

**Test Mode:** TX / IEEE 802.11n HT20 MHz (CH Mid)**Tested by:** Darry Wu**Ambient temperature:** 24°C    **Relative humidity:** 52% RH    **Date:** December 14, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
2503.000	46.16	-2.25	43.91	74.00	-30.09	V	Peak
3880.000	44.43	1.08	45.51	74.00	-28.49	V	Peak
4879.000	48.81	4.59	53.40	74.00	-20.60	V	Peak
4879.000	40.77	4.59	45.36	54.00	-8.64	V	AVG
6193.000	42.16	6.39	48.55	74.00	-25.45	V	Peak
6949.000	42.05	7.62	49.67	74.00	-24.33	V	Peak
8002.000	41.60	9.65	51.25	74.00	-22.75	V	Peak
2179.000	49.76	-4.02	45.74	74.00	-28.26	H	Peak
2521.000	46.61	-2.22	44.39	74.00	-29.61	H	Peak
4402.000	43.24	3.01	46.25	74.00	-27.75	H	Peak
4879.000	48.14	4.59	52.73	74.00	-21.27	H	Peak
4879.000	40.03	4.59	44.62	54.00	-9.38	H	AVG
6796.000	42.20	7.37	49.57	74.00	-24.43	H	Peak
9613.000	41.66	10.87	52.53	74.00	-21.47	H	Peak
9613.000	31.72	10.87	42.59	54.00	-11.41	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 / EEE 802.11n HT20 MHz (CH High)**Tested by:** Darry Wu**Ambient temperature:** 24°C    **Relative humidity:** 52% RH    **Date:** December 14, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1342.000	47.68	-7.27	40.41	74.00	-33.59	V	Peak
2242.000	46.44	-3.67	42.77	74.00	-31.23	V	Peak
4933.000	48.05	4.76	52.81	74.00	-21.19	V	Peak
4933.000	40.43	4.76	45.19	54.00	-8.81	V	AVG
6868.000	41.91	7.49	49.40	74.00	-24.60	V	Peak
7723.000	41.32	9.11	50.43	74.00	-23.57	V	Peak
8101.000	41.63	9.59	51.22	74.00	-22.78	V	Peak
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2179.000	51.55	-4.02	47.53	74.00	-26.47	H	Peak
2521.000	46.58	-2.22	44.36	74.00	-29.64	H	Peak
4924.000	45.96	4.73	50.69	74.00	-23.31	H	Peak
5104.000	42.73	5.17	47.90	74.00	-26.10	H	Peak
6184.000	41.76	6.38	48.14	74.00	-25.86	H	Peak
7165.000	41.84	8.02	49.86	74.00	-24.14	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/ IEEE 802.11n HT40 MHz (CH Low)**Tested by:** Darry Wu**Ambient temperature:** 24°C    **Relative humidity:** 52% RH    **Date:** December 14, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
2242.000	46.31	-3.67	42.64	74.00	-31.36	V	Peak
2593.000	45.80	-2.09	43.71	74.00	-30.29	V	Peak
3205.000	44.82	-1.02	43.80	74.00	-30.20	V	Peak
4357.000	43.33	2.85	46.18	74.00	-27.82	V	Peak
4843.000	49.43	4.47	53.90	74.00	-20.10	V	Peak
4843.000	39.70	4.47	44.17	54.00	-9.83	V	AVG
7642.000	41.58	8.95	50.53	74.00	-23.47	V	Peak
2116.000	46.79	-4.36	42.43	74.00	-31.57	H	Peak
2665.000	45.68	-1.96	43.72	74.00	-30.28	H	Peak
4681.000	43.00	3.94	46.94	74.00	-27.06	H	Peak
4843.000	47.63	4.47	52.10	74.00	-21.90	H	Peak
4843.000	42.69	4.47	47.16	54.00	-6.84	H	AVG
6697.000	41.45	7.21	48.66	74.00	-25.34	H	Peak
8101.000	41.95	9.59	51.54	74.00	-22.46	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 / IEEE 802.11n HT40 MHz (CH Mid)**Tested by:** Darry Wu**Ambient temperature:** 24°C    **Relative humidity:** 52% RH    **Date:** December 14, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
2530.000	46.48	-2.21	44.27	74.00	-29.73	V	Peak
3970.000	43.40	1.46	44.86	74.00	-29.14	V	Peak
4879.000	48.29	4.59	52.88	74.00	-21.12	V	Peak
4879.000	42.92	4.59	47.51	54.00	-6.49	V	AVG
5626.000	41.74	5.92	47.66	74.00	-26.34	V	Peak
6013.000	41.20	6.10	47.30	74.00	-26.70	V	Peak
7714.000	41.57	9.09	50.66	74.00	-23.34	V	Peak
2503.000	46.58	-2.25	44.33	74.00	-29.67	H	Peak
3826.000	43.86	0.86	44.72	74.00	-29.28	H	Peak
4870.000	47.03	4.56	51.59	74.00	-22.41	H	Peak
6346.000	41.76	6.64	48.40	74.00	-25.60	H	Peak
7102.000	41.72	7.90	49.62	74.00	-24.38	H	Peak
7687.000	41.21	9.04	50.25	74.00	-23.75	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/ IEEE 802.11n HT40 MHz (CH High)**Tested by:** Darry Wu**Ambient temperature:** 24°C    **Relative humidity:** 52% RH    **Date:** December 14, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
2521.000	46.18	-2.22	43.96	74.00	-30.04	V	Peak
2782.000	45.23	-1.75	43.48	74.00	-30.52	V	Peak
4339.000	43.13	2.78	45.91	74.00	-28.09	V	Peak
4897.000	46.77	4.64	51.41	74.00	-22.59	V	Peak
6553.000	41.96	6.98	48.94	74.00	-25.06	V	Peak
7615.000	41.51	8.90	50.41	74.00	-23.59	V	Peak
1450.000	46.89	-6.97	39.92	74.00	-34.08	H	Peak
2242.000	45.97	-3.67	42.30	74.00	-31.70	H	Peak
2656.000	45.94	-1.98	43.96	74.00	-30.04	H	Peak
3997.000	43.08	1.58	44.66	74.00	-29.34	H	Peak
4888.000	44.53	4.61	49.14	74.00	-24.86	H	Peak
7957.000	41.49	9.57	51.06	74.00	-22.94	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).



## 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

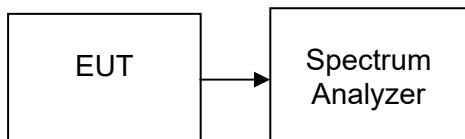
Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Calibration Due
Spectrum Analyzer	Agilent	N9010A	MY52221469	02/21/2016	02/20/2017

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

#### 8.1 Option 2:

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (i.e., RBW = 100 kHz, VBW  $\geq$  3 RBW, peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be  $\geq$  6 dB.

### 7.3.4. TEST SETUP





### 7.3.5. TEST RESULTS

No non-compliance noted

#### Test Data

##### Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	7093	>500	PASS
Mid	2437	7106		PASS
High	2462	7100		PASS

##### Test mode: IEEE 802.11g

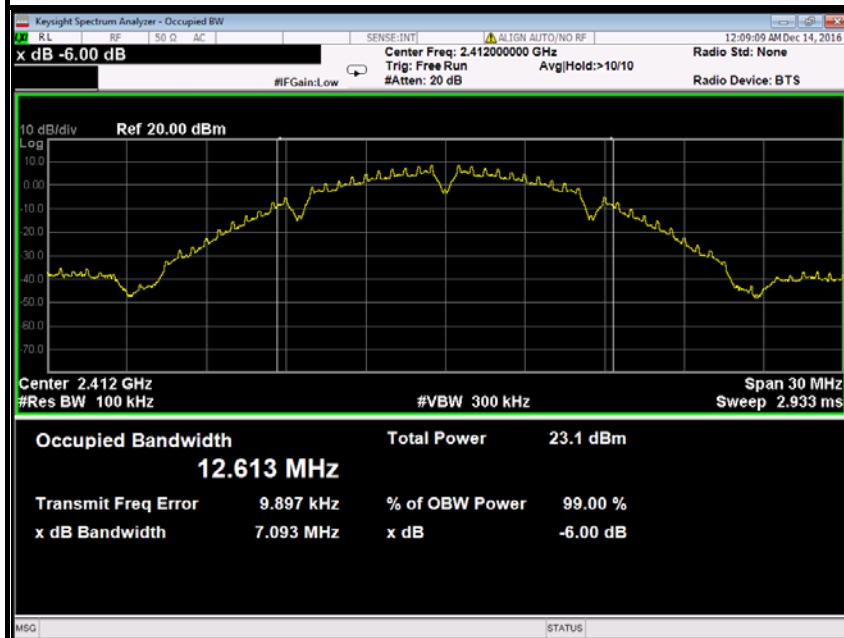
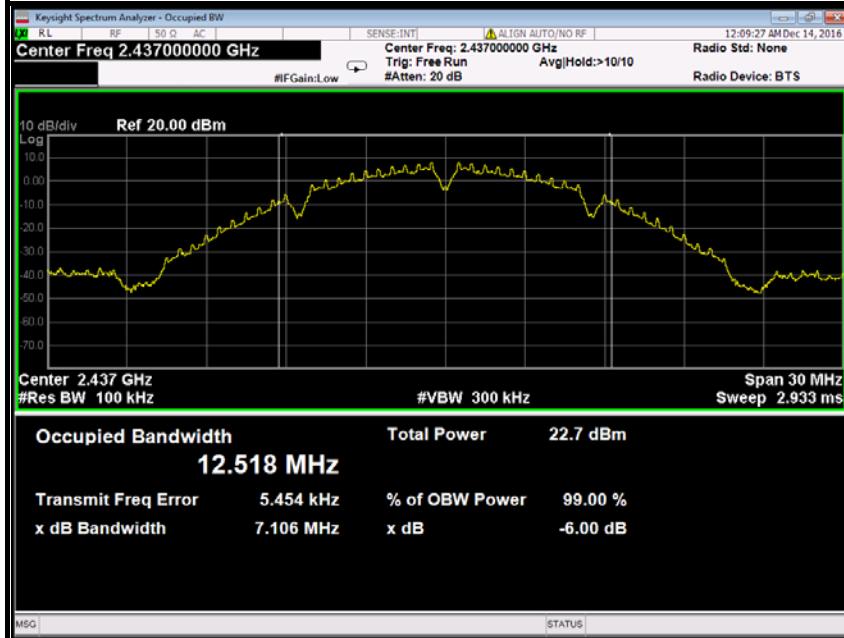
Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	16350	>500	PASS
Mid	2437	16350		PASS
High	2462	16340		PASS

