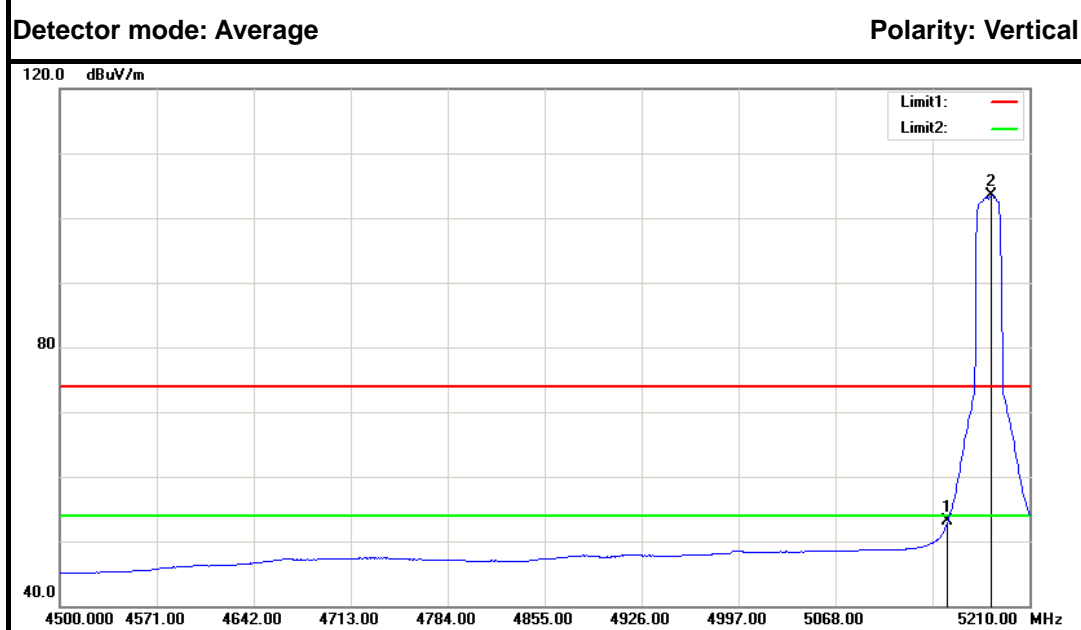
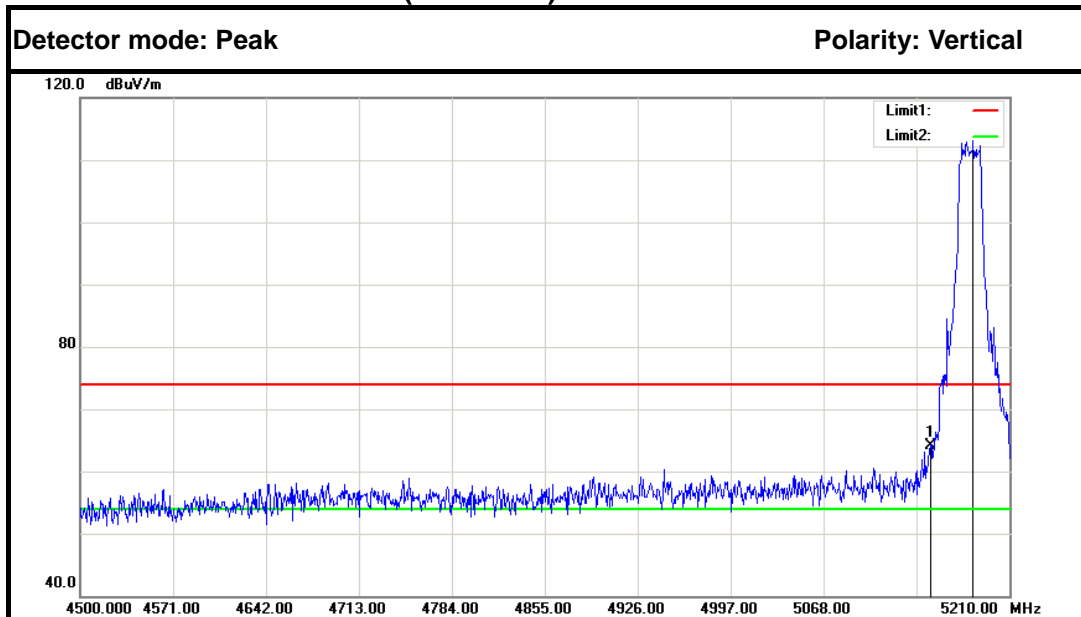
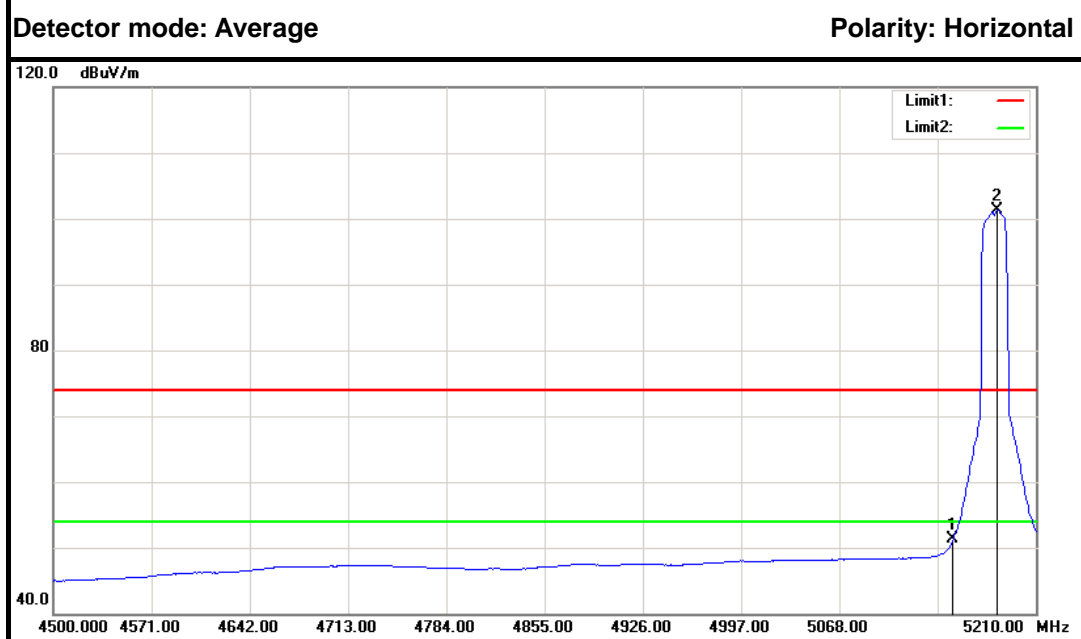
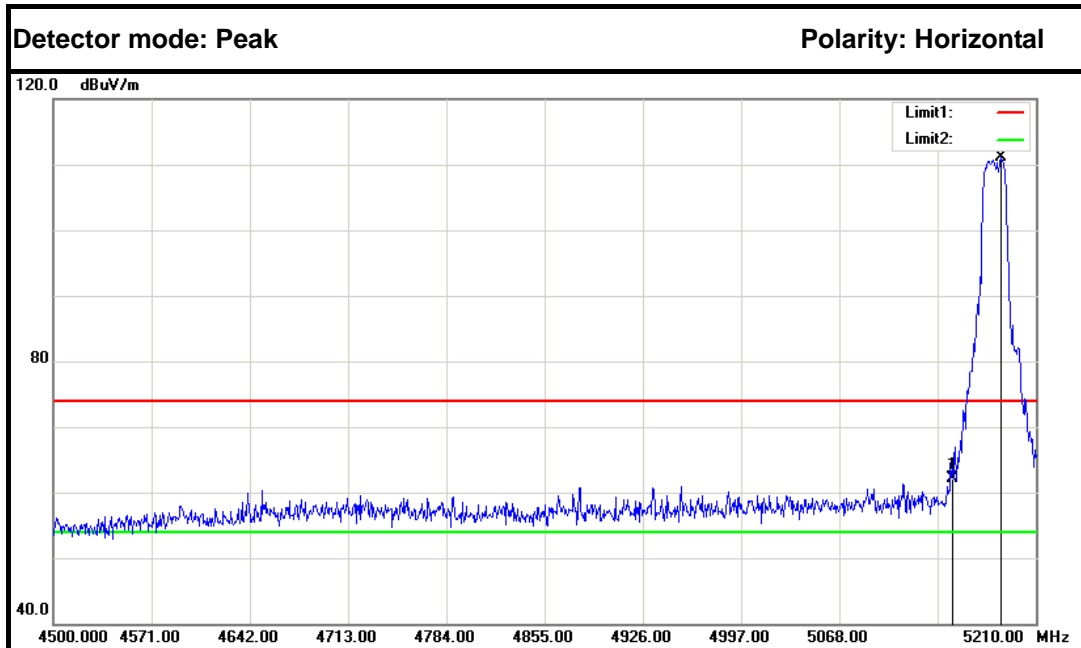




IEEE 802.11a mode / 5180MHz (Antenna 1)



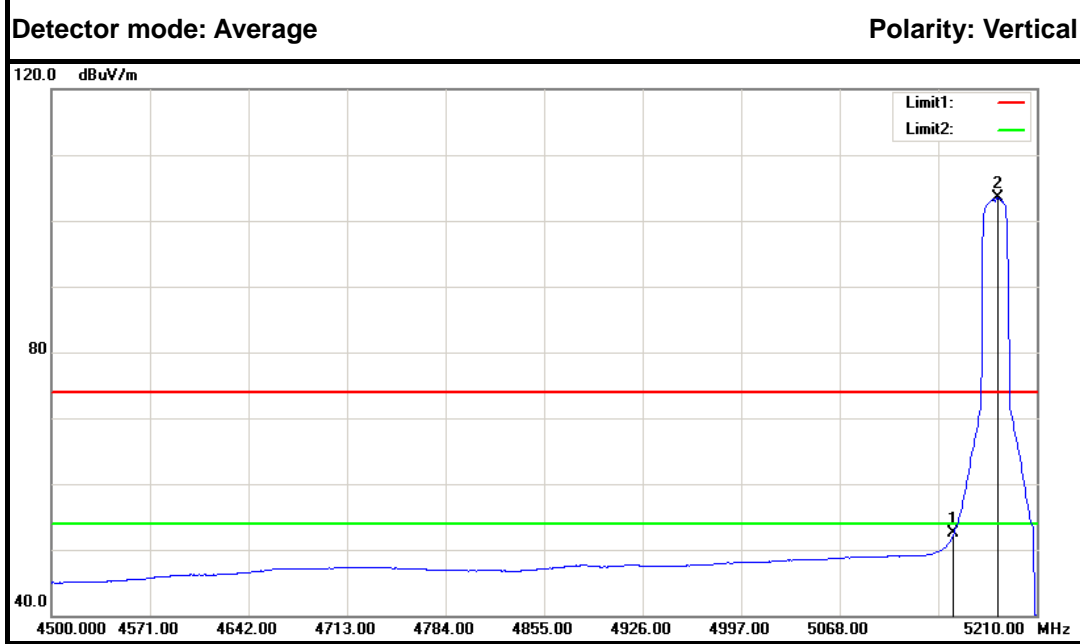
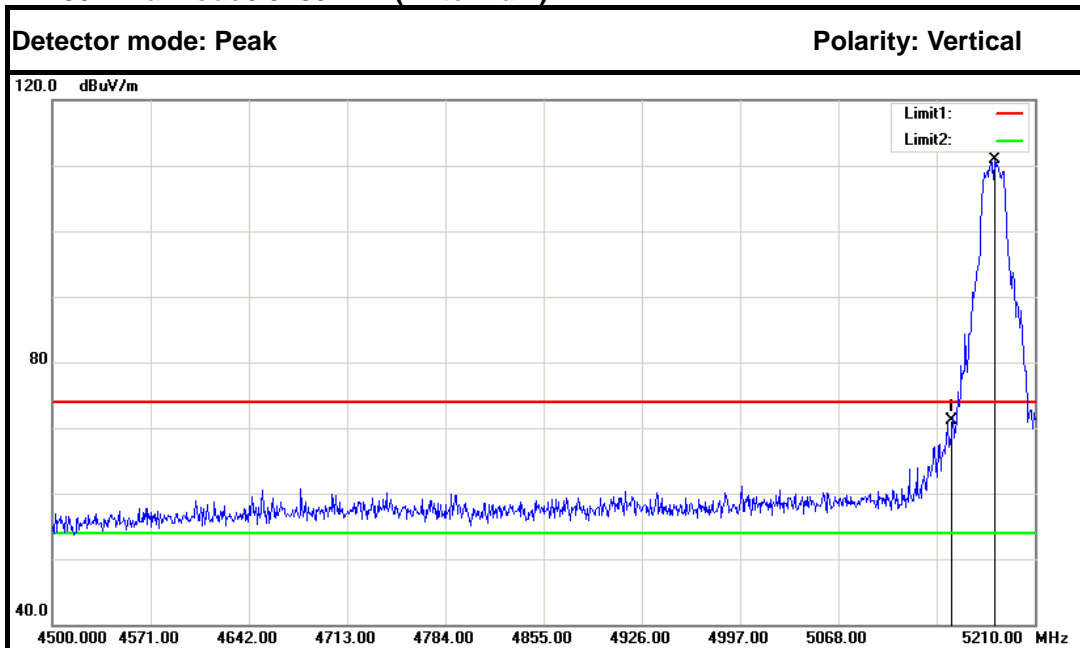
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5150.000	58.92	5.25	64.17	74.00	-9.83	Peak	Vertical
2	5182.310	107.78	5.30	113.08	---	---	Peak	Vertical
1	5150.000	47.92	5.25	53.17	54.00	-0.83	Average	Vertical
2	5182.310	98.26	5.30	103.56	---	---	Average	Vertical



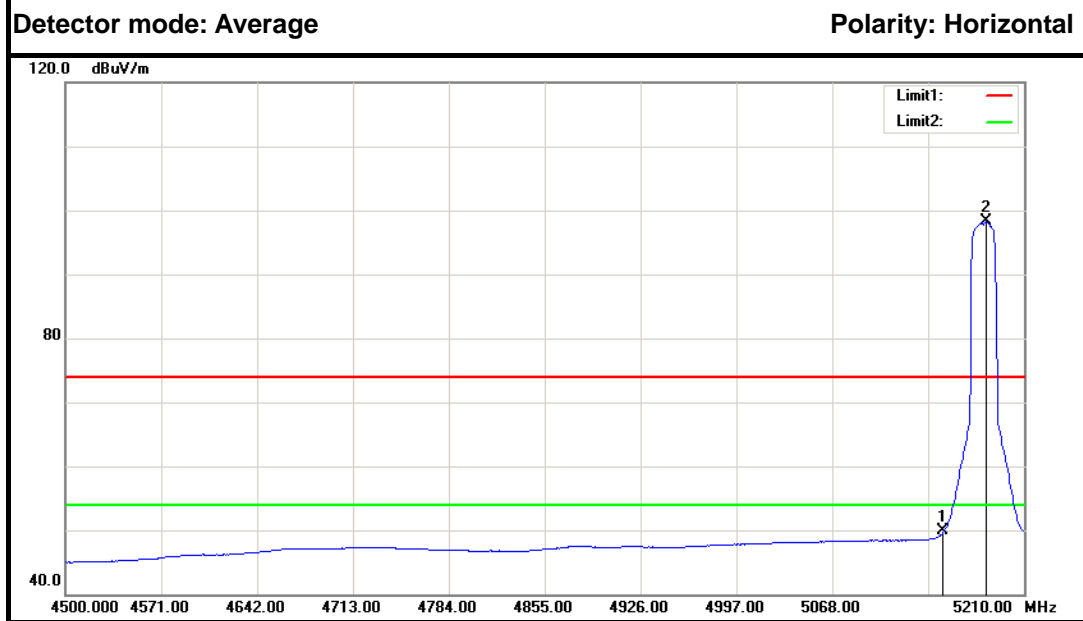
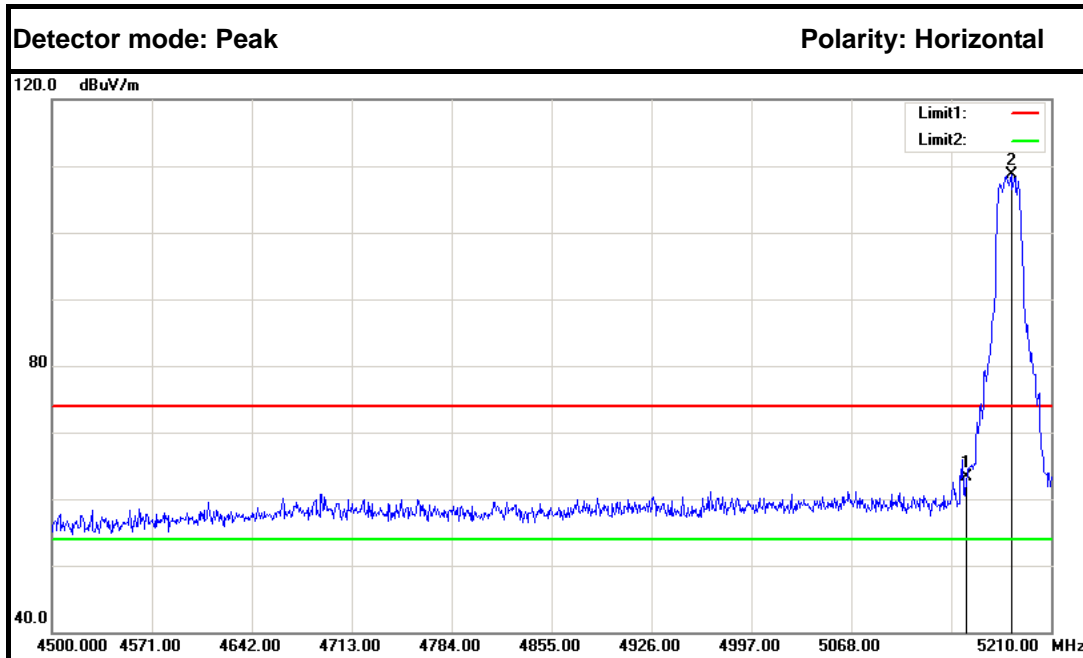
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5150.000	56.87	5.25	62.12	74.00	-11.88	Peak	Horizontal
2	5184.440	105.84	5.31	111.15	---	---	Peak	Horizontal
1	5150.000	45.97	5.25	51.22	54.00	-2.78	Average	Horizontal
2	5181.600	96.04	5.30	101.34	---	---	Average	Horizontal



IEEE 802.11a mode / 5180MHz (Antenna 2)



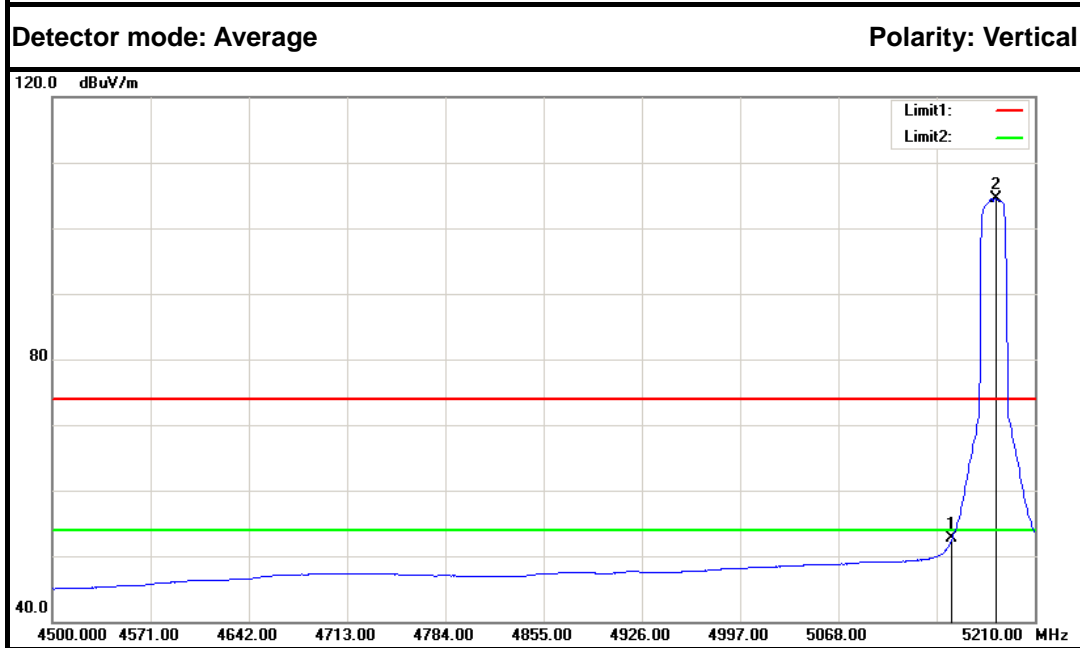
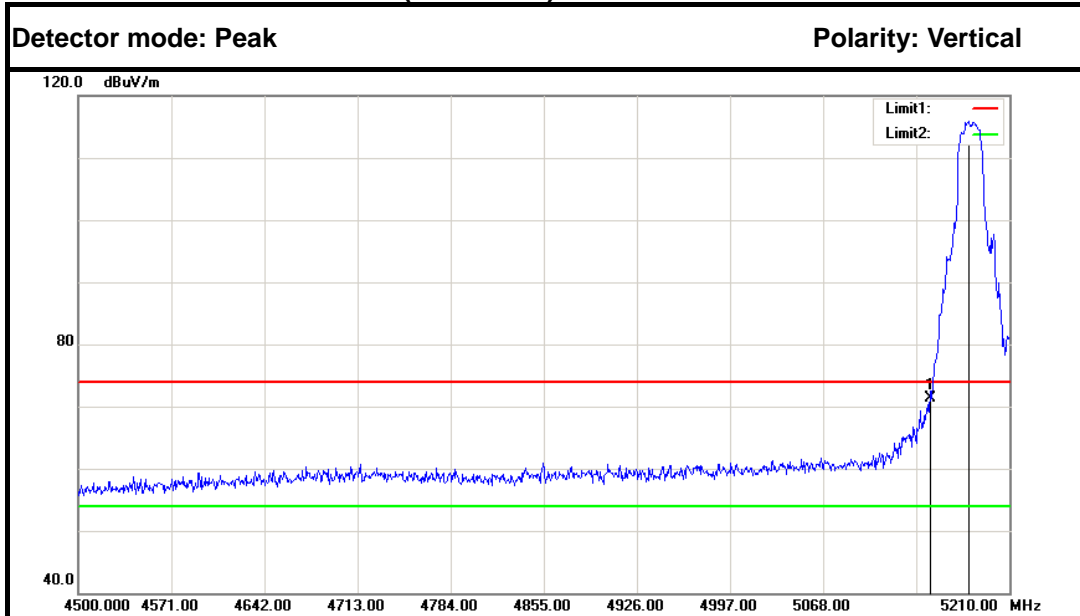
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5150.000	65.76	5.25	71.01	74.00	-2.99	Peak	Vertical
2	5180.890	105.56	5.30	110.86	---	---	Peak	Vertical
1	5150.000	47.32	5.25	52.57	54.00	-1.43	Average	Vertical
2	5181.600	98.23	5.30	103.53	---	---	Average	Vertical



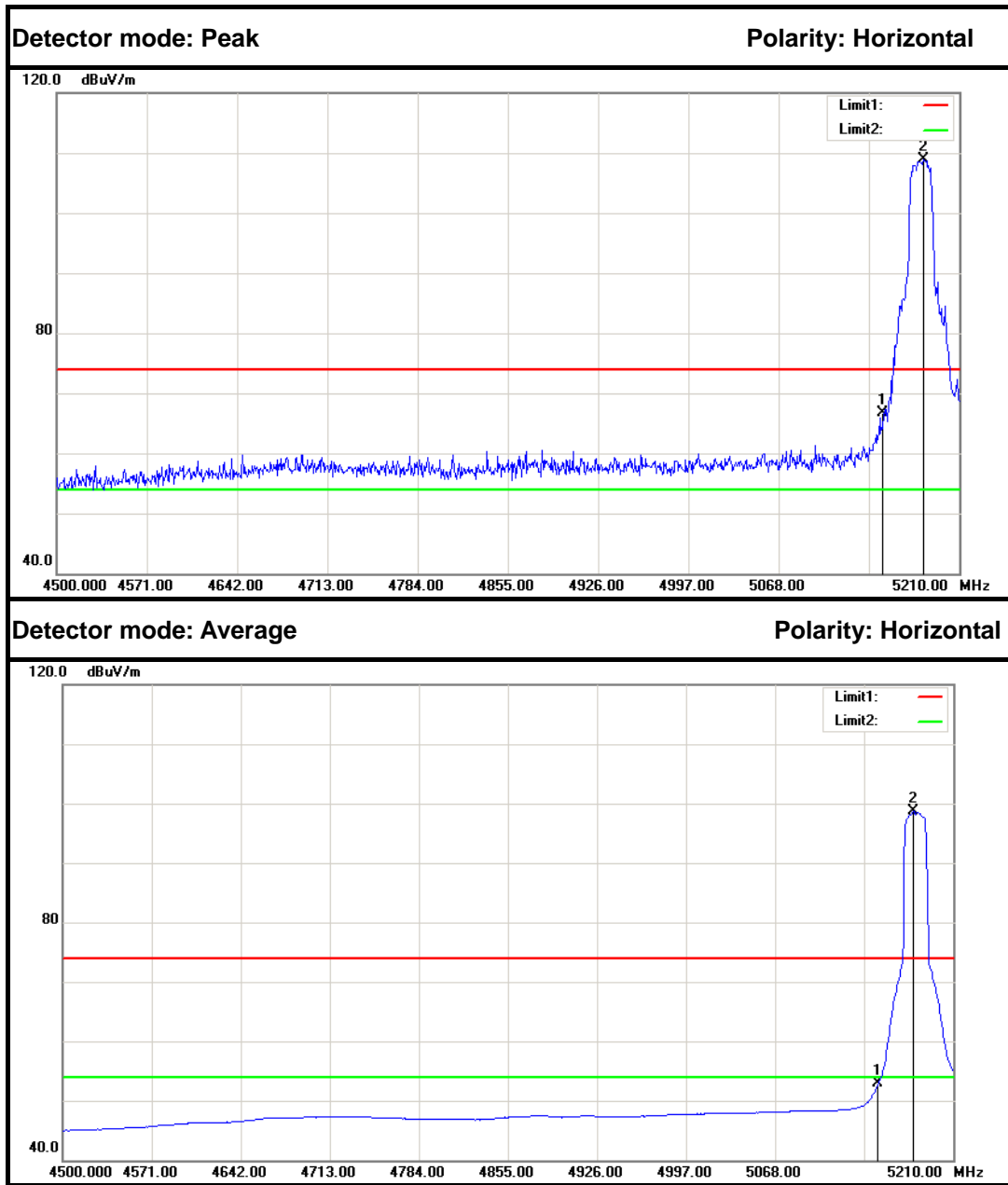
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5150.000	57.98	5.25	63.23	74.00	-10.77	Peak	Horizontal
2	5181.600	103.33	5.30	108.63	---	---	Peak	Horizontal
1	5150.000	44.58	5.25	49.83	54.00	-4.17	Average	Horizontal
2	5181.600	92.91	5.30	98.21	---	---	Average	Horizontal



IEEE 802.11a mode / 5180MHz (Antenna 3)



