



FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

Mobile Computer

Model: CP60

Trade Name: CIPHERLAB

Issued to

Cipherlab Co., Ltd.

12F, 333 Dunhua S. Rd., Sec.2, Taipei, Taiwan R.O.C.

Issued by

Compliance Certification Services Inc.

No.11, Wu-Gong 6th Rd., Wugu Industrial Park,

New Taipei City 248, Taiwan (R.O.C.)

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Issued Date: December 10, 2012



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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	December 10, 2012	Initial Issue	ALL	Angel Cheng



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1. TEST RESULT CERTIFICATION

Applicant: Cipherlab Co., Ltd.
12F, 333 Dunhua S. Rd., Sec.2, Taipei, Taiwan R.O.C.

Equipment Under Test: Mobile Computer

Trade Name: CIPHERLAB

Model: CP60

Date of Test: October 16 ~ November 24, 2012

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: 2009 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:

Miller Lee
Section Manager
Compliance Certification Services Inc.

Reviewed by:

Gina Lo
Section Manager
Compliance Certification Services Inc.



2. EUT DESCRIPTION

Product	Mobile Computer
Trade Name	CIPHERLAB
Model Number	CP60
Model Discrepancy	N/A
Received Date	October 14, 2012
Power Supply	1. Vdc from Power Adapter Brand: Adapter Technology Co., LTD., Model: STD-05040T I/P: 100-240V, 47-63Hz, 0.58A MAX O/P: 5V, 4A, 20W MAX 2. Vdc from Battery a). Model: BA-0064A4 Rating: 3.7V, 4400mAh, 16.28Wh b) Model: BA-0063A6 Rating: 3.7V, 3600mAh, 13.32Wh
Frequency Range	IEEE 802.11a/ IEEE 802.11n HT 20 MHz: 5.725~5.850 GHz IEEE 802.11b/g/ IEEE 802.11n HT 20 MHz: 2.412~2.462 GHz
Transmit Power	IEEE 802.11a mode: 18.78 dBm IEEE 802.11n HT 20 MHz mode: 18.75 dBm IEEE 802.11b mode: 14.24 dBm IEEE 802.11g mode: 21.98 dBm IEEE 802.11n HT 20 MHz mode: 20.12 dBm
Modulation Technique & Transmit Data Rate	802.11n: Up to MCS7 802.11a/g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps 802.11b: 11, 5.5, 2, 1 Mbps
Number of Channels	IEEE 802.11a mode: 5 Channels IEEE 802.11n HT 20 MHz mode: 5 Channels IEEE 802.11b/g mode: 11 Channels IEEE 802.11n HT 20 MHz mode: 11 Channels
Antenna Specification	mono pole antenna / IEEE 802.11a/ IEEE 802.11n HT 20 MHz: Gain: 2.18 dBi IEEE 802.11b/g/ IEEE 802.11n HT 20 MHz: Gain: 2.15 dBi

Remark:

1. The sample selected for test was production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for FCC ID: **Q3N-CP60** filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.



3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, 15.207, 15.209, 15.247 and KDB558074.

3.1 EUT CONFIGURATION

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

3.2 EUT EXERCISE

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

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

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

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

Radiated Emissions

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



3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

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

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

- (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.



3.5 DESCRIPTION OF TEST MODES

The EUT (model: CP60) 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 and power line conducted emissions below 30MHz, which worst case was in normal link mode only.

IEEE 802.11b mode:

Channel Low (2412MHz), Channel Mid (2442MHz) and Channel High (2462MHz) with 1Mbps data rate were chosen for full testing.

IEEE 802.11g mode:

Channel Low (2412MHz), Channel Mid (2442MHz) and Channel High (2462MHz) with 6Mbps data rate were chosen for full testing.

IEEE 802.11n HT 20 MHz mode:

Channel Low (2412MHz), Channel Mid (2442MHz) and Channel High (2462MHz) with 6.5Mbps data rate were chosen for full testing.

IEEE 802.11a mode:

Channel Low (5745MHz), Channel Mid (5785MHz) and Channel High (5825MHz) with 6Mbps data rate were chosen for full testing.

IEEE 802.11n HT 20 MHz mode:

Channel Low(5745MHz), Channel Mid(5785MHz) and Channel High(5825MHz) with 6.5Mbps data rate were chosen for full testing.

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



4. INSTRUMENT CALIBRATION

4.1 MEASURING INSTRUMENT CALIBRATION

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

4.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

Remark: Each piece of equipment is scheduled for calibration once a year and Loop Antenna is scheduled for calibration once three years.

Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360131	03/21/2013
Power Meter	Anritsu	ML2495A	1012009	06/05/2013
Power Sensor	Anritsu	MA2411B	0917072	06/05/2013

Wugu 966 Chamber A				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US42510268	11/14/2013
EMI Test Receiver	R&S	ESCI	100064	03/01/2013
Pre-Amplifier	Mini-Circuits	ZFL-1000LN	SF350700823	01/13/2013
Pre-Amplifier	MITEQ	AFS44-00102650-42-10P-44	1415367	11/19/2013
Bilog Antenna	Sunol Sciences	JB3	A030105	10/02/2013
Horn Antenna	EMCO	3117	00055165	02/14/2013
Horn Antenna	EMCO	3116	00026370	10/11/2013
Loop Antenna	EMCO	6502	8905/2356	06/10/2013
Turn Table	CCS	CC-T-1F	N/A	N.C.R
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R
Site NSA	CCS	N/A	N/A	12/25/2012
Test S/W	EZ-EMC (CCS-3A1RE)			

Conducted Emission room # B				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	R&S	ESCI	101073	07/31/2013
LISN	R&S	ENV216	101054	06/06/2013
LISN	EMCO	3825/2	9106-1809	07/03/2013
ISN	FCC	FCC-TLISN-T2-02-09	100105	07/30/2013
ISN	FCC	FCC-TLISN-T4-02-09	20395	05/24/2013
ISN	FCC	FCC-TLISN-T8-02-09	100106	07/31/2013
Capacitive Voltage Probe	FCC	F-CVP-1	100185	03/25/2013
Test S/W	CCS-3A1-CE			



4.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
Powerline Conducted Emission	+/- 1.2159
3M Semi Anechoic Chamber / 30M~200M	+/- 4.0138
3M Semi Anechoic Chamber / 200M~1000M	+/- 3.9483
3M Semi Anechoic Chamber / 1G~8G	+/- 2.5975
3M Semi Anechoic Chamber / 8G~18G	+/- 2.6112
3M Semi Anechoic Chamber / 18G~26G	+/- 2.7389
3M Semi Anechoic Chamber / 26G~40G	+/- 2.9683

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, Wu-Gong 6th Rd., Wugu Industrial Park, New Taipei City 248, Taiwan (R.O.C.)

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

☐ No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township, Taoyuan County 33841, 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 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	FCC	3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements	 FCC MRA: TW1039
Taiwan	TAF	LP0002, RTTE01, FCC Method-47 CFR Part 15 Subpart C, D, E, RSS-210, RSS-310 IDA TS SRD, AS/NZS 4268, AS/NZS 4771, TS 12.1 & 12.2, ETSI EN 300 440-1, ETSI EN 300 440-2, ETSI EN 300 328, ETSI EN 300 220-1, ETSI EN 300 220-2, ETSI EN 301 893, ETSI EN 301 489-1/3/7/17 FCC OET Bulletin 65 + Supplement C, EN 50360, EN 50361, EN 50371, RSS 102, EN 50383, EN 50385, EN 50392, IEC 62209, CNS 14958-1, CNS 14959 FCC Method –47 CFR Part 15 Subpart B IEC / EN 61000-3-2, IEC / EN 61000-3-3, IEC / EN 61000-4-2/3/4/5/6/8/11	 Testing Laboratory 1309
Canada	Industry Canada	3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform	 IC 2324G-1 IC 2324G-2

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



6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix 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
1.	PC	HP	Compaq dx7510 mtpc	SGH947RR1Y	FCC DoC	Non-Shielded, 1.8 m	Shielded, 1.8 m with 2 cores
2.	LCD Monitor	DELL	U2410F	CN-082WXD-72872-16 R-04TL	FCC DoC	Non-Shielded, 1.8 m	N/A
3.	Printer	EPSON	Stylus-C63	FAPY150360	FCC DoC	Non-Shielded, 1.8 m	Shielded, 1.8 m
4.	HDD	WD	My Passport	WX31A41A7211	FCC DoC	N/A	Shielded, 1.5 m
5.	Docking	N/A	N/A	N/A	N/A	N/A	Shielded, 1.8 m
6.	Keyboard	DELL	SK-8115	MY-ODJ325-71619-9B P-0931	FCC DoC	N/A	Shielded, 1.8 m
7.	Mouse	DELL	OXN867	J0206CRS	FCC DoC	N/A	Shielded, 1.8 m
8.	SIM Card	N/A	N/A	N/A	N/A	N/A	N/A
9.	Micro SD 8G	Transcend	N/A	N/A	N/A	N/A	N/A
10.	Universal Radio Communication Tester (Remote)	R&S	CMU200	101245	N/A	Non-Shielded, 1.8 m	N/A

Remark:

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



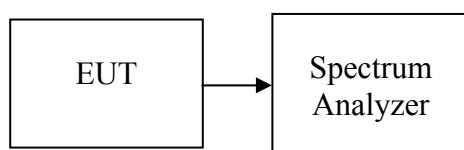
7. FCC PART 15.247 REQUIREMENTS

7.1 6dB BANDWIDTH

LIMIT

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

Test Configuration



TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. Set the RBW = 1%-5% of the emission bandwidth, VBW $\geq 3 \times$ RBW, Detector = Peak, Trace mode = max hold, Sweep = auto couple. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6dB relative to the maximum level measured in the fundamental emission.

TEST RESULTS

No non-compliance noted

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

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	9.13	>500	PASS
Mid	2442	9.13		PASS
High	2462	9.13		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	15.50	>500	PASS
Mid	2442	15.33		PASS
High	2462	15.77		PASS

Test mode: IEEE 802.11n HT 20 MHz mode

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	15.93	>500	PASS
Mid	2442	15.23		PASS
High	2462	16.37		PASS

Test mode: IEEE 802.11a mode

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (kHz)	Result
Low	5745	15.25	>500	PASS
Mid	5785	15.58		PASS
High	5825	16.42		PASS

Test mode: IEEE 802.11n HT 20 MHz mode

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (kHz)	Result
Low	5745	17.17	>500	PASS
Mid	5785	17.42		PASS
High	5825	11.25		PASS

Test Plot

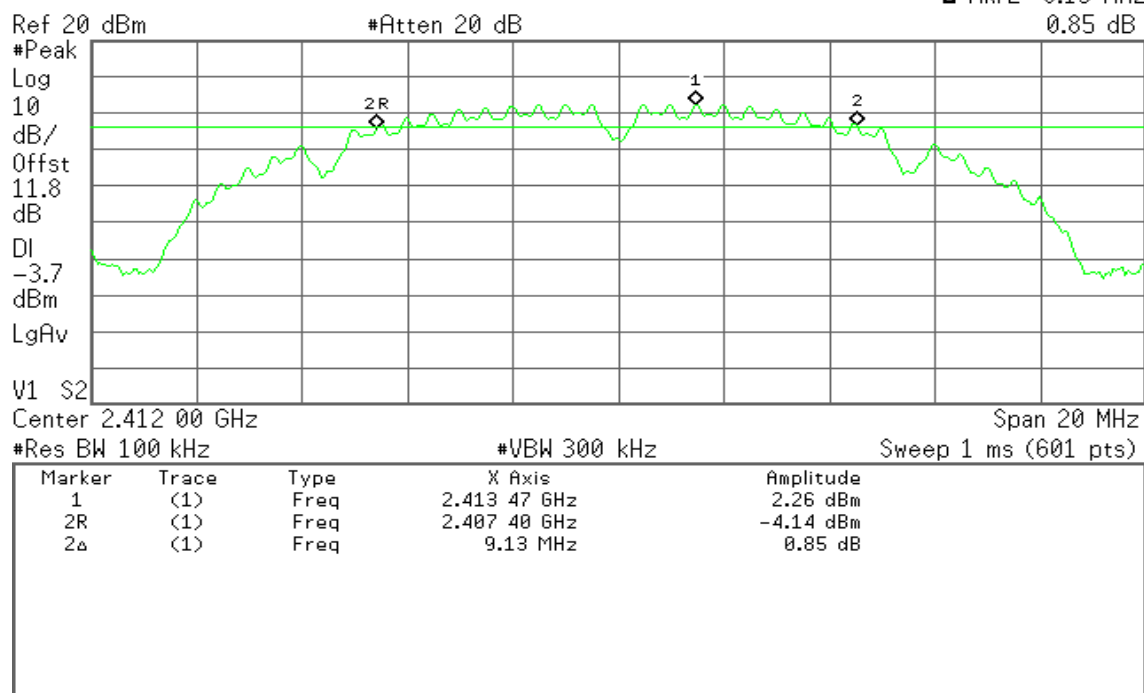
IEEE 802.11b mode

6dB Bandwidth (CH Low)

❄ Agilent 15:10:23 Nov 1, 2012

R T

▲ Mkr2 9.13 MHz
0.85 dB

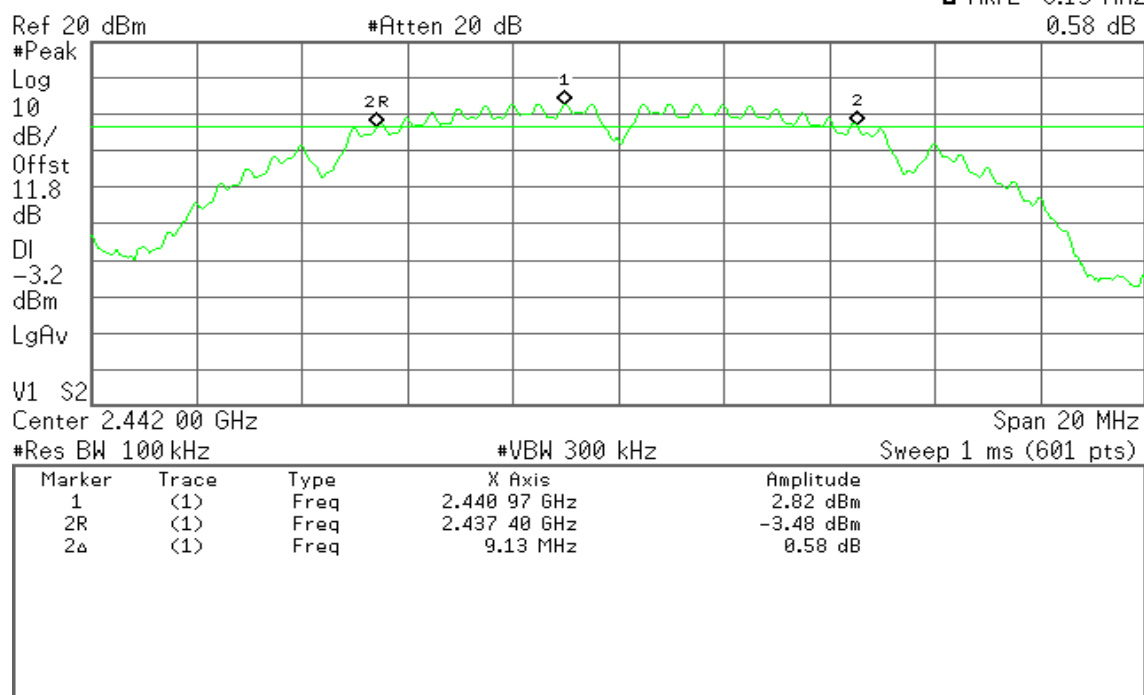


6dB Bandwidth (CH Mid)

