▣Straddle channels TEST RESULTS_Ant 0

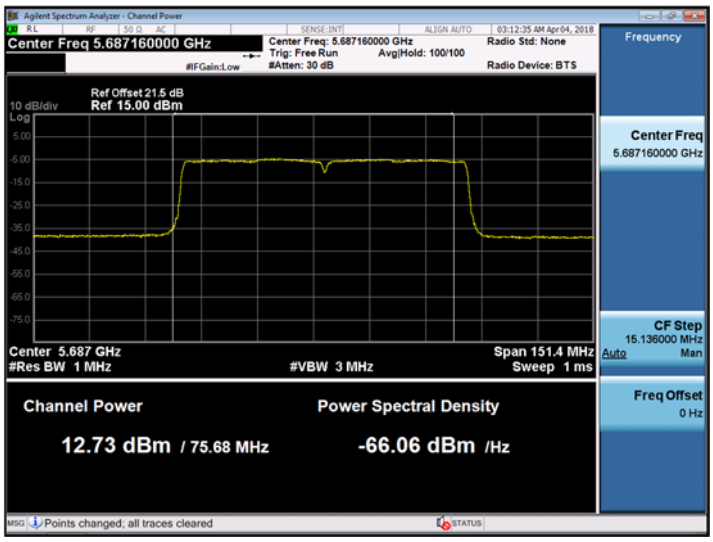
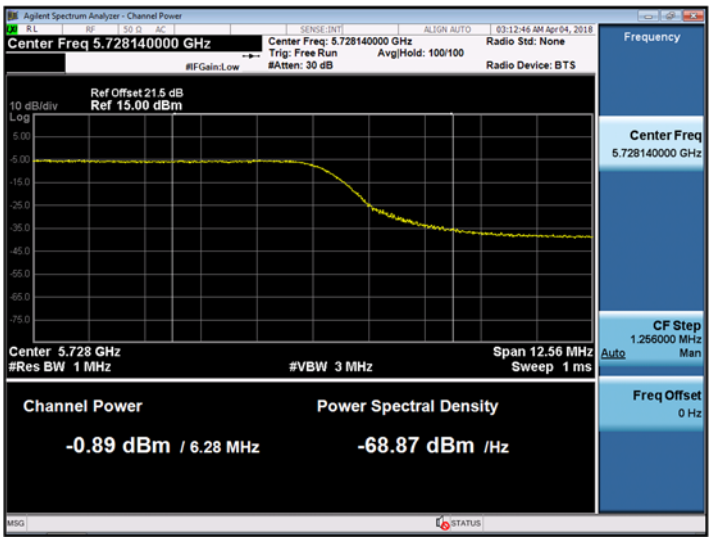
Conducted Output Power Measurements (802.11ac_VHT80 Mode: UNII 2C Band 5690MHz)

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	12.73	0.265	12.99	23.63

Conducted Output Power Measurements (802.11ac_VHT80 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	-0.89	0.265	-0.63	18.84

▣Straddle channels TEST Plot for 802.11ac_VHT80_Ant 0

802.11ac_VHT80 UNII 2C Band Average Power CH.138	802.11ac_VHT80 UNII 3 Band Average Power CH.138
	

