



FCC 47 CFR PART 15 SUBPART C TEST REPORT

For

Computing Box

Model: TREK-550; TREK-550XXXXXXXXXXXXX
("X" can be 0-9 or A-Z or blank or any alphanumeric character)

Trade Name: ADVANTECH

Issued to

Advantech Co. Ltd.
No. 1, Alley 20, Lane 26, Rueiguang Road, Neihu District,
Taipei 114, 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
FAX: 886-3-324-5235
<http://www.ccsrf.com>
service@ccsrf.com



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



Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	July 6, 2010	Initial Is sue	All	Angel Hu



TABLE OF CONTENTS

1. TEST RESULT CERTIFICATION	4
2. EUT DESCRIPTION.....	5
3. TEST METHODOLOGY.....	6
3.1 EUT CONFIGURATION.....	6
3.2 EUT EXERCISE.....	6
3.3 GENERAL TEST PROCEDURES	6
3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS	7
3.5 DESCRIPTION OF TEST MODES	8
4. INSTRUMENT CALIBRATION	9
4.1 MEASURING INSTRUMENT CALIBRATION.....	9
4.2 MEASUREMENT EQUIPMENT USED.....	9
4.3 MEASUREMENT UNCERTAINTY.....	10
5. FACILITIES AND ACCREDITATIONS.....	11
5.1 FACILITIES	11
5.2 EQUIPMENT.....	11
5.3 TABLE OF ACCREDITATIONS AND LISTINGS	12
6. SETUP OF EQUIPMENT UNDER TEST	13
6.1 SETUP CONFIGURATION OF EUT.....	13
6.2 SUPPORT EQUIPMENT	13
7. FCC PART 15.247 REQUIREMENTS	14
7.1 6dB BANDWIDTH.....	14
7.2 PEAK POWER.....	22
7.3 AVERAGE POWER	30
7.4 BAND EDGES MEASUREMENT.....	38
7.5 PEAK POWER SPECTRAL DENSITY	55
7.6 SPURIOUS EMISSIONS	63
7.7 POWERLINE CONDUCTED EMISSIONS.....	86
APPENDIX I RADIO FREQUENCY EXPOSURE	89
APPENDIX II PHOTOGRAPHS OF TEST SETUP	91



1. TEST RESULT CERTIFICATION

Applicant: **Advantech Co. Ltd.**
No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District,
Taipei 114, Taiwan, R.O.C.

Manufacturer: **Advantech Co. Ltd.**
No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District,
Taipei 114, Taiwan, R.O.C.

Equipment Under Test: Computing Box

Trade Name: ADVANTECH

Model: TREK-550; TREK-550XXXXXXXXXXXXX
("X" can be 0-9 or A-Z or blank or any alphanumeric
character)

Date of Test: June 26 ~29, 2010

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:

Stan Lin
Supervisor

Reviewed by:

Alonso Lu
Engineer



2. EUT DESCRIPTION

Product	Computing Box
Trade Name	ADVANTECH
Model Number	TREK-550; TREK-550XXXXXXXXXXXXX ("X" can be 0-9 or A-Z or blank or any alphanumeric character)
Model Discrepancy	1. All the model numbers are identical just for marketing purpose only 2. The mean of "X" ("X" can be 0-9 or A-Z or blank or any alphanumeric character)" on model number, they are identical just for marketing purpose only. 3. Client consigns only one sample to test (model number: TREK-550). Therefore, the testing Lab. just guarantees the unit, which has been tested.
EUT Power Rating	12-24VDC
DC Power Cable Type	1.8m (Detachable)
Operating Frequency Range	2412 ~ 2462 MHz
Transmit Power	IEEE 802.11b mode: 19.13 dBm IEEE 802.11g mode: 22.07 dBm draft 802.11n 20 MHz Channel mode: 22.30 dBm draft 802.11n 40 MHz Channel mode: 21.42 dBm
Modulation Technique	IEEE 802.11b mode: DSSS (1, 2, 5.5 and 11 Mbps) IEEE 802.11g mode: OFDM (6, 9, 12, 18, 24, 36, 48 and 54 Mbps) draft 802.11n 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	Dipole Antenna / Gain: 3.8dBi

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: **M82-TREK-550** 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 is a 1x2 MIMO transmitter.

The EUT (model: TREK-550) had been tested under operating condition.

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 was chosen for full testing.

IEEE 802.11g mode:

Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 6Mbps data rate was 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 Emission Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY48250064	11/05/2010
Spectrum Analyzer	R&S	FSEB	825829/011	10/29/2010
USB Power Sensor	BOONTON	52012	2061194	06/08/2011
Power Meter	Agilnet	E4416A	GB41291611	04/03/2011

3M Semi Anechoic Chamber				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY48250064	11/05/2010
Spectrum Analyzer	R&S	FSEB	825829/011	10/29/2010
Pre-Amplifier	HP	8447D	2944A06530	12/31/2010
Pre-Amplifier	HP	8449B	3008A01738	04/17/2011
EMI Test Receiver	SCHAFFNER	SCR 3501	436	01/21/2011
Loop Antenna	EMCO	6502	2356	05/28/2011
Bilog Antenna	SCHWAZBECK	VULB9160	3084	09/11/2010
Horn Antenna	EMCO	3115	00022250	05/08/2011
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
Test S/W	LabVIEW 6.1 (Wugu Chamber EMI Test V1_4.5.3)			

Powerline Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
TEST RECEIVER	R&S	ESHS20	840455/006	02/12/2011
LISN (EUT)	SCHWARZBECK	NSLK 8127	8127382	12/09/2010
LISN	SOLAR	8012-50-R-24-BNC	8305114	12/09/2010
BNC CABLE	MIYAZAKI	5D-FB	BNC A4	05/12/2011
THERMO-HYGRO METER	TECPEL	DTM-303	No.7	11/24/2010
Test S/W	EMI 32.exe			



4.3 MEASUREMENT UNCERTAINTY

Parameter	Uncertainty
Powerline Conducted Emission	± 1.7376
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 FACILITIES

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

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

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

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

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

☒ No. 81-1, Lane 210, 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	 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-321/1646
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	 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	 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 Below 1GHz & Powerline Conducted Emissions							
No.	Equipment	Model No.	Serial No.	FCC ID	Trade Name	Data Cable	Power Cord
1	LCD Monitor	2407WFPb	CN-0FC255-46633-6 75-24TKS	FCC DoC	DELL	D-SUB Cable: Shielded, 1.8m with two cores	Unshielded, 1.8m
2	Monitor	TREK-303H	N/A	N/A	ADVANTECH	D4 Cable: Shielded, 1.8m	Unshielded, 1.8m
3	Modem	DM-1414	304012265	IFAXDM1414	ACEEX	Unshielded, 1.8m	Unshielded, 1.8m
4	Modem	DM-1414	304012268	IFAXDM1414	ACEEX	Unshielded, 1.8m	Unshielded, 1.8m
5	Modem	DM-1414	304012261	IFAXDM1414	ACEEX	Unshielded, 1.8m	Unshielded, 1.8m
6	Modem	DM-1414	304012262	IFAXDM1414	ACEEX	Unshielded, 1.8m	Unshielded, 1.8m
7	Printer	STYLUS C60	DR3K039632	FCC DoC	EPSON	USB Cable: Shielded, 1.8m	Unshielded, 1.8m
8	USB Keyboard	6512-UV	21200201-12939999 53	FCC DoC	ACER	USB Cable: Shielded, 1.8m	N/A
9	USB Mouse	MO19UCA	020509284	FCC DoC	HP	USB Cable: Shielded, 1.8m	N/A
10	Multimedia Headset	ClearChat	N/A	FCC DoC	Logitech	Unshielded, 1.8m	N/A
11	DVD Player	DVD-S53	VC7KA001763 R	FCC DoC	Panasonic	LAN Cable: Unshielded, 1.8m	Unshielded, 1.8m
12	DC Power Supply (Remote)	GPS-3303	0011606	FCC DoC	GW	N/A	Unshielded, 1.8m
13	Notebook PC (Remote)	COMPAQ NC 4010	CNU441F8LV	FCC DOC	HP	LAN Cable: Unshielded, 10m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core

For Radiated and Conducted Measurement Above 1GHz							
No.	Equipment	Model No.	Serial No.	FCC ID	Trade Name	Data Cable	Power Cord
1	Monitor	TREK-303H	N/A	N/A	ADVANTECH	D4 Cable: Shielded, 1.8m	Unshielded, 1.8m

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



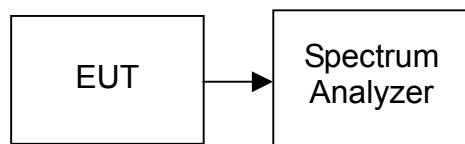
7. FCC PART 15.247 REQUIREMENTS

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	12.25	>500	PASS
Mid	2437	12.30		PASS
High	2462	12.30		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	16.55	>500	PASS
Mid	2437	16.55		PASS
High	2462	16.55		PASS

Test mode: draft 802.11n 20 MHz Channel mode

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	17.40	>500	PASS
Mid	2437	17.50		PASS
High	2462	17.50		PASS

Test mode: draft 802.11n 40 MHz Channel mode

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2422	36.25	>500	PASS
Mid	2437	36.25		PASS
High	2452	36.25		PASS



Test Plot

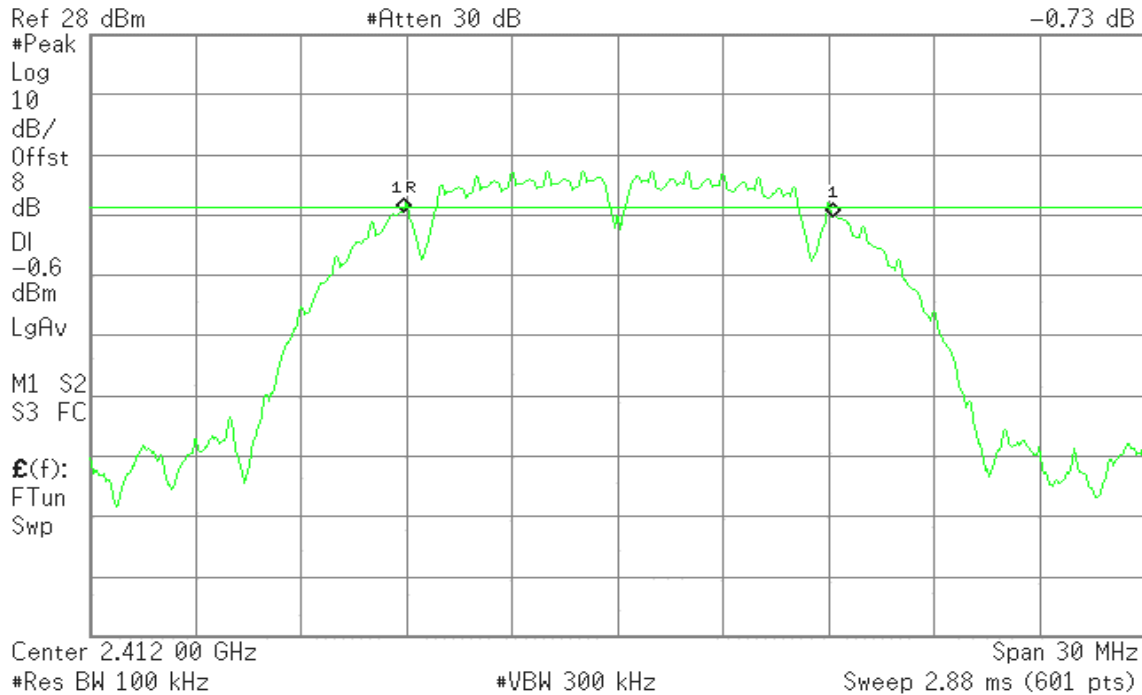
IEEE 802.11b mode

6dB Bandwidth (CH Low)

Agilent 19:39:41 Jun 29, 2010

R T

▲ Mkr1 12.25 MHz
-0.73 dB

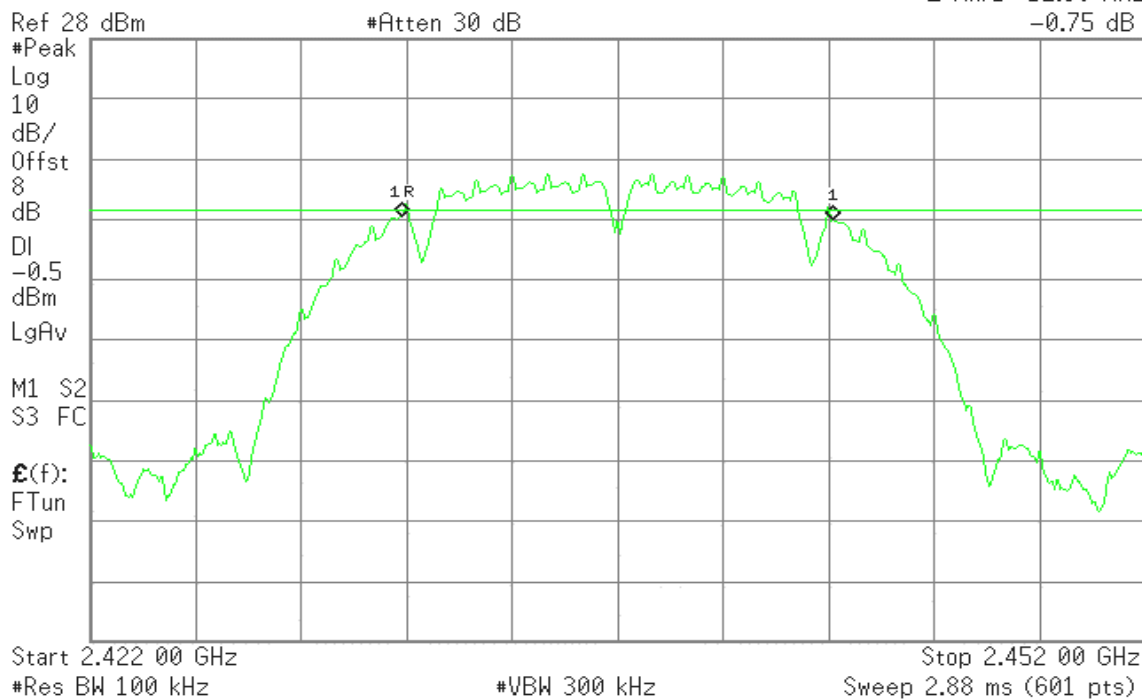


6dB Bandwidth (CH Mid)

Agilent 19:40:40 Jun 29, 2010

R T

▲ Mkr1 12.30 MHz
-0.75 dB



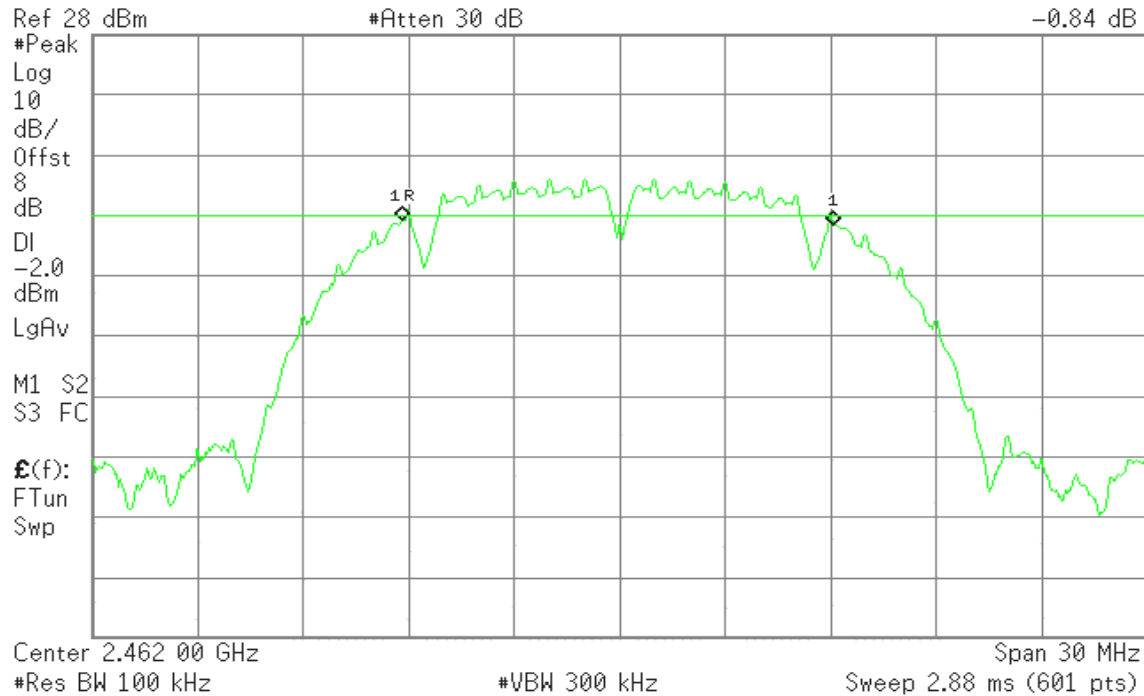


6dB Bandwidth (CH High)

Agilent 19:41:37 Jun 29, 2010

R T

Mkr1 12.30 MHz
-0.84 dB



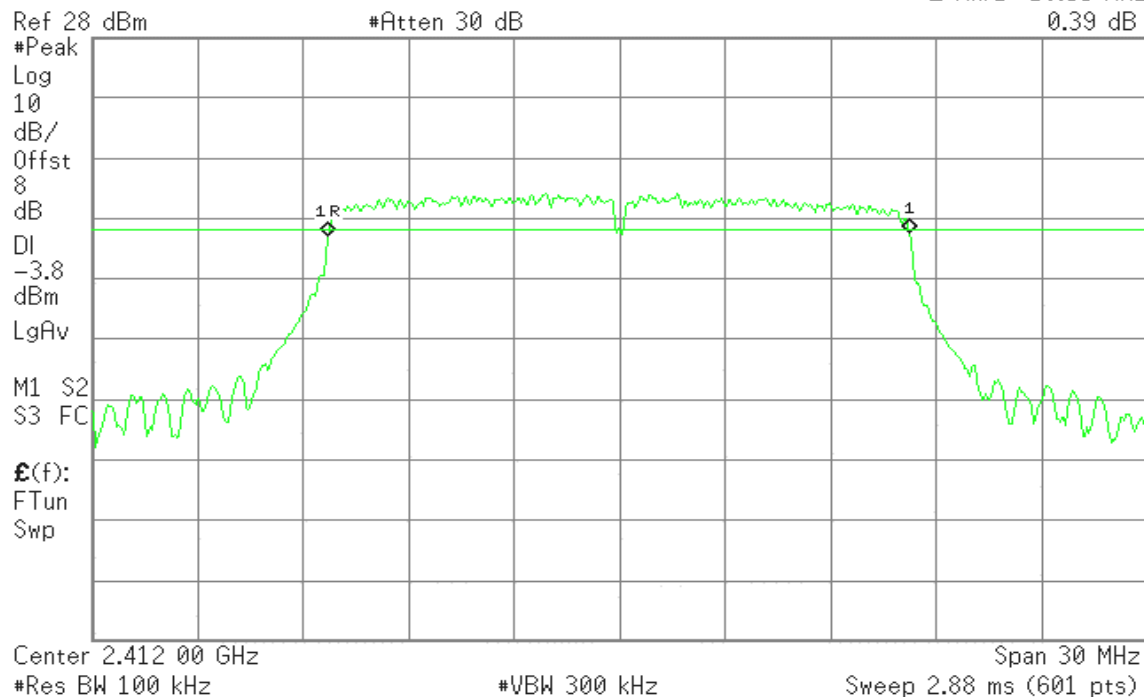
IEEE 802.11g mode

6dB Bandwidth (CH Low)

Agilent 19:37:29 Jun 29, 2010

R T

Mkr1 16.55 MHz
0.39 dB



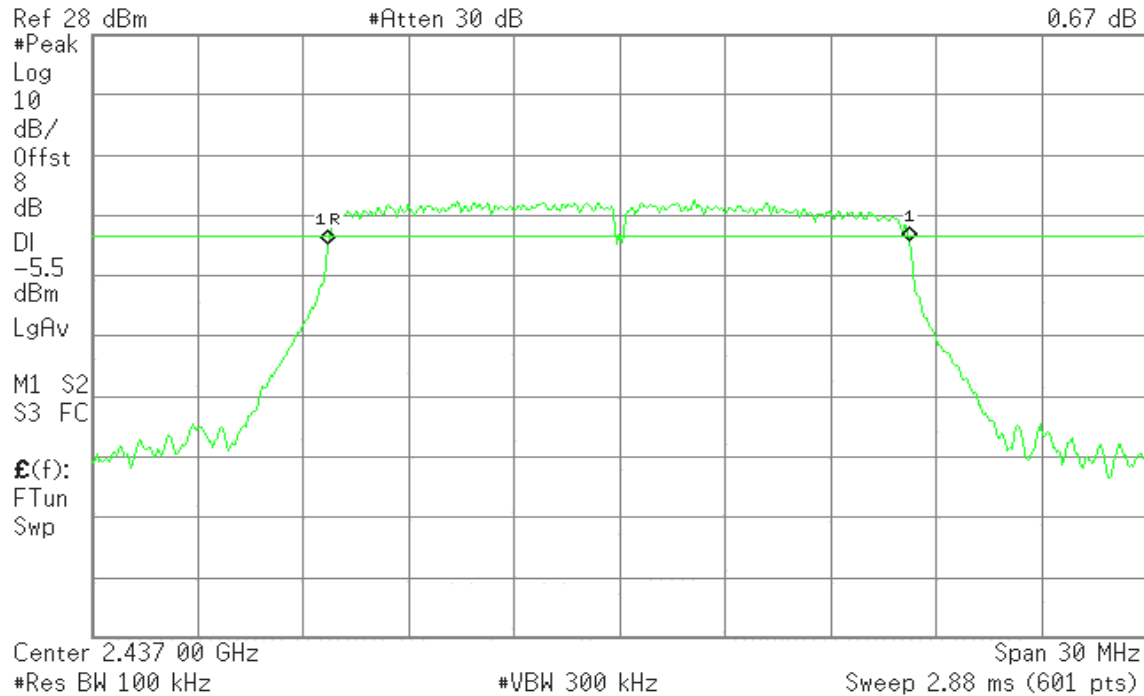


6dB Bandwidth (CH Mid)

Agilent 19:38:39 Jun 29, 2010

R T

▲ Mkr1 16.55 MHz
0.67 dB

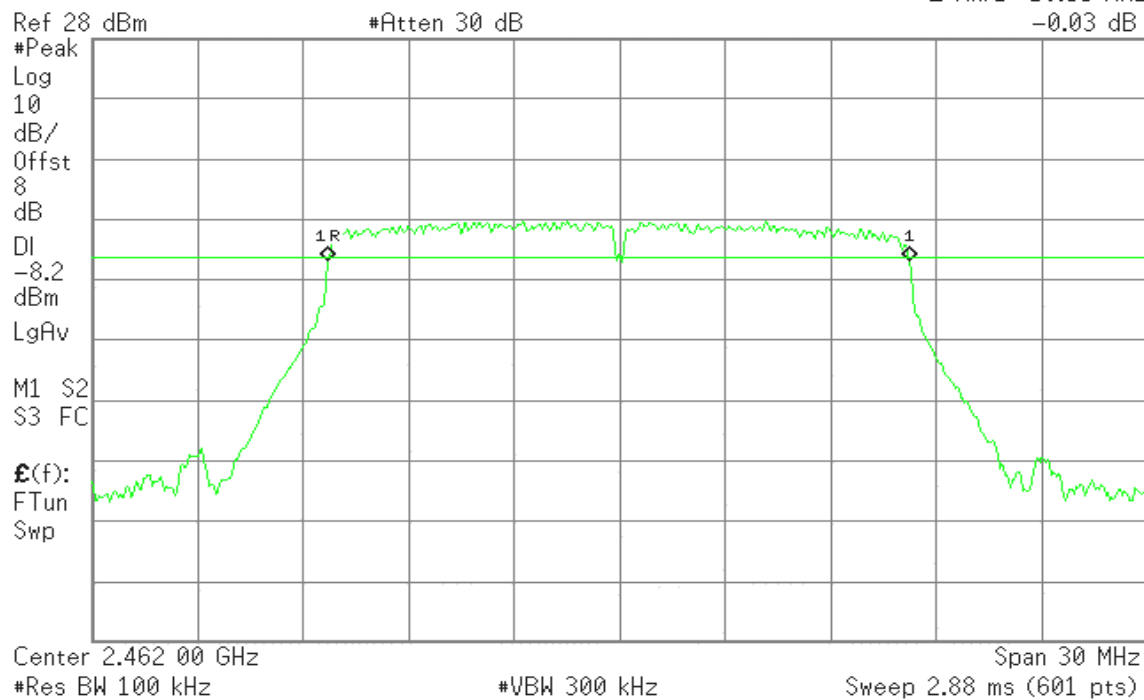


6dB Bandwidth (CH High)

Agilent 17:19:51 Jun 29, 2010

R T

▲ Mkr1 16.55 MHz
-0.03 dB





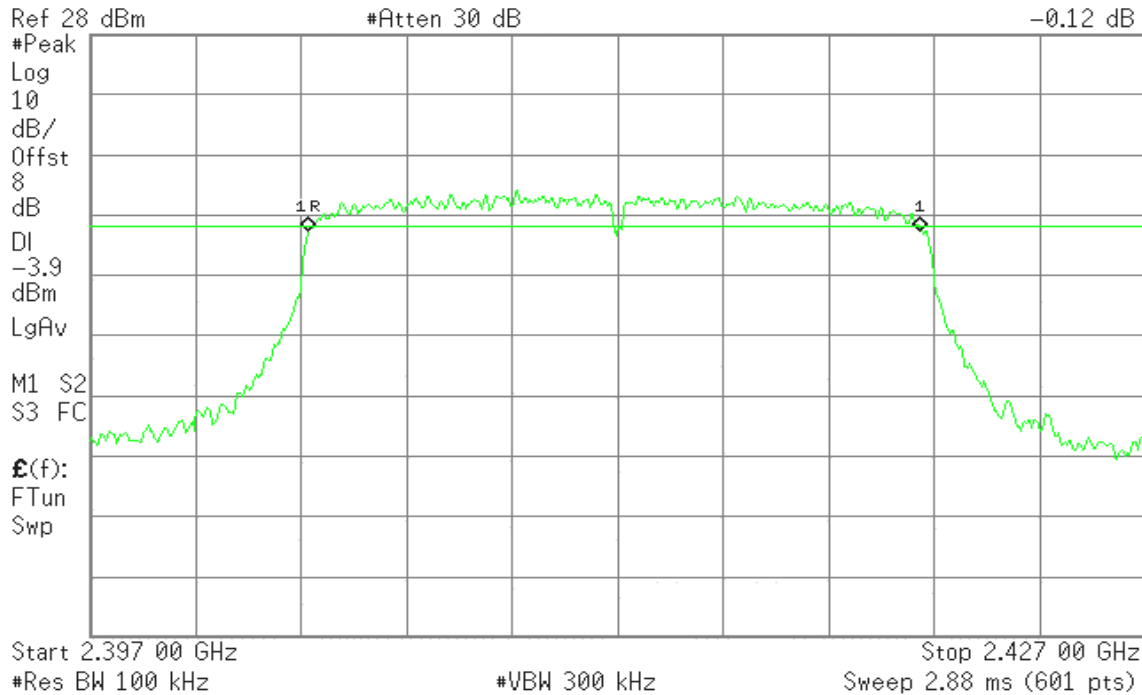
draft 802.11n 20 MHz Channel mode

6dB Bandwidth (CH Low)

Agilent 19:44:26 Jun 29, 2010

R T

Mkr1 17.40 MHz
-0.12 dB

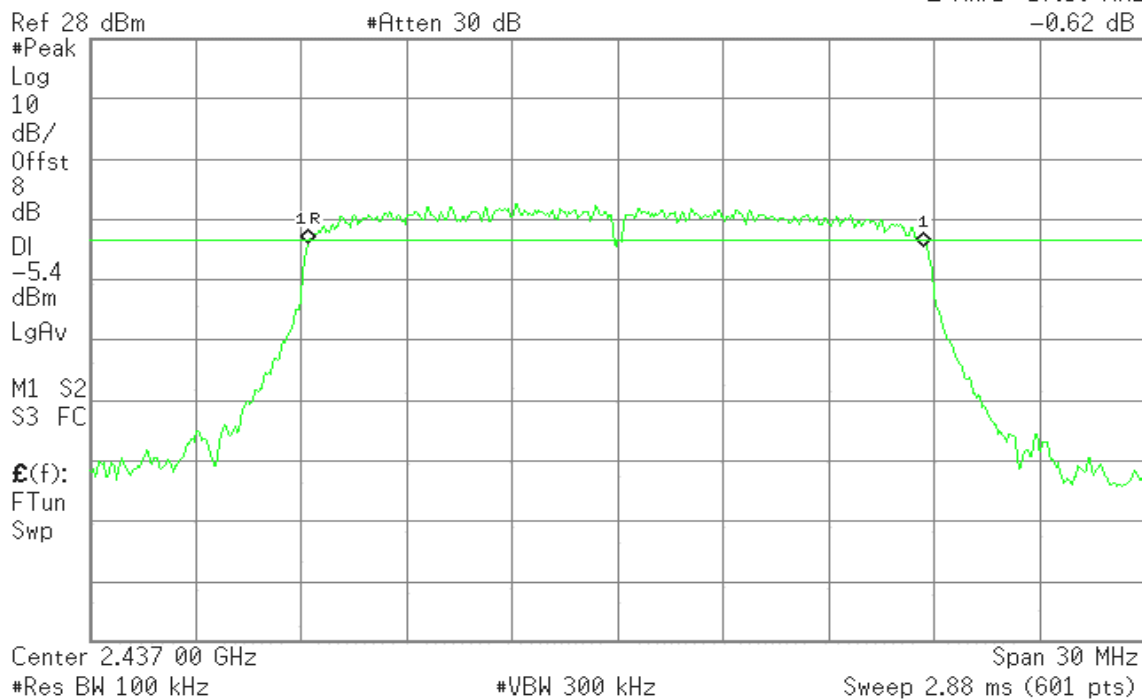


6dB Bandwidth (CH Mid)

