



FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

Gigabit Ethernet Router with HPNA and 802.11n

Model: 2108-N9, 2108-D9

Trade Name: Motorola

Issued to

Motorola, Inc.

**1101 Marina Village Parkway, Alameda,
California, United States 94501**

Issued by

Compliance Certification Services Inc.

**No. 11, Wu-Gong 6th Rd., Wugu Industrial Park,
Taipei Hsien 248, Taiwan (R.O.C.)**

<http://www.ccsrf.com>

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1. TEST RESULT CERTIFICATION

Applicant: Motorola, Inc.
 1101 Marina Village Parkway, Alameda,
 California, United States 94501

Equipment Under Test: Gigabit Ethernet Router with HPNA and 802.11n

Trade Name: Motorola

Model: 2108-N9, 2108-D9

Date of Test: May 21 ~ June 1, 2010

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 15 Subpart C & Industry Canada RSS-210 Issue 7 June, 2007	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 and Industry Canada RSS-210.

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

Approved by:

Reviewed by:

Rex Lai
 Section Manager
 Compliance Certification Services Inc.

Gina Lo
 Section Manager
 Compliance Certification Services Inc.



2. EUT DESCRIPTION

Product	Gigabit Ethernet Router with HPNA and 802.11n			
Trade Name	Motorola			
Model Number	2108-N9, 2108-D9			
Model Discrepancy	For 2108-N9: Gigabit Ethernet Router with HPNA and 802.11n For 2108-D9: Gigabit Ethernet Router with 802.11n			
Power Adapter	1. LEADER / MU18-D120150-A1 I/P: 100-240V, 50-60Hz, 0.6A O/P: 12V, 1.5 A 2. Sunny / SYS1308-2412-W2 I/P: 100-240V, 50-60Hz, 1.0A MAX O/P: 12V, 1.5 A			
Frequency Range	2412 ~ 2462 MHz			
Transmit Power	Mode	Frequency Range	Output Power (dBm)	Output Power (mW)
	802.11b	2412 - 2462	21.38	137.4041
	802.11g	2412 - 2462	25.87	386.3670
	802.11n Standard-20 MHz	2412 - 2462	28.25	668.3439
	802.11n Standard-40 MHz	2422 - 2452	23.96	248.8857
Modulation Technique	IEEE 802.11b mode: DSSS (1, 2, 5.5 and 11 Mbps) IEEE 802.11g mode: OFDM (6, 9, 12, 18, 24, 36, 48 and 54 Mbps) draft 802.11n Standard-20 MHz Channel mode: OFDM (6.5, 7.2, 13, 14.4, 14.44, 19.5, 21.7, 26, 28.89, 28.9, 39, 43.3, 43.33 52, 57.78, 57.8, 58.5, 65.0, 72.2, 78, 86.67, 104, 115.56, 117, 130, 144.44 Mbps) draft 802.11n Wide-40 MHz Channel mode: OFDM (13.5, 15, 27, 30, 40.5, 45, 54, 60, 81, 90, 108, 120, 121.5, 135, 150, 162, 180, 216, 240, 243, 270, 300 Mbps)			
Number of Channels	IEEE 802.11b/g mode: 11 Channels draft 802.11n Standard-20 MHz Channel mode: 11 Channels draft 802.11n Wide-40 MHz Channel mode: 7 Channels			
Antenna Specification	Part No: C147-510635-A Omni-directional Antenna / Gain: 1.8 dBi Part No: C147-510634-A Omni-directional Antenna / Gain: 1.8 dBi			

Remark:

1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for FCC ID: **GZ52108-N9** filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.



3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, 15.207, 15.209 and 15.247.

3.1 EUT CONFIGURATION

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

3.2 EUT EXERCISE

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

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

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

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

Radiated Emissions

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



3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

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

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
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: 2108-N9) comes with two types of power adapter (MU18-D120150-A1 & SYS1308-2412-W2) for sale. After the preliminary test, the EUT with power adapter (Model: MU18-D120150-A1) was found to emit the worst emissions and therefore 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 and receiving mode was programmed.

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

IEEE 802.11b mode:

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

IEEE 802.11g mode:

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

draft 802.11n Standard-20 MHz Channel mode:

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

draft 802.11n Wide-40 MHz Channel mode:

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

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



4. INSTRUMENT CALIBRATION

4.1 MEASURING INSTRUMENT CALIBRATION

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

4.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

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

Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360131	03/03/2011

3M Semi Anechoic Chamber				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US42510252	10/26/2010
EMI Test Receiver	R&S	ESCI	100064	02/04/2011
Pre-Amplifier	Mini-Circuits	ZFL-1000LN	SF350700823	01/13/2011
Pre-Amplifier	MITEQ	AFS44-00102650-42-10P-44	1415367	11/20/2010
Bilog Antenna	Sunol Sciences	JB3	A030105	09/11/2010
Horn Antenna	EMCO	3117	00055165	12/07/2010
Loop Antenna	EMCO	6502	8905/2356	05/27/2011
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
Site NSA	CCS	N/A	N/A	12/31/2010
Test S/W	LabVIEW 6.1 (CCS OATS EMI SW V2.7)			

Conducted Emission room # A				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
TEST RECEIVER	R&S	ESHS20	840455/006	02/28/2011
LISN (EUT)	SCHWARZBECK	NSLK 8127	8127527	12/16/2010
LISN	SCHWARZBECK	NSLK 8127	8127526	12/16/2010
BNC CABLE	MIYAZAKI	5D-FB	BNC A5	02/01/2011
THERMO-HYGRO METER	TECPEL	DTM-303	NO.3	11/23/2010
Test S/W	EZ-EMC (CCS-3A1RE)			



4.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
Powerline Conducted Emission	+/- 1.0717
3M Semi Anechoic Chamber / 30M~200M	+/-3.9944
3M Semi Anechoic Chamber / 200M~1000M	+/-3.9285
3M Semi Anechoic Chamber / 1G~8G	+/-2.4734
3M Semi Anechoic Chamber / 8G~18G	+/-2.4878
3M Semi Anechoic Chamber / 18G~26G	+/-2.6215
3M Semi Anechoic Chamber / 26G~40G	+/-2.8603

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



5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

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

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

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

*Remark: The Powerline Conducted test items was tested at Compliance Certification Services Inc. (Hsintien Lab.)
The test equipments were listed in page 8 and the test data, please refer page 84-85.*

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

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

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

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

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

5.2 EQUIPMENT

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

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




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

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

5.3 LABORATORY ACCREDITATIONS AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by American Association for Laboratory Accreditation Program for the specific scope accreditation under Lab Code: 0824-01 to perform Electromagnetic Interference tests according to FCC Part 15 and CISPR 22 requirements. In addition, the test facilities are listed with Industry Canada, Certification and Engineering Bureau, IC 2324G-1 for 3M Semi Anechoic Chamber A, 2324G-2 for 3M Semi Anechoic Chamber B.

5.4 TABLE OF ACCREDITATIONS AND LISTINGS

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

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



6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

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

6.2 SUPPORT EQUIPMENT

Wugu Lab

No	Equipment	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
1.	Notebook PC (Remoter)	ASUS	M5200AE	5BN0AG019631	PD9WM3B2100	LAN Cable: Unshielded, 10m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core

Hsintien Lab

No.	Equipment	Model No.	Serial No.	FCC ID/BSMI ID	Brand Name	Data Cable	Power Cord
1	PS/2 Mouse	M071KC	443029438	DOC BSMI: R41108	DELL	Shielded, 1.8m	N/A
2	PS/2 Keyboard	SK-8110	N/A	DOC BSMI: T3A002	DELL	Shielded, 1.8m	N/A
3	Printer	Deskjet D2360	TH73C1492F	DOC BSMI: R33001	HP	Shielded, 1.8m	Unshielded, 1.8m
4	Monitor	933SN+	N/A	DOC BSMI: R33475	SAMSUNG	Shielded, 1.8m with two cores	Unshielded, 1.8m
5	Host PC	HD075AV	SGH948QGVX	DOC BSMI: R33001	HP	Unshielded, 1.5m	Unshielded, 1.8m
6	Modem	AL-56ERM	0MERM04A0212	DOC	GALILEO	Shielded, 1.0m	Unshielded, 1.8m
7	Server Notebook	2210B	CNV7472KG5	DOC BSMI: R33001	HP	Unshielded, 20m	Unshielded, 1.8m
8	HPNA bridge	HA21	N/A	N/A	Sercomm	Shielded, 20m	N/A
9	Server Notebook	PP05L	2464936188	DoC BSMI: R33002	DELL	Unshielded, 1.0m	Unshielded, 1.8m with a core
10	LAN Cable	N/A	N/A	N/A	N/A	Unshielded, 3.0mx3	N/A

Remark:

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

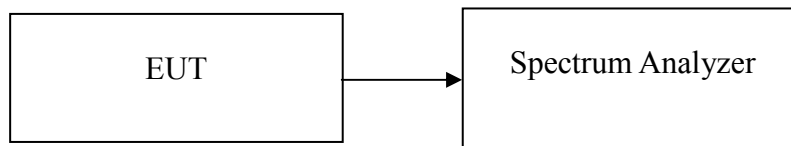
7. FCC PART 15.247 REQUIREMENTS

7.1 6DB BANDWIDTH

LIMIT

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

Test Configuration



TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 100 kHz, VBW = RBW, Span = 50 MHz, Sweep = auto.
4. Mark the peak frequency and -6dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

TEST RESULTS

No non-compliance noted

**Test Data****Test mode: IEEE 802.11b mode**

Channel	Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
Low	2412	10080	>500	PASS
Mid	2437	10250		PASS
High	2462	10170		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
Low	2412	16330	>500	PASS
Mid	2437	16330		PASS
High	2462	16420		PASS

Test mode: draft 802.11n Standard-20 MHz Channel mode / Chain 0

Channel	Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
Low	2412	16920	>500	PASS
Mid	2437	16830		PASS
High	2462	17330		PASS

Test mode: draft 802.11n Standard-20 MHz Channel mode / Chain 1

Channel	Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
Low	2412	17420	>500	PASS
Mid	2437	17250		PASS
High	2462	16830		PASS

Test mode: draft 802.11n Wide-40 MHz Channel mode / Chain 0

Channel	Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
Low	2422	34750	>500	PASS
Mid	2437	35170		PASS
High	2452	35000		PASS

Test mode: draft 802.11n Wide-40 MHz Channel mode / Chain 1

Channel	Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
Low	2422	34830	>500	PASS
Mid	2437	33750		PASS
High	2452	35420		PASS



Test Plot

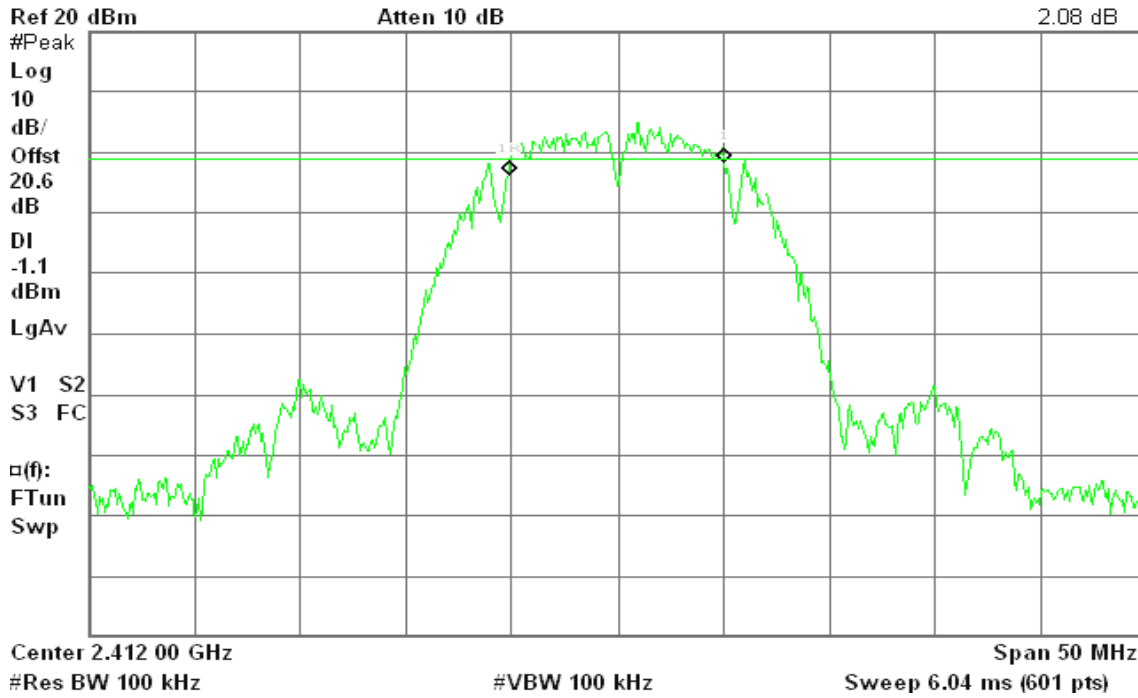
IEEE 802.11b mode

6dB Bandwidth (CH Low)

Agilent 21:29:14 May 21, 2010

R T

Δ Mkr1 10.08 MHz
2.08 dB

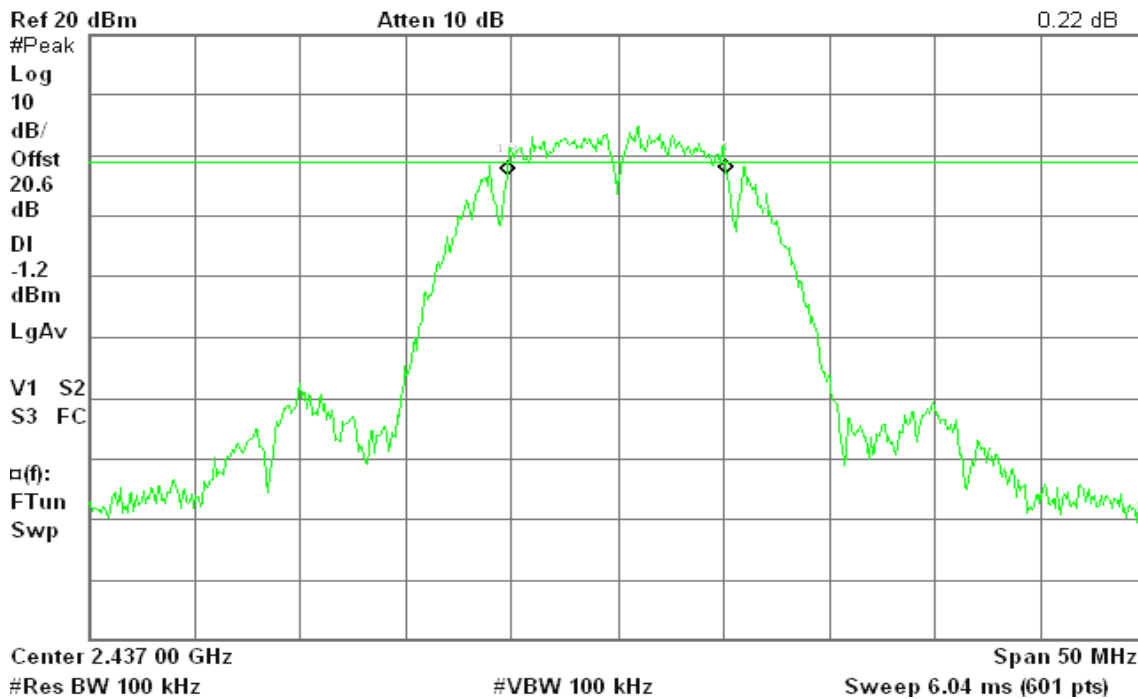


6dB Bandwidth (CH Mid)

Agilent 21:39:30 May 21, 2010

R T

Δ Mkr1 10.25 MHz
0.22 dB



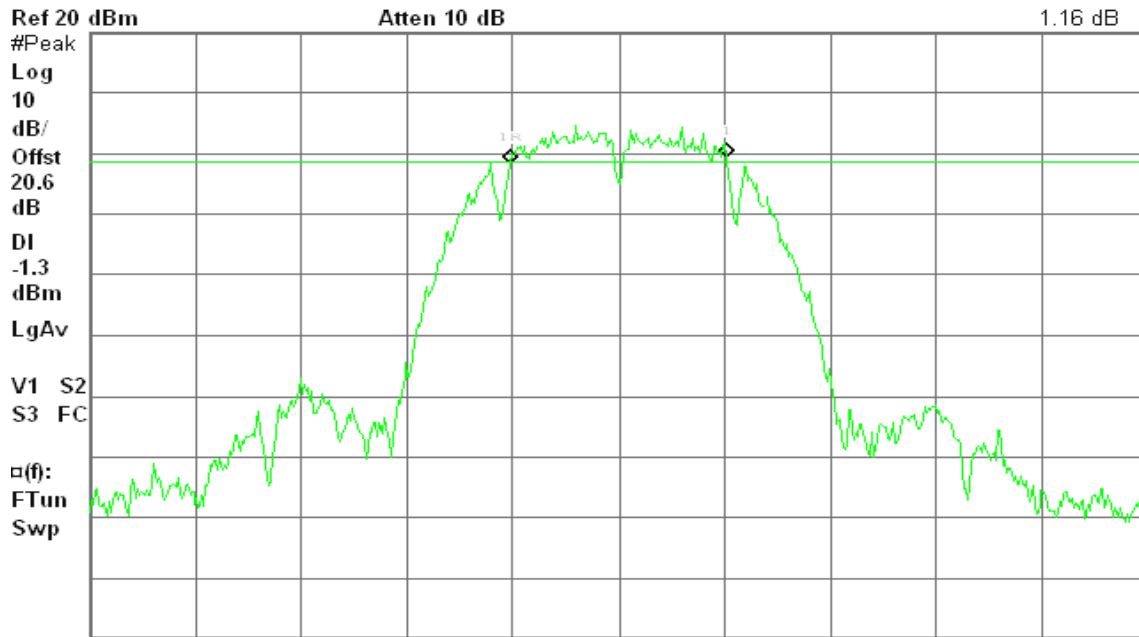


6dB Bandwidth (CH High)

Agilent 21:45:58 May 21, 2010

R T

Δ Mkr1 10.17 MHz
1.16 dB



Center 2.462 00 GHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 6.04 ms (601 pts)

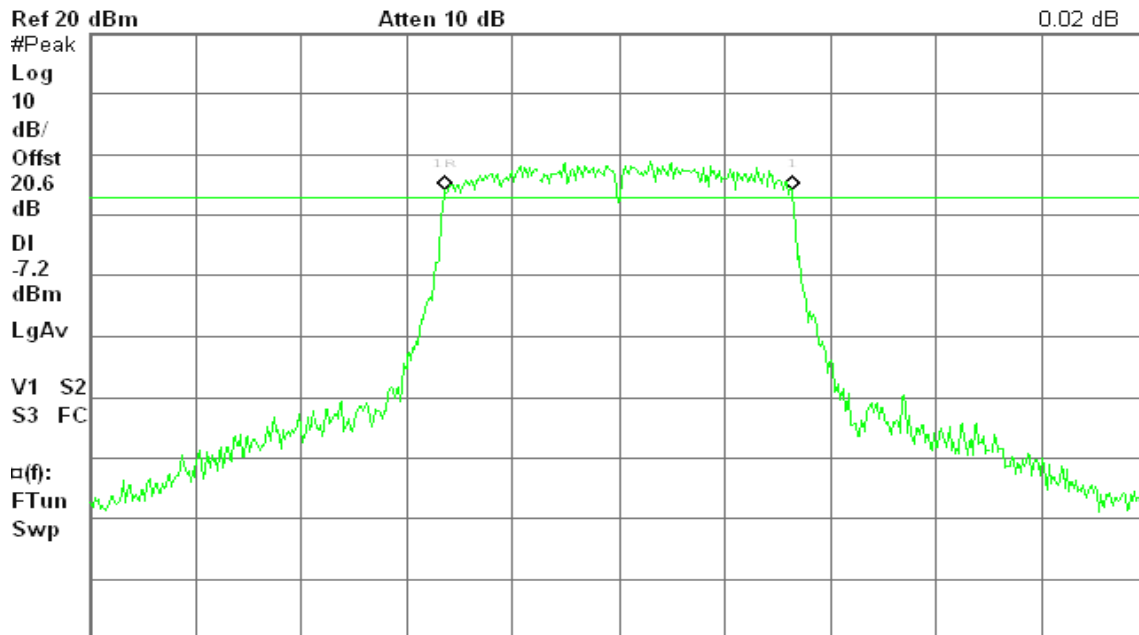
IEEE 802.11g mode

6dB Bandwidth (CH Low)

Agilent 22:07:34 May 21, 2010

R T

Δ Mkr1 16.33 MHz
0.02 dB



Center 2.412 00 GHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 6.04 ms (601 pts)

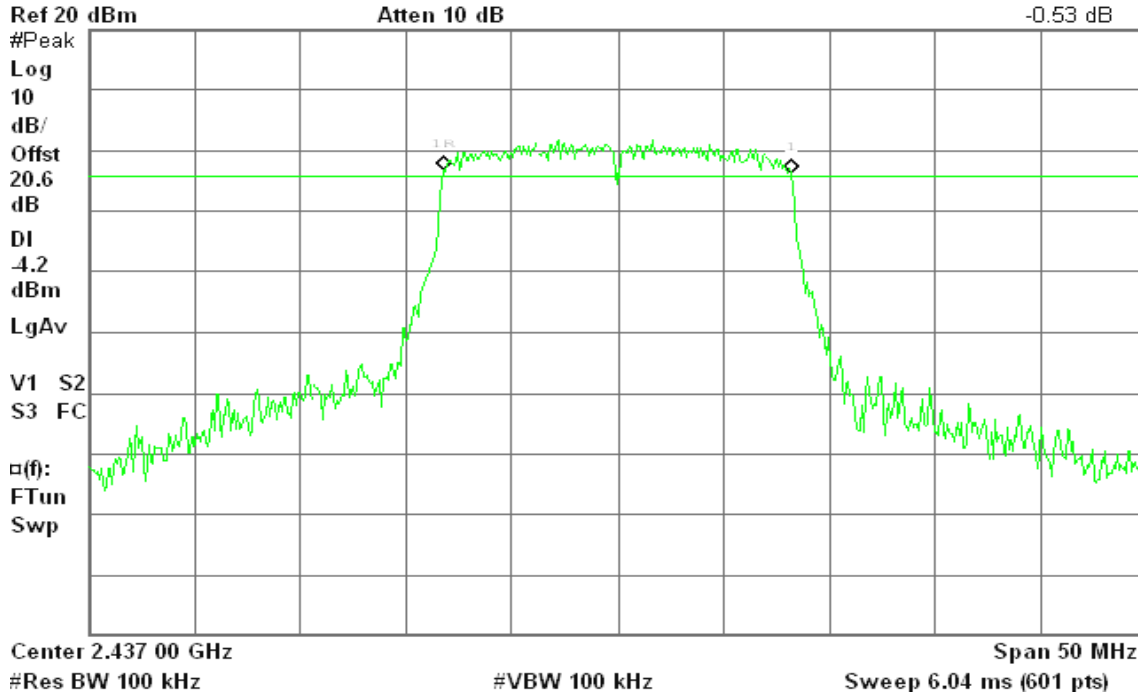


6dB Bandwidth (CH Mid)

Agilent 22:01:23 May 21, 2010

R T

Δ Mkr1 16.33 MHz
-0.53 dB

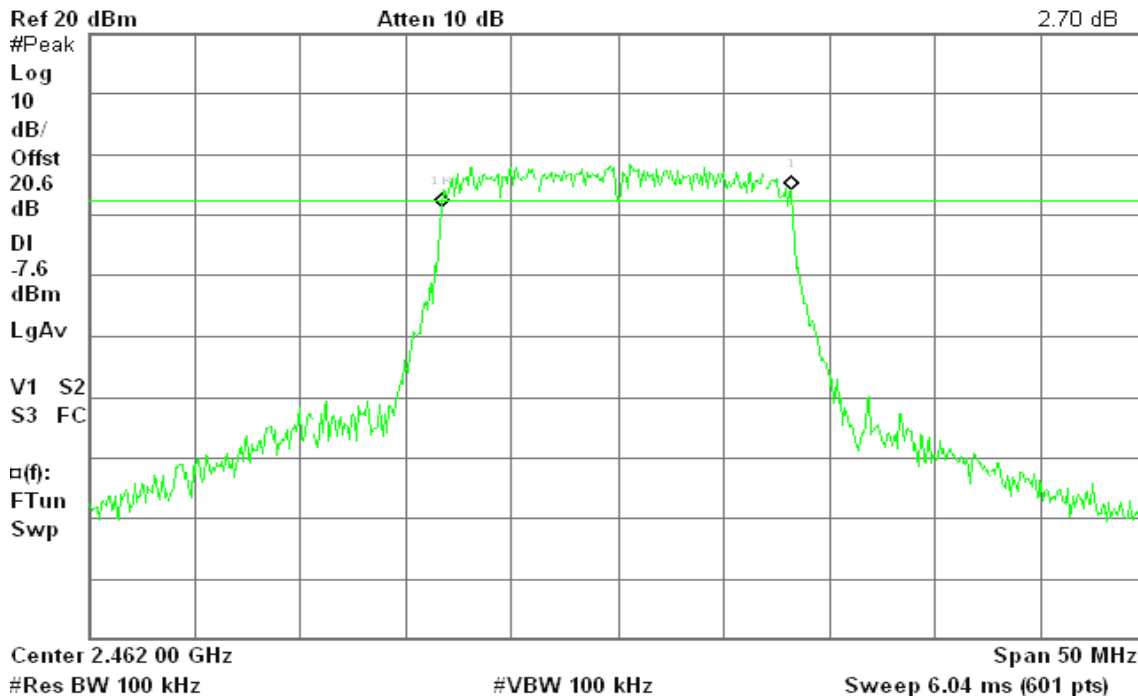


6dB Bandwidth (CH High)

Agilent 21:53:58 May 21, 2010

R T

Δ Mkr1 16.42 MHz
2.70 dB





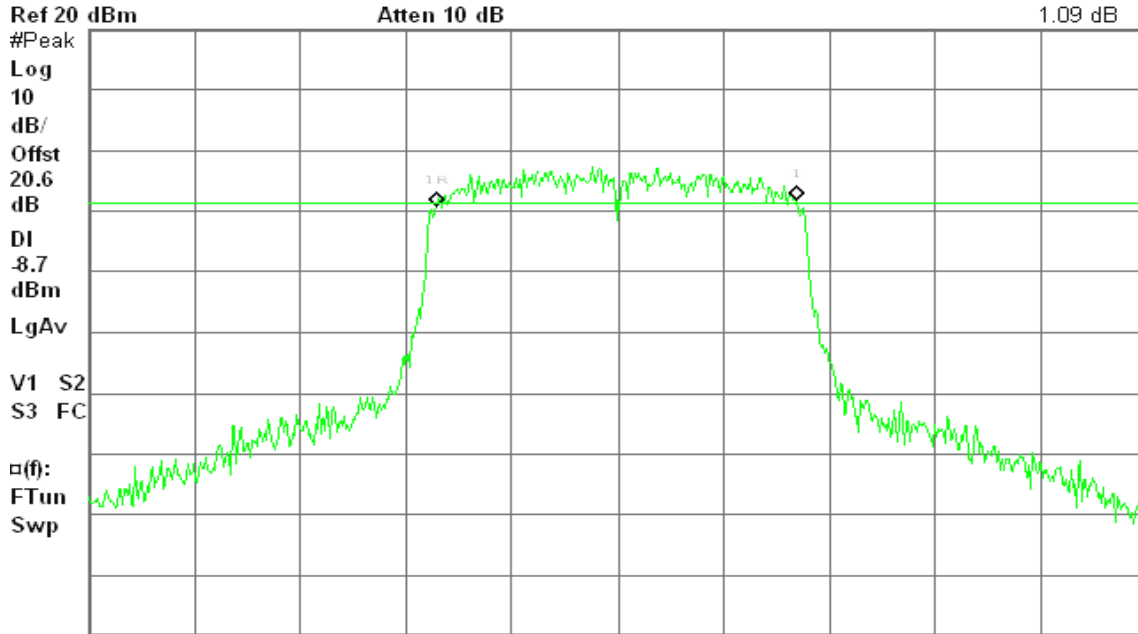
draft 802.11n Standard-20 MHz Channel mode / Chain 0

6dB Bandwidth (CH Low)

Agilent 17:32:32 May 24, 2010

R T

Δ Mkr1 16.92 MHz
1.09 dB



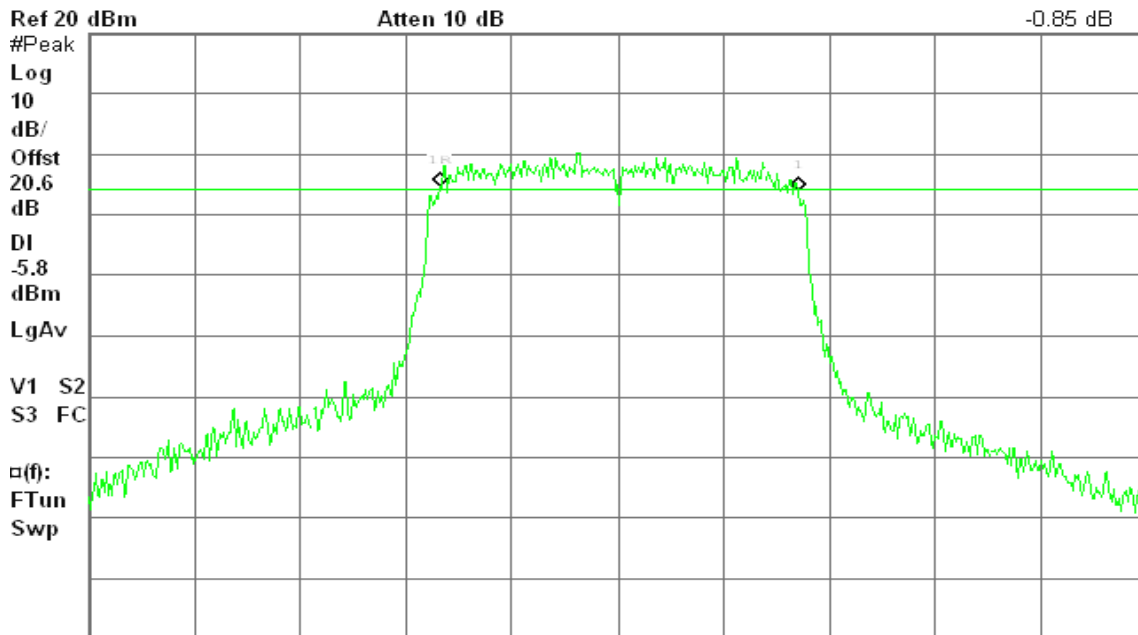
Center 2.412 00 GHz Span 50 MHz
#Res BW 100 kHz #VBW 100 kHz Sweep 6.04 ms (601 pts)

6dB Bandwidth (CH Mid)

Agilent 18:02:27 May 24, 2010

R T

Δ Mkr1 16.83 MHz
-0.85 dB



Center 2.437 00 GHz Span 50 MHz
#Res BW 100 kHz #VBW 100 kHz Sweep 6.04 ms (601 pts)

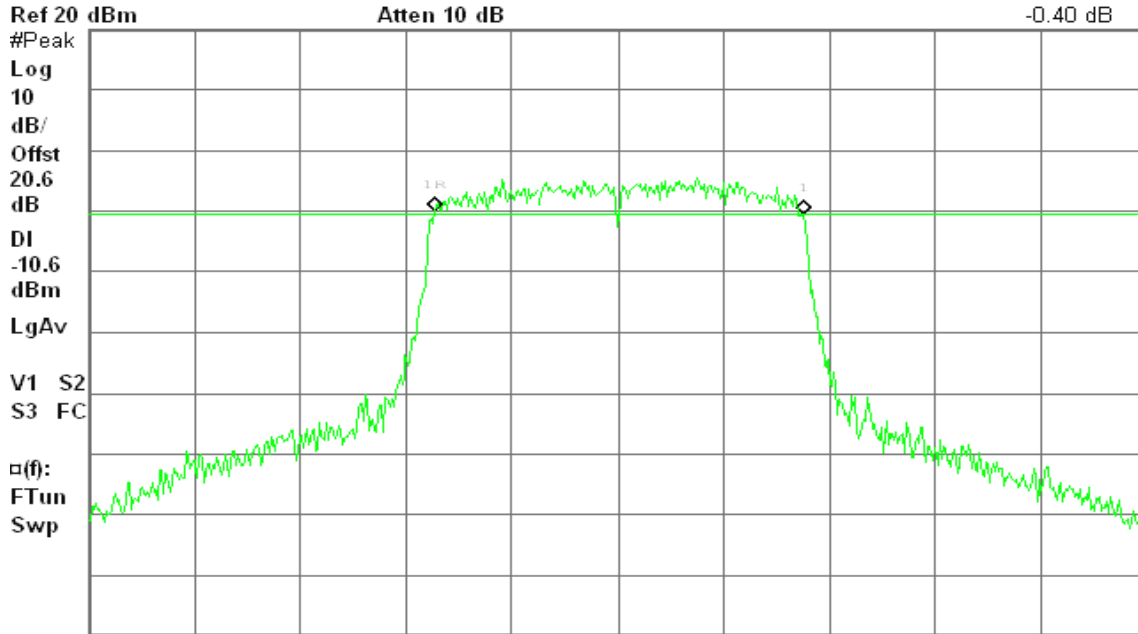


6dB Bandwidth (CH High)

Agilent 18:21:38 May 24, 2010

R T

Δ Mkr1 17.33 MHz
-0.40 dB



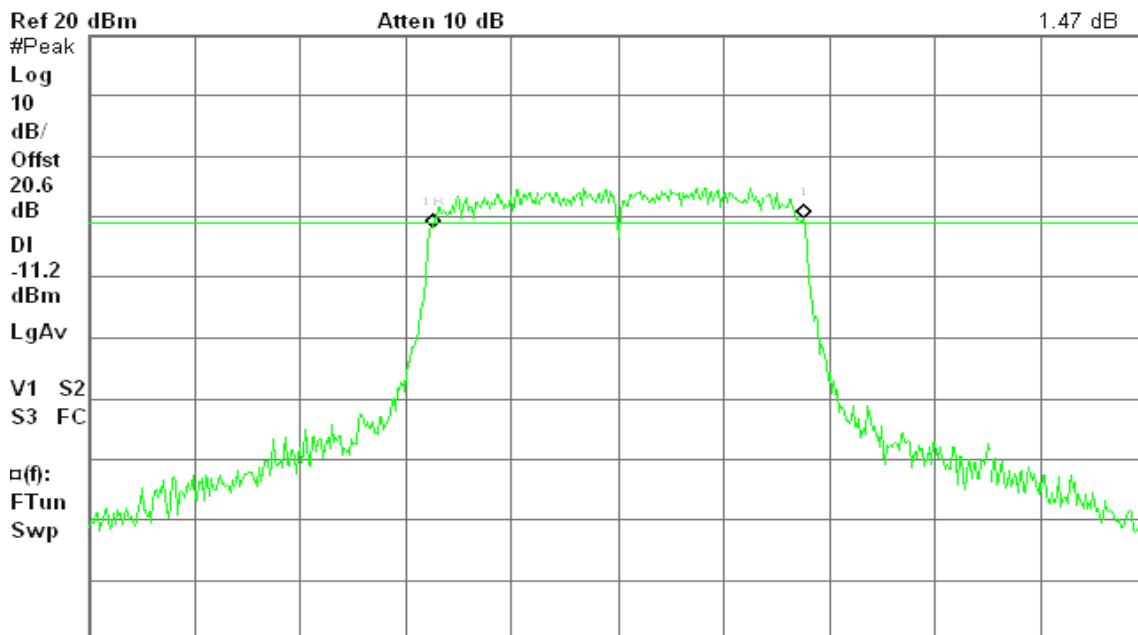
draft 802.11n Standard-20 MHz Channel mode / Chain 1

