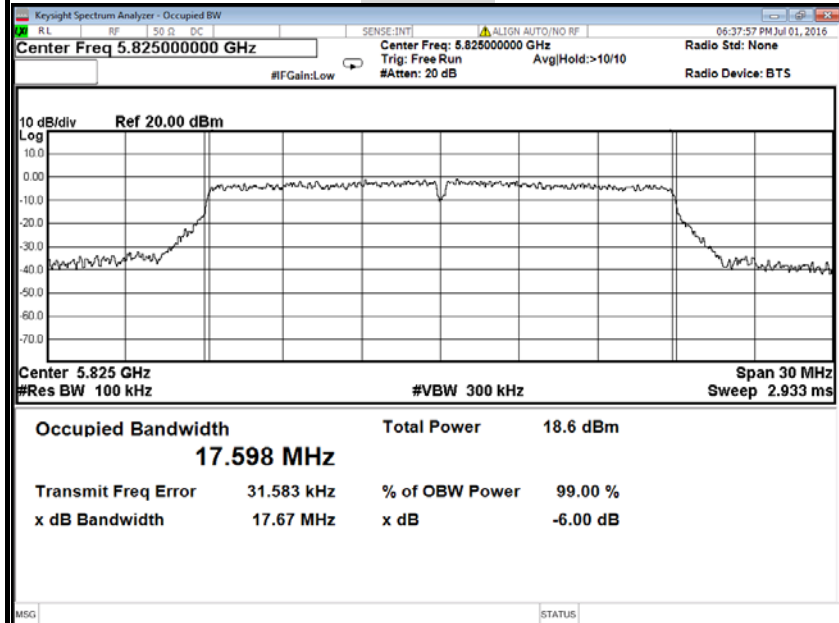




6dB Bandwidth (CH High)

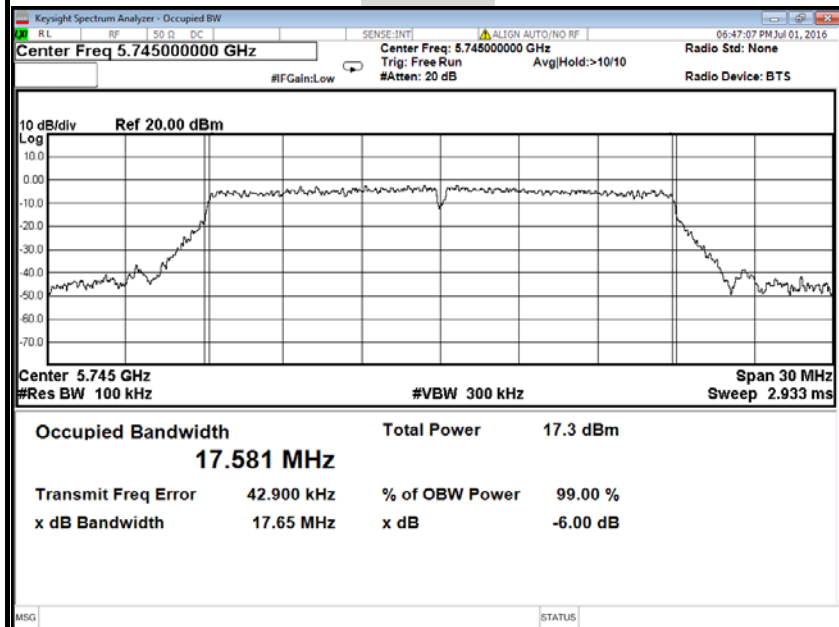
Antenna 0



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

6dB Bandwidth (CH Low)

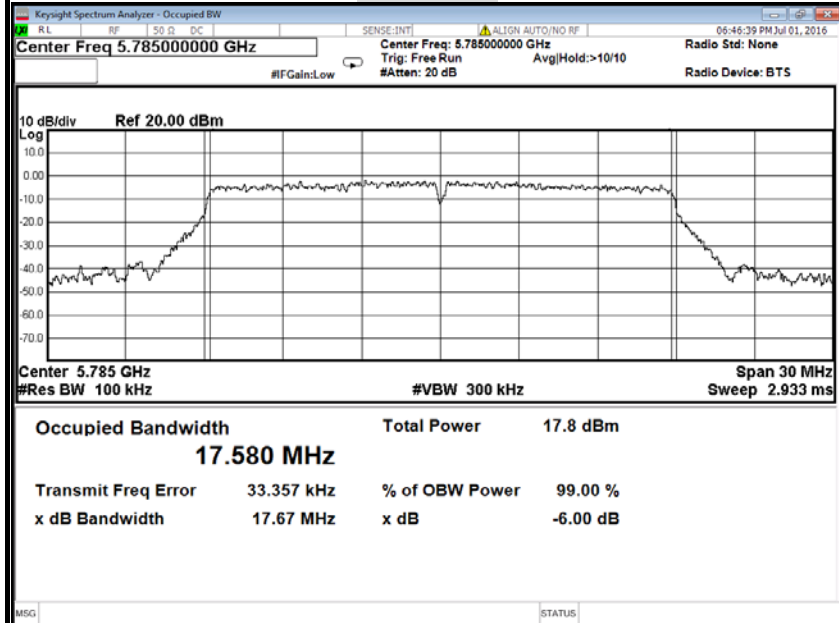
Antenna 1





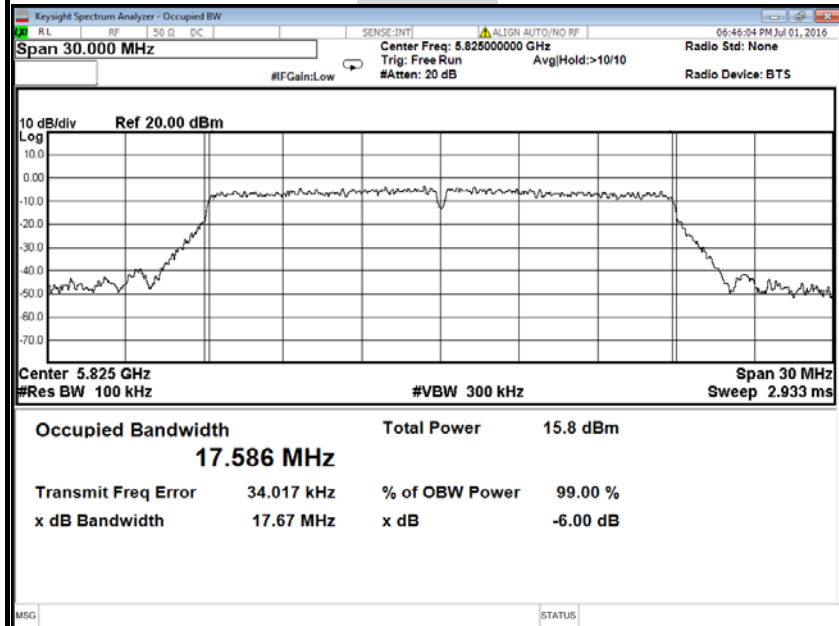
6dB Bandwidth (CH Mid)

Antenna 1



6dB Bandwidth (CH High)

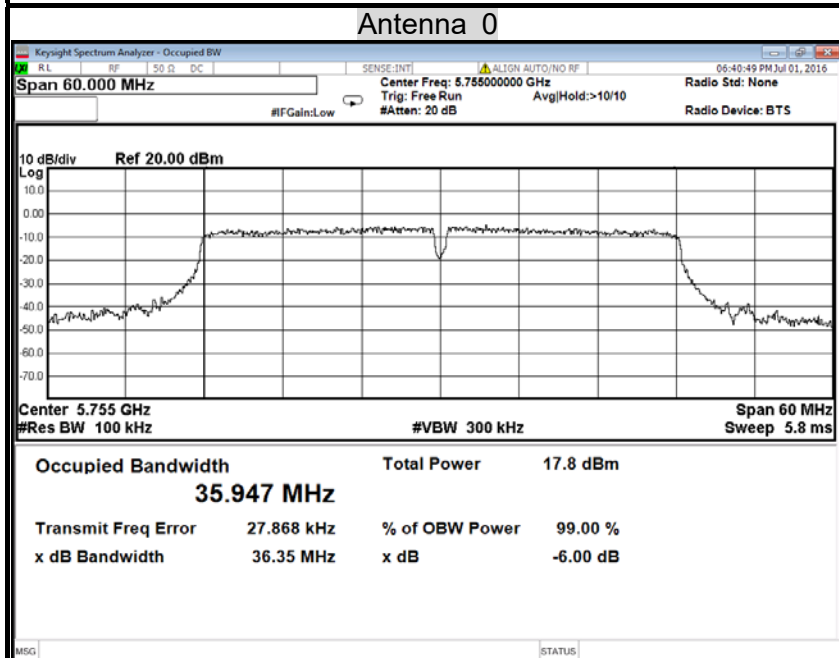
Antenna 1



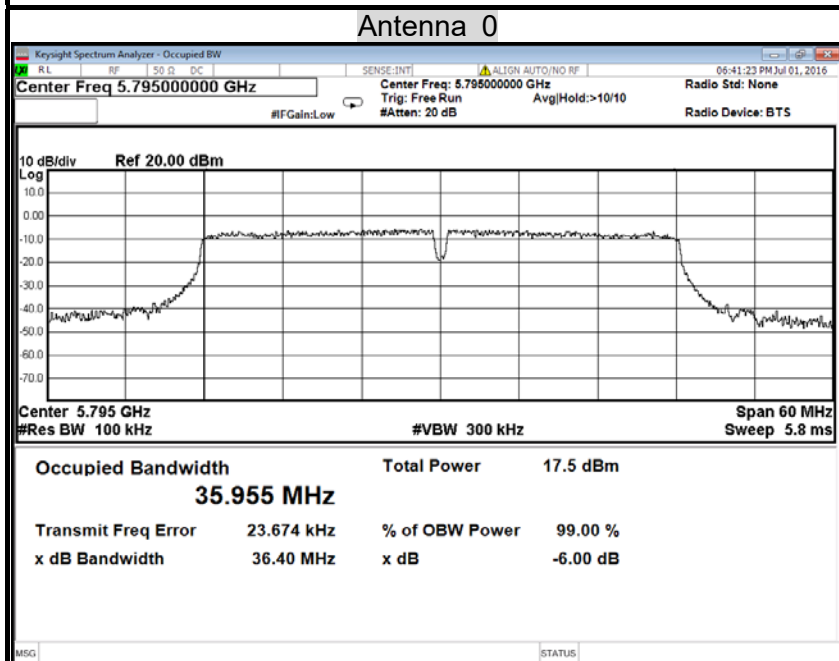


IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz

6dB Bandwidth (CH Low)



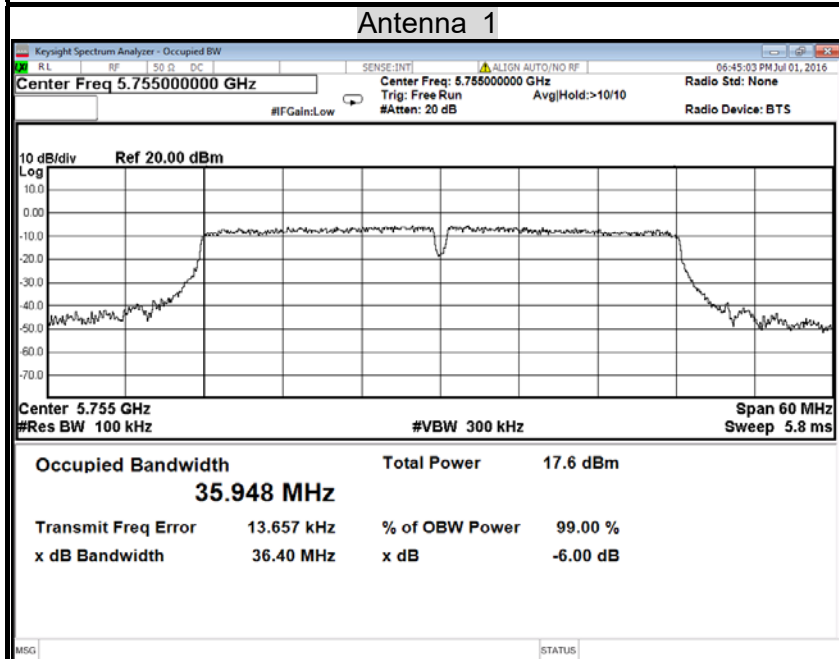
6dB Bandwidth (CH High)



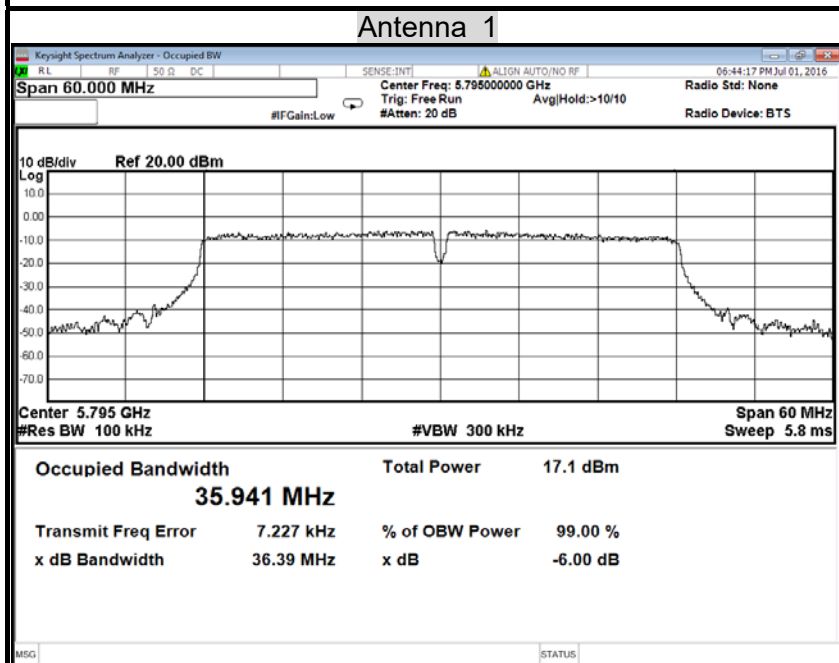


IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz

6dB Bandwidth (CH Low)



6dB Bandwidth (CH High)

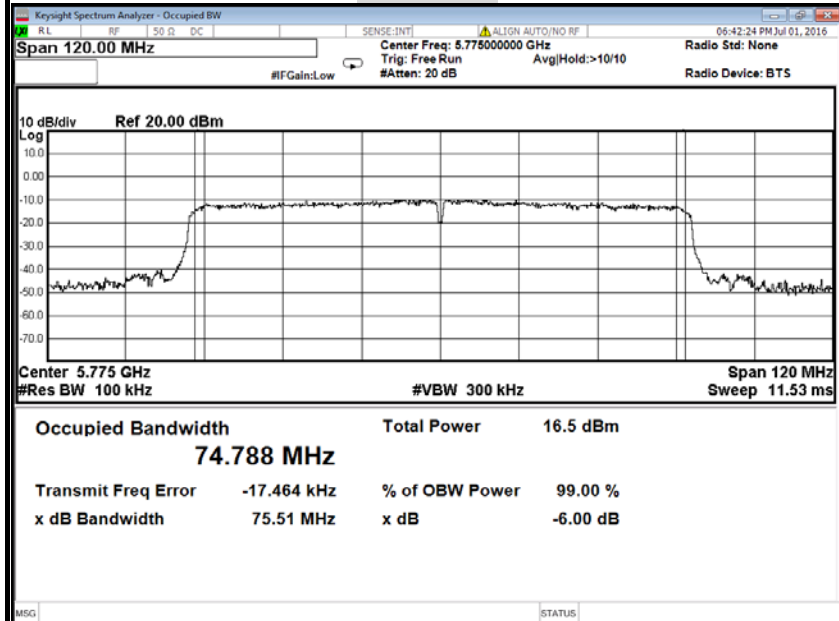




IEEE 802.11ac 80 MHz mode / 5775MHz

6dB Bandwidth

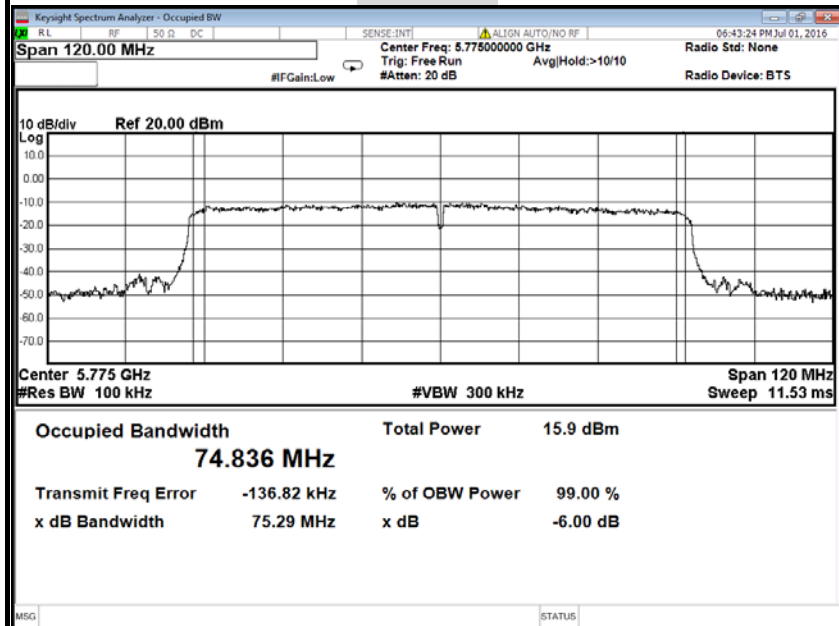
Antenna 0



IEEE 802.11ac 80 MHz mode / 5775MHz

6dB Bandwidth

Antenna 1





6.3 ANTENNA GAIN

MEASUREMENT

The antenna gain of the complete system is calculated by the difference of radiated power in EIRP and the conducted power of the module. For normal WLAN devices, the OFDM mode is used.

MEASUREMENT PARAMETERS

Measurement parameter	
Detector	Peak
Sweep time	Auto
Resolution bandwidth	3 MHz
Video bandwidth	3 MHz
Trace-Mode	Max hold

LIMITS

FCC	IC
Antenna Gain	
6 dBi	



TEST RESULTS

IEEE 802.11a mode / 5180 ~ 5240MHz

T _{nom}	V _{nom}	Lowest channel 5180MHz	Highest channel 5240MHz	Lowest channel 5180MHz	Highest channel 5240MHz
		Antenna 0		Antenna 1	
Conducted power [dBm] Measured with OFDM modulation		-0.40	-1.69	1.87	2.53
Radiated power [dBm] Measured with OFDM modulation		2.83	1.05	4.51	4.73
Gain [dBi] Calculated		3.23	2.74	2.64	2.20
Measurement uncertainty		± 1.5 dB (cond.) / ± 3 dB (rad.)			

IEEE 802.11a mode / 5260~ 5320MHz

T _{nom}	V _{nom}	Lowest channel 5260MHz	Highest channel 5320MHz	Lowest channel 5260MHz	Highest channel 5320MHz
		Antenna 0		Antenna 1	
Conducted power [dBm] Measured with OFDM modulation		2.91	2.67	2.56	2.42
Radiated power [dBm] Measured with OFDM modulation		5.03	4.86	4.97	4.69
Gain [dBi] Calculated		2.12	2.19	2.41	2.27
Measurement uncertainty		± 1.5 dB (cond.) / ± 3 dB (rad.)			

IEEE 802.11a mode / 5500 ~ 5700MHz

T _{nom}	V _{nom}	Lowest channel 5500MHz	Highest channel 5700MHz	Lowest channel 5500MHz	Highest channel 5700MHz
		Antenna 0		Antenna 1	
Conducted power [dBm] Measured with OFDM modulation		2.47	2.32	3.44	2.44
Radiated power [dBm] Measured with OFDM modulation		5.09	4.97	5.98	4.86
Gain [dBi] Calculated		2.62	2.65	2.54	2.42
Measurement uncertainty		± 1.5 dB (cond.) / ± 3 dB (rad.)			

IEEE 802.11a mode / 5745 ~ 5825MHz

T _{nom}	V _{nom}	Lowest channel 5745MHz	Highest channel 5825MHz	Lowest channel 5745MHz	Highest channel 5825MHz
		Antenna 0		Antenna 1	
Conducted power [dBm] Measured with OFDM modulation		2.79	2.60	3.01	2.28
Radiated power [dBm] Measured with OFDM modulation		5.26	5.17	5.86	5.09
Gain [dBi] Calculated		2.47	2.57	2.85	2.81
Measurement uncertainty		± 1.5 dB (cond.) / ± 3 dB (rad.)			



6.4 OUTPUT POWER

6.4.1 LIMIT

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

(1) For the band 5.15-5.25 GHz.

(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.

(iii) For fixed point-to-point access points 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. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. 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.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. 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.

(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 $11 \text{ dBm} + 10 \log B$, 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 30 dBm 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.

Note to paragraph (a)(3): The Commission strongly recommends that parties employing U-NII devices to provide critical communications services should determine if there are any nearby Government radar systems that could affect their operation.