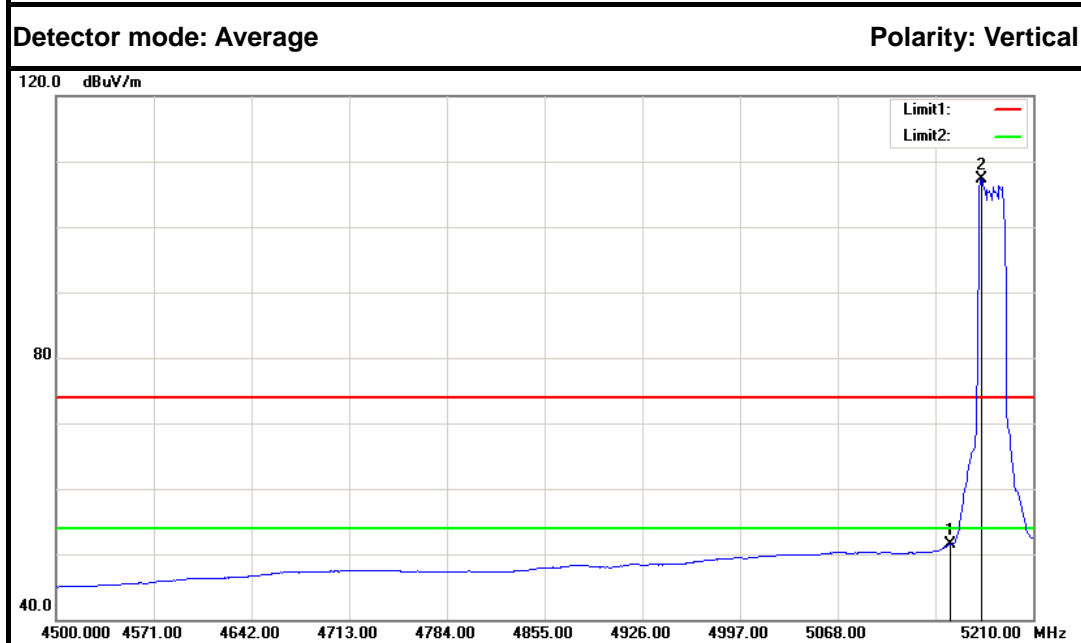
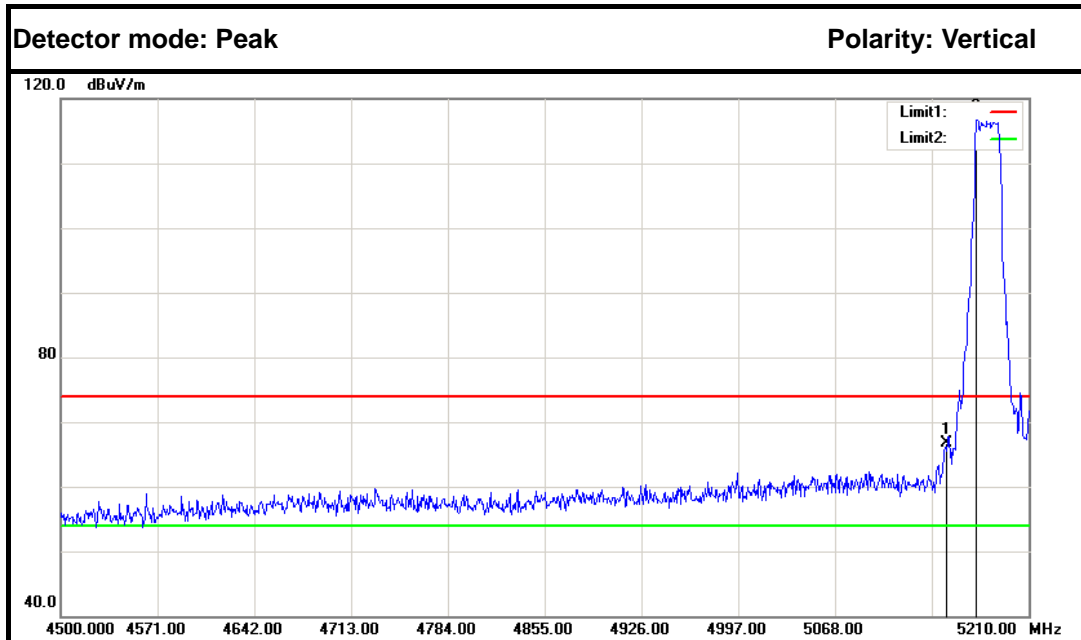
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5150.000	66.03	5.25	71.28	74.00	-2.72	Peak	Vertical
2	5179.470	110.65	5.30	115.95	---	---	Peak	Vertical
1	5150.000	47.49	5.25	52.74	54.00	-1.26	Average	Vertical
2	5181.600	99.24	5.30	104.54	---	---	Average	Vertical



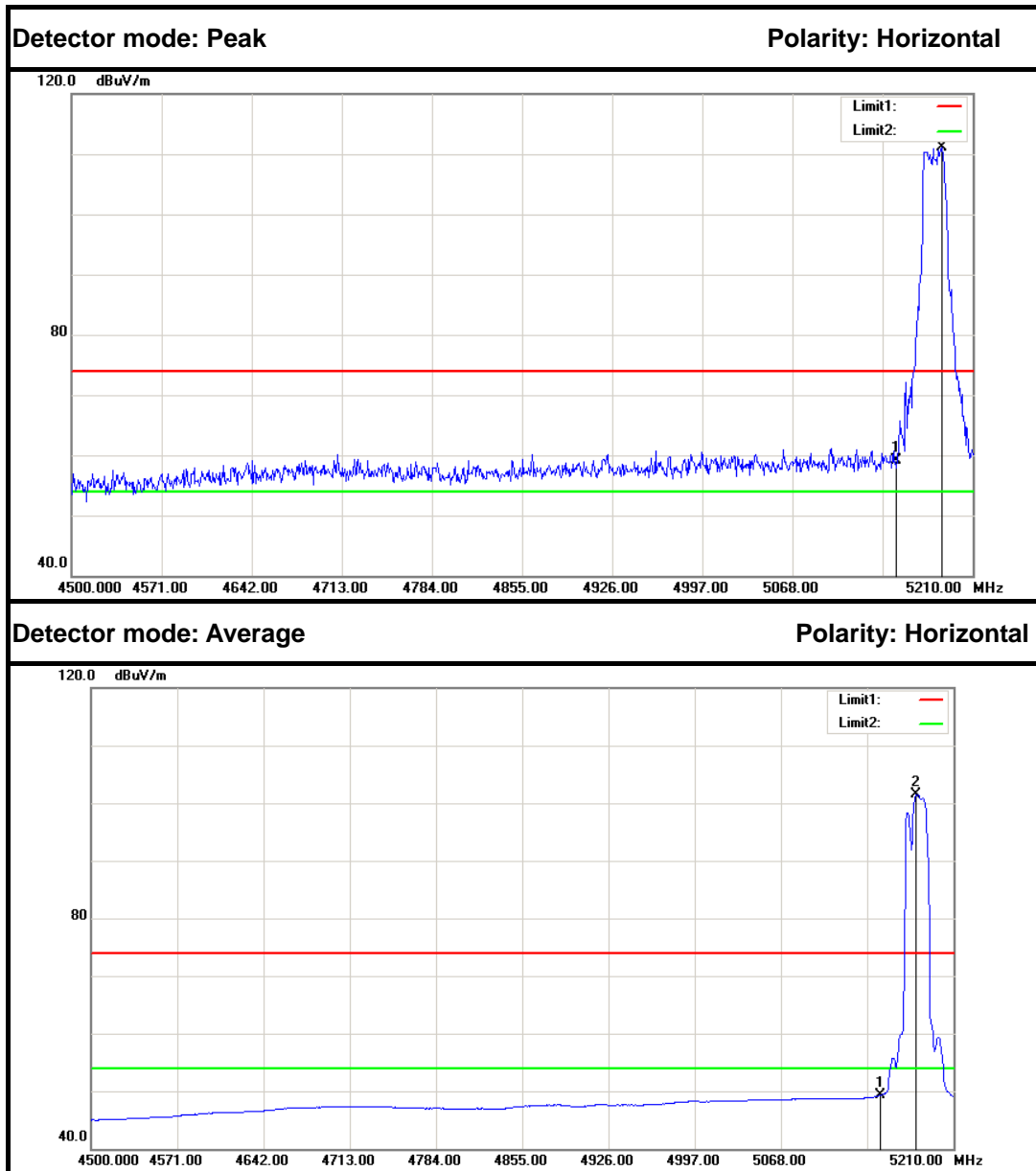
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5150.000	61.45	5.25	66.70	74.00	-7.30	Peak	Horizontal
2	5182.310	103.69	5.30	108.99	---	---	Peak	Horizontal
1	5150.000	47.58	5.25	52.83	54.00	-1.17	Average	Horizontal
2	5178.050	93.37	5.30	98.67	---	---	Average	Horizontal



Combine with antenna 0 , antenna 1, antenna 2 and antenna 3:
IEEE 802.11n HT 20 MHz mode / 5180 MHz



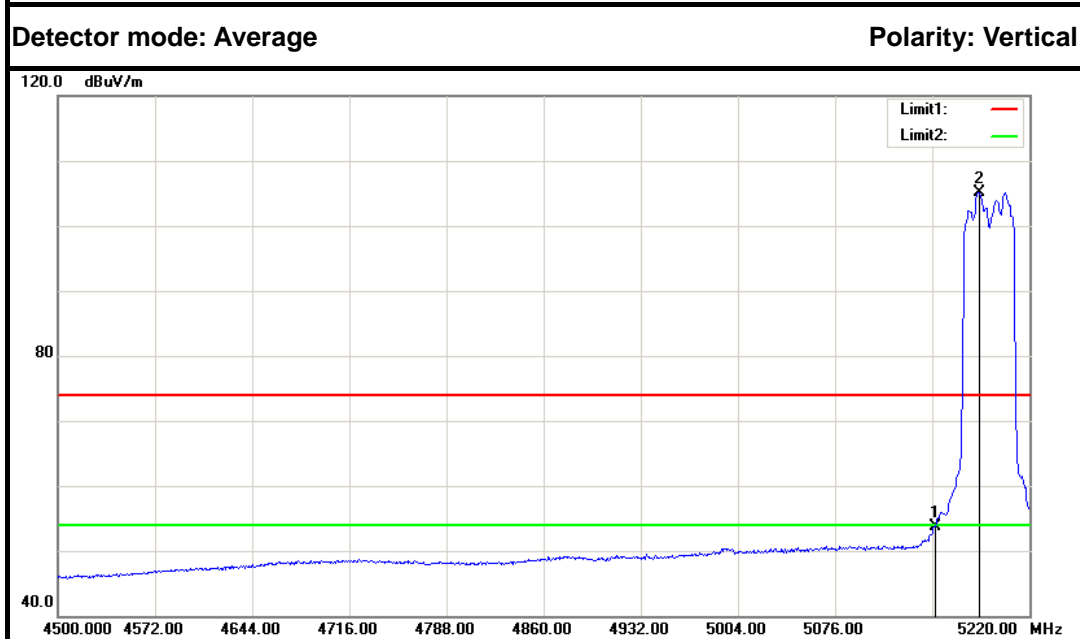
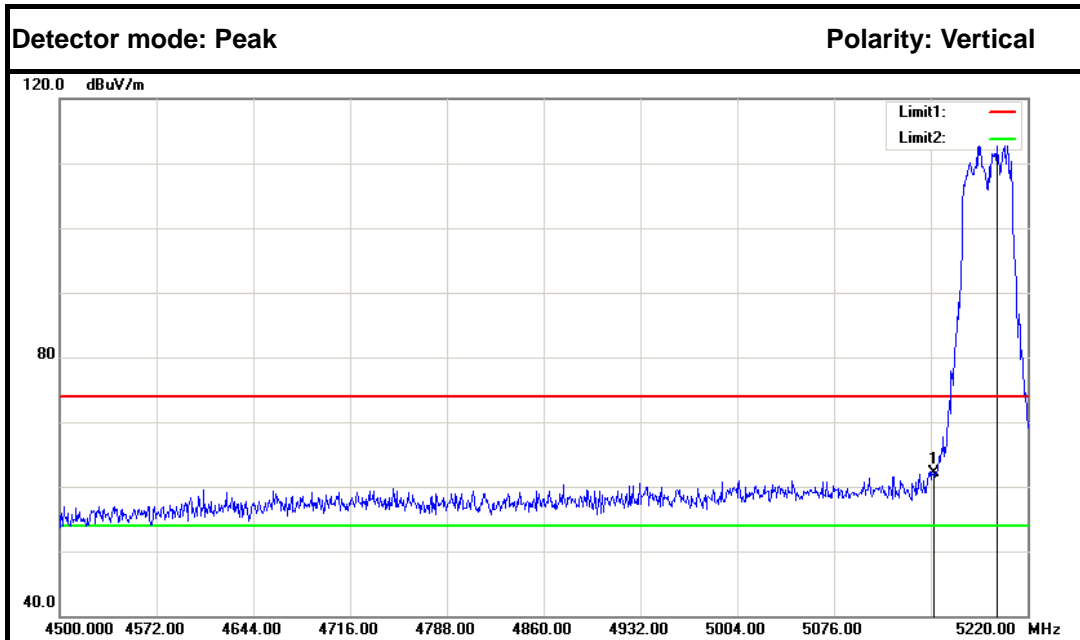
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5150.000	61.54	5.25	66.79	74.00	-7.21	Peak	Vertical
2	5171.660	111.51	5.29	116.80	---	---	Peak	Vertical
1	5150.000	46.27	5.25	51.52	54.00	-2.48	Average	Vertical
2	5172.370	102.02	5.29	107.31	---	---	Average	Vertical



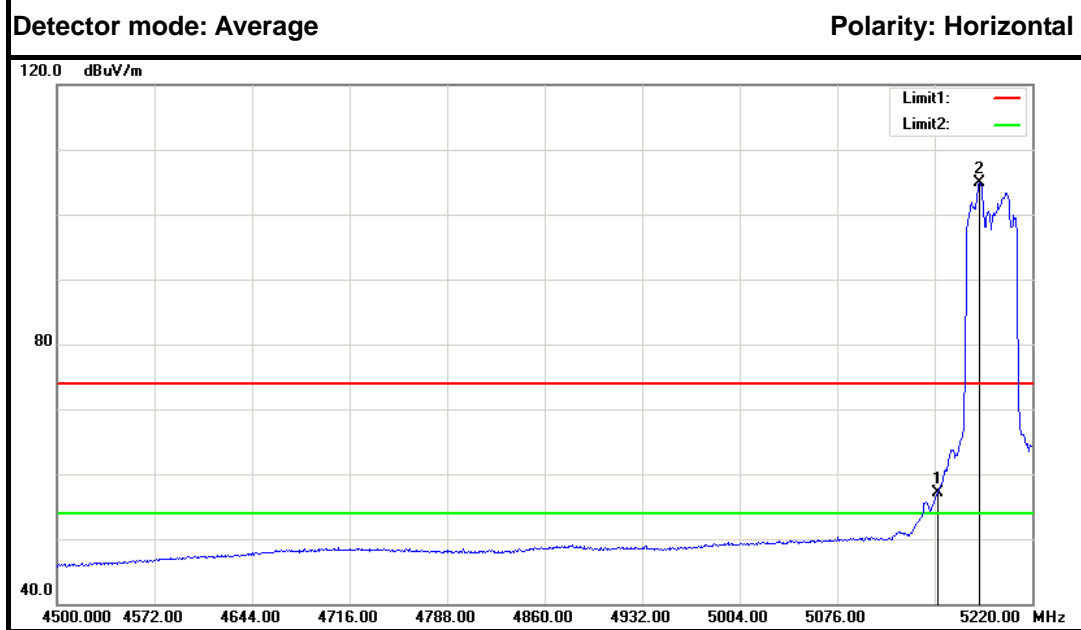
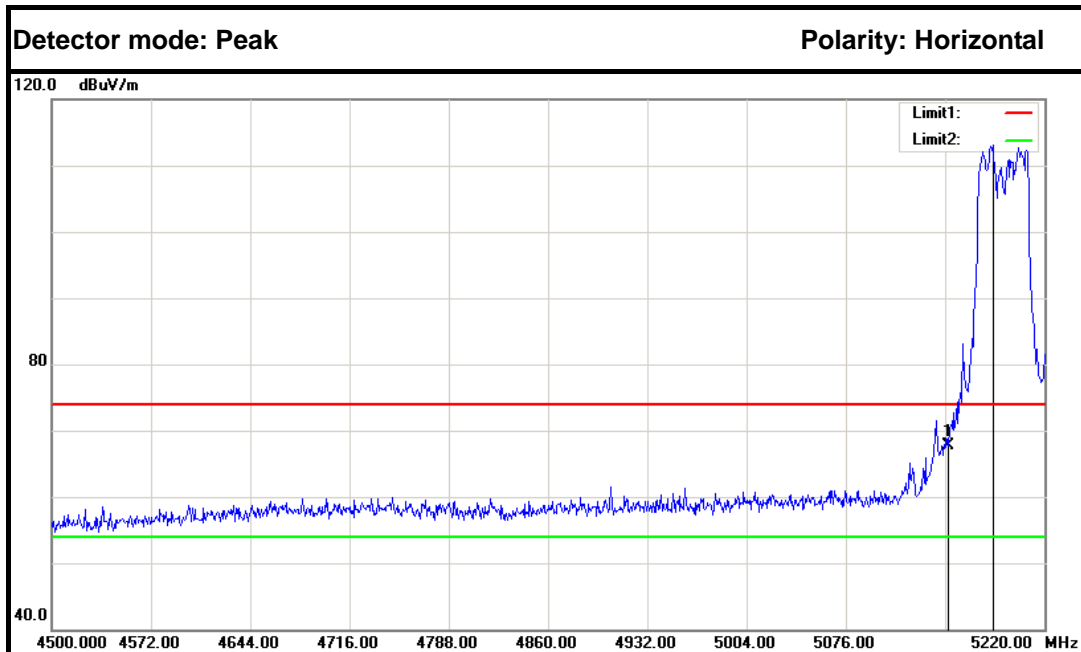
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5150.000	53.86	5.25	59.11	74.00	-14.89	Peak	Horizontal
2	5185.860	105.78	5.31	111.09	---	---	Peak	Horizontal
1	5150.000	44.00	5.25	49.25	54.00	-4.75	Average	Horizontal
2	5179.470	96.28	5.30	101.58	---	---	Average	Horizontal



Combine with antenna 0 , antenna 1, antenna 2 and antenna 3:
IEEE 802.11n HT 40 MHz mode / 5190 MHz



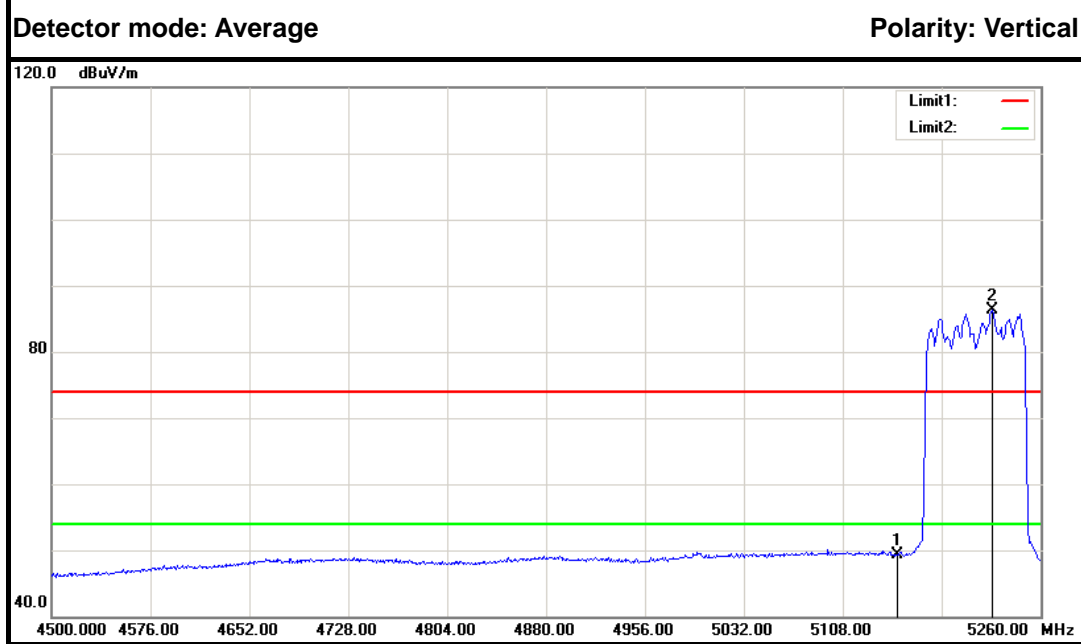
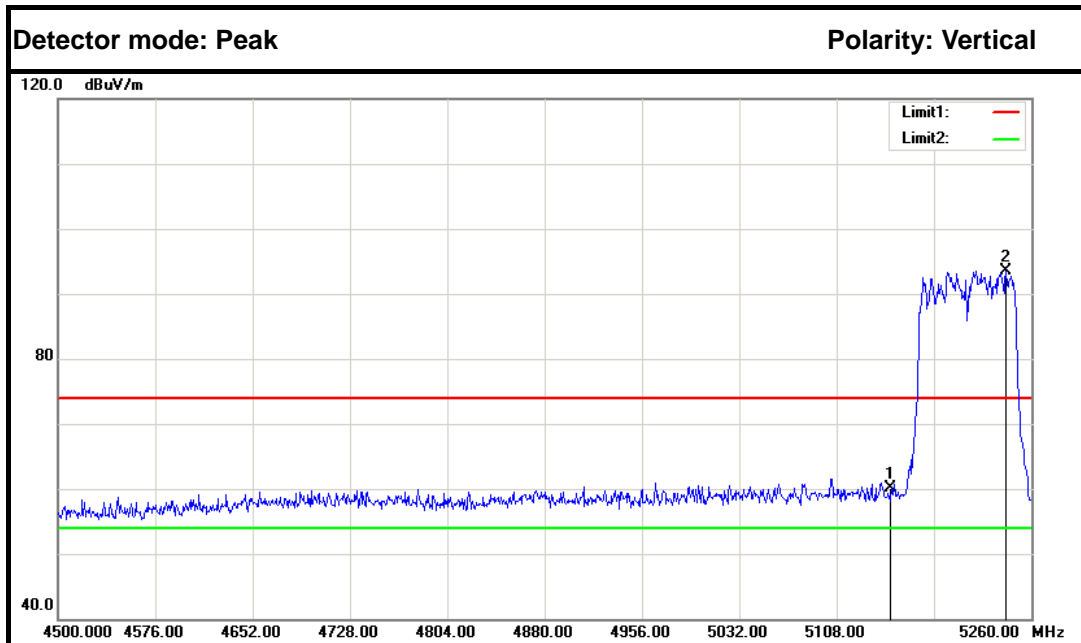
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5150.000	56.94	5.25	62.19	74.00	-11.81	Peak	Vertical
2	5196.960	107.34	5.33	112.67	---	---	Peak	Vertical
1	5150.000	48.39	5.25	53.64	54.00	-0.36	Average	Vertical
2	5183.280	99.89	5.31	105.20	---	---	Average	Vertical



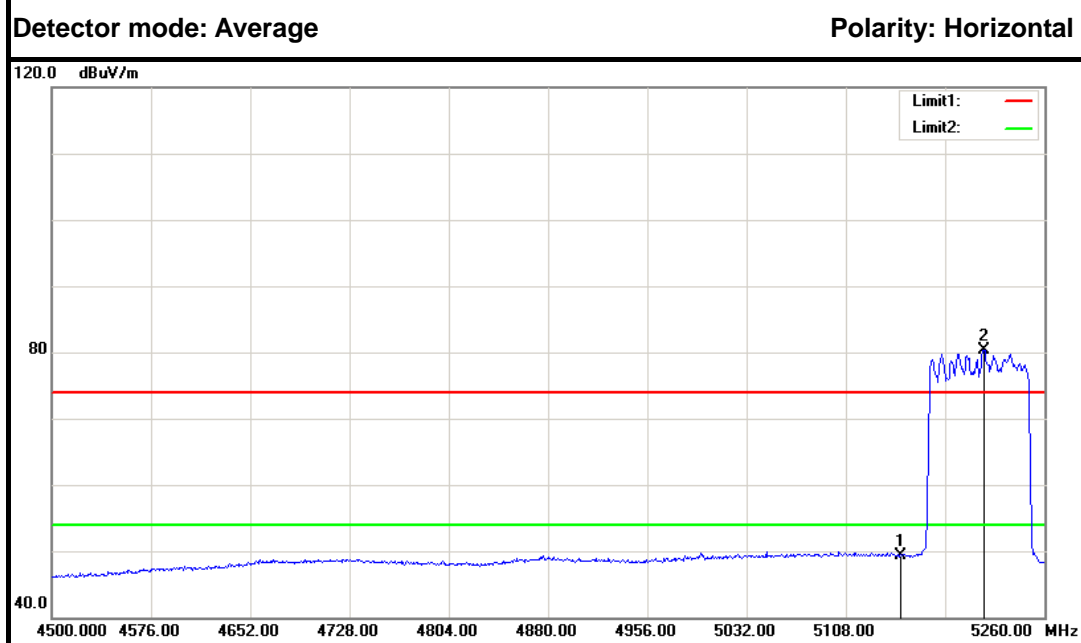
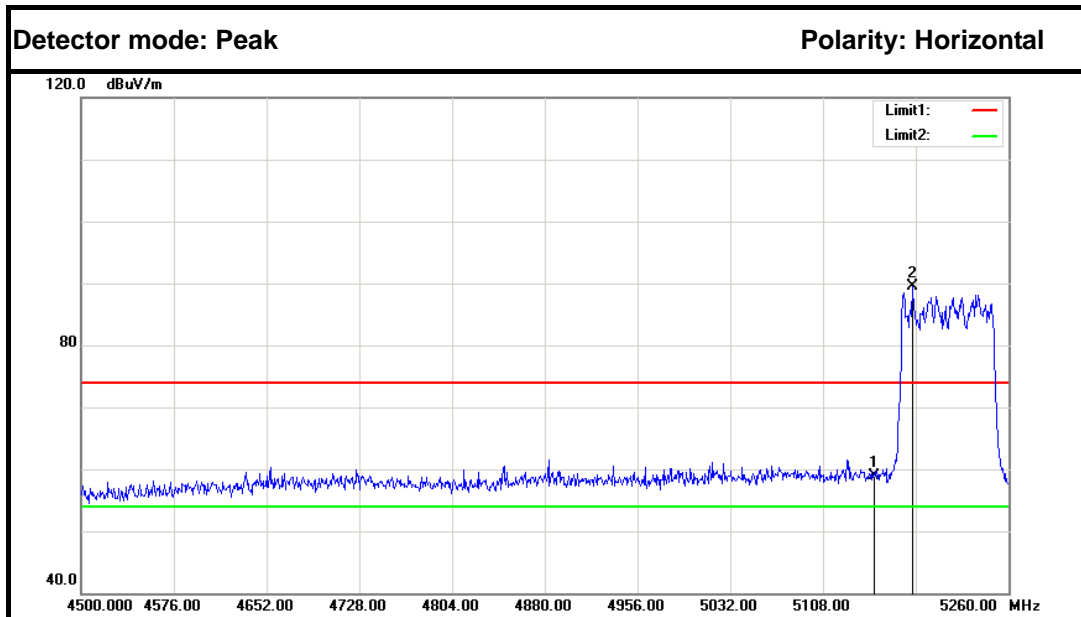
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5150.000	62.39	5.25	67.64	74.00	-6.36	Peak	Horizontal
2	5182.560	107.74	5.30	113.04	---	---	Peak	Horizontal
1	5150.000	51.85	5.25	57.10	54.00	3.10	Average	Horizontal
2	5181.120	99.62	5.30	104.92	---	---	Average	Horizontal



Combine with antenna 0 , antenna 1, antenna 2 and antenna 3:
IEEE 802.11ac 80 mode / 5210 MHz



No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5150.000	54.76	5.25	60.01	74.00	-13.99	Peak	Vertical
2	5240.240	88.09	5.41	93.50	---	---	Peak	Vertical
1	5150.000	44.13	5.25	49.38	54.00	-4.62	Average	Vertical
2	5222.760	80.98	5.38	86.36	---	---	Average	Vertical



No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	5150.000	53.72	5.25	58.97	74.00	-15.03	Peak	Horizontal
2	5180.960	84.18	5.30	89.48	---	---	Peak	Horizontal
1	5150.000	44.14	5.25	49.39	54.00	-4.61	Average	Horizontal
2	5213.640	74.95	5.36	80.31	---	---	Average	Horizontal



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.