6dB Bandwidth (CH Low)

Agilent 18:45:18 May 24, 2010

R T

Δ Mkr1 17.42 MHz
1.47 dB



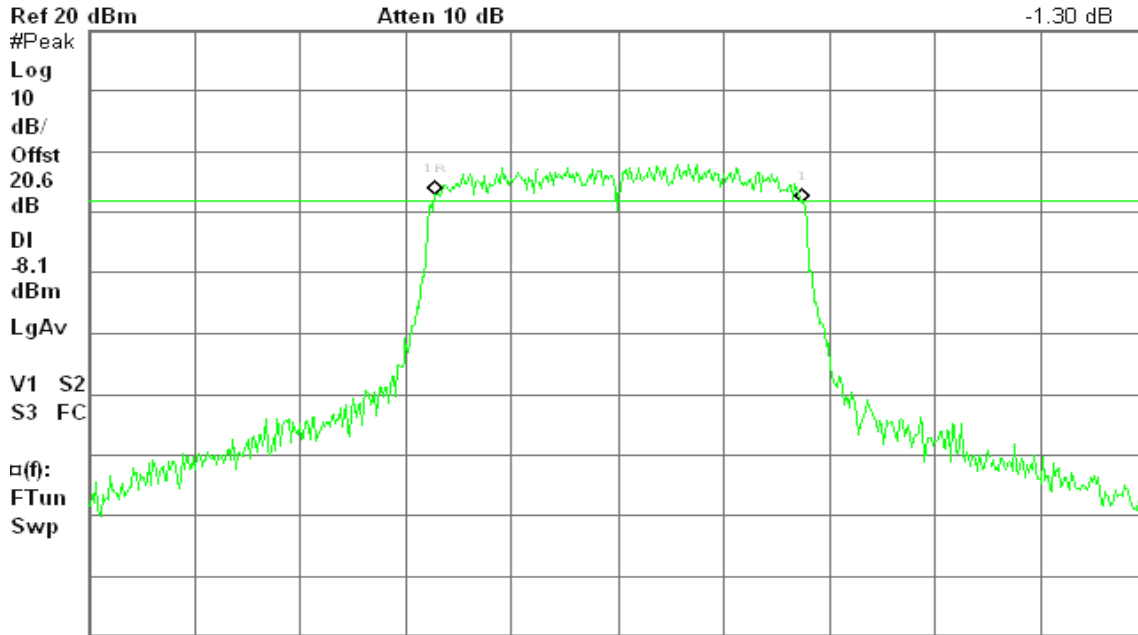


6dB Bandwidth (CH Mid)

Agilent 18:51:07 May 24, 2010

R T

Δ Mkr1 17.25 MHz
-1.30 dB



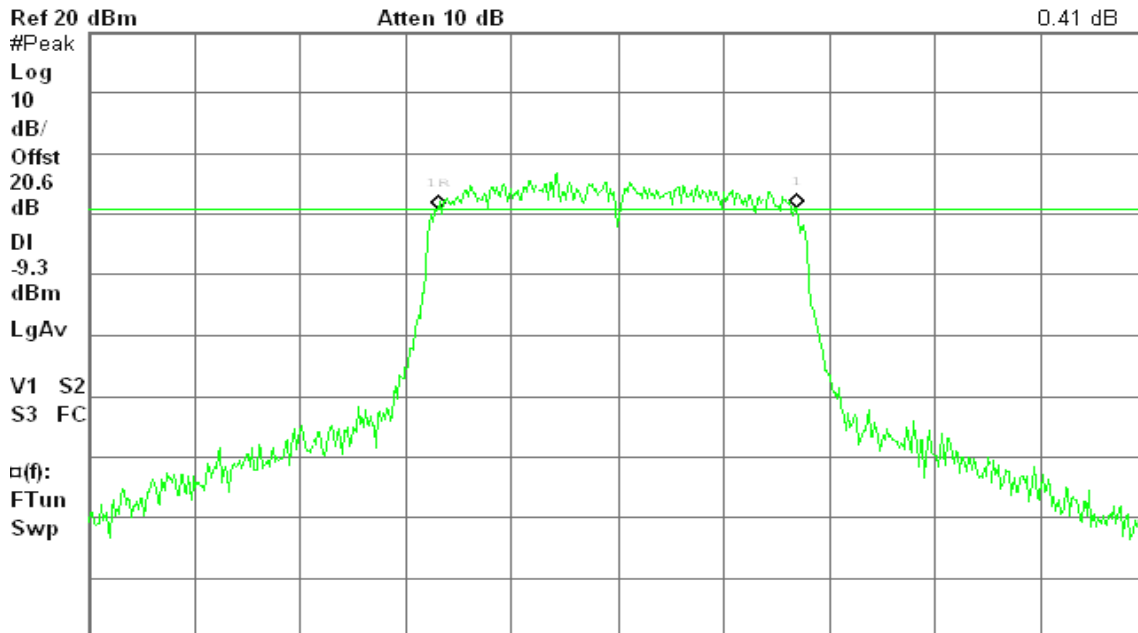
Center 2.437 00 GHz Span 50 MHz
#Res BW 100 kHz #VBW 100 kHz Sweep 6.04 ms (601 pts)

6dB Bandwidth (CH High)

Agilent 18:34:28 May 24, 2010

R T

Δ Mkr1 16.83 MHz
0.41 dB



Center 2.462 00 GHz Span 50 MHz
#Res BW 100 kHz #VBW 100 kHz Sweep 6.04 ms (601 pts)



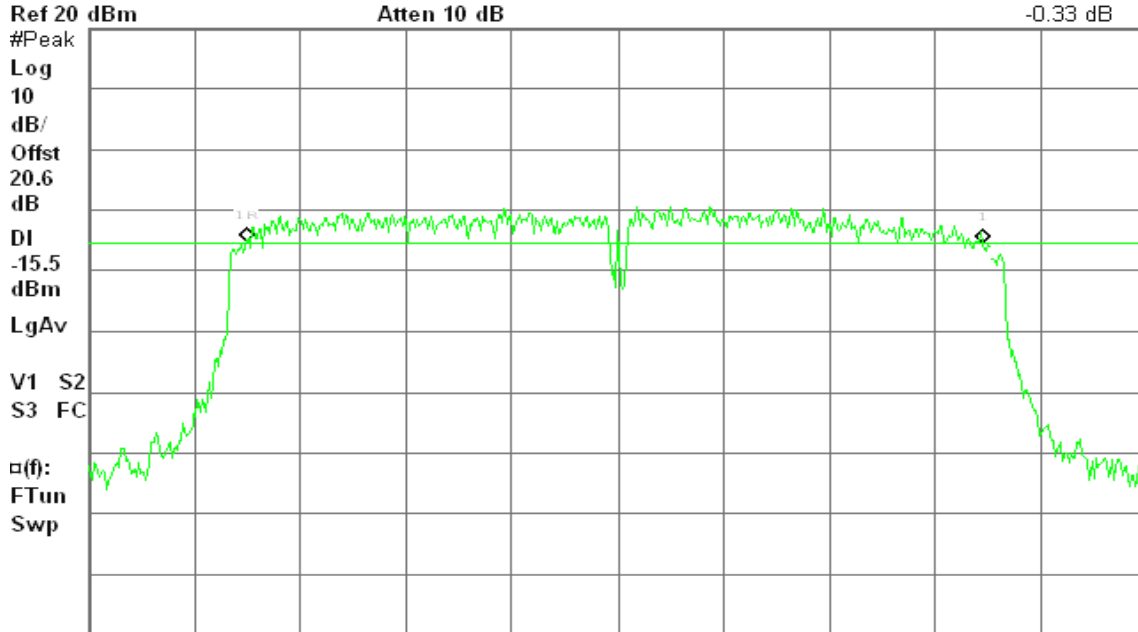
draft 802.11n Wide-40 MHz Channel mode / Chain 0

6dB Bandwidth (CH Low)

Agilent 19:34:24 May 24, 2010

R T

Δ Mkr1 34.75 MHz
-0.33 dB



Center 2.422 00 GHz

#Res BW 100 kHz

#VBW 100 kHz

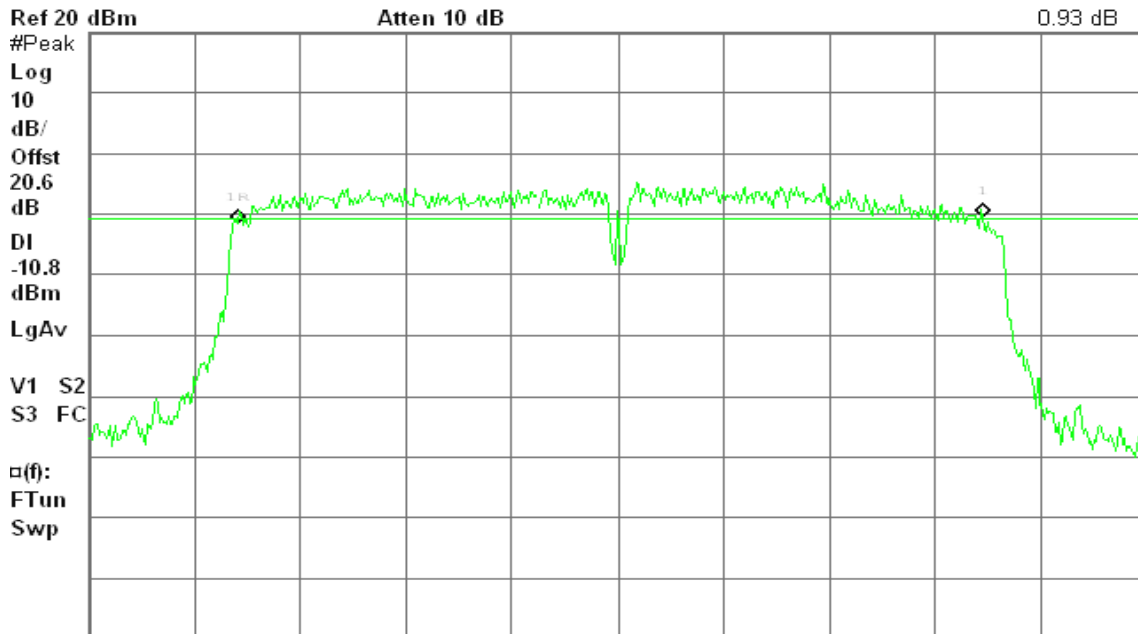
Span 50 MHz
Sweep 6.04 ms (601 pts)

6dB Bandwidth (CH Mid)

Agilent 19:39:20 May 24, 2010

R T

Δ Mkr1 35.17 MHz
0.93 dB



Center 2.437 00 GHz

#Res BW 100 kHz

#VBW 100 kHz

Span 50 MHz
Sweep 6.04 ms (601 pts)

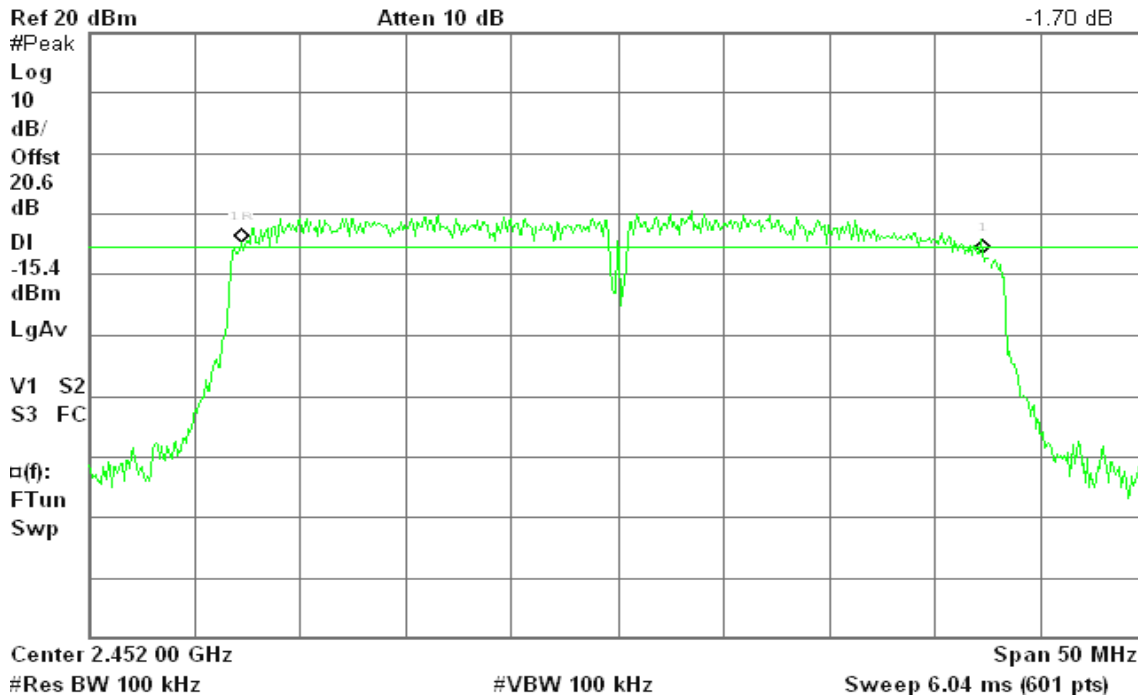


6dB Bandwidth (CH High)

Agilent 19:44:12 May 24, 2010

R T

Δ Mkr1 35.00 MHz
-1.70 dB



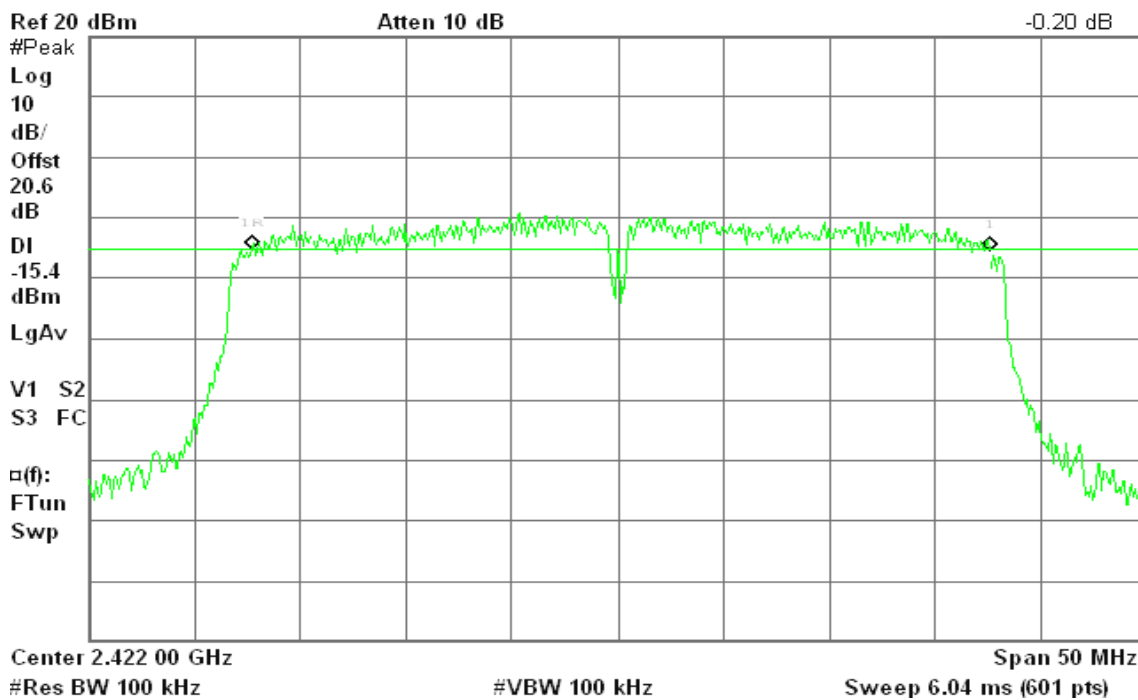
draft 802.11n Wide-40 MHz Channel mode / Chain 1

6dB Bandwidth (CH Low)

Agilent 19:10:36 May 24, 2010

R T

Δ Mkr1 34.83 MHz
-0.20 dB



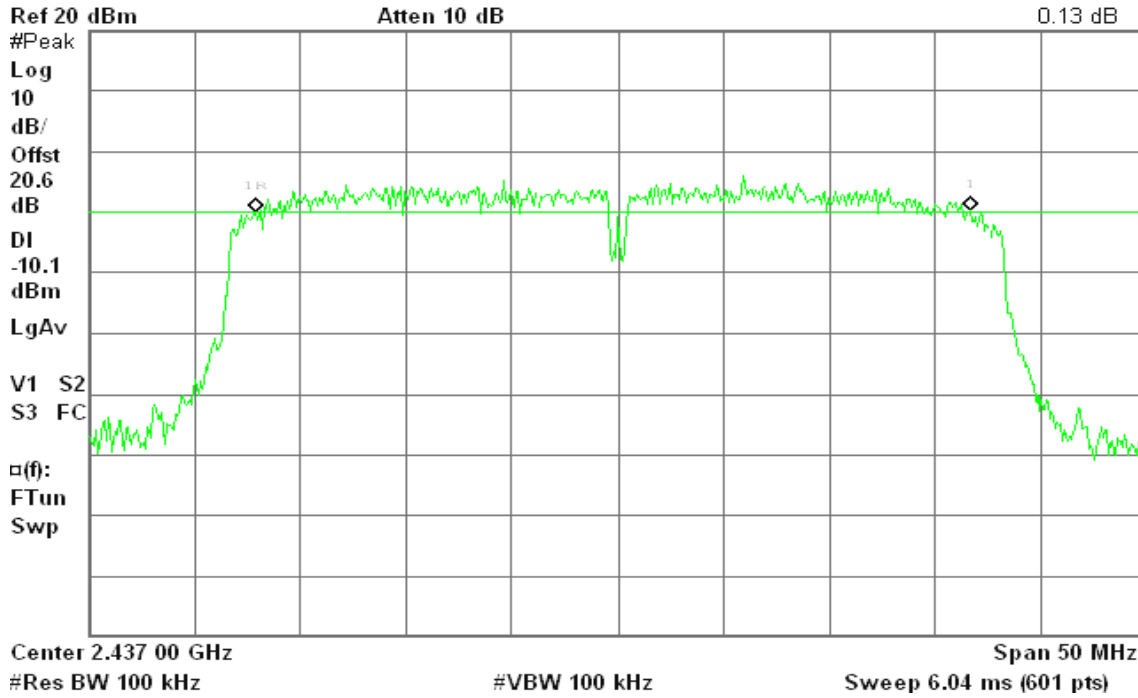


6dB Bandwidth (CH Mid)

Agilent 19:15:20 May 24, 2010

R T

Δ Mkr1 33.75 MHz
0.13 dB

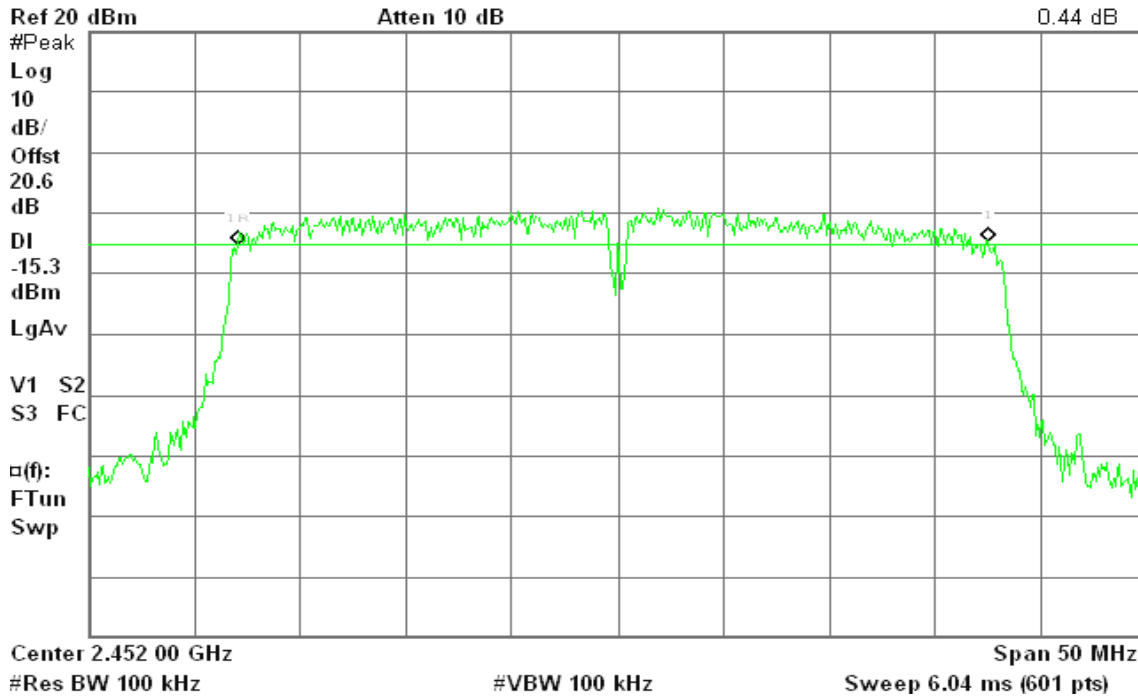


6dB Bandwidth (CH High)

Agilent 19:20:16 May 24, 2010

R T

Δ Mkr1 35.42 MHz
0.44 dB



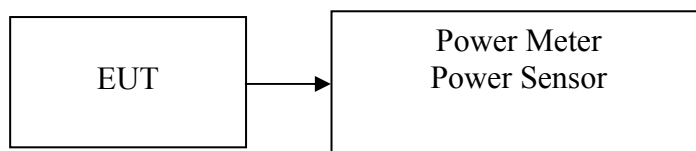
7.2 PEAK POWER

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 Power Meter. The Power Meter 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	21.38	0.1374	1.00	PASS
Mid	2437	21.36	0.1368		PASS
High	2462	21.36	0.1368		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	25.38	0.3451	1.00	PASS
Mid	2437	25.87	0.3864		PASS
High	2462	25.34	0.3420		PASS

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

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Total Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	21.68	21.42	24.56	0.2859	1.00	PASS
Mid	2437	25.11	25.37	28.25	0.6687		PASS
High	2462	20.64	20.54	23.60	0.2291		PASS

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

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Total Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2422	19.14	20.01	18.83	0.0764	1.00	PASS
Mid	2437	23.68	20.64	23.96	0.2489		PASS
High	2452	19.29	23.63	18.81	0.0760		PASS

Remark: Total Output Power (w) = Chain 0 ($10^{(Output Power / 10) / 1000}$) + Chain 1 ($10^{(Output Power / 10) / 1000}$)

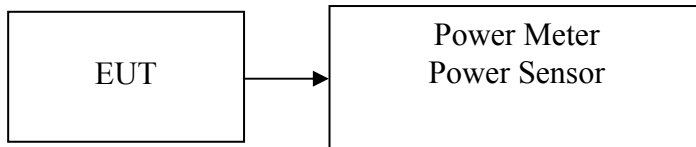


7.3 AVERAGE POWER

LIMIT

None; for reporting purposes only.

Test Configuration



TEST PROCEDURE

The transmitter output is connected to the Power Meter. The Power Meter 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)
Low	2412	18.69	0.0740
Mid	2437	18.63	0.0729
High	2462	18.68	0.0738

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2412	15.5	0.0355
Mid	2437	16.25	0.0422
High	2462	15.47	0.0352

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

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Total Output Power (dBm)	Output Power (W)
Low	2412	12.73	12.76	15.76	0.0376
Mid	2437	15.26	15.32	18.30	0.0676
High	2462	11.9	11.61	14.77	0.0300

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

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Total Output Power (dBm)	Output Power (W)
Low	2422	10.18	10.06	21.38	0.1374
Mid	2437	14.76	14.81	17.80	0.0602
High	2452	10.46	9.90	13.20	0.0209

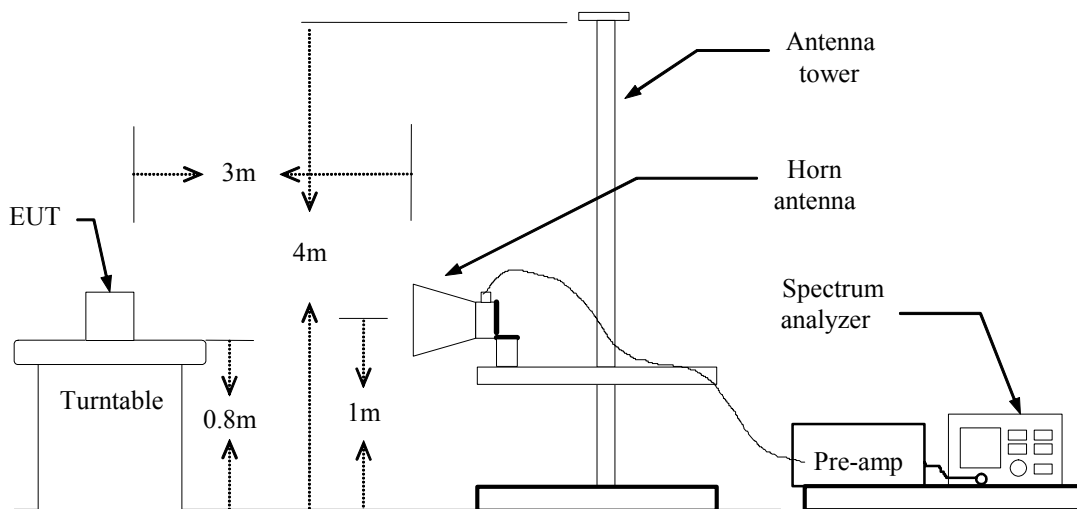
Remark: Total Output Power (w) = Chain 0 ($10^{(Output Power / 10) / 1000}$) + Chain 1 ($10^{(Output Power / 10) / 1000}$)

7.4 BAND EDGES MEASUREMENT

LIMIT

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

Test Configuration



TEST PROCEDURE

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

TEST RESULTS

Refer to attach spectrum analyzer data chart.



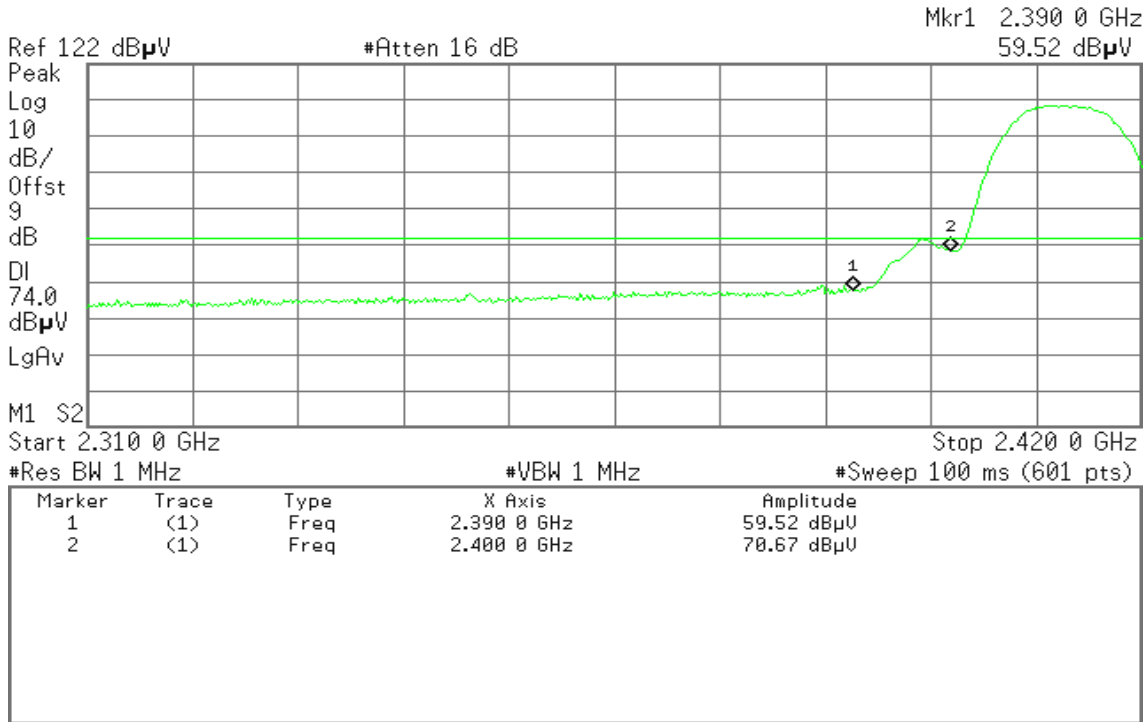
Band Edges (IEEE 802.11b mode / CH Low)

Detector mode: Peak

Polarity: Vertical

Agilent 17:26:10 May 20, 2010

T

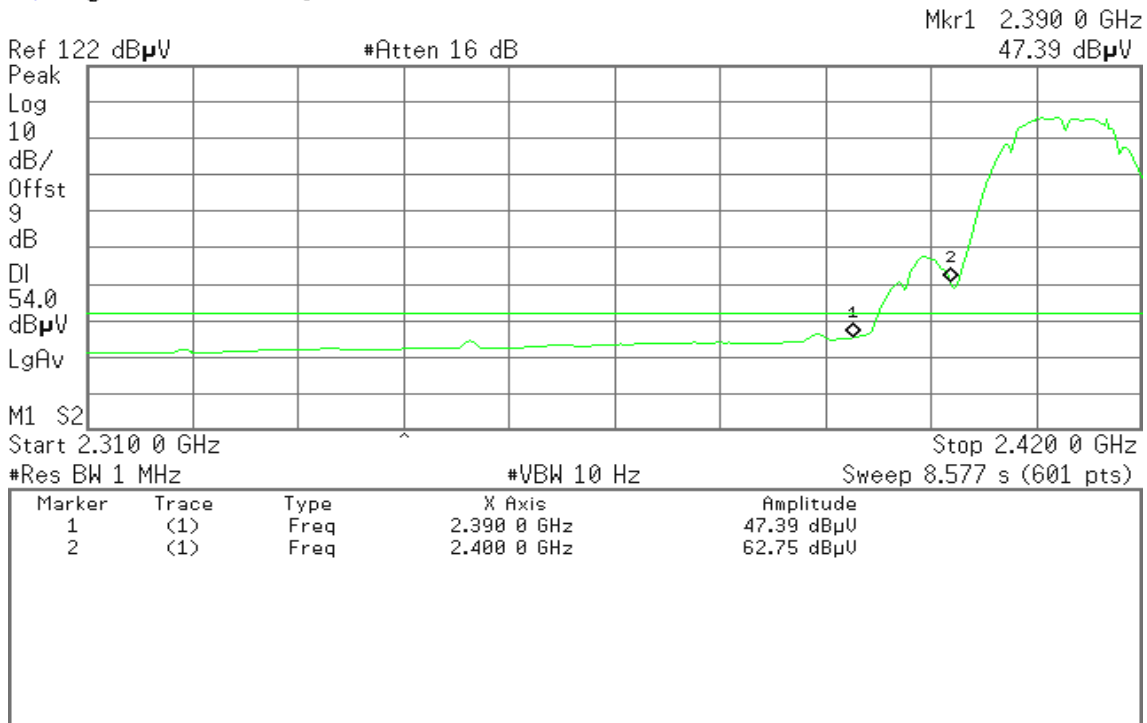


Detector mode: Average

Polarity: Vertical

Agilent 17:24:48 May 20, 2010

T



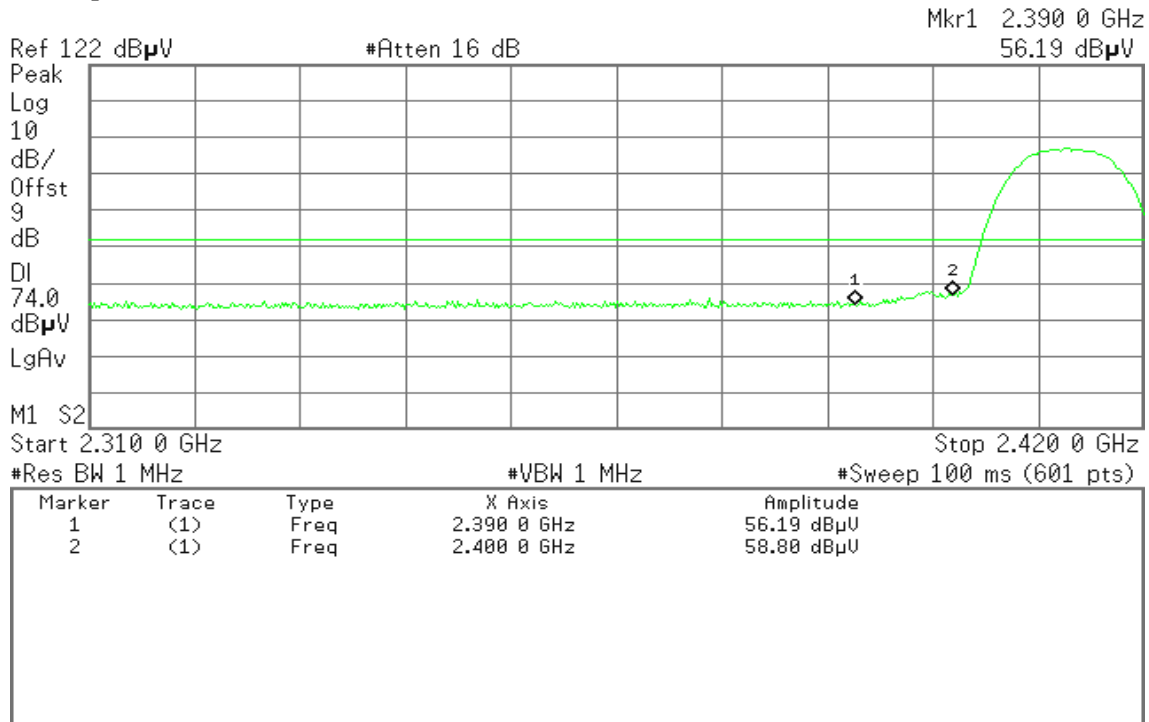


Detector mode: Peak

Polarity: Horizontal

Agilent 17:17:29 May 20, 2010

T

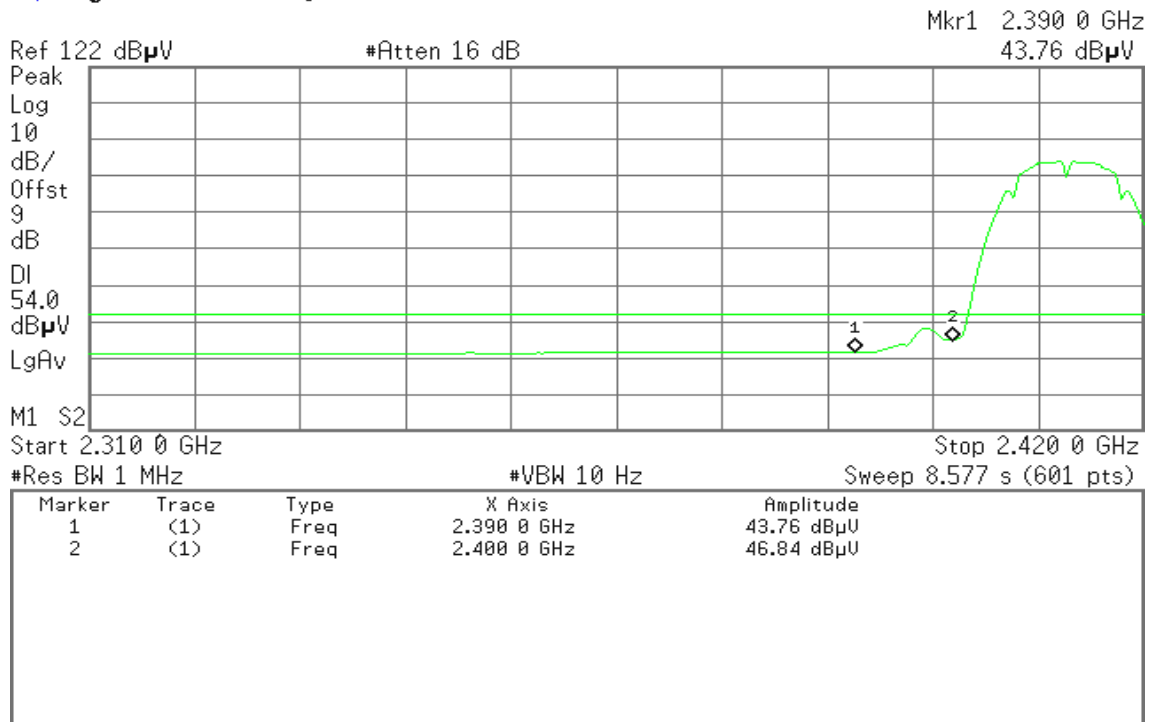


Detector mode: Average

Polarity: Horizontal

Agilent 17:18:19 May 20, 2010

T





Band Edges (IEEE 802.11b mode / CH High)