Agilent 19:43:30 Jun 29, 2010

R T

Mkr1 17.50 MHz
-0.62 dB



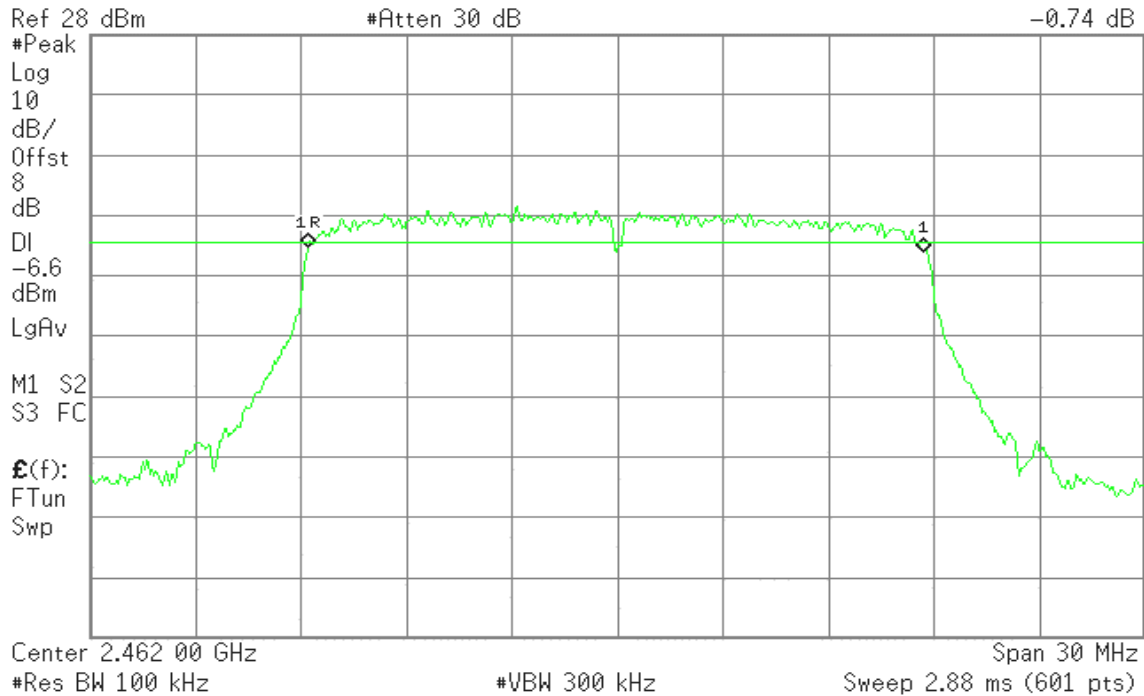


6dB Bandwidth (CH High)

Agilent 19:42:36 Jun 29, 2010

R T

Mkr1 17.50 MHz
-0.74 dB



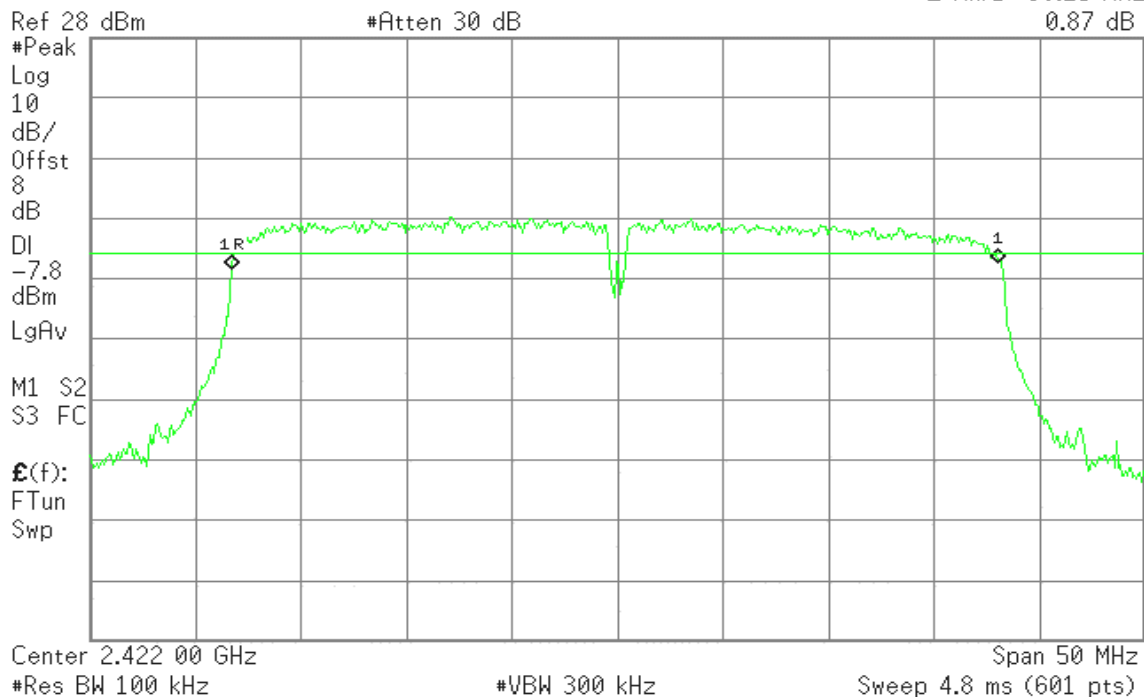
draft 802.11n 40 MHz Channel mode

6dB Bandwidth (CH Low)

Agilent 19:46:03 Jun 29, 2010

R T

Mkr1 36.25 MHz
0.87 dB



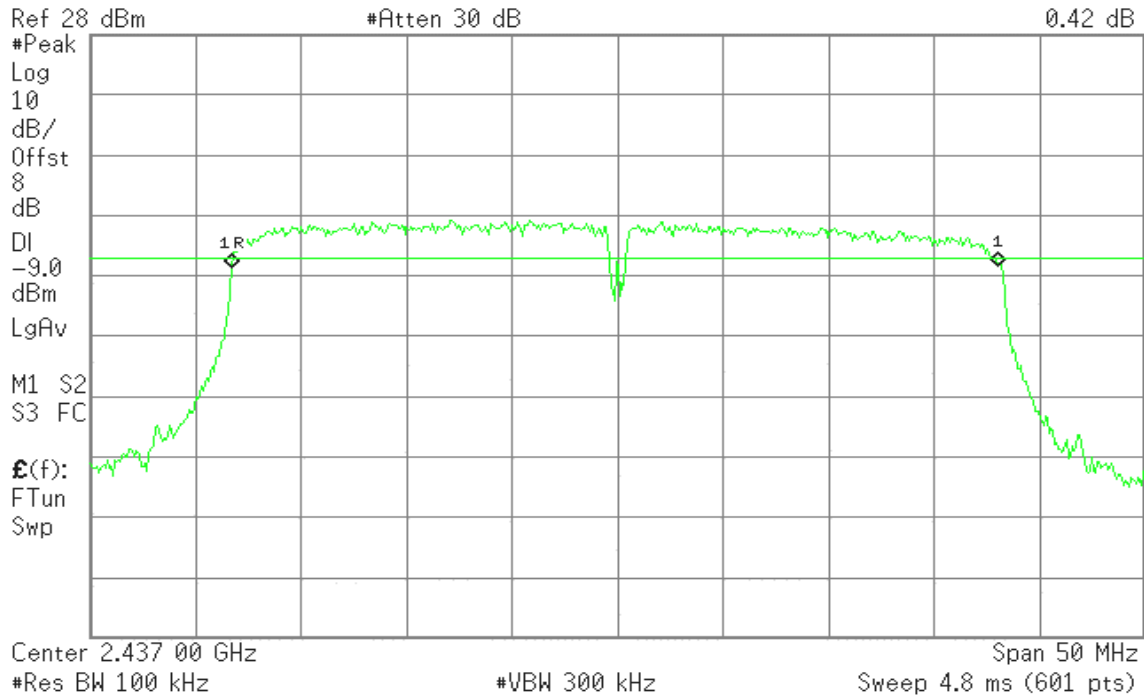


6dB Bandwidth (CH Mid)

Agilent 19:46:48 Jun 29, 2010

R T

▲ Mkr1 36.25 MHz
0.42 dB

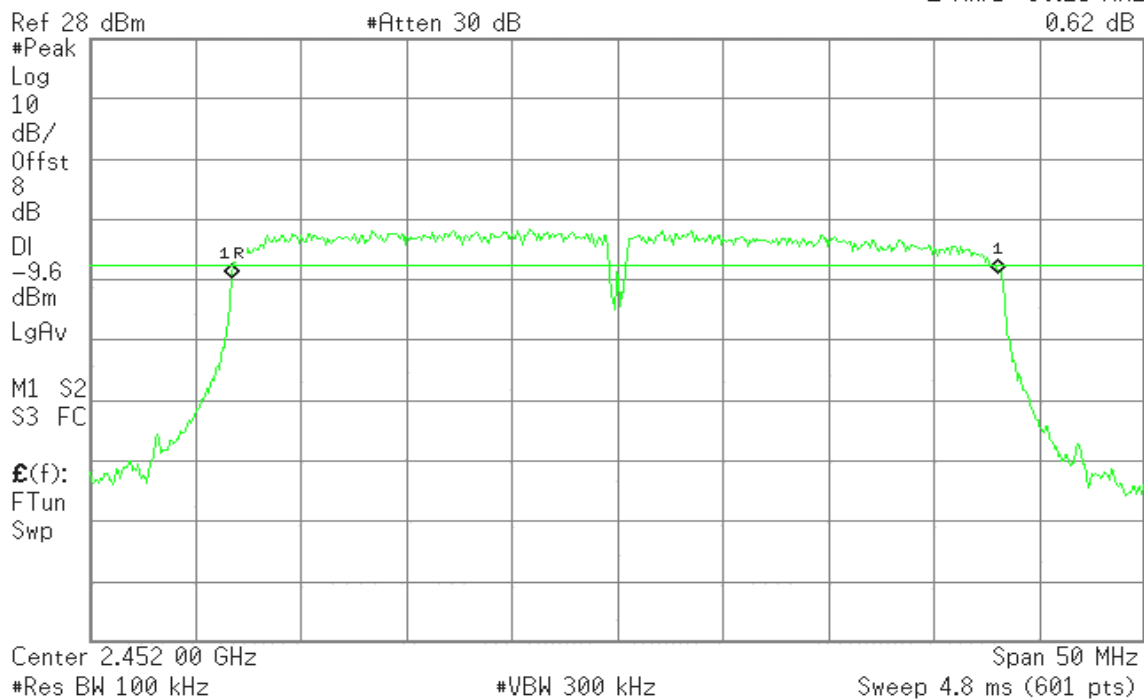


6dB Bandwidth (CH High)

Agilent 19:47:46 Jun 29, 2010

R T

▲ Mkr1 36.25 MHz
0.62 dB





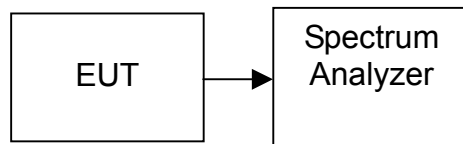
7.2 PEAK POWER

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 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	19.05	0.08035	1.00	PASS
Mid	2437	19.13	0.08184		PASS
High	2462	17.66	0.05834		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	22.07	0.16106	1.00	PASS
Mid	2437	20.88	0.12246		PASS
High	2462	19.52	0.08953		PASS

Test mode: draft 802.11n 20 MHz Channel mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	22.30	0.16982	1.00	PASS
Mid	2437	20.91	0.12331		PASS
High	2462	19.50	0.08912		PASS

Test mode: draft 802.11n 40 MHz Channel mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2422	21.42	0.13867	1.00	PASS
Mid	2437	20.69	0.11721		PASS
High	2452	19.86	0.09682		PASS



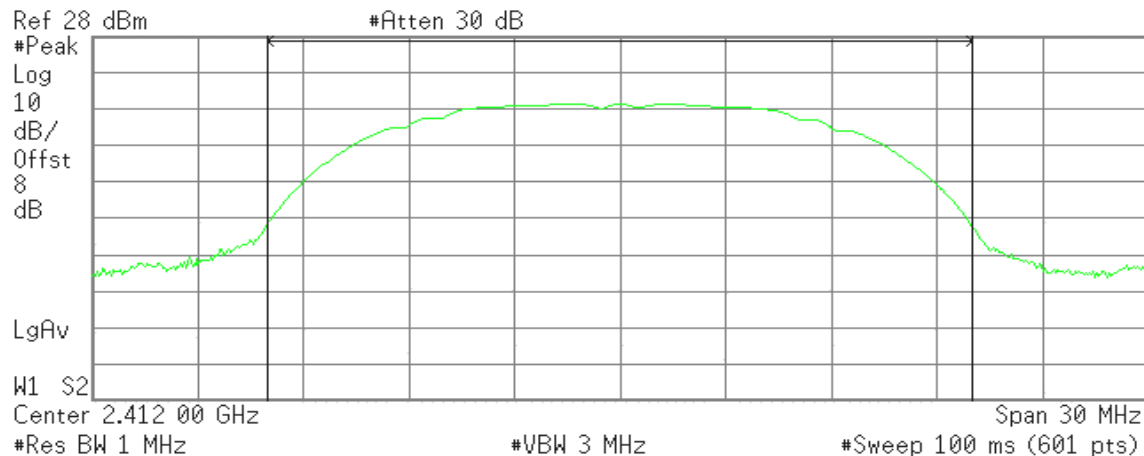
Test Plot

IEEE 802.11b mode

Peak Power (CH Low)

Agilent 16:15:57 Jun 29, 2010

R T



Channel Power

19.05 dBm /20.0000 MHz

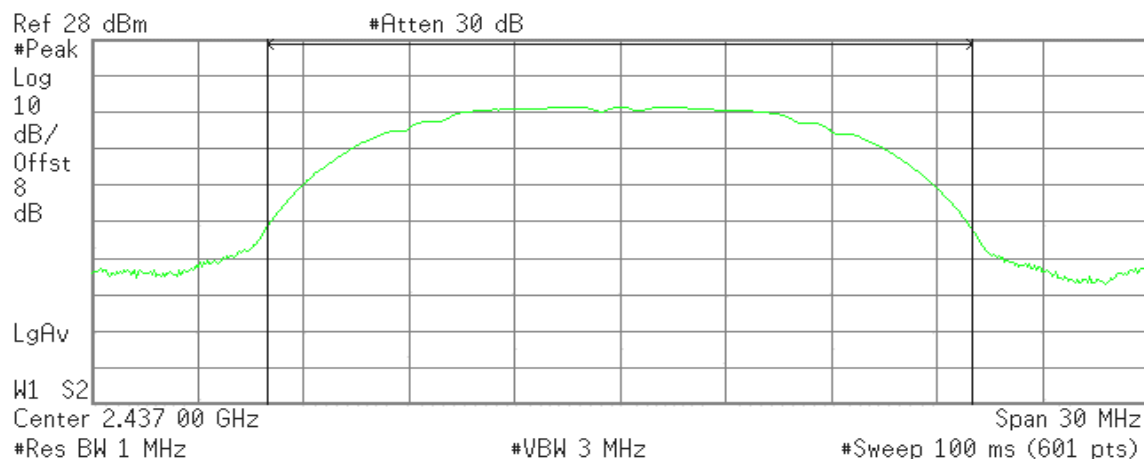
Power Spectral Density

-53.96 dBm/Hz

Peak Power (CH Mid)

Agilent 16:18:41 Jun 29, 2010

R T



Channel Power

19.13 dBm /20.0000 MHz

Power Spectral Density

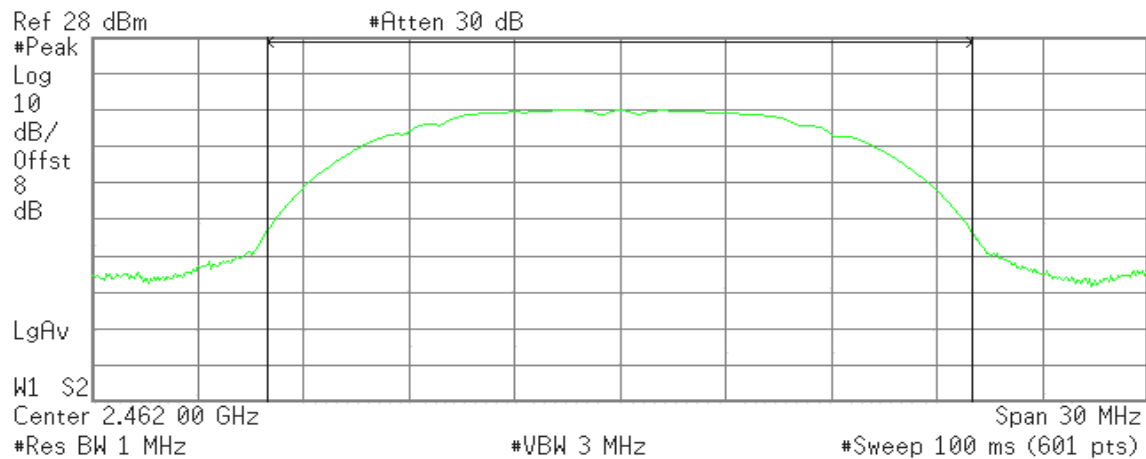
-53.88 dBm/Hz



Peak Power (CH High)

Agilent 16:21:00 Jun 29, 2010

R T



Channel Power

17.66 dBm /20.0000 MHz

Power Spectral Density

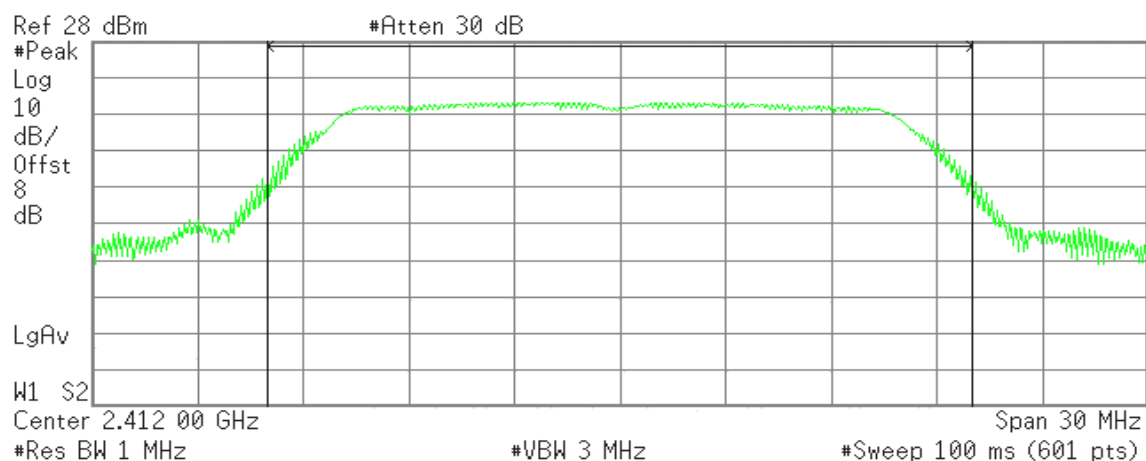
-55.35 dBm/Hz

IEEE 802.11g mode

Peak Power (CH Low)

Agilent 16:30:56 Jun 29, 2010

R T



Channel Power

22.07 dBm /20.0000 MHz

Power Spectral Density

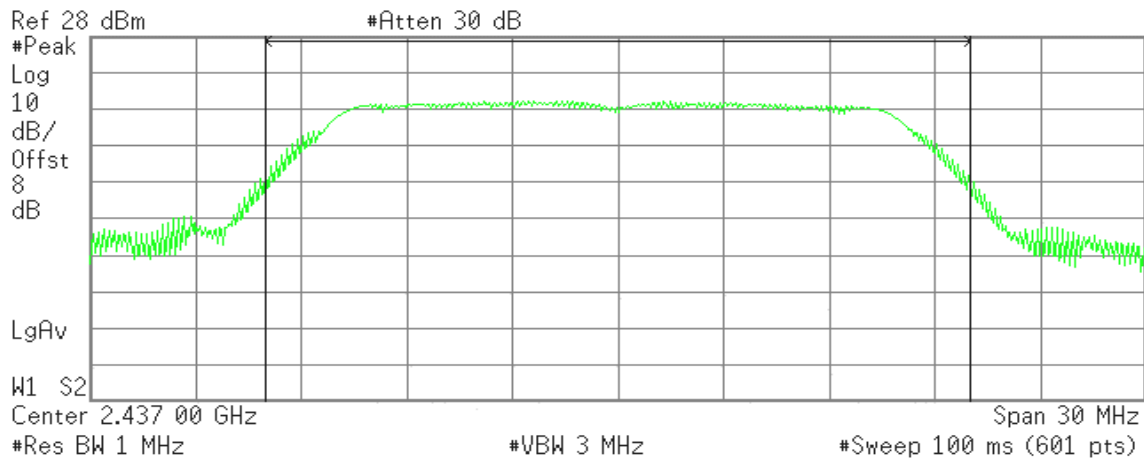
-50.94 dBm/Hz



Peak Power (CH Mid)

Agilent 16:26:31 Jun 29, 2010

R T



Channel Power

20.88 dBm /20.0000 MHz

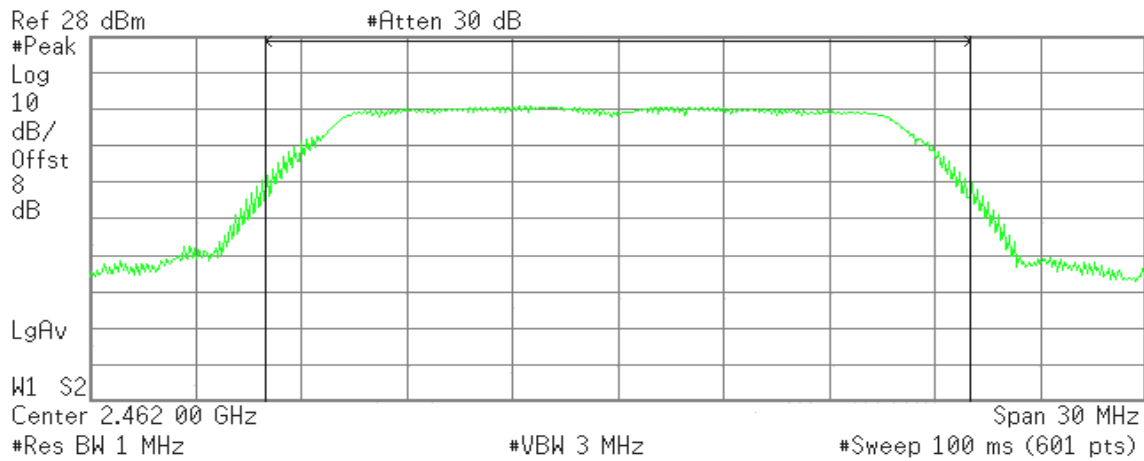
Power Spectral Density

-52.13 dBm/Hz

Peak Power (CH High)

Agilent 16:24:20 Jun 29, 2010

R T



Channel Power

19.52 dBm /20.0000 MHz

Power Spectral Density

-53.49 dBm/Hz

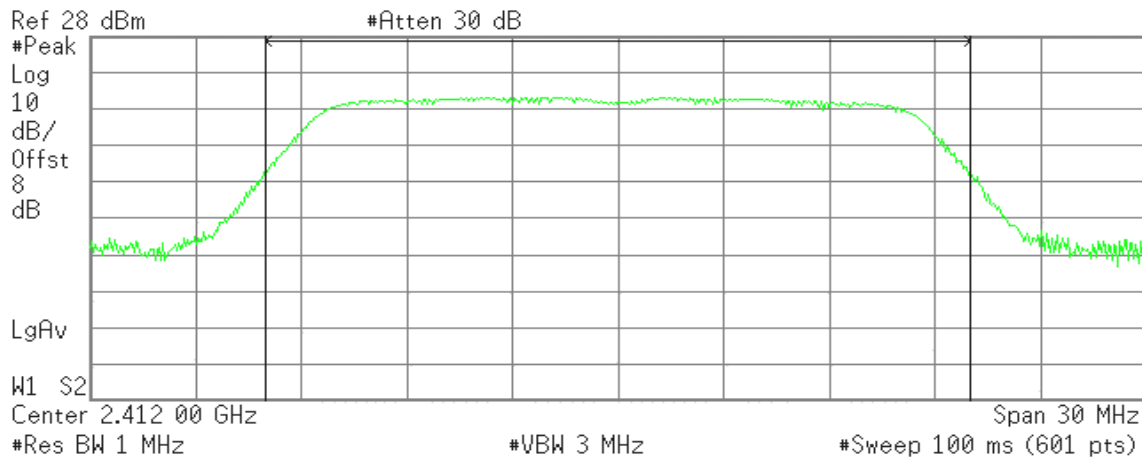


draft 802.11n 20 MHz Channel mode

Peak Power (CH Low)

✱ Agilent 16:32:04 Jun 29, 2010

R T



Channel Power

22.30 dBm /20.0000 MHz

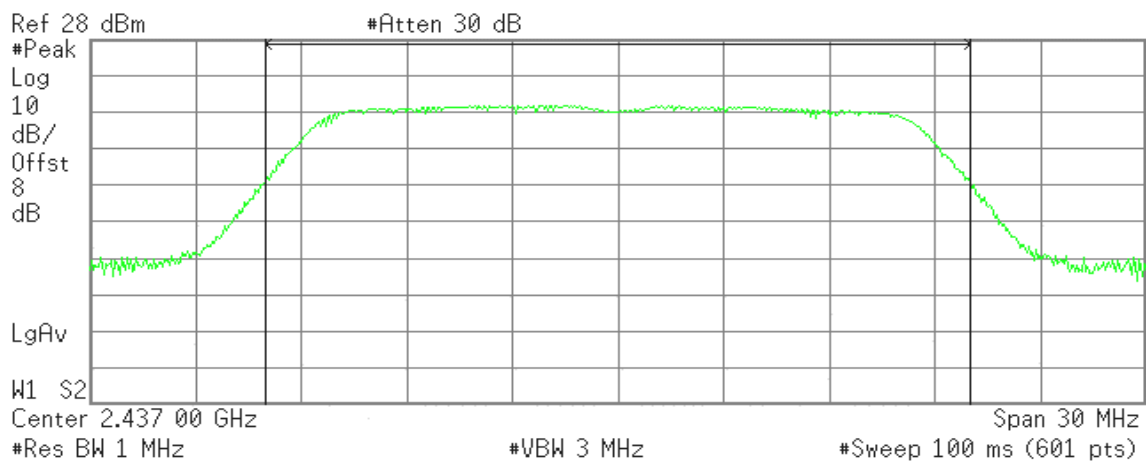
Power Spectral Density

-50.71 dBm/Hz

Peak Power (CH Mid)

✱ Agilent 16:35:05 Jun 29, 2010

R T



Channel Power

20.91 dBm /20.0000 MHz

Power Spectral Density

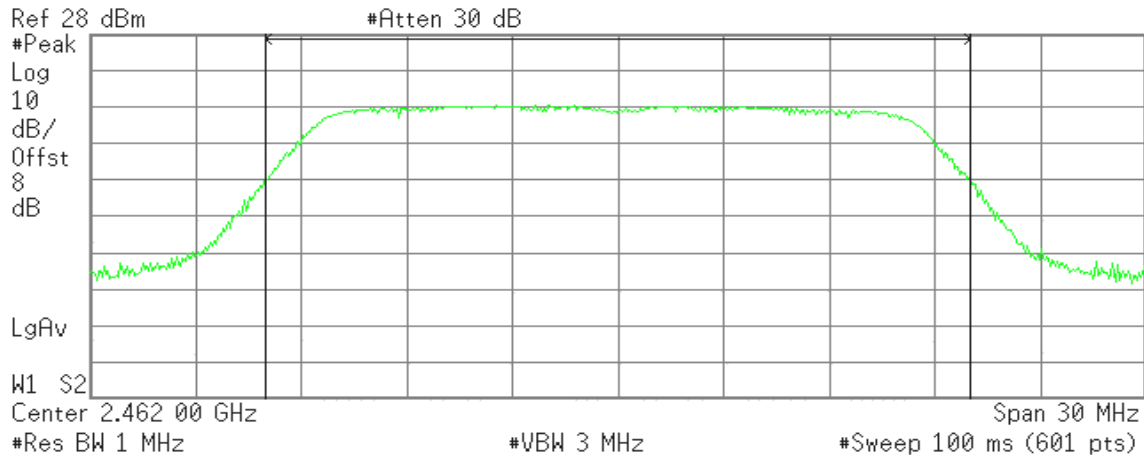
-52.10 dBm/Hz



Peak Power (CH High)

Agilent 16:36:01 Jun 29, 2010

R T



Channel Power

19.50 dBm /20.0000 MHz

Power Spectral Density

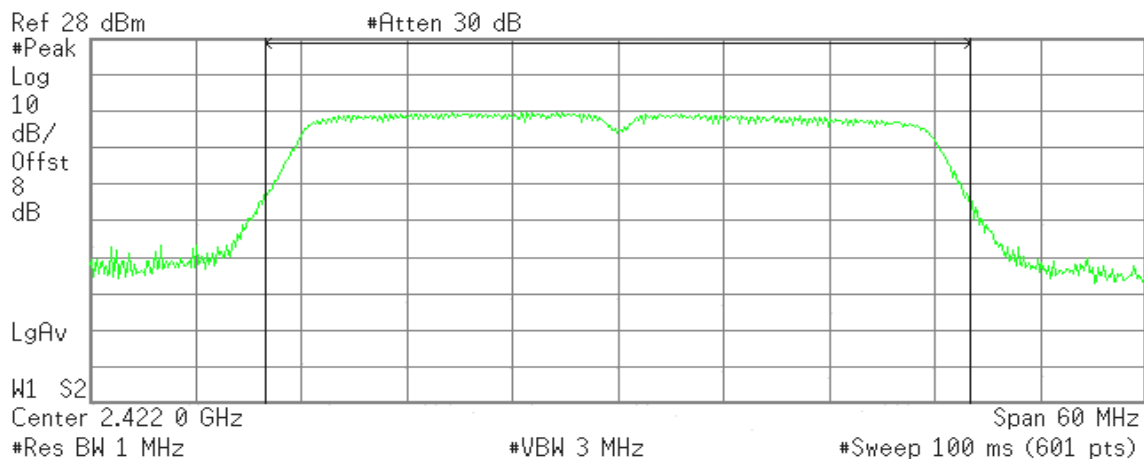
-53.51 dBm/Hz

draft 802.11n 40 MHz Channel mode

Peak Power (CH Low)

