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 in 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	06/21/2013	06/21/2014
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.

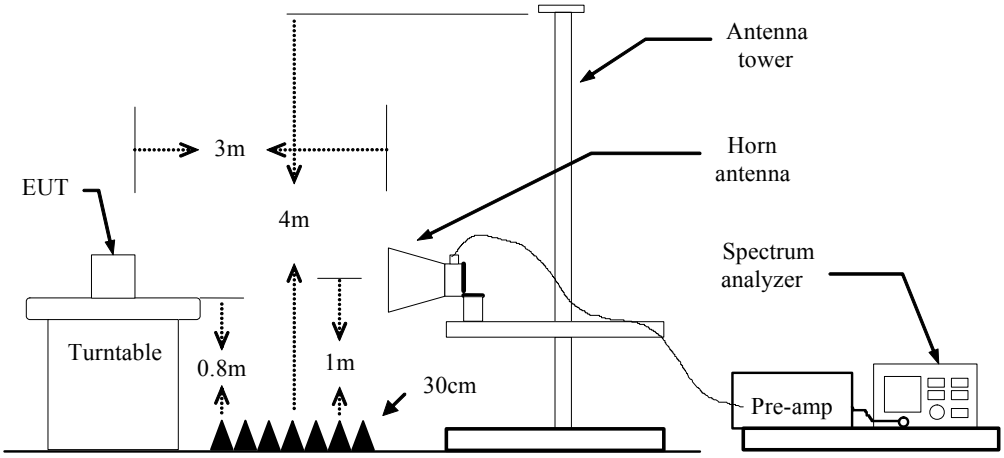
2. The FCC Site Registration number is 101879.

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

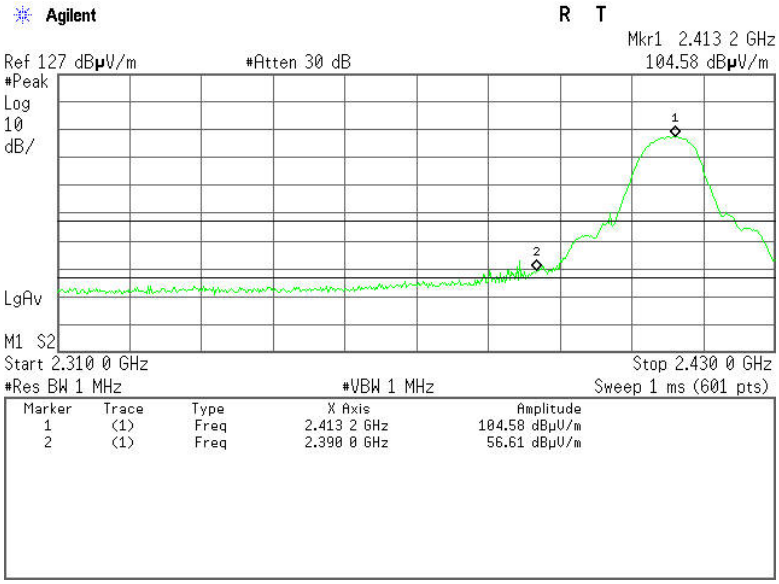
Test Plot

Antenna 0+ Antenna 1

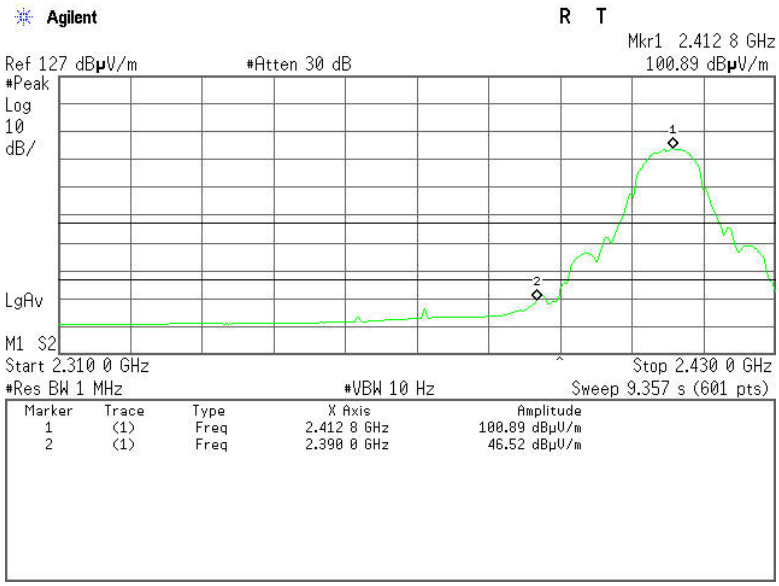
IEEE 802.11b mode

Band Edges (CH Low)

Detector mode: Peak **Polarity: Vertical**

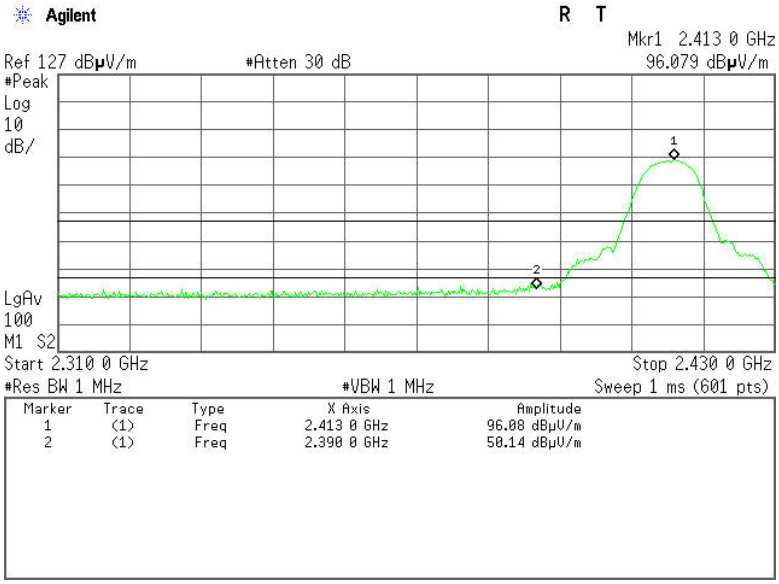


Detector mode: Average **Polarity: Vertical**

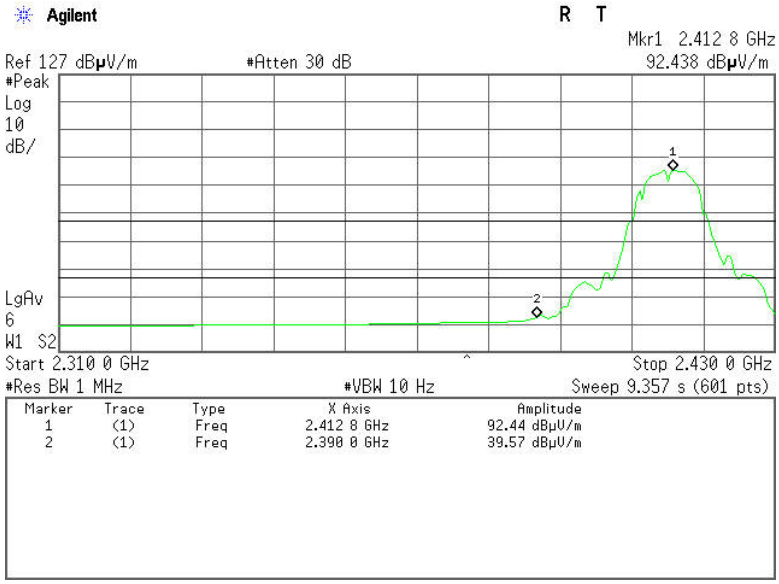


No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	50.01	-6.60	56.61	74.00	-17.39	Peak	Vertical
2	2390.0000	39.92	-6.60	46.52	54.00	-7.48	Average	Vertical

Detector mode: Peak **Polarity: Horizontal**



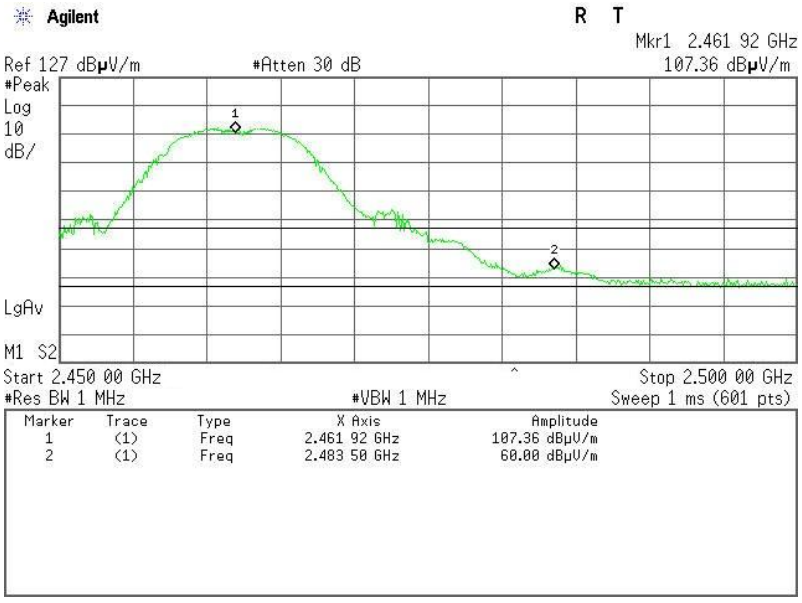
Detector mode: Average **Polarity: Horizontal**



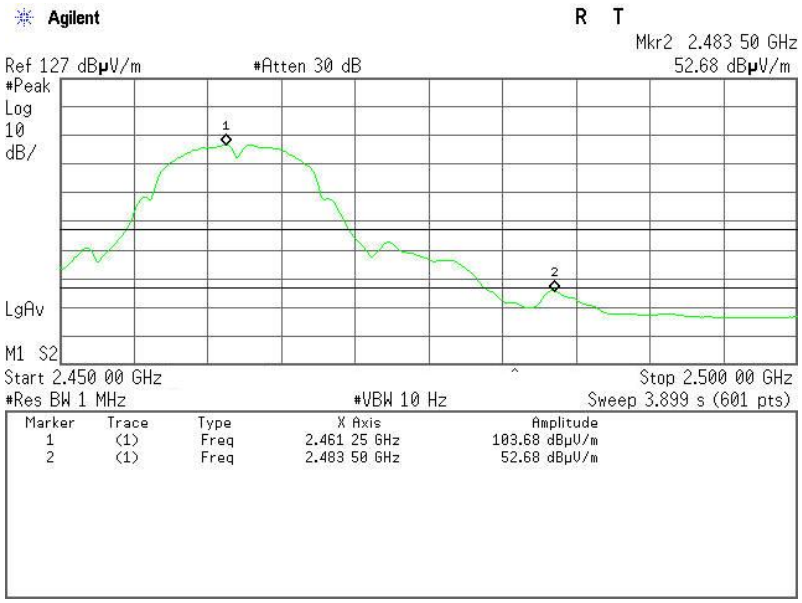
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	43.54	-6.60	50.14	74.00	-23.86	Peak	Horizontal
2	2390.0000	32.97	-6.60	39.57	54.00	-14.43	Average	Horizontal

Band Edges (CH High)