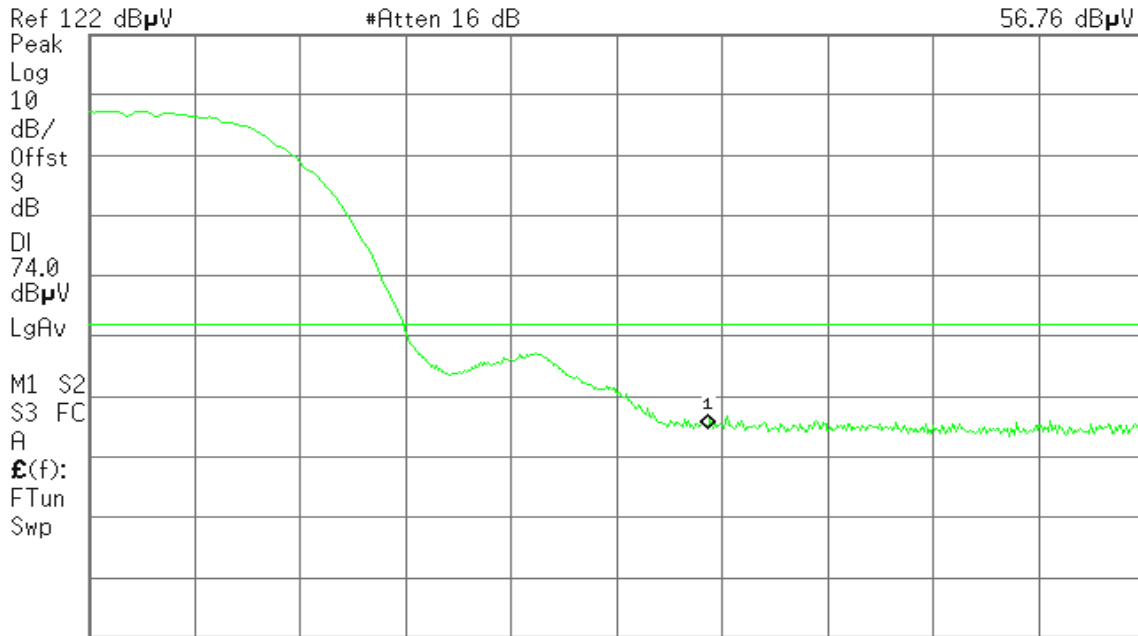
Detector mode: Peak

Polarity: Vertical

Agilent 17:32:03 May 20, 2010

T

Mkr1 2.483 50 GHz
56.76 dB μ V



Start 2.460 00 GHz Stop 2.500 00 GHz
#Res BW 1 MHz #VBW 1 MHz #Sweep 100 ms (601 pts)_

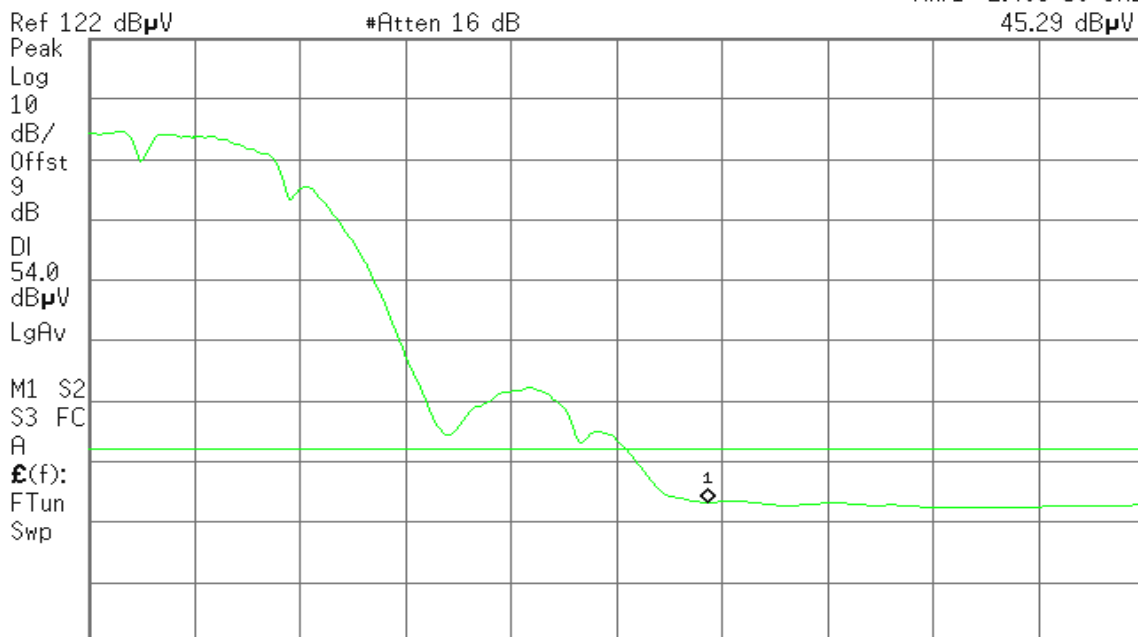
Detector mode: Average

Polarity: Vertical

Agilent 17:31:39 May 20, 2010

T

Mkr1 2.483 50 GHz
45.29 dB μ V



Start 2.460 00 GHz^ Stop 2.500 00 GHz
#Res BW 1 MHz #VBW 10 Hz Sweep 3.119 s (601 pts)_



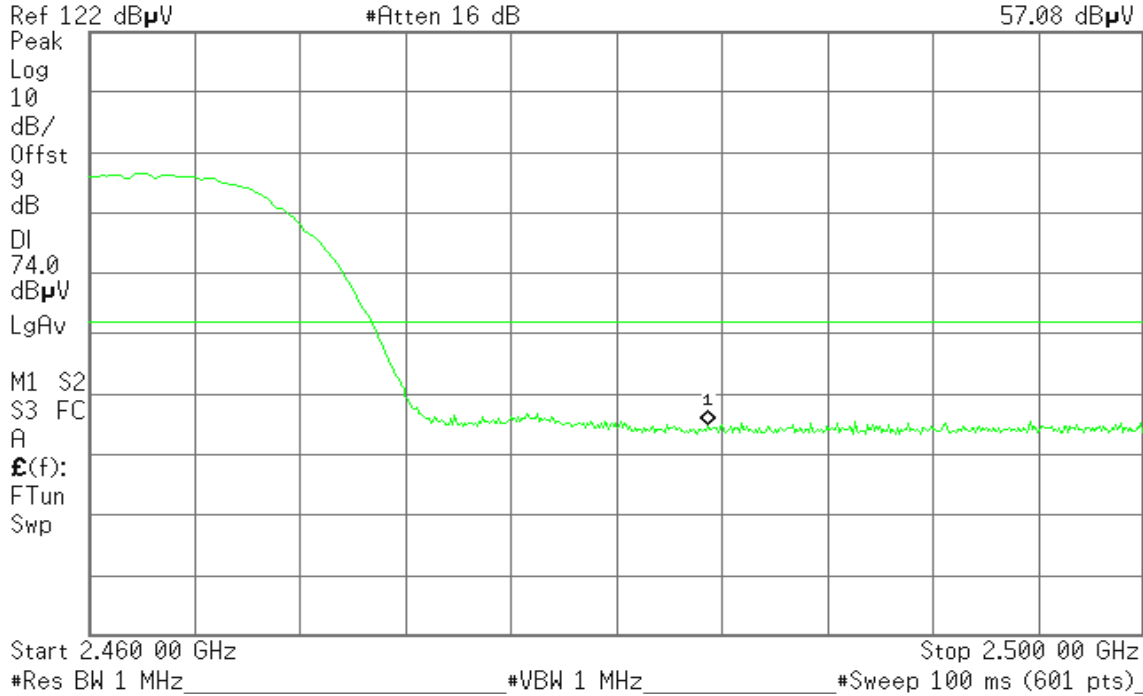
Detector mode: Peak

Polarity: Horizontal

Agilent 17:37:59 May 20, 2010

T

Mkr1 2.483 50 GHz
57.08 dBμV



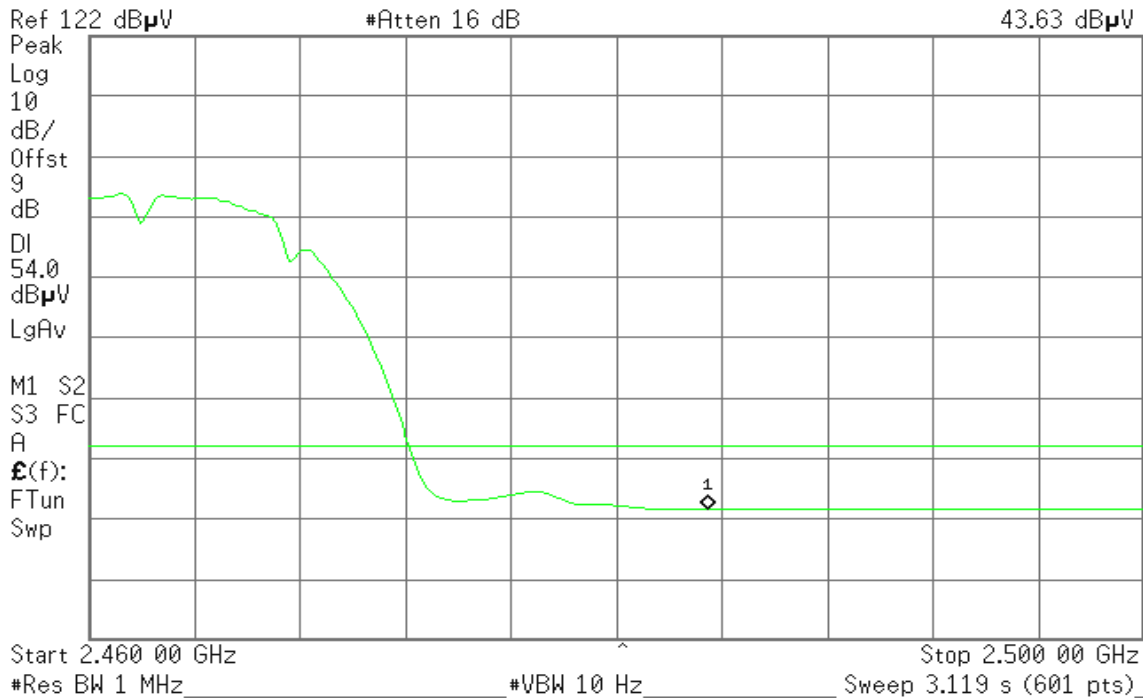
Detector mode: Average

Polarity: Horizontal

Agilent 17:38:27 May 20, 2010

T

Mkr1 2.483 50 GHz
43.63 dBμV





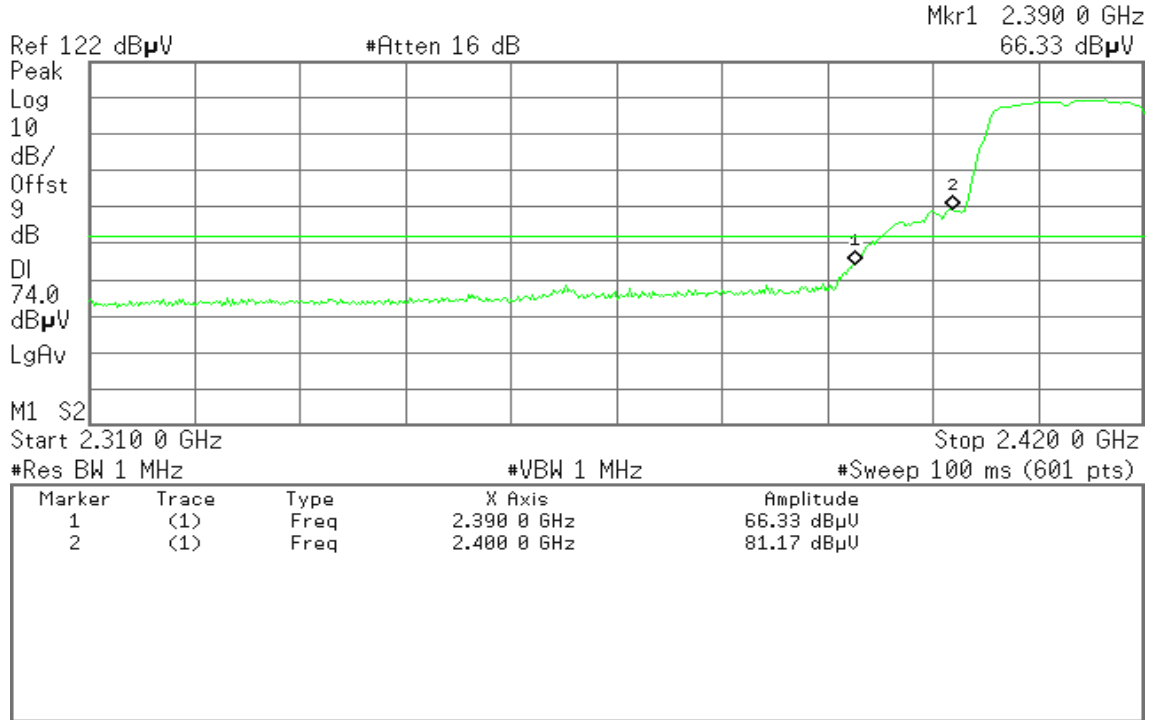
Band Edges (IEEE 802.11g mode / CH Low)

Detector mode: Peak

Polarity: Vertical

Agilent 15:00:04 May 20, 2010

R T

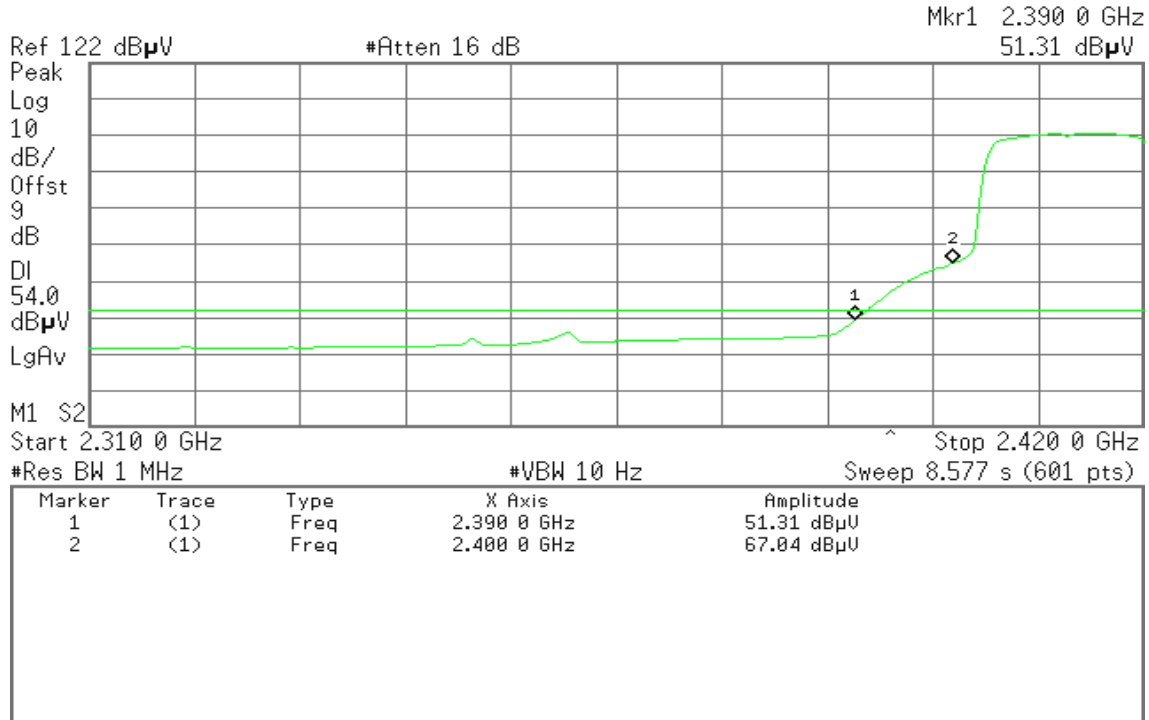


Detector mode: Average

Polarity: Vertical

Agilent 14:59:10 May 20, 2010

R T





Detector mode: Peak

Polarity: Horizontal

Agilent 17:10:28 May 20, 2010

T

Mkr1 2.390 0 GHz
56.33 dBµV



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

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.390 0 GHz	56.33 dBµU
2	(1)	Freq	2.400 0 GHz	62.16 dBµU

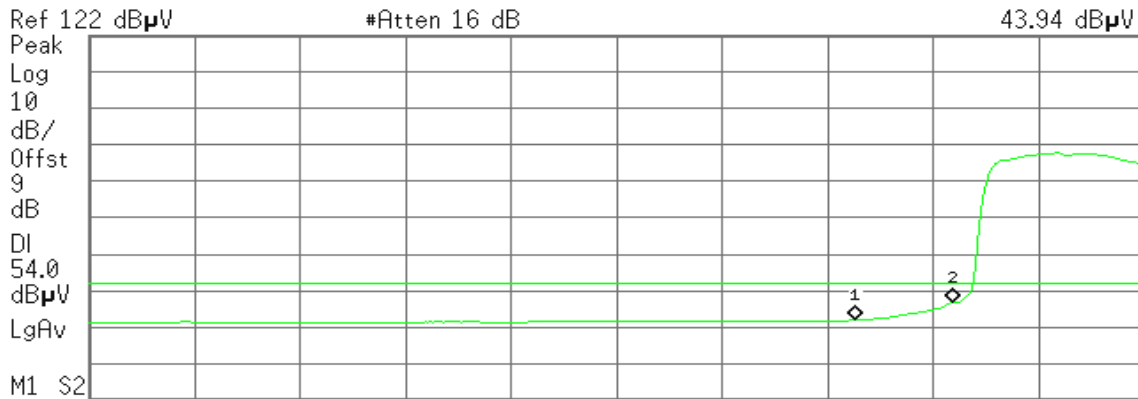
Detector mode: Average

Polarity: Horizontal

Agilent 17:08:11 May 20, 2010

T

Mkr1 2.390 0 GHz
43.94 dBµV



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

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.390 0 GHz	43.94 dBµU
2	(1)	Freq	2.400 0 GHz	48.73 dBµU



Band Edges (IEEE 802.11g mode / CH High)

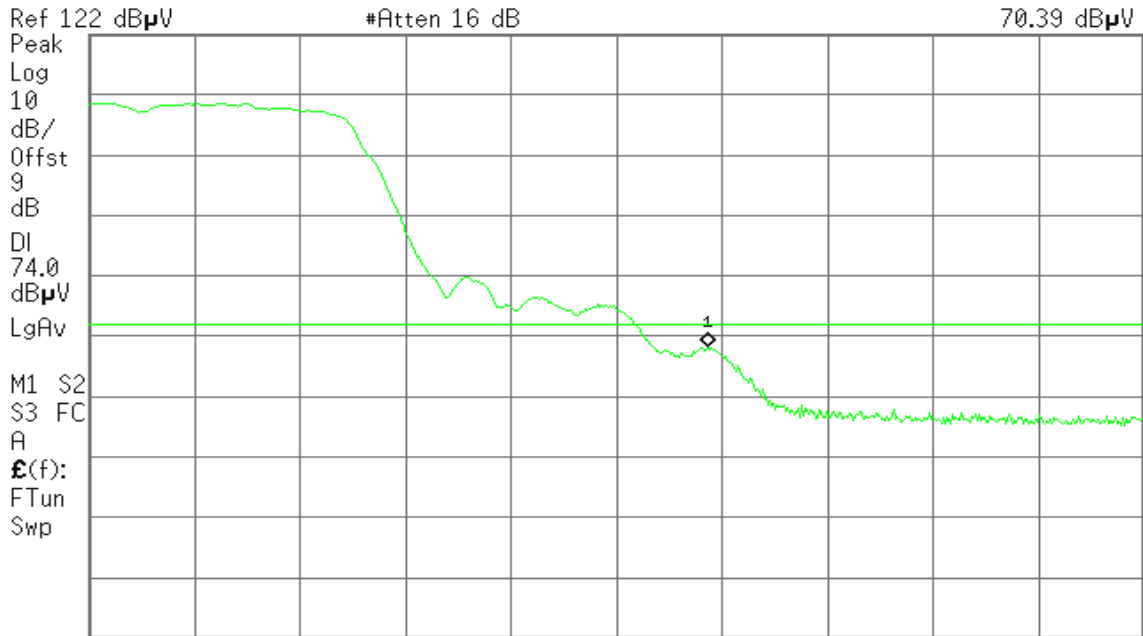
Detector mode: Peak

Polarity: Vertical

Agilent 14:40:47 May 20, 2010

R T

Mkr1 2.483 50 GHz
70.39 dB μ V



Start 2.460 00 GHz Stop 2.500 00 GHz
#Res BW 1 MHz #VBW 1 MHz #Sweep 100 ms (601 pts)

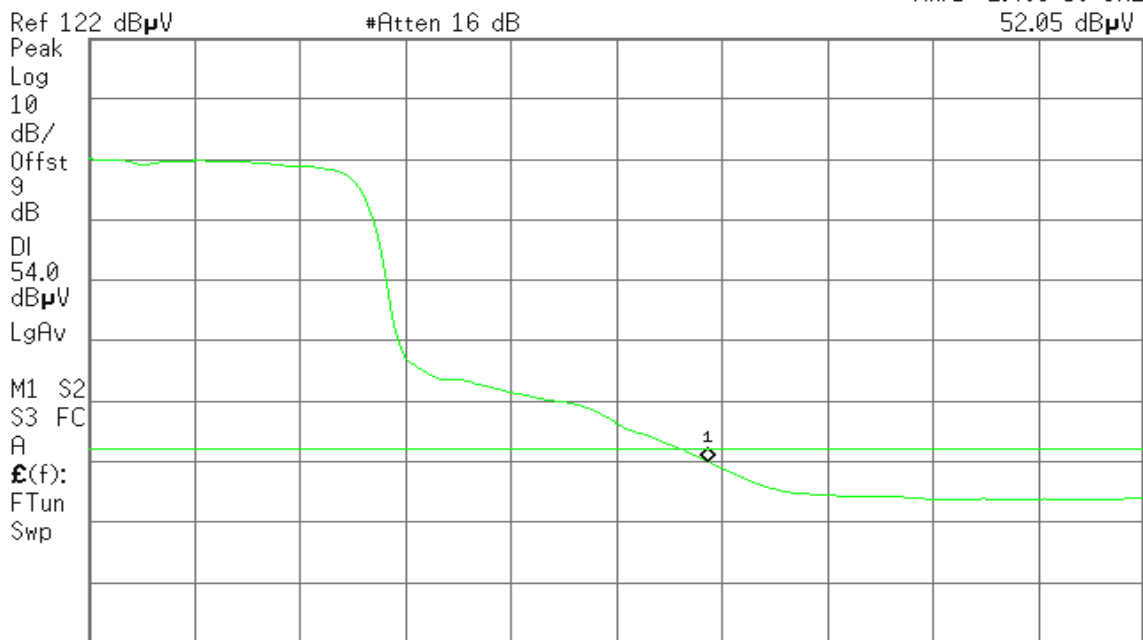
Detector mode: Average

Polarity: Vertical

Agilent 14:39:48 May 20, 2010

R T

Mkr1 2.483 50 GHz
52.05 dB μ V



Start 2.460 00 GHz Stop 2.500 00 GHz
#Res BW 1 MHz #VBW 10 Hz Sweep 3.119 s (601 pts)



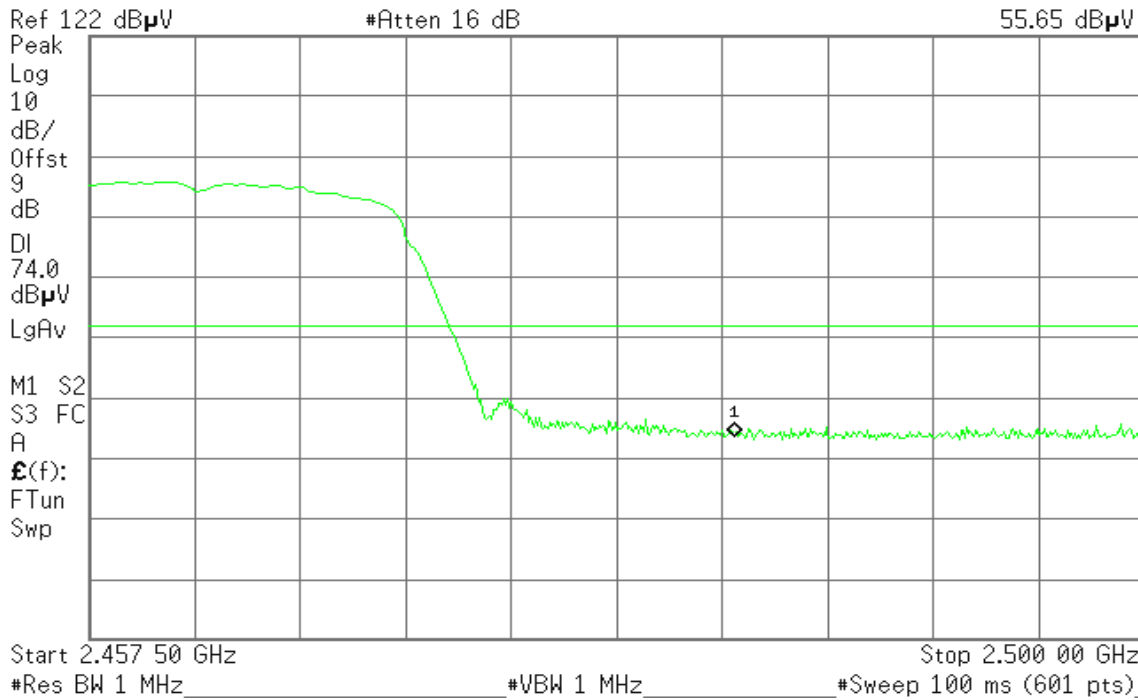
Detector mode: Peak

Polarity: Horizontal

Agilent 14:50:05 May 20, 2010

R T

Mkr1 2.483 50 GHz
55.65 dBμV



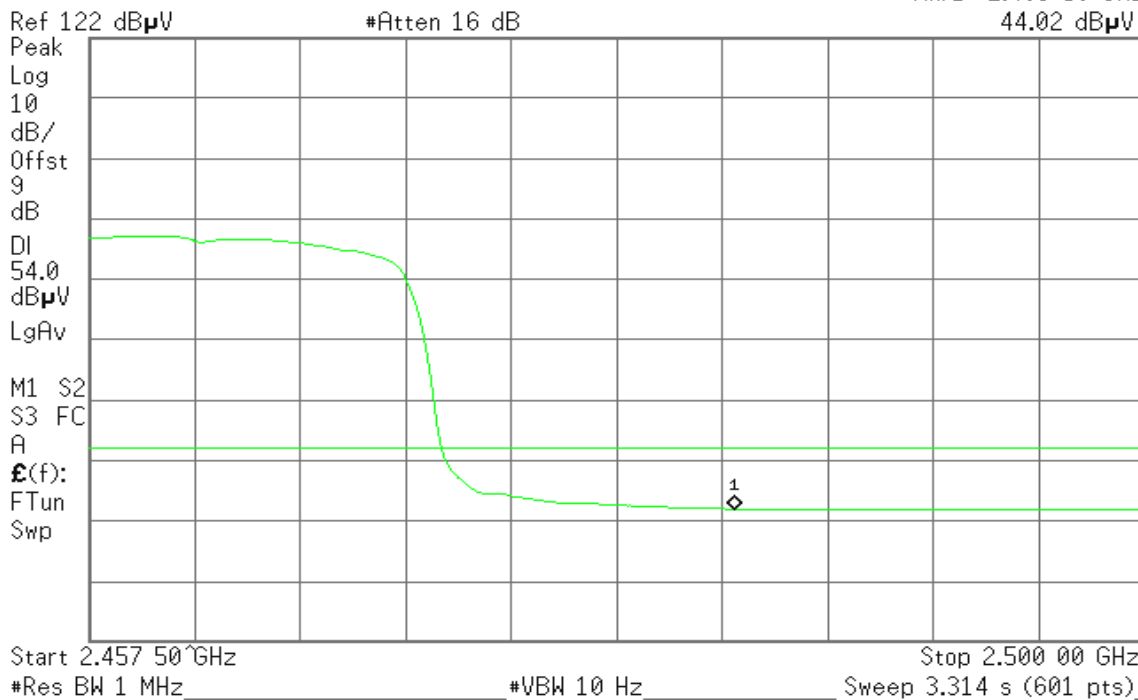
Detector mode: Average

Polarity: Horizontal

Agilent 14:51:07 May 20, 2010

R T

Mkr1 2.483 50 GHz
44.02 dBμV





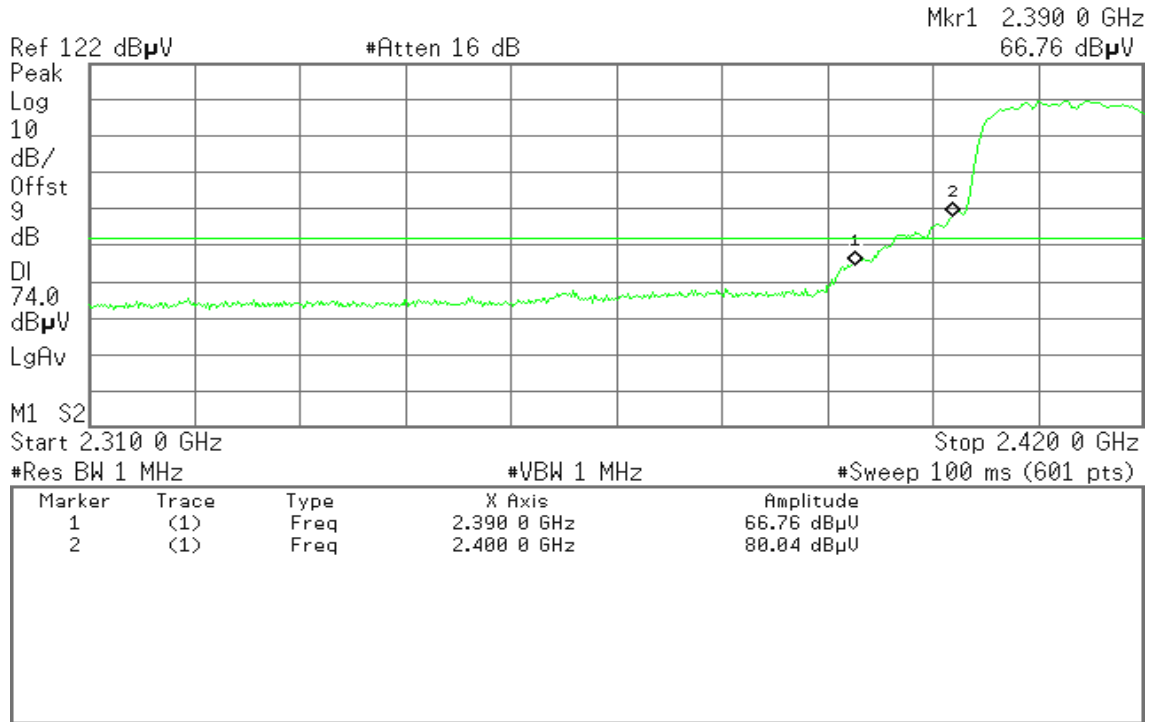
Band Edges (draft 802.11n Standard-20 MHz Channel mode / CH Low)

