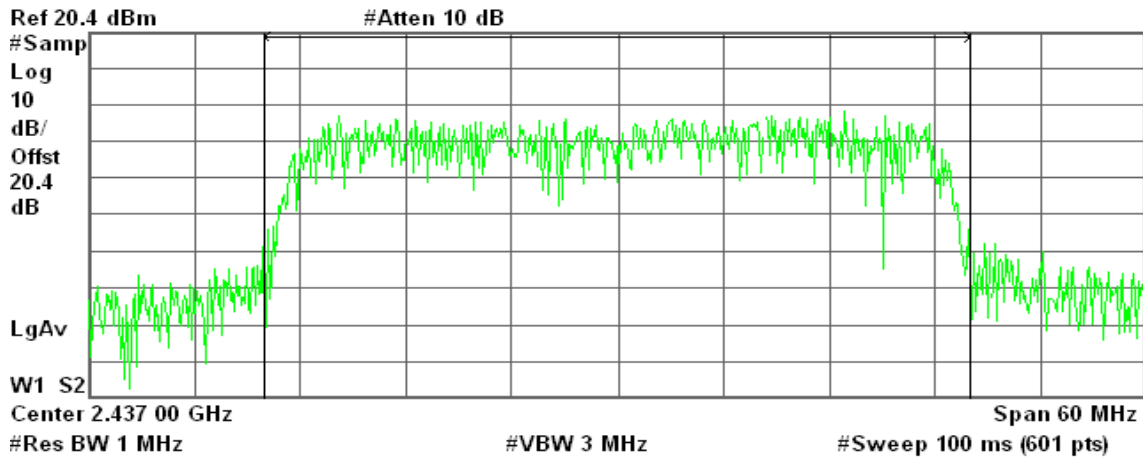
-69.32 dBm/Hz



Average Power (CH Mid)

Agilent 14:48:00 May 13, 2009

R T



Channel Power

7.28 dBm / 40.0000 MHz

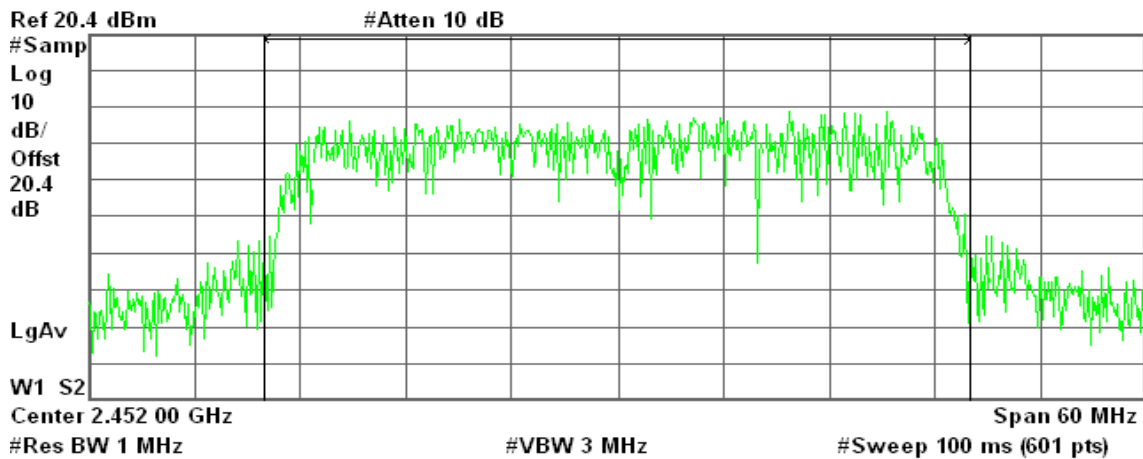
Power Spectral Density

-68.74 dBm/Hz

Average Power (CH High)

Agilent 14:48:24 May 13, 2009

R T



Channel Power

7.23 dBm / 40.0000 MHz

Power Spectral Density

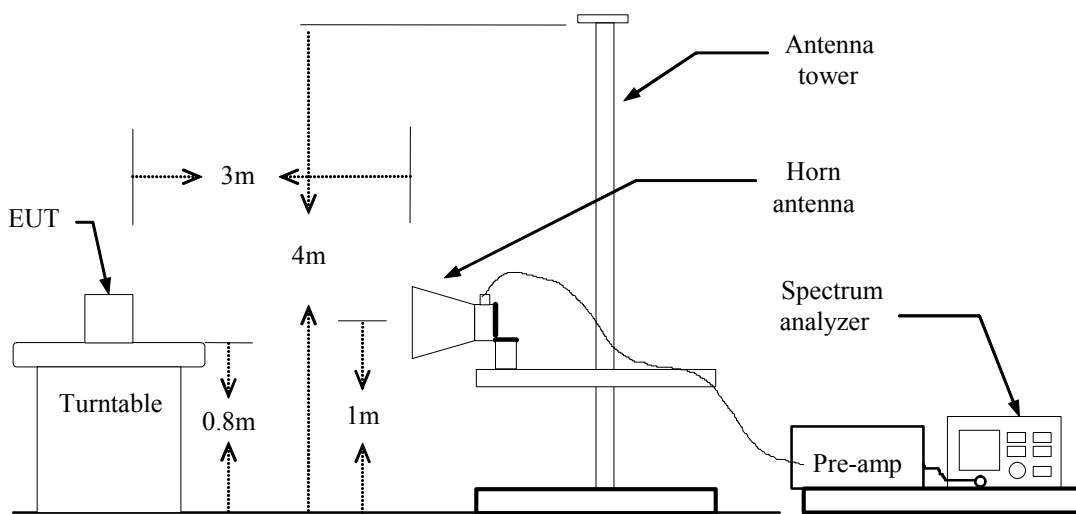
-68.79 dBm/Hz

7.4 BAND EDGES MEASUREMENT

LIMIT

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).

Test Configuration



TEST PROCEDURE

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

TEST RESULTS

Refer to attach spectrum analyzer data chart.



Band Edges (IEEE 802.11b mode / CH Low)

Detector mode: Peak

Polarity: Vertical

Agilent

R T

Mkr1 2.390 0 GHz
54.28 dBμV

Ref 117 dBμV

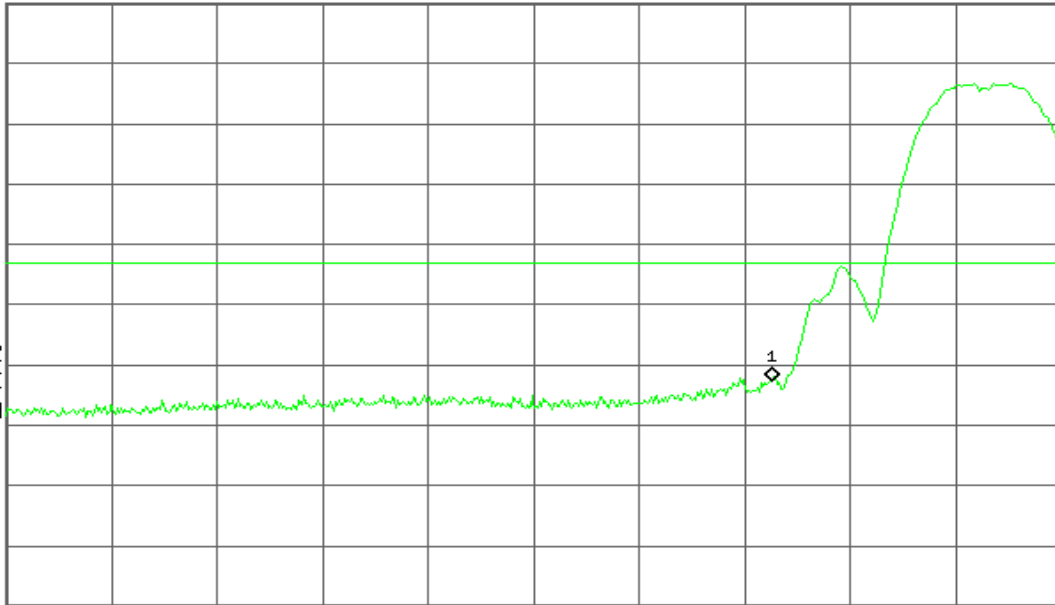
#Atten 20 dB

#Peak
Log
10
dB/

DI
74.0
dBμV
LgAv

M1 S2
S3 FC
A AA

£(f):
FTun
Swp



Start 2.310 0 GHz

Stop 2.420 0 GHz

#Res BW 1 MHz

#VBW 1 MHz

#Sweep 100 ms (601 pts)

Detector mode: Average

Polarity: Vertical

Agilent

R T

Mkr1 2.390 0 GHz
44.16 dBμV

Ref 117 dBμV

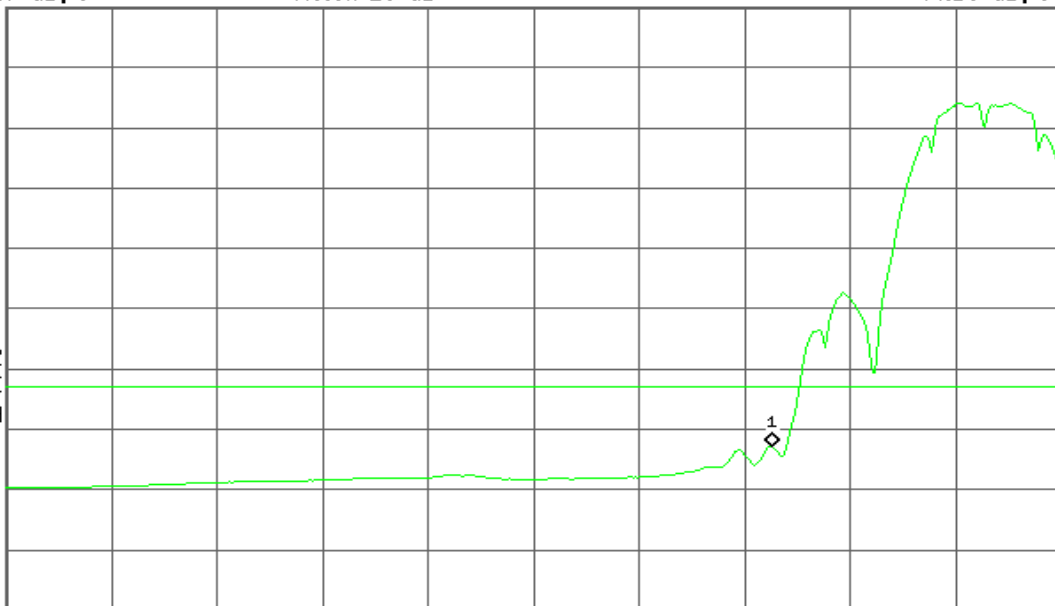
#Atten 20 dB

#Peak
Log
10
dB/

DI
54.0
dBμV
LgAv

M1 S2
S3 FC
A AA

£(f):
FTun
Swp



Start 2.310 0 GHz

Stop 2.420 0 GHz

#Res BW 1 MHz

#VBW 10 Hz

Sweep 8.577 s (601 pts)



Detector mode: Peak

Polarity: Horizontal

Agilent

R T

Mkr1 2.390 0 GHz
49.39 dBμV

Ref 117 dBμV

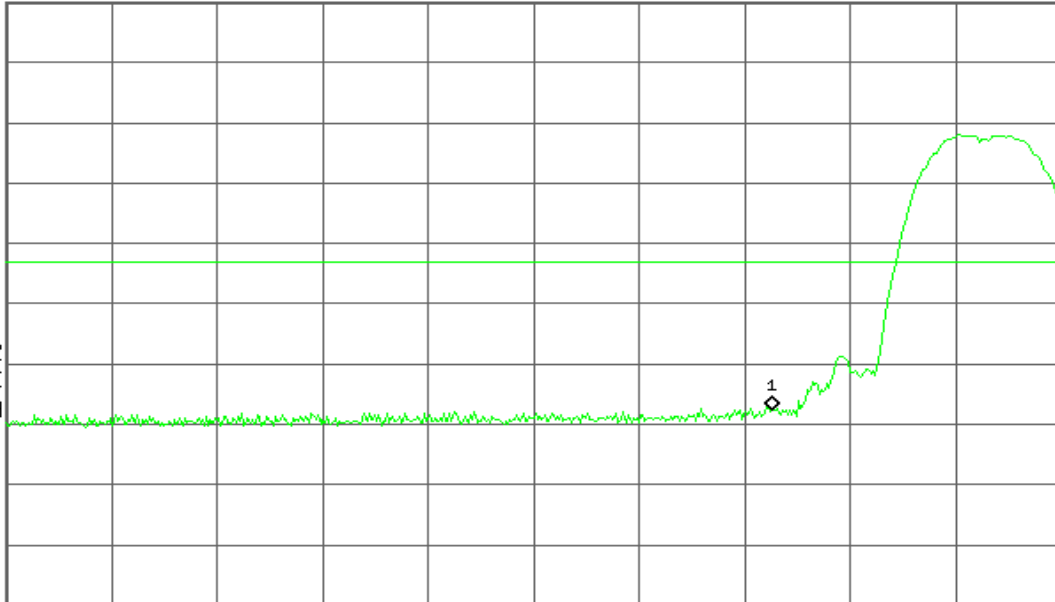
#Atten 20 dB

#Peak
Log
10
dB/

DI
74.0
dBμV
LgAv

M1 S2
S3 FC
A AA

£(f):
FTun
Swp



Start 2.310 0 GHz

Stop 2.420 0 GHz

#Res BW 1 MHz

#VBW 1 MHz

#Sweep 100 ms (601 pts)

Detector mode: Average

Polarity: Horizontal

Agilent

R T

Mkr1 2.390 0 GHz
38.33 dBμV

Ref 117 dBμV

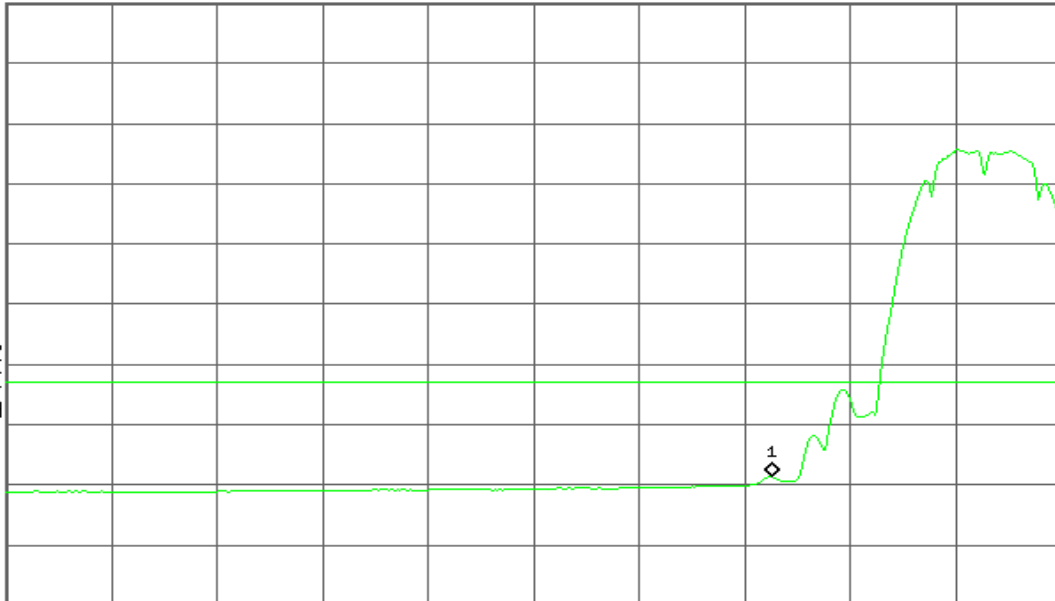
#Atten 20 dB

#Peak
Log
10
dB/

DI
54.0
dBμV
LgAv

M1 S2
S3 FC
A AA

£(f):
FTun
Swp



Start 2.310 0 GHz

Stop 2.420 0 GHz

#Res BW 1 MHz

#VBW 10 Hz

Sweep 8.577 s (601 pts)



Band Edges (IEEE 802.11b mode / CH High)

Detector mode: Peak

Polarity: Vertical

Agilent

R T

Mkr1 2.483 50 GHz
56.28 dB μ V

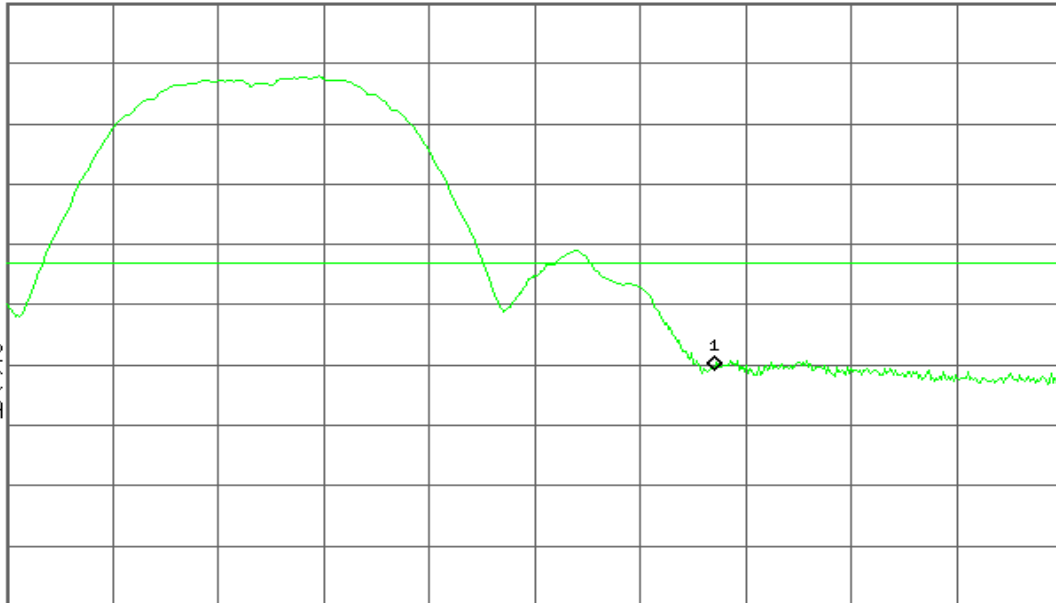
Ref 117 dB μ V

#Atten 20 dB

#Peak
Log
10
dB/

DI
74.0
dB μ V
LgAv

M1 S2
S3 FC
A AA
E(f):
FTun
Swp



Start 2.450 00 GHz

#Res BW 1 MHz

#VBW 1 MHz

Stop 2.500 00 GHz

#Sweep 100 ms (601 pts)

Detector mode: Average

Polarity: Vertical

Agilent

R T

Mkr1 2.483 50 GHz
44.91 dB μ V

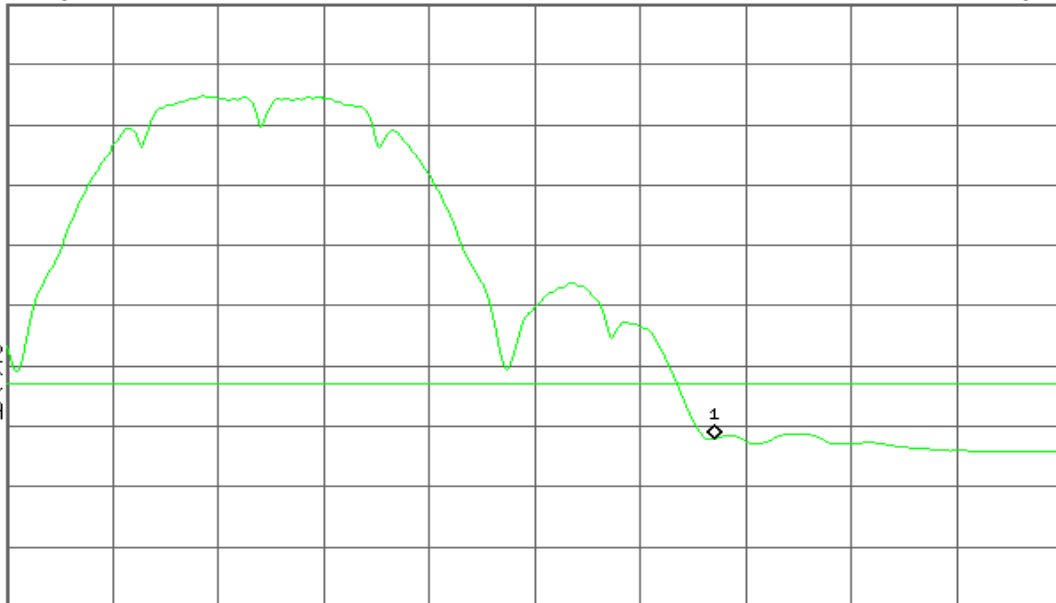
Ref 117 dB μ V

#Atten 20 dB

#Peak
Log
10
dB/

DI
54.0
dB μ V
LgAv

M1 S2
S3 FC
A AA
E(f):
FTun
Swp



Start 2.450 00 GHz

#Res BW 1 MHz

#VBW 10 Hz

Stop 2.500 00 GHz

Sweep 3.899 s (601 pts)



