

**Test Mode:** TX / IEEE 802.11n HT20 MHz (CH Mid)**Tested by:** Jack Chen**Ambient temperature:** 24 °C    **Relative humidity:** 52% RH**Date:** May 2, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
4366.000	42.28	2.88	45.16	74.00	-28.84	V	Peak
4870.000	52.50	4.56	57.06	74.00	-16.94	V	Peak
4870.000	41.95	4.56	46.51	54.00	-7.49	V	AVG
5653.000	40.95	5.93	46.88	74.00	-27.12	V	Peak
6292.000	41.82	6.55	48.37	74.00	-25.63	V	Peak
7309.000	44.83	8.30	53.13	74.00	-20.87	V	Peak
7309.000	33.66	8.30	41.96	54.00	-12.04	V	AVG
7912.000	40.97	9.48	50.45	74.00	-23.55	V	Peak
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4879.000	52.17	4.59	56.76	74.00	-17.24	H	Peak
4879.000	40.83	4.59	45.42	54.00	-8.58	H	AVG
6148.000	41.59	6.32	47.91	74.00	-26.09	H	Peak
6346.000	41.38	6.64	48.02	74.00	-25.98	H	Peak
6814.000	41.35	7.40	48.75	74.00	-25.25	H	Peak
7300.000	44.73	8.29	53.02	74.00	-20.98	H	Peak
7300.000	33.84	8.29	42.13	54.00	-11.87	H	AVG
7930.000	41.12	9.51	50.63	74.00	-23.37	H	Peak

**REMARKS:**

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).

**Test Mode:** TX / EEE 802.11n HT20 MHz (CH High)**Tested by:** Jack Chen**Ambient temperature:** 24 °C**Relative humidity:** 52% RH**Date:** May 2, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1765.000	53.54	-6.35	47.19	74.00	-26.81	V	Peak
2458.000	49.04	-2.49	46.55	74.00	-27.45	V	Peak
4924.000	54.86	4.73	59.59	74.00	-14.41	V	Peak
4924.000	43.64	4.73	48.37	54.00	-5.63	V	AVG
5599.000	41.60	5.91	47.51	74.00	-26.49	V	Peak
6742.000	41.11	7.28	48.39	74.00	-25.61	V	Peak
7381.000	48.00	8.44	56.44	74.00	-17.56	V	Peak
7381.000	36.82	8.44	45.26	54.00	-8.74	V	AVG
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4924.000	53.66	4.73	58.39	74.00	-15.61	H	Peak
4924.000	42.58	4.73	47.31	54.00	-6.69	H	AVG
5761.000	41.05	5.98	47.03	74.00	-26.97	H	Peak
6922.000	41.37	7.57	48.94	74.00	-25.06	H	Peak
7390.000	46.12	8.46	54.58	74.00	-19.42	H	Peak
7390.000	34.70	8.46	43.16	54.00	-10.84	H	AVG
8452.000	41.01	9.40	50.41	74.00	-23.59	H	Peak
9847.000	43.70	11.54	55.24	74.00	-18.76	H	Peak
9847.000	31.74	11.54	43.28	54.00	-10.72	H	AVG

**REMARKS:**

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).

**Combine with Antenna 1 and Antenna 2****Model: PW5002****Test Mode: TX/ IEEE 802.11n HT40 MHz (CH Low)****Tested by: Jack Chen****Ambient temperature: 24 °C****Relative humidity: 52% RH****Date: May 2, 2016**

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
3340.000	44.41	-0.79	43.62	74.00	-30.38	V	Peak
4843.000	49.06	4.47	53.53	74.00	-20.47	V	Peak
4843.000	39.92	4.47	44.39	54.00	-9.61	V	AVG
5545.000	42.07	5.89	47.96	74.00	-26.04	V	Peak
7264.000	45.08	8.21	53.29	74.00	-20.71	V	Peak
7264.000	34.38	8.21	42.59	54.00	-11.41	V	AVG
8569.000	41.96	9.34	51.30	74.00	-22.70	V	Peak
9685.000	42.74	11.07	53.81	74.00	-20.19	V	Peak
9685.000	33.09	11.07	44.16	54.00	-9.84	V	AVG
3286.000	44.67	-0.88	43.79	74.00	-30.21	H	Peak
4843.000	54.39	4.47	58.86	74.00	-15.14	H	Peak
4843.000	43.36	4.47	47.83	54.00	-6.17	H	AVG
6274.000	41.80	6.52	48.32	74.00	-25.68	H	Peak
7255.000	46.93	8.20	55.13	74.00	-18.87	H	Peak
7255.000	37.12	8.20	45.32	54.00	-8.68	H	AVG
7759.000	41.67	9.18	50.85	74.00	-23.15	H	Peak
9703.000	42.75	11.12	53.87	74.00	-20.13	H	Peak
9703.000	31.06	11.12	42.18	54.00	-11.82	H	AVG

**REMARKS:**

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).

**Test Mode:** TX / IEEE 802.11n HT40 MHz (CH Mid)**Tested by:** Jack Chen**Ambient temperature:** 24 °C**Relative humidity:** 52% RH**Date:** May 2, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1765.000	56.59	-6.35	50.24	74.00	-23.76	V	Peak
4870.000	49.26	4.56	53.82	74.00	-20.18	V	Peak
4870.000	39.70	4.56	44.26	54.00	-9.74	V	AVG
5626.000	42.69	5.92	48.61	74.00	-25.39	V	Peak
7318.000	45.57	8.32	53.89	74.00	-20.11	V	Peak
7318.000	35.69	8.32	44.01	54.00	-9.99	V	AVG
8578.000	41.66	9.33	50.99	74.00	-23.01	V	Peak
9811.000	43.00	11.44	54.44	74.00	-19.56	V	Peak
9811.000	30.74	11.44	42.18	54.00	-11.82	V	AVG
4879.000	52.74	4.59	57.33	74.00	-16.67	H	Peak
4879.000	43.75	4.59	48.34	54.00	-5.66	H	AVG
5626.000	41.78	5.92	47.70	74.00	-26.30	H	Peak
6967.000	42.83	7.65	50.48	74.00	-23.52	H	Peak
7309.000	43.61	8.30	51.91	74.00	-22.09	H	Peak
8362.000	41.08	9.45	50.53	74.00	-23.47	H	Peak
9748.000	43.23	11.25	54.48	74.00	-19.52	H	Peak
9748.000	30.14	11.25	41.39	54.00	-12.61	H	AVG

**REMARKS:**

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).

**Test Mode:** TX/ IEEE 802.11n HT40 MHz (CH High)**Tested by:** Jack Chen**Ambient temperature:** 24°C    **Relative humidity:** 52% RH**Date:** May 2, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
4888.000	50.45	4.61	55.06	74.00	-18.94	V	Peak
4888.000	40.61	4.61	45.22	54.00	-8.78	V	AVG
5608.000	41.16	5.92	47.08	74.00	-26.92	V	Peak
6346.000	41.25	6.64	47.89	74.00	-26.11	V	Peak
7345.000	45.06	8.37	53.43	74.00	-20.57	V	Peak
7345.000	35.92	8.37	44.29	54.00	-9.71	V	AVG
8209.000	41.09	9.54	50.63	74.00	-23.37	V	Peak
8515.000	41.43	9.37	50.80	74.00	-23.20	V	Peak
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1783.000	55.90	-6.31	49.59	74.00	-24.41	H	Peak
3898.000	43.79	1.16	44.95	74.00	-29.05	H	Peak
4897.000	52.03	4.64	56.67	74.00	-17.33	H	Peak
4897.000	42.75	4.64	47.39	54.00	-6.61	H	AVG
6130.000	41.88	6.29	48.17	74.00	-25.83	H	Peak
7363.000	44.00	8.41	52.41	74.00	-21.59	H	Peak
7363.000	39.51	8.41	48.01	54.00	-5.99	H	AVG
9811.000	45.00	11.44	56.44	74.00	-17.56	H	Peak
9811.000	35.11	11.44	46.55	54.00	-7.45	H	AVG

**REMARKS:**

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).

**Model: PW5003****Test Mode: TX/ IEEE 802.11n HT40 MHz (CH Low)****Tested by: Jack Chen****Ambient temperature: 24 °C****Relative humidity: 52% RH****Date: May 2, 2016**

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
4042.000	42.46	1.74	44.20	74.00	-29.80	V	Peak
4843.000	53.57	4.47	58.04	74.00	-15.96	V	Peak
4843.000	42.96	4.47	47.43	54.00	-6.57	V	AVG
5599.000	41.21	5.91	47.12	74.00	-26.88	V	Peak
6904.000	41.75	7.54	49.29	74.00	-24.71	V	Peak
7246.000	48.13	8.18	56.31	74.00	-17.69	V	Peak
7246.000	35.43	8.18	43.61	54.00	-10.39	V	AVG
8371.000	42.28	9.45	51.73	74.00	-22.27	V	Peak
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1747.000	53.77	-6.38	47.39	74.00	-26.61	H	Peak
4105.000	41.97	1.96	43.93	74.00	-30.07	H	Peak
4843.000	53.62	4.47	58.09	74.00	-15.91	H	Peak
4843.000	43.85	4.47	48.32	54.00	-5.68	H	AVG
5923.000	40.86	6.05	46.91	74.00	-27.09	H	Peak
7255.000	47.60	8.20	55.80	74.00	-18.20	H	Peak
7255.000	36.58	8.20	44.78	54.00	-9.22	H	AVG
8353.000	40.84	9.46	50.30	74.00	-23.70	H	Peak

**REMARKS:**

7. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
8. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
9. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
10. 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.
11. 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.
12. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Test Mode:** TX / IEEE 802.11n HT40 MHz (CH Mid)**Tested by:** Jack Chen**Ambient temperature:** 24 °C**Relative humidity:** 52% RH**Date:** May 2, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
4195.000	42.48	2.28	44.76	74.00	-29.24	V	Peak
4879.000	52.30	4.59	56.89	74.00	-17.11	V	Peak
4879.000	41.63	4.59	46.22	54.00	-7.78	V	AVG
6310.000	42.39	6.58	48.97	74.00	-25.03	V	Peak
7318.000	48.04	8.32	56.36	74.00	-17.64	V	Peak
7318.000	35.22	8.32	43.54	54.00	-10.46	V	AVG
8362.000	40.64	9.45	50.09	74.00	-23.91	V	Peak
9748.000	43.74	11.25	54.99	74.00	-19.01	V	Peak
9748.000	30.11	11.25	41.36	54.00	-12.64	V	AVG
4258.000	42.03	2.50	44.53	74.00	-29.47	H	Peak
4861.000	51.35	4.53	55.88	74.00	-18.12	H	Peak
4861.000	39.63	4.53	44.16	54.00	-9.84	H	AVG
5761.000	41.43	5.98	47.41	74.00	-26.59	H	Peak
6139.000	41.45	6.31	47.76	74.00	-26.24	H	Peak
7309.000	48.12	8.30	56.42	74.00	-17.58	H	Peak
7309.000	37.07	8.30	45.37	54.00	-8.63	H	AVG
9748.000	43.07	11.25	54.32	74.00	-19.68	H	Peak
9748.000	31.14	11.25	42.39	54.00	-11.61	H	AVG

**REMARKS:**

7. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
8. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
9. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
10. 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.
11. 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.
12. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Test Mode:** TX/ IEEE 802.11n HT40 MHz (CH High)**Tested by:** Jack Chen**Ambient temperature:** 24°C    **Relative humidity:** 52% RH**Date:** May 2, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
4906.000	52.31	4.67	56.98	74.00	-17.02	V	Peak
4906.000	40.72	4.67	45.39	54.00	-8.61	V	AVG
5365.000	41.32	5.63	46.95	74.00	-27.05	V	Peak
6733.000	40.99	7.27	48.26	74.00	-25.74	V	Peak
6949.000	41.84	7.62	49.46	74.00	-24.54	V	Peak
7363.000	47.55	8.41	55.96	74.00	-18.04	V	Peak
7363.000	36.82	8.41	45.23	54.00	-8.77	V	AVG
9820.000	42.24	11.46	53.70	74.00	-20.30	V	Peak
9820.000	39.90	11.46	51.36	54.00	-2.64	V	AVG
4897.000	50.72	4.64	55.36	74.00	-18.64	H	Peak
4897.000	37.75	4.64	42.39	54.00	-11.61	H	AVG
5860.000	41.40	6.02	47.42	74.00	-26.58	H	Peak
6922.000	40.74	7.57	48.31	74.00	-25.69	H	Peak
7354.000	46.69	8.39	55.08	74.00	-18.92	H	Peak
7354.000	37.89	8.39	46.28	54.00	-7.72	H	AVG
8299.000	40.56	9.49	50.05	74.00	-23.95	H	Peak
9811.000	42.87	11.44	54.31	74.00	-19.69	H	Peak
9811.000	29.81	11.44	41.25	54.00	-12.75	H	AVG

**REMARKS:**

7. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
8. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
9. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
10. 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.
11. 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.
12. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).



## 7.3. 6dB BANDWIDTH MEASUREMENT

### 7.3.1. LIMITS

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

### 7.3.2. TEST INSTRUMENTS

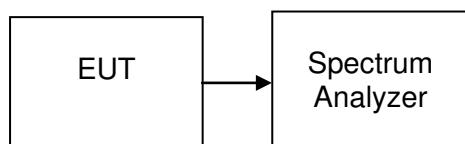
Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Calibration Due
Spectrum Analyzer	Agilent	N9010A	MY52221469	02/21/2016	02/20/2017

### 7.3.3. TEST PROCEDURES (please refer to measurement standard)

#### 8.1 Option 1:

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

### 7.3.4. TEST SETUP





### 7.3.5. TEST RESULTS

No non-compliance noted

#### Test Data

##### Test mode: IEEE 802.11b (Antenna 1)

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	8568	>500	PASS
Mid	2437	9520		PASS
High	2462	9070		PASS

##### Test mode: IEEE 802.11b (Antenna 2)

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	9528	>500	PASS
Mid	2437	9069		PASS
High	2462	9060		PASS

##### Test mode: IEEE 802.11g (Antenna 1)

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	16320	>500	PASS
Mid	2437	16300		PASS
High	2462	16310		PASS

##### Test mode: IEEE 802.11g (Antenna 2)

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	16290	>500	PASS
Mid	2437	15450		PASS
High	2462	16300		PASS

**Test mode: IEEE 802.11n HT20 MHz (Antenna 1)**

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	17500	>500	PASS
Mid	2437	17270		PASS
High	2462	17040		PASS

**Test mode: IEEE 802.11n HT20 MHz (Antenna 2)**

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	17515	>500	PASS
Mid	2437	17530		PASS
High	2462	16310		PASS

**Test mode: IEEE 802.11n HT40 MHz (Antenna 1)**

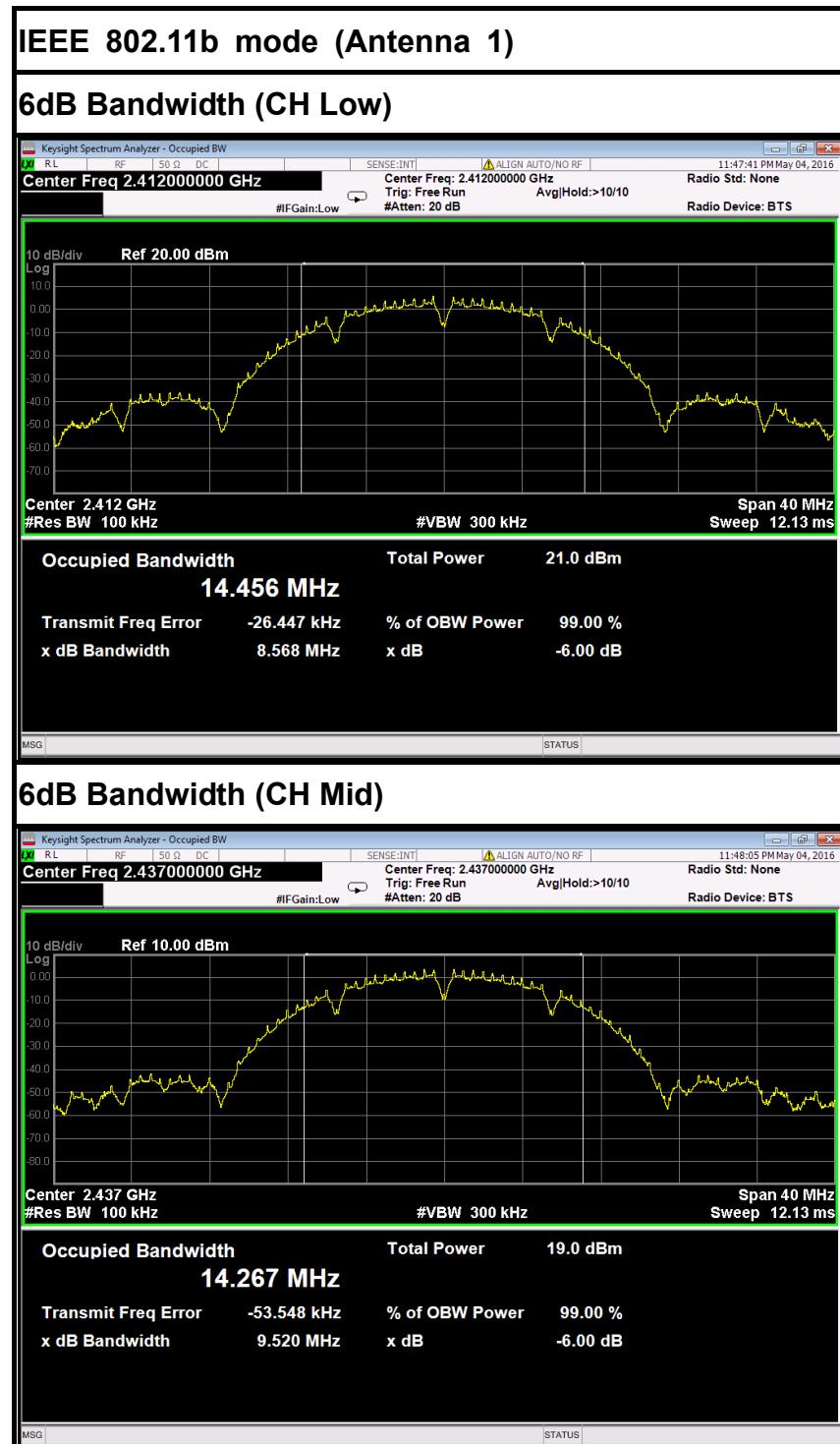
Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2422	35260	>500	PASS
Mid	2437	35390		PASS
High	2452	35000		PASS

