



7.3.5. TEST RESULTS

No non-compliance noted

**Test Data**

**Antenna 11:**

**Test mode: IEEE 802.11b**

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	12121	>500	PASS
Mid	2437	12111		PASS
High	2462	12127		PASS

**Test mode: IEEE 802.11g**

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	16351	>500	PASS
Mid	2437	16369		PASS
High	2462	16411		PASS

**Antenna 10:**

**Test mode: IEEE 802.11b**

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	12119	>500	PASS
Mid	2437	12129		PASS
High	2462	12128		PASS

**Test mode: IEEE 802.11g**

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	16370	>500	PASS
Mid	2437	16375		PASS
High	2462	16369		PASS

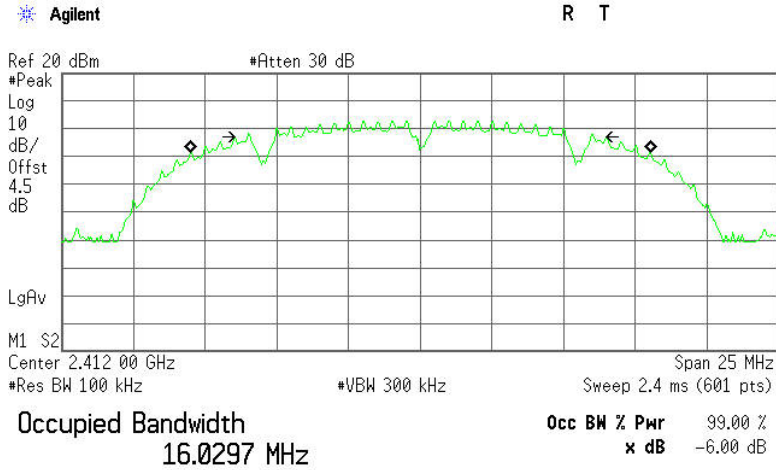


**Test Plot**

**Antenna 11:**

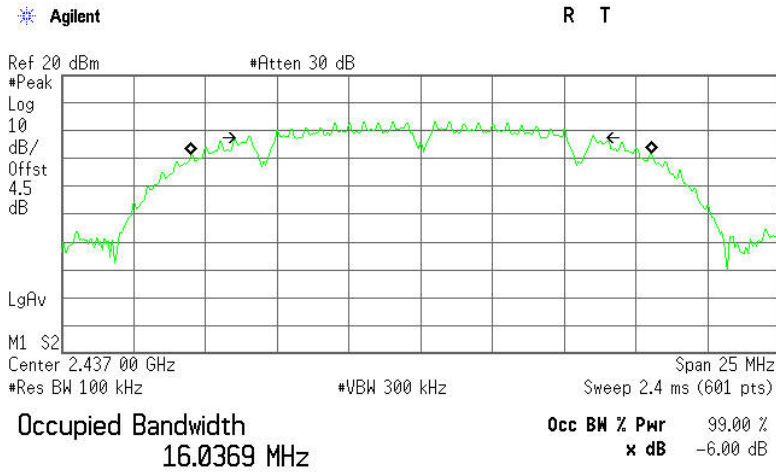
**IEEE 802.11b mode**

**6dB Bandwidth (CH Low)**



Transmit Freq Error 25,138 kHz  
x dB Bandwidth 12,121 MHz

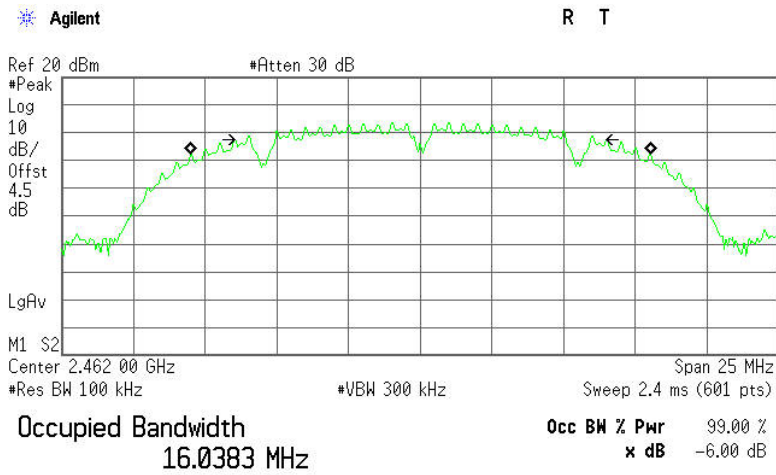
**6dB Bandwidth (CH Mid)**



Transmit Freq Error 27,432 kHz  
x dB Bandwidth 12,111 MHz



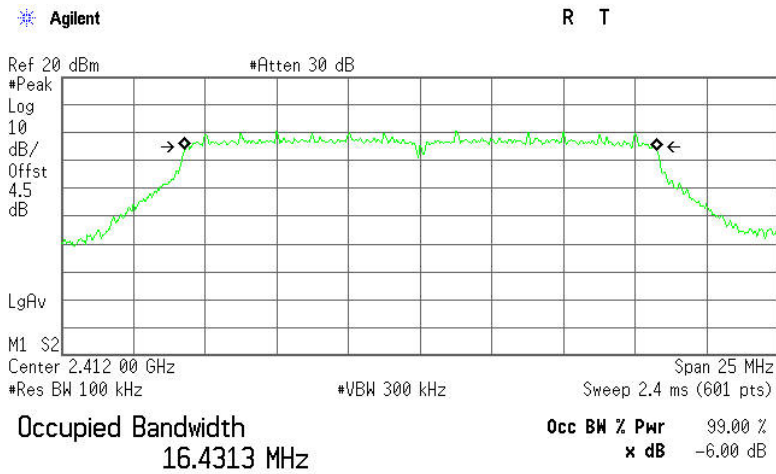
### 6dB Bandwidth (CH High)



Transmit Freq Error 22.185 kHz  
x dB Bandwidth 12.127 MHz

### IEEE 802.11g mode

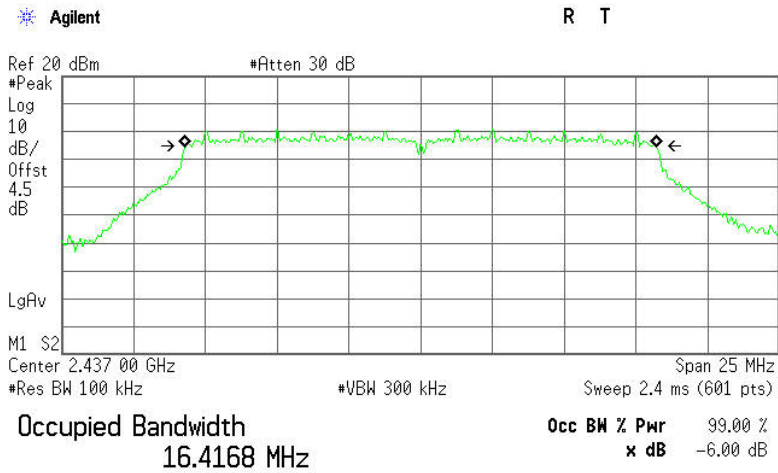
### 6dB Bandwidth (CH Low)



Transmit Freq Error 18.320 kHz  
x dB Bandwidth 16.351 MHz

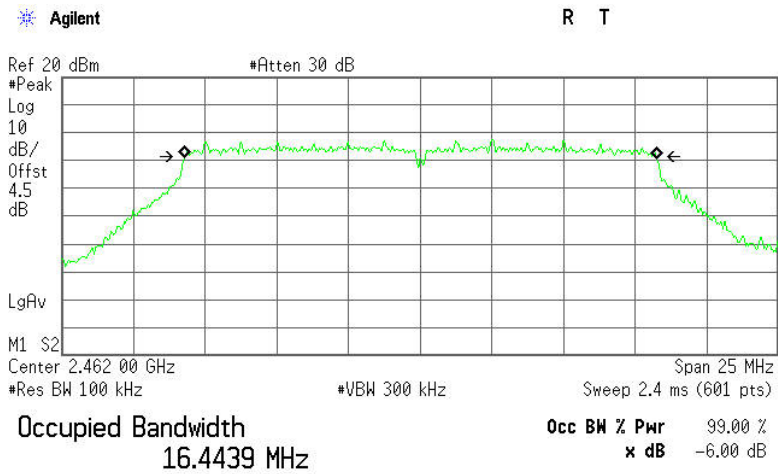


### 6dB Bandwidth (CH Mid)



Transmit Freq Error 18.979 kHz  
x dB Bandwidth 16.369 MHz

### 6dB Bandwidth (CH High)



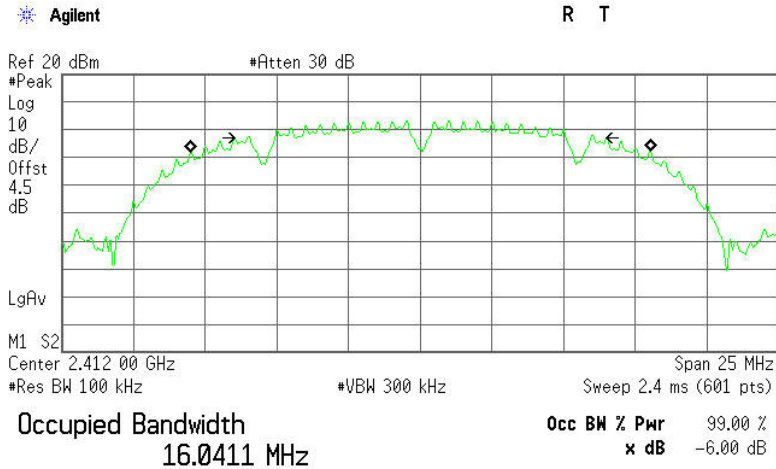
Transmit Freq Error 17.075 kHz  
x dB Bandwidth 16.411 MHz



Antenna 10:

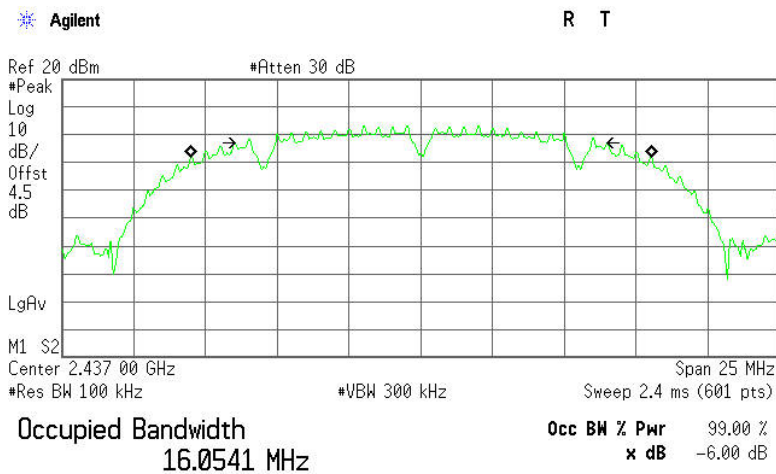
IEEE 802.11b mode

6dB Bandwidth (CH Low)



Transmit Freq Error 19.649 kHz  
x dB Bandwidth 12.119 MHz

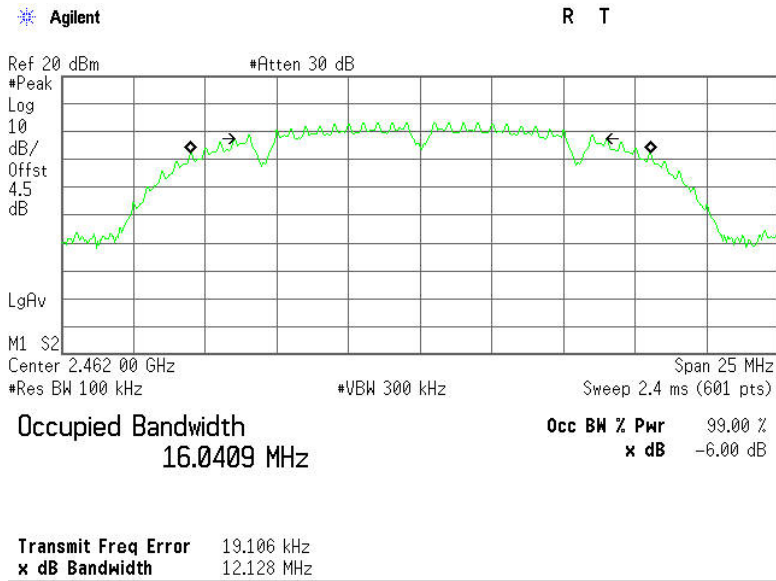
6dB Bandwidth (CH Mid)