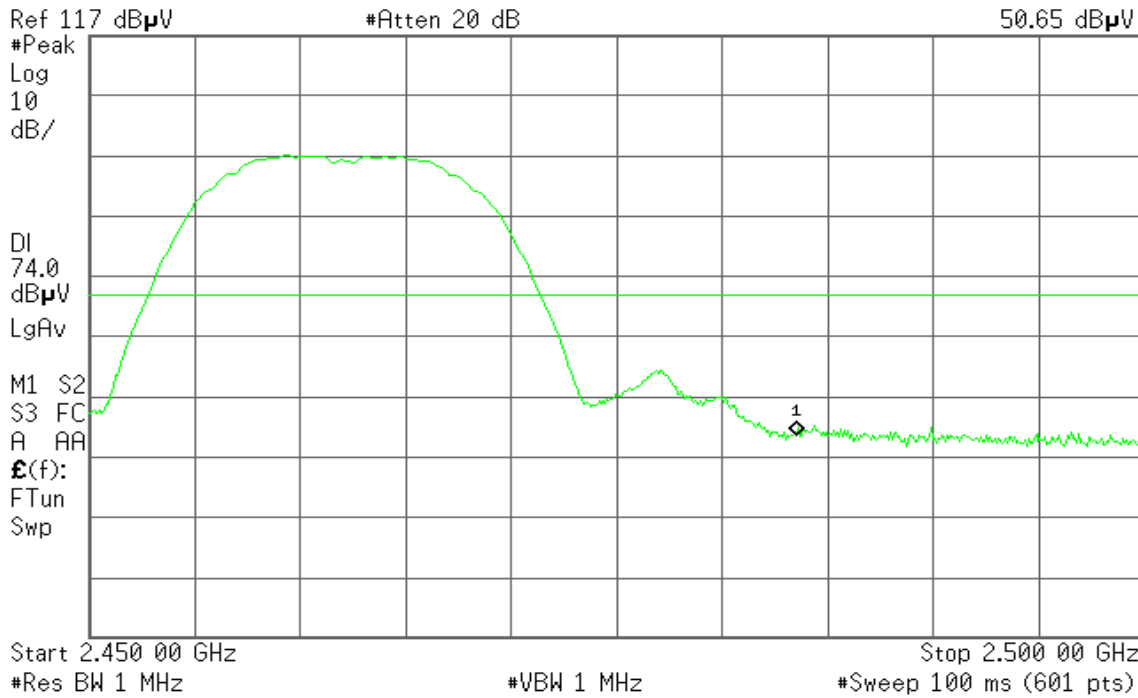
Detector mode: Peak

Polarity: Horizontal

Agilent

R T

Mkr1 2.483 50 GHz
50.65 dBμV



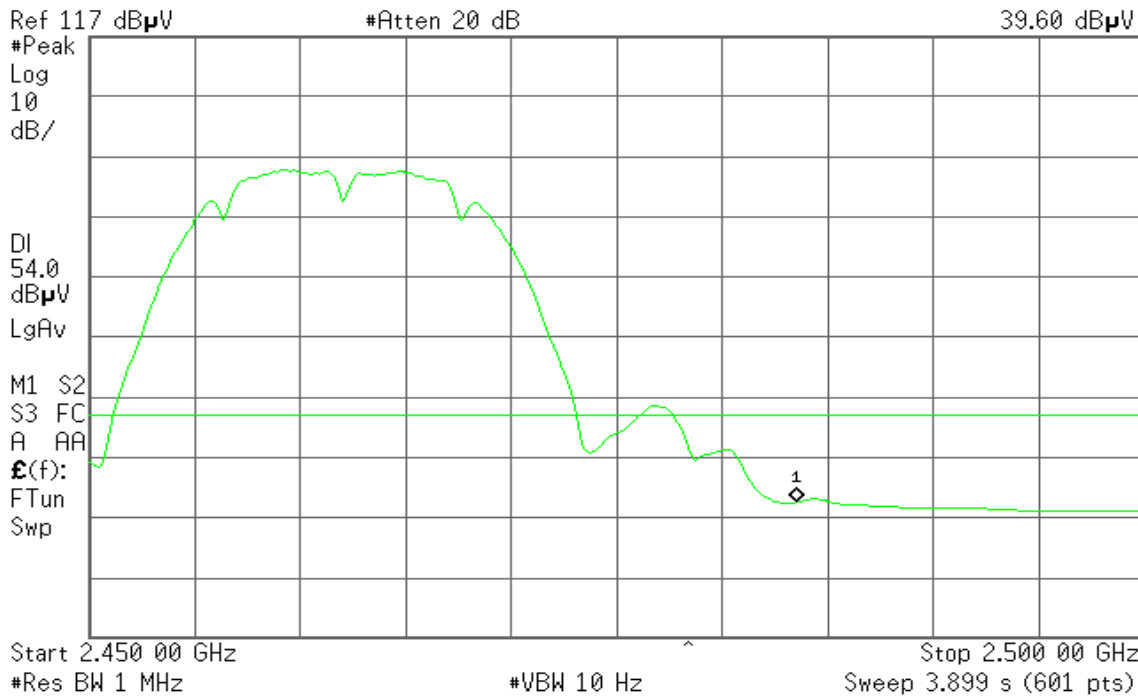
Detector mode: Average

Polarity: Horizontal

Agilent

R T

Mkr1 2.483 50 GHz
39.60 dBμV

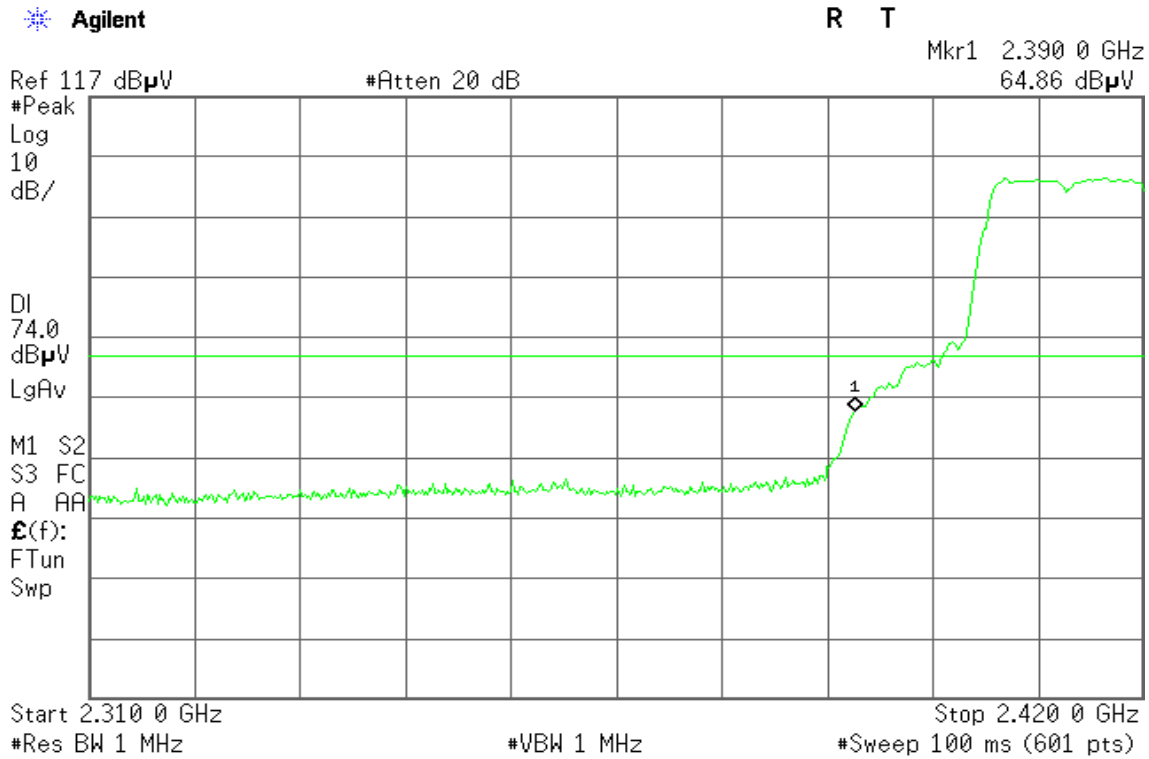




Band Edges (IEEE 802.11g mode / CH Low)

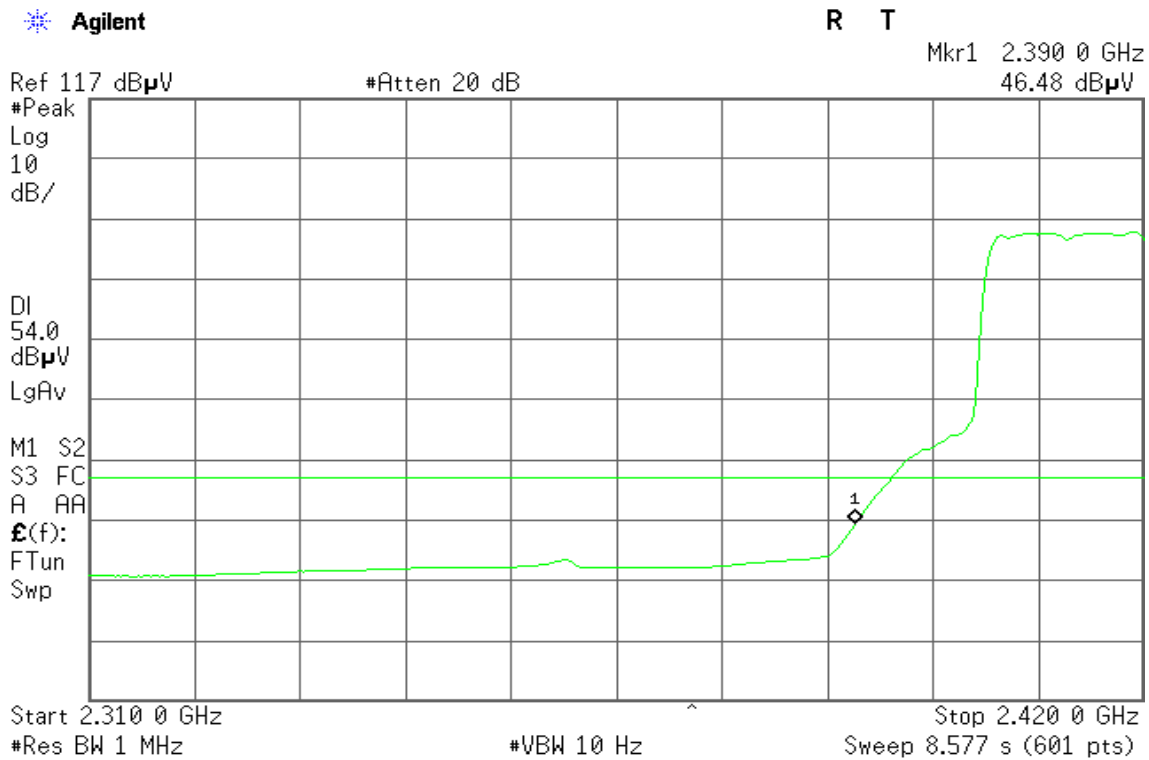
Detector mode: Peak

Polarity: Vertical



Detector mode: Average

Polarity: Vertical





Detector mode: Peak

Polarity: Horizontal

Agilent

R T

Mkr1 2.390 0 GHz
48.90 dBμV

Ref 117 dBμV

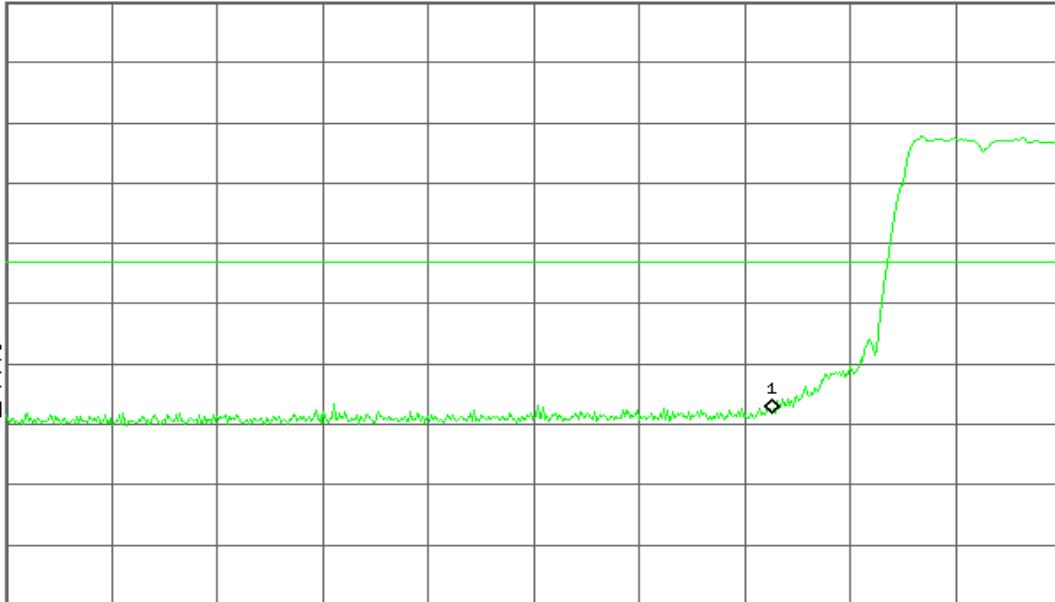
#Atten 20 dB

#Peak
Log
10
dB/

DI
74.0
dBμV
LgAv

M1 S2
S3 FC
A AA

£(f):
FTun
Swp



Start 2.310 0 GHz

Stop 2.420 0 GHz

#Res BW 1 MHz

#VBW 1 MHz

#Sweep 100 ms (601 pts)

Detector mode: Average

Polarity: Horizontal

Agilent

R T

Mkr1 2.390 0 GHz
37.03 dBμV

Ref 117 dBμV

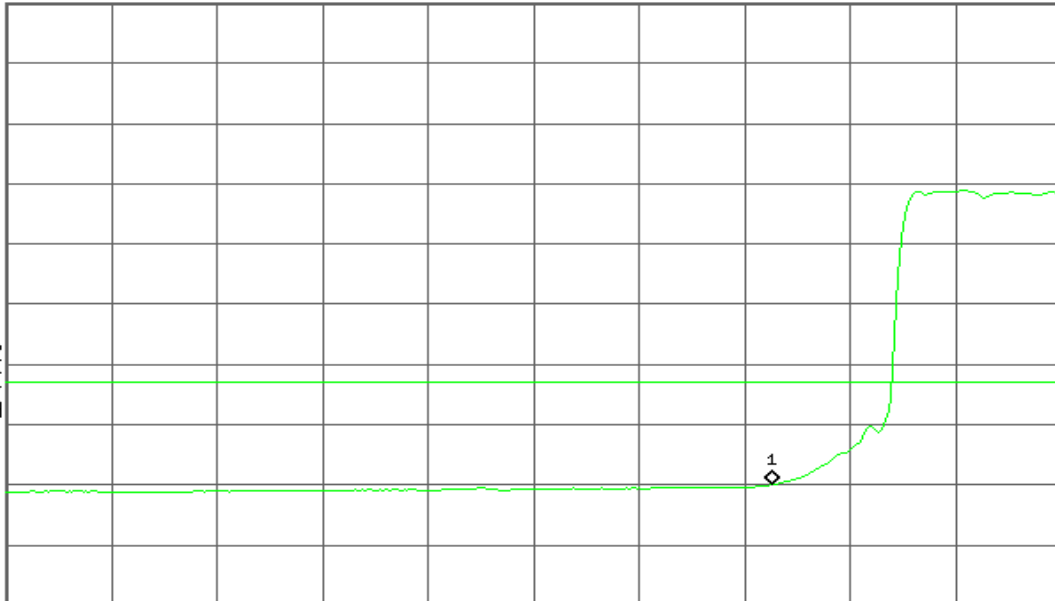
#Atten 20 dB

#Peak
Log
10
dB/

DI
54.0
dBμV
LgAv

M1 S2
S3 FC
A AA

£(f):
FTun
Swp



Start 2.310 0 GHz

Stop 2.420 0 GHz

#Res BW 1 MHz

#VBW 10 Hz

Sweep 8.577 s (601 pts)



Band Edges (IEEE 802.11g mode / CH High)

Detector mode: Peak

Polarity: Vertical

Agilent

R T

Mkr1 2.483 50 GHz
66.62 dBμV

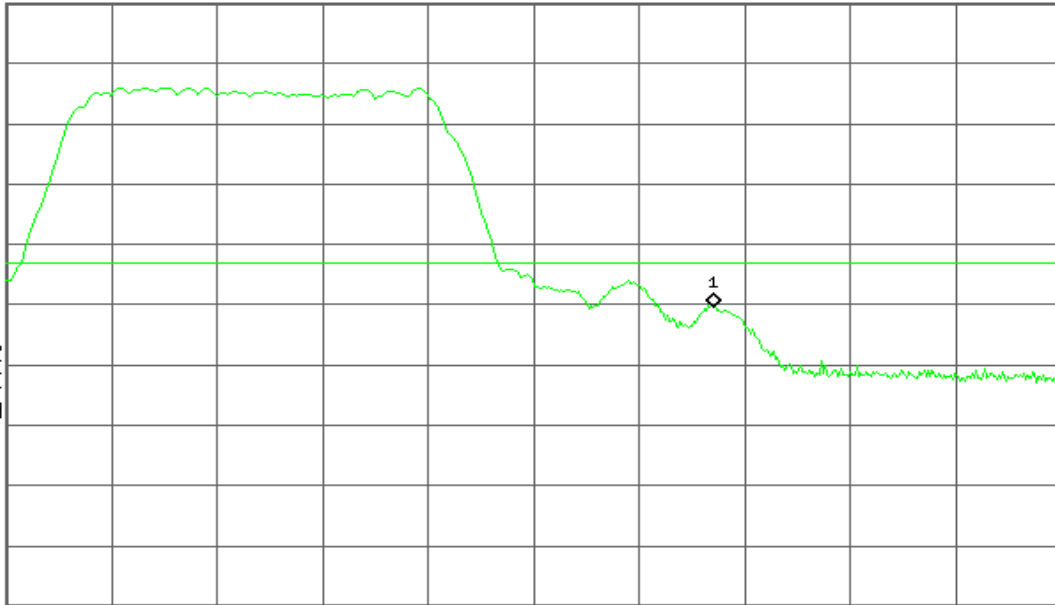
Ref 117 dBμV

#Atten 20 dB

#Peak
Log
10
dB/

DI
74.0
dBμV
LgAv

M1 S2
S3 FC
A AA
£(f):
FTun
Swp



Start 2.450 00 GHz

Stop 2.500 00 GHz

#Res BW 1 MHz

#VBW 1 MHz

#Sweep 100 ms (601 pts)

Detector mode: Average

Polarity: Vertical

Agilent

R T

Mkr1 2.483 50 GHz
47.31 dBμV

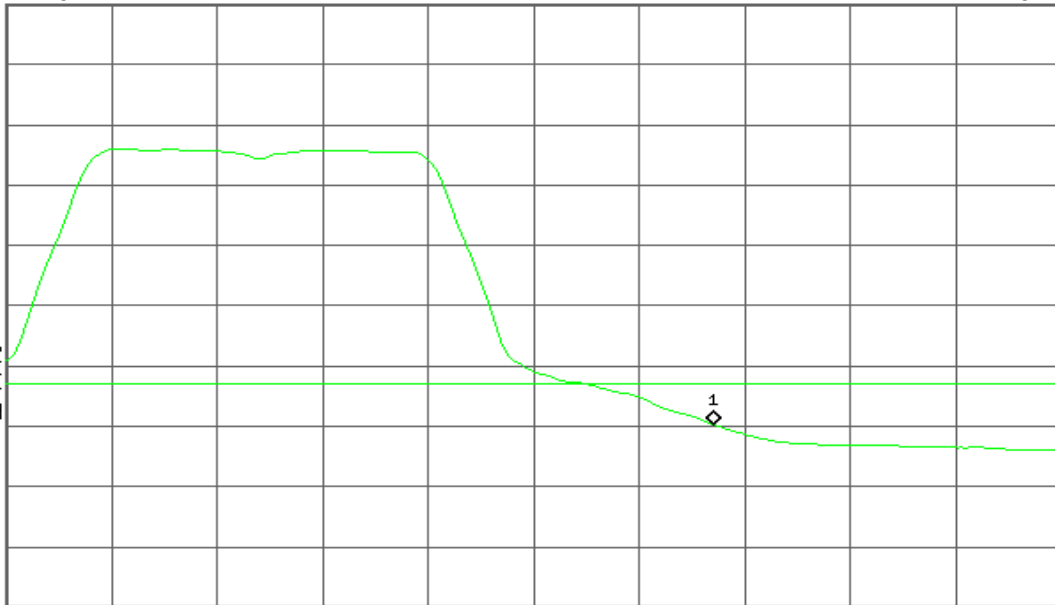
Ref 117 dBμV

#Atten 20 dB

#Peak
Log
10
dB/

DI
54.0
dBμV
LgAv

M1 S2
S3 FC
A AA
£(f):
FTun
Swp



Start 2.450 00 GHz ^

Stop 2.500 00 GHz

#Res BW 1 MHz

#VBW 10 Hz

Sweep 3.899 s (601 pts)



