



FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

Panel PC

Model:

**PIT-1701-XXXX (X=A~Z or 0~9 or Blank),
PIT-1701-ON1E, PIT-1701-GE1E, PIT-1701-BI1E**

Trade Name: ADVANTECH, OneView

Issued to

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

Issued by

Compliance Certification Services Inc.
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1. TEST RESULT CERTIFICATION

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

Equipment Under Test: Panel PC

Trade Name: ADVANTECH, OneView

Model: PIT-1701-XXXX (X=A~Z or 0~9 or Blank),
PIT-1701-ON1E, PIT-1701-GE1E, PIT-1701-BI1E

Date of Test: June 16 ~ July 1, 2008

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:

Rex Lai
Section Manager
Compliance Certification Services Inc.

Reviewed by:

Amanda Wu
Section Manager
Compliance Certification Services Inc.



2. EUT DESCRIPTION

Product	Panel PC
Trade Name	ADVANTECH, OneView
Model Number	PIT-1701-XXXX (X=A~Z or 0~9 or Blank), PIT-1701-ON1E, PIT-1701-GE1E, PIT-1701-BI1E
Model Discrepancy	All the specification and layout are identical except they come with different model numbers for marketing purposes
Power Adapter	LIE ELECTRONICS INC. / LE-0316B190072 I/P: 100-240V, 50-60Hz, 1.5A O/P: 19V, 3.79A, 72W MAX
Frequency Range	2412 ~ 2462 MHz
Transmit Power	IEEE 802.11b: 20.76 dBm IEEE 802.11g: 17.91 dBm
Modulation Technique	IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: DSSS (CCK, DQPSK, DBPSK) + OFDM (QPSK, BPSK, 16-QAM, 64-QAM)
Transmit Data Rate	IEEE 802.11b Mode: 11, 5.5, 2, 1 Mbps IEEE 802.11g Mode: 54, 48, 36, 24, 18, 12, 11, 9, 6, 5.5, 2, 1Mbps
Number of Channels	11 Channels
Antenna Specification	Gain: 2.11 dBi
Antenna Designation	PIFA Antenna

Remark:

1. *The sample selected for test was production product and was provided by manufacturer.*
2. *This submittal(s) (test report) is intended for FCC ID: **M82-PIT-1701** filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.*



3. TEST METHODOLOGY

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

3.1 EUT CONFIGURATION

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

3.2 EUT EXERCISE

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

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

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

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

Radiated Emissions

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

3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

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

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

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

² Above 38.6

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



3.5 DESCRIPTION OF TEST MODES

The EUT (model: PIT-1701) had been tested under operating condition.

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

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 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 11Mbps data rate were chosen for the final testing.

IEEE 802.11g mode:

Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 54Mbps data rate were chosen for the final testing.

The field strength of spurious emission was measured in the following position: EUT stand-up position (Z mode), lie-down position (X, Y mode). The worst emission was X mode for conducted emissions, Z mode for powerline conducted emissions and radiation emissions worst cases were recorded.



4. INSTRUMENT CALIBRATION

4.1 MEASURING INSTRUMENT CALIBRATION

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

4.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

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

Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360131	02/24/2009
Spectrum Analyzer	R&S	FSEK30	100264	04/15/2009

3M Semi Anechoic Chamber				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US42510252	09/10/2009
Test Receiver	Rohde&Schwarz	ESCI	100064	11/30/2009
Switch Controller	TRC	Switch Controller	SC94050010	05/03/2009
4 Port Switch	TRC	4 Port Switch	SC94050020	05/03/2009
Horn-Antenna	TRC	HA-0502	06	06/04/2009
Horn-Antenna	TRC	HA-0801	04	06/18/2009
Horn-Antenna	TRC	HA-1201A	01	08/10/2009
Horn-Antenna	TRC	HA-1301A	01	08/11/2009
Bilog- Antenna	Sunol Sciences	JB3	A030205	03/28/2009
Turn Table	Max-Full	MFT-120S	T120S940302	N.C.R.
Antenna Tower	Max-Full	MFA-430	A440940302	N.C.R.
Controller	Max-Full	MF-CM886	CC-C-1F-13	N.C.R.
Site NSA	CCS	N/A	FCC: 965860 IC: IC 6106	09/25/2008
Test S/W	LABVIEW (V 6.1)			

Remark: The measurement uncertainty is less than +/-3.7046dB (30MHz ~ 1GHz), +/-3.0958dB (Above 1GHz) which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV.

Powerline Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI TEST RECEIVER 9kHz-30MHz	ROHDE & SCHWARZ	ESHS30	828144/003	11/18/2009
TWO-LINE V-NETWORK 9kHz-30MHz	SCHAFFNER	NNB41	03/10013	06/11/2009
LISN 10kHz-100MHz	EMCO	3825/2	9106-1809	04/09/2009
Test S/W	LABVIEW (V 6.1)			

Remark: The measurement uncertainty is less than +/- 2.81dB, which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV.



5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

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

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

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

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

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

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

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

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

5.2 EQUIPMENT

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

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

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

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

5.3 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	A2LA	EN 55011, EN 55014-1/2, CISPR 11, CISPR 14-1/2, EN 55022, EN 55015, CISPR 22, CISPR 15, AS/NZS 3548, VCCI V3 (2001), CFR 47, FCC Part 15/18, CNS 13783-1, CNS 13439, CNS 13438, CNS 13803, CNS 14115, EN 55024, IEC 801-2, IEC 801-3, IEC 801-4, IEC/EN 61000-3-2, EIC/EN 61000-3-3, IEC/EN 61000-4-2/3/4/5/6/8/11, EN 50081-1/EN 61000-6-3, EN 50081-2/EN 61000-6-4, EN 50081-2/EN 61000-6-1: 2001	 ACCREDITED TESTING CERT #0824.01
USA	FCC	3M Semi Anechoic Chamber (965860 and 898658) to perform FCC Part 15/18 measurements	 965860, 898658
Taiwan	TAF	LP0002, RTTE01, FCC Method-47 CFR Part 15 Subpart C, D, E, RSS-210, RSS-310 IDATs 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 6106 & IC 6106A-2) to perform RSS 212 Issue 1	 IC 6106 IC 6106A-2

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



6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

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

6.2 SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
1.	USB 2.0 External HDD	TeraSyS	F12-U	A0100214-2Bq0039	FCC DoC	Shielded, 1.8m	N/A
2.	USB 2.0 External HDD	TeraSyS	F12-U	A0100214-31d0014	FCC DoC	Shielded, 1.8m	N/A
3.	Multimedia Earphone	Labtec	Axis-301	N/A	FCC DoC	Unshielded, 1.8m*2	N/A
4.	USB Keyboard	DELL	Sk-8115	N/A	FCC DoC	Shielded, 1.8m	N/A
5.	USB Mouse	DELL	MO56UO	408031121	FCC DoC	Shielded, 1.8m	N/A
6.	Smart Card (Insert into EUT)	N/A	N/A	N/A	N/A	N/A	N/A
7.	SIM Card (Insert into EUT)	N/A	N/A	N/A	N/A	N/A	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.

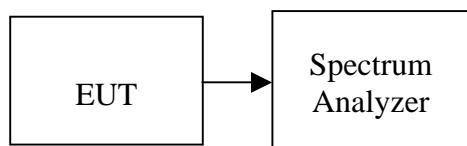
7. FCC PART 15.247 REQUIREMENTS

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 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 = RBW, Span = 50MHz, 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 mode: IEEE 802.11b

Channel	Frequency (MHz)	6Db Bandwidth (kHz)	Limit (kHz)	Result
Low	2412	11750	>500	PASS
Mid	2437	12580		PASS
High	2462	12000		PASS

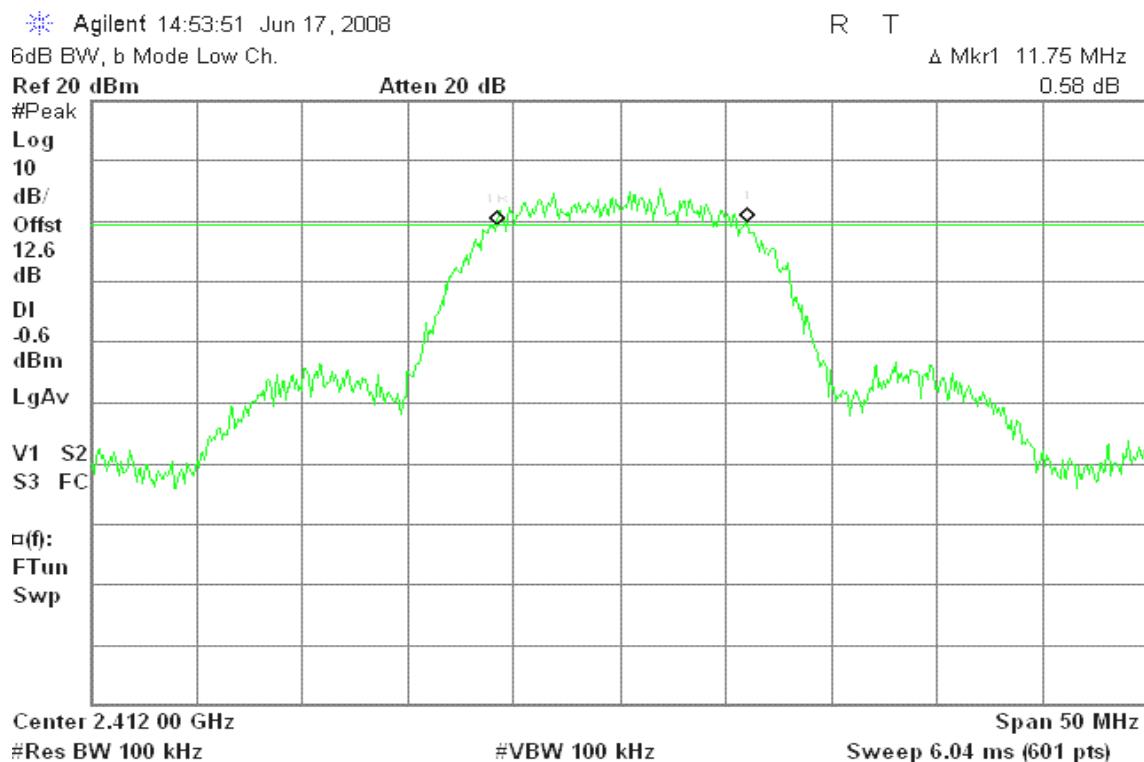
Test mode: IEEE 802.11g

Channel	Frequency (MHz)	6Db Bandwidth (kHz)	Limit (kHz)	Result
Low	2412	16500	>500	PASS
Mid	2437	16500		PASS
High	2462	16500		PASS

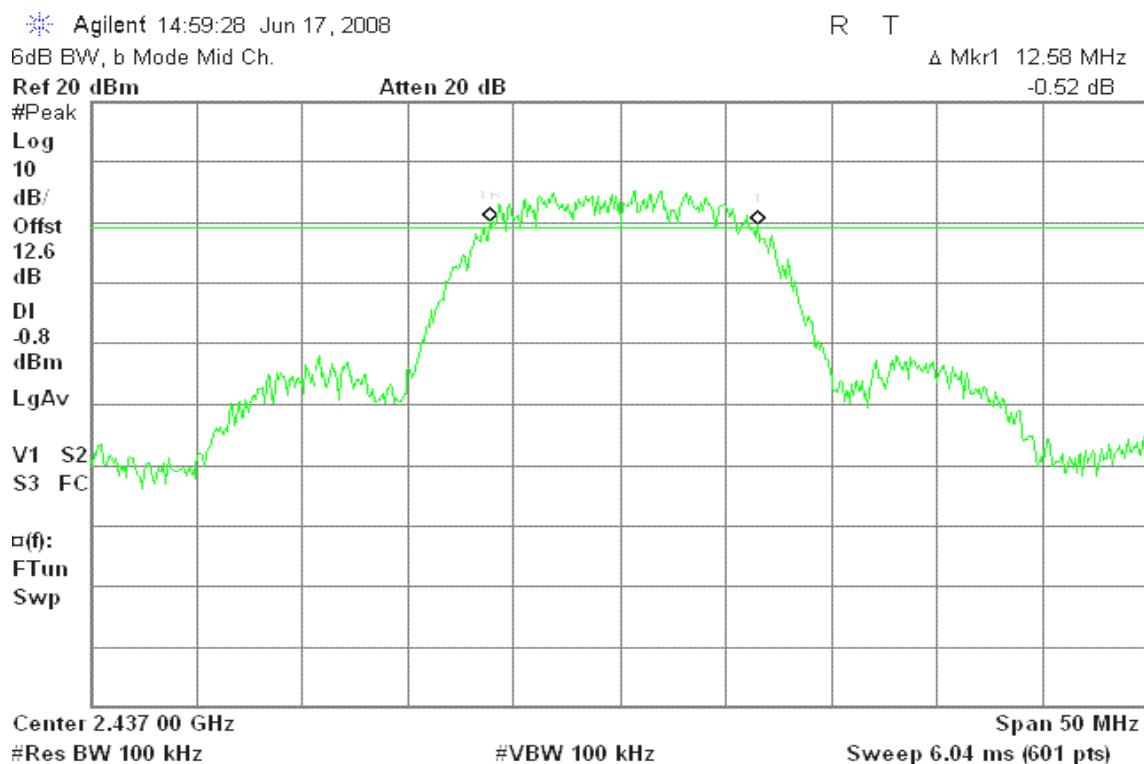
Test Plot

IEEE 802.11b

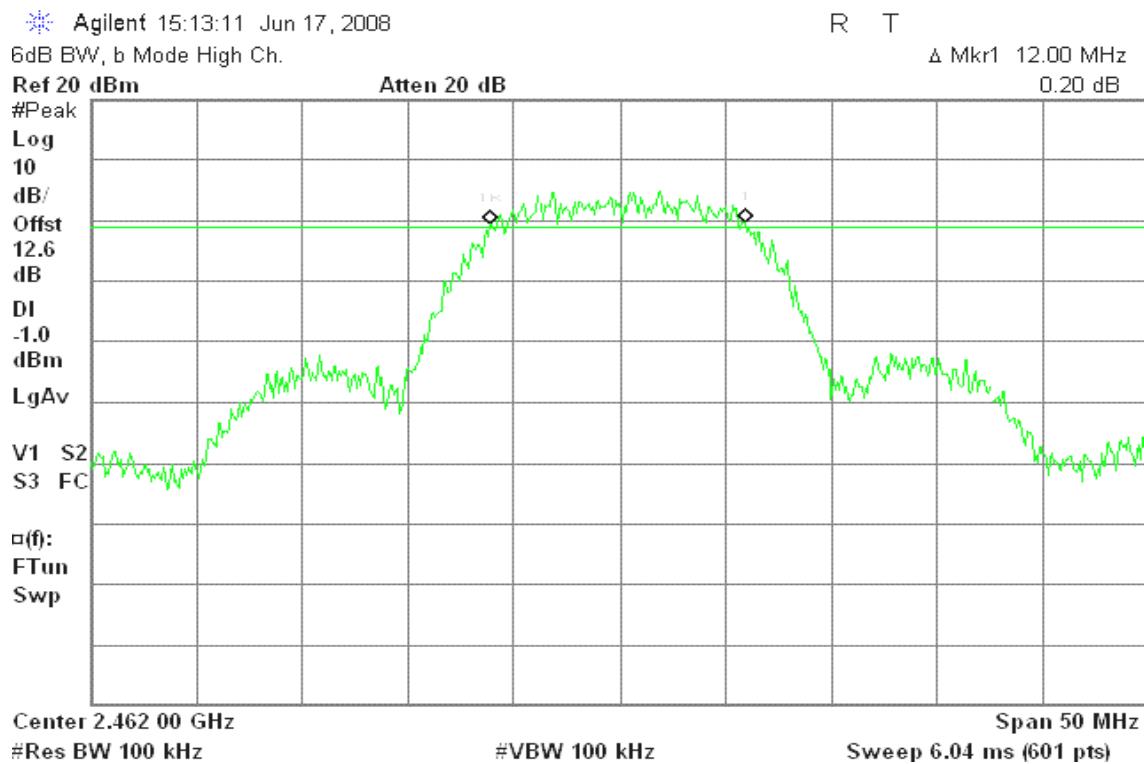
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

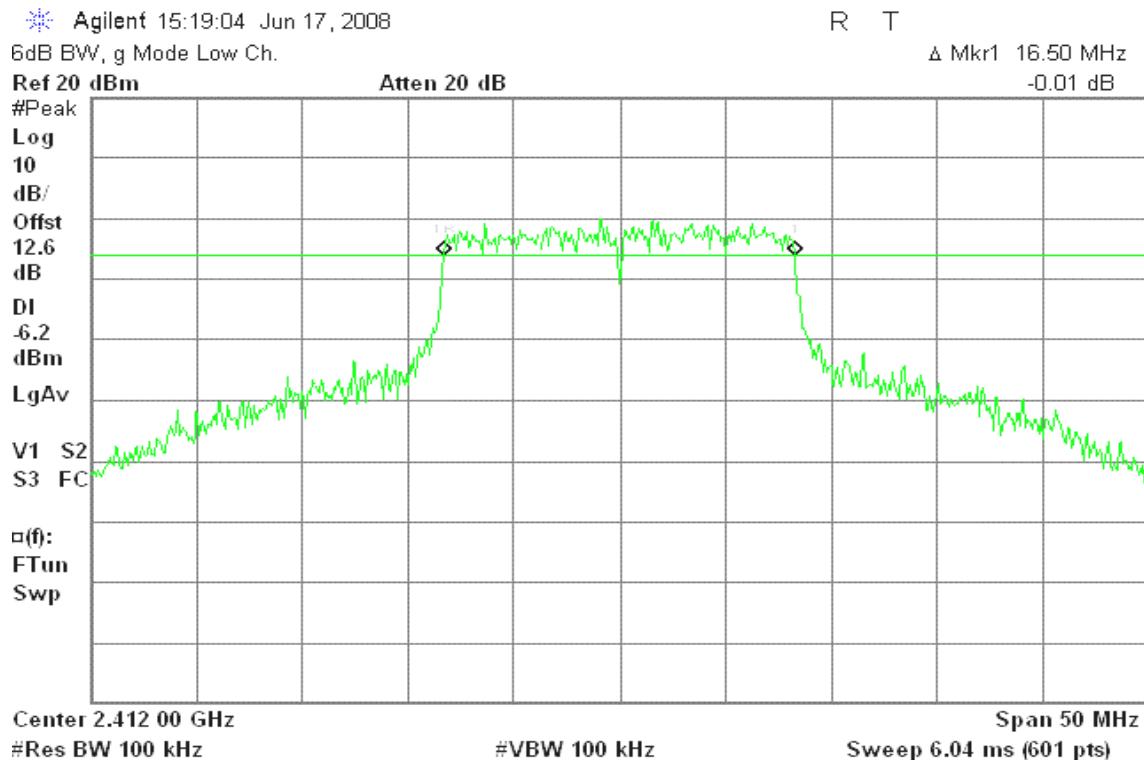


6dB Bandwidth (CH High)