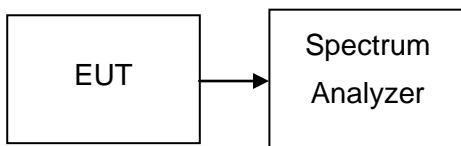
(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall 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 TEST CONFIGURATION



6.6.3 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 > 26dB bandwidth, Sweep=1ms
3. For devices operating in the bands 5.725-5.85 GHz, Set the spectrum analyzer as RBW = 1MHz, VBW = 3MHz, Span > 26dB bandwidth, Sweep=1ms
4. Record the max. reading.
5. Repeat the above procedure until the measurements for all frequencies are completed



6.6.4 TEST RESULTS

Test Data

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

Channel	Frequency (MHz)	PPSD (dBm)				Limit (dBm)	Margain				Result
		Antenna 0	Antenna 1	Antenna 2	Antenna 3		Antenna 0	Antenna 1	Antenna 2	Antenna 3	
Low	5180	6.066	6.204	5.981	6.300	17	-10.934	-10.796	-11.019	-10.700	PASS
Mid	5200	6.440	5.871	5.545	5.904		-10.560	-11.129	-11.455	-11.096	PASS
High	5240	6.501	6.084	5.316	6.219		-10.499	-10.916	-11.684	-10.781	PASS

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

Channel	Frequency (MHz)	PPSD (dBm)				Limit (dBm)	Margain				Result
		Antenna 0	Antenna 1	Antenna 2	Antenna 3		Antenna	Antenna	Antenna	Antenna	
Low	5745	6.960	7.282	6.349	5.489	30	-23.040	-22.718	-23.651	-24.511	PASS
Mid	5785	7.179	7.084	6.464	6.067		-22.821	-22.916	-23.536	-23.933	PASS
High	5825	7.868	6.877	5.936	6.043		-22.132	-23.123	-24.064	-23.957	PASS

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

Channel	Frequency (MHz)	PPSD (dBm)				Total (dBm)	Limit (dBm)	Margain	Result
		Antenna 0	Antenna 1	Antenna 2	Antenna 3				
Low	5180	-0.592	1.027	0.476	0.537	6.421	12.46	-6.039	PASS
Mid	5200	0.923	0.184	0.306	0.396	6.482		-5.978	PASS
High	5240	0.814	0.432	0.742	0.520	6.650		-5.810	PASS

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

Channel	Frequency (MHz)	PPSD (dBm)				Total (dBm)	Limit (dBm)	Margain	Result
		Antenna 0	Antenna 1	Antenna 2	Antenna 3				
Low	5745	5.843	5.434	4.688	4.242	11.117	25.46	-14.343	PASS
Mid	5785	6.740	7.289	6.028	5.427	12.449		-13.011	PASS
High	5825	6.193	5.854	4.860	4.947	11.522		-13.938	PASS

Remark:

$$\text{Directional Gain} = G_{\text{ant}} + 10 \log(N_{\text{ant}}) \text{ dBi}$$

G_{ant} : Gain of Individual Antennas (Same for Each Antenna)

N_{ant} : Number of Transmit Antennas



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

Channel	Frequency (MHz)	PPSD (dBm)				Total (dBm)	Limit (dBm)	Margain	Result
		Antenna 0	Antenna 1	Antenna 2	Antenna 3				
Low	5190	1.038	0.622	0.211	0.796	5.593	12.46	-6.867	PASS
High	5230	0.572	-0.033	0.042	0.956	5.288		-7.172	PASS

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

Channel	Frequency (MHz)	PPSD (dBm)				Total (dBm)	Limit (dBm)	Margain	Result
		Antenna 0	Antenna 1	Antenna 2	Antenna 3				
Low	5755	2.449	2.173	1.469	1.199	7.873	25.46	-17.587	PASS
High	5795	2.492	2.159	1.395	1.620	7.959		-17.501	PASS

Test mode: IEEE 802.11ac 80 mode / 5210MHz

Channel	Frequency (MHz)	PPSD (dBm)				Total (dBm)	Limit (dBm)	Margain	Result
		Antenna 0	Antenna 1	Antenna 2	Antenna 3				
	5210	0.466	0.694	0.228	0.714	6.551	12.46	-5.909	PASS

Test mode: IEEE 802.11ac 80 mode / 5775MHz

Channel	Frequency (MHz)	PPSD (dBm)				Total (dBm)	Limit (dBm)	Margain	Result
		Antenna 0	Antenna 1	Antenna 2	Antenna 3				
	5775	-0.270	0.937	-0.650	-0.568	5.932	25.46	-19.528	PASS

Remark:

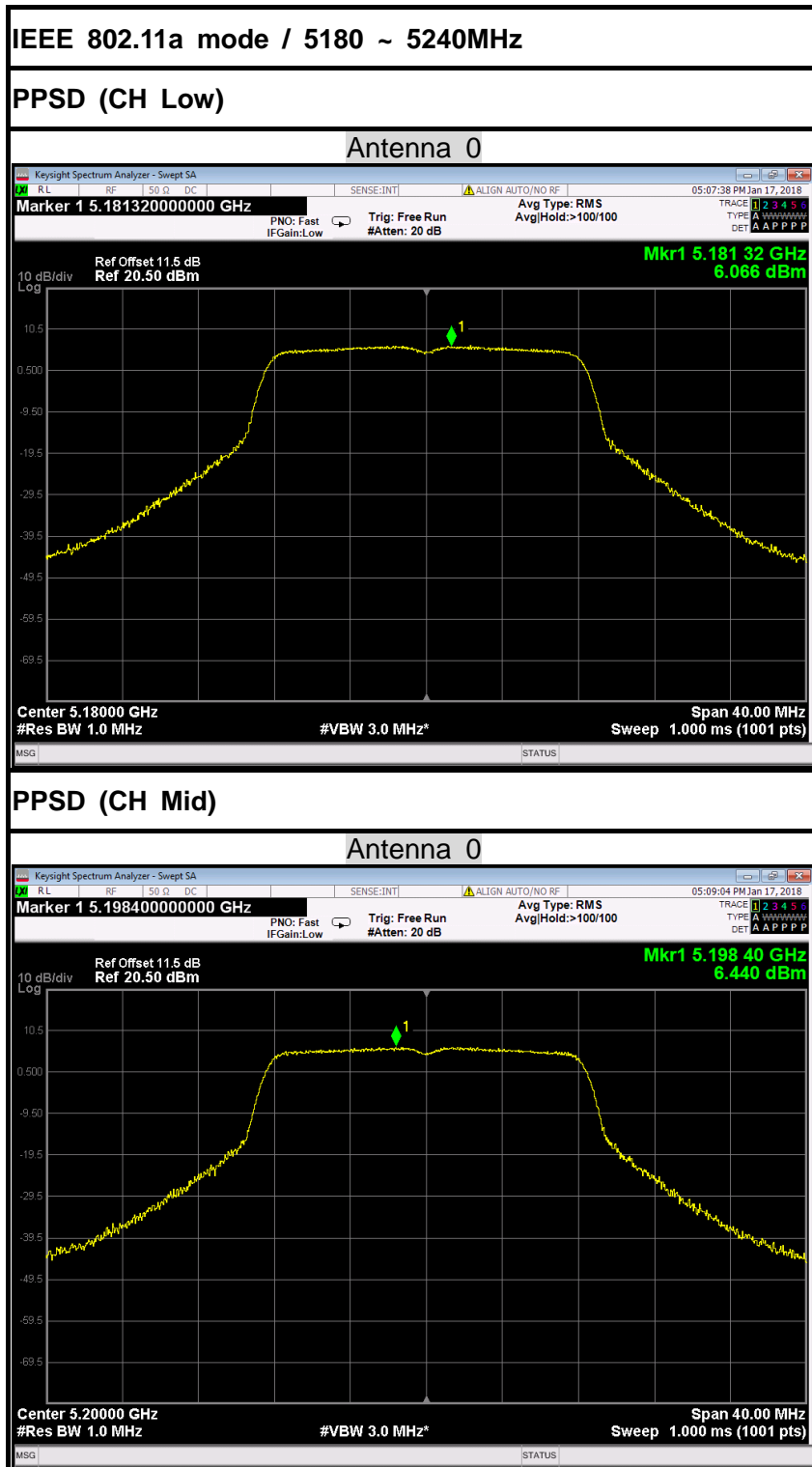
Directional Gain= $G_{ant} + 10\log(N_{ant})$ dBi

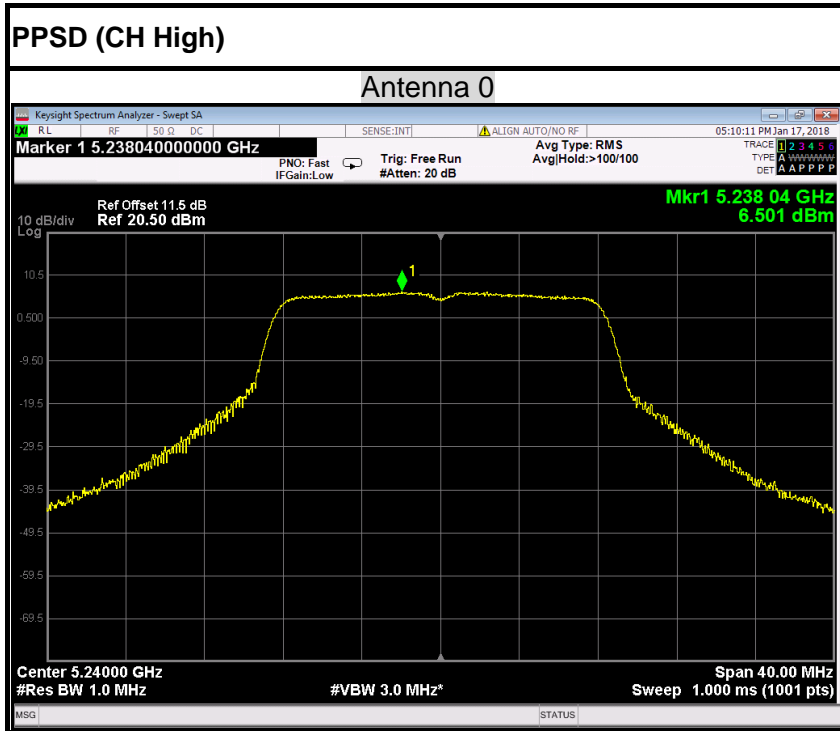
G_{ant} : Gain of Individual Antennas (Same for Each Antenna)

