

802.11ac_80 MHz BW (UNII 1)

■ TEST RESULTS

Conducted Output Power Measurements (802.11ac_80MHz Mode: 5210)

802.11ac(80MHz) Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5210	42	0	7.58	1.15	8.73	22.09
		1	6.75	1.87	8.61	22.09
		2	6.37	2.31	8.68	22.09
		3	6.06	2.72	8.78	22.09
		4	5.59	3.14	8.73	22.09
		5	5.26	3.52	8.77	22.09
		6	5.09	3.67	8.76	22.09
		7	4.99	3.81	8.80	22.09
		8	4.83	3.95	8.78	22.09
		9	4.72	4.14	8.86	22.09

802.11ac_80MHz BW (UNII 2A)

■ TEST RESULTS

Conducted Output Power Measurements (802.11ac_80MHz Mode: 5290)

802.11ac(80MHz) Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5290	58	0	7.65	1.15	8.80	23.98
		1	6.76	1.87	8.62	23.98
		2	6.39	2.31	8.69	23.98
		3	6.01	2.72	8.73	23.98
		4	5.62	3.14	8.76	23.98
		5	5.23	3.52	8.74	23.98
		6	5.13	3.67	8.80	23.98
		7	5.05	3.81	8.85	23.98
		8	4.91	3.95	8.86	23.98
		9	4.78	4.14	8.92	23.98

802.11ac_80MHz BW (UNII 2C)

■ TEST RESULTS

Conducted Output Power Measurements (802.11ac_80MHz Mode: 5530 ~ 5690 MHz)

802.11ac(80MHz) Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5530	106	0	6.69	1.15	7.85	23.98
		1	6.09	1.87	7.96	23.98
		2	5.53	2.31	7.84	23.98
		3	5.14	2.72	7.86	23.98
		4	4.80	3.14	7.94	23.98
		5	4.41	3.52	7.93	23.98
		6	4.26	3.67	7.94	23.98
		7	4.17	3.81	7.98	23.98
		8	4.03	3.95	7.99	23.98
		9	3.86	4.14	8.00	23.98
5610	122	0	13.06	1.15	14.22	23.98
		1	12.30	1.87	14.17	23.98
		2	11.89	2.31	14.20	23.98
		3	11.36	2.72	14.08	23.98
		4	10.90	3.14	14.04	23.98
		5	10.52	3.52	14.04	23.98
		6	10.41	3.67	14.08	23.98
		7	10.28	3.81	14.09	23.98
		8	10.12	3.95	14.07	23.98
		9	9.99	4.14	14.13	23.98
5690	138	0	13.10	1.15	14.25	23.98
		1	12.31	1.87	14.17	23.98
		2	11.92	2.31	14.23	23.98
		3	11.52	2.72	14.24	23.98
		4	11.23	3.14	14.37	23.98
		5	10.69	3.52	14.21	23.98
		6	10.58	3.67	14.26	23.98
		7	10.36	3.81	14.16	23.98
		8	10.23	3.95	14.19	23.98
		9	10.14	4.14	14.28	23.98

802.11ac_80MHz BW (UNII 3)

■ TEST RESULTS

Conducted Output Power Measurements (802.11ac_80MHz Mode: 5775 MHz)

802.11ac(80MHz) Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
5775	155	0	6.76	1.15	7.91	30
		1	5.92	1.87	7.79	30
		2	5.55	2.31	7.86	30
		3	5.22	2.72	7.94	30
		4	4.83	3.14	7.97	30
		5	4.44	3.52	7.95	30
		6	4.35	3.67	8.03	30
		7	4.10	3.81	7.91	30
		8	3.84	3.95	7.79	30
		9	3.75	4.14	7.89	30

TEST Plot for 802.11ac_80MHz BW

<p>802.11ac_80 MHz BW UNII 1 BAND Average Power (5210 MHz) CH 42 MCS9</p>	<p>802.11ac_80 MHz BW UNII 2A BAND Average Power (5290 MHz) CH 58 MCS9</p>
<p>Agilent Spectrum Analyzer - Channel Power</p> <p>Center Freq: 5.210000000 GHz</p> <p>Ref Offset: 11.1 dB, Ref: 10.00 dBm</p> <p>Channel Power: 4.72 dBm / 75.36 MHz</p> <p>Power Spectral Density: -74.05 dBm / Hz</p>	<p>Agilent Spectrum Analyzer - Channel Power</p> <p>Center Freq: 5.290000000 GHz</p> <p>Ref Offset: 11.1 dB, Ref: 10.00 dBm</p> <p>Channel Power: 4.78 dBm / 75.43 MHz</p> <p>Power Spectral Density: -74.00 dBm / Hz</p>
<p>802.11ac_80 MHz BW UNII 2C BAND Average Power (5530 ~ 5690 MHz) CH 138 MCS4</p>	<p>802.11ac_80 MHz BW UNII 3 BAND Average Power (5755 MHz) CH 155 MCS6</p>
<p>Agilent Spectrum Analyzer - Channel Power</p> <p>Center Freq: 5.690000000 GHz</p> <p>Ref Offset: 11.1 dB, Ref: 15.00 dBm</p> <p>Channel Power: 11.23 dBm / 75.52 MHz</p> <p>Power Spectral Density: -67.55 dBm / Hz</p>	<p>Agilent Spectrum Analyzer - Channel Power</p> <p>Center Freq: 5.775000000 GHz</p> <p>Ref Offset: 11.1 dB, Ref: 10.00 dBm</p> <p>Channel Power: 4.35 dBm / 75.52 MHz</p> <p>Power Spectral Density: -74.43 dBm / Hz</p>

▣ Straddle channels TEST RESULTS

Conducted Output Power Measurements (802.11a/n/ac _20M Mode: UNII 2C Band 5720MHz)

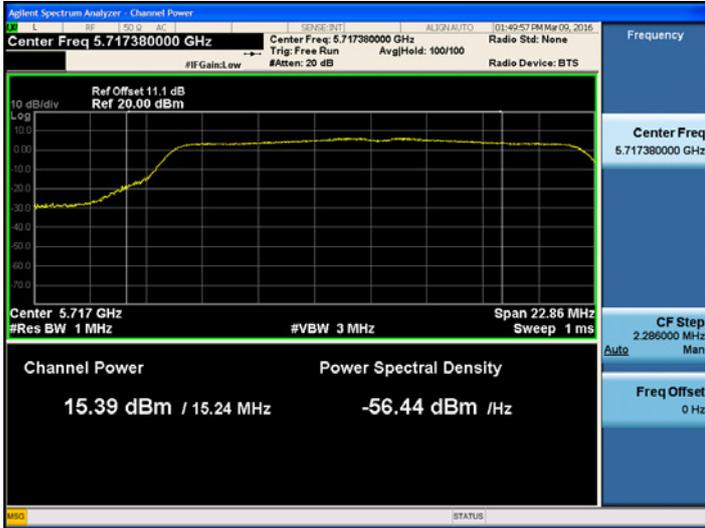
Mode	Frequency [MHz]	Channel No.	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
802.11a	5720	144	15.39	0.31	15.70	22.66
802.11n			14.91	0.31	15.22	22.64
802.11ac			15.05	0.32	15.37	22.64

Conducted Output Power Measurements (802.11a/n/ac _20M Mode: UNII 3 Band 5720MHz)

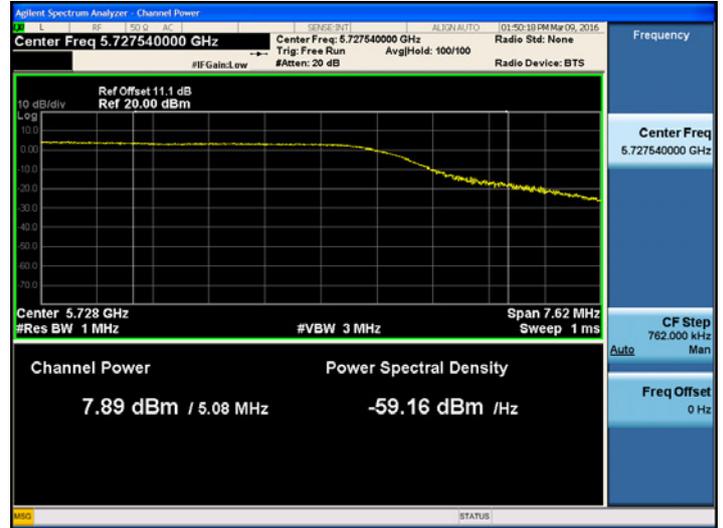
Mode	Frequency [MHz]	Channel No.	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
802.11a	5720	144	7.89	0.31	8.20	24.19
802.11n			8.03	0.31	8.34	24.23
802.11ac			8.25	0.32	8.57	24.25