▣Straddle channels TEST RESULTS_Ant 1

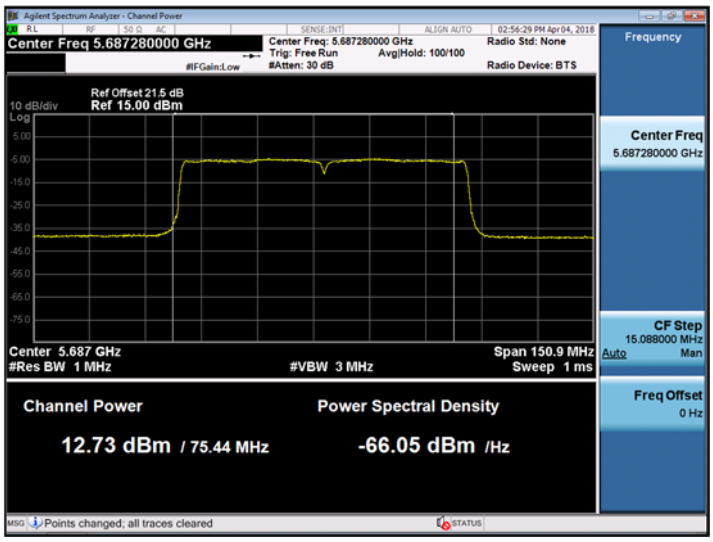
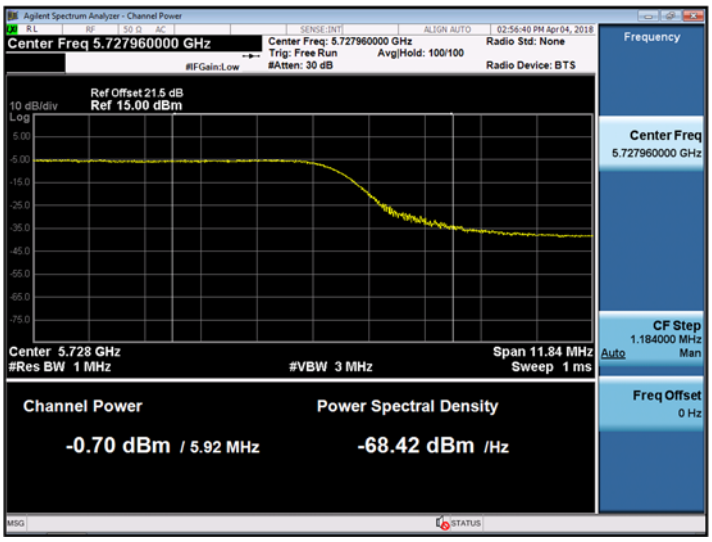
Conducted Output Power Measurements (802.11ac_VHT80 Mode: UNII 2C Band 5690MHz)

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	12.73	0.265	13.00	23.65

Conducted Output Power Measurements (802.11ac_VHT80 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	-0.70	0.265	-0.44	18.62

▣Straddle channels TEST Plot for 802.11ac_VHT80_Ant 1

802.11ac_VHT80 UNII 2C Band Average Power CH.138	802.11ac_VHT80 UNII 3 Band Average Power CH.138
	

▣Straddle channels TEST RESULTS_Ant 2

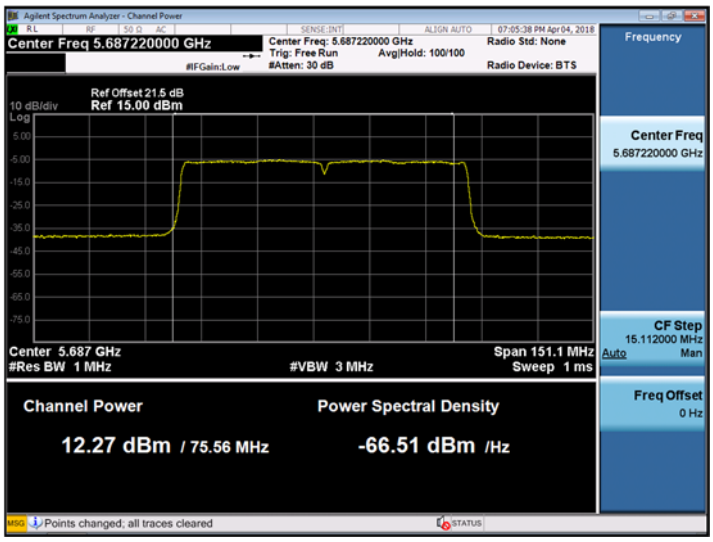
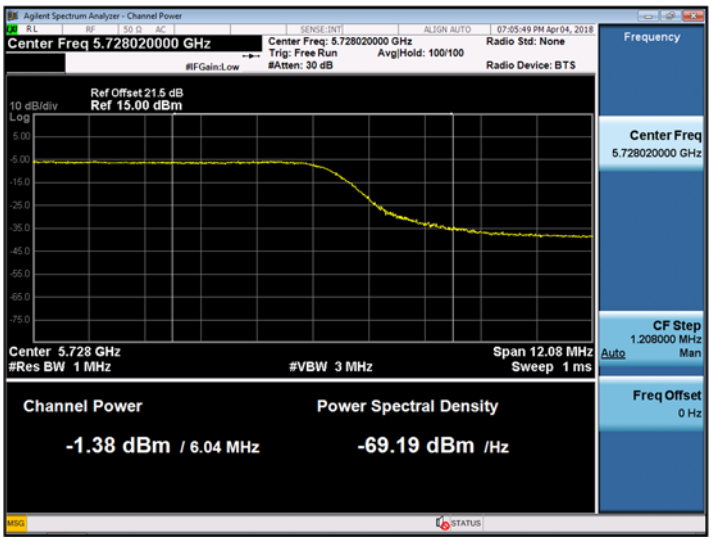
Conducted Output Power Measurements (802.11ac_VHT80 Mode: UNII 2C Band 5690MHz)