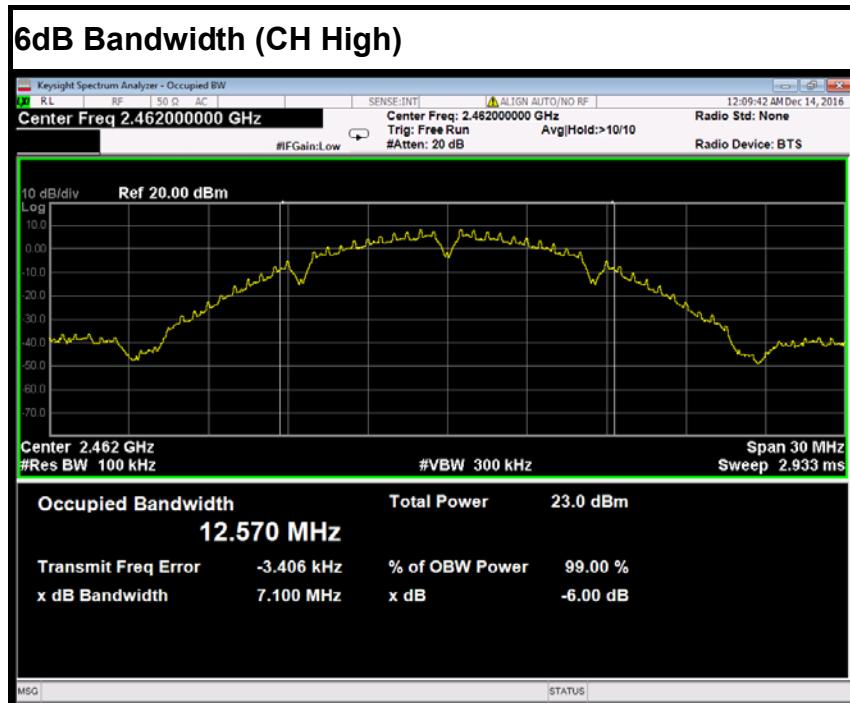
##### Test mode: IEEE 802.11n HT20 MHz

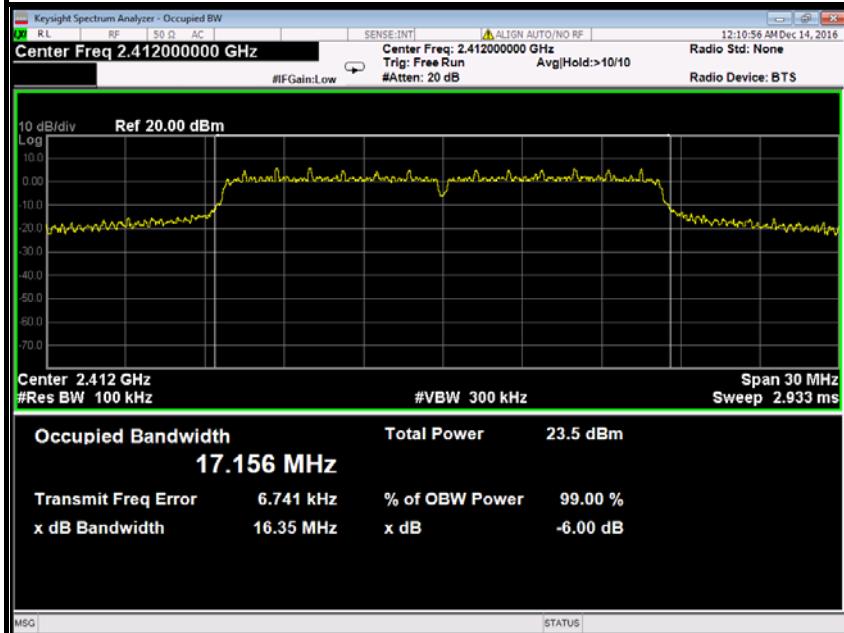
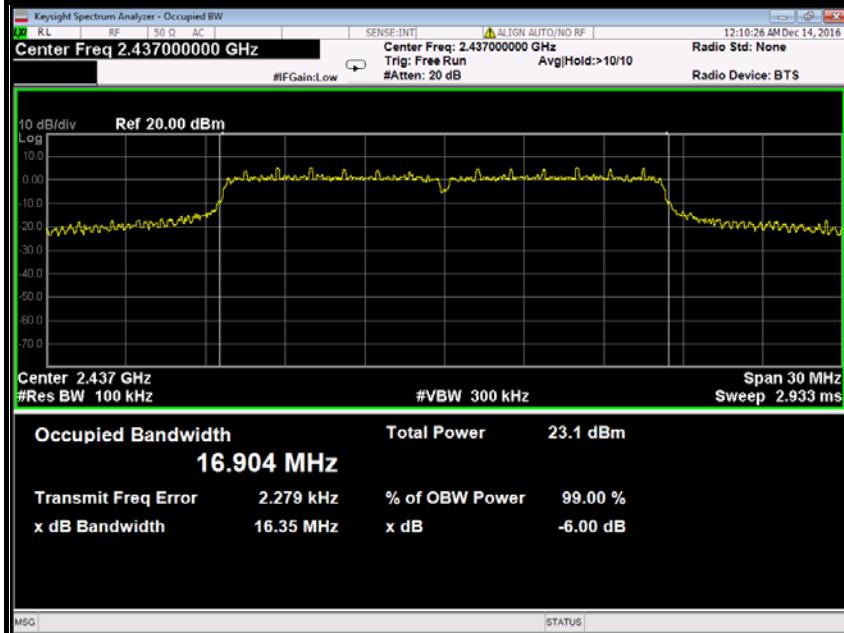
Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	17560	>500	PASS
Mid	2437	17560		PASS
High	2462	17560		PASS

##### Test mode: IEEE 802.11n HT40 MHz

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2422	35110	>500	PASS
Mid	2437	35100		PASS
High	2452	35140		PASS

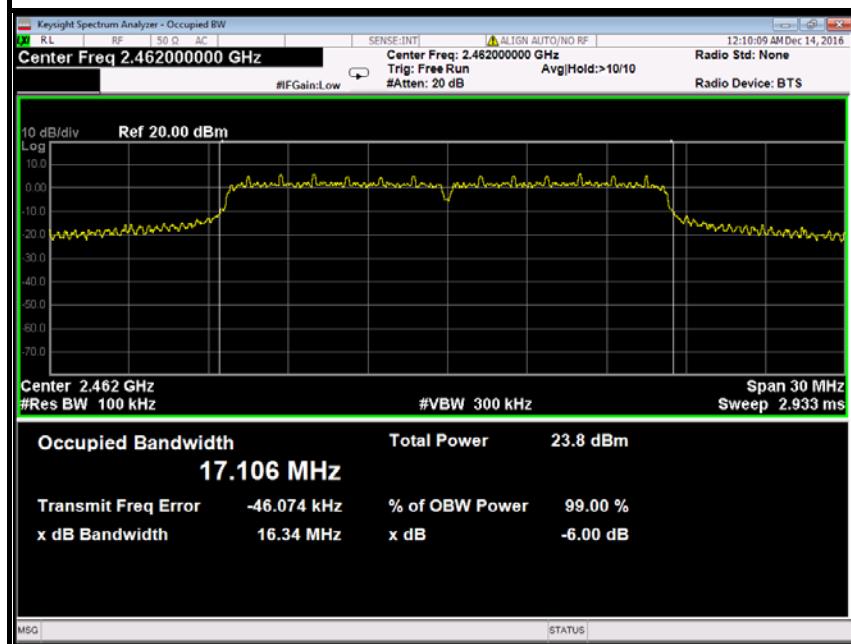
**Test Plot****IEEE 802.11b mode****6dB Bandwidth (CH Low)****6dB Bandwidth (CH Mid)**

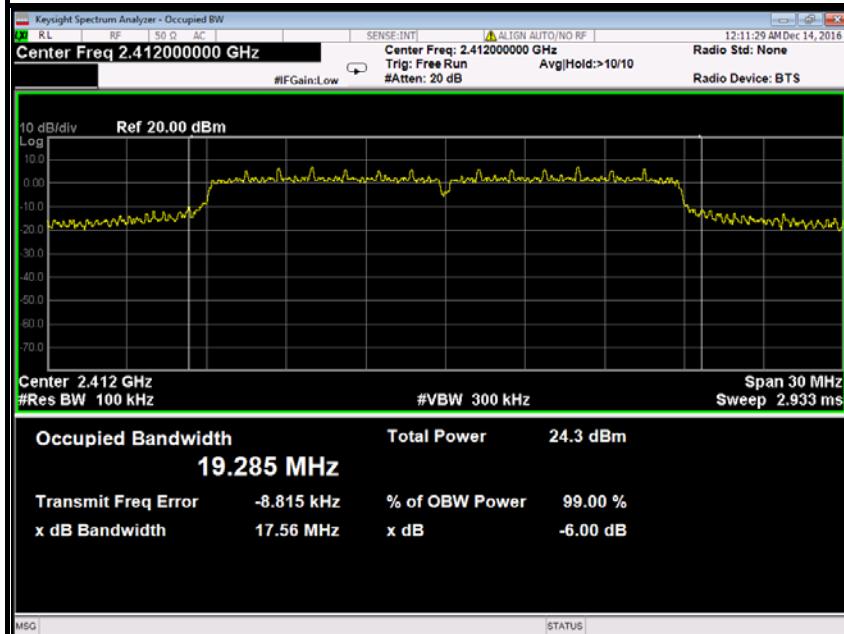
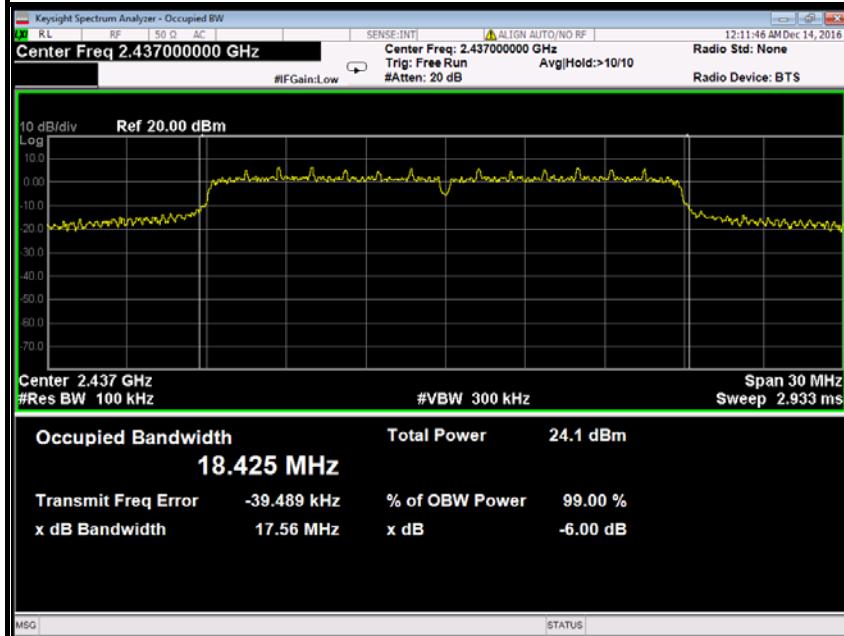


**IEEE 802.11g mode****6dB Bandwidth (CH Low)****6dB Bandwidth (CH Mid)**



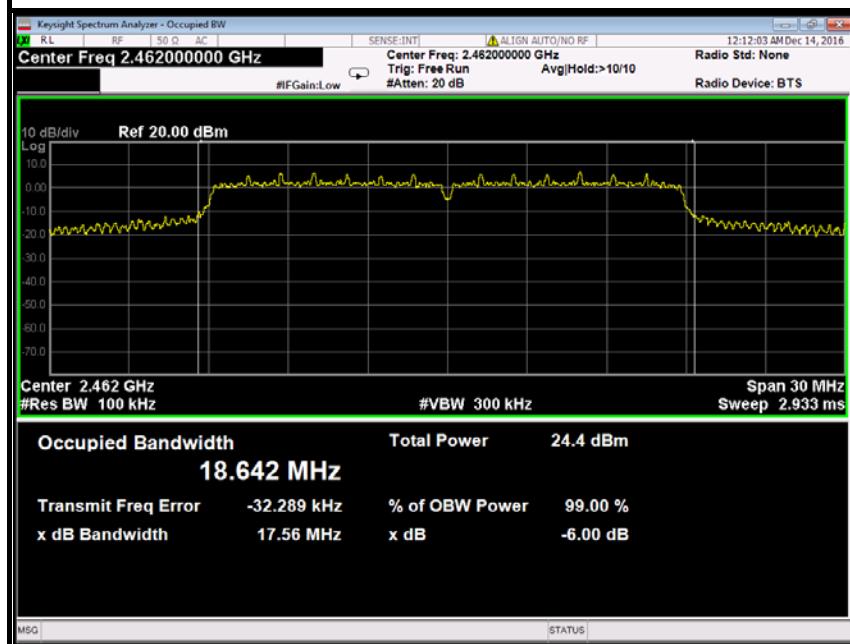
### 6dB Bandwidth (CH High)