Straddle channels TEST Plot for 802.11a/n_20MHz BW

802.11a UNII 2C Band Average Power CH.144



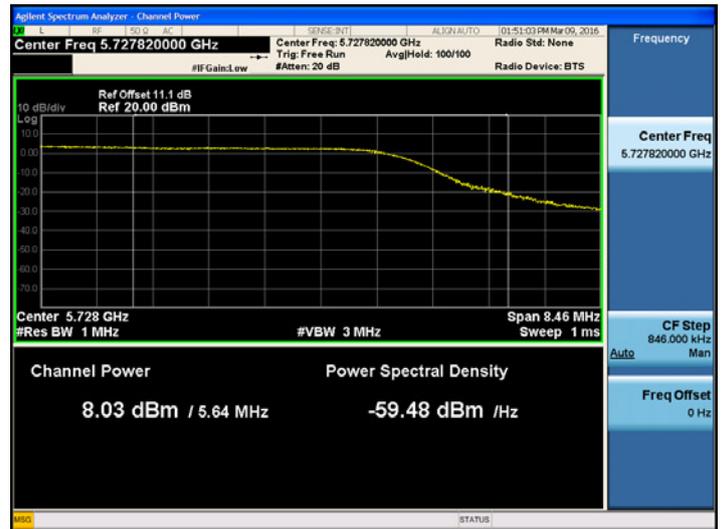
802.11a UNII 3 Band Average Power CH.144



802.11n_20MHz BW UNII 2C Band Average Power CH.144

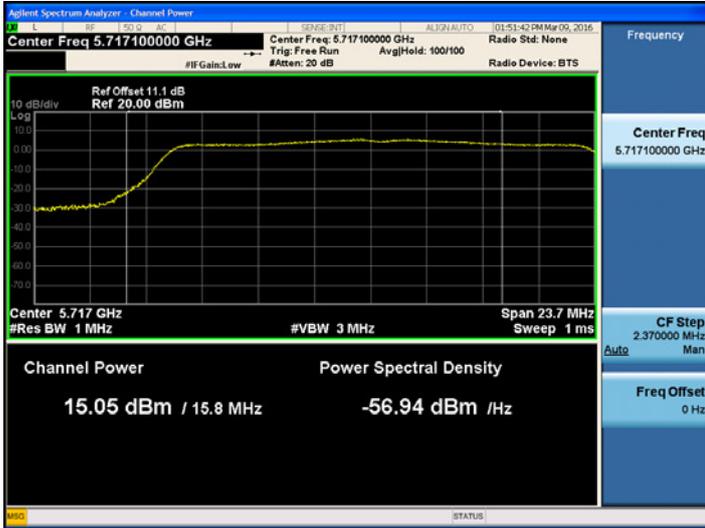


802.11n_20MHz BW UNII 3 Band Average Power CH.144

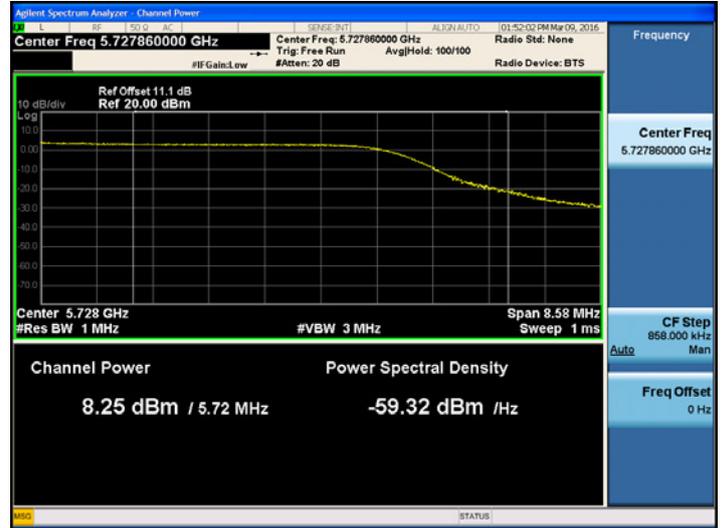


Straddle channels TEST Plot for 802.11ac _20MHz BW

802.11ac UNII 2C Band Average Power CH.144



802.11ac UNII 3 Band Average Power CH.144



▣ Straddle channels TEST RESULTS

Conducted Output Power Measurements (802.11n/ac _40M Mode: UNII 2C Band 5710MHz)

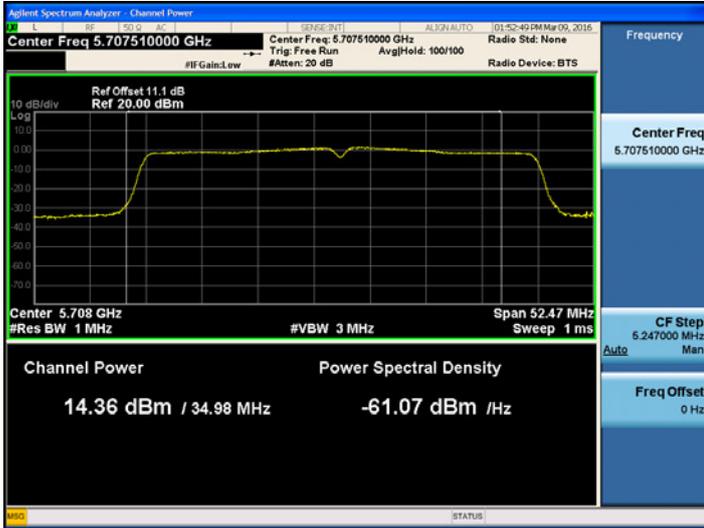
Mode	Frequency [MHz]	Channel No.	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
802.11n	5710	142	14.36	0.61	14.97	23.42
802.11ac			14.30	0.62	14.92	23.42

Conducted Output Power Measurements (802.11n/ac_40M Mode: UNII 3 Band 5710MHz)

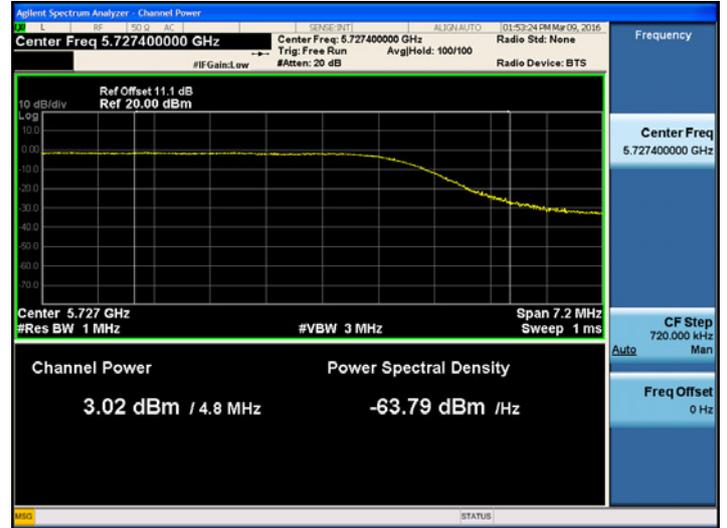
Mode	Frequency [MHz]	Channel No.	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
802.11n	5710	142	3.02	0.61	3.63	20.82
802.11ac			2.94	0.62	3.56	20.82

☐ Straddle channels TEST Plot for 802.11n/ac _40MHz BW

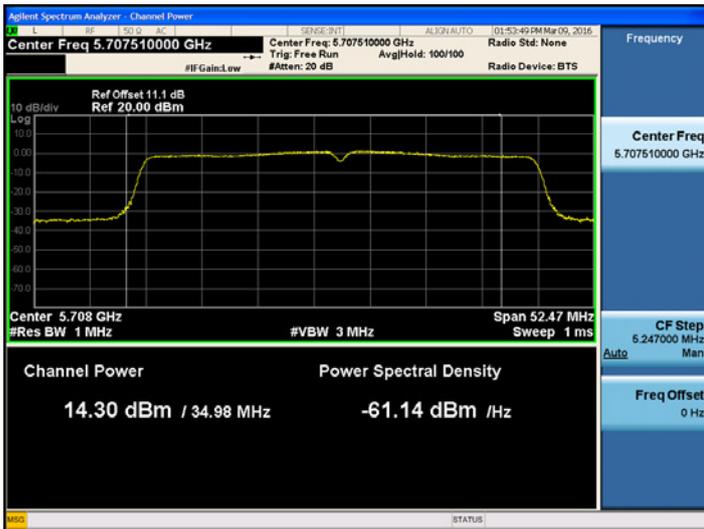
802.11n_40MHz BW UNII 2C Band Average Power CH.142