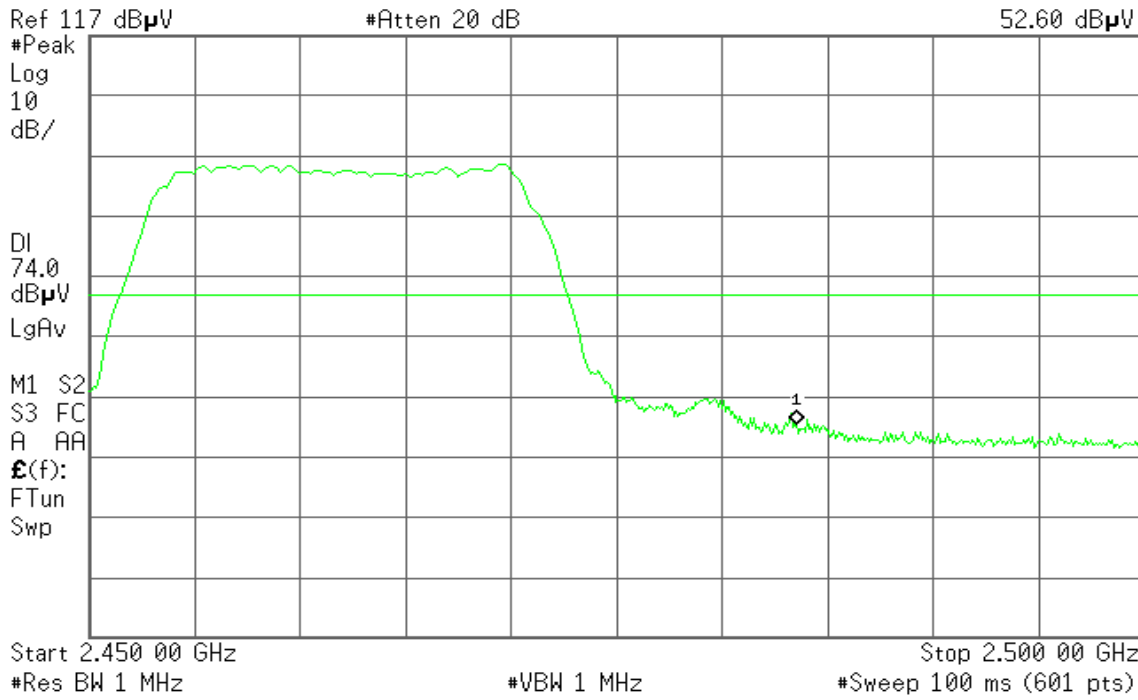
Detector mode: Peak

Polarity: Horizontal

Agilent

R T

Mkr1 2.483 50 GHz
52.60 dBμV



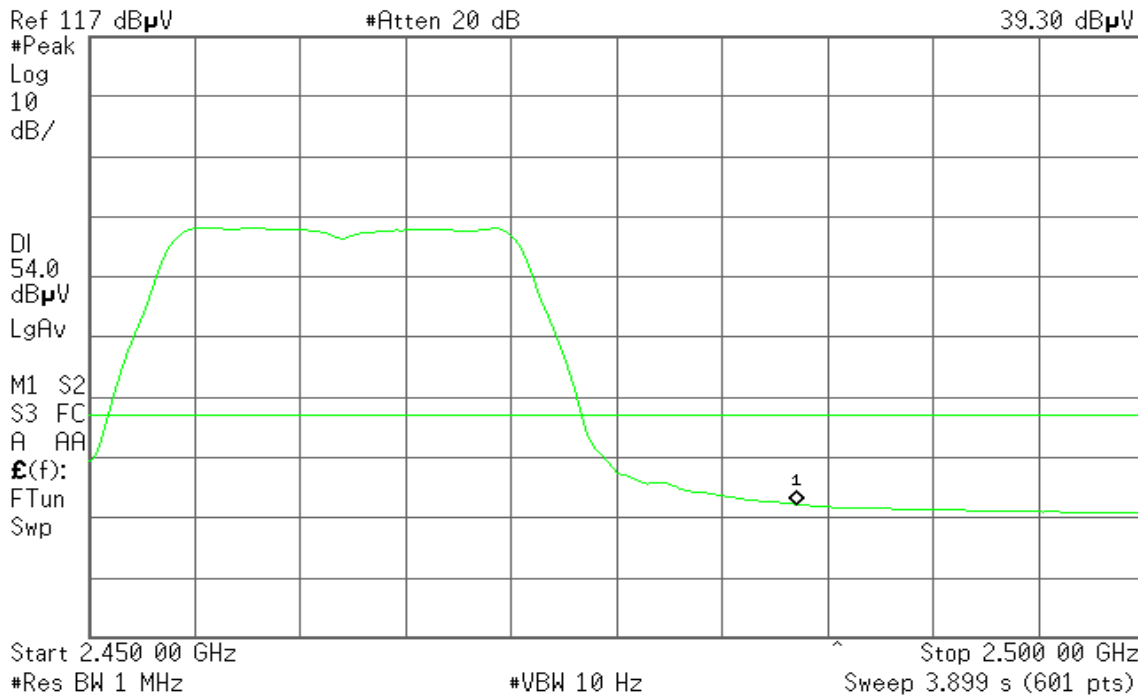
Detector mode: Average

Polarity: Horizontal

Agilent

R T

Mkr1 2.483 50 GHz
39.30 dBμV





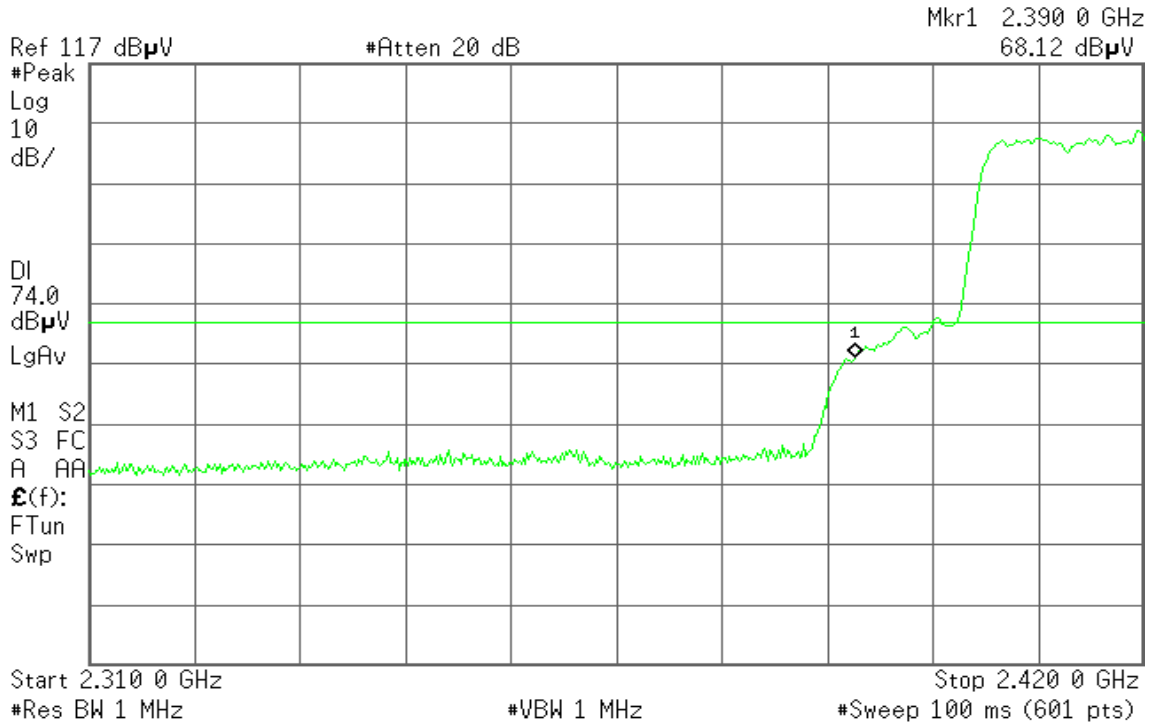
Band Edges (draft 802.11n Standard-20 MHz Channel mode / CH Low)

Detector mode: Peak

Polarity: Vertical

Agilent

R T

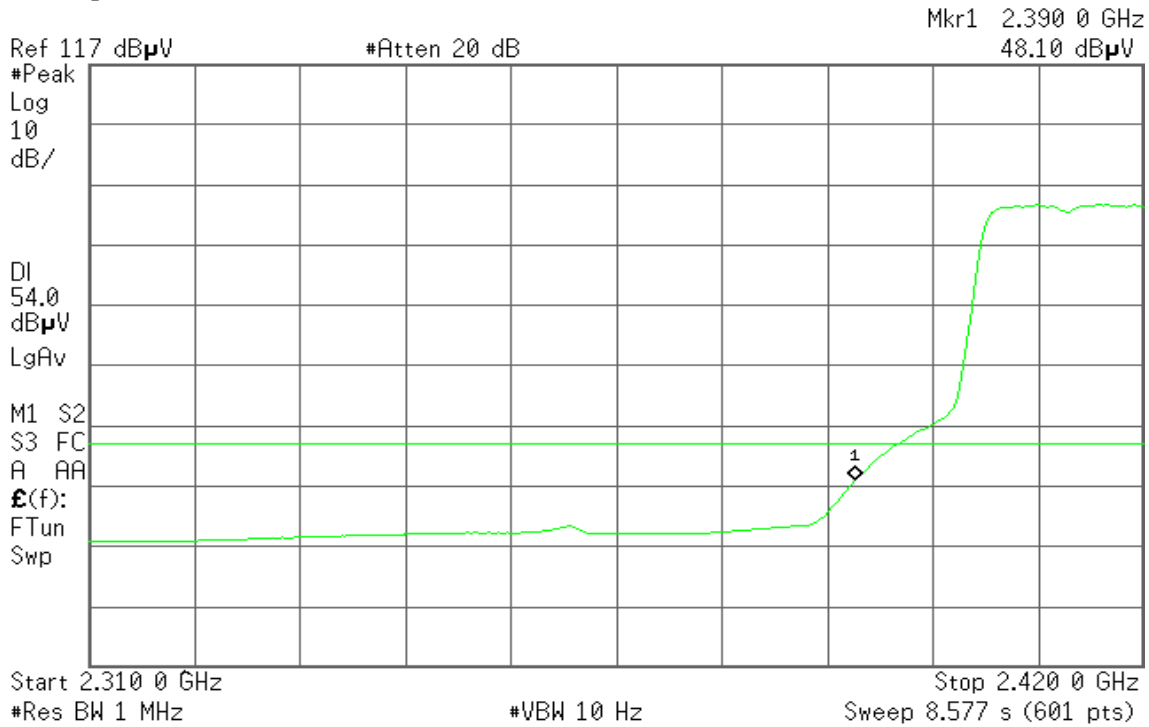


Detector mode: Average

Polarity: Vertical

Agilent

R T





Detector mode: Peak

Polarity: Horizontal

Agilent

R T

Mkr1 2.390 0 GHz
52.47 dBμV

Ref 117 dBμV

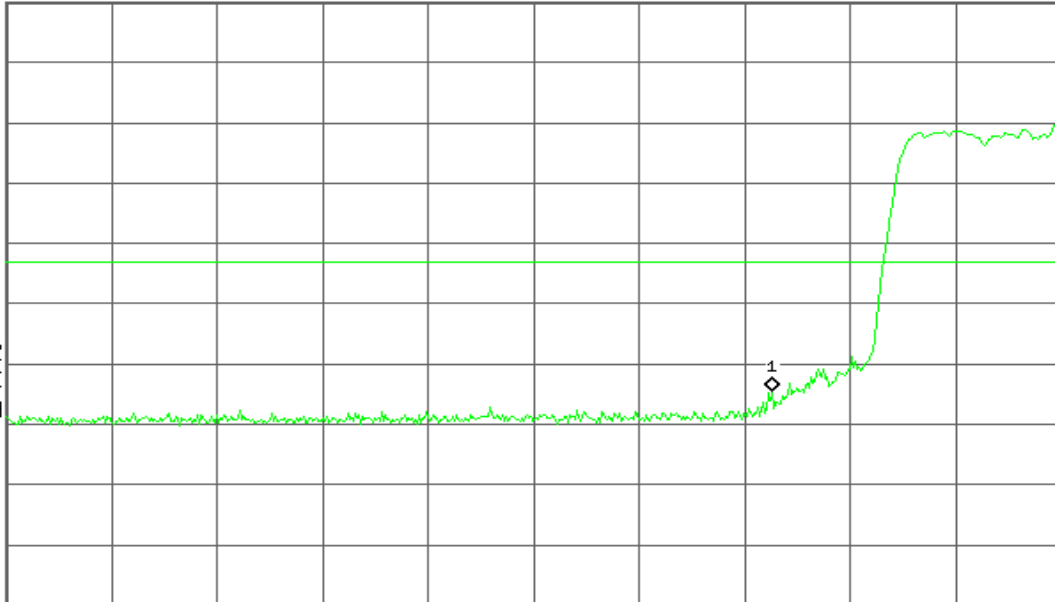
#Atten 20 dB

#Peak
Log
10
dB/

DI
74.0
dBμV
LgAv

M1 S2
S3 FC
A AA

£(f):
FTun
Swp



Start 2.310 0 GHz

Stop 2.420 0 GHz

#Res BW 1 MHz

#VBW 1 MHz

#Sweep 100 ms (601 pts)

Detector mode: Average

Polarity: Horizontal

Agilent

R T

Mkr1 2.390 0 GHz
37.23 dBμV

Ref 117 dBμV

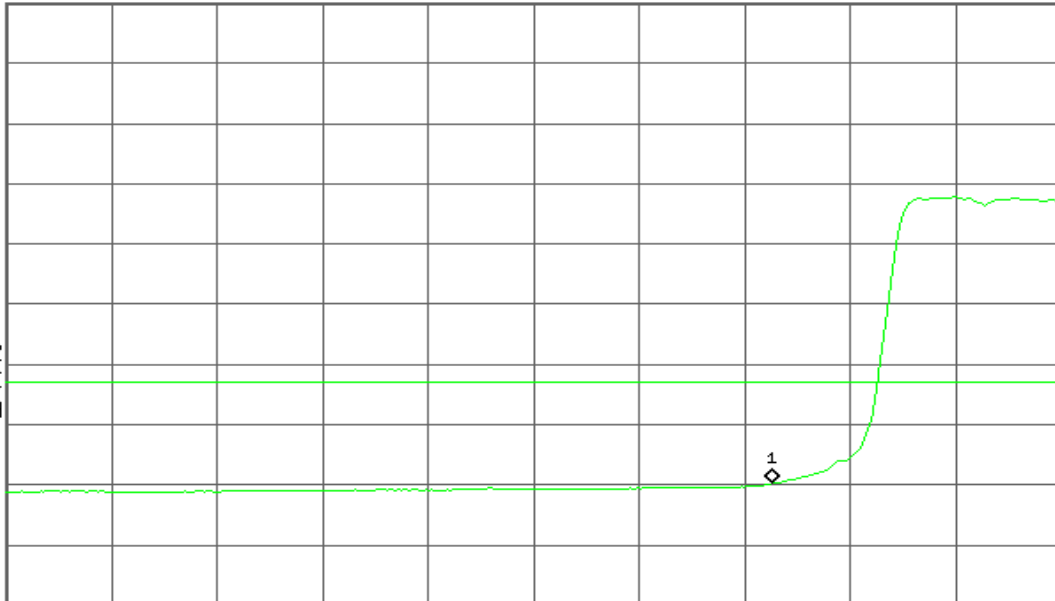
#Atten 20 dB

#Peak
Log
10
dB/

DI
54.0
dBμV
LgAv

M1 S2
S3 FC
A AA

£(f):
FTun
Swp



Start 2.310 0 GHz

Stop 2.420 0 GHz

#Res BW 1 MHz

#VBW 10 Hz

Sweep 8.577 s (601 pts)



Band Edges (draft 802.11n Standard-20 MHz Channel mode / CH High)

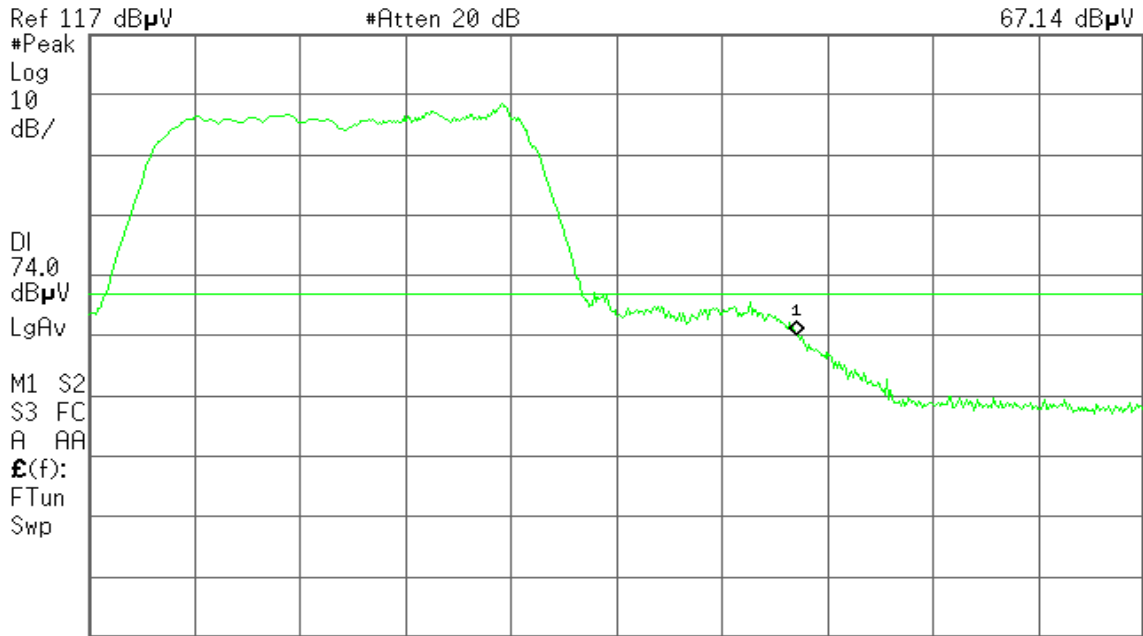
Detector mode: Peak

Polarity: Vertical

Agilent

R T

Mkr1 2.483 50 GHz
67.14 dBμV



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

Detector mode: Average

Polarity: Vertical

Agilent

R T

Mkr1 2.483 50 GHz
47.91 dBμV



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



Detector mode: Peak

Polarity: Horizontal

Agilent

R T

Mkr1 2.483 50 GHz
55.30 dBμV

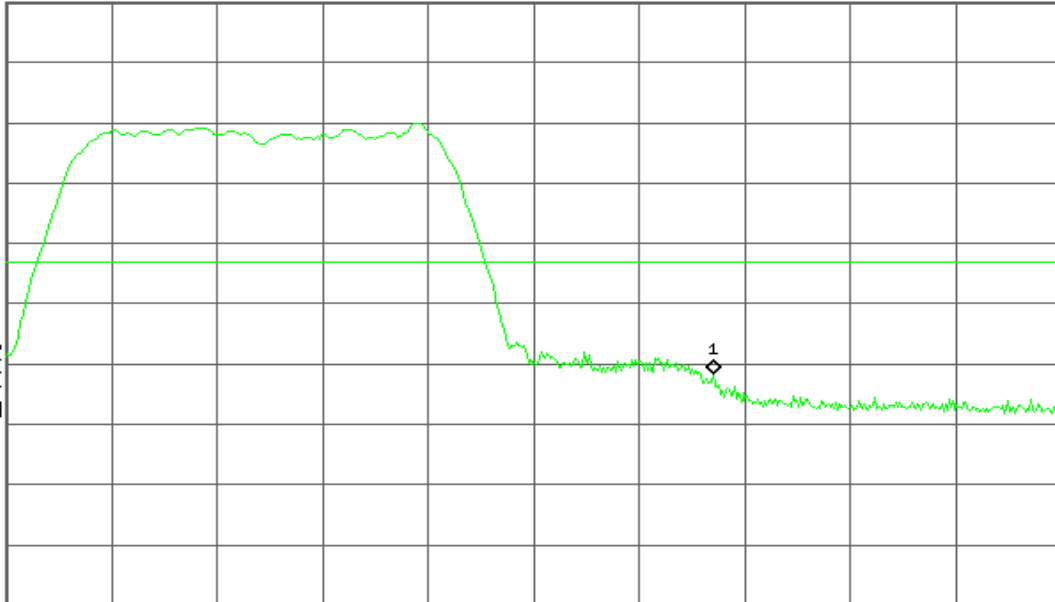
Ref 117 dBμV

#Atten 20 dB

#Peak
Log
10
dB/

DI
74.0
dBμV
LgAv

M1 S2
S3 FC
A AA
£(f):
FTun
Swp



Start 2.450 00 GHz

Stop 2.500 00 GHz

#Res BW 1 MHz

#VBW 1 MHz

#Sweep 100 ms (601 pts)