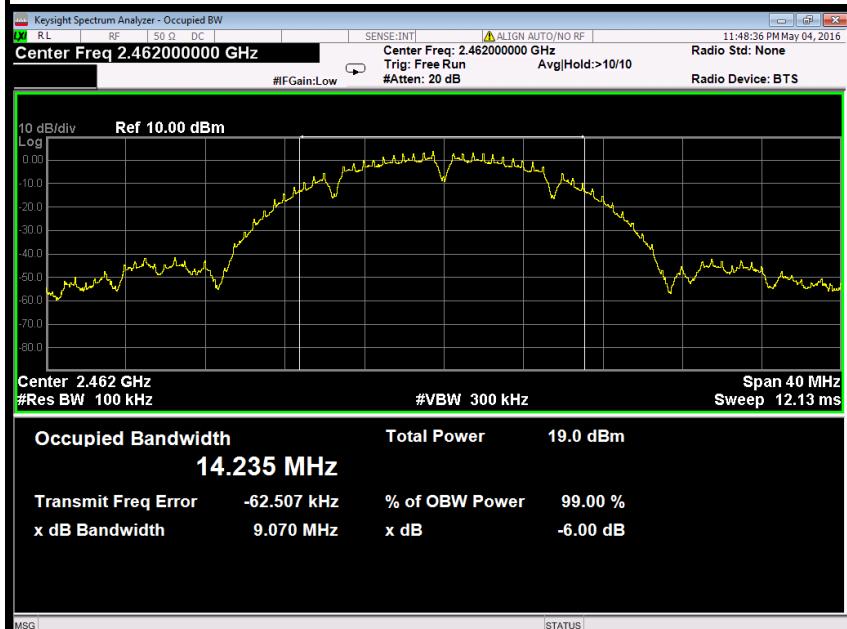
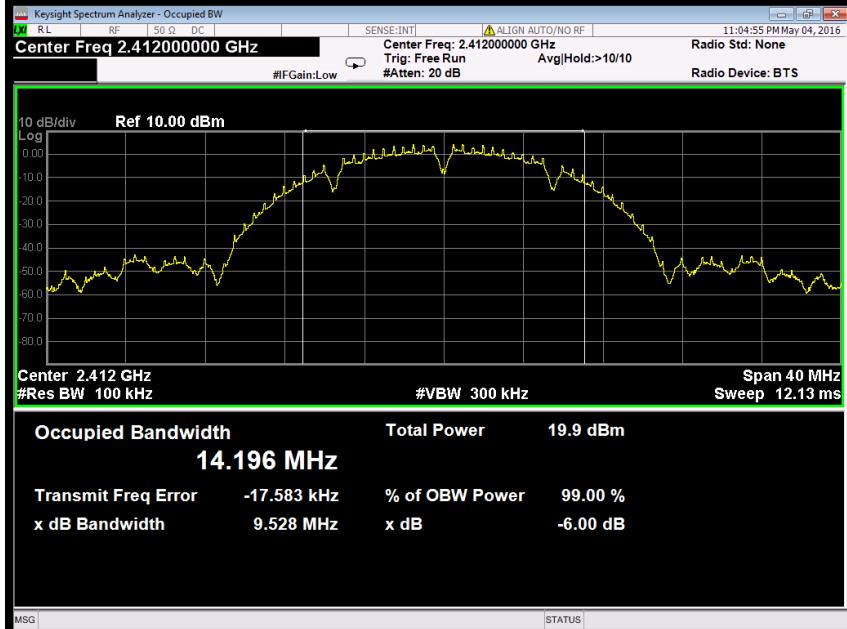
**Test mode: IEEE 802.11n HT40 MHz (Antenna 2)**

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2422	35040	>500	PASS
Mid	2437	22800		PASS
High	2452	34420		PASS



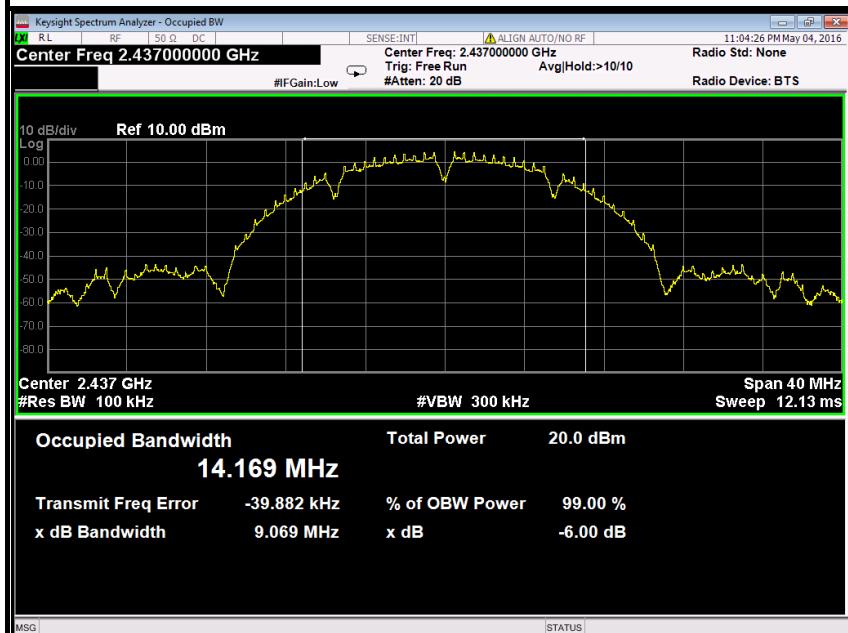
## Test Plot



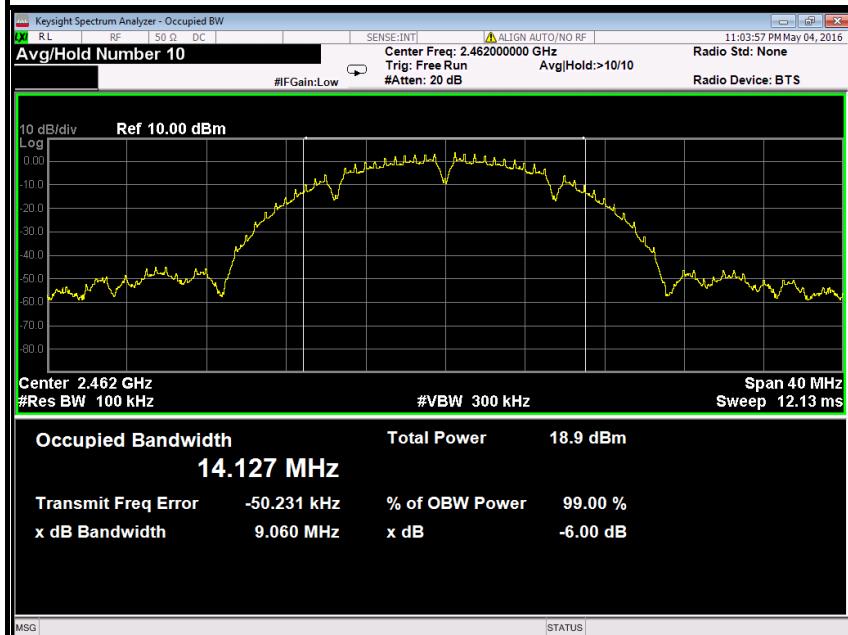
**6dB Bandwidth (CH High)****IEEE 802.11b mode (Antenna 2)****6dB Bandwidth (CH Low)**

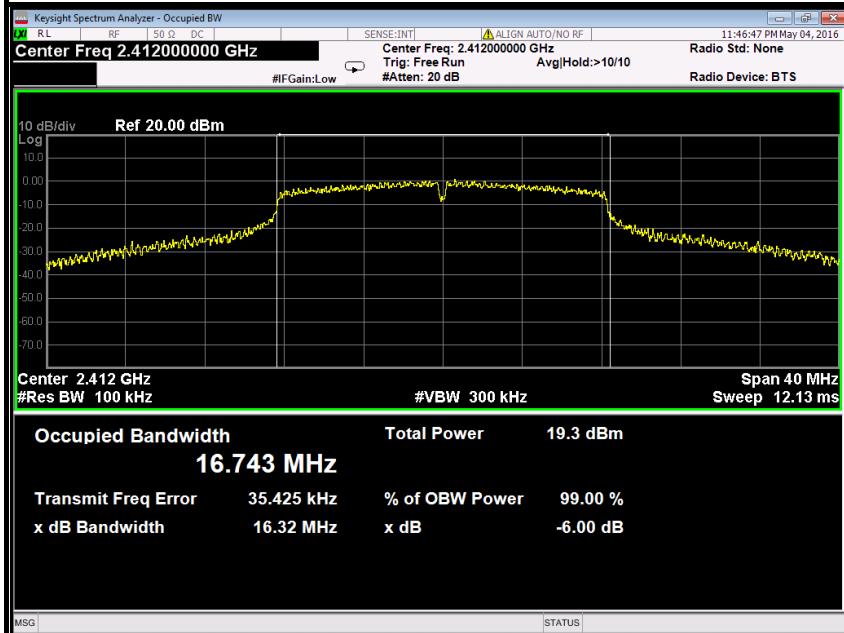
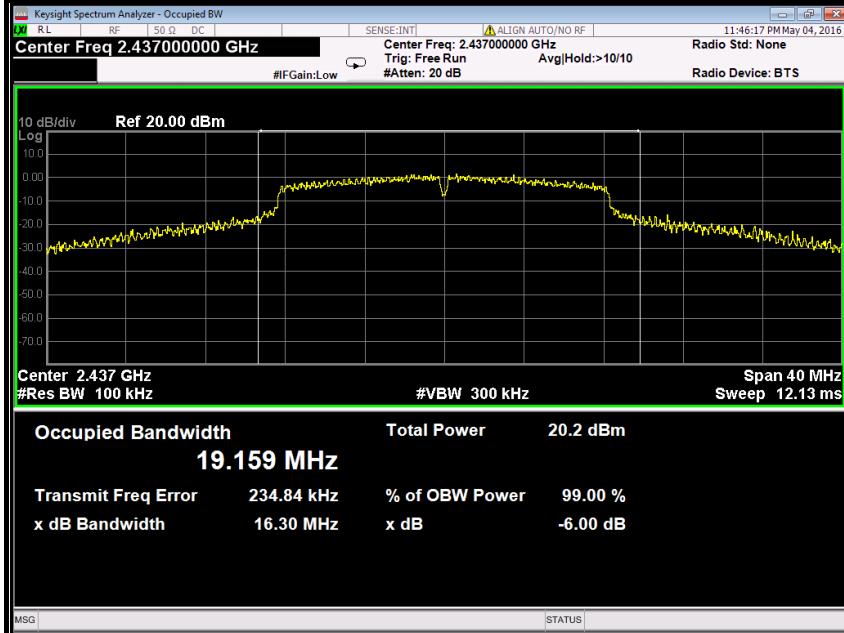


### 6dB Bandwidth (CH Mid)



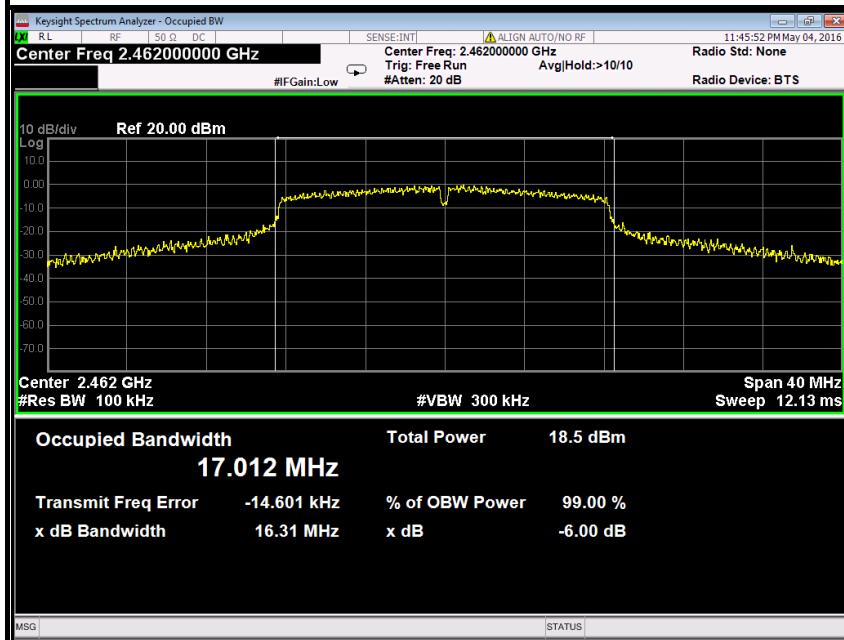
### 6dB Bandwidth (CH High)



**IEEE 802.11g mode (Antenna 1)****6dB Bandwidth (CH Low)****6dB Bandwidth (CH Mid)**

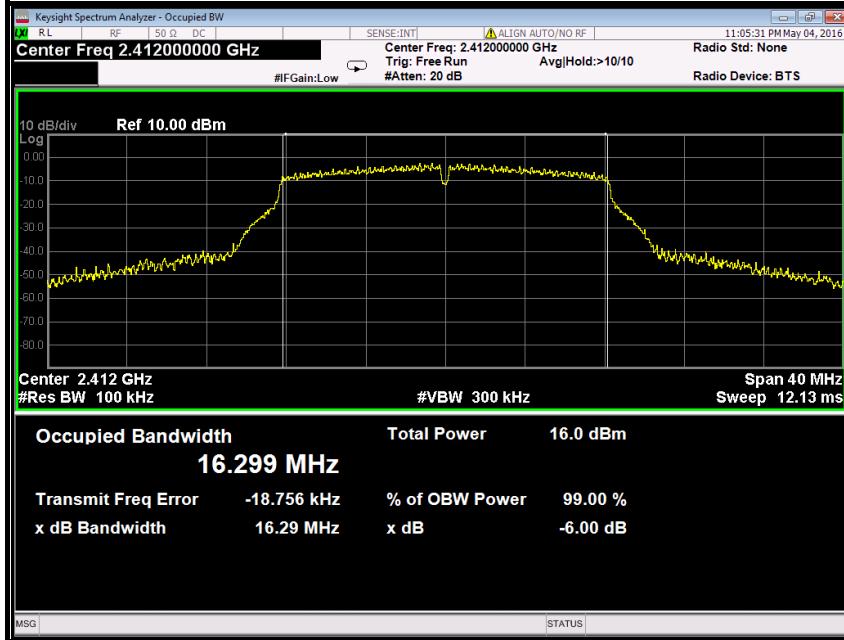


### 6dB Bandwidth (CH High)



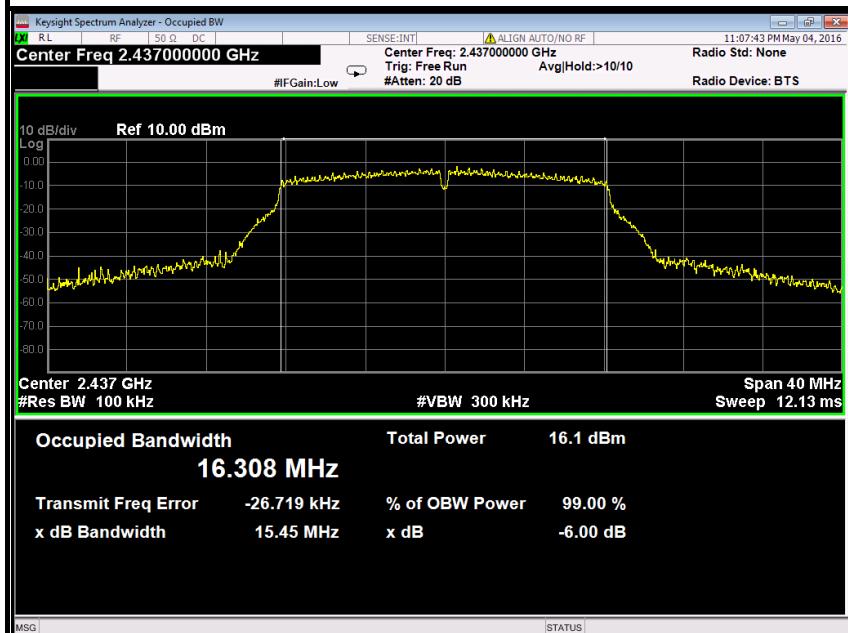
### IEEE 802.11g mode (Antenna 2)

