



FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

Home Security Camera

Model: iCamera-1000

Trade Name: iControl

Issued to

**iControl Networks Inc.
3045 Park Blvd. 2nd floor Palo Alto, CA 94306, U.S.A.**

Issued by

**Compliance Certification Services Inc.
No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township,
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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	Feb. 10, 2011	Initial Issue	ALL	Jill Shiau



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1. TEST RESULT CERTIFICATION

Applicant: **iControl Networks Inc.**
3045 Park Blvd. 2nd floor Palo Alto, CA 94306, U.S.A.

Manufacturer: **iControl Networks Inc.**
3045 Park Blvd. 2nd floor Palo Alto, CA 94306, U.S.A.

Equipment Under Test: Home Security Camera

Trade Name: iControl

Model: iCamera-1000

Date of Test: January 17 ~ 22, 2011

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:

Reviewed by:



 Stan Lin
 Supervisor



 Chieh Cheng
 Engineer



2. EUT DESCRIPTION

Product	Home Security Camera		
Trade Name	iControl		
Model Number	iCamera-1000		
Model Discrepancy	N/A		
EUT Power Rating	12VDC, 1A		
Power Adapter	Sunny	Model	SYS1381-1212-W2
Operating Frequency Range	2412 ~ 2462 MHz		
Transmit Power	IEEE 802.11b mode: 17.64 dBm (58.076mW) IEEE 802.11g mode: 24.67 dBm (293.089mW) draft 802.11n 20 MHz Channel mode: 26.81 dBm (479.733mW) draft 802.11n 40 MHz Channel mode: 25.54 dBm (358.096mW)		
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	PIFA Antenna / Gain: 3.40dBi		

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: **S23-ICAMERA1000** 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 2Tx2R MIMO transmitter.

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 Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY48250064	12/29/2011
Spectrum Analyzer	R&S	FSEB	825829/011	12/12/2011
Power meter	Anritsu	MA2411B	917221	08/24/2011

3M Semi Anechoic Chamber				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY48250064	12/29/2011
Pre-Amplifier	HP	8447D	2944A06530	01/02/2012
Pre-Amplifier	HP	8449B	3008A01738	04/17/2011
EMI Test Receiver	SCHAFFNER	SCR 3501	436	01/26/2011
Loop Antenna	EMCO	6502	2356	06/11/2013
Bilog Antenna	SCHWAZBECK	VULB9160	3084	10/07/2011
Horn Antenna	EMCO	3115	00022250	05/09/2011
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 Teat V1_4.5.3)			

Powerline Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	R&S	ESCS30	845552/030	05/27/2011
LISN	R&S	ENV216	100069	6/19/2011
LISN	FCC	FCC-LISN-50/ 250-16-2-07	06013	11/21/2011
Test S/W	EZ-EMC			



4.3 MEASUREMENT UNCERTAINTY

Parameter	Uncertainty
Powerline Conducted Emission	± 2.0878
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, Chungshen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.

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

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

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

No. 81-1, Lane 210, Pa-De 2nd Rd., Luchu Hsiang, Taoyuan Shien, (338) Taiwan, R.O.C.

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

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

5.2 EQUIPMENT

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





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

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

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



5.3 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	A2LA	CFR 47, FCC Part15/18, CISPR 22, EN 55022, ICES-003, AS/NZS CISPR 22, VCCI V-3, EN 55011, CISPR 11, IEC/EN 61000-4-2/3/4/5/6/8/11, EN 61000-6-1/2/3/4, EN 55024, CISPR 24, AS/NZS CISPR 24, AS/NZS 61000.6.2, EN 55014-1/-2, ETSI EN 300 386 v1.3.2/v1.3.3, IEC/EN 61000-3-2, AS/NZS 61000.3.2, IEC/EN 61000-3-3, AS/NZS 61000.3.3	 ACCREDITED No. 0824-01
USA	FCC MRA	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	 FC _{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-1930/1646
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	 ilac-MRA 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

No.	Device Type	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
	N/A						

****No any support equipment during the test.**

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



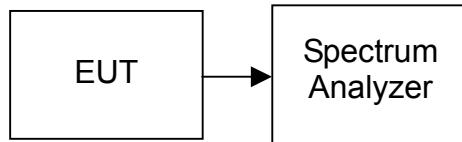
7. FCC PART 15.247 REQUIREMENTS

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	12.132	>500	PASS
Mid	2437	12.138		PASS
High	2462	12.138		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	16.503	>500	PASS
Mid	2437	16.437		PASS
High	2462	16.503		PASS

Test mode: draft 802.11n 20 MHz Channel mode

Channel	Frequency (MHz)	Bandwidth (MHz)		Limit (kHz)	Result
		Chain 0	Chain 1		
Low	2412	17.230	17.675	>500	PASS
Mid	2437	17.285	17.627		PASS
High	2462	17.339	17.651		PASS

Test mode: draft 802.11n 40 MHz Channel mode

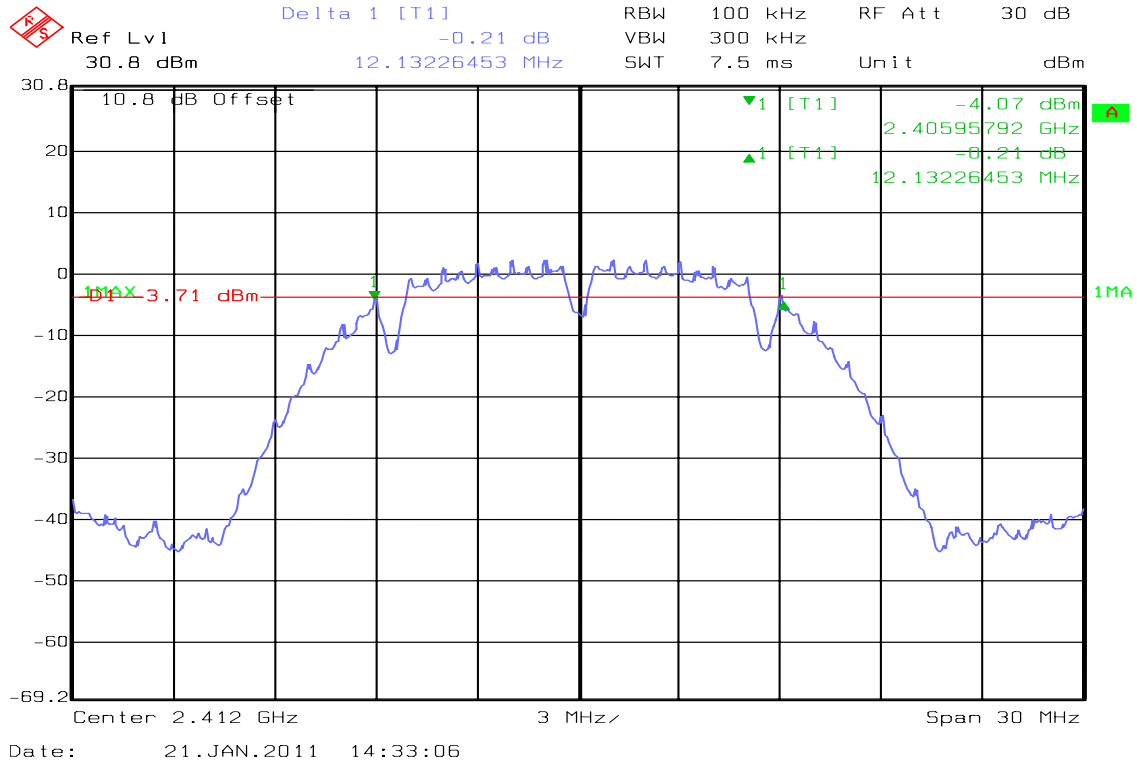
Channel	Frequency (MHz)	Bandwidth (MHz)		Limit (kHz)	Result
		Chain 0	Chain 1		
Low	2422	36.012	36.513	>500	PASS
Mid	2437	36.112	36.503		PASS
High	2452	36.202	36.202		PASS



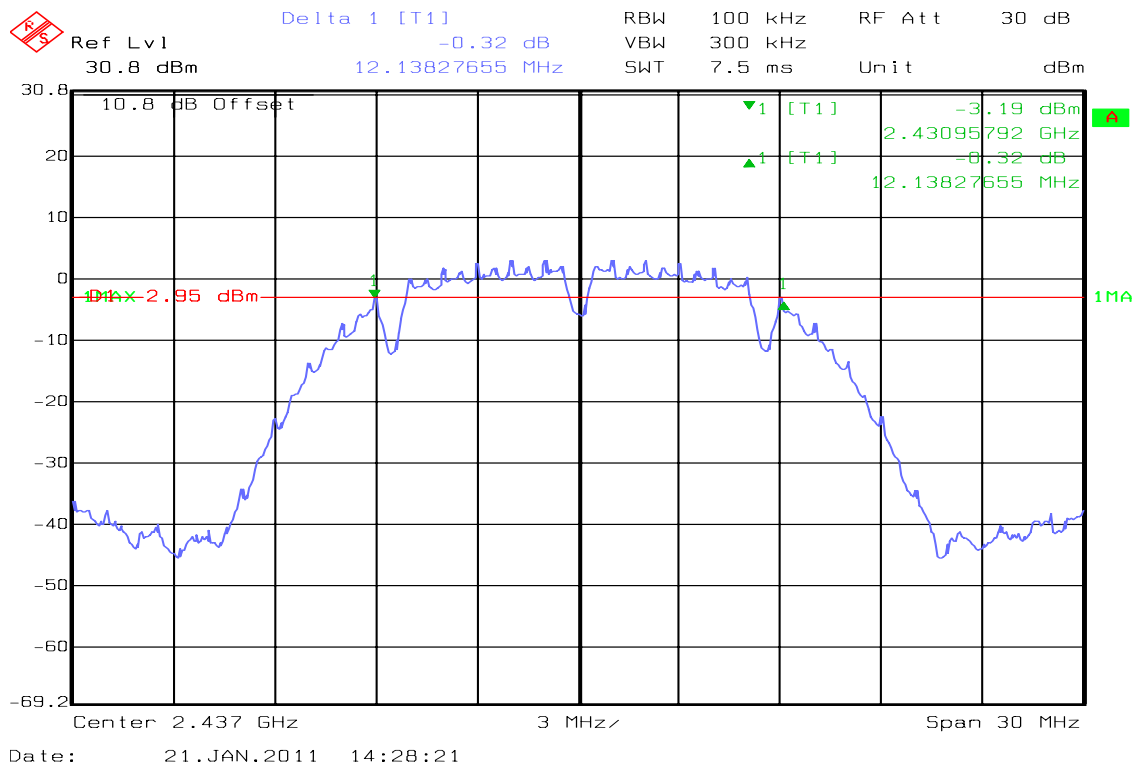
Test Plot

IEEE 802.11b mode

6dB Bandwidth (CH Low)

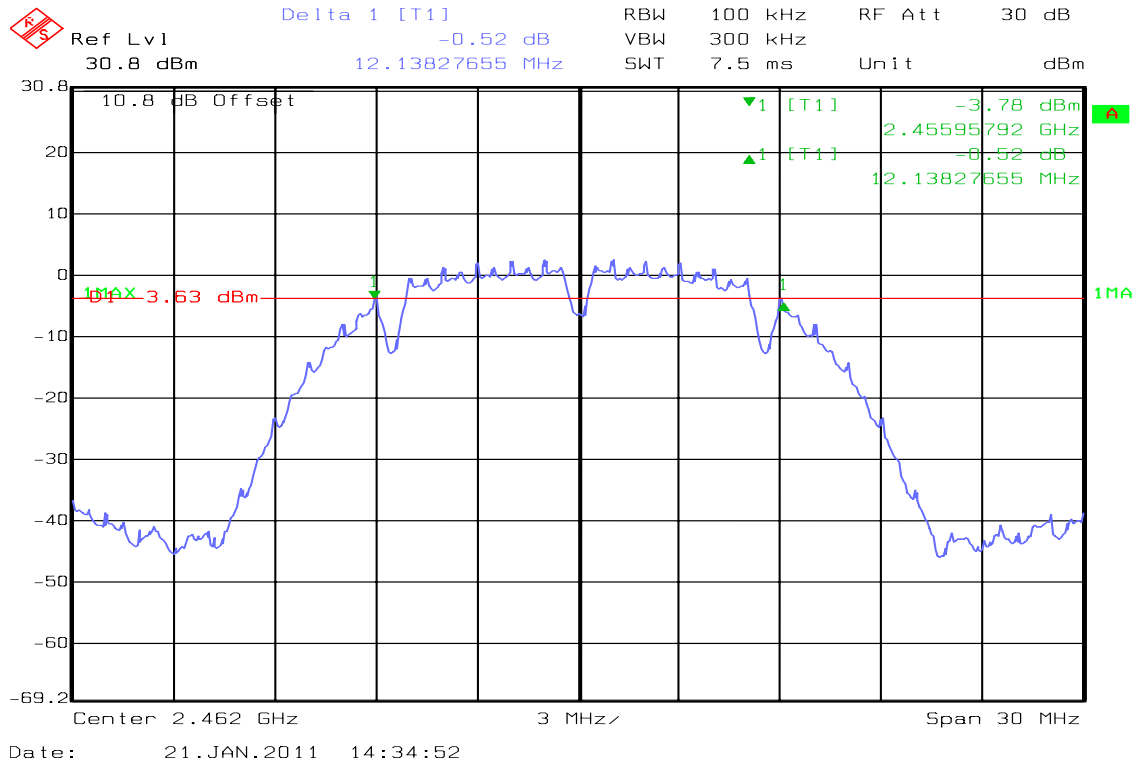


6dB Bandwidth (CH Mid)



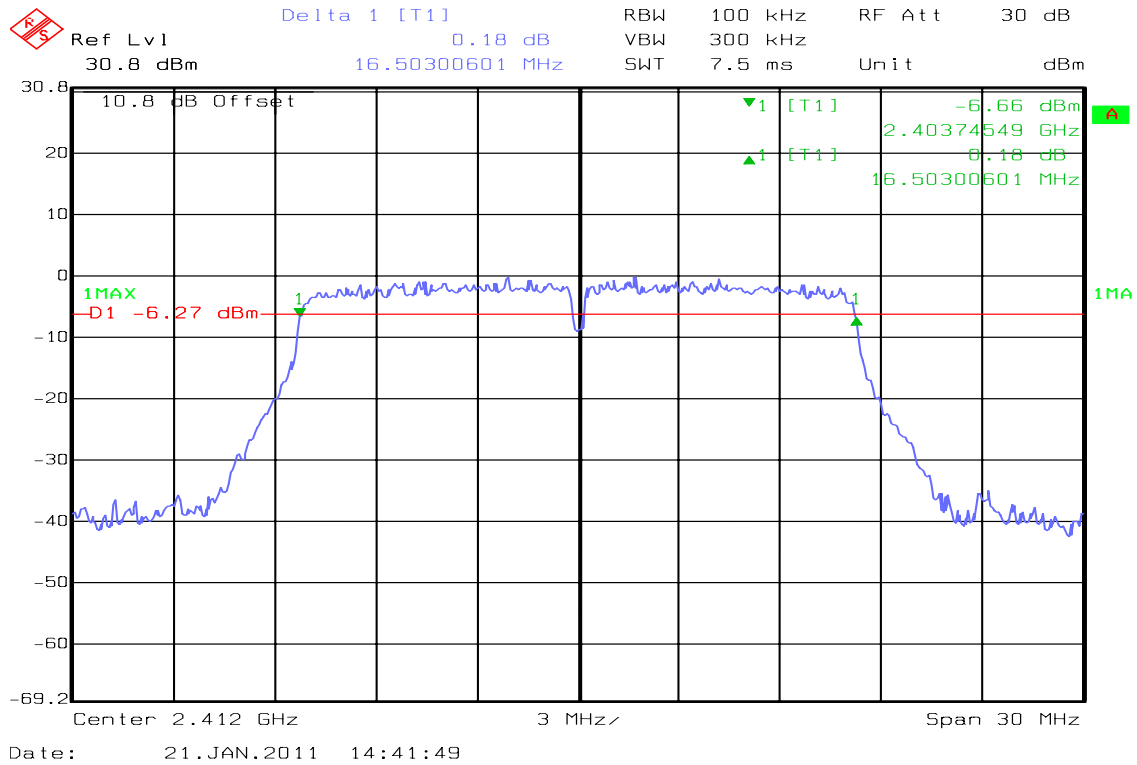


6dB Bandwidth (CH High)



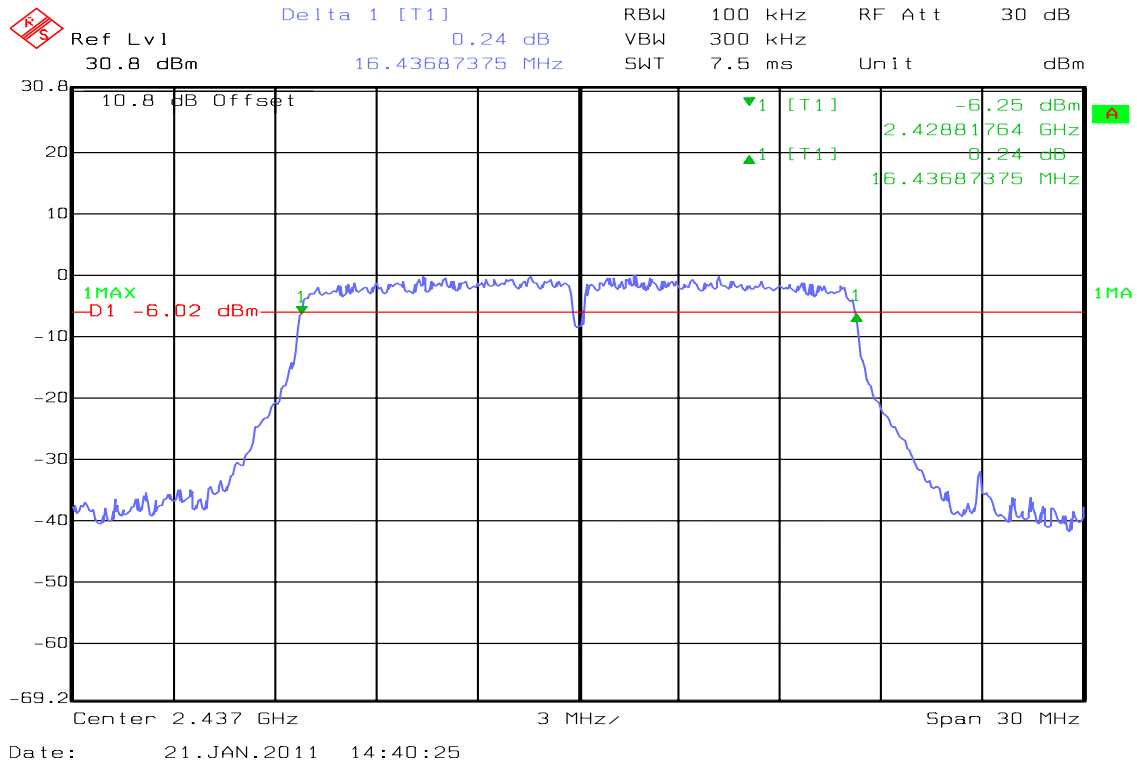
IEEE 802.11g mode

6dB Bandwidth (CH Low)

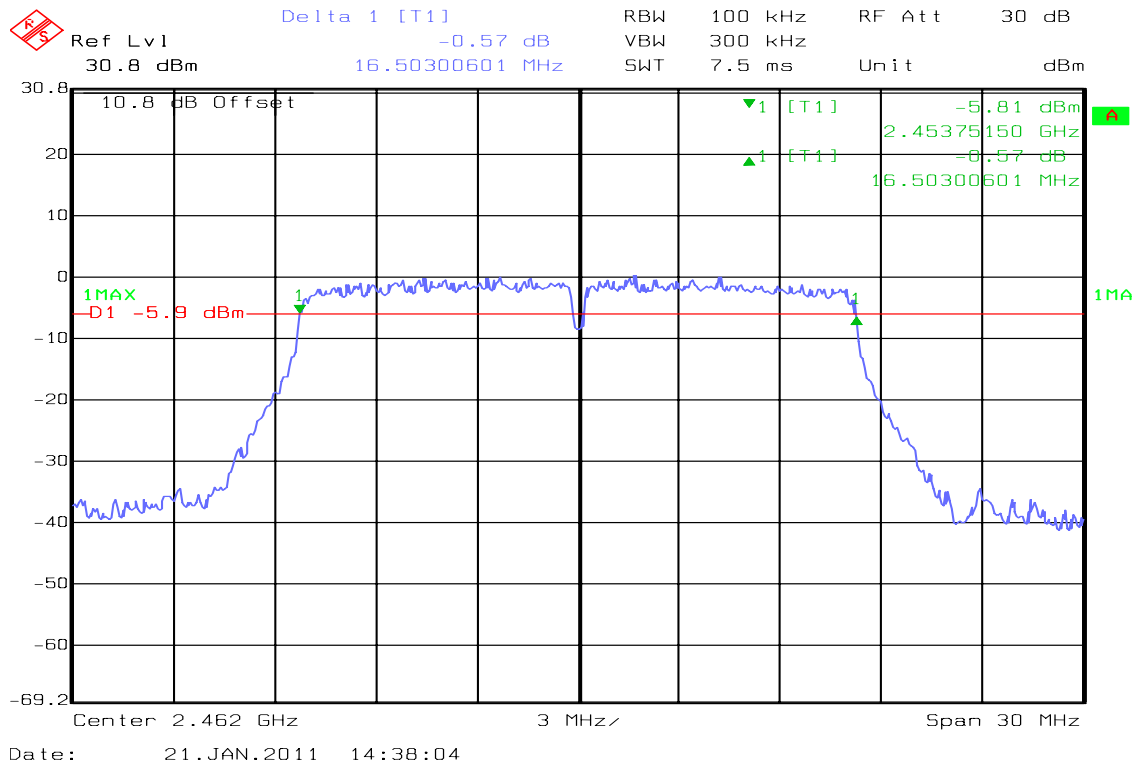




6dB Bandwidth (CH Mid)



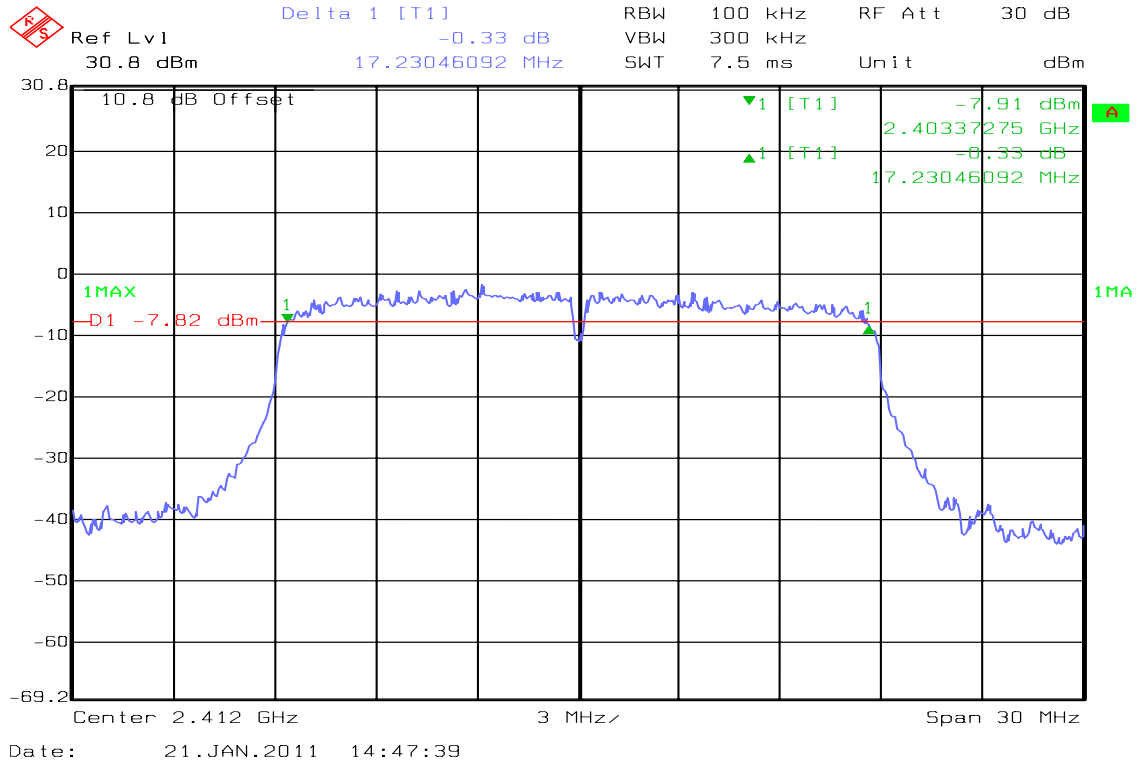
6dB Bandwidth (CH High)



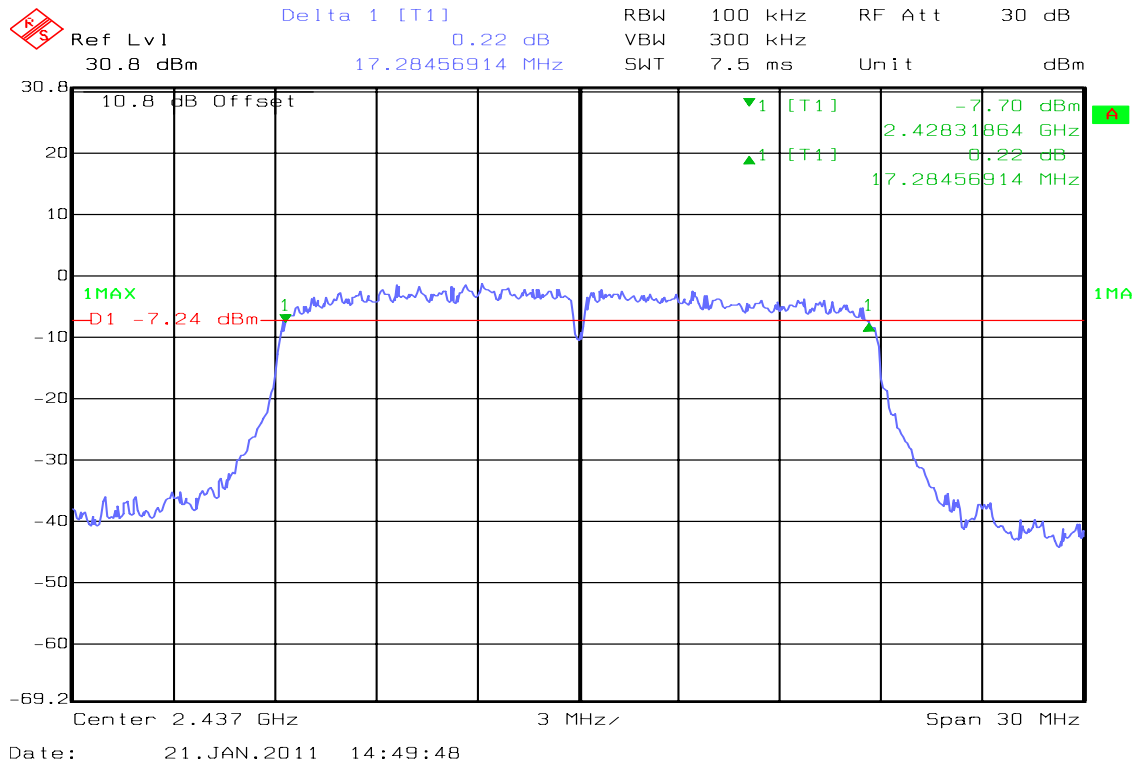


draft 802.11n 20 MHz Channel mode / Chain 0

6dB Bandwidth (CH Low)

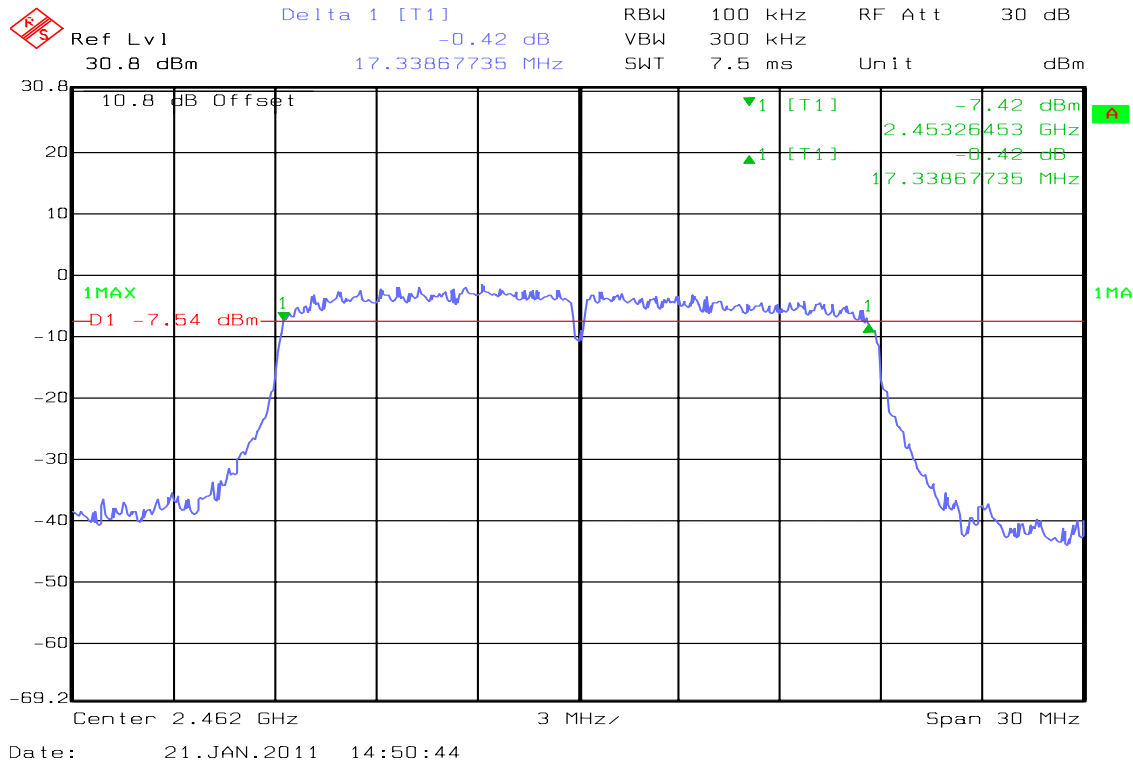


6dB Bandwidth (CH Mid)



