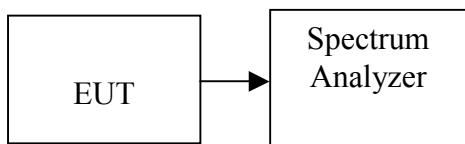


7.5 PEAK POWER SPECTRAL DENSITY

LIMIT

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

Test Configuration



TEST PROCEDURE

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



TEST RESULTS

No non-compliance noted.

Test Data

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 2 PPSD (dBm)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-15.89	-18.05	-13.83	8.00	PASS
Mid	2437	-15.82	-18.99	-14.11		PASS
High	2462	-14.99	-17.78	-13.15		PASS

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 2 PPSD (dBm)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-14.06	-10.36	-13.83	8.00	PASS
Mid	2437	-12.90	-14.27	-14.11		PASS
High	2462	-12.43	-13.95	-13.15		PASS

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

Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 2 PPSD (dBm)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-10.41	-13.18	-8.57	8.00	PASS
Mid	2437	-10.48	-13.25	-8.64		PASS
High	2462	-11.38	-14.09	-9.52		PASS

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

Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 2 PPSD (dBm)	PPSD (dBm)	Limit (dBm)	Result
Low	2422	-10.48	-16.07	-9.42	8.00	PASS
Mid	2437	-11.88	-12.73	-9.27		PASS
High	2452	-15.96	-17.27	-13.56		PASS

Remark: Total PPSD (dBm) = $10 * \log(10^{(Chain\ 0\ PPSD\ /10)} + 10^{(Chain\ 2\ PPSD\ /10)})$

**Test mode: IEEE 802.11b mode with combiner**

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-12.42	8.00	PASS
Mid	2437	-13.81		PASS
High	2462	-10.78		PASS

Test mode: IEEE 802.11g mode with combiner

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-9.66	8.00	PASS
Mid	2437	-9.31		PASS
High	2462	-7.76		PASS

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

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-5.87	8.00	PASS
Mid	2437	-5.71		PASS
High	2462	-6.21		PASS

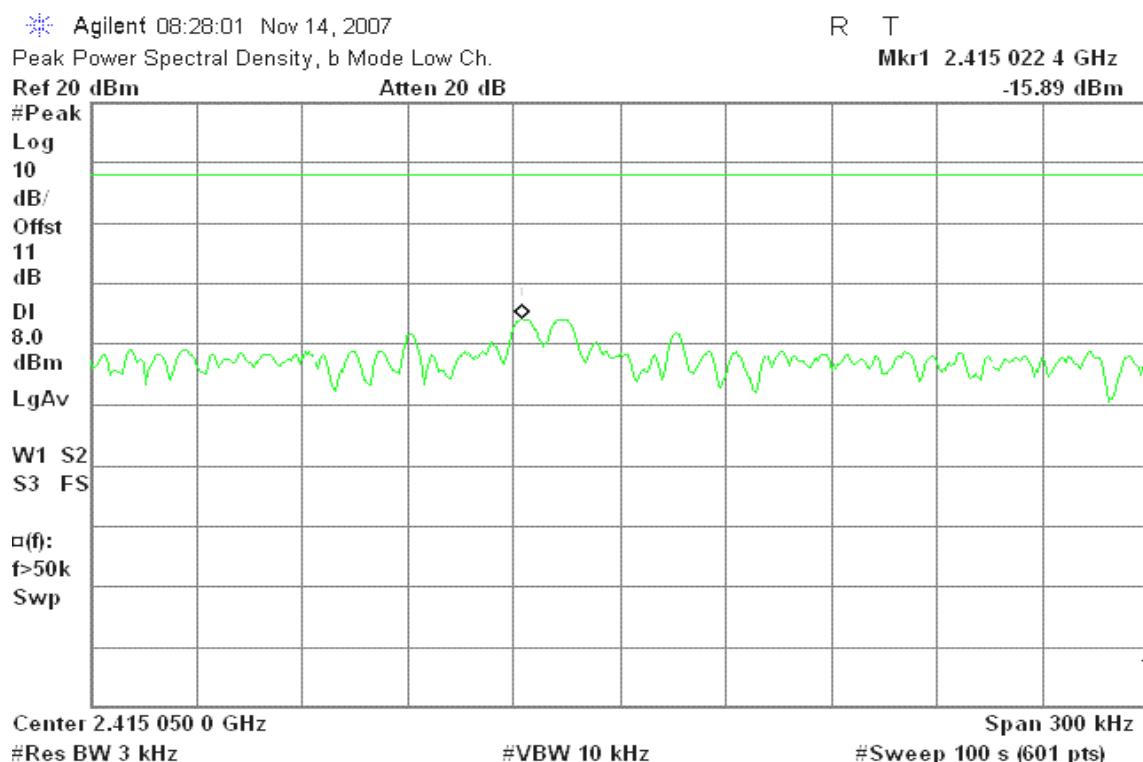
Test mode: draft 802.11n Wide-40 MHz Channel mode with combiner

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-8.98	8.00	PASS
Mid	2437	-8.08		PASS
High	2462	-11.31		PASS

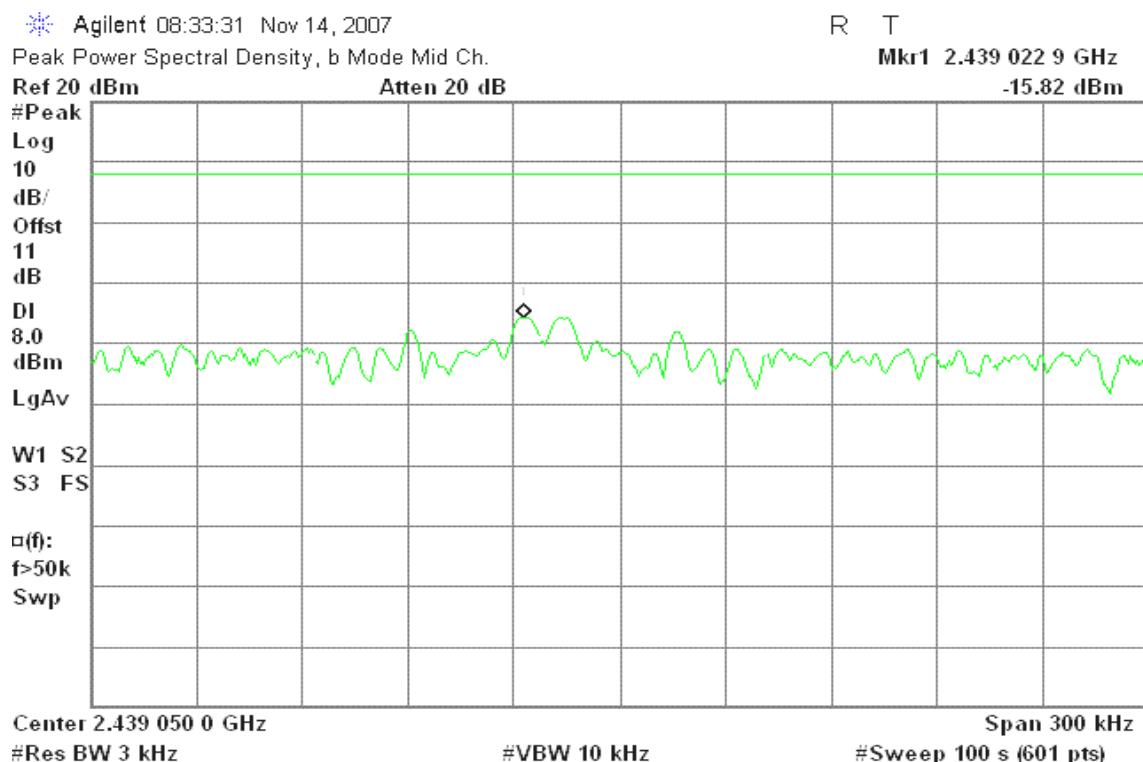
Test Plot

IEEE 802.11b mode / Chain 0

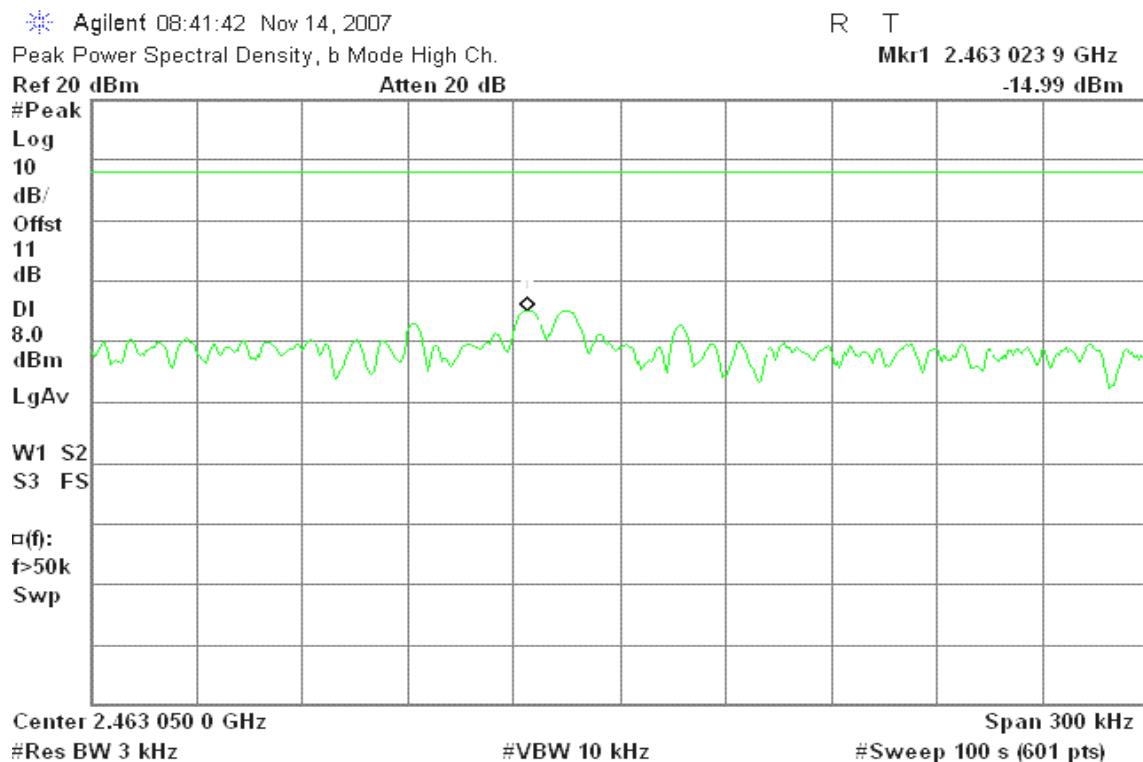
PPSD (CH Low)



PPSD (CH Mid)

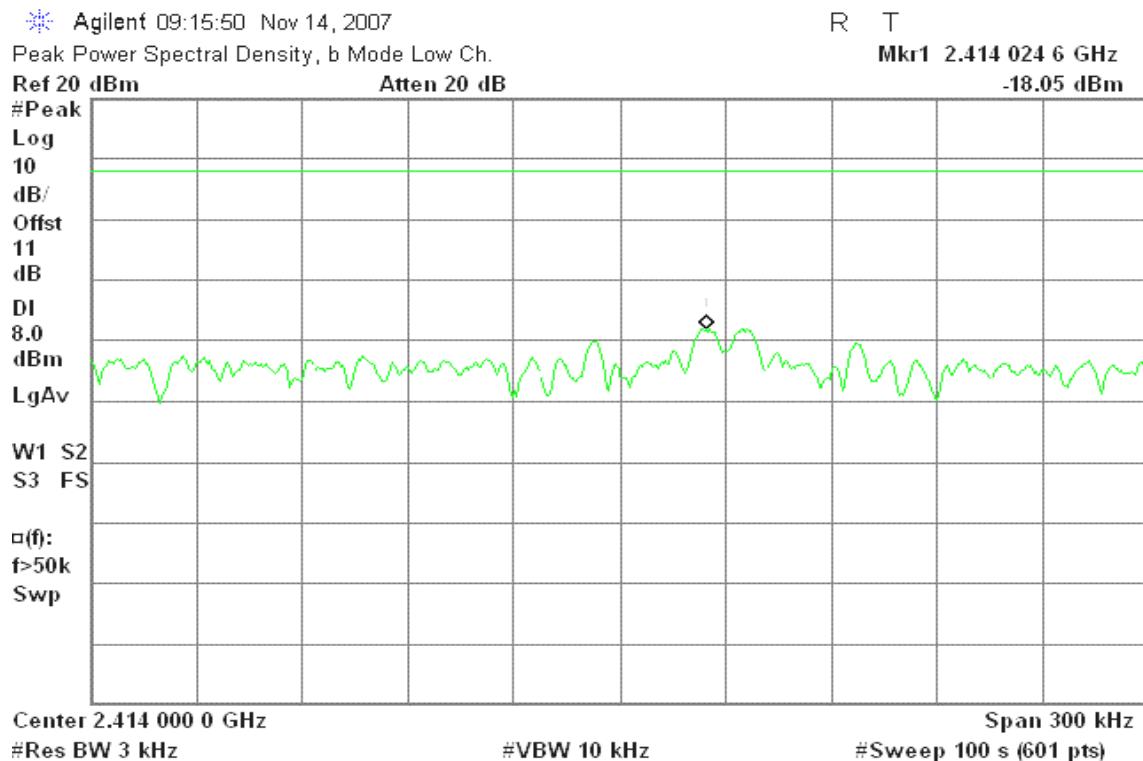


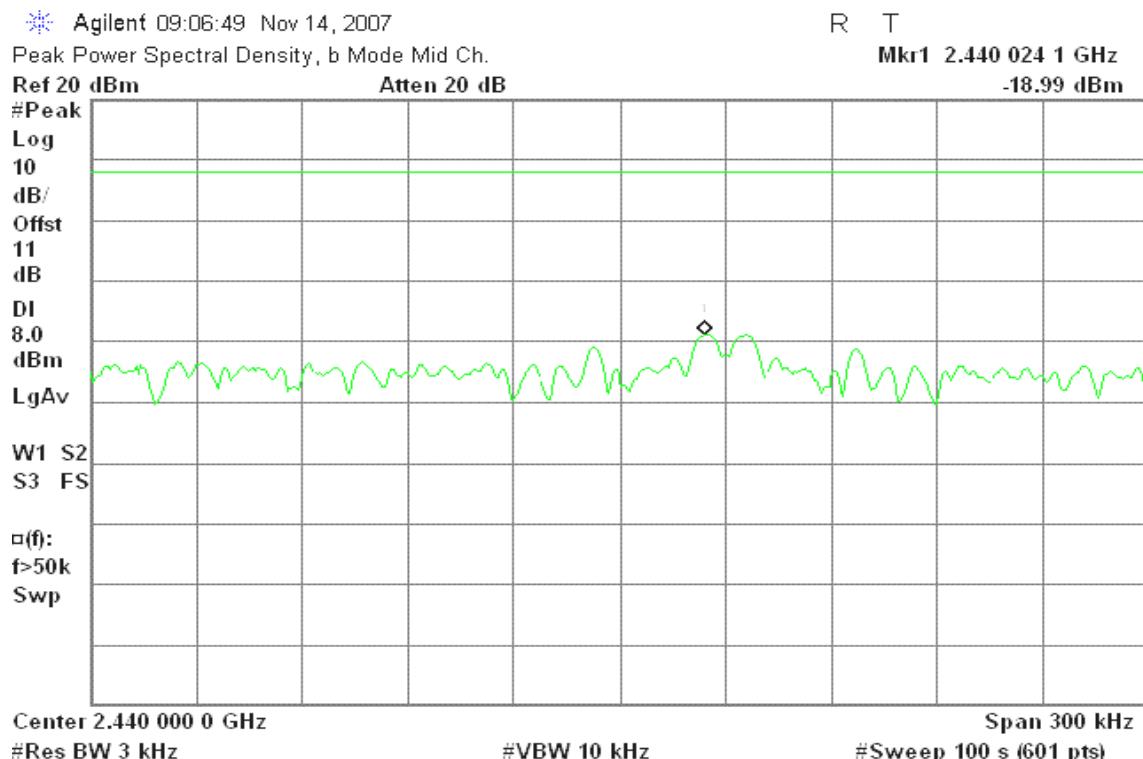
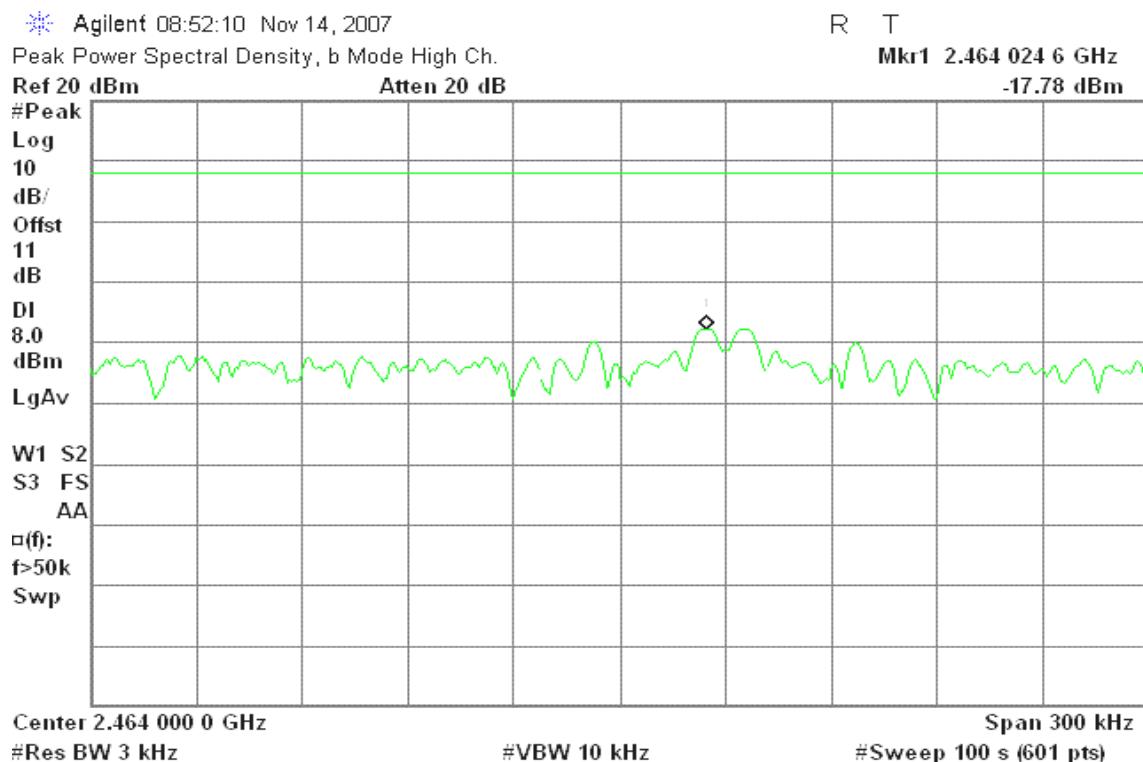
PPSD (CH High)



IEEE 802.11b mode / Chain 2

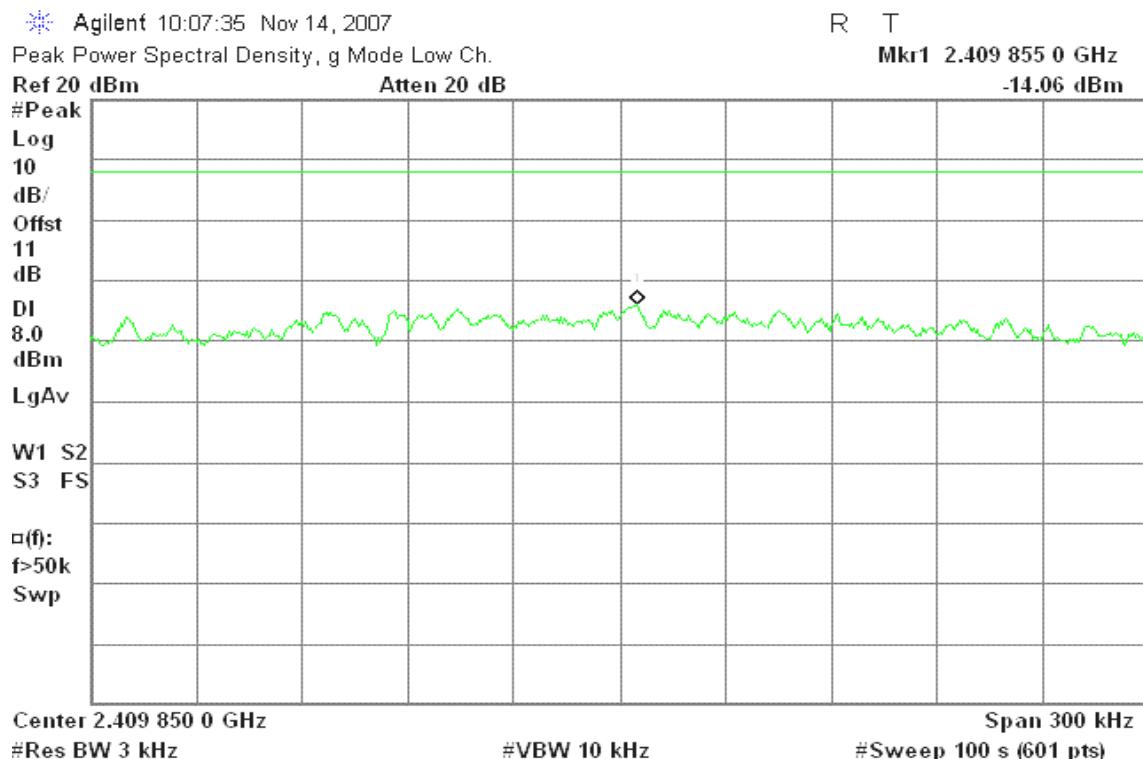
PPSD (CH Low)



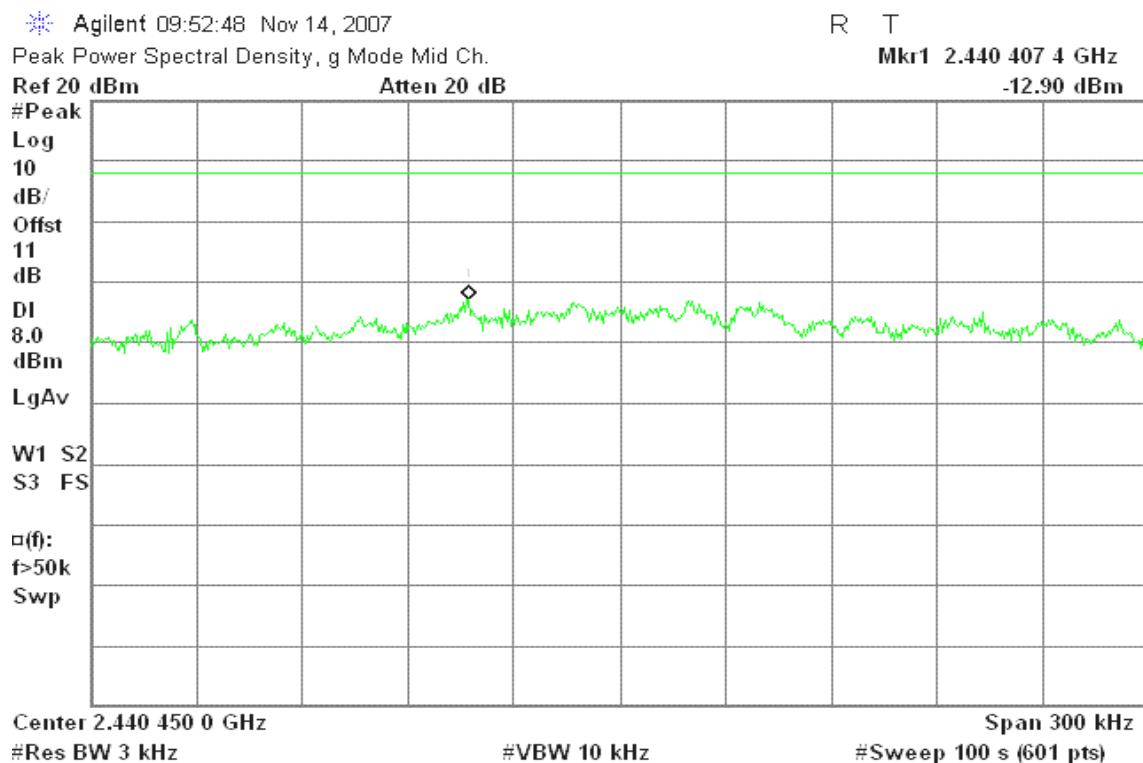
PPSD (CH Mid)**PPSD (CH High)**

IEEE 802.11g mode / Chain 0

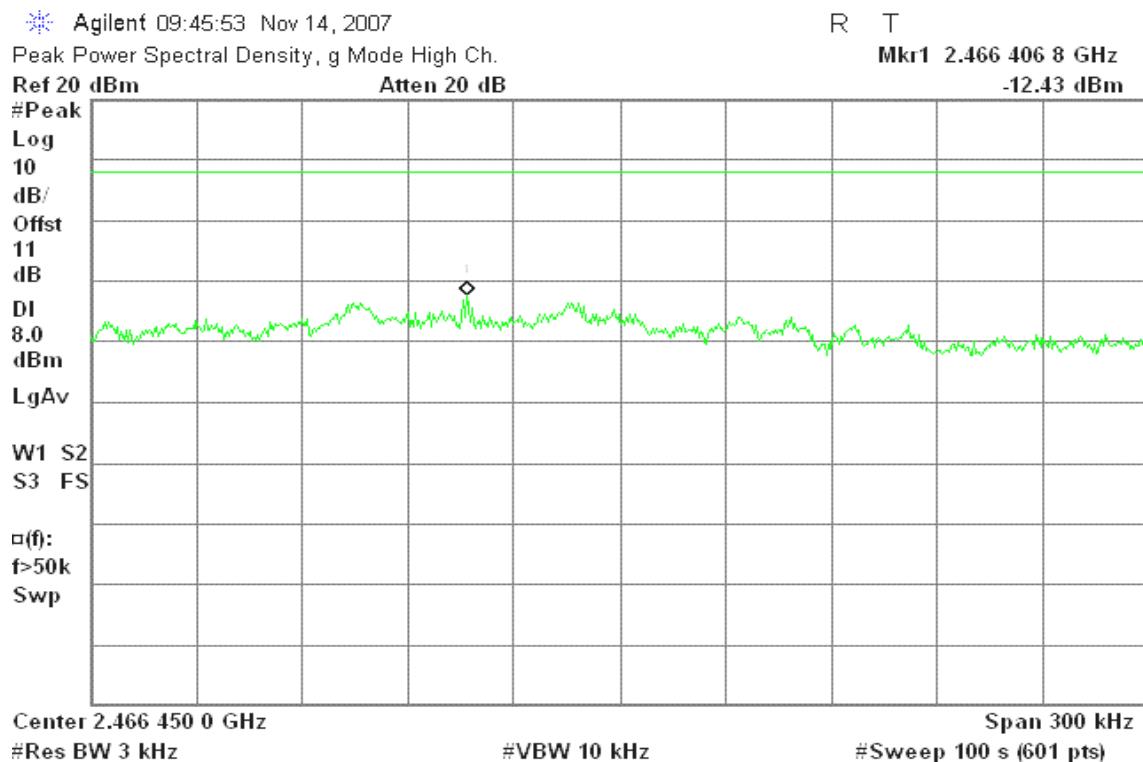
PPSD (CH Low)



