



6.4.5 TEST 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:

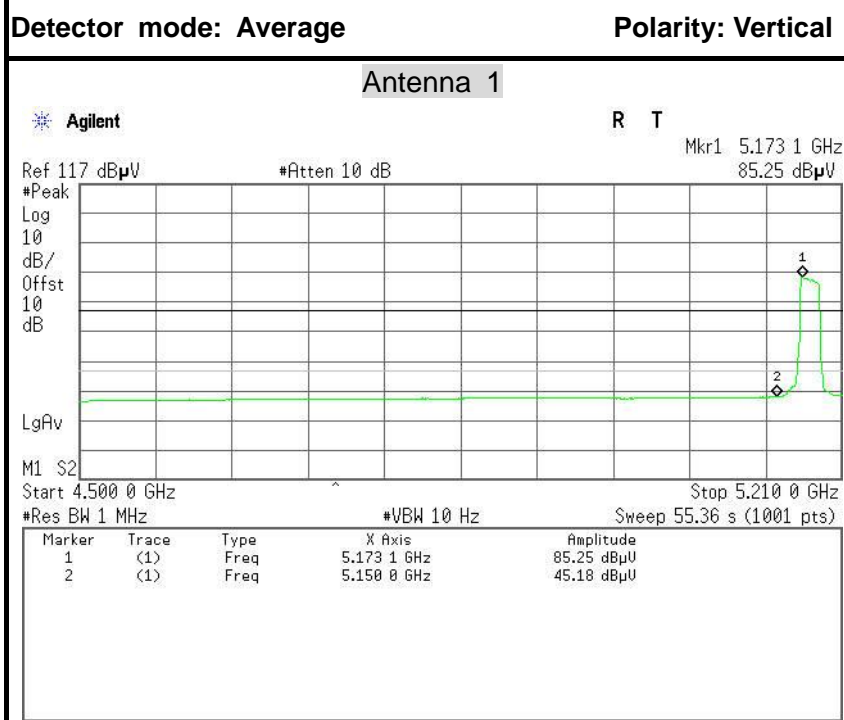
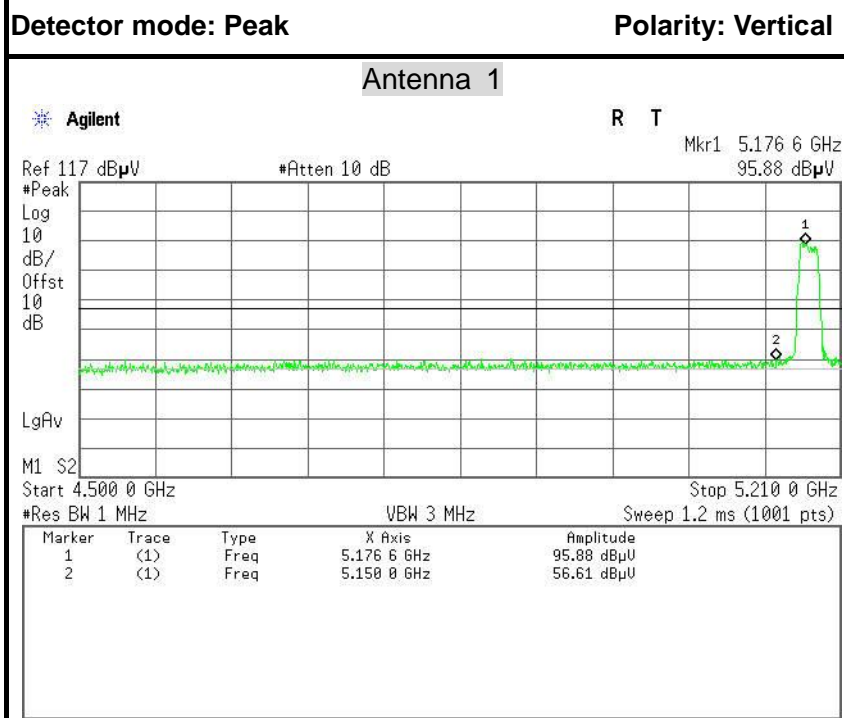
1. Operating Frequency: 5775MHz
2. CH: 5775MHz
3. 26dB bandwidth: CH: 80.716MHz
4. Frequency Range: 5734.6420MHz, 5815.3850MHz

Because the mentioned conditions, the test is not applicable.

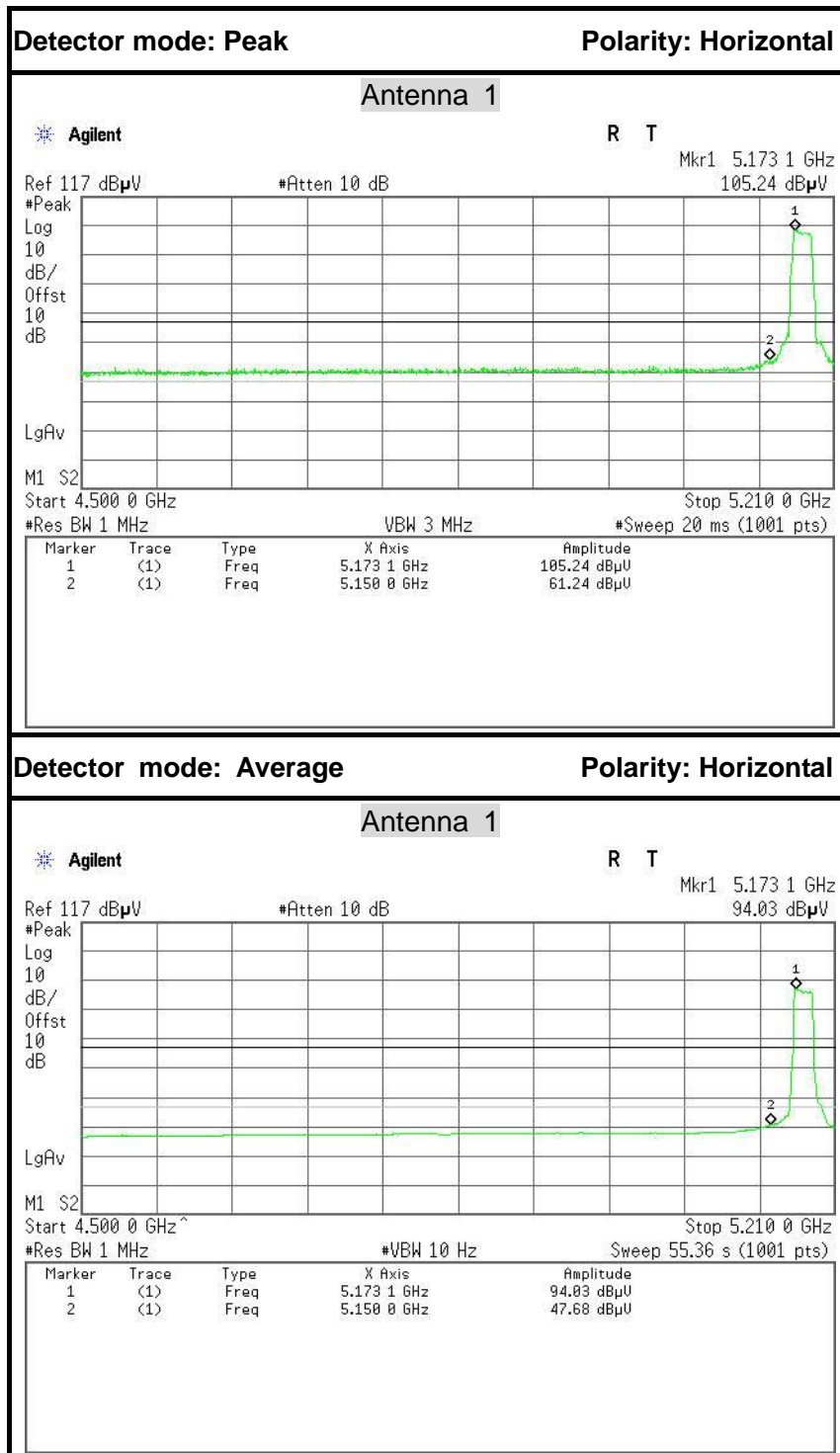


Test Plot

IEEE 802.11a mode / 5180MHz



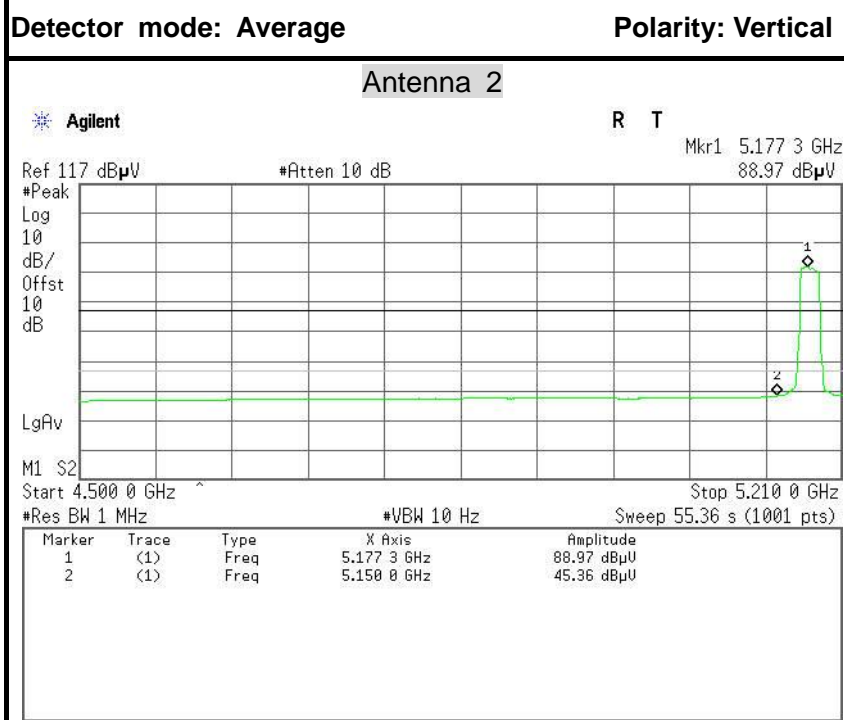
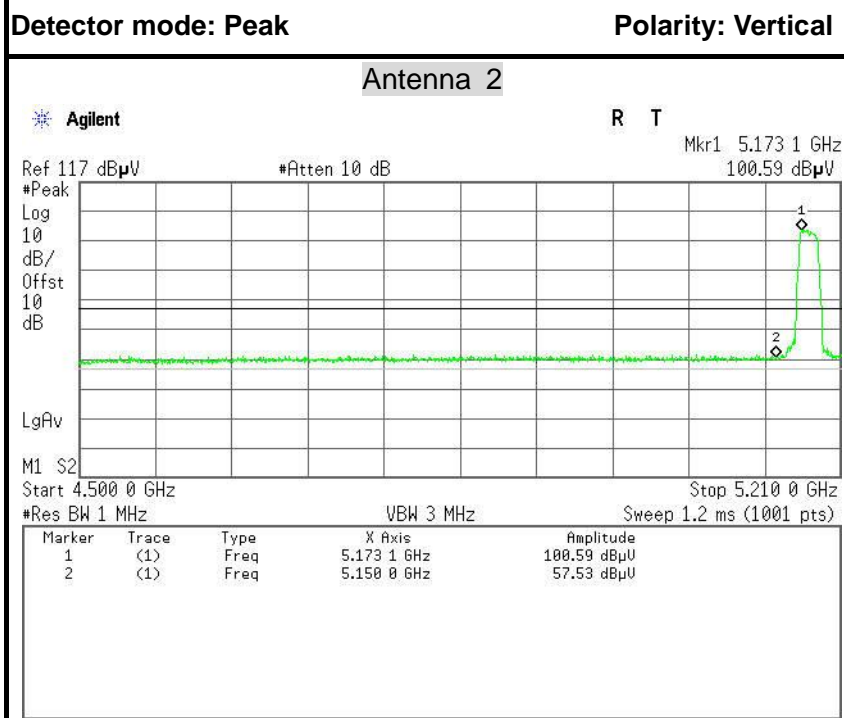
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5150.0000	50.01	-6.60	56.61	74.00	-17.39	Peak	Vertical
2	5150.0000	38.58	-6.60	45.18	54.00	-8.82	Average	Vertical



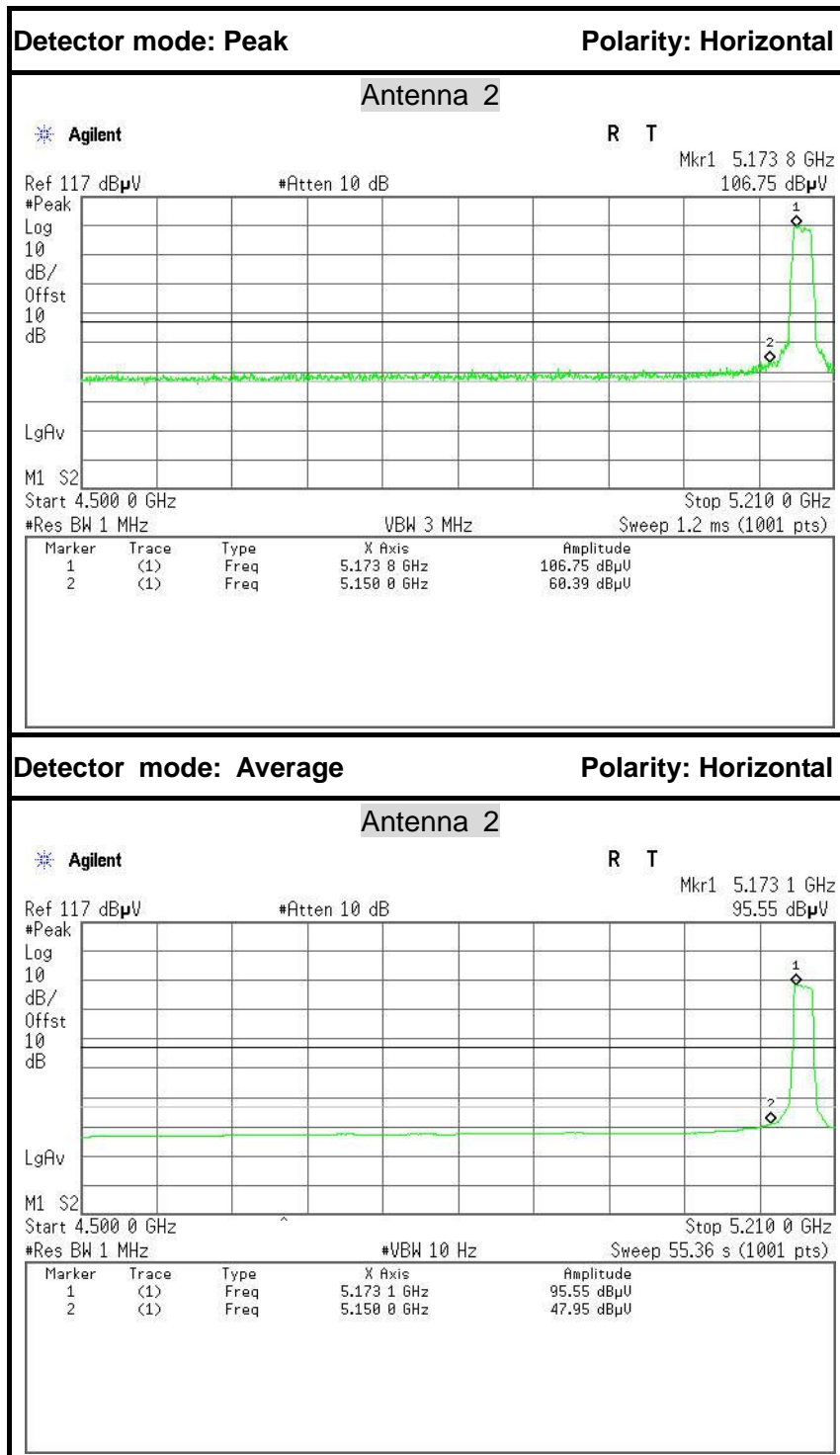
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5150.0000	54.64	-6.60	61.24	74.00	-12.76	Peak	Horizontal
2	5150.0000	41.08	-6.60	47.68	54.00	-6.32	Average	Horizontal