Detector mode: Peak **Polarity: Vertical**

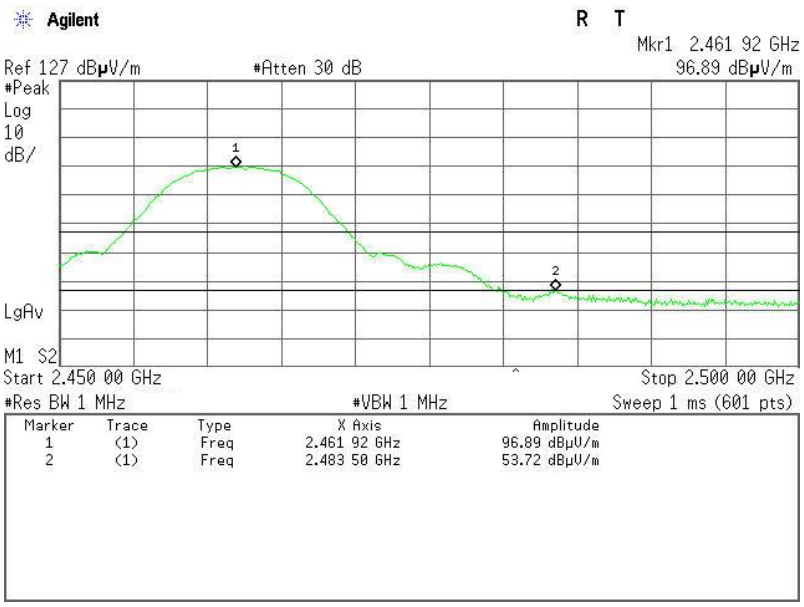


Detector mode: Average **Polarity: Vertical**

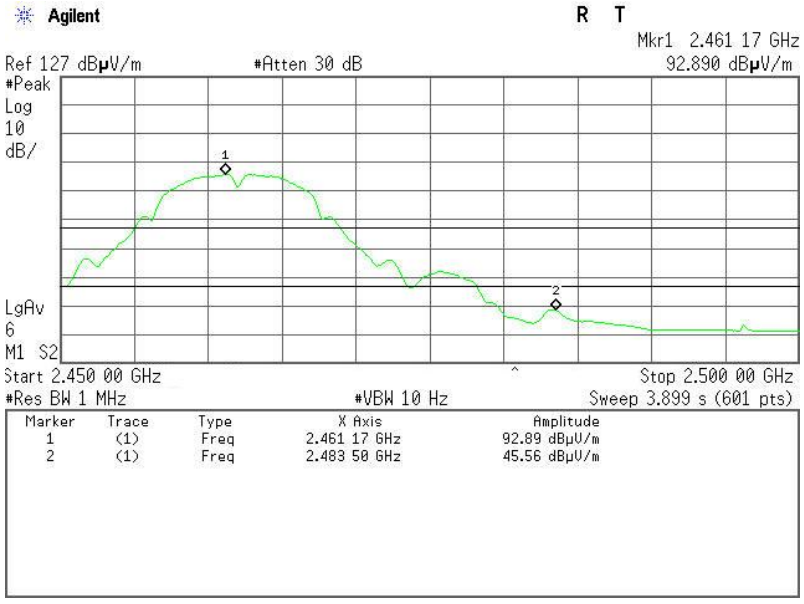


No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	53.76	-6.24	60.00	74.00	-14.00	Peak	Vertical
2	2483.5000	46.44	-6.24	52.68	54.00	-1.32	AVG	Vertical

Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**



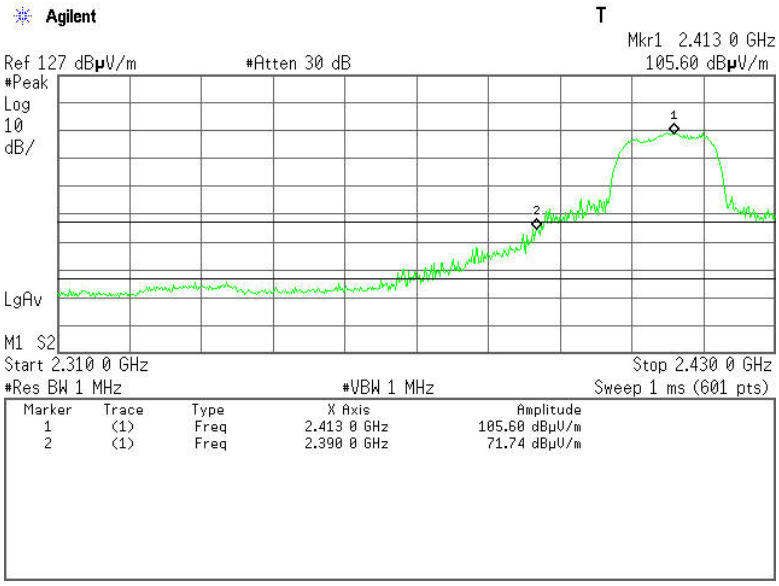
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	47.48	-6.24	53.72	74.00	-20.28	Peak	Horizontal
2	2483.5000	39.32	-6.24	45.56	54.00	-8.44	AVG	Horizontal

Antenna 0

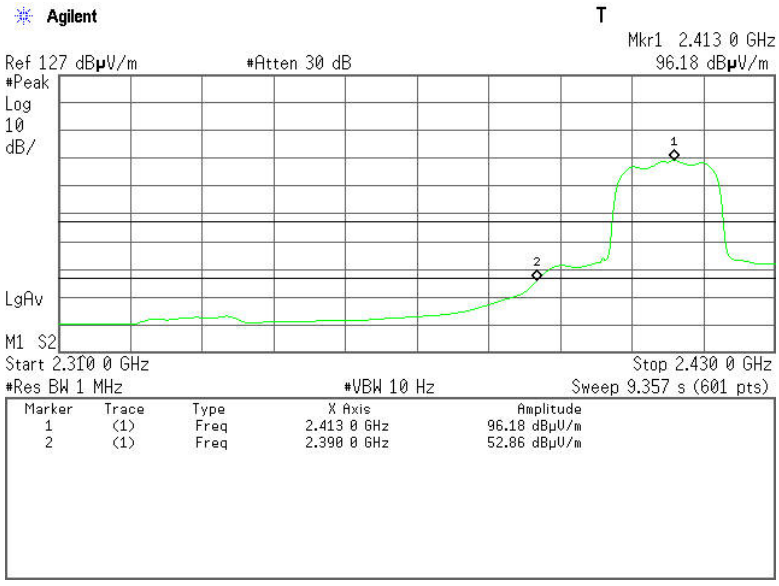
IEEE 802.11g mode

Band Edges (CH Low)

Detector mode: Peak **Polarity: Vertical**

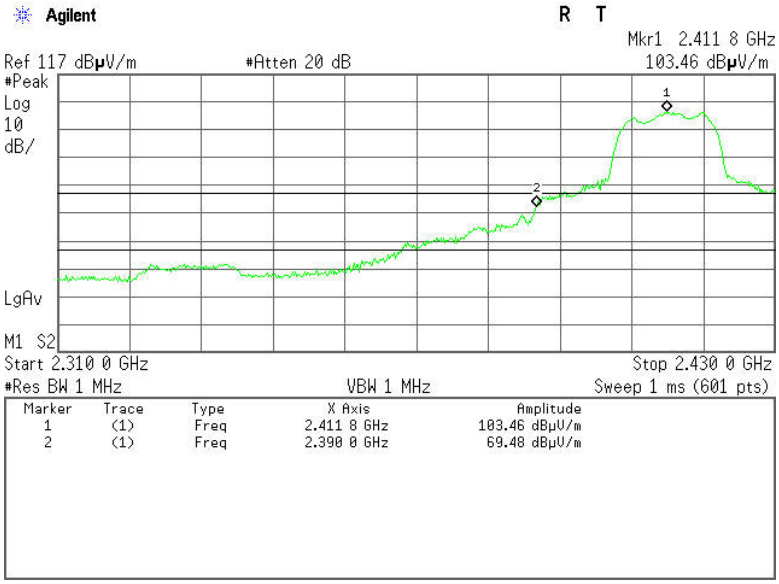


Detector mode: Average **Polarity: Vertical**

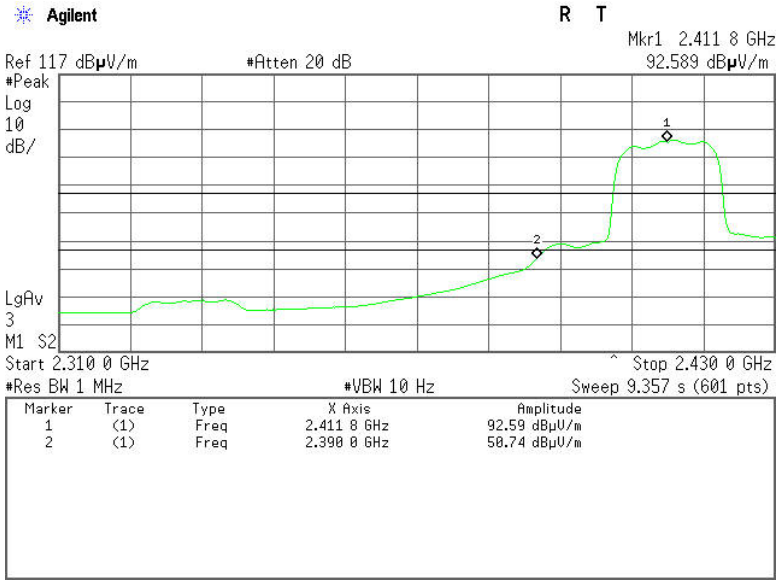


No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	65.14	-6.60	71.74	74.00	-2.26	Peak	Vertical
2	2390.0000	46.26	-6.60	52.86	54.00	-1.14	Average	Vertical

Detector mode: Peak **Polarity: Horizontal**



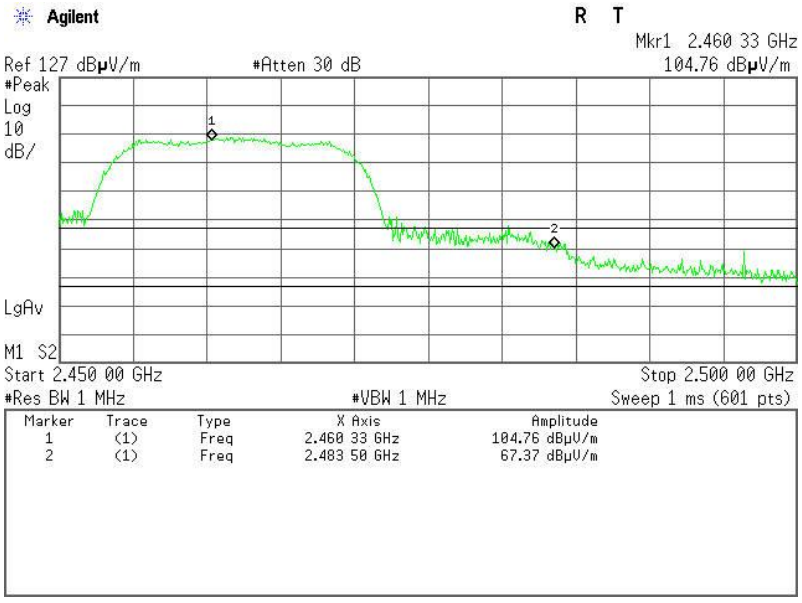
Detector mode: Average **Polarity: Horizontal**



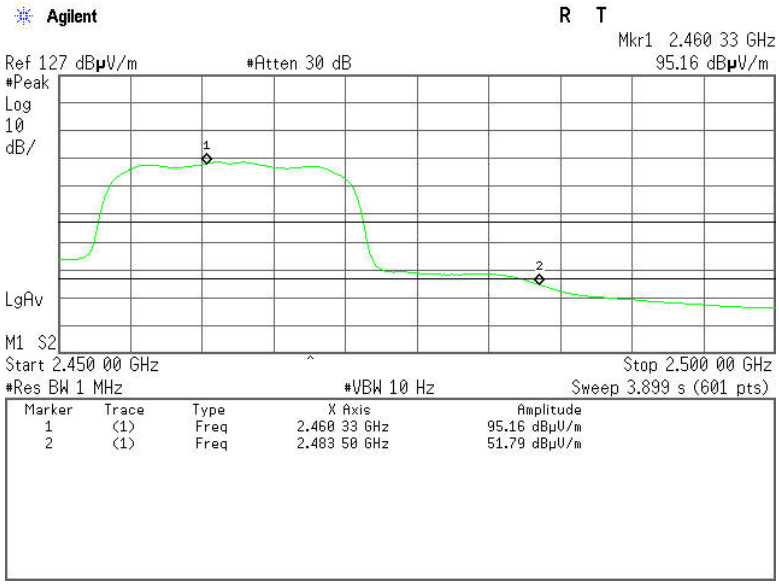
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	62.88	-6.60	69.48	74.00	-4.52	Peak	Horizontal
2	2390.0000	44.14	-6.60	50.74	54.00	-3.26	Average	Horizontal

Band Edges (CH High)