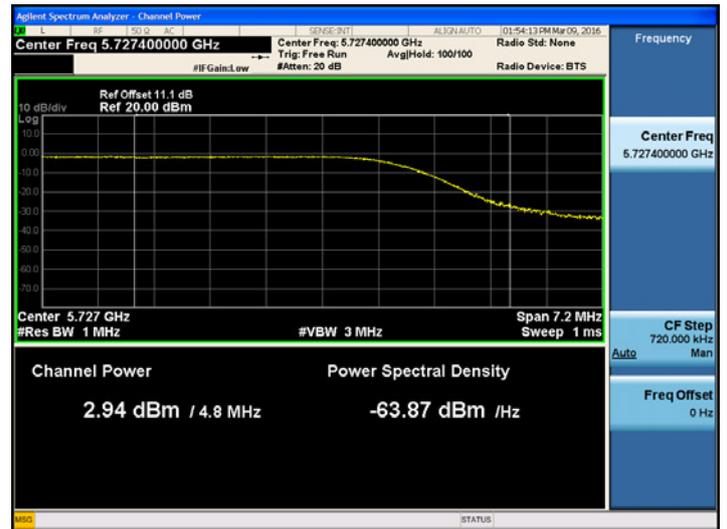
802.11n_40MHz BW UNII 3 Band Average Power CH.142



802.11ac_40MHz BW UNII 2C Band Average Power CH.142



802.11ac_40MHz BW UNII 3 Band Average Power CH.142



Straddle channels TEST RESULTS

Conducted Output Power Measurements (802.11ac _80M Mode: UNII 2C Band 5690MHz)

Mode	Frequency [MHz]	Channel No.	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
802.11ac	5690	138	13.08	1.15	14.23	23.67

Conducted Output Power Measurements (802.11ac _80M Mode: UNII 3 Band 5690MHz)

Mode	Frequency [MHz]	Channel No.	Measured Power (dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
802.11ac	5690	138	-2.17	1.15	-1.02	18.31

Straddle channels TEST Plot for 802.11ac _80MHz BW

802.11ac_80MHz BW UNII 2C Band Average Power CH.138



802.11ac_80MHz BW UNII 3 Band Average Power CH.138



9.4 POWER SPECTRAL DENSITY

The peak power density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies. The maximum permissible peak power spectral density is 11 dBm/ MHz for UNII 1,2A, 2C and 30 dBm/500 kHz for UNII 3.

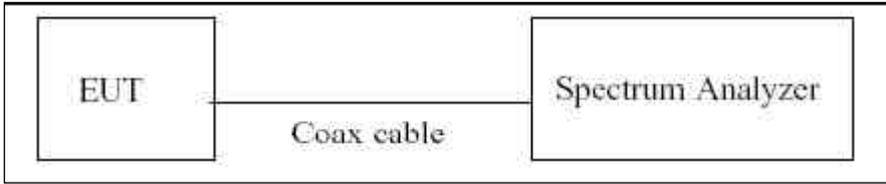
■ Limit

Power Spectral Density

Band	Mode	Limit
UNII 1	802.11 a,n,ac	11 dBm/MHz
UNII 2A	802.11a,n,ac	11 dBm/MHz
UNII 2C	802.11a,n,ac	11 dBm/MHz
UNII 3	802.11a,n,ac	30 dBm/500 kHz

Note : Note : According to KDB644545 D03 v01, emission for straddle channels in each band shall comply with the PSD limits applicable to that band under the appropriate rule section.

■ **TEST CONFIGURATION**



■ **TEST PROCEDURE**

We tested according to Method in KDB 789033(issued 01/08/2016).

The spectrum analyzer is set to :

1. Set span to encompass the entire emission bandwidth(EBW) of the signal.
2. RBW = 1 MHz(510 kHz for UNII 3)
3. VBW ≥ 3 MHz
4. Number of points in sweep ≥ 2*span/RBW.
5. Sweep time = auto.
6. Detector = RMS(i.e., power averaging), if available. Otherwise, use sample detector mode.
7. Do not use sweep triggering. Allow the sweep to “free run”.
8. Trace average at least 100 traces in power averaging(RMS) mode
9. Use the peak search function on the spectrum analyzer to find the peak of the spectrum.
10. If Method SA-2 was used, add $10 \log(1/x)$, where x is the duty cycle, to the peak of the spectrum.

■ **Sample Calculation**

PSD = Reading Value + ATT loss + Cable loss(1 ea) + Duty Cycle Factor

Output Power = 5 dBm + 10 dB + 0.8 dB + 0.21 dB = 16.01 dBm

Note :

1. Spectrum reading values are not plot data. The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset = Attenuator loss + Cable loss
3. We apply to the offset in the 5.2 GHz, 5.3 GHz and 5.6 GHz range that was rounded off to the closest tenth dB. Actual value of loss for the attenuator and cable combination is below table.

Band	Loss(dB)
UNII 1, 2A, 2C, 3	11.1

(Actual value of loss for the attenuator and cable combination)

■ 802.11a_20MHz BW

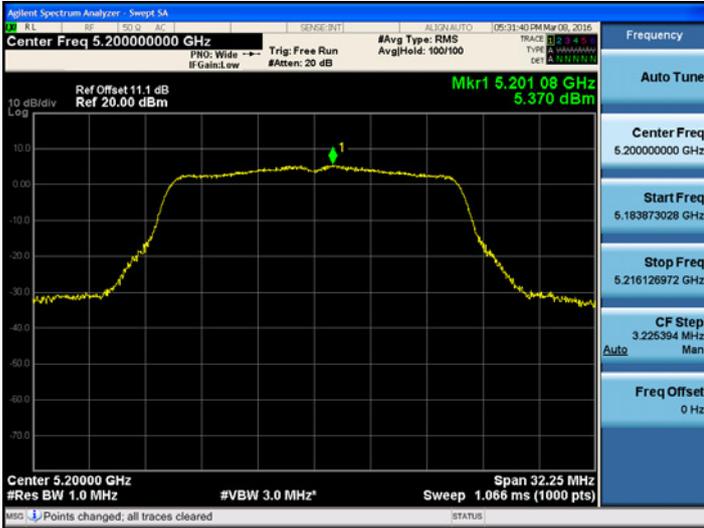
■ TEST RESULTS

Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5180	36	802.11a	3.653	0.843	4.496	11	Pass
5200	40		5.370	0.843	6.213		Pass
5240	48		5.786	0.309	6.095		Pass
5260	52		4.989	1.950	6.939	11	Pass
5300	60		5.499	0.843	6.342		Pass
5320	64		4.252	0.587	4.839		Pass
5500	100		3.426	0.843	4.269	11	Pass
5580	116		5.482	0.587	6.069		Pass
5720	144		5.879	0.309	6.188		Pass
5745	149		3.023	0.843	3.866	30	Pass
5785	157		2.611	0.843	3.454		Pass
5825	165		0.802	0.843	1.645		Pass