N_{ant} : Number of Transmit Antennas

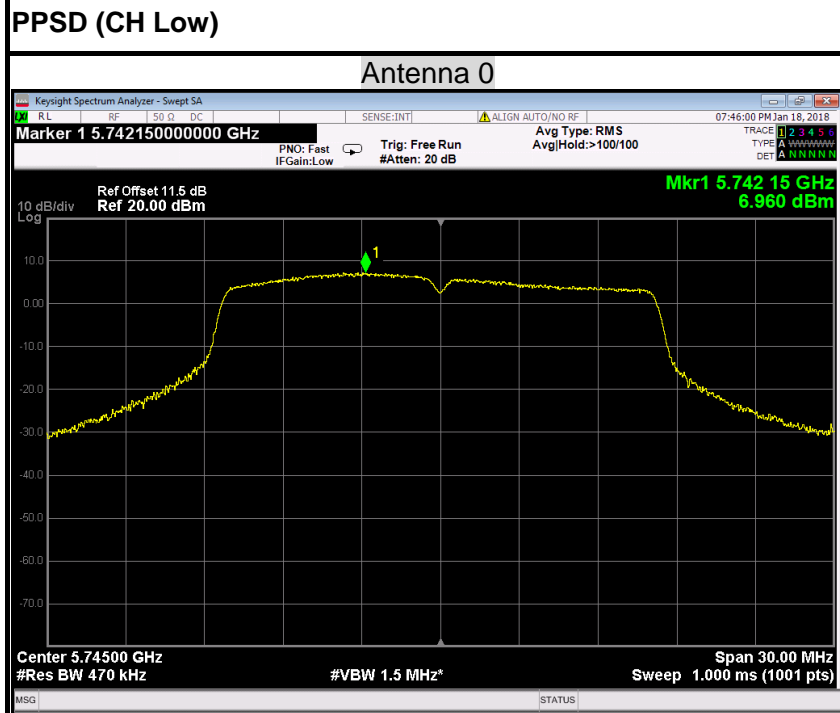


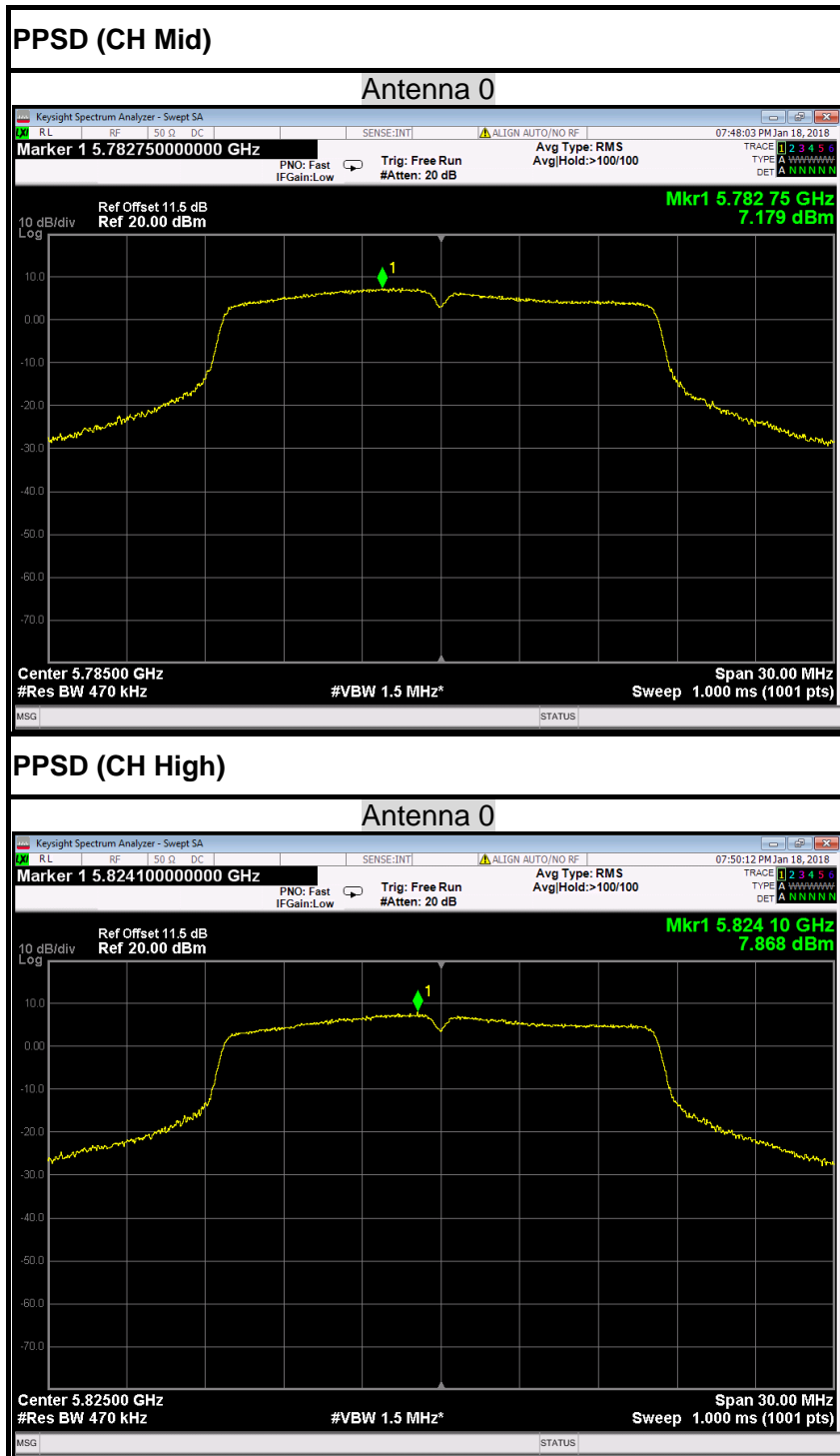
Test Plot

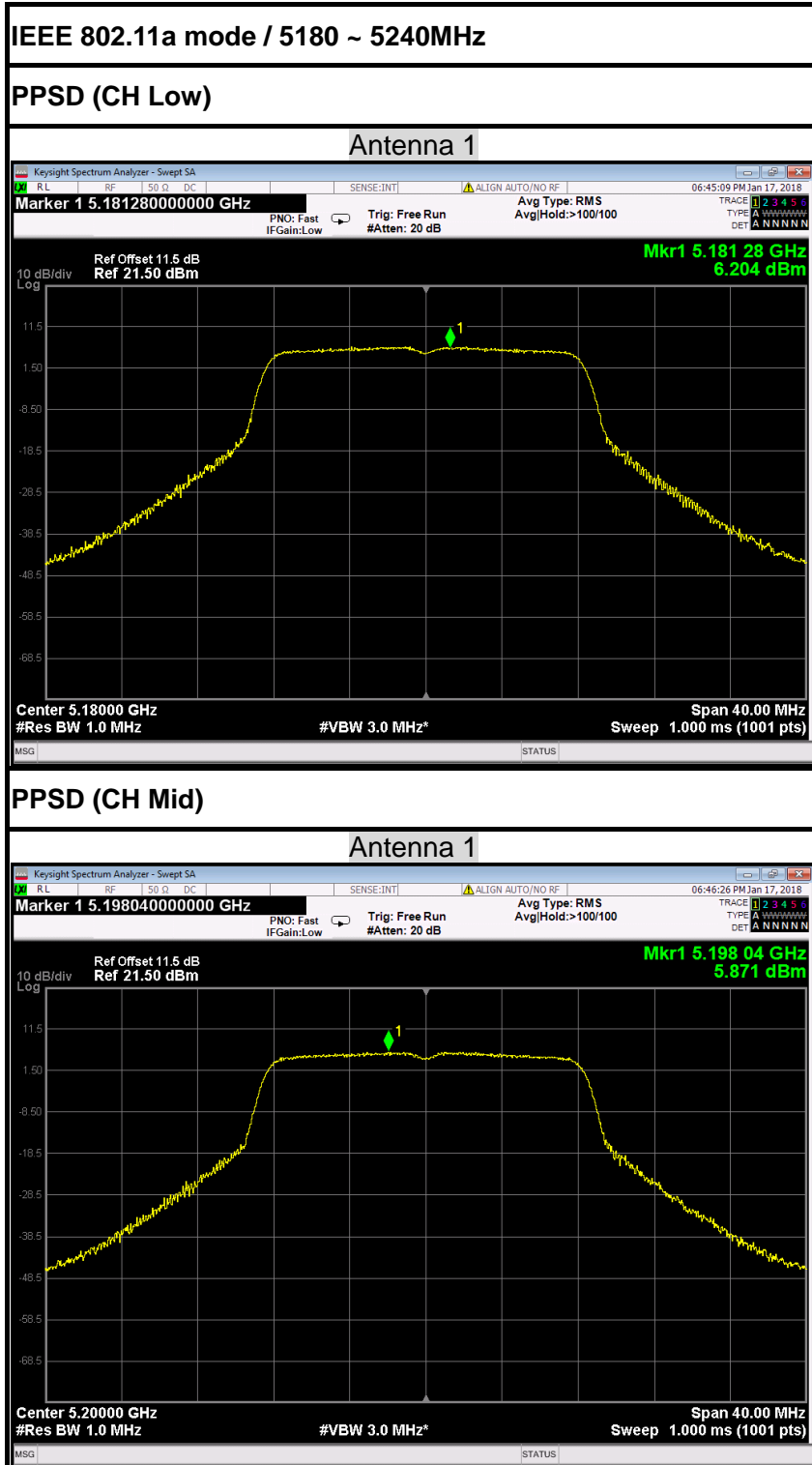


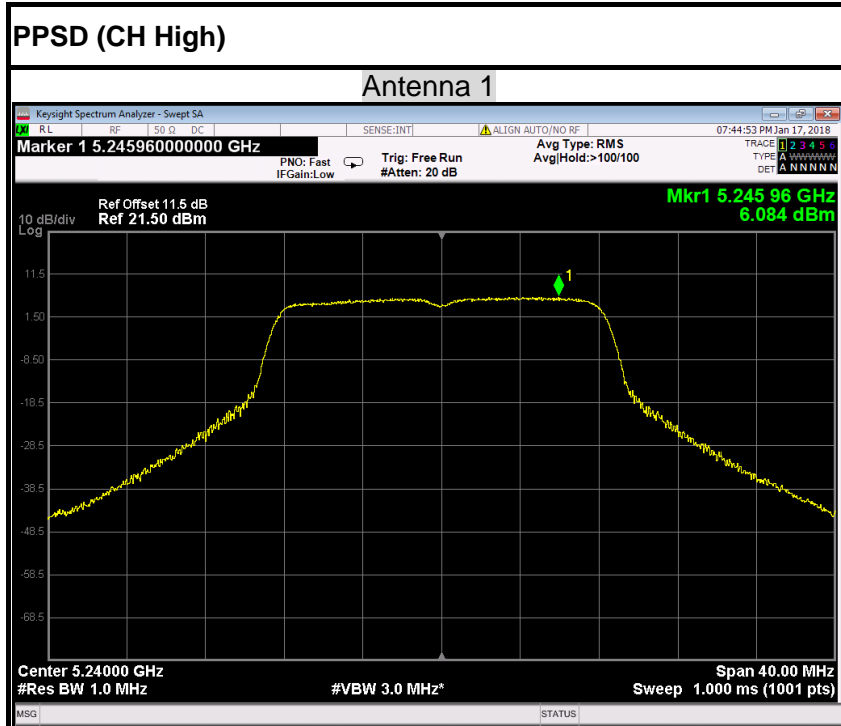


IEEE 802.11a mode / 5745 ~ 5825MHz

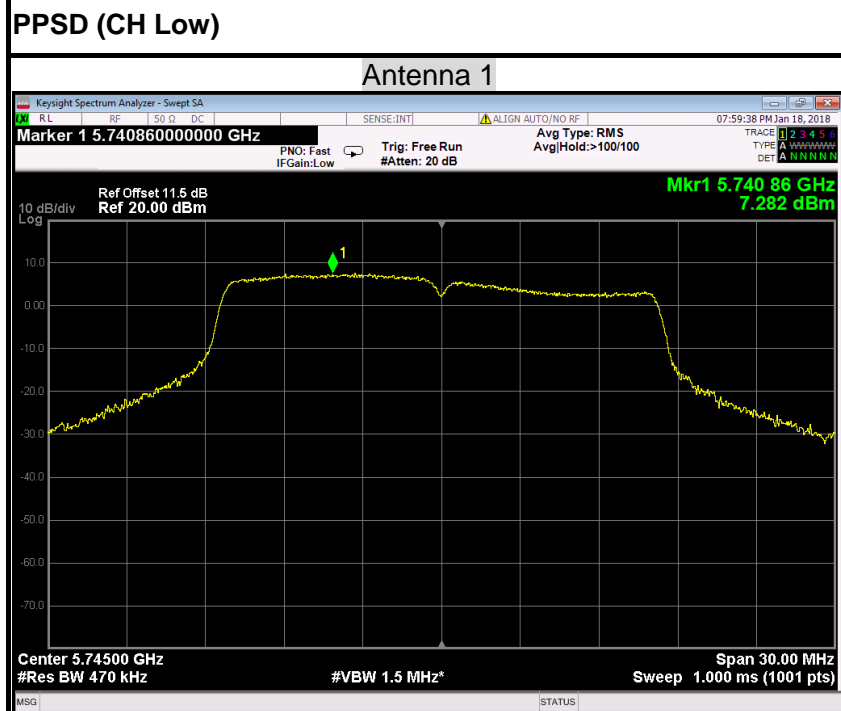


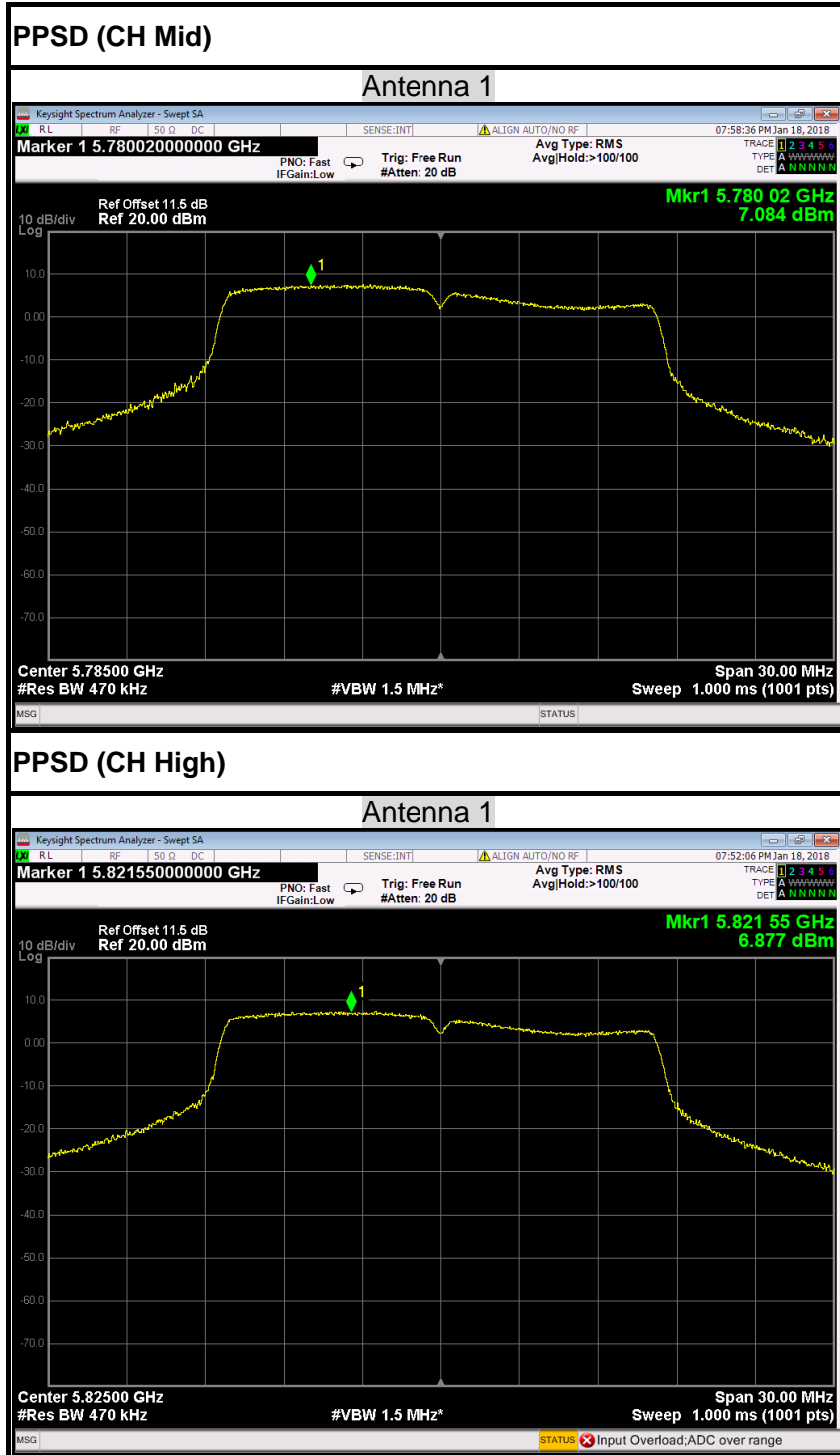


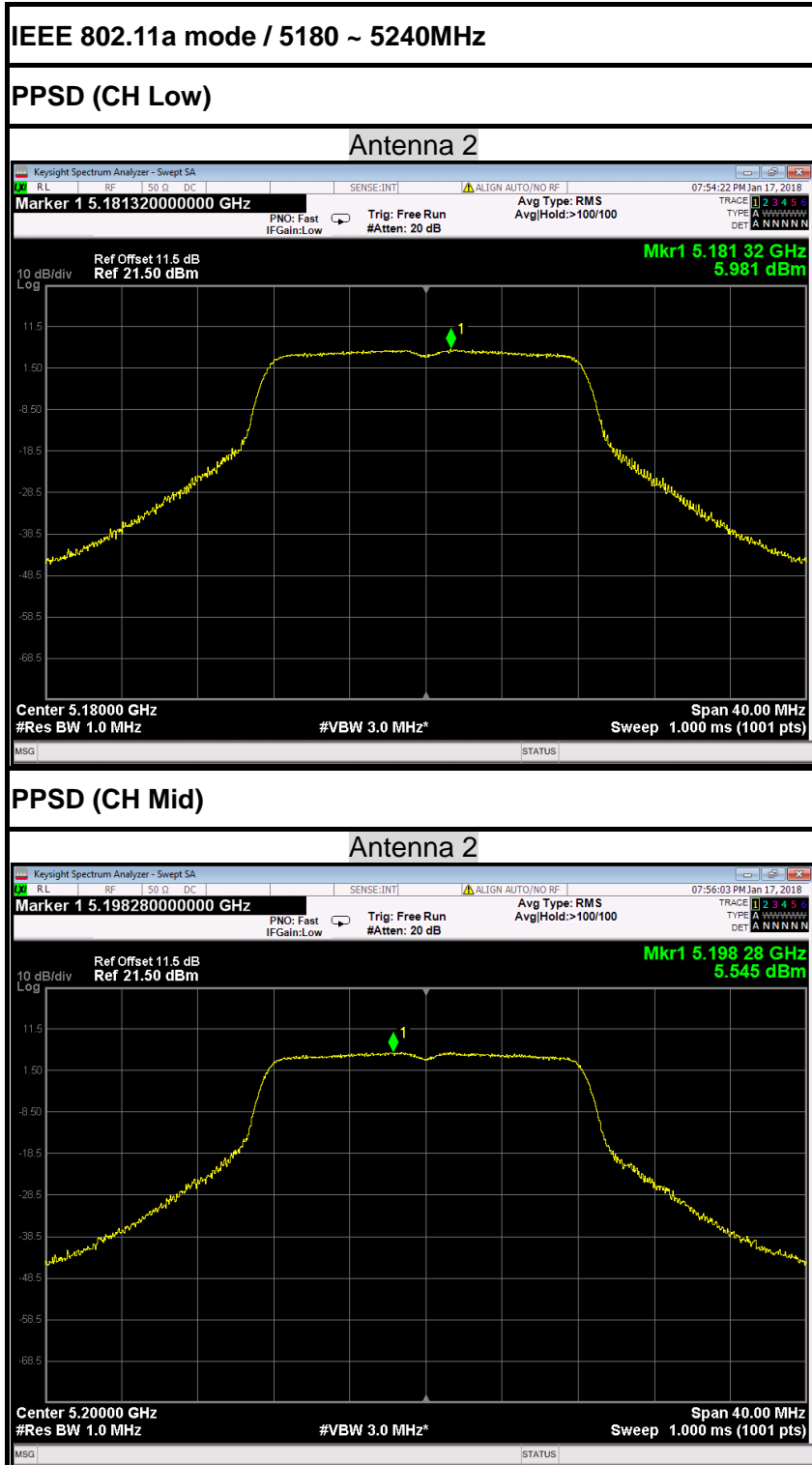


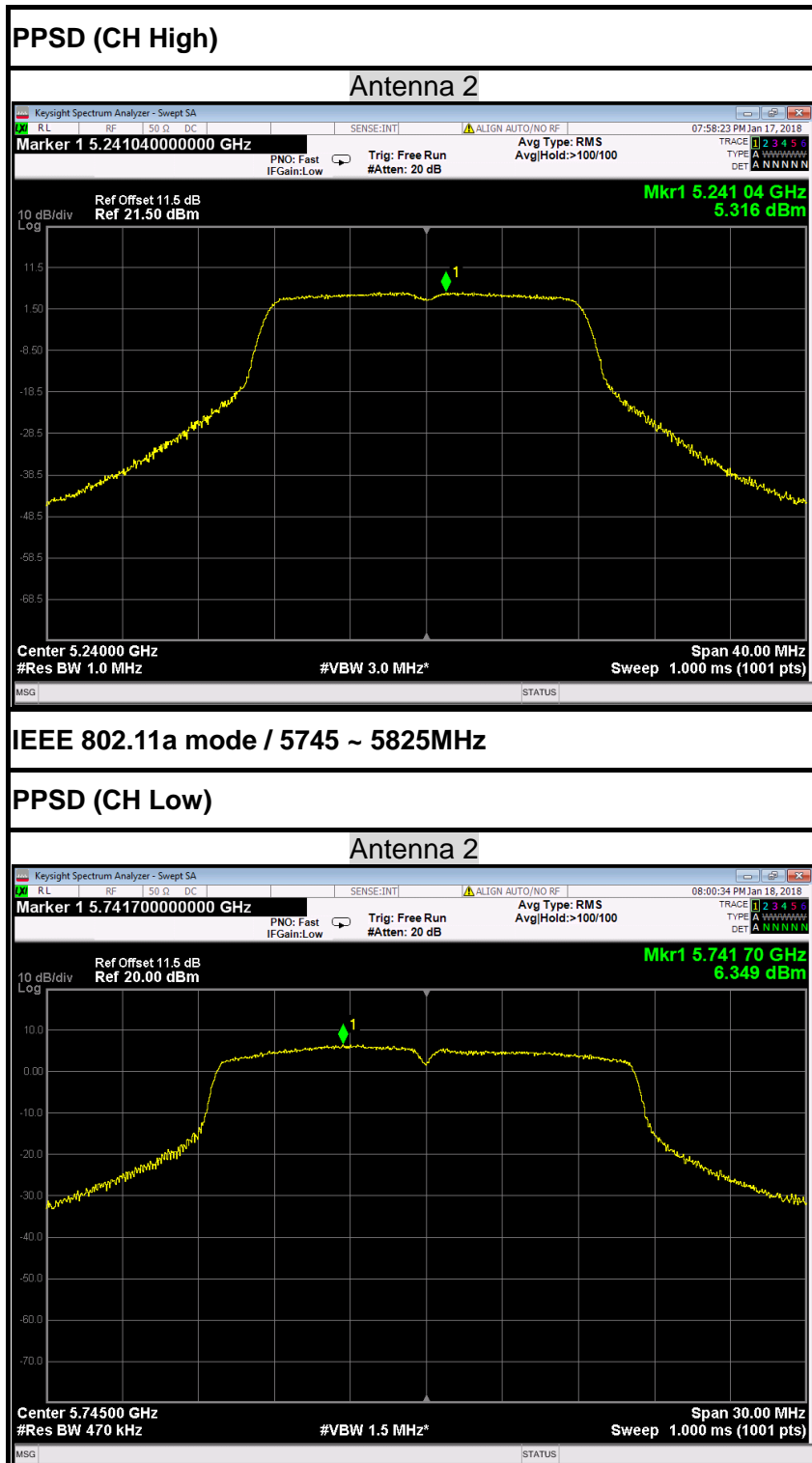


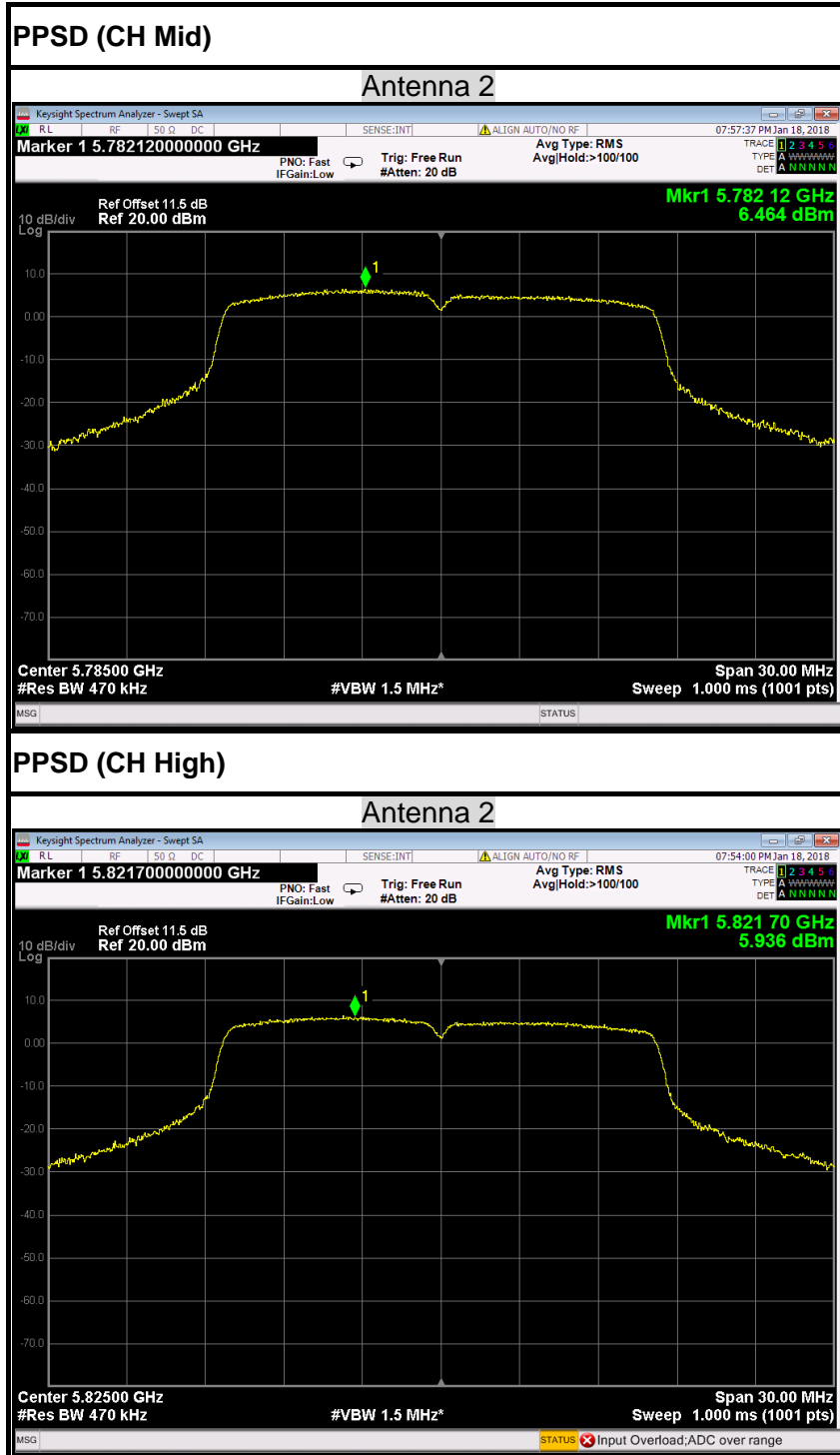
IEEE 802.11a mode / 5745 ~ 5825MHz

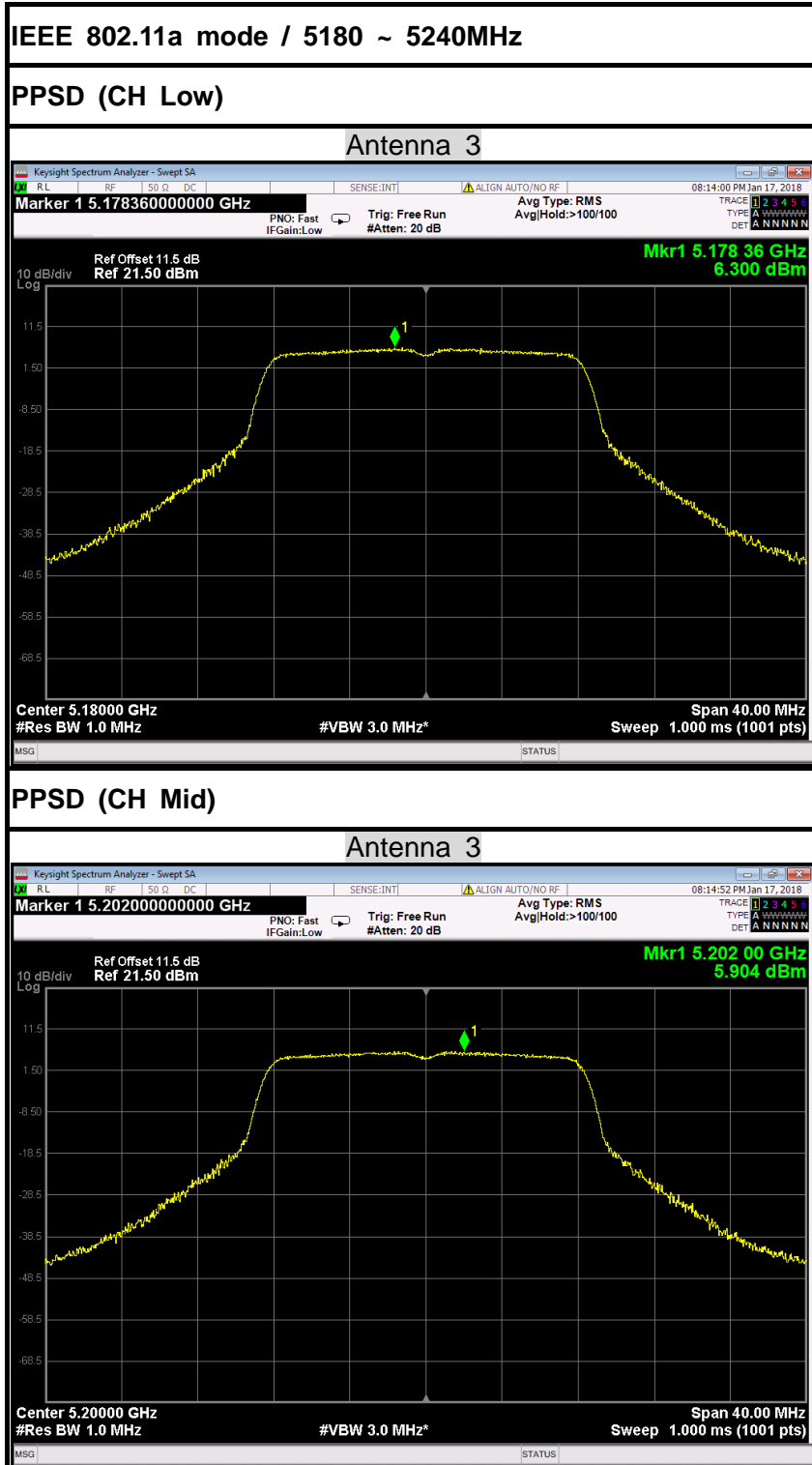


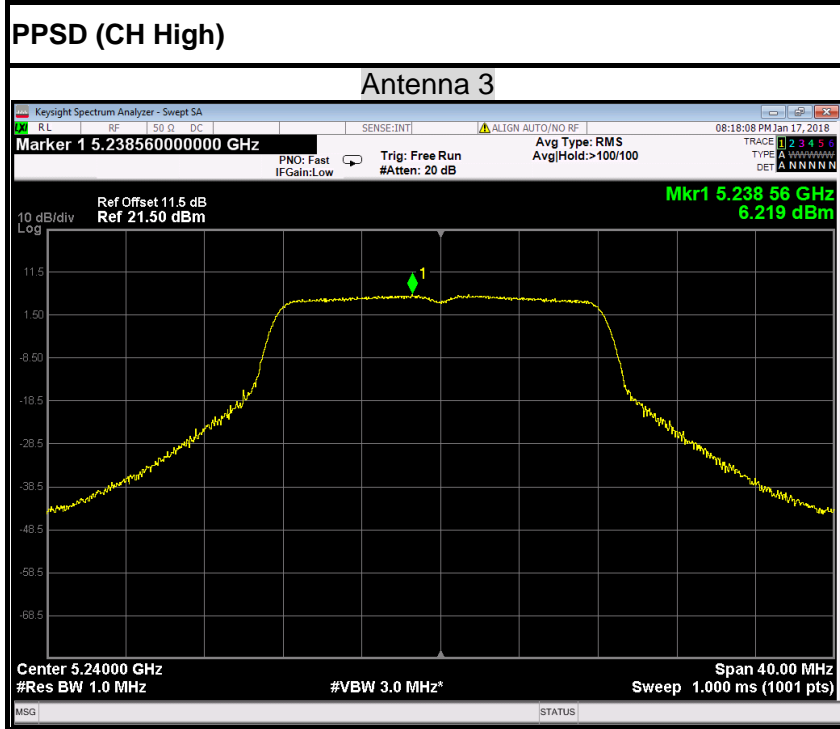




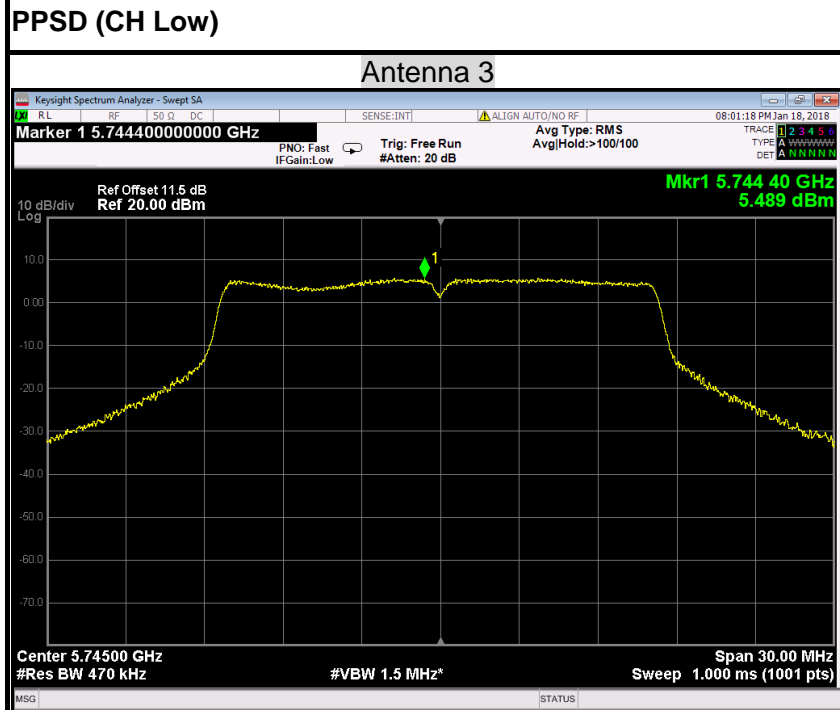


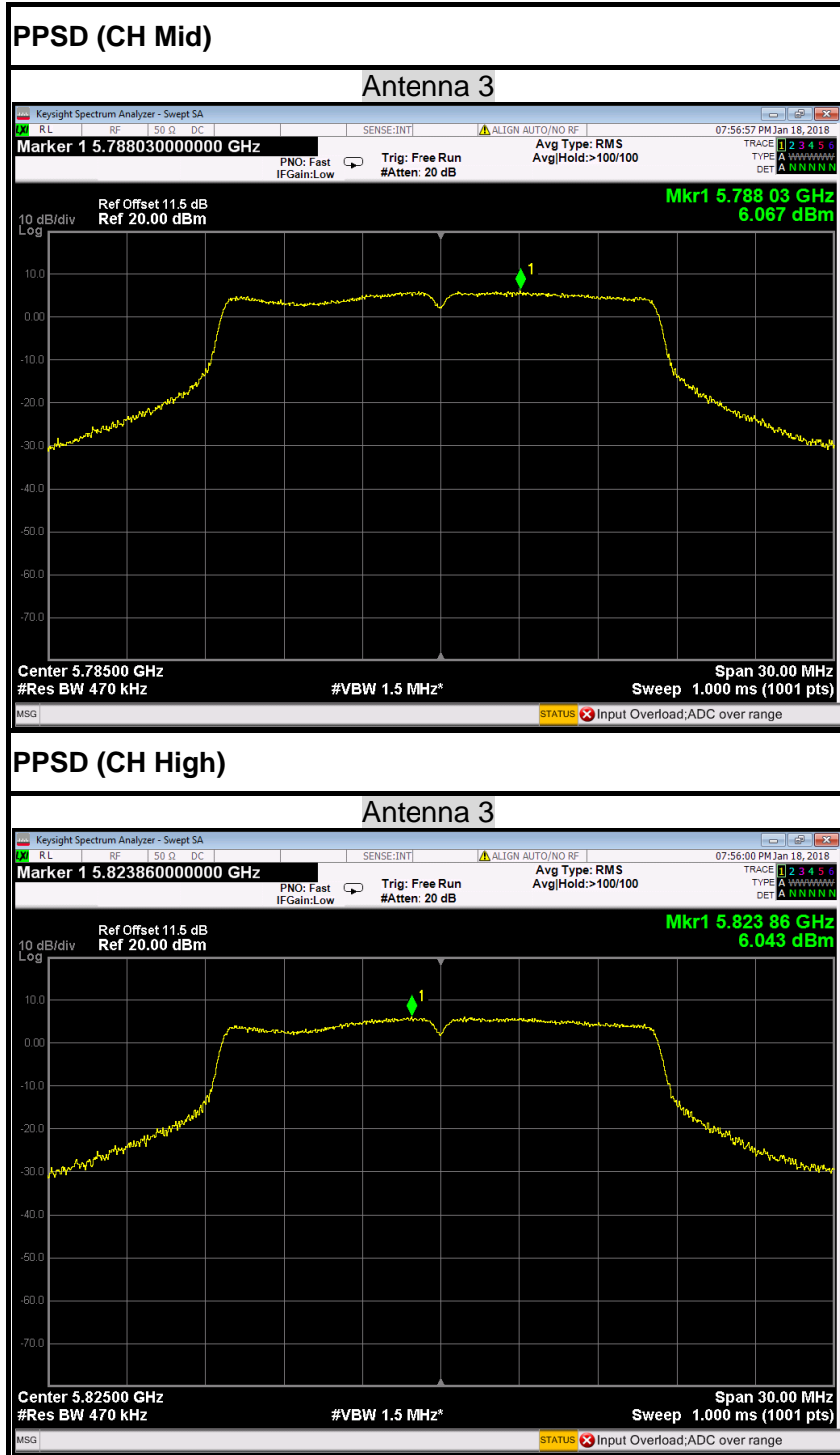


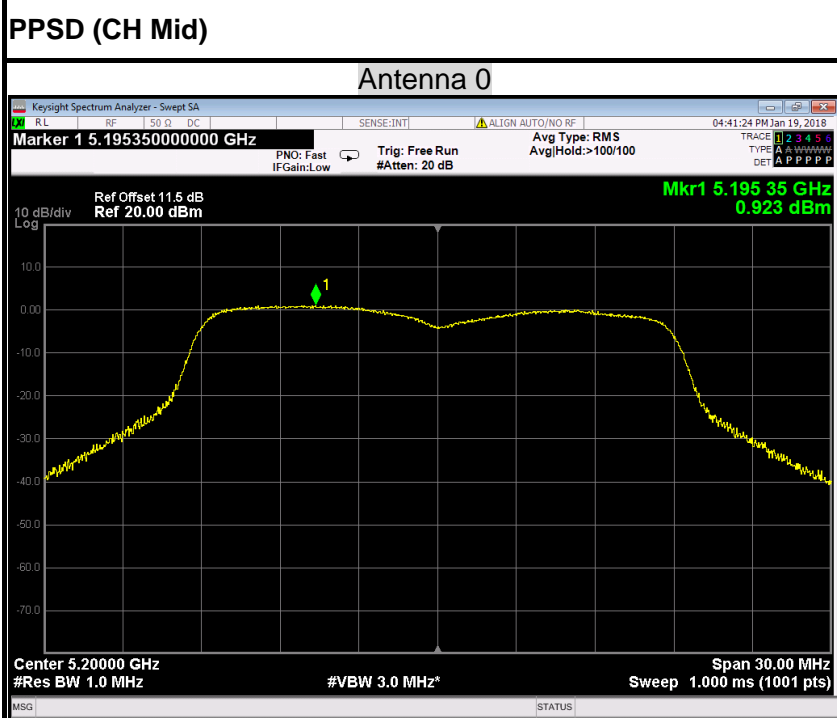
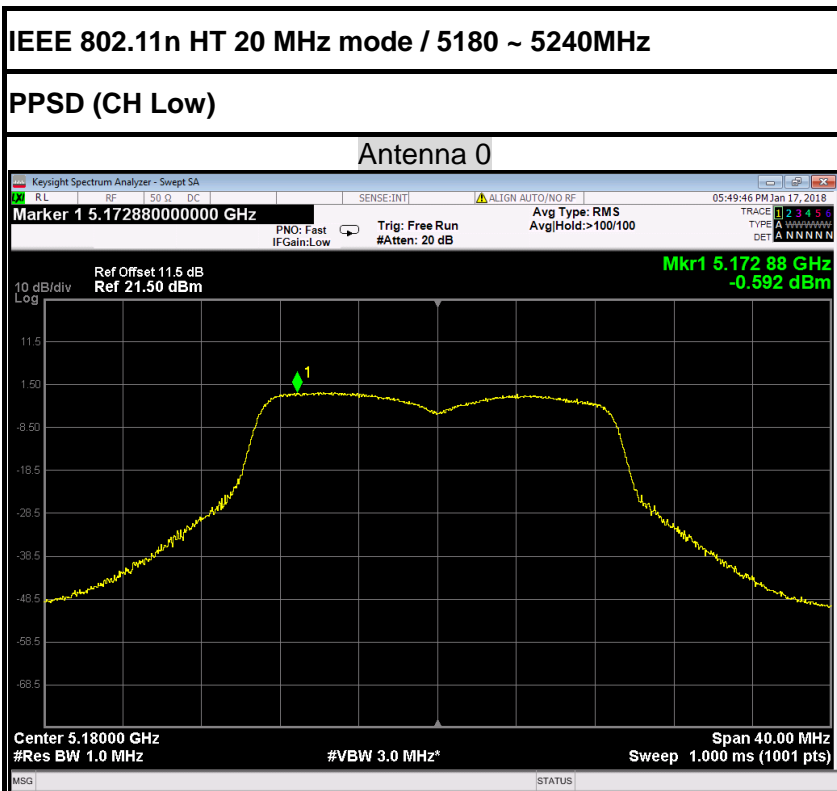