PPSD (CH Mid)

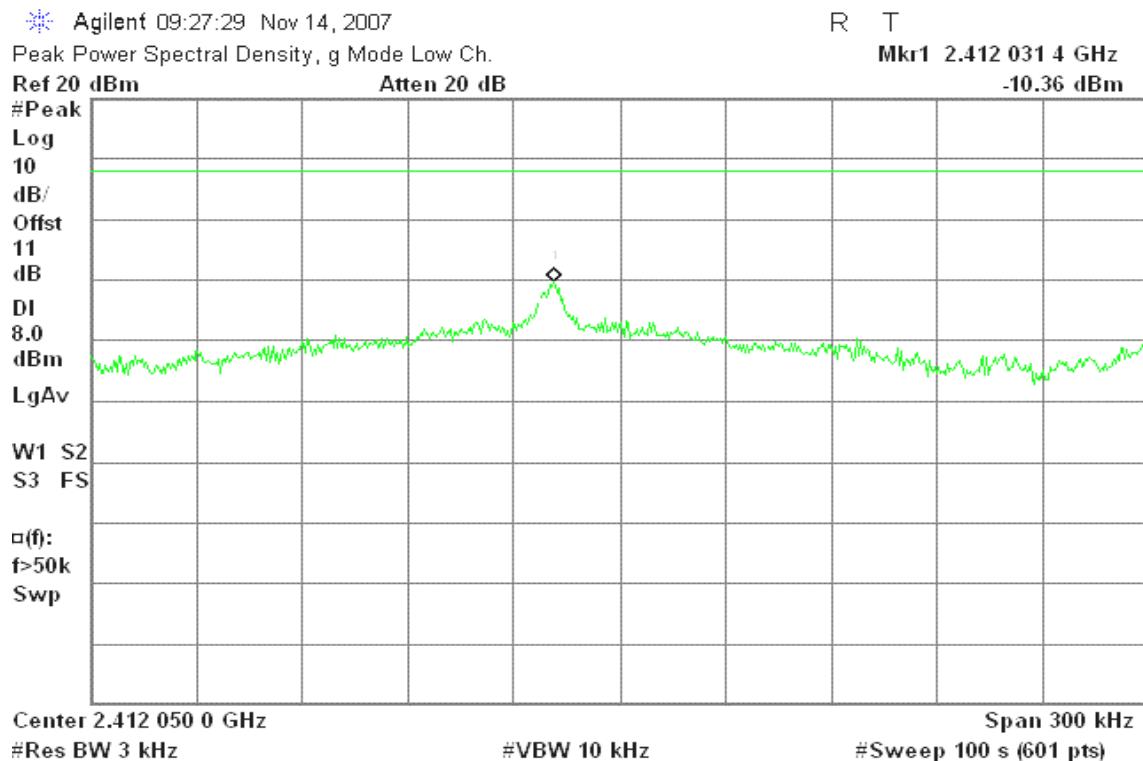


PPSD (CH High)

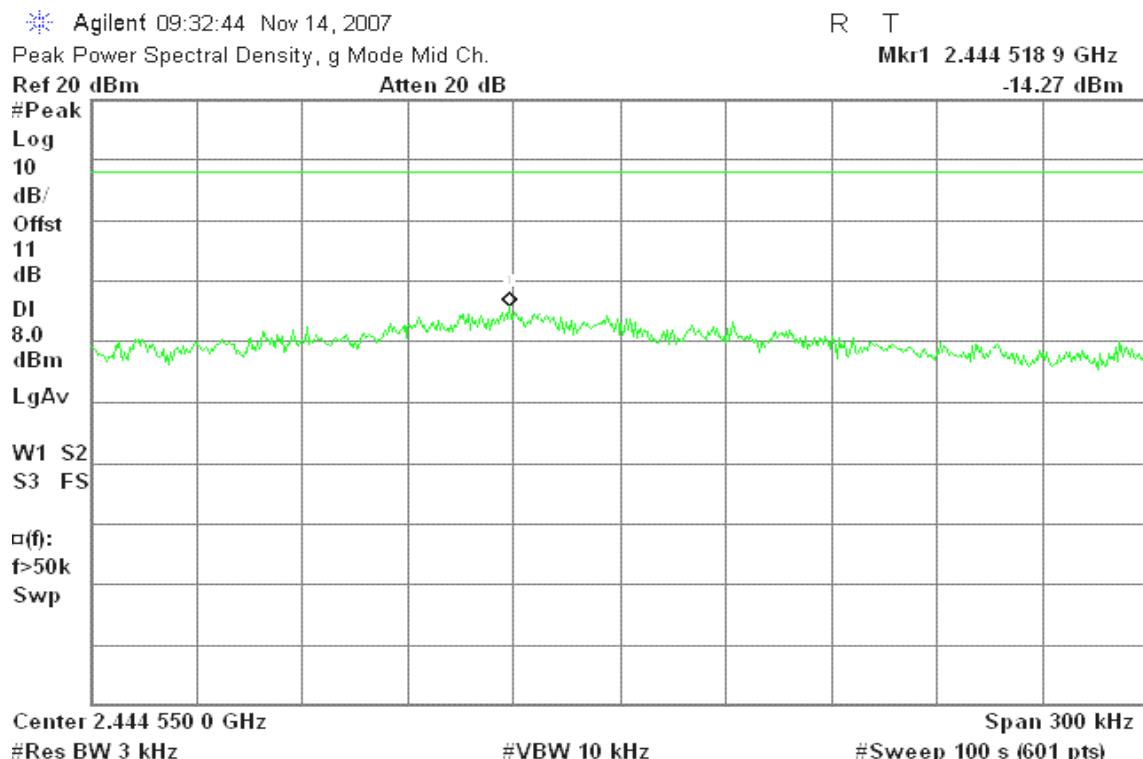


IEEE 802.11g mode / Chain 2

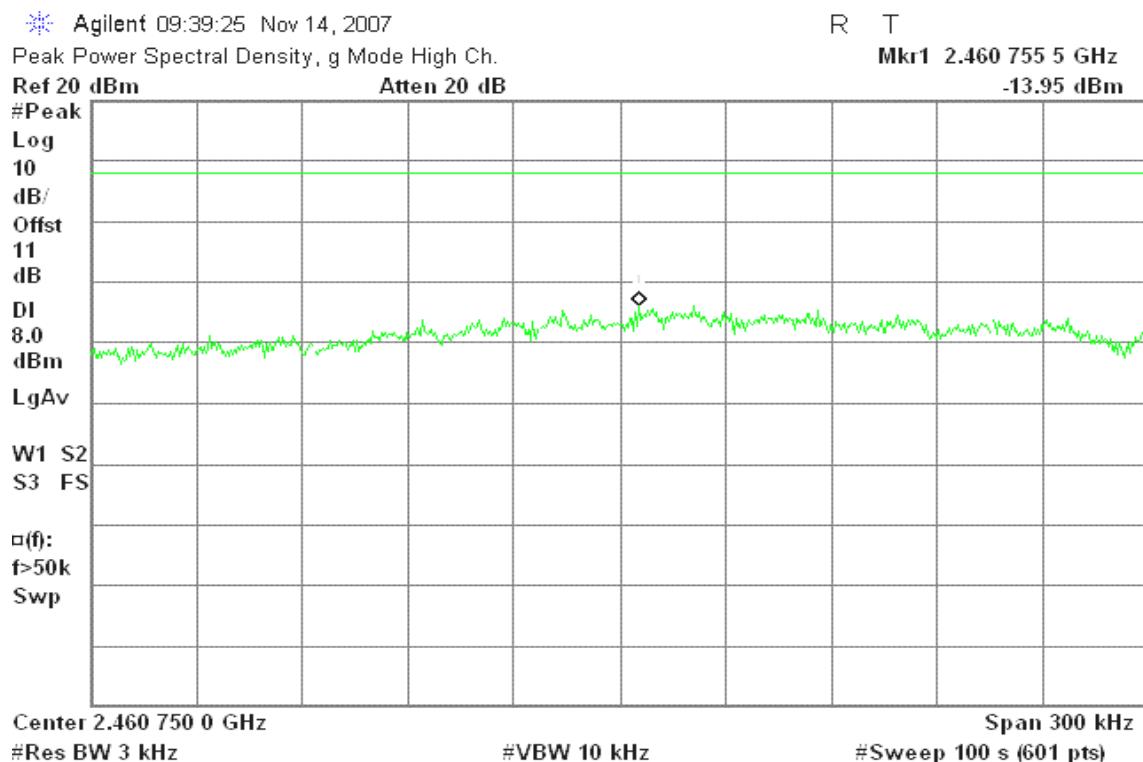
PPSD (CH Low)

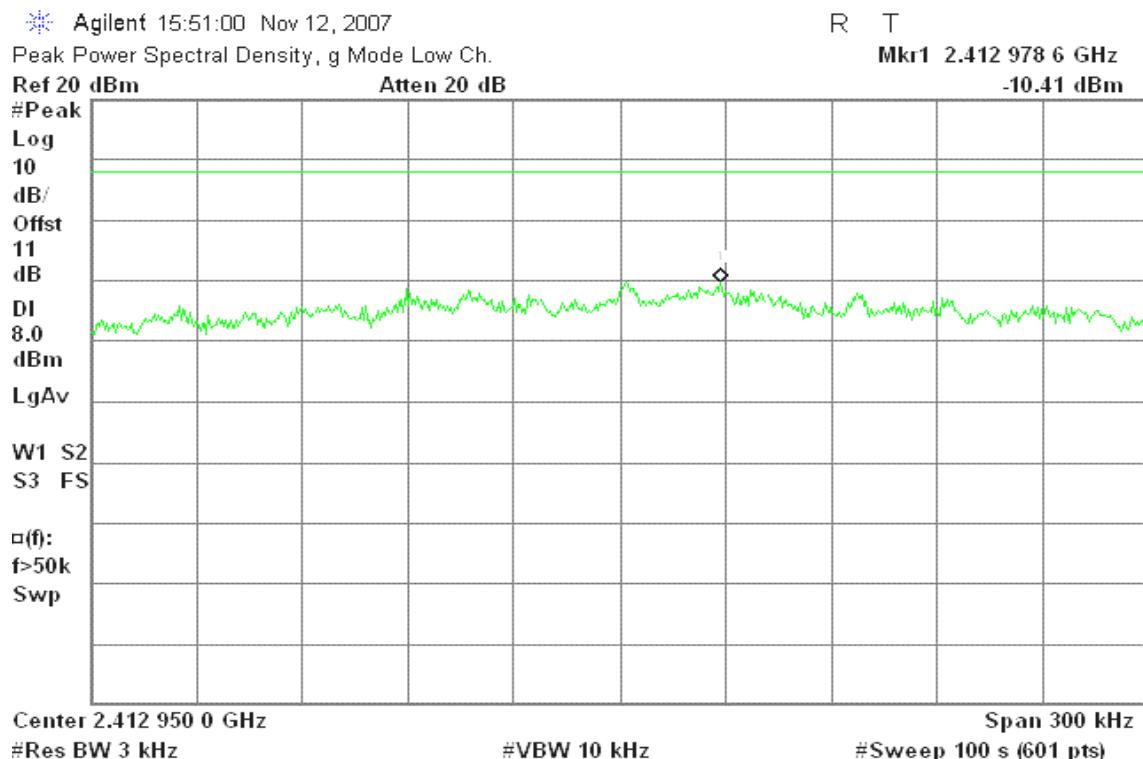
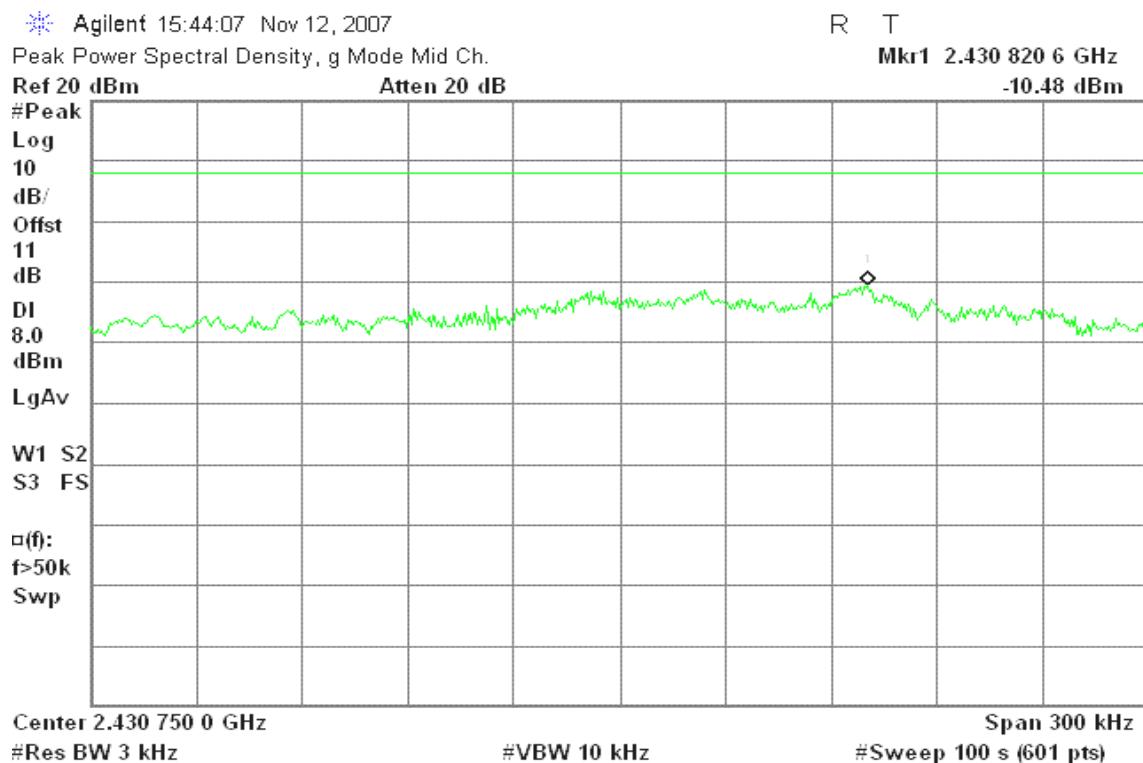


PPSD (CH Mid)

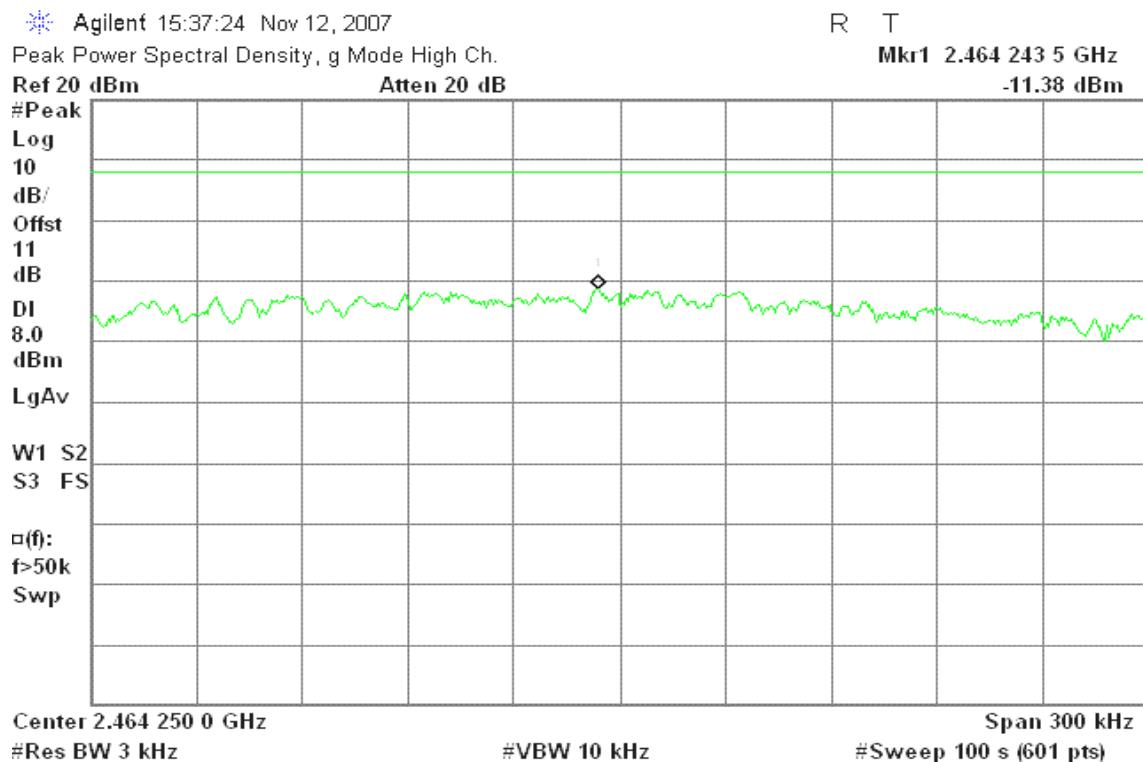


PPSD (CH High)



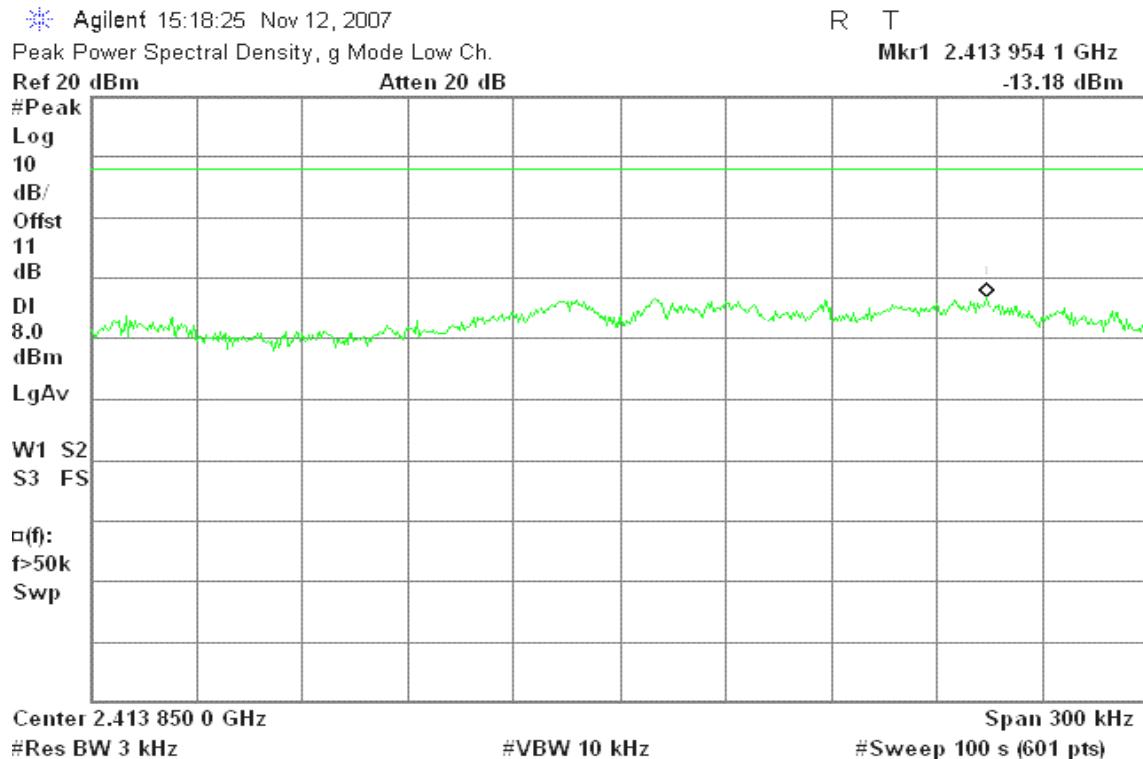
draft 802.11n Standard-20 MHz Channel mode / Chain 0**PPSD (CH Low)****PPSD (CH Mid)**

PPSD (CH High)

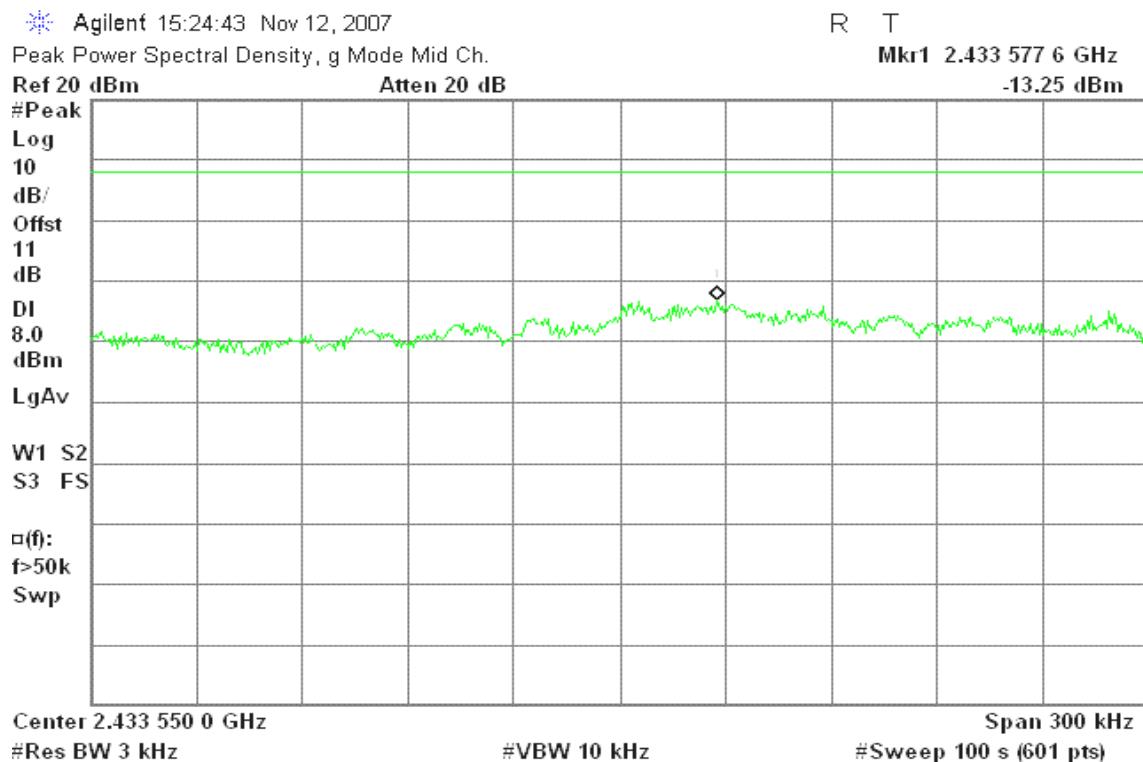


draft 802.11n Standard-20 MHz Channel mode / Chain 2

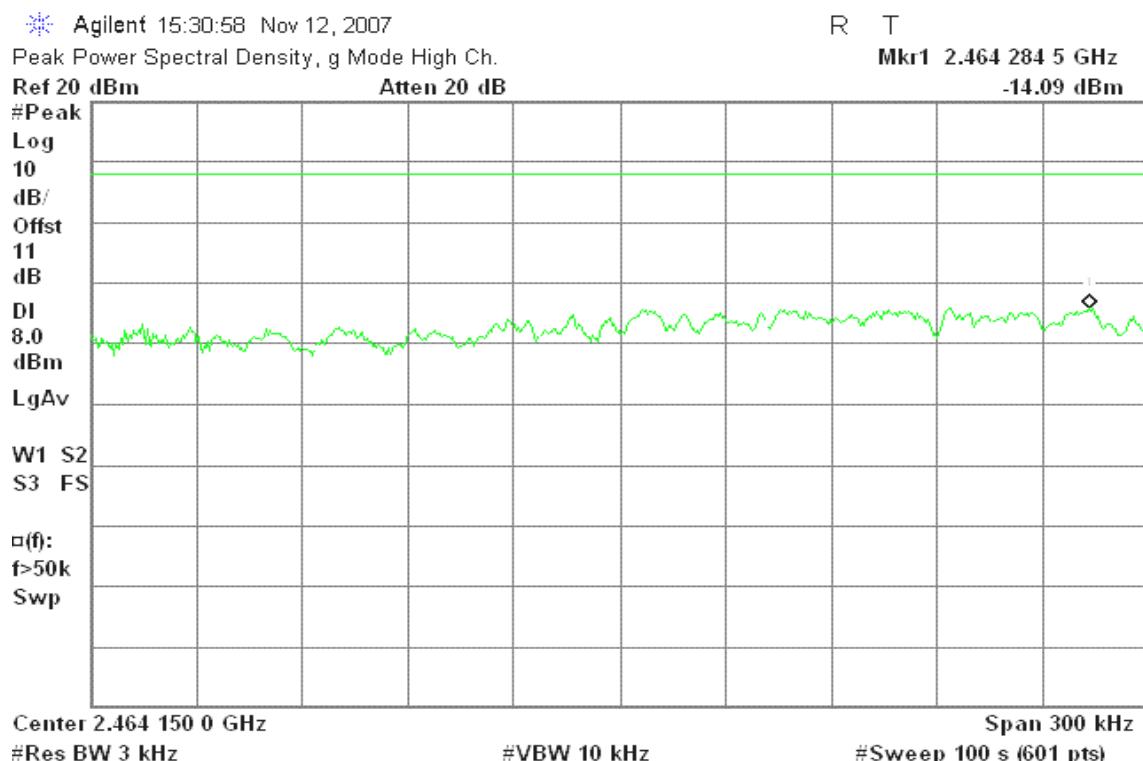
PPSD (CH Low)