Detector mode: Peak Polarity: Vertical

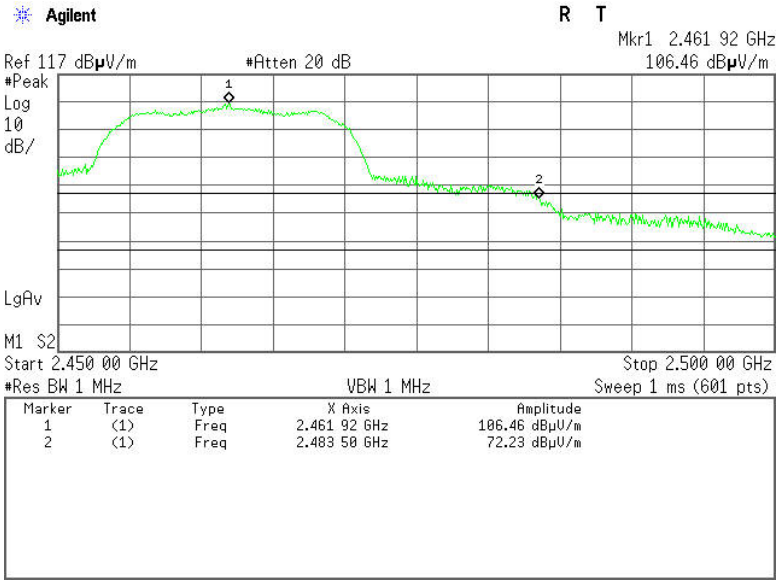


Detector mode: Average Polarity: Vertical

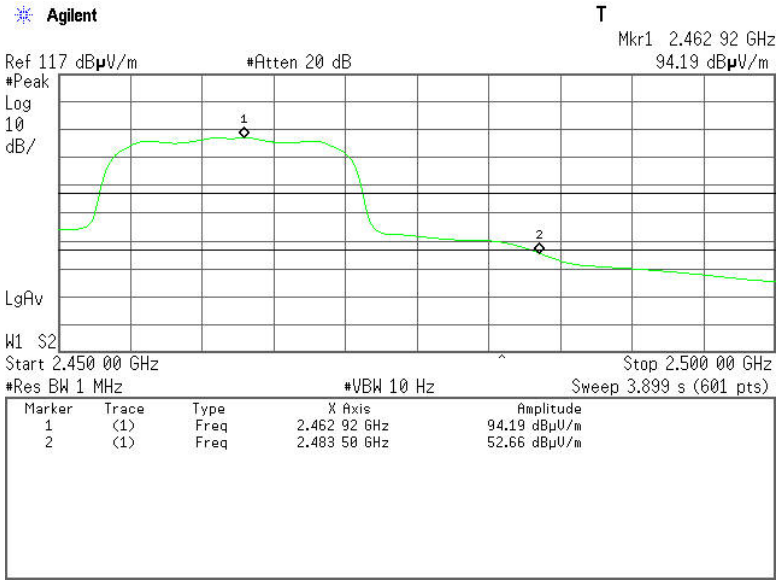


No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	61.13	-6.24	67.37	74.00	-6.63	Peak	Vertical
2	2483.5000	45.55	-6.24	51.79	54.00	-2.21	AVG	Vertical

Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**



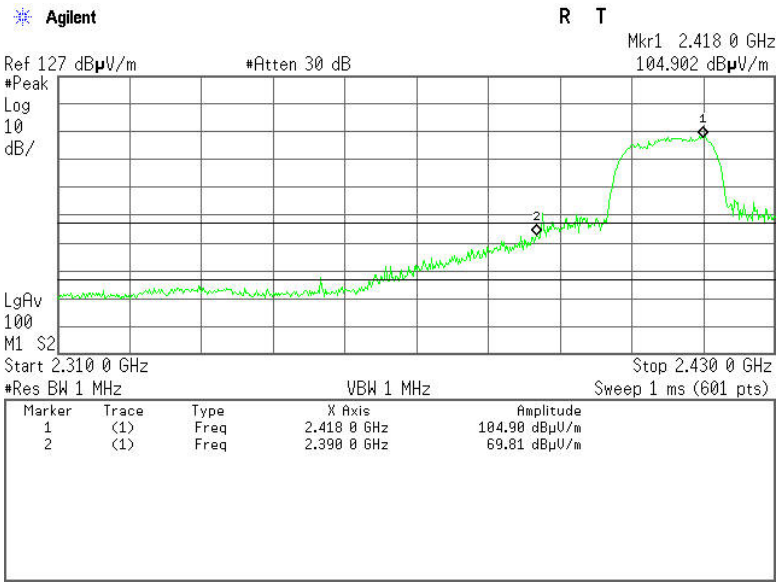
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	65.99	-6.24	72.23	74.00	-1.77	Peak	Horizontal
2	2483.5000	46.42	-6.24	52.66	54.00	-1.34	AVG	Horizontal

Antenna 1

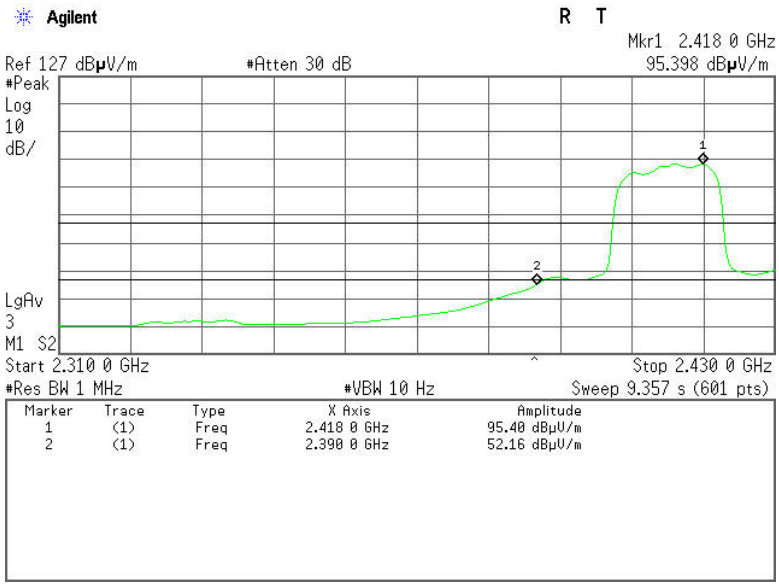
IEEE 802.11g mode

Band Edges (CH Low)

Detector mode: Peak **Polarity: Vertical**

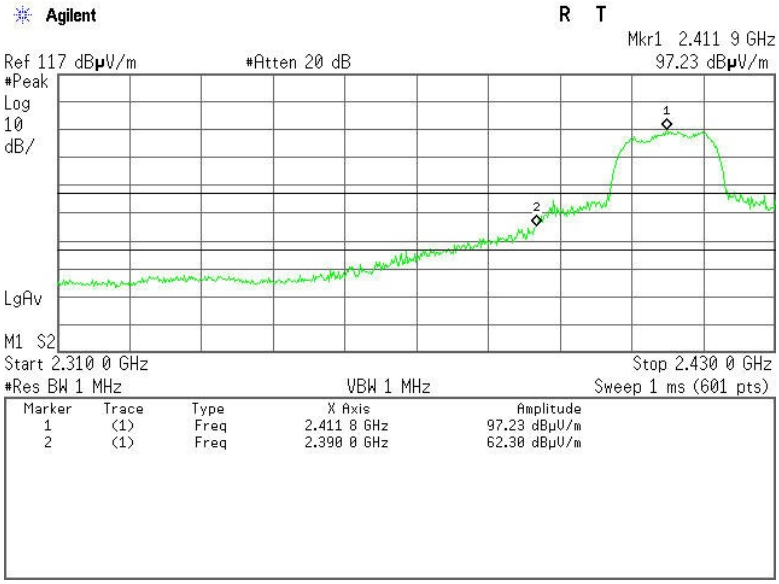


Detector mode: Average **Polarity: Vertical**

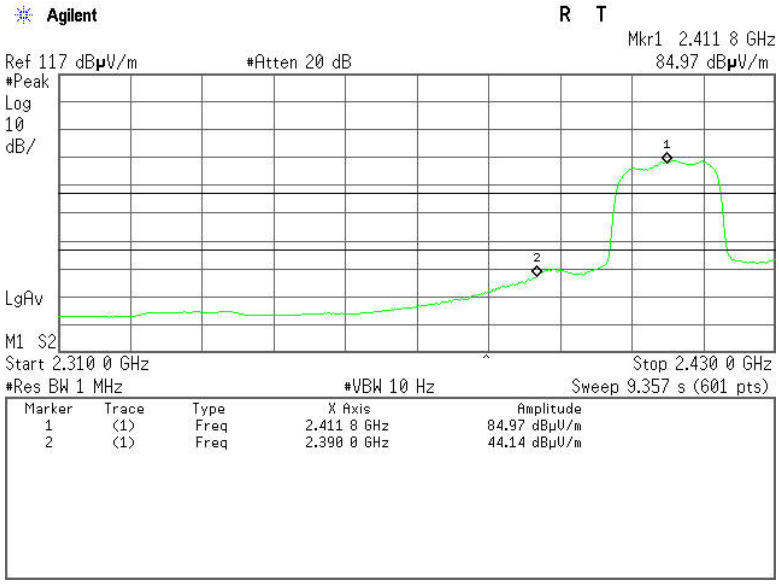


No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	63.21	-6.60	69.81	74.00	-4.19	Peak	Vertical
2	2390.0000	45.56	-6.60	52.16	54.00	-1.84	Average	Vertical

Detector mode: Peak **Polarity: Horizontal**



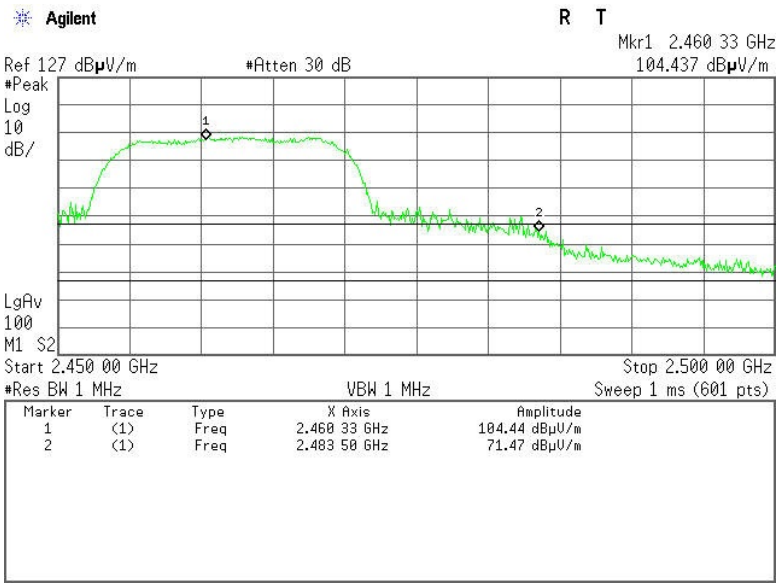
Detector mode: Average **Polarity: Horizontal**



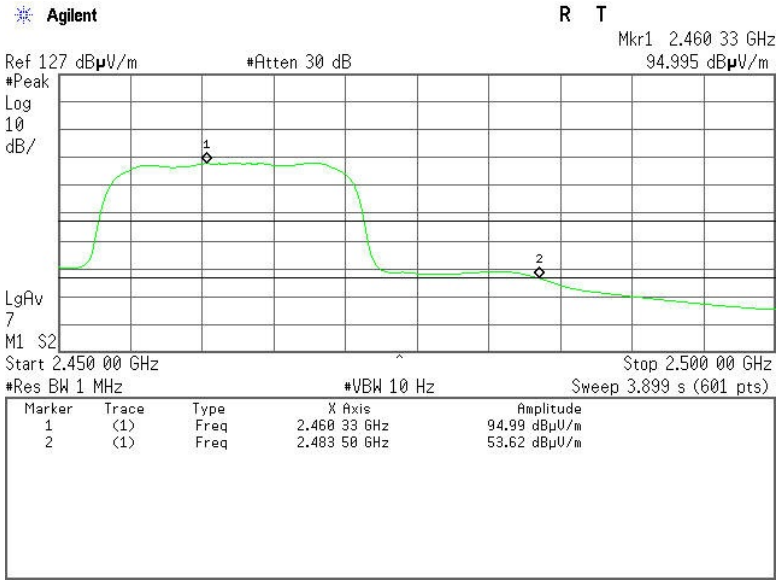
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	55.70	-6.60	62.30	74.00	-11.70	Peak	Horizontal
2	2390.0000	37.54	-6.60	44.14	54.00	-9.86	Average	Horizontal