Agilent 15:08:44 Nov 1, 2012

R T

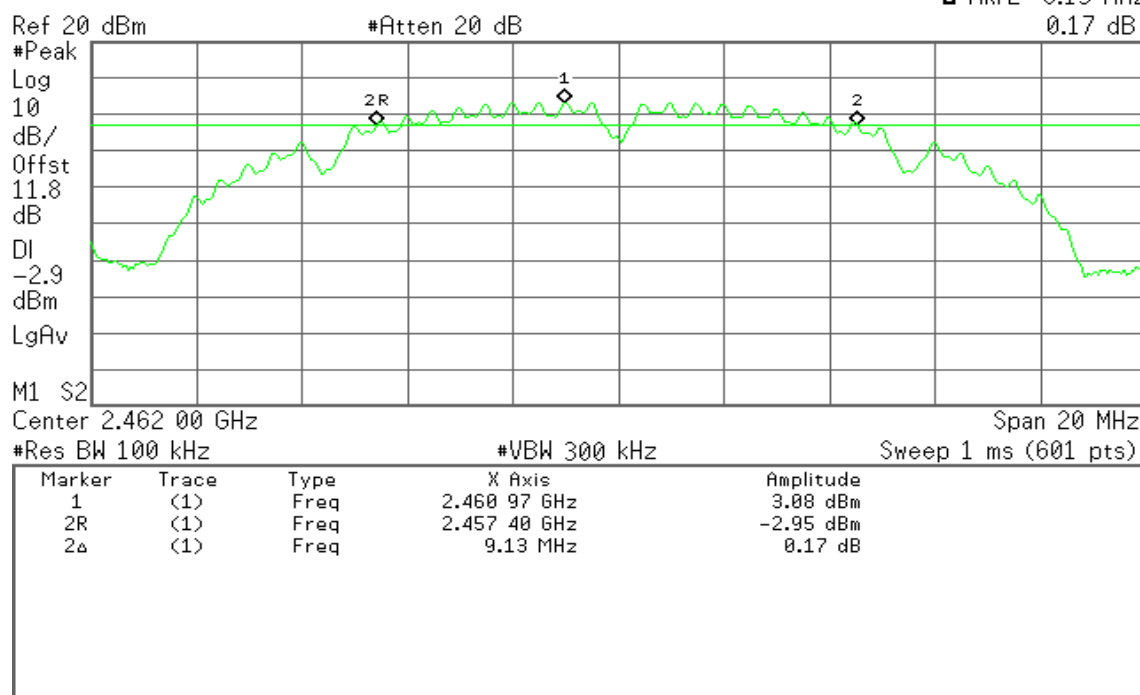
▲ Mkr2 9.13 MHz
0.58 dB



**6dB Bandwidth (CH High)**

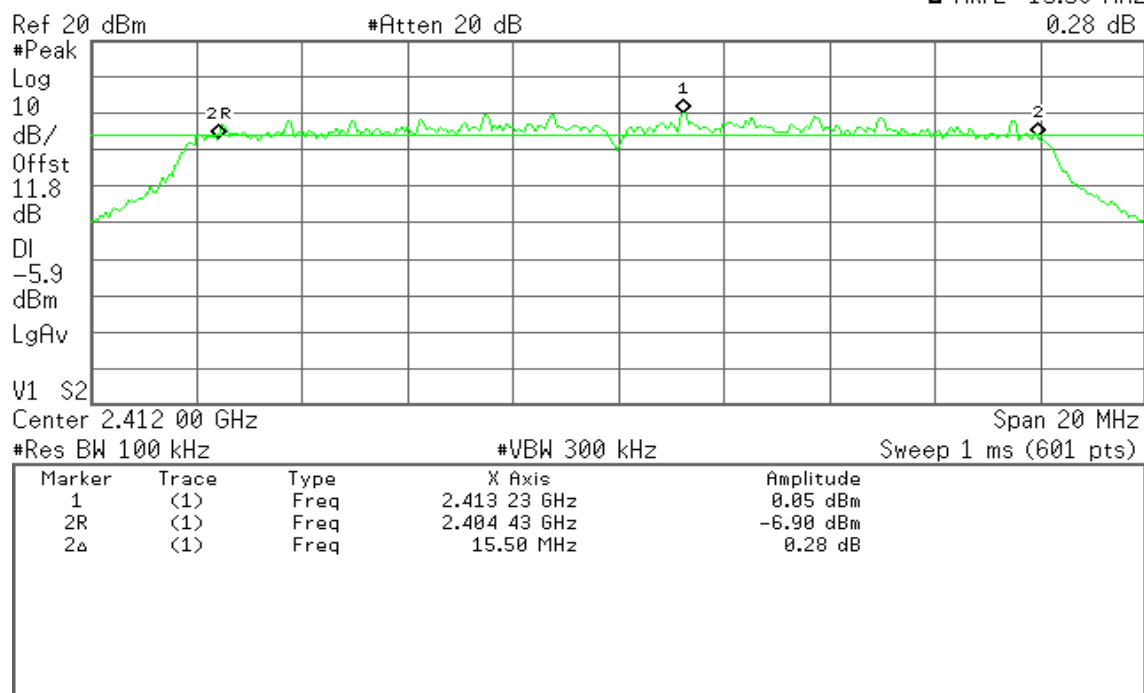
* Agilent 15:07:07 Nov 1, 2012

R T

▲ Mkr2 9.13 MHz
0.17 dB**IEEE 802.11g mode****6dB Bandwidth (CH Low)**

* Agilent 15:12:48 Nov 1, 2012

R T

▲ Mkr2 15.50 MHz
0.28 dB

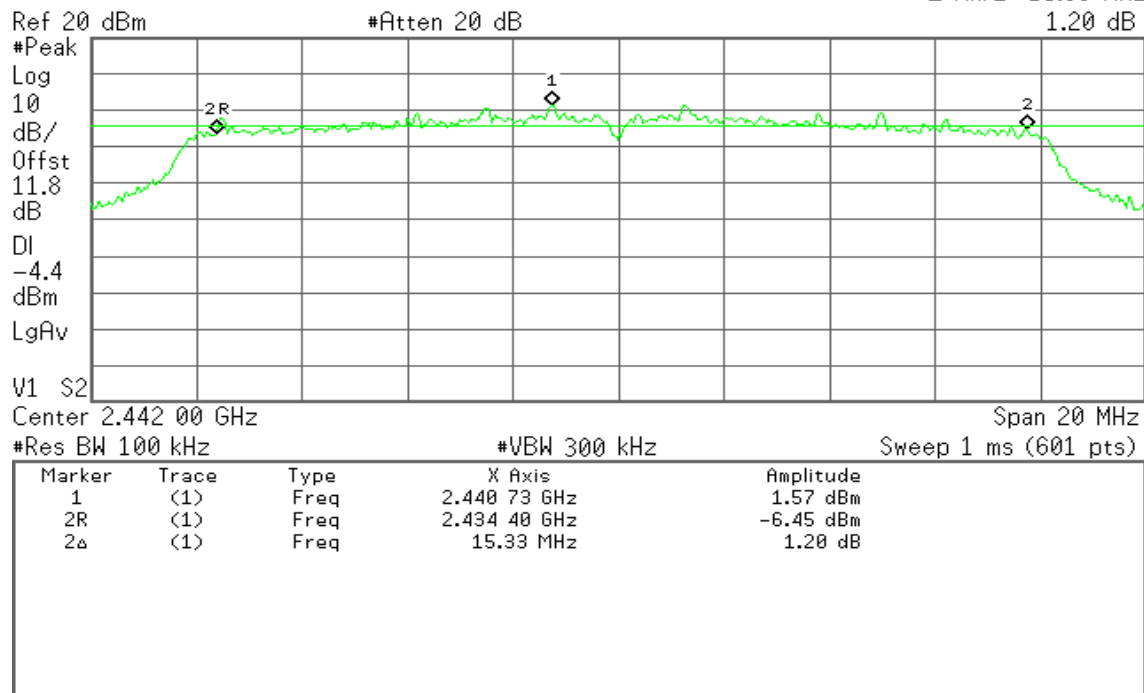
**6dB Bandwidth (CH Mid)**

* Agilent 15:14:27 Nov 1, 2012

R T

▲ Mkr2 15.33 MHz

1.20 dB

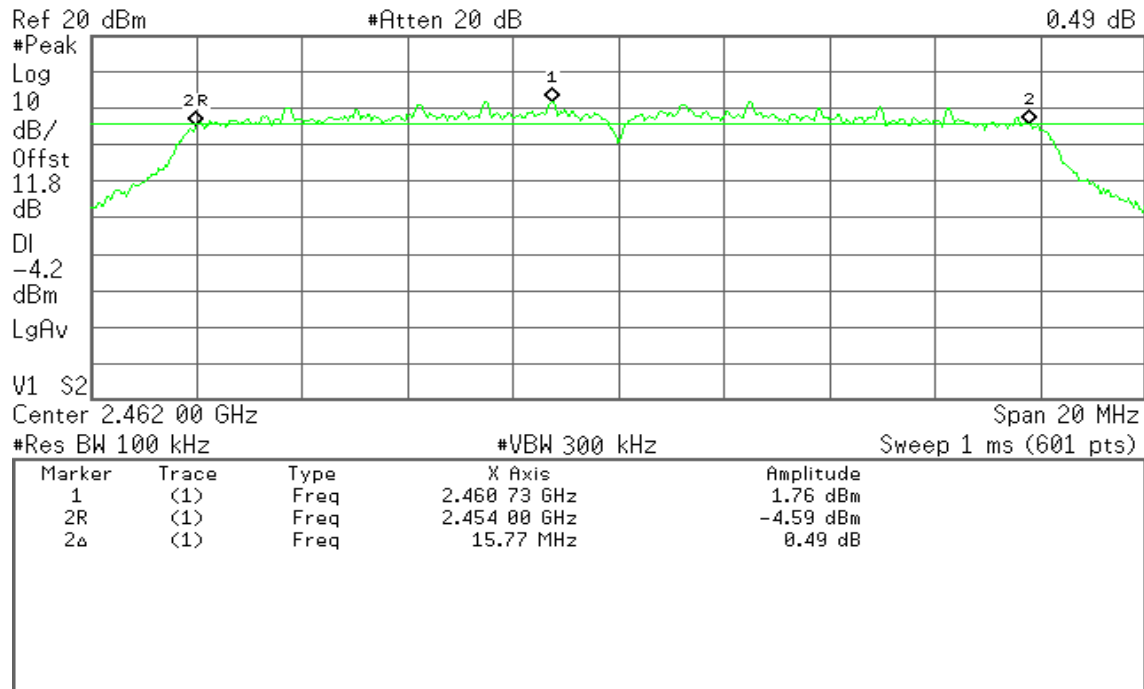
**6dB Bandwidth (CH High)**

* Agilent 15:16:20 Nov 1, 2012

R T

▲ Mkr2 15.77 MHz

0.49 dB



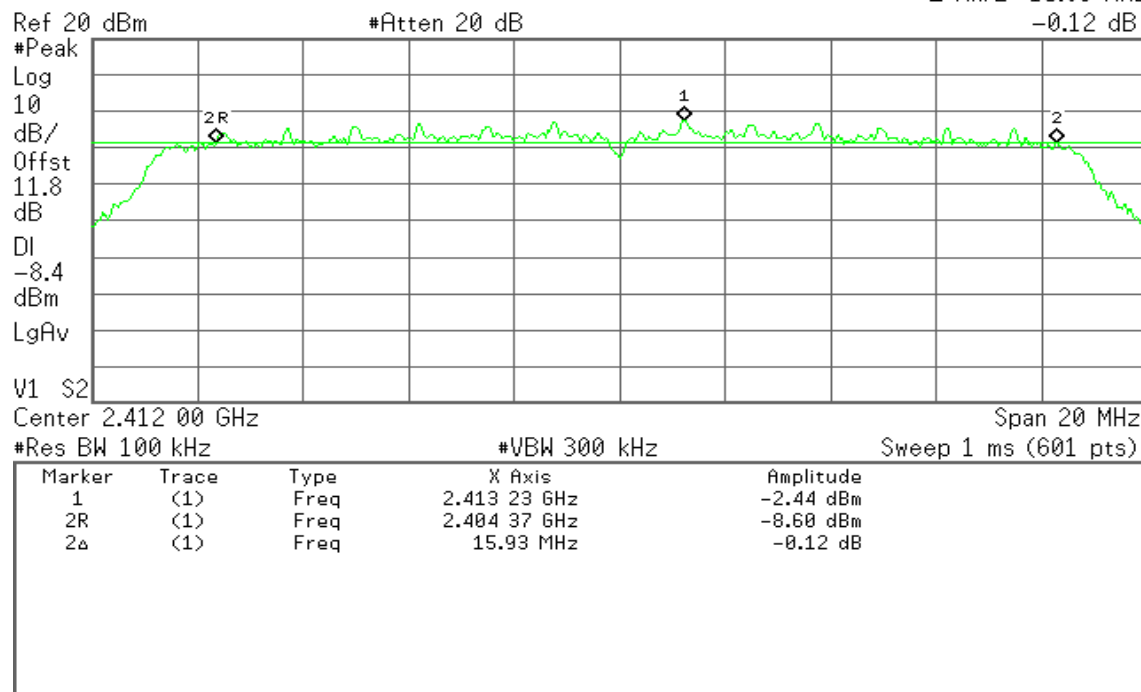


IEEE 802.11n HT 20 MHz mode

6dB Bandwidth (CH Low)

Agilent 15:21:25 Nov 1, 2012

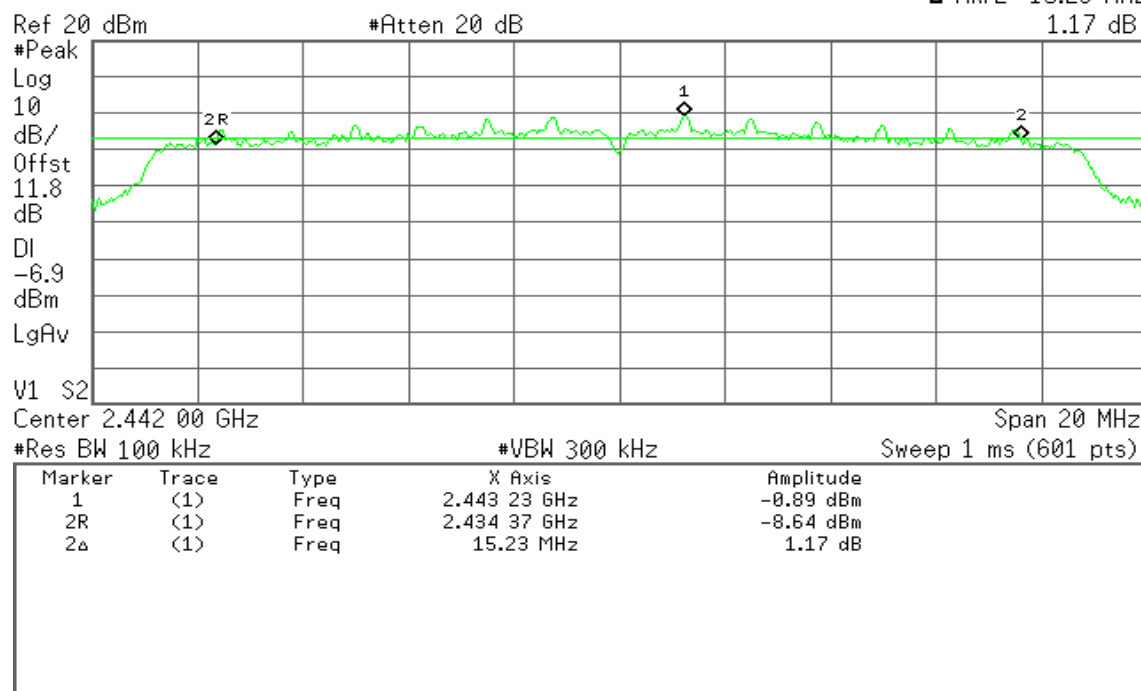
R T

▲ Mkr2 15.93 MHz
-0.12 dB

6dB Bandwidth (CH Mid)

Agilent 15:20:04 Nov 1, 2012

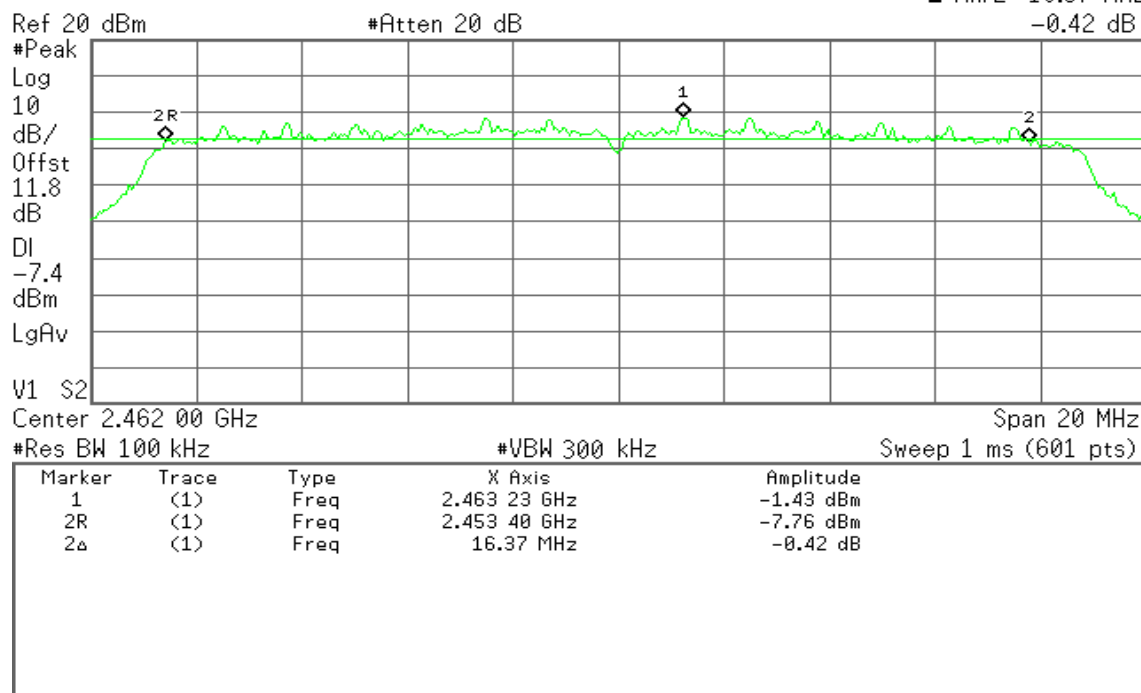
R T

▲ Mkr2 15.23 MHz
1.17 dB

**6dB Bandwidth (CH High)**

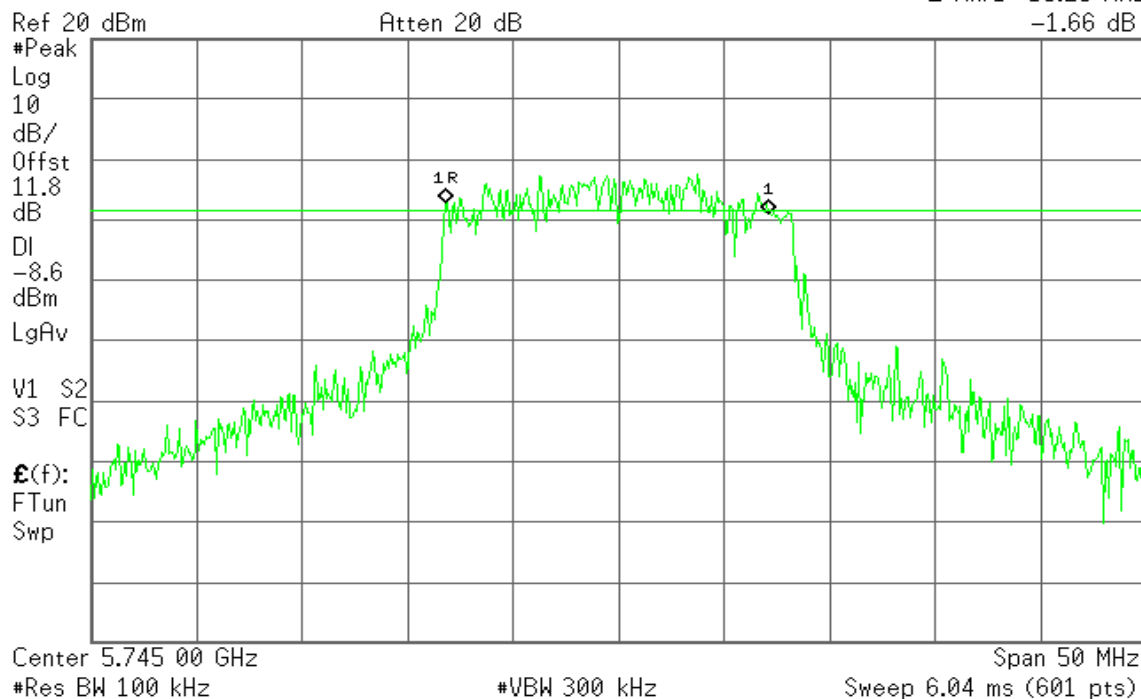
* Agilent 15:18:19 Nov 1, 2012

R T

▲ Mkr2 16.37 MHz
-0.42 dB**IEEE 802.11a mode****6dB Bandwidth (CH Low)**

* Agilent 08:44:16 Oct 31, 2012

R T

▲ Mkr1 15.25 MHz
-1.66 dB

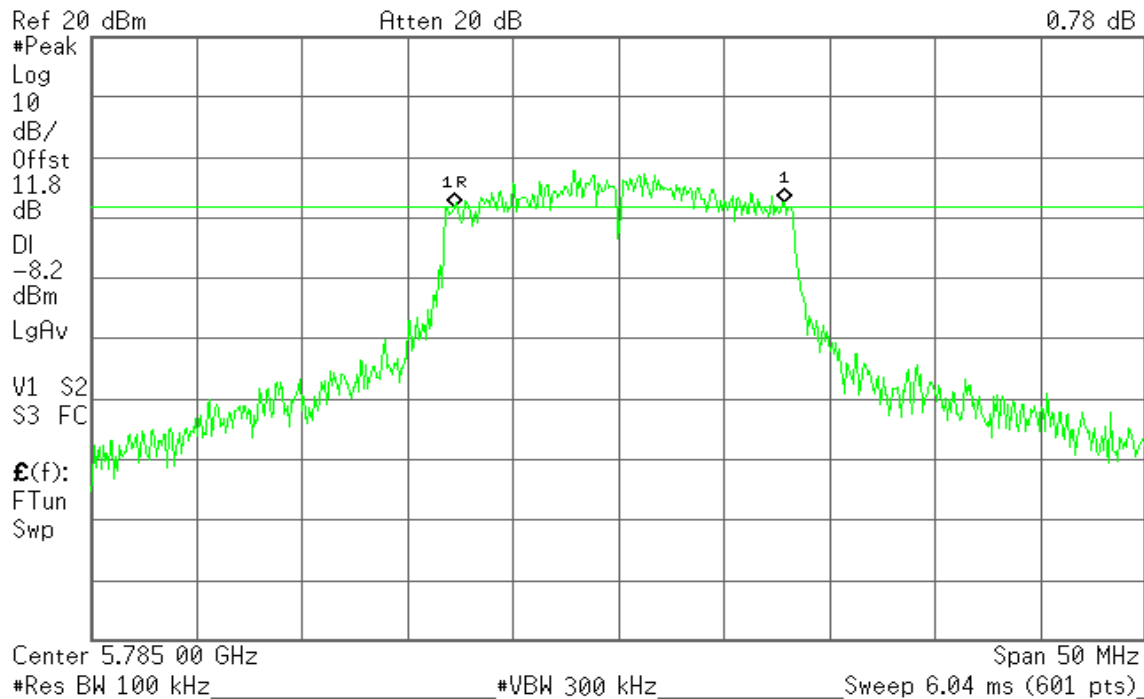


6dB Bandwidth (CH Mid)

Agilent 09:04:56 Oct 31, 2012

R T

▲ Mkr1 15.58 MHz
0.78 dB

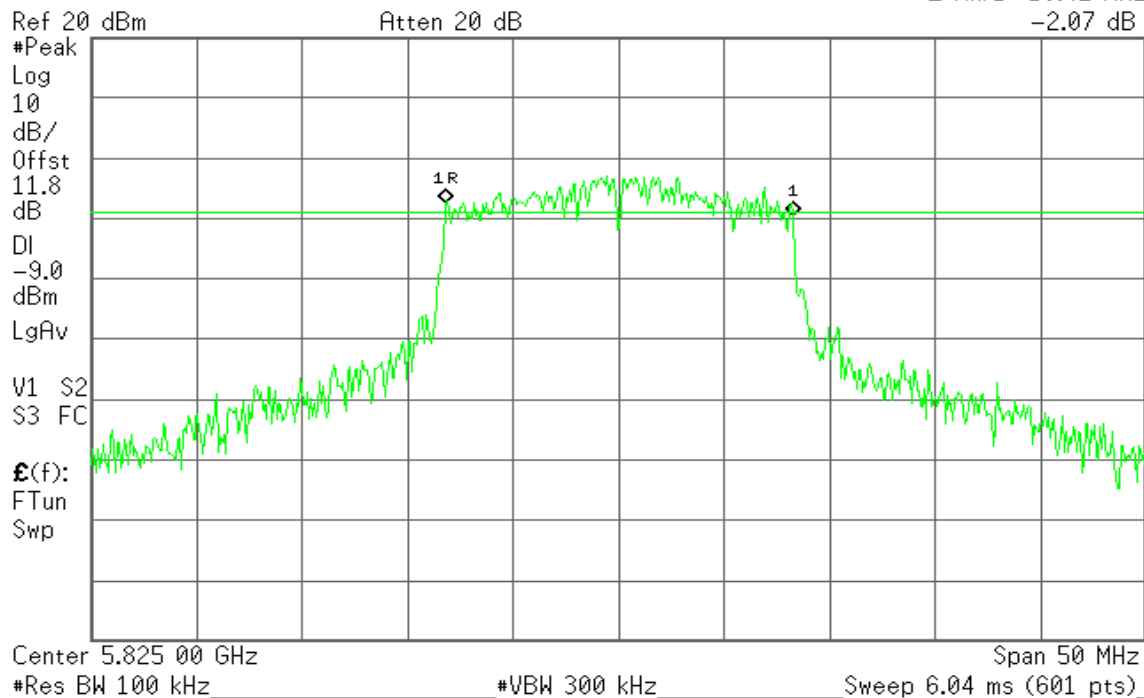


6dB Bandwidth (CH High)

Agilent 09:10:15 Oct 31, 2012

R T

▲ Mkr1 16.42 MHz
-2.07 dB





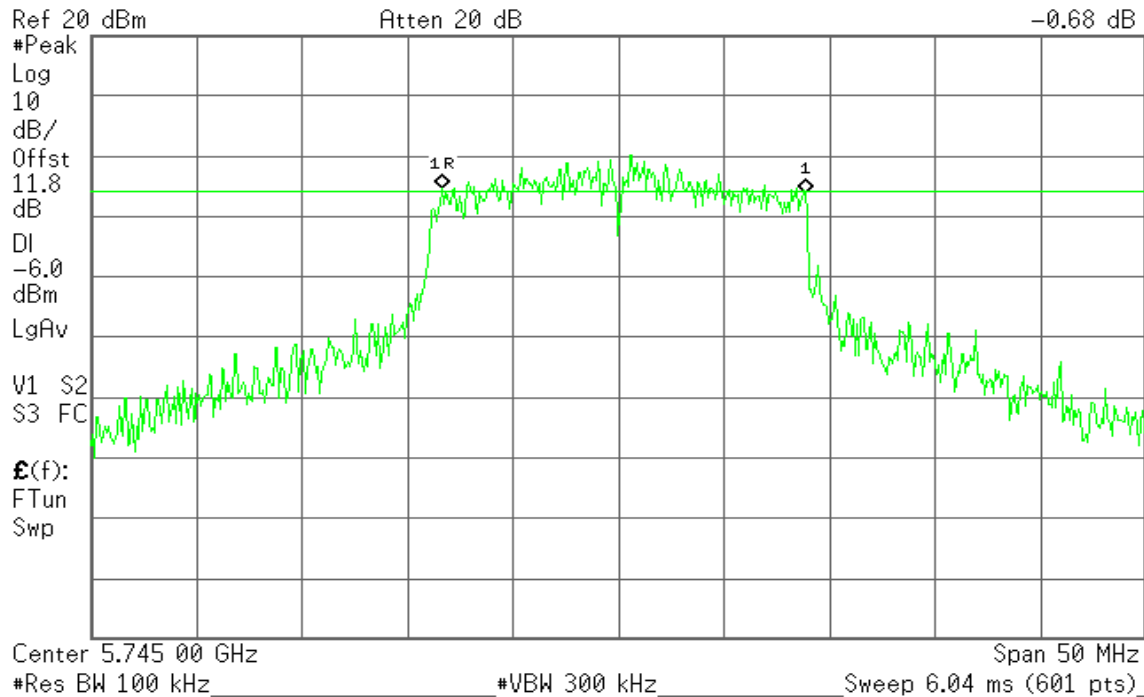
IEEE 802.11n HT 20 MHz mode

6dB Bandwidth (CH Low)

Agilent 09:27:35 Oct 31, 2012

R T

Mkr1 17.17 MHz
-0.68 dB



6dB Bandwidth (CH Mid)

Agilent 09:33:35 Oct 31, 2012

R T

Mkr1 17.42 MHz
0.04 dB



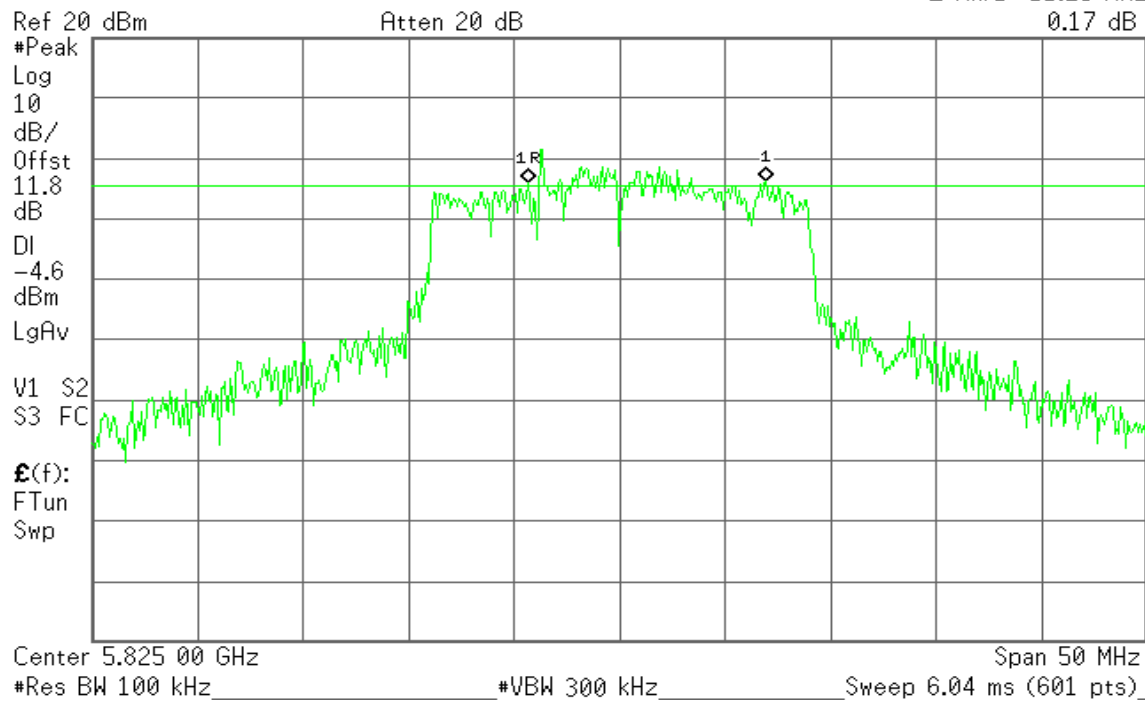


6dB Bandwidth (CH High)

Agilent 09:39:22 Oct 31, 2012

R T

▲ Mkr1 11.25 MHz
0.17 dB





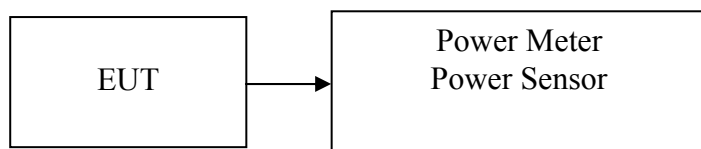
7.2 PEAK POWER

LIMIT

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

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

Test Configuration



TEST PROCEDURE

The transmitter output is connected to the Power Meter. The Power Meter is set to the peak power detection.