IEEE 802.11a mode / 5180MHz



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



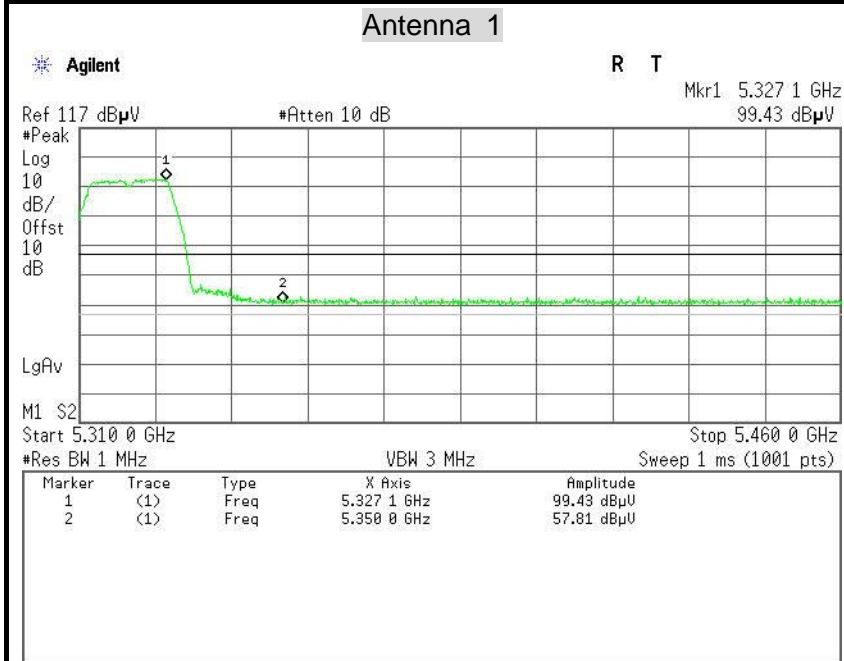
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5150.0000	53.79	-6.60	60.39	74.00	-13.61	Peak	Horizontal
2	5150.0000	41.35	-6.60	47.95	54.00	-6.05	Average	Horizontal



IEEE 802.11a mode / 5320MHz

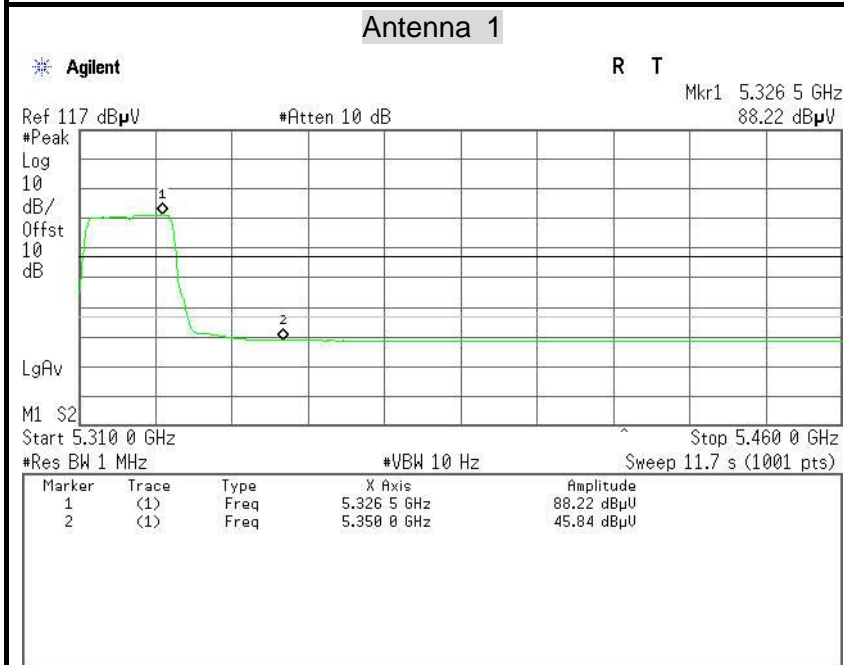
Detector mode: Peak

Polarity: Vertical

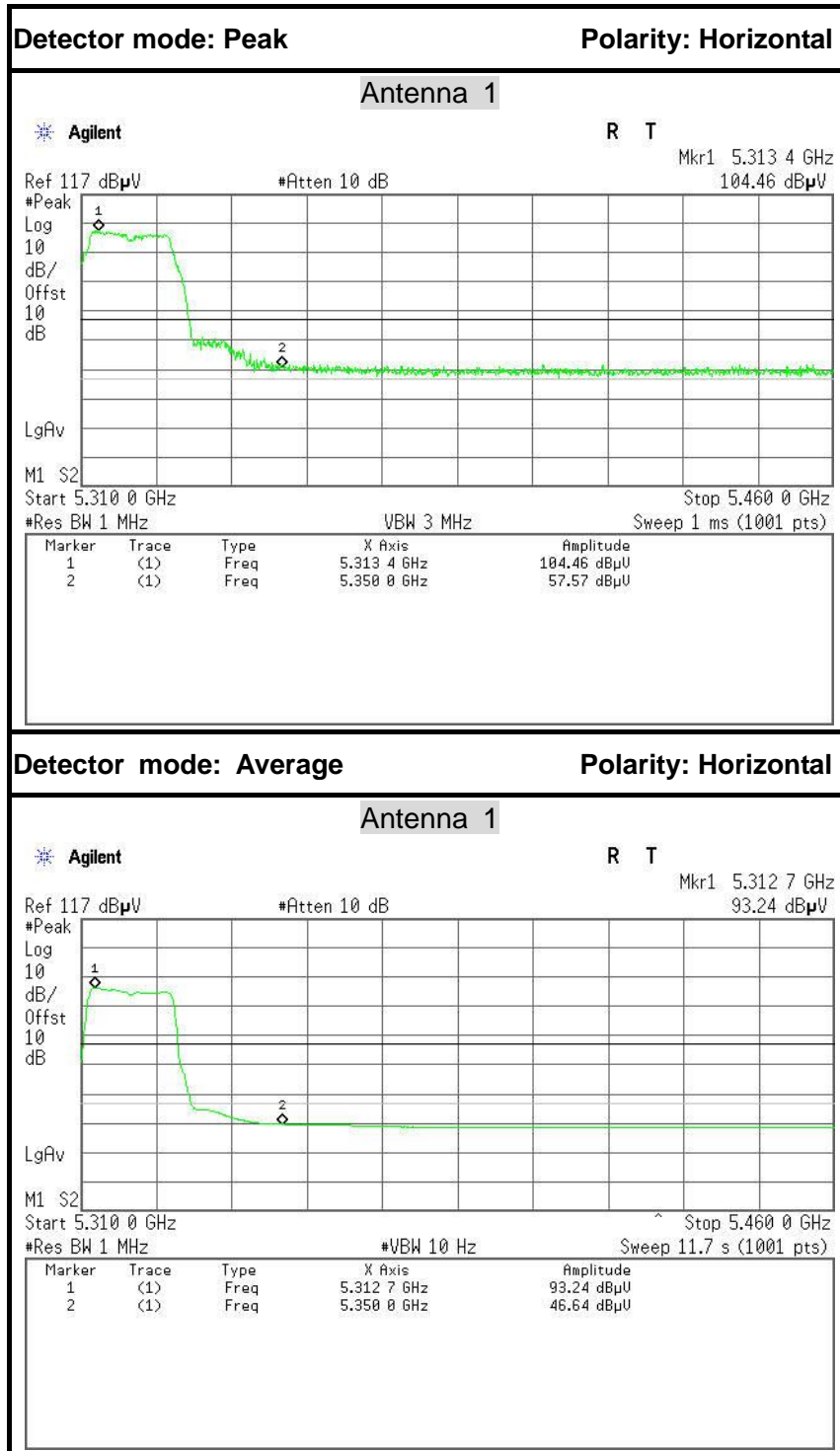


Detector mode: Average

Polarity: Vertical



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5350.0000	51.21	-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



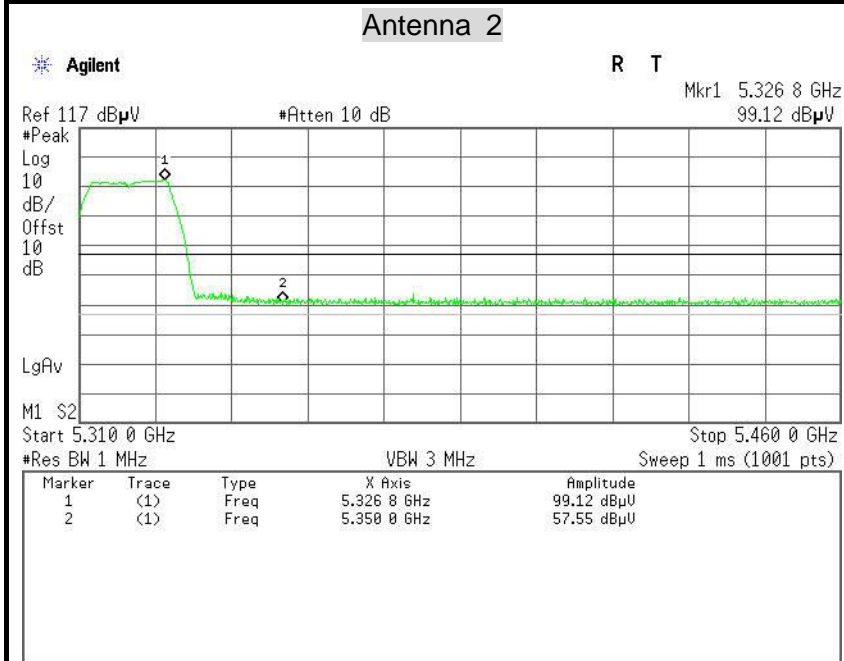
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5350.0000	50.97	-6.60	57.57	74.00	-16.43	Peak	Horizontal
2	5350.0000	40.04	-6.60	46.64	54.00	-7.36	Average	Horizontal