Transmit Freq Error 17.960 kHz  
x dB Bandwidth 12.129 MHz

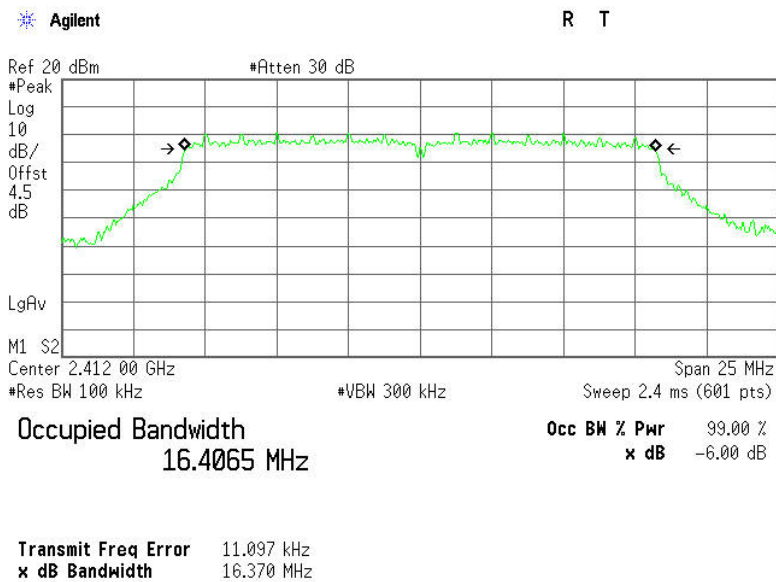


### 6dB Bandwidth (CH High)



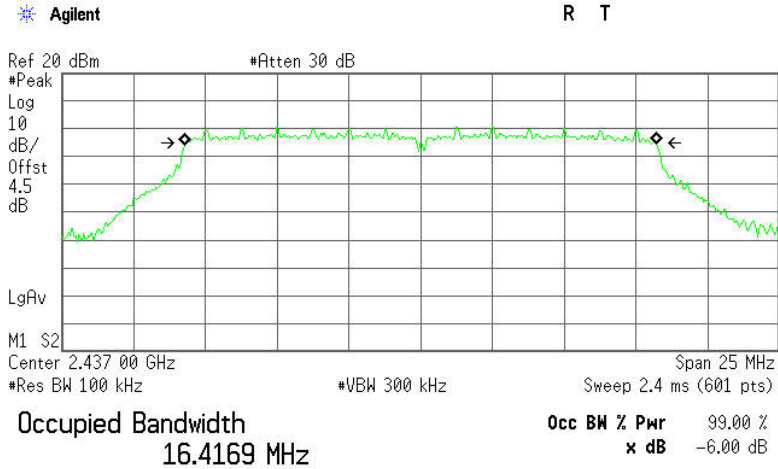
### IEEE 802.11g mode

### 6dB Bandwidth (CH Low)





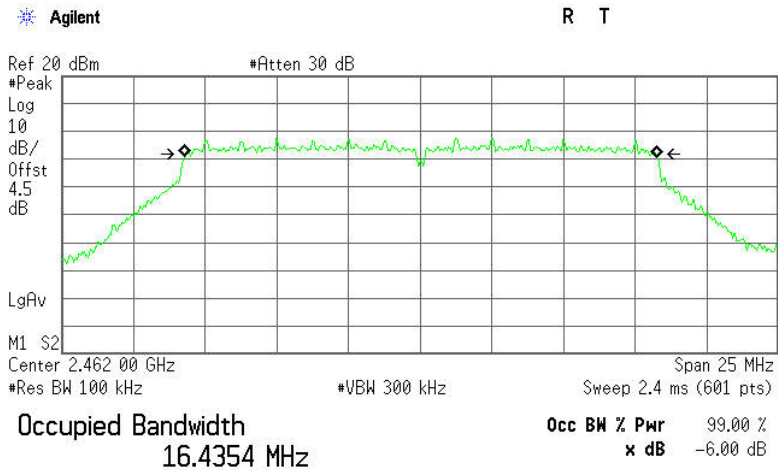
### 6dB Bandwidth (CH Mid)



Transmit Freq Error 9.616 kHz

x dB Bandwidth 16.375 MHz

### 6dB Bandwidth (CH High)



Transmit Freq Error 20.328 kHz

x dB Bandwidth 16.369 MHz



## 7.4. PEAK OUTPUT POWER

### 7.4.1. 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.

### 7.4.2. TEST INSTRUMENTS

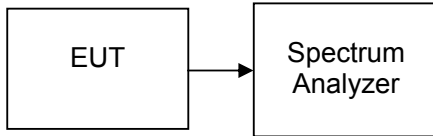
Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US44300399	03/09/2013	03/08/2014

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

1. This procedure provides an integrated measurement alternative when the maximum available RBW < EBW.
2. Set the RBW = 1 MHz.
3. Set the VBW = 3 MHz.
4. Set the span to a value that is 5-30 % greater than the EBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the spectrum analyzer's integrated band power measurement function with band limits set equal to the EBW band edges(for some analyzers, this may require a manual override to ensure use of peak detector). If the spectrum analyzer does not have a band power function, sum the spectrum levels (in linear power units) at 1 MHz intervals extending across the EBW of the spectrum.



7.4.4. TEST SETUP



7.4.5. TEST RESULTS

No non-compliance noted

**Test Data**

**Antenna 11:**

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	14.87	0.03069	1	PASS
Mid	2437	15.12	0.03251		PASS
High	2462	15.32	0.03404		PASS

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	14.93	0.03112	1	PASS
Mid	2437	14.80	0.03020		PASS
High	2462	11.90	0.01549		PASS

**Antenna 10:**

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	14.85	0.03055	1	PASS
Mid	2437	14.96	0.03133		PASS
High	2462	15.04	0.03192		PASS

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	14.96	0.03133	1	PASS
Mid	2437	14.78	0.03006		PASS
High	2462	14.53	0.02838		PASS