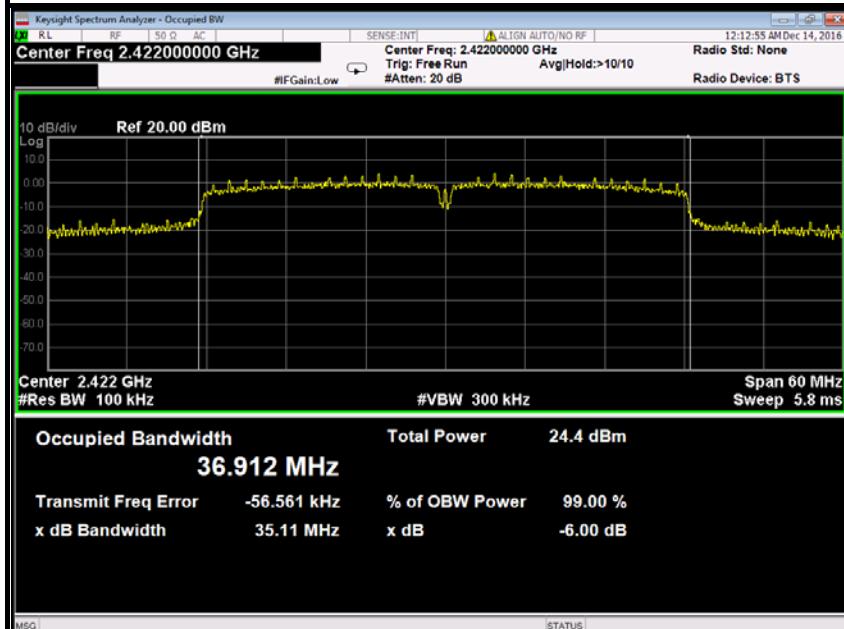
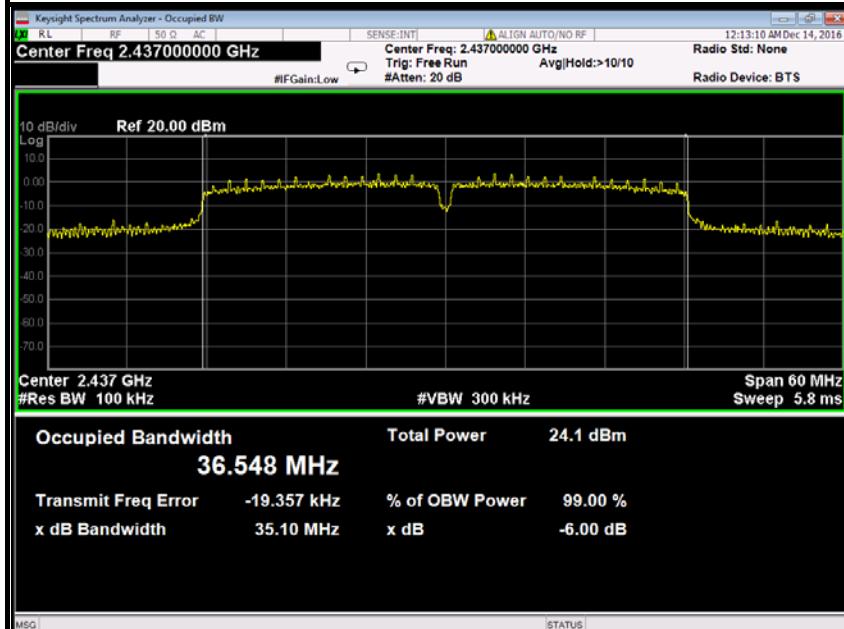


**IEEE 802.11n HT20 MHz mode****6dB Bandwidth (CH Low)****6dB Bandwidth (CH Mid)**



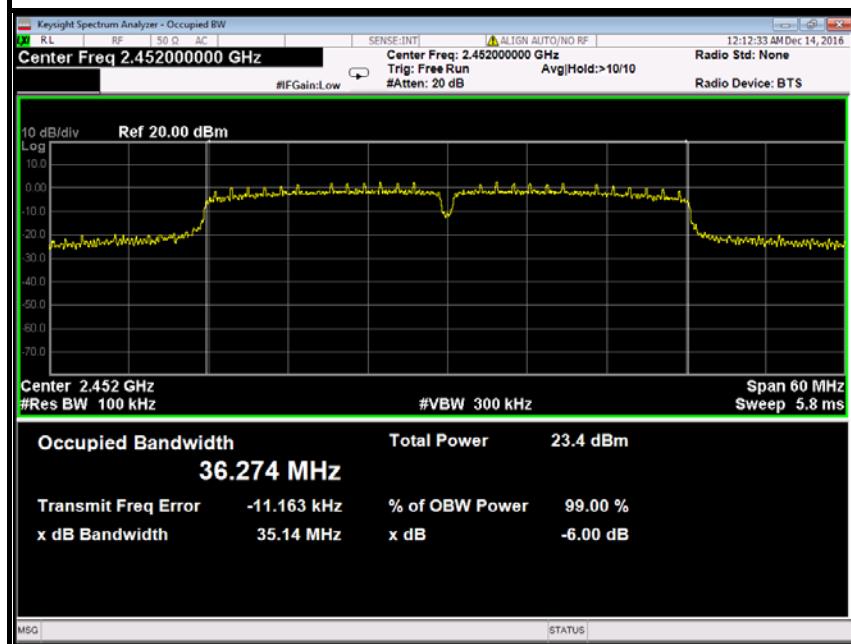
### 6dB Bandwidth (CH High)



**IEEE 802.11n HT40 MHz mode****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 802.11b mode**

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		7.77	7.53	7.43
Radiated power [dBm/MHz] Measured with DSSS modulation		9.85	9.36	9.57
Gain [dBi] Calculated		2.08	1.83	2.14
Measurement uncertainty		$\pm 1.5 \text{ dB (cond.)} / \pm 3 \text{ dB (rad.)}$		



## 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

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

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

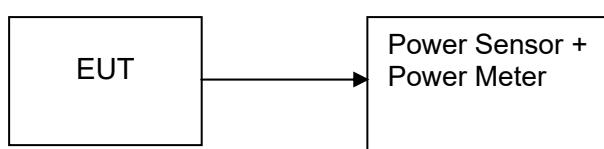
This procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the *DTS bandwidth*.

- 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 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

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Peak / AVG	Limit (W)	Result
Low	2412	18.78	0.07551	Peak	1	PASS
Mid	2437	18.51	0.07096			PASS
High	2462	18.42	0.06950			PASS
Low	2412	16.56	0.04529	AVG	1	PASS
Mid	2437	16.19	0.04159			PASS
High	2462	16.08	0.04055			PASS

##### Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Peak / AVG	Limit (W)	Result
Low	2412	21.96	0.15704	Peak	1	PASS
Mid	2437	21.62	0.14521			PASS
High	2462	21.84	0.15276			PASS
Low	2412	18.02	0.06339	AVG	1	PASS
Mid	2437	17.44	0.05546			PASS
High	2462	17.42	0.05521			PASS

##### Test mode: IEEE 802.11n HT20 MHz

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Peak / AVG	Limit (W)	Result
Low	2412	21.98	0.15776	Peak	1	PASS
Mid	2437	21.79	0.15101			PASS
High	2462	21.66	0.14655			PASS
Low	2412	17.88	0.06138	AVG	1	PASS
Mid	2437	17.53	0.05662			PASS
High	2462	17.49	0.05610			PASS

##### Test mode: IEEE 802.11n HT40 MHz

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Peak / AVG	Limit (W)	Result
Low	2422	21.39	0.13772	Peak	1	PASS
Mid	2437	21.47	0.14028			PASS
High	2452	21.26	0.13366			PASS
Low	2422	17.00	0.05012	AVG	1	PASS
Mid	2437	15.95	0.03936			PASS
High	2452	16.54	0.04508			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	09/25/2016	09/24/2017
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
Antenna Tower	SUNOL	TLT2	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
Test S/W	FARAD	LZ-RF / CCS-SZ-3A2			

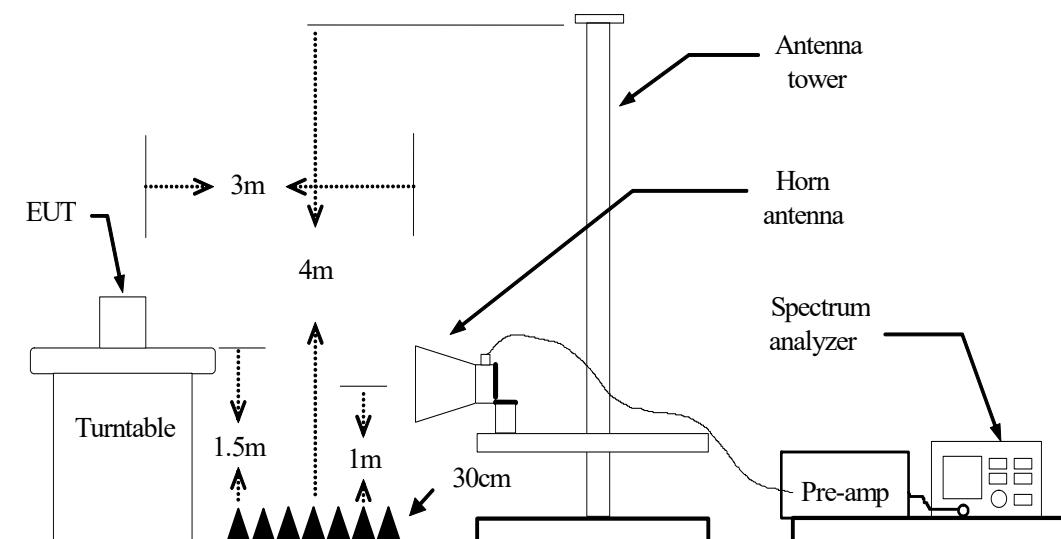
- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. The FCC Site Registration number is 101879.  
3. N.C.R = No Calibration Required.



### 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=1/B / Sweep=AUTO / Detector=PEAK
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are

