6.3 PEAK POWER

6.3.1 LIMIT

According to §15.407(a)& FCC R&O FCC 14 - 30,

(1) (i) For an outdoor access point operating in the band 5.15 – 5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15 – 5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30dBm in any 500 kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

If transmitting antennas of directional gain greater than 6dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Specified Limit of the Peak Power

Test mode: IEEE 802.11a mode / 5260 ~ 5320MHz

Channel	Frequency (MHz)	26 dB Bandwidth (B) (MHz)		10*Log(B) (dB)		11 + 10*Log(B) (dBm)		Maximum Conducted Output Power Limit (dBm)	
		Antenna 1	Antenna 2	Antenna 1	Antenna 2	Antenna 1	Antenna 2	Antenna 1	Antenna 2
Low	5260	21.70	21.63	13.37	13.35	24.37	24.35	24.00	24.00
Mid	5300	21.77	21.62	13.38	13.35	24.38	24.35	24.00	24.00
High	5320	21.63	21.51	13.35	13.33	24.35	24.33	24.00	24.00

Test mode: IEEE 802.11n HT 20 MHz mode / 5260 ~ 5320MHz

Channel	Frequency (MHz)	26 dB Bandwidth (B) (MHz)		10*Log(B) (dB)		11 + 10*Log(B) (dBm)		Maximum Conducted Output Power Limit (dBm)	
		Antenna 1	Antenna 2	Antenna 1	Antenna 2	Antenna 1	Antenna 2	Antenna 1	Antenna 2
Low	5260	21.75	21.75	13.37	13.37	24.37	24.37	24.00	24.00
Mid	5300	21.92	21.55	13.41	13.34	24.41	24.34	24.00	24.00
High	5320	21.83	21.89	13.39	13.40	24.39	24.40	24.00	24.00

IEEE 802.11n HT 40 MHz mode / 5270 ~ 5310MHz

Channel	Frequency (MHz)	26 dB Bandwidth (B) (MHz)		10*Log(B) (dB)		11 + 10*Log(B) (dBm)		Maximum Conducted Output Power Limit (dBm)	
		Antenna 1	Antenna 2	Antenna 1	Antenna 2	Antenna 1	Antenna 2	Antenna 1	Antenna 2
Low	5270	39.52	39.48	15.97	15.96	26.97	26.96	24.00	24.00
High	5310	39.61	39.34	15.98	15.95	26.98	26.95	24.00	24.00

IEEE 802.11ac 80 mode / 5290MHz

Channel	Frequency (MHz)	26 dB Bandwidth (B) (MHz)		10*Log(B) (dB)		11 + 10*Log(B) (dBm)		Maximum Conducted Output Power Limit (dBm)	
		Antenna 1	Antenna 2	Antenna 1	Antenna 2	Antenna 1	Antenna 2	Antenna 1	Antenna 2
	5290	80.25	80.49	19.04	19.06	30.04	30.06	24.00	24.00

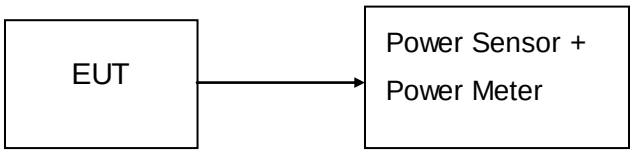
6.3.2 MEASUREMENT EQUIPMENT USED

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

Remark: *Each piece of equipment is scheduled for calibration once a year.*

6.3.3 TEST CONFIGURATIONS

The EUT was connected to a spectrum analyzer through a 50Ω RF cable.



6.3.4 TEST PROCEDURE

Set span to encompass the entire emission bandwidth (EBW) of the signal.

Set RBW = 1 MHz / Set VBW = 3 MHz.

Use sample detector mode if bin width (i.e., span/number of points in spectrum display) < 0.5 RBW. Otherwise use peak detector mode. Use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at full control power for entire sweep of every sweep. If the device transmits continuously, with no off intervals or reduced power intervals, the trigger may be set to "free run".·Trace average 100 traces in power averaging mode. Compute power by integrating the spectrum across the 26 dB EBW of the signal. The integration can be performed using the spectrum analyzer's band power measurement function with band limits set equal to the EBW band edges or by summing power levels in each 1 MHz band in linear power terms. The 1 MHz band power levels to be summed can be obtained by averaging, in linear power terms, power levels in each frequency bin across the 1 MHz.

6.3.5 TEST RESULTS

No non-compliance noted

6.3.6 TEST DATA

IEEE 802.11a mode / 5180 ~ 5240MHz

Channel	Frequency (MHz)	Output Power (dBm)		Output Power (W)		Limit (dBm)	Result
		Antenna 1	Antenna 2	Antenna 1	Antenna 2		
Low	5180	15.79	14.32	0.03793	0.02704	30.00	PASS
Mid	5200	15.79	15.50	0.03793	0.03548		PASS
High	5240	15.51	14.45	0.03556	0.02786		PASS

IEEE 802.11a mode / 5260~ 5320MHz

Channel	Frequency (MHz)	Output Power (dBm)		Output Power (W)		Limit (dBm)	Result
		Antenna 1	Antenna 2	Antenna 1	Antenna 2		
Low	5260	15.49	14.33	0.03540	0.02710	24.00	PASS
Mid	5300	15.15	14.46	0.03273	0.02793		PASS
High	5320	15.20	14.20	0.03311	0.02630		PASS

IEEE 802.11a mode / 5745 ~ 5825MHz

Channel	Frequency (MHz)	Output Power (dBm)		Output Power (W)		Limit (dBm)	Result
		Antenna 1	Antenna 2	Antenna 1	Antenna 2		
Low	5745	15.26	14.41	0.03357	0.02761	30.00	PASS
Mid	5785	15.32	15.22	0.03404	0.03327		PASS
High	5825	14.90	14.91	0.03090	0.03097		PASS

IEEE 802.11n HT 20 MHz mode / 5180 ~ 5240MHz

Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)	Limit (dBm)	Result
		Antenna 1	Antenna 2	Total			
Low	5180	15.56	14.39	18.02	0.06345	30.00	PASS
Mid	5200	15.42	14.43	17.96	0.06257		PASS
High	5240	15.46	13.34	17.54	0.05673		PASS

IEEE 802.11n HT 20 MHz mode / 5260~ 5320MHz

Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)	Limit (dBm)	Result
		Antenna 1	Antenna 2	Total			
Low	5260	15.34	14.36	17.89	0.06149	24.00	PASS
Mid	5300	14.04	14.26	17.16	0.05202		PASS
High	5320	15.16	14.22	17.73	0.05923		PASS

IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz

Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)	Limit (dBm)	Result
		Antenna 1	Antenna 2	Total			
Low	5745	14.07	15.39	17.79	0.06012	30.00	PASS
Mid	5785	15.12	15.04	18.09	0.06442		PASS
High	5825	14.63	14.54	17.60	0.05748		PASS

IEEE 802.11n HT 40 MHz mode / 5190 ~ 5230MHz

Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)	Limit (dBm)	Result
		Antenna 1	Antenna 2	Total			
Low	5190	16.21	14.90	18.61	0.07269	30.00	PASS
High	5230	15.94	14.98	18.50	0.07074		PASS

IEEE 802.11n HT 40 MHz mode / 5270 ~ 5310MHz

Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)	Limit (dBm)	Result
		Antenna 1	Antenna 2	Total			
Low	5270	15.76	14.71	18.28	0.06725	24.00	PASS
High	5310	15.70	14.86	18.31	0.06777		PASS

IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHzs

Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)	Limit (dBm)	Result
		Antenna 1	Antenna 2	Total			
Low	5755	15.75	16.00	18.89	0.07739	30.00	PASS
High	5795	15.54	15.77	18.67	0.07357		PASS

IEEE 802.11ac 80 mode / 5210MHz

Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)	Limit (dBm)	Result
		Antenna 1	Antenna 2	Total			
	5210	15.46	13.83	17.73	0.05931	30.00	PASS

IEEE 802.11ac 80 mode / 5290MHz

Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)	Limit (dBm)	Result
		Antenna 1	Antenna 2	Total			
	5290	15.17	13.89	17.59	0.05738	24.00	PASS

IEEE 802.11ac 80 mode / 5775MHz

Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)	Limit (dBm)	Result
		Antenna 1	Antenna 2	Total			
	5775	14.90	15.14	18.03	0.06356	30.00	PASS

6.4 BAND EDGES MEASUREMENT

6.4.1 LIMIT

According to §15.407(b)

(1) The provisions of Section 15.205 of this part apply to intentional radiators operating under this section.

(2) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency block edges as the design of the equipment permits.

6.4.2 MEASUREMENT EQUIPMENT USED

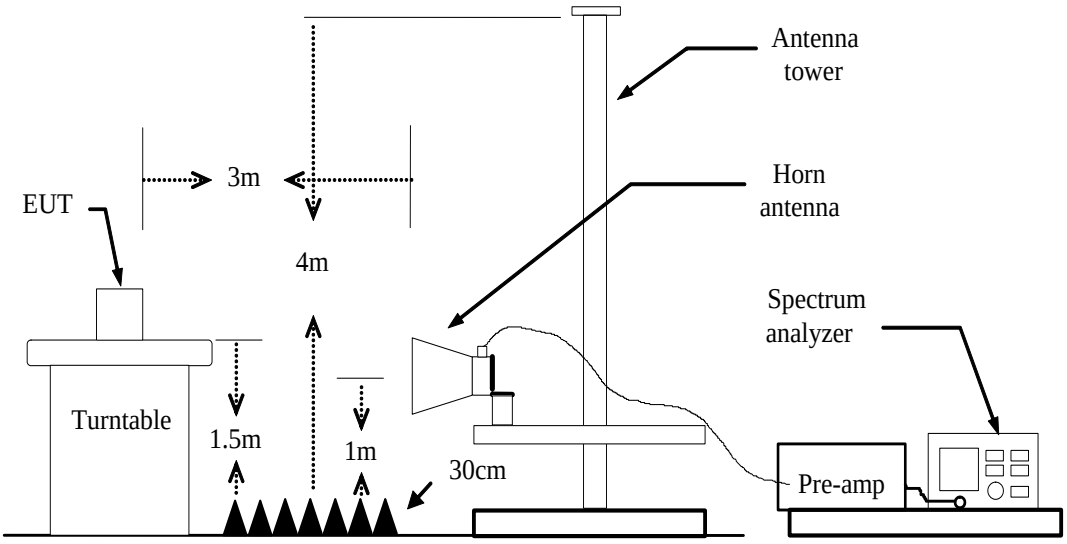
Radiated Emission Test Site 966(2)					
Name of Equipment	**Manufacturer**	**Model Number**	**Serial Number**	**Last Calibration**	**Due Calibration**
PSA Series Spectrum Analyzer	Agilent	E4446A	US44300399	02/21/2016	02/20/2017
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100783	02/21/2016	02/20/2017
Amplifier	MITEQ	AM-1604-3000	1123808	03/18/2015	03/18/2016
High Noise Amplifier	Agilent	8449B	3008A01838	02/21/2016	02/20/2017
Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170-497	02/28/2016	02/27/2017
Bilog Antenna	SCHAFFNER	CBL6143	5082	02/21/2016	02/20/2017
Horn Antenna	SCHWARZBECK	BBHA9120	D286	02/28/2016	02/27/2017
Loop Antenna	COM-POWER	AL-130	121044	09/25/2015	09/24/2016
Turn Table	N/A	N/A	N/A	N.C.R	N.C.R
Controller	Sunol Sciences	SC104V	022310-1	N.C.R	N.C.R
Controller	CT	N/A	N/A	N.C.R	N.C.R
Temp. / Humidity Meter	Anymetre	JR913	N/A	02/21/2016	02/20/2017
Antenna Tower	SUNOL	TLT2	N/A	N.C.R	N.C.R
Test S/W	FARAD	LZ-RF / CCS-SZ-3A2			

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

2. The FCC Site Registration number is 101879.

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

6.4.3TEST CONFIGURATION



6.4.4TEST PROCEDURE

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=1 / VBW=3MHz / Sweep=AUTO
   (b) AVERAGE: RBW=1MHz / VBW=3MHz / Sweep=AUTO / Detector=RMS
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

6.4.5TEST RESULT

IEEE 802.11a mode / 5745 ~ 5825MHz

Antenna 1:

1. Operating Frequency: 5745-5825MHz
2. CH Low: 5745MHz, CH High: 5825MHz
3. 26dB bandwidth: CH Low: 21.779MHz, CH High: 21.787MHz
4. Frequency Range: 5734.1105MHz, 5835.8935MHz

Antenna 2:

1. Operating Frequency: 5745-5825MHz
2. CH Low: 5745MHz, CH High: 5825MHz
3. 26dB bandwidth: CH Low: 21.560MHz, CH High: 21.541MHz
4. Frequency Range: 5734.2200MHz, 5835.7705MHz

IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz

Antenna 1:

1. Operating Frequency: 5745-5825MHz
2. CH Low: 5745MHz, CH High: 5825MHz
3. 26dB bandwidth: CH Low: 22.046MHz, CH High: 21.508MHz
4. Frequency Range: 5733.9770MHz, 5835.7540MHz

Antenna 2:

1. Operating Frequency: 5745-5825MHz
2. CH Low: 5745MHz, CH High: 5825MHz
3. 26dB bandwidth: CH Low: 21.725MHz, CH High: 21.518MHz
4. Frequency Range: 5734.1375MHz, 5835.7590MHz

IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz

Antenna 1:

1. Operating Frequency: 5755-5795MHz
2. CH Low: 5755MHz, CH High: 5795MHz
3. 26dB bandwidth: CH Low: 39.350MHz, CH High: 39.594MHz
4. Frequency Range: 5735.3250MHz, 5814.7970MHz

Antenna 2:

1. Operating Frequency: 5755-5795MHz
2. CH Low: 5755MHz, CH High: 5795MHz
3. 26dB bandwidth: CH Low: 39.299MHz, CH High: 39.478MHz
4. Frequency Range: 5735.3505MHz, 5814.7390MHz

IEEE 802.11ac 80 mode / 5775MHz

Antenna 1:

1. Operating Frequency: 5775MHz
2. CH: 5775MHz
3. 26dB bandwidth: CH: 80.176MHz
4. Frequency Range: 5734.9120MHz, 5815.0880MHz

Antenna 2:

1. Operating Frequency: 5775MHz
2. CH: 5775MHz
3. 26dB bandwidth: CH: 80.716MHz
4. Frequency Range: 5734.6420MHz, 5815.3850MHz

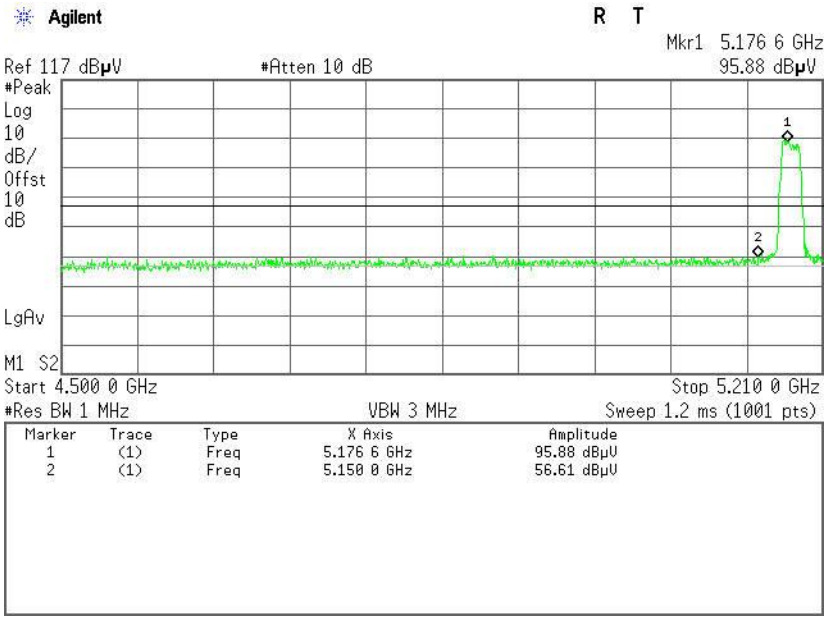
Because the mentioned conditions, the test is not applicable.