IEEE 802.11a mode / 5320MHz

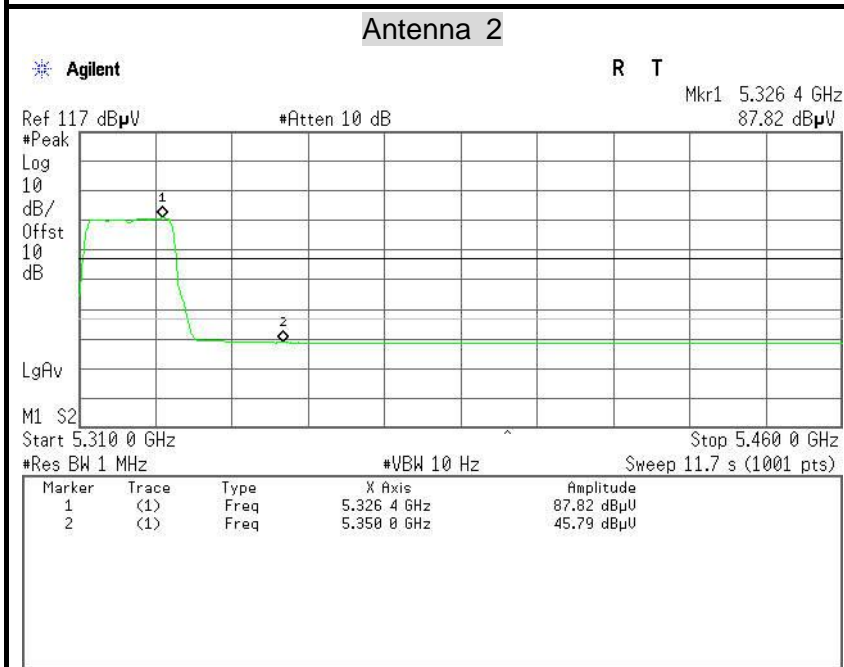
Detector mode: Peak

Polarity: Vertical

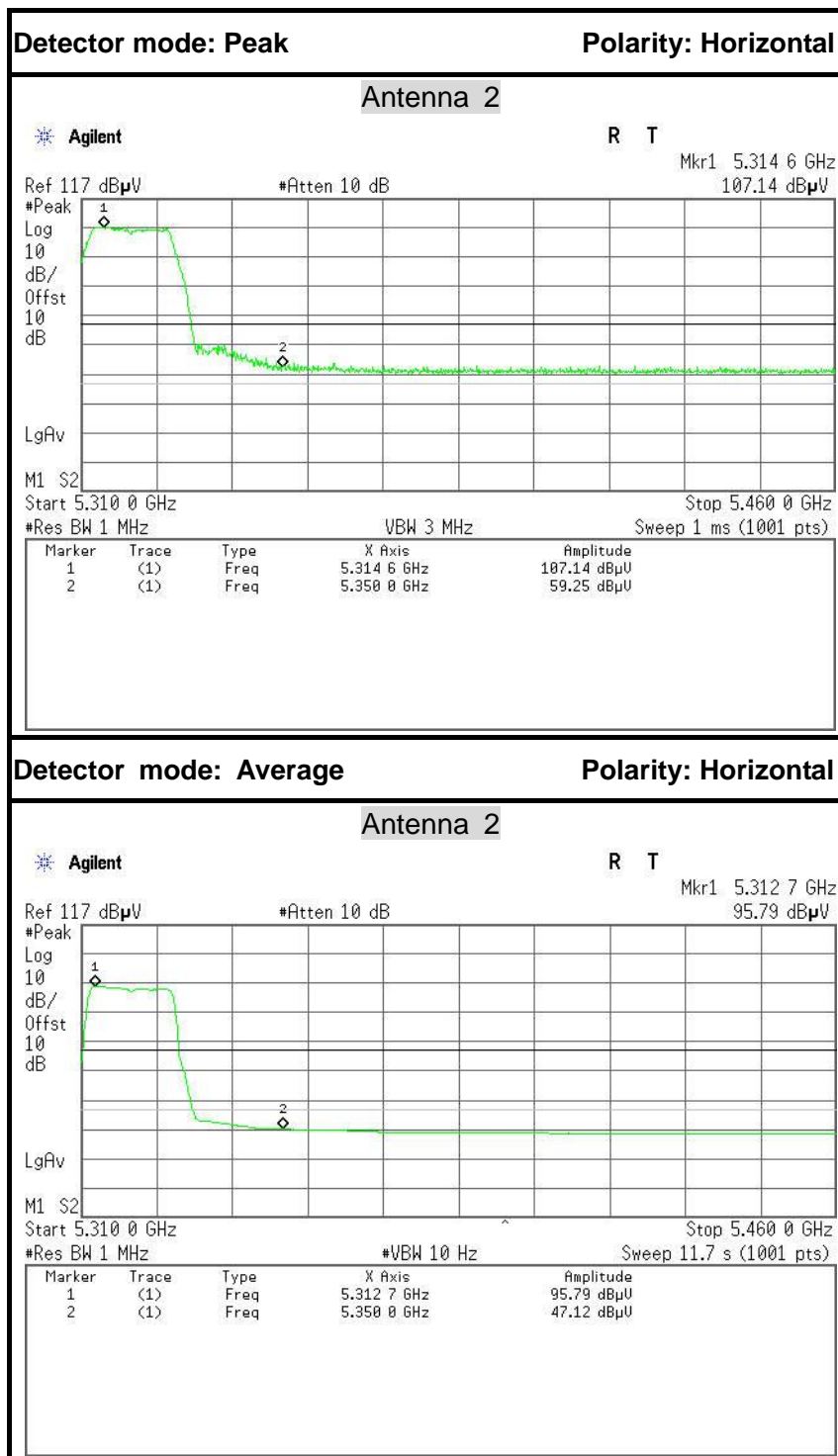


Detector mode: Average

Polarity: Vertical

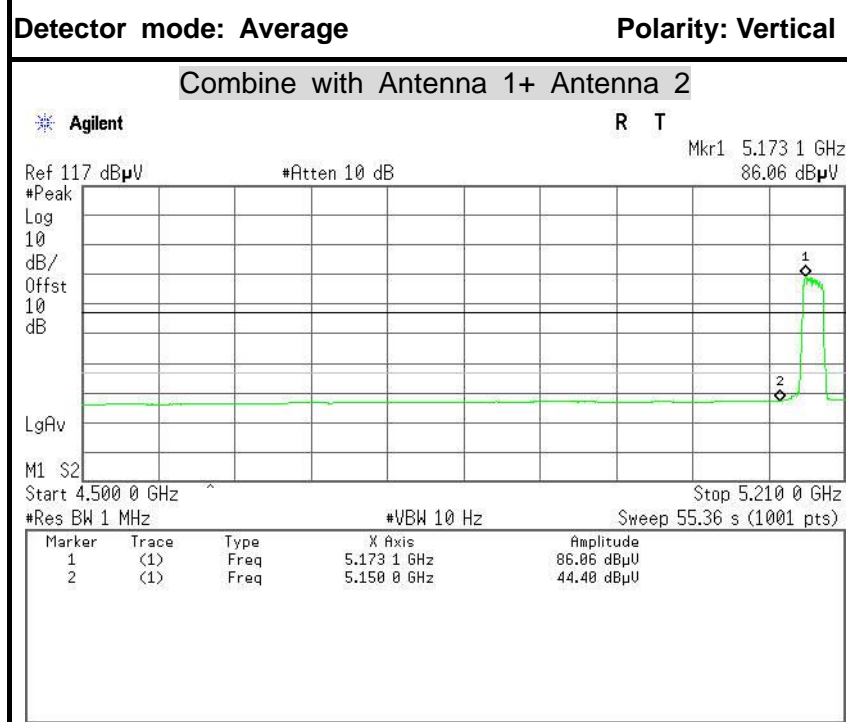
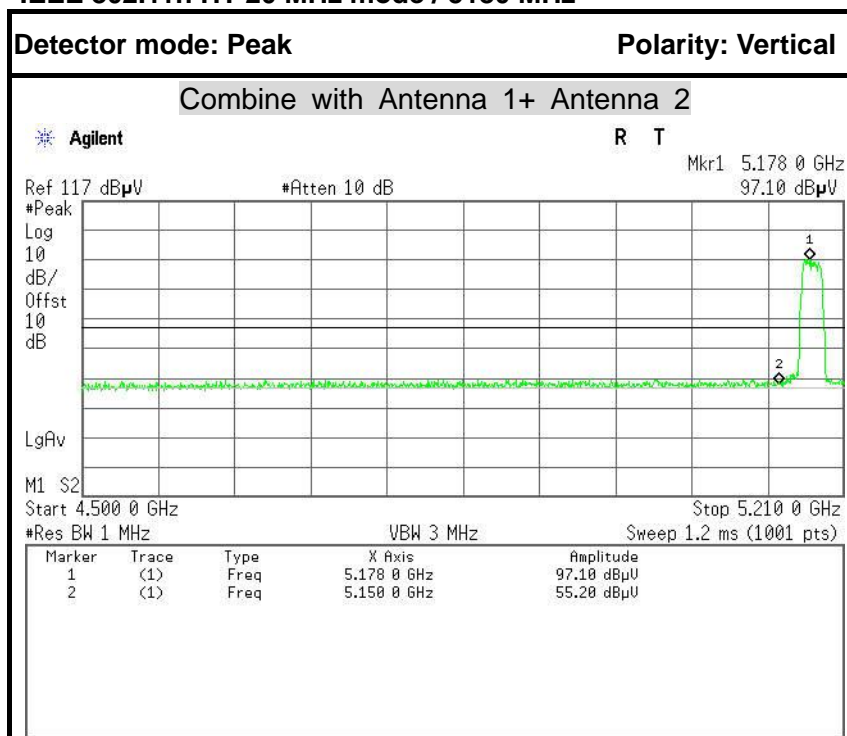


No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5350.0000	50.95	-6.60	57.55	74.00	-16.45	Peak	Vertical
2	5350.0000	39.19	-6.60	45.79	54.00	-8.21	Average	Vertical



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

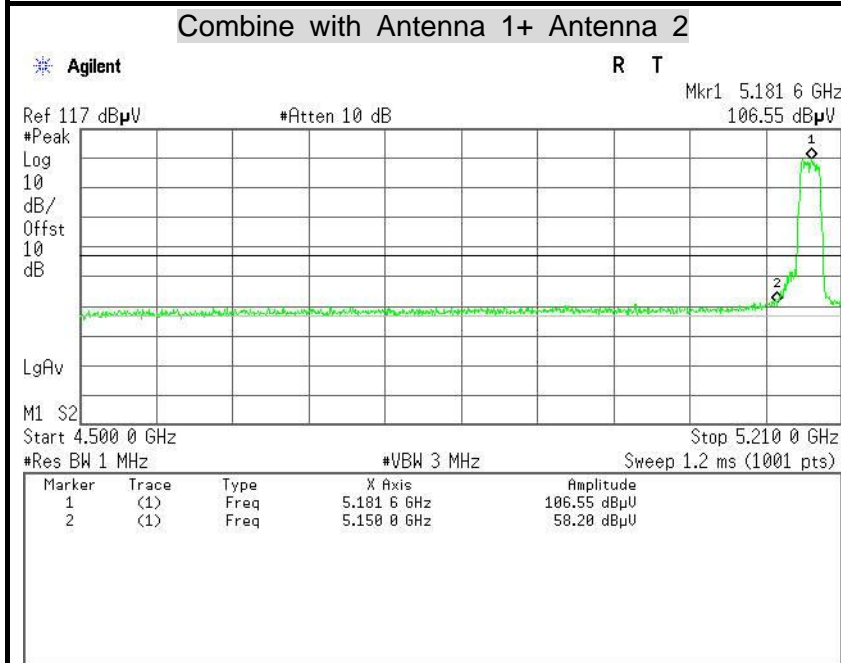
IEEE 802.11n HT 20 MHz mode / 5180 MHz



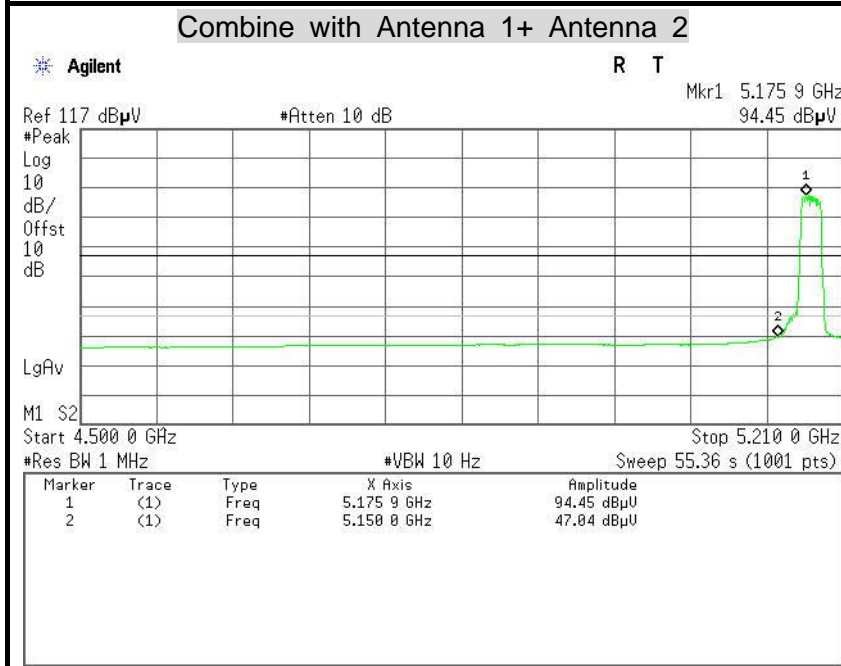
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5150.0000	48.60	-6.60	55.20	74.00	-18.80	Peak	Vertical
2	5150.0000	37.80	-6.60	44.40	54.00	-9.60	Average	Vertical



Detector mode: Peak Polarity: Horizontal



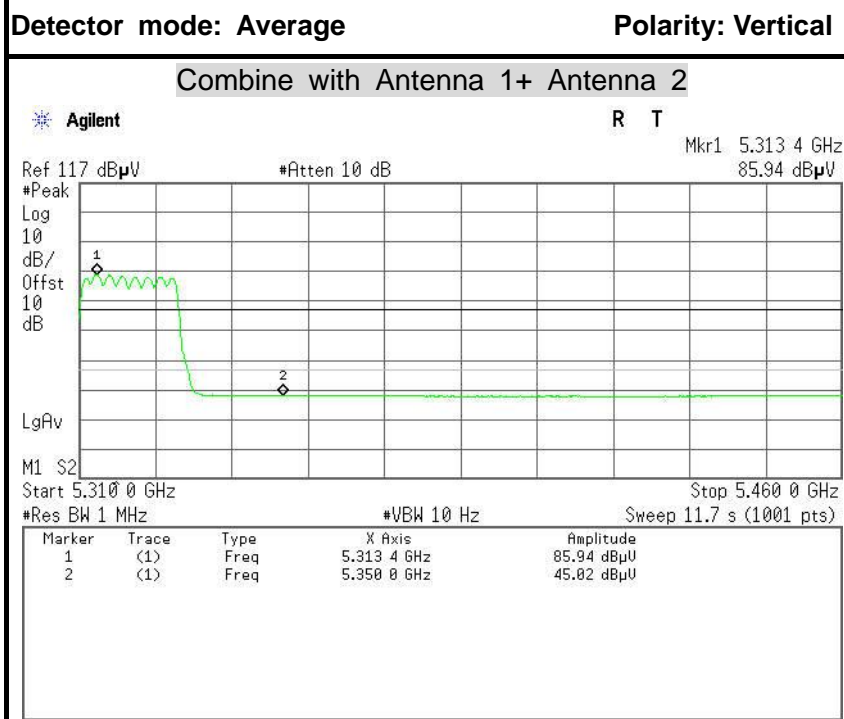
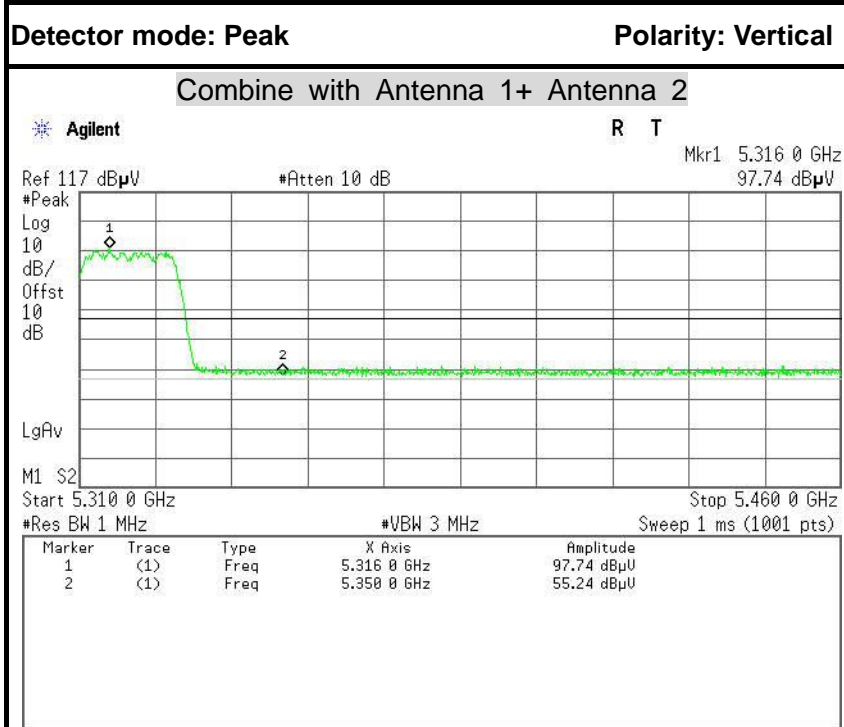
Detector mode: Average Polarity: Horizontal



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

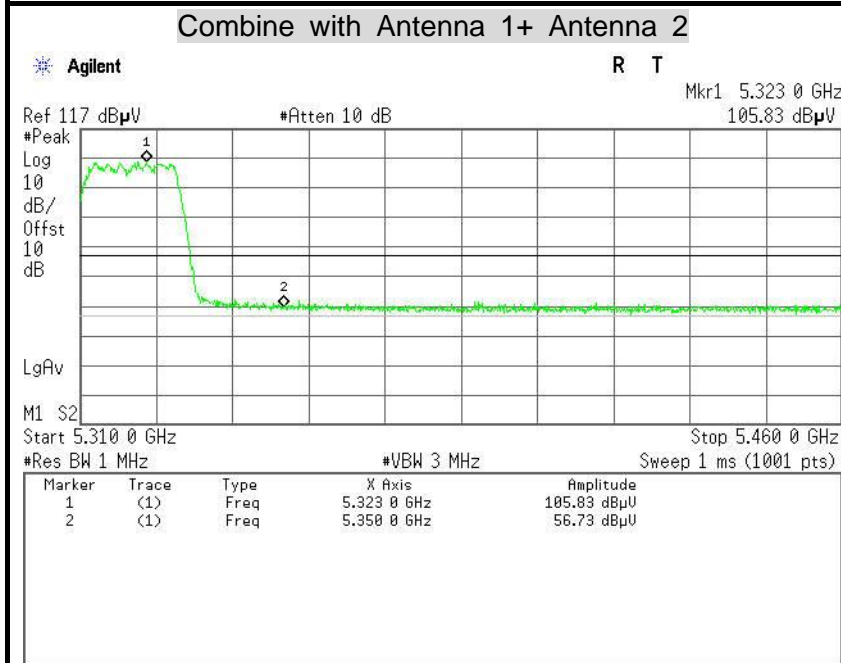


No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5350.0000	48.64	-6.60	55.24	74.00	-18.76	Peak	Vertical
2	5350.0000	38.42	-6.60	45.02	54.00	-8.98	Average	Vertical