### 7.6.4. TEST SETUP



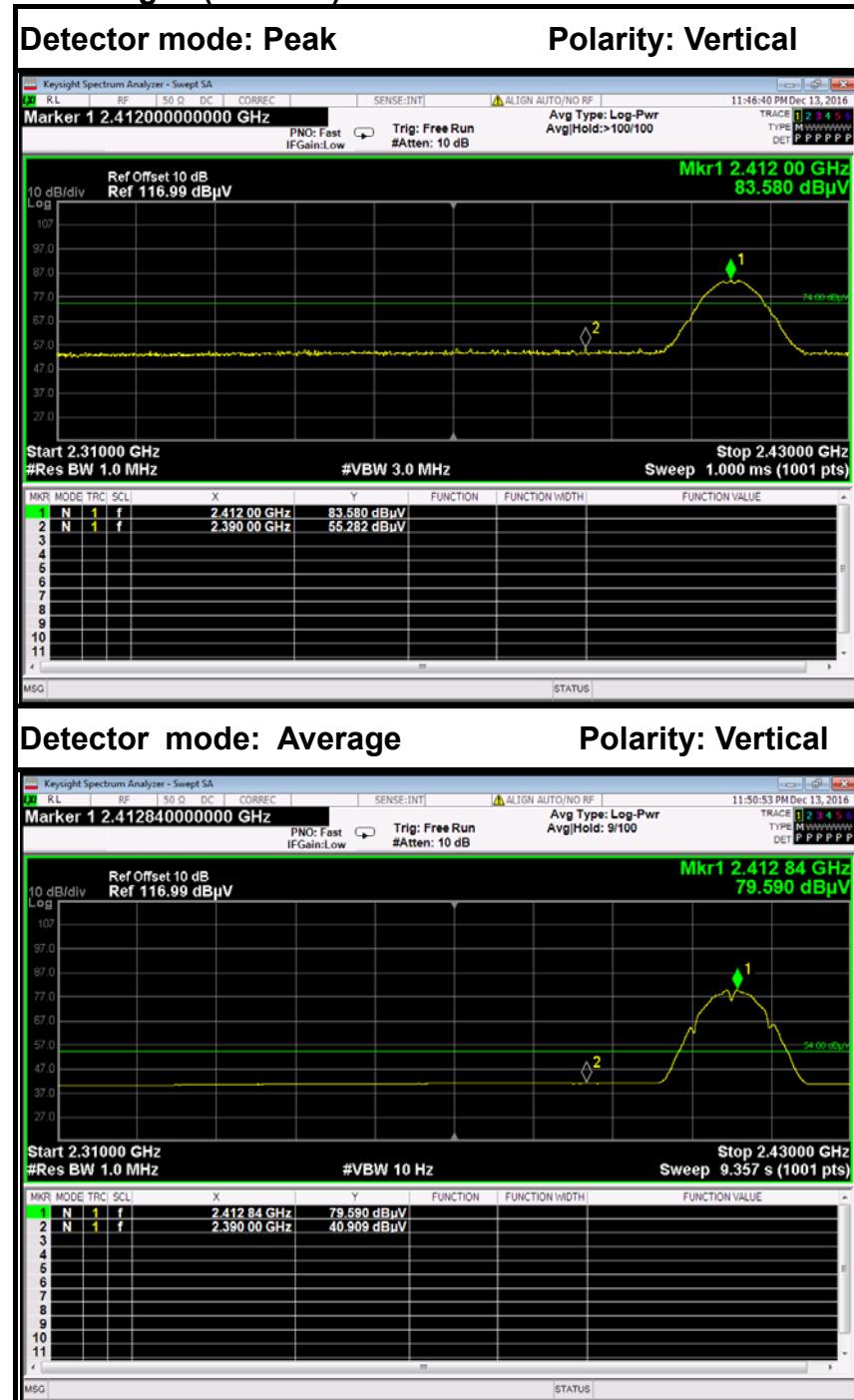


## 7.6.5. TEST RESULTS

### Test Plot

#### IEEE 802.11b mode

##### Band Edges (CH Low)

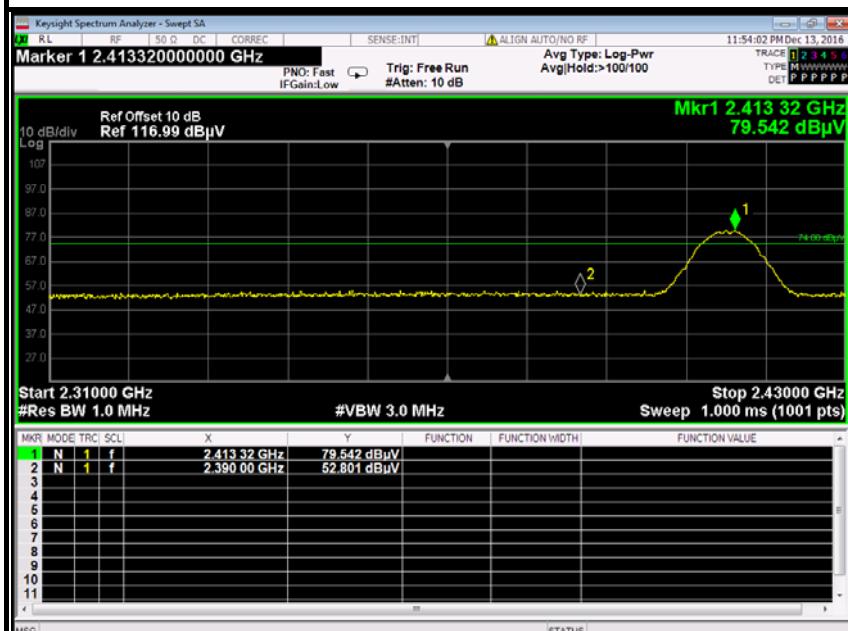


No.	Frequency (MHz)	Reading (dB $\mu$ V)	Corrected (dB/m)	Result (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	58.14	-2.86	55.28	74.00	-18.72	Peak	Vertical
2	2390.0000	43.77	-2.86	40.91	54.00	-13.09	Average	Vertical



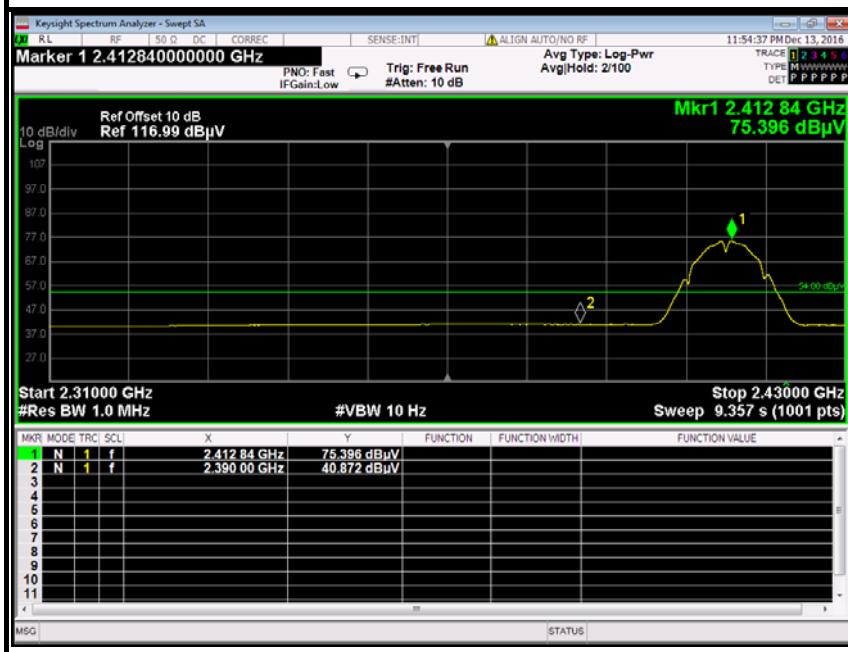
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

Polarity: Horizontal



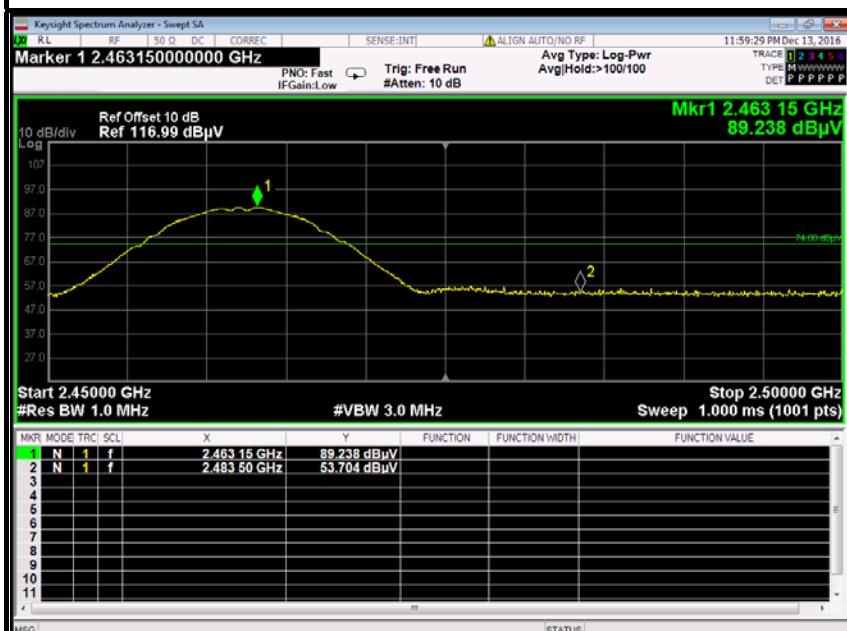
No.	Frequency (MHz)	Reading (dB $\mu$ V)	Corrected (dB/m)	Result (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	55.66	-2.86	52.80	74.00	-21.20	Peak	Horizontal
2	2390.0000	43.73	-2.86	40.87	54.00	-13.23	Average	Horizontal



## Band Edges (CH High)

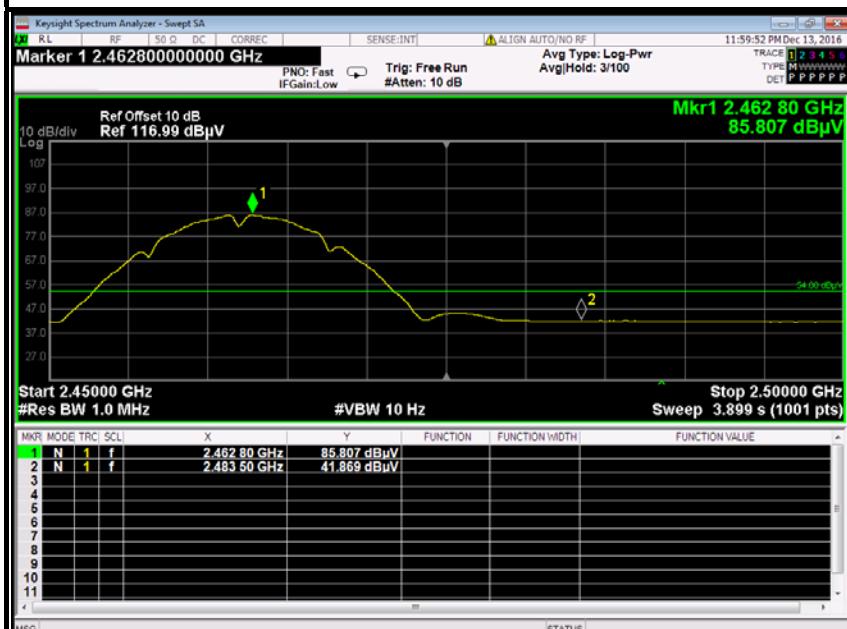
Detector mode: Peak

Polarity: Vertical



Detector mode: Average

Polarity: Vertical

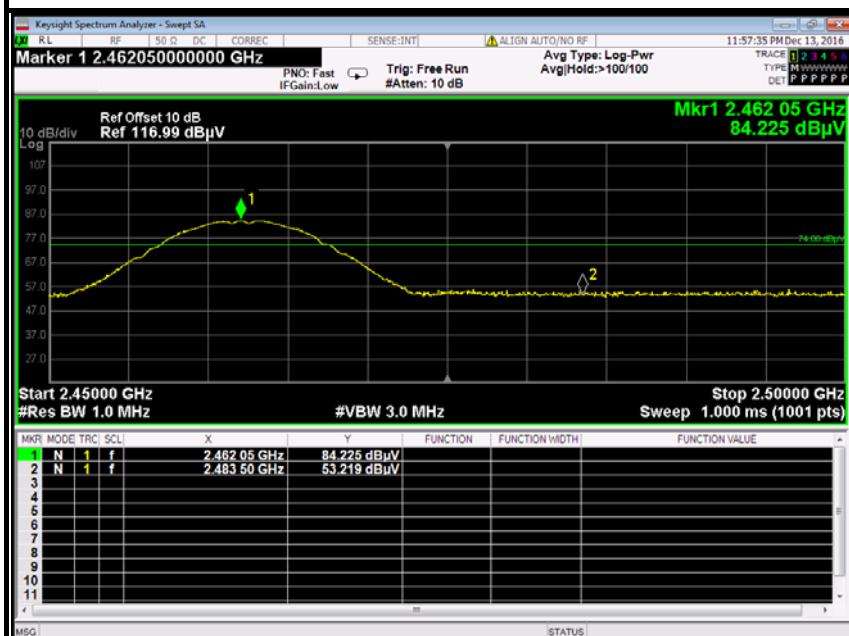


No.	Frequency (MHz)	Reading (dB $\mu$ V)	Corrected (dB/m)	Result (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	56.05	-2.35	53.70	74.00	-20.30	Peak	Vertical
2	2483.5000	44.22	-2.35	41.87	54.00	-12.13	Average	Vertical



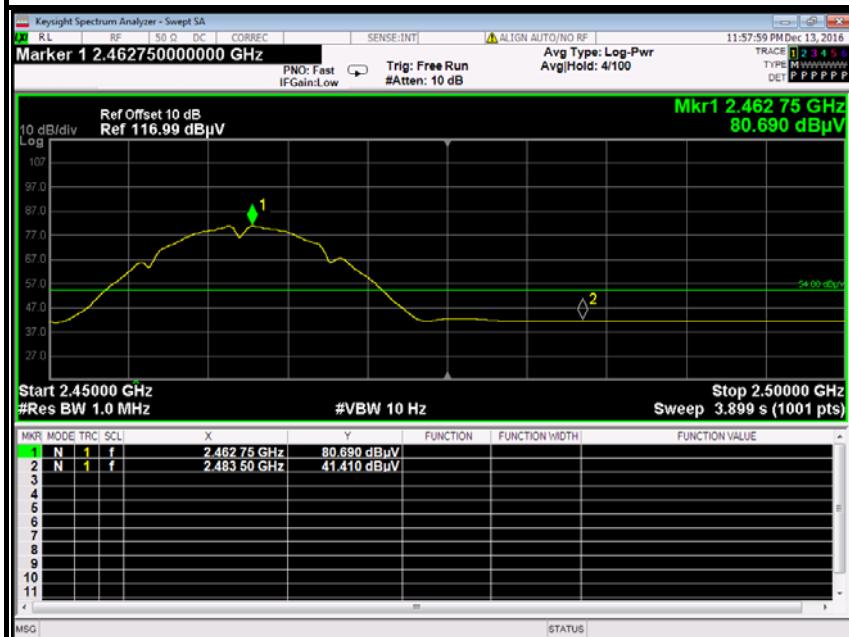
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