TEST Plot for 802.11a 20MHz BW

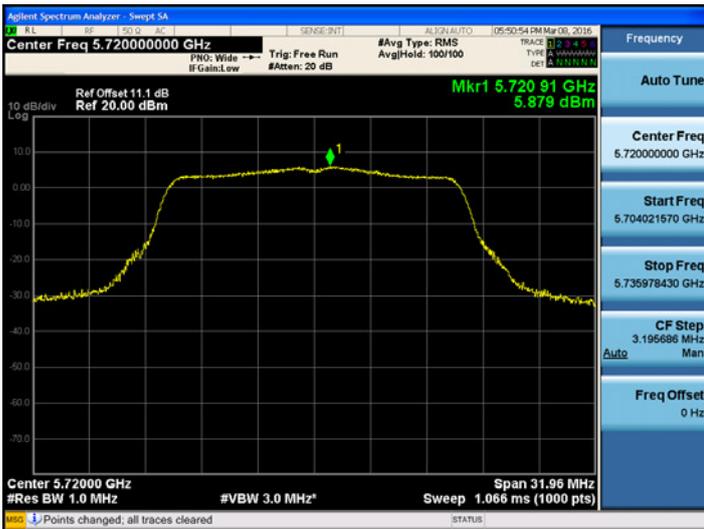
802.11a_20MHz BW UNII 1 BAND PSD CH 40



802.11a_20MHz BW UNII 2A BAND PSD CH 52



802.11a_20MHz BW UNII 2C BAND PSD CH 144



802.11a_20MHz BW UNII 3 BAND PSD CH 149



■802.11n_20MHz BW

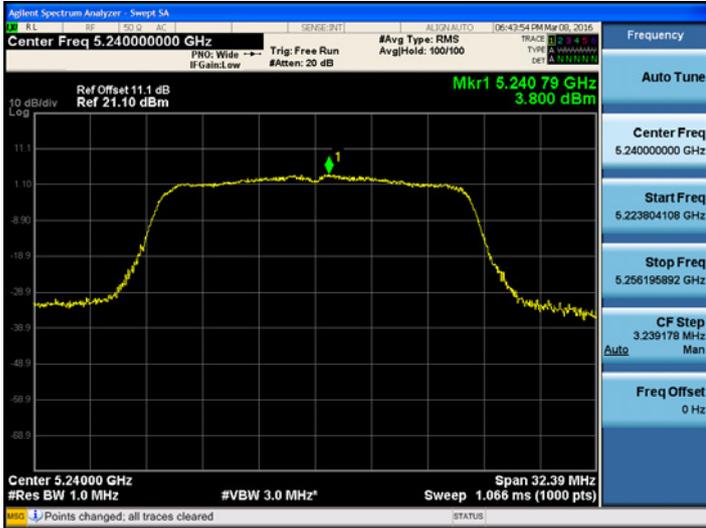
■ TEST RESULTS

Conducted Power Density Measurements

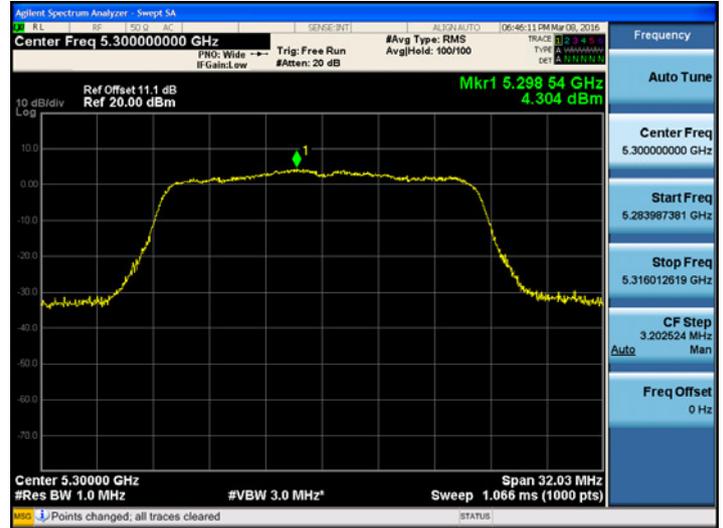
Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5180	36	802.11n 20M BW	2.980	0.619	3.599	11	Pass
5200	40		4.650	0.876	5.526		Pass
5240	48		3.800	2.054	5.854		Pass
5260	52		3.950	2.054	6.004	11	Pass
5300	60		4.304	1.915	6.219		Pass
5320	64		3.099	0.876	3.975		Pass
5500	100		2.991	0.876	3.867	11	Pass
5580	116		4.284	1.444	5.728		Pass
5720	144		3.759	2.054	5.813		Pass
5745	149		0.939	1.915	2.854	30	Pass
5785	157		1.006	1.915	2.921		Pass
5825	165		-1.196	1.783	0.587		Pass

☐ TEST Plot for 802.11n 20MHz BW

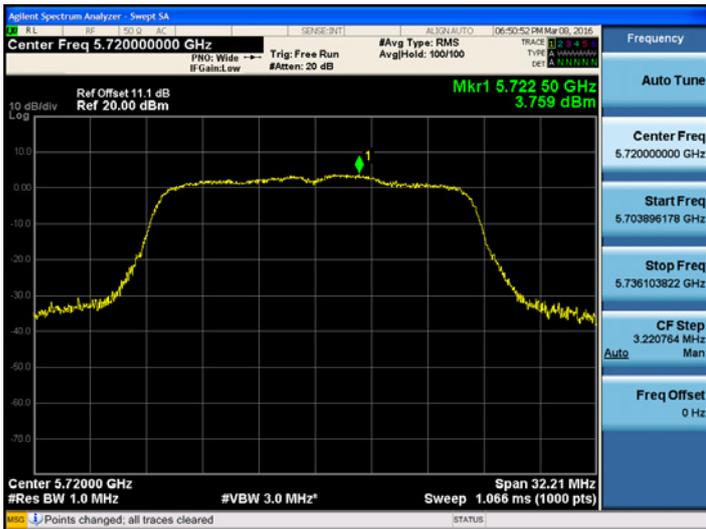
802.11n_20MHz BW UNII 1 BAND PSD CH 48



802.11n_20MHz BW UNII 2A BAND PSD CH 60



802.11n_20MHz BW UNII 2C BAND PSD CH 144



802.11n_20MHz BW UNII 3 BAND PSD CH 157



■802.11ac_20MHz BW

■ TEST RESULTS

Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5180	36	802.11ac 20M BW	1.412	2.241	3.653	11	Pass
5200	40		3.920	2.241	6.161		Pass
5240	48		4.012	1.867	5.879		Pass
5260	52		4.009	2.241	6.250	11	Pass
5300	60		4.476	1.970	6.446		Pass
5320	64		2.068	2.241	4.309		Pass
5500	100		1.496	2.241	3.737	11	Pass
5580	116		4.501	1.433	5.934		Pass
5720	144		4.277	1.970	6.247		Pass
5745	149		1.767	1.867	3.634	30	Pass
5785	157		1.279	1.761	3.040		Pass
5825	165		-1.055	2.241	1.186		Pass

TEST Plot for 802.11ac 20MHz BW

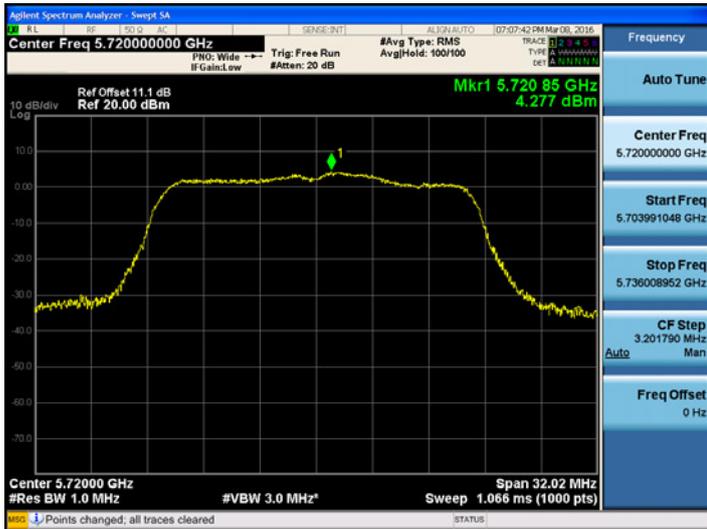
802.11ac_20MHz BW UNII 1 BAND PSD CH 40



802.11ac_20MHz BW UNII 2A BAND PSD CH 60



802.11ac_20MHz BW UNII 2C BAND PSD CH 144



802.11ac_20MHz BW UNII 3 BAND PSD CH 149



■ 802.11n_40MHz BW

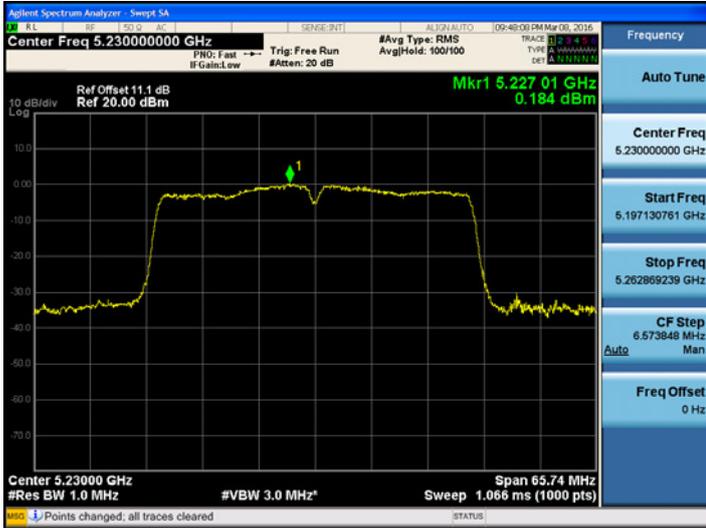
■ TEST RESULTS

Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5190	38	802.11n 40MHz BW	-6.426	1.805	-4.621	11	Pass
5230	46		0.184	1.805	1.989		Pass
5270	54		-0.410	3.032	2.622	11	Pass
5310	62		-7.039	2.867	-4.172		Pass
5510	102		-6.295	0.614	-5.681	11	Pass
5550	110		1.144	0.614	1.758		Pass
5710	142		-0.802	2.308	1.506		Pass
5755	151		-1.658	0.614	-1.044	30	Pass
5795	159		-9.995	2.867	-7.128		Pass