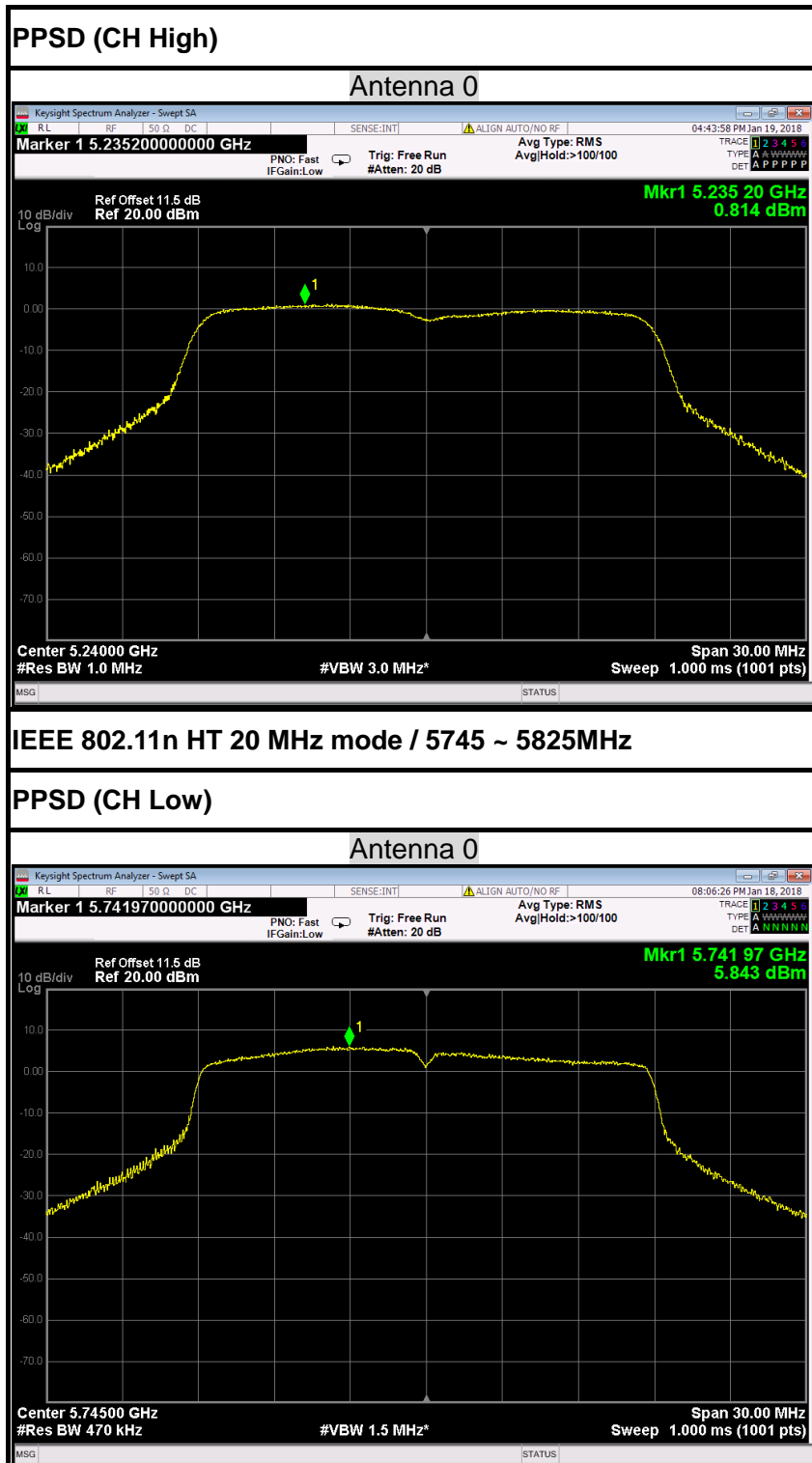


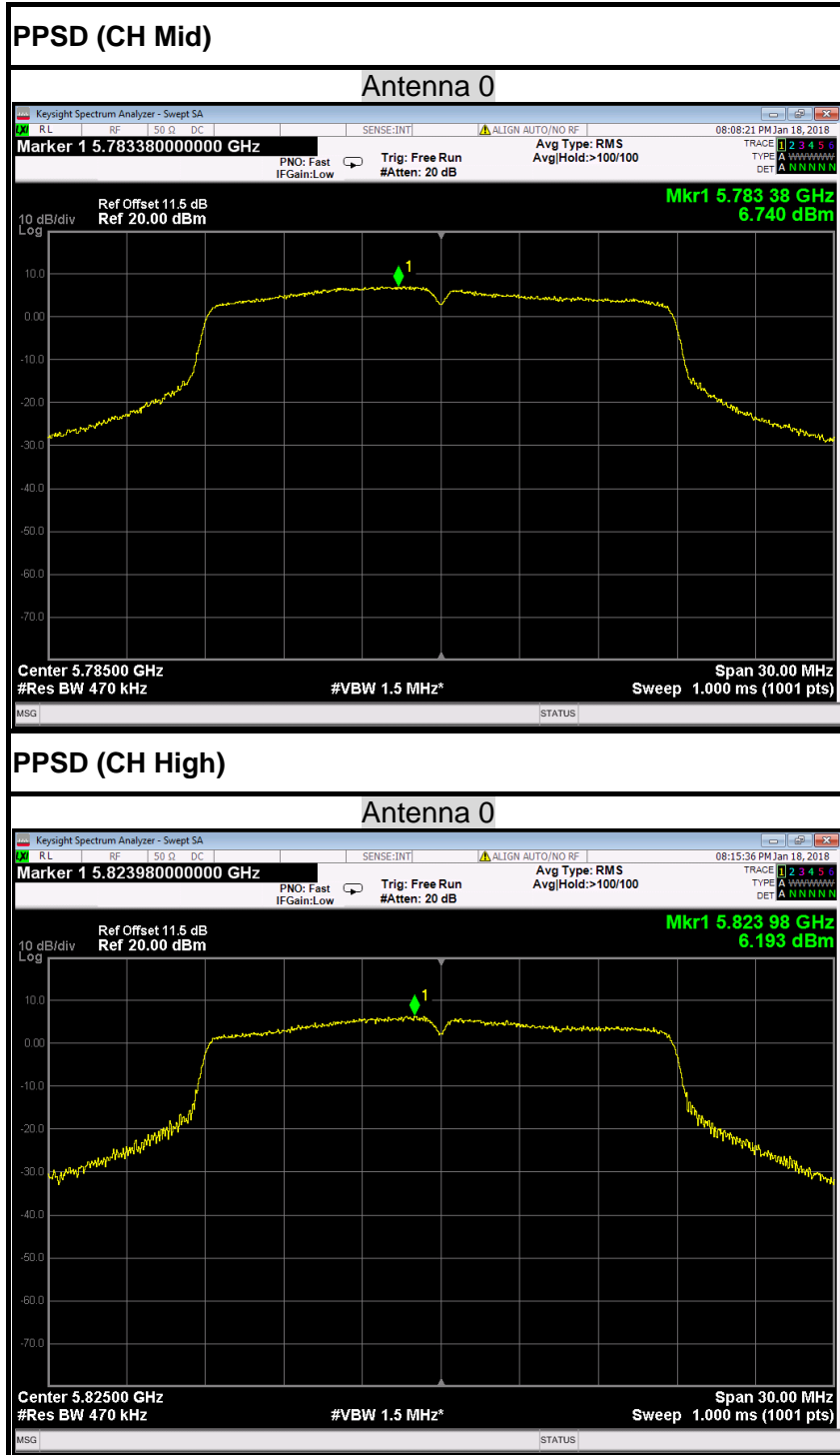
IEEE 802.11a mode / 5745 ~ 5825MHz

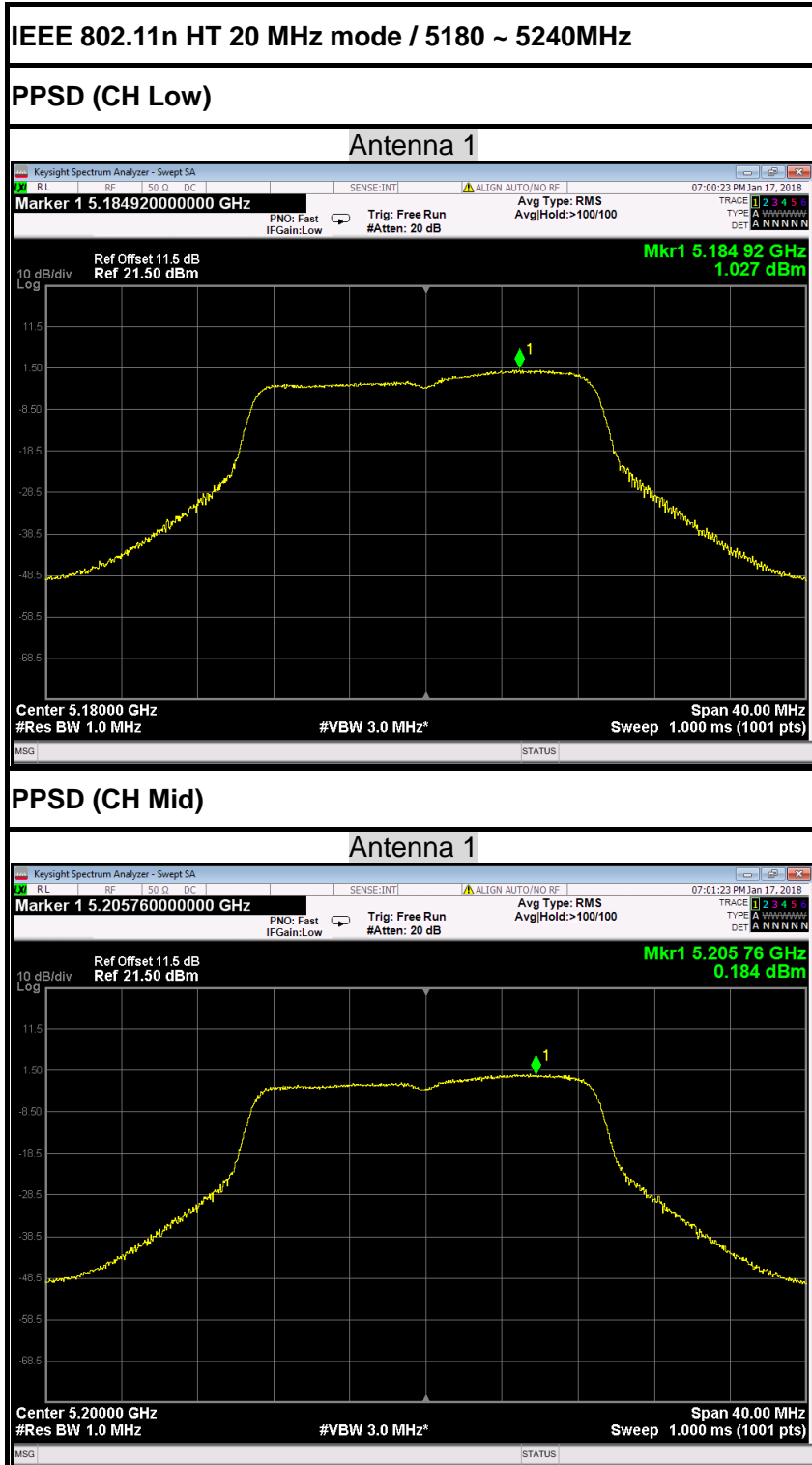


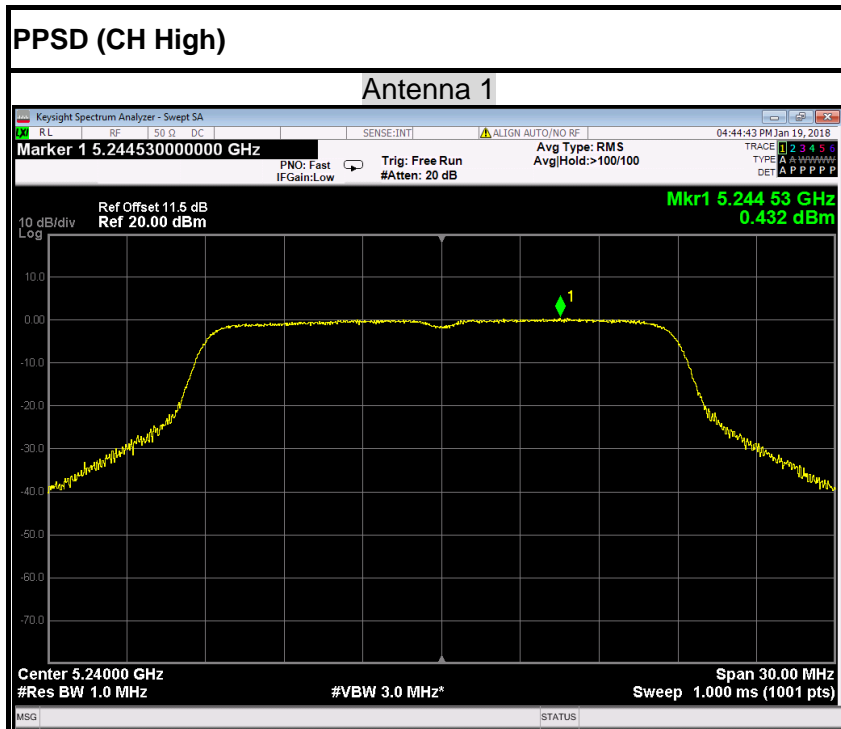




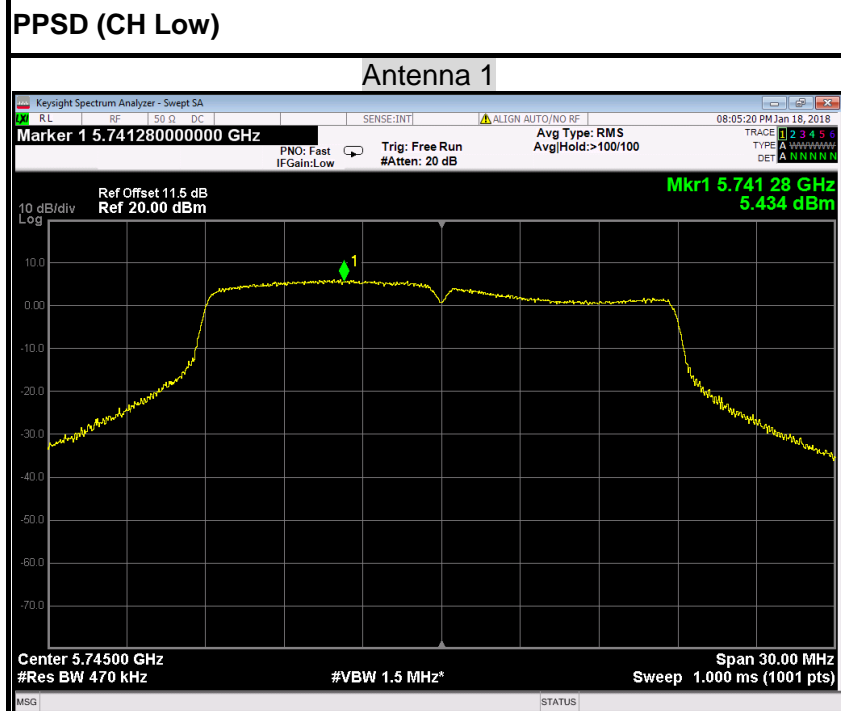


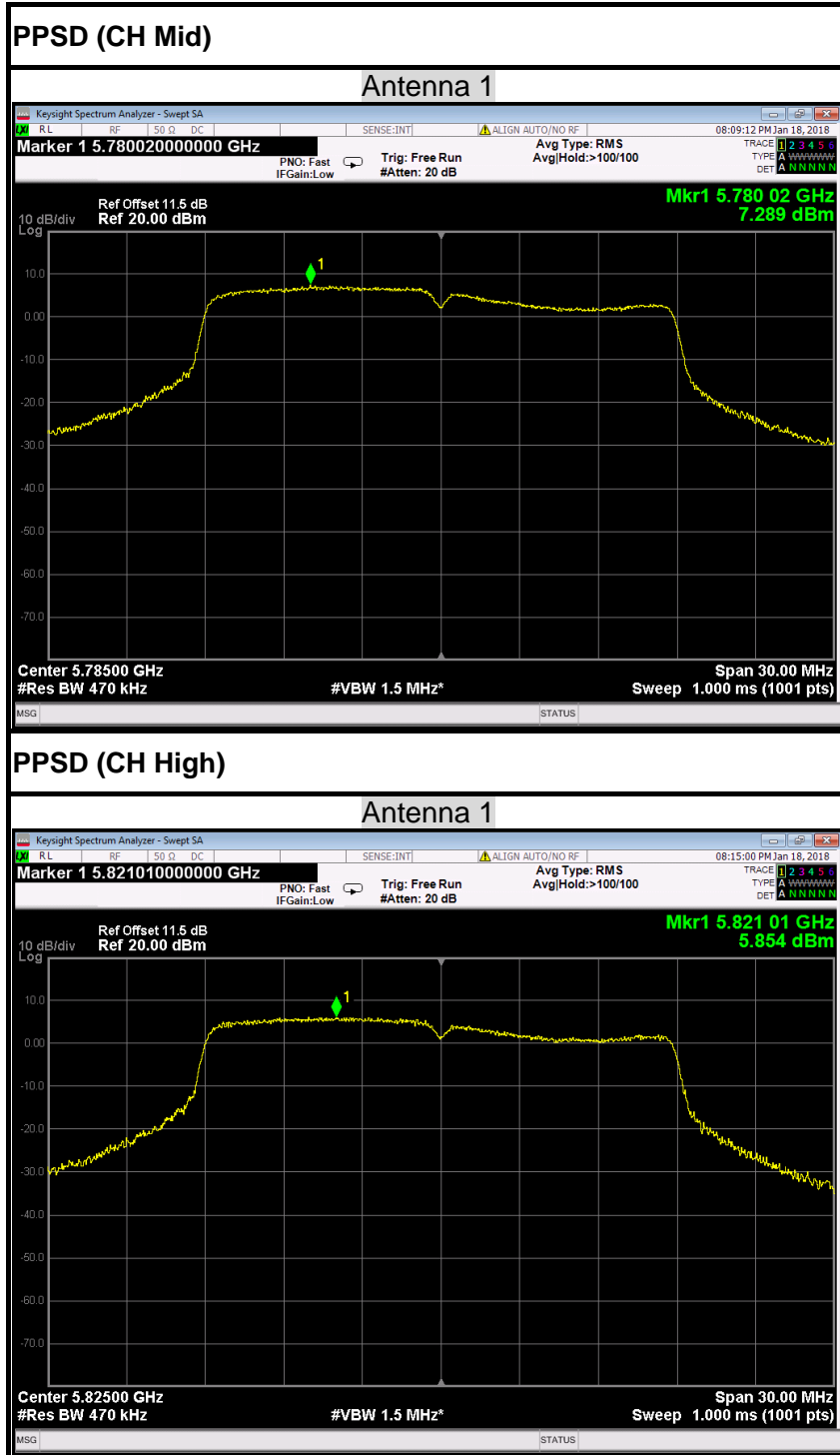


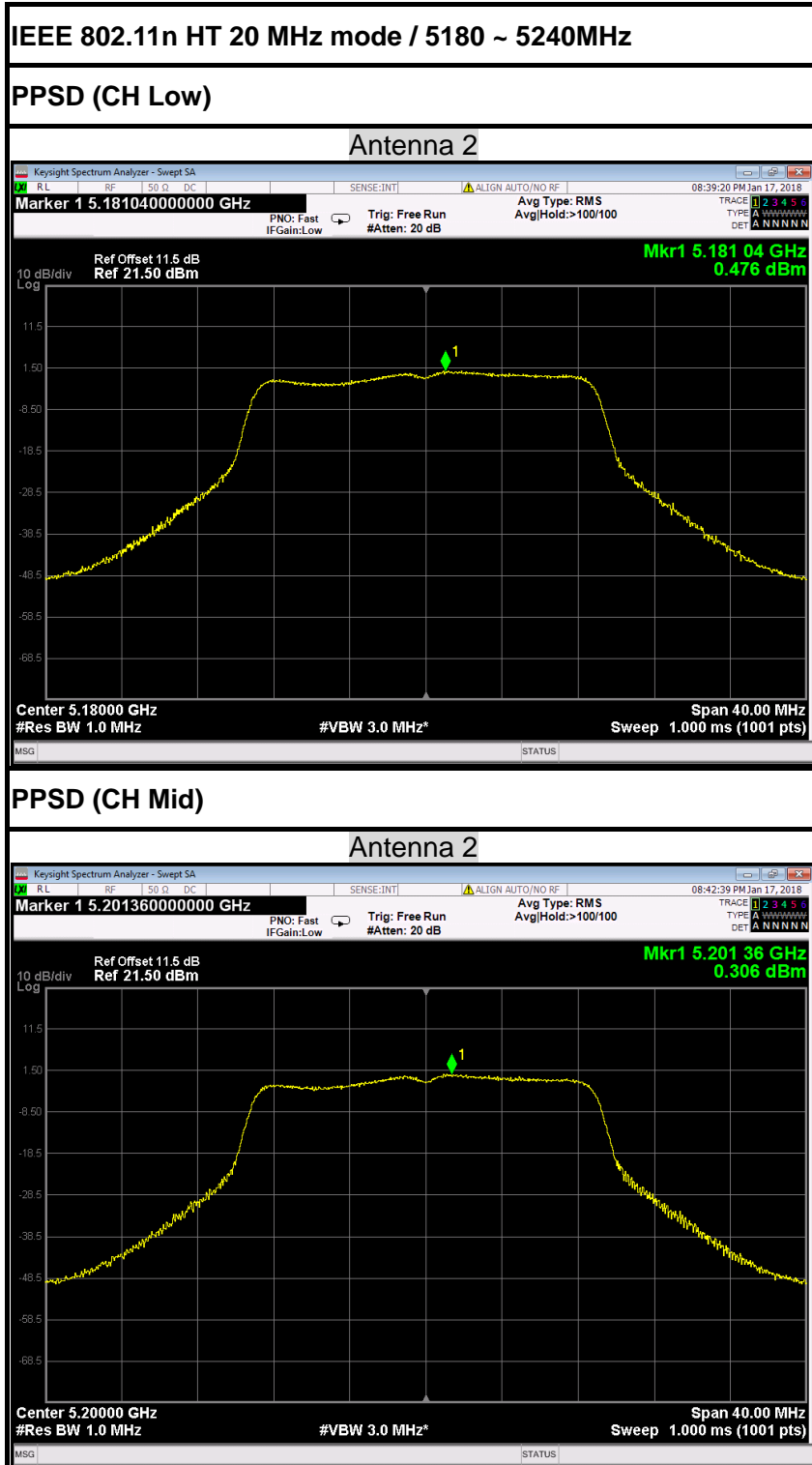


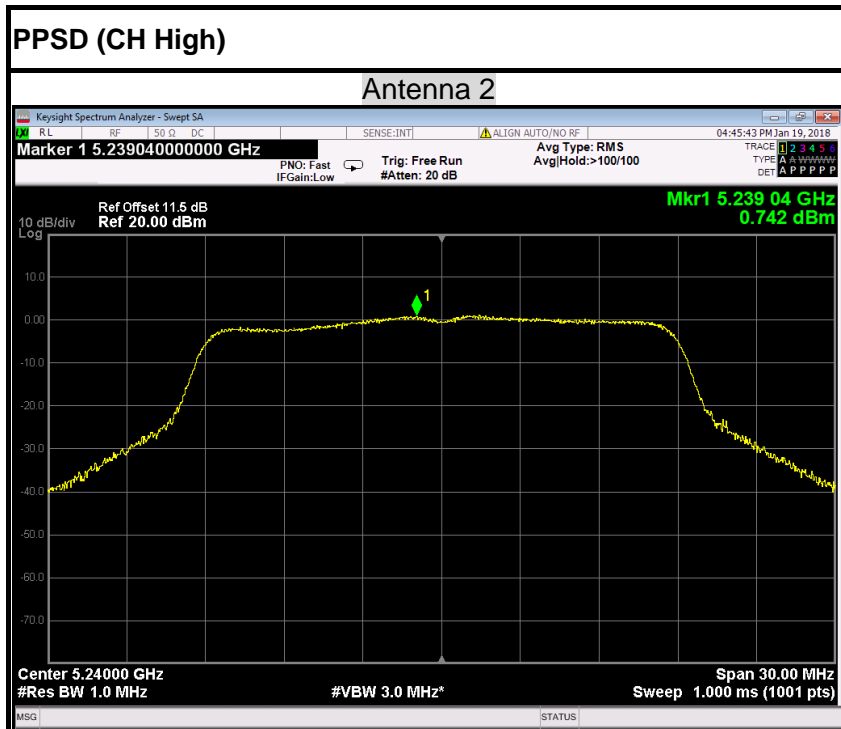


IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz

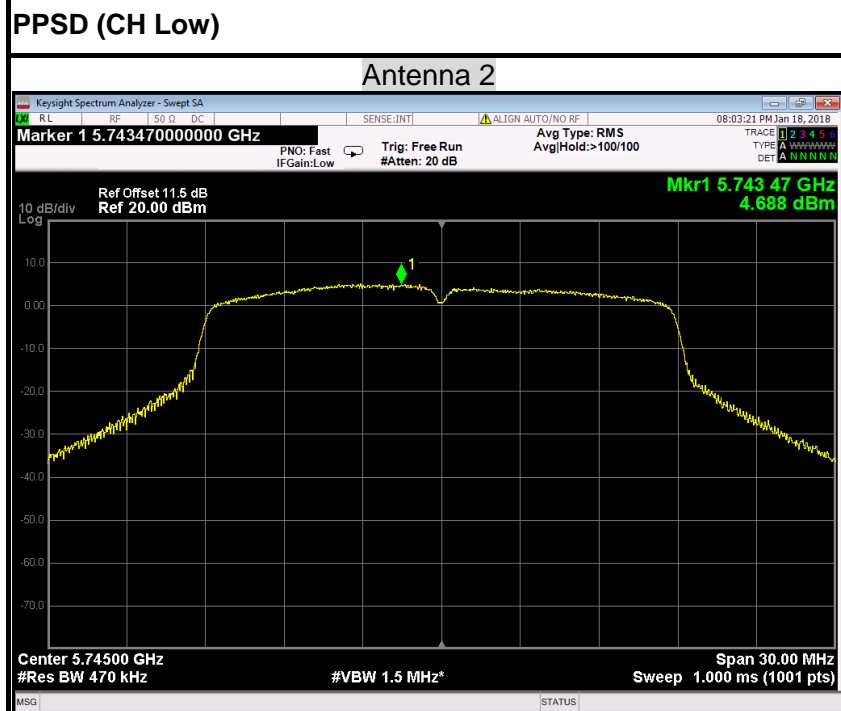