Test Plot

IEEE 802.11a mode / 5180MHz

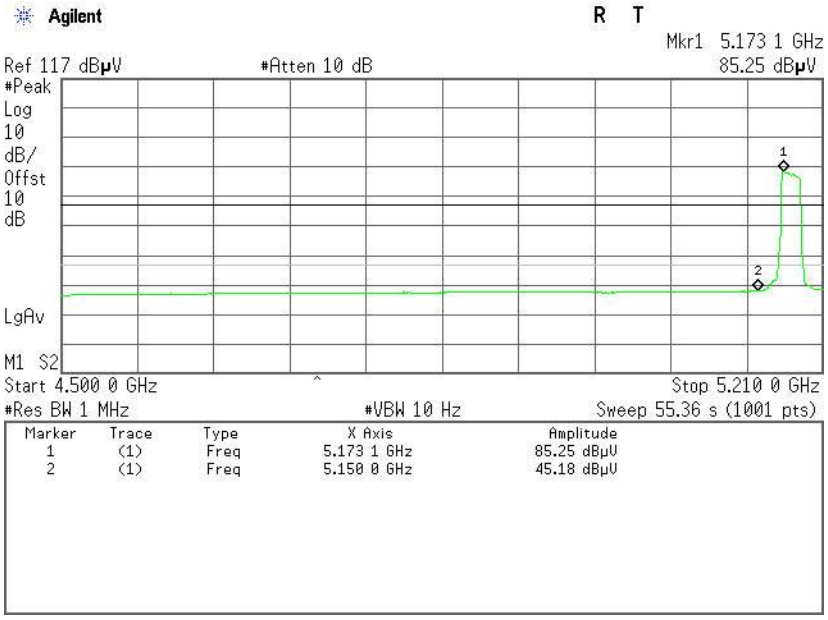
Detector mode: Peak **Polarity: Vertical**

Antenna 1



Detector mode: Average **Polarity: Vertical**

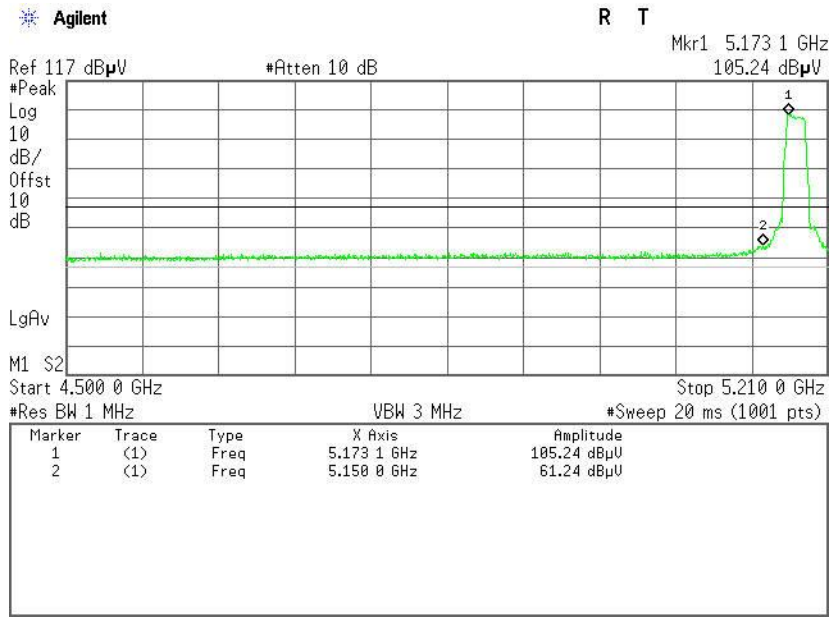
Antenna 1



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5150.0000	50.01	-6.60	56.61	74.00	-17.39	Peak	Vertical
2	5150.0000	38.58	-6.60	45.18	54.00	-8.82	Average	Vertical

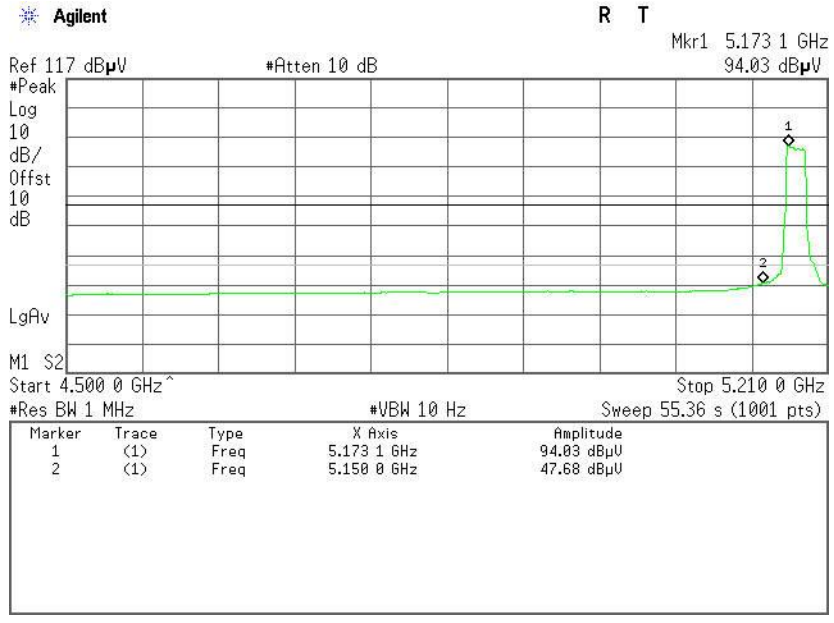
Detector mode: Peak **Polarity: Horizontal**

Antenna 1



Detector mode: Average **Polarity: Horizontal**

Antenna 1

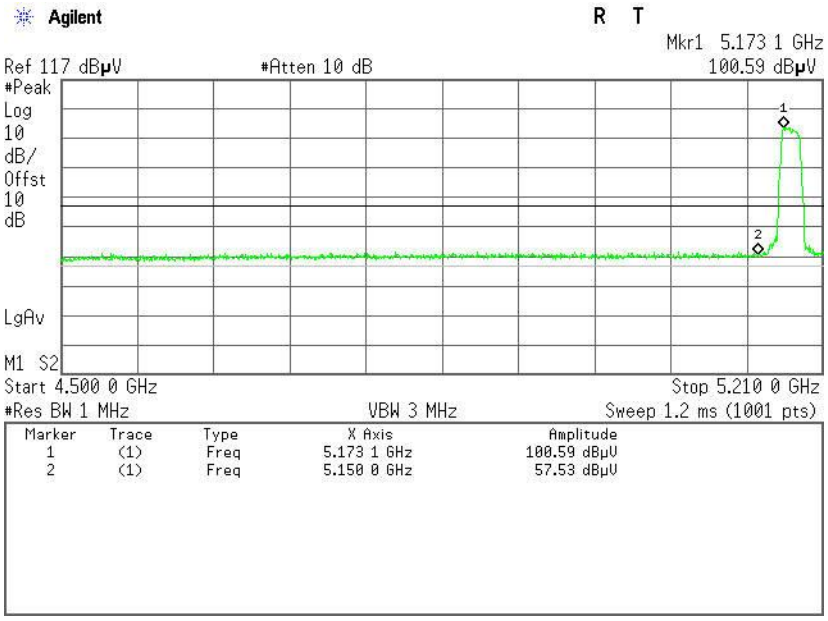


No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5150.0000	54.64	-6.60	61.24	74.00	-12.76	Peak	Horizontal
2	5150.0000	41.08	-6.60	47.68	54.00	-6.32	Average	Horizontal

IEEE 802.11a mode / 5180MHz

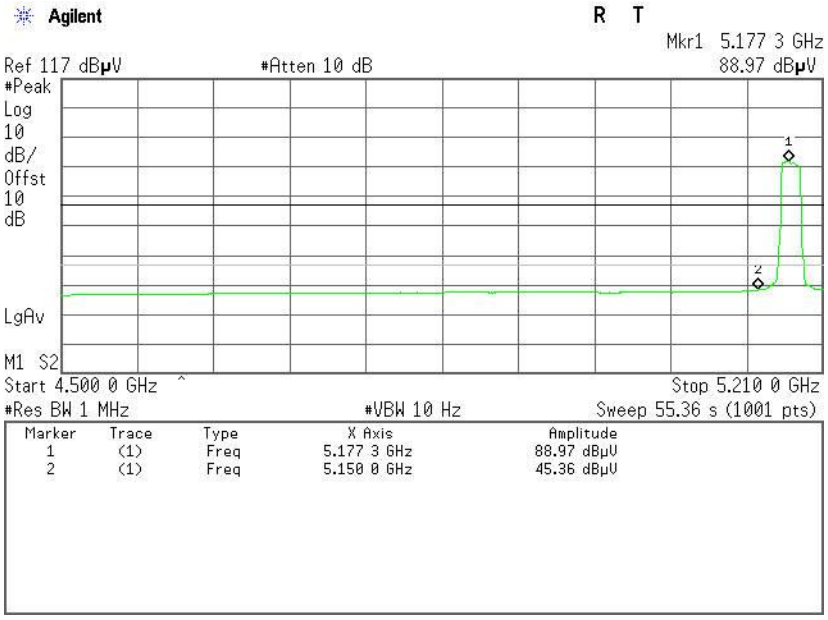
Detector mode: Peak **Polarity: Vertical**

Antenna 2



Detector mode: Average **Polarity: Vertical**

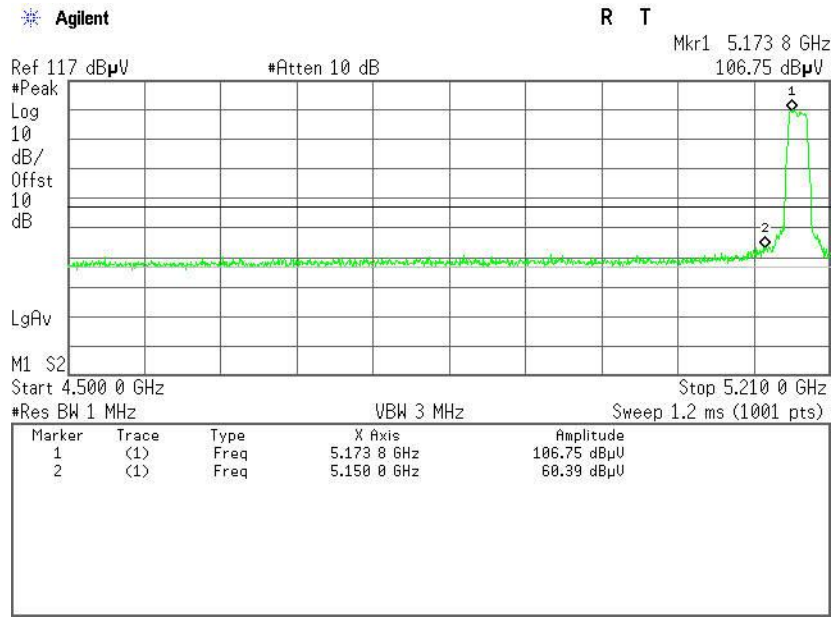
Antenna 2



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5150.0000	50.93	-6.60	57.53	74.00	-16.47	Peak	Vertical
2	5150.0000	38.76	-6.60	45.36	54.00	-8.64	Average	Vertical

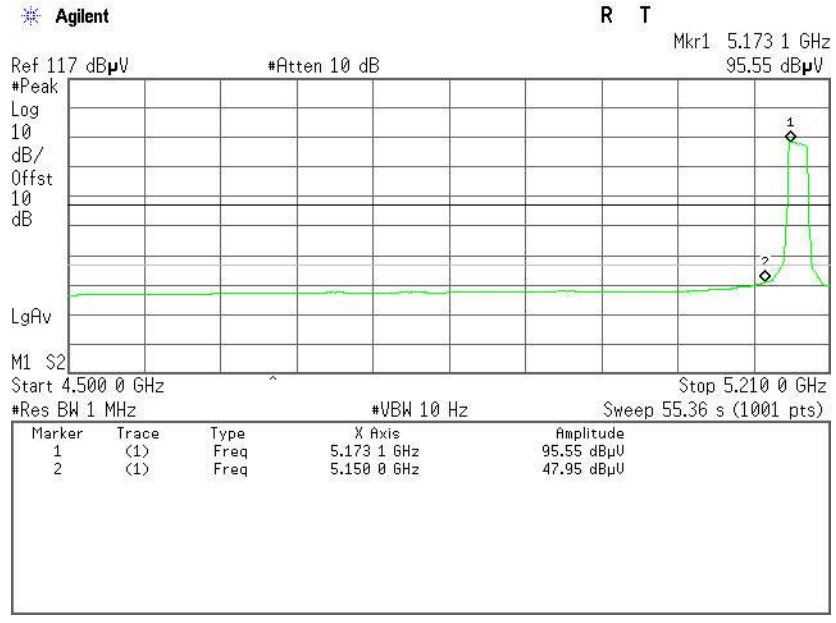
Detector mode: Peak **Polarity: Horizontal**

Antenna 2



Detector mode: Average **Polarity: Horizontal**

Antenna 2

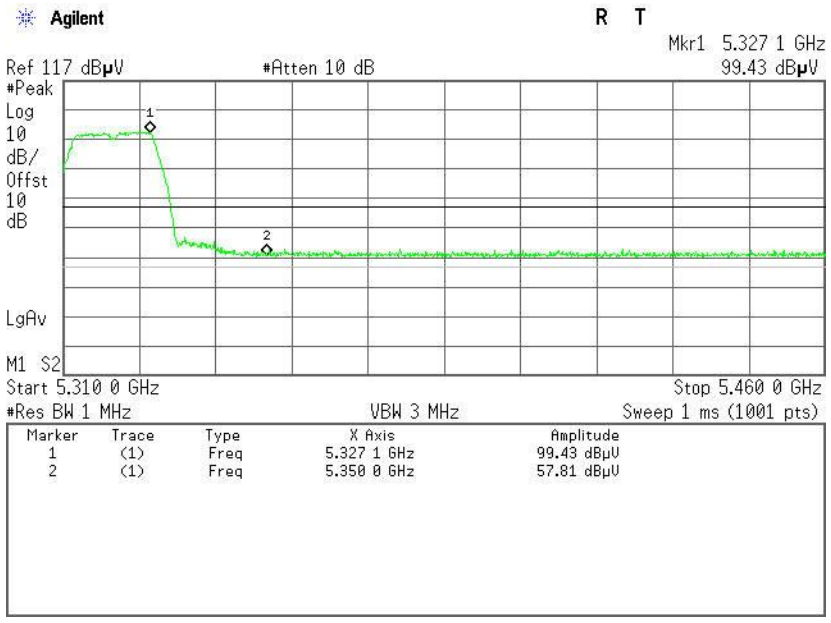


No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5150.0000	53.79	-6.60	60.39	74.00	-13.61	Peak	Horizontal
2	5150.0000	41.35	-6.60	47.95	54.00	-6.05	Average	Horizontal

IEEE 802.11a mode / 5320MHz

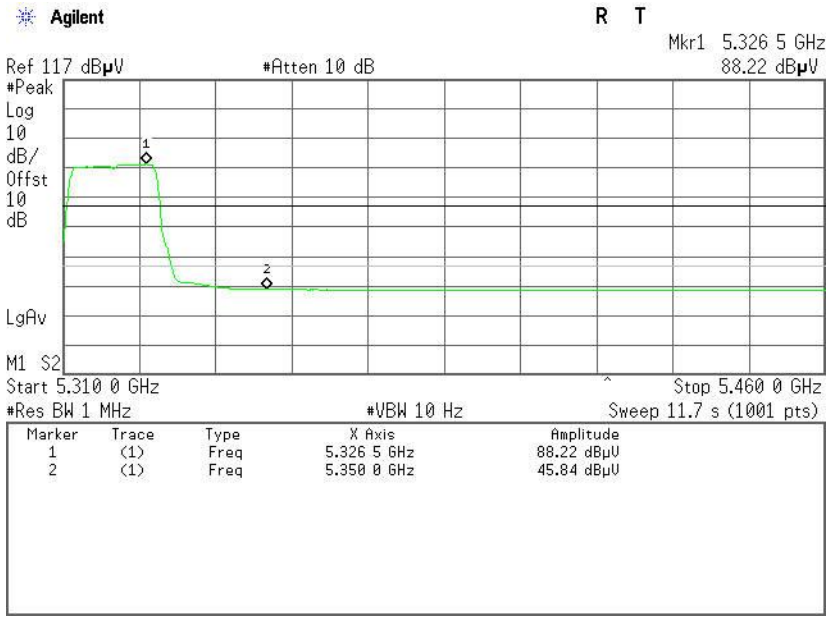
Detector mode: Peak **Polarity: Vertical**