Agilent 16:49:13 Jun 29, 2010

R T



Channel Power

21.42 dBm /40.0000 MHz

Power Spectral Density

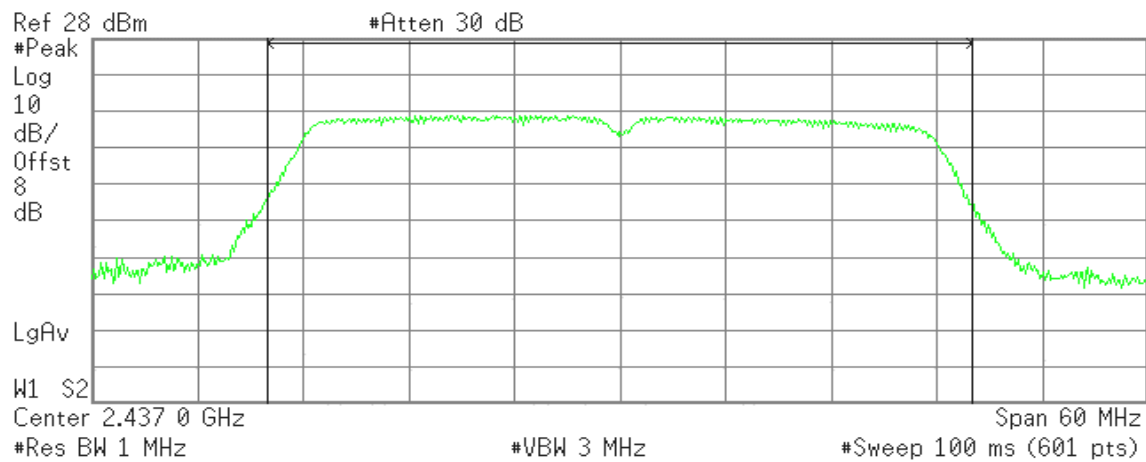
-54.60 dBm/Hz



Peak Power (CH Mid)

Agilent 16:42:01 Jun 29, 2010

R T



Channel Power

20.69 dBm /40.0000 MHz

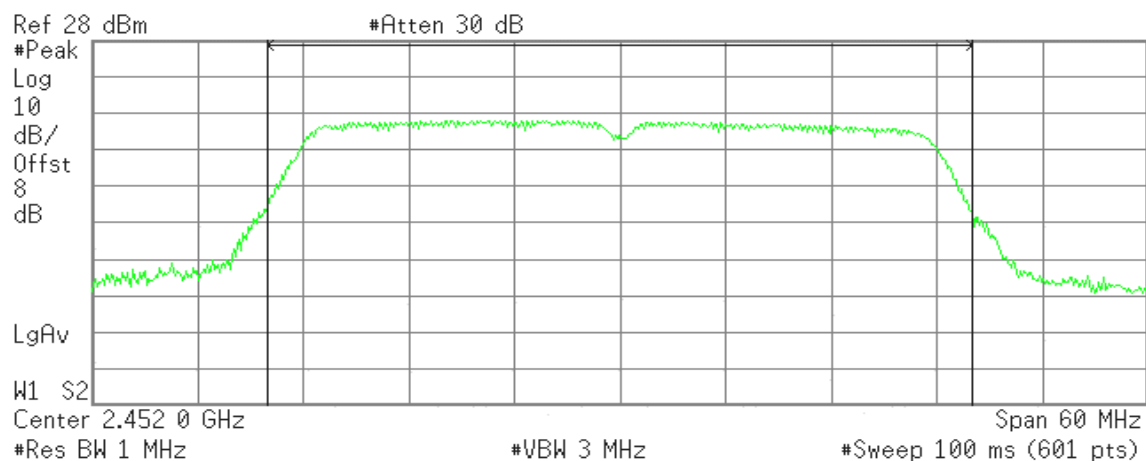
Power Spectral Density

-55.33 dBm/Hz

Peak Power (CH High)

Agilent 16:40:40 Jun 29, 2010

R T



Channel Power

19.86 dBm /40.0000 MHz

Power Spectral Density

-56.16 dBm/Hz

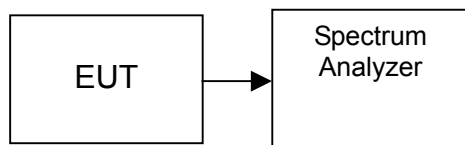


7.3 AVERAGE POWER

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	16.06	0.04036
Mid	2437	16.23	0.04197
High	2462	14.72	0.02964

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2412	15.01	0.03169
Mid	2437	13.75	0.02371
High	2462	12.49	0.01774

Test mode: draft 802.11n 20 MHz Channel mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2412	15.55	0.03589
Mid	2437	14.23	0.02648
High	2462	12.26	0.01682

Test mode: draft 802.11n 40 MHz Channel mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2422	14.38	0.02741
Mid	2437	13.67	0.23280
High	2452	12.77	0.01892



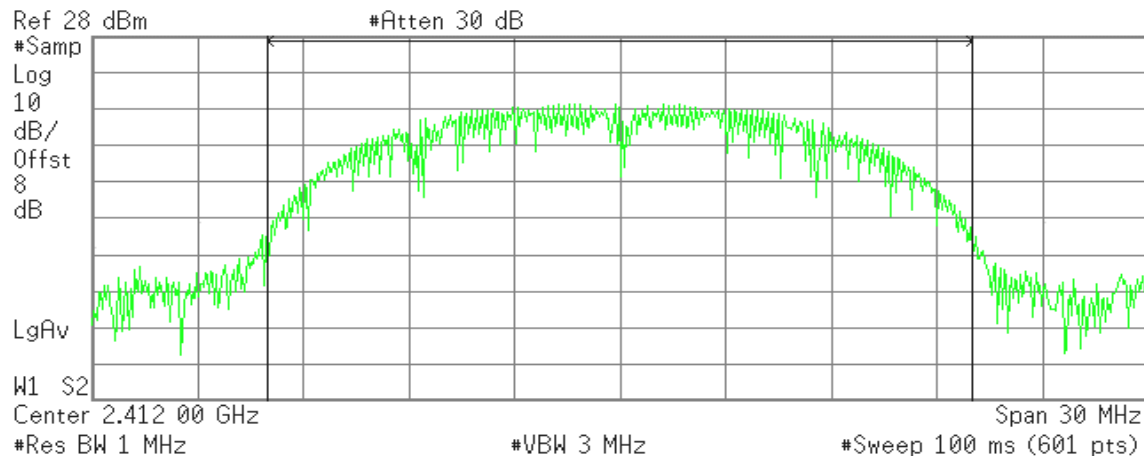
Test Plot

IEEE 802.11b mode

Average power (CH Low)

Agilent 16:16:52 Jun 29, 2010

R T



Channel Power

16.06 dBm /20.0000 MHz

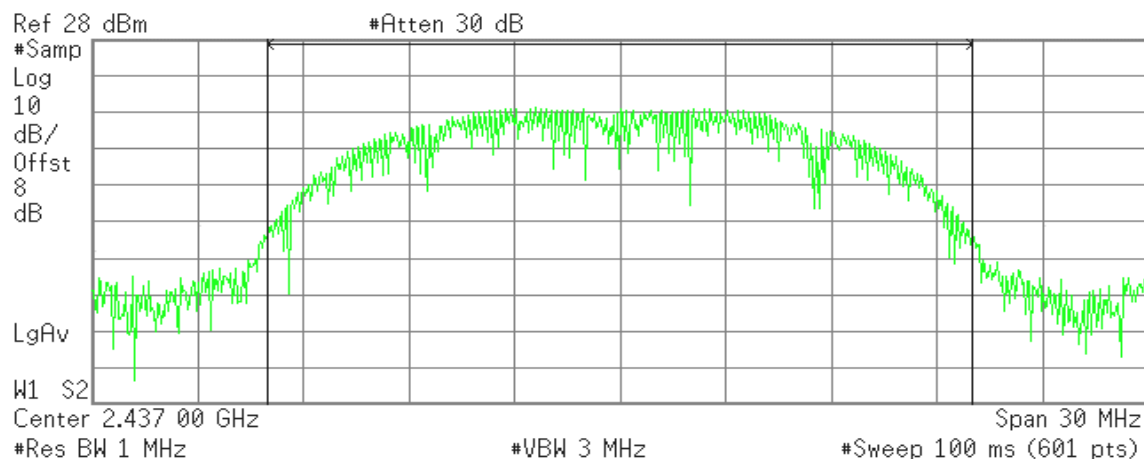
Power Spectral Density

-56.95 dBm/Hz

Average power (CH Mid)

Agilent 16:17:53 Jun 29, 2010

R T



Channel Power

16.23 dBm /20.0000 MHz

Power Spectral Density

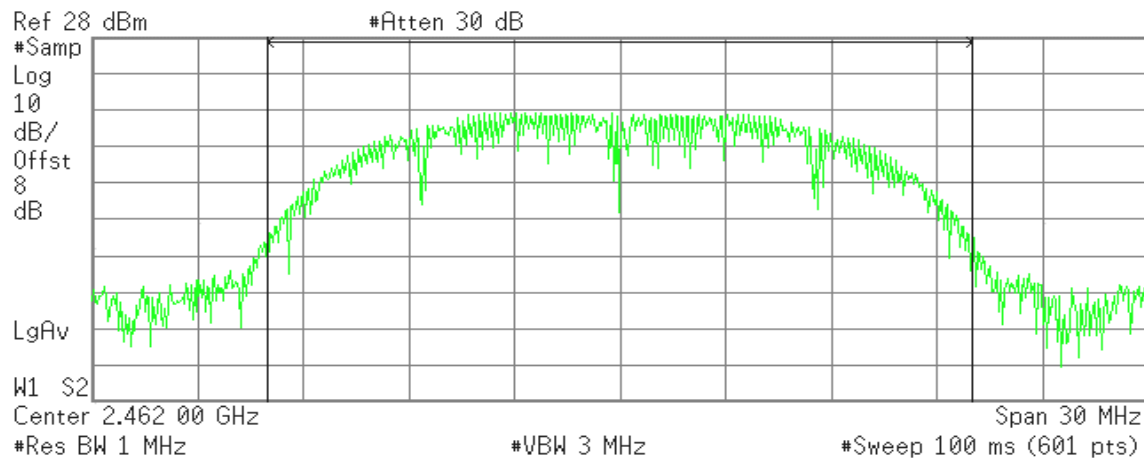
-56.78 dBm/Hz



Average power

Agilent 16:21:36 Jun 29, 2010

R T



Channel Power

14.72 dBm /20.0000 MHz

Power Spectral Density

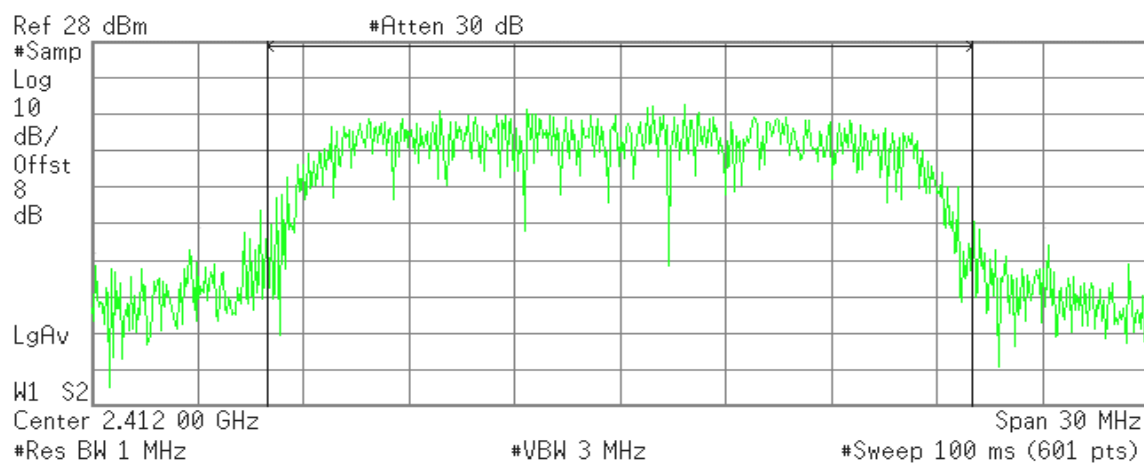
-58.29 dBm/Hz

IEEE 802.11g mode

Average power (CH Low)

Agilent 16:30:23 Jun 29, 2010

R T



Channel Power

15.01 dBm /20.0000 MHz

Power Spectral Density

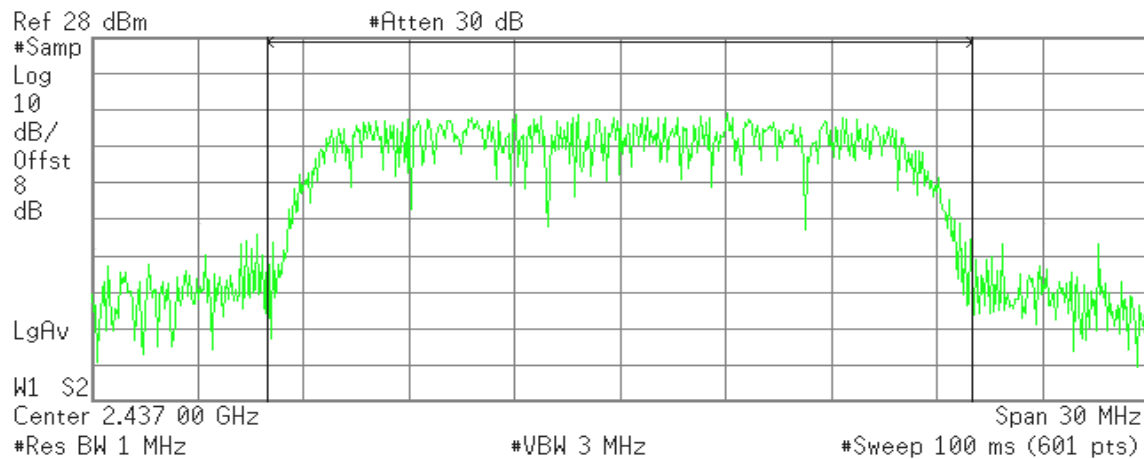
-58.00 dBm/Hz



Average power (CH Mid)

Agilent 16:28:46 Jun 29, 2010

R T



Channel Power

13.75 dBm /20.0000 MHz

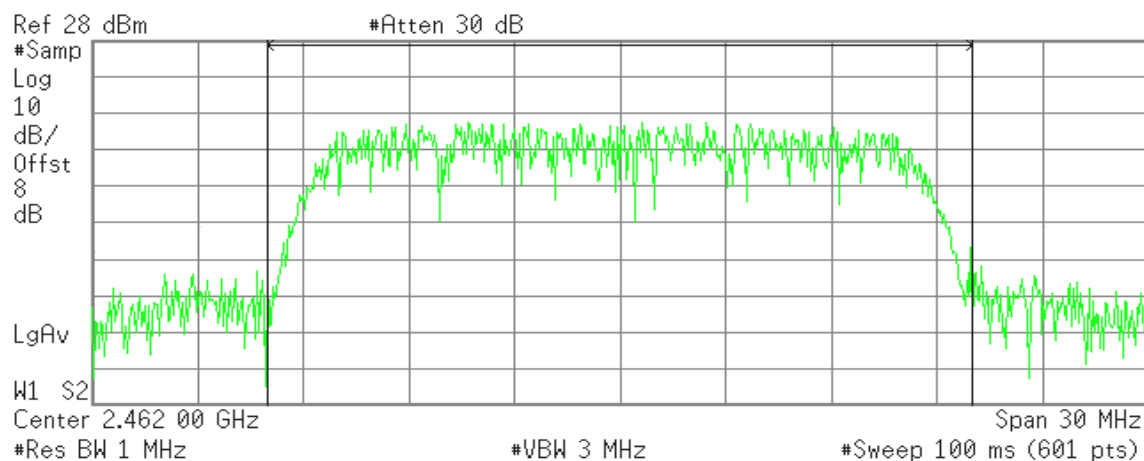
Power Spectral Density

-59.26 dBm/Hz

Average power (CH High)

Agilent 16:23:47 Jun 29, 2010

R T



Channel Power

12.49 dBm /20.0000 MHz

Power Spectral Density

-60.52 dBm/Hz

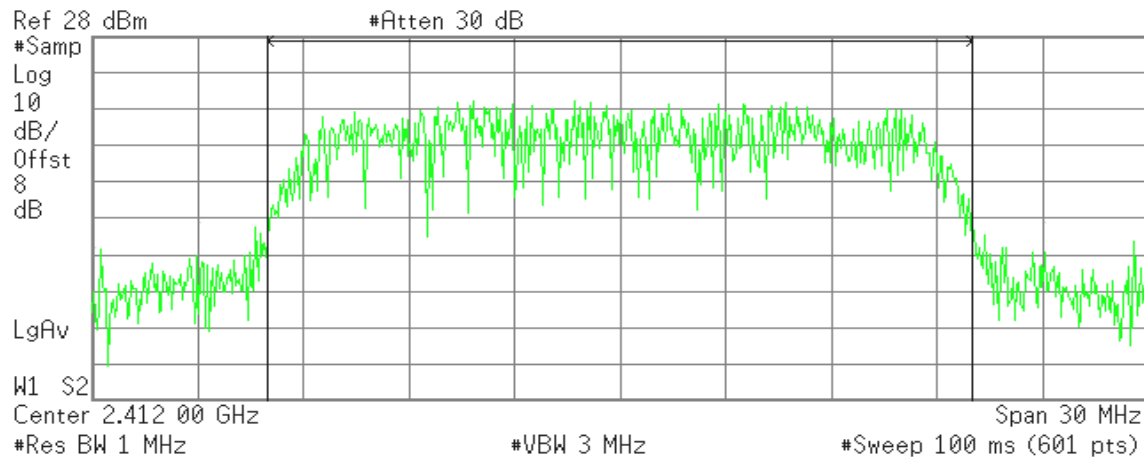


draft 802.11n 20 MHz Channel mode

Average power (CH Low)

✱ Agilent 16:32:57 Jun 29, 2010

R T



Channel Power

15.55 dBm /20.0000 MHz

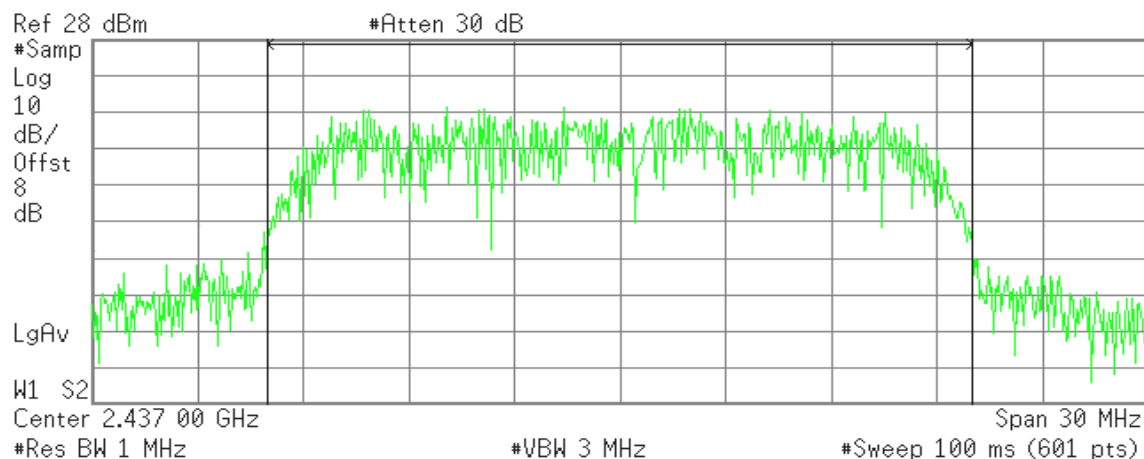
Power Spectral Density

-57.46 dBm/Hz

Average power (CH Mid)

✱ Agilent 16:34:39 Jun 29, 2010

R T



Channel Power

14.23 dBm /20.0000 MHz

Power Spectral Density

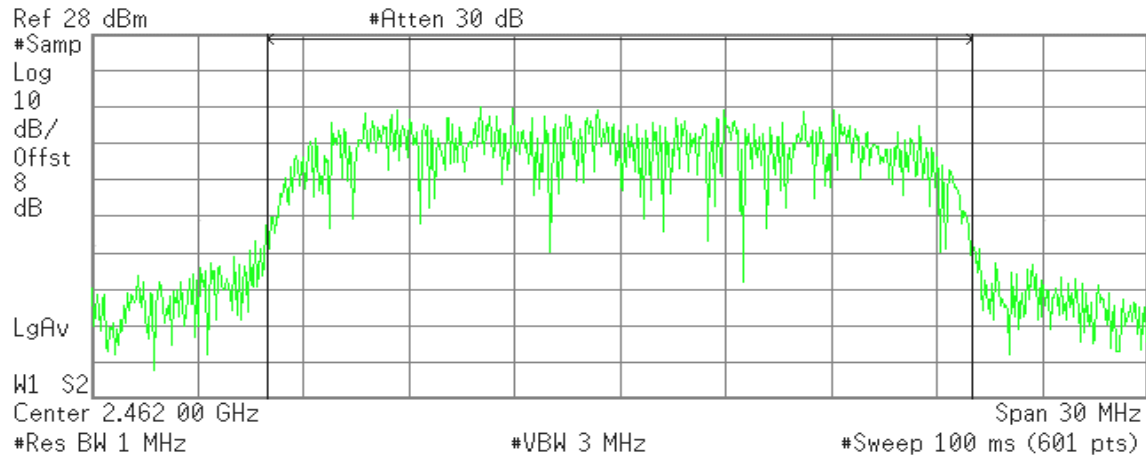
-58.78 dBm/Hz



Average power (CH High)

Agilent 16:37:09 Jun 29, 2010

R T



Channel Power

12.26 dBm /20.0000 MHz

Power Spectral Density

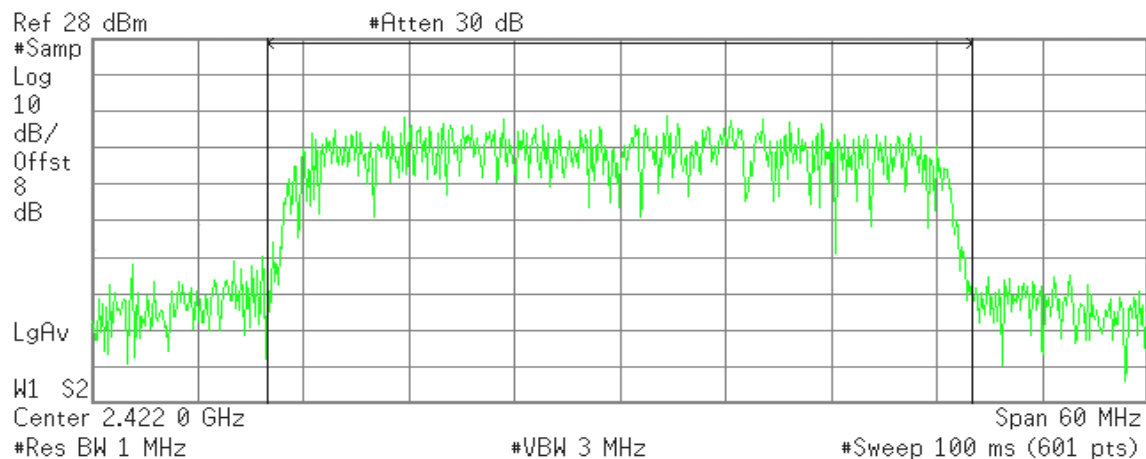
-60.75 dBm/Hz

draft 802.11n 40 MHz Channel mode

Average power (CH Low)

Agilent 16:47:41 Jun 29, 2010

R T



Channel Power

14.38 dBm /40.0000 MHz

Power Spectral Density

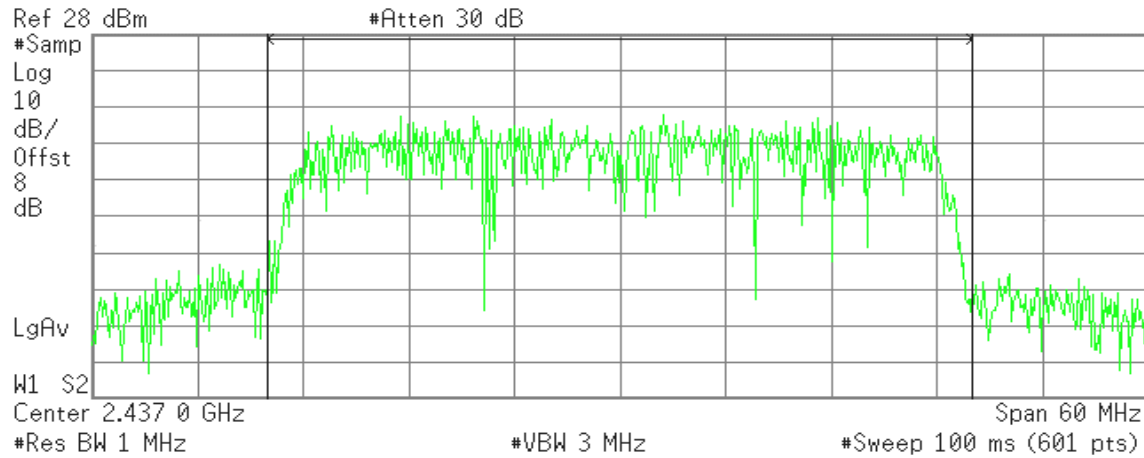
-61.64 dBm/Hz



Average power (CH Mid)

Agilent 16:43:01 Jun 29, 2010

R T



Channel Power

13.67 dBm /40.0000 MHz

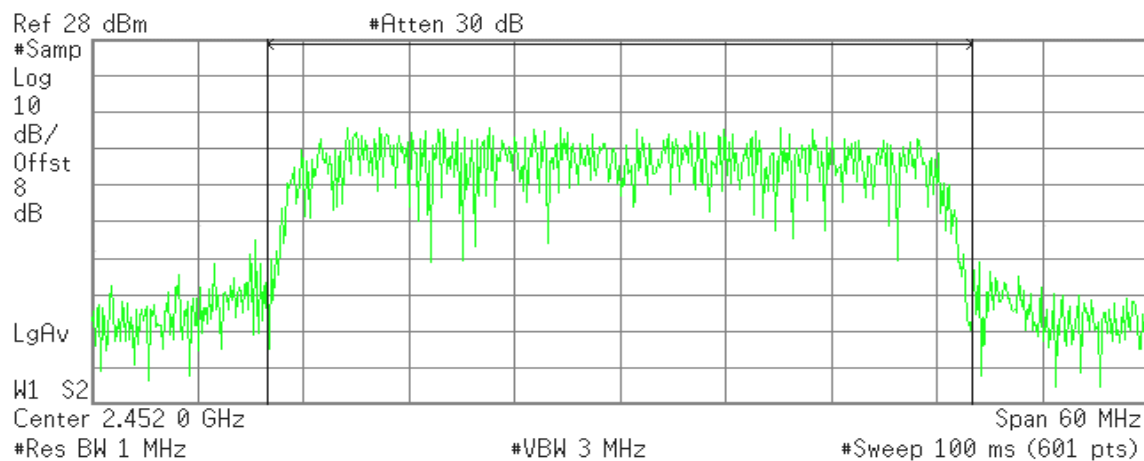
Power Spectral Density

-62.35 dBm/Hz

Average power (CH High)

Agilent 16:40:08 Jun 29, 2010

R T



Channel Power

12.77 dBm /40.0000 MHz

Power Spectral Density

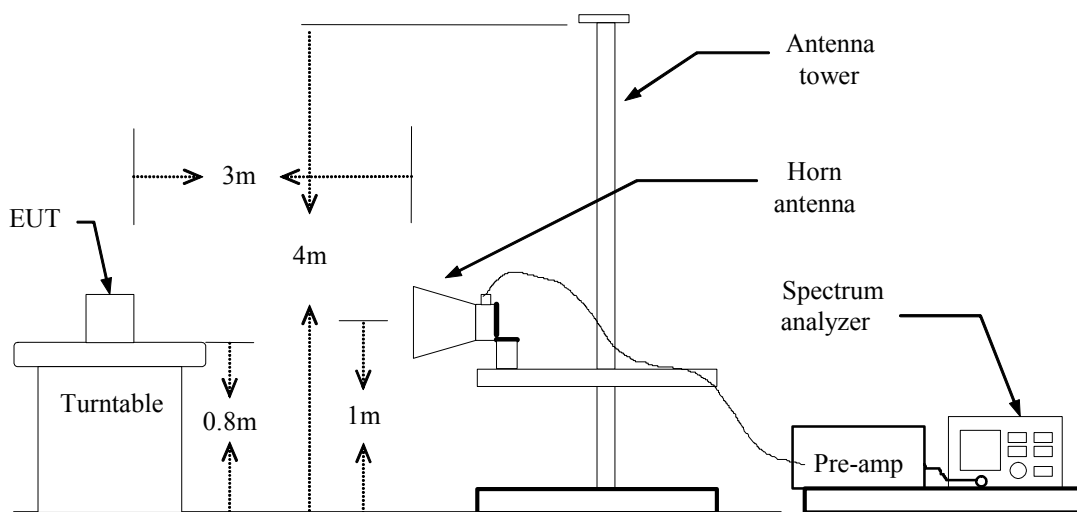
-63.25 dBm/Hz

7.4 BAND EDGES MEASUREMENT

LIMIT

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

TEST CONFIGURATION



TEST PROCEDURE

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

TEST RESULTS

Refer to attach spectrum analyzer data chart.