TEST Plot for 802.11n 40MHz BW

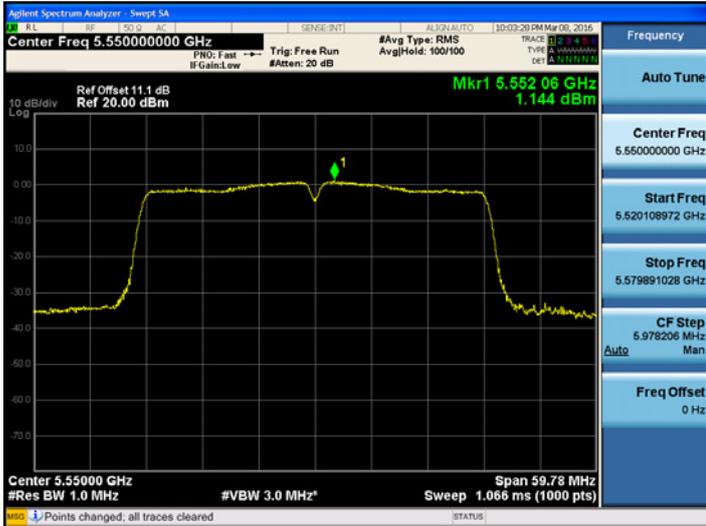
802.11n_40MHz BW UNII 1 BAND PSD CH 46



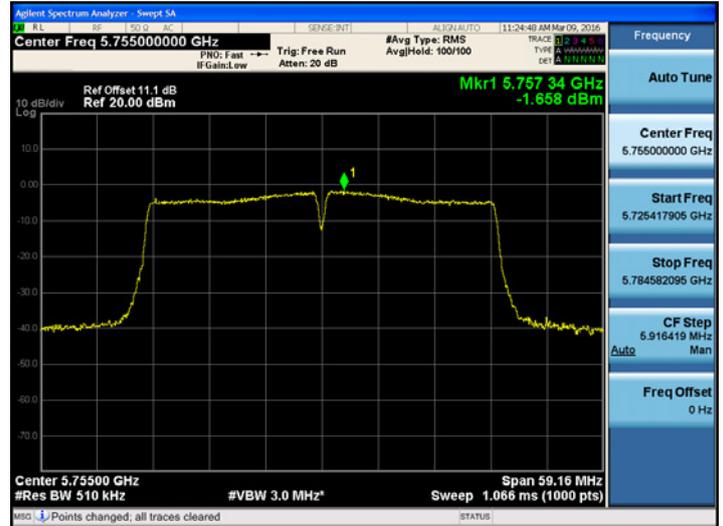
802.11n_40MHz BW UNII 2A BAND PSD CH 54



802.11n_40MHz BW UNII 2C BAND PSD CH 110



802.11n_40MHz BW UNII 3 BAND PSD CH 151



■ 802.11ac_40MHz BW

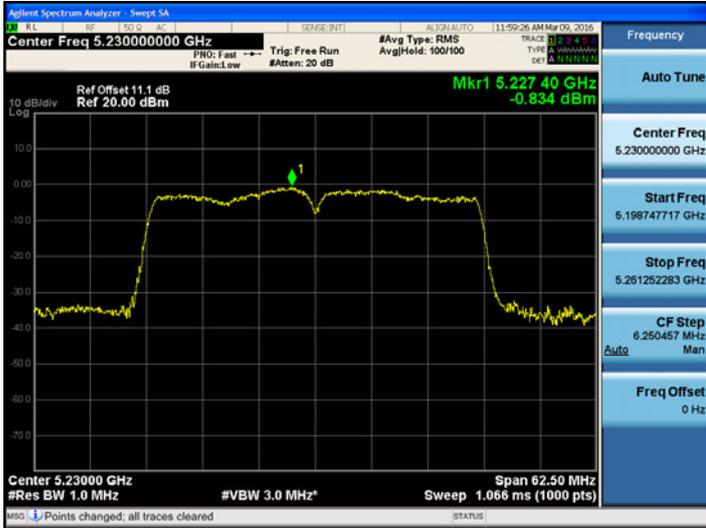
■ TEST RESULTS

Conducted Power Density Measurements

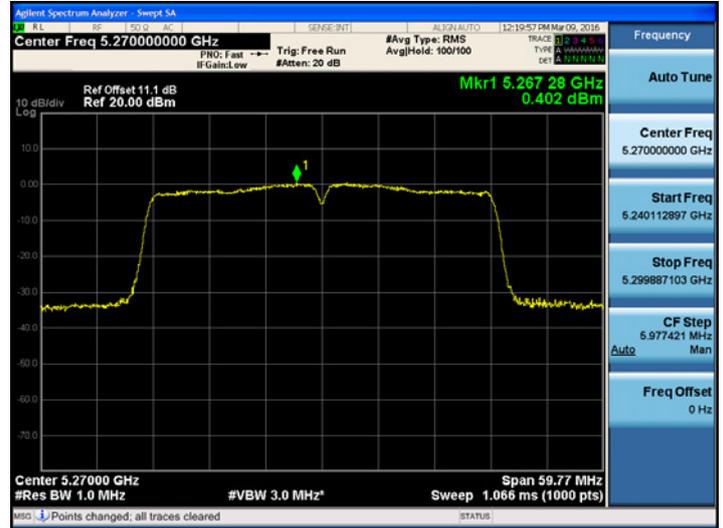
Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5190	38	802.11ac 40MHz BW	-6.259	1.761	-4.498	11	Pass
5230	46		-0.834	3.032	2.198		Pass
5270	54		0.402	1.476	1.878	11	Pass
5310	62		-6.431	2.242	-4.189		Pass
5510	102		-7.061	1.761	-5.300	11	Pass
5550	110		0.858	1.094	1.952		Pass
5710	142		0.604	1.476	2.080		Pass
5755	151		-1.650	0.617	-1.033	30	Pass
5795	159		-10.402	3.032	-7.370		Pass

TEST Plot for 802.11ac 40MHz BW

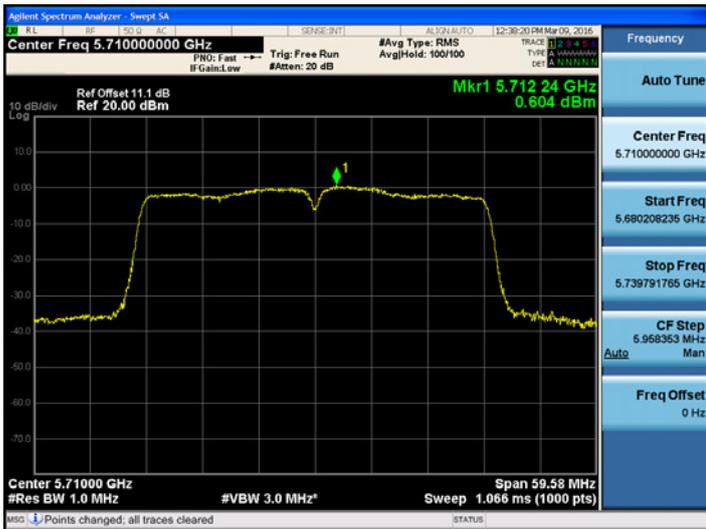
802.11ac_40MHz BW UNII 1 BAND PSD CH 46



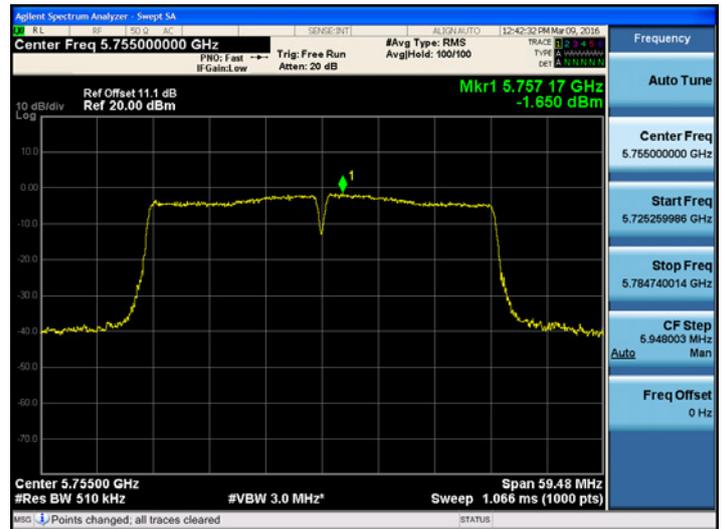
802.11ac_40MHz BW UNII 2A BAND PSD CH 54



802.11ac_40MHz BW UNII 2C BAND PSD CH 142



802.11ac_40MHz BW UNII 3 BAND PSD CH 151



■ 802.11ac_80MHz BW

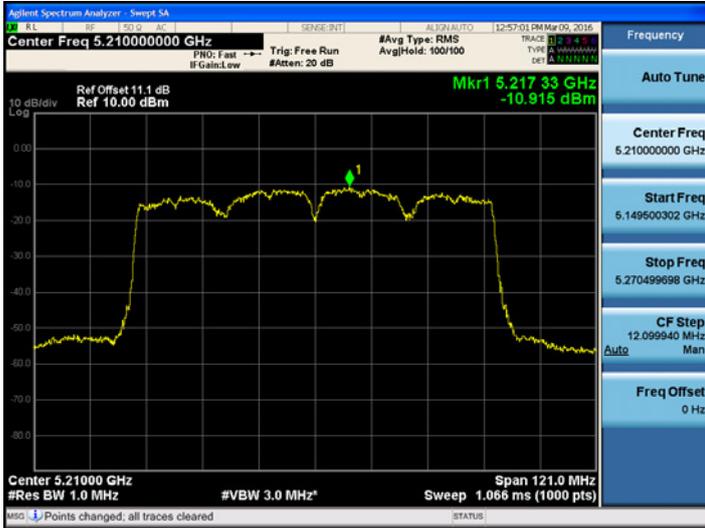
■ TEST RESULTS

Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5210	42	802.11ac 80MHz BW	-10.915	4.139	-6.776	11	Pass
5290	58		-11.078	4.139	-6.939		Pass
5530	106		-12.075	4.139	-7.936		Pass
5610	122		-3.020	1.153	-1.867		Pass
5690	138		-4.593	3.144	-1.449		Pass
5775	155		-14.000	3.672	-10.328	30	Pass

