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 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.

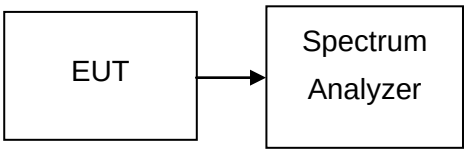
Note to paragraph (a)(3): The Commission strongly recommends that parties employing U-NII devices to provide critical communications services should determine if there are any nearby Government radar systems that could affect their operation.

6.6.2MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Due Calibration
Spectrum Analyzer	Agilent	N9010A	MY52221469	02/21/2017	02/20/2018

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 > 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

6.6.5 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 2		Antenna 0	Antenna 1	Antenna 2	
Low	5180	4.785	4.640	5.094	15.23	-10.445	-10.590	-10.136	PASS
Mid	5200	4.920	4.982	4.808		-10.310	-10.248	-10.422	PASS
High	5240	5.018	5.113	4.755		-10.212	-10.117	-10.475	PASS

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

Channel	Frequency (MHz)	PPSD (dBm)			Limit (dBm)	Margin			Result
		Antenna 0	Antenna 1	Antenna 2		Antenna 0	Antenna 1	Antenna 2	
Low	5745	1.398	1.352	1.436	28.23	-26.832	-26.878	-26.794	PASS
Mid	5785	6.511	6.059	6.377		-21.719	-22.171	-21.853	PASS
High	5825	0.892	1.033	0.392		-27.338	-27.197	-27.838	PASS

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	Antenna 2				
Low	5180	-4.446	-4.719	-4.837	0.107	15.23	-15.123	PASS
Mid	5200	-4.340	-4.378	-4.327	0.423		-14.807	PASS
High	5240	-4.347	-4.545	-4.541	0.295		-14.935	PASS

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

Channel	Frequency (MHz)	PPSD (dBm)			Total (dBm)	Limit (dBm)	Margin	Result
		Antenna 0	Antenna 1	Antenna 2				
Low	5745	-3.021	-2.964	-2.947	1.794	28.23	-26.436	PASS
Mid	5785	5.502	5.658	5.343	10.274		-17.956	PASS
High	5825	-2.572	-3.380	-2.930	1.823		-26.407	PASS

Remark:

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

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

The RBW factor = 10log10(500/470)=0.269 dB into test plots.

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	Antenna 2				
Low	5190	-5.269	-5.573	-5.179	-0.566	15.23	-15.796	PASS
High	5230	-4.725	-5.334	-5.210	-0.310		-15.540	PASS

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

Channel	Frequency (MHz)	PPSD (dBm)			Total (dBm)	Limit (dBm)	Margin	Result
		Antenna 0	Antenna 1	Antenna 2				
Low	5755	-3.639	-3.554	-3.840	1.095	28.23	-27.135	PASS
High	5795	-3.903	-3.977	-3.986	0.816		-27.414	PASS

Test mode: IEEE 802.11ac 80 mode / 5210MHz

Channel	Frequency (MHz)	PPSD (dBm)			Total (dBm)	Limit (dBm)	Margin	Result
		Antenna 0	Antenna 1	Antenna 2				
	5210	-13.052	-13.020	-12.861	-8.206	9.23	-17.436	PASS

Test mode: IEEE 802.11ac 80 mode / 5775MHz

Channel	Frequency (MHz)	PPSD (dBm)			Total (dBm)	Limit (dBm)	Margin	Result
		Antenna 0	Antenna 1	Antenna 2				
	5775	-4.806	-4.721	-5.161	-0.121	28.23	-28.351	PASS

Remark:

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

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

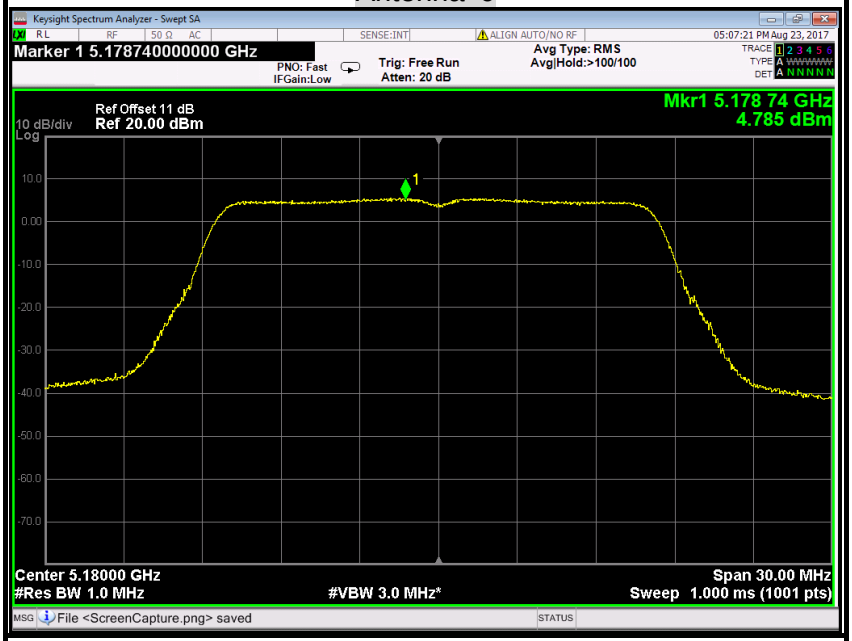
The RBW factor = 10log10(500/470)=0.269 dB into test plots.

Test Plot

IEEE 802.11a mode / 5180 ~ 5240MHz

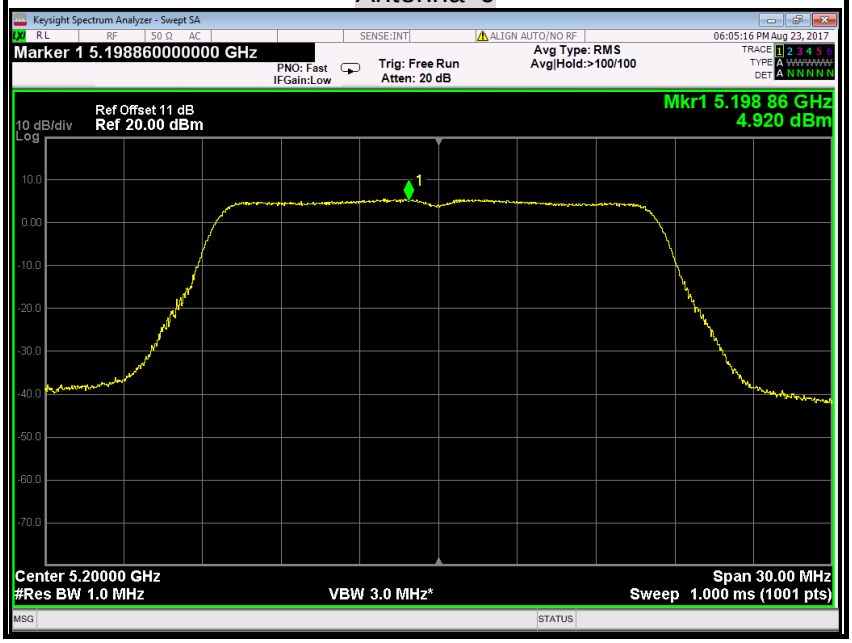
PPSD (CH Low)

Antenna 0



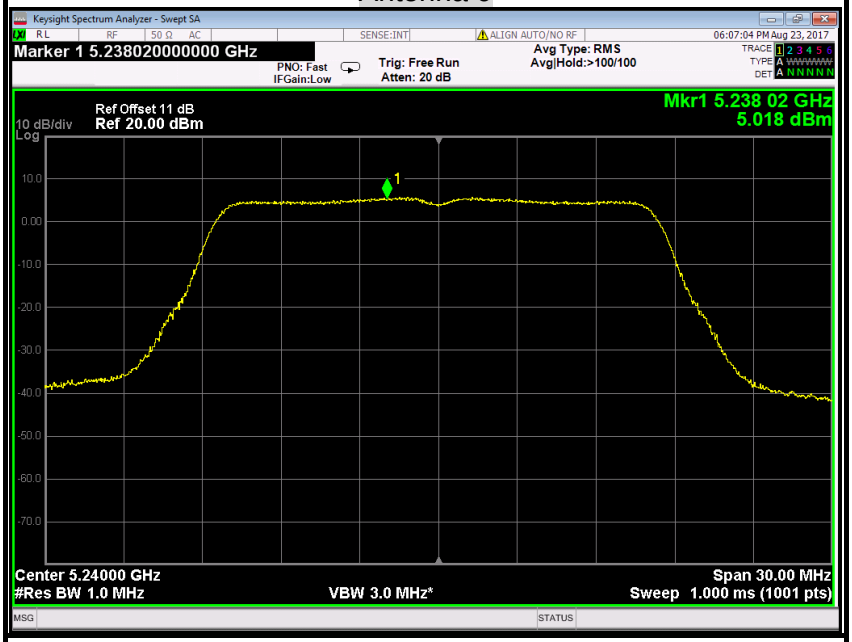
PPSD (CH Mid)

Antenna 0



PPSD (CH High)

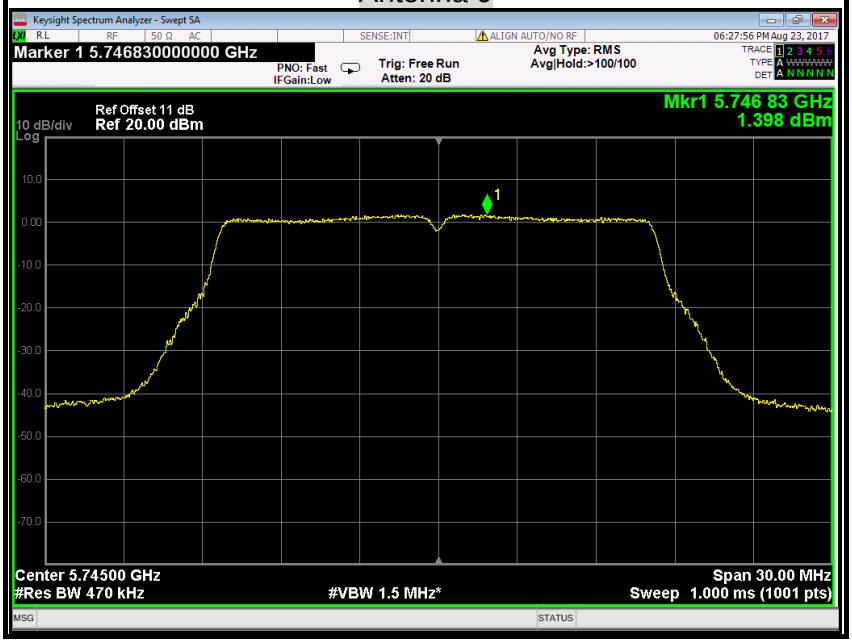
Antenna 0



IEEE 802.11a mode / 5745 ~ 5825MHz

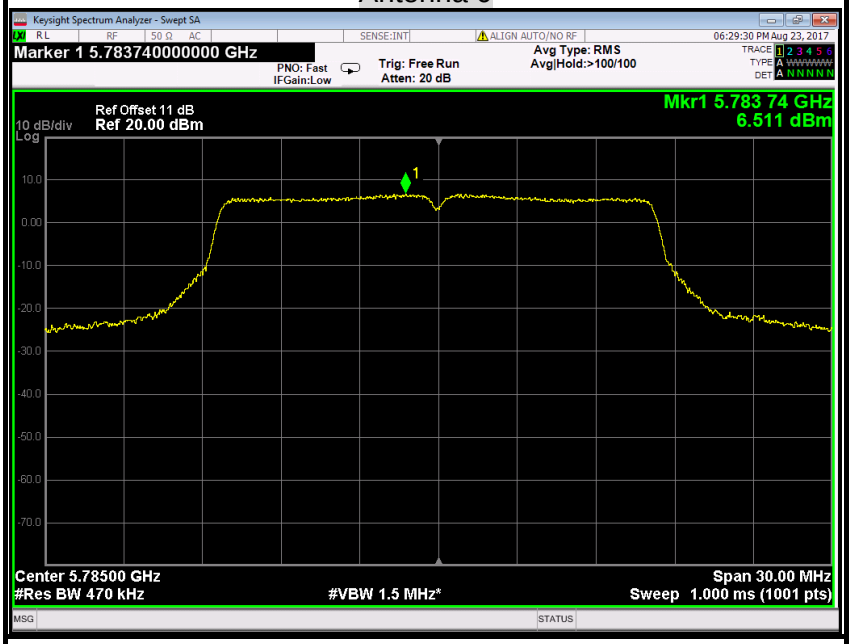
PPSD (CH Low)

Antenna 0



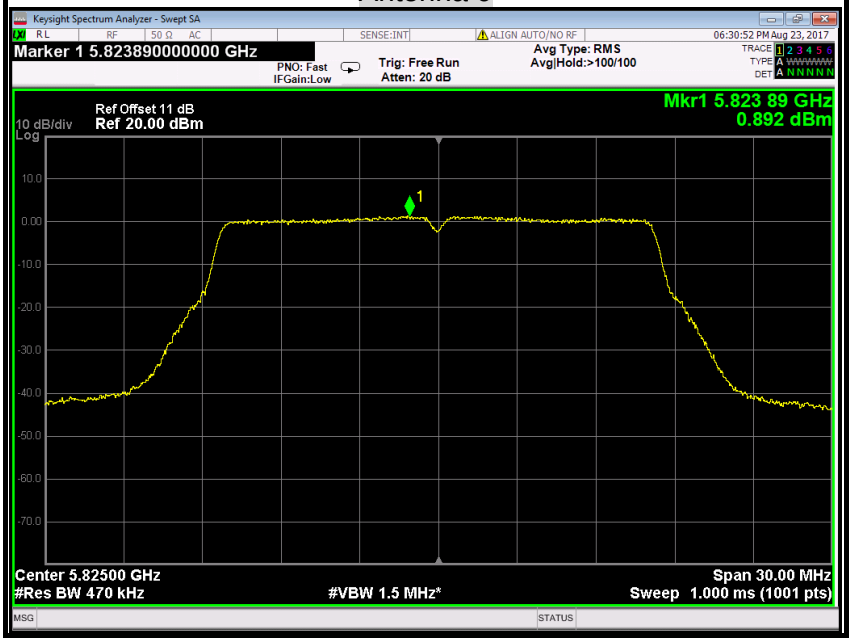
PPSD (CH Mid)

Antenna 0



PPSD (CH High)