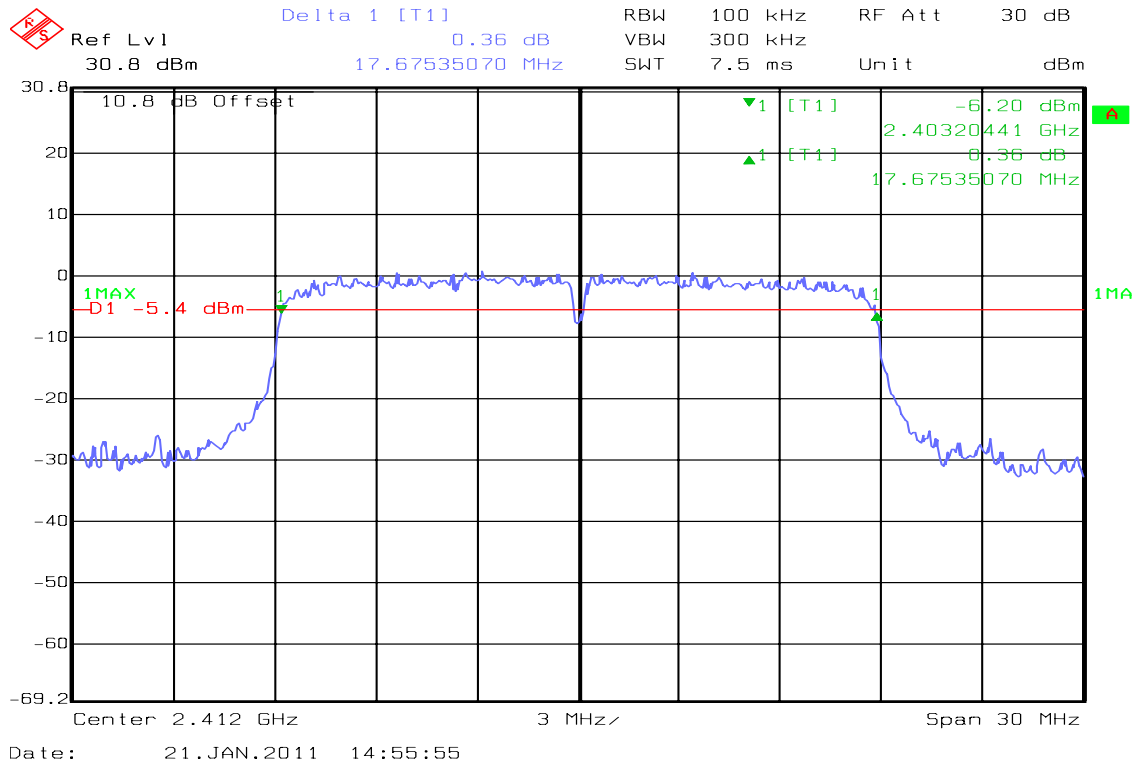


6dB Bandwidth (CH High)



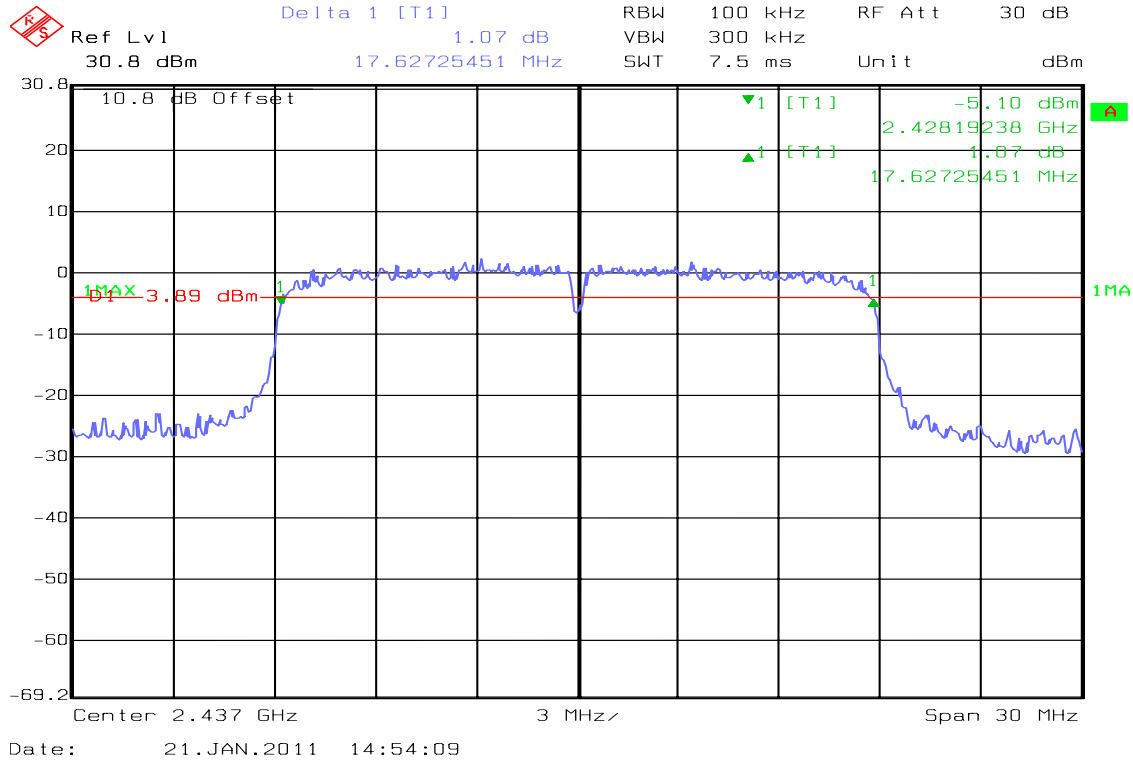
draft 802.11n 20 MHz Channel mode / Chain 1

6dB Bandwidth (CH Low)

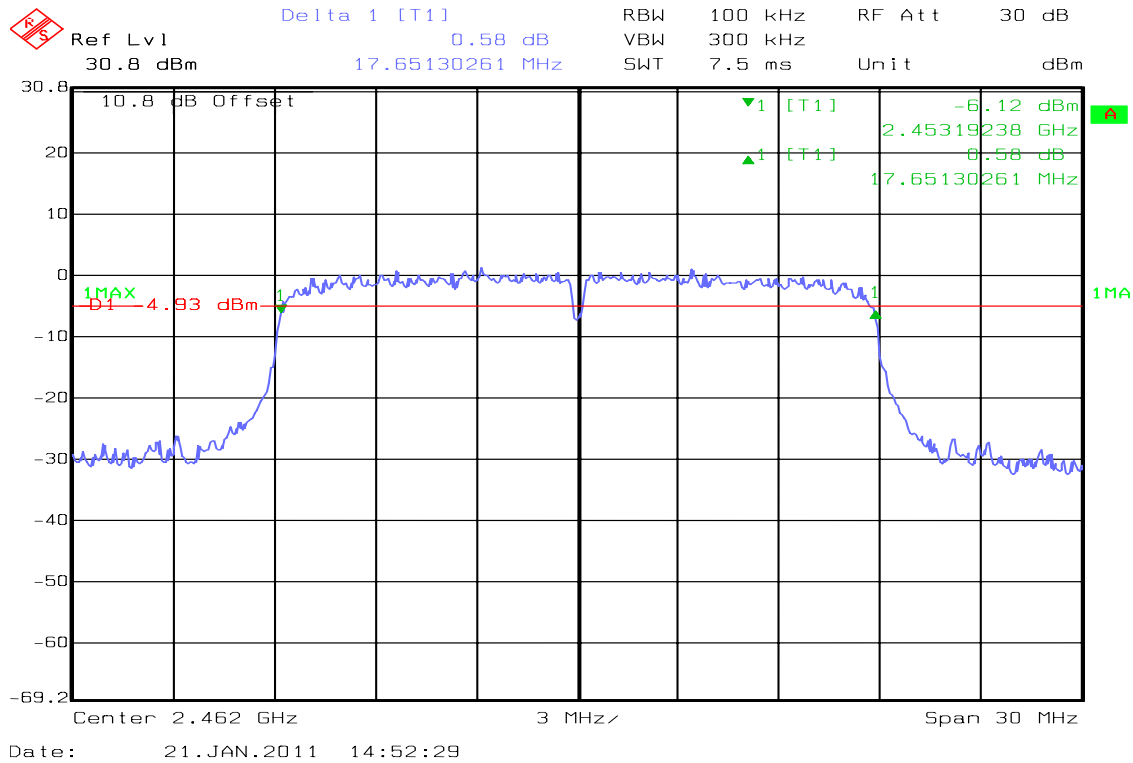




6dB Bandwidth (CH Mid)



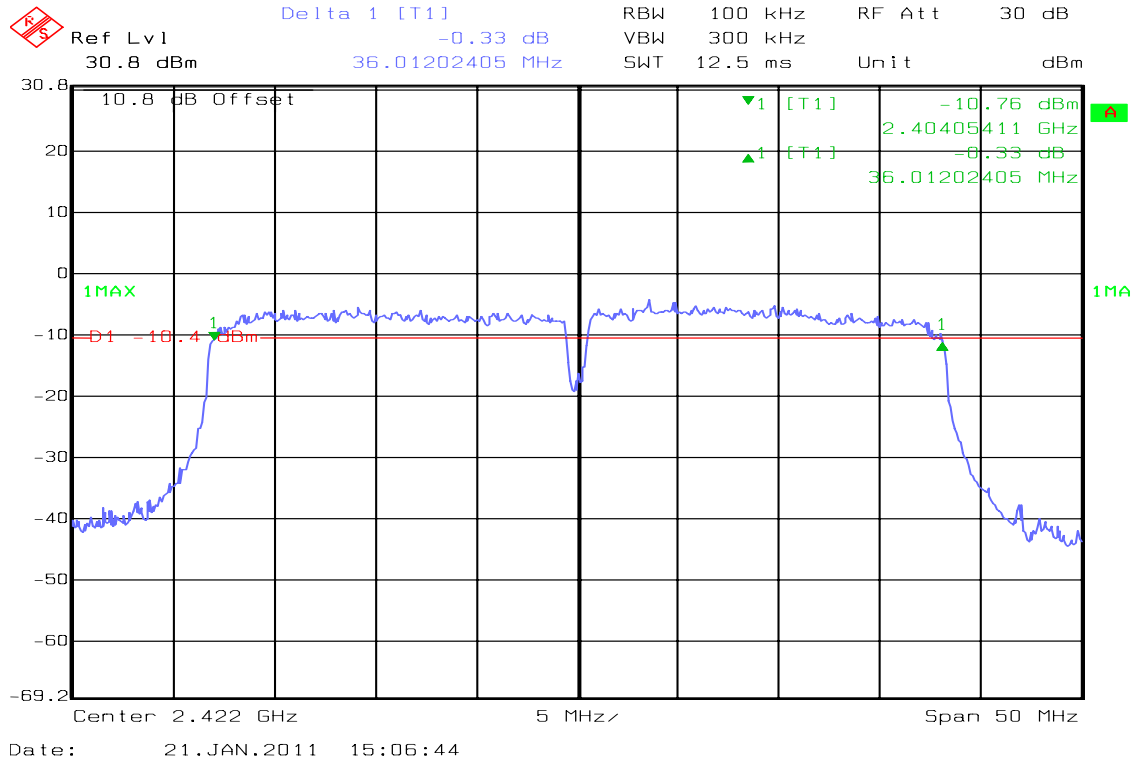
6dB Bandwidth (CH High)



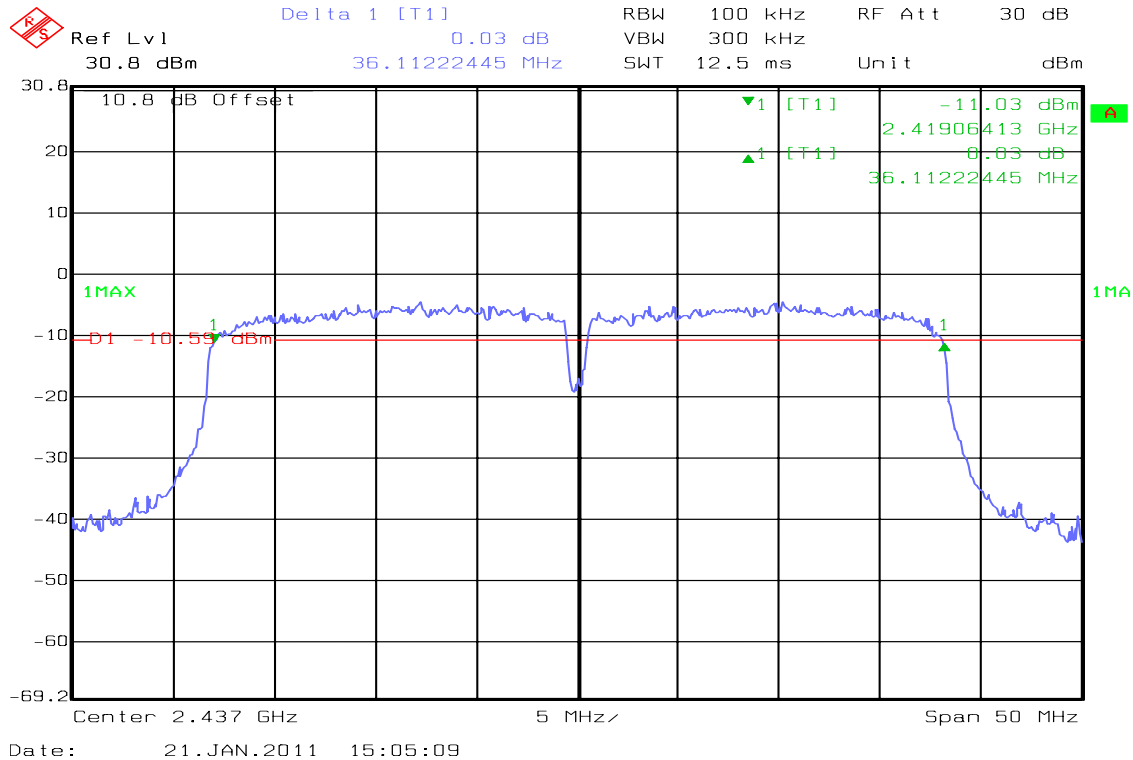


draft 802.11n 40 MHz Channel mode / Chain 0

6dB Bandwidth (CH Low)

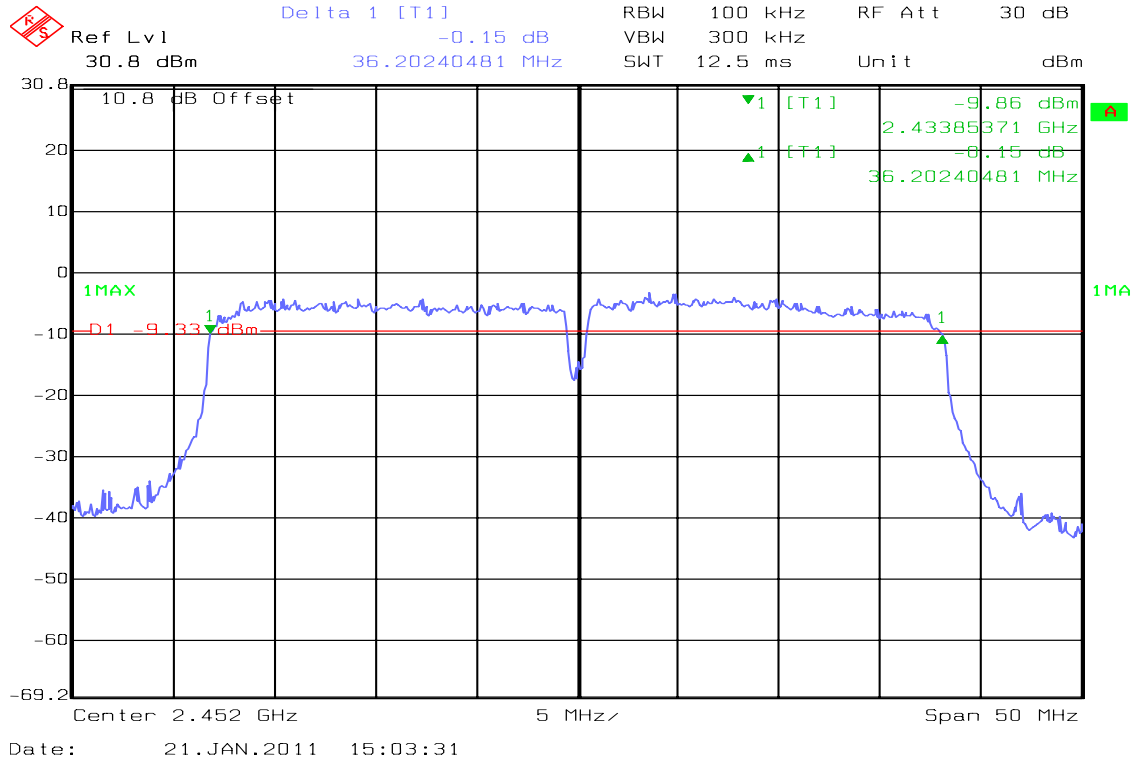


6dB Bandwidth (CH Mid)



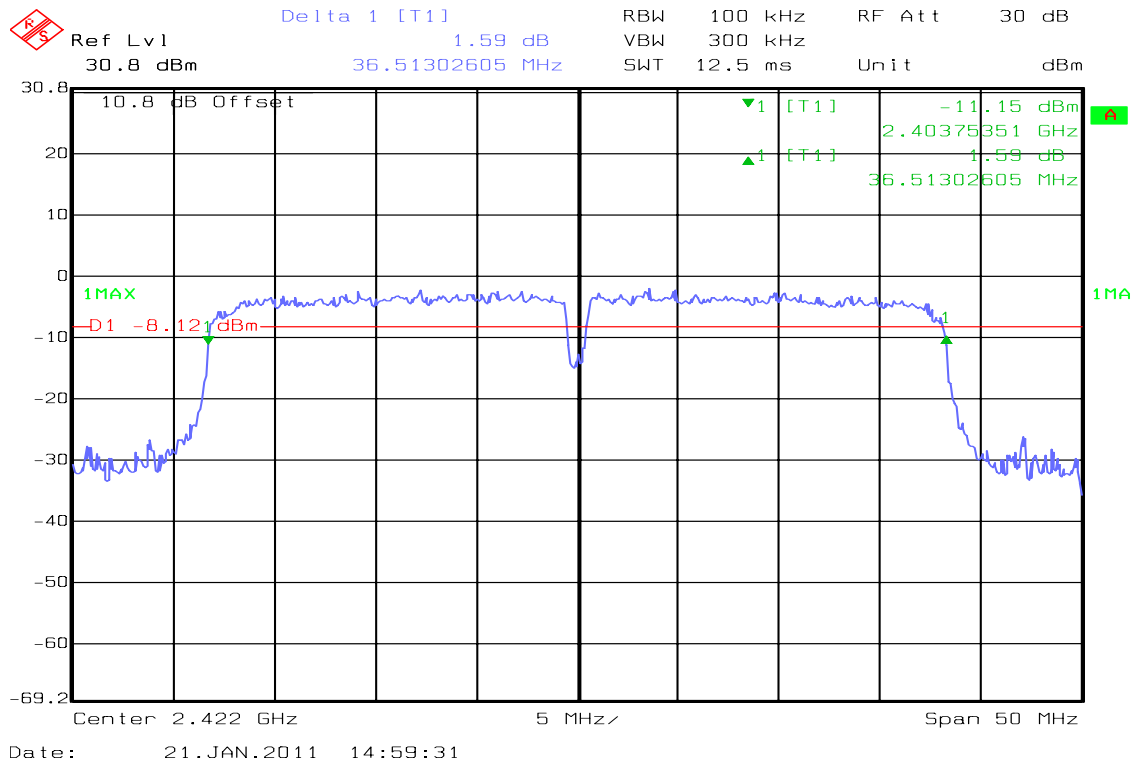


6dB Bandwidth (CH High)



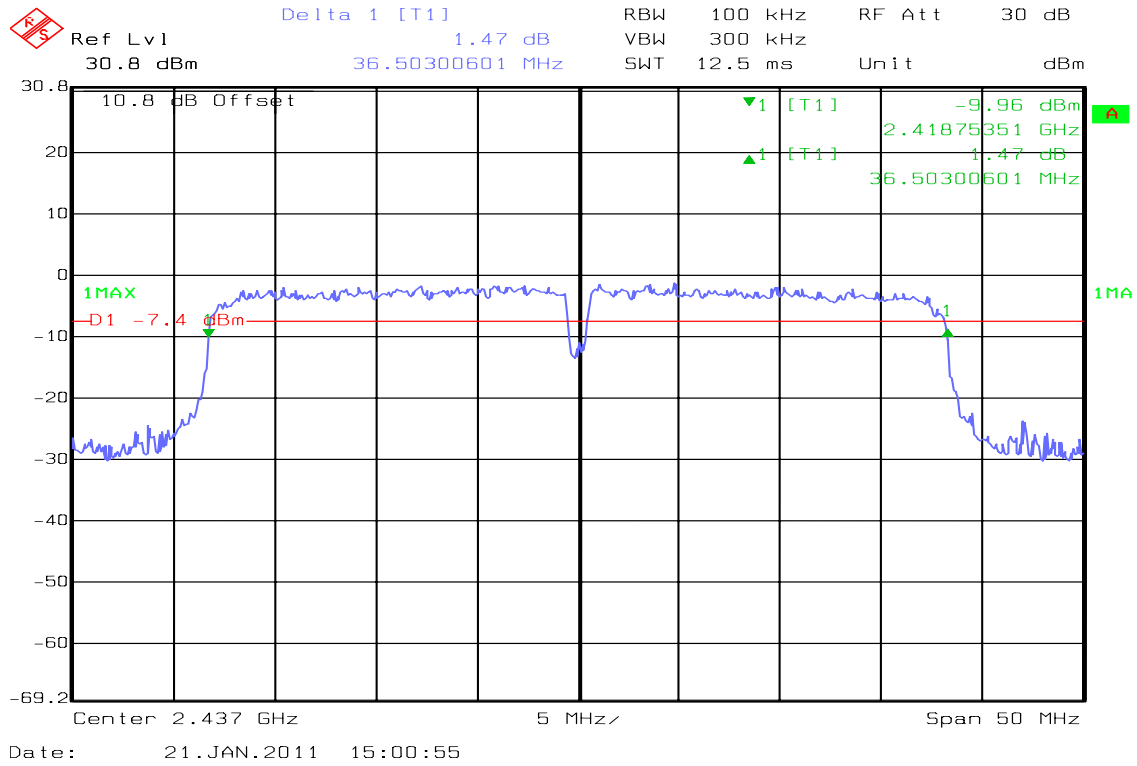
draft 802.11n 40 MHz Channel mode / Chain 1

6dB Bandwidth (CH Low)

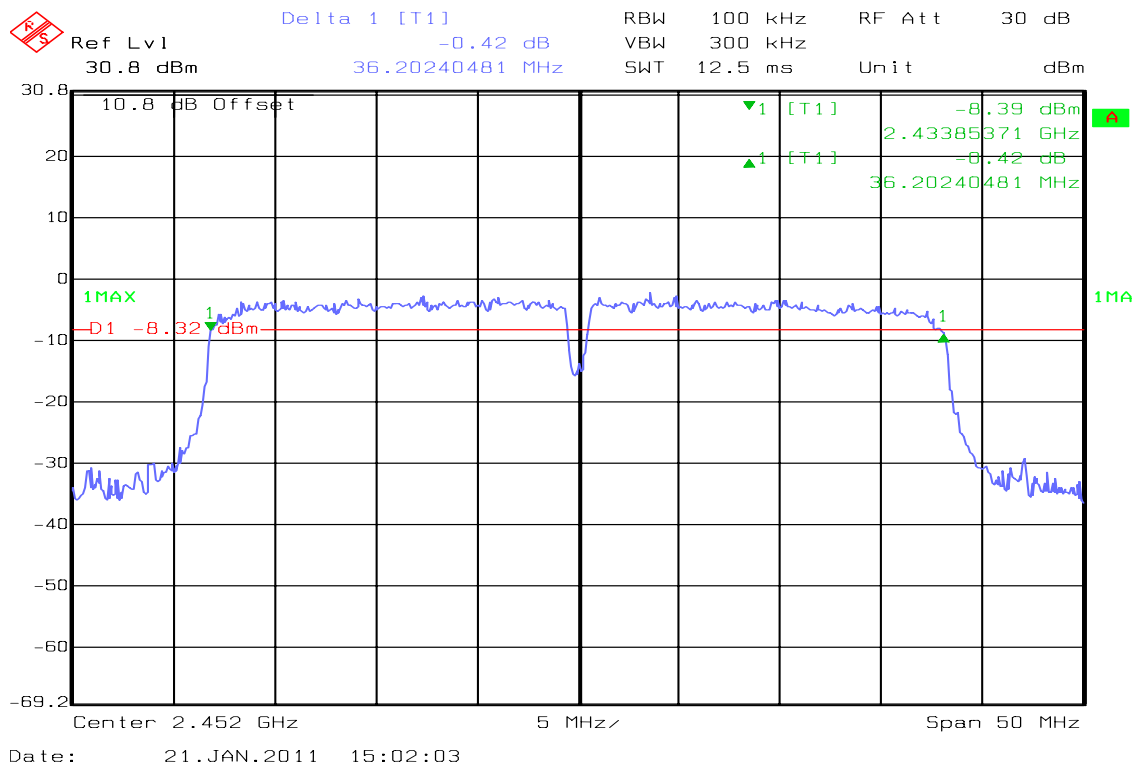




6dB Bandwidth (CH Mid)



6dB Bandwidth (CH High)





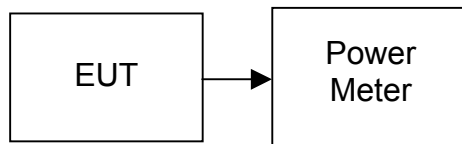
7.2 PEAK POWER

LIMIT

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

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

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output is connected to the 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	17.64	0.0581	1.00	PASS
Mid	2437	17.53	0.0566		PASS
High	2462	17.03	0.0505		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	24.41	0.2761	1.00	PASS
Mid	2437	24.67	0.2931		PASS
High	2462	24.58	0.2871		PASS

Test mode: draft 802.11n 20 MHz Channel mode

Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)			Limit (W)	Result
		Chain 0	Chain 1	Combination	Chain 0	Chain 1	Combination		
Low	2412	24.72	22.62	26.81	0.2965	0.1828	0.4793	1.00	PASS
Mid	2437	23.81	22.66	26.28	0.2404	0.1845	0.4249		PASS
High	2462	22.02	22.31	25.18	0.1592	0.1702	0.3294		PASS

Test mode: draft 802.11n 40 MHz Channel mode

Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)			Limit (W)	Result
		Chain 0	Chain 1	Combination	Chain 0	Chain 1	Combination		
Low	2422	22.52	22.36	25.45	0.1786	0.1722	0.3508	1.00	PASS
Mid	2437	22.56	22.50	25.54	0.1803	0.1778	0.3581		PASS
High	2452	22.25	22.38	25.33	0.1679	0.1730	0.3409		PASS

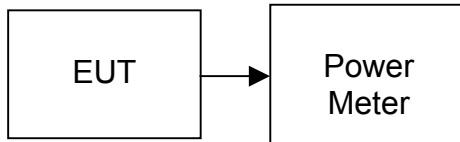


7.3 AVERAGE POWER

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 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	15.19	0.0330
Mid	2437	15.26	0.0336
High	2462	14.76	0.0299

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2412	14.73	0.0297
Mid	2437	15.08	0.0322
High	2462	14.56	0.0286

Test mode: draft 802.11n 20 MHz Channel mode

Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)		
		Chain 0	Chain 1	Combination	Chain 0	Chain 1	Combination
Low	2412	13.36	15.91	17.83	0.0217	0.0390	0.0607
Mid	2437	13.86	16.68	18.51	0.0243	0.0466	0.0709
High	2462	13.09	16.12	17.87	0.0204	0.0409	0.0613

Test mode: draft 802.11n 40 MHz Channel mode

Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)		
		Chain 0	Chain 1	Combination	Chain 0	Chain 1	Combination
Low	2422	14.71	11.24	16.32	0.02958	0.01330	0.04288
Mid	2437	15.31	12.45	17.12	0.03396	0.01758	0.05154
High	2452	14.49	12.39	16.58	0.02812	0.01734	0.04546

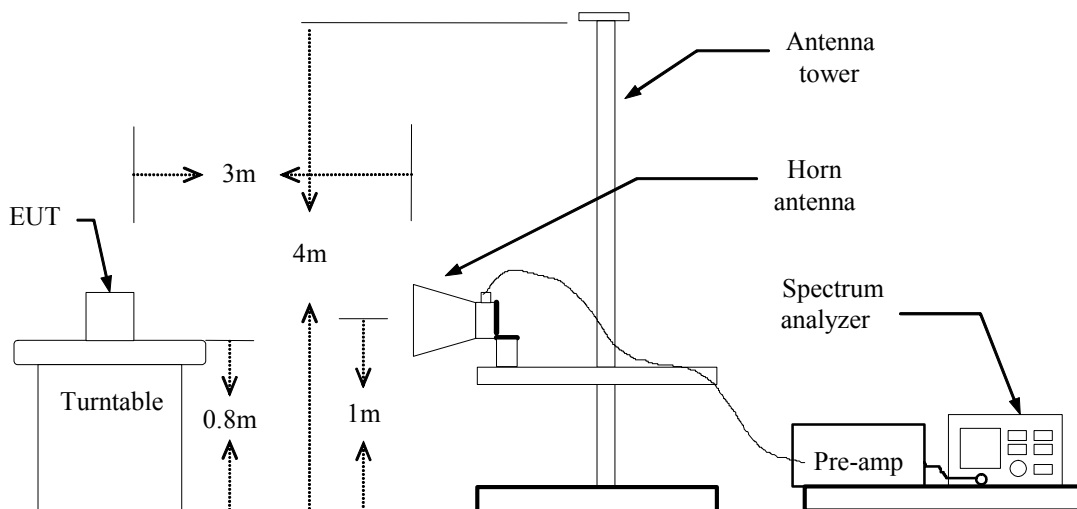


7.4 BAND EDGES MEASUREMENT

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 16:13:46 Jan 22, 2011

R T

Mkr3 2.411 02 GHz
97.98 dBµV/m



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	52.61 dBµV/m
2	(1)	Freq	2.400 00 GHz	56.78 dBµV/m
3	(1)	Freq	2.411 02 GHz	97.98 dBµV/m