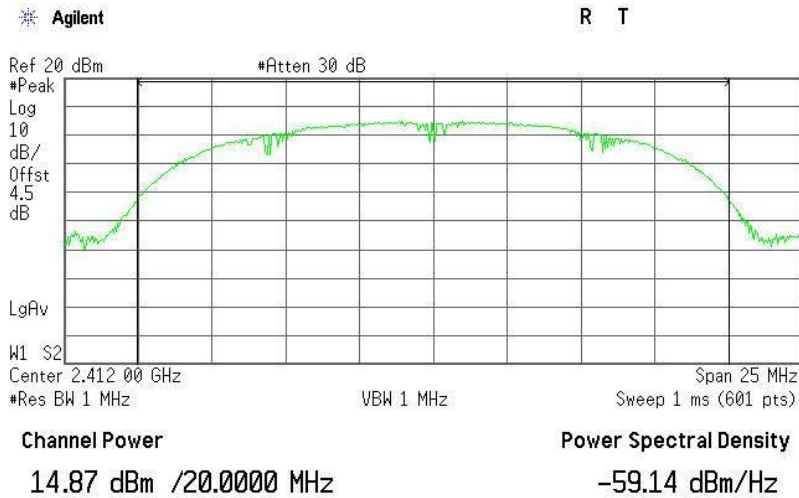


**Test Plot**

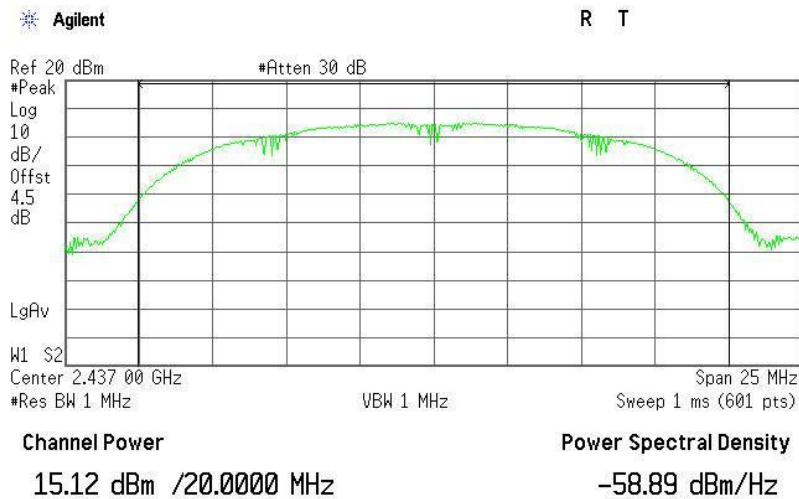
**Antenna 11:**

**IEEE 802.11b mode**

**Peak power (CH Low)**

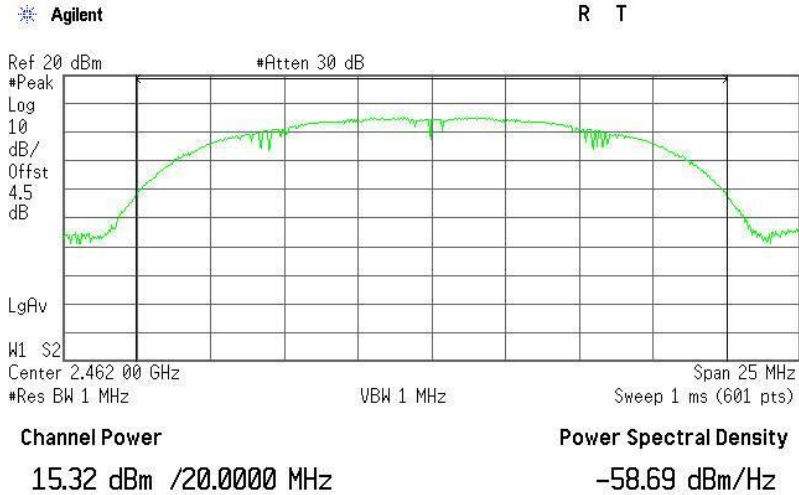


**Peak power (CH Mid)**



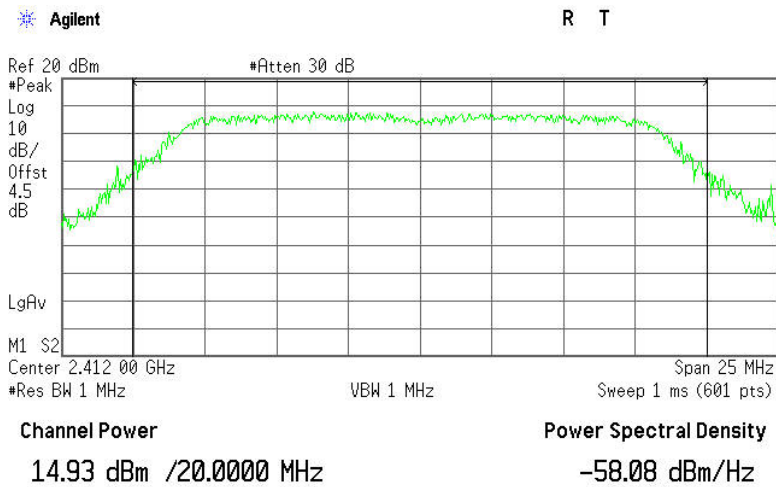


### Peak power (CH High)



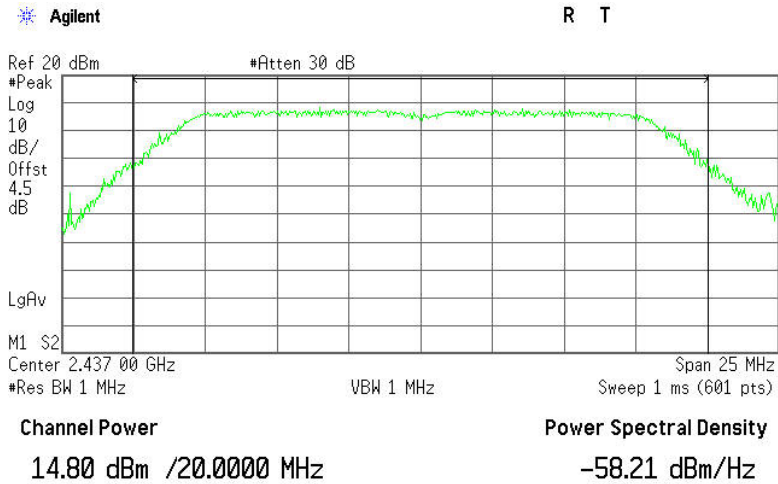
### IEEE 802.11g mode

#### Peak power (CH Low)

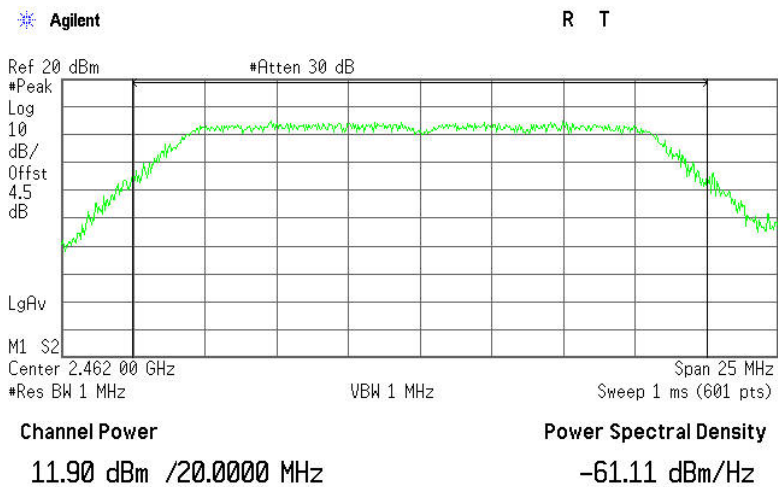




### Peak power (CH Mid)



### Peak power (CH High)

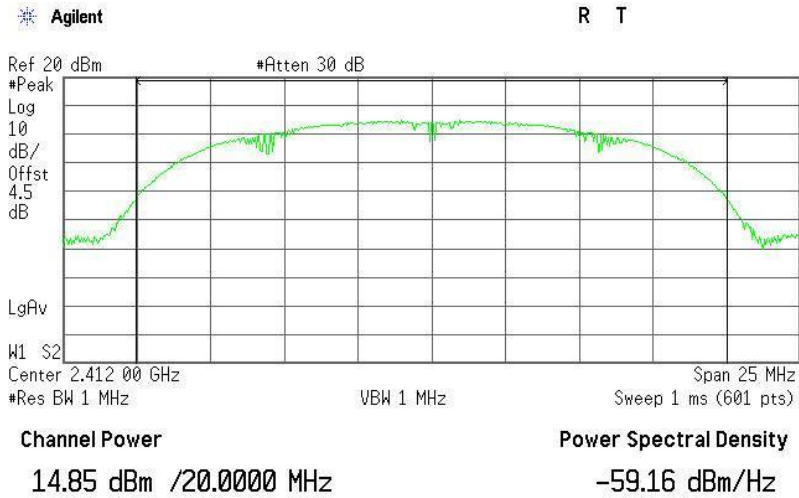




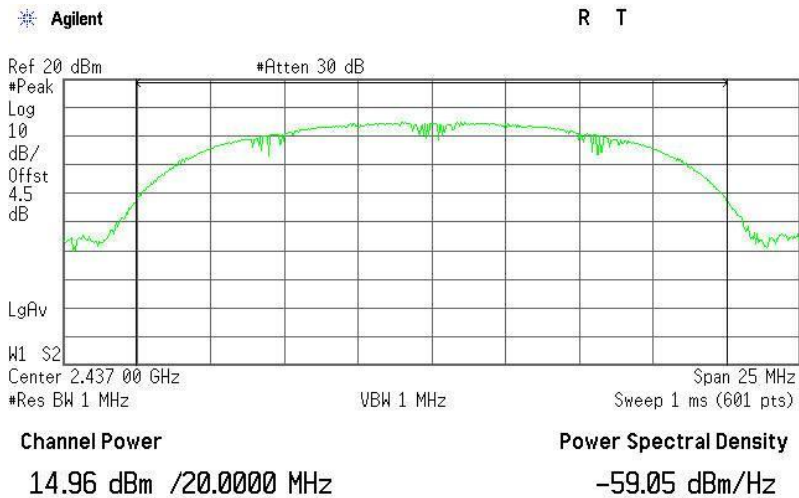
Antenna 10:

IEEE 802.11b mode

Peak power (CH Low)

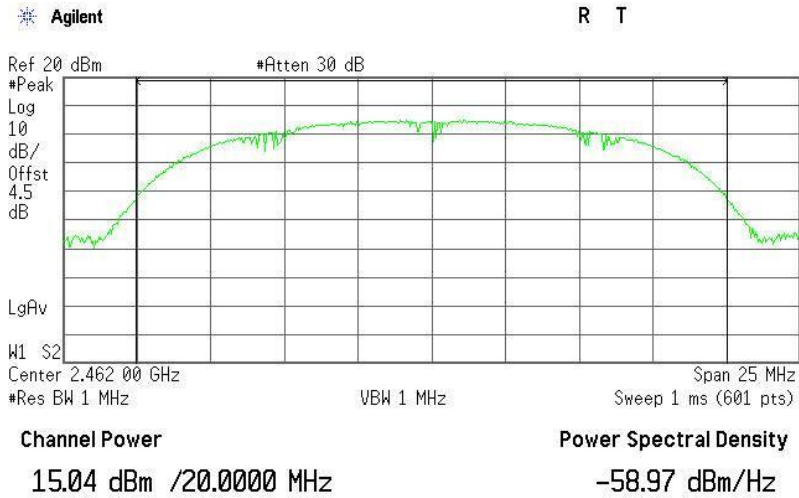


Peak power (CH Mid)



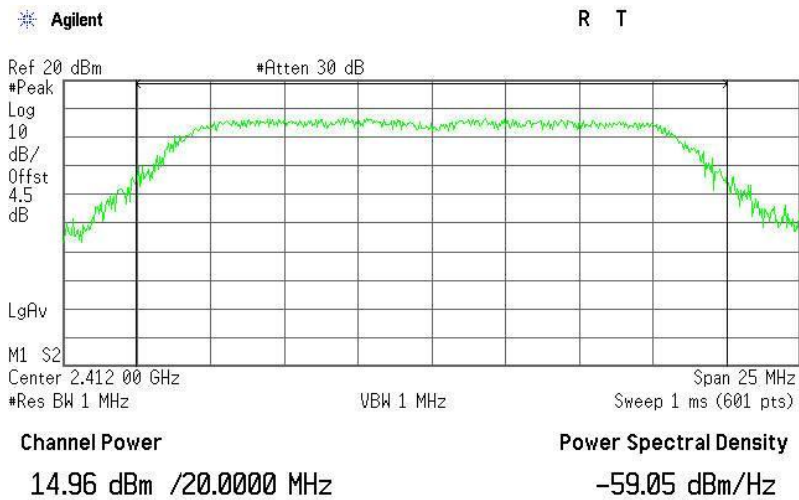


### Peak power (CH High)



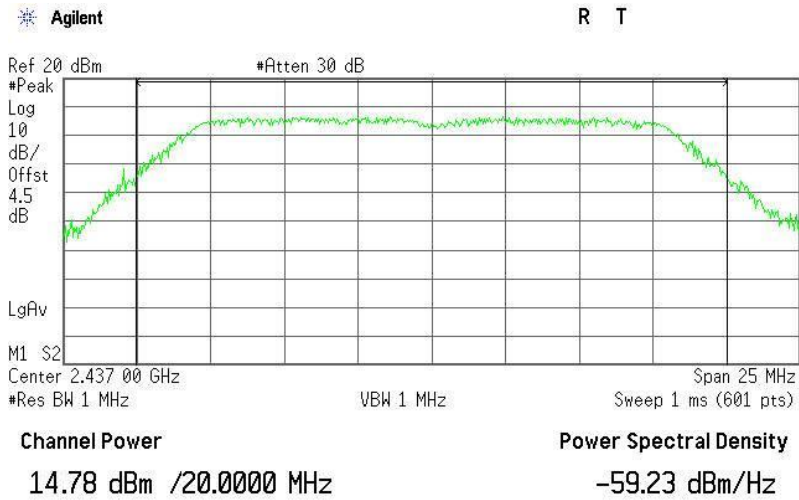
### IEEE 802.11g mode

#### Peak power (CH Low)

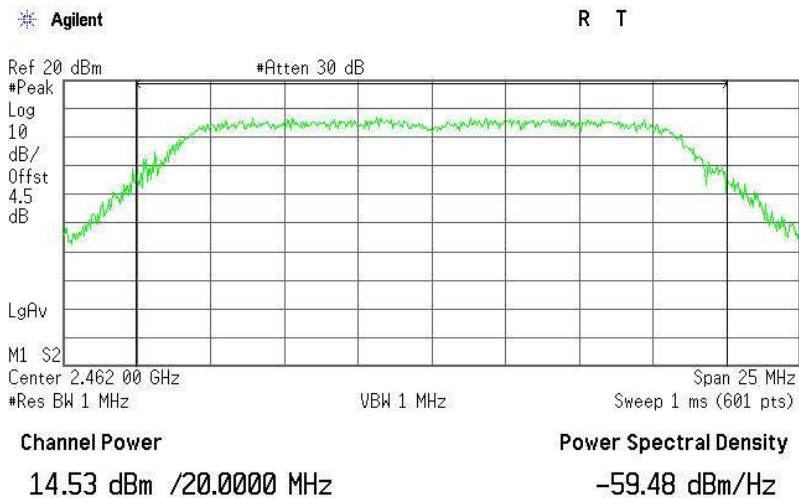




### Peak power (CH Mid)



### Peak power (CH High)





### 7.5. BAND EDGES MEASUREMENT

#### 7.5.1. 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)).

#### 7.5.2. 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	03/09/2013	03/08/2014
ESCI EMI TEST RECEIVER.ESCI	ROHDE&SCHWARZ	ESCI	100783	03/09/2013	03/08/2014
Amplifier	MITEQ	AM-1604-3000	1123808	03/18/2013	03/18/2014
High Noise Amplifier	Agilent	8449B	3008A01838	03/18/2013	03/18/2014
Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170-497	06/21/2012	06/21/2013
Bilog Antenna	SCHAFFNER	CBL6143	5082	03/02/2013	03/01/2014
Horn Antenna	SCHWARZBECK	BBHA9120	D286	03/02/2013	03/01/2014
Loop Antenna	A、 R、 A	PLA-1030/B	1029	03/23/2013	03/23/2014
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	03/04/2013	03/03/2014
Antenna Tower	SUNOL	TLT2	N/A	N.C.R	N.C.R
Test S/W	FARAD	LZ-RF / CCS-SZ-3A2			

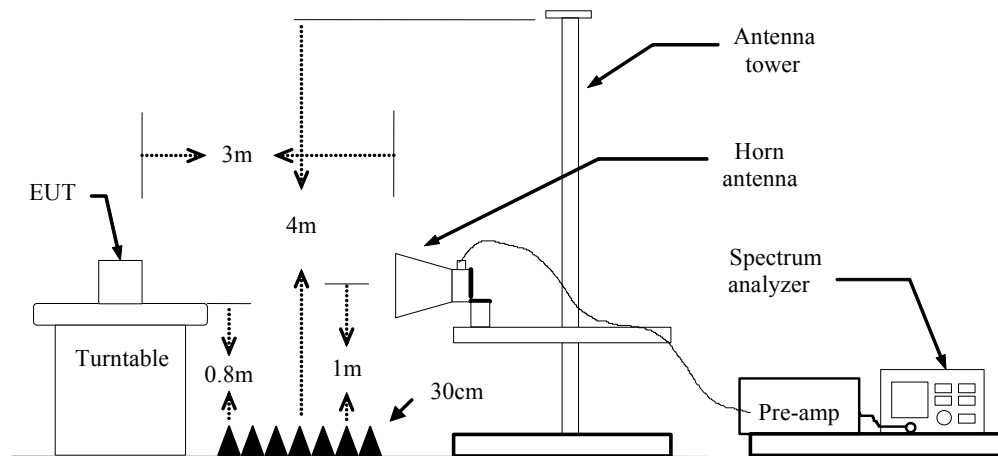
- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
 2. The FCC Site Registration number is 101879.  
 3. N.C.R = No Calibration Required.



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

1. The EUT is placed on a turntable, which is 0.8m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
  - (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
  - (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are

**7.5.4. TEST SETUP**





7.5.5. TEST RESULTS

Test Plot

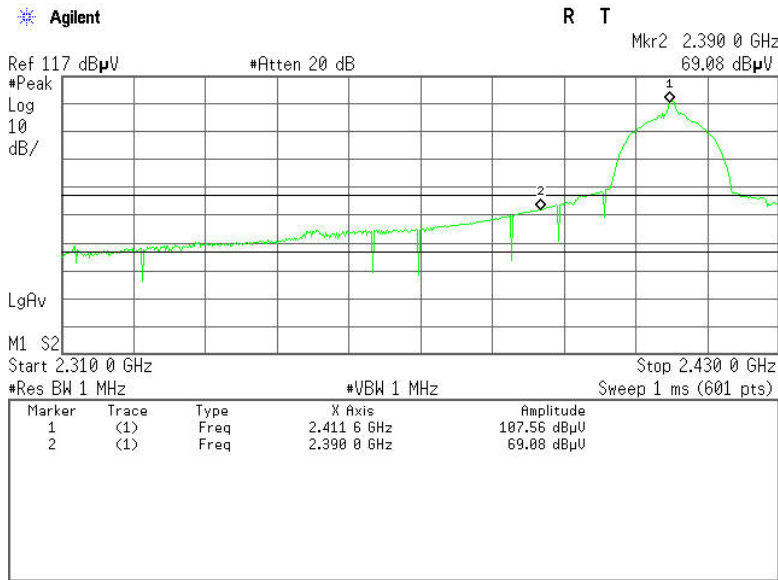
Antenna 11:

IEEE 802.11b mode

Band Edges (CH Low)