Polarity: Horizontal



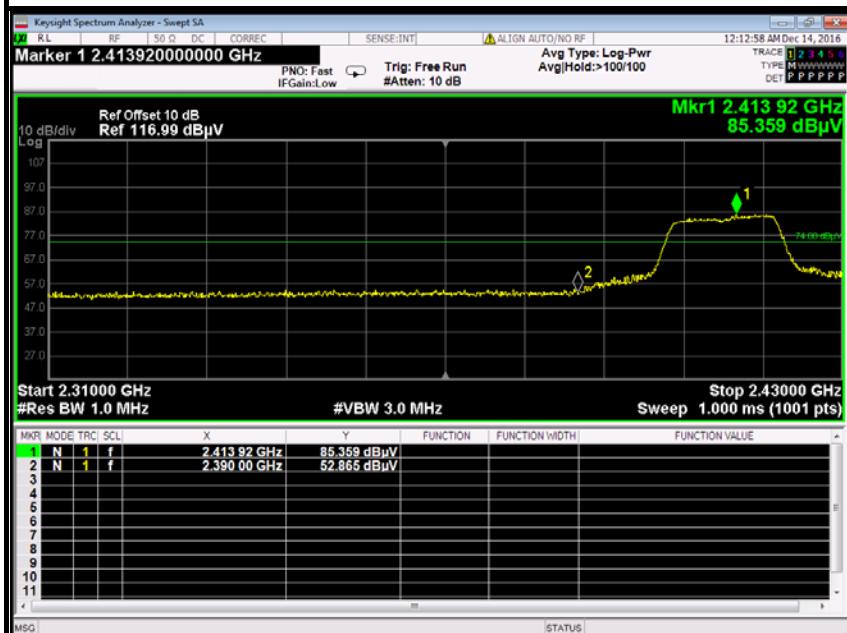
No.	Frequency (MHz)	Reading (dB $\mu$ V)	Corrected (dB/m)	Result (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	55.57	-2.35	53.22	74.00	-20.78	Peak	Horizontal
2	2483.5000	43.76	-2.35	41.41	54.00	-12.59	Average	Horizontal



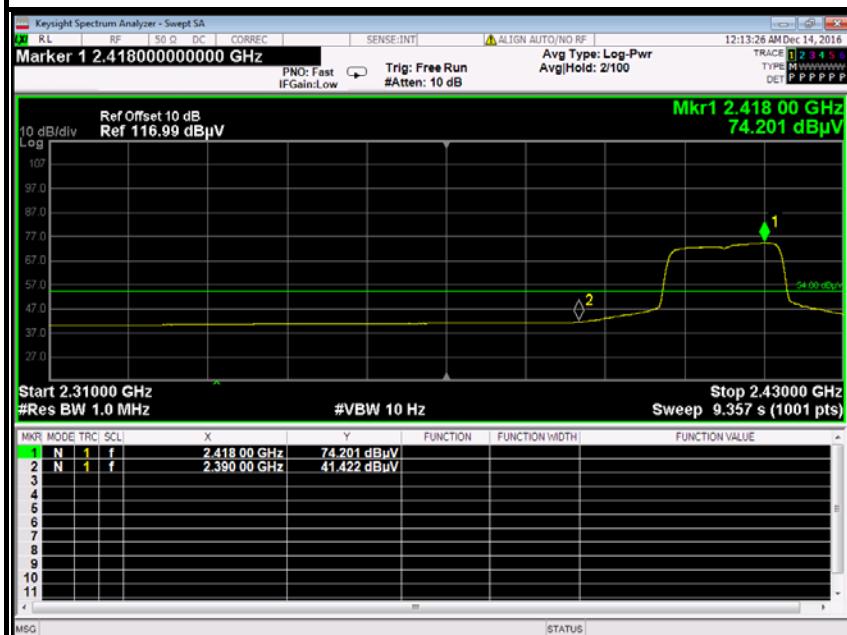
## IEEE 802.11g mode

## Band Edges (CH Low)

Detector mode: Peak      Polarity: Vertical



Detector mode: Average      Polarity: Vertical

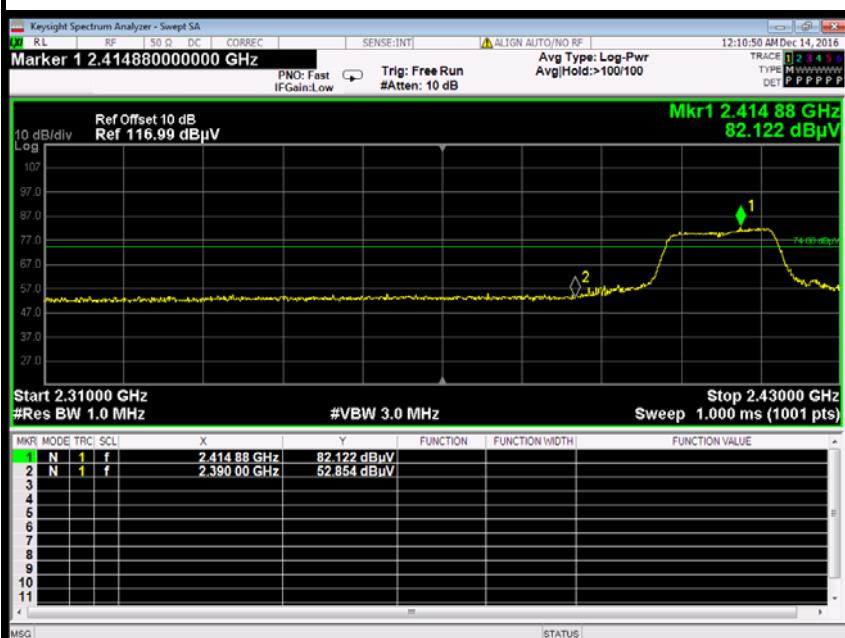


No.	Frequency (MHz)	Reading (dB $\mu$ V)	Corrected (dB/m)	Result (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	55.73	-2.86	52.87	74.00	-21.14	Peak	Vertical
2	2390.0000	44.28	-2.86	41.42	54.00	-12.58	Average	Vertical



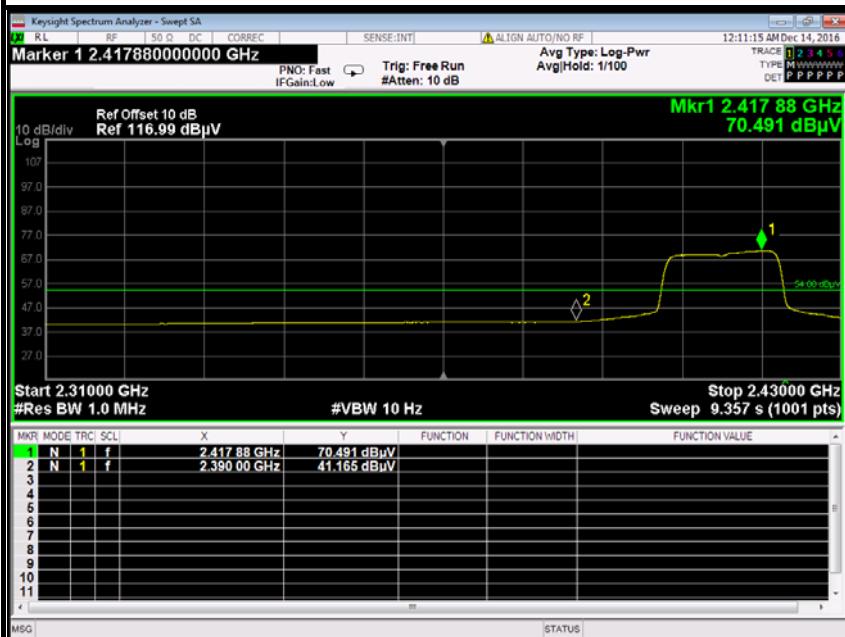
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

Polarity: Horizontal



No.	Frequency (MHz)	Reading (dB $\mu$ V)	Corrected (dB/m)	Result (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	55.71	-2.86	52.85	74.00	-21.15	Peak	Horizontal
2	2390.0000	44.03	-2.86	41.17	54.00	-12.84	Average	Horizontal



## Band Edges (CH High)

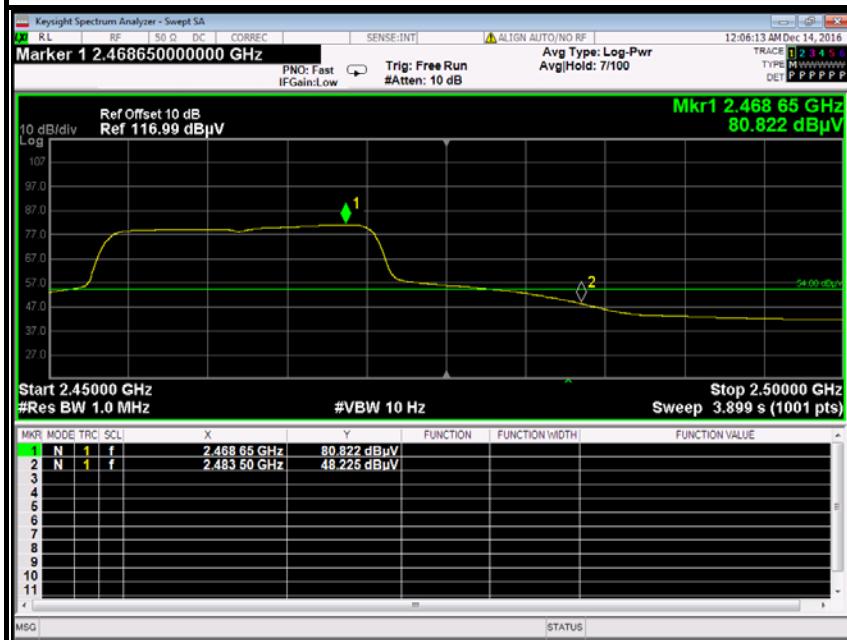
Detector mode: Peak

Polarity: Vertical



Detector mode: Average

Polarity: Vertical



No.	Frequency (MHz)	Reading (dB $\mu$ V)	Corrected (dB/m)	Result (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	72.00	-2.35	69.65	74.00	-4.35	Peak	Vertical
2	2483.5000	50.58	-2.35	48.23	54.00	-5.78	Average	Vertical



Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

Polarity: Horizontal



No.	Frequency (MHz)	Reading (dB $\mu$ V)	Corrected (dB/m)	Result (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	63.25	-2.35	60.90	74.00	-13.10	Peak	Horizontal
2	2483.5000	46.86	-2.35	44.51	54.00	-9.49	Average	Horizontal