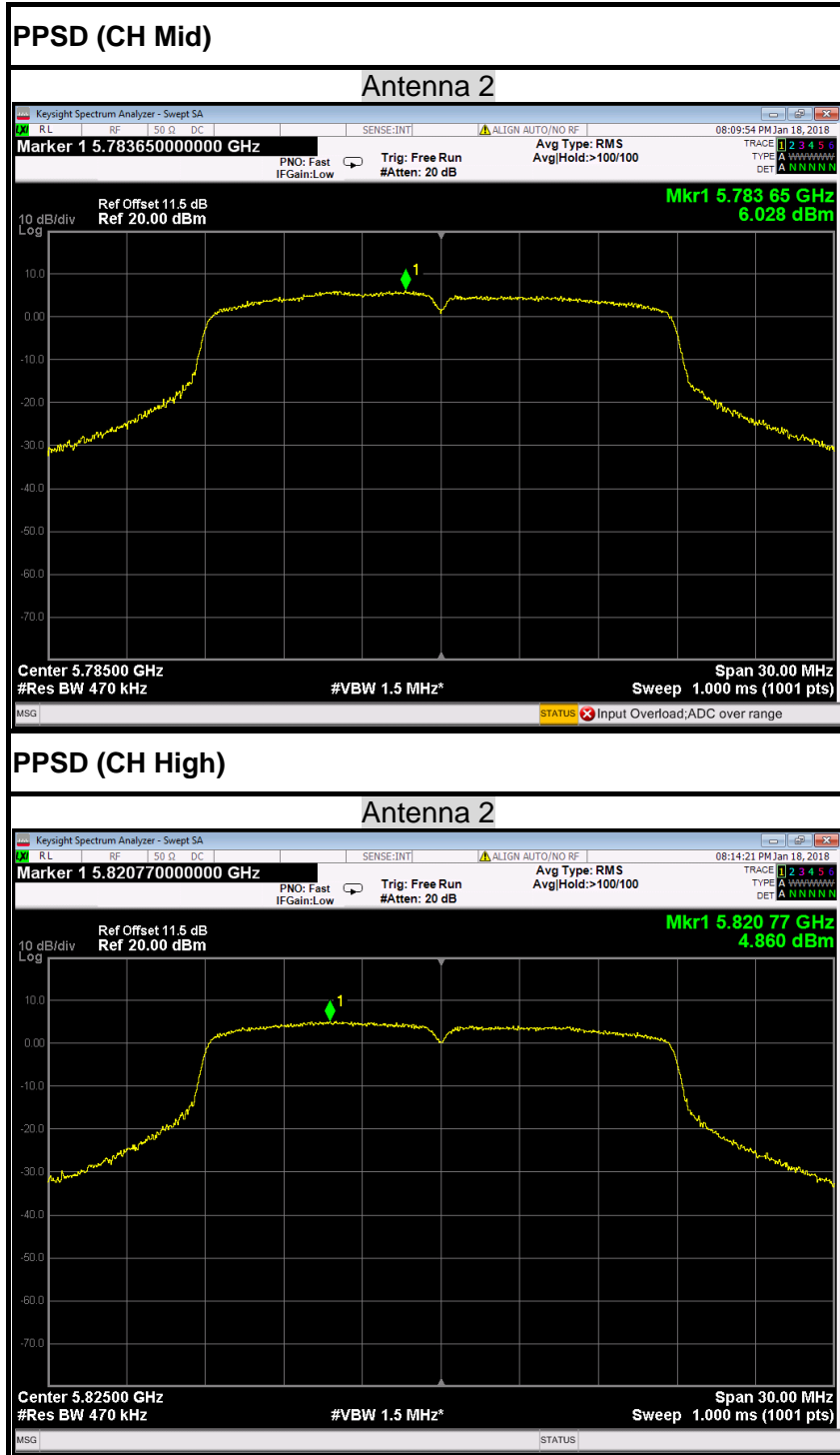






IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz

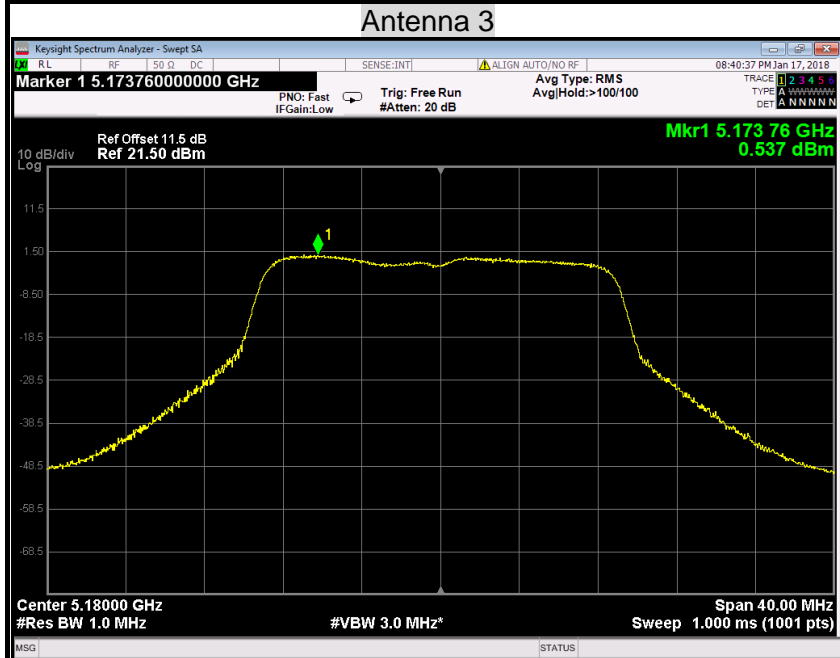




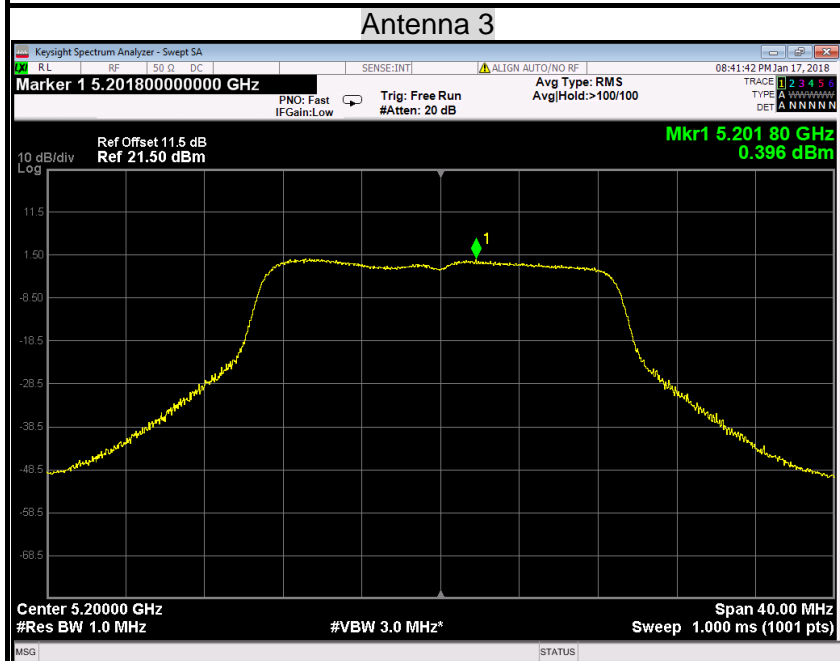


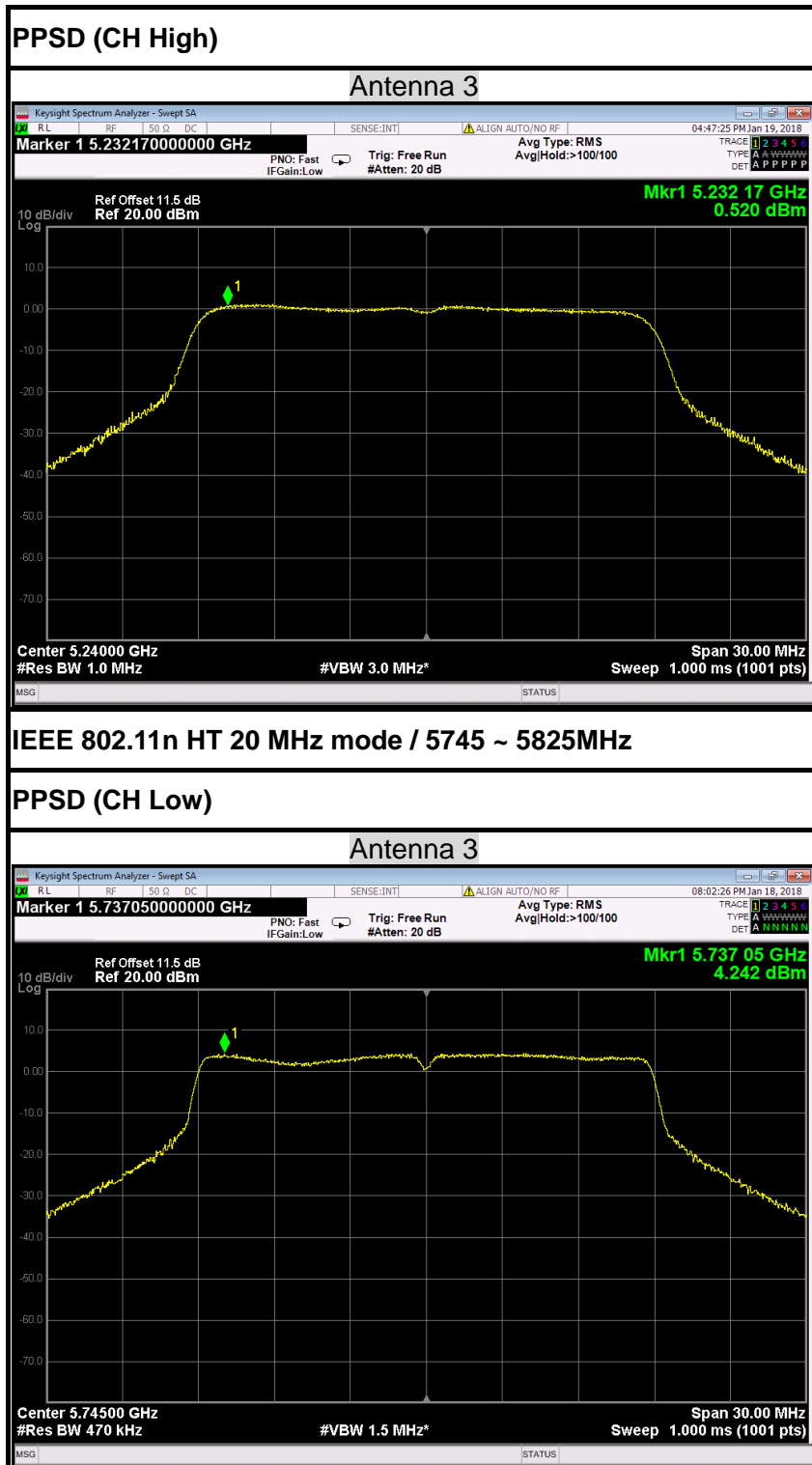
IEEE 802.11n HT 20 MHz mode / 5180 ~ 5240MHz

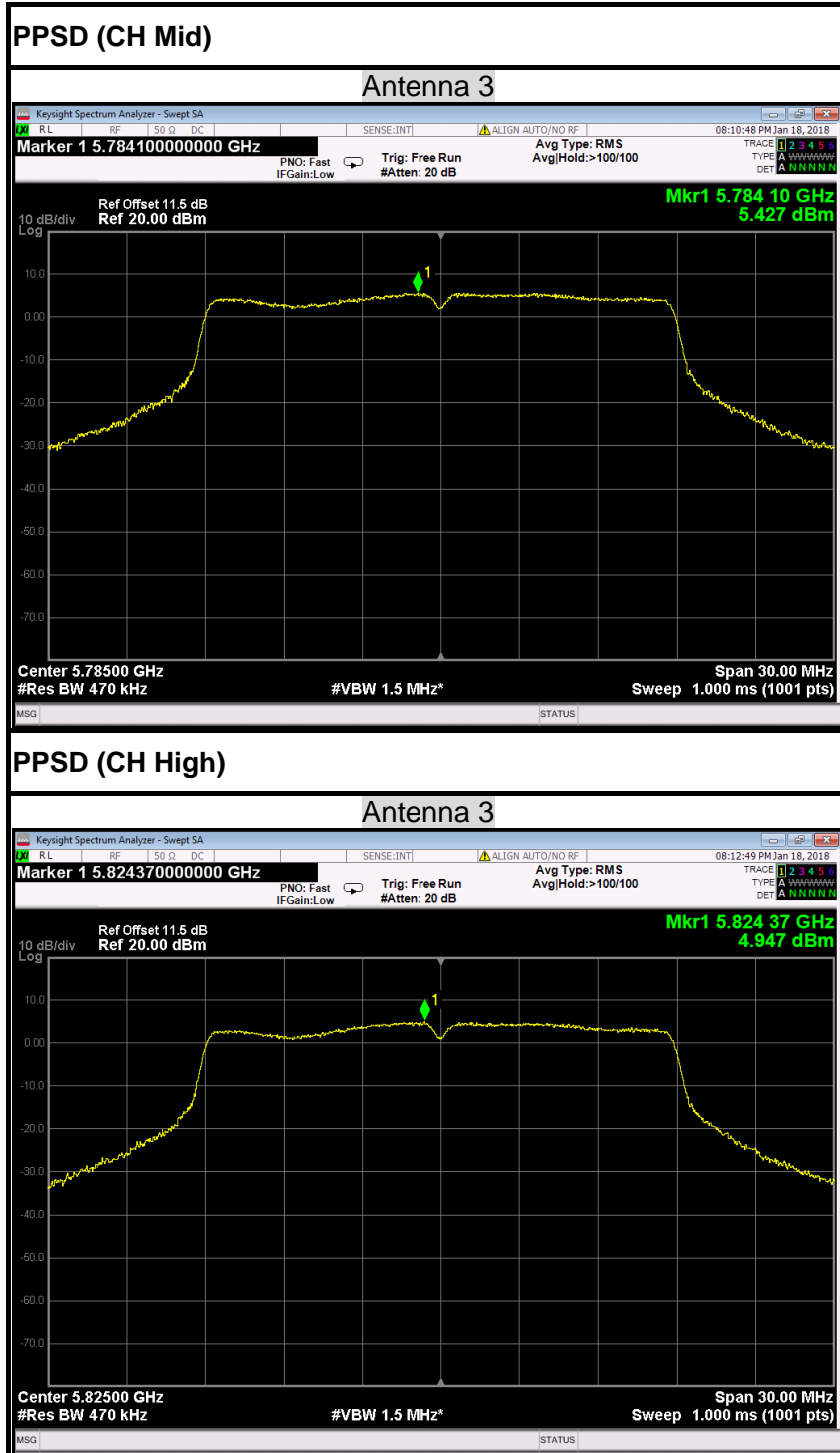
PPSD (CH Low)

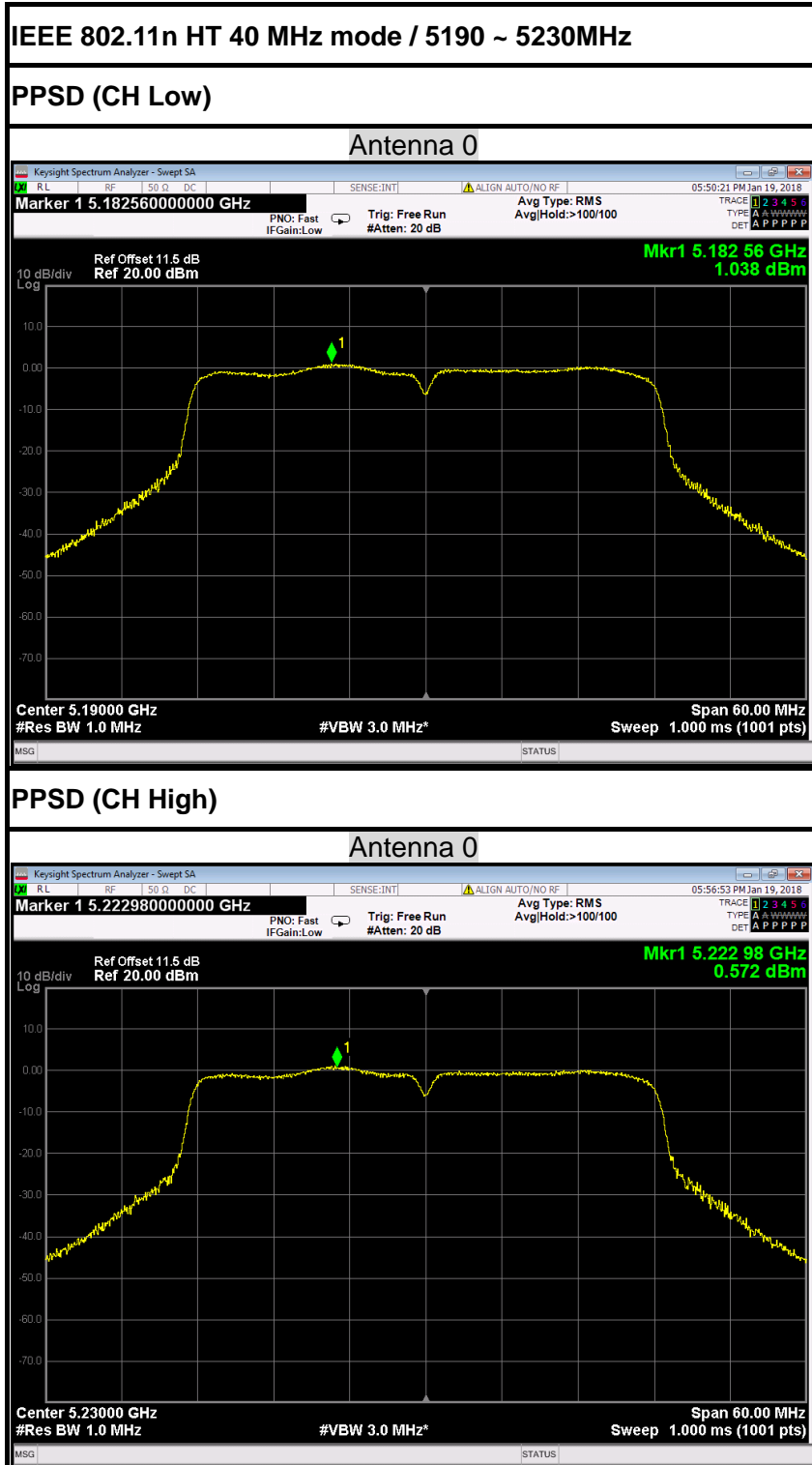


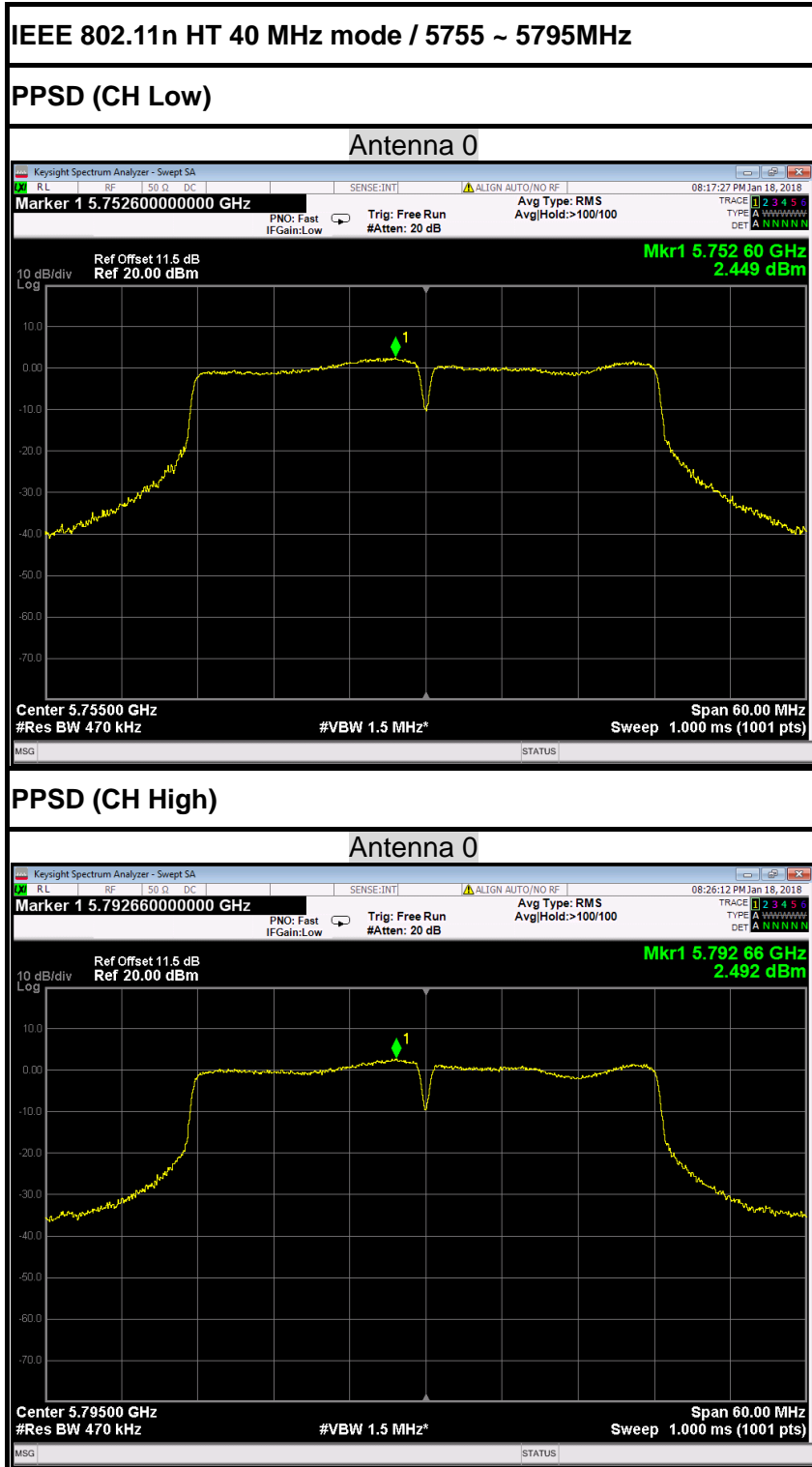
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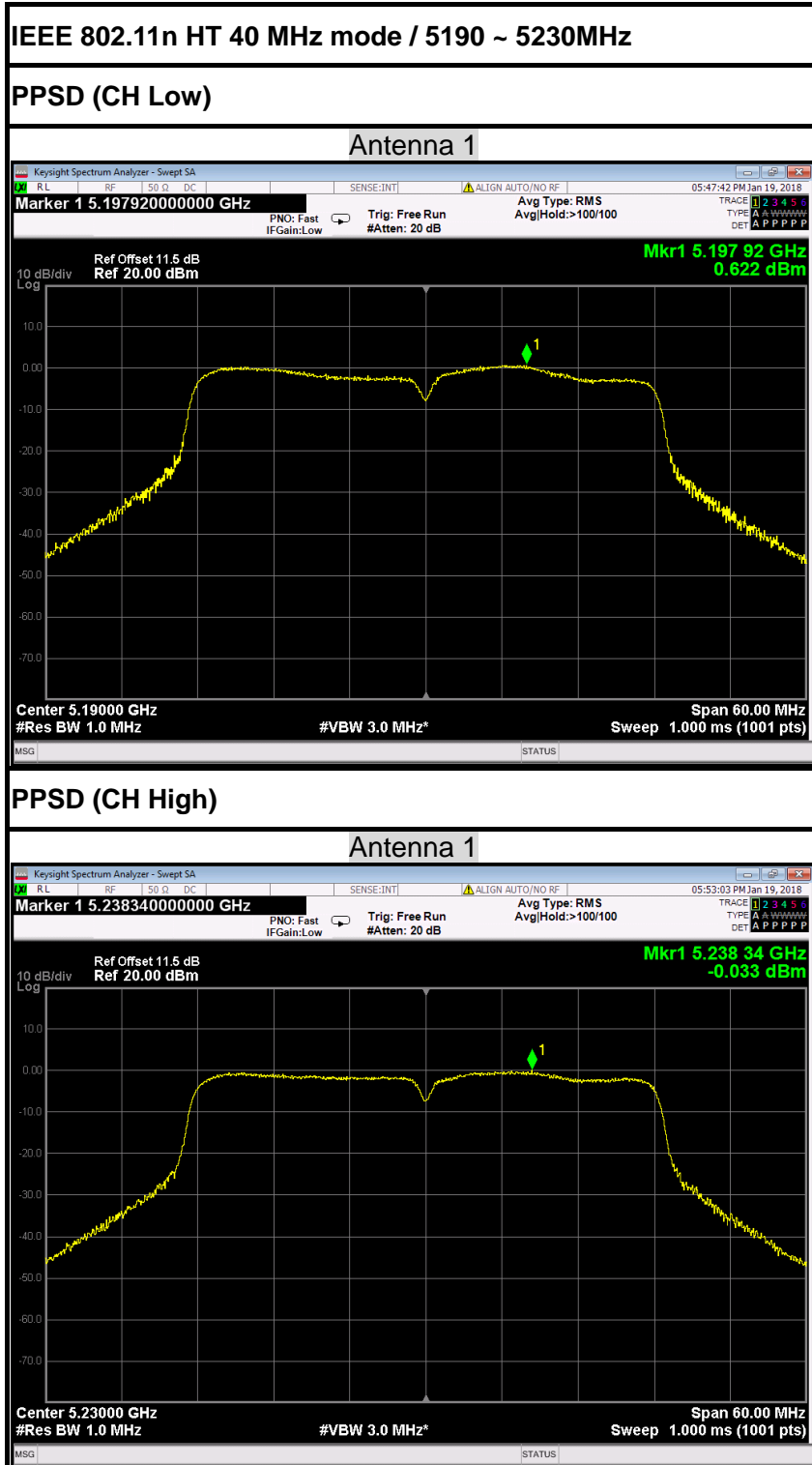


