FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

Wireless USB Dongle

Model: WU81RS

Trade Name: PRO-NETS; Speed Com+; Jet Com

Issued to

PRO-NETS TECHNOLOGY CORPORATION
7F, No. 95, Li-De St., Chung Ho City 235, Taipei, Taiwan R.O.C.

Issued by

Compliance Certification Services Inc.
No. 81-1, Lane 210, Pa-De 2nd Rd., Luchu Hsiang,
Taoyuan Shien, (338) Taiwan, R.O.C.
TEL: 886-3-324-0332
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Revision History

Rev.		Issue Date		Revisions	Effect Page	Revised By
00		August 26, 2009		Initial Issue	ALL	Celine Chou

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1. TEST RESULT CERTIFICATION

Applicant:	**PRO-NETS TECHNOLOGY CORPORATION** 7F, No. 95, Li-De St., Chung Ho City 235, Taipei, Taiwan R.O.C.
Equipment Under Test:	Wireless USB Dongle
Trade Name:	PRO-NETS; Speed Com+; Jet Com
Model:	WU81RS
Date of Test:	July 22 ~ August 24, 2009

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

We hereby certify that:

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

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

Approved by:

David Wang
Director
Compliance Certification Services Inc.

Reviewed by:

Ethan Huang
Section Manage
Compliance Certification Services Inc.

2. EUT DESCRIPTION

Product	Wireless USB Dongle
Trade Name	PRO-NETS; Speed Com+; Jet Com
Model Number	WU81RS
Model Discrepancy	N/A
EUT Power Rating	5VDC
Operating Frequency Range	2412 ~ 2462 MHz
Transmit Power	IEEE 802.11b mode: 16.78 dBm IEEE 802.11g mode: 20.61 dBm draft 802.11n 20 MHz Channel mode: 20.58 dBm draft 802.11n 40 MHz Channel mode: 19.82 dBm
Modulation Technique	IEEE 802.11b mode: DSSS (1, 2, 5.5 and 11 Mpbs) IEEE 802.11g mode: OFDM (6, 9, 12, 18, 24, 36, 48 and 54 Mpbs) draft 802.11n 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 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 20 MHz Channel mode: 11 Channels draft 802.11n 40 MHz Channel mode: 7 Channels
Antenna Specification	PCB Antenna / Gain: 3.4dBi

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: **RXZ-WU81RS** 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 2, 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: WU81RS) had been tested under operating condition.

The EUT is a 2x2 configuration spatial MIMO (2Tx & 2Rx) without beam forming function that operate in double TX chains and double RX chains. The 2x2 configuration is implemented with two outside TX & RX chains (Chain 0 and 1).

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

The worst case data rate is determined as the data rate with highest output power.

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

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 20 MHz Channel mode:

Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 13.5Mbps data rate were chosen for full testing.

draft 802.11n 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	Agilnet	E4446A	MY48250064	10/28/2009
Spectrum Analyzer	R&S	FSEB	825829/011	10/29/2009

3M Semi Anechoic Chamber				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum Analyzer	Agilnet	E4446A	MY48250064	10/28/2009
Spectrum Analyzer	R&S	FSEB	825829/011	10/29/2009
Pre-Amplifier	HP	8447D	2944A06530	12/31/2009
Pre-Amplifier	HP	8449B	3008A01738	04/17/2010
EMI Test Receiver	SCHAFFNER	SCR 3501	436	01/21/2010
Loop Antenna	EMCO	6502	2356	05/28/2010
Bilog Antenna	SCHWAZBECK	VULB9160	3084	09/08/2009
Horn Antenna	EMCO	3115	00022250	05/08/2010
Turn Table	CCS	CC-T-1F	N/A	N.C.R
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R
Test S/W	LabVIEW 6.1 (Wugu Chamber EMI Teat V1_4.5.3)			

Powerline Conducted Emissions Test Site				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
EMI Test Receiver	R&S	ESCI	100782	06/01/2010
LISN	R&S	ENV216	100066	05/06/2010
LISN	R&S	ENV 4200	830326/016	04/15/2010
Test S/W	CCS-3A1-CE			

4.3 MEASUREMENT UNCERTAINTY

Parameter	Uncertainty
Powerline Conducted Emission	±1.7983
3M Semi Anechoic Chamber / 30MHz ~ 1GHz	±3.8856
3M Semi Anechoic Chamber / Above 1GHz	±3.8721

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 FACILTIES

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, Pa-De 2nd Rd., Luchu Hsiang, Taoyuan Shien, (338) Taiwan, R.O.C.
Tel: 886-3-324-0332 / Fax: 886-3-324-5235

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

5.2 EQUIPMENT

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

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

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

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

5.3 TABLE OF ACCREDITATIONS AND LISTINGS

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

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

6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

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

6.2 SUPPORT EQUIPMENT

For Radiated and Conducted Measurement							
No.	**Device Type**	**Brand**	**Model**	**Series No.**	**FCC ID**	**Data Cable**	**Power Cord**
1.	Notebook PC	DELL	D400	0932RY	E2K24GBRL	N/A	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core

For Powerline Measurement							
No.	**Device Type**	**Brand**	**Model**	**Series No.**	**FCC ID**	**Data Cable**	**Power Cord**
1.	Notebook PC	DELL	D400	0932RY	E2K24GBRL	N/A	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core
2.	LCD Monitor	DELL	2407WFPb	CN-0FC255-46633 -675-24TKS	FCC DoC	D-SUB Cable; Shielded, 1.8m with two cores	Unshielded, 1.8m
3.	USB Mouse	HP	MO19UCA	020440986	FCC DoC	Unshielded, 1.8m	N/A

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

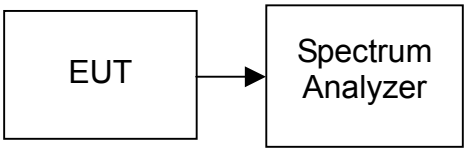
7. FCC PART 15.247 REQUIREMENTS

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 6 dB bandwidth shall be at least 500 kHz.

TEST CONFIGURATION



TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 100kHz, VBW = 300kHz, Span = 30MHz, Sweep = auto.
4. Mark the peak frequency and –6dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

TEST RESULTS

No non-compliance noted

TEST DATA

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	10.20	>500	PASS
Mid	2437	10.20		PASS
High	2462	10.20		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	16.60	>500	PASS
Mid	2437	16.65		PASS
High	2462	16.65		PASS

Test mode: draft 802.11n 20 MHz Channel mode

Channel	Frequency (MHz)	Bandwidth (MHz)		Limit (kHz)	Result
		Chain 0	Chain 1		
Low	2412	17.85	17.85	>500	PASS
Mid	2437	17.85	17.85		PASS
High	2462	17.80	17.80		PASS

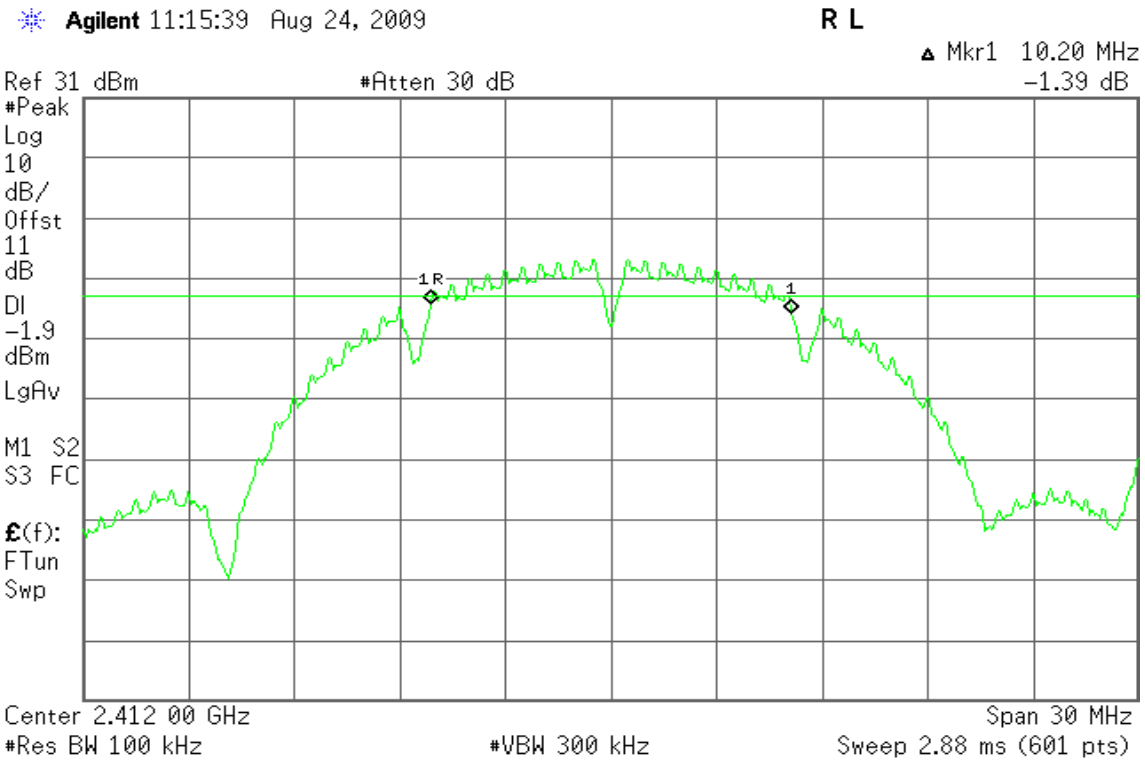
Test mode: draft 802.11n 40 MHz Channel mode

Channel	Frequency (MHz)	Bandwidth (MHz)		Limit (kHz)	Result
		Chain 0	Chain 1		
Low	2422	36.50	36.50	>500	PASS
Mid	2437	36.58	36.58		PASS
High	2452	36.58	36.58		PASS

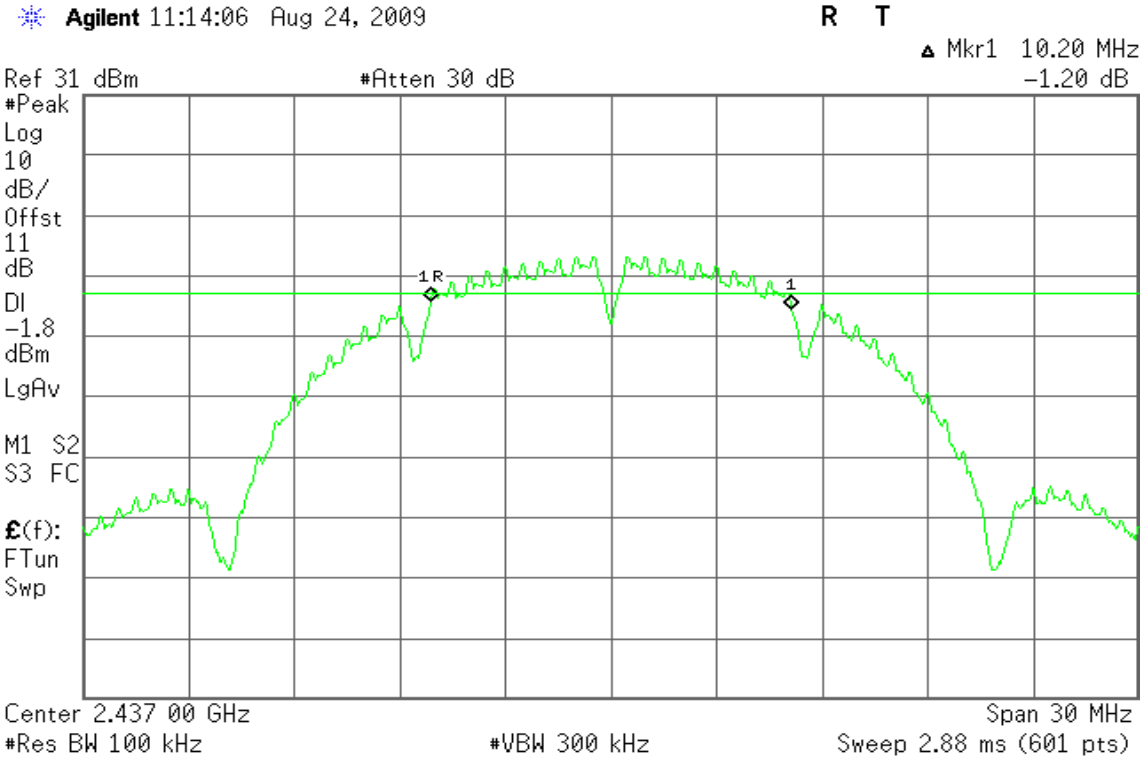
Test Plot

IEEE 802.11b mode

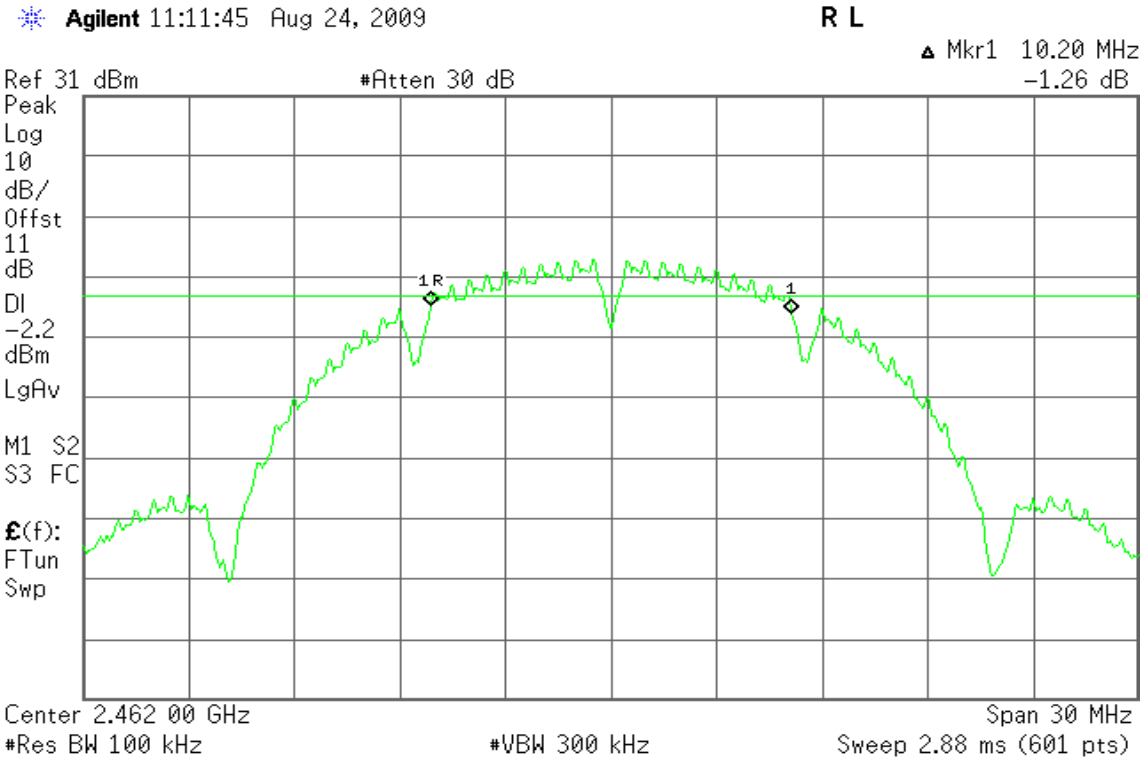
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

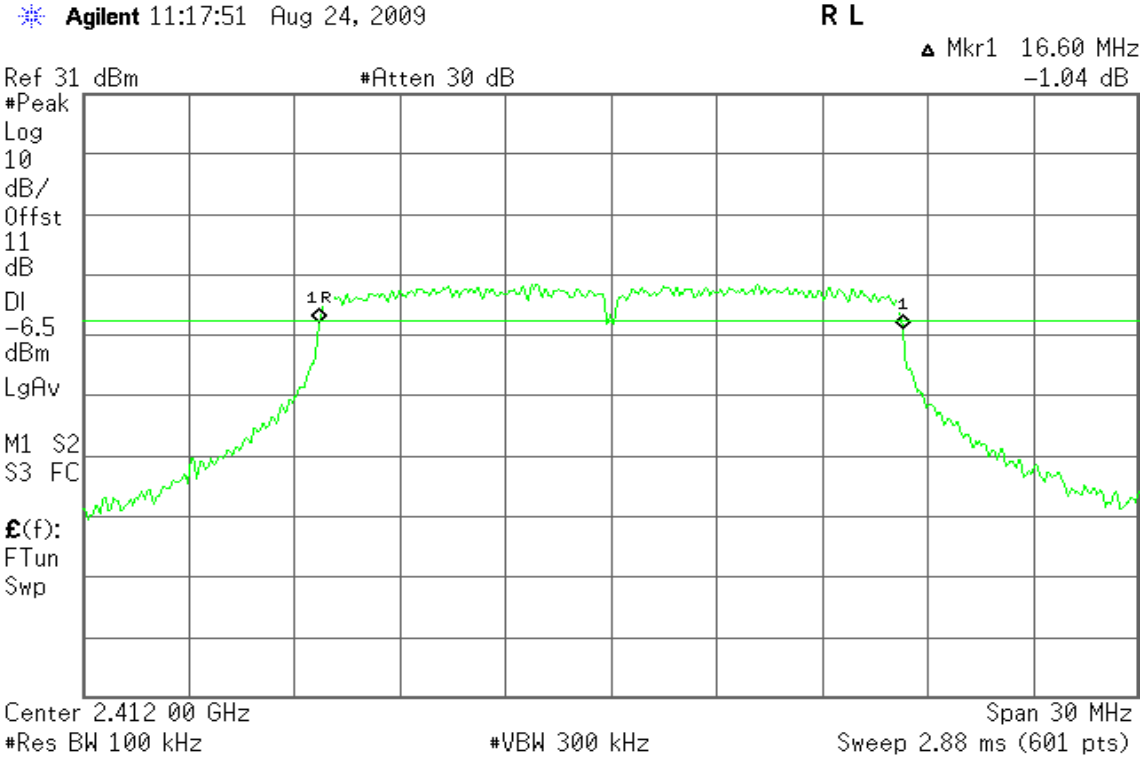


6dB Bandwidth (CH High)

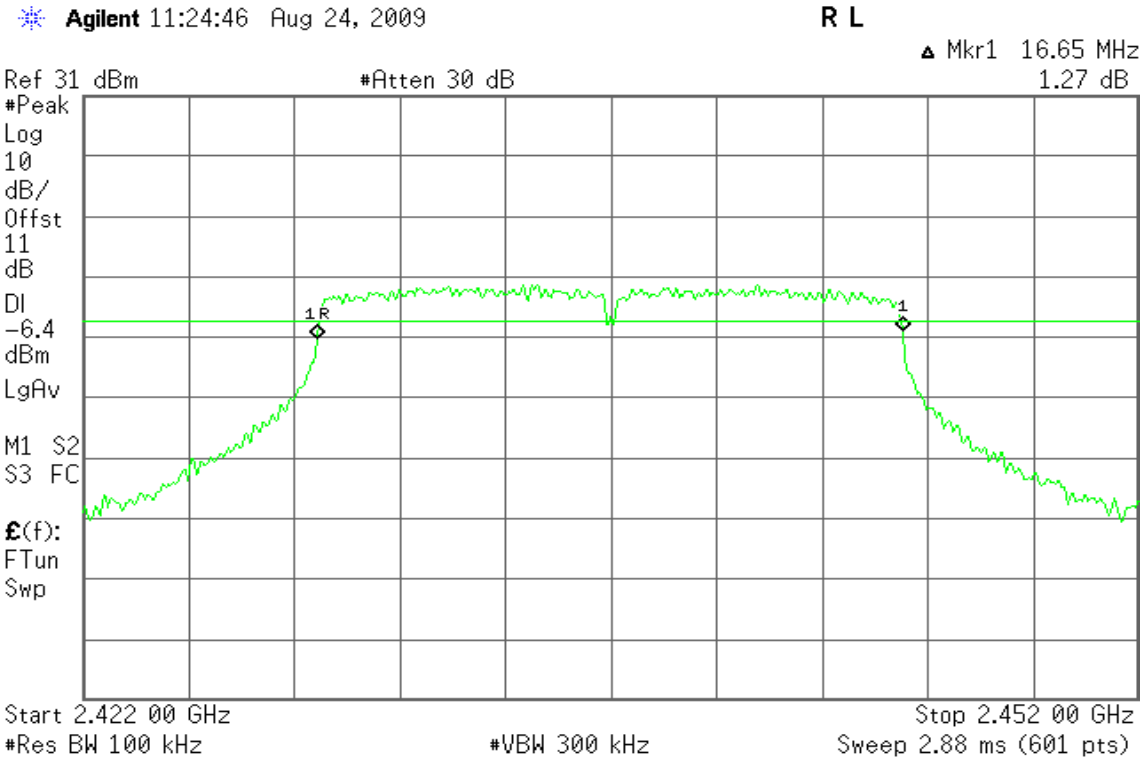


IEEE 802.11g mode

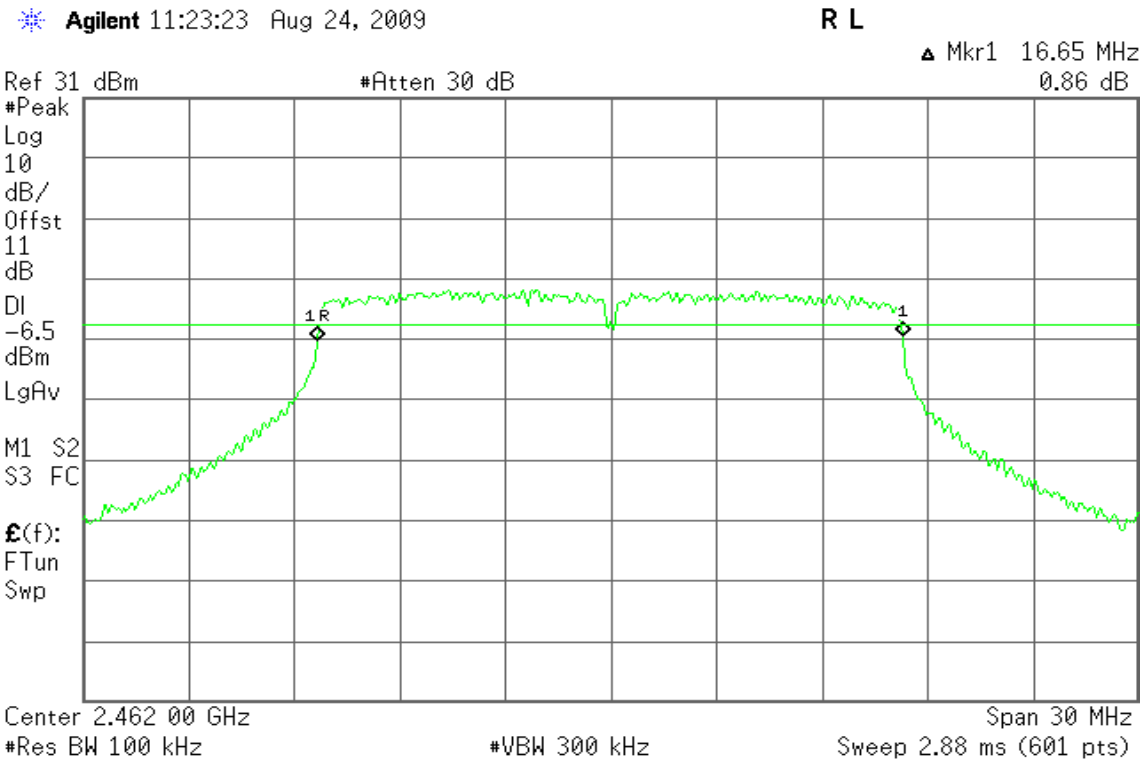
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

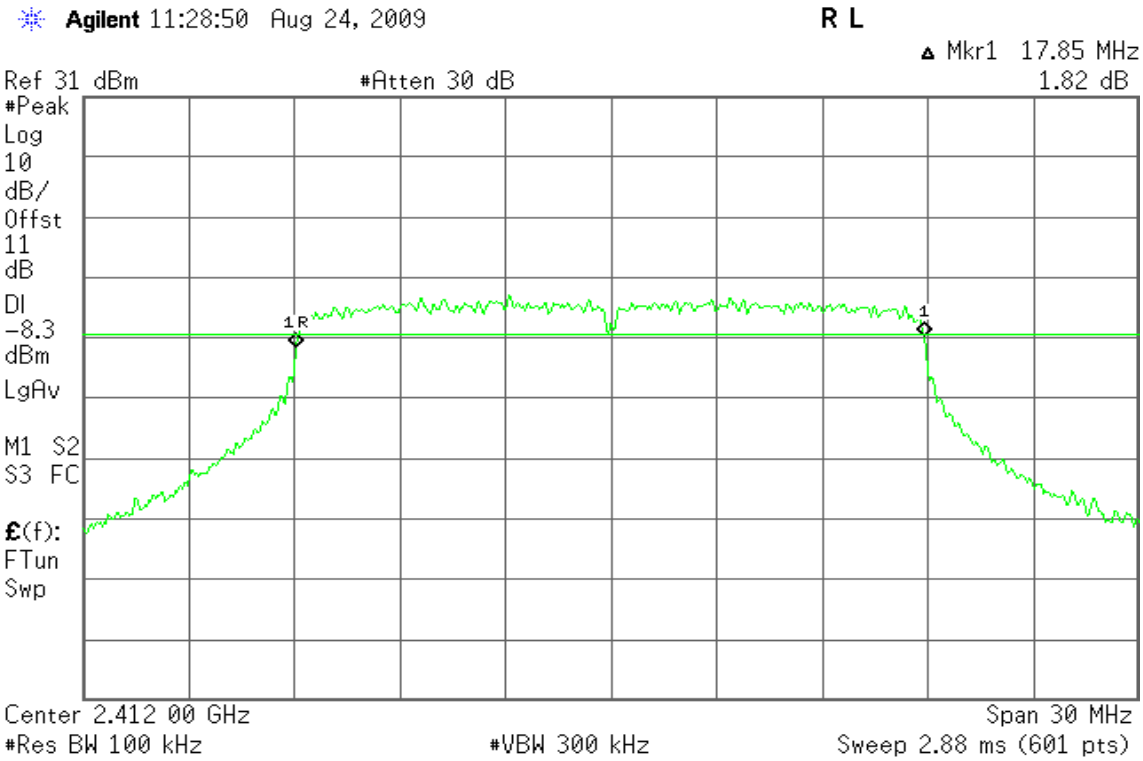


6dB Bandwidth (CH High)

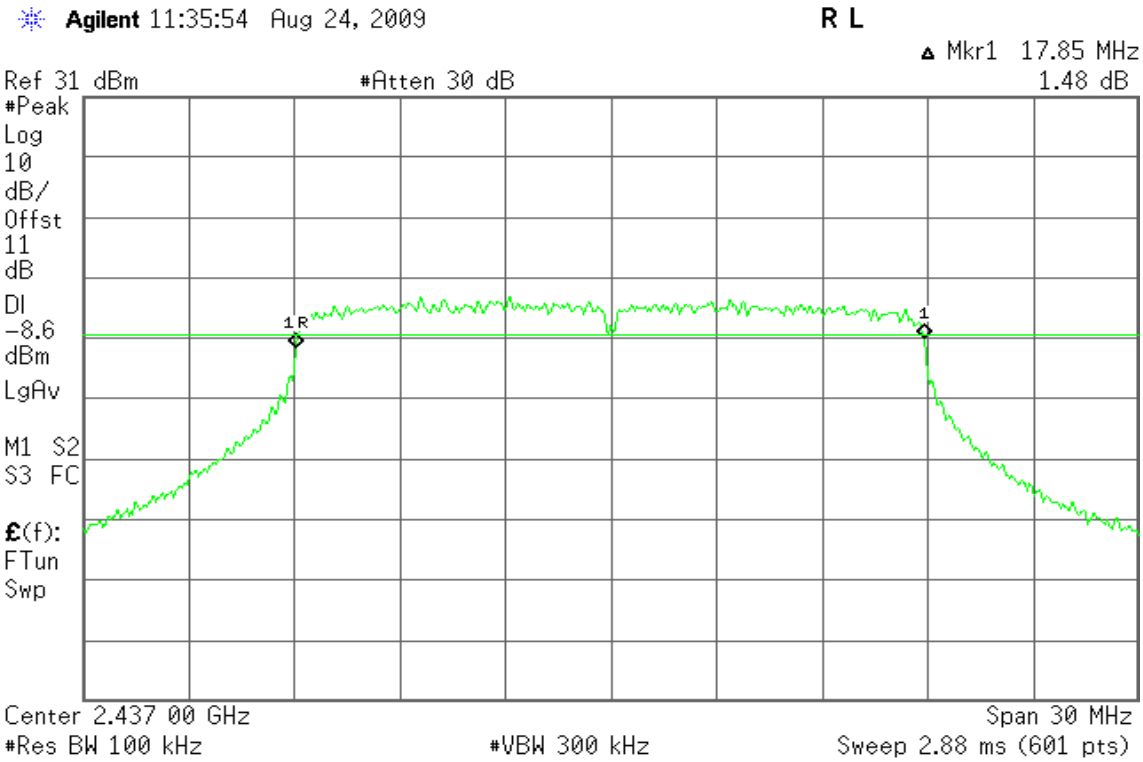


draft 802.11n 20 MHz Channel mode / Chain 0

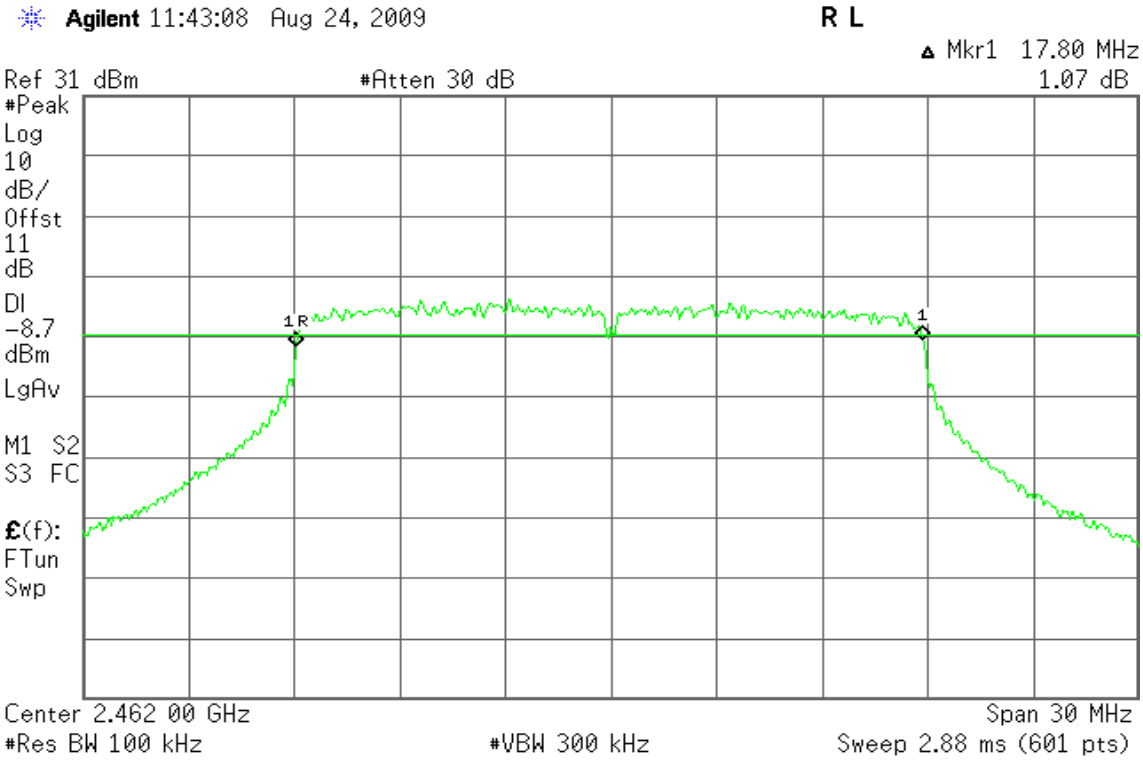
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

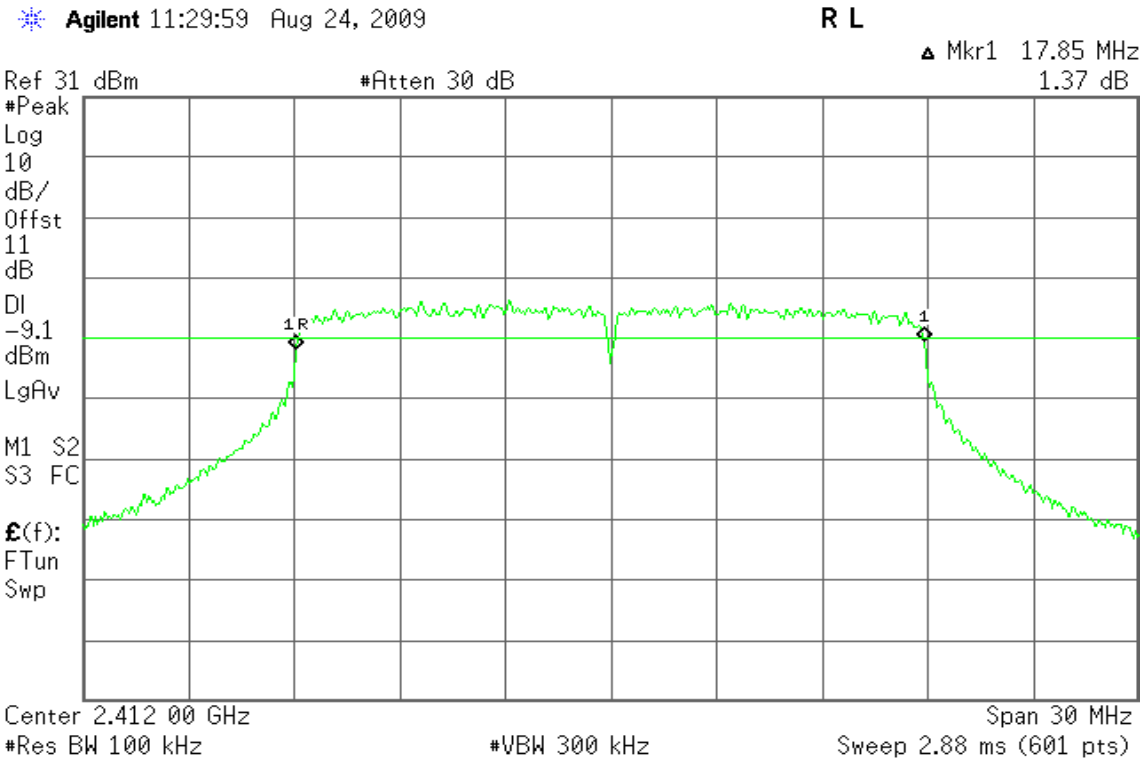


6dB Bandwidth (CH High)

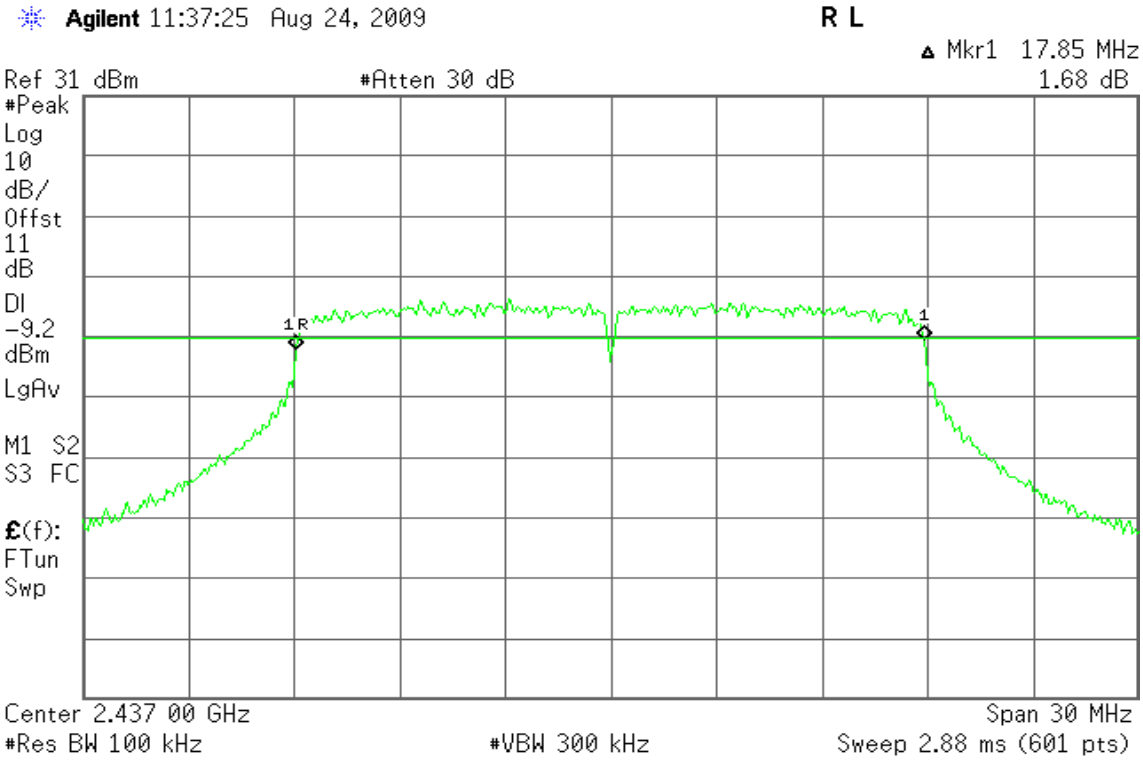


draft 802.11n 20 MHz Channel mode / Chain 1

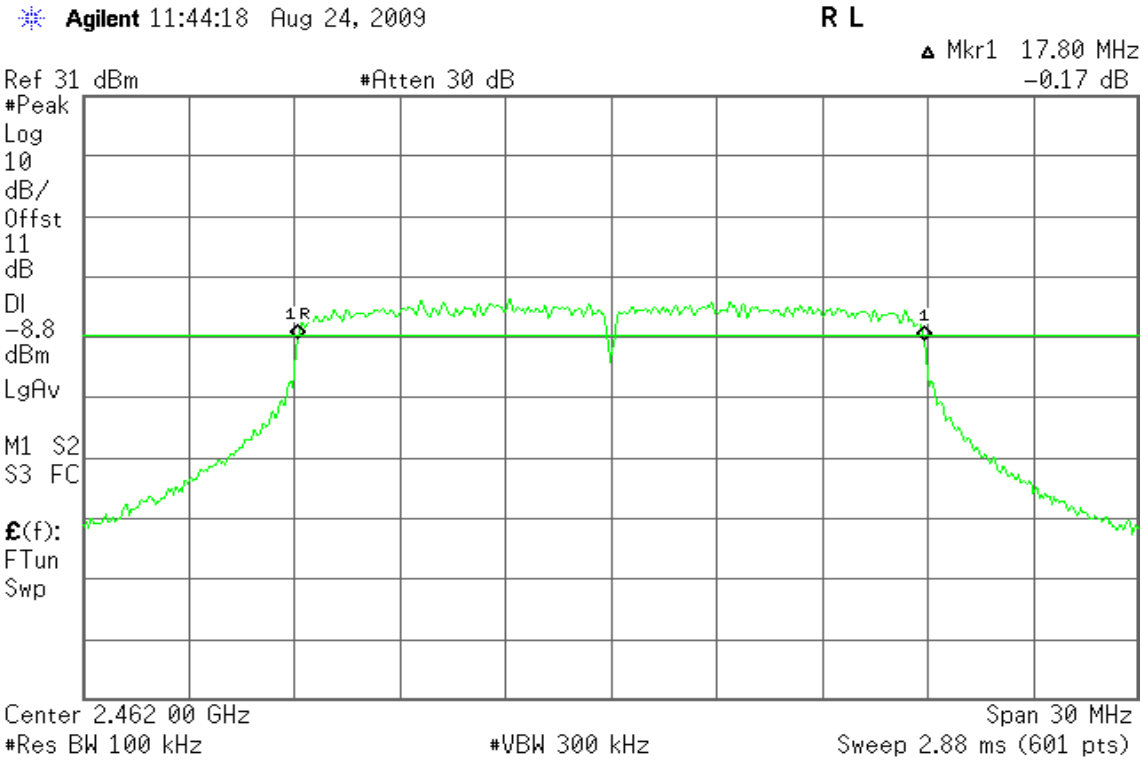
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

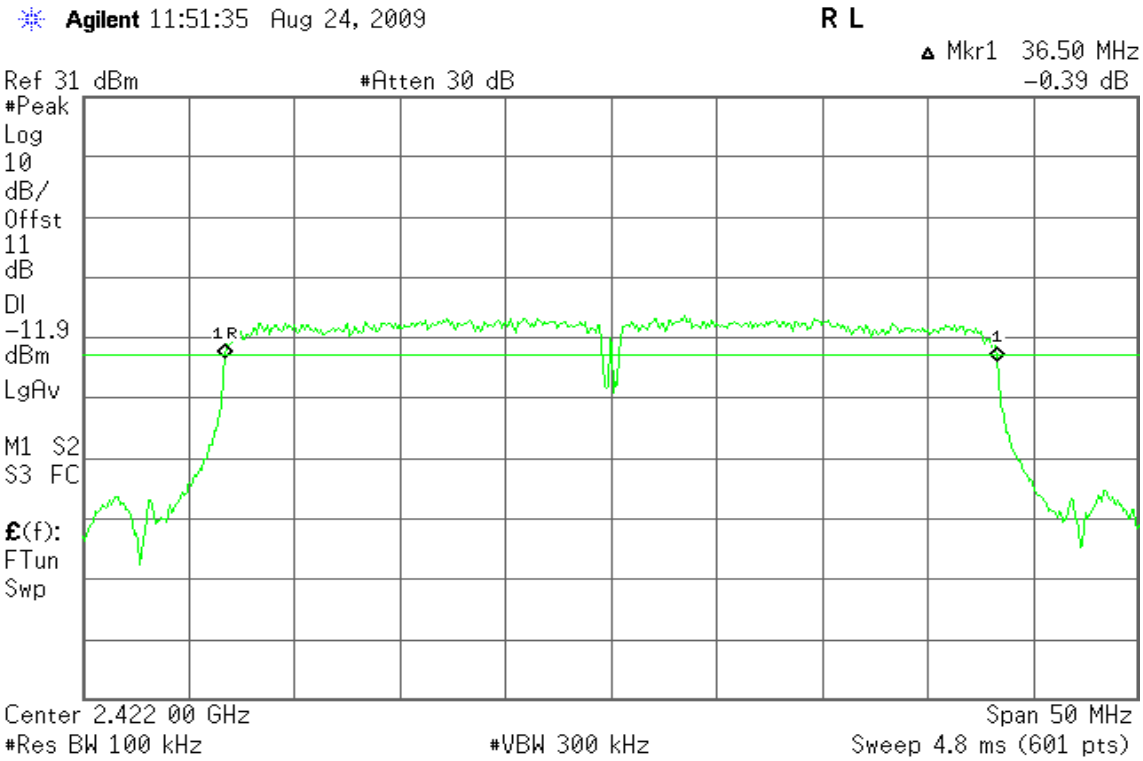


6dB Bandwidth (CH High)

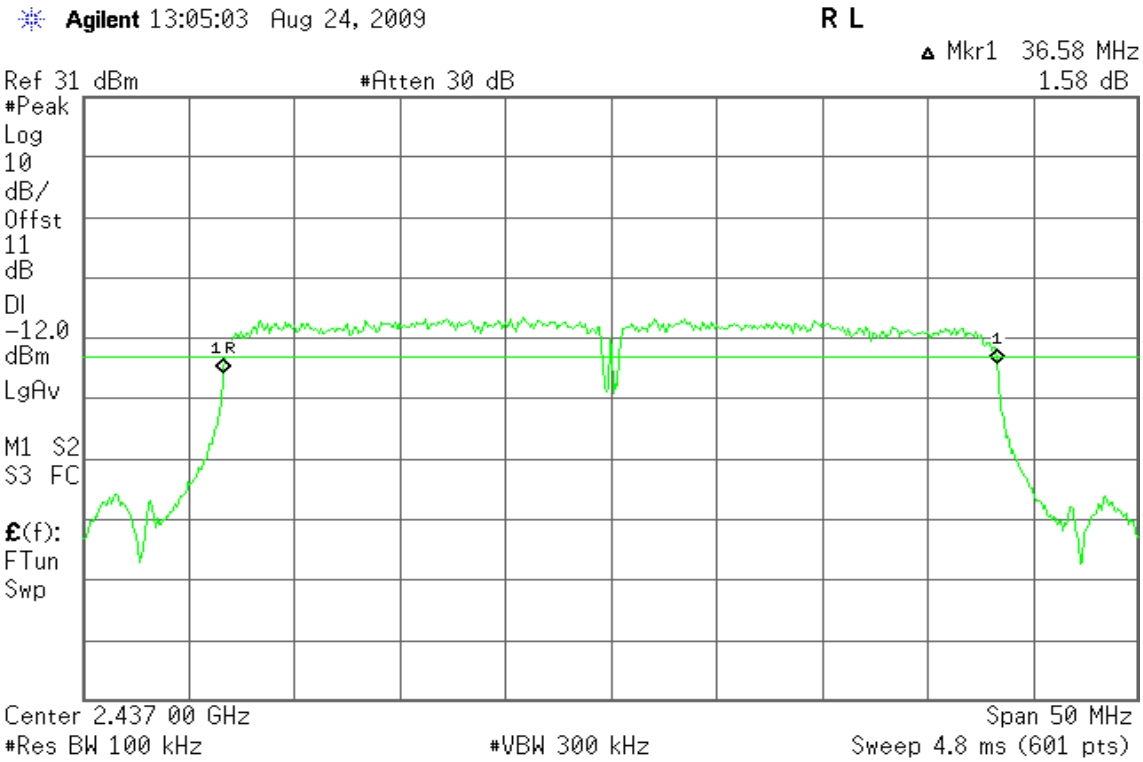


draft 802.11n 40 MHz Channel mode / Chain 0

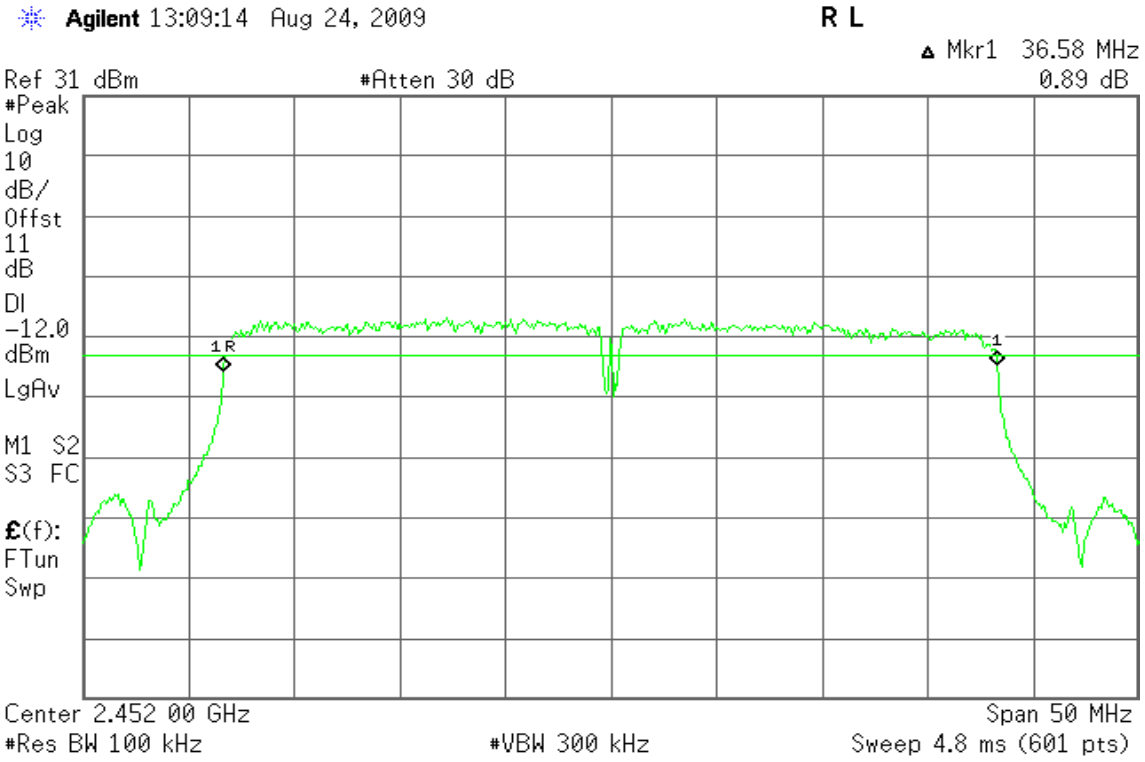
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

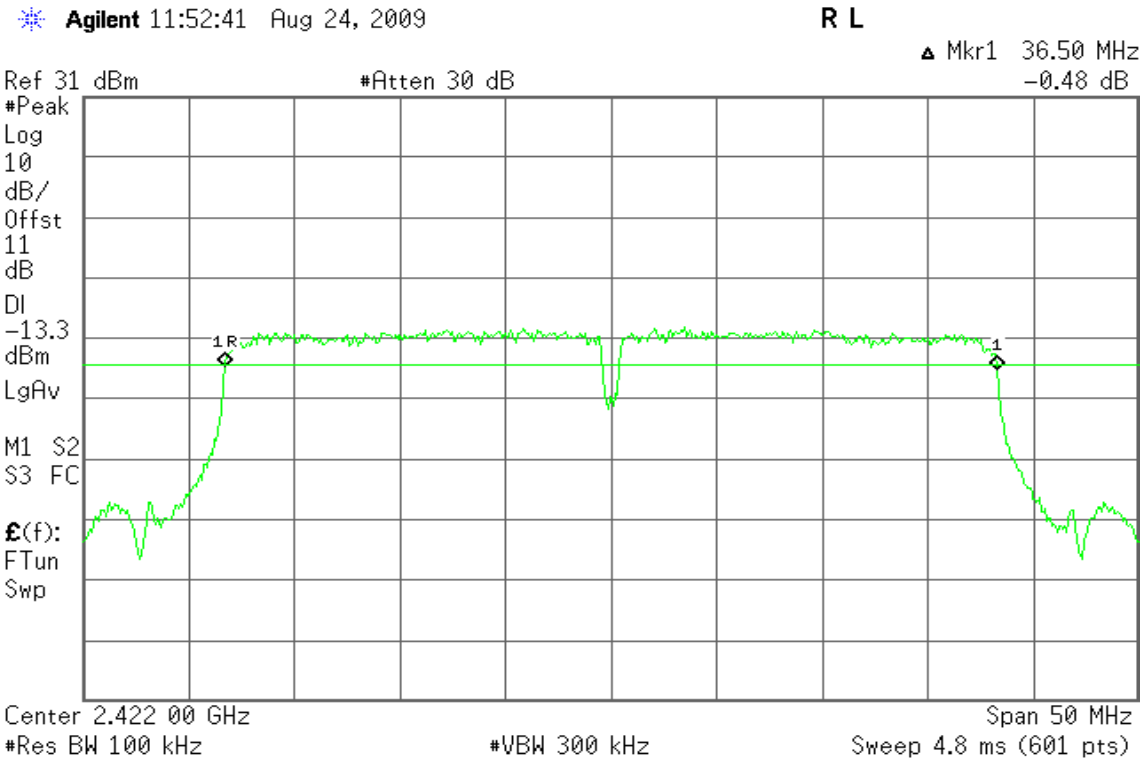


6dB Bandwidth (CH High)