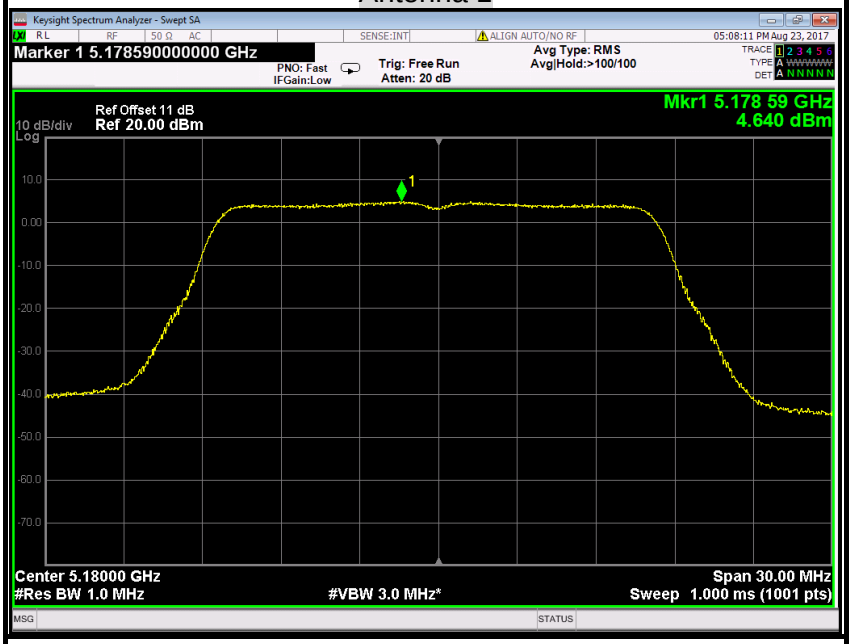
Antenna 0



IEEE 802.11a mode / 5180 ~ 5240MHz

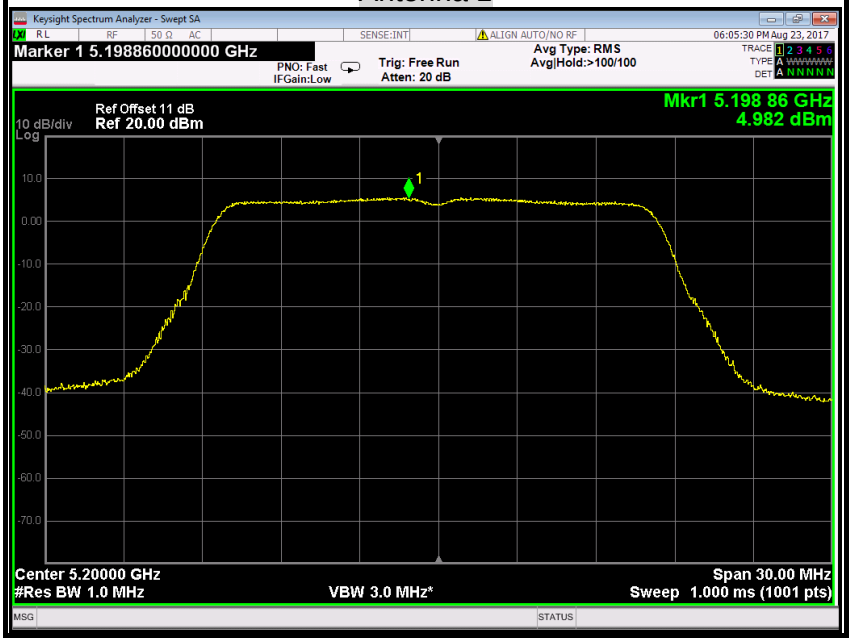
PPSD (CH Low)

Antenna 1



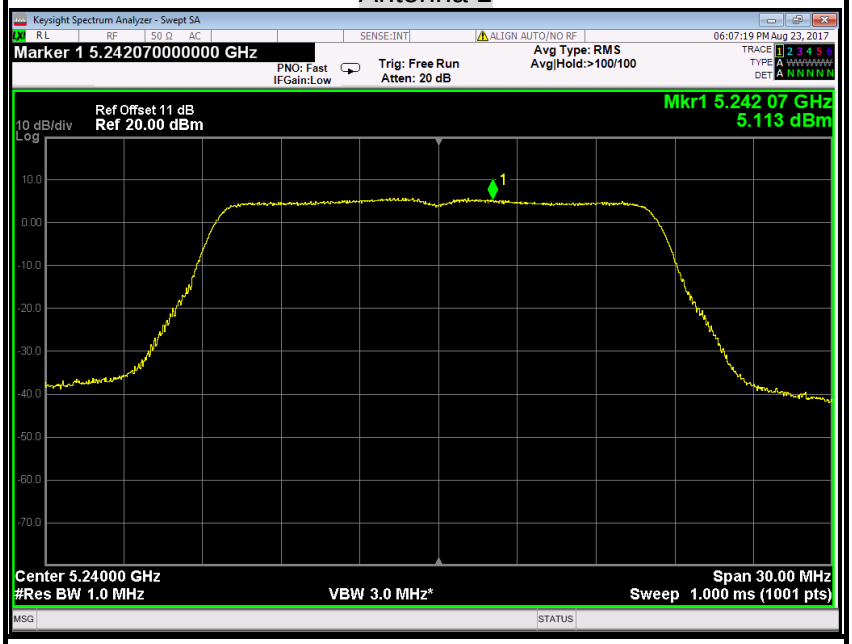
PPSD (CH Mid)

Antenna 1



PPSD (CH High)

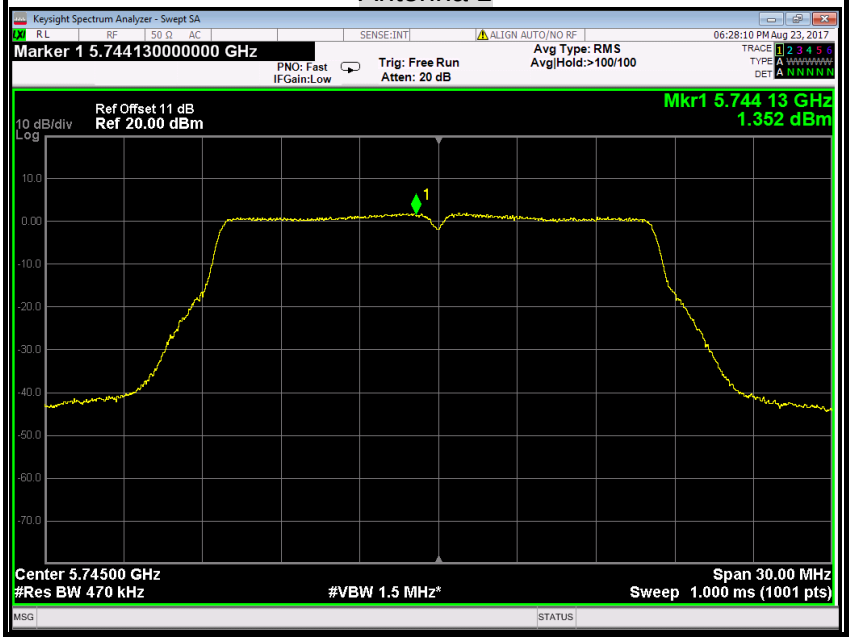
Antenna 1



IEEE 802.11a mode / 5745 ~ 5825MHz

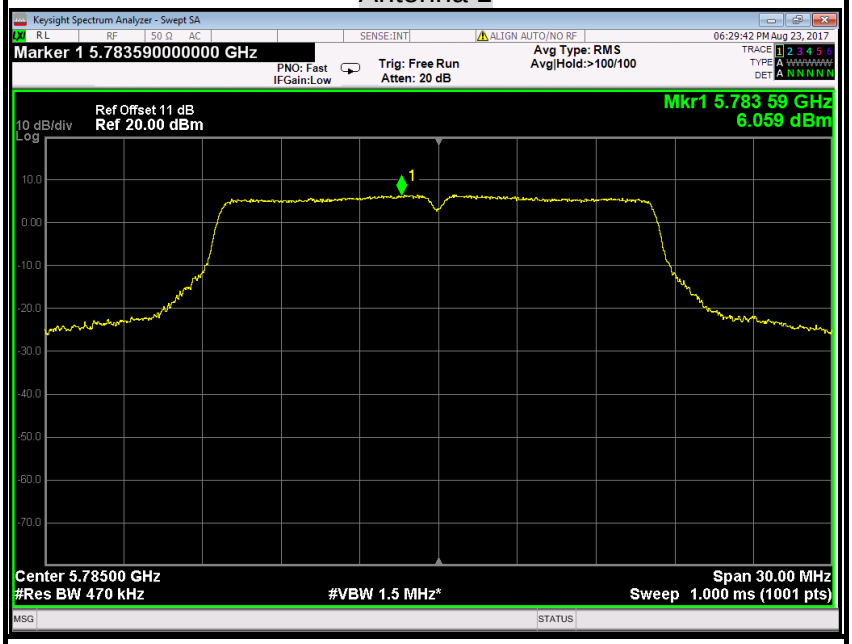
PPSD (CH Low)

Antenna 1



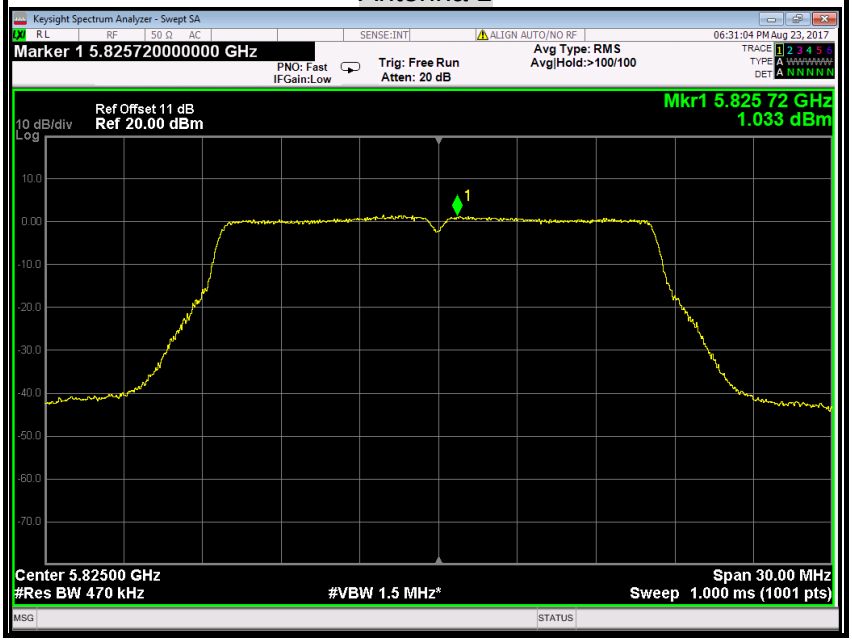
PPSD (CH Mid)

Antenna 1



PPSD (CH High)

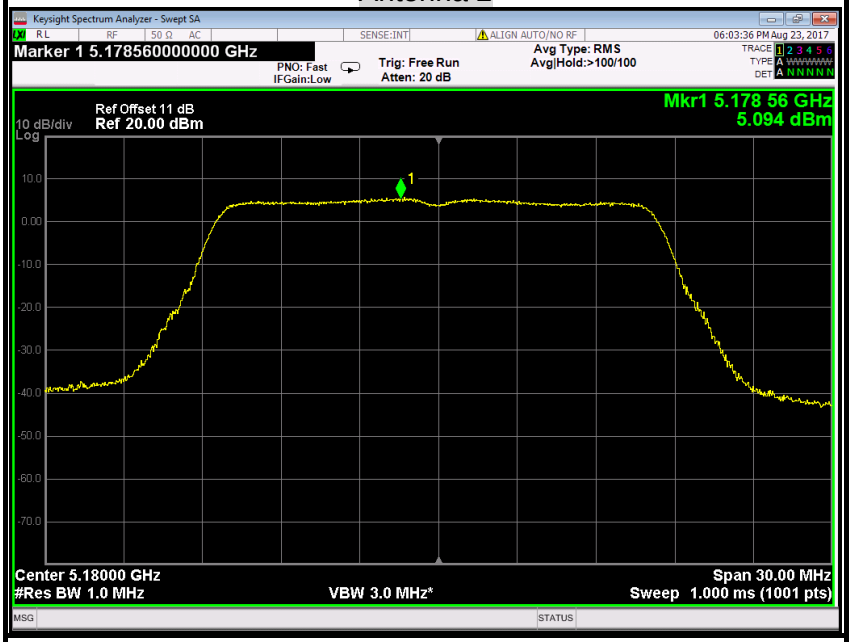
Antenna 1



IEEE 802.11a mode / 5180 ~ 5240MHz

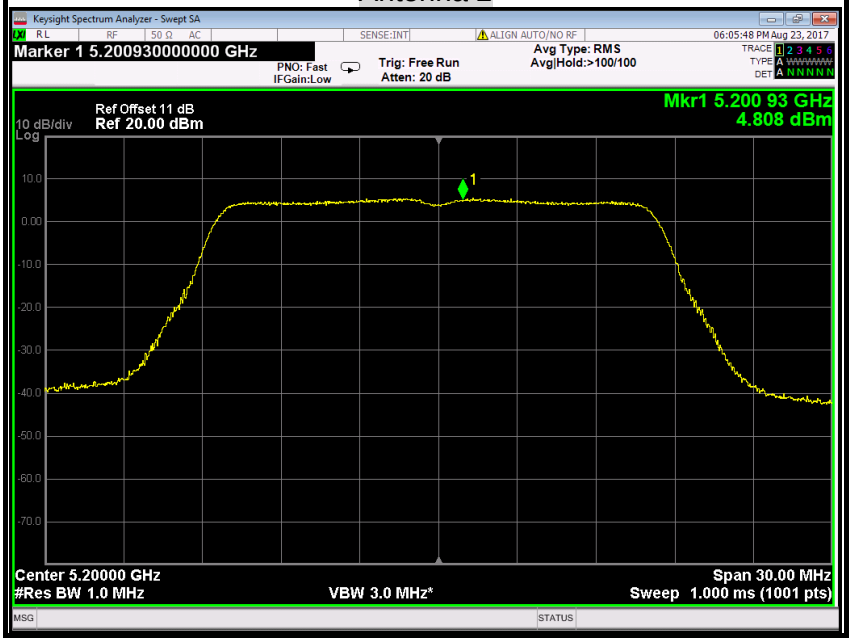
PPSD (CH Low)

Antenna 2



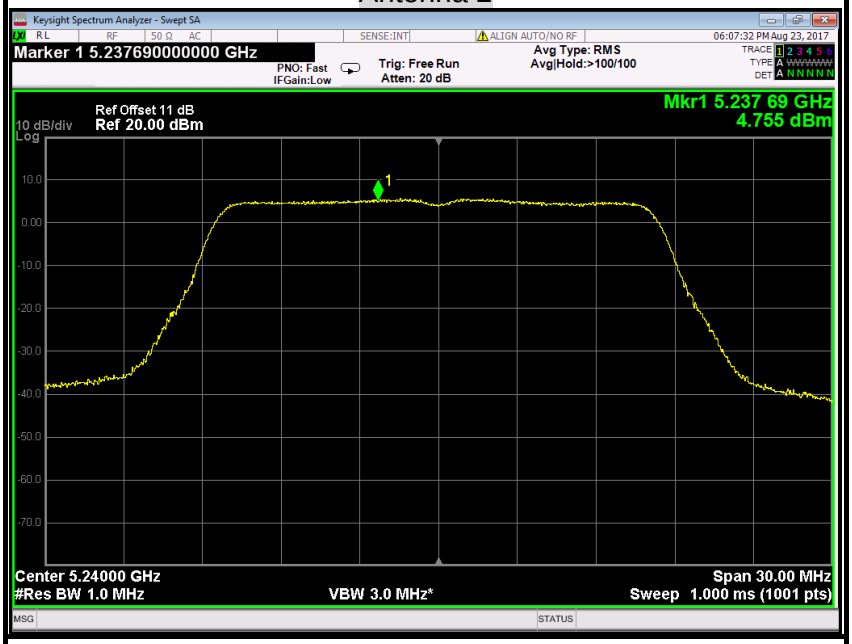
PPSD (CH Mid)

Antenna 2



PPSD (CH High)