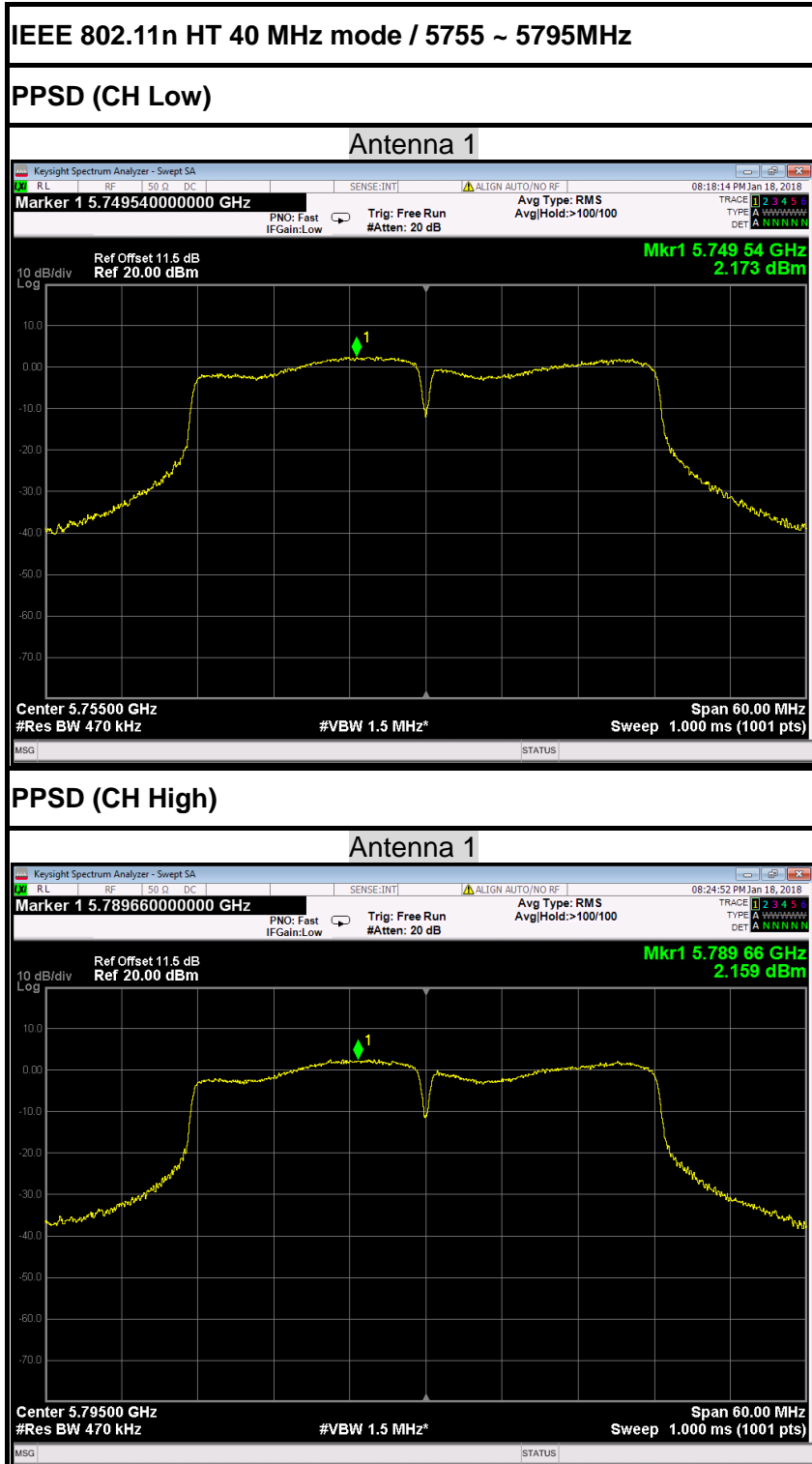


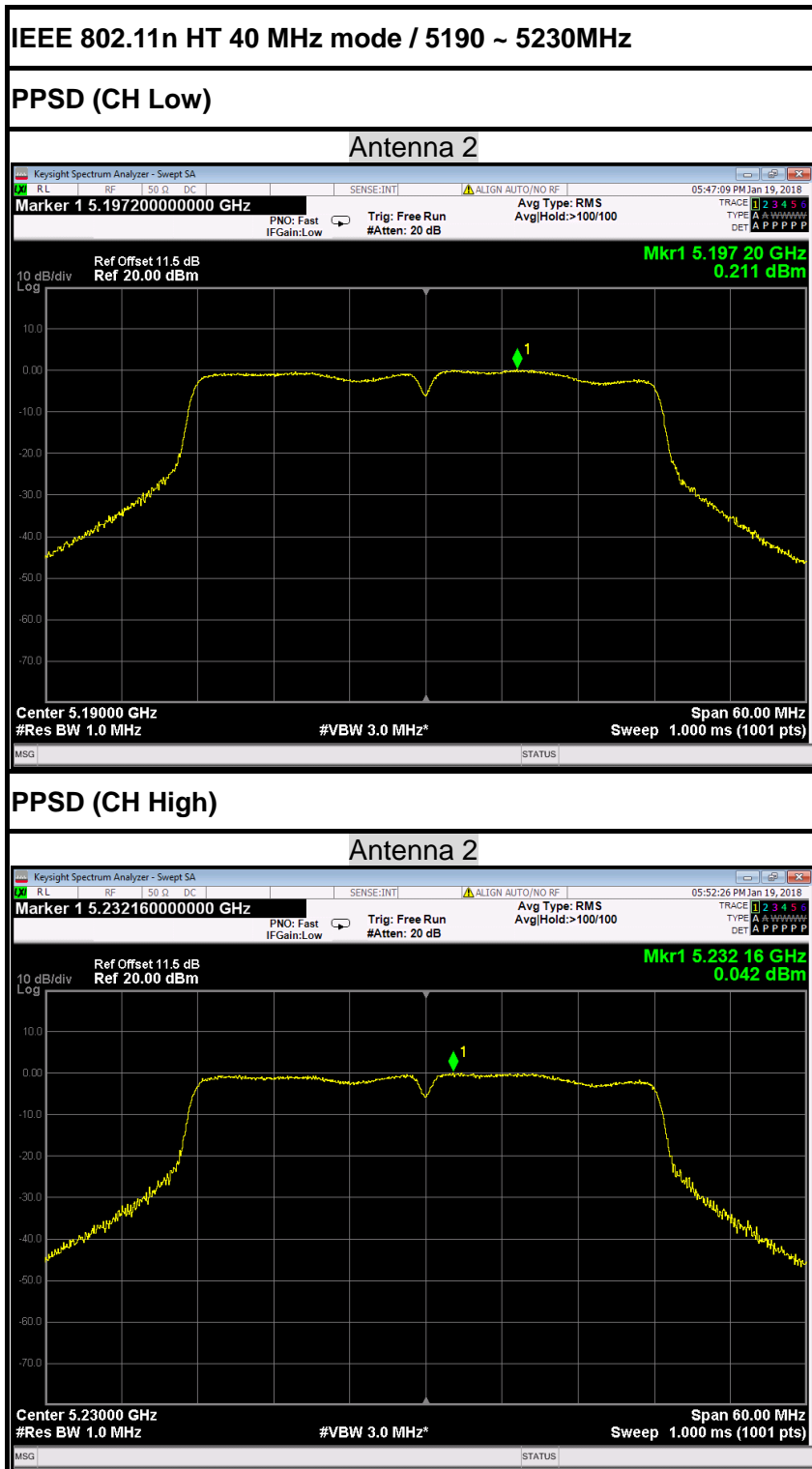










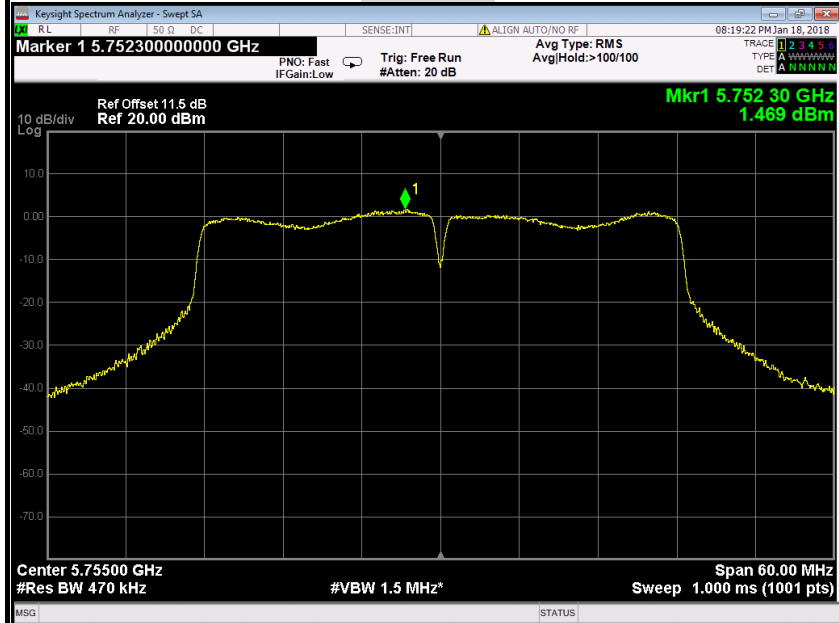




IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz

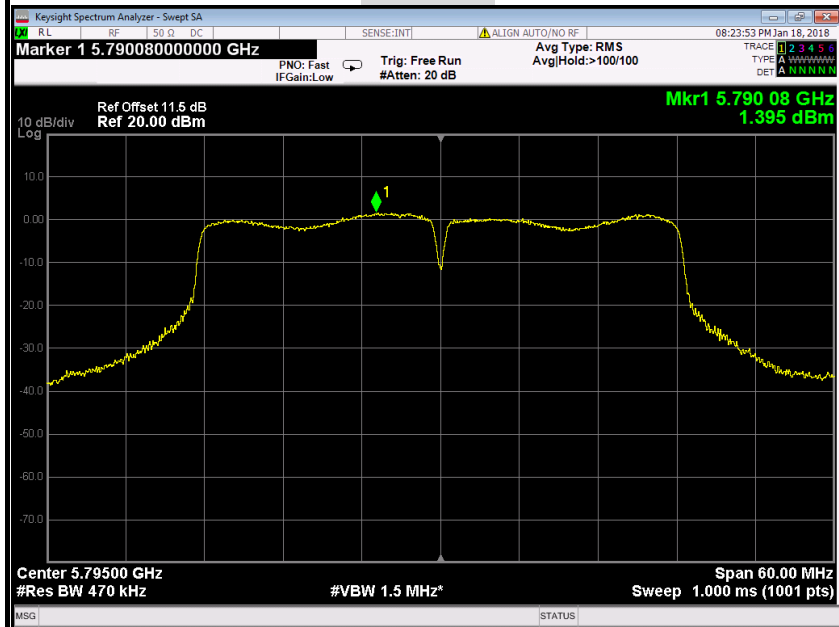
PPSD (CH Low)

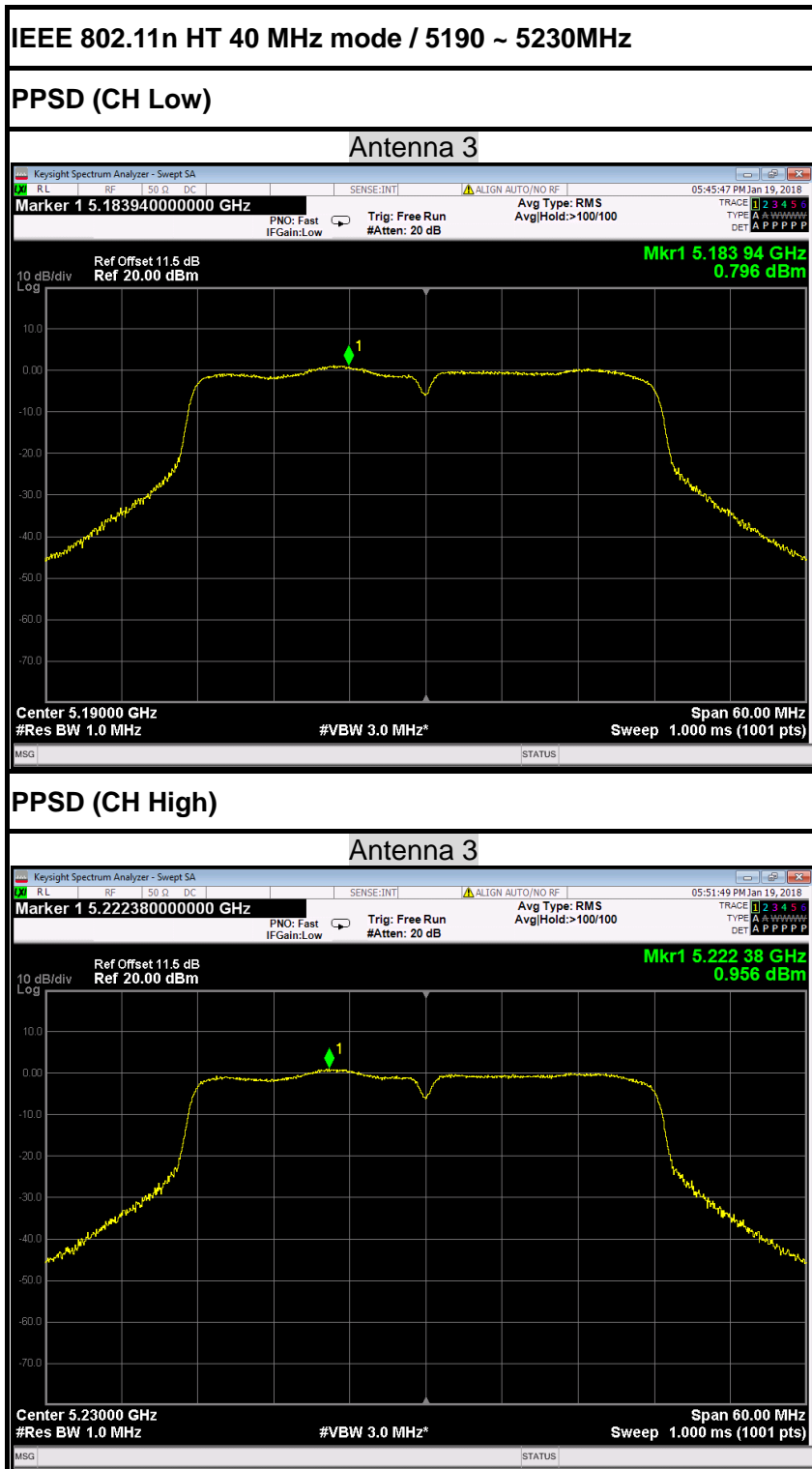
Antenna 2

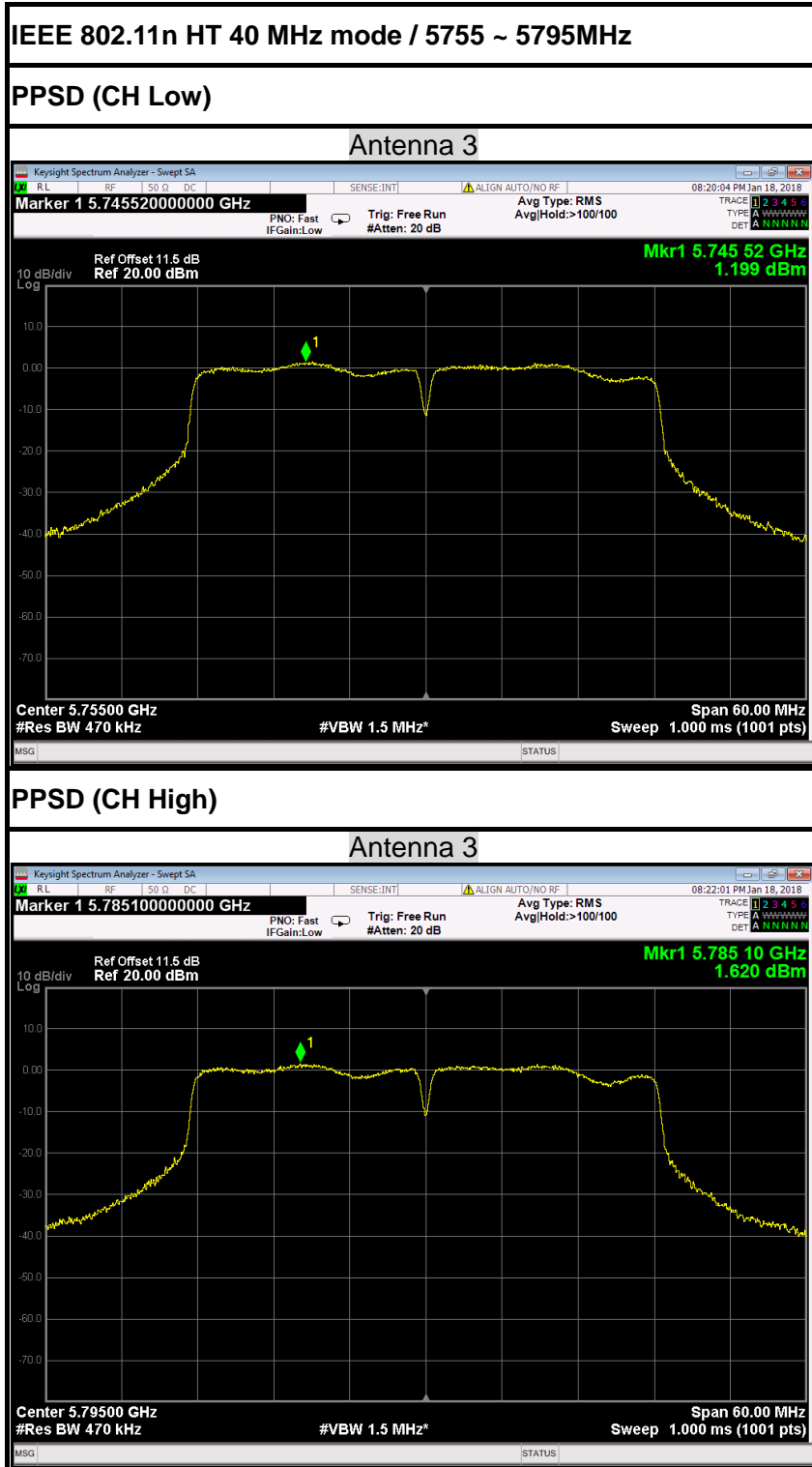


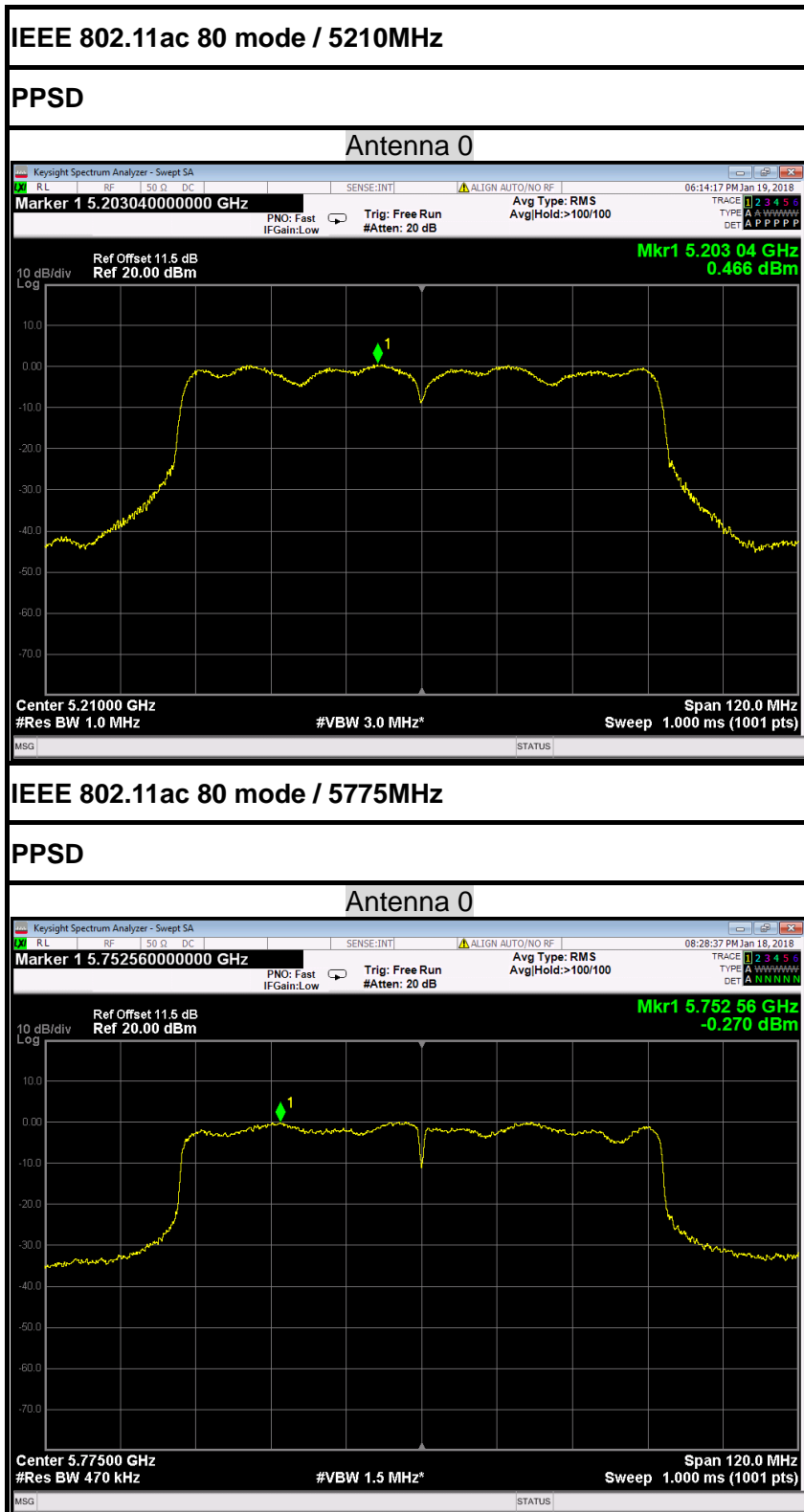
PPSD (CH High)

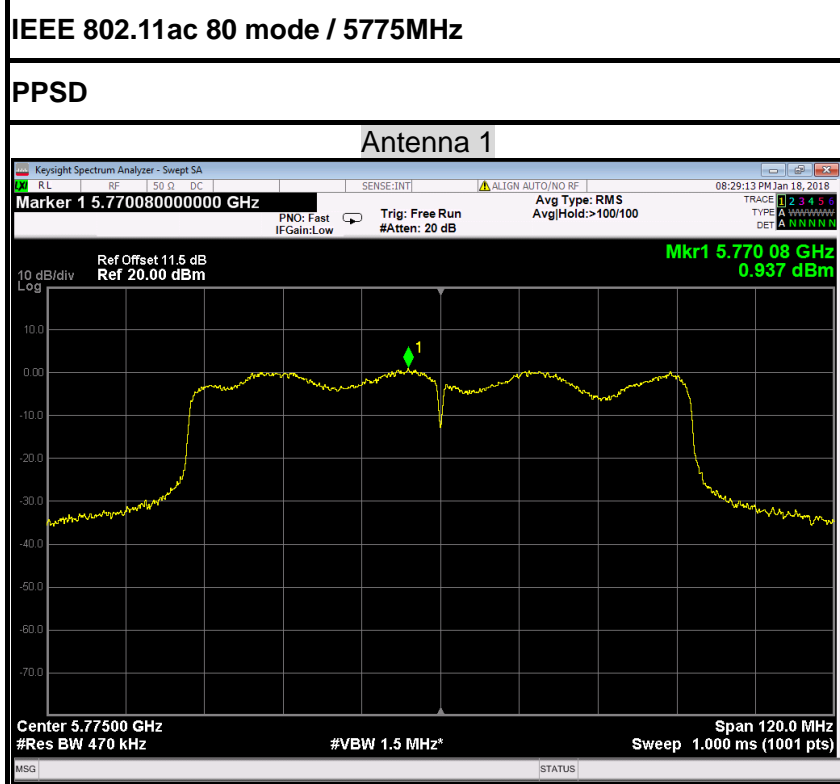
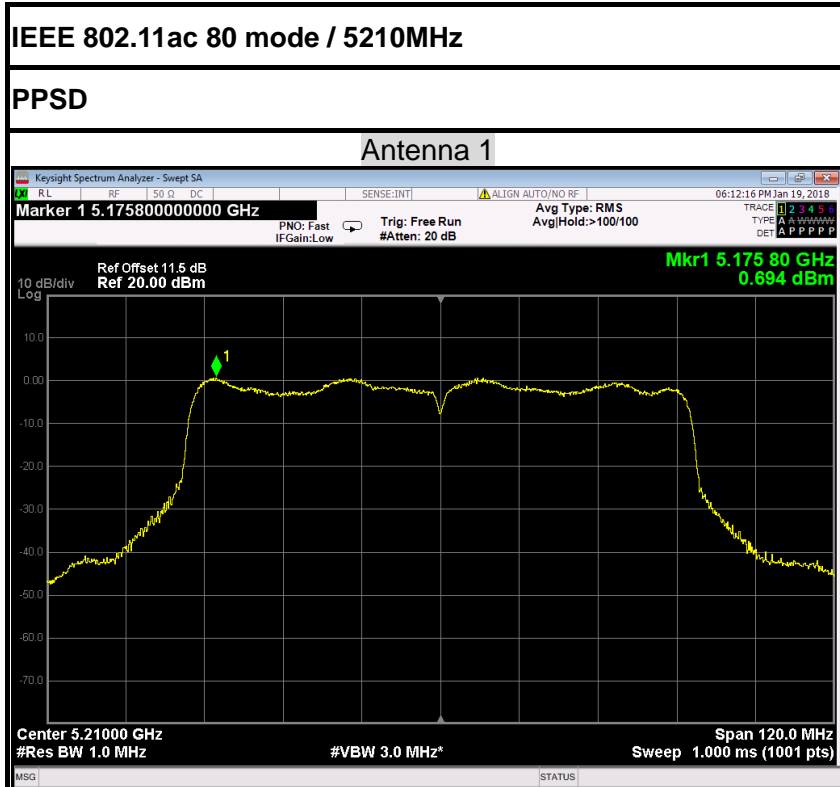
Antenna 2

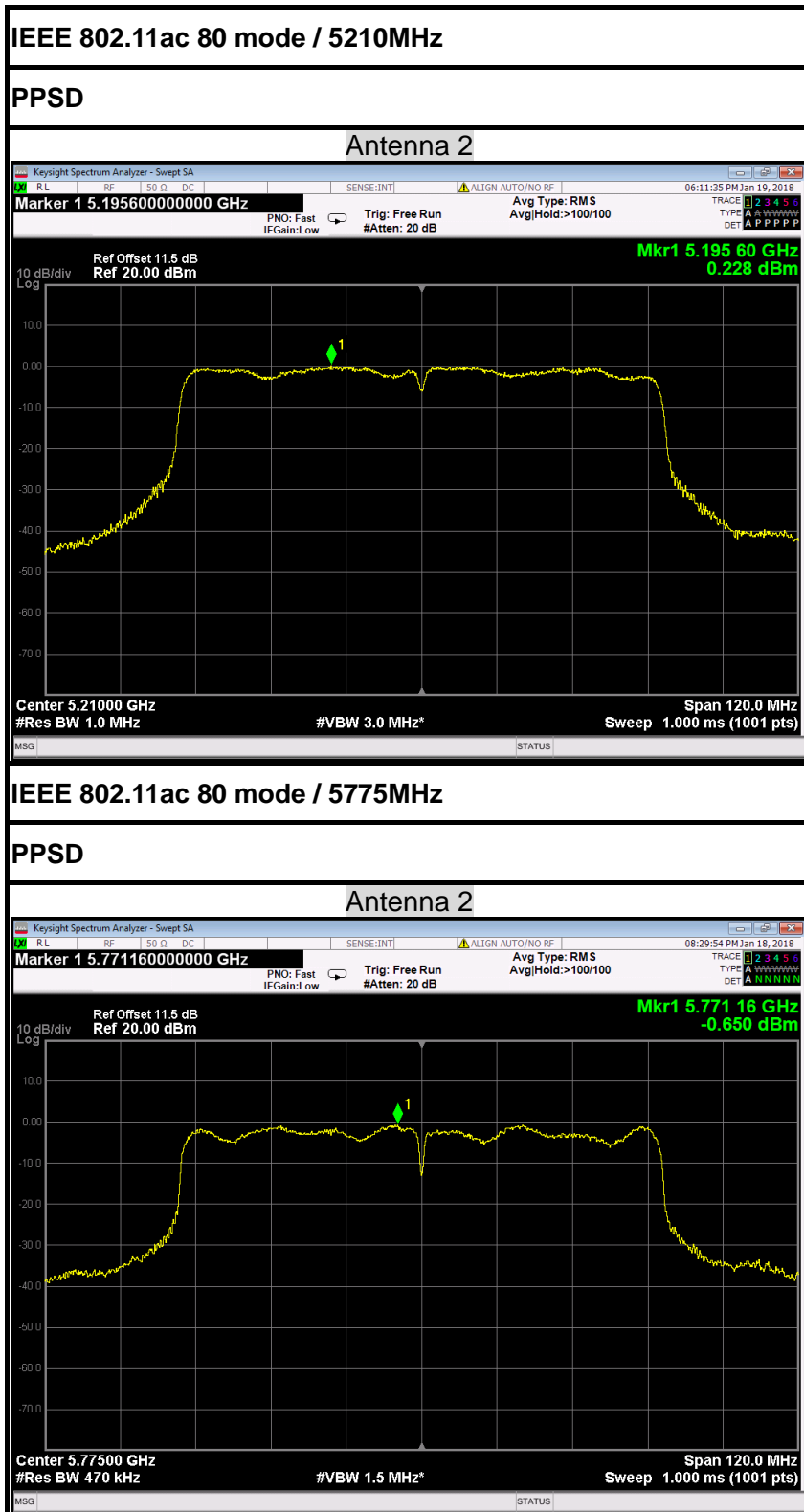


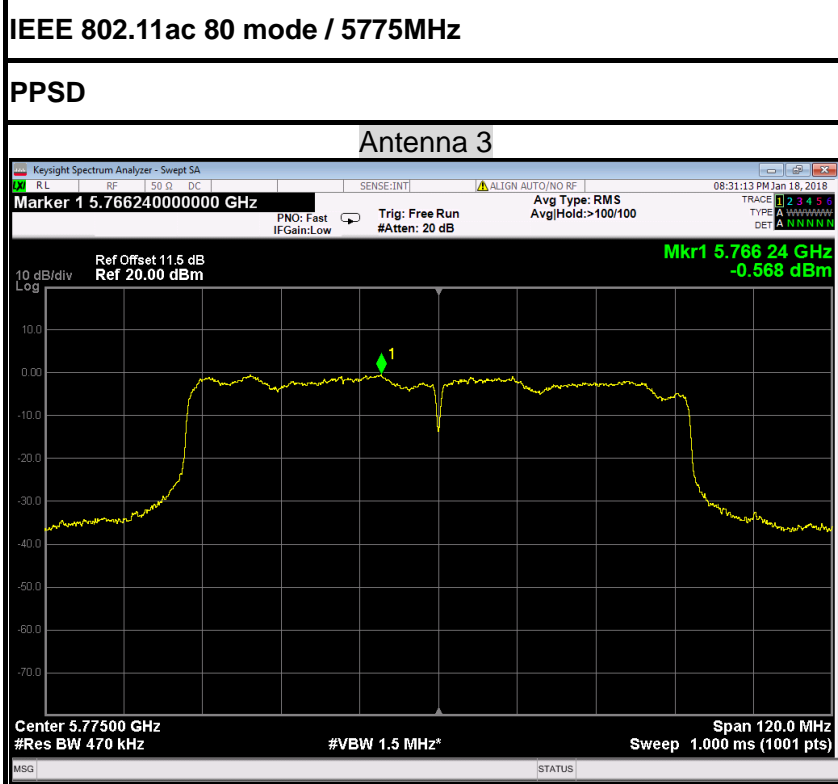
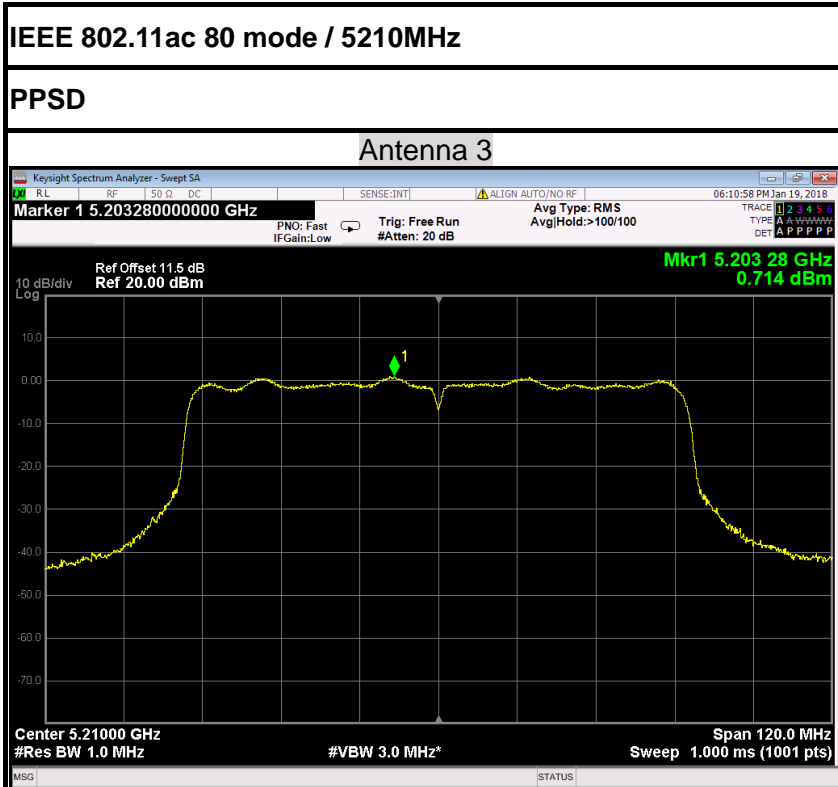














6.7 RADIATED UNDESIRABLE EMISSION

6.7.1 LIMIT

1. According to §15.209(a), except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

Remark: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

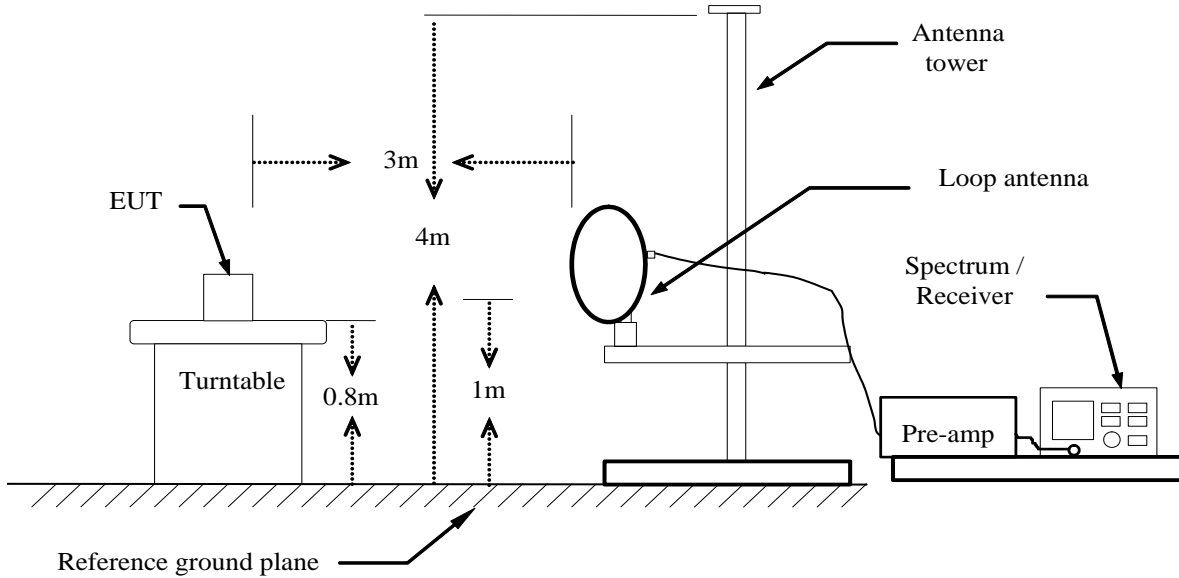
2. In the emission table above, the tighter limit applies at the band edges.