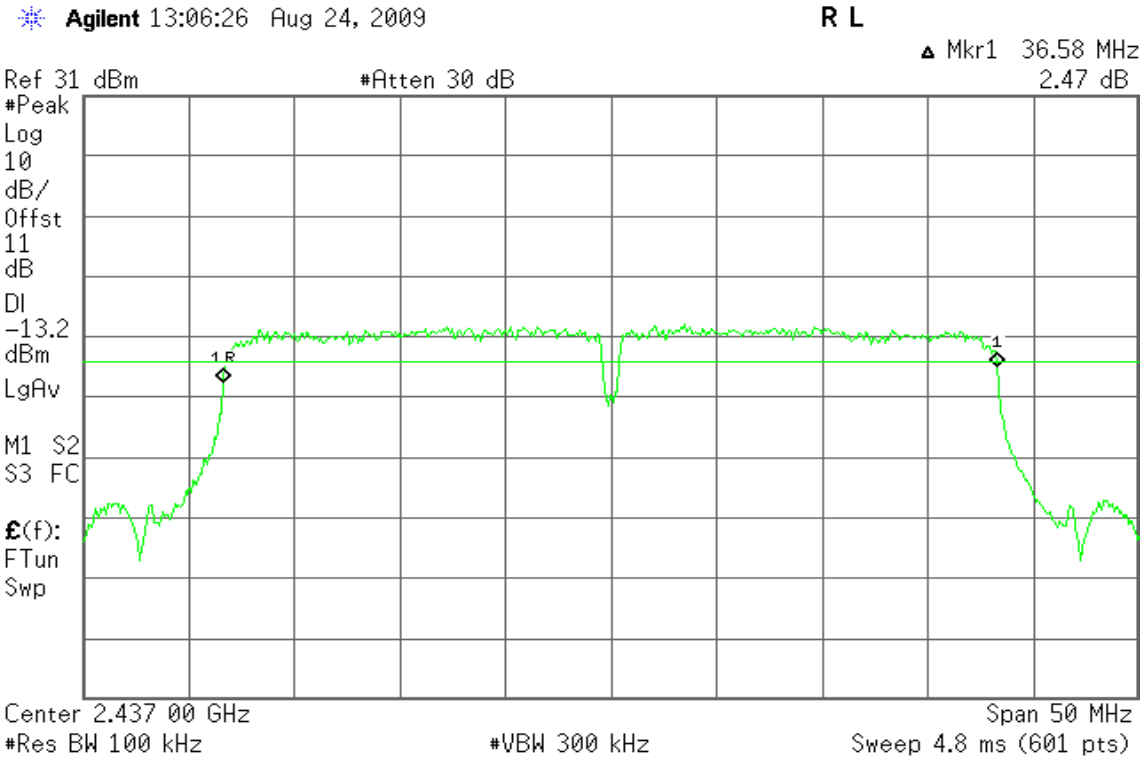


draft 802.11n 40 MHz Channel mode / Chain 1

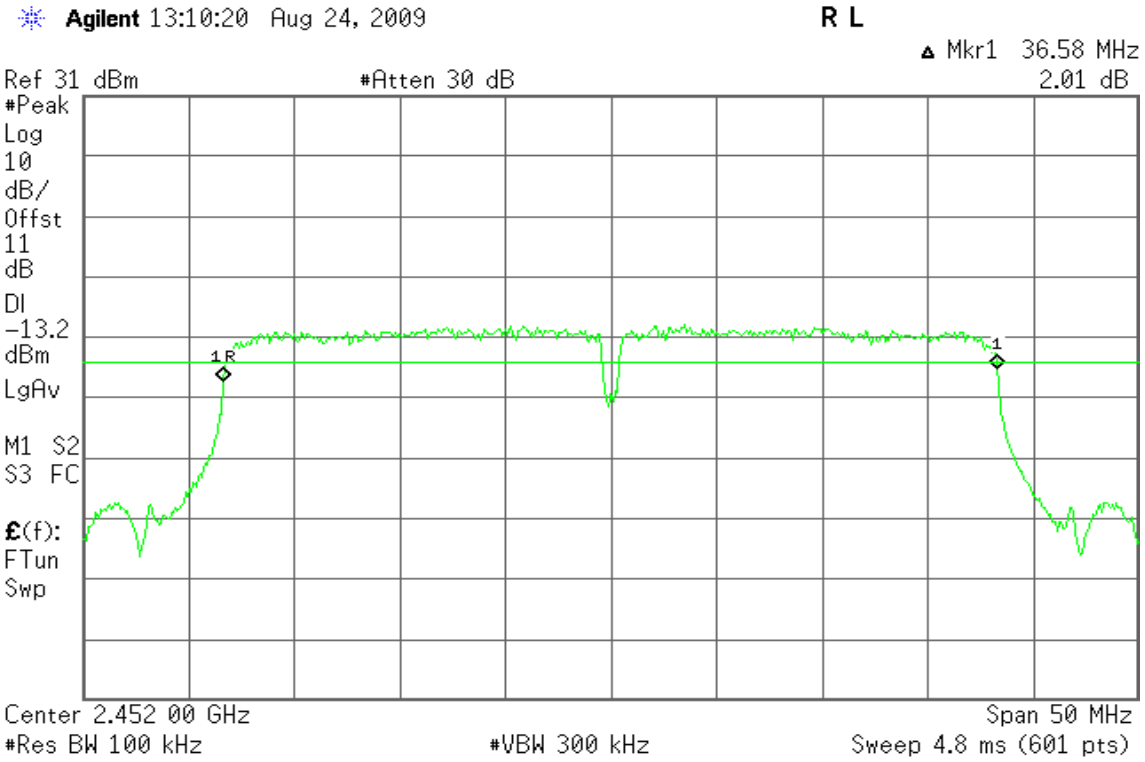
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)



6dB Bandwidth (CH High)



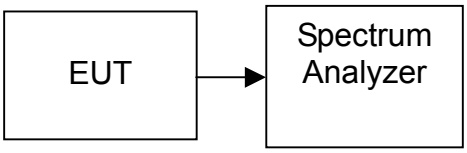
7.2 PEAK POWER

LIMIT

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

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

TEST CONFIGURATION



TEST PROCEDURE

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

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	16.64	0.04613	1.00	PASS
Mid	2437	16.78	0.04764		PASS
High	2462	16.39	0.04355		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	20.31	0.10740	1.00	PASS
Mid	2437	20.61	0.11508		PASS
High	2462	20.34	0.10814		PASS

Test mode: draft 802.11n 20 MHz Channel mode

Channel	Frequency (MHz)	Output Power (dBm)		Output Power (W)		Total Power (dBm)	Total Power (W)	Limit (W)	Result
		Chain 0	Chain 1	Chain 0	Chain 1				
Low	2412	18.76	17.77	0.07516	0.05984	20.58	0.11429	1.00	PASS
Mid	2437	18.94	18.16	0.07834	0.06546	20.55	0.11350		PASS
High	2462	17.70	17.86	0.05888	0.06109	20.10	0.10233		PASS

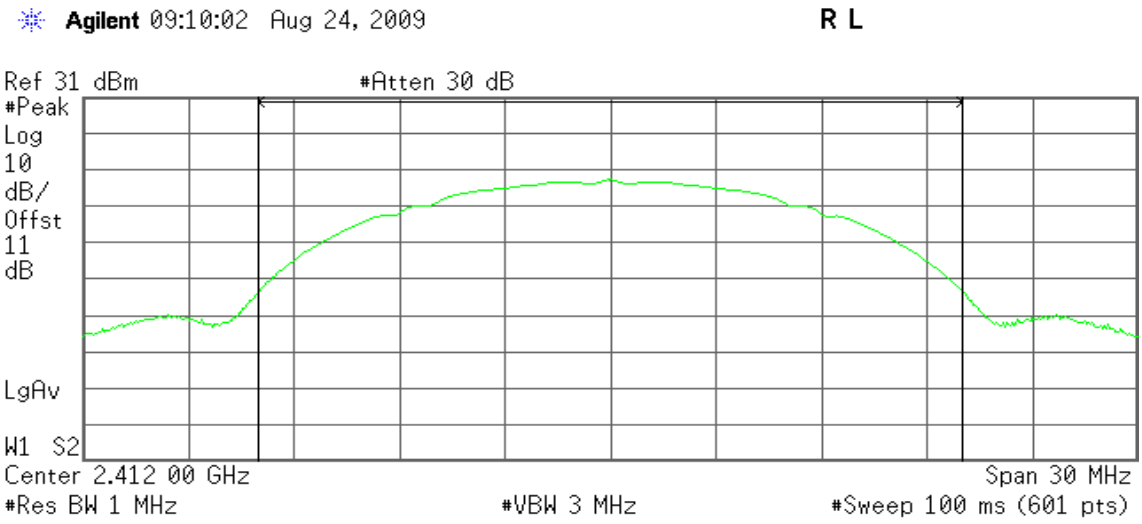
Test mode: draft 802.11n 40 MHz Channel mode

Channel	Frequency (MHz)	Output Power (dBm)		Output Power (W)		Total Power (dBm)	Total Power (W)	Limit (W)	Result
		Chain 0	Chain 1	Chain 0	Chain 1				
Low	2422	18.44	16.51	0.06982	0.04477	19.78	0.09506	1.00	PASS
Mid	2437	18.27	16.63	0.06714	0.04603	19.73	0.09397		PASS
High	2452	18.10	16.80	0.06457	0.04786	19.82	0.09594		PASS

Test Plot

IEEE 802.11b mode

Peak Power (CH Low)



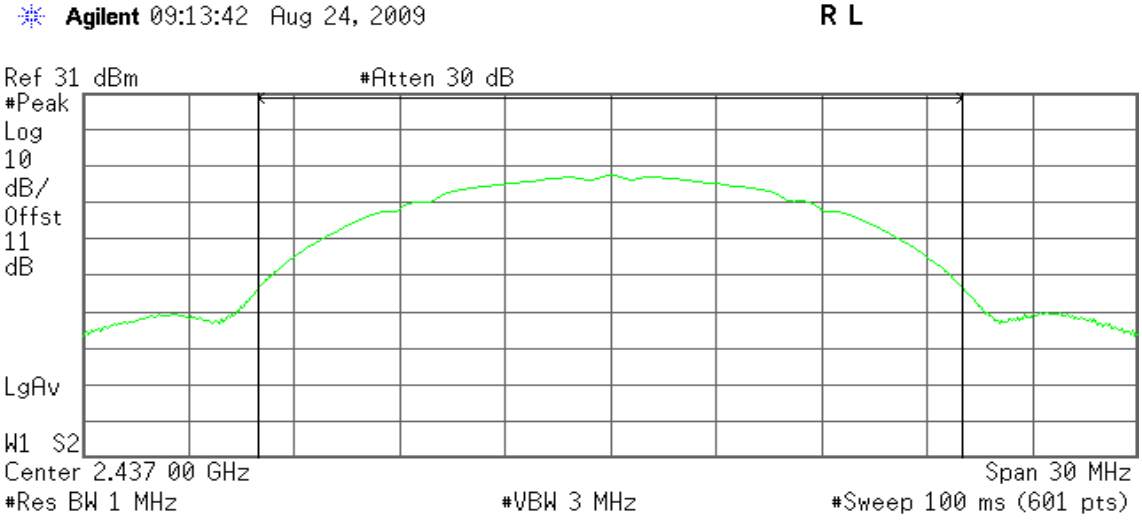
Channel Power

16.64 dBm /20.0000 MHz

Power Spectral Density

-56.37 dBm/Hz

Peak Power (CH Mid)



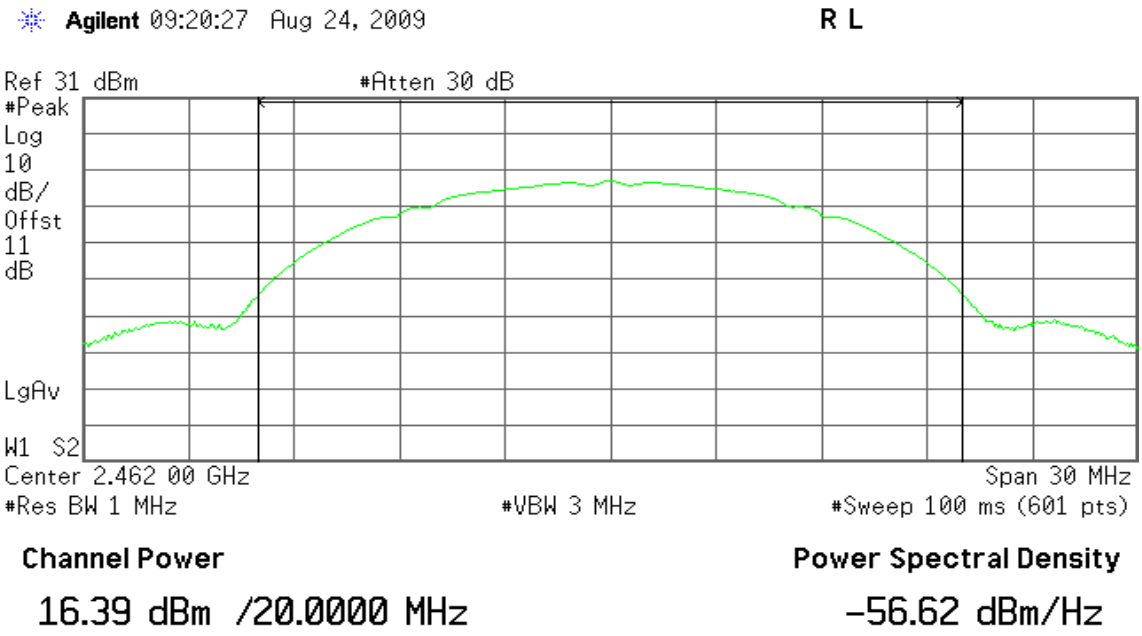
Channel Power

16.78 dBm /20.0000 MHz

Power Spectral Density

-56.23 dBm/Hz

Peak Power (CH High)



Channel Power

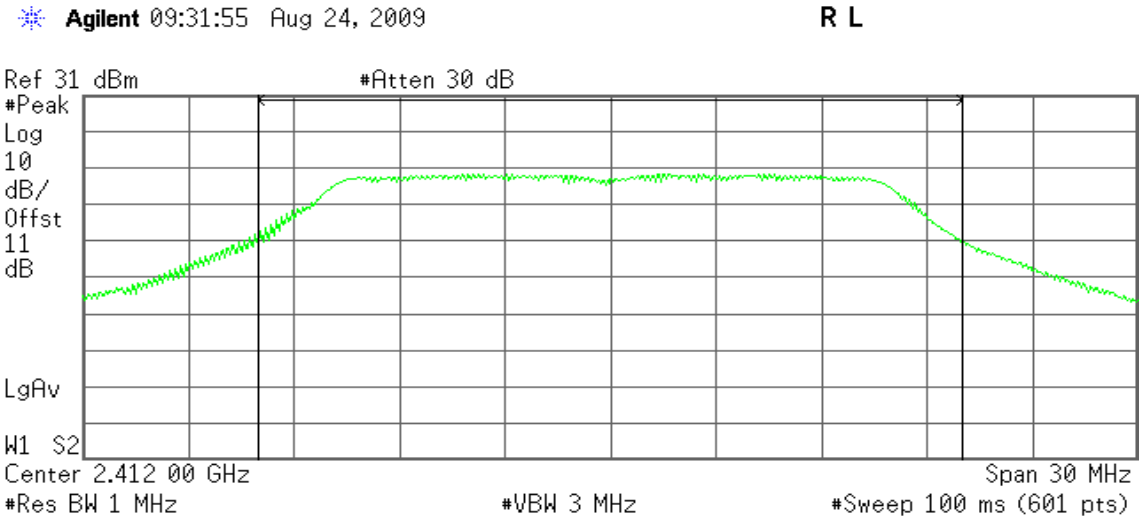
16.39 dBm /20.0000 MHz

Power Spectral Density

-56.62 dBm/Hz

IEEE 802.11g mode

Peak Power (CH Low)



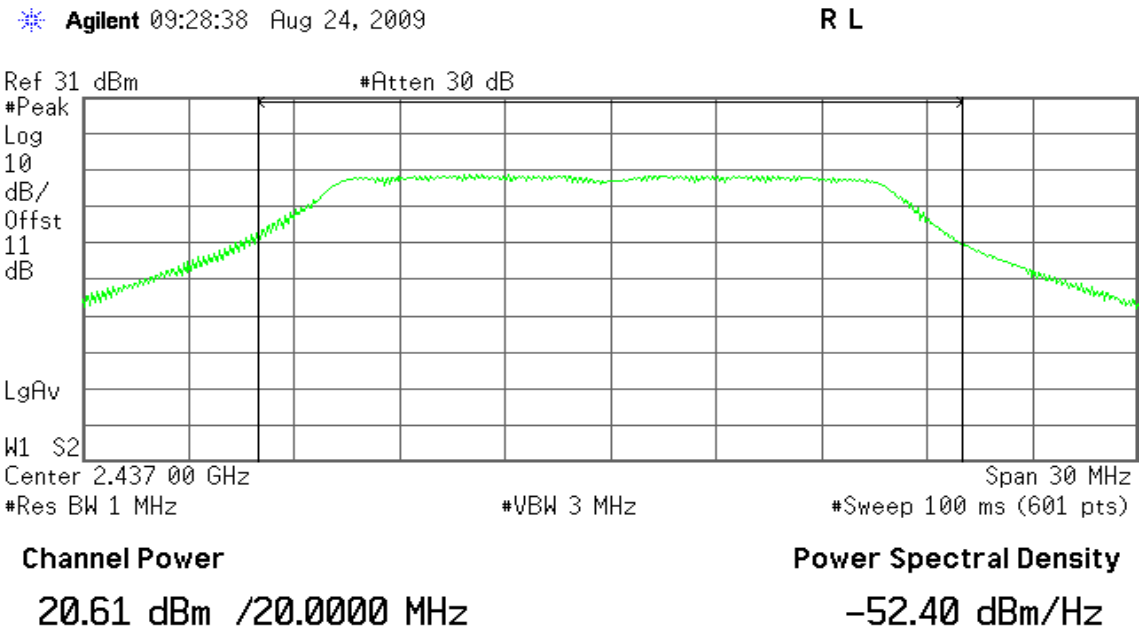
Channel Power

20.31 dBm /20.0000 MHz

Power Spectral Density

-52.70 dBm/Hz

Peak Power (CH Mid)



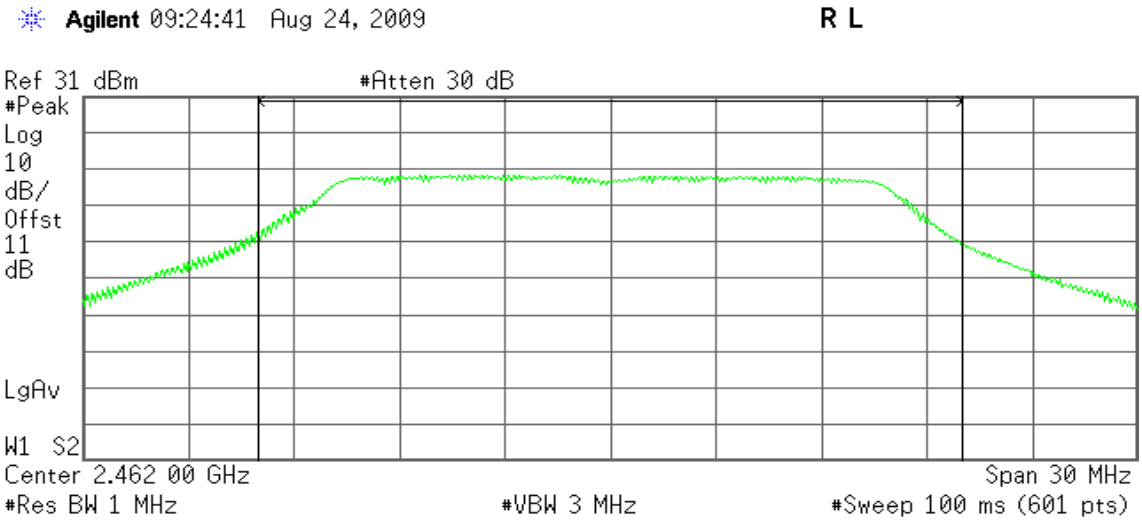
Channel Power

20.61 dBm /20.0000 MHz

Power Spectral Density

-52.40 dBm/Hz

Peak Power (CH High)



Channel Power

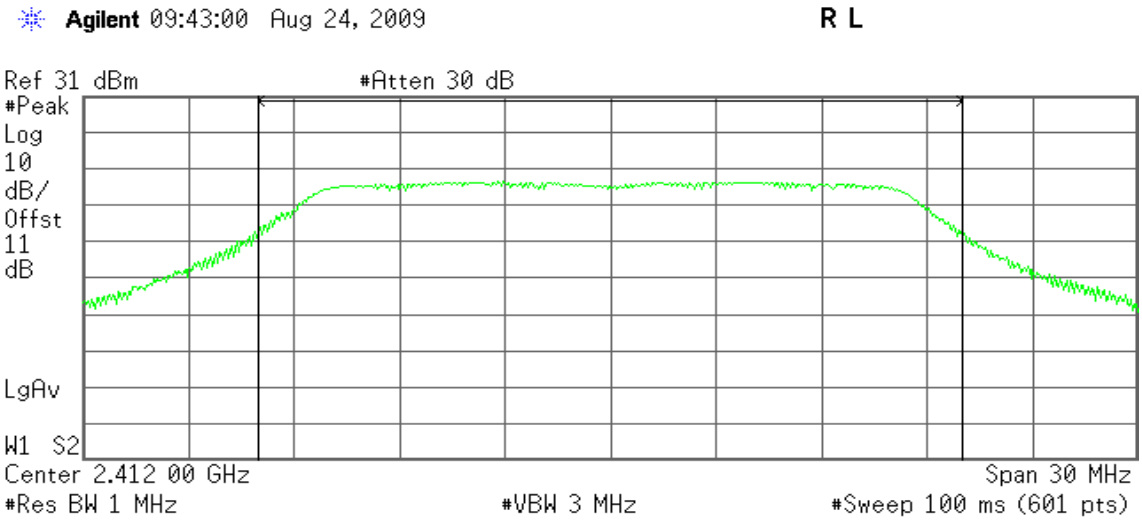
20.34 dBm /20.0000 MHz

Power Spectral Density

-52.67 dBm/Hz

draft 802.11n 20 MHz Channel mode / Chain 0

Peak Power (CH Low)



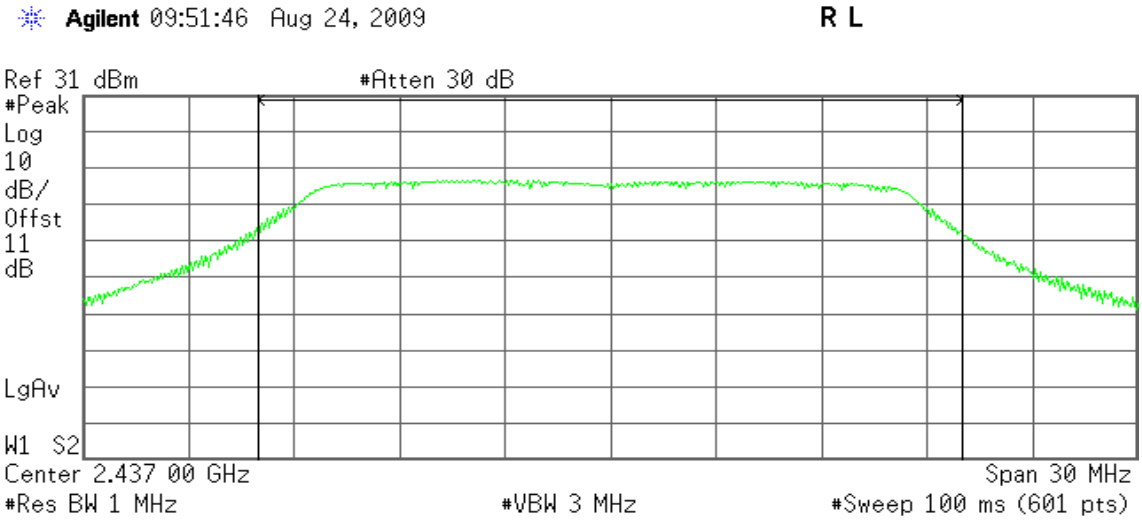
Channel Power

18.76 dBm /20.0000 MHz

Power Spectral Density

-54.25 dBm/Hz

Peak Power (CH Mid)



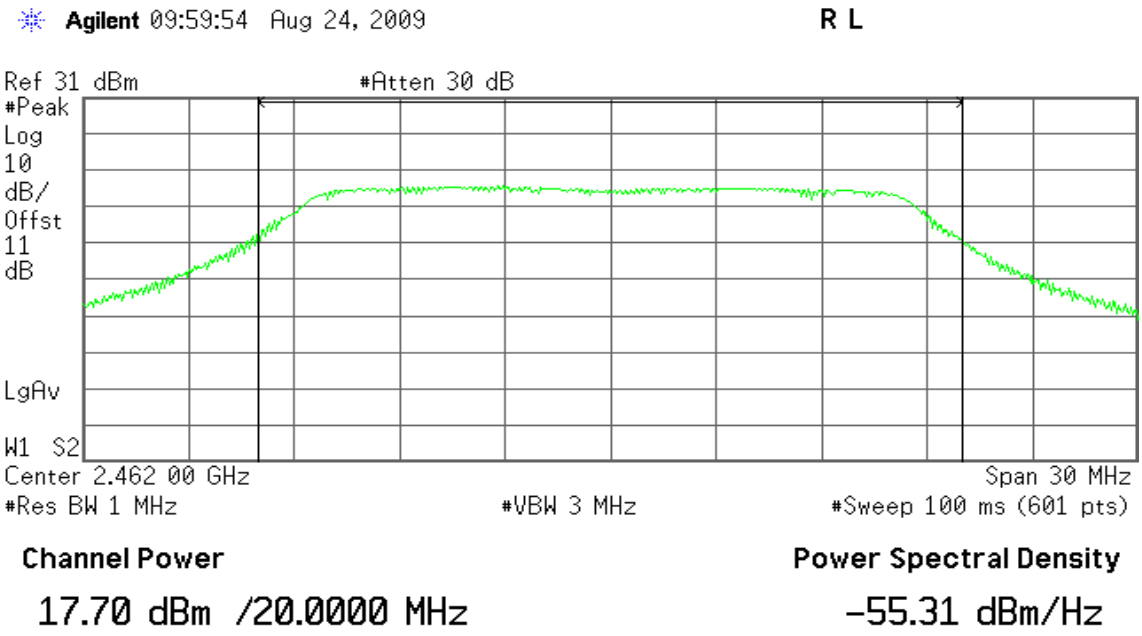
Channel Power

18.94 dBm /20.0000 MHz

Power Spectral Density

-54.07 dBm/Hz

Peak Power (CH High)



Channel Power

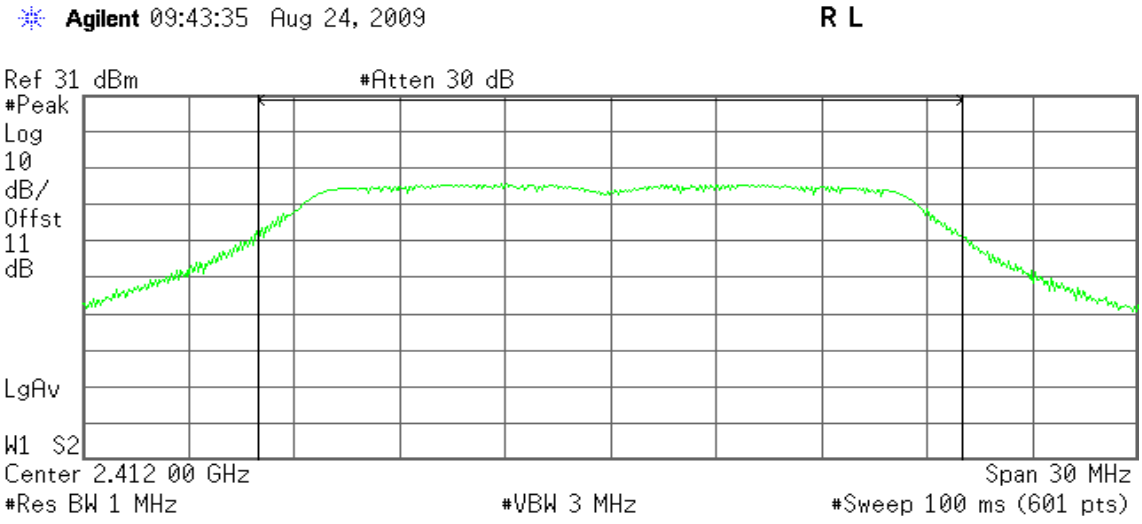
17.70 dBm /20.0000 MHz

Power Spectral Density

-55.31 dBm/Hz

draft 802.11n 20 MHz Channel mode / Chain 1

Peak Power (CH Low)



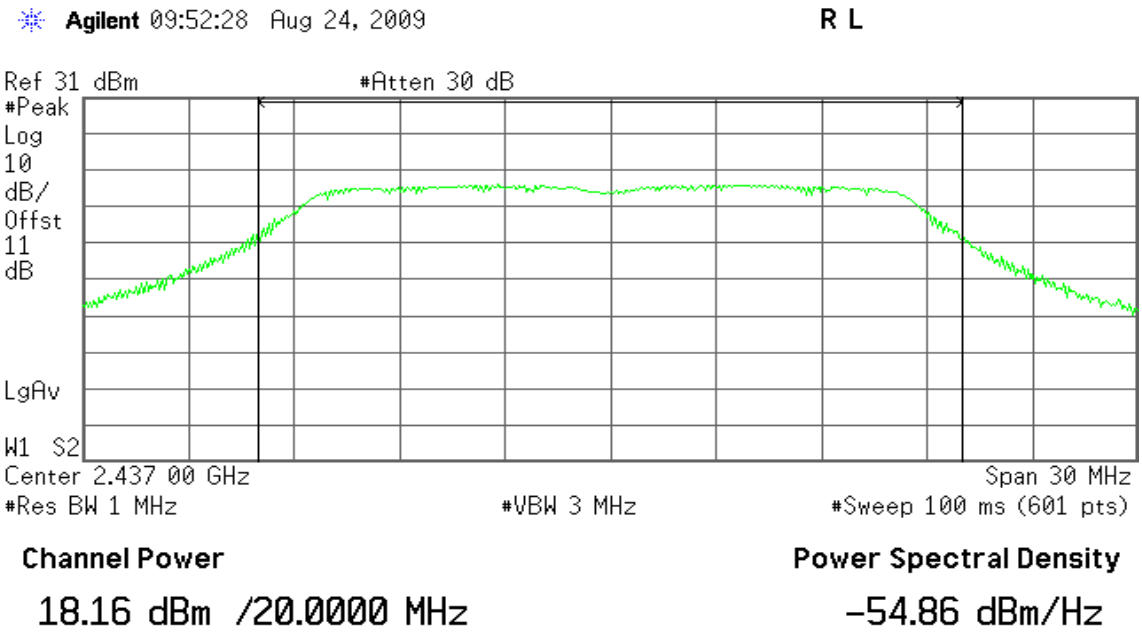
Channel Power

17.77 dBm /20.0000 MHz

Power Spectral Density

-55.24 dBm/Hz

Peak Power (CH Mid)



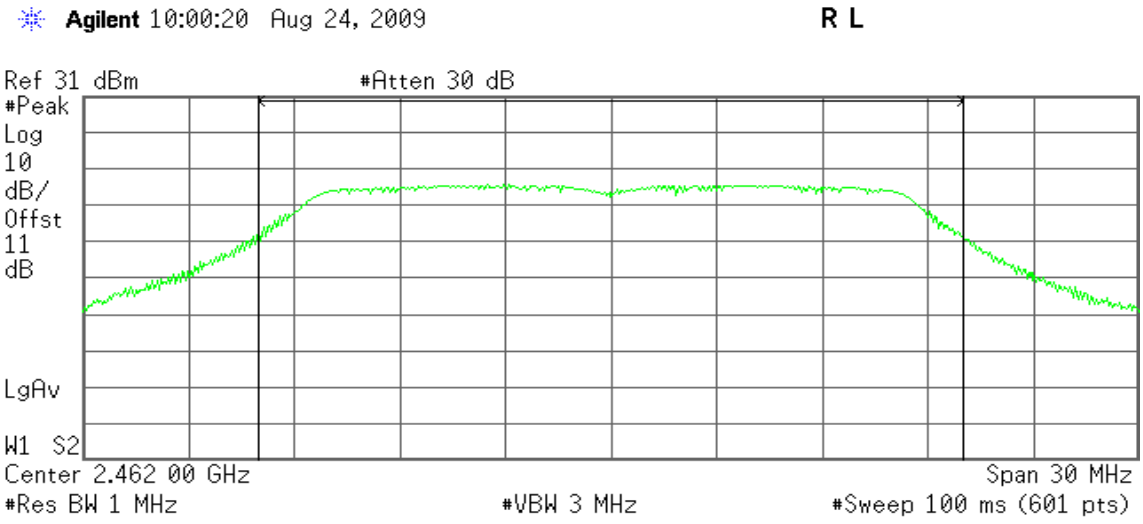
Channel Power

18.16 dBm /20.0000 MHz

Power Spectral Density

-54.86 dBm/Hz

Peak Power (CH High)



Channel Power

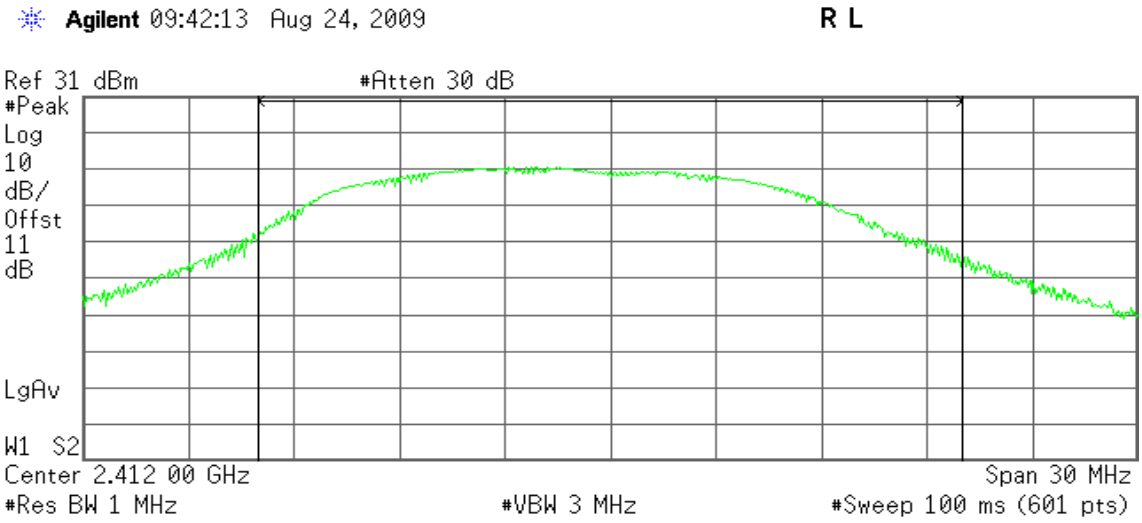
17.86 dBm /20.0000 MHz

Power Spectral Density

-55.15 dBm/Hz

draft 802.11n 20 MHz Channel mode / Combiner

Peak Power (CH Low)



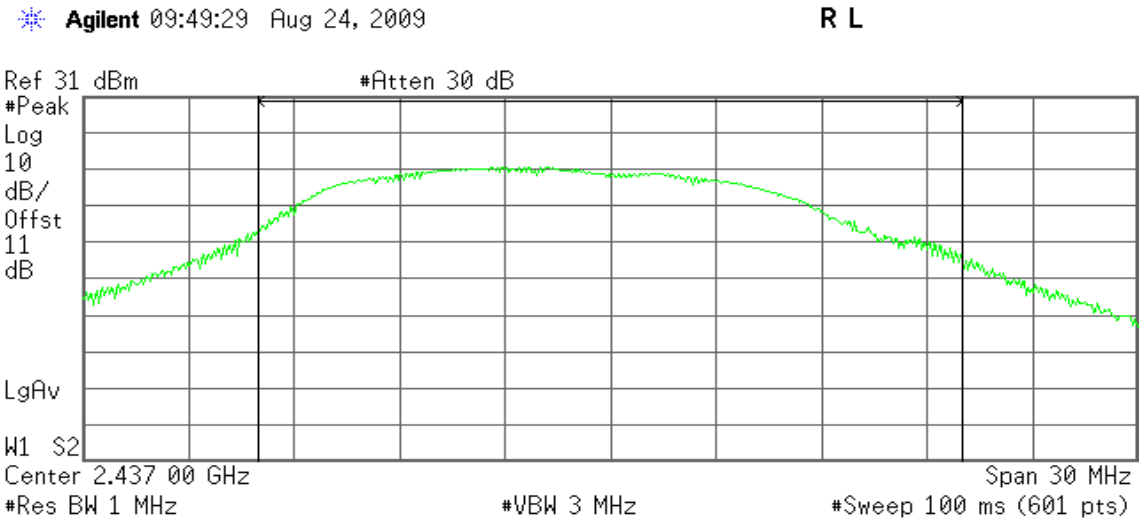
Channel Power

20.58 dBm /20.0000 MHz

Power Spectral Density

-52.43 dBm/Hz

Peak Power (CH Mid)



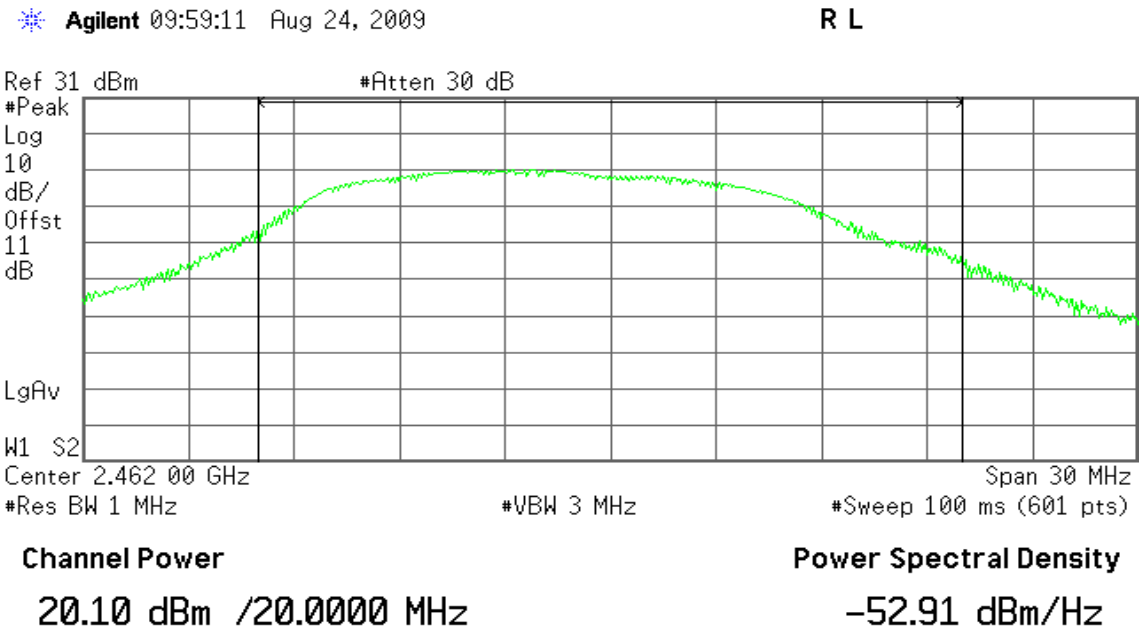
Channel Power

20.55 dBm /20.0000 MHz

Power Spectral Density

-52.46 dBm/Hz

Peak Power (CH High)



Channel Power

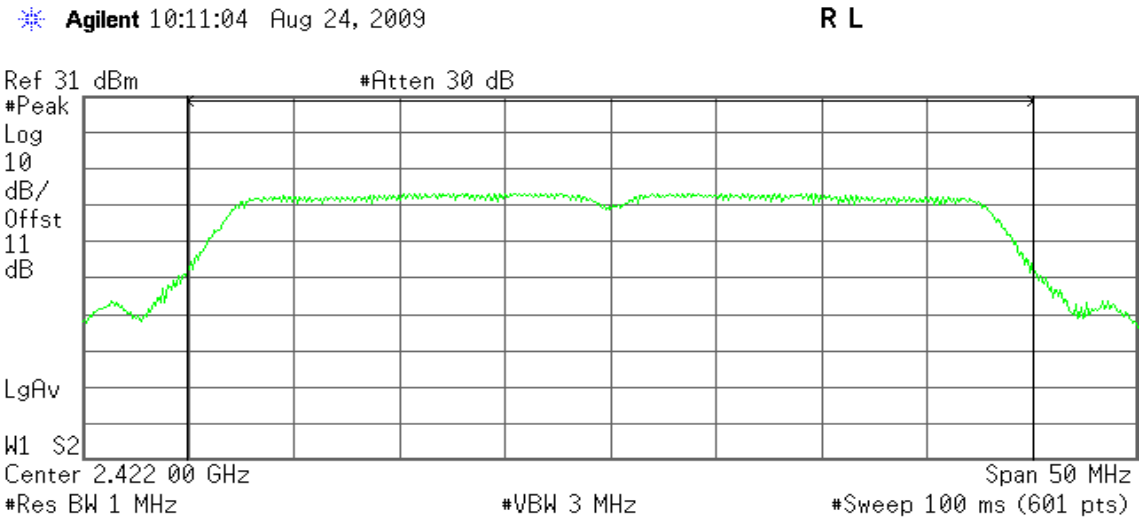
20.10 dBm /20.0000 MHz

Power Spectral Density

-52.91 dBm/Hz

draft 802.11n 40 MHz Channel mode / Chain 0

Peak Power (CH Low)



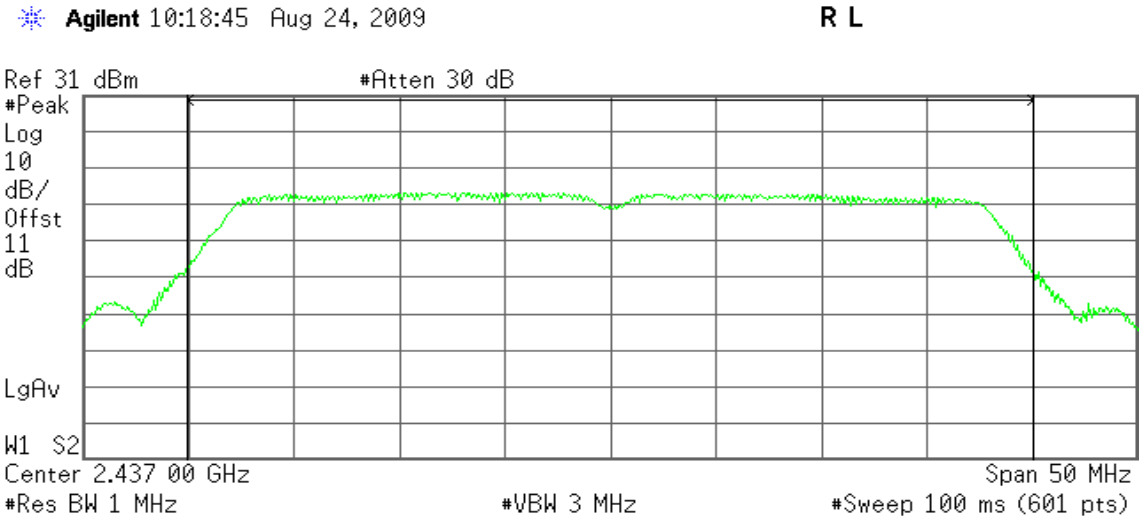
Channel Power

18.44 dBm /40.0000 MHz

Power Spectral Density

-57.58 dBm/Hz

Peak Power (CH Mid)



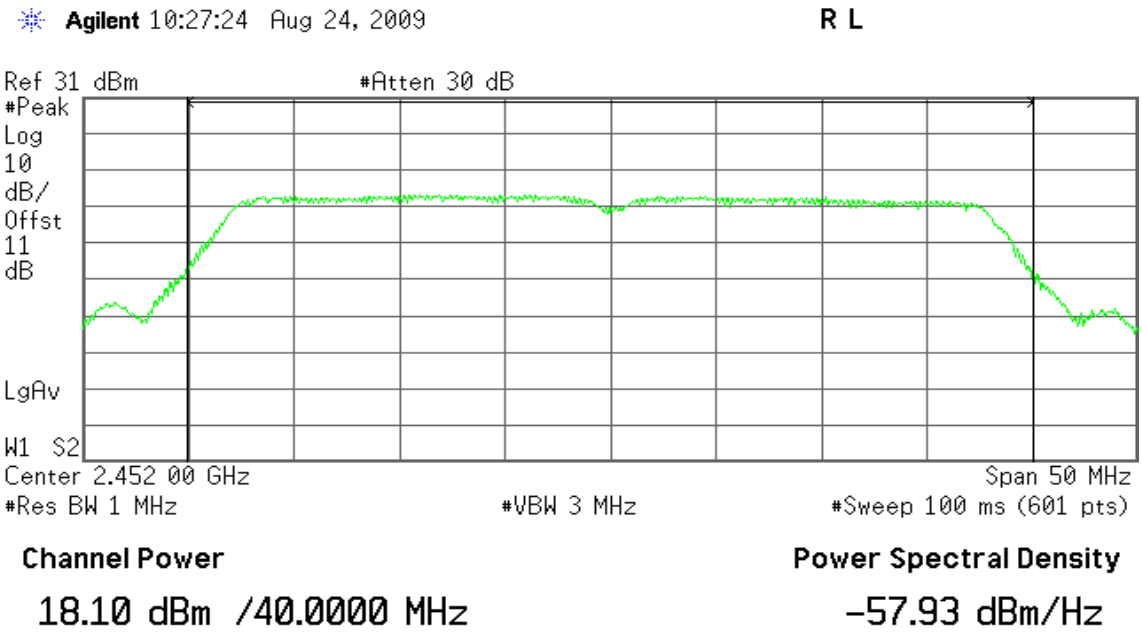
Channel Power

18.27 dBm /40.0000 MHz

Power Spectral Density

-57.75 dBm/Hz

Peak Power (CH High)



Channel Power

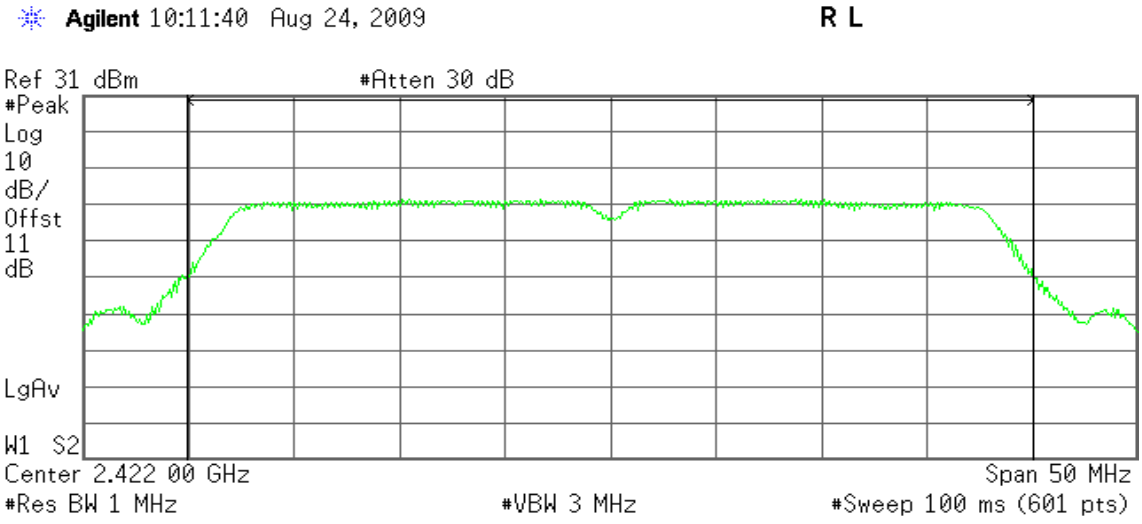
18.10 dBm /40.0000 MHz

Power Spectral Density

-57.93 dBm/Hz

draft 802.11n 40 MHz Channel mode / Chain 1

Peak Power (CH Low)



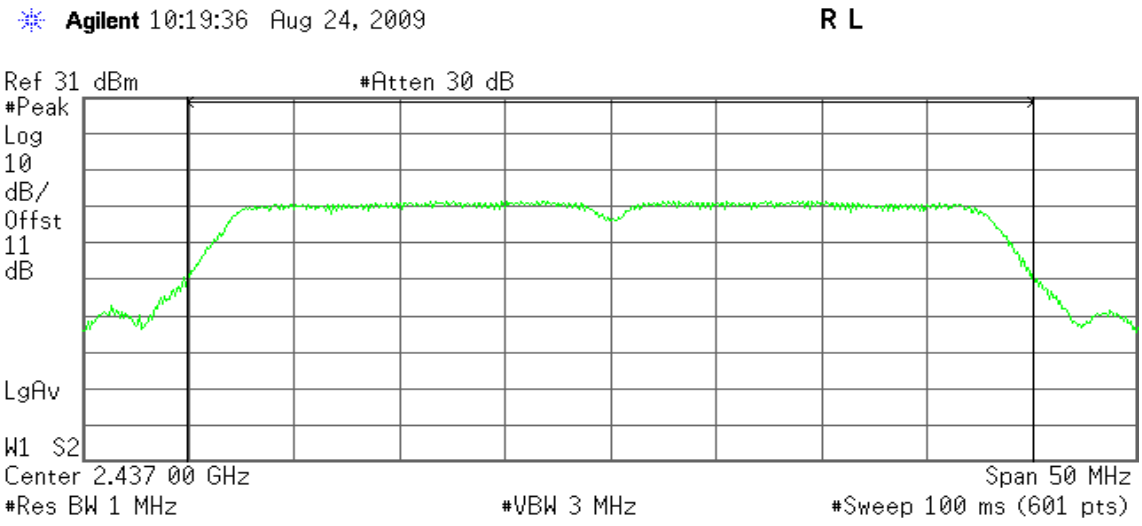
Channel Power

16.51 dBm /40.0000 MHz

Power Spectral Density

-59.52 dBm/Hz

Peak Power (CH Mid)



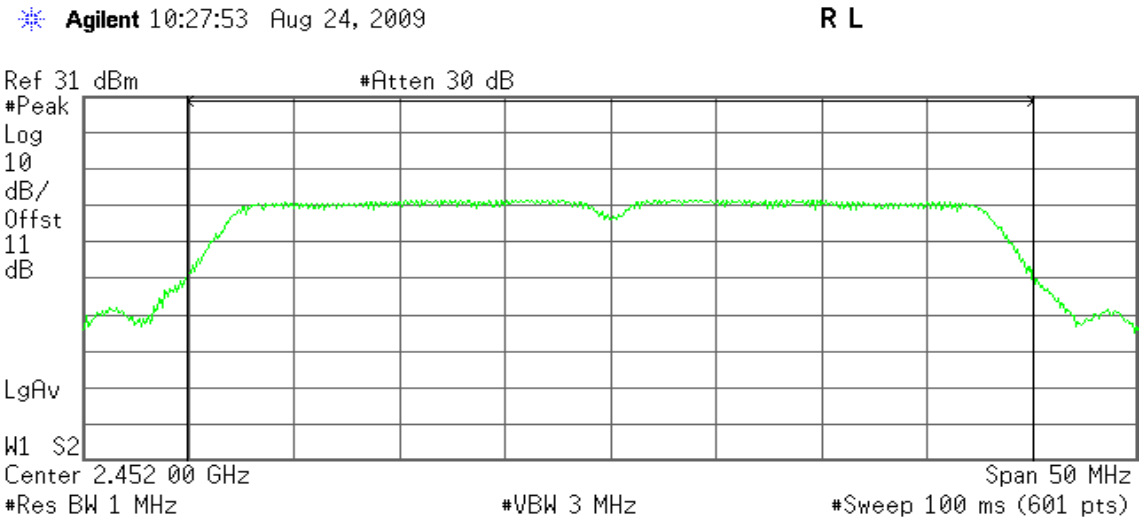
Channel Power

16.63 dBm /40.0000 MHz

Power Spectral Density

-59.39 dBm/Hz

Peak Power (CH High)



Channel Power

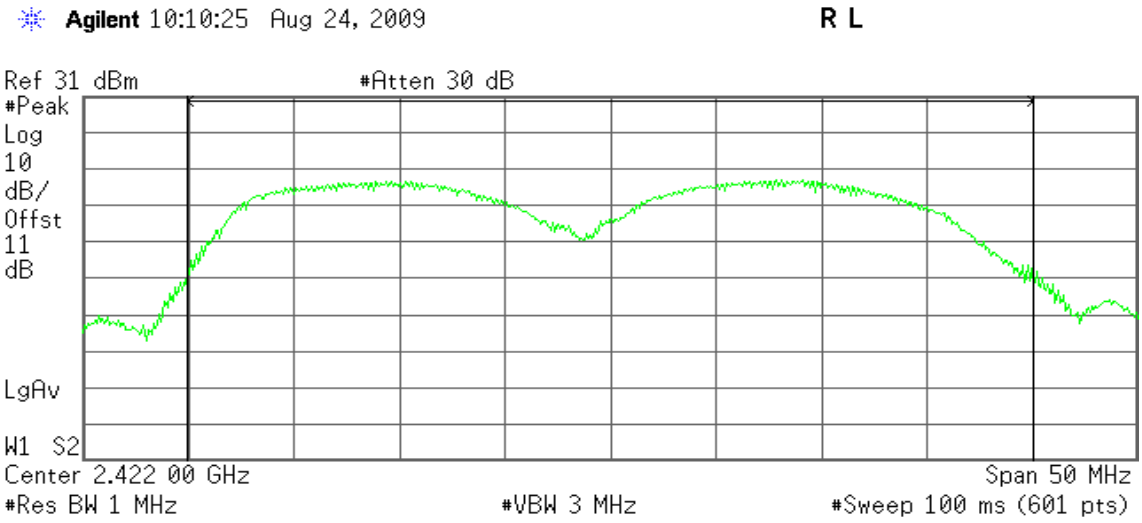
16.80 dBm /40.0000 MHz

Power Spectral Density

-59.22 dBm/Hz

draft 802.11n 40 MHz Channel mode / Combiner

Peak Power (CH Low)



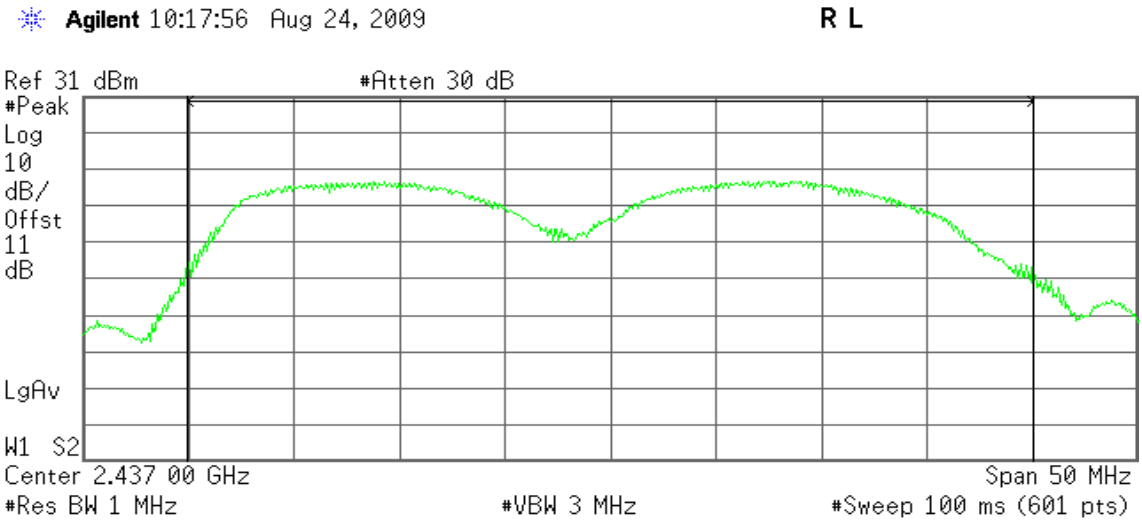
Channel Power

19.78 dBm /40.0000 MHz

Power Spectral Density

-56.24 dBm/Hz

Peak Power (CH Mid)