**Specified Limit of the Output 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 0	Antenna 1	Antenna 0	Antenna 1	Antenna 0	Antenna 1	Antenna 0	Antenna 1
Low	5260	19.60	19.35	12.92	12.87	23.92	23.87	23.92	23.92
Mid	5300	19.27	19.40	12.85	12.88	23.85	23.88	23.85	23.88
High	5320	19.35	19.38	12.87	12.87	23.87	23.87	23.87	23.87

Test mode: IEEE 802.11a mode / 5500 ~ 5700MHz

Channel	Frequency (MHz)	26 dB Bandwidth (B) (MHz)		10*Log(B) (dB)		11 + 10*Log(B) (dBm)		Maximum Conducted Output Power Limit (dBm)	
		Antenna 0	Antenna 1	Antenna 0	Antenna 1	Antenna 0	Antenna 1	Antenna 0	Antenna 1
Low	5500	19.61	19.36	12.92	12.87	23.92	23.87	23.92	23.87
Mid	5580	19.40	19.50	12.88	12.90	23.88	23.90	23.88	23.90
High	5700	19.57	19.75	12.92	12.96	23.92	23.96	23.92	23.96

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 0	Antenna 1	Antenna 0	Antenna 1	Antenna 0	Antenna 1	Antenna 0	Antenna 1
Low	5260	19.66	19.91	12.94	12.99	23.94	23.99	23.94	23.99
Mid	5300	19.74	19.71	12.95	12.95	23.95	23.95	23.95	23.95
High	5320	20.02	19.91	13.01	12.99	24.01	23.99	24.00	23.99

Test mode: IEEE 802.11n HT 20 MHz mode / 5500 ~ 5700MHz

Channel	Frequency (MHz)	26 dB Bandwidth (B) (MHz)		10*Log(B) (dB)		11 + 10*Log(B) (dBm)		Maximum Conducted Output Power Limit (dBm)	
		Antenna 0	Antenna 1	Antenna 0	Antenna 1	Antenna 0	Antenna 1	Antenna 0	Antenna 1
Low	5500	19.79	19.75	12.96	12.96	23.96	23.96	23.96	23.96
Mid	5580	20.08	19.83	13.03	12.97	24.03	23.97	24.00	23.97
High	5700	19.76	19.76	12.96	12.96	23.96	23.96	23.96	23.96

**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 0	Antenna 1	Antenna 0	Antenna 1	Antenna 0	Antenna 1	Antenna 0	Antenna 1
Low	5270	39.15	39.13	15.93	15.93	26.93	26.93	24.00	24.00
High	5310	38.74	39.28	15.88	15.94	26.88	26.94	24.00	24.00

IEEE 802.11n HT 40 MHz mode / 5510 ~ 5670MHz

Channel	Frequency (MHz)	26 dB Bandwidth (B) (MHz)		10*Log(B) (dB)		11 + 10*Log(B) (dBm)		Maximum Conducted Output Power Limit (dBm)	
		Antenna 0	Antenna 1	Antenna 0	Antenna 1	Antenna 0	Antenna 1	Antenna 0	Antenna 1
Low	5510	39.08	38.76	15.92	15.88	26.92	26.88	24.00	24.00
Mid	5550	39.18	39.31	15.93	15.95	26.93	26.95	24.00	24.00
High	5670	39.09	39.27	15.92	15.94	26.92	26.94	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 0	Antenna 1	Antenna 0	Antenna 1	Antenna 0	Antenna 1	Antenna 0	Antenna 1
	5290	78.71	78.76	16.00	18.96	29.96	29.96	24.00	24.00

IEEE 802.11ac 80 mode / 5530MHz

Channel	Frequency (MHz)	26 dB Bandwidth (B) (MHz)		10*Log(B) (dB)		11 + 10*Log(B) (dBm)		Maximum Conducted Output Power Limit (dBm)	
		Antenna 0	Antenna 1	Antenna 0	Antenna 1	Antenna 0	Antenna 1	Antenna 0	Antenna 1
	5530	78.77	78.76	16.00	18.96	29.96	29.96	24.00	24.00



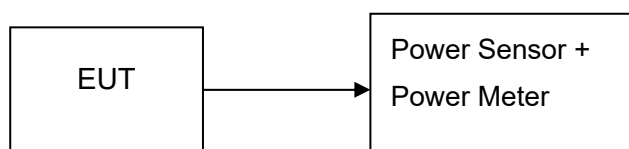
6.4.2 MEASUREMENT EQUIPMENT USED

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.

6.4.3 TEST CONFIGURATIONS

The EUT was connected to a Power Meter through a 50 Ω RF cable.



6.4.4 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.

6.4.5 TEST RESULTS

No non-compliance noted

**6.4.6 TEST DATA****IEEE 802.11a mode / 5180 ~ 5240MHz**

Channel	Frequency (MHz)	AVG Output Power (dBm)		AVG Output Power (W)		Limit (dBm)	Result
		Antenna 0	Antenna 1	Antenna 0	Antenna 1		
Low	5180	11.76	14.04	0.01500	0.02535	30.00	PASS
Mid	5200	10.23	14.94	0.01054	0.03119		PASS
High	5240	10.47	14.69	0.01114	0.02944		PASS

IEEE 802.11a mode / 5260~ 5320MHz

Channel	Frequency (MHz)	AVG Output Power (dBm)		AVG Output Power (W)		Limit (dBm)	Result
		Antenna 0	Antenna 1	Antenna 0	Antenna 1		
Low	5260	15.08	14.71	0.03221	0.02958	23.85	PASS
Mid	5300	14.83	14.78	0.03041	0.03006		PASS
High	5320	14.83	14.58	0.03041	0.02871		PASS

IEEE 802.11a mode / 5500 ~ 5700MHz

Channel	Frequency (MHz)	AVG Output Power (dBm)		AVG Output Power (W)		Limit (dBm)	Result
		Antenna 0	Antenna 1	Antenna 0	Antenna 1		
Low	5500	14.64	15.60	0.02911	0.03631	23.87	PASS
Mid	5580	15.08	14.85	0.03221	0.03055		PASS
High	5700	14.49	14.60	0.02812	0.02884		PASS

IEEE 802.11a mode / 5745 ~ 5825MHz

Channel	Frequency (MHz)	AVG Output Power (dBm)		AVG Output Power (W)		Limit (dBm)	Result
		Antenna 0	Antenna 1	Antenna 0	Antenna 1		
Low	5745	14.94	15.17	0.03119	0.03289	30.00	PASS
Mid	5785	14.73	15.03	0.02972	0.03184		PASS
High	5825	14.76	14.44	0.02992	0.02780		PASS

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

Channel	Frequency (MHz)	AVG Output Power (dBm)			AVG Output Power (dBm)	Limit (dBm)	Result
		Antenna 0	Antenna 1	Total			
Low	5180	12.79	8.74	14.23	0.02649	30.00	PASS
Mid	5200	13.58	11.05	15.51	0.03554		PASS
High	5240	13.61	12.03	15.90	0.03892		PASS

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

Channel	Frequency (MHz)	AVG Output Power (dBm)			AVG Output Power (dBm)	Limit (dBm)	Result
		Antenna 0	Antenna 1	Total			
Low	5260	15.19	15.06	18.14	0.06510	23.94	PASS
Mid	5300	15.63	15.17	18.42	0.06944		PASS
High	5320	15.66	15.31	18.50	0.07078		PASS

IEEE 802.11n HT 20 MHz mode / 5500 ~ 5700MHz

Channel	Frequency (MHz)	AVG Output Power (dBm)			AVG Output Power (dBm)	Limit (dBm)	Result
		Antenna 0	Antenna 1	Total			
Low	5500	13.17	15.01	17.20	0.05244	23.96	PASS
Mid	5580	12.31	15.14	16.96	0.04968		PASS
High	5700	13.07	15.32	17.35	0.05432		PASS

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

Channel	Frequency (MHz)	AVG Output Power (dBm)			AVG Output Power (dBm)	Limit (dBm)	Result
		Antenna 0	Antenna 1	Total			
Low	5745	17.42	15.08	19.42	0.08742	30.00	PASS
Mid	5785	14.95	15.89	18.46	0.07008		PASS
High	5825	15.27	14.93	18.11	0.06477		PASS

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

Channel	Frequency (MHz)	AVG Output Power (dBm)			AVG Output Power (dBm)	Limit (dBm)	Result
		Antenna 0	Antenna 1	Total			
Low	5190	14.34	14.61	17.49	0.05607	30.00	PASS
High	5230	14.01	15.50	17.83	0.06066		PASS

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

Channel	Frequency (MHz)	AVG Output Power (dBm)			AVG Output Power (dBm)	Limit (dBm)	Result
		Antenna 0	Antenna 1	Total			
Low	5270	14.52	15.50	18.05	0.06380	24.00	PASS
High	5310	14.86	14.51	17.70	0.05887		PASS

IEEE 802.11n HT 40 MHz mode / 5510 ~ 5670MHz

Channel	Frequency (MHz)	AVG Output Power (dBm)			AVG Output Power (dBm)	Limit (dBm)	Result
		Antenna 0	Antenna 1	Total			
Low	5510	14.77	14.46	17.63	0.05792	24.00	PASS
Mid	5550	13.95	14.50	17.24	0.05302		PASS
High	5670	14.41	14.54	17.49	0.05605		PASS

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

Channel	Frequency (MHz)	AVG Output Power (dBm)			AVG Output Power (dBm)	Limit (dBm)	Result
		Antenna 0	Antenna 1	Total			
Low	5755	15.63	14.28	18.02	0.06335	30.00	PASS
High	5795	14.19	14.47	17.34	0.05423		PASS

**IEEE 802.11ac 80 mode / 5210MHz**

Channel	Frequency (MHz)	AVG Output Power (dBm)			AVG Output Power (dBm)	Limit (dBm)	Result
		Antenna 0	Antenna 1	Total			
	5210	13.62	12.43	16.08	0.04051	30.00	PASS

IEEE 802.11ac 80 mode / 5290MHz

Channel	Frequency (MHz)	AVG Output Power (dBm)			AVG Output Power (dBm)	Limit (dBm)	Result
		Antenna 0	Antenna 1	Total			
	5290	11.94	12.52	15.25	0.03350	24.00	PASS

IEEE 802.11ac 80 mode / 5530MHz

Channel	Frequency (MHz)	AVG Output Power (dBm)			AVG Output Power (dBm)	Limit (dBm)	Result
		Antenna 0	Antenna 1	Total			
	5530	13.15	12.58	15.88	0.03877	24.00	PASS

IEEE 802.11ac 80 mode / 5775MHz

Channel	Frequency (MHz)	AVG Output Power (dBm)			AVG Output Power (dBm)	Limit (dBm)	Result
		Antenna 0	Antenna 1	Total			
	5775	13.82	12.54	16.24	0.04205	30.00	PASS



6.5 BAND EDGES MEASUREMENT

6.5.1 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.

6.5.2 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	N9010A	MY52221469	02/21/2016	02/20/2017
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100783	02/21/2016	02/20/2017
Amplifier	EMEC	EM330	060661	03/18/2016	03/17/2017
High Noise Amplifier	Agilent	8449B	3008A01838	02/21/2016	02/20/2017
Loop Antenna	COM-POWER	AL-130	121044	09/25/2016	09/24/2017
Bilog Antenna	SCHAFFNER	CBL6143	5082	02/21/2016	02/20/2017
Horn Antenna	SCHWARZBECK	BBHA9120	D286	02/28/2016	02/27/2017
Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170-497	02/28/2016	02/27/2017
Turn Table	N/A	N/A	N/A	N.C.R	N.C.R
Antenna Tower	SUNOL	TLT2	N/A	N.C.R	N.C.R
Controller	Sunol Sciences	SC104V	022310-1	N.C.R	N.C.R
Controller	CT	N/A	N/A	N.C.R	N.C.R
Temp. / Humidity Meter	Anymetre	JR913	N/A	02/21/2016	02/20/2017
Test S/W	FARAD	LZ-RF / CCS-SZ-3A2			

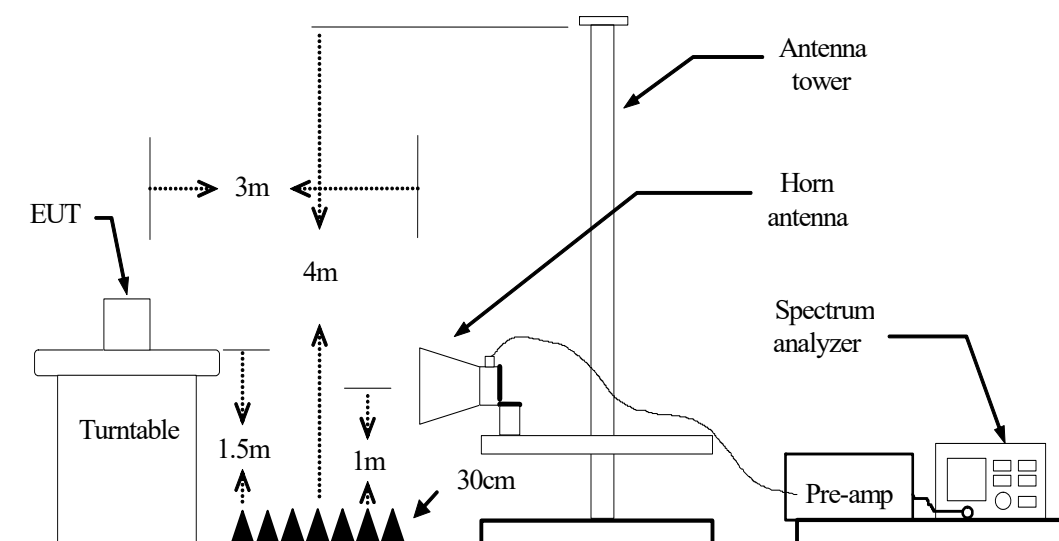
NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The FCC Site Registration number is 101879.

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



6.5.3 TEST CONFIGURATION



6.5.4 TEST 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=10Hz / Sweep=AUTO / Detector=Peak
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.



6.5.5 TEST RESULT

IEEE 802.11a mode / 5500 ~ 5700MHz

Antenna 0:

1. Operating Frequency: 5500-5700MHz
2. CH Low: 5500MHz, CH High: 5700MHz
3. 26dB bandwidth: CH Low: 19.61MHz, CH High: 19.57MHz
4. Frequency Range: 5490.1950MHz, 5709.7850MHz

Antenna 1:

1. Operating Frequency: 5500-5700MHz
2. CH Low: 5500MHz, CH High: 5700MHz
3. 26dB bandwidth: CH Low: 19.36MHz, CH High: 19.75MHz
4. Frequency Range: 5490.3200MHz, 5709.8750MHz

IEEE 802.11a mode / 5745 ~ 5825MHz

Antenna 0:

1. Operating Frequency: 5745-5825MHz
2. CH Low: 5745MHz, CH High: 5825MHz
3. 26dB bandwidth: CH Low: 19.41MHz, CH High: 19.25MHz
4. Frequency Range: 5735.2950MHz, 5834.6250MHz

Antenna 1:

1. Operating Frequency: 5745-5825MHz
2. CH Low: 5745MHz, CH High: 5825MHz
3. 26dB bandwidth: CH Low: 19.83MHz, CH High: 19.70MHz
4. Frequency Range: 5735.0850MHz, 5834.8500MHz



IEEE 802.11n HT 20 MHz mode / 5500 ~ 5700MHz

Antenna 0:

1. Operating Frequency: 5500-5700MHz
2. CH Low: 5500MHz, CH High: 5700MHz
3. 26dB bandwidth: CH Low: 19.79MHz, CH High: 19.76MHz
4. Frequency Range: 5490.1050MHz, 5709.8800MHz

Antenna 1:

1. Operating Frequency: 5500-5700MHz
2. CH Low: 5500MHz, CH High: 5700MHz
3. 26dB bandwidth: CH Low: 19.75MHz, CH High: 19.76MHz
4. Frequency Range: 5490.1250MHz, 5709.8800MHz

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

Antenna 0:

1. Operating Frequency: 5745-5825MHz
2. CH Low: 5745MHz, CH High: 5825MHz
3. 26dB bandwidth: CH Low: 19.82MHz, CH High: 19.95MHz
4. Frequency Range: 5735.0900MHz, 5834.9750MHz

Antenna 1:

1. Operating Frequency: 5745-5825MHz
2. CH Low: 5745MHz, CH High: 5825MHz
3. 26dB bandwidth: CH Low: 19.89MHz, CH High: 19.82MHz
4. Frequency Range: 5735.0550MHz, 5834.9100MHz



IEEE 802.11n HT 40 MHz mode / 5510 ~ 5670MHz

Antenna 0:

1. Operating Frequency: 5510-5670MHz
2. CH Low: 5510MHz, CH High: 5670MHz
3. 26dB bandwidth: CH Low: 39.08MHz, CH High: 39.09MHz
4. Frequency Range: 5490.4600MHz, 5689.5450MHz

Antenna 1:

1. Operating Frequency: 5510-5670MHz
2. CH Low: 5510MHz, CH High: 5670MHz
3. 26dB bandwidth: CH Low: 38.76MHz, CH High: 39.27MHz
4. Frequency Range: 5490.6200MHz, 5689.6350MHz

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

Antenna 0:

1. Operating Frequency: 5755-5795MHz
2. CH Low: 5755MHz, CH High: 5795MHz
3. 26dB bandwidth: CH Low: 39.36MHz, CH High: 39.37MHz
4. Frequency Range: 5735.3200MHz, 5814.6850MHz

Antenna 1:

1. Operating Frequency: 5755-5795MHz
2. CH Low: 5755MHz, CH High: 5795MHz
3. 26dB bandwidth: CH Low: 38.84MHz, CH High: 39.27MHz
4. Frequency Range: 5735.5800MHz, 5814.6350MHz



IEEE 802.11ac 80 mode / 5530MHz

Antenna 0:

1. Operating Frequency: 5530MHz
2. CH: 5530MHz
3. 26dB bandwidth: CH: 78.77MHz
4. Frequency Range: 5490.6150MHz, 5569.3850MHz

Antenna 1:

1. Operating Frequency: 5530MHz
2. CH: 5530MHz
3. 26dB bandwidth: CH: 78.76MHz
4. Frequency Range: 5490.6200MHz, 5569.3800MHz

IEEE 802.11ac 80 mode / 5775MHz

Antenna 0:

1. Operating Frequency: 5775MHz
2. CH: 5775MHz
3. 26dB bandwidth: CH: 78.94MHz
4. Frequency Range: 5735.5300MHz, 5814.4700MHz

Antenna 1:

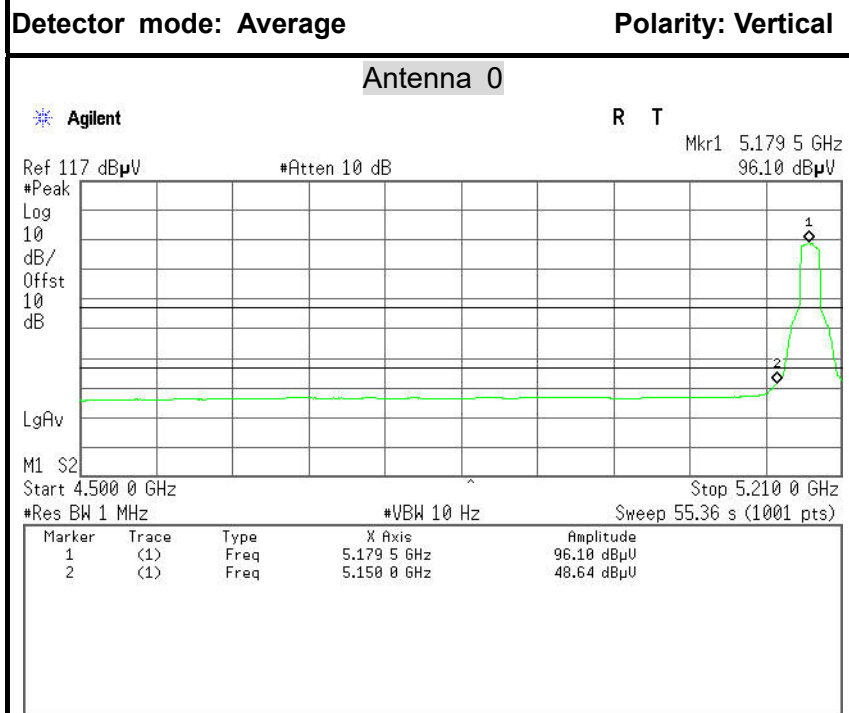
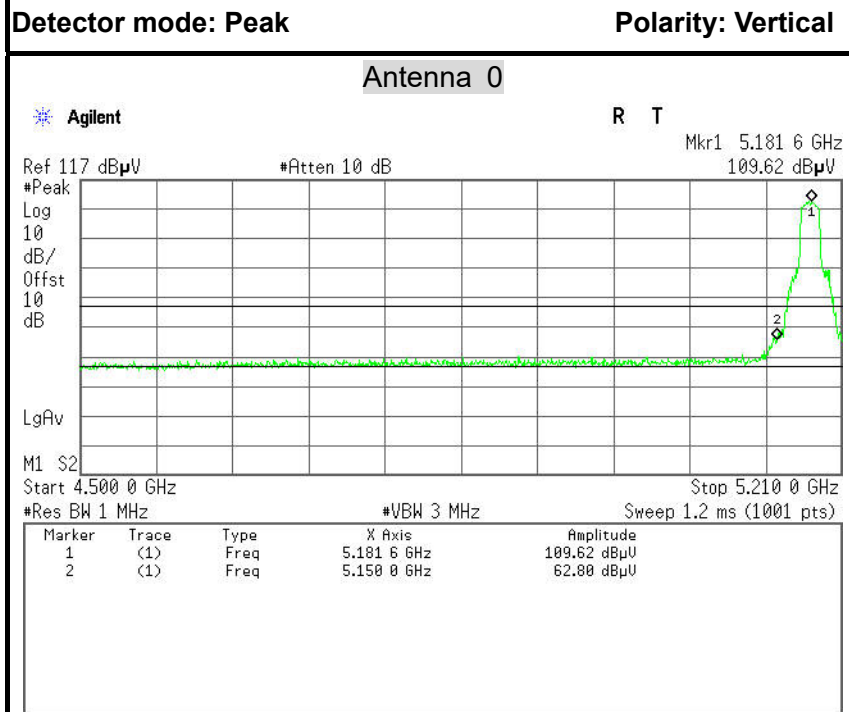
1. Operating Frequency: 5775MHz
2. CH: 5775MHz
3. 26dB bandwidth: CH: 78.64MHz
4. Frequency Range: 5735.6800MHz, 5814.3200MHz