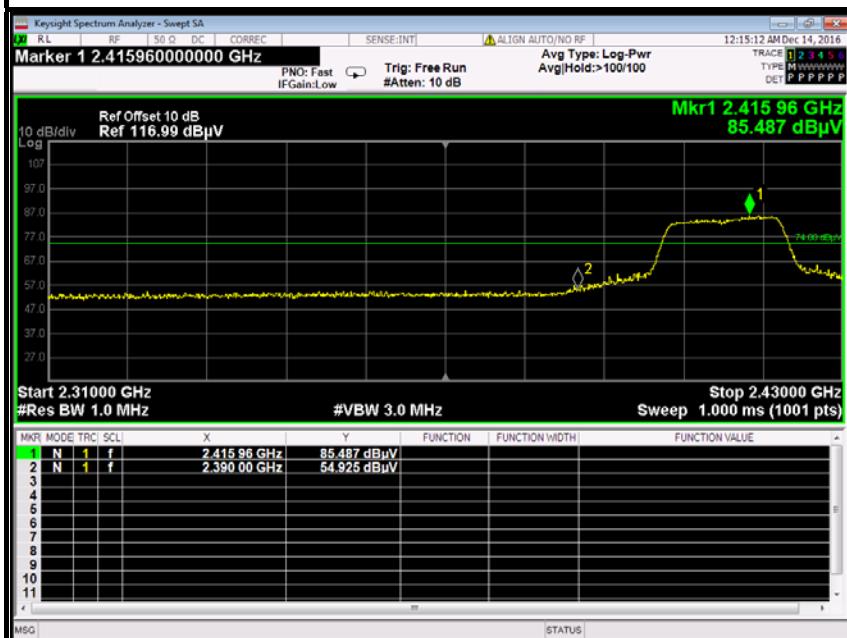


## IEEE 802.11n HT20 MHz mode

## Band Edges (CH Low)

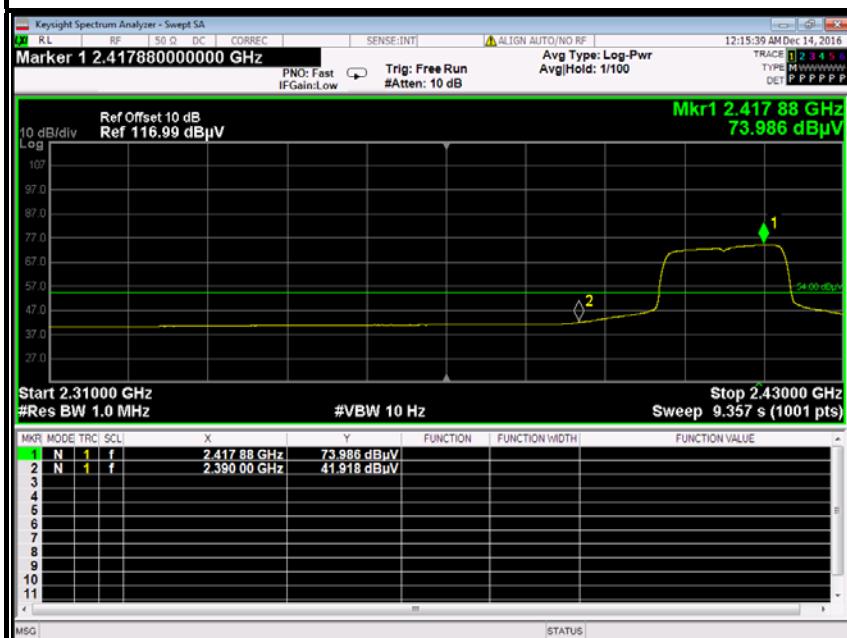
Detector mode: Peak

Polarity: Vertical



Detector mode: Average

Polarity: Vertical

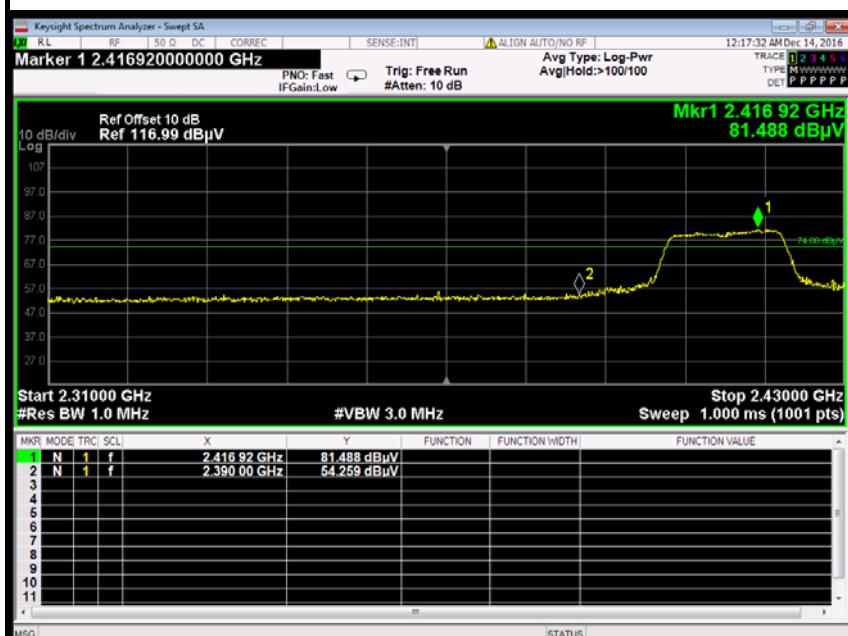


No.	Frequency (MHz)	Reading (dB $\mu$ V)	Corrected (dB/m)	Result (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	57.79	-2.86	54.93	74.00	-19.08	Peak	Vertical
2	2390.0000	44.78	-2.86	41.92	54.00	-12.08	Average	Vertical



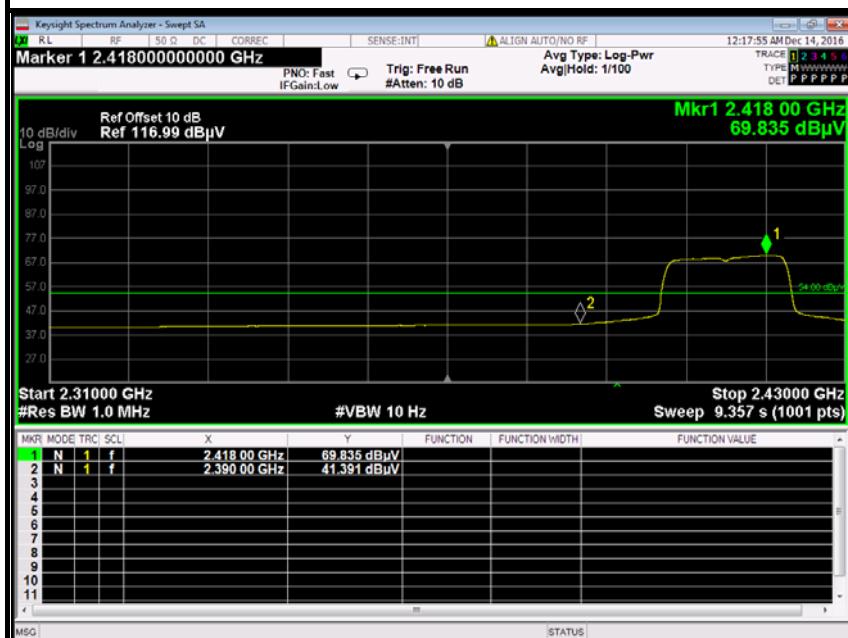
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

Polarity: Horizontal



No.	Frequency (MHz)	Reading (dB $\mu$ V)	Corrected (dB/m)	Result (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	57.12	-2.86	54.26	74.00	-19.74	Peak	Horizontal
2	2390.0000	44.25	-2.86	41.39	54.00	-12.61	Average	Horizontal



## Band Edges (CH High)

Detector mode: Peak

Polarity: Vertical

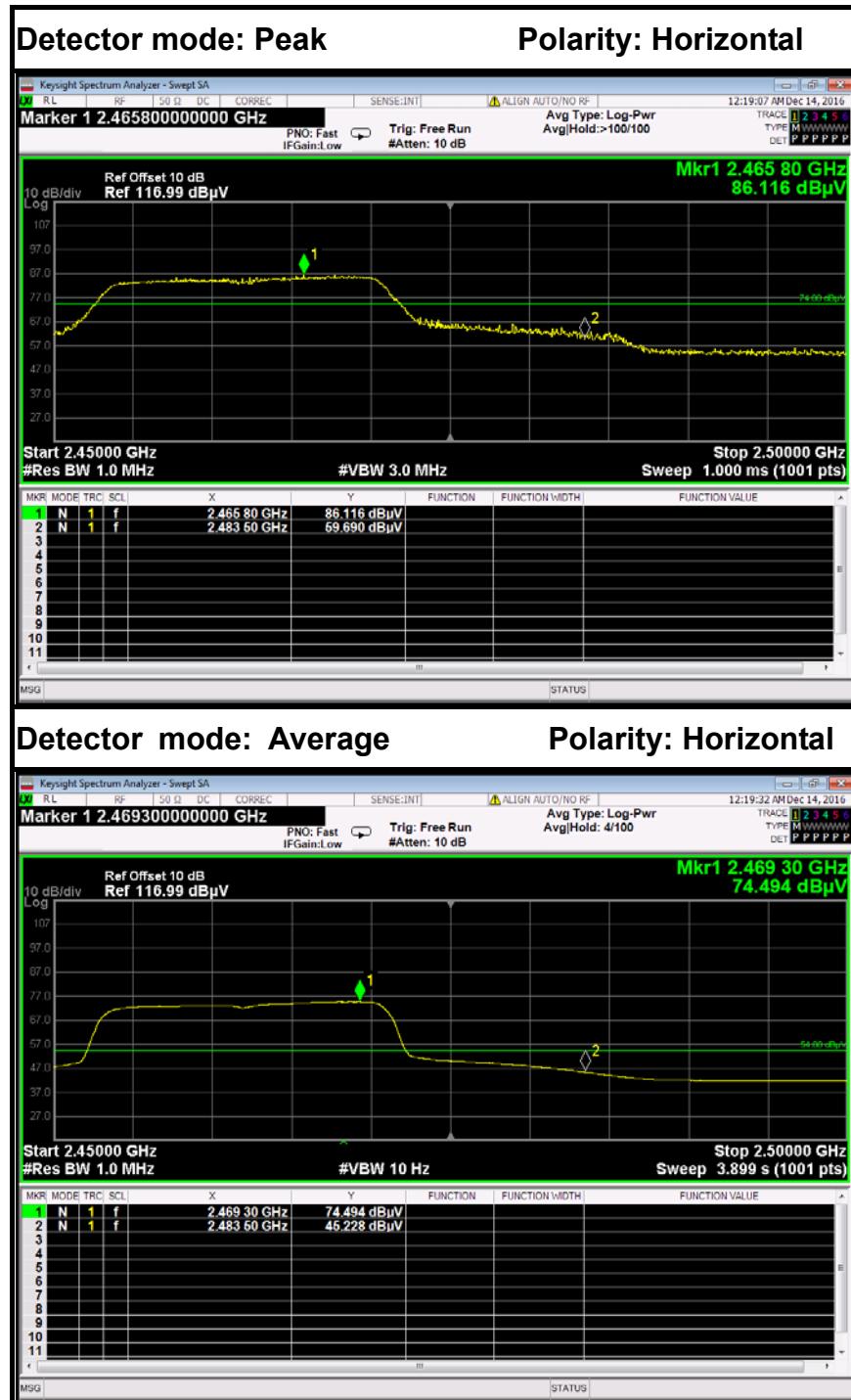


Detector mode: Average

Polarity: Vertical



No.	Frequency (MHz)	Reading (dB $\mu$ V)	Corrected (dB/m)	Result (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	70.51	-2.35	68.16	74.00	-5.84	Peak	Vertical
2	2483.5000	52.26	-2.35	49.91	54.00	-4.09	Average	Vertical



No.	Frequency (MHz)	Reading (dB $\mu$ V)	Corrected (dB/m)	Result (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	62.04	-2.35	59.69	74.00	-14.31	Peak	Horizontal
2	2483.5000	47.58	-2.35	45.23	54.00	-8.77	Average	Horizontal



## IEEE 802.11n HT40 MHz mode

## Band Edges (CH Low)

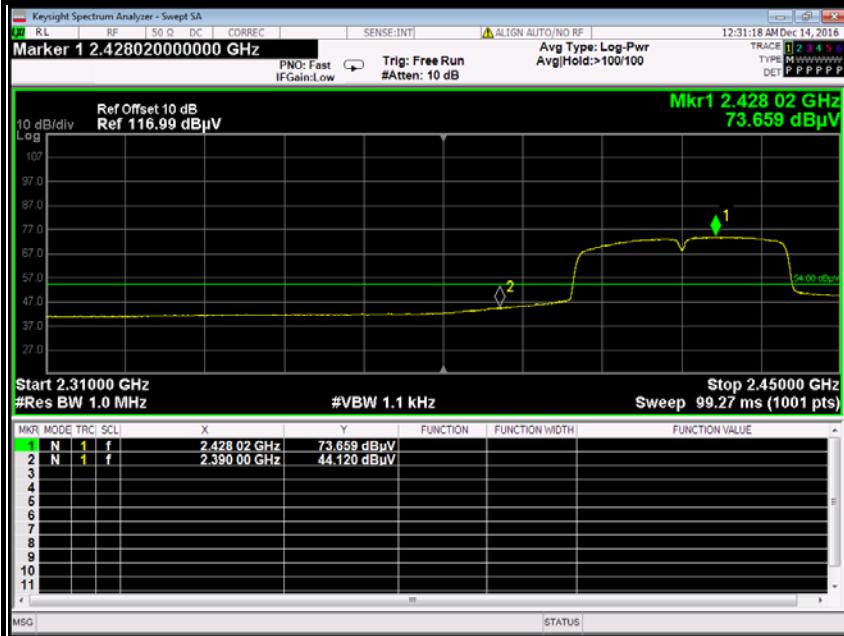
Detector mode: Peak

Polarity: Vertical



Detector mode: Average

Polarity: Vertical

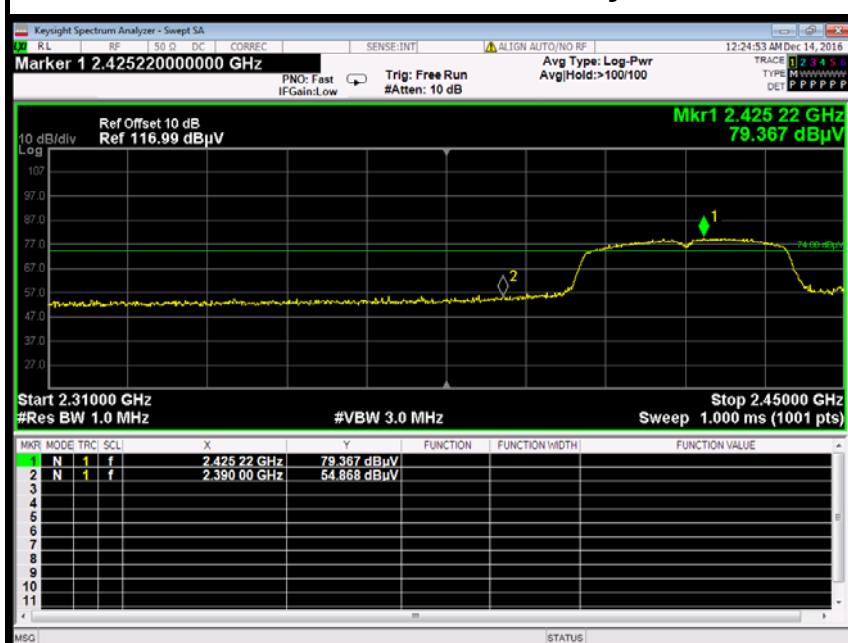


No.	Frequency (MHz)	Reading (dB $\mu$ V)	Corrected (dB/m)	Result (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	58.38	-2.86	55.52	74.00	-18.48	Peak	Vertical
2	2390.0000	46.98	-2.86	44.12	54.00	-9.88	Average	Vertical