### 6dB Bandwidth (CH Low)

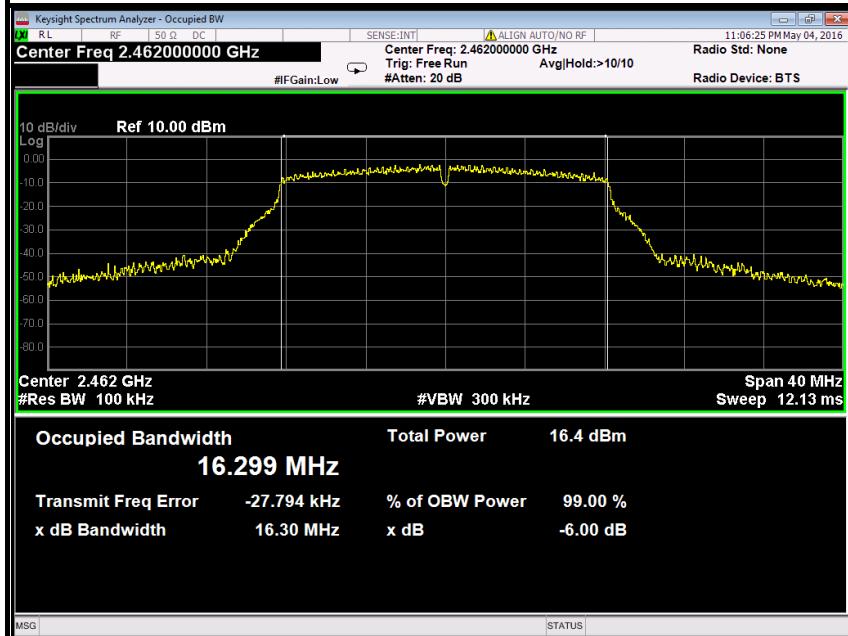


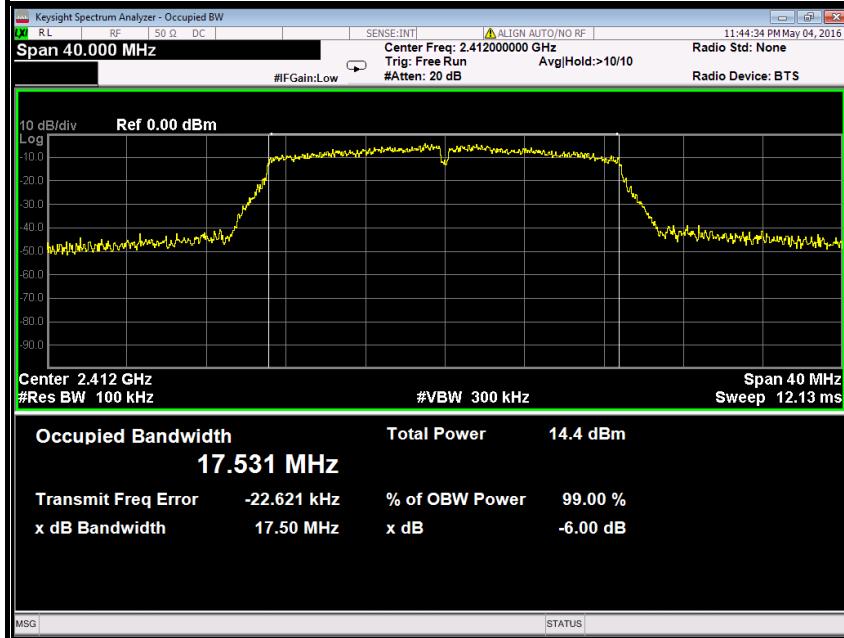
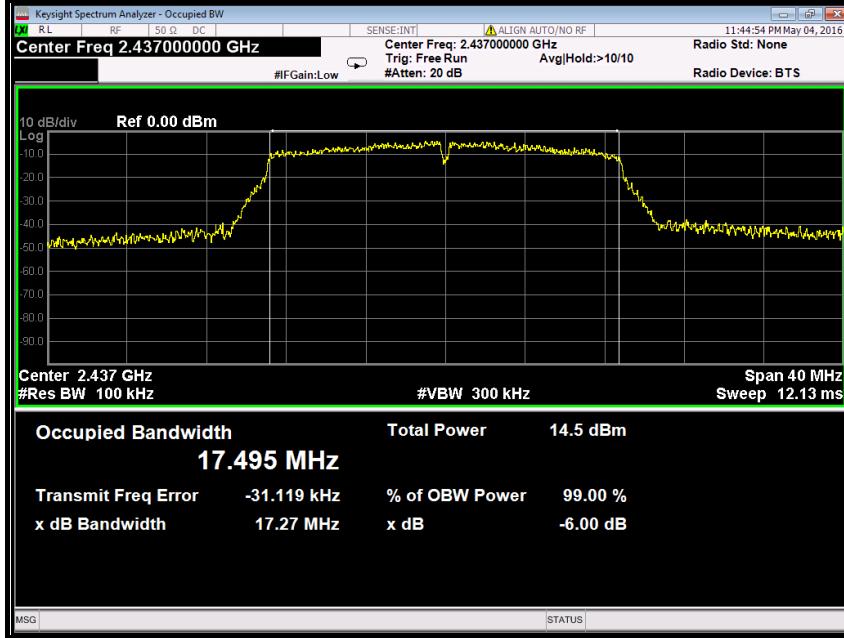


### 6dB Bandwidth (CH Mid)



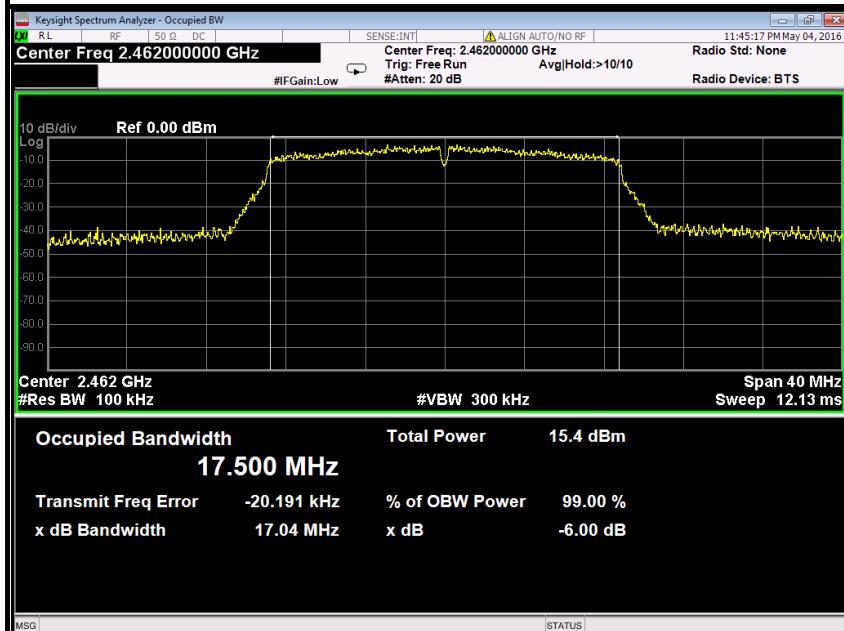
### 6dB Bandwidth (CH High)



**IEEE 802.11n HT20 MHz mode (Antenna 1)****6dB Bandwidth (CH Low)****6dB Bandwidth (CH Mid)**

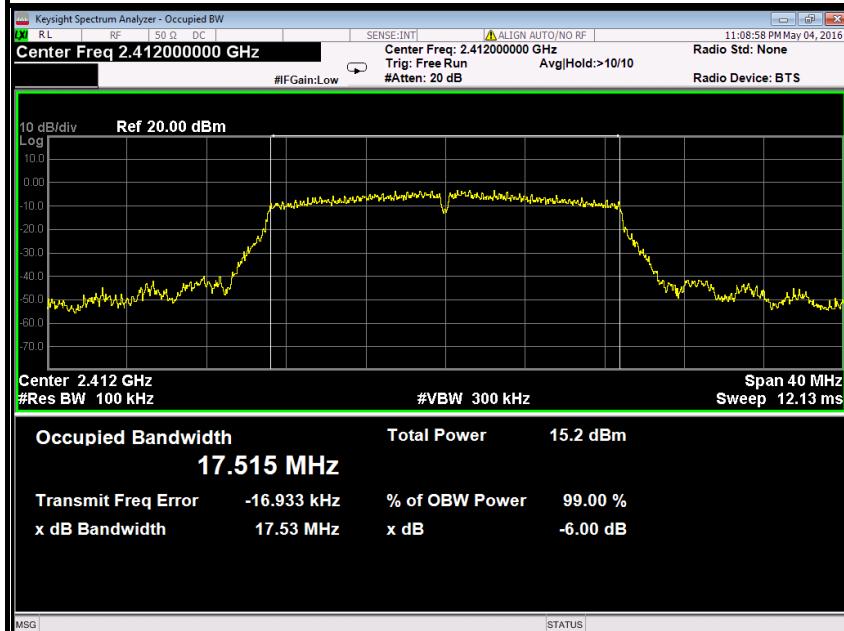


### 6dB Bandwidth (CH High)



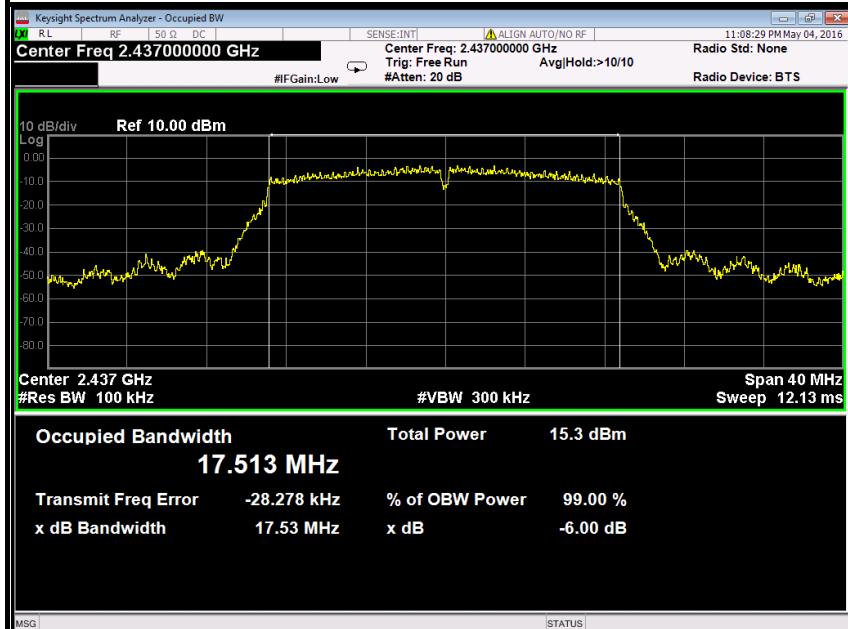
### IEEE 802.11n HT20 MHz mode (Antenna 2)

### 6dB Bandwidth (CH Low)

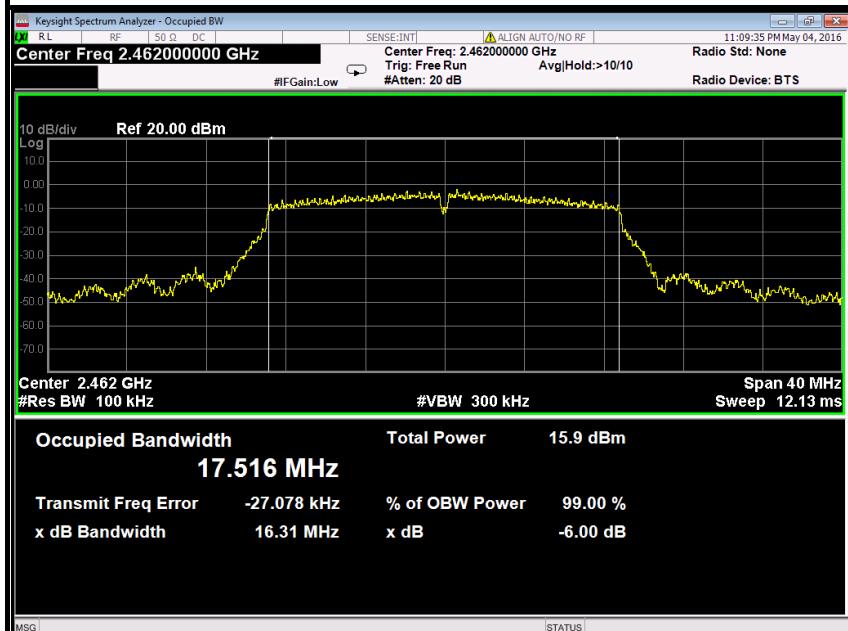


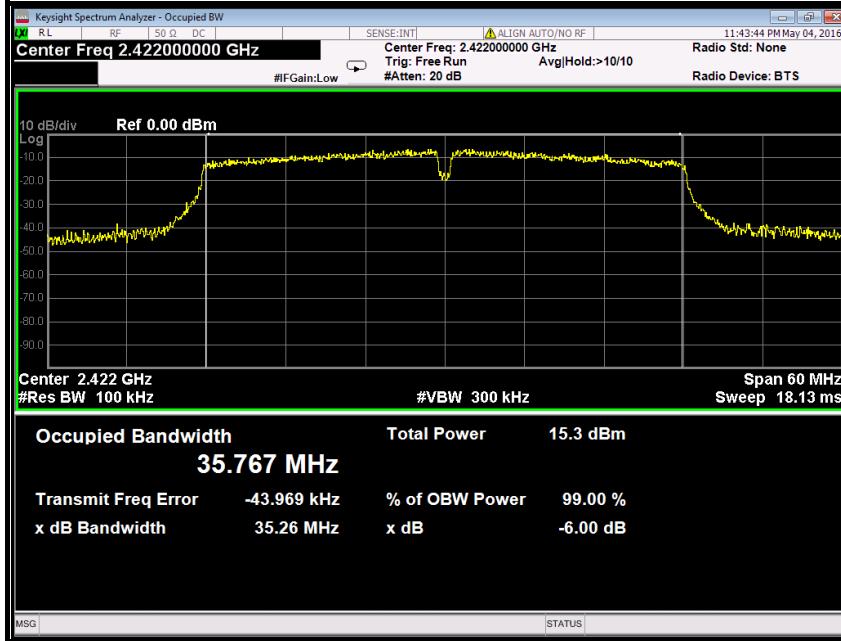
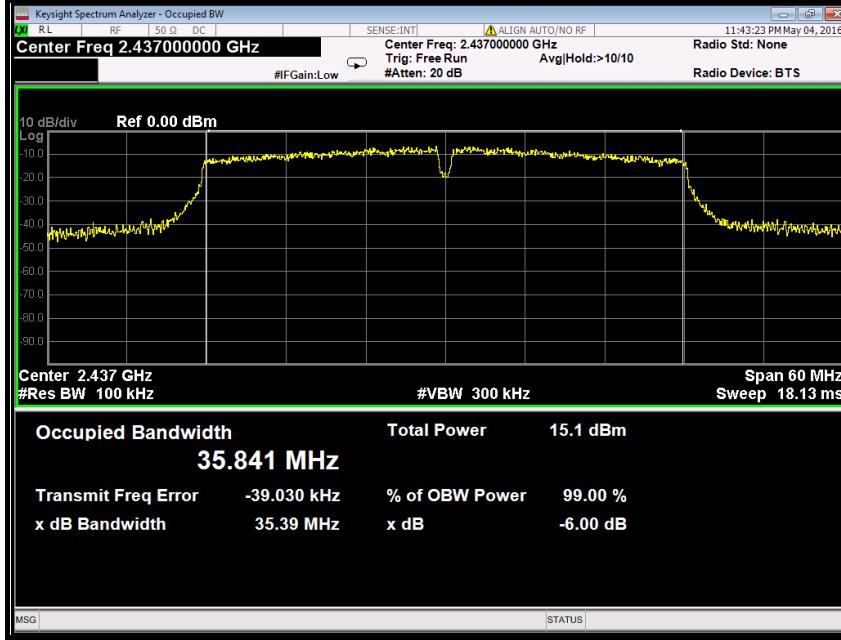


### 6dB Bandwidth (CH Mid)



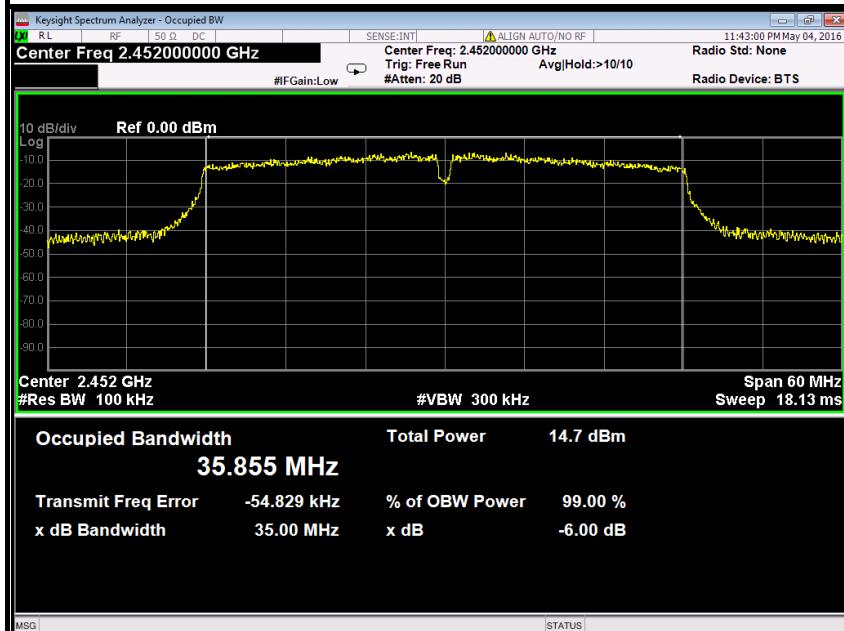
### 6dB Bandwidth (CH High)



**IEEE 802.11n HT40 MHz mode (Antenna 1)****6dB Bandwidth (CH Low)****6dB Bandwidth (CH Mid)**

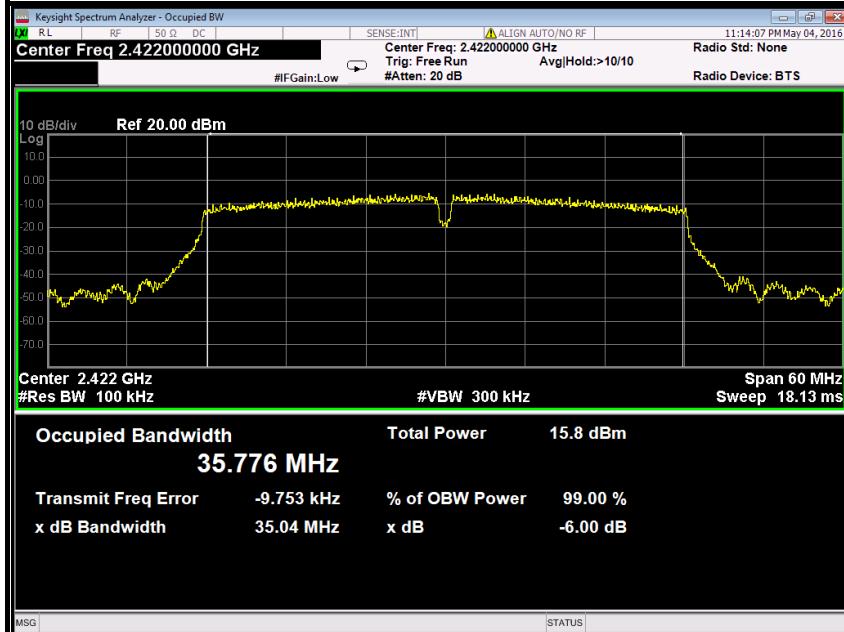


### 6dB Bandwidth (CH High)



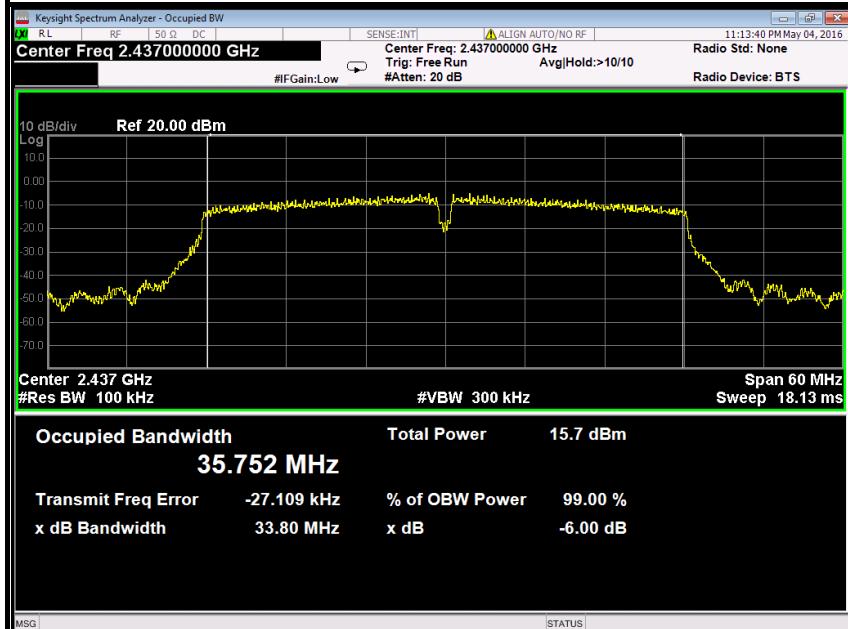
### IEEE 802.11n HT40 MHz mode (Antenna 2)