Detector mode: Average

Polarity: Horizontal

Agilent

R T

Mkr1 2.483 50 GHz
39.68 dBμV

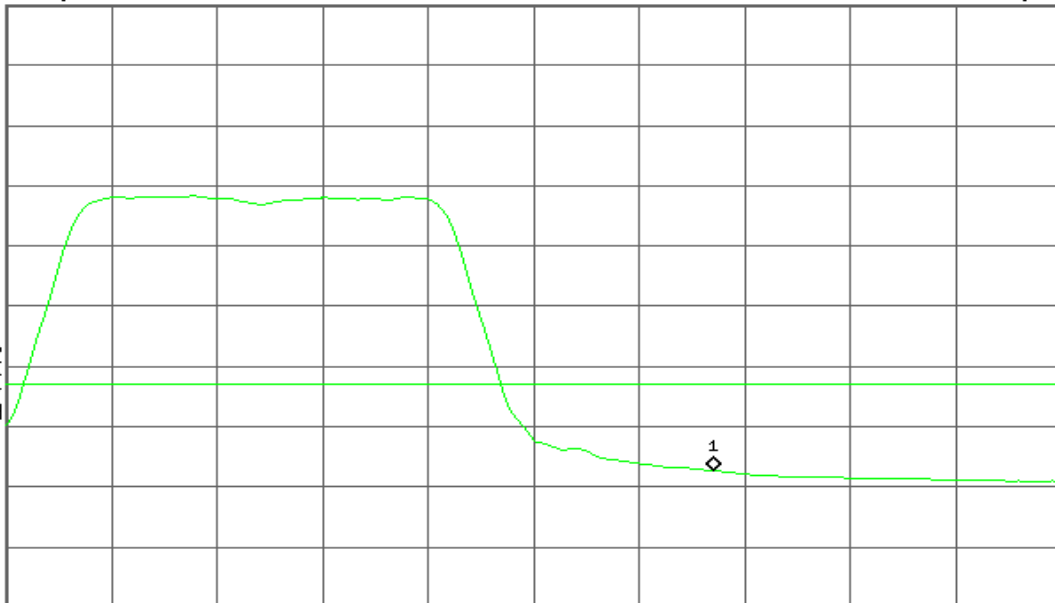
Ref 117 dBμV

#Atten 20 dB

#Peak
Log
10
dB/

DI
54.0
dBμV
LgAv

M1 S2
S3 FC
A AA
£(f):
FTun
Swp



Start 2.450 00 GHz

Stop 2.500 00 GHz

#Res BW 1 MHz

#VBW 10 Hz

Sweep 3.899 s (601 pts)



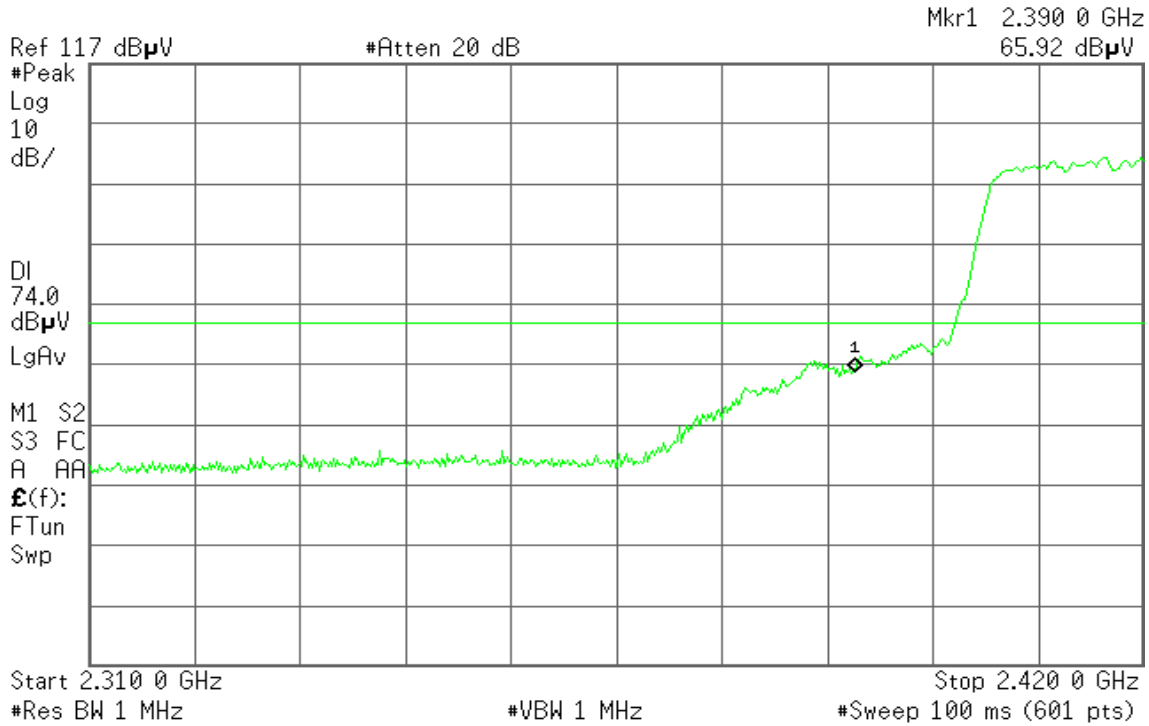
Band Edges (draft 802.11n Wide-40 MHz Channel mode / CH Low)

Detector mode: Peak

Polarity: Vertical

Agilent

R T

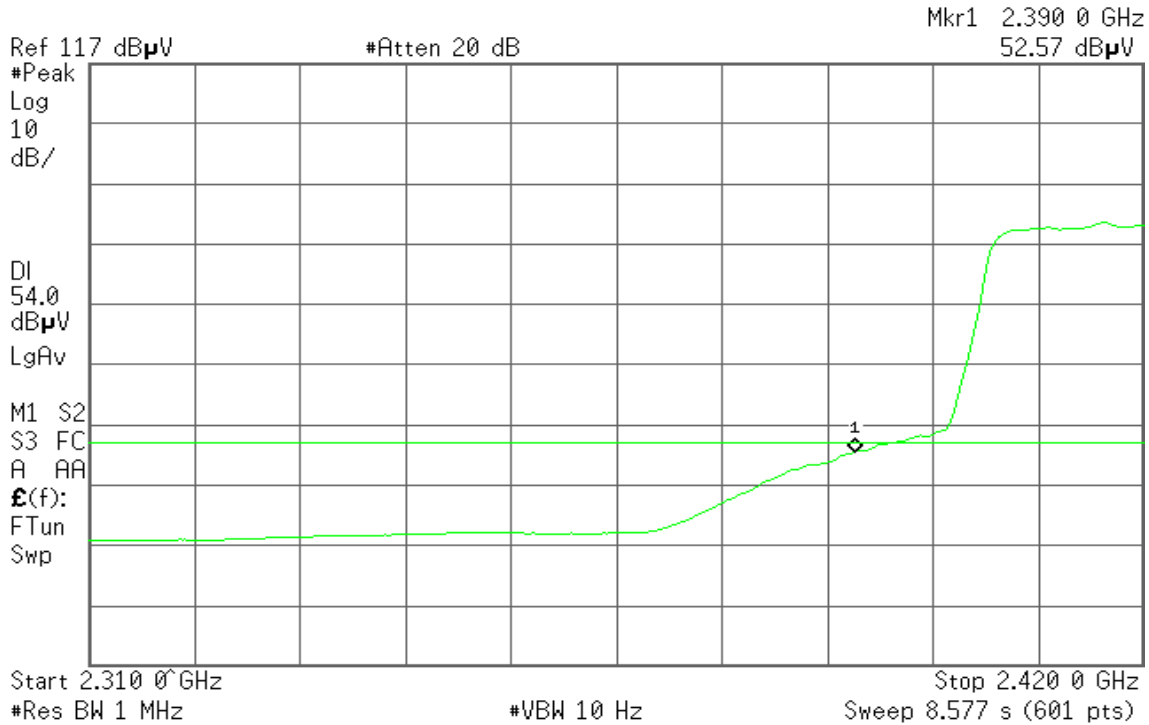


Detector mode: Average

Polarity: Vertical

Agilent

R T





Detector mode: Peak

Polarity: Horizontal

Agilent

R T

Mkr1 2.390 0 GHz
50.34 dB μ V

Ref 117 dB μ V

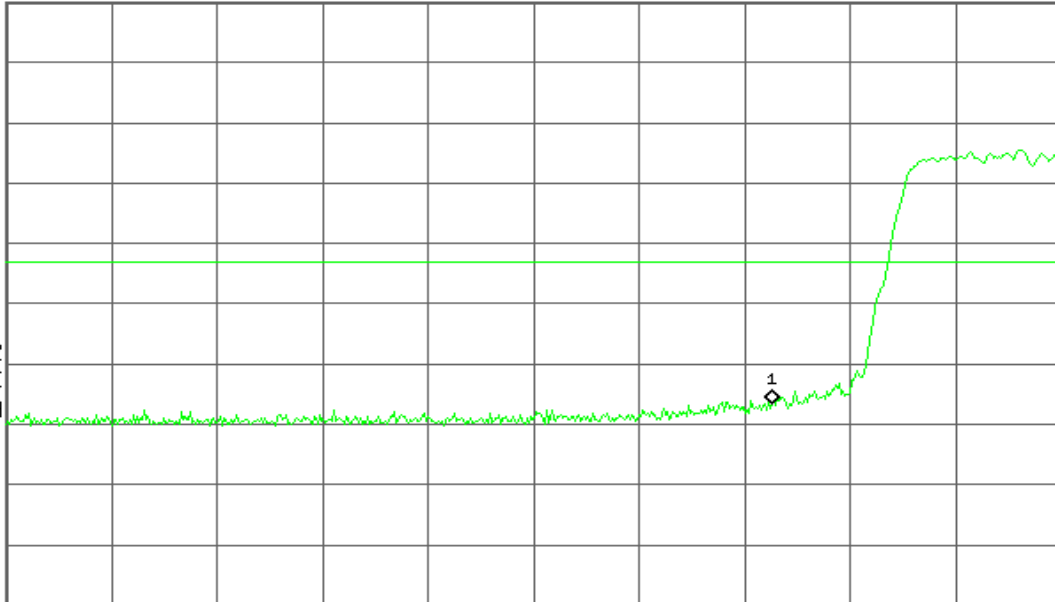
#Atten 20 dB

#Peak
Log
10
dB/

DI
74.0
dB μ V
LgAv

M1 S2
S3 FC
A AA

$\mathcal{E}(f)$:
FTun
Swp



Start 2.310 0 GHz

Stop 2.420 0 GHz

#Res BW 1 MHz

#VBW 1 MHz

#Sweep 100 ms (601 pts)

Detector mode: Average

Polarity: Horizontal

Agilent

R T

Mkr1 2.390 0 GHz
38.15 dB μ V

Ref 117 dB μ V

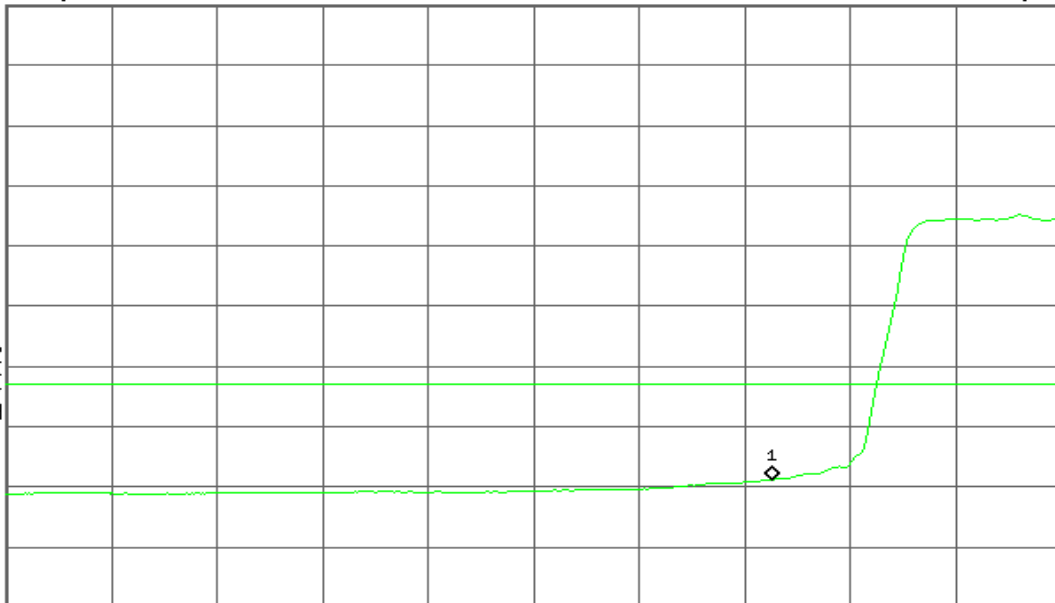
#Atten 20 dB

#Peak
Log
10
dB/

DI
54.0
dB μ V
LgAv

M1 S2
S3 FC
A AA

$\mathcal{E}(f)$:
FTun
Swp



Start 2.310 0 GHz

Stop 2.420 0 GHz

#Res BW 1 MHz

#VBW 10 Hz

Sweep 8.577 s (601 pts)



Band Edges (draft 802.11n Wide-40 MHz Channel mode / CH High)

Detector mode: Peak

Polarity: Vertical

Agilent

R T

Mkr1 2.483 50 GHz
65.27 dBμV

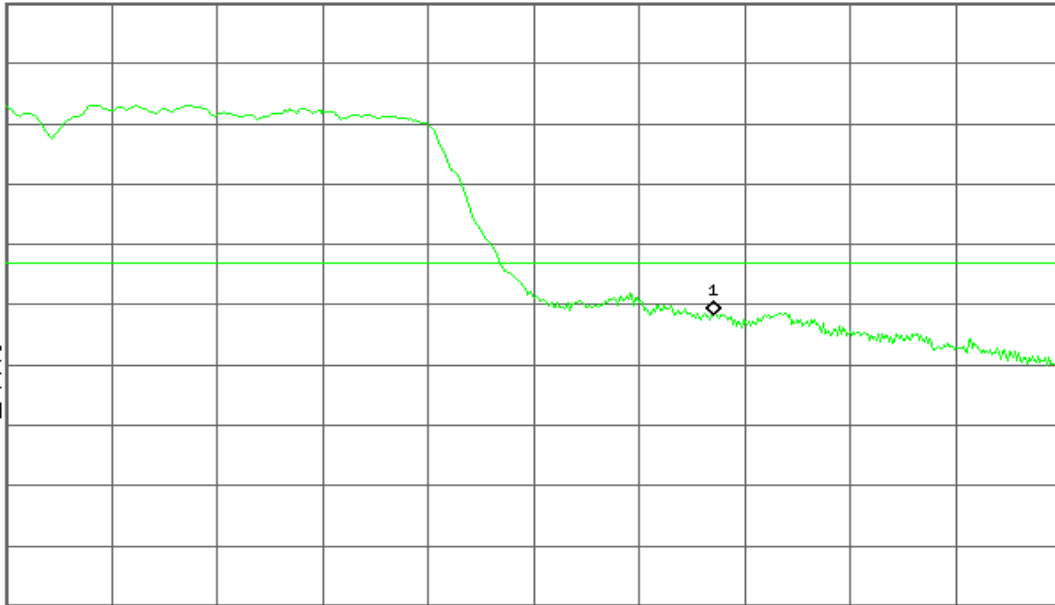
Ref 117 dBμV

#Atten 20 dB

#Peak
Log
10
dB/

DI
74.0
dBμV
LgAv

M1 S2
S3 FC
A AA
£(f):
FTun
Swp



Start 2.450 00 GHz

Stop 2.500 00 GHz

#Res BW 1 MHz

#VBW 1 MHz

#Sweep 100 ms (601 pts)

Detector mode: Average

Polarity: Vertical

Agilent

R T

Mkr1 2.483 50 GHz
51.96 dBμV

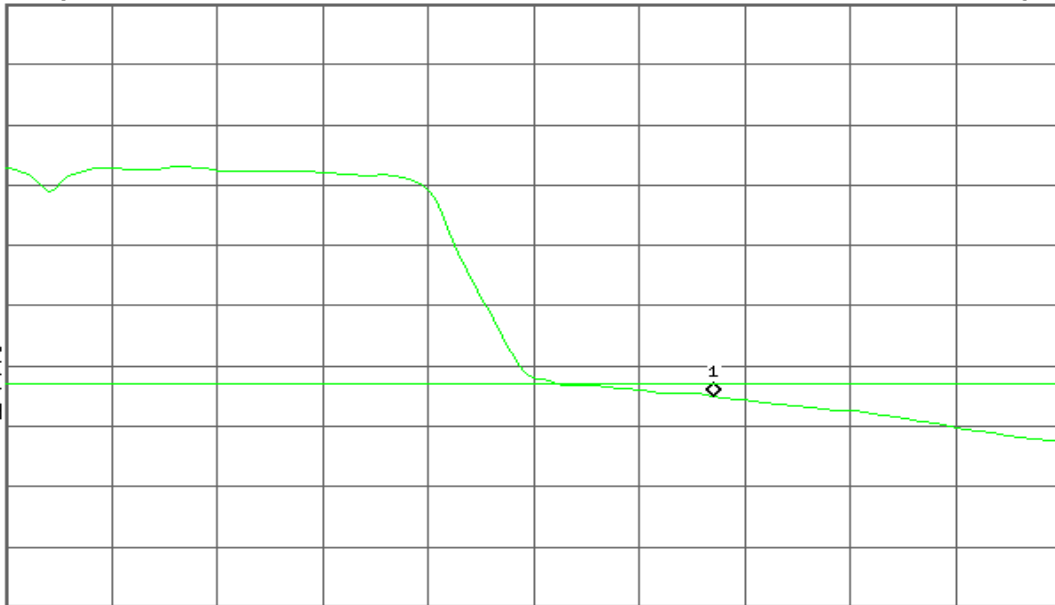
Ref 117 dBμV

#Atten 20 dB

#Peak
Log
10
dB/

DI
54.0
dBμV
LgAv

M1 S2
S3 FC
A AA
£(f):
FTun
Swp



Start 2.450 00 GHz

Stop 2.500 00 GHz

#Res BW 1 MHz

#VBW 10 Hz

Sweep 3.899 s (601 pts)



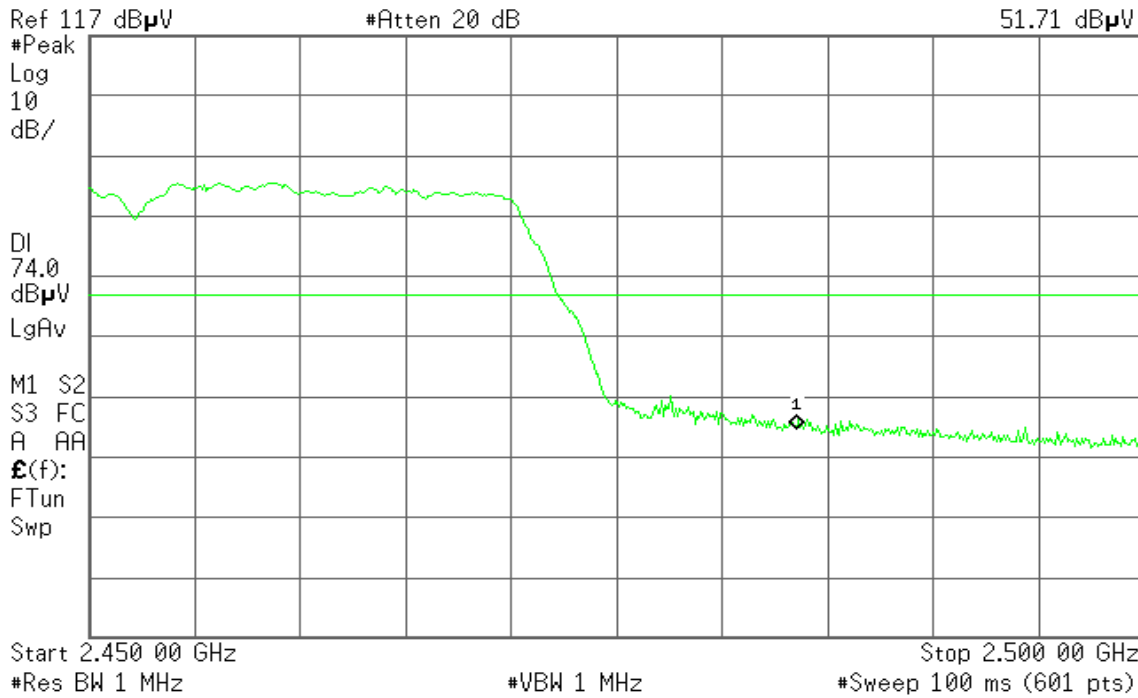
Detector mode: Peak

Polarity: Horizontal

Agilent

R T

Mkr1 2.483 50 GHz
51.71 dBμV



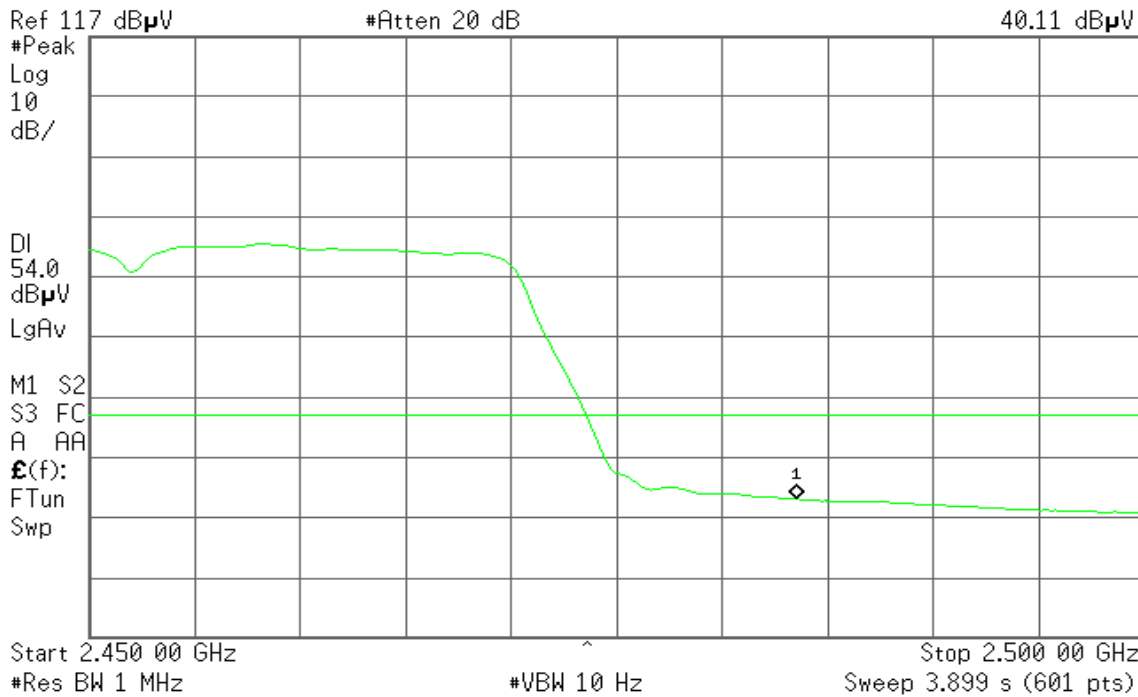
Detector mode: Average

Polarity: Horizontal

Agilent

R T

Mkr1 2.483 50 GHz
40.11 dBμV

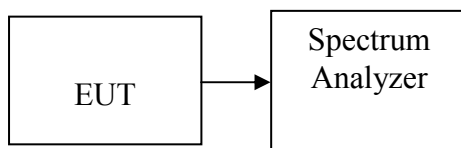


7.5 PEAK POWER SPECTRAL DENSITY

LIMIT

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

Test Configuration



TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set the spectrum analyzer as RBW = 3 kHz, VBW = 10 kHz, Span = 300 kHz, Sweep time = 100 s
3. Record the max reading.
4. Repeat the above procedure until the measurements for all frequencies are completed.