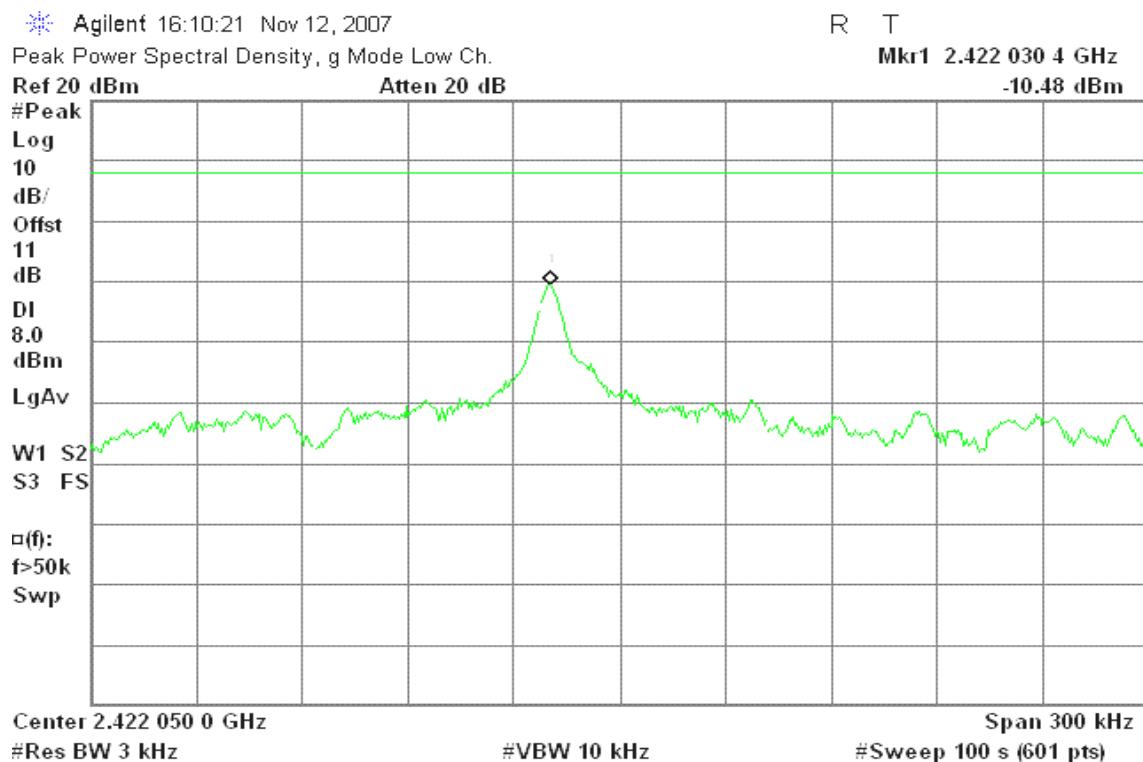
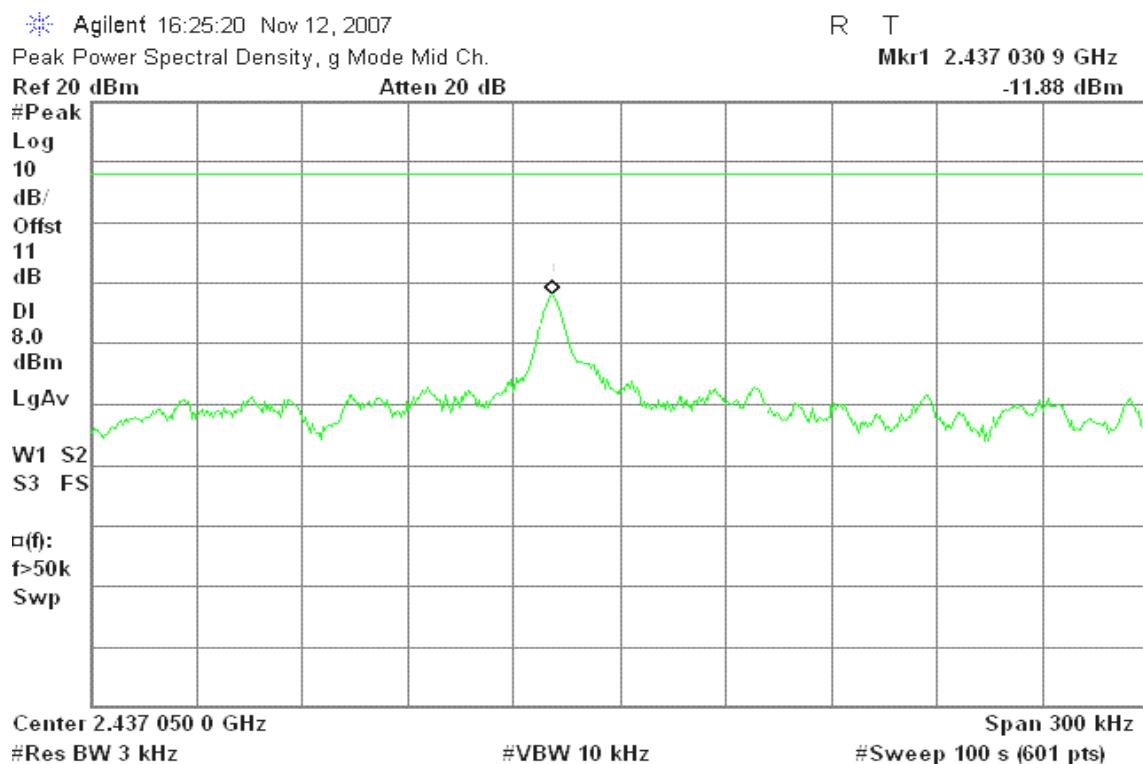


PPSD (CH Mid)

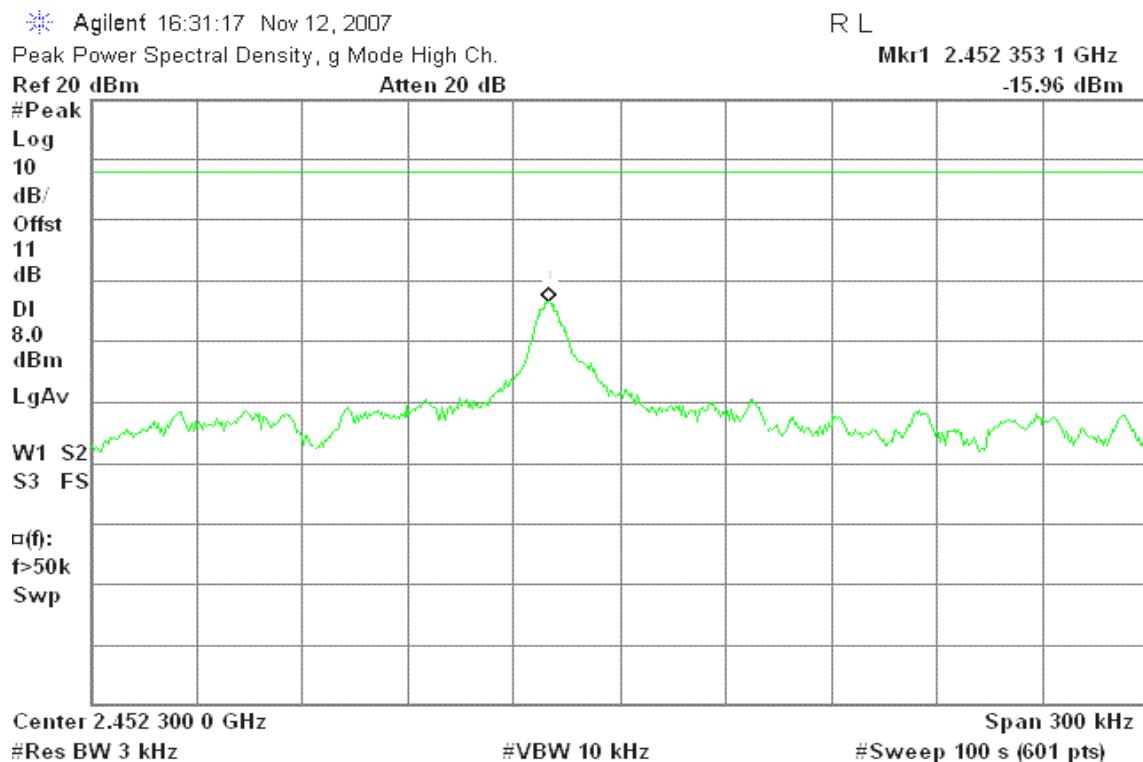


PPSD (CH High)



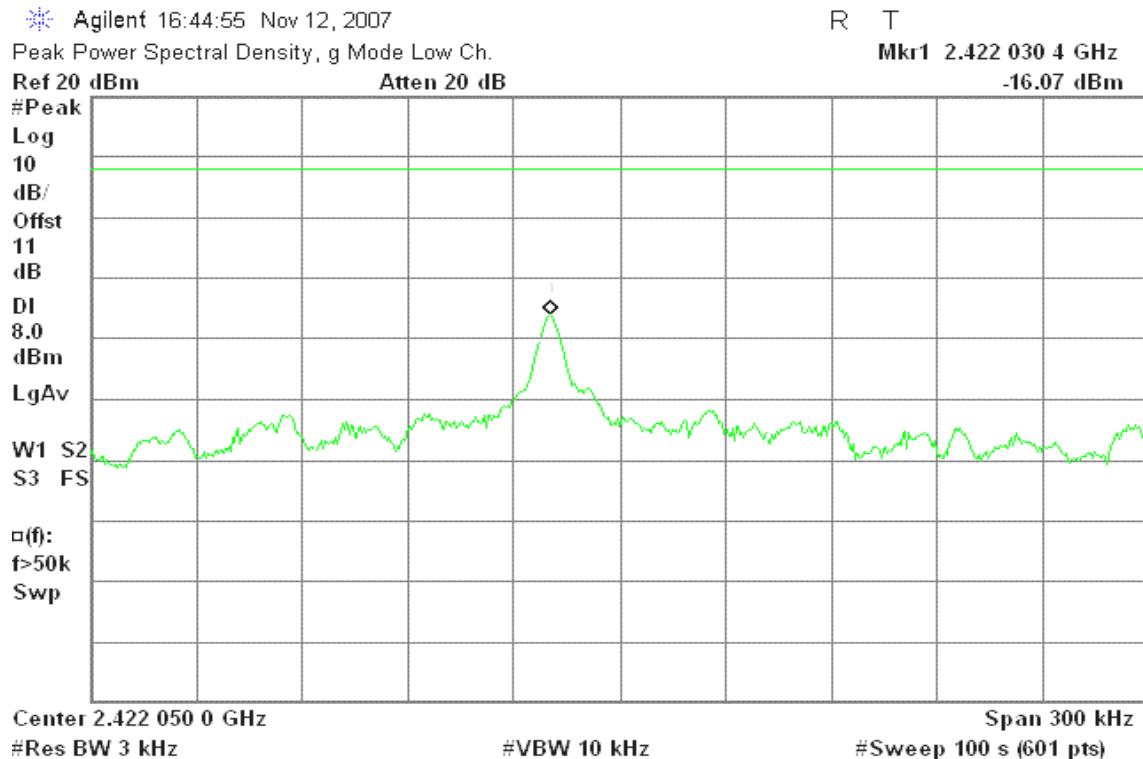
draft 802.11n Wide-40 MHz Channel mode / Chain 0**PPSD (CH Low)****PPSD (CH Mid)**

PPSD (CH High)

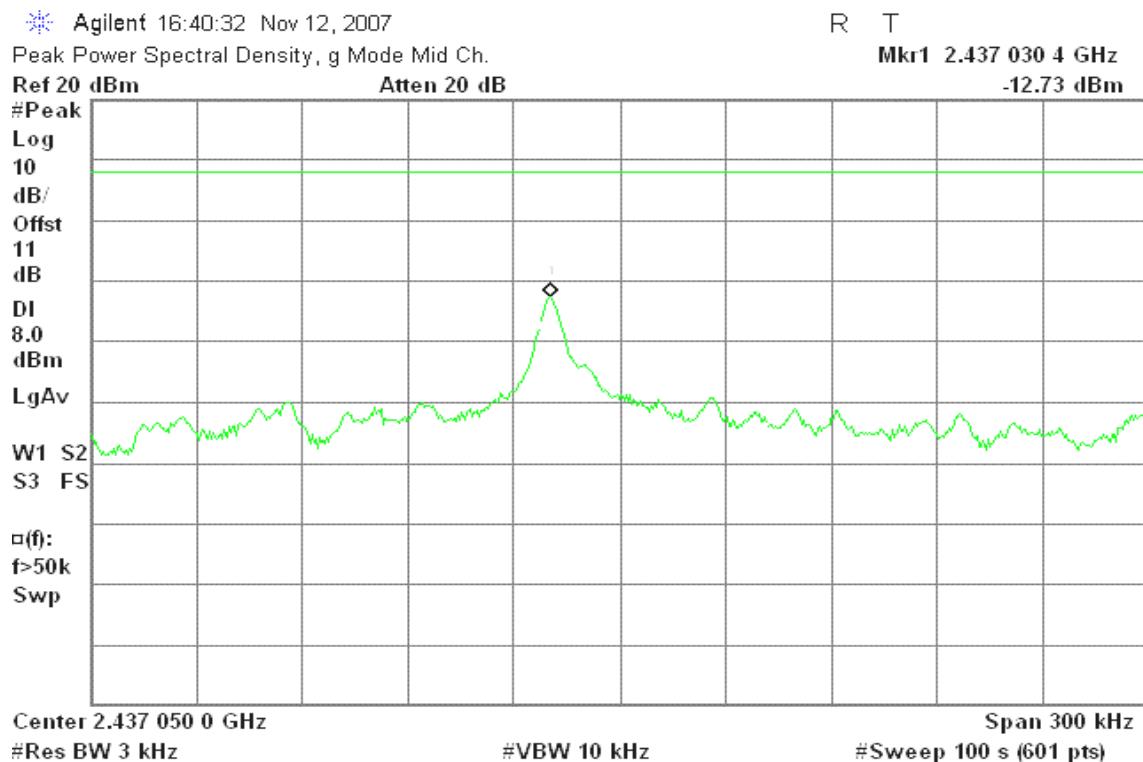


draft 802.11n Wide-40 MHz Channel mode / Chain 2

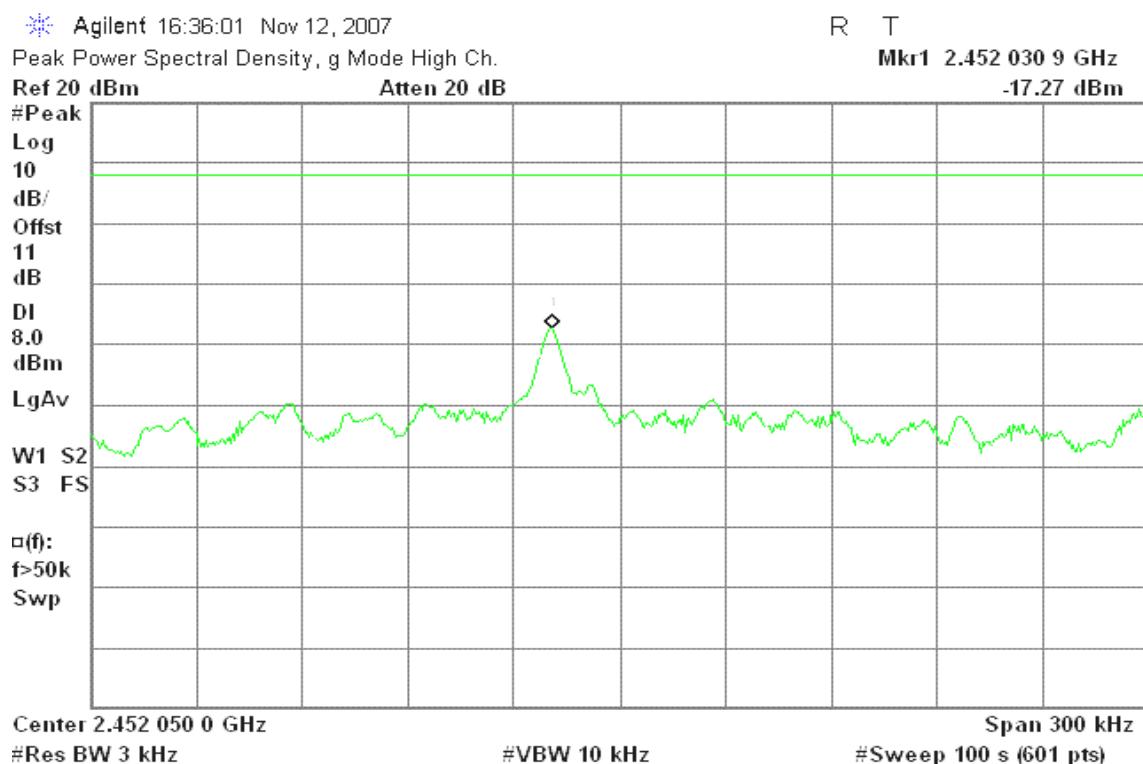
PPSD (CH Low)

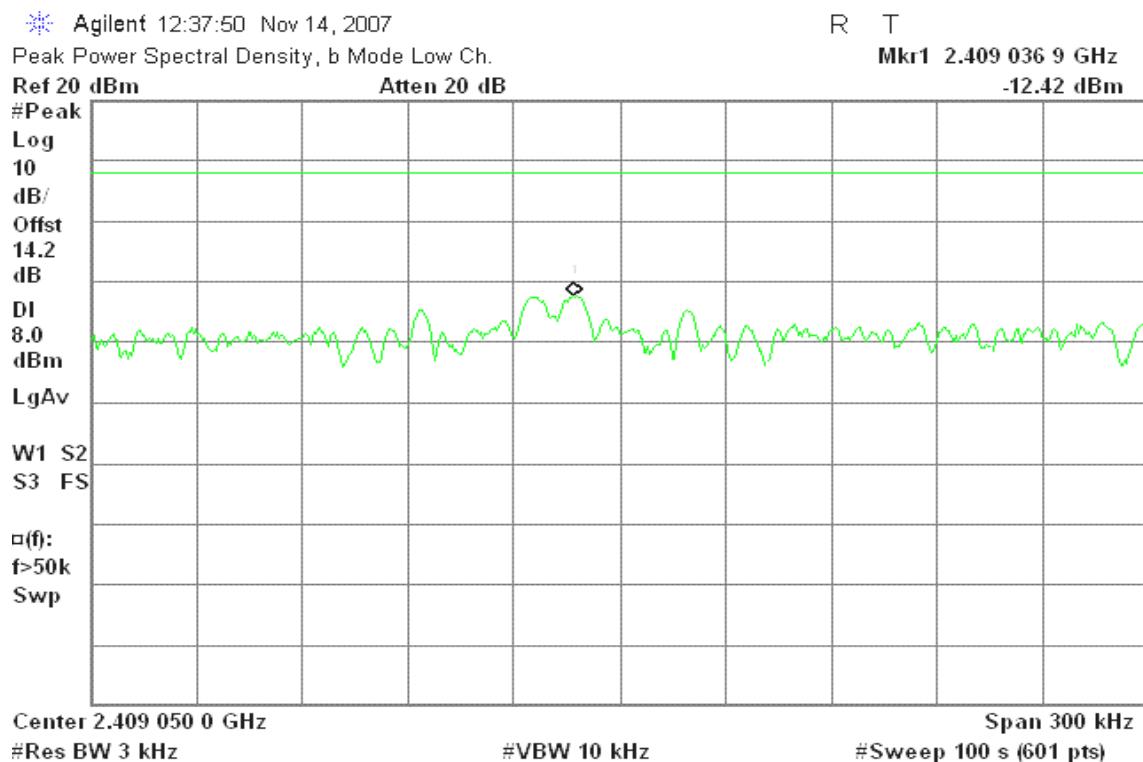
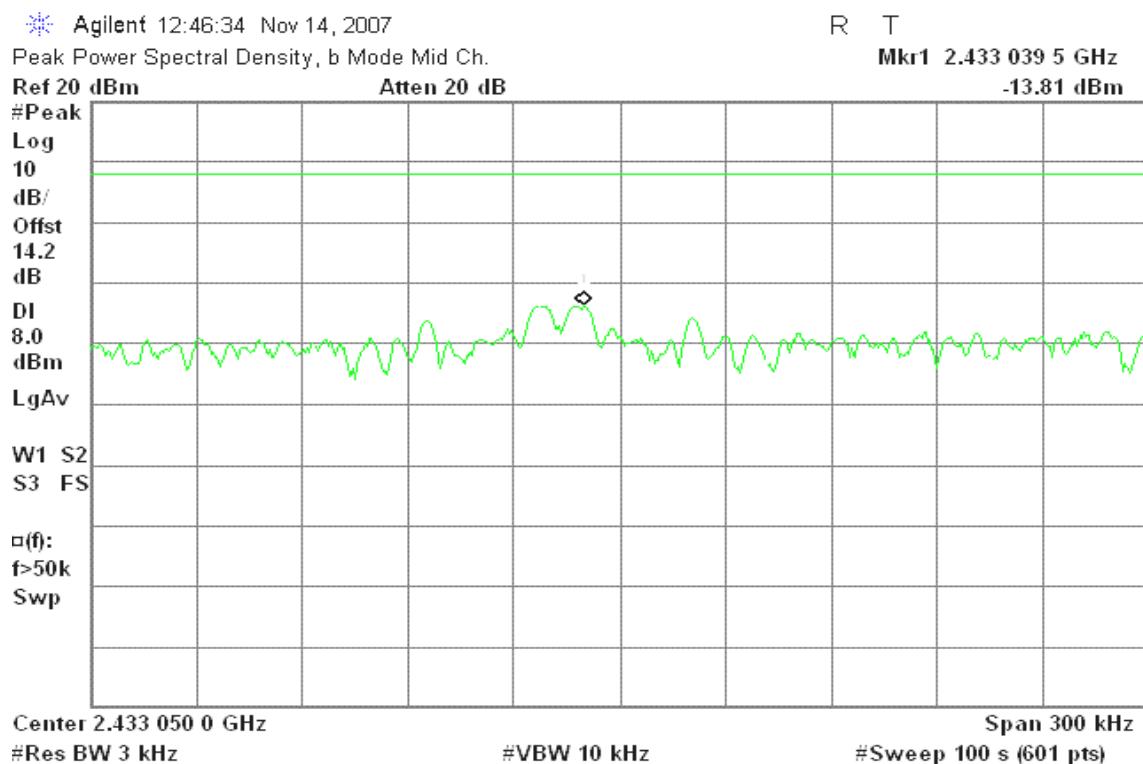


PPSD (CH Mid)