TEST RESULTS

No non-compliance noted.

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

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	13.27	0.0212	1.00	PASS
Mid	2442	13.57	0.0228		PASS
High	2462	14.24	0.0265		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	21.03	0.1268	1.00	PASS
Mid	2442	21.13	0.1297		PASS
High	2462	21.98	0.1578		PASS

Test mode: IEEE 802.11n HT 20 MHz mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	18.48	0.0705	1.00	PASS
Mid	2442	18.91	0.0778		PASS
High	2462	20.12	0.1028		PASS

Test mode: IEEE 802.11a mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	5745	18.78	0.0755	1.00	PASS
Mid	5785	18.65	0.0733		PASS
High	5825	18.59	0.0723		PASS

Test mode: IEEE 802.11n HT 20 MHz mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	5745	18.75	0.0750	1.00	PASS
Mid	5785	18.66	0.0735		PASS
High	5825	18.6	0.0724		PASS

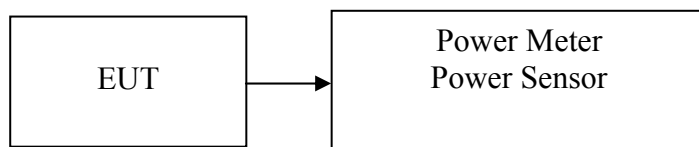


7.3 AVERAGE POWER

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	10.13	0.0103
Mid	2442	10.37	0.0109
High	2462	10.98	0.0125

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2412	10.97	0.0125
Mid	2442	11.8	0.0151
High	2462	12.37	0.0173

Test mode: IEEE 802.11n HT 20 MHz mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2412	8.36	0.0069
Mid	2442	9.27	0.0085
High	2462	9.7	0.0093

Test mode: IEEE 802.11a mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	5745	11.86	0.0153
Mid	5785	11.77	0.0150
High	5825	11.57	0.0144

Test mode: IEEE 802.11n HT 20 MHz mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	5745	12.99	0.0199
Mid	5785	13.37	0.0217
High	5825	13.40	0.0219



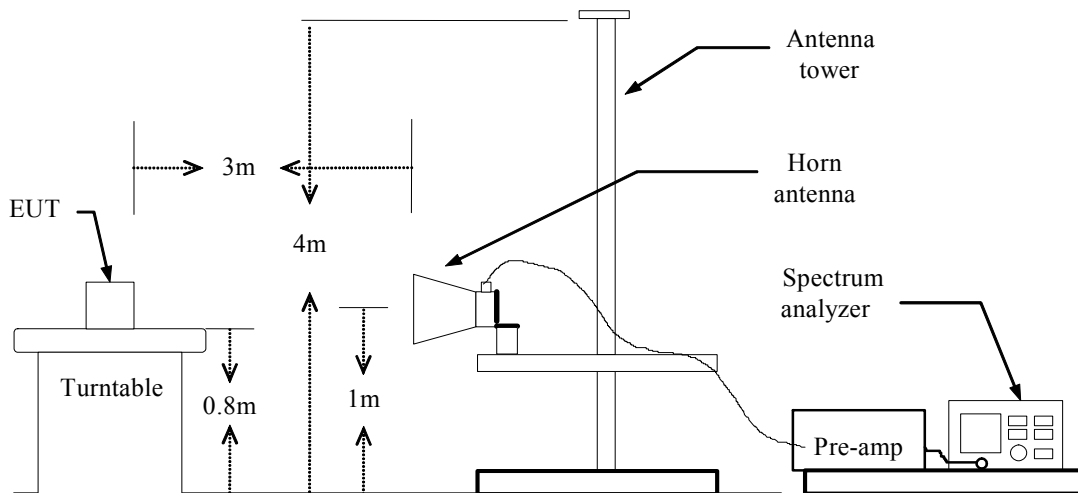
7.4 BAND EDGES MEASUREMENT

LIMIT

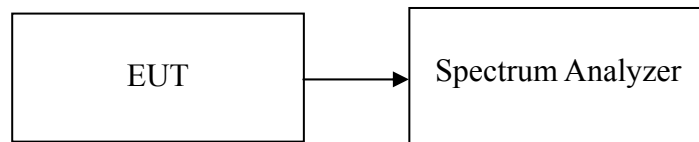
According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains 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

For Radiated



For Conducted





TEST PROCEDURE

For Radiated

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.

For Conducted

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.

TEST RESULTS

Refer to attach spectrum analyzer data chart.

802.11a Mode

1. Operating Frequency: 5725-5875MHz
2. CH Low: 5745MHz, CH High: 5825MHz
3. 6dB bandwidth: CH Low: 15.25MHz, CH High: 16.42MHz

Because the mentioned conditions, the test is not applicable.

**Band Edges (IEEE 802.11b mode / CH Low)****Detector mode: Peak****Polarity: Vertical**

Agilent 00:01:48 16 Oct 2012

R T

Mkr1 2.389 60 GHz

53.45 dB μ V/mRef 110 dB μ V/m

#Atten 18 dB

#Peak

Log

10

dB/

Offst

6

dB

DI

74.0

dB μ V/m

LgAv

M1 S2

S3 FC

A AA

E(f):

FTun

Swp

Start 2.310 00 GHz

#Res BW 1 MHz

#VBW 3 MHz

Stop 2.390 00 GHz

#Sweep 100 ms (601 pts)

Detector mode: Average**Polarity: Vertical**

Agilent 00:02:14 16 Oct 2012

R T

Mkr1 2.390 00 GHz

45.10 dB μ V/mRef 110 dB μ V/m

#Atten 18 dB

#Peak

Log

10

dB/

Offst

6

dB

DI

54.0

dB μ V/m

LgAv

M1 S2

S3 FC

A AA

E(f):

FTun

Swp

Start 2.310 00 GHz

#Res BW 1 MHz

#VBW 10 Hz

Stop 2.390 00 GHz

Sweep 6.238 s (601 pts)

**Detector mode: Peak****Polarity: Horizontal**

* Agilent 00:09:32 16 Oct 2012

R T

Mkr1 2.389 73 GHz

49.48 dB μ V/mRef 110 dB μ V/m

#Atten 18 dB

#Peak

Log

10

dB/

Offst

6

dB

DI

74.0

dB μ V/m

LgAv

M1 S2

S3 FC

A AA

E(f):

FTun

Swp

Start 2.310 00 GHz

#Res BW 1 MHz

#VBW 3 MHz

Stop 2.390 00 GHz

#Sweep 100 ms (601 pts)

Detector mode: Average**Polarity: Horizontal**

* Agilent 00:09:57 16 Oct 2012

R T

Mkr1 2.390 00 GHz

37.95 dB μ V/mRef 110 dB μ V/m

#Atten 18 dB

#Peak

Log

10

dB/

Offst

6

dB

DI

54.0

dB μ V/m

LgAv

M1 S2

S3 FC

A AA

E(f):

FTun

Swp

Start 2.310 00 GHz

#Res BW 1 MHz

#VBW 10 Hz

Stop 2.390 00 GHz

Sweep 6.238 s (601 pts)

**Band Edges (IEEE 802.11b mode / CH High)****Detector mode: Peak****Polarity: Vertical**

Agilent 00:29:33 16 Oct 2012

R T

Mkr1 2.483 66 GHz

55.51 dB μ V/mRef 110 dB μ V/m

#Atten 18 dB

#Peak

Log

10

dB/

Offst

6

dB

DI

74.0

dB μ V/m

LgAv

1

M1 S2

S3 FC

A AA

 $\mathcal{E}(f)$:

FTun

Swp

Start 2.483 50 GHz

#Res BW 1 MHz

#VBW 3 MHz

Stop 2.500 00 GHz

#Sweep 100 ms (601 pts)

Detector mode: Average**Polarity: Vertical**

Agilent 00:29:54 16 Oct 2012

R T

Mkr1 2.483 66 GHz

48.08 dB μ V/mRef 110 dB μ V/m

#Atten 18 dB

#Peak

Log

10

dB/

Offst

6

dB

DI

54.0

dB μ V/m

LgAv

1

M1 S2

S3 FC

A AA

 $\mathcal{E}(f)$:

FTun

Swp

Start 2.483 50 GHz

#Res BW 1 MHz

#VBW 10 Hz

Stop 2.500 00 GHz

Sweep 1.287 s (601 pts)

**Detector mode: Peak****Polarity: Horizontal**

* Agilent 00:34:13 16 Oct 2012

R T

Mkr1 2.483 91 GHz

65.72 dB μ V/mRef 110 dB μ V/m

#Atten 18 dB

#Peak

Log

10

dB/

Offst

6

dB

DI

74.0

dB μ V/m

LgAv

M1 S2

S3 FC

A AA

E(f):

FTun

Swp

Start 2.483 50 GHz

#Res BW 1 MHz

#VBW 3 MHz

Stop 2.500 00 GHz

#Sweep 100 ms (601 pts)

Detector mode: Average**Polarity: Horizontal**

* Agilent 00:46:10 16 Oct 2012

R T

Mkr1 2.483 50 GHz

51.24 dB μ V/mRef 110 dB μ V/m

#Atten 18 dB

#Peak

Log

10

dB/

Offst

6

dB

DI

54.0

dB μ V/m

LgAv

M1 S2

S3 FC

A AA

E(f):

FTun

Swp

Start 2.483 50 GHz

#Res BW 1 MHz

#VBW 10 Hz

Stop 2.500 00 GHz

Sweep 1.287 s (601 pts)



Band Edges (IEEE 802.11g mode / CH Low)

Detector mode: Peak

Polarity: Vertical

Agilent 01:05:19 16 Oct 2012

R T

Mkr1 2.389 73 GHz

68.33 dB μ V/m

Ref 110 dB μ V/m

#Atten 16 dB

#Peak

Log

10

dB/

Offst

10

dB

DI

74.0

dB μ V/m

LgAv

M1 S2

S3 FC

A AA

E(f):

FTun

Swp

Start 2.310 00 GHz

#Res BW 1 MHz

#VBW 3 MHz

Stop 2.390 00 GHz

#Sweep 100 ms (601 pts)

Detector mode: Average

Polarity: Vertical

Agilent 01:05:44 16 Oct 2012

R T

Mkr1 2.390 00 GHz

46.03 dB μ V/m

Ref 110 dB μ V/m

#Atten 16 dB

#Peak

Log

10

dB/

Offst

10

dB

DI

54.0

dB μ V/m

LgAv

M1 S2

S3 FC

A AA

E(f):

FTun

Swp

Start 2.310 00 GHz

#Res BW 1 MHz

#VBW 10 Hz

Stop 2.390 00 GHz

Sweep 6.238 s (601 pts)



Detector mode: Peak

Polarity: Horizontal

* Agilent 00:59:27 16 Oct 2012

R T

Mkr1 2.390 00 GHz

65.23 dB μ V/mRef 110 dB μ V/m

#Atten 16 dB

#Peak

Log

10

dB/

Offst

10

dB

DI

74.0

dB μ V/m

LgAv

M1 S2

S3 FC

A AA

E(f):

FTun

Swp

Start 2.310 00 GHz

#Res BW 1 MHz

#VBW 3 MHz

Stop 2.390 00 GHz

#Sweep 100 ms (601 pts)

Detector mode: Average

Polarity: Horizontal

* Agilent 00:59:53 16 Oct 2012

R T

Mkr1 2.390 00 GHz

43.09 dB μ V/mRef 110 dB μ V/m

#Atten 16 dB

#Peak

Log

10

dB/

Offst

10

dB

DI

54.0

dB μ V/m

LgAv

M1 S2

S3 FC

A AA

E(f):

FTun

Swp

Start 2.310 00 GHz

#Res BW 1 MHz

#VBW 10 Hz

Stop 2.390 00 GHz

Sweep 6.238 s (601 pts)

**Band Edges (IEEE 802.11g mode / CH High)****Detector mode: Peak****Polarity: Vertical**

* Agilent 01:35:03 16 Oct 2012

R T

Mkr1 2.483 61 GHz
69.79 dB μ V/mRef 110 dB μ V/m

#Atten 16 dB

#Peak

Log

10

dB/

Offst

10

dB

DI

74.0

dB μ V/m

LgAv

M1 S2

S3 FC

A AA

 $\mathcal{E}(f)$:

FTun

Swp

Start 2.483 50 GHz

#Res BW 1 MHz

#VBW 3 MHz

Stop 2.500 00 GHz

#Sweep 100 ms (601 pts)

Detector mode: Average**Polarity: Vertical**

* Agilent 01:35:38 16 Oct 2012

R T

Mkr1 2.483 50 GHz
46.11 dB μ V/mRef 110 dB μ V/m

#Atten 16 dB

#Peak

Log

10

dB/

Offst

10

dB

DI

54.0

dB μ V/m

LgAv

M1 S2

S3 FC

A AA

 $\mathcal{E}(f)$:

FTun

Swp

Start 2.483 50 GHz

#Res BW 1 MHz

#VBW 10 Hz

Stop 2.500 00 GHz

Sweep 1.287 s (601 pts)

**Detector mode: Peak****Polarity: Horizontal**

* Agilent 01:38:24 16 Oct 2012

R T

Mkr1 2.483 56 GHz

73.07 dB μ V/mRef 110 dB μ V/m

#Atten 16 dB

#Peak

Log

10

dB/

Offst

10

dB

DI

74.0

dB μ V/m

LgAv

M1 S2

S3 FC

A AA

E(f):

FTun

Swp

Start 2.483 50 GHz

#Res BW 1 MHz

#VBW 3 MHz

Stop 2.500 00 GHz

#Sweep 100 ms (601 pts)

Detector mode: Average**Polarity: Horizontal**

* Agilent 01:40:58 16 Oct 2012

R T

Mkr1 2.483 50 GHz

52.40 dB μ V/mRef 110 dB μ V/m

#Atten 16 dB

#Peak

Log

10

dB/

Offst

10

dB

DI

54.0

dB μ V/m

LgAv

M1 S2

S3 FC

A AA

E(f):

FTun

Swp

Start 2.483 50 GHz

#Res BW 1 MHz

#VBW 10 Hz

Stop 2.500 00 GHz

Sweep 1.287 s (601 pts)

**Band Edges (IEEE 802.11n HT 20 MHz mode / CH Low)****Detector mode: Peak****Polarity: Vertical**

* Agilent 03:01:21 16 Oct 2012

R T

Mkr1 2.389 73 GHz

67.83 dB μ V/mRef 110 dB μ V/m

#Atten 16 dB

#Peak

Log

10

dB/

Offst

10

dB

DI

74.0

dB μ V/m

LgAv

M1 S2

S3 FC

A AA

 $\mathcal{E}(f)$:

FTun

Swp

Start 2.310 00 GHz

#Res BW 1 MHz

#VBW 3 MHz

Stop 2.390 00 GHz

#Sweep 100 ms (601 pts)

Detector mode: Average**Polarity: Vertical**

* Agilent 03:02:00 16 Oct 2012

R T

Mkr1 2.390 00 GHz

44.27 dB μ V/mRef 110 dB μ V/m

#Atten 16 dB

#Peak

Log

10

dB/

Offst

10

dB

DI

54.0

dB μ V/m

LgAv

M1 S2

S3 FC

A AA

 $\mathcal{E}(f)$:

FTun

Swp

Start 2.310 00 GHz

#Res BW 1 MHz

#VBW 10 Hz

Stop 2.390 00 GHz

Sweep 6.238 s (601 pts)



Detector mode: Peak

Polarity: Horizontal

* Agilent 02:52:51 16 Oct 2012

R T

Mkr1 2.389 60 GHz

63.25 dB μ V/mRef 110 dB μ V/m

#Atten 16 dB

#Peak

Log

10

dB/

Offst

10

dB

DI

74.0

dB μ V/m

LgAv

M1 S2

S3 FC

A AA

E(f):

FTun

Swp

Start 2.310 00 GHz

#Res BW 1 MHz

#VBW 3 MHz

Stop 2.390 00 GHz

#Sweep 100 ms (601 pts)

Detector mode: Average

Polarity: Horizontal

* Agilent 02:53:23 16 Oct 2012

R T

Mkr1 2.389 60 GHz

41.43 dB μ V/mRef 110 dB μ V/m

#Atten 16 dB

#Peak

Log

10

dB/

Offst

10

dB

DI

54.0

dB μ V/m

LgAv

M1 S2

S3 FC

A AA

E(f):

FTun

Swp

Start 2.310 00 GHz

#Res BW 1 MHz

#VBW 10 Hz

Stop 2.390 00 GHz

Sweep 6.238 s (601 pts)

**Band Edges (IEEE 802.11n HT 20 MHz mode / CH High)****Detector mode: Peak****Polarity: Vertical**

* Agilent 03:45:52 16 Oct 2012

R T

Mkr1 2.483 64 GHz
64.06 dB μ V/mRef 110 dB μ V/m

#Atten 16 dB

#Peak

Log

10

dB/

Offst

10

dB

DI

74.0

dB μ V/

LgAv

M1 S2

S3 FC

A AA

E(f):

FTun

Swp

Start 2.483 50 GHz

#Res BW 1 MHz

#VBW 3 MHz

Stop 2.500 00 GHz

#Sweep 100 ms (601 pts)

Detector mode: Average**Polarity: Vertical**

* Agilent 03:46:37 16 Oct 2012

R T

Mkr1 2.483 50 GHz
48.07 dB μ V/mRef 110 dB μ V/m

#Atten 16 dB

#Peak

Log

10

dB/

Offst

10

dB

DI

54.0

dB μ V/

LgAv

M1 S2

S3 FC

A AA

E(f):

FTun

Swp

Start 2.483 50 GHz

#Res BW 1 MHz

#VBW 10 Hz

Stop 2.500 00 GHz

Sweep 1.287 s (601 pts)

**Detector mode: Peak****Polarity: Horizontal**

* Agilent 03:35:53 16 Oct 2012

R T

Mkr1 2.483 66 GHz

67.52 dB μ V/mRef 120 dB μ V/m

#Atten 16 dB

#Peak

Log

10

dB/

Offst

10

dB

DI

74.0

dB μ V/m

LgAv

M1 S2

S3 FC

A AA

E(f):

FTun

Swp

Start 2.483 50 GHz

#Res BW 1 MHz

#VBW 3 MHz

Stop 2.500 00 GHz

#Sweep 100 ms (601 pts)

Detector mode: Average**Polarity: Horizontal**

* Agilent 03:37:27 16 Oct 2012

R T

Mkr1 2.483 50 GHz

52.50 dB μ V/mRef 120 dB μ V/m

#Atten 16 dB

#Peak

Log

10

dB/

Offst

10

dB

DI

54.0

dB μ V/m

LgAv

M1 S2

S3 FC

A AA

E(f):

FTun

Swp

Start 2.483 50 GHz

#Res BW 1 MHz

#VBW 10 Hz

^ Stop 2.500 00 GHz

Sweep 1.287 s (601 pts)

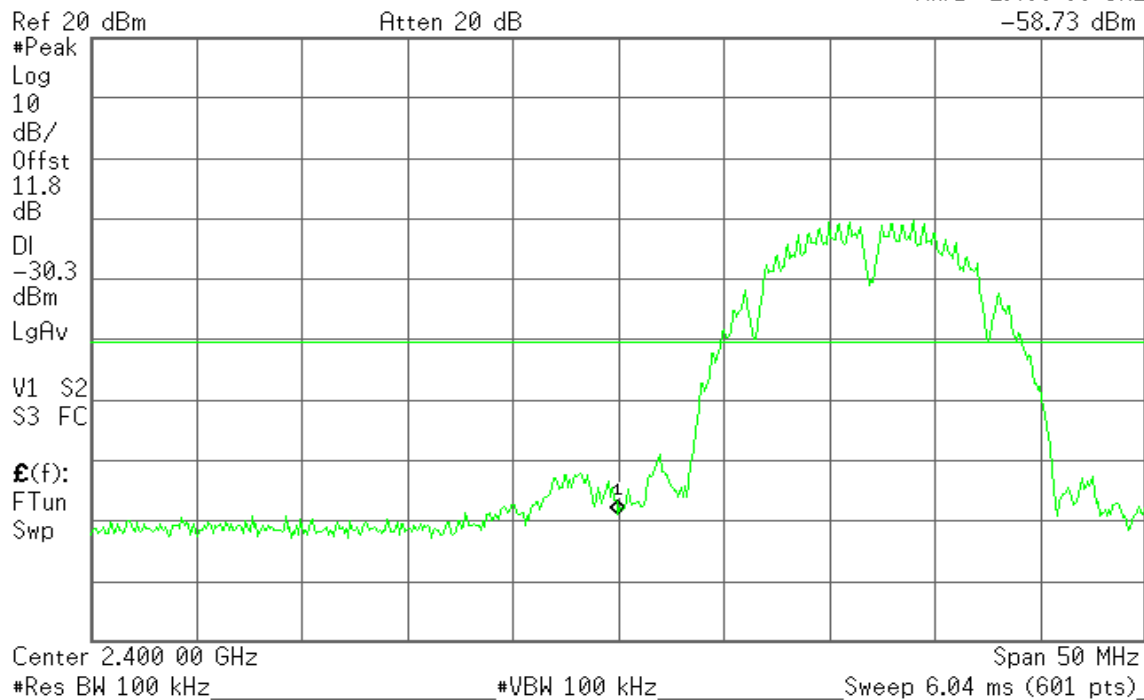


Conducted Band Edges (IEEE 802.11b mode / CH Low)

