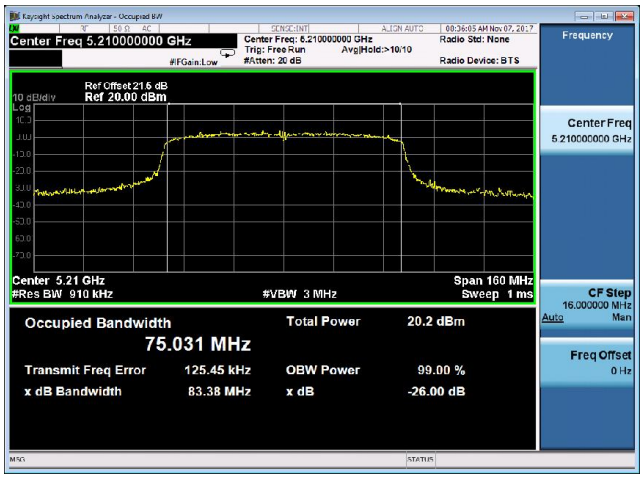
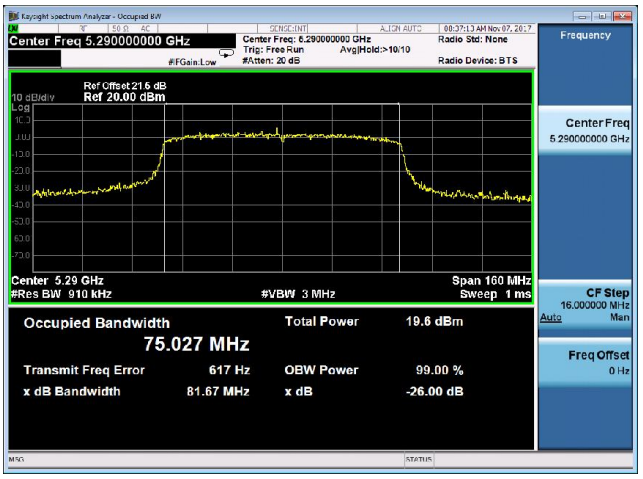
802.11ac-VHT80 26dB Bandwidth & 99% Bandwidth

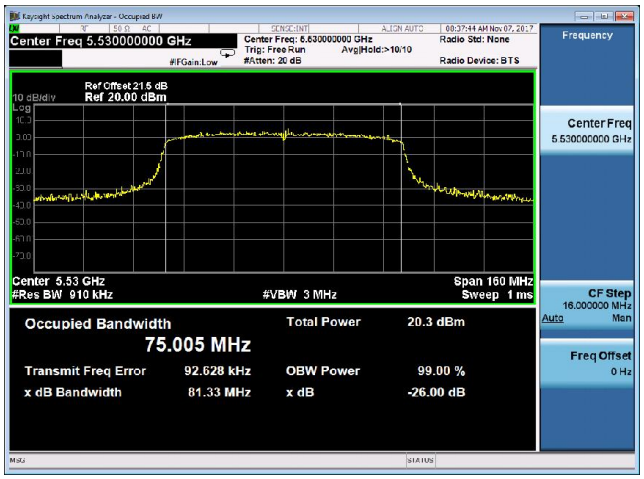
Channel 42 (5210MHz)



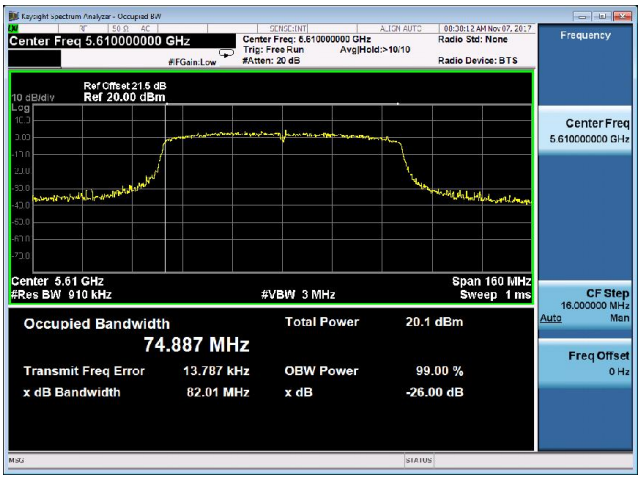
Channel 58 (5290MHz)



Channel 106 (5530MHz)



Channel 122 (5610MHz)



Channel 138 (5690MHz)

Channel 155 (5775MHz)

7.3. 6dB Bandwidth Measurement

7.3.1.Test Limit

The minimum 6dB bandwidth shall be at least 500 kHz.

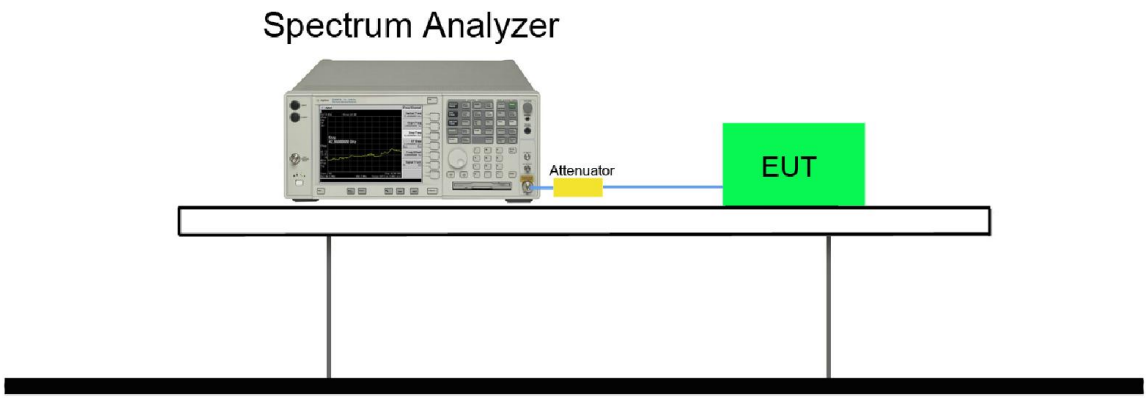
7.3.2.Test Procedure used

KDB 789033 D02v02r01 – Section C.2

7.3.3.Test Setting

1. Set center frequency to the nominal EUT channel center frequency.
2. RBW = 100 kHz.
3. VBW ≧ 3 × RBW.
4. Detector = Peak.
5. Trace mode = max hold.
6. Sweep = auto couple.
7. Allow the trace to stabilize.
8. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

7.3.4.Test Setup



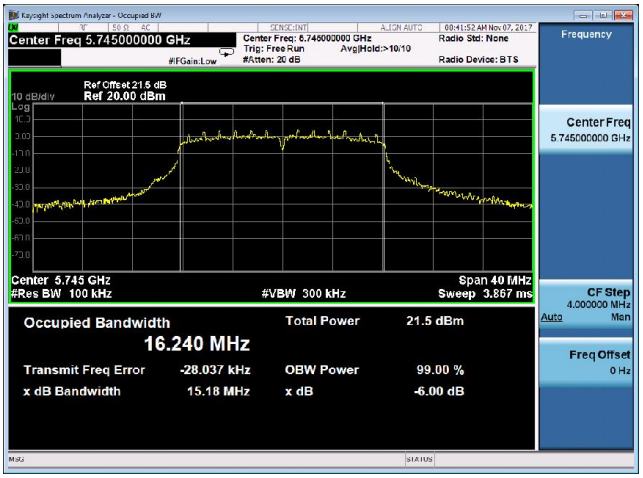
7.3.5.Test Result

Product	W-LAN + Bluetooth Module	Temperature	24°C
Test Engineer	Dandy Li	Relative Humidity	53%
Test Site	TR3	Test Date	2017/11/07
Test Item	6dB Bandwidth		

Test Mode	Data Rate / MCS	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
802.11a	6Mbps	149	5745	15.18	≥ 0.5	Pass
802.11a	6Mbps	157	5785	15.19	≥ 0.5	Pass
802.11a	6Mbps	165	5825	14.51	≥ 0.5	Pass
802.11n-HT20	MCS0	149	5745	15.19	≥ 0.5	Pass
802.11n-HT20	MCS0	157	5785	15.17	≥ 0.5	Pass
802.11n-HT20	MCS0	165	5825	15.15	≥ 0.5	Pass
802.11n-HT40	MCS0	151	5755	35.17	≥ 0.5	Pass
802.11n-HT40	MCS0	159	5795	35.13	≥ 0.5	Pass
802.11ac-VHT20	MCS0	149	5745	15.11	≥ 0.5	Pass
802.11ac-VHT20	MCS0	157	5785	15.14	≥ 0.5	Pass
802.11ac-VHT20	MCS0	165	5825	15.48	≥ 0.5	Pass
802.11ac-VHT40	MCS0	151	5755	35.16	≥ 0.5	Pass
802.11ac-VHT40	MCS0	159	5795	33.94	≥ 0.5	Pass
802.11ac-VHT80	MCS0	155	5775	75.21	≥ 0.5	Pass

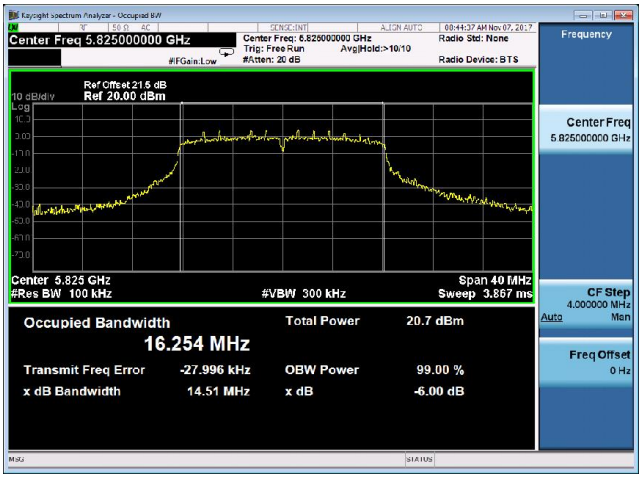
802.11a 6dB Bandwidth

Channel 149 (5745MHz)



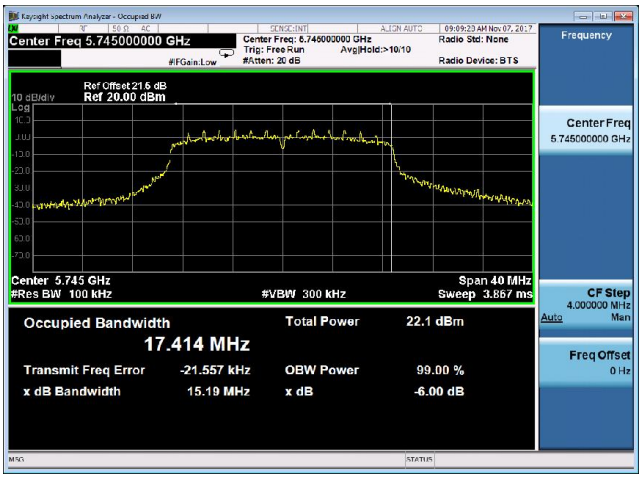
Channel 157 (5785MHz)

Channel 165 (5825MHz)