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	12.27	0.265	12.54	23.65

Conducted Output Power Measurements (802.11ac_VHT80 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	-1.38	0.265	-1.12	18.69

▣Straddle channels TEST Plot for 802.11ac_VHT80_Ant 2

802.11ac_VHT80 UNII 2C Band Average Power CH.138	802.11ac_VHT80 UNII 3 Band Average Power CH.138
	

▣Straddle channels TEST RESULTS_Ant 3

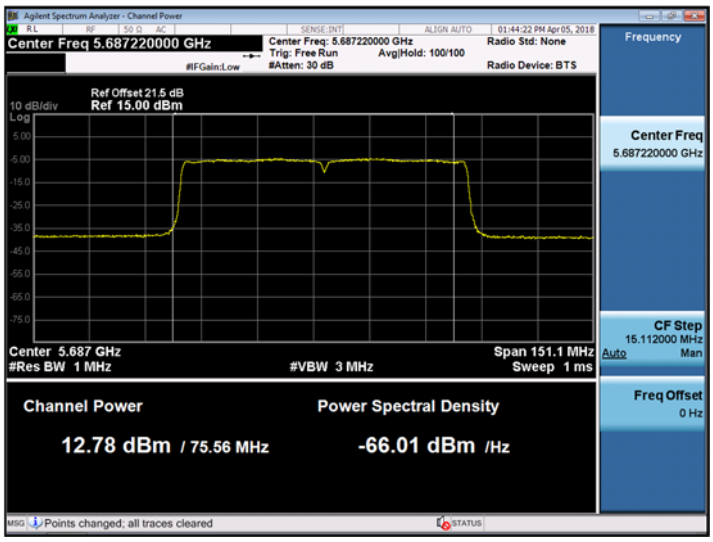
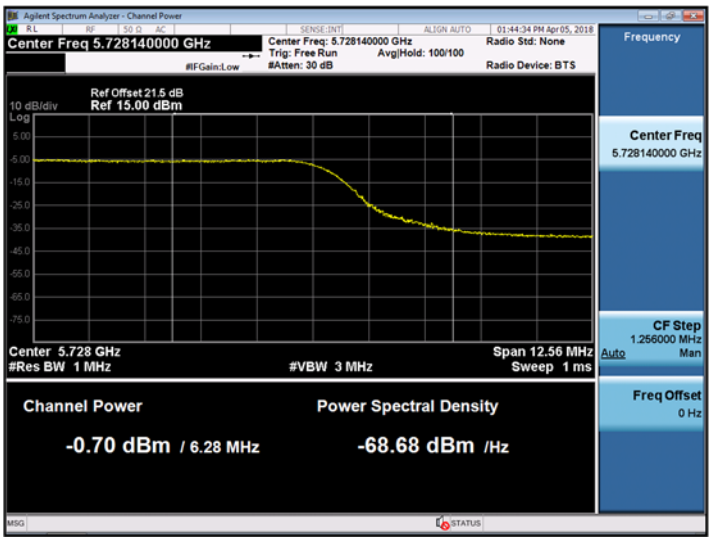
Conducted Output Power Measurements (802.11ac_VHT80 Mode: UNII 2C Band 5690MHz)

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	12.78	0.265	13.04	23.63

Conducted Output Power Measurements (802.11ac_VHT80 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	-0.70	0.265	-0.43	18.85

▣Straddle channels TEST Plot for 802.11ac_VHT80_Ant 3

802.11ac_VHT80 UNII 2C Band Average Power CH.138	802.11ac_VHT80 UNII 3 Band Average Power CH.138
	

▣Straddle channels TEST RESULTS_ Sum Data of Ant.0 and Ant.1 and Ant.2 and Ant.3

Conducted Output Power Measurements (802.11ac_VHT80 Mode: UNII 3 Band 5690MHz)

Mode (MIMO)	Frequency [MHz]	Channel No.	Sum Power of Ant.0 & 1	Limit (dBm)
802.11ac	5690	138	18.91	23.63

Conducted Output Power Measurements (802.11ac_VHT80 Mode: UNII 3 Band 5690MHz)

Mode (MIMO)	Frequency [MHz]	Channel No.	Sum Power of Ant.0 & 1	Limit (dBm)
802.11ac	5690	138	5.37	18.62

Note : The limit on maximum conducted output power in each U-NII band is computed based on the portion of the emission bandwidth contained within that band.