Agilent 15:50:38 Nov 1, 2012

R T

Mkr1 2.400 00 GHz
-58.73 dBm

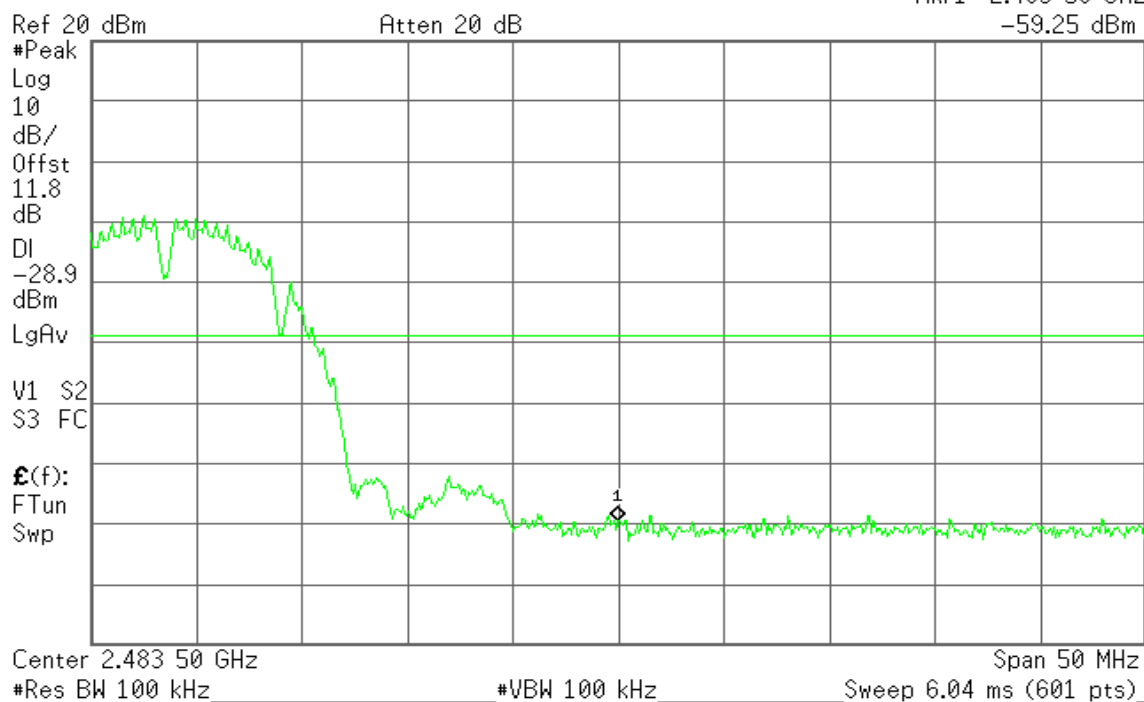


Conducted Band Edges (IEEE 802.11b mode / CH High)

Agilent 16:31:10 Nov 1, 2012

R T

Mkr1 2.483 50 GHz
-59.25 dBm



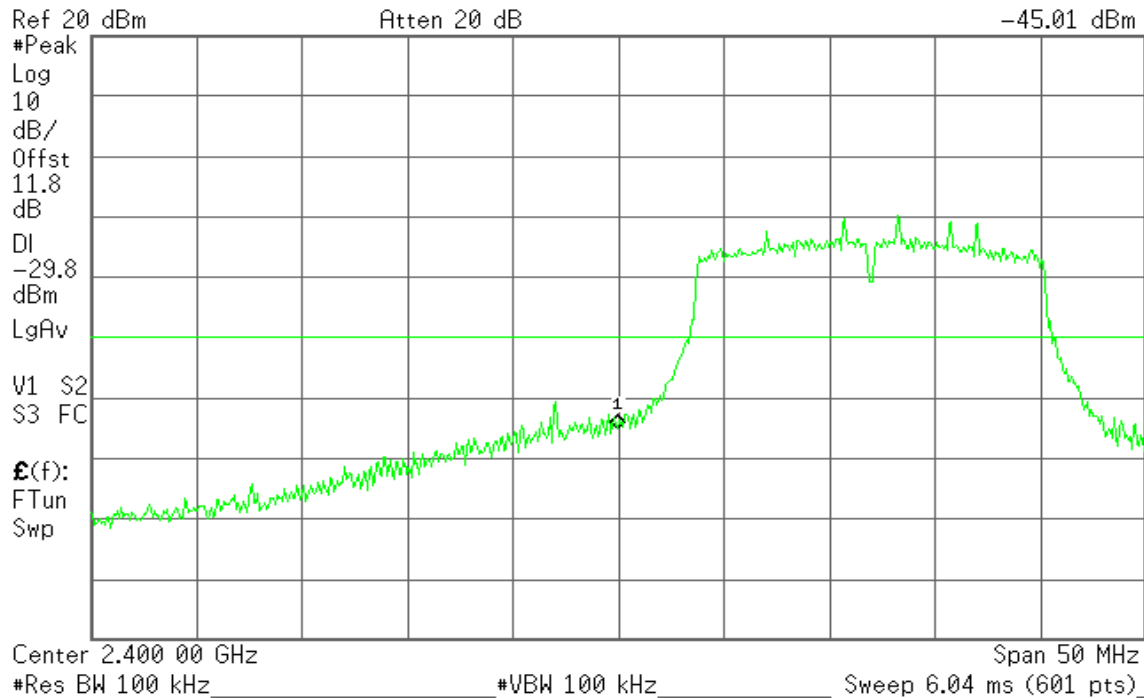


Conducted Band Edges (IEEE 802.11g mode / CH Low)

Agilent 16:33:38 Nov 1, 2012

R T

Mkr1 2.400 00 GHz
-45.01 dBm

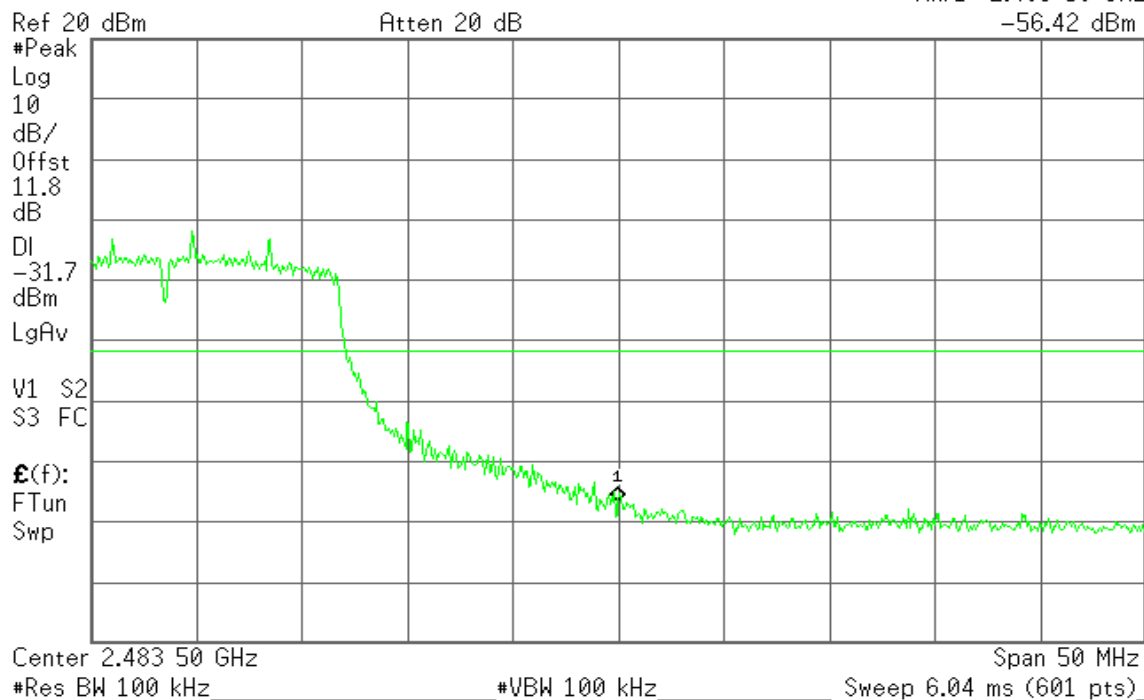


Conducted Band Edges (IEEE 802.11g mode / CH High)

Agilent 16:41:37 Nov 1, 2012

R T

Mkr1 2.483 50 GHz
-56.42 dBm



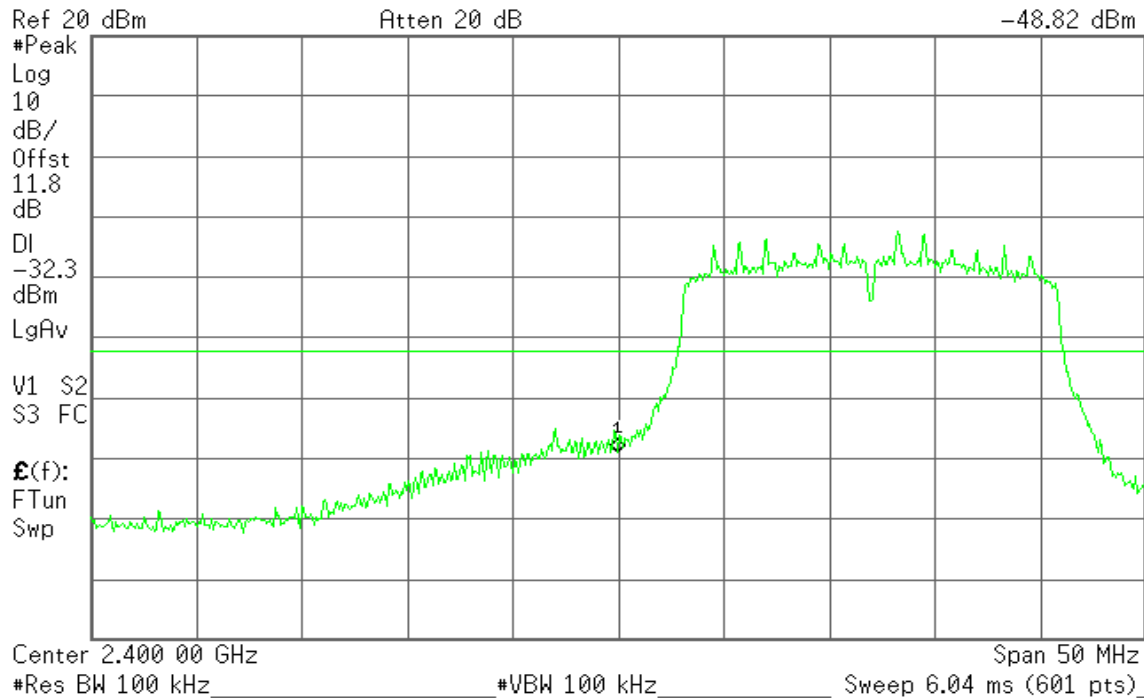


Conducted Band Edges (IEEE 802.11n HT20 MHz mode / CH Low)

Agilent 16:47:58 Nov 1, 2012

R T

Mkr1 2.400 00 GHz
-48.82 dBm

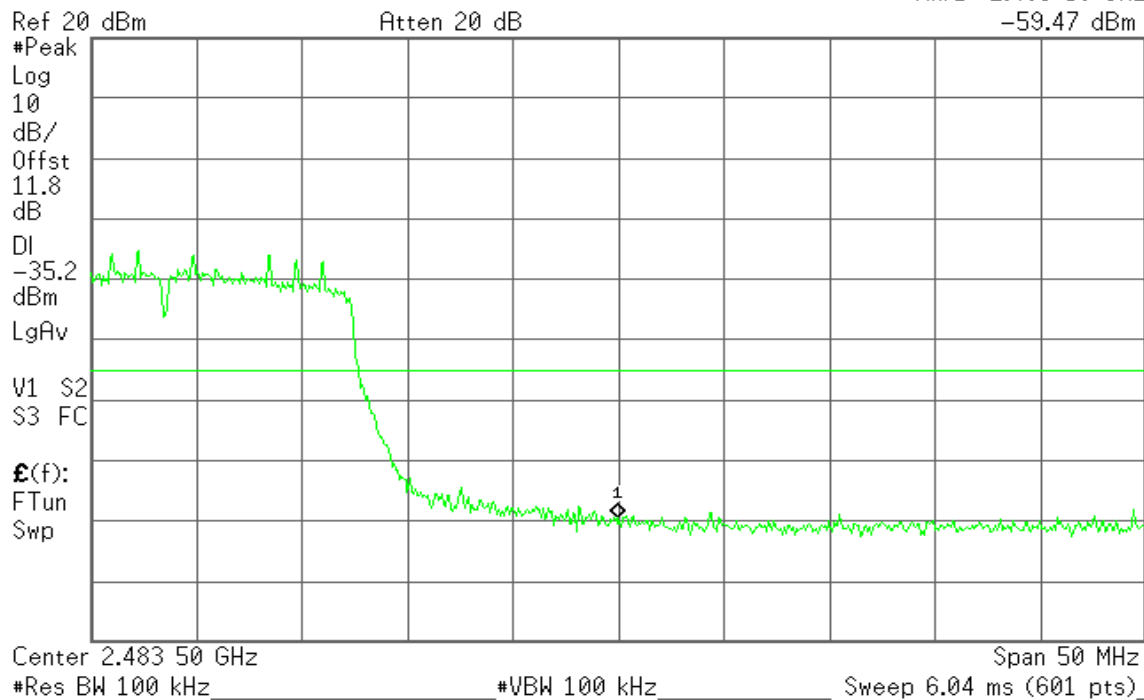


Conducted Band Edges (IEEE 802.11n HT20 MHz mode / CH High)

Agilent 16:55:12 Nov 1, 2012

R T

Mkr1 2.483 50 GHz
-59.47 dBm



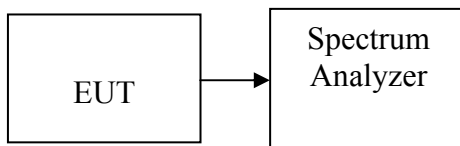


7.5 PEAK POWER SPECTRAL DENSITY

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

The transmitter output is connected to a spectrum analyzer. Set the RBW ≥ 3 kHz, VBW $\geq 3 \times$ RBW, span to 1.5 times the DTS channel bandwidth, Detector = peak, Trace mode = max hold, Sweep = auto couple. Use the peak marker function to determine the maximum amplitude level, Record the maximum reading. 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	-13.59	8.00	PASS
Mid	2442	-10.32		PASS
High	2462	-12.08		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-16.74	8.00	PASS
Mid	2442	-16.16		PASS
High	2462	-16.37		PASS

Test mode: IEEE 802.11n HT 20 MHz mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-19.63	8.00	PASS
Mid	2442	-18.55		PASS
High	2462	-17.92		PASS

Test mode: IEEE 802.11a mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	5745	-14.15	8.00	PASS
Mid	5785	-14.38		PASS
High	5825	-13.14		PASS

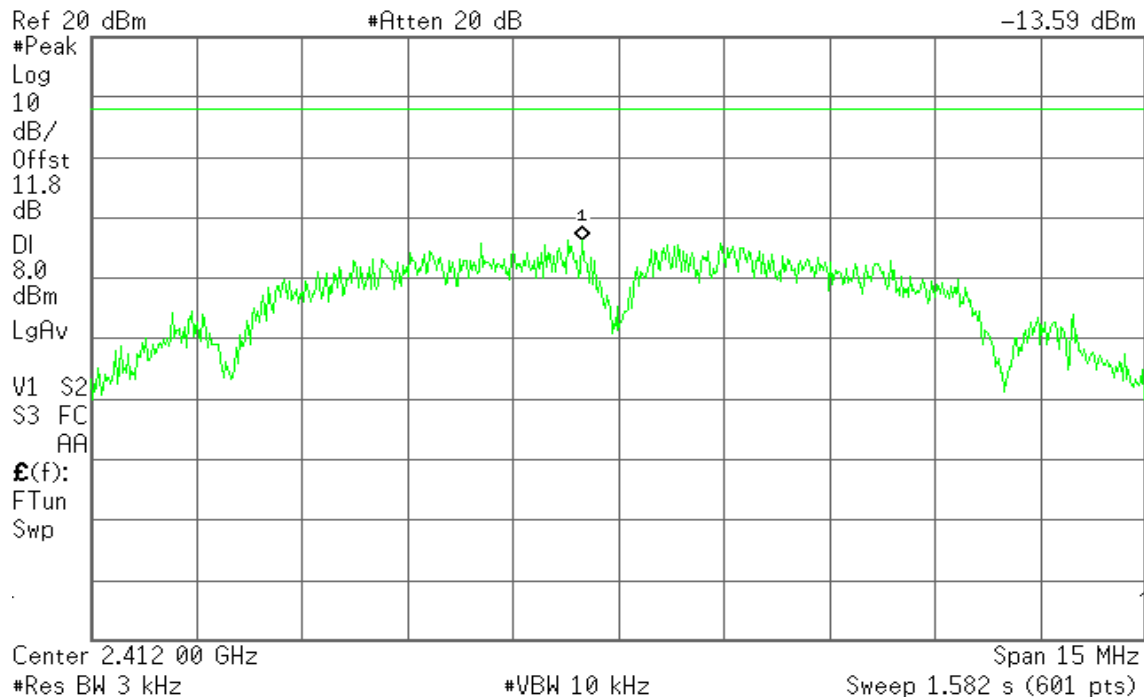
Test mode: IEEE 802.11n HT 20 MHz mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	5745	-11.81	8.00	PASS
Mid	5785	-12.13		PASS
High	5825	-11.99		PASS

**Test Plot****IEEE 802.11b mode****PPSD (CH Low)**

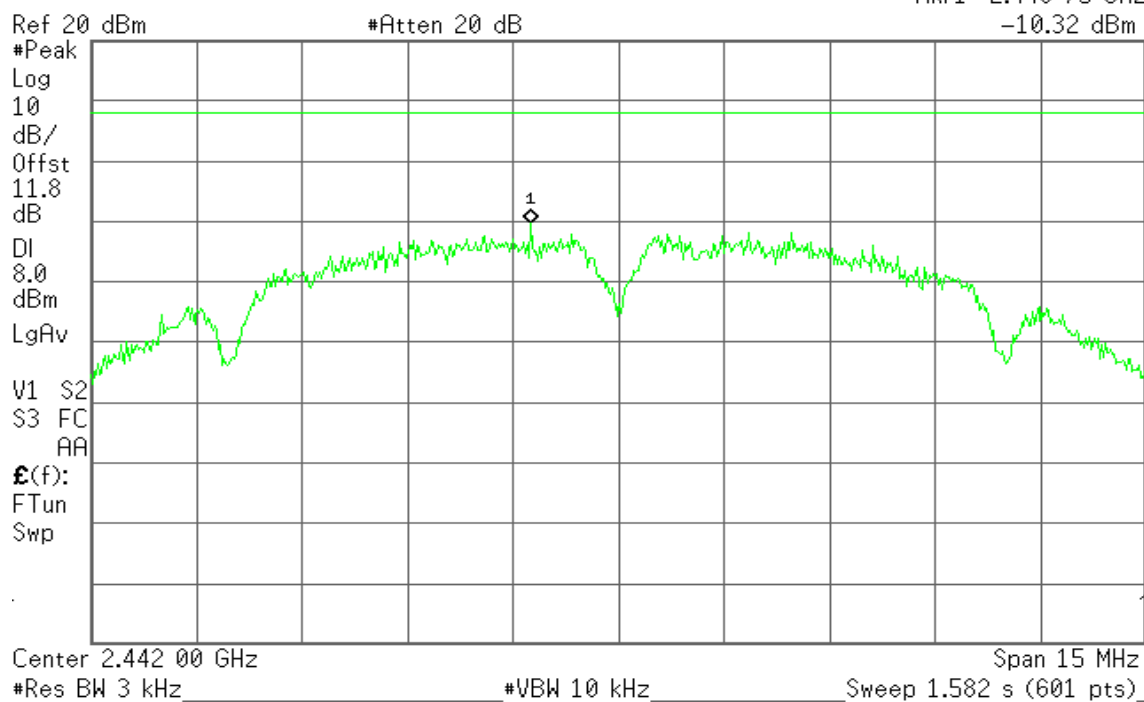
* Agilent 15:34:08 Nov 1, 2012

R T

Mkr1 2.411 48 GHz
-13.59 dBm**PPSD (CH Mid)**

* Agilent 15:33:16 Nov 1, 2012

R T

Mkr1 2.440 75 GHz
-10.32 dBm

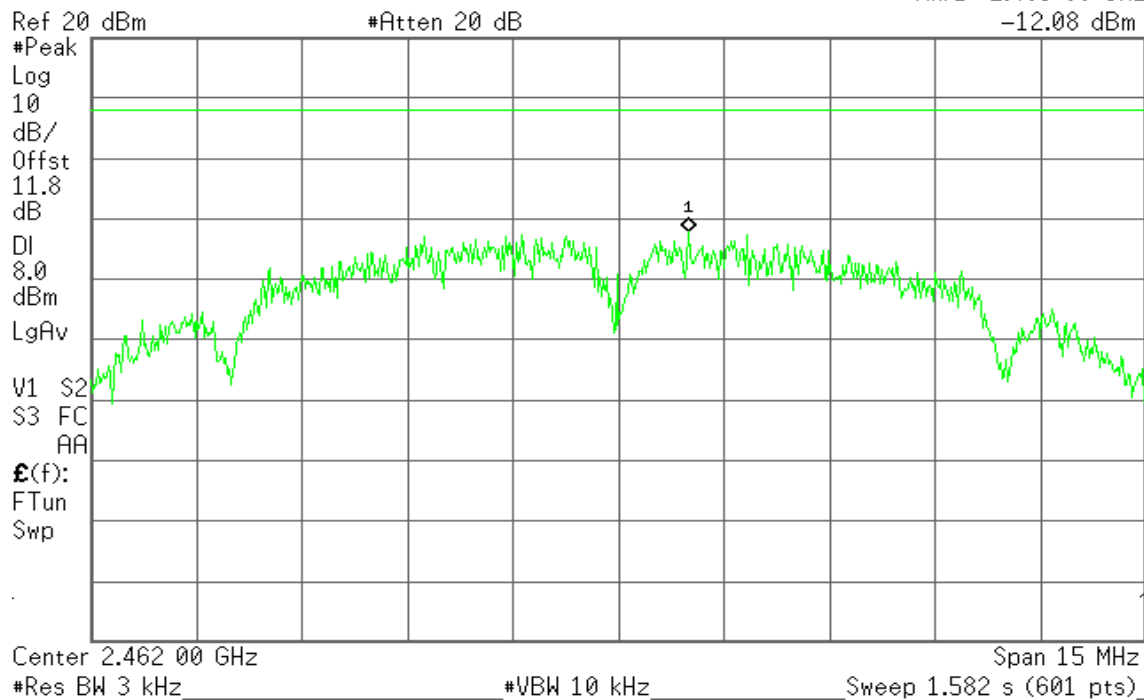


PPSD (CH High)