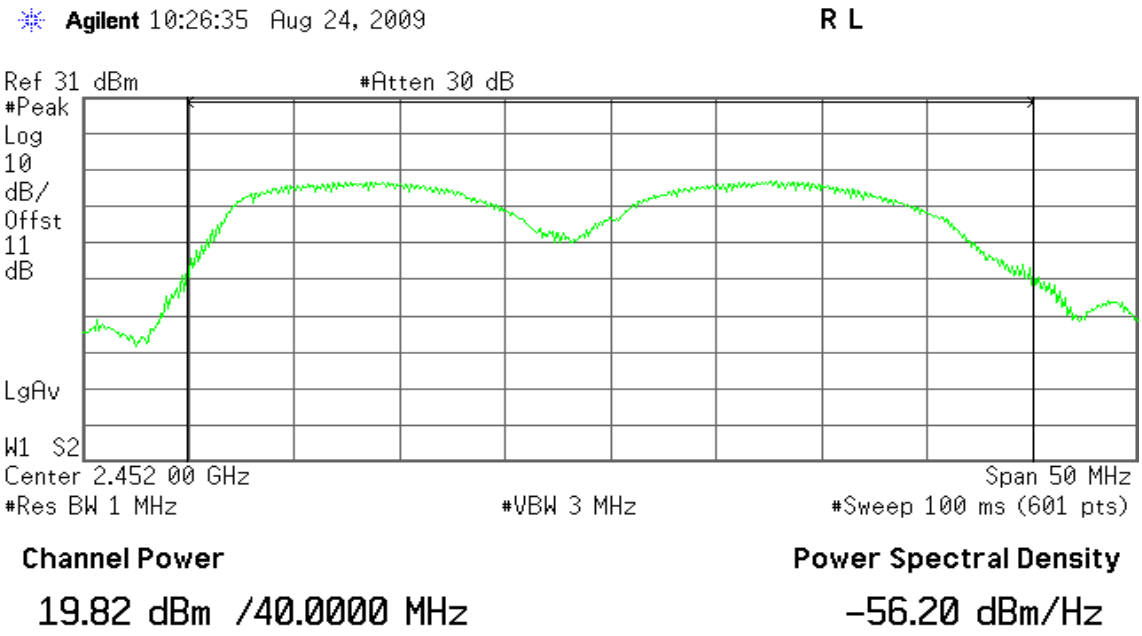
Channel Power

19.73 dBm /40.0000 MHz

Power Spectral Density

-56.29 dBm/Hz

Peak Power (CH High)



Channel Power

19.82 dBm /40.0000 MHz

Power Spectral Density

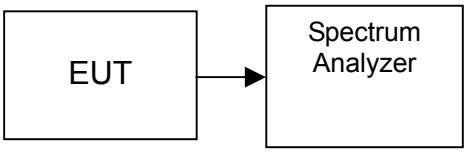
-56.20 dBm/Hz

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)	Output Power (W)
Low	2412	13.54	0.02259
Mid	2437	13.63	0.02307
High	2462	13.31	0.02143

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2412	13.21	0.02094
Mid	2437	13.47	0.02223
High	2462	13.25	0.02113

Test mode: draft 802.11n 20 MHz Channel mode

Channel	Frequency (MHz)	Output Power (dBm)		Output Power (W)		Total Power (dBm)	Total Power (W)
		Chain 0	Chain 1	Chain 0	Chain 1		
Low	2412	12.16	10.87	0.01644	0.01222	13.32	0.02148
Mid	2437	12.01	11.39	0.01589	0.01377	13.49	0.02234
High	2462	10.98	11.22	0.01253	0.01324	13.31	0.02143

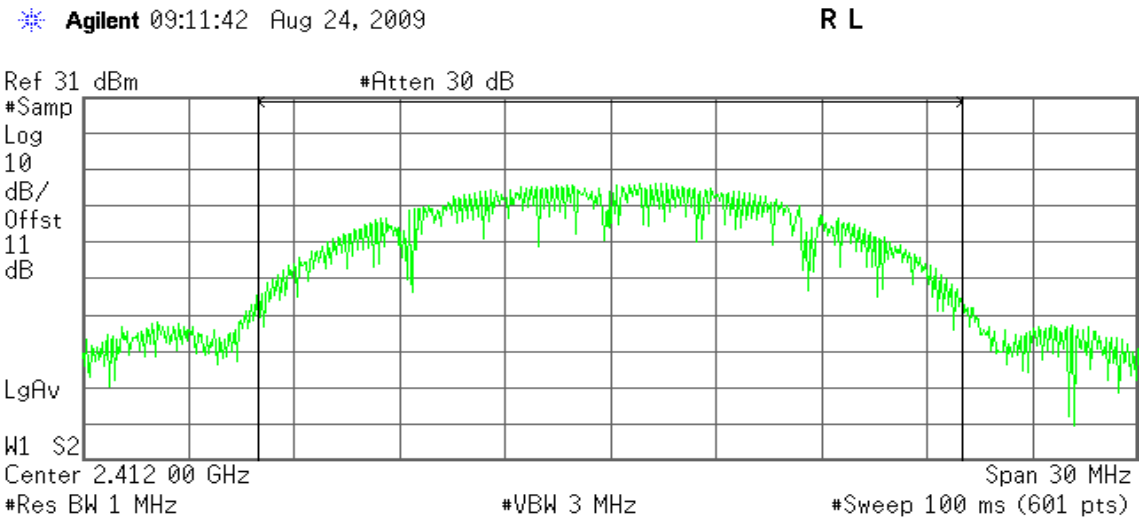
Test mode: draft 802.11n 40 MHz Channel mode

Channel	Frequency (MHz)	Output Power (dBm)		Output Power (W)		Total Power (dBm)	Total Power (W)
		Chain 0	Chain 1	Chain 0	Chain 1		
Low	2422	11.90	9.45	0.01549	0.00881	12.76	0.01888
Mid	2437	11.64	9.87	0.01459	0.00971	13.05	0.02018
High	2452	11.29	9.98	0.01346	0.00995	13.17	0.02075

Test Plot

IEEE 802.11b mode

Averge power (CH Low)



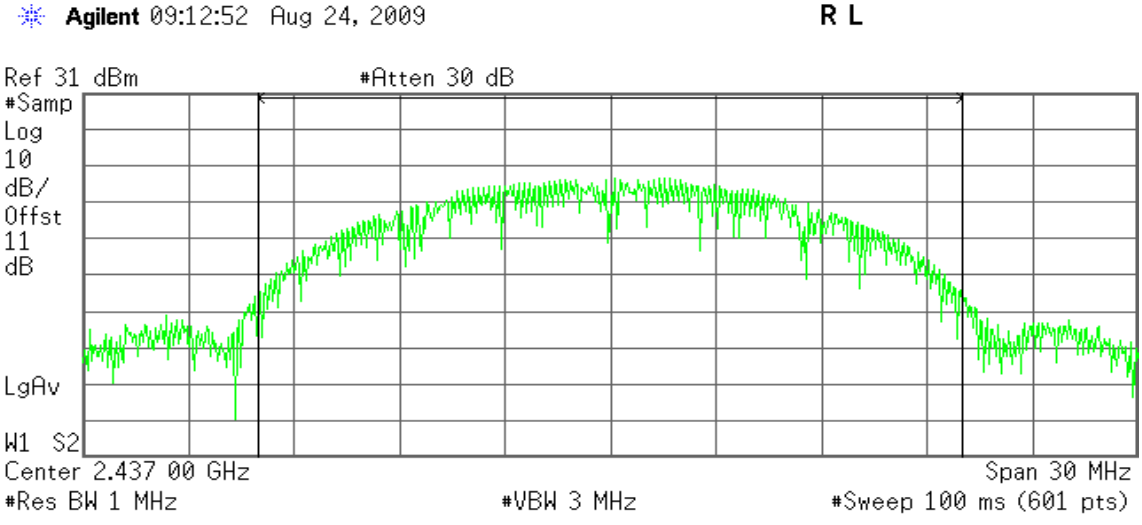
Channel Power

13.54 dBm /20.0000 MHz

Power Spectral Density

-59.47 dBm/Hz

Averge power (CH Mid)



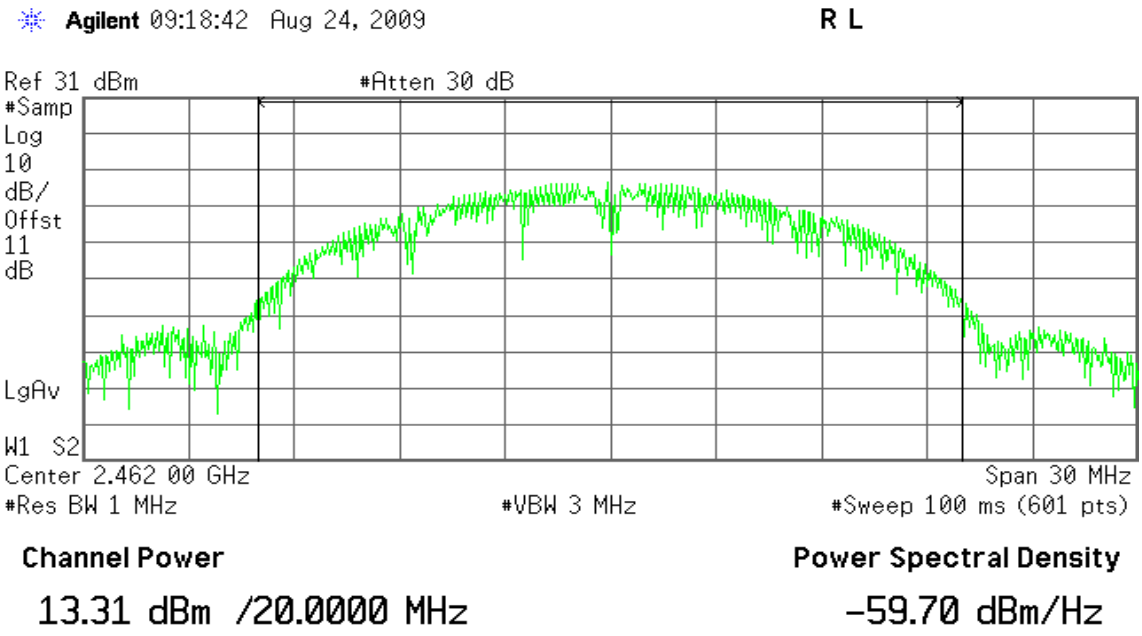
Channel Power

13.63 dBm /20.0000 MHz

Power Spectral Density

-59.38 dBm/Hz

Averge power (CH High)



Channel Power

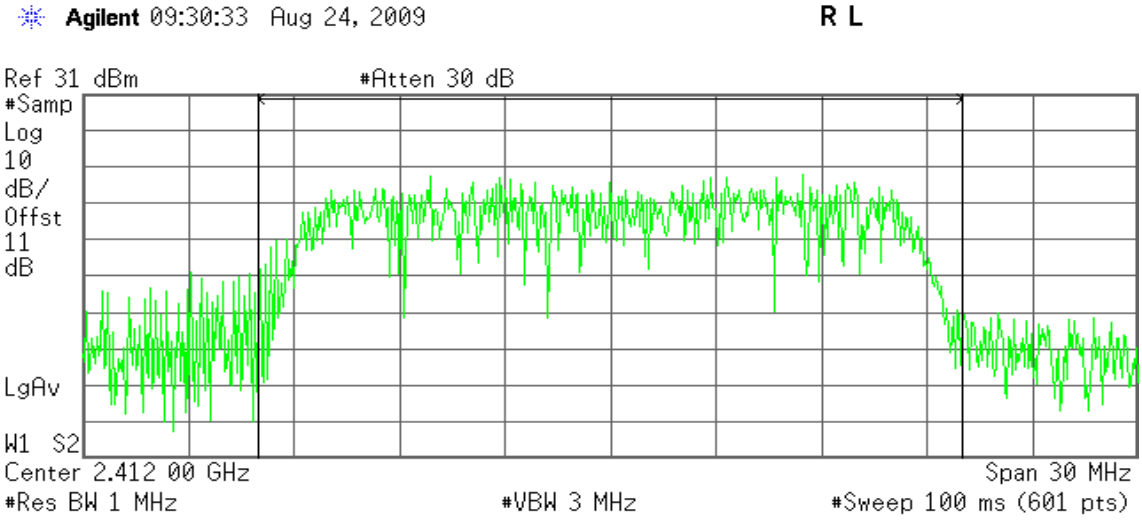
13.31 dBm /20.0000 MHz

Power Spectral Density

-59.70 dBm/Hz

IEEE 802.11g mode

Averge power (CH Low)



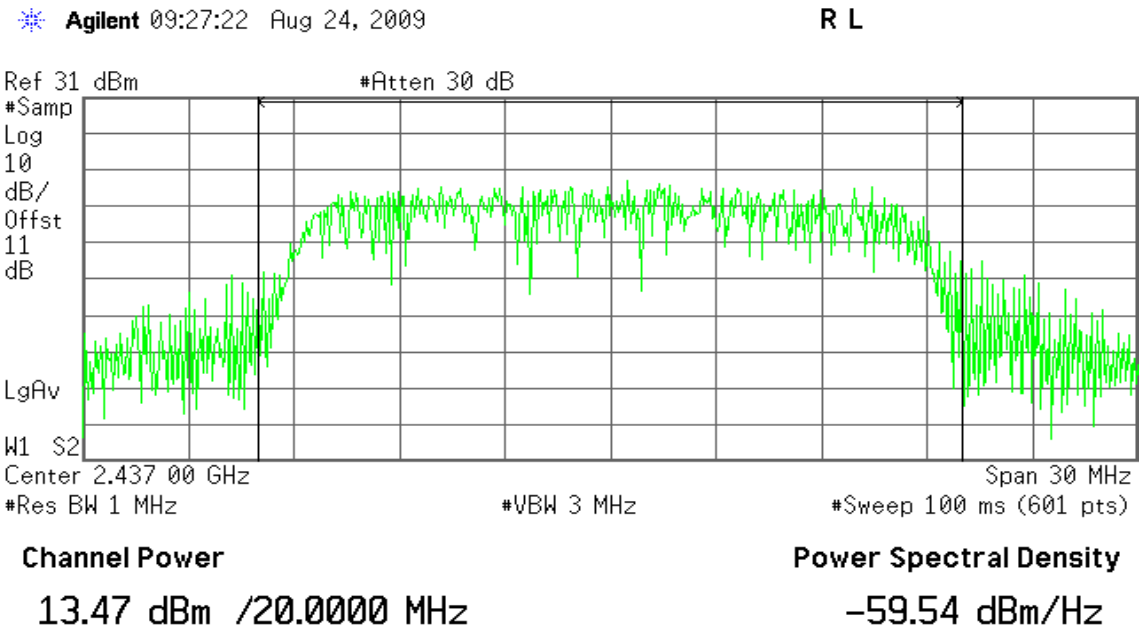
Channel Power

13.21 dBm /20.0000 MHz

Power Spectral Density

-59.80 dBm/Hz

Averge power (CH Mid)



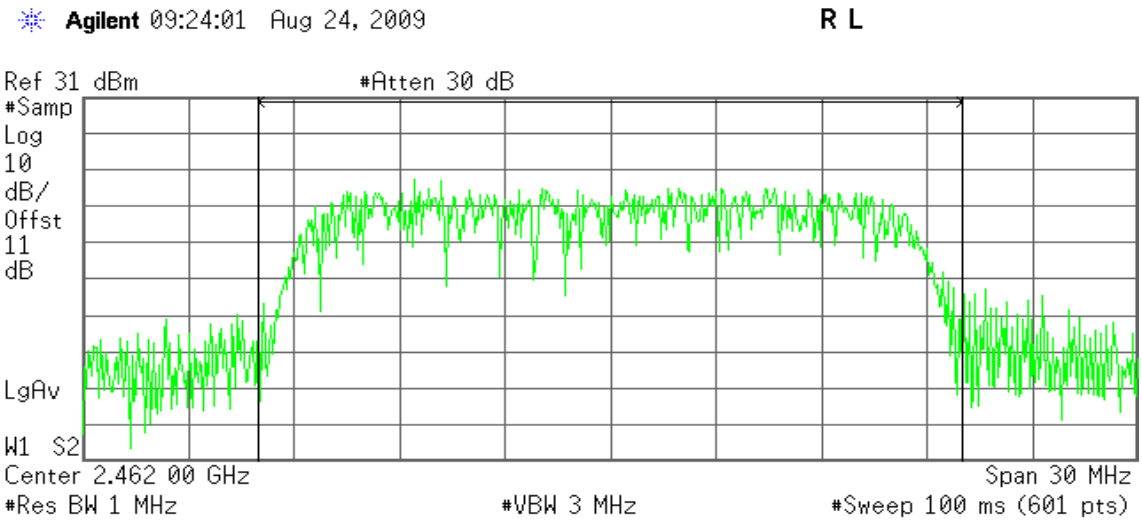
Channel Power

13.47 dBm /20.0000 MHz

Power Spectral Density

-59.54 dBm/Hz

Averge power (CH High)



Channel Power

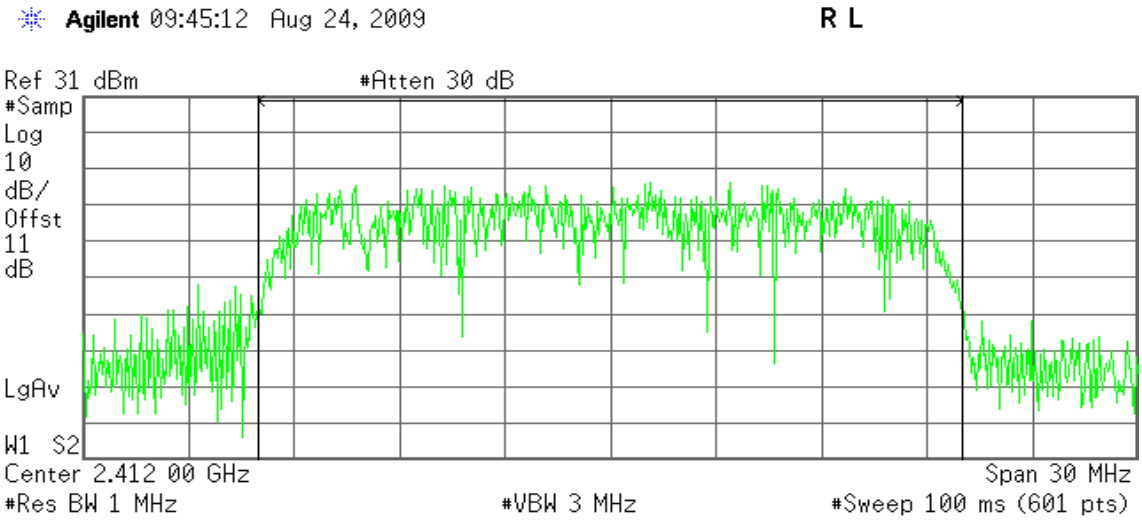
13.25 dBm /20.0000 MHz

Power Spectral Density

-59.76 dBm/Hz

draft 802.11n 20 MHz Channel mode / Chain 0

Averge power (CH Low)



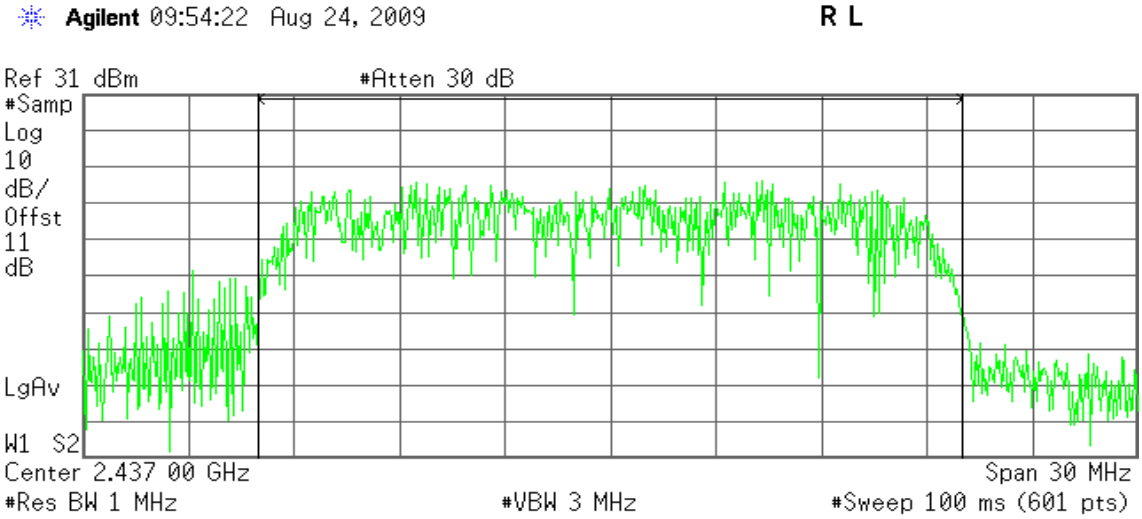
Channel Power

12.16 dBm /20.0000 MHz

Power Spectral Density

-60.85 dBm/Hz

Averge power (CH Mid)



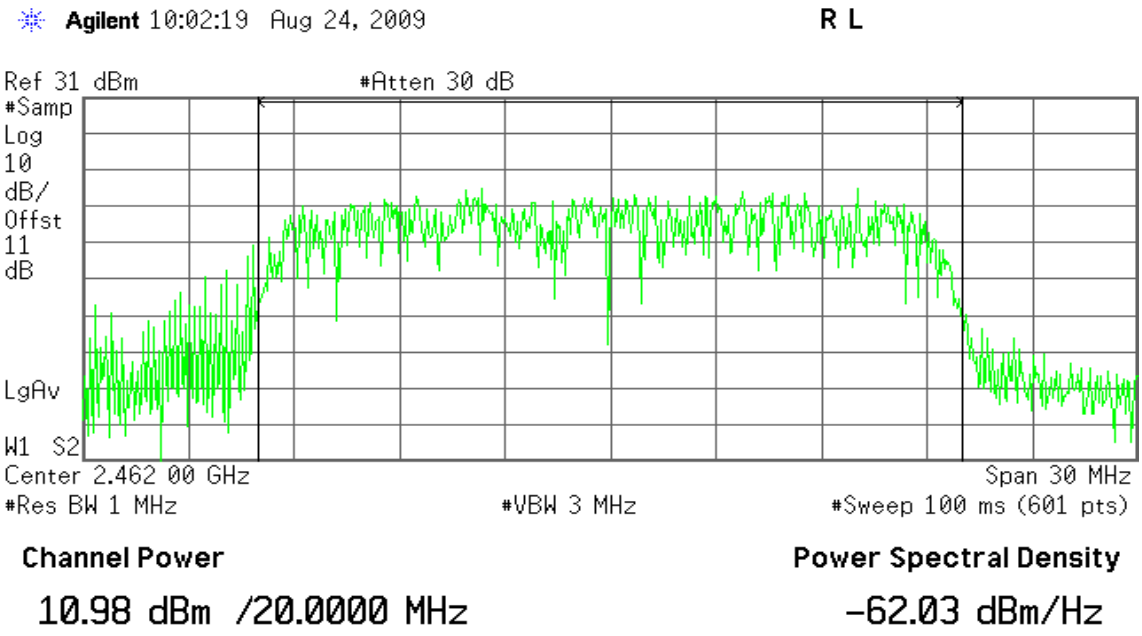
Channel Power

12.01 dBm /20.0000 MHz

Power Spectral Density

-61.00 dBm/Hz

Averge power (CH High)



Channel Power

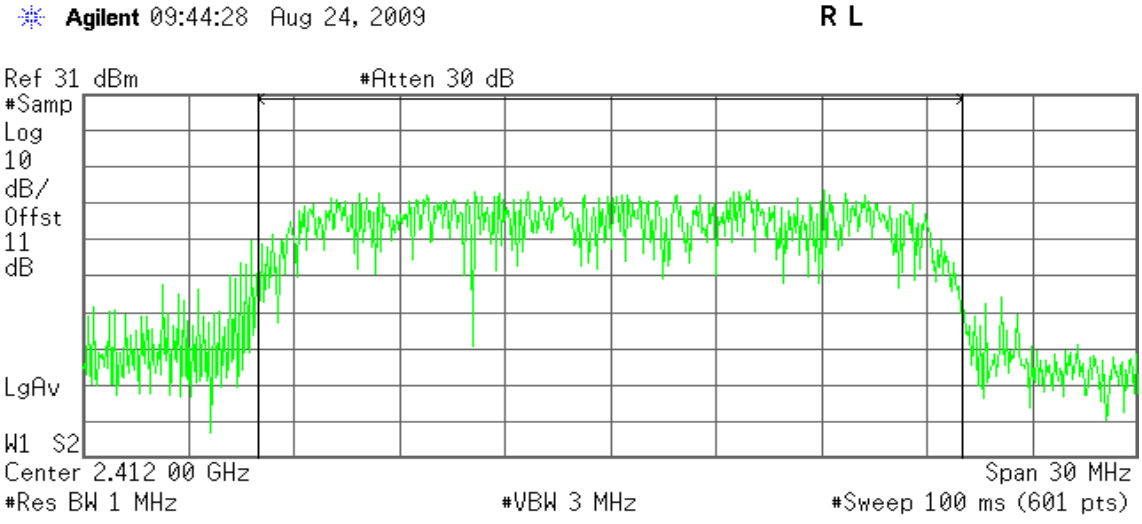
10.98 dBm /20.0000 MHz

Power Spectral Density

-62.03 dBm/Hz

draft 802.11n 20 MHz Channel mode / Chain 1

Averge power (CH Low)



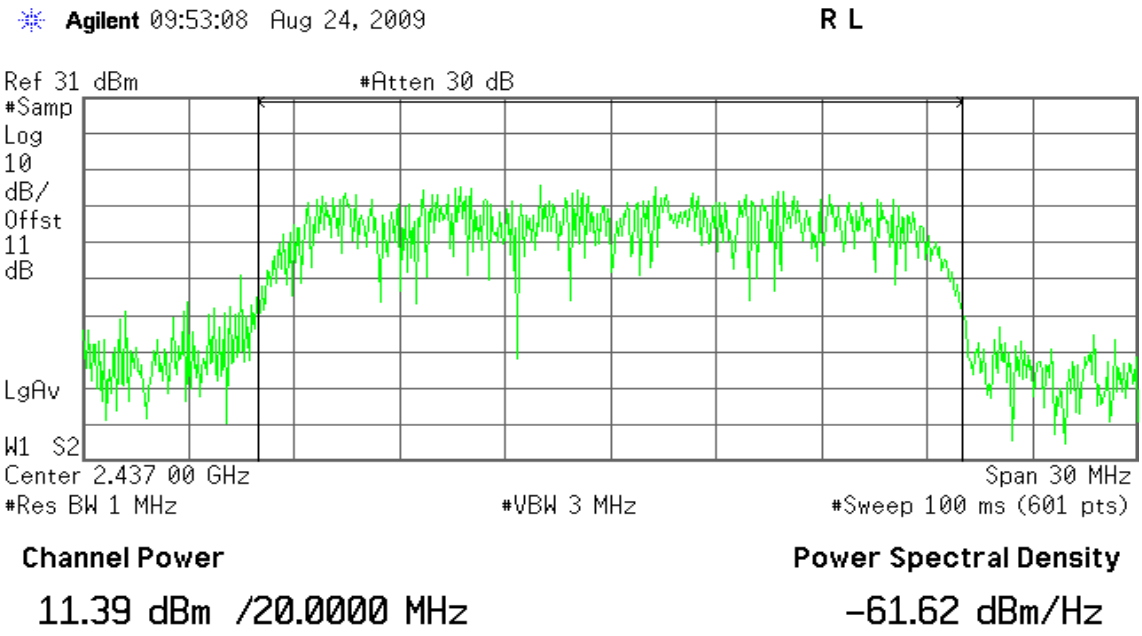
Channel Power

10.87 dBm /20.0000 MHz

Power Spectral Density

-62.14 dBm/Hz

Averge power (CH Mid)



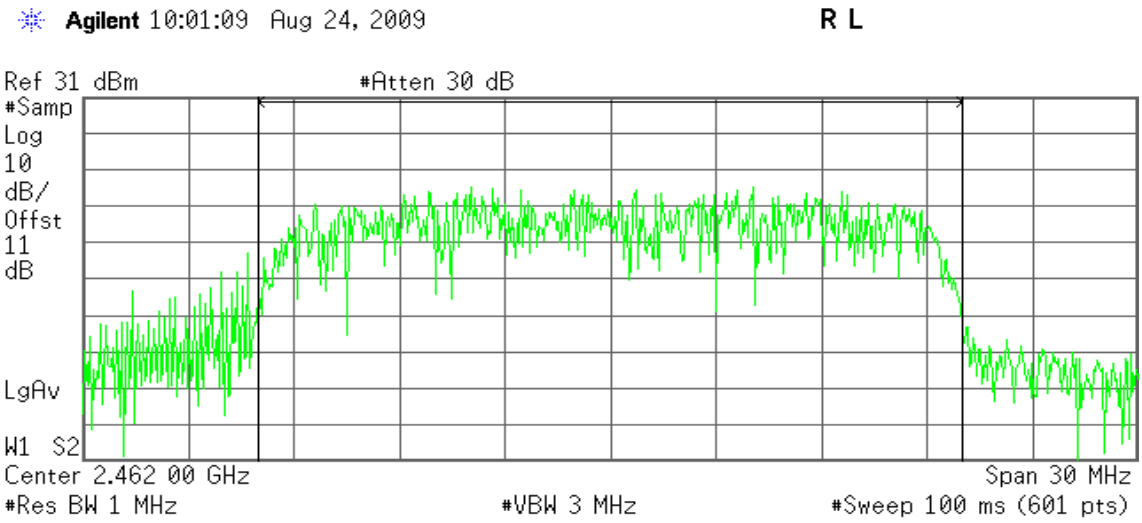
Channel Power

11.39 dBm /20.0000 MHz

Power Spectral Density

-61.62 dBm/Hz

Averge power (CH High)



Channel Power

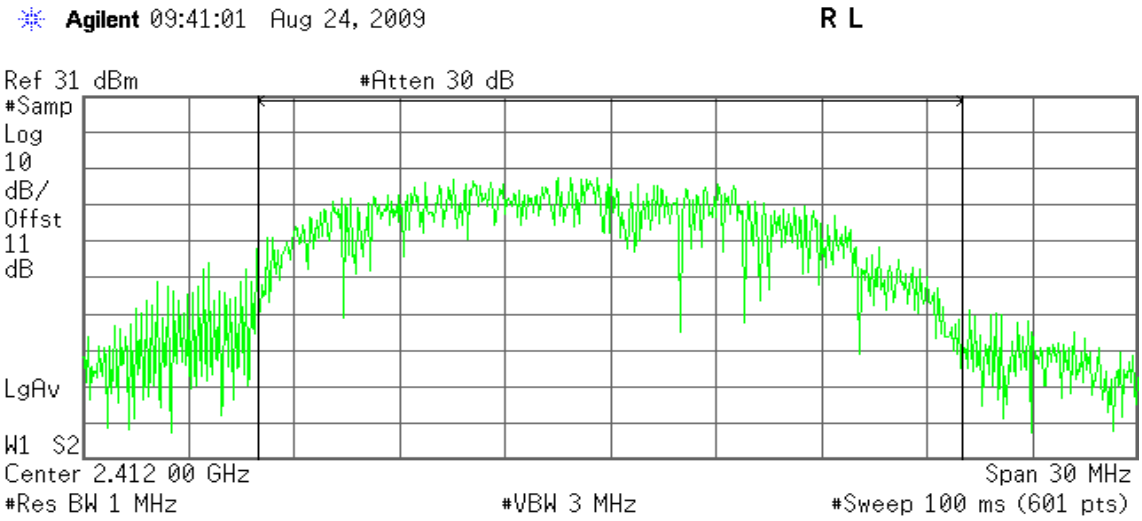
11.22 dBm /20.0000 MHz

Power Spectral Density

-61.79 dBm/Hz

draft 802.11n 20 MHz Channel mode / Combiner

Averge power (CH Low)



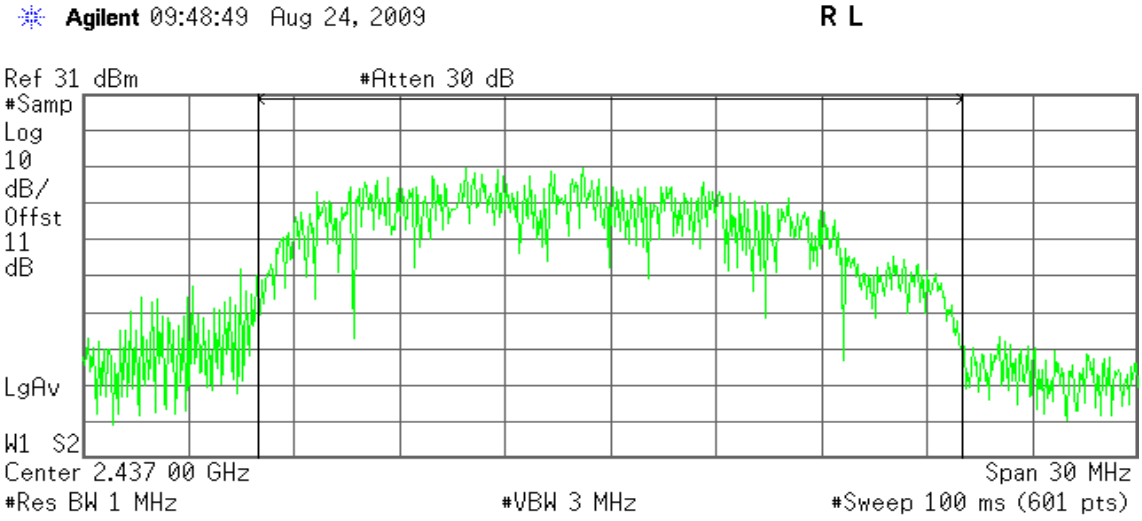
Channel Power

13.32 dBm /20.0000 MHz

Power Spectral Density

-59.69 dBm/Hz

Averge power (CH Mid)



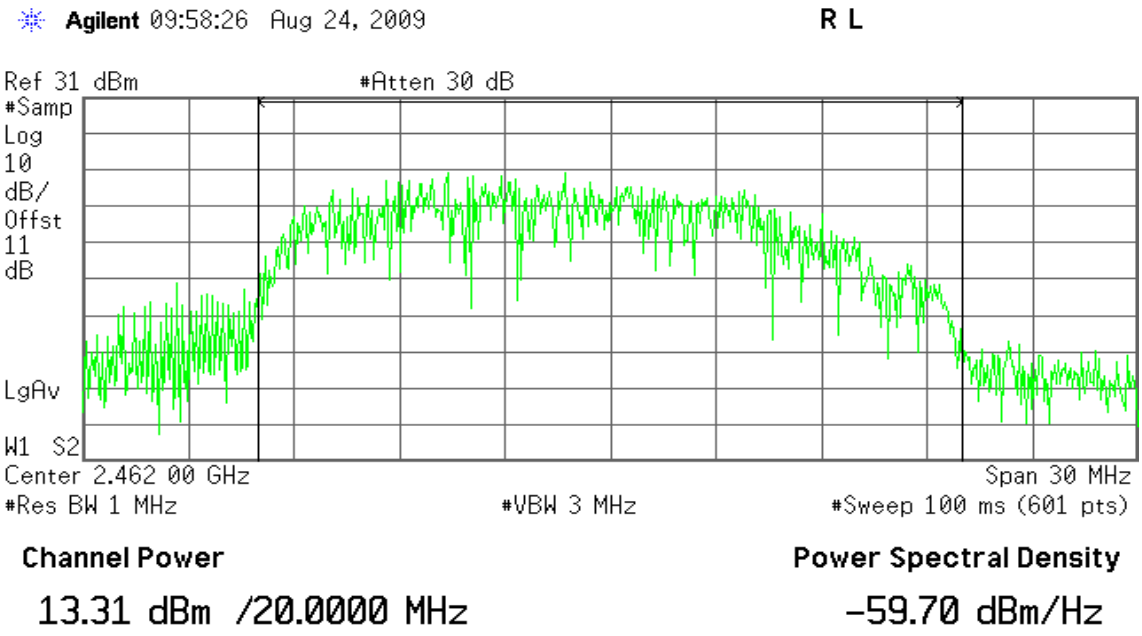
Channel Power

13.49 dBm /20.0000 MHz

Power Spectral Density

-59.52 dBm/Hz

Averge power (CH High)



Channel Power

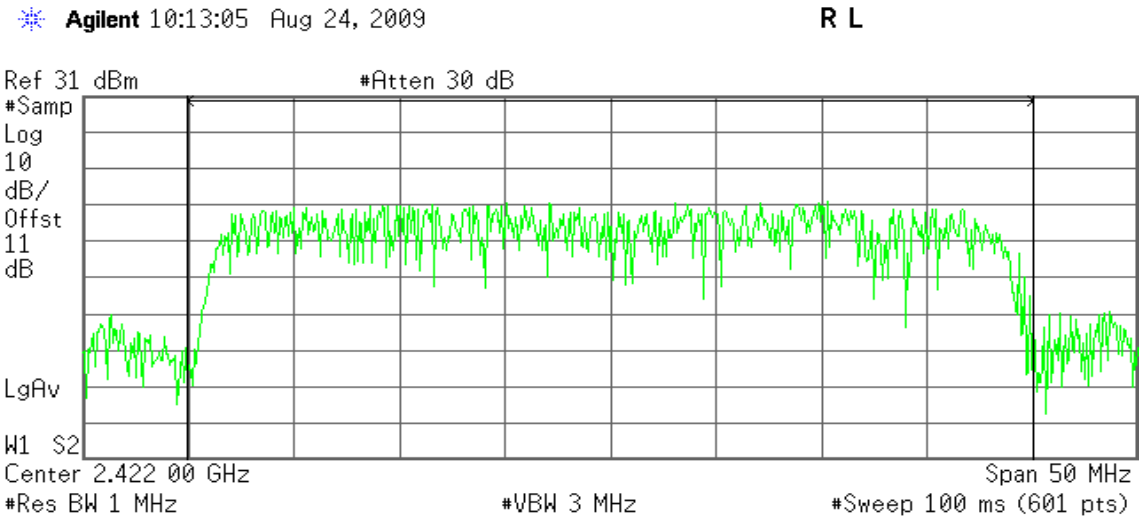
13.31 dBm /20.0000 MHz

Power Spectral Density

-59.70 dBm/Hz

draft 802.11n 40 MHz Channel mode / Chain 0

Averge power (CH Low)



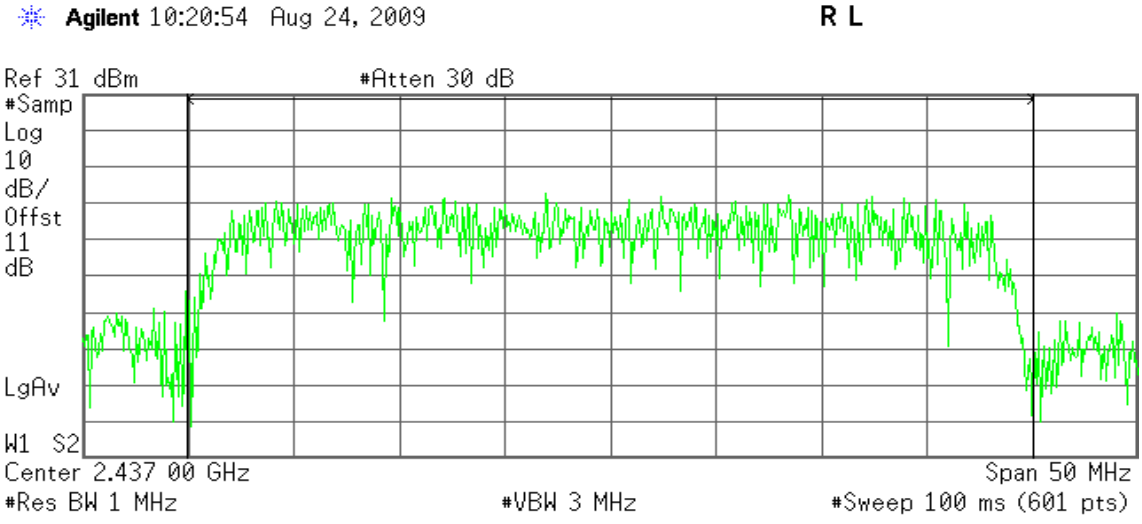
Channel Power

11.90 dBm /40.0000 MHz

Power Spectral Density

-64.12 dBm/Hz

Averge power (CH Mid)



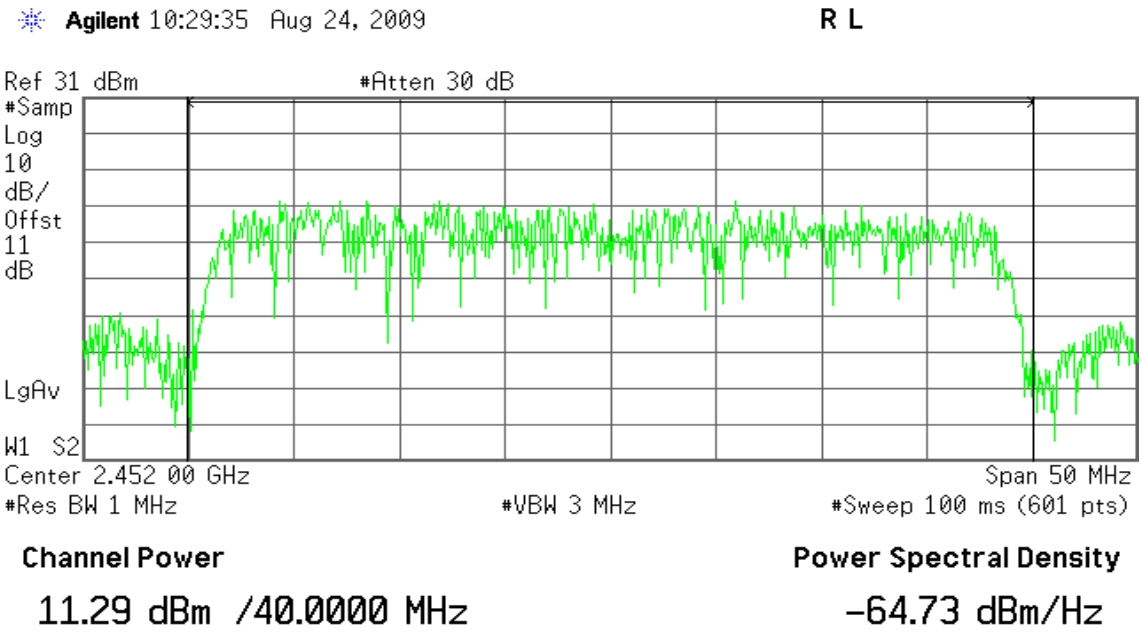
Channel Power

11.64 dBm /40.0000 MHz

Power Spectral Density

-64.38 dBm/Hz

Averge power (CH High)



Channel Power

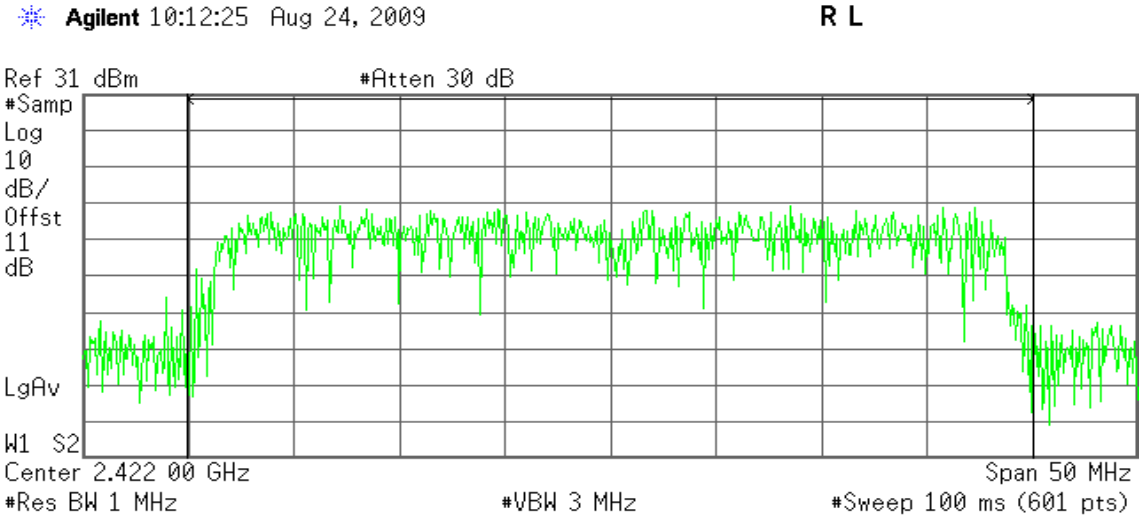
11.29 dBm /40.0000 MHz

Power Spectral Density

-64.73 dBm/Hz

draft 802.11n 40 MHz Channel mode / Chain 1

Averge power (CH Low)



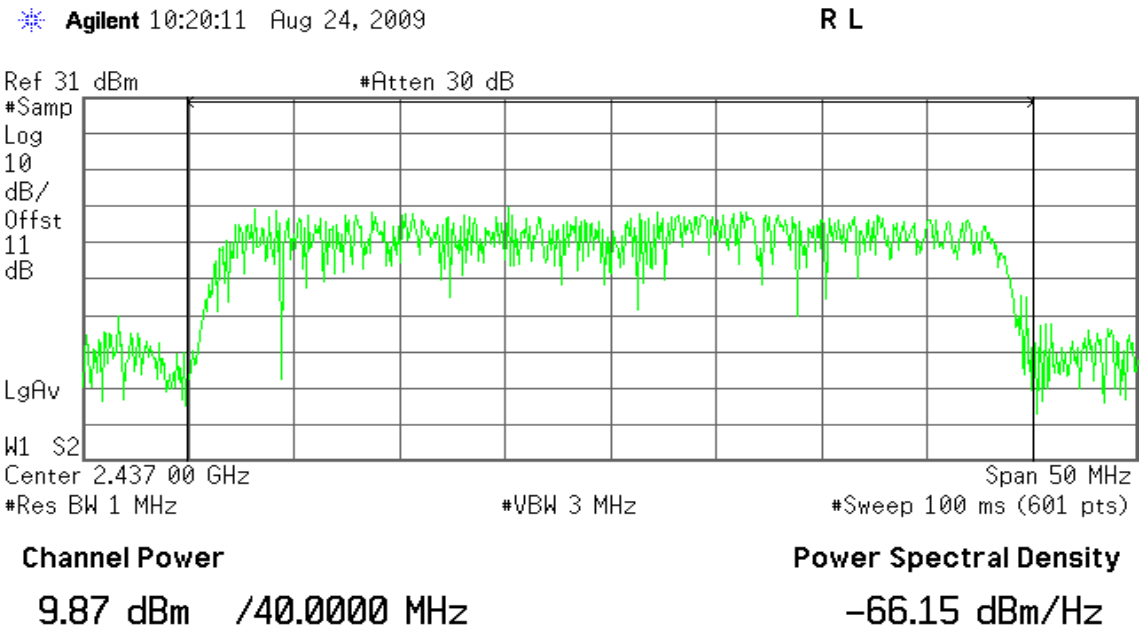
Channel Power

9.45 dBm /40.0000 MHz

Power Spectral Density

-66.57 dBm/Hz

Averge power (CH Mid)



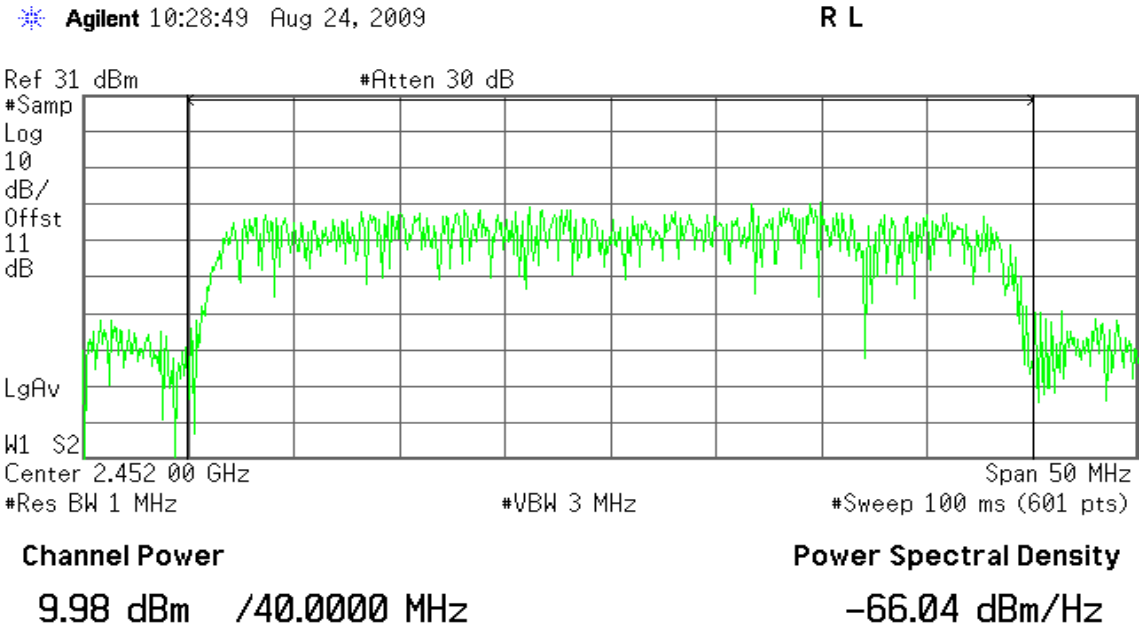
Channel Power

9.87 dBm /40.0000 MHz

Power Spectral Density

-66.15 dBm/Hz

Averge power (CH High)



Channel Power

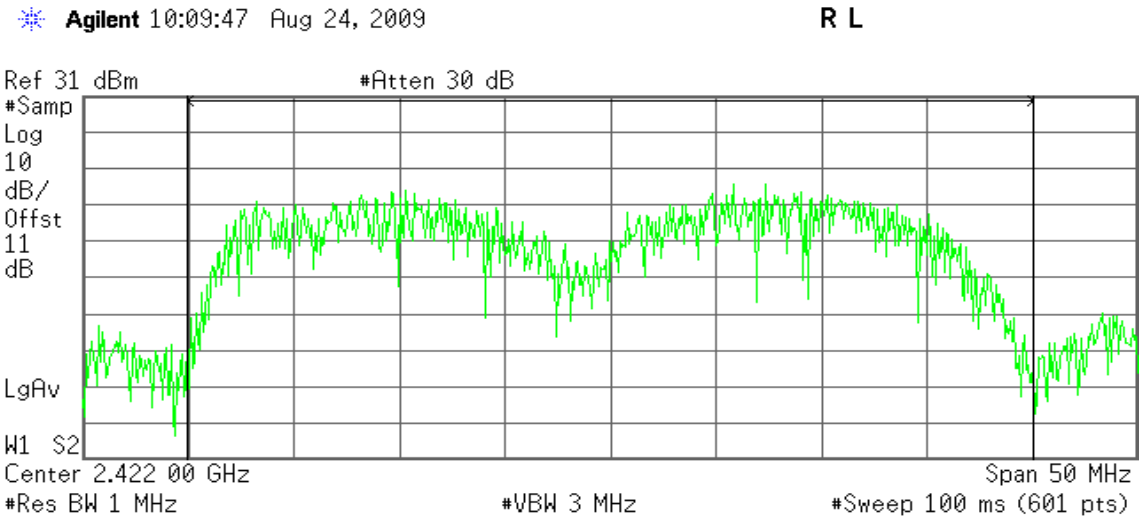
9.98 dBm /40.0000 MHz

Power Spectral Density

-66.04 dBm/Hz

draft 802.11n 40 MHz Channel mode / Combiner

Averge power (CH Low)



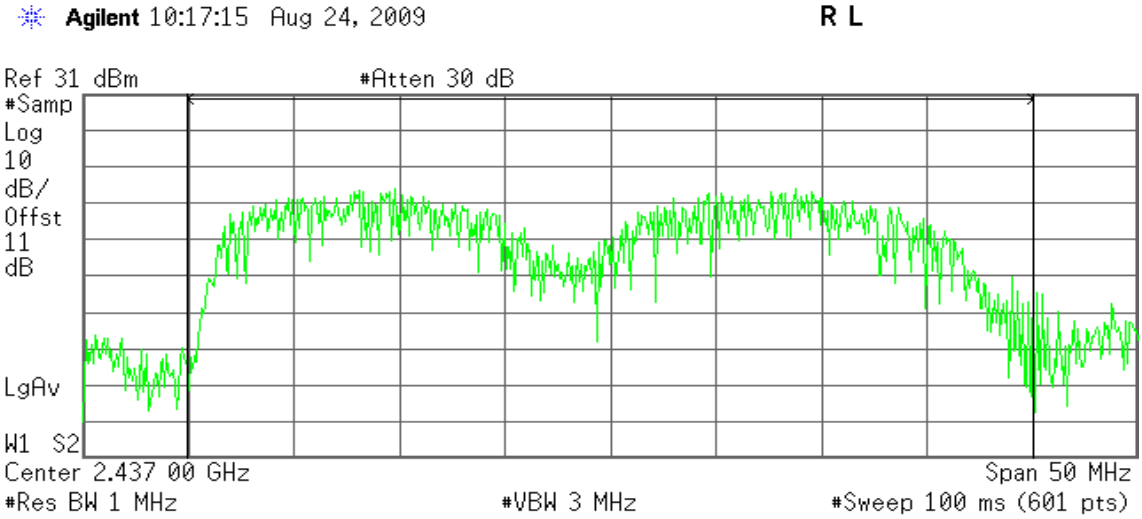
Channel Power

12.76 dBm /40.0000 MHz

Power Spectral Density

-63.26 dBm/Hz

Averge power (CH Mid)



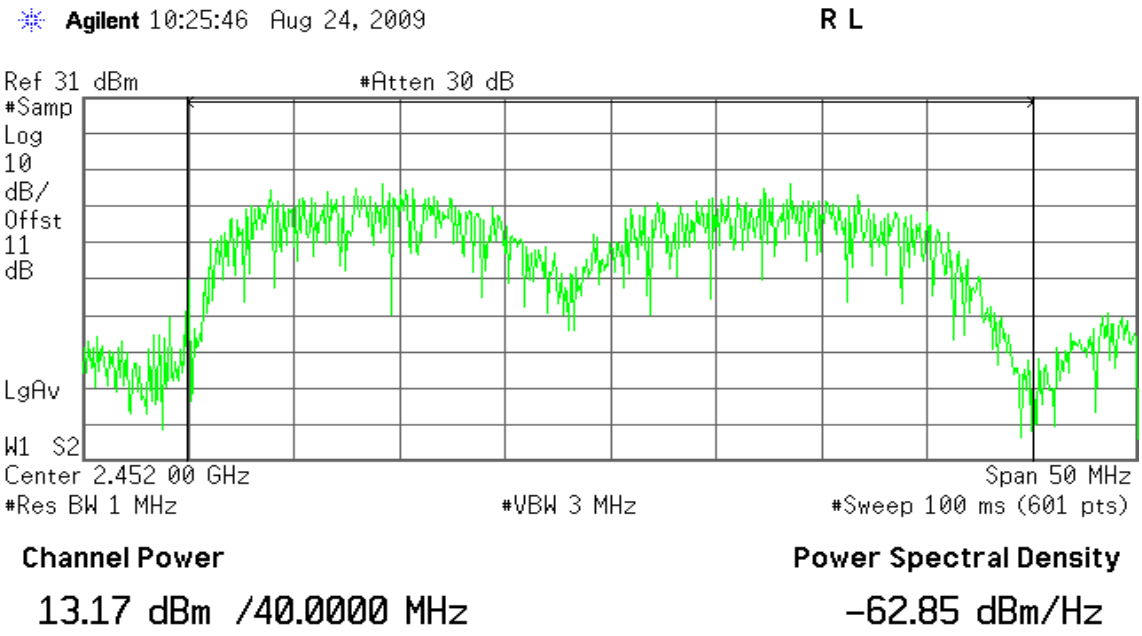
Channel Power

13.05 dBm /40.0000 MHz

Power Spectral Density

-62.97 dBm/Hz

Averge power (CH High)



Channel Power

13.17 dBm /40.0000 MHz

Power Spectral Density

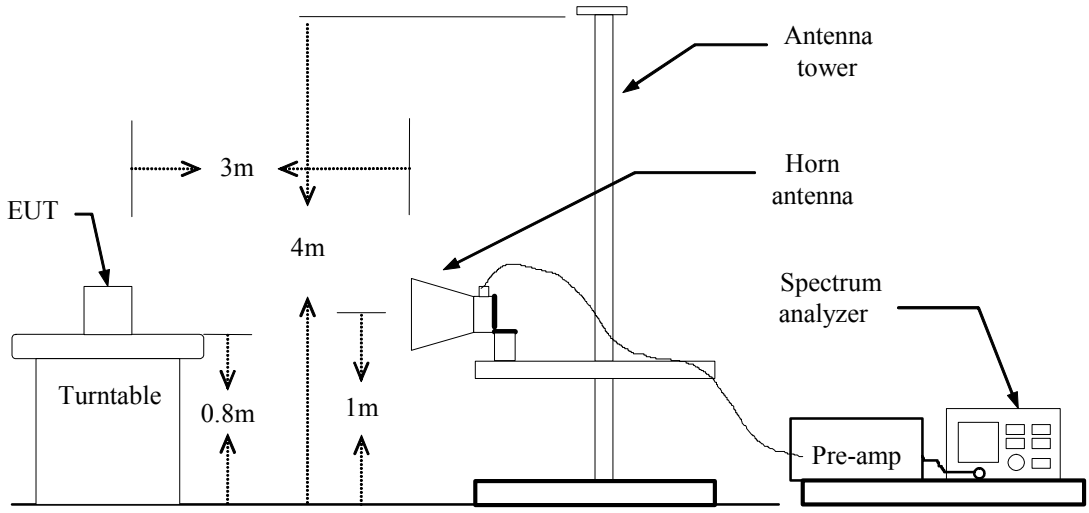
-62.85 dBm/Hz

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

TEST CONFIGURATION



TEST PROCEDURE

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

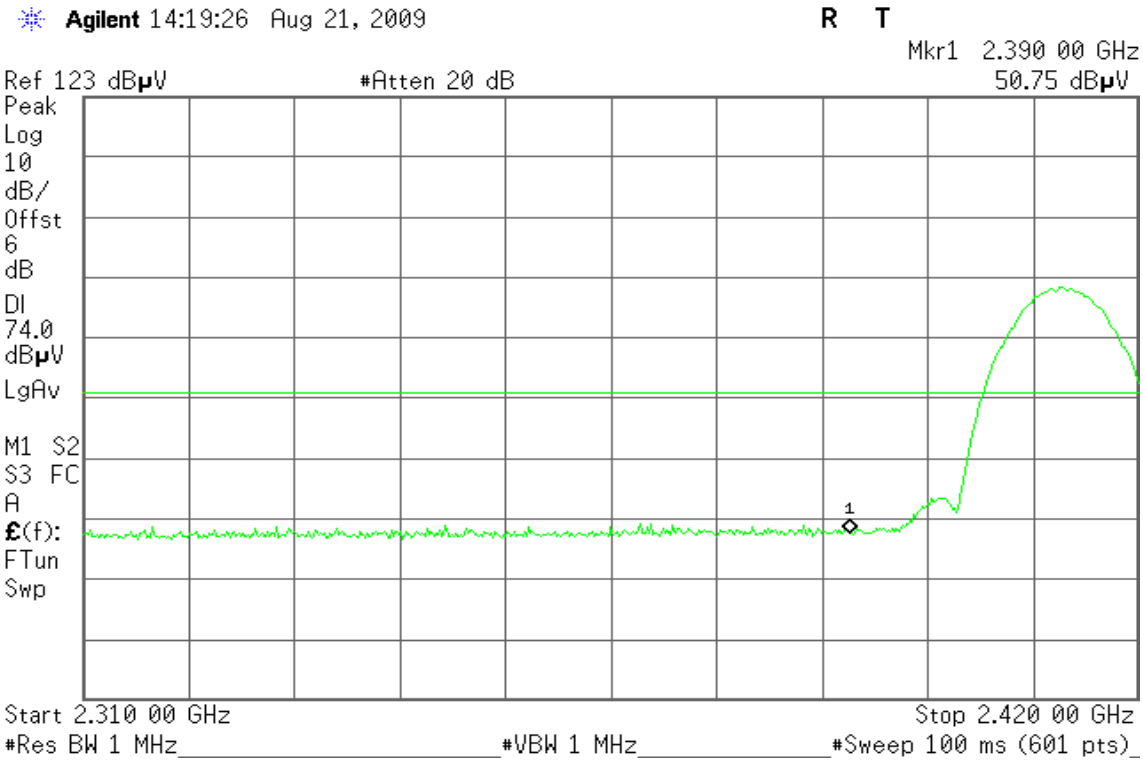
TEST RESULTS

Refer to attach spectrum analyzer data chart.