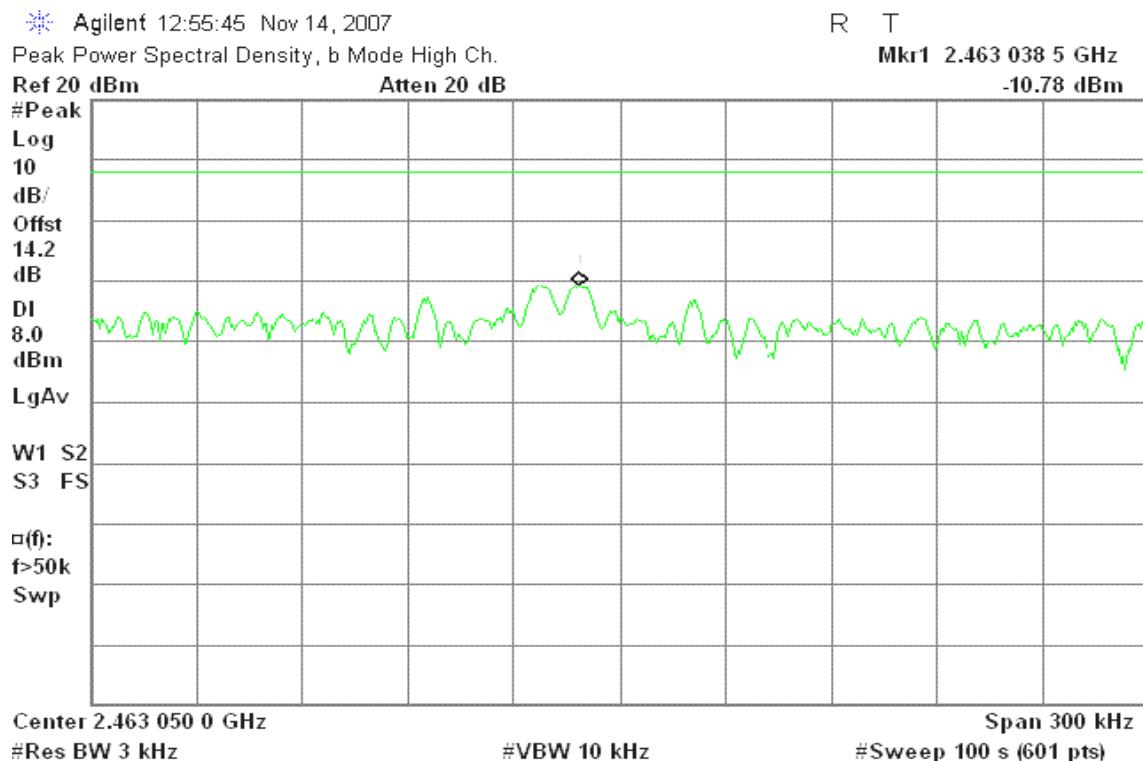


PPSD (CH High)



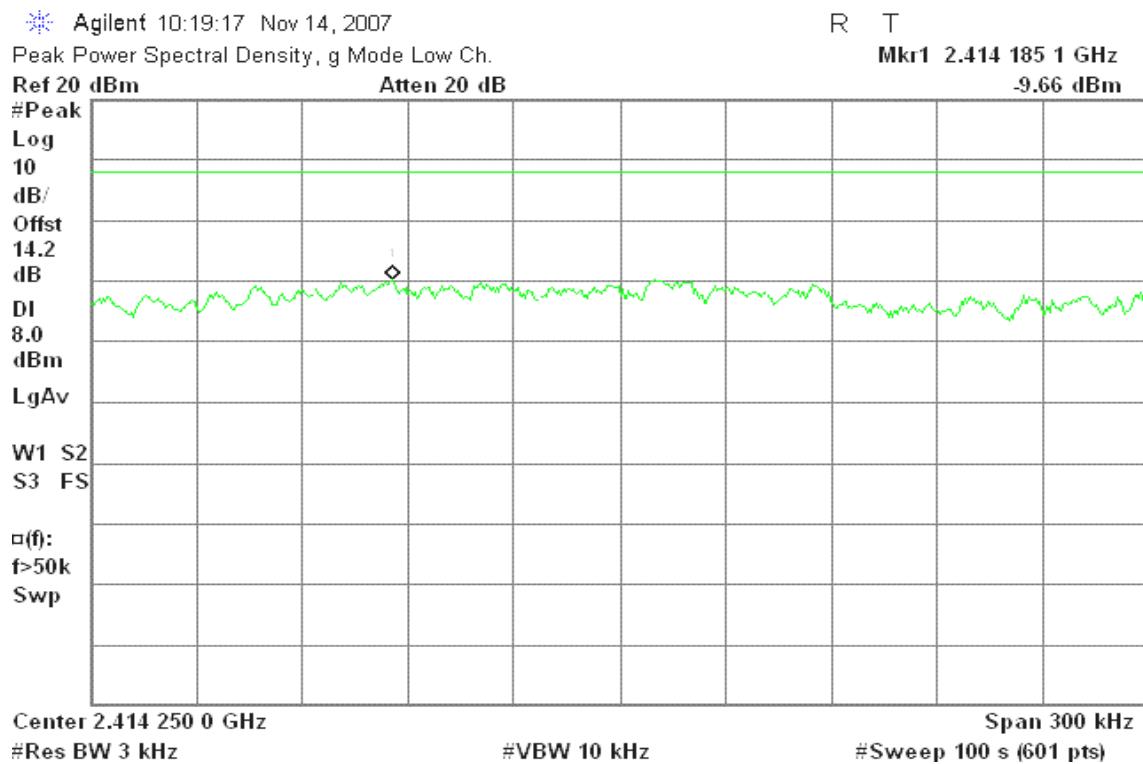
IEEE 802.11b mode with combiner**PPSD (CH Low)****PPSD (CH Mid)**

PPSD (CH High)

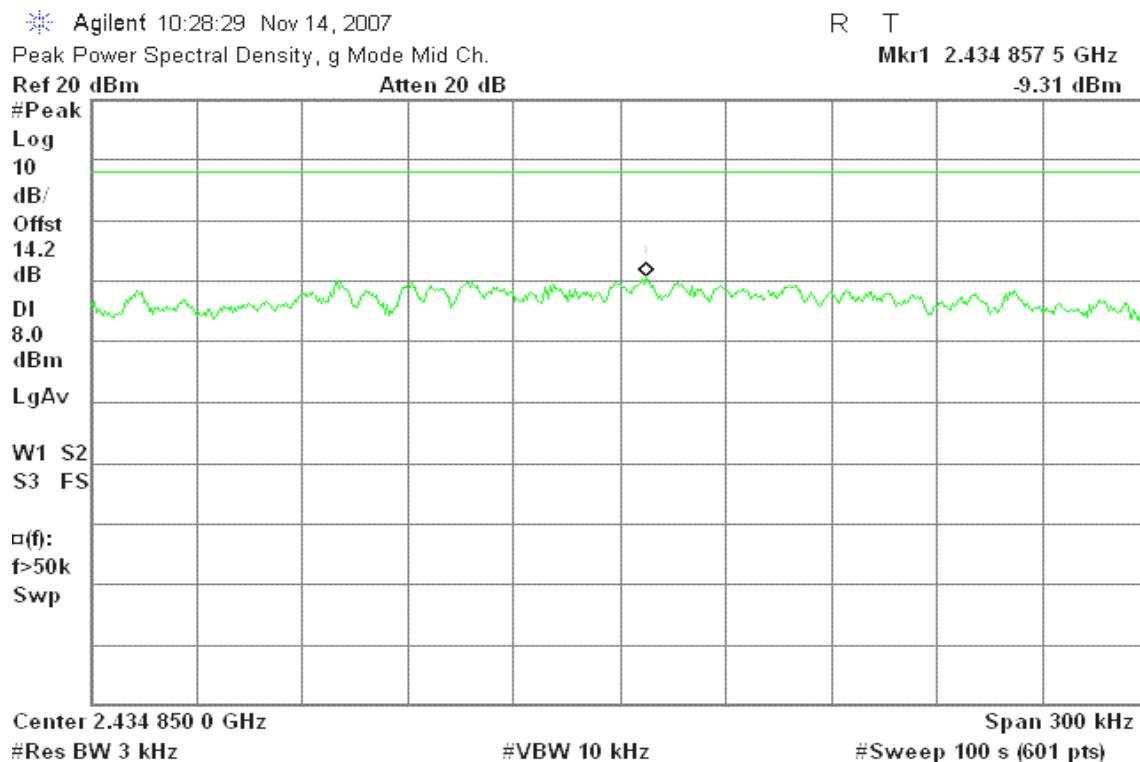


IEEE 802.11g mode with combiner

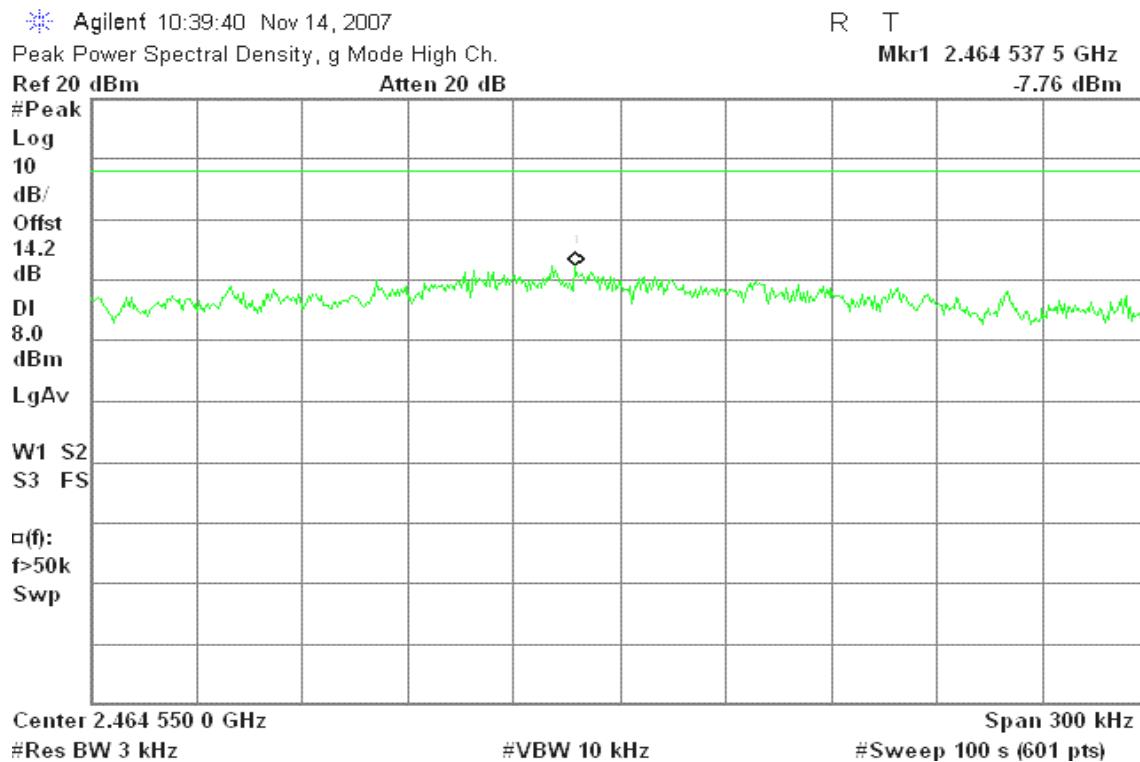
PPSD (CH Low)

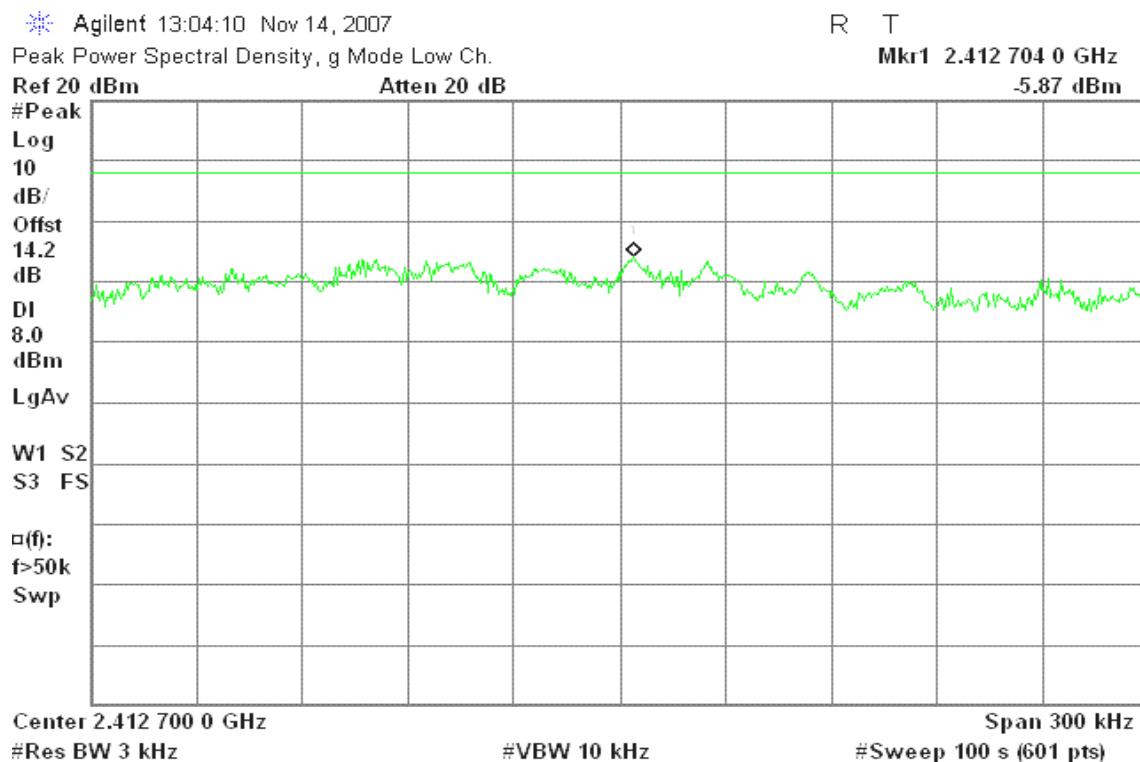
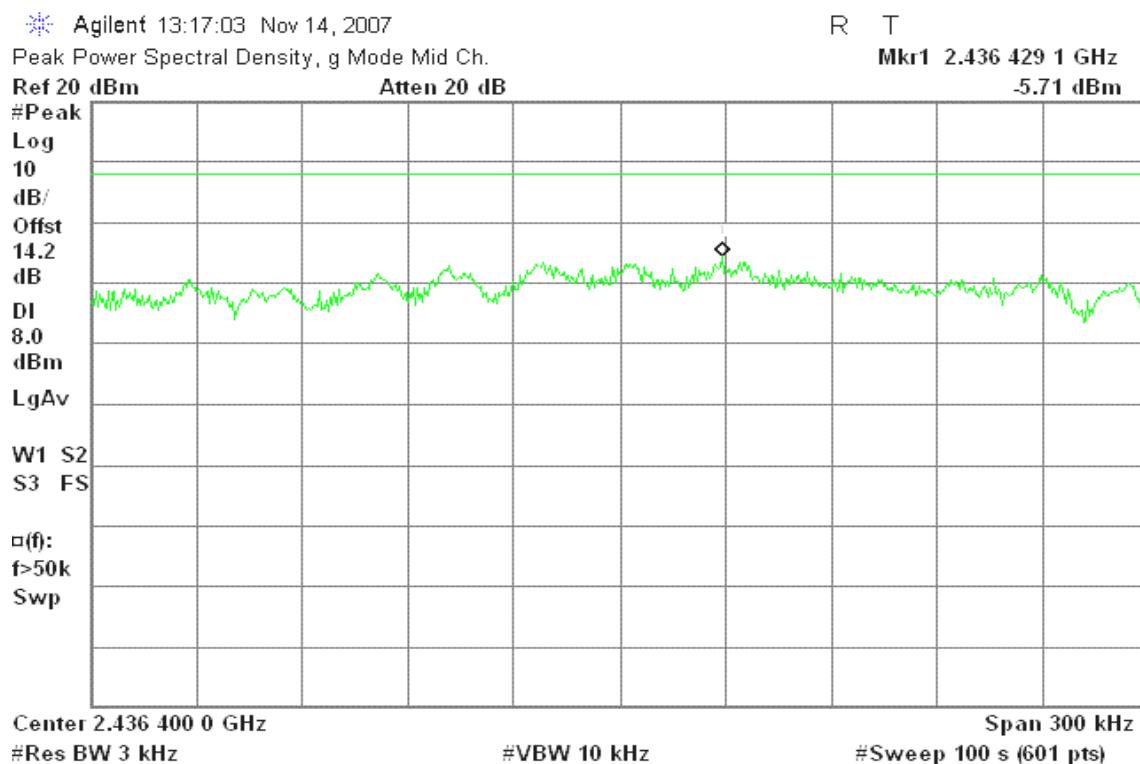


PPSD (CH Mid)

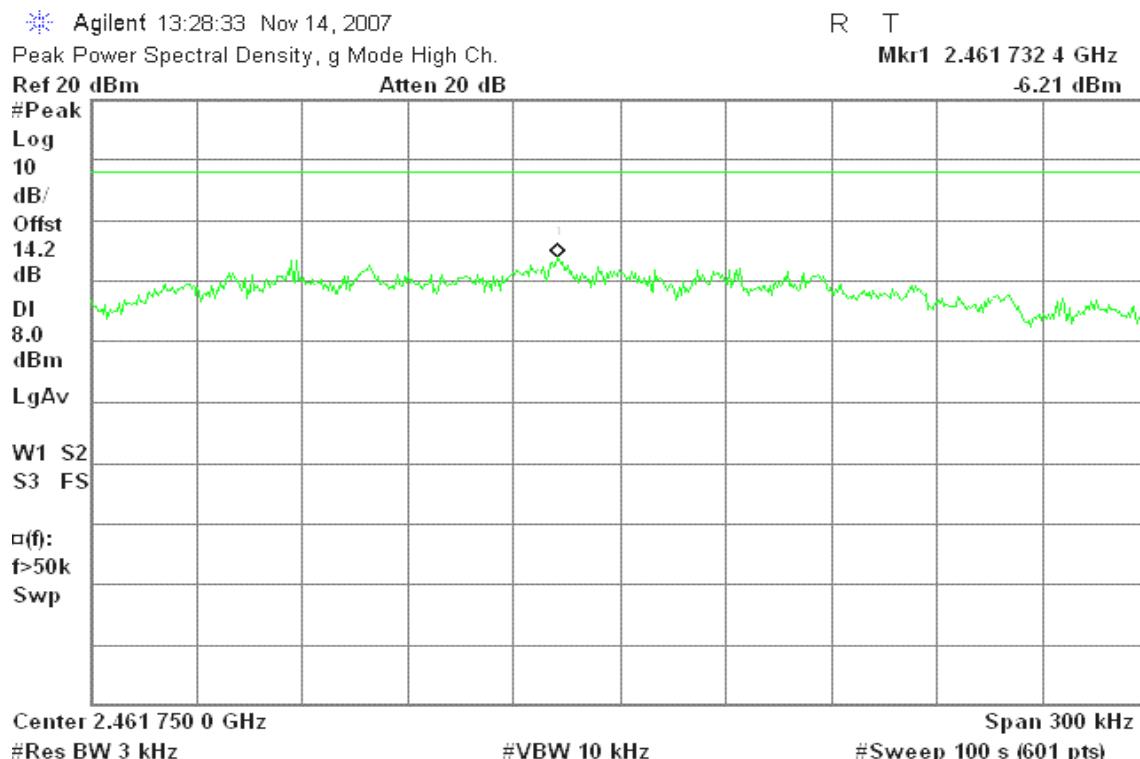


PPSD (CH High)



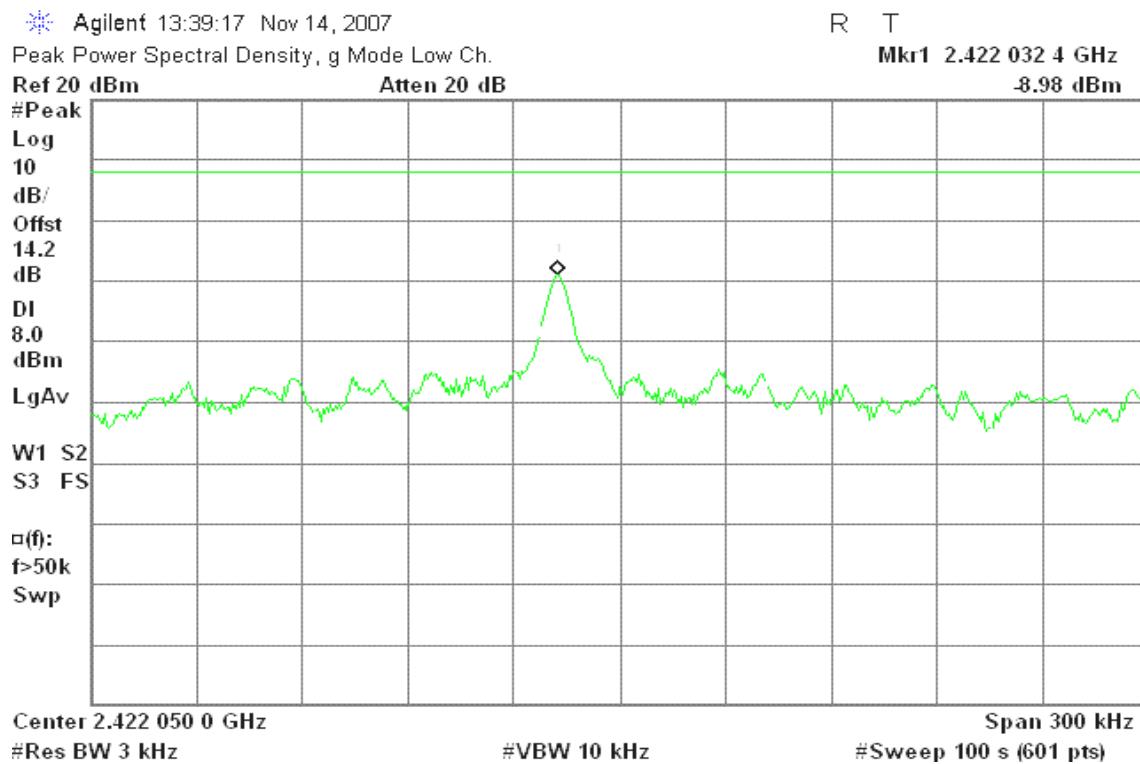
draft 802.11n Standard-20 MHz Channel mode with combiner**PPSD (CH Low)****PPSD (CH Mid)**

PPSD (CH High)

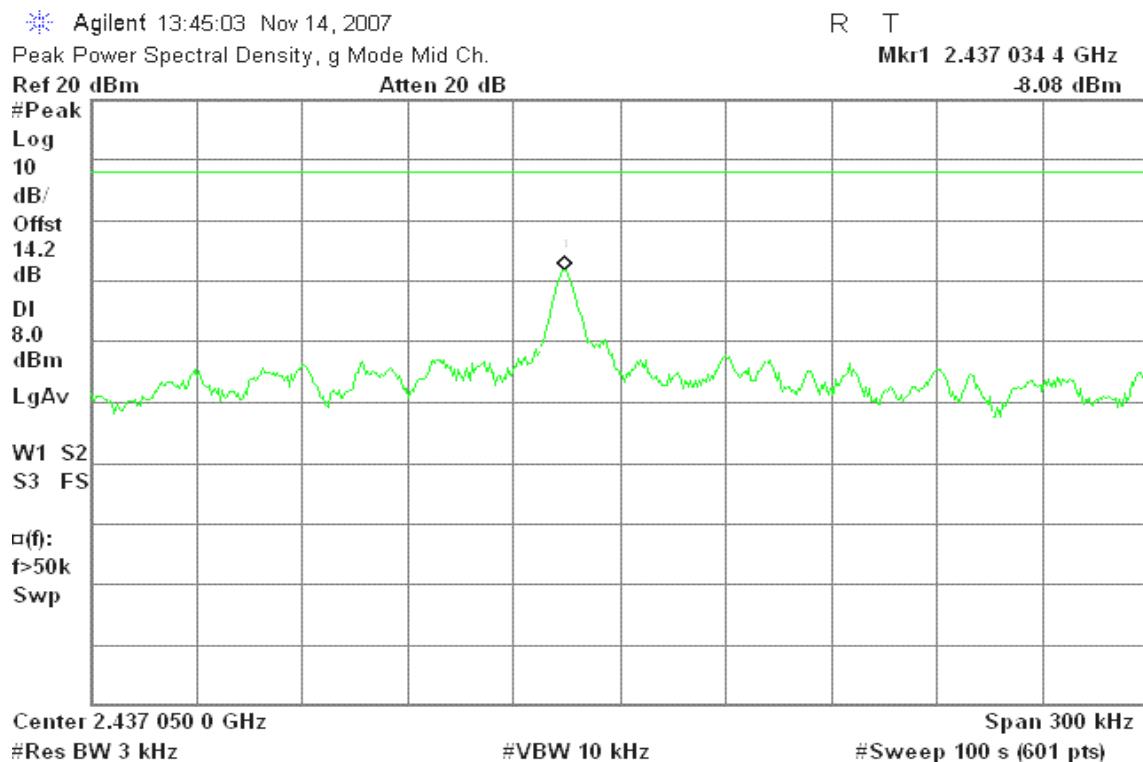


draft 802.11n Wide-40 MHz Channel mode with combiner

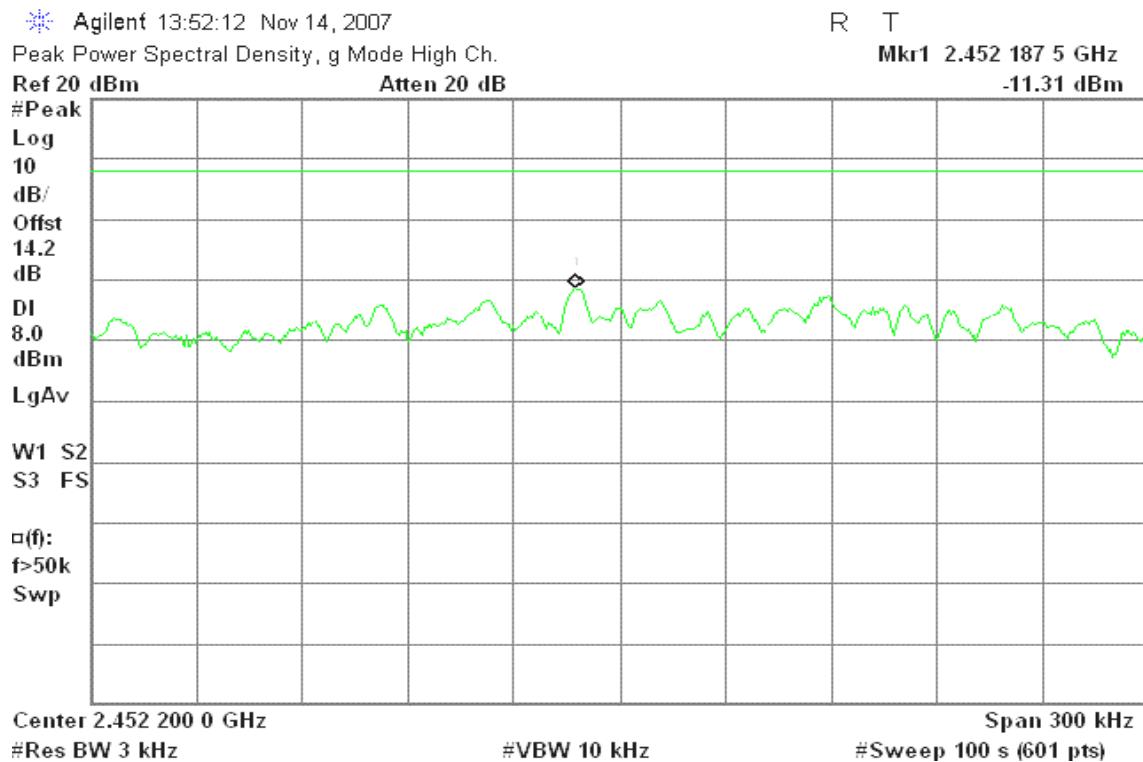
PPSD (CH Low)



PPSD (CH Mid)



PPSD (CH High)



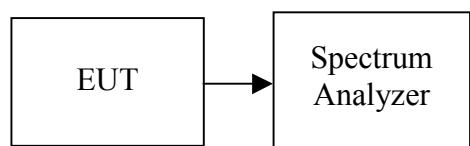
7.6 SPURIOUS EMISSIONS

7.6.1 Conducted Measurement

LIMIT

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

Test Configuration



TEST PROCEDURE

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

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 100 kHz.