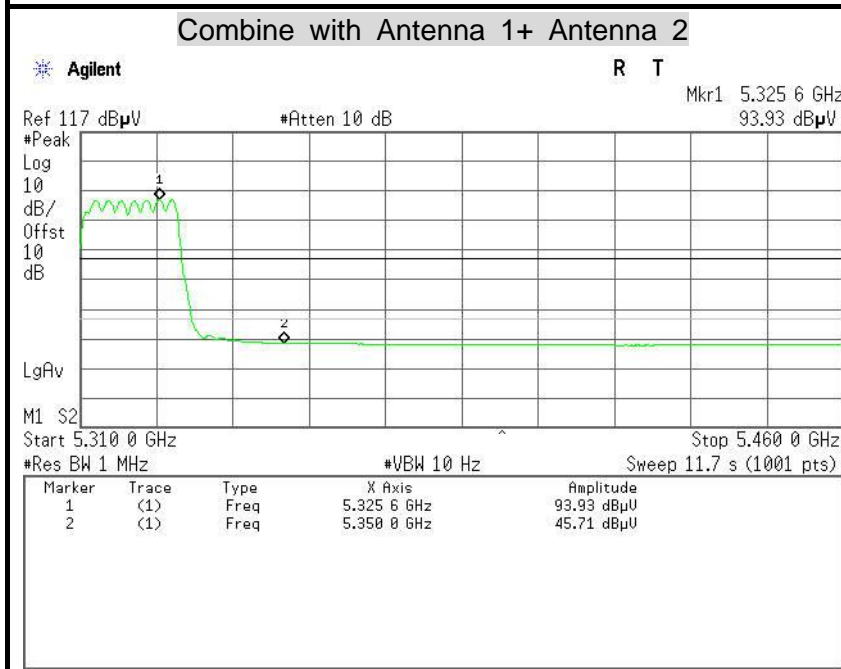
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

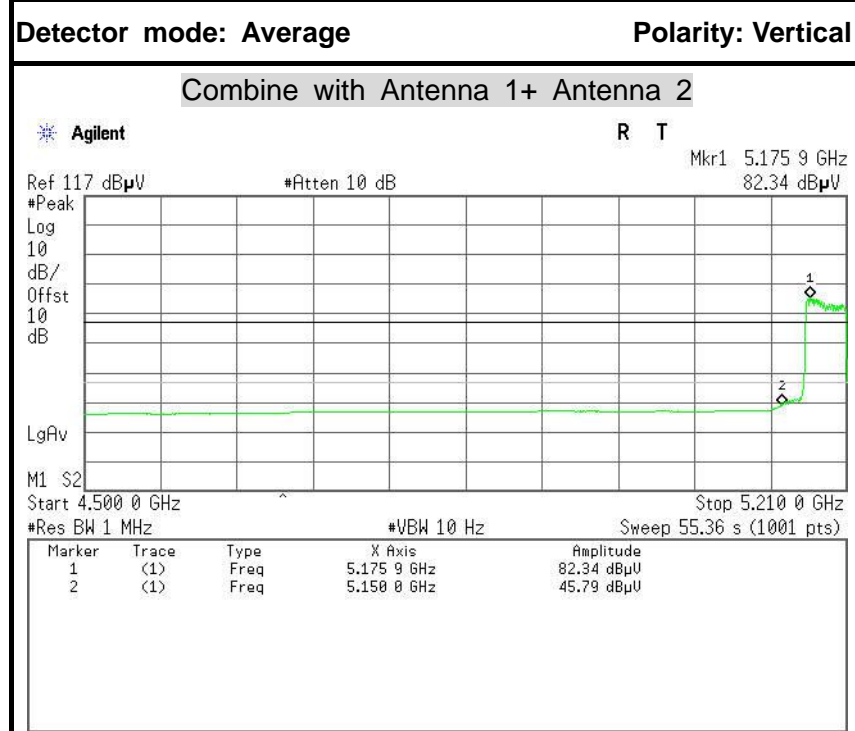
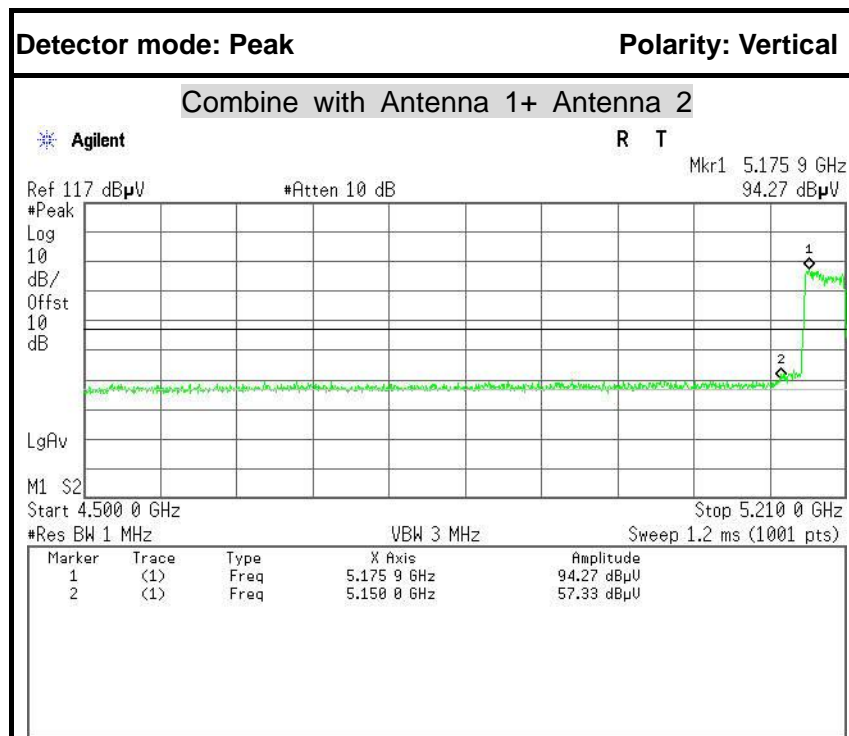
Polarity: Horizontal



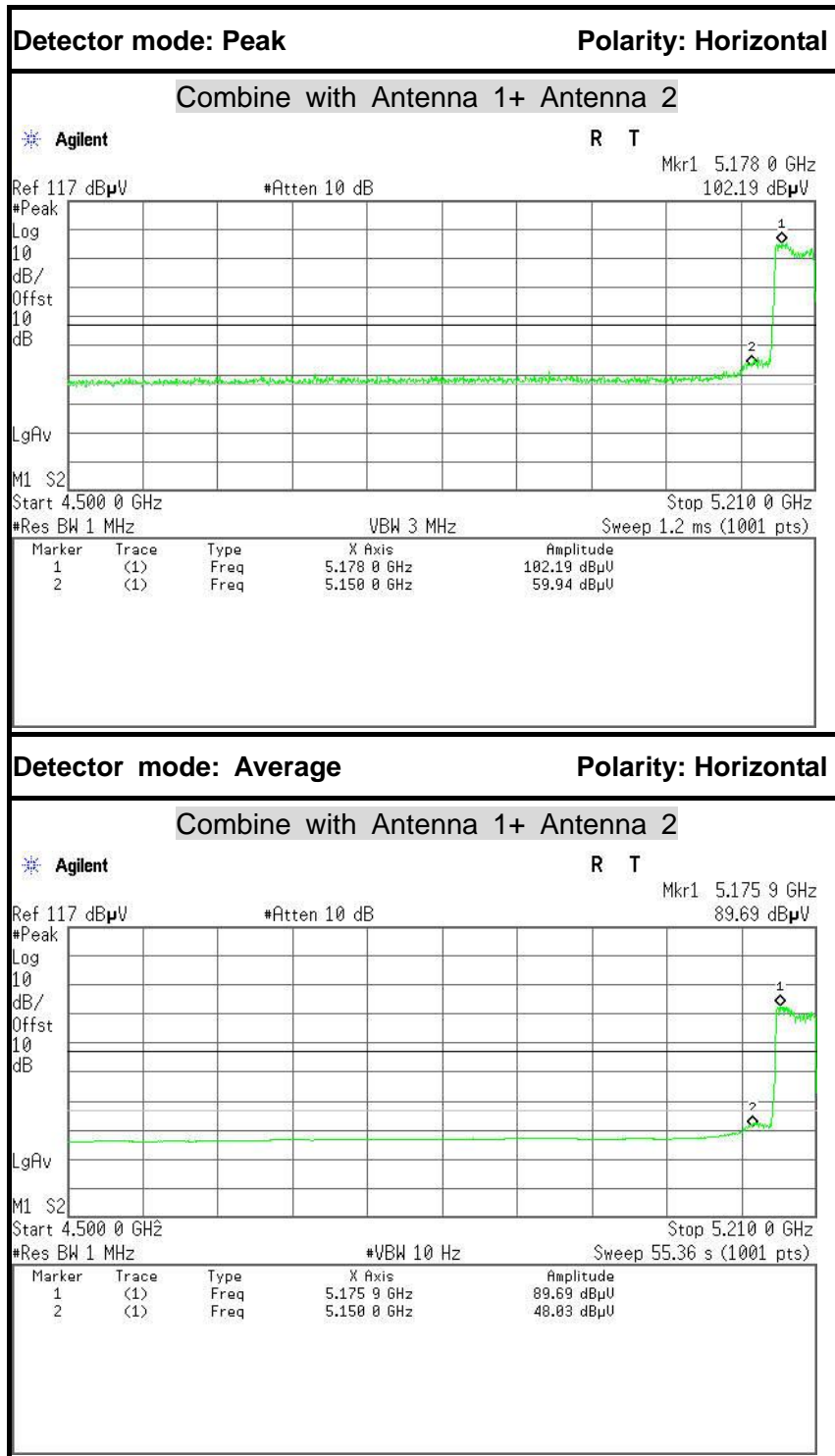
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5350.0000	50.13	-6.60	56.73	74.00	-17.27	Peak	Horizontal
2	5350.0000	39.11	-6.60	45.71	54.00	-8.29	Average	Horizontal



IEEE 802.11n HT 40 MHz mode / 5190 MHz



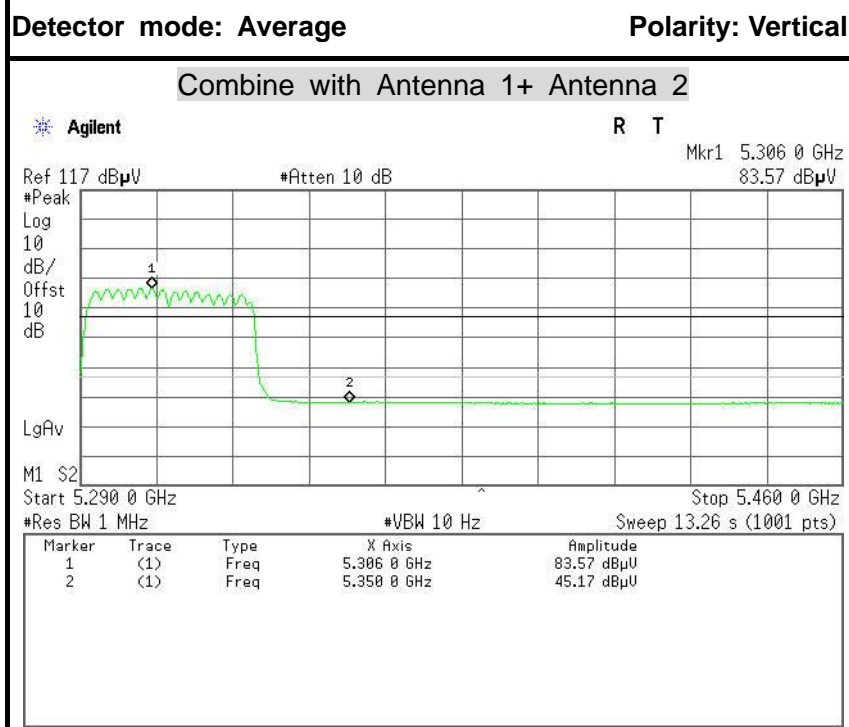
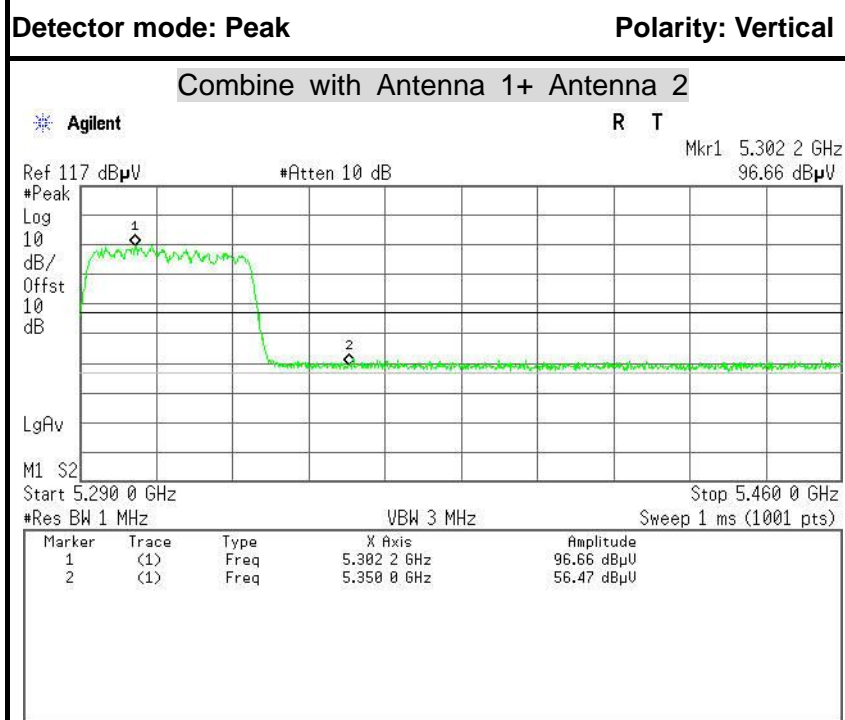
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5150.0000	50.73	-6.60	57.33	74.00	-16.67	Peak	Vertical
2	5150.0000	39.19	-6.60	45.79	54.00	-8.21	Average	Vertical