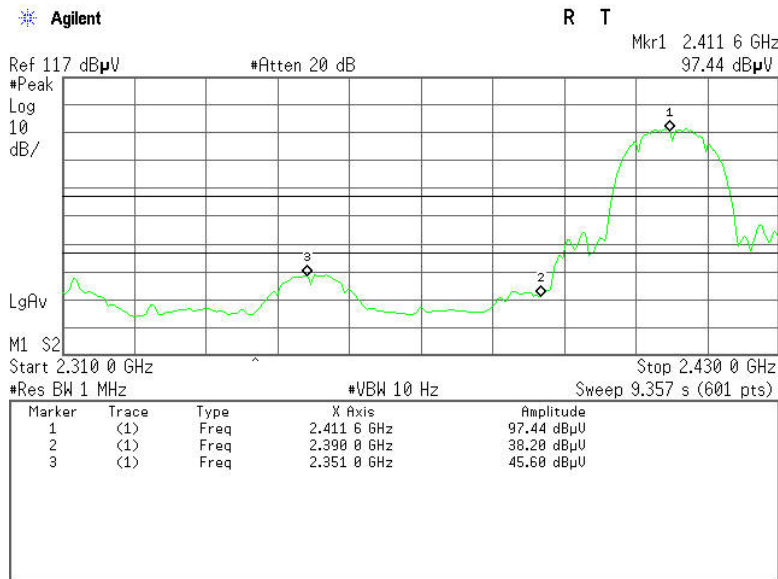
Detector mode: Peak

Polarity: Vertical



Detector mode: Average

Polarity: Vertical

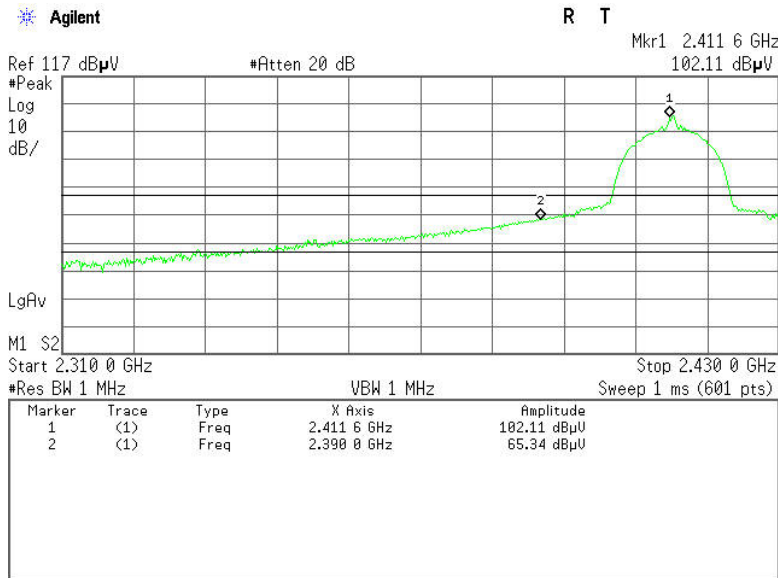


No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	62.48	-6.60	69.08	74.00	-4.92	Peak	Vertical
2	2390.0000	31.60	-6.60	38.20	54.00	-15.80	Average	Vertical



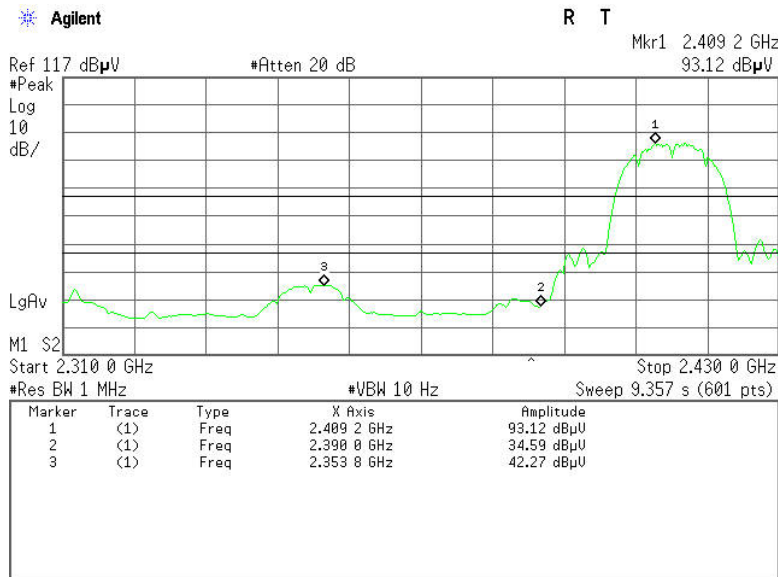
**Detector mode: Peak**

**Polarity: Horizontal**



**Detector mode: Average**

**Polarity: Horizontal**



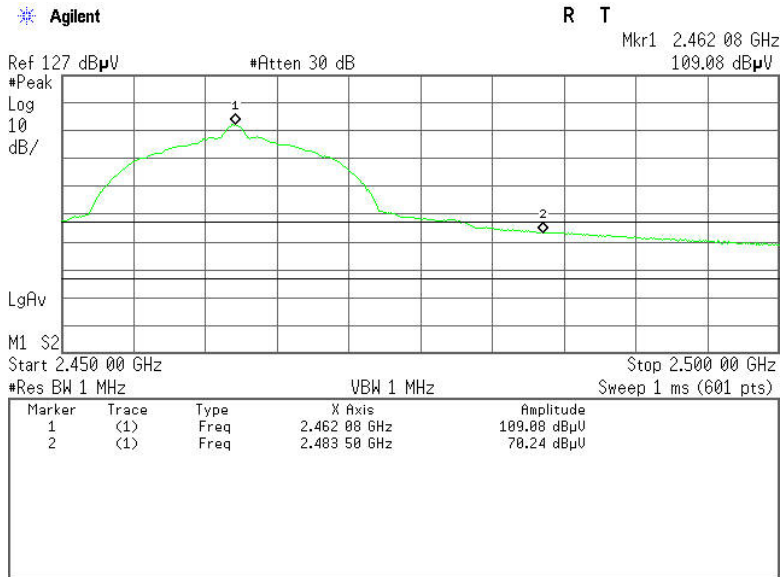
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	58.74	-6.60	65.34	74.00	-8.66	Peak	Horizontal
2	2390.0000	27.99	-6.60	34.59	54.00	-19.41	Average	Horizontal



**Band Edges (CH High)**

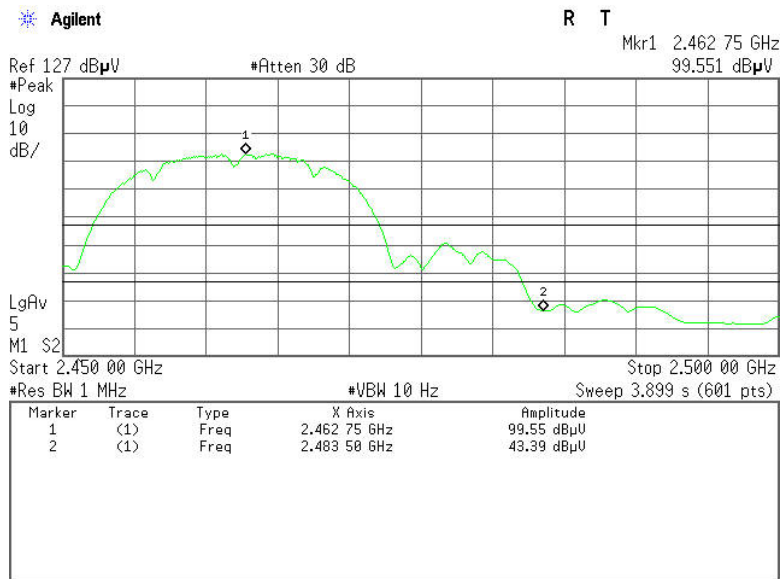
**Detector mode: Peak**

**Polarity: Vertical**



**Detector mode: Average**

**Polarity: Vertical**

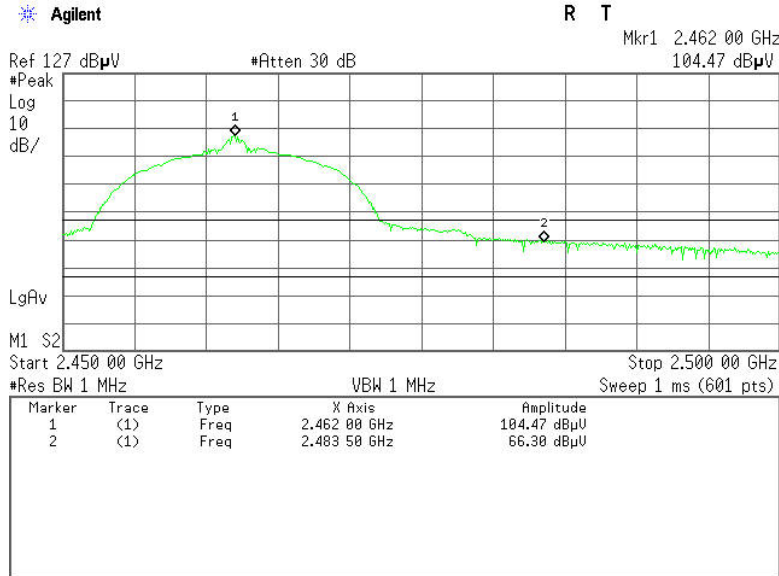


No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	64.00	-6.24	70.24	74.00	-3.76	Peak	Vertical
2	2483.5000	37.15	-6.24	43.39	54.00	-10.61	AVG	Vertical



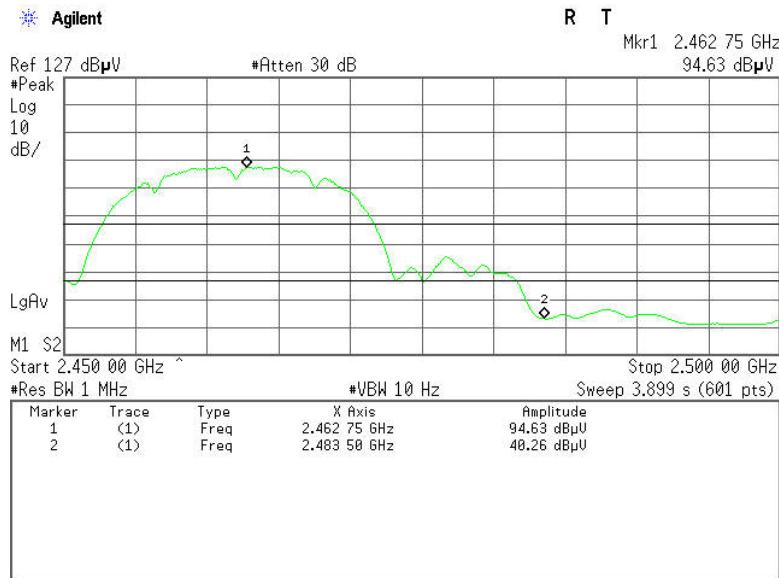
**Detector mode: Peak**

**Polarity: Horizontal**



**Detector mode: Average**

**Polarity: Horizontal**



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	60.06	-6.24	66.30	74.00	-7.70	Peak	Horizontal
2	2483.5000	34.02	-6.24	40.26	54.00	-13.74	AVG	Horizontal

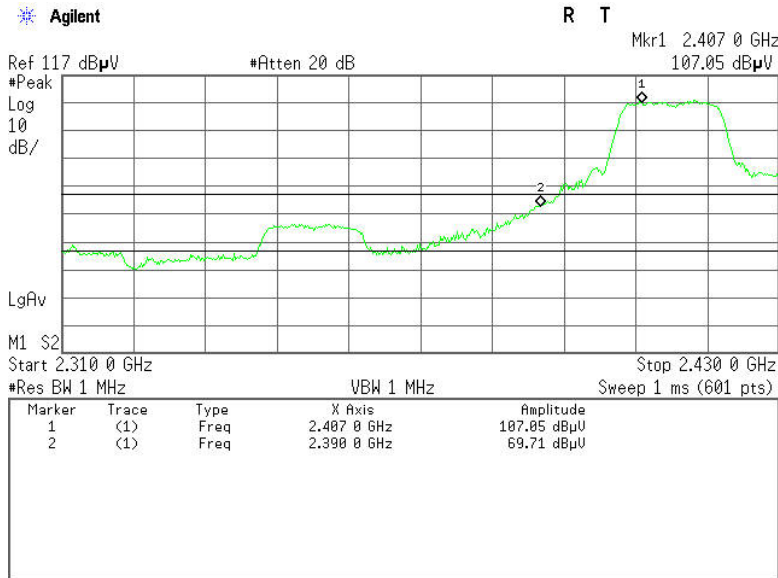


IEEE 802.11g mode

Band Edges (CH Low)

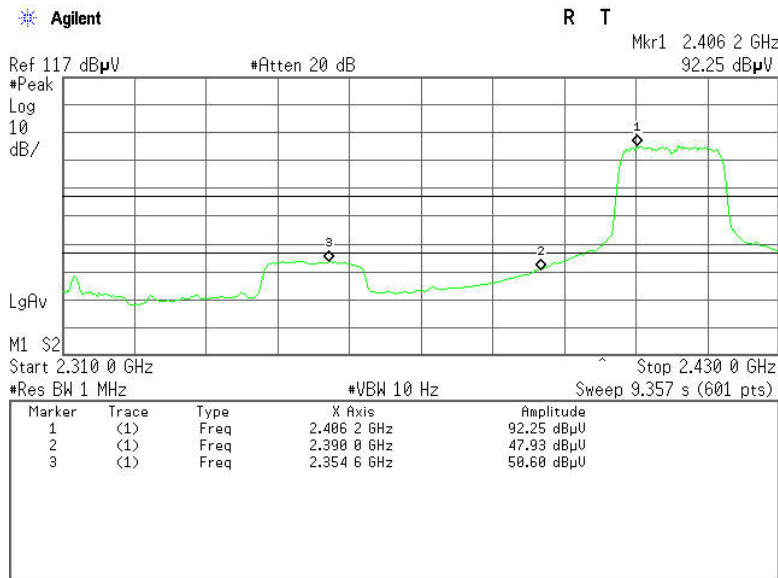
Detector mode: Peak

Polarity: Vertical



Detector mode: Average

Polarity: Vertical

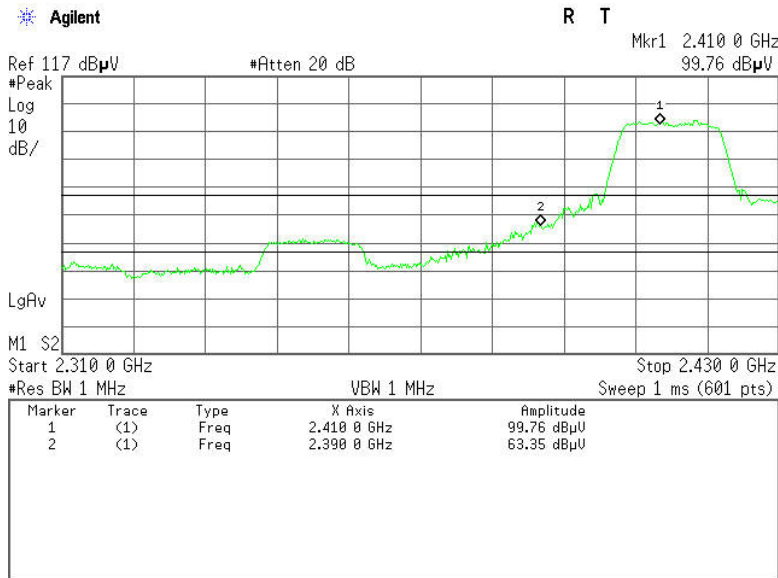


No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	63.11	-6.60	69.71	74.00	-4.29	Peak	Vertical
2	2390.0000	41.33	-6.60	47.93	54.00	-6.07	Average	Vertical