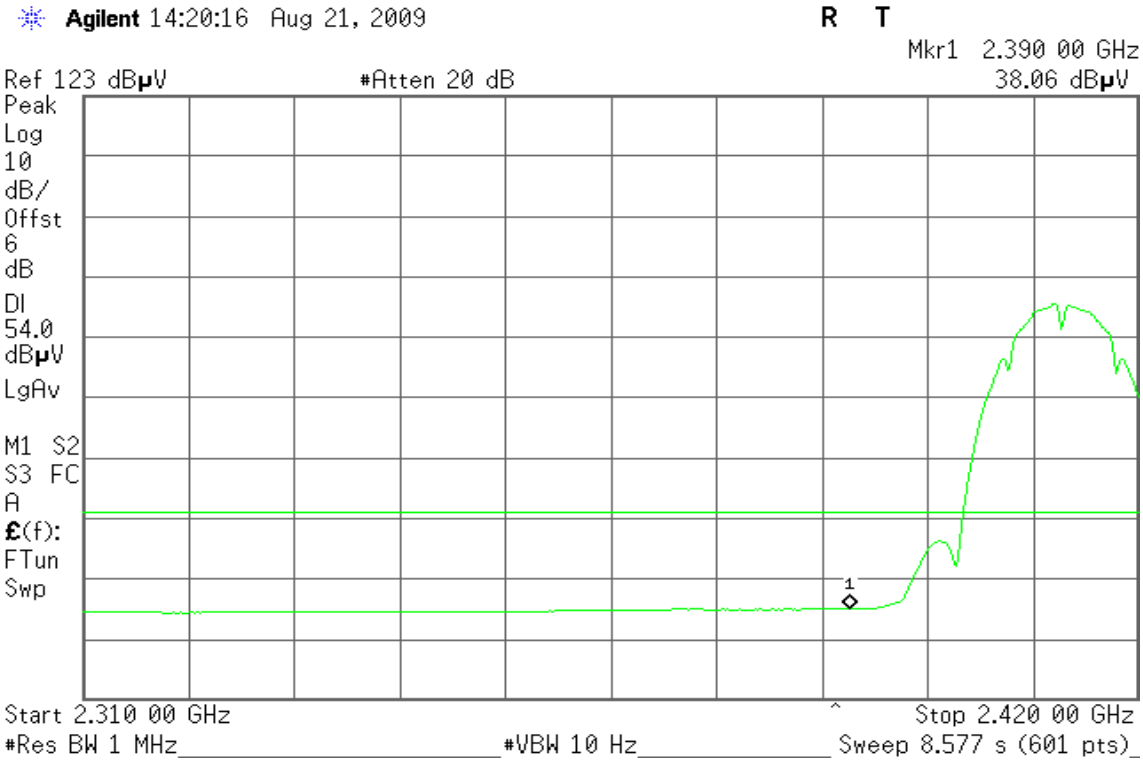
Test Plot

Band Edges (IEEE 802.11b mode / CH Low)

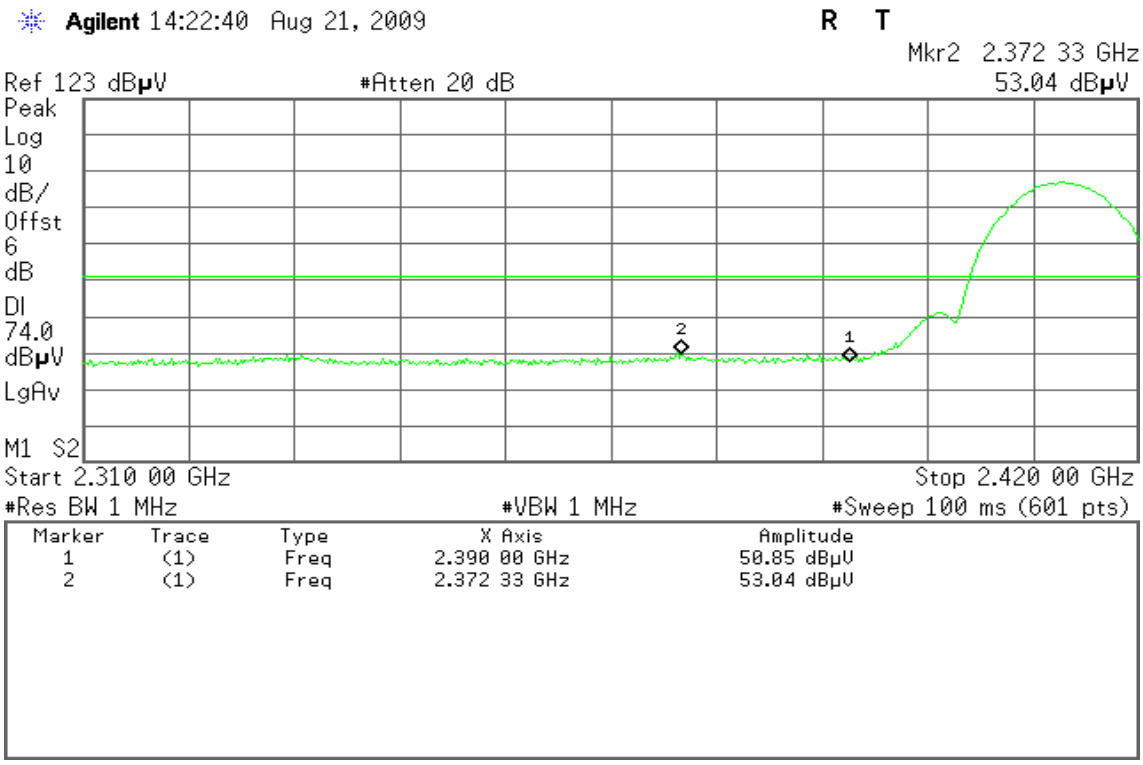
Detector mode: Peak **Polarity: Vertical**



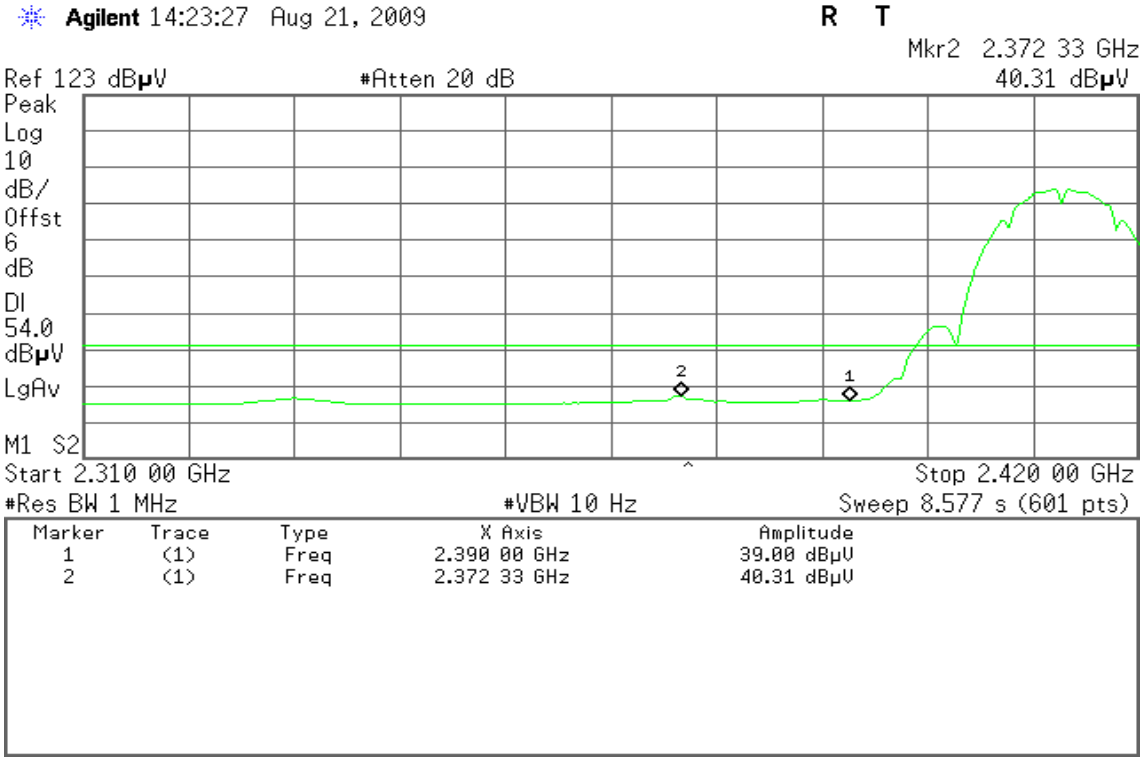
Detector mode: Average **Polarity: Vertical**



Detector mode: Peak **Polarity: Horizontal**

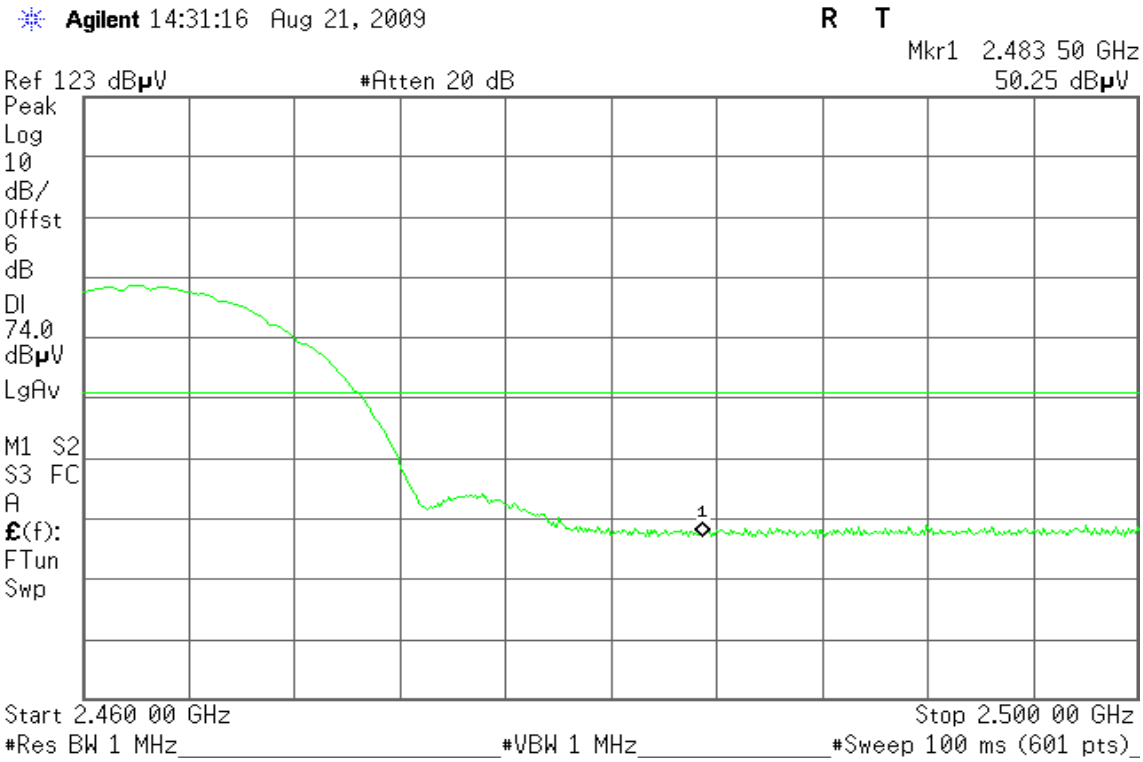


Detector mode: Average **Polarity: Horizontal**

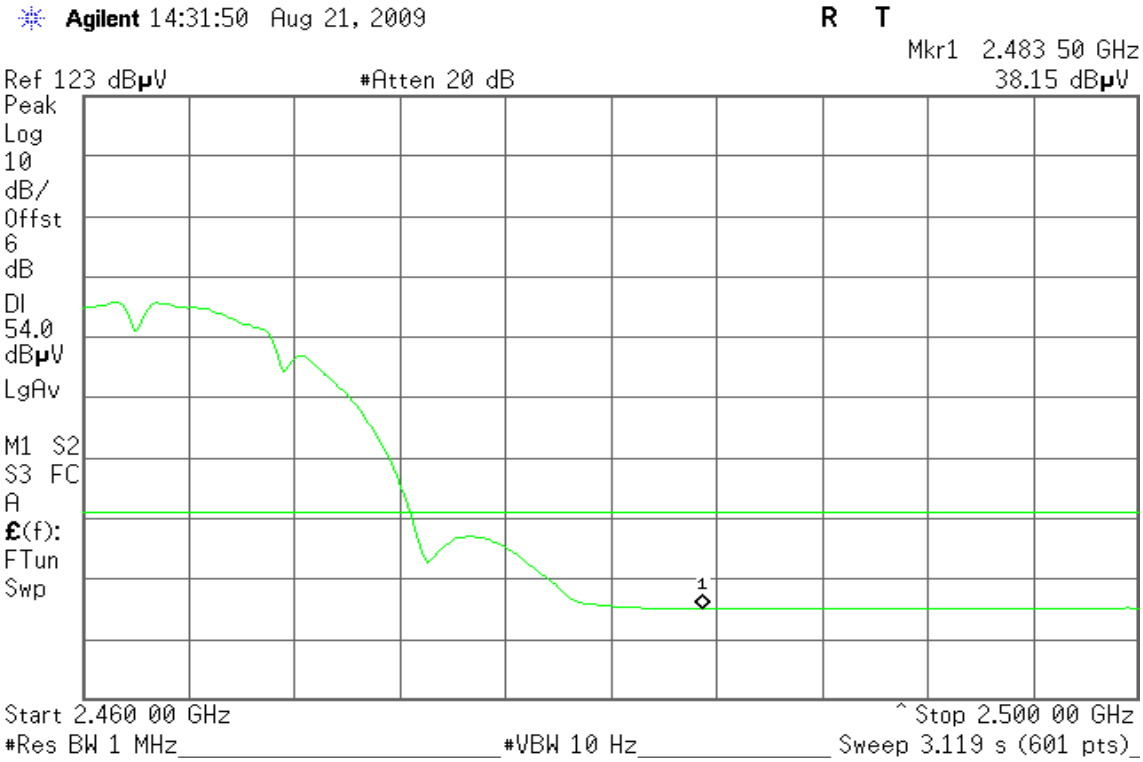


Band Edges (IEEE 802.11b mode / CH High)

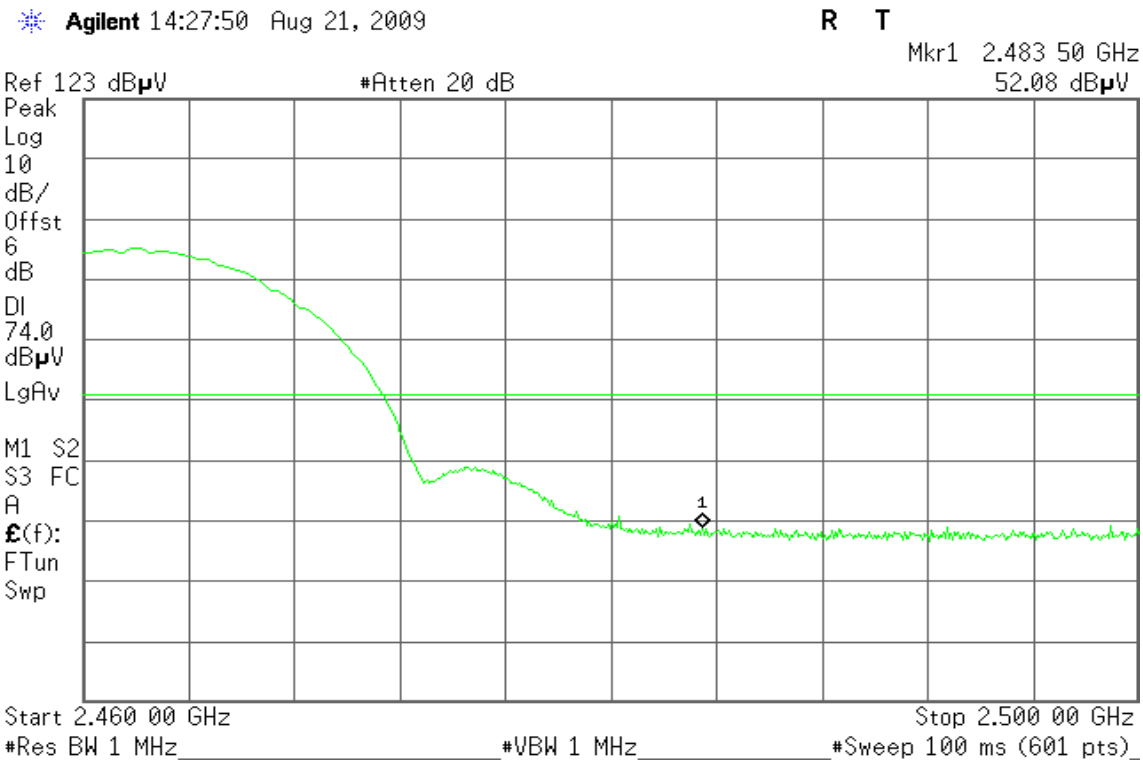
Detector mode: Peak Polarity: Vertical



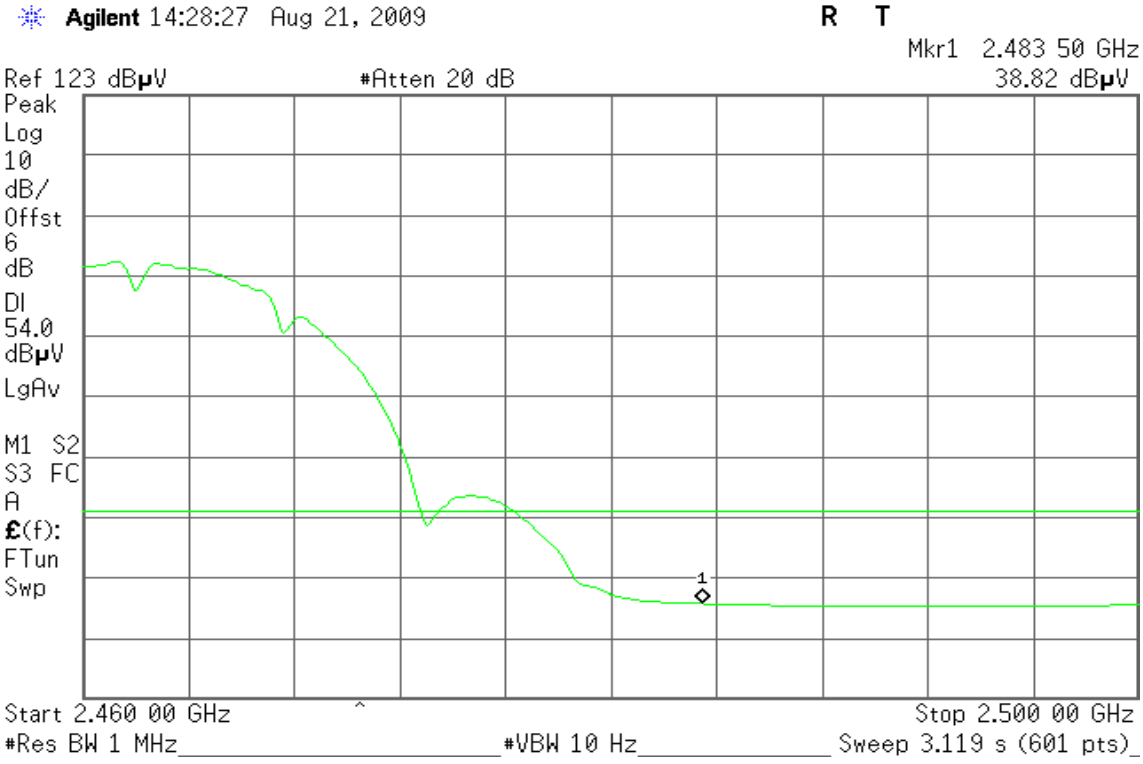
Detector mode: Average Polarity: Vertical



Detector mode: Peak **Polarity: Horizontal**

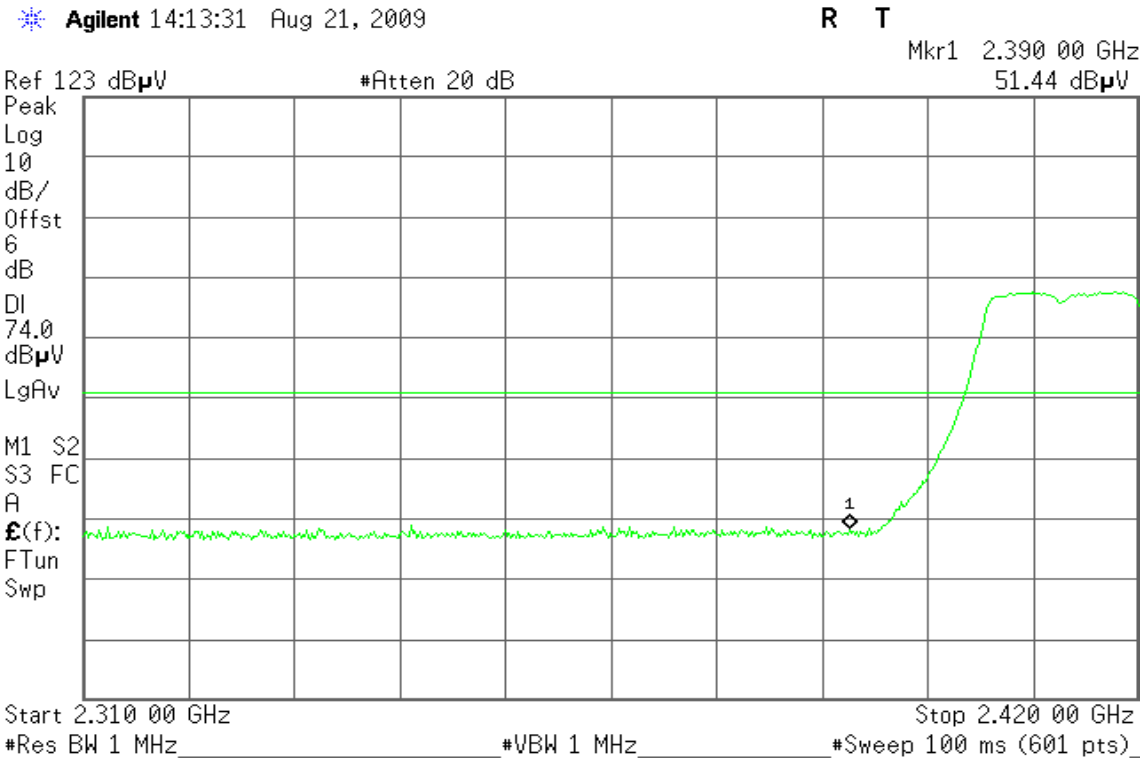


Detector mode: Average **Polarity: Horizontal**

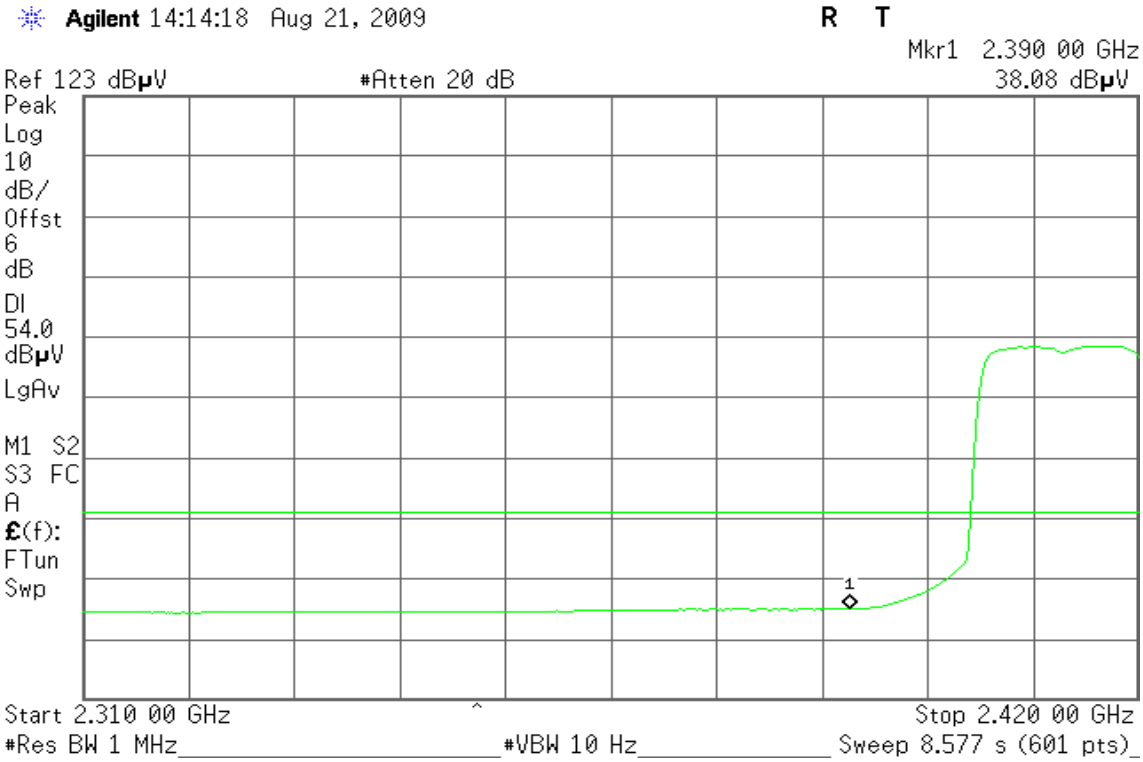


Band Edges (IEEE 802.11g mode / CH Low)

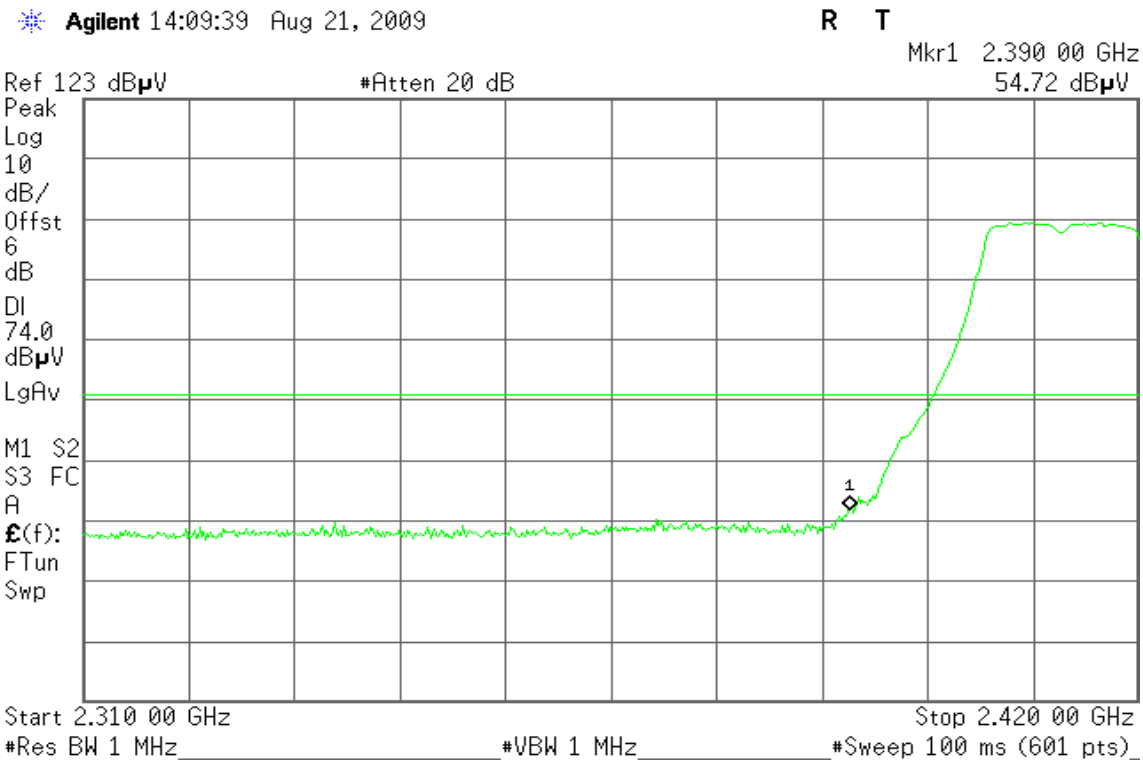
Detector mode: Peak Polarity: Vertical



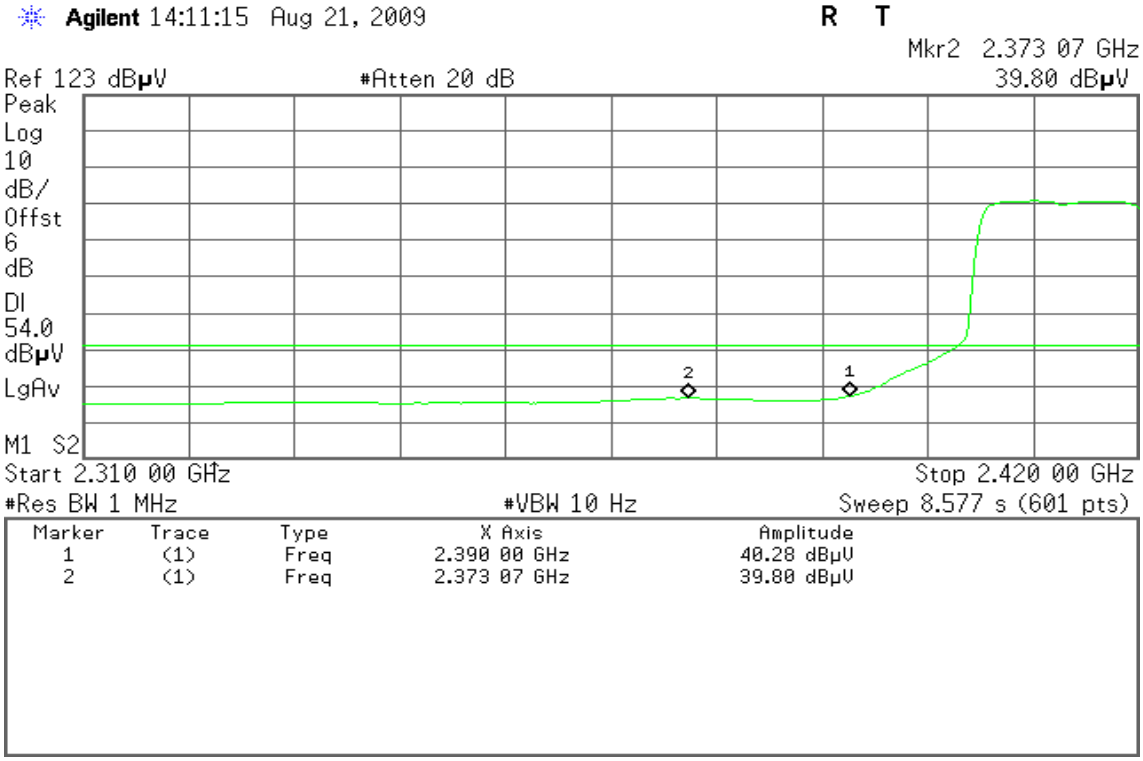
Detector mode: Average Polarity: Vertical



Detector mode: Peak **Polarity: Horizontal**

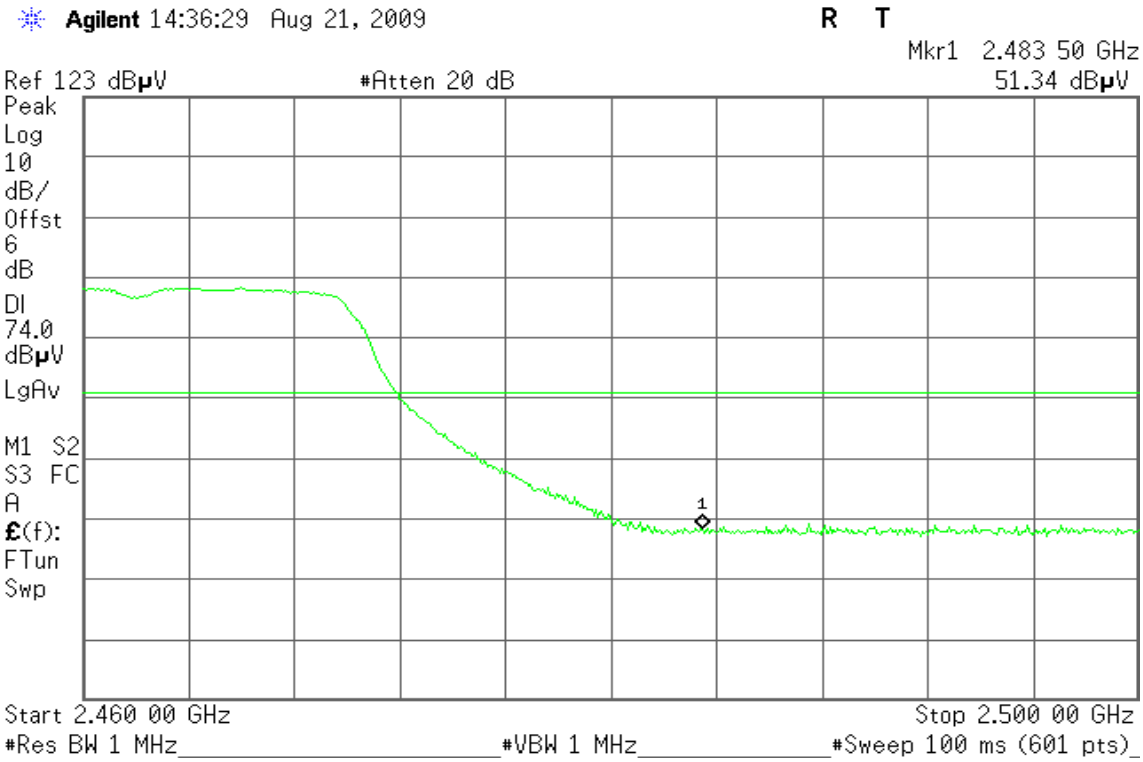


Detector mode: Average **Polarity: Horizontal**

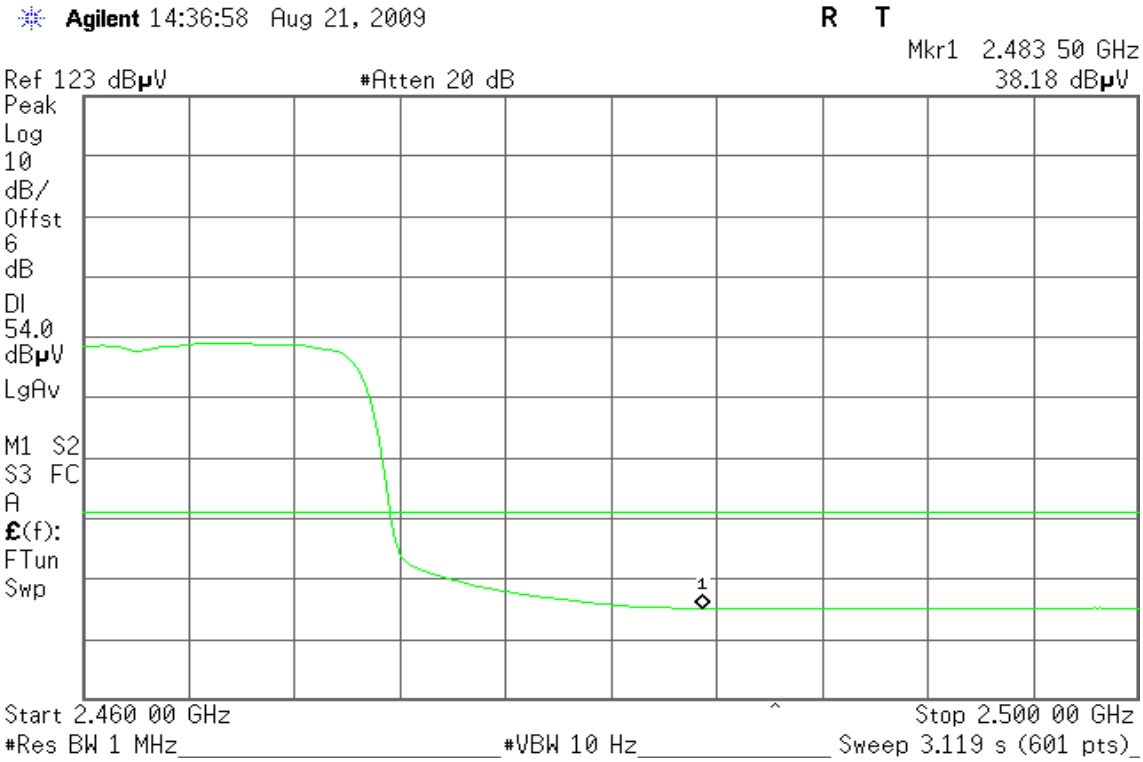


Band Edges (IEEE 802.11g mode / CH High)

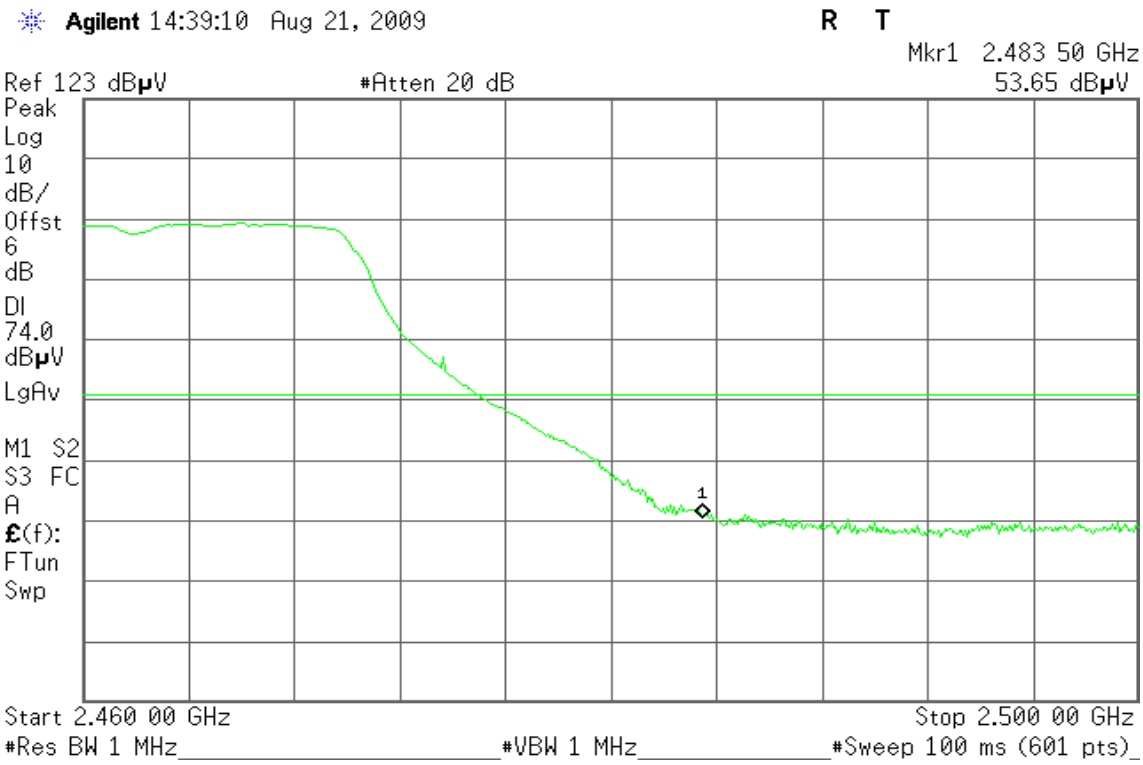
Detector mode: Peak Polarity: Vertical



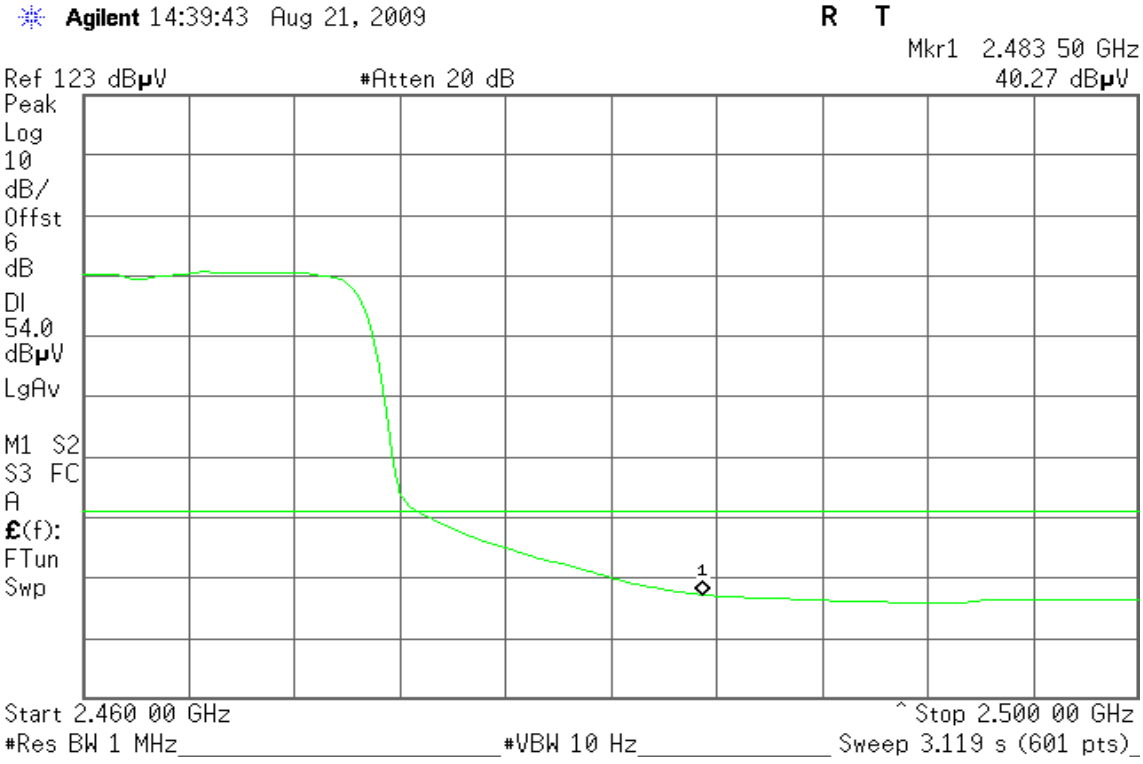
Detector mode: Average Polarity: Vertical



Detector mode: Peak **Polarity: Horizontal**

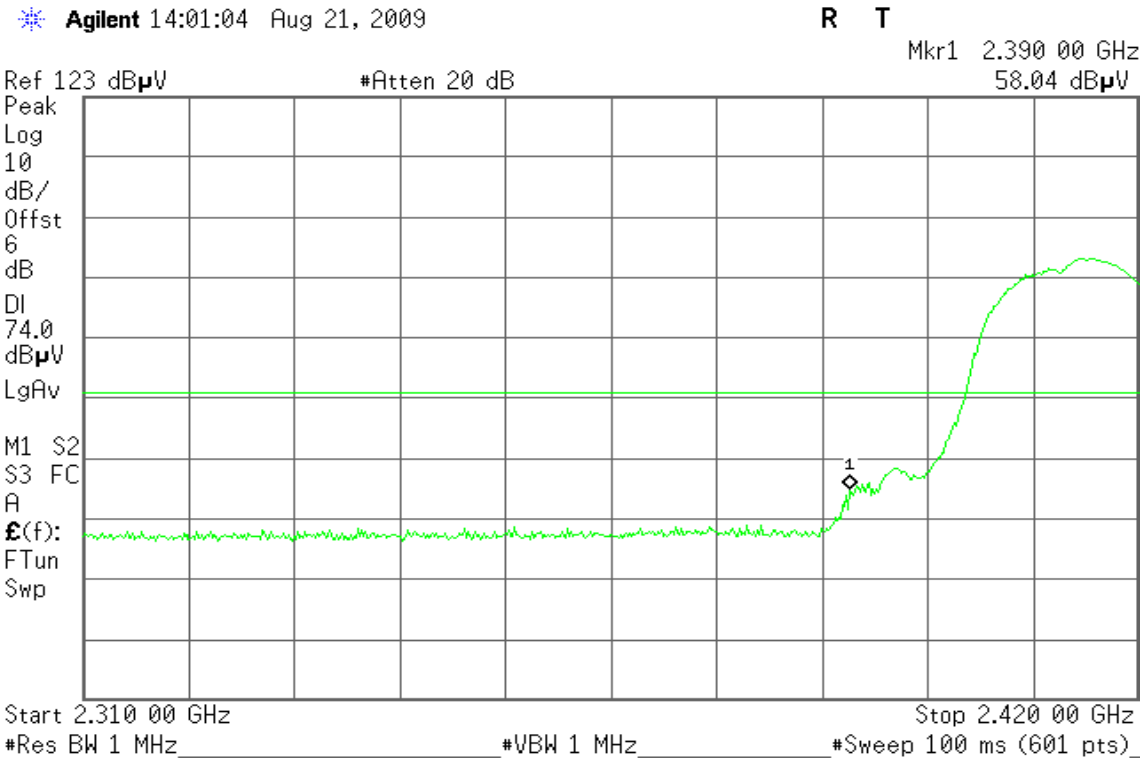


Detector mode: Average **Polarity: Horizontal**

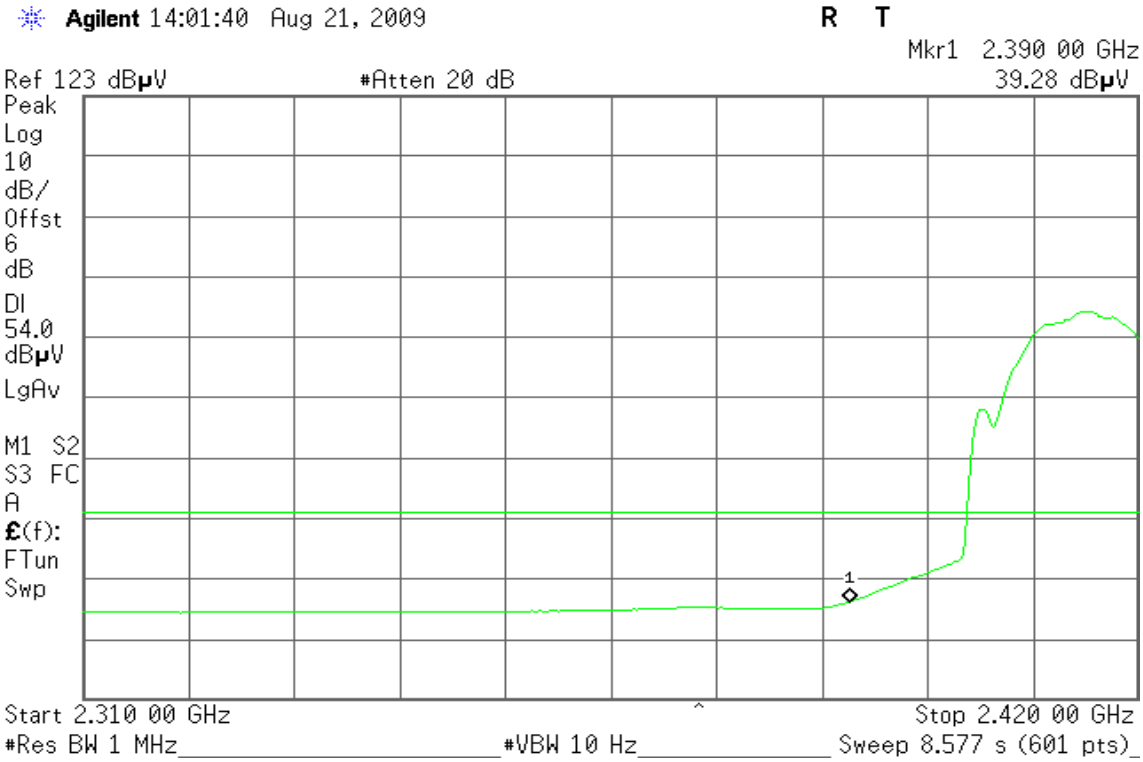


Band Edges (draft 802.11n 20 MHz Channel mode / CH Low)