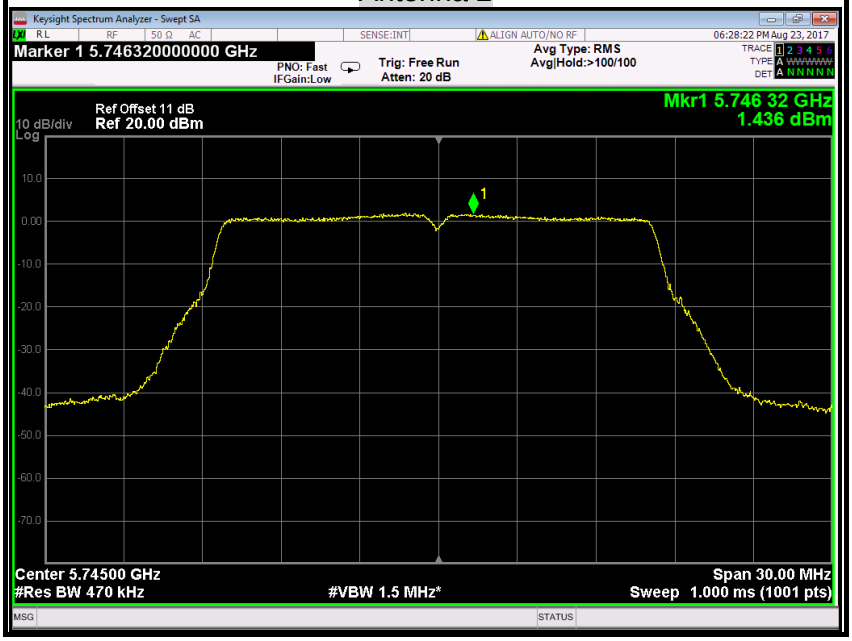
Antenna 2



IEEE 802.11a mode / 5745 ~ 5825MHz

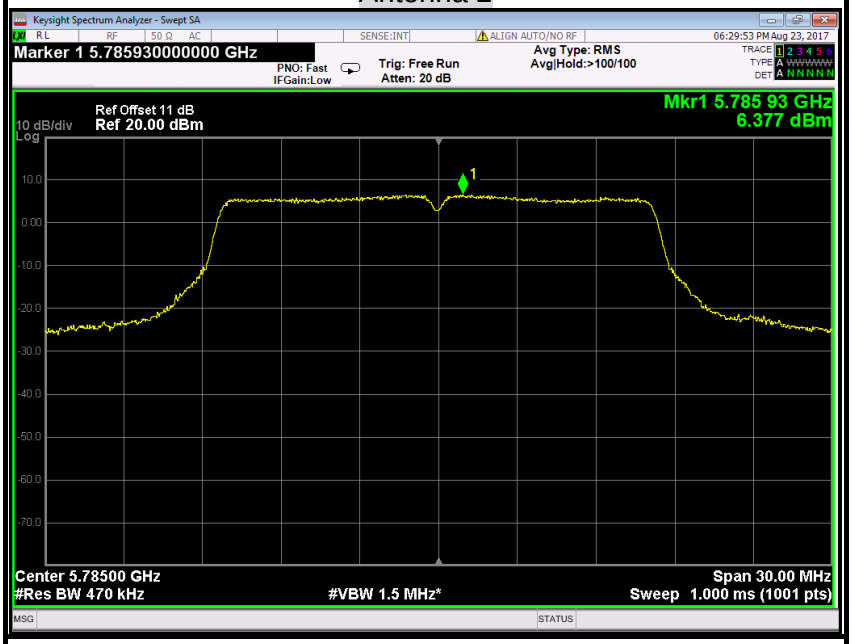
PPSD (CH Low)

Antenna 2



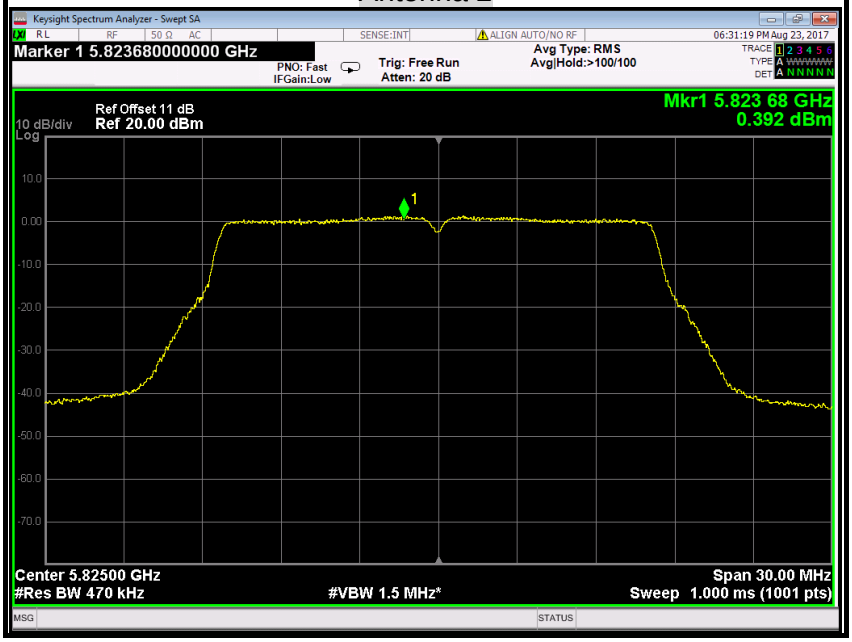
PPSD (CH Mid)

Antenna 2



PPSD (CH High)

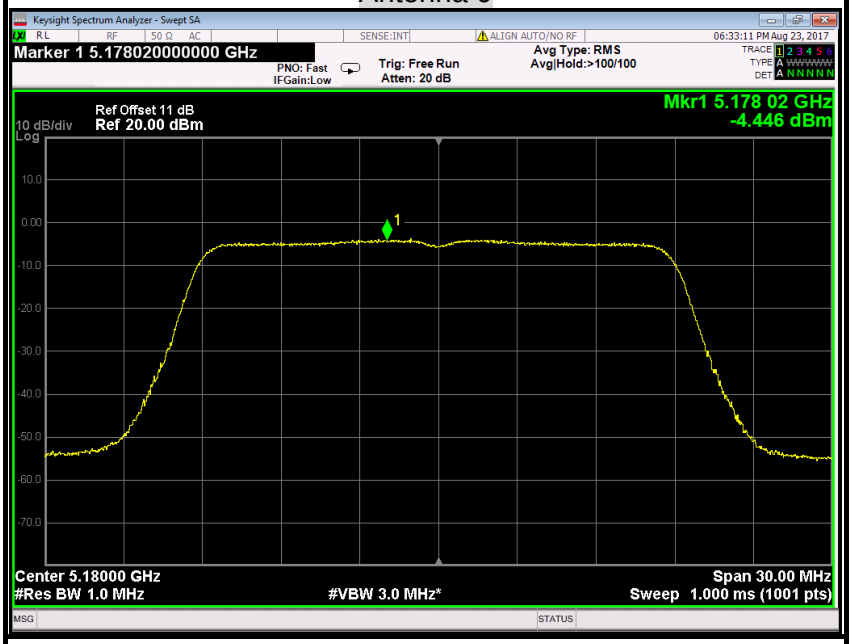
Antenna 2



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

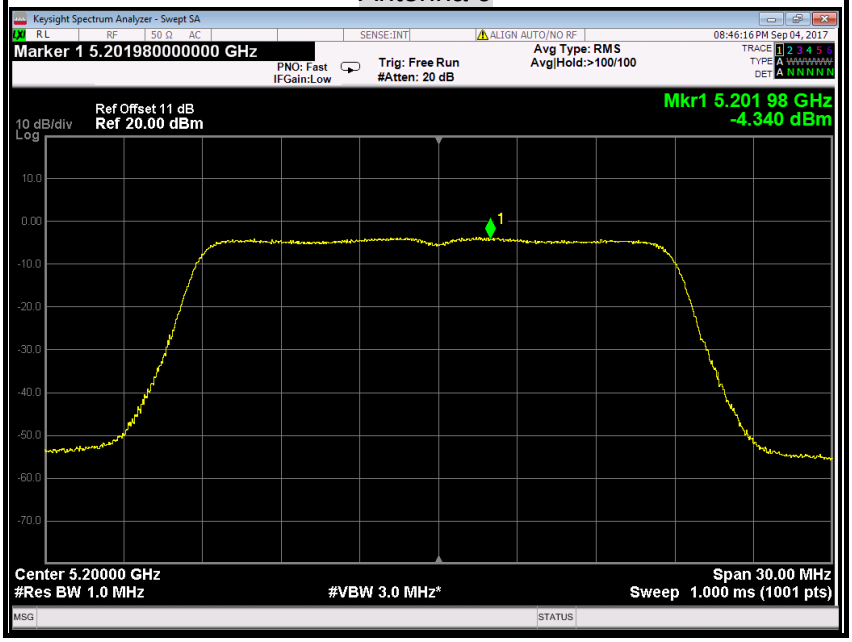
PPSD (CH Low)

Antenna 0



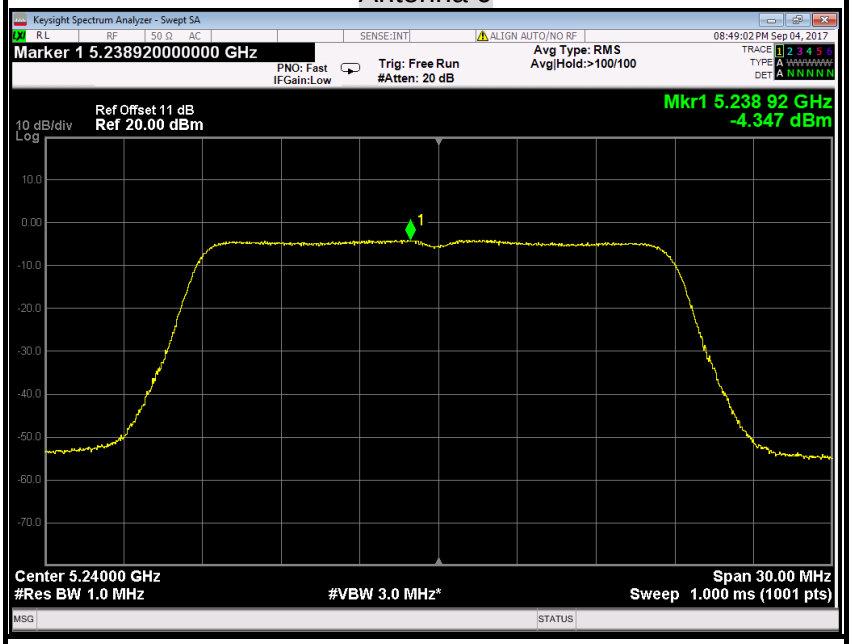
PPSD (CH Mid)

Antenna 0



PPSD (CH High)

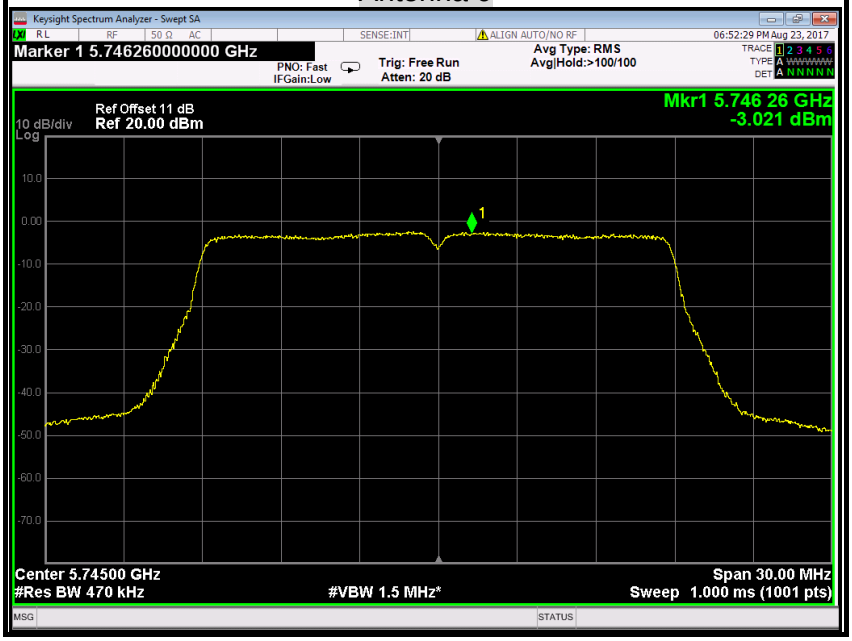
Antenna 0



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

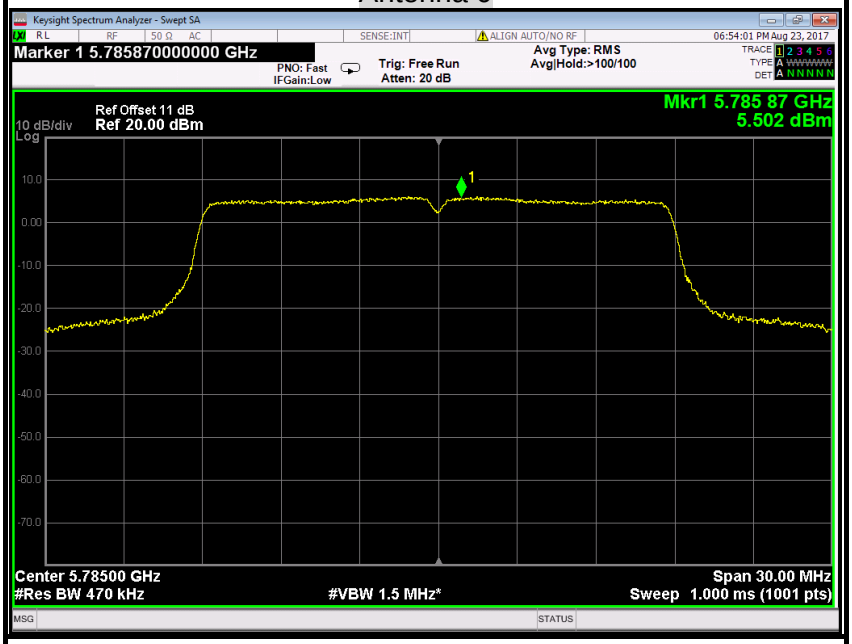
PPSD (CH Low)

Antenna 0



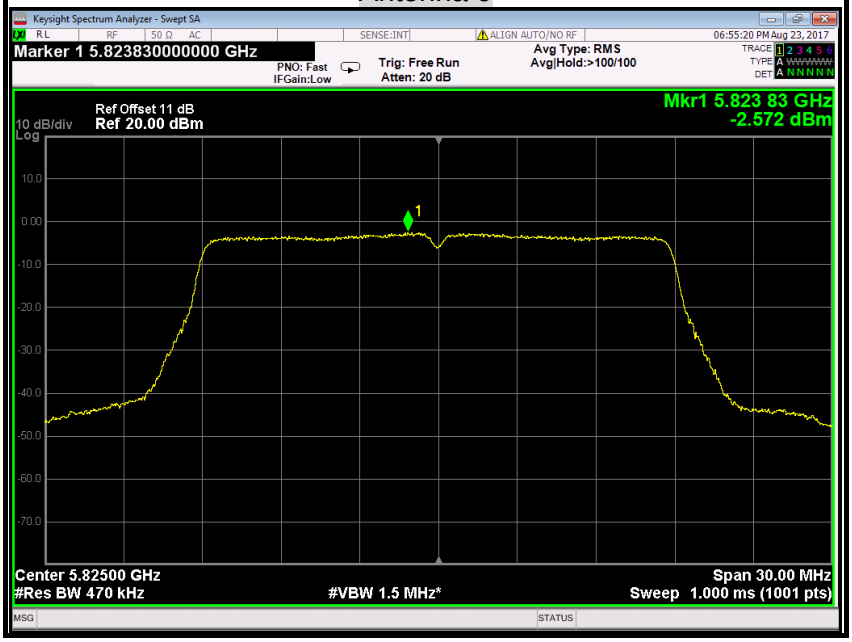
PPSD (CH Mid)