Detector mode: Peak

Polarity: Vertical

Agilent 15:38:01 May 20, 2010

T

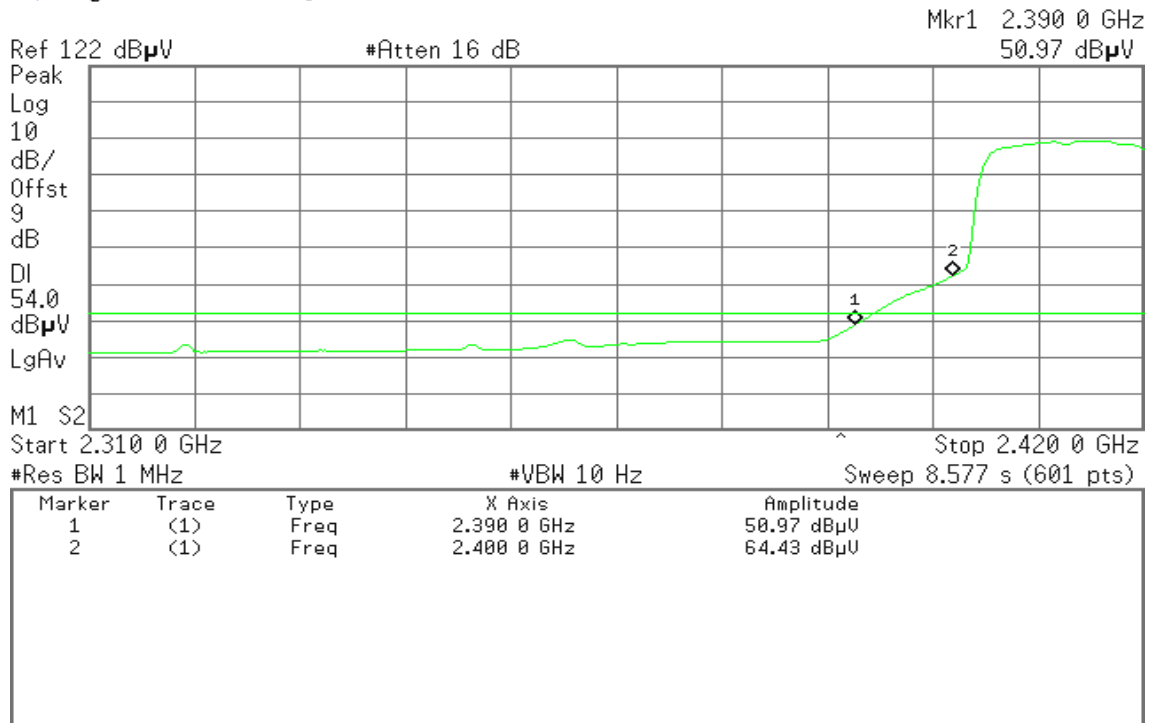


Detector mode: Average

Polarity: Vertical

Agilent 15:37:34 May 20, 2010

T



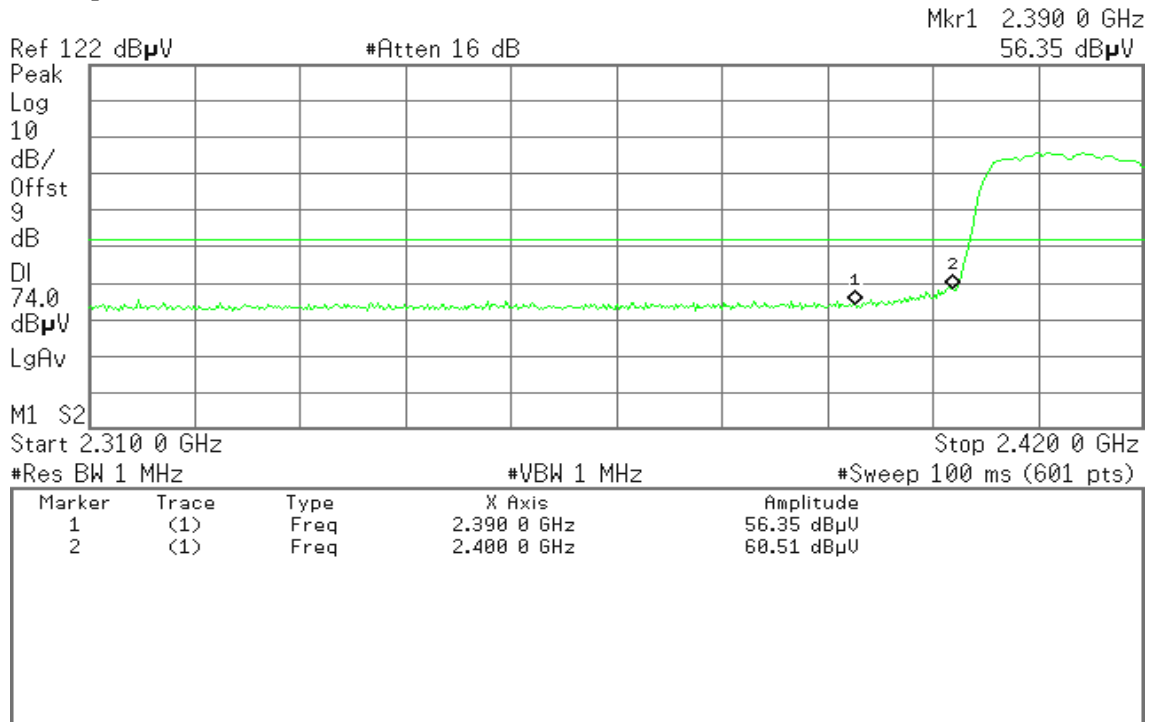


Detector mode: Peak

Polarity: Horizontal

Agilent 16:49:29 May 20, 2010

T

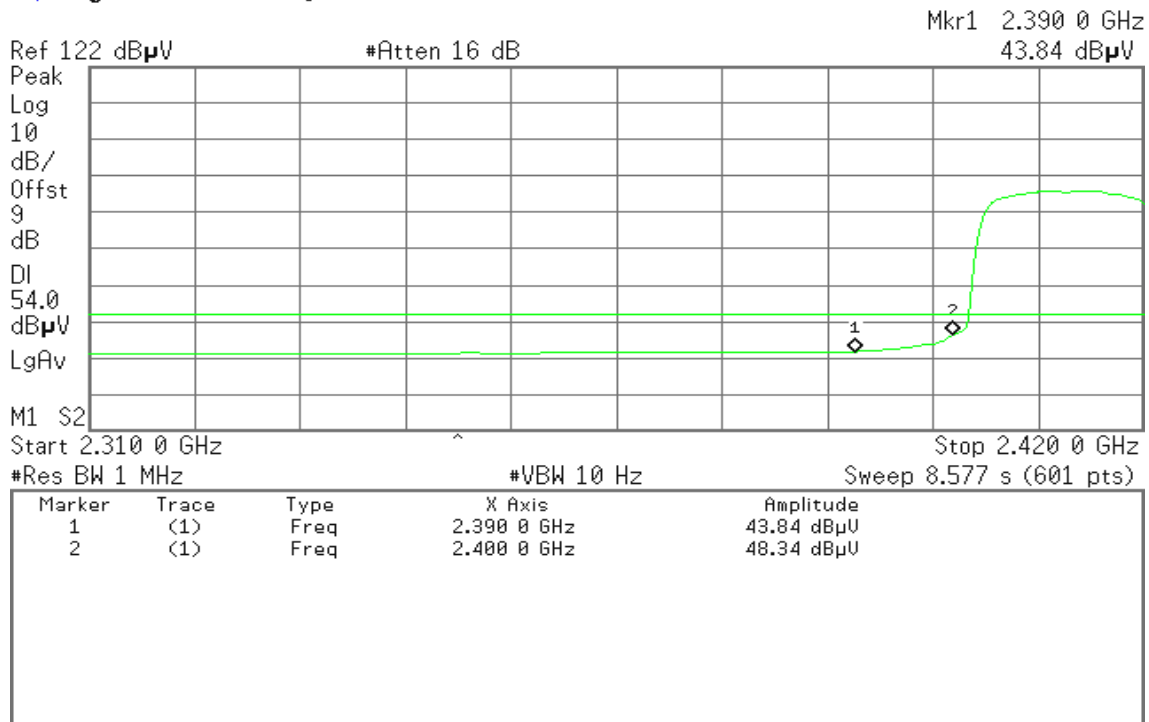


Detector mode: Average

Polarity: Horizontal

Agilent 16:48:51 May 20, 2010

T





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

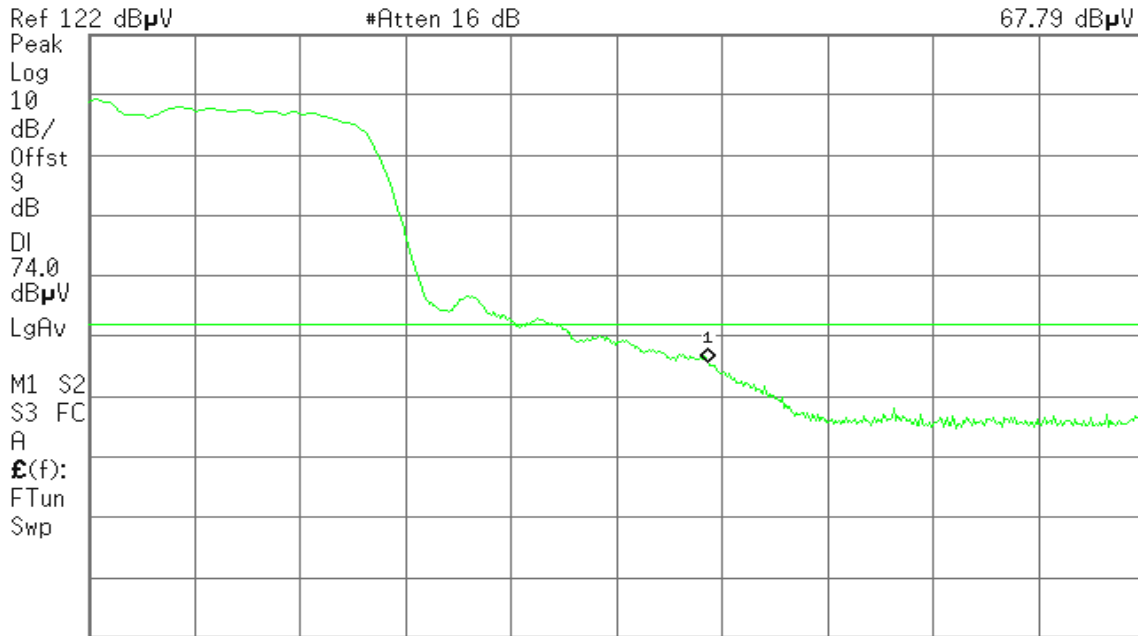
Detector mode: Peak

Polarity: Vertical

Agilent 15:26:39 May 20, 2010

T

Mkr1 2.483 50 GHz
67.79 dB μ V



Start 2.460 00 GHz Stop 2.500 00 GHz
#Res BW 1 MHz #VBW 1 MHz #Sweep 100 ms (601 pts)

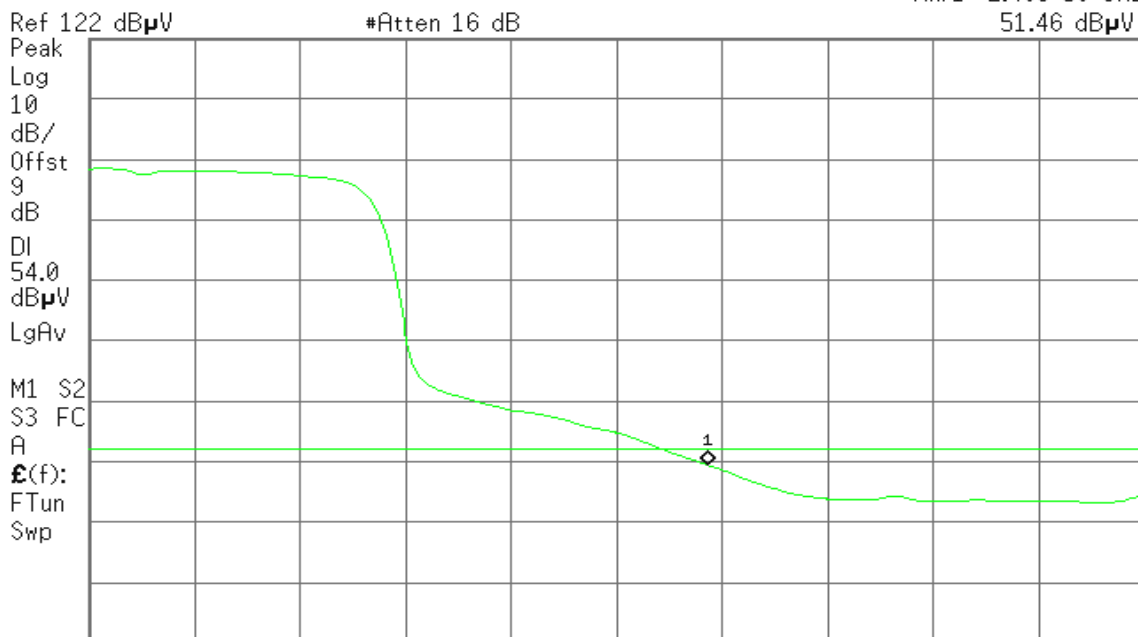
Detector mode: Average

Polarity: Vertical

Agilent 15:25:54 May 20, 2010

T

Mkr1 2.483 50 GHz
51.46 dB μ V



Start 2.460 00 GHz Stop 2.500 00 GHz
#Res BW 1 MHz #VBW 10 Hz Sweep 3.119 s (601 pts)



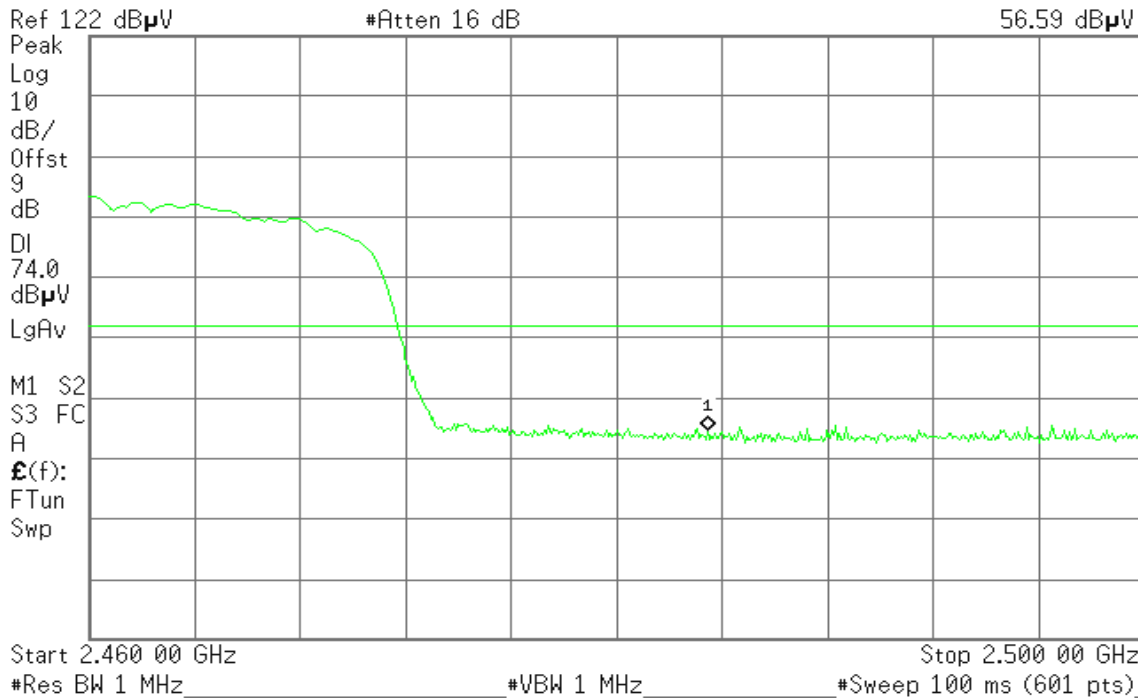
Detector mode: Peak

Polarity: Horizontal

Agilent 17:00:29 May 20, 2010

T

Mkr1 2.483 50 GHz
56.59 dBμV



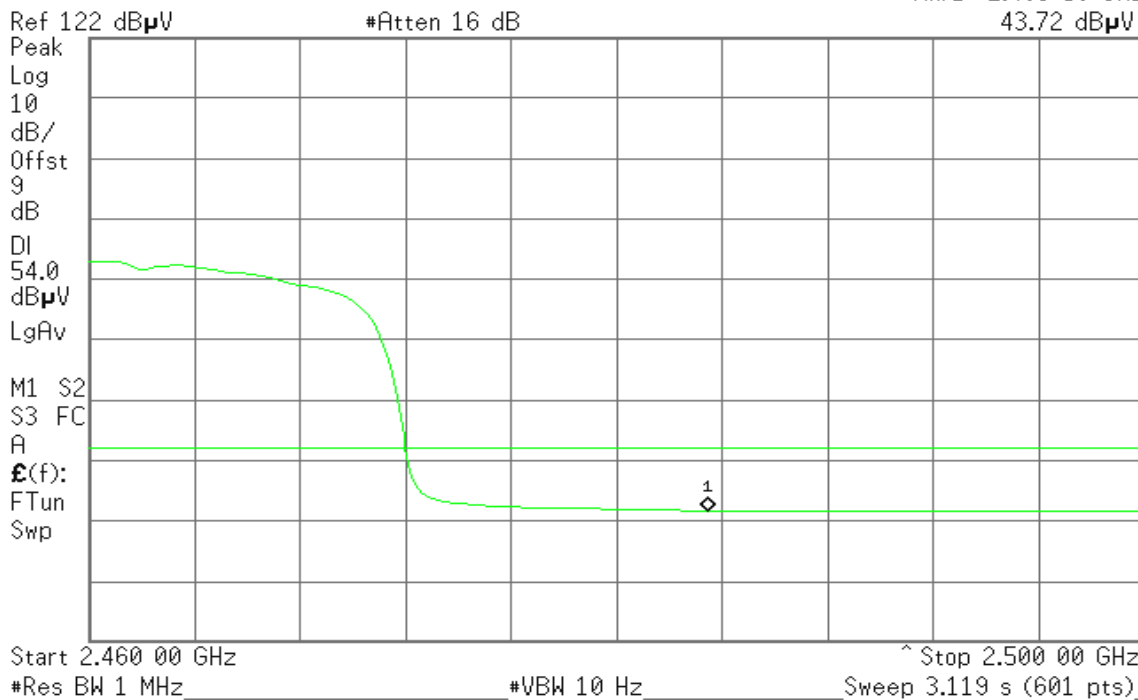
Detector mode: Average

Polarity: Horizontal

Agilent 16:59:34 May 20, 2010

T

Mkr1 2.483 50 GHz
43.72 dBμV





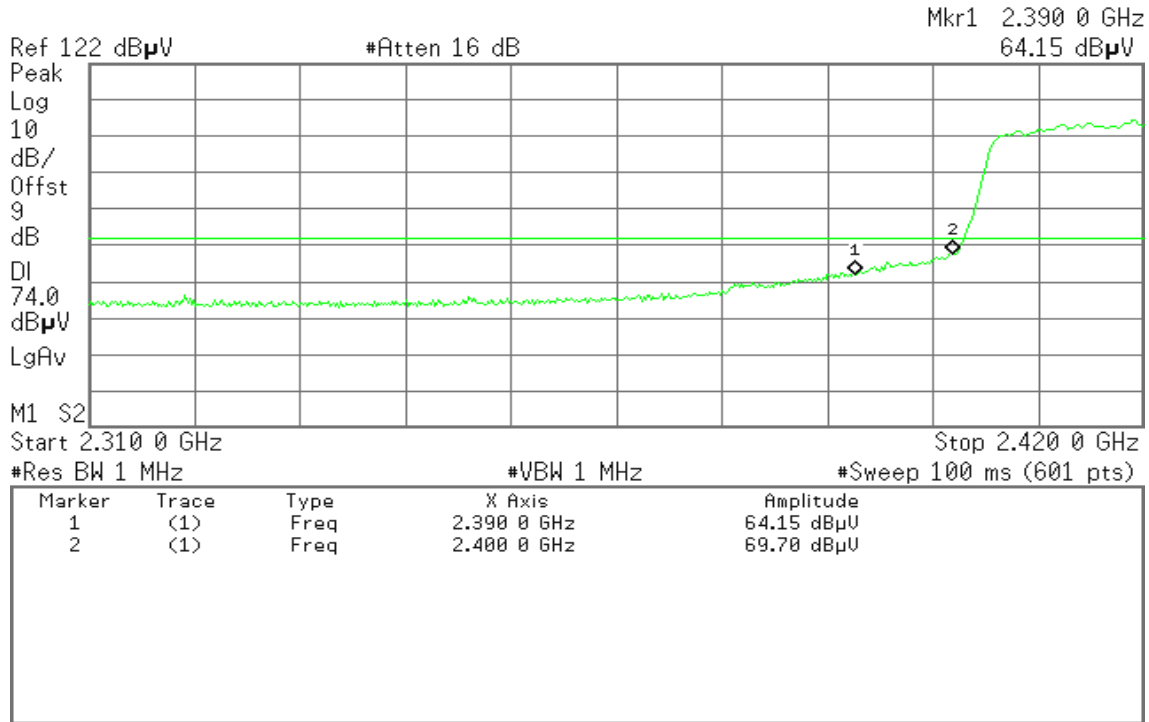
Band Edges (draft 802.11n Wide-40 MHz Channel mode / CH Low)

Detector mode: Peak

Polarity: Vertical

Agilent 15:48:40 May 20, 2010

T

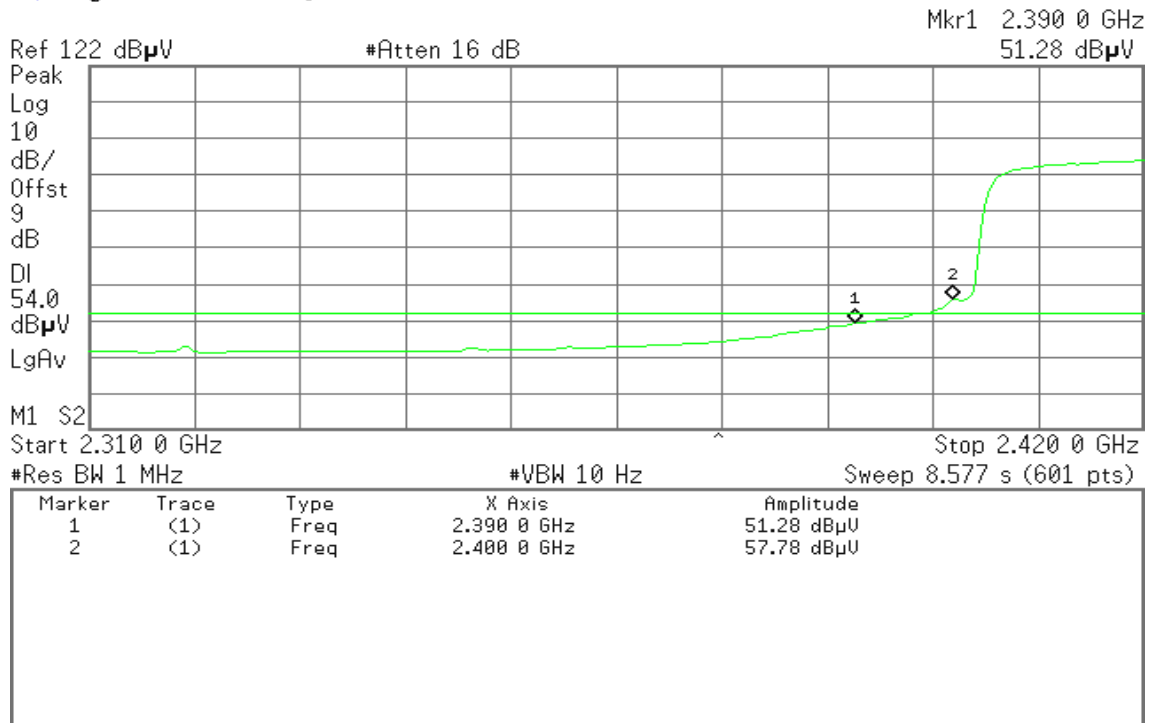


Detector mode: Average

Polarity: Vertical

Agilent 15:46:53 May 20, 2010

T



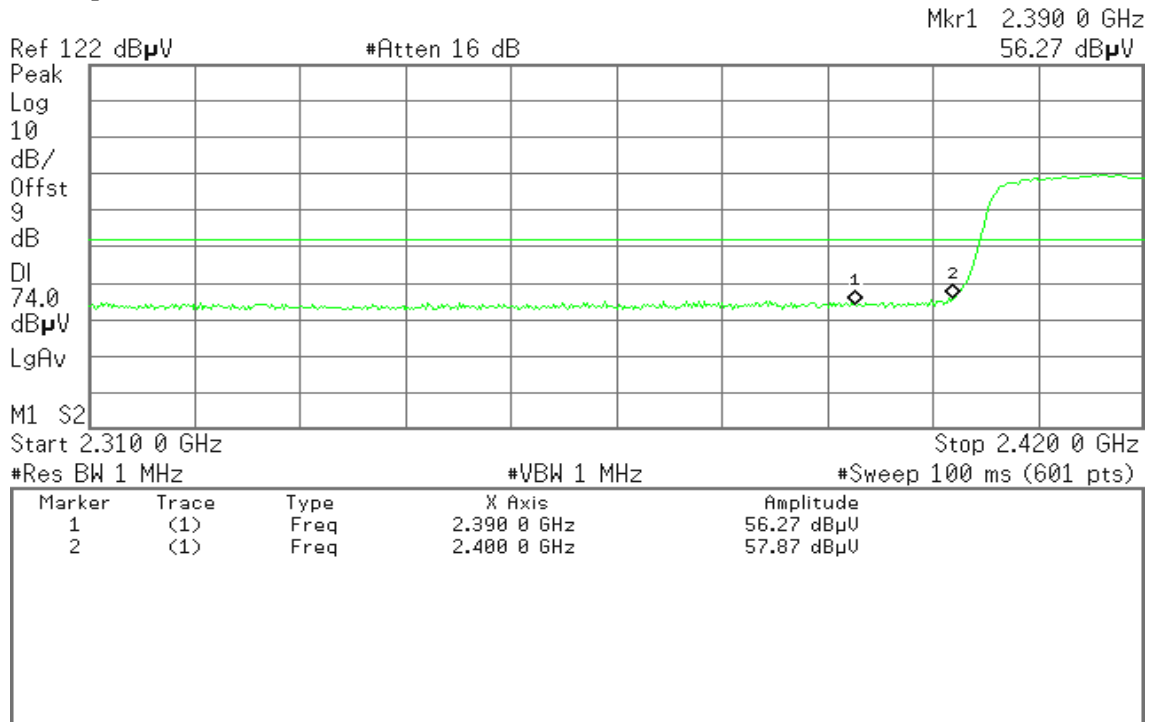


Detector mode: Peak

Polarity: Horizontal

Agilent 16:35:16 May 20, 2010

T

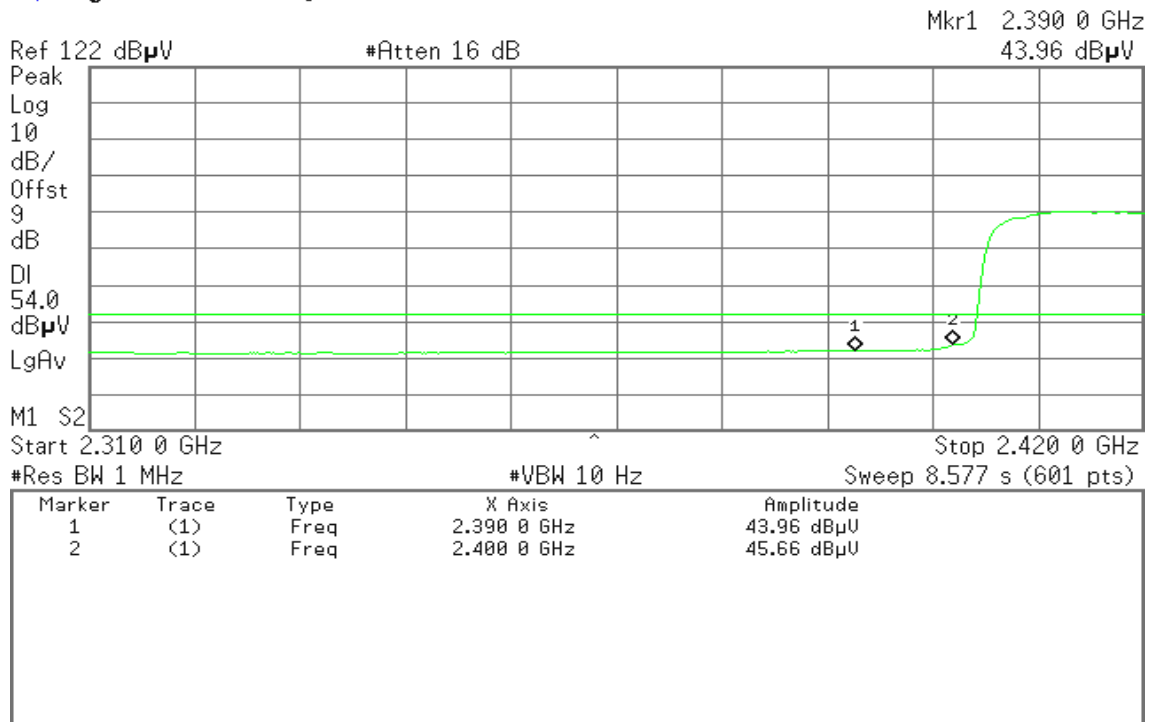


Detector mode: Average

Polarity: Horizontal

Agilent 16:34:29 May 20, 2010

T





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

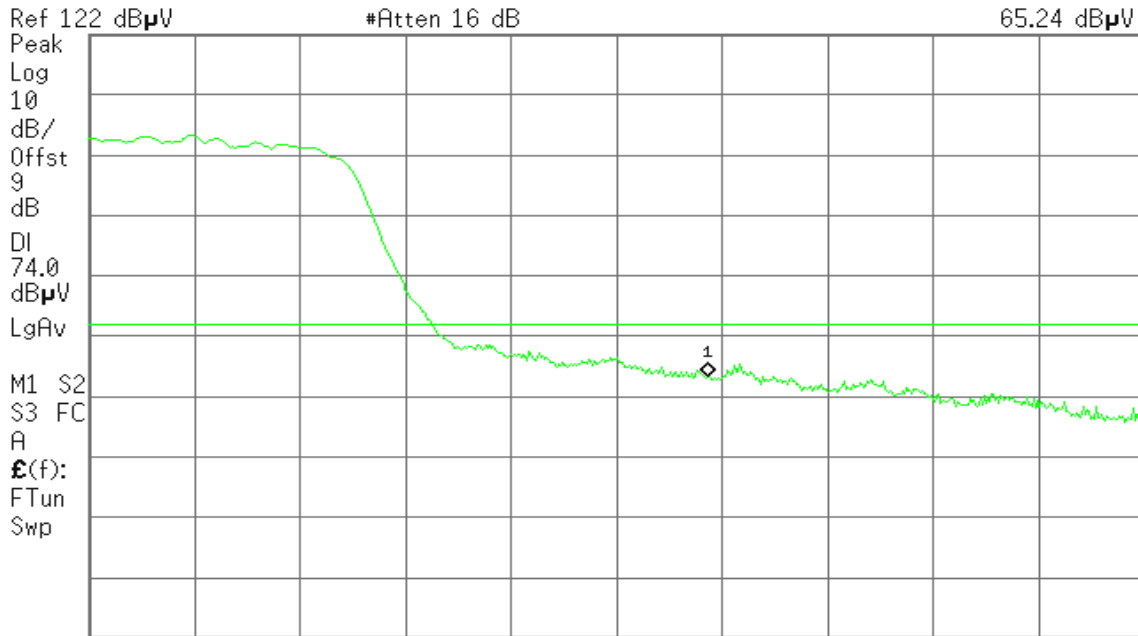
Detector mode: Peak

Polarity: Vertical

Agilent 15:56:54 May 20, 2010

T

Mkr1 2.483 50 GHz
65.24 dBμV



Start 2.460 00 GHz Stop 2.500 00 GHz
#Res BW 1 MHz #VBW 1 MHz #Sweep 100 ms (601 pts)

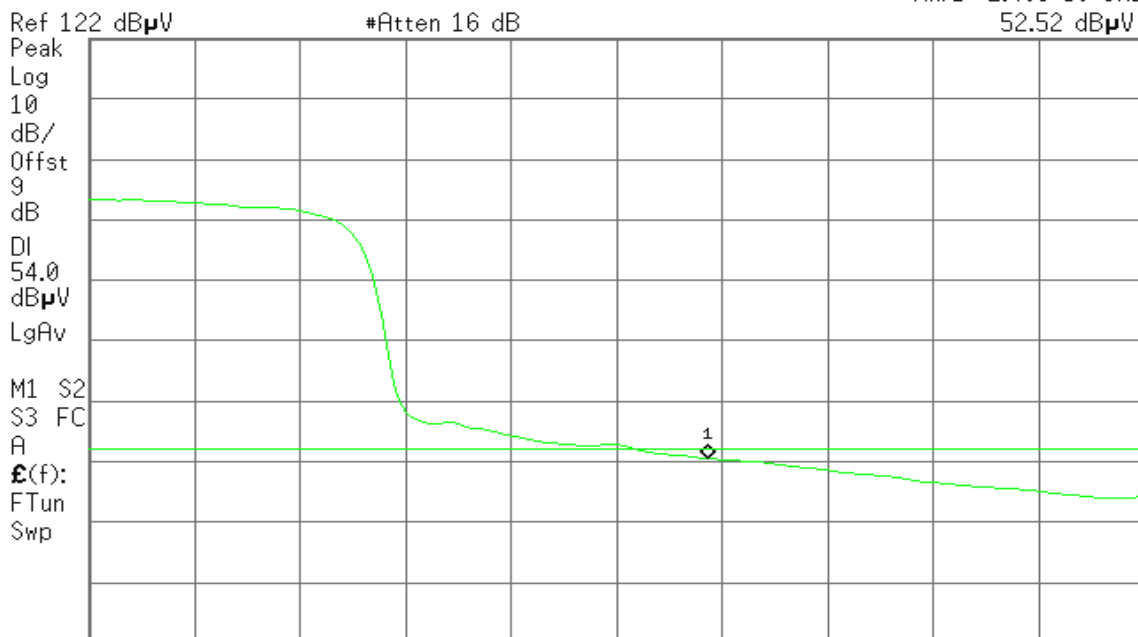
Detector mode: Average

Polarity: Vertical

Agilent 15:56:24 May 20, 2010

T

Mkr1 2.483 50 GHz
52.52 dBμV



Start 2.460 00 GHz Stop 2.500 00 GHz
#Res BW 1 MHz #VBW 10 Hz Sweep 3.119 s (601 pts)



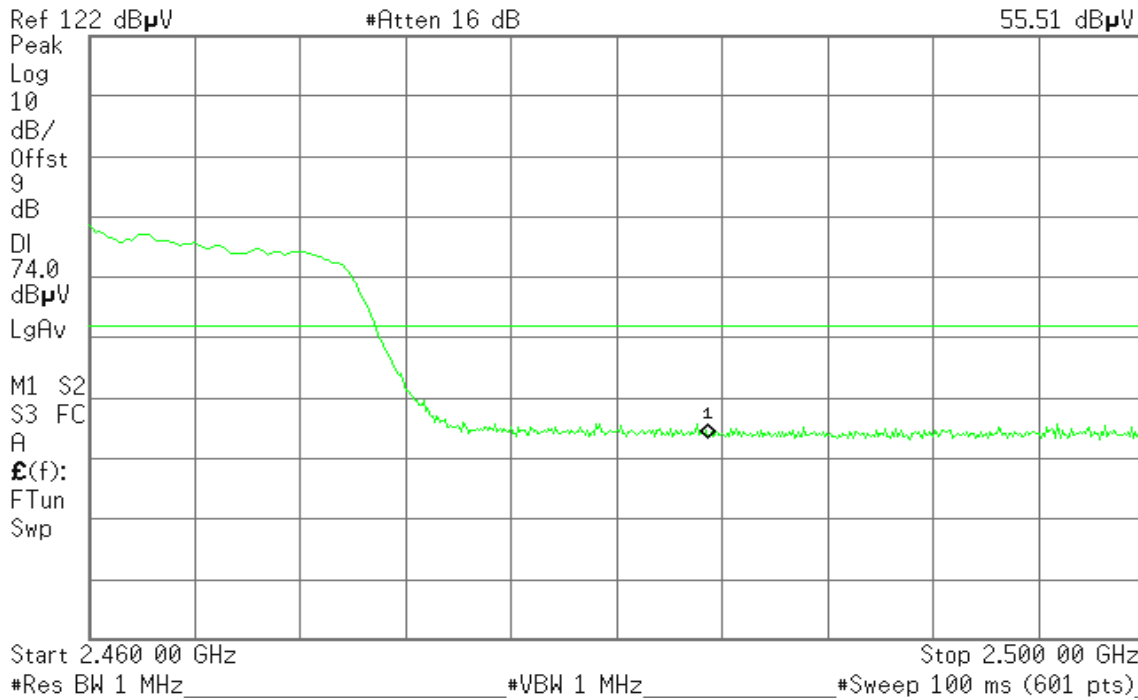
Detector mode: Peak

Polarity: Horizontal

Agilent 16:27:32 May 20, 2010

T

Mkr1 2.483 50 GHz
55.51 dBμV



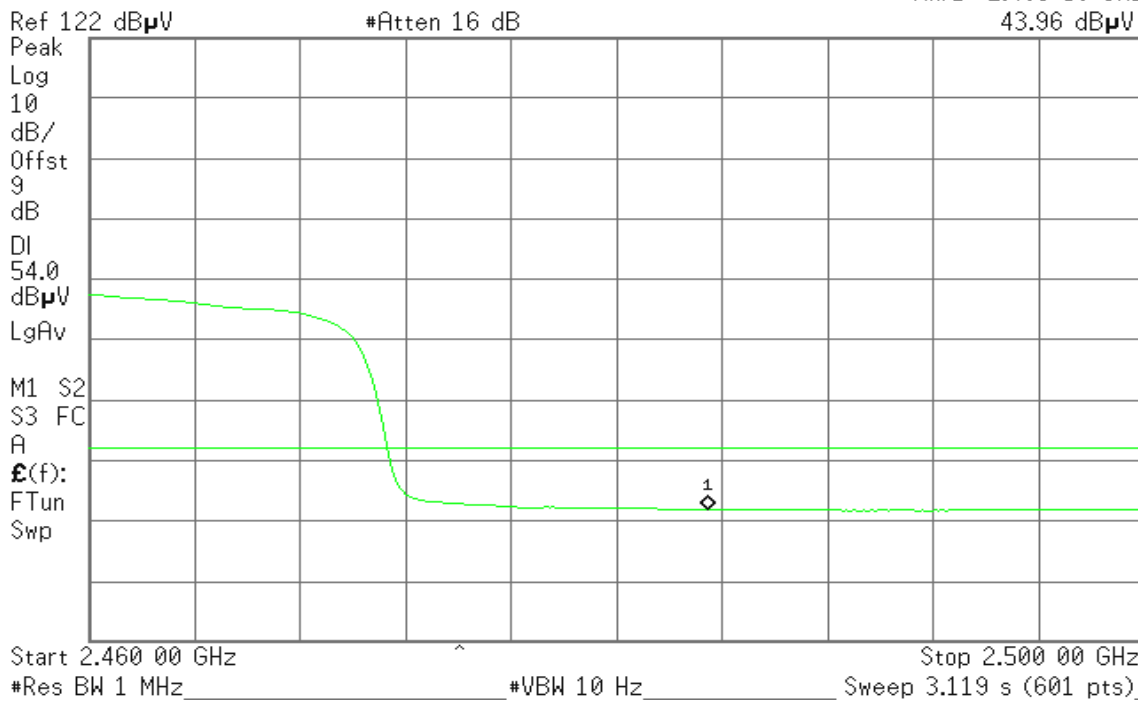
Detector mode: Average

Polarity: Horizontal

Agilent 16:26:16 May 20, 2010

T

Mkr1 2.483 50 GHz
43.96 dBμV

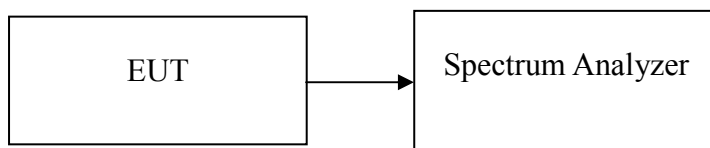


7.5 PEAK POWER SPECTRAL DENSITY

LIMIT

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

Test Configuration



TEST PROCEDURE

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

TEST RESULTS

No non-compliance noted

**Test Data****Test mode: IEEE 802.11b mode**

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-11.37	8.00	PASS
Mid	2437	-11.54		PASS
High	2462	-12.13		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-11.21	8.00	PASS
Mid	2437	-7.64		PASS
High	2462	-10.69		PASS