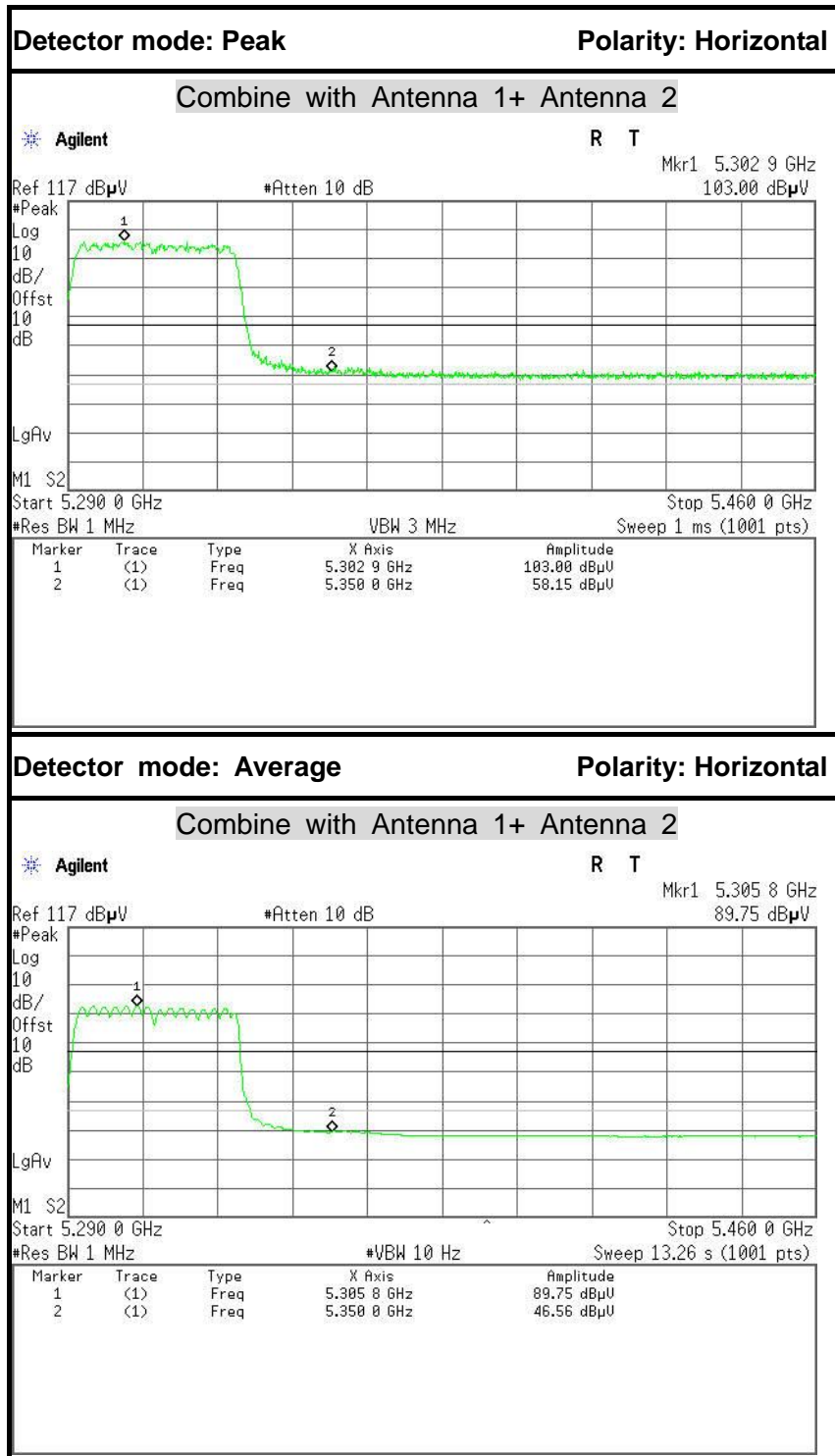
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5150.0000	53.34	-6.60	59.94	74.00	-14.06	Peak	Horizontal
2	5150.0000	41.43	-6.60	48.03	54.00	-5.97	Average	Horizontal



IEEE 802.11n HT 40 MHz mode / 5310 MHz



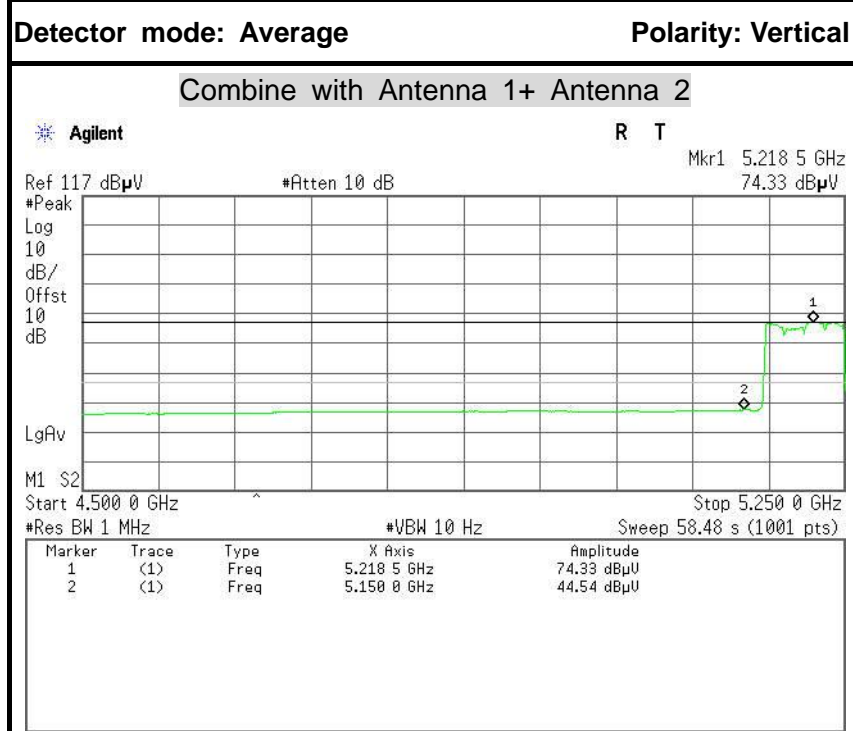
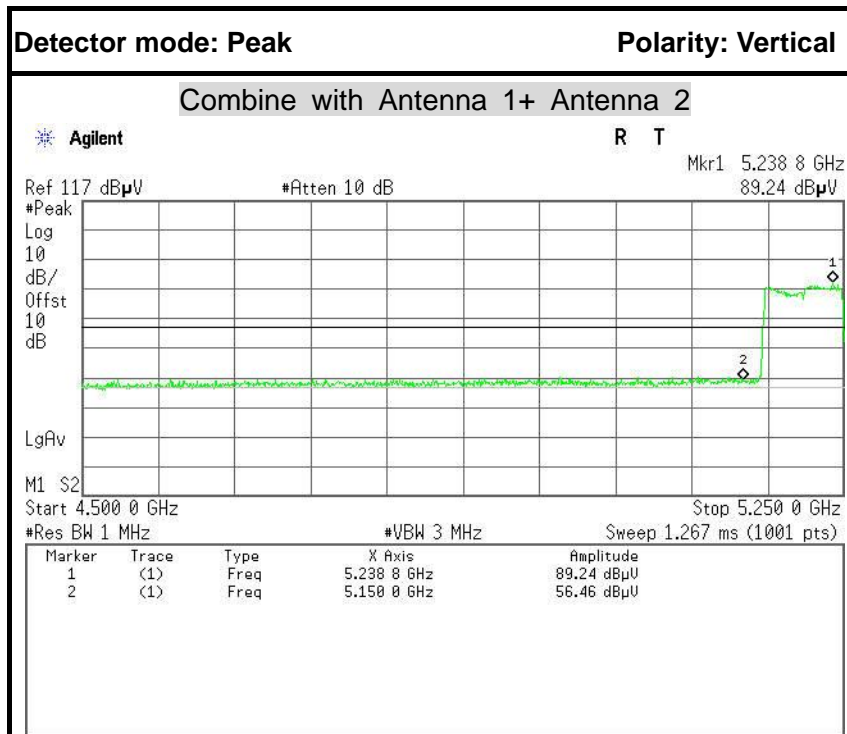
No.	Frequency (MHz)	Reading (dBUV)	Corrected (dB)	Result (dBUV)	Limit (dBUV)	Margin (dB)	Detector	Antenna Pole
1	5350.0000	49.87	-6.60	56.47	74.00	-17.53	Peak	Vertical
2	5350.0000	38.57	-6.60	45.17	54.00	-8.83	Average	Vertical



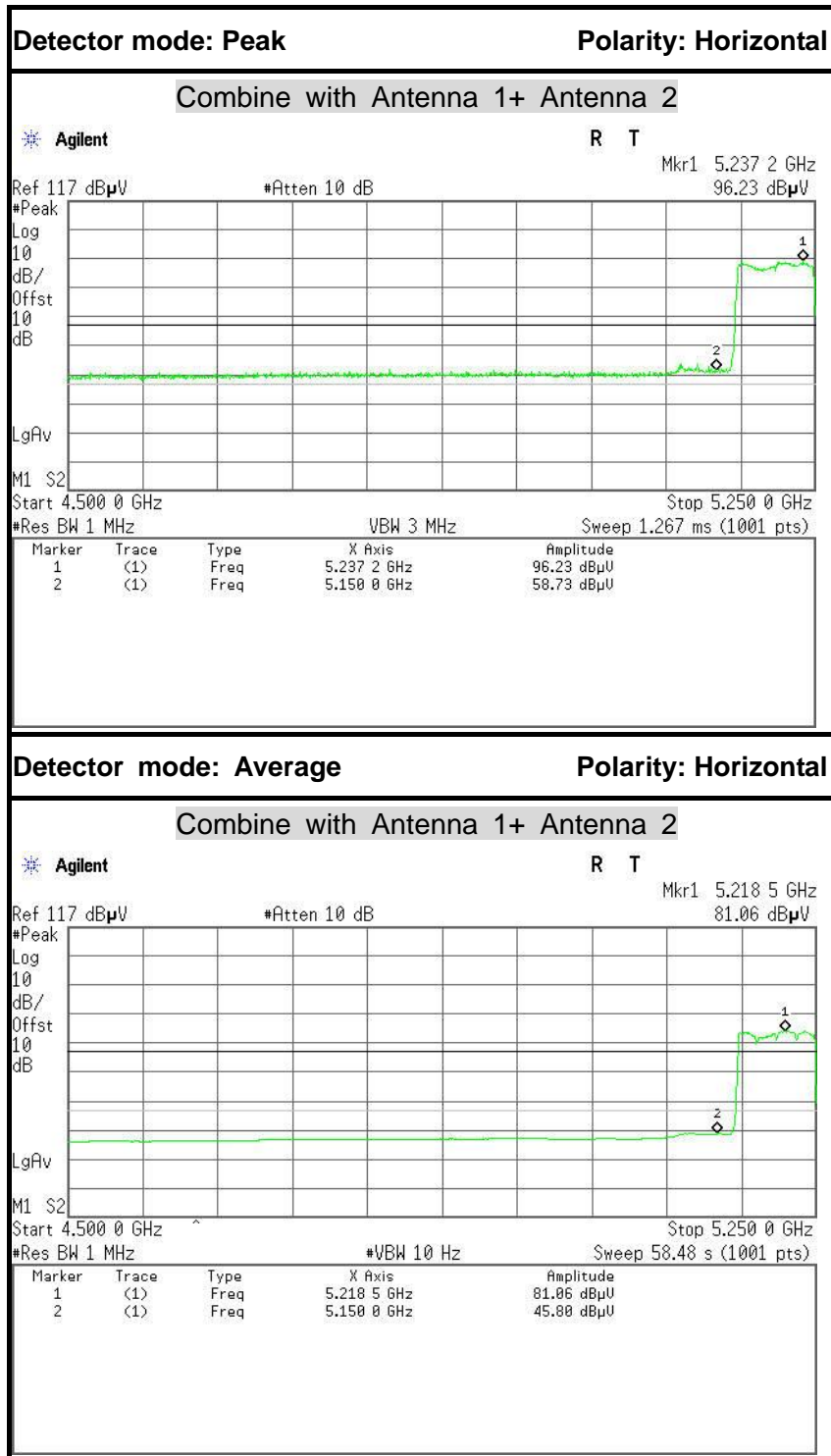
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5350.0000	51.55	-6.60	58.15	74.00	-15.85	Peak	Horizontal
2	5350.0000	39.96	-6.60	46.56	54.00	-7.44	Average	Horizontal



IEEE 802.11ac 80 mode / 5210 MHz



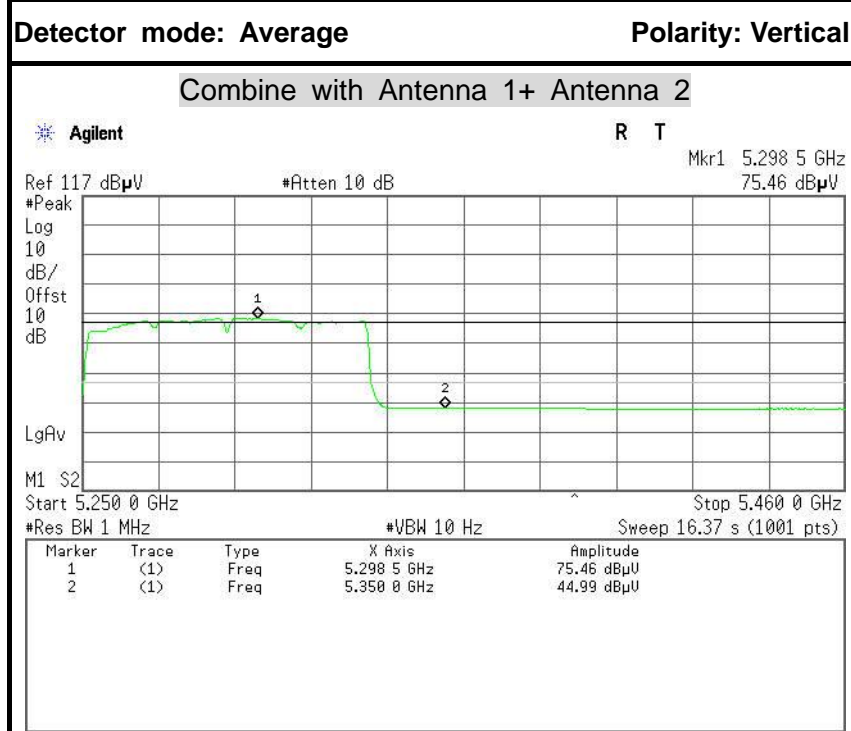
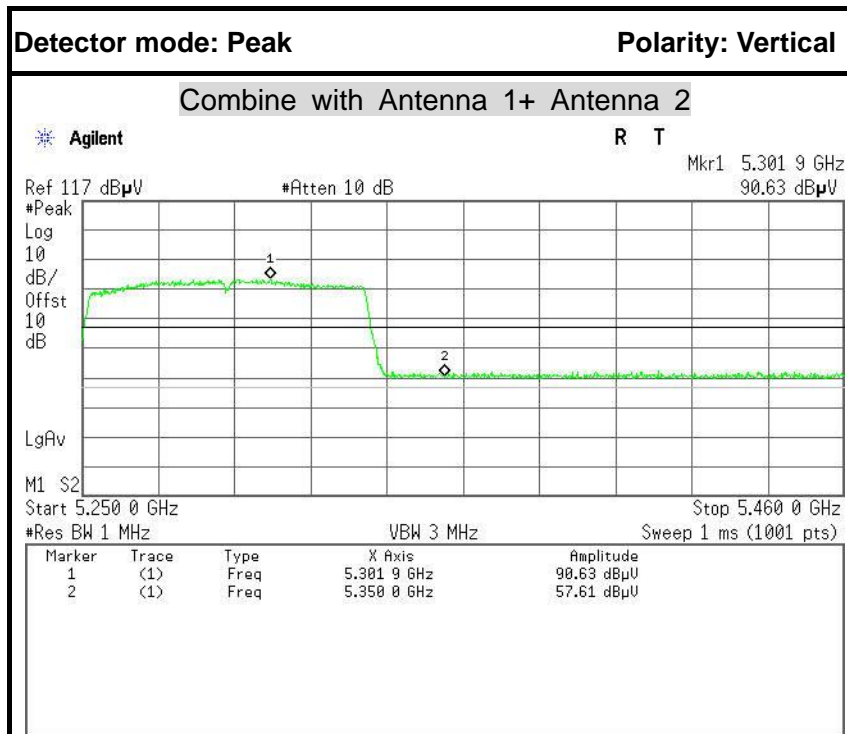
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5150.0000	49.86	-6.60	56.46	74.00	-17.54	Peak	Vertical
2	5150.0000	37.94	-6.60	44.54	54.00	-9.46	Average	Vertical