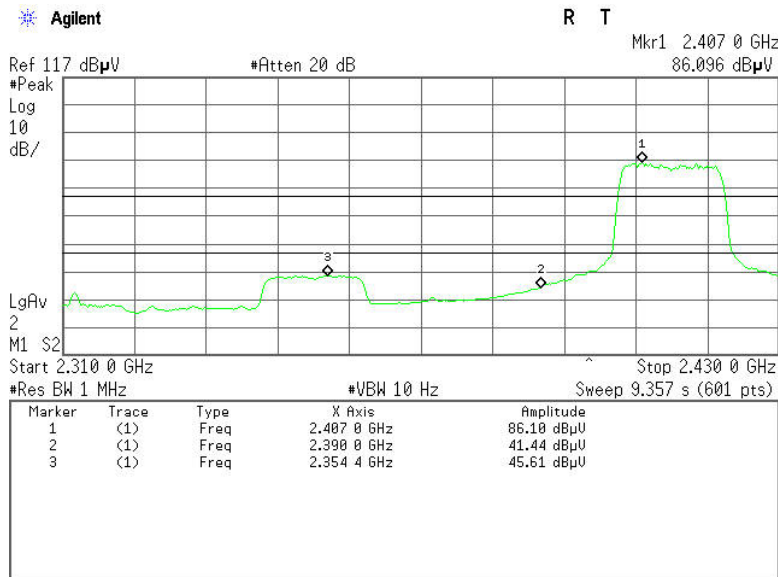
**Detector mode: Peak**

**Polarity: Horizontal**



**Detector mode: Average**

**Polarity: Horizontal**



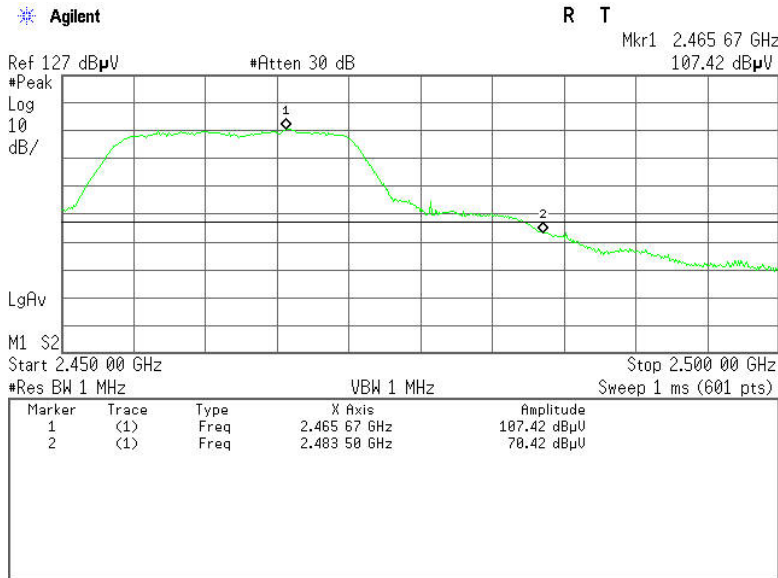
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	56.75	-6.60	63.35	74.00	-10.65	Peak	Horizontal
2	2390.0000	34.84	-6.60	41.44	54.00	-12.56	Average	Horizontal



**Band Edges (CH High)**

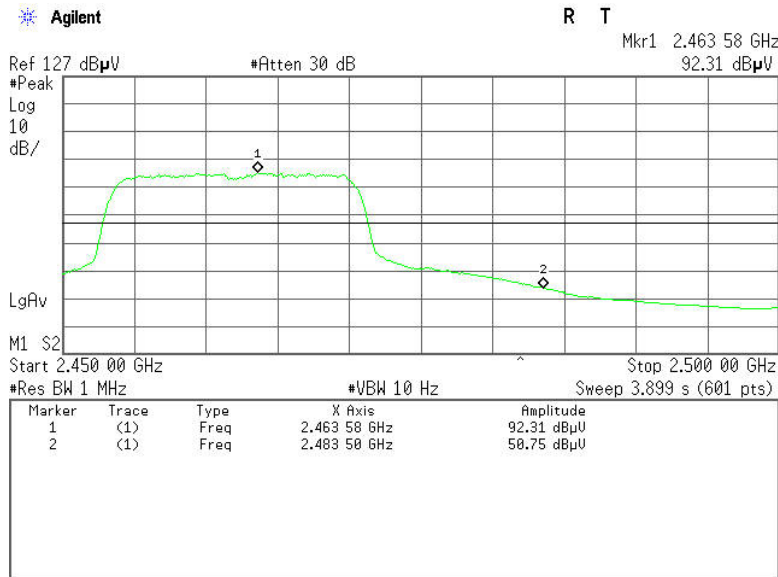
**Detector mode: Peak**

**Polarity: Vertical**



**Detector mode: Average**

**Polarity: Vertical**

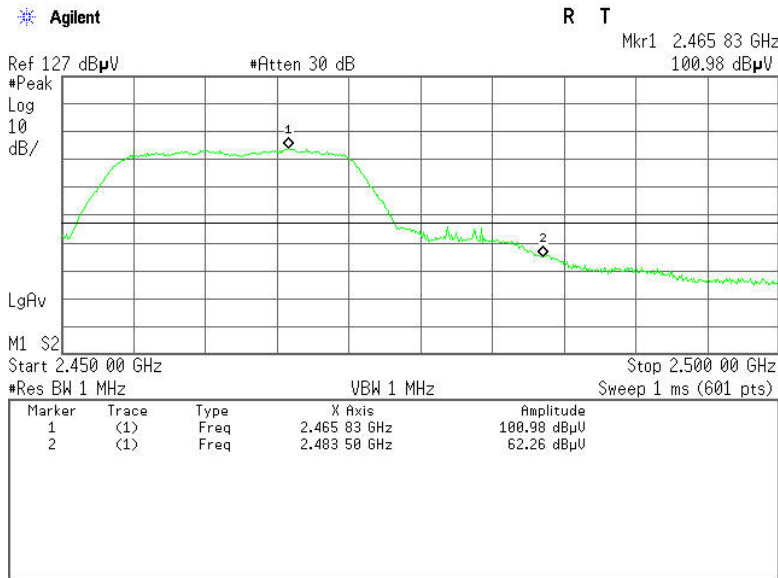


No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	64.18	-6.24	70.42	74.00	-3.58	Peak	Vertical
2	2483.5000	44.51	-6.24	50.75	54.00	-3.25	AVG	Vertical



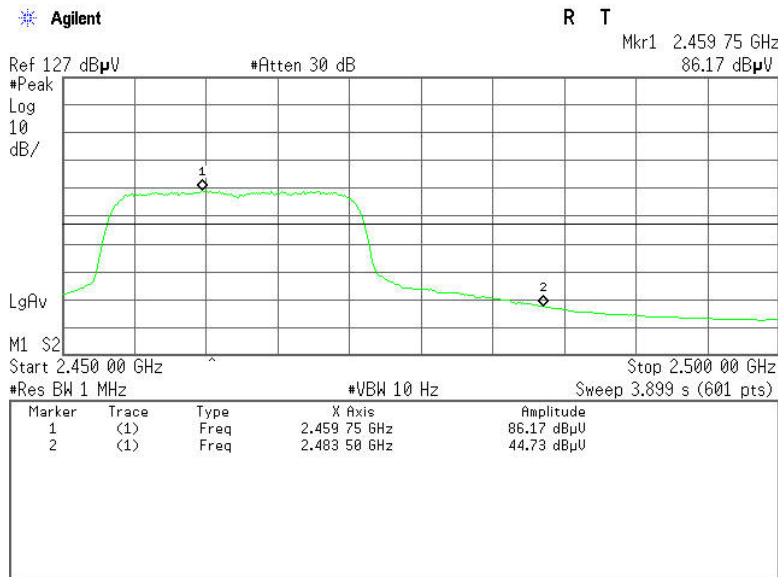
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

Polarity: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	56.02	-6.24	62.26	74.00	-11.74	Peak	Horizontal
2	2483.5000	38.49	-6.24	44.73	54.00	-9.27	AVG	Horizontal



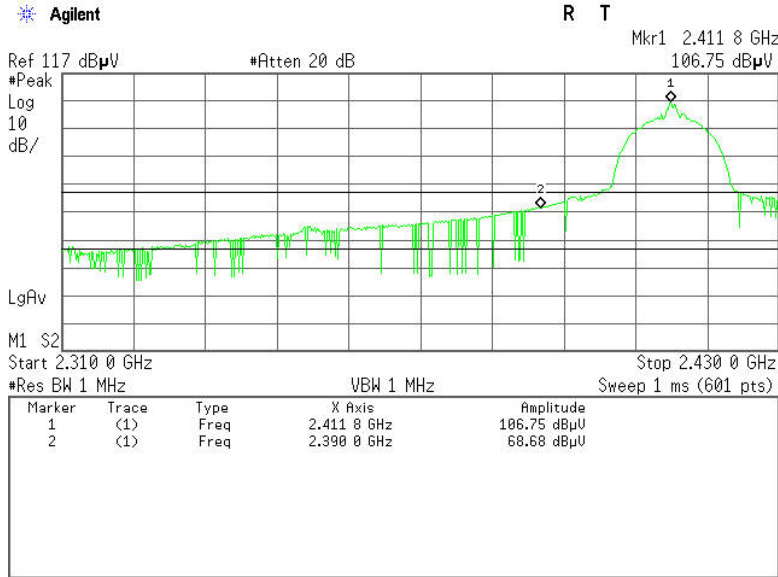
**Antenna 10:**

**IEEE 802.11b mode**

**Band Edges (CH Low)**

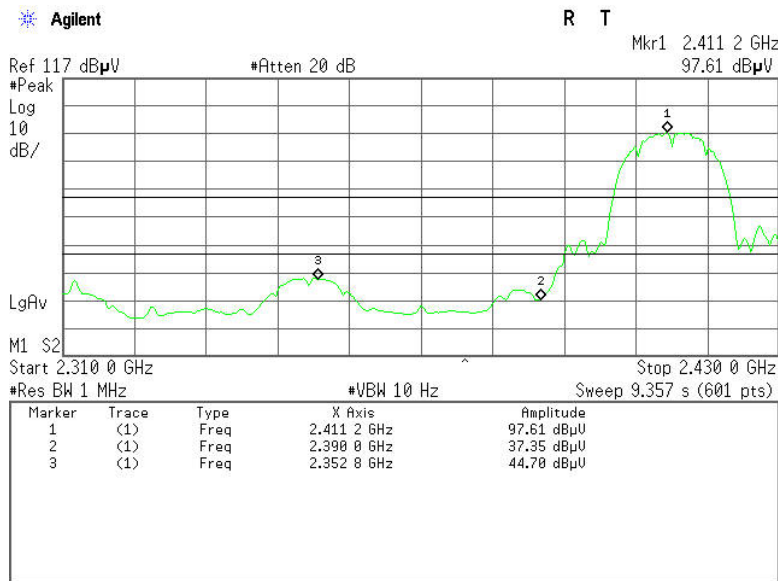
**Detector mode: Peak**

**Polarity: Vertical**



**Detector mode: Average**

**Polarity: Vertical**

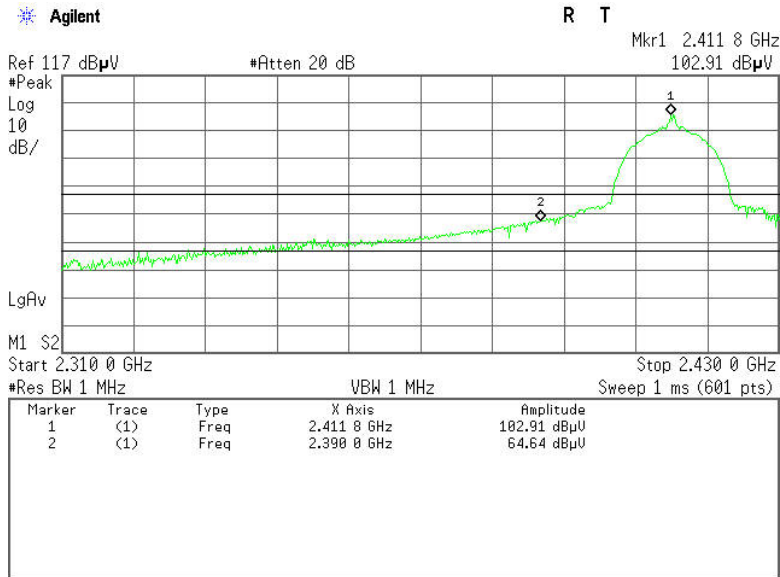


No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	62.08	-6.60	68.68	74.00	-5.32	Peak	Vertical
2	2390.0000	30.75	-6.60	37.35	54.00	-16.65	Average	Vertical