Test Plot

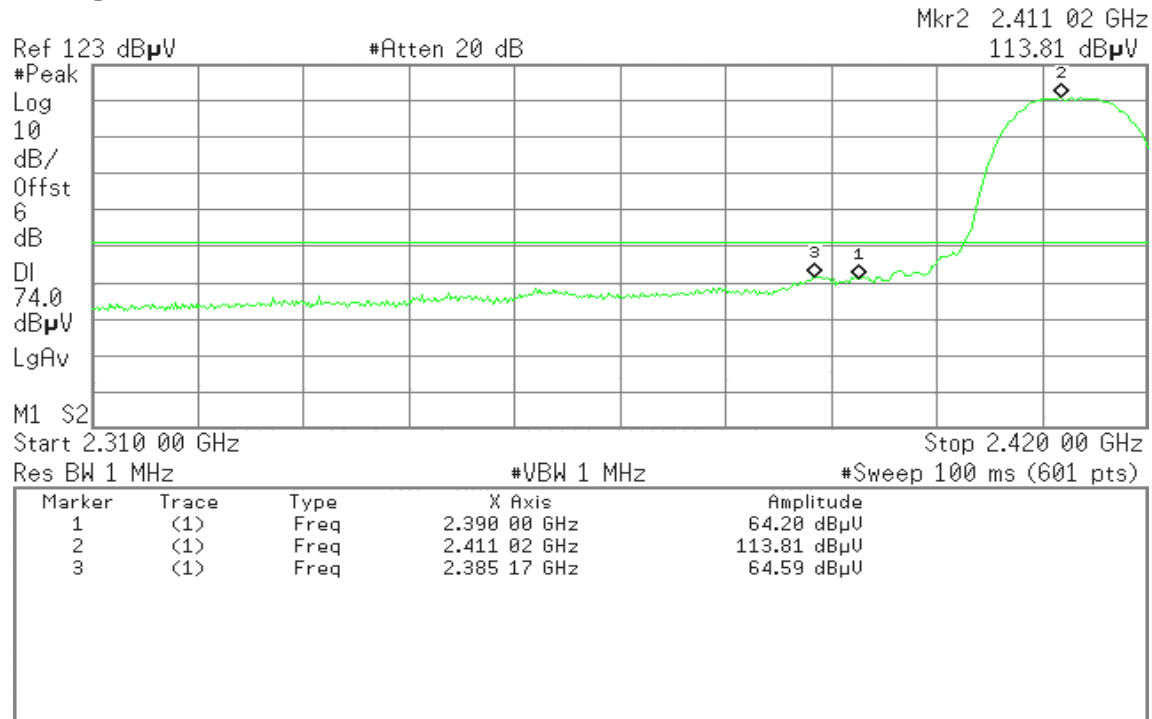
Band Edges (IEEE 802.11b mode / CH Low)

Detector mode: Peak

Polarity: Vertical

Agilent 21:52:22 Jun 28, 2010

R L

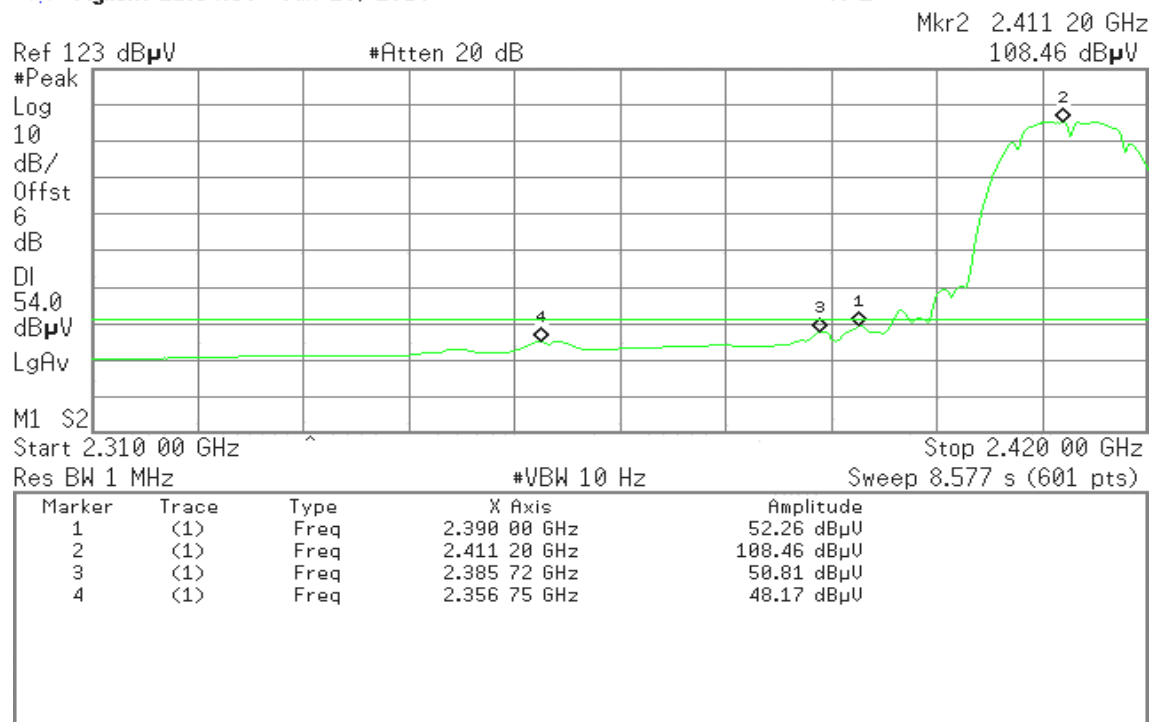


Detector mode: Average

Polarity: Vertical

Agilent 21:54:58 Jun 28, 2010

R L





Detector mode: Peak

Polarity: Horizontal

Agilent 21:47:33 Jun 28, 2010

R L

Mkr3 2.386 27 GHz
58.38 dB μ V

Ref 123 dB μ V

#Atten 20 dB

#Peak

Log

10

dB/

Offst

6

dB

DI

74.0

dB μ V

LgAv

M1 S2

Start 2.310 00 GHz

Stop 2.420 00 GHz

#Res BW 1 MHz

#VBW 1 MHz

#Sweep 100 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.390 00 GHz	57.53 dB μ V
2	(1)	Freq	2.411 02 GHz	103.54 dB μ V
3	(1)	Freq	2.386 27 GHz	58.38 dB μ V

Detector mode: Average

Polarity: Horizontal

Agilent 21:48:33 Jun 28, 2010

R L

Mkr2 2.411 20 GHz
100.61 dB μ V

Ref 123 dB μ V

#Atten 20 dB

#Peak

Log

10

dB/

Offst

6

dB

DI

54.0

dB μ V

LgAv

M1 S2

Start 2.310 00 GHz

Stop 2.420 00 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 00 GHz	47.01 dB μ V
2	(1)	Freq	2.411 20 GHz	100.61 dB μ V
3	(1)	Freq	2.386 27 GHz	48.23 dB μ V



Band Edges (IEEE 802.11b mode / CH High)

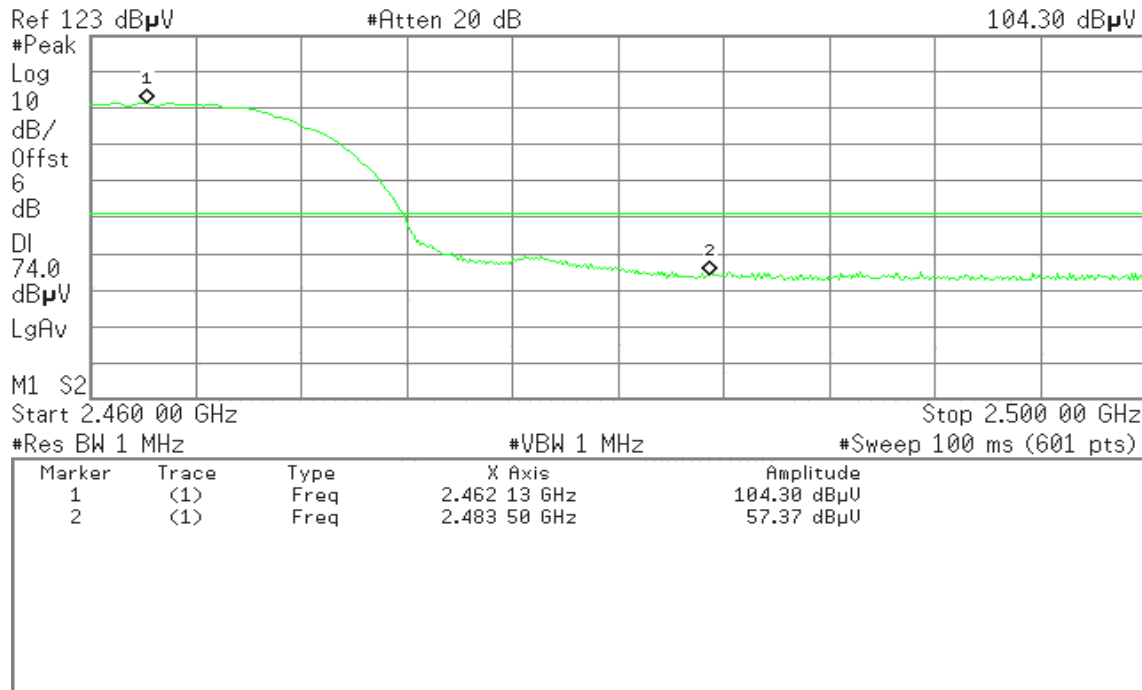
Detector mode: Peak

Polarity: Vertical

Agilent 19:31:51 Jun 26, 2010

R T

Mkr1 2.462 13 GHz
104.30 dBμV



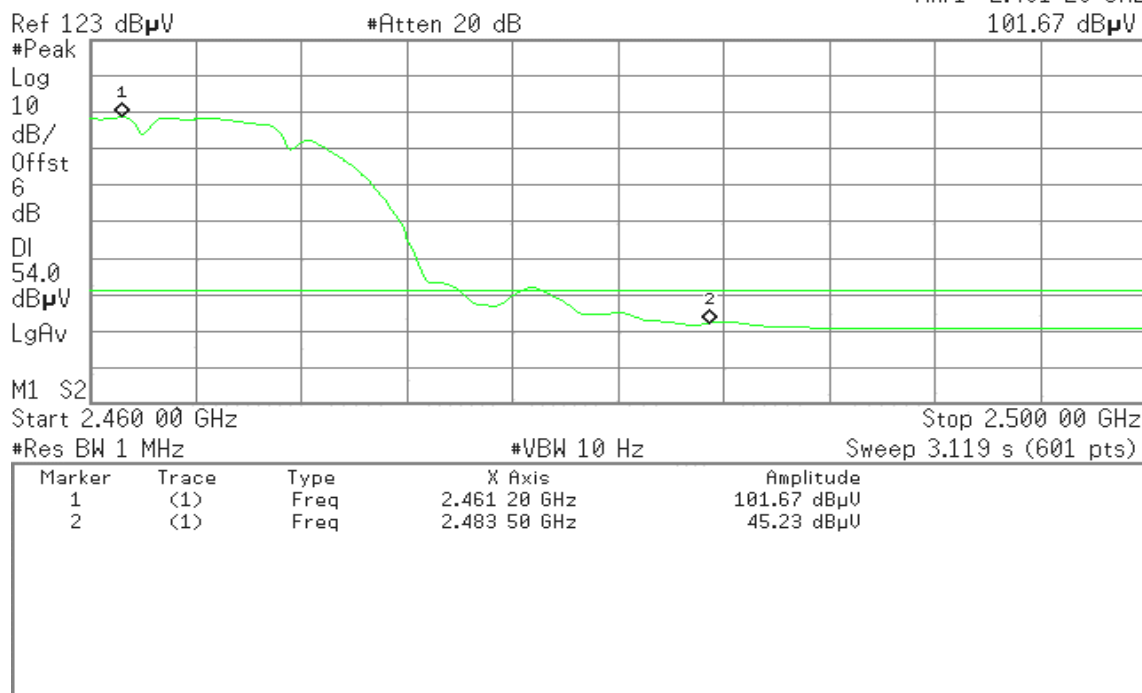
Detector mode: Average

Polarity: Vertical

Agilent 19:32:30 Jun 26, 2010

R T

Mkr1 2.461 20 GHz
101.67 dBμV





Detector mode: Peak

Polarity: Horizontal

Agilent 19:28:34 Jun 26, 2010

R T

Mkr1 2.460 93 GHz

Ref 123 dB μ V

#Atten 20 dB

109.19 dB μ V

#Peak

Log

10

dB/

Offst

6

dB

DI

74.0

dB μ V

LgAv

M1 S2

Start 2.460 00 GHz

Stop 2.500 00 GHz

#Res BW 1 MHz

#VBW 1 MHz

#Sweep 100 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.460 93 GHz	109.19 dB μ V
2	(1)	Freq	2.483 50 GHz	59.15 dB μ V

Detector mode: Average

Polarity: Horizontal

Agilent 19:29:15 Jun 26, 2010

R T

Mkr1 2.461 20 GHz

Ref 123 dB μ V

#Atten 20 dB

106.63 dB μ V

#Peak

Log

10

dB/

Offst

6

dB

DI

54.0

dB μ V

LgAv

M1 S2

Start 2.460 00 GHz

Stop 2.500 00 GHz

#Res BW 1 MHz

#VBW 10 Hz

Sweep 3.119 s (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.461 20 GHz	106.63 dB μ V
2	(1)	Freq	2.483 50 GHz	48.42 dB μ V



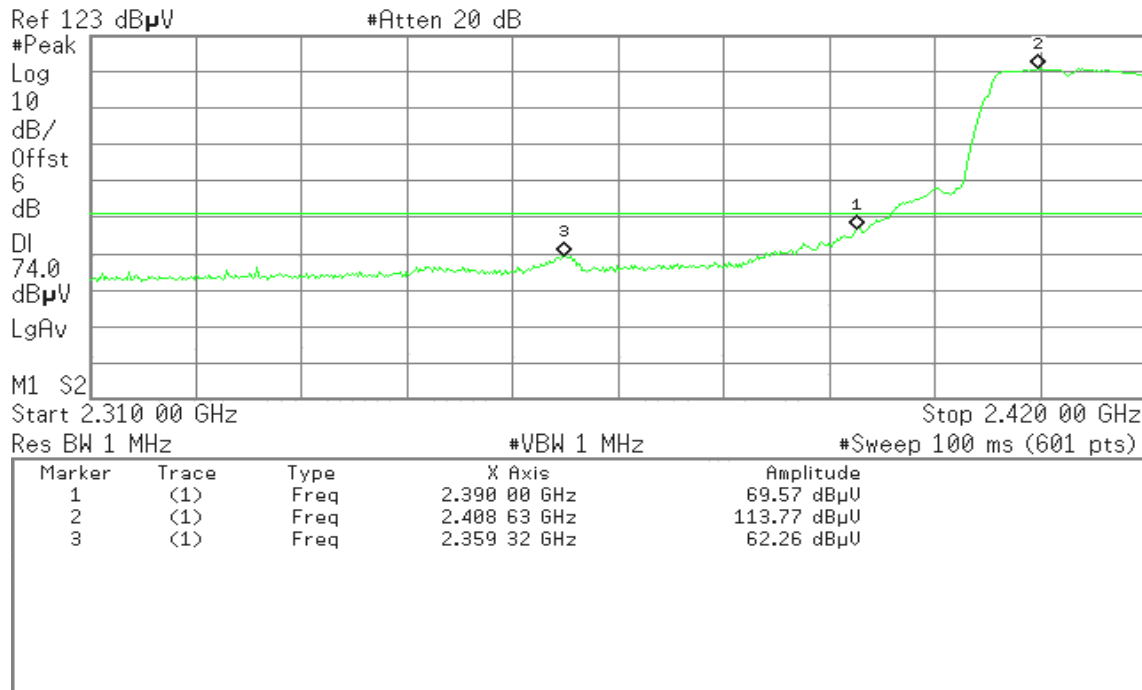
Band Edges (IEEE 802.11g mode / CH Low)

Detector mode: Peak

Polarity: Vertical

Agilent 22:01:55 Jun 28, 2010

R L

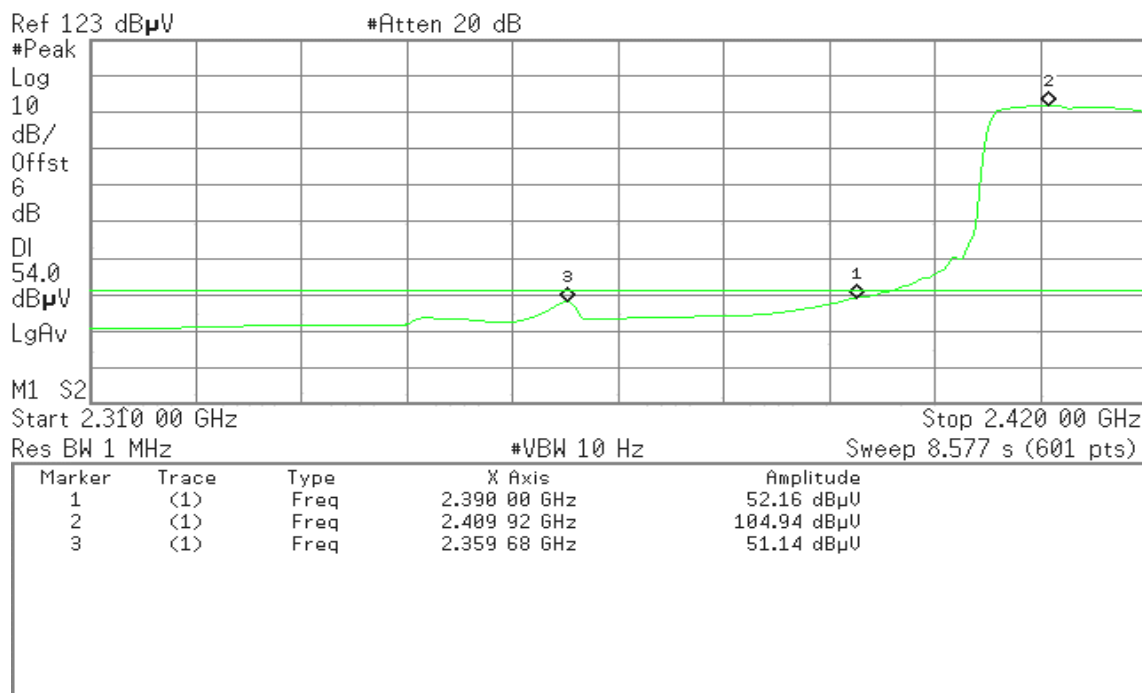


Detector mode: Average

Polarity: Vertical

Agilent 22:03:36 Jun 28, 2010

R T





Detector mode: Peak

Polarity: Horizontal

Agilent 18:39:47 Jun 26, 2010

R T

Mkr2 2.408 63 GHz

Ref 123 dB μ V

#Atten 20 dB

101.03 dB μ V



Start 2.310 00 GHz

Stop 2.420 00 GHz

#Res BW 1 MHz

#VBW 1 MHz

#Sweep 100 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.390 00 GHz	55.27 dB μ V
2	(1)	Freq	2.408 63 GHz	101.03 dB μ V

Detector mode: Average

Polarity: Horizontal

Agilent 18:40:38 Jun 26, 2010

R T

Mkr2 2.408 45 GHz

Ref 123 dB μ V

#Atten 20 dB

92.27 dB μ V



Start 2.310 00 GHz

Stop 2.420 00 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 00 GHz	43.02 dB μ V
2	(1)	Freq	2.408 45 GHz	92.27 dB μ V



Band Edges (IEEE 802.11g mode / CH High)

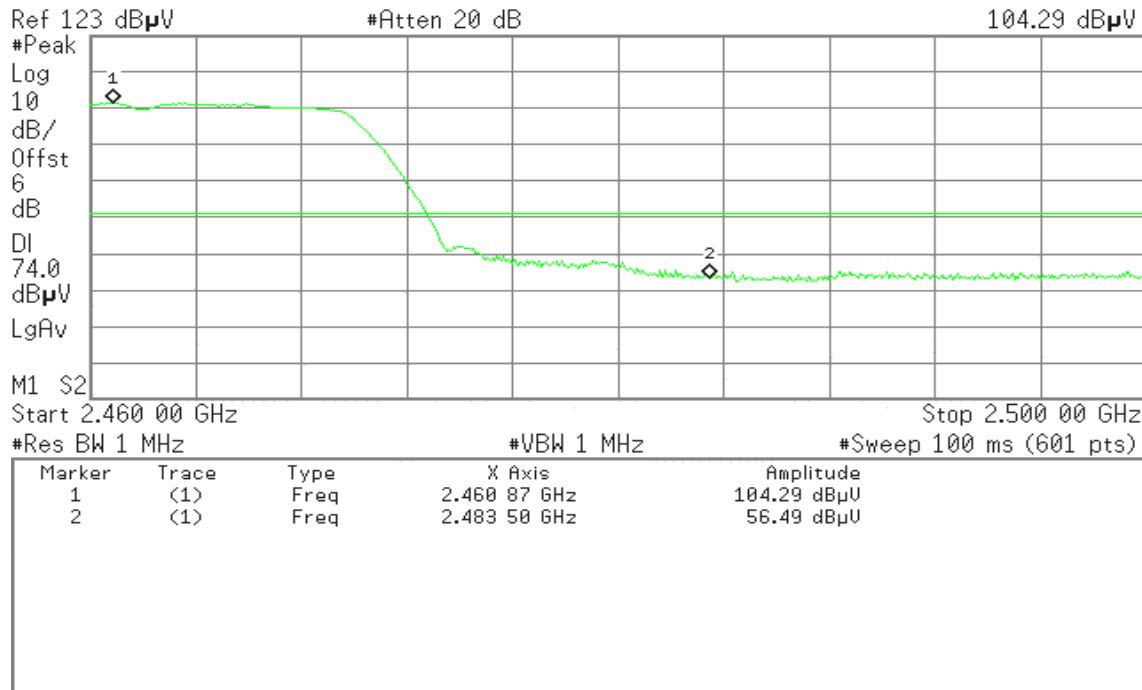
Detector mode: Peak

Polarity: Vertical

Agilent 19:20:57 Jun 26, 2010

R T

Mkr1 2.460 87 GHz
104.29 dB μ V



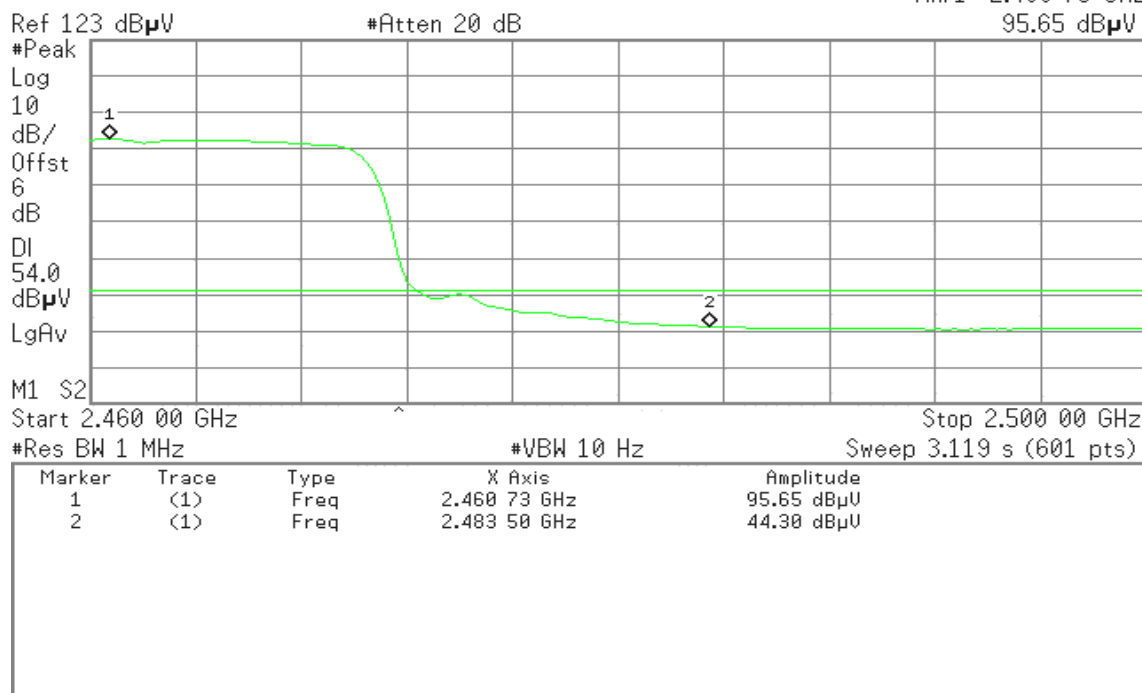
Detector mode: Average

Polarity: Vertical

Agilent 19:21:26 Jun 26, 2010

R T

Mkr1 2.460 73 GHz
95.65 dB μ V





Detector mode: Peak

Polarity: Horizontal

Agilent 19:23:39 Jun 26, 2010

R T

Mkr1 2.460 53 GHz

Ref 123 dB μ V

#Atten 20 dB

109.41 dB μ V

#Peak

Log

10

dB/

Offst

6

dB

DI

74.0

dB μ V

LgAv

M1 S2

Start 2.460 00 GHz

Stop 2.500 00 GHz

#Res BW 1 MHz

#VBW 1 MHz

#Sweep 100 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.460 53 GHz	109.41 dB μ V
2	(1)	Freq	2.483 50 GHz	59.27 dB μ V

Detector mode: Average

Polarity: Horizontal

Agilent 19:24:07 Jun 26, 2010

R T

Mkr1 2.460 67 GHz

Ref 123 dB μ V

#Atten 20 dB

100.89 dB μ V

#Peak

Log

10

dB/

Offst

6

dB

DI

54.0

dB μ V

LgAv

M1 S2

Start 2.460 00 GHz

Stop 2.500 00 GHz

#Res BW 1 MHz

#VBW 10 Hz

Sweep 3.119 s (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.460 67 GHz	100.89 dB μ V
2	(1)	Freq	2.483 50 GHz	46.64 dB μ V



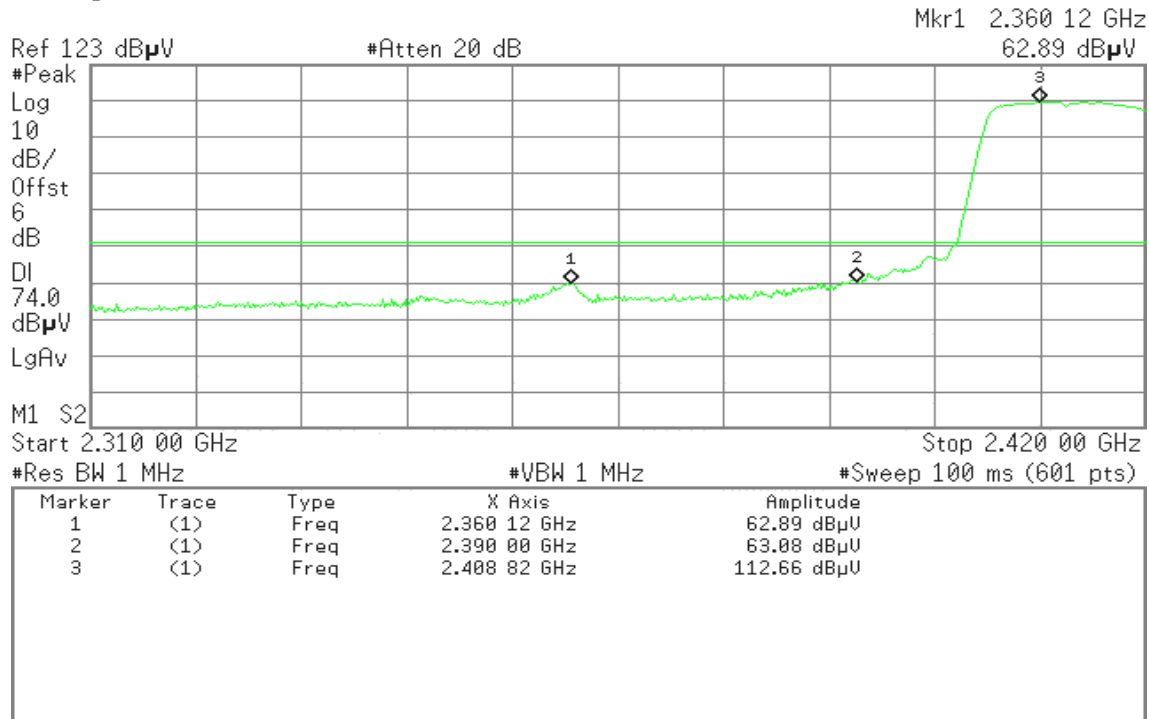
Band Edges (draft 802.11n 20 MHz Channel mode / CH Low)

Detector mode: Peak

Polarity: Vertical

Agilent 18:47:10 Jun 26, 2010

R T

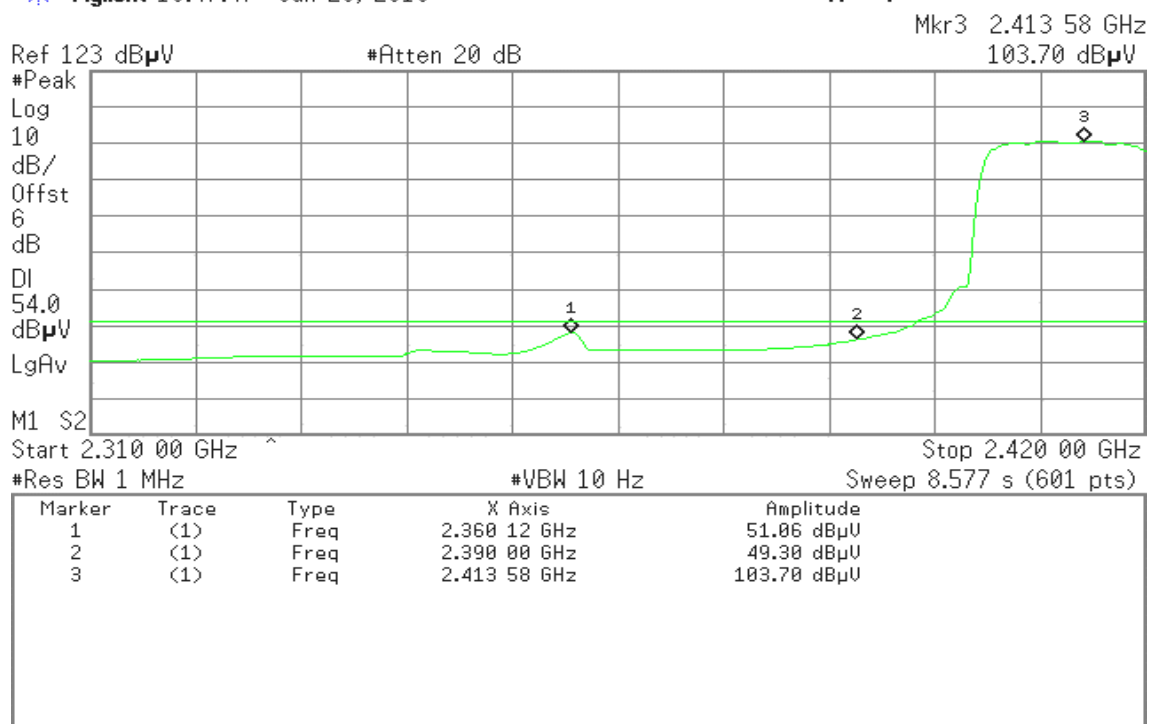


Detector mode: Average

Polarity: Vertical

Agilent 18:47:47 Jun 26, 2010

R T





Detector mode: Peak

Polarity: Horizontal

Agilent 18:50:44 Jun 26, 2010

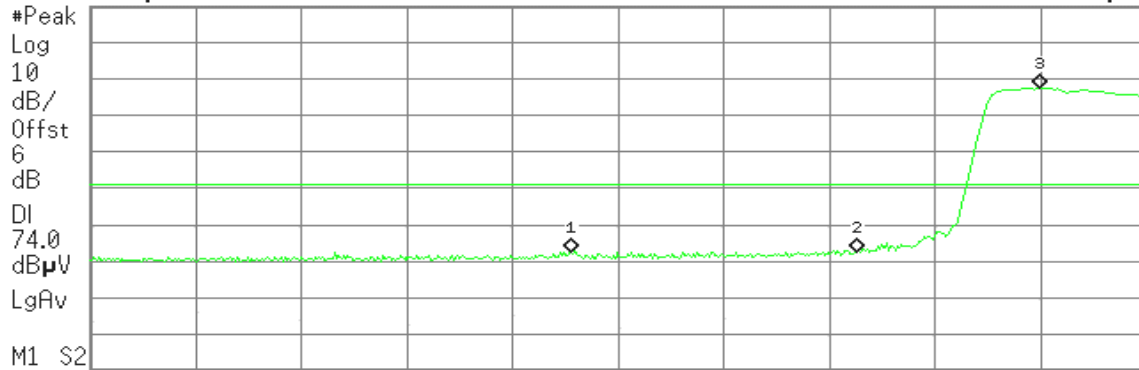
R T

Mkr3 2.408 82 GHz

Ref 123 dB μ V

#Atten 20 dB

100.60 dB μ V



Start 2.310 00 GHz

Stop 2.420 00 GHz

#Res BW 1 MHz

#VBW 1 MHz

#Sweep 100 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.360 12 GHz	55.35 dB μ V
2	(1)	Freq	2.390 00 GHz	55.55 dB μ V
3	(1)	Freq	2.408 82 GHz	100.60 dB μ V