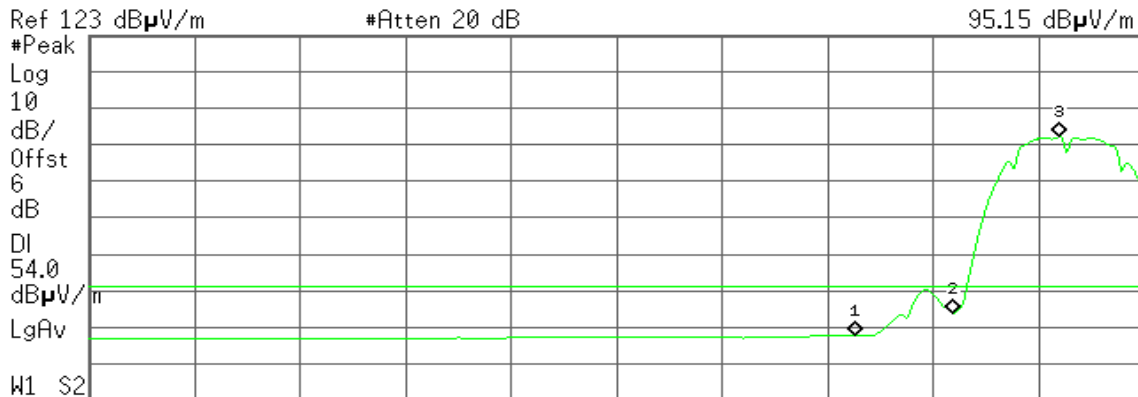
Detector mode: Average

Polarity: Vertical

Agilent 16:14:54 Jan 22, 2011

R T

Mkr3 2.411 20 GHz
95.15 dBµV/m



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	40.85 dBµV/m
2	(1)	Freq	2.400 00 GHz	46.92 dBµV/m
3	(1)	Freq	2.411 20 GHz	95.15 dBµV/m



Detector mode: Peak

Polarity: Horizontal

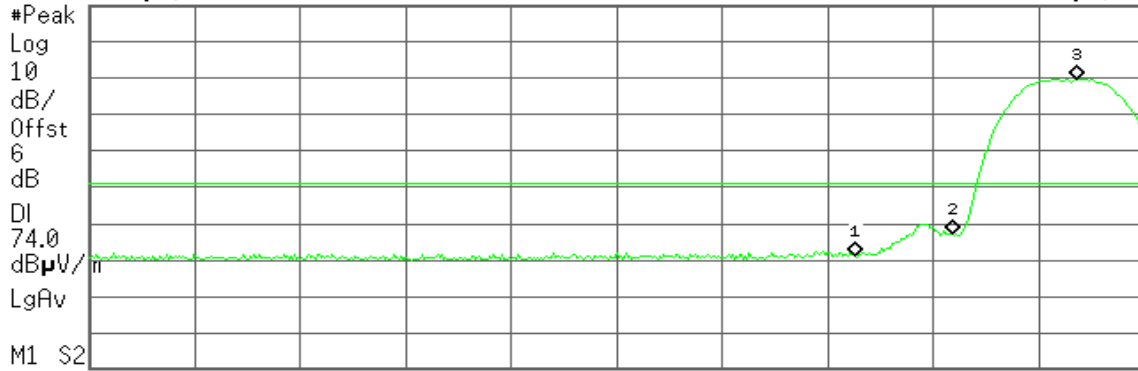
Agilent 16:04:42 Jan 22, 2011

R T

Mkr3 2.413 03 GHz
102.74 dBµV/m

Ref 123 dBµV/m

#Atten 20 dB



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.390 00 GHz	54.06 dBµV/m
2	(1)	Freq	2.400 00 GHz	68.09 dBµV/m
3	(1)	Freq	2.413 03 GHz	102.74 dBµV/m

Detector mode: Average

Polarity: Horizontal

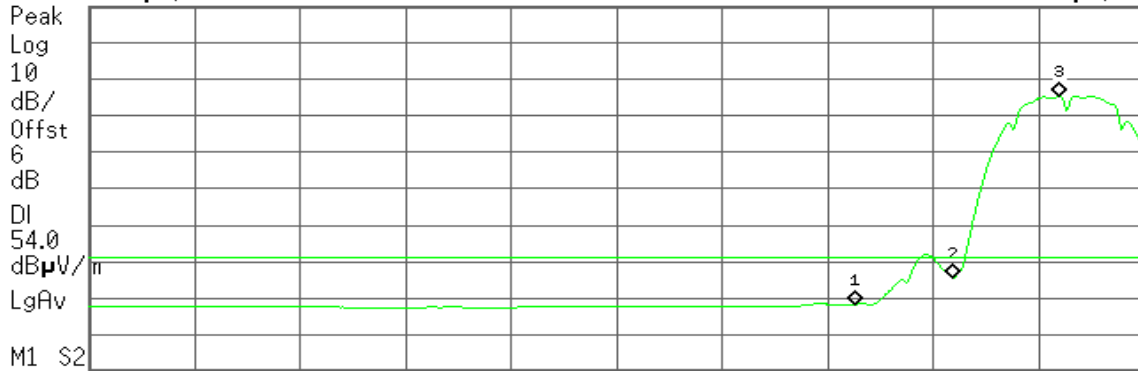
Agilent 16:10:42 Jan 22, 2011

R T

Mkr3 2.411 20 GHz
98.43 dBµV/m

Ref 123 dBµV/m

#Atten 20 dB



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.390 00 GHz	41.28 dBµV/m
2	(1)	Freq	2.400 00 GHz	48.61 dBµV/m
3	(1)	Freq	2.411 20 GHz	98.43 dBµV/m



Band Edges (IEEE 802.11b mode / CH High)

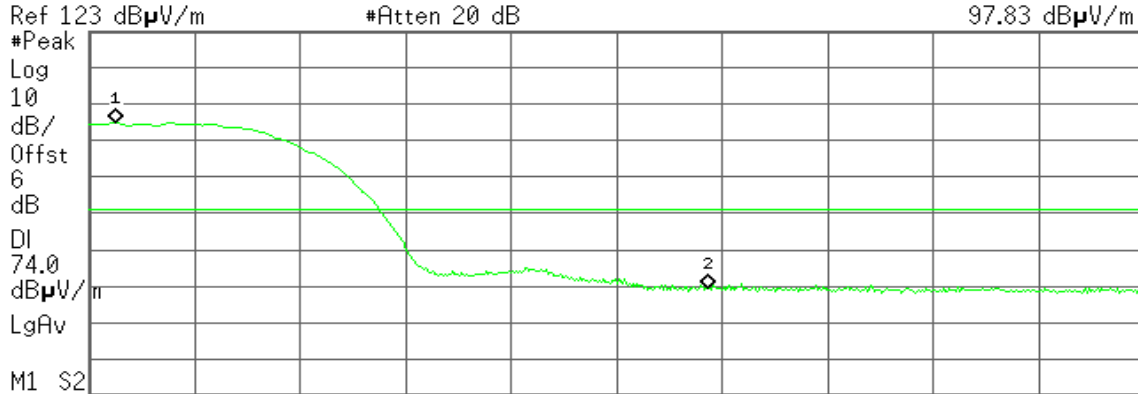
Detector mode: Peak

Polarity: Vertical

Agilent 17:03:59 Jan 22, 2011

R T

Mkr1 2.461 00 GHz
97.83 dBμV/m



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	2.461 00 GHz	97.83 dBμV/m
2	(1)	Freq	2.483 50 GHz	52.45 dBμV/m

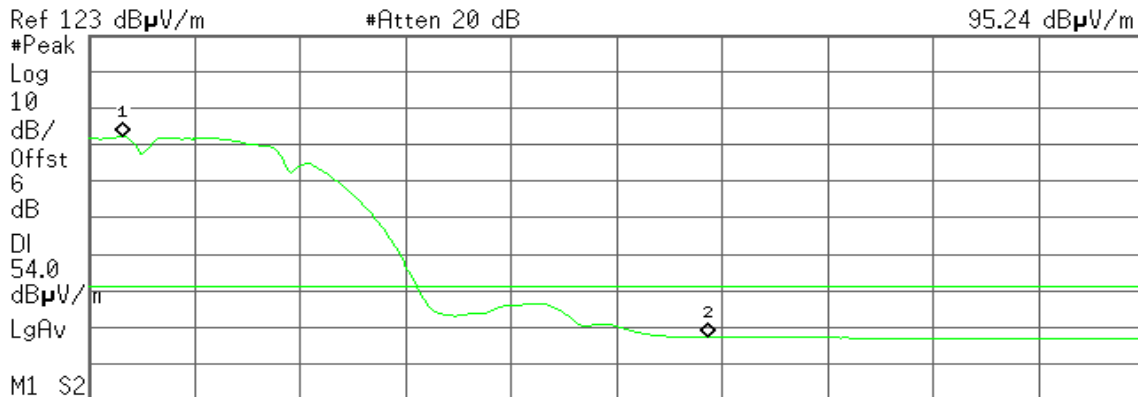
Detector mode: Average

Polarity: Vertical

Agilent 17:04:34 Jan 22, 2011

R T

Mkr1 2.461 27 GHz
95.24 dBμV/m



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 27 GHz	95.24 dBμV/m
2	(1)	Freq	2.483 50 GHz	40.43 dBμV/m



Detector mode: Peak

Polarity: Horizontal

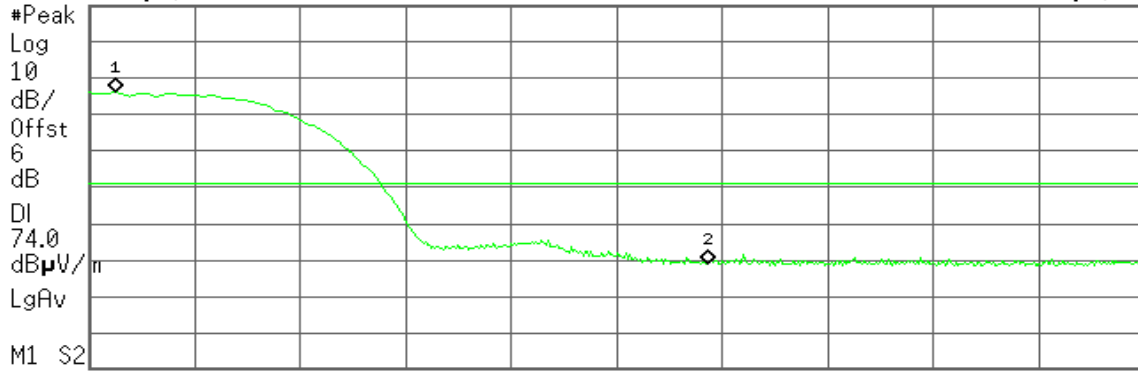
Agilent 17:06:16 Jan 22, 2011

R T

Mkr1 2.461 00 GHz
99.04 dBµV/m

Ref 123 dBµV/m

#Atten 20 dB



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	2.461 00 GHz	99.04 dBµV/m
2	(1)	Freq	2.483 50 GHz	52.05 dBµV/m

Detector mode: Average

Polarity: Horizontal

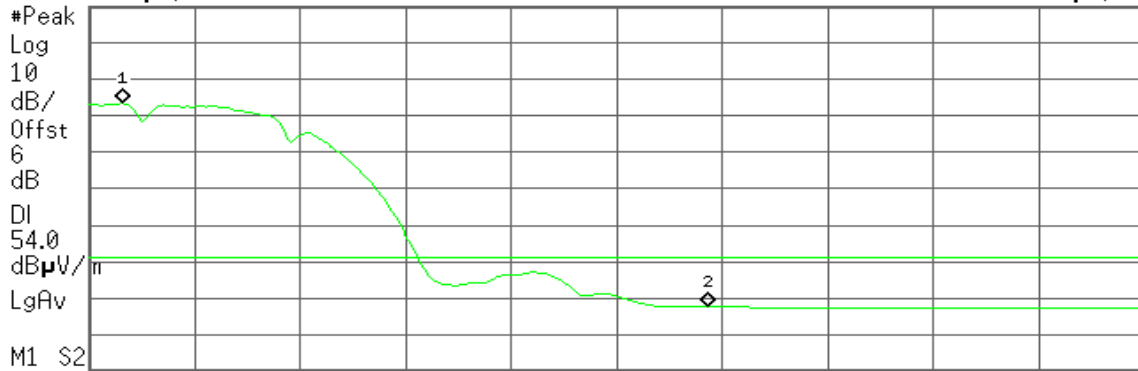
Agilent 17:06:56 Jan 22, 2011

R T

Mkr1 2.461 27 GHz
96.40 dBµV/m

Ref 123 dBµV/m

#Atten 20 dB



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 27 GHz	96.40 dBµV/m
2	(1)	Freq	2.483 50 GHz	40.56 dBµV/m



Band Edges (IEEE 802.11g mode / CH Low)

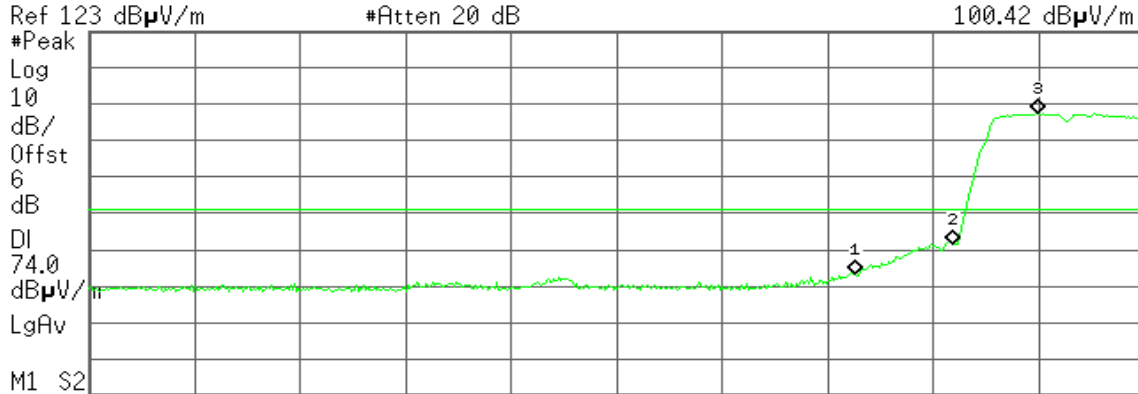
Detector mode: Peak

Polarity: Vertical

Agilent 16:17:36 Jan 22, 2011

R T

Mkr3 2.408 82 GHz
100.42 dBµV/m



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.390 00 GHz	56.21 dBµV/m
2	(1)	Freq	2.400 00 GHz	64.75 dBµV/m
3	(1)	Freq	2.408 82 GHz	100.42 dBµV/m

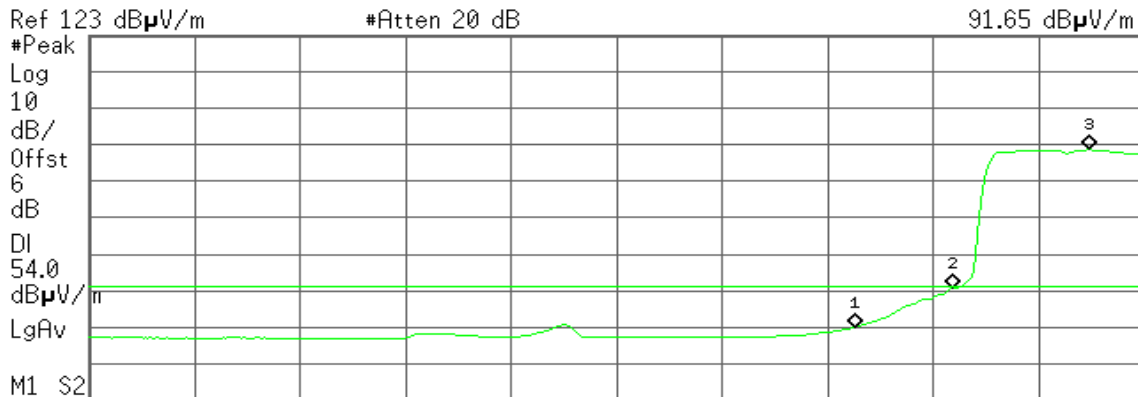
Detector mode: Average

Polarity: Vertical

Agilent 16:18:41 Jan 22, 2011

R T

Mkr3 2.414 32 GHz
91.65 dBµV/m



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.390 00 GHz	43.05 dBµV/m
2	(1)	Freq	2.400 00 GHz	53.81 dBµV/m
3	(1)	Freq	2.414 32 GHz	91.65 dBµV/m



Detector mode: Peak

Polarity: Horizontal

Agilent 16:20:48 Jan 22, 2011

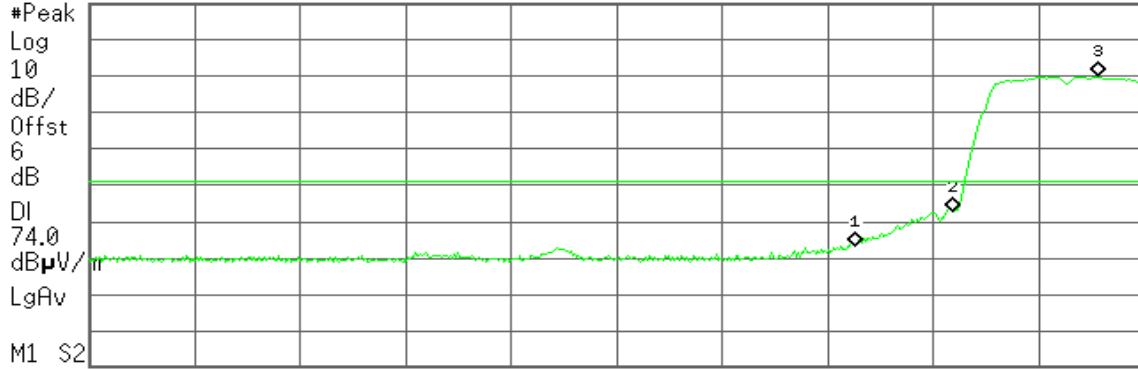
R T

Mkr3 2.415 23 GHz

Ref 123 dBµV/m

#Atten 20 dB

102.86 dBµV/m



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.390 00 GHz	56.48 dBµV/m
2	(1)	Freq	2.400 00 GHz	65.90 dBµV/m
3	(1)	Freq	2.415 23 GHz	102.86 dBµV/m

Detector mode: Average

Polarity: Horizontal

Agilent 16:21:57 Jan 22, 2011

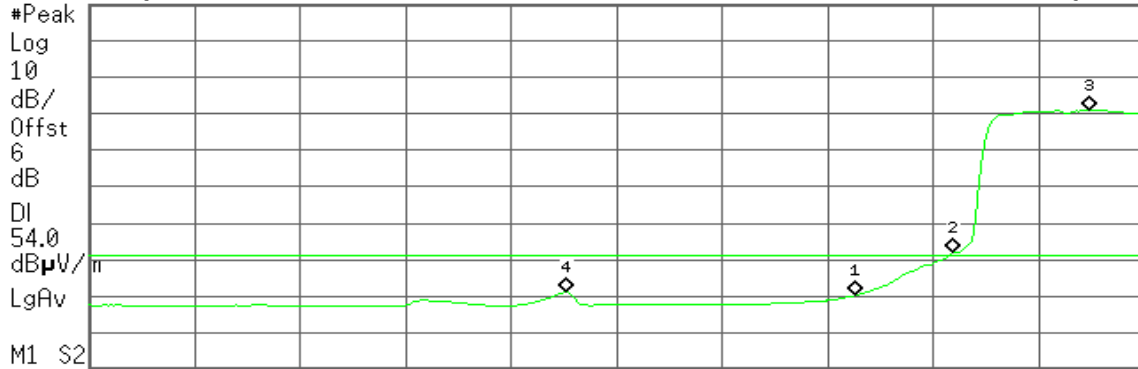
R T

Mkr4 2.359 68 GHz

Ref 123 dBµV/m

#Atten 20 dB

44.01 dBµV/m



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.390 00 GHz	43.25 dBµV/m
2	(1)	Freq	2.400 00 GHz	54.88 dBµV/m
3	(1)	Freq	2.414 32 GHz	94.20 dBµV/m
4	(1)	Freq	2.359 68 GHz	44.01 dBµV/m



Band Edges (IEEE 802.11g mode / CH High)

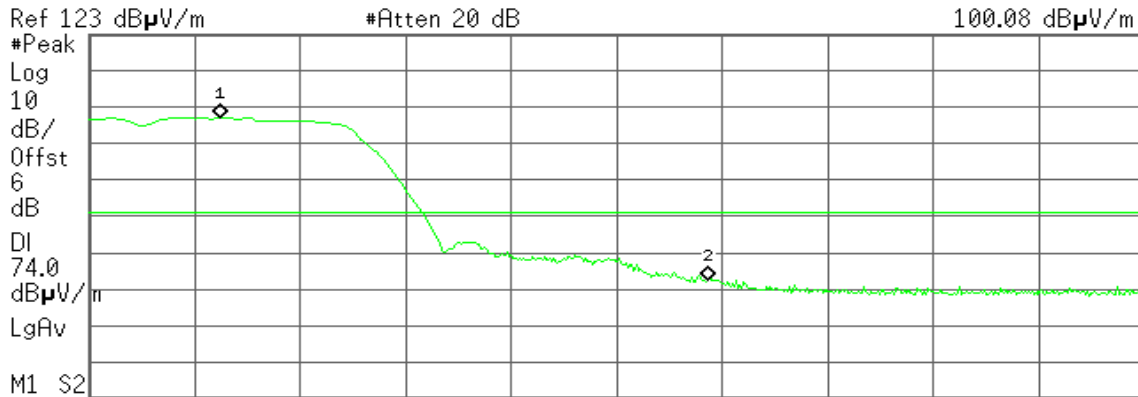
Detector mode: Peak

Polarity: Vertical

Agilent 17:01:03 Jan 22, 2011

R T

Mkr1 2.465 00 GHz
100.08 dBμV/m



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	2.465 00 GHz	100.08 dBμV/m
2	(1)	Freq	2.483 50 GHz	55.41 dBμV/m

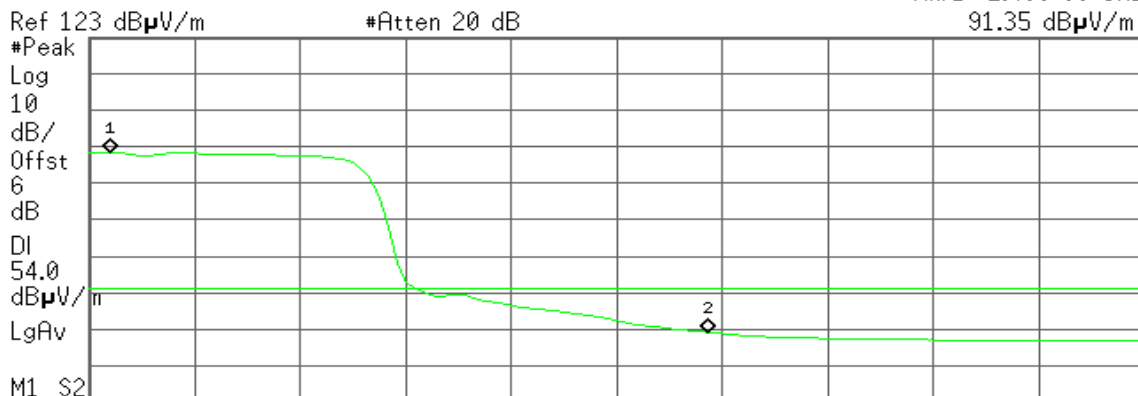
Detector mode: Average

Polarity: Vertical

Agilent 17:01:36 Jan 22, 2011

R T

Mkr1 2.460 80 GHz
91.35 dBμV/m



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 80 GHz	91.35 dBμV/m
2	(1)	Freq	2.483 50 GHz	42.13 dBμV/m



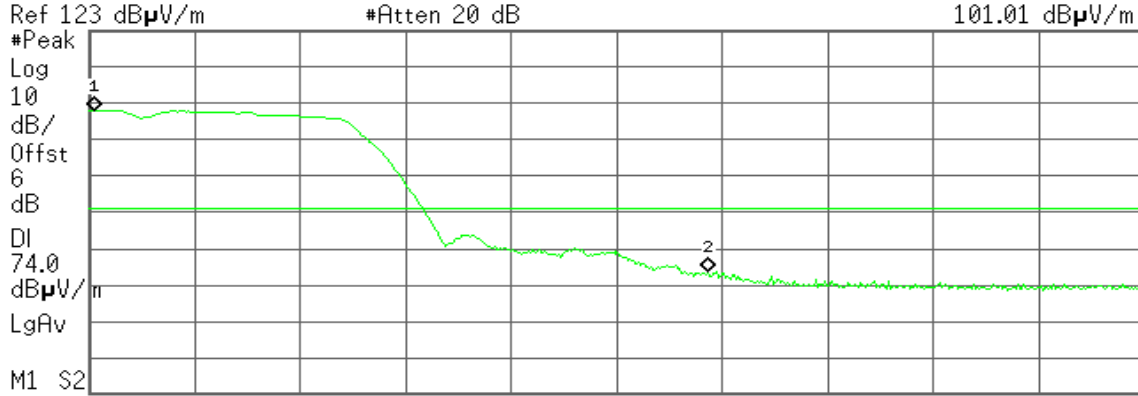
Detector mode: Peak

Polarity: Horizontal

Agilent 16:58:56 Jan 22, 2011

R T

Mkr1 2.460 20 GHz
101.01 dBµV/m



#Res BW 1 MHz #VBW 1 MHz #Sweep 100 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.460 20 GHz	101.01 dBµV/m
2	(1)	Freq	2.483 50 GHz	56.66 dBµV/m

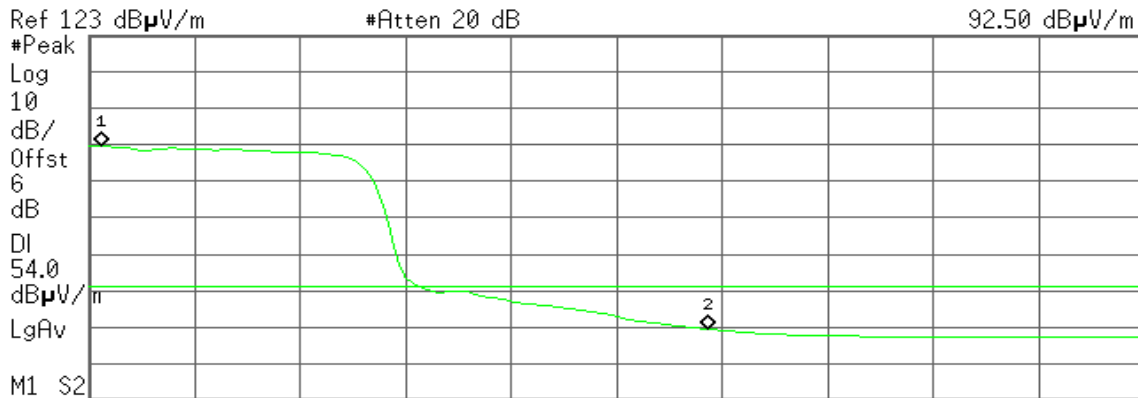
Detector mode: Average

Polarity: Horizontal

Agilent 16:59:29 Jan 22, 2011

R T

Mkr1 2.460 47 GHz
92.50 dBµV/m



#Res BW 1 MHz #VBW 10 Hz Sweep 3.119 s (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.460 47 GHz	92.50 dBµV/m
2	(1)	Freq	2.483 50 GHz	42.48 dBµV/m