Band Edges (CH High)

Detector mode: Peak Polarity: Vertical

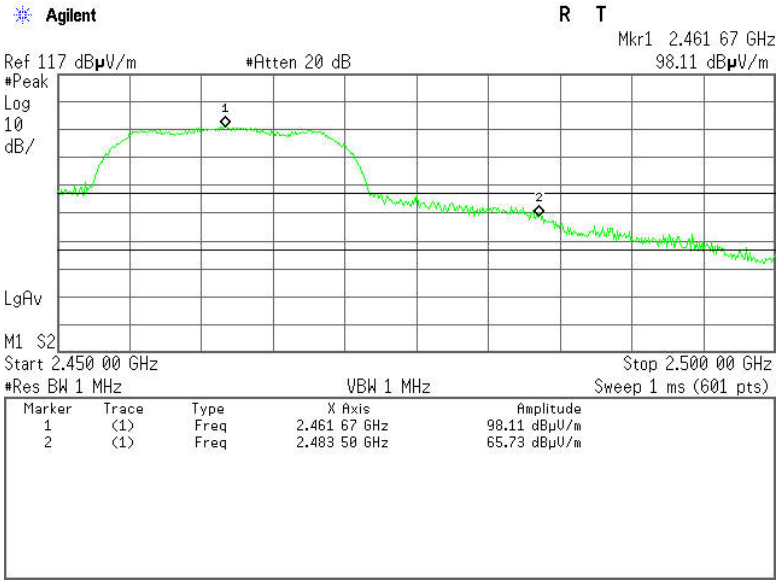


Detector mode: Average Polarity: Vertical

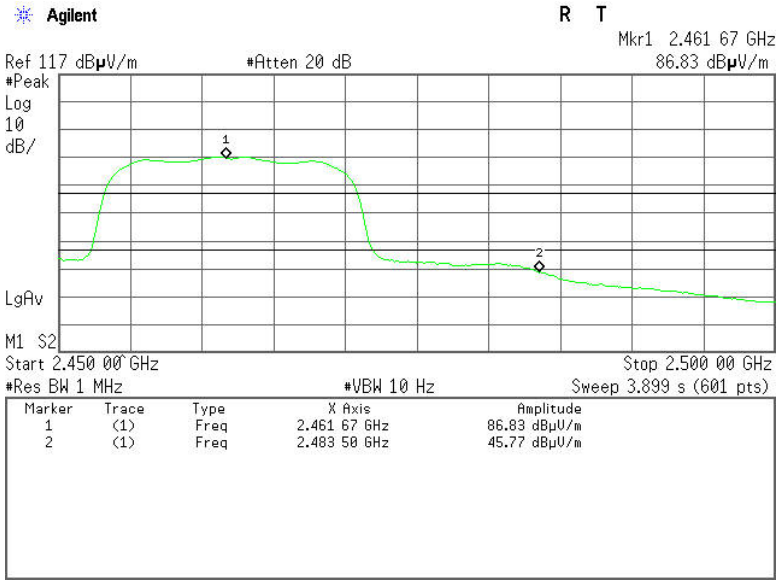


No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	65.23	-6.24	71.47	74.00	-2.53	Peak	Vertical
2	2483.5000	47.38	-6.24	53.62	54.00	-0.38	AVG	Vertical

Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**



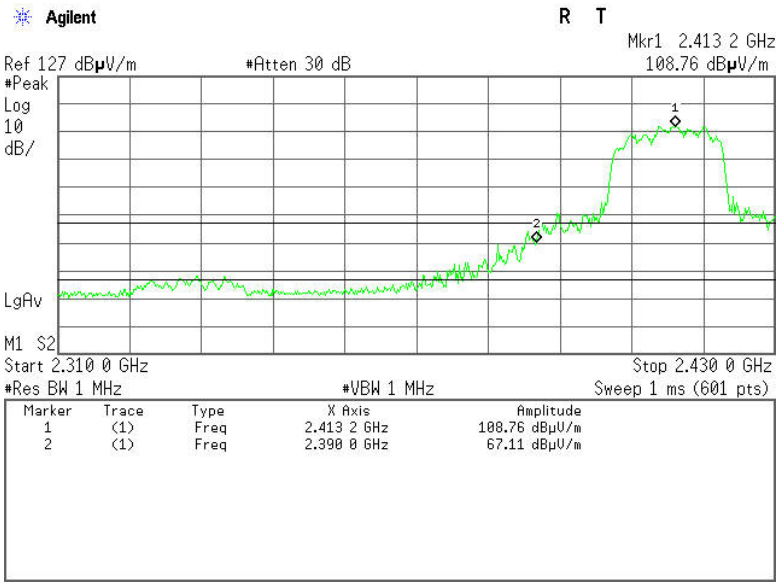
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	59.49	-6.24	65.73	74.00	-8.27	Peak	Horizontal
2	2483.5000	39.53	-6.24	45.77	54.00	-8.23	AVG	Horizontal

Antenna 0 + Antenna 1

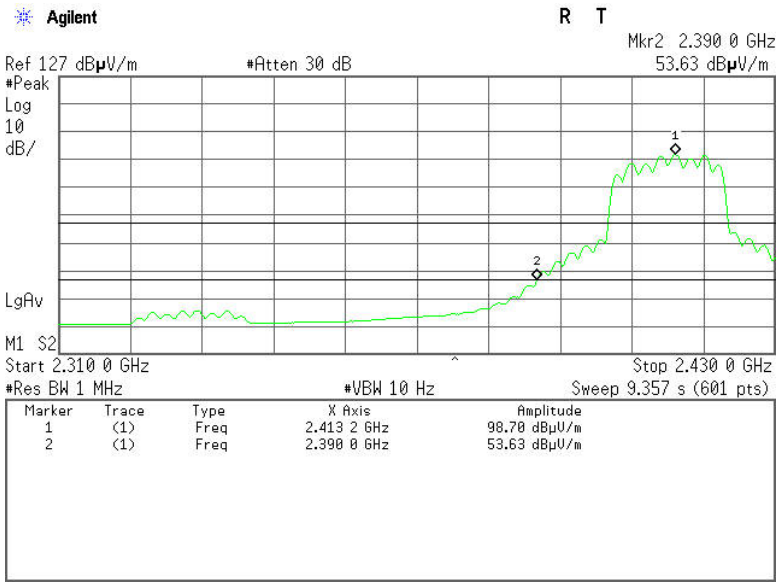
IEEE 802.11n HT20 MHz mode

Band Edges (CH Low)

Detector mode: Peak **Polarity: Vertical**

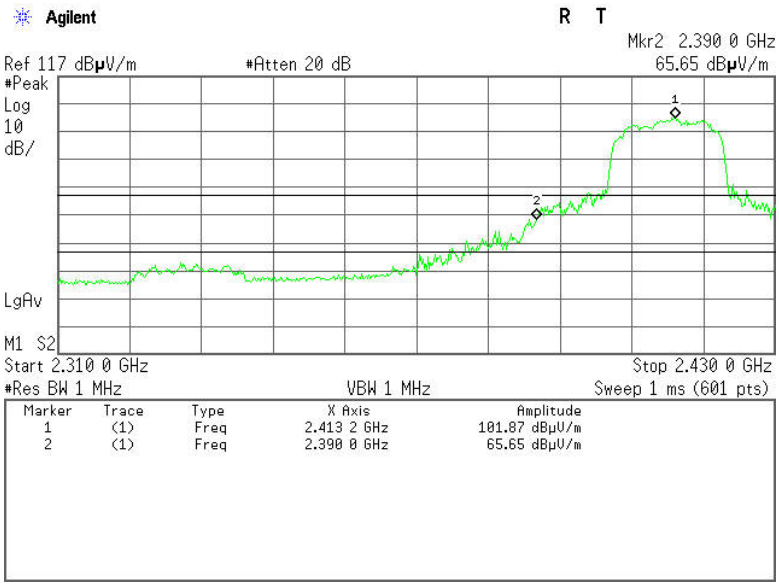


Detector mode: Average **Polarity: Vertical**

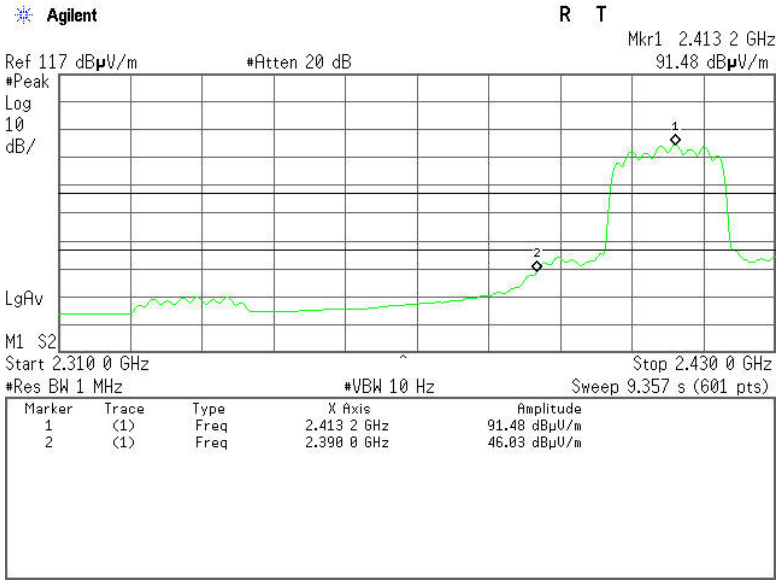


No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	60.51	-6.60	67.11	74.00	-6.89	Peak	Vertical
2	2390.0000	47.03	-6.60	53.63	54.00	-0.37	Average	Vertical

Detector mode: Peak **Polarity: Horizontal**



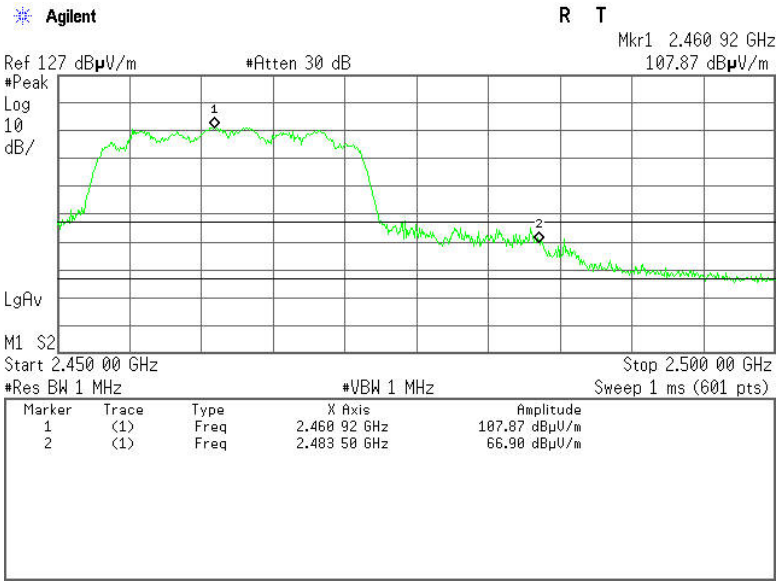
Detector mode: Average **Polarity: Horizontal**