Detector mode: Average

Polarity: Horizontal

Agilent 18:51:16 Jun 26, 2010

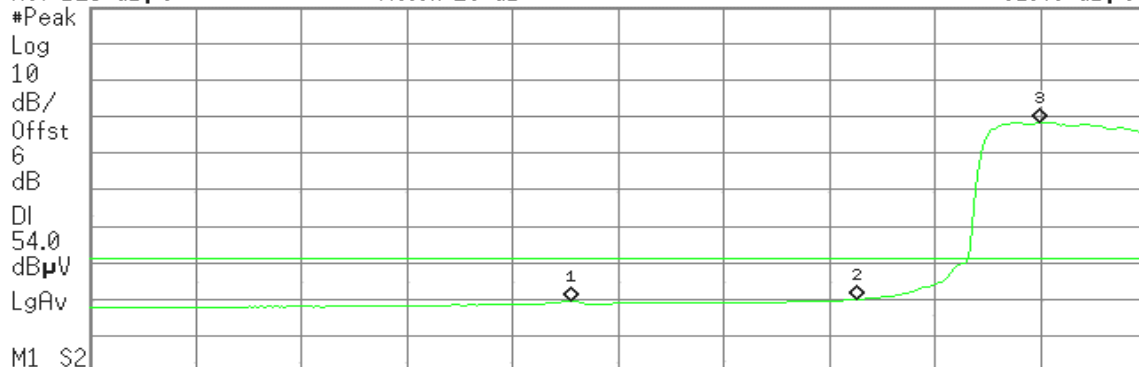
R T

Mkr3 2.408 82 GHz

Ref 123 dB μ V

#Atten 20 dB

91.49 dB μ V



Start 2.310 00 GHz

Stop 2.420 00 GHz

#Res BW 1 MHz

#VBW 10 Hz

Sweep 8.577 s (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.360 12 GHz	42.52 dB μ V
2	(1)	Freq	2.390 00 GHz	42.92 dB μ V
3	(1)	Freq	2.408 82 GHz	91.49 dB μ V



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

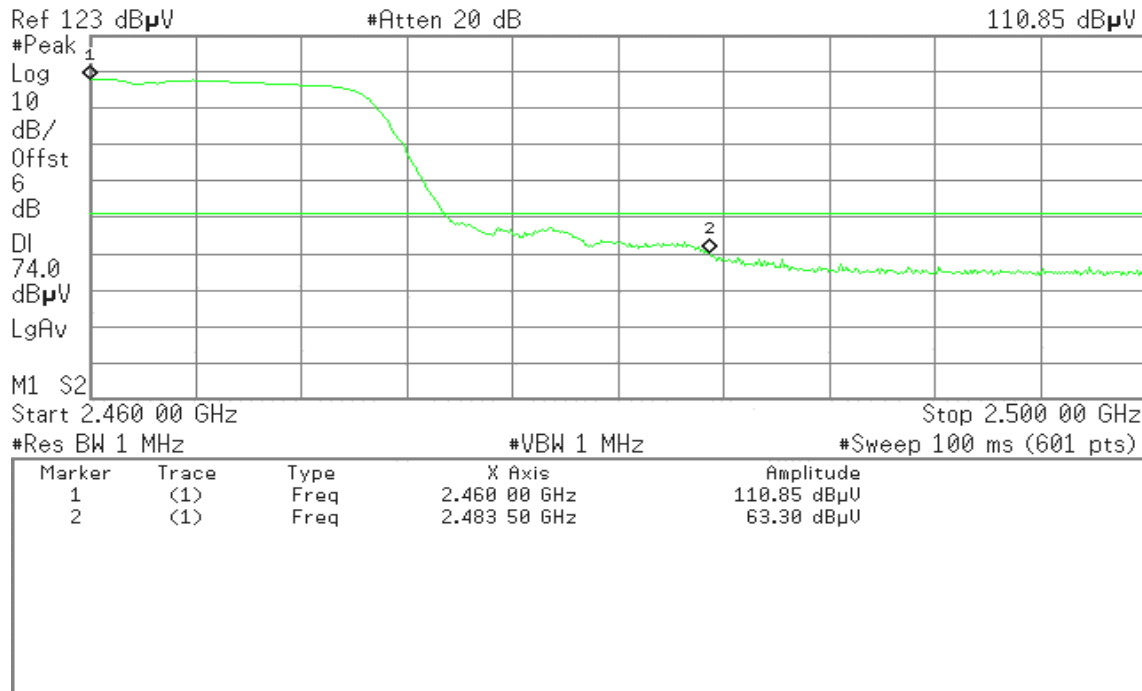
Detector mode: Peak

Polarity: Vertical

Agilent 22:25:00 Jun 28, 2010

R L

Mkr1 2.460 00 GHz
110.85 dBμV



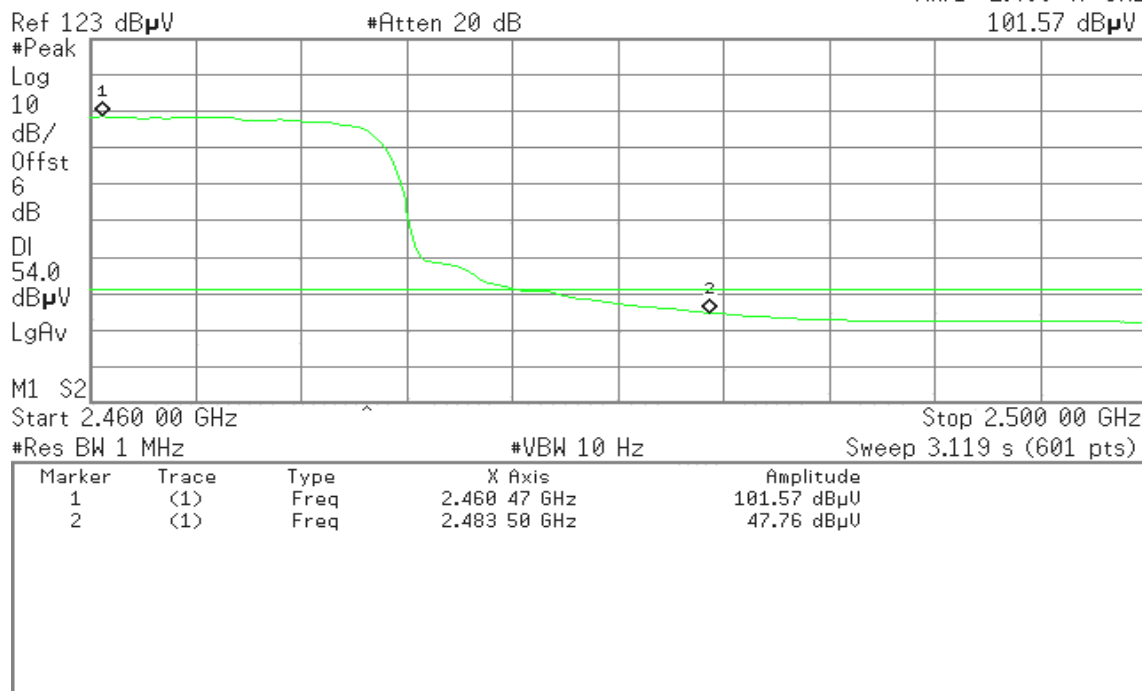
Detector mode: Average

Polarity: Vertical

Agilent 22:25:49 Jun 28, 2010

R L

Mkr1 2.460 47 GHz
101.57 dBμV





Detector mode: Peak

Polarity: Horizontal

Agilent 19:14:15 Jun 26, 2010

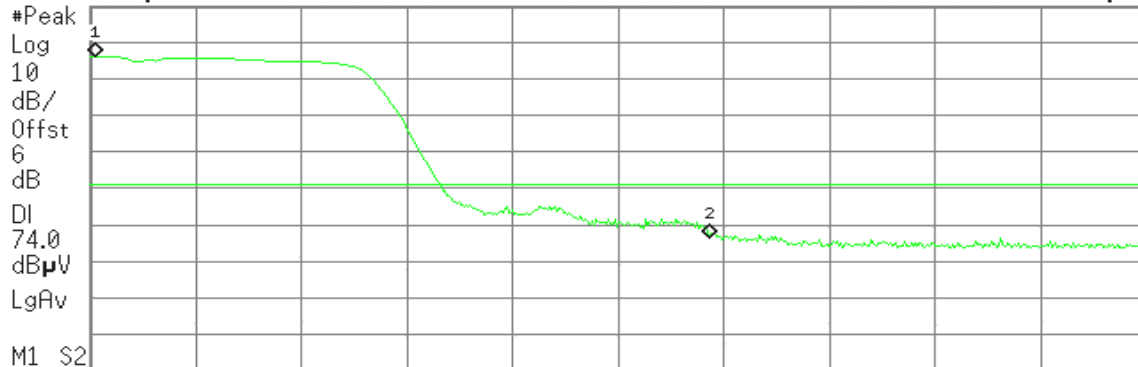
R T

Mkr1 2.460 20 GHz

Ref 123 dB μ V

#Atten 20 dB

109.16 dB μ V



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.460 20 GHz	109.16 dB μ V
2	(1)	Freq	2.483 50 GHz	59.53 dB μ V

Detector mode: Average

Polarity: Horizontal

Agilent 19:14:43 Jun 26, 2010

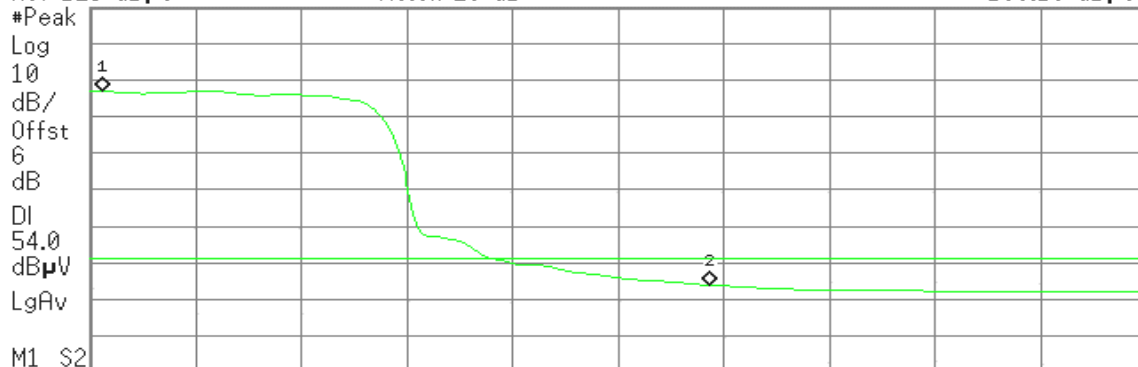
R T

Mkr1 2.460 47 GHz

Ref 123 dB μ V

#Atten 20 dB

100.10 dB μ V



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.460 47 GHz	100.10 dB μ V
2	(1)	Freq	2.483 50 GHz	46.85 dB μ V



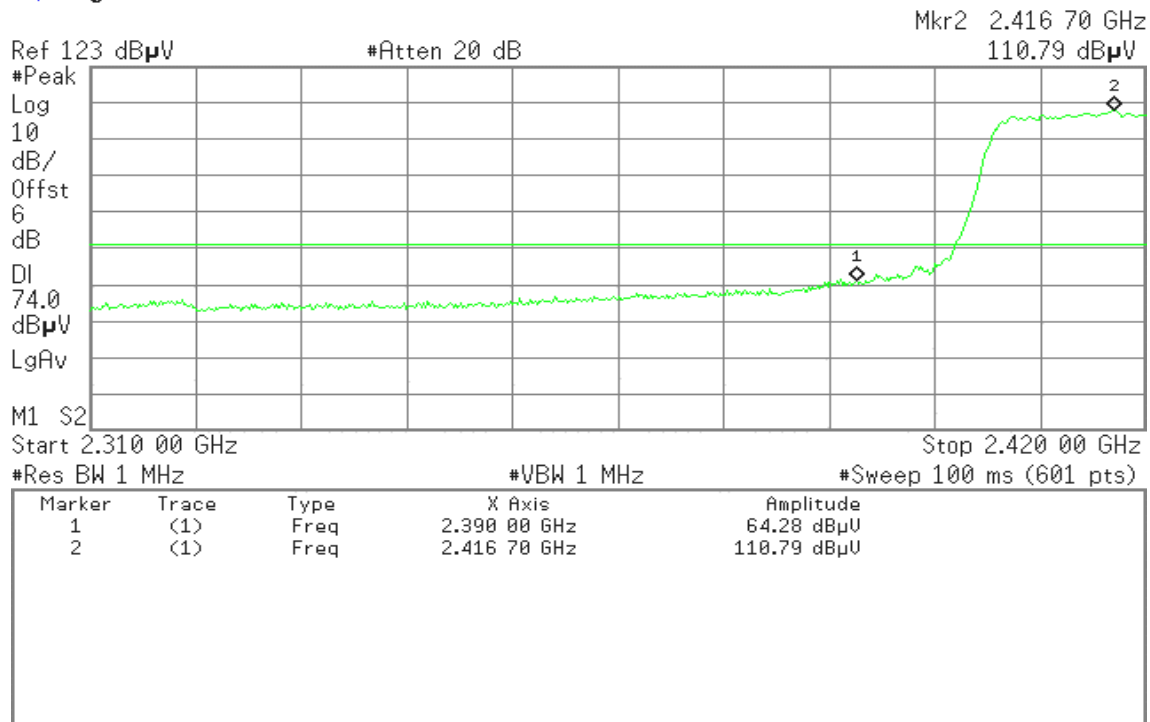
Band Edges (draft 802.11n 40 MHz Channel mode / CH Low)

Detector mode: Peak

Polarity: Vertical

Agilent 19:00:12 Jun 26, 2010

R T

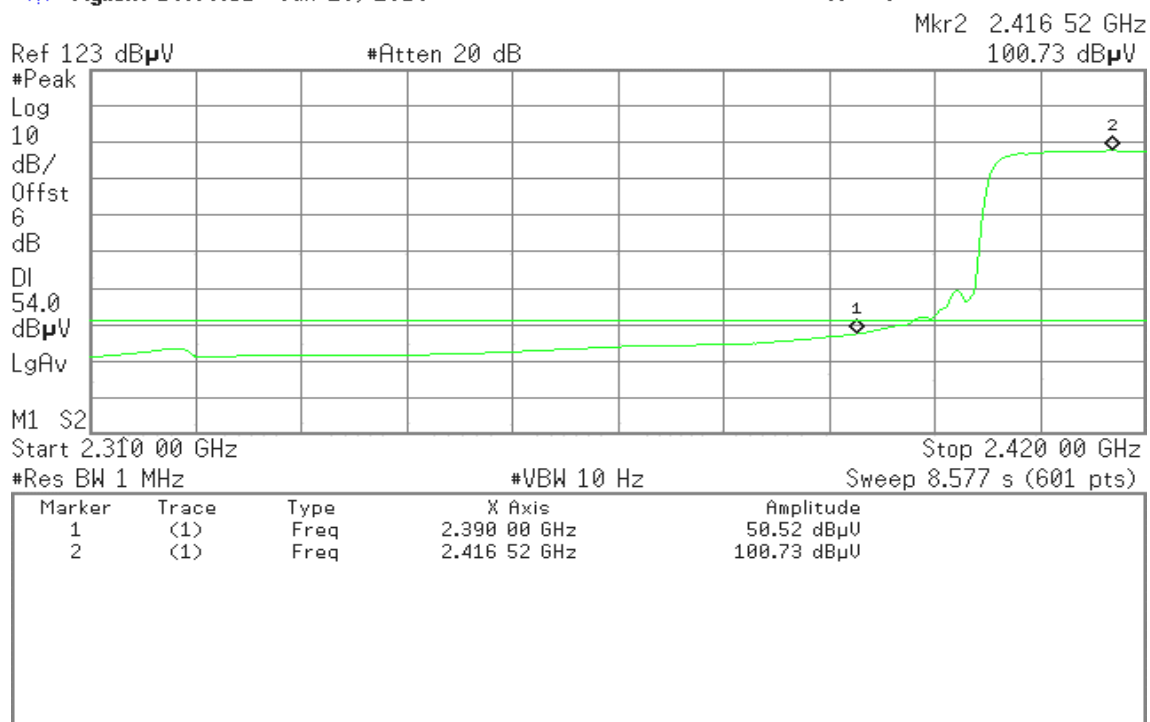


Detector mode: Average

Polarity: Vertical

Agilent 19:00:51 Jun 26, 2010

R T





Detector mode: Peak

Polarity: Horizontal

Agilent 18:56:56 Jun 26, 2010

R T

Mkr1 2.390 00 GHz
55.42 dB μ V

Ref 123 dB μ V

#Atten 20 dB

#Peak

Log

10

dB/

Offst

6

dB

DI

74.0

dB μ V

LgAv

M1 S2

Start 2.310 00 GHz

Stop 2.420 00 GHz

#Res BW 1 MHz

#VBW 1 MHz

#Sweep 100 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.390 00 GHz	55.42 dB μ V
2	(1)	Freq	2.416 88 GHz	97.46 dB μ V

Detector mode: Average

Polarity: Horizontal

Agilent 18:57:42 Jun 26, 2010

R T

Mkr2 2.410 47 GHz
87.92 dB μ V

Ref 123 dB μ V

#Atten 20 dB

#Peak

Log

10

dB/

Offst

6

dB

DI

54.0

dB μ V

LgAv

M1 S2

Start 2.310 00 GHz

Stop 2.420 00 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 00 GHz	43.31 dB μ V
2	(1)	Freq	2.410 47 GHz	87.92 dB μ V



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

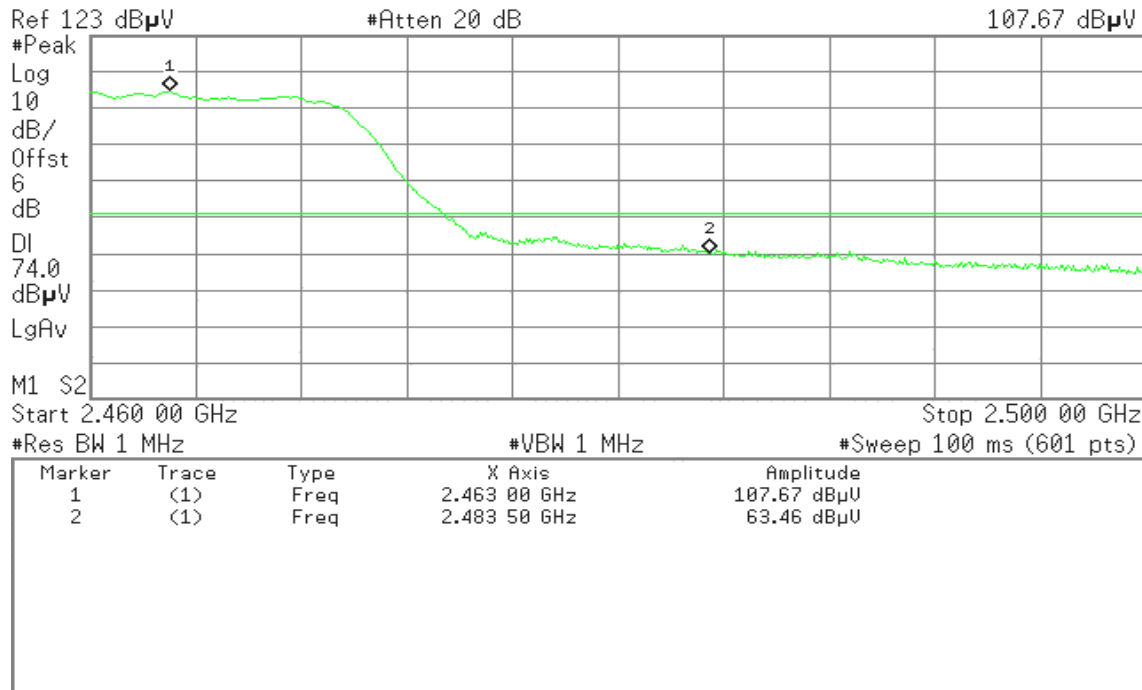
Detector mode: Peak

Polarity: Vertical

Agilent 19:04:01 Jun 26, 2010

R T

Mkr1 2.463 00 GHz
107.67 dB μ V



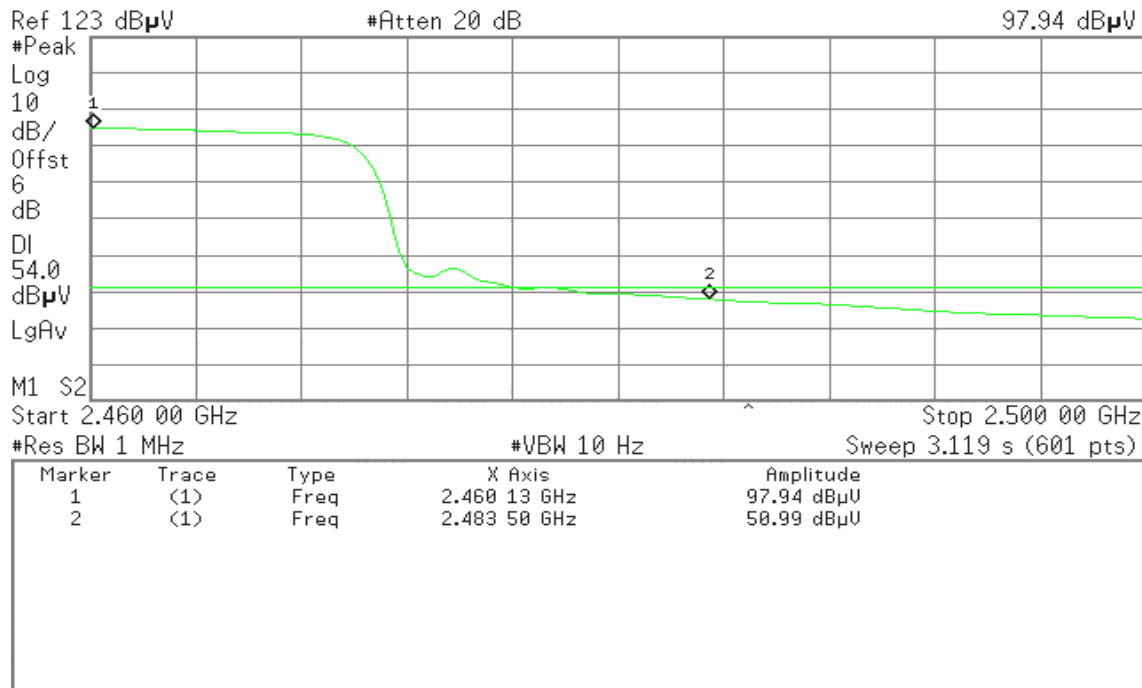
Detector mode: Average

Polarity: Vertical

Agilent 19:04:42 Jun 26, 2010

R T

Mkr1 2.460 13 GHz
97.94 dB μ V





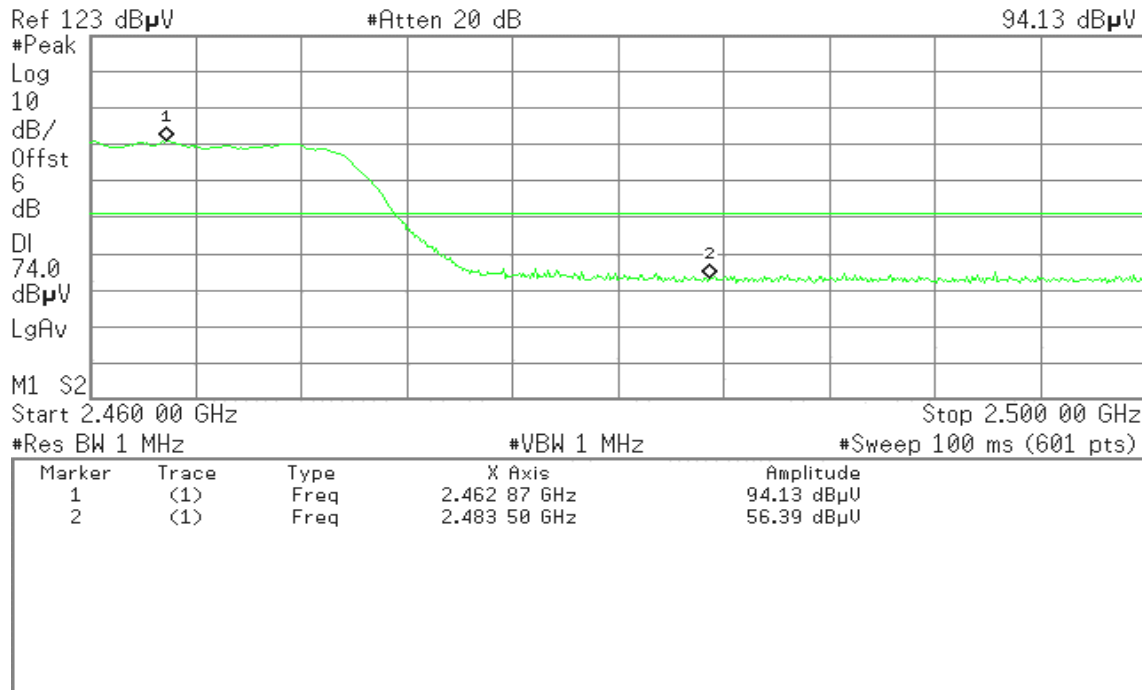
Detector mode: Peak

Polarity: Horizontal

Agilent 19:07:59 Jun 26, 2010

R T

Mkr1 2.462 87 GHz
94.13 dB μ V



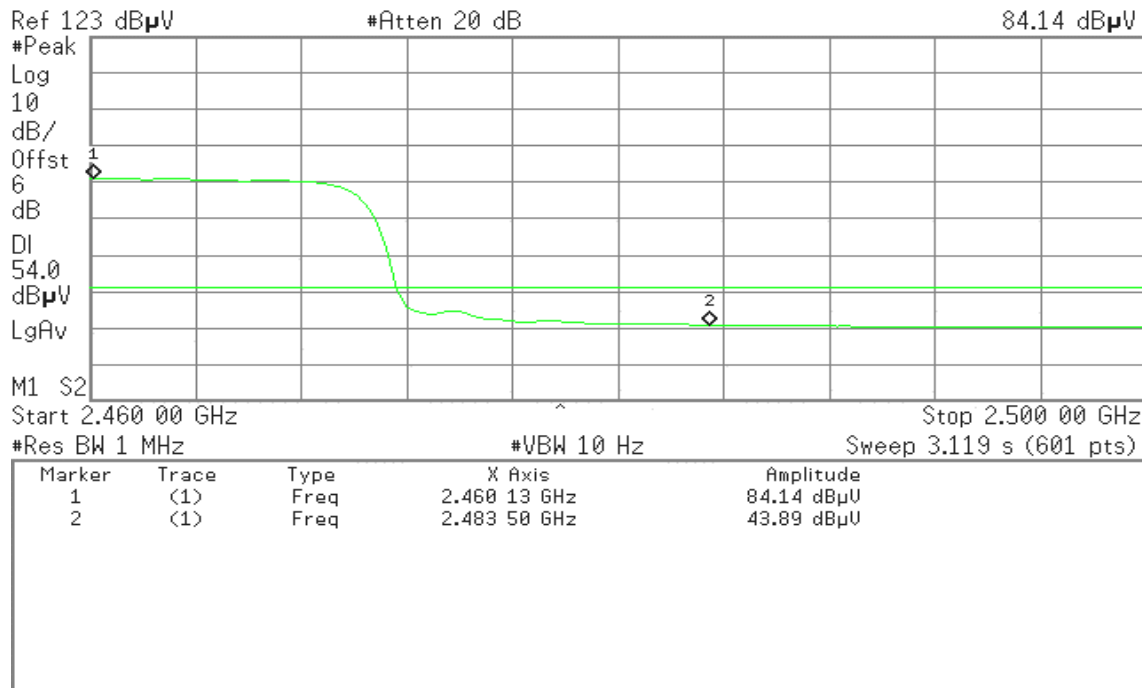
Detector mode: Average

Polarity: Horizontal

Agilent 19:08:28 Jun 26, 2010

R T

Mkr1 2.460 13 GHz
84.14 dB μ V



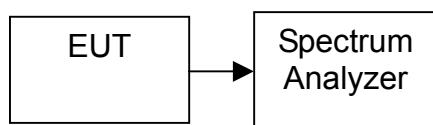


7.5 PEAK POWER SPECTRAL DENSITY

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	-12.13	8.00	PASS
Mid	2437	-13.73		PASS
High	2462	-14.80		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-12.12	8.00	PASS
Mid	2437	-13.44		PASS
High	2462	-15.09		PASS

Test mode: draft 802.11n 20 MHz Channel mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-12.27	8.00	PASS
Mid	2437	-13.61		PASS
High	2462	-15.09		PASS

Test mode: draft 802.11n 40 MHz Channel mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2422	-13.40	8.00	PASS
Mid	2437	-14.20		PASS
High	2452	-15.18		PASS