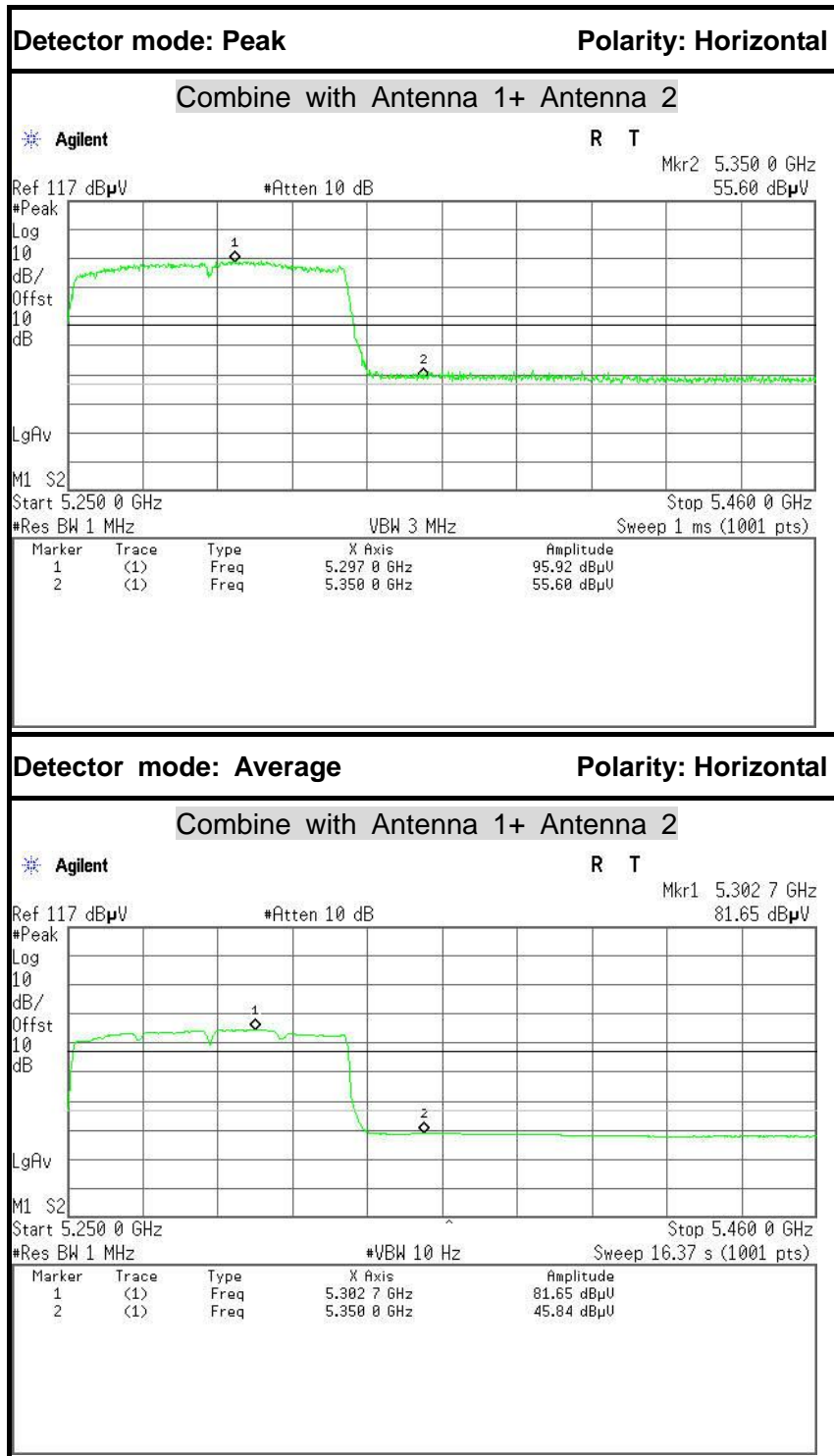
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	5150.0000	52.13	-6.60	58.73	74.00	-15.27	Peak	Horizontal
2	5150.0000	39.20	-6.60	45.80	54.00	-8.20	Average	Horizontal



IEEE 802.11ac 80 mode / 5290 MHz



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



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

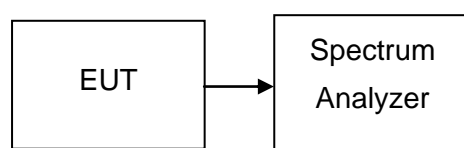
- (1) (i) For an outdoor access point operating in the band 5.15 – 5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in 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	02/28/2015	02/27/2016

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)	Margin		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)	Margin		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)	Margin		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 = $10 \cdot \log_{10}(500/\text{RBW})$

**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 = $10 \cdot \log_{10}(500/\text{RBW})$

**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 = $10 \cdot \log_{10}(500/\text{RBW})$

**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

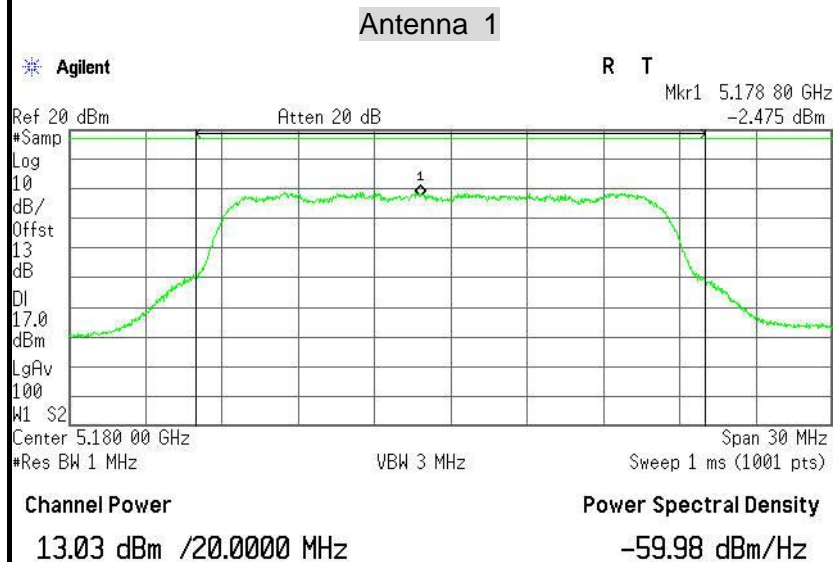
Remark: factor = $10 \cdot \log_{10}(500/\text{RBW})$



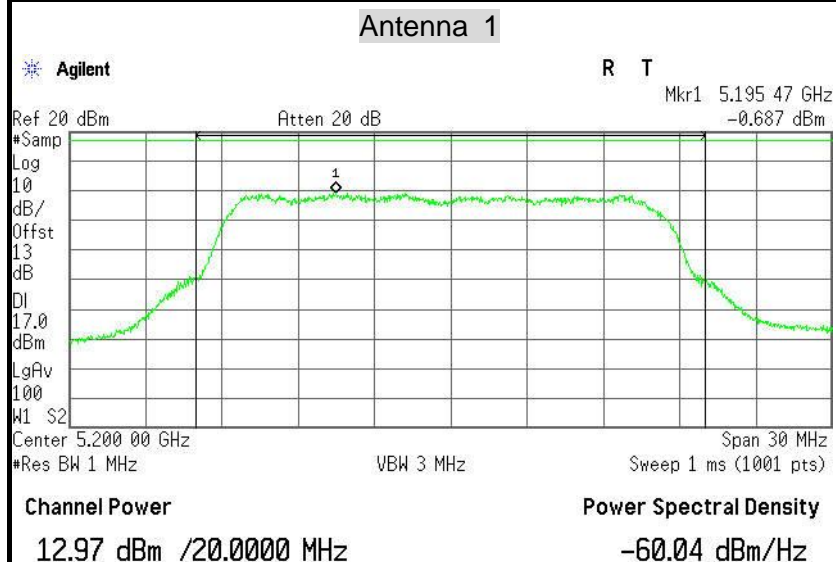
Test Plot

IEEE 802.11a mode / 5180 ~ 5240MHz

PPSD (CH Low)

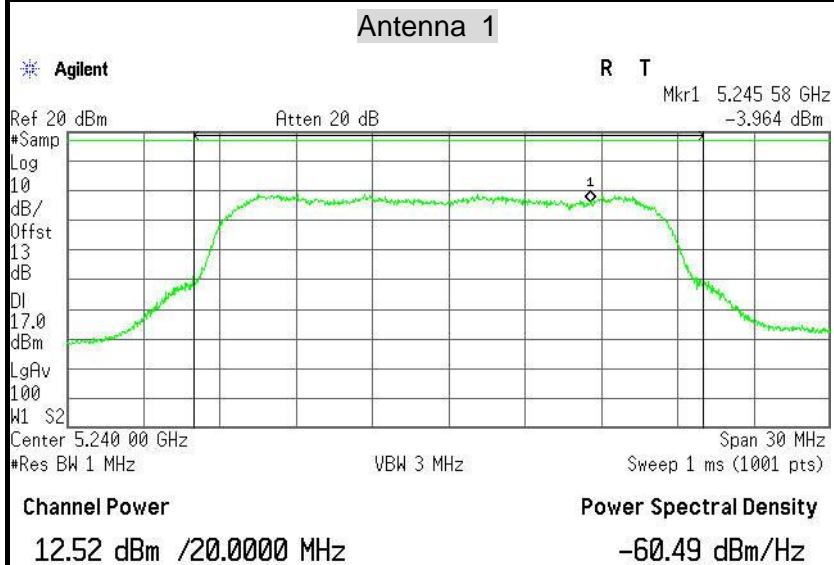


PPSD (CH Mid)



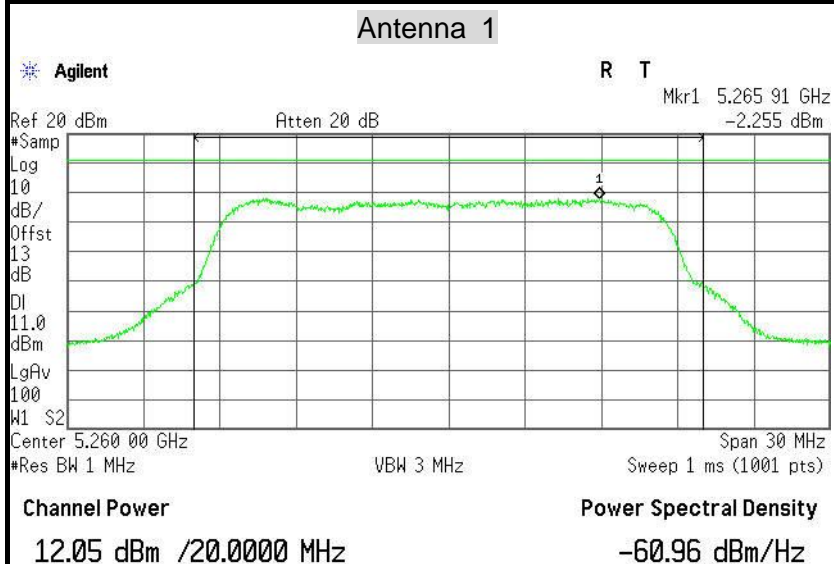


PPSD (CH High)



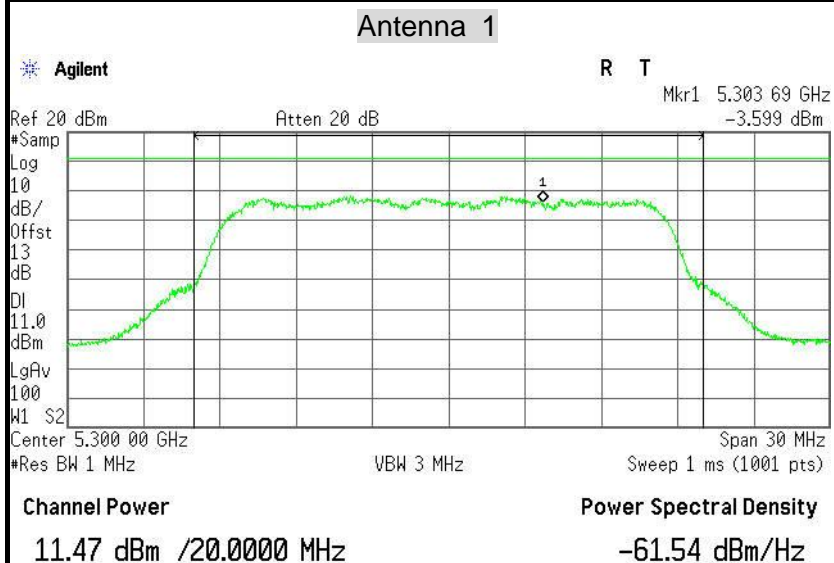
IEEE 802.11a mode / 5260~ 5320MHz

PPSD (CH Low)

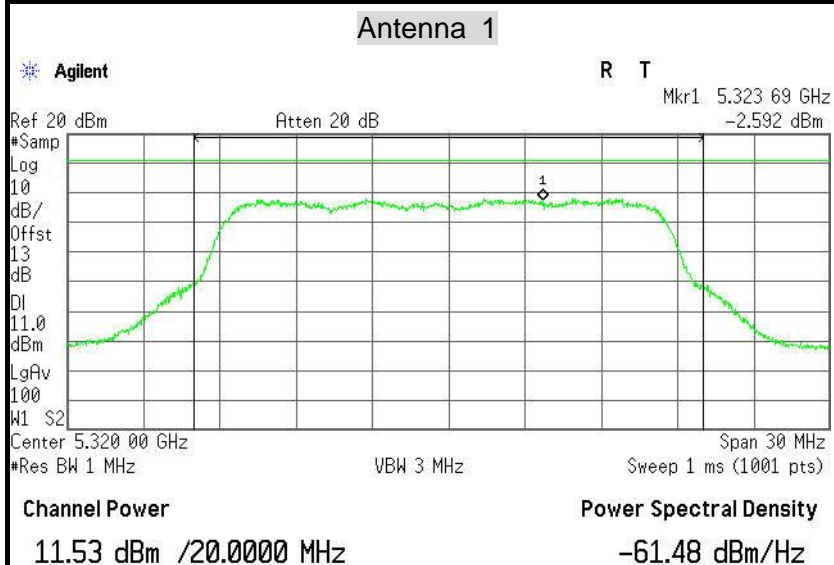




PPSD (CH Mid)