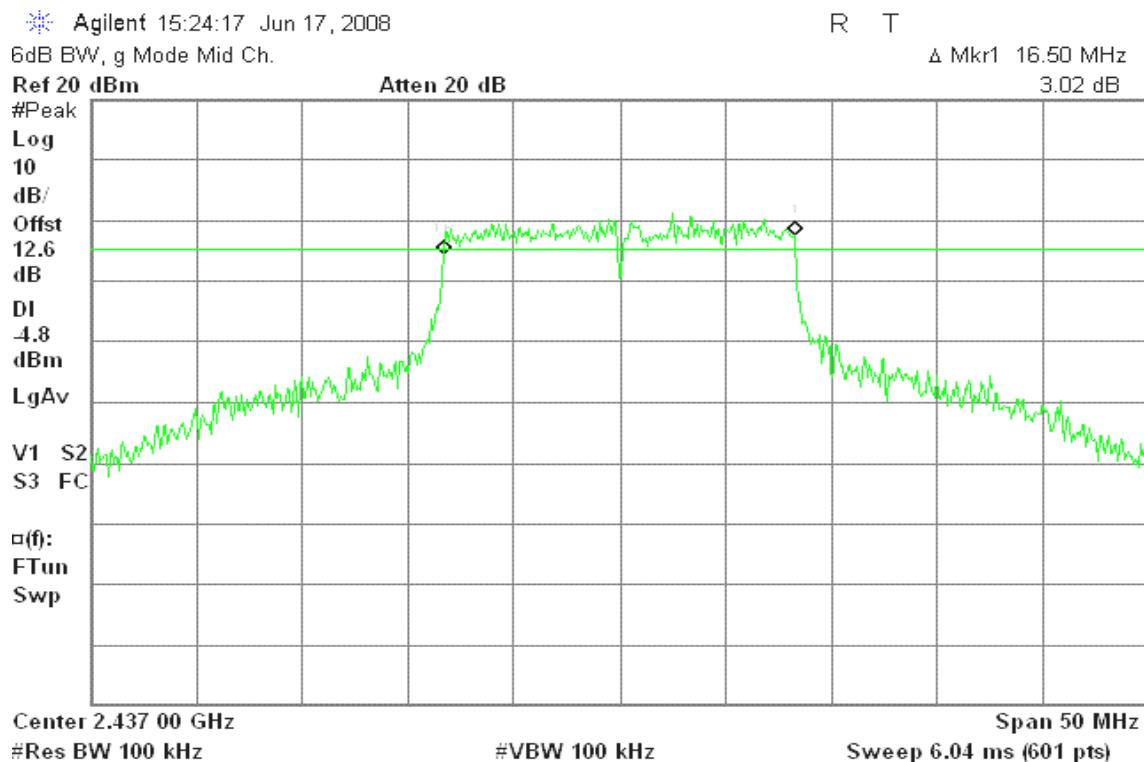


IEEE 802.11g

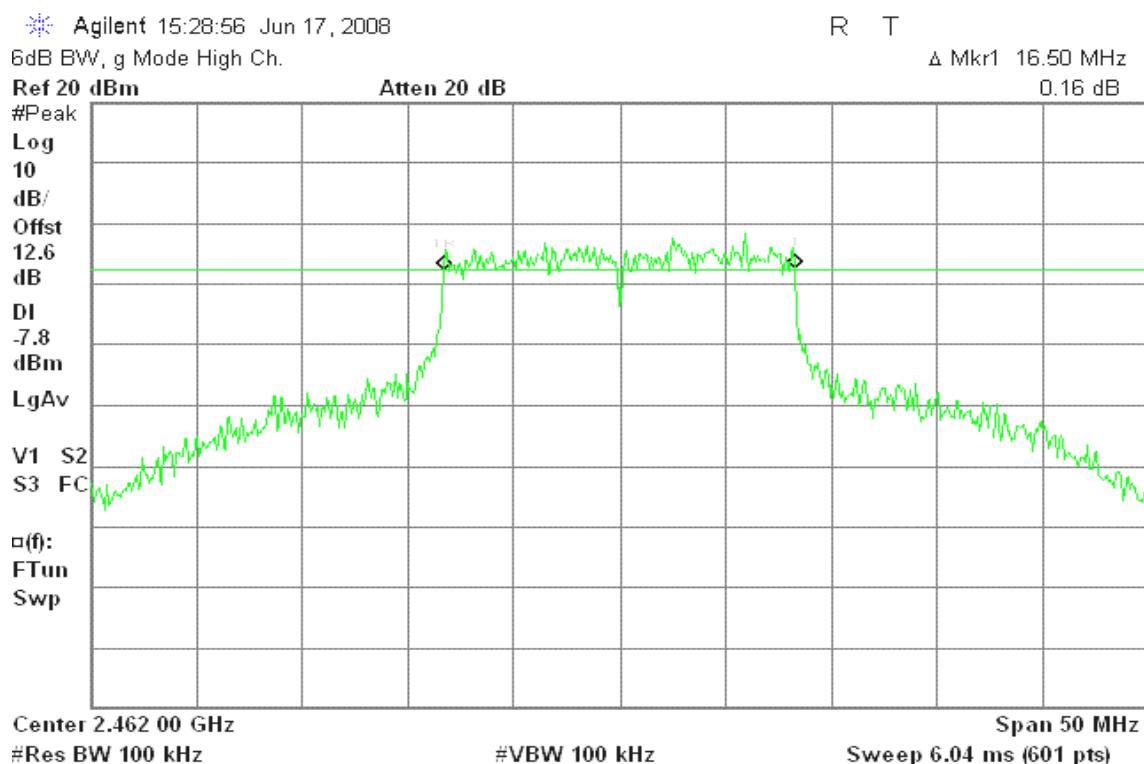
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)



6dB Bandwidth (CH High)



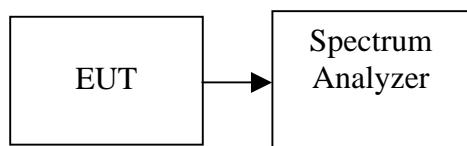
7.2 PEAK POWER

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

1. Peak power is measured using the spectrum analyzer's internal channel power integration function.
2. Power is integrated over a bandwidth greater than or equal to the 99% bandwidth.

TEST RESULTS

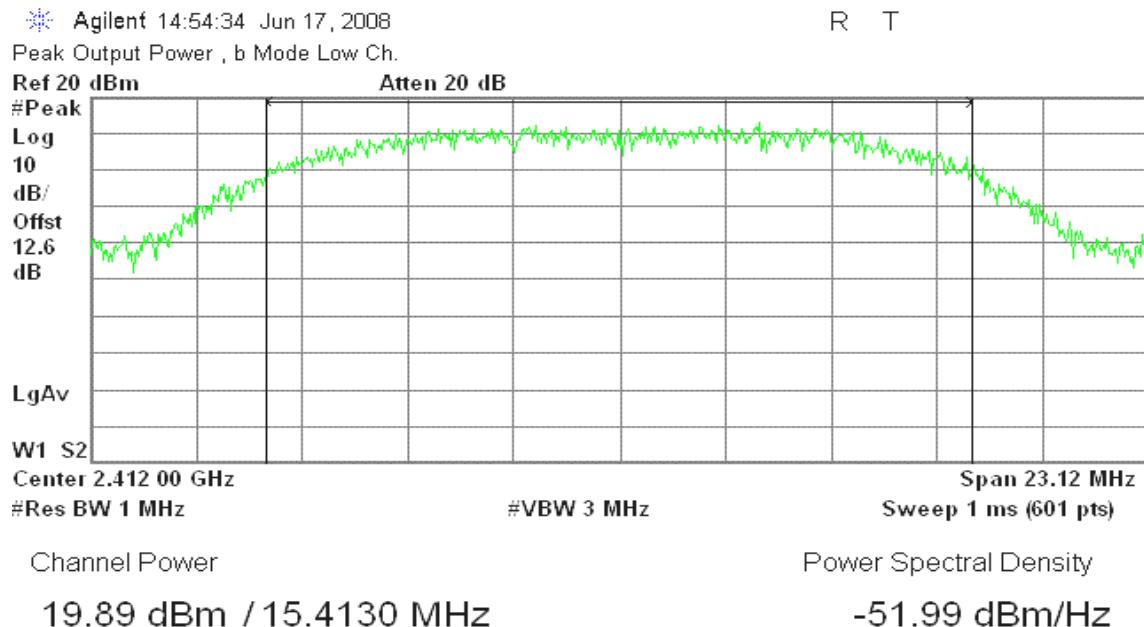
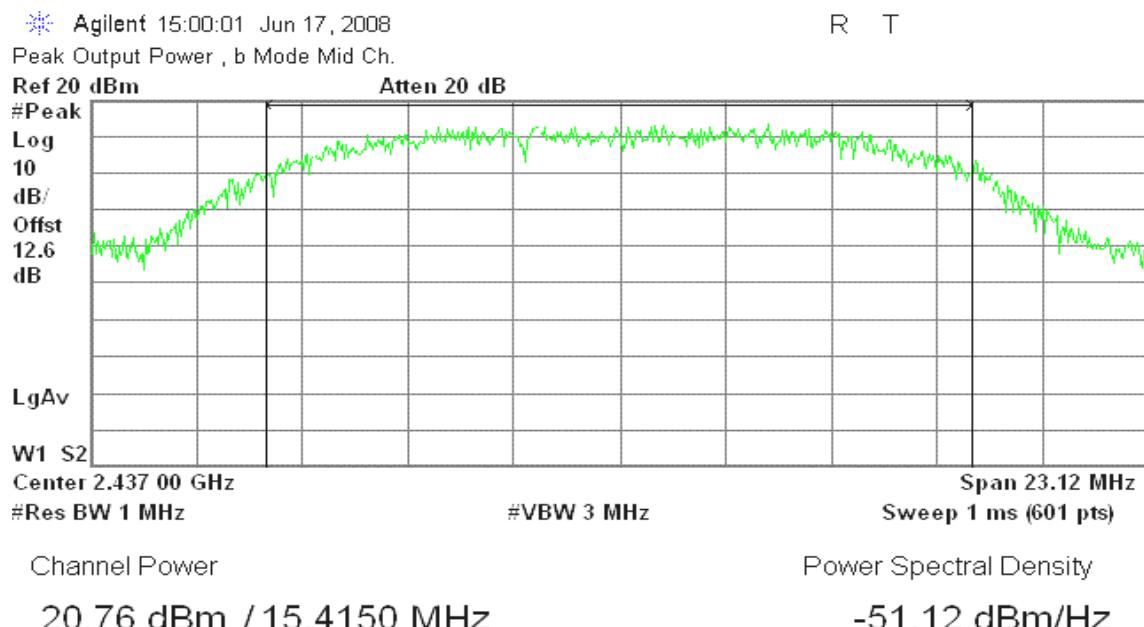
No non-compliance noted.

Test mode: IEEE 802.11b

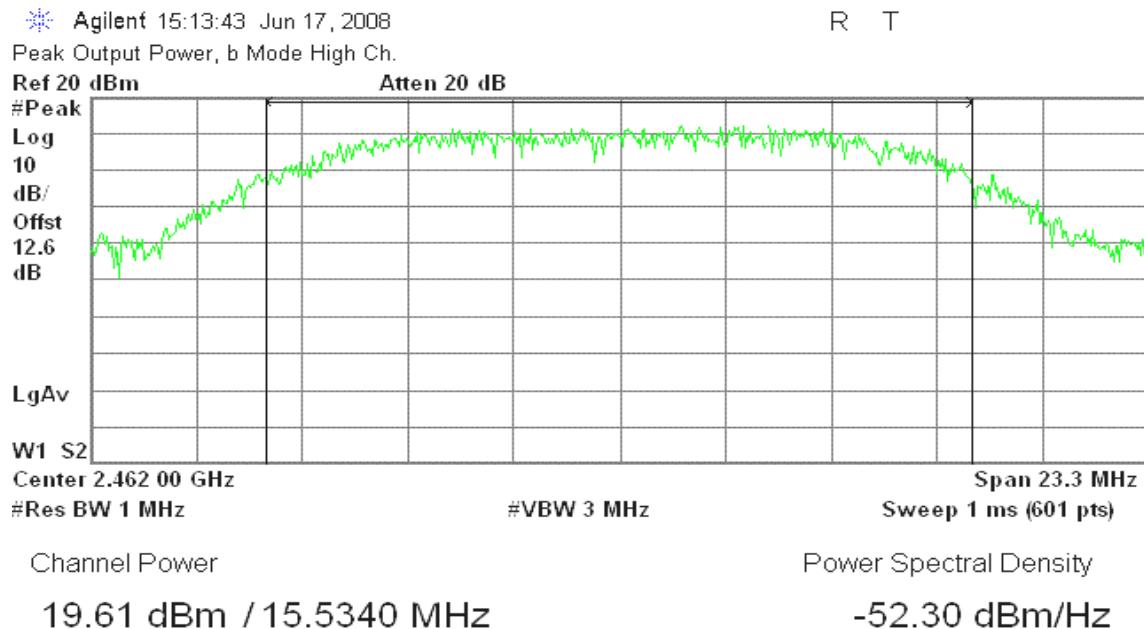
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	19.89	0.0975	1.00	PASS
Mid	2437	20.76	0.1191		PASS
High	2462	19.61	0.0914		PASS

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	16.86	0.0485	1.00	PASS
Mid	2437	17.91	0.0618		PASS
High	2462	14.41	0.0276		PASS

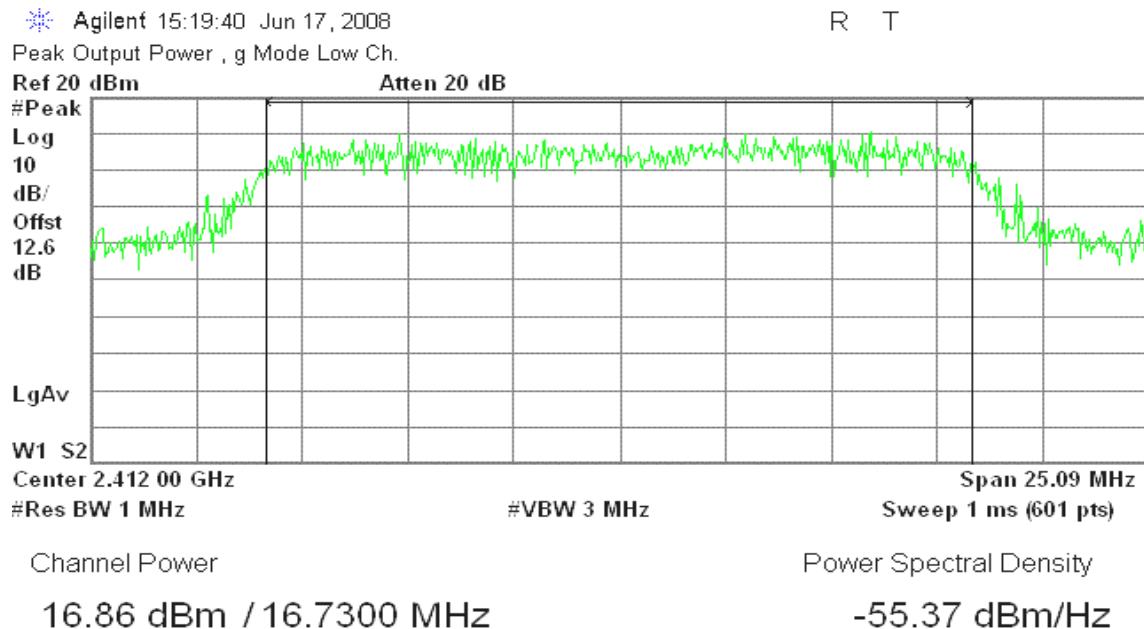
Test Plot**IEEE 802.11b****Peak Power (CH Low)****Peak Power (CH Mid)**

Peak Power (CH High)

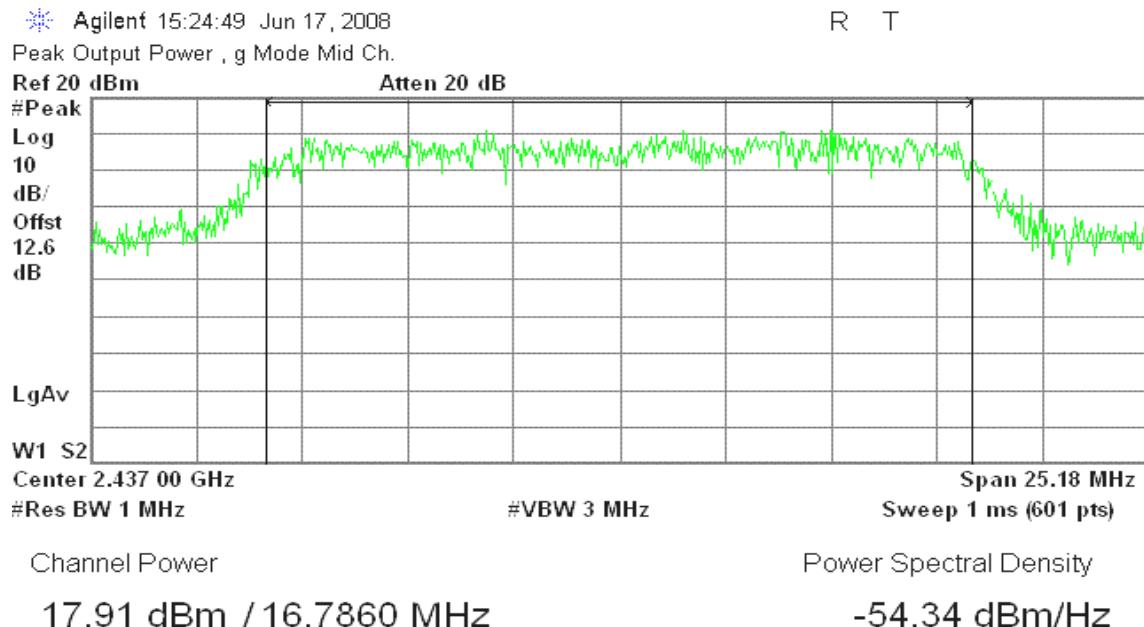


IEEE 802.11g

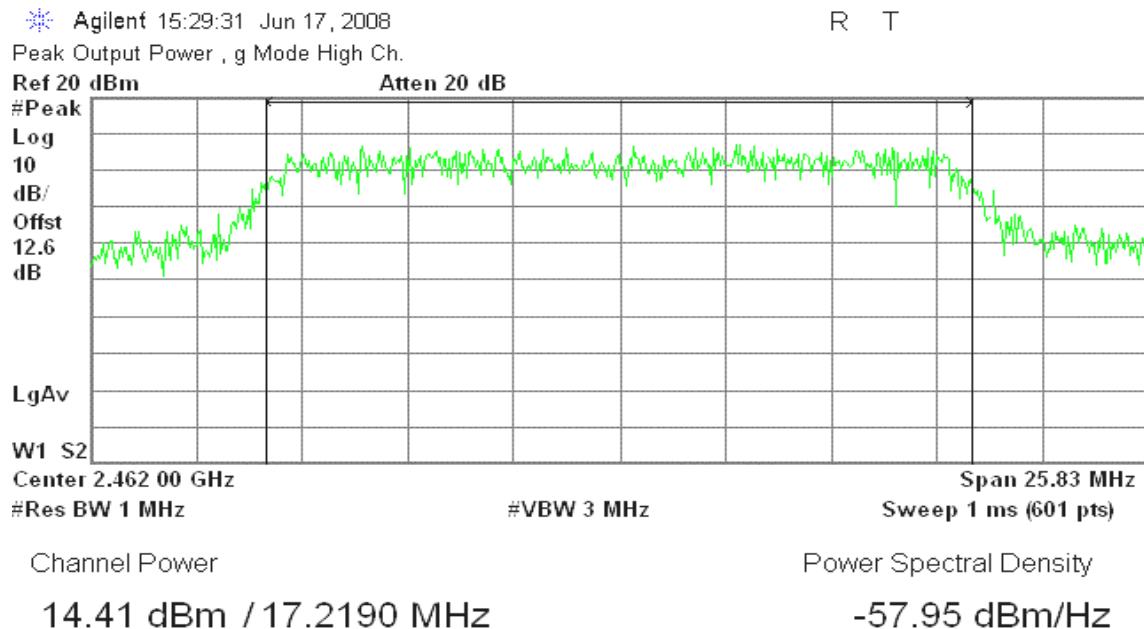
Peak Power (CH Low)



Peak Power (CH Mid)



Peak Power (CH High)

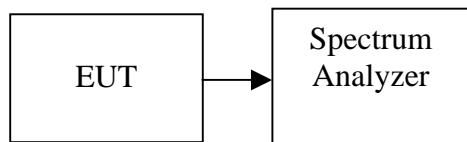


7.3 AVERAGE POWER

LIMIT

None; for reporting purposes only.