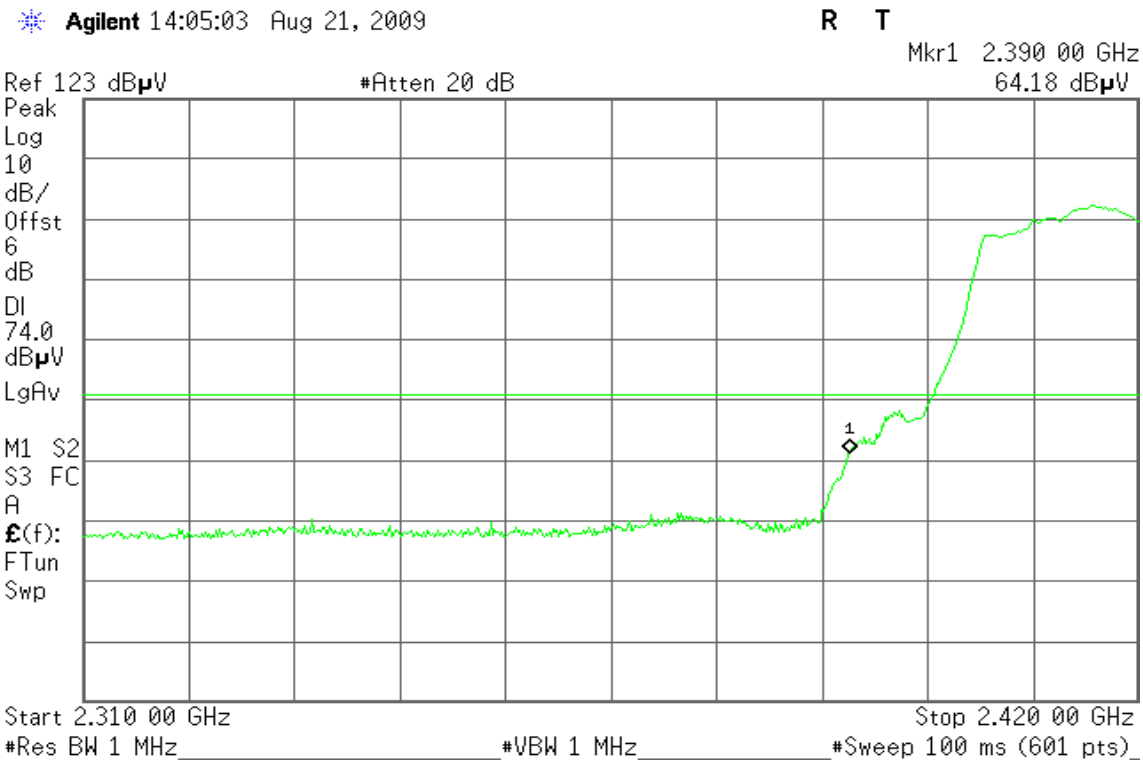
Detector mode: Peak Polarity: Vertical



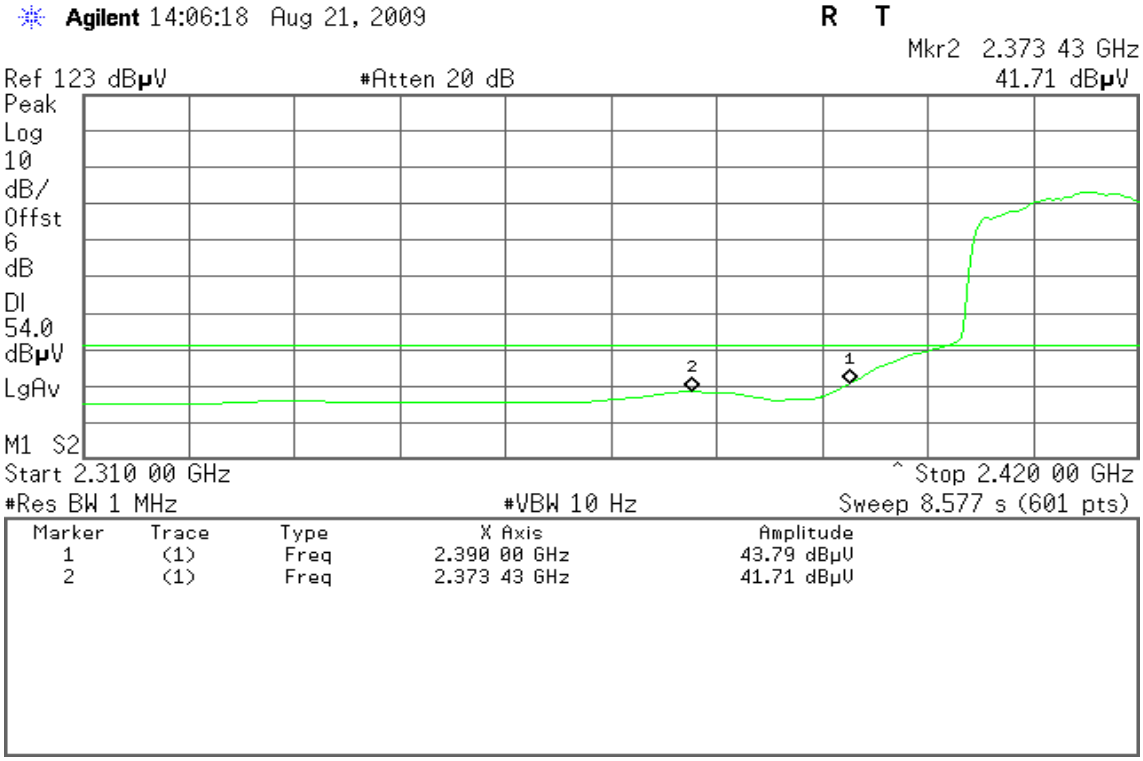
Detector mode: Average Polarity: Vertical



Detector mode: Peak **Polarity: Horizontal**

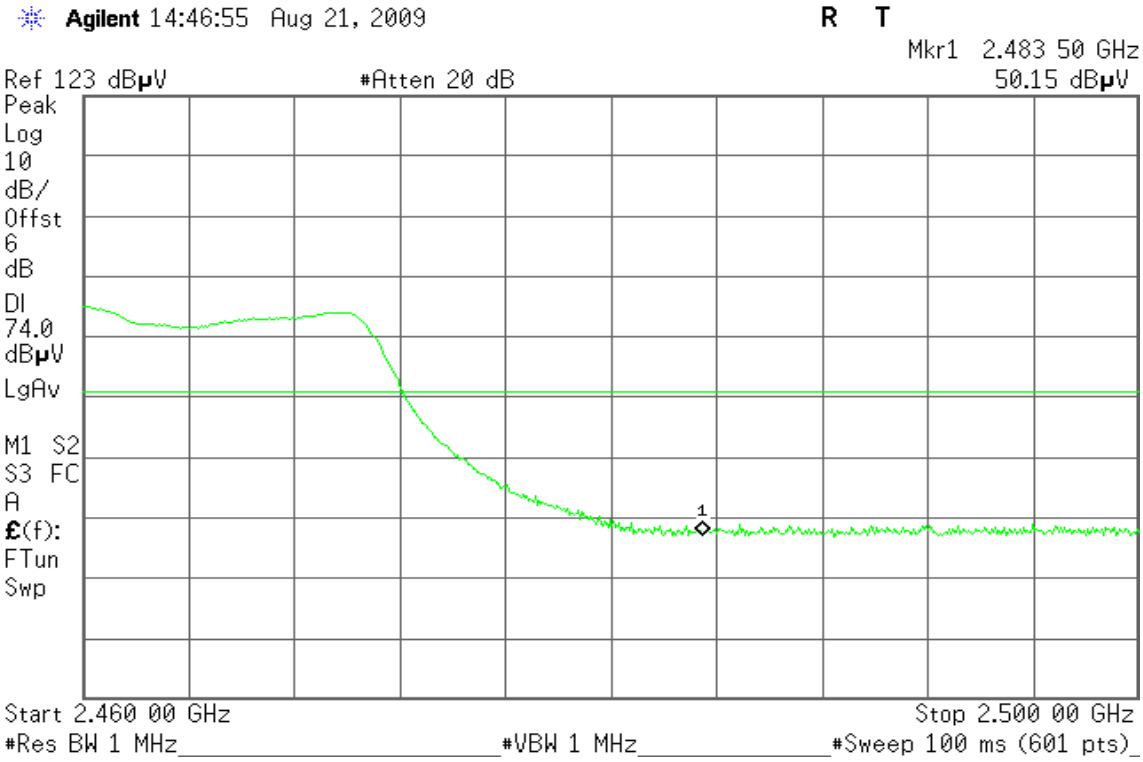


Detector mode: Average **Polarity: Horizontal**

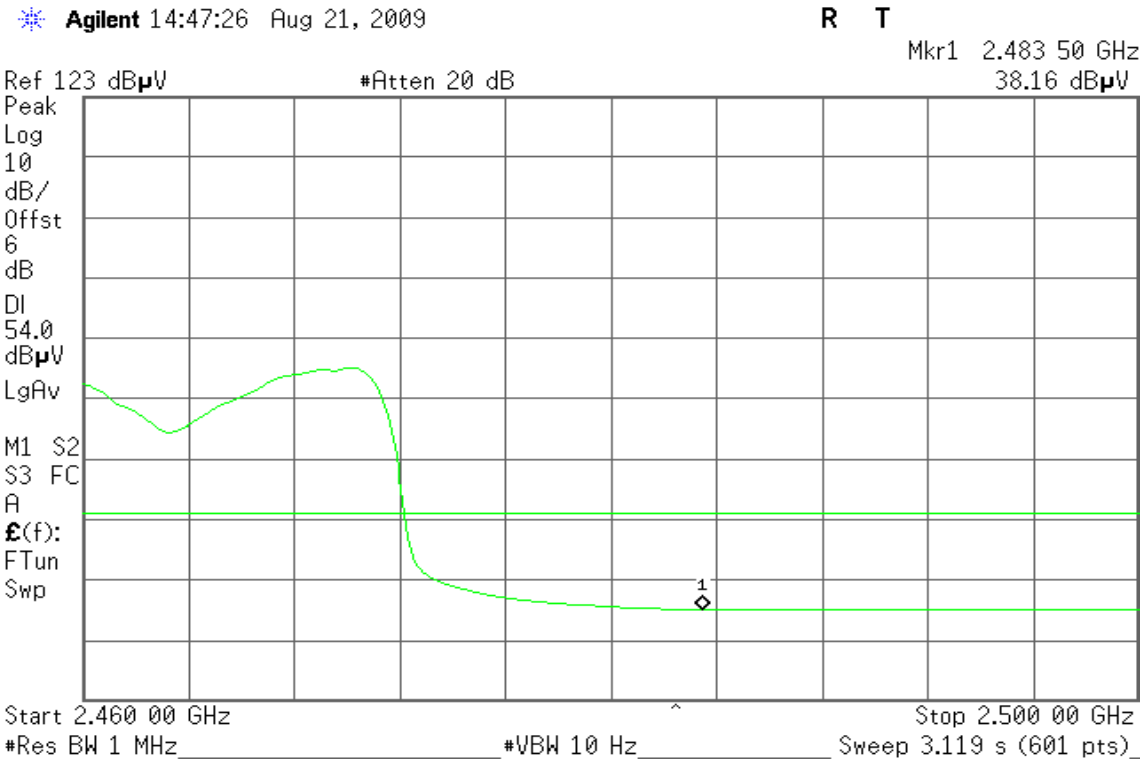


Band Edges (draft 802.11n 20 MHz Channel mode / CH High)

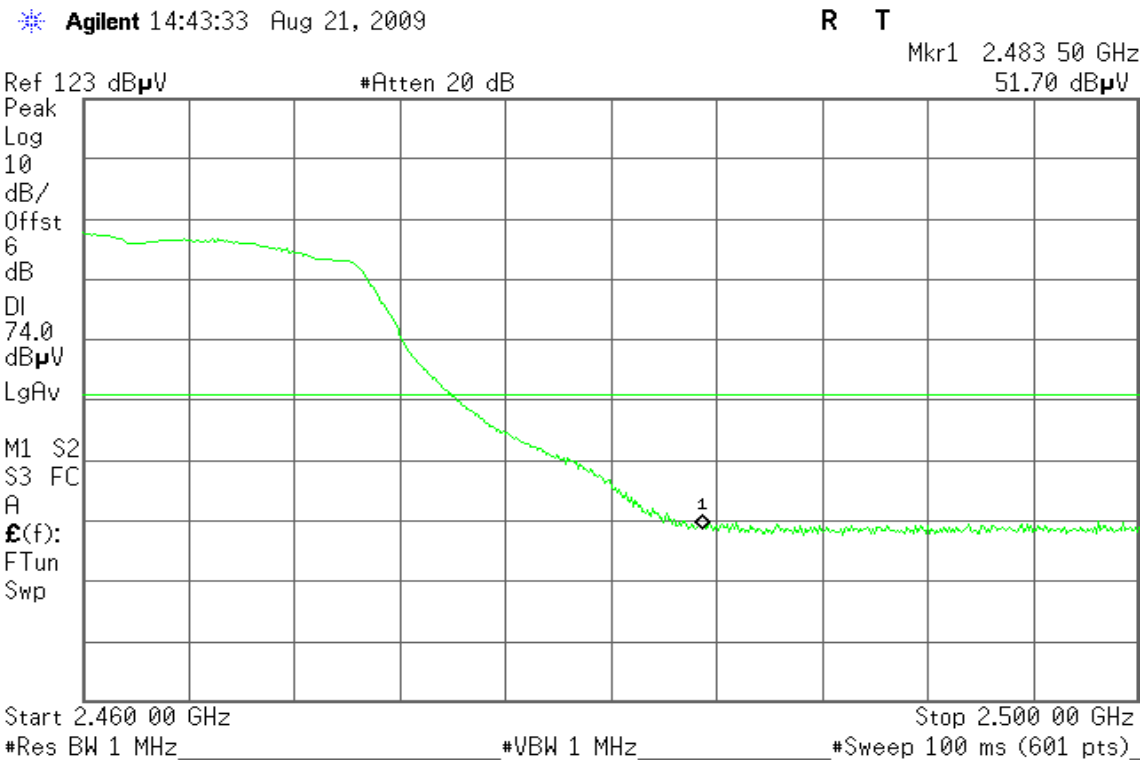
Detector mode: Peak Polarity: Vertical



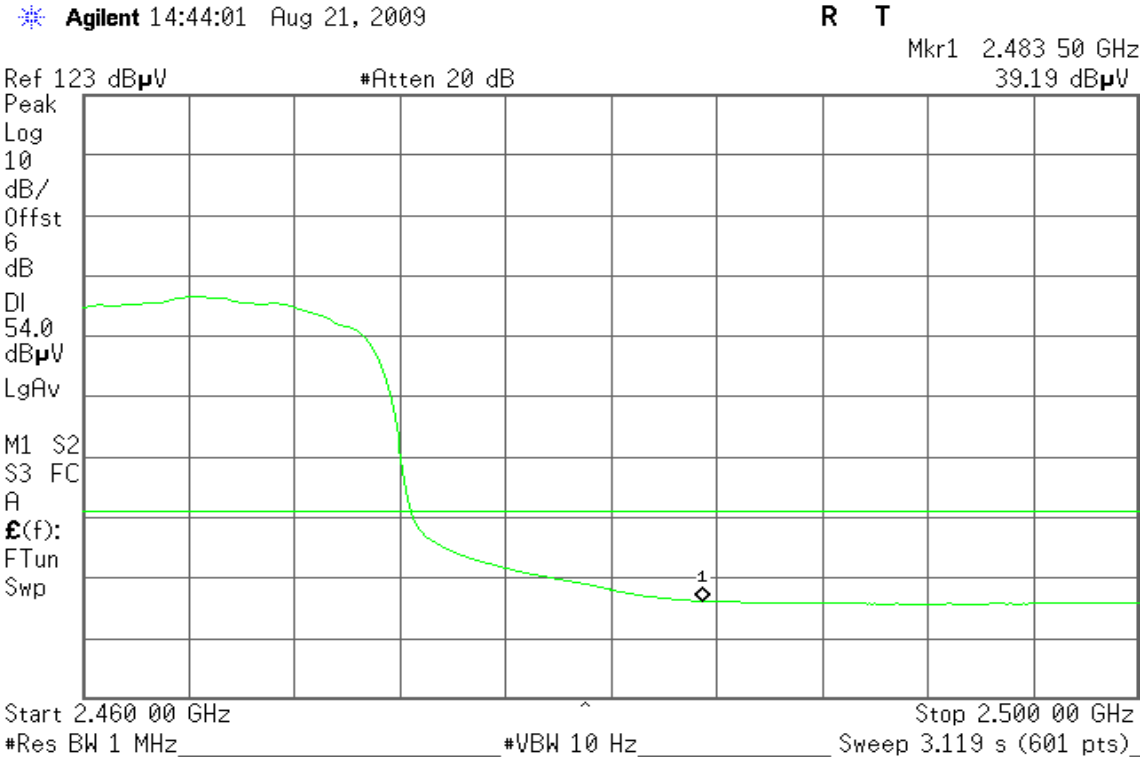
Detector mode: Average Polarity: Vertical



Detector mode: Peak **Polarity: Horizontal**

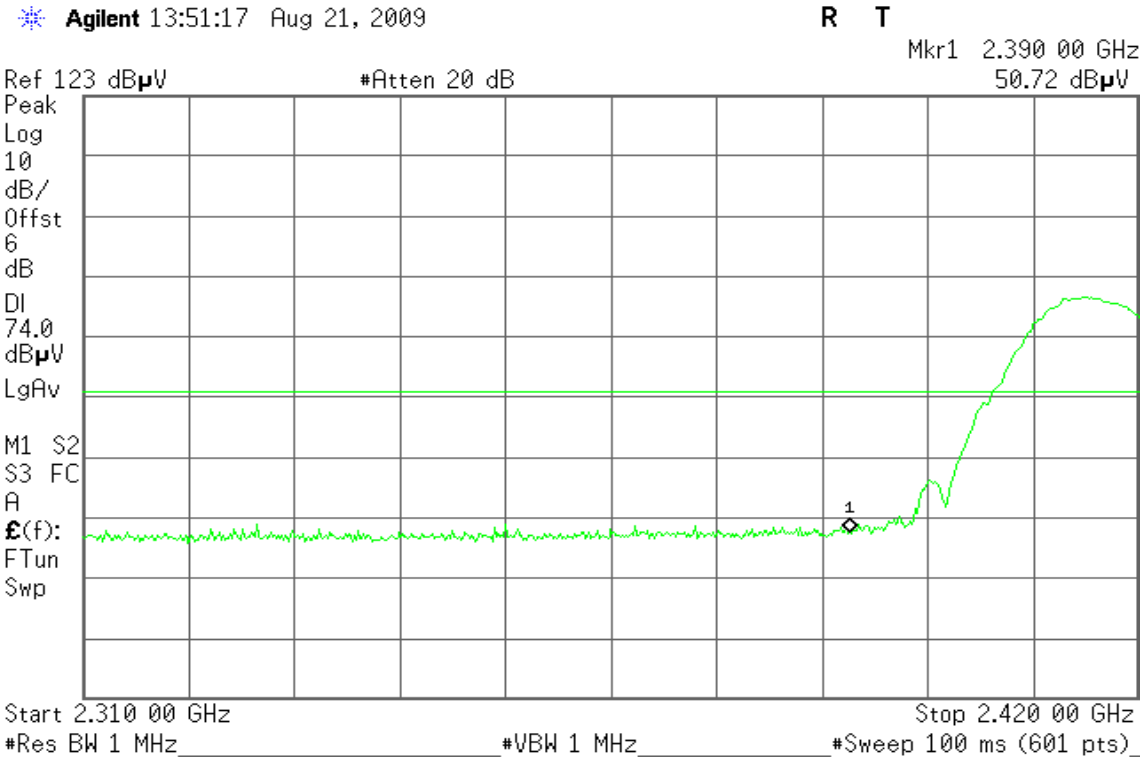


Detector mode: Average **Polarity: Horizontal**

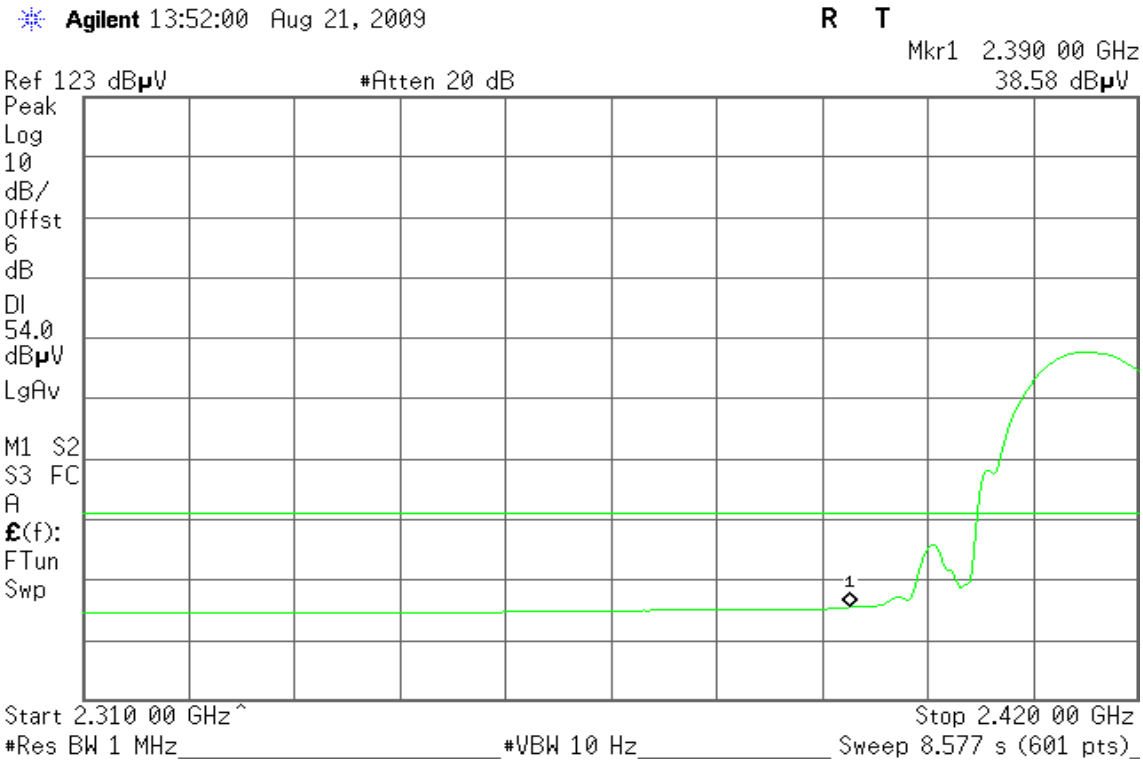


Band Edges (draft 802.11n 40 MHz Channel mode / CH Low)

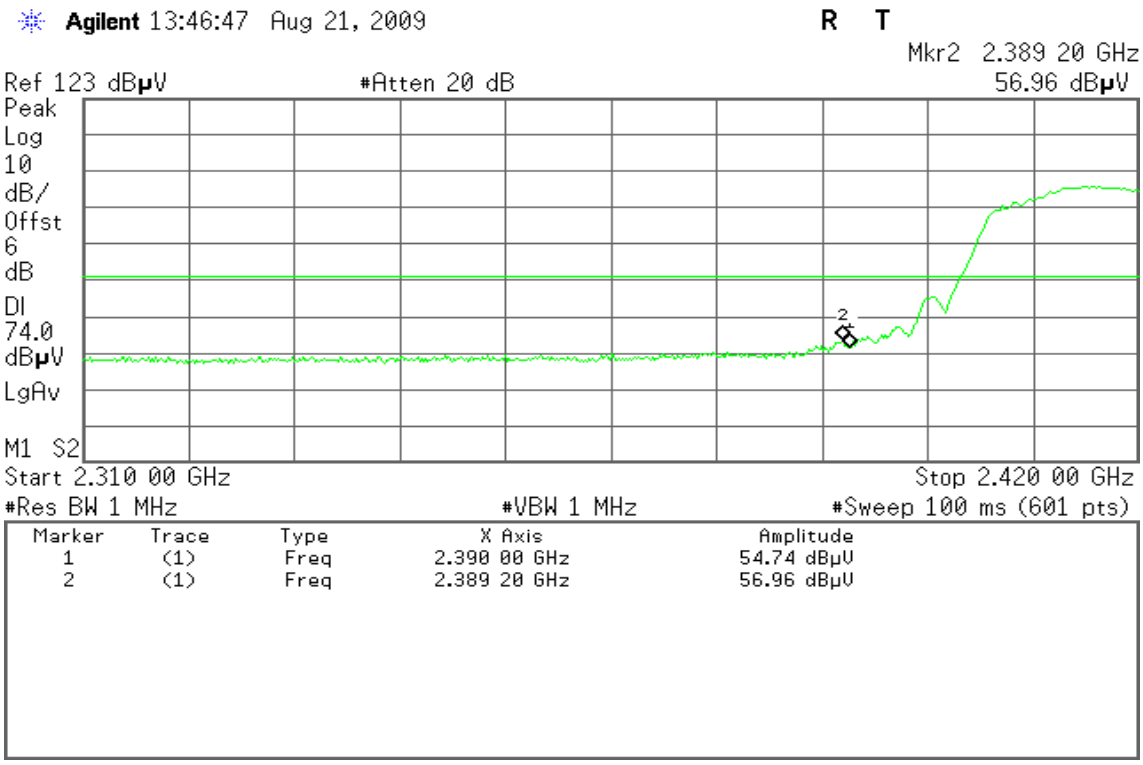
Detector mode: Peak Polarity: Vertical



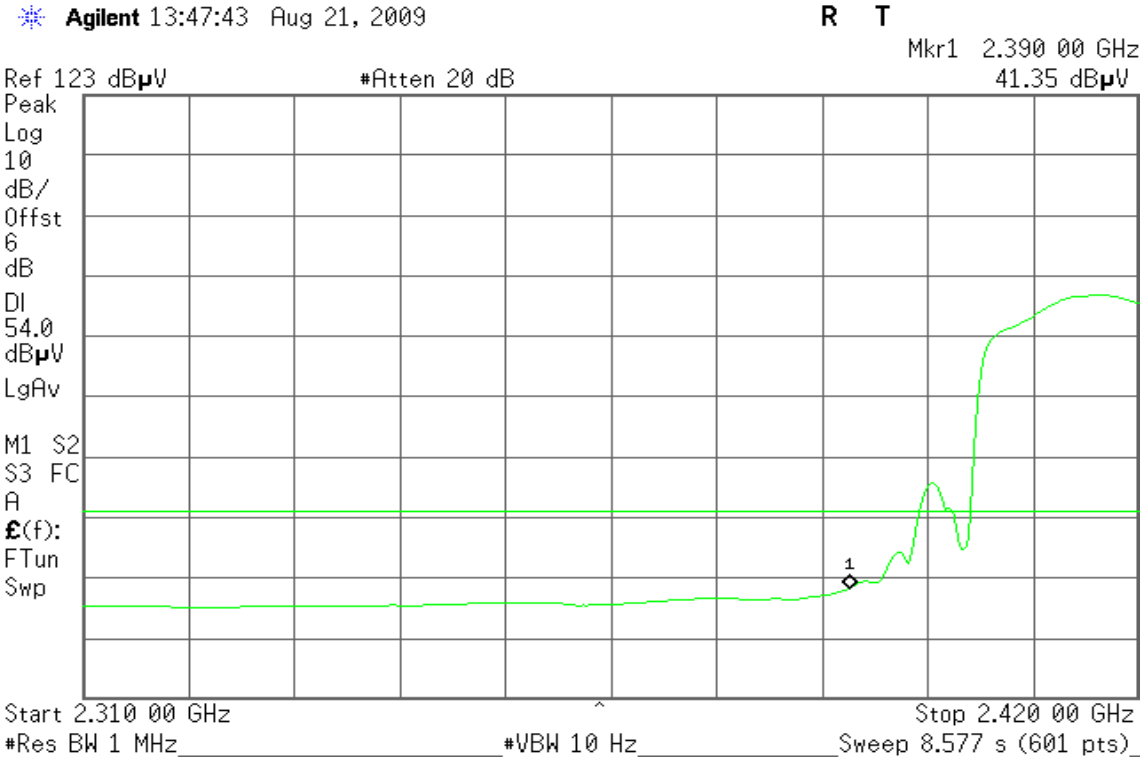
Detector mode: Average Polarity: Vertical



Detector mode: Peak **Polarity: Horizontal**

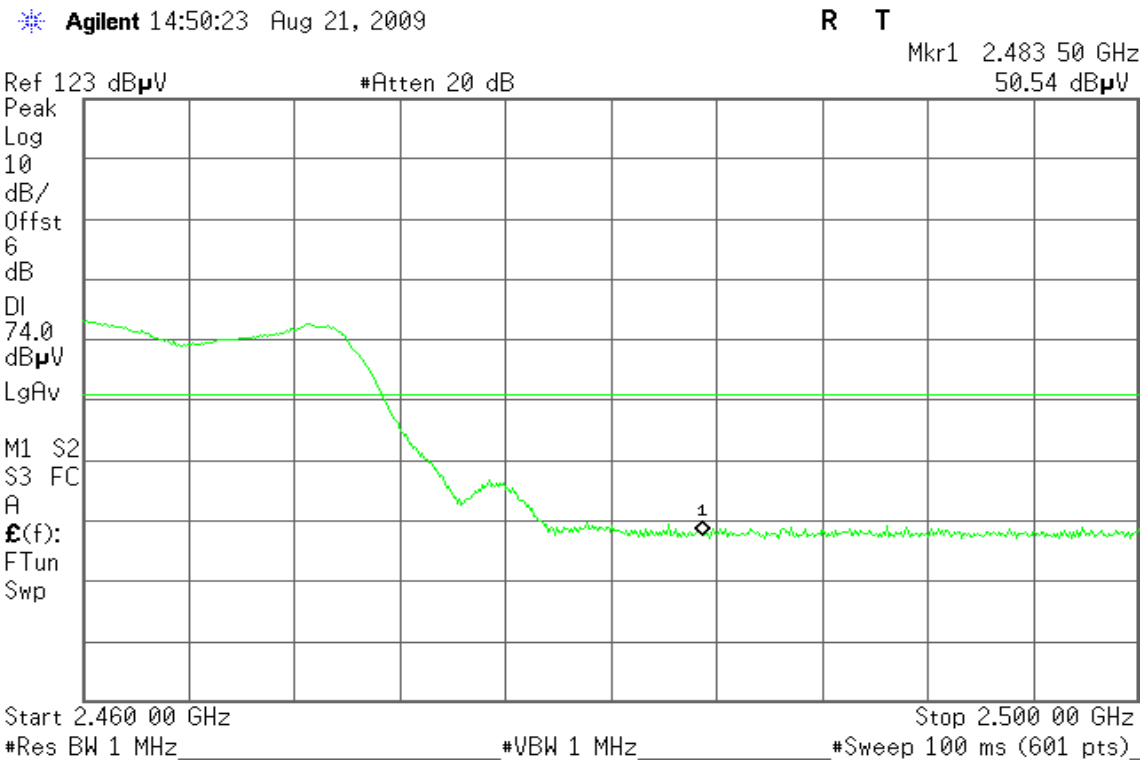


Detector mode: Average **Polarity: Horizontal**

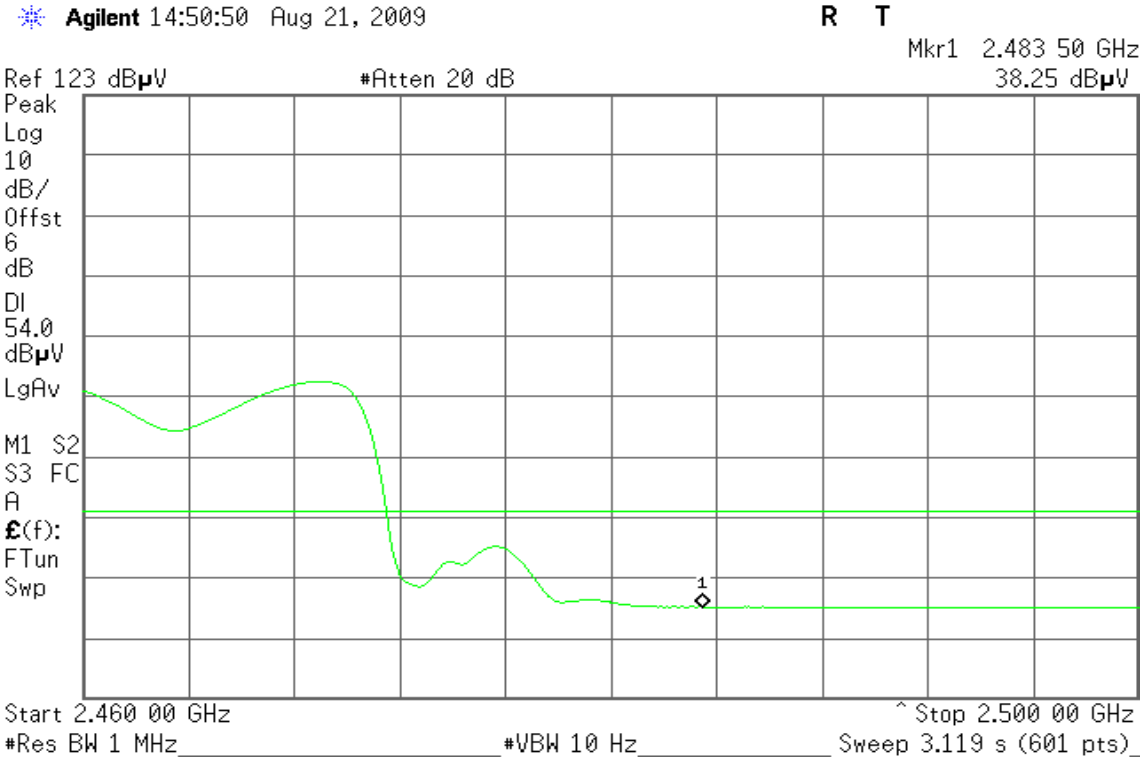


Band Edges (draft 802.11n 40 MHz Channel mode / CH High)

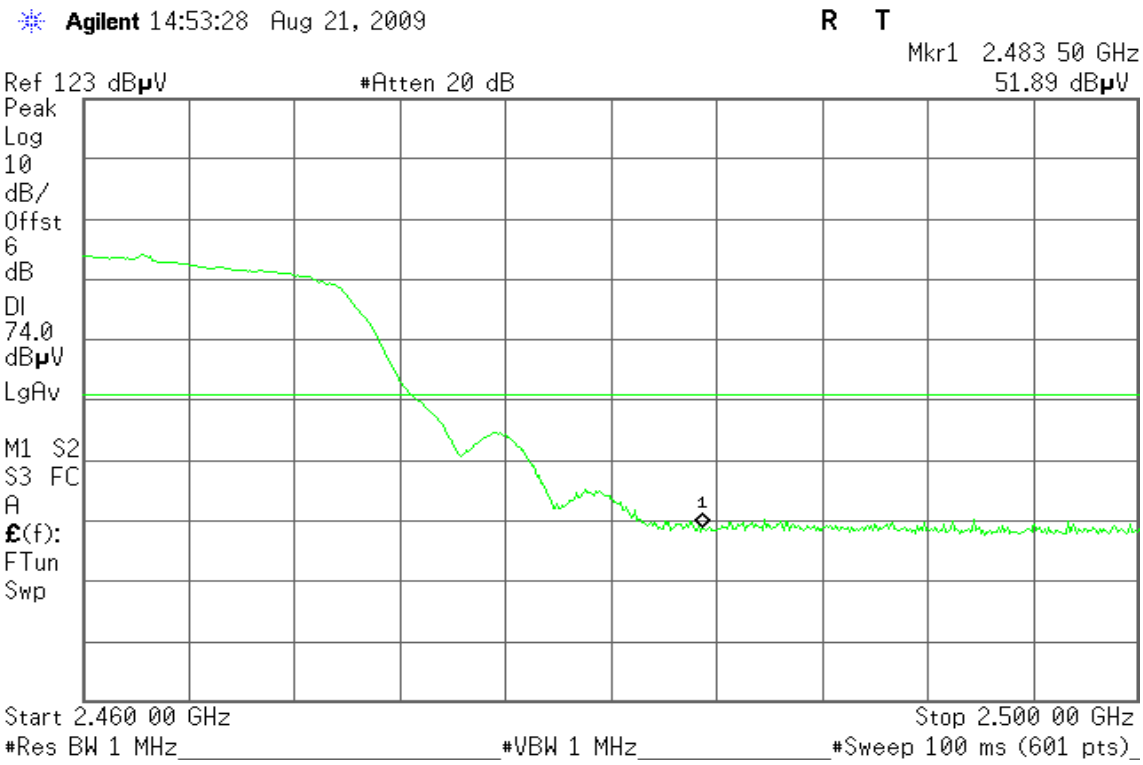
Detector mode: Peak Polarity: Vertical



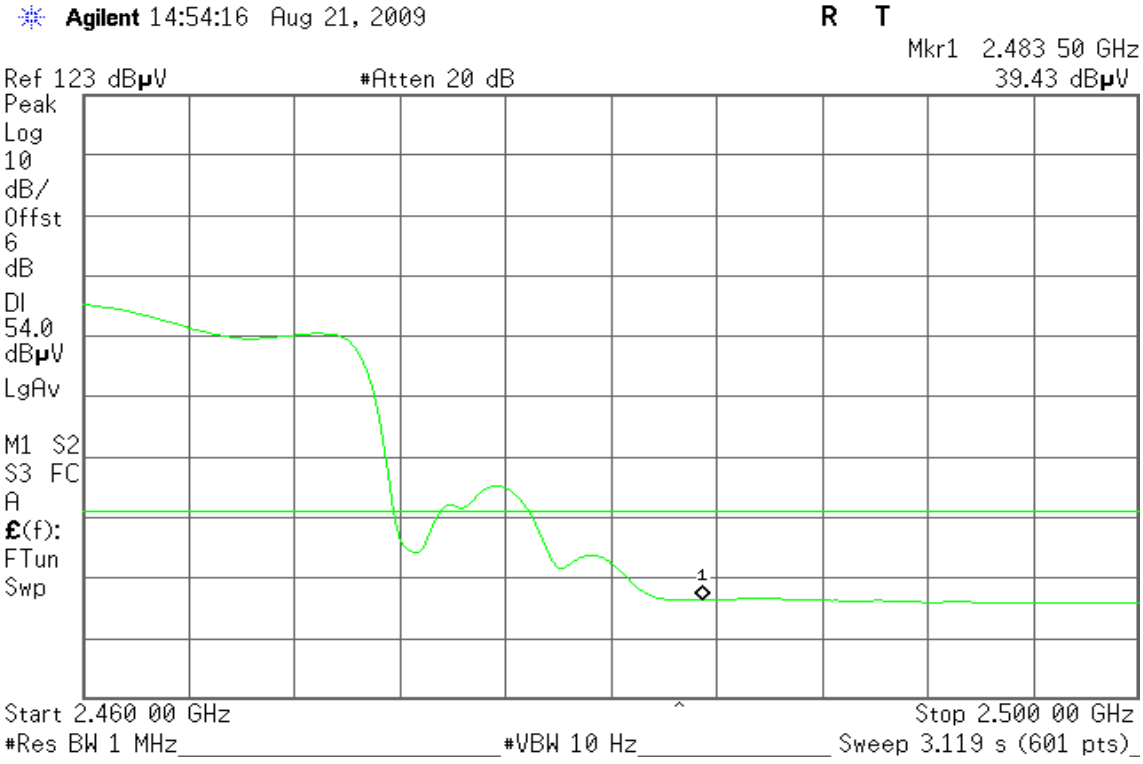
Detector mode: Average Polarity: Vertical



Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**

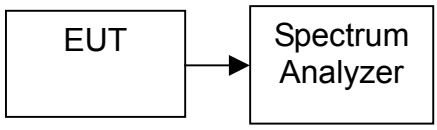


7.5 PEAK POWER SPECTRAL DENSITY

LIMIT

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

TEST CONFIGURATION



TEST PROCEDURE

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

TEST RESULTS

No non-compliance noted

TEST DATA

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-16.83	8.00	PASS
Mid	2437	-16.65		PASS
High	2462	-17.12		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-10.56	8.00	PASS
Mid	2437	-10.70		PASS
High	2462	-11.44		PASS

Test mode: draft 802.11n 20 MHz Channel mode

Channel	Frequency (MHz)	PPSD (dBm)			Limit (dBm)	Result
		Chain 0	Chain 1	Combiner		
Low	2412	-10.61	-16.70	-10.47	8.00	PASS
Mid	2437	-10.75	-16.63	-12.02		PASS
High	2462	-11.54	-16.95	-11.55		PASS

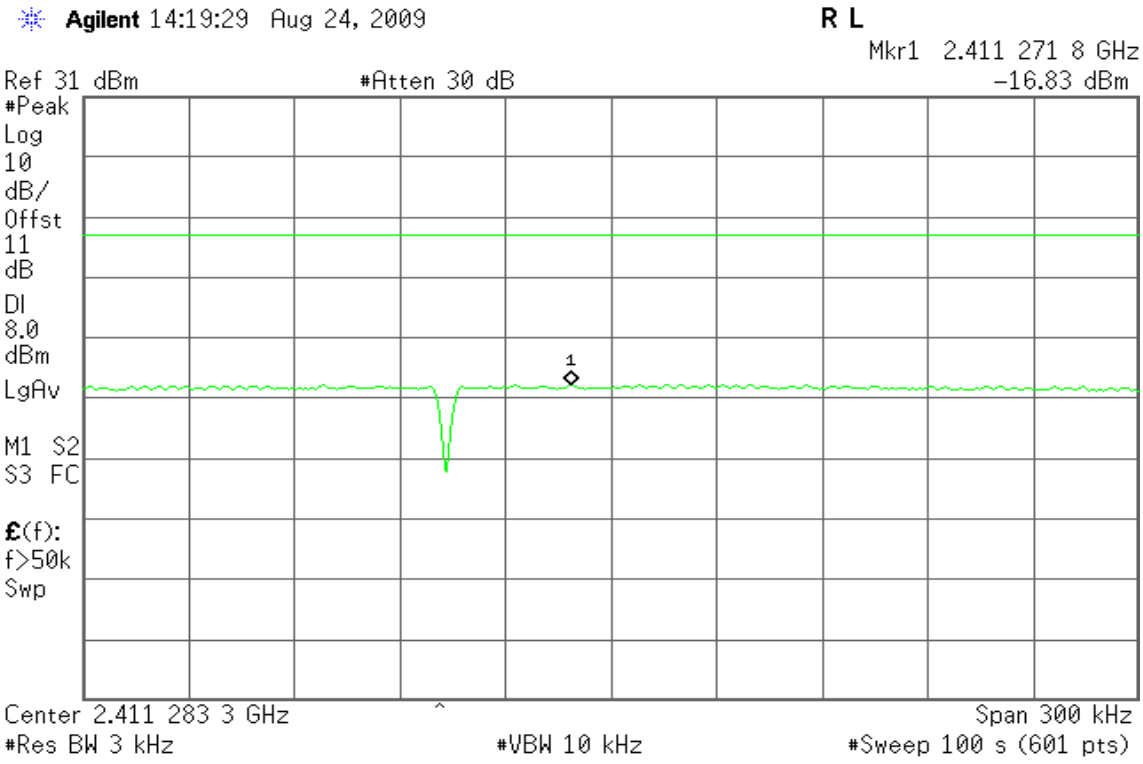
Test mode: draft 802.11n 40 MHz Channel mode

Channel	Frequency (MHz)	PPSD (dBm)			Limit (dBm)	Result
		Chain 0	Chain 1	Combiner		
Low	2422	-10.51	-20.76	-10.57	8.00	PASS
Mid	2437	-10.72	-20.60	-12.15		PASS
High	2452	-11.16	-18.92	-12.57		PASS

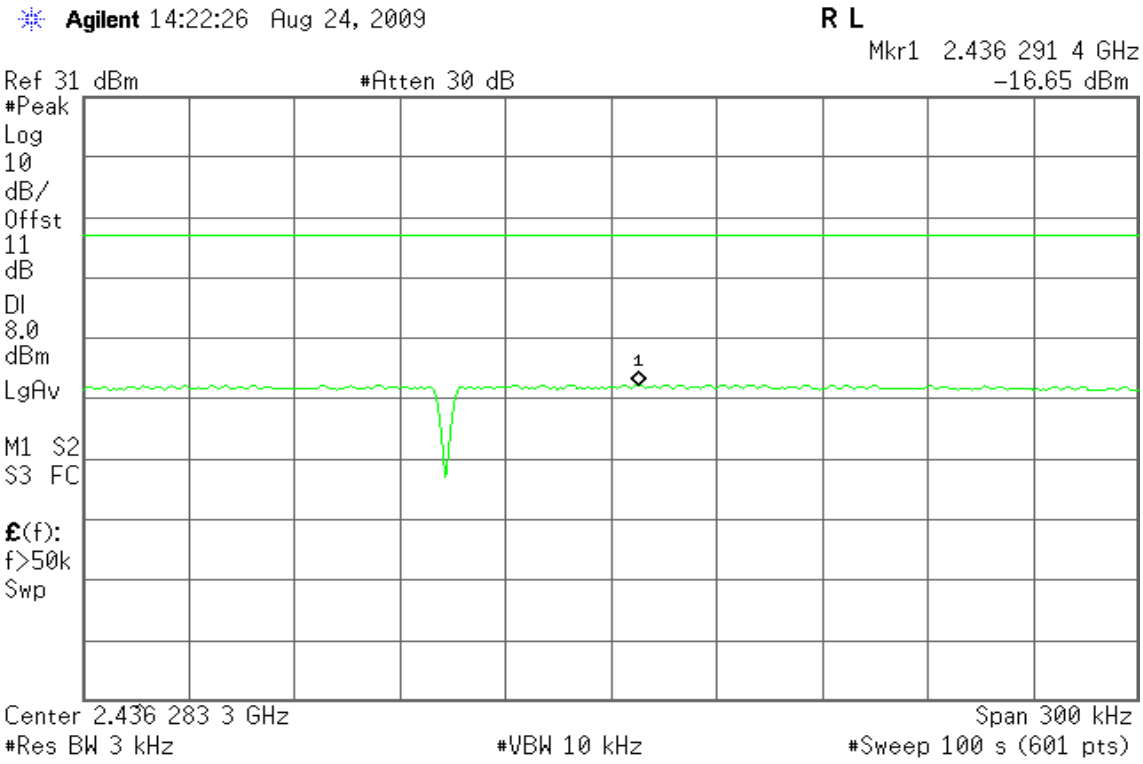
Test Plot

IEEE 802.11b mode

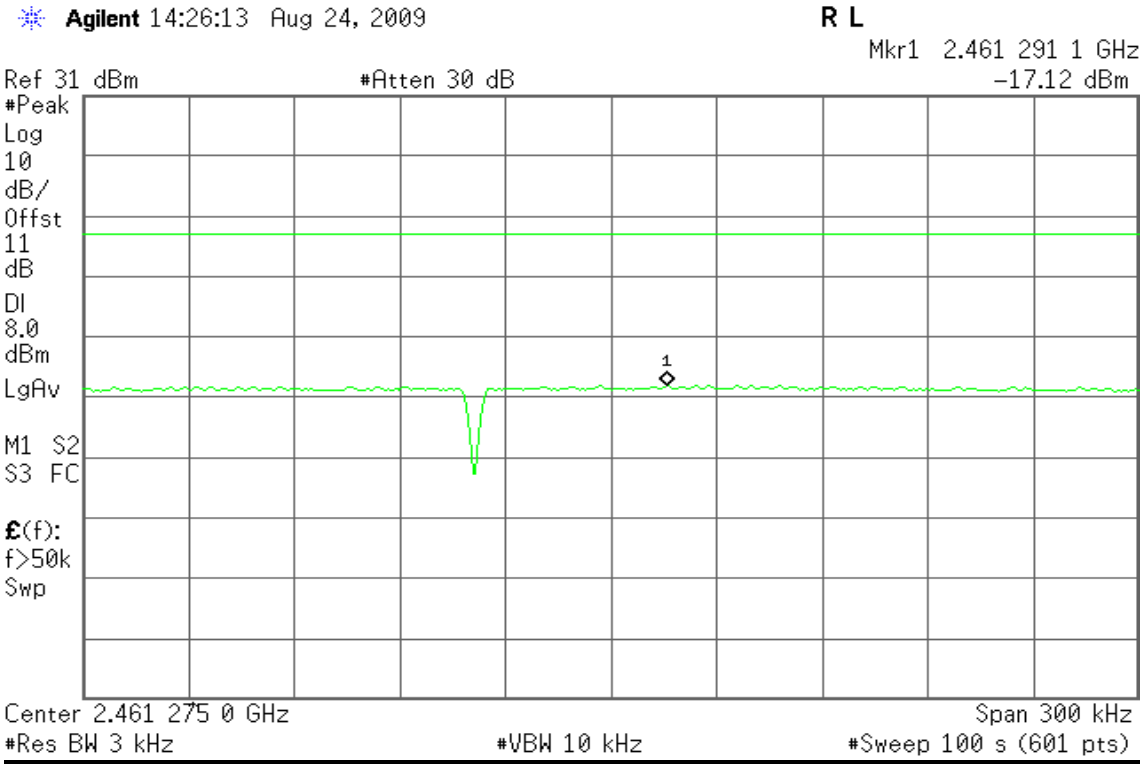
PPSD (CH Low)



PPSD (CH Mid)

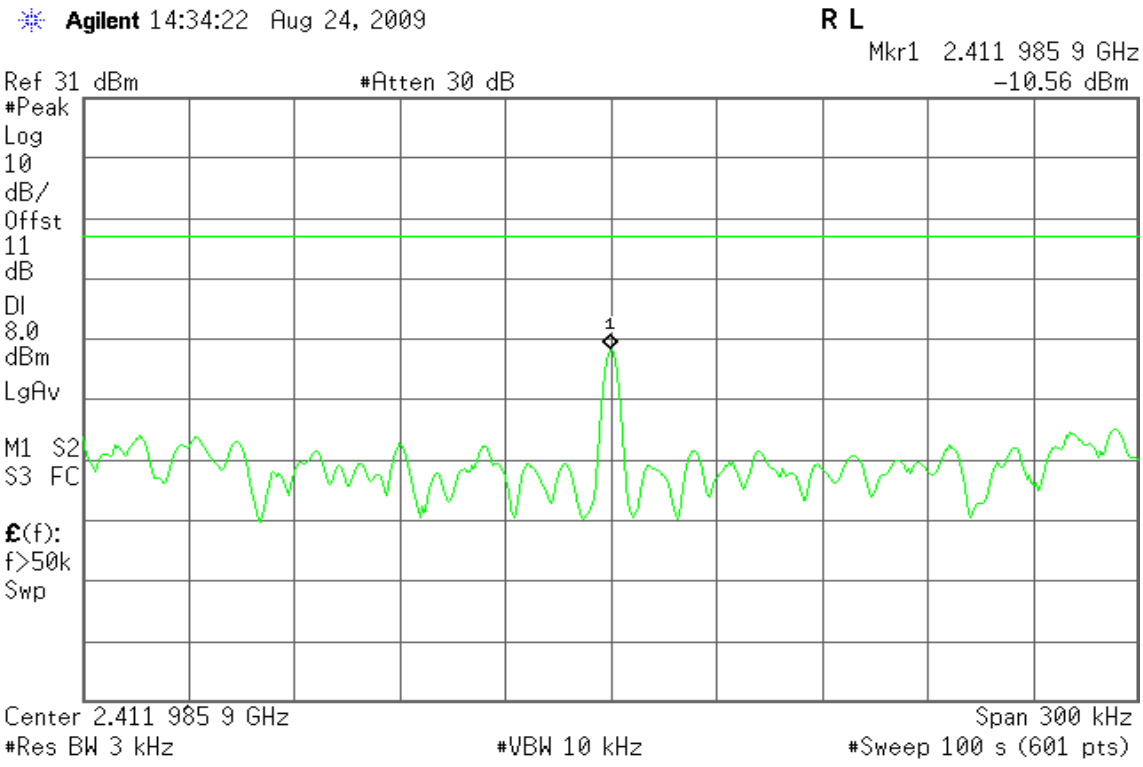


PPSD (CH High)