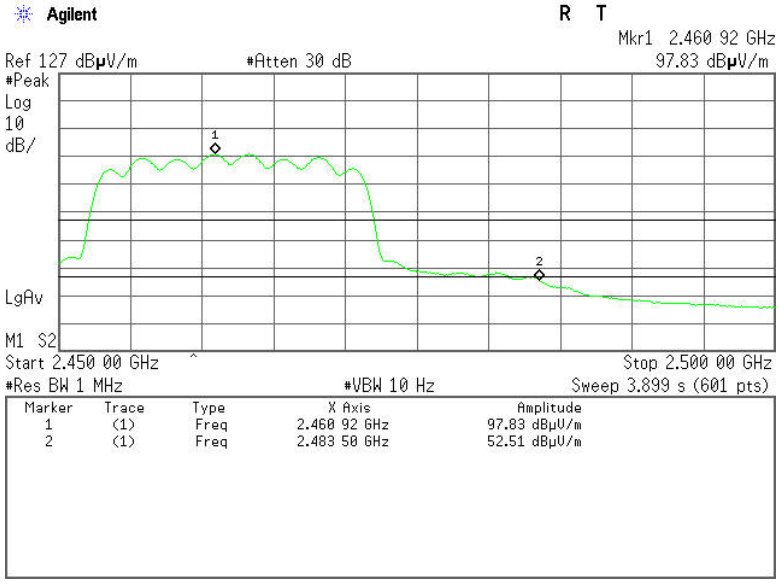
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	59.05	-6.60	65.65	74.00	-8.35	Peak	Horizontal
2	2390.0000	39.43	-6.60	46.03	54.00	-7.97	Average	Horizontal

Band Edges (CH High)

Detector mode: Peak Polarity: Vertical

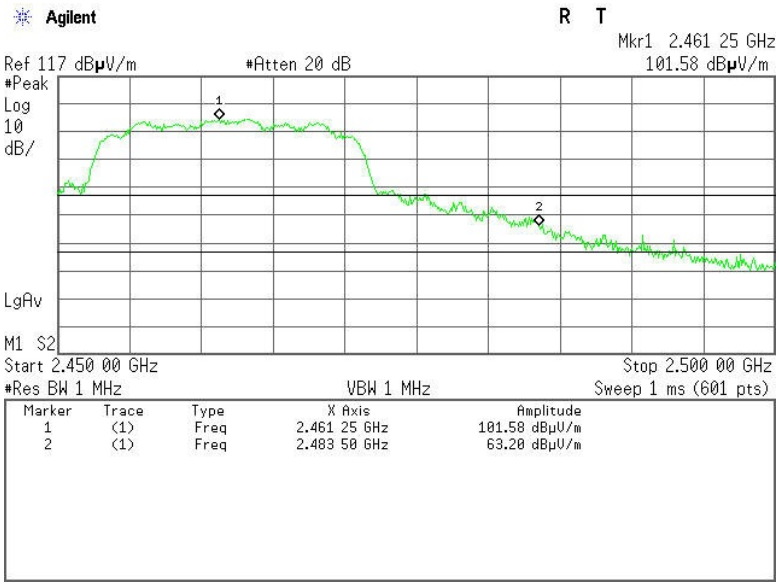


Detector mode: Average Polarity: Vertical

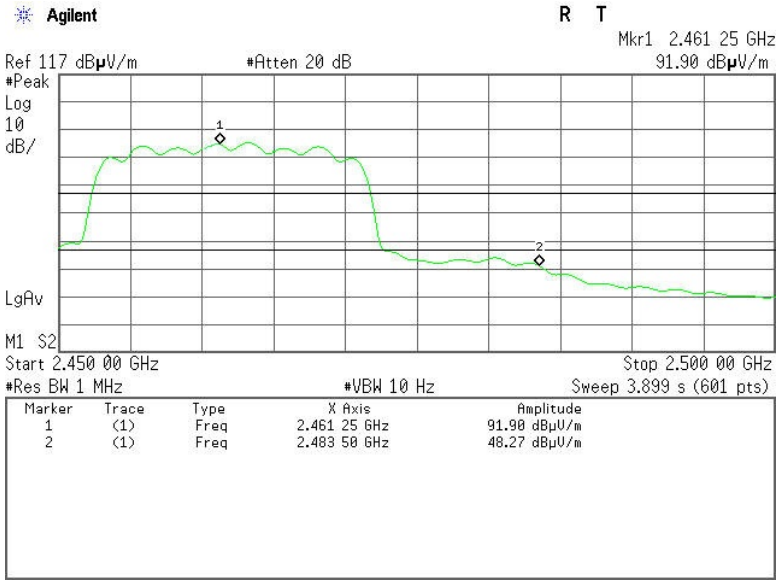


No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	60.66	-6.24	66.90	74.00	-7.10	Peak	Vertical
2	2483.5000	46.27	-6.24	52.51	54.00	-1.49	AVG	Vertical

Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**



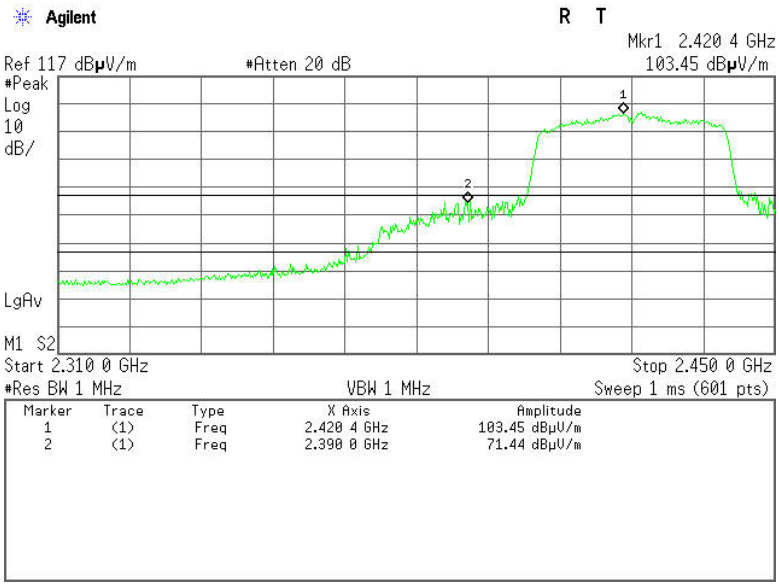
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	56.96	-6.24	63.20	74.00	-10.80	Peak	Horizontal
2	2483.5000	42.03	-6.24	48.27	54.00	-5.73	AVG	Horizontal

Antenna 0+ Antenna 1

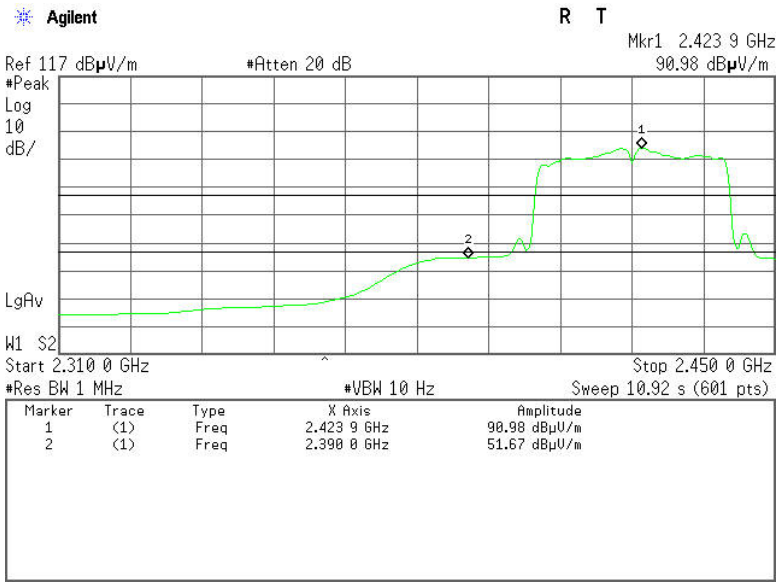
IEEE 802.11n HT40 MHz mode

Band Edges (CH Low)

Detector mode: Peak **Polarity: Vertical**

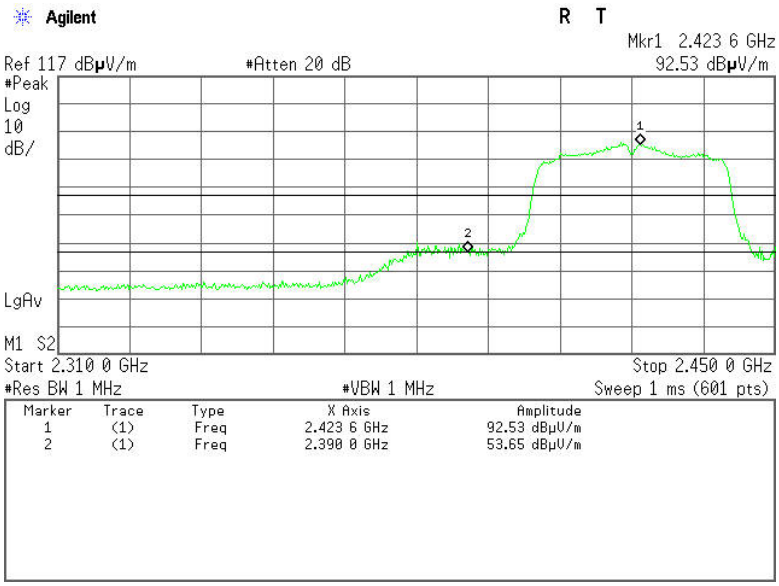


Detector mode: Average **Polarity: Vertical**

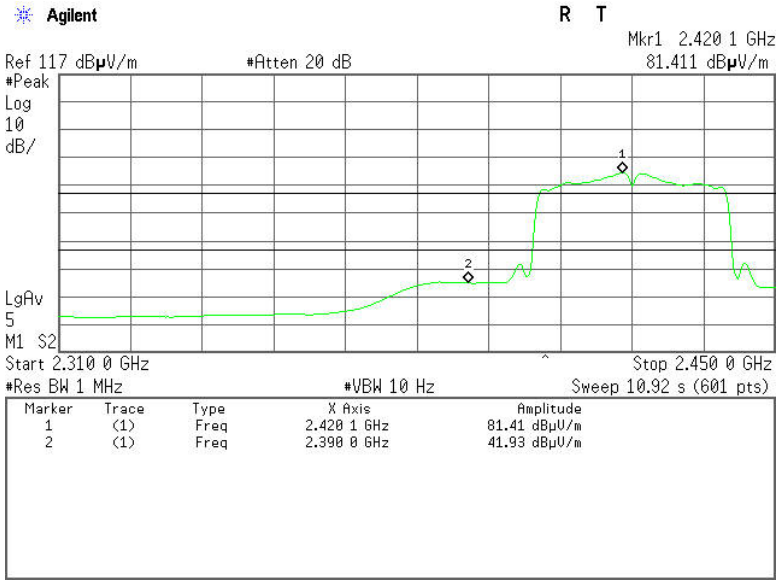


No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	64.84	-6.60	71.44	74.00	-2.56	Peak	Vertical
2	2390.0000	45.07	-6.60	51.67	54.00	-2.33	Average	Vertical

Detector mode: Peak **Polarity: Horizontal**



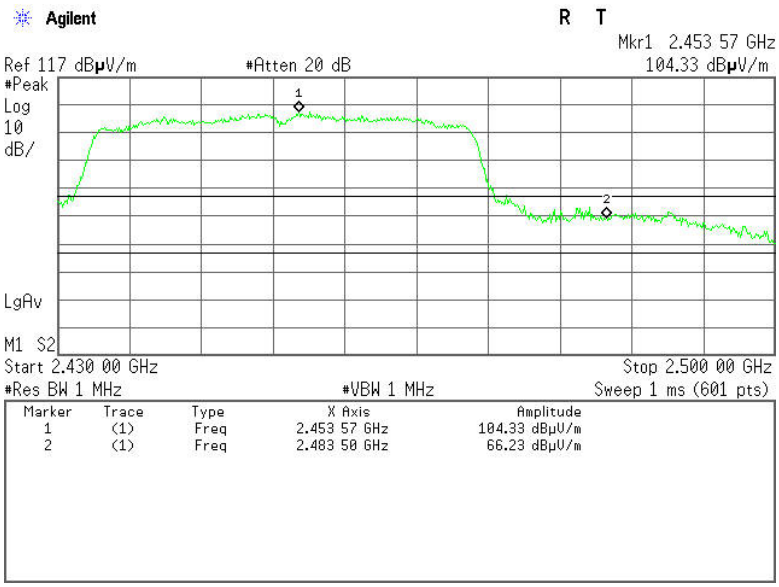
Detector mode: Average **Polarity: Horizontal**