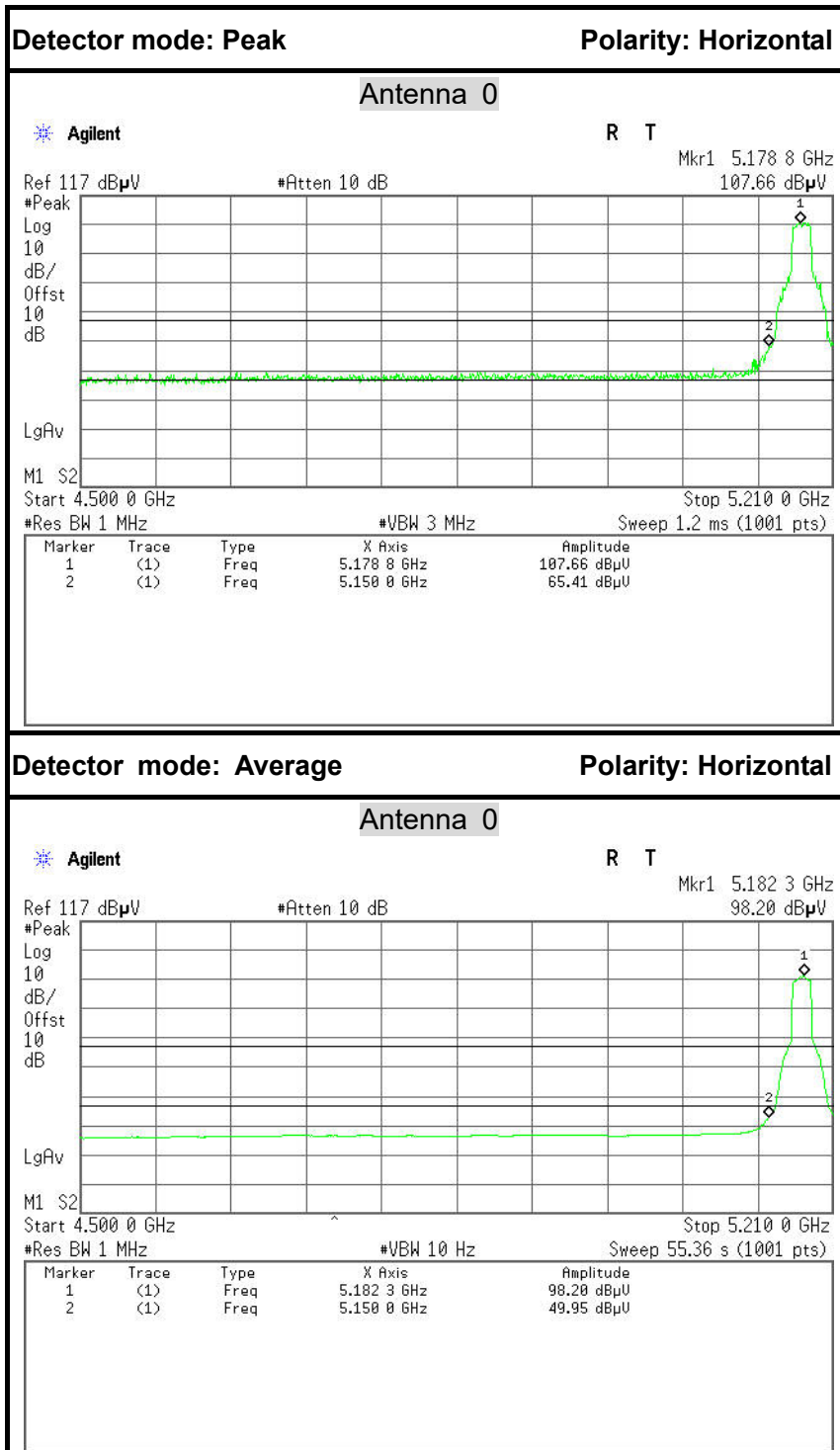
Because the mentioned conditions the Fundamental Frequency Range was far away from the Restricted bands in the table published in 15.205,, the test is not applicable.



Test Plot

IEEE 802.11a mode / 5180MHz



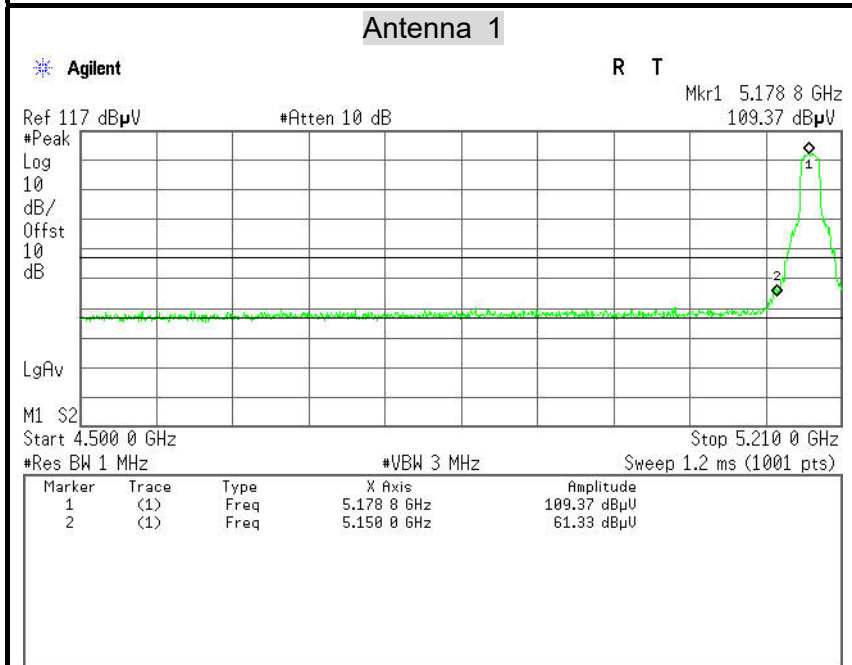




IEEE 802.11a mode / 5180MHz

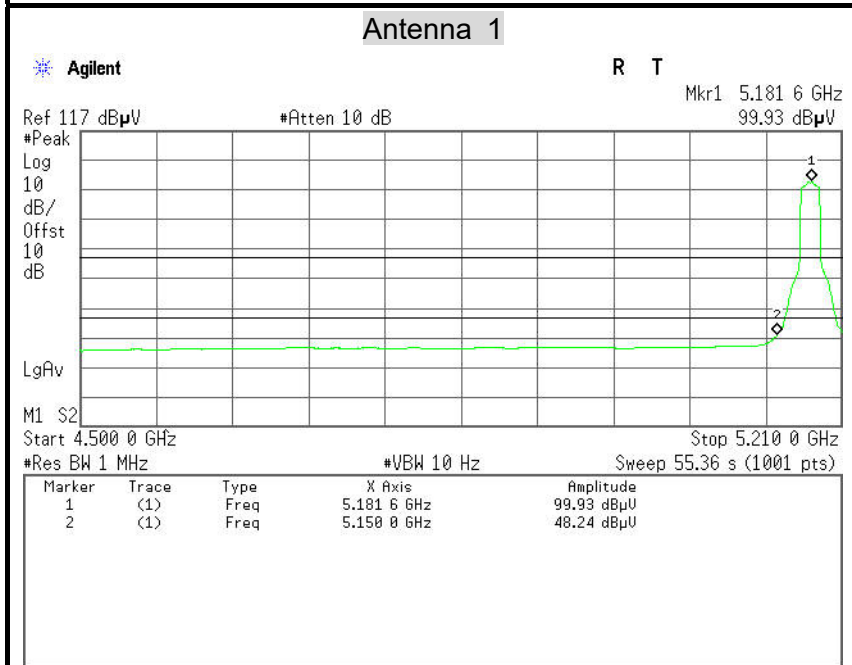
Detector mode: Peak

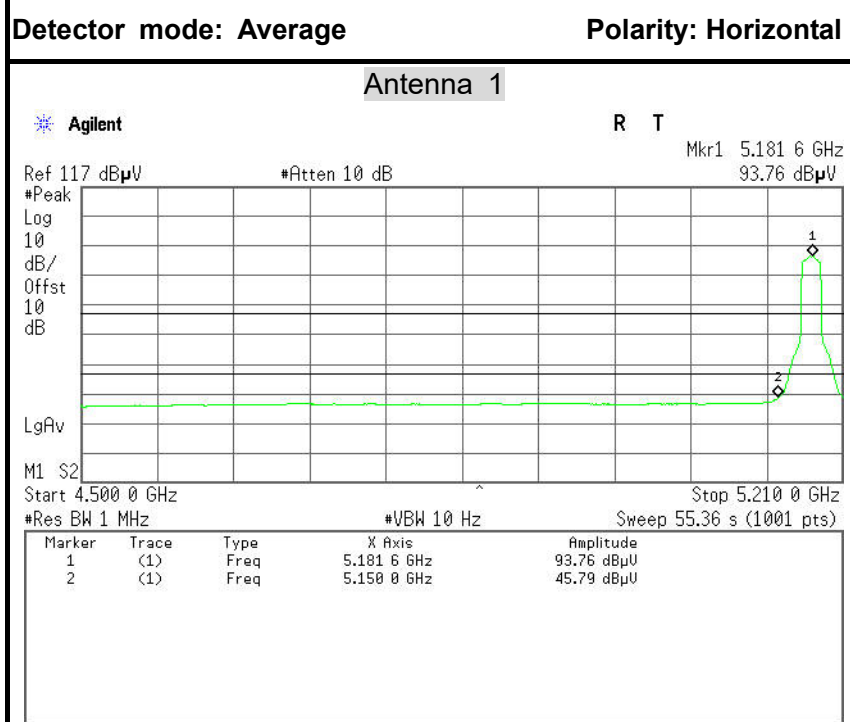
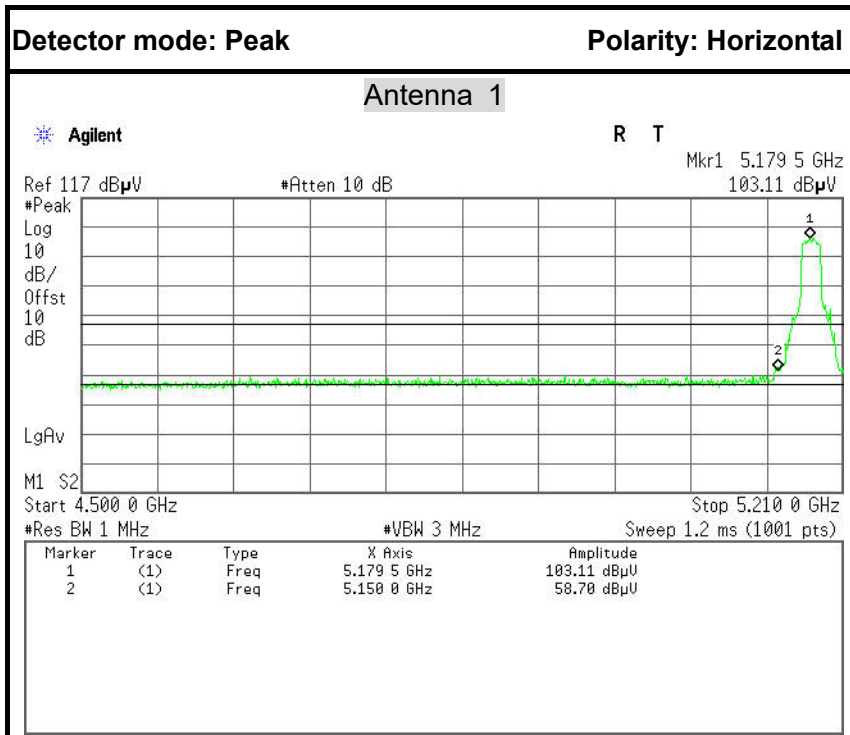
Polarity: Vertical



Detector mode: Average

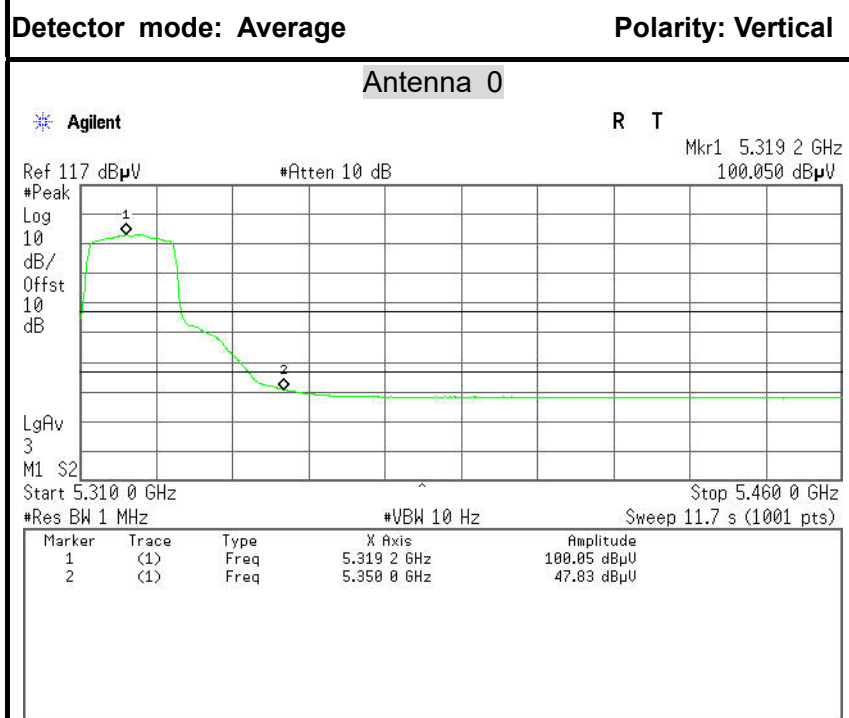
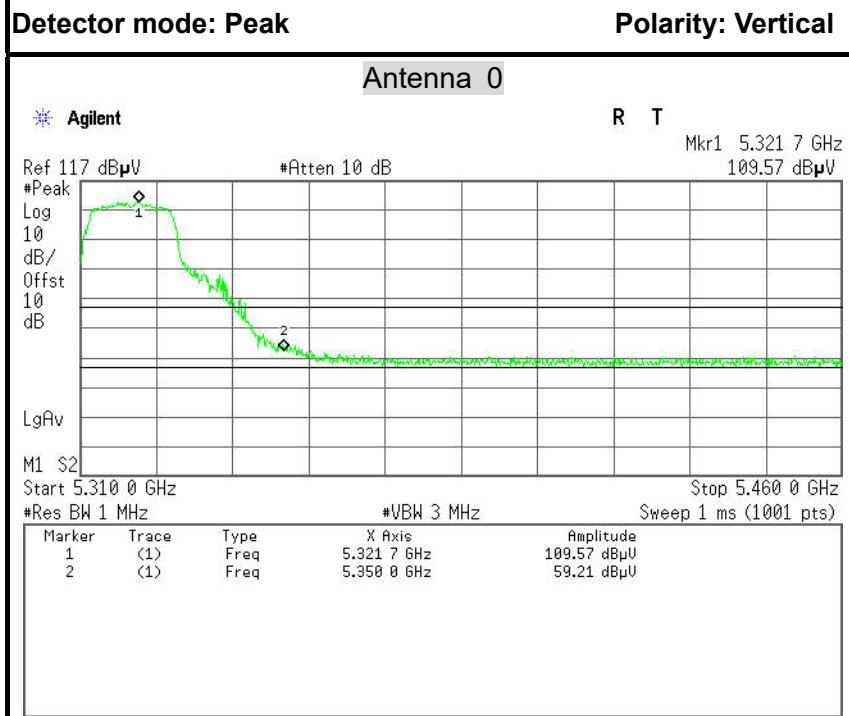
Polarity: Vertical

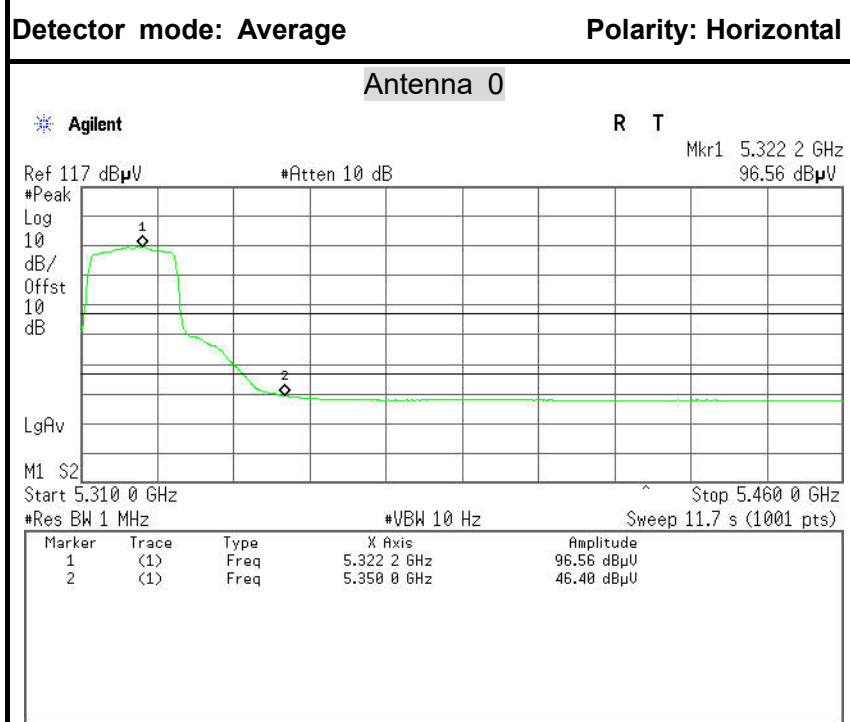
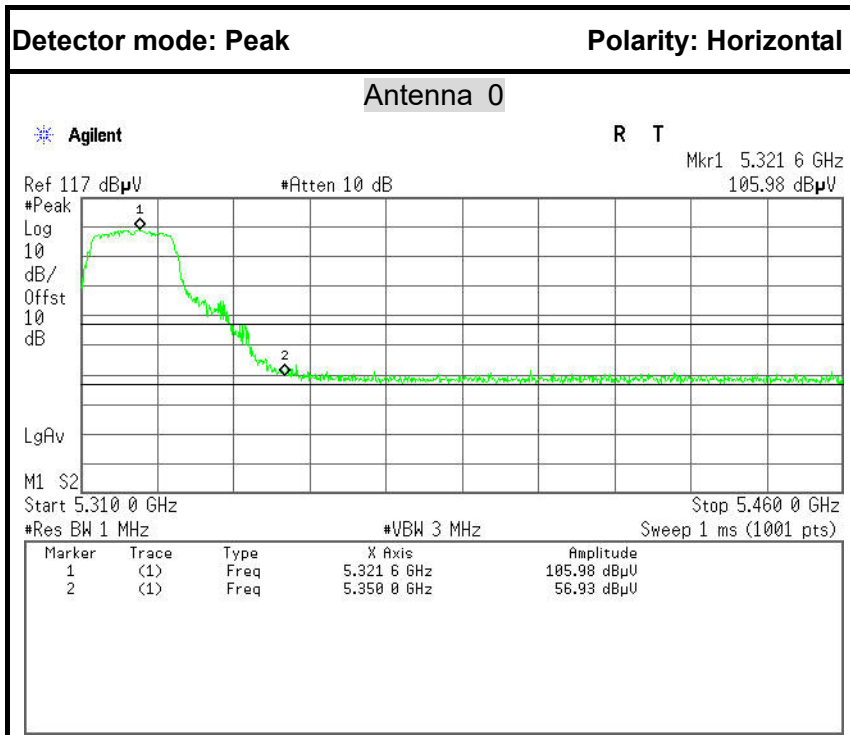