Agilent 15:34:50 Nov 1, 2012

R T

Mkr1 2.463 00 GHz
-12.08 dBm



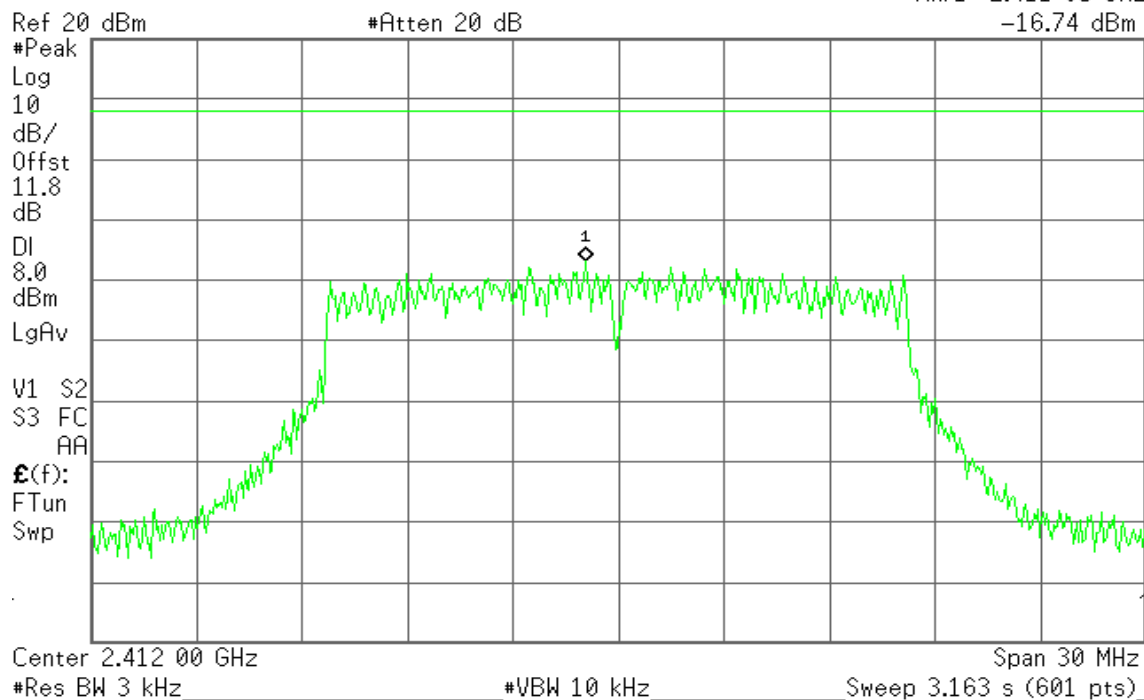
IEEE 802.11g mode

PPSD (CH Low)

Agilent 15:29:26 Nov 1, 2012

R T

Mkr1 2.411 05 GHz
-16.74 dBm



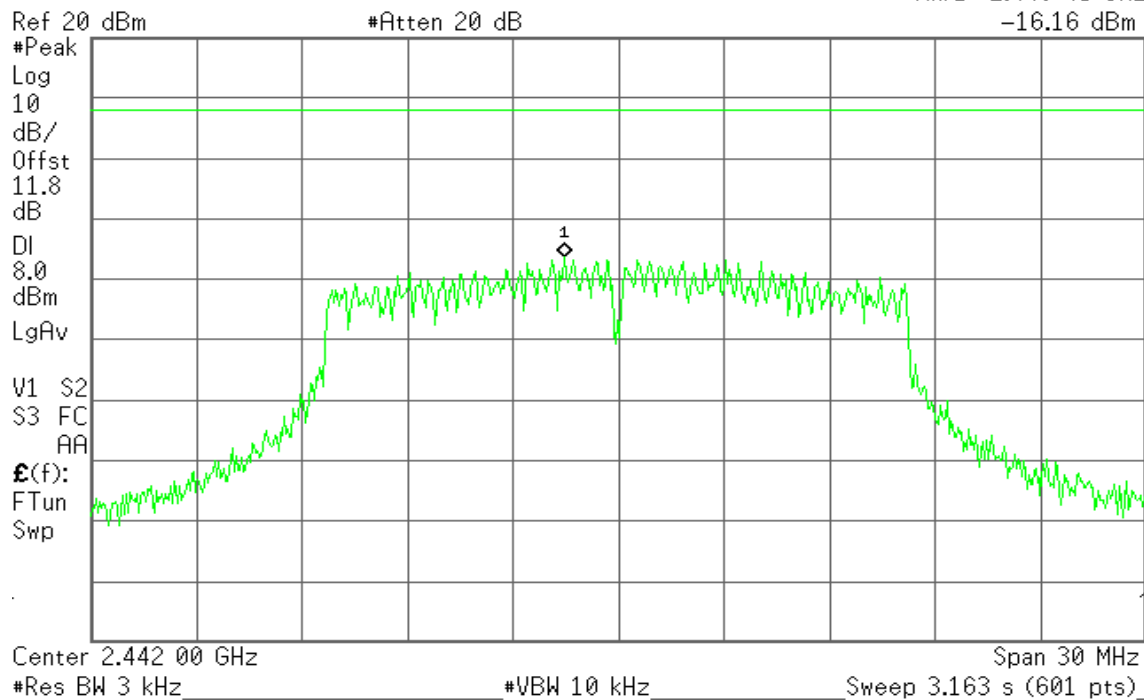


PPSD (CH Mid)

Agilent 15:28:42 Nov 1, 2012

R T

Mkr1 2.440 45 GHz
-16.16 dBm

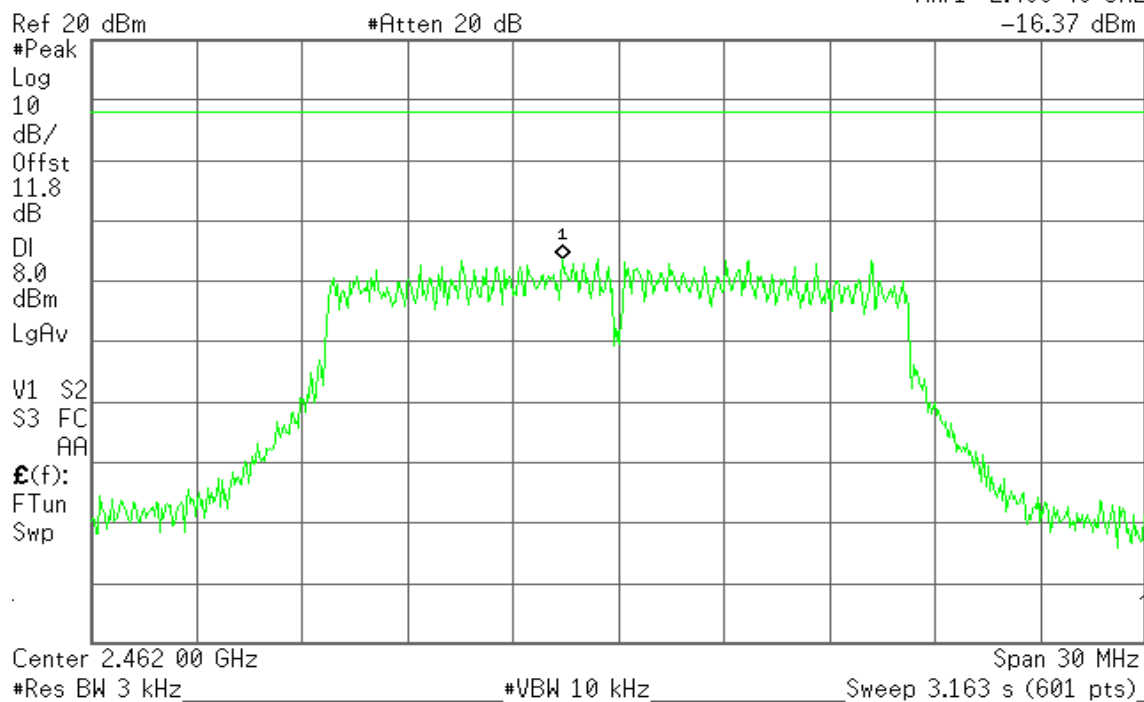


PPSD (CH High)

Agilent 15:27:52 Nov 1, 2012

R T

Mkr1 2.460 40 GHz
-16.37 dBm





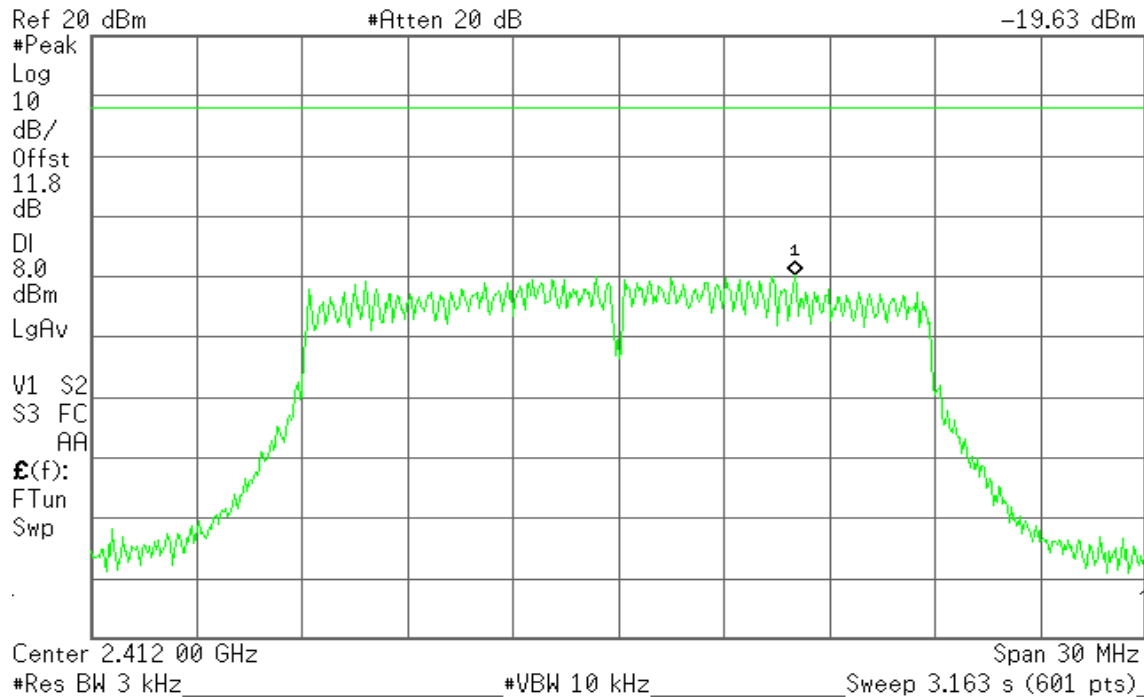
IEEE 802.11n HT 20 MHz mode

PPSD (CH Low)

Agilent 15:24:17 Nov 1, 2012

R T

Mkr1 2.417 00 GHz
-19.63 dBm

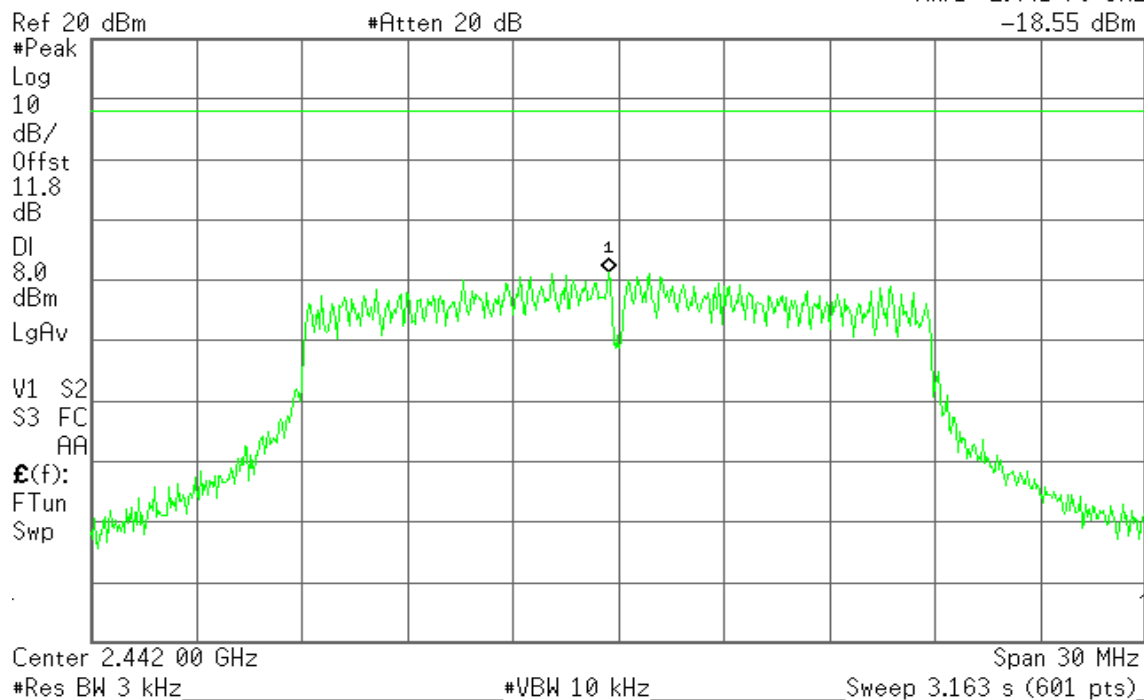


PPSD (CH Mid)

Agilent 15:25:28 Nov 1, 2012

R T

Mkr1 2.441 70 GHz
-18.55 dBm



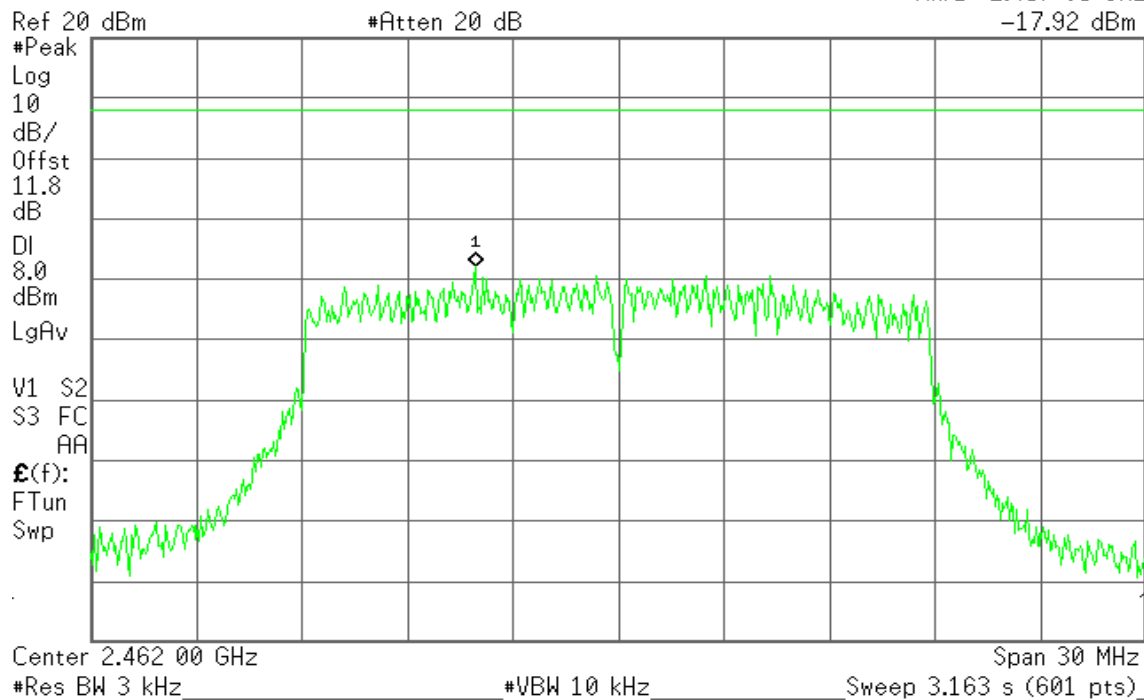


PPSD (CH High)

Agilent 15:26:23 Nov 1, 2012

R T

Mkr1 2.457 95 GHz
-17.92 dBm



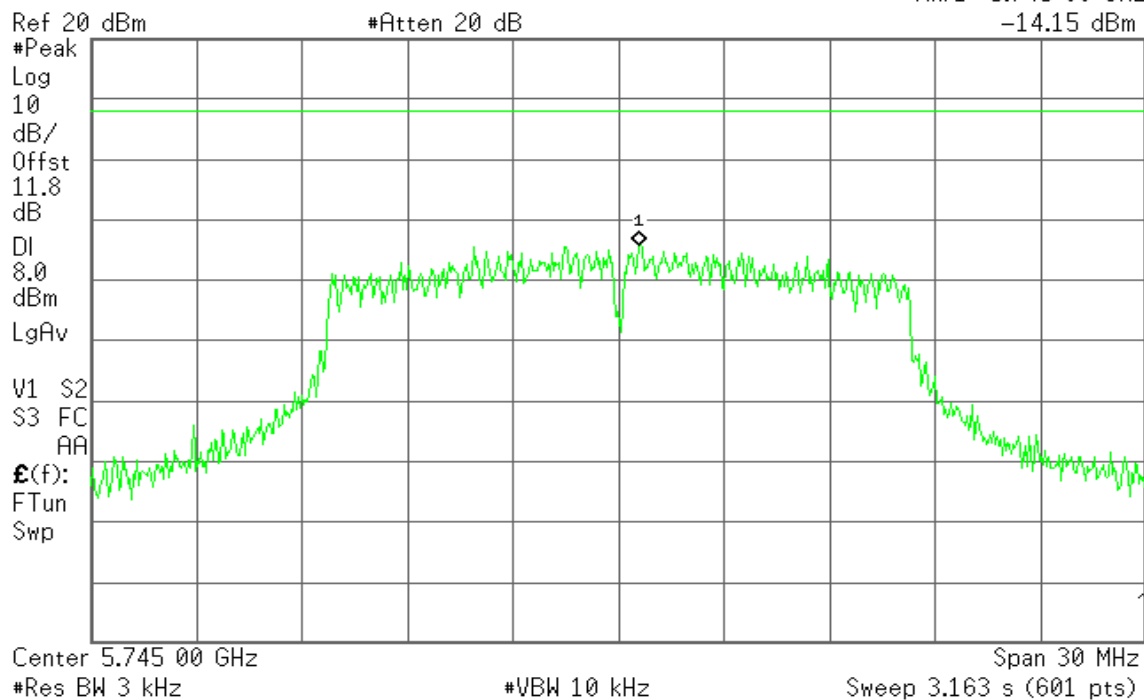
IEEE 802.11a mode

PPSD (CH Low)

Agilent 13:40:47 Nov 1, 2012

R T

Mkr1 5.745 60 GHz
-14.15 dBm

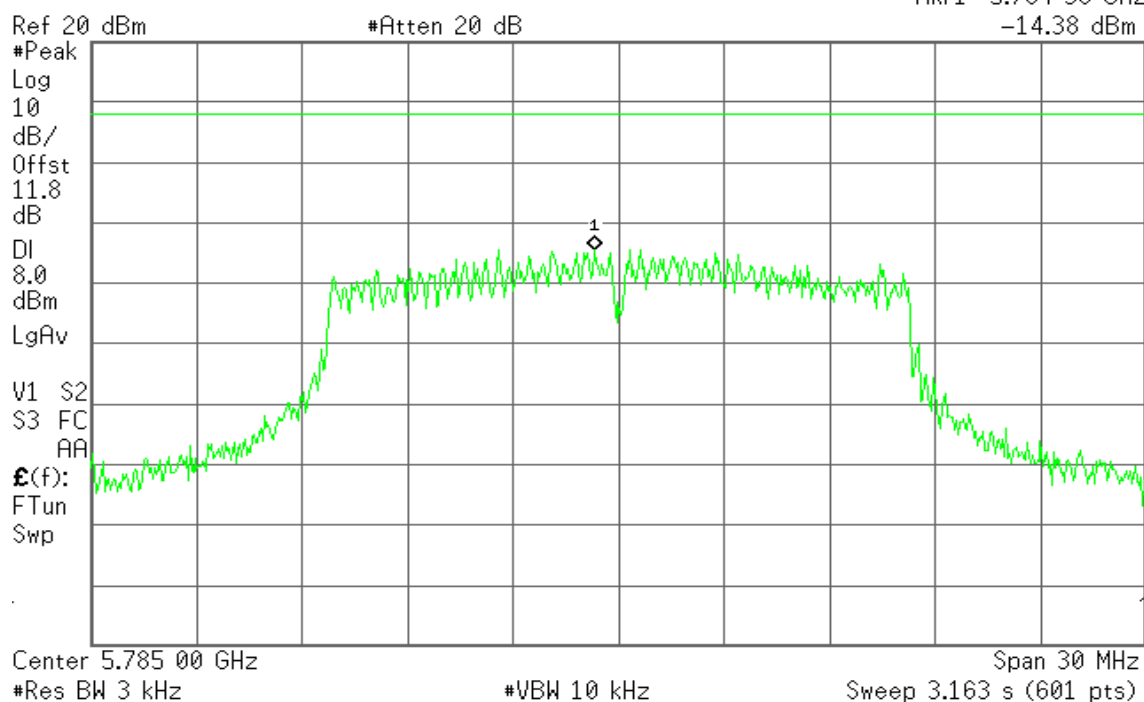




PPSD (CH Mid)

Agilent 13:53:23 Nov 1, 2012

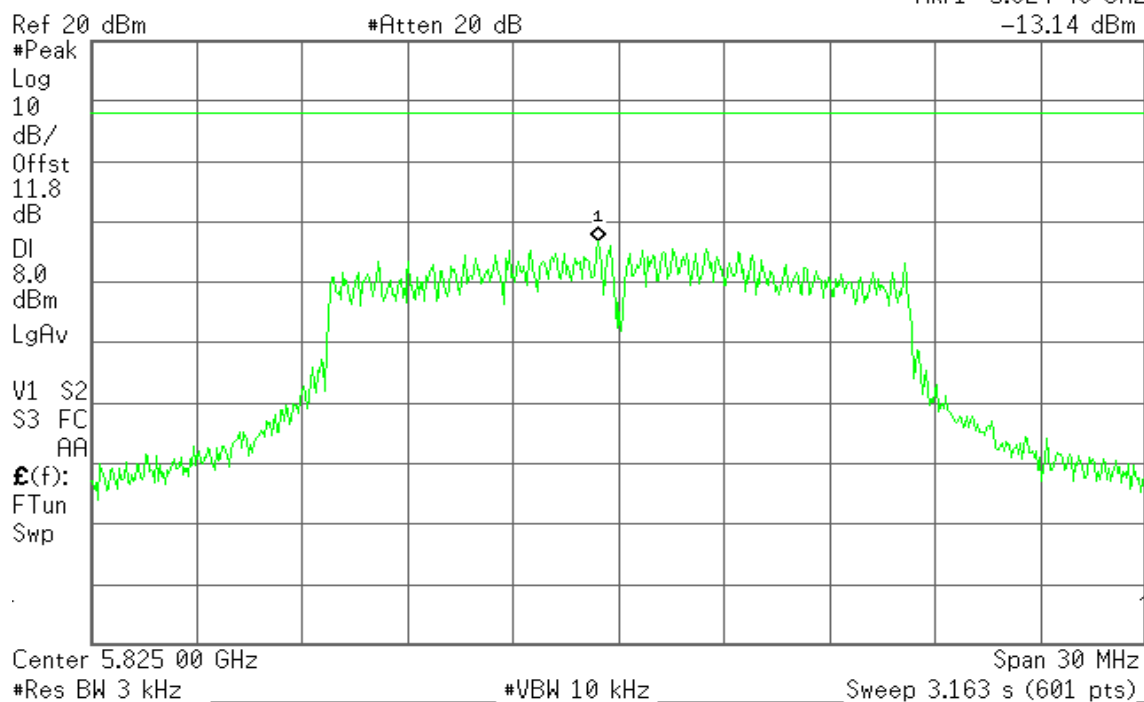
R T

Mkr1 5.784 30 GHz
-14.38 dBm

PPSD (CH High)