Test Configuration



TEST PROCEDURE

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

TEST RESULTS

No non-compliance noted.

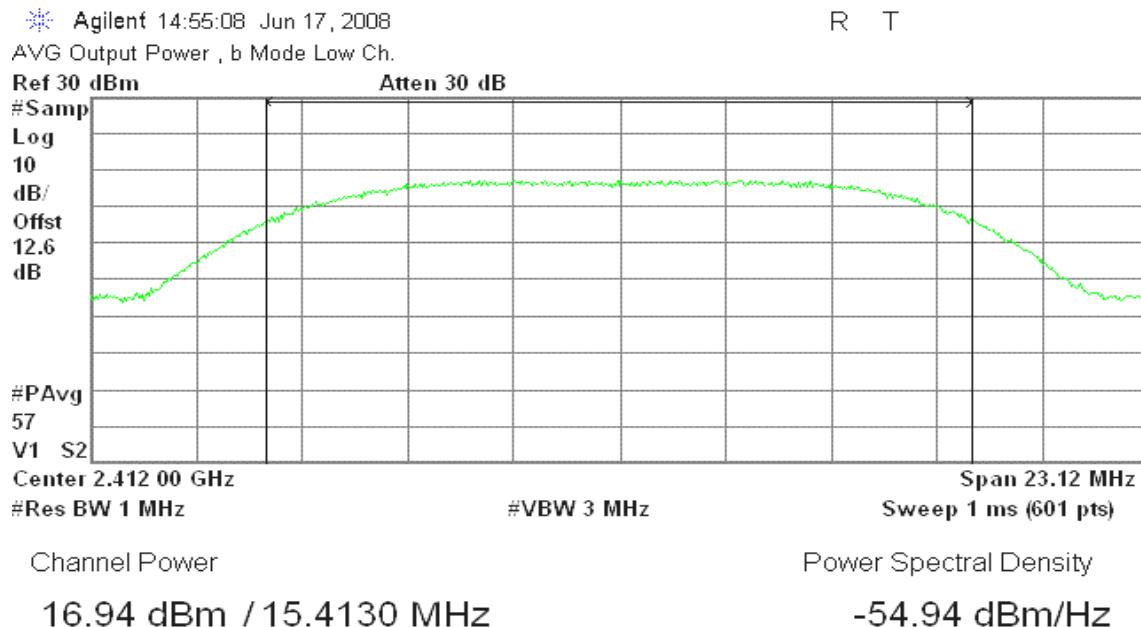
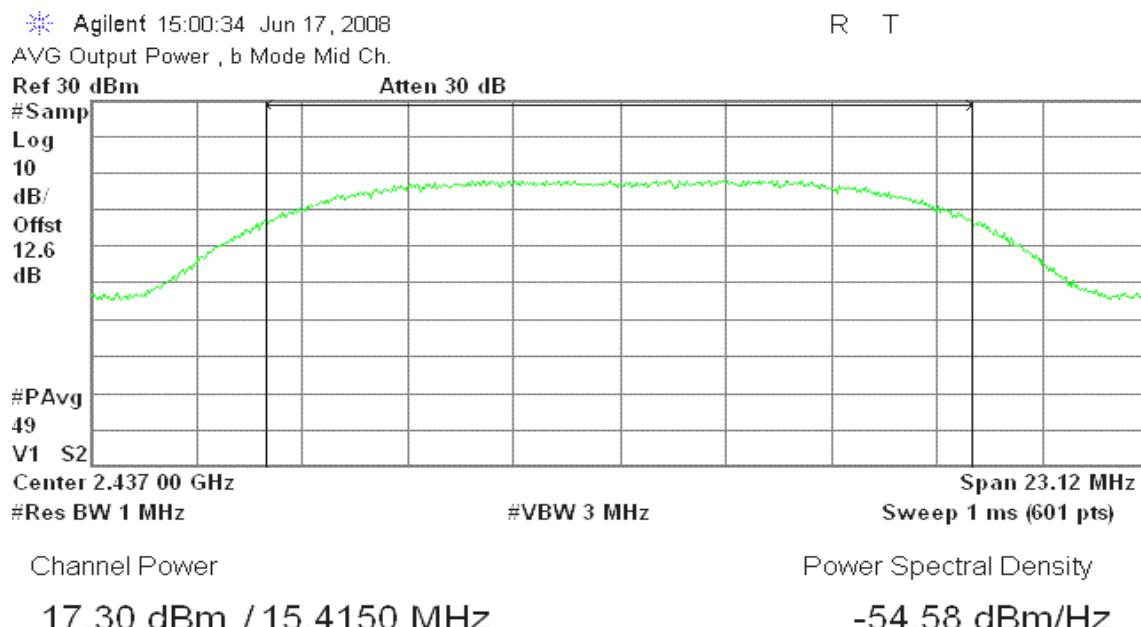
Test Data

Test mode: IEEE 802.11b mode

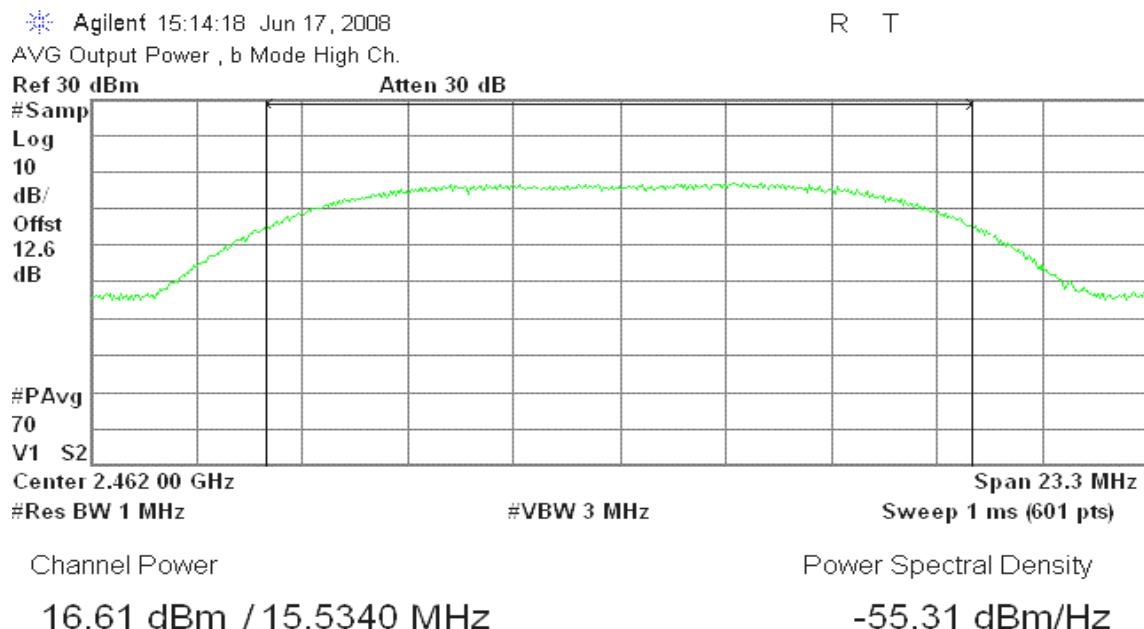
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2412	16.94	0.0494
Mid	2437	17.30	0.0537
High	2462	16.61	0.0458

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2412	13.67	0.0233
Mid	2437	14.16	0.0261
High	2462	10.72	0.0118

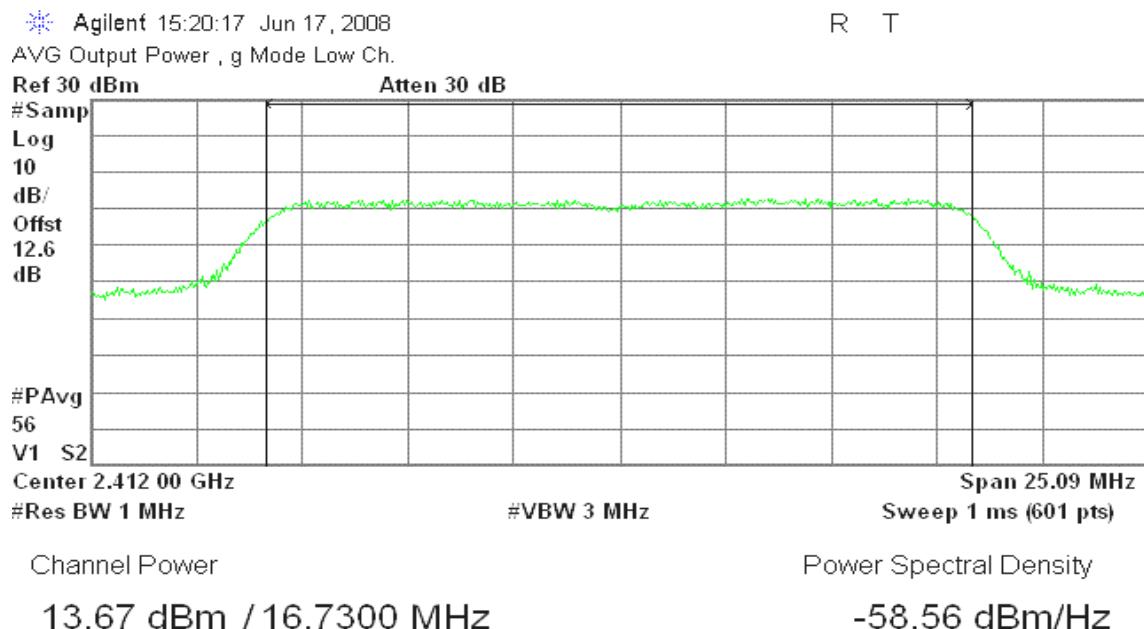
Test Plot**IEEE 802.11b****Average Power (CH Low)****Average Power (CH Mid)**

Average Power (CH High)

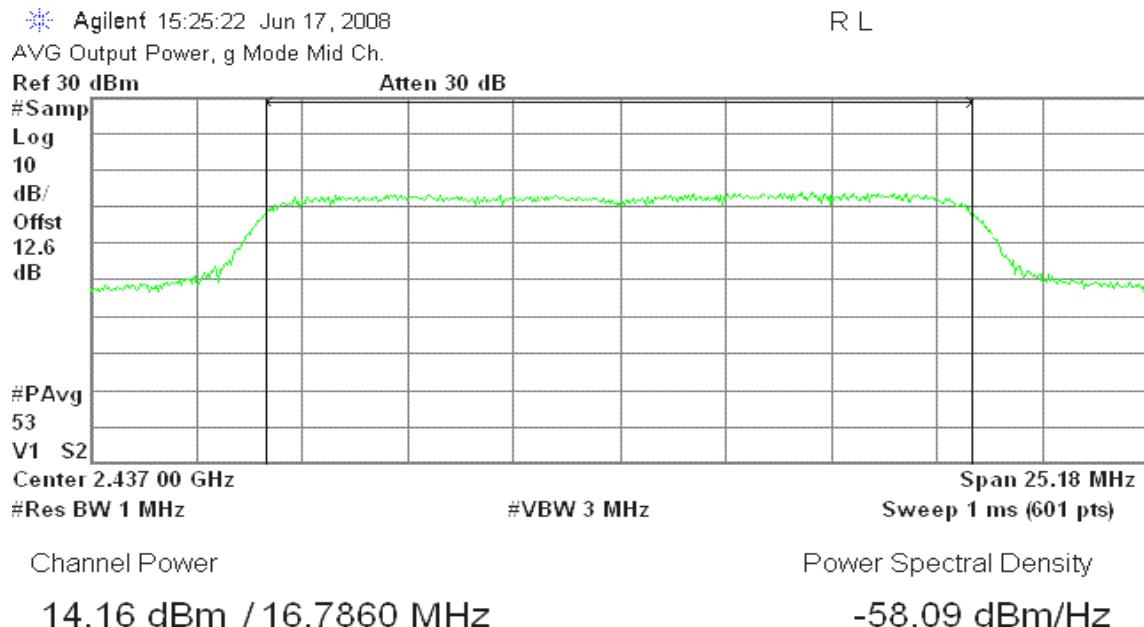


IEEE 802.11g

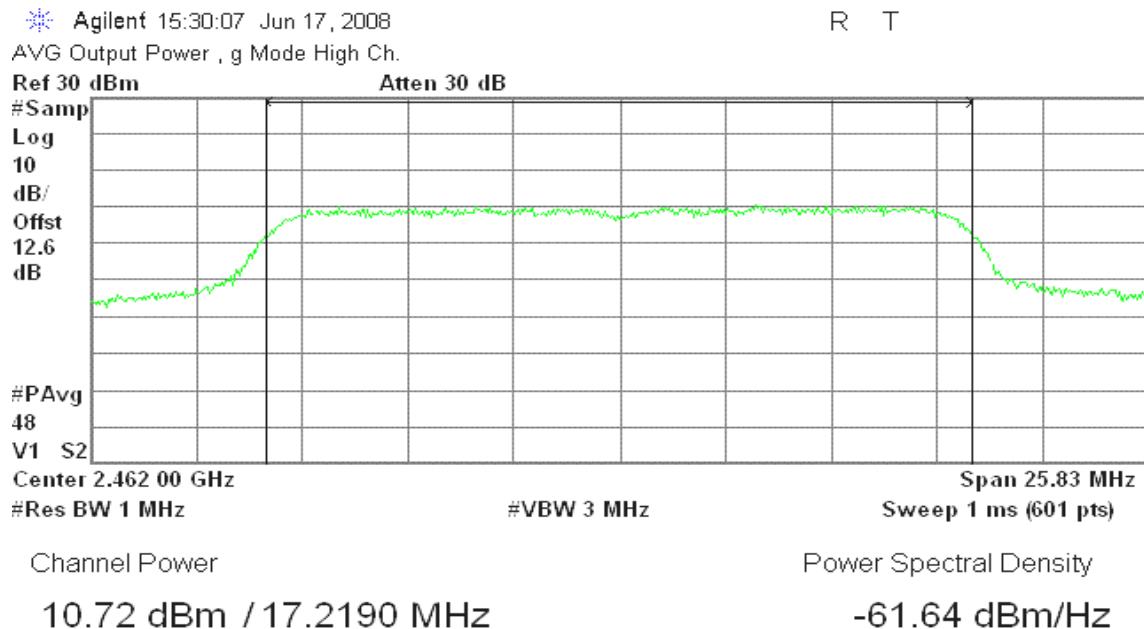
Average Power (CH Low)



Average Power (CH Mid)



Average Power (CH High)

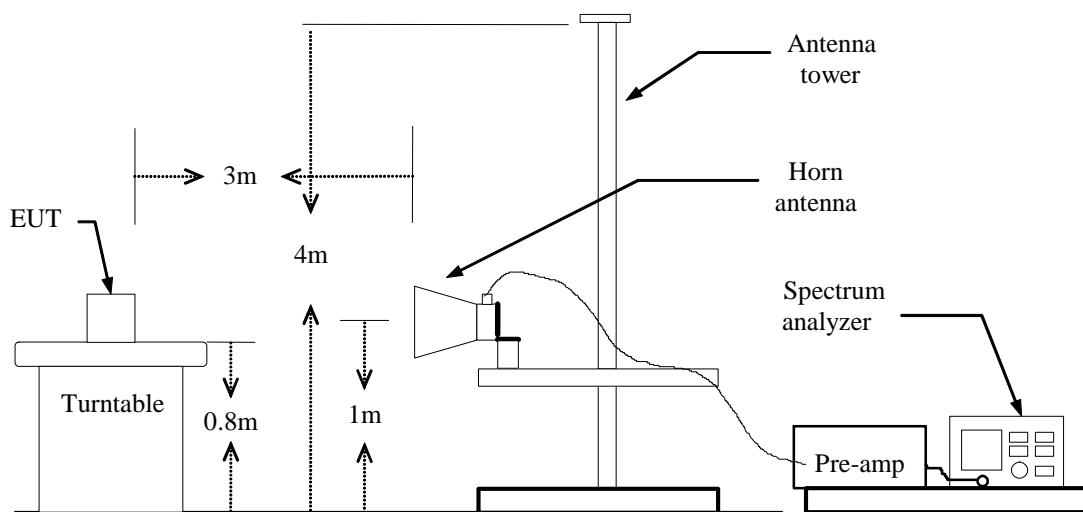


7.4 BAND EDGES MEASUREMENT

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.
 - (a) Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
 - i.PEAK: RBW=VBW=1MHz / Sweep=AUTO
 - ii.AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
 - (b) Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

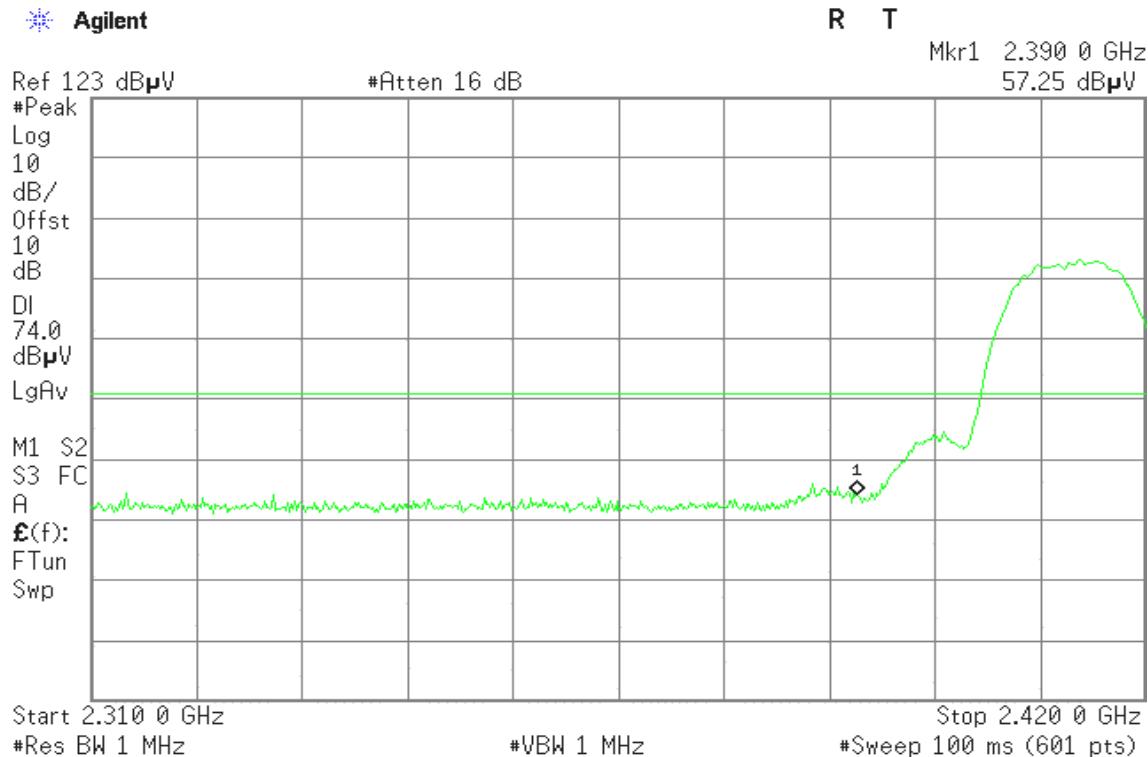
TEST RESULTS

Refer to attach spectrum analyzer data chart.