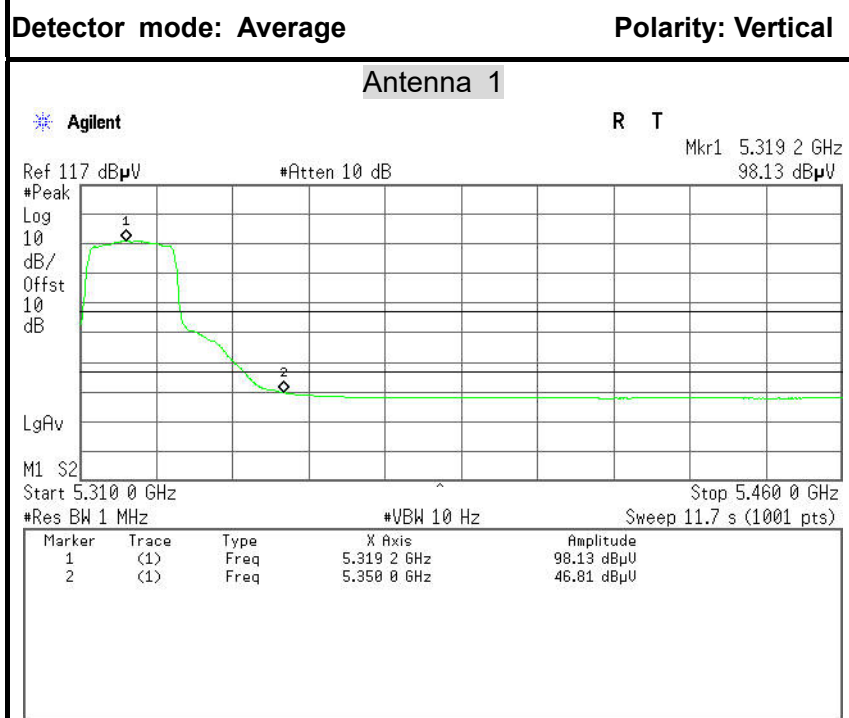
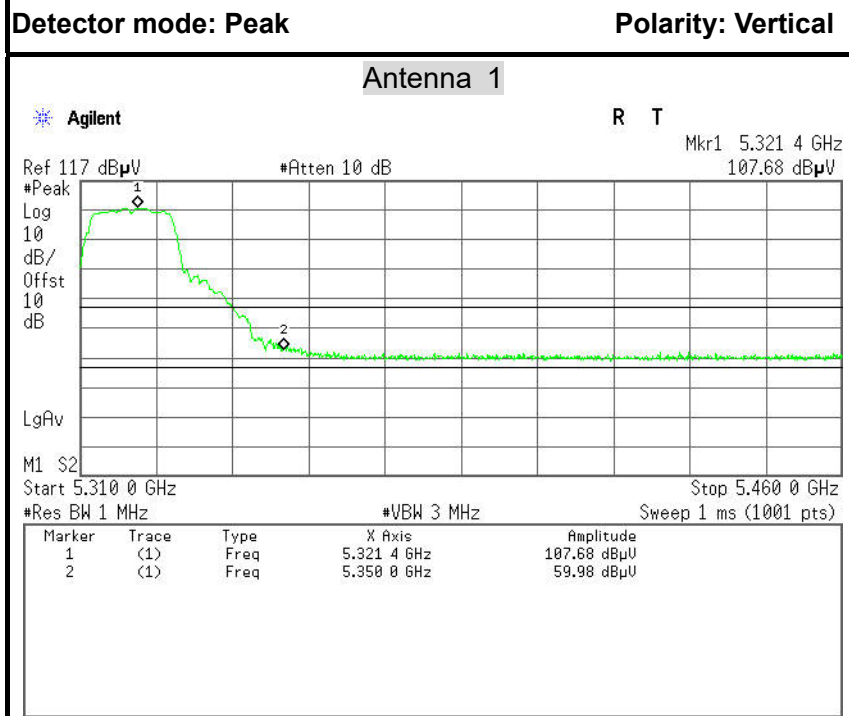
IEEE 802.11a mode / 5320MHz

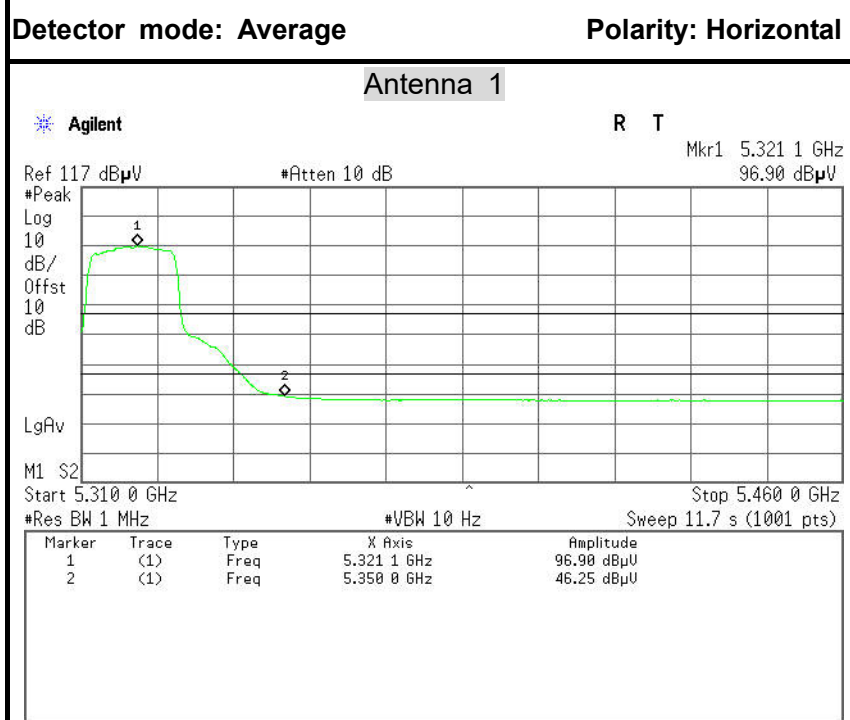
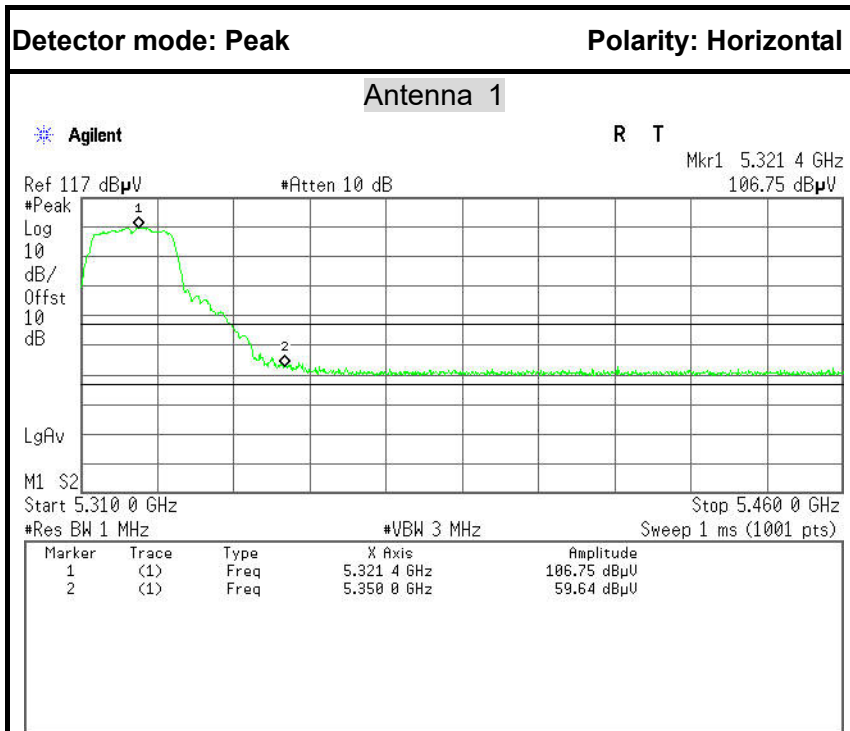






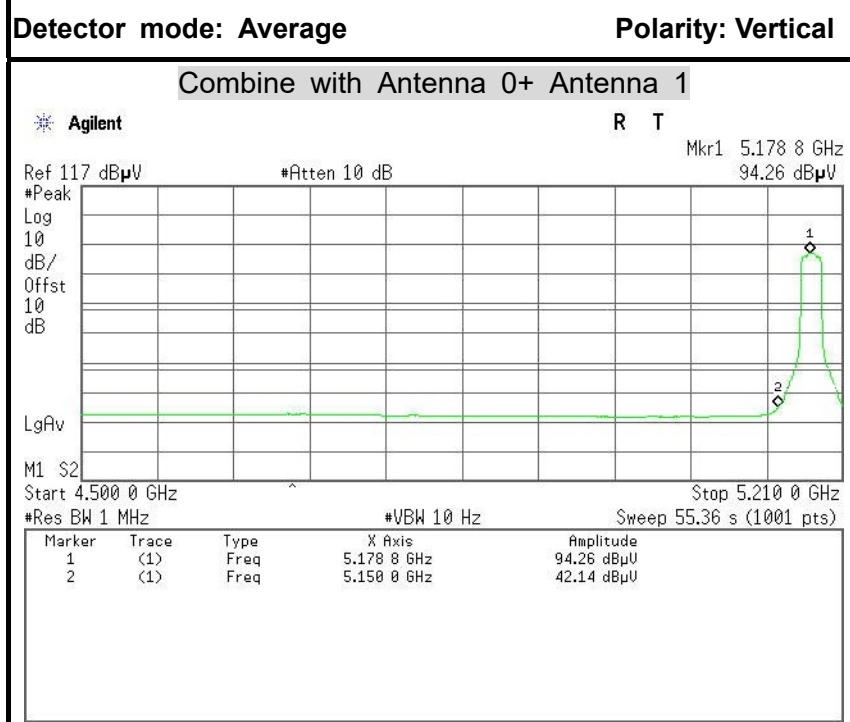
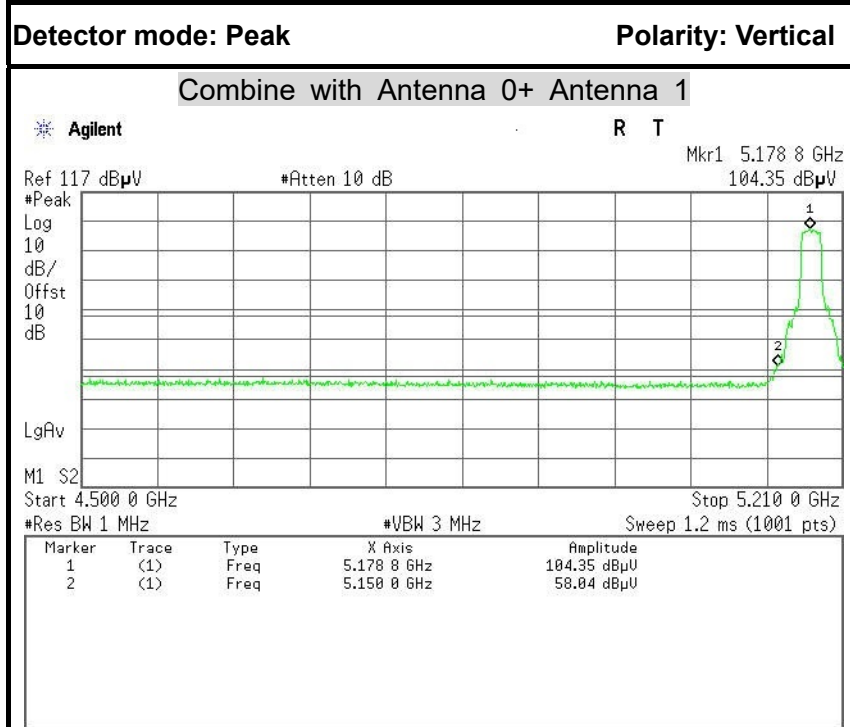
IEEE 802.11a mode / 5320MHz







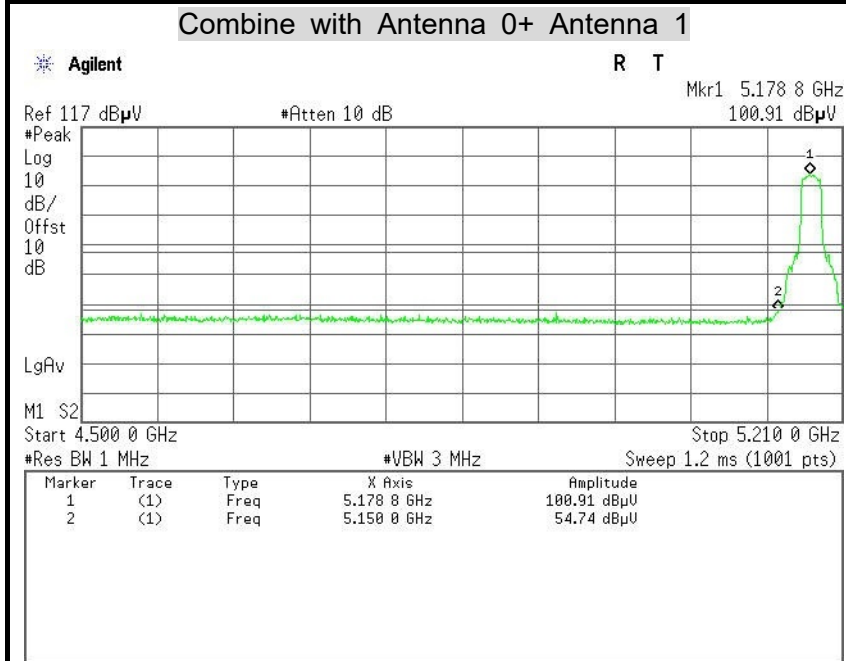
IEEE 802.11n HT 20 MHz mode / 5180 MHz





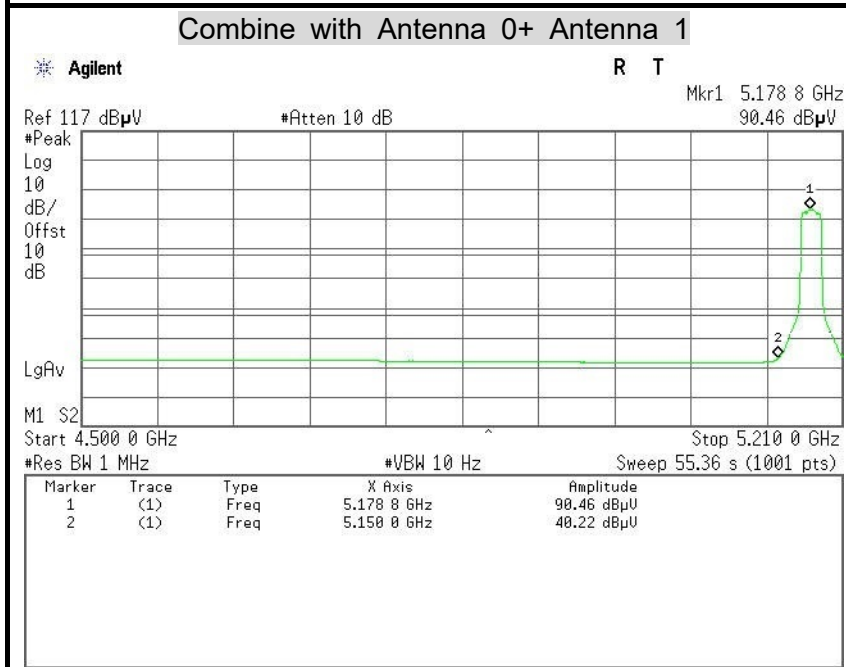
Detector mode: Peak

Polarity: Horizontal



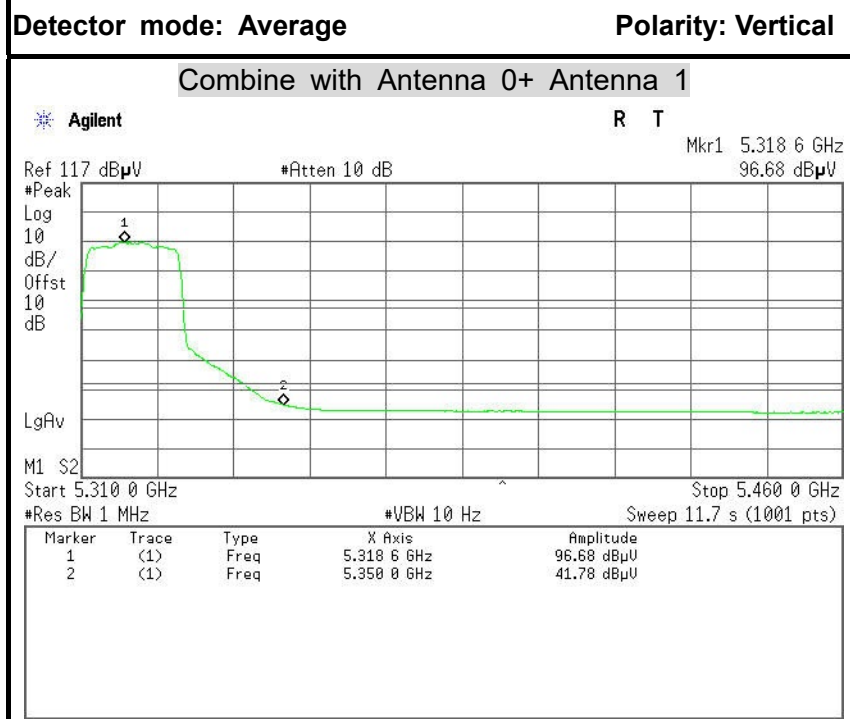
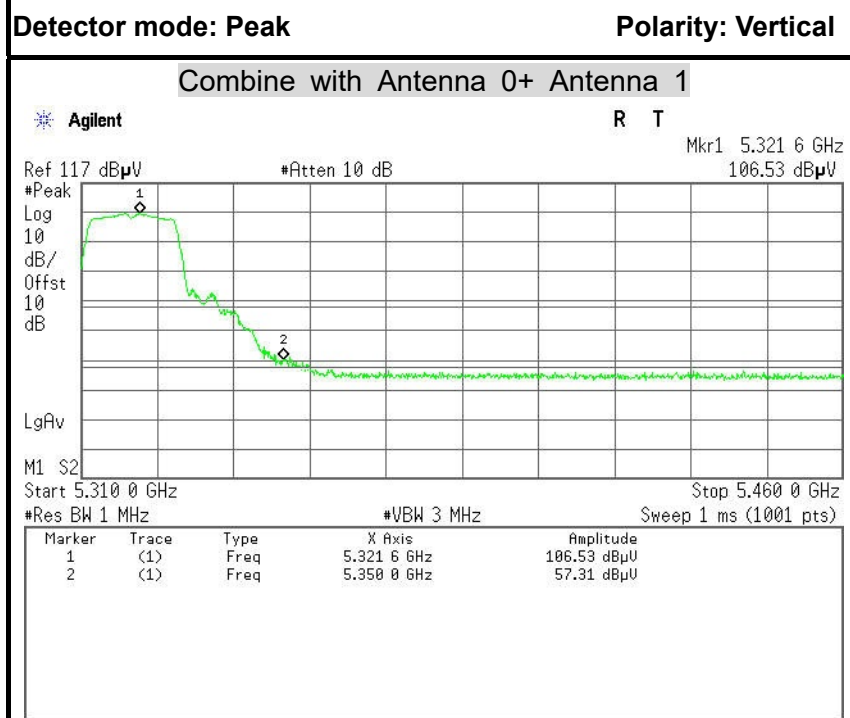
Detector mode: Average

Polarity: Horizontal





IEEE 802.11n HT 20 MHz mode / 5320 MHz





Detector mode: Peak

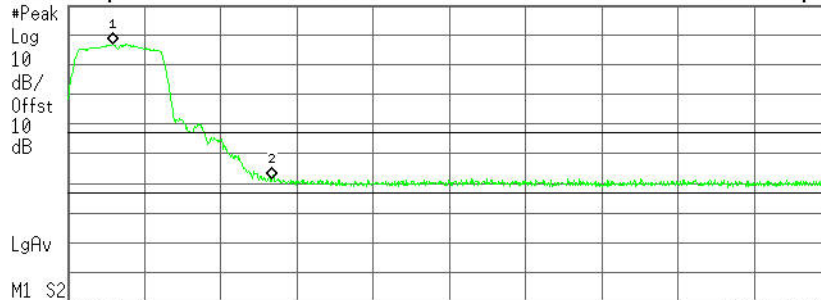
Polarity: Horizontal

Combine with Antenna 0+ Antenna 1

Agilent

R T

Ref 117 dBμV #Atten 10 dB Mkr1 5.318 7 GHz
103.93 dBμV



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	5.318 7 GHz	103.93 dBμV
2	(1)	Freq	5.350 0 GHz	58.57 dBμV

Detector mode: Average

Polarity: Horizontal

Combine with Antenna 0+ Antenna 1

Agilent

R T

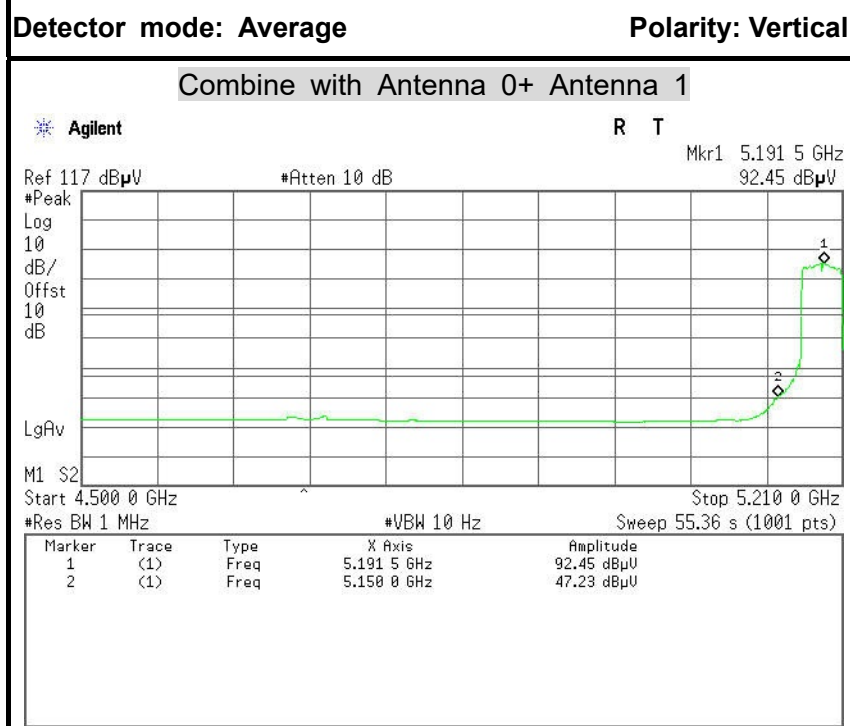
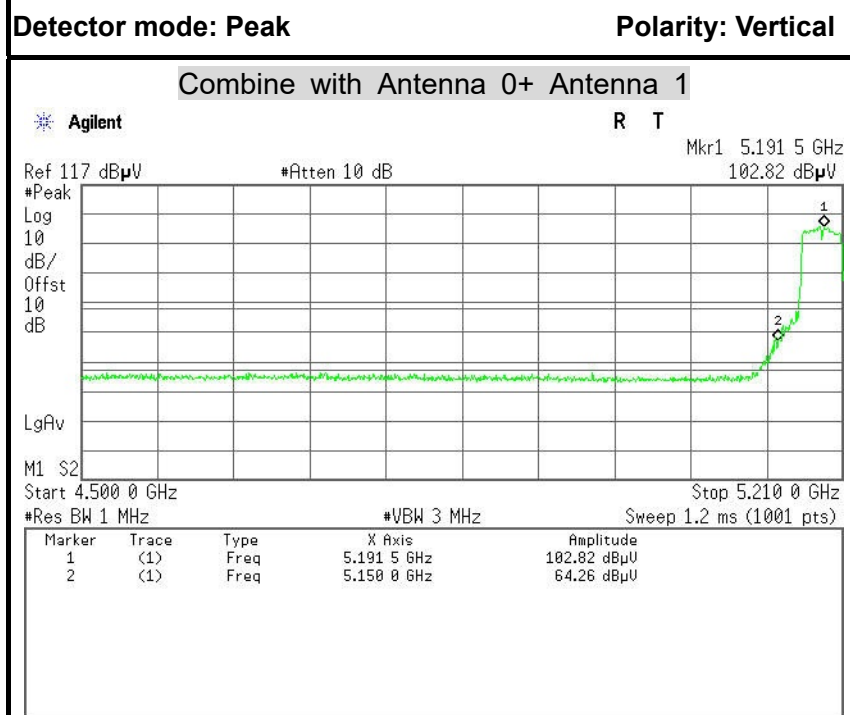
Ref 117 dBμV #Atten 10 dB Mkr1 5.318 7 GHz
93.28 dBμV