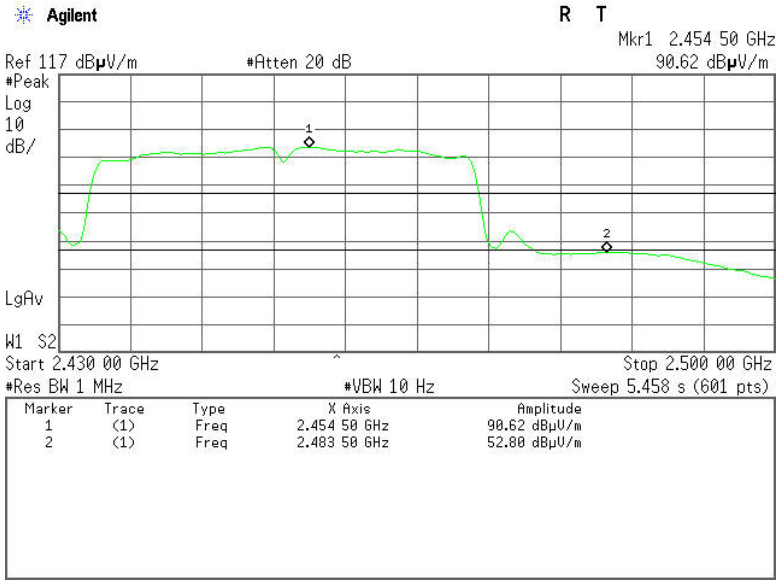
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	47.05	-6.60	53.65	74.00	-20.35	Peak	Horizontal
2	2390.0000	35.33	-6.60	41.93	54.00	-12.07	Average	Horizontal

Band Edges (CH High)

Detector mode: Peak Polarity: Vertical

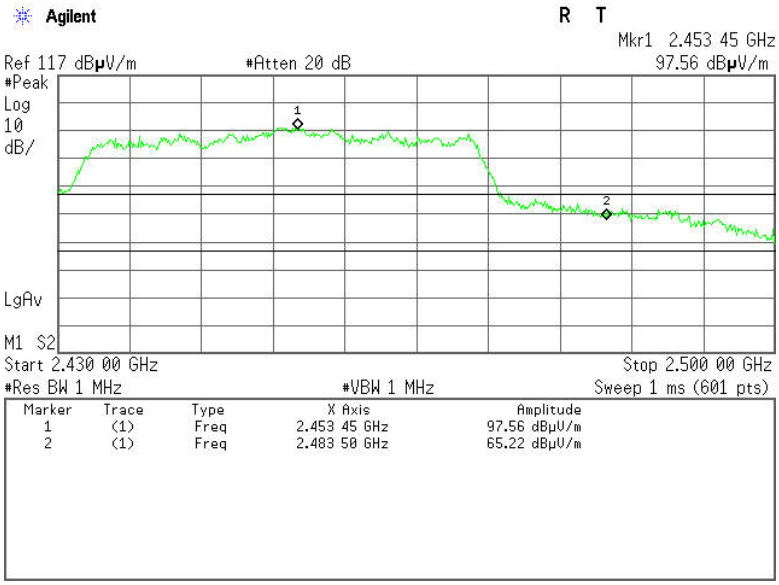


Detector mode: Average Polarity: Vertical

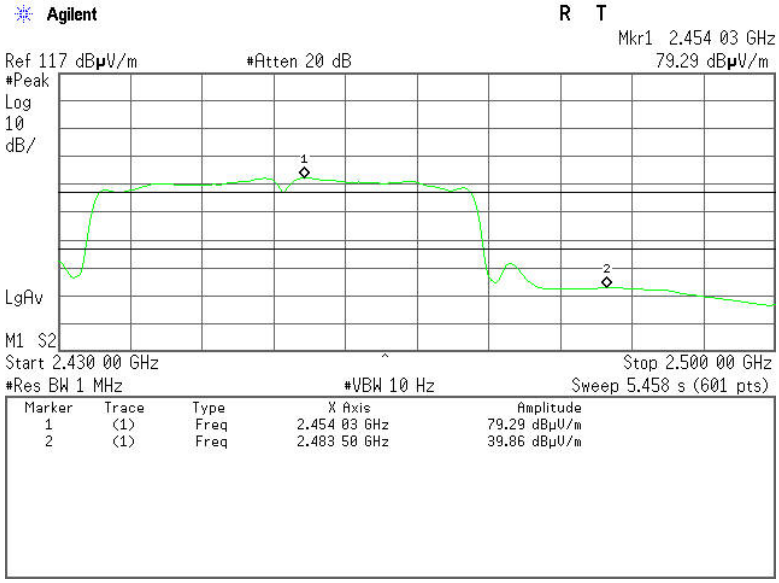


No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	59.99	-6.24	66.23	74.00	-7.77	Peak	Vertical
2	2483.5000	46.56	-6.24	52.80	54.00	-1.20	AVG	Vertical

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	58.98	-6.24	65.22	74.00	-8.78	Peak	Horizontal
2	2483.5000	33.62	-6.24	39.86	54.00	-14.14	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

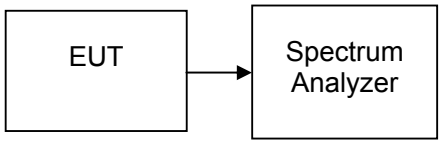
7.6.3. TEST PROCEDURES (please refer to measurement standard)

§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).

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 kHz ⩽RBW ⩽100 kHz.
4. Set the VBW ⩾ 3 ×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.

7.6.4. TEST SETUP



7.6.5. TEST RESULTS

No non-compliance noted

Test Data

Antenna 0

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-6.31	8	PASS
Mid	2437	-6.18		PASS
High	2462	-6.57		PASS

Antenna 0

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-8.83	8	PASS
Mid	2437	-8.74		PASS
High	2462	-8.35		PASS

Antenna 1

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-8.98	8	PASS
Mid	2437	-9.48		PASS
High	2462	-10.62		PASS

Test mode: IEEE 802.11n HT20 MHz(Combine with Antenna 0 and Anteena 1)

Channel	Frequency (MHz)	PPSD (dBm)		PPSD Total (dBm)	Limit (W)	Result
		Chain 1	Chain 2			
Low	2422	-11.36	-13.56	-9.31	8	PASS
Mid	2437	-12.40	-14.68	-10.38		PASS
High	2452	-11.15	-14.52	-9.51		PASS

Test mode: IEEE 802.11n HT40 MHz(Combine with Antenna 0 and Anteena 1)

Channel	Frequency (MHz)	PPSD (dBm)		PPSD Total (dBm)	Limit (W)	Result
		Chain 1	Chain 2			
Low	2422	-14.81	-16.86	-12.70	8	PASS
Mid	2437	-14.48	-17.09	-12.58		PASS
High	2452	-13.17	-16.59	-11.54		PASS

Note : Combine Power Calculation :

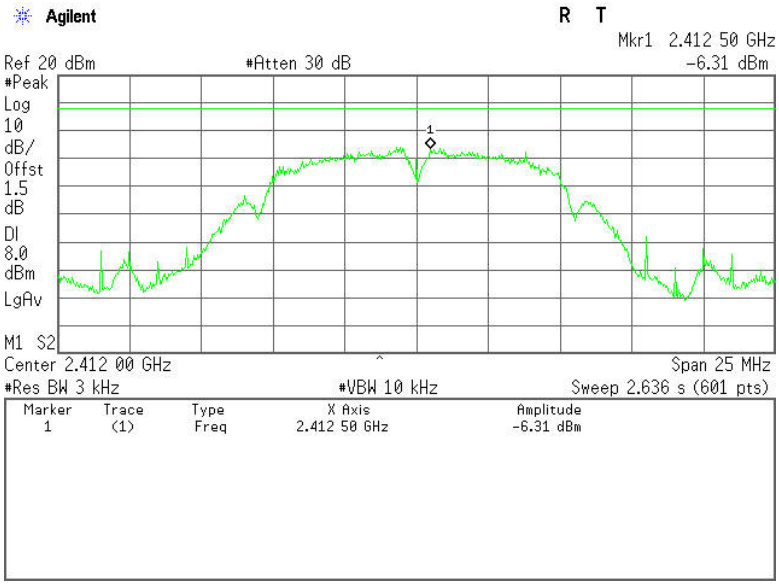
Total PPSD(dBm) =log (10 $^{(\text{chain 0 PPSD/10})}$+10 $^{(\text{chain 1 PPSD/10})}$)*10

Test Plot

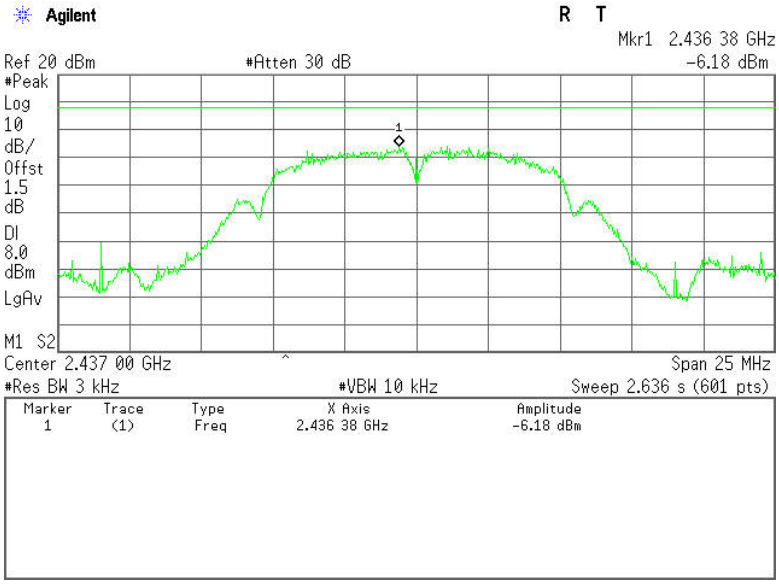
Antenna 0

IEEE 802.11b mode

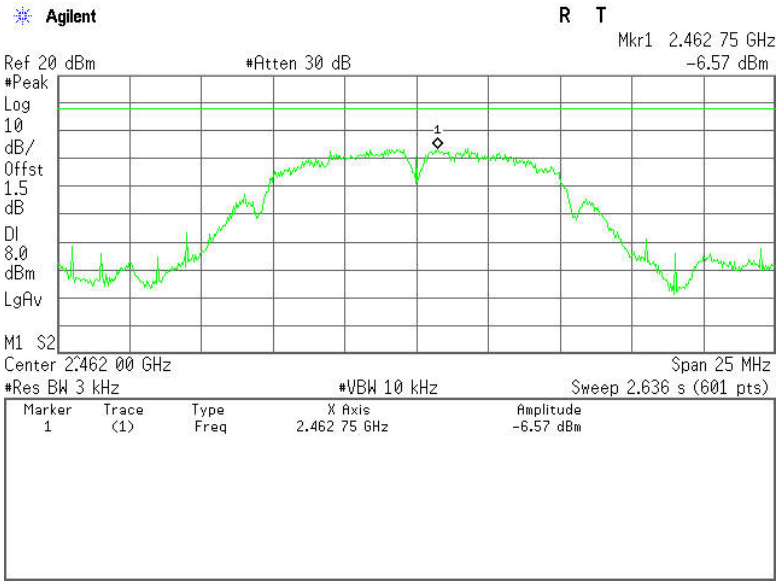
PPSD (CH Low)



PPSD (CH Mid)



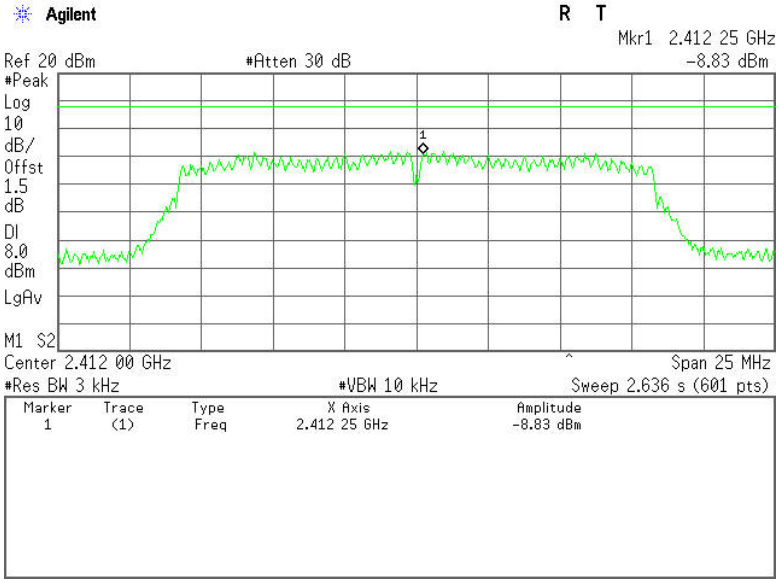
PPSD (CH High)