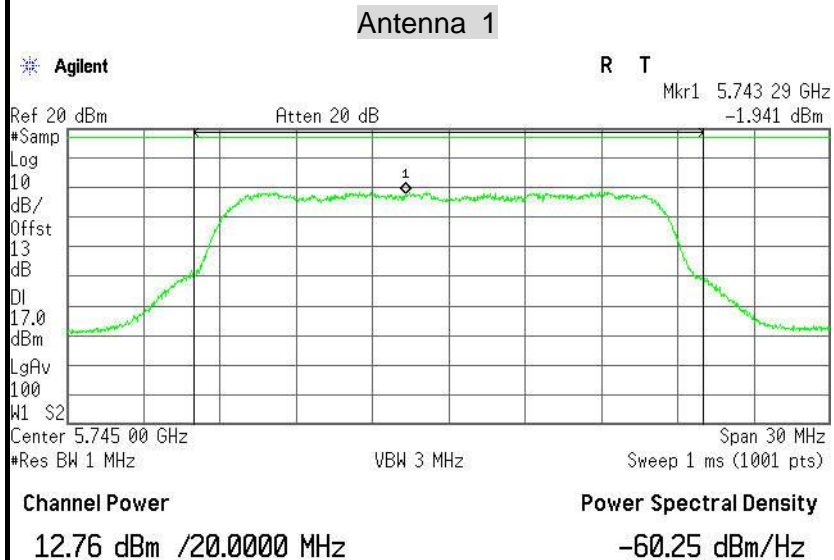
PPSD (CH High)



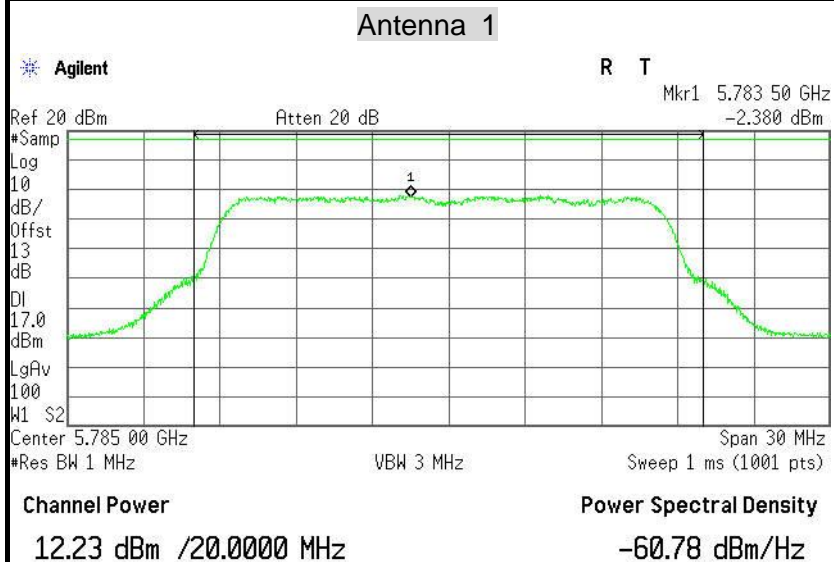


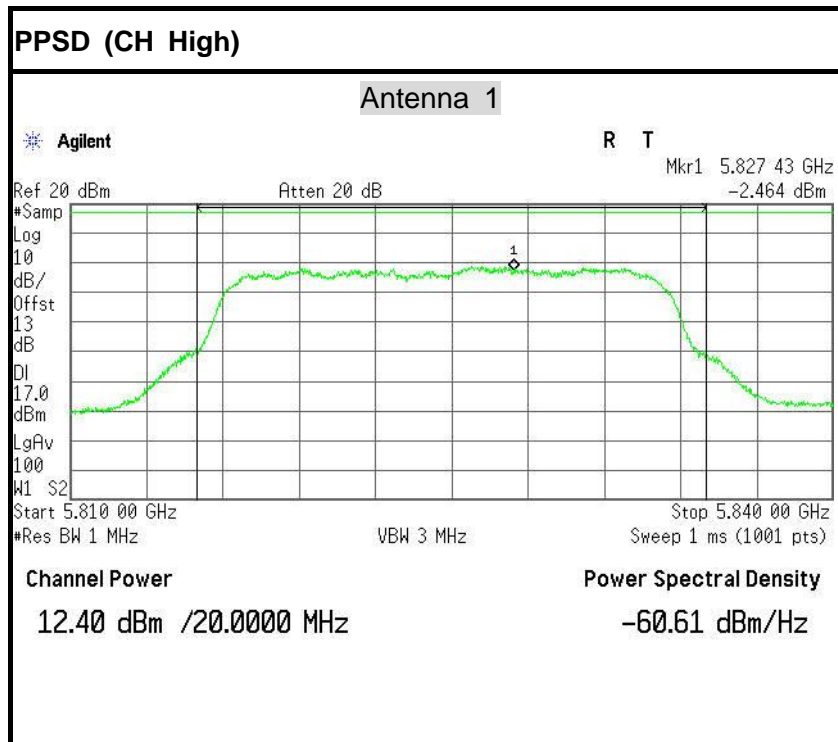
IEEE 802.11a mode / 5745 ~ 5825MHz

PPSD (CH Low)



PPSD (CH Mid)

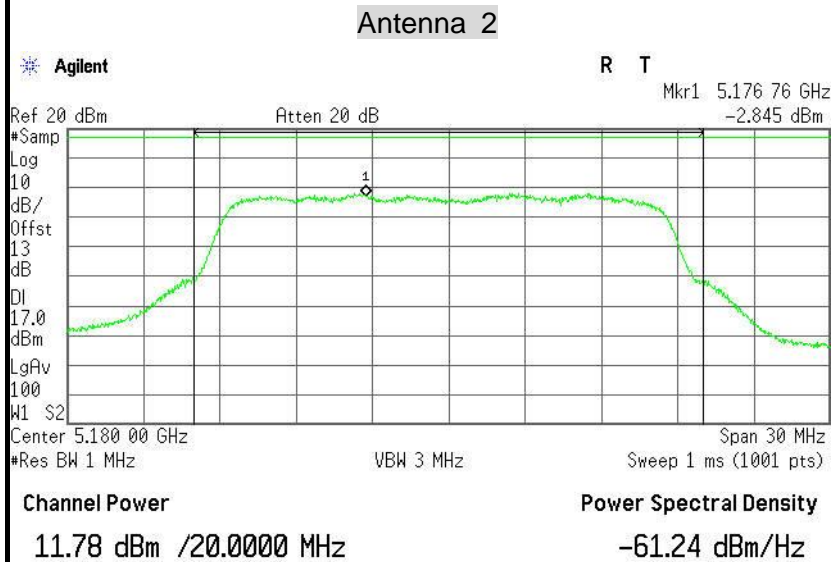




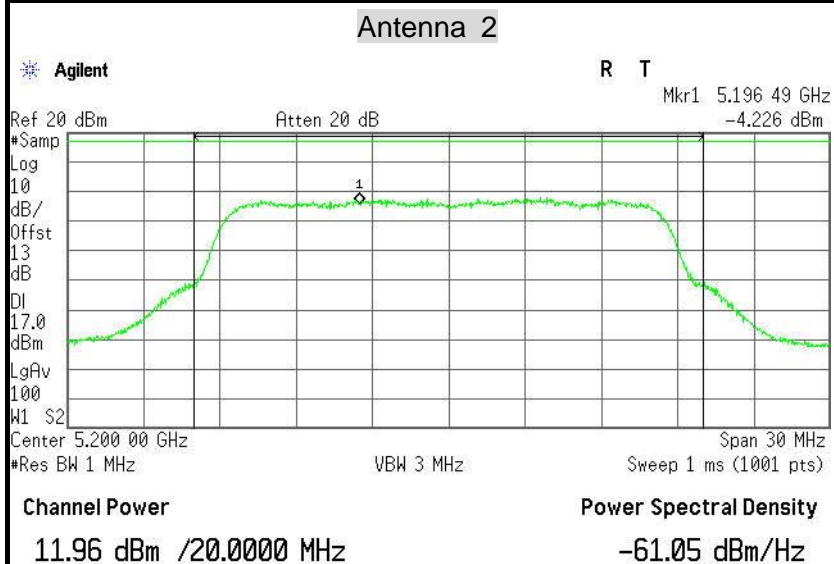


IEEE 802.11a mode / 5180 ~ 5240MHz

PPSD (CH Low)

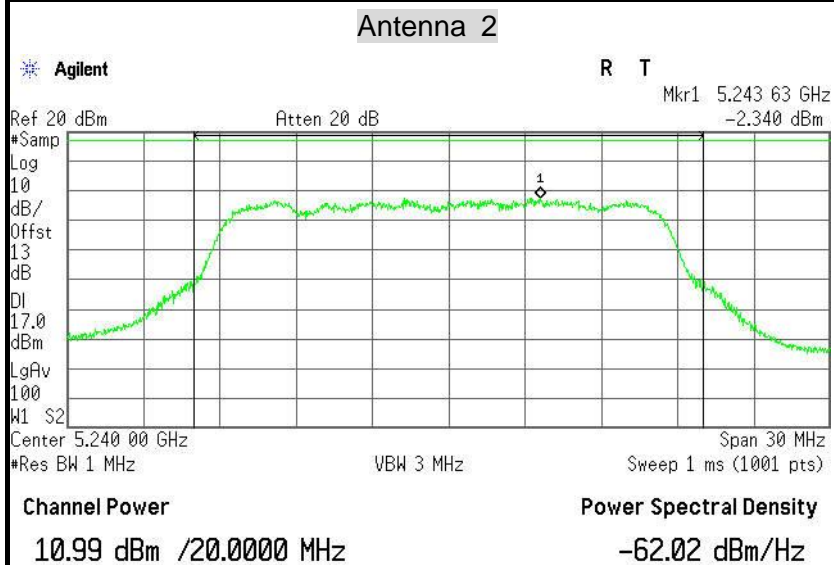


PPSD (CH Mid)



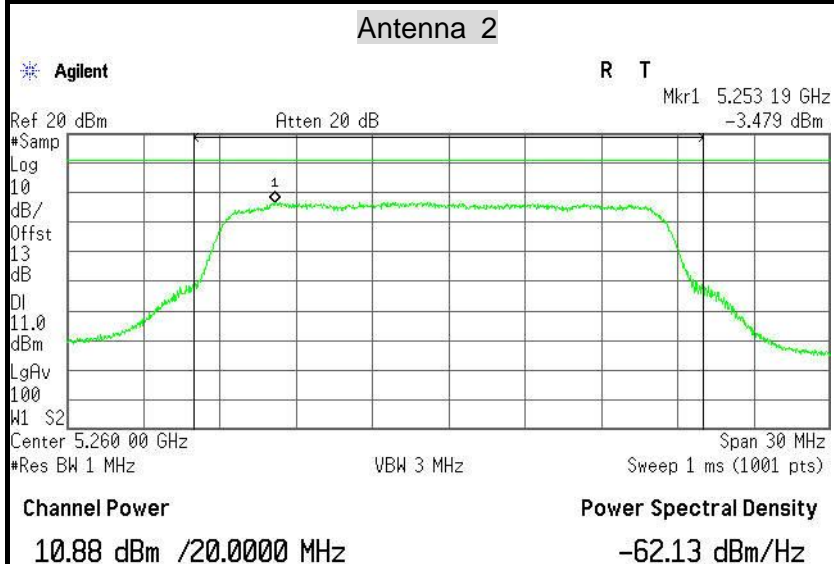


PPSD (CH High)



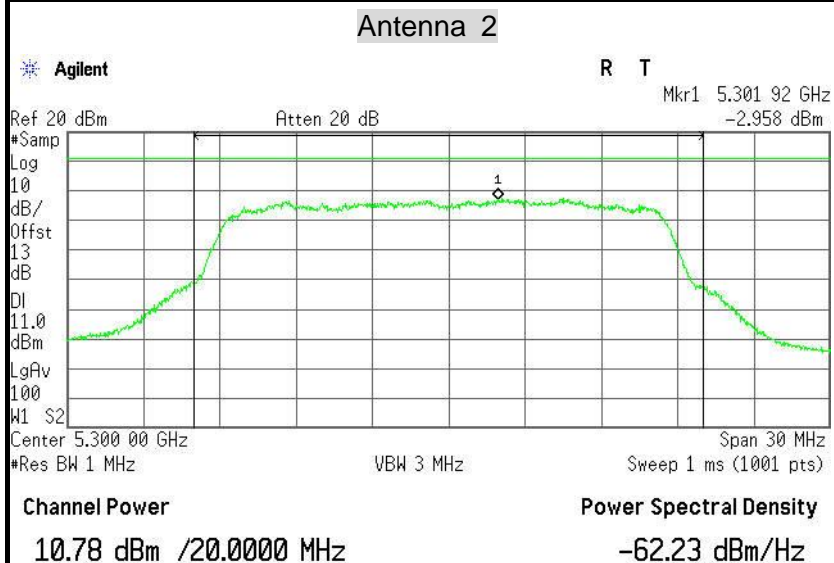
IEEE 802.11a mode / 5260~ 5320MHz

PPSD (CH Low)

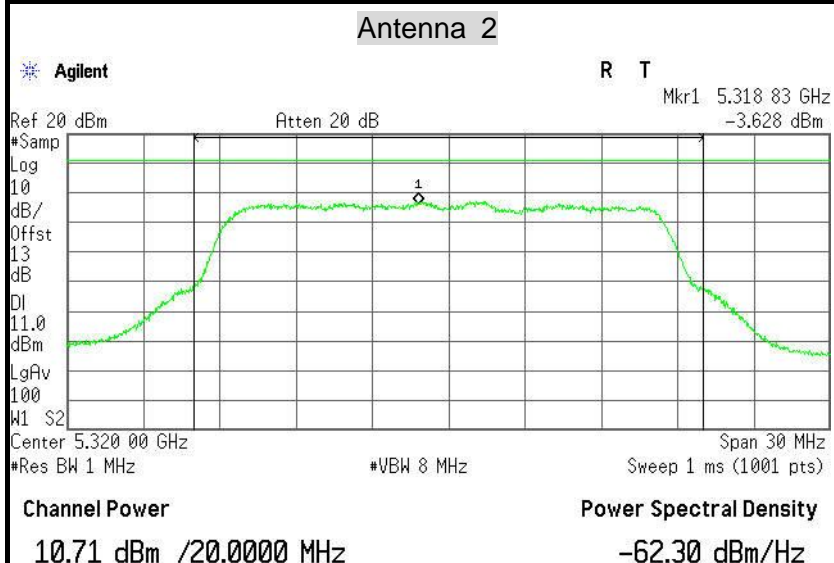




PPSD (CH Mid)



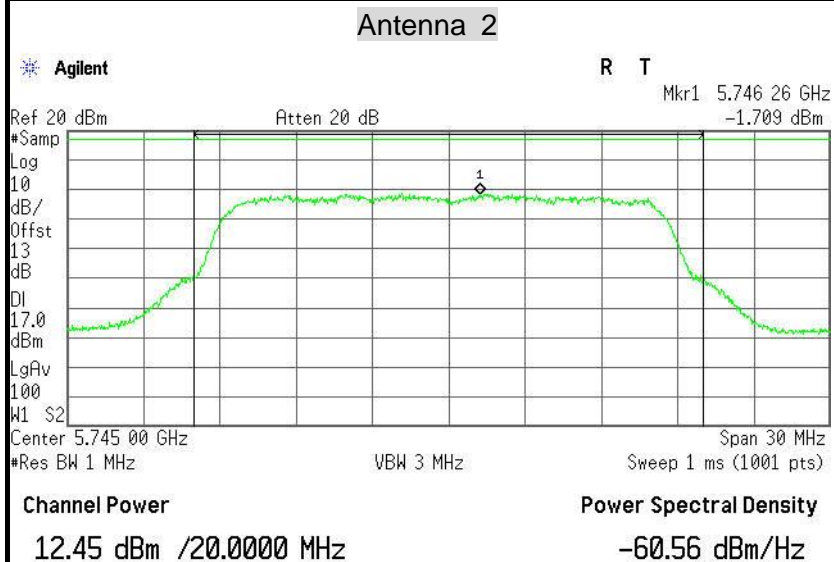
PPSD (CH High)