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

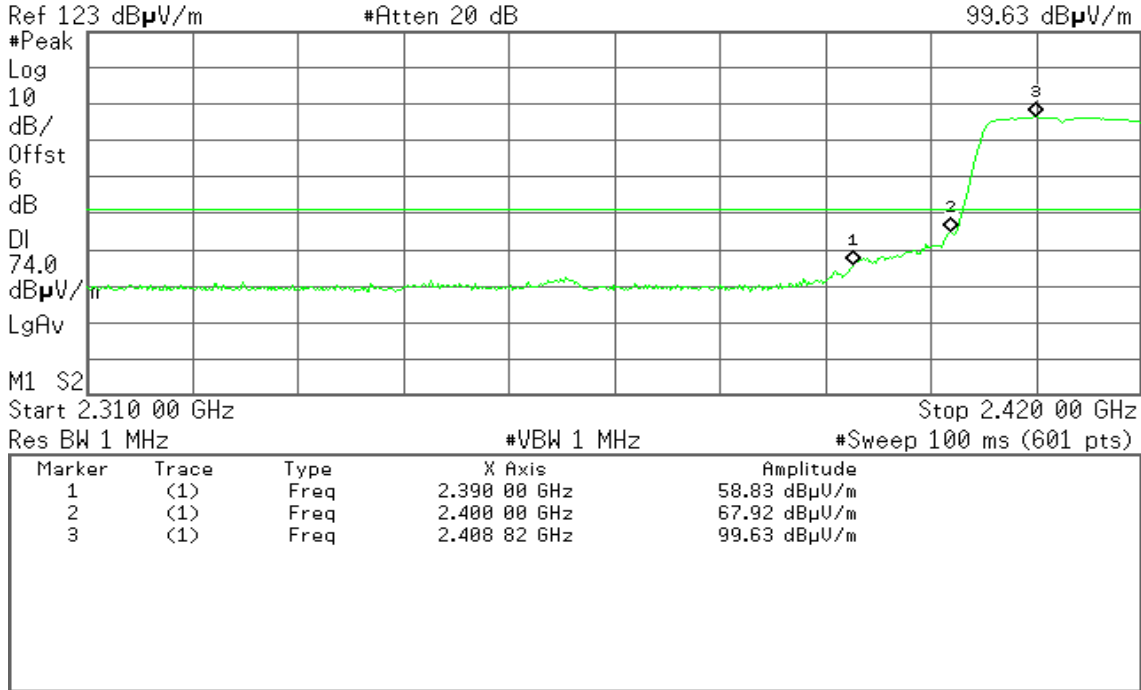
Detector mode: Peak

Polarity: Vertical

Agilent 16:28:37 Jan 22, 2011

R T

Mkr3 2.408 82 GHz
99.63 dBμV/m



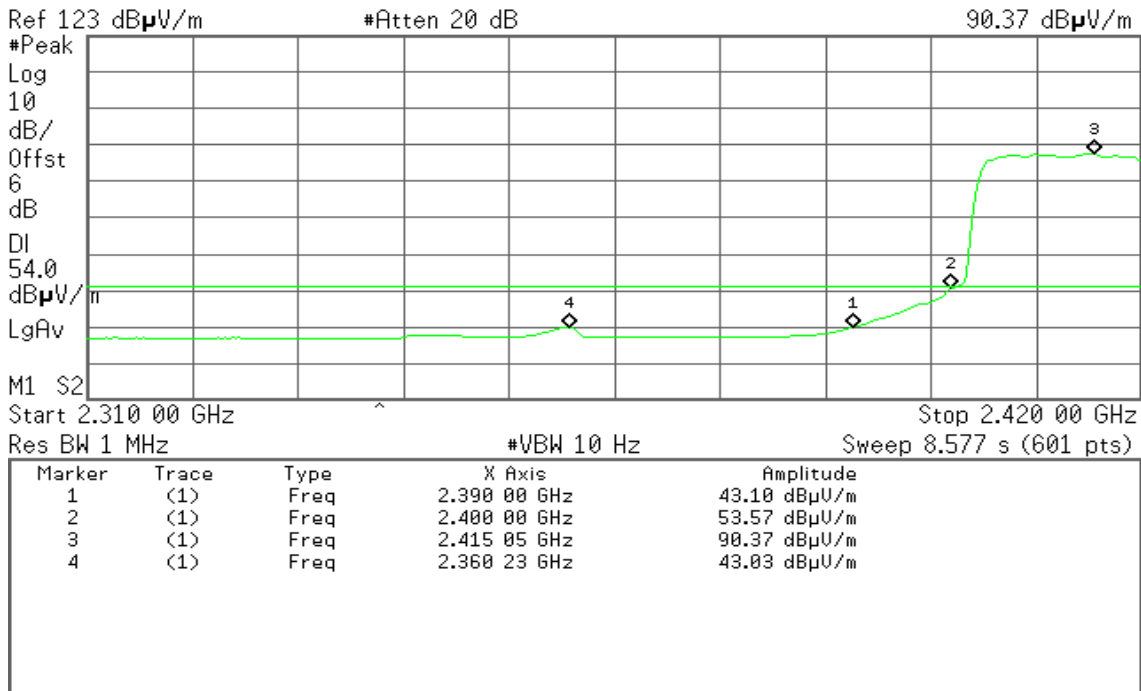
Detector mode: Average

Polarity: Vertical

Agilent 16:29:52 Jan 22, 2011

R T

Mkr3 2.415 05 GHz
90.37 dBμV/m





Detector mode: Peak

Polarity: Horizontal

Agilent 16:25:23 Jan 22, 2011

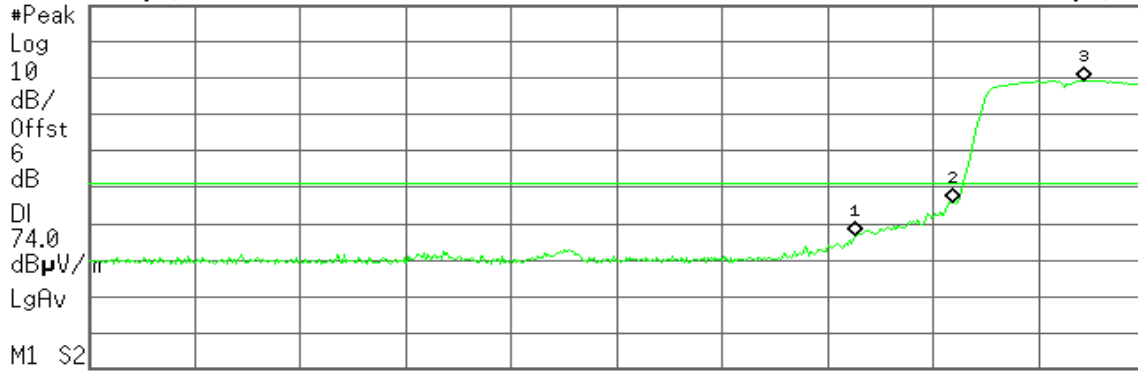
R T

Mkr3 2.413 77 GHz

Ref 123 dBµV/m

#Atten 20 dB

102.42 dBµV/m



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.390 00 GHz	59.72 dBµV/m
2	(1)	Freq	2.400 00 GHz	69.05 dBµV/m
3	(1)	Freq	2.413 77 GHz	102.42 dBµV/m

Detector mode: Average

Polarity: Horizontal

Agilent 16:26:26 Jan 22, 2011

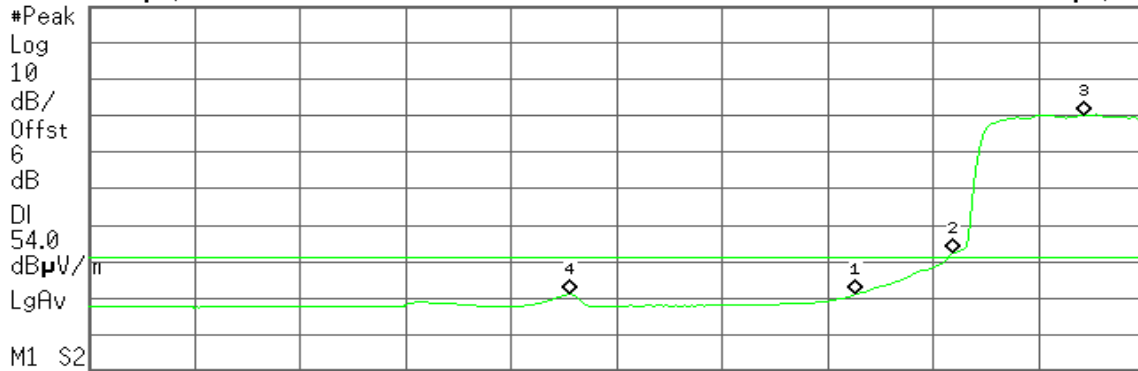
R T

Mkr4 2.360 05 GHz

Ref 123 dBµV/m

#Atten 20 dB

44.05 dBµV/m



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.390 00 GHz	44.07 dBµV/m
2	(1)	Freq	2.400 00 GHz	55.26 dBµV/m
3	(1)	Freq	2.413 77 GHz	93.28 dBµV/m
4	(1)	Freq	2.360 05 GHz	44.05 dBµV/m



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

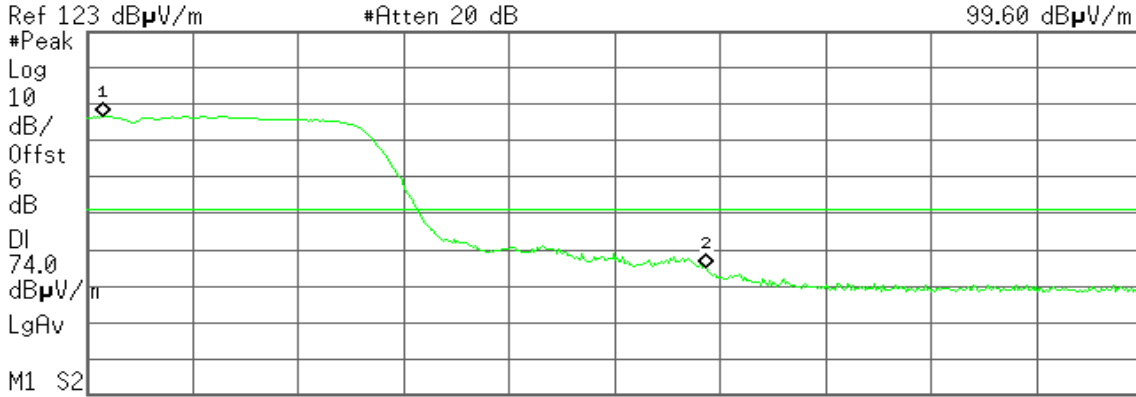
Detector mode: Peak

Polarity: Vertical

Agilent 16:51:38 Jan 22, 2011

R T

Mkr1 2.460 60 GHz
99.60 dBµV/m



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 60 GHz	99.60 dBµV/m
2	(1)	Freq	2.483 50 GHz	57.85 dBµV/m

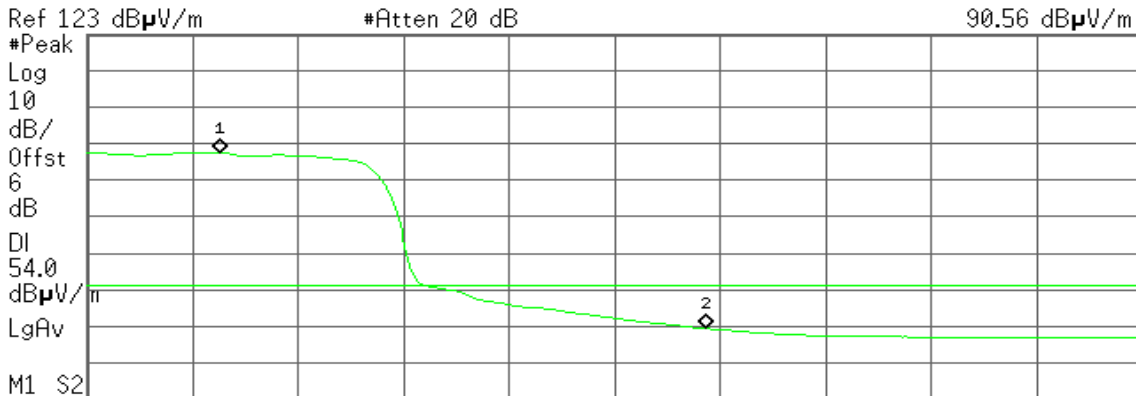
Detector mode: Average

Polarity: Vertical

Agilent 16:52:22 Jan 22, 2011

R T

Mkr1 2.465 07 GHz
90.56 dBµV/m



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	2.465 07 GHz	90.56 dBµV/m
2	(1)	Freq	2.483 50 GHz	42.32 dBµV/m



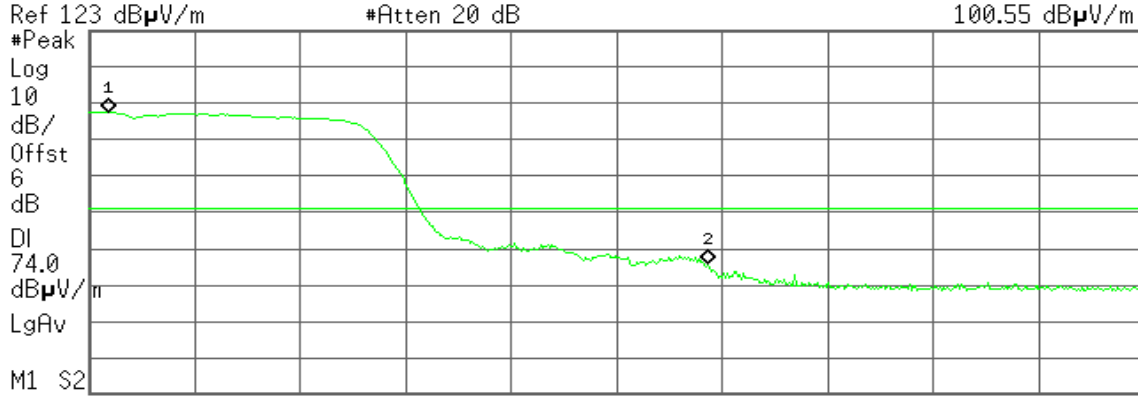
Detector mode: Peak

Polarity: Horizontal

Agilent 16:54:16 Jan 22, 2011

R T

Mkr1 2.460 73 GHz
100.55 dBµV/m



#Res BW 1 MHz #VBW 1 MHz #Sweep 100 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.460 73 GHz	100.55 dBµV/m
2	(1)	Freq	2.483 50 GHz	58.76 dBµV/m

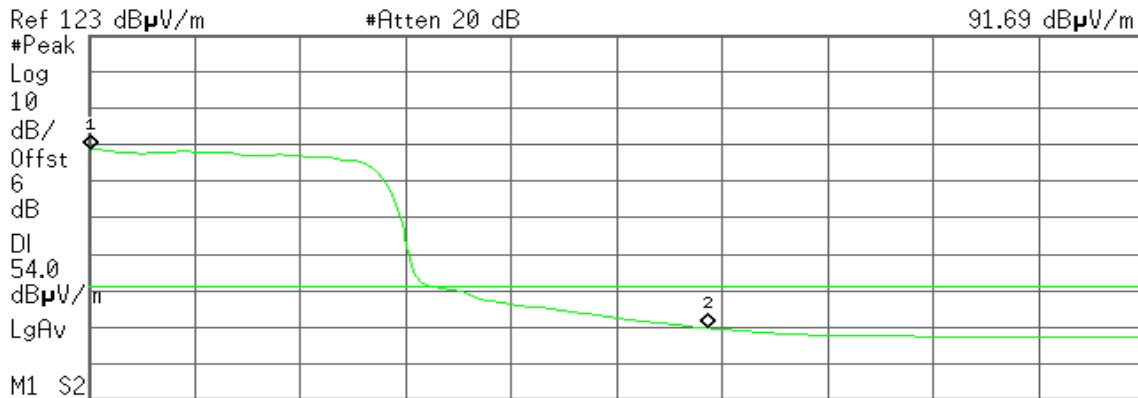
Detector mode: Average

Polarity: Horizontal

Agilent 16:54:56 Jan 22, 2011

R T

Mkr1 2.460 07 GHz
91.69 dBµV/m



#Res BW 1 MHz #VBW 10 Hz Sweep 3.119 s (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.460 07 GHz	91.69 dBµV/m
2	(1)	Freq	2.483 50 GHz	42.73 dBµV/m



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

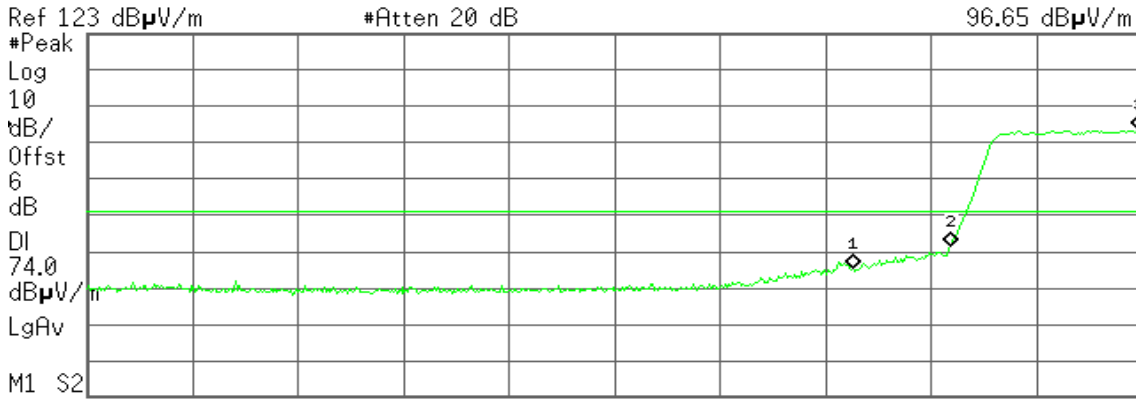
Detector mode: Peak

Polarity: Vertical

Agilent 16:32:19 Jan 22, 2011

R T

Mkr3 2.419 63 GHz
96.65 dBµV/m



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	58.41 dBµV/m
2	(1)	Freq	2.400 00 GHz	64.74 dBµV/m
3	(1)	Freq	2.419 63 GHz	96.65 dBµV/m

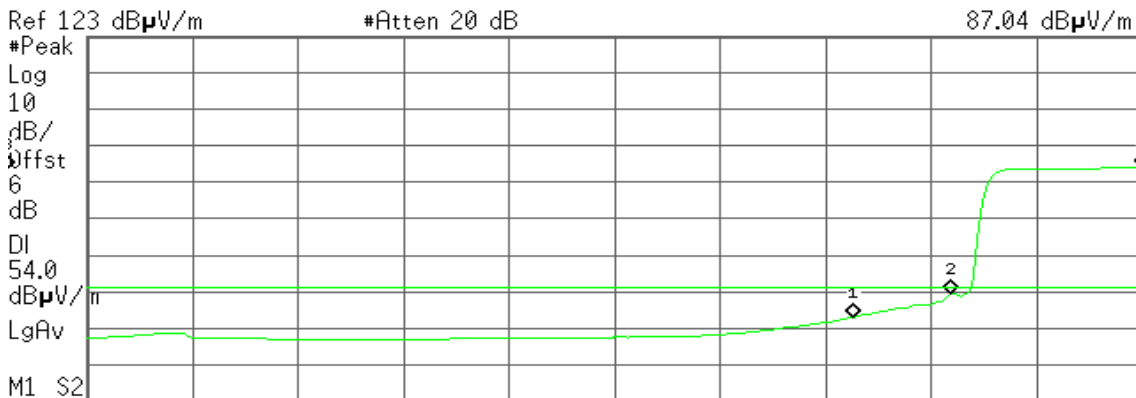
Detector mode: Average

Polarity: Vertical

Agilent 16:33:22 Jan 22, 2011

R T

Mkr3 2.420 00 GHz
87.04 dBµV/m



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	46.02 dBµV/m
2	(1)	Freq	2.400 00 GHz	52.46 dBµV/m
3	(1)	Freq	2.420 00 GHz	87.04 dBµV/m



Detector mode: Peak

Polarity: Horizontal

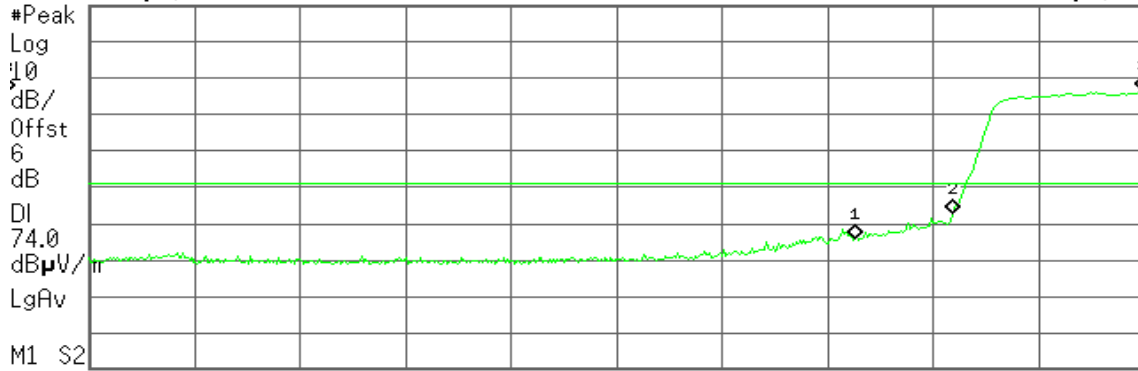
Agilent 16:35:27 Jan 22, 2011

R T

Mkr3 2.419 82 GHz
99.42 dBµV/m

Ref 123 dBµV/m

#Atten 20 dB



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	58.75 dBµV/m
2	(1)	Freq	2.400 00 GHz	65.81 dBµV/m
3	(1)	Freq	2.419 82 GHz	99.42 dBµV/m

Detector mode: Average

Polarity: Horizontal

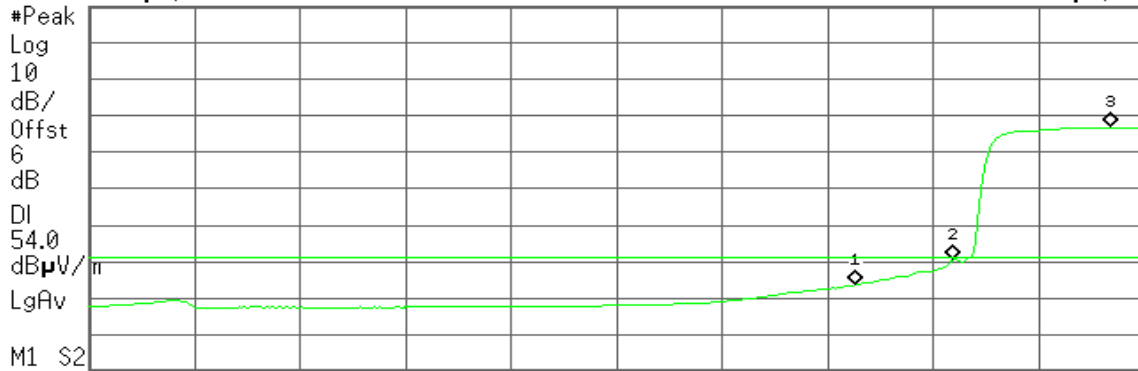
Agilent 16:36:11 Jan 22, 2011

R T

Mkr3 2.416 52 GHz
89.88 dBµV/m

Ref 123 dBµV/m

#Atten 20 dB



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	46.65 dBµV/m
2	(1)	Freq	2.400 00 GHz	53.51 dBµV/m
3	(1)	Freq	2.416 52 GHz	89.88 dBµV/m



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

Detector mode: Peak

Polarity: Vertical

Agilent 16:48:43 Jan 22, 2011

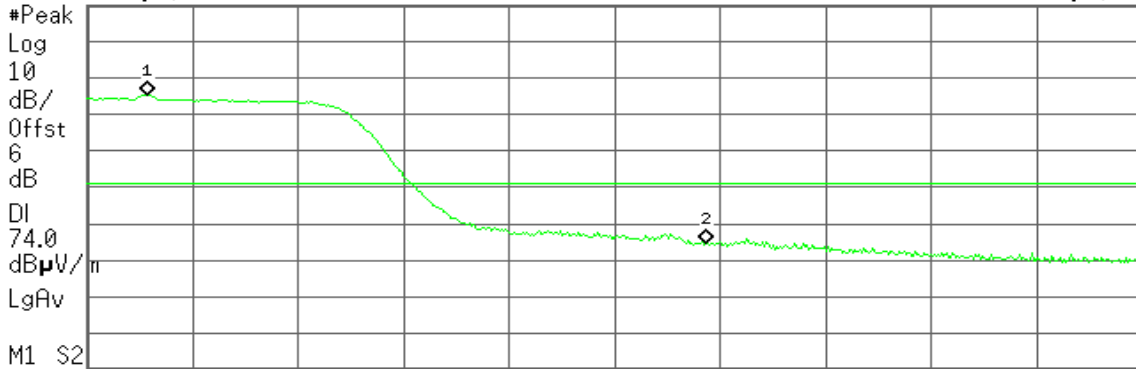
R T

Mkr1 2.462 27 GHz

98.25 dBμV/m

Ref 123 dBμV/m

#Atten 20 dB



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	2.462 27 GHz	98.25 dBμV/m
2	(1)	Freq	2.483 50 GHz	57.48 dBμV/m

Detector mode: Average

Polarity: Vertical

Agilent 16:49:23 Jan 22, 2011

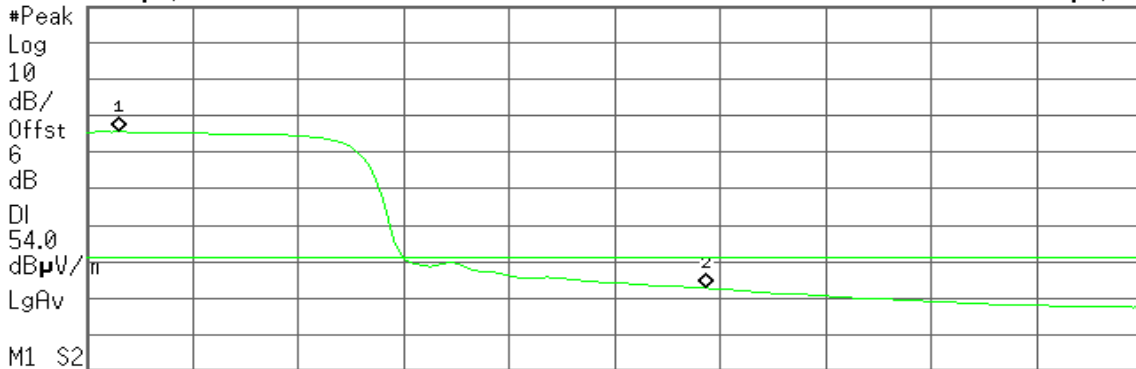
R T

Mkr1 2.461 20 GHz

88.60 dBμV/m

Ref 123 dBμV/m

#Atten 20 dB



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	88.60 dBμV/m
2	(1)	Freq	2.483 50 GHz	45.74 dBμV/m



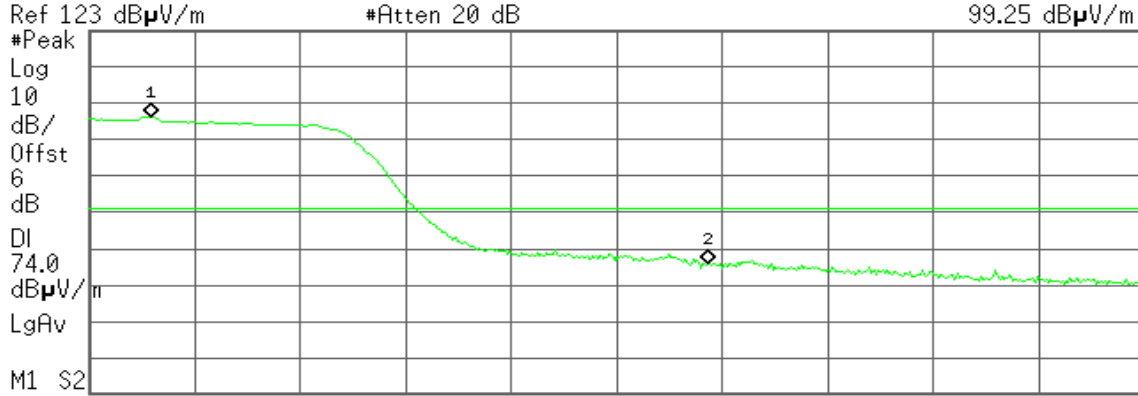
Detector mode: Peak

Polarity: Horizontal

Agilent 16:44:04 Jan 22, 2011

R T

Mkr1 2.462 33 GHz
99.25 dBµV/m



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.462 33 GHz	99.25 dBµV/m
2	(1)	Freq	2.483 50 GHz	58.74 dBµV/m

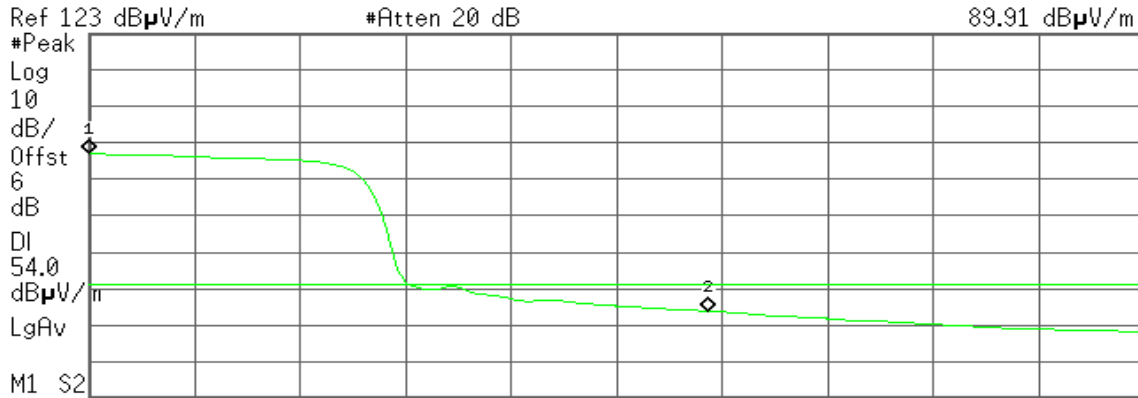
Detector mode: Average

Polarity: Horizontal

Agilent 16:44:41 Jan 22, 2011

R T

Mkr1 2.460 00 GHz
89.91 dBµV/m



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.460 00 GHz	89.91 dBµV/m
2	(1)	Freq	2.483 50 GHz	46.85 dBµV/m

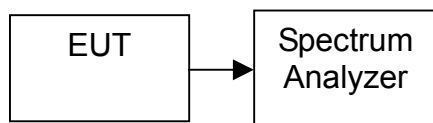


7.5 PEAK POWER SPECTRAL DENSITY

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	-17.16	8.00	PASS
Mid	2437	-17.01		PASS
High	2462	-17.14		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-16.47	8.00	PASS
Mid	2437	-16.15		PASS
High	2462	-16.25		PASS

Test mode: draft 802.11n 20 MHz Channel mode

Channel	Frequency (MHz)	PPSD (dBm)			Limit (dBm)	Result
		Chain 0	Chain 1	Combination		
Low	2412	-16.16	-13.23	-9.55	8.00	PASS
Mid	2437	-15.50	-12.02	-7.85		PASS
High	2462	-15.52	-12.72	-8.93		PASS

Test mode: draft 802.11n 40 MHz Channel mode

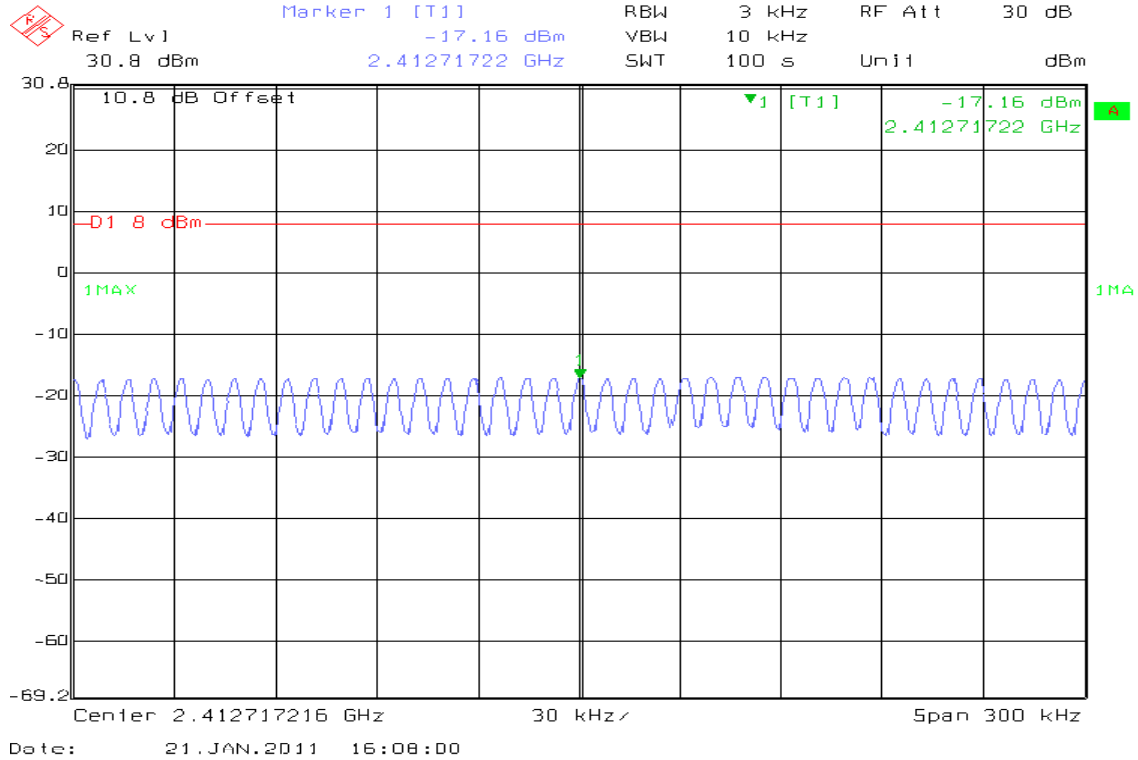
Channel	Frequency (MHz)	PPSD (dBm)			Limit (dBm)	Result
		Chain 0	Chain 1	Combination		
Low	2422	-18.32	-15.15	-11.87	8.00	PASS
Mid	2437	-16.61	-13.60	-10.04		PASS
High	2452	-15.89	-15.07	-10.50		PASS