Band Edges (IEEE 802.11b / CH Low)

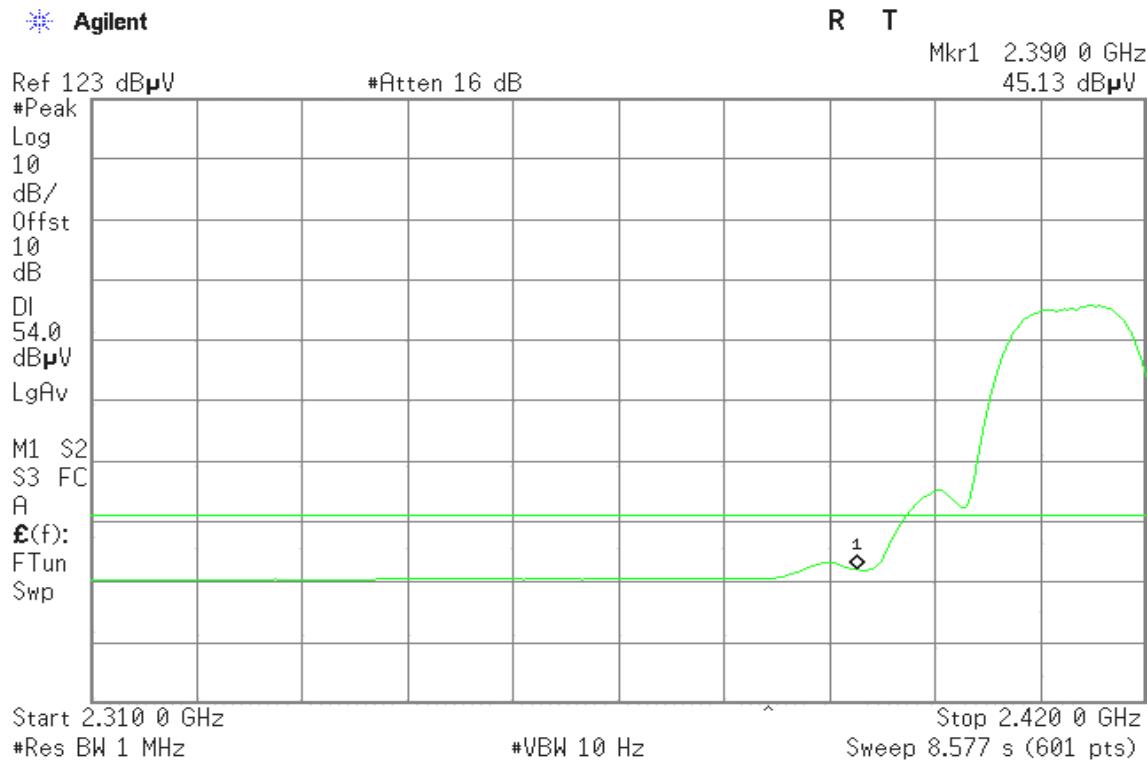
Detector mode: Peak

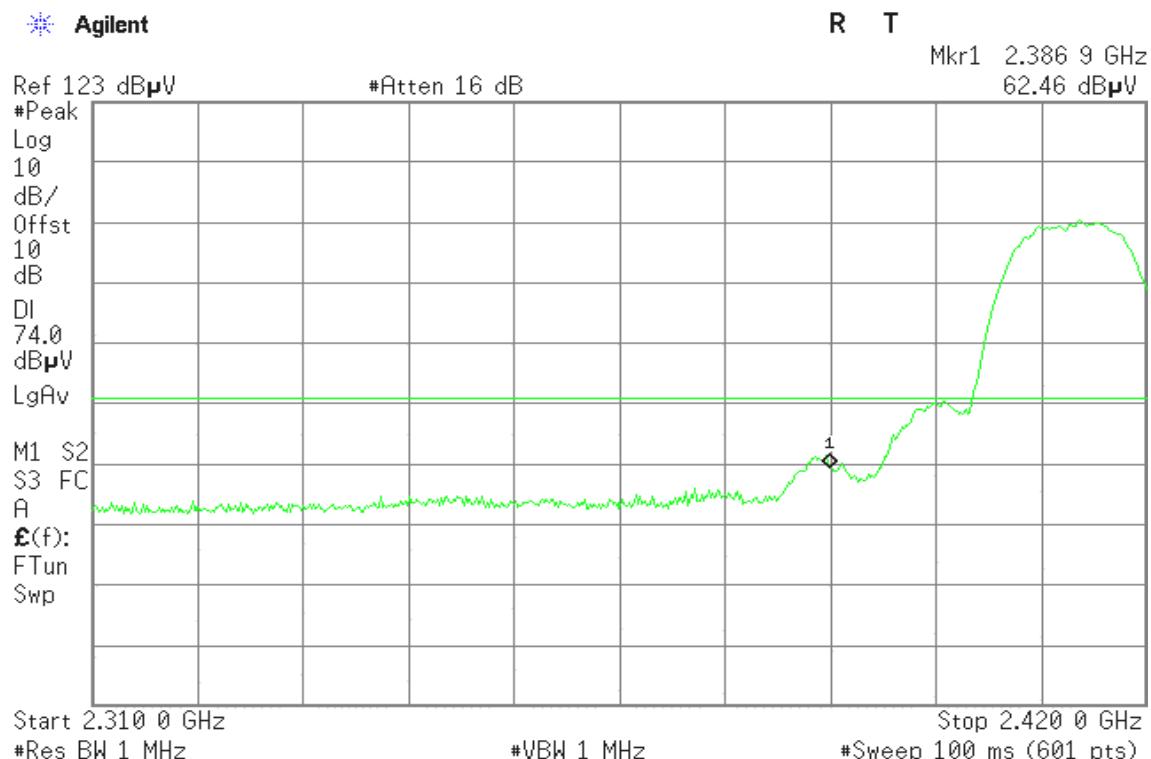
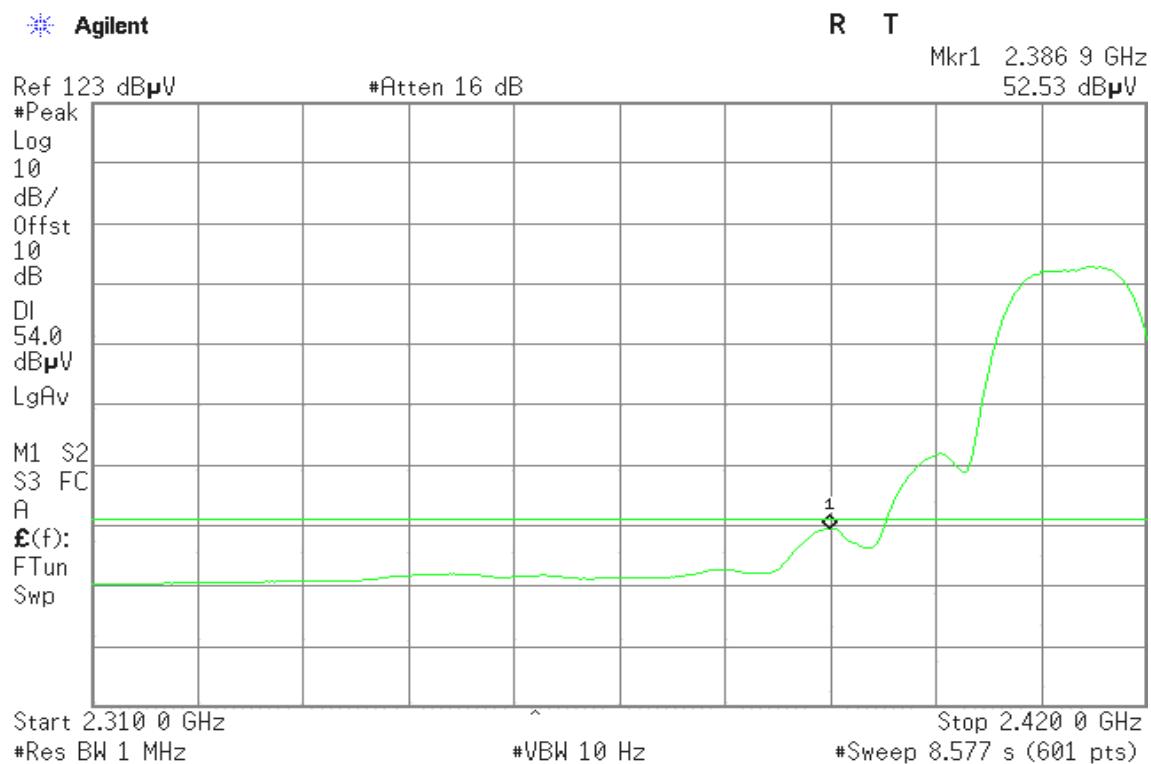
Polarity: Vertical

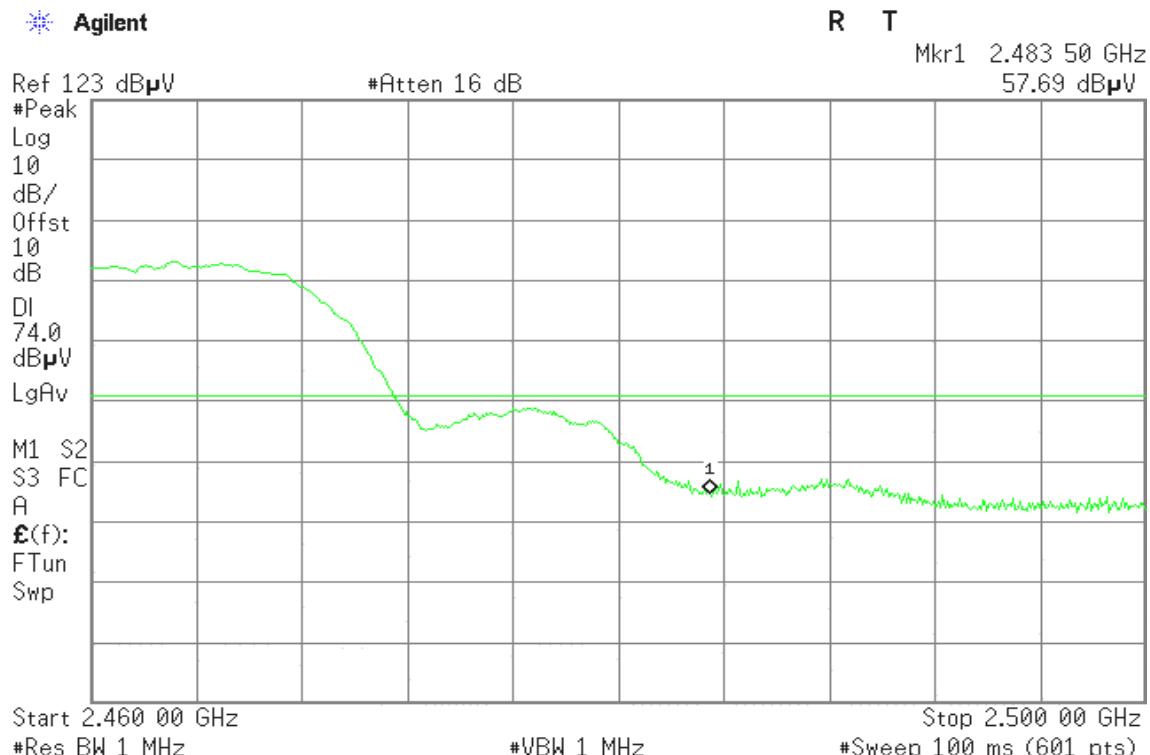
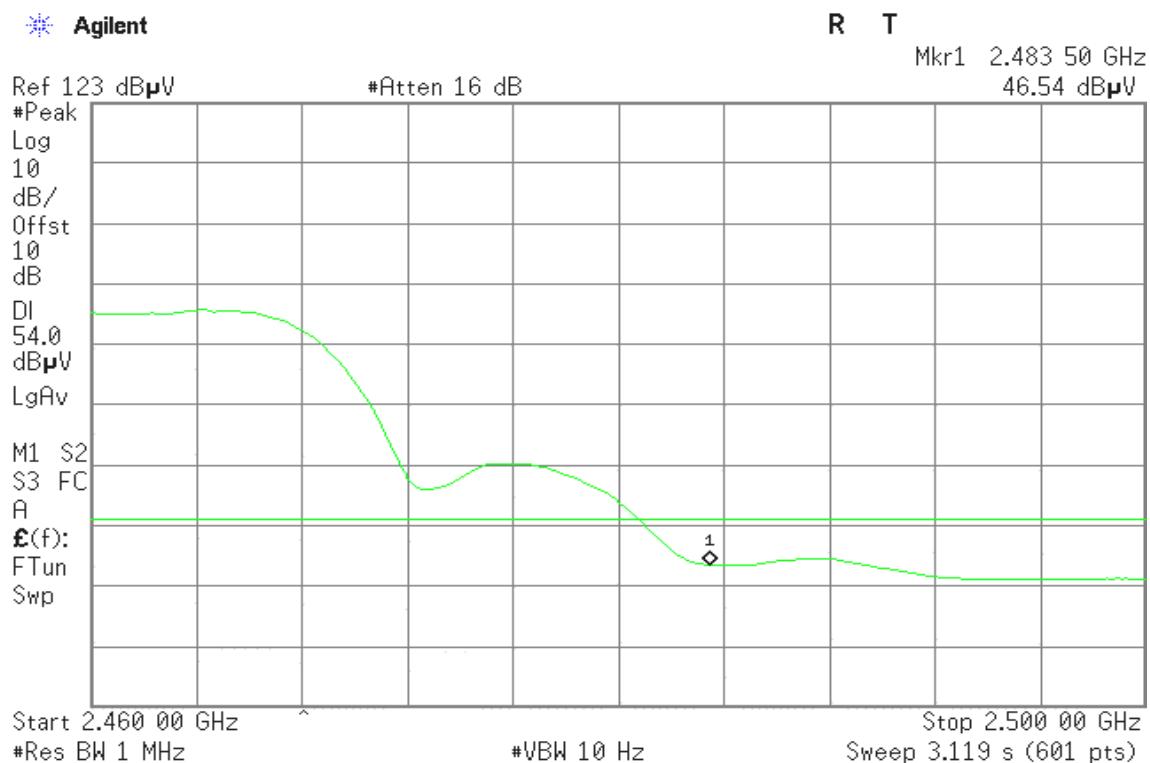


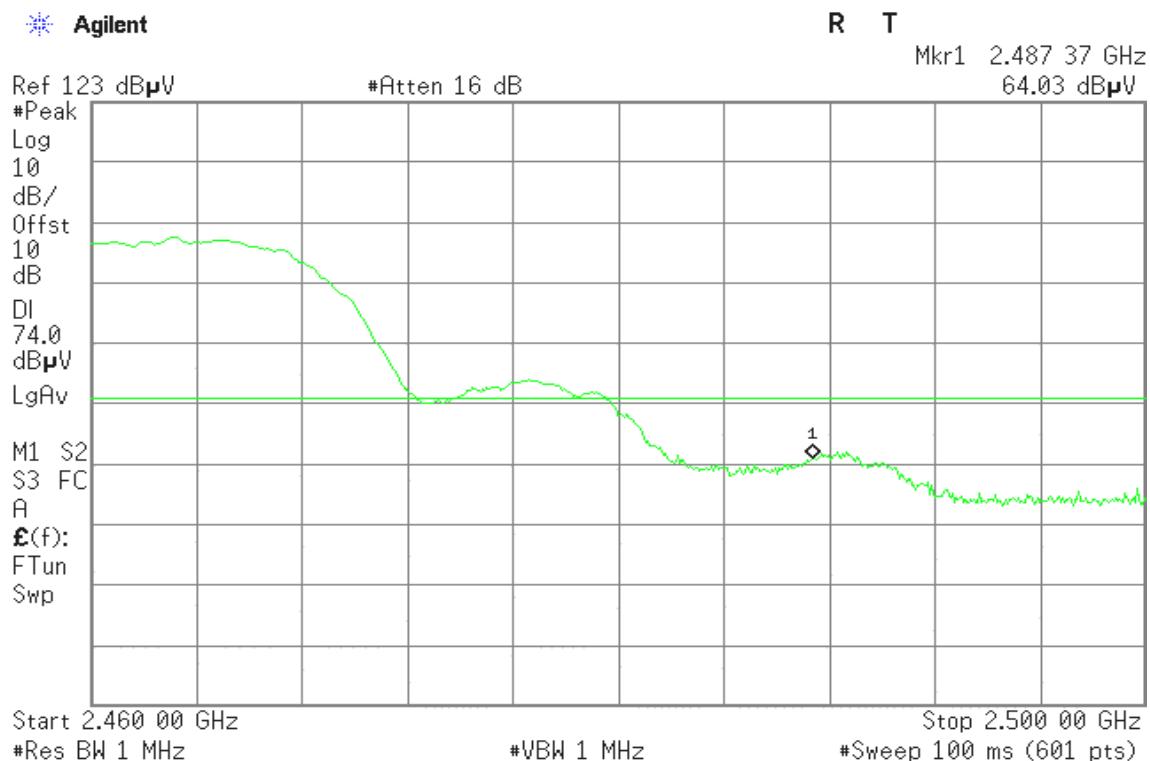
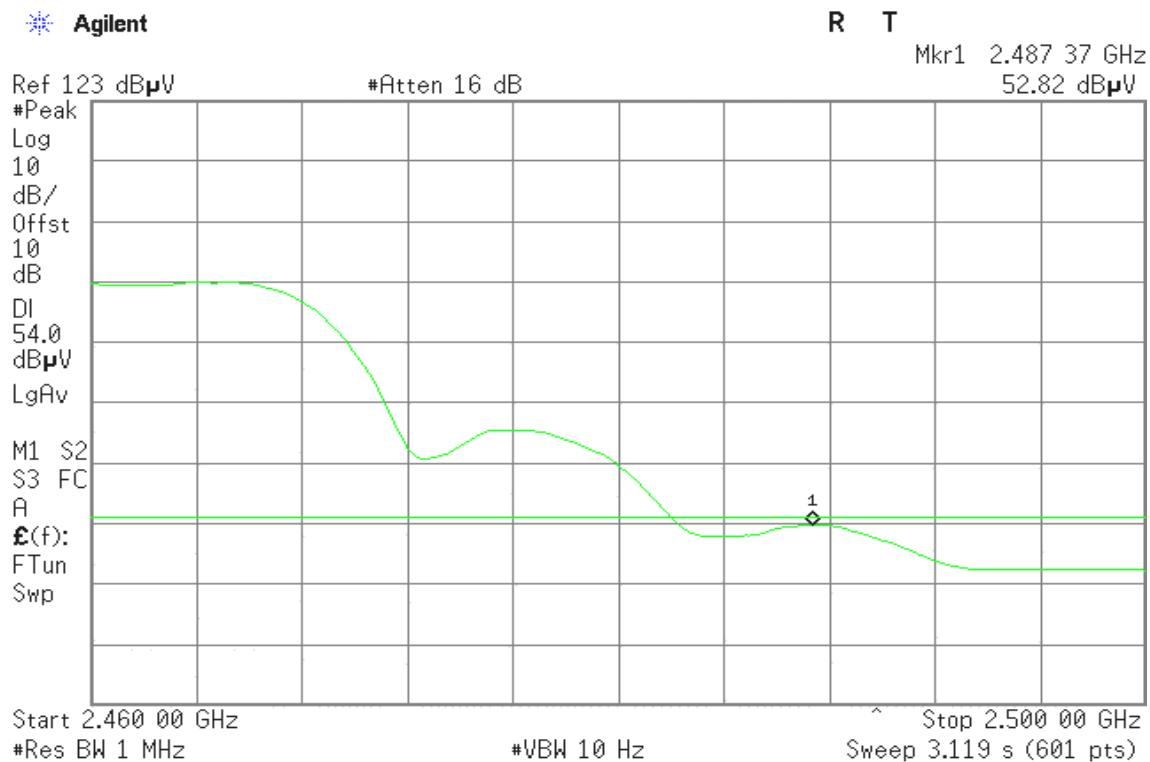
Detector mode: Average