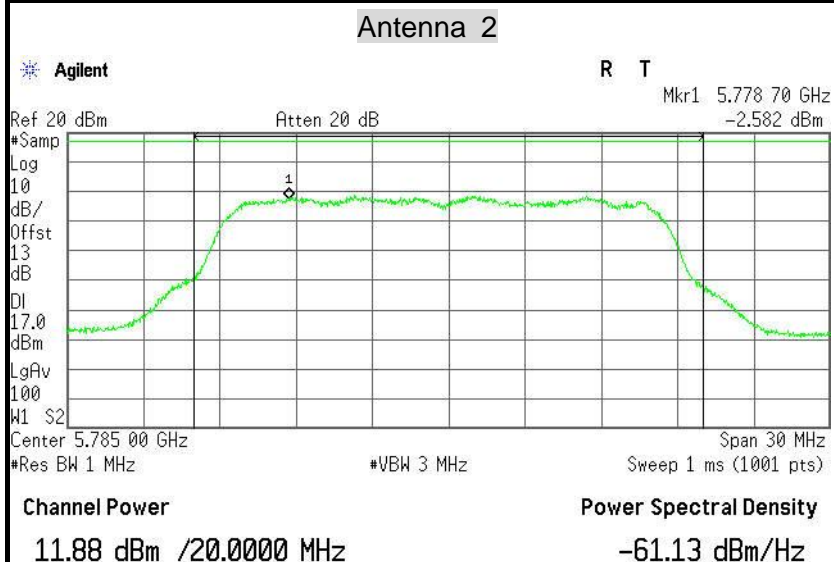


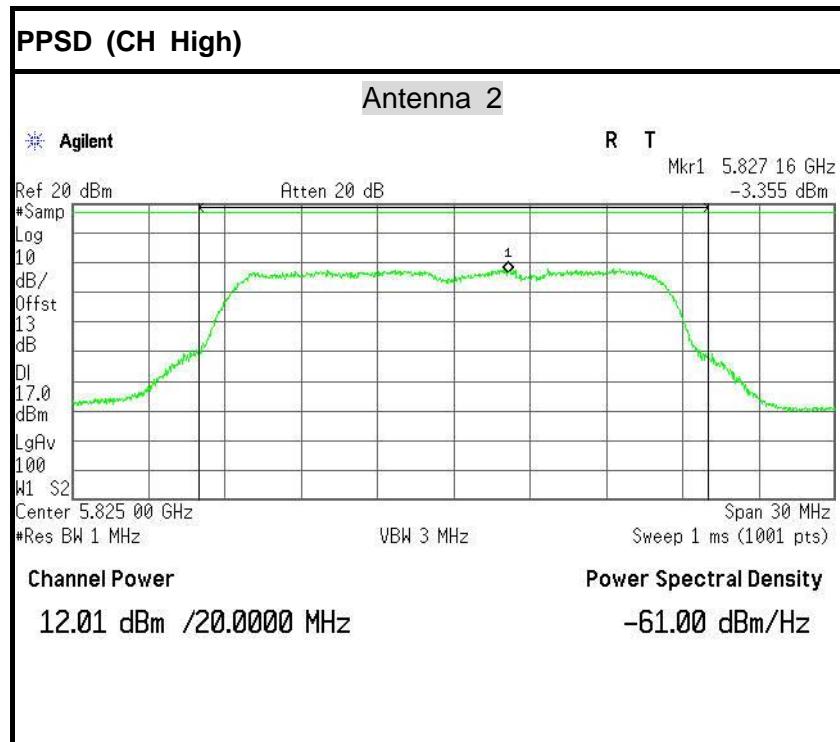
IEEE 802.11a mode / 5745 ~ 5825MHz

PPSD (CH Low)



PPSD (CH Mid)

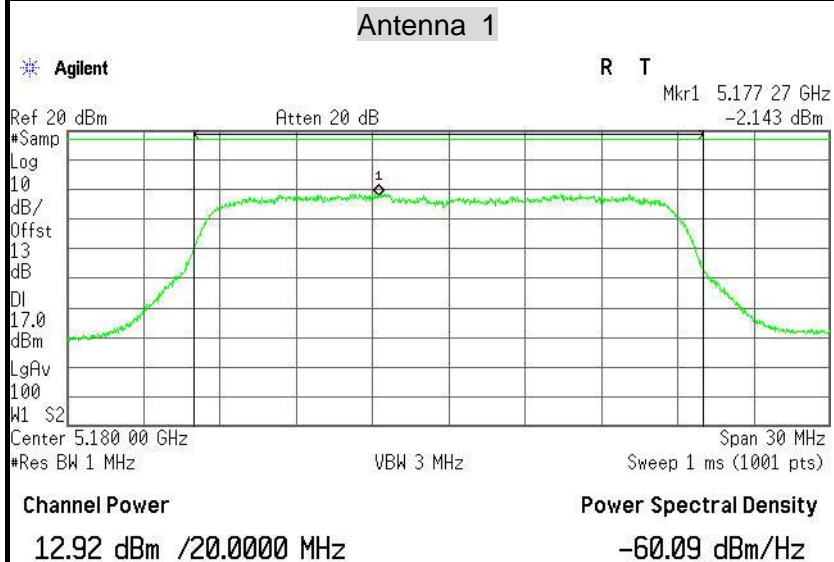




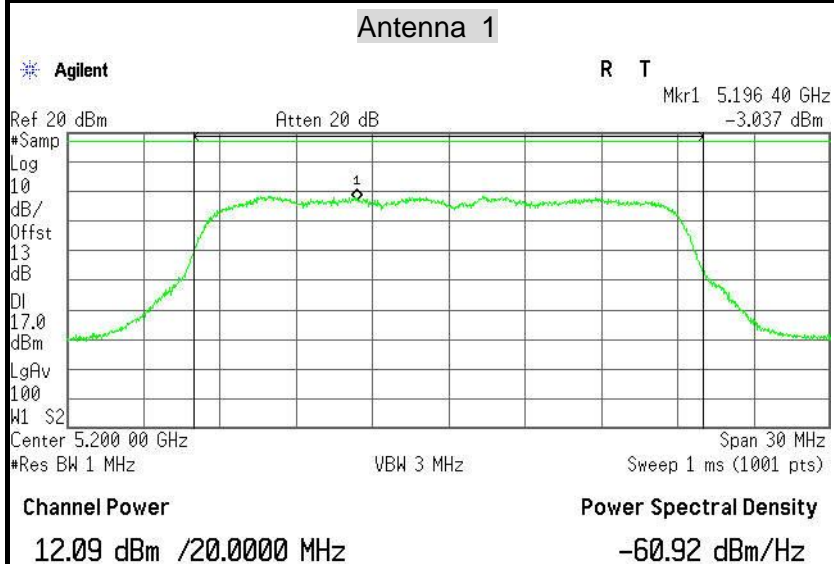


IEEE 802.11n HT 20 MHz mode / 5180 ~ 5240MHz

PPSD (CH Low)

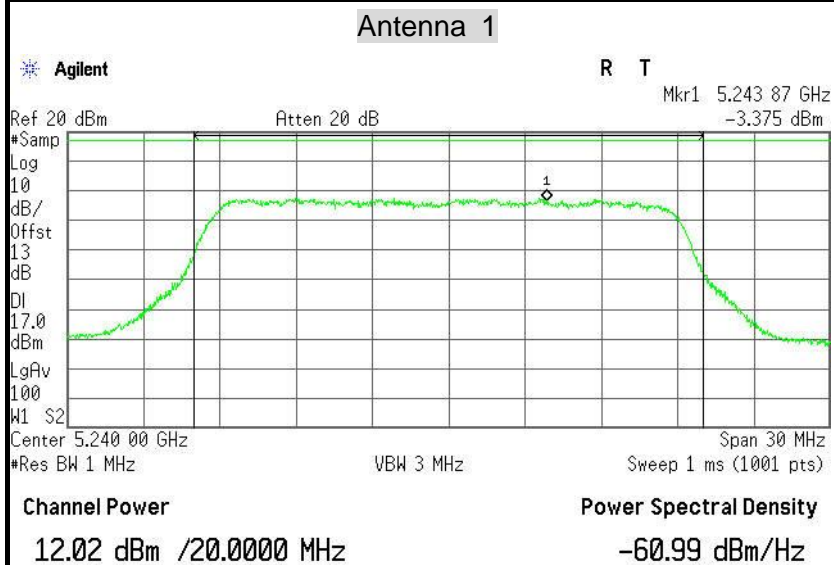


PPSD (CH Mid)



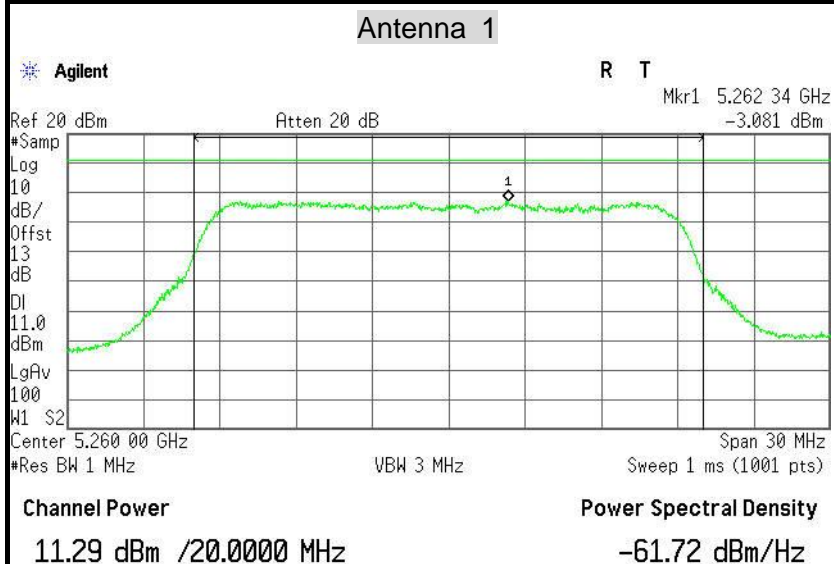


PPSD (CH High)



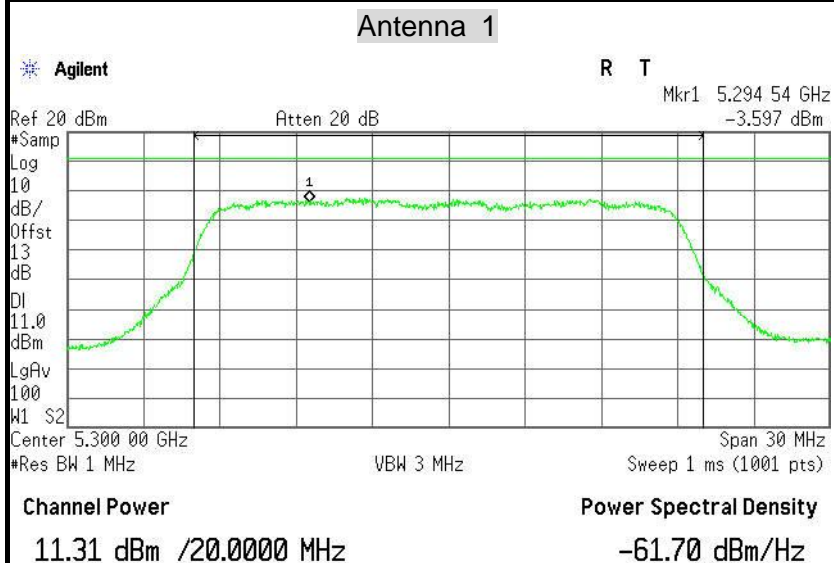
IEEE 802.11n HT 20 MHz mode / 5260~ 5320MHz

PPSD (CH Low)

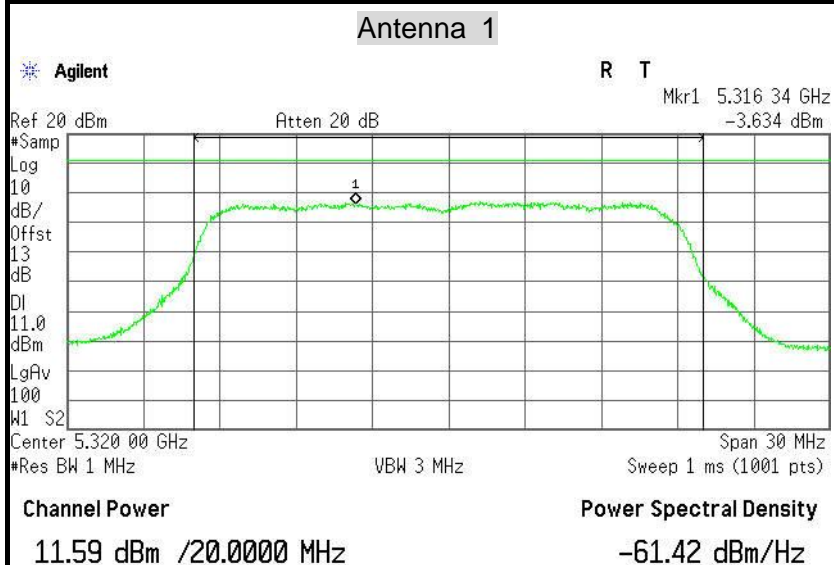




PPSD (CH Mid)



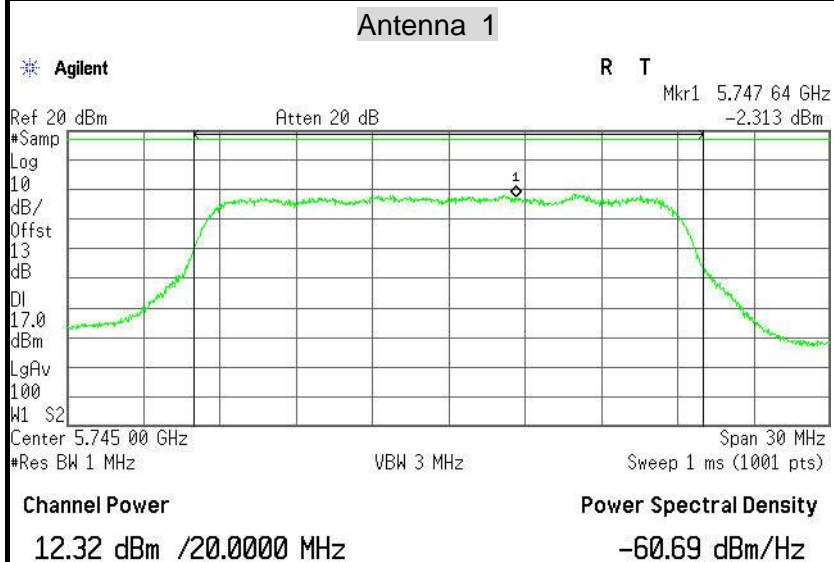
PPSD (CH High)





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

PPSD (CH Low)



PPSD (CH Mid)