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

Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-15.91	-15.32	-12.59	8.00	PASS
Mid	2437	-12.65	-11.84	-9.22		PASS
High	2462	-16.47	-15.31	-12.84		PASS

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

Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	PPSD (dBm)	Limit (dBm)	Result
Low	2422	-15.89	-17.08	-13.43	8.00	PASS
Mid	2437	-11.40	-13.12	-9.17		PASS
High	2452	-16.11	-17.01	-13.53		PASS

Remark: Total PPSD (dBm) = $10 * \text{LOG}(10^{(\text{Chain 0 PPSD} / 10)} + 10^{(\text{Chain 1 PPSD} / 10)})$



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

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-11.74	8.00	PASS
Mid	2437	-5.75		PASS
High	2462	-13.61		PASS

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

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2422	-10.98	8.00	PASS
Mid	2437	-8.75		PASS
High	2452	-10.92		PASS

Remark: Total PPSD (dBm) = 10*LOG(10^(Chain 0 PPSD / 10)+10^(Chain 1 PPSD /10))



Test Plot

IEEE 802.11b mode

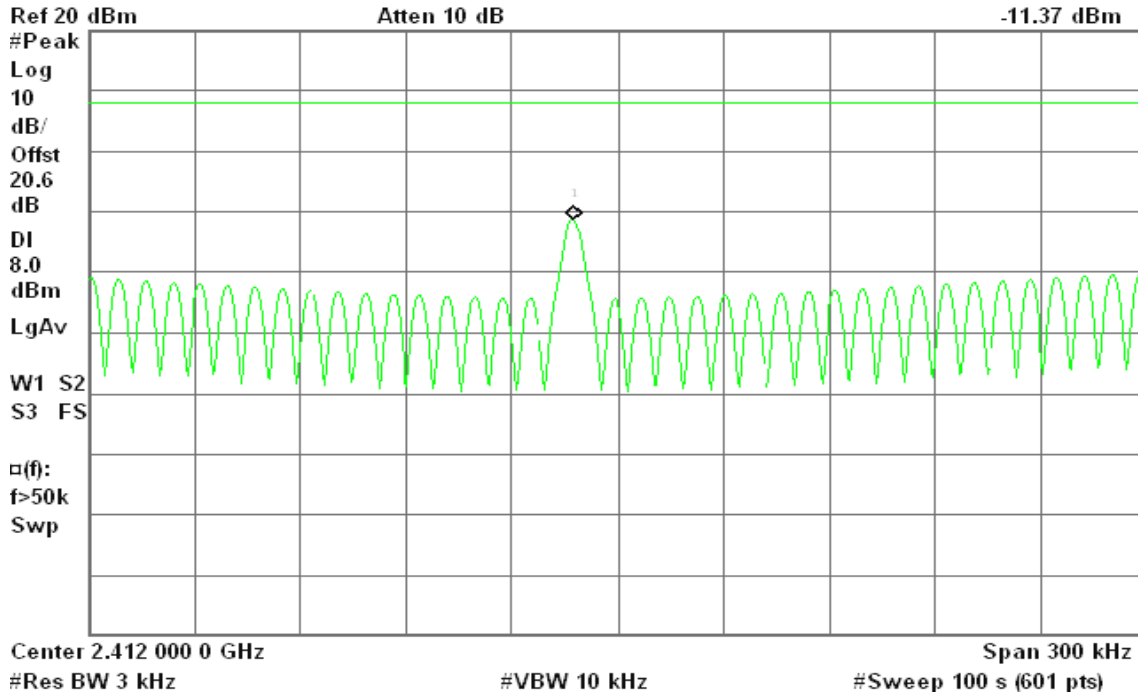
PPSD (CH Low)

Agilent 21:36:57 May 21, 2010

R T

Mkr1 2.411 987 4 GHz

-11.37 dBm



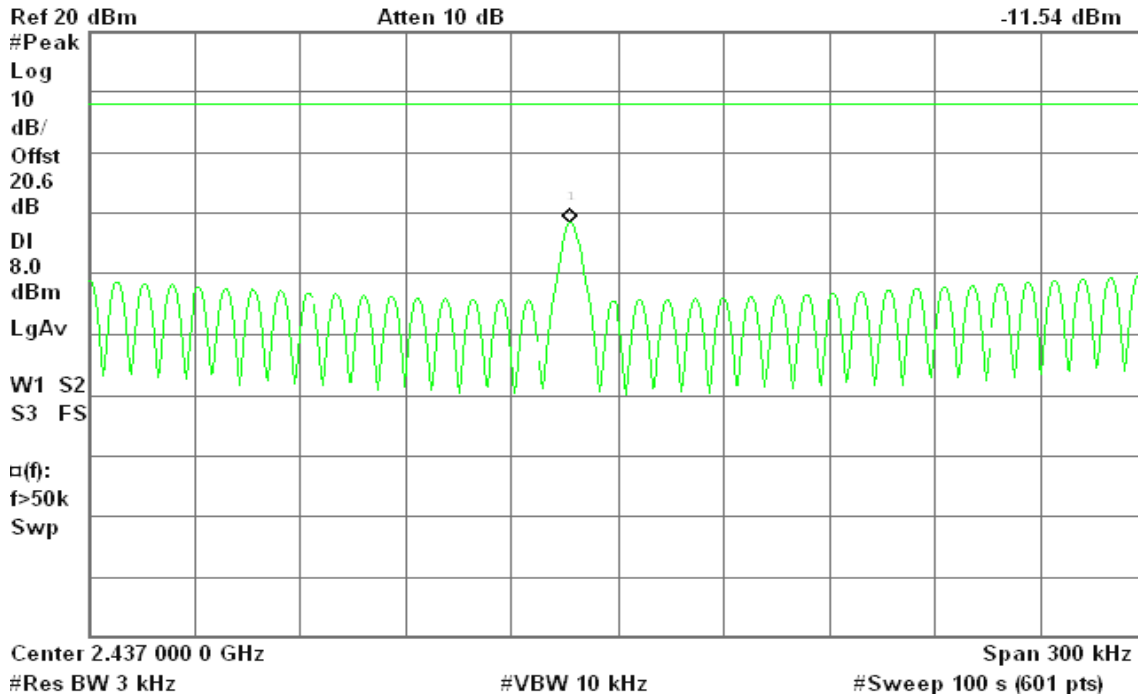
PPSD (CH Mid)

Agilent 21:44:20 May 21, 2010

R T

Mkr1 2.436 986 4 GHz

-11.54 dBm



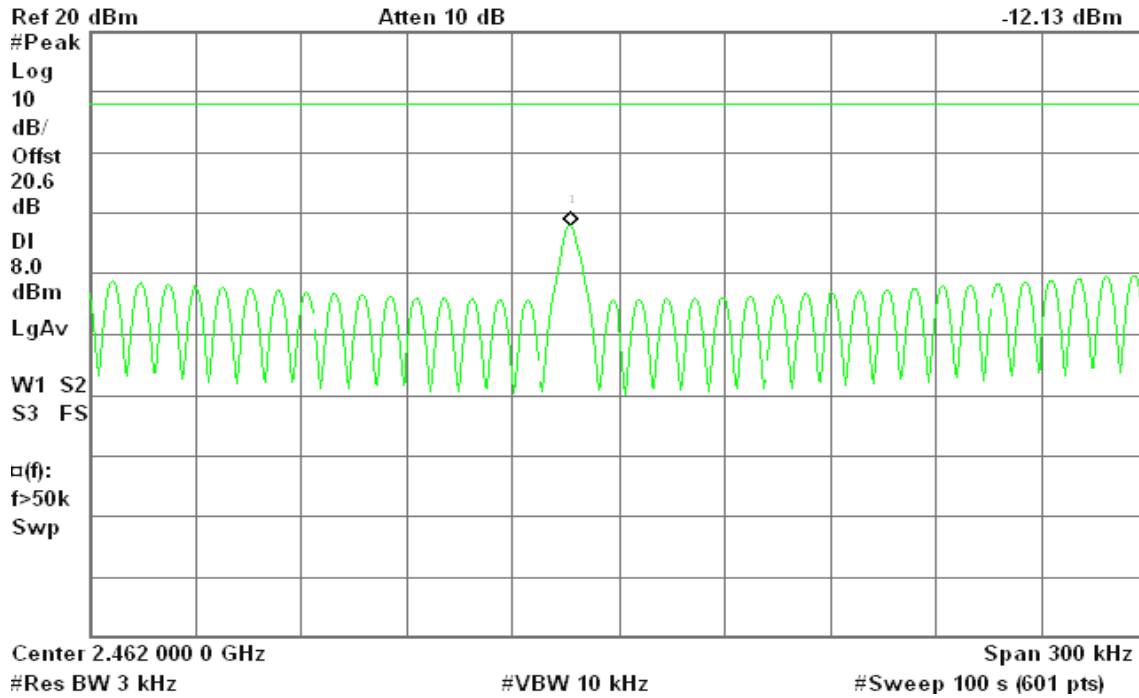


PPSD (CH High)

Agilent 21:51:54 May 21, 2010

R T

Mkr1 2.461 986 4 GHz
-12.13 dBm



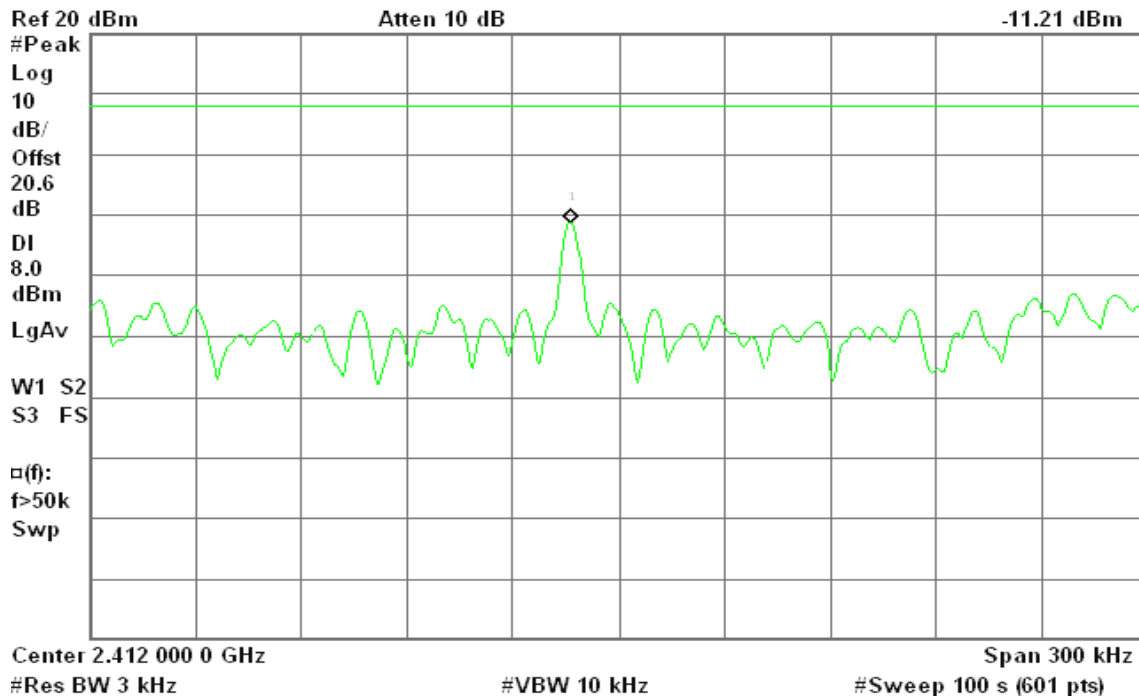
IEEE 802.11g mode

PPSD (CH Low)

Agilent 22:12:01 May 21, 2010

R T

Mkr1 2.411 986 4 GHz
-11.21 dBm



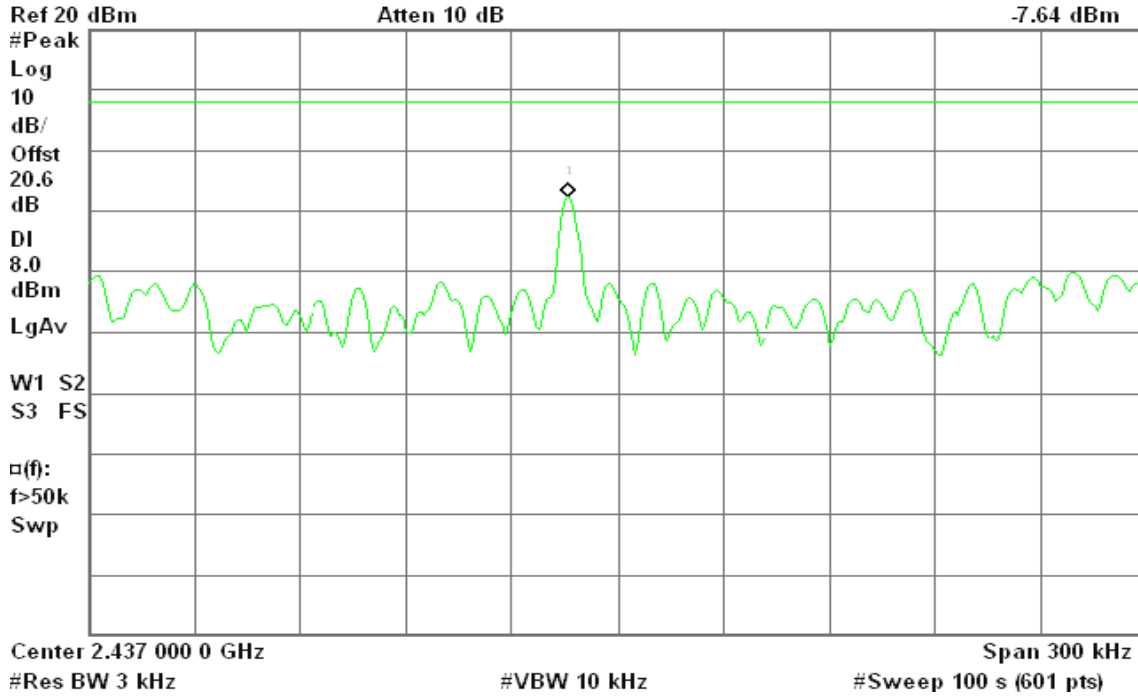


PPSD (CH Mid)

Agilent 22:05:38 May 21, 2010

R T

Mkr1 2.436 985 9 GHz
-7.64 dBm

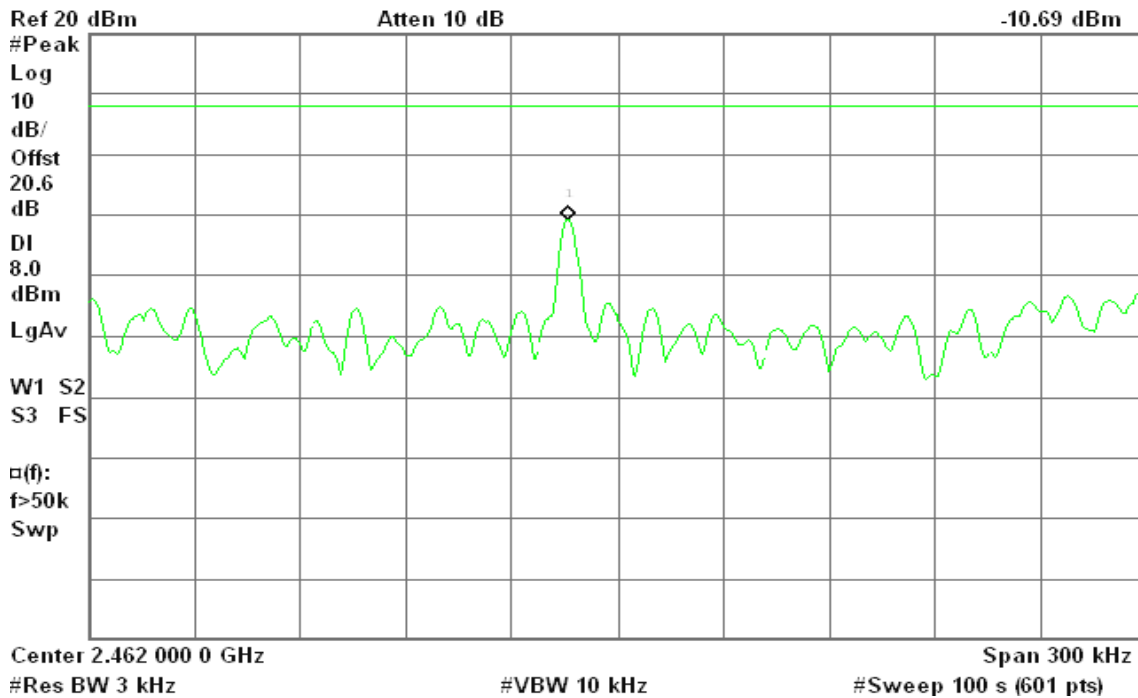


PPSD (CH High)

Agilent 21:59:02 May 21, 2010

R T

Mkr1 2.461 985 9 GHz
-10.69 dBm





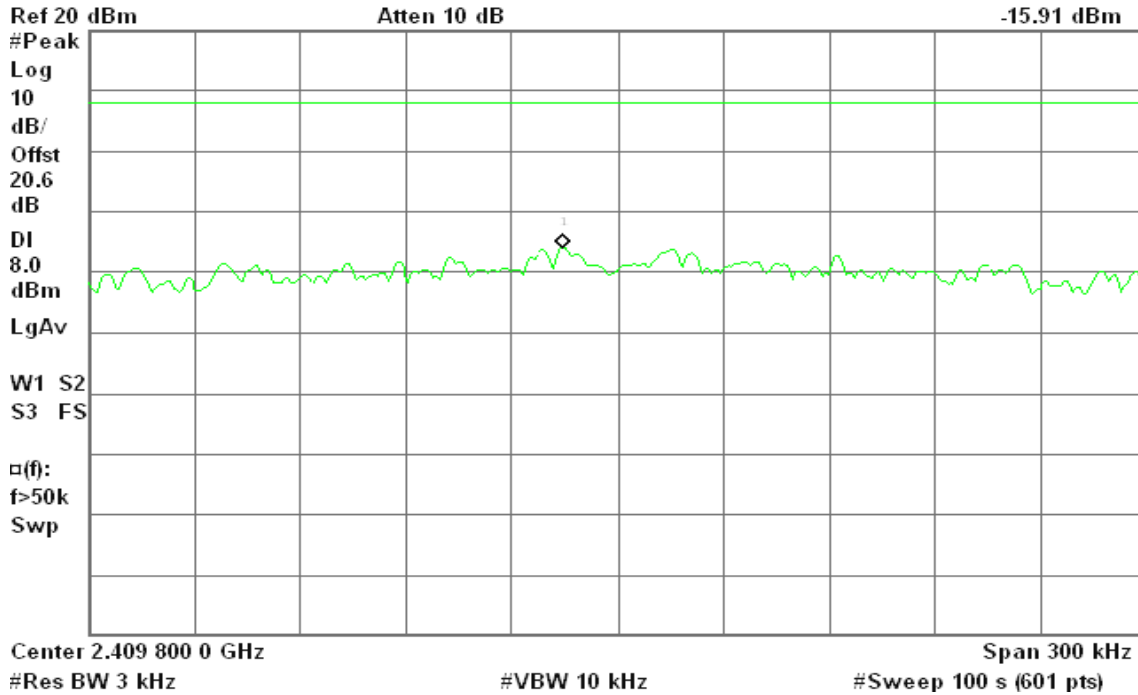
draft 802.11n Standard-20 MHz Channel mode / Chain 0

PPSD (CH Low)

Agilent 17:46:52 May 24, 2010

R T

Mkr1 2.409 784 4 GHz
-15.91 dBm

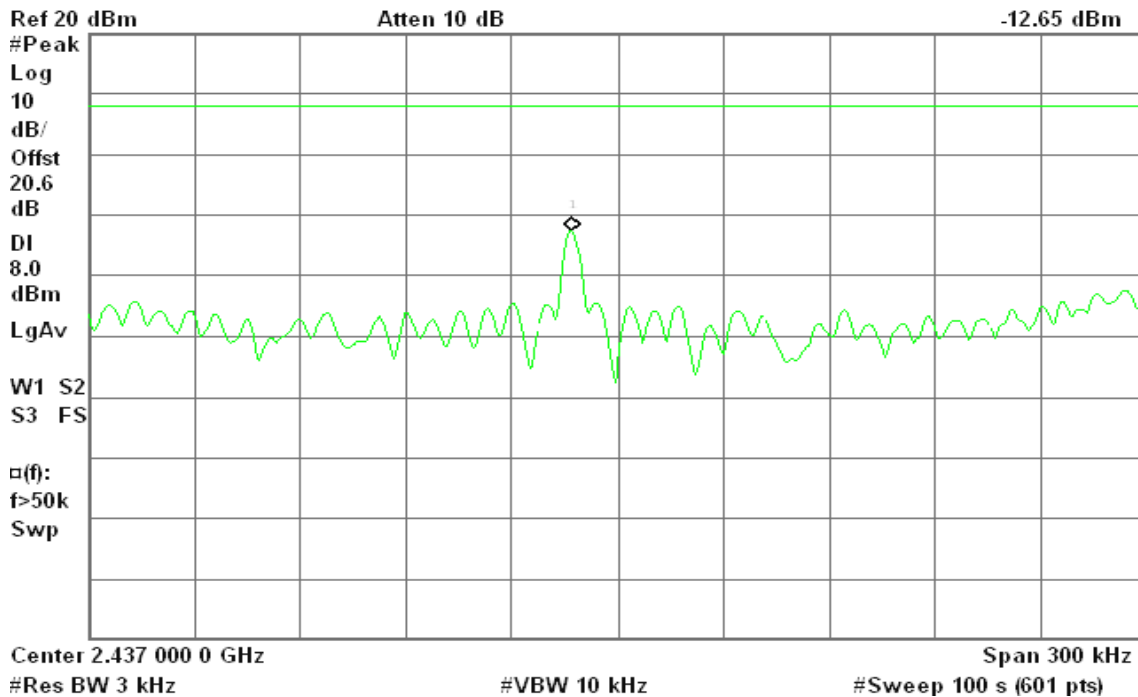


PPSD (CH Mid)

Agilent 18:08:29 May 24, 2010

R T

Mkr1 2.436 986 9 GHz
-12.65 dBm



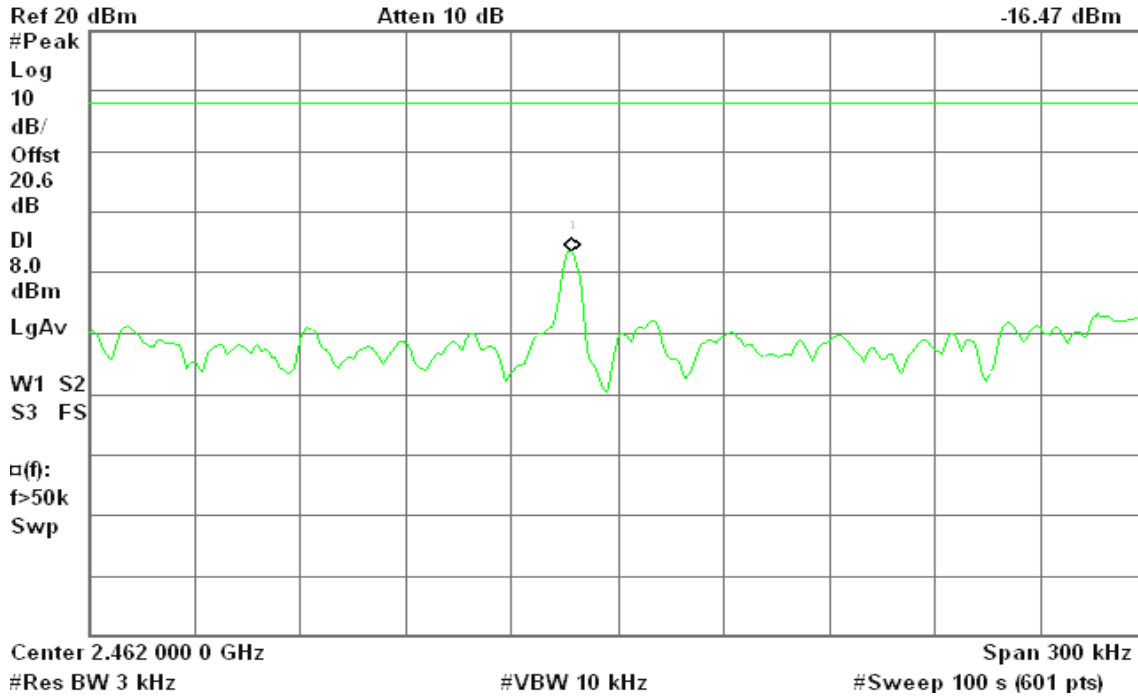


PPSD (CH High)

Agilent 18:30:29 May 24, 2010

R T

Mkr1 2.461 987 0 GHz
-16.47 dBm



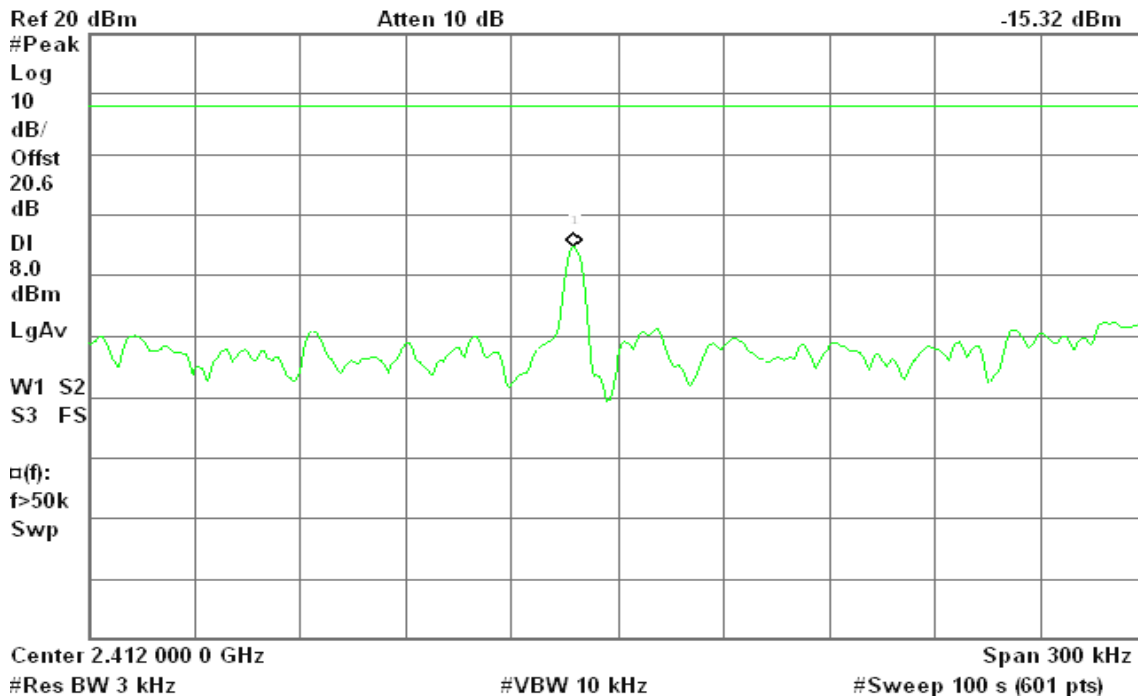
draft 802.11n Standard-20 MHz Channel mode / Chain 1

PPSD (CH Low)

Agilent 18:49:19 May 24, 2010

R T

Mkr1 2.411 987 4 GHz
-15.32 dBm



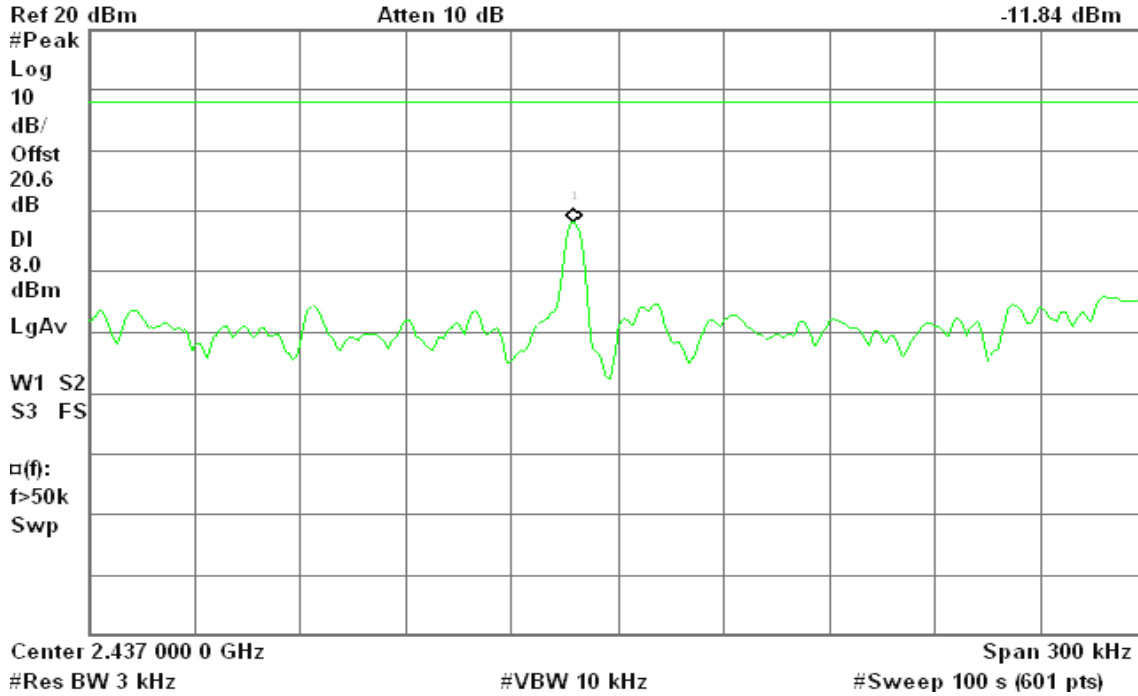


PPSD (CH Mid)

Agilent 18:54:03 May 24, 2010

R T

Mkr1 2.436 987 4 GHz
-11.84 dBm

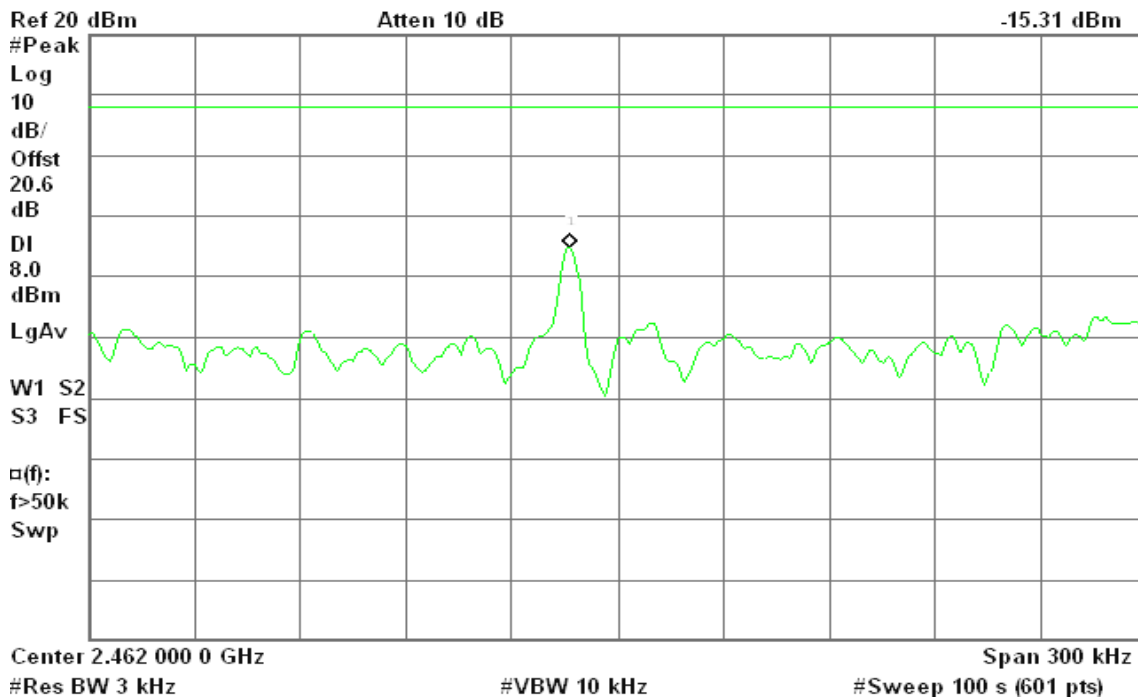


PPSD (CH High)