TEST Plot for 802.11ac_80MHz BW

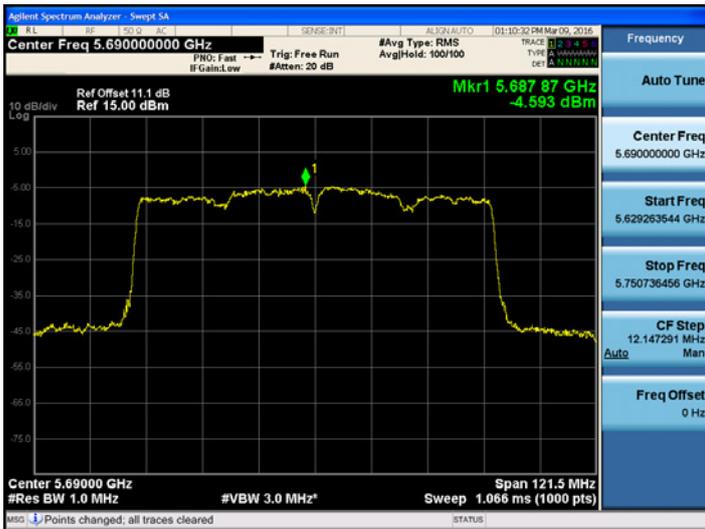
802.11ac_80MHz BW UNII 1 BAND PSD CH 42



802.11ac_80MHz BW UNII 2A BAND PSD CH 58



802.11ac_80MHz BW UNII 2C BAND PSD CH 138



802.11ac_80MHz BW UNII 3 BAND PSD CH 155



▣ **Straddle channels TEST RESULTS for 802.11a/n/ac_20MHz BW**

Conducted Power Density Measurements (UNII 2C Band 5720MHz)

Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5720	144	802.11a	6.037	0.309	6.346	11	Pass
		802.11n	3.755	2.054	5.809	11	Pass
		802.11ac	4.032	1.970	6.002	11	Pass

Conducted Power Density Measurements (UNII 3 Band 5720MHz)

Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5720	144	802.11a	0.658	0.309	0.967	30	Pass
		802.11n	-0.656	2.054	1.398	30	Pass
		802.11ac	-0.652	1.970	1.318	30	Pass

☐ Straddle channels TEST Plot for 802.11a/n/ac_20MHz BW

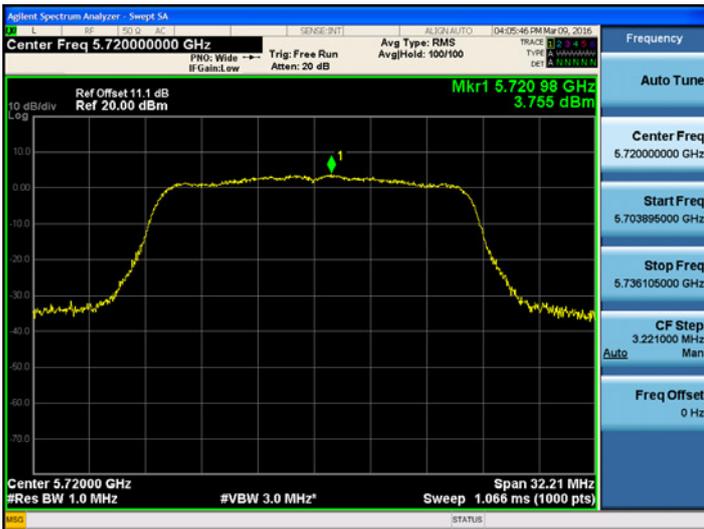
802.11a UNII 2C Band PSD CH.144



802.11a UNII 3 Band PSD CH.144



802.11n_20MHz BW UNII 2C Band PSD CH.144



802.11n_20MHz BW UNII 3 Band PSD CH.144



802.11ac_20MHz BW UNII 2C Band PSD CH.144



802.11ac_20MHz BW UNII 3 Band PSD CH.144



▣ **Straddle channels TEST RESULTS for 802.11n/ac_40MHz BW**

Conducted Power Density Measurements (UNII 2C Band 5710MHz)

Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5710	142	802.11n	-0.430	2.308	1.878	11	Pass
		802.11ac	0.406	1.476	1.882	11	Pass

Conducted Power Density Measurements (UNII 3 Band 5710MHz)

Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5710	142	802.11n	-4.473	2.308	-2.165	30	Pass
		802.11ac	-4.998	1.476	-3.522	30	Pass

Straddle channels TEST Plot for 802.11n/ac_40MHz BW

802.11n_40MHz BW UNII 2C Band PSD CH.142



802.11n_40MHz BW UNII 3 Band PSD CH.142



802.11ac_40MHz BW UNII 2C Band PSD CH.142



802.11ac_40MHz BW UNII 3 Band PSD CH.142



Straddle channels TEST RESULTS

Conducted Power Density Measurements (UNII 2C Band 5690MHz)

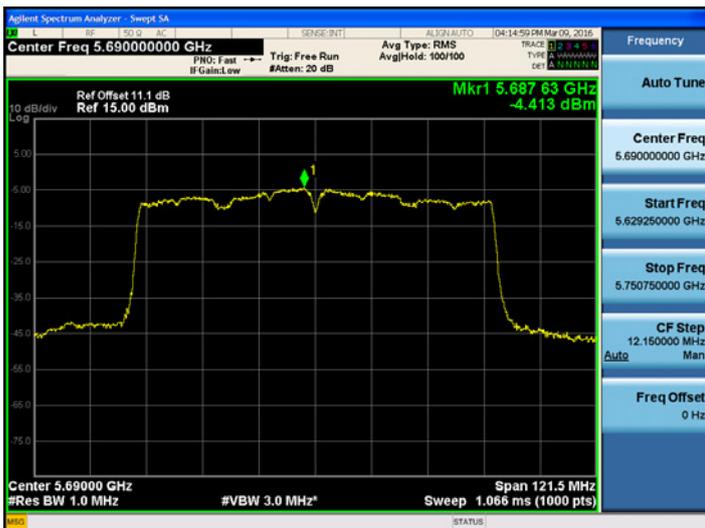
Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5690	138	802.11ac	-4.413	3.144	-1.269	11	Pass

Conducted Power Density Measurements (UNII 3 Band 5690MHz)

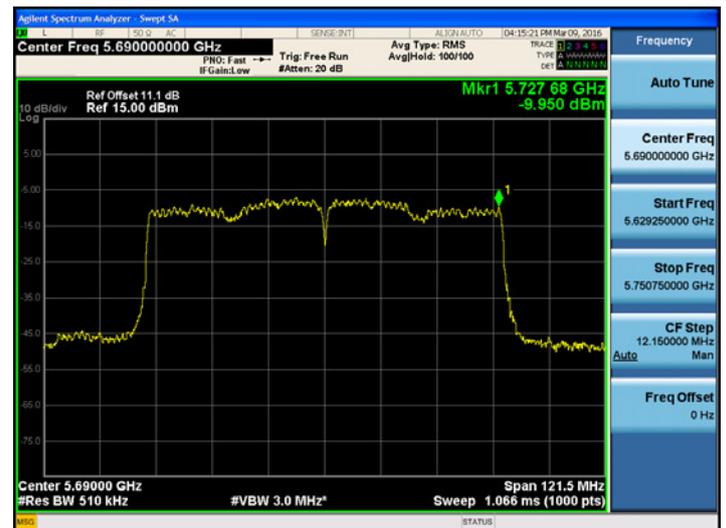
Frequency (MHz)	Channel No.	Mode	Test Result				
			Measured Power Density (dBm)	Duty Cycle Factor (dB)	Measured Power Density(dBm) + Duty Cycle Factor	Limit (dBm)	Pass/Fail
5690	138	802.11ac	-9.950	3.144	-6.806	30	Pass

Straddle channels TEST Plot for 802.11ac _80MHz BW

802.11ac_80MHz BW UNII 2C Band PSD CH.138



802.11ac_80MHz BW UNII 3 Band PSD CH.138



9.5 FREQUENCY STABILITY.

The EUT was placed inside an environmental chamber as the temperature in the chamber was varied between -30 °C and 50 °C. The temperature was incremented by 10 °C intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded.