Antenna 1



Detector mode: Average **Polarity: Vertical**

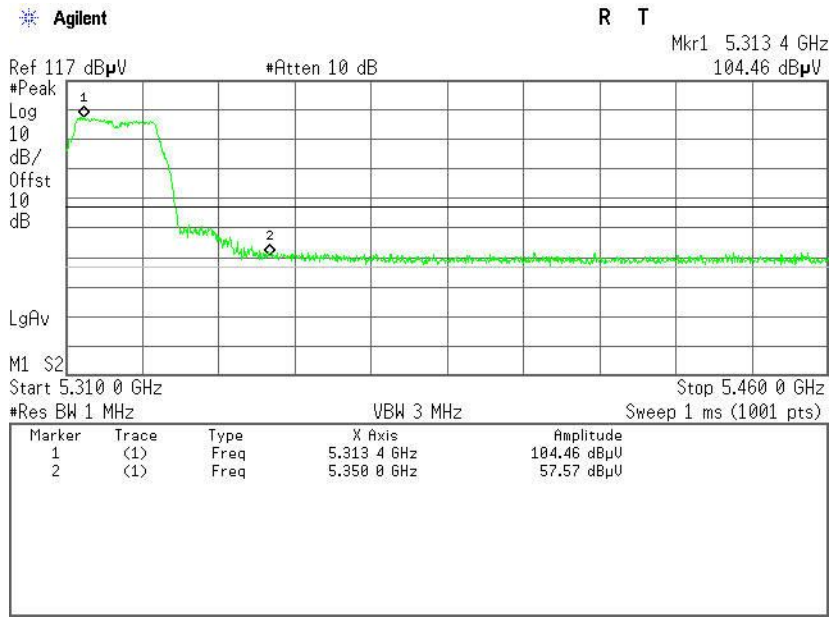
Antenna 1



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5350.0000	51.21	-6.60	57.81	74.00	-16.19	Peak	Vertical
2	5350.0000	39.24	-6.60	45.84	54.00	-8.16	Average	Vertical

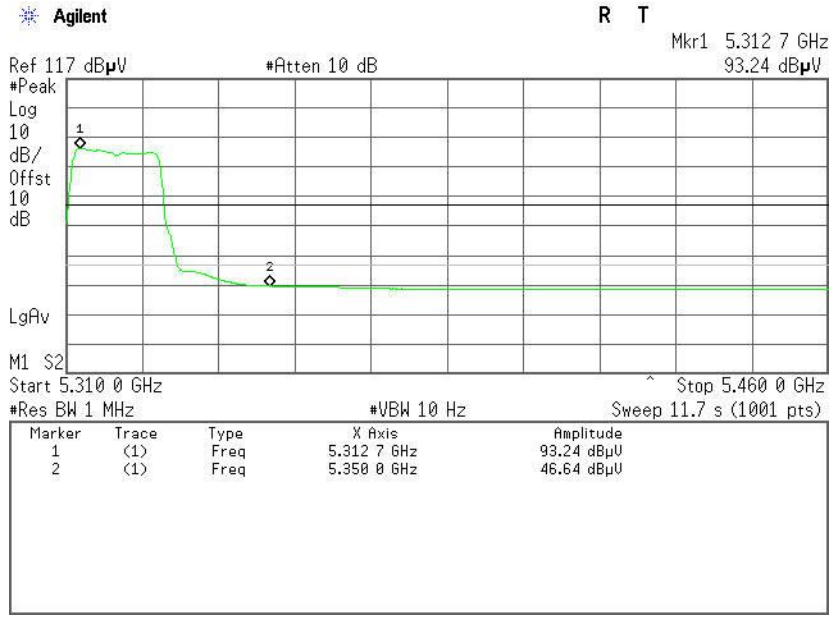
Detector mode: Peak **Polarity: Horizontal**

Antenna 1



Detector mode: Average **Polarity: Horizontal**

Antenna 1

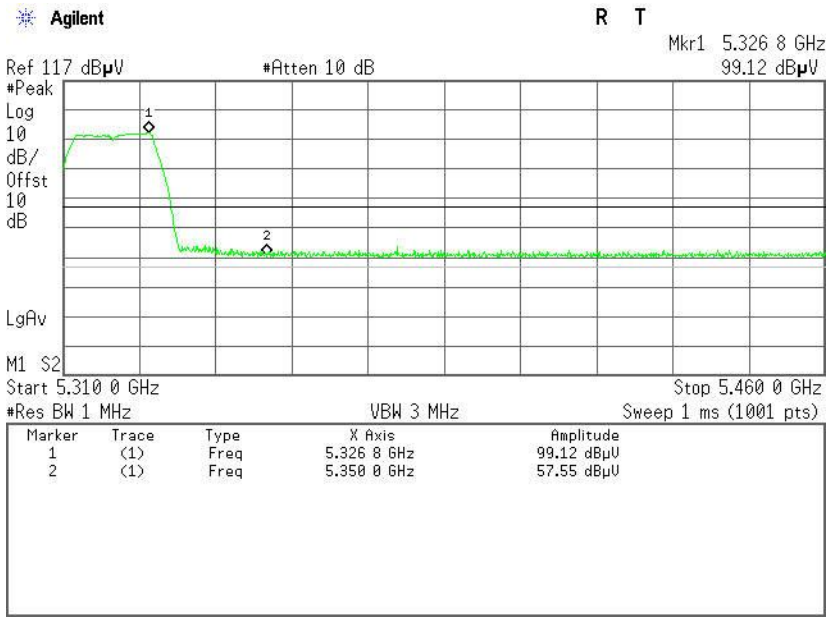


No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5350.0000	50.97	-6.60	57.57	74.00	-16.43	Peak	Horizontal
2	5350.0000	40.04	-6.60	46.64	54.00	-7.36	Average	Horizontal

IEEE 802.11a mode / 5320MHz

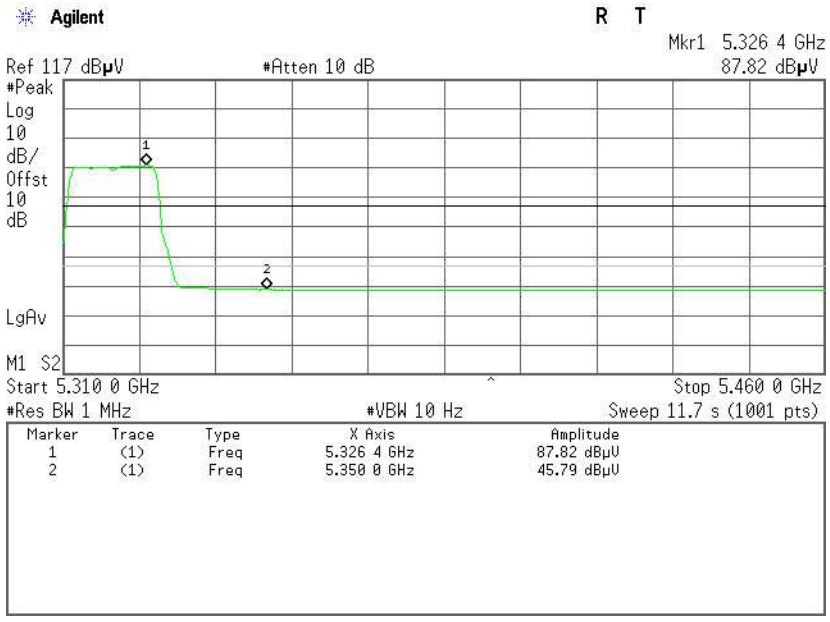
Detector mode: Peak **Polarity: Vertical**

Antenna 2



Detector mode: Average **Polarity: Vertical**

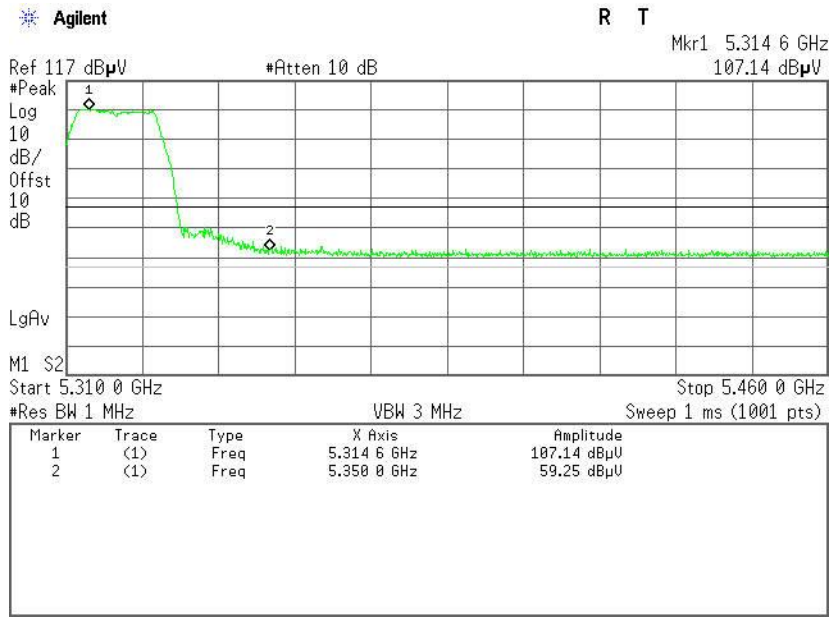
Antenna 2



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5350.0000	50.95	-6.60	57.55	74.00	-16.45	Peak	Vertical
2	5350.0000	39.19	-6.60	45.79	54.00	-8.21	Average	Vertical

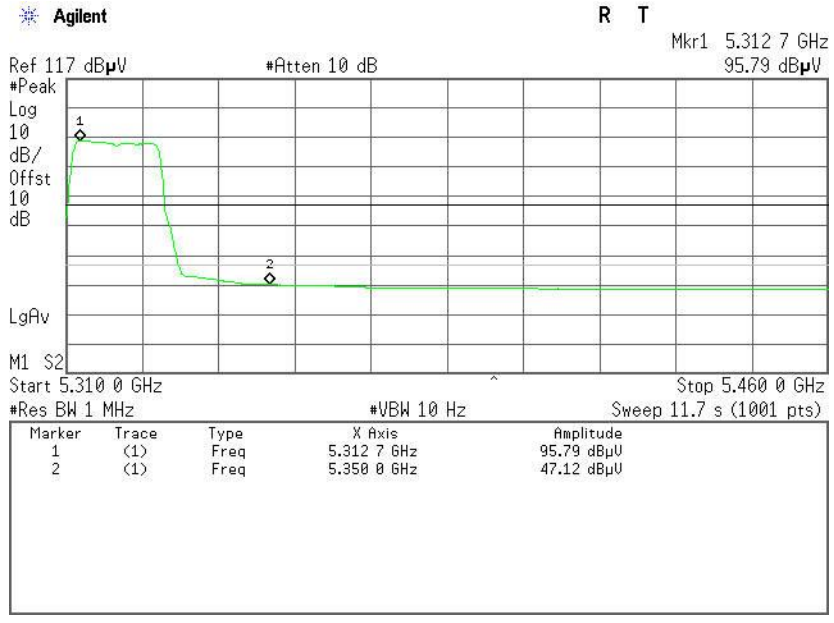
Detector mode: Peak **Polarity: Horizontal**

Antenna 2



Detector mode: Average **Polarity: Horizontal**

Antenna 2

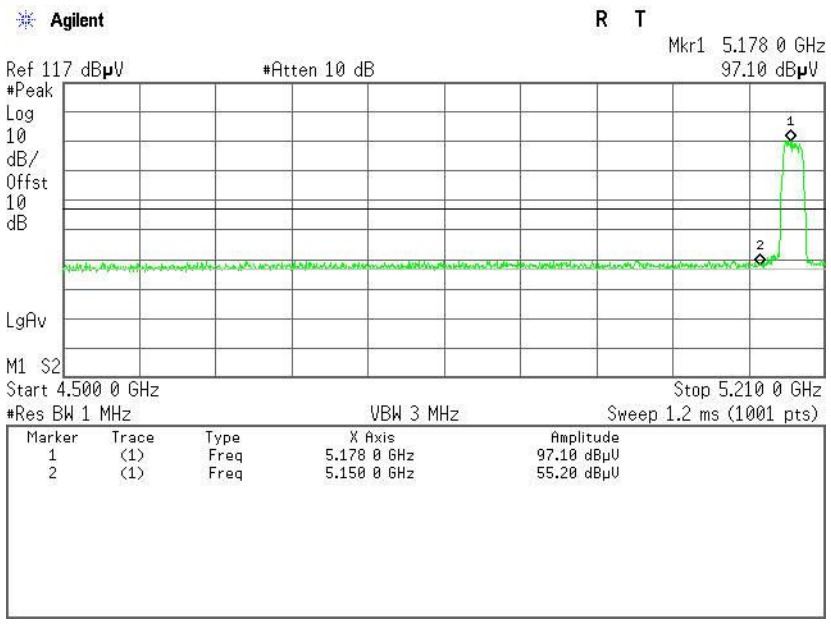


No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5350.0000	52.65	-6.60	59.25	74.00	-14.75	Peak	Horizontal
2	5350.0000	40.52	-6.60	47.12	54.00	-6.88	Average	Horizontal

IEEE 802.11n HT 20 MHz mode / 5180 MHz

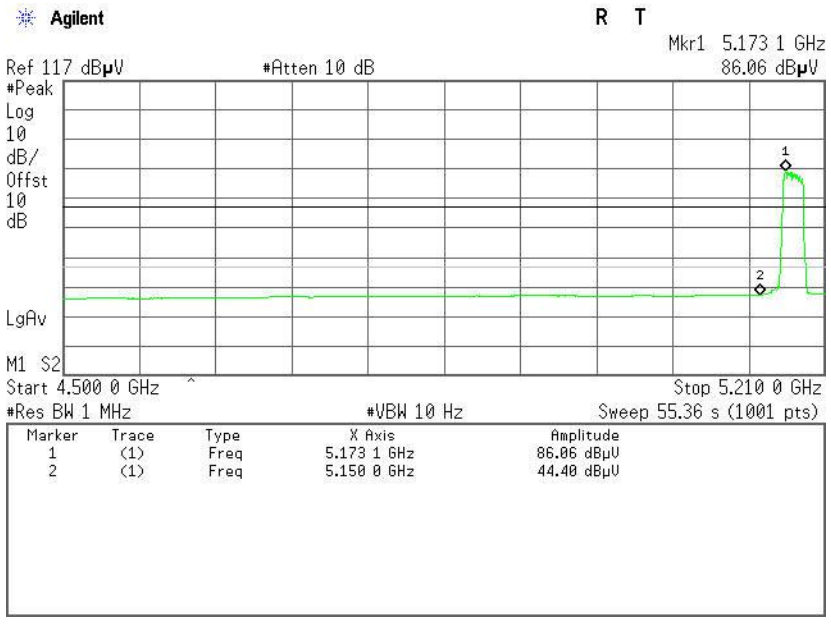
Detector mode: Peak **Polarity: Vertical**

Combine with Antenna 1+ Antenna 2



Detector mode: Average **Polarity: Vertical**

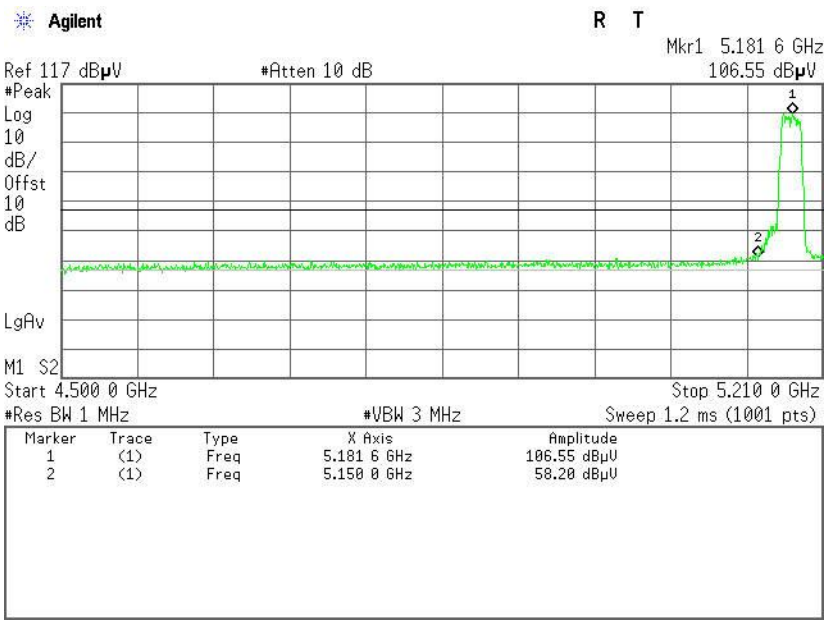
Combine with Antenna 1+ Antenna 2



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5150.0000	48.60	-6.60	55.20	74.00	-18.80	Peak	Vertical
2	5150.0000	37.80	-6.60	44.40	54.00	-9.60	Average	Vertical