Agilent 14:18:47 Nov 1, 2012

R T

Mkr1 5.824 40 GHz
-13.14 dBm

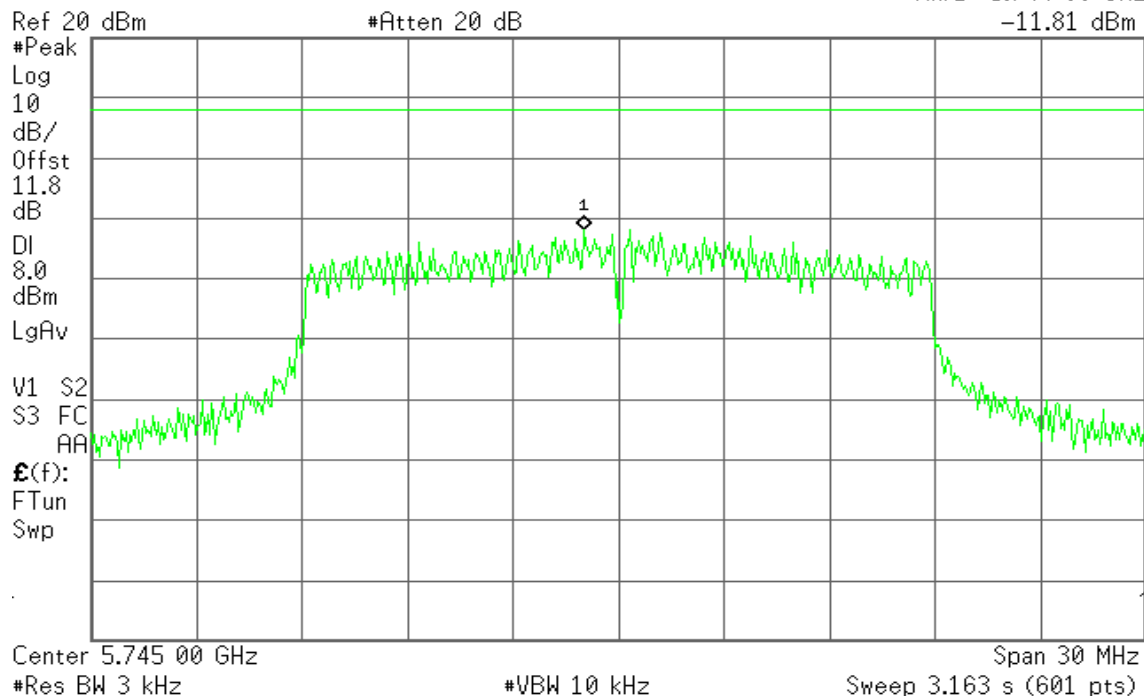


IEEE 802.11n HT 20 MHz mode

PPSD (CH Low)

Agilent 14:24:21 Nov 1, 2012

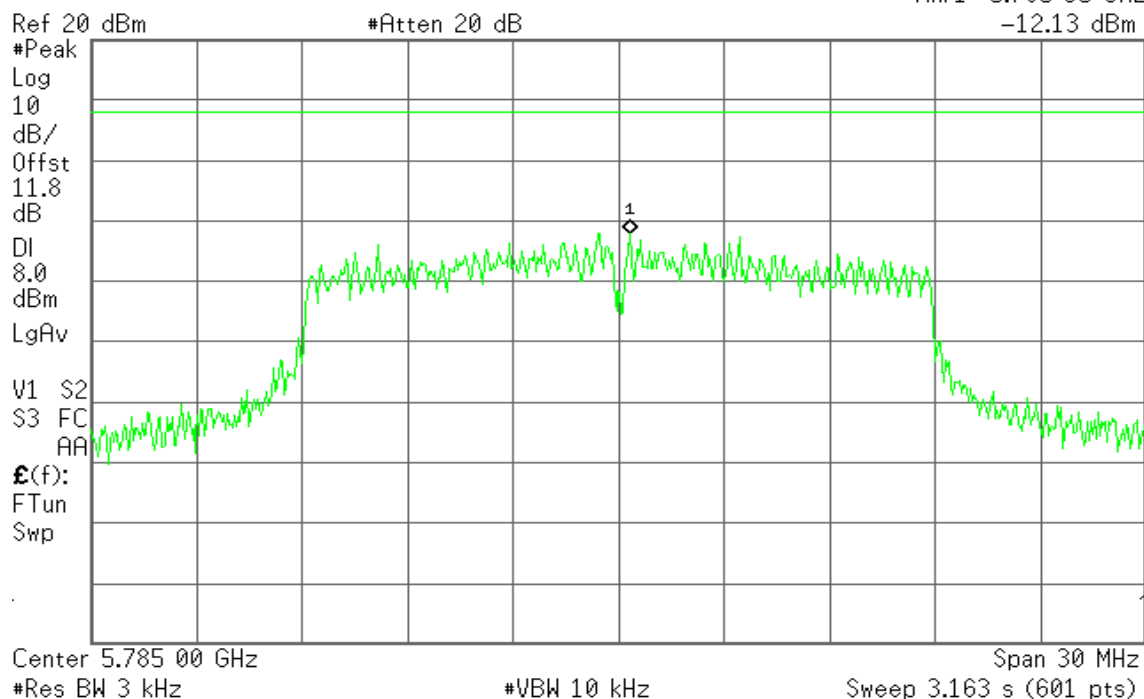
R T

Mkr1 5.744 00 GHz
-11.81 dBm

PPSD (CH Mid)

Agilent 14:29:35 Nov 1, 2012

R T

Mkr1 5.785 35 GHz
-12.13 dBm

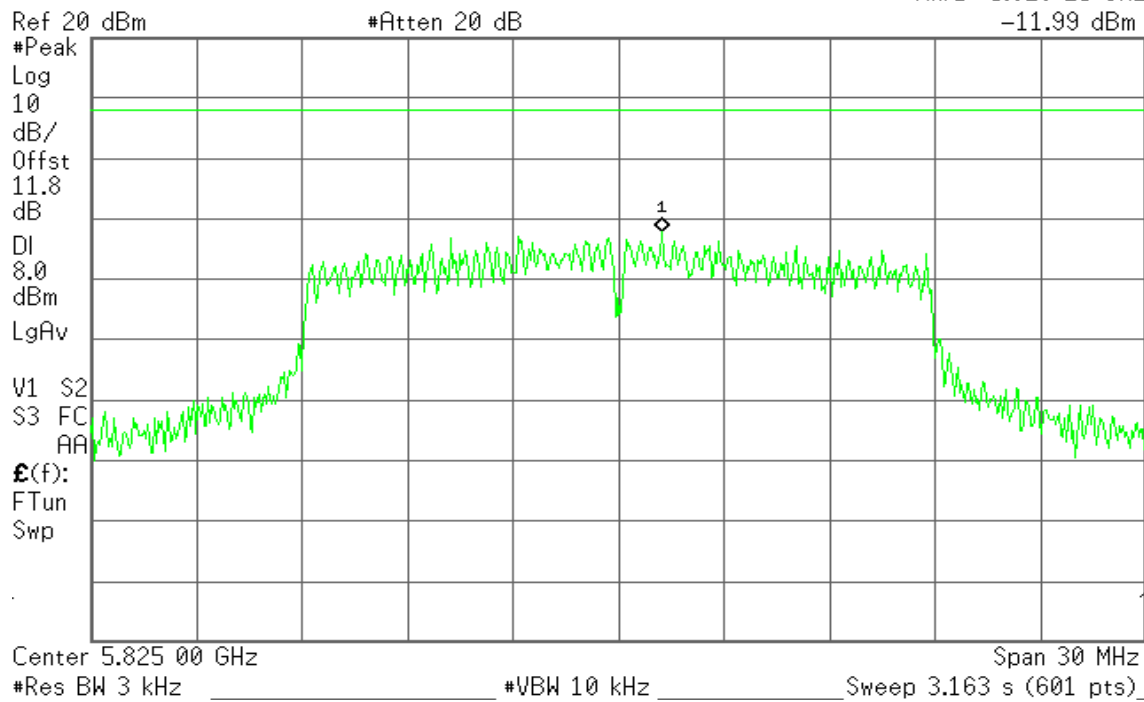


PPSD (CH High)

Agilent 14:33:47 Nov 1, 2012

R T

Mkr1 5.826 25 GHz
-11.99 dBm





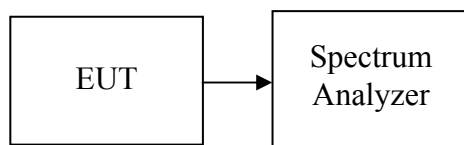
7.6 SPURIOUS EMISSIONS

7.6.1 Conducted Measurement

LIMIT

According to §15.247(d) & RSS-210 §A8.5, 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 for IEEE 802.11b/g, 30MHz to 40GHz range for IEEE 802.11a with the transmitter set to the lowest, middle, and highest channels.