TEST RESULTS

No non-compliance noted



Test Data

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-20.34	8.00	PASS
Mid	2437	-17.94		PASS
High	2462	-17.50		PASS

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-22.60	8.00	PASS
Mid	2437	-22.51		PASS
High	2462	-22.49		PASS

Test mode: draft 802.11n Standard-20 MHz Channel mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-21.32	8.00	PASS
Mid	2437	-21.40		PASS
High	2462	-20.41		PASS

Test mode: draft 802.11n Wide-40 MHz Channel mode

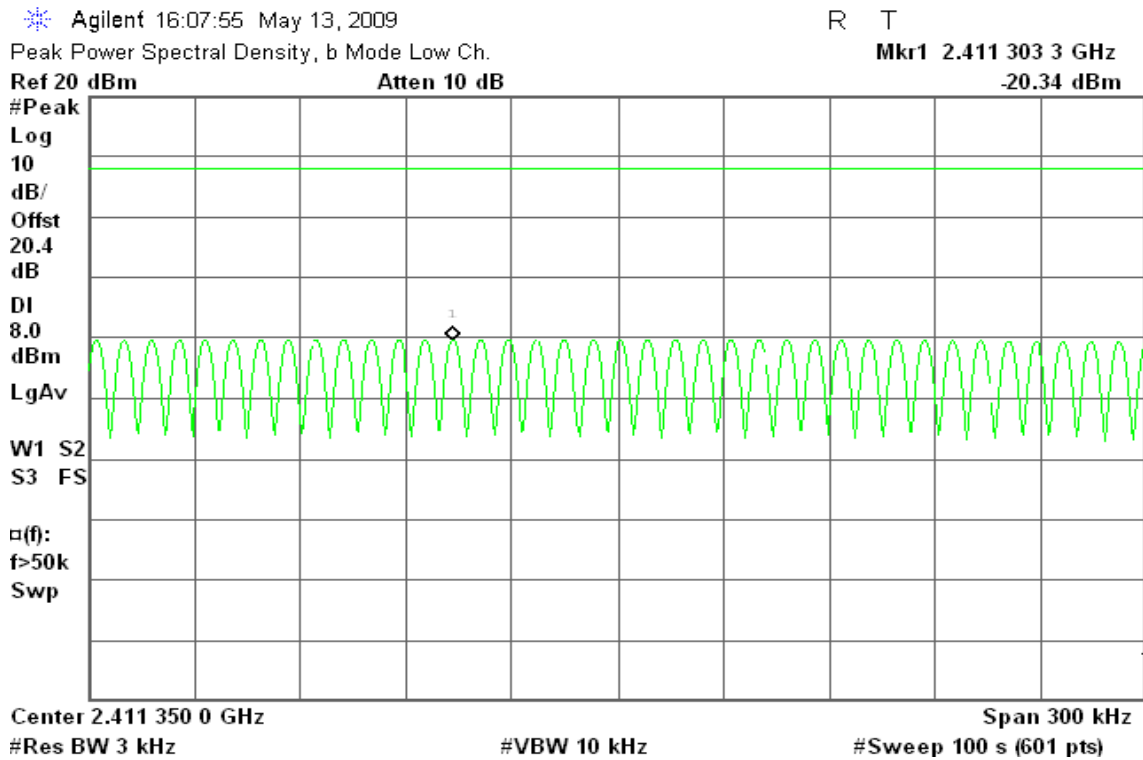
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2422	-23.32	8.00	PASS
Mid	2437	-22.23		PASS
High	2452	-23.78		PASS



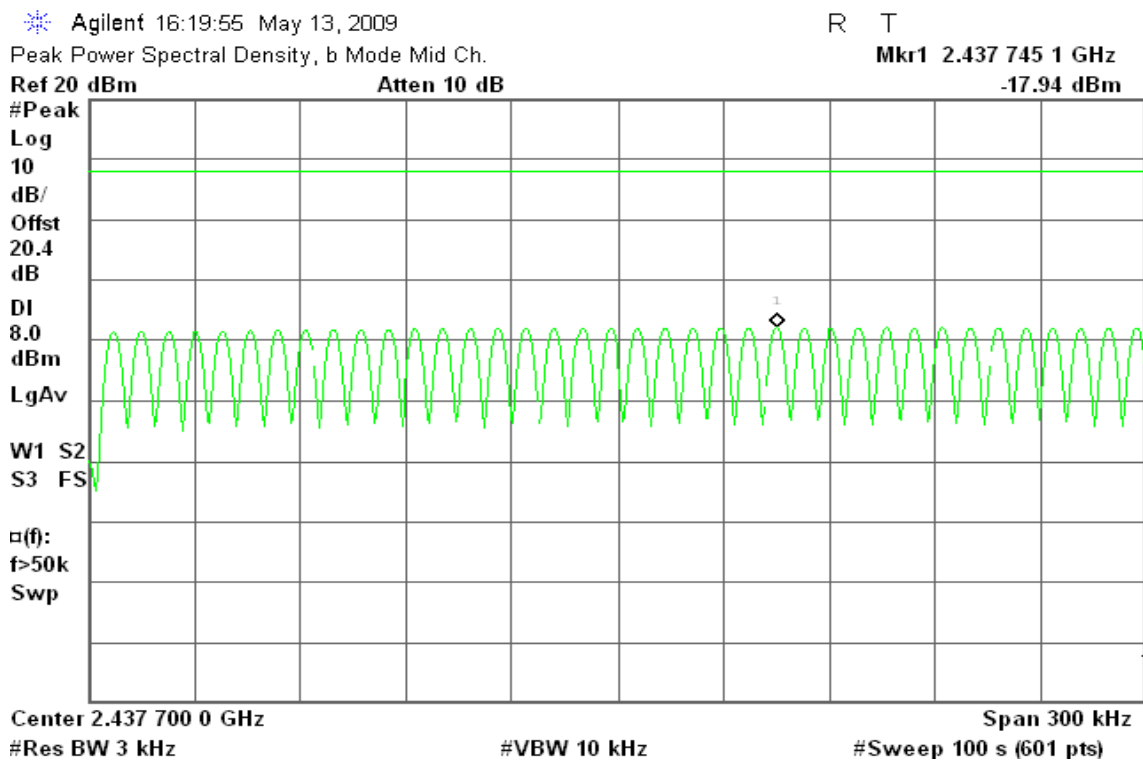
Test Plot

IEEE 802.11b mode

PPSD (CH Low)



PPSD (CH Mid)





PPSD (CH High)

Agilent 16:25:04 May 13, 2009

R T

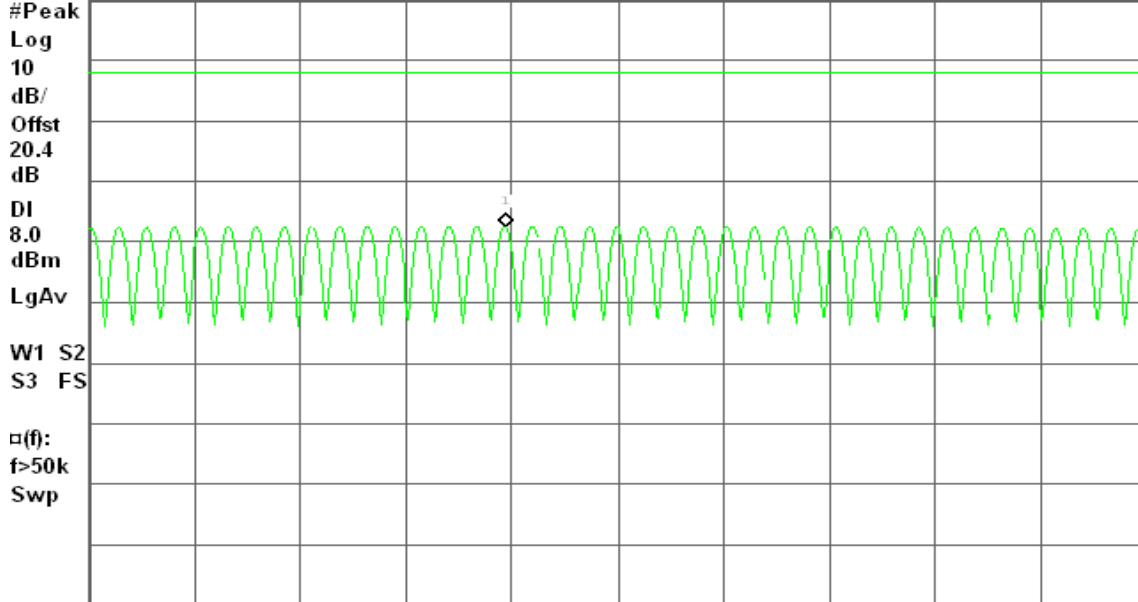
Peak Power Spectral Density, b Mode High Ch.

Mkr1 2.462 768 4 GHz

Ref 20 dBm

Atten 10 dB

-17.50 dBm



Center 2.462 800 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)

IEEE 802.11g mode

PPSD (CH Low)

Agilent 15:29:17 May 13, 2009

R T

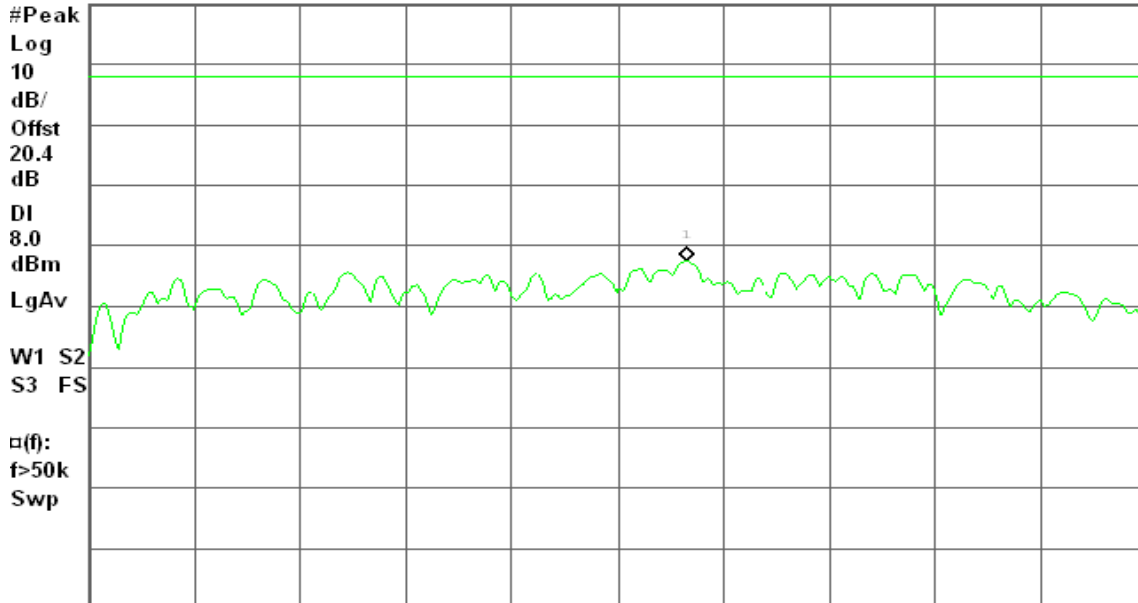
Peak Power Spectral Density, g Mode Low Ch.

Mkr1 2.409 869 6 GHz

Ref 20 dBm

Atten 10 dB

-22.60 dBm



Center 2.409 850 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)



PPSD (CH Mid)

Agilent 15:42:21 May 13, 2009

R L

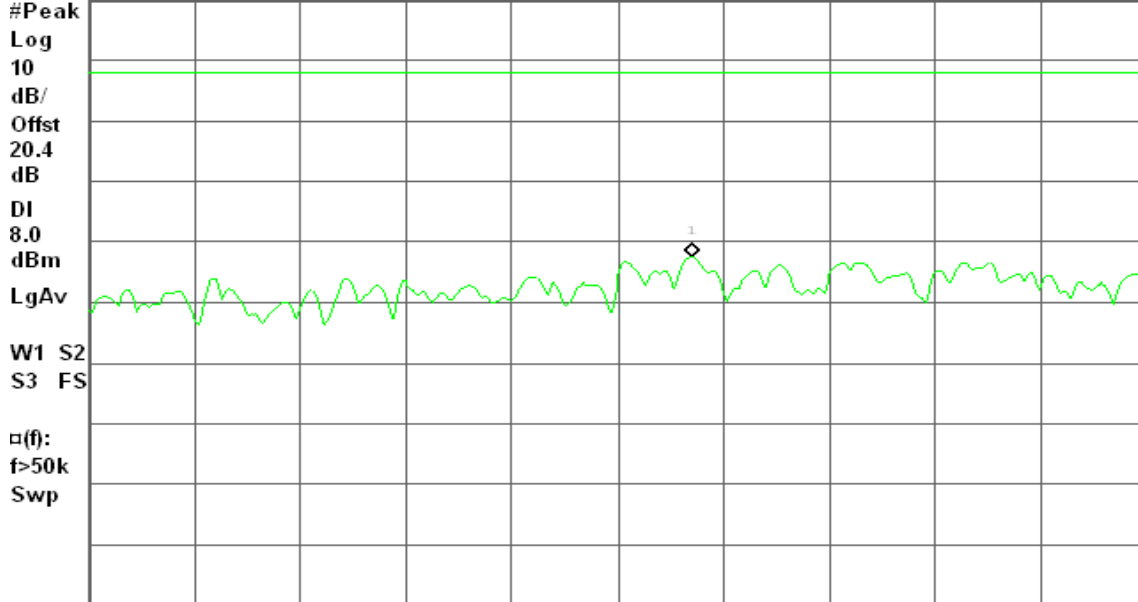
Peak Power Spectral Density, g Mode Mid Ch.

Mkr1 2.443 571 1 GHz

Ref 20 dBm

Atten 10 dB

-22.51 dBm



Center 2.443 550 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)

PPSD (CH High)

Agilent 15:47:51 May 13, 2009

R T

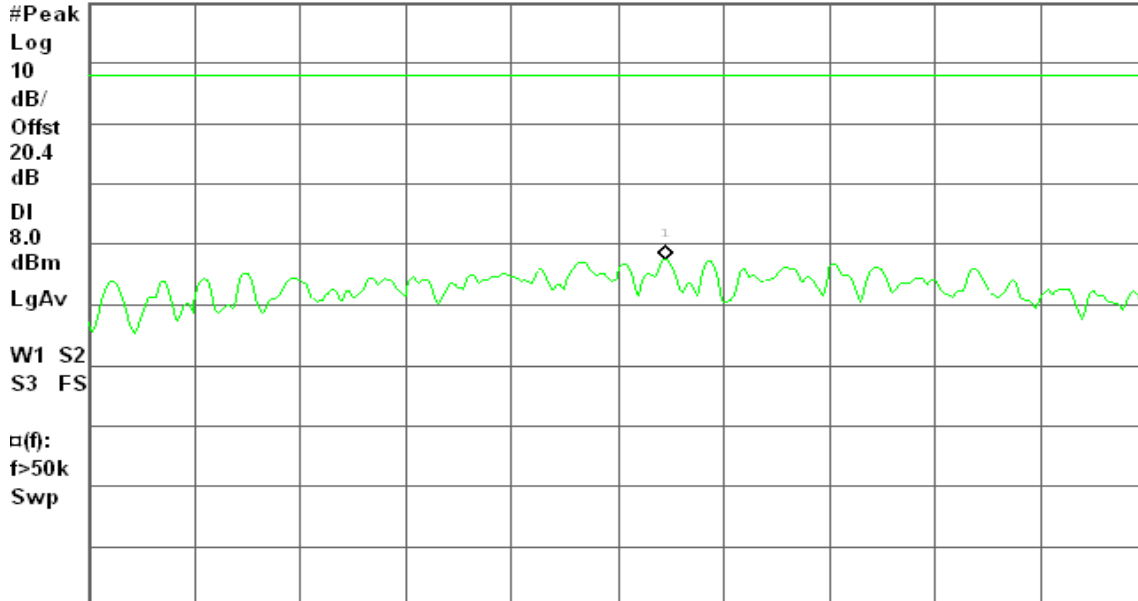
Peak Power Spectral Density, g Mode High Ch.