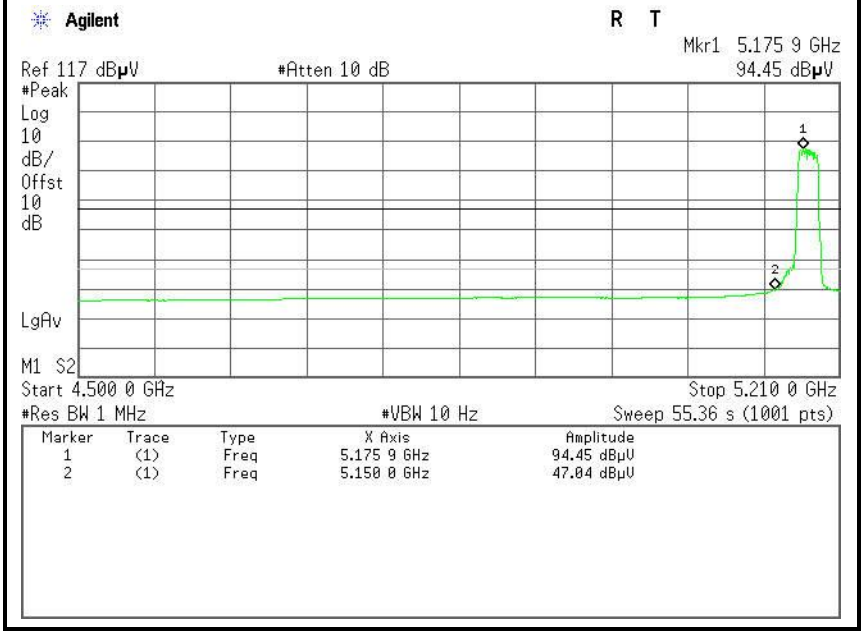
Detector mode: Peak **Polarity: Horizontal**

Combine with Antenna 1+ Antenna 2



Detector mode: Average **Polarity: Horizontal**

Combine with Antenna 1+ Antenna 2

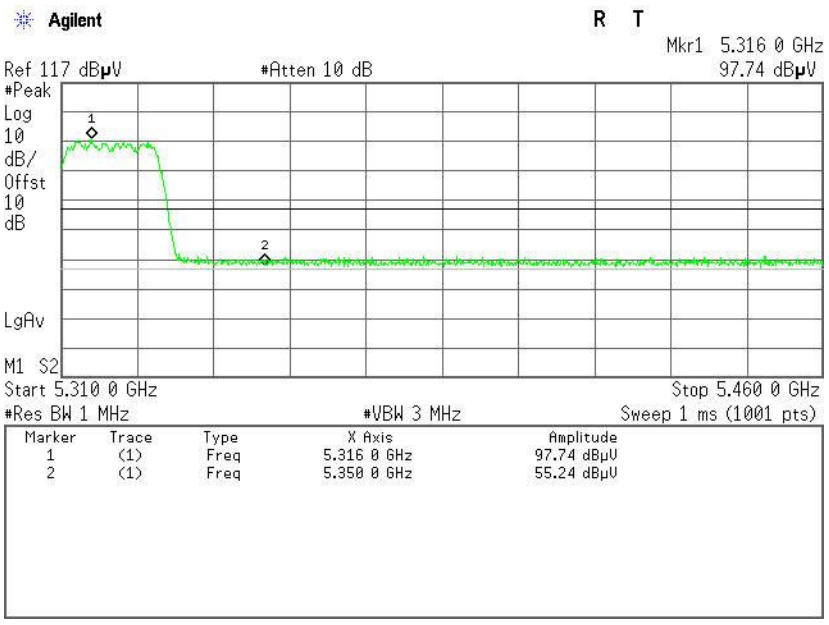


No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5150.0000	51.60	-6.60	58.20	74.00	-15.80	Peak	Horizontal
2	5150.0000	40.44	-6.60	47.04	54.00	-6.96	Average	Horizontal

IEEE 802.11n HT 20 MHz mode / 5320 MHz

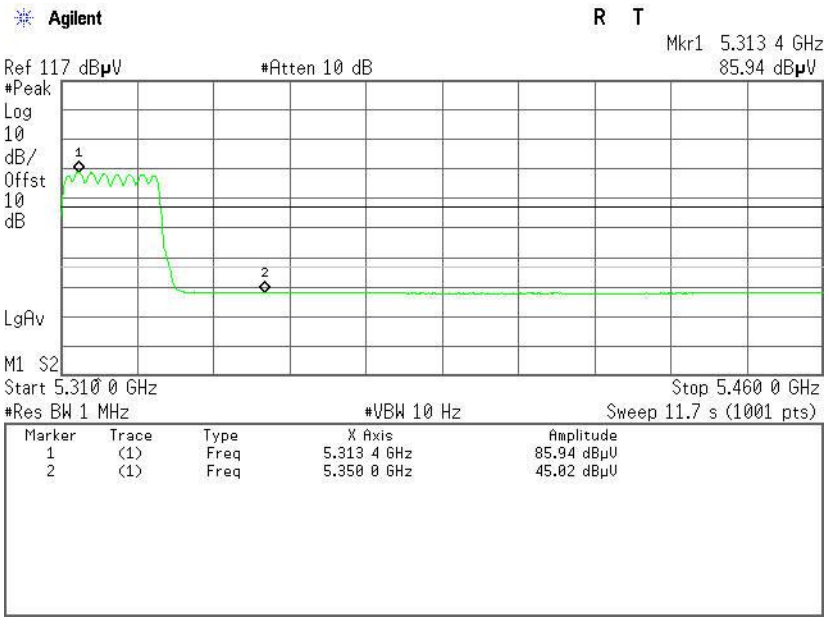
Detector mode: Peak **Polarity: Vertical**

Combine with Antenna 1+ Antenna 2



Detector mode: Average **Polarity: Vertical**

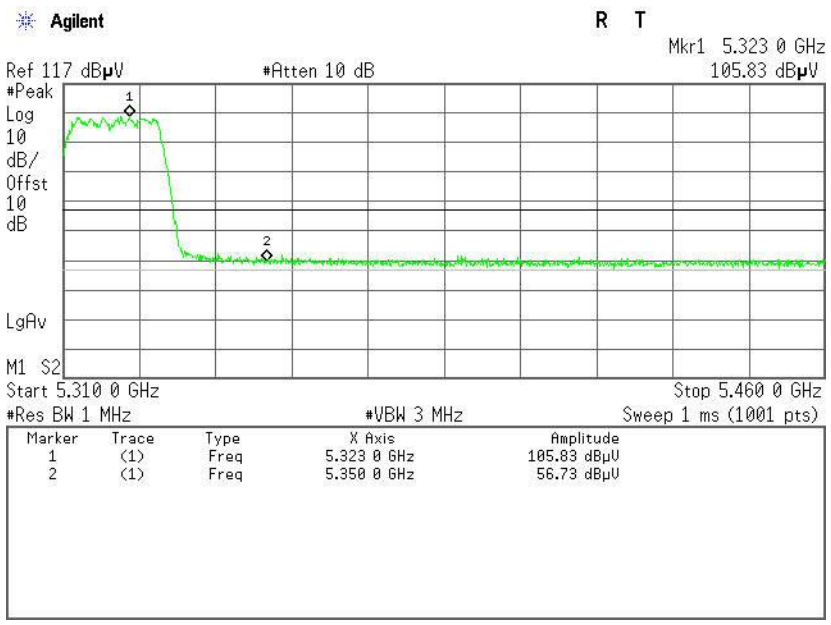
Combine with Antenna 1+ Antenna 2



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5350.0000	48.64	-6.60	55.24	74.00	-18.76	Peak	Vertical
2	5350.0000	38.42	-6.60	45.02	54.00	-8.98	Average	Vertical

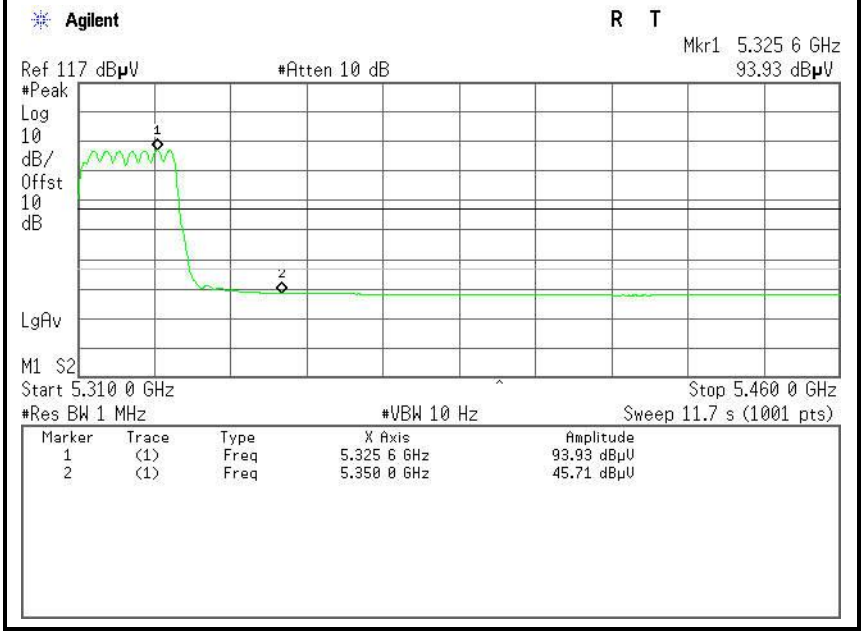
Detector mode: Peak **Polarity: Horizontal**

Combine with Antenna 1+ Antenna 2



Detector mode: Average **Polarity: Horizontal**

Combine with Antenna 1+ Antenna 2

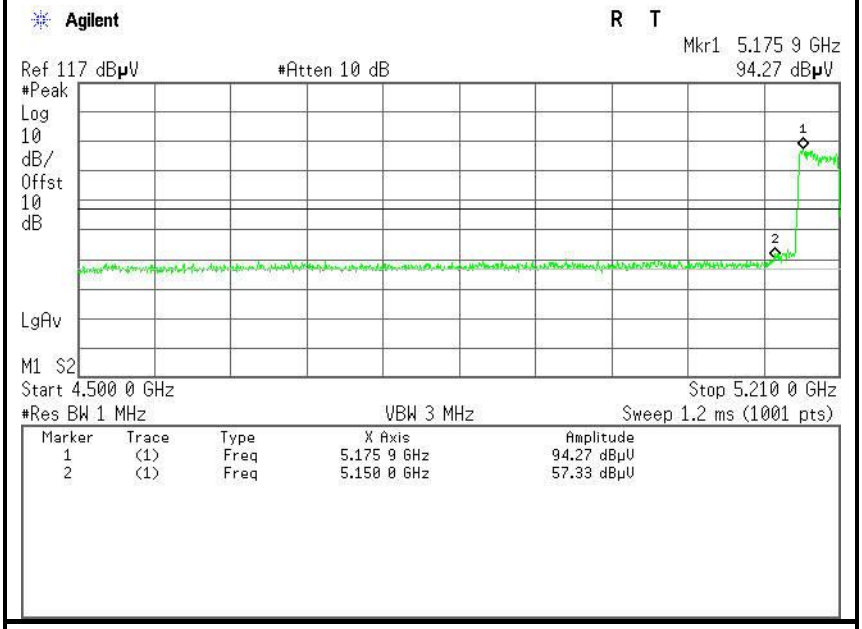


No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5350.0000	50.13	-6.60	56.73	74.00	-17.27	Peak	Horizontal
2	5350.0000	39.11	-6.60	45.71	54.00	-8.29	Average	Horizontal

IEEE 802.11n HT 40 MHz mode / 5190 MHz

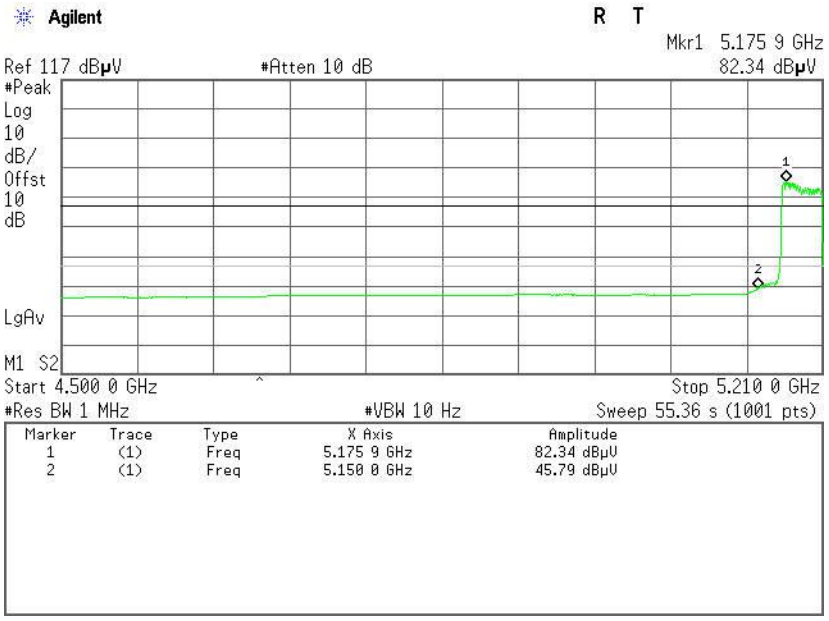
Detector mode: Peak **Polarity: Vertical**

Combine with Antenna 1+ Antenna 2



Detector mode: Average **Polarity: Vertical**

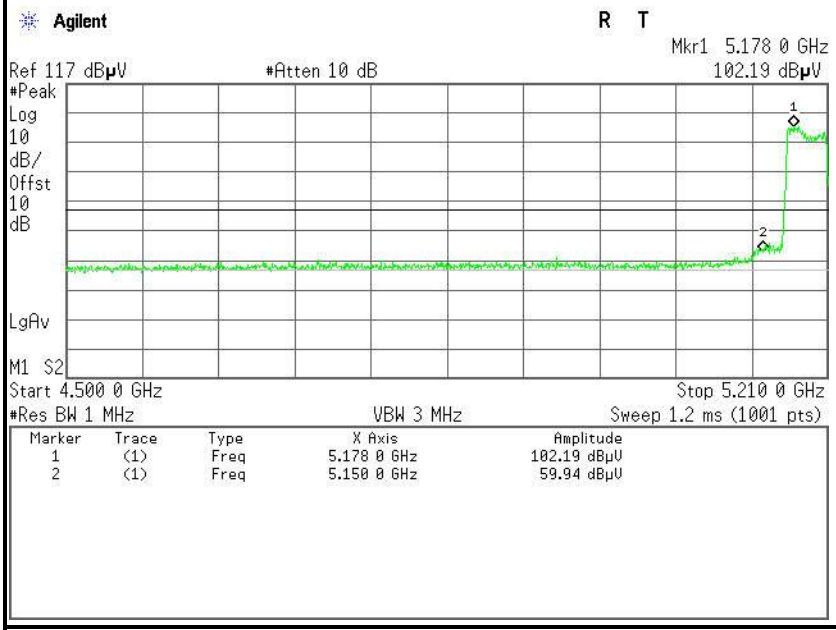
Combine with Antenna 1+ Antenna 2



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5150.0000	50.73	-6.60	57.33	74.00	-16.67	Peak	Vertical
2	5150.0000	39.19	-6.60	45.79	54.00	-8.21	Average	Vertical