Frequency (MHz)	Field Strength ($\mu\text{V/m}$ at 3-meter)	Field Strength ($\text{dB}\mu\text{V/m}$ at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

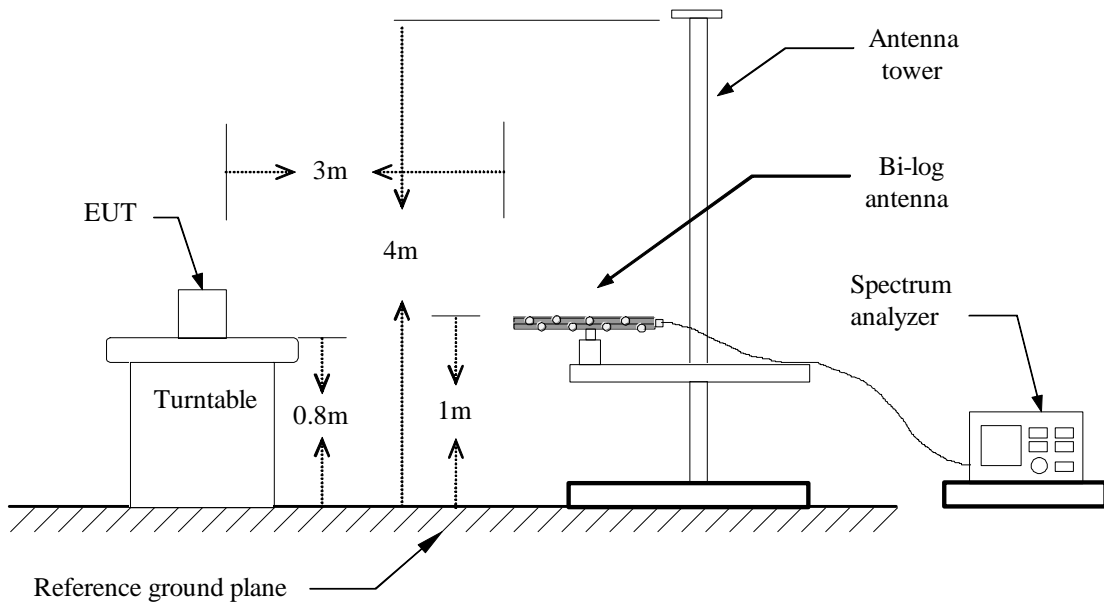


6.7.2 TEST CONFIGURATION

Below 30MHz

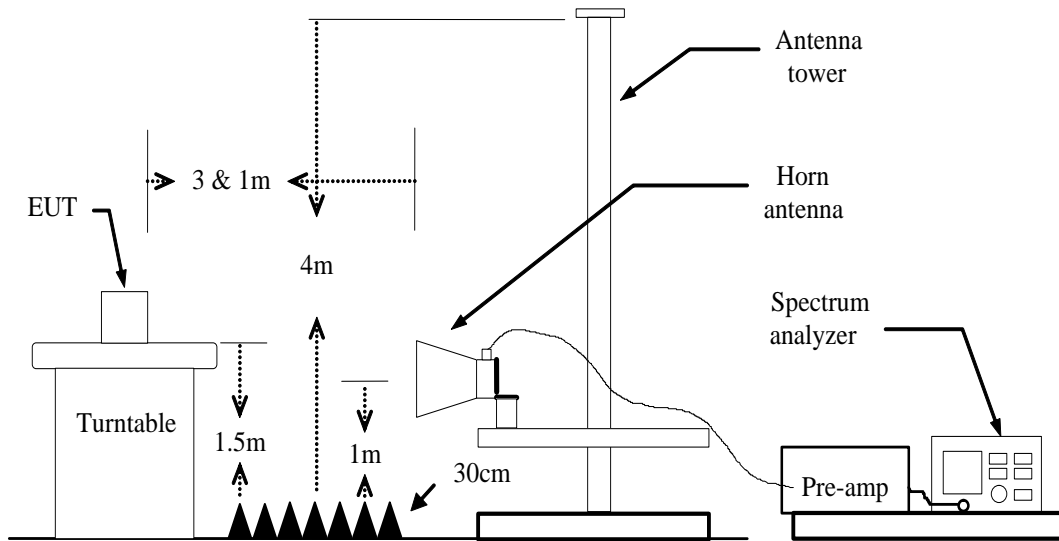


Below 1 GHz





Above 1 GHz



For the actual test configuration, please refer to the related item – Photographs of the TEST CONFIGURATION.



6.7.3 MEASURING SETTING

The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (Emission in non-restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP/AVG
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP/AVG
Start ~ Stop Frequency	30MHz~1000MHz / RB 100kHz for QP

6.7.4 TEST PROCEDURE

1) Sequence of testing 9 kHz to 30 MHz

Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.
- If the EUT is a floor standing device, it is placed on the ground.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.

Pre measurement:

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna height is 0.8 meter.
- At each turntable position the analyzer sweeps with peak detection to find the



maximum of all emissions

Final measurement:

--- Identified emissions during the pre measurement the software maximizes by rotating the turntable position (0° to 360°) and by rotating the elevation axes (0° to 360°).

--- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QPK detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre measurement and the limit will be stored.

2) Sequence of testing 30 MHz to 1 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Pre measurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna is polarized vertical and horizontal.

--- The antenna height changes from 1 to 3 meter.

--- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.



Final measurement:

- The final measurement will be performed with minimum the six highest peaks.
- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position ($\pm 45^\circ$) and antenna movement between 1 and 4 meter.
- The final measurement will be done with QP detector with an EMI receiver.
- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

3) Sequence of testing 1 GHz to 18 GHz

Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.

Pre measurement:

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height scan range is 1 meter to 2.5 meter.
- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.



Final measurement:

- The final measurement will be performed with minimum the six highest peaks.
- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position ($\pm 45^\circ$) and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.
- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.
- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre measurement with marked maximum final measurements and the limit will be stored.

4) Sequence of testing above 18 GHz

Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 1 meter.
- The EUT was set into operation.

Pre measurement:

- The antenna is moved spherical over the EUT in different polarisations of the antenna.

Final measurement:

- The final measurement will be performed at the position and antenna orientation for all detected emissions that were found during the premeasurements with Peak and Average detector.
- The final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.



6.7.5 DATA SAPLE

Below 1GHz

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
XXX.XXXX	36.37	-12.20	24.17	40.00	-15.83	V	QP

Frequency (MHz) = Emission frequency in MHz
 Reading (dBuV) = Uncorrected Analyzer / Receiver reading
 Correct Factor (dB/m) = Antenna factor + Cable loss – Amplifier gain
 Result (dBuV/m) = Reading (dBuV) + Corr. Factor (dB/m)
 Limit (dBuV/m) = Limit stated in standard
 Margin (dB) = Result (dBuV/m) – Limit (dBuV/m)
 Q.P. = Quasi-peak Reading

Above 1GHz

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
XXXX.XXXX	62.09	-11.42	50.67	74.00	-23.33	V	Peak
XXXX.XXXX	49.78	-11.42	38.36	54.00	-15.64	V	AVG

Frequency (MHz) = Emission frequency in MHz
 Reading (dBuV) = Uncorrected Analyzer / Receiver reading
 Correction Factor (dB/m) = Antenna factor + Cable loss – Amplifier gain
 Result (dBuV/m) = Reading (dBuV) + Corr. Factor (dB/m)
 Limit (dBuV/m) = Limit stated in standard
 Margin (dB) = Result (dBuV/m) – Limit (dBuV/m)
 Peak = Peak Reading
 AVG = Average Reading

Calculation Formula

Margin (dB) = Result (dBuV/m) – Limits (dBuV/m)
 Result (dBuV/m) = Reading (dBuV) + Correction Factor

**6.7.6 TEST RESULTS****Below 1 GHz****Test Mode:** TX / IEEE 802.11a / 5180MHz / (CH Low)**Tested by:** Darry Wu**Ambient temperature:** 24°C **Relative humidity:** 52% RH**Date:** January 3, 2018

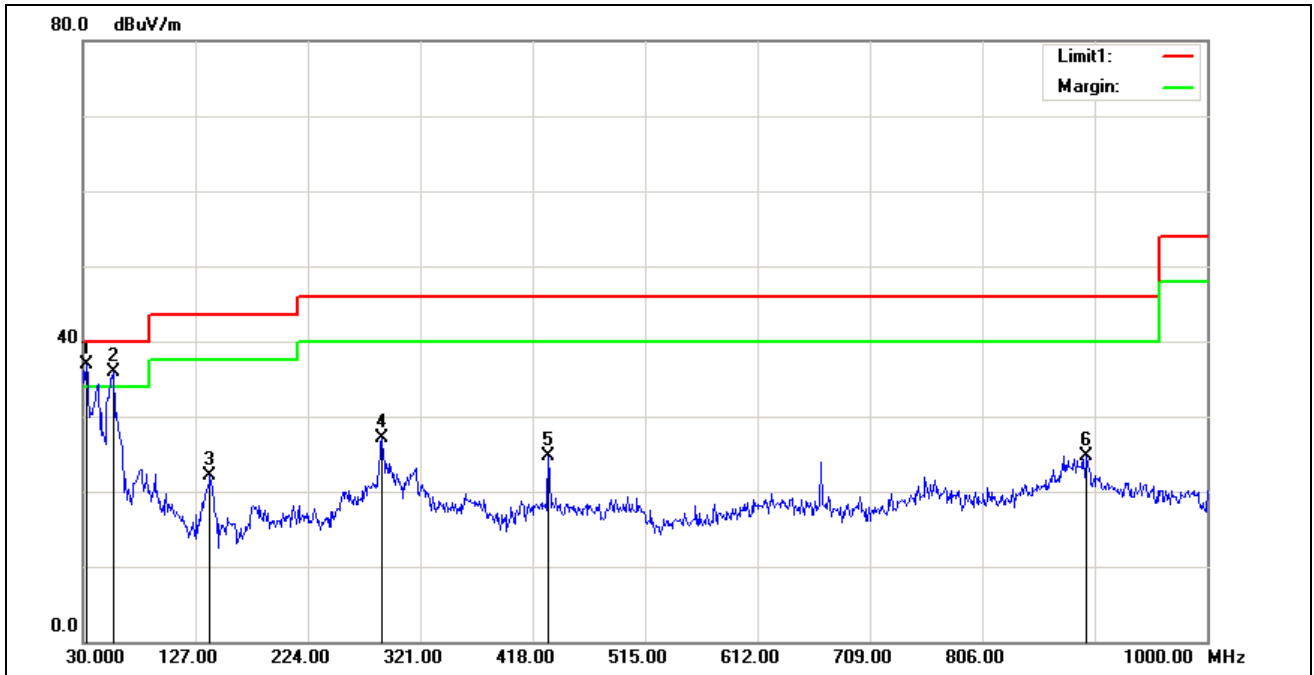
Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
32.9100	50.40	-13.43	36.97	40.00	-3.03	V	QP
56.1900	58.84	-23.02	35.82	40.00	-4.18	V	QP
139.6100	43.37	-21.23	22.14	43.50	-21.36	V	QP
288.0200	47.49	-20.45	27.04	46.00	-18.96	V	QP
431.5800	40.24	-15.60	24.64	46.00	-21.36	V	QP
896.2100	34.63	-9.86	24.77	46.00	-21.23	V	QP
139.6100	44.15	-21.23	22.92	43.50	-20.58	H	QP
199.7500	48.05	-22.73	25.32	43.50	-18.18	H	QP
288.0200	54.25	-20.45	33.80	46.00	-12.20	H	QP
331.6700	43.69	-18.36	25.33	46.00	-20.67	H	QP
431.5800	44.09	-15.60	28.49	46.00	-17.51	H	QP
879.7200	32.72	-9.98	22.74	46.00	-23.26	H	QP

*Pre-scan all mode and recorded the worst case results in this report (802.11a (Low Mid)).***Remark:**

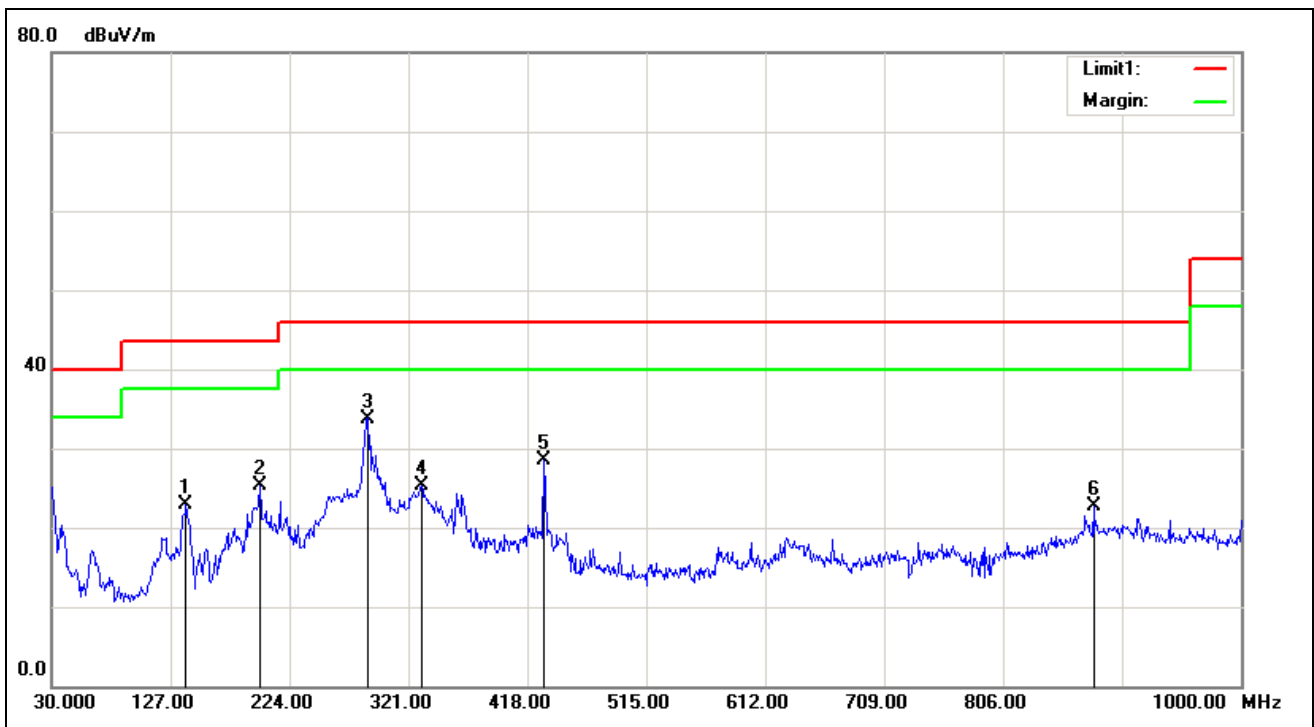
- 1. No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz)*
- 2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.*
- 3. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit.*
- 4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
- 5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
- 6. Margin (dB) = Remark result (dBuV/m) – Quasi-peak limit (dBuV/m).*



Vertical



Horizontal





Above 1 GHz

1GHz~6GHz

Test Mode: TX / IEEE 802.11a / 5180MHz / (CH Low)

Tested by: Darry Wu

Ambient temperature: 24°C Relative humidity: 52% RH

Date: January 3, 2018

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1250.000	50.71	-7.61	43.10	74.00	-30.90	V	peak
2000.000	46.50	-5.00	41.50	74.00	-32.50	V	peak
2545.000	43.46	-2.18	41.28	74.00	-32.72	V	peak
2660.000	42.77	-1.97	40.80	74.00	-33.20	V	peak
3625.000	41.43	0.01	41.44	74.00	-32.56	V	peak
5000.000	49.23	4.98	54.21	74.00	-19.79	V	peak
5000.000	43.27	4.98	48.25	54.00	-5.75	V	AVG
5445.000	55.71	5.77	61.48	74.00	-12.52	V	peak
5445.000	43.59	5.77	49.36	54.00	-4.64	V	AVG
1250.000	50.24	-7.61	42.63	74.00	-31.37	H	Peak
1755.000	47.25	-6.37	40.88	74.00	-33.12	H	Peak
1905.000	47.33	-5.60	41.73	74.00	-32.27	H	Peak
2495.000	43.70	-2.29	41.41	74.00	-32.59	H	peak
5000.000	45.41	4.98	50.39	74.00	-23.61	H	peak
5485.000	49.97	5.84	55.81	74.00	-18.19	H	peak
5485.000	40.54	5.84	46.38	54.00	-7.62	H	AVG

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).



Above 6GHz

Antenna 0

Test Mode: TX / IEEE 802.11a / 5180MHz / (CH Low)

Tested by: Darry Wu

Ambient temperature: 24°C **Relative humidity:** 52% RH

Date: January 3, 2018

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
6696.000	31.59	7.21	38.80	74.00	-35.20	V	peak
7920.000	31.59	9.49	41.08	74.00	-32.92	V	peak
9960.000	30.62	11.86	42.48	74.00	-31.52	V	peak
11160.000	31.52	15.01	46.53	74.00	-27.47	V	peak
12648.000	30.67	16.78	47.45	74.00	-26.55	V	peak
13248.000	29.30	18.60	47.90	74.00	-26.10	V	peak
7752.000	31.67	9.17	40.84	74.00	-33.16	H	Peak
9468.000	31.19	10.45	41.64	74.00	-32.36	H	Peak
11136.000	31.79	15.02	46.81	74.00	-27.19	H	Peak
11712.000	31.21	14.77	45.98	74.00	-28.02	H	peak
12240.000	30.85	15.43	46.28	74.00	-27.72	H	peak
13212.000	29.85	18.51	48.36	74.00	-25.64	H	peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. $Margin (dB) = Remark\ result (dBuV/m) - Average\ limit (dBuV/m)$.



Test Mode: TX / IEEE 802.11a / 5200MHz / (CH Mid)

Tested by: Darry Wu

Ambient temperature: 24°C

Relative humidity: 52% RH

Date: January 3, 2018

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
6804.000	31.51	7.38	38.89	74.00	-35.11	V	peak
7932.000	31.03	9.52	40.55	74.00	-33.45	V	peak
10740.000	29.95	14.27	44.22	74.00	-29.78	V	peak
11520.000	31.06	14.85	45.91	74.00	-28.09	V	peak
11892.000	30.92	14.69	45.61	74.00	-28.39	V	peak
13140.000	29.38	18.32	47.70	74.00	-26.30	V	peak
7944.000	31.43	9.54	40.97	74.00	-33.03	H	Peak
8376.000	31.52	9.44	40.96	74.00	-33.04	H	Peak
10476.000	30.06	13.46	43.52	74.00	-30.48	H	Peak
11148.000	31.46	15.01	46.47	74.00	-27.53	H	peak
12564.000	29.95	16.51	46.46	74.00	-27.54	H	peak
13452.000	28.39	19.14	47.53	74.00	-26.47	H	peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. $Margin (dB) = Remark\ result (dBuV/m) - Average\ limit (dBuV/m)$.



Test Mode: TX / IEEE 802.11a / 5240MHz / (CH High)

Tested by: Darry Wu

Ambient temperature: 24°C Relative humidity: 52% RH

Date: January 3, 2018

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
7308.000	31.11	8.30	39.41	74.00	-34.59	V	peak
7968.000	31.51	9.59	41.10	74.00	-32.90	V	peak
9900.000	30.83	11.69	42.52	74.00	-31.48	V	peak
11136.000	31.45	15.02	46.47	74.00	-27.53	V	peak
12672.000	29.45	16.86	46.31	74.00	-27.69	V	peak
15720.000	33.63	17.88	51.51	74.00	-22.49	V	peak
6924.000	31.20	7.58	38.78	74.00	-35.22	H	Peak
7980.000	31.58	9.61	41.19	74.00	-32.81	H	Peak
10104.000	31.08	12.30	43.38	74.00	-30.62	H	Peak
10596.000	30.53	13.83	44.36	74.00	-29.64	H	peak
11136.000	31.12	15.02	46.14	74.00	-27.86	H	peak
12612.000	30.05	16.67	46.72	74.00	-27.28	H	peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. $Margin (dB) = Remark\ result (dBuV/m) - Average\ limit (dBuV/m)$.

Test Mode: TX / IEEE 802.11a / 5745MHz / (CH Low)Tested by: Darry WuAmbient temperature: 24°CRelative humidity: 52% RHDate: January 3, 2018

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
6804.000	31.62	7.38	39.00	74.00	-35.00	V	peak
8076.000	32.17	9.61	41.78	74.00	-32.22	V	peak
10692.000	30.84	14.13	44.97	74.00	-29.03	V	peak
11256.000	31.85	14.97	46.82	74.00	-27.18	V	peak
11952.000	31.61	14.66	46.27	74.00	-27.73	V	peak
12720.000	30.19	17.02	47.21	74.00	-26.79	V	peak
6984.000	31.42	7.67	39.09	74.00	-34.91	H	Peak
7980.000	31.43	9.61	41.04	74.00	-32.96	H	Peak
8364.000	31.86	9.45	41.31	74.00	-32.69	H	Peak
10704.000	30.77	14.16	44.93	74.00	-29.07	H	peak
11160.000	31.19	15.01	46.20	74.00	-27.80	H	peak
13212.000	29.63	18.51	48.14	74.00	-25.86	H	peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. $Margin (dB) = Remark\ result (dBuV/m) - Average\ limit (dBuV/m)$.

Test Mode: TX / IEEE 802.11a / 5785MHz / (CH Mid)Tested by: Darry WuAmbient temperature: 24°CRelative humidity: 52% RHDate: January 3, 2018

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
7956.000	31.25	9.56	40.81	74.00	-33.19	V	peak
8412.000	31.89	9.42	41.31	74.00	-32.69	V	peak
10032.000	30.77	12.08	42.85	74.00	-31.15	V	peak
11208.000	31.35	14.99	46.34	74.00	-27.66	V	peak
12660.000	29.66	16.82	46.48	74.00	-27.52	V	peak
13260.000	29.31	18.63	47.94	74.00	-26.06	V	peak
7500.000	31.15	8.68	39.83	74.00	-34.17	H	Peak
8028.000	31.29	9.63	40.92	74.00	-33.08	H	Peak
10548.000	30.78	13.68	44.46	74.00	-29.54	H	Peak
11136.000	31.50	15.02	46.52	74.00	-27.48	H	peak
12600.000	30.10	16.63	46.73	74.00	-27.27	H	peak
13392.000	29.11	18.98	48.09	74.00	-25.91	H	peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).



Test Mode: TX / IEEE 802.11a / 5825MHz / (CH High)

Tested by: Darry Wu

Ambient temperature: 24°C

Relative humidity: 52% RH

Date: January 3, 2018

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
7020.000	31.92	7.74	39.66	74.00	-34.34	V	peak
8400.000	31.41	9.43	40.84	74.00	-33.16	V	peak
9828.000	30.94	11.48	42.42	74.00	-31.58	V	peak
11172.000	31.52	15.00	46.52	74.00	-27.48	V	peak
12396.000	30.71	15.95	46.66	74.00	-27.34	V	peak
13212.000	29.14	18.51	47.65	74.00	-26.35	V	peak
7056.000	31.44	7.81	39.25	74.00	-34.75	H	Peak
8148.000	31.87	9.57	41.44	74.00	-32.56	H	Peak
9336.000	31.64	10.07	41.71	74.00	-32.29	H	Peak
10248.000	31.13	12.75	43.88	74.00	-30.12	H	peak
11508.000	30.94	14.86	45.80	74.00	-28.20	H	peak
13092.000	29.08	18.19	47.27	74.00	-26.73	H	peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. $Margin (dB) = Remark\ result (dBuV/m) - Average\ limit (dBuV/m)$.



Antenna 1

Test Mode: TX / IEEE 802.11a / 5180MHz / (CH Low)

Tested by: Darry Wu

Ambient temperature: 24°C **Relative humidity:** 52% RH

Date: January 3, 2018

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
7680.000	31.95	9.03	40.98	74.00	-33.02	V	peak
8400.000	31.88	9.43	41.31	74.00	-32.69	V	peak
10752.000	30.75	14.31	45.06	74.00	-28.94	V	peak
11268.000	31.60	14.96	46.56	74.00	-27.44	V	peak
11952.000	31.12	14.66	45.78	74.00	-28.22	V	peak
13080.000	29.68	18.16	47.84	74.00	-26.16	V	peak
6540.000	32.06	6.95	39.01	74.00	-34.99	H	Peak
6984.000	31.99	7.67	39.66	74.00	-34.34	H	Peak
8304.000	31.62	9.48	41.10	74.00	-32.90	H	Peak
9912.000	31.03	11.73	42.76	74.00	-31.24	H	peak
11208.000	31.27	14.99	46.26	74.00	-27.74	H	peak
13212.000	29.57	18.51	48.08	74.00	-25.92	H	peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. $Margin (dB) = Remark\ result (dBuV/m) - Average\ limit (dBuV/m)$.