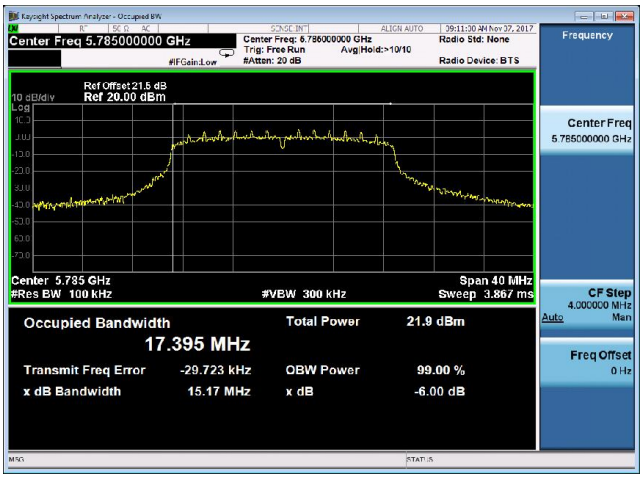


802.11n-HT20 6dB Bandwidth

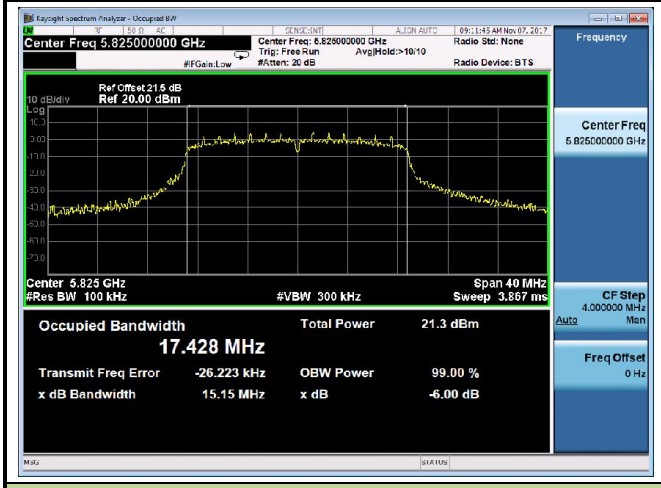
Channel 149 (5745MHz)



Channel 157 (5785MHz)

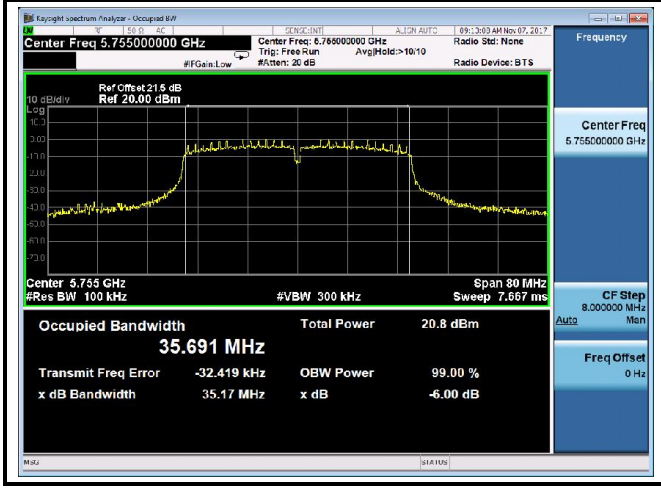


Channel 165 (5825MHz)

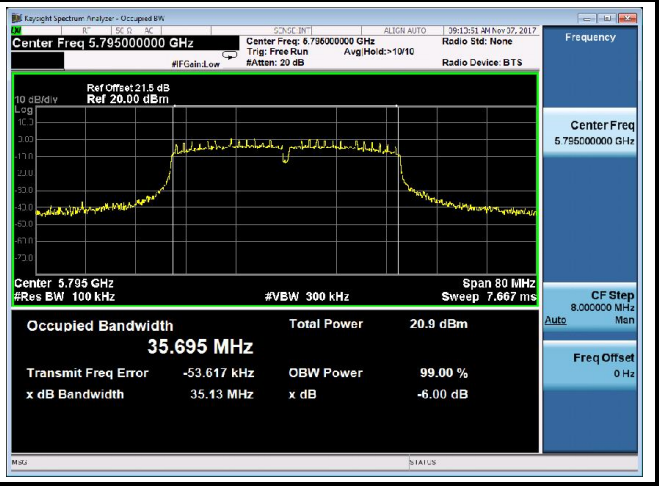


802.11n-HT40 6dB Bandwidth

Channel 151 (5755MHz)

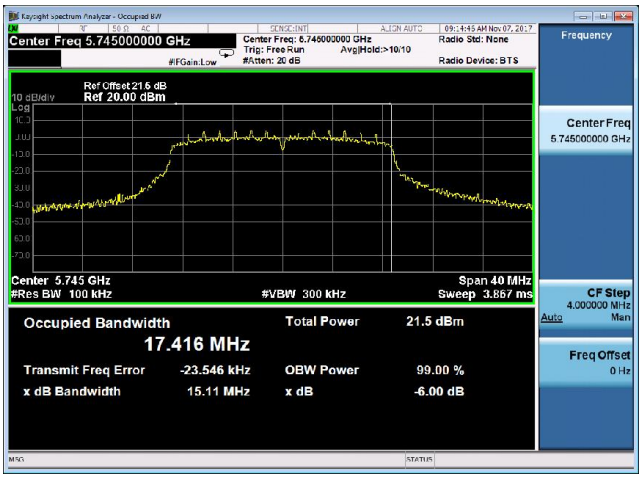


Channel 159 (5795MHz)

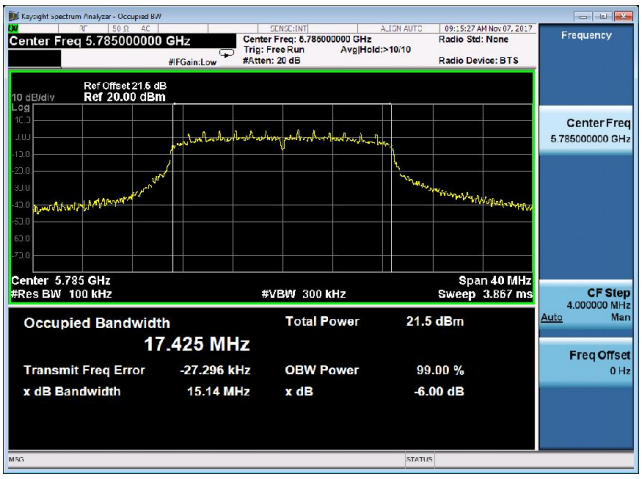


802.11ac-VHT20 6dB Bandwidth

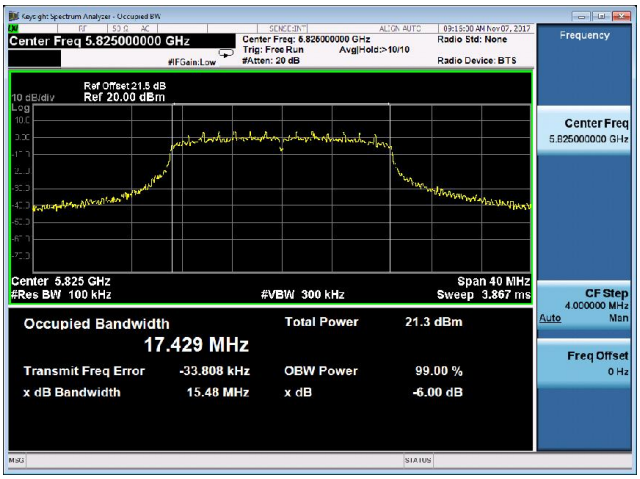
Channel 149 (5745MHz)



Channel 157 (5785MHz)

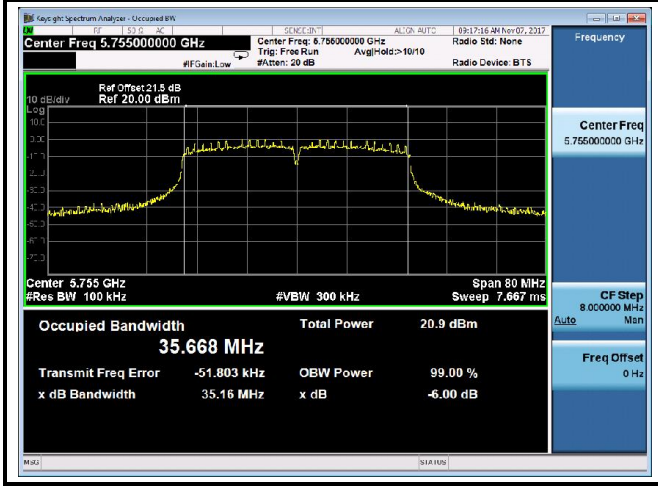


Channel 165 (5825MHz)

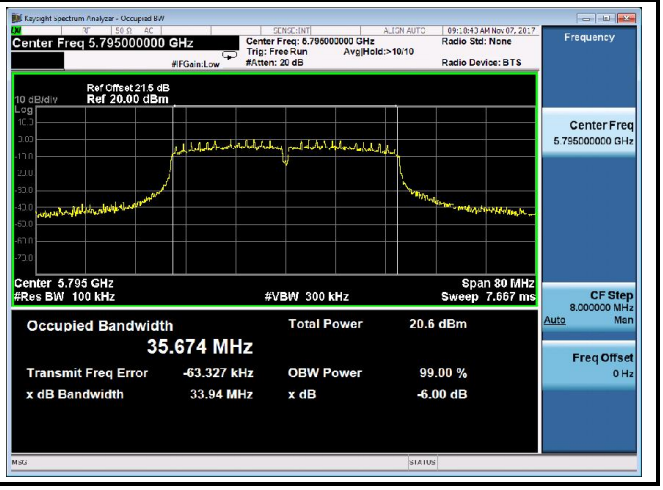


802.11ac-VHT40 6dB Bandwidth

Channel 151 (5755MHz)



Channel 159 (5795MHz)



802.11ac-VHT80 6dB Bandwidth	
Channel 155 (5775MHz)	
	

7.4. Output Power Measurement

7.4.1.Test Limit

For FCC

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 250mW provided the maximum antenna gain does not exceed 6dBi.

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 250mW or 11dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm). If transmitting antennas of directional gain greater than 6dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Additional Requirement for IC

For the band 5.15-5.25 GHz, the maximum e.i.r.p. shall not exceed 200mW (23.01dBm) or 10 + 10 $\log_{10}$ B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.

For the 5.25 - 5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power shall not exceed 250mW (23.98dBm) or 11 + 10 $\log_{10}$ B, dBm, whichever power is less. The maximum e.i.r.p. shall not exceed 1.0 W (30dBm) or 17 + 10 $\log_{10}$ B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.