Agilent 18:43:11 May 24, 2010

R T

Mkr1 2.461 986 4 GHz
-15.31 dBm





draft 802.11n Wide-40 MHz Channel mode / Chain 0

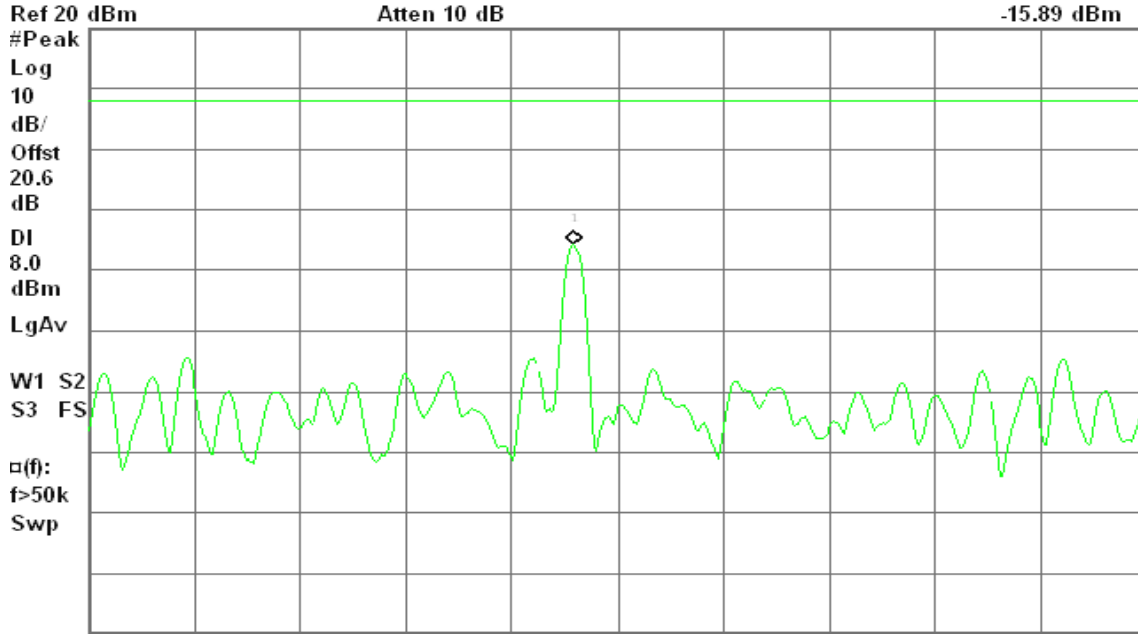
PPSD (CH Low)

Agilent 19:38:01 May 24, 2010

R T

Mkr1 2.421 987 5 GHz

-15.89 dBm



Center 2.422 000 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)

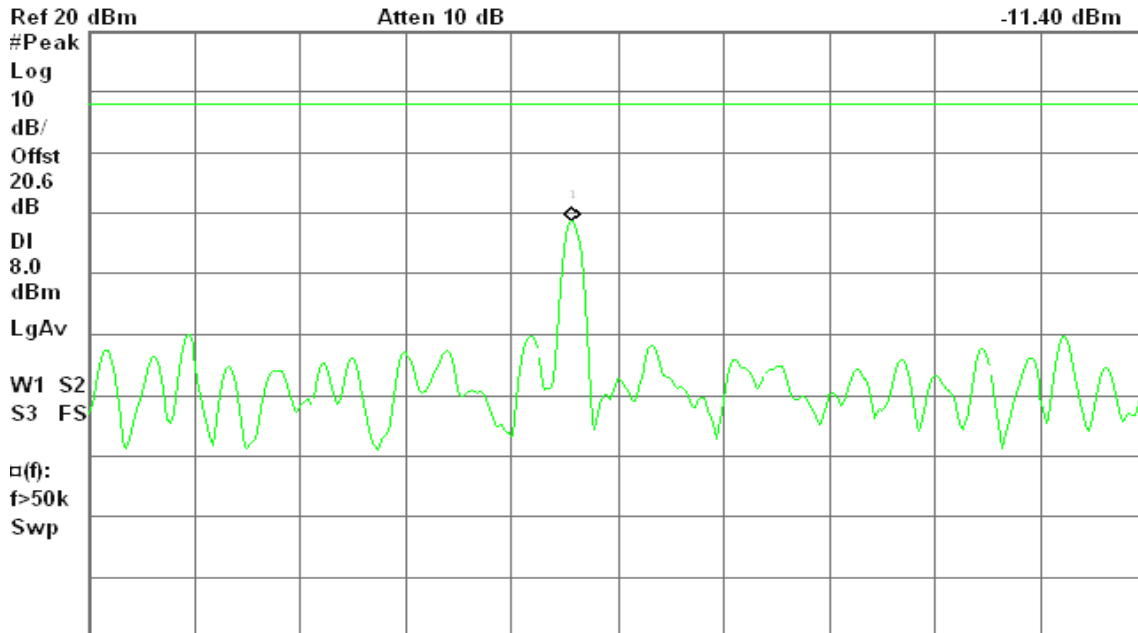
PPSD (CH Mid)

Agilent 19:42:26 May 24, 2010

R L

Mkr1 2.436 986 9 GHz

-11.40 dBm



Center 2.437 000 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)

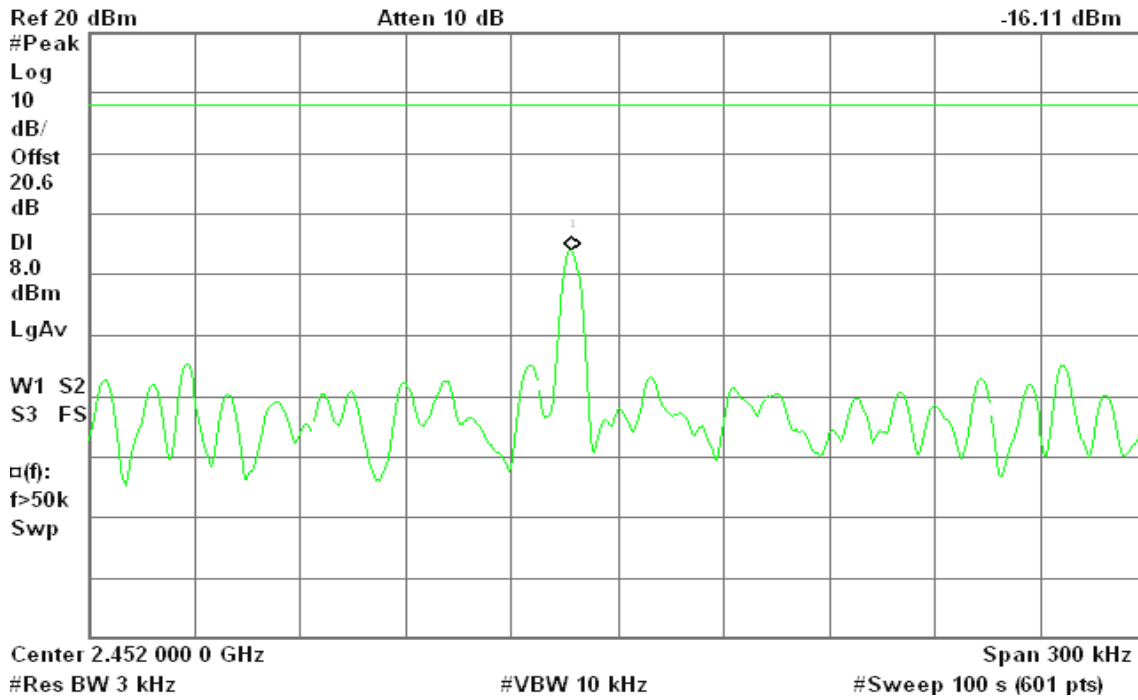


PPSD (CH High)

Agilent 19:47:01 May 24, 2010

R T

Mkr1 2.451 986 9 GHz
-16.11 dBm



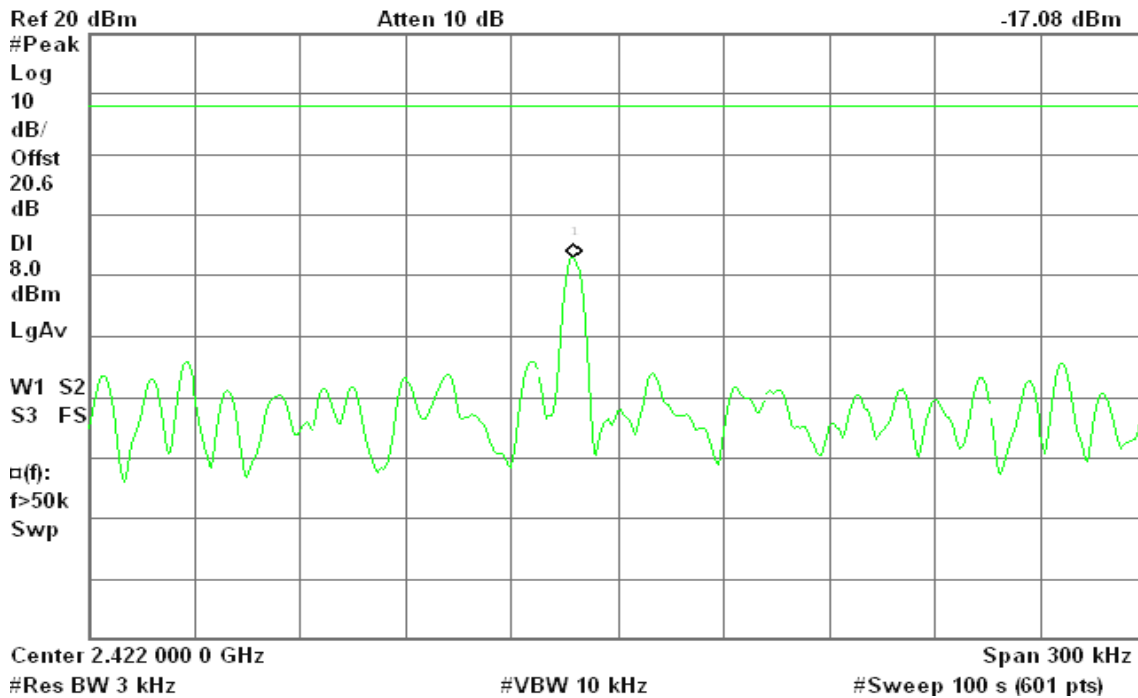
draft 802.11n Wide-40 MHz Channel mode / Chain 1

PPSD (CH Low)

Agilent 19:13:34 May 24, 2010

R L

Mkr1 2.421 987 5 GHz
-17.08 dBm



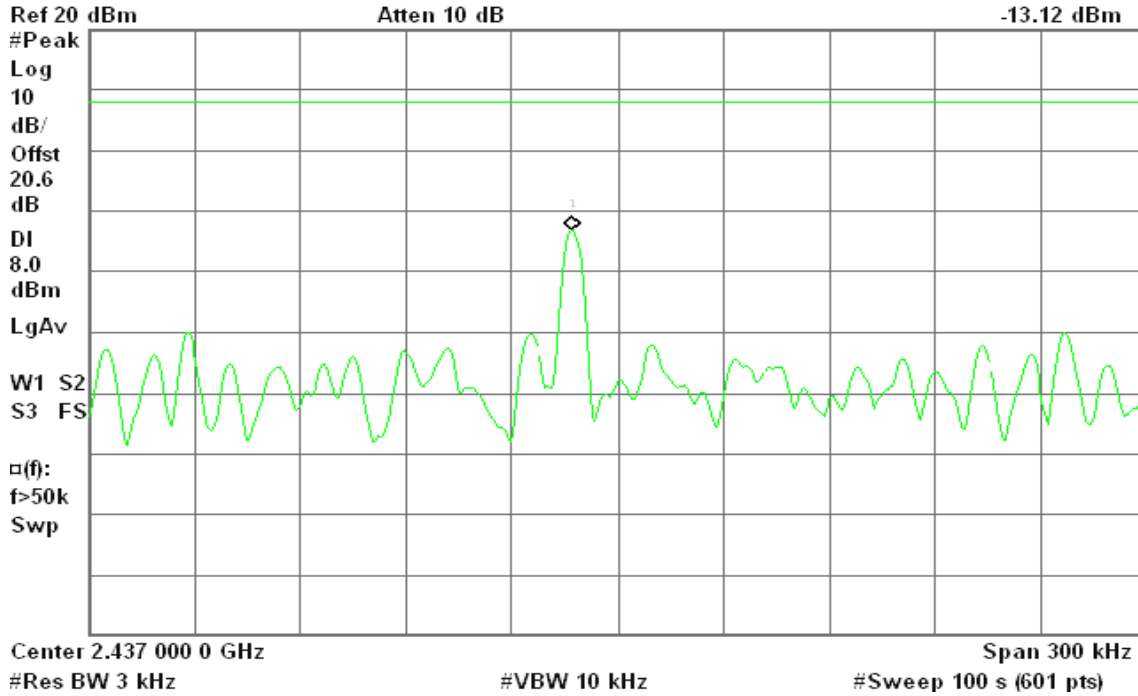


PPSD (CH Mid)

Agilent 19:18:15 May 24, 2010

R T

Mkr1 2.436 986 9 GHz
-13.12 dBm

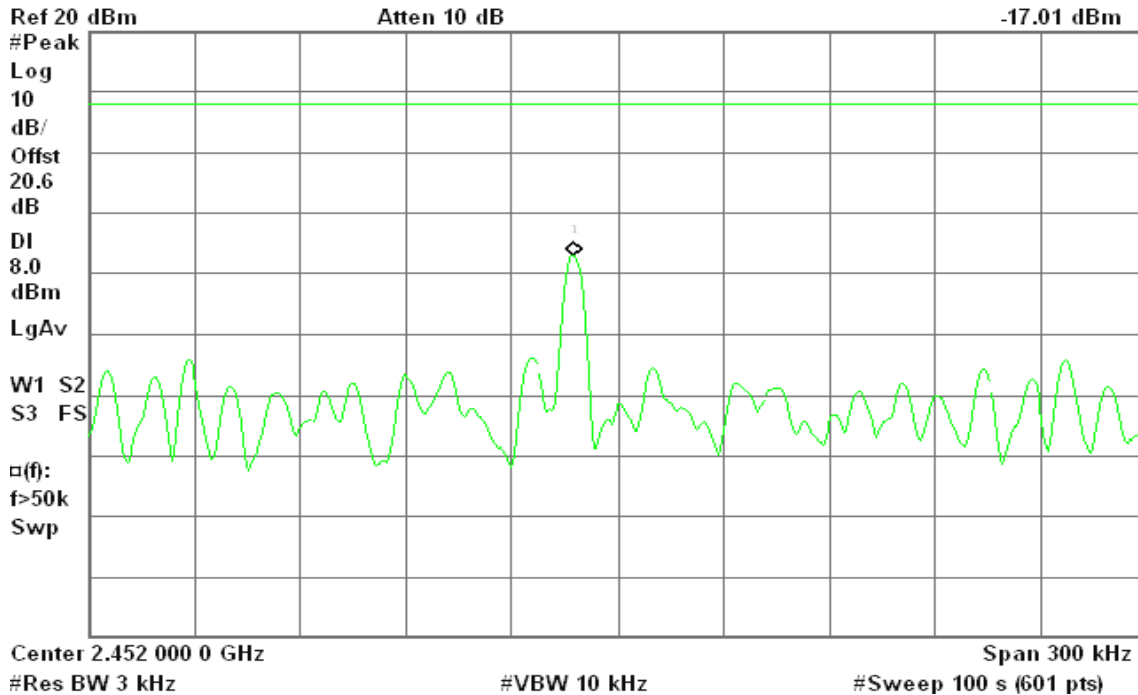


PPSD (CH High)

Agilent 19:23:12 May 24, 2010

R T

Mkr1 2.451 987 4 GHz
-17.01 dBm





draft 802.11n Standard-20 MHz Channel mode with combiner

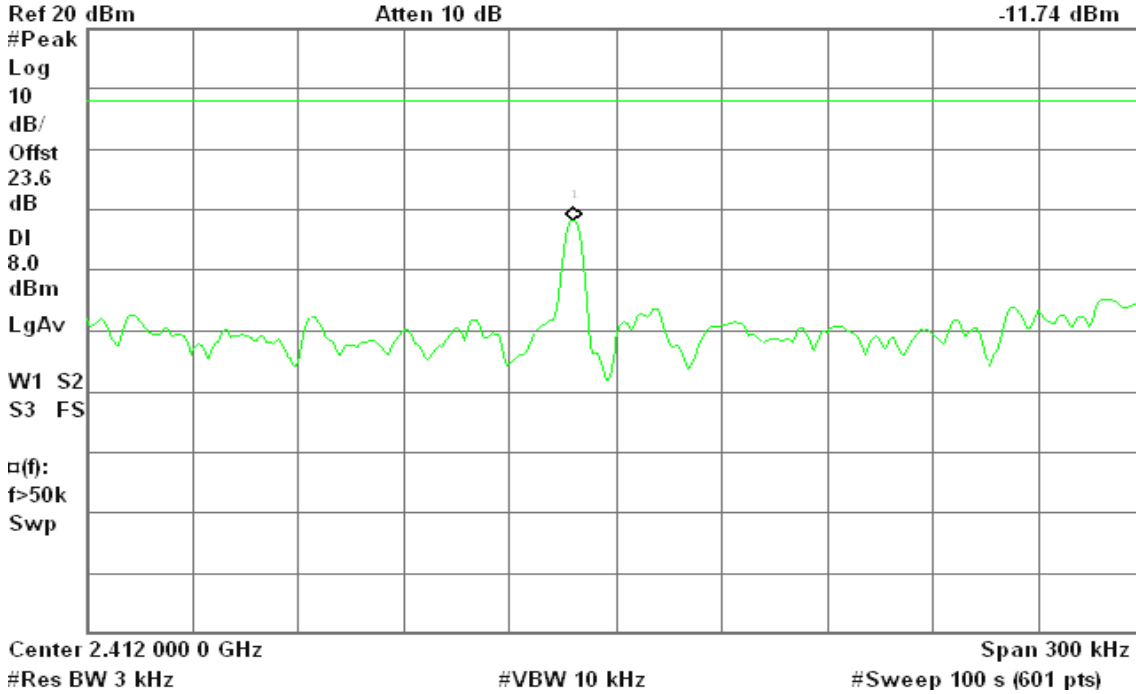
PPSD (CH Low)

Agilent 20:06:03 May 24, 2010

R T

Mkr1 2.411 987 9 GHz

-11.74 dBm



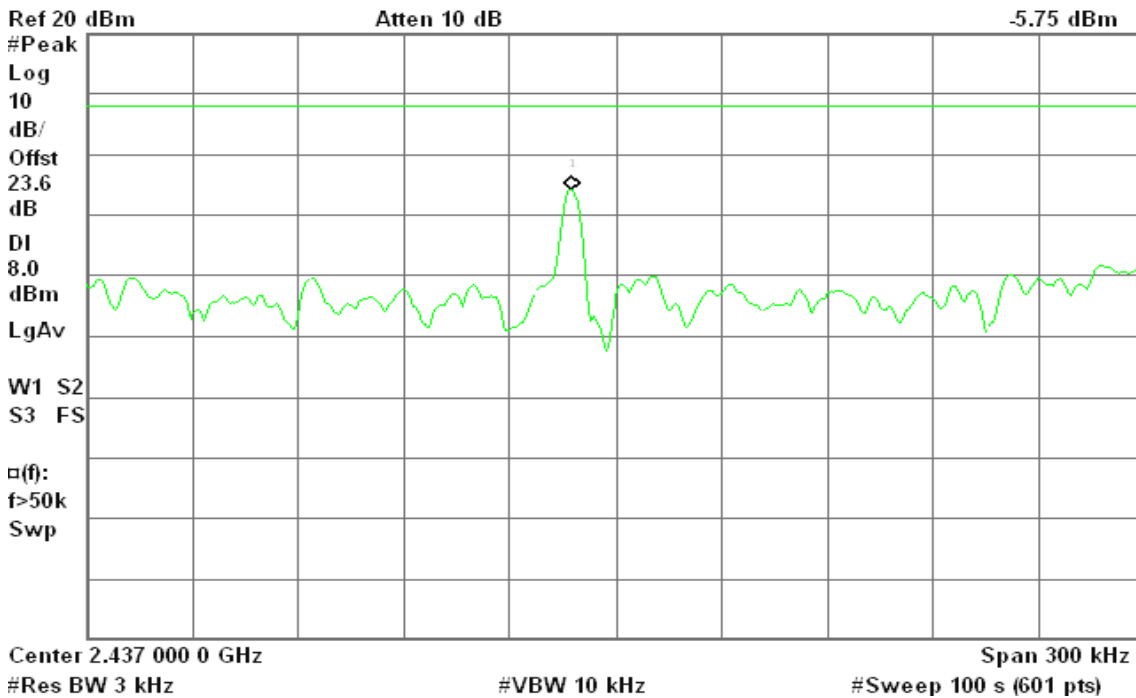
PPSD (CH Mid)

Agilent 20:09:38 May 24, 2010

R T

Mkr1 2.436 987 4 GHz

-5.75 dBm



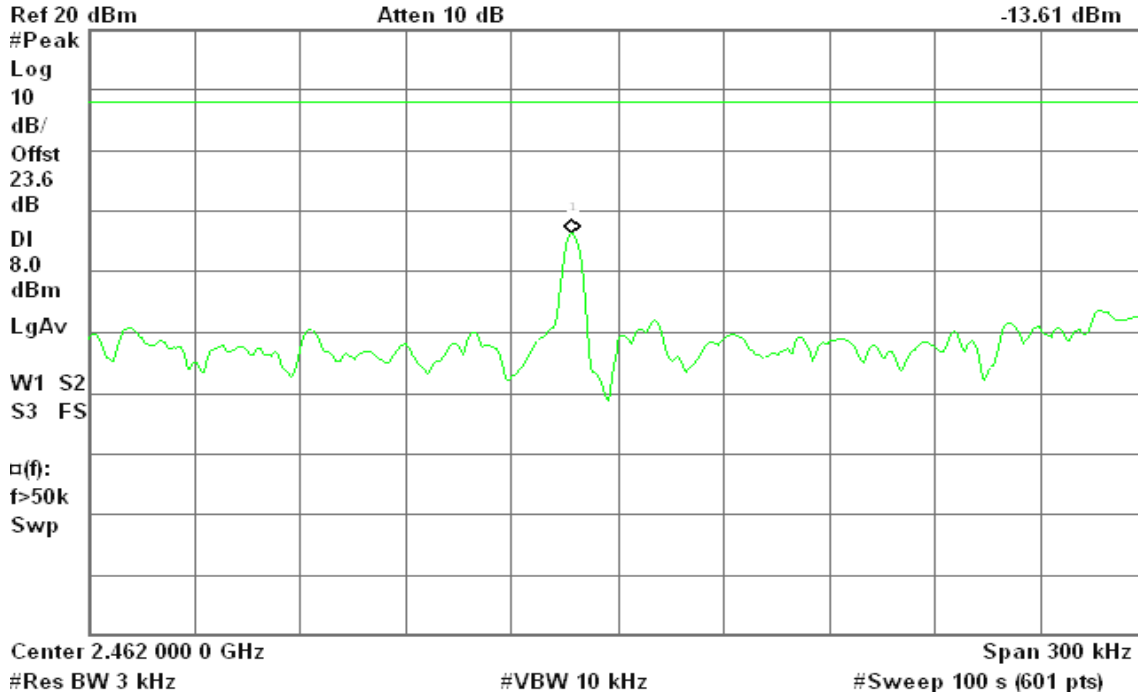


PPSD (CH High)

Agilent 20:13:12 May 24, 2010

R T

Mkr1 2.461 987 0 GHz
-13.61 dBm



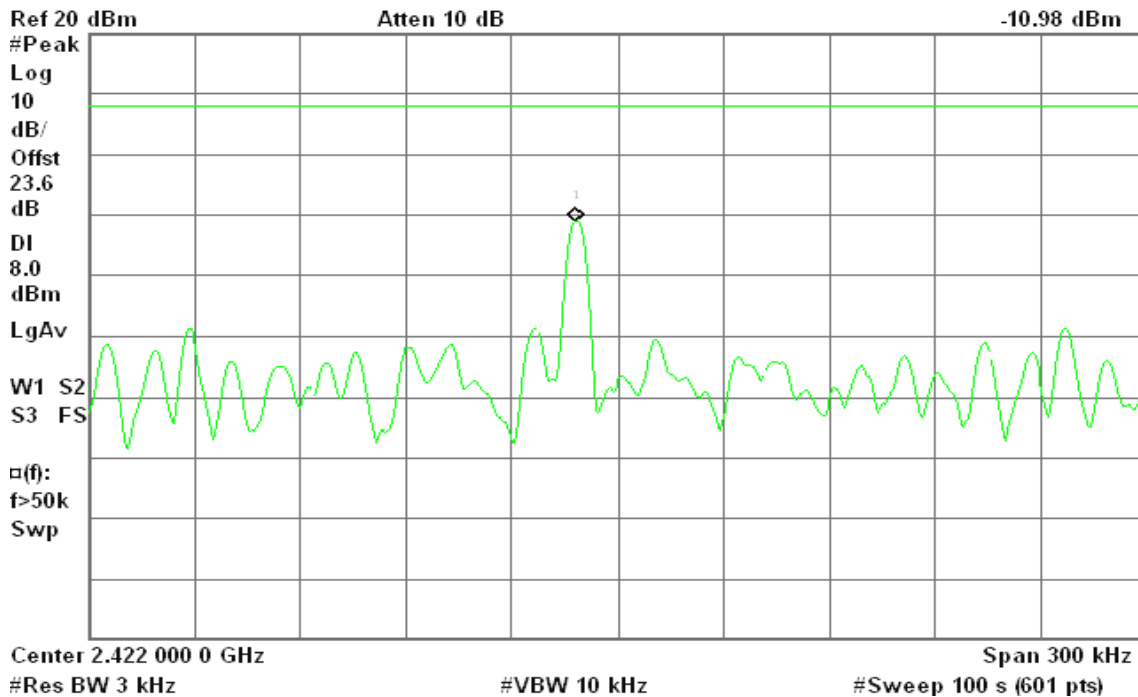
draft 802.11n Wide-40 MHz Channel mode with combiner

PPSD (CH Low)

Agilent 19:58:23 May 24, 2010

R L

Mkr1 2.421 988 0 GHz
-10.98 dBm



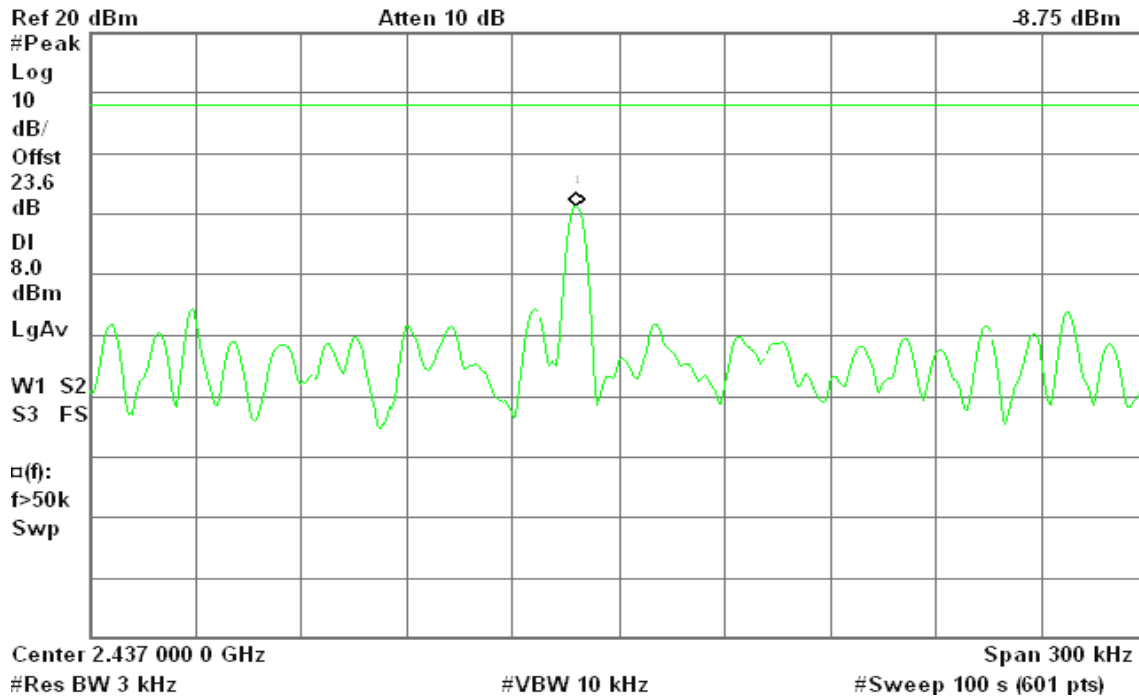


PPSD (CH Mid)

Agilent 20:01:46 May 24, 2010

R L

Mkr1 2.436 987 9 GHz
-8.75 dBm

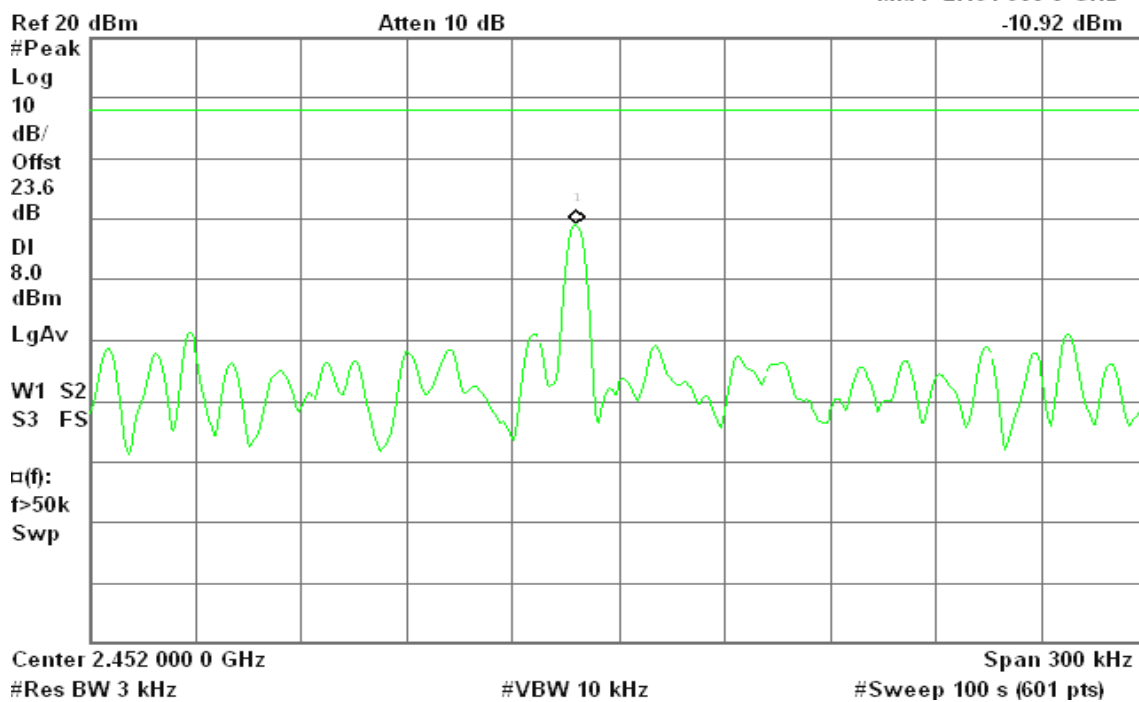


PPSD (CH High)

Agilent 19:54:48 May 24, 2010

R T

Mkr1 2.451 988 0 GHz
-10.92 dBm



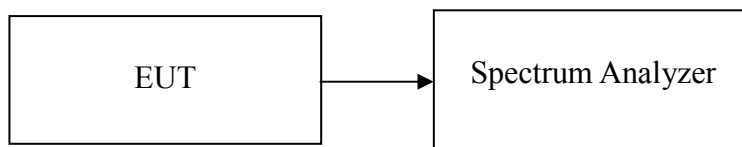
7.6 SPURIOUS EMISSIONS

7.6.1 Conducted Measurement

LIMIT

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

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 13GHz to 26GHz range with the transmitter set to the lowest, middle, and highest channels.