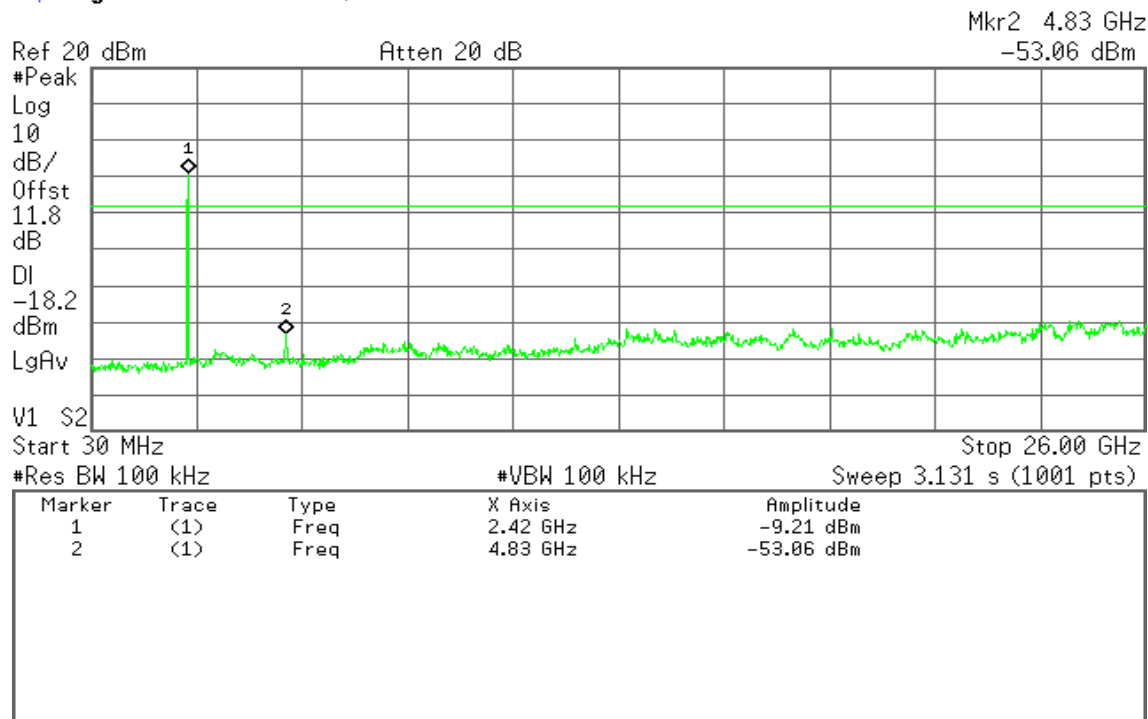
TEST RESULTS

No non-compliance noted

**Test Plot****IEEE 802.11b mode****CH Low**

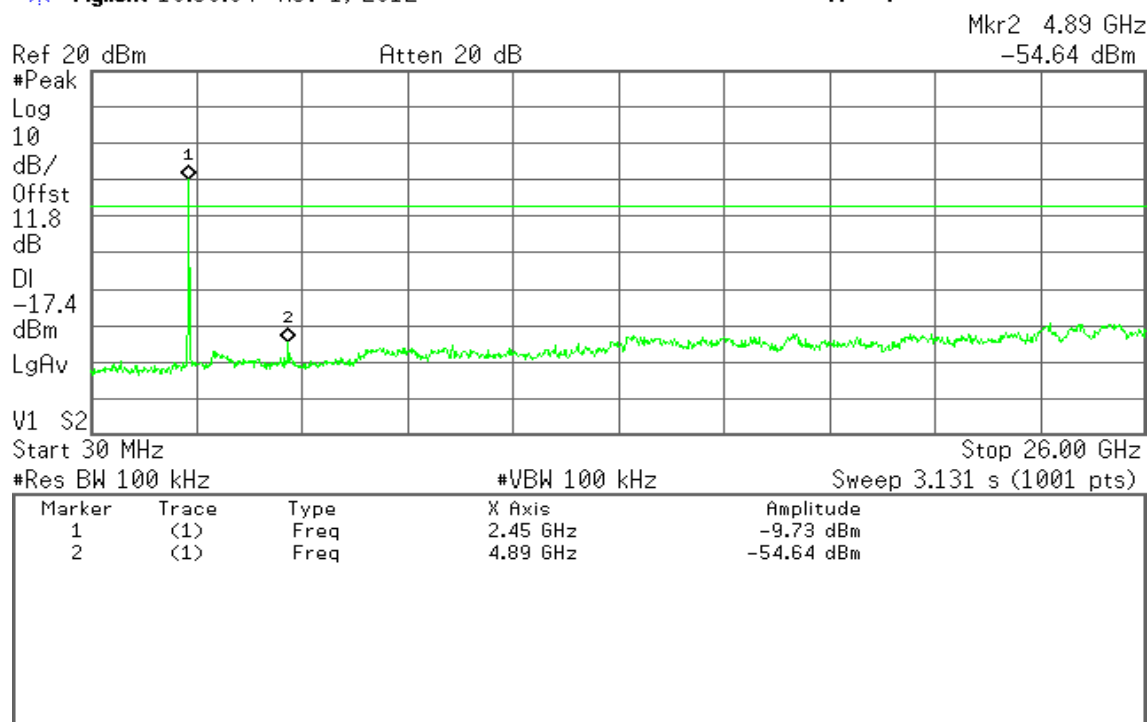
* Agilent 16:25:15 Nov 1, 2012

R T

**CH Mid**

* Agilent 16:30:04 Nov 1, 2012

R T



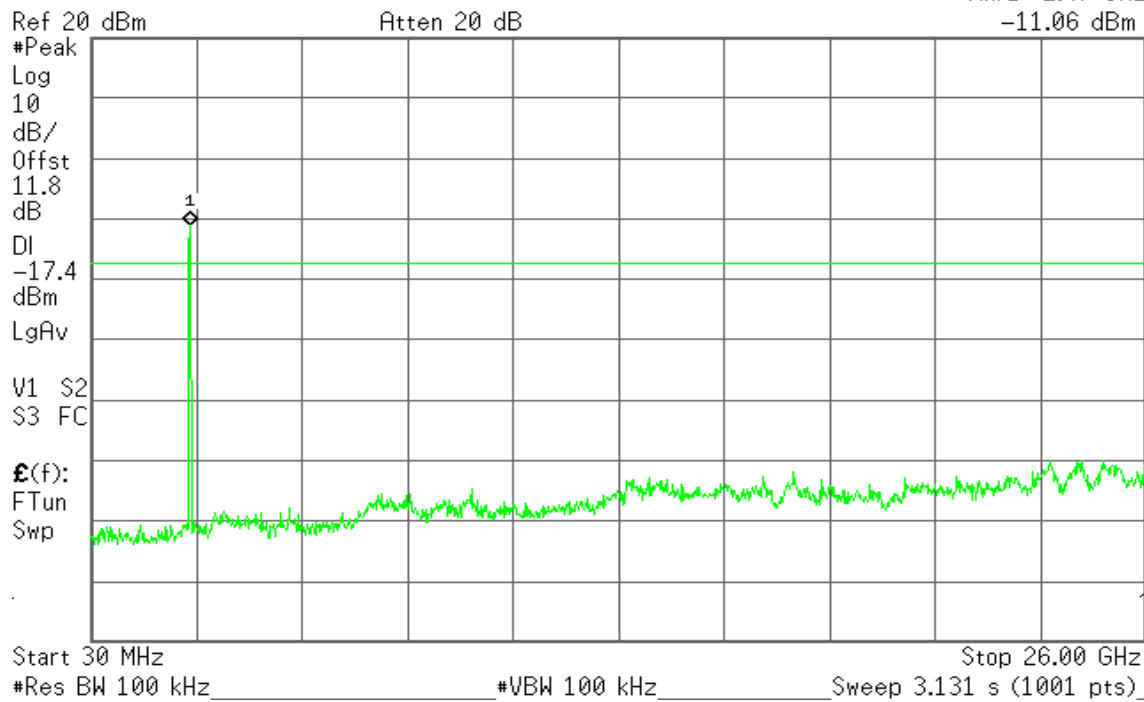


CH High

Agilent 16:32:12 Nov 1, 2012

R T

Mkr1 2.47 GHz
-11.06 dBm



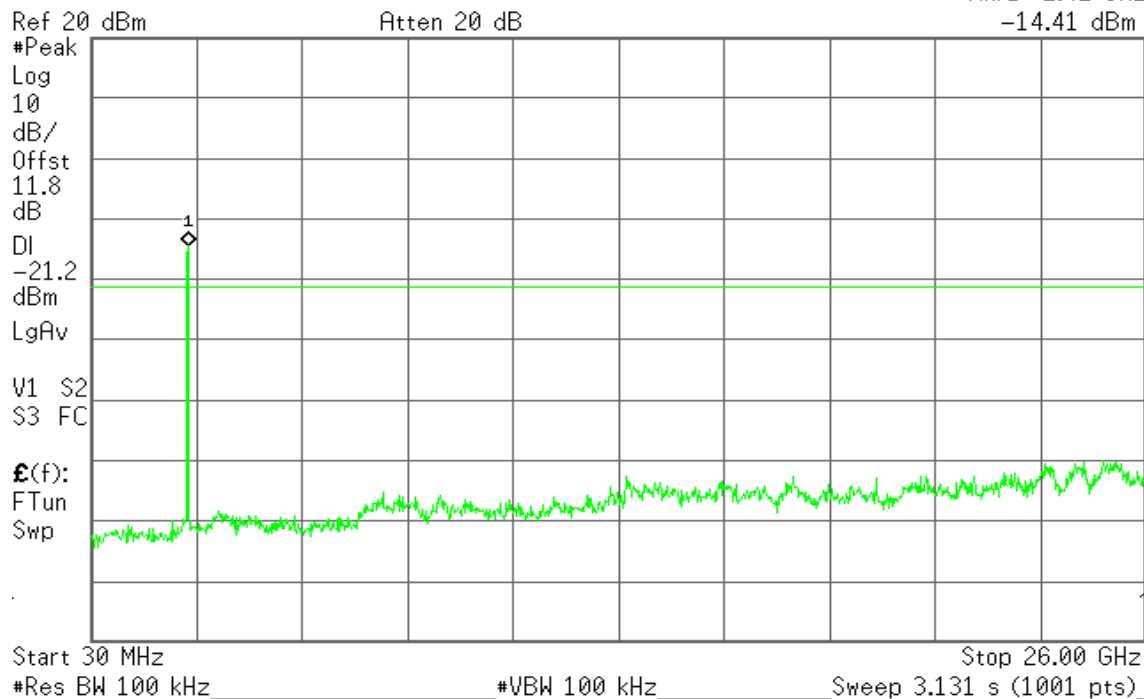
IEEE 802.11g mode

CH Low

Agilent 16:36:04 Nov 1, 2012

R T

Mkr1 2.42 GHz
-14.41 dBm



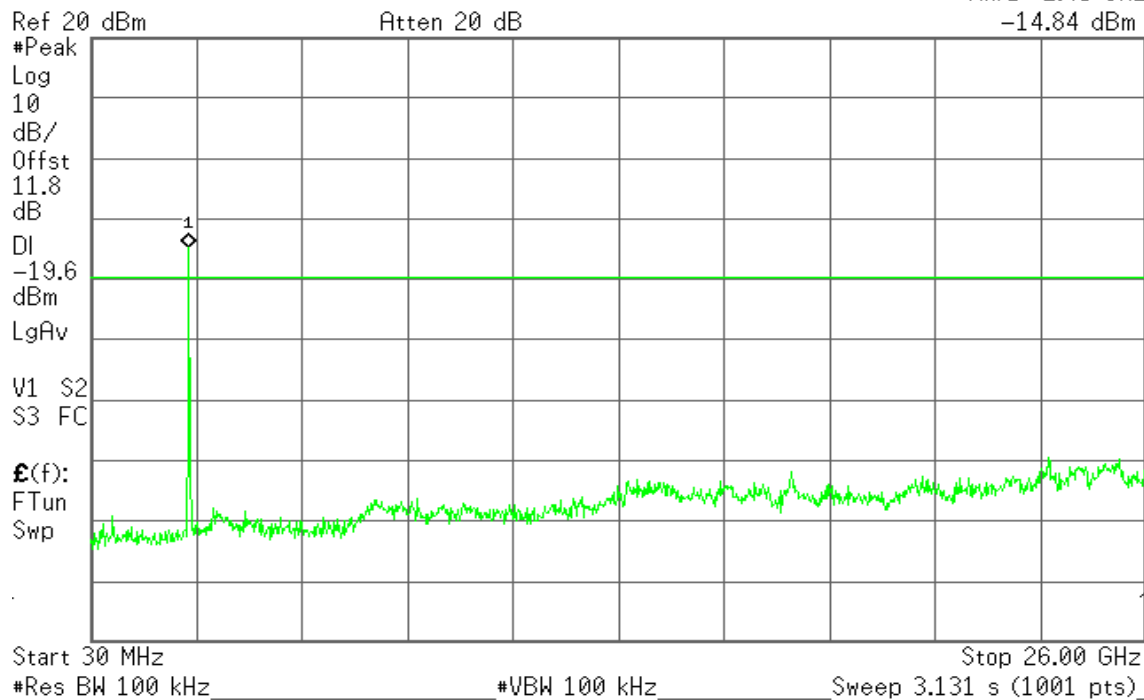


CH Mid

Agilent 16:39:21 Nov 1, 2012

R T

Mkr1 2.45 GHz
-14.84 dBm

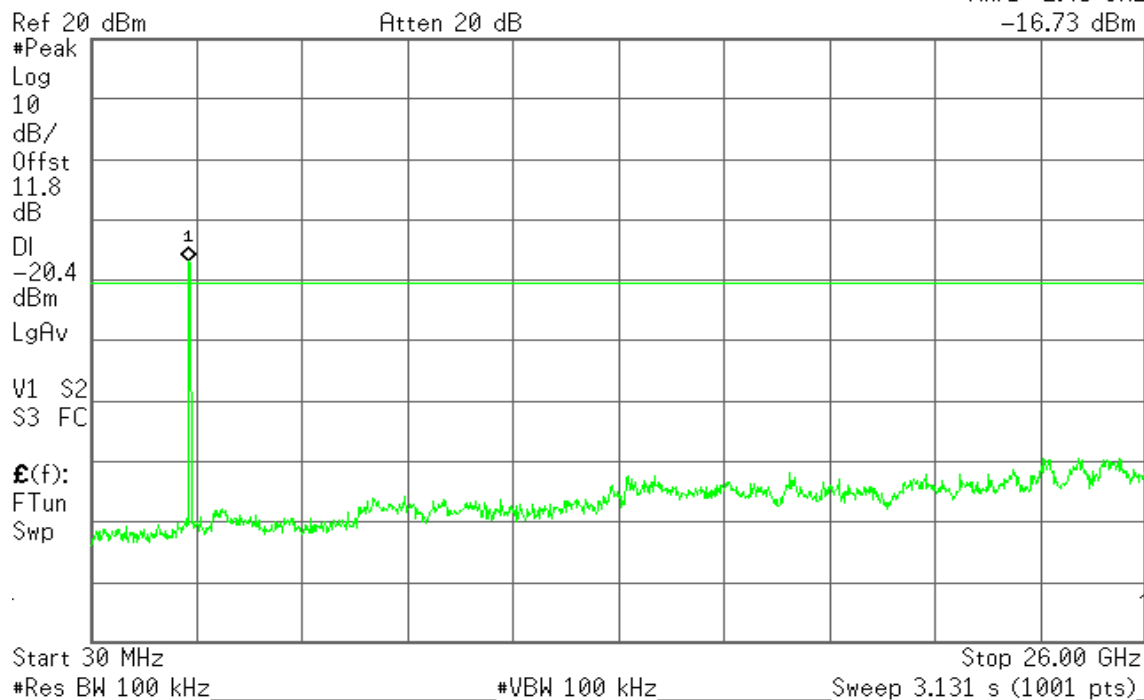


CH High

Agilent 16:43:30 Nov 1, 2012

R T

Mkr1 2.45 GHz
-16.73 dBm



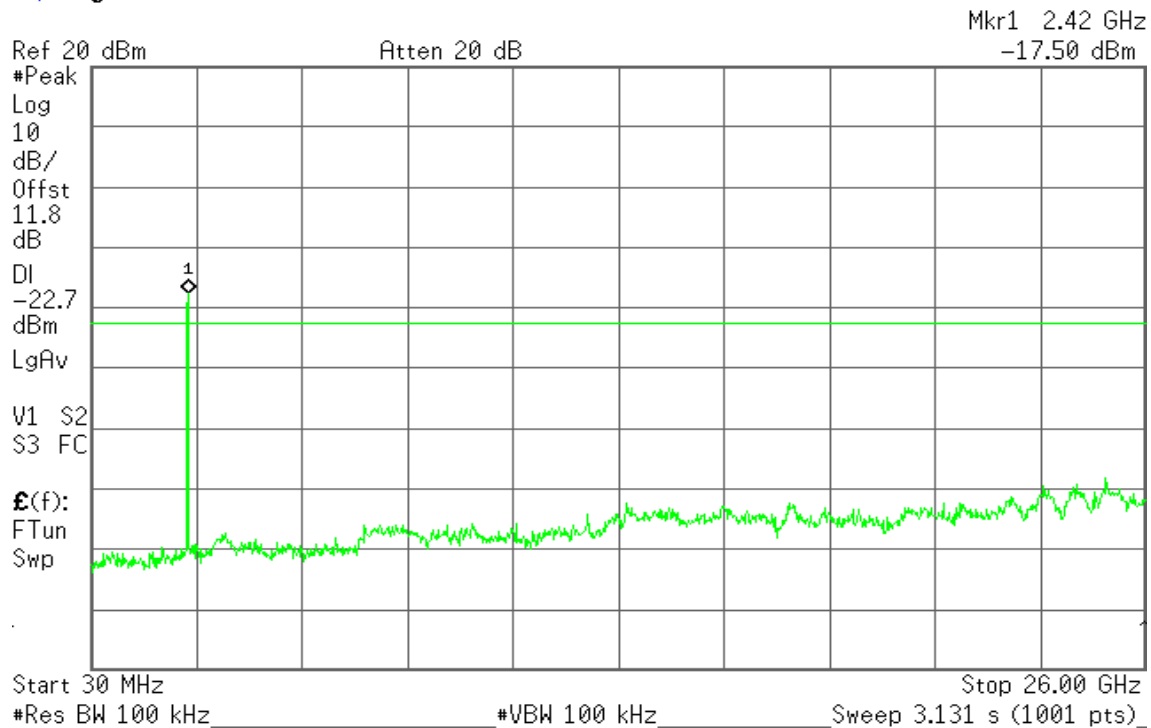


IEEE 802.11n HT 20 MHz mode

CH Low

Agilent 16:50:48 Nov 1, 2012

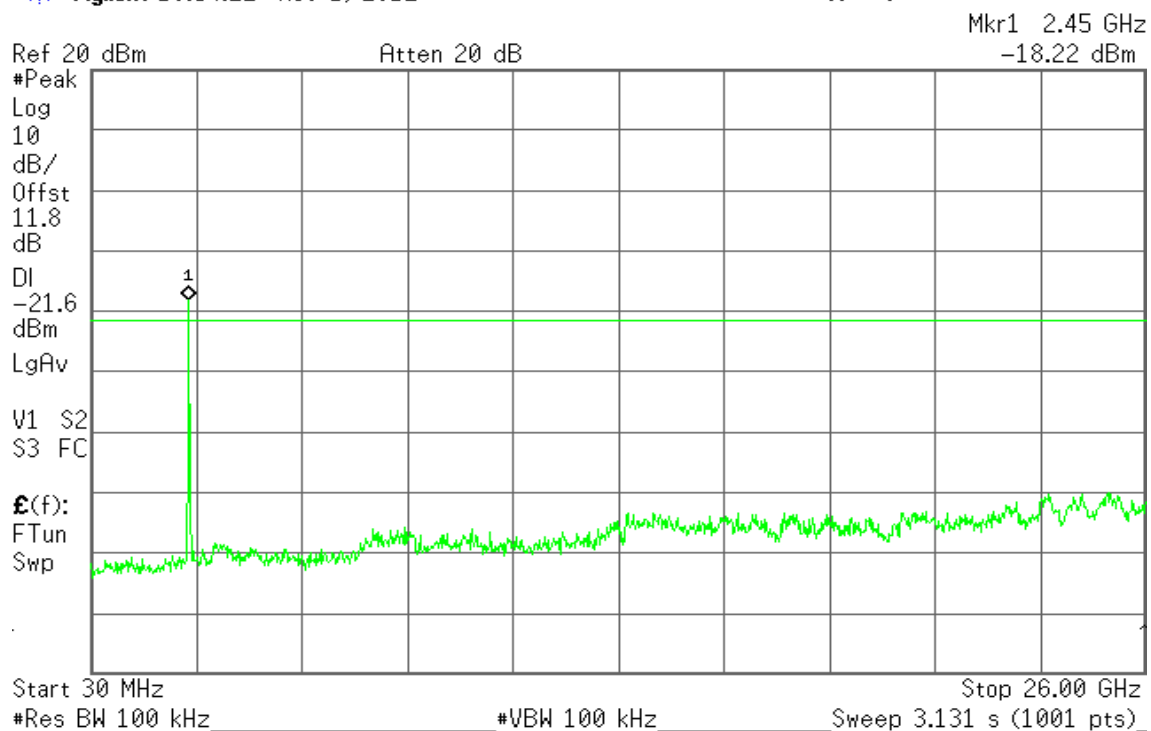
R T



CH Mid

Agilent 16:54:22 Nov 1, 2012

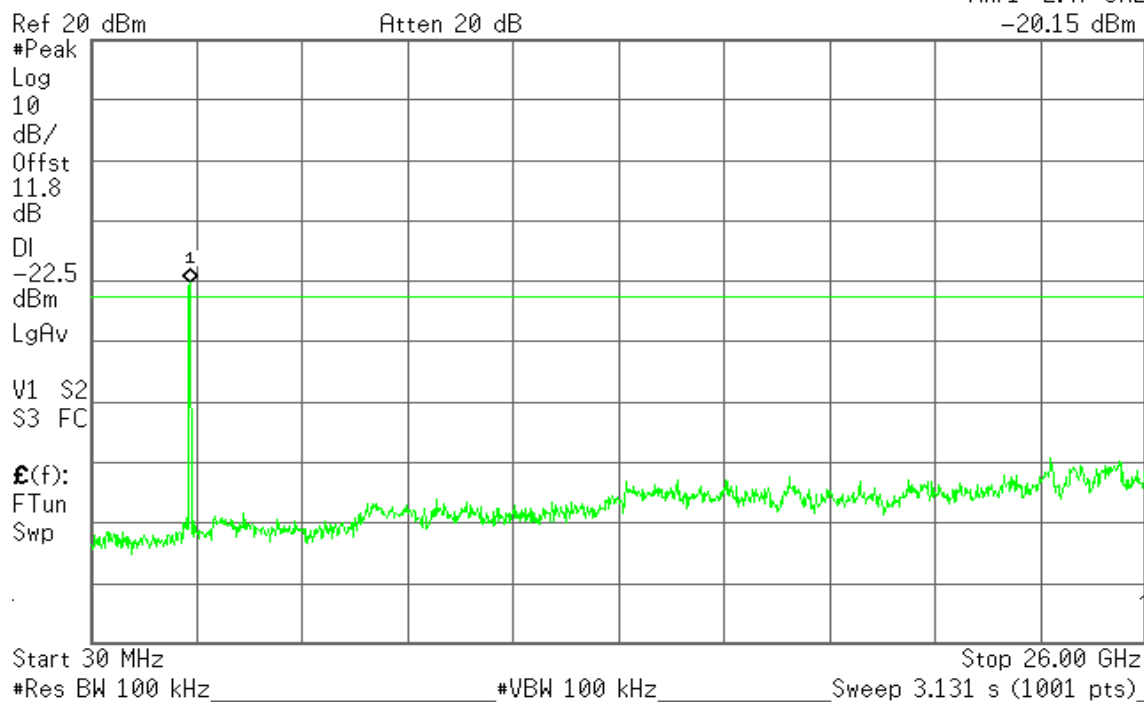
R T



**CH High**

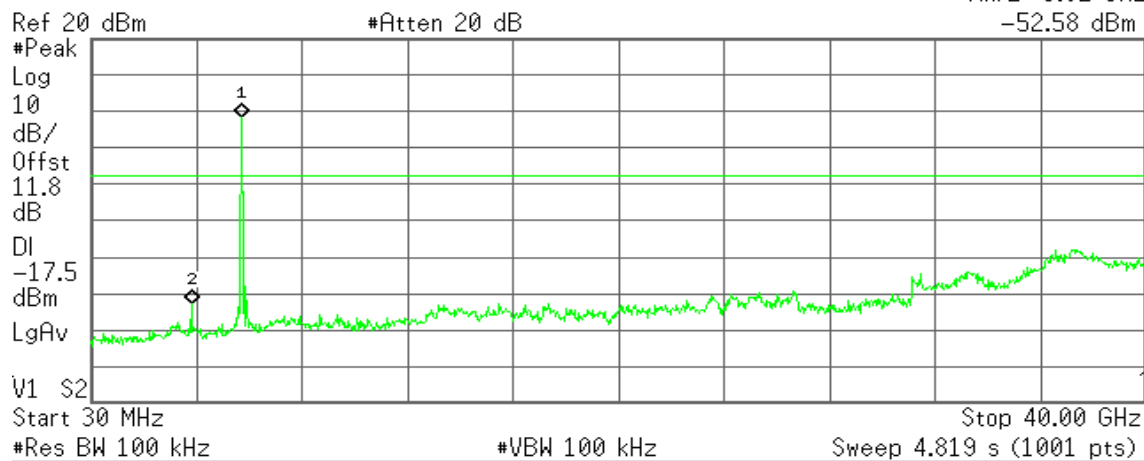
Agilent 16:56:25 Nov 1, 2012

R T

Mkr1 2.47 GHz
-20.15 dBm**IEEE 802.11a mode****CH Low**

Agilent 13:44:31 Nov 1, 2012

R T

Mkr2 3.82 GHz
-52.58 dBm

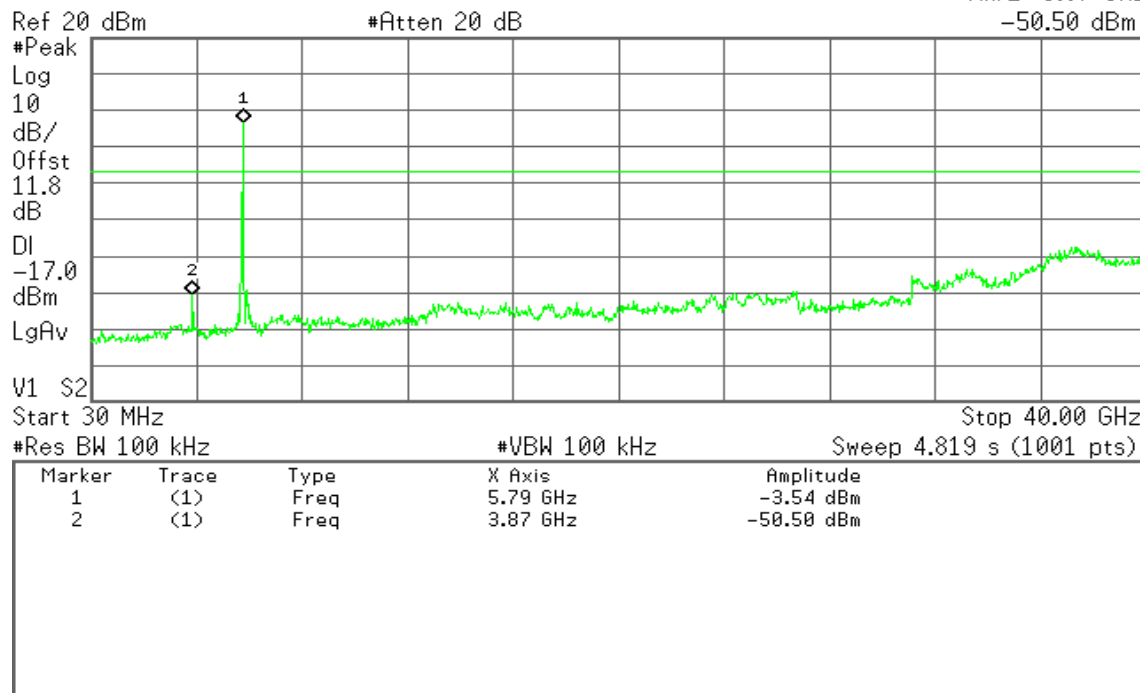
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	5.76 GHz	-1.71 dBm
2	(1)	Freq	3.82 GHz	-52.58 dBm



CH Mid

* Agilent 13:56:17 Nov 1, 2012

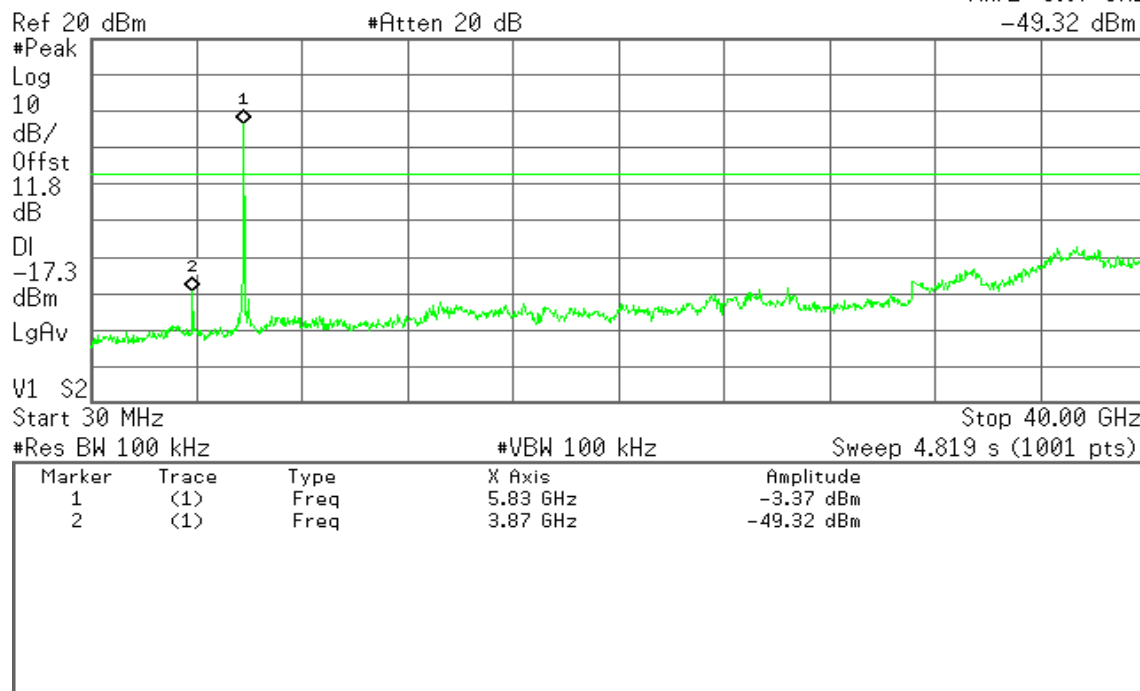
R T

Mkr2 3.87 GHz
-50.50 dBm

CH High

* Agilent 14:21:00 Nov 1, 2012

R T

Mkr2 3.87 GHz
-49.32 dBm



IEEE 802.11n HT 20 MHz mode

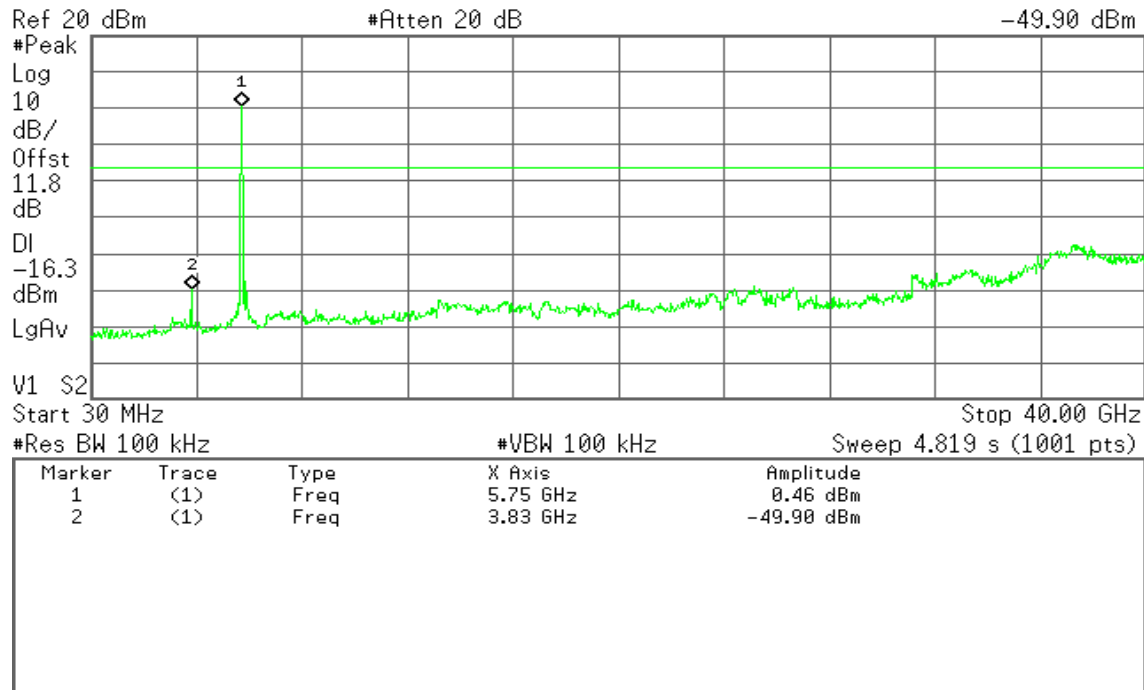
CH Low

* Agilent 14:26:56 Nov 1, 2012

R T

Mkr2 3.83 GHz

-49.90 dBm



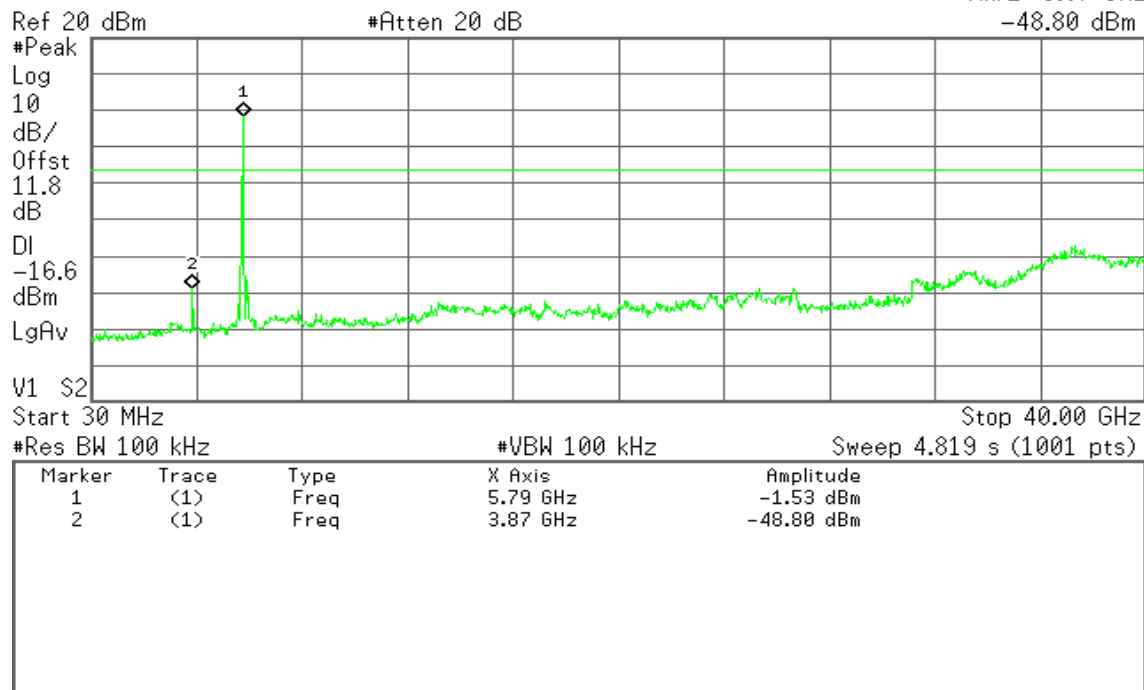
CH Mid

* Agilent 14:31:37 Nov 1, 2012

R T

Mkr2 3.87 GHz

-48.80 dBm

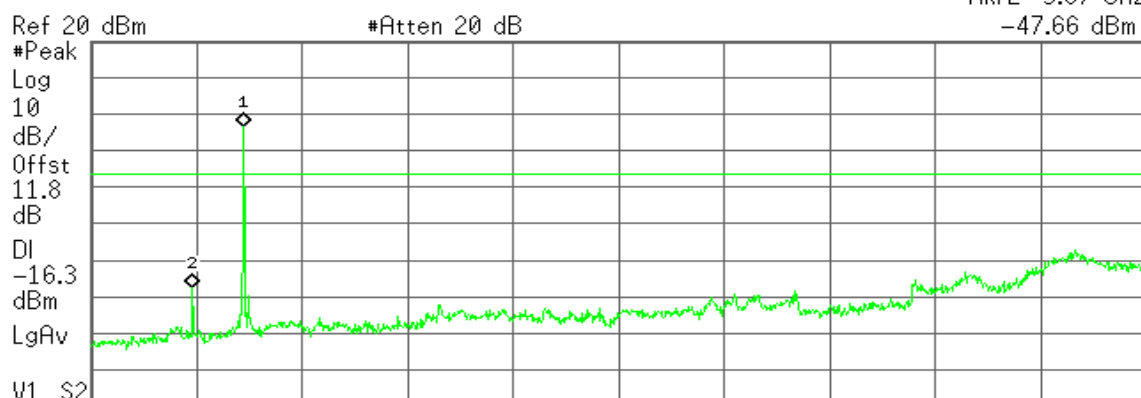




CH High

* Agilent 14:36:02 Nov 1, 2012

R T

Mkr2 3.87 GHz
-47.66 dBm

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	5.83 GHz	-3.17 dBm
2	(1)	Freq	3.87 GHz	-47.66 dBm