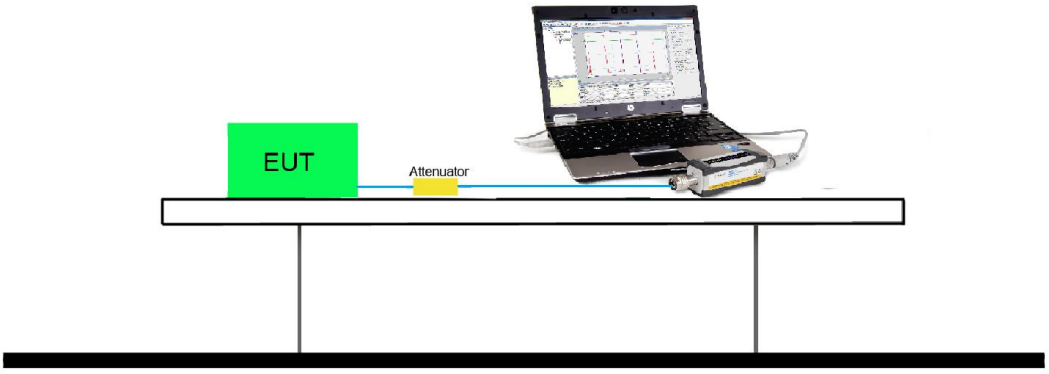
7.4.2.Test Procedure Used

KDB 789033 D02v02r01 - Section E) 3) b) Method PM-G

7.4.3.Test Setting

Average power measurements were perform only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter. The trace was averaged over 100 traces to obtain the final measured average power.

7.4.4.Test Setup



7.4.5.Test Result

Power output test was verified over all data rates of each mode shown as below, and then choose the maximum power output (Gray Marker) for final test of each channel.

Test Mode	Bandwidth	Channel	Frequency (MHz)	Data Rate / MCS	Power Parameter Value	Average Power (dBm)
802.11a	20	36	5180	6Mbps	16	13.84
				24Mbps	14.5	12.16
				54Mbps	12	10.62
802.11n	20	36	5180	MCS0	16.5	13.75
				MCS4	14	11.64
				MCS7	11	9.70
802.11n	40	38	5190	MCS0	15	12.53
				MCS3	13	10.41
				MCS7	10	8.75
802.11ac	20	36	5180	MCS0	16.5	13.83
				MCS4	14	11.49
				MCS8	11	9.63
802.11ac	40	38	5190	MCS0	15	12.62
				MCS4	13.5	10.62
				MCS9	12	8.70
802.11ac	80	42	5210	MCS0	14.5	11.73
				MCS4	12.5	9.61
				MCS9	9	7.91

Product	W-LAN + Bluetooth Module	Temperature	23°C
Test Engineer	Hunk Li	Relative Humidity	54%
Test Site	TR3	Test Date	2017/11/07
Test Item	Output Power		

Test Mode	Data Rate / MCS	Channel No.	Freq. (MHz)	Average Power (dBm)	Power Limit (dBm)	Result
11a	6Mbps	36	5180	13.84	≤ 23.98	Pass
11a	6Mbps	44	5220	13.61	≤ 23.98	Pass
11a	6Mbps	48	5240	13.55	≤ 23.98	Pass
11a	6Mbps	52	5260	13.83	≤ 23.98	Pass
11a	6Mbps	60	5300	14.43	≤ 23.98	Pass
11a	6Mbps	64	5320	13.58	≤ 23.98	Pass
11a	6Mbps	100	5500	13.80	≤ 23.98	Pass
11a	6Mbps	116	5580	13.88	≤ 23.98	Pass
11a	6Mbps	120	5600	13.87	≤ 23.98	Pass
11a	6Mbps	140	5700	13.78	≤ 23.98	Pass
11a	6Mbps	144	5720	13.79	≤ 23.98	Pass
11a	6Mbps	149	5745	13.65	≤ 30.00	Pass
11a	6Mbps	157	5785	13.62	≤ 30.00	Pass
11a	6Mbps	165	5825	13.56	≤ 30.00	Pass
11n-HT20	MCS0	36	5180	13.75	≤ 23.98	Pass
11n-HT20	MCS0	44	5220	13.84	≤ 23.98	Pass
11n-HT20	MCS0	48	5240	13.75	≤ 23.98	Pass
11n-HT20	MCS0	52	5260	13.54	≤ 23.98	Pass
11n-HT20	MCS0	60	5300	13.61	≤ 23.98	Pass
11n-HT20	MCS0	64	5320	13.62	≤ 23.98	Pass
11n-HT20	MCS0	100	5500	13.84	≤ 23.98	Pass
11n-HT20	MCS0	116	5580	13.88	≤ 23.98	Pass
11n-HT20	MCS0	120	5600	13.65	≤ 23.98	Pass
11n-HT20	MCS0	140	5700	13.76	≤ 23.98	Pass
11n-HT20	MCS0	144	5720	13.89	≤ 23.98	Pass
11n-HT20	MCS0	149	5745	13.83	≤ 30.00	Pass
11n-HT20	MCS0	157	5785	13.71	≤ 30.00	Pass
11n-HT20	MCS0	165	5825	13.70	≤ 30.00	Pass

Test Mode	Data Rate / MCS	Channel No.	Freq. (MHz)	Average Power (dBm)	Power Limit (dBm)	Result
11n-HT40	MCS0	38	5190	12.53	≤ 23.98	Pass
11n-HT40	MCS0	46	5230	12.69	≤ 23.98	Pass
11n-HT40	MCS0	54	5270	12.82	≤ 23.98	Pass
11n-HT40	MCS0	62	5310	12.87	≤ 23.98	Pass
11n-HT40	MCS0	102	5510	12.81	≤ 23.98	Pass
11n-HT40	MCS0	110	5550	12.92	≤ 23.98	Pass
11n-HT40	MCS0	118	5590	12.89	≤ 23.98	Pass
11n-HT40	MCS0	134	5670	12.83	≤ 23.98	Pass
11n-HT40	MCS0	142	5710	12.86	≤ 23.98	Pass
11n-HT40	MCS0	151	5755	12.80	≤ 30.00	Pass
11n-HT40	MCS0	159	5795	12.67	≤ 30.00	Pass
11ac-VHT20	MCS0	36	5180	13.83	≤ 23.98	Pass
11ac-VHT20	MCS0	44	5220	13.66	≤ 23.98	Pass
11ac-VHT20	MCS0	48	5240	13.60	≤ 23.98	Pass
11ac-VHT20	MCS0	52	5260	13.52	≤ 23.98	Pass
11ac-VHT20	MCS0	60	5300	13.65	≤ 23.98	Pass
11ac-VHT20	MCS0	64	5320	13.72	≤ 23.98	Pass
11ac-VHT20	MCS0	100	5500	13.93	≤ 23.98	Pass
11ac-VHT20	MCS0	116	5580	13.85	≤ 23.98	Pass
11ac-VHT20	MCS0	120	5600	13.85	≤ 23.98	Pass
11ac-VHT20	MCS0	140	5700	13.93	≤ 23.98	Pass
11ac-VHT20	MCS0	144	5720	13.72	≤ 23.98	Pass
11ac-VHT20	MCS0	149	5745	13.78	≤ 30.00	Pass
11ac-VHT20	MCS0	157	5785	13.65	≤ 30.00	Pass
11ac-VHT20	MCS0	165	5825	13.84	≤ 30.00	Pass

Test Mode	Data Rate / MCS	Channel No.	Freq. (MHz)	Average Power (dBm)	Power Limit (dBm)	Result
11ac-VHT40	MCS0	38	5190	12.62	≤ 23.98	Pass
11ac-VHT40	MCS0	46	5230	12.65	≤ 23.98	Pass
11ac-VHT40	MCS0	54	5270	12.82	≤ 23.98	Pass
11ac-VHT40	MCS0	62	5310	12.88	≤ 23.98	Pass
11ac-VHT40	MCS0	102	5510	12.72	≤ 23.98	Pass
11ac-VHT40	MCS0	110	5550	12.85	≤ 23.98	Pass
11ac-VHT40	MCS0	118	5590	12.77	≤ 23.98	Pass
11ac-VHT40	MCS0	134	5670	12.51	≤ 23.98	Pass
11ac-VHT40	MCS0	142	5710	12.62	≤ 23.98	Pass
11ac-VHT40	MCS0	151	5755	12.53	≤ 30.00	Pass
11ac-VHT40	MCS0	159	5795	12.55	≤ 30.00	Pass
11ac-VHT80	MCS0	42	5210	11.73	≤ 23.98	Pass
11ac-VHT80	MCS0	58	5290	11.56	≤ 23.98	Pass
11ac-VHT80	MCS0	106	5530	11.73	≤ 23.98	Pass
11ac-VHT80	MCS0	122	5610	11.53	≤ 23.98	Pass
11ac-VHT80	MCS0	138	5690	11.65	≤ 23.98	Pass
11ac-VHT80	MCS0	155	5775	11.86	≤ 30.00	Pass

7.5. Transmit Power Control

7.5.1.Test Limit

The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm.

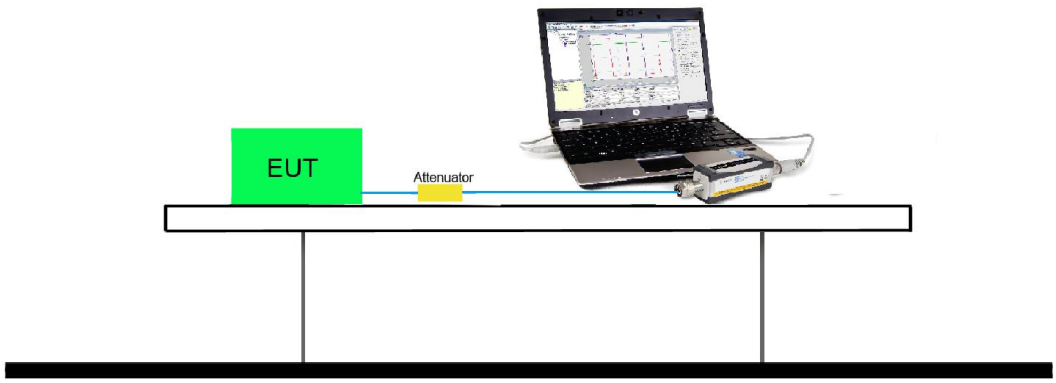
7.5.2.Test Procedure Used

KDB 789033 D02v01- Section E)3)b) Method PM-G

7.5.3.Test Setting

Average power measurements were perform only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter. The trace was averaged over 100 traces to obtain the final measured average power.

7.5.4.Test Setup



7.5.5.Test Result

A TPC mechanism is not required for systems with an e.i.r.p. of less than 500mW.

7.6. Power Spectral Density Measurement

7.6.1.Test Limit

For FCC

For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.