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

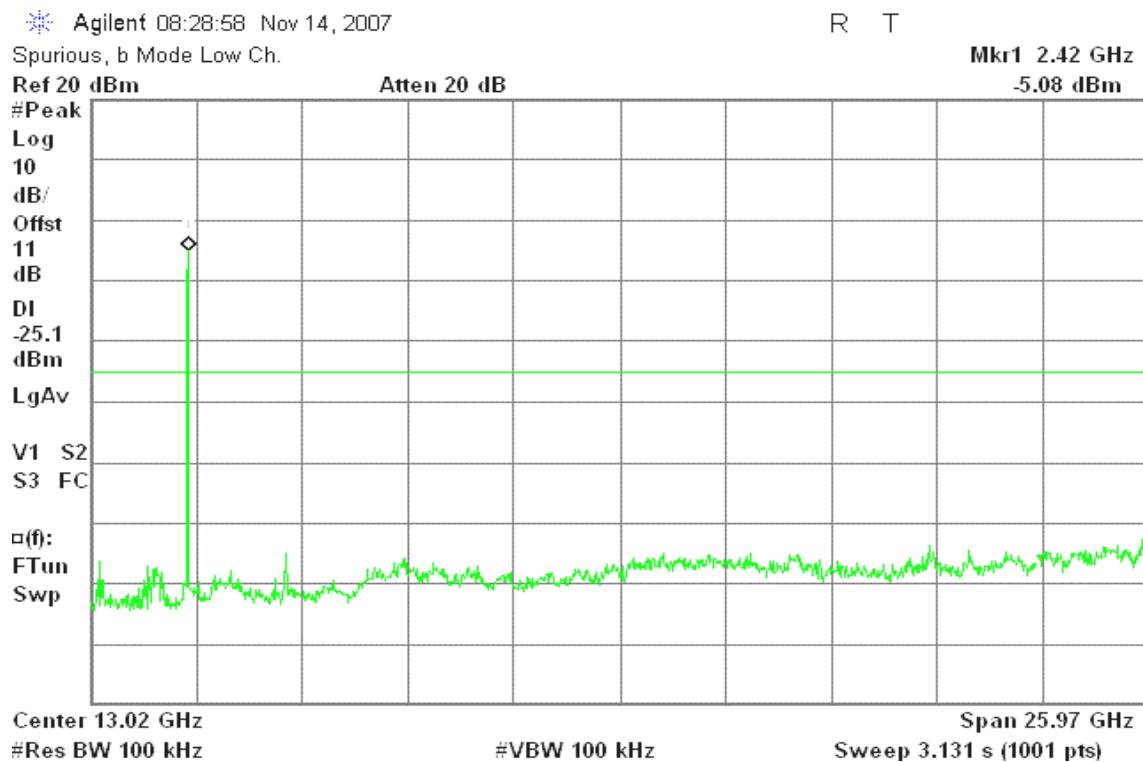
TEST RESULTS

No non-compliance noted.

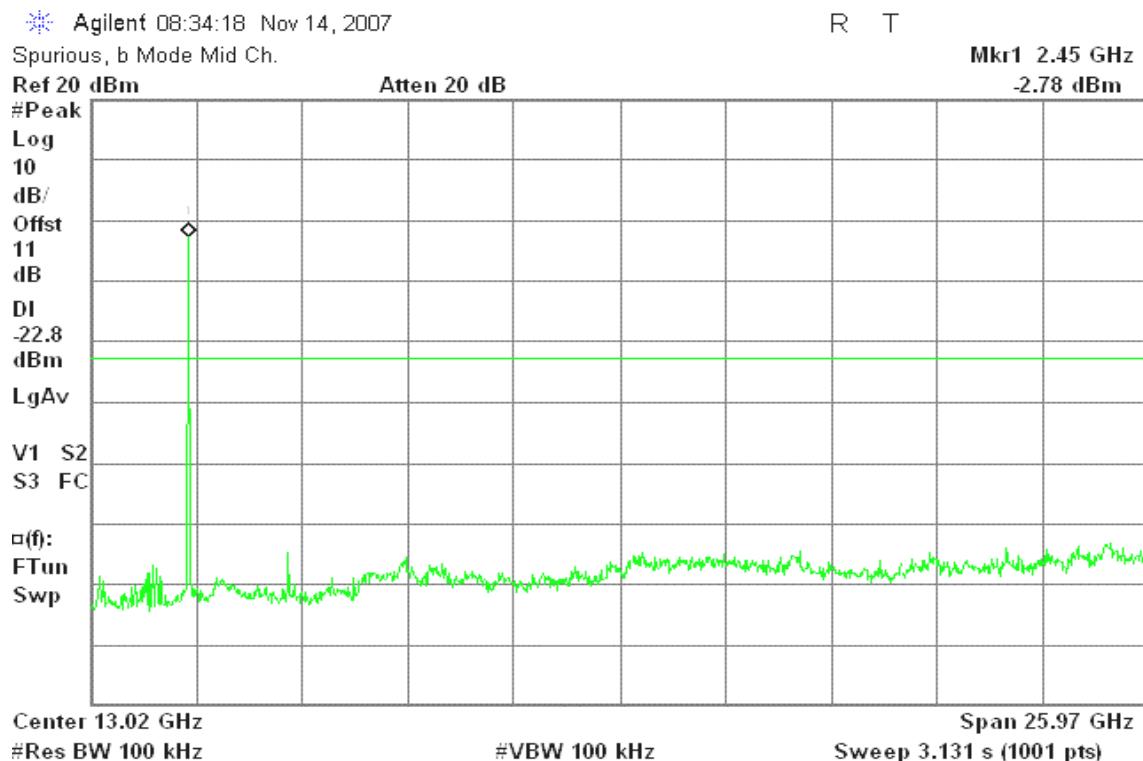
Test Plot

IEEE 802.11b mode / Chain 0

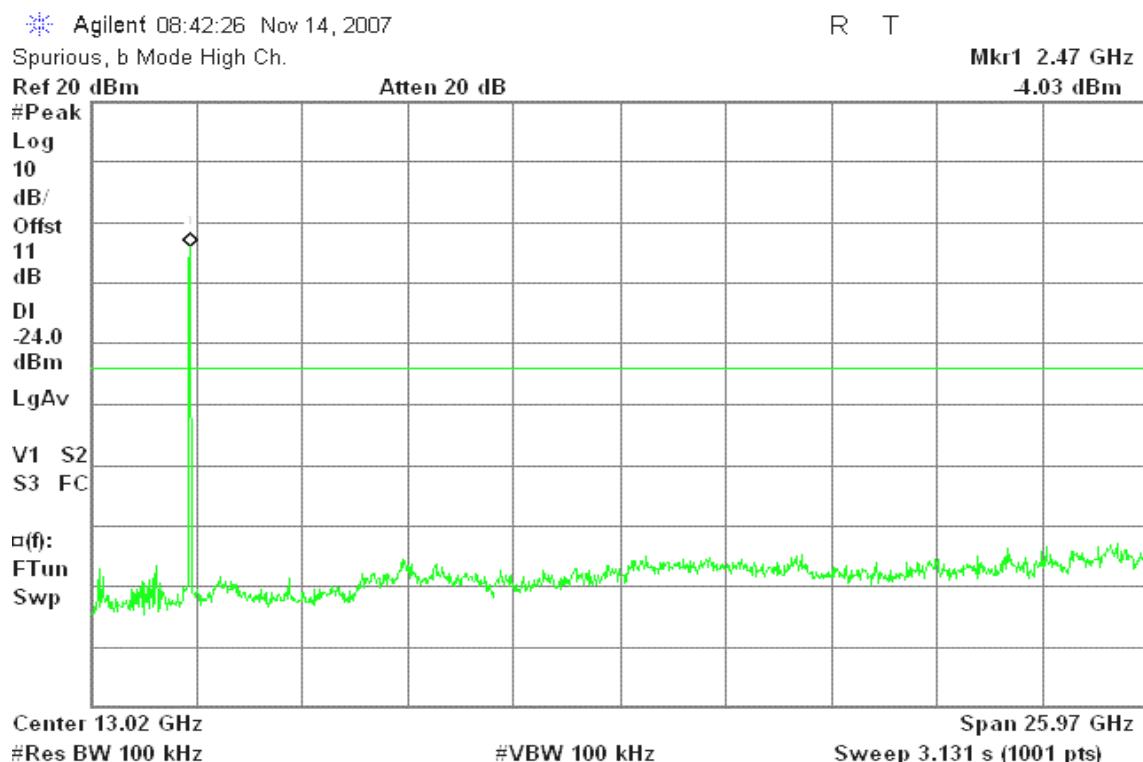
CH Low



CH Mid

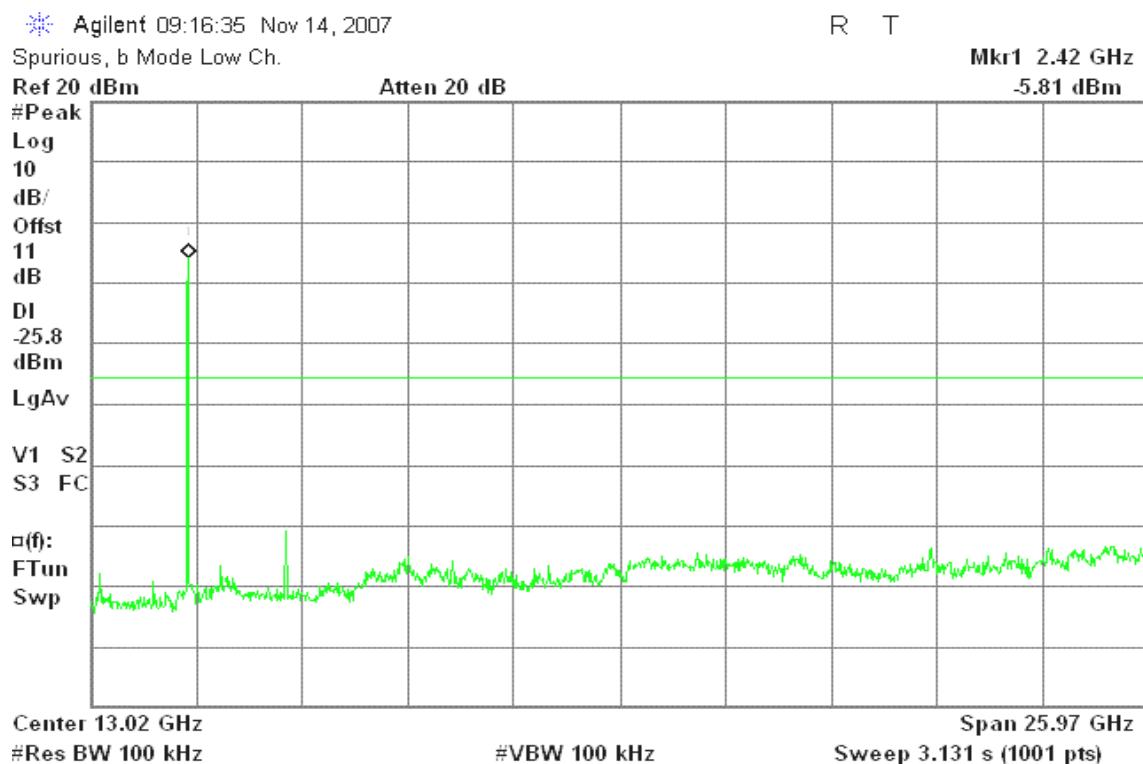


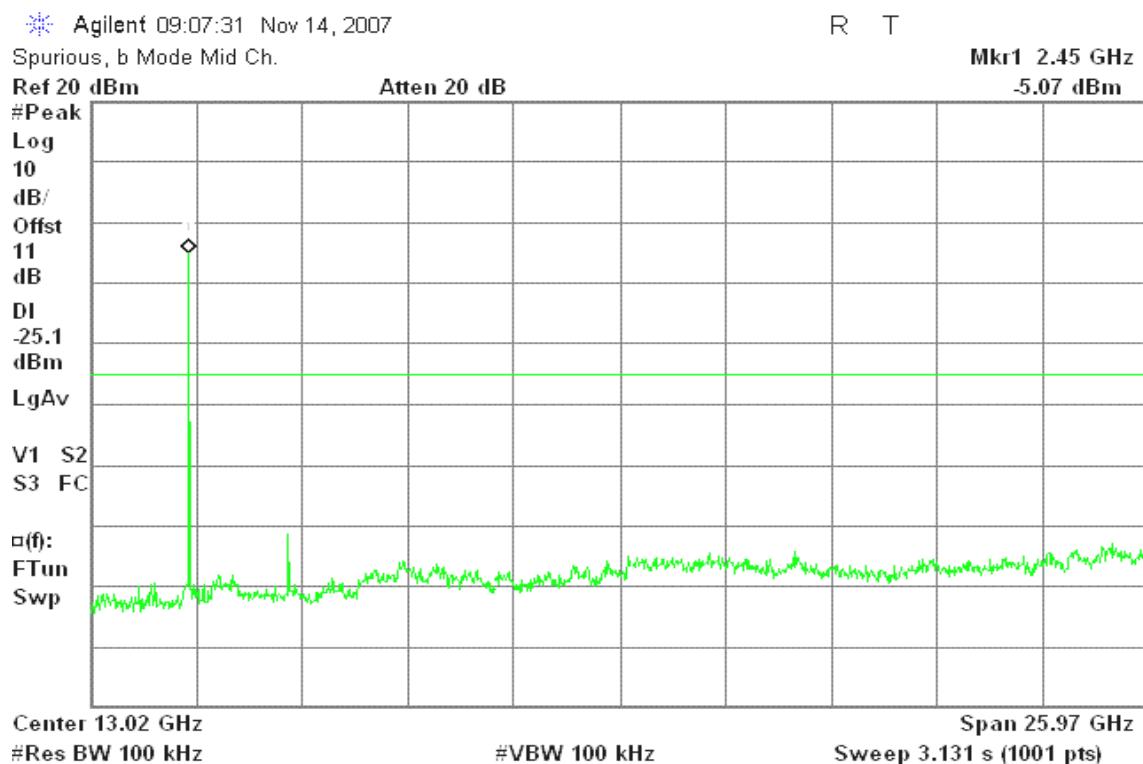
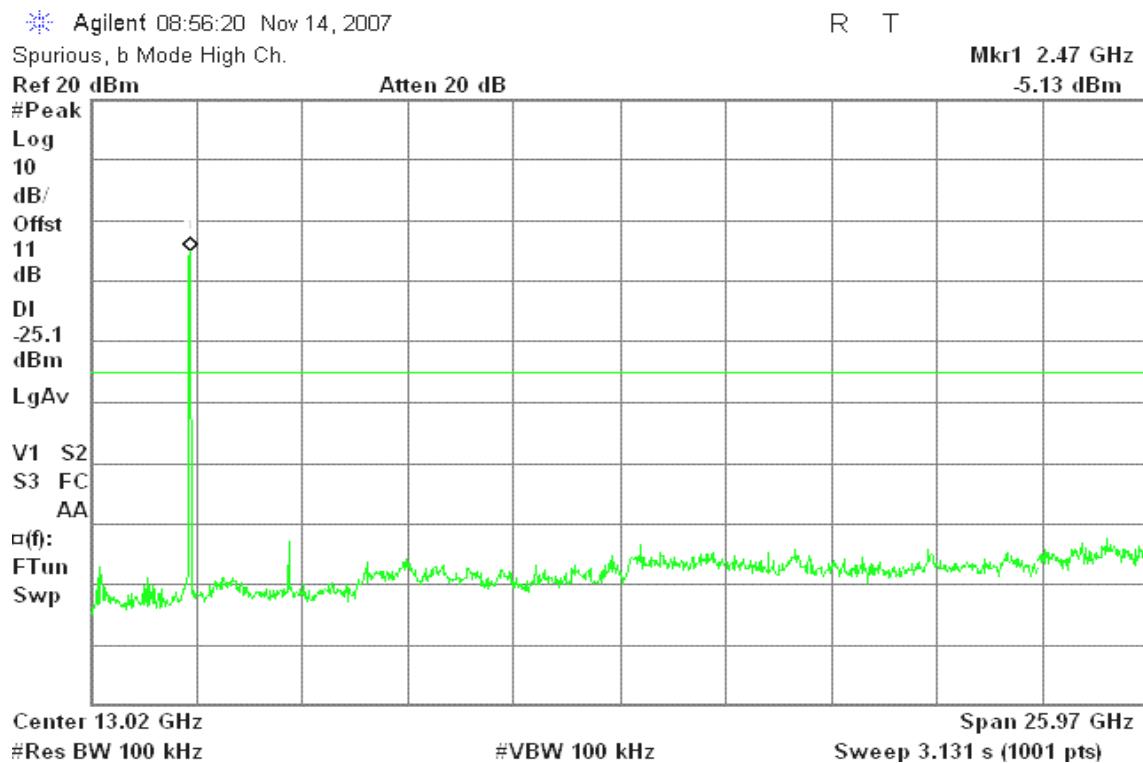
CH High



IEEE 802.11b mode / Chain 2

CH Low



CH Mid**CH High**

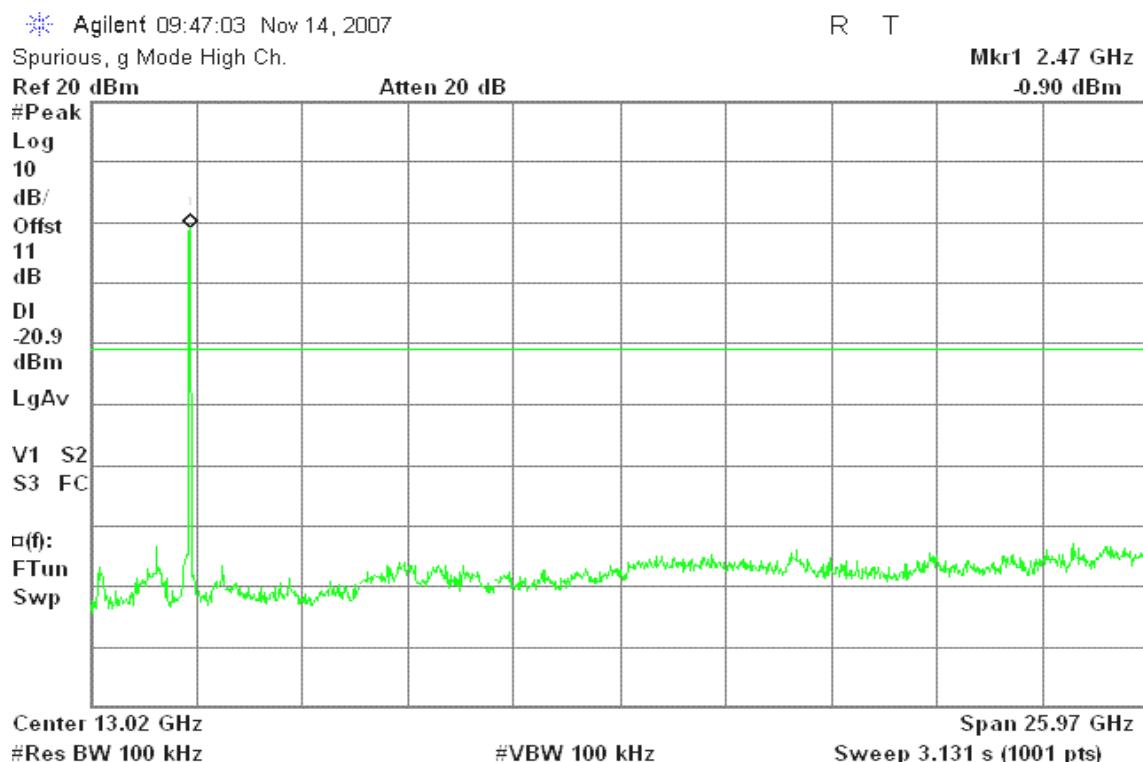
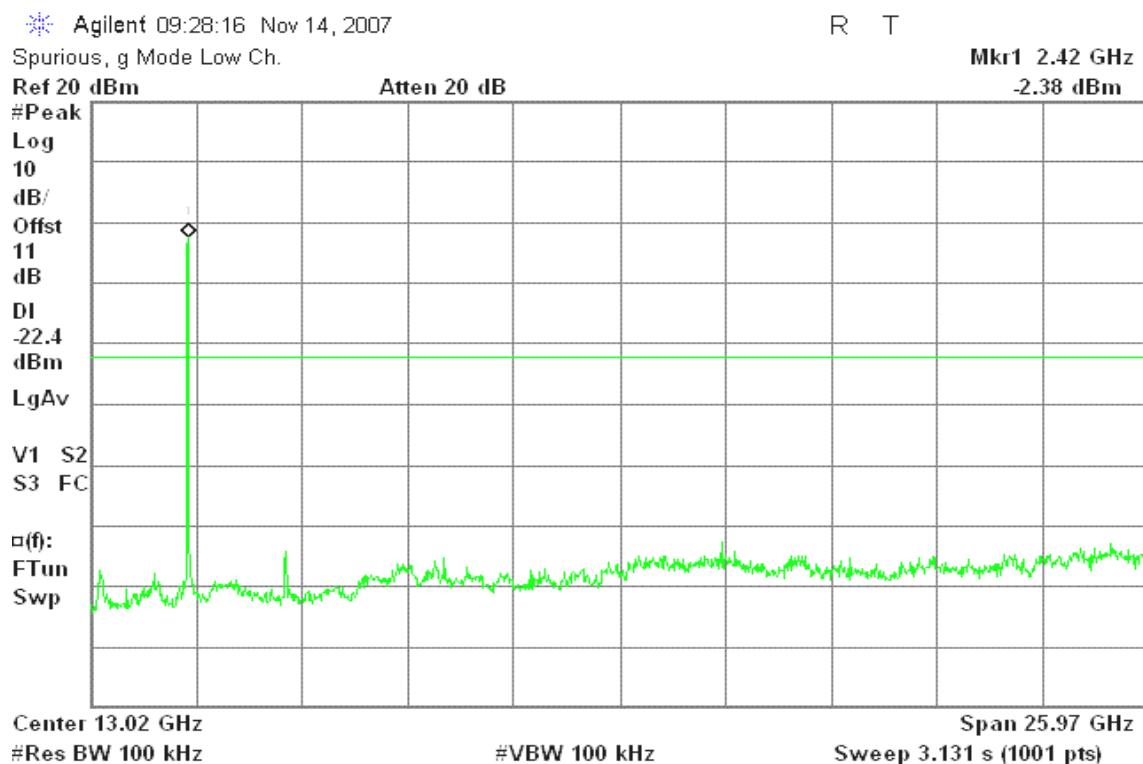
IEEE 802.11g mode / Chain 0