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.

▣ Limit

Power Spectral Density

Band	Mode	Limit
UNII 1	802.11a,n,ac	17 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 KDB789033 D02 v02r01, emission for straddle channels in each band shall comply with the PSD limits applicable to that band under the appropriate rule section.

Power Spectral Density

Operating Mode	Band	Mode	Operating Ant.	Ant. Gain (dBi)	Limit (dBm)
SISO	UNII 1	802.11a/n/ac	Ant 0	2.00	17.00
			Ant 1	2.00	17.00
			Ant 2	2.00	17.00
			Ant 3	2.00	17.00
	UNII 2A		Ant 0	2.00	11.00
			Ant 1	2.00	11.00
			Ant 2	2.00	11.00
			Ant 3	2.00	11.00
	UNII 2C		Ant 0	2.00	11.00
			Ant 1	2.00	11.00
			Ant 2	2.00	11.00
			Ant 3	2.00	11.00
	UNII 3		Ant 0	2.00	30.00
			Ant 1	2.00	30.00
			Ant 2	2.00	30.00
			Ant 3	2.00	30.00
MIMO	UNII 1	802.11a/n/ac	Ant 0 & 1 & 2 & 3	2.00	14.98
	UNII 2A			2.00	8.98
	UNII 2C			2.00	8.98
	UNII 3			2.00	27.98

Note : 1. If all antennas have the same gain, G_{ANT}

Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

• For power spectral density (PSD) measurements on all devices.

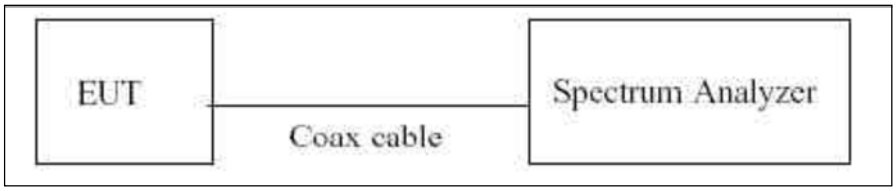
Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

(according to KDB662911 D01 v02r01)

2. Limit is calculated by antenna gain.

3. The limits of maximum conducted power were applied the antenna gain. Therefore, if conducted power is pass, e.i.r.p. is also pass. So, we attached only conducted power table.

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

We tested according to Method in KDB 789033 D02 v02r01.

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

ANT.0

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

Ex) PSD = 10 dBm + 20 dB + 1.17 dB + 0.2 dB = 31.0 dBm

ANT.1

PSD = Reading Value + ATT loss + Cable loss(2 ea) + Duty Cycle Factor

Ex) PSD = 10 dBm + 20 dB + 2.05 dB + 0.2 dB = 31.7 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 the offset of 5 GHz band is 21.5dB.

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

4. MIMO output power results are calculated by each antenna output power on MIMO operating mode.

So, in case of MIMO output power, we attached only MIMO output power except each antenna power result.

Ant.0

▣ 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 (SISO)	3.849	0.222	4.07	17	Pass
5200	40		3.825	0.222	4.05		Pass
5240	48		4.248	0.222	4.47		Pass
5260	52		1.495	0.222	1.72	11	Pass
5300	60		1.922	0.222	2.14		Pass
5320	64		1.766	0.222	1.99		Pass
5500	100		2.599	0.222	2.82	11	Pass
5600	120		2.452	0.222	2.67		Pass
5720	144		1.373	0.222	1.59		Pass
5745	149		1.199	0.222	1.42	30	Pass
5785	157		1.678	0.222	1.90		Pass
5825	165		1.610	0.222	1.83		Pass

Ant.1

▣ 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 (SISO)	4.100	0.222	4.32	17	Pass
5200	40		4.114	0.222	4.34		Pass
5240	48		4.387	0.222	4.61		Pass
5260	52		2.029	0.222	2.25	11	Pass
5300	60		2.019	0.222	2.24		Pass
5320	64		2.032	0.222	2.25		Pass
5500	100		2.405	0.222	2.63	11	Pass
5600	120		2.523	0.222	2.74		Pass
5720	144		2.022	0.222	2.24		Pass
5745	149		0.908	0.222	1.13	30	Pass
5785	157		1.048	0.222	1.27		Pass
5825	165		1.352	0.222	1.57		Pass