If transmitting antennas of directional gain greater than 6dBi are used, the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Additional Requirement for IC

For the band 5.15-5.25 GHz, the e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

7.6.2.Test Procedure Used

KDB 789033 D02v02r01 - Section F

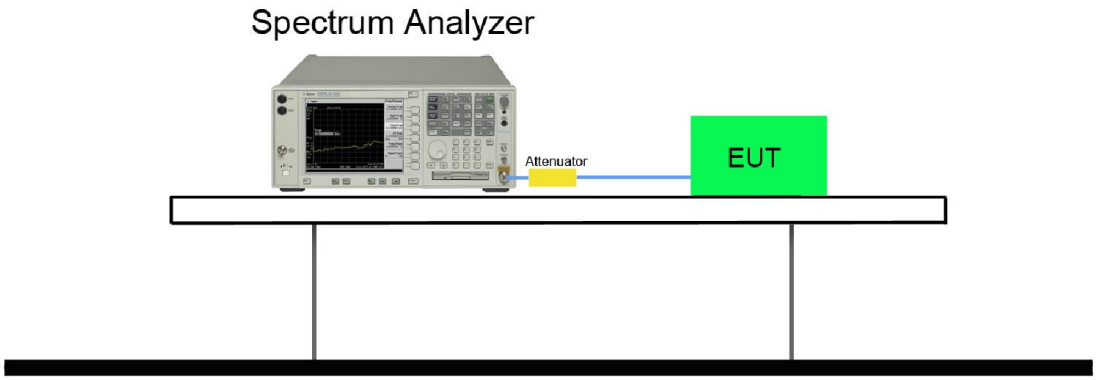
7.6.3.Test Setting

1. Analyzer was set to the center frequency of the UNII channel under investigation
2. Span was set to encompass the entire 26dB OBW of the signal.
3. RBW = 1MHz, if measurement bandwidth of Maximum PSD is specified in 500 kHz,
4. RBW = 100 kHz
5. VBW = 3MHz
6. Number of sweep points ≥ 2 × (span / RBW)
7. Detector = power averaging (RMS)
8. Sweep time = auto
9. Trigger = free run
10. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
11. Add 10*log(1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times (because the measurement represents an

average over both the on and off times of the transmission). For example, add 10*log(1/0.25) = 6 dB if the duty cycle is 25 percent.

12. When the measurement bandwidth of Maximum PSD is specified in 500 kHz, add a constant factor 10*log(500kHz/100kHz) = 6.99 dB to the measured result

7.6.4.Test Setup



7.6.5.Test Result

Product	W-LAN + Bluetooth Module	Temperature	23°C
Test Engineer	Hunk Li	Relative Humidity	54%
Test Site	TR3	Test Date	2017/11/07
Test Item	Power Spectral Density (UNII-Band 1 & UNII-2A & UNII-2C)		

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	PSD (dBm/ MHz)	Duty Cycle (%)	Total PSD (dBm/ MHz)	PSD Limit (dBm/MHz)	Result
11a	6Mbps	36	5180	2.71	95.81	2.89	≤ 11.00	Pass
11a	6Mbps	44	5220	2.82	95.81	3.00	≤ 11.00	Pass
11a	6Mbps	48	5240	3.01	95.81	3.19	≤ 11.00	Pass
11a	6Mbps	52	5260	2.58	95.81	2.76	≤ 11.00	Pass
11a	6Mbps	60	5300	2.51	95.81	2.70	≤ 11.00	Pass
11a	6Mbps	64	5320	2.45	95.81	2.63	≤ 11.00	Pass
11a	6Mbps	100	5500	3.15	95.81	3.34	≤ 11.00	Pass
11a	6Mbps	116	5580	3.05	95.81	3.24	≤ 11.00	Pass
11a	6Mbps	120	5600	3.61	95.81	3.80	≤ 11.00	Pass
11a	6Mbps	140	5700	3.47	95.81	3.66	≤ 11.00	Pass
11a	6Mbps	144	5720	3.70	95.81	3.89	≤ 11.00	Pass
11n-HT20	MCS0	36	5180	3.12	95.81	3.35	≤ 11.00	Pass
11n-HT20	MCS0	44	5220	3.03	95.81	3.26	≤ 11.00	Pass
11n-HT20	MCS0	48	5240	2.72	95.81	2.95	≤ 11.00	Pass
11n-HT20	MCS0	52	5260	2.52	94.78	2.76	≤ 11.00	Pass
11n-HT20	MCS0	60	5300	2.64	94.78	2.87	≤ 11.00	Pass
11n-HT20	MCS0	64	5320	2.67	94.78	2.90	≤ 11.00	Pass
11n-HT20	MCS0	100	5500	3.36	94.78	3.59	≤ 11.00	Pass
11n-HT20	MCS0	116	5580	3.51	94.78	3.74	≤ 11.00	Pass
11n-HT20	MCS0	120	5600	2.92	94.78	3.16	≤ 11.00	Pass
11n-HT20	MCS0	140	5700	3.18	94.78	3.42	≤ 11.00	Pass
11n-HT20	MCS0	144	5720	3.24	94.78	3.47	≤ 11.00	Pass

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	PSD (dBm/ MHz)	Duty Cycle (%)	Total PSD (dBm/ MHz)	PSD Limit (dBm/MHz)	Result
11n-HT40	MCS0	38	5190	-1.04	91.21	-0.64	≤ 11.00	Pass
11n-HT40	MCS0	46	5230	-1.14	91.21	-0.74	≤ 11.00	Pass
11n-HT40	MCS0	54	5270	-0.71	91.21	-0.31	≤ 11.00	Pass
11n-HT40	MCS0	62	5310	-1.07	91.21	-0.67	≤ 11.00	Pass
11n-HT40	MCS0	102	5510	-0.76	91.21	-0.36	≤ 11.00	Pass
11n-HT40	MCS0	110	5550	-0.89	91.21	-0.49	≤ 11.00	Pass
11n-HT40	MCS0	118	5590	-0.82	91.21	-0.42	≤ 11.00	Pass
11n-HT40	MCS0	134	5670	-0.69	91.21	-0.29	≤ 11.00	Pass
11n-HT40	MCS0	142	5710	-0.18	91.21	0.22	≤ 11.00	Pass
11ac-VHT20	MCS0	36	5180	3.25	91.21	3.46	≤ 11.00	Pass
11ac-VHT20	MCS0	44	5220	3.26	91.21	3.47	≤ 11.00	Pass
11ac-VHT20	MCS0	48	5240	2.70	95.30	2.91	≤ 11.00	Pass
11ac-VHT20	MCS0	52	5260	2.59	95.30	2.79	≤ 11.00	Pass
11ac-VHT20	MCS0	60	5300	2.45	95.30	2.66	≤ 11.00	Pass
11ac-VHT20	MCS0	64	5320	3.05	95.30	3.26	≤ 11.00	Pass
11ac-VHT20	MCS0	100	5500	3.58	95.30	3.79	≤ 11.00	Pass
11ac-VHT20	MCS0	116	5580	3.88	95.30	4.09	≤ 11.00	Pass
11ac-VHT20	MCS0	120	5600	3.95	95.30	4.16	≤ 11.00	Pass
11ac-VHT20	MCS0	140	5700	3.58	95.30	3.79	≤ 11.00	Pass
11ac-VHT20	MCS0	144	5720	3.30	95.30	3.51	≤ 11.00	Pass
11ac-VHT40	MCS0	38	5190	-1.20	91.02	-0.79	≤ 11.00	Pass
11ac-VHT40	MCS0	46	5230	-0.87	91.02	-0.46	≤ 11.00	Pass
11ac-VHT40	MCS0	54	5270	-0.99	91.02	-0.58	≤ 11.00	Pass
11ac-VHT40	MCS0	62	5310	-0.94	91.02	-0.54	≤ 11.00	Pass
11ac-VHT40	MCS0	102	5510	-0.77	91.02	-0.36	≤ 11.00	Pass
11ac-VHT40	MCS0	110	5550	-0.55	91.02	-0.14	≤ 11.00	Pass
11ac-VHT40	MCS0	118	5590	-0.60	91.02	-0.19	≤ 11.00	Pass
11ac-VHT40	MCS0	134	5670	-1.14	91.02	-0.73	≤ 11.00	Pass
11ac-VHT40	MCS0	142	5710	-0.67	91.02	-0.26	≤ 11.00	Pass
11ac-VHT80	MCS0	42	5210	-4.94	91.02	-4.20	≤ 11.00	Pass
11ac-VHT80	MCS0	58	5290	-5.38	91.02	-4.64	≤ 11.00	Pass
11ac-VHT80	MCS0	106	5530	-4.85	84.37	-4.11	≤ 11.00	Pass
11ac-VHT80	MCS0	122	5610	-7.18	84.37	-6.44	≤ 11.00	Pass
11ac-VHT80	MCS0	138	5690	-6.02	84.37	-5.28	≤ 11.00	Pass

Note: When EUT duty cycle < 98%, Total PSD (dBm/MHz) = PSD (dBm/MHz) + 10*log (1/Duty Cycle).

Product	W-LAN + Bluetooth Module	Temperature	23°C
Test Engineer	Dandy Li	Relative Humidity	54%
Test Site	TR3	Test Date	2017/11/07
Test Item	Power Spectral Density (UNII-Band 3)		

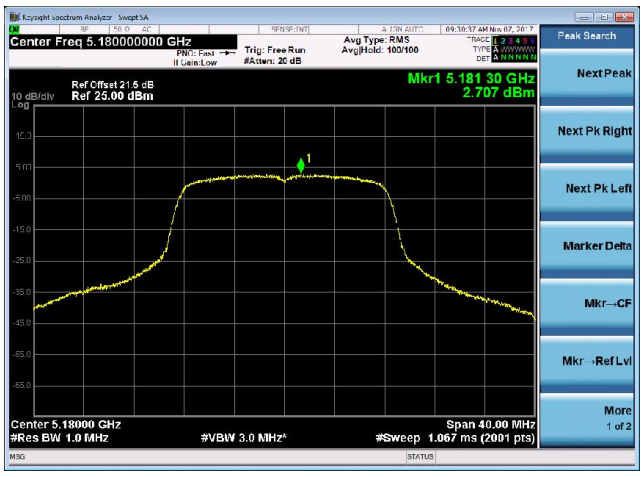
Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	PSD (dBm/ 100kHz)	Duty Cycle (%)	Constant Factor	Total PSD (dBm/ 500kHz)	Limit (dBm/ 500kHz)	Result
11a	6Mbps	149	5745	-6.22	95.81	6.99	-6.04	≤ 30.00	Pass
11a	6Mbps	157	5785	-6.62	95.81	6.99	-6.44	≤ 30.00	Pass
11a	6Mbps	165	5825	-6.67	95.81	6.99	-6.48	≤ 30.00	Pass
11n-HT20	MCS0	149	5745	-6.16	94.78	6.99	-5.93	≤ 30.00	Pass
11n-HT20	MCS0	157	5785	-6.42	94.78	6.99	-6.18	≤ 30.00	Pass
11n-HT20	MCS0	165	5825	-7.17	94.78	6.99	-6.94	≤ 30.00	Pass
11n-HT40	MCS0	151	5755	-10.65	91.21	6.99	-10.25	≤ 30.00	Pass
11n-HT40	MCS0	159	5795	-10.63	91.21	6.99	-10.23	≤ 30.00	Pass
11ac-VHT20	MCS0	149	5745	-5.43	95.30	6.99	-5.22	≤ 30.00	Pass
11ac-VHT20	MCS0	157	5785	-5.73	95.30	6.99	-5.52	≤ 30.00	Pass
11ac-VHT20	MCS0	165	5825	-5.84	95.30	6.99	-5.63	≤ 30.00	Pass
11ac-VHT40	MCS0	151	5755	-9.84	91.02	6.99	-9.43	≤ 30.00	Pass
11ac-VHT40	MCS0	159	5795	-9.93	91.02	6.99	-9.52	≤ 30.00	Pass
11ac-VHT80	MCS0	155	5775	-14.81	84.37	6.99	-14.07	≤ 30.00	Pass

Note 1: When EUT duty cycle ≥ 98%, Total PSD (dBm/500kHz) = PSD (dBm/100kHz) + Constant Factor.