TEST RESULTS

No non-compliance noted



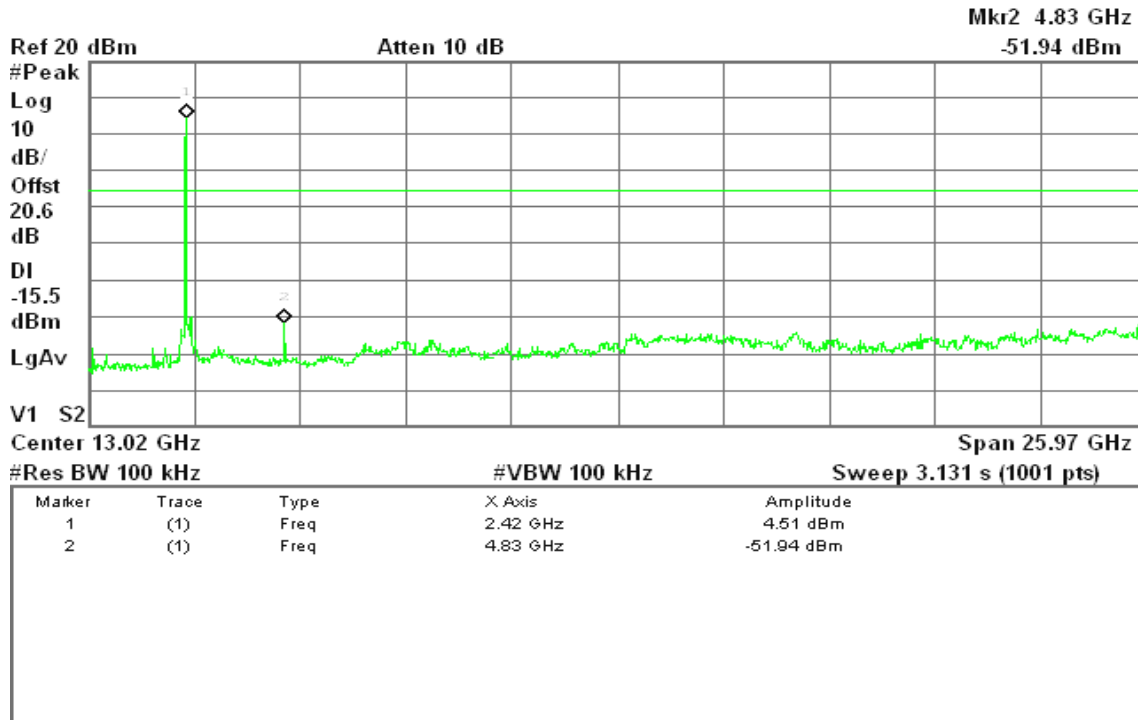
Test Plot

IEEE 802.11b mode

CH Low

Agilent 21:37:59 May 21, 2010

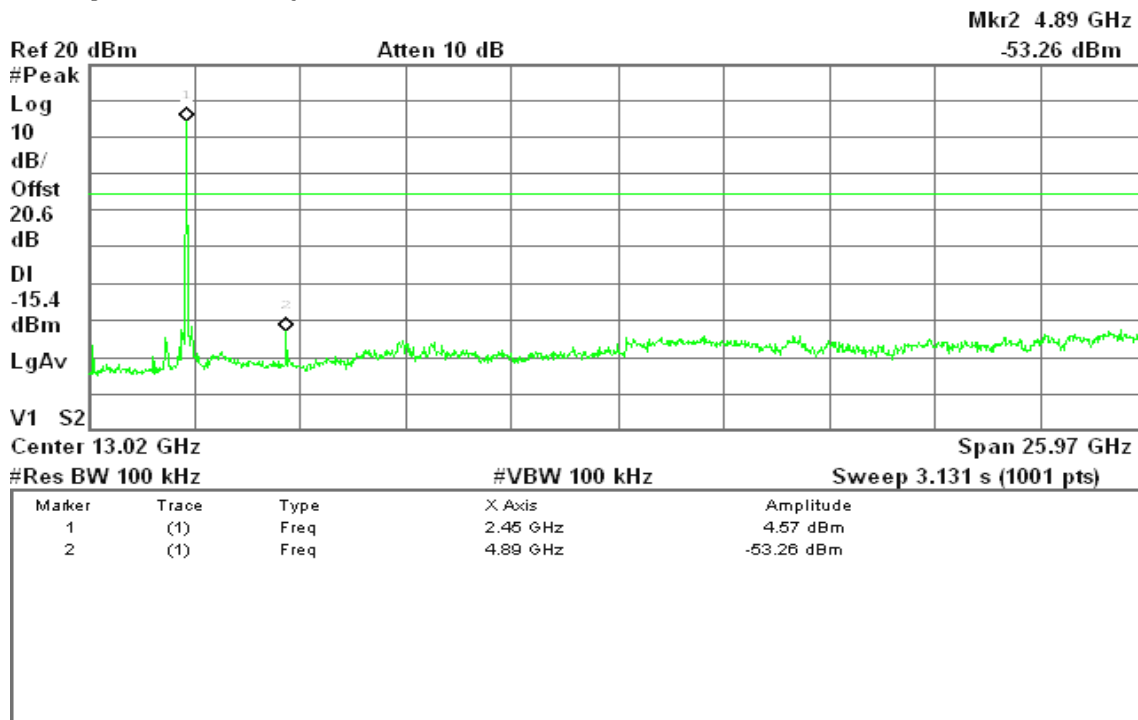
R T



CH Mid

Agilent 21:45:19 May 21, 2010

R T

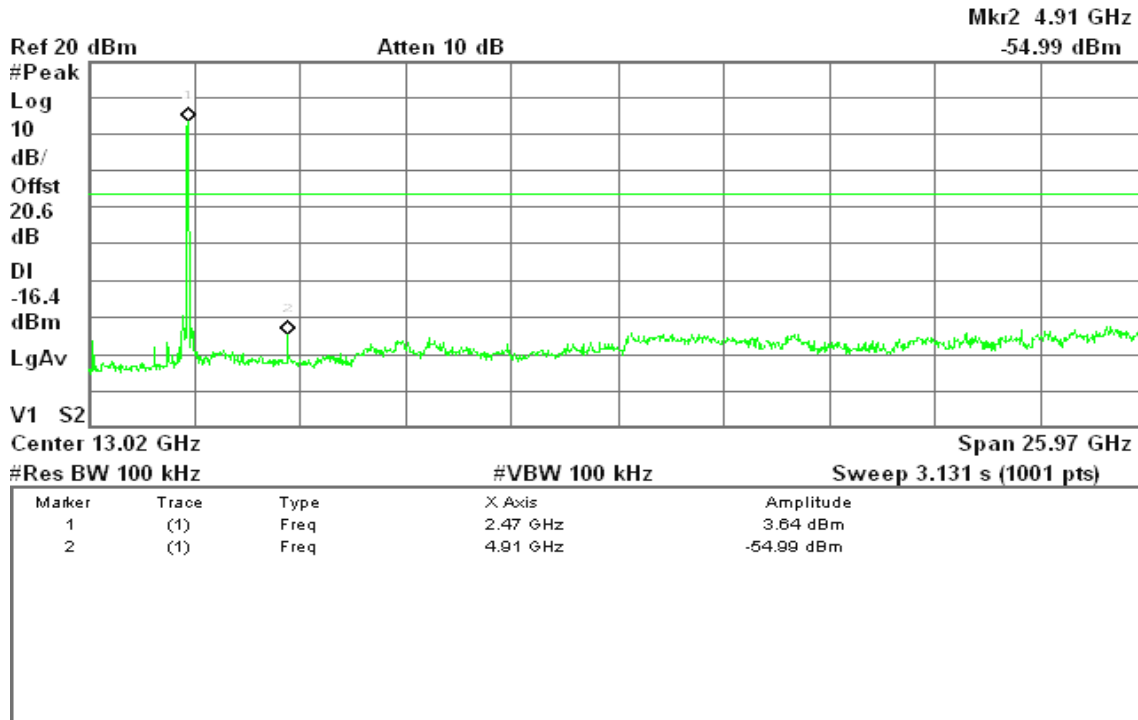




CH High

Agilent 21:52:53 May 21, 2010

R T

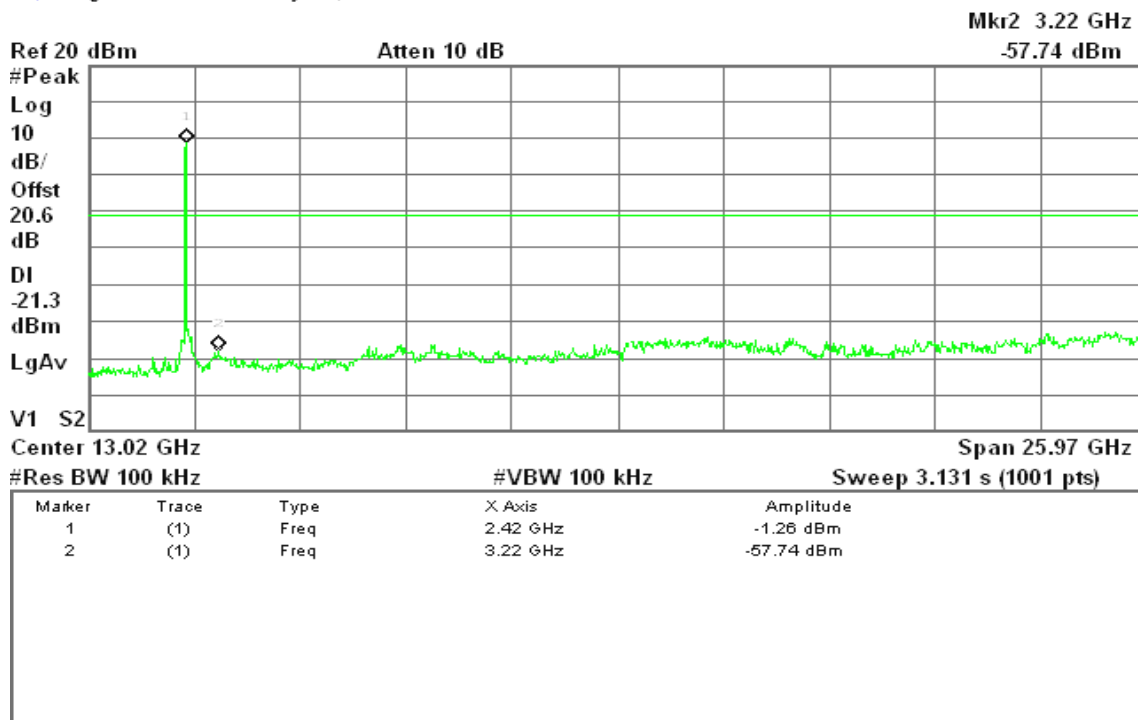


IEEE 802.11g mode

CH Low

Agilent 22:13:10 May 21, 2010

R T

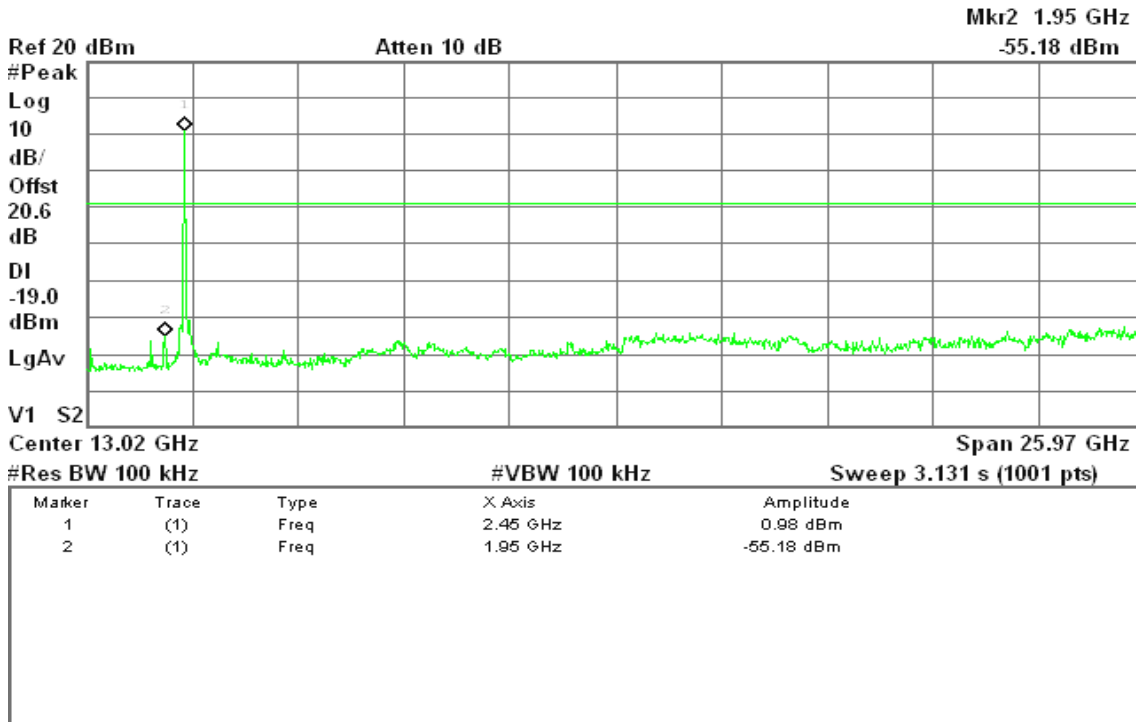




CH Mid

Agilent 22:06:52 May 21, 2010

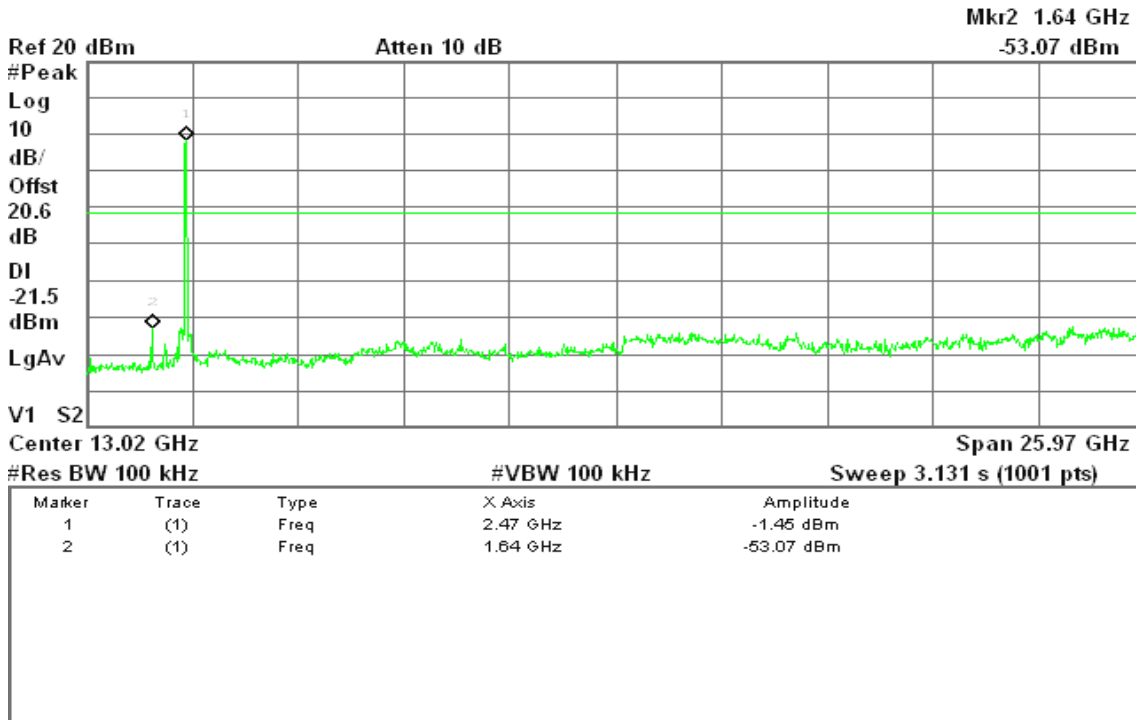
R T



CH High

Agilent 22:00:24 May 21, 2010

R T





draft 802.11n Standard-20 MHz Channel mode / Chain 0

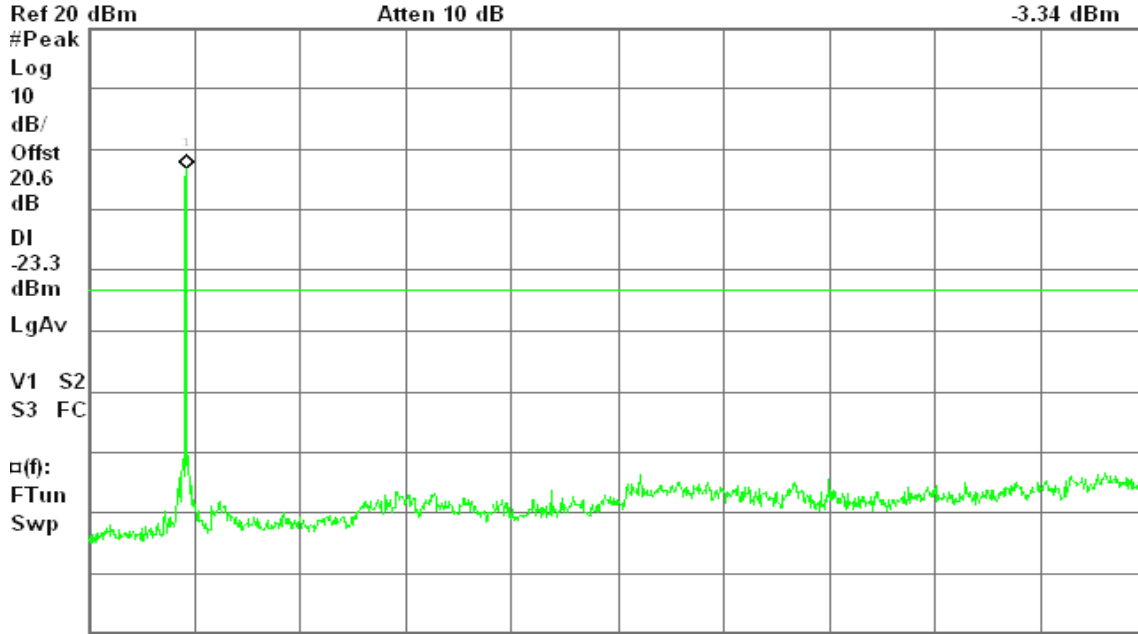
CH Low

Agilent 17:47:46 May 24, 2010

R T

Mkr1 2.42 GHz

-3.34 dBm



Center 13.02 GHz

#Res BW 100 kHz

#VBW 100 kHz

Span 25.97 GHz

Sweep 3.131 s (1001 pts)

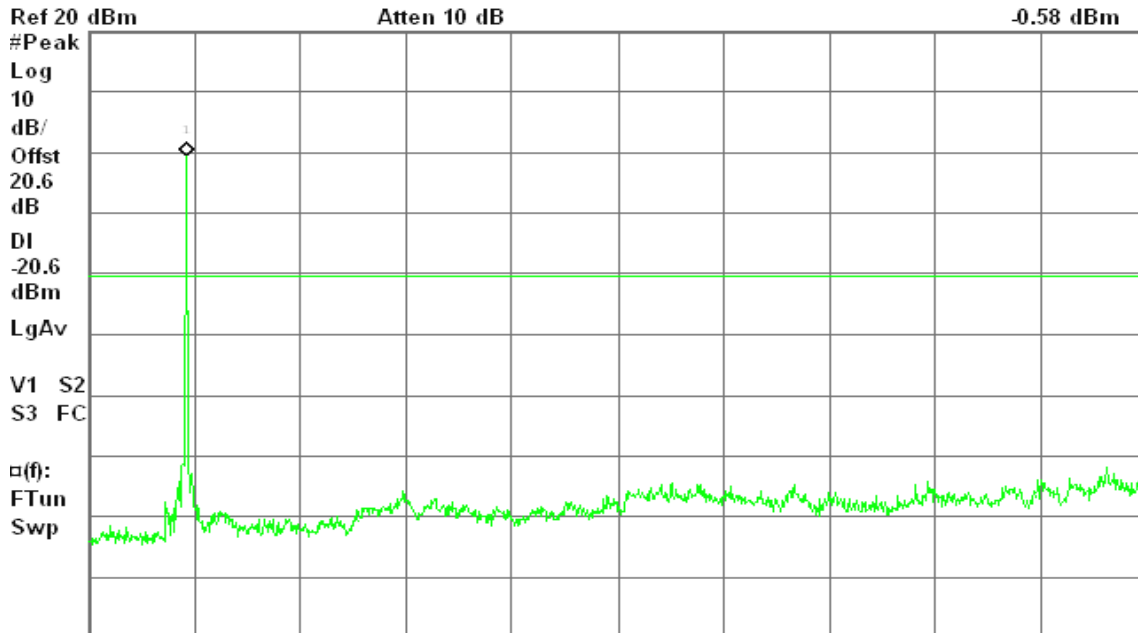
CH Mid

Agilent 18:11:14 May 24, 2010

R T

Mkr1 2.45 GHz

-0.58 dBm



Center 13.02 GHz

#Res BW 100 kHz

#VBW 100 kHz

Span 25.97 GHz

Sweep 3.131 s (1001 pts)

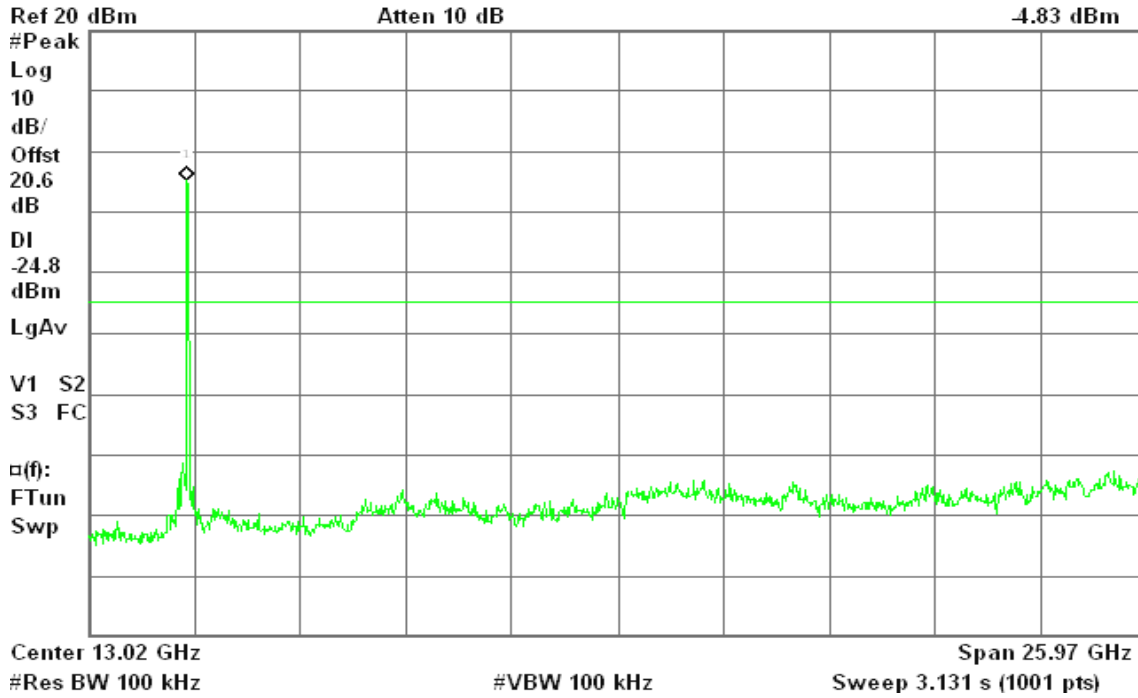


CH High

Agilent 18:31:09 May 24, 2010

R T

Mkr1 2.45 GHz
-4.83 dBm



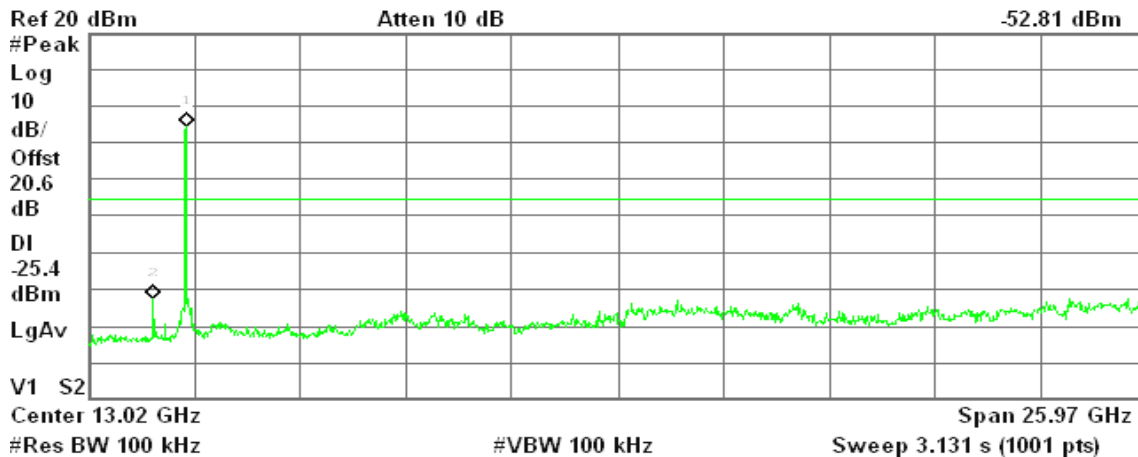
draft 802.11n Standard-20 MHz Channel mode / Chain 1

CH Low

Agilent 18:50:08 May 24, 2010

R T

Mkr2 1.61 GHz
-52.81 dBm



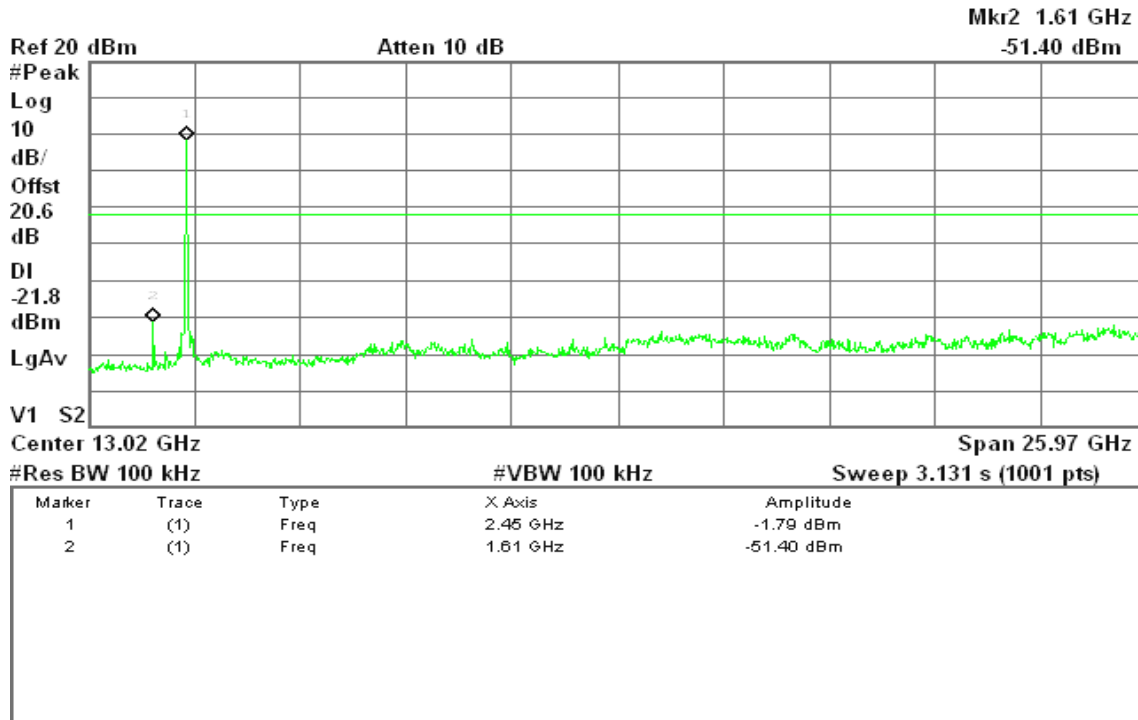
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.42 GHz	-5.42 dBm
2	(1)	Freq	1.61 GHz	-52.81 dBm



CH Mid

Agilent 18:54:47 May 24, 2010

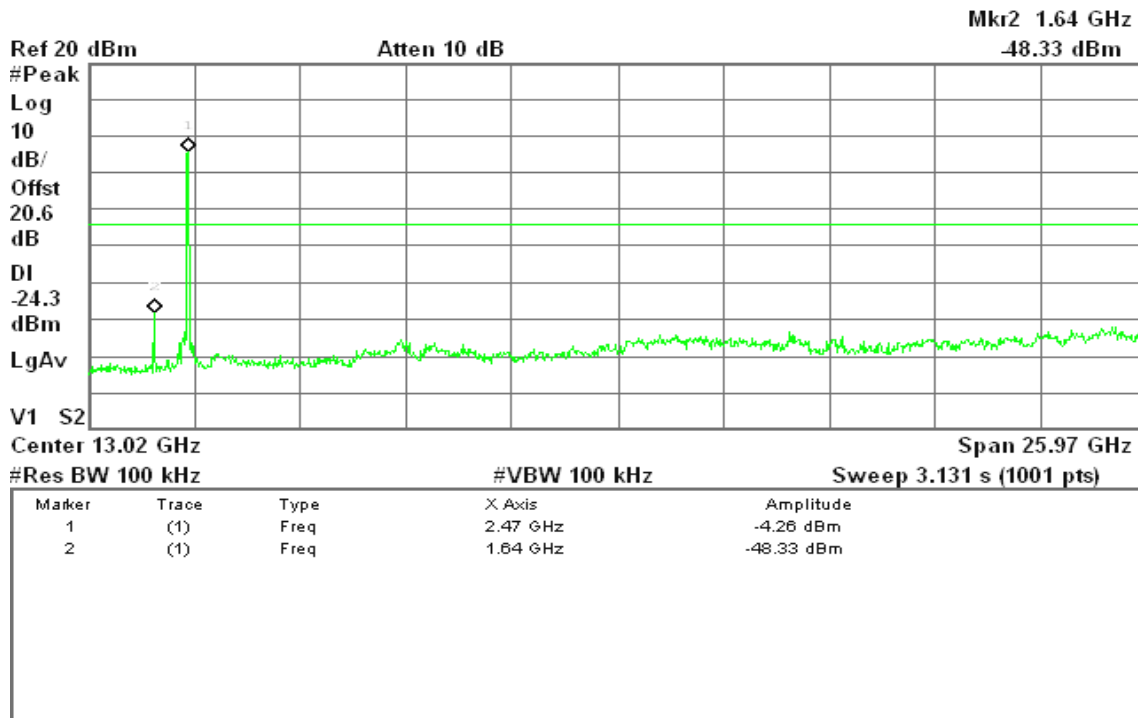
R T



CH High

Agilent 18:44:11 May 24, 2010

R T





draft 802.11n Wide-40 MHz Channel mode / Chain 0

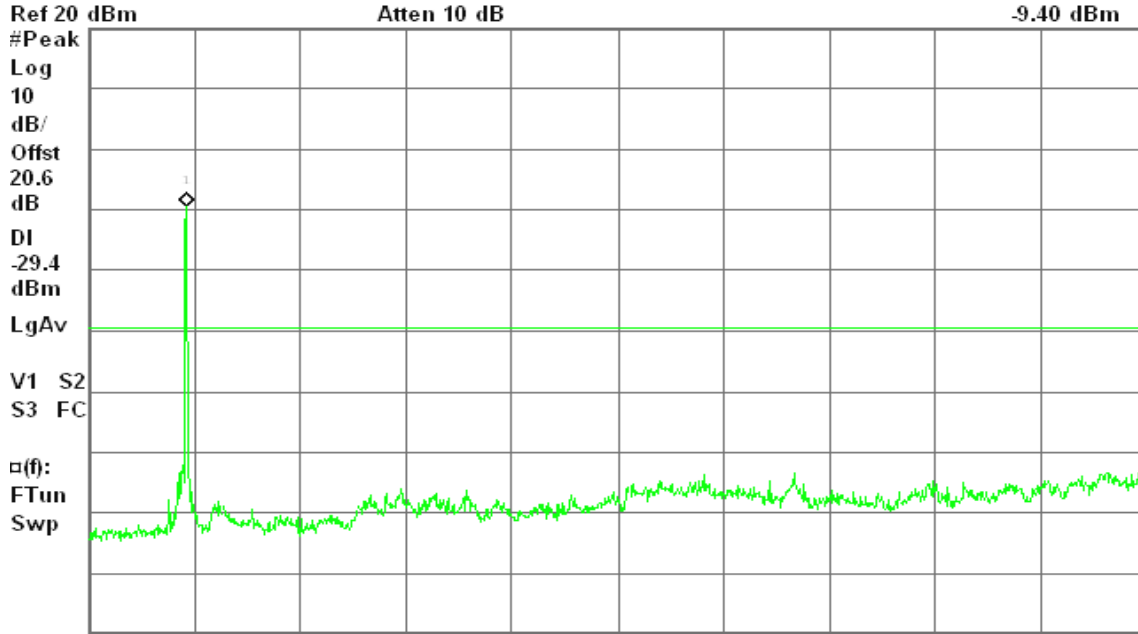
CH Low

Agilent 19:38:34 May 24, 2010

R T

Mkr1 2.42 GHz

-9.40 dBm



Center 13.02 GHz

#Res BW 100 kHz

#VBW 100 kHz

Span 25.97 GHz

Sweep 3.131 s (1001 pts)

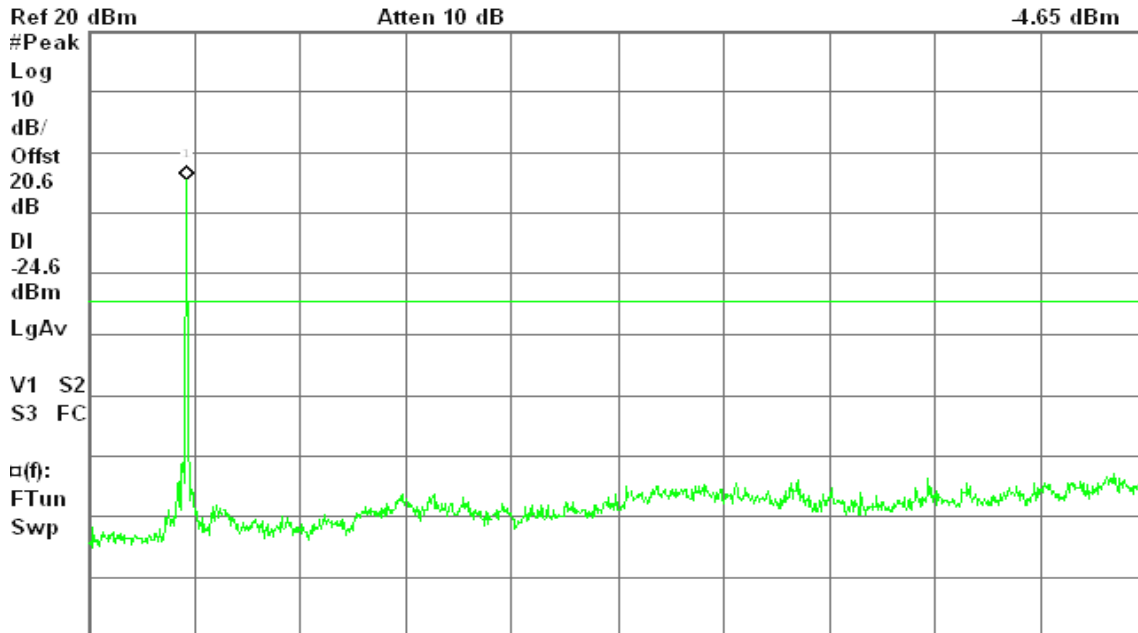
CH Mid

Agilent 19:43:13 May 24, 2010

R T

Mkr1 2.45 GHz

-4.65 dBm



Center 13.02 GHz

#Res BW 100 kHz

#VBW 100 kHz

Span 25.97 GHz

Sweep 3.131 s (1001 pts)

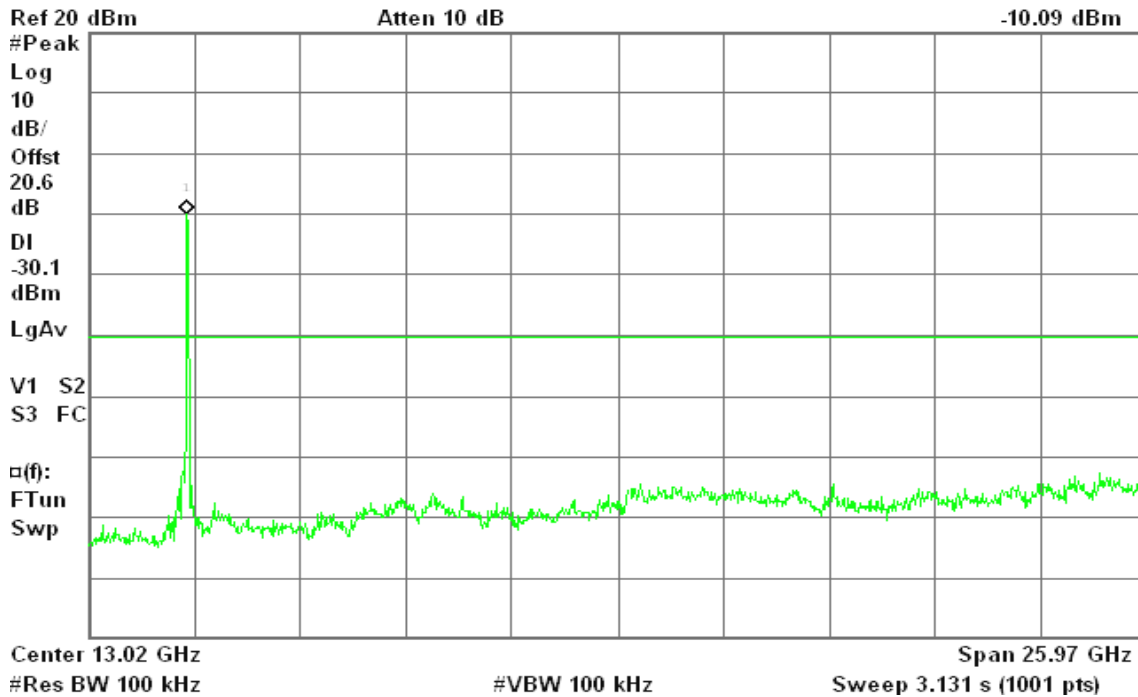


CH High

Agilent 19:47:41 May 24, 2010

R T

Mkr1 2.45 GHz
-10.09 dBm



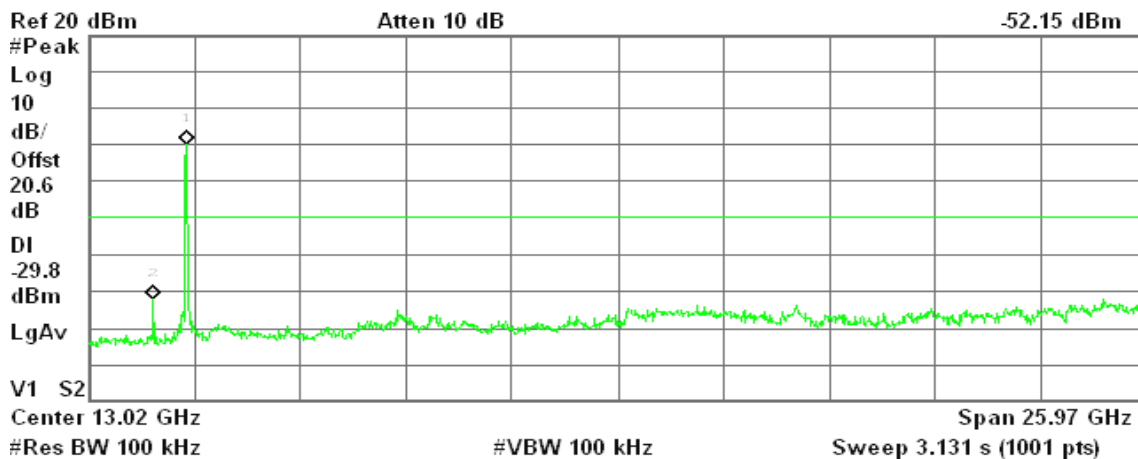
draft 802.11n Wide-40 MHz Channel mode / Chain 1