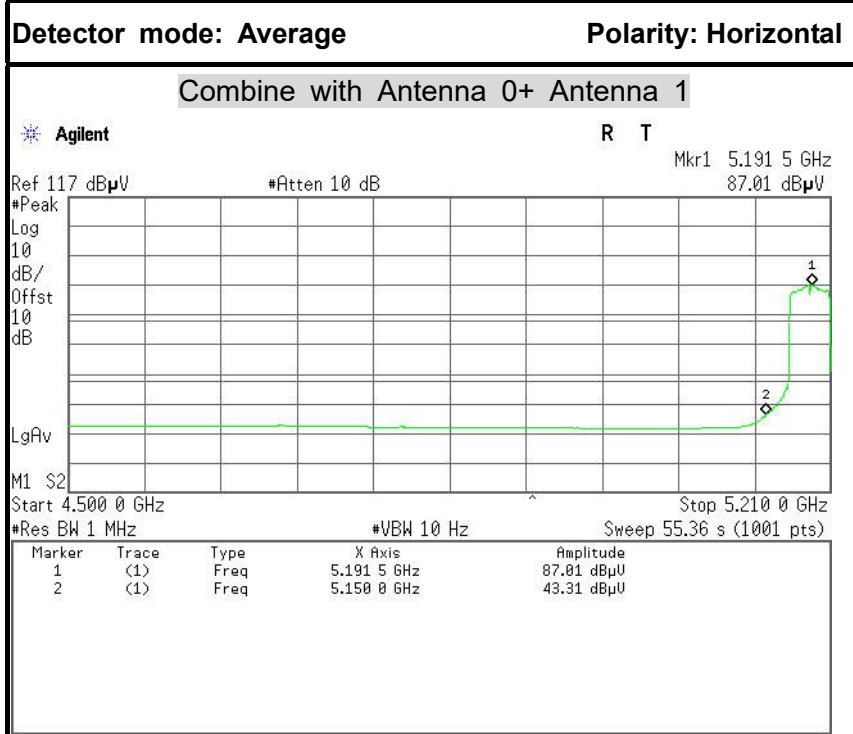
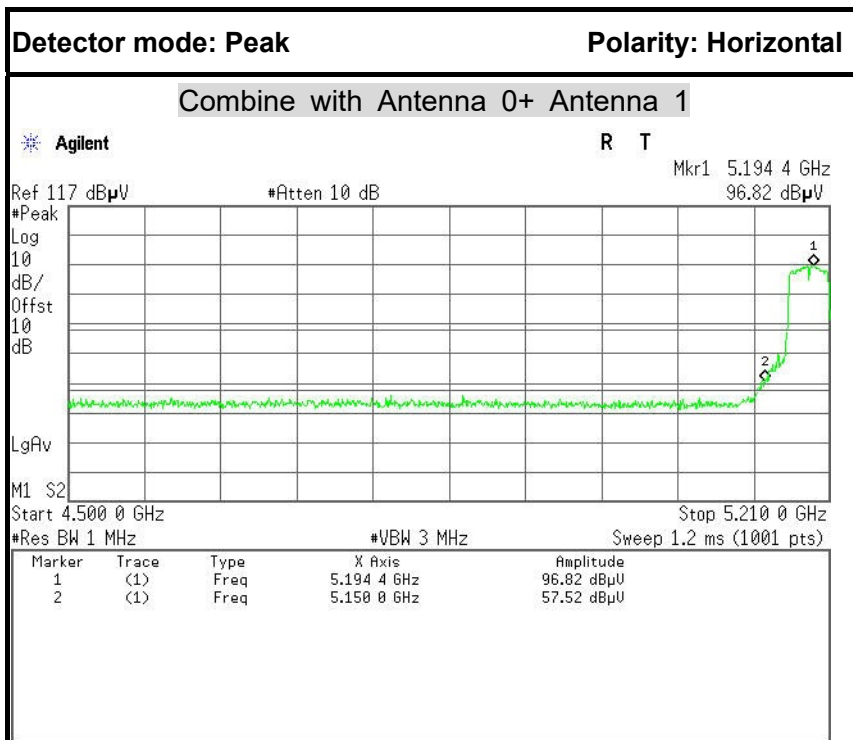


Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	5.318 7 GHz	93.28 dBμV
2	(1)	Freq	5.350 0 GHz	45.88 dBμV



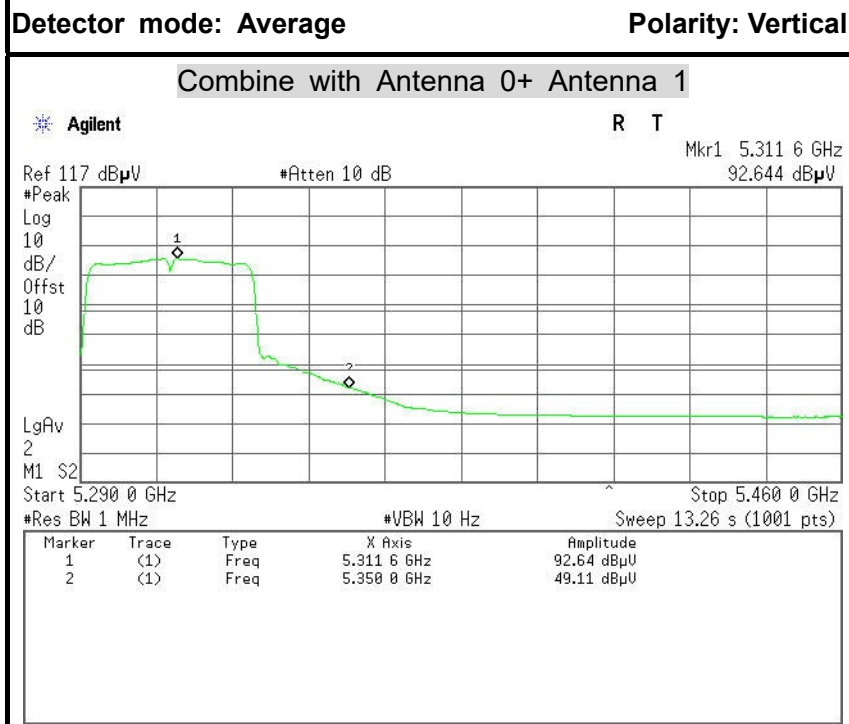
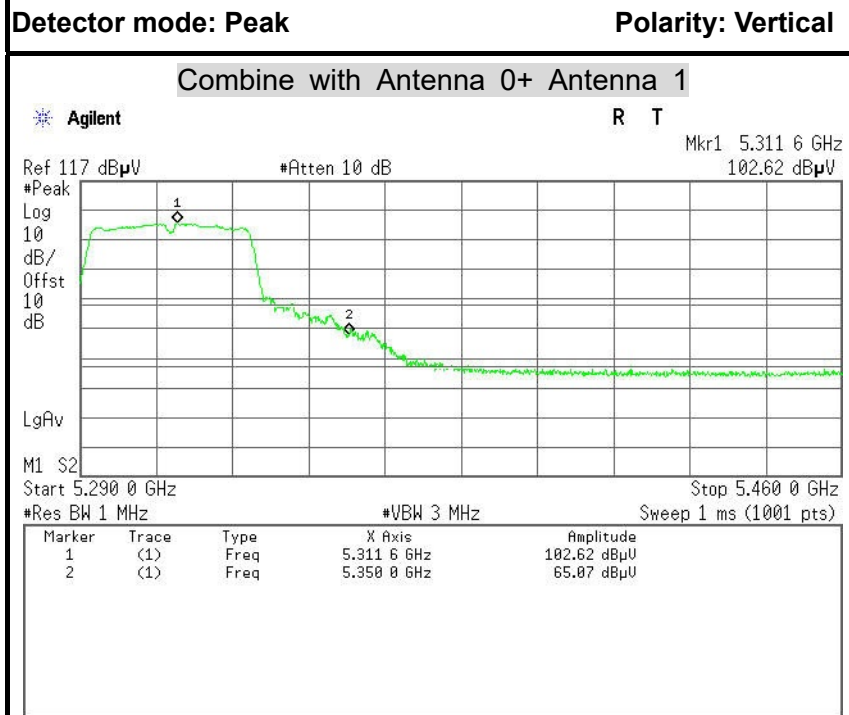
IEEE 802.11n HT 40 MHz mode / 5190 MHz

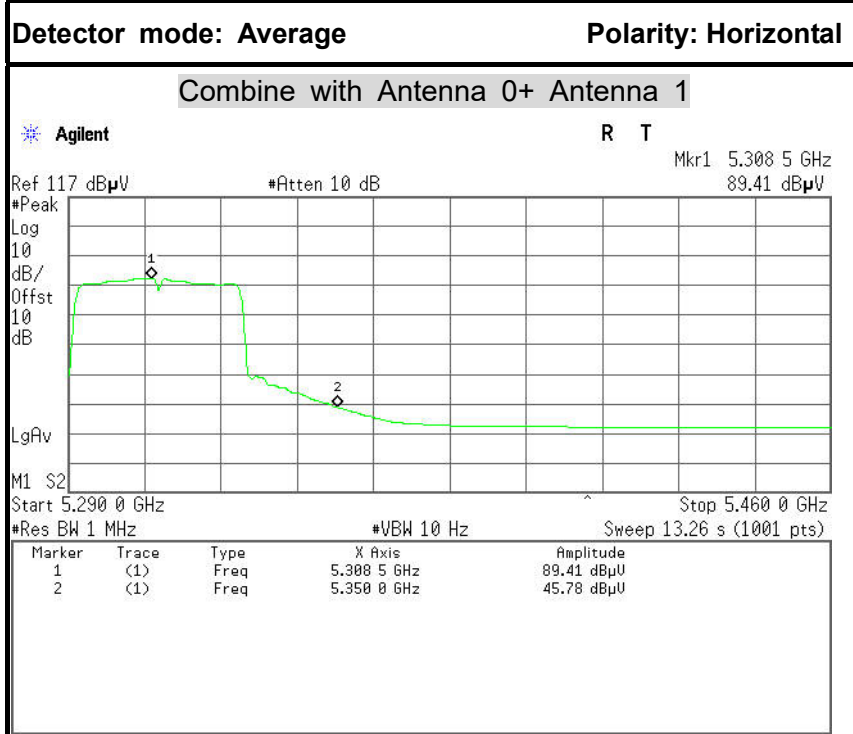
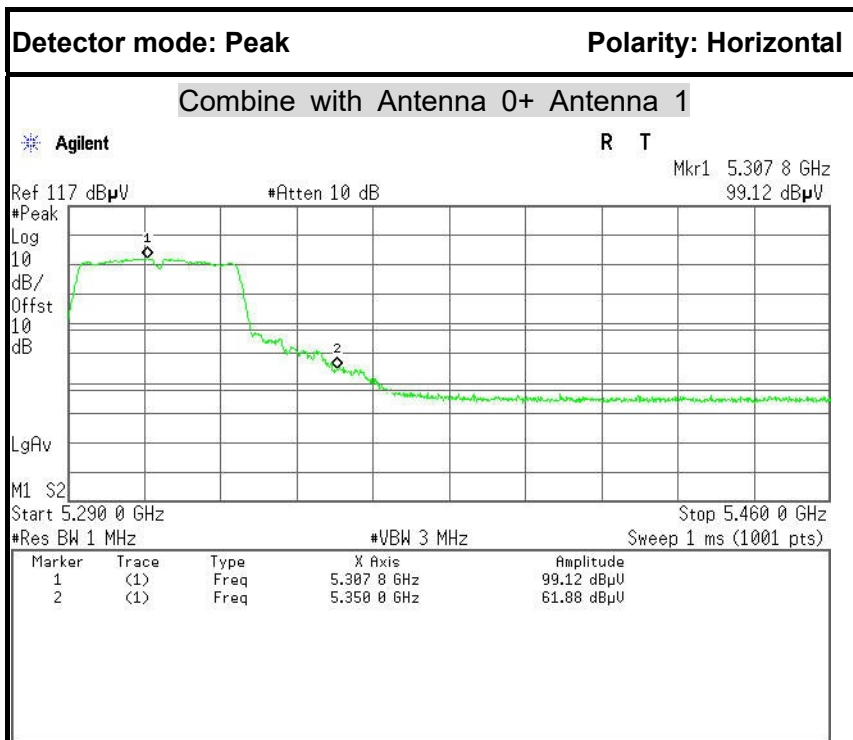






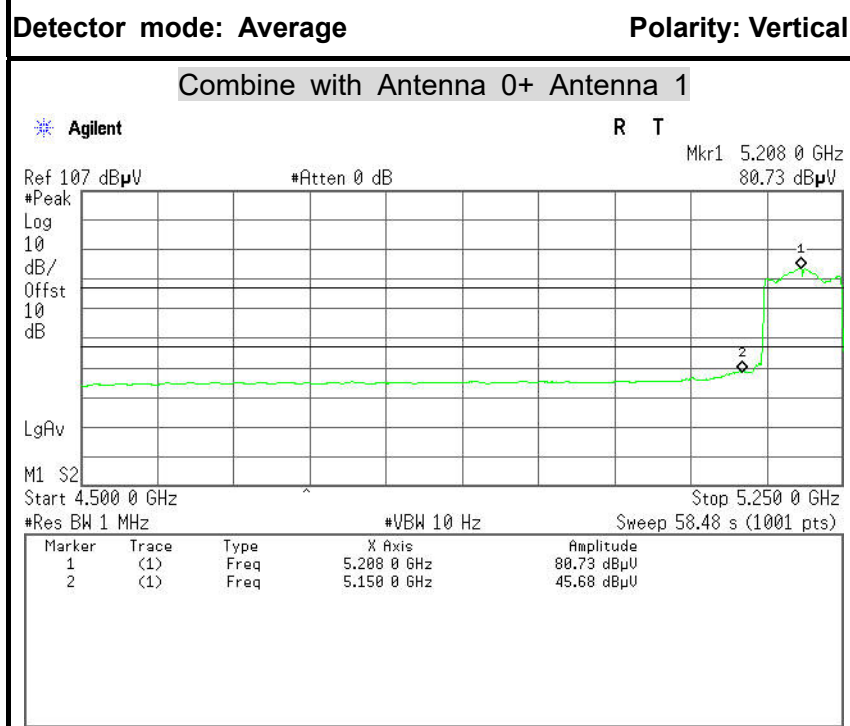
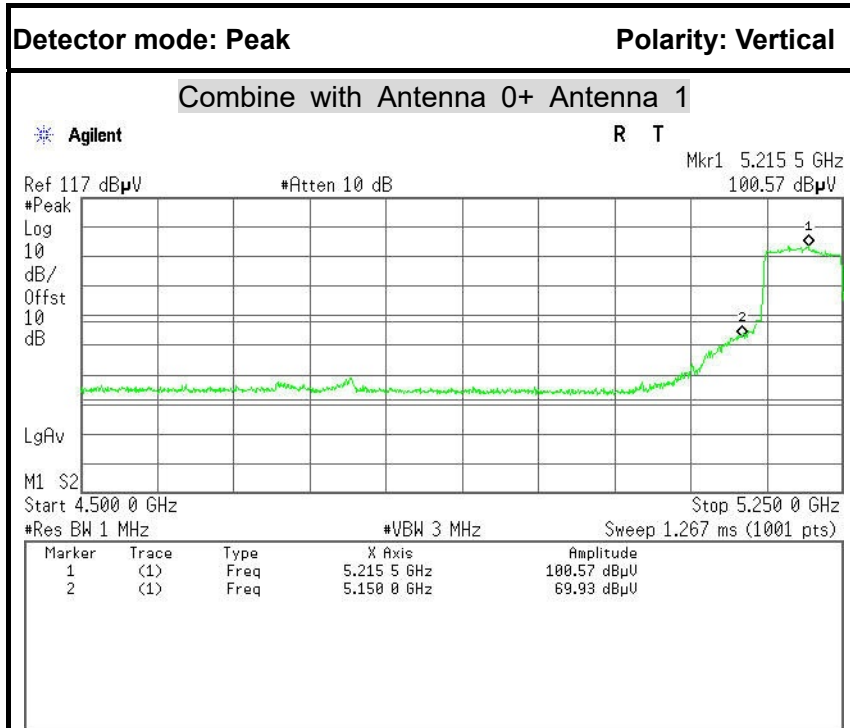
IEEE 802.11n HT 40 MHz mode / 5310 MHz

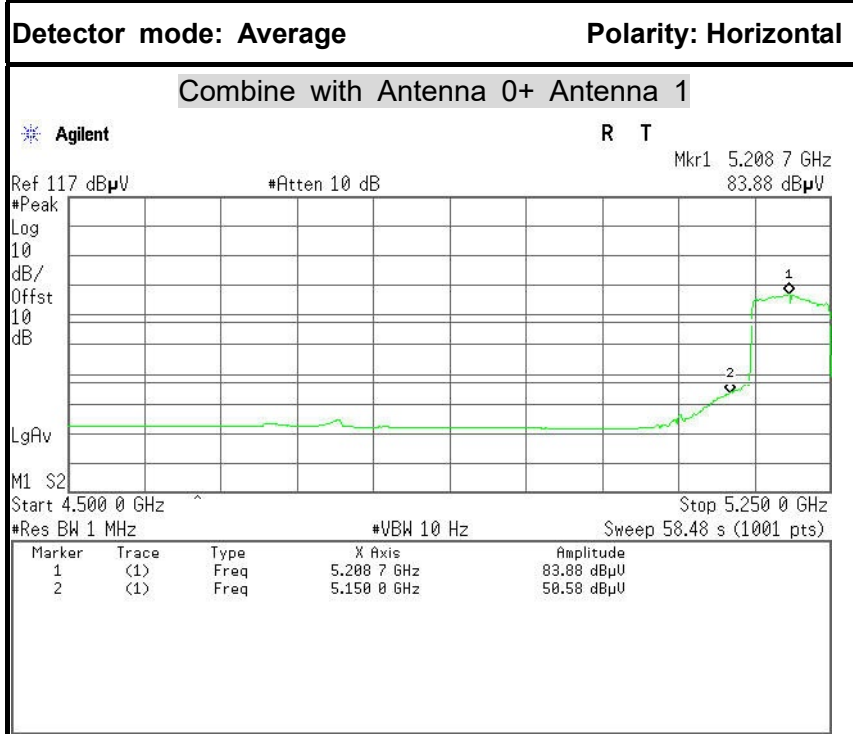
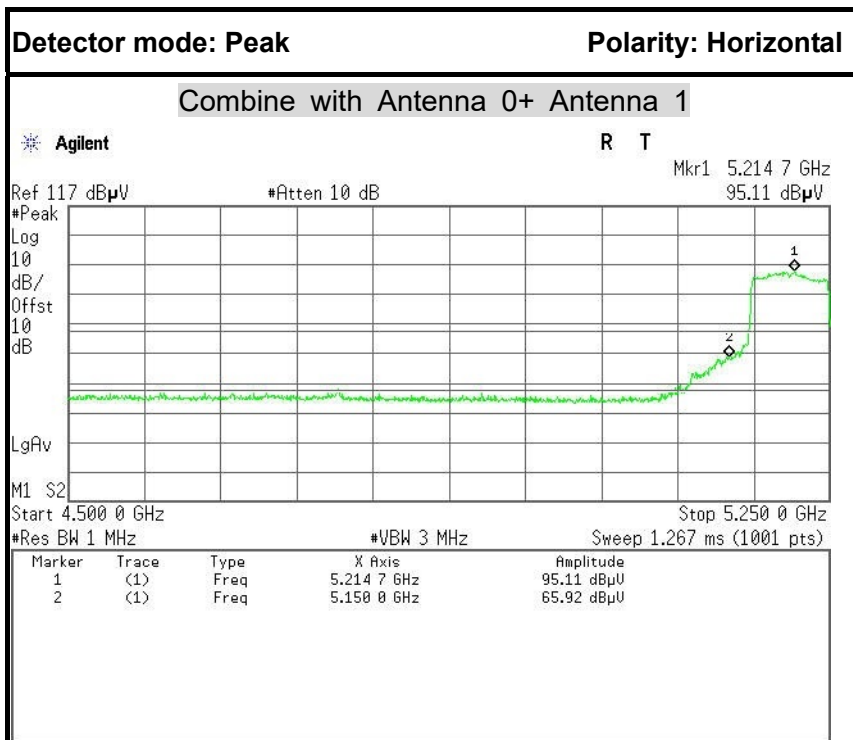