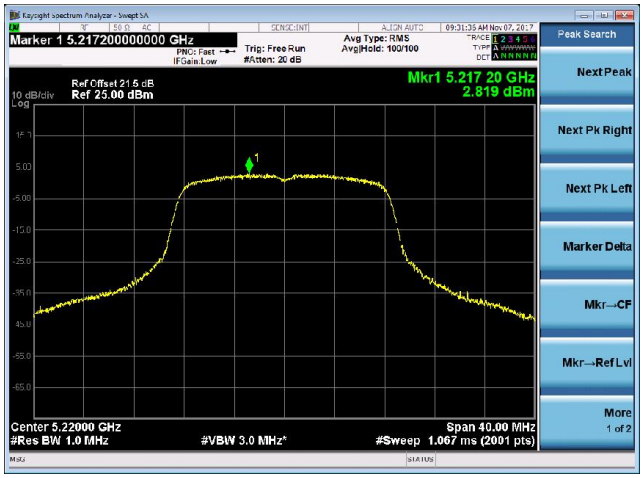
Note 2: When EUT duty cycle < 98%, Total PSD (dBm/500kHz) = PSD (dBm/100kHz) + 10*log (1/Duty Cycle) + Constant Factor.

802.11a Power Spectral Density

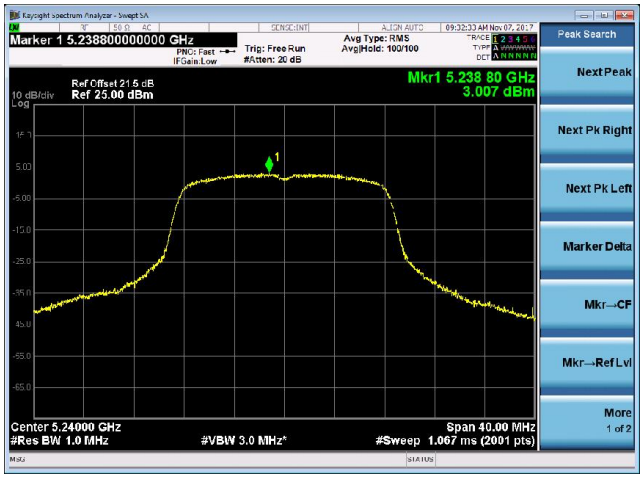
Channel 36 (5180MHz)



Channel 44 (5220MHz)

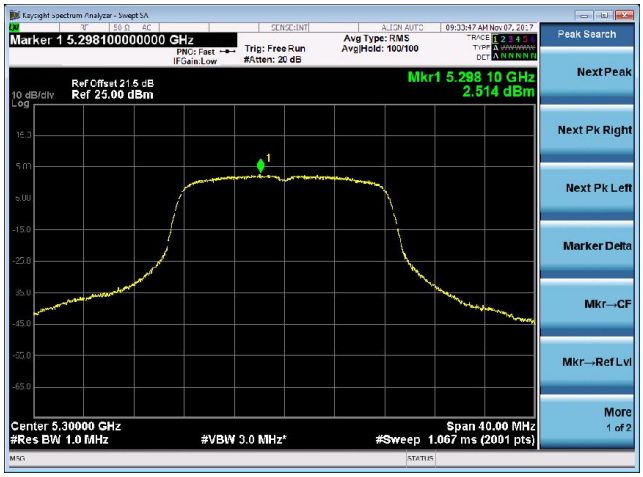


Channel 48 (5240MHz)

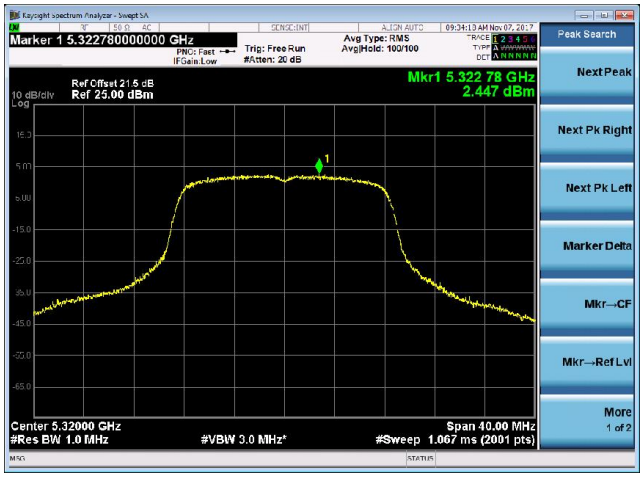


Channel 52 (5260MHz)

Channel 60 (5300MHz)

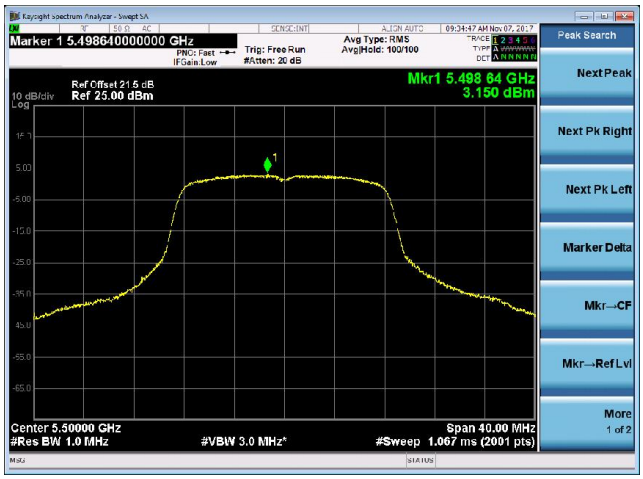


Channel 64 (5320MHz)

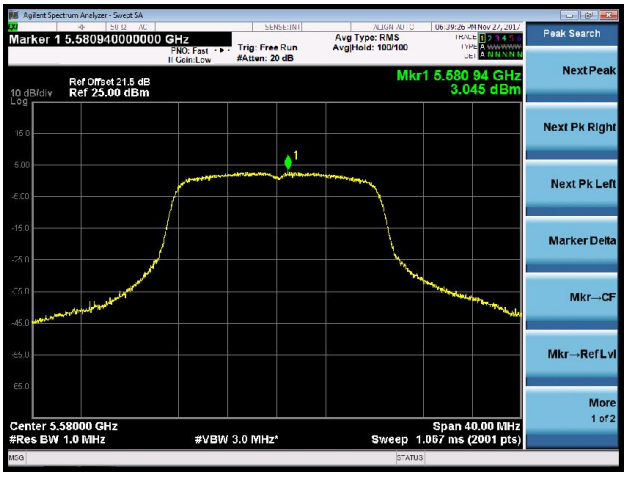


802.11a Power Spectral Density

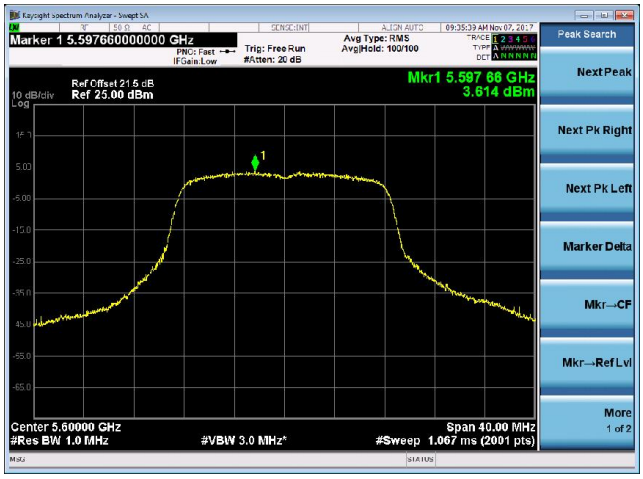
Channel 100 (5500MHz)



Channel 116 (5580MHz)

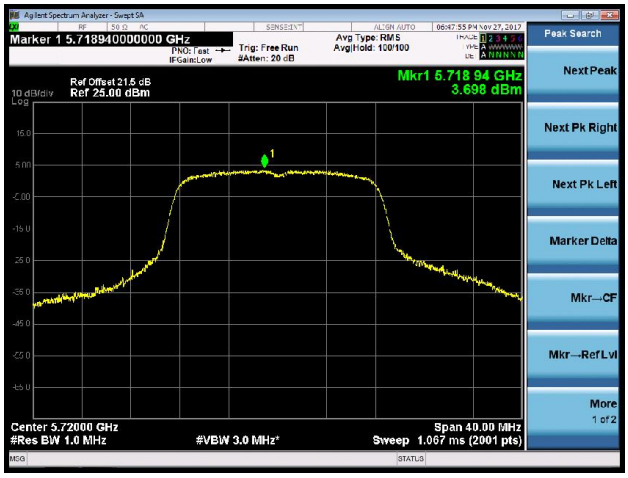


Channel 120 (5600MHz)

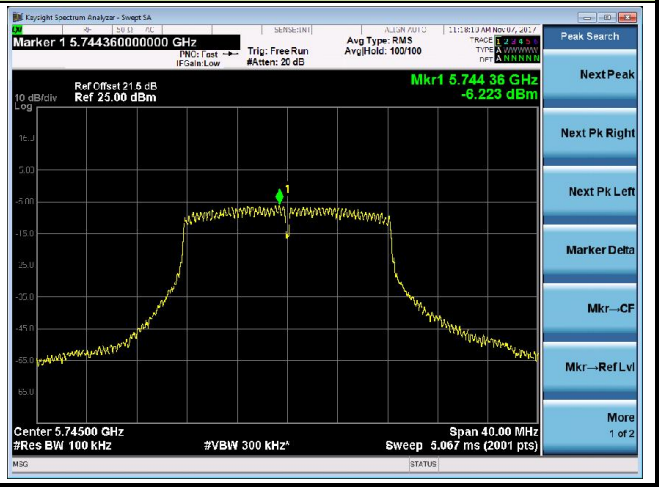


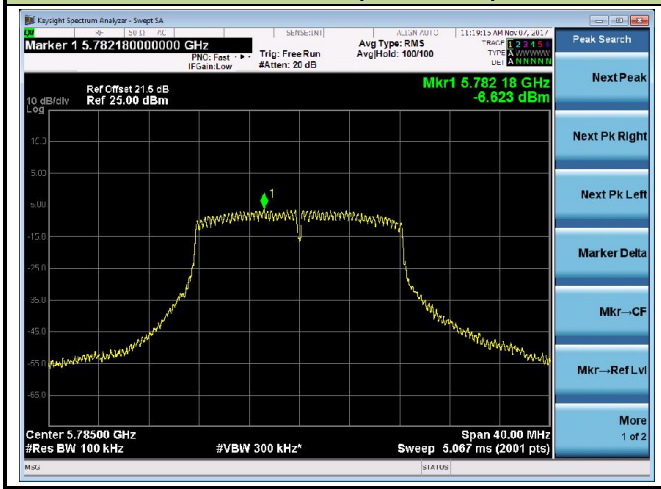
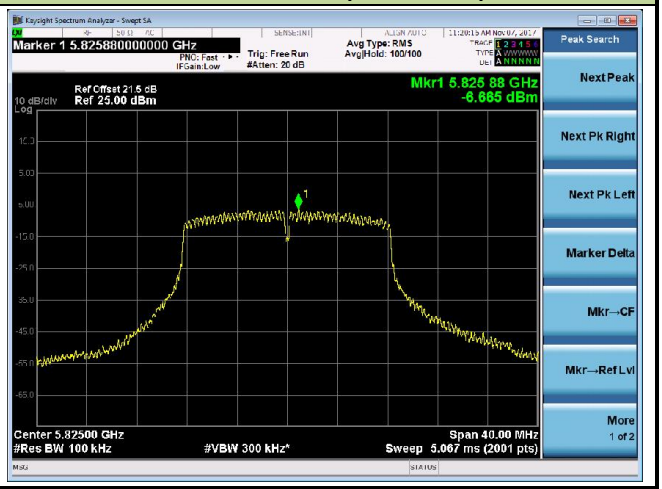
Channel 140 (5700MHz)