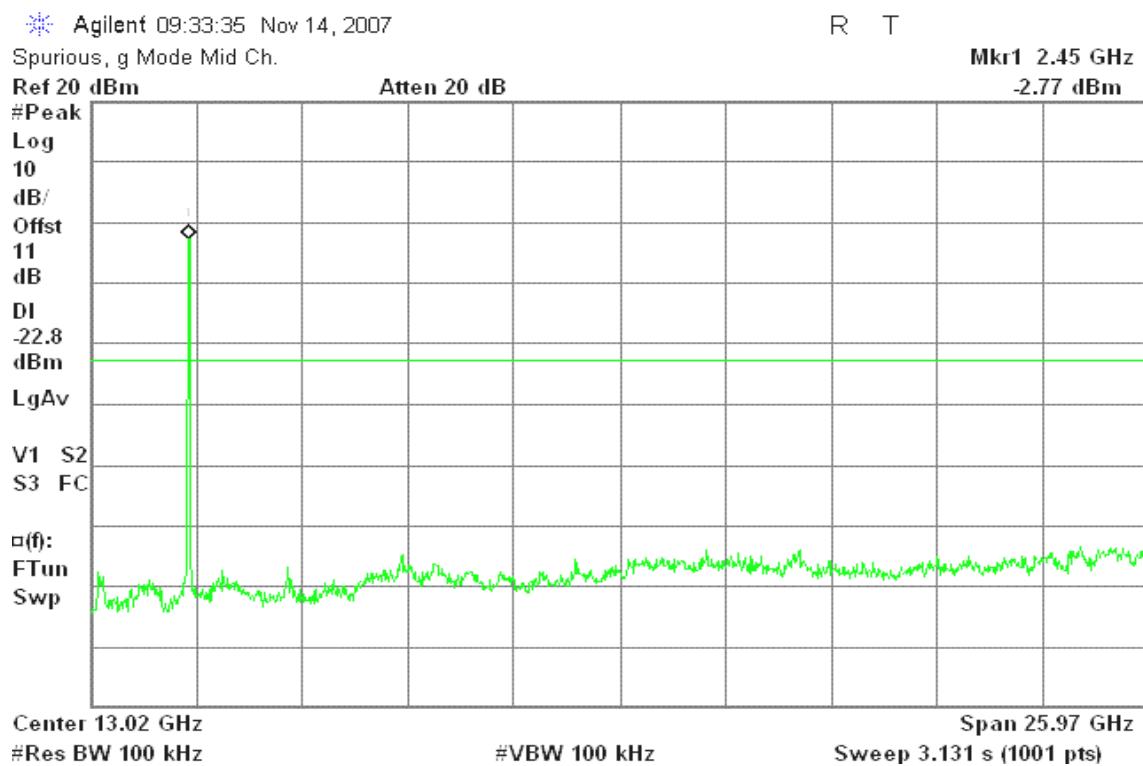
CH Low

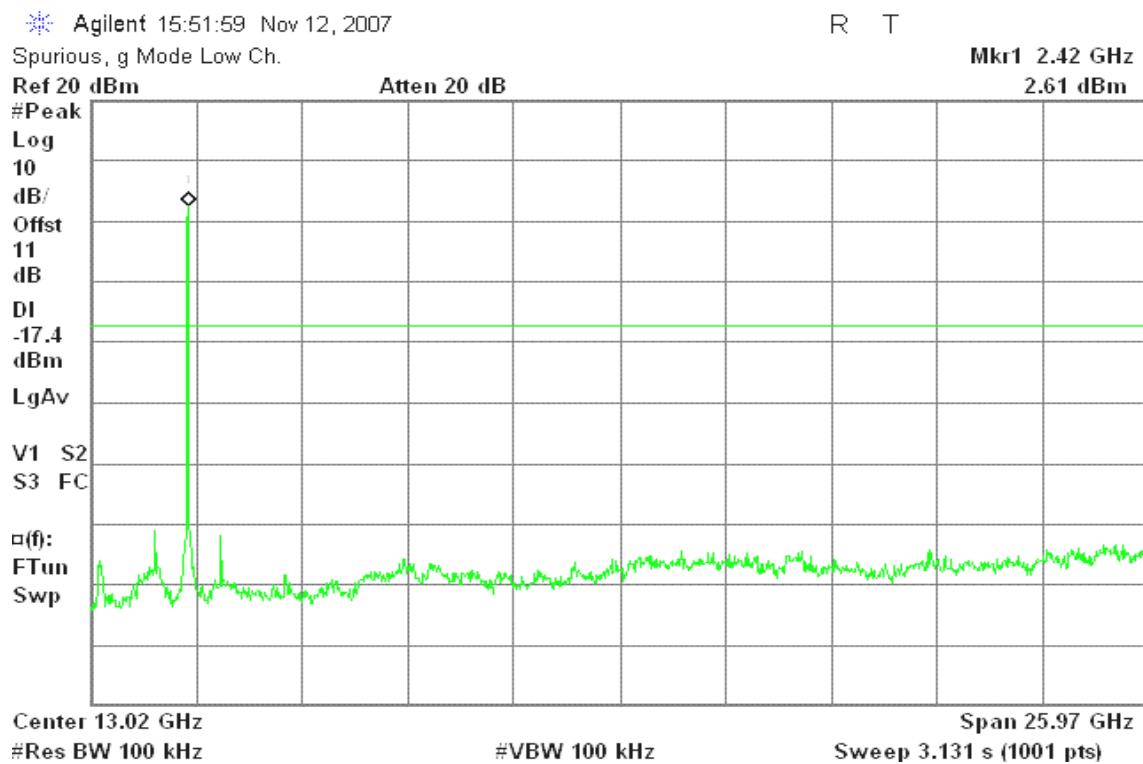
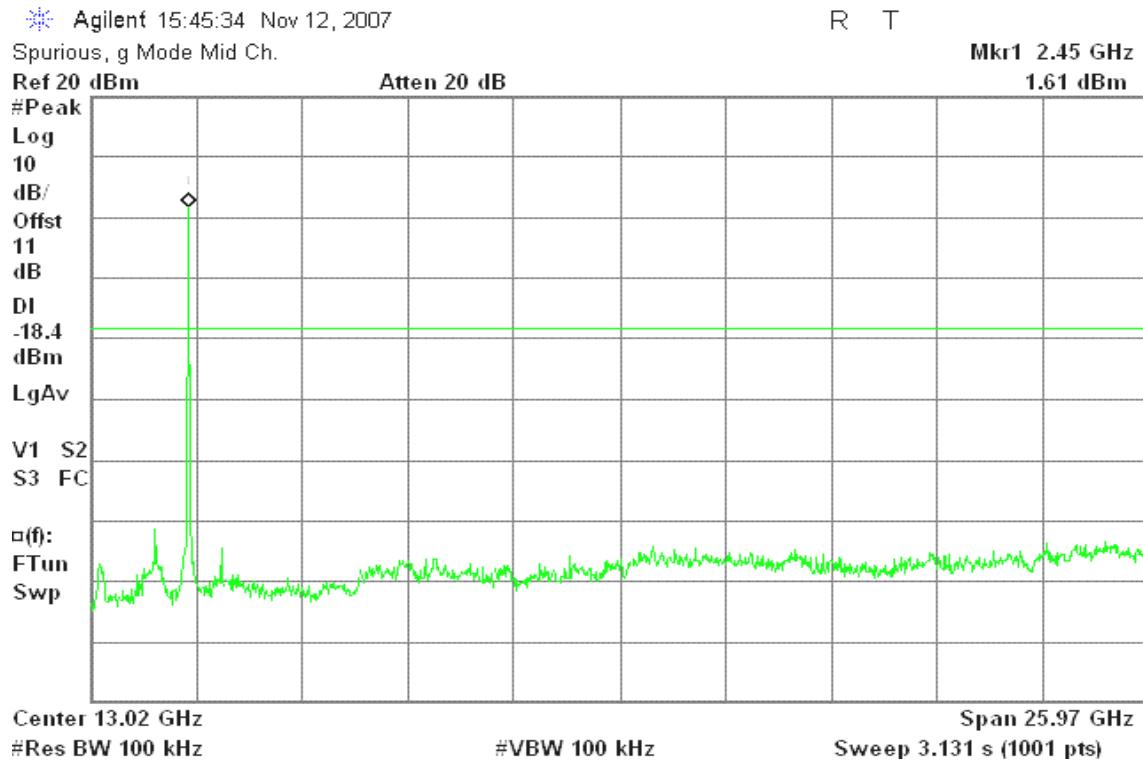


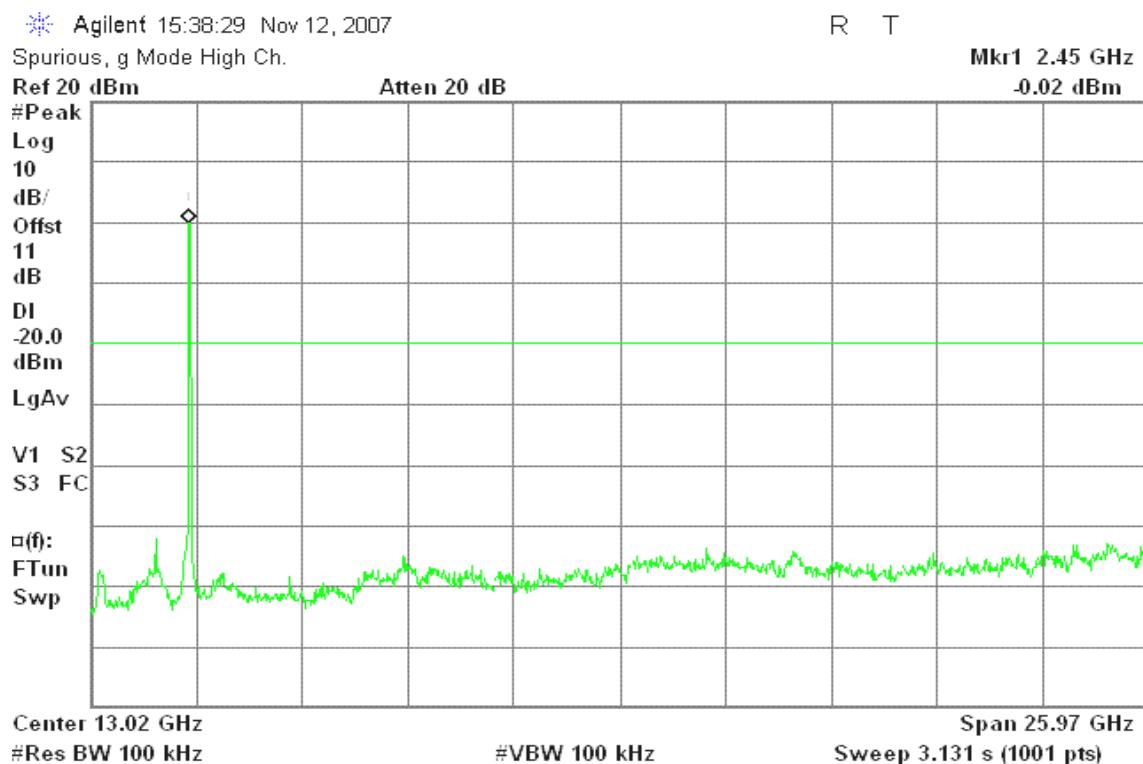
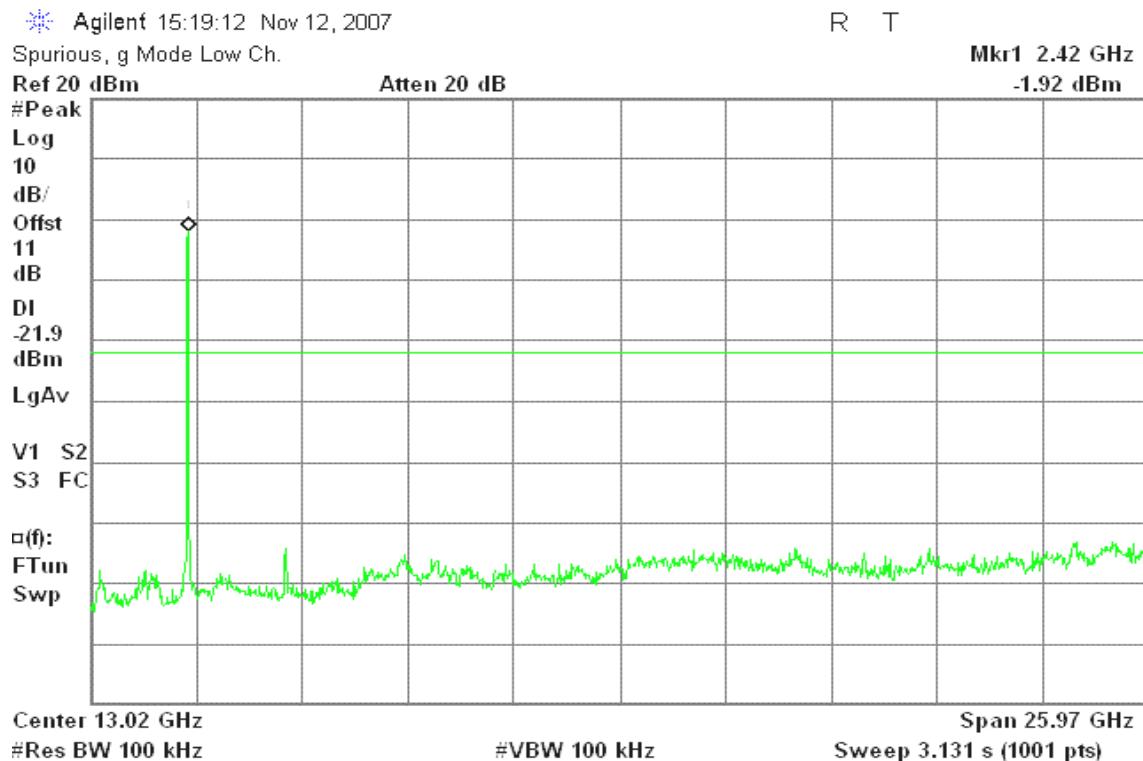
CH Mid

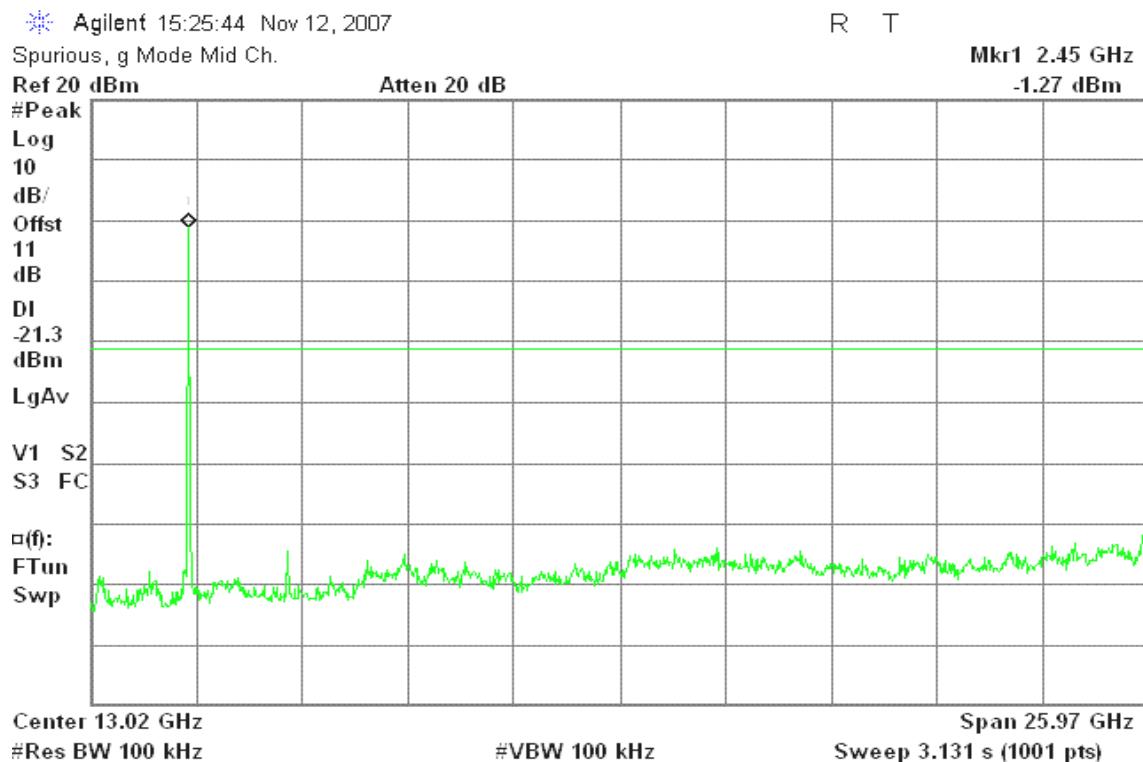
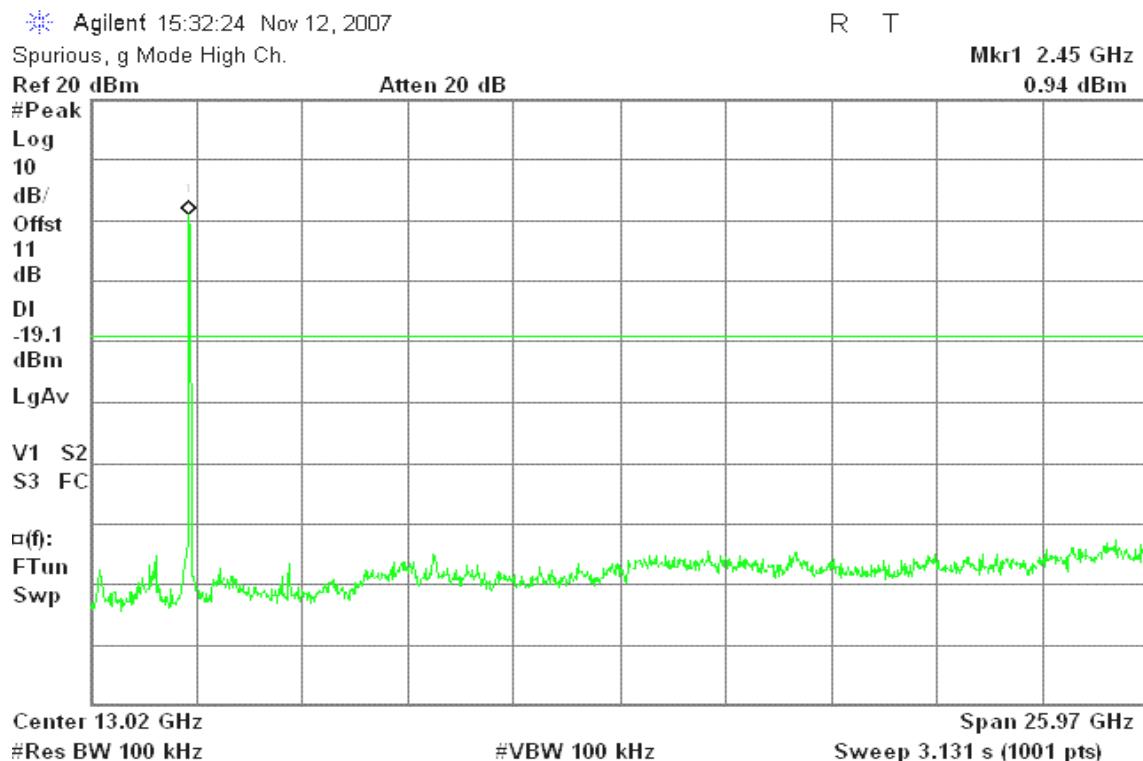


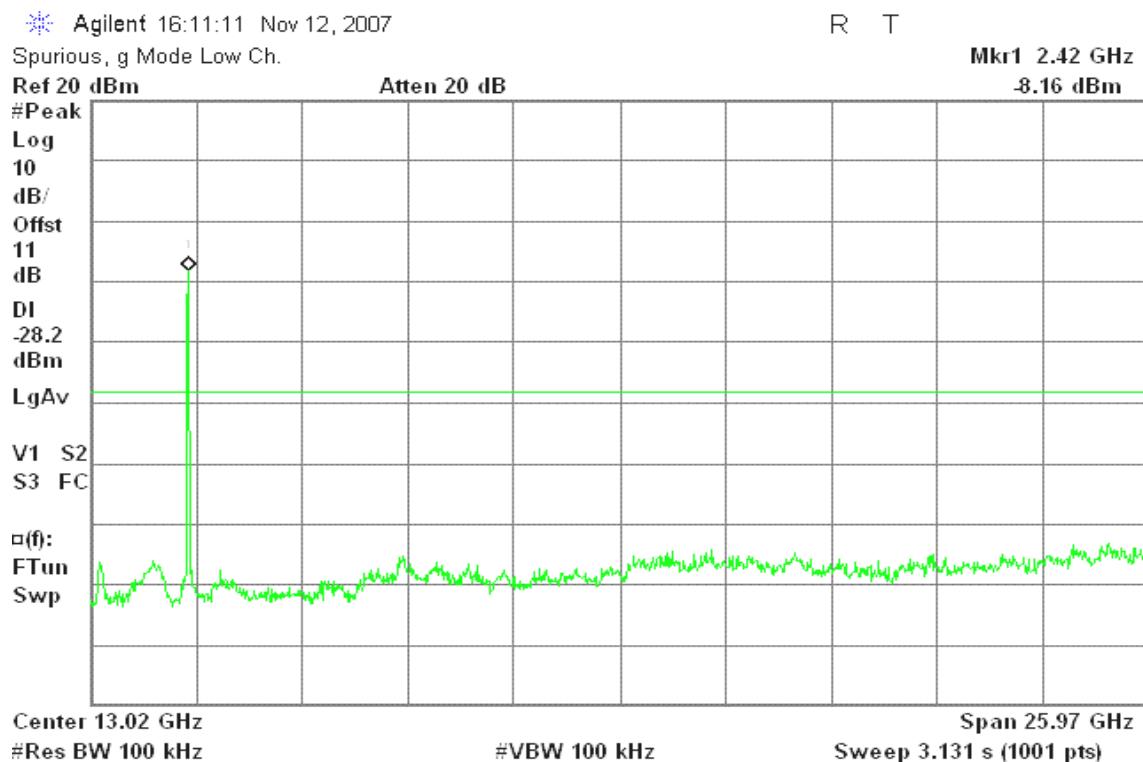
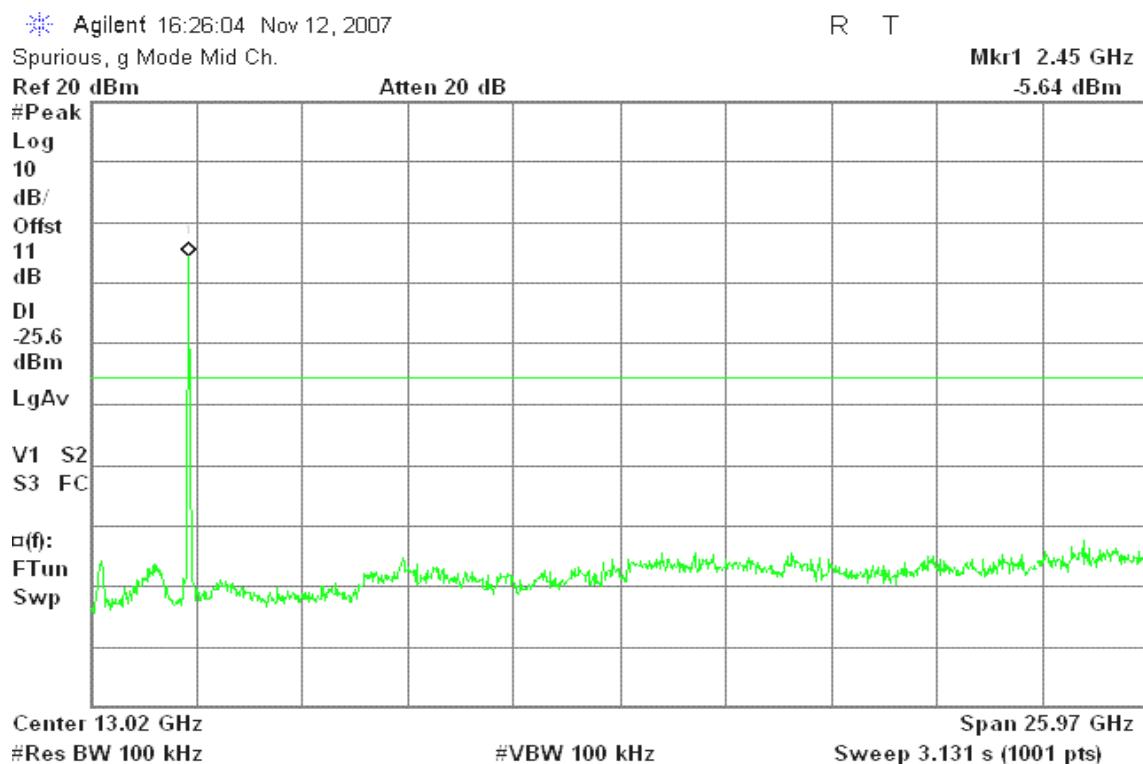
CH High**IEEE 802.11g mode / Chain 2****CH Low**