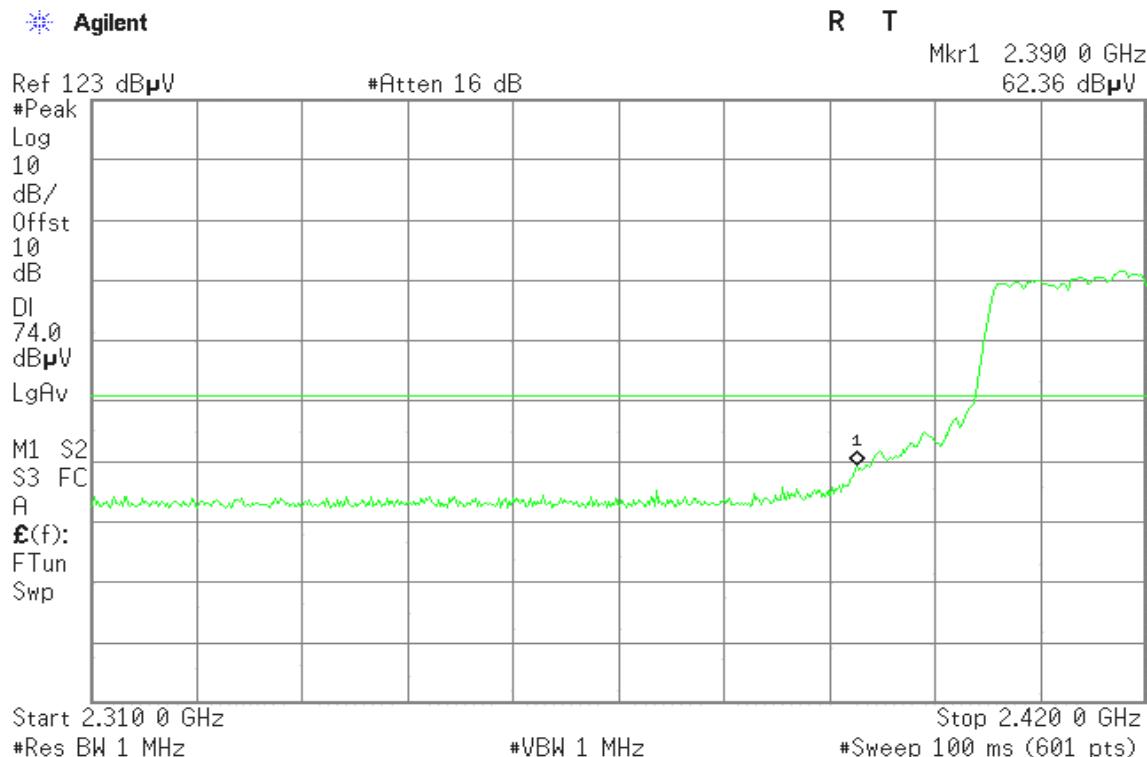
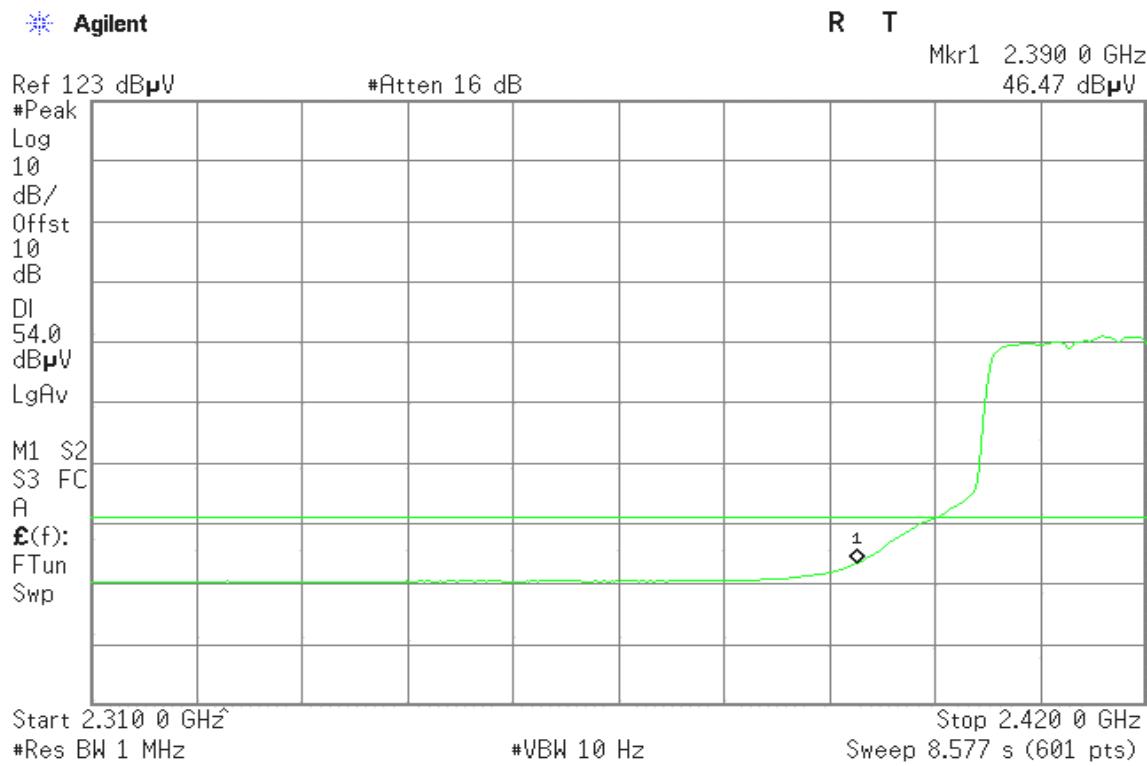
Polarity: Vertical

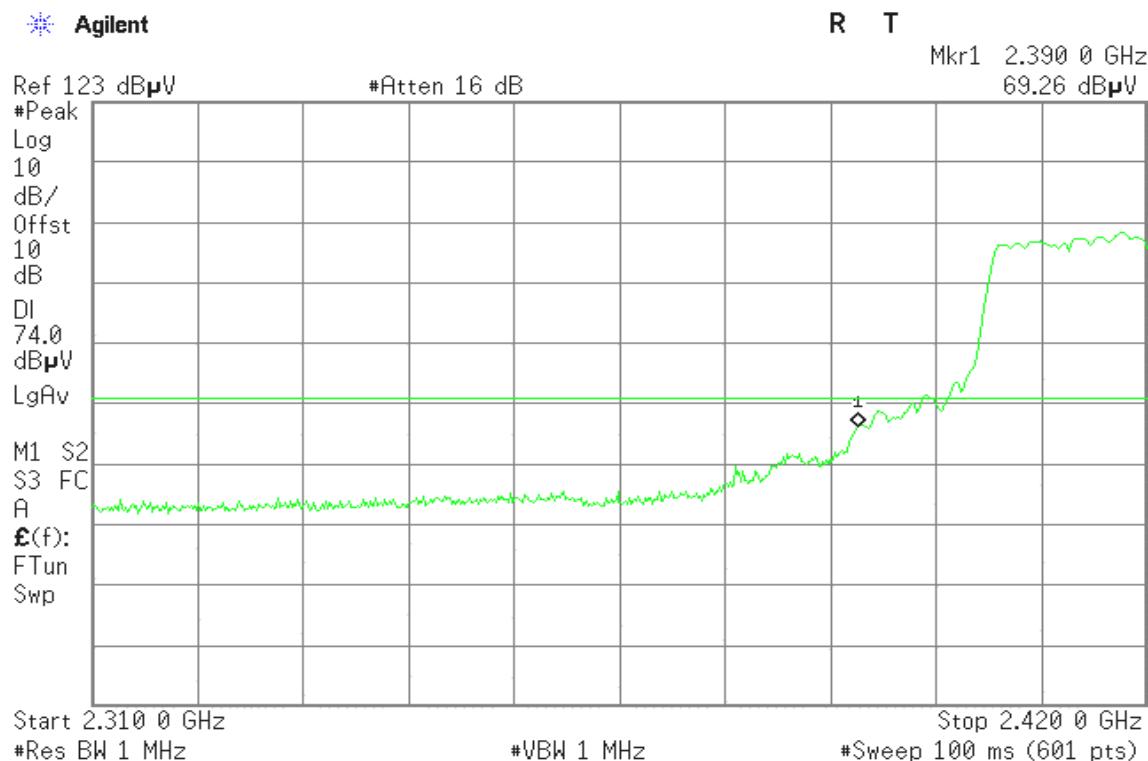
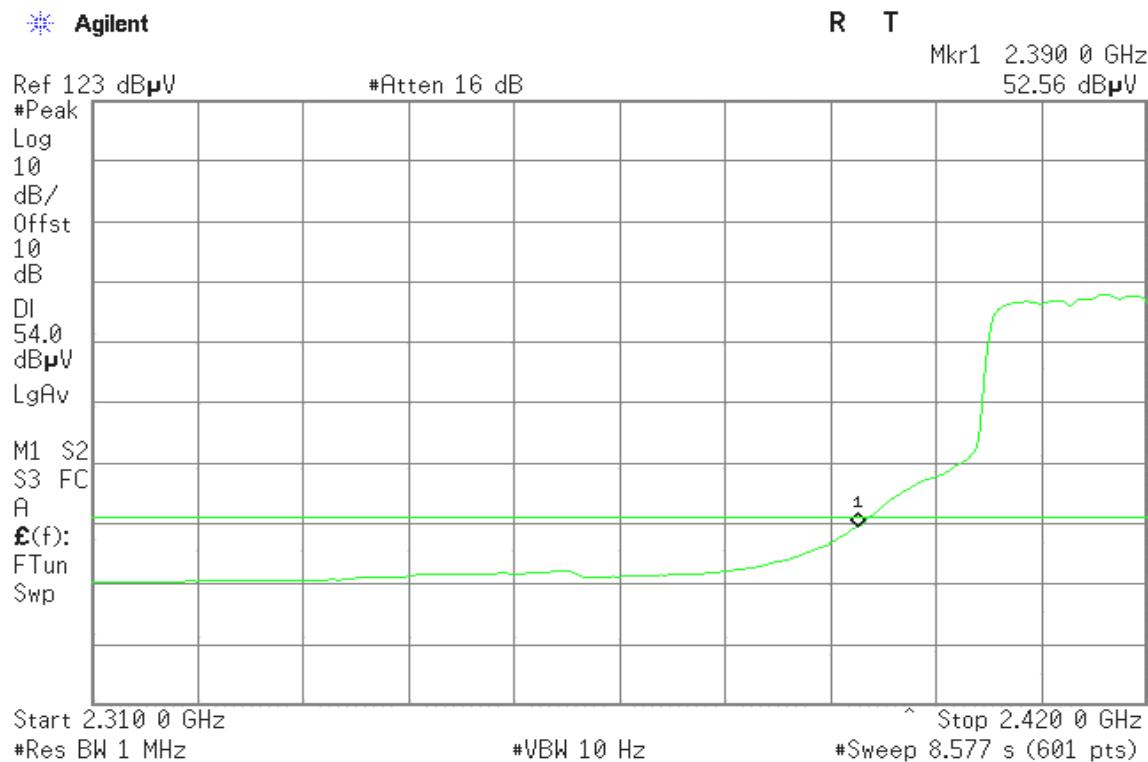


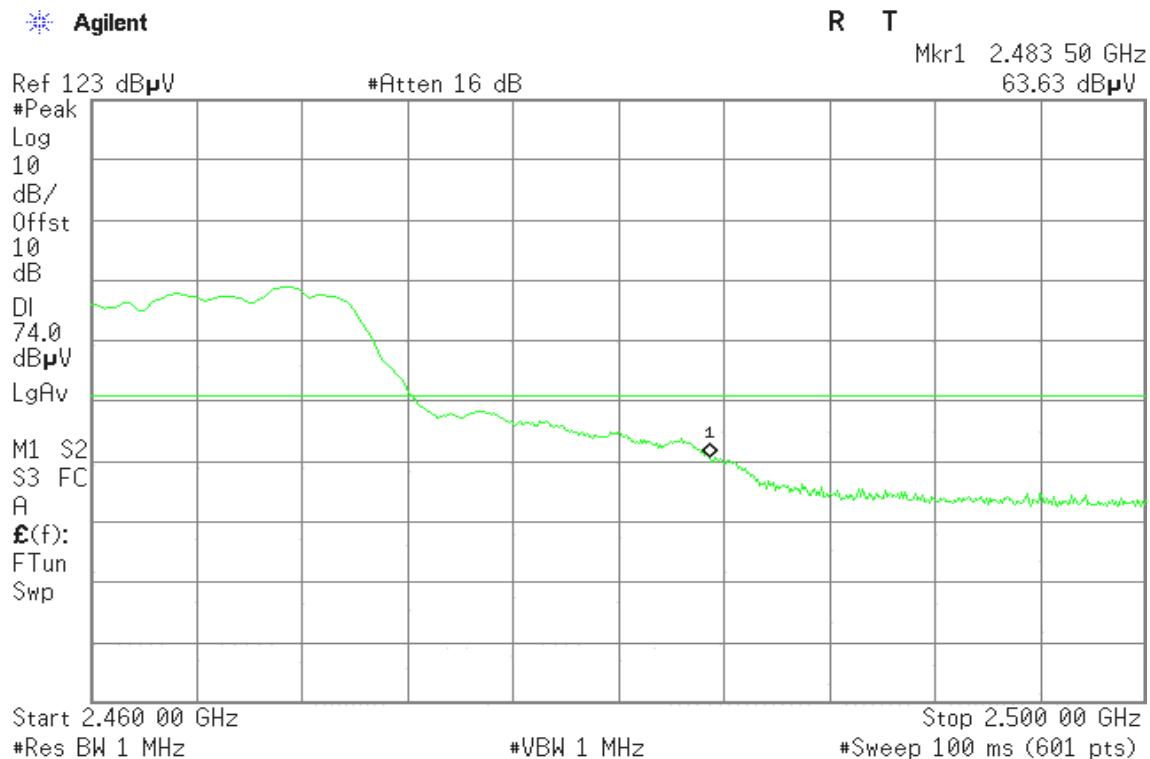
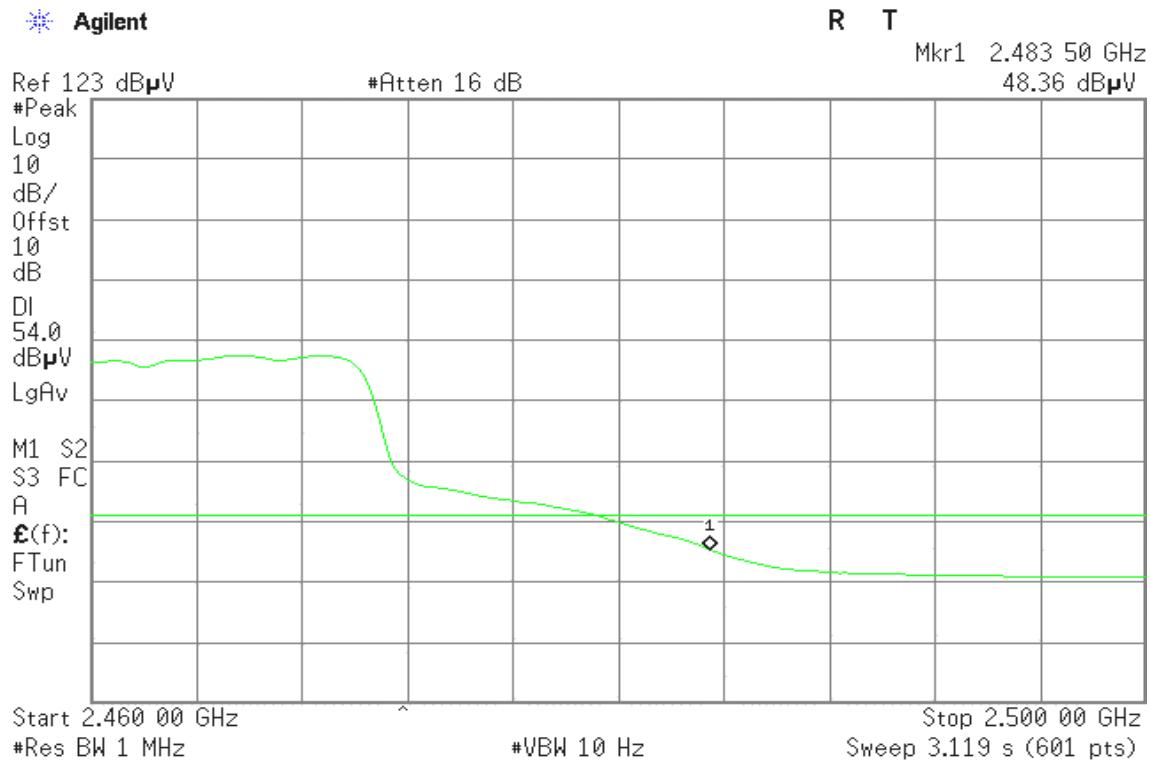
Detector mode: Peak**Polarity: Horizontal****Detector mode: Average****Polarity: Horizontal**