### 6dB Bandwidth (CH Low)

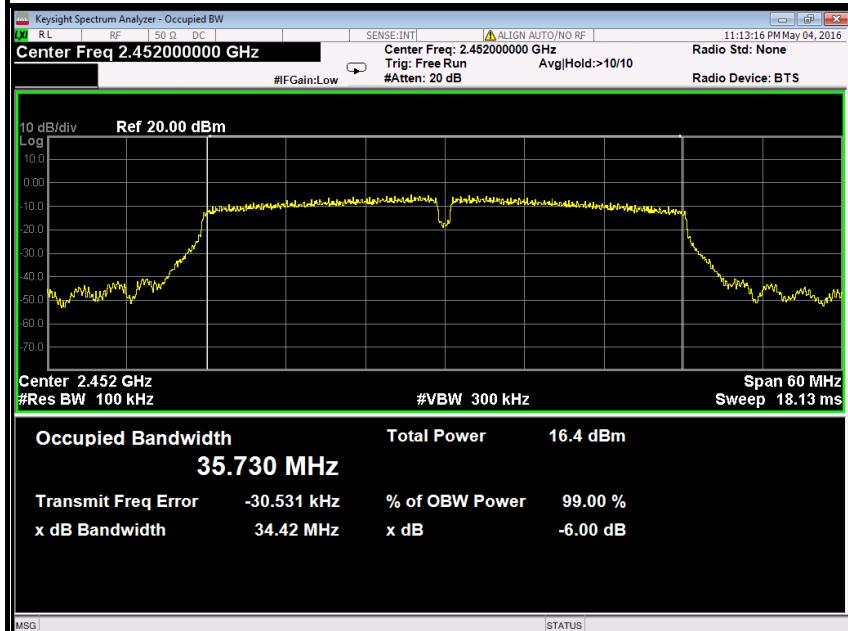




### 6dB Bandwidth (CH Mid)



### 6dB Bandwidth (CH High)





## 7.4. ANTENNA GAIN

### MEASUREMENT

The antenna gain of the complete system is calculated by the difference of radiated power in EIRP and the conducted power of the module. For normal WLAN devices, the DSSS mode is used.

### MEASUREMENT PARAMETERS

Measurement parameter	
Detector	Peak
Sweep time	Auto
Resolution bandwidth	3 MHz
Video bandwidth	3 MHz
Trace-Mode	Max hold

### LIMITS

FCC	IC
Antenna Gain	
6 dBi	



## TEST RESULTS

### IEEE 802.11g mode (Antenna 1)

T <sub>nom</sub>	V <sub>nom</sub>	Lowest channel 2412MHz	Middle channel 2437MHz	Highest channel 2462MHz
Conducted power [dBm/MHz] Measured with DSSS modulation		4.65	2.28	2.59
Radiated power [dBm/MHz] Measured with DSSS modulation		6.56	4.43	4.30
Gain [dBi] Calculated		1.91	2.15	1.71
Measurement uncertainty	$\pm 1.5$ dB (cond.) / $\pm 3$ dB (rad.)			

### IEEE 802.11g mode (Antenna 2)

T <sub>nom</sub>	V <sub>nom</sub>	Lowest channel 2412MHz	Middle channel 2437MHz	Highest channel 2462MHz
Conducted power [dBm/MHz] Measured with DSSS modulation		1.86	1.50	2.44
Radiated power [dBm/MHz] Measured with DSSS modulation		4.42	4.33	4.23
Gain [dBi] Calculated		2.56	2.83	1.79
Measurement uncertainty	$\pm 1.5$ dB (cond.) / $\pm 3$ dB (rad.)			



## 7.5. PEAK OUTPUT POWER

### 7.5.1. LIMITS

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.

### 7.5.2. TEST INSTRUMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Calibration Due
Power Meter	Anritsu	ML2495A	1204003	02/21/2016	02/20/2017
Power Sensor	Anritsu	MA2411B	1126150	02/21/2016	02/20/2017
Spectrum Analyzer	Agilent	E4446A	US44300399	02/21/2016	02/20/2017

### 7.5.3. TEST PROCEDURES (please refer to measurement standard)

#### 9.1.1 RBW $\geq$ DTS bandwidth

This procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the *DTS bandwidth*.

- a) Set the RBW  $\geq$  *DTS bandwidth*.
- b) Set VBW  $\geq$  3 RBW.
- c) Set span  $\geq$  3 x RBW
- d) Sweep time = auto couple.
- e) Detector = peak.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use peak marker function to determine the peak amplitude level.



### 9.1.2 Integrated band power method

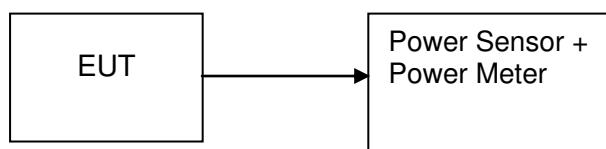
This procedure may be used when the maximum available RBW of the measurement instrument is less than the *DTS bandwidth*.

- a) Set the RBW = 1 MHz.
- b) Set the VBW  $\geq$  3 RBW
- c) Set the span  $\geq$  1.5 x DTS bandwidth.
- d) Detector = peak.
- e) Sweep time = auto couple.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some instruments, this may require a manual override to select peak detector). If the instrument does not have a band power function, sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the DTS bandwidth.

### 9.1.3 PKPM1 Peak power meter method

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

#### 7.5.4. TEST SETUP





### 7.5.5. TEST RESULTS

No non-compliance noted

#### Test Data

##### Test mode: IEEE 802.11b (Antenna 1)

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Peak/Avg	Result
Low	2412	16.11	0.04083	1	Peak	PASS
Mid	2437	13.74	0.02366			PASS
High	2462	14.05	0.02541			PASS
Low	2412	14.42	0.02767		AVG	PASS
Mid	2437	12.04	0.01600			PASS
High	2462	12.31	0.01702			PASS

##### Test mode: IEEE 802.11b (Antenna 2)

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Peak/Avg	Result
Low	2412	13.32	0.02148	1	Peak	PASS
Mid	2437	12.96	0.01977			PASS
High	2462	13.9	0.02455			PASS
Low	2412	11.56	0.01432		AVG	PASS
Mid	2437	11.25	0.01334			PASS
High	2462	12.17	0.01648			PASS

##### Test mode: IEEE 802.11g (Antenna 1)

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Peak/Avg	Result
Low	2412	19.11	0.08147	1	Peak	PASS
Mid	2437	19.32	0.08551			PASS
High	2462	18.95	0.07852			PASS
Low	2412	13.27	0.02123		AVG	PASS
Mid	2437	14.05	0.02541			PASS
High	2462	12.53	0.01791			PASS

##### Test mode: IEEE 802.11g (Antenna 2)

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Peak/Avg	Result
Low	2412	19.9	0.09772	1	Peak	PASS
Mid	2437	20.12	0.10280			PASS
High	2462	20.36	0.10864			PASS
Low	2412	9.87	0.00971		AVG	PASS
Mid	2437	10.03	0.01007			PASS
High	2462	10.55	0.01135			PASS

**Test mode: IEEE 802.11n HT20 MHz(Combine with Antenna 1 and Antenna 2)**

Channel	Frequency	Output Power			Output Power	Limit (W)	Detector Function	Result
		Antenna 1	Antenna 2	Total				
Low	2412	17.54	20.35	22.18	0.16515	1	Peak	PASS
Mid	2437	17.23	19.61	21.59	0.14426			PASS
High	2462	17.29	20.09	21.92	0.15567			PASS
Low	2412	8.53	9.45	12.02	0.01594		AVG	PASS
Mid	2437	8.7	9.29	12.02	0.01590			PASS
High	2462	9.59	9.76	12.69	0.01856			PASS

**Test mode: IEEE 802.11n HT40 MHz(Combine with Antenna 1 and Antenna 2)**

Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)	Limit (W)	Detector Function	Result
		Antenna 1	Antenna 2	Total				
Low	2422	17.29	19.19	21.35	0.13656	1	Peak	PASS
Mid	2437	17.44	19.29	21.47	0.14038			PASS
High	2452	17.38	18.71	21.11	0.12900			PASS
Low	2422	9.59	9.85	12.73	0.01876		AVG	PASS
Mid	2437	9.47	10.10	12.81	0.01908			PASS
High	2452	9.5	10.01	12.77	0.01894			PASS



## 7.6. BAND EDGES MEASUREMENT

### 7.6.1. LIMITS

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)).

### 7.6.2. TEST INSTRUMENTS

Radiated Emission Test Site 966 (2)					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
PSA Series Spectrum Analyzer	Agilent	E4446A	US44300399	02/21/2016	02/20/2017
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100783	02/21/2016	02/20/2017
Amplifier	EMEC	EM330	060661	03/18/2016	03/17/2017
High Noise Amplifier	Agilent	8449B	3008A01838	02/21/2016	02/20/2017
Loop Antenna	COM-POWER	AL-130	121044	09/25/2015	09/24/2016
Bilog Antenna	SCHAFFNER	CBL6143	5082	02/21/2016	02/20/2017
Horn Antenna	SCHWARZBECK	BBHA9120	D286	02/28/2016	02/27/2017
Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170-497	02/28/2016	02/27/2017
Turn Table	N/A	N/A	N/A	N.C.R	N.C.R
Controller	Sunol Sciences	SC104V	022310-1	N.C.R	N.C.R
Controller	CT	N/A	N/A	N.C.R	N.C.R
Temp. / Humidity Meter	Anymetre	JR913	N/A	02/21/2016	02/20/2017
Antenna Tower	SUNOL	TLT2	N/A	N.C.R	N.C.R
Test S/W	FARAD	LZ-RF / CCS-SZ-3A2			

**NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

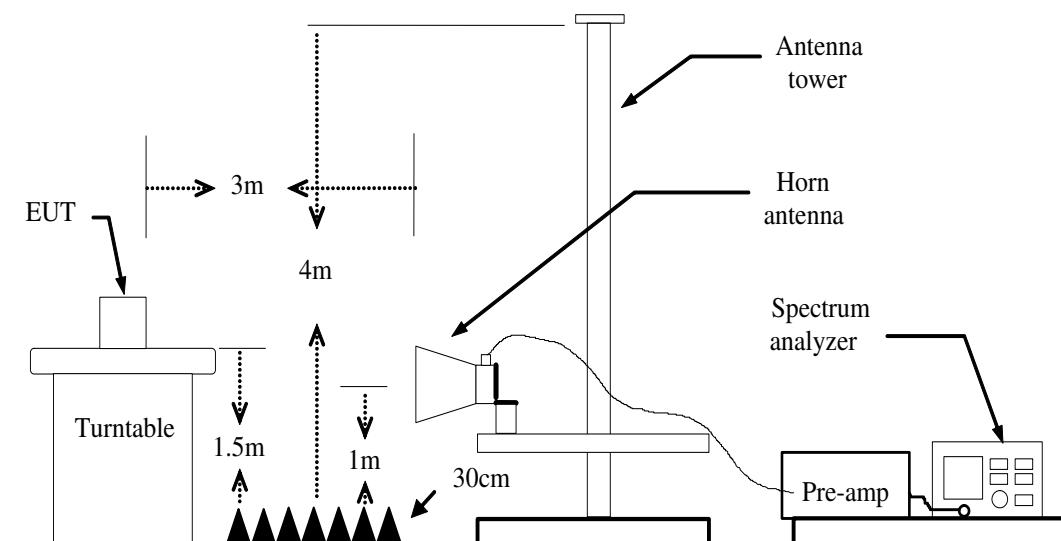
2. The FCC Site Registration number is 101879.

3. N.C.R = No Calibration Required.

### 7.6.3. TEST PROCEDURES (please refer to measurement standard)

1. The EUT is placed on a turntable, which is 1.5m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
  - (a) PEAK: RBW=1MHz / VBW=3MHz / Sweep=AUTO
  - (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are

### 7.6.4. TEST SETUP





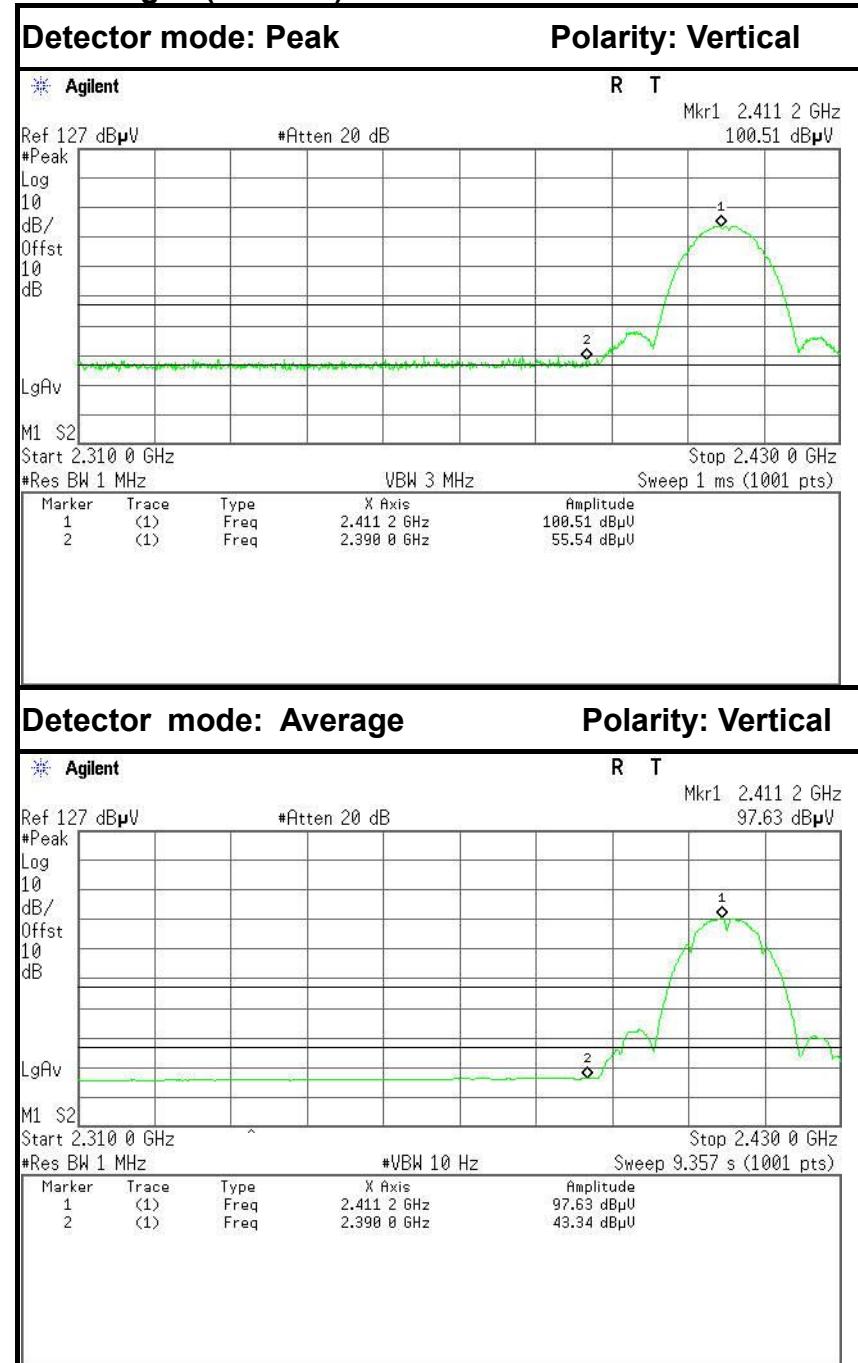
### 7.6.5. TEST RESULTS

#### Test Plot

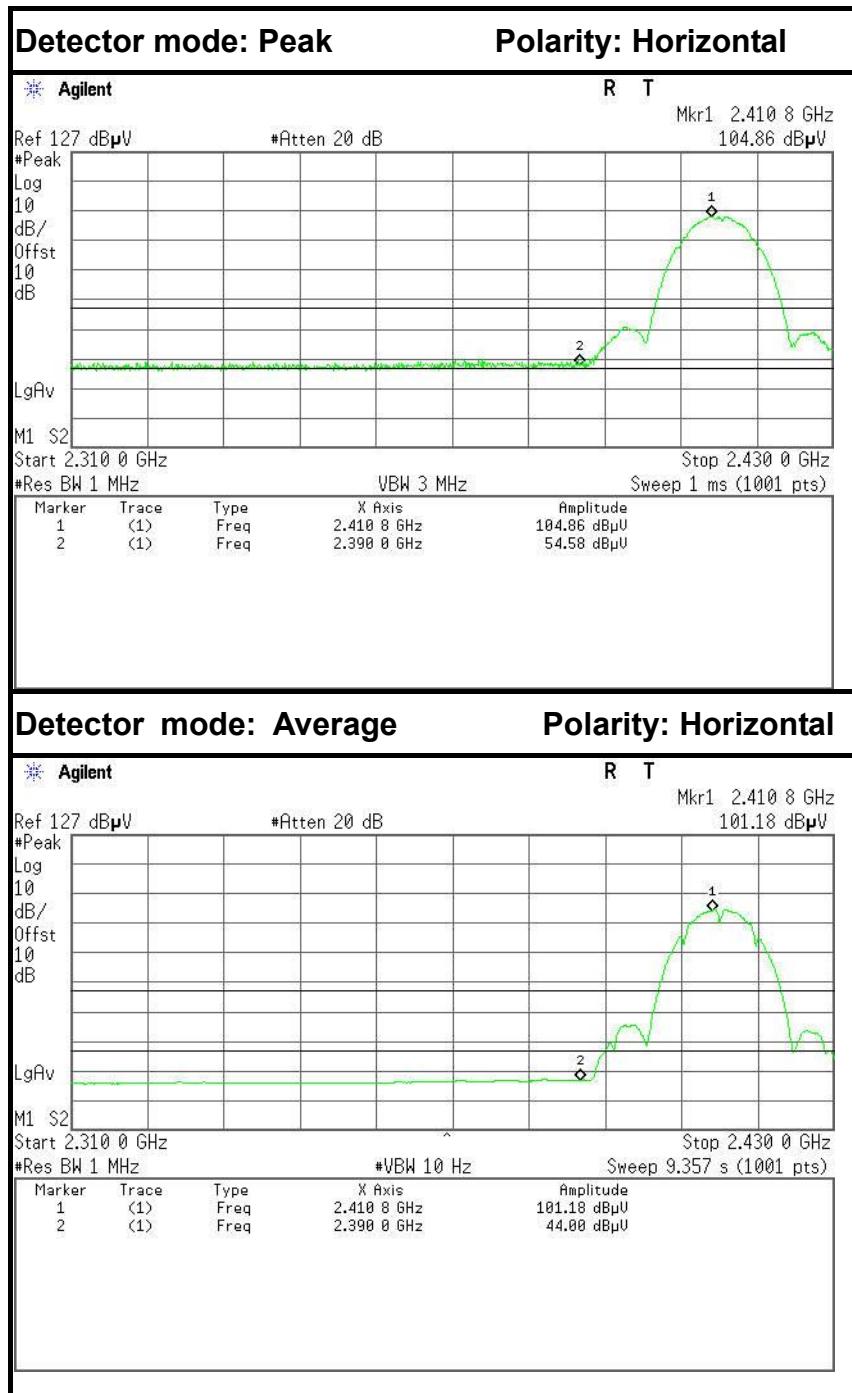
##### IEEE 802.11b mode (Antenna 1)