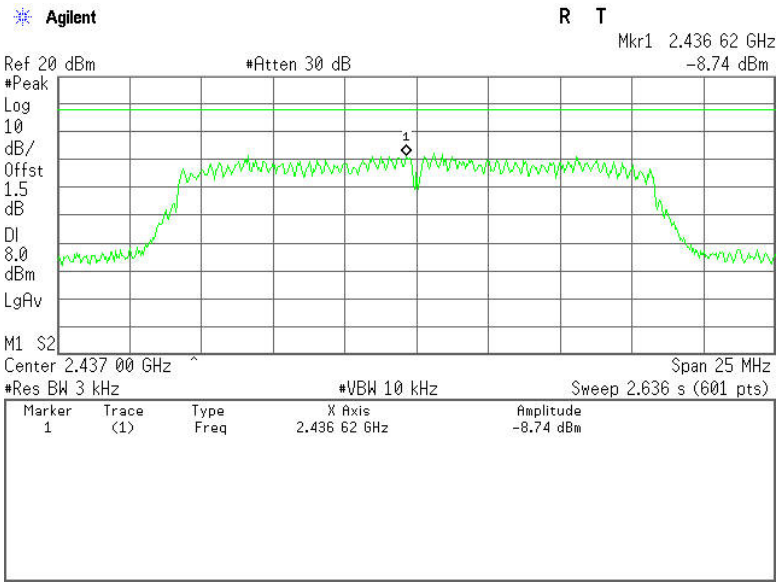
Antenna 0

IEEE 802.11g mode

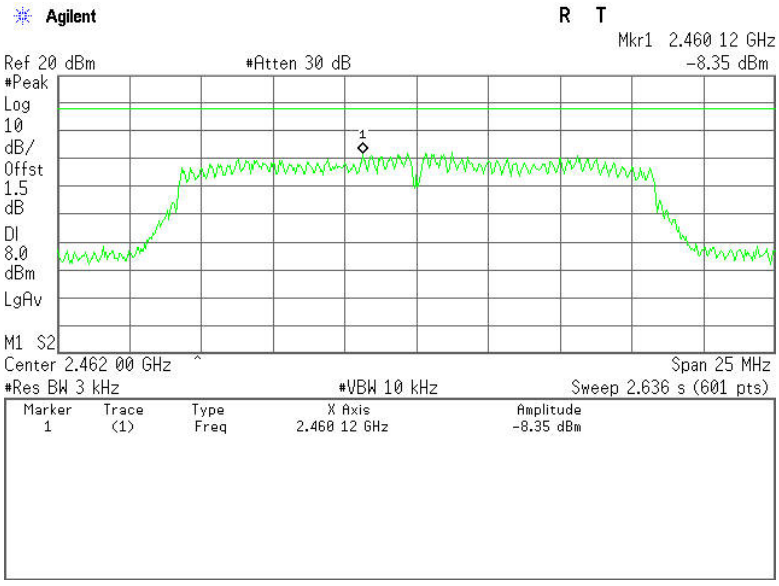
PPSD (CH Low)



PPSD (CH Mid)



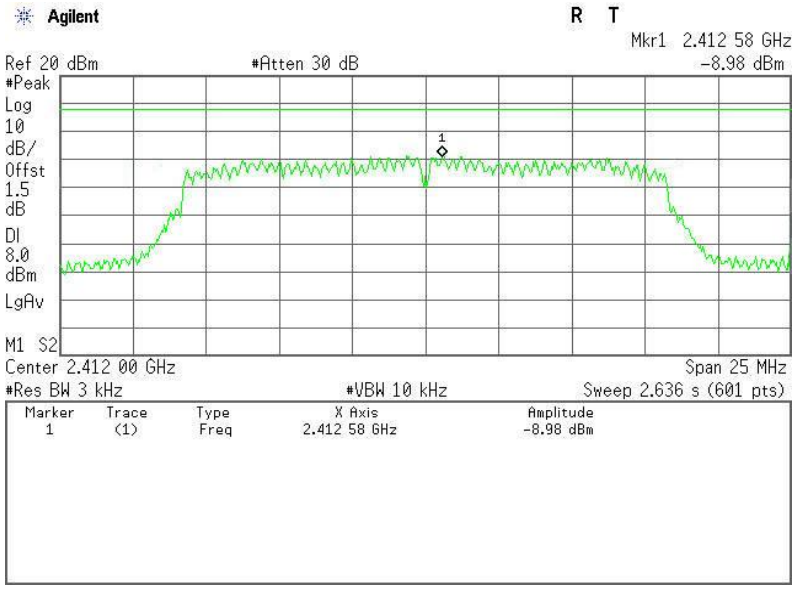
PPSD (CH High)



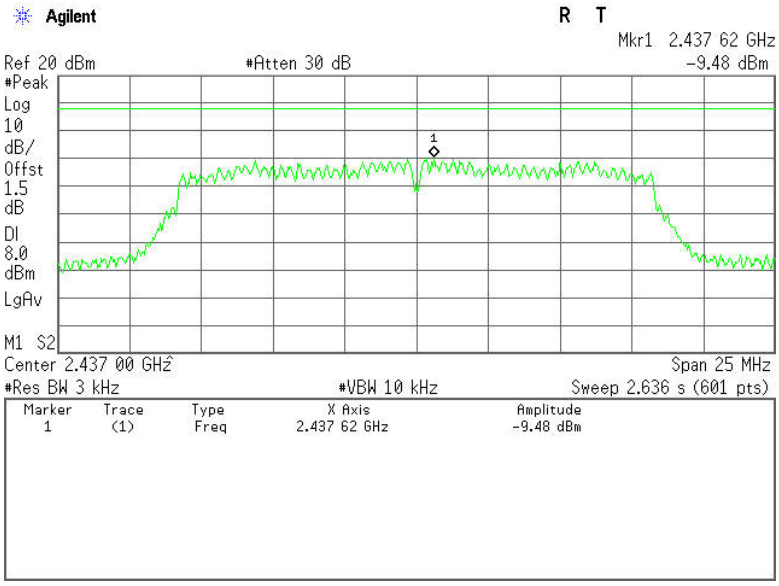
Antenna 1

IEEE 802.11g mode

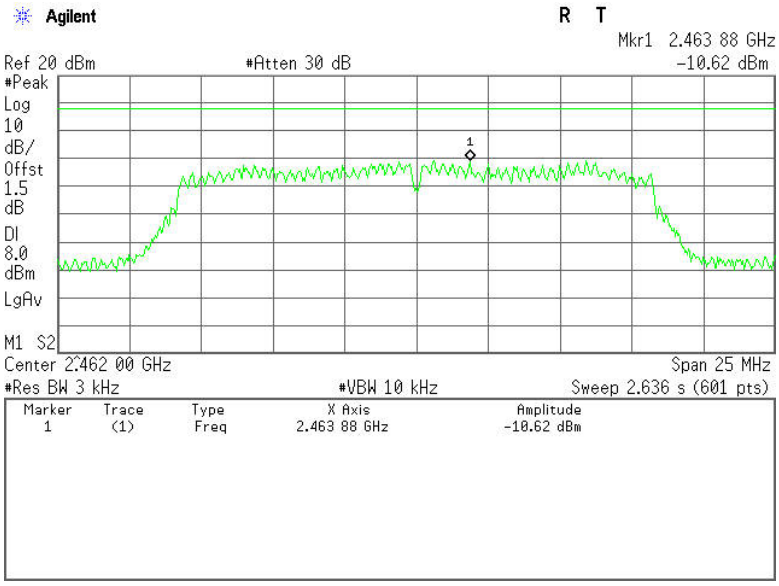
PPSD (CH Low)



PPSD (CH Mid)



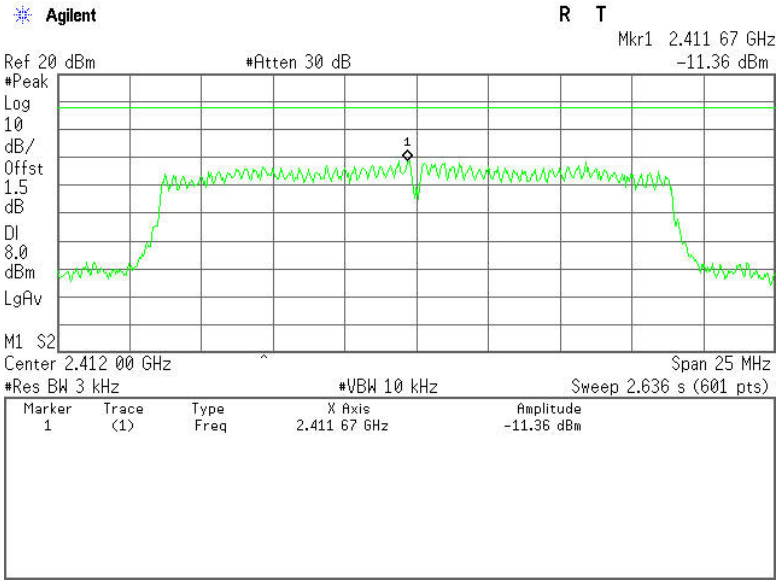
PPSD (CH High)



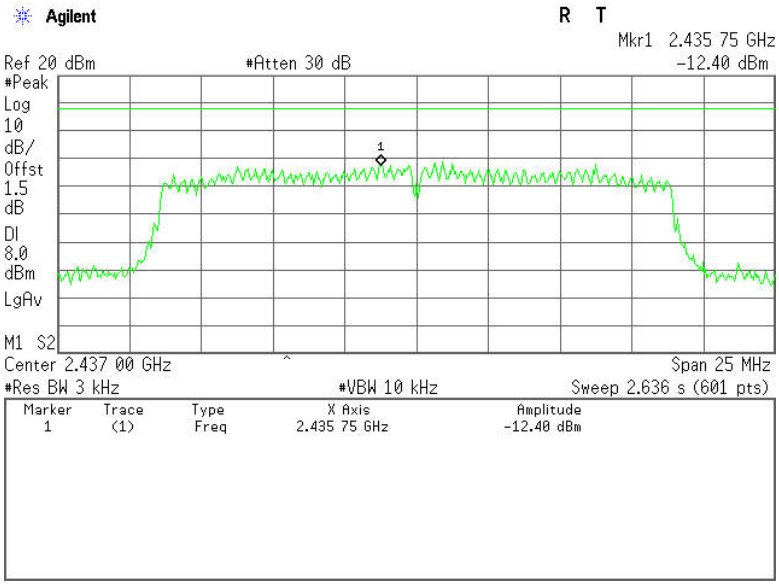
Antenna 0

IEEE 802.11n HT20 MHz mode

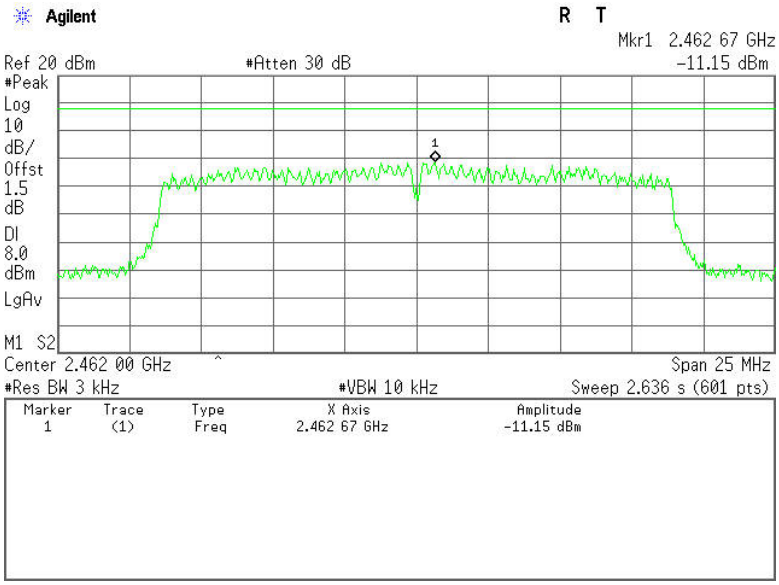
PPSD (CH Low)