Channel 144 (5720MHz)



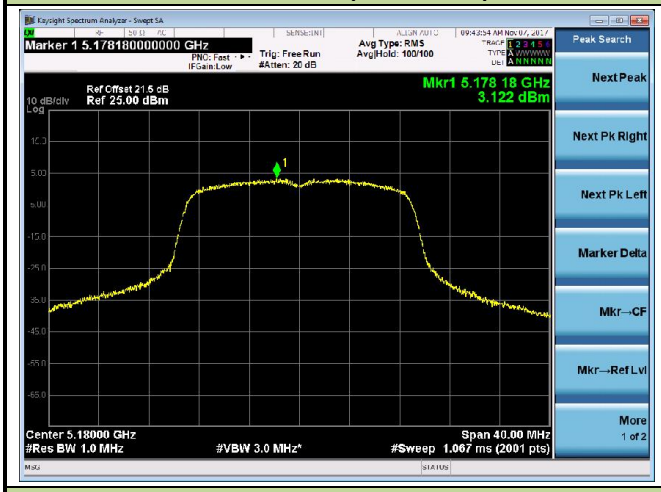
Channel 149 (5745MHz)



802.11a Power Spectral Density	
Channel 157 (5785MHz)	**Channel 165 (5825MHz)**
	

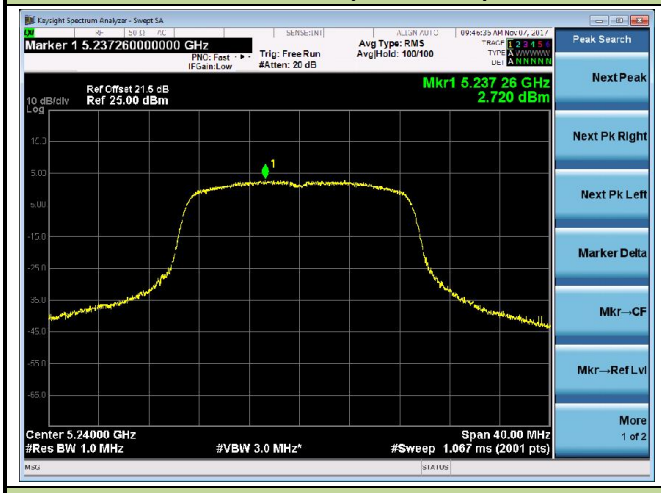
802.11n-HT20 Power Spectral Density

Channel 36 (5180MHz)



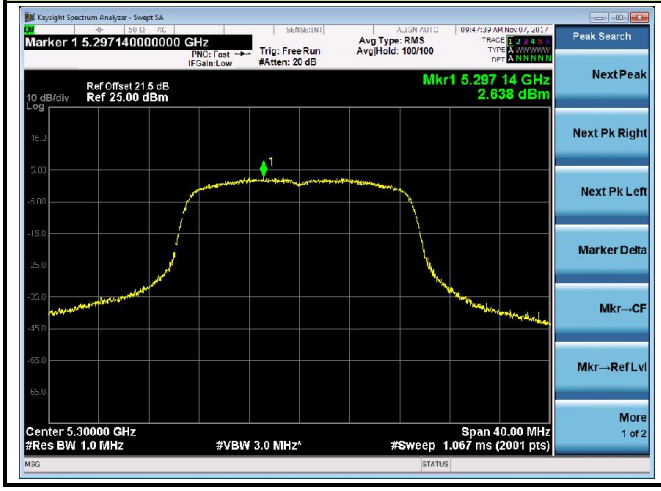
Channel 44 (5220MHz)

Channel 48 (5240MHz)

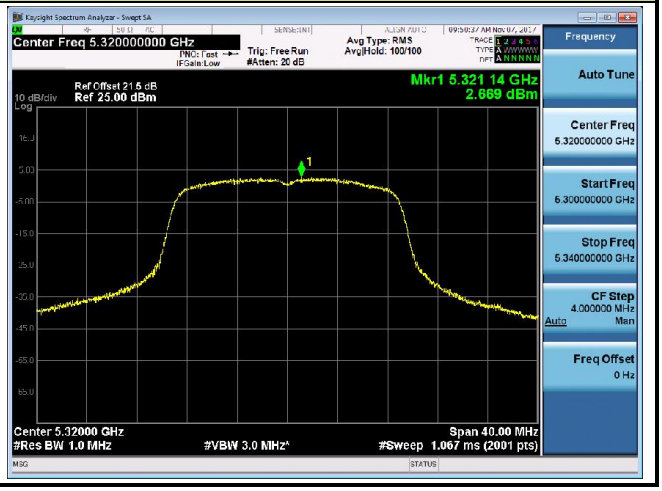


Channel 52 (5260MHz)

Channel 60 (5300MHz)

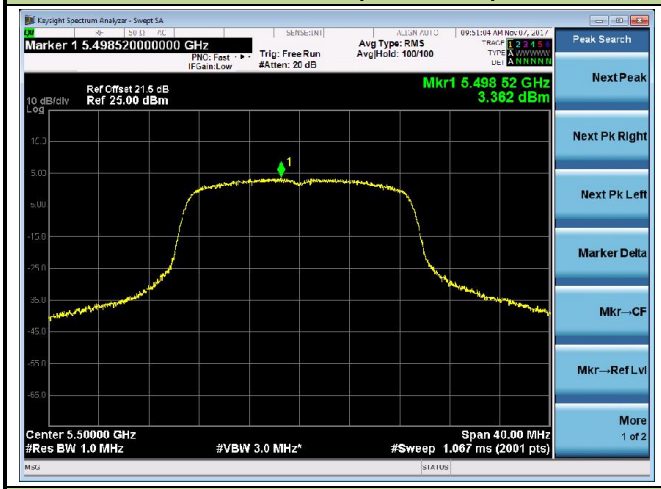


Channel 64 (5320MHz)

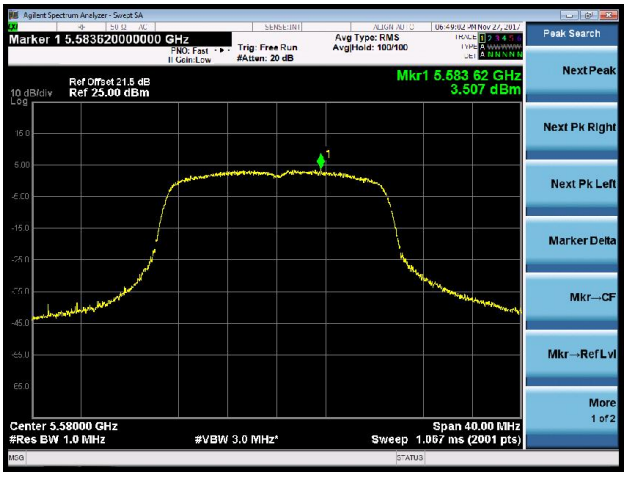


802.11n-HT20 Power Spectral Density

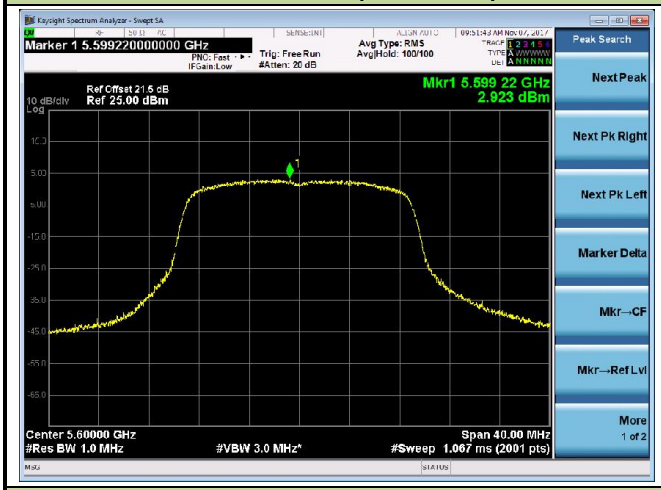
Channel 100 (5500MHz)



Channel 116 (5580MHz)

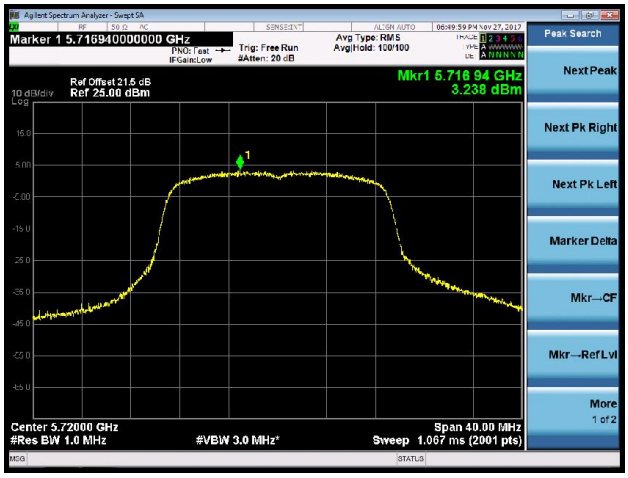


Channel 120 (5600MHz)