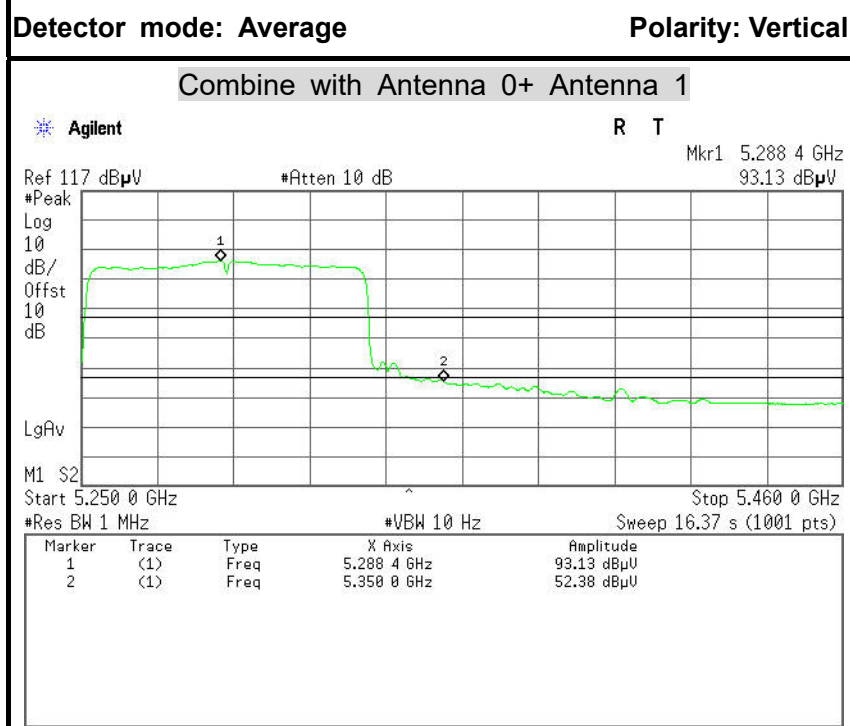
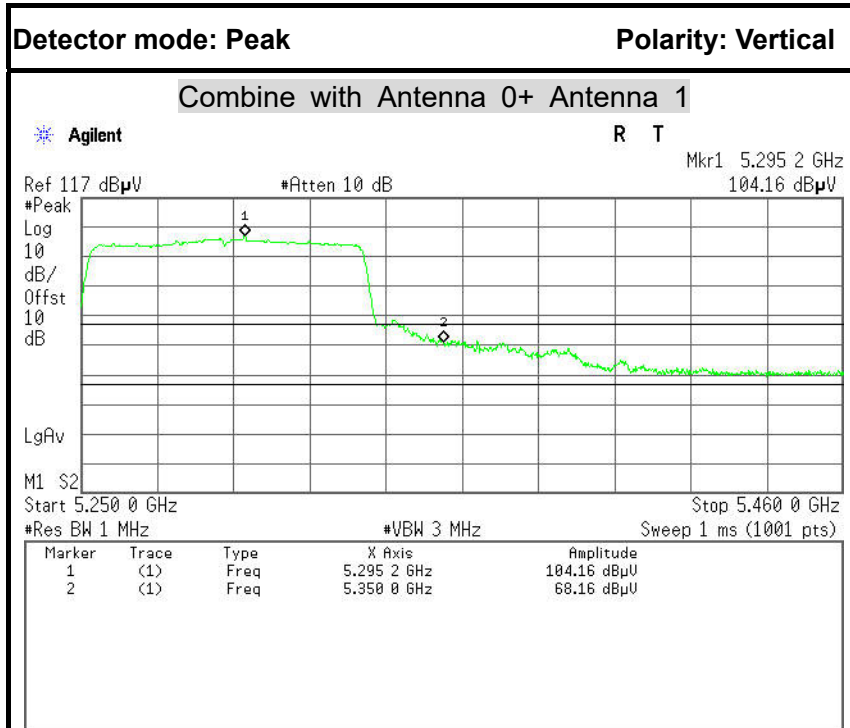
IEEE 802.11ac 80 mode / 5210 MHz

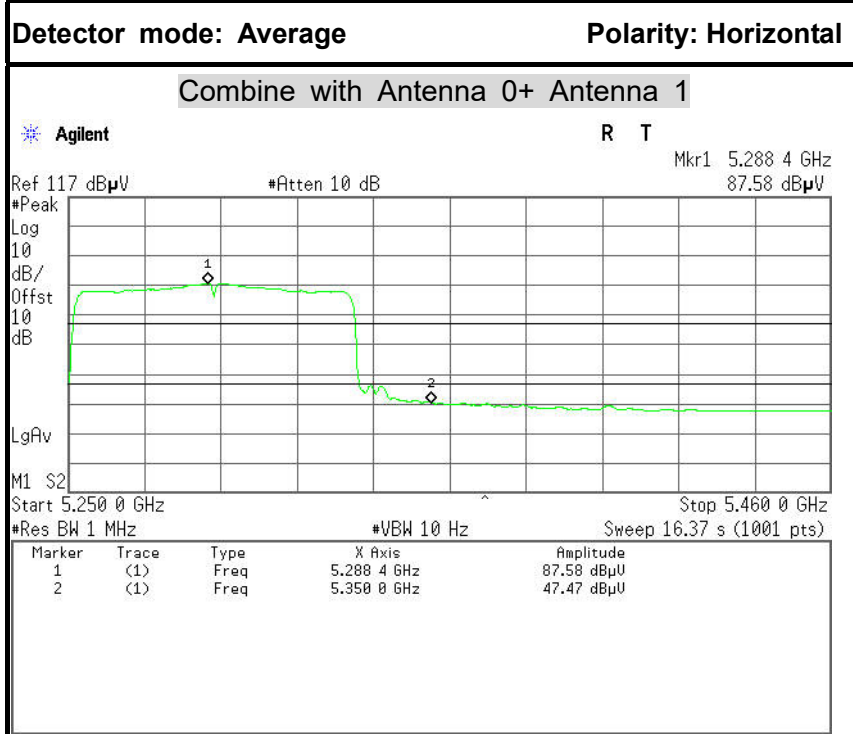
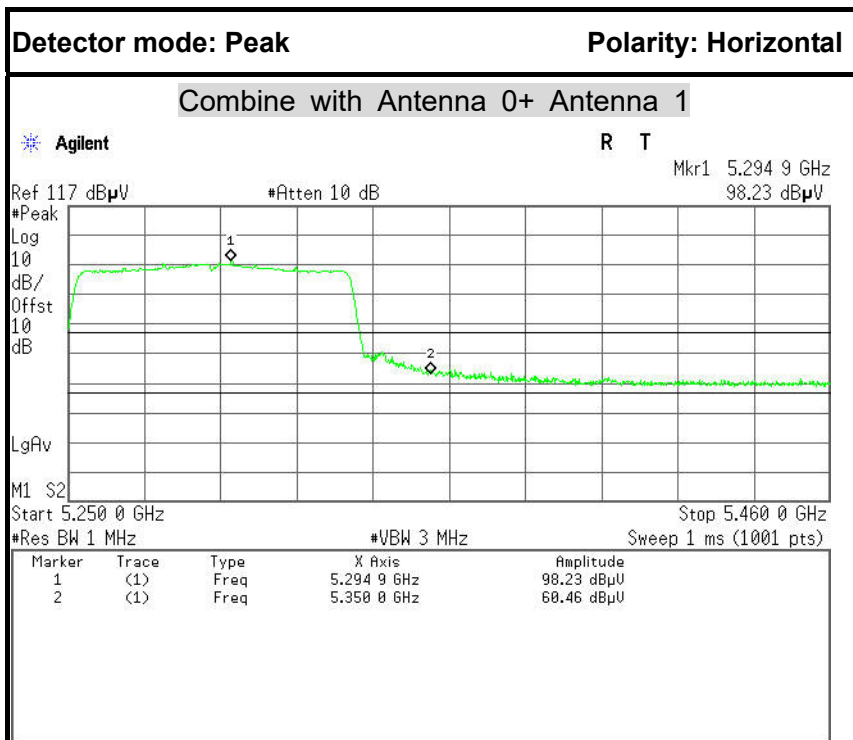






IEEE 802.11ac 80 mode / 5290 MHz







6.6 PEAK POWER SPECTAL DENSITY

6.6.1 LIMIT

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

(1) For the band 5.15-5.25 GHz.

(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.

(iii) For fixed point-to-point access points 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. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. 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.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. 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.

(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 $11 \text{ dBm} + 10 \log B$, 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 30 dBm 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.

Note to paragraph (a)(3): The Commission strongly recommends that parties employing U-NII devices to provide critical communications services should determine if there are any nearby Government radar systems that could affect their operation.

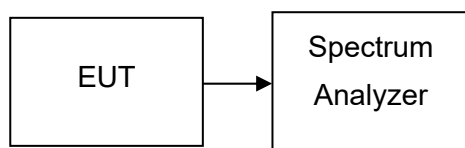
6.6.2 MEASUREMENT EQUIPMENT USED

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

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



6.6.3 TEST CONFIGURATION



6.6.4 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=1ms
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=1ms
4. Record the max. reading.
5. Repeat the above procedure until the measurements for all frequencies are completed



6.6.5 TEST RESULTS

Test Data

Test mode: IEEE 802.11a mode / 5180 ~ 5240MHz

Channel	Frequency (MHz)	PPSD (dBm)		Limit (dBm)	Margin		Result
		Antenna 0	Antenna 1		Antenna 0	Antenna 1	
Low	5180	5.816	5.961	17	-11.184	-11.039	PASS
Mid	5200	5.643	5.856		-11.357	-11.144	PASS
High	5240	5.445	5.746		-11.555	-11.254	PASS

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

Channel	Frequency (MHz)	PPSD (dBm)		Limit (dBm)	Margin		Result
		Antenna 0	Antenna 1		Antenna 0	Antenna 1	
Low	5260	7.482	4.713	11	-3.518	-6.287	PASS
Mid	5300	7.474	5.427		-3.526	-5.573	PASS
High	5320	7.371	5.344		-3.629	-5.656	PASS

Test mode: IEEE 802.11a mode / 5500 ~ 5700MHz

Channel	Frequency (MHz)	PPSD (dBm)		Limit (dBm)	Margin		Result
		Antenna 0	Antenna 1		Antenna 0	Antenna 1	
Low	5500	7.194	5.013	11	-3.806	-5.987	PASS
Mid	5580	8.278	5.169		-2.722	-5.831	PASS
High	5700	6.363	7.041		-4.637	-3.959	PASS

Test mode: IEEE 802.11a mode / 5745 ~ 5825MHz

Channel	Frequency (MHz)	PPSD (dBm)		factor	Limit (dBm)	Margin		Result
		Antenna 0	Antenna 1			Antenna 0	Antenna 1	
Low	5745	7.341	6.896	-3.01	17	-12.669	-13.114	PASS
Mid	5785	7.016	6.064	-3.01		-12.994	-13.946	PASS
High	5825	6.587	4.974	-3.01		-13.423	-15.036	PASS

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

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

Channel	Frequency (MHz)	PPSD (dBm)		Total (dBm)	Limit (dBm)	Margin	Result
		Antenna 0	Antenna 1				
Low	5180	3.313	3.705	6.524	17.00	-10.476	PASS
Mid	5200	3.539	3.253	6.409		-10.591	PASS
High	5240	2.959	3.890	6.460		-10.540	PASS

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

Channel	Frequency (MHz)	PPSD (dBm)		Total (dBm)	Limit (dBm)	Margin	Result
		Antenna 0	Antenna 1				
Low	5260	4.049	5.259	7.706	11.00	-3.294	PASS
Mid	5300	7.822	1.686	8.768		-2.232	PASS
High	5320	7.773	1.709	8.733		-2.267	PASS

Test mode: IEEE 802.11n HT 20 MHz mode / 5500 ~ 5700MHz

Channel	Frequency (MHz)	PPSD (dBm)		Total (dBm)	Limit (dBm)	Margin	Result
		Antenna 0	Antenna 1				
Low	5500	7.315	4.579	9.169	11.00	-1.831	PASS
Mid	5580	7.867	4.772	9.600		-1.400	PASS
High	5700	7.381	6.641	10.037		-0.963	PASS

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

Channel	Frequency (MHz)	PPSD (dBm)		factor	Total (dBm)	Limit (dBm)	Margin	Result
		Antenna 0	Antenna 1					
Low	5745	7.850	6.508	-3.01	7.231	17.00	-9.769	PASS
Mid	5785	9.325	5.649	-3.01	7.865		-9.135	PASS
High	5825	9.772	5.781	-3.01	8.220		-8.780	PASS

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

**Test mode: IEEE 802.11n HT 40 MHz mode / 5190 ~ 5230MHz**

Channel	Frequency (MHz)	PPSD (dBm)		Total (dBm)	Limit (dBm)	Margin	Result
		Antenna 0	Antenna 1				
Low	5190	4.440	2.501	6.588	17.00	-10.412	PASS
High	5230	3.546	1.972	5.840		-11.160	PASS

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

Channel	Frequency (MHz)	PPSD (dBm)		Total (dBm)	Limit (dBm)	Margin	Result
		Antenna 0	Antenna 1				
Low	5270	4.702	2.798	6.864	11.00	-4.136	PASS
High	5310	3.473	3.414	6.454		-4.546	PASS

Test mode: IEEE 802.11n HT 40 MHz mode / 5510 ~ 5670MHz

Channel	Frequency (MHz)	PPSD (dBm)		Total (dBm)	Limit (dBm)	Margin	Result
		Antenna 0	Antenna 1				
Low	5510	3.467	1.366	5.553	11.00	-5.447	PASS
Mid	5550	2.492	1.762	5.153		-5.847	PASS
High	5670	3.245	1.966	5.663		-5.337	PASS

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

Channel	Frequency (MHz)	PPSD (dBm)		factor	Total (dBm)	Limit (dBm)	Margin	Result
		Antenna 0	Antenna 1					
Low	5755	2.417	3.312	-3.01	2.888	17.00	-14.112	PASS
High	5795	5.146	2.665	-3.01	4.081		-12.919	PASS

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

**Test mode: IEEE 802.11ac 80 mode / 5210MHz**

Channel	Frequency (MHz)	PPSD (dBm)		Total (dBm)	Limit (dBm)	Margin	Result
		Antenna 0	Antenna 1				
	5210	-0.465	-0.279	2.639	17.00	-14.361	PASS

Test mode: IEEE 802.11ac 80 mode / 5290MHz

Channel	Frequency (MHz)	PPSD (dBm)		Total (dBm)	Limit (dBm)	Margin	Result
		Antenna 0	Antenna 1				
	5290	-3.806	-2.365	-0.016	11.00	-11.016	PASS

Test mode: IEEE 802.11ac 80 mode / 5530MHz

Channel	Frequency (MHz)	PPSD (dBm)		Total (dBm)	Limit (dBm)	Margin	Result
		Antenna 0	Antenna 1				
	5530	-2.054	-3.664	0.225	11.00	-10.775	PASS

Test mode: IEEE 802.11ac 80 mode / 5775MHz

Channel	Frequency (MHz)	PPSD (dBm)		factor	Total (dBm)	Limit (dBm)	Margin	Result
		Antenna 0	Antenna 1					
	5775	1.206	-1.411	-3.01	0.092	17.00	-16.908	PASS

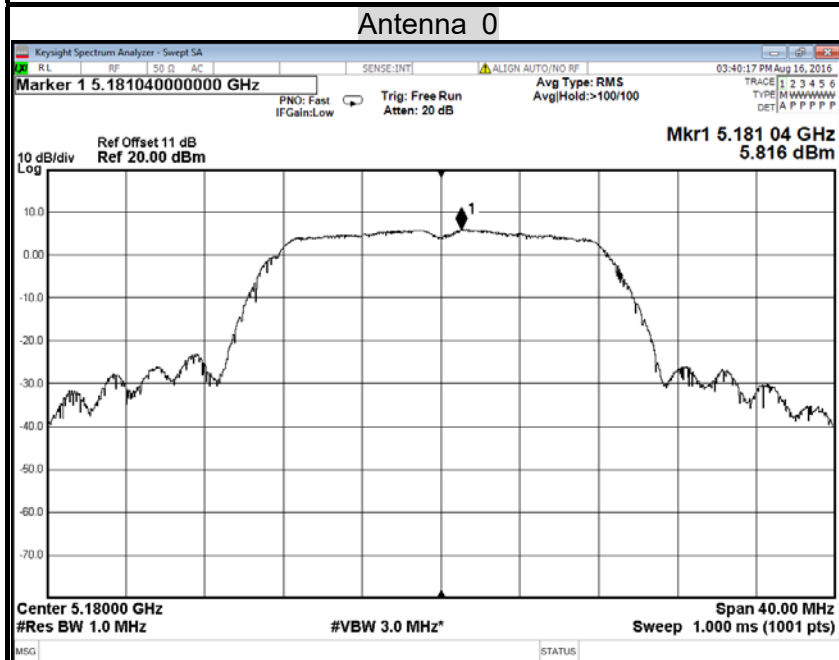
Remark: factor = $10 \cdot \log_{10}(500/\text{RBW})$



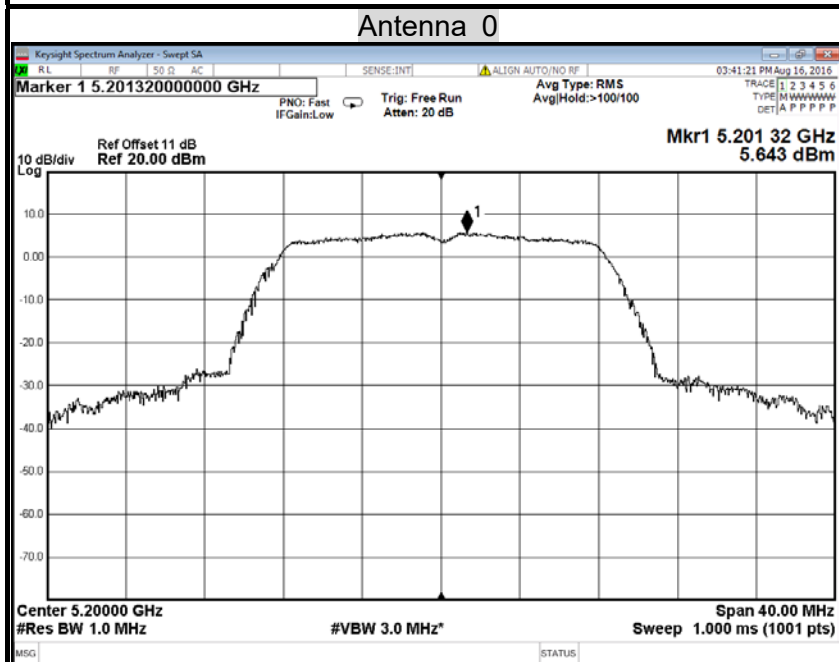
Test Plot

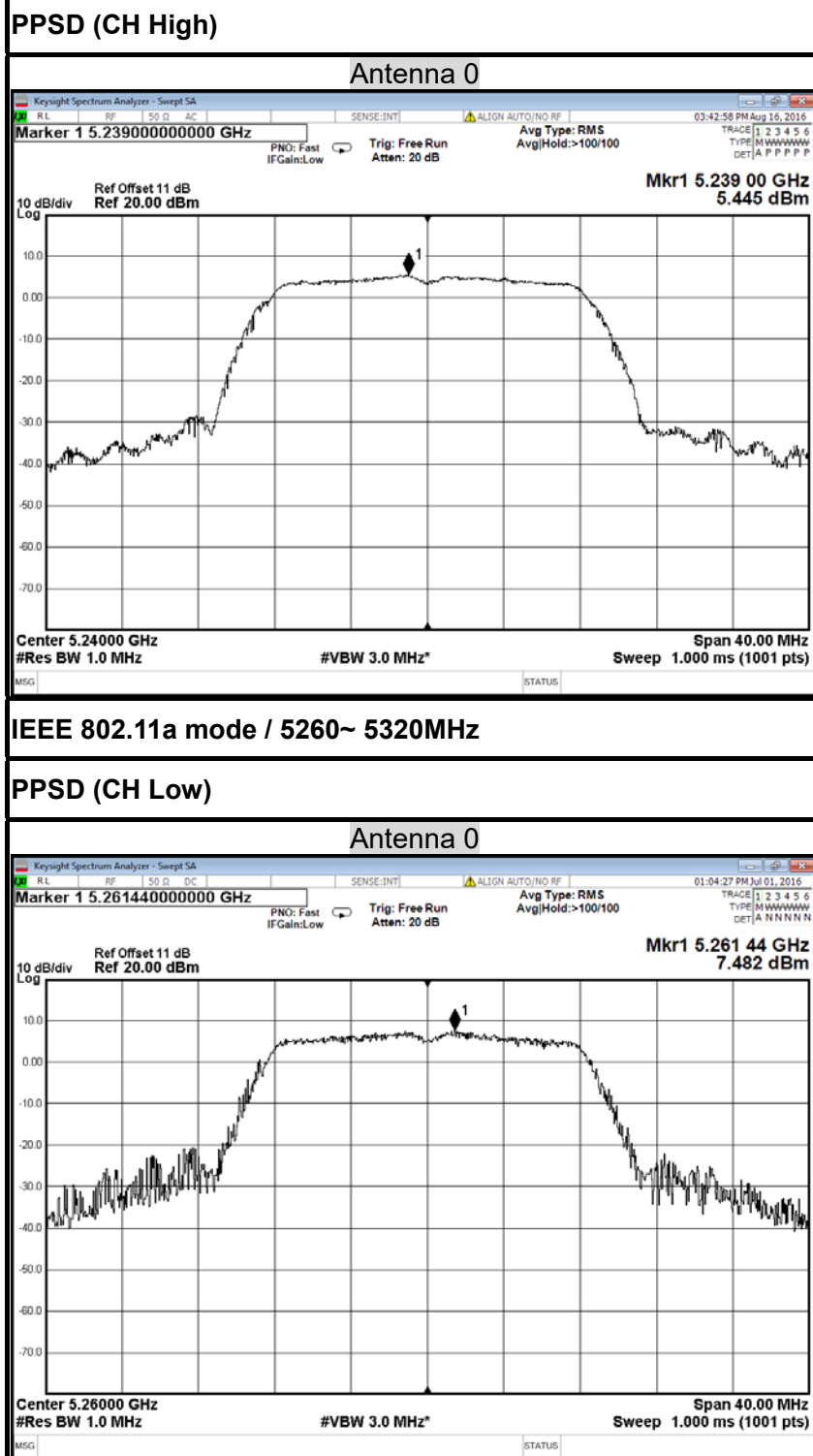
IEEE 802.11a mode / 5180 ~ 5240MHz

PPSD (CH Low)