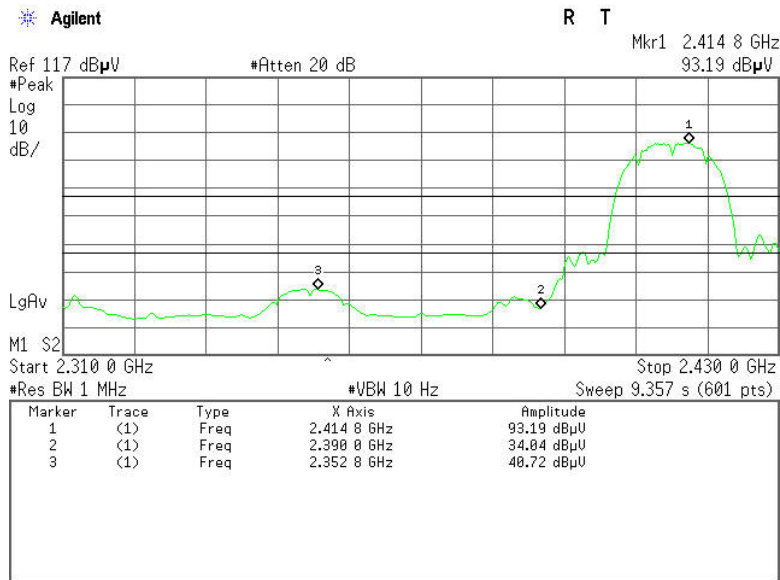
**Detector mode: Peak**

**Polarity: Horizontal**



**Detector mode: Average**

**Polarity: Horizontal**



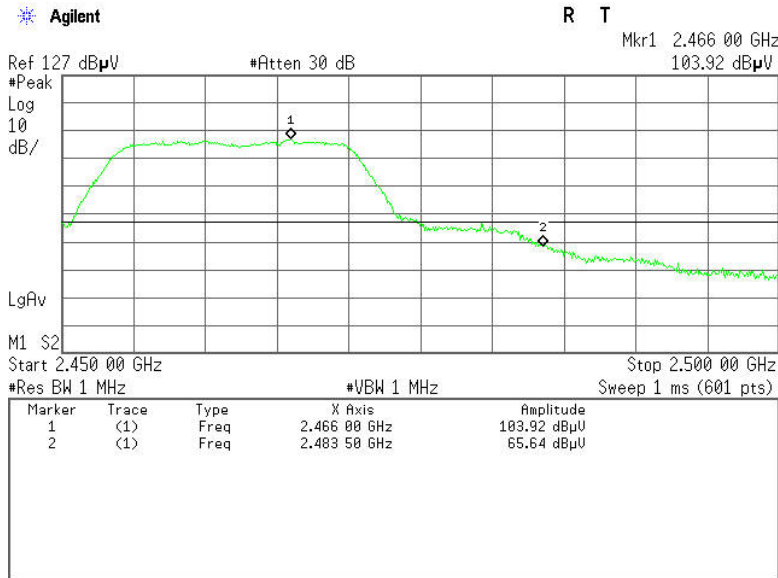
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	58.04	-6.60	64.64	74.00	-9.36	Peak	Horizontal
2	2390.0000	27.44	-6.60	34.04	54.00	-19.96	Average	Horizontal



**Band Edges (CH High)**

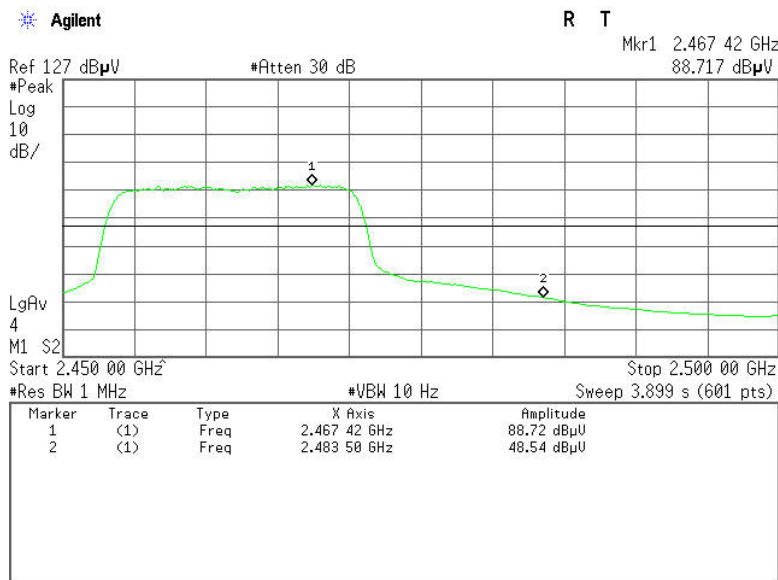
**Detector mode: Peak**

**Polarity: Vertical**



**Detector mode: Average**

**Polarity: Vertical**

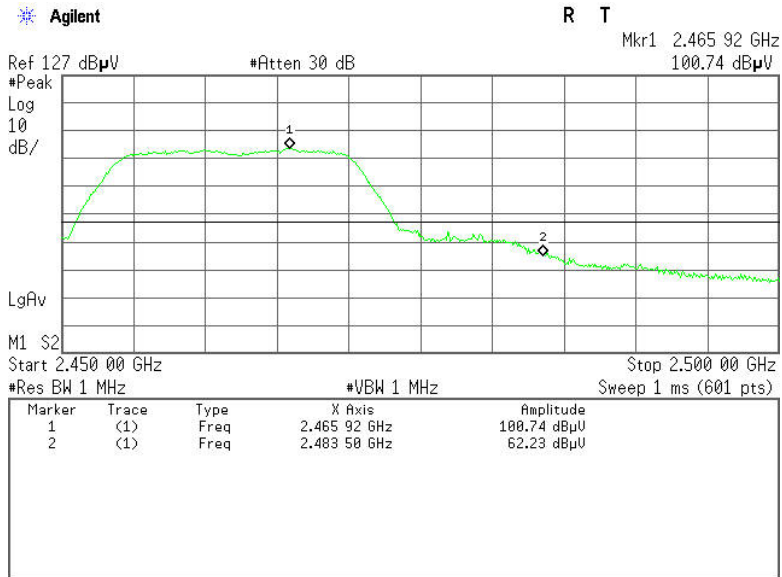


No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	59.40	-6.24	65.64	74.00	-8.36	Peak	Horizontal
2	2483.5000	42.30	-6.24	48.54	54.00	-5.46	AVG	Horizontal



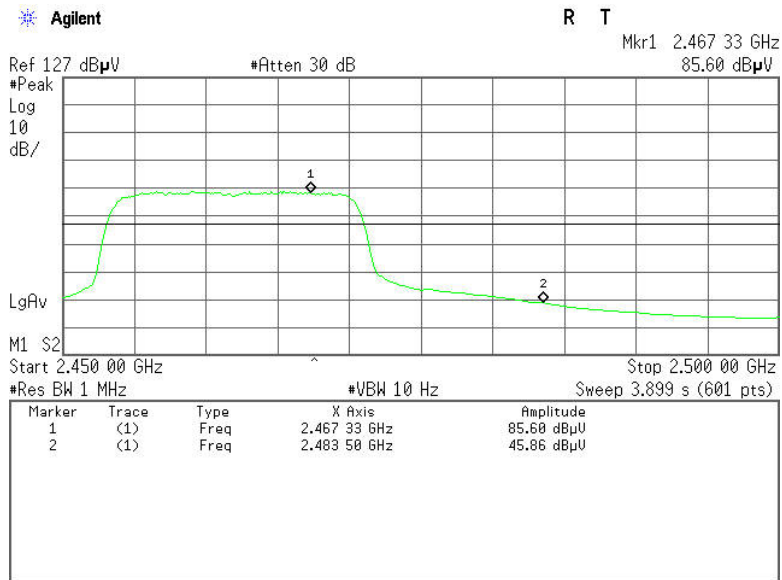
**Detector mode: Peak**

**Polarity: Horizontal**



**Detector mode: Average**

**Polarity: Horizontal**



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	55.99	-6.24	62.23	74.00	-11.77	Peak	Horizontal
2	2483.5000	39.62	-6.24	45.86	54.00	-8.14	AVG	Horizontal

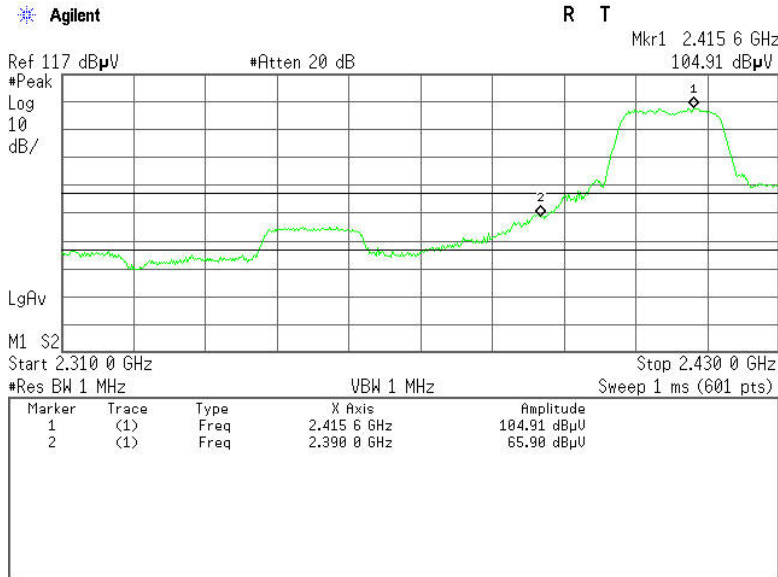


IEEE 802.11g mode

Band Edges (CH Low)

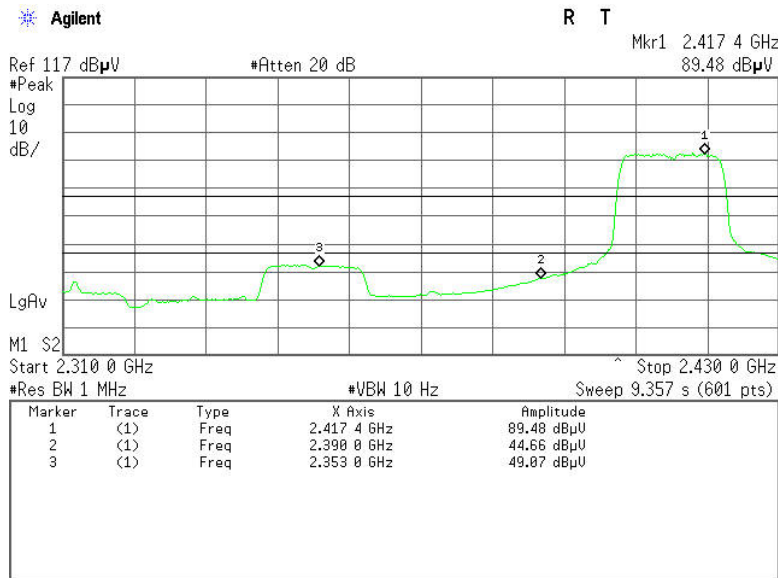
Detector mode: Peak

Polarity: Vertical



Detector mode: Average

Polarity: Vertical

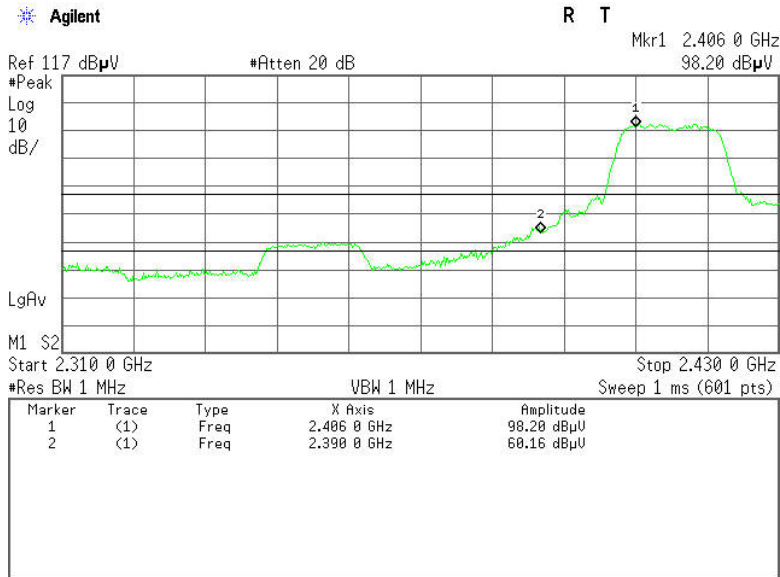


No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	59.30	-6.60	65.90	74.00	-8.10	Peak	Vertical
2	2390.0000	38.06	-6.60	44.66	54.00	-9.34	Average	Vertical