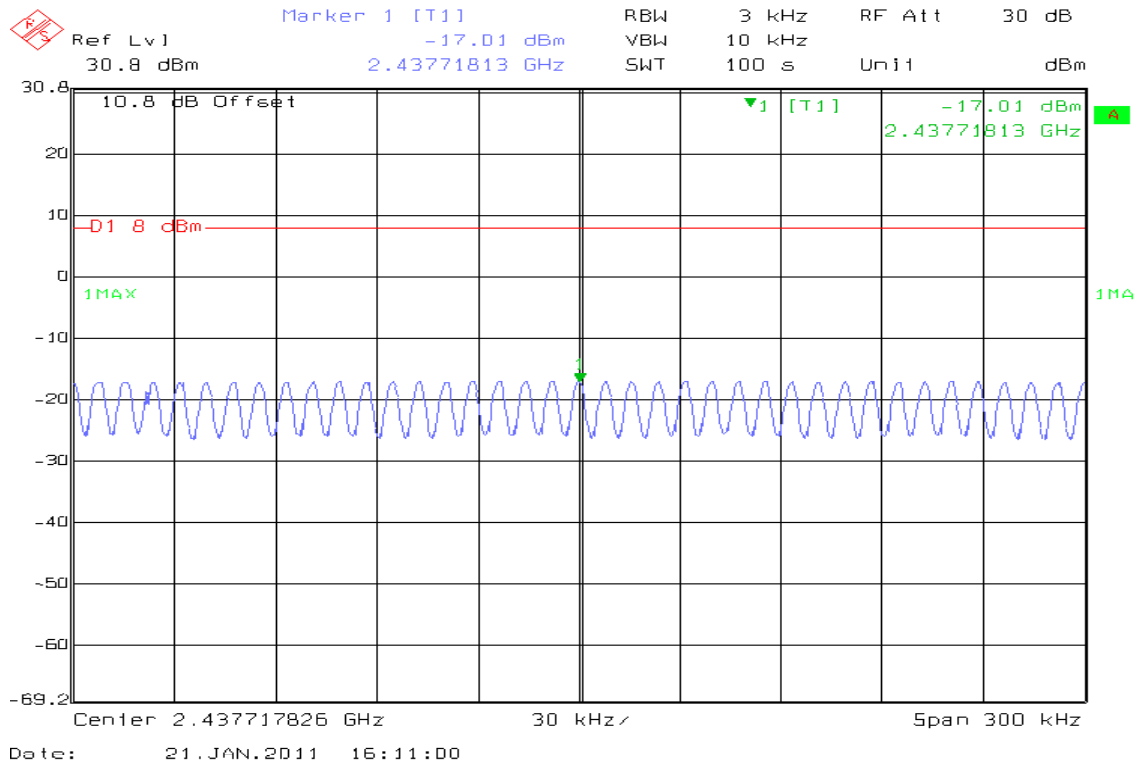
Test Plot

IEEE 802.11b mode

PPSD (CH Low)

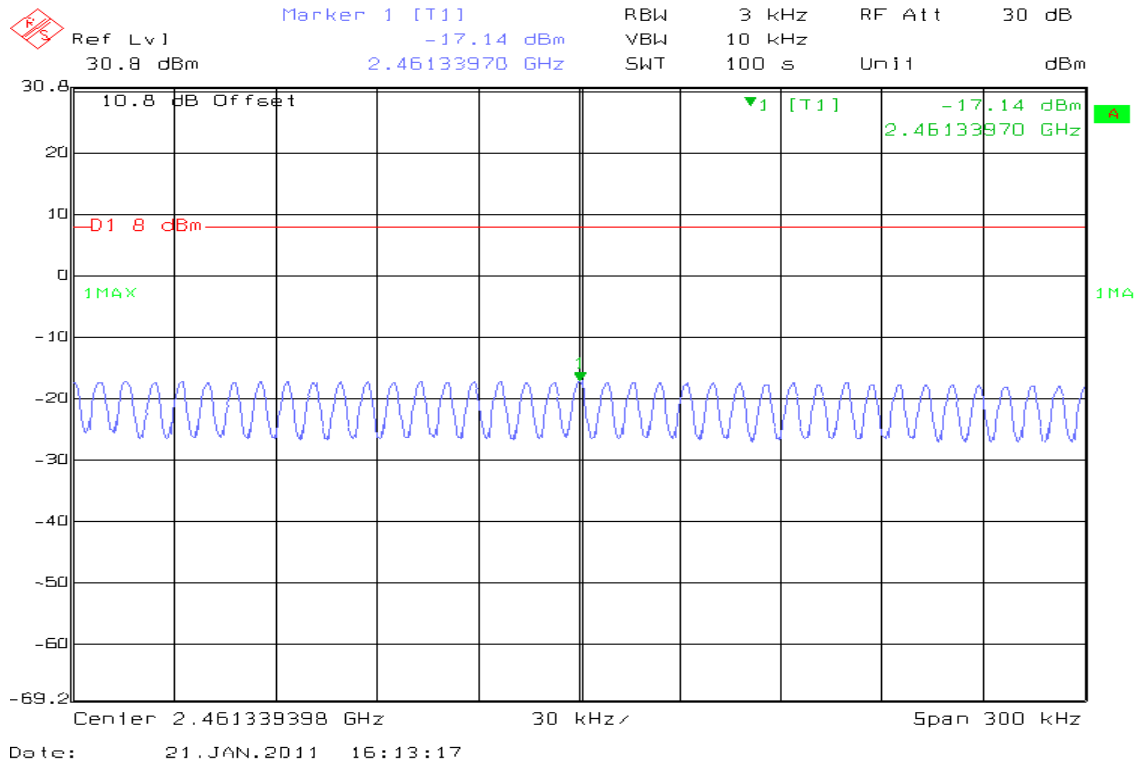


PPSD (CH Mid)



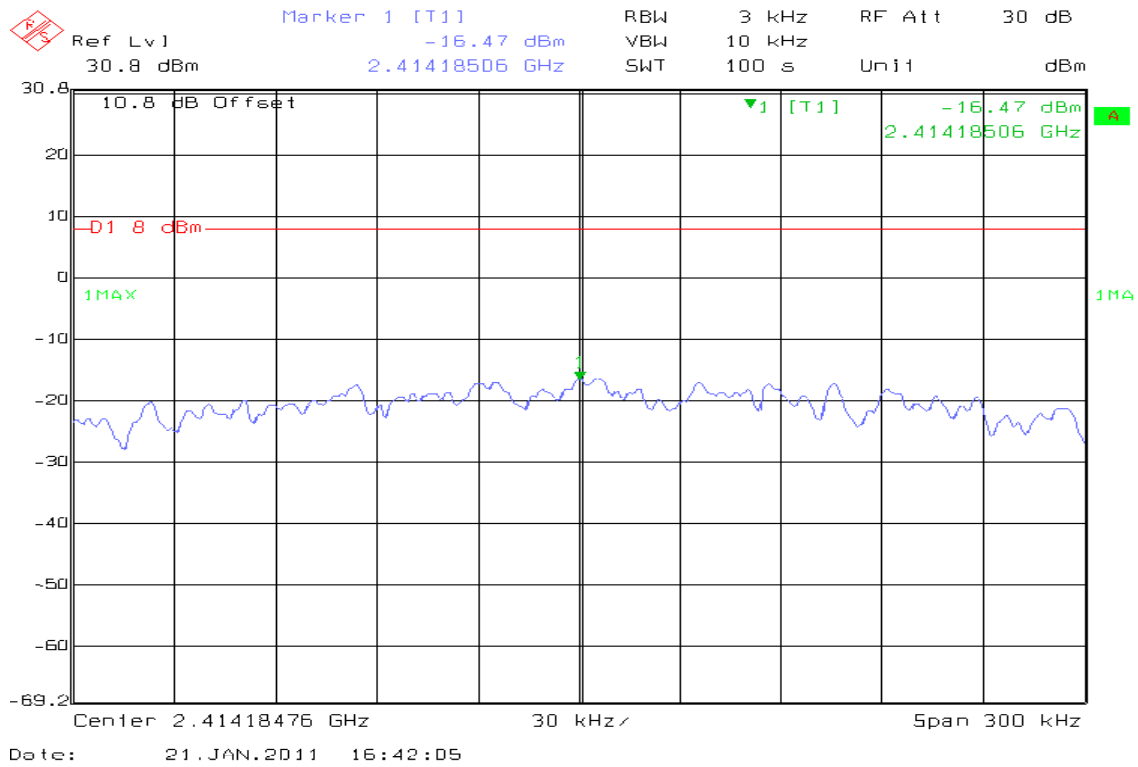


PPSD (CH High)



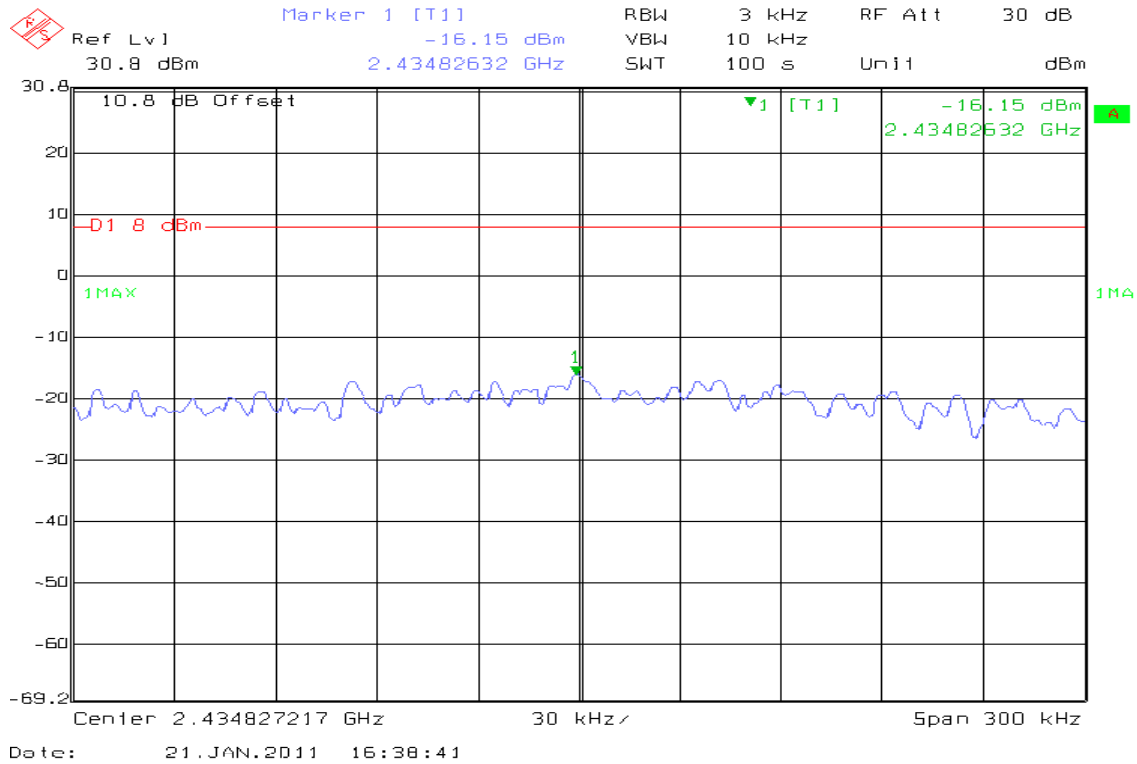
IEEE 802.11g mode

PPSD (CH Low)

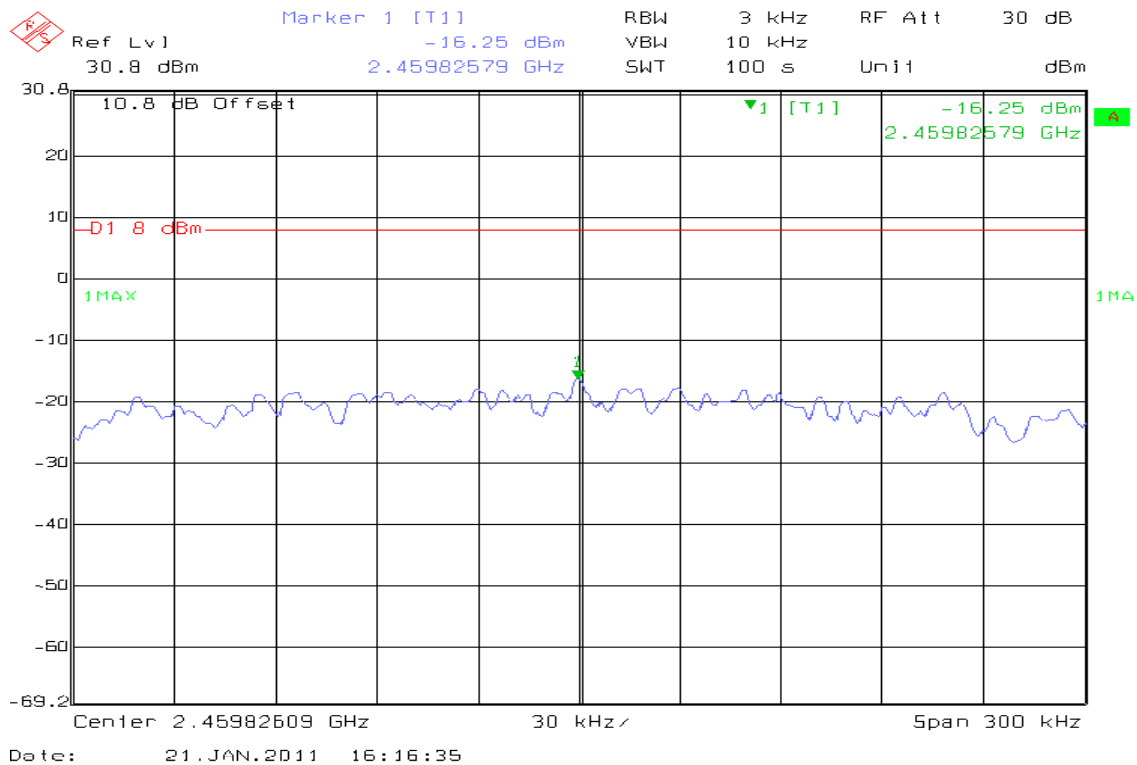




PPSD (CH Mid)



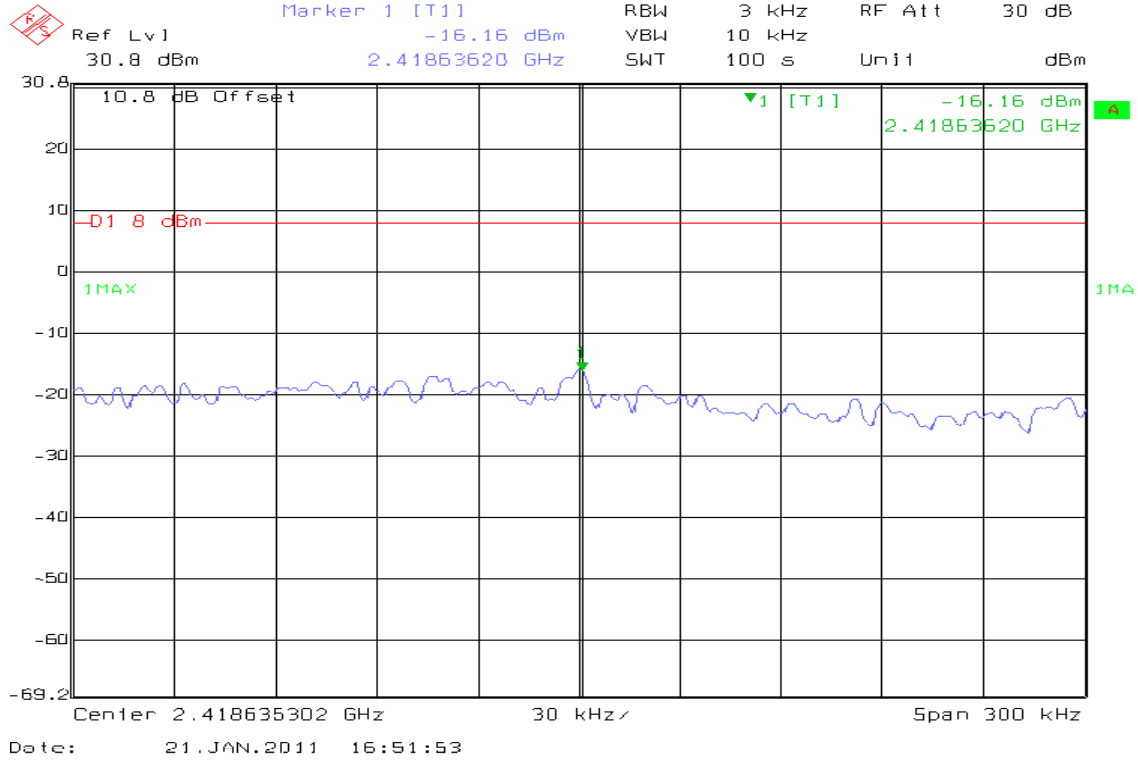
PPSD (CH High)



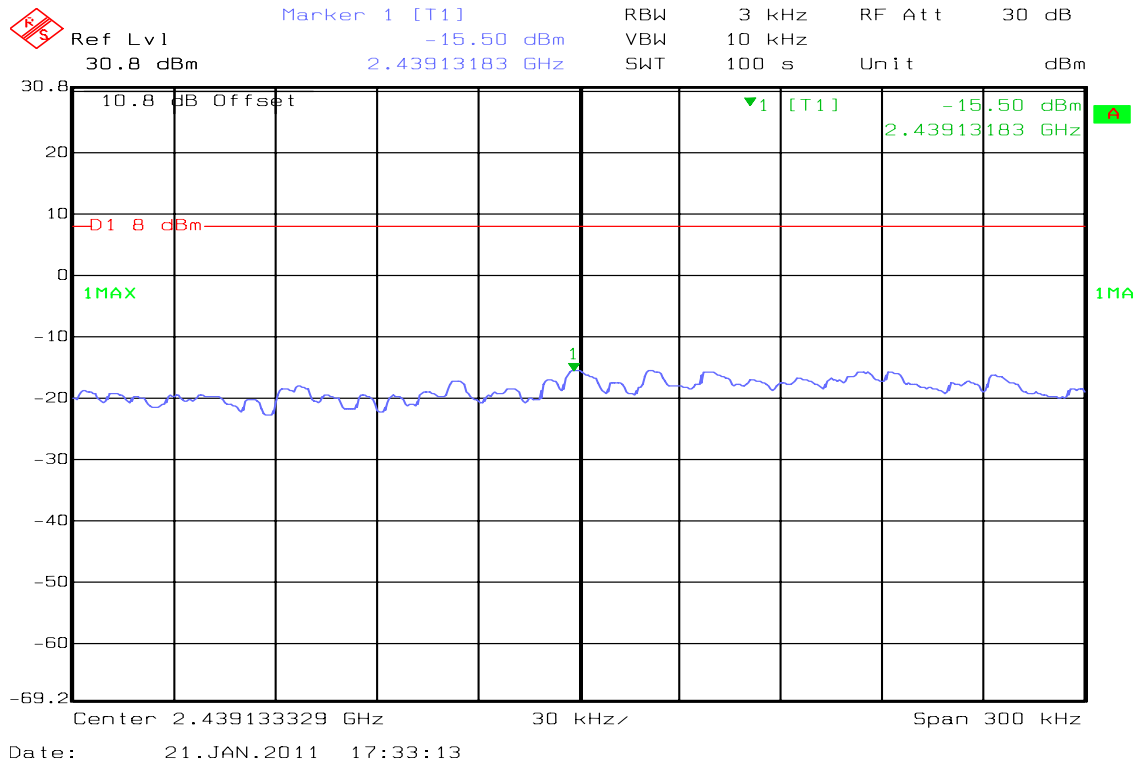


draft 802.11n 20 MHz Channel mode / Chain 0

PPSD (CH Low)

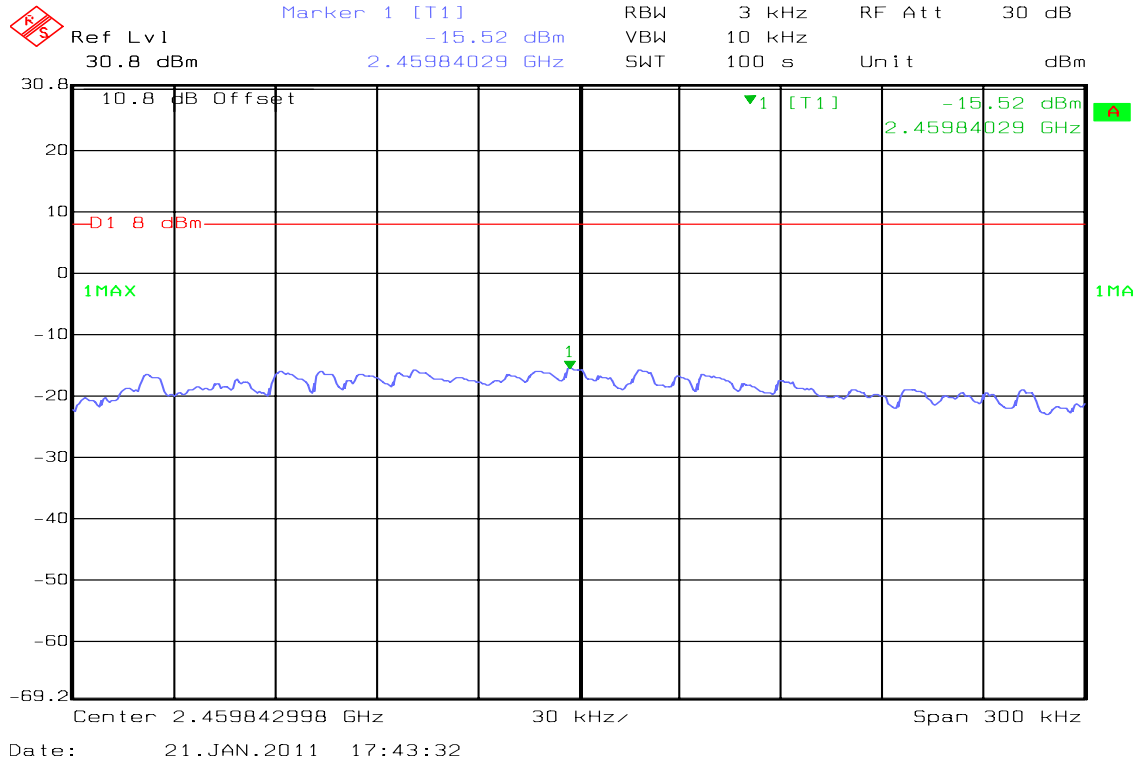


PPSD (CH Mid)



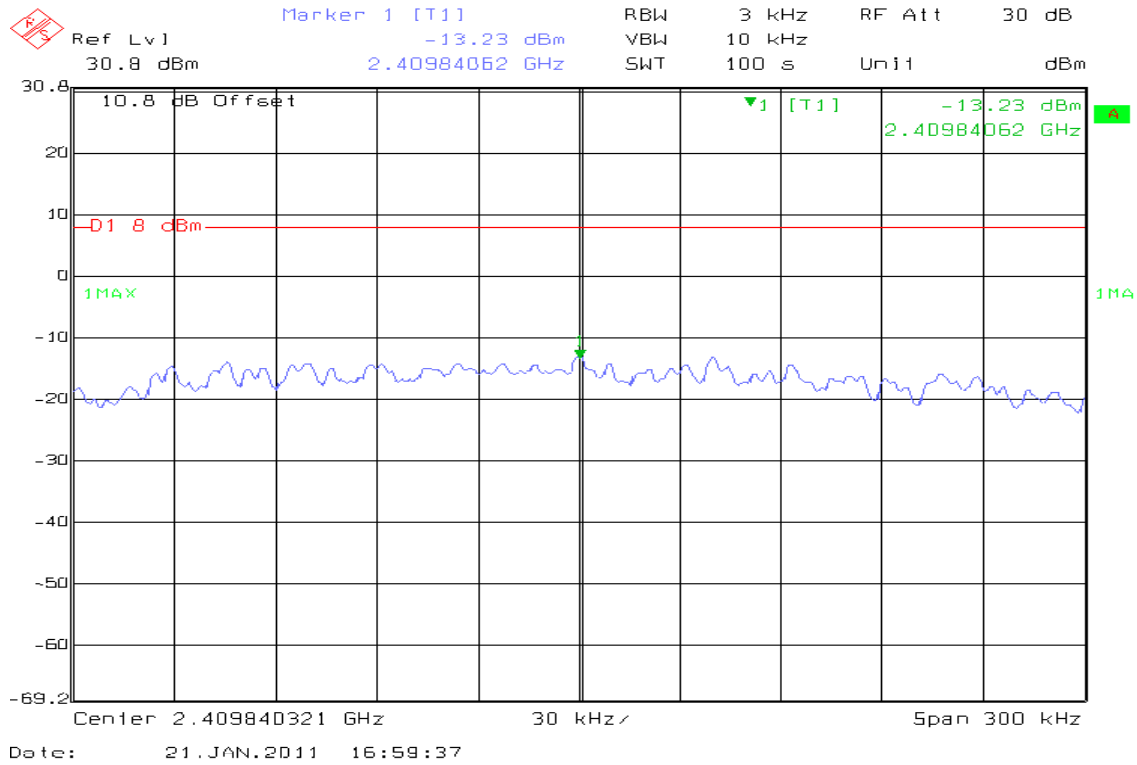


PPSD (CH High)



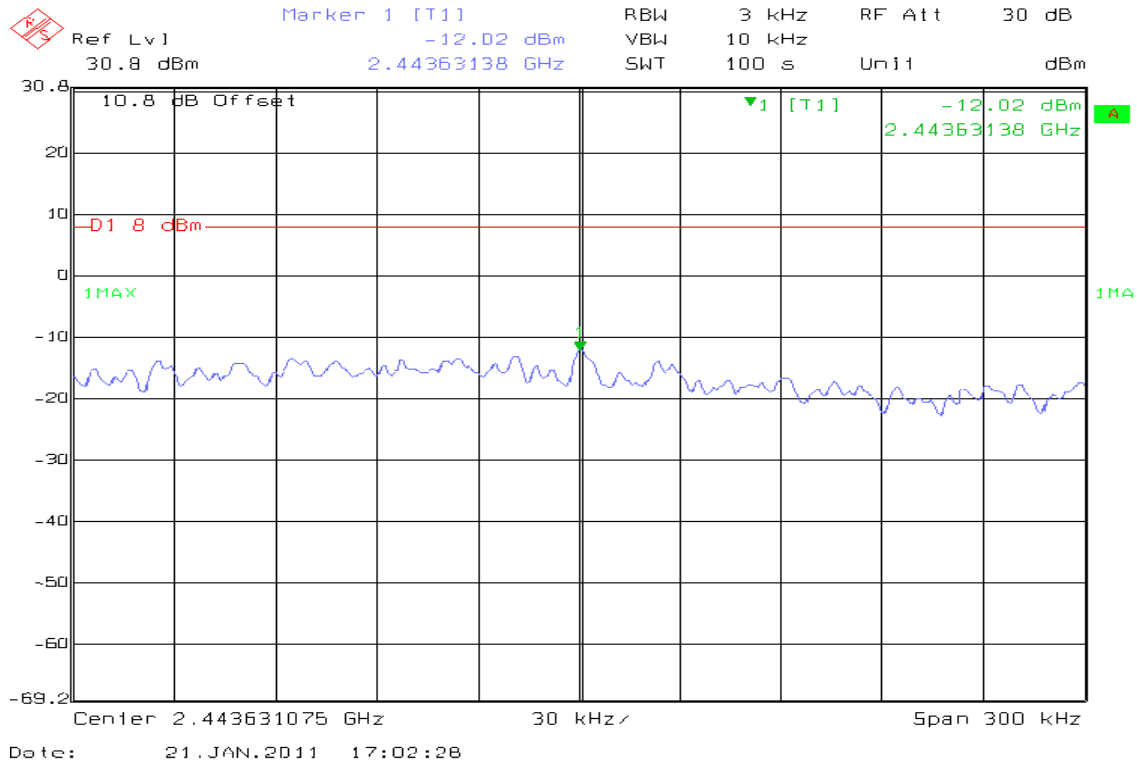
draft 802.11n 20 MHz Channel mode / Chain 1

PPSD (CH Low)

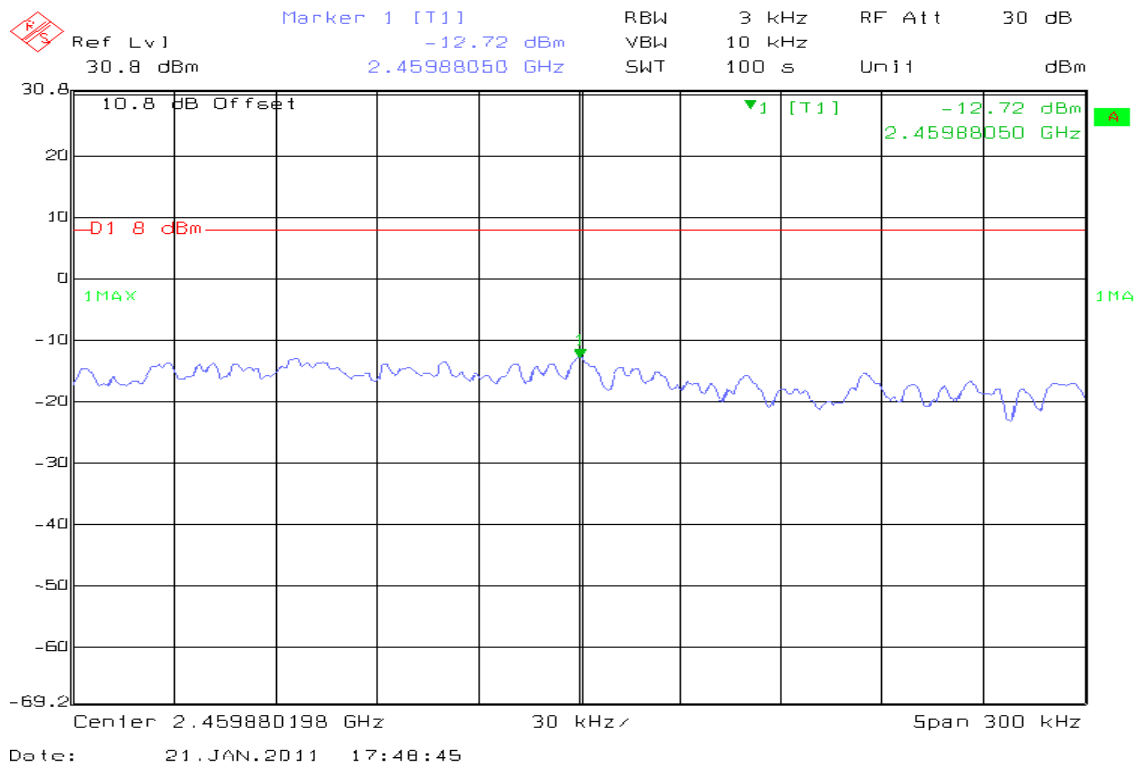




PPSD (CH Mid)