Ant.2

▣ 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 (SISO)	4.524	0.222	4.75	17	Pass
5200	40		4.403	0.222	4.62		Pass
5240	48		4.547	0.222	4.77		Pass
5260	52		1.743	0.222	1.96	11	Pass
5300	60		1.970	0.222	2.19		Pass
5320	64		2.159	0.222	2.38		Pass
5500	100		2.541	0.222	2.76	11	Pass
5600	120		2.208	0.222	2.43		Pass
5720	144		1.532	0.222	1.75		Pass
5745	149		0.712	0.222	0.93	30	Pass
5785	157		1.006	0.222	1.23		Pass
5825	165		1.302	0.222	1.52		Pass

Ant.3

▣ 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 (SISO)	4.954	0.222	5.18	17	Pass
5200	40		4.330	0.222	4.55		Pass
5240	48		4.809	0.222	5.03		Pass
5260	52		2.546	0.222	2.77	11	Pass
5300	60		2.605	0.222	2.83		Pass
5320	64		2.763	0.222	2.98		Pass
5500	100		3.254	0.222	3.48	11	Pass
5600	120		2.751	0.222	2.97		Pass
5720	144		1.817	0.222	2.04		Pass
5745	149		1.126	0.222	1.35	30	Pass
5785	157		1.241	0.222	1.46		Pass
5825	165		1.739	0.222	1.96		Pass

▣ **Sum Data of Ant.0 and Ant.1 and Ant.2 and Ant.3**

▣ **TEST RESULTS**

Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result		
			Measured Power Density (dBm)	Limit (dBm)	Pass/Fail
5180	36	802.11a (MIMO)	10.61	14.98	Pass
5200	40		10.41		Pass
5240	48		10.74		Pass
5260	52		8.20	8.98	Pass
5300	60		8.38		Pass
5320	64		8.43		Pass
5500	100		8.95	8.98	Pass
5600	120		8.73		Pass
5720	144		7.93		Pass
5745	149		7.23	27.98	Pass
5785	157		7.49		Pass
5825	165		7.74		Pass

▣ TEST Plot for 802.11a 20MHz BW_Ant.0

802.11a UNII 1 BAND PSD CH 48	802.11a UNII 2A BAND PSD CH 60
802.11a UNII 2C BAND PSD CH 100	**802.11a UNII 3 BAND PSD CH 157**

▣ TEST Plot for 802.11a 20MHz BW_Ant.1

802.11a UNII 1 BAND PSD CH 48	802.11a UNII 2A BAND PSD CH 64
802.11a UNII 2C BAND PSD CH 120	**802.11a UNII 3 BAND PSD CH 165**

▣ TEST Plot for 802.11a 20MHz BW_Ant.2

802.11a UNII 1 BAND PSD CH 48	802.11a UNII 2A BAND PSD CH 64
802.11a UNII 2C BAND PSD CH 100	**802.11a UNII 3 BAND PSD CH 165**

▣ TEST Plot for 802.11a 20MHz BW_Ant.3

802.11a UNII 1 BAND PSD CH 36	802.11a UNII 2A BAND PSD CH 64
802.11a UNII 2C BAND PSD CH 100	**802.11a UNII 3 BAND PSD CH 165**

Ant.0

▣ 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_ HT20 (SISO)	3.359	0.218	3.58	17	Pass
5200	40		3.289	0.218	3.51		Pass
5240	48		3.849	0.218	4.07		Pass
5260	52		2.044	0.218	2.26	11	Pass
5300	60		2.137	0.218	2.36		Pass
5320	64		2.048	0.218	2.27		Pass
5500	100		2.484	0.218	2.70	11	Pass
5600	120		1.883	0.218	2.10		Pass
5720	144		1.059	0.218	1.28		Pass
5745	149		0.502	0.218	0.72	30	Pass
5785	157		1.016	0.218	1.23		Pass
5825	165		1.020	0.218	1.24		Pass