Antenna 0



PPSD (CH High)

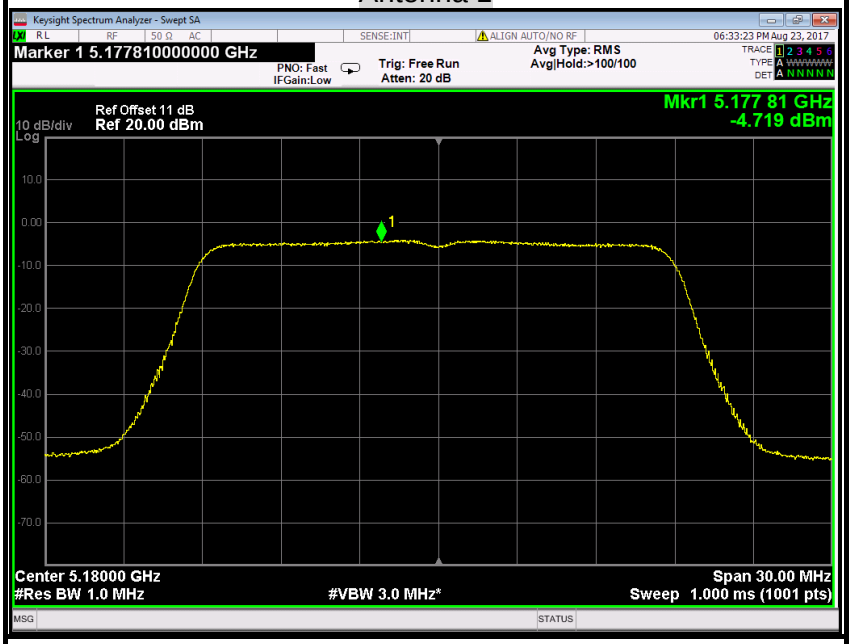
Antenna 0



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

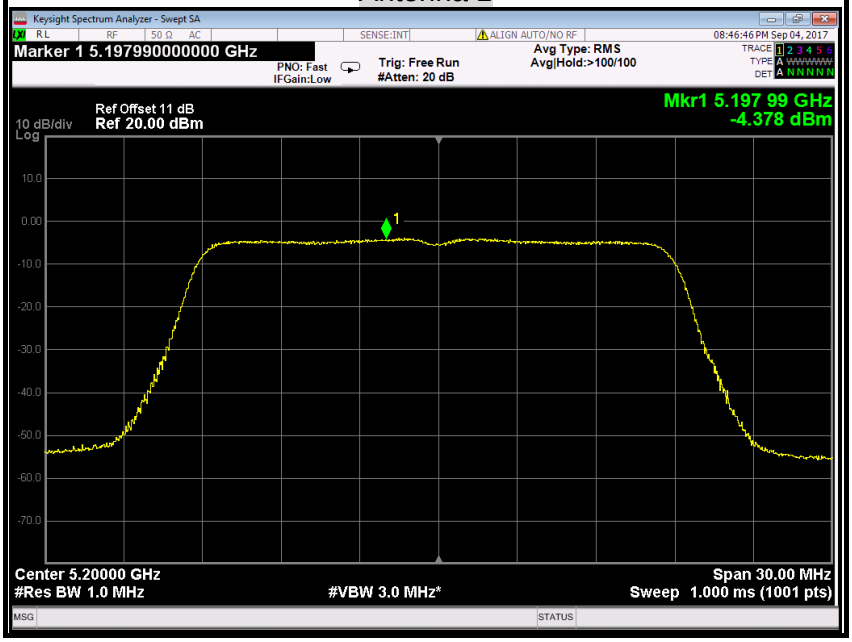
PPSD (CH Low)

Antenna 1



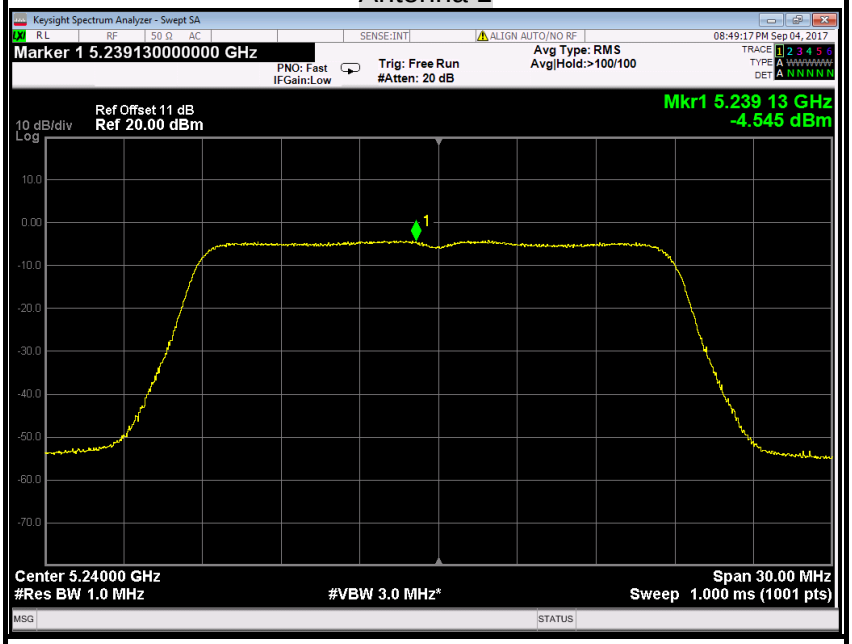
PPSD (CH Mid)

Antenna 1



PPSD (CH High)

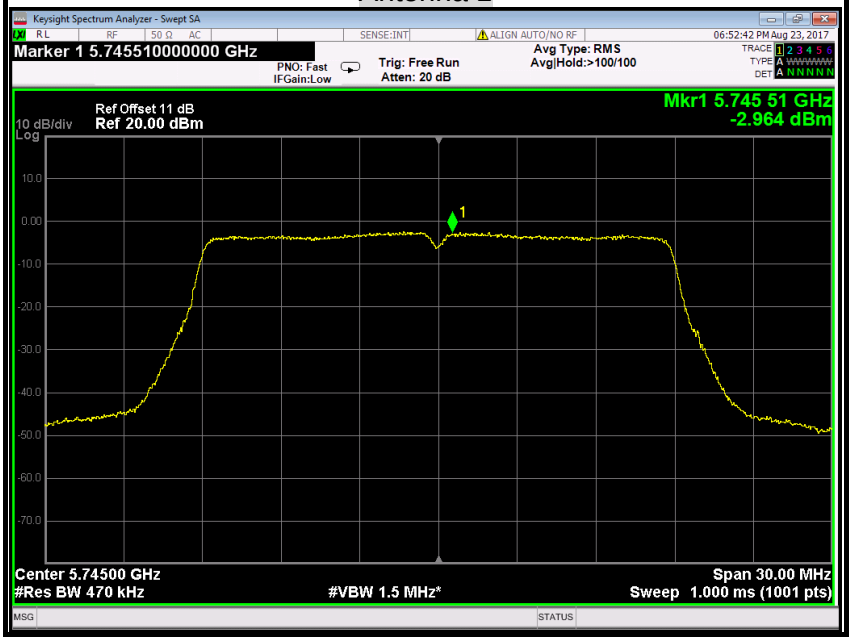
Antenna 1



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

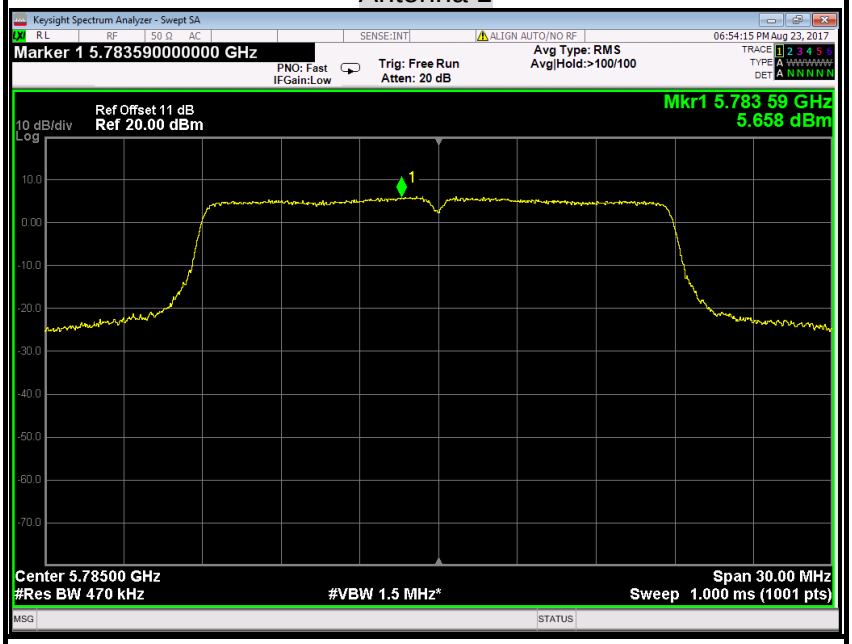
PPSD (CH Low)

Antenna 1



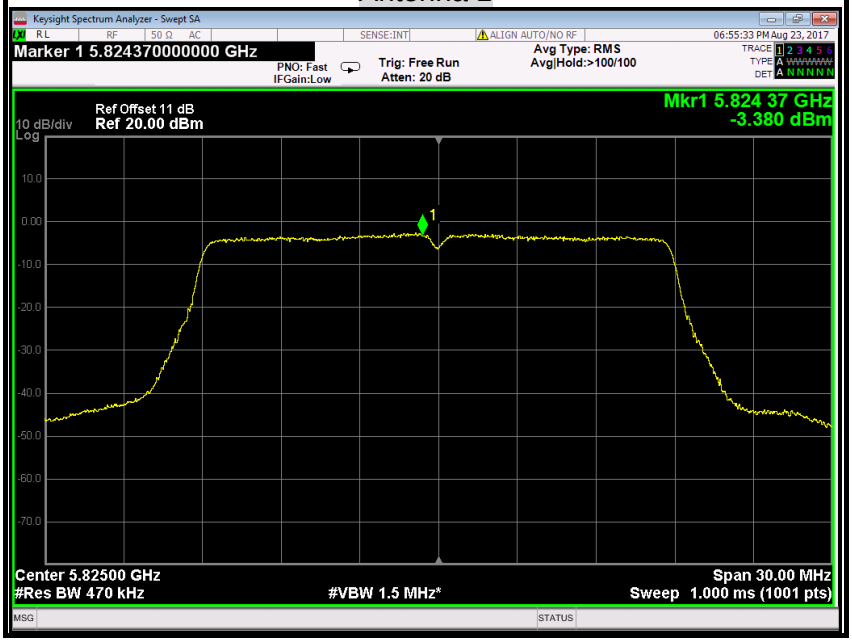
PPSD (CH Mid)

Antenna 1



PPSD (CH High)

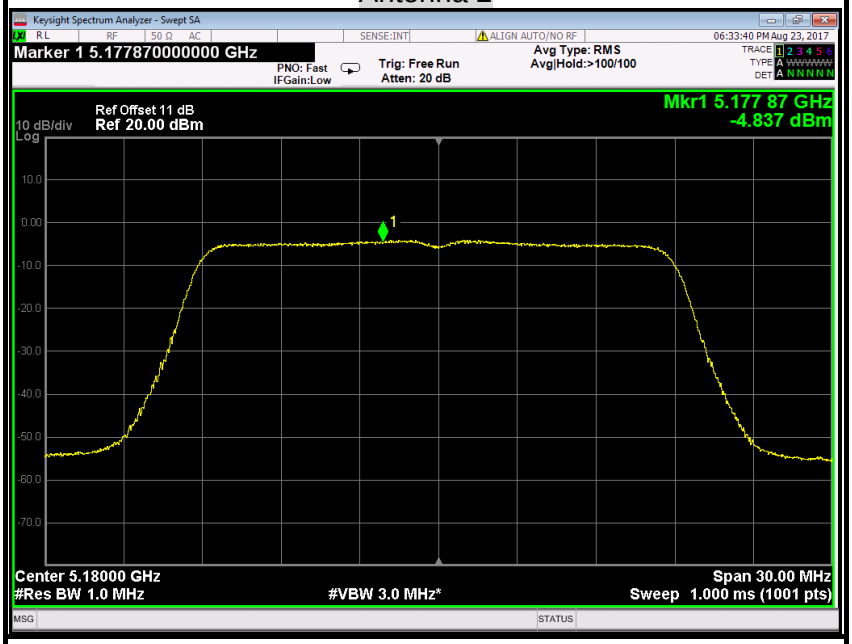
Antenna 1



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

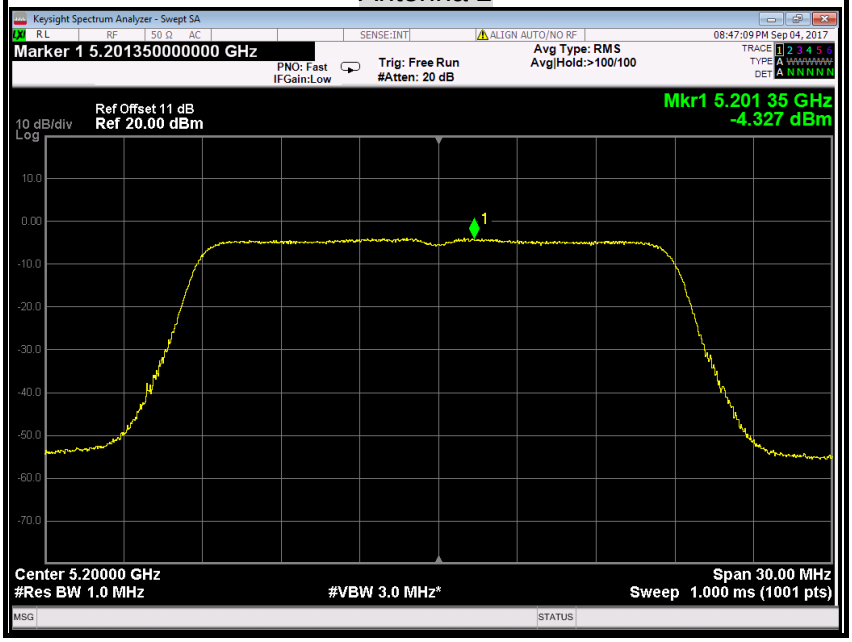
PPSD (CH Low)