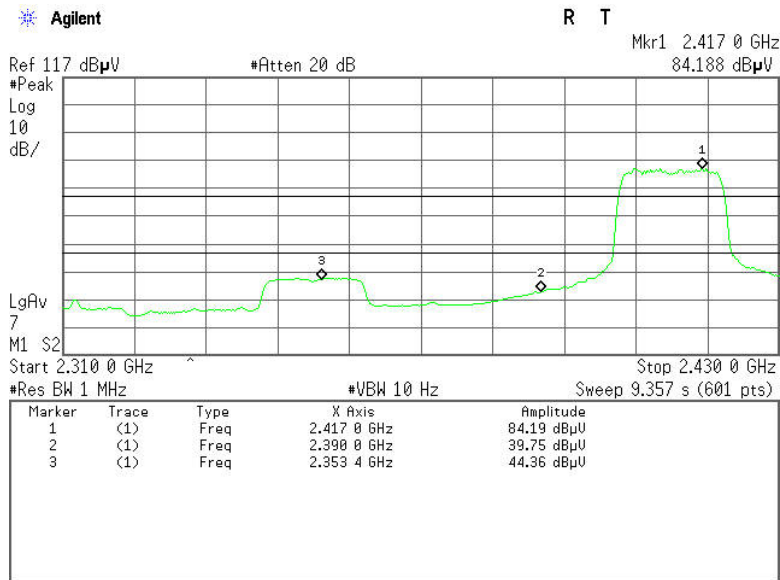
**Detector mode: Peak**

**Polarity: Horizontal**



**Detector mode: Average**

**Polarity: Horizontal**



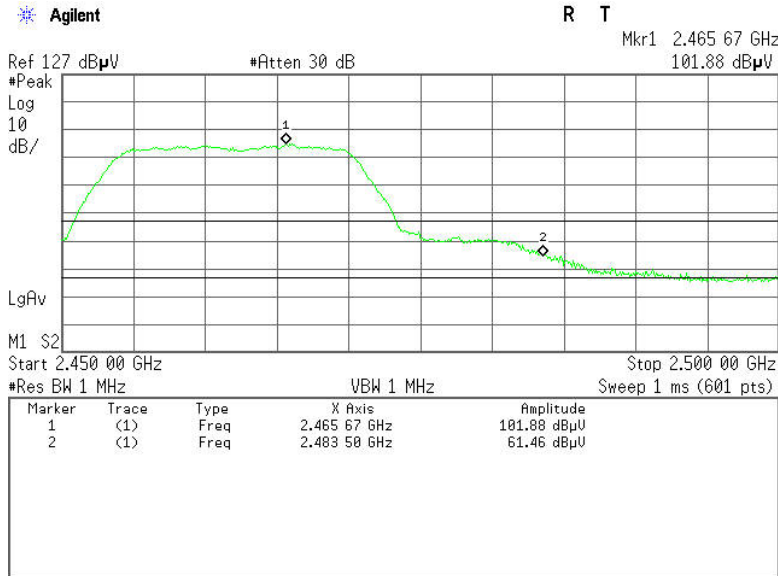
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	53.56	-6.60	60.16	74.00	-13.84	Peak	Horizontal
2	2390.0000	33.15	-6.60	39.75	54.00	-14.25	Average	Horizontal



**Band Edges (CH High)**

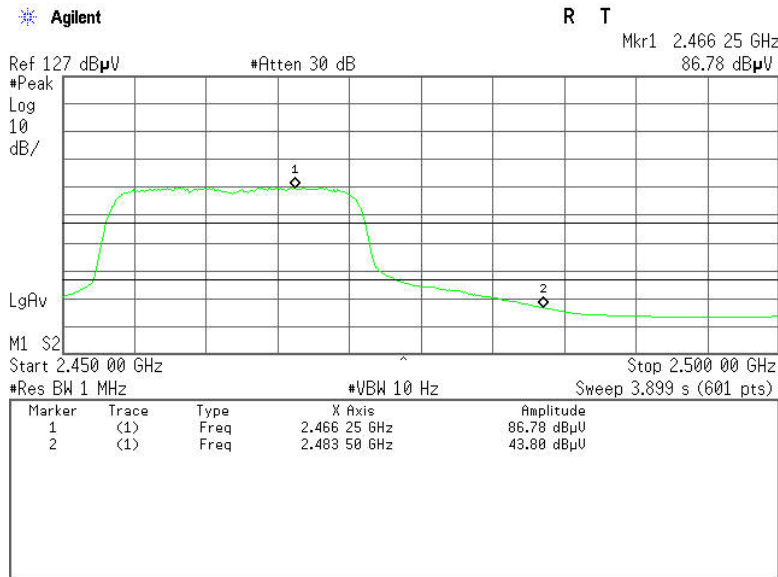
**Detector mode: Peak**

**Polarity: Vertical**



**Detector mode: Average**

**Polarity: Vertical**

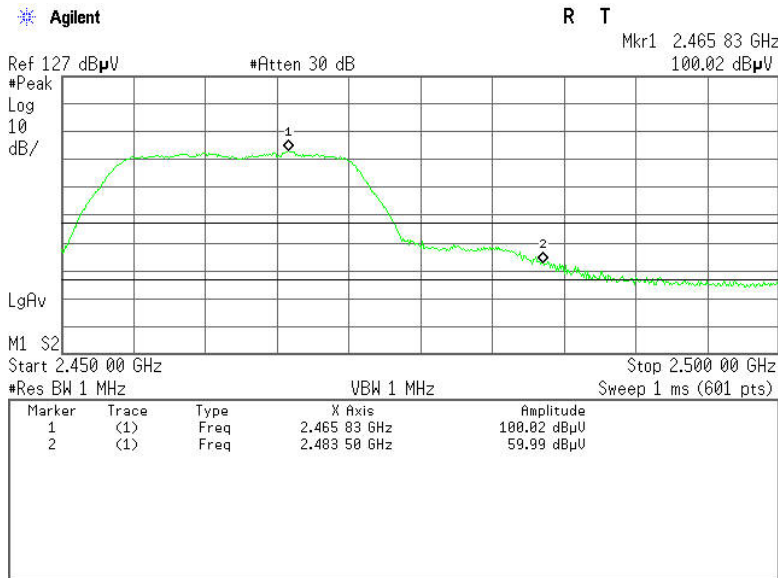


No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	55.22	-6.24	61.46	74.00	-12.54	Peak	Vertical
2	2483.5000	36.76	-6.24	43.00	54.00	-11.00	AVG	Vertical



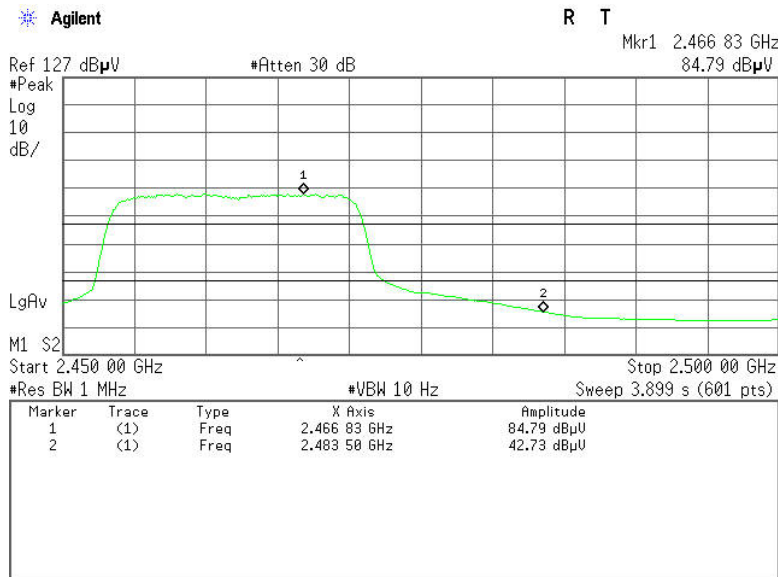
**Detector mode: Peak**

**Polarity: Horizontal**



**Detector mode: Average**

**Polarity: Horizontal**



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	53.75	-6.24	59.99	74.00	-14.01	Peak	Horizontal
2	2483.5000	36.49	-6.24	42.73	54.00	-11.27	AVG	Horizontal



## 7.6. PEAK POWER SPECTRAL DENSITY MEASUREMENT

### 7.6.1. 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.

### 7.6.2. TEST INSTRUMENTS

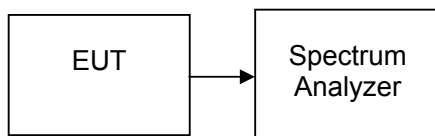
Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US44300399	03/09/2013	03/08/2014

### 7.6.3. 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).

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW = 100 kHz.
3. Set the VBW  $\geq$  300 kHz.
4. Set the span to 5-30 % greater than the EBW.
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 power level in any 100 kHz band segment within the fundamental EBW.
10. Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where  $BWCF = 10\log(3 \text{ kHz}/100 \text{ kHz} = -15.2 \text{ dB})$ .
11. The resulting peak PSD level must be  $\leq$  8 dBm.

### 7.6.4. TEST SETUP





7.6.5. TEST RESULTS

No non-compliance noted

Test Data

Antenna 11:

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-11.27	8	PASS
Mid	2437	-11.73		PASS
High	2462	-11.15		PASS

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-11.14	8	PASS
Mid	2437	-11.27		PASS
High	2462	-17.33		PASS

Antenna 10:

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-11.33	8	PASS
Mid	2437	-11.84		PASS
High	2462	-10.71		PASS

Test mode: IEEE 802.11g

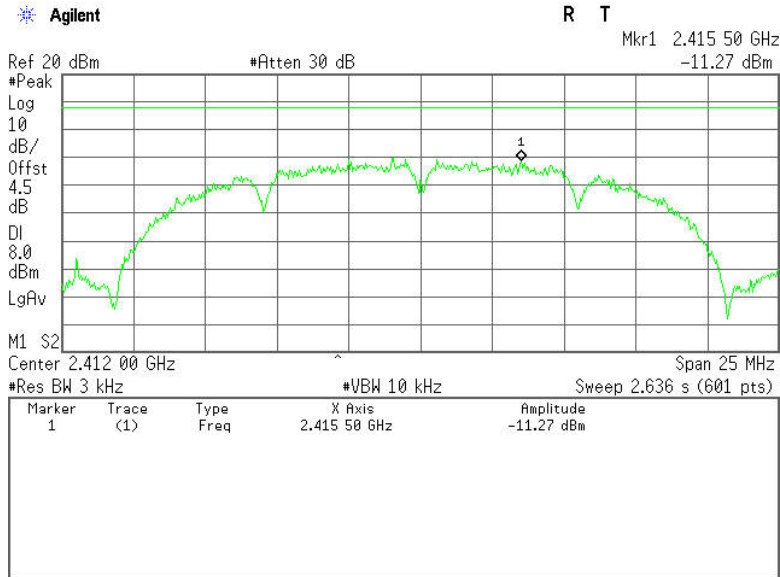
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-10.62	8	PASS
Mid	2437	-11.25		PASS
High	2462	-17.45		PASS



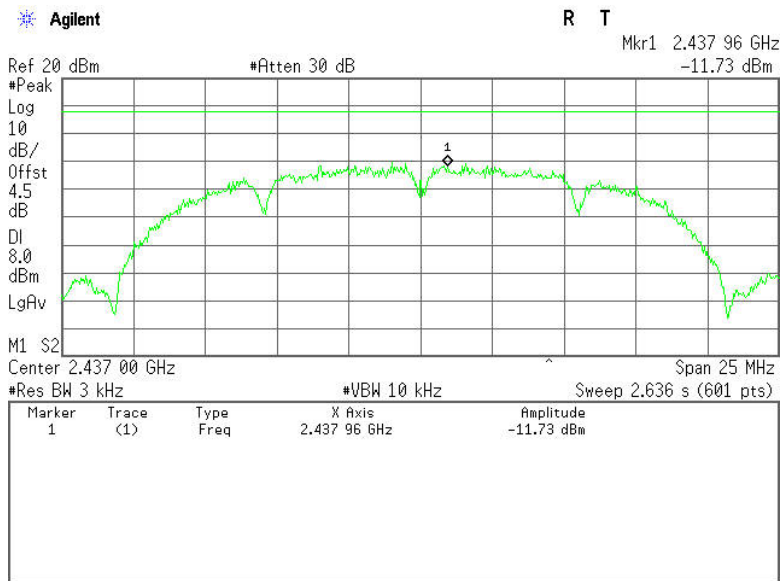
Antenna 11:

Test Plot IEEE 802.11b mode

PPSD (CH Low)