Mkr1 2.467 363 5 GHz

Ref 20 dBm

Atten 10 dB

-22.49 dBm



Center 2.467 350 0 GHz

Span 300 kHz

#Res BW 3 kHz

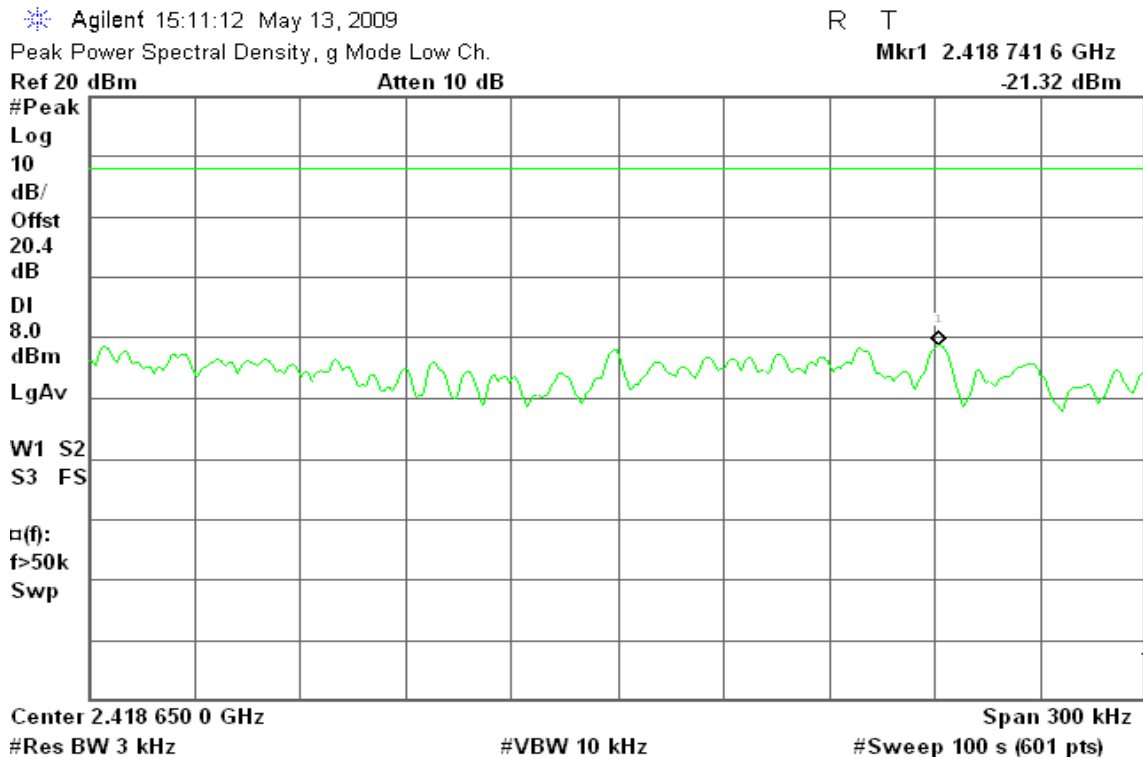
#VBW 10 kHz

#Sweep 100 s (601 pts)

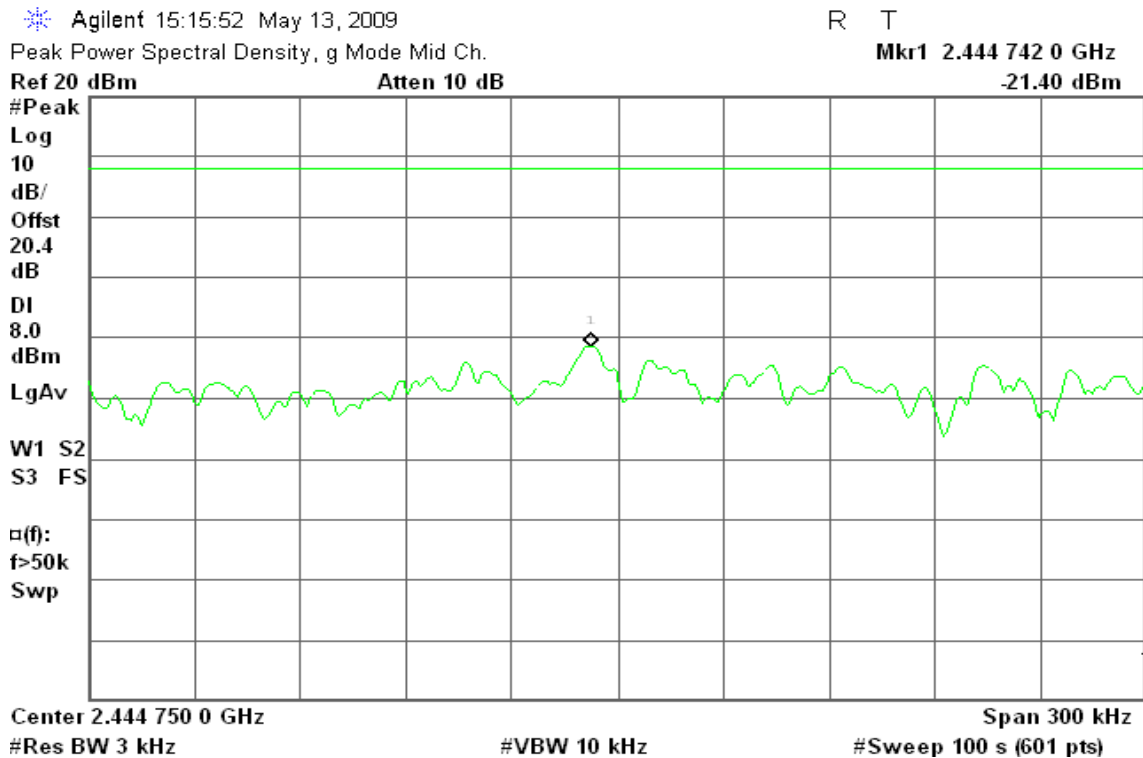


draft 802.11n Standard-20 MHz Channel mode

PPSD (CH Low)



PPSD (CH Mid)





PPSD (CH High)

Agilent 15:24:07 May 13, 2009

R T

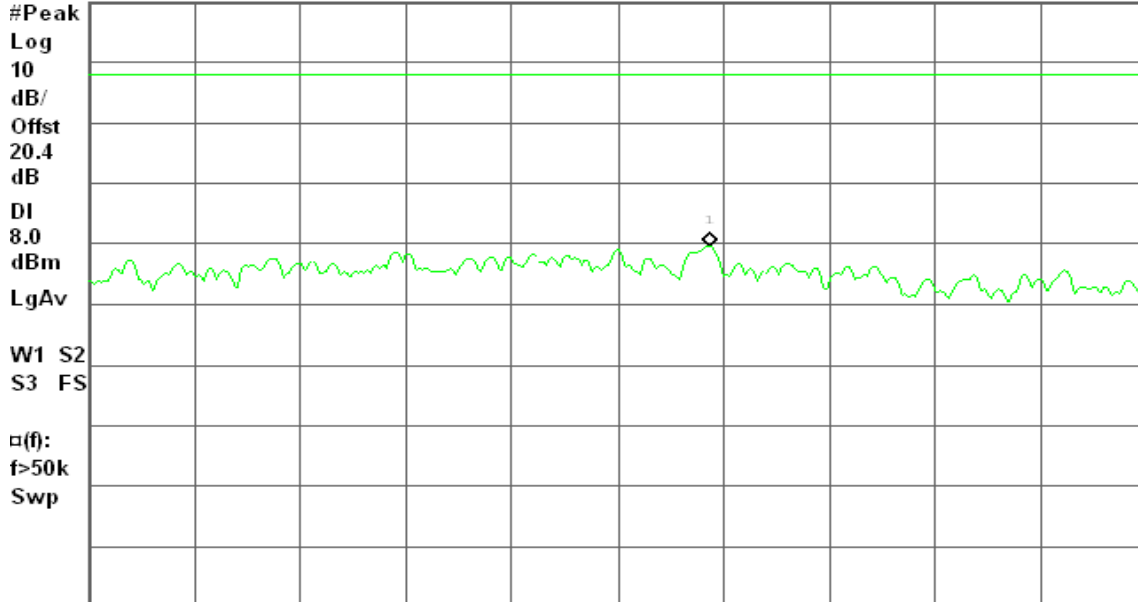
Peak Power Spectral Density, g Mode High Ch.

Mkr1 2.468 676 1 GHz

Ref 20 dBm

Atten 10 dB

-20.41 dBm



Center 2.468 650 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)

draft 802.11n Wide-40 MHz Channel mode

PPSD (CH Low)

Agilent 15:05:12 May 13, 2009

R T

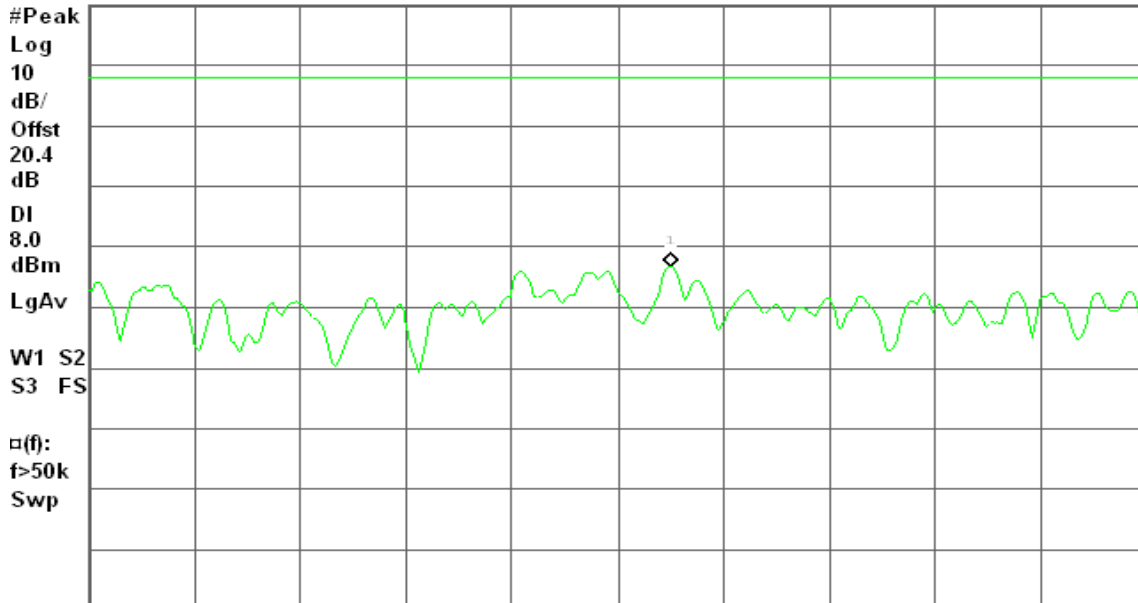
Peak Power Spectral Density, g Mode Low Ch.

Mkr1 2.428 515 0 GHz

Ref 20 dBm

Atten 10 dB

-23.32 dBm



Center 2.428 500 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)



PPSD (CH Mid)

Agilent 15:00:45 May 13, 2009

R T

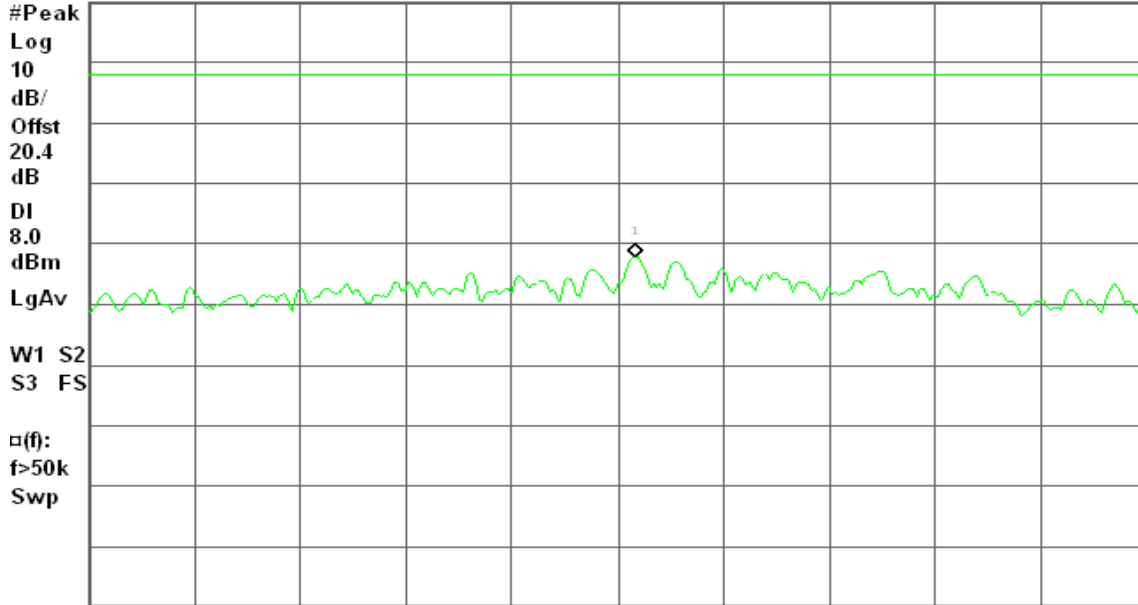
Peak Power Spectral Density, g Mode Mid Ch.

Mkr1 2.433 605 0 GHz

Ref 20 dBm

Atten 10 dB

-22.23 dBm



Center 2.433 600 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)

PPSD (CH High)

Agilent 14:56:11 May 13, 2009

R T

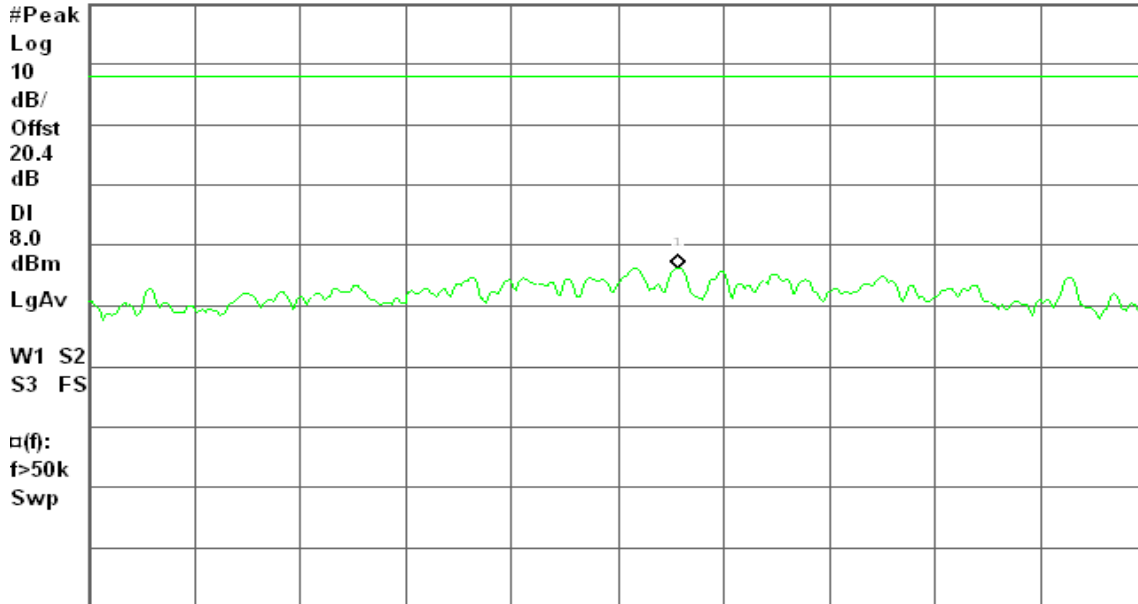
Peak Power Spectral Density, g Mode High Ch.

Mkr1 2.448 617 1 GHz

Ref 20 dBm

Atten 10 dB

-23.78 dBm



Center 2.448 600 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)

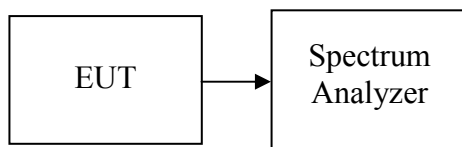
7.6 SPURIOUS EMISSIONS

7.6.1 Conducted Measurement

LIMIT

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).

Test Configuration



TEST PROCEDURE

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

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

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

TEST RESULTS

No non-compliance noted



Test Plot

IEEE 802.11b mode

CH Low

Agilent 16:08:40 May 13, 2009

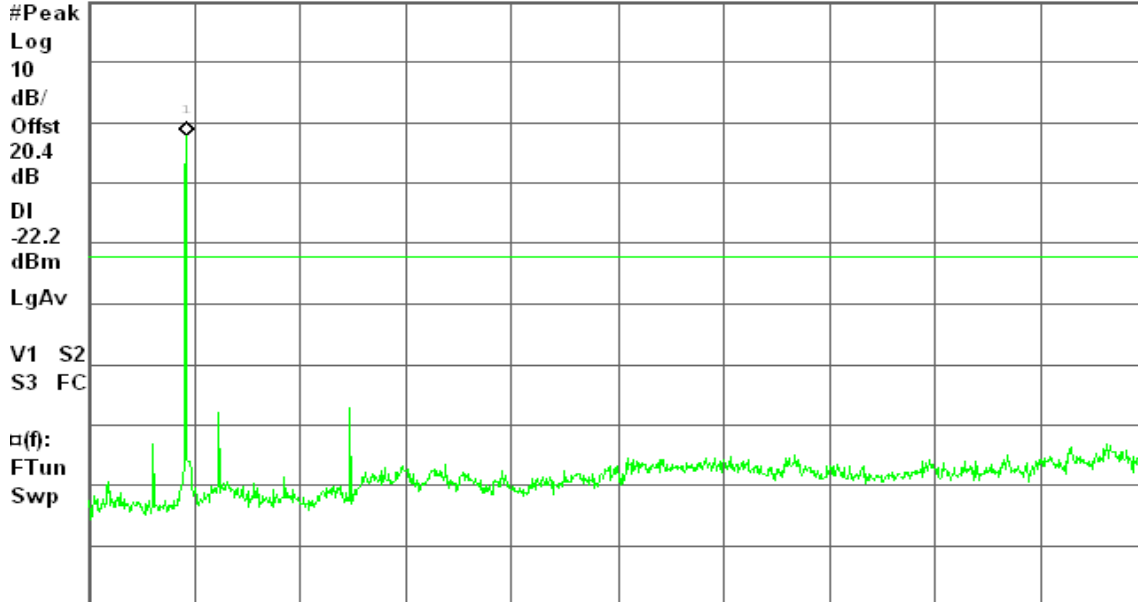
R T

Spurious, b Mode Low Ch.

Mkr1 2.42 GHz
-2.24 dBm

Ref 20 dBm

Atten 10 dB



Center 13.02 GHz

Span 25.97 GHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 3.131 s (1001 pts)

CH Mid

Agilent 16:21:13 May 13, 2009

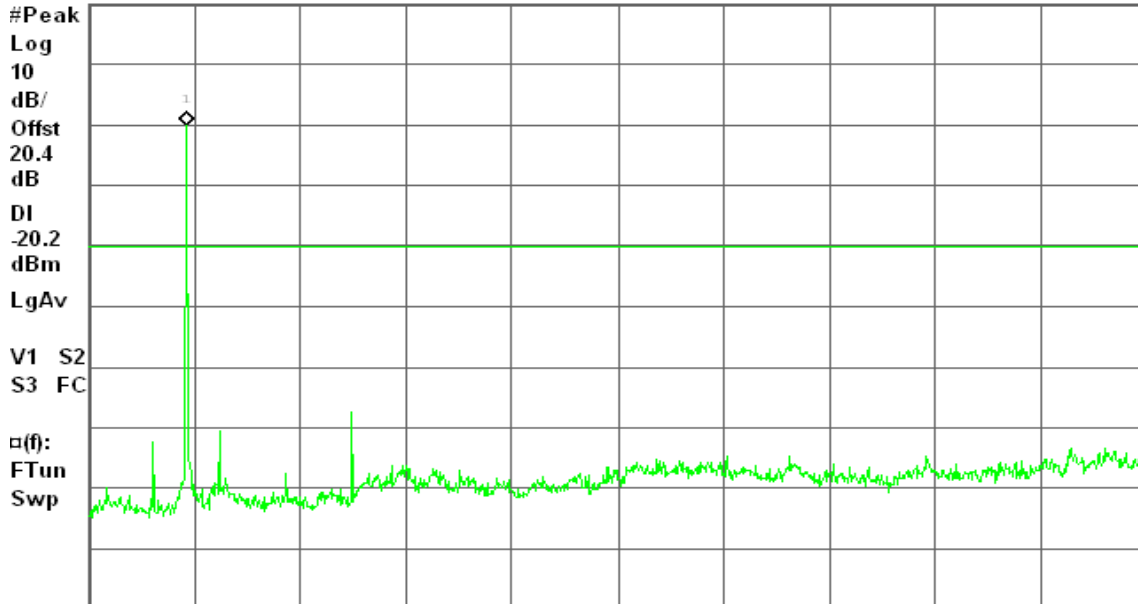
R T

Spurious, b Mode Mid Ch.

Mkr1 2.45 GHz
-0.16 dBm

Ref 20 dBm

Atten 10 dB



Center 13.02 GHz

Span 25.97 GHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 3.131 s (1001 pts)



CH High

Agilent 16:25:46 May 13, 2009

R L

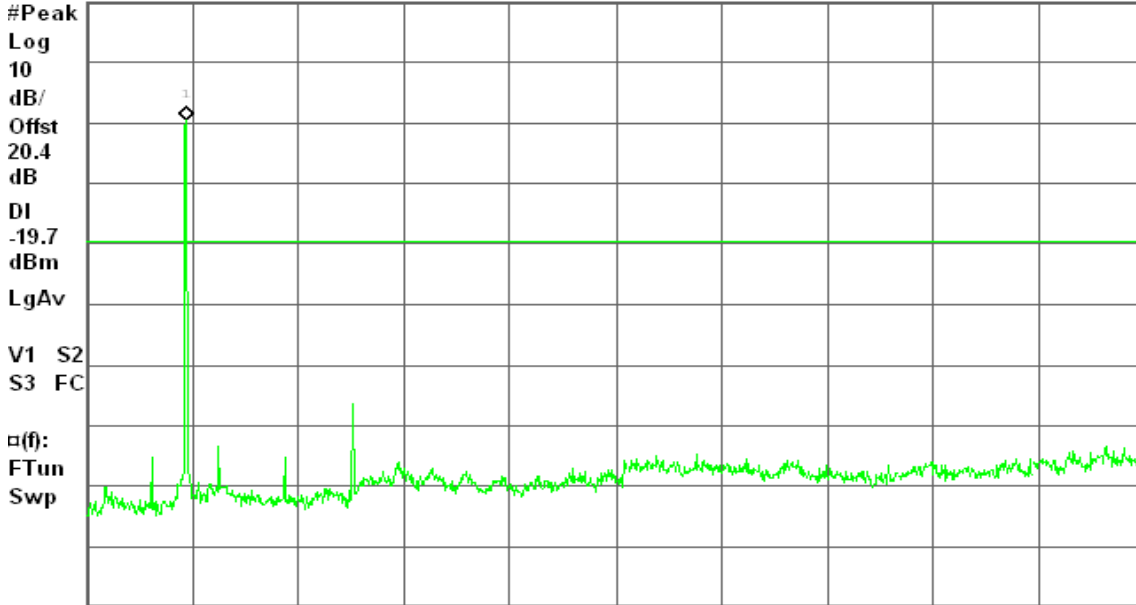
Spurious, b Mode High Ch.