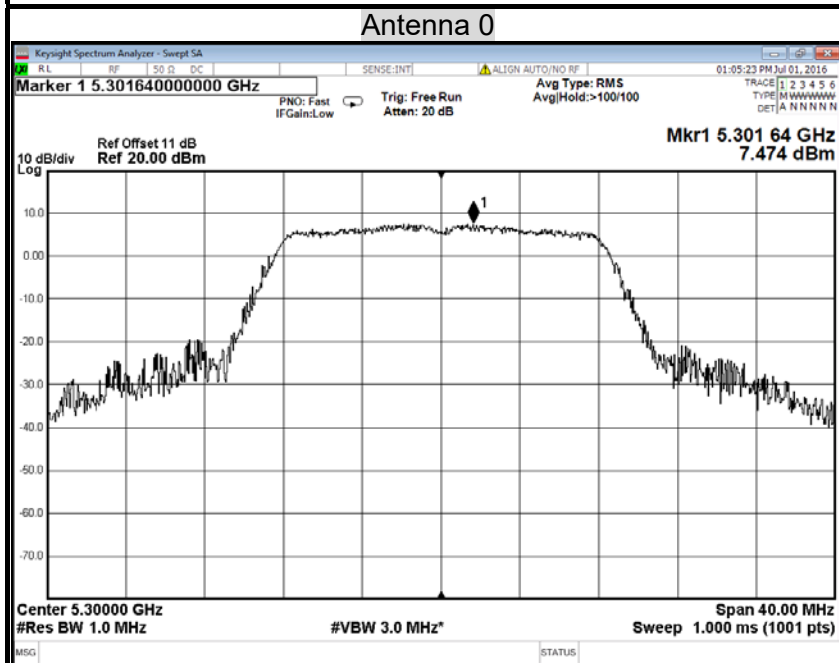
PPSD (CH Mid)



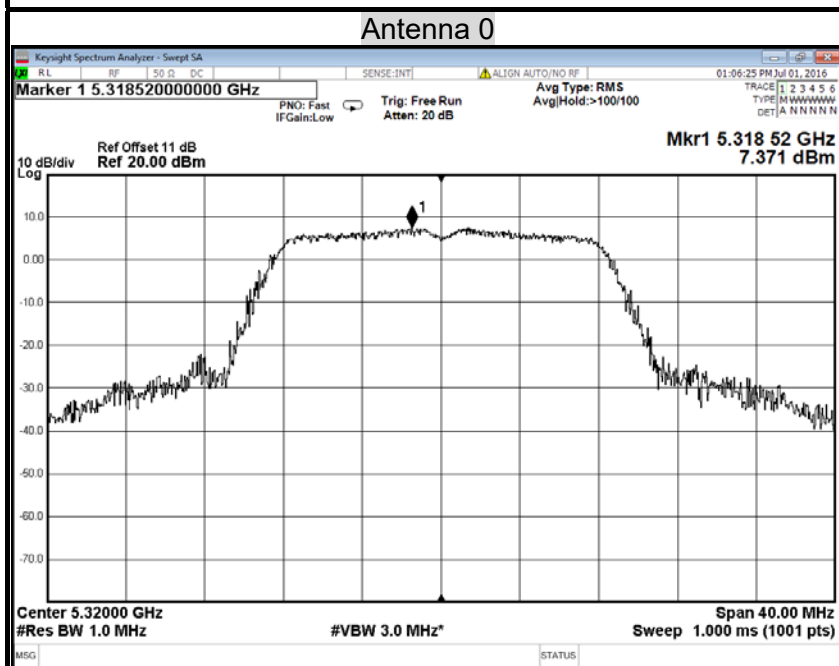




PPSD (CH Mid)



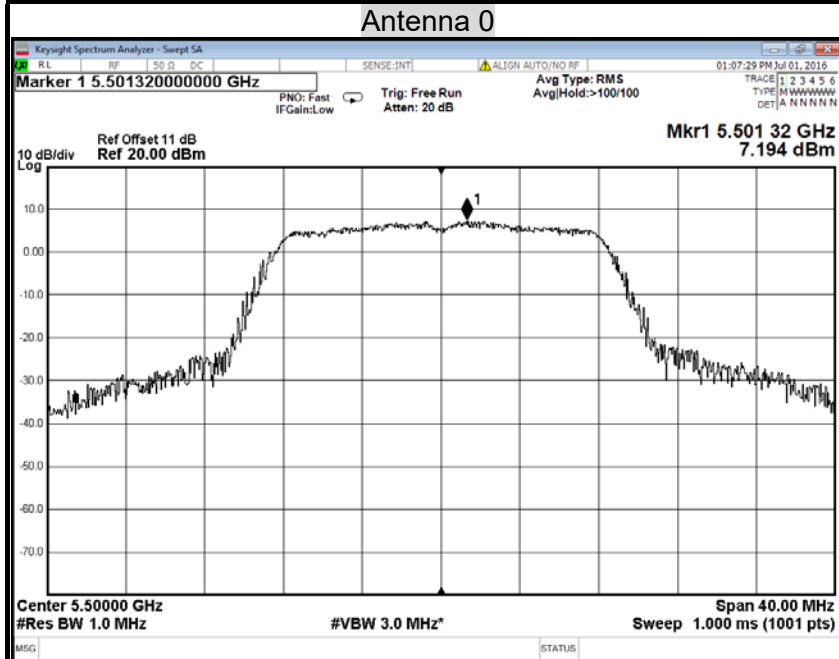
PPSD (CH High)



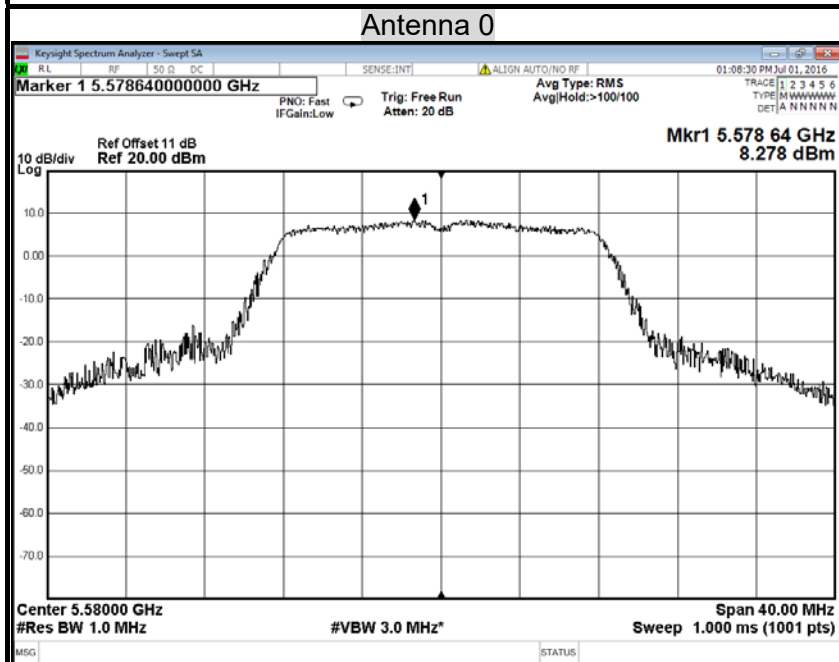


IEEE 802.11a mode / 5500 ~ 5700MHz

PPSD (CH Low)

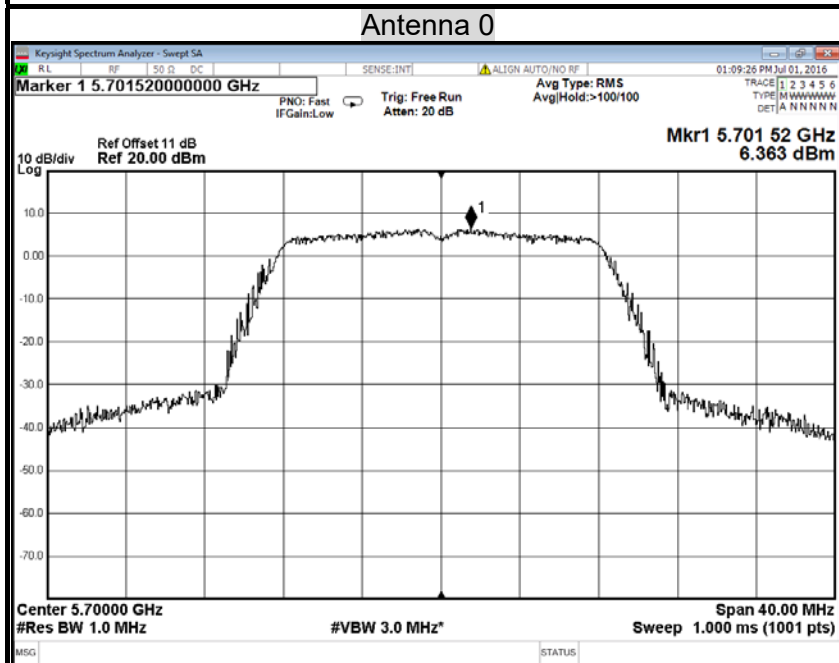


PPSD (CH Mid)



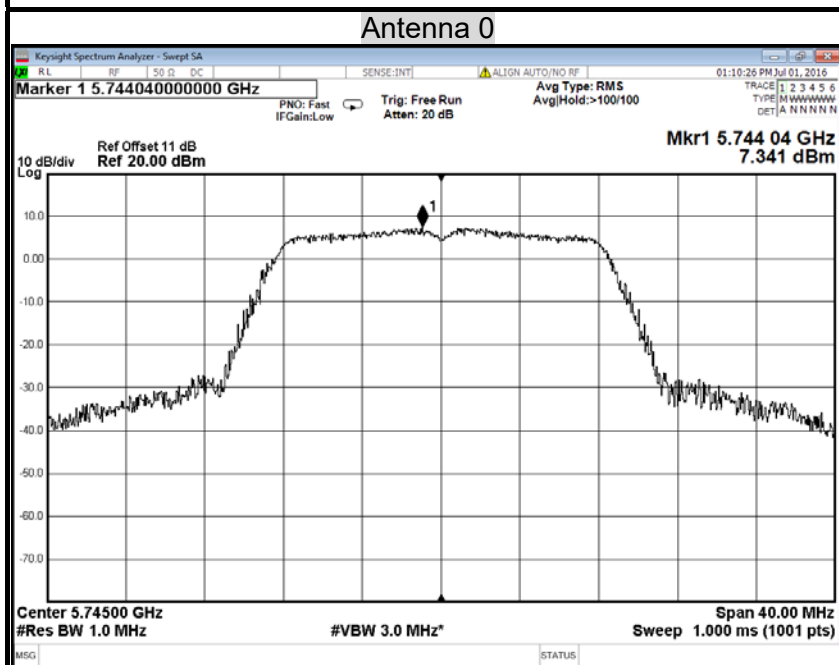


PPSD (CH High)



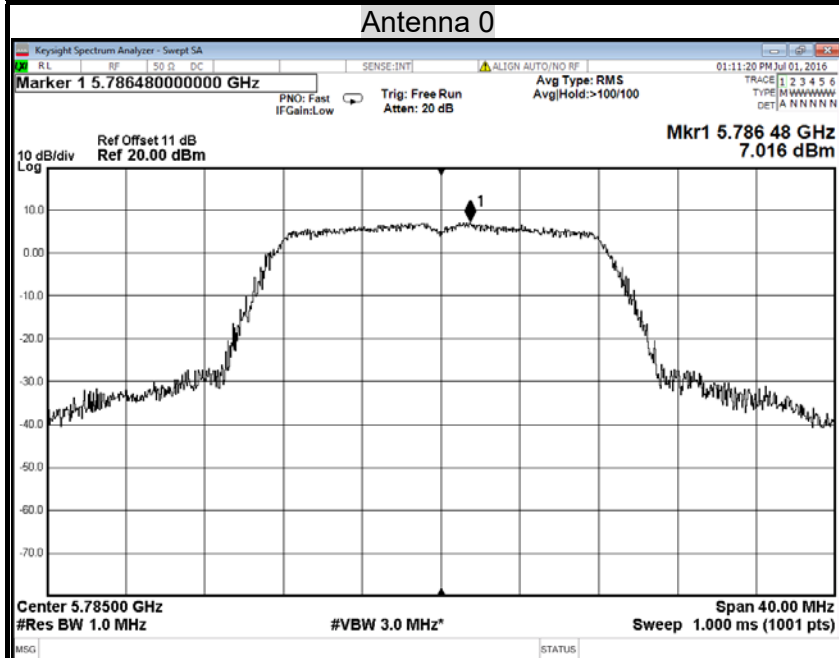
IEEE 802.11a mode / 5745 ~ 5825MHz

PPSD (CH Low)

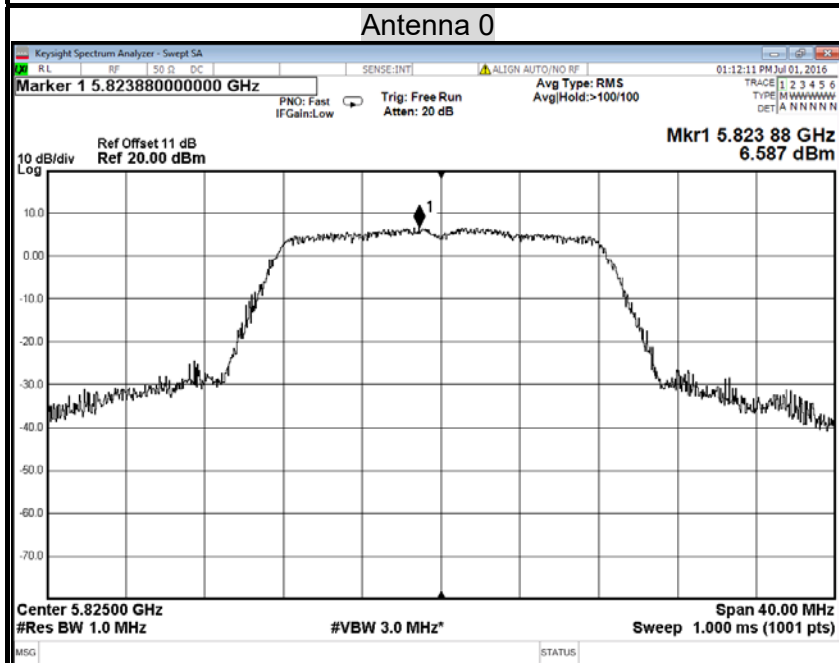




PPSD (CH Mid)



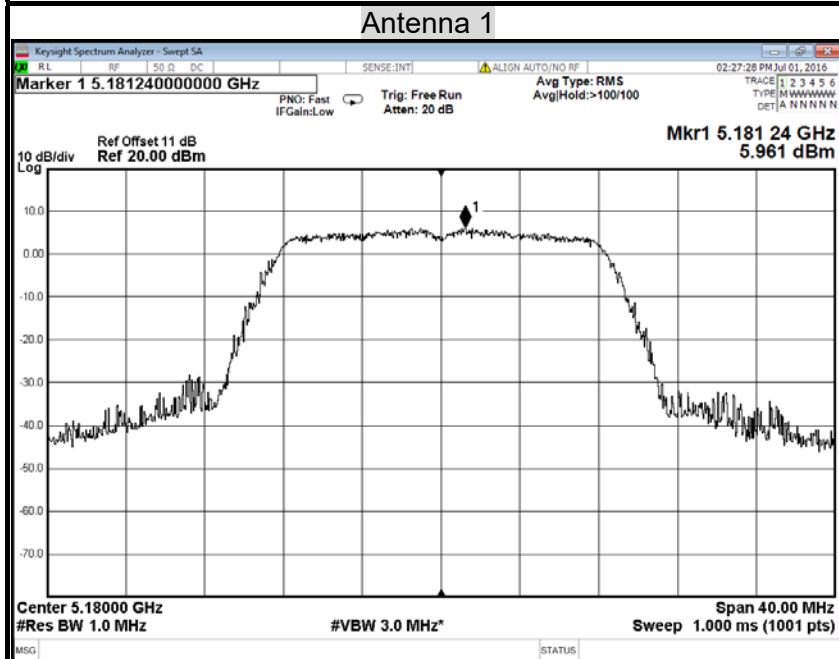
PPSD (CH High)



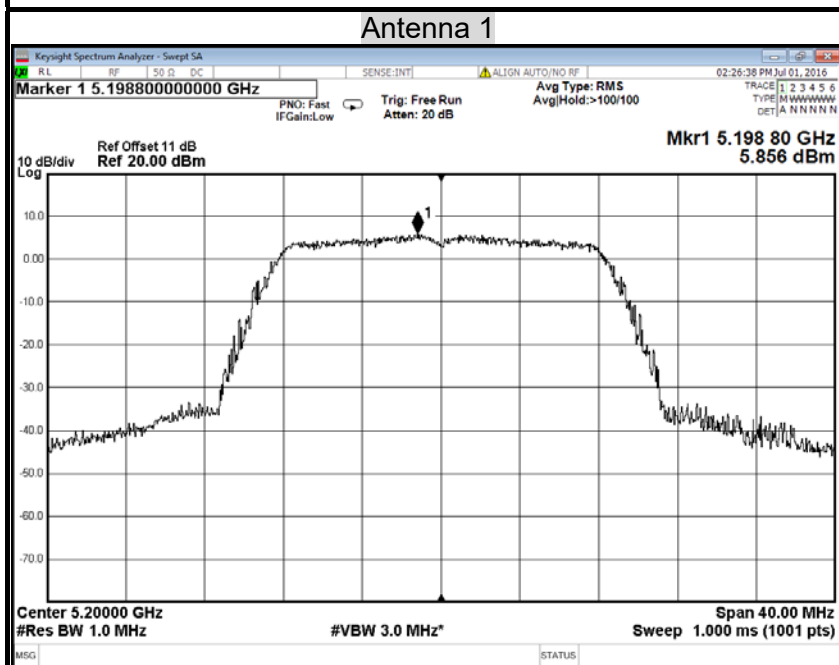


IEEE 802.11a mode / 5180 ~ 5240MHz

PPSD (CH Low)

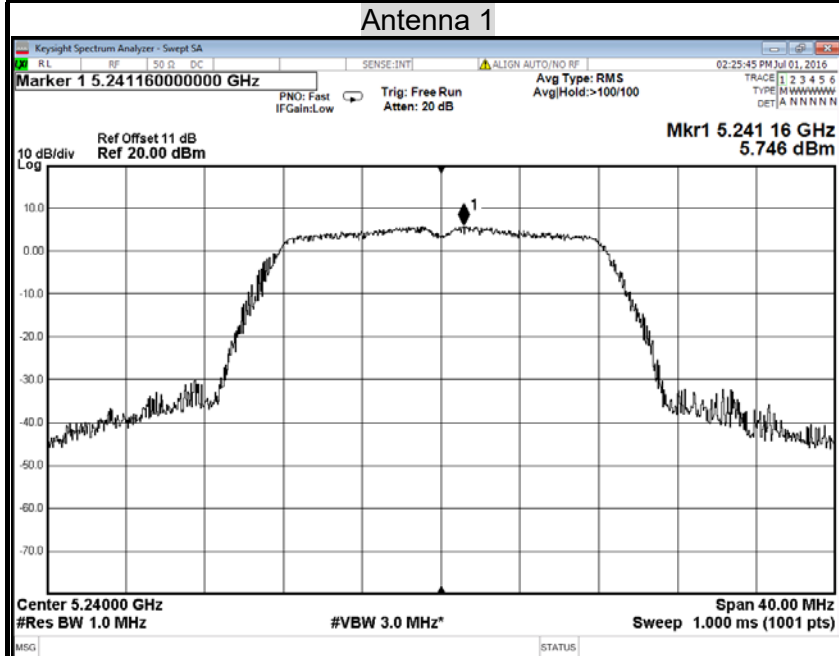


PPSD (CH Mid)