20 MHz BW

OPERATING BAND:	<u>UNII Band 1</u>
OPERATING FREQUENCY:	<u>5,180,000,000 Hz</u>
CHANNEL:	<u>36</u>
REFERENCE VOLTAGE:	<u>3.85 VDC</u>

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.8	+20(Ref)	5179980.31	-19.69
100%		-30	5179967.84	-32.16
100%		-20	5179972.46	-27.54
100%		-10	5179974.39	-25.61
100%		0	5179976.92	-23.08
100%		+10	5179978.01	-21.99
100%		+30	5179984.36	-15.64
100%		+40	5179988.74	-11.26
100%		+50	5179991.75	-8.25
115%	4.2	+20	5179977.97	-22.03
Batt. Endpoint	3.7	+20	5179980.31	-19.69

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2A
 OPERATING FREQUENCY: 5,260,000,000 Hz
 CHANNEL: 52
 REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.8	+20(Ref)	5259979.26	-20.74
100%		-30	5259958.77	-41.23
100%		-20	5259962.49	-37.51
100%		-10	5259966.74	-33.26
100%		0	5259971.95	-28.05
100%		+10	5259975.39	-24.61
100%		+30	5259983.49	-16.51
100%		+40	5259986.52	-13.48
100%		+50	5259990.42	-9.58
115%	4.2	+20	5259981.15	-18.85
Batt. Endpoint	3.7	+20	5259979.26	-20.74

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2C
 OPERATING FREQUENCY: 5,500,000,000 Hz
 CHANNEL: 100
 REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.8	+20(Ref)	5499978.18	-21.82
100%		-30	5499956.79	-43.21
100%		-20	5499960.54	-39.46
100%		-10	5499966.45	-33.55
100%		0	5499970.52	-29.48
100%		+10	5499974.36	-25.64
100%		+30	5499982.26	-17.74
100%		+40	5499986.05	-13.95
100%		+50	5499991.47	-8.53
115%		4.2	+20	5499984.36
Batt. Endpoint	3.7	+20	5499978.18	-21.82

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 3
 OPERATING FREQUENCY: 5,745,000,000 Hz
 CHANNEL: 149
 REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.8	+20(Ref)	5744977.06	-22.94
100%		-30	5744954.49	-45.51
100%		-20	5744957.19	-42.81
100%		-10	5744962.51	-37.49
100%		0	5744966.74	-33.26
100%		+10	5744971.38	-28.62
100%		+30	5744982.51	-17.49
100%		+40	5744986.44	-13.56
100%		+50	5744991.55	-8.45
115%		4.2	+20	5744980.06
Batt. Endpoint	3.7	+20	5744977.06	-22.94

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

40 MHz BW

OPERATING BAND: UNII Band 1
 OPERATING FREQUENCY: 5,190,000,000 Hz
 CHANNEL: 38
 REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.8	+20(Ref)	5189979.38	-20.62
100%		-30	5189951.16	-48.84
100%		-20	5189957.39	-42.61
100%		-10	5189961.55	-38.45
100%		0	5189965.05	-34.95
100%		+10	5189973.85	-26.15
100%		+30	5189982.54	-17.46
100%		+40	5189987.36	-12.64
100%		+50	5189992.53	-7.47
115%	4.2	+20	5189981.55	-18.45
Batt. Endpoint	3.7	+20	5189979.38	-20.62

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2A
 OPERATING FREQUENCY: 5,270,000,000 Hz
 CHANNEL: 54
 REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.8	+20(Ref)	5269978.87	-21.13
100%		-30	5269956.65	-43.35
100%		-20	5269961.15	-38.85
100%		-10	5269965.84	-34.16
100%		0	5269969.82	-30.18
100%		+10	5269973.85	-26.15
100%		+30	5269983.45	-16.55
100%		+40	5269988.66	-11.34
100%		+50	5269993.41	-6.59
115%	4.2	+20	5269979.54	-20.46
Batt. Endpoint	3.7	+20	5269978.87	-21.13

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2C
 OPERATING FREQUENCY: 5,510,000,000 Hz
 CHANNEL: 102
 REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.8	+20(Ref)	5509977.88	-22.12
100%		-30	5509955.33	-44.67
100%		-20	5509959.98	-40.02
100%		-10	5509963.41	-36.59
100%		0	5509967.26	-32.74
100%		+10	5509971.84	-28.16
100%		+30	5509981.14	-18.86
100%		+40	5509984.78	-15.22
100%		+50	5509989.38	-10.62
115%	4.2	+20	5509976.39	-23.61
Batt. Endpoint	3.7	+20	5509977.88	-22.12

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 3
 OPERATING FREQUENCY: 5,755,000,000 Hz
 CHANNEL: 151
 REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.8	+20(Ref)	5754976.82	-23.18
100%		-30	5754951.21	-48.79
100%		-20	5754956.79	-43.21
100%		-10	5754961.38	-38.62
100%		0	5754968.33	-31.67
100%		+10	5754972.45	-27.55
100%		+30	5754981.54	-18.46
100%		+40	5754984.74	-15.26
100%		+50	5754988.53	-11.47
115%		4.2	+20	5754984.23
Batt. Endpoint	3.7	+20	5754976.82	-23.18

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

80 MHz BW

OPERATING BAND: UNII Band 1
 OPERATING FREQUENCY: 5,210,000,000 Hz
 CHANNEL: 42
 REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.8	+20(Ref)	5209979.77	-20.23
100%		-30	5209955.49	-44.51
100%		-20	5209959.91	-40.09
100%		-10	5209962.58	-37.42
100%		0	5209965.84	-34.16
100%		+10	5209972.44	-27.56
100%		+30	5209984.35	-15.65
100%		+40	5209987.06	-12.94
100%		+50	5209992.24	-7.76
115%	4.2	+20	5209981.46	-18.54
Batt. Endpoint	3.7	+20	5209979.77	-20.23

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2A
 OPERATING FREQUENCY: 5,290,000,000 Hz
 CHANNEL: 58
 REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.8	+20(Ref)	5289979.18	-20.82
100%		-30	5289956.65	-43.35
100%		-20	5289960.52	-39.48
100%		-10	5289965.25	-34.75
100%		0	5289969.91	-30.09
100%		+10	5289974.36	-25.64
100%		+30	5289985.33	-14.67
100%		+40	5289989.31	-10.69
100%		+50	5289994.33	-5.67
115%	4.2	+20	5289981.56	-18.44
Batt. Endpoint	3.7	+20	5289979.18	-20.82

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2C
 OPERATING FREQUENCY: 5,530,000,000 Hz
 CHANNEL: 106
 REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.8	+20(Ref)	5529978.38	-21.62
100%		-30	5529953.84	-46.16
100%		-20	5529959.73	-40.27
100%		-10	5529964.54	-35.46
100%		0	5529968.15	-31.85
100%		+10	5529973.51	-26.49
100%		+30	5529984.33	-15.67
100%		+40	5529988.37	-11.63
100%		+50	5529991.77	-8.23
115%		4.2	+20	5529981.46
Batt. Endpoint	3.7	+20	5529978.38	-21.62

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 3
 OPERATING FREQUENCY: 5,775,000,000 Hz
 CHANNEL: 155
 REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.8	+20(Ref)	5774977.28	-22.72
100%		-30	5774951.49	-48.51
100%		-20	5774956.39	-43.61
100%		-10	5774962.52	-37.48
100%		0	5774968.05	-31.95
100%		+10	5774974.11	-25.89
100%		+30	5774982.54	-17.46
100%		+40	5774986.35	-13.65
100%		+50	5774992.06	-7.94
115%	4.2	+20	5774980.79	-19.21
Batt. Endpoint	3.7	+20	5774977.28	-22.72