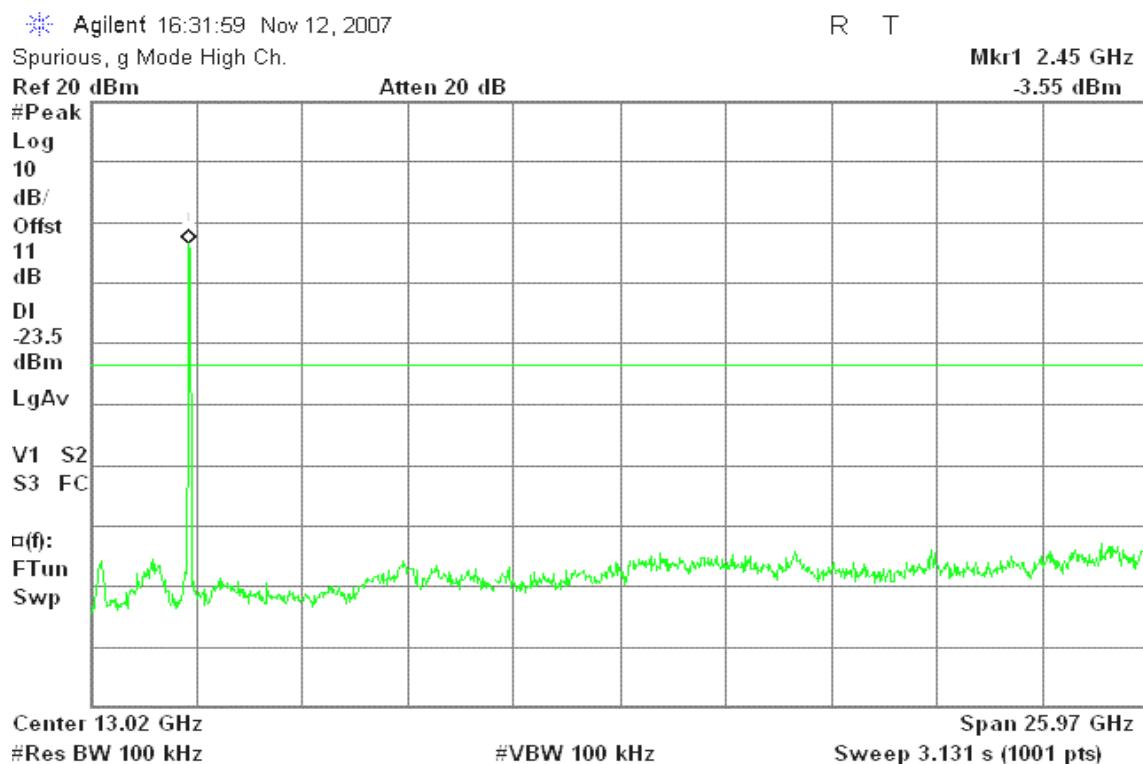
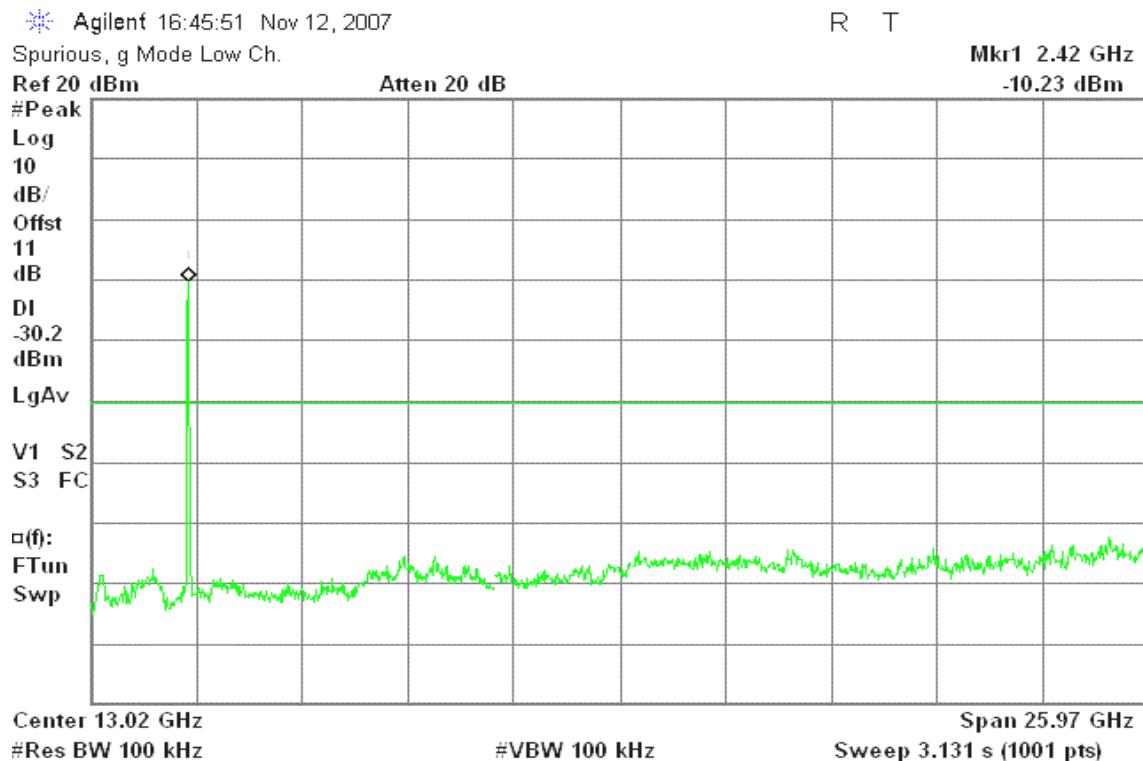
CH Mid**CH High**

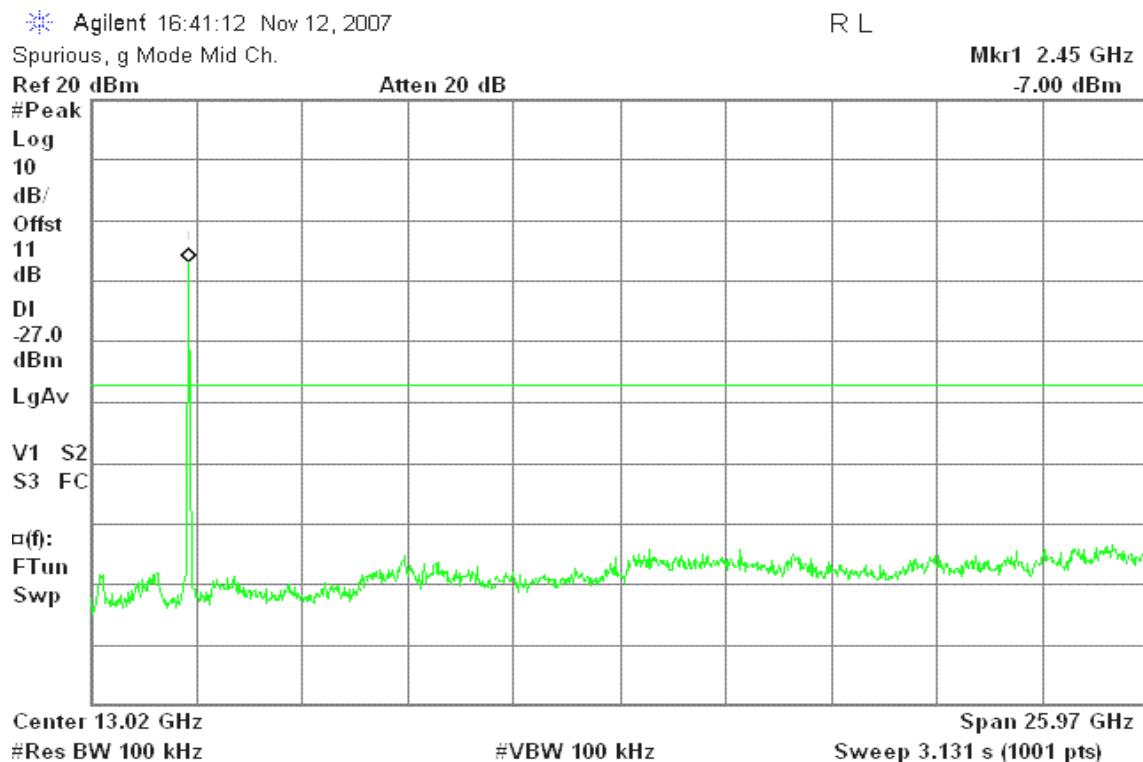
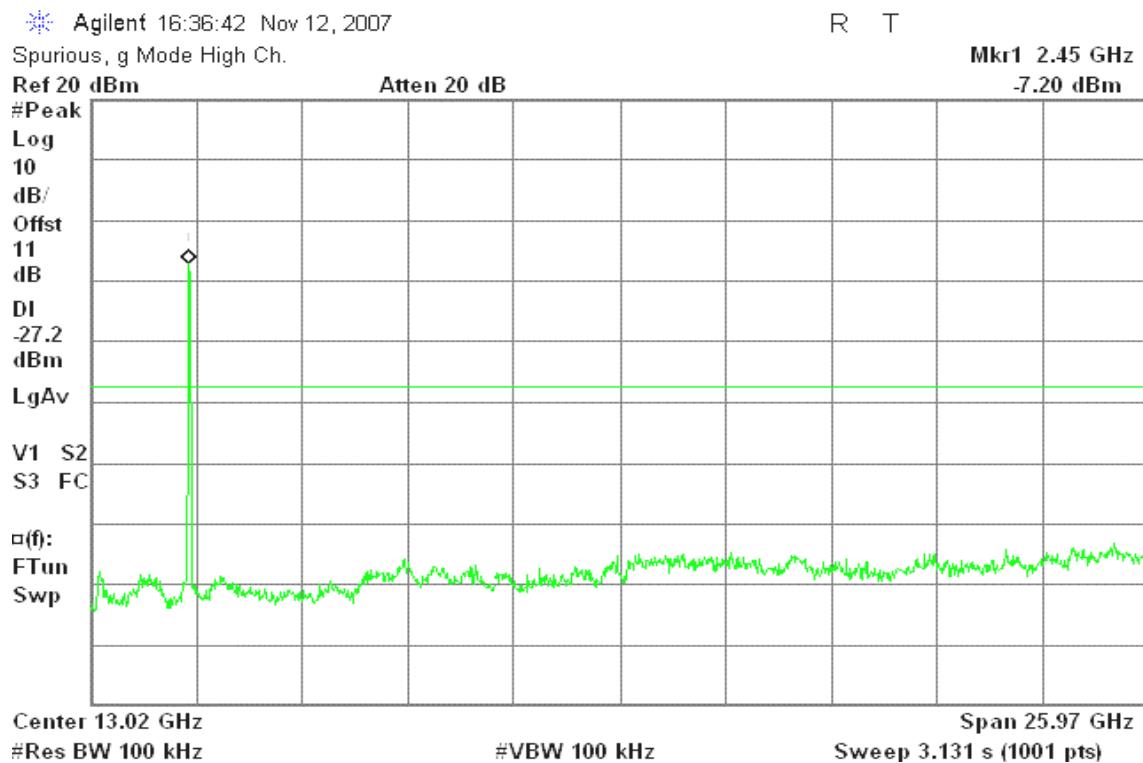
draft 802.11n Standard-20 MHz Channel mode / Chain 0**CH Low****CH Mid**

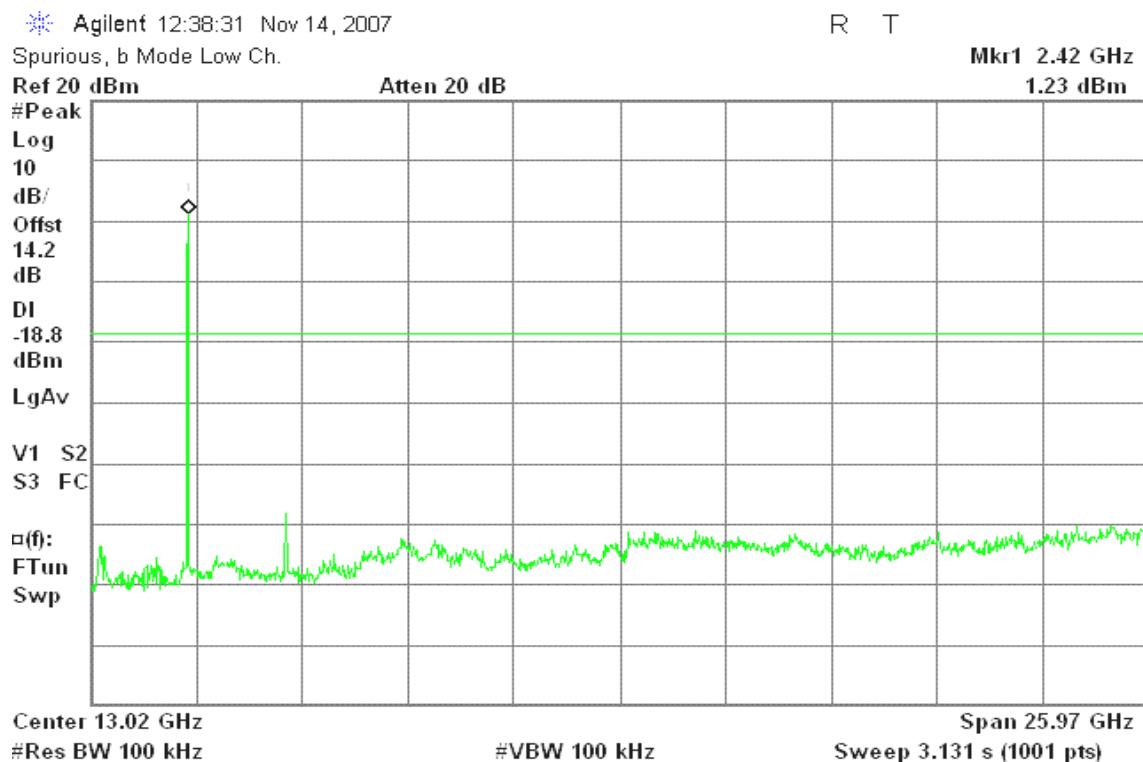
CH High**draft 802.11n Standard-20 MHz Channel mode / Chain 2****CH Low**

CH Mid**CH High**

draft 802.11n Wide-40 MHz Channel mode / Chain 0**CH Low****CH Mid**

CH High**draft 802.11n Wide-40 MHz Channel mode / Chain 2****CH Low**

CH Mid**CH High**

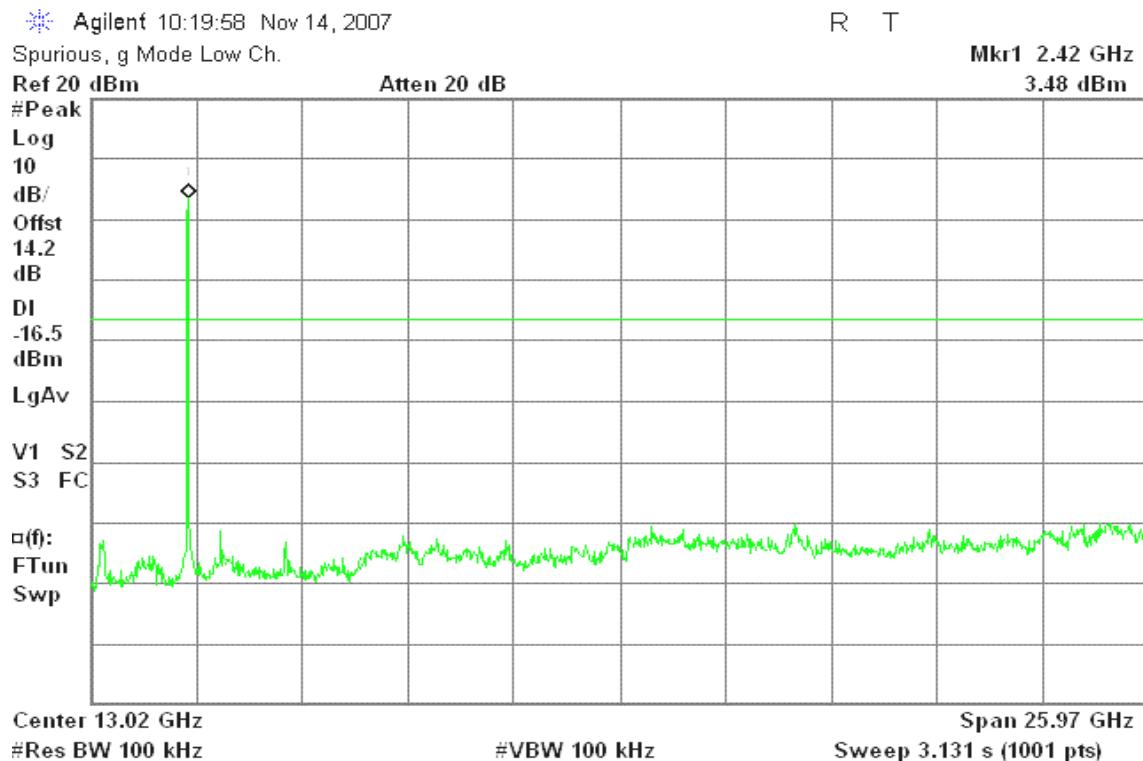
IEEE 802.11b mode with combiner**CH Low****CH Mid**

CH High

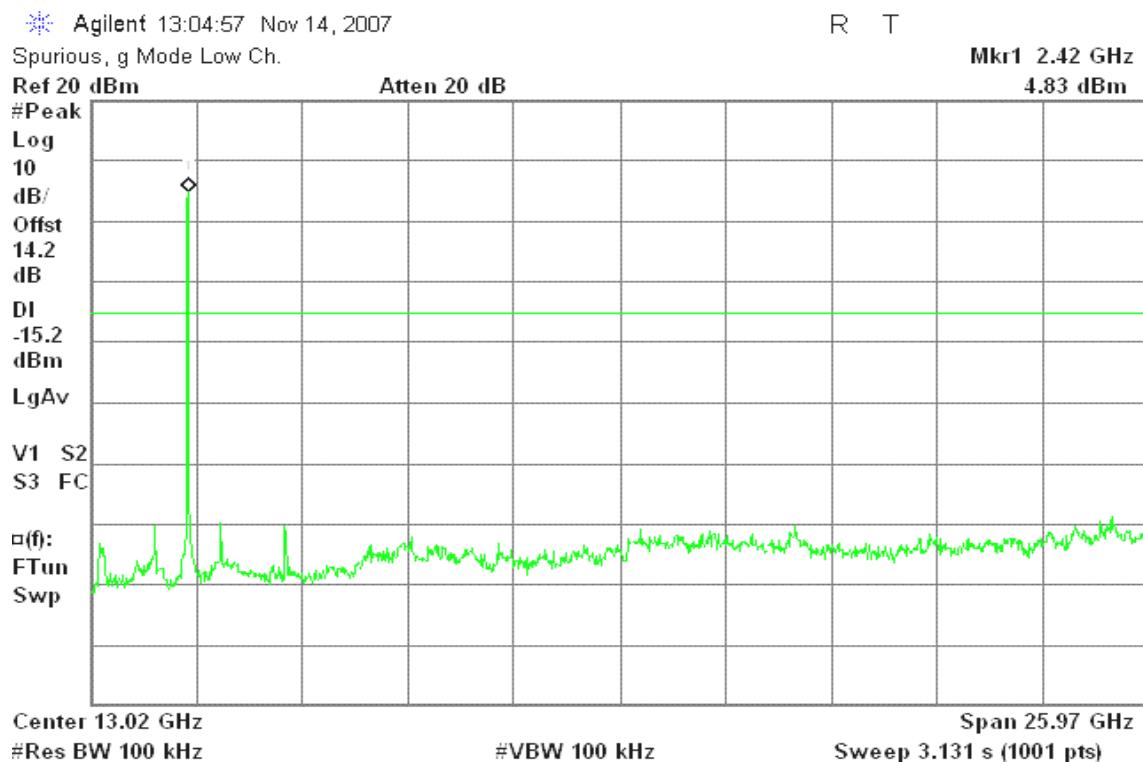
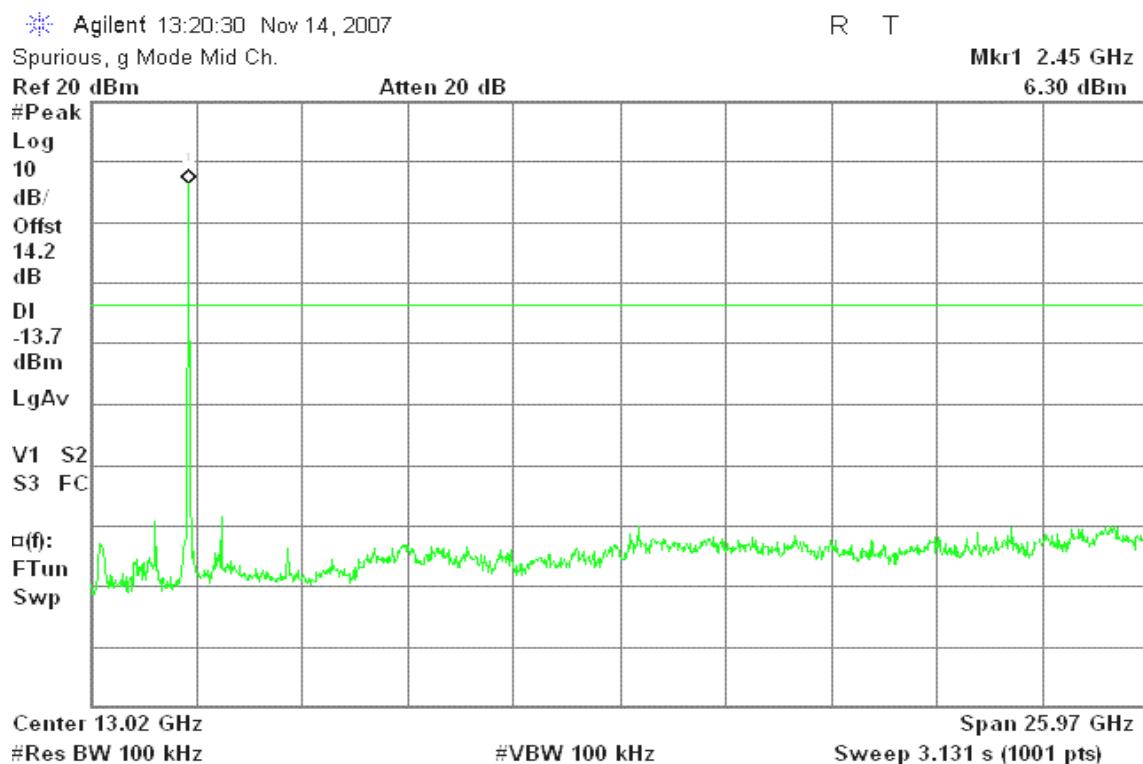


IEEE 802.11g mode with combiner

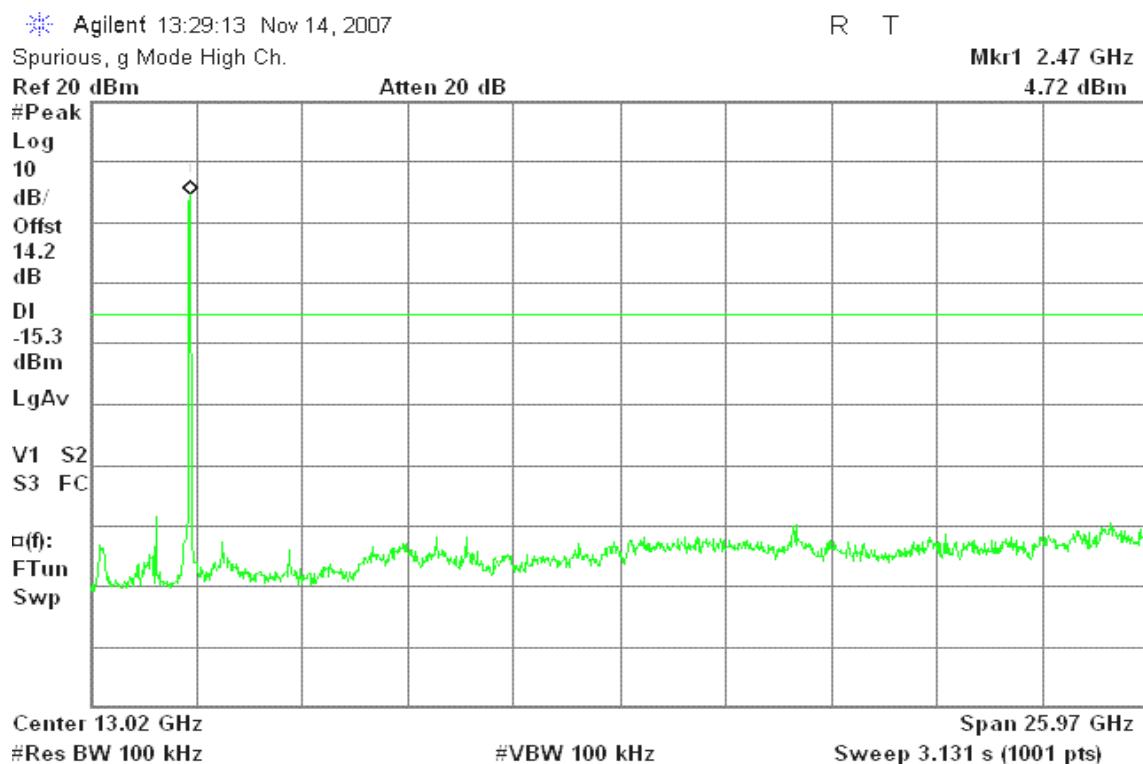
CH Low



CH Mid**CH High**

draft 802.11n Standard-20 MHz Channel mode with combiner**CH Low****CH Mid**

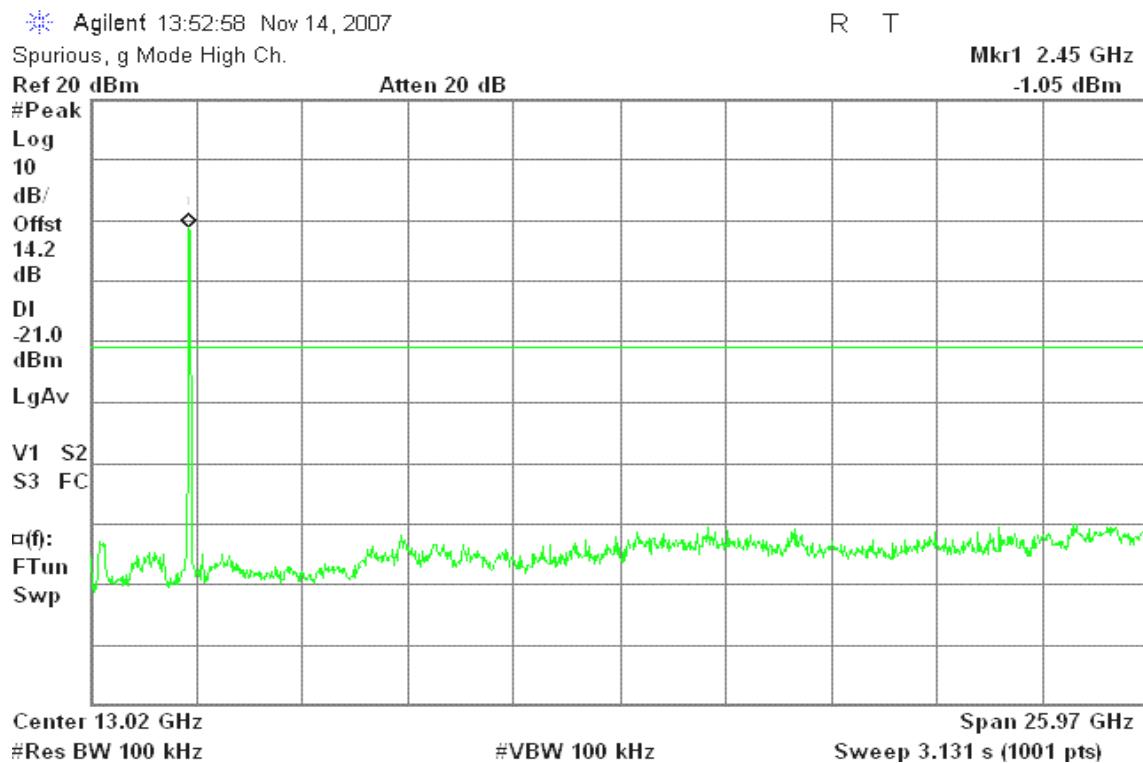
CH High



draft 802.11n Wide-40 MHz Channel mode with combiner

CH Low



CH Mid**CH High**



7.7 RADIATED EMISSIONS

LIMIT

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

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

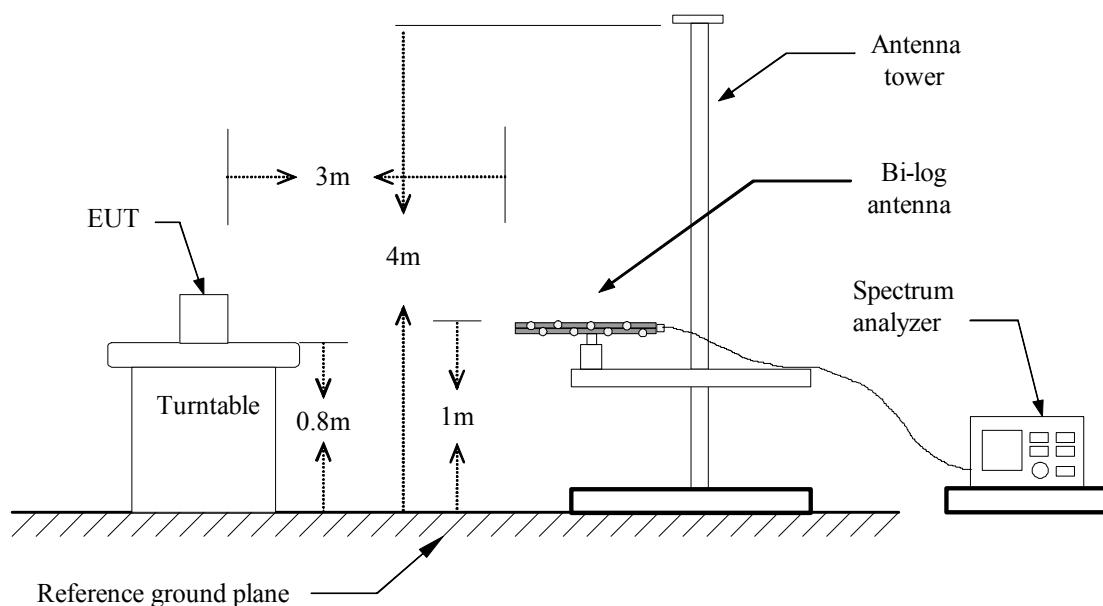
Remark: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of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