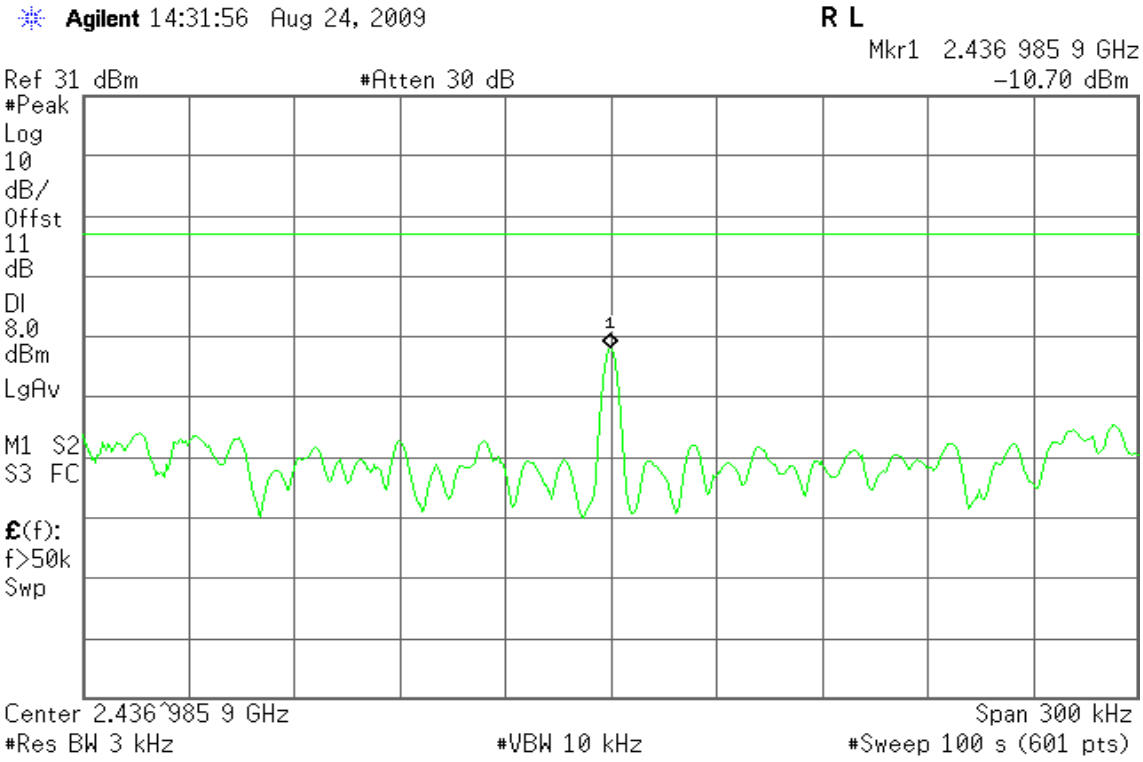


IEEE 802.11g mode

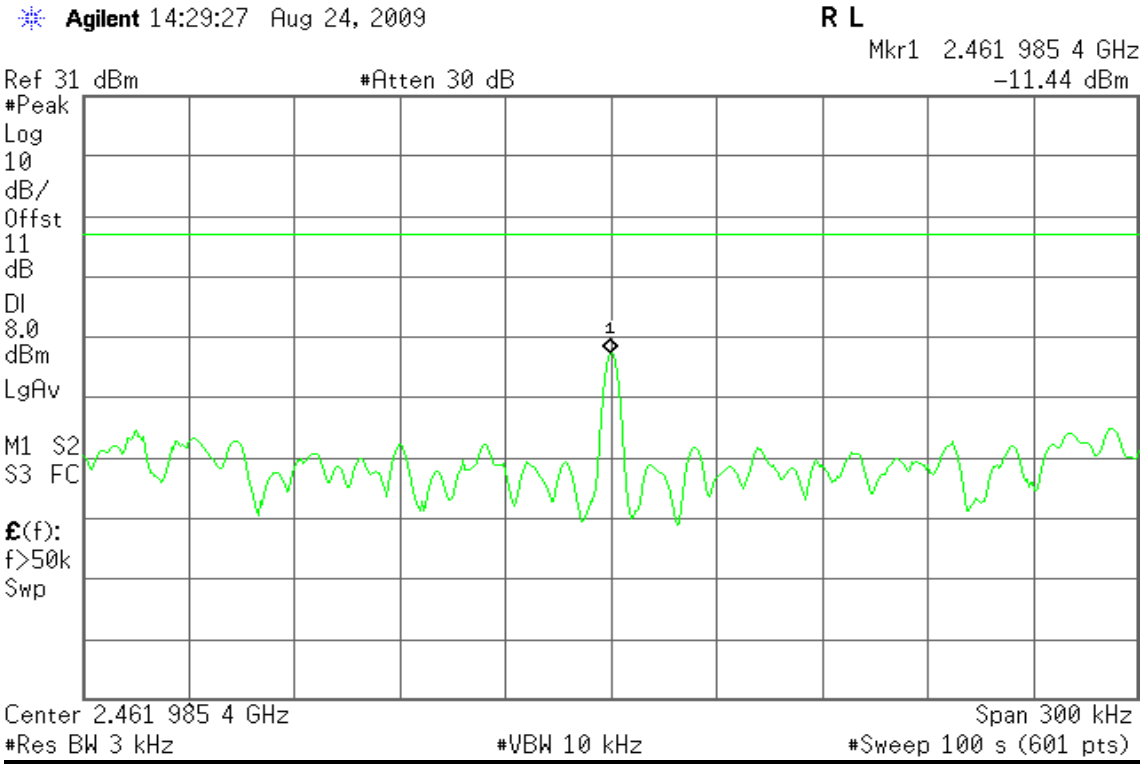
PPSD (CH Low)



PPSD (CH Mid)

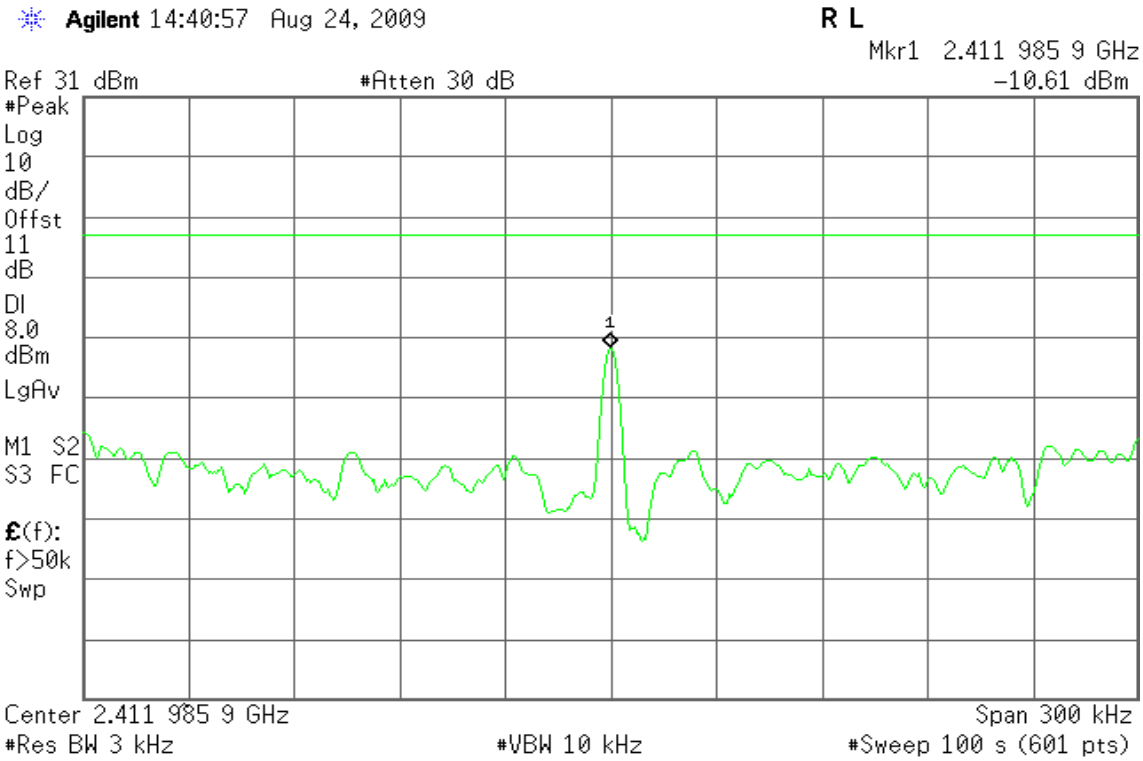


PPSD (CH High)

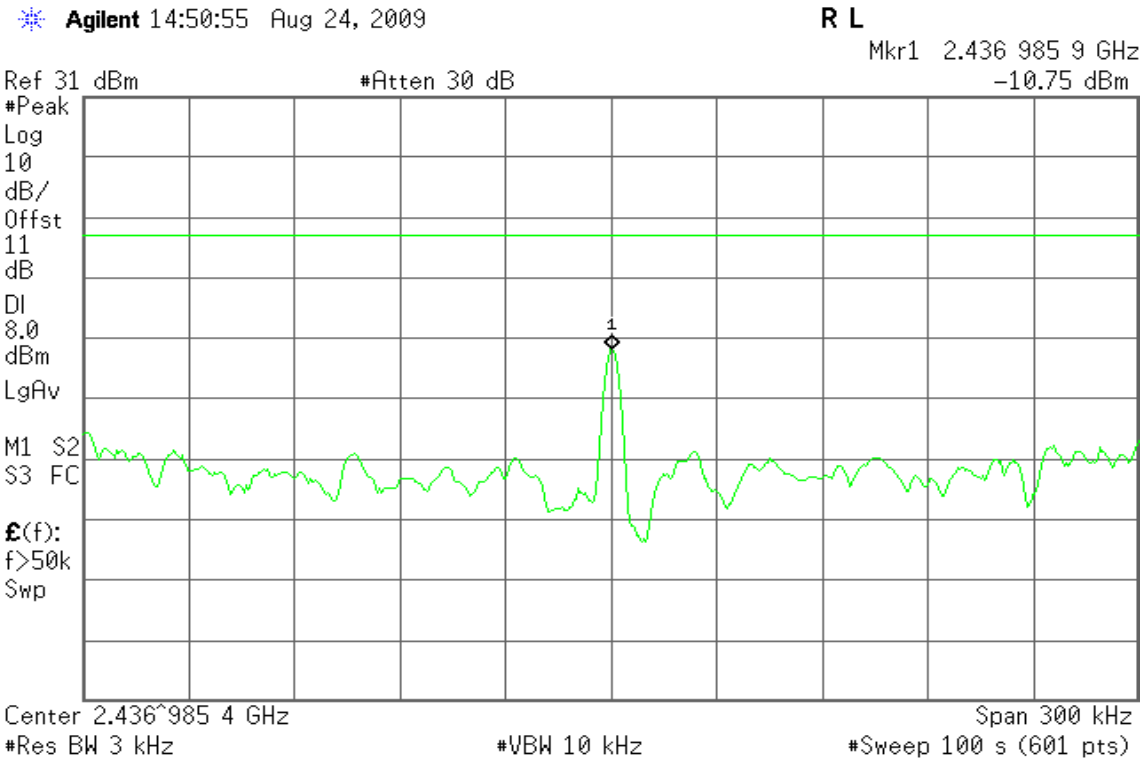


draft 802.11n 20 MHz Channel mode / Chain 0

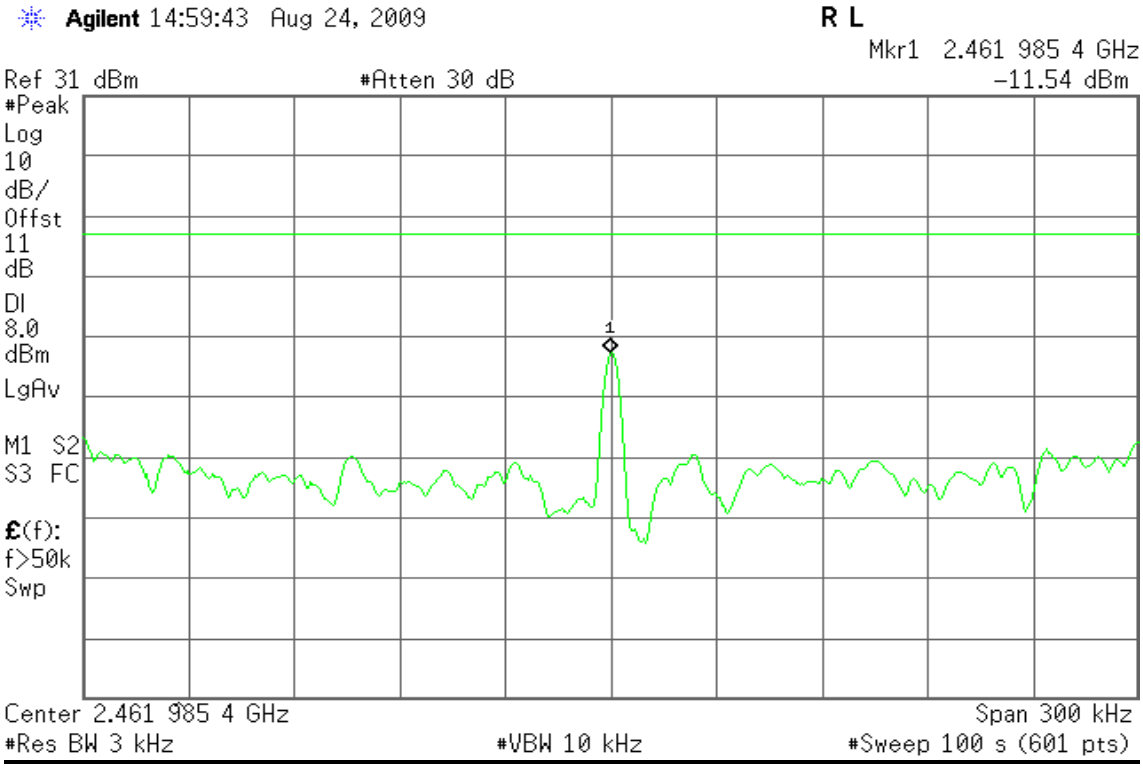
PPSD (CH Low)



PPSD (CH Mid)

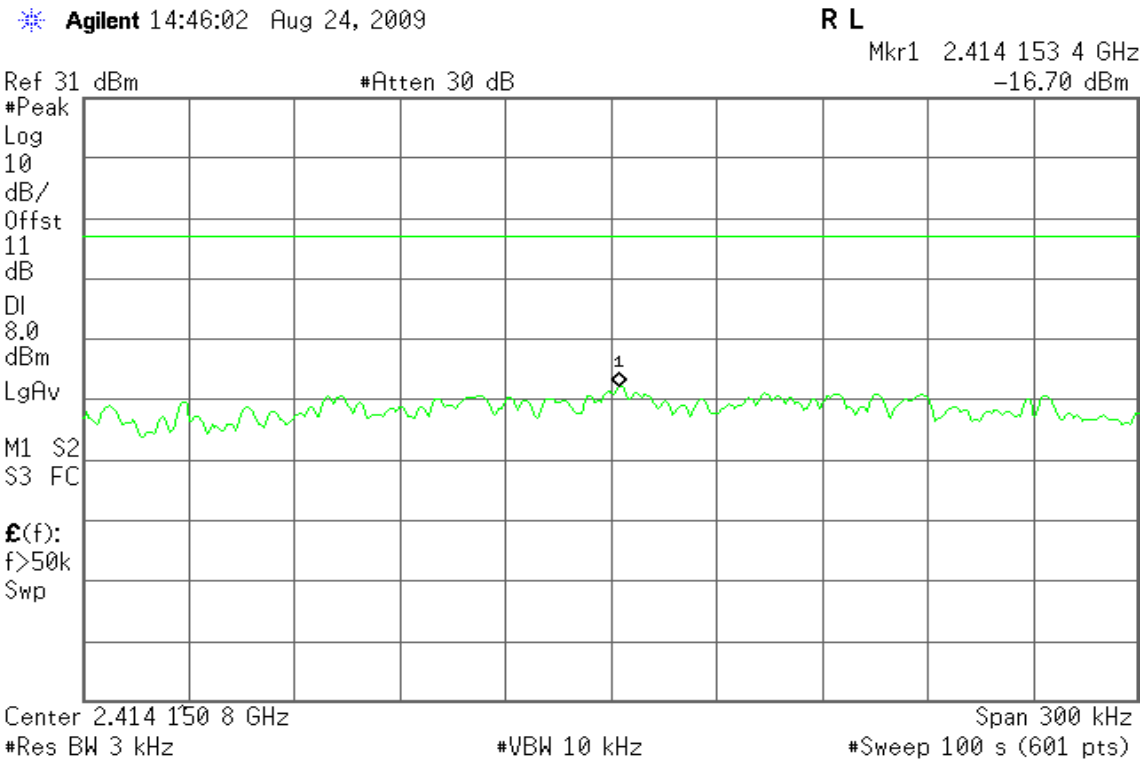


PPSD (CH High)

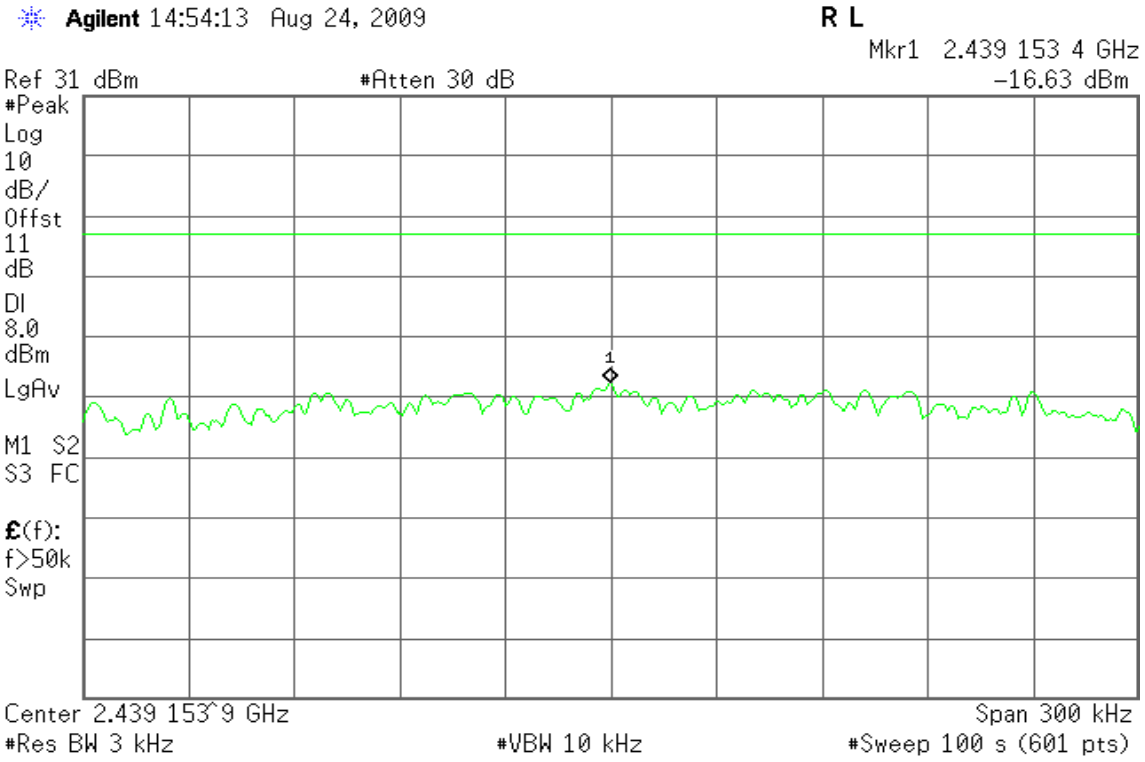


draft 802.11n 20 MHz Channel mode / Chain 1

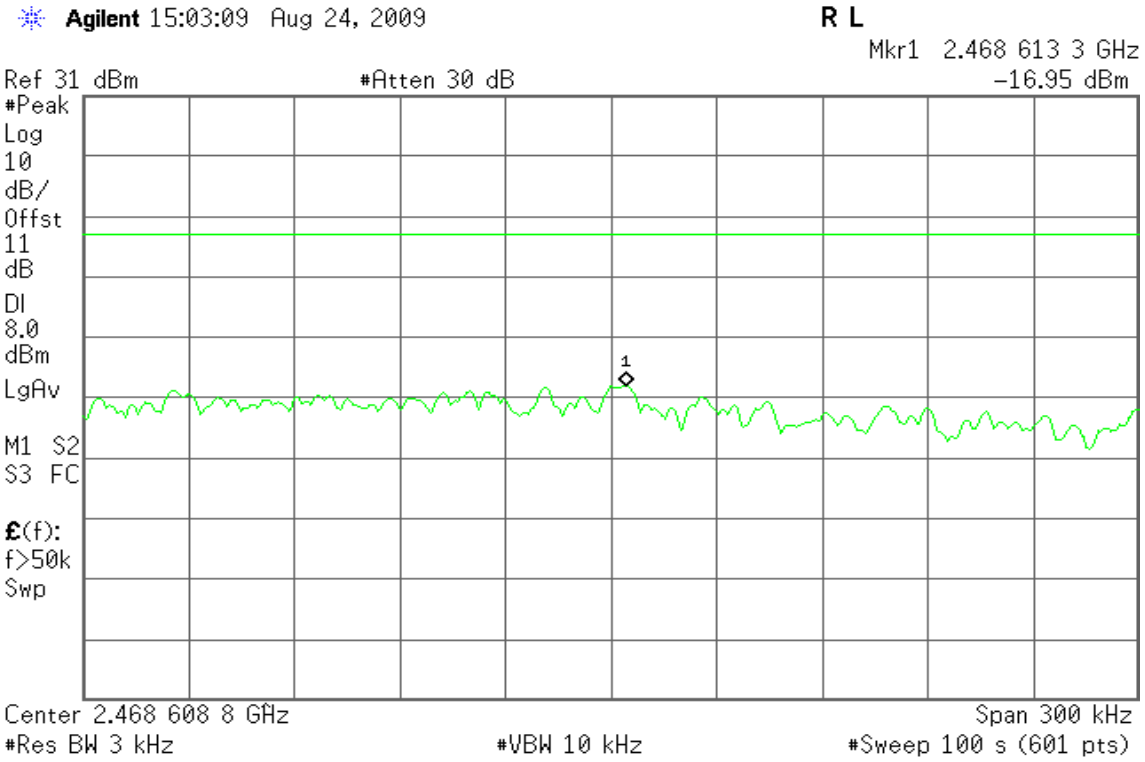
PPSD (CH Low)



PPSD (CH Mid)

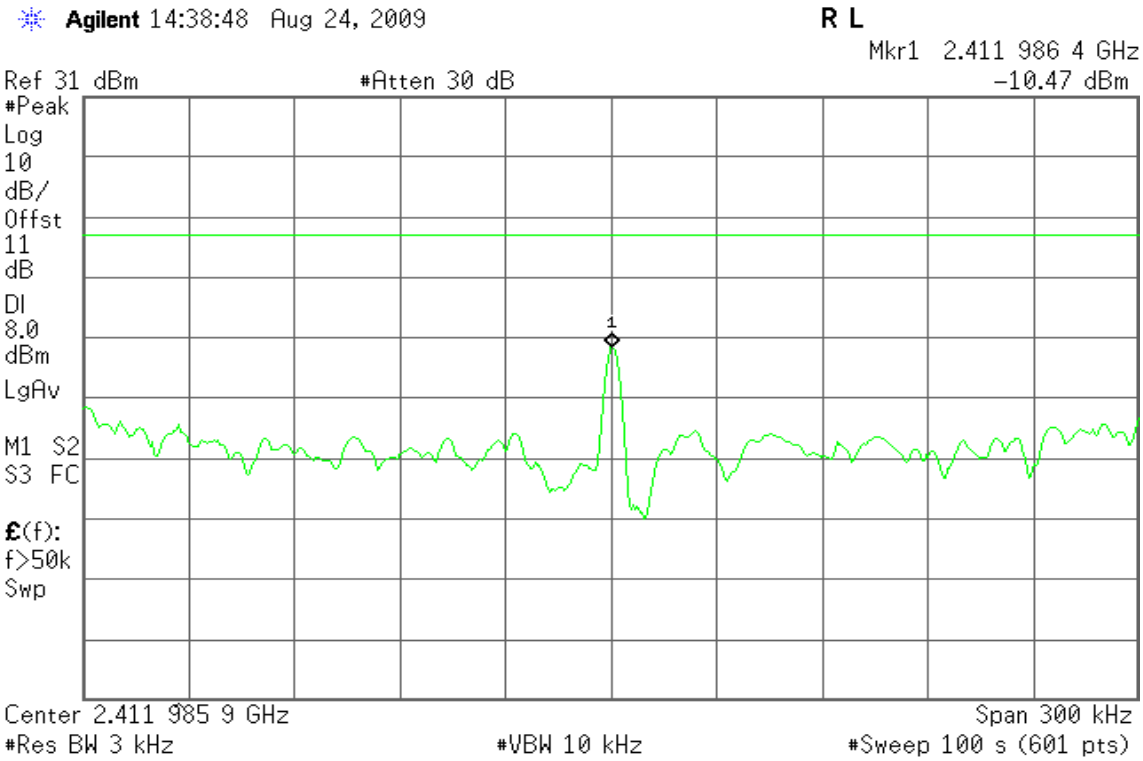


PPSD (CH High)

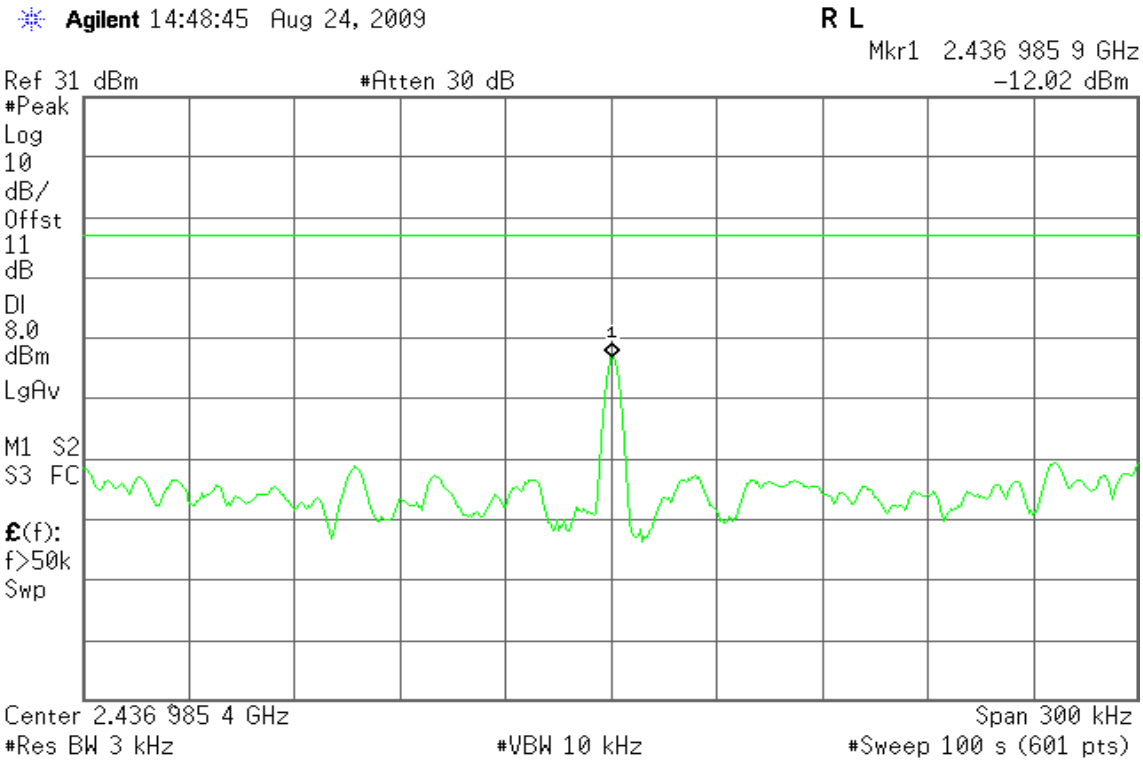


draft 802.11n 20 MHz Channel mode / Combiner

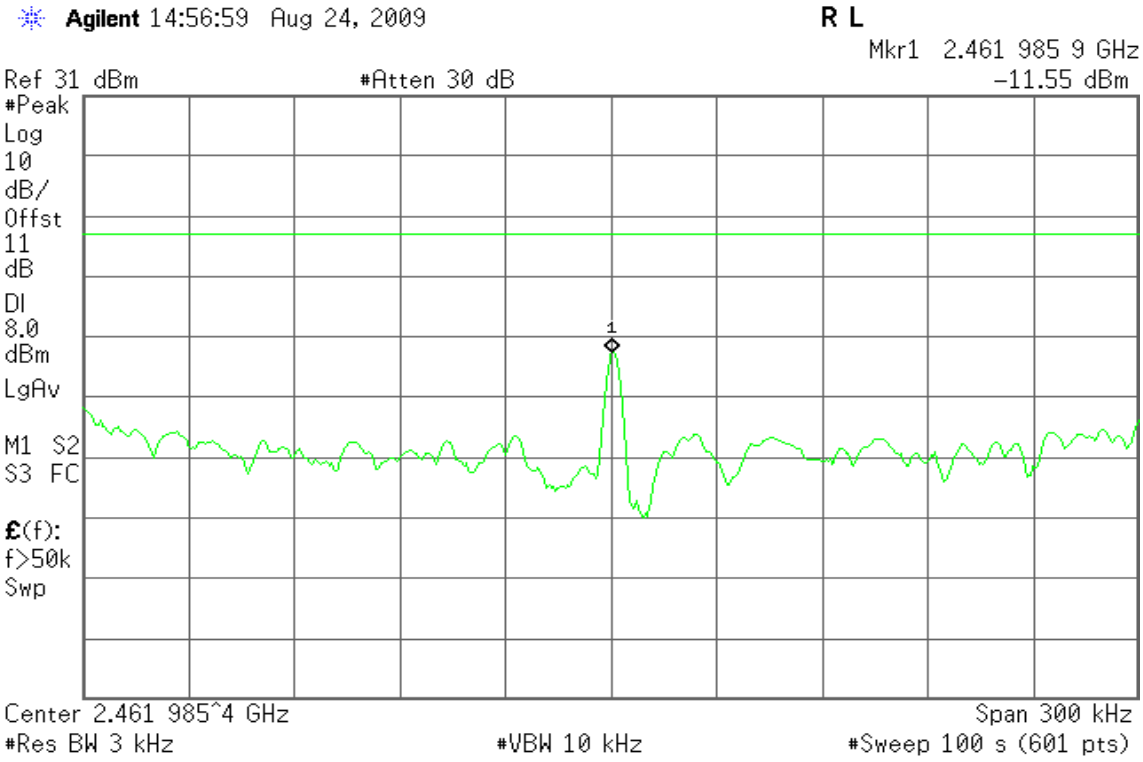
PPSD (CH Low)



PPSD (CH Mid)

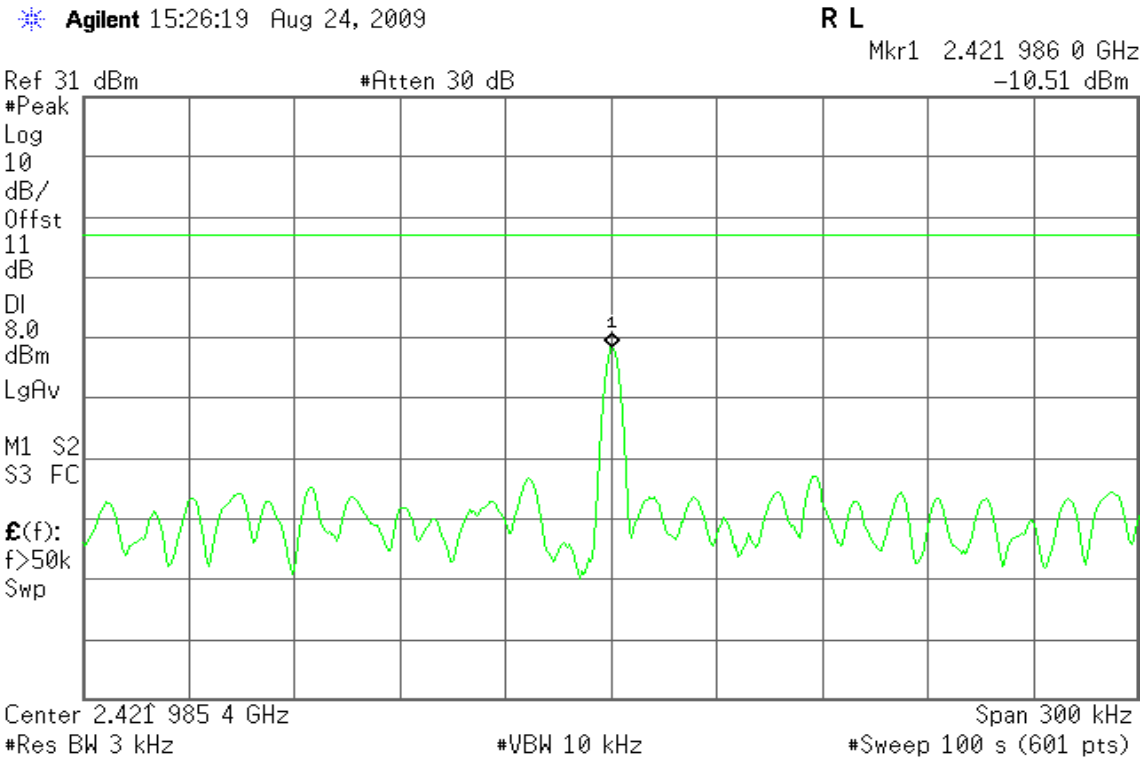


PPSD (CH High)

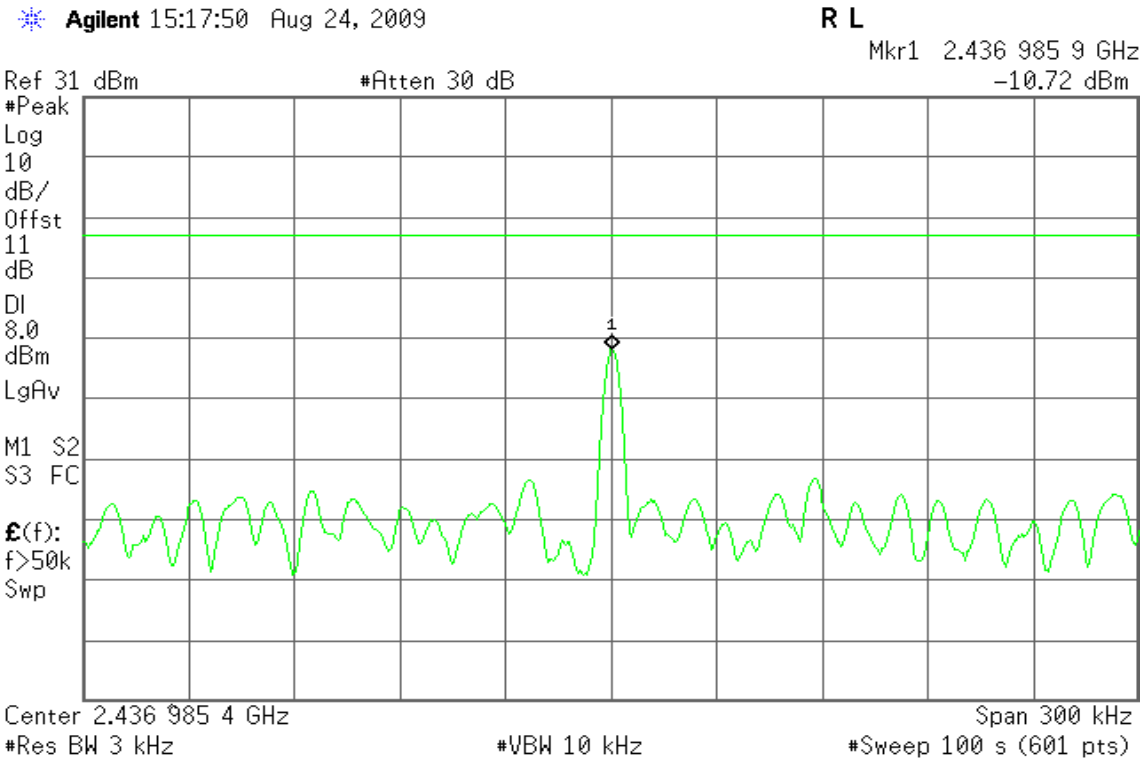

Agilent 14:56:59 Aug 24, 2009
R L
Mkr1 2.461 985 9 GHz
-11.55 dBm
Ref 31 dBm
#Atten 30 dB
#Peak
Log
10
dB/
Offst
11
dB
Dl
8.0
dBm
LgAv
M1 S2
S3 FC
£(f):
f>50k
Swp
1
Center 2.461 985^4 GHz
Span 300 kHz
#Res BW 3 kHz
#VBW 10 kHz
#Sweep 100 s (601 pts)

draft 802.11n 40 MHz Channel mode / Chain 0

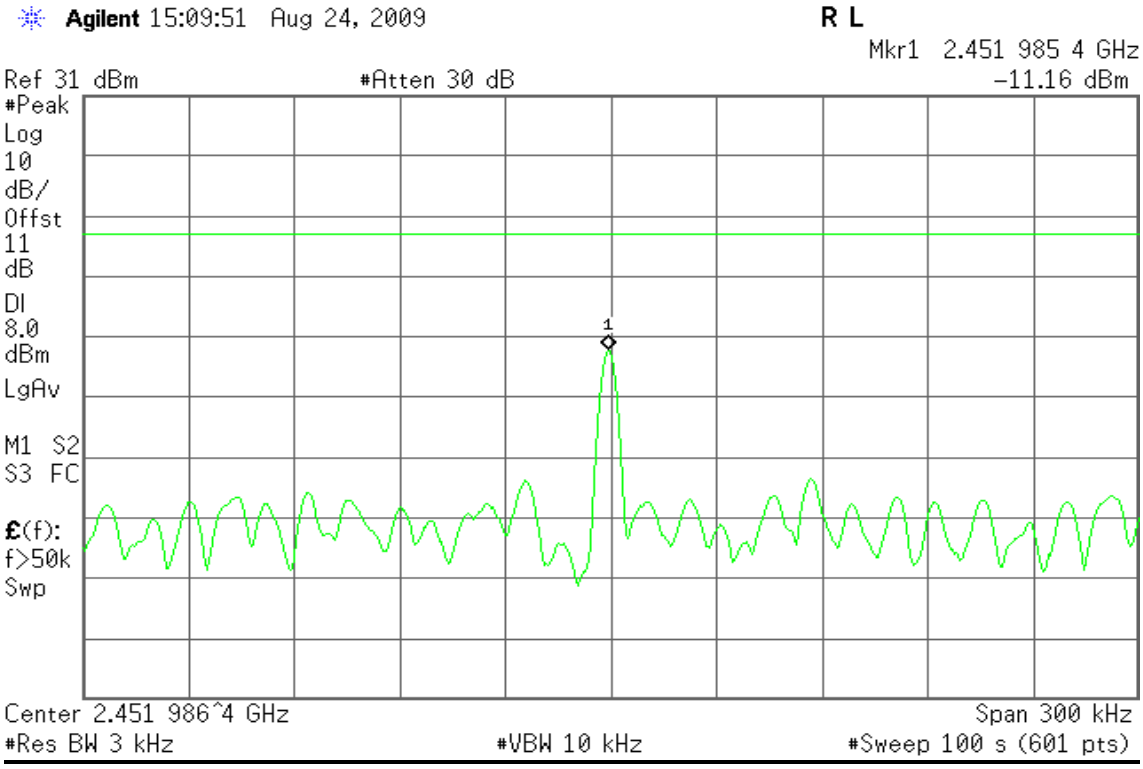
PPSD (CH Low)



PPSD (CH Mid)

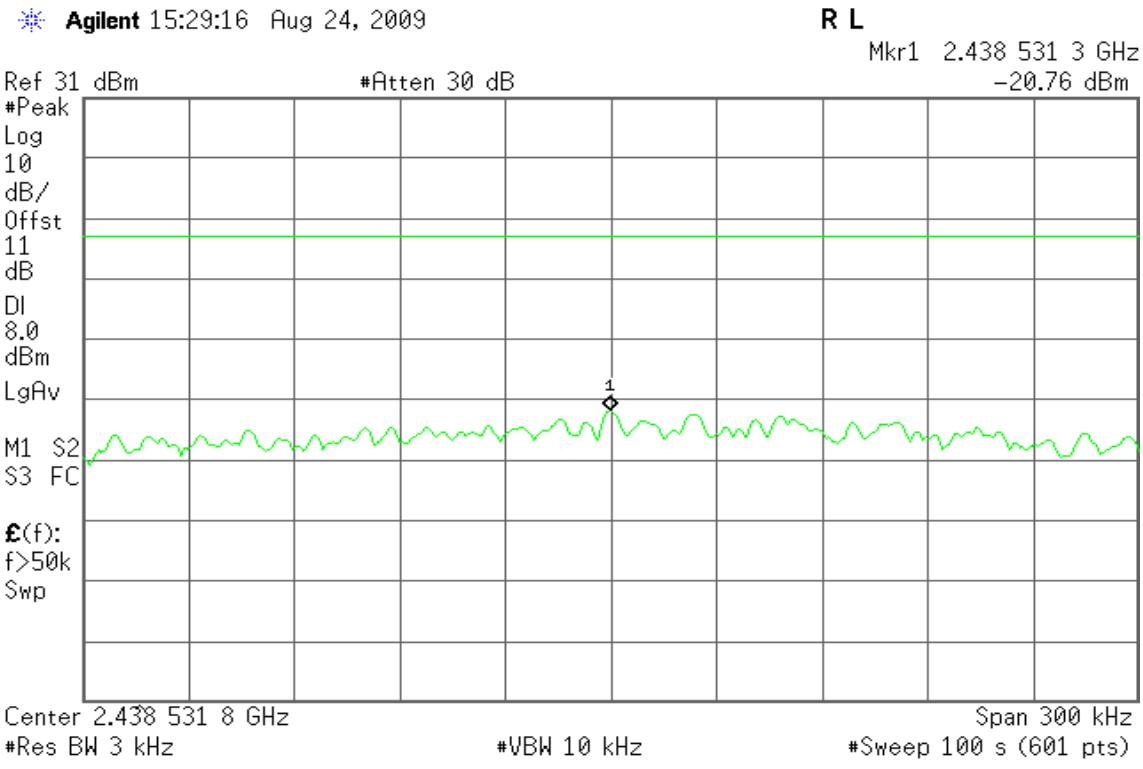


PPSD (CH High)

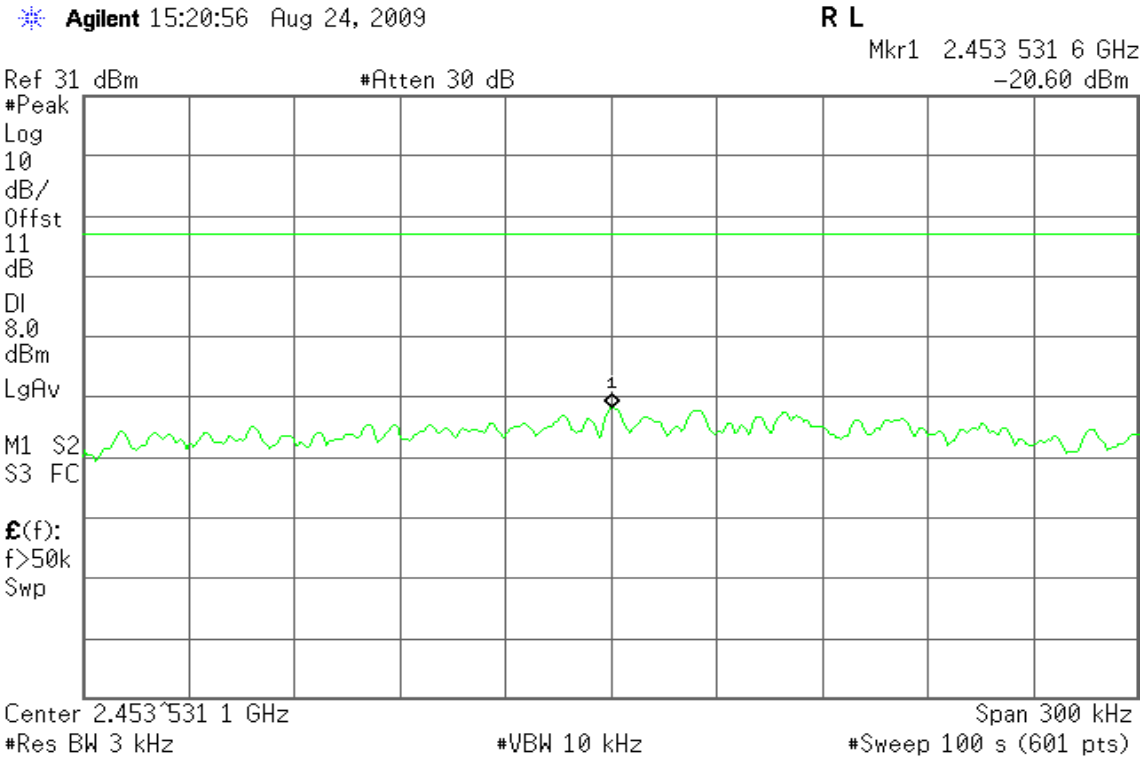


draft 802.11n 40 MHz Channel mode / Chain 1

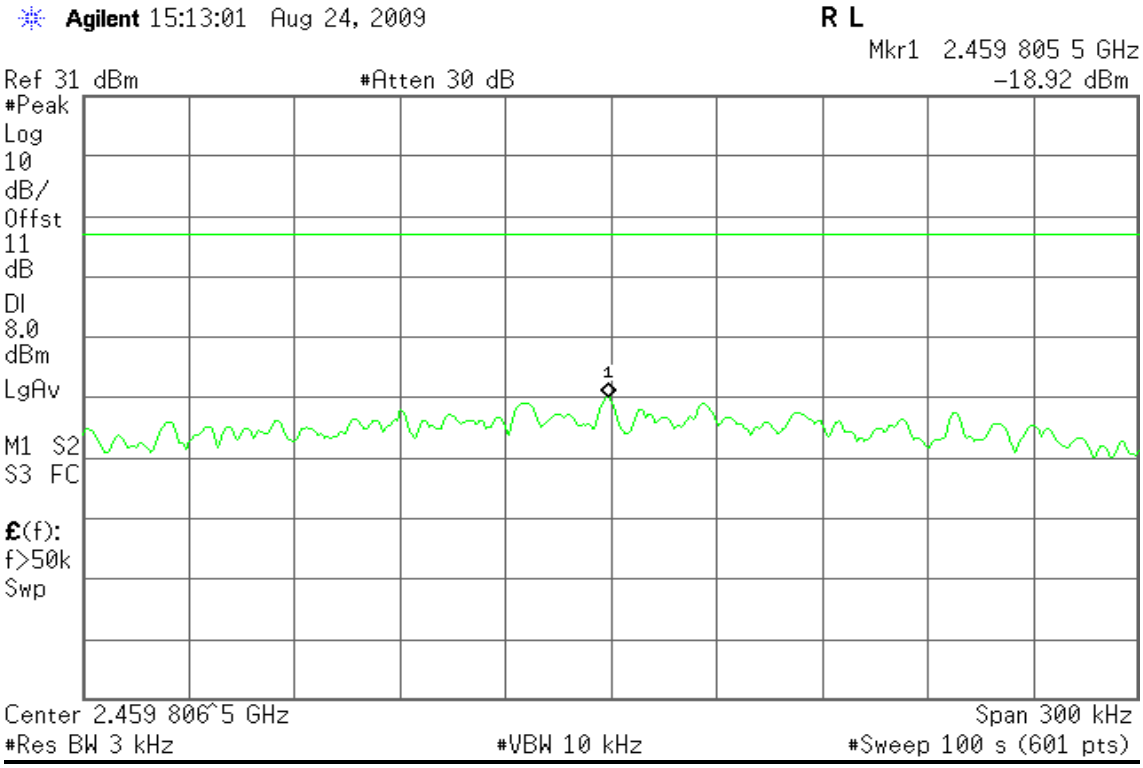
PPSD (CH Low)



PPSD (CH Mid)

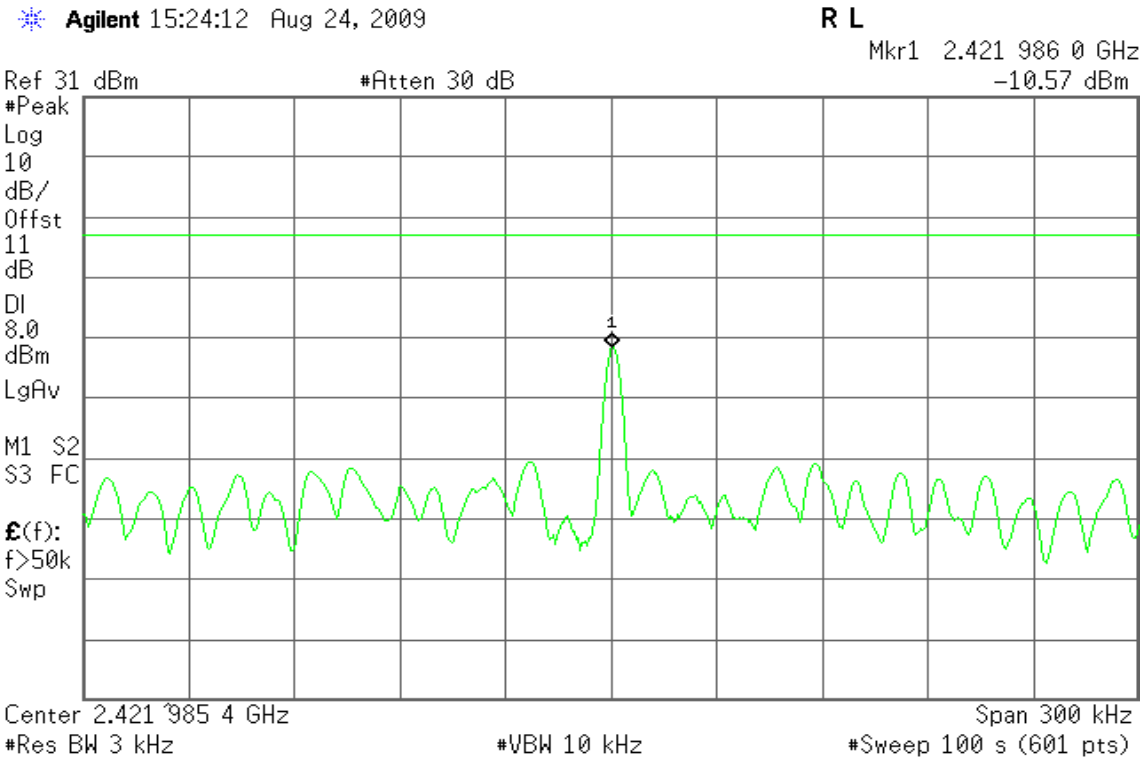


PPSD (CH High)

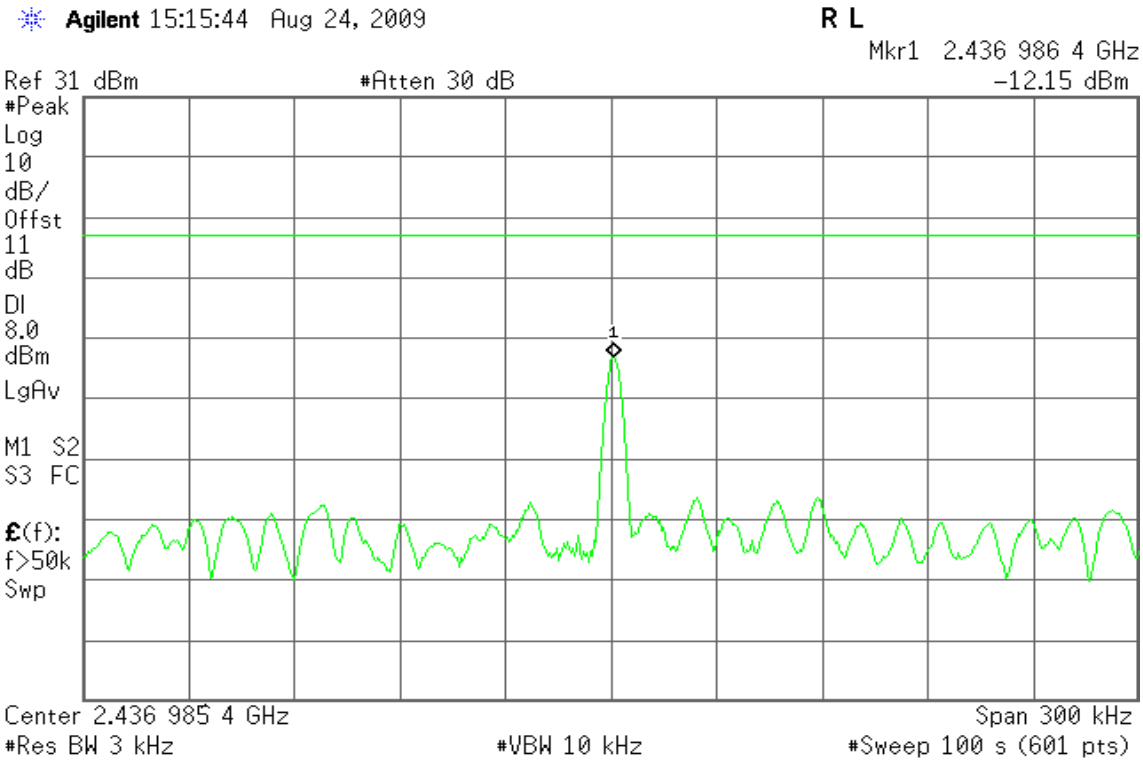


draft 802.11n 40 MHz Channel mode / Combiner

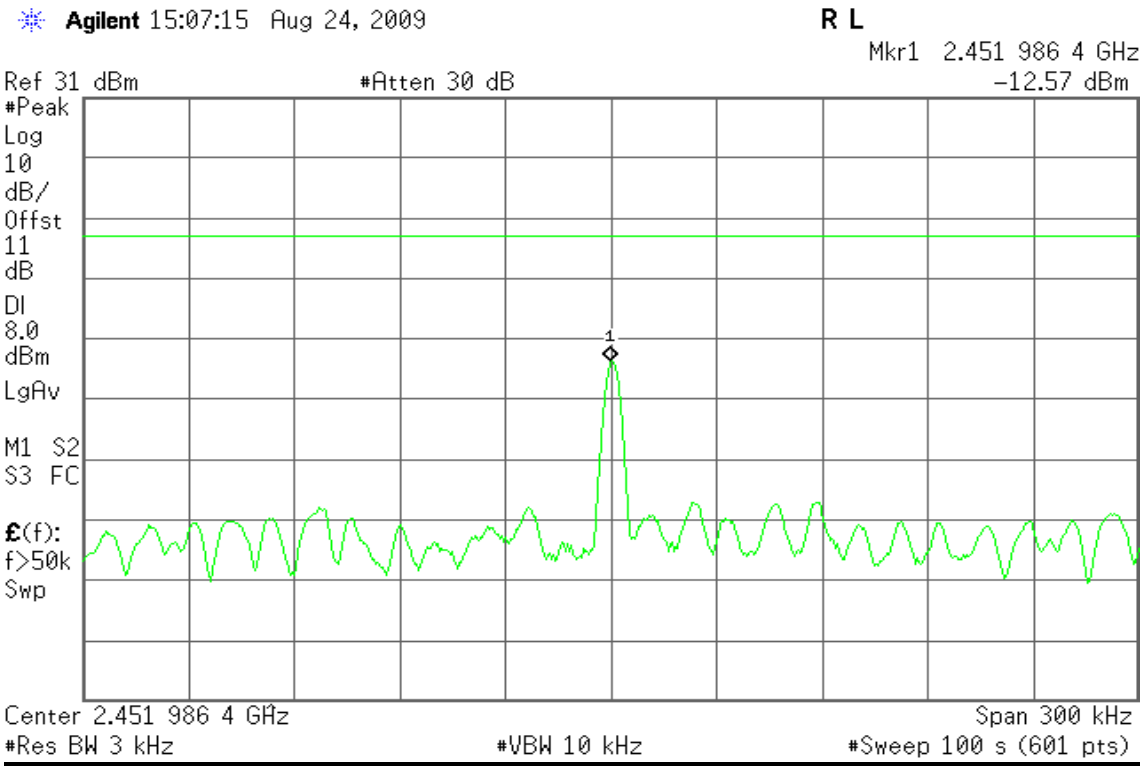
PPSD (CH Low)



PPSD (CH Mid)



PPSD (CH High)


Agilent 15:07:15 Aug 24, 2009
R L
Mkr1 2.451 986 4 GHz
-12.57 dBm
Ref 31 dBm
#Atten 30 dB
#Peak
Log
10
dB/
Offst
11
dB
Dl
8.0
dBm
LgAv
M1 S2
S3 FC
£(f):
f>50k
Swp
1
Center 2.451 986 4 GHz
Span 300 kHz
#Res BW 3 kHz
#VBW 10 kHz
#Sweep 100 s (601 pts)

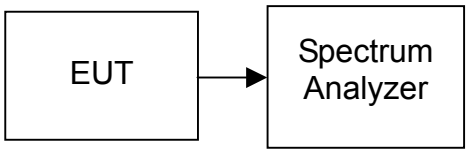
7.6 SPURIOUS EMISSIONS

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 in 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.