7.6.2 Radiated Emissions

LIMIT

1. Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

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

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

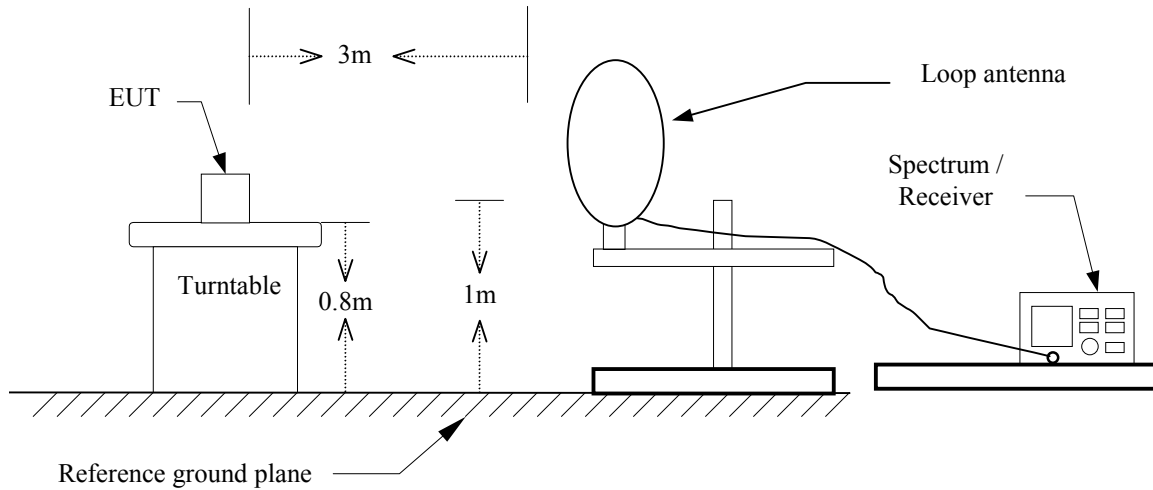
2. In the above emission table, the tighter limit applies at the band edges.

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

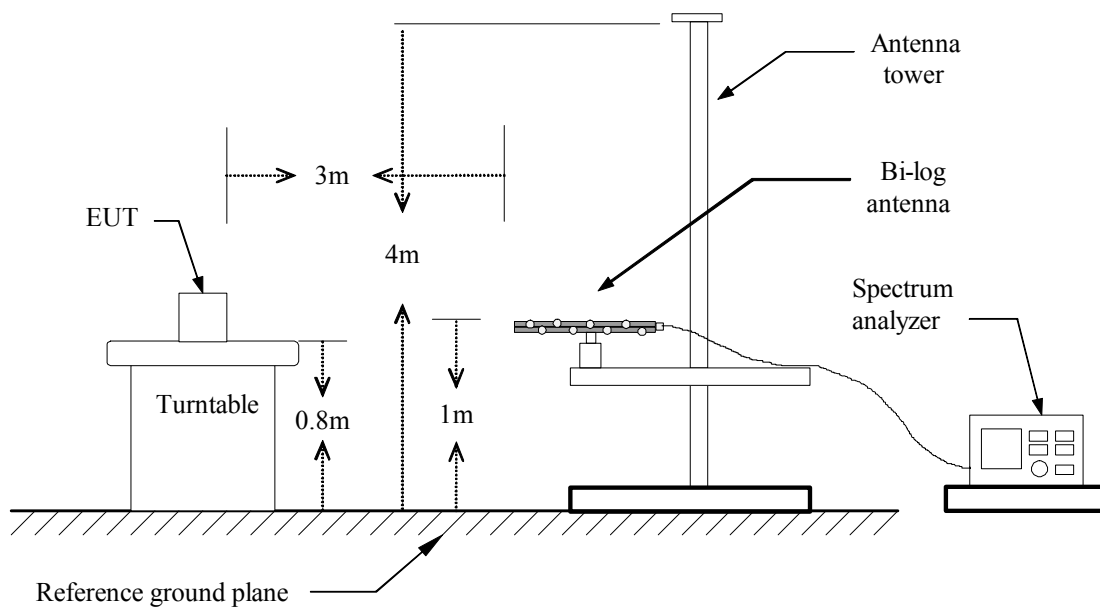


Test Configuration

9kHz ~ 30MHz

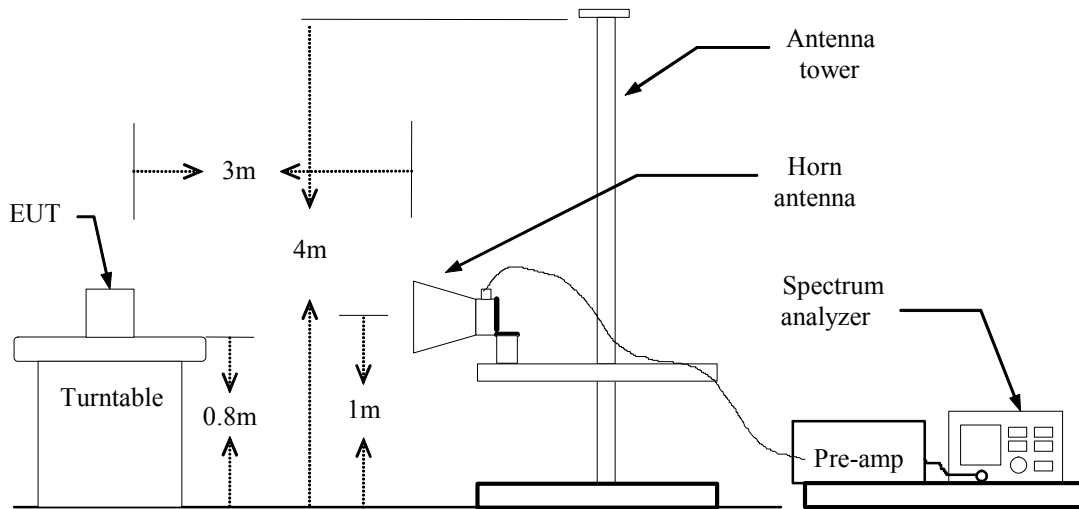


30MHz ~ 1 GHz





Above 1 GHz





TEST PROCEDURE

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

**Below 1 GHz**

Operation Mode: Normal Link **Test Date:** November 24, 2012
Temperature: 27°C **Tested by:** Shawn Wu
Humidity: 53 % RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
96.2833	40.20	-16.87	23.33	43.50	-20.17	peak	V
215.9167	34.52	-13.44	21.08	43.50	-22.42	peak	V
311.3000	32.33	-10.98	21.35	46.00	-24.65	peak	V
384.0500	37.41	-9.84	27.57	46.00	-18.43	peak	V
527.9333	39.04	-7.85	31.19	46.00	-14.81	peak	V
576.4333	39.65	-7.37	32.28	46.00	-13.72	peak	V
144.7833	32.96	-12.84	20.12	43.50	-23.38	peak	H
167.4167	37.28	-13.60	23.68	43.50	-19.82	peak	H
191.6667	39.46	-13.13	26.33	43.50	-17.17	peak	H
215.9167	42.59	-13.44	29.15	43.50	-14.35	peak	H
264.4167	37.88	-12.02	25.86	46.00	-20.14	peak	H
335.5500	32.70	-10.54	22.16	46.00	-23.84	peak	H

Remark:

1. No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz)
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.
3. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.
4. 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. $\text{Margin (dB)} = \text{Remark result (dBuV/m)} - \text{Quasi-peak limit (dBuV/m)}$.

**Above 1 GHz****Operation Mode:** Tx / IEEE 802.11b mode / CH Low**Test Date:** November 24, 2012**Temperature:** 27°C**Tested by:** Shawn Wu**Humidity:** 53% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2116.667	66.33	-18.87	47.46	74.00	-26.54	peak	V
4825.000	61.81	-12.29	49.52	74.00	-24.48	peak	V
N/A							
2200.000	66.52	-18.68	47.84	74.00	-26.16	peak	H
4825.000	65.54	-12.29	53.25	74.00	-20.75	peak	H
4825.000	63.91	-12.29	51.62	54.00	-2.38	AVG	H
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 mode / CH Mid**Test Date:** November 24, 2012**Temperature:** 27°C**Tested by:** Shawn Wu**Humidity:** 53% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2303.333	65.69	-18.43	47.26	74.00	-26.74	peak	V
4875.000	61.06	-12.15	48.91	74.00	-25.09	peak	V
N/A							
2366.667	66.46	-18.21	48.25	74.00	-25.75	peak	H
4875.000	62.49	-12.15	50.34	74.00	-23.66	peak	H
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. $\text{Margin (dB)} = \text{Remark result (dBuV/m)} - \text{Average limit (dBuV/m)}$.

**Operation Mode:** Tx / IEEE 802.11b mode / CH High**Test Date:** November 24, 2012**Temperature:** 27°C**Tested by:** Shawn Wu**Humidity:** 53% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2246.667	66.15	-18.57	47.58	74.00	-26.42	peak	V
4925.000	58.90	-12.00	46.90	74.00	-27.10	peak	
N/A							
2380.000	68.14	-18.16	49.98	74.00	-24.02	peak	H
4925.000	59.06	-12.00	47.06	74.00	-26.94	peak	H
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. $\text{Margin (dB)} = \text{Remark result (dBuV/m)} - \text{Average limit (dBuV/m)}$.

**Operation Mode:** Tx / IEEE 802.11g mode / CH Low**Test Date:** November 24, 2012**Temperature:** 27°C**Tested by:** Shawn Wu**Humidity:** 53% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2256.667	69.34	-18.54	50.80	74.00	-23.20	peak	V
4816.667	62.67	-12.32	50.35	74.00	-23.65	peak	V
N/A							
2570.000	69.52	-17.69	51.83	74.00	-22.17	peak	H
4816.667	65.45	-12.32	53.13	74.00	-20.87	peak	H
4816.667	54.41	-12.32	42.09	54.00	-11.91	AVG	H
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. $\text{Margin (dB)} = \text{Remark result (dBuV/m)} - \text{Average limit (dBuV/m)}$.

**Operation Mode:** Tx / IEEE 802.11g mode/ CH Mid**Test Date:** November 24, 2012**Temperature:** 27°C**Tested by:** Shawn Wu**Humidity:** 53% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2803.333	68.76	-17.14	51.62	74.00	-22.38	peak	V
4883.333	59.10	-12.12	46.98	74.00	-27.02	peak	V
N/A							
2983.333	68.24	-16.71	51.53	74.00	-22.47	peak	H
4883.333	60.44	-12.12	48.32	74.00	-25.68	peak	H
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. $\text{Margin (dB)} = \text{Remark result (dBuV/m)} - \text{Average limit (dBuV/m)}$.

**Operation Mode:** Tx / IEEE 802.11g mode/ CH High**Test Date:** November 24, 2012**Temperature:** 27°C**Tested by:** Shawn Wu**Humidity:** 53% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2390.000	70.04	-18.12	51.92	74.00	-22.08	peak	V
N/A							
2813.333	68.95	-17.11	51.84	74.00	-22.16	peak	H
4925.000	58.60	-12.00	46.60	74.00	-27.40	peak	H
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. $\text{Margin (dB)} = \text{Remark result (dBuV/m)} - \text{Average limit (dBuV/m)}$.

**Operation Mode:** TX / IEEE 802.11n HT 20 MHz mode / CH Low **Test Date:** November 24, 2012**Temperature:** 27°C**Tested by:** Shawn Wu**Humidity:** 53% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2863.333	68.48	-17.00	51.48	74.00	-22.52	peak	V
4950.000	57.60	-11.93	45.67	74.00	-28.33	peak	V
N/A							
2696.667	69.12	-17.39	51.73	74.00	-22.27	peak	H
4825.000	62.45	-12.29	50.16	74.00	-23.84	peak	H
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 802.11n HT 20 MHz mode / CH Mid **Test Date:** November 24, 2012**Temperature:** 27°C**Tested by:** Shawn Wu**Humidity:** 53% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2653.333	68.79	-17.50	51.29	74.00	-22.71	peak	V
N/A							
2853.333	68.77	-17.02	51.75	74.00	-22.25	peak	H
4883.333	58.54	-12.12	46.42	74.00	-27.58	peak	H
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 802.11n HT 20 MHz mode / CH High **Test Date:** November 24, 2012**Temperature:** 27°C**Tested by:** Shawn Wu**Humidity:** 53% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2690.000	68.89	-17.41	51.48	74.00	-22.52	peak	V
N/A							
2903.333	68.22	-16.90	51.32	74.00	-22.68	peak	H
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 802.11a mode/ CH Low**Test Date:** November 24, 2012**Temperature:** 27°C**Tested by:** Shawn Wu**Humidity:** 53% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
5900.000	66.16	-9.59	56.57	74.00	-17.43	peak	V
5900.000	58.96	-9.59	49.37	54.00	-4.63	AVG	V
N/A							
5900.000	67.06	-9.59	57.47	74.00	-16.53	peak	H
5900.000	61.57	-9.59	51.98	54.00	-2.02	AVG	H
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. $\text{Margin (dB)} = \text{Remark result (dBuV/m)} - \text{Average limit (dBuV/m)}$.

**Operation Mode:** Tx / IEEE 802.11a mode/ CH Mid**Test Date:** November 24, 2012**Temperature:** 27°C**Tested by:** Shawn Wu**Humidity:** 53% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
5946.667	65.49	-9.48	56.01	74.00	-17.99	peak	V
5946.667	57.16	-9.48	47.68	54.00	-6.32	AVG	V
N/A							
4021.667	65.25	-14.46	50.79	74.00	-23.21	peak	H
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. $\text{Margin (dB)} = \text{Remark result (dBuV/m)} - \text{Average limit (dBuV/m)}$.

**Operation Mode:** Tx / IEEE 802.11a mode/ CH High**Test Date:** November 24, 2012**Temperature:** 27°C**Tested by:** Shawn Wu**Humidity:** 53% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
5993.333	64.80	-9.37	55.43	74.00	-18.57	peak	V
5993.333	56.75	-9.37	47.38	54.00	-6.62	AVG	V
N/A							
3928.333	64.34	-14.73	49.61	74.00	-24.39	peak	H
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. $\text{Margin (dB)} = \text{Remark result (dBuV/m)} - \text{Average limit (dBuV/m)}$.

**Operation Mode:** TX / IEEE 802.11n HT 20 MHz mode / CH Low **Test Date:** November 24, 2012**Temperature:** 27°C**Tested by:** Shawn Wu**Humidity:** 53% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
5911.667	66.76	-9.57	57.19	74.00	-16.81	peak	V
5911.667	55.95	-9.57	46.38	54.00	-7.62	AVG	V
N/A							
5911.667	66.85	-9.57	57.28	74.00	-16.72	peak	H
5911.667	57.90	-9.57	48.33	54.00	-5.67	AVG	H
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 802.11n HT 20 MHz mode / CH Mid **Test Date:** November 24, 2012**Temperature:** 27°C**Tested by:** Shawn Wu**Humidity:** 53% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
5946.667	66.09	-9.48	56.61	74.00	-17.39	peak	V
5946.667	56.66	-9.48	47.18	54.00	-6.82	AVG	V
N/A							
3940.000	65.65	-14.70	50.95	74.00	-23.05	peak	H
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 802.11n HT 20 MHz mode / CH High **Test Date:** November 24, 2012**Temperature:** 27°C**Tested by:** Shawn Wu**Humidity:** 53% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
5981.667	64.89	-9.39	55.50	74.00	-18.50	peak	V
5981.667	55.78	-9.39	46.39	54.00	-7.61	AVG	V
N/A							
5981.667	65.51	-9.39	56.12	74.00	-17.88	peak	H
5981.667	57.07	-9.39	47.68	54.00	-6.32	AVG	H
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 1 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:** October 26, 2012
Temperature: 24°C **Tested by:** Moore Cheng
Humidity: 50% RH

Freq. (MHz)	QP Reading (dBuV)	AV Reading (dBuV)	Corr. factor (dB/m)	QP Result (dBuV/m)	AV Result (dBuV/m)	QP Limit (dBuV)	AV Limit (dBuV)	QP Margin (dB)	AV Margin (dB)	Note
0.1660	34.28	19.85	9.87	44.15	29.72	65.15	55.16	-21.00	-25.44	L1
0.2100	27.49	15.57	9.87	37.36	25.44	63.20	53.21	-25.84	-27.77	L1
0.6460	23.65	18.05	9.89	33.54	27.94	56.00	46.00	-22.46	-18.06	L1
8.9580	23.16	17.54	10.13	33.29	27.67	60.00	50.00	-26.71	-22.33	L1
17.7500	19.46	13.11	10.34	29.80	23.45	60.00	50.00	-30.20	-26.55	L1
21.8700	17.32	11.74	10.46	27.78	22.20	60.00	50.00	-32.22	-27.80	L1
0.1660	34.73	18.17	9.63	44.36	27.80	65.15	55.16	-20.79	-27.36	L2
0.3260	21.69	14.87	9.65	31.34	24.52	59.55	49.55	-28.21	-25.03	L2
0.6340	24.62	18.93	9.67	34.29	28.60	56.00	46.00	-21.71	-17.40	L2
4.5460	19.52	12.24	9.82	29.34	22.06	56.00	46.00	-26.66	-23.94	L2
9.8580	21.25	16.03	9.96	31.21	25.99	60.00	50.00	-28.79	-24.01	L2
18.0260	19.12	13.07	10.23	29.35	23.30	60.00	50.00	-30.65	-26.70	L2

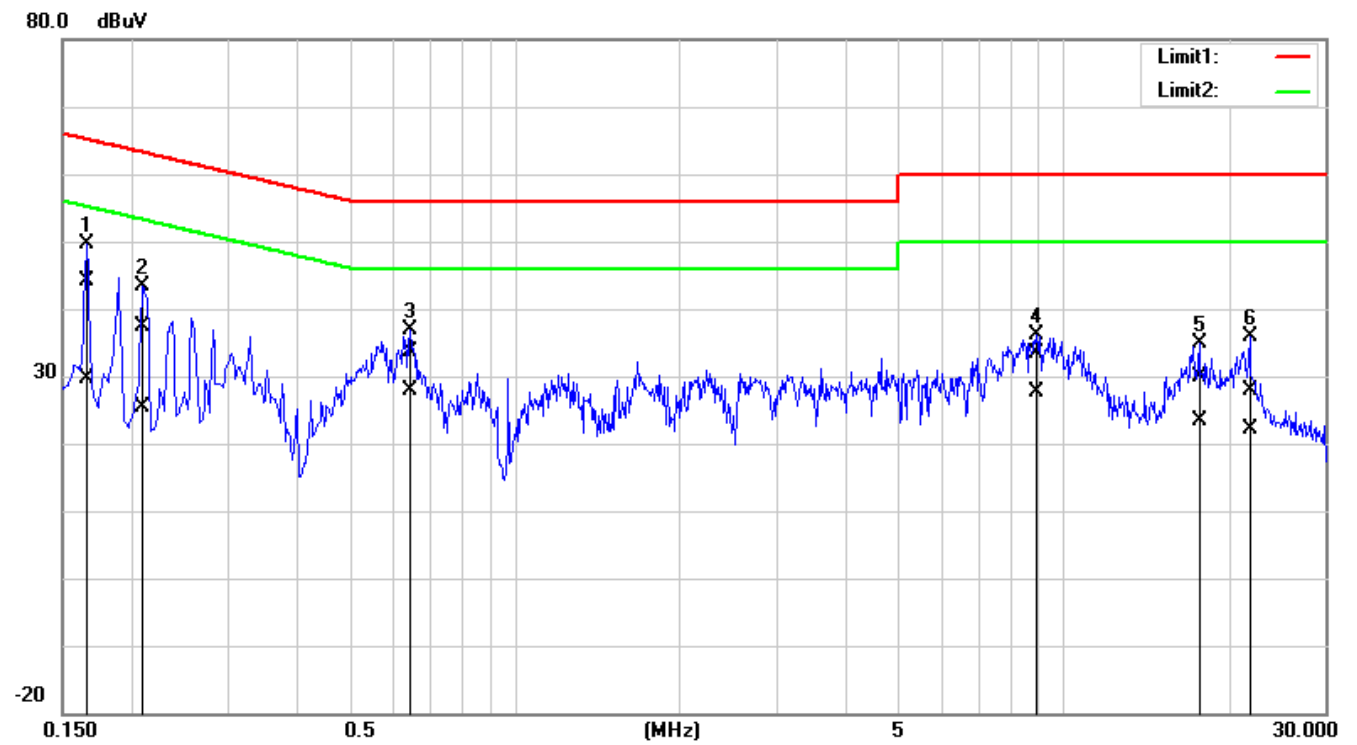
Remark:

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



Test Plots

Conducted emissions (Line 1)



Conducted emissions (Line 2)