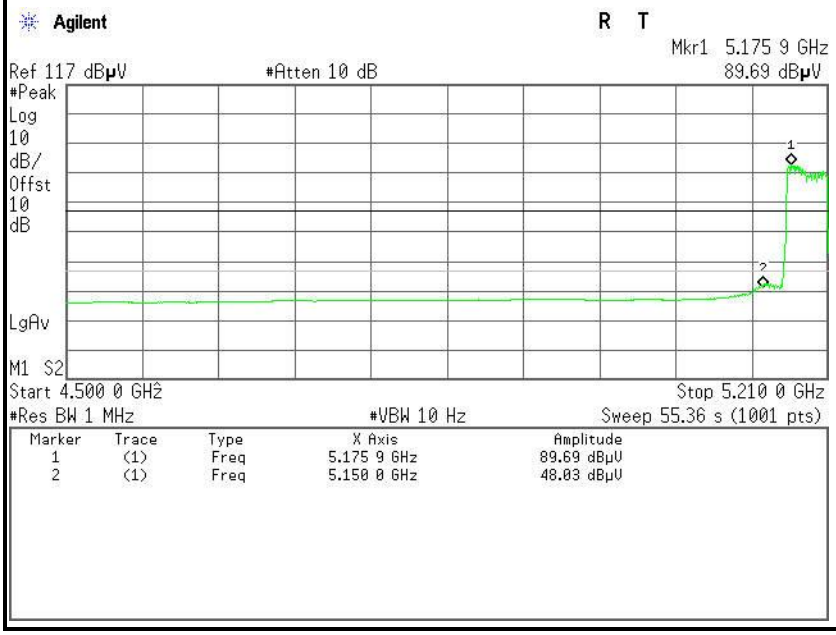
Detector mode: Peak **Polarity: Horizontal**

Combine with Antenna 1+ Antenna 2



Detector mode: Average **Polarity: Horizontal**

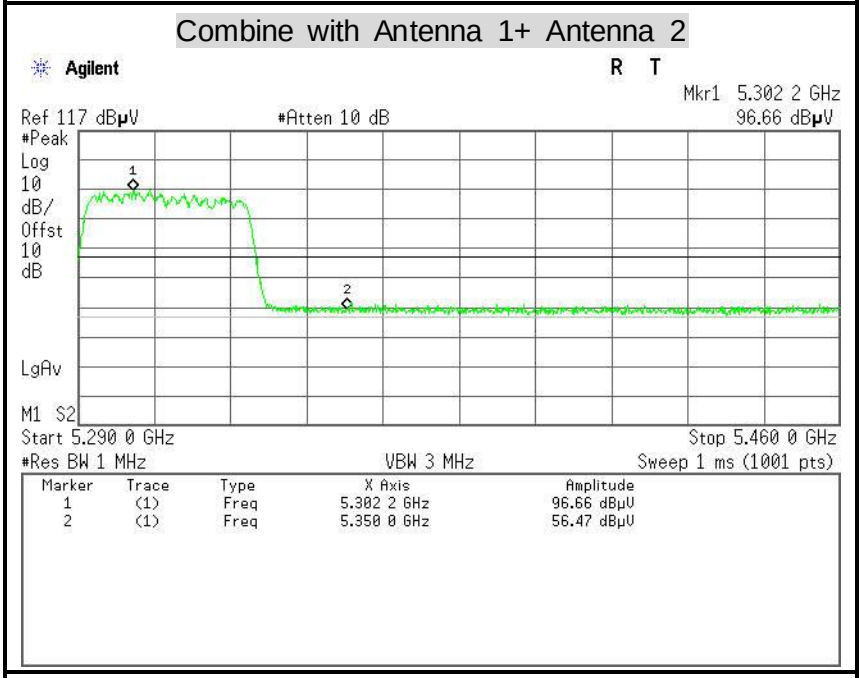
Combine with Antenna 1+ Antenna 2



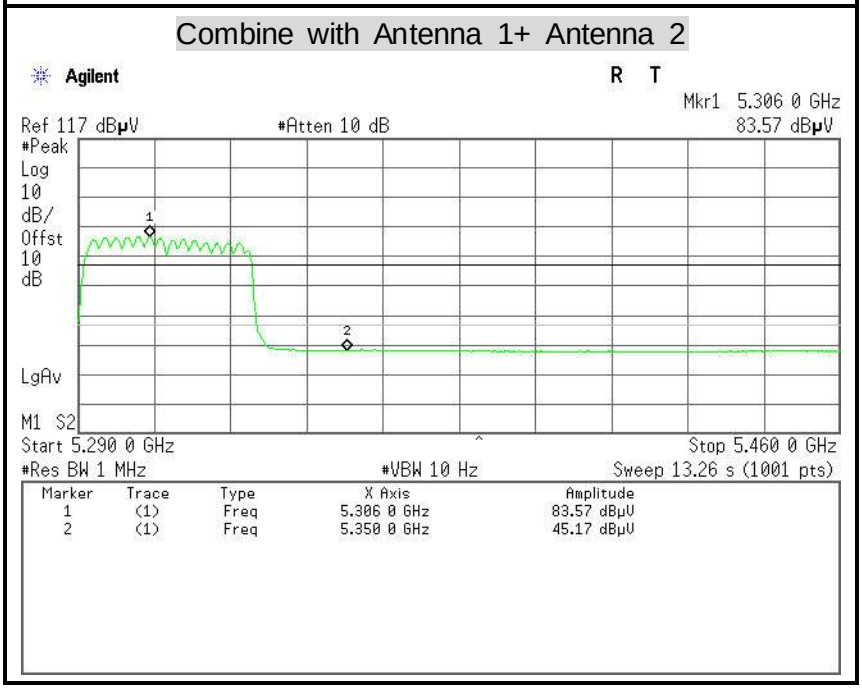
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5150.0000	53.34	-6.60	59.94	74.00	-14.06	Peak	Horizontal
2	5150.0000	41.43	-6.60	48.03	54.00	-5.97	Average	Horizontal

IEEE 802.11n HT 40 MHz mode / 5310 MHz

Detector mode: Peak **Polarity: Vertical**



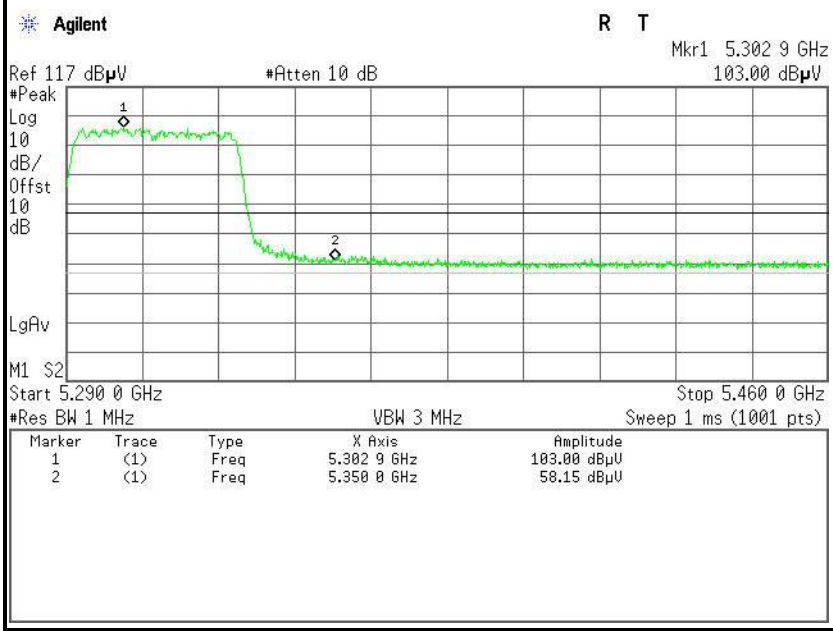
Detector mode: Average **Polarity: Vertical**



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5350.0000	49.87	-6.60	56.47	74.00	-17.53	Peak	Vertical
2	5350.0000	38.57	-6.60	45.17	54.00	-8.83	Average	Vertical

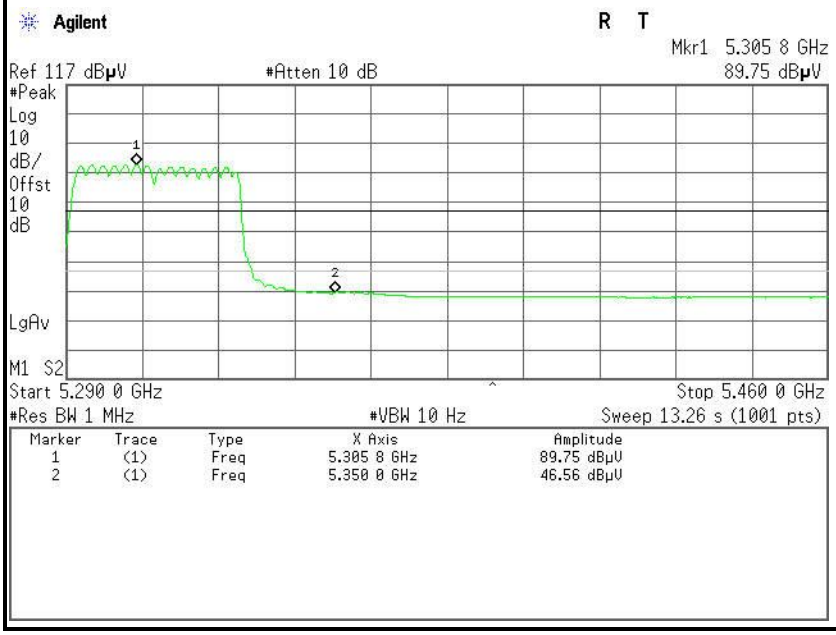
Detector mode: Peak **Polarity: Horizontal**

Combine with Antenna 1+ Antenna 2



Detector mode: Average **Polarity: Horizontal**

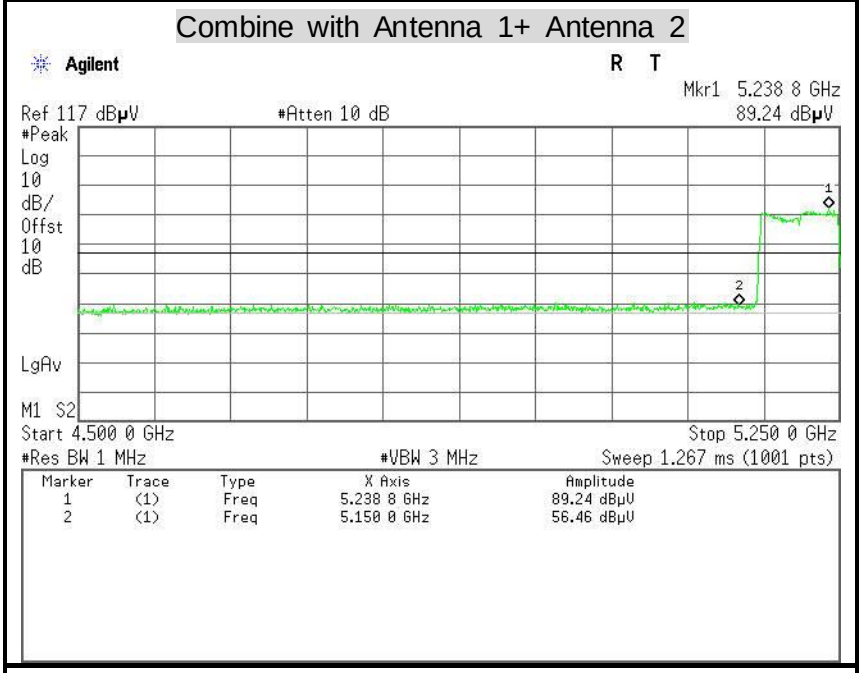
Combine with Antenna 1+ Antenna 2



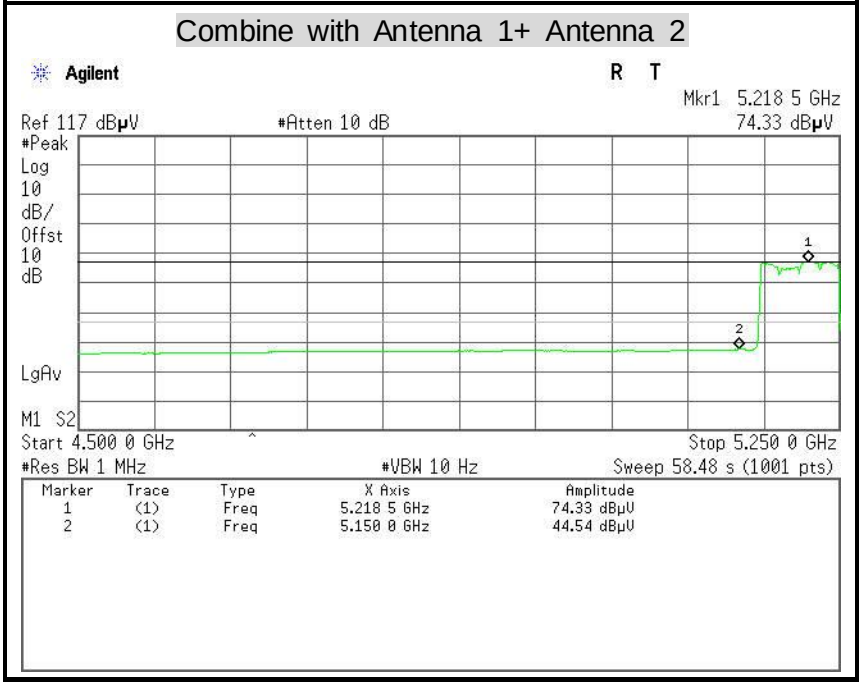
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5350.0000	51.55	-6.60	58.15	74.00	-15.85	Peak	Horizontal
2	5350.0000	39.96	-6.60	46.56	54.00	-7.44	Average	Horizontal

IEEE 802.11ac 80 mode / 5210 MHz

Detector mode: Peak **Polarity: Vertical**



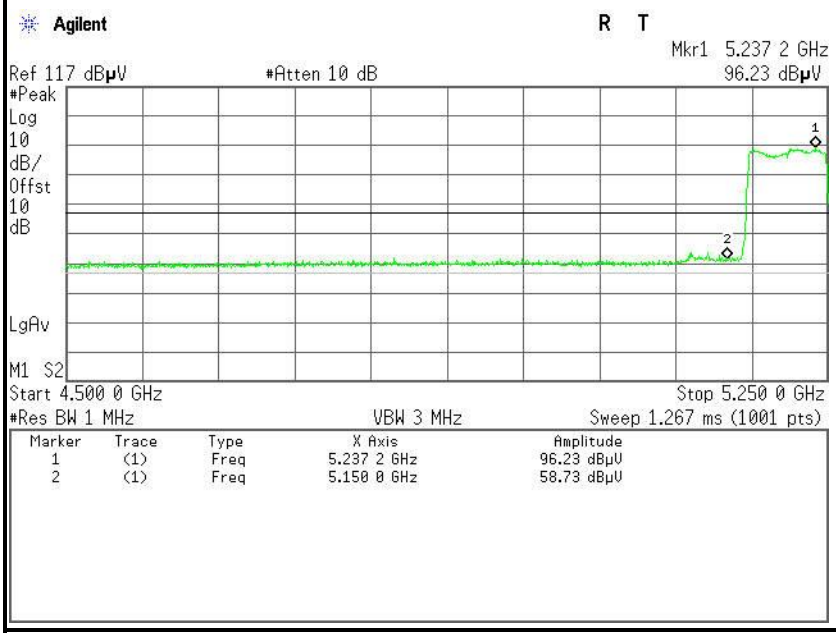
Detector mode: Average **Polarity: Vertical**



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5150.0000	49.86	-6.60	56.46	74.00	-17.54	Peak	Vertical
2	5150.0000	37.94	-6.60	44.54	54.00	-9.46	Average	Vertical