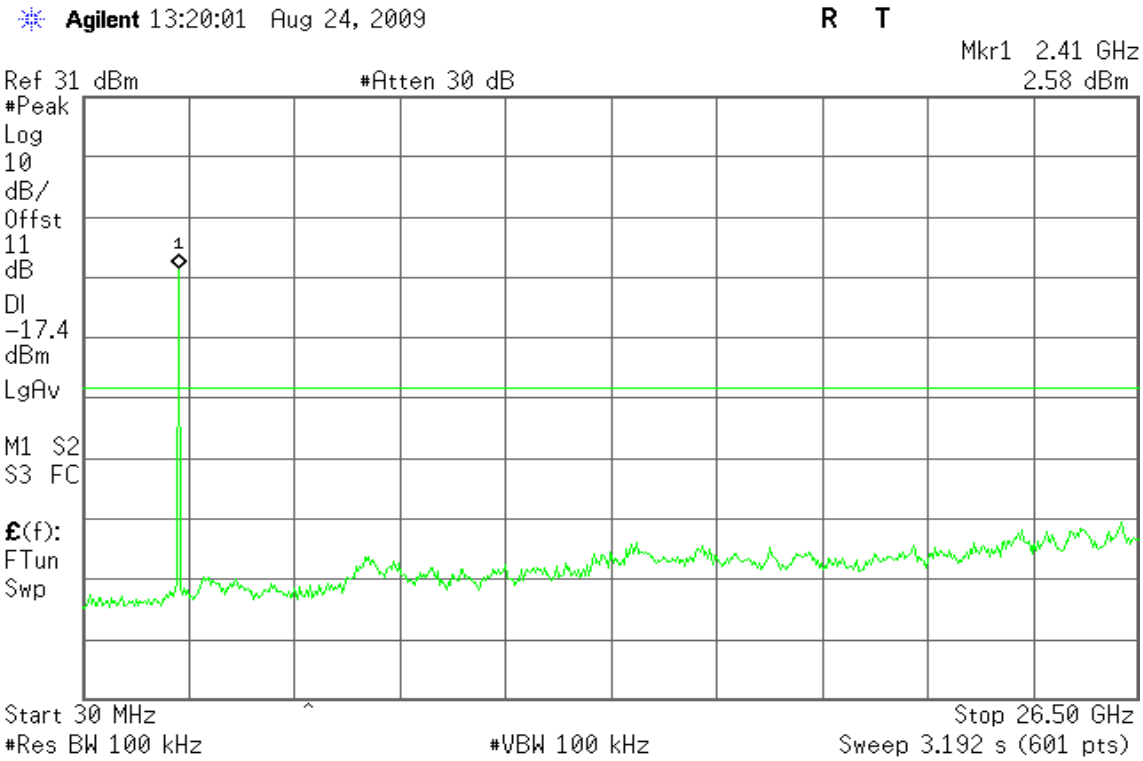
TEST RESULTS

No non-compliance noted.

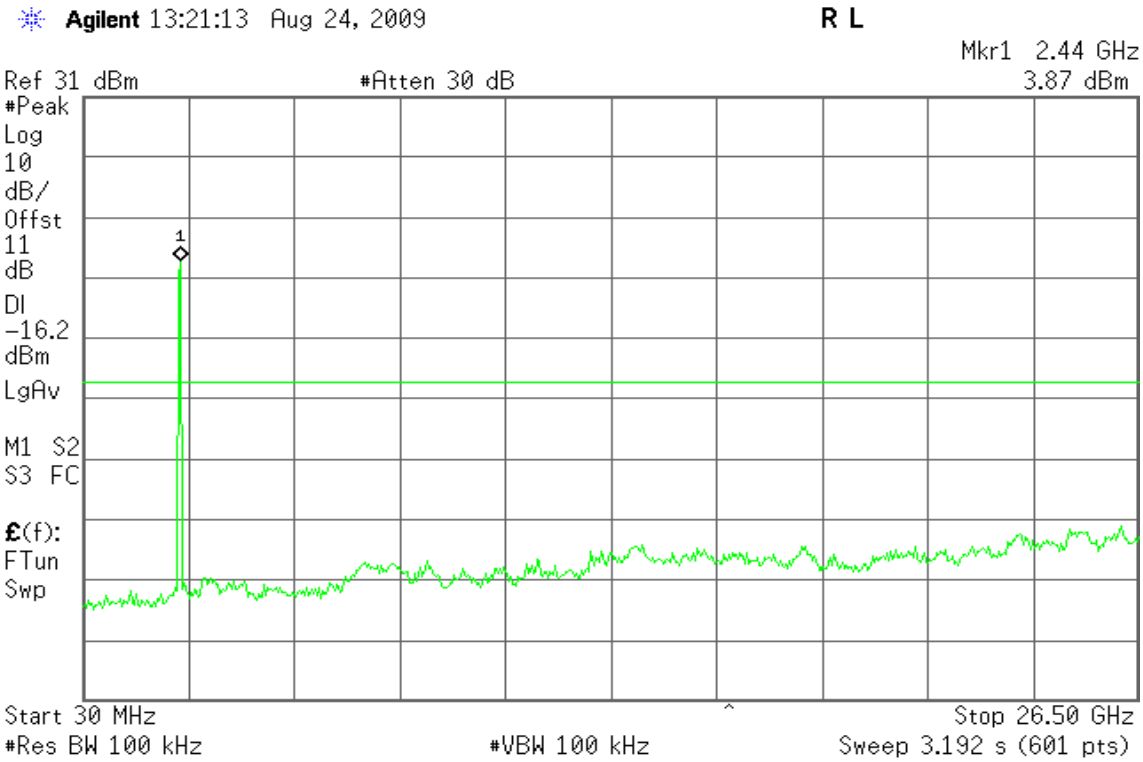
Test Plot

IEEE 802.11b mode

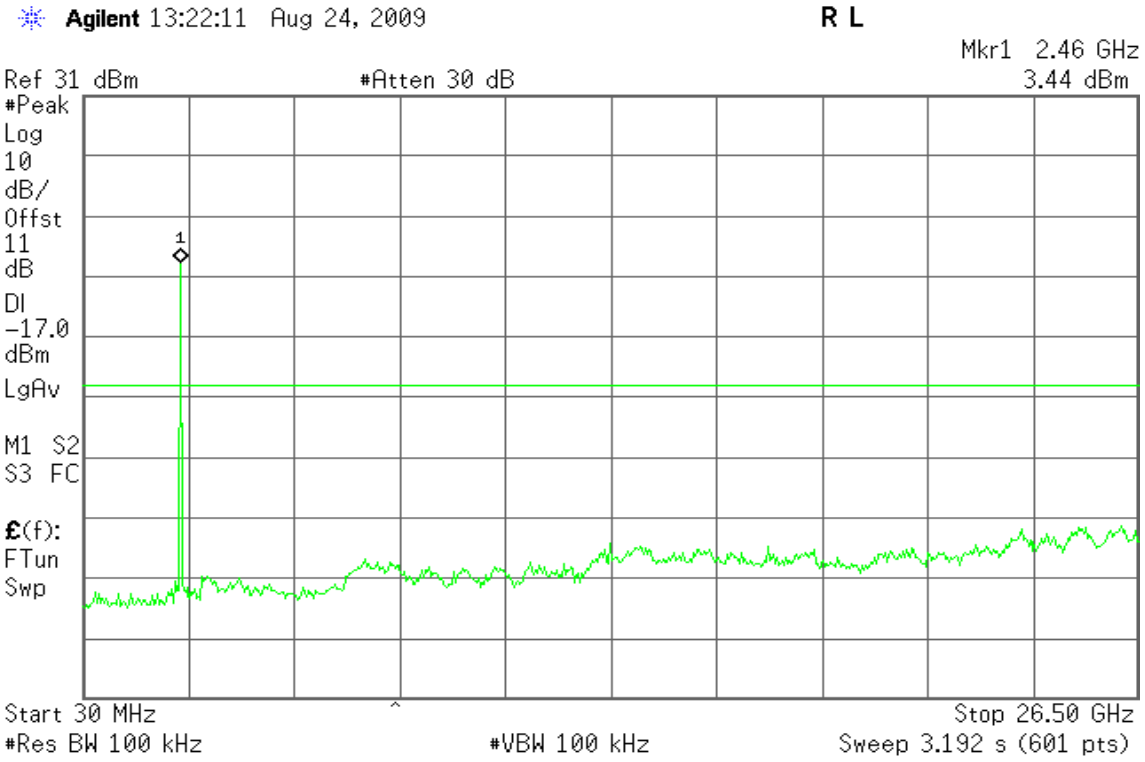
CH Low



CH Mid

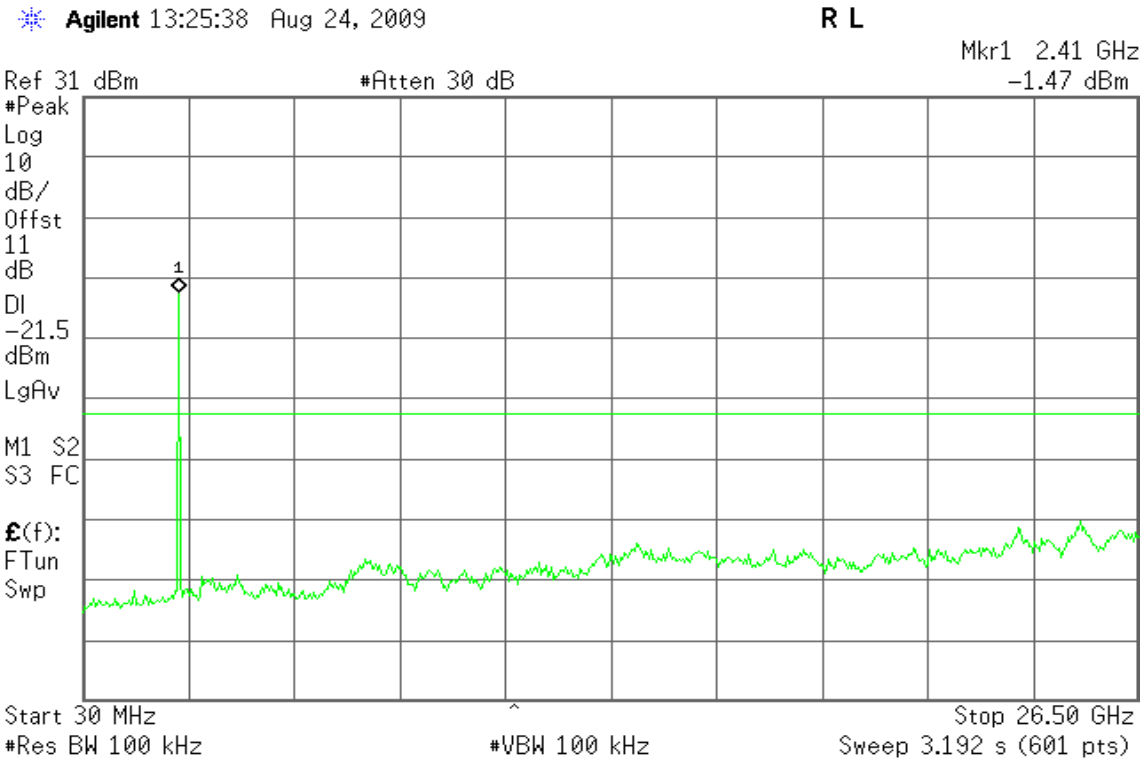


CH High

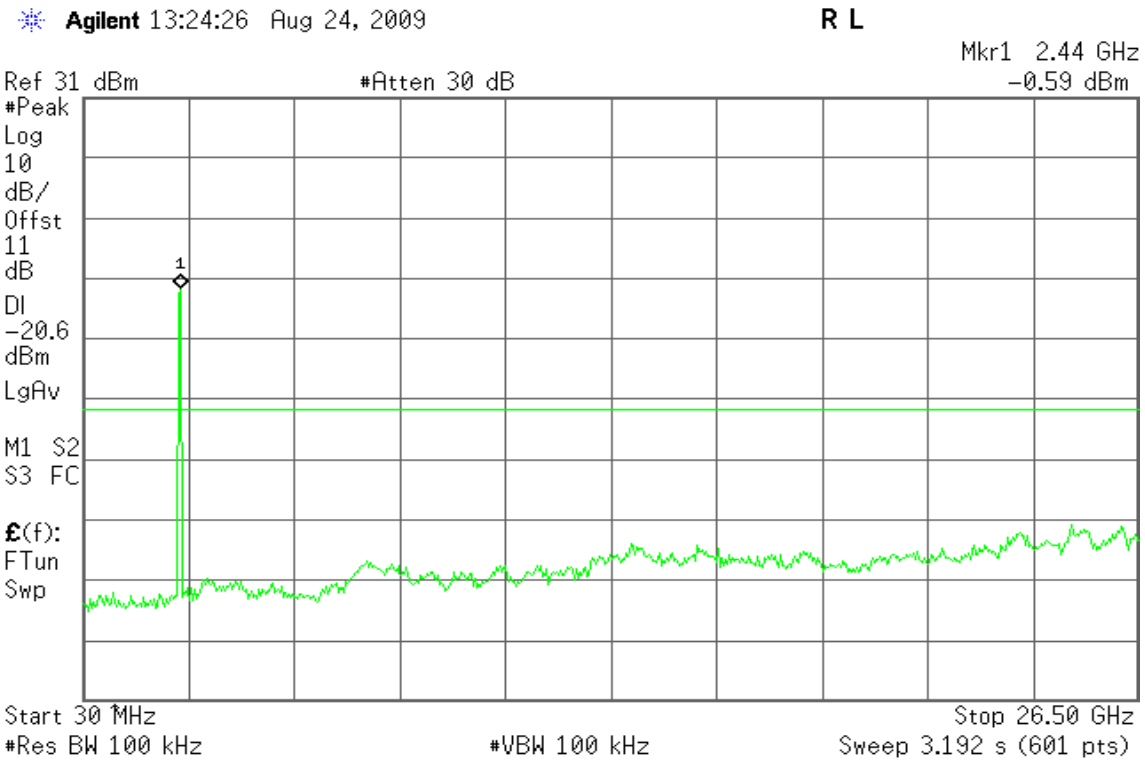


IEEE 802.11g mode

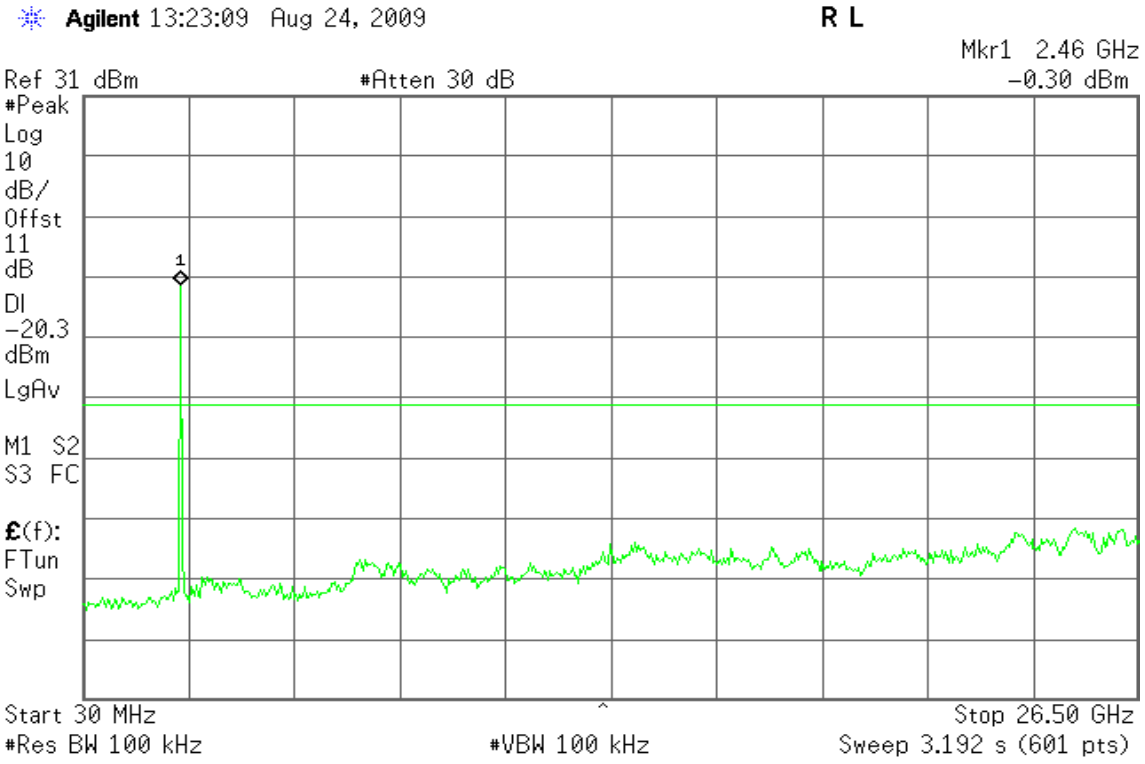
CH Low



CH Mid

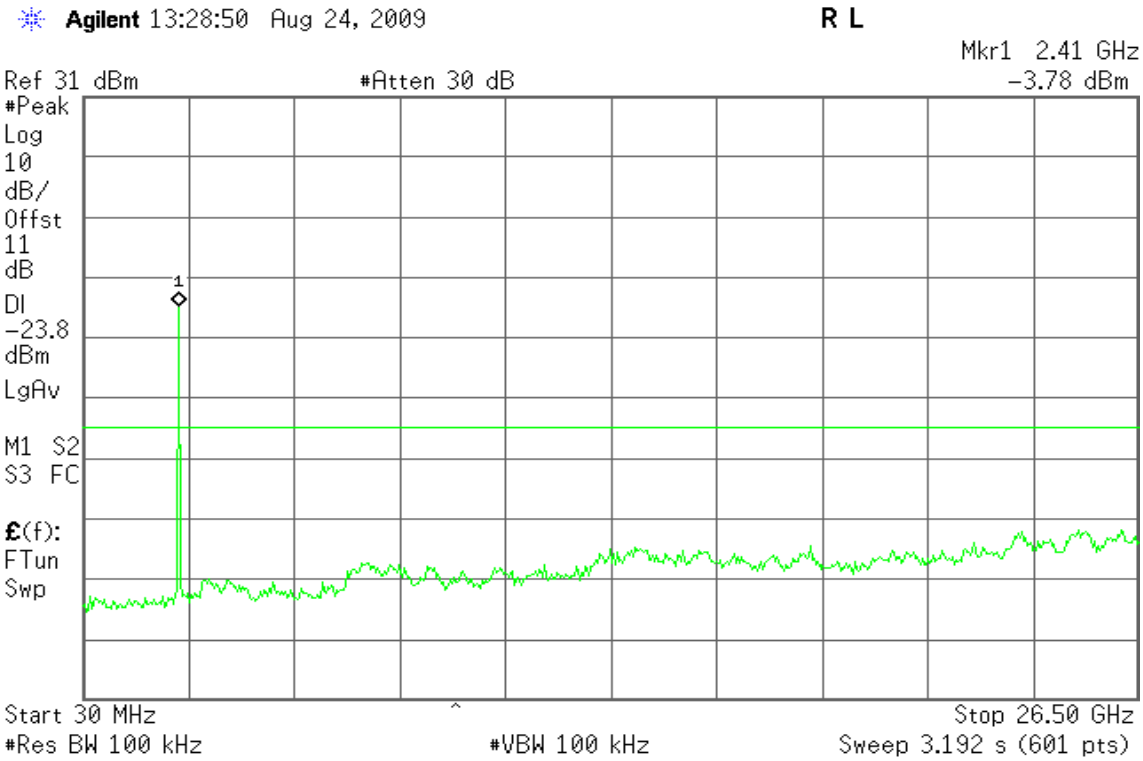


CH High

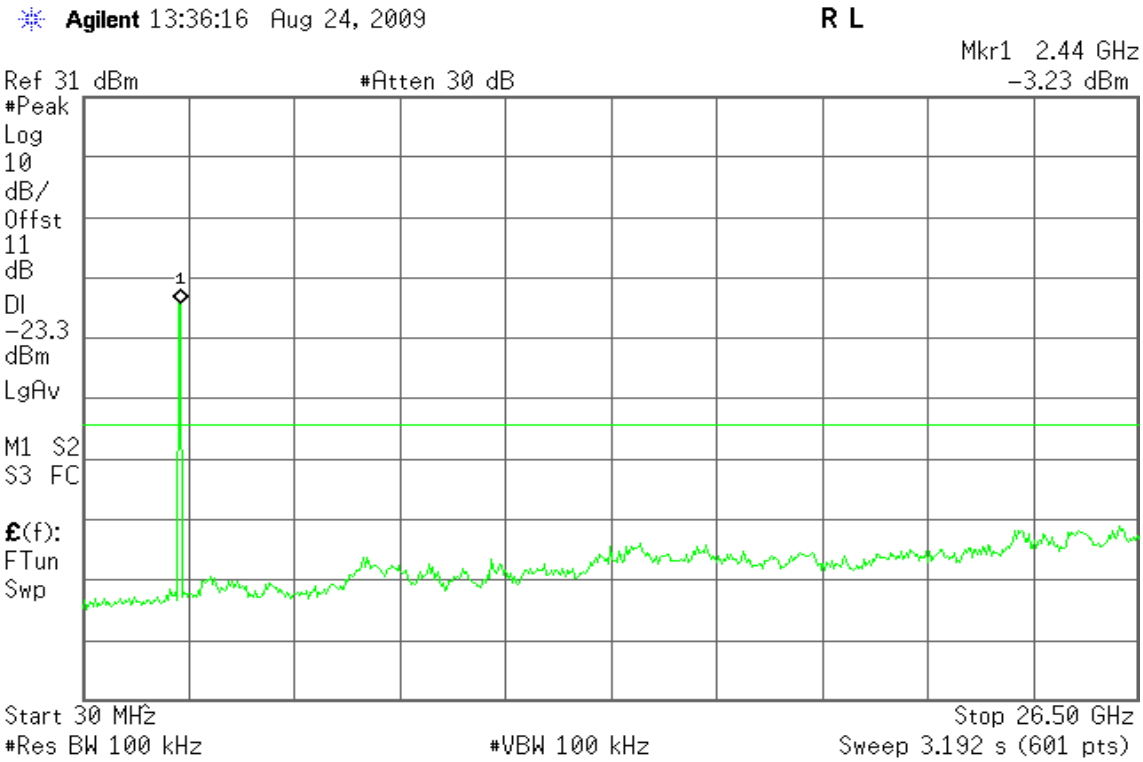


draft 802.11n 20 MHz Channel mode / Chain 0

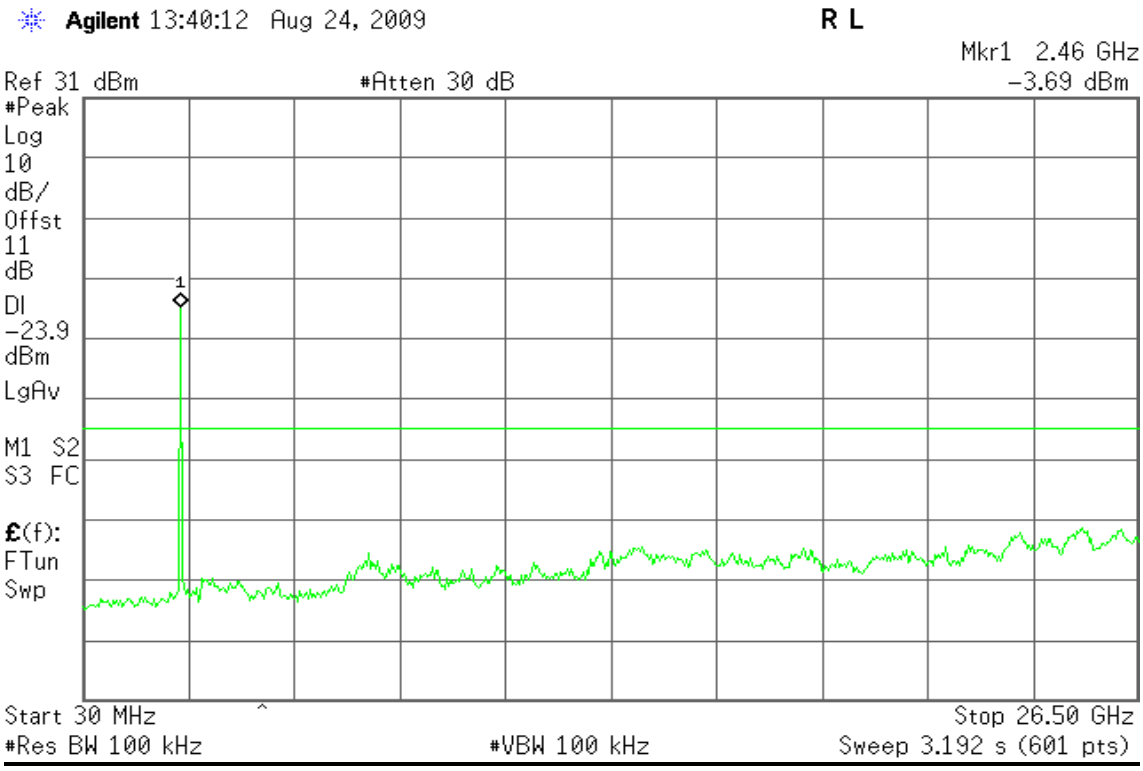
CH Low



CH Mid

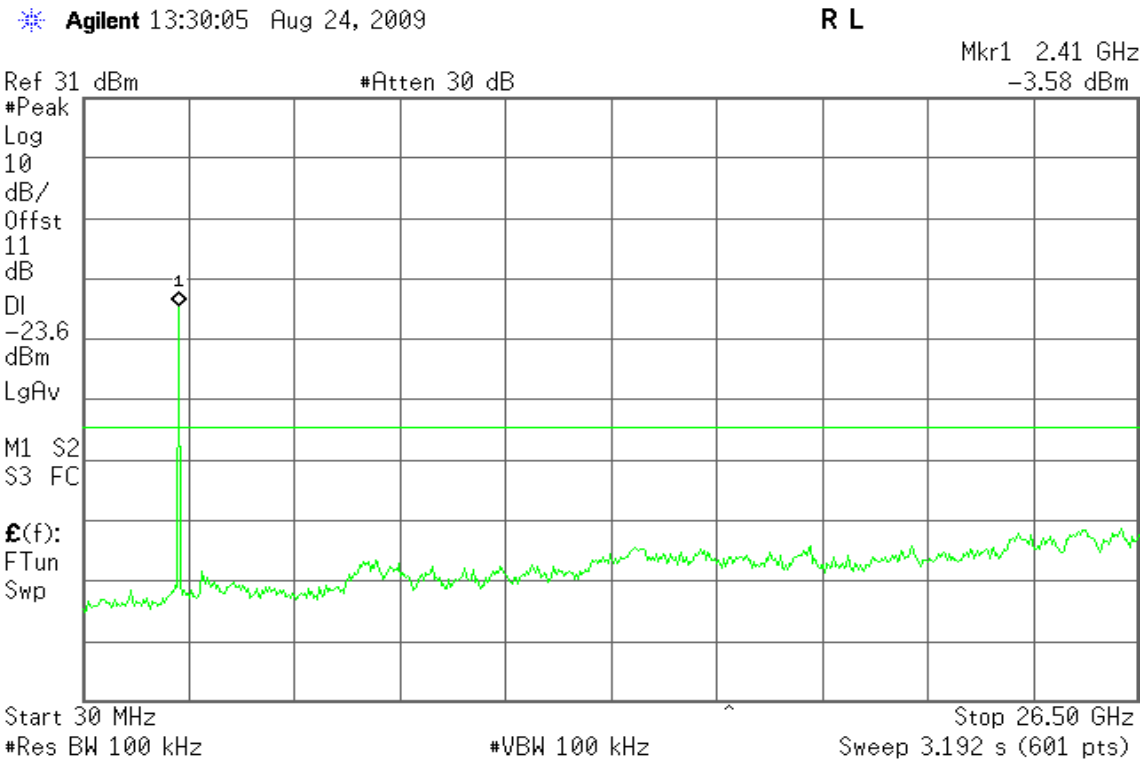


CH High

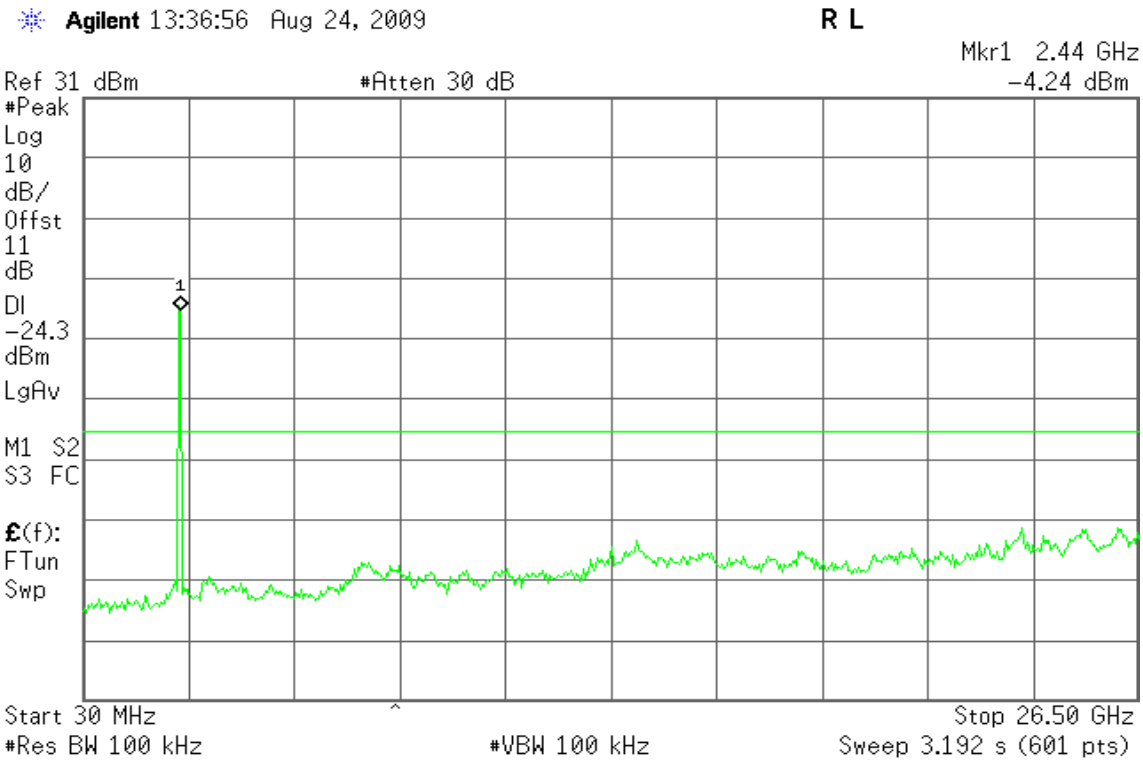


draft 802.11n 20 MHz Channel mode / Chain 1

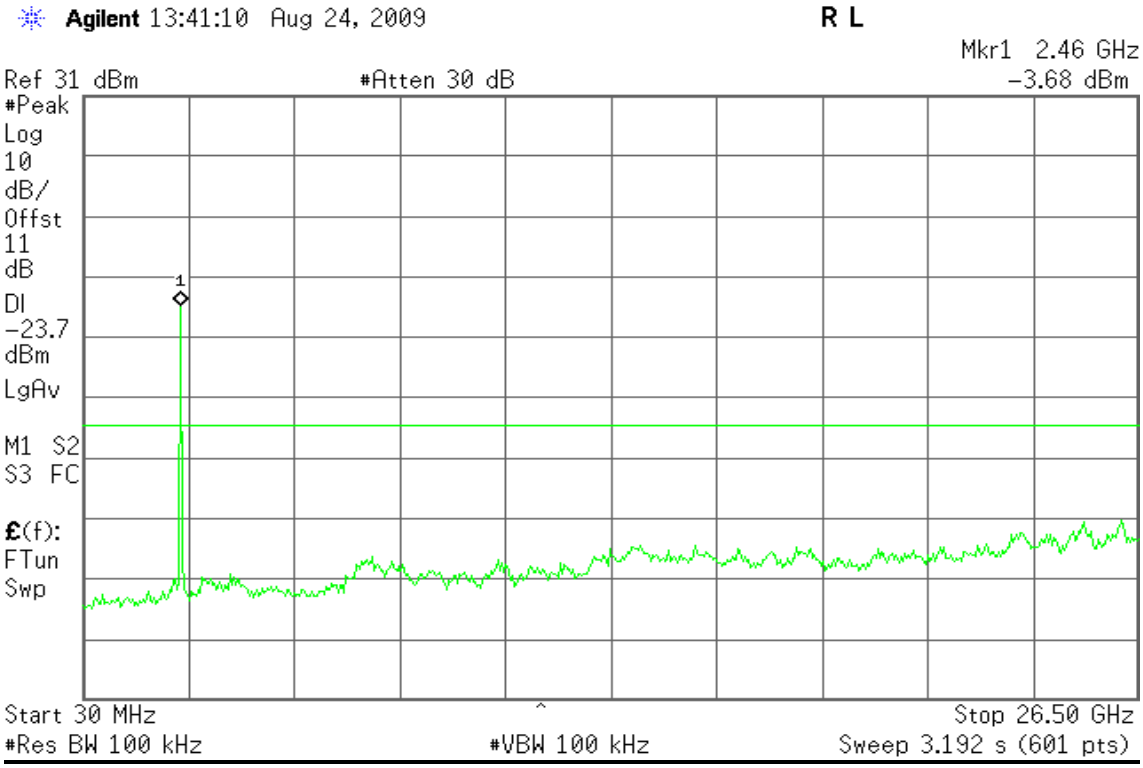
CH Low



CH Mid

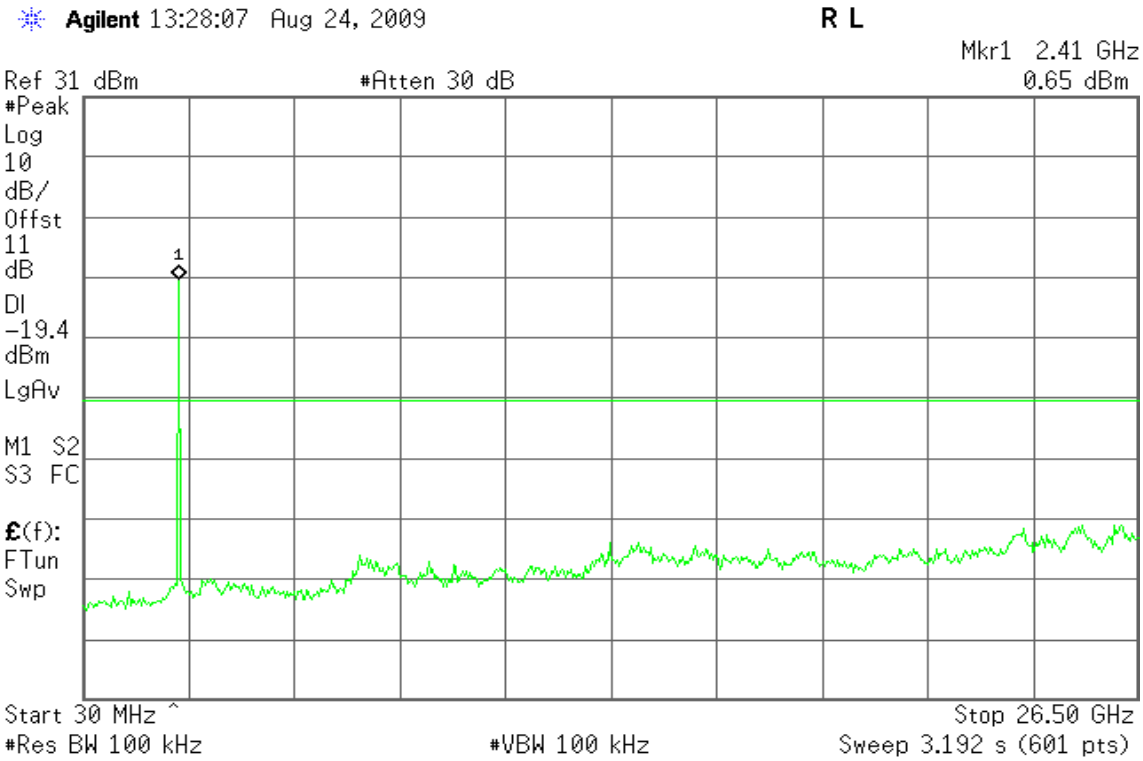


CH High

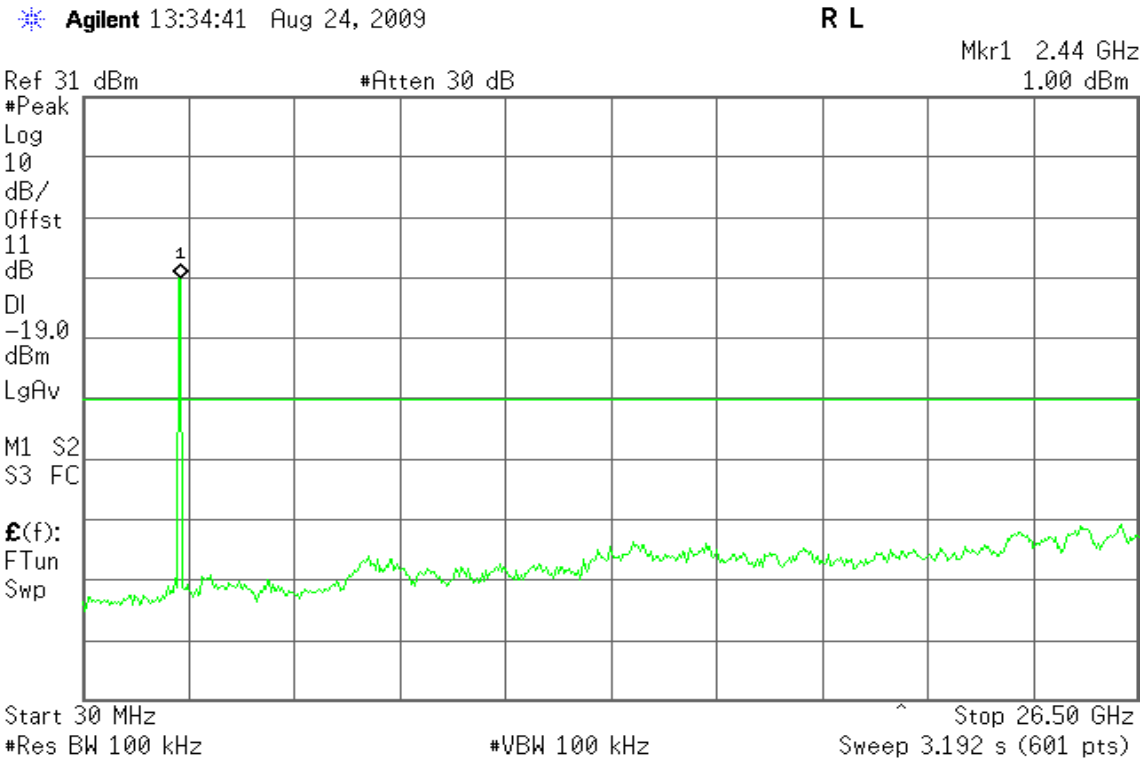


draft 802.11n 20 MHz Channel mode / Combiner

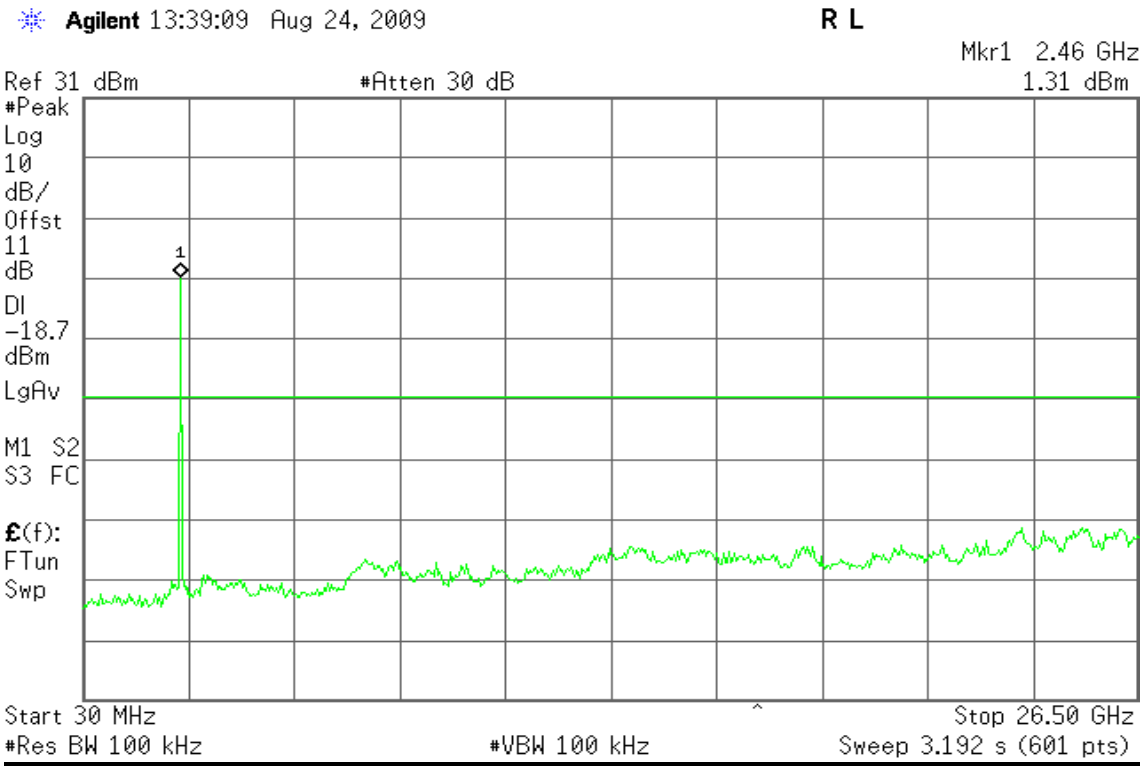
CH Low



CH Mid

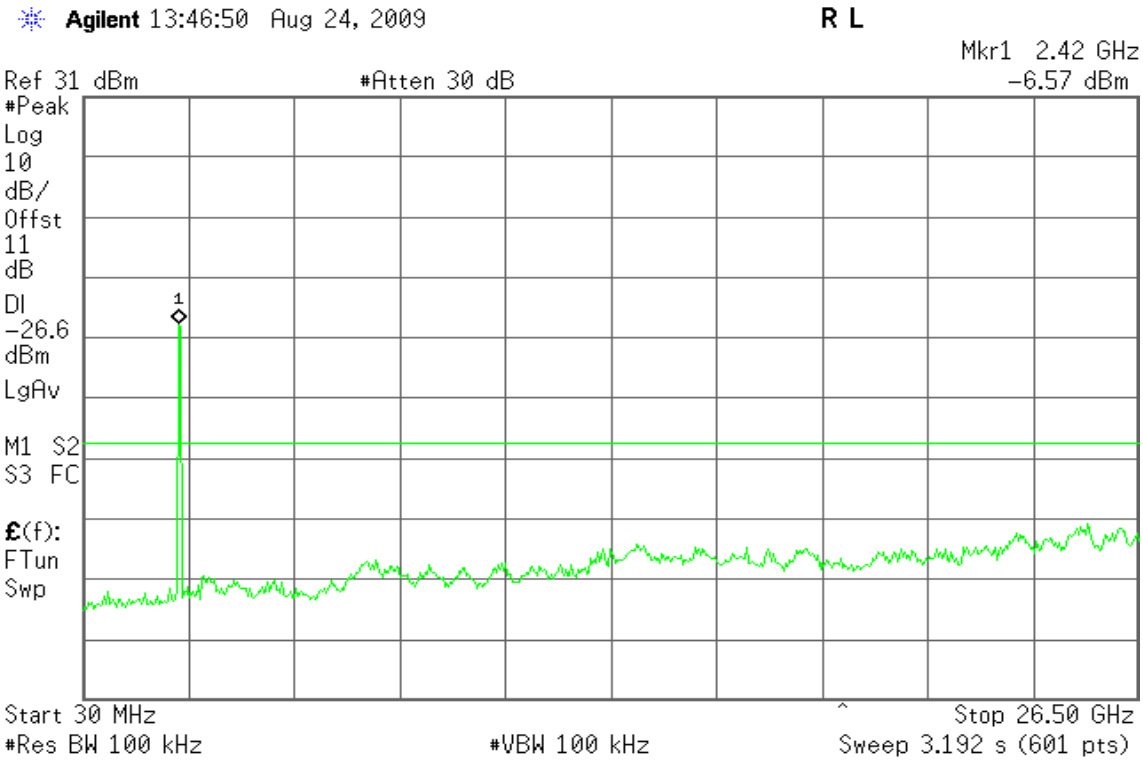


CH High

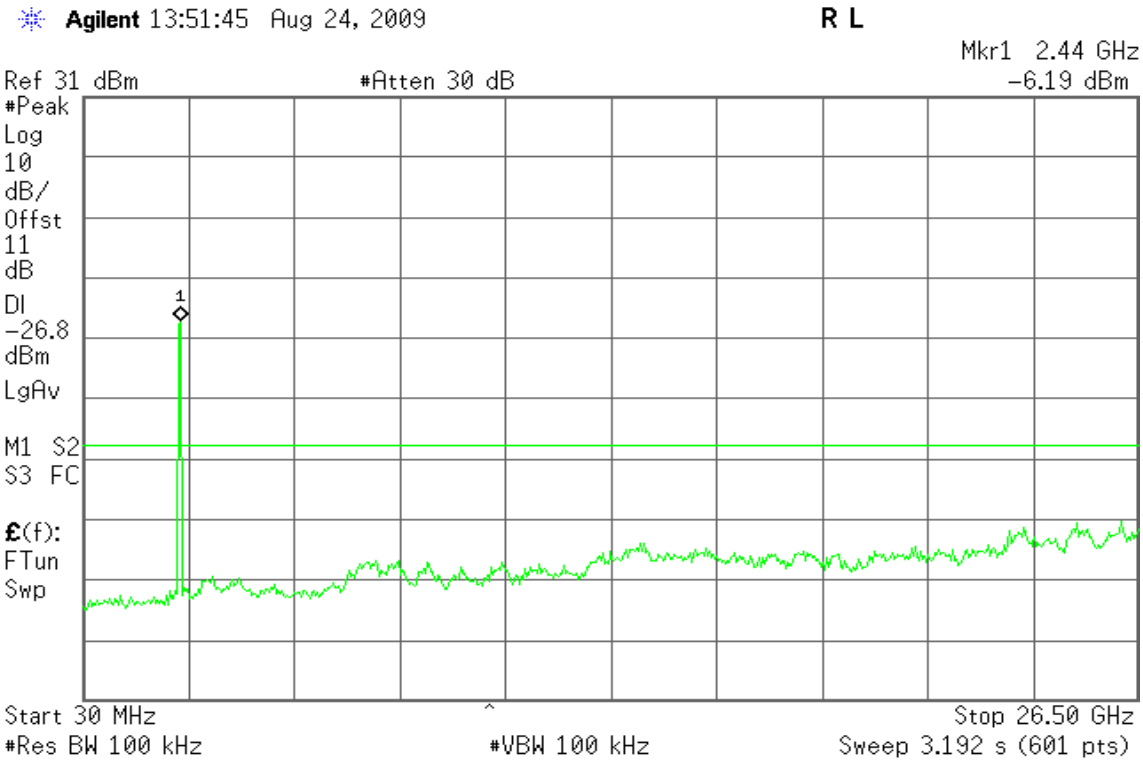

Agilent 13:39:09 Aug 24, 2009
R L
Mkr1 2.46 GHz
1.31 dBm
Ref 31 dBm
#Atten 30 dB
#Peak
Log
10
dB/
Offst
11
dB
Dl
-18.7
dBm
LgAv
M1 S2
S3 FC
£(f):
FTun
Swp
Start 30 MHz
#Res BW 100 kHz
#VBW 100 kHz
Stop 26.50 GHz
Sweep 3.192 s (601 pts)