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

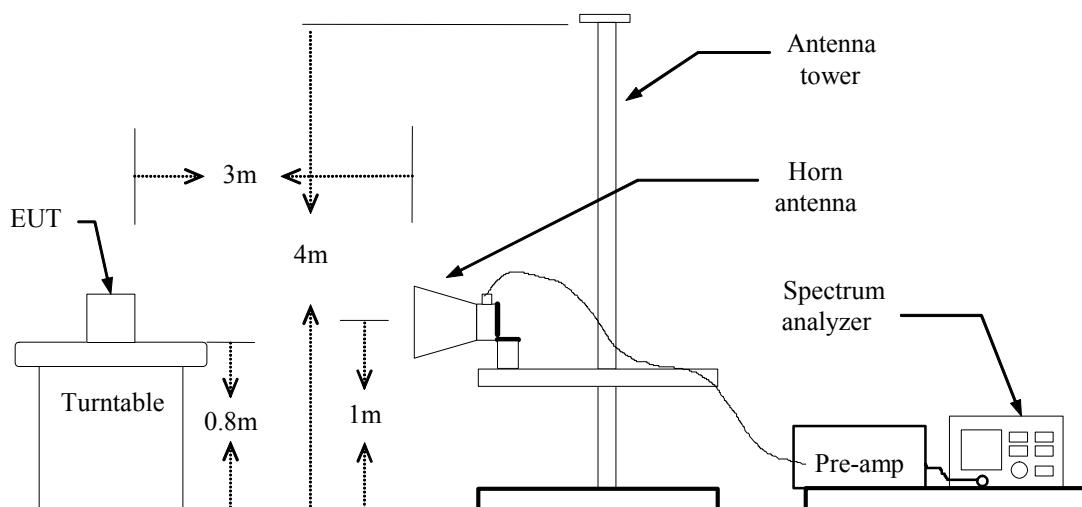
Frequency (MHz)	Field Strength (μ V/m at 3-meter)	Field Strength (dB μ V/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

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:

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

(b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO

7. Repeat above procedures until the measurements for all frequencies are complete.



TEST RESULTS

No non-compliance noted.

Below 1GHz

Operation Mode: Normal Link

Test Date: October 29, 2007

Temperature: 25°C

Tested by: Ivan Tsai

Humidity: 55% 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
88.20	V	47.06	-19.33	27.73	43.50	-15.77	Peak
335.55	V	41.18	-11.19	29.99	46.00	-16.01	Peak
576.43	V	37.81	-6.19	31.62	46.00	-14.38	Peak
623.32	V	38.46	-5.43	33.02	46.00	-12.98	Peak
671.82	V	40.63	-4.80	35.83	46.00	-10.17	Peak
864.20	V	32.31	-2.50	29.81	46.00	-16.19	Peak
<hr/>							
186.82	H	43.92	-15.07	28.85	43.50	-14.65	Peak
288.67	H	42.24	-12.69	29.55	46.00	-16.45	Peak
450.33	H	37.11	-8.73	28.38	46.00	-17.62	Peak
576.43	H	34.65	-6.19	28.46	46.00	-17.54	Peak
668.58	H	35.50	-4.86	30.64	46.00	-15.36	Peak
864.20	H	37.70	-2.50	35.20	46.00	-10.80	Peak

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. *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.*
4. *Margin (dB) = Result (dBuV/m) – Limit (dBuV/m).*

**Above 1 GHz****Operation Mode:** TX / IEEE 802.11b / CH Low**Test Date:** November 13, 2007**Temperature:** 25°C**Tested by:** Ivan Tsai**Humidity:** 55 % 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
1663.33	V	58.27	---	-8.35	49.92	---	74.00	54.00	-4.08	Peak
1830.00	V	57.62	---	-6.69	50.92	---	74.00	54.00	-3.08	Peak
4825.00	V	54.63	51.64	0.55	55.18	52.19	74.00	54.00	-1.81	AVG
N/A										
1830.00	H	60.13	---	-6.69	53.44	---	74.00	54.00	-0.56	Peak
4825.00	H	53.99	52.71	0.55	54.54	53.26	74.00	54.00	-0.74	AVG
N/A										

Remark:

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

**Operation Mode:** TX / IEEE 802.11b / CH Mid**Test Date:** November 13, 2007**Temperature:** 25°C**Tested by:** Ivan Tsai**Humidity:** 55 % 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
1666.67	V	53.14	---	-8.32	44.82	---	74.00	54.00	-9.18	Peak
1830.00	V	58.16	---	-6.69	51.46	---	74.00	54.00	-2.54	Peak
4875.00	V	54.97	51.77	0.60	55.57	52.37	74.00	54.00	-1.63	AVG
N/A										
1660.00	H	48.98	---	-8.38	40.60	---	74.00	54.00	-13.40	Peak
1836.67	H	56.83	---	-6.63	50.20	---	74.00	54.00	-3.80	Peak
4875.00	H	57.10	52.60	0.60	57.71	53.20	74.00	54.00	-0.80	AVG
N/A										

Remark:

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

**Operation Mode:** TX / IEEE 802.11b / CH High**Test Date:** November 13, 2007**Temperature:** 25°C**Tested by:** Ivan Tsai**Humidity:** 55 % 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
1663.33	V	55.22	---	-8.35	46.87	---	74.00	54.00	-7.13	Peak
1830.00	V	57.38	---	-6.69	50.69	---	74.00	54.00	-3.31	Peak
4925.00	V	54.29	51.78	0.65	54.94	52.43	74.00	54.00	-1.57	AVG
N/A										
1663.33	H	49.65	---	-8.35	41.30	---	74.00	54.00	-12.70	Peak
1836.67	H	57.94	---	-6.63	51.31	---	74.00	54.00	-2.69	Peak
4925.00	H	55.33	52.66	0.65	55.98	53.31	74.00	54.00	-0.69	AVG
N/A										

Remark:

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

**Operation Mode:** TX / IEEE 802.11g / CH Low**Test Date:** November 13, 2007**Temperature:** 25°C**Tested by:** Ivan Tsai**Humidity:** 55 % 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
1663.33	V	52.60	---	-8.35	44.25	---	74.00	54.00	-9.75	Peak
1830.00	V	57.23	---	-6.69	50.53	---	74.00	54.00	-3.47	Peak
4825.00	V	50.85	---	0.55	51.40	---	74.00	54.00	-2.60	Peak
7233.33	V	45.77	---	3.55	49.32	---	74.00	54.00	-4.68	Peak
N/A										
1836.67	H	58.01	---	-6.63	51.38	---	74.00	54.00	-2.62	Peak
4866.67	H	52.38	---	0.59	52.98	---	74.00	54.00	-1.02	Peak
N/A										

Remark:

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

**Operation Mode:** TX / IEEE 802.11g / CH Mid**Test Date:** November 13, 2007**Temperature:** 25°C**Tested by:** Ivan Tsai**Humidity:** 55 % 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
1830.00	V	57.16	---	-6.69	50.46	---	74.00	54.00	-3.54	Peak
4875.00	V	49.75	---	0.60	50.36	---	74.00	54.00	-3.64	Peak
N/A										
1836.67	H	58.12	---	-6.63	51.49	---	74.00	54.00	-2.51	Peak
4875.00	H	51.48	---	0.60	52.09	---	74.00	54.00	-1.91	Peak
N/A										

Remark:

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

**Operation Mode:** TX / IEEE 802.11g / CH High**Test Date:** November 13, 2007**Temperature:** 25°C**Tested by:** Ivan Tsai**Humidity:** 55 % 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
1660.00	V	54.88	---	-8.38	46.50	---	74.00	54.00	-7.50	Peak
1836.67	V	56.17	---	-6.63	49.54	---	74.00	54.00	-4.46	Peak
4916.67	V	49.73	---	0.64	50.37	---	74.00	54.00	-3.63	Peak
N/A										
1830.00	H	57.73	---	-6.69	51.04	---	74.00	54.00	-2.96	Peak
4925.00	H	52.12	---	0.65	52.77	---	74.00	54.00	-1.23	Peak
7383.33	H	45.44	---	3.27	48.71	---	74.00	54.00	-5.29	Peak
N/A										

Remark:

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



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

Test Date: November 8, 2007

Temperature: 25°C

Tested by: Ivan Tsai

Humidity: 55 % 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
1256.67	V	60.39	---	-10.37	50.02	---	74.00	54.00	-3.98	Peak
3216.67	V	46.68	---	-2.17	44.51	---	74.00	54.00	-9.49	Peak
4825.00	V	60.31	49.30	0.55	60.86	49.85	74.00	54.00	-4.15	AVG
N/A										
1310.00	H	60.22	---	-10.28	49.94	---	74.00	54.00	-4.06	Peak
3216.67	H	50.42	---	-2.17	48.25	---	74.00	54.00	-5.75	Peak
4833.33	H	63.34	52.19	0.56	63.90	52.75	74.00	54.00	-1.25	AVG
N/A										

Remark:

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



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

Test Date: November 8, 2007

Temperature: 25°C

Tested by: Ivan Tsai

Humidity: 55 % 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
1196.67	V	59.64	---	-10.47	49.17	---	74.00	54.00	-4.83	Peak
4875.00	V	59.11	47.54	0.60	59.71	48.14	74.00	54.00	-5.86	AVG
7316.67	V	46.66	---	3.39	50.05	---	74.00	54.00	-3.95	Peak
N/A										
1243.33	H	60.35	---	-10.39	49.95	---	74.00	54.00	-4.05	Peak
3250.00	H	47.11	---	-2.13	44.98	---	74.00	54.00	-9.02	Peak
4875.00	H	61.11	48.28	0.60	61.71	48.88	74.00	54.00	-5.12	AVG
7308.33	H	45.15	---	3.41	48.56	---	74.00	54.00	-5.44	Peak
N/A										

Remark:

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



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

Test Date: November 8, 2007

Temperature: 25°C

Tested by: Ivan Tsai

Humidity: 55 % 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
1333.33	V	58.81	---	-10.25	48.57	---	74.00	54.00	-5.43	Peak
4925.00	V	60.24	47.80	0.65	60.89	48.45	74.00	54.00	-5.55	AVG
7391.67	V	48.58	---	3.25	51.83	---	74.00	54.00	-2.17	Peak
N/A										
1333.33	H	60.63	---	-10.25	50.38	---	74.00	54.00	-3.62	Peak
3283.33	H	45.10	---	-2.09	43.01	---	74.00	54.00	-10.99	Peak
4925.00	H	61.50	49.87	0.65	62.15	50.52	74.00	54.00	-3.48	AVG
7383.33	H	45.56	---	3.27	48.83	---	74.00	54.00	-5.17	Peak
N/A										

Remark:

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



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

Test Date: November 8, 2007

Temperature: 25°C

Tested by: Ivan Tsai

Humidity: 55 % 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
1280.00	V	60.06	---	-10.33	49.72	---	74.00	54.00	-4.28	Peak
4841.67	V	46.09	---	0.57	46.66	---	74.00	54.00	-7.34	Peak
N/A										
1530.00	H	59.60	---	-9.68	49.92	---	74.00	54.00	-4.08	Peak
3233.33	H	46.60	---	-2.15	44.45	---	74.00	54.00	-9.55	Peak
4841.67	H	46.42	---	0.57	46.99	---	74.00	54.00	-7.01	Peak
N/A										

Remark:

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



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

Test Date: November 9, 2007

Temperature: 25°C

Tested by: Ivan Tsai

Humidity: 55 % 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
1240.00	V	60.41	---	-10.40	50.01	---	74.00	54.00	-3.99	Peak
4875.00	V	47.70	---	0.60	48.31	---	74.00	54.00	-5.69	Peak
N/A										
1490.00	H	60.25	---	-9.99	50.26	---	74.00	54.00	-3.74	Peak
4875.00	H	48.70	---	0.60	49.30	---	74.00	54.00	-4.70	Peak
N/A										

Remark:

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



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

Test Date: November 9, 2007

Temperature: 25°C

Tested by: Ivan Tsai

Humidity: 55 % RH

Polarity: Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
1360.00	V	60.33	---	-10.20	50.13	---	74.00	54.00	-3.87	Peak
4916.67	V	51.23	---	0.64	51.87	---	74.00	54.00	-2.13	Peak
N/A										
1500.00	H	60.08	---	-9.97	50.10	---	74.00	54.00	-3.90	Peak
3275.00	H	46.32	---	-2.10	44.22	---	74.00	54.00	-9.78	Peak
4916.67	H	50.19	---	0.64	50.83	---	74.00	54.00	-3.17	Peak
N/A										

Remark:

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



7.8 POWERLINE CONDUCTED EMISSIONS

LIMIT

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

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

* Decreases with the logarithm of the frequency.

Test Configuration

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

TEST PROCEDURE

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



TEST RESULTS

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

Test Data

Operation Mode: Normal Link **Test Date:** October 22, 2007
Temperature: 25°C **Tested by:** Eddy Cheng
Humidity: 55% RH

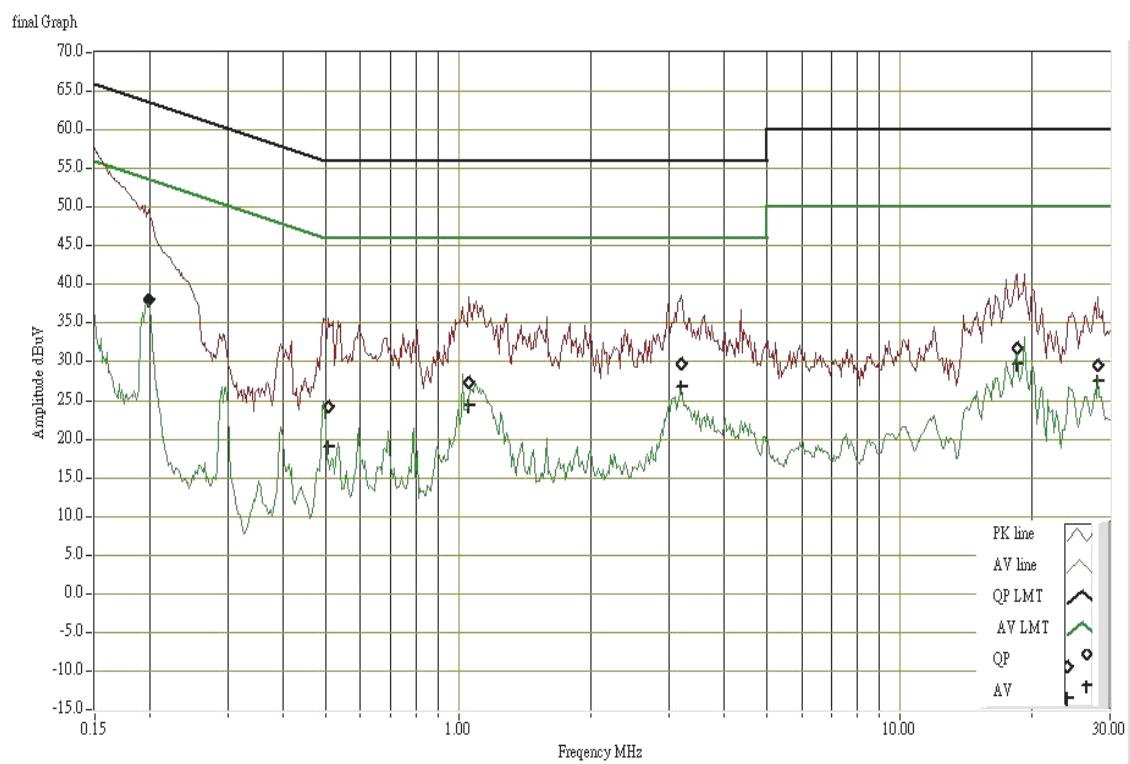
Freq. (MHz)	QP Reading (dBuV)	AV Reading (dBuV)	Corr. factor (dB/m)	QP Result (dBuV/m)	AV Result (dBuV/m)	QP Limit (dBuV)	AV Limit (dBuV)	QP Margin (dB)	AV Margin (dB)	Note
0.198	38.120	38.050	0.112	38.232	38.162	63.694	53.694	-25.462	-15.532	L1
0.508	24.210	18.990	0.000	24.210	18.990	56.000	46.000	-31.790	-27.010	L1
1.057	27.260	24.310	0.001	27.261	24.311	56.000	46.000	-28.739	-21.689	L1
3.198	29.760	26.800	0.046	29.806	26.846	56.000	46.000	-26.194	-19.154	L1
18.461	31.830	29.720	0.468	32.298	30.188	60.000	50.000	-27.702	-19.812	L1
28.162	29.600	27.560	0.579	30.179	28.139	60.000	50.000	-29.821	-21.861	L1
0.191	38.900	36.210	0.118	39.018	36.328	63.993	53.993	-24.975	-17.665	L2
0.295	25.350	25.320	0.075	25.425	25.395	60.382	50.382	-34.957	-24.987	L2
0.484	26.260	24.110	0.006	26.266	24.116	56.270	46.270	-30.004	-22.154	L2
0.960	21.920	16.650	0.000	21.920	16.650	56.000	46.000	-34.080	-29.350	L2
2.953	24.740	21.930	0.039	24.779	21.969	56.000	46.000	-31.221	-24.031	L2
19.211	32.640	31.090	0.479	33.119	31.569	60.000	50.000	-26.881	-18.431	L2

Remark:

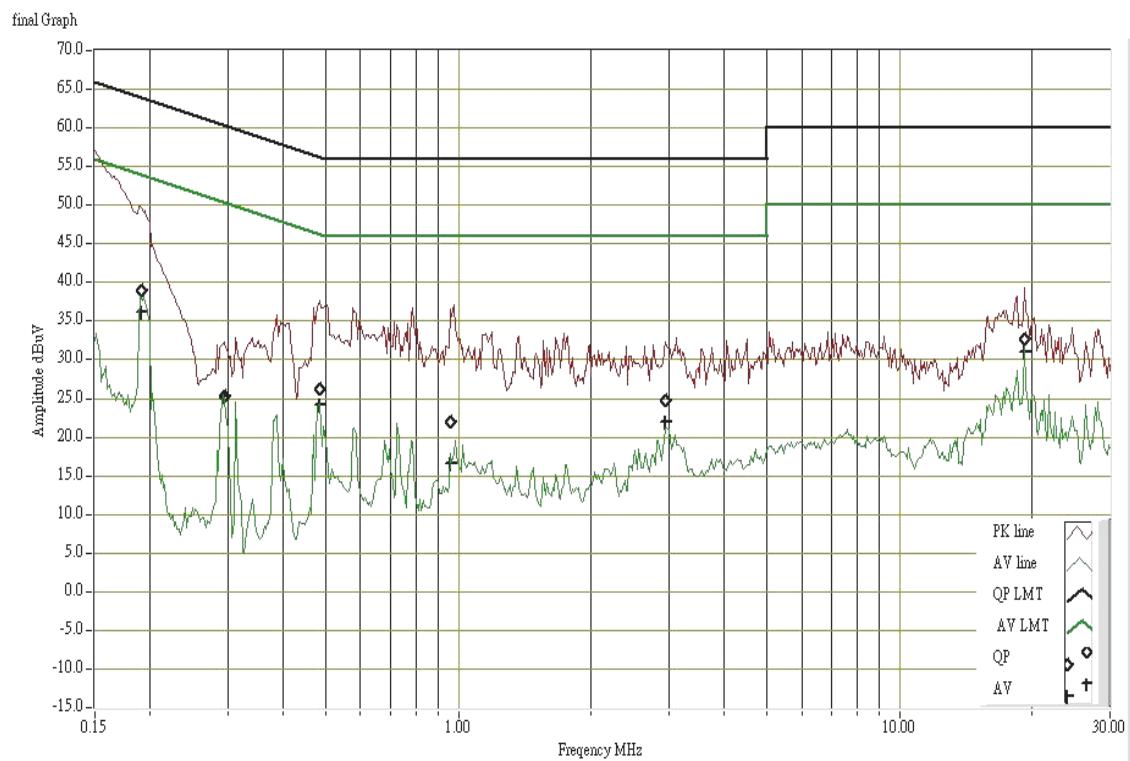
1. Measuring frequencies from 0.15 MHz to 30MHz.
2. The emissions measured in frequency range from 0.15 MHz to 30MHz were made with an instrument using Quasi-peak detector and average detector.
3. The IF bandwidth of SPA between 0.15MHz and 30MHz was 10 kHz; the IF bandwidth of Test Receiver between 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)





APPENDIX I

RADIO FREQUENCY EXPOSURE

LIMIT

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

EUT Specification

EUT	IEEE802.11 b/g/n USB Dongle
Frequency band (Operating)	<input checked="" type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz <input type="checkbox"/> WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz <input type="checkbox"/> WLAN: 5.745GHz ~ 5.825GHz <input type="checkbox"/> Others
Device category	<input checked="" type="checkbox"/> Portable (<20cm separation) <input type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others
Exposure classification	<input type="checkbox"/> Occupational/Controlled exposure ($S = 5\text{mW/cm}^2$) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure ($S=1\text{mW/cm}^2$)
Antenna diversity	<input type="checkbox"/> Single antenna <input checked="" type="checkbox"/> Multiple antennas <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input checked="" type="checkbox"/> Tx/Rx diversity
Max. output power	IEEE 802.11b mode: 12.74 dBm (18.79 mW) IEEE 802.11g mode: 18.63 dBm (72.95 mW) draft 802.11n Standard-20 MHz Channel mode: 20.32 dBm (107.65 mW) draft 802.11n Wide-40 MHz Channel mode: 15.24 dBm (33.42 mW)
Antenna gain (Max)	MIMO Mode: -0.30 dBi for TX / RX (Numeric gain: 0.93) CDD Mode: -0.30 dBi + 10 log (2) = 2.71 dBi (Numeric gain: 1.86)
Evaluation applied	<input type="checkbox"/> MPE Evaluation <input checked="" type="checkbox"/> SAR Evaluation* <input type="checkbox"/> N/A

Remark:

1. The maximum output power is 20.32dBm (107.65mW) at 2462MHz (with 1.86numeric antenna gain.)
2. DTS device is not subject to routine RF evaluation; MPE estimate is used to justify the compliance.
3. For mobile or fixed location transmitters, no SAR consideration applied. The maximum power density is 1.0 mW/cm² even if the calculation indicates that the power density would be larger.

TEST RESULTS

Remark: Please refer to the separated SAR report.