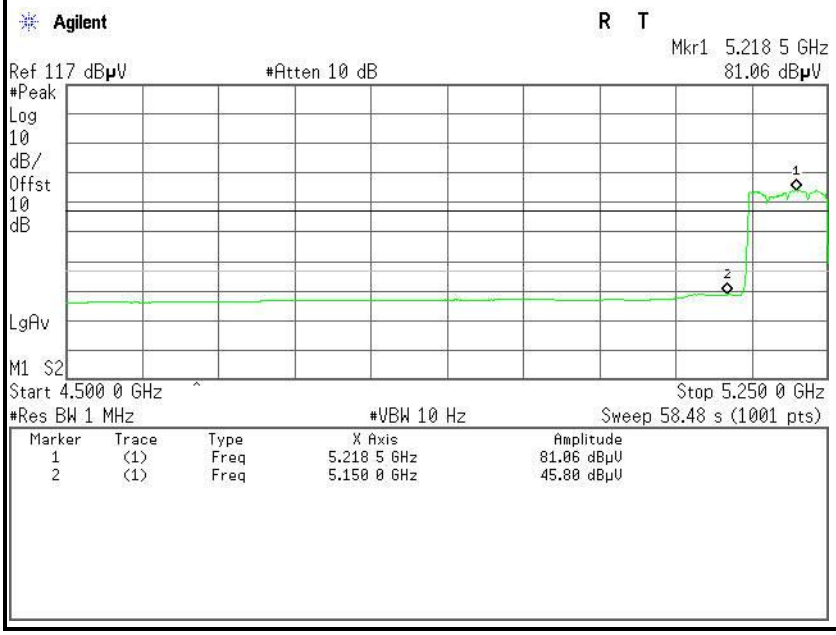
Detector mode: Peak **Polarity: Horizontal**

Combine with Antenna 1+ Antenna 2



Detector mode: Average **Polarity: Horizontal**

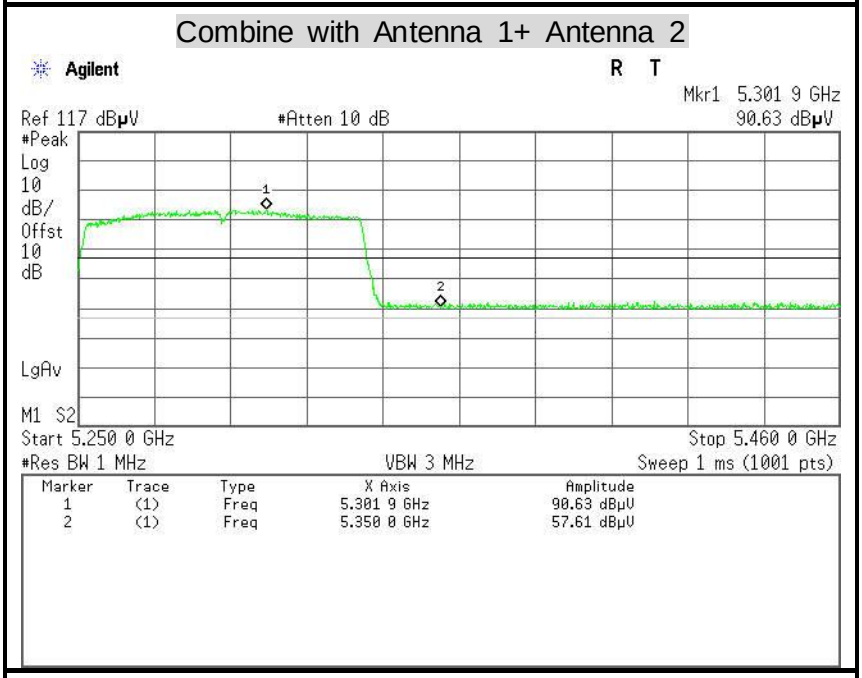
Combine with Antenna 1+ Antenna 2



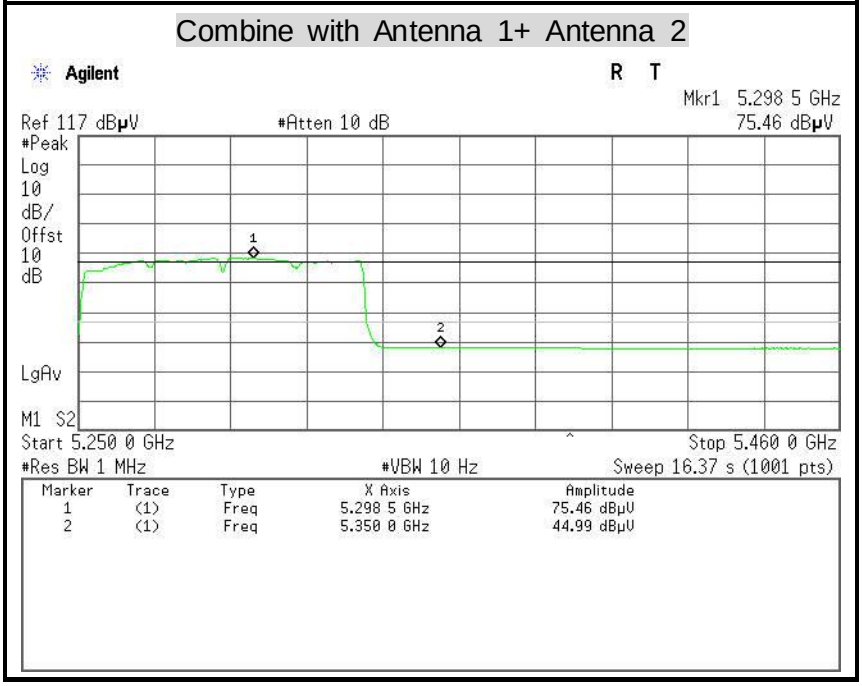
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5150.0000	52.13	-6.60	58.73	74.00	-15.27	Peak	Horizontal
2	5150.0000	39.20	-6.60	45.80	54.00	-8.20	Average	Horizontal

IEEE 802.11ac 80 mode / 5290 MHz

Detector mode: Peak **Polarity: Vertical**



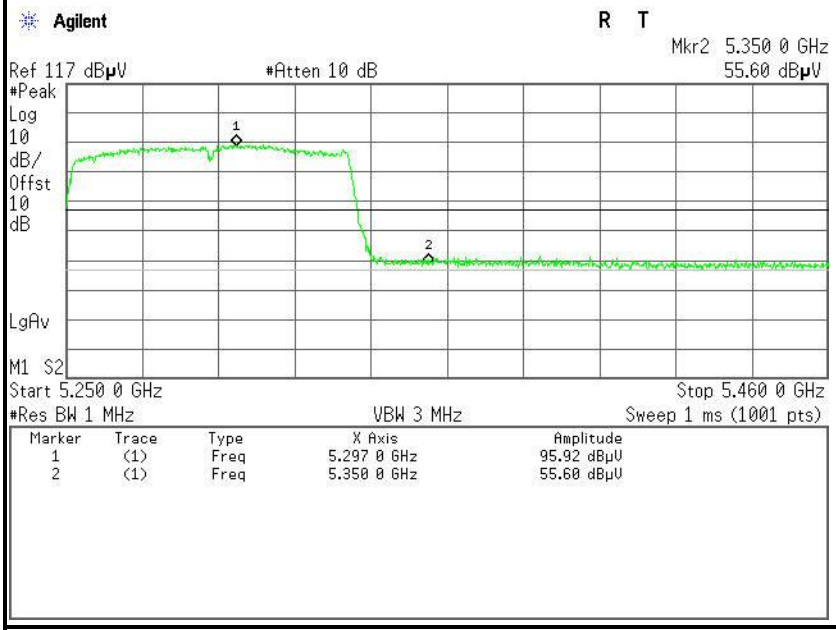
Detector mode: Average **Polarity: Vertical**



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5350.0000	51.01	-6.60	57.61	74.00	-16.39	Peak	Vertical
2	5350.0000	38.39	-6.60	44.99	54.00	-9.01	Average	Vertical

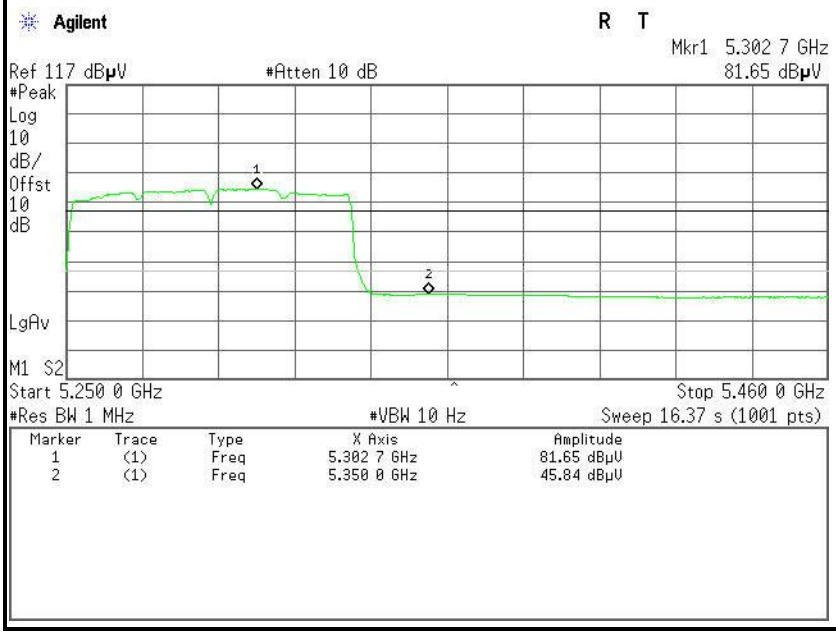
Detector mode: Peak **Polarity: Horizontal**

Combine with Antenna 1+ Antenna 2



Detector mode: Average **Polarity: Horizontal**

Combine with Antenna 1+ Antenna 2



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5350.0000	49.00	-6.60	55.60	74.00	-18.40	Peak	Horizontal
2	5350.0000	39.24	-6.60	45.84	54.00	-8.16	Average	Horizontal

6.5 PEAK POWER SPECTAL DENSITY

6.5.1 LIMIT

According to §15.407(a) & FCC R&O FCC 14-30

(1) (i) For an outdoor access point operating in the band 5.15 – 5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15 – 5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30dBm in any 500 kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

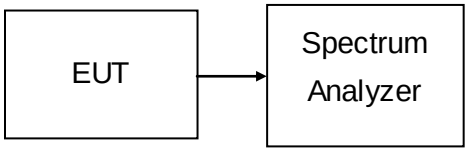
If transmitting antennas of directional gain greater than 6dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

6.5.2 MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Due Calibration
Spectrum Analyzer	Agilent	E4446A	US44300399	02/21/2016	02/20/2017

Remark: *Each piece of equipment is scheduled for calibration once a year.*

6.5.3 TEST CONFIGURATION



6.5.4 TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
   Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. For devices operating in the bands 5.15-5.25 GHz,Set the spectrum analyzer as RBW = 1MHz, VBW = 3MHz, Span = 30MHz, Sweep=1.2ms
3. For devices operating in the bands 5.725-5.85 GHz,Set the spectrum analyzer as RBW = 500kHz, VBW = 1.5MHz, Span = 30MHz, Sweep=1.2ms
4. Record the max. reading.
5. Repeat the above procedure until the measurements for all frequencies are completed

6.5.5 TEST RESULTS

Test Data

IEEE 802.11a mode / 5180 ~ 5240MHz

Channel	Frequency (MHz)	PPSD (dBm)		Limit (dBm)	Margain		Result
		Antenna 1	Antenna 2		Antenna 1	Antenna 2	
Low	5180	-2.475	-2.845	17	-19.475	-19.845	PASS
Mid	5200	-0.687	-4.226		-17.687	-21.226	PASS
High	5240	-5.466	-2.340		-22.466	-19.340	PASS

IEEE 802.11a mode / 5260~ 5320MHz

Channel	Frequency (MHz)	PPSD (dBm)		Limit (dBm)	Margain		Result
		Antenna 1	Antenna 2		Antenna 1	Antenna 2	
Low	5260	-2.255	-3.479	11	-13.255	-14.479	PASS
Mid	5300	-3.599	-2.958		-14.599	-13.958	PASS
High	5320	-2.592	-3.628		-13.592	-14.628	PASS

IEEE 802.11a mode / 5745 ~ 5825MHz

Channel	Frequency (MHz)	PPSD (dBm)		factor	Limit (dBm)	Margain		Result
		Antenna 1	Antenna 2			Antenna 1	Antenna 2	
Low	5745	-1.941	-1.709	-3.01	17	-21.951	-21.719	PASS
Mid	5785	-2.380	-2.582	-3.01		-22.390	-22.592	PASS
High	5825	-2.464	-3.355	-3.01		-22.474	-20.355	PASS

Remark: factor =10*log10(500/RBW)

Test mode: IEEE 802.11n HT 20 MHz mode / 5180 ~ 5240MHz

Channel	Frequency (MHz)	PPSD (dBm)		Limit (dBm)	Margain		Result
		Antenna 1	Antenna 2		Antenna 1	Antenna 2	
Low	5180	-2.143	-4.115	17	-19.143	-21.115	PASS
Mid	5200	-3.037	-4.786		-20.037	-21.786	PASS
High	5240	-3.375	-4.836		-20.375	-21.836	PASS

IEEE 802.11n HT 20 MHz mode / 5260~ 5320MHz

Channel	Frequency (MHz)	PPSD (dBm)		Limit (dBm)	Margain		Result
		Antenna 1	Antenna 2		Antenna 1	Antenna 2	
Low	5260	-3.081	-3.742	11	-14.081	-14.742	PASS
Mid	5300	-3.597	-5.745		-14.597	-16.745	PASS
High	5320	-3.634	-5.390		-14.634	-16.390	PASS

Test mode: IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz

Channel	Frequency (MHz)	PPSD (dBm)		factor	Total (dBm)	Limit (dBm)	Margain	Result
		Antenna 1	Antenna 2					
Low	5745	-2.313	-2.007	-3.01	-2.157	30	-32.157	PASS
Mid	5785	-1.943	-2.528	-3.01	-2.225		-32.225	PASS
High	5825	-2.401	-3.090	-3.01	-2.732		-32.732	PASS

Remark: factor =10*log10(500/RBW)

IEEE 802.11n HT 40 MHz mode / 5190 ~ 5230MHz

Channel	Frequency (MHz)	PPSD (dBm)		Total (dBm)	Limit (dBm)	Margain	Result
		Antenna 1	Antenna 2				
Low	5190	-4.533	-4.064	-1.282	17	-18.282	PASS
High	5230	-6.047	-6.055	-3.041		-20.041	PASS

IEEE 802.11n HT 40 MHz mode / 5270 ~ 5310MHz

Channel	Frequency (MHz)	PPSD (dBm)		Total (dBm)	Limit (dBm)	Margain	Result
		Antenna 1	Antenna 2				
Low	5270	-5.807	-6.338	-3.054	11	-14.054	PASS
High	5310	-7.223	-7.281	-4.242		-15.242	PASS

IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz

Channel	Frequency (MHz)	PPSD (dBm)		factor	Total (dBm)	Limit (dBm)	Margain	Result
		Antenna 1	Antenna 2					
Low	5755	-4.894	-7.568	-3.01	-6.028	17	-23.028	PASS
High	5795	-5.337	-9.173	-3.01	-6.844		-23.844	PASS

Remark: factor =10*log10(500/RBW)

IEEE 802.11ac 80 mode / 5210MHz

Channel	Frequency (MHz)	PPSD (dBm)		Total (dBm)	Limit (dBm)	Margain	Result
		Antenna 1	Antenna 2				
	5210	-8.865	-10.198	-6.470	17	-23.470	PASS

IEEE 802.11ac 80 mode / 5290MHz

Channel	Frequency (MHz)	PPSD (dBm)		Total (dBm)	Limit (dBm)	Margain	Result
		Antenna 1	Antenna 2				
	5290	-12.958	-13.563	-10.240	11	-21.240	PASS

IEEE 802.11ac 80 mode / 5775MHz

Channel	Frequency (MHz)	PPSD (dBm)		factor	Total (dBm)	Limit (dBm)	Margain	Result
		Antenna 1	Antenna 2					
	5775	-12.281	-12.279	-3.01	-12.280	17	-29.280	PASS

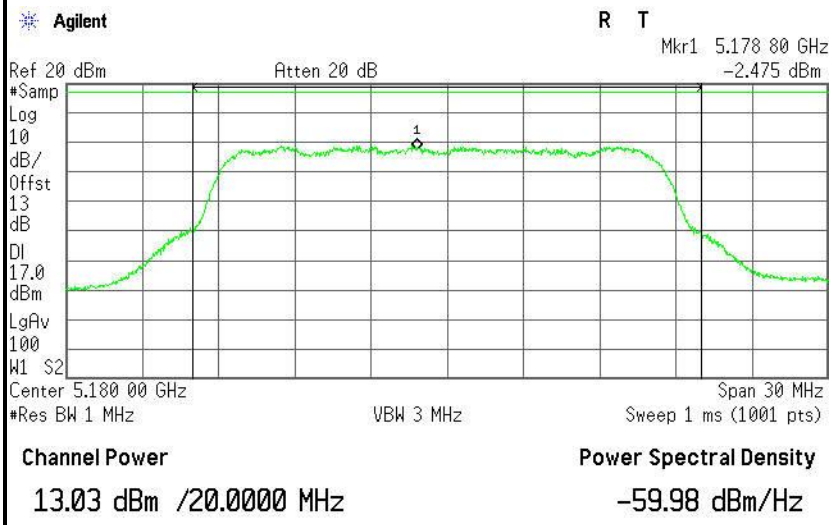
Remark: factor =10*log10(500/RBW)