draft 802.11n 40 MHz Channel mode / Chain 0

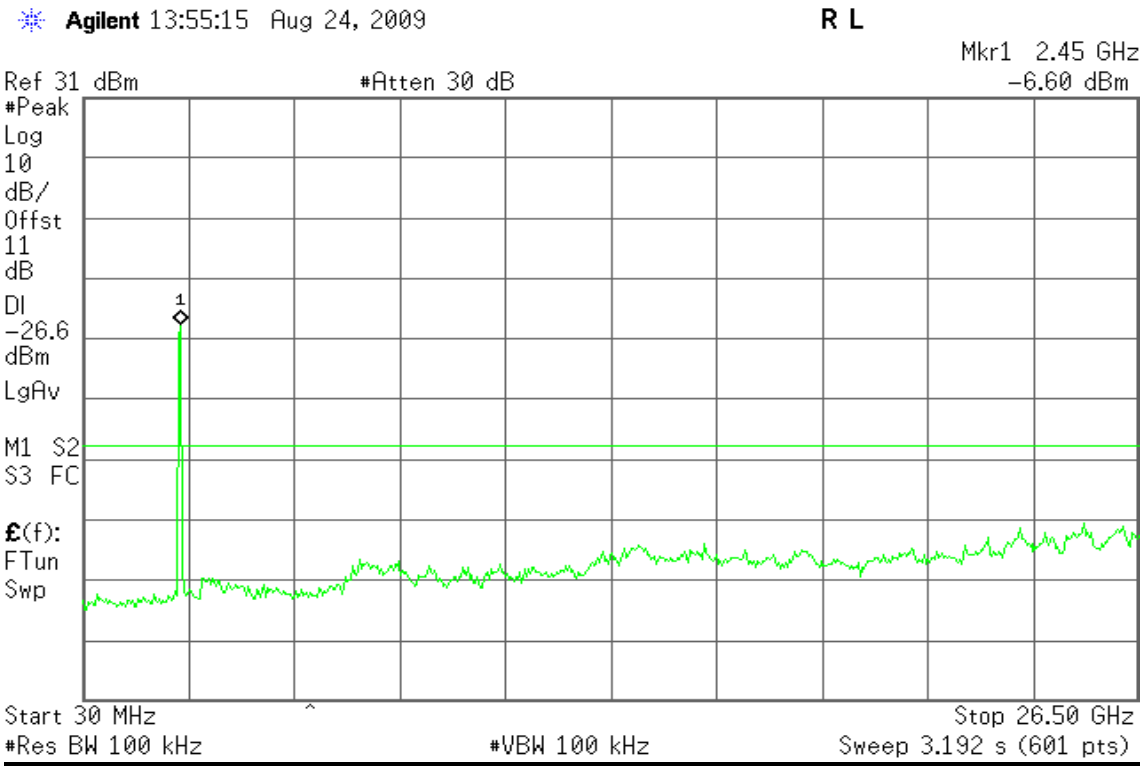
CH Low



CH Mid

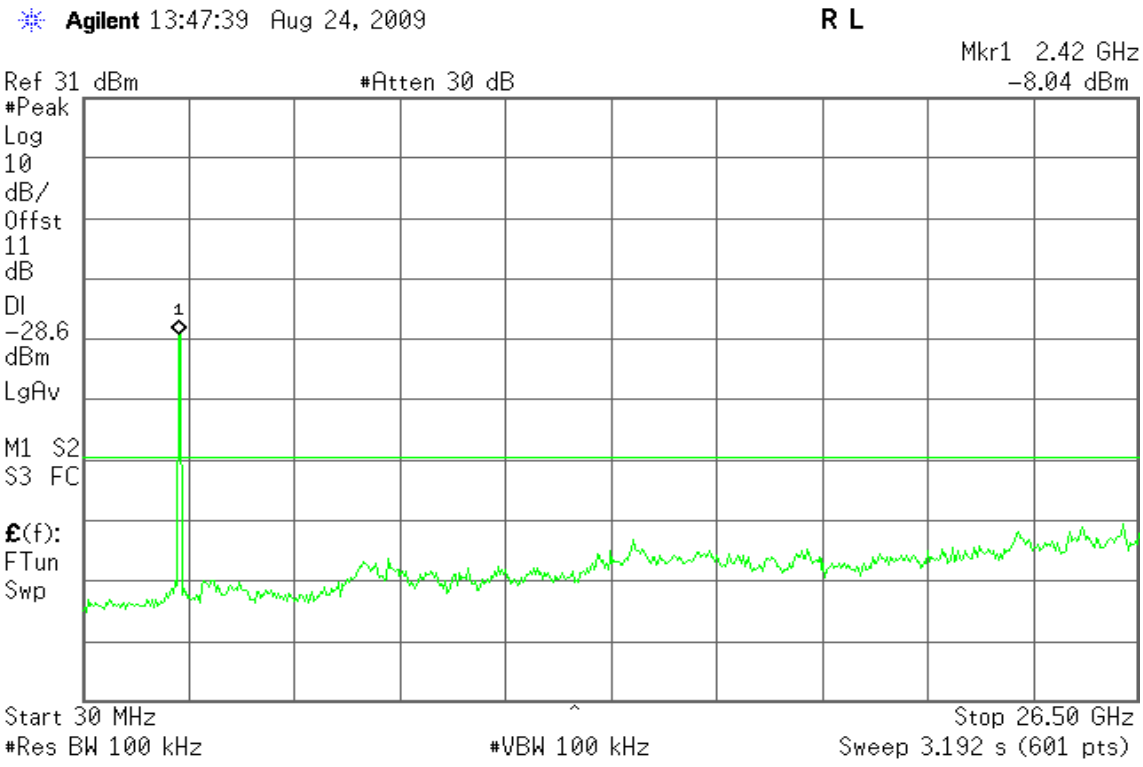


CH High

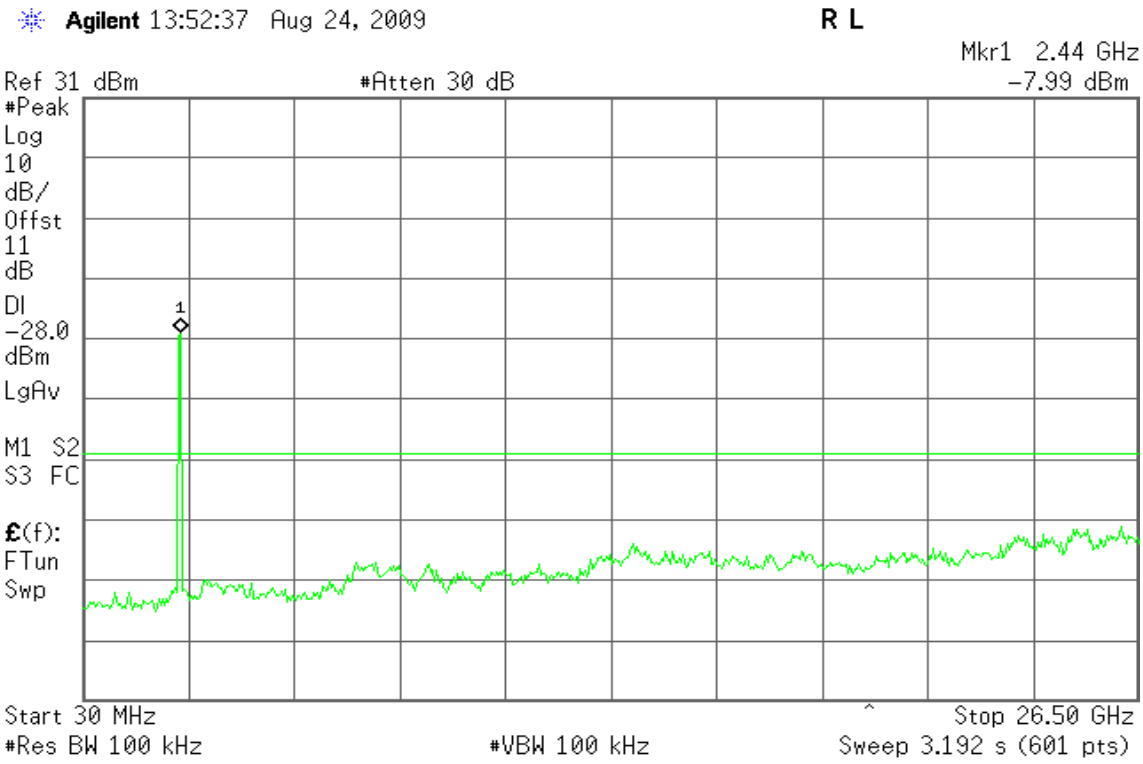


draft 802.11n 40 MHz Channel mode / Chain 1

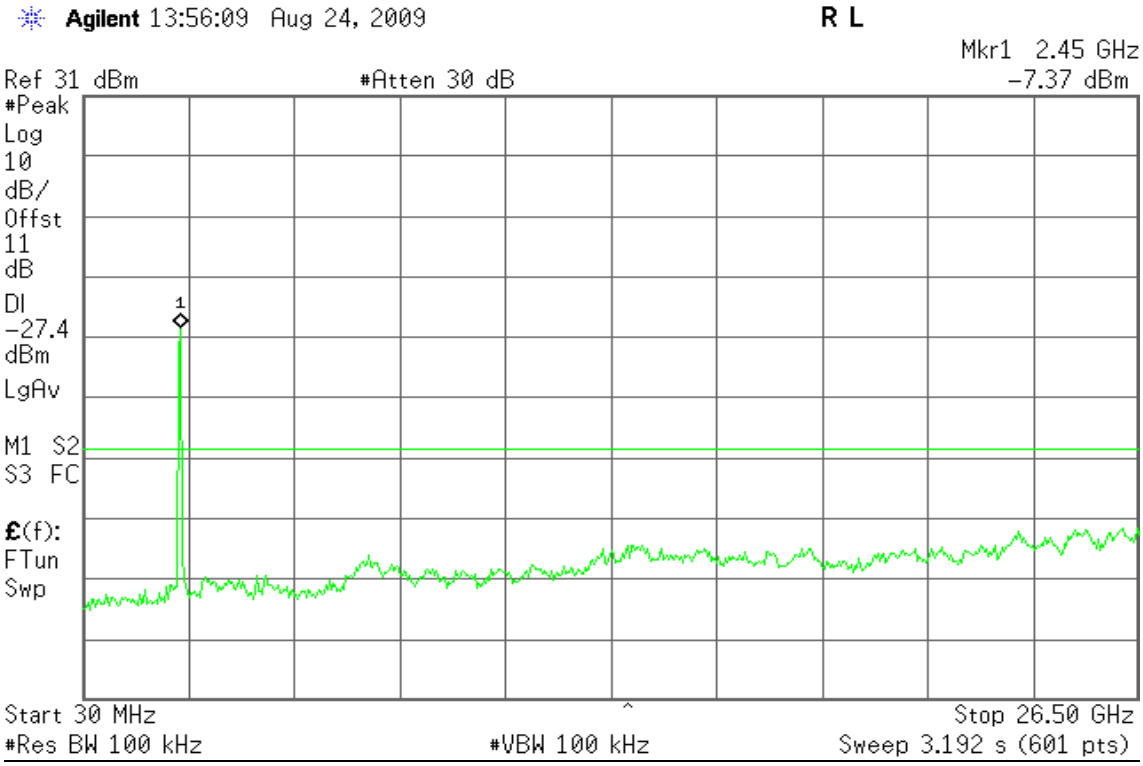
CH Low



CH Mid

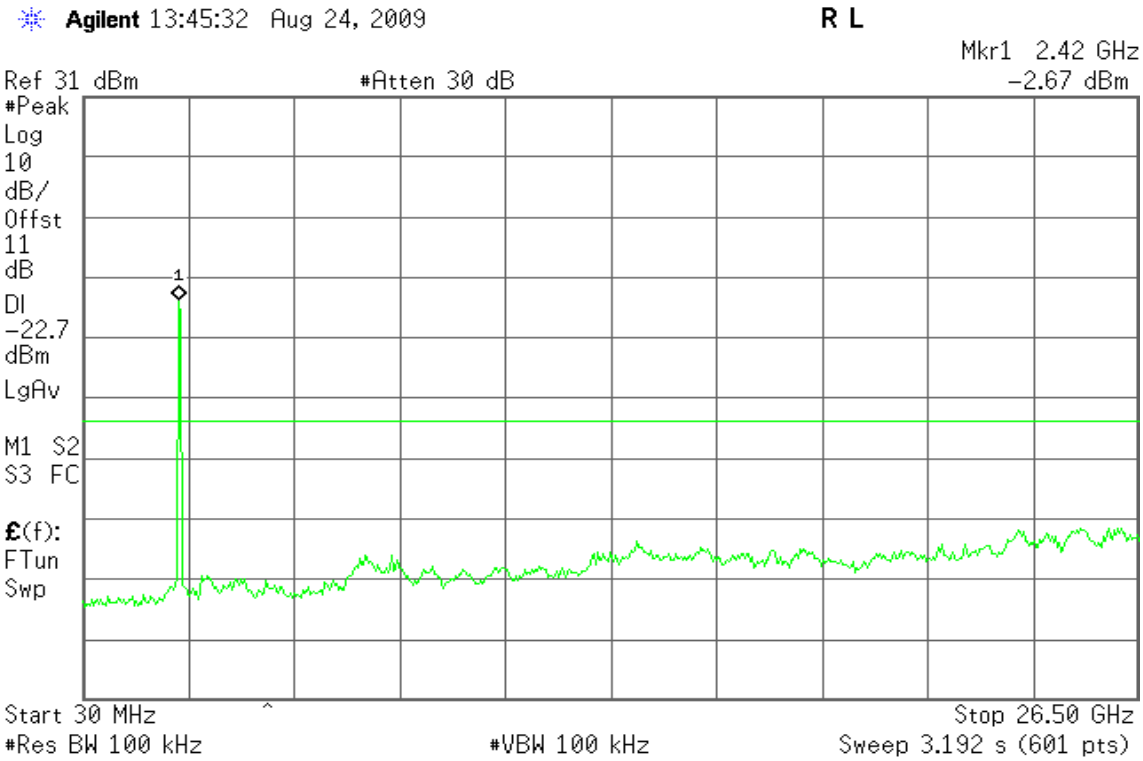


CH High

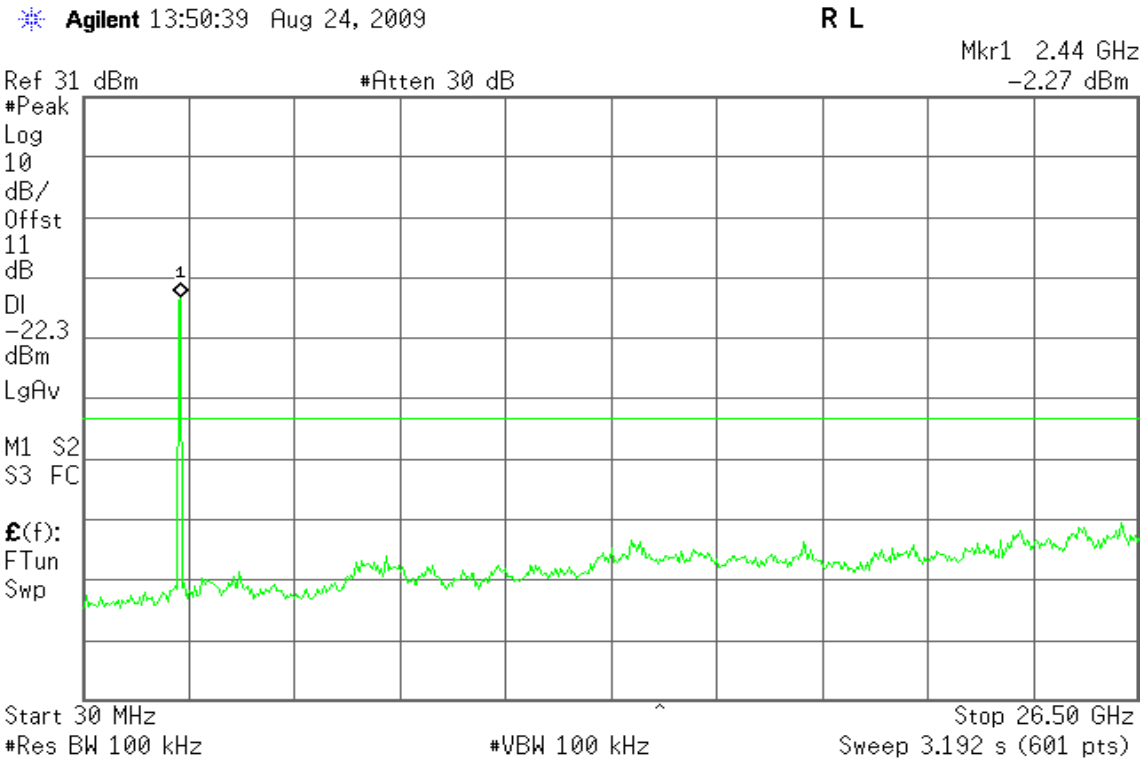


draft 802.11n 40 MHz Channel mode / Combiner

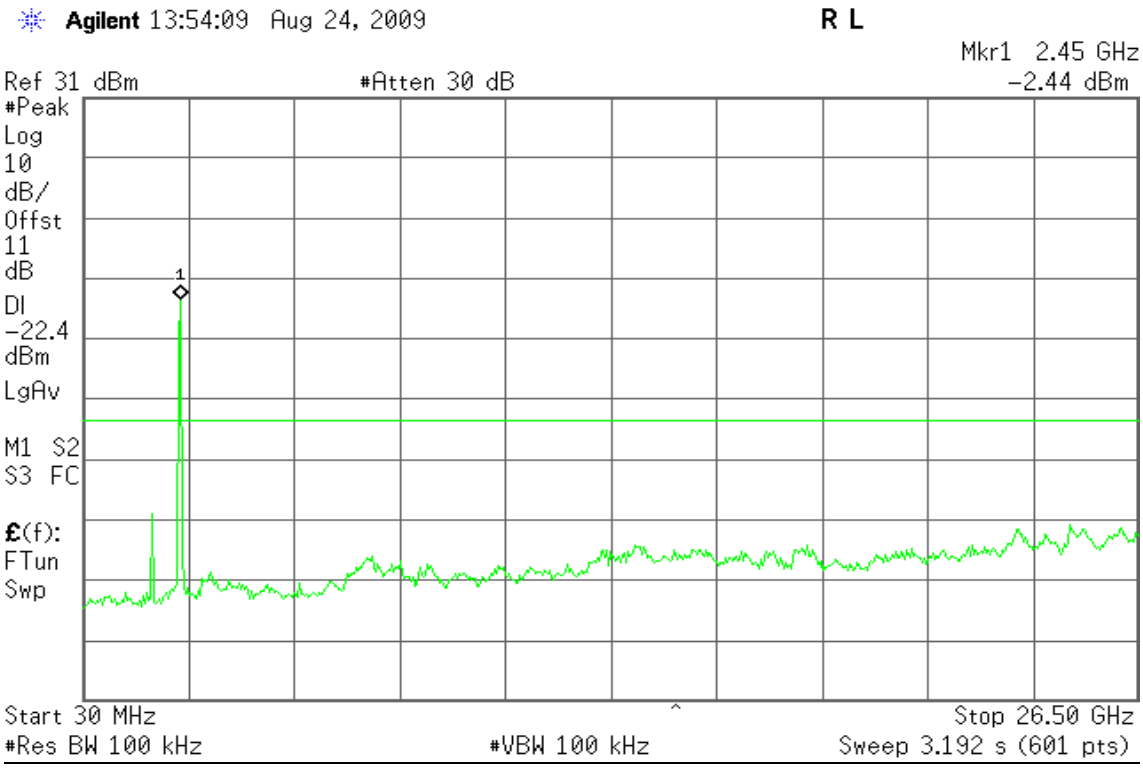
CH Low



CH Mid



CH High


Agilent 13:54:09 Aug 24, 2009
R L
Mkr1 2.45 GHz
−2.44 dBm
Ref 31 dBm
#Atten 30 dB
#Peak
Log
10
dB/
Offst
11
dB
Dl
−22.4
dBm
LgAv
M1 S2
S3 FC
£(f):
FTun
Swp
Start 30 MHz
#Res BW 100 kHz
#VBW 100 kHz
Stop 26.50 GHz
Sweep 3.192 s (601 pts)

7.6.2 RADIATED EMISSIONS

LIMIT

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

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

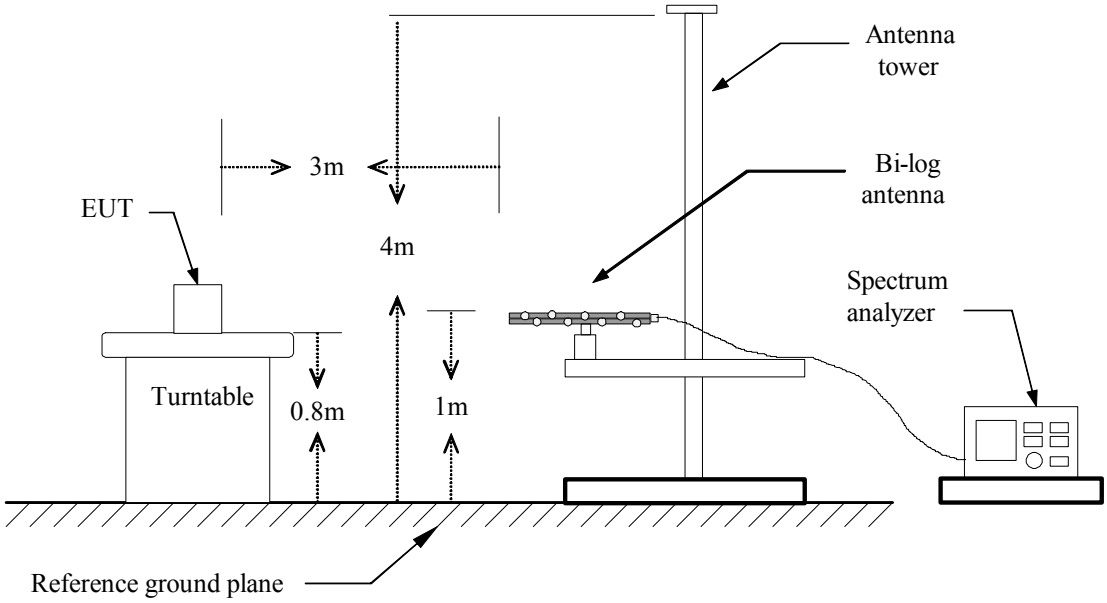
Remark: *Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of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

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

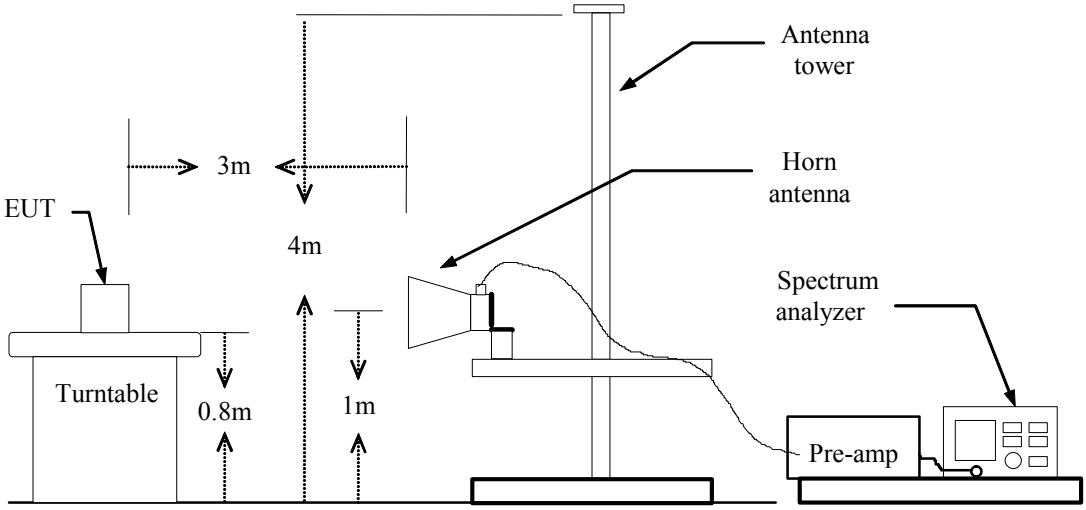
Frequency (MHz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

TEST CONFIGURATION

Below 1 GHz



Above 1 GHz



TEST PROCEDURE

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

   Below 1GHz:

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

   Above 1GHz:

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

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

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

TEST RESULTS

No non-compliance noted.

TEST DATA

Below 1GHz

Operation Mode: Normal Link **Test Date:** July 22, 2009

Temperature: 18°C **Tested by:** Stan Lin

Humidity: 60% 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
54.2500	V	51.46	-14.37	37.09	40.00	-2.91	QP
119.7250	V	54.05	-13.37	40.68	43.50	-2.82	QP
134.2750	V	52.06	-13.69	38.37	43.50	-5.13	QP
180.3500	V	52.55	-14.42	38.13	43.50	-5.37	QP
267.6500	V	52.06	-12.48	39.58	46.00	-6.42	QP
449.5250	V	46.01	-8.36	37.65	46.00	-8.35	QP
531.9750	V	48.66	-8.60	40.06	46.00	-5.94	QP
665.3500	V	42.71	-5.27	37.44	46.00	-8.56	QP
68.7999	H	49.04	-16.19	32.85	40.00	-7.15	QP
110.0250	H	56.31	-15.24	41.07	43.50	-2.43	QP
131.8499	H	54.04	-13.62	40.42	43.50	-3.08	QP
182.7750	H	52.91	-14.45	38.46	43.50	-5.04	QP
226.4250	H	52.82	-14.19	38.63	46.00	-7.37	QP
267.6499	H	51.30	-12.48	38.82	46.00	-7.18	QP
311.3000	H	52.74	-12.34	40.40	46.00	-5.60	QP
398.6000	H	49.20	-10.72	38.48	46.00	-7.52	QP

Remark:

1. *No emission found between lowest internal used / generated frequency to 30 MHz. (9kHz ~ 30MHz)*
2. *Measuring frequencies from 9 kHz to the 1GHz.*
3. *Radiated emissions measured in the measured frequency range were made with an instrument using peak detector or quasi-peak detector mode.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.*

Above 1 GHz

Operation Mode: TX / IEEE 802.11b / CH Low **Test Date:** August 21, 2009

Temperature: 22°C **Tested by:** Alonso Lu

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
1430.00	V	55.21	---	-5.48	49.73	---	74.00	54.00	-4.27	Peak
1830.00	V	52.58	---	-1.95	50.63	---	74.00	54.00	-3.37	Peak
1993.33	V	53.37	---	-1.88	51.50	---	74.00	54.00	-2.50	Peak
2193.33	V	51.66	---	0.33	51.99	---	74.00	54.00	-2.01	Peak
2496.67	V	50.74	---	1.20	51.94	---	74.00	54.00	-2.06	Peak
4825.00	V	43.02	---	7.72	50.75	---	74.00	54.00	-3.25	Peak
2093.33	H	50.48	---	-1.36	49.13	---	74.00	54.00	-4.87	Peak
2333.33	H	51.68	---	-1.44	50.25	---	74.00	54.00	-3.75	Peak
2513.33	H	51.13	---	-0.53	50.60	---	74.00	54.00	-3.40	Peak
4825.00	H	45.68	42.74	6.92	52.61	49.66	74.00	54.00	-4.34	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 802.11b / CH Mid **Test Date:** August 21, 2009

Temperature: 22°C **Tested by:** Alonso Lu

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
1676.67	V	51.79	---	-2.54	49.24	---	74.00	54.00	-4.76	Peak
2216.67	V	51.23	---	0.46	51.69	---	74.00	54.00	-2.31	Peak
2530.00	V	50.73	---	0.64	51.37	---	74.00	54.00	-2.63	Peak
2700.00	V	50.92	---	-0.28	50.64	---	74.00	54.00	-3.36	Peak
4808.33	V	41.97	---	7.65	49.62	---	74.00	54.00	-4.38	Peak
N/A										
1686.67	H	53.37	---	-4.53	48.84	---	74.00	54.00	-5.16	Peak
1946.67	H	51.93	---	-3.54	48.39	---	74.00	54.00	-5.61	Peak
2103.33	H	51.38	---	-1.31	50.07	---	74.00	54.00	-3.93	Peak
2496.67	H	51.98	---	-0.60	51.39	---	74.00	54.00	-2.61	Peak
4875.00	H	42.16	---	7.35	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 / IEEE 802.11b / CH High **Test Date:** August 21, 2009

Temperature: 22°C **Tested by:** Alonso Lu

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
1603.33	V	52.29	---	-3.91	48.39	---	74.00	54.00	-5.61	Peak
1833.33	V	52.52	---	-1.96	50.56	---	74.00	54.00	-3.44	Peak
2213.33	V	51.51	---	0.48	51.99	---	74.00	54.00	-2.01	Peak
2693.33	V	51.42	---	-0.31	51.11	---	74.00	54.00	-2.89	Peak
4816.67	V	41.30	---	7.69	48.98	---	74.00	54.00	-5.02	Peak
5366.67	V	40.19	---	7.32	47.51	---	74.00	54.00	-6.49	Peak
1616.67	H	52.79	---	-5.17	47.62	---	74.00	54.00	-6.38	Peak
2096.67	H	51.24	---	-1.30	49.94	---	74.00	54.00	-4.06	Peak
2380.00	H	51.44	---	-1.24	50.21	---	74.00	54.00	-3.79	Peak
2620.00	H	51.04	---	-0.16	50.87	---	74.00	54.00	-3.13	Peak
5116.67	H	40.81	---	8.80	49.61	---	74.00	54.00	-4.39	Peak
6883.33	H	40.05	---	10.28	50.33	---	74.00	54.00	-3.67	Peak

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:** August 21, 2009

Temperature: 22°C **Tested by:** Alonso Lu

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
1993.33	V	51.69	---	-1.88	49.81	---	74.00	54.00	-4.19	Peak
2176.67	V	50.93	---	-0.32	50.61	---	74.00	54.00	-3.39	Peak
2500.00	V	50.35	---	1.25	51.60	---	74.00	54.00	-2.40	Peak
4850.00	V	40.72	---	7.84	48.56	---	74.00	54.00	-5.44	Peak
N/A										
1536.67	H	52.20	---	-6.18	46.02	---	74.00	54.00	-7.98	Peak
1820.00	H	51.60	---	-3.76	47.84	---	74.00	54.00	-6.16	Peak
2143.33	H	51.31	---	-2.05	49.26	---	74.00	54.00	-4.74	Peak
2693.33	H	51.02	---	0.04	51.06	---	74.00	54.00	-2.94	Peak
4716.67	H	41.77	---	7.78	49.55	---	74.00	54.00	-4.45	Peak
4825.00	H	43.18	---	6.92	50.10	---	74.00	54.00	-3.90	Peak
5225.00	H	40.87	---	8.64	49.51	---	74.00	54.00	-4.49	Peak

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:** August 21, 2009

Temperature: 22°C **Tested by:** Alonso Lu

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
1830.00	V	51.75	---	-1.95	49.80	---	74.00	54.00	-4.20	Peak
2196.67	V	50.14	---	0.46	50.60	---	74.00	54.00	-3.40	Peak
2490.00	V	50.53	---	1.09	51.62	---	74.00	54.00	-2.38	Peak
4891.67	V	40.58	---	8.03	48.61	---	74.00	54.00	-5.39	Peak
5075.00	V	41.19	---	6.55	47.74	---	74.00	54.00	-6.26	Peak
N/A										
2353.33	H	52.96	---	-1.35	51.61	---	74.00	54.00	-2.39	Peak
2556.67	H	51.62	---	-0.38	51.24	---	74.00	54.00	-2.76	Peak
2710.00	H	50.15	---	0.03	50.18	---	74.00	54.00	-3.82	Peak
4875.00	H	42.90	---	7.35	50.24	---	74.00	54.00	-3.76	Peak
5275.00	H	40.50	---	8.86	49.36	---	74.00	54.00	-4.64	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:** August 21, 2009

Temperature: 22°C **Tested by:** Alonso Lu

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
1460.00	V	53.66	---	-5.62	48.05	---	74.00	54.00	-5.95	Peak
1830.00	V	52.98	---	-1.95	51.03	---	74.00	54.00	-2.97	Peak
2213.33	V	51.08	---	0.48	51.56	---	74.00	54.00	-2.44	Peak
2576.67	V	50.92	---	-0.30	50.63	---	74.00	54.00	-3.37	Peak
4950.00	V	41.33	---	7.73	49.06	---	74.00	54.00	-4.94	Peak
N/A										
1610.00	H	52.35	---	-5.23	47.12	---	74.00	54.00	-6.88	Peak
2096.67	H	50.77	---	-1.30	49.47	---	74.00	54.00	-4.53	Peak
2336.67	H	52.58	---	-1.42	51.16	---	74.00	54.00	-2.84	Peak
4916.67	H	41.67	---	7.66	49.33	---	74.00	54.00	-4.67	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 20 MHz Channel mode / CH Low	**Test Date:**	August 21, 2009
Temperature:	22°C	**Tested by:**	Alonso Lu
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
1736.67	V	51.71	---	-2.01	49.70	---	74.00	54.00	-4.30	Peak
1833.33	V	52.08	---	-1.96	50.12	---	74.00	54.00	-3.88	Peak
1990.00	V	51.87	---	-1.89	49.99	---	74.00	54.00	-4.01	Peak
2210.00	V	50.98	---	0.51	51.49	---	74.00	54.00	-2.51	Peak
2533.33	V	51.39	---	0.58	51.97	---	74.00	54.00	-2.03	Peak
3883.33	V	42.56	---	4.16	46.72	---	74.00	54.00	-7.28	Peak
4808.33	V	41.34	---	7.65	48.99	---	74.00	54.00	-5.01	Peak
1733.33	H	51.72	---	-4.16	47.56	---	74.00	54.00	-6.44	Peak
2290.00	H	52.02	---	-1.73	50.28	---	74.00	54.00	-3.72	Peak
2620.00	H	50.34	---	-0.16	50.18	---	74.00	54.00	-3.82	Peak
4108.33	H	41.46	---	8.26	49.72	---	74.00	54.00	-4.28	Peak
4950.00	H	41.12	---	7.85	48.97	---	74.00	54.00	-5.03	Peak
6300.00	H	40.17	---	8.43	48.60	---	74.00	54.00	-5.40	Peak

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 20 MHz Channel mode / CH Mid	**Test Date:**	August 21, 2009
Temperature:	22°C	**Tested by:**	Alonso Lu
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
1486.67	V	53.69	---	-5.74	47.96	---	74.00	54.00	-6.04	Peak
1826.67	V	52.62	---	-1.94	50.68	---	74.00	54.00	-3.32	Peak
2223.33	V	50.75	---	0.41	51.15	---	74.00	54.00	-2.85	Peak
2523.33	V	50.05	---	0.78	50.83	---	74.00	54.00	-3.17	Peak
4866.67	V	41.56	---	7.92	49.47	---	74.00	54.00	-4.53	Peak
N/A										
1610.00	H	52.13	---	-5.23	46.90	---	74.00	54.00	-7.10	Peak
2110.00	H	50.69	---	-1.43	49.26	---	74.00	54.00	-4.74	Peak
2293.33	H	52.43	---	-1.68	50.75	---	74.00	54.00	-3.25	Peak
2513.33	H	51.12	---	-0.53	50.59	---	74.00	54.00	-3.41	Peak
4166.67	H	41.16	---	8.18	49.35	---	74.00	54.00	-4.65	Peak
5100.00	H	40.87	---	8.86	49.73	---	74.00	54.00	-4.27	Peak

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 20 MHz Channel mode / CH High	**Test Date:**	August 21, 2009
Temperature:	22°C	**Tested by:**	Alonso Lu
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
1830.00	V	51.73	---	-1.95	49.78	---	74.00	54.00	-4.22	Peak
2196.67	V	50.84	---	0.46	51.30	---	74.00	54.00	-2.70	Peak
2530.00	V	50.62	---	0.64	51.26	---	74.00	54.00	-2.74	Peak
4908.33	V	40.40	---	8.01	48.41	---	74.00	54.00	-5.59	Peak
6866.67	V	41.11	---	10.41	51.52	---	74.00	54.00	-2.48	Peak
N/A										
1490.00	H	55.19	---	-6.87	48.32	---	74.00	54.00	-5.68	Peak
2066.67	H	50.52	---	-1.79	48.73	---	74.00	54.00	-5.27	Peak
2343.33	H	52.04	---	-1.39	50.65	---	74.00	54.00	-3.35	Peak
2383.33	H	51.96	---	-1.22	50.74	---	74.00	54.00	-3.26	Peak
4133.33	H	42.39	---	8.23	50.61	---	74.00	54.00	-3.39	Peak
4908.33	H	41.52	---	7.61	49.13	---	74.00	54.00	-4.87	Peak

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 40 MHz Channel mode / CH Low	**Test Date:**	August 21, 2009
Temperature:	22°C	**Tested by:**	Alonso Lu
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
1993.33	V	52.81	---	-1.88	50.94	---	74.00	54.00	-3.06	Peak
2146.67	V	52.99	---	-1.48	51.51	---	74.00	54.00	-2.49	Peak
2203.33	V	51.06	---	0.56	51.62	---	74.00	54.00	-2.38	Peak
2510.00	V	50.55	---	1.05	51.60	---	74.00	54.00	-2.40	Peak
4841.67	V	41.96	---	7.80	49.76	---	74.00	54.00	-4.24	Peak
N/A										
2116.67	H	50.80	---	-1.56	49.24	---	74.00	54.00	-4.76	Peak
2506.67	H	51.59	---	-0.56	51.03	---	74.00	54.00	-2.97	Peak
4866.67	H	42.06	---	7.28	49.34	---	74.00	54.00	-4.66	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 40 MHz Channel mode / CH Mid	**Test Date:**	August 21, 2009
Temperature:	22°C	**Tested by:**	Alonso Lu
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
1490.00	V	55.71	---	-5.75	49.95	---	74.00	54.00	-4.05	Peak
1826.67	V	51.80	---	-1.94	49.86	---	74.00	54.00	-4.14	Peak
2503.33	V	50.45	---	1.18	51.64	---	74.00	54.00	-2.36	Peak
2570.00	V	51.25	---	-0.16	51.08	---	74.00	54.00	-2.92	Peak
4866.67	V	41.49	---	7.92	49.41	---	74.00	54.00	-4.59	Peak
N/A										
2096.67	H	51.30	---	-1.30	50.00	---	74.00	54.00	-4.00	Peak
2306.67	H	51.30	---	-1.55	49.75	---	74.00	54.00	-4.25	Peak
4133.33	H	42.65	---	8.23	50.88	---	74.00	54.00	-3.12	Peak
5500.00	H	40.10	---	8.80	48.90	---	74.00	54.00	-5.10	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 40 MHz Channel mode / CH High	**Test Date:**	August 21, 2009
Temperature:	22°C	**Tested by:**	Alonso Lu
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
1743.33	V	51.74	---	-1.99	49.75	---	74.00	54.00	-4.25	Peak
1993.33	V	53.03	---	-1.88	51.15	---	74.00	54.00	-2.85	Peak
2193.33	V	50.84	---	0.33	51.17	---	74.00	54.00	-2.83	Peak
2536.67	V	50.75	---	0.51	51.26	---	74.00	54.00	-2.74	Peak
4891.67	V	41.37	---	8.03	49.41	---	74.00	54.00	-4.59	Peak
6583.33	V	39.49	---	10.97	50.47	---	74.00	54.00	-3.53	Peak
2106.67	H	50.57	---	-1.37	49.20	---	74.00	54.00	-4.80	Peak
2310.00	H	52.23	---	-1.54	50.70	---	74.00	54.00	-3.30	Peak
2616.67	H	51.04	---	-0.17	50.87	---	74.00	54.00	-3.13	Peak
4200.00	H	41.56	---	8.14	49.70	---	74.00	54.00	-4.30	Peak
4916.67	H	42.74	---	7.66	50.40	---	74.00	54.00	-3.60	Peak
N/A										

Remark:

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

7.7 POWERLINE CONDUCTED EMISSIONS

LIMIT

According to §15.207(a), except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

** Decreases with the logarithm of the frequency.*

TEST CONFIGURATION

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

TEST PROCEDURE

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

TEST RESULTS

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

TEST DATA

Operation Mode: Normal Link **Test Date:** July 22, 2009

Temperature: 25°C **Tested by:** Stan Lin

Humidity: 57% RH

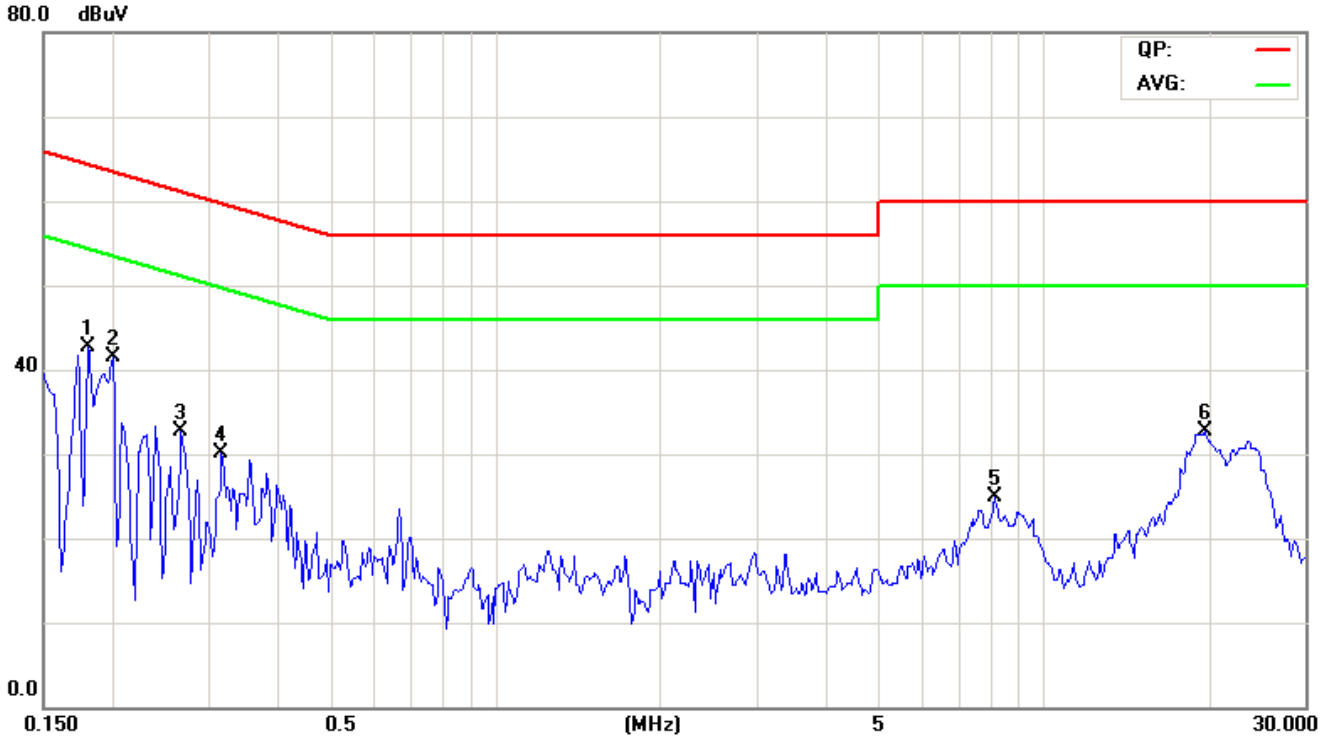
Freq. (MHz)	QP Reading	AV Reading	Corr. factor	QP Result	AV Result	QP Limit	AV Limit	QP Margin	AV Margin	Note
0.1812	32.42	17.92	9.68	42.10	27.60	64.43	54.43	-22.33	-26.83	L1
0.2008	33.42	15.92	9.68	43.10	25.60	63.58	53.58	-20.48	-27.98	L1
0.2672	25.42	11.42	9.68	35.10	21.10	61.20	51.20	-26.10	-30.10	L1
0.3180	23.32	11.92	9.68	33.00	21.60	59.76	49.76	-26.76	-28.16	L1
8.1617	14.04	8.24	9.96	24.00	18.20	60.00	50.00	-36.00	-31.80	L1
19.6539	22.64	19.64	10.36	33.00	30.00	60.00	50.00	-27.00	-20.00	L1
0.1812	31.22	15.22	9.68	40.90	24.90	64.43	54.43	-23.53	-29.53	L2
0.2203	26.02	10.62	9.68	35.70	20.30	62.81	52.81	-27.11	-32.51	L2
0.2477	24.42	9.62	9.68	34.10	19.30	61.83	51.83	-27.73	-32.53	L2
0.3453	19.52	11.42	9.68	29.20	21.10	59.07	49.07	-29.87	-27.97	L2
7.6969	14.79	9.49	9.91	24.70	19.40	60.00	50.00	-35.30	-30.60	L2
19.5367	23.04	19.84	10.36	33.40	30.20	60.00	50.00	-26.60	-19.80	L2

Remark:

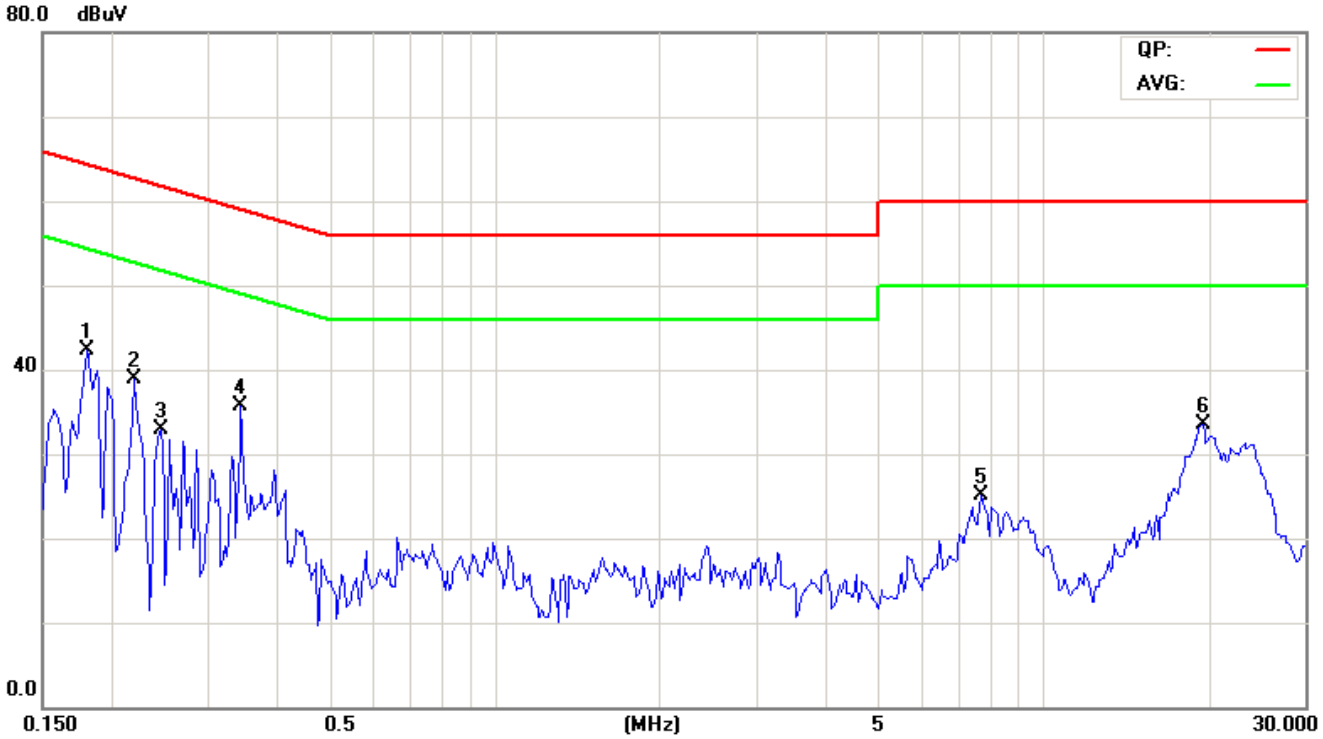
1. *The measuring frequencies range between 0.15 MHz and 30 MHz.*
2. *The emissions measured in the frequency range between 0.15 MHz and 30MHz were made with an instrument using Quasi-peak detector and Average detector.*
3. *The IF bandwidth of SPA between 0.15MHz and 30MHz was 10kHz. The IF bandwidth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

Test Plot

Conducted emissions (Line 1)



Conducted emissions (Line 2)



8. APPENDIX I
RADIO FREQUENCY EXPOSURE

LIMIT

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

EUT SPECIFICATION

EUT	Wireless USB Dongle
Frequency band (Operating)	☒ WLAN: 2.412GHz ~ 2.462GHz ☐ WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz ☐ WLAN: 5.745GHz ~ 5.825GHz ☐ Others
Device category	☒ Portable (<20cm separation) ☐ Mobile (>20cm separation) ☐ Others
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm^2) ☒ General Population/Uncontrolled exposure (S=1mW/cm^2)
Antenna diversity	☐ Single antenna ☒ Multiple antennas (2 for TX/RX function) ☐ Tx diversity ☐ Rx diversity ☒ Tx/Rx diversity
Max. output power	IEEE 802.11b mode: 16.78 dBm (46.13 mW) IEEE 802.11g mode: 20.61 dBm (115.08 mW) draft 802.11n 20 MHz Channel mode: 20.58 dBm (114.29mW) draft 802.11n 40 MHz Channel mode: 19.82 dBm (95.94mW)
Antenna gain (Max)	3.4dBi (including cable loss) (Numeric gain: 2.19)
Evaluation applied	☐ MPE Evaluation* ☐ SAR Evaluation ☒ N/A

Remark:

1. *The maximum output power is 20.61dBm (115.08mW) at 2412MHz (with 2.19numeric antenna gain.)*

TEST RESULTS

No non-compliance noted.

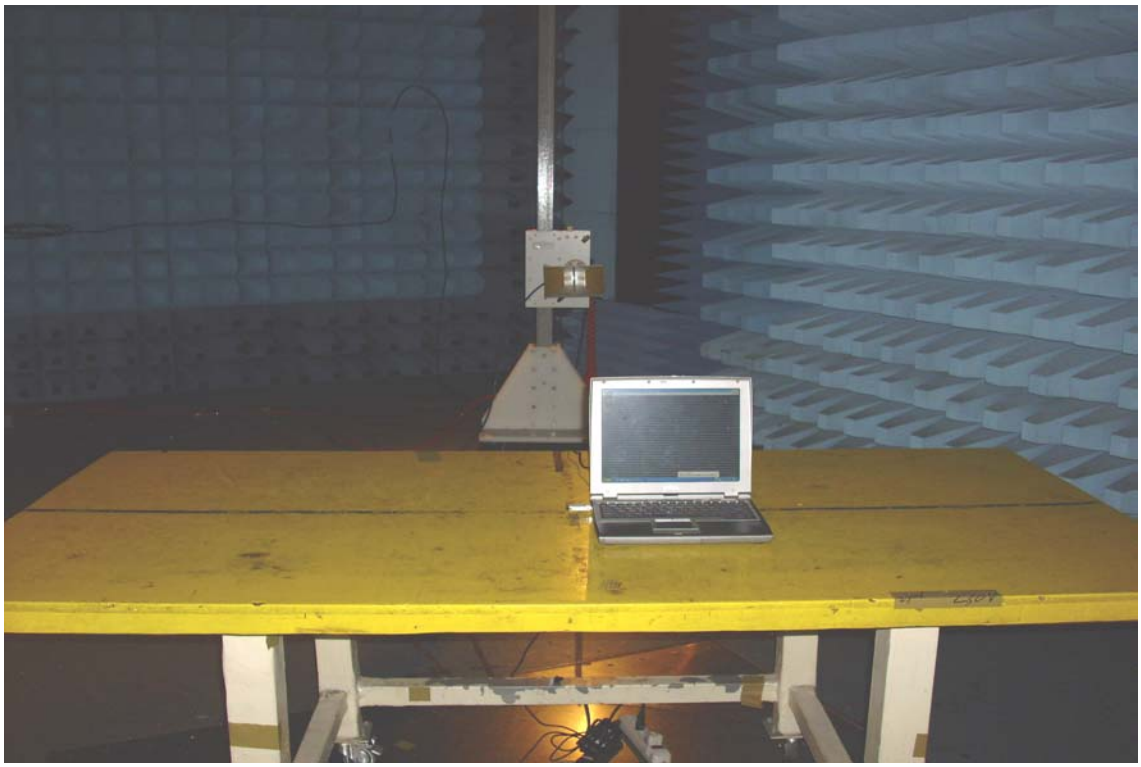
*(According to **RF Exposure Procedures and Equipment Authorization Policies**, SAR evaluation is not required for the PORTABLE device while its maximum average output power is lower than 60/f $_{(GHz)}$=60/2.441=24.58mW)*

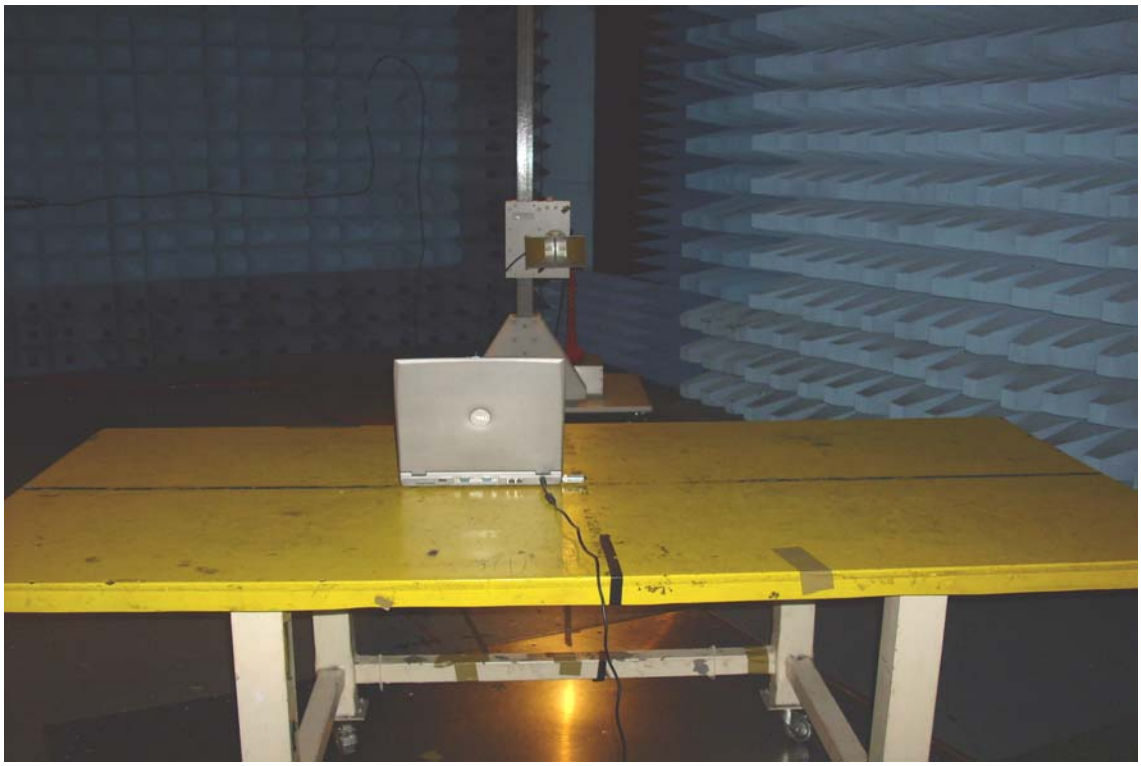
Remark:

802.11b maximum average power is 13.63dBm = 23.07mW <(60/f); Individual SAR is not required.
802.11g maximum average power is 13.47dBm = 22.23mW <(60/f); Individual SAR is not required.
802.11n 20 MHz maximum average power is 13.49dBm = 22.34mW <(60/f); Individual SAR is not required.
802.11n 40 MHz maximum average power is 13.17dBm = 20.75mW <(60/f); Individual SAR is not required.

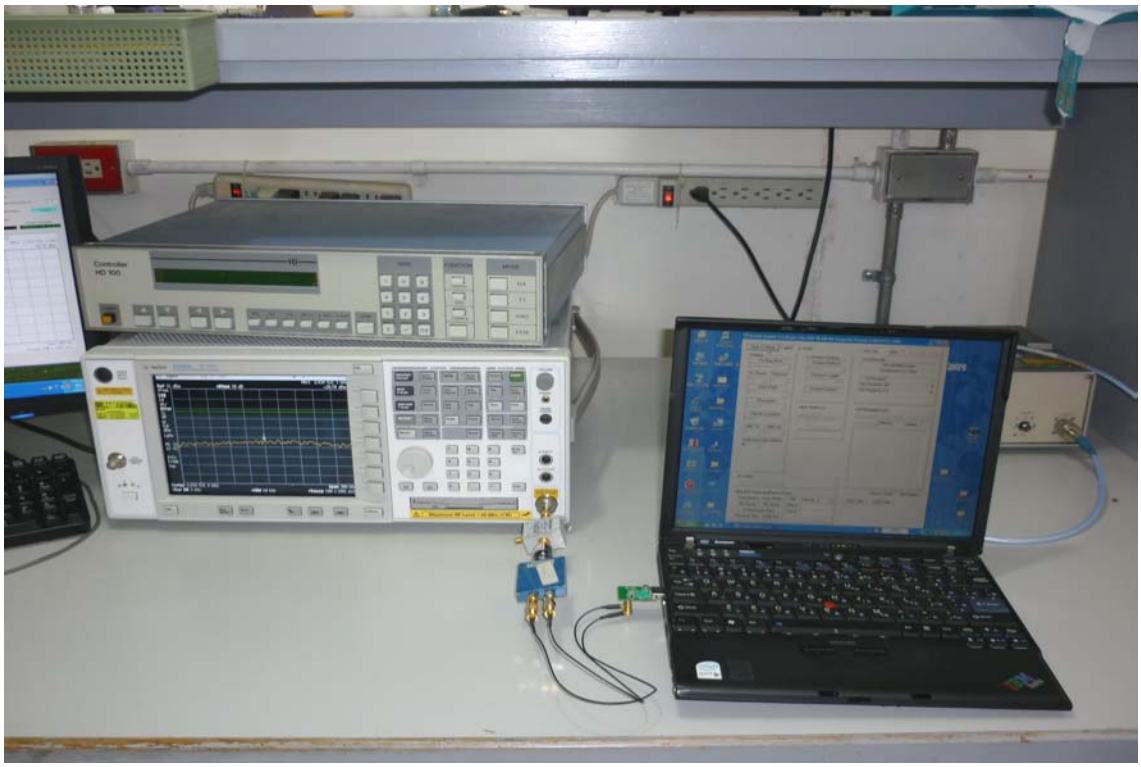
9. APPENDIX II
PHOTOGRAPHS OF TEST SETUP

Radiated Emission Set up Photos





Conducted Emission Setup Photos



Powerline Conducted Emissions Setup Photos