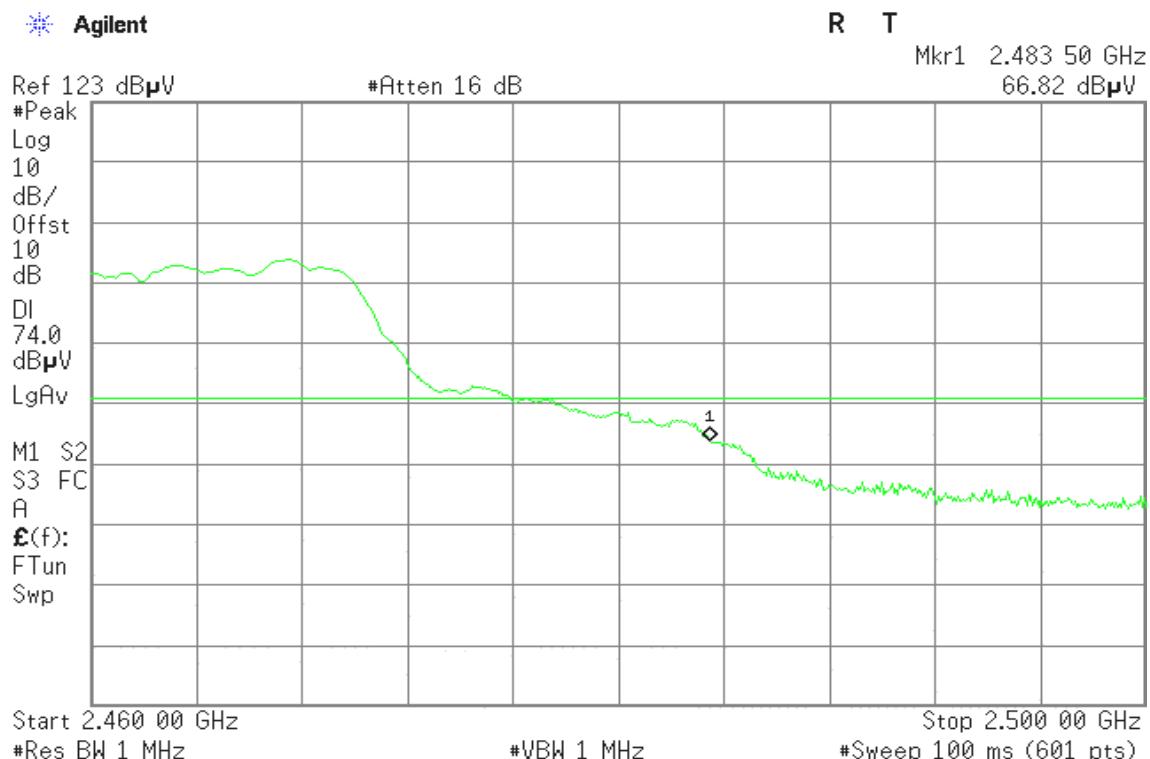
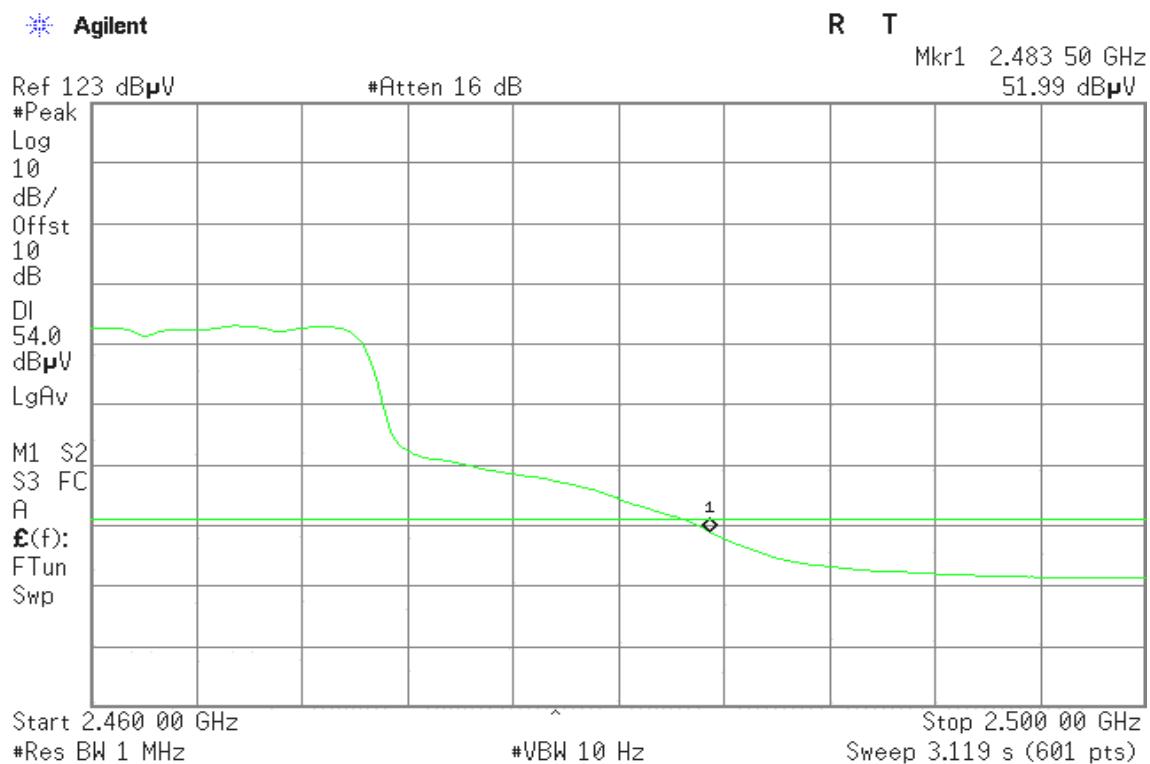
Band Edges (IEEE 802.11b / CH High)**Detector mode: Peak****Polarity: Vertical****Detector mode: Average****Polarity: Vertical**

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

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

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

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

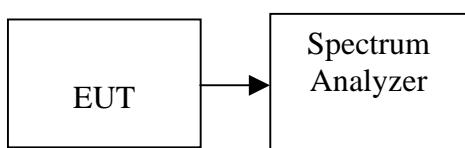
Detector mode: Peak**Polarity: Horizontal****Detector mode: Average****Polarity: Horizontal**

7.5 PEAK POWER SPECTRAL DENSITY

LIMIT

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

Test Configuration



TEST PROCEDURE

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

TEST RESULTS

No non-compliance noted.

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

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-8.03	8.00	PASS
Mid	2437	-7.08		PASS
High	2462	-8.24		PASS

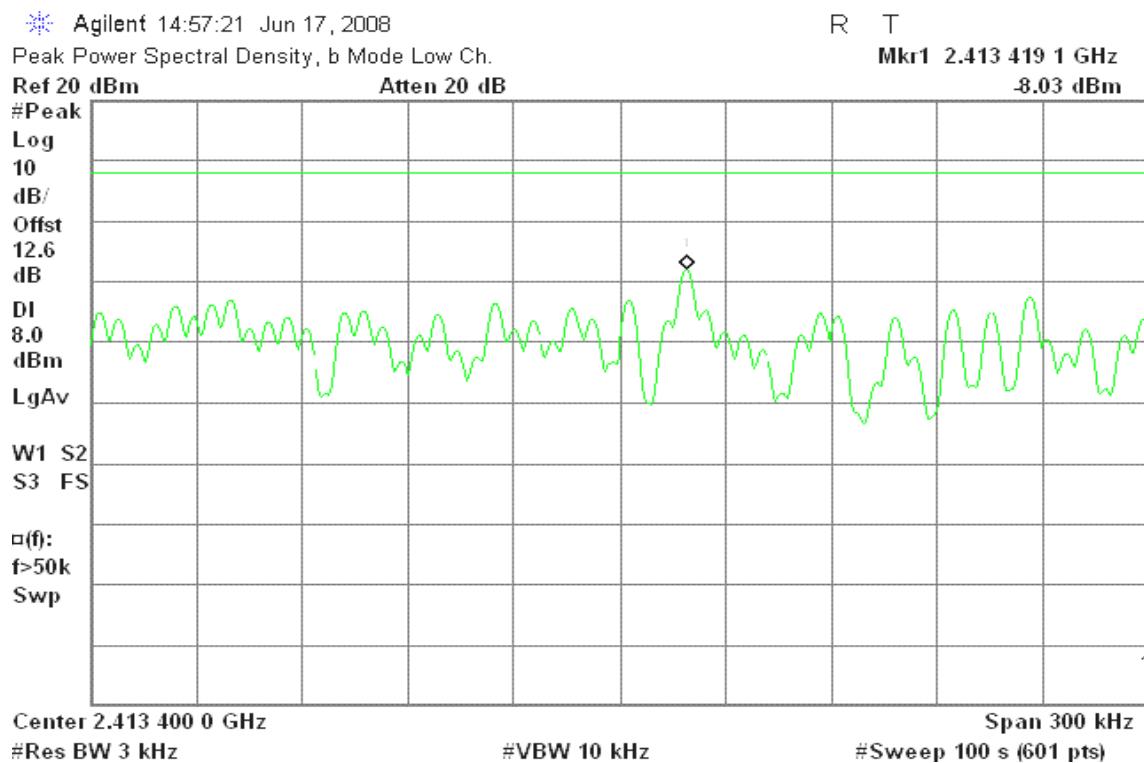
Test mode: IEEE 802.11g

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-12.82	8.00	PASS
Mid	2437	-11.87		PASS
High	2462	-15.34		PASS

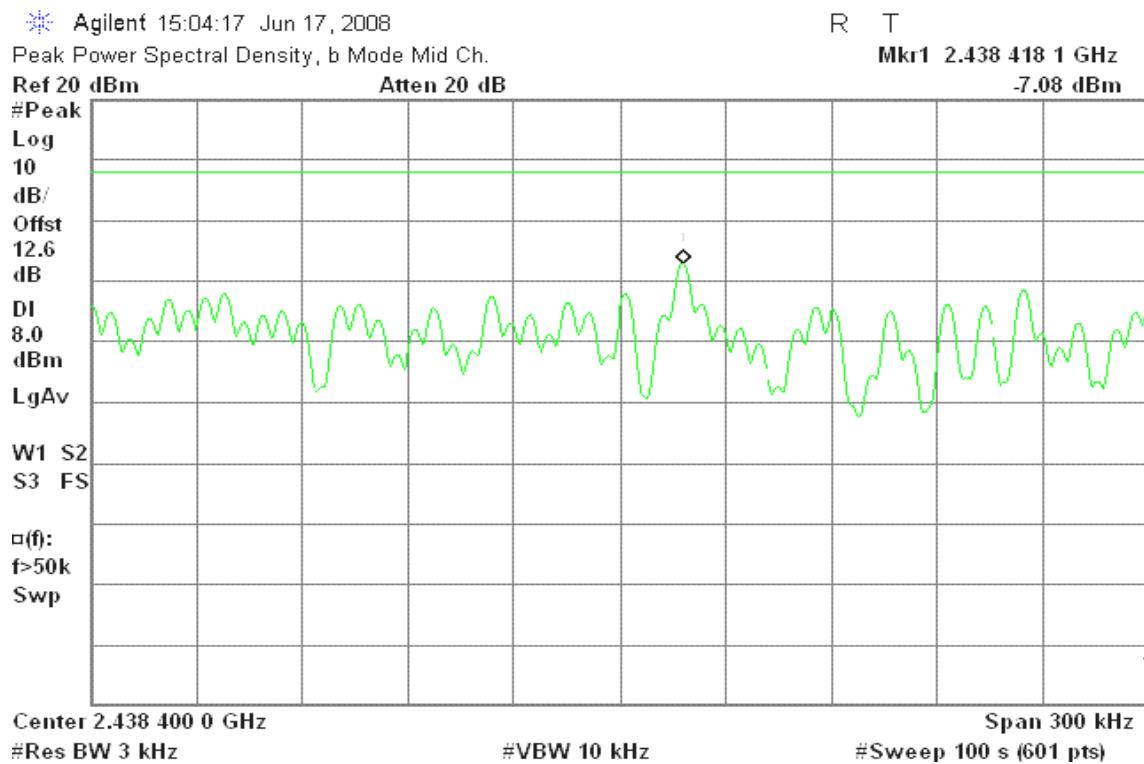
Test Plot

IEEE 802.11b

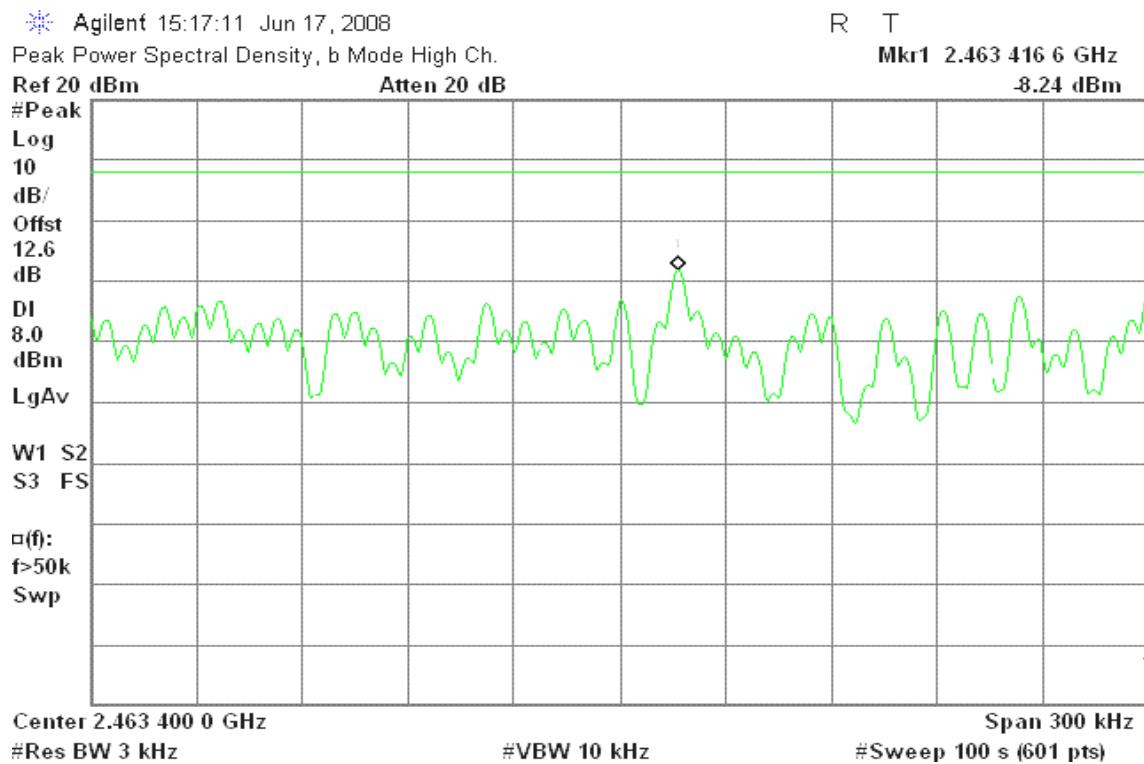
PPSD (CH Low)



PPSD (CH Mid)

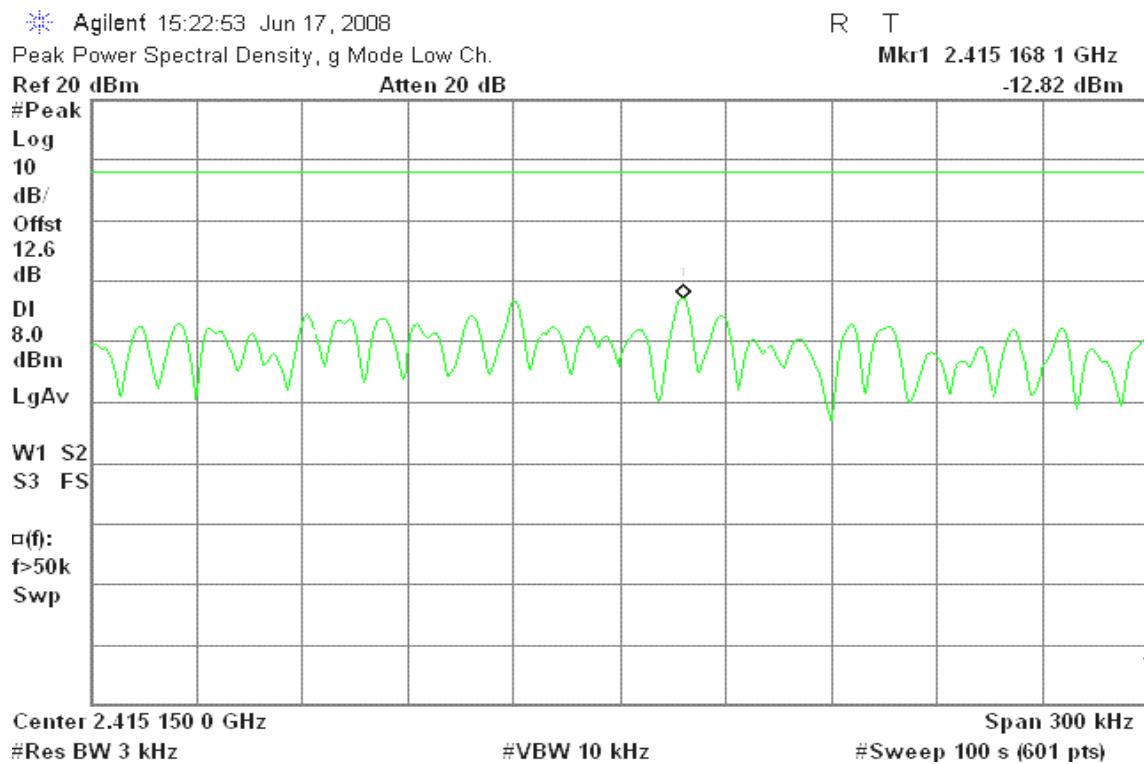


PPSD (CH High)