Ant.1

▣ 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_ HT20 (SISO)	3.996	0.218	4.21	17	Pass
5200	40		3.871	0.218	4.09		Pass
5240	48		4.139	0.218	4.36		Pass
5260	52		2.446	0.218	2.66	11	Pass
5300	60		2.498	0.218	2.72		Pass
5320	64		2.510	0.218	2.73		Pass
5500	100		2.559	0.218	2.78	11	Pass
5600	120		2.506	0.218	2.72		Pass
5720	144		1.627	0.218	1.85		Pass
5745	149		0.805	0.218	1.02	30	Pass
5785	157		0.914	0.218	1.13		Pass
5825	165		0.918	0.218	1.14		Pass

Ant.2

▣ 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_ HT20 (SISO)	3.280	0.218	3.50	17	Pass
5200	40		3.522	0.218	3.74		Pass
5240	48		3.867	0.218	4.09		Pass
5260	52		2.002	0.218	2.22	11	Pass
5300	60		2.056	0.218	2.27		Pass
5320	64		2.013	0.218	2.23		Pass
5500	100		1.519	0.218	1.74	11	Pass
5600	120		1.386	0.218	1.60		Pass
5720	144		1.292	0.218	1.51		Pass
5745	149		0.480	0.218	0.70	30	Pass
5785	157		0.648	0.218	0.87		Pass
5825	165		0.645	0.218	0.86		Pass

Ant.3

▣ 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_ HT20 (SISO)	4.053	0.218	4.27	17	Pass
5200	40		4.212	0.218	4.43		Pass
5240	48		4.693	0.218	4.91		Pass
5260	52		2.422	0.218	2.64	11	Pass
5300	60		2.696	0.218	2.91		Pass
5320	64		2.638	0.218	2.86		Pass
5500	100		1.906	0.218	2.12	11	Pass
5600	120		1.862	0.218	2.08		Pass
5720	144		1.437	0.218	1.66		Pass
5745	149		0.754	0.218	0.97	30	Pass
5785	157		0.874	0.218	1.09		Pass
5825	165		1.122	0.218	1.34		Pass

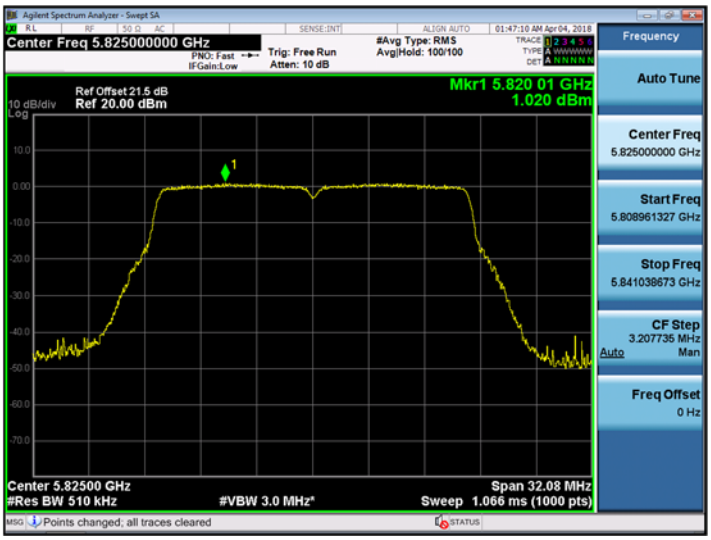
▣ **Sum Data of Ant.0 and Ant.1 and Ant.2 and Ant.3**