Antenna 2



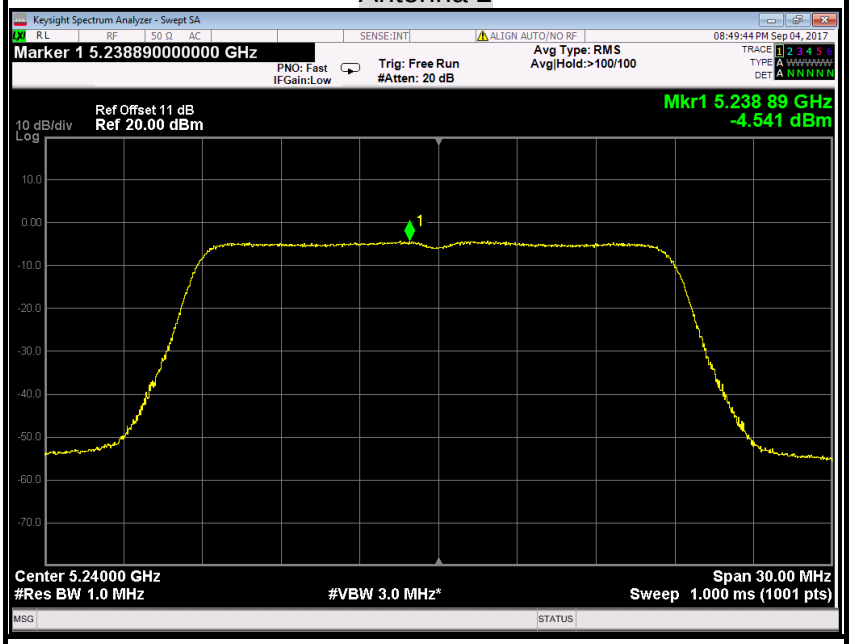
PPSD (CH Mid)

Antenna 2



PPSD (CH High)

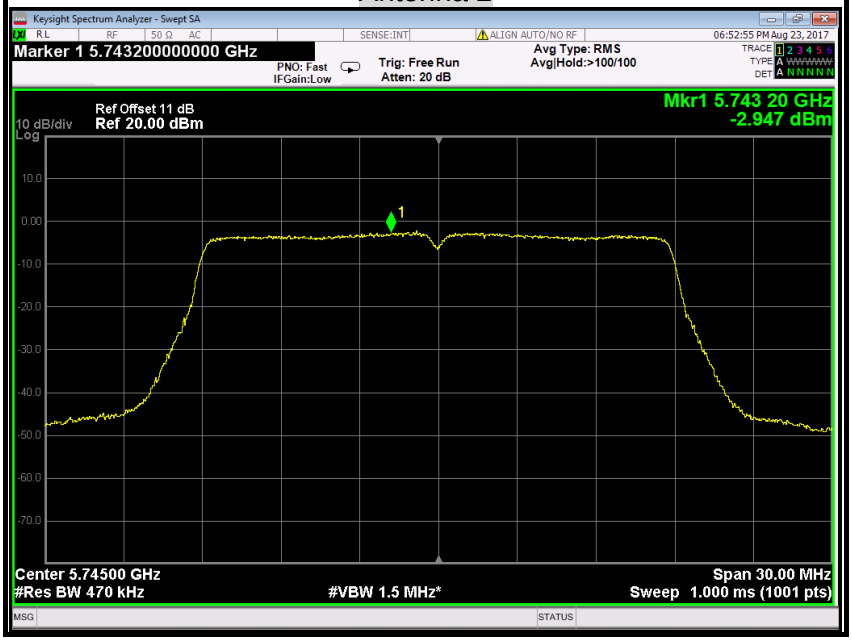
Antenna 2



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

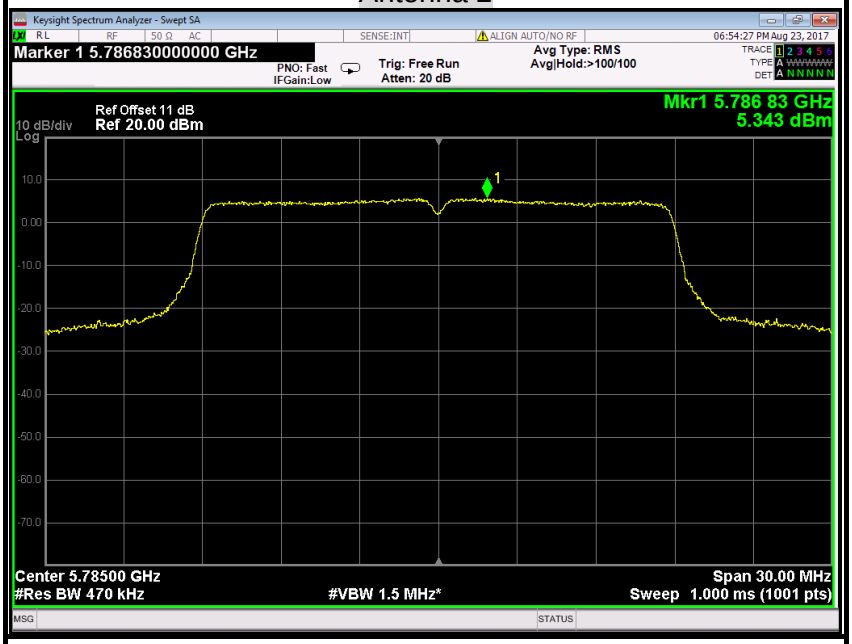
PPSD (CH Low)

Antenna 2



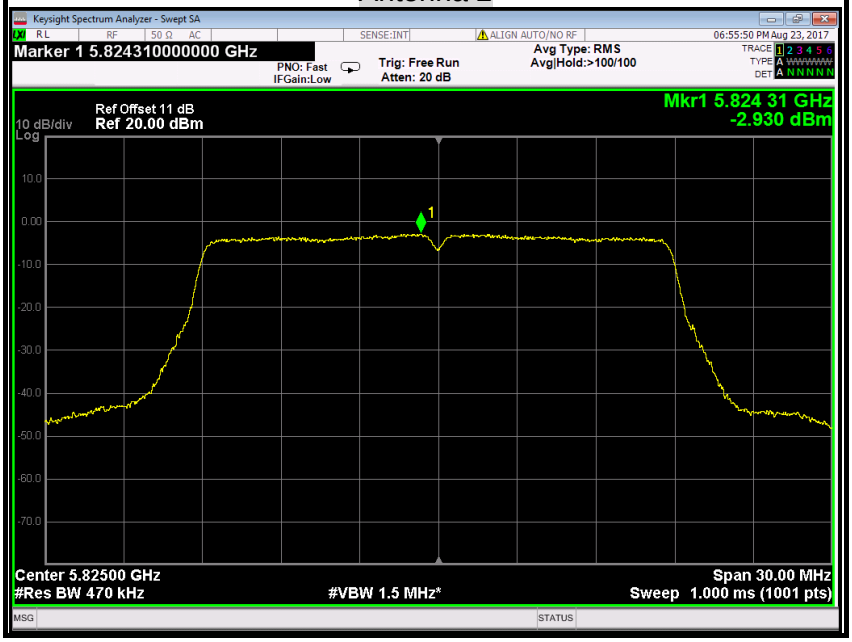
PPSD (CH Mid)

Antenna 2



PPSD (CH High)

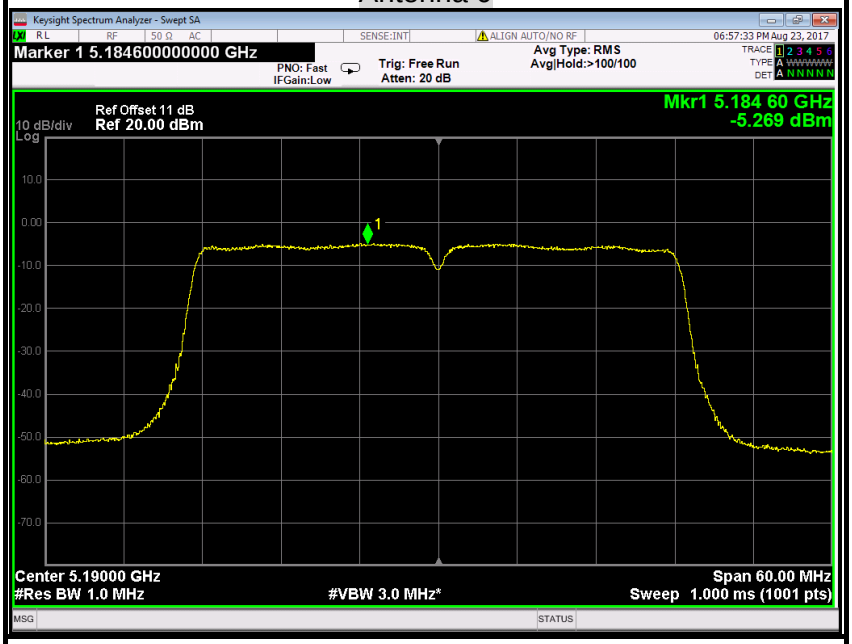
Antenna 2



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

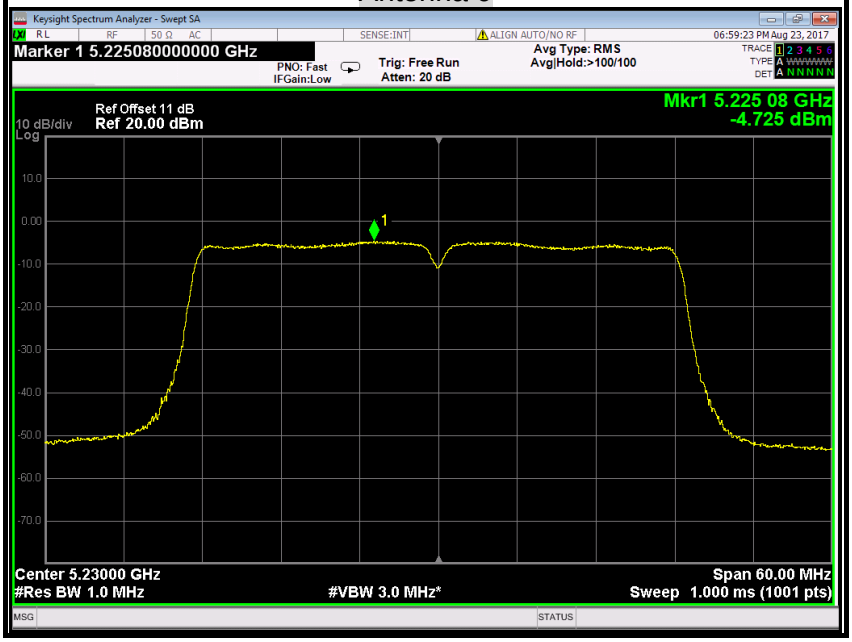
PPSD (CH Low)

Antenna 0



PPSD (CH High)

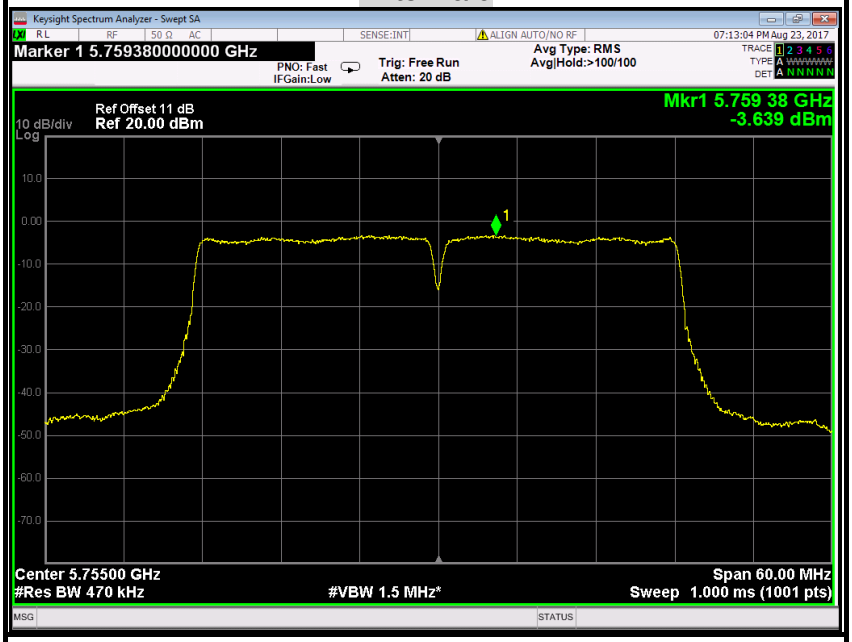
Antenna 0



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

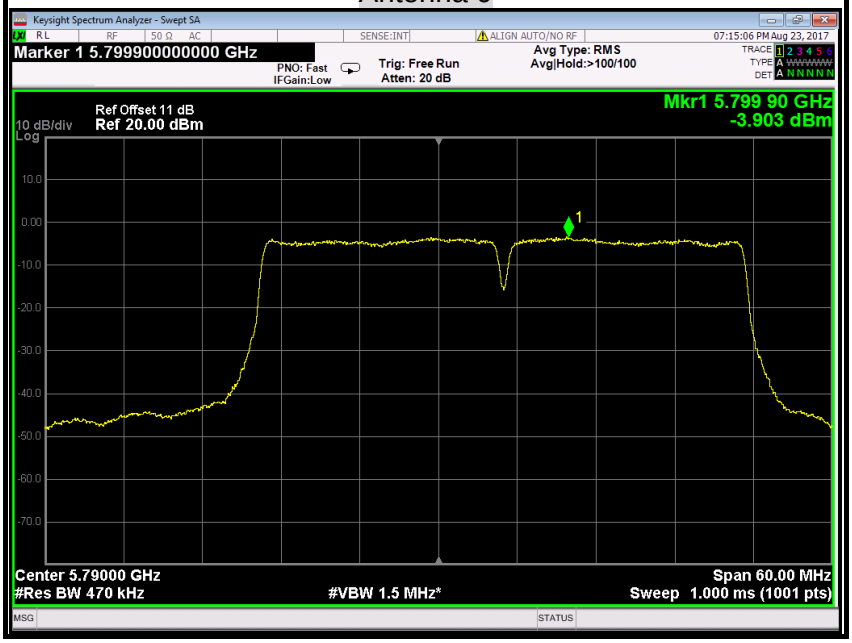
PPSD (CH Low)

Antenna 0



PPSD (CH High)