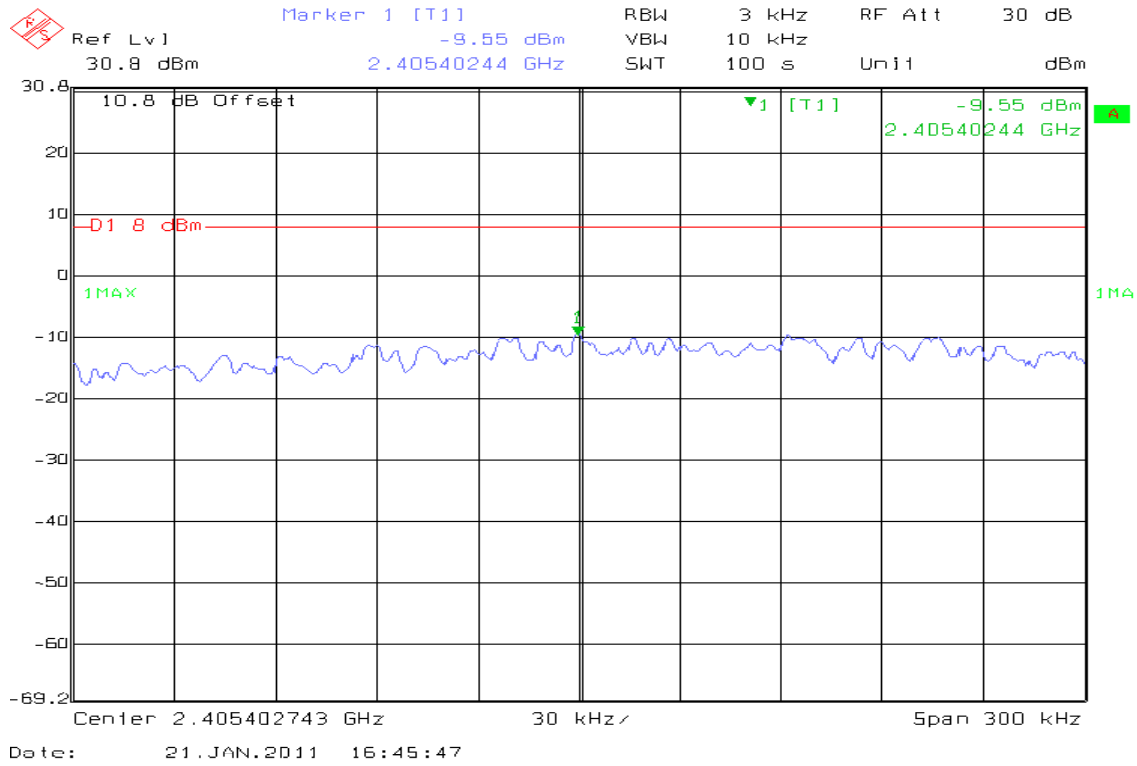
PPSD (CH High)



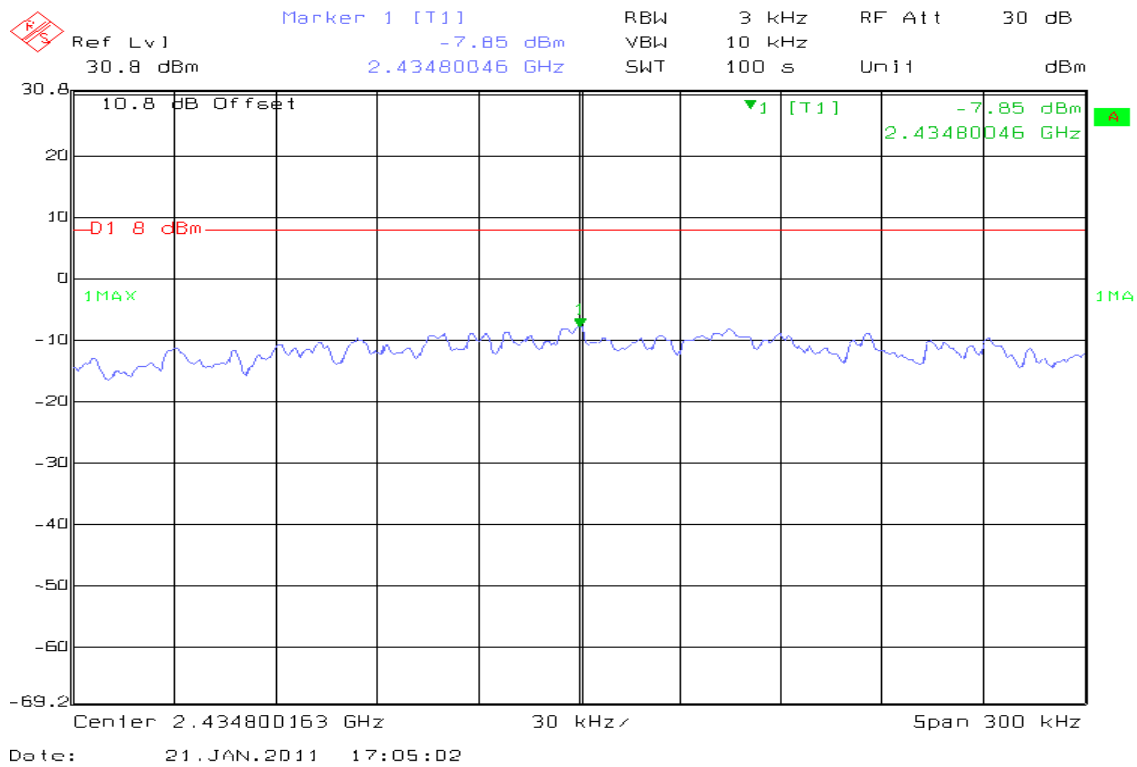


draft 802.11n 20 MHz Channel mode / Combination

PPSD (CH Low)

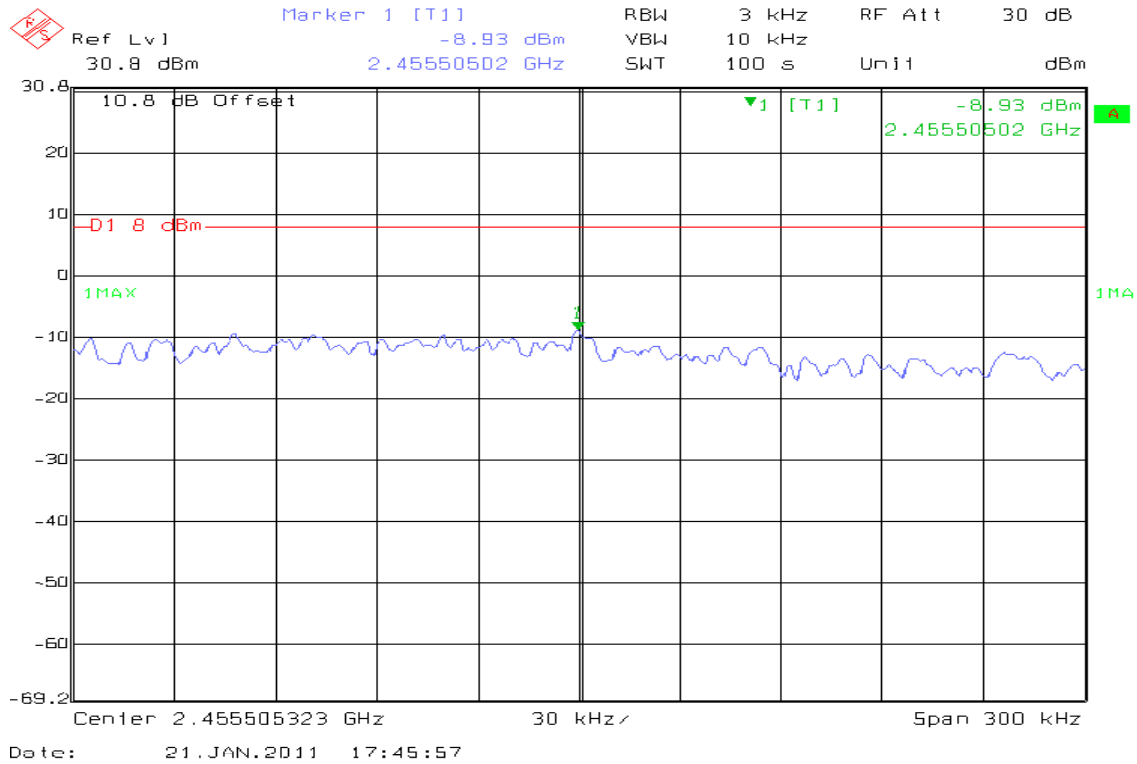


PPSD (CH Mid)



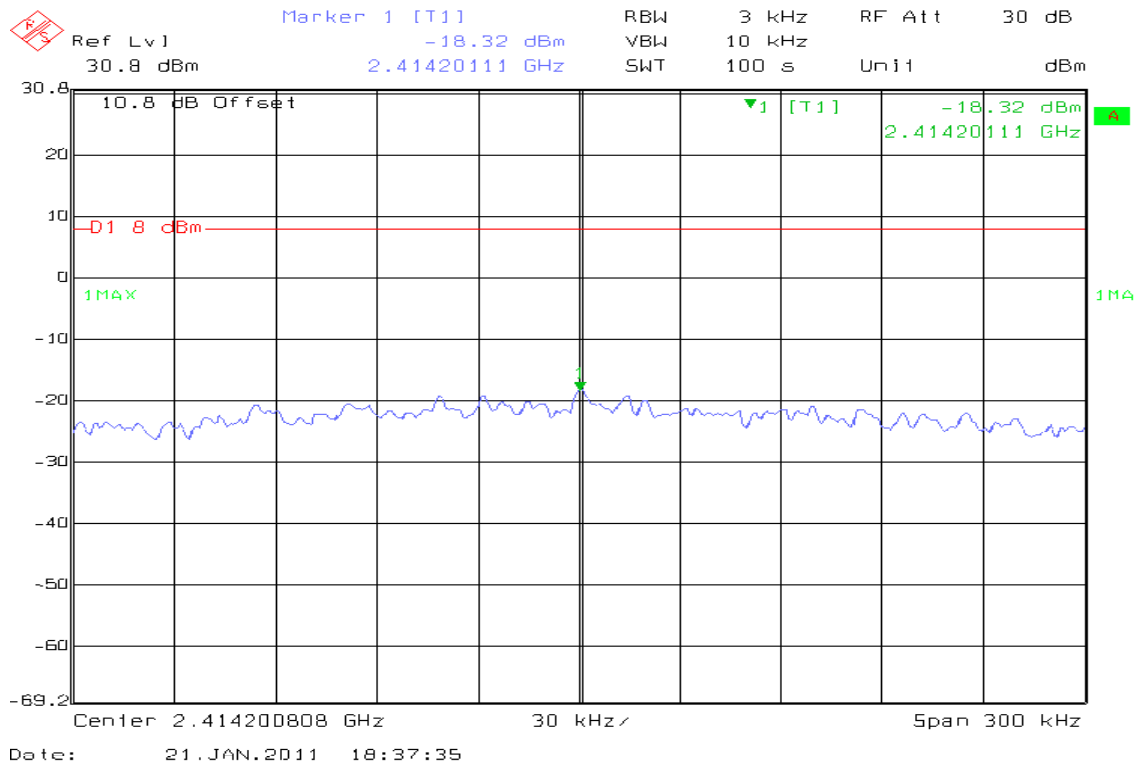


PPSD (CH High)



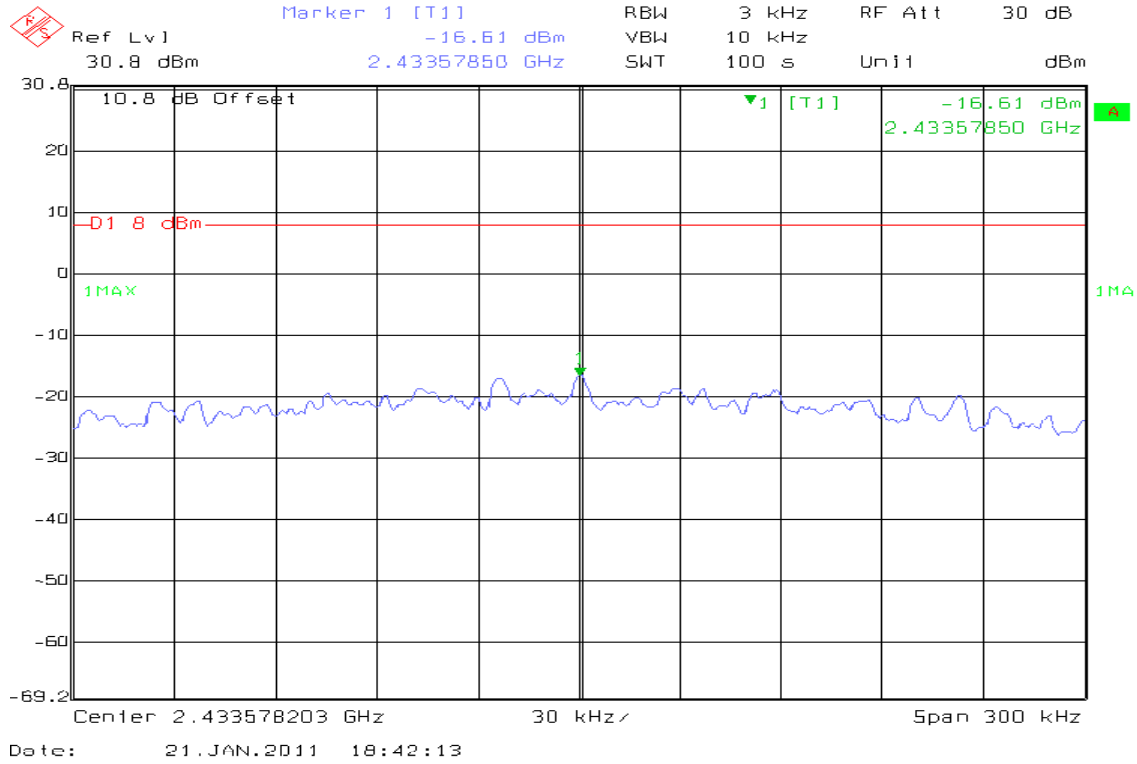
draft 802.11n 40 MHz Channel mode / Chain 0

PPSD (CH Low)

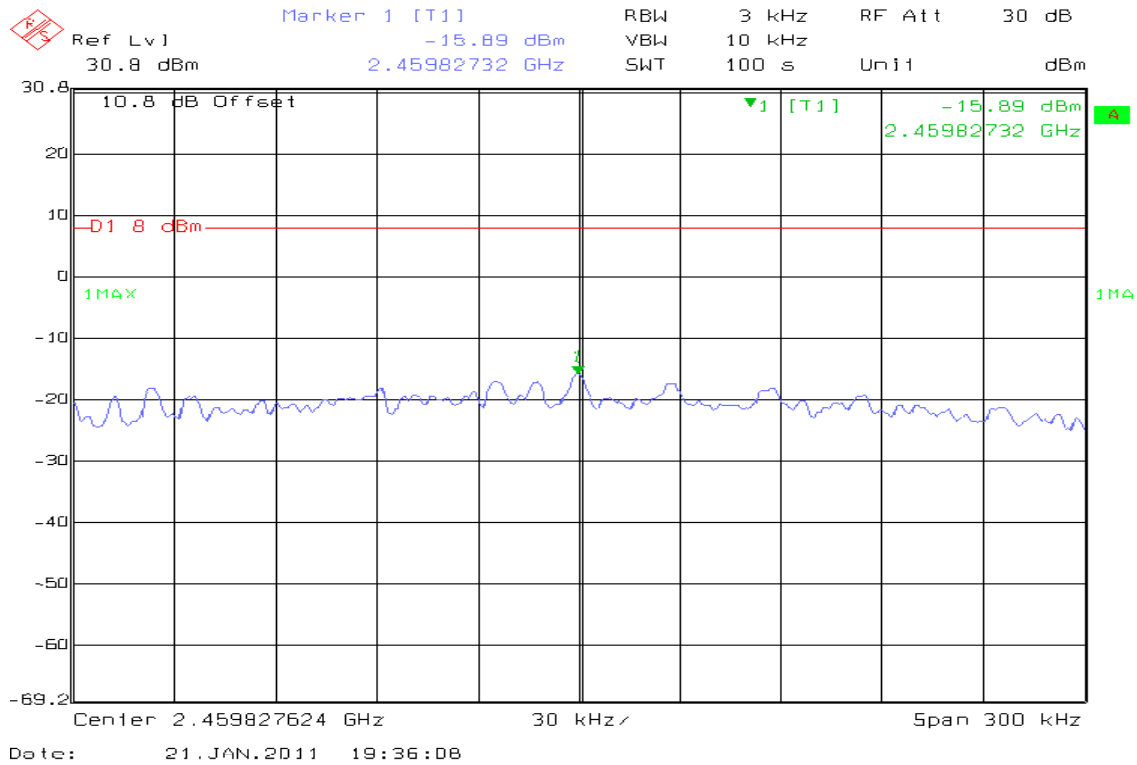




PPSD (CH Mid)



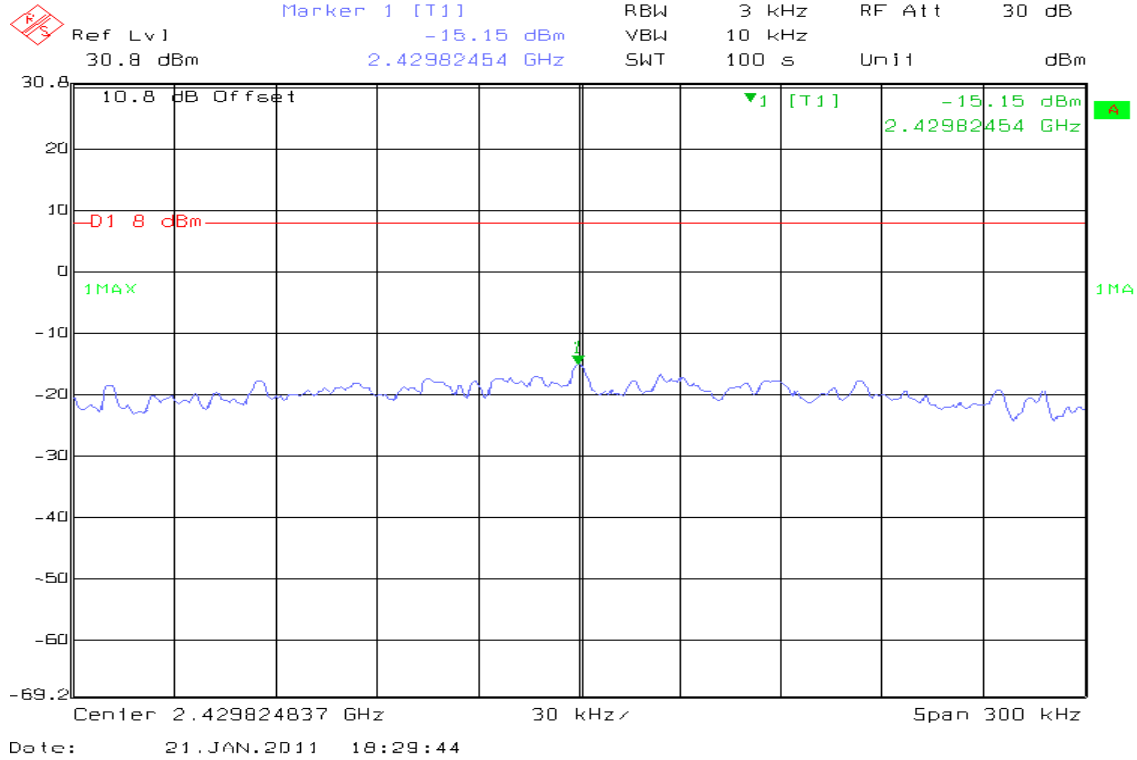
PPSD (CH High)



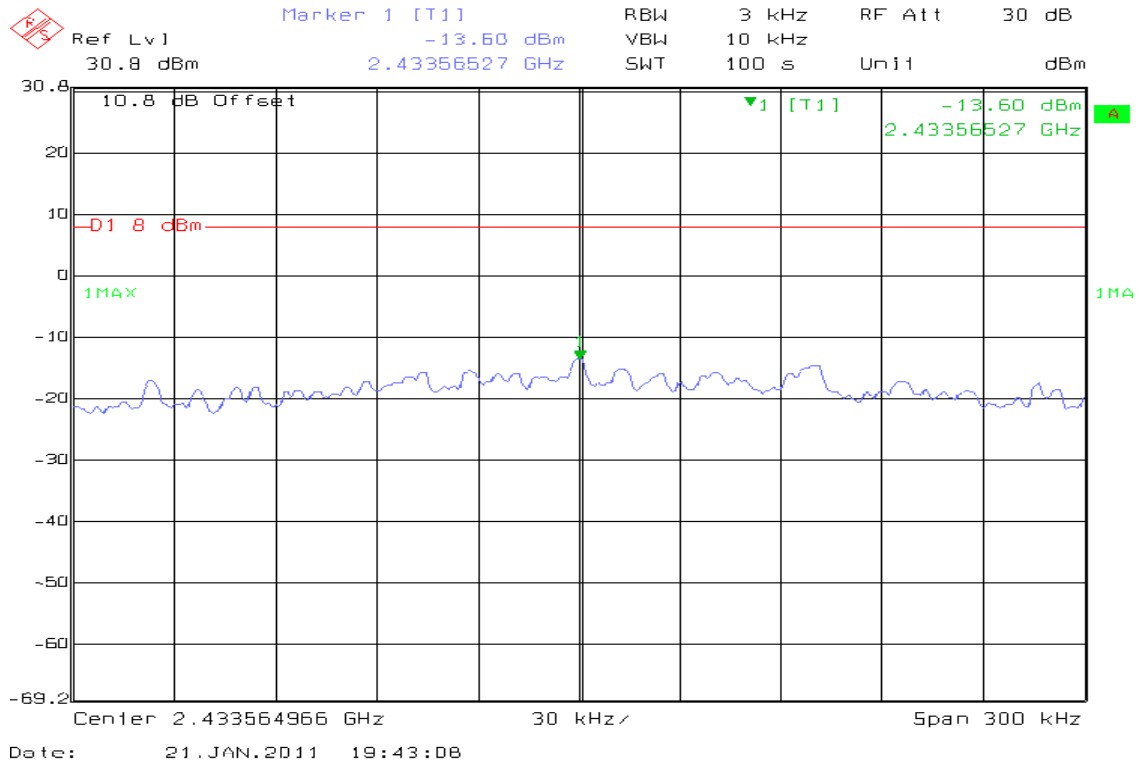


draft 802.11n 40 MHz Channel mode / Chain 1

PPSD (CH Low)

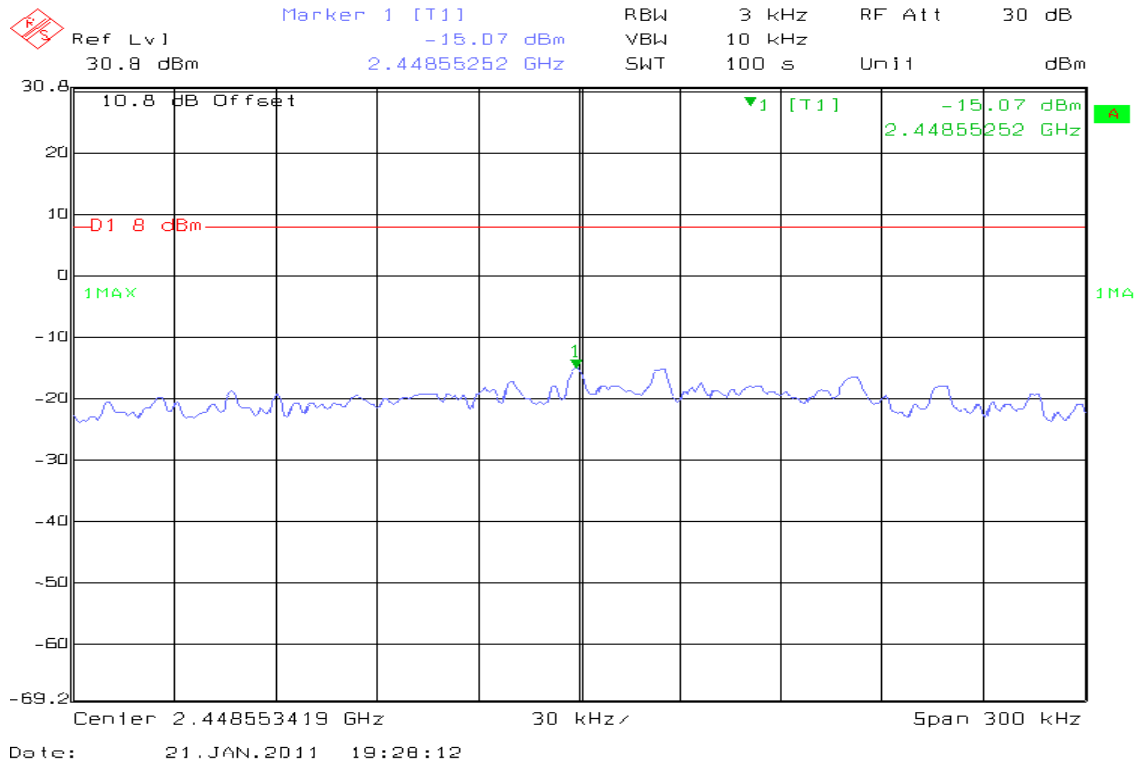


PPSD (CH Mid)



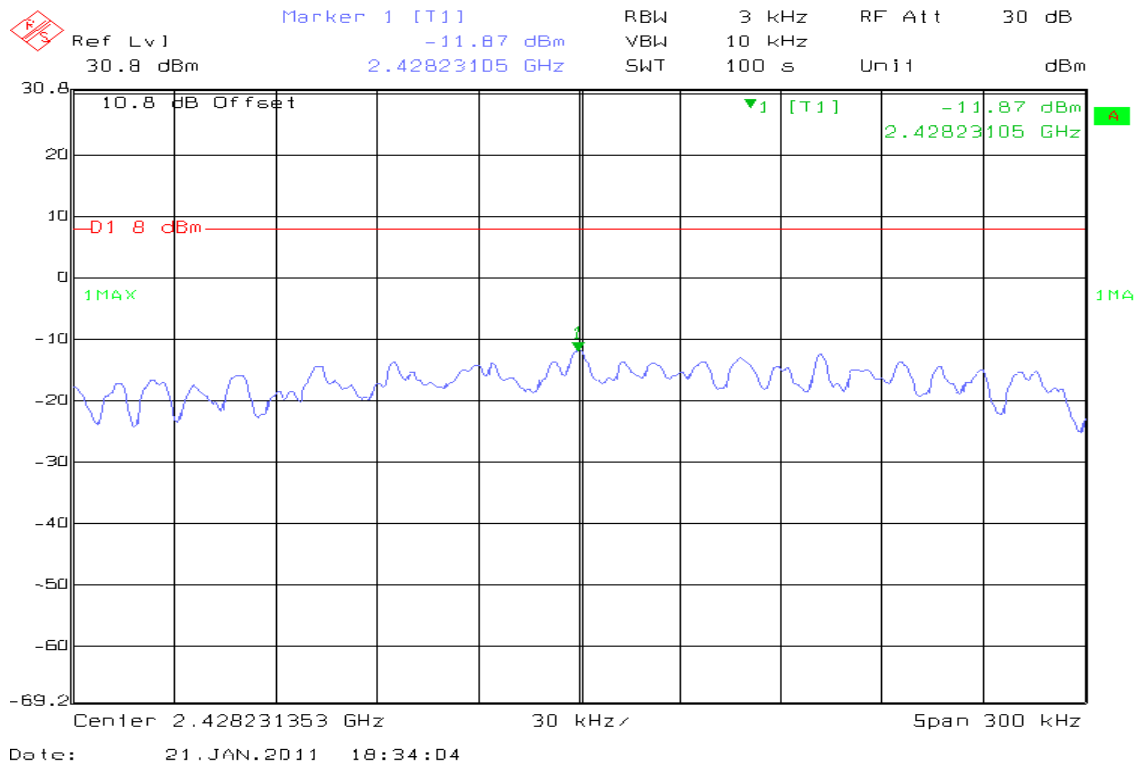


PPSD (CH High)