Model: PW5002

##### Band Edges (CH Low)



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	48.94	-6.60	55.54	74.00	-18.46	Peak	Vertical
2	2390.0000	36.74	-6.60	43.34	54.00	-10.66	Average	Vertical



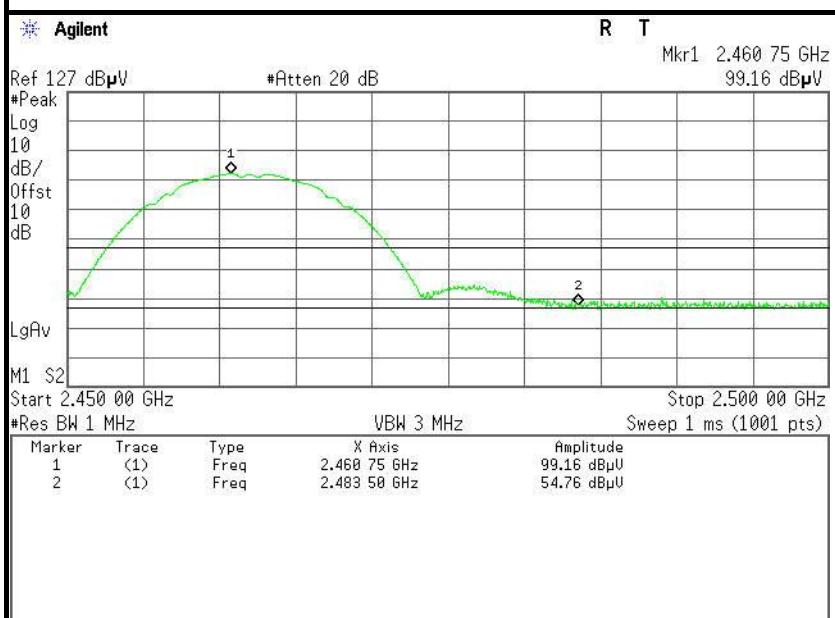
No.	Frequency (MHz)	Reading (dB $\mu$ V)	Corrected (dB)	Result (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	47.98	-6.60	54.58	74.00	-19.42	Peak	Horizontal
2	2390.0000	37.40	-6.60	44.00	54.00	-10.00	Average	Horizontal



## Band Edges (CH High)

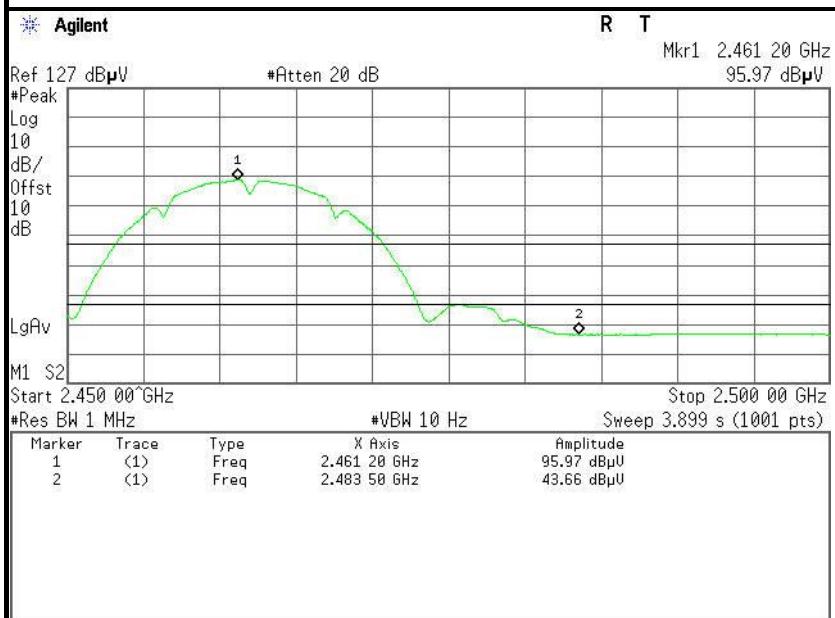
Detector mode: Peak

Polarity: Vertical

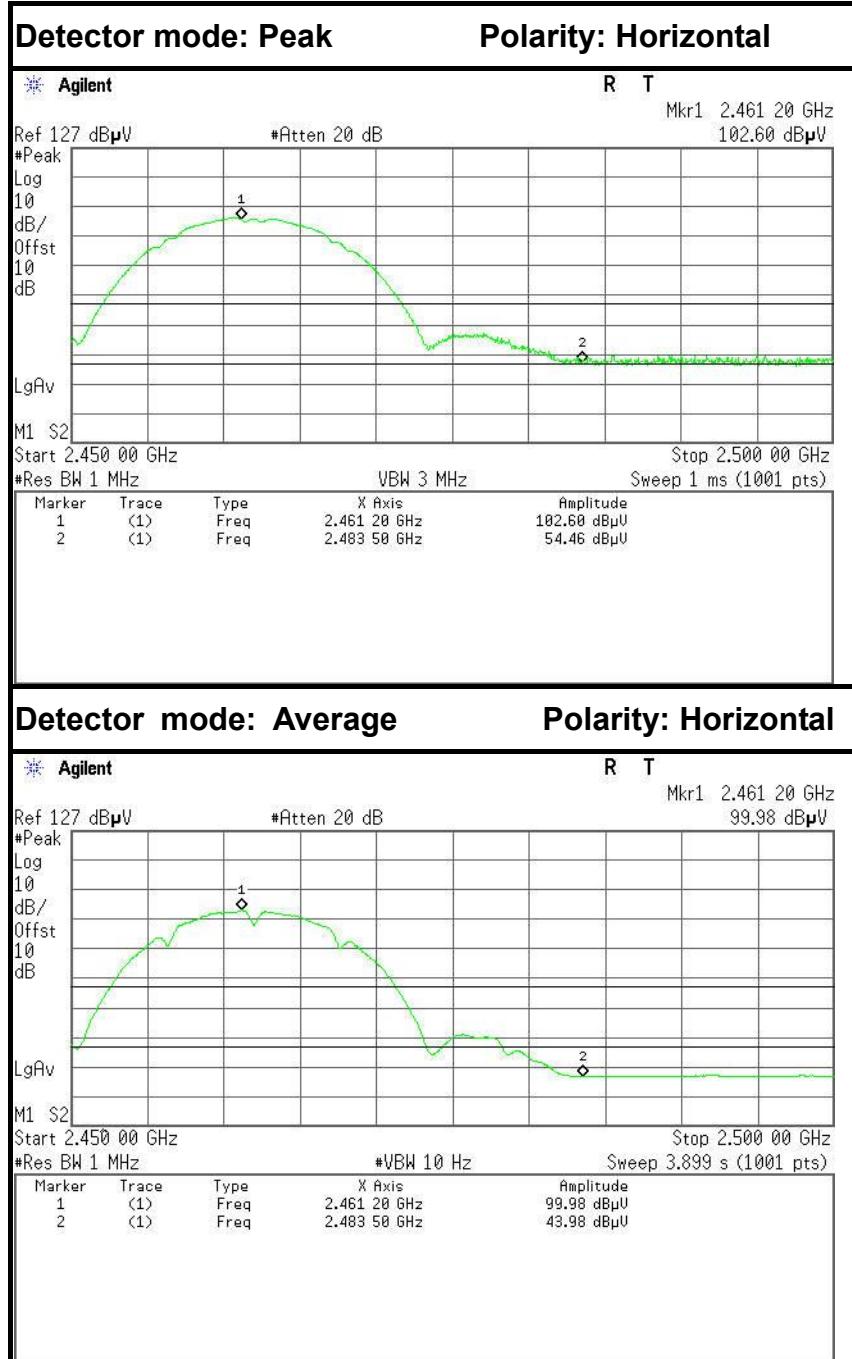


Detector mode: Average

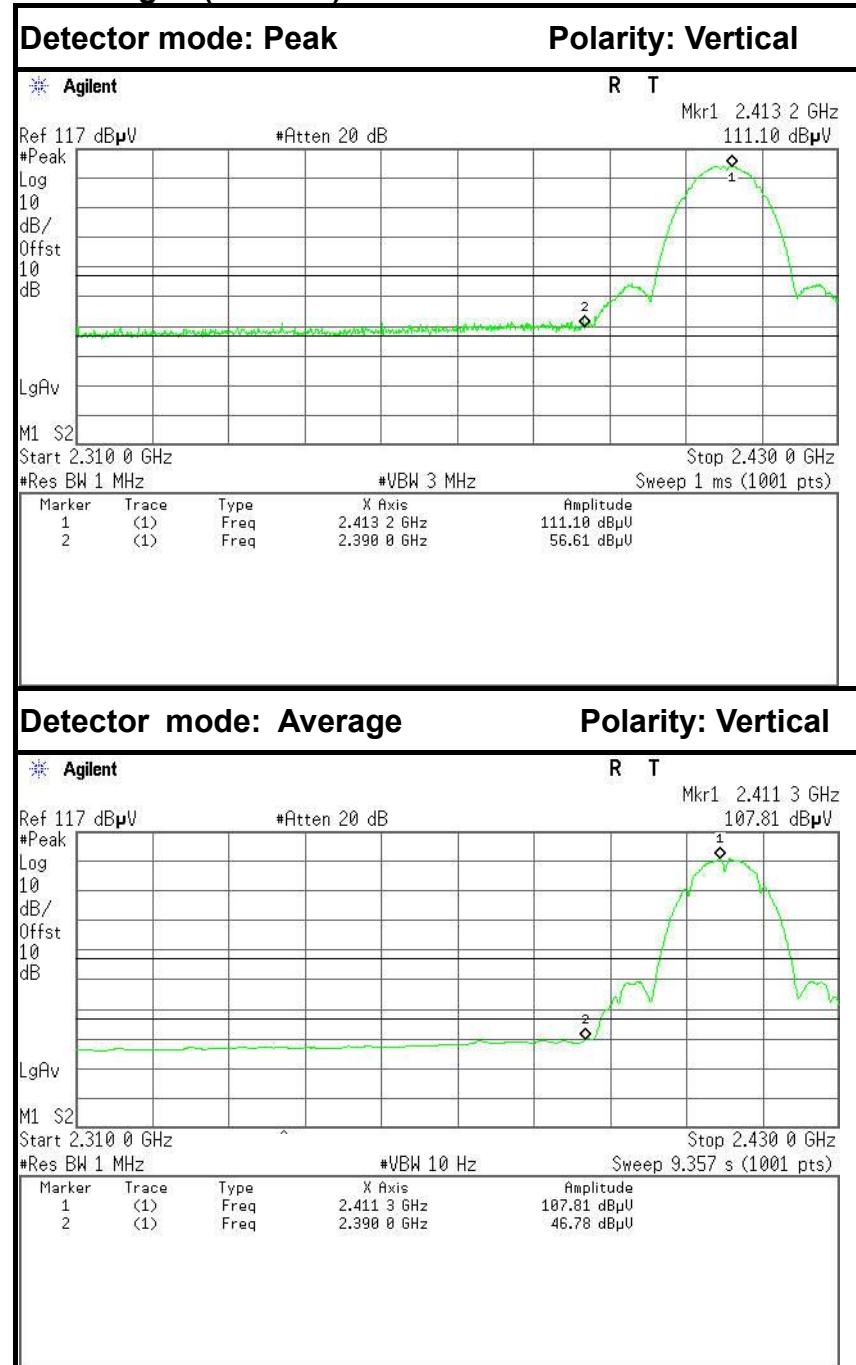
Polarity: Vertical



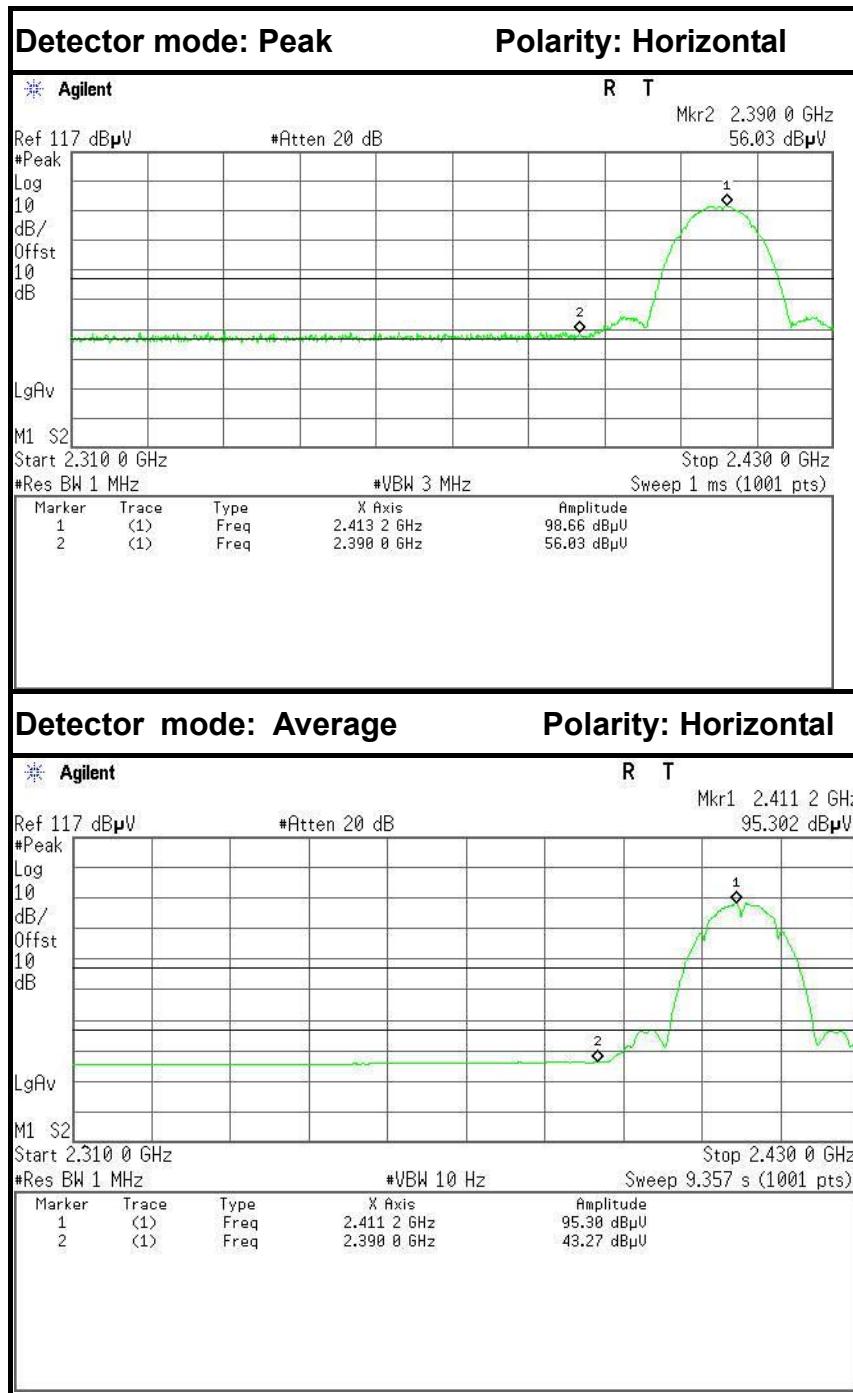
No.	Frequency (MHz)	Reading (dB $\mu$ V)	Corrected (dB)	Result (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	48.52	-6.24	54.76	74.00	-19.24	Peak	Vertical
2	2483.5000	37.42	-6.24	43.66	54.00	-10.34	Average	Vertical



No.	Frequency (MHz)	Reading (dB $\mu$ V)	Corrected (dB)	Result (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	48.22	-6.24	54.46	74.00	-19.54	Peak	Horizontal
2	2483.5000	37.74	-6.24	43.98	54.00	-10.02	Average	Horizontal

**Model: PW5003****Band Edges (CH Low)**

No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	50.01	-6.60	56.61	74.00	-17.39	Peak	Vertical
2	2390.0000	40.18	-6.60	46.78	54.00	-7.22	Average	Vertical