Test Plot

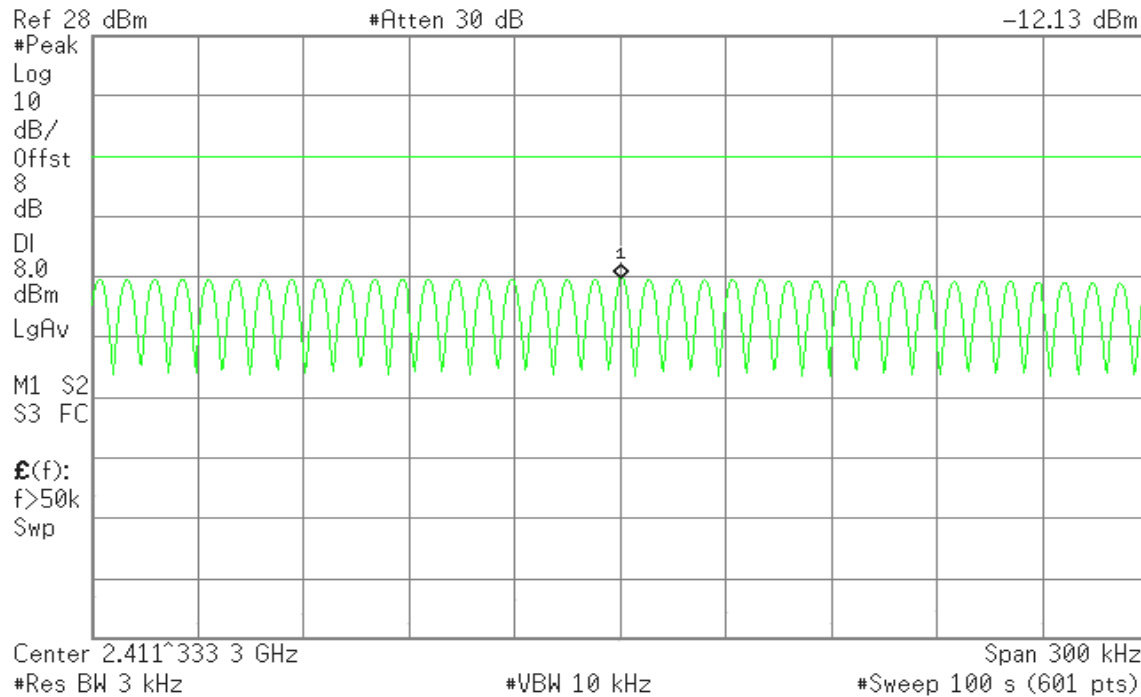
IEEE 802.11b mode

PPSD (CH Low)

Agilent 20:09:35 Jun 29, 2010

R T

Mkr1 2.411 333 8 GHz
-12.13 dBm

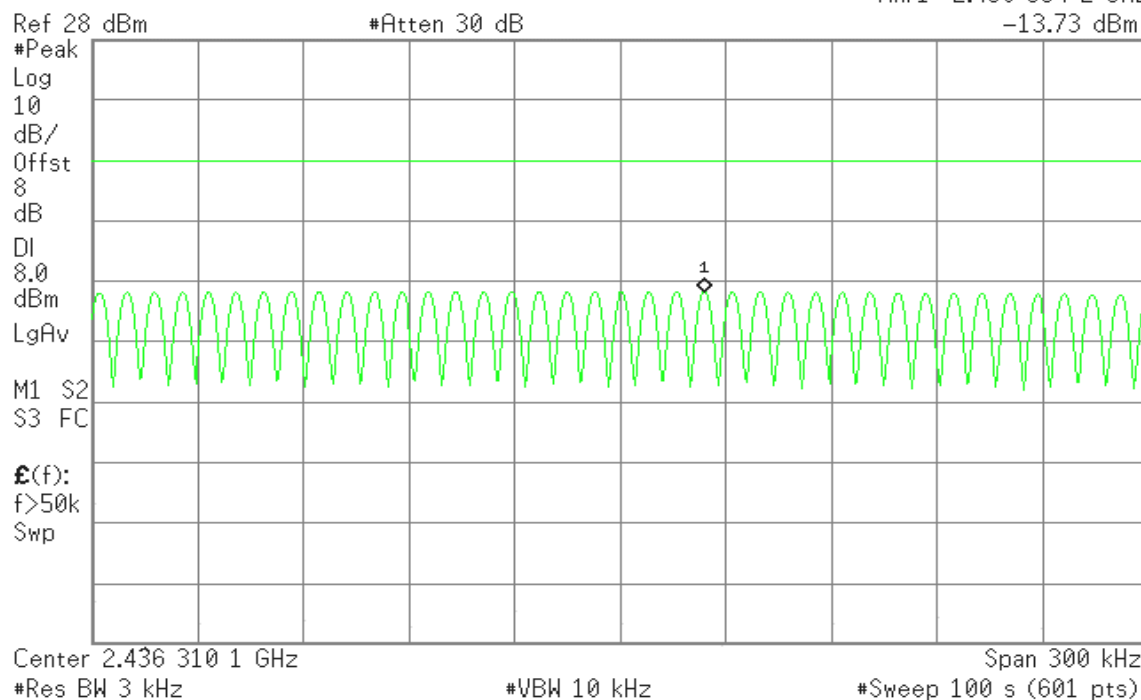


PPSD (CH Mid)

Agilent 20:06:42 Jun 29, 2010

R T

Mkr1 2.436 334 2 GHz
-13.73 dBm



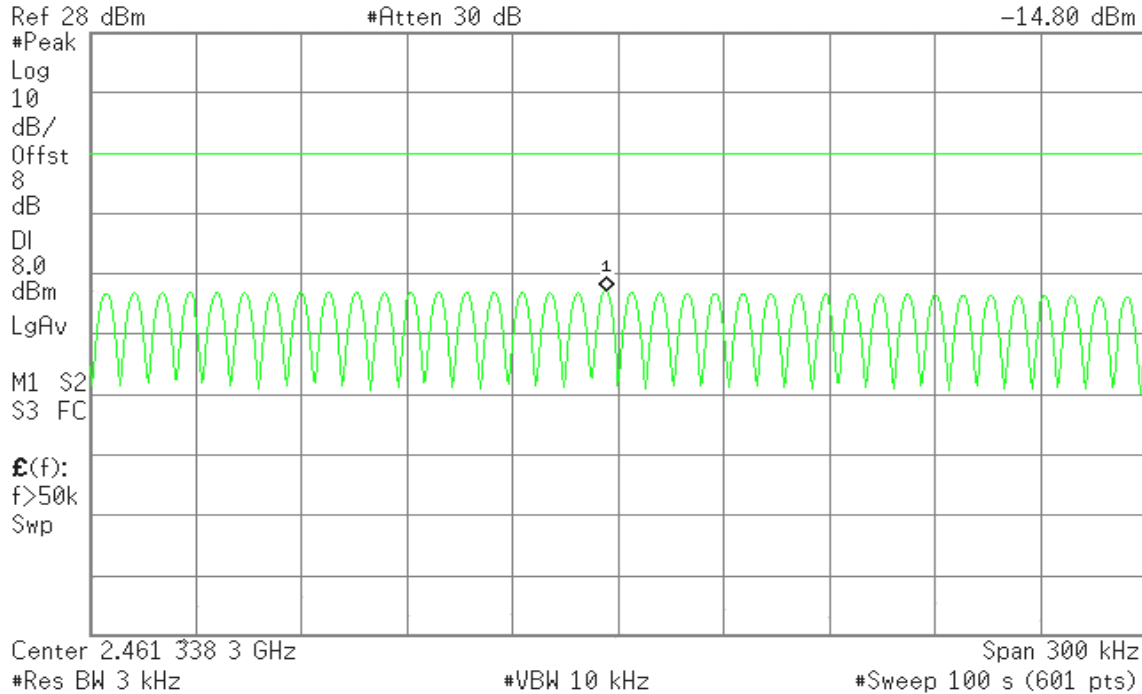


PPSD (CH High)

Agilent 20:03:51 Jun 29, 2010

R T

Mkr1 2.461 334 8 GHz
-14.80 dBm



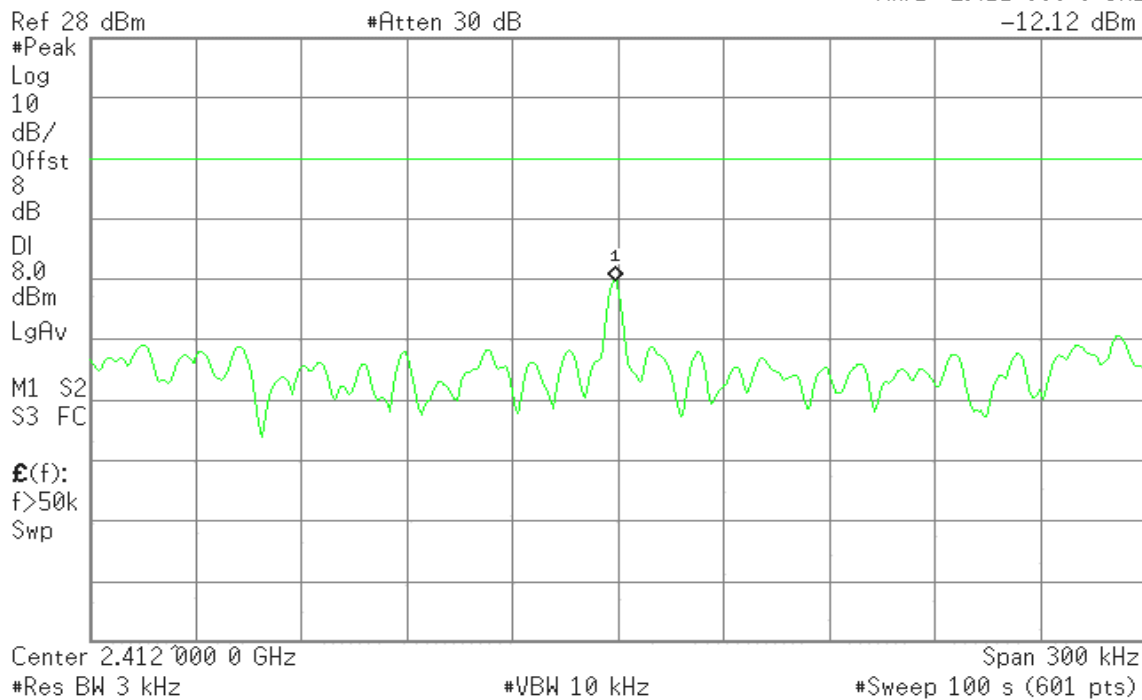
IEEE 802.11g mode

PPSD (CH Low)

Agilent 20:12:18 Jun 29, 2010

R T

Mkr1 2.411 999 0 GHz
-12.12 dBm



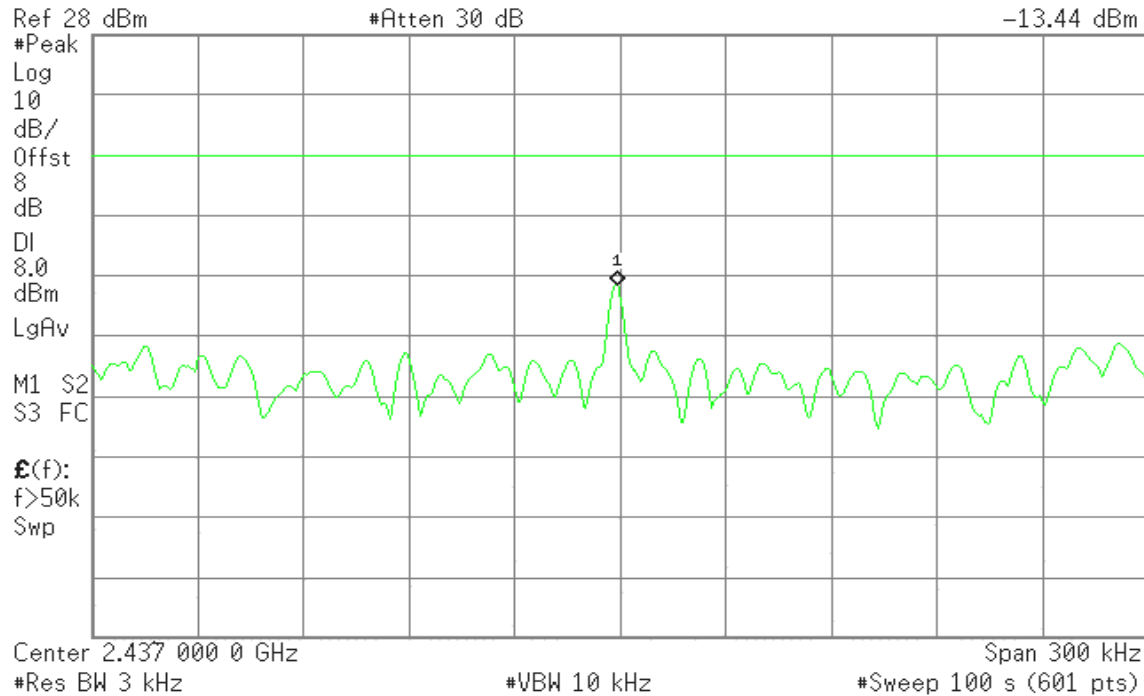


PPSD (CH Mid)

Agilent 20:14:50 Jun 29, 2010

R T

Mkr1 2.436 999 0 GHz
-13.44 dBm

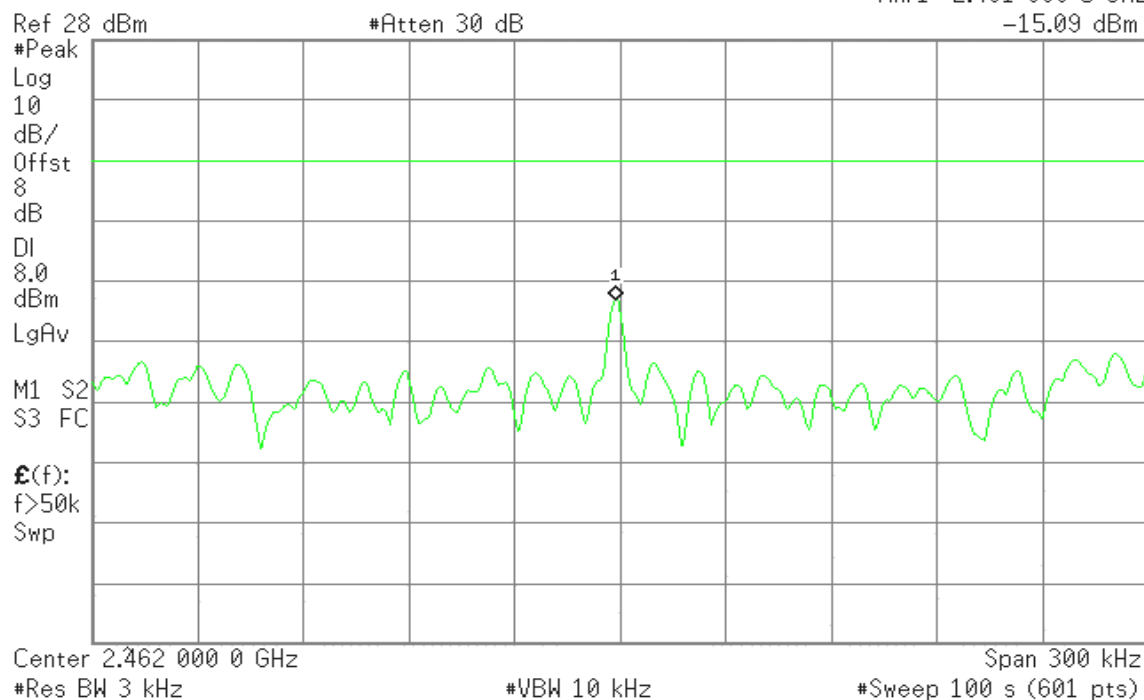


PPSD (CH High)

Agilent 20:16:50 Jun 29, 2010

R T

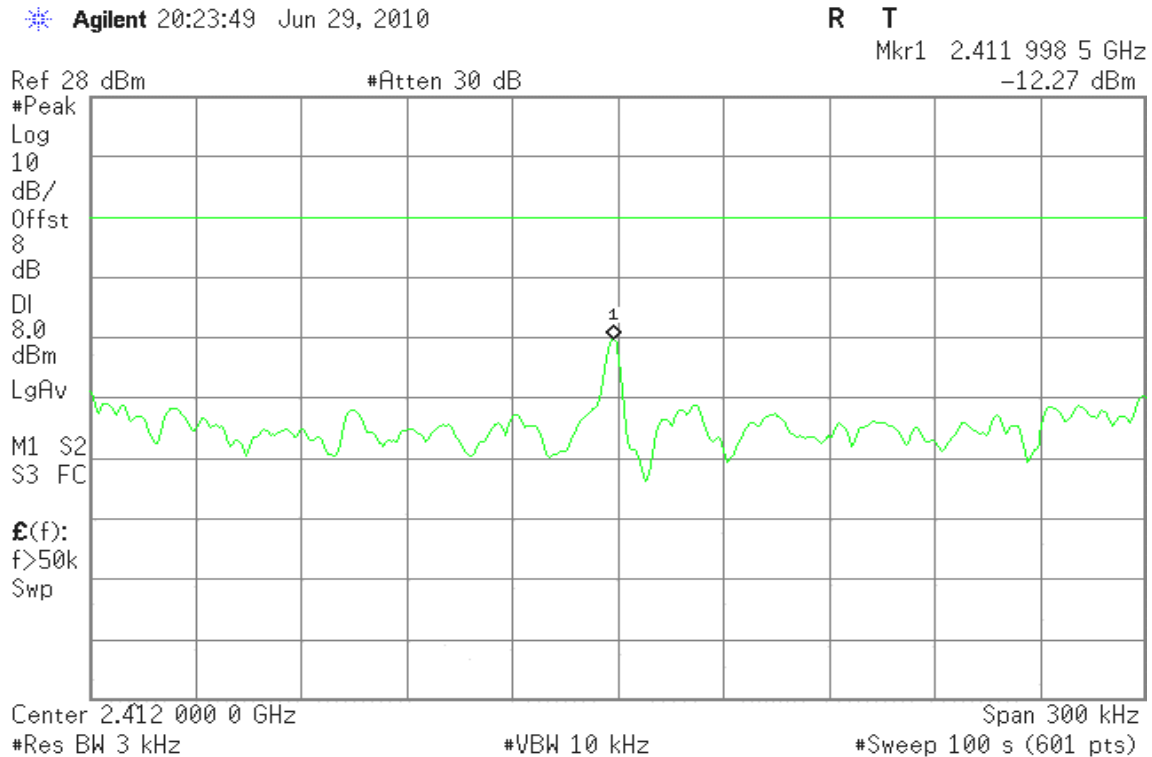
Mkr1 2.461 998 5 GHz
-15.09 dBm



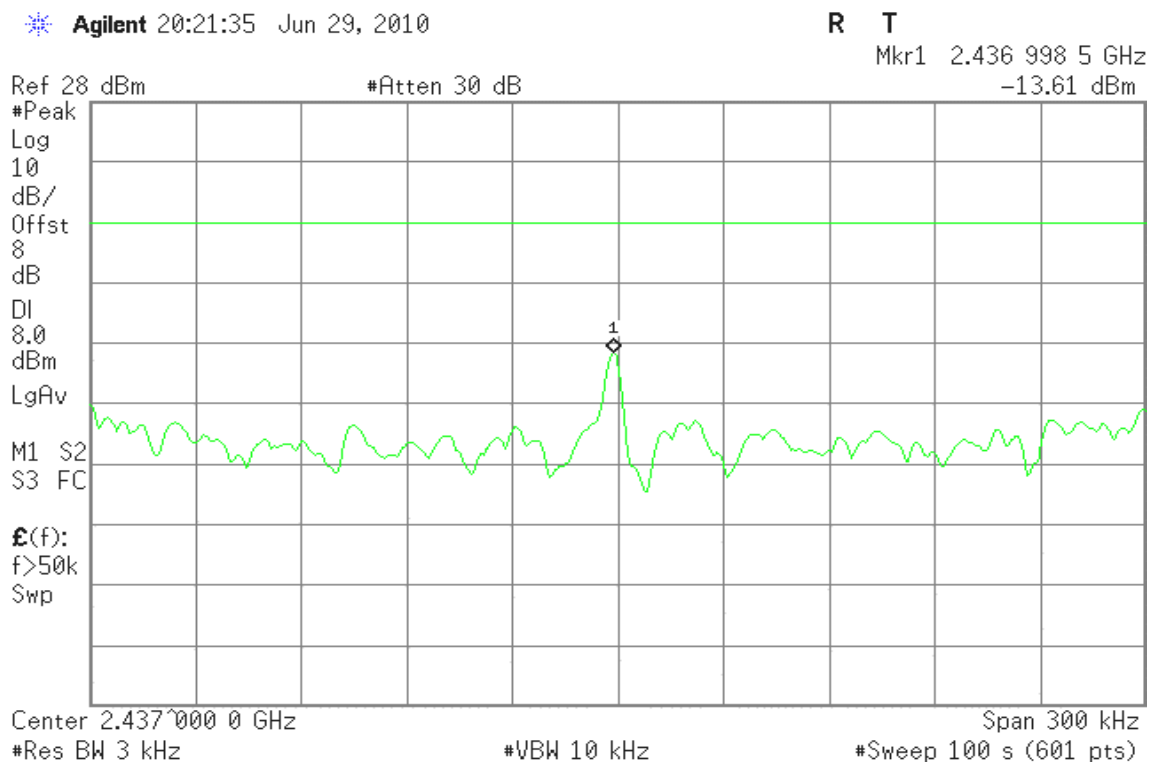


draft 802.11n 20 MHz Channel mode

PPSD (CH Low)



PPSD (CH Mid)



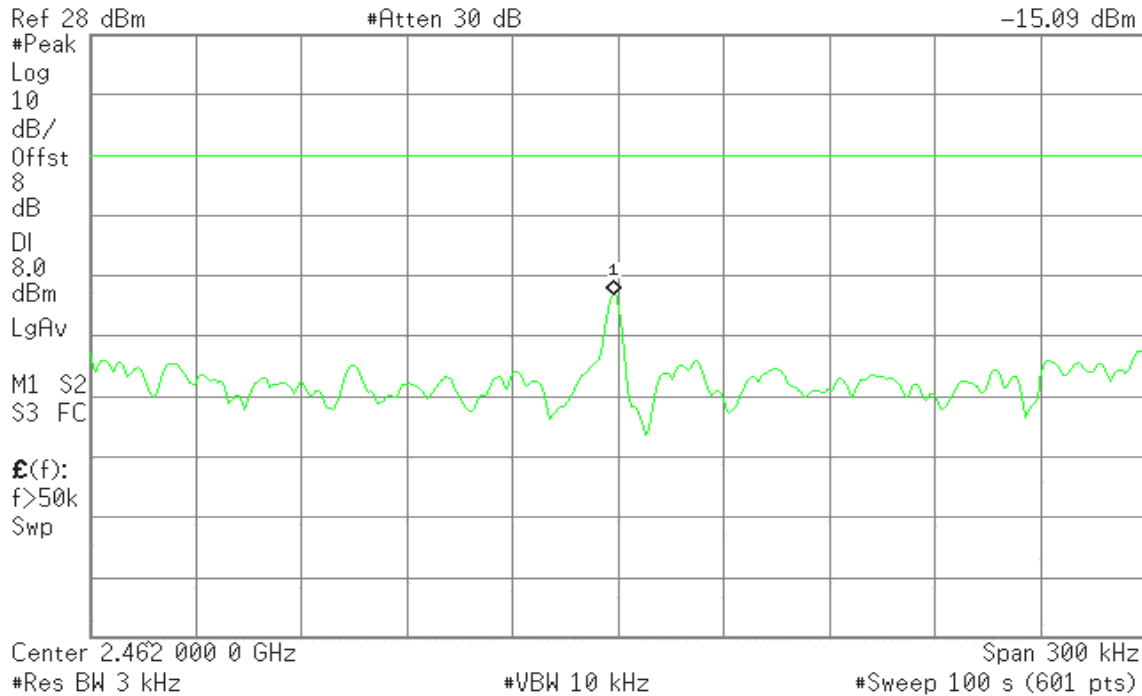


PPSD (CH High)

Agilent 20:19:27 Jun 29, 2010

R T

Mkr1 2.461 998 5 GHz
-15.09 dBm



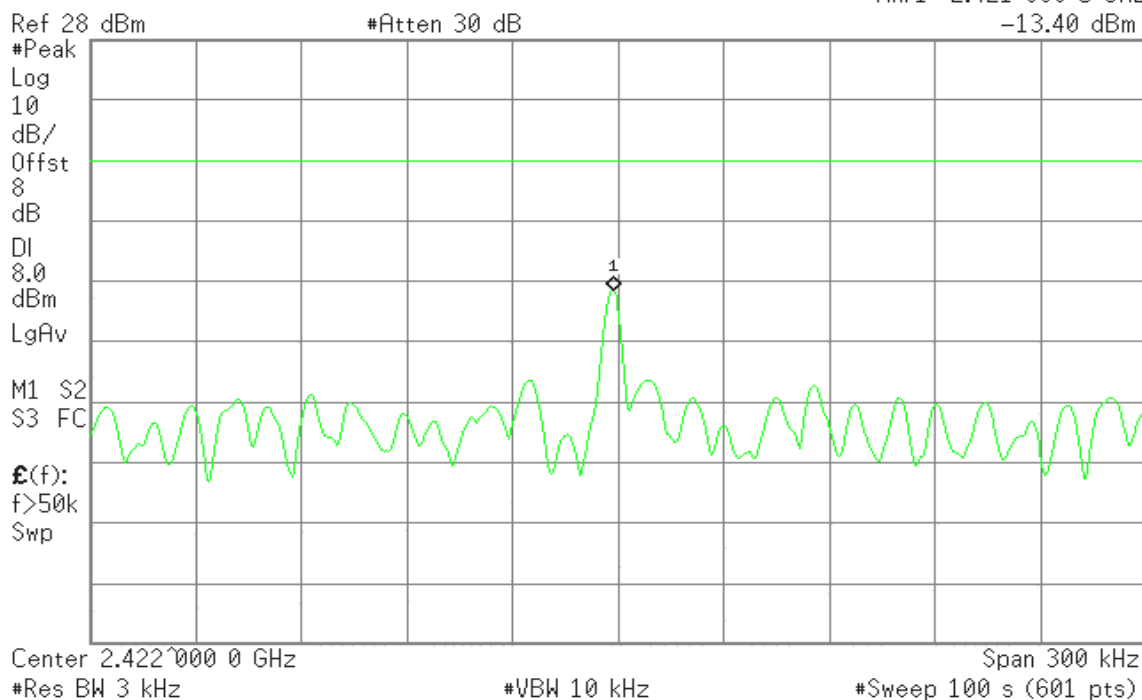
draft 802.11n 40 MHz Channel mode

PPSD (CH Low)

Agilent 20:26:37 Jun 29, 2010

R T

Mkr1 2.421 998 5 GHz
-13.40 dBm



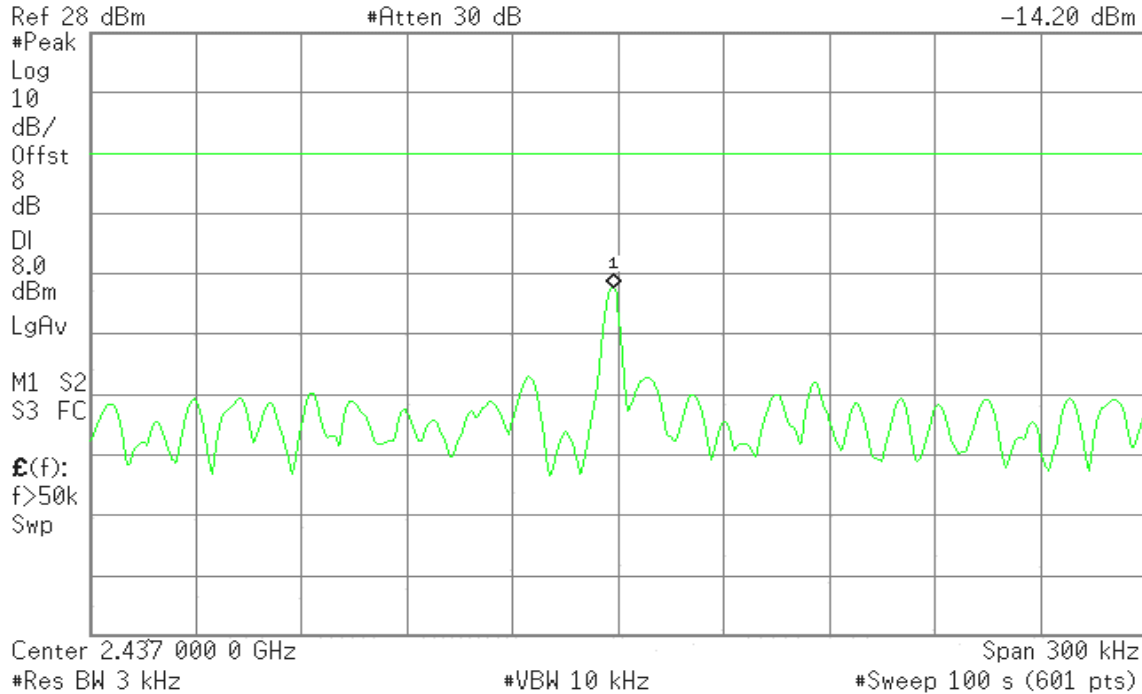


PPSD (CH Mid)

Agilent 20:28:49 Jun 29, 2010

R T

Mkr1 2.436 998 5 GHz
-14.20 dBm

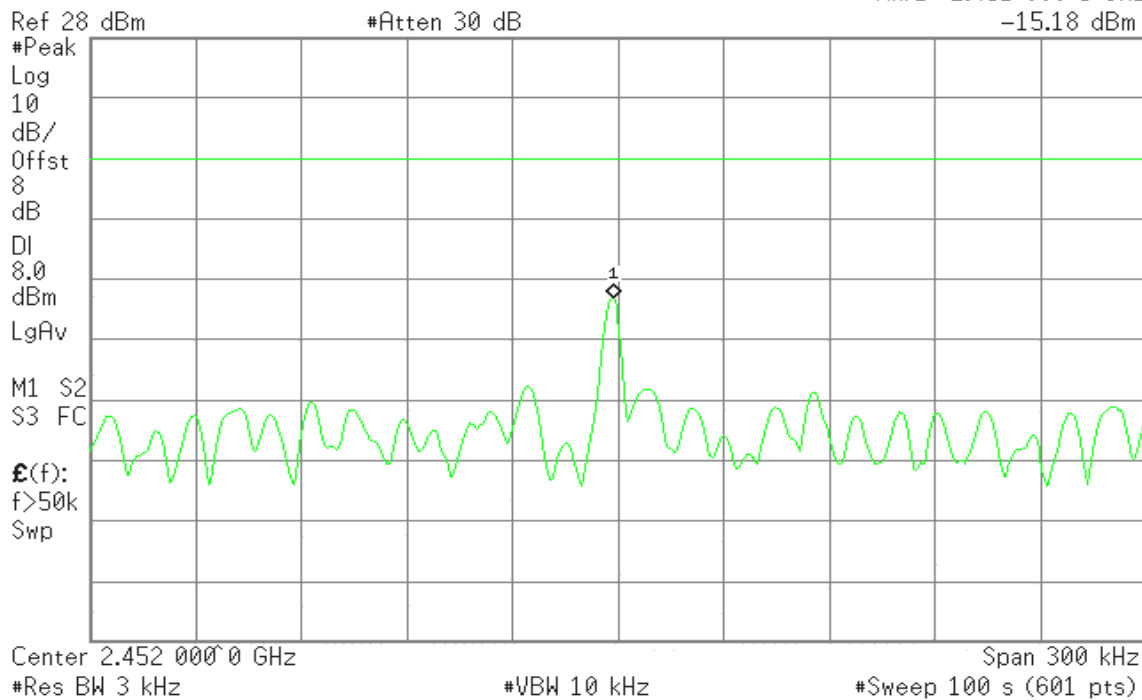


PPSD (CH High)

Agilent 20:31:16 Jun 29, 2010

R T

Mkr1 2.451 998 5 GHz
-15.18 dBm





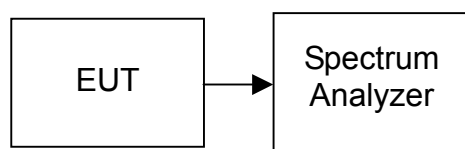
7.6 SPURIOUS EMISSIONS

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

TEST RESULTS

No non-compliance noted.