PPSD (CH Mid)



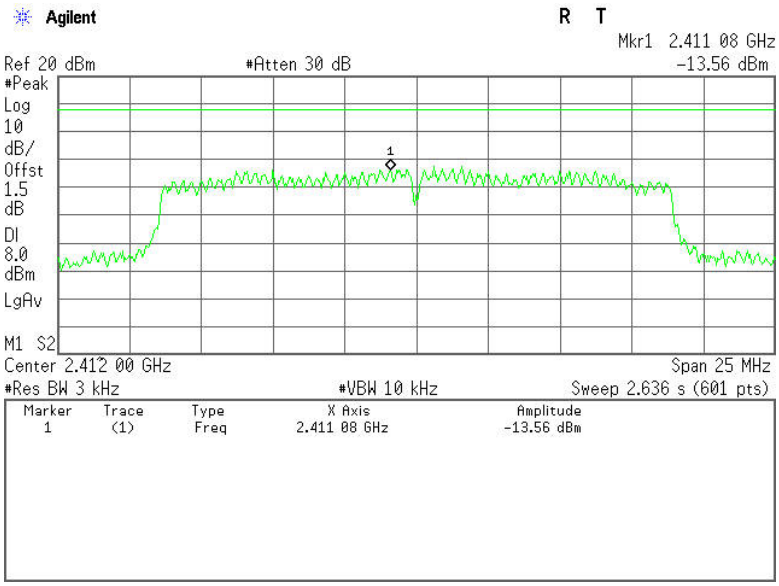
PPSD (CH High)



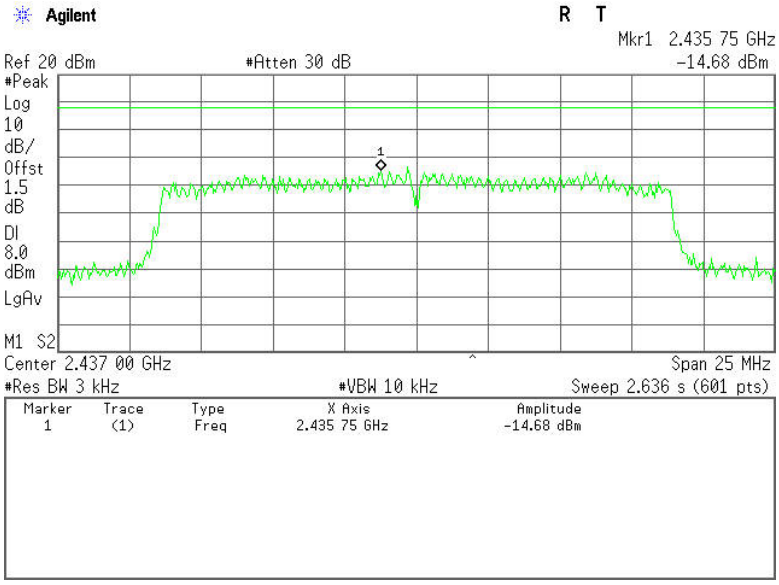
Antenna 1

IEEE 802.11n HT20 MHz mode

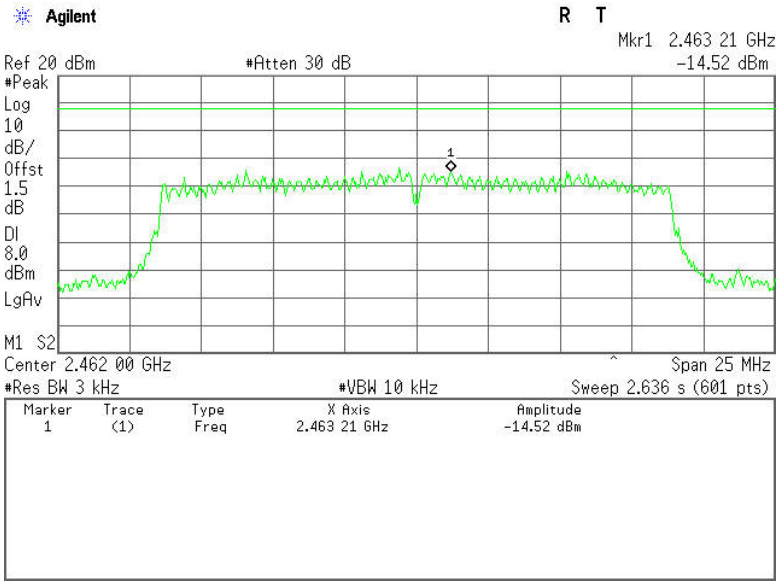
PPSD (CH Low)



PPSD (CH Mid)



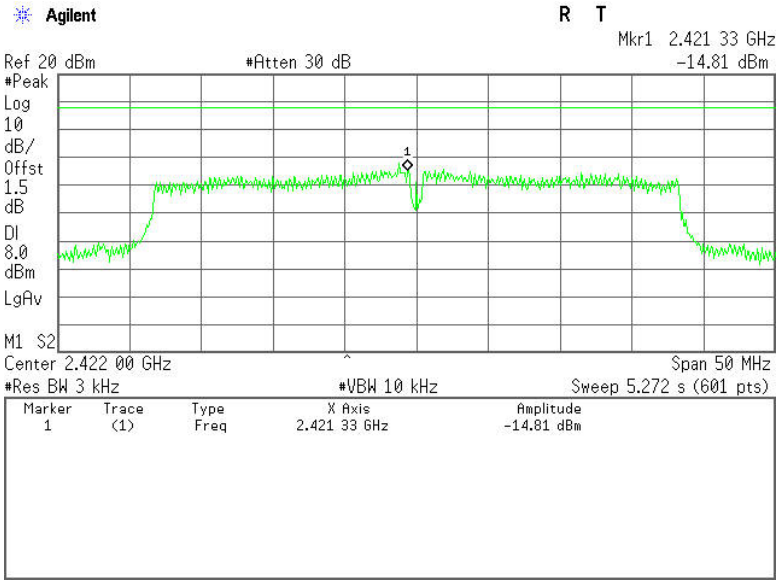
PPSD (CH High)



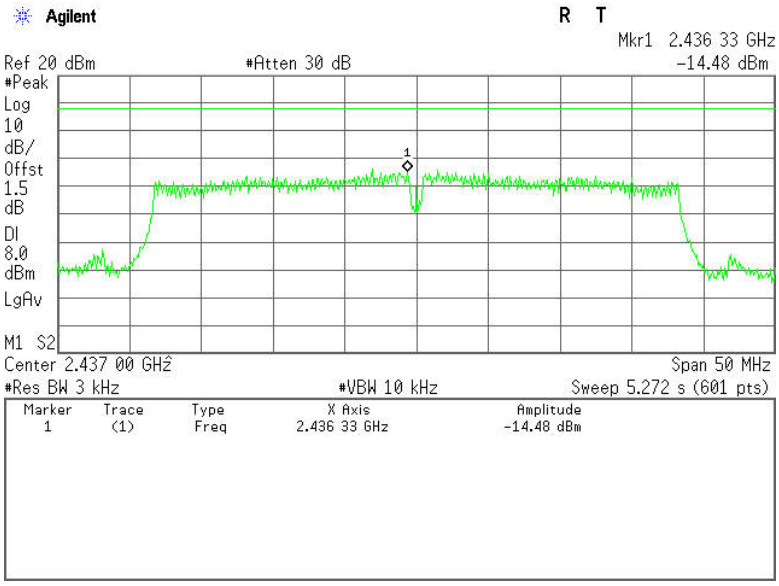
Antenna 0

IEEE 802.11n HT40 MHz mode

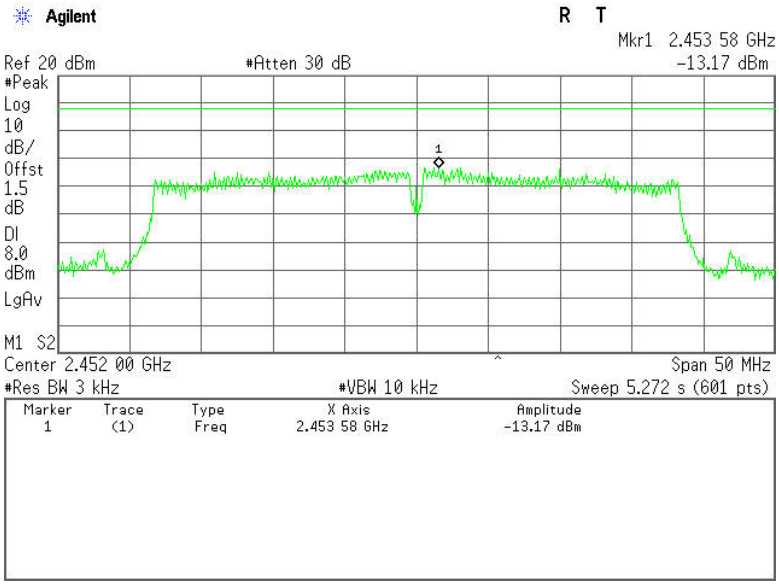
PPSD (CH Low)



PPSD (CH Mid)



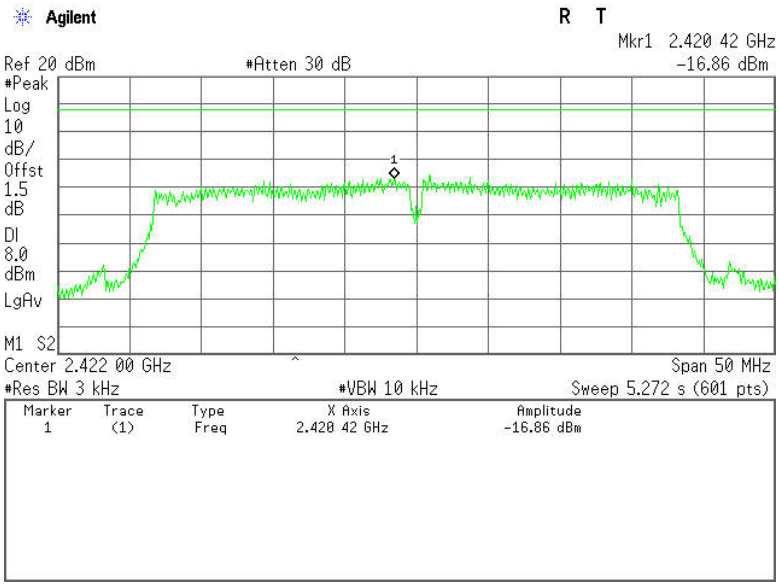
PPSD (CH High)



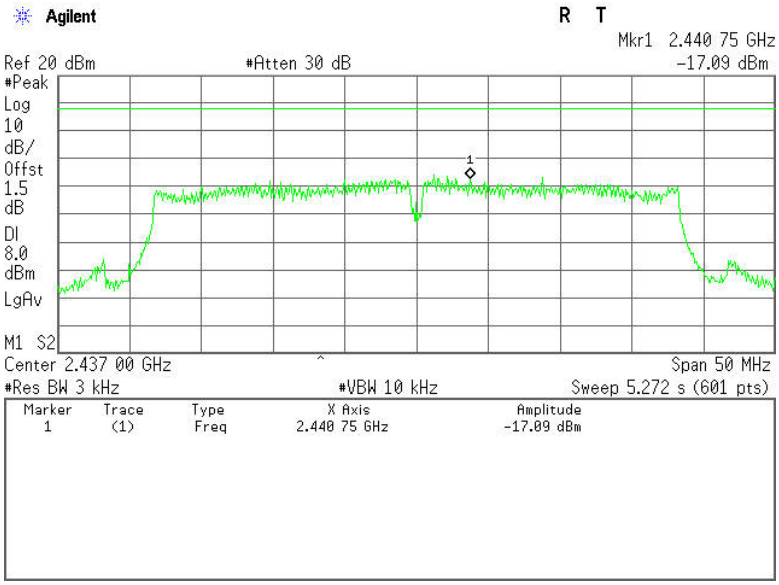
Antenna 1

IEEE 802.11n HT40 MHz mode

PPSD (CH Low)



PPSD (CH Mid)



PPSD (CH High)