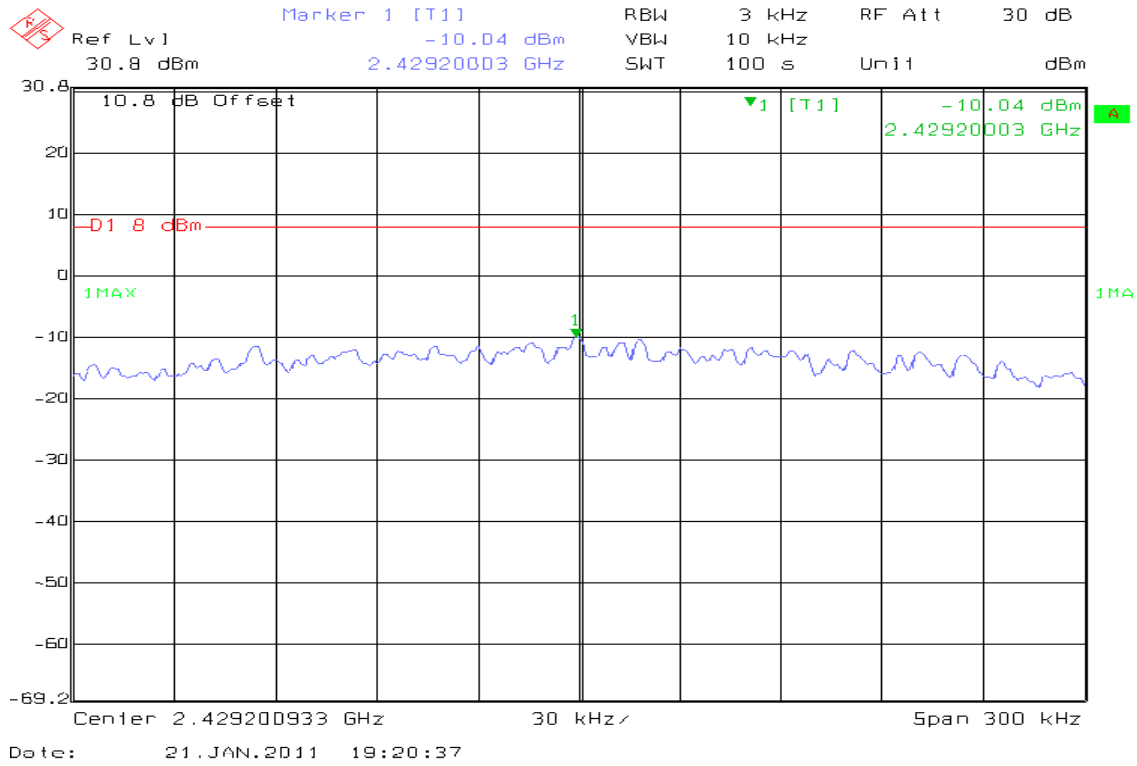
draft 802.11n 40 MHz Channel mode / Combination

PPSD (CH Low)

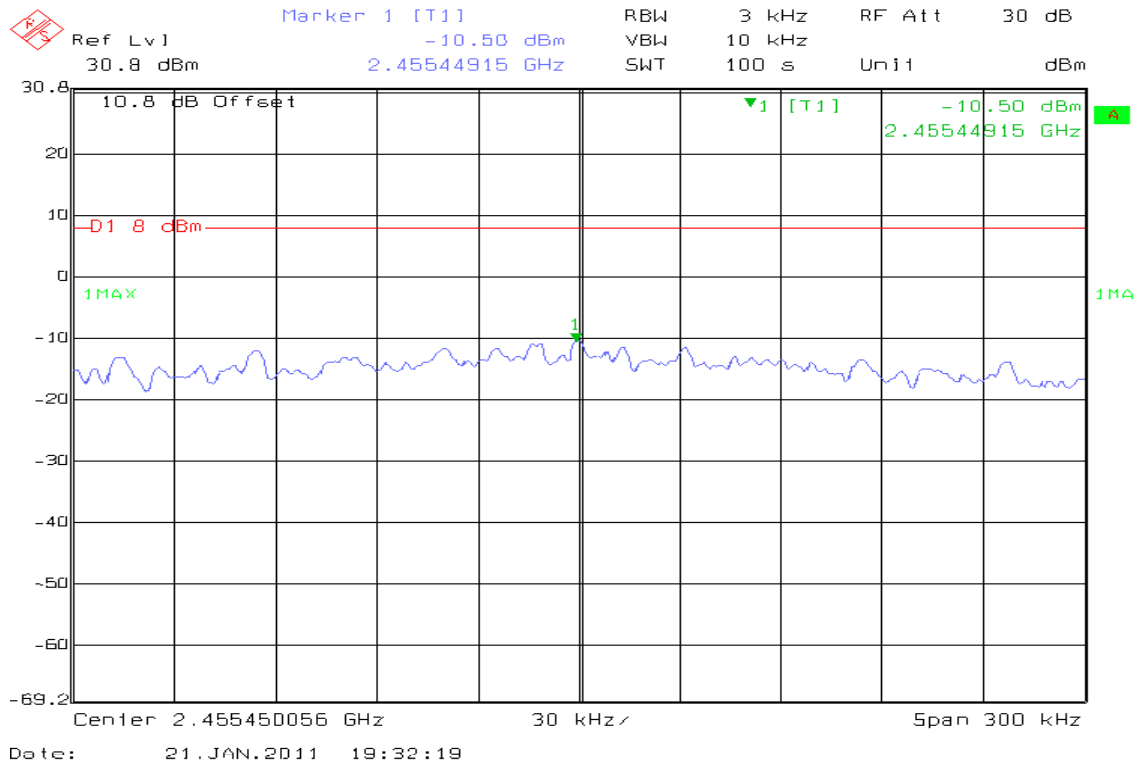




PPSD (CH Mid)



PPSD (CH High)





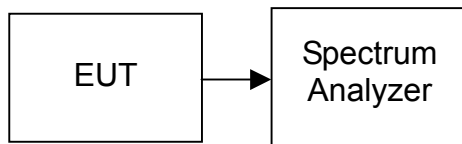
7.6 SPURIOUS EMISSIONS

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.