Test Plot

IEEE 802.11a mode / 5180 ~ 5240MHz

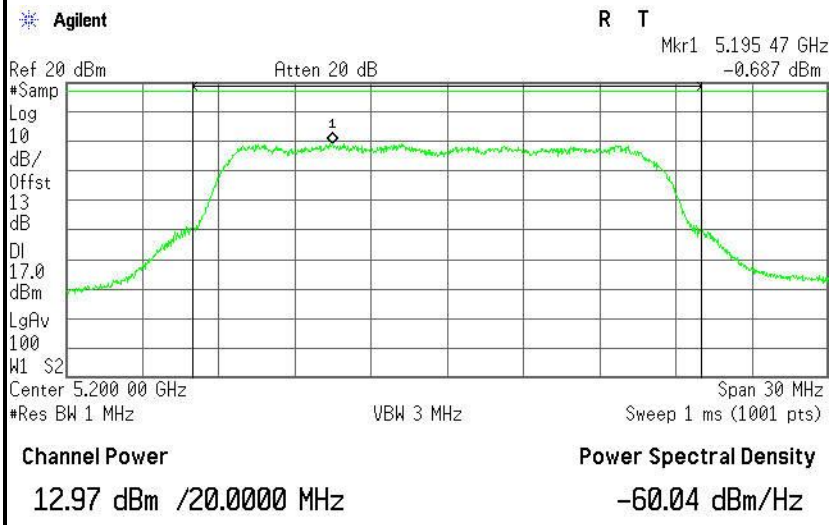
PPSD (CH Low)

Antenna 1



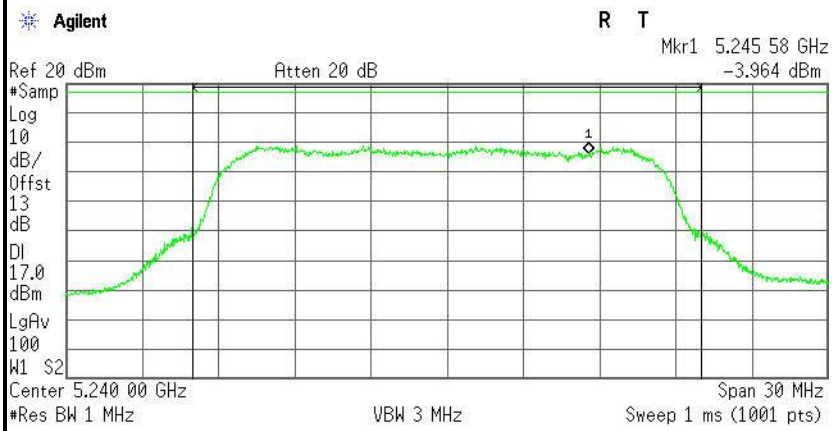
PPSD (CH Mid)

Antenna 1



PPSD (CH High)

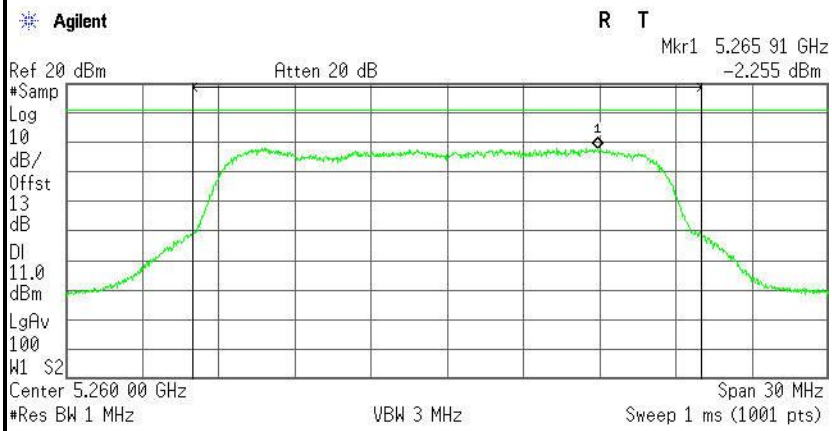
Antenna 1



IEEE 802.11a mode / 5260~ 5320MHz

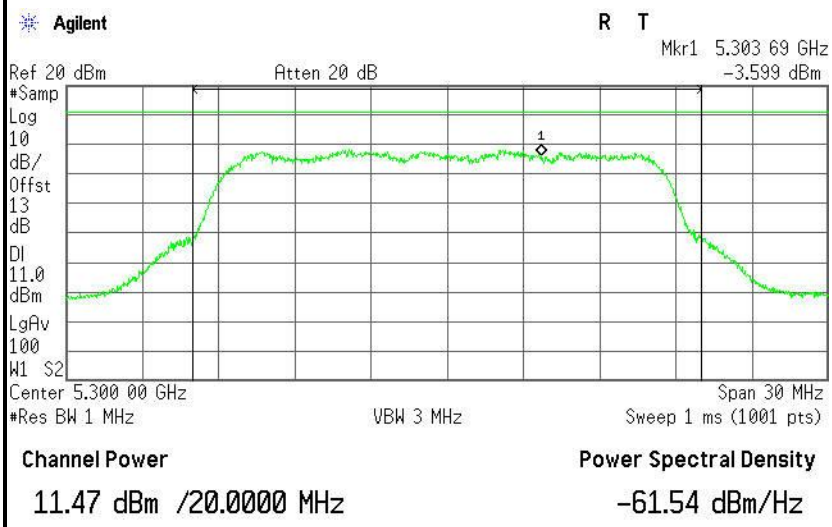
PPSD (CH Low)

Antenna 1



PPSD (CH Mid)

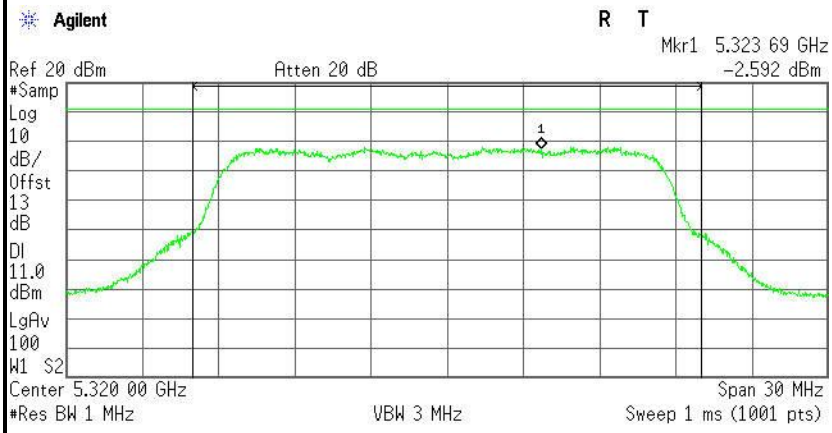
Antenna 1



Channel Power	Power Spectral Density
11.47 dBm /20.0000 MHz	-61.54 dBm/Hz

PPSD (CH High)

Antenna 1

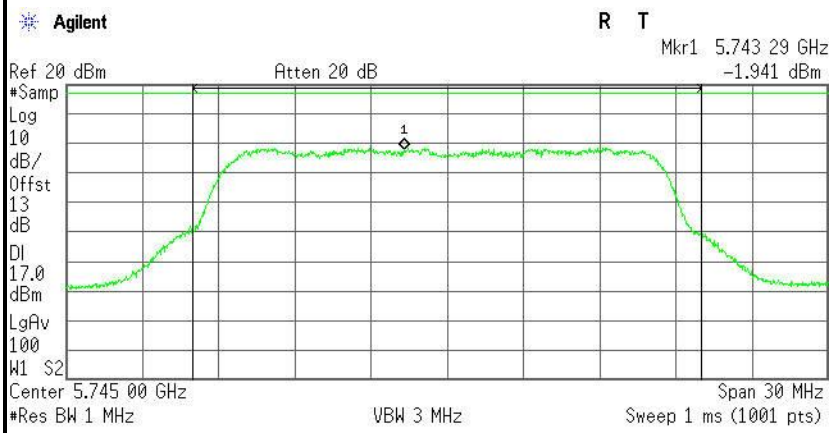


Channel Power	Power Spectral Density
11.53 dBm /20.0000 MHz	-61.48 dBm/Hz

IEEE 802.11a mode / 5745 ~ 5825MHz

PPSD (CH Low)

Antenna 1



Channel Power

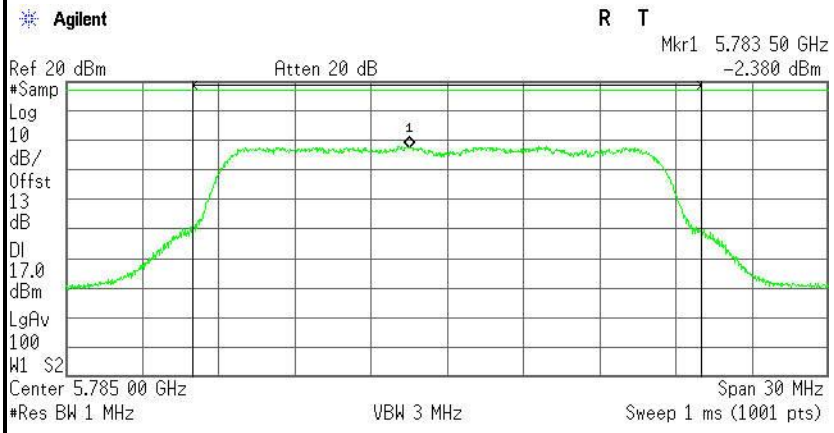
12.76 dBm /20.0000 MHz

Power Spectral Density

-60.25 dBm/Hz

PPSD (CH Mid)

Antenna 1



Channel Power

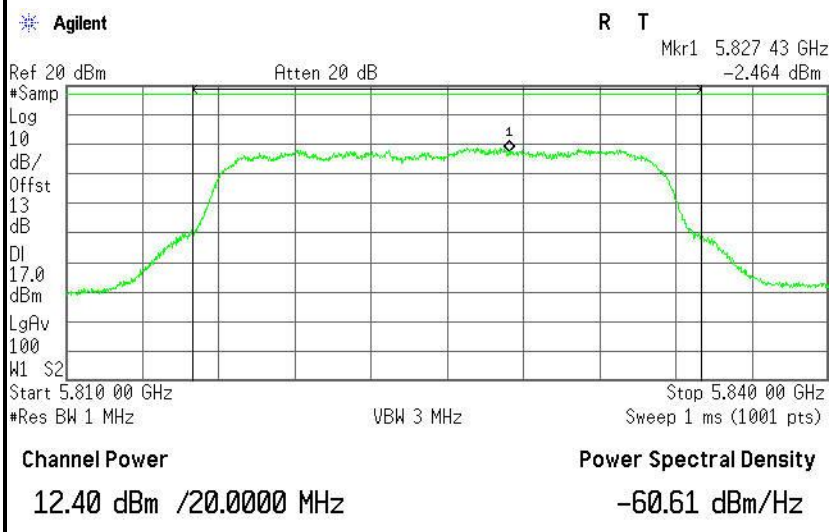
12.23 dBm /20.0000 MHz

Power Spectral Density

-60.78 dBm/Hz

PPSD (CH High)

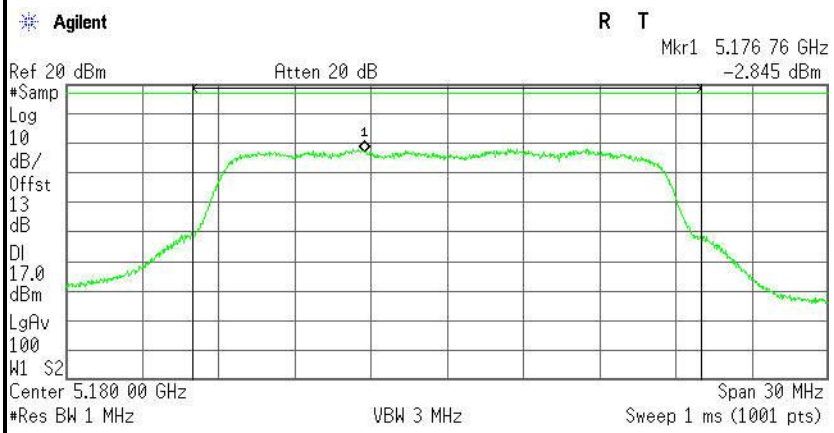
Antenna 1



IEEE 802.11a mode / 5180 ~ 5240MHz

PPSD (CH Low)

Antenna 2



Channel Power

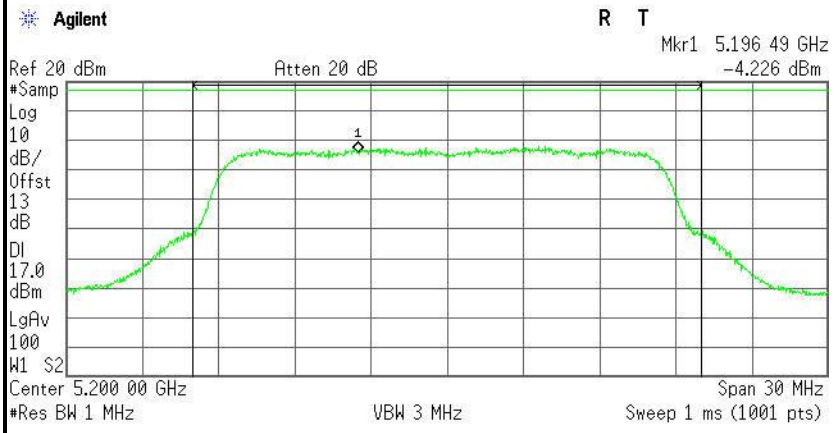
11.78 dBm /20.0000 MHz

Power Spectral Density

-61.24 dBm/Hz

PPSD (CH Mid)

Antenna 2



Channel Power

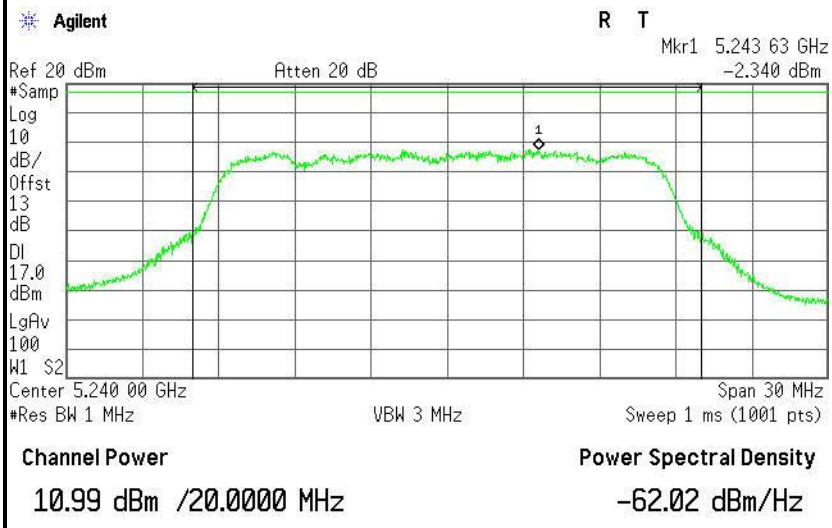
11.96 dBm /20.0000 MHz

Power Spectral Density

-61.05 dBm/Hz

PPSD (CH High)