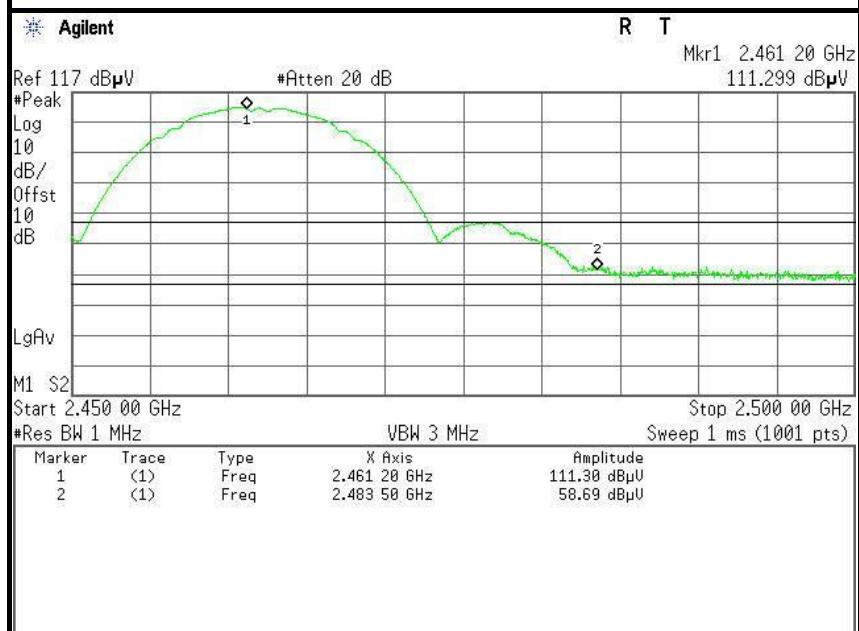
No.	Frequency (MHz)	Reading (dB $\mu$ V)	Corrected (dB)	Result (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	49.43	-6.60	56.03	74.00	-17.97	Peak	Horizontal
2	2390.0000	36.67	-6.60	43.27	54.00	-10.73	Average	Horizontal



## Band Edges (CH High)

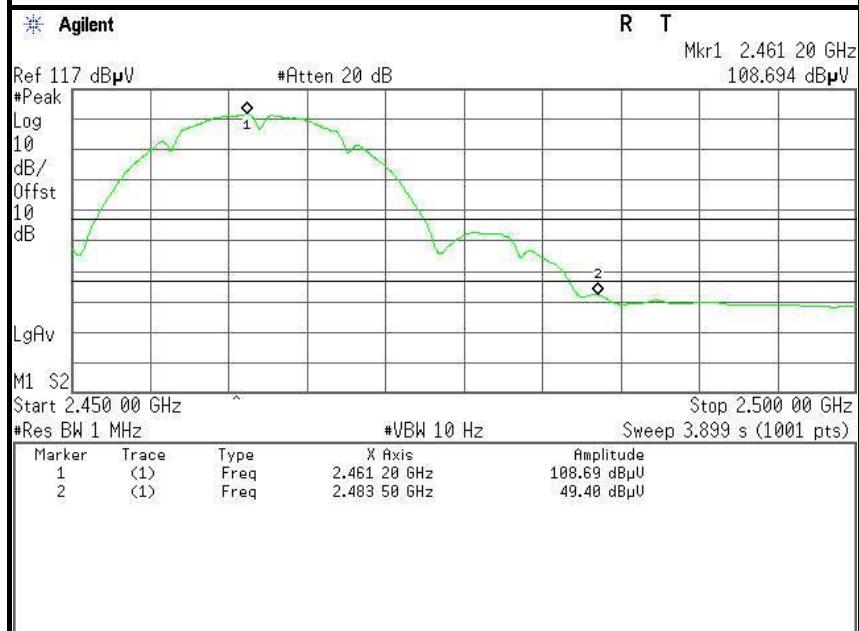
Detector mode: Peak

Polarity: Vertical

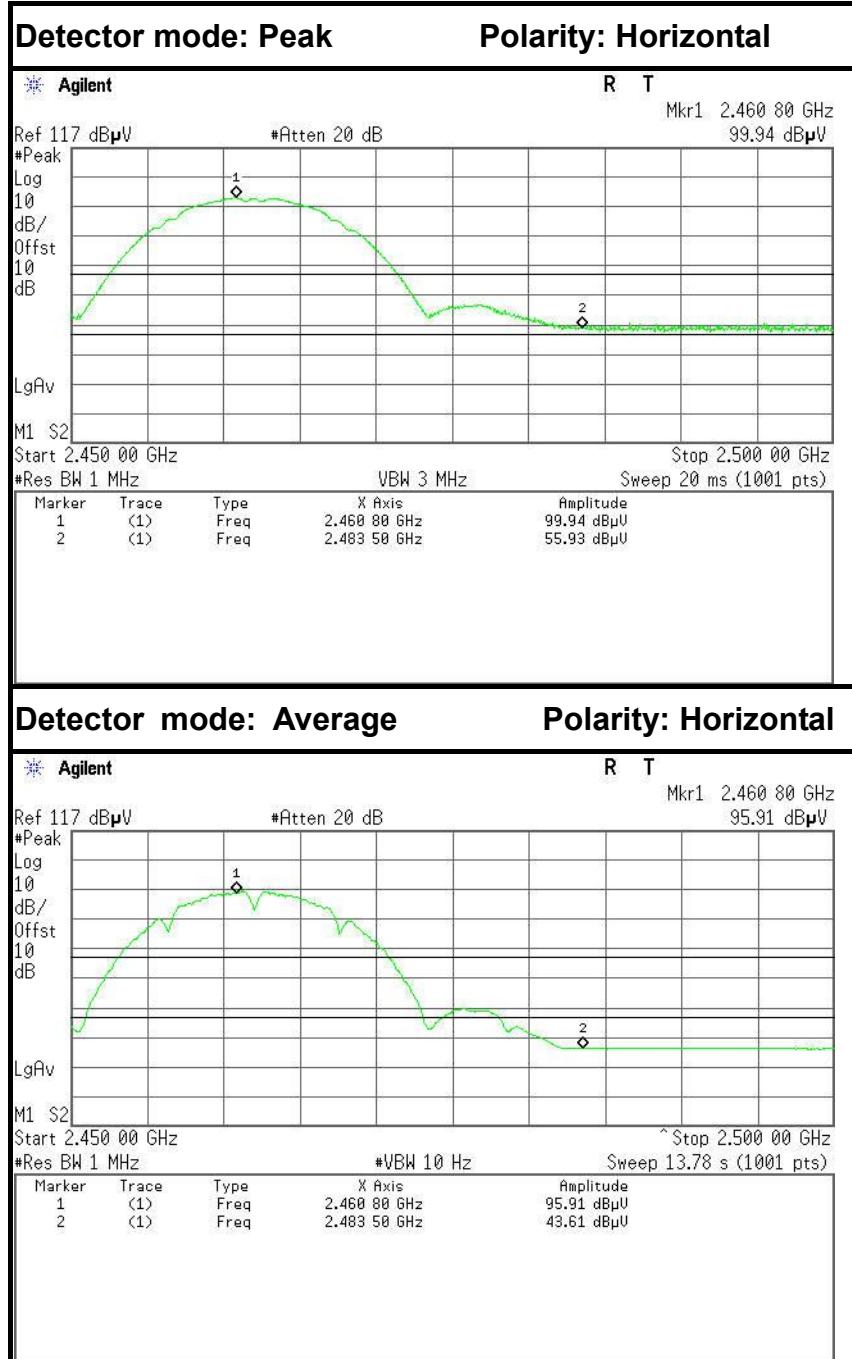


Detector mode: Average

Polarity: Vertical



No.	Frequency (MHz)	Reading (dB $\mu$ V)	Corrected (dB)	Result (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	52.45	-6.24	58.69	74.00	-15.31	Peak	Vertical
2	2483.5000	43.16	-6.24	49.40	54.00	-4.60	Average	Vertical



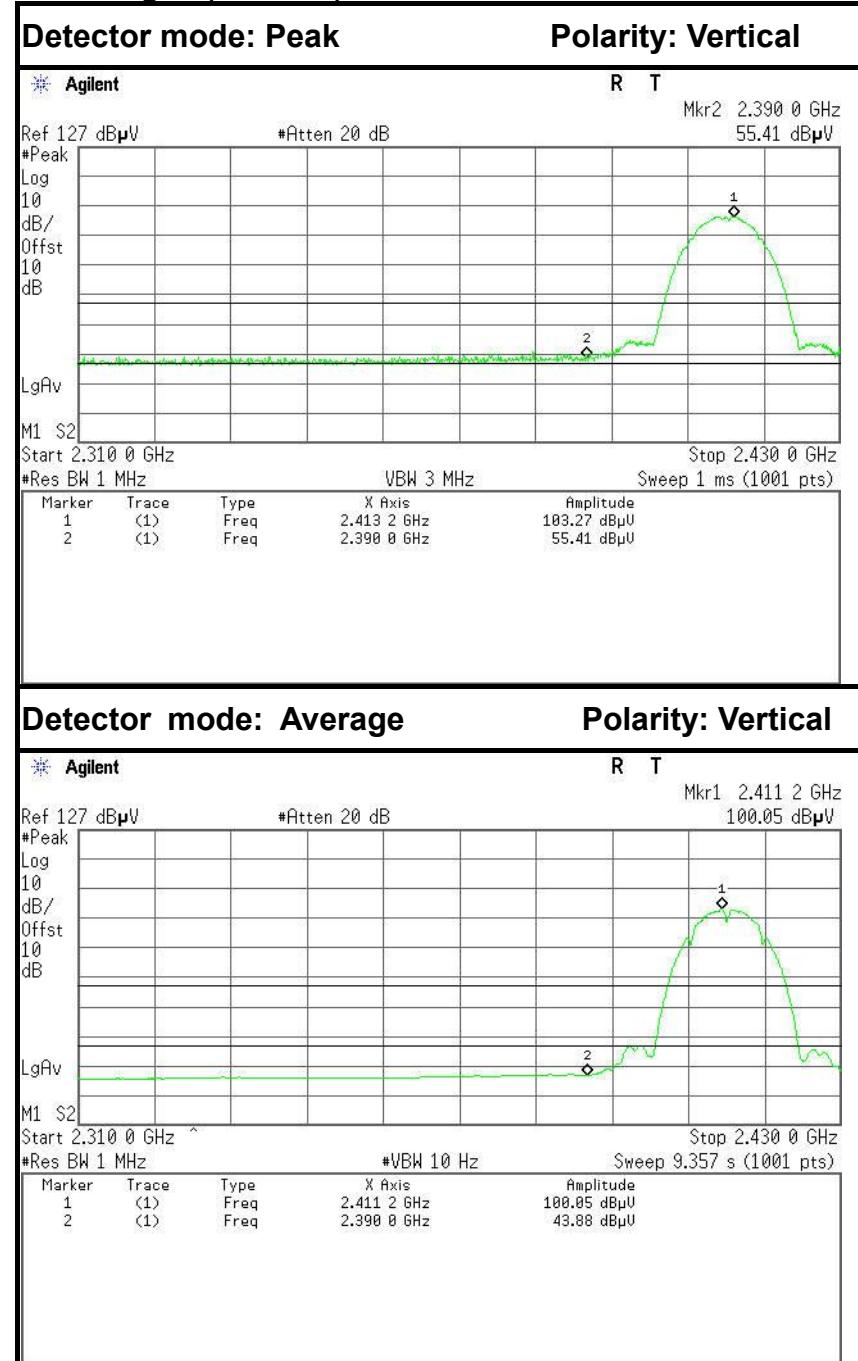
No.	Frequency (MHz)	Reading (dB $\mu$ V)	Corrected (dB)	Result (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	49.69	-6.24	55.93	74.00	-18.07	Peak	Horizontal
2	2483.5000	37.37	-6.24	43.61	54.00	-10.39	Average	Horizontal



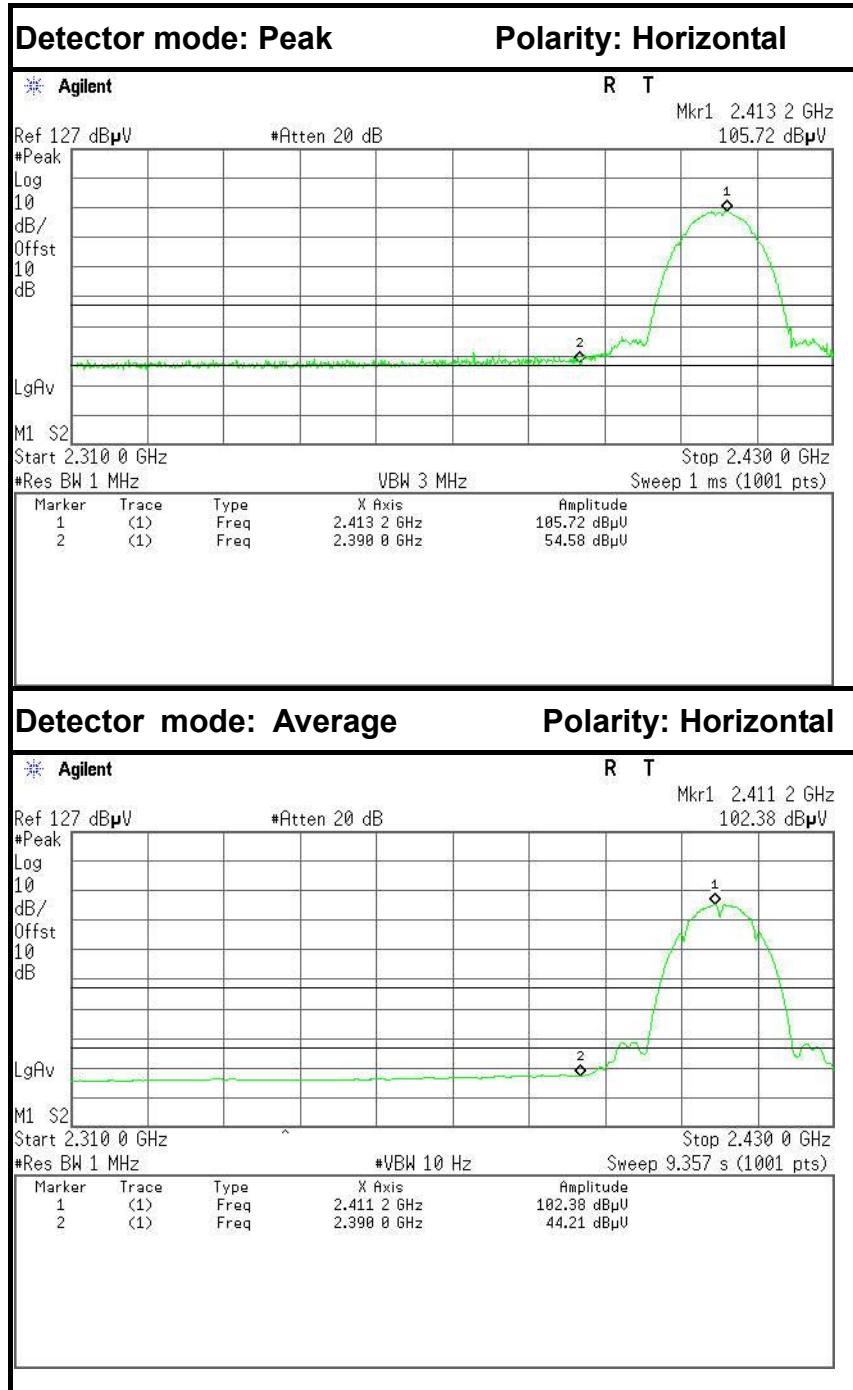
## IEEE 802.11b mode (Antenna 2)

Model: PW5002

## Band Edges (CH Low)



No.	Frequency (MHz)	Reading (dB $\mu$ V)	Corrected (dB)	Result (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	48.81	-6.60	55.41	74.00	-18.59	Peak	Vertical
2	2390.0000	37.28	-6.60	43.88	54.00	-10.12	Average	Vertical



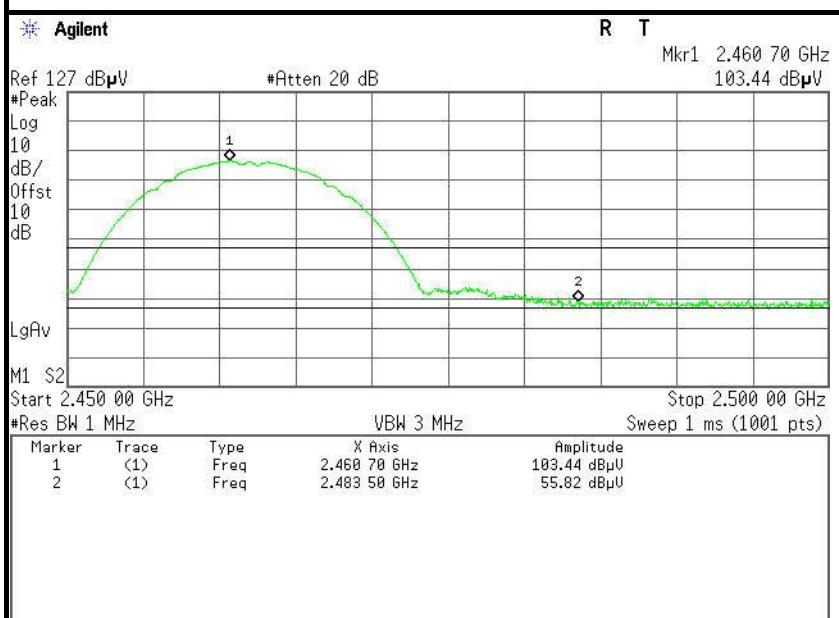
No.	Frequency (MHz)	Reading (dB $\mu$ V)	Corrected (dB)	Result (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	47.98	-6.60	54.58	74.00	-19.42	Peak	Horizontal
2	2390.0000	37.61	-6.60	44.21	54.00	-9.79	Average	Horizontal