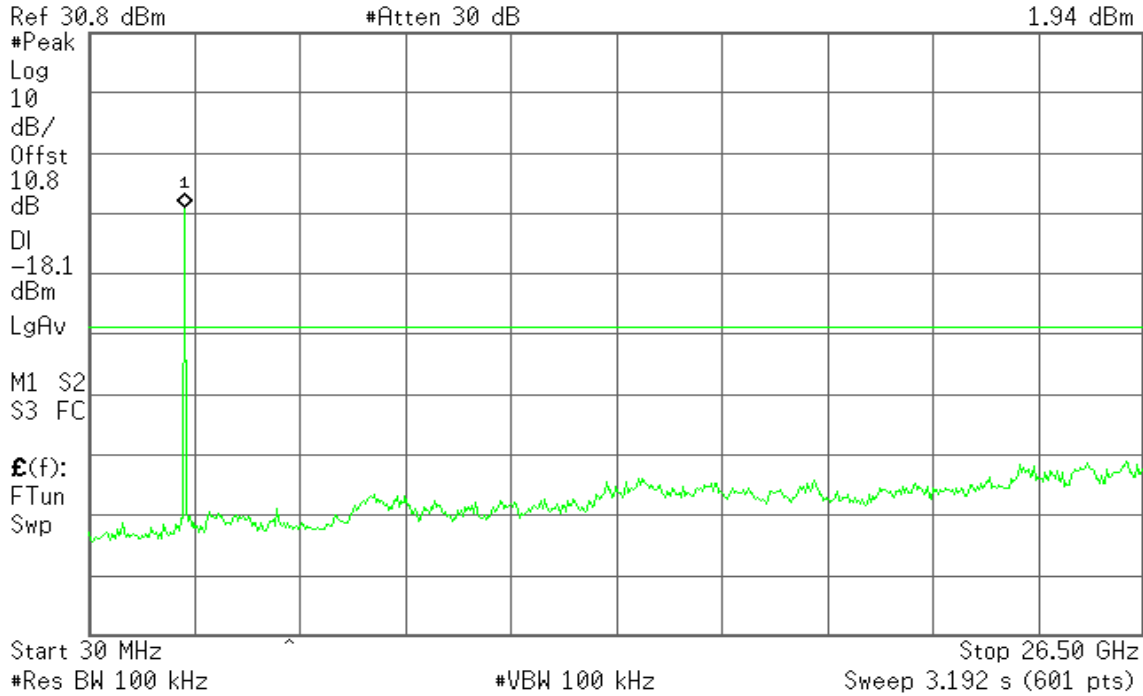
Test Plot

IEEE 802.11b mode

Agilent 14:41:01 Jan 22, 2011

R L

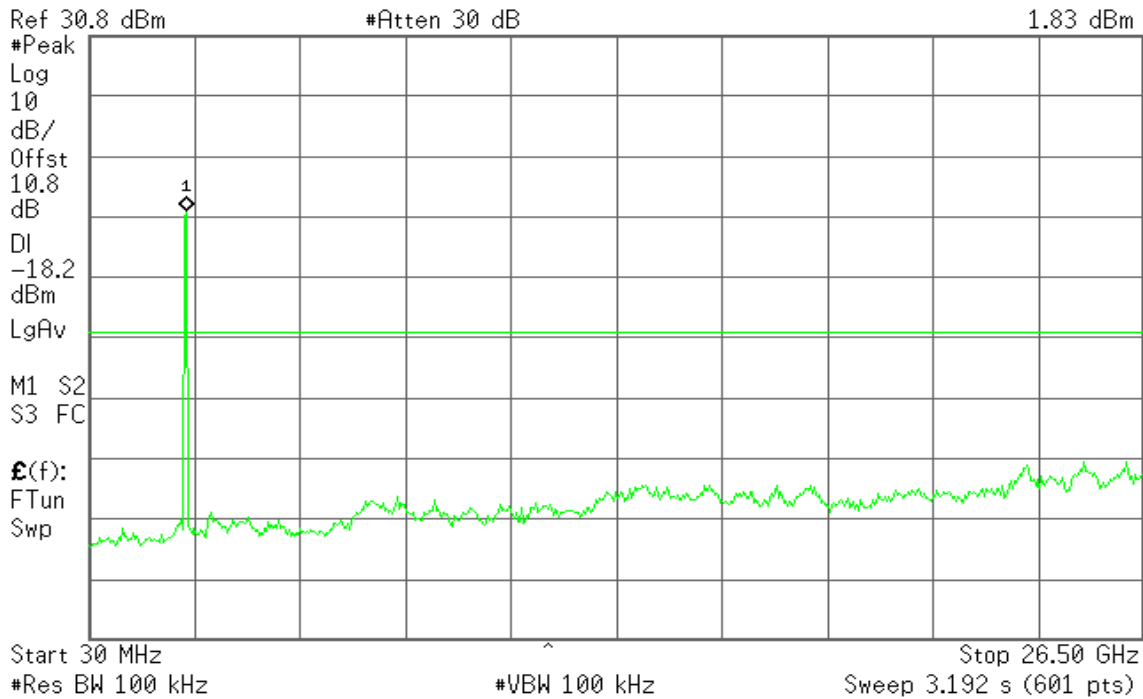
Mkr1 2.41 GHz
1.94 dBm



Agilent 14:43:13 Jan 22, 2011

R L

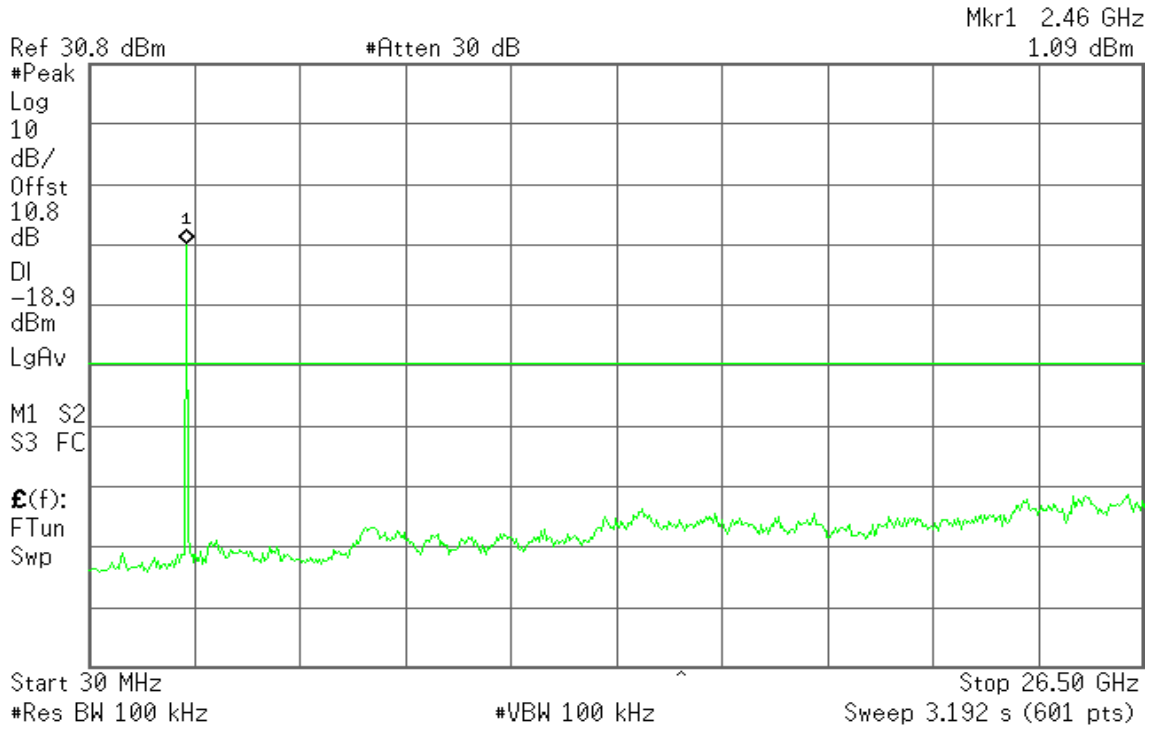
Mkr1 2.46 GHz
1.83 dBm





Agilent 14:45:24 Jan 22, 2011

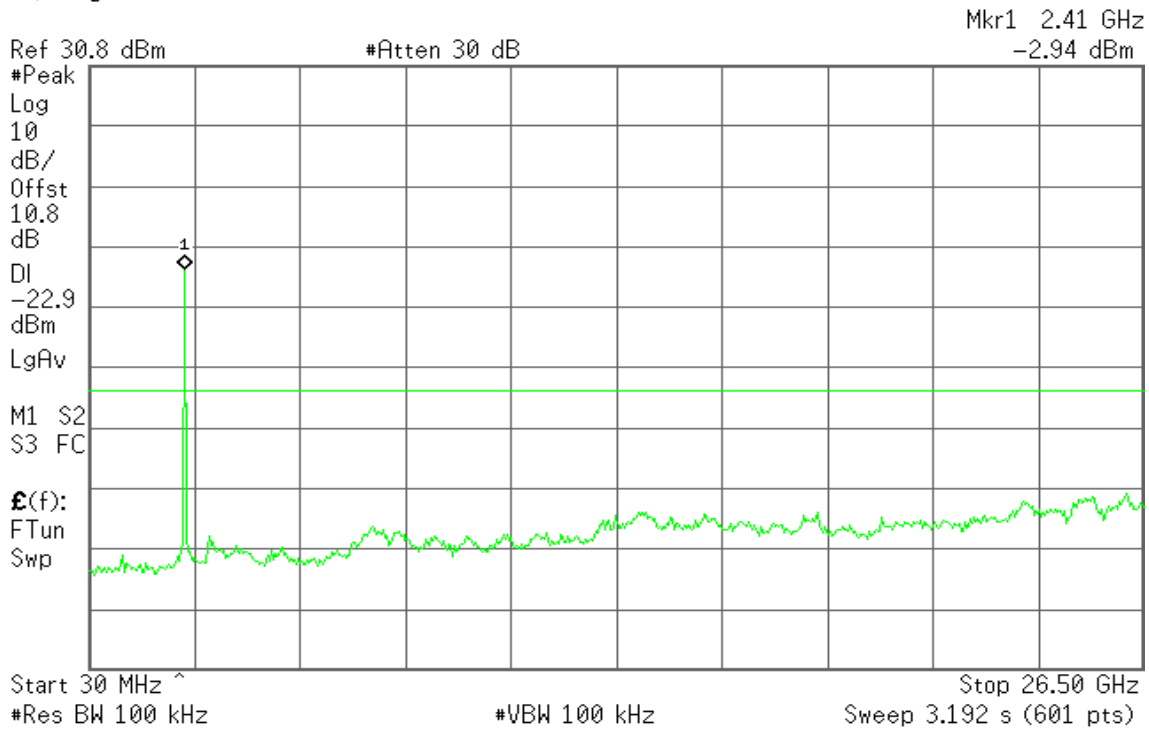
R T



IEEE 802.11g mode

Agilent 14:53:45 Jan 22, 2011

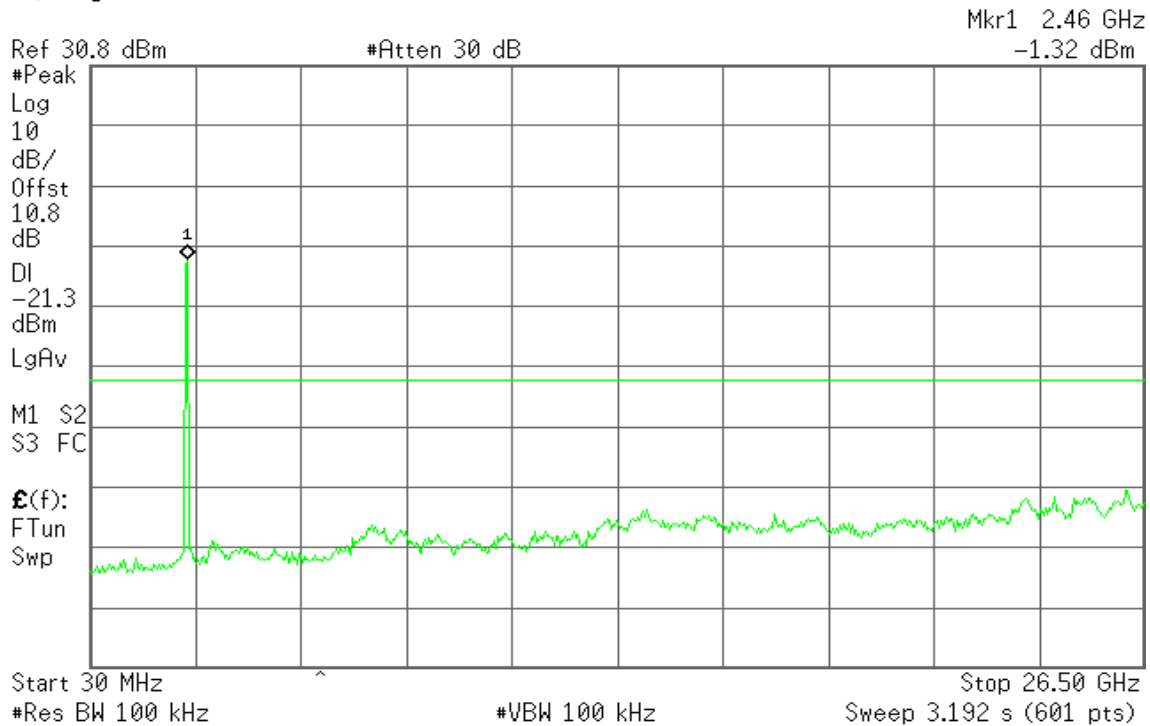
R T





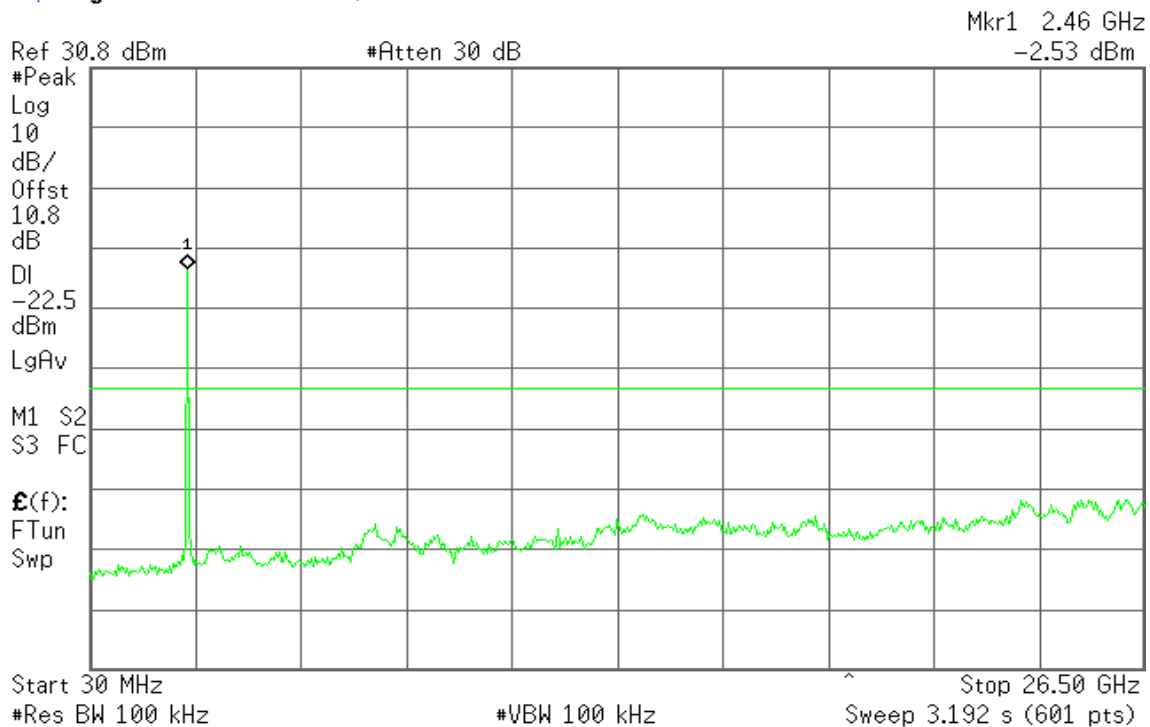
Agilent 14:50:41 Jan 22, 2011

R T



Agilent 14:55:48 Jan 22, 2011

R T



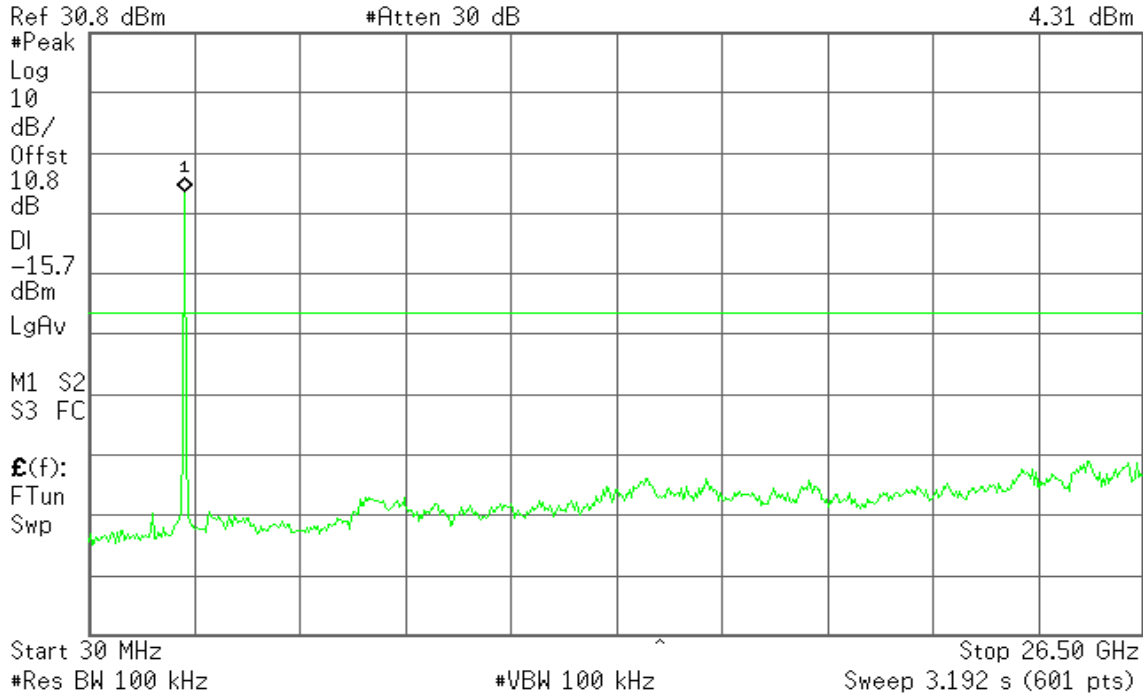


draft 802.11n 20 MHz Channel mode

Agilent 14:57:59 Jan 22, 2011

R T

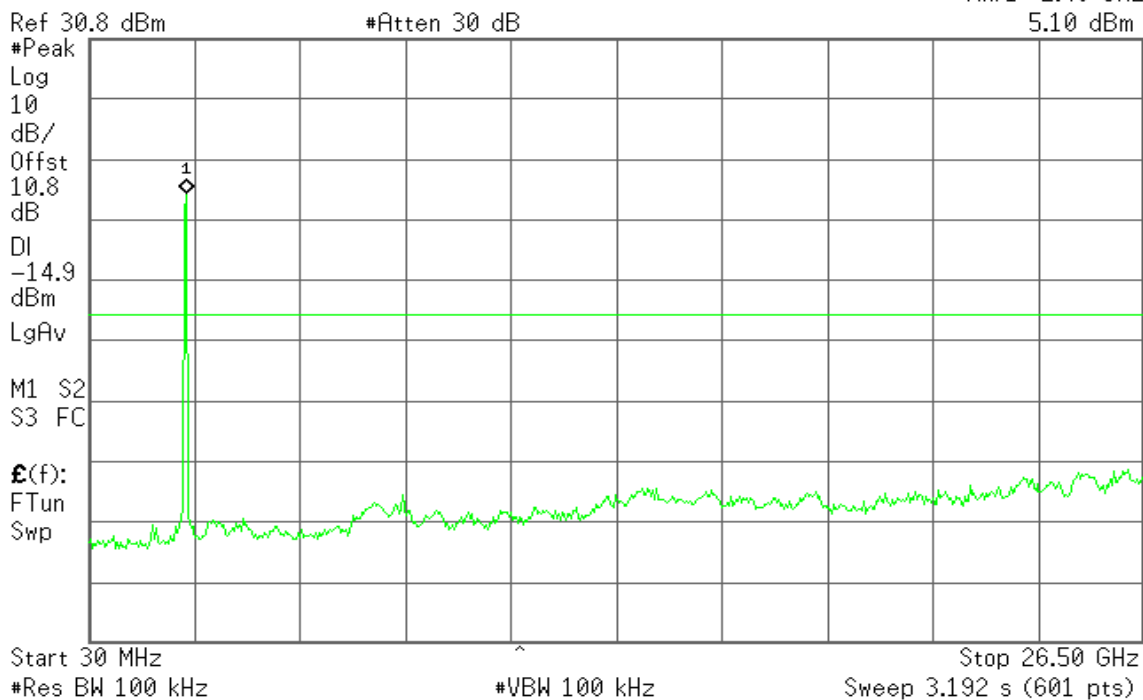
Mkr1 2.41 GHz
4.31 dBm



Agilent 15:07:05 Jan 22, 2011

R T

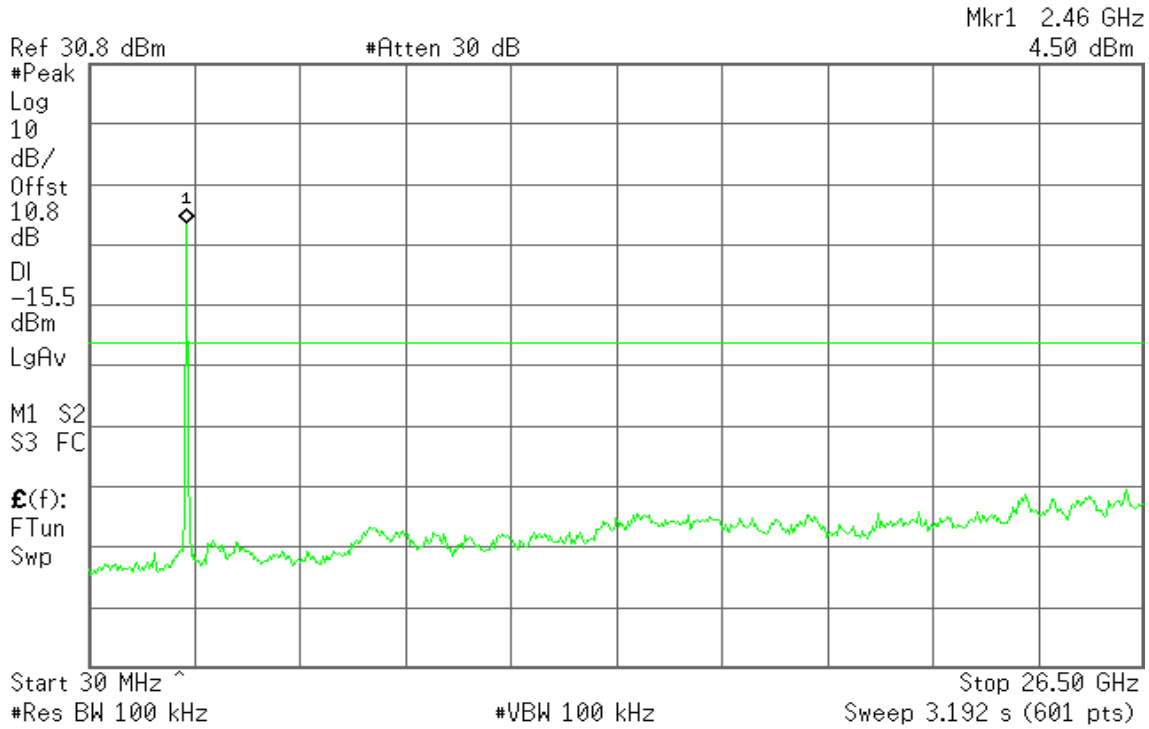
Mkr1 2.46 GHz
5.10 dBm





Agilent 15:09:12 Jan 22, 2011

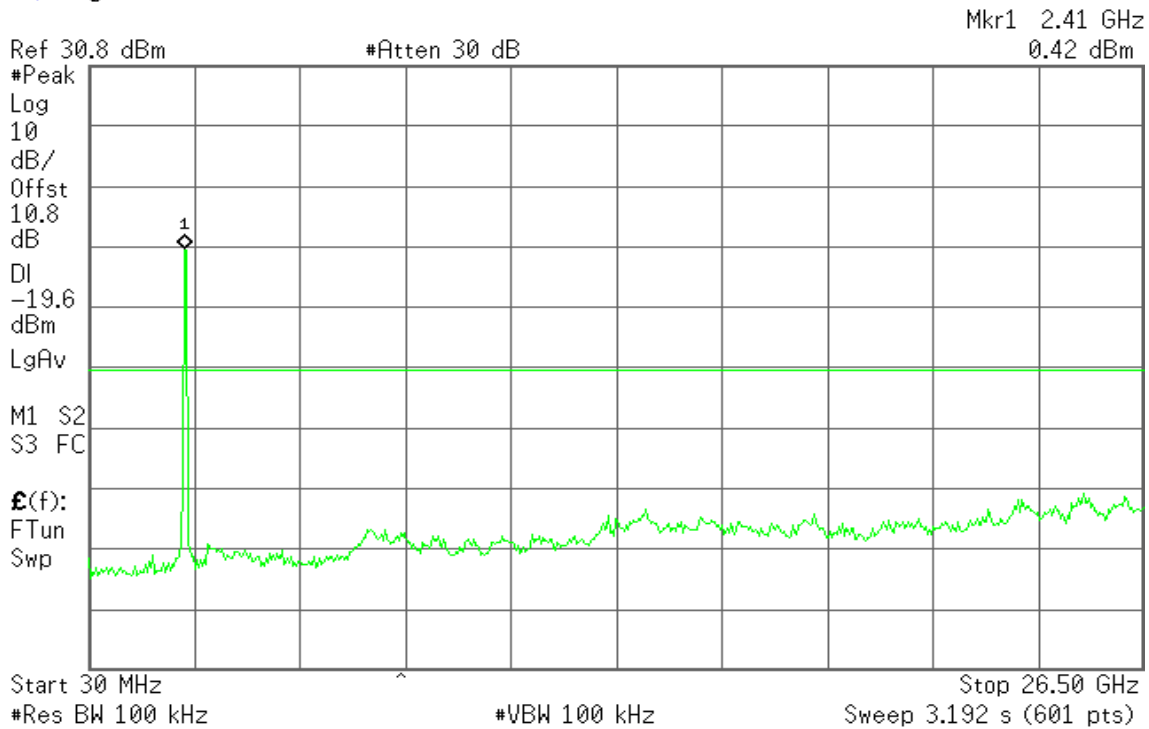
R T



draft 802.11n 40 MHz Channel mode

Agilent 15:21:54 Jan 22, 2011

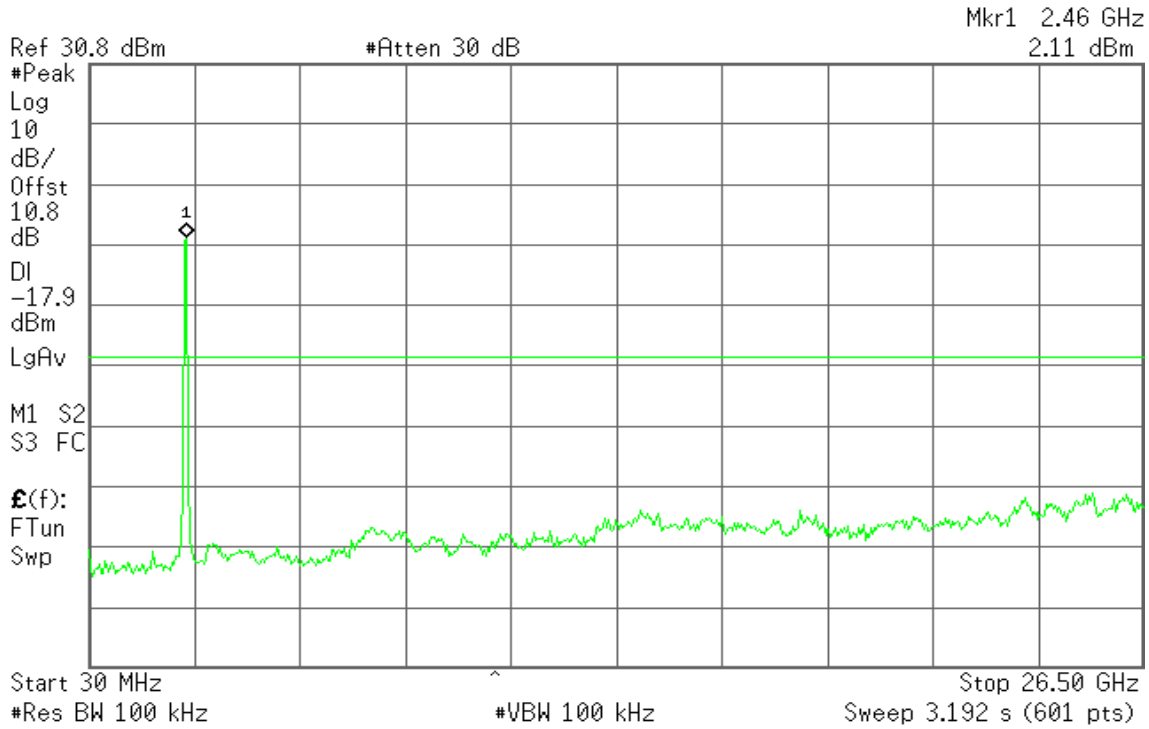
R T





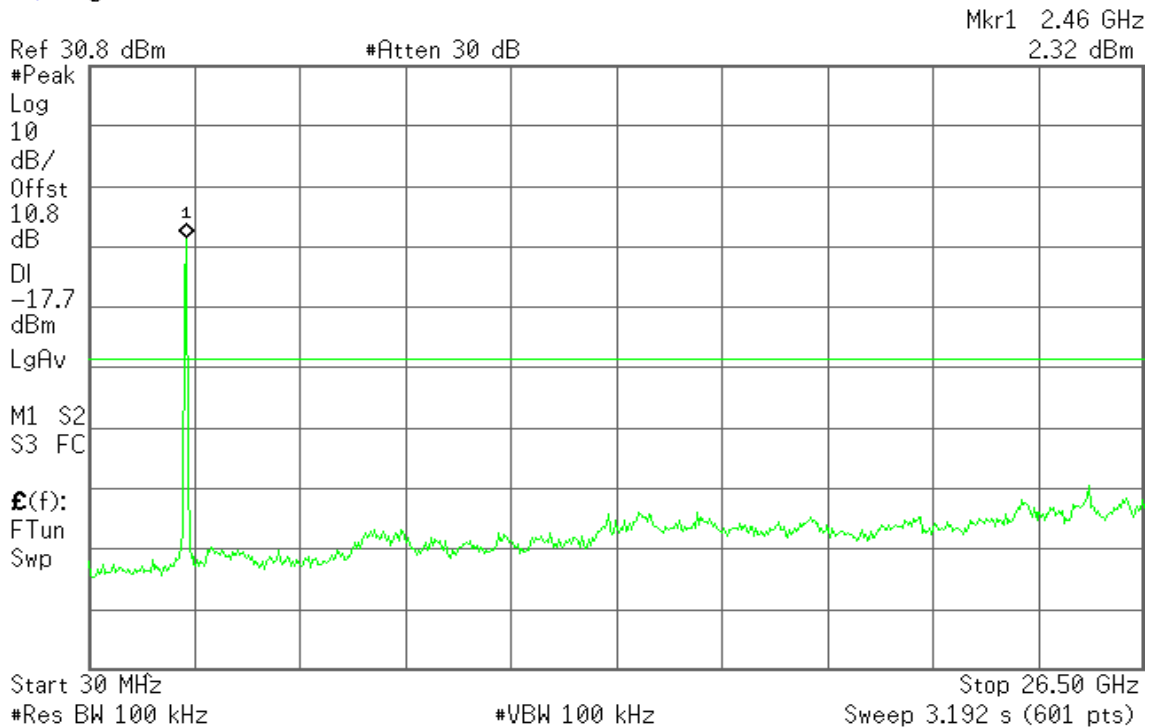
Agilent 15:23:32 Jan 22, 2011

R T



Agilent 15:32:26 Jan 22, 2011

R T





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.

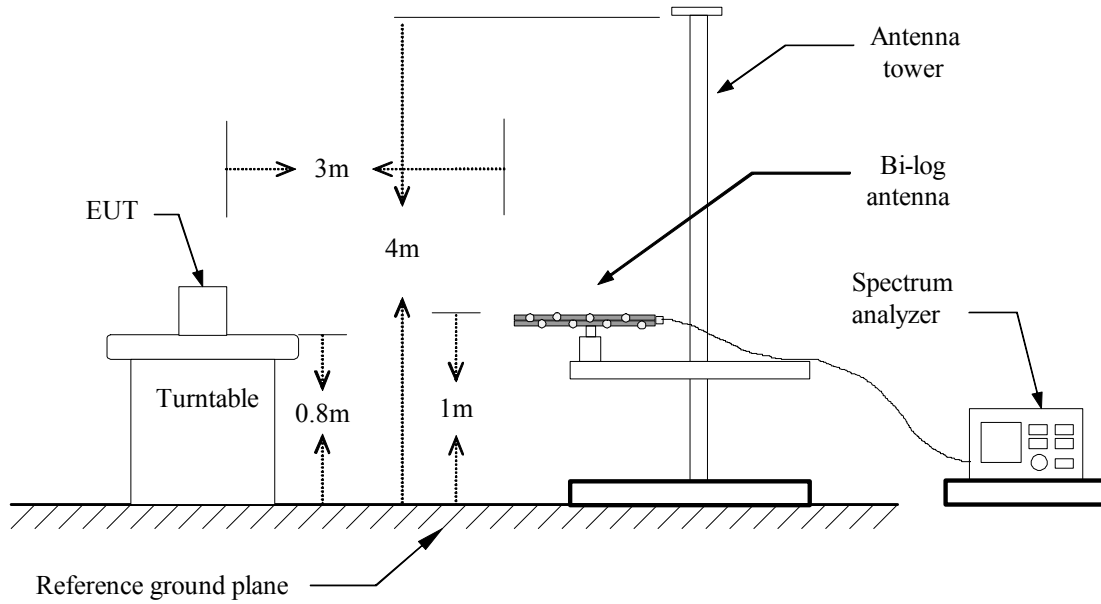
2. In the emission table above, the tighter limit applies at the band edges.

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

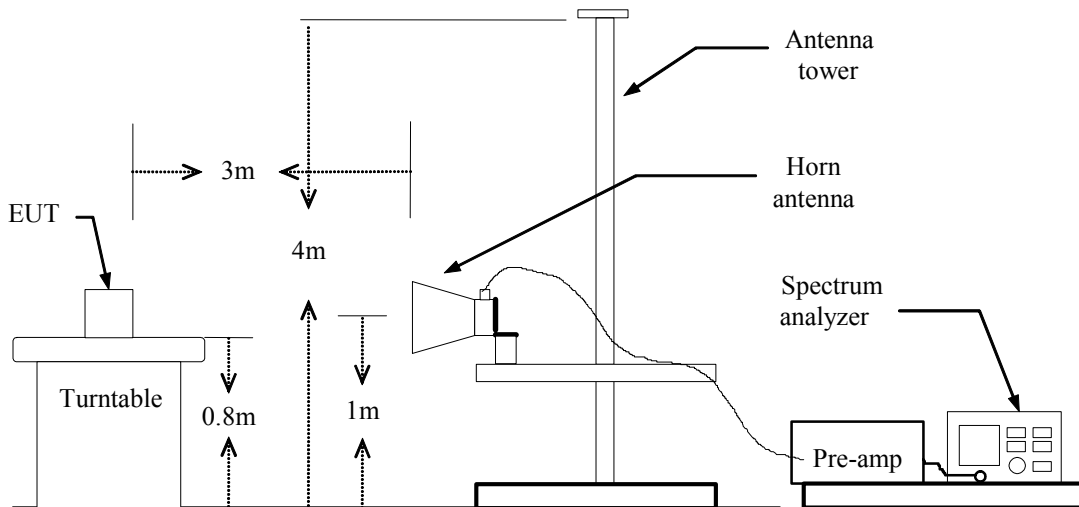


TEST CONFIGURATION

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 30MHz

RBW=9kHz / VBW=300kHz / Sweep=AUTO

30 ~ 1000MHz:

RBW=120kHz / 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: Transmitting **Test Date:** Jan. 20, 2011
Temperature: 18°C **Tested by:** Chieh Cheng
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
44.4308	V	48.64	-13.43	35.21	40.00	-4.79	QP
138.6400	V	50.23	-12.55	37.68	43.50	-5.82	QP
152.2200	V	50.53	-12.68	37.85	43.50	-5.65	QP
239.5200	V	48.43	-13.46	34.97	46.00	-11.03	QP
431.5800	V	43.75	-8.72	35.03	46.00	-10.97	QP
641.1000	V	42.42	-4.76	37.66	46.00	-8.34	QP
827.3400	V	43.97	-1.13	42.84	46.00	-3.16	QP
937.9200	V	42.02	1.20	43.22	46.00	-2.78	QP
39.7147	H	41.30	-13.67	27.63	40.00	-12.37	QP
152.2200	H	44.69	-12.68	32.01	43.50	-11.49	QP
239.5200	H	46.84	-13.46	33.38	46.00	-12.62	QP
359.8000	H	44.29	-9.63	34.66	46.00	-11.34	QP
709.0000	H	42.41	-2.96	39.45	46.00	-6.55	QP
757.5000	H	42.19	-2.15	40.04	46.00	-5.96	QP
868.0800	H	43.75	-0.06	43.69	46.00	-2.31	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: Jan. 17, 2011

Temperature: 12°C

Tested by: Chieh Cheng

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
2350.00	V	50.70	---	0.85	51.56	---	74.00	54.00	-2.44	Peak
2500.00	V	50.49	---	2.43	52.92	---	74.00	54.00	-1.08	Peak
N/A										
2113.33	H	50.17	---	-1.64	48.53	---	74.00	54.00	-5.47	Peak
2523.33	H	51.32	---	-1.10	50.22	---	74.00	54.00	-3.78	Peak
2960.00	H	49.37	---	1.96	51.33	---	74.00	54.00	-2.67	Peak
4825.00	H	43.79	---	7.74	51.52	---	74.00	54.00	-2.48	Peak
7241.67	H	39.48	---	12.45	51.93	---	74.00	54.00	-2.07	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: Jan. 17, 2011

Temperature: 12°C

Tested by: Chieh Cheng

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
1360.00	V	50.99	---	-4.85	46.14	---	74.00	54.00	-7.86	Peak
1830.00	V	50.34	---	-0.96	49.38	---	74.00	54.00	-4.62	Peak
2340.00	V	51.22	---	0.77	51.99	---	74.00	54.00	-2.01	Peak
2583.33	V	50.16	---	1.38	51.54	---	74.00	54.00	-2.46	Peak
N/A										
1750.00	H	50.99	---	-4.03	46.97	---	74.00	54.00	-7.03	Peak
2293.33	H	51.10	---	-1.38	49.72	---	74.00	54.00	-4.28	Peak
2640.00	H	51.13	---	-0.06	51.06	---	74.00	54.00	-2.94	Peak
4875.00	H	43.69	---	7.74	51.43	---	74.00	54.00	-2.57	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: Jan. 17, 2011

Temperature: 12°C

Tested by: Chieh Cheng

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
1816.67	V	50.85	---	-0.97	49.88	---	74.00	54.00	-4.12	Peak
2290.00	V	51.10	---	0.47	51.57	---	74.00	54.00	-2.43	Peak
2653.33	V	50.00	---	1.35	51.35	---	74.00	54.00	-2.65	Peak
4925.00	V	48.19	44.53	7.38	55.57	51.91	74.00	54.00	-2.09	AVG
N/A										
2376.67	H	51.65	---	-1.49	50.16	---	74.00	54.00	-3.84	Peak
2626.67	H	49.93	---	0.04	49.97	---	74.00	54.00	-4.03	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: Jan. 17, 2011

Temperature: 12°C

Tested by: Chieh Cheng

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
2176.67	V	49.92	---	0.09	50.01	---	74.00	54.00	-3.99	Peak
2360.00	V	52.00	---	0.94	52.94	---	74.00	54.00	-1.06	Peak
2463.33	V	52.90	43.56	2.01	54.91	45.57	74.00	54.00	-8.43	AVG
N/A										
1886.67	H	55.25	---	-4.92	50.33	---	74.00	54.00	-3.67	Peak
2160.00	H	49.99	---	-1.94	48.05	---	74.00	54.00	-5.95	Peak
2463.33	H	57.24	45.33	-1.52	55.71	43.81	74.00	54.00	-10.19	AVG
7233.33	H	41.53	29.91	12.43	53.96	42.34	74.00	54.00	-11.66	AVG
N/A										

Remark:

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



Operation Mode: TX / IEEE 802.11g / CH Mid

Test Date: Jan. 17, 2011

Temperature: 12°C

Tested by: Chieh Cheng

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
1820.00	V	49.32	---	-0.97	48.35	---	74.00	54.00	-5.65	Peak
2383.33	V	53.27	44.34	1.14	54.41	45.48	74.00	54.00	-8.52	AVG
2490.00	V	53.37	42.22	2.32	55.68	44.54	74.00	54.00	-9.46	AVG
2760.00	V	49.02	---	1.29	50.31	---	74.00	54.00	-3.69	Peak
N/A										
1350.00	H	54.94	---	-7.15	47.79	---	74.00	54.00	-6.21	Peak
1890.00	H	53.68	---	-4.95	48.73	---	74.00	54.00	-5.27	Peak
2373.33	H	54.50	46.98	-1.48	53.02	45.50	74.00	54.00	-8.50	AVG
2490.00	H	55.06	44.57	-1.51	53.55	43.06	74.00	54.00	-10.94	AVG
N/A										

Remark:

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



Operation Mode: TX / IEEE 802.11g / CH High

Test Date: Jan. 17, 2011

Temperature: 12°C

Tested by: Chieh Cheng

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
2186.67	V	49.38	---	0.40	49.78	---	74.00	54.00	-4.22	Peak
2410.00	V	52.84	43.21	1.39	54.24	44.60	74.00	54.00	-9.40	AVG
2513.33	V	52.34	41.56	2.26	54.60	43.82	74.00	54.00	-10.18	AVG
2666.67	V	49.68	---	1.40	51.08	---	74.00	54.00	-2.92	Peak
N/A										
2106.67	H	49.54	---	-1.59	47.95	---	74.00	54.00	-6.05	Peak
2410.00	H	54.15	---	-1.54	52.61	---	74.00	54.00	-1.39	Peak
2526.67	H	54.41	47.83	-1.05	53.37	46.78	74.00	54.00	-7.22	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 20 MHz Channel mode / CH Low **Test Date:** Jan. 17, 2011
Temperature: 12°C **Tested by:** Chieh Cheng
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
1886.67	V	49.92	---	-0.92	49.00	---	74.00	54.00	-5.00	Peak
2360.00	V	55.07	41.69	0.94	56.01	42.63	74.00	54.00	-11.37	AVG
2466.67	V	53.31	42.37	2.05	55.35	44.42	74.00	54.00	-9.58	AVG
2586.67	V	50.14	---	1.34	51.48	---	74.00	54.00	-2.52	Peak
N/A										
2143.33	H	50.73	---	-1.83	48.90	---	74.00	54.00	-5.10	Peak
2360.00	H	55.41	43.65	-1.45	53.96	42.20	74.00	54.00	-11.80	AVG
2463.33	H	54.82	44.32	-1.52	53.30	42.80	74.00	54.00	-11.20	AVG
7241.67	H	44.11	30.50	12.45	56.56	42.95	74.00	54.00	-11.05	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 20 MHz Channel mode / CH Mid **Test Date:** Jan. 17, 2011
Temperature: 12°C **Tested by:** Chieh Cheng
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
1840.00	V	50.25	---	-0.95	49.30	---	74.00	54.00	-4.70	Peak
2213.33	V	50.78	---	0.75	51.53	---	74.00	54.00	-2.47	Peak
2763.33	V	49.65	---	1.28	50.93	---	74.00	54.00	-3.07	Peak
4875.00	V	39.30	---	7.30	46.60	---	74.00	54.00	-7.40	Peak
N/A										
1623.33	H	52.49	---	-5.54	46.96	---	74.00	54.00	-7.04	Peak
2383.33	H	55.66	44.11	-1.50	54.15	42.61	74.00	54.00	-11.39	AVG
2923.33	H	48.26	---	1.48	49.75	---	74.00	54.00	-4.25	Peak
4875.00	H	42.15	---	7.74	49.89	---	74.00	54.00	-4.11	Peak
7308.33	H	44.49	31.41	12.48	56.98	43.89	74.00	54.00	-10.11	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 20 MHz Channel mode / CH High **Test Date:** Jan. 17, 2011
Temperature: 12°C **Tested by:** Chieh Cheng
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
1890.00	V	50.72	---	-0.92	49.80	---	74.00	54.00	-4.20	Peak
2213.33	V	51.42	---	0.75	52.17	---	74.00	54.00	-1.83	Peak
2570.00	V	50.55	---	1.55	52.10	---	74.00	54.00	-1.90	Peak
4925.00	V	40.52	---	7.38	47.91	---	74.00	54.00	-6.09	Peak
N/A										
1893.33	H	56.72	---	-4.97	51.75	---	74.00	54.00	-2.25	Peak
2393.33	H	54.48	---	-1.53	52.95	---	74.00	54.00	-1.05	Peak
2513.33	H	57.11	43.69	-1.28	55.83	42.41	74.00	54.00	-11.59	AVG
4925.00	H	41.57	---	8.18	49.75	---	74.00	54.00	-4.25	Peak
7391.67	H	44.96	32.94	11.42	56.38	44.36	74.00	54.00	-9.64	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 40 MHz Channel mode / CH Low **Test Date:** Jan. 17, 2011
Temperature: 12°C **Tested by:** Chieh Cheng
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
1890.00	V	49.32	---	-0.92	48.40	---	74.00	54.00	-5.60	Peak
2213.33	V	50.67	---	0.75	51.42	---	74.00	54.00	-2.58	Peak
2316.67	V	52.18	---	0.57	52.75	---	74.00	54.00	-1.25	Peak
2526.67	V	49.93	---	2.09	52.02	---	74.00	54.00	-1.98	Peak
N/A										
1350.00	H	53.57	---	-7.15	46.42	---	74.00	54.00	-7.58	Peak
1890.00	H	54.30	---	-4.95	49.35	---	74.00	54.00	-4.65	Peak
2316.67	H	54.33	---	-1.36	52.98	---	74.00	54.00	-1.02	Peak
N/A										

Remark:

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



Operation Mode: TX / draft 802.11n 40 MHz Channel mode / CH Mid **Test Date:** Jan. 17, 2011
Temperature: 12°C **Tested by:** Chieh Cheng
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
1626.67	V	51.36	---	-3.14	48.22	---	74.00	54.00	-5.78	Peak
1953.33	V	50.28	---	-1.86	48.42	---	74.00	54.00	-5.58	Peak
2333.33	V	51.79	---	0.71	52.50	---	74.00	54.00	-1.50	Peak
2546.67	V	51.16	---	1.84	53.00	---	74.00	54.00	-1.00	Peak
N/A										
1620.00	H	52.56	---	-5.62	46.94	---	74.00	54.00	-7.06	Peak
2256.67	H	51.56	---	-1.70	49.86	---	74.00	54.00	-4.14	Peak
2333.33	H	54.94	45.54	-1.39	53.54	44.15	74.00	54.00	-9.85	AVG
2540.00	H	53.21	---	-0.81	52.40	---	74.00	54.00	-1.60	Peak
4875.00	H	40.70	---	7.74	48.44	---	74.00	54.00	-5.56	Peak
7308.33	H	41.01	33.61	12.48	53.50	46.09	74.00	54.00	-7.91	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 40 MHz Channel mode / CH High **Test Date:** Jan. 17, 2011
Temperature: 12°C **Tested by:** Chieh Cheng
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
1793.33	V	50.66	---	-1.09	49.57	---	74.00	54.00	-4.43	Peak
2350.00	V	52.16	45.87	0.85	53.01	46.72	74.00	54.00	-7.28	AVG
2556.67	V	51.64	46.25	1.72	53.35	47.97	74.00	54.00	-6.03	AVG
N/A										
1350.00	H	54.37	---	-7.15	47.22	---	74.00	54.00	-6.78	Peak
2346.67	H	53.01	---	-1.42	51.59	---	74.00	54.00	-2.41	Peak
2553.33	H	53.68	46.28	-0.58	53.10	45.70	74.00	54.00	-8.30	AVG
2933.33	H	49.21	---	1.61	50.82	---	74.00	54.00	-3.18	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).



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: Charging

Test Date: Jan. 21, 2011

Temperature: 22°C

Tested by: Jin Liao

Humidity: 55% RH

Freq. (MHz)	QP Reading	AV Reading	Corr. factor	QP Result	AV Result	QP Limit	AV Limit	QP Margin	AV Margin	Note
0.1695	23.39	6.09	9.71	33.10	15.80	64.98	54.98	-31.88	-39.18	L1
0.2281	26.50	7.70	9.70	36.20	17.40	62.52	52.52	-26.32	-35.12	L1
0.4117	34.92	20.22	9.68	44.60	29.90	57.61	47.61	-13.01	-17.71	L1
0.4430	36.48	21.88	9.62	46.10	31.50	57.01	47.01	-10.91	-15.51	L1
1.2437	28.38	19.48	9.12	37.50	28.60	56.00	46.00	-18.50	-17.40	L1
2.3844	26.06	16.56	9.24	35.30	25.80	56.00	46.00	-20.70	-20.20	L1
0.1969	40.39	31.09	9.71	50.10	40.80	63.74	53.74	-13.64	-12.94	L2
0.3922	36.89	29.99	9.71	46.60	39.70	58.02	48.02	-11.42	-8.32	L2
0.4273	36.72	20.72	9.68	46.40	30.40	57.31	47.31	-10.91	-16.91	L2
0.5953	28.79	20.89	9.61	38.40	30.50	56.00	46.00	-17.60	-15.50	L2
1.2437	28.66	20.36	9.64	38.30	30.00	56.00	46.00	-17.70	-16.00	L2
1.9664	24.97	16.77	9.73	34.70	26.50	56.00	46.00	-21.30	-19.50	L2

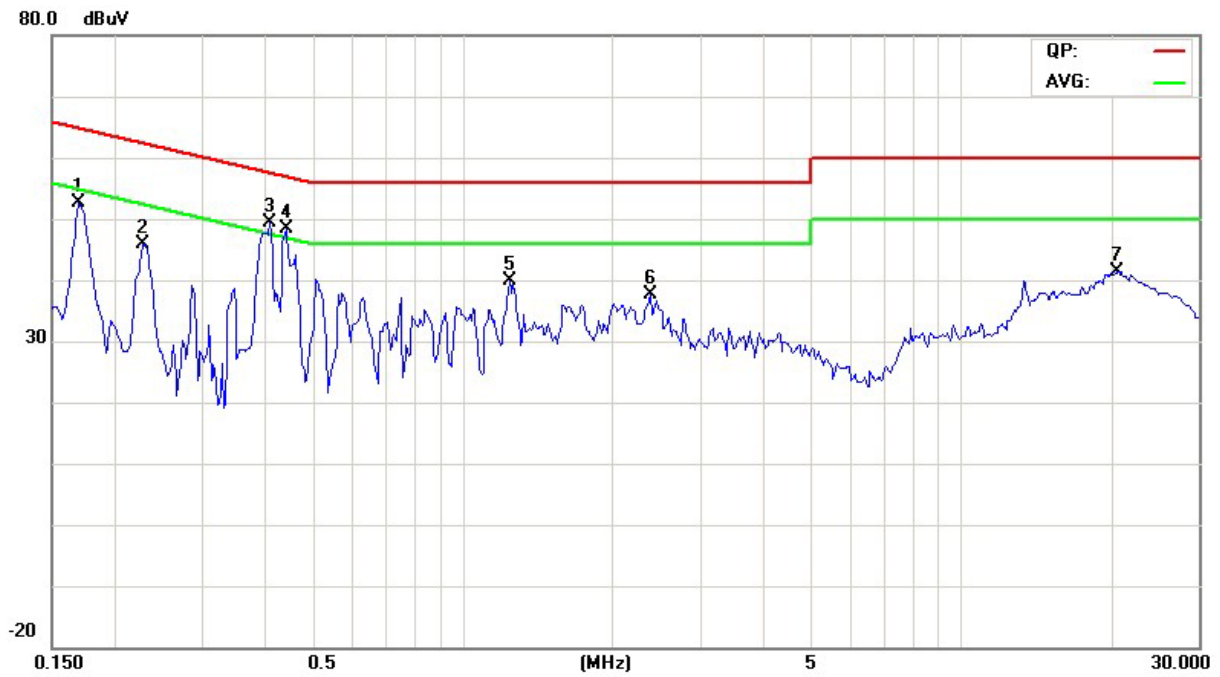
Remark:

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



Test Plot

Conducted emissions (Line 1)



Conducted emissions (Line 2)





8. APPENDIX I RADIO FREQUENCY EXPOSURE

LIMIT

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

EUT Specification

EUT	Home Security Camera
Frequency band (Operating)	<input checked="" type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz <input type="checkbox"/> WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz <input type="checkbox"/> WLAN: 5.745GHz ~ 5.825GHz <input type="checkbox"/> Others
Device category	<input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others
Exposure classification	<input type="checkbox"/> Occupational/Controlled exposure (S = 5mW/cm ²) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm ²)
Antenna diversity	<input checked="" type="checkbox"/> Single antenna <input type="checkbox"/> Multiple antennas <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input checked="" type="checkbox"/> Tx/Rx diversity
Max. output power	IEEE 802.11b mode: 17.64 dBm (58.076mW) IEEE 802.11g mode: 24.67 dBm (293.089mW) draft 802.11n 20 MHz Channel mode: 26.81 dBm (479.733mW) draft 802.11n 40 MHz Channel mode: 25.54 dBm (358.096mW)
Antenna gain (Max)	3.40dBi (including cable loss) (Numeric gain: 2.19)
Evaluation applied	<input checked="" type="checkbox"/> MPE Evaluation <input type="checkbox"/> SAR Evaluation <input type="checkbox"/> N/A

Remark:

- The maximum output power is 26.81dBm (479.733mW) at 2412MHz (with 2.19numeric antenna gain.)
- For mobile or fixed location transmitters, no SAR consideration applied. The maximum power density is 1.0 mW/cm² even if the calculation indicates that the power density would be larger.

TEST RESULTS

No non-compliance noted.



Calculation

Given $E = \frac{\sqrt{30 \times P \times G}}{d}$ & $S = \frac{E^2}{3770}$

Where $E =$ Field strength in Volts / meter

$P =$ Power in Watts

$G =$ Numeric antenna gain

$d =$ Distance in meters

$S =$ Power density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{3770d^2}$$

Changing to units of mW and cm, using:

$$P (mW) = P (W) / 1000 \text{ and}$$

$$d (cm) = d(m) / 100$$

Yields

$$S = \frac{30 \times (P/1000) \times G}{3770 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2} \quad \text{Equation 1}$$

Where $d =$ Distance in cm

$P =$ Power in mW

$G =$ Numeric antenna gain

$S =$ Power density in mW / cm²

Maximum Permissible Exposure

EUT output power = 479.733mW

Numeric Antenna gain = 2.19

Substituting the MPE safe distance using $d = 20$ cm into Equation 1:

Yields

$$S = 0.000199 \times P \times G$$

Where $P =$ Power in mW

$G =$ Numeric antenna gain

$S =$ Power density in mW / cm²

→ Power density = 0.209 mW / cm²

(For mobile or fixed location transmitters, the maximum power density is 1.0 mW/cm² even if the calculation indicates that the power density would be larger.)