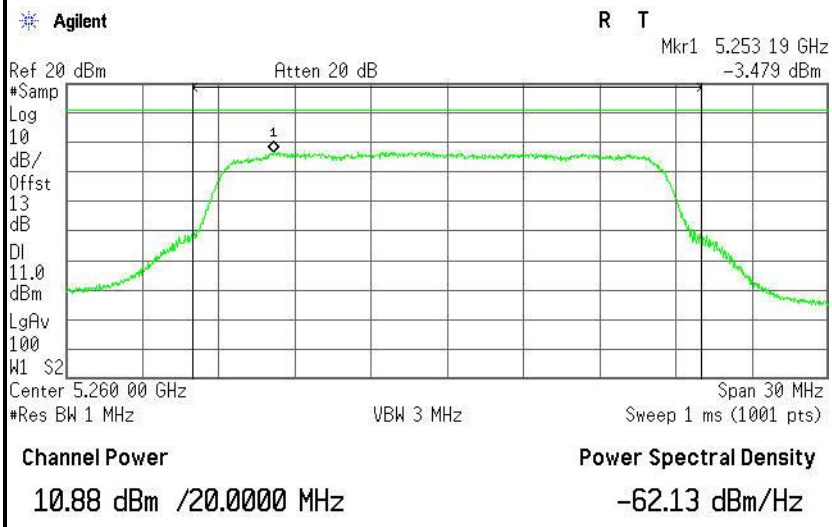
Antenna 2



IEEE 802.11a mode / 5260~ 5320MHz

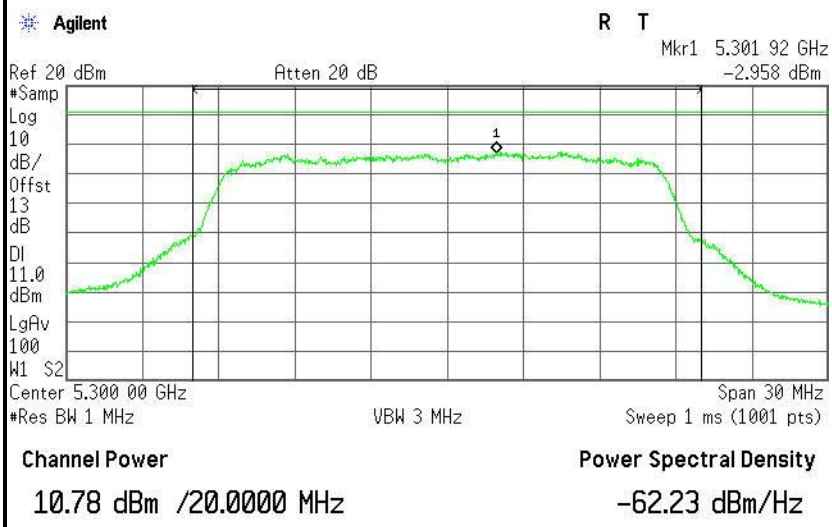
PPSD (CH Low)

Antenna 2



PPSD (CH Mid)

Antenna 2



Channel Power

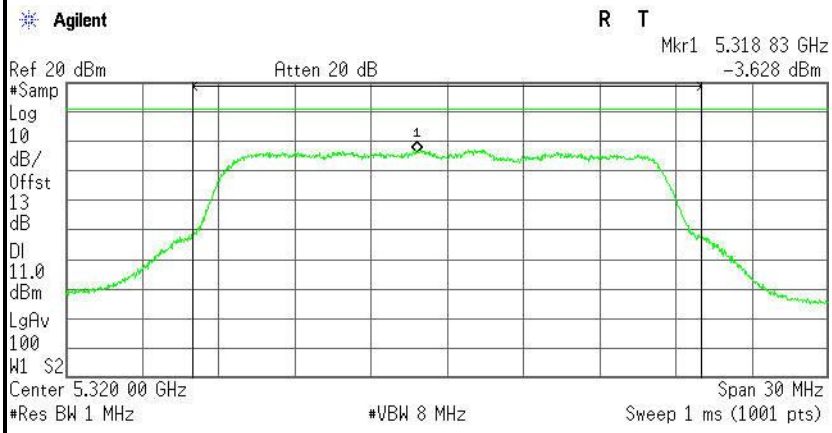
10.78 dBm /20.0000 MHz

Power Spectral Density

-62.23 dBm/Hz

PPSD (CH High)

Antenna 2



Channel Power

10.71 dBm /20.0000 MHz

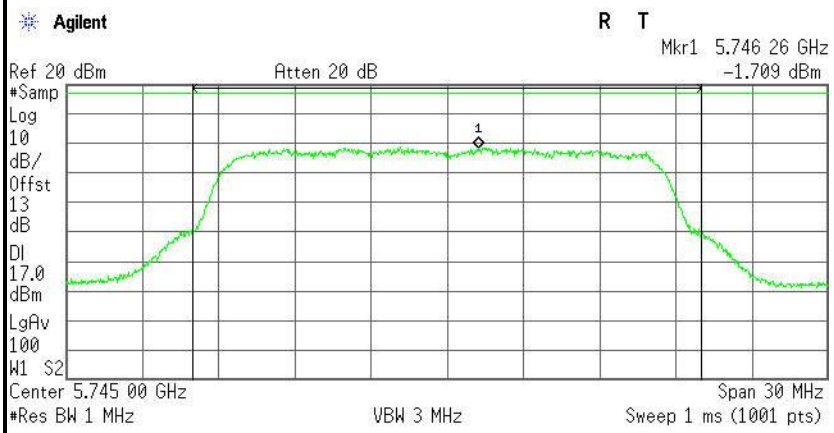
Power Spectral Density

-62.30 dBm/Hz

IEEE 802.11a mode / 5745 ~ 5825MHz

PPSD (CH Low)

Antenna 2



Channel Power

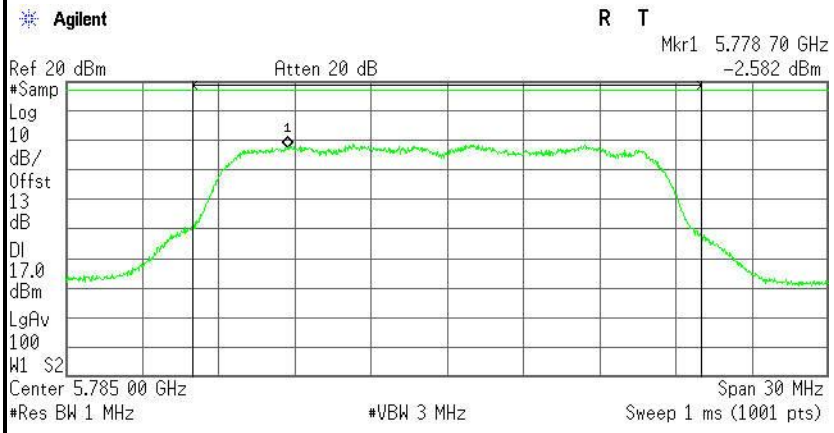
12.45 dBm /20.0000 MHz

Power Spectral Density

-60.56 dBm/Hz

PPSD (CH Mid)

Antenna 2



Channel Power

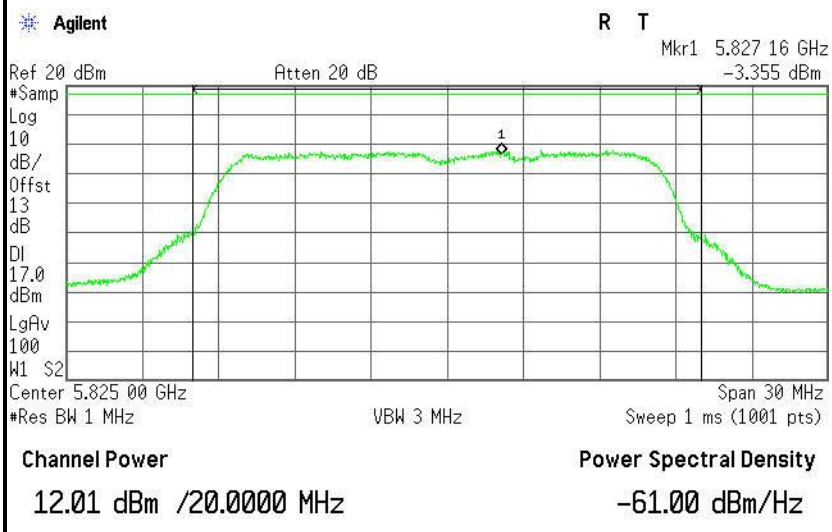
11.88 dBm /20.0000 MHz

Power Spectral Density

-61.13 dBm/Hz

PPSD (CH High)

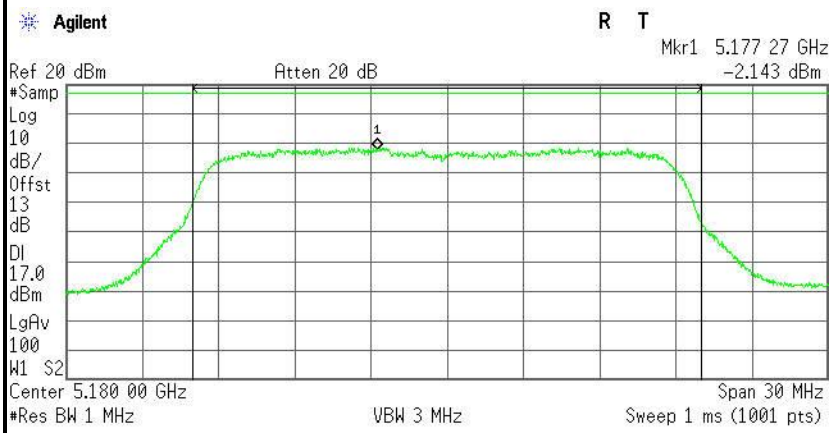
Antenna 2



IEEE 802.11n HT 20 MHz mode / 5180 ~ 5240MHz

PPSD (CH Low)

Antenna 1



Channel Power

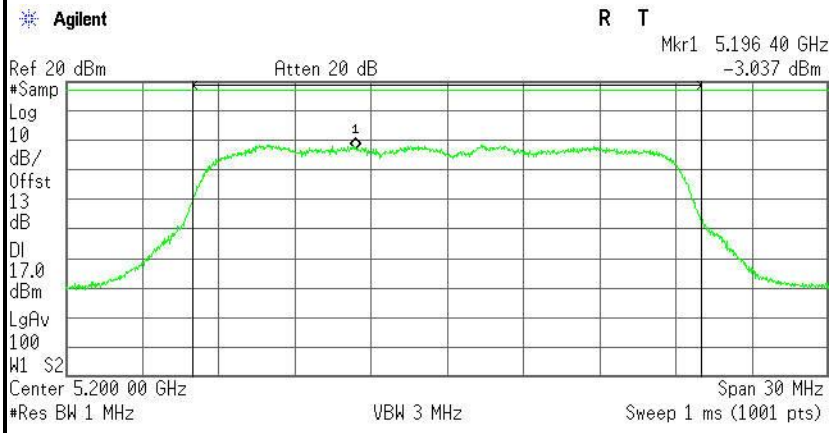
12.92 dBm /20.0000 MHz

Power Spectral Density

-60.09 dBm/Hz

PPSD (CH Mid)

Antenna 1



Channel Power

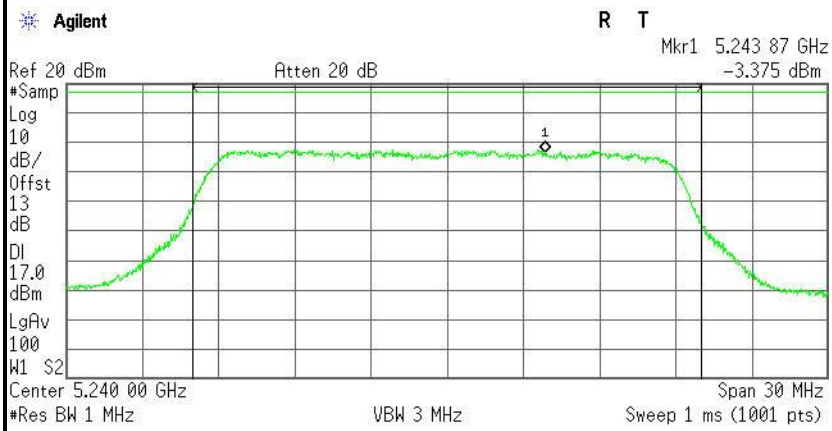
12.09 dBm /20.0000 MHz

Power Spectral Density

-60.92 dBm/Hz

PPSD (CH High)

Antenna 1

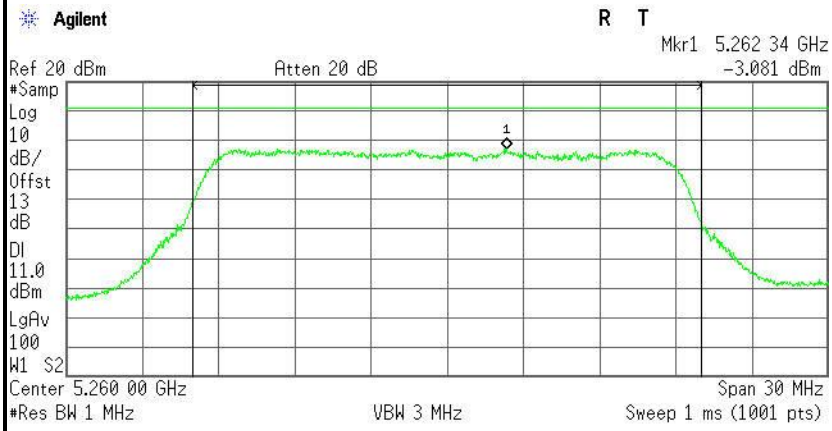


Channel Power	Power Spectral Density
12.02 dBm /20.0000 MHz	-60.99 dBm/Hz

IEEE 802.11n HT 20 MHz mode / 5260~ 5320MHz

PPSD (CH Low)

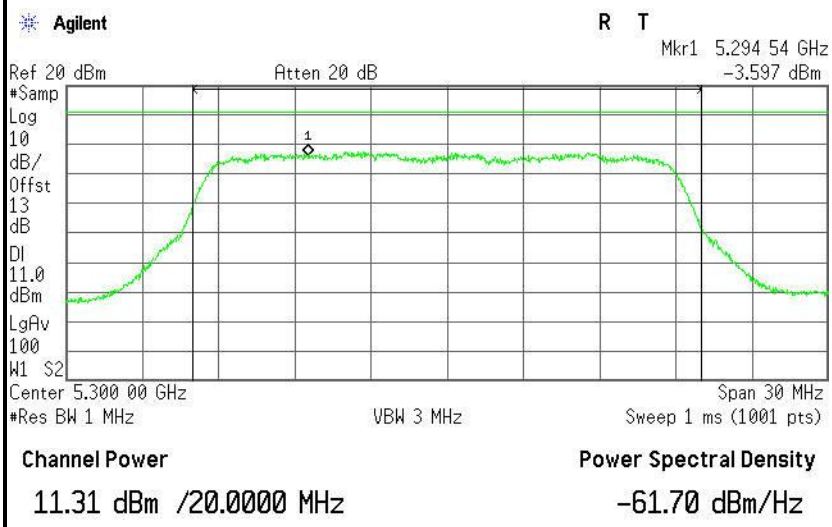
Antenna 1



Channel Power	Power Spectral Density
11.29 dBm /20.0000 MHz	-61.72 dBm/Hz

PPSD (CH Mid)

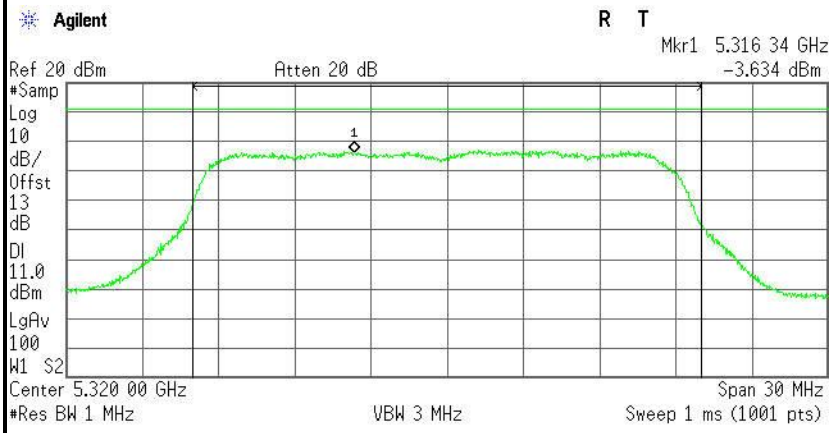
Antenna 1



Channel Power	Power Spectral Density
11.31 dBm /20.0000 MHz	-61.70 dBm/Hz

PPSD (CH High)

Antenna 1



Channel Power	Power Spectral Density
11.59 dBm /20.0000 MHz	-61.42 dBm/Hz