▣ **TEST RESULTS**

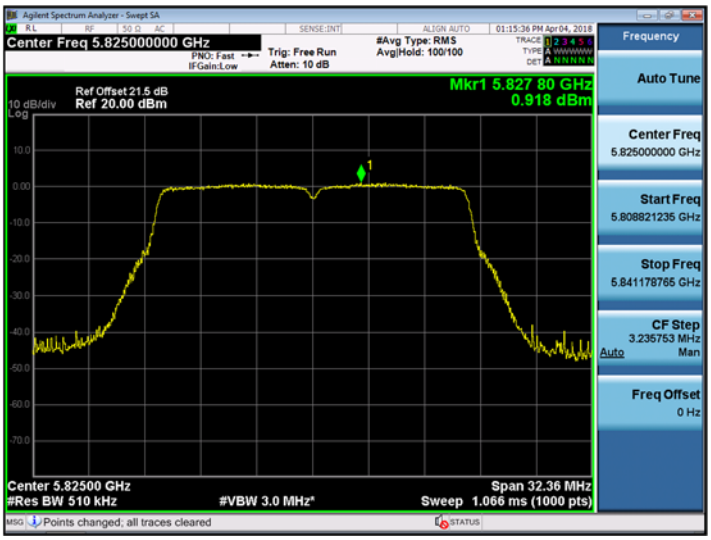
Conducted Power Density Measurements

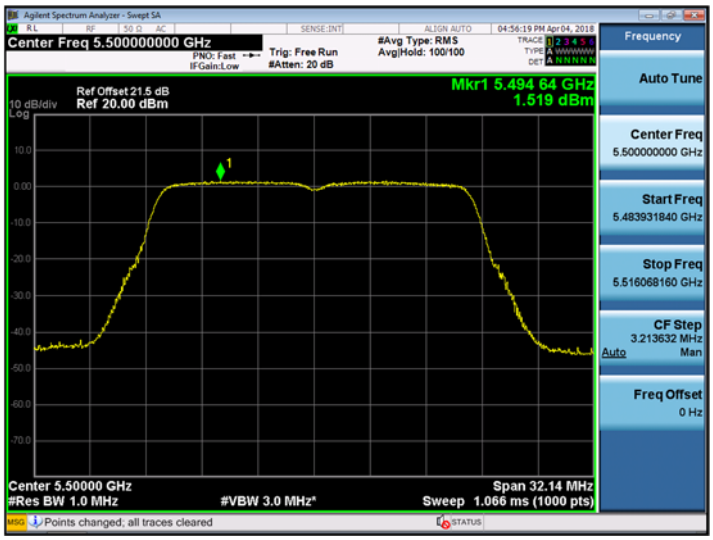
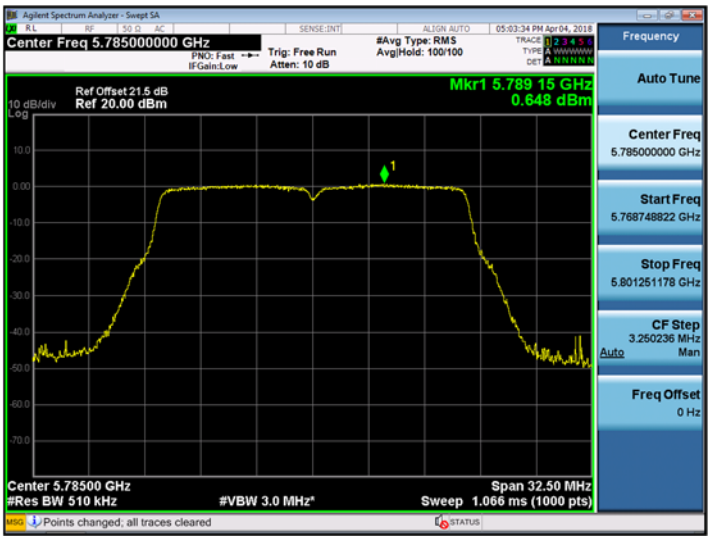
Frequency (MHz)	Channel No.	Mode	Test Result		
			Measured Power Density (dBm)	Limit (dBm)	Pass/Fail
5180	36	802.11n_ HT20 (MIMO)	9.92	14.98	Pass
5200	40		9.97		Pass
5240	48		10.38		Pass
5260	52		8.47	8.98	Pass
5300	60		8.59		Pass
5320	64		8.55		Pass
5500	100		8.37	8.98	Pass
5600	120		8.16		Pass
5720	144		7.60		Pass
5745	149		6.88	27.98	Pass
5785	157		7.10		Pass
5825	165		7.17		Pass

▣ TEST Plot for 802.11n_HT20_Ant.0

802.11n_HT20 UNII 1 BAND PSD CH 48	802.11n_HT20 UNII 2A BAND PSD CH 60
802.11n_HT20 UNII 2C BAND PSD CH 100	**802.11n_HT20 UNII 3 BAND PSD CH 165**
	

▣ TEST Plot for 802.11n_HT20_Ant.1

802.11n_HT20 UNII 1 BAND PSD CH 48	802.11n_HT20 UNII 2A BAND PSD CH 64
802.11n_HT20 UNII 2C BAND PSD CH 100	**802.11n_HT20 UNII 3 BAND PSD CH 165**
	

▣ TEST Plot for 802.11n_HT20_Ant.2

802.11n_HT20 UNII 1 BAND PSD CH 48	802.11n_HT20 UNII 2A BAND PSD CH 60
802.11n_HT20 UNII 2C BAND PSD CH 100	**802.11n_HT20 UNII 3 BAND PSD CH 157**