## Band Edges (CH High)

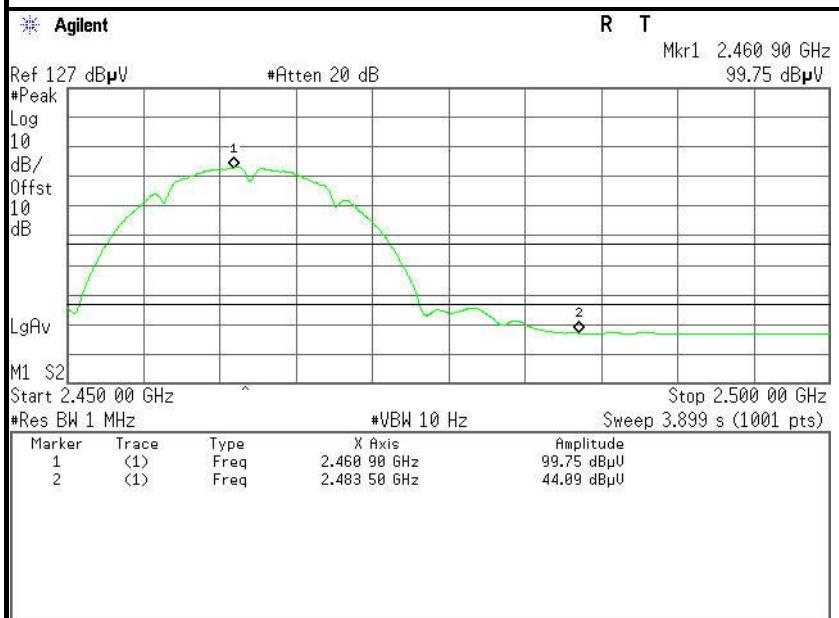
Detector mode: Peak

Polarity: Vertical

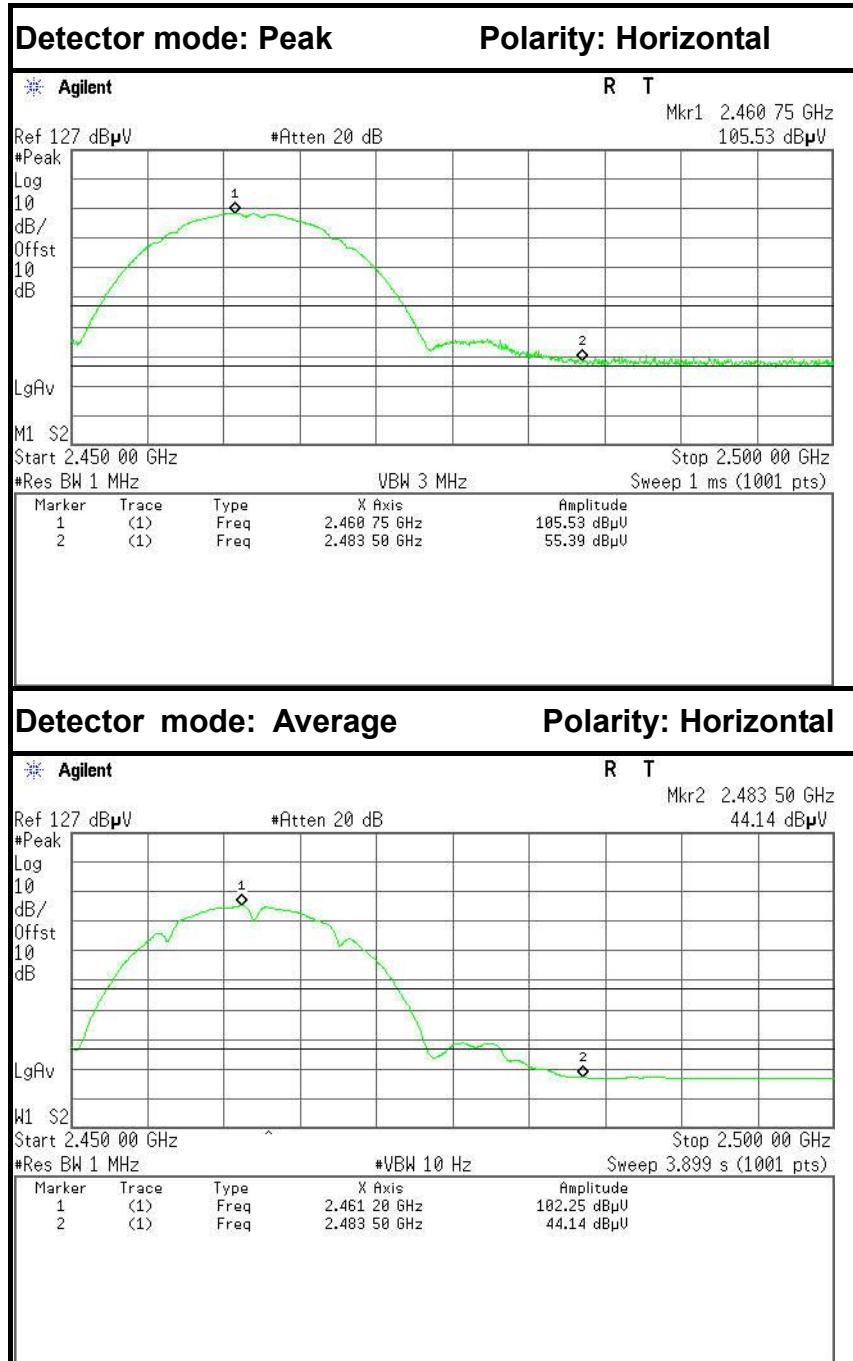


Detector mode: Average

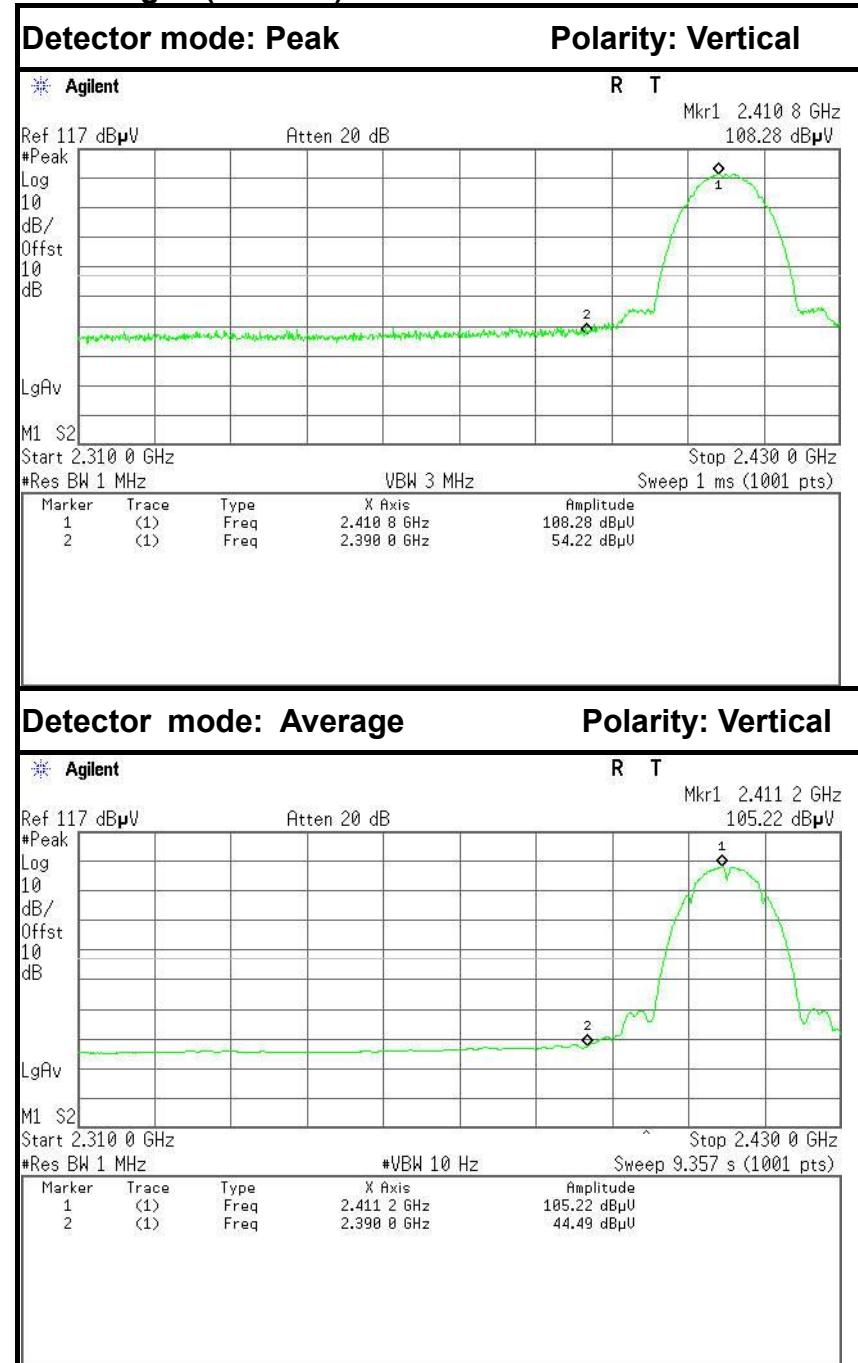
Polarity: Vertical



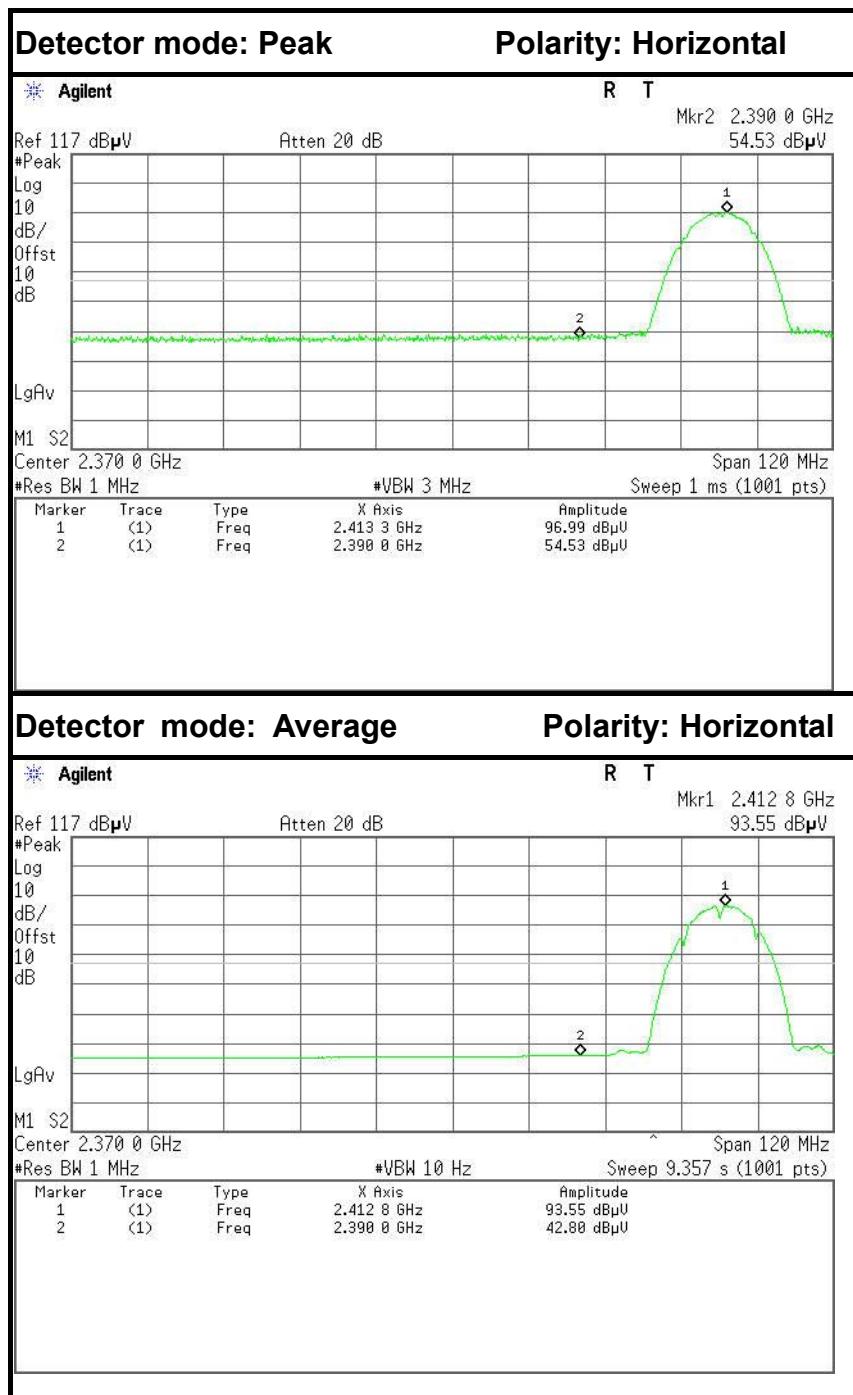
No.	Frequency (MHz)	Reading (dB $\mu$ V)	Corrected (dB)	Result (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	49.58	-6.24	55.82	74.00	-18.18	Peak	Vertical
2	2483.5000	37.85	-6.24	44.09	54.00	-9.91	Average	Vertical



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	49.15	-6.24	55.39	74.00	-18.61	Peak	Horizontal
2	2483.5000	37.90	-6.24	44.14	54.00	-9.86	Average	Horizontal

**Model: PW5003****Band Edges (CH Low)**

No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	47.62	-6.60	54.22	74.00	-19.78	Peak	Vertical
2	2390.0000	37.89	-6.60	44.49	54.00	-9.51	Average	Vertical



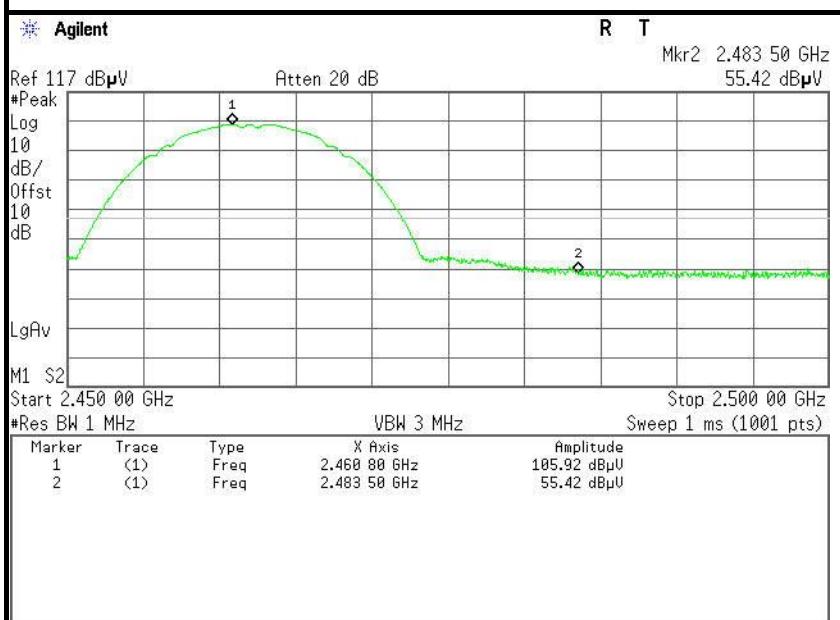
No.	Frequency (MHz)	Reading (dB $\mu$ V)	Corrected (dB)	Result (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	47.93	-6.60	54.53	74.00	-19.47	Peak	Horizontal
2	2390.0000	36.20	-6.60	42.80	54.00	-11.20	Average	Horizontal



## Band Edges (CH High)

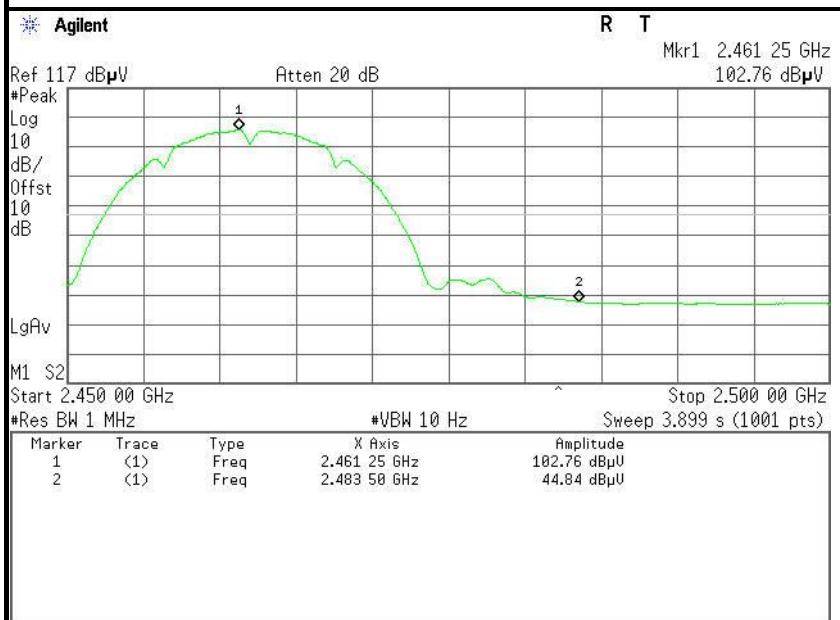
Detector mode: Peak

Polarity: Vertical

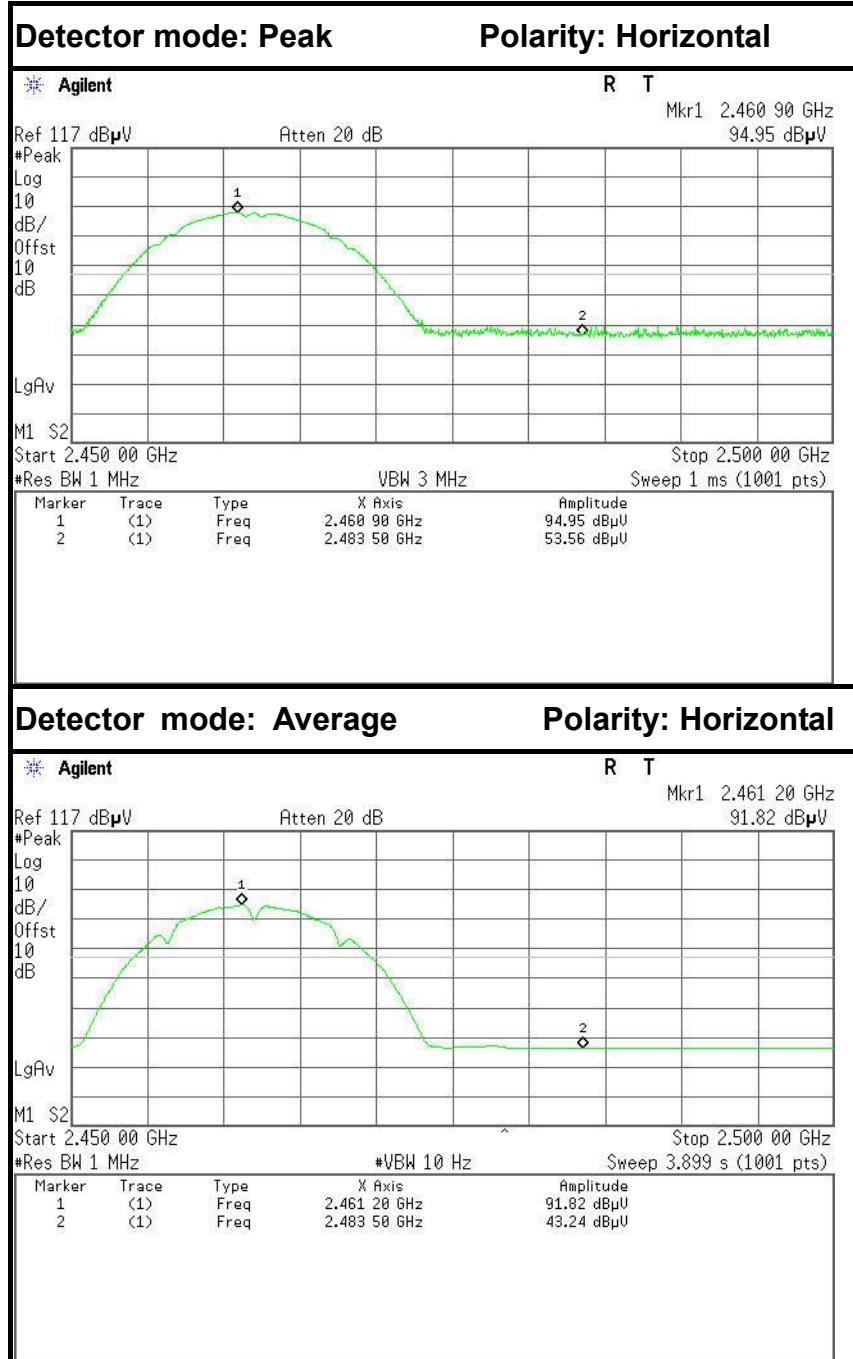


Detector mode: Average

Polarity: Vertical



No.	Frequency (MHz)	Reading (dB $\mu$ V)	Corrected (dB)	Result (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	49.18	-6.24	55.42	74.00	-18.58	Peak	Vertical
2	2483.5000	38.60	-6.24	44.84	54.00	-9.16	Average	Vertical