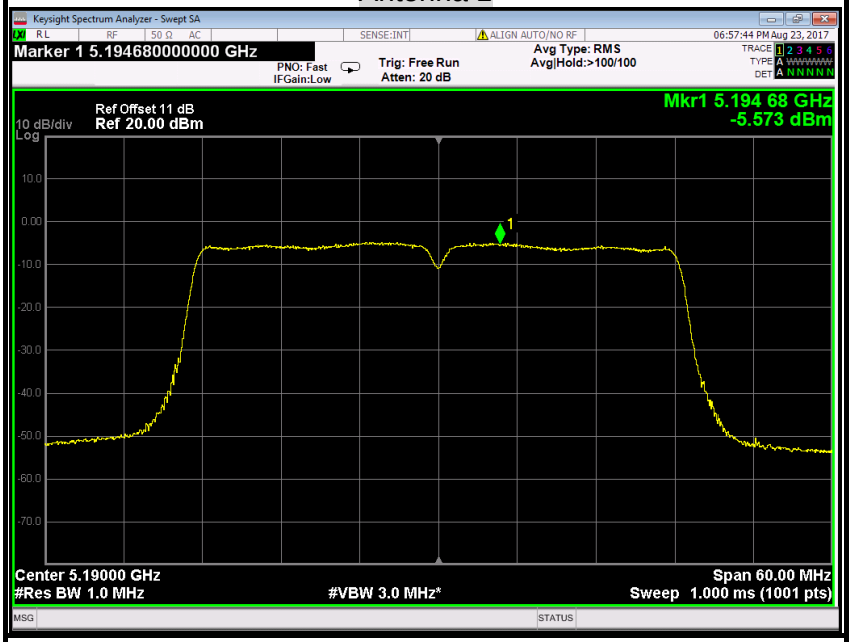
Antenna 0



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

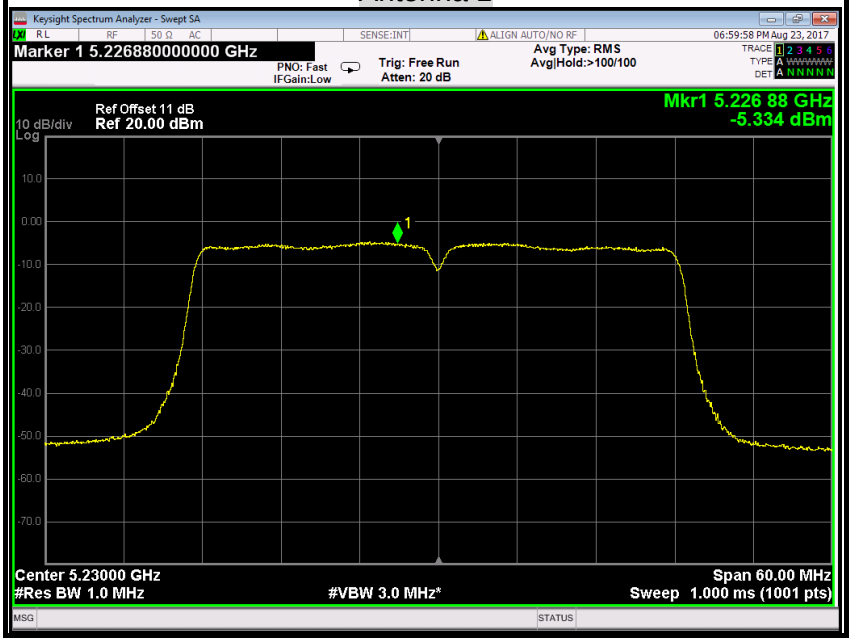
PPSD (CH Low)

Antenna 1



PPSD (CH High)

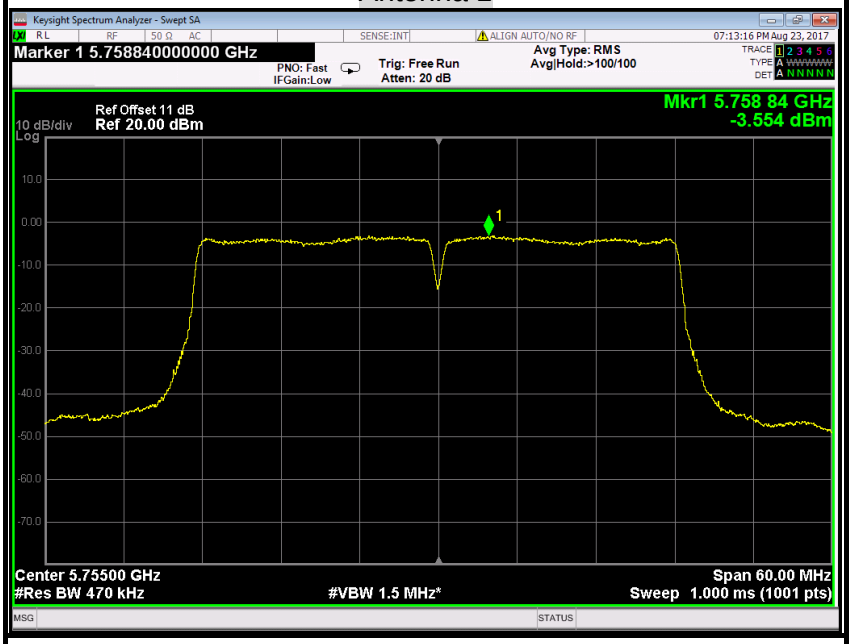
Antenna 1



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

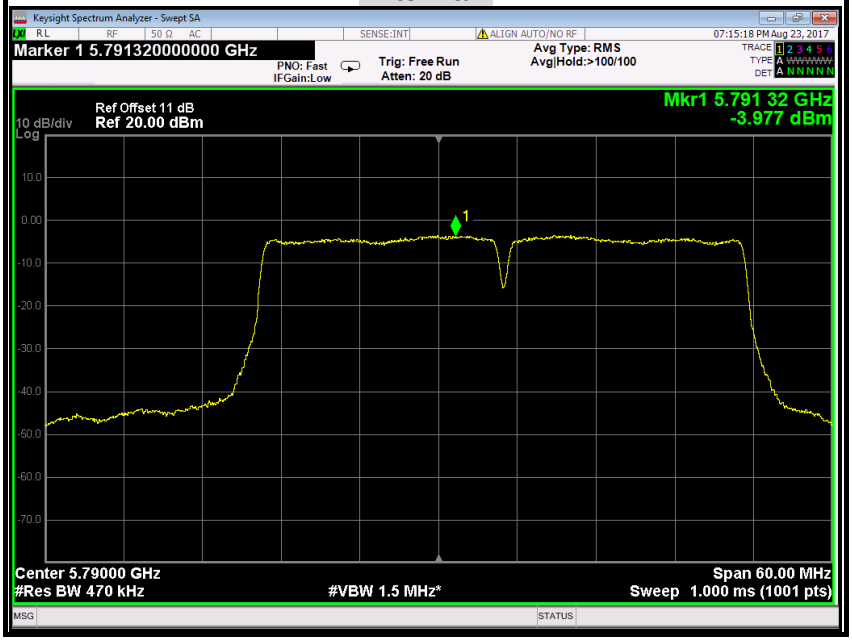
PPSD (CH Low)

Antenna 1



PPSD (CH High)

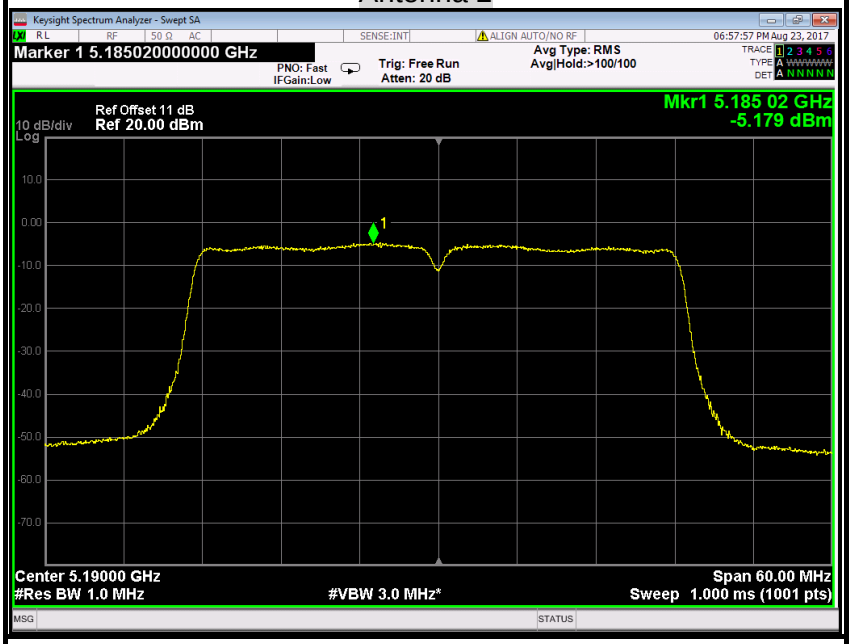
Antenna 1



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

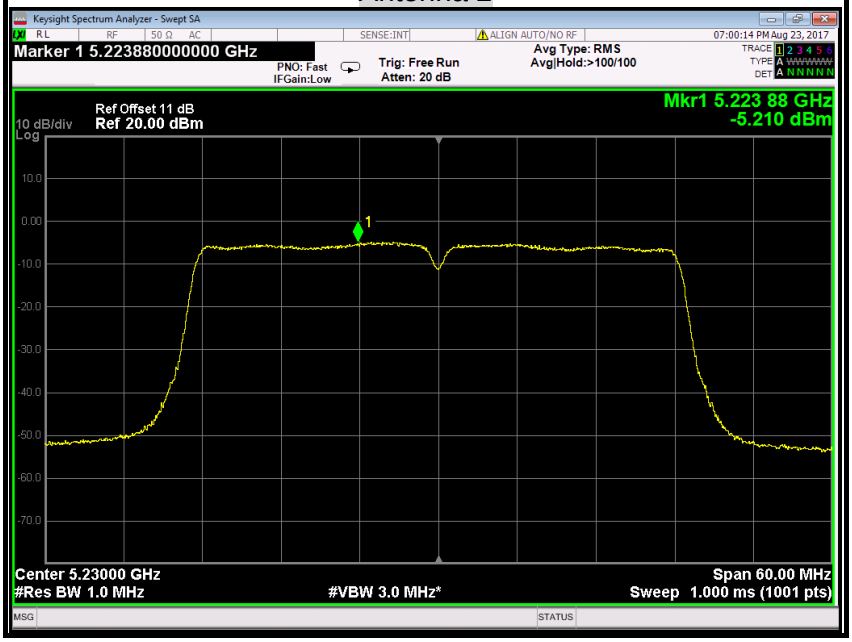
PPSD (CH Low)

Antenna 2

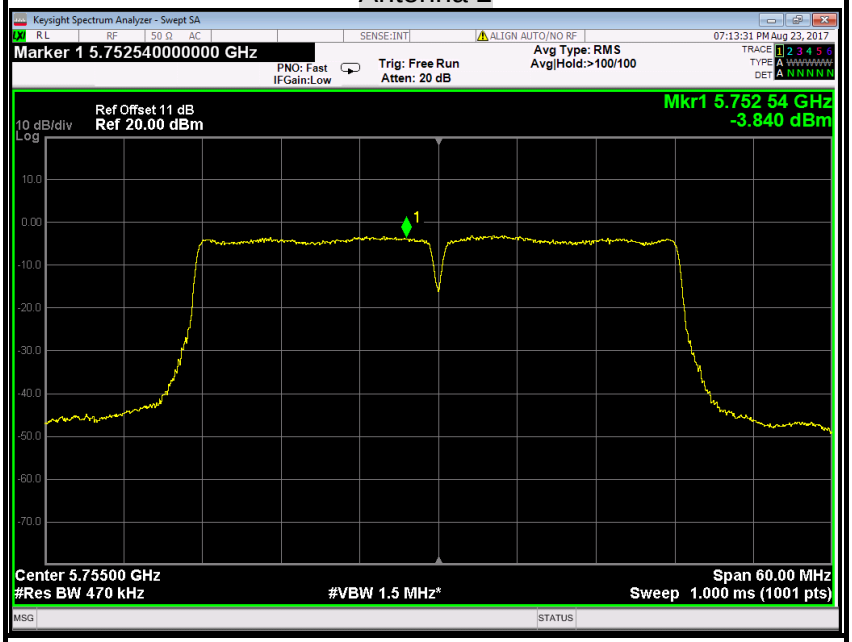


PPSD (CH High)