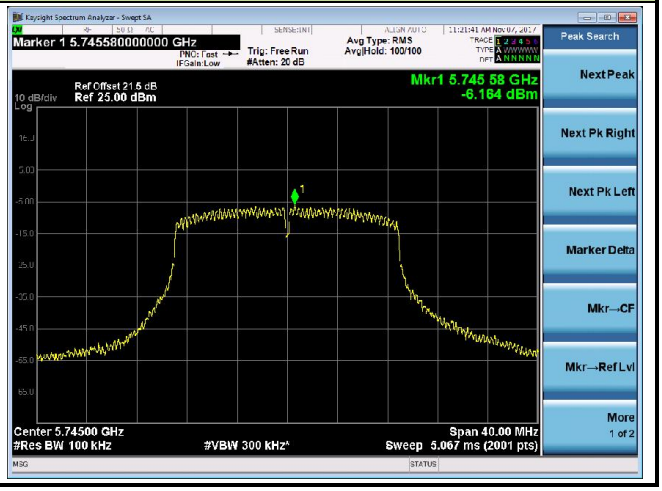


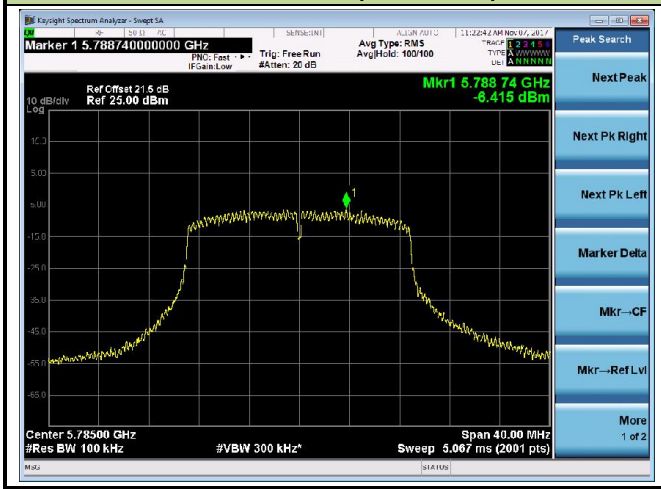
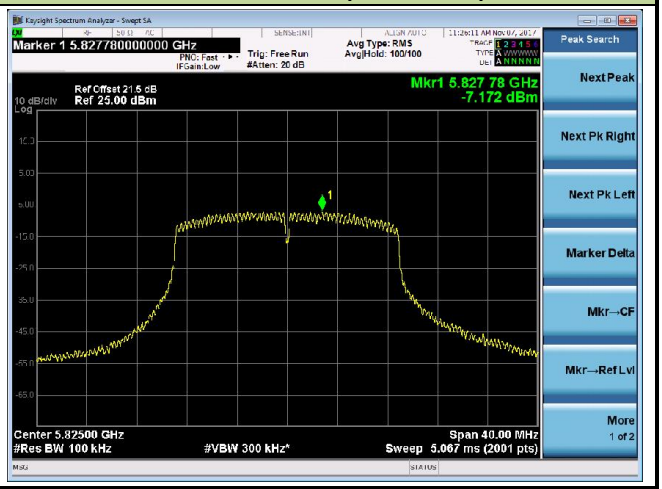
Channel 140 (5700MHz)

Channel 144 (5720MHz)



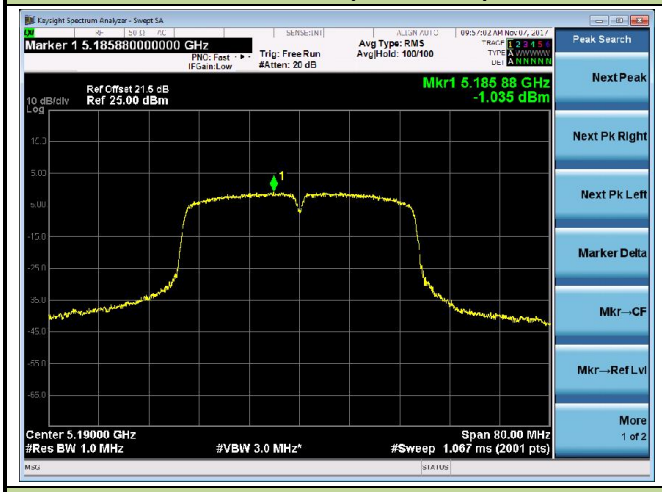
Channel 149 (5745MHz)



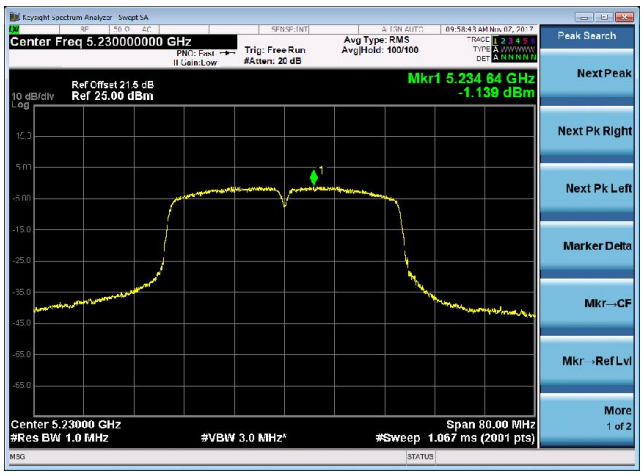
802.11n-HT20 Power Spectral Density	
Channel 157 (5785MHz)	**Channel 165 (5825MHz)**
	

802.11n-HT40 Power Spectral Density

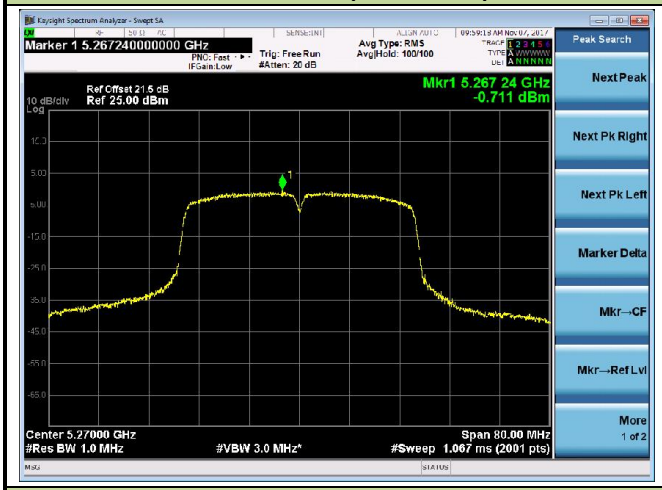
Channel 38 (5190MHz)



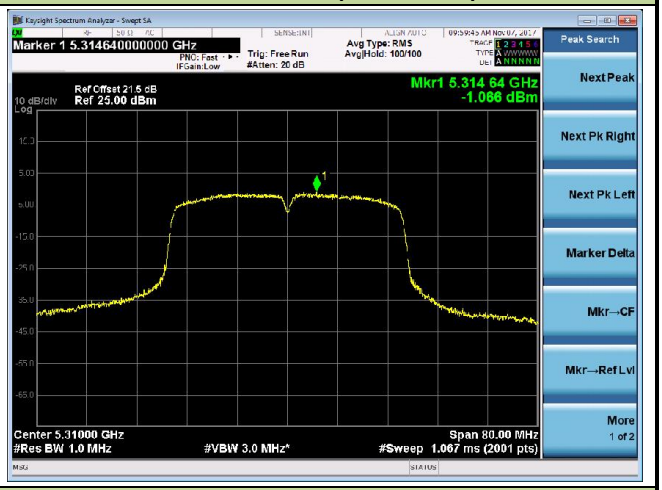
Channel 46 (5230MHz)



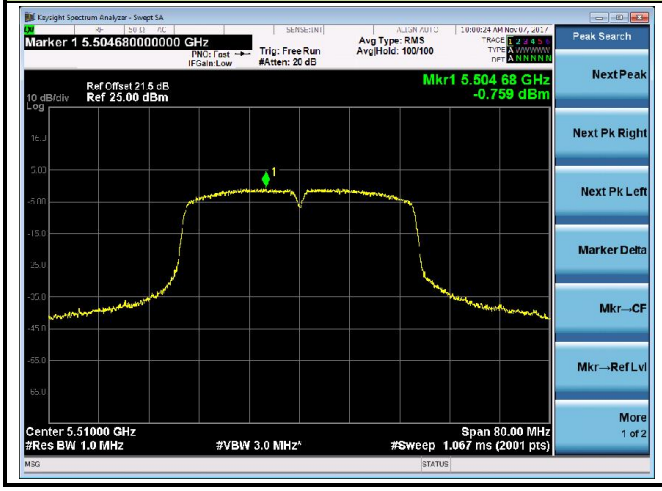
Channel 54 (5270MHz)



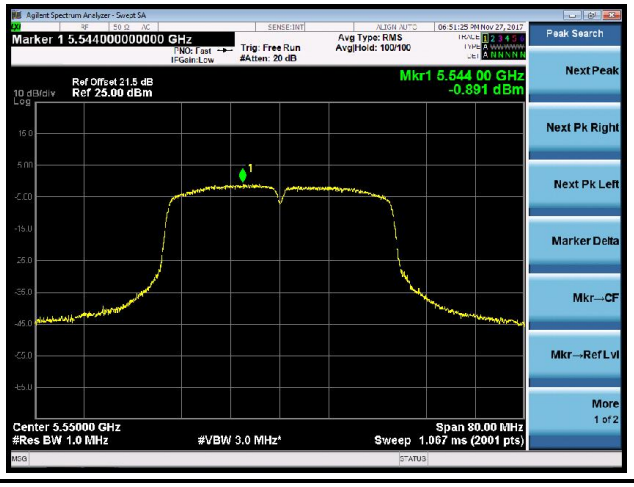
Channel 62 (5310MHz)



Channel 102 (5510MHz)

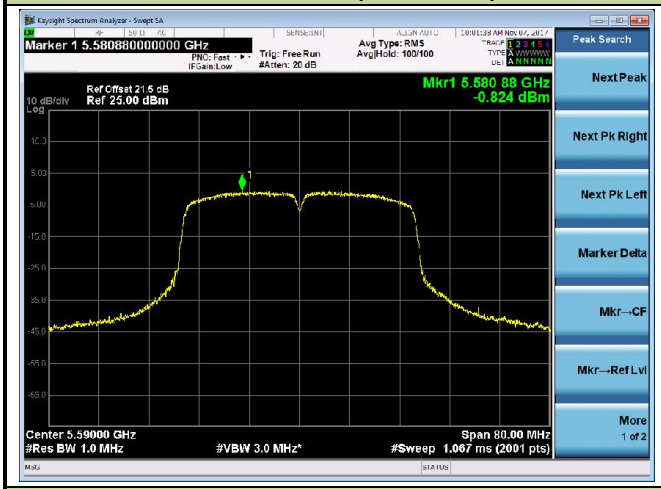


Channel 110 (5550MHz)

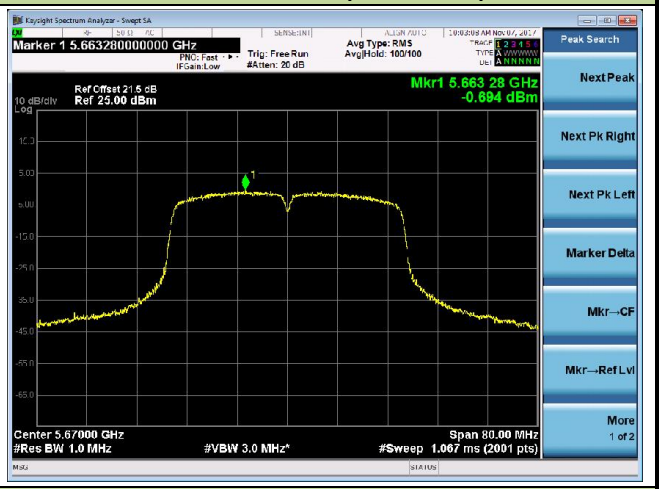


802.11n-HT40 Power Spectral Density

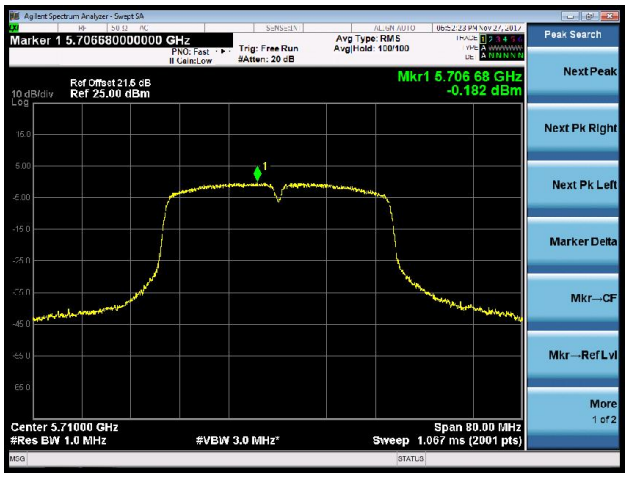
Channel 118 (5590MHz)