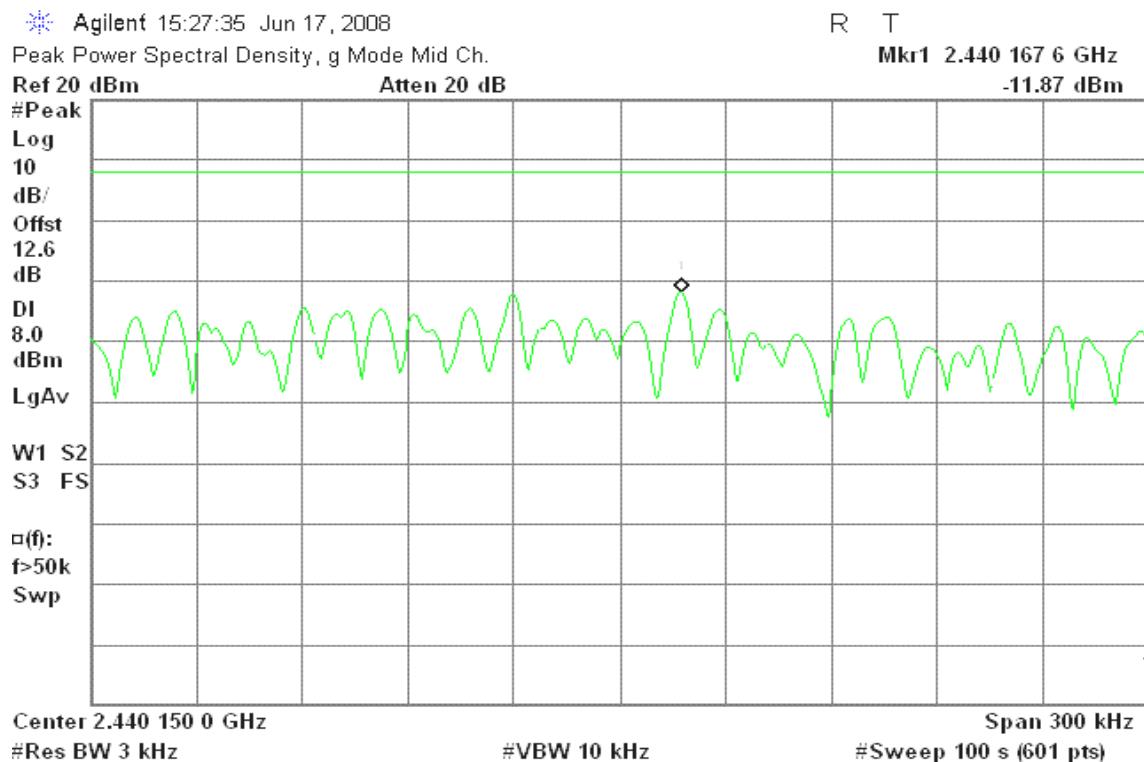


IEEE 802.11g

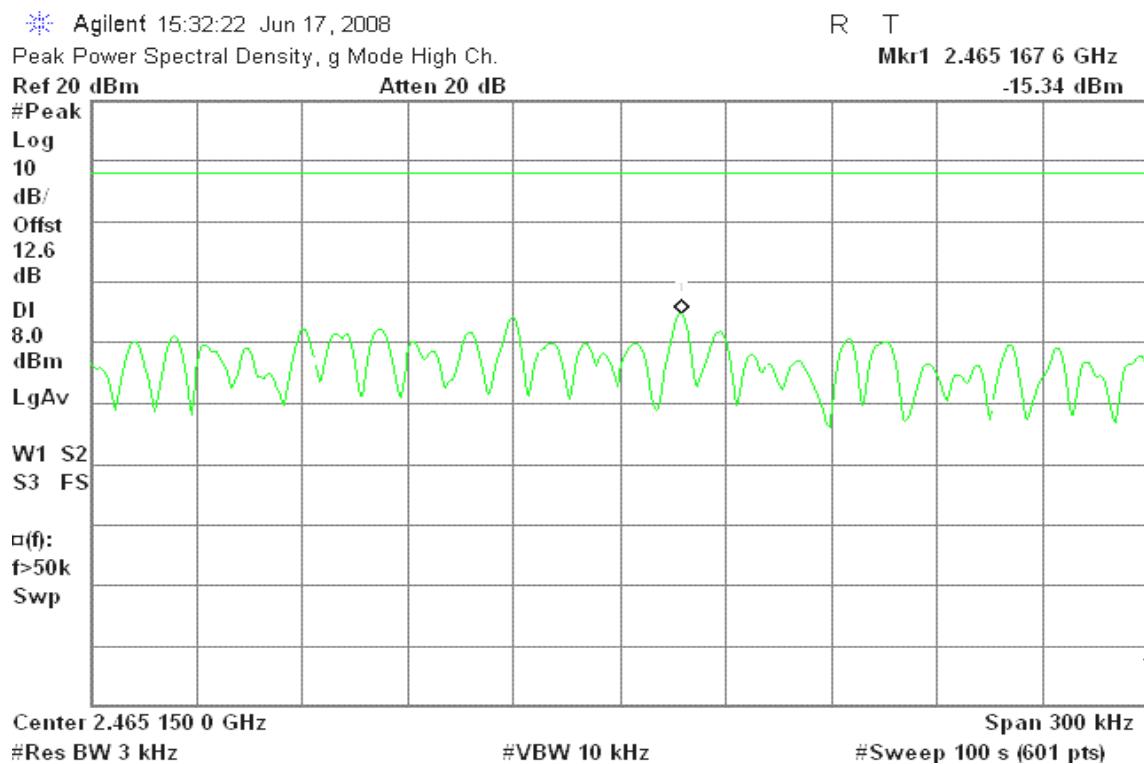
PPSD (CH Low)



PPSD (CH Mid)



PPSD (CH High)



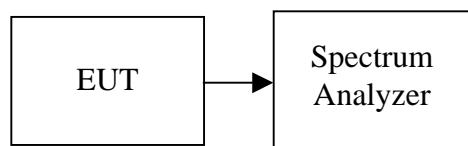
7.6 SPURIOUS EMISSIONS

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

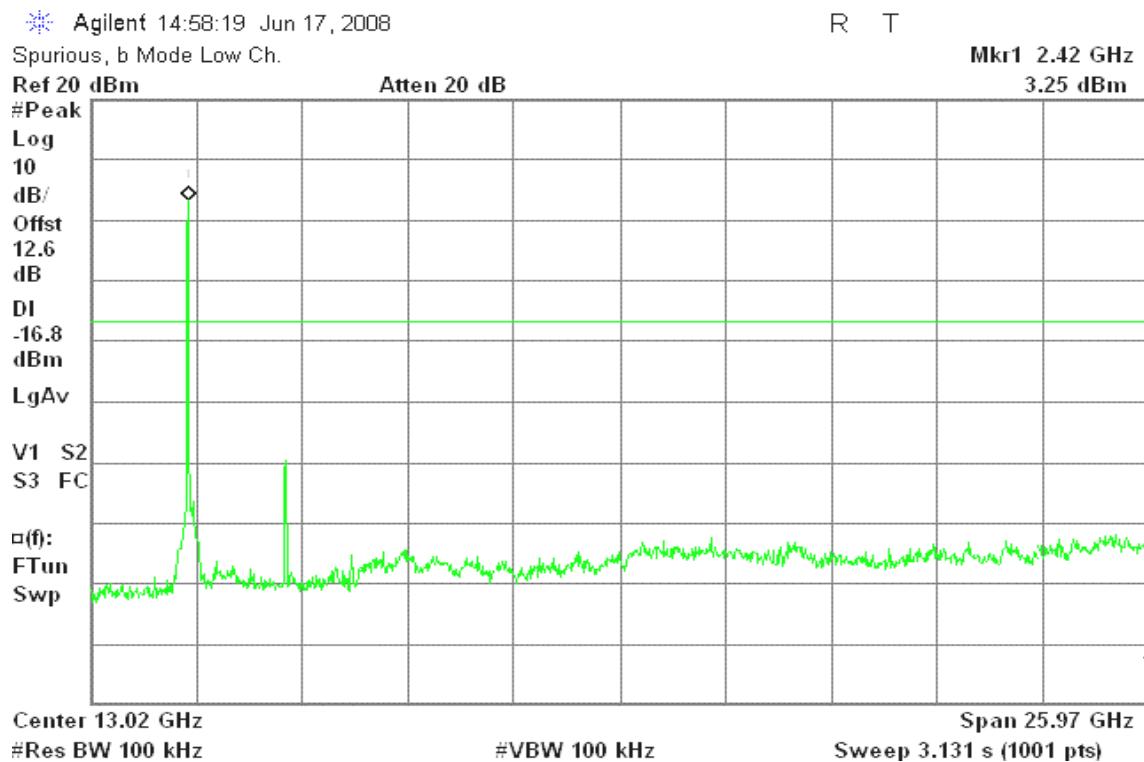
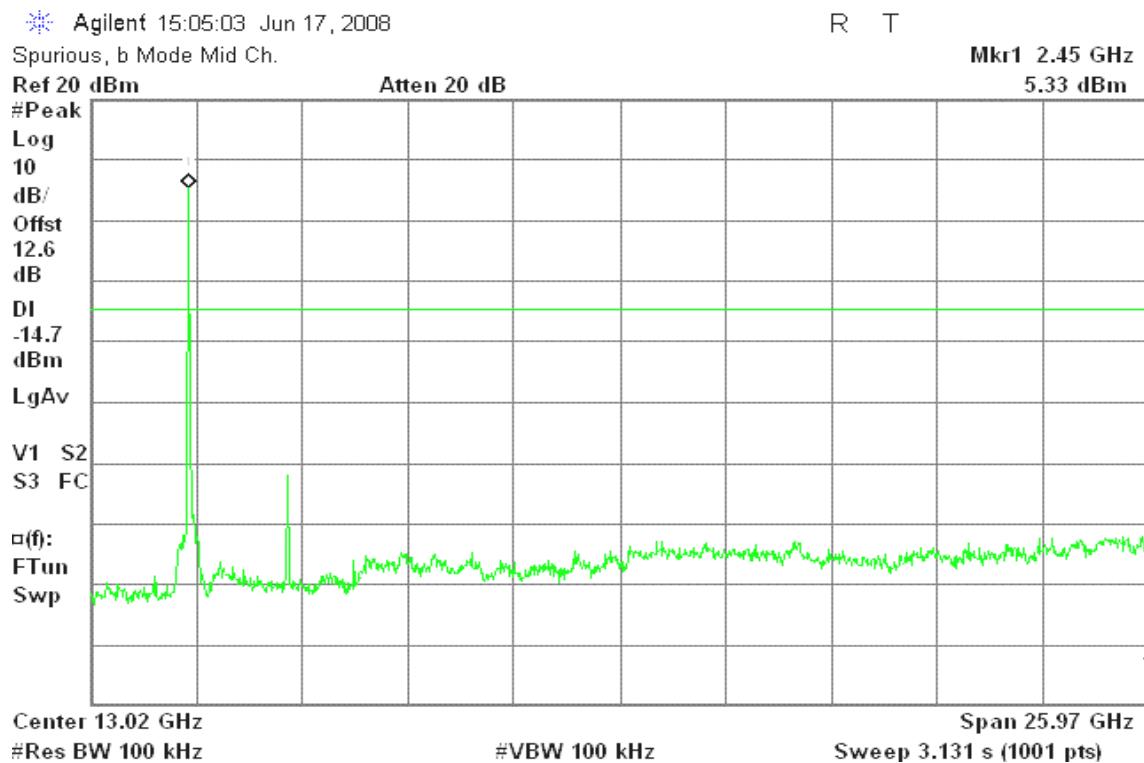
Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

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.

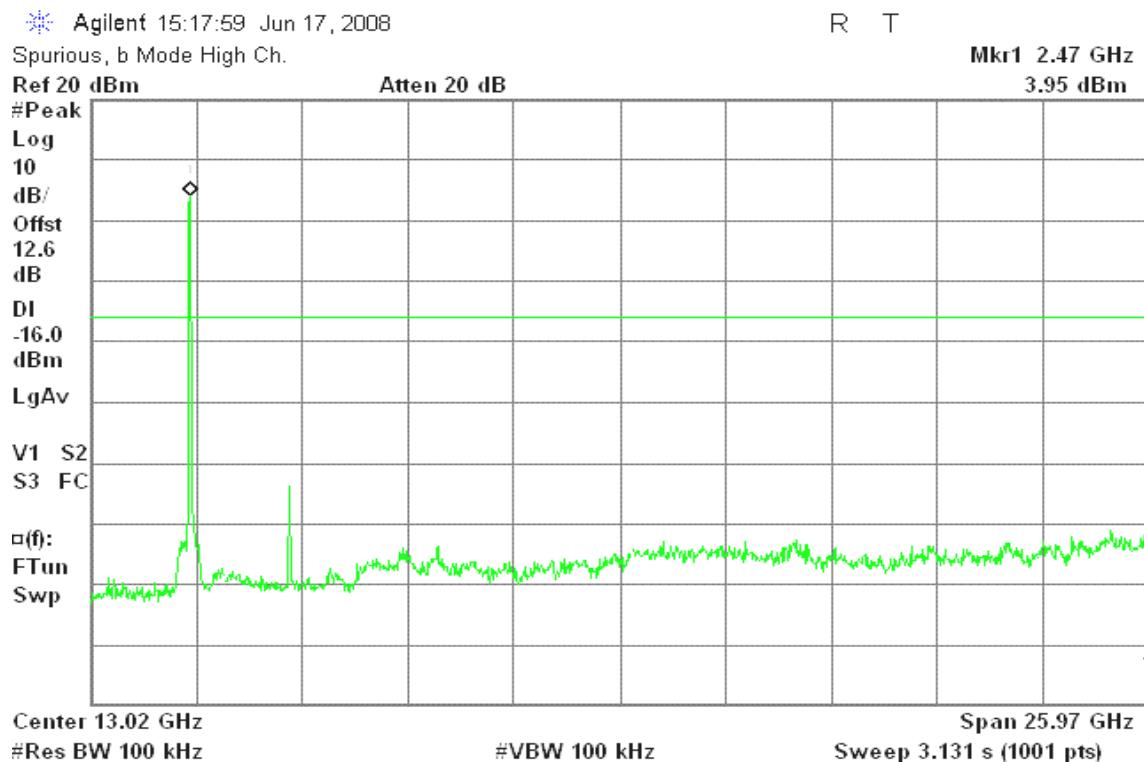
Measurements are made over the 13GHz to 26GHz range with the transmitter set to the lowest, middle, and highest channels.

TEST RESULTS

No non-compliance noted.

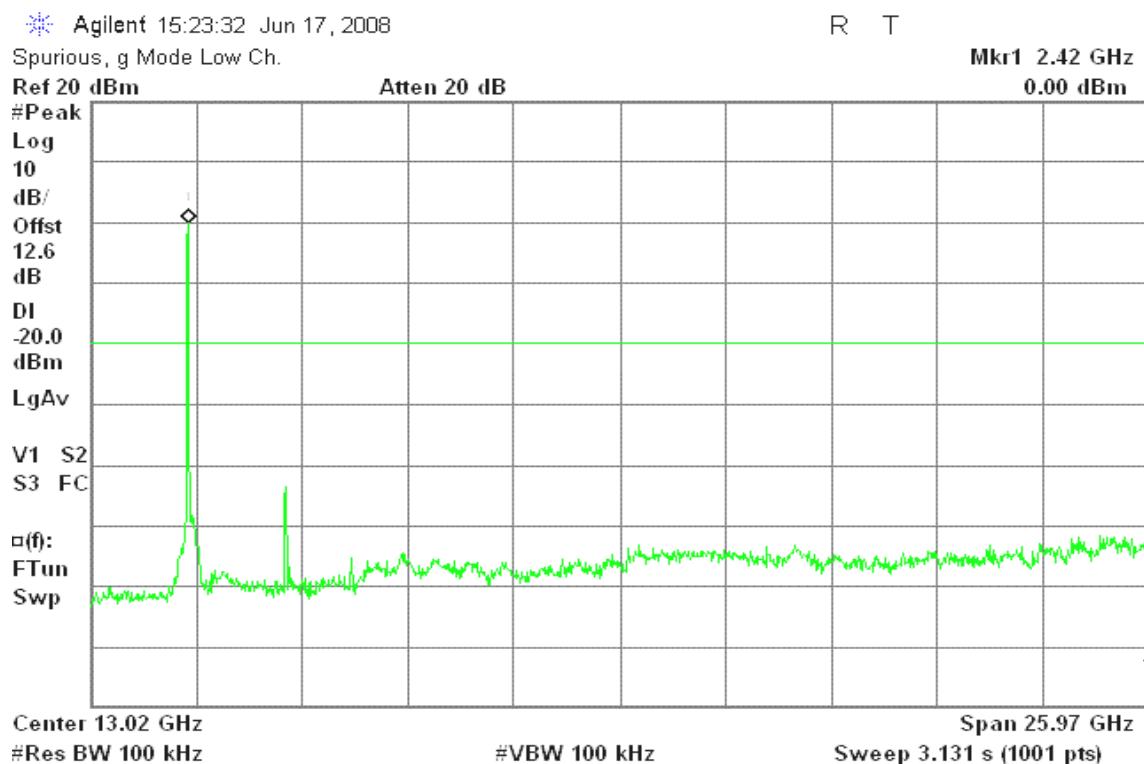
Test Plot**IEEE 802.11b****CH Low****CH Mid**

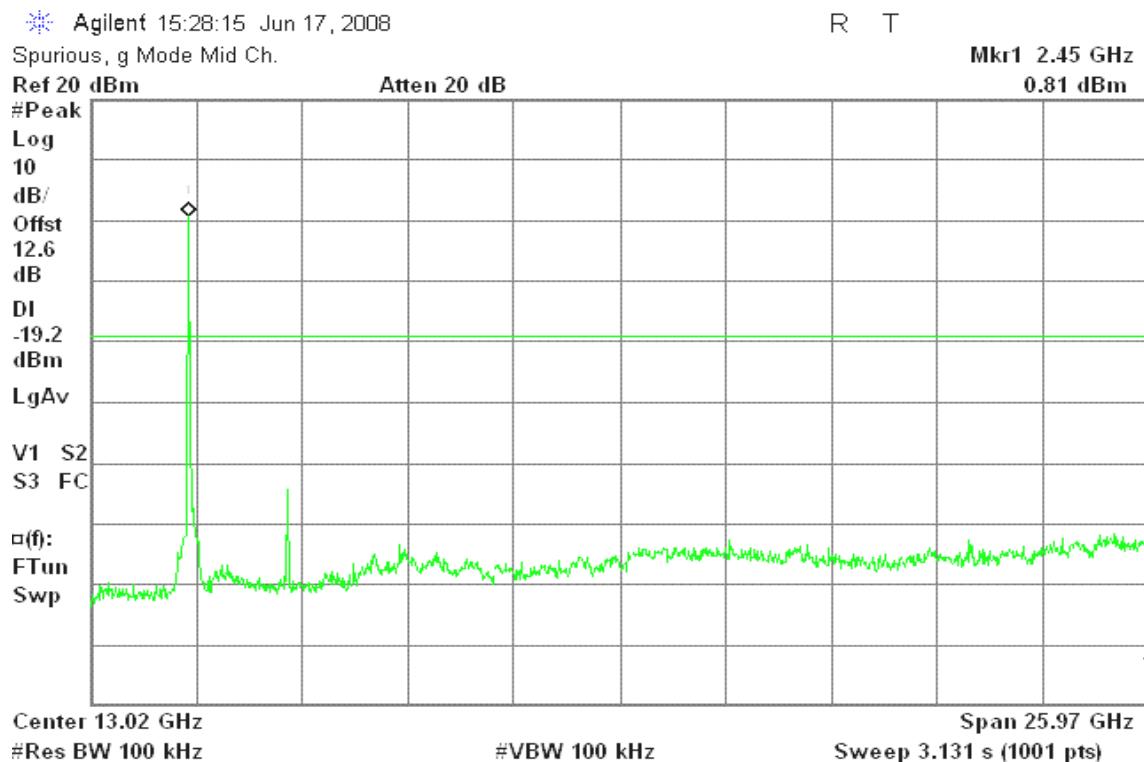
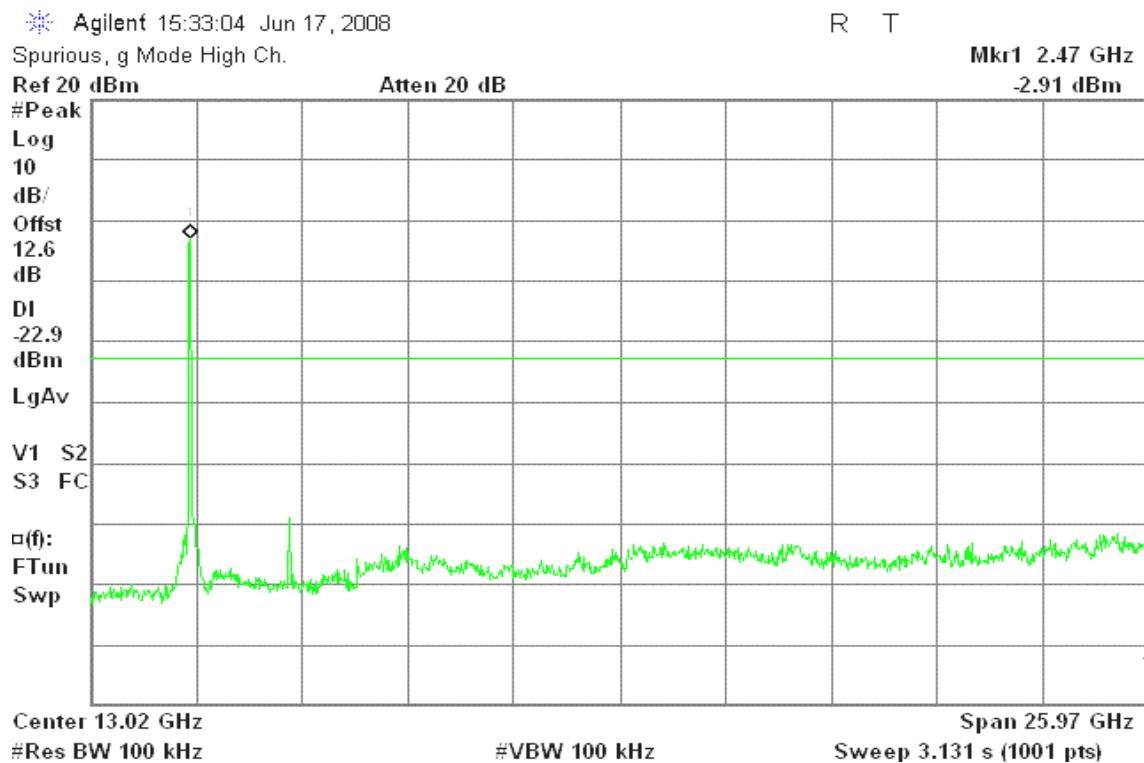
CH High