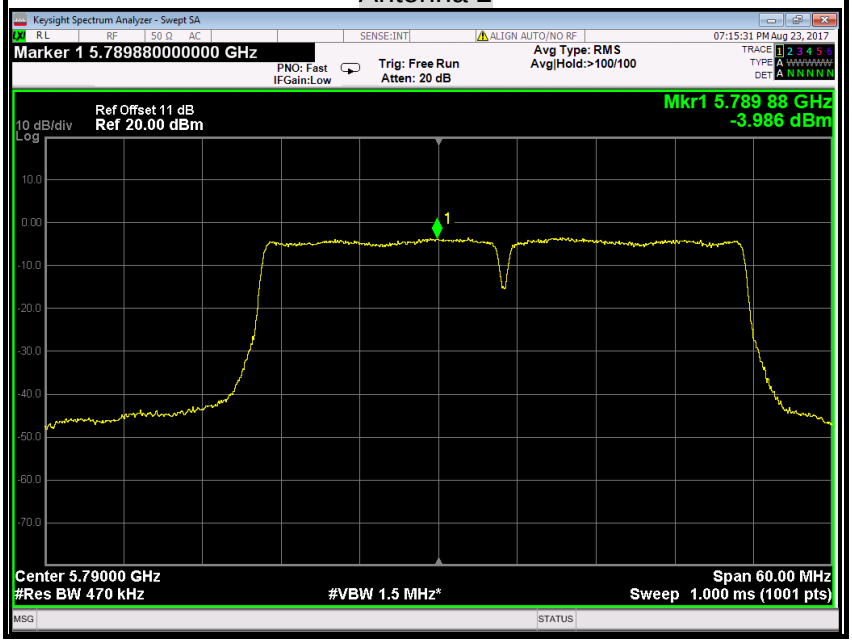
Antenna 2



IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz
PPSD (CH Low)
Antenna 2



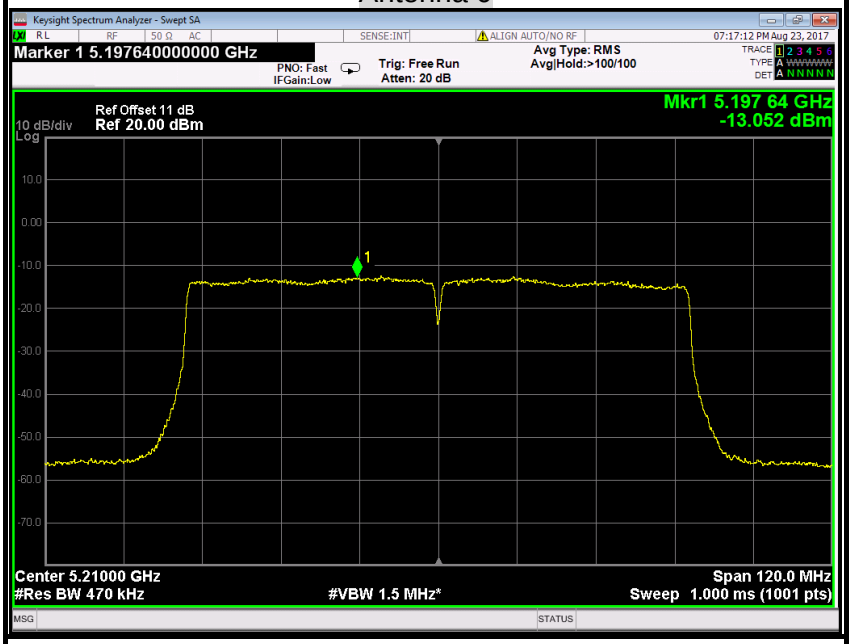
PPSD (CH High)
Antenna 2



IEEE 802.11ac 80 mode / 5210MHz

PPSD

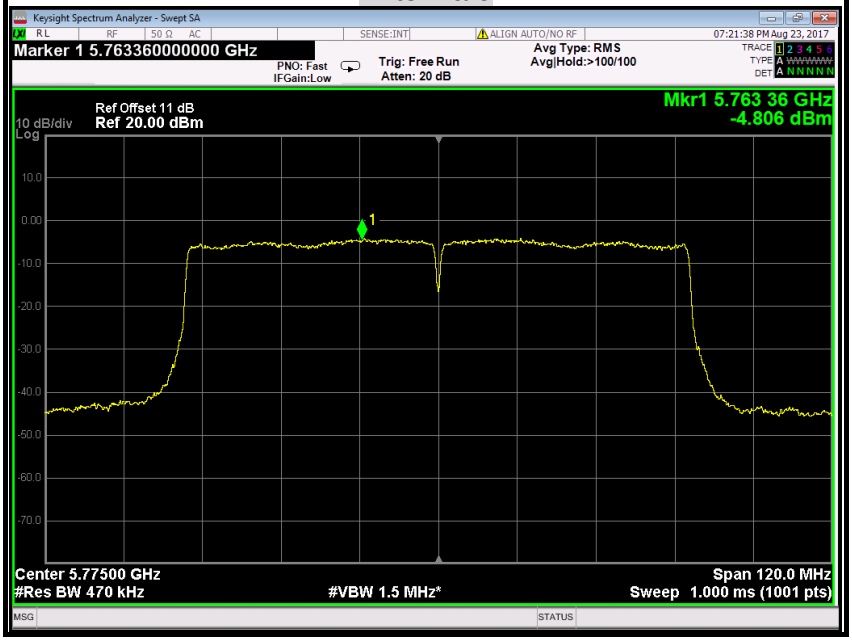
Antenna 0



IEEE 802.11ac 80 mode / 5775MHz

PPSD

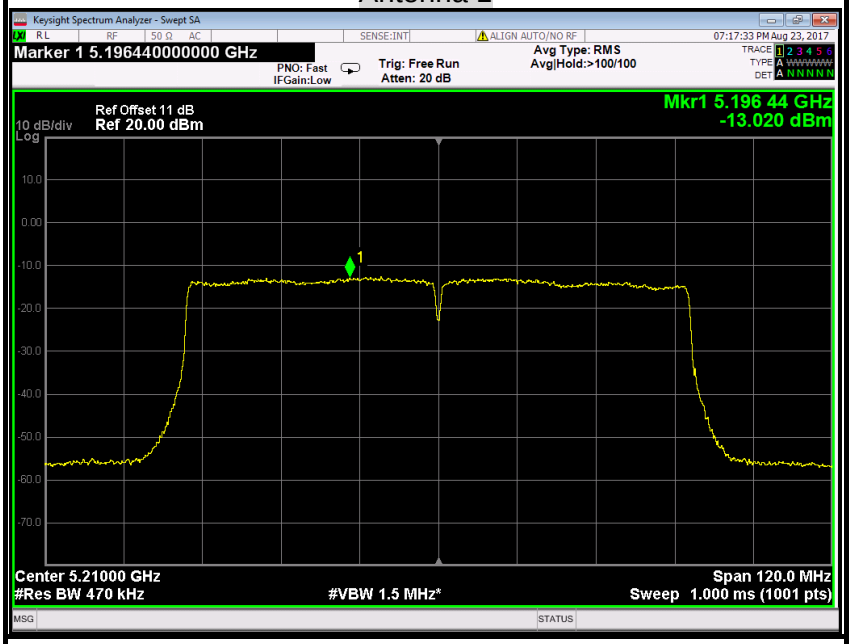
Antenna 0



IEEE 802.11ac 80 mode / 5210MHz

PPSD

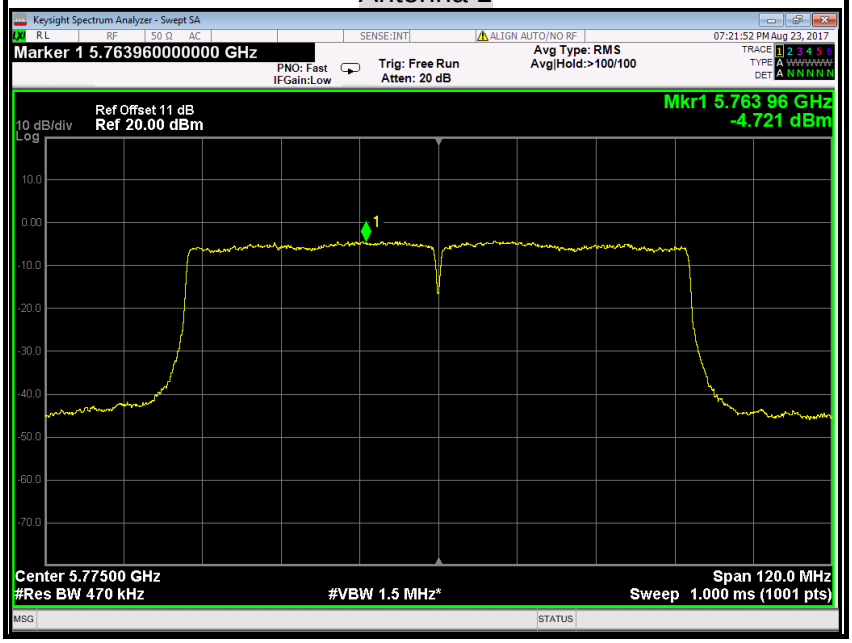
Antenna 1



IEEE 802.11ac 80 mode / 5775MHz

PPSD

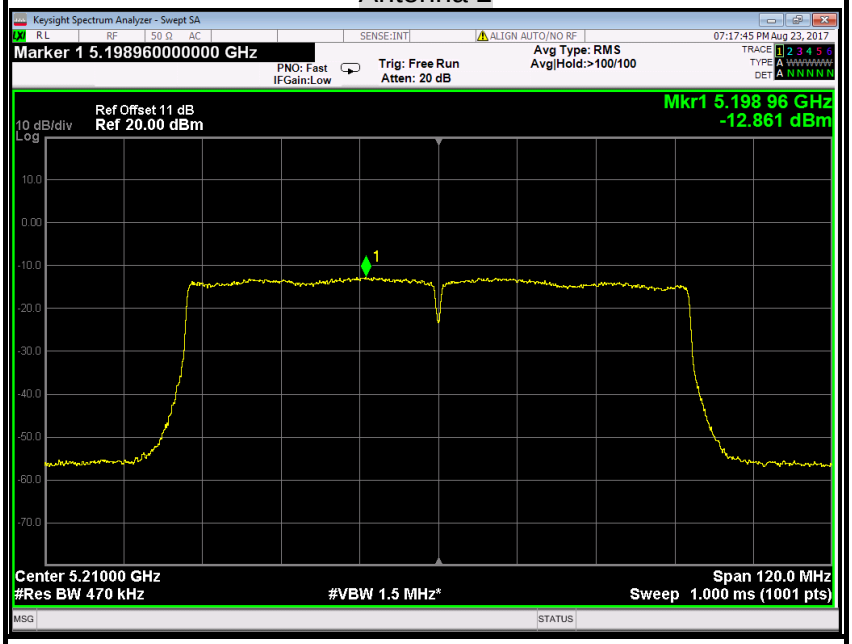
Antenna 1



IEEE 802.11ac 80 mode / 5210MHz

PPSD

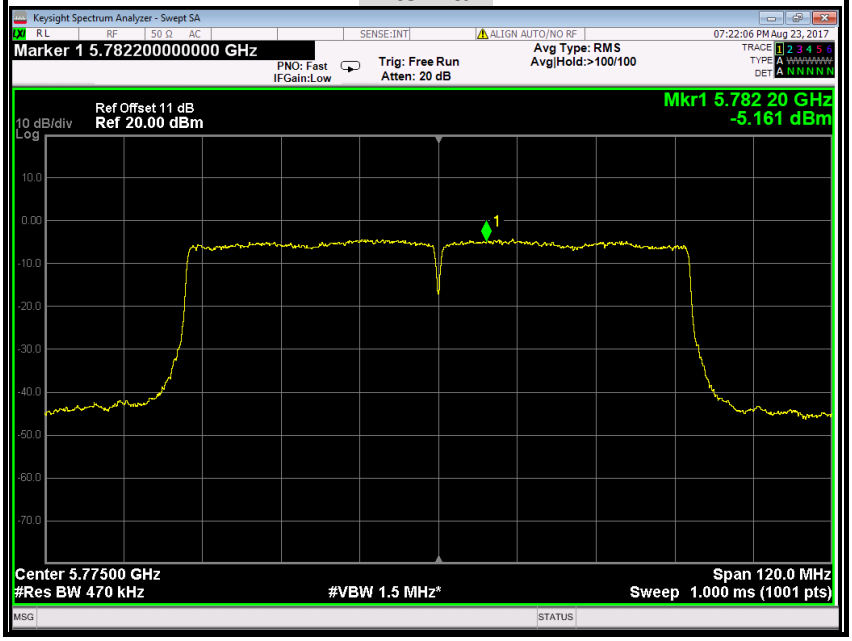
Antenna 2



IEEE 802.11ac 80 mode / 5775MHz

PPSD

Antenna 2



6.7 RADIATED UNDESIABLE 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 (μV/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.

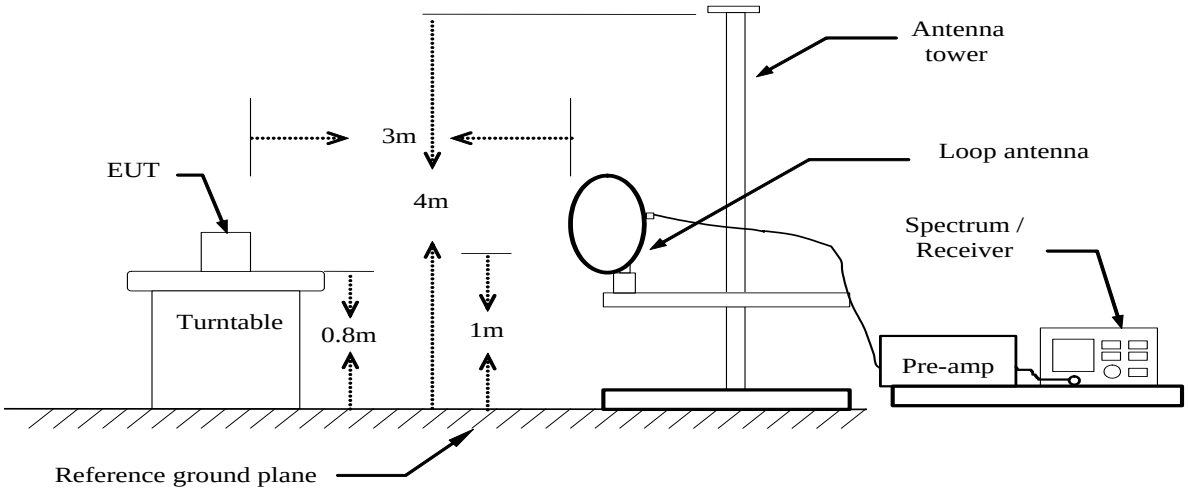
Frequency (MHz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

6.7.2 TEST INSTRUMENTS

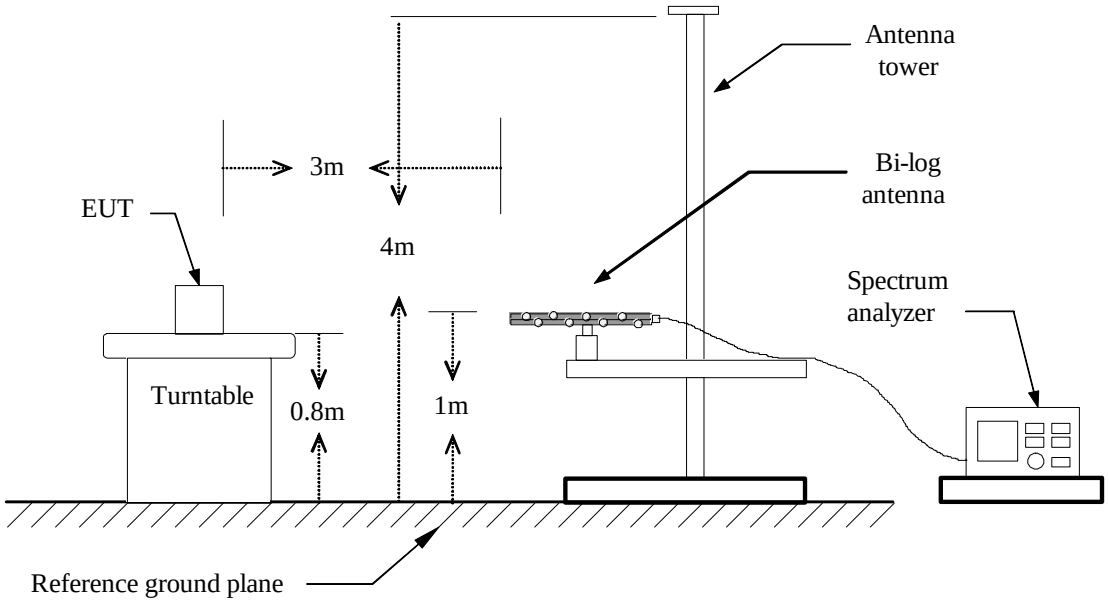
Radiated Emission Test Site 966（2）					
Name of Equipment	**Manufacturer**	**Model Number**	**Serial Number**	**Last Calibration**	**Due Calibration**
PSA Series Spectrum Analyzer	Agilent	N9010A	MY52221469	02/21/2017	02/20/2018
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100783	02/21/2017	02/20/2018
Amplifier	EMEC	EM330	060661	03/18/2017	03/17/2018
High Noise Amplifier	Agilent	8449B	3008A01838	02/21/2017	02/20/2018
Loop Antenna	COM-POWER	AL-130	121044	09/25/2016	09/24/2017
Bilog Antenna	SCHAFFNER	CBL6143	5082	02/21/2017	02/20/2018
Horn Antenna	SCHWARZBECK	BBHA9120	D286	02/27/2017	02/27/2018
Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170-497	02/27/2017	02/27/2018
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	02/21/2017	02/20/2018
Test S/W	FARAD	LZ-RF / CCS-SZ-3A2			

6.7.3 TEST CONFIGURATION

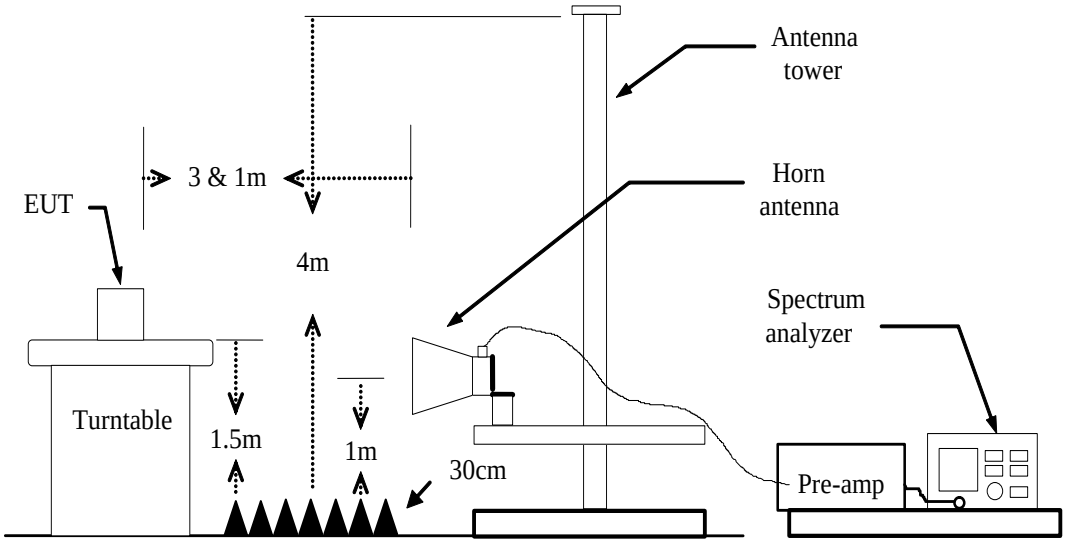
Below 30MHz



Below 1 GHz



Above 1 GHz



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

6.7.4 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 / 1/T for Average
RB / VB (Emission in non-restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/T 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

6.7.5TEST 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 (± 45°) 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 (± 45°) 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.