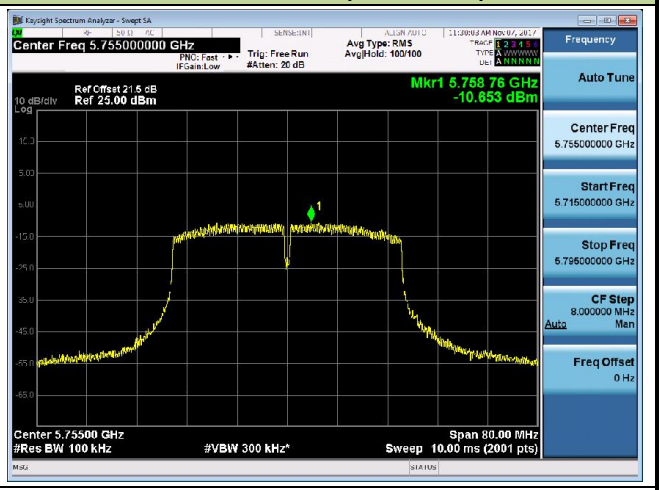
Channel 134 (5670MHz)



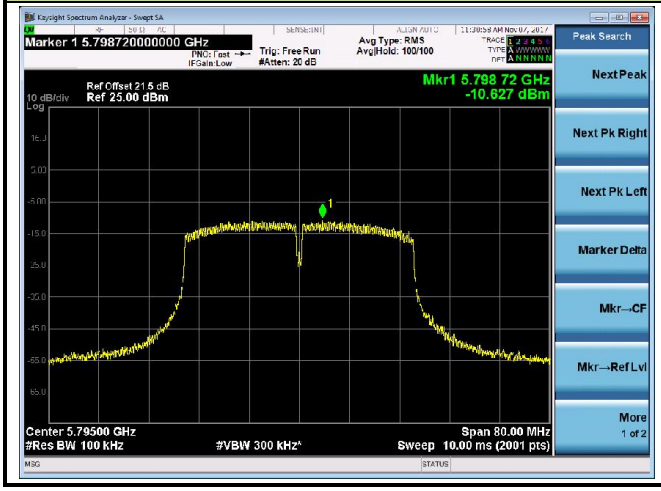
Channel 142 (5710MHz)



Channel 151 (5755MHz)

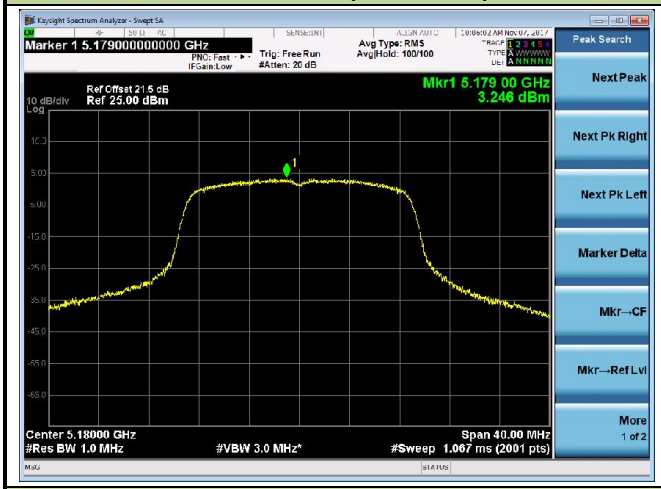


Channel 159 (5795MHz)



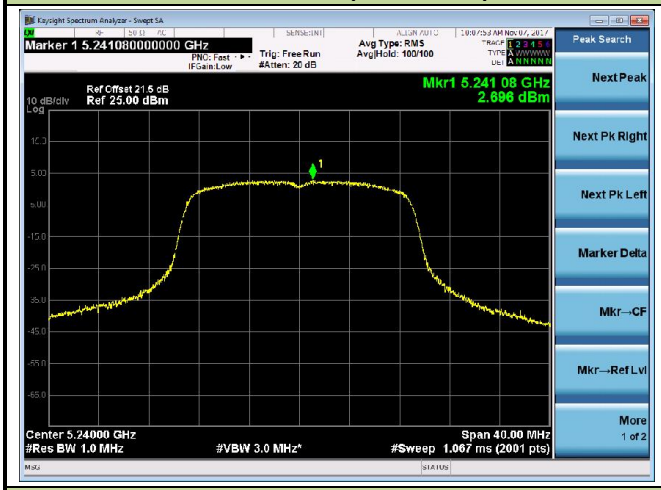
802.11ac-VHT20 Power Spectral Density

Channel 36 (5180MHz)



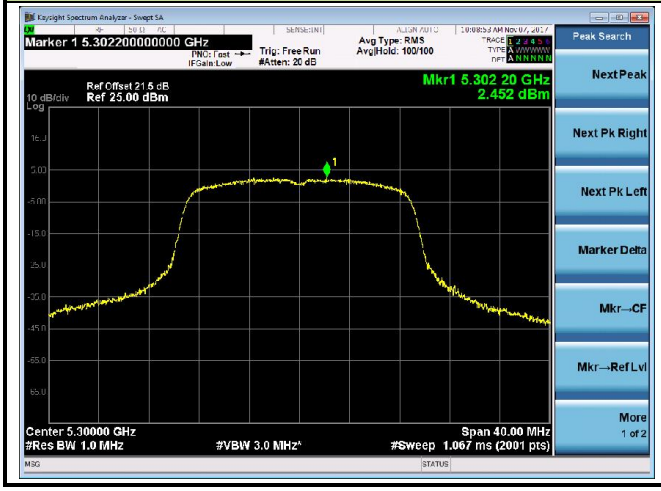
Channel 44 (5220MHz)

Channel 48 (5240MHz)

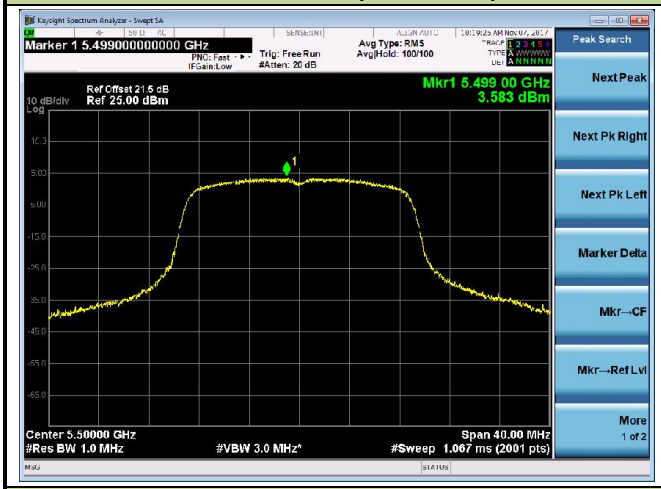
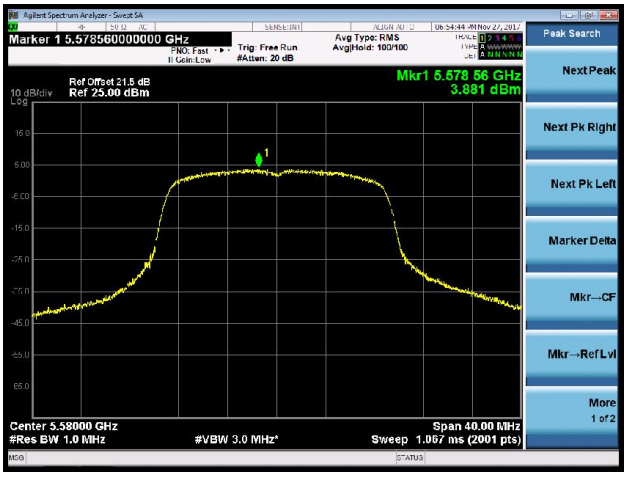
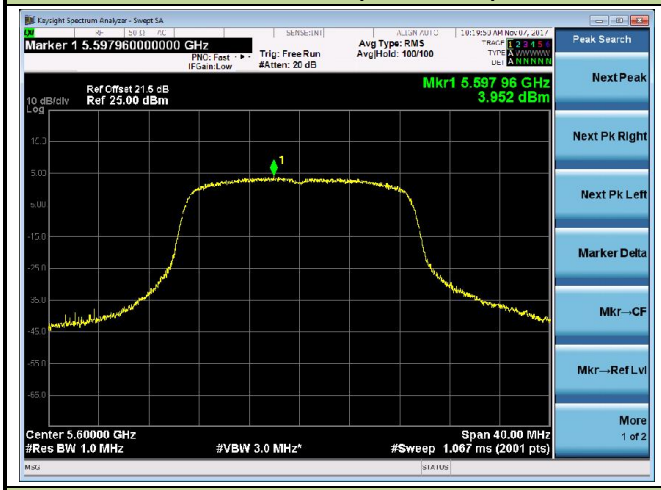
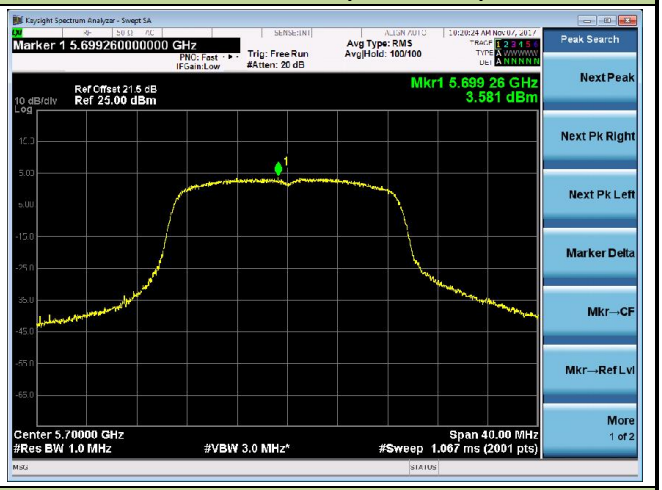
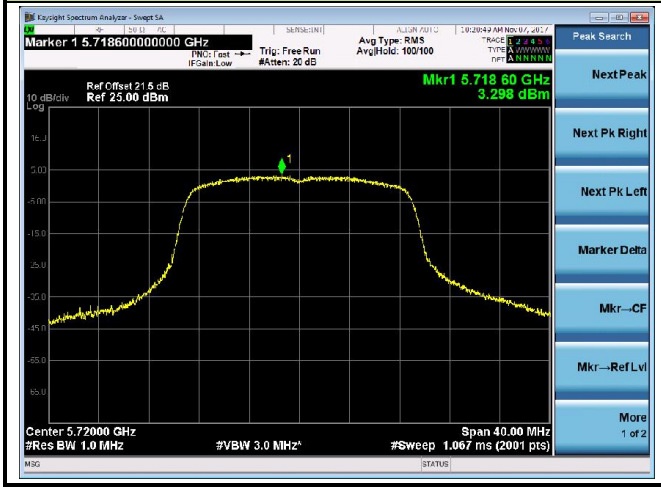