Mkr1 2.47 GHz

Ref 20 dBm

Atten 10 dB

0.32 dBm



Center 13.02 GHz

Span 25.97 GHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 3.131 s (1001 pts)

IEEE 802.11g mode

CH Low

Agilent 15:30:08 May 13, 2009

R T

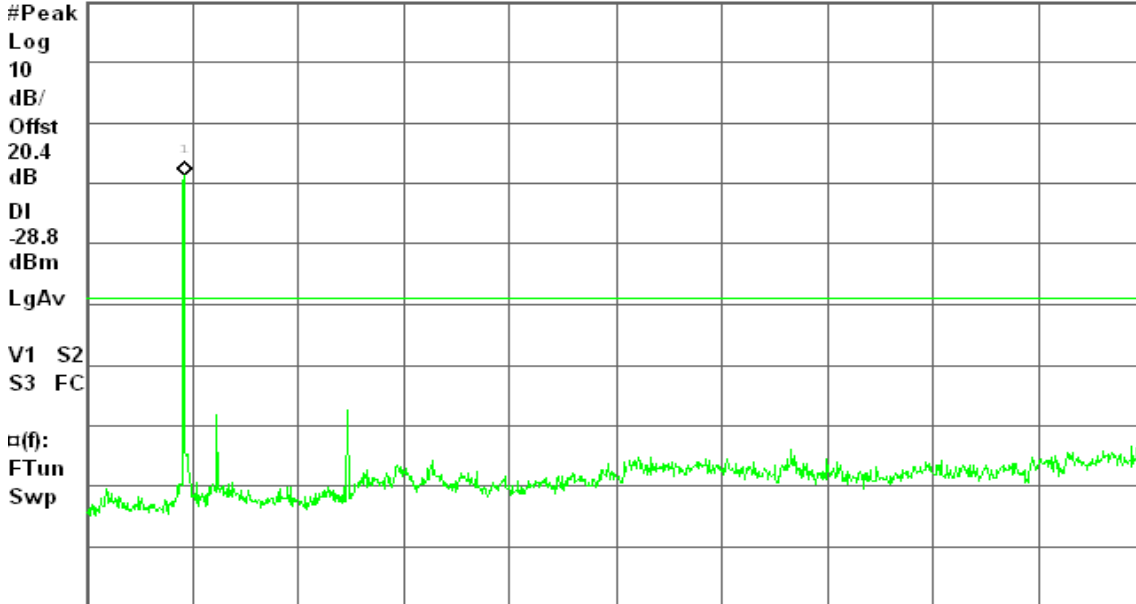
Spurious, g Mode Low Ch.

Mkr1 2.42 GHz

Ref 20 dBm

Atten 10 dB

-8.80 dBm



Center 13.02 GHz

Span 25.97 GHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 3.131 s (1001 pts)



CH Mid

Agilent 15:43:10 May 13, 2009

R T

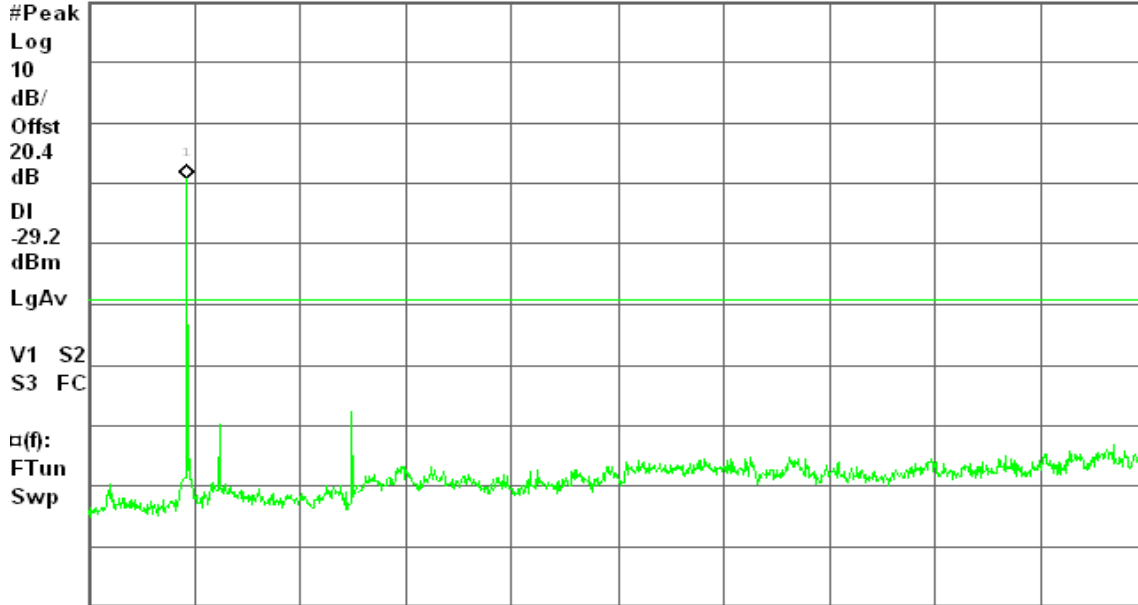
Spurious, g Mode Mid Ch.

Mkr1 2.45 GHz

Ref 20 dBm

Atten 10 dB

-9.21 dBm



Center 13.02 GHz

Span 25.97 GHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 3.131 s (1001 pts)

CH High

Agilent 15:48:41 May 13, 2009

R T

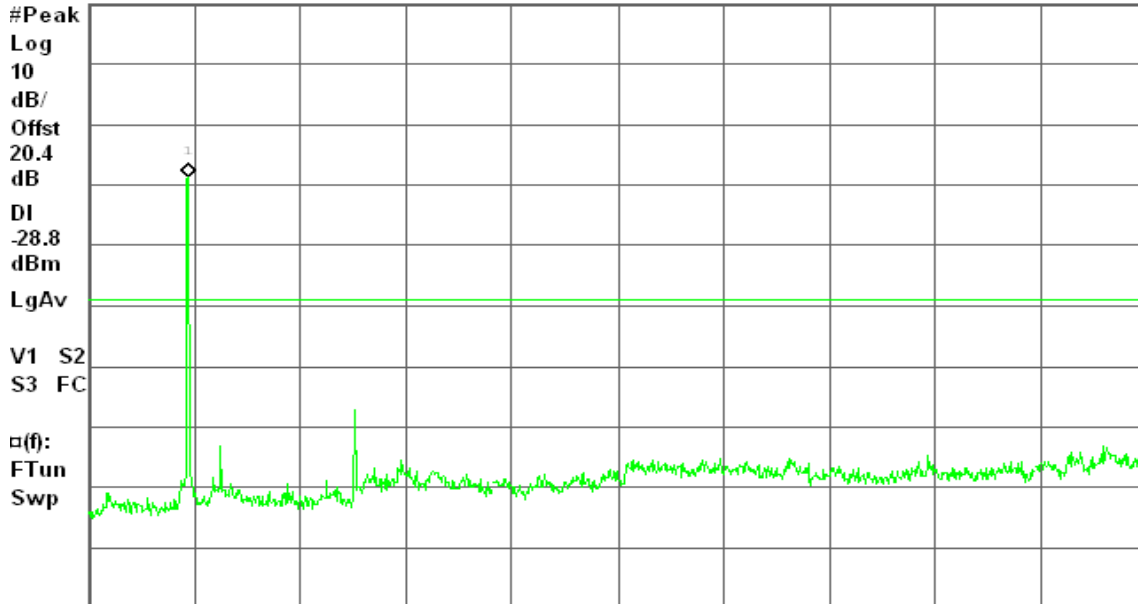
Spurious, g Mode High Ch.

Mkr1 2.47 GHz

Ref 20 dBm

Atten 10 dB

-8.84 dBm



Center 13.02 GHz

Span 25.97 GHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 3.131 s (1001 pts)



draft 802.11n Standard-20 MHz Channel mode

CH Low

Agilent 15:11:55 May 13, 2009

R T

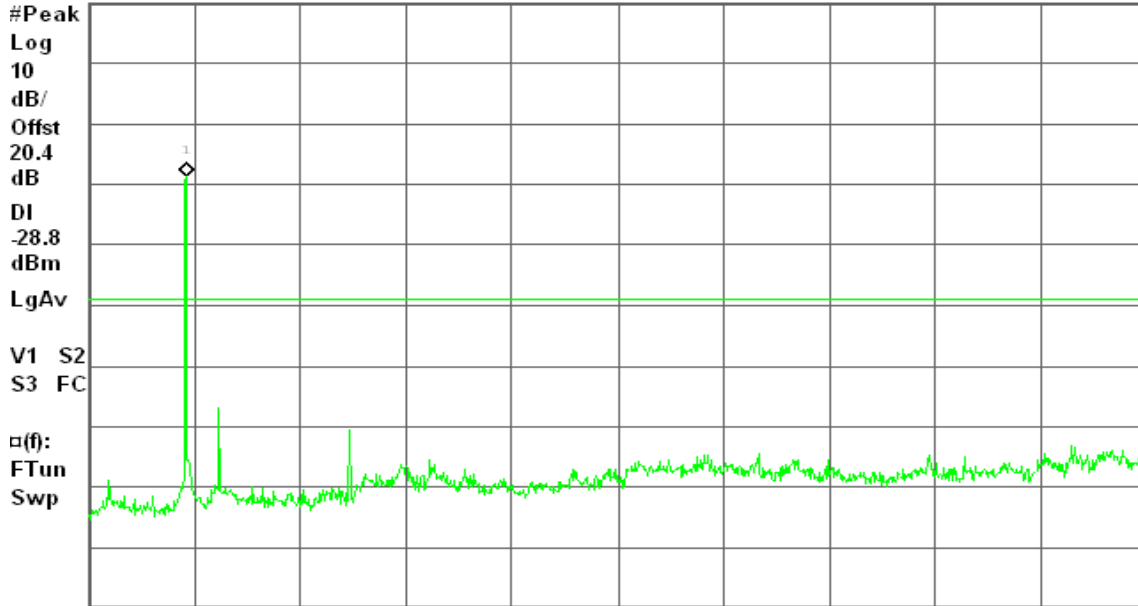
Spurious, g Mode Low Ch.

Mkr1 2.42 GHz

Ref 20 dBm

Atten 10 dB

-8.83 dBm



Center 13.02 GHz

Span 25.97 GHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 3.131 s (1001 pts)

CH Mid

Agilent 15:16:42 May 13, 2009

R T

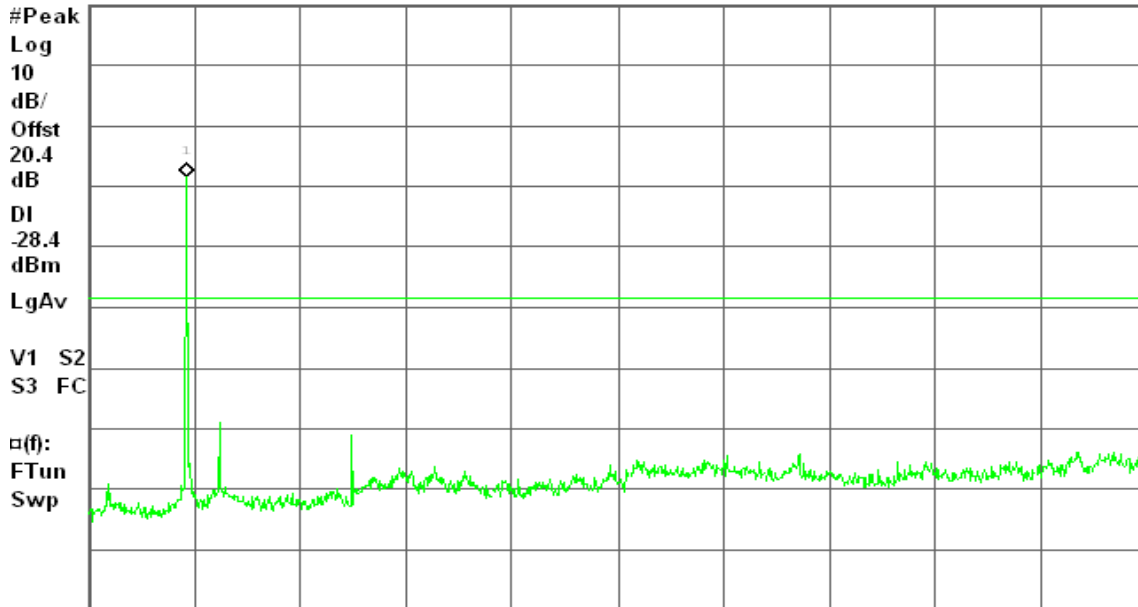
Spurious, g Mode Mid Ch.

Mkr1 2.45 GHz

Ref 20 dBm

Atten 10 dB

-8.35 dBm



Center 13.02 GHz

Span 25.97 GHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 3.131 s (1001 pts)

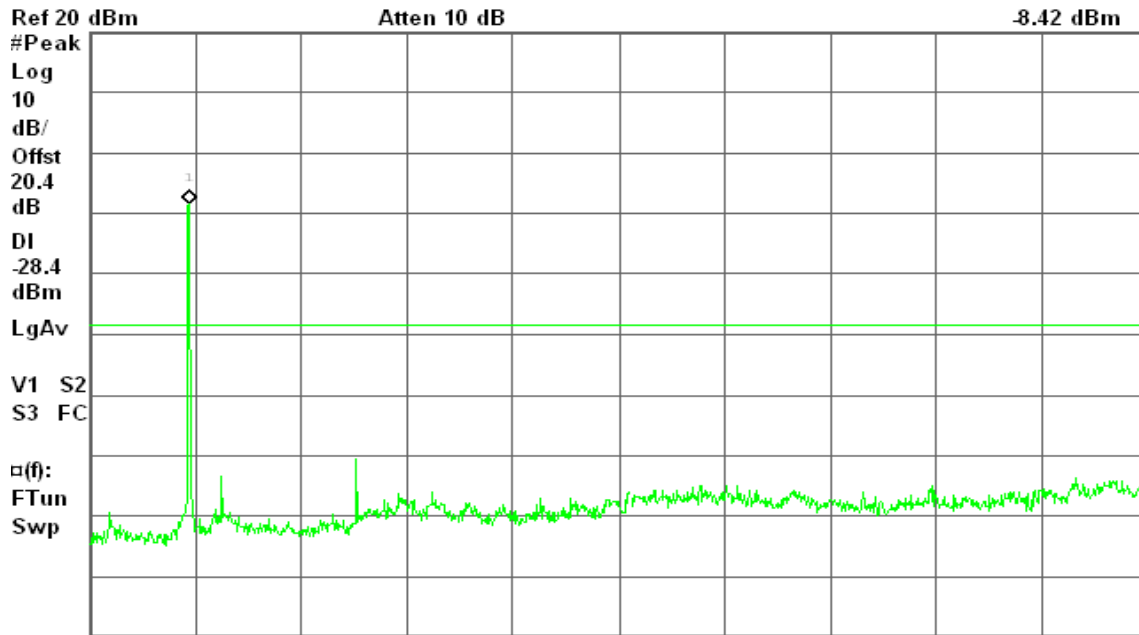


CH High

Agilent 15:25:16 May 13, 2009

R T

Mkr1 2.47 GHz
-8.42 dBm



Center 13.02 GHz Span 25.97 GHz
#Res BW 100 kHz #VBW 100 kHz Sweep 3.131 s (1001 pts)

draft 802.11n Wide-40 MHz Channel mode

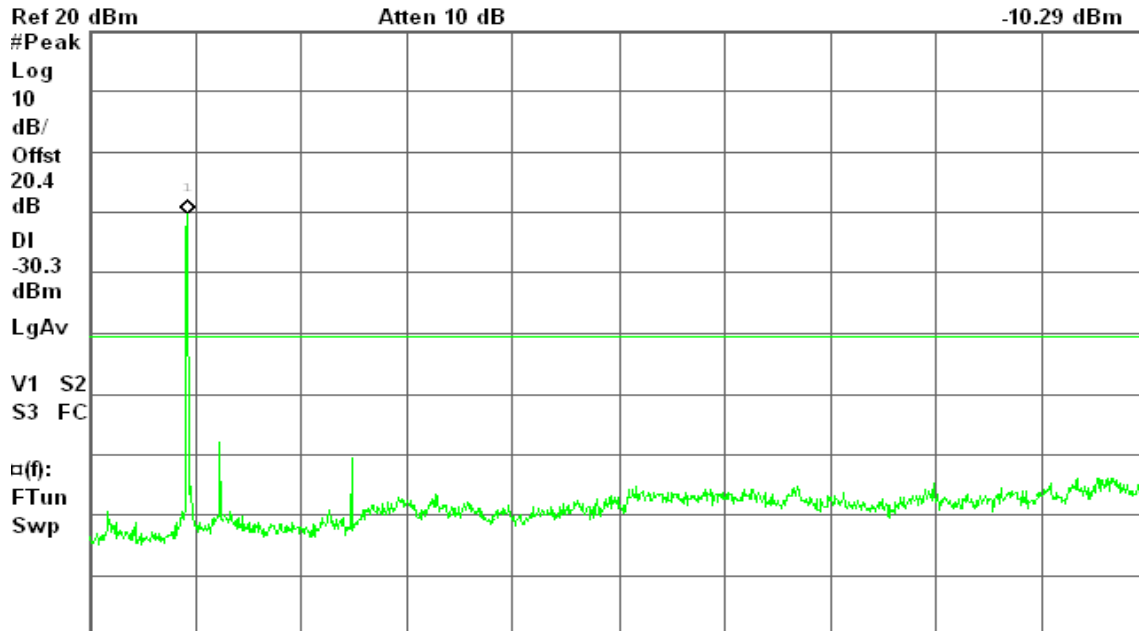
CH Low

Agilent 15:06:22 May 13, 2009

R T

Mkr1 2.42 GHz
-10.29 dBm

Spurious, g Mode Low Ch.



Center 13.02 GHz Span 25.97 GHz
#Res BW 100 kHz #VBW 100 kHz Sweep 3.131 s (1001 pts)



CH Mid

Agilent 15:01:30 May 13, 2009

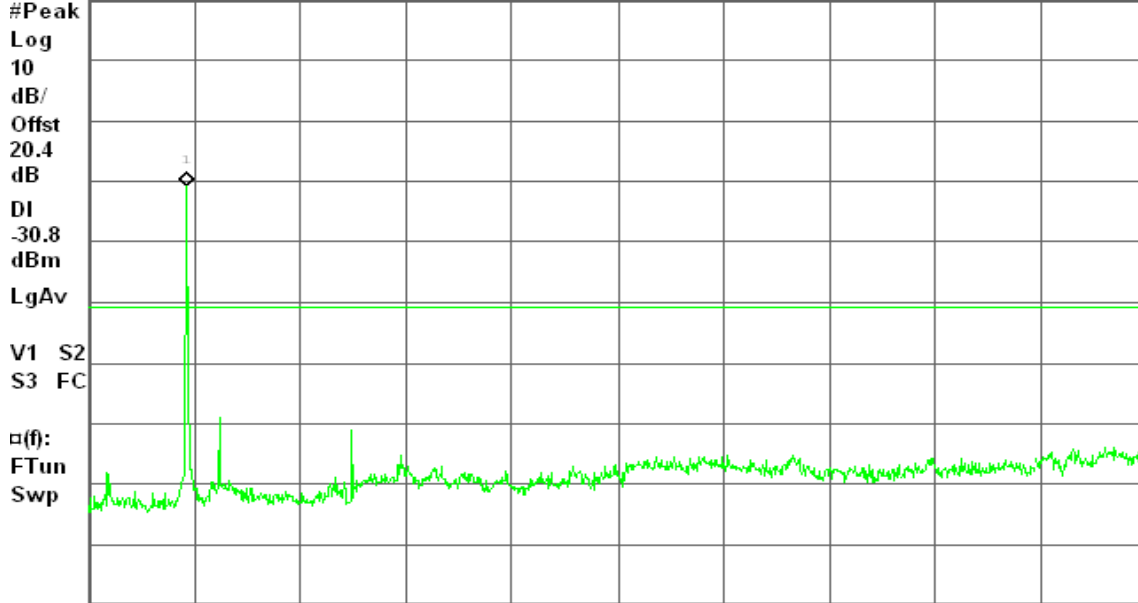
R T

Spurious, g Mode Mid Ch.