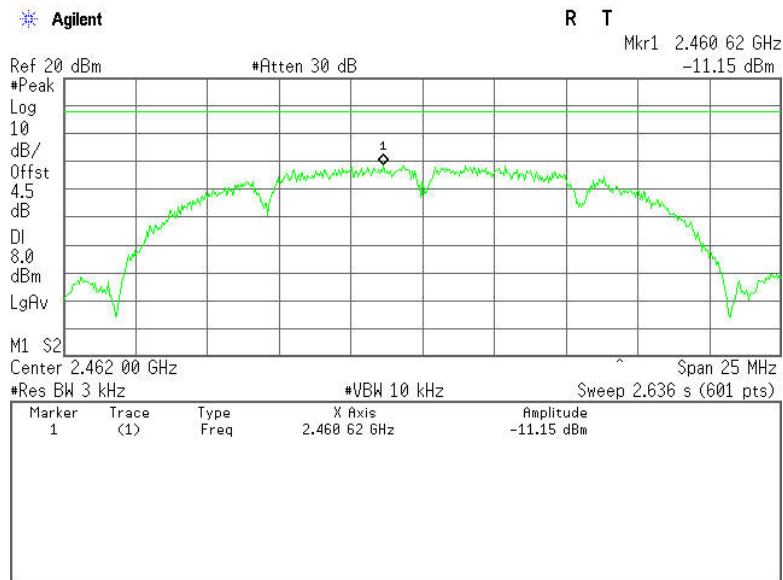


PPSD (CH Mid)



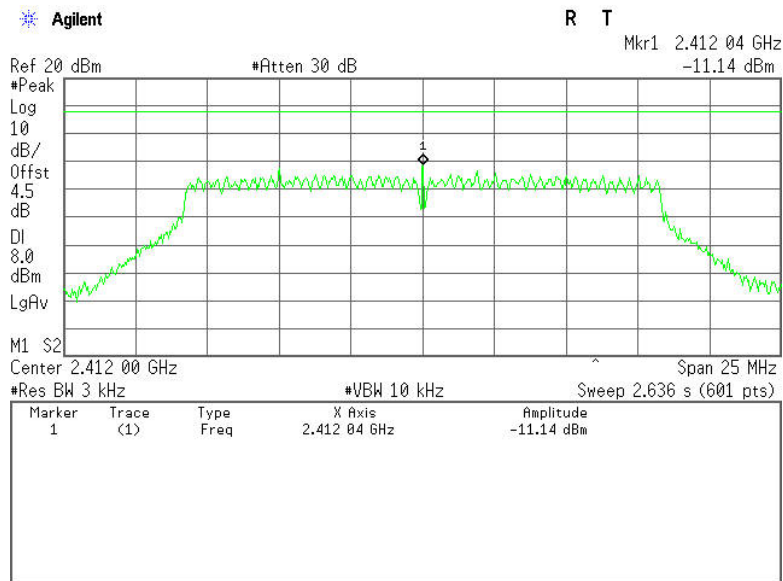


### PPSD (CH High)



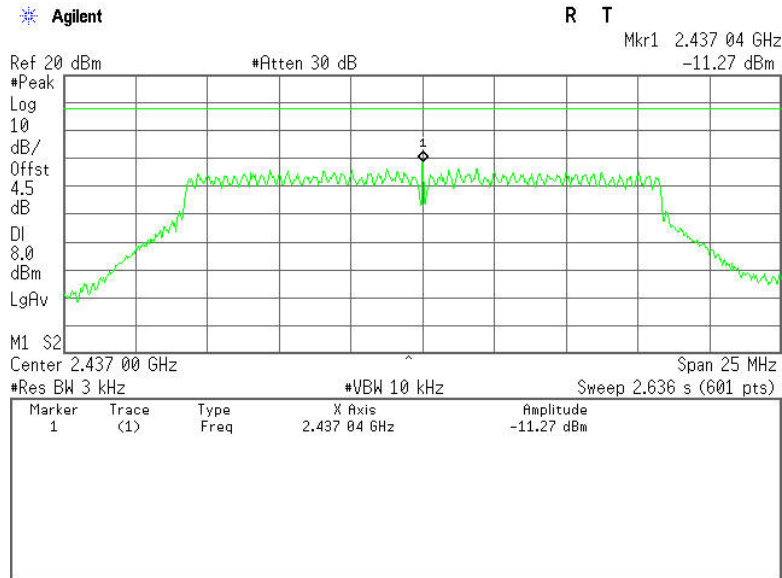
### IEEE 802.11g mode

### PPSD (CH Low)

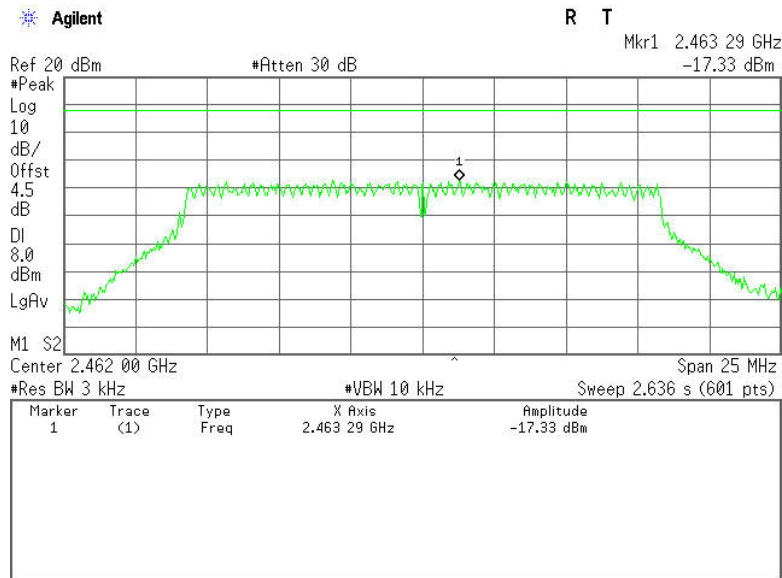




### PPSD (CH Mid)



### PPSD (CH High)

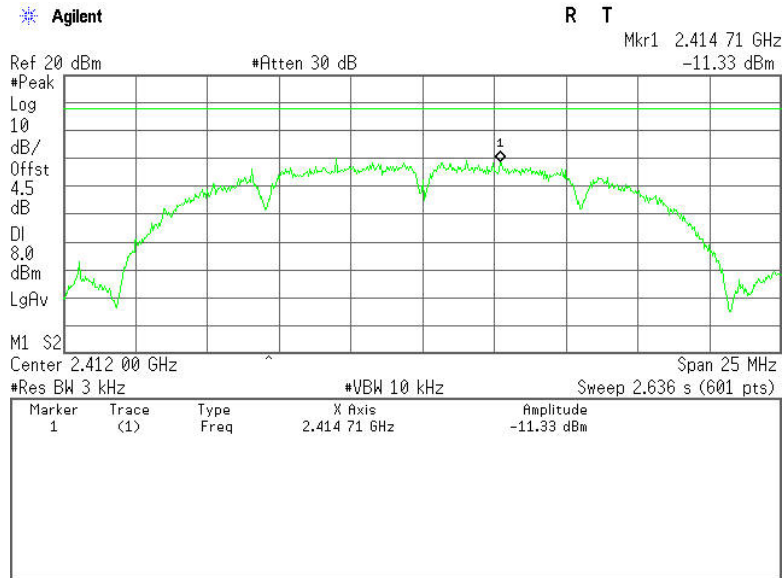




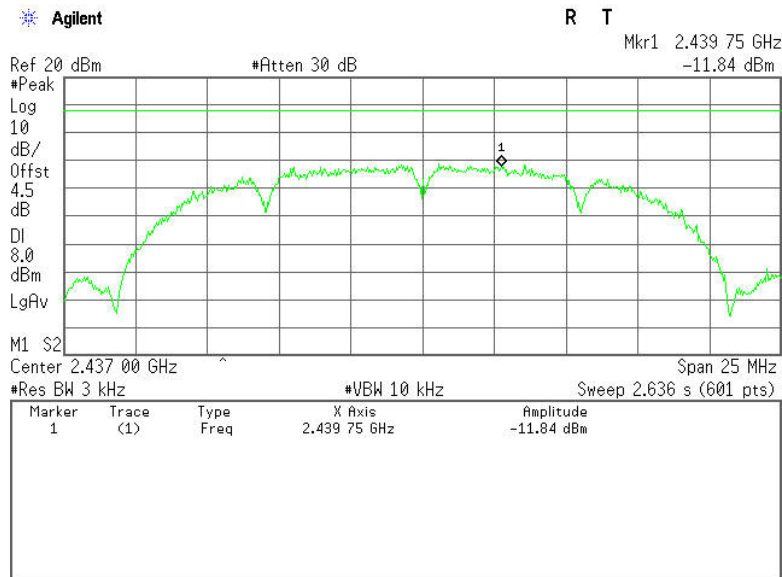
Antenna 10:

IEEE 802.11b mode

PPSD (CH Low)

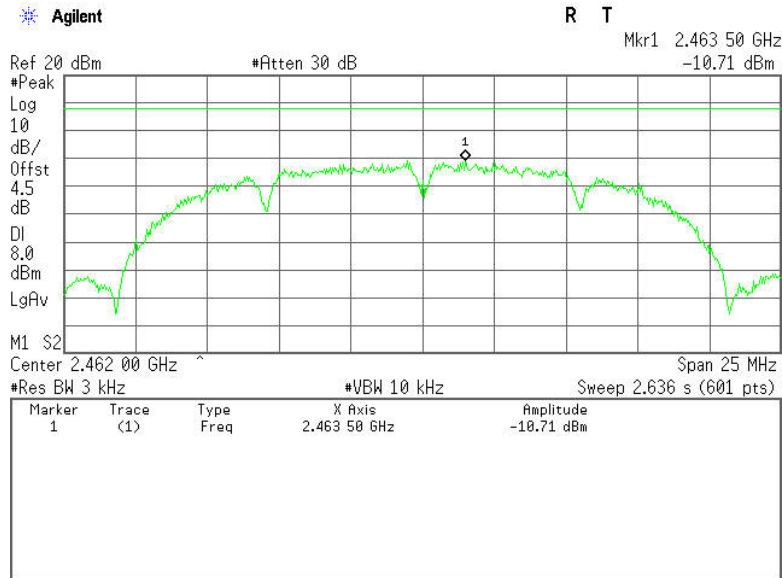


PPSD (CH Mid)



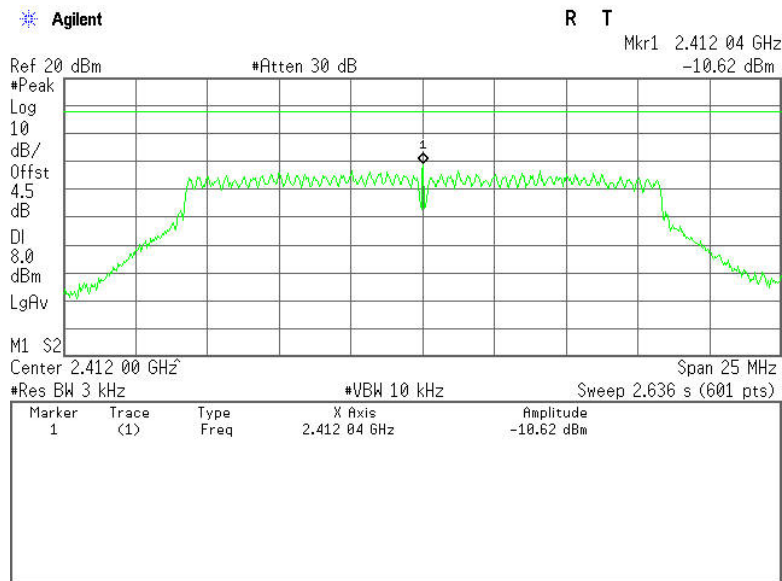


### PPSD (CH High)



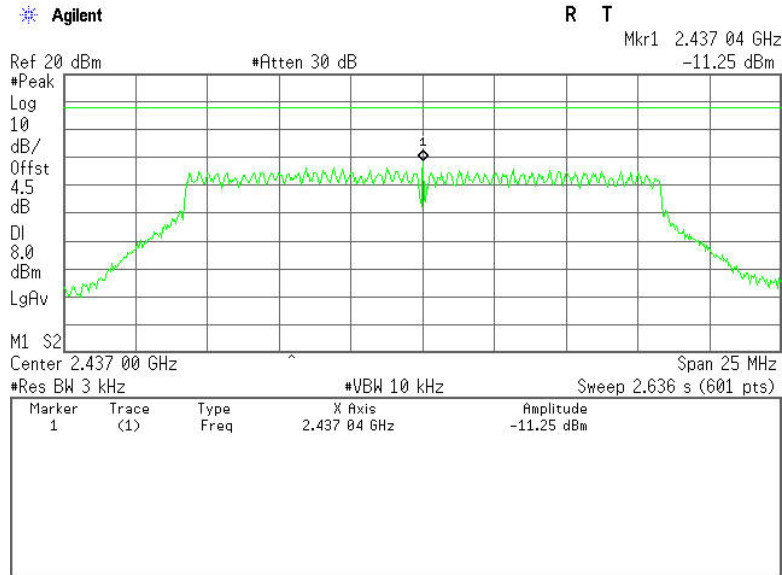
### IEEE 802.11g mode

### PPSD (CH Low)





### PPSD (CH Mid)



### PPSD (CH High)