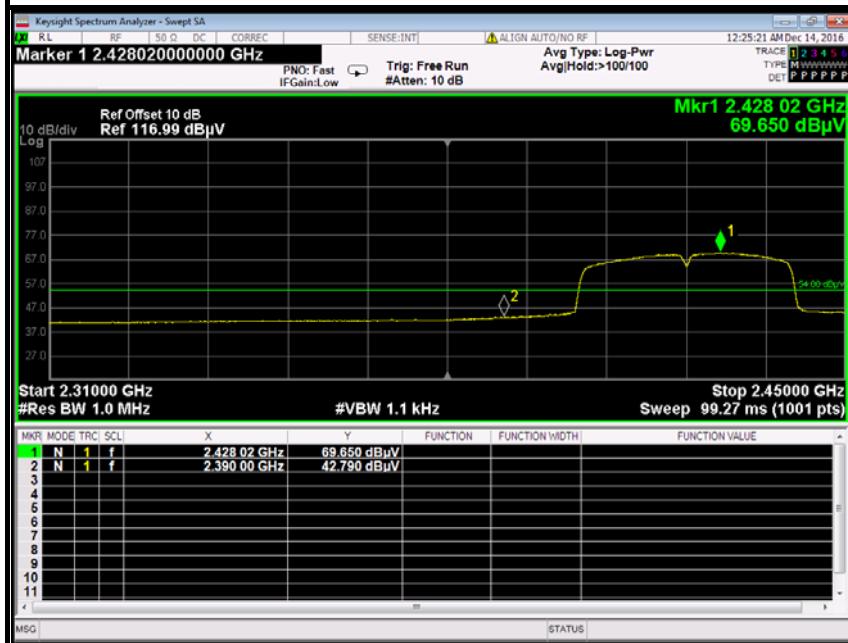
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

Polarity: Horizontal



No.	Frequency (MHz)	Reading (dB $\mu$ V)	Corrected (dB/m)	Result (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	57.73	-2.86	54.87	74.00	-19.13	Peak	Horizontal
2	2390.0000	45.65	-2.86	42.79	54.00	-11.21	Average	Horizontal



## Band Edges (CH High)

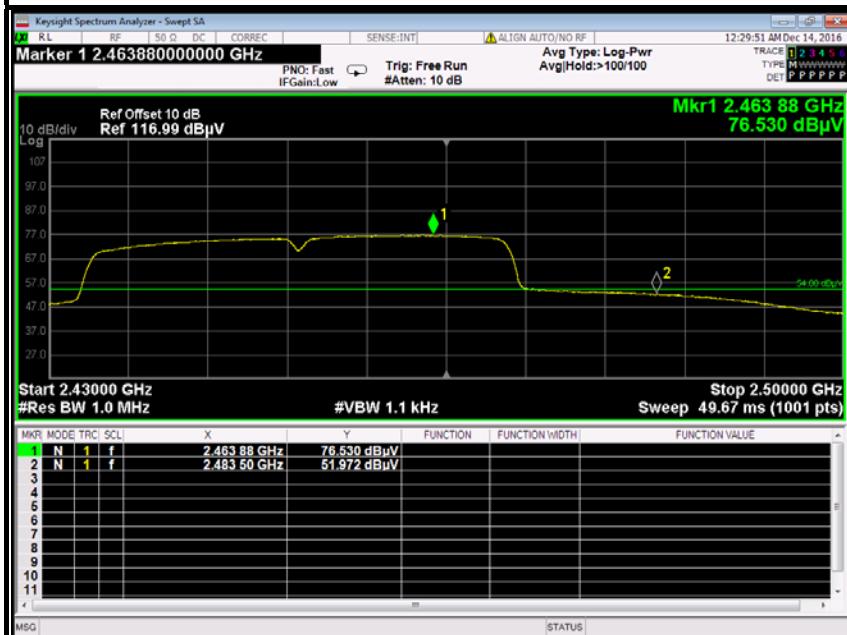
Detector mode: Peak

Polarity: Vertical



Detector mode: Average

Polarity: Vertical



No.	Frequency (MHz)	Reading (dB $\mu$ V)	Corrected (dB/m)	Result (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	68.82	-2.35	66.47	74.00	-7.53	Peak	Vertical
2	2483.5000	54.32	-2.35	51.97	54.00	-2.03	Average	Vertical



Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

Polarity: Horizontal



No.	Frequency (MHz)	Reading (dB $\mu$ V)	Corrected (dB/m)	Result (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	63.89	-2.35	61.54	74.00	-12.47	Peak	Horizontal
2	2483.5000	51.04	-2.35	48.69	54.00	-5.31	Average	Horizontal



## 7.7. PEAK POWER SPECTRAL DENSITY MEASUREMENT

### 7.7.1. LIMITS

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.

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.

### 7.7.2. TEST INSTRUMENTS

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

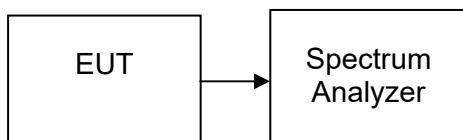
### 7.7.3. TEST PROCEDURES (please refer to measurement standard)

§15.247(e) specifies a conducted power spectral density (PSD) limit of 8 dBm in any 3 kHz band segment within the fundamental EBW during any time interval of continuous transmission. The same method as used to determine the conducted output power shall be used to determine the power spectral density (i.e., if peak-detected fundamental power was measured then use the peak PSD procedure and if average fundamental power was measured then use the average PSD procedure).

#### 10.2 Method PKPSD (peak PSD)

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
4. Set the VBW  $\geq 3 \times \text{RBW}$ .
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

### 7.7.4. TEST SETUP





### 7.7.5. TEST RESULTS

No non-compliance noted

#### Test Data

##### Test mode: IEEE 802.11b

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-6.420	8	PASS
Mid	2437	-5.735		PASS
High	2462	-5.821		PASS

##### Test mode: IEEE 802.11g

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-7.216	8	PASS
Mid	2437	-7.646		PASS
High	2462	-7.466		PASS

##### Test mode: IEEE 802.11n HT20 MHz

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-8.060	8	PASS
Mid	2437	-7.714		PASS
High	2462	-7.930		PASS

##### Test mode: IEEE 802.11n HT40 MHz

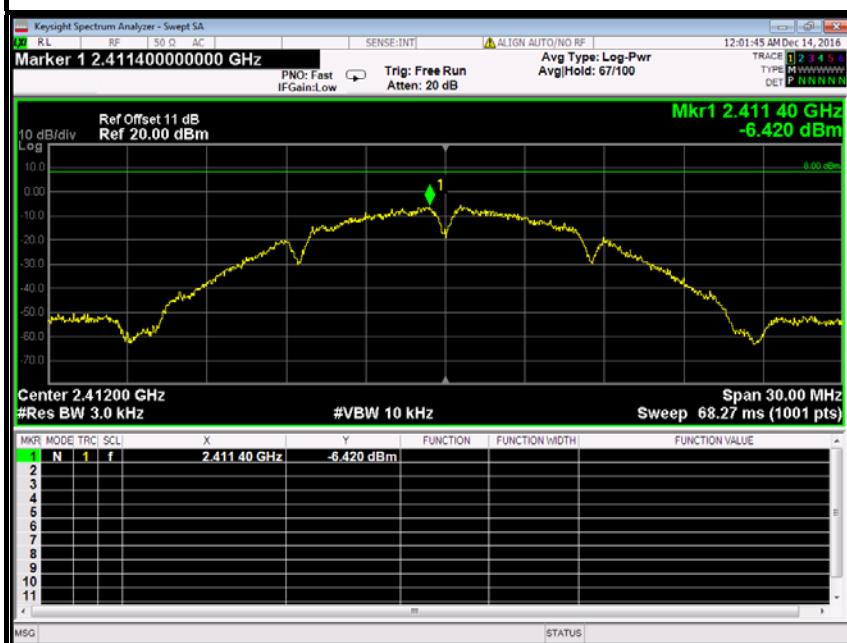
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2422	-11.048	8	PASS
Mid	2437	-9.253		PASS
High	2452	-11.532		PASS



## Test Plot

IEEE 802.11b mode

### PPSD (CH Low)



### PPSD (CH Mid)





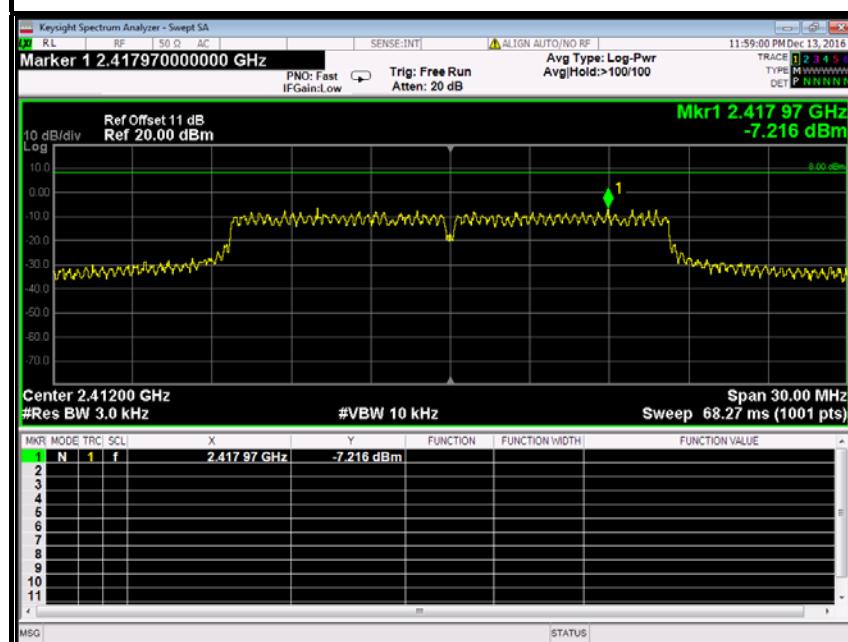
## PPSD (CH High)