Mkr1 2.45 GHz
-10.77 dBm

Ref 20 dBm

Atten 10 dB



Center 13.02 GHz

Span 25.97 GHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 3.131 s (1001 pts)

CH High

Agilent 14:57:19 May 13, 2009

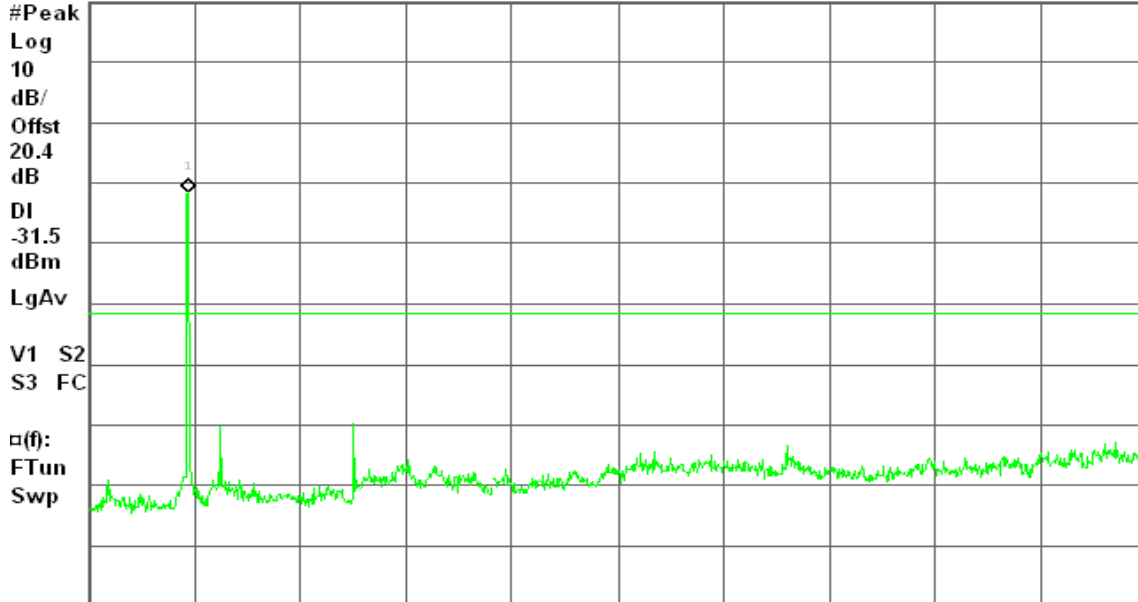
R T

Spurious, g Mode High Ch.

Mkr1 2.47 GHz
-11.50 dBm

Ref 20 dBm

Atten 10 dB



Center 13.02 GHz

Span 25.97 GHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 3.131 s (1001 pts)



7.7 RADIATED EMISSIONS

LIMIT

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

Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

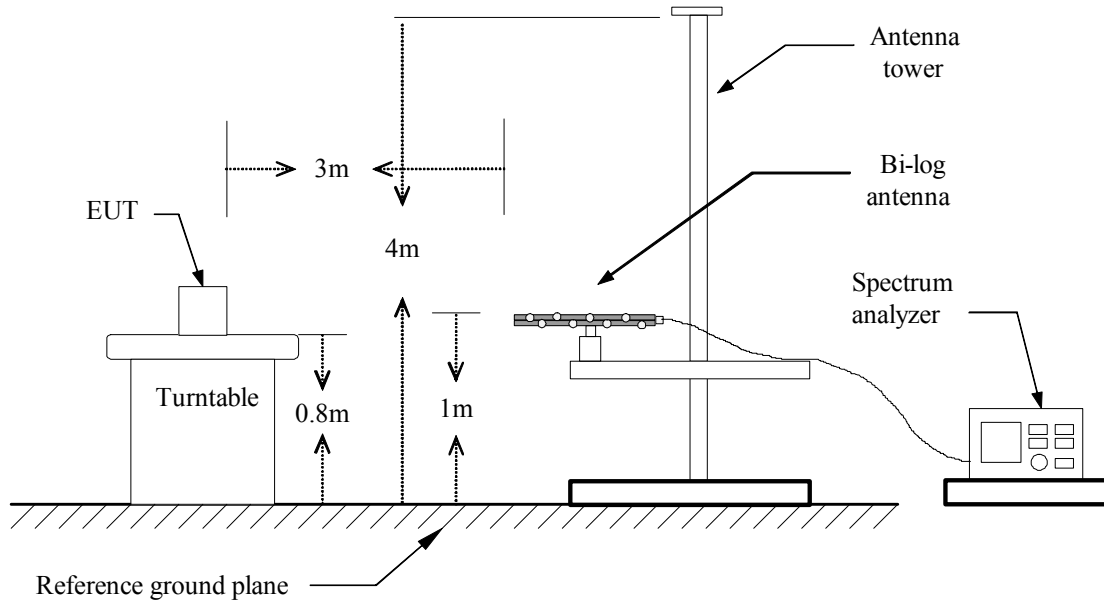
Remark: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of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

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

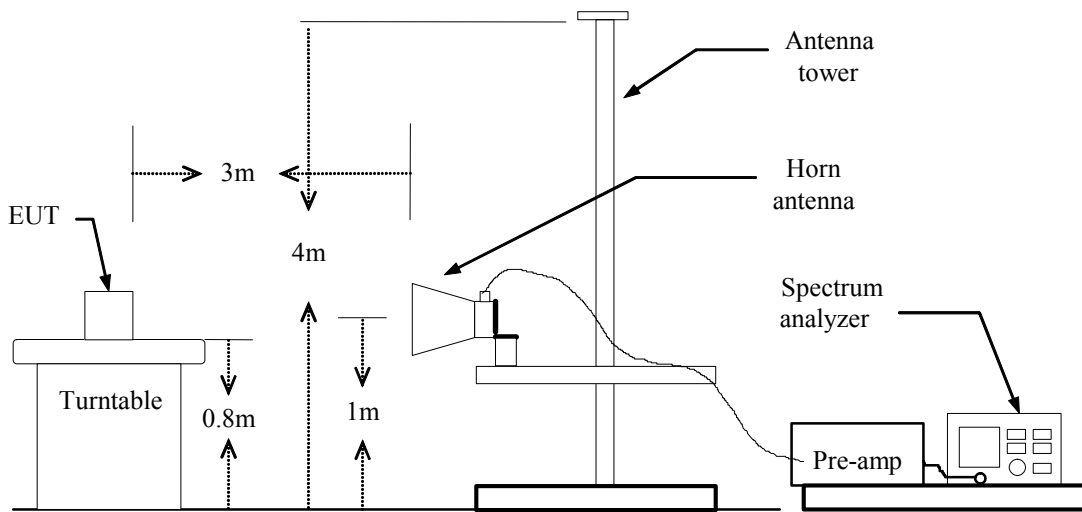
Frequency (MHz)	Field Strength ($\mu\text{V/m}$ at 3-meter)	Field Strength (dB $\mu\text{V/m}$ at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Test Configuration

Below 1 GHz



Above 1 GHz





TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:
Below 1GHz:
RBW=100kHz / VBW=300kHz / Sweep=AUTO
Above 1GHz:
(a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
(b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
7. Repeat above procedures until the measurements for all frequencies are complete.

**Below 1GHz**

Operation Mode: Normal Link **Test Date:** May 12, 2009
Temperature: 25°C **Tested by:** Nan Tsai
Humidity: 50 % RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
130.23	V	38.47	-8.98	29.48	43.50	-14.02	Peak
165.80	V	41.38	-10.61	30.77	43.50	-12.73	Peak
497.22	V	34.71	-4.09	30.62	46.00	-15.38	Peak
566.73	V	35.15	-2.75	32.40	46.00	-13.60	Peak
629.78	V	32.83	-2.39	30.44	46.00	-15.56	Peak
846.42	V	29.52	0.29	29.81	46.00	-16.19	Peak
165.80	H	35.65	-10.61	25.04	43.50	-18.46	Peak
291.90	H	40.29	-8.63	31.67	46.00	-14.33	Peak
430.93	H	33.03	-5.85	27.19	46.00	-18.81	Peak
633.02	H	28.44	-2.37	26.07	46.00	-19.93	Peak
846.42	H	31.52	0.29	31.81	46.00	-14.19	Peak
912.70	H	31.87	0.99	32.86	46.00	-13.14	Peak

Remark:

1. No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).
2. Radiated emissions measured were made with an instrument using peak/quasi-peak detector mode.
3. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. Margin (dB) = Remark result (dBuV/m) – Quasi-peak limit (dBuV/m).

**Above 1 GHz****Operation Mode:** TX / IEEE 802.11b / CH Low**Test Date:** May 12, 2009**Temperature:** 25°C**Tested by:** Nan Tsai**Humidity:** 50 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
2410.00	V	105.46	102.13	-1.57	103.89	100.56	Fundamental			
2813.33	V	50.92	---	-0.80	50.12	---	74.00	54.00	-3.88	Peak
3216.67	V	51.51	---	-0.19	51.32	---	74.00	54.00	-2.68	Peak
6433.33	V	54.43	53.17	2.77	57.20	55.94	83.89	80.56	-24.62	20dBC AVG Fundamental
N/A										
1946.67	H	50.81	---	-2.76	48.05	---	74.00	54.00	-5.95	Peak
2533.33	H	51.82	---	-1.35	50.47	---	74.00	54.00	-3.53	Peak
6433.33	H	51.04	48.33	2.77	53.81	51.10	74.00	54.00	-2.90	AVG
N/A										

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser; with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).
7. In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

**Operation Mode:** TX / IEEE 802.11b / CH Mid**Test Date:** May 12, 2009**Temperature:** 25°C**Tested by:** Nan Tsai**Humidity:** 50 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
1623.33	V	52.12	---	-5.85	46.27	---	74.00	54.00	-7.73	Peak
6500.00	V	52.93	50.41	2.85	55.78	53.26	74.00	54.00	-0.74	AVG
N/A										
2323.33	H	51.37	---	-1.71	49.65	---	74.00	54.00	-4.35	Peak
5608.33	H	49.23	---	1.72	50.95	---	74.00	54.00	-3.05	Peak
N/A										

Remark:

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

**Operation Mode:** TX / IEEE 802.11b / CH High**Test Date:** May 12, 2009**Temperature:** 25°C**Tested by:** Nan Tsai**Humidity:** 50 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
6566.67	V	52.43	49.91	3.03	55.46	52.94	74.00	54.00	-1.06	AVG
N/A										
1966.67	H	50.73	---	-2.57	48.16	---	74.00	54.00	-5.84	Peak
6566.67	H	50.61	47.25	3.03	53.64	50.28	74.00	54.00	-3.72	AVG
N/A										

Remark:

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

**Operation Mode:** TX / IEEE 802.11g / CH Low**Test Date:** May 12, 2009**Temperature:** 25°C**Tested by:** Nan Tsai**Humidity:** 50 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
2266.67	V	52.12	---	-1.81	50.31	---	74.00	54.00	-3.69	Peak
3216.67	V	51.68	---	-0.19	51.49	---	74.00	54.00	-2.51	Peak
6433.33	V	55.20	50.48	2.77	57.97	53.25	74.00	54.00	-0.75	AVG
N/A										
2136.67	H	50.62	---	-2.02	48.60	---	74.00	54.00	-5.40	Peak
6433.33	H	51.62	46.79	2.77	54.39	49.56	74.00	54.00	-4.44	AVG
N/A										

Remark:

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

**Operation Mode:** TX / IEEE 802.11g / CH Mid**Test Date:** May 12, 2009**Temperature:** 25°C**Tested by:** Nan Tsai**Humidity:** 50 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
2033.33	V	50.47	---	-2.19	48.27	---	74.00	54.00	-5.73	Peak
4800.00	V	50.62	---	1.04	51.66	---	74.00	54.00	-2.34	Peak
6500.00	V	54.14	50.75	2.85	56.99	53.60	74.00	54.00	-0.40	AVG
N/A										
4916.67	H	48.75	---	1.01	49.76	---	74.00	54.00	-4.24	Peak
N/A										

Remark:

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

**Operation Mode:** TX / IEEE 802.11g / CH High**Test Date:** May 12, 2009**Temperature:** 25°C**Tested by:** Nan Tsai**Humidity:** 50 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
3283.33	V	49.81	---	-0.11	49.70	---	74.00	54.00	-4.30	Peak
6566.67	V	52.17	50.44	3.03	55.20	53.47	74.00	54.00	-0.53	AVG
N/A										
1980.00	H	51.45	---	-2.44	49.01	---	74.00	54.00	-4.99	Peak
6566.67	H	50.69	47.95	3.03	53.72	50.98	74.00	54.00	-3.02	AVG
N/A										

Remark:

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



Operation Mode: TX / draft 802.11n Standard-20 MHz Channel mode / CH Low

Test Date: May 12, 2009

Temperature: 25°C

Tested by: Nan Tsai

Humidity: 50 % RH

Polarity: Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
2650.00	V	51.38	---	-1.12	50.26	---	74.00	54.00	-3.74	Peak
3216.67	V	52.00	---	-0.19	51.81	---	74.00	54.00	-2.19	Peak
6433.33	V	54.30	50.21	2.77	57.07	52.98	74.00	54.00	-1.02	AVG
N/A										
2660.00	H	50.60	---	-1.10	49.50	---	74.00	54.00	-4.50	Peak
N/A										

Remark:

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



Operation Mode: TX / draft 802.11n Standard-20 MHz Channel mode / CH Mid

Test Date: May 12, 2009

Temperature: 25°C

Tested by: Nan Tsai

Humidity: 50 % RH

Polarity: Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
1843.33	V	51.11	---	-3.75	47.36	---	74.00	54.00	-6.64	Peak
6500.00	V	52.92	50.32	2.85	55.77	53.17	74.00	54.00	-0.83	AVG
N/A										
1833.33	H	51.11	---	-3.84	47.26	---	74.00	54.00	-6.74	Peak
4908.33	H	50.02	---	1.01	51.03	---	74.00	54.00	-2.97	Peak
N/A										

Remark:

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



Operation Mode: TX / draft 802.11n Standard-20 MHz Channel mode / CH High

Test Date: May 12, 2009

Temperature: 25°C

Tested by: Nan Tsai

Humidity: 50 % RH

Polarity: Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
2036.67	V	51.32	---	-2.19	49.13	---	74.00	54.00	-4.87	Peak
6566.67	V	52.79	48.90	3.03	55.83	51.93	74.00	54.00	-2.07	AVG
N/A										
1993.33	H	51.04	---	-2.31	48.73	---	74.00	54.00	-5.27	Peak
6566.67	H	51.73	48.25	3.03	54.76	51.28	74.00	54.00	-2.72	AVG
N/A										

Remark:

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



Operation Mode: TX / draft 802.11n Wide-40 MHz Channel mode / CH Low **Test Date:** May 12, 2009
Temperature: 25°C **Tested by:** Nan Tsai
Humidity: 50 % RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
1843.33	V	51.46	---	-3.75	47.71	---	74.00	54.00	-6.29	Peak
3233.33	V	50.70	---	-0.17	50.54	---	74.00	54.00	-3.46	Peak
6458.33	V	54.43	50.66	2.80	57.23	53.46	74.00	54.00	-0.54	AVG
N/A										
2736.67	H	50.98	---	-0.95	50.03	---	74.00	54.00	-3.97	Peak
6458.33	H	51.46	48.34	2.80	54.26	51.14	74.00	54.00	-2.86	AVG
N/A										

Remark:

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



Operation Mode: TX / draft 802.11n Wide-40 MHz Channel mode / CH Mid

Test Date: May 12, 2009

Temperature: 25°C

Tested by: Nan Tsai

Humidity: 50 % RH

Polarity: Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
6500.00	V	53.22	50.78	2.85	56.07	53.63	74.00	54.00	-0.37	AVG
N/A										
1810.00	H	51.24	---	-4.07	47.17	---	74.00	54.00	-6.83	Peak
6500.00	H	50.25	47.21	2.85	53.10	50.06	74.00	54.00	-3.94	AVG
N/A										

Remark:

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



Operation Mode: TX / draft 802.11n Wide-40 MHz Channel mode / CH High **Test Date:** May 12, 2009
Temperature: 25°C **Tested by:** Nan Tsai
Humidity: 50 % RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
1950.00	V	50.69	---	-2.73	47.96	---	74.00	54.00	-6.04	Peak
6541.67	V	53.99	49.21	2.96	56.95	52.17	74.00	54.00	-1.83	AVG
N/A										
1976.67	H	51.31	---	-2.47	48.84	---	74.00	54.00	-5.16	Peak
4575.00	H	48.82	---	1.10	49.92	---	74.00	54.00	-4.08	Peak
6541.67	H	50.77	46.25	2.96	53.74	49.21	74.00	54.00	-4.79	AVG
N/A										

Remark:

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



7.8 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

* Decreases with the logarithm of the frequency.

Test Configuration

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

TEST PROCEDURE

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



TEST RESULTS

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

Test Data

Operation Mode: Normal Link **Test Date:** May 12, 2009

Temperature: 22°C **Tested by:** Mark Yang

Humidity: 45 % RH

Freq. (MHz)	QP Reading (dBuV)	AV Reading (dBuV)	Corr. factor (dB)	QP Result (dBuV)	AV Result (dBuV)	QP Limit (dBuV)	AV Limit (dBuV)	QP Margin (dB)	AV Margin (dB)	Note
0.1650	48.79	39.19	0.11	48.90	39.30	65.21	55.21	-16.31	-15.91	L1
0.2250	40.02	31.82	0.08	40.10	31.90	62.63	52.63	-22.53	-20.73	L1
0.2800	36.13	29.03	0.07	36.20	29.10	60.82	50.82	-24.62	-21.72	L1
1.8150	28.35	16.35	0.05	28.40	16.40	56.00	46.00	-27.60	-29.60	L1
3.9650	39.54	26.14	0.06	39.60	26.20	56.00	46.00	-16.40	-19.80	L1
28.8150	23.57	16.47	0.23	23.80	16.70	60.00	50.00	-36.20	-33.30	L1
0.1650	48.17	39.67	0.13	48.30	39.80	65.21	55.21	-16.91	-15.41	L2
0.2200	41.40	34.70	0.10	41.50	34.80	62.82	52.82	-21.32	-18.02	L2
0.2800	38.61	30.91	0.09	38.70	31.00	60.82	50.82	-22.12	-19.82	L2
0.3350	34.91	28.91	0.09	35.00	29.00	59.33	49.33	-24.33	-20.33	L2
1.9500	31.62	24.62	0.08	31.70	24.70	56.00	46.00	-24.30	-21.30	L2
4.0250	36.31	23.61	0.09	36.40	23.70	56.00	46.00	-19.60	-22.30	L2

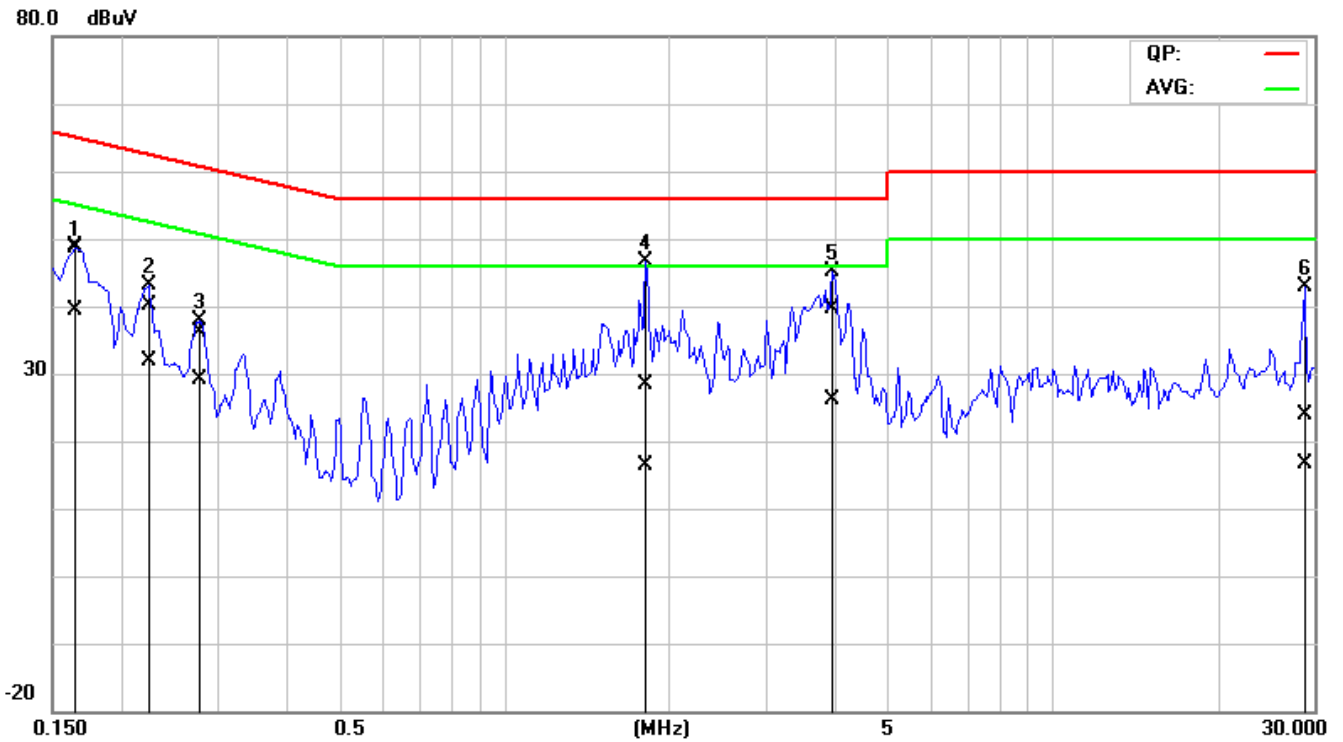
Remark:

1. Measuring frequencies from 0.15 MHz to 30MHz.
2. The emissions measured in frequency range from 0.15 MHz to 30MHz were made with an instrument using Quasi-peak detector and average detector.
3. The IF bandwidth of SPA between 0.15MHz and 30MHz was 10kHz; the IF bandwidth of Test Receiver between 0.15MHz and 30MHz was 9kHz;
4. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)



Test Plots

Conducted emissions (Line 1)



Conducted emissions (Line 2)