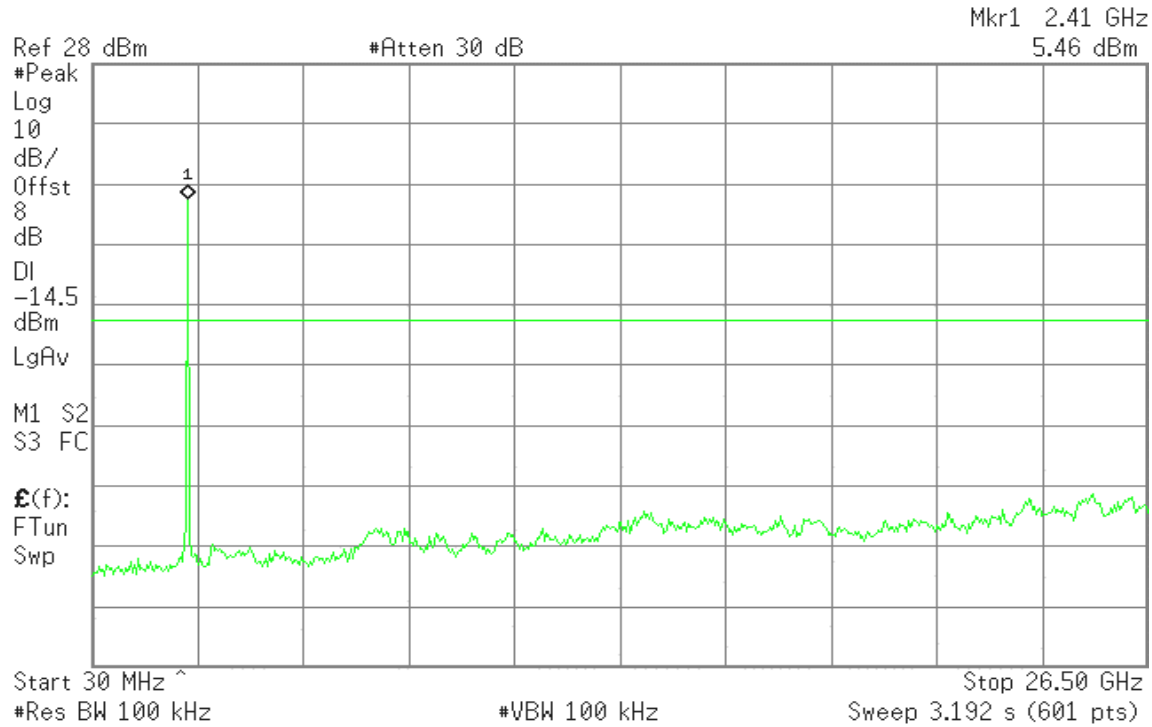
Test Plot

IEEE 802.11b mode

CH Low

Agilent 19:58:19 Jun 29, 2010

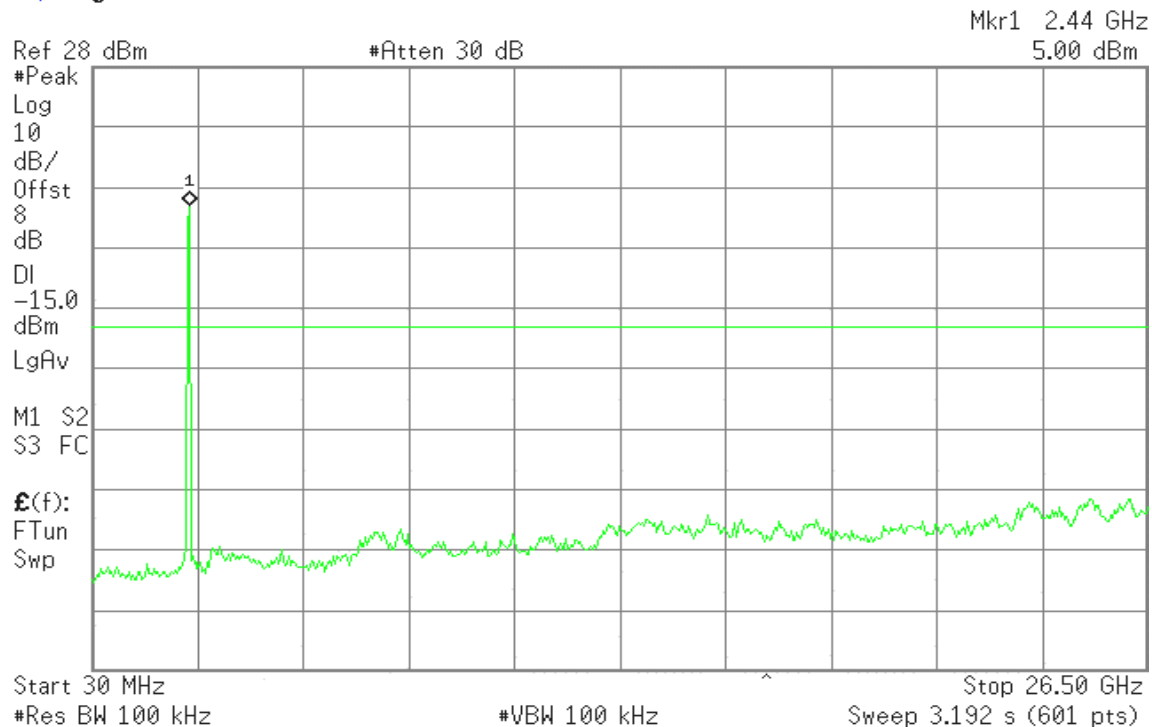
R T



CH Mid

Agilent 19:59:01 Jun 29, 2010

R T



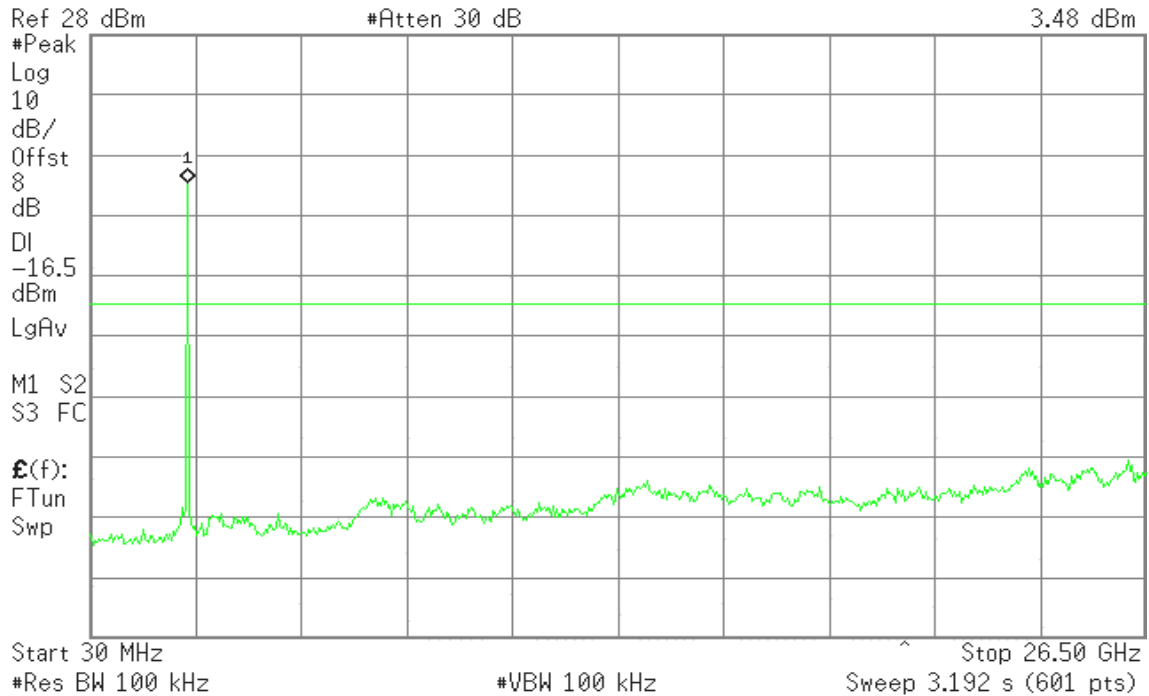


CH High

Agilent 20:00:09 Jun 29, 2010

R T

Mkr1 2.46 GHz
3.48 dBm



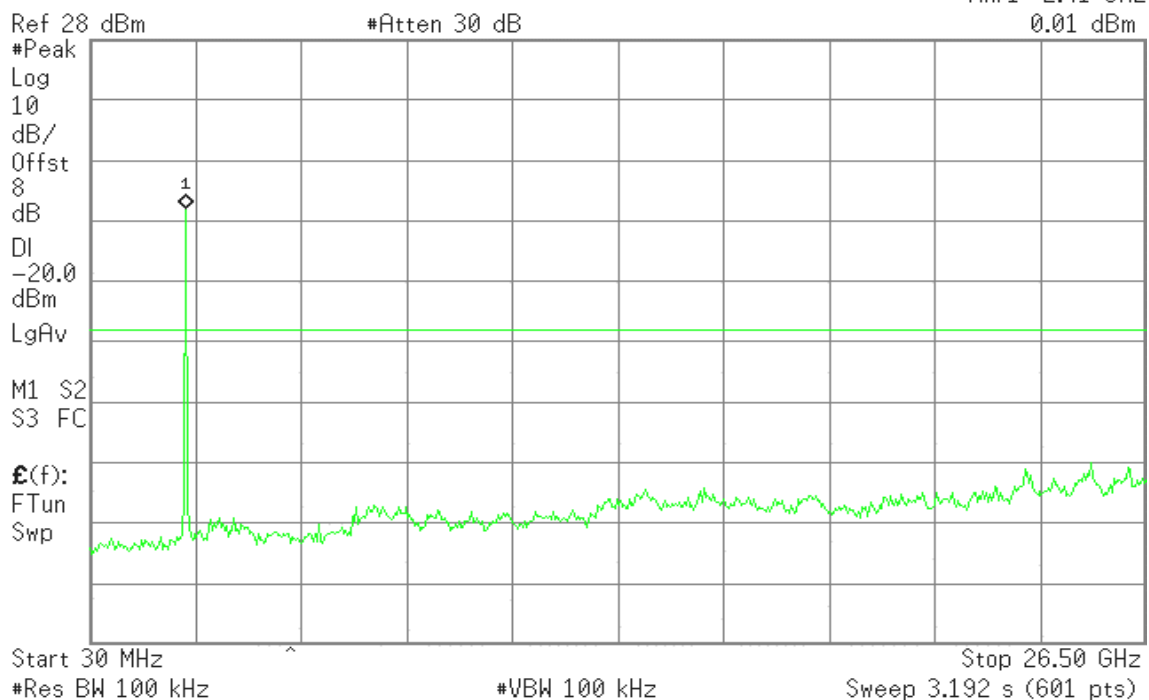
IEEE 802.11g mode

CH Low

Agilent 19:57:27 Jun 29, 2010

R T

Mkr1 2.41 GHz
0.01 dBm



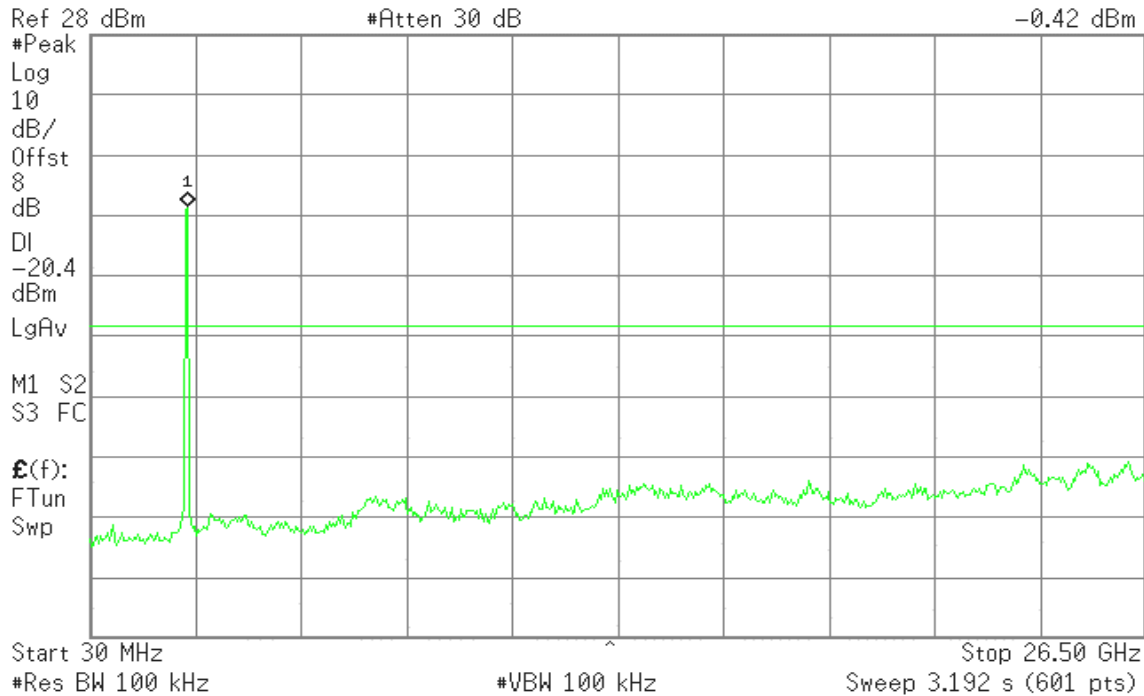


CH Mid

Agilent 19:56:42 Jun 29, 2010

R T

Mkr1 2.44 GHz
-0.42 dBm

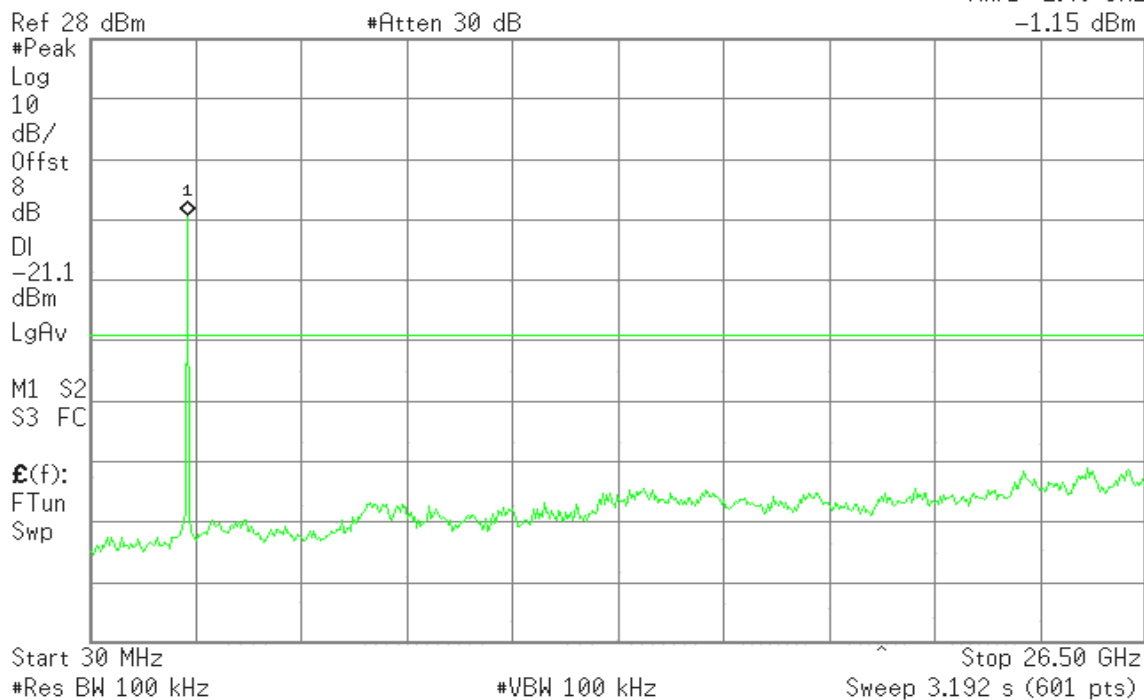


CH High

Agilent 19:56:07 Jun 29, 2010

R T

Mkr1 2.46 GHz
-1.15 dBm



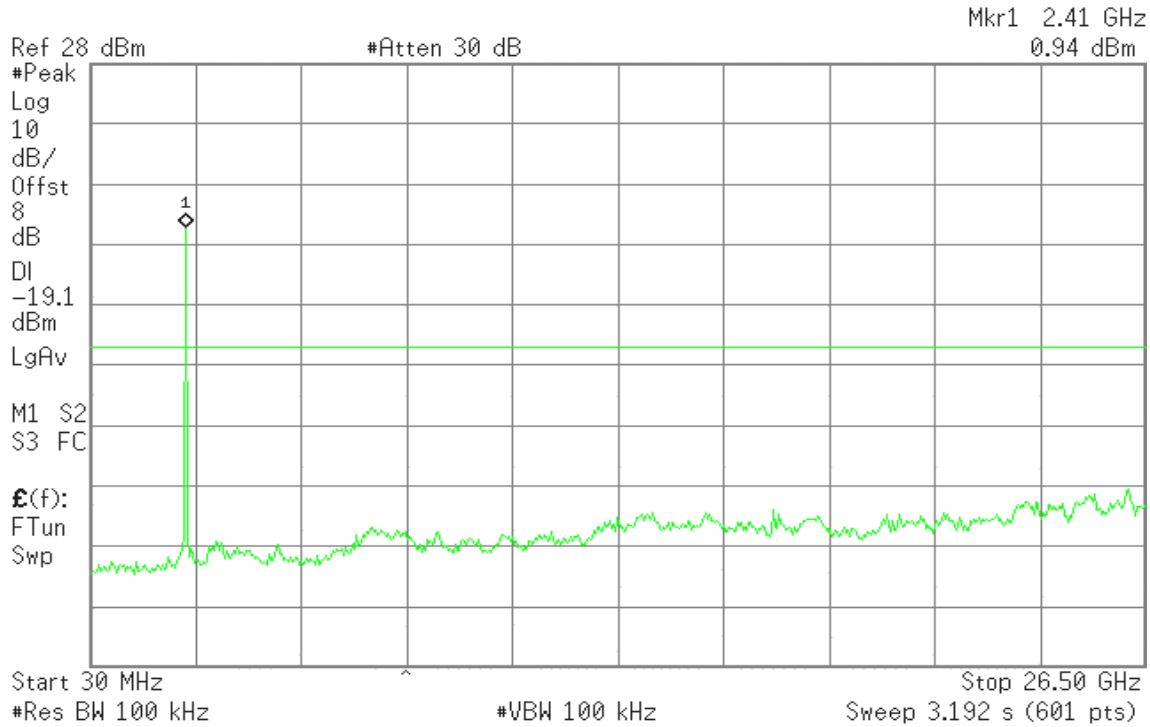


draft 802.11n 20 MHz Channel mode

CH Low

Agilent 19:52:50 Jun 29, 2010

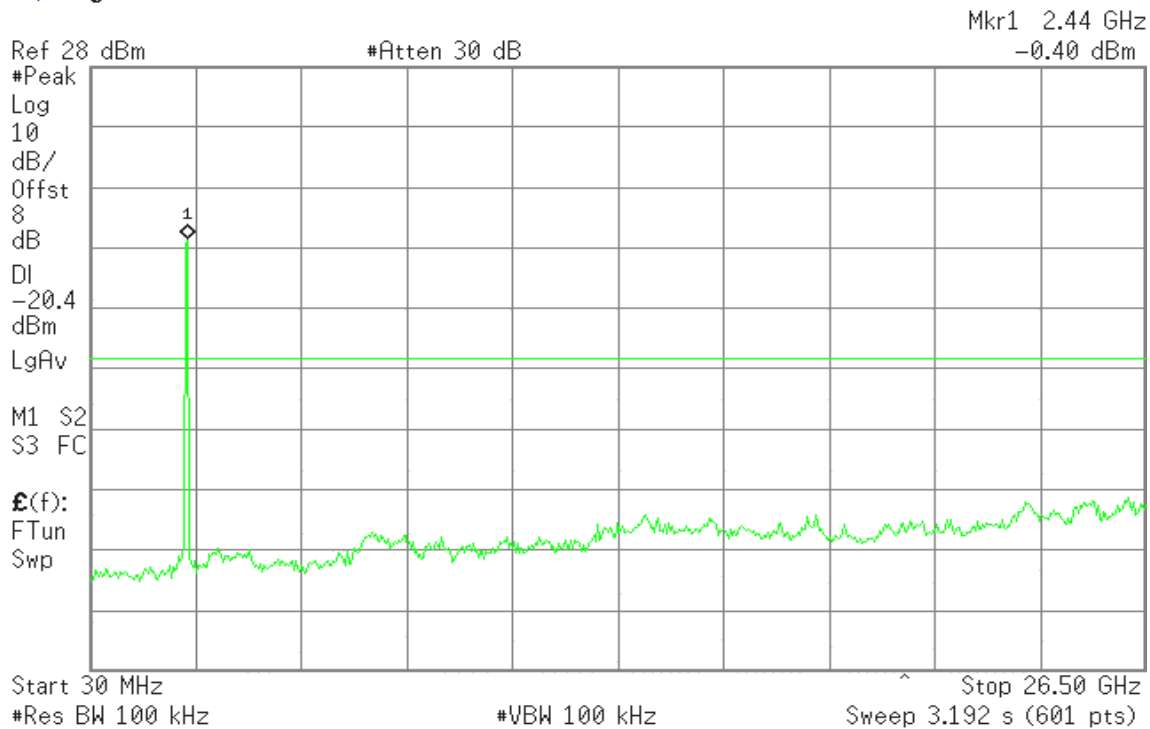
R T



CH Mid

Agilent 19:53:33 Jun 29, 2010

R T



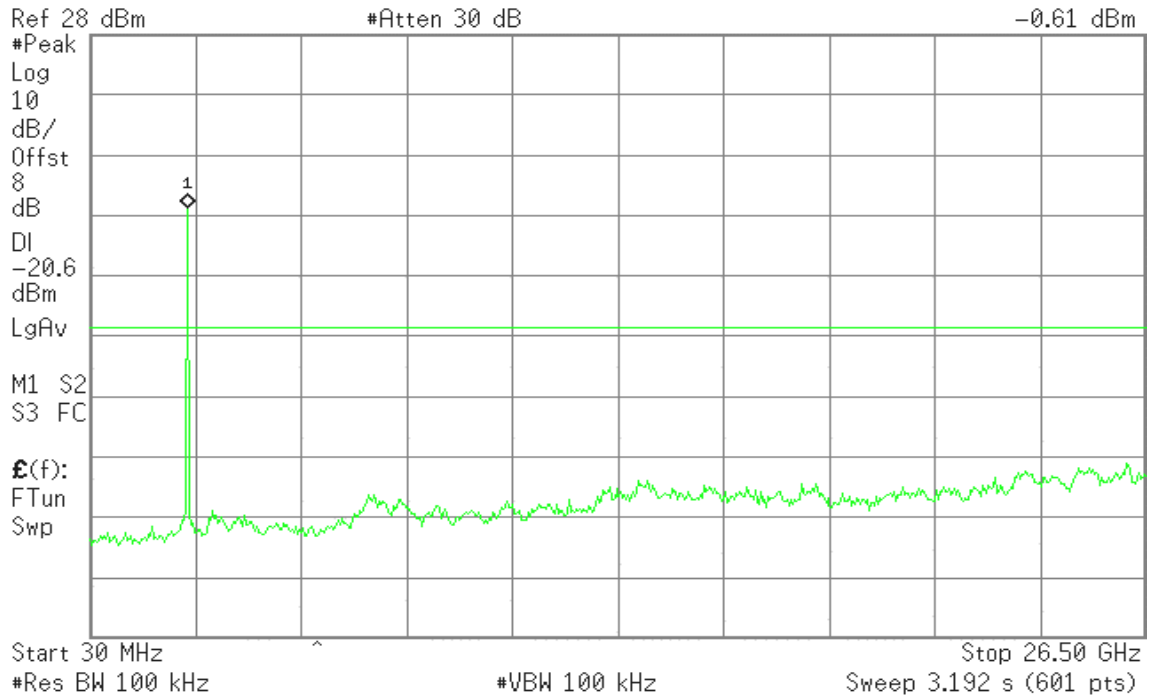


CH High

Agilent 19:54:44 Jun 29, 2010

R T

Mkr1 2.46 GHz
-0.61 dBm



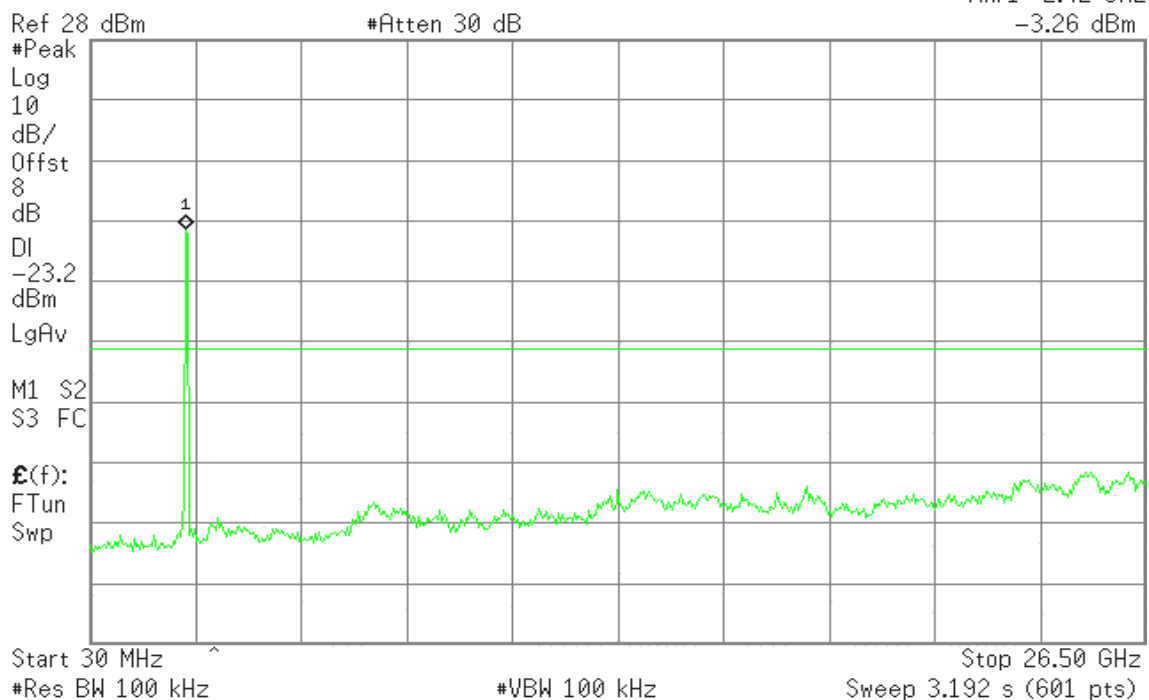
draft 802.11n 40 MHz Channel mode

CH Low

Agilent 19:51:17 Jun 29, 2010

R T

Mkr1 2.42 GHz
-3.26 dBm



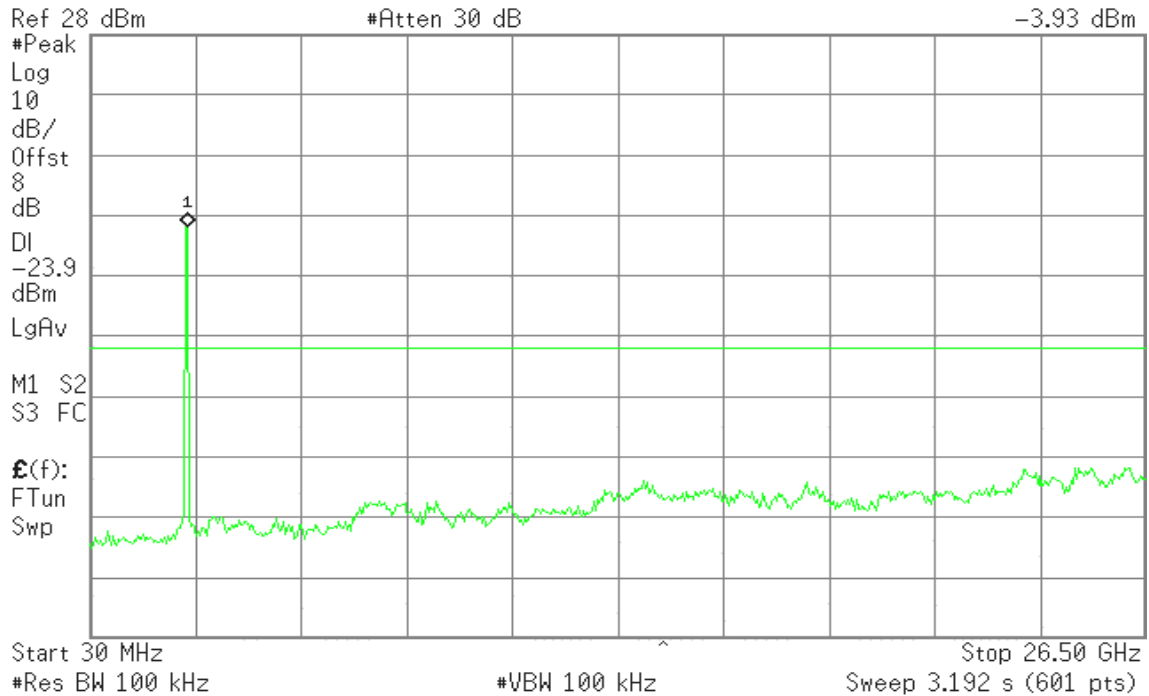


CH Mid

Agilent 19:50:28 Jun 29, 2010

R T

Mkr1 2.44 GHz
-3.93 dBm

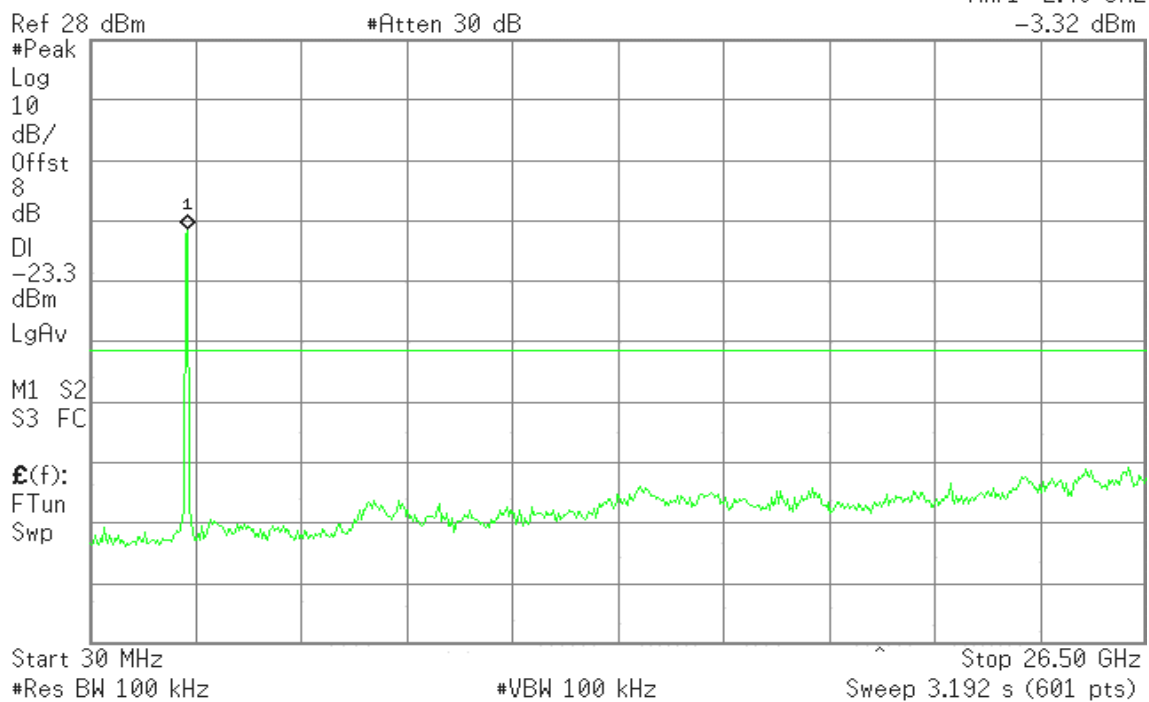


CH High

Agilent 19:49:30 Jun 29, 2010

R T

Mkr1 2.46 GHz
-3.32 dBm





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

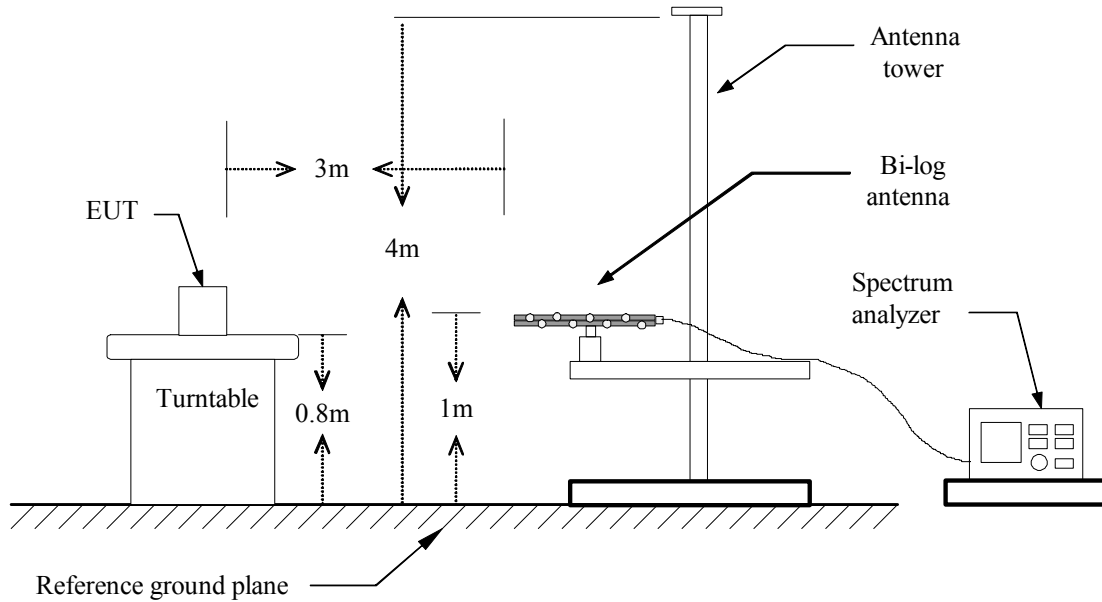
Remark: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of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

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

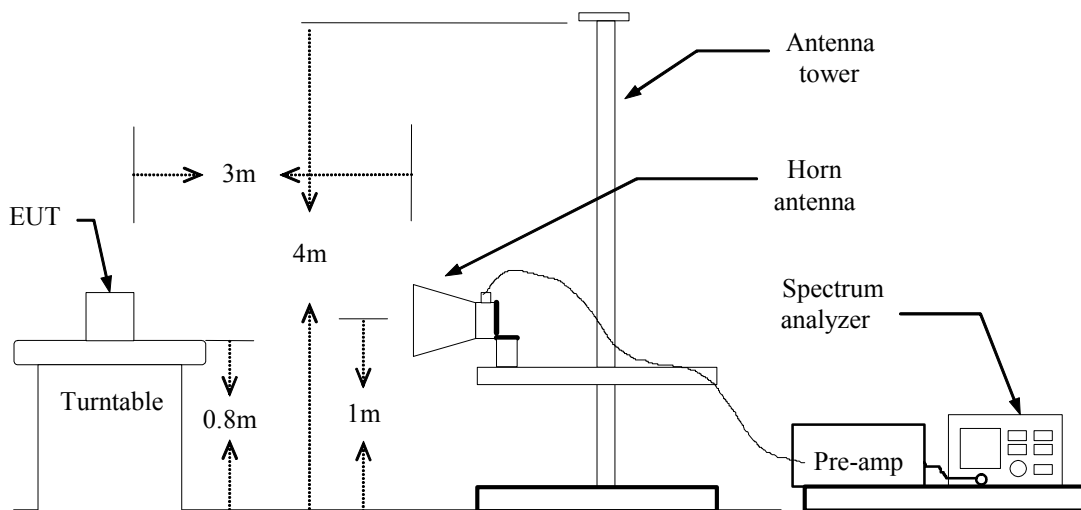
Frequency (MHz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

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:** 2010/6/29**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
43.5800	V	51.45	-13.48	37.97	40.00	-2.03	QP
119.2400	V	49.99	-16.48	33.51	43.50	-9.99	QP
158.0399	V	46.84	-12.87	33.97	43.50	-9.53	QP
367.5600	V	51.52	-9.60	41.92	46.00	-4.08	QP
433.5200	V	50.91	-8.68	42.23	46.00	-3.77	QP
594.5400	V	44.95	-4.23	40.72	46.00	-5.28	QP
633.3400	V	45.91	-4.61	41.30	46.00	-4.70	QP
714.8200	V	43.16	-2.84	40.32	46.00	-5.68	QP
953.4400	V	44.05	1.54	45.59	53.90	-8.31	QP
99.8399	H	47.37	-17.57	29.80	43.50	-13.70	QP
253.0999	H	52.21	-12.43	39.78	46.00	-6.22	QP
272.5000	H	52.72	-12.02	40.70	46.00	-5.30	QP
311.3000	H	52.89	-10.79	42.10	46.00	-3.90	QP
361.7400	H	51.92	-9.62	42.30	46.00	-3.70	QP
433.5199	H	51.74	-8.68	43.06	46.00	-2.94	QP
631.3999	H	47.18	-4.58	42.60	46.00	-3.40	QP
714.8200	H	46.72	-2.84	43.88	46.00	-2.12	QP
774.9600	H	43.92	-2.16	41.76	46.00	-4.24	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:** 2010/6/26**Temperature:** 20°C**Tested by:** Stan Lin**Humidity:** 54 % 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
1063.33	V	55.65	---	-6.80	48.84	---	74.00	54.00	-5.16	Peak
1333.33	V	60.78	42.17	-5.11	55.67	37.06	74.00	54.00	-16.94	AVG
1596.67	V	53.89	---	-3.38	50.50	---	74.00	54.00	-3.50	Peak
2990.00	V	51.10	36.97	1.90	53.00	38.87	74.00	54.00	-15.13	AVG
3725.00	V	42.84	---	4.80	47.63	---	74.00	54.00	-6.37	Peak
5916.67	V	43.44	---	8.34	51.78	---	74.00	54.00	-2.22	Peak
1250.00	H	53.73	---	-7.91	45.82	---	74.00	54.00	-8.18	Peak
1450.00	H	52.57	---	-6.24	46.33	---	74.00	54.00	-7.67	Peak
2123.33	H	51.57	---	-1.70	49.87	---	74.00	54.00	-4.13	Peak
5916.67	H	40.36	---	10.27	50.63	---	74.00	54.00	-3.37	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 802.11b / CH Mid**Test Date:** 2010/6/26**Temperature:** 20°C**Tested by:** Stan Lin**Humidity:** 54 % 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
1200.00	V	55.26	---	-5.70	49.56	---	74.00	54.00	-4.44	Peak
1330.00	V	60.44	42.11	-5.14	55.29	36.97	74.00	54.00	-17.03	AVG
1446.67	V	55.62	---	-4.70	50.91	---	74.00	54.00	-3.09	Peak
1600.00	V	55.32	40.70	-3.33	51.99	37.37	74.00	54.00	-16.63	AVG
2216.67	V	51.99	40.37	0.74	52.72	41.11	74.00	54.00	-12.89	AVG
2986.67	V	51.16	36.02	1.85	53.00	37.87	74.00	54.00	-16.13	AVG
3733.33	V	42.54	---	4.81	47.35	---	74.00	54.00	-6.65	Peak
5916.67	V	43.27	---	8.34	51.61	---	74.00	54.00	-2.39	Peak
1063.33	H	53.45	---	-7.53	45.92	---	74.00	54.00	-8.08	Peak
1250.00	H	53.26	---	-7.91	45.35	---	74.00	54.00	-8.65	Peak
1450.00	H	52.56	---	-6.24	46.32	---	74.00	54.00	-7.68	Peak
2123.33	H	51.89	---	-1.70	50.18	---	74.00	54.00	-3.82	Peak
2490.00	H	50.83	---	-1.51	49.32	---	74.00	54.00	-4.68	Peak
4283.33	H	39.63	---	9.21	48.83	---	74.00	54.00	-5.17	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 802.11b / CH High**Test Date:** 2010/6/26**Temperature:** 20°C**Tested by:** Stan Lin**Humidity:** 54 % 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
1200.00	V	55.59	---	-5.70	49.89	---	74.00	54.00	-4.11	Peak
1333.33	V	56.89	---	-5.11	51.78	---	74.00	54.00	-2.22	Peak
1593.33	V	57.46	40.51	-3.44	54.02	37.07	74.00	54.00	-16.93	AVG
2230.00	V	52.72	40.19	0.69	53.41	40.88	74.00	54.00	-13.12	AVG
3000.00	V	52.16	40.24	2.07	54.23	42.31	74.00	54.00	-11.69	AVG
3716.67	V	45.11	---	4.79	49.90	---	74.00	54.00	-4.10	Peak
5916.67	V	43.75	33.17	8.34	52.08	41.51	74.00	54.00	-12.49	AVG
1250.00	H	53.53	---	-7.91	45.62	---	74.00	54.00	-8.38	Peak
2126.67	H	51.28	---	-1.72	49.56	---	74.00	54.00	-4.44	Peak
2983.33	H	49.22	---	2.26	51.48	---	74.00	54.00	-2.52	Peak
5916.67	H	40.39	---	10.27	50.66	---	74.00	54.00	-3.34	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: 2010/6/26

Temperature: 20°C

Tested by: Stan Lin

Humidity: 54 % 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
1063.33	V	55.61	---	-6.80	48.80	---	74.00	54.00	-5.20	Peak
1326.67	V	60.31	41.93	-5.17	55.14	36.76	74.00	54.00	-17.24	AVG
1450.00	V	56.06	---	-4.72	51.34	---	74.00	54.00	-2.66	Peak
1600.00	V	55.07	---	-3.33	51.74	---	74.00	54.00	-2.26	Peak
2360.00	V	59.69	47.55	0.94	60.63	48.49	74.00	54.00	-5.51	AVG
2463.33	V	56.93	43.29	2.01	58.94	45.30	74.00	54.00	-8.70	AVG
2993.33	V	52.02	35.88	1.96	53.98	37.84	74.00	54.00	-16.16	AVG
3733.33	V	42.66	---	4.81	47.47	---	74.00	54.00	-6.53	Peak
5916.67	V	44.37	41.54	8.34	52.71	49.88	74.00	54.00	-4.12	AVG
1250.00	H	53.51	---	-7.91	45.60	---	74.00	54.00	-8.40	Peak
1450.00	H	52.93	---	-6.24	46.69	---	74.00	54.00	-7.31	Peak
1500.00	H	53.35	---	-6.13	47.22	---	74.00	54.00	-6.78	Peak
2123.33	H	51.74	---	-1.70	50.04	---	74.00	54.00	-3.96	Peak
5916.67	H	39.74	---	10.27	50.01	---	74.00	54.00	-3.99	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: 2010/6/26

Temperature: 20°C

Tested by: Stan Lin

Humidity: 54 % 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
1060.00	V	58.13	---	-6.79	51.34	---	74.00	54.00	-2.66	Peak
1333.33	V	57.67	41.99	-5.11	52.56	36.88	74.00	54.00	-17.12	AVG
1423.33	V	57.47	42.85	-4.59	52.88	38.26	74.00	54.00	-15.74	AVG
1596.67	V	55.62	40.53	-3.38	52.24	37.15	74.00	54.00	-16.85	AVG
2383.33	V	57.48	47.63	1.14	58.62	48.77	74.00	54.00	-5.23	AVG
2490.00	V	55.89	44.18	2.32	58.20	46.50	74.00	54.00	-7.50	AVG
2986.67	V	52.51	35.92	1.85	54.36	37.77	74.00	54.00	-16.23	AVG
3725.00	V	43.53	---	4.80	48.33	---	74.00	54.00	-5.67	Peak
5916.67	V	42.65	---	8.34	50.99	---	74.00	54.00	-3.01	Peak
1363.33	H	52.20	---	-6.94	45.26	---	74.00	54.00	-8.74	Peak
2130.00	H	51.03	---	-1.75	49.29	---	74.00	54.00	-4.71	Peak
2976.67	H	49.96	35.58	2.18	52.14	37.76	74.00	54.00	-16.24	AVG
5916.67	H	40.76	---	10.27	51.03	---	74.00	54.00	-2.97	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 High

Test Date: 2010/6/26

Temperature: 20°C

Tested by: Stan Lin

Humidity: 54 % 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
1066.67	V	56.91	---	-6.82	50.09	---	74.00	54.00	-3.91	Peak