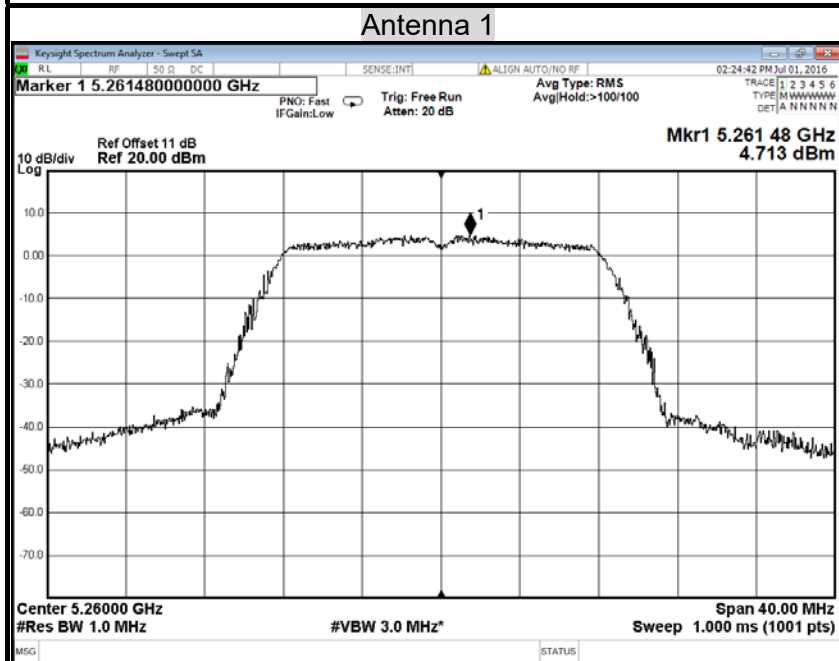


PPSD (CH High)



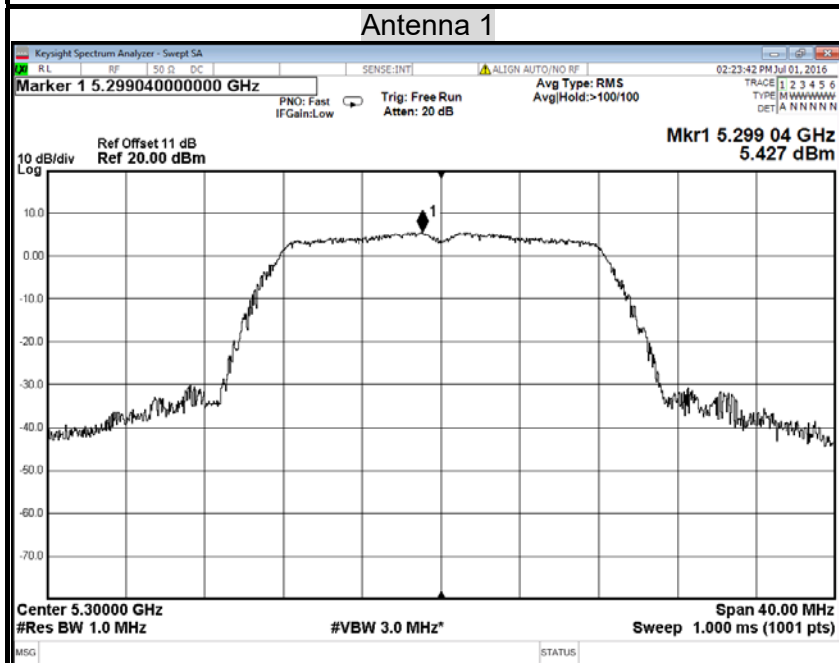
IEEE 802.11a mode / 5260~ 5320MHz

PPSD (CH Low)

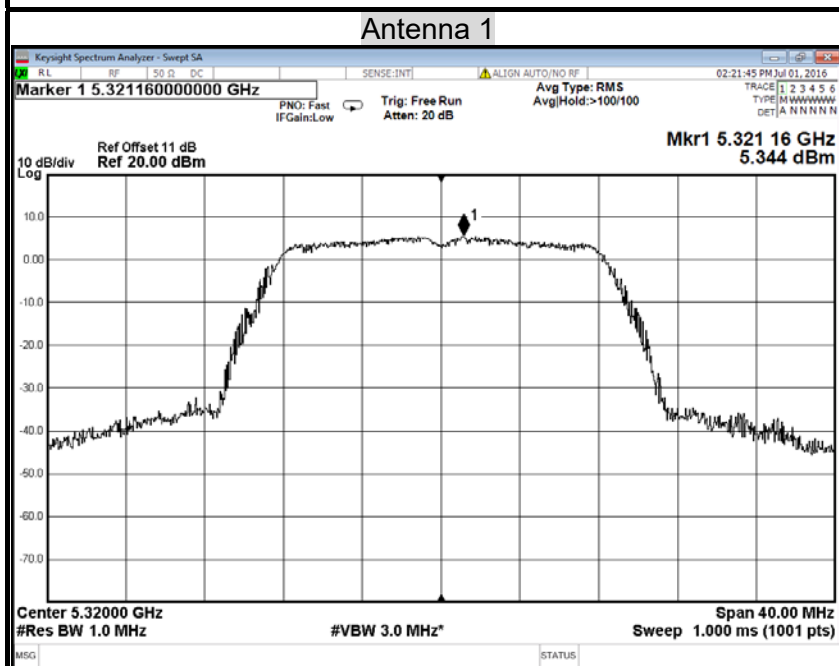




PPSD (CH Mid)



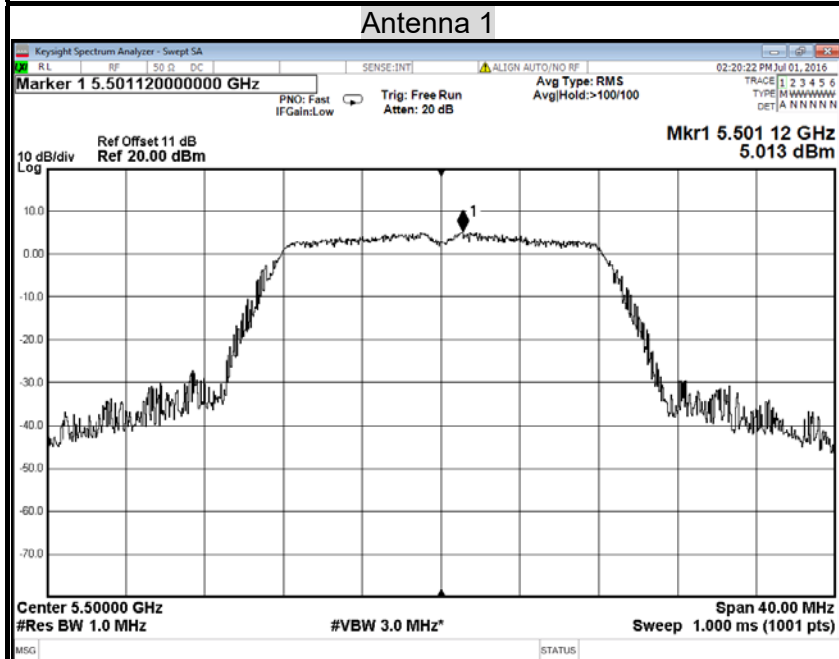
PPSD (CH High)



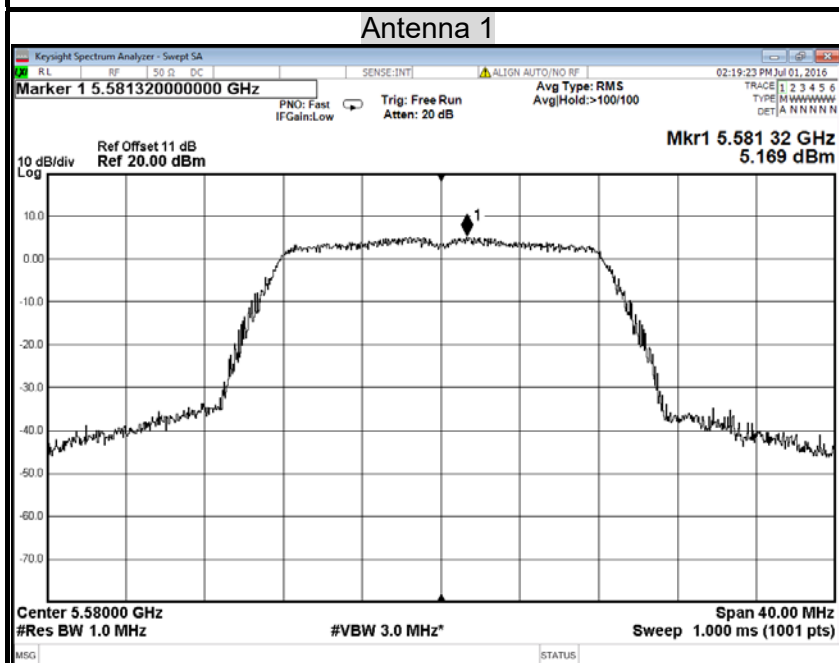


IEEE 802.11a mode / 5500 ~ 5700MHz

PPSD (CH Low)

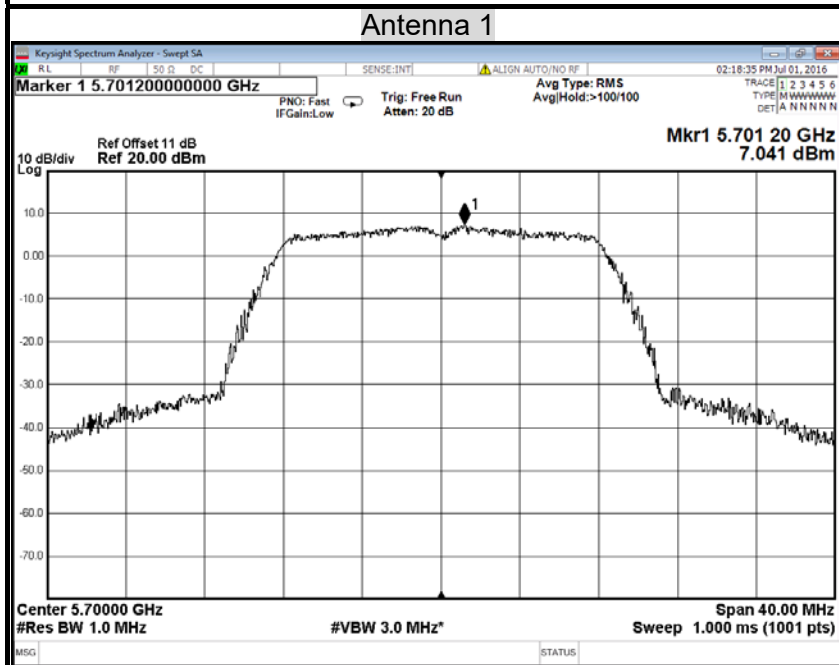


PPSD (CH Mid)



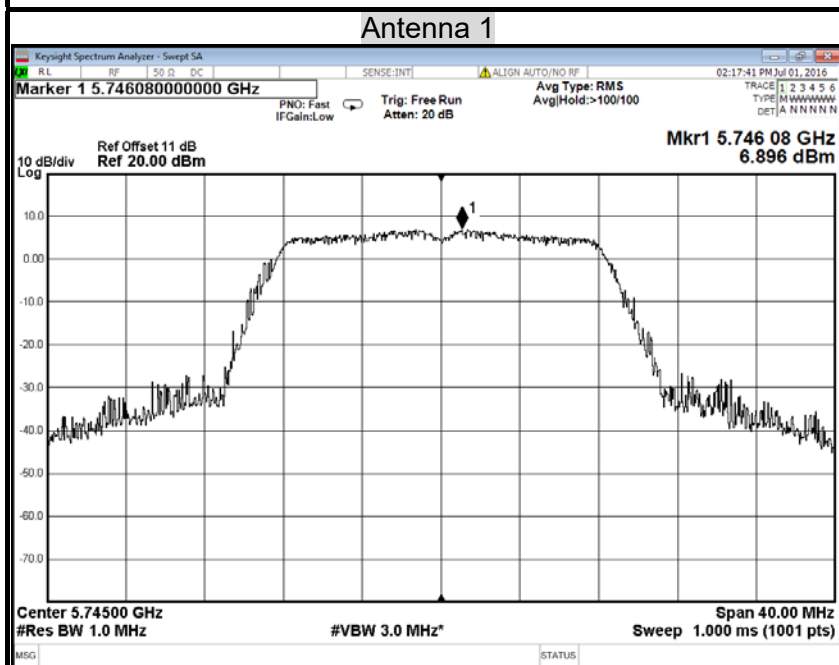


PPSD (CH High)



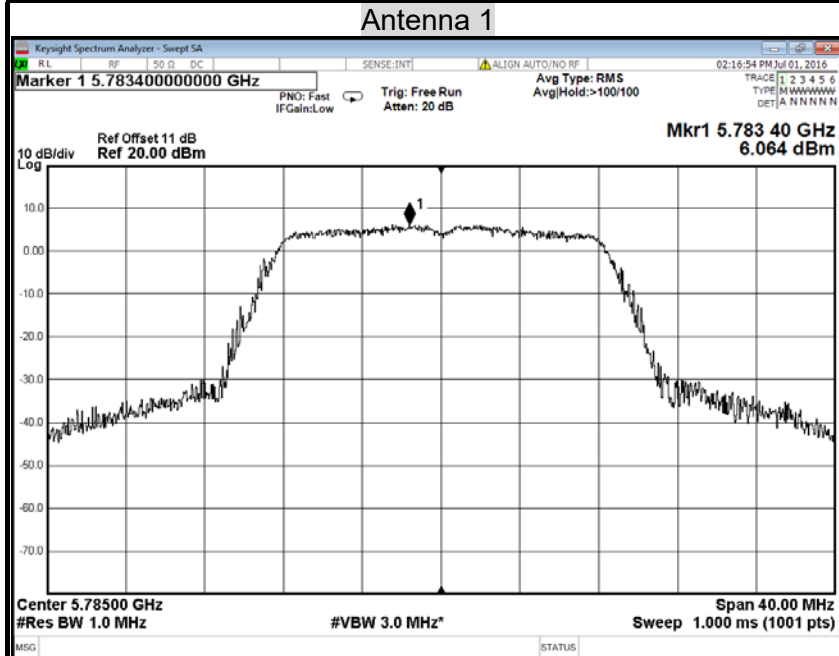
IEEE 802.11a mode / 5745 ~ 5825MHz

PPSD (CH Low)

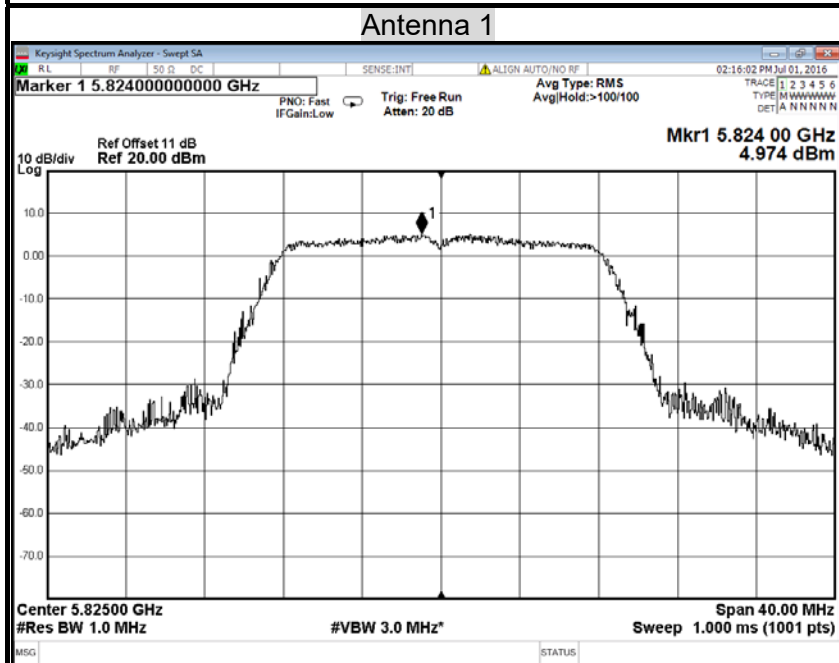




PPSD (CH Mid)



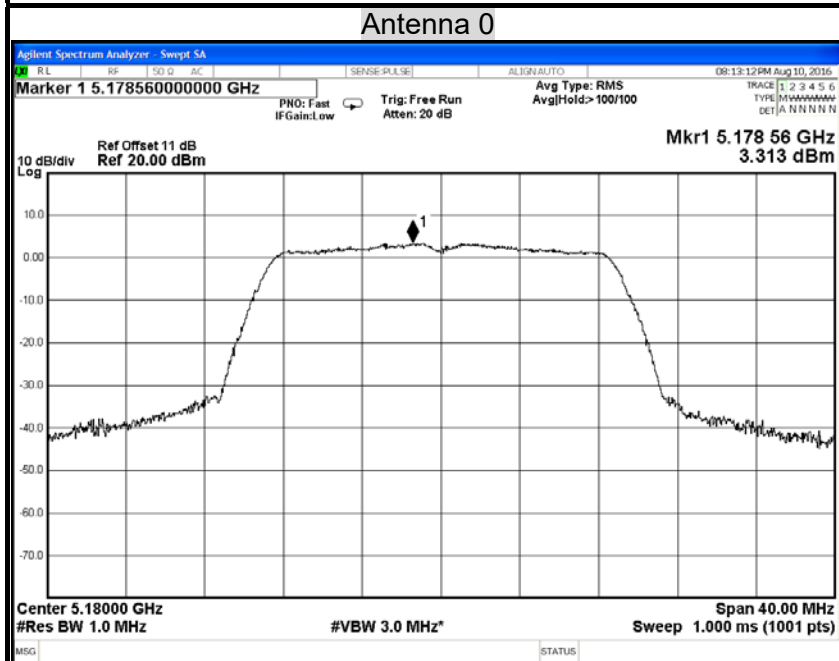
PPSD (CH High)



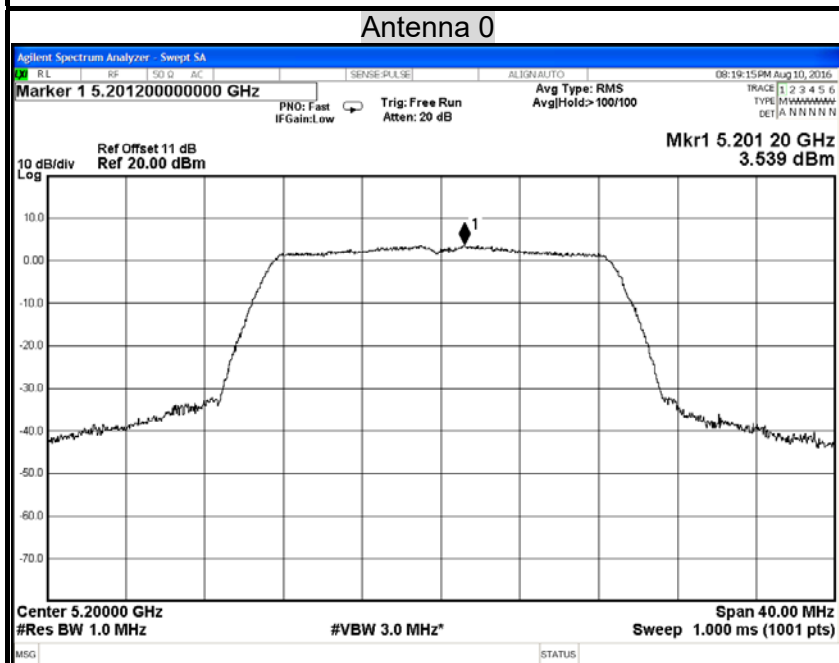


IEEE 802.11n HT 20 MHz mode / 5180 ~ 5240MHz

PPSD (CH Low)

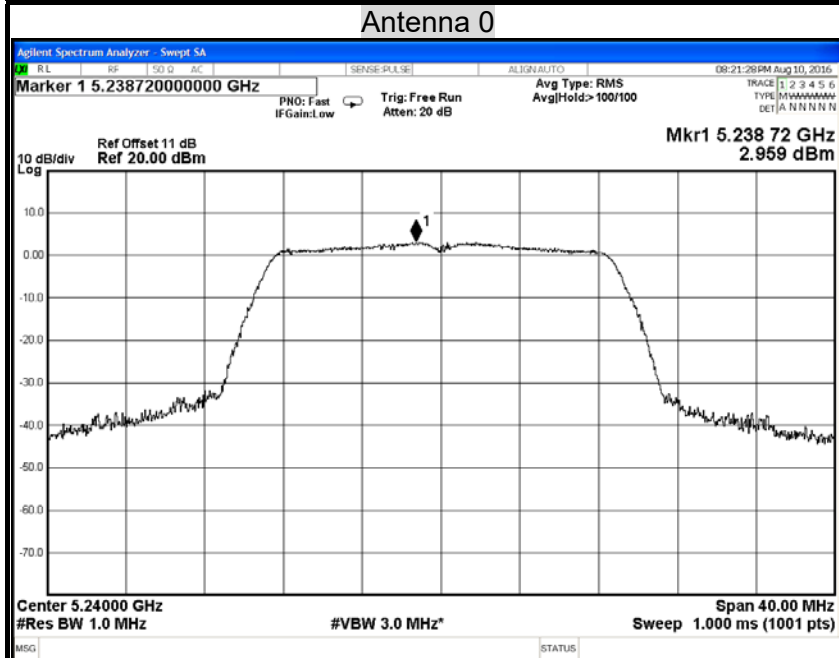


PPSD (CH Mid)





PPSD (CH High)



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

PPSD (CH Low)