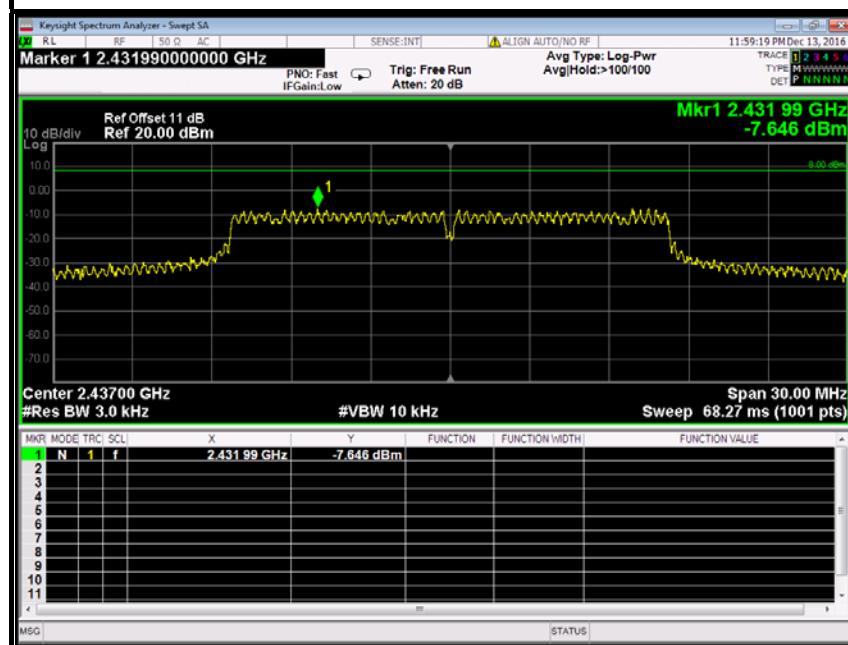


## IEEE 802.11g mode

## PPSD (CH Low)

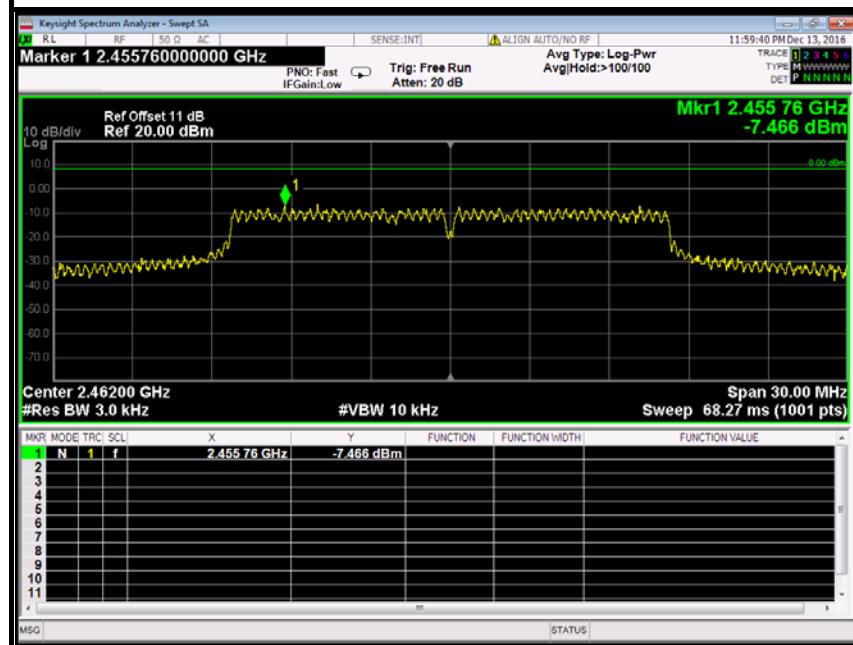


## PPSD (CH Mid)





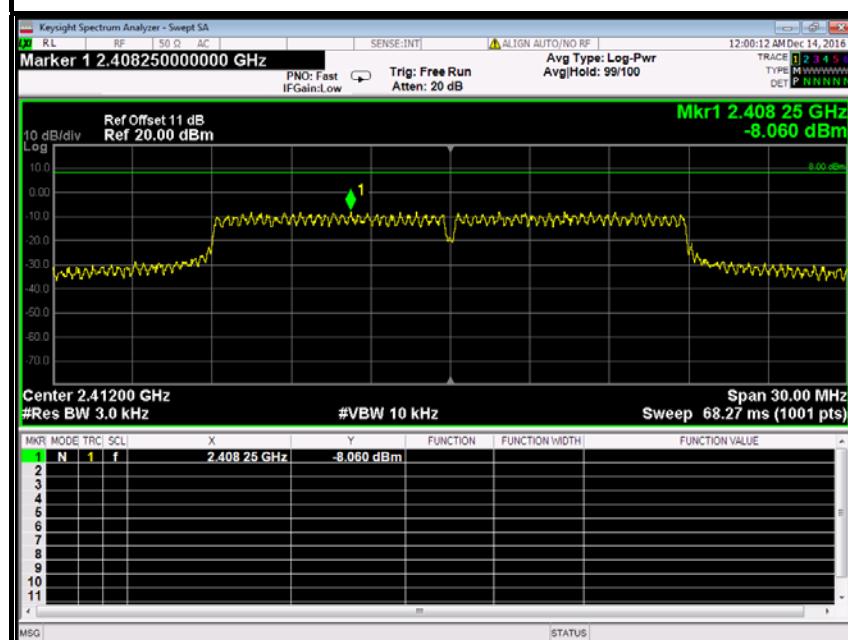
## PPSD (CH High)



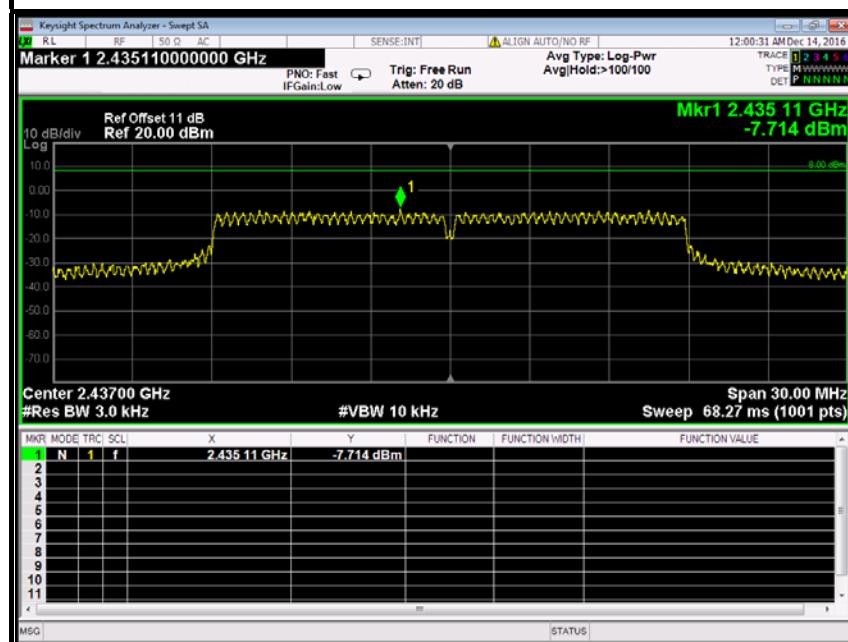


## IEEE 802.11n HT20 MHz mode

## PPSD (CH Low)

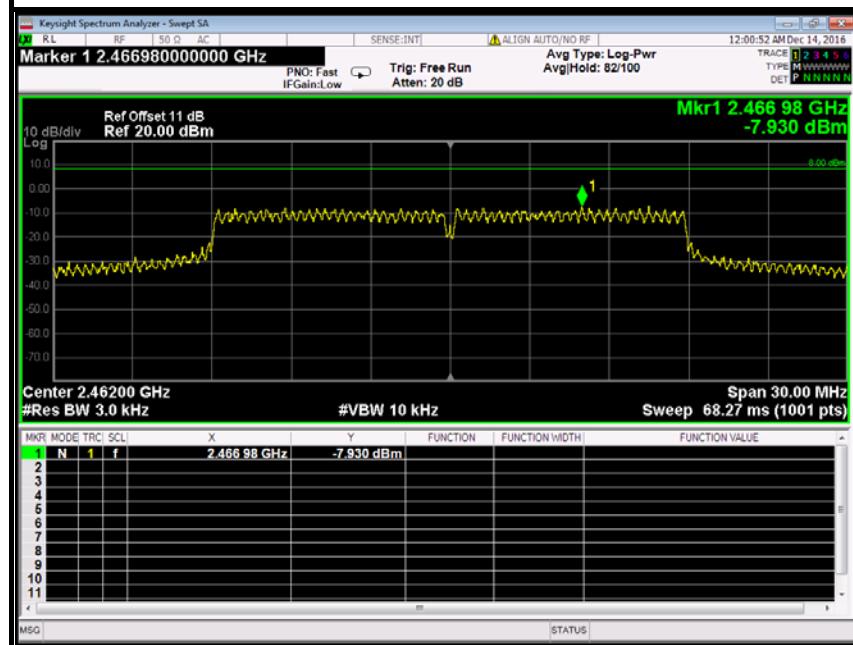


## PPSD (CH Mid)





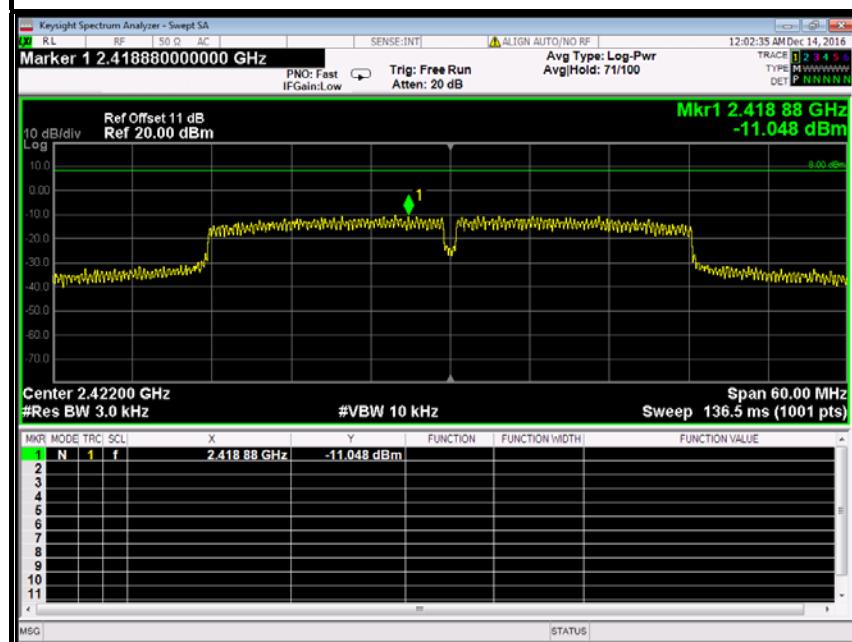
## PPSD (CH High)



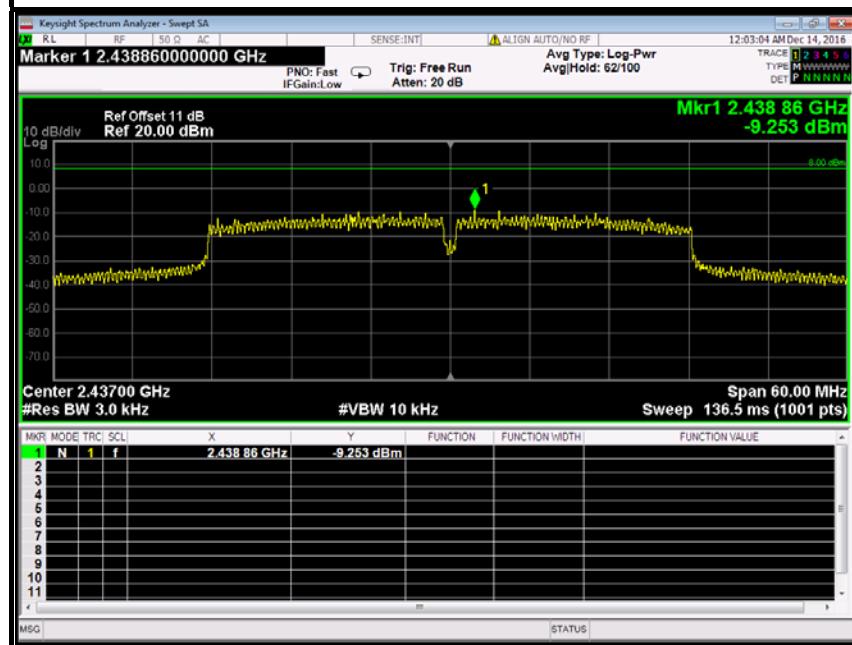


## IEEE 802.11n HT40 MHz mode

## PPSD (CH Low)



## PPSD (CH Mid)





## PPSD (CH High)