1333.33	V	60.48	42.09	-5.11	55.37	36.98	74.00	54.00	-17.02	AVG
1596.67	V	56.12	40.55	-3.38	52.73	37.17	74.00	54.00	-16.83	AVG
1680.00	V	53.35	---	-2.76	50.59	---	74.00	54.00	-3.41	Peak
1866.67	V	52.67	---	-0.93	51.73	---	74.00	54.00	-2.27	Peak
2410.00	V	60.16	48.77	1.39	61.56	50.16	74.00	54.00	-3.84	AVG
2513.33	V	55.62	44.13	2.26	57.89	46.39	74.00	54.00	-7.61	AVG
3733.33	V	42.24	---	4.81	47.04	---	74.00	54.00	-6.96	Peak
5916.67	V	43.32	---	8.34	51.65	---	74.00	54.00	-2.35	Peak
1250.00	H	54.17	---	-7.91	46.26	---	74.00	54.00	-7.74	Peak
2123.33	H	51.77	---	-1.70	50.07	---	74.00	54.00	-3.93	Peak
5916.67	H	40.02	---	10.27	50.29	---	74.00	54.00	-3.71	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 Low **Test Date:** 2010/6/26
Temperature: 20°C **Tested by:** Stan Lin
Humidity: 54 % 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
1330.00	V	59.94	41.25	-5.14	54.80	36.11	74.00	54.00	-17.89	AVG
1450.00	V	54.89	---	-4.72	50.17	---	74.00	54.00	-3.83	Peak
1600.00	V	54.01	---	-3.33	50.68	---	74.00	54.00	-3.32	Peak
2233.33	V	52.73	40.23	0.68	53.40	40.91	74.00	54.00	-13.09	AVG
2360.00	V	58.59	47.51	0.94	59.53	48.45	74.00	54.00	-5.55	AVG
2463.33	V	58.23	43.74	2.01	60.24	45.75	74.00	54.00	-8.25	AVG
2986.67	V	52.21	35.69	1.85	54.05	37.54	74.00	54.00	-16.46	AVG
3725.00	V	43.27	---	4.80	48.07	---	74.00	54.00	-5.93	Peak
5916.67	V	42.90	---	8.34	51.24	---	74.00	54.00	-2.76	Peak
1500.00	H	52.42	---	-6.13	46.29	---	74.00	54.00	-7.71	Peak
2123.33	H	51.33	---	-1.70	49.63	---	74.00	54.00	-4.37	Peak
2853.33	H	51.54	---	0.27	51.81	---	74.00	54.00	-2.19	Peak
5916.67	H	39.54	---	10.27	49.81	---	74.00	54.00	-4.19	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:** 2010/6/26
Temperature: 20°C **Tested by:** Stan Lin
Humidity: 54 % 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
1200.00	V	55.87	---	-5.70	50.17	---	74.00	54.00	-3.83	Peak
1333.33	V	59.33	41.82	-5.11	54.22	36.71	74.00	54.00	-17.29	AVG
1450.00	V	54.91	---	-4.72	50.19	---	74.00	54.00	-3.81	Peak
1593.33	V	54.85	---	-3.44	51.41	---	74.00	54.00	-2.59	Peak
1866.67	V	54.10	41.63	-0.93	53.16	40.70	74.00	54.00	-13.30	AVG
2383.33	V	58.64	47.54	1.14	59.78	48.68	74.00	54.00	-5.32	AVG
2490.00	V	55.87	43.53	2.32	58.19	45.85	74.00	54.00	-8.15	AVG
2996.67	V	52.01	35.37	2.01	54.02	37.38	74.00	54.00	-16.62	AVG
3716.67	V	42.25	---	4.79	47.04	---	74.00	54.00	-6.96	Peak
5916.67	V	43.59	---	8.34	51.93	---	74.00	54.00	-2.07	Peak
1250.00	H	53.77	---	-7.91	45.86	---	74.00	54.00	-8.14	Peak
1450.00	H	52.56	---	-6.24	46.32	---	74.00	54.00	-7.68	Peak
2123.33	H	52.96	---	-1.70	51.26	---	74.00	54.00	-2.74	Peak
5916.67	H	41.24	---	10.27	51.51	---	74.00	54.00	-2.49	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 / draft 802.11n 20 MHz Channel mode / CH High **Test Date:** 2010/6/26
Temperature: 20°C **Tested by:** Stan Lin
Humidity: 54 % 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
1066.67	V	55.97	---	-6.82	49.15	---	74.00	54.00	-4.85	Peak
1333.33	V	57.05	---	-5.11	51.94	---	74.00	54.00	-2.06	Peak
1450.00	V	54.91	---	-4.72	50.19	---	74.00	54.00	-3.81	Peak
1596.67	V	55.06	---	-3.38	51.68	---	74.00	54.00	-2.32	Peak
2410.00	V	59.82	50.25	1.39	61.22	51.64	74.00	54.00	-2.36	AVG
2513.33	V	55.81	44.78	2.26	58.07	47.04	74.00	54.00	-6.96	AVG
5916.67	V	42.71	---	8.34	51.05	---	74.00	54.00	-2.95	Peak
1250.00	H	53.47	---	-7.91	45.56	---	74.00	54.00	-8.44	Peak
2130.00	H	51.75	---	-1.75	50.01	---	74.00	54.00	-3.99	Peak
5916.67	H	40.75	---	10.27	51.02	---	74.00	54.00	-2.98	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:** 2010/6/26

Temperature: 20°C **Tested by:** Stan Lin

Humidity: 54 % 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
1200.00	V	55.20	---	-5.70	49.50	---	74.00	54.00	-4.50	Peak
1326.67	V	57.11	---	-5.17	51.94	---	74.00	54.00	-2.06	Peak
1450.00	V	54.42	---	-4.72	49.70	---	74.00	54.00	-4.30	Peak
1593.33	V	55.98	39.55	-3.44	52.54	36.11	74.00	54.00	-17.89	AVG
2220.00	V	53.35	41.72	0.73	54.08	42.45	74.00	54.00	-11.55	AVG
2990.00	V	52.06	37.25	1.90	53.96	39.15	74.00	54.00	-14.85	AVG
5916.67	V	43.12	---	8.34	51.46	---	74.00	54.00	-2.54	Peak
1250.00	H	53.77	---	-7.91	45.86	---	74.00	54.00	-8.14	Peak
1453.33	H	52.39	---	-6.23	46.15	---	74.00	54.00	-7.85	Peak
1756.67	H	51.08	---	-4.07	47.01	---	74.00	54.00	-6.99	Peak
2133.33	H	52.53	---	-1.77	50.77	---	74.00	54.00	-3.23	Peak
7066.67	H	38.48	---	11.28	49.76	---	74.00	54.00	-4.24	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 Mid **Test Date:** 2010/6/26
Temperature: 20°C **Tested by:** Stan Lin
Humidity: 54 % 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
1200.00	V	55.23	---	-5.70	49.53	---	74.00	54.00	-4.47	Peak
1330.00	V	56.27	---	-5.14	51.13	---	74.00	54.00	-2.87	Peak
1450.00	V	54.56	---	-4.72	49.84	---	74.00	54.00	-4.16	Peak
1593.33	V	54.94	---	-3.44	51.50	---	74.00	54.00	-2.50	Peak
2333.33	V	55.52	49.29	0.71	56.23	50.00	74.00	54.00	-4.00	AVG
2990.00	V	51.92	37.84	1.90	53.82	39.74	74.00	54.00	-14.26	AVG
3725.00	V	44.32	---	4.80	49.11	---	74.00	54.00	-4.89	Peak
5916.67	V	44.25	42.75	8.34	52.59	51.09	74.00	54.00	-2.91	AVG
2126.67	H	51.86	---	-1.72	50.13	---	74.00	54.00	-3.87	Peak
5916.67	H	41.45	---	10.27	51.72	---	74.00	54.00	-2.28	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 High **Test Date:** 2010/6/26

Temperature: 20°C **Tested by:** Stan Lin

Humidity: 54 % 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
1060.00	V	57.18	---	-6.79	50.39	---	74.00	54.00	-3.61	Peak
1330.00	V	58.38	43.18	-5.14	53.24	38.04	74.00	54.00	-15.96	AVG
1436.67	V	55.33	---	-4.65	50.67	---	74.00	54.00	-3.33	Peak
1596.67	V	53.31	---	-3.38	49.93	---	74.00	54.00	-4.07	Peak
2350.00	V	56.69	49.52	0.85	57.54	50.37	74.00	54.00	-3.63	AVG
2990.00	V	51.86	37.81	1.90	53.76	39.71	74.00	54.00	-14.29	AVG
3733.33	V	43.57	---	4.81	48.38	---	74.00	54.00	-5.62	Peak
5916.67	V	43.85	41.92	8.34	52.18	50.26	74.00	54.00	-1.82	Peak
2130.00	H	51.15	---	-1.75	49.40	---	74.00	54.00	-4.60	Peak
5916.67	H	41.09	---	10.27	51.36	---	74.00	54.00	-2.64	Peak
7091.67	H	39.21	---	11.51	50.71	---	74.00	54.00	-3.29	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).



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 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

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

* Decreases with the logarithm of the frequency.

TEST CONFIGURATION

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

TEST PROCEDURE

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

TEST RESULTS

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

**TEST DATA****Operation Mode:** Normal Link**Test Date:** 2010/6/26**Temperature:** 25°C**Tested by:** Jin Liao**Humidity:** 57% RH

Freq. (MHz)	QP Reading	AV Reading	Corr. factor	QP Result	AV Result	QP Limit	AV Limit	QP Margin	AV Margin	Note
0.1973	65.13	45.48	4.83	69.96	50.31	79.00	66.00	-9.04	-15.69	L1
0.2312	72.27	52.28	4.64	76.91	56.92	79.00	66.00	-2.09	-9.08	L1
0.2699	55.49	48.79	4.42	59.91	53.21	79.00	66.00	-19.09	-12.79	L1
0.3646	59.70	52.51	3.89	63.59	56.40	79.00	66.00	-15.41	-9.60	L1
0.4622	47.58	28.30	3.28	50.86	31.58	79.00	66.00	-28.14	-34.42	L1
0.5235	43.98	35.77	2.89	46.87	38.66	73.00	60.00	-26.13	-21.34	L1
0.1643	63.86	38.04	5.02	68.88	43.06	79.00	66.00	-10.12	-22.94	L2
0.2009	66.72	43.71	4.81	71.53	48.52	79.00	66.00	-7.47	-17.48	L2
0.2318	72.09	54.69	4.64	76.73	59.33	79.00	66.00	-2.27	-6.67	L2
0.3305	52.07	45.68	4.08	56.15	49.76	79.00	66.00	-22.85	-16.24	L2
0.3633	58.88	51.76	3.90	62.78	55.66	79.00	66.00	-16.22	-10.34	L2
0.4626	46.89	27.25	3.27	50.16	30.52	79.00	66.00	-28.84	-35.48	L2

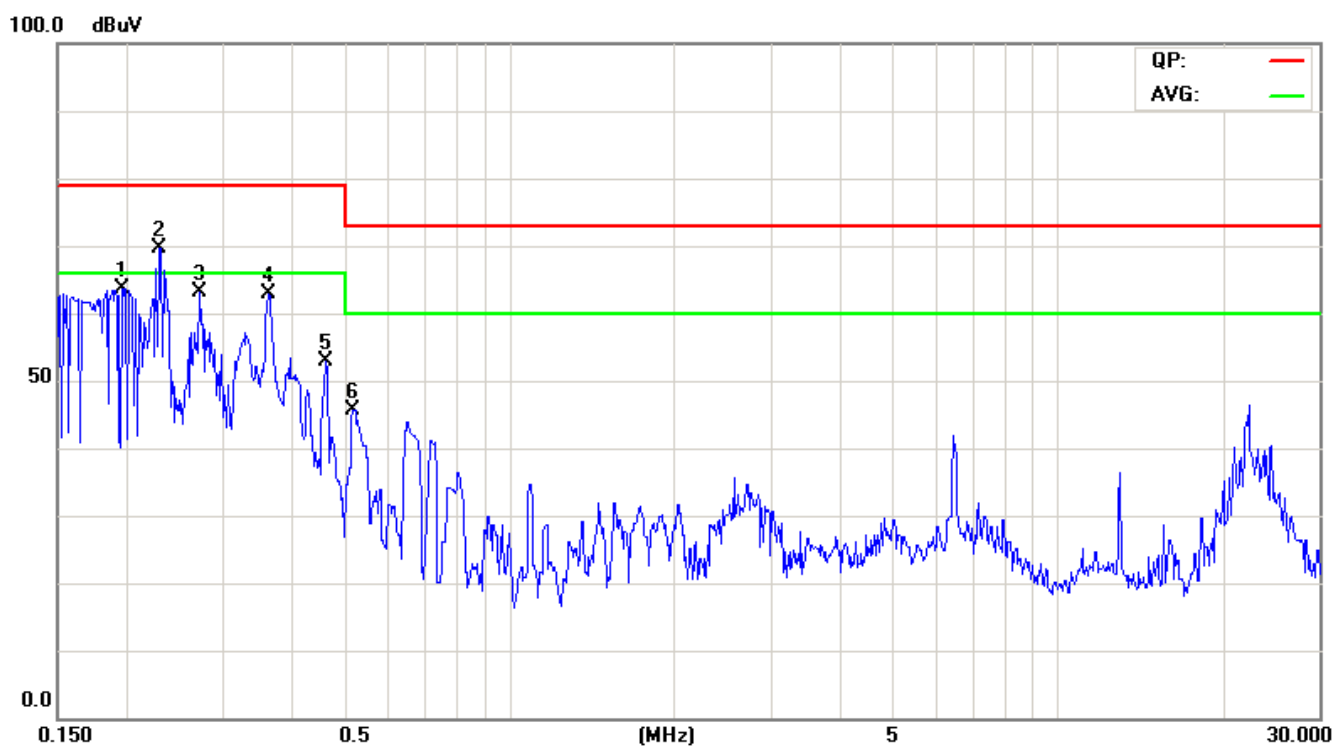
Remark:

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)