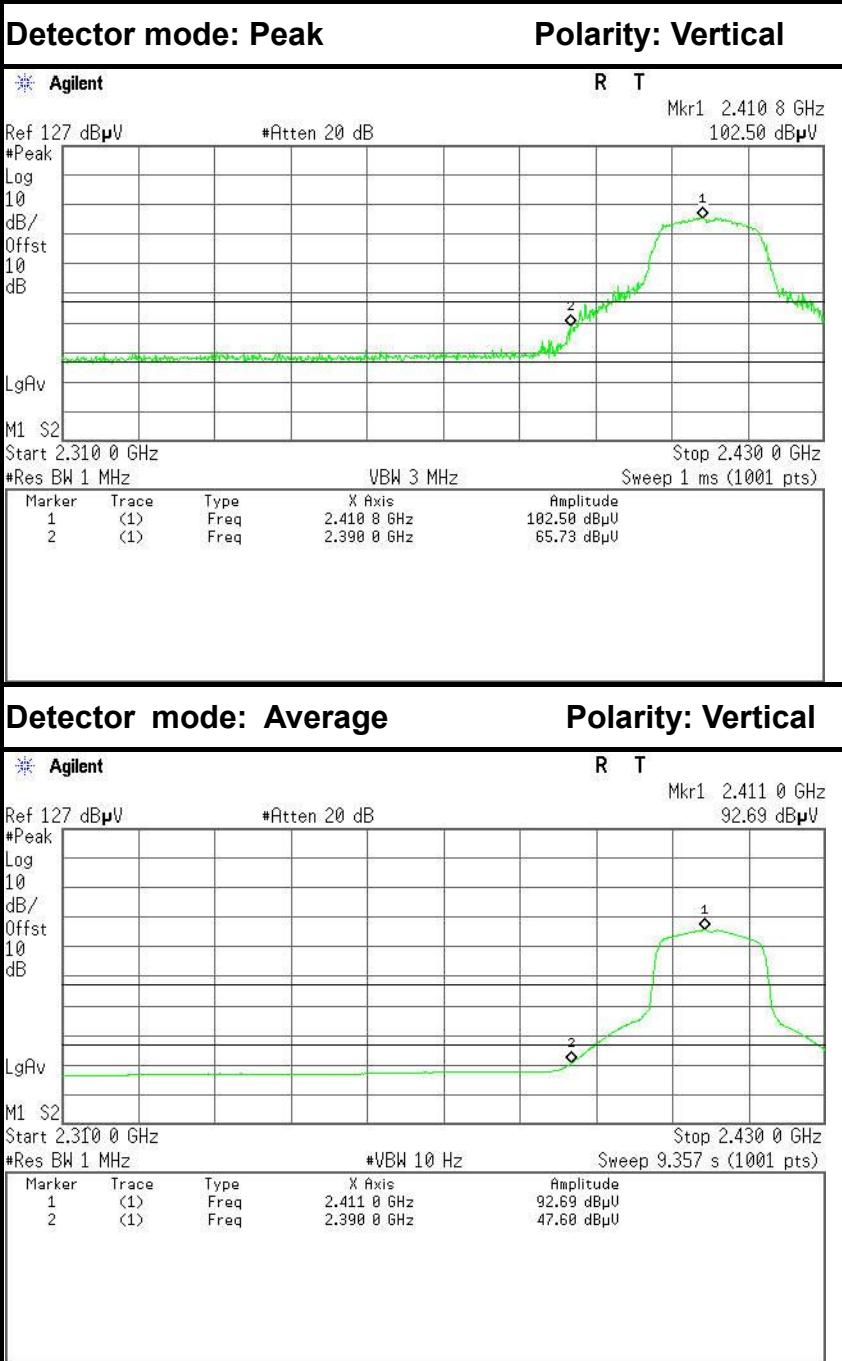
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	47.32	-6.24	53.56	74.00	-20.44	Peak	Horizontal
2	2483.5000	37.00	-6.24	43.24	54.00	-10.76	Average	Horizontal



## IEEE 802.11g mode (Antenna 1)

Model: PW5002

## Band Edges (CH Low)

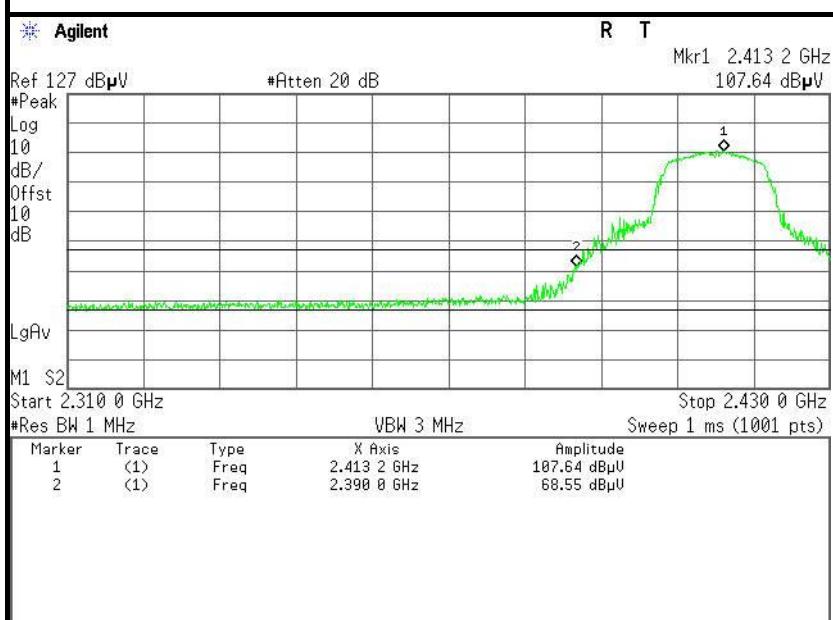


No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	59.13	-6.60	65.73	74.00	-8.27	Peak	Vertical
2	2390.0000	41.00	-6.60	47.60	54.00	-6.40	Average	Vertical



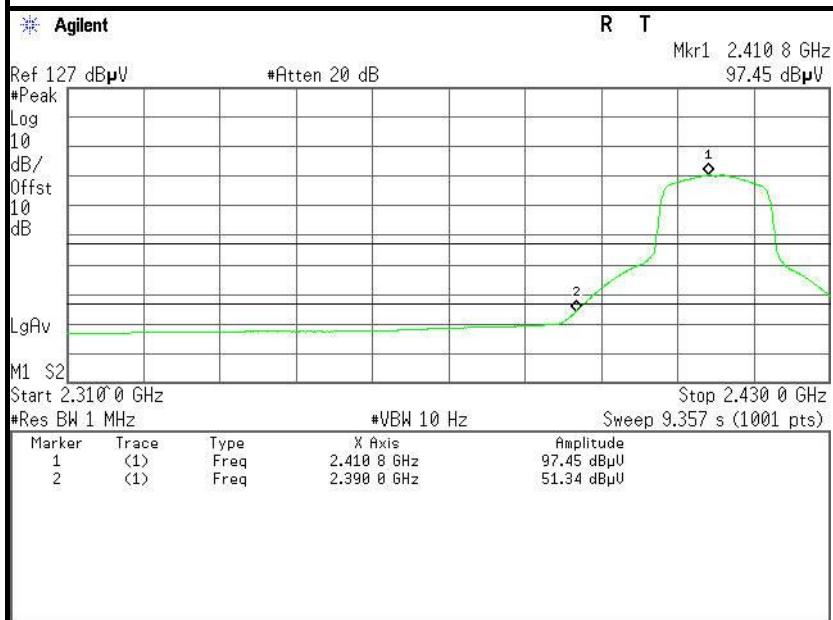
## Detector mode: Peak

## Polarity: Horizontal



## Detector mode: Average

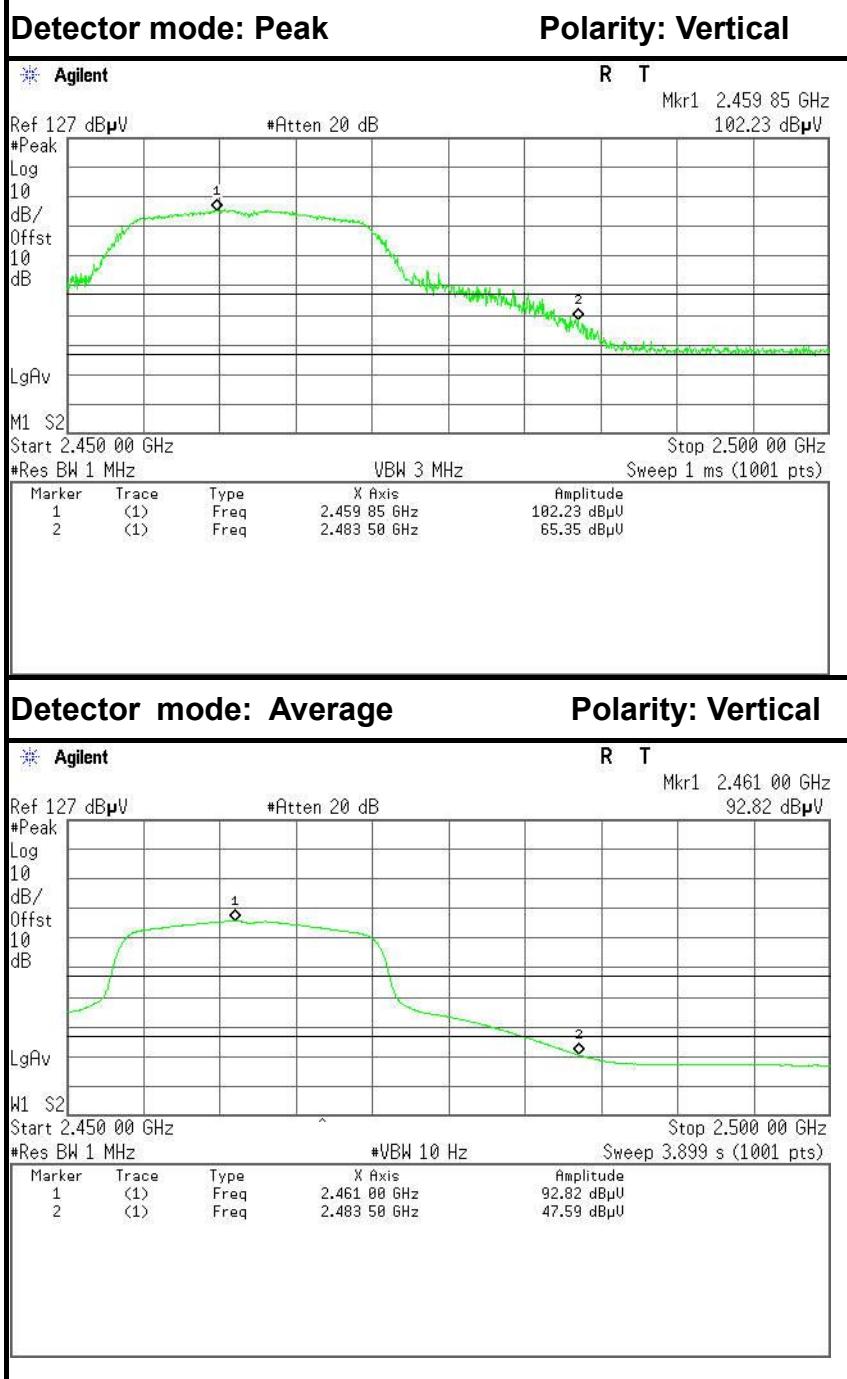
## Polarity: Horizontal



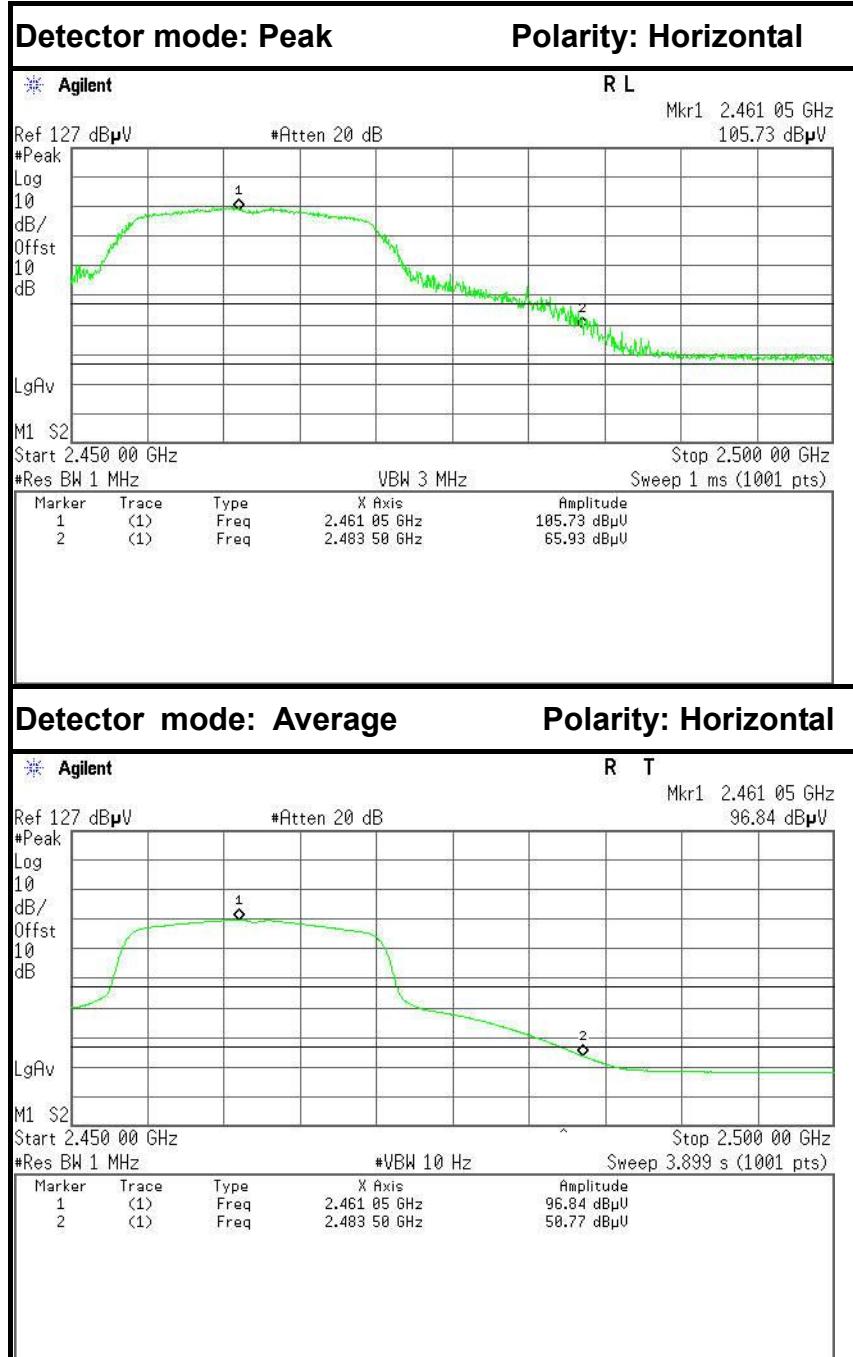
No.	Frequency (MHz)	Reading (dB $\mu$ V)	Corrected (dB)	Result (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	61.95	-6.60	68.55	74.00	-5.45	Peak	Horizontal
2	2390.0000	44.74	-6.60	51.34	54.00	-2.66	Average	Horizontal



## Band Edges (CH High)



No.	Frequency (MHz)	Reading (dB $\mu$ V)	Corrected (dB)	Result (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	59.11	-6.24	65.35	74.00	-8.65	Peak	Vertical
2	2483.5000	41.35	-6.24	47.59	54.00	-6.41	Average	Vertical



No.	Frequency (MHz)	Reading (dB $\mu$ V)	Corrected (dB)	Result (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	59.69	-6.24	65.93	74.00	-8.07	Peak	Horizontal
2	2483.5000	44.53	-6.24	50.77	54.00	-3.23	Average	Horizontal