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

9.6 RADIATED MEASUREMENT

9.6.1 RADIATED SPURIOUS EMISSIONS.

Test Requirements and limit, §15.205, §15.209, §15.407

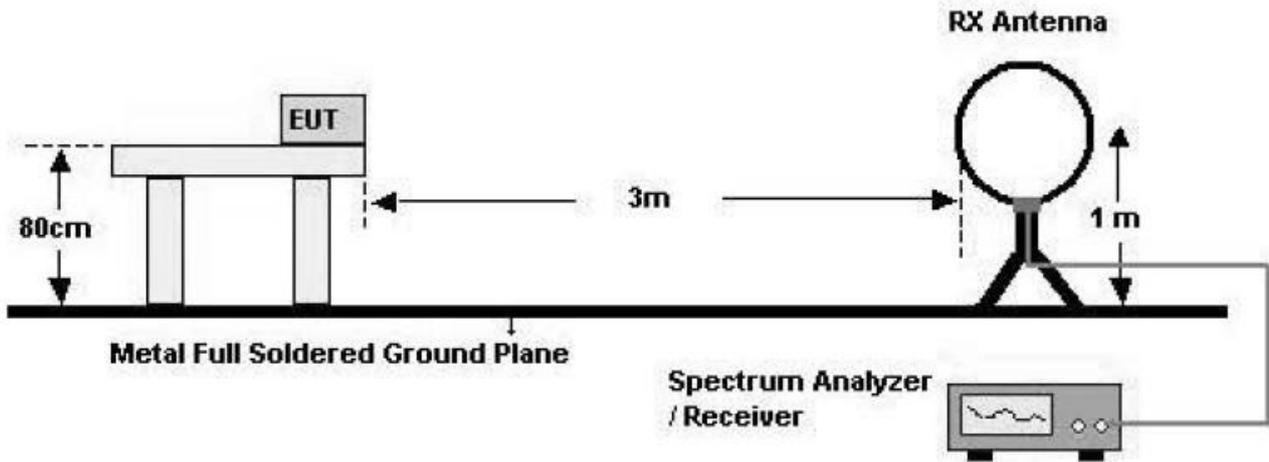
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

■ §15.407, KDB 789033 D02

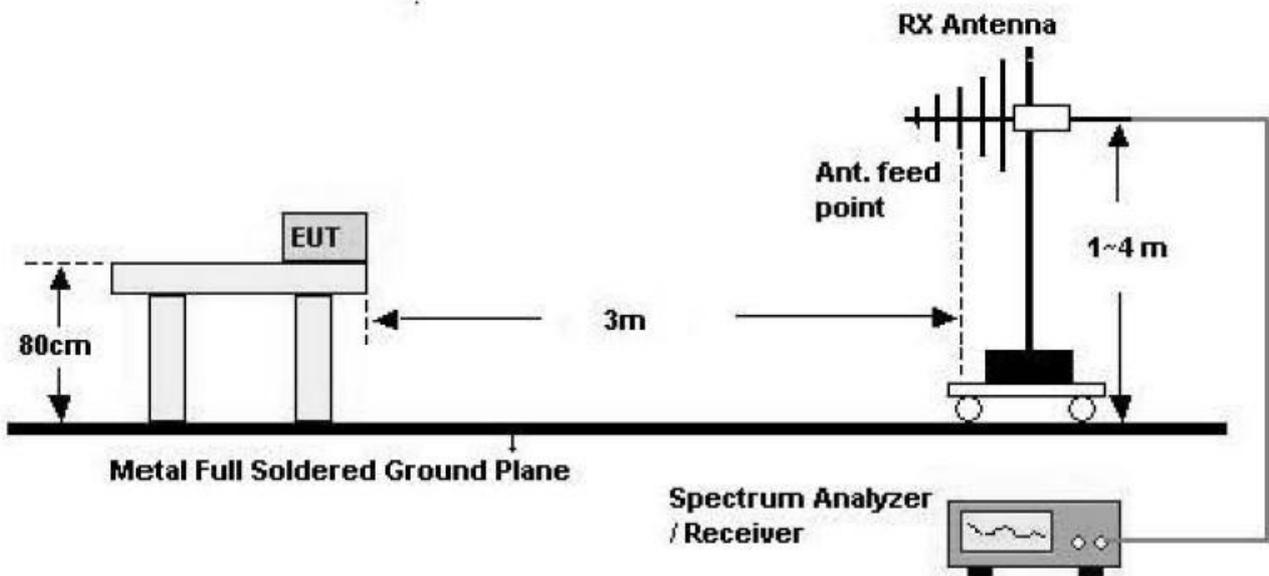
All harmonics that do not lie in a restricted band are subject to a peak limit of -27 dBm/MHz. At a distance of 3 meters the field strength limit in dB μ V/m can be determined by adding a “conversion” factor of 95.2 dB to the EIRP limit of -27 dBm/MHz to obtain the limit for out of band spurious emissions of 68.2 dB μ V/m. Especially, for transmitter operating in the 5725 Mhz – 5850 MHz : all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of -17 dBm/MHz; for frequency 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27 dBm/MHz.

Test Configuration

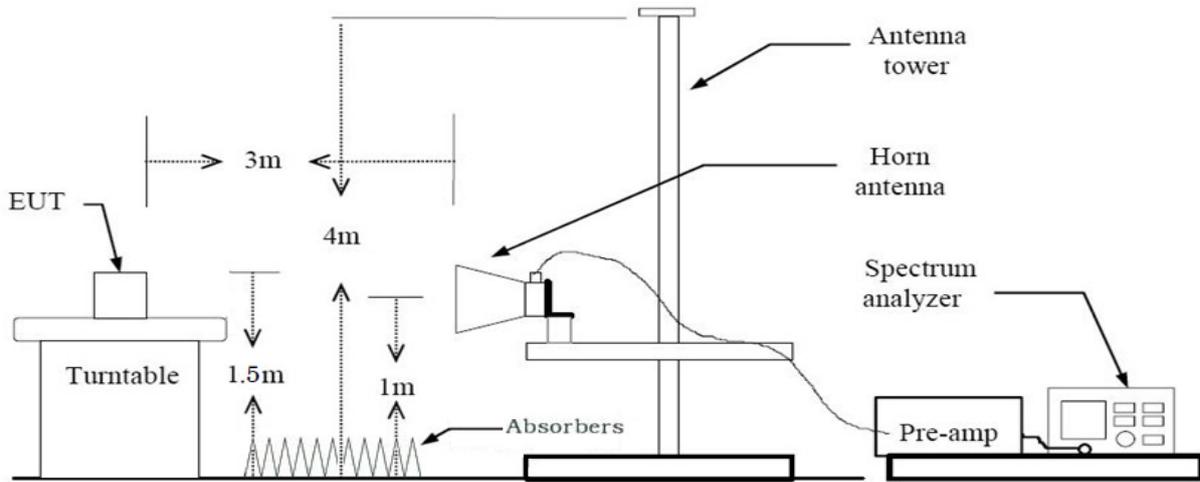
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



TEST PROCEDURE USED

ANSI C63.10:2013

Method G)5) in KDB 789033, issued 01/08/2016 (Peak)

Method G)6)d) in KDB 789033, issued 01/08/2016 (Average)

. Spectrum setting:

- Peak.

1. RBW = 1 MHz

2. VBW \geq 3 MHz

3. Detector = Peak

4. Sweep Time = auto

5. Trace mode = max hold

6. Allow sweeps to continue until the trace stabilizes.

7. Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately 1/x, where x is the duty cycle.

- Average (Method VB :Averaging using reduced video bandwidth)

1. RBW = 1 MHz

2. VBW

2.1. If the EUT is configured to transmit with duty cycle \geq 98 percent, set VBW \leq RBW/100(i.e., 10 kHz) but not less than 10 Hz.

2.2. If the EUT duty cycle is $<$ 98 percent, set VBW \geq 1/T, where T is the minimum transmission duration.

3. The analyzer is set to linear detector mode.

4. Detector = Peak.
5. Sweep time = auto.
6. Trace mode = max hold.
7. Allow max hold to run for at least 50 traces if the transmitted signal is continuous or has at least 98 percent duty cycle. For lower duty cycles, increase the minimum number of traces by a factor of $1/x$, where x is the duty cycle.

Note :

1. We used the Method VB for 802.11a/n_20, n, ac_80 mode to perform the average field strength measurements.
2. The actual setting value of VBW for 802.11a/n_20, n_40, ac_80

Mode	Worst Data rate (Mbps)	T _{on} (ms)	T _{total} (ms)	Duty Cycle (%)	VBW(1/T) (Hz)	The actual setting value of VBW (Hz)
a	6	1.425	1.530	93.14	702	1000
n_20	MCS 0	1.340	1.440	93.06	746	1000
ac_20	MCS 0	1.344	1.446	92.95	744	1000
n_40	MCS 0	0.665	0.766	86.81	1504	3000
ac_40	MCS 0	0.668	0.770	86.75	1497	3000
ac_80	MCS 0	0.332	0.433	76.67	3012	10000

TEST RESULTS

9 kHz – 30MHz

Operation Mode: Normal Mode

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dB μ V	dB /m	dB	(H/V)	dB μ V/m	dB μ V/m	dB
No Critical peaks found							

Notes:

1. Measuring frequencies from 9 kHz to the 30MHz.
2. The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
3. Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB)
4. Limit line = specific Limits (dBuV) + Distance extrapolation factor
5. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

TEST RESULTS

Below 1 GHz

Operation Mode: Normal Mode

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dB μ V	dB /m	dB	(H/V)	dB μ V/m	dB μ V/m	dB
No Critical peaks found							

Notes:

1. Measuring frequencies from 30 MHz to the 1 GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.