CH Low

Agilent 19:14:18 May 24, 2010

R T

Mkr2 1.61 GHz
-52.15 dBm



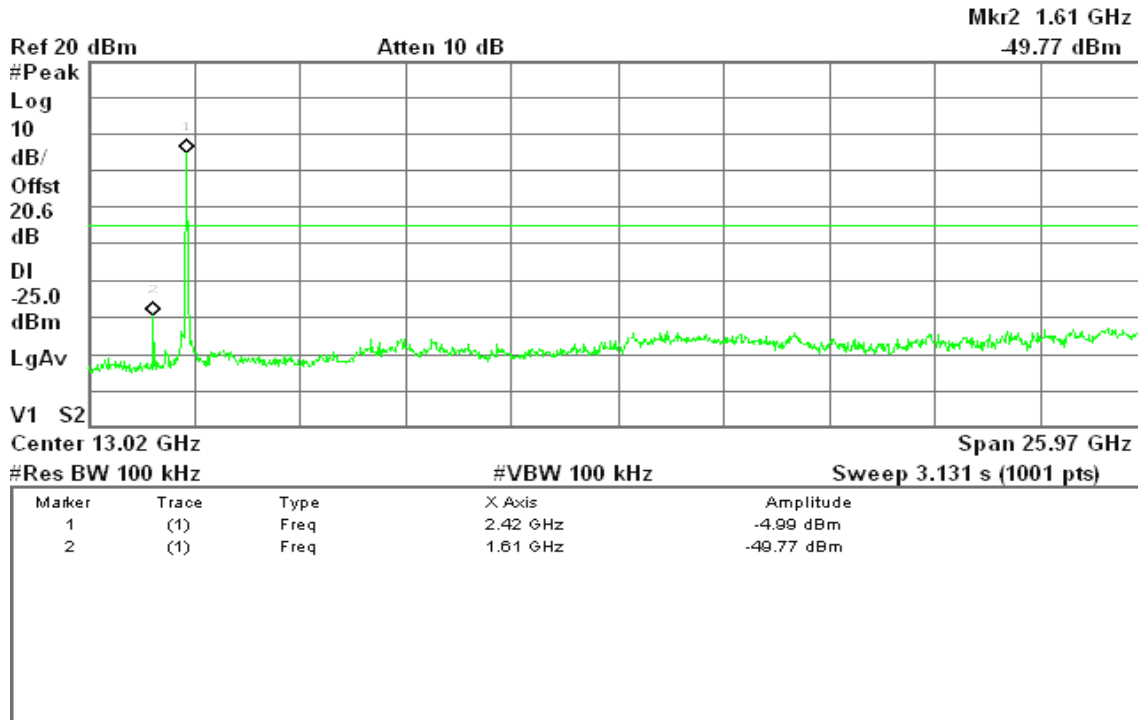
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.42 GHz	-9.75 dBm
2	(1)	Freq	1.61 GHz	-52.15 dBm



CH Mid

Agilent 19:19:14 May 24, 2010

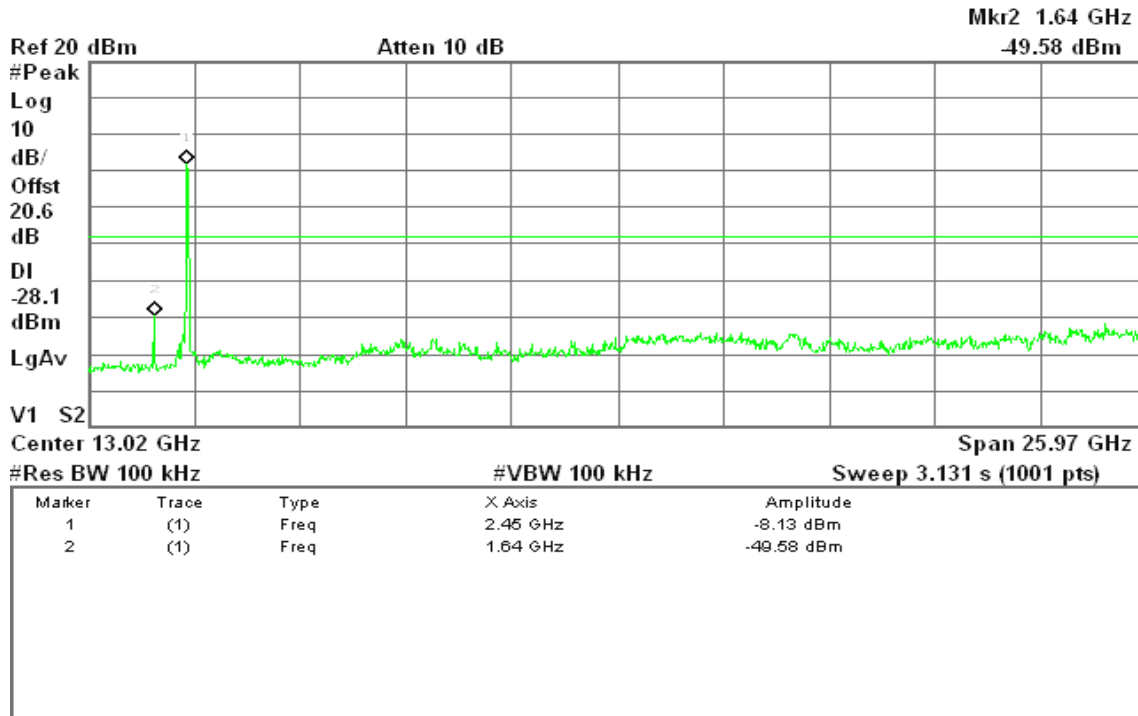
R T



CH High

Agilent 19:24:23 May 24, 2010

R T



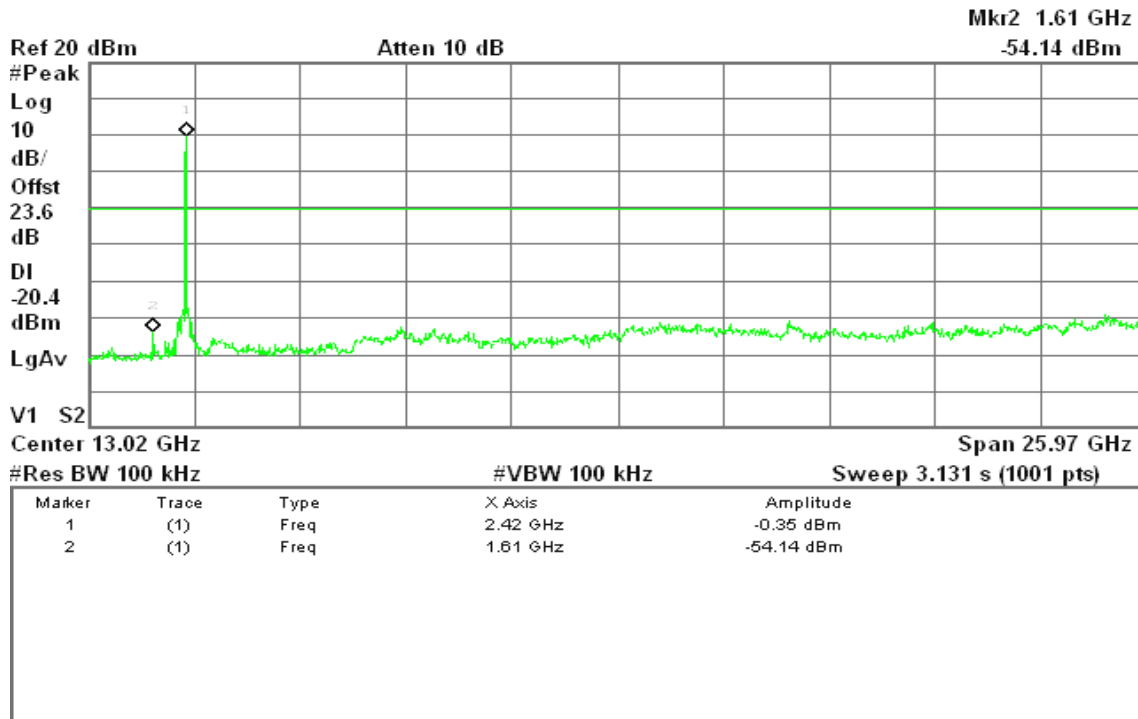


draft 802.11n Standard-20 MHz Channel mode with combiner

CH Low

Agilent 20:06:49 May 24, 2010

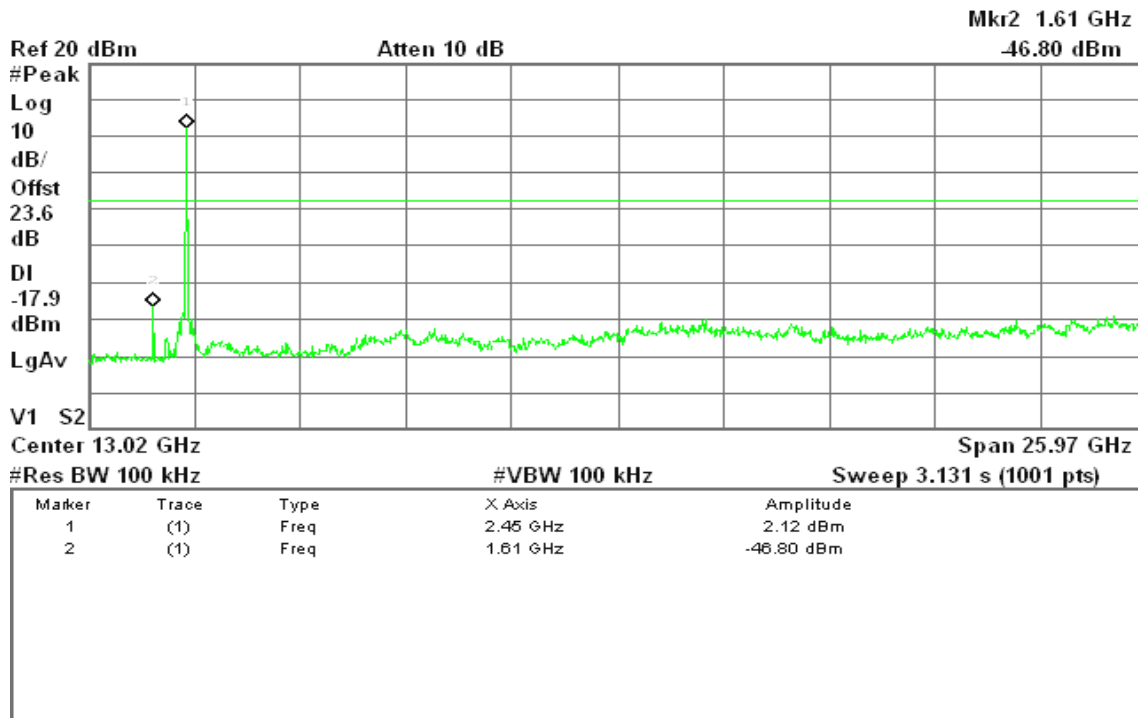
R T



CH Mid

Agilent 20:10:32 May 24, 2010

R T

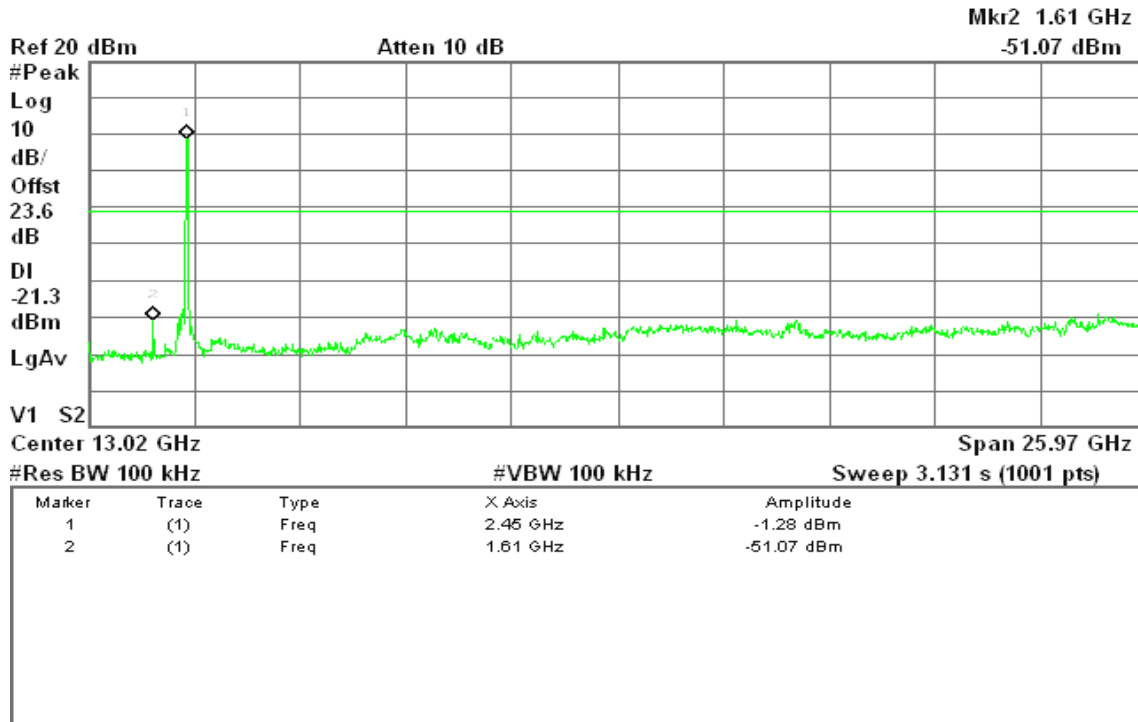




CH Mid

Agilent 20:02:29 May 24, 2010

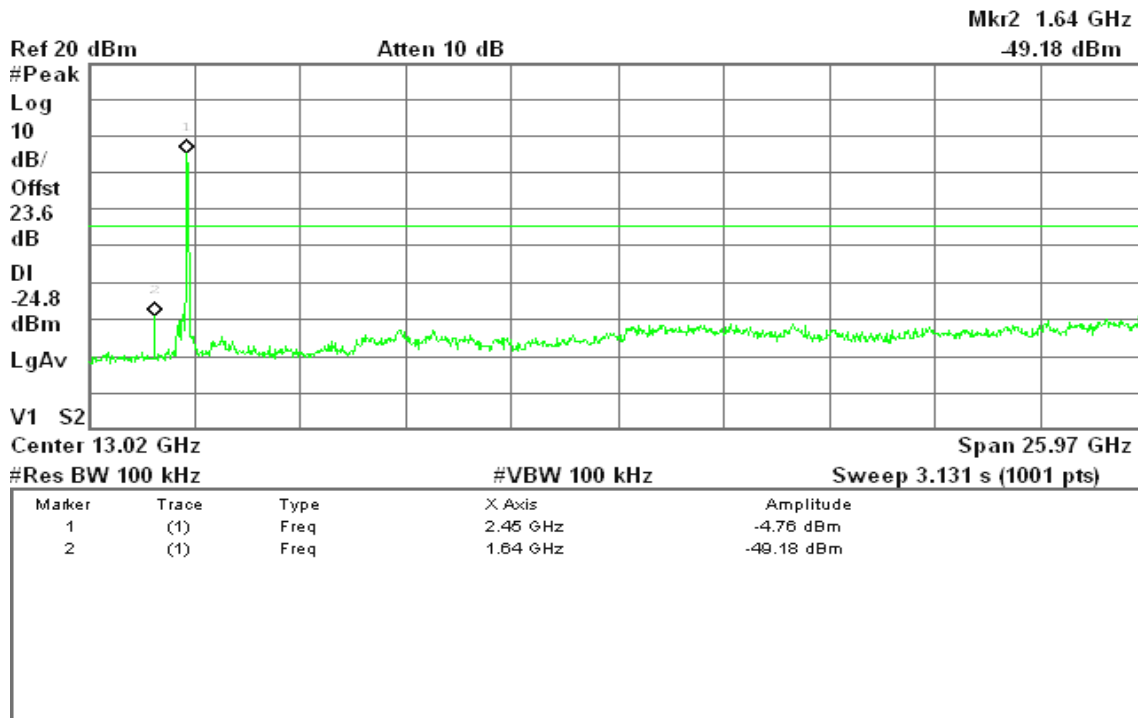
R T



CH High

Agilent 19:55:33 May 24, 2010

R T





7.7 RADIATED EMISSIONS

LIMIT

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

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

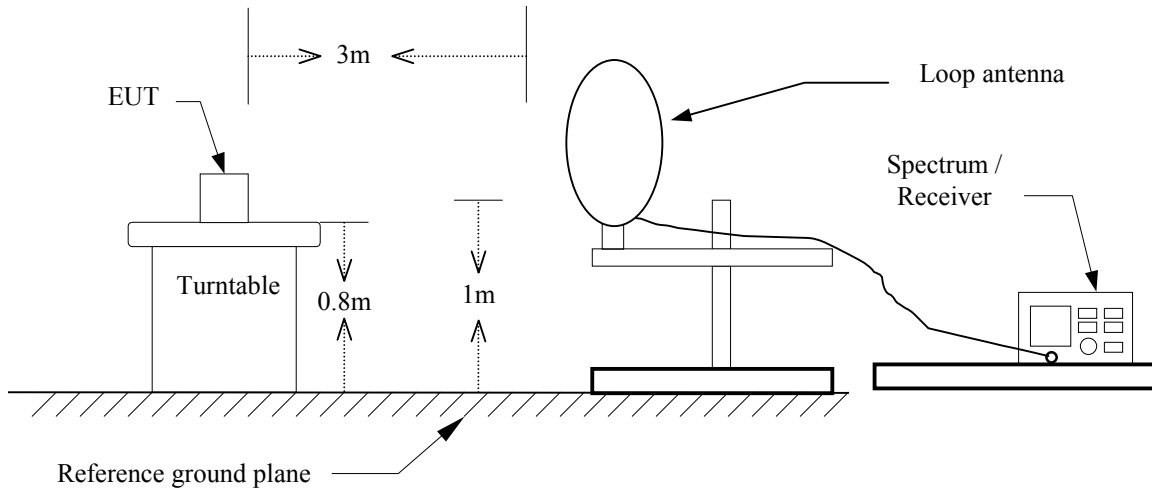
Remark: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of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

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

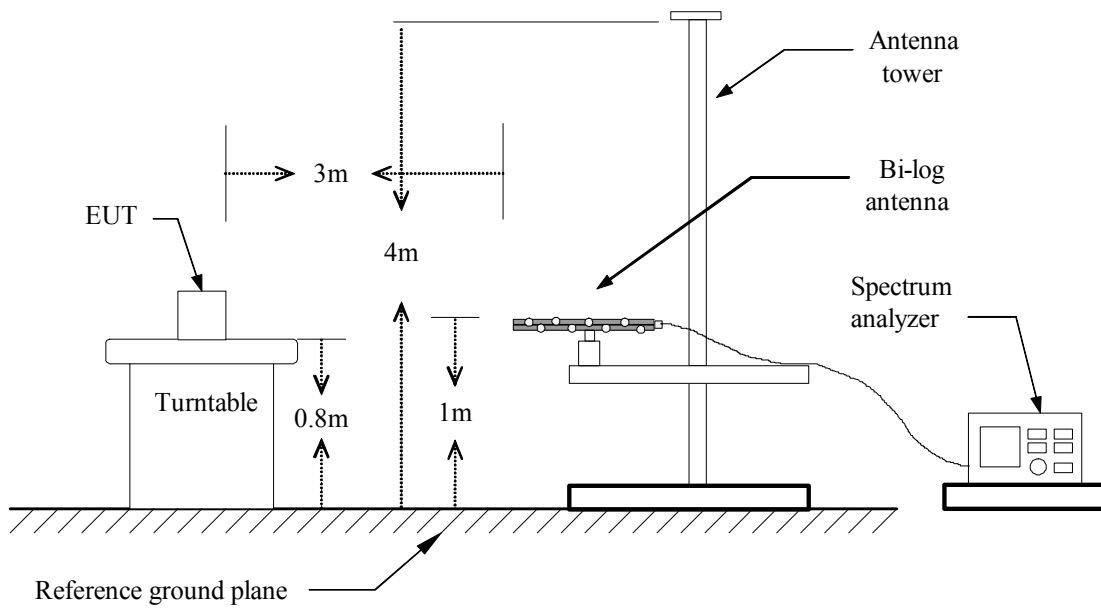
Frequency (MHz)	Field Strength ($\mu\text{V/m}$ at 3-meter)	Field Strength (dB $\mu\text{V/m}$ at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Test Configuration

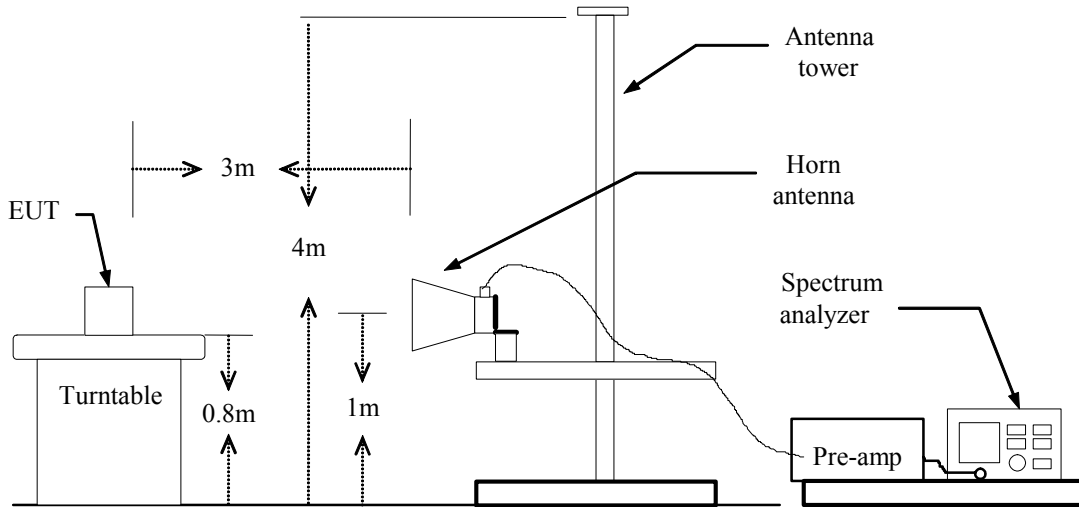
9kHz ~ 30MHz



30MHz ~ 1GHz



Above 1 GHz





TEST PROCEDURE

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

**Below 1GHz****Operation Mode:** Normal Link**Test Date:** May 27, 2010**Temperature:** 25°C**Tested by:** Mark Yang**Humidity:** 50% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
39.70	V	45.70	-9.01	36.69	40.00	-3.31	Peak
249.87	V	54.42	-10.90	43.52	46.00	-2.48	QP
335.55	V	49.31	-8.39	40.92	46.00	-5.08	Peak
600.68	V	45.67	-4.04	41.63	46.00	-4.37	QP
624.93	V	45.69	-3.48	42.21	46.00	-3.79	QP
699.30	V	45.40	-2.54	42.86	46.00	-3.14	Peak
249.87	H	56.07	-10.90	45.17	46.00	-0.83	QP
299.98	H	50.80	-9.24	41.56	46.00	-4.44	Peak
324.23	H	50.87	-8.66	42.20	46.00	-3.80	Peak
600.68	H	47.74	-4.04	43.70	46.00	-2.30	Peak
624.93	H	49.06	-3.48	45.58	46.00	-0.42	QP
699.30	H	47.26	-2.54	44.72	46.00	-1.28	QP

Remark:

1. Measuring frequencies from 30 MHz to the 1GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.
3. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser; with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. Margin (dB) = Result (dBuV/m) – Limit (dBuV/m).



Above 1 GHz

Operation Mode: TX / IEEE 802.11b / CH Low

Test Date: May 21, 2010

Temperature: 25°C

Tested by: Jerry Lin

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
2283.33	V	58.11	48.16	-3.31	54.80	44.85	74.00	54.00	-9.15	AVG
2536.67	V	58.10	48.39	-2.55	55.55	45.84	74.00	54.00	-8.16	AVG
4825.00	V	49.70	---	1.18	50.88	---	74.00	54.00	-3.12	Peak
N/A										
4908.33	H	49.17	---	1.15	50.32	---	74.00	54.00	-3.68	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 Mid

Test Date: May 21, 2010

Temperature: 25°C

Tested by: Jerry Lin

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
2313.33	V	61.19	50.34	-3.22	57.97	47.12	74.00	54.00	-6.88	AVG
2563.33	V	57.70	48.15	-2.48	55.22	45.67	74.00	54.00	-8.33	AVG
5183.33	V	49.56	---	1.38	50.94	---	74.00	54.00	-3.06	Peak
N/A										
4908.33	H	48.56	---	1.15	49.71	---	74.00	54.00	-4.29	Peak
N/A										

Remark:

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

**Operation Mode:** TX / IEEE 802.11b / CH High**Test Date:** May 21, 2010**Temperature:** 25°C**Tested by:** Jerry Lin**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
1376.67	V	60.66	---	-8.96	51.70	---	74.00	54.00	-2.30	Peak
1750.00	V	62.44	44.08	-6.46	55.98	37.62	74.00	54.00	-16.38	AVG
2340.00	V	63.92	55.34	-3.14	60.79	52.20	74.00	54.00	-1.80	AVG
2586.67	V	59.56	52.51	-2.41	57.16	50.10	74.00	54.00	-3.90	AVG
4925.00	V	48.84	---	1.14	49.98	---	74.00	54.00	-4.02	Peak
N/A										
1373.33	H	63.09	54.09	-8.97	54.12	45.12	74.00	54.00	-8.88	AVG
2333.33	H	59.02	48.34	-3.16	55.86	45.18	74.00	54.00	-8.82	AVG
4783.33	H	48.31	---	1.19	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 802.11g / CH Low

Test Date: May 21, 2010

Temperature: 25°C

Tested by: Jerry Lin

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
2293.33	V	58.48	47.33	-3.28	55.20	44.05	74.00	54.00	-9.95	AVG
2536.67	V	60.42	51.07	-2.55	57.86	48.52	74.00	54.00	-5.48	AVG
N/A										
N/A										

Remark:

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

**Operation Mode:** TX / IEEE 802.11g / CH Mid**Test Date:** May 21, 2010**Temperature:** 25°C**Tested by:** Jerry Lin**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
2310.00	V	60.67	49.15	-3.23	57.44	45.92	74.00	54.00	-8.08	AVG
2560.00	V	58.82	50.20	-2.48	56.34	47.72	74.00	54.00	-6.28	AVG
4916.67	V	48.99	---	1.15	50.13	---	74.00	54.00	-3.87	Peak
N/A										
4791.67	H	50.04	---	1.19	51.22	---	74.00	54.00	-2.78	Peak
5766.67	H	49.63	---	2.19	51.82	---	74.00	54.00	-2.18	Peak
N/A										

Remark:

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

**Operation Mode:** TX / IEEE 802.11g / CH High**Test Date:** May 21, 2010**Temperature:** 25°C**Tested by:** Jerry Lin**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
2343.33	V	62.46	48.39	-3.13	59.33	45.26	74.00	54.00	-8.74	AVG
2410.00	V	62.39	52.10	-2.93	59.46	49.17	74.00	54.00	-4.83	AVG
N/A										
2343.33	H	58.40	47.10	-3.13	55.27	43.97	74.00	54.00	-10.03	AVG
N/A										

Remark:

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



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

Test Date: May 21, 2010

Temperature: 25°C

Tested by: Jerry Lin

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
2533.33	V	57.30	46.20	-2.56	54.74	43.64	74.00	54.00	-10.36	AVG
4875.00	V	48.76	---	1.16	49.92	---	74.00	54.00	-4.08	Peak
N/A										
6433.33	H	49.31	44.78	3.45	52.76	48.23	74.00	54.00	-5.77	AVG
N/A										

Remark:

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



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

Test Date: May 21, 2010

Temperature: 25°C

Tested by: Jerry Lin

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
2316.67	V	60.76	48.62	-3.21	57.55	45.41	74.00	54.00	-8.59	AVG
2373.33	V	64.21	51.35	-3.04	61.17	48.31	74.00	54.00	-5.69	AVG
5000.00	V	49.45	---	1.12	50.57	---	74.00	54.00	-3.43	Peak
N/A										
6500.00	H	49.88	40.20	3.59	53.47	43.79	74.00	54.00	-10.21	AVG
N/A										

Remark:

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



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

Test Date: May 21, 2010

Temperature: 25°C

Tested by: Jerry Lin

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
2340.00	V	61.59	48.69	-3.14	58.45	45.55	74.00	54.00	-8.45	AVG
2380.00	V	62.77	52.10	-3.02	59.75	49.08	74.00	54.00	-4.92	AVG
4558.33	V	48.67	---	1.26	49.93	---	74.00	54.00	-4.07	Peak
N/A										
6325.00	H	49.83	42.70	3.22	53.04	45.92	74.00	54.00	-8.08	AVG
N/A										

Remark:

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



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

Test Date: May 21, 2010

Temperature: 25°C

Tested by: Jerry Lin

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
4850.00	V	47.89	---	1.17	49.06	---	74.00	54.00	-4.94	Peak
N/A										
6458.33	H	50.95	45.59	3.50	54.45	49.09	74.00	54.00	-4.91	AVG
N/A										

Remark:

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



Operation Mode: TX / draft 802.11n Wide-40 MHz Channel mode / CH Mid **Test Date:** May 21, 2010
Temperature: 25°C **Tested by:** Jerry Lin
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
2310.00	V	59.56	48.60	-3.23	56.33	45.37	74.00	54.00	-8.63	AVG
5150.00	V	49.57	---	1.33	50.90	---	74.00	54.00	-3.10	Peak
N/A										
4758.33	H	48.99	---	1.20	50.18	---	74.00	54.00	-3.82	Peak
6500.00	H	50.32	44.96	3.59	53.91	48.55	74.00	54.00	-5.45	AVG
N/A										

Remark:

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



Operation Mode: TX / draft 802.11n Wide-40 MHz Channel mode / CH High **Test Date:** May 21, 2010
Temperature: 25°C **Tested by:** Jerry Lin
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
2373.33	V	61.41	50.10	-3.04	58.37	47.06	74.00	54.00	-6.94	AVG
6600.00	V	49.80	34.67	3.89	53.69	38.56	74.00	54.00	-15.44	AVG
N/A										
6541.67	H	49.89	45.40	3.71	53.60	49.11	74.00	54.00	-4.89	AVG
N/A										

Remark:

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



7.8 POWERLINE CONDUCTED EMISSIONS

LIMIT

According to §15.207(a), except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 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:** 2010/5/28
Temperature: 26°C **Tested by:** Webber Chung
Humidity: 60% RH

Freq. (MHz)	QP Reading (dBuV)	AV Reading (dBuV)	Corr. factor (dB/m)	QP Result (dBuV/m)	AV Result (dBuV/m)	QP Limit (dBuV)	AV Limit (dBuV)	QP Margin (dB)	AV Margin (dB)	Note
0.1612	59.12	46.49	0.08	59.20	46.57	65.40	55.40	-6.20	-8.83	L1
0.2181	50.92	37.12	0.08	51.00	37.20	62.89	52.89	-11.89	-15.69	L1
0.3198	41.05	22.48	0.07	41.12	22.55	59.71	49.71	-18.59	-27.16	L1
0.5630	38.62	26.15	0.09	38.71	26.24	56.00	46.00	-17.29	-19.76	L1
2.6207	32.80	20.14	0.22	33.02	20.36	56.00	46.00	-22.98	-25.64	L1
14.0797	39.26	27.45	0.70	39.96	28.15	60.00	50.00	-20.04	-21.85	L1
0.1586	60.98	46.50	0.08	61.06	46.58	65.53	55.53	-4.47	-8.95	L2
0.2147	51.40	36.91	0.08	51.48	36.99	63.02	53.02	-11.54	-16.03	L2
0.2705	46.35	29.34	0.08	46.43	29.42	61.10	51.10	-14.67	-21.68	L2
0.5675	38.70	25.98	0.10	38.80	26.08	56.00	46.00	-17.20	-19.92	L2
2.5588	33.54	20.08	0.71	34.25	20.79	56.00	46.00	-21.75	-25.21	L2
13.7472	38.98	270.06	0.68	39.66	27.74	60.00	50.00	-20.34	-22.26	L2

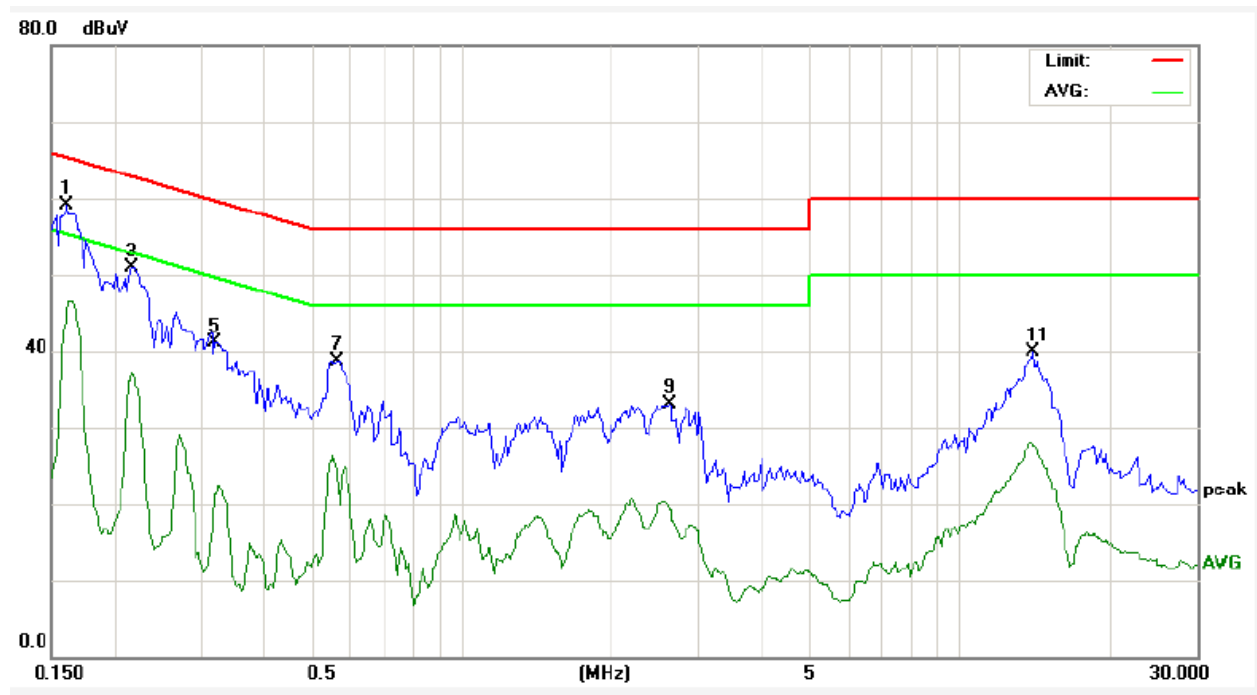
Remark:

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



Test Plots

Conducted emissions (Line 1)



Conducted emissions (Line 2)