6.7.6 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

6.7.7 TEST RESULTS

Below 1 GHz

Test Mode: TX / IEEE 802.11a / 5180MHz /(CH Low) **Tested by:** Sam Zeng

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** June 21, 2017

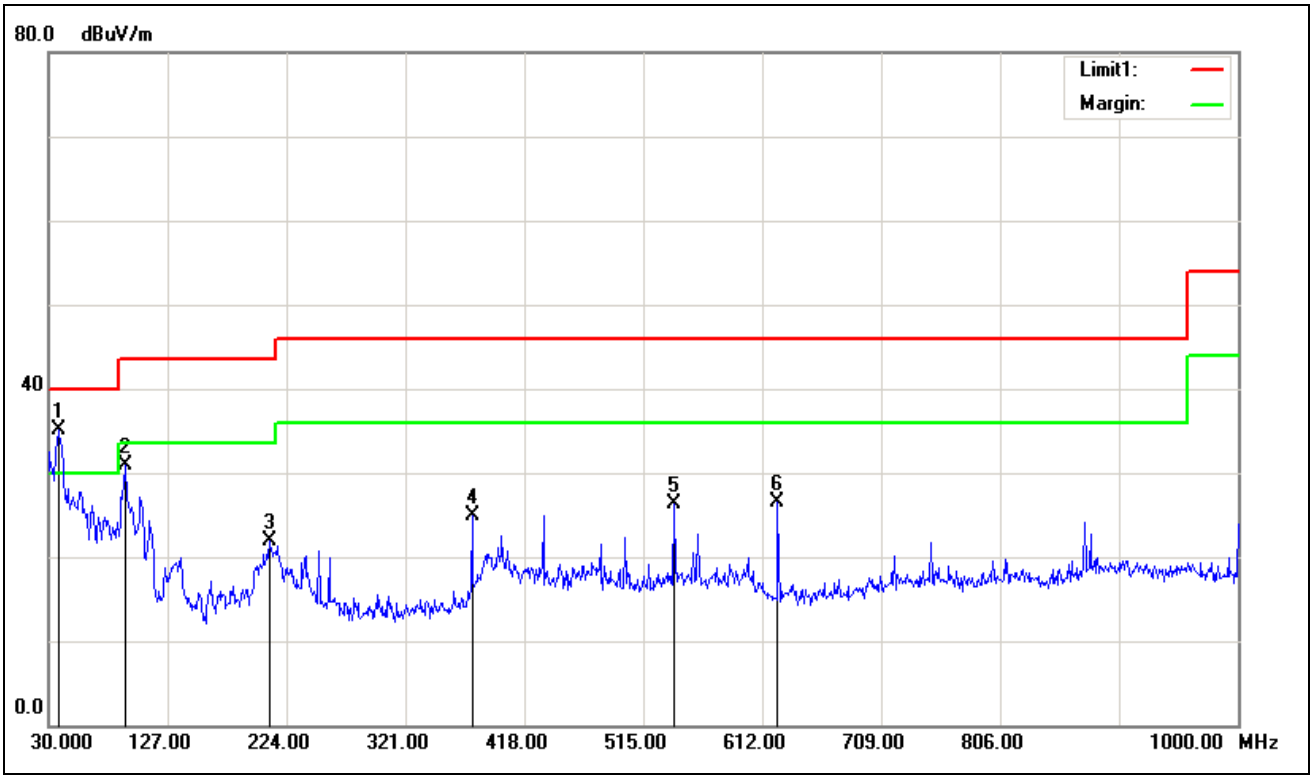
Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
37.7600	50.50	-15.48	35.02	40.00	-4.98	V	QP
93.0500	55.31	-24.42	30.89	43.50	-12.61	V	QP
210.4200	43.38	-21.46	21.92	43.50	-21.58	V	QP
375.3200	41.81	-16.82	24.99	46.00	-21.01	V	QP
540.2200	39.60	-13.28	26.32	46.00	-19.68	V	QP
624.6100	39.18	-12.73	26.45	46.00	-19.55	V	QP
56.1900	46.52	-23.02	23.50	40.00	-16.50	H	QP
113.4200	46.69	-21.59	25.10	43.50	-18.40	H	QP
250.1900	46.75	-21.06	25.69	46.00	-20.31	H	QP
375.3200	43.80	-16.82	26.98	46.00	-19.02	H	QP
500.4500	39.08	-14.35	24.73	46.00	-21.27	H	QP
624.6100	42.31	-12.73	29.58	46.00	-16.42	H	QP

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

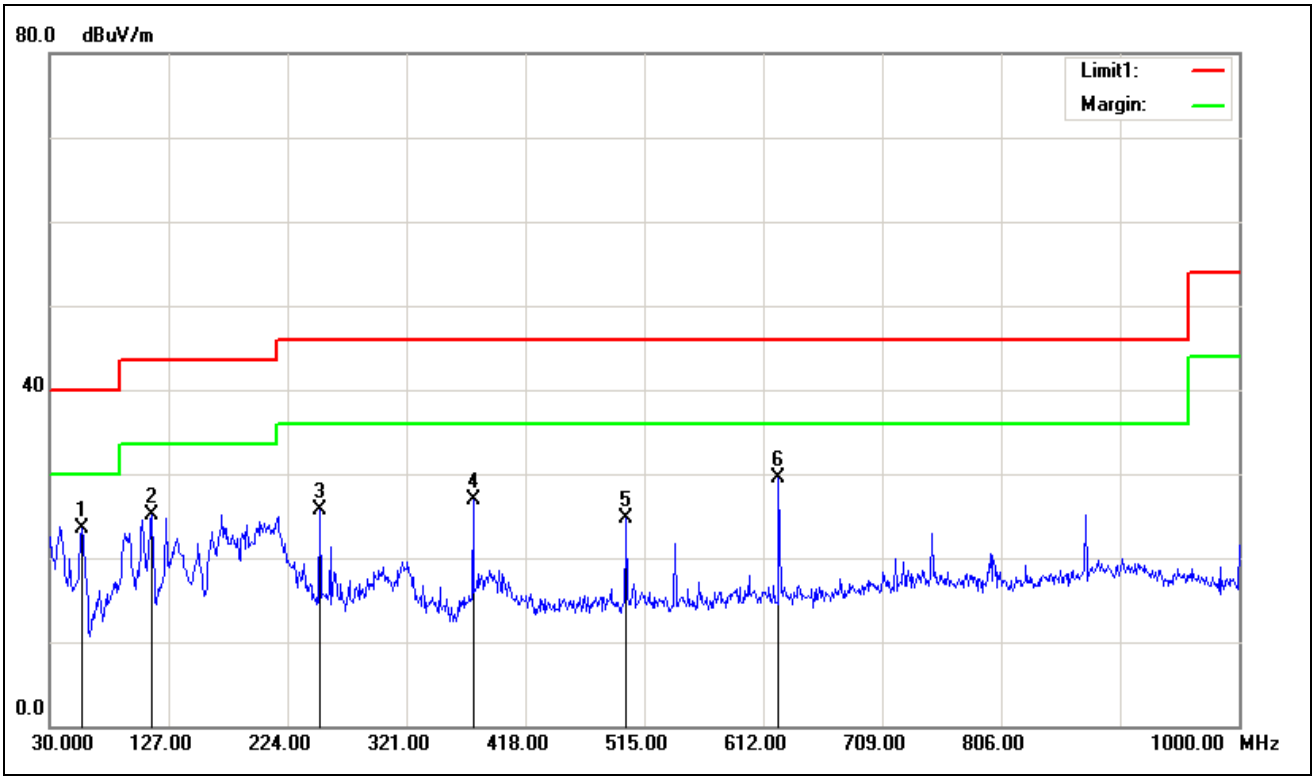
Remark:

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 6GHz

Antenna 0

Test Mode: TX / IEEE 802.11a / 5180MHz /(CH Low) **Tested by:** Sam Zeng

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** August 10, 2017

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
6828.000	31.93	7.42	39.35	68.23	-28.88	V	peak
7272.000	31.96	8.23	40.19	68.23	-28.04	V	peak
7968.000	31.97	9.59	41.56	68.23	-26.67	V	peak
8664.000	31.19	9.28	40.47	68.23	-27.76	V	peak
9816.000	30.43	11.45	41.88	68.23	-26.35	V	peak
10704.000	30.46	14.16	44.62	68.23	-23.61	V	peak
6864.000	31.80	7.48	39.28	68.23	-28.95	H	Peak
7656.000	31.88	8.98	40.86	68.23	-27.37	H	Peak
8964.000	31.39	9.12	40.51	68.23	-27.72	H	Peak
9972.000	30.89	11.90	42.79	68.23	-25.44	H	peak
11460.000	30.96	14.88	45.84	68.23	-22.39	H	peak
13008.000	29.03	17.97	47.00	68.23	-21.23	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:** Sam Zeng

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** August 10, 2017

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
6876.000	31.88	7.50	39.38	68.23	-28.85	V	peak
8052.000	32.08	9.62	41.70	68.23	-26.53	V	peak
9348.000	30.95	10.10	41.05	68.23	-27.18	V	peak
10968.000	29.84	14.98	44.82	68.23	-23.41	V	peak
11832.000	30.58	14.71	45.29	68.23	-22.94	V	peak
14028.000	31.29	20.60	51.89	68.23	-16.34	V	peak
6372.000	32.34	6.68	39.02	68.23	-29.21	H	Peak
7092.000	31.55	7.88	39.43	68.23	-28.80	H	Peak
8052.000	32.05	9.62	41.67	68.23	-26.56	H	Peak
9816.000	30.37	11.45	41.82	68.23	-26.41	H	peak
11244.000	31.12	14.97	46.09	68.23	-22.14	H	peak
12720.000	29.27	17.02	46.29	68.23	-21.94	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:** Sam Zeng

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** August 10, 2017

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
6780.000	32.38	7.34	39.72	68.23	-28.51	V	peak
7704.000	31.81	9.07	40.88	68.23	-27.35	V	peak
8196.000	32.26	9.54	41.80	68.23	-26.43	V	peak
9408.000	31.18	10.28	41.46	68.23	-26.77	V	peak
10248.000	30.92	12.75	43.67	68.23	-24.56	V	peak
11136.000	32.01	15.02	47.03	68.23	-21.20	V	peak
7392.000	31.37	8.46	39.83	68.23	-28.40	H	Peak
8364.000	32.45	9.45	41.90	68.23	-26.33	H	Peak
9408.000	30.93	10.28	41.21	68.23	-27.02	H	Peak
11160.000	31.64	15.01	46.65	68.23	-21.58	H	peak
12420.000	30.05	16.03	46.08	68.23	-22.15	H	peak
13452.000	28.46	19.14	47.60	68.23	-20.63	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:** Sam Zeng

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** August 10, 2017

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
7116.000	31.72	7.93	39.65	68.23	-28.58	V	peak
8112.000	31.89	9.59	41.48	68.23	-26.75	V	peak
9336.000	31.41	10.07	41.48	68.23	-26.75	V	peak
10728.000	30.46	14.24	44.70	68.23	-23.53	V	peak
12564.000	29.86	16.51	46.37	68.23	-21.86	V	peak
13980.000	30.33	20.53	50.86	68.23	-17.37	V	peak
6864.000	32.04	7.48	39.52	68.23	-28.71	H	Peak
8040.000	31.74	9.63	41.37	68.23	-26.86	H	Peak
9828.000	30.80	11.48	42.28	68.23	-25.95	H	Peak
10776.000	30.63	14.39	45.02	68.23	-23.21	H	peak
11484.000	32.45	14.87	47.32	68.23	-20.91	H	peak
12984.000	29.15	17.90	47.05	68.23	-21.18	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:** Sam Zeng

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** August 10, 2017

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
6792.000	31.80	7.36	39.16	68.23	-29.07	V	peak
8184.000	32.02	9.55	41.57	68.23	-26.66	V	peak
9348.000	31.31	10.10	41.41	68.23	-26.82	V	peak
10488.000	30.06	13.49	43.55	68.23	-24.68	V	peak
11184.000	31.28	15.00	46.28	68.23	-21.95	V	peak
12648.000	29.68	16.78	46.46	68.23	-21.77	V	peak
6948.000	31.87	7.62	39.49	68.23	-28.74	H	Peak
7728.000	31.58	9.12	40.70	68.23	-27.53	H	Peak
8940.000	31.51	9.13	40.64	68.23	-27.59	H	Peak
10584.000	30.27	13.79	44.06	68.23	-24.17	H	peak
11508.000	31.03	14.86	45.89	68.23	-22.34	H	peak
12648.000	29.68	16.78	46.46	68.23	-21.77	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:** Sam Zeng

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** August 10, 2017

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
6312.000	32.57	6.59	39.16	68.23	-29.07	V	peak
7656.000	31.73	8.98	40.71	68.23	-27.52	V	peak
8364.000	32.18	9.45	41.63	68.23	-26.60	V	peak
9780.000	30.14	11.35	41.49	68.23	-26.74	V	peak
10788.000	30.59	14.42	45.01	68.23	-23.22	V	peak
11964.000	31.06	14.66	45.72	68.23	-22.51	V	peak
6840.000	32.16	7.44	39.60	68.23	-28.63	H	Peak
8112.000	31.86	9.59	41.45	68.23	-26.78	H	Peak
9036.000	31.45	9.20	40.65	68.23	-27.58	H	Peak
10152.000	31.09	12.45	43.54	68.23	-24.69	H	peak
11244.000	32.06	14.97	47.03	68.23	-21.20	H	peak
12024.000	30.98	14.72	45.70	68.23	-22.53	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:** Sam Zeng

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** August 10, 2017

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
7032.000	32.11	7.76	39.87	68.23	-28.36	V	peak
8016.000	31.68	9.64	41.32	68.23	-26.91	V	peak
9336.000	31.20	10.07	41.27	68.23	-26.96	V	peak
10008.000	30.86	12.00	42.86	68.23	-25.37	V	peak
11004.000	30.05	15.08	45.13	68.23	-23.10	V	peak
12060.000	30.42	14.84	45.26	68.23	-22.97	V	peak
6600.000	32.40	7.05	39.45	68.23	-28.78	H	Peak
7884.000	31.39	9.42	40.81	68.23	-27.42	H	Peak
9120.000	31.12	9.45	40.57	68.23	-27.66	H	Peak
10104.000	30.74	12.30	43.04	68.23	-25.19	H	peak
10992.000	30.05	15.06	45.11	68.23	-23.12	H	peak
12024.000	30.55	14.72	45.27	68.23	-22.96	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:** Sam Zeng

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** August 10, 2017

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
6756.000	32.11	7.30	39.41	68.23	-28.82	V	peak
7980.000	32.06	9.61	41.67	68.23	-26.56	V	peak
9048.000	31.27	9.24	40.51	68.23	-27.72	V	peak
9852.000	30.79	11.55	42.34	68.23	-25.89	V	peak
11160.000	31.58	15.01	46.59	68.23	-21.64	V	peak
11868.000	30.58	14.70	45.28	68.23	-22.95	V	peak
7068.000	31.79	7.83	39.62	68.23	-28.61	H	Peak
7908.000	31.87	9.47	41.34	68.23	-26.89	H	Peak
9024.000	31.68	9.17	40.85	68.23	-27.38	H	Peak
10260.000	30.16	12.79	42.95	68.23	-25.28	H	peak
11160.000	31.25	15.01	46.26	68.23	-21.97	H	peak
12420.000	30.06	16.03	46.09	68.23	-22.14	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).