IEEE 802.11g

CH Low



CH Mid**CH High**



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 (μ V/m)	Measurement Distance (m)
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

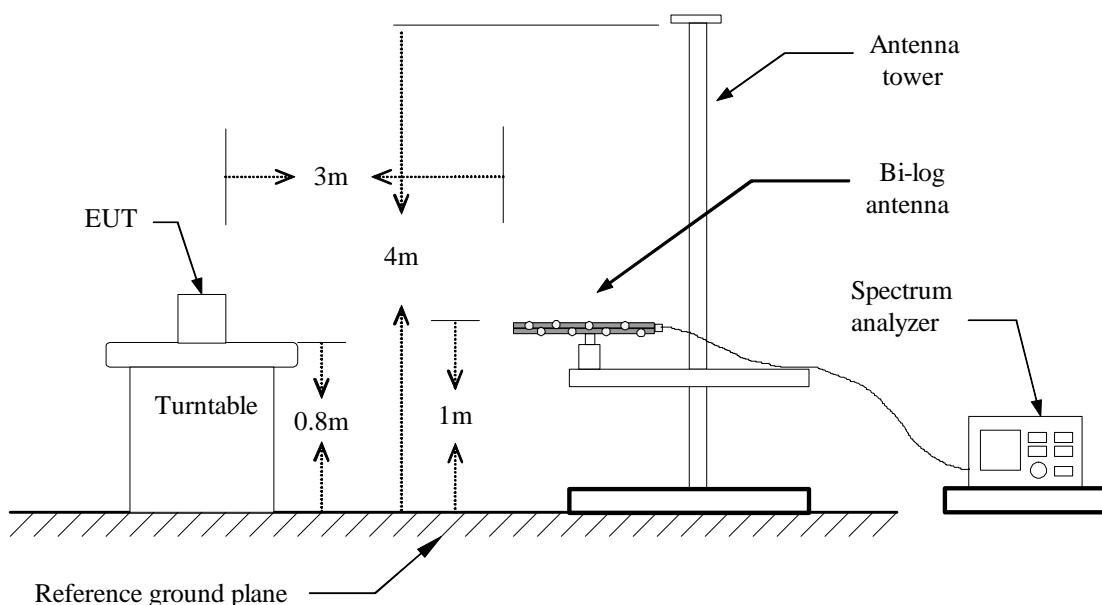
Remark: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of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

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

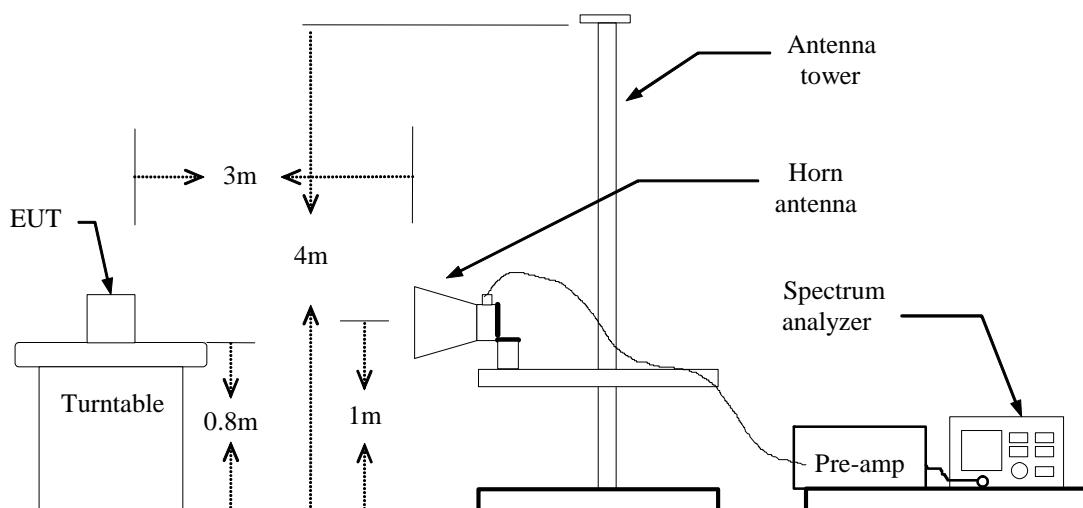
Frequency (MHz)	Field Strength (μ V/m at 3-meter)	Field Strength (dB μ V/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Test Configuration

Below 1 GHz



Above 1 GHz





TEST PROCEDURE

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

Below 1GHz:

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

Above 1GHz:

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

(d) 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.

**Below 1 GHz****Operation Mode:** Normal Link**Test Date:** June 16, 2008**Temperature:** 21°C**Tested by:** Wolf Huang**Humidity:** 51 % 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
55.87	V	51.16	-14.15	37.01	40.00	-2.99	QP
151.25	V	49.45	-8.69	40.76	43.50	-2.74	Peak
532.78	V	40.92	0.06	40.99	46.00	-5.01	Peak
639.48	V	40.54	1.57	42.11	46.00	-3.89	Peak
746.18	V	37.78	4.12	41.90	46.00	-4.10	Peak
799.53	V	39.65	5.03	44.68	46.00	-1.32	Peak
151.25	H	50.12	-8.69	41.43	43.50	-2.07	Peak
532.78	H	43.34	0.06	43.40	46.00	-2.60	Peak
615.23	H	44.19	1.29	45.48	46.00	-0.52	Peak
710.62	H	36.52	2.69	39.21	46.00	-6.79	QP
744.57	H	40.21	4.06	44.27	46.00	-1.73	Peak
799.53	H	40.13	5.03	45.16	46.00	-0.84	QP

Remark:

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

**Above 1 GHz****Operation Mode:** IEEE 802.11b / TX / CH Low**Test Date:** June 17, 2008**Temperature:** 21°C**Tested by:** Wolf Huang**Humidity:** 51 % 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
1496.67	V	54.25	---	-8.37	45.88	---	74.00	54.00	-8.12	Peak
2143.33	V	49.32	---	-3.73	45.59	---	74.00	54.00	-8.41	Peak
4825.00	V	56.29	50.26	0.35	56.64	50.61	74.00	54.00	-3.39	AVG
6433.33	V	50.29	---	1.67	51.96	---	74.00	54.00	-2.04	Peak
7233.33	V	46.23	---	2.96	49.19	---	74.00	54.00	-4.81	Peak
N/A										
1500.00	H	51.58	---	-8.36	43.22	---	74.00	54.00	-10.78	Peak
2206.67	H	49.84	---	-3.54	46.30	---	74.00	54.00	-7.70	Peak
2346.67	H	52.23	---	-3.10	49.13	---	74.00	54.00	-4.87	Peak
4825.00	H	61.30	52.25	0.35	61.65	52.60	74.00	54.00	-1.40	AVG
6433.33	H	52.92	51.15	1.67	54.60	52.82	74.00	54.00	-1.18	AVG
7241.67	H	49.34	---	2.96	52.31	---	74.00	54.00	-1.69	Peak

Remark:

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

**Operation Mode:** IEEE 802.11b / TX / CH Mid**Test Date:** June 17, 2008**Temperature:** 21°C**Tested by:** Wolf Huang**Humidity:** 51 % 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
1500.00	V	54.44	---	-8.36	46.08	---	74.00	54.00	-7.92	Peak
2176.67	V	50.24	---	-3.63	46.61	---	74.00	54.00	-7.39	Peak
2993.33	V	49.53	---	-1.33	48.21	---	74.00	54.00	-5.79	Peak
4875.00	V	50.60	---	0.24	50.84	---	74.00	54.00	-3.16	Peak
6500.00	V	49.90	---	1.75	51.65	---	74.00	54.00	-2.35	Peak
7308.33	V	45.93	---	2.95	48.87	---	74.00	54.00	-5.13	Peak
2203.33	H	50.12	---	-3.55	46.57	---	74.00	54.00	-7.43	Peak
2370.00	H	51.70	---	-3.03	48.67	---	74.00	54.00	-5.33	Peak
3000.00	H	49.79	---	-1.31	48.48	---	74.00	54.00	-5.52	Peak
4875.00	H	54.59	52.14	0.24	54.82	52.38	74.00	54.00	-1.62	AVG
6500.00	H	54.39	51.36	1.75	56.14	53.11	74.00	54.00	-0.89	AVG
7308.33	H	47.93	---	2.95	50.88	---	74.00	54.00	-3.12	Peak

Remark:

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

**Operation Mode:** IEEE 802.11b / TX / CH High**Test Date:** June 17, 2008**Temperature:** 21°C**Tested by:** Wolf Huang**Humidity:** 51 % 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
1500.00	V	54.22	---	-8.36	45.86	---	74.00	54.00	-8.14	Peak
2206.67	V	49.97	---	-3.54	46.43	---	74.00	54.00	-7.57	Peak
3000.00	V	50.09	---	-1.31	48.78	---	74.00	54.00	-5.22	Peak
4925.00	V	58.22	49.76	0.13	58.35	49.89	74.00	54.00	-4.11	AVG
6566.67	V	49.19	---	1.92	51.11	---	74.00	54.00	-2.89	Peak
7391.67	V	46.56	---	2.93	49.49	---	74.00	54.00	-4.51	Peak
2200.00	H	49.49	---	-3.56	45.93	---	74.00	54.00	-8.07	Peak
2340.00	H	50.85	---	-3.13	47.72	---	74.00	54.00	-6.28	Peak
2996.67	H	49.34	---	-1.32	48.03	---	74.00	54.00	-5.97	Peak
4925.00	H	63.07	53.57	0.13	63.20	53.70	74.00	54.00	-0.30	AVG
6566.67	H	52.35	51.56	1.92	54.27	53.48	74.00	54.00	-0.52	AVG
7391.67	H	52.75	45.88	2.93	55.68	48.81	74.00	54.00	-5.19	AVG

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:** IEEE 802.11g / TX / CH Low**Test Date:** June 17, 2008**Temperature:** 21°C**Tested by:** Wolf Huang**Humidity:** 51 % 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
1500.00	V	54.11	---	-8.36	45.75	---	74.00	54.00	-8.25	Peak
4825.00	V	52.03	---	0.35	52.38	---	74.00	54.00	-1.62	Peak
6433.33	V	50.92	---	1.67	52.59	---	74.00	54.00	-1.41	Peak
N/A										
1500.00	H	51.66	---	-8.36	43.30	---	74.00	54.00	-10.70	Peak
1603.33	H	49.22	---	-7.50	41.73	---	74.00	54.00	-12.27	Peak
1870.00	H	47.82	---	-5.26	42.56	---	74.00	54.00	-11.44	Peak
4825.00	H	59.34	47.91	0.35	59.69	48.26	74.00	54.00	-5.74	AVG
6433.33	H	51.97	---	1.67	53.64	---	74.00	54.00	-0.36	Peak
7241.67	H	47.15	---	2.96	50.12	---	74.00	54.00	-3.88	Peak

Remark:

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

**Operation Mode:** IEEE 802.11g / TX / CH Mid**Test Date:** June 17, 2008**Temperature:** 21°C**Tested by:** Wolf Huang**Humidity:** 51 % 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
1500.00	V	54.03	---	-8.36	45.67	---	74.00	54.00	-8.33	Peak
2203.33	V	49.66	---	-3.55	46.11	---	74.00	54.00	-7.89	Peak
4500.00	V	46.12	---	1.07	47.18	---	74.00	54.00	-6.82	Peak
4875.00	V	48.16	---	0.24	48.39	---	74.00	54.00	-5.61	Peak
6500.00	V	49.68	---	1.75	51.43	---	74.00	54.00	-2.57	Peak
N/A										
1500.00	H	51.80	---	-8.36	43.44	---	74.00	54.00	-10.56	Peak
1870.00	H	48.29	---	-5.26	43.03	---	74.00	54.00	-10.97	Peak
2203.33	H	48.45	---	-3.55	44.90	---	74.00	54.00	-9.10	Peak
4875.00	H	52.04	---	0.24	52.28	---	74.00	54.00	-1.72	Peak
6500.00	H	54.38	51.85	1.75	56.13	53.60	74.00	54.00	-0.40	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:** IEEE 802.11g / TX / CH High**Test Date:** June 17, 2008**Temperature:** 21°C**Tested by:** Wolf Huang**Humidity:** 51 % 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
1500.00	V	54.17	---	-8.36	45.81	---	74.00	54.00	-8.19	Peak
2200.00	V	47.70	---	-3.56	44.14	---	74.00	54.00	-9.86	Peak
4200.00	V	44.78	---	0.90	45.68	---	74.00	54.00	-8.32	Peak
4916.67	V	46.81	---	0.15	46.96	---	74.00	54.00	-7.04	Peak
6566.67	V	48.92	---	1.92	50.84	---	74.00	54.00	-3.16	Peak
N/A										
1500.00	H	52.22	---	-8.36	43.86	---	74.00	54.00	-10.14	Peak
2363.33	H	50.43	---	-3.05	47.37	---	74.00	54.00	-6.63	Peak
3283.33	H	45.92	---	-0.78	45.14	---	74.00	54.00	-8.86	Peak
4491.67	H	46.32	---	1.06	47.38	---	74.00	54.00	-6.62	Peak
4925.00	H	49.91	---	0.13	50.04	---	74.00	54.00	-3.96	Peak
6566.67	H	51.96	---	1.92	53.88	---	74.00	54.00	-0.12	Peak

Remark:

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



7.7 POWERLINE CONDUCTED EMISSIONS

LIMIT

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

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

Test Configuration

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

TEST PROCEDURE

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



TEST RESULTS

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

Test Data

Operation Mode: Normal Link **Test Date:** July 1, 2008
Temperature: 22°C **Tested by:** Eddy Chung
Humidity: 45% RH

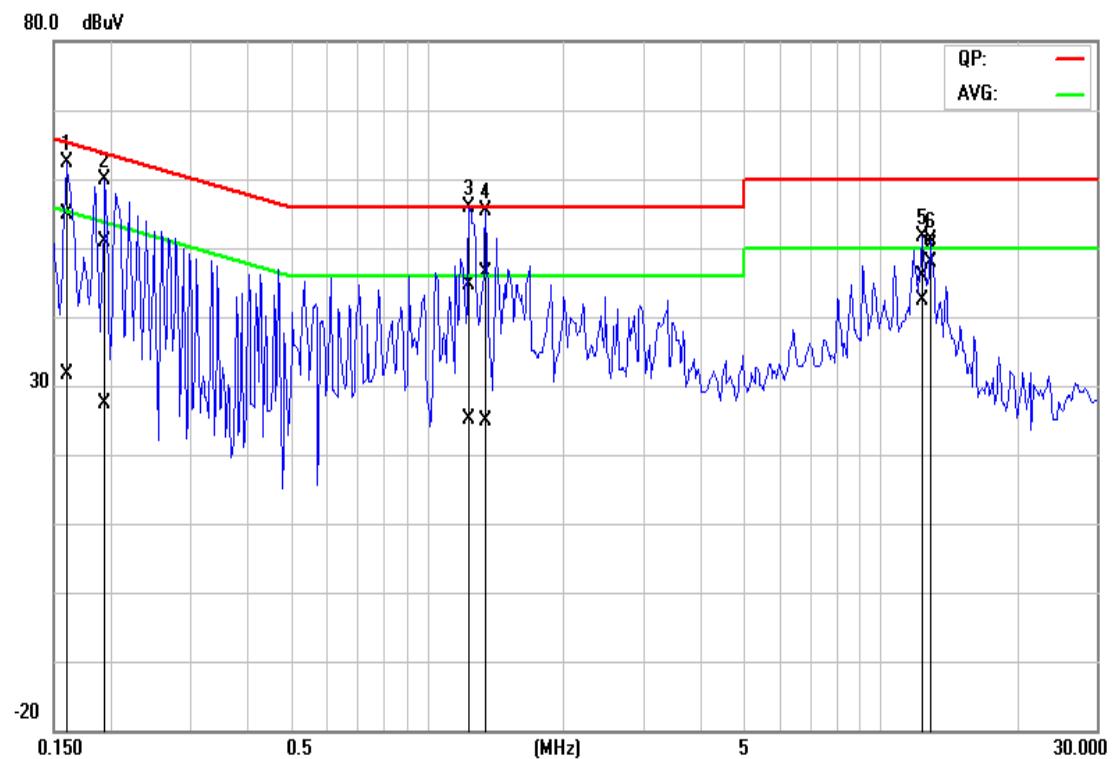
Frequency (MHz)	QP Reading (dBuV)	AV Reading (dBuV)	Corr. factor (dB)	QP Result (dBuV)	AV Result (dBuV)	QP Limit (dBuV)	AV Limit (dBuV)	QP Margin (dB)	AV Margin (dB)	Note
0.1600	54.71	31.41	0.19	54.90	31.60	65.46	55.46	-10.56	-23.86	L1
0.1950	50.74	27.24	0.16	50.90	27.40	63.82	53.82	-12.92	-26.42	L1
1.2400	44.57	25.17	0.03	44.60	25.20	56.00	46.00	-11.40	-20.80	L1
1.3450	46.37	24.97	0.03	46.40	25.00	56.00	46.00	-9.60	-21.00	L1
12.3550	45.30	41.70	0.60	45.90	42.30	60.00	50.00	-14.10	-7.70	L1
12.8900	49.69	47.39	0.61	50.30	48.00	60.00	50.00	-9.70	-2.00	L1
0.1650	54.52	34.22	0.18	54.70	34.40	65.21	55.21	-10.51	-20.81	L2
0.2250	48.36	25.96	0.14	48.50	26.10	62.63	52.63	-14.13	-26.53	L2
1.3850	47.67	22.77	0.03	47.70	22.80	56.00	46.00	-8.30	-23.20	L2
1.4900	43.57	22.27	0.03	43.60	22.30	56.00	46.00	-12.40	-23.70	L2
11.8100	48.50	45.80	0.60	49.10	46.40	60.00	50.00	-10.90	-3.60	L2
12.8850	50.68	48.18	0.62	51.30	48.80	60.00	50.00	-8.70	-1.20	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 to 30MHz was 10kHz; the IF bandwidth of Test Receiver between 0.15MHz to 30MHz was 9kHz;
4. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)

Test Plots

Conducted emissions (Line 1)



Conducted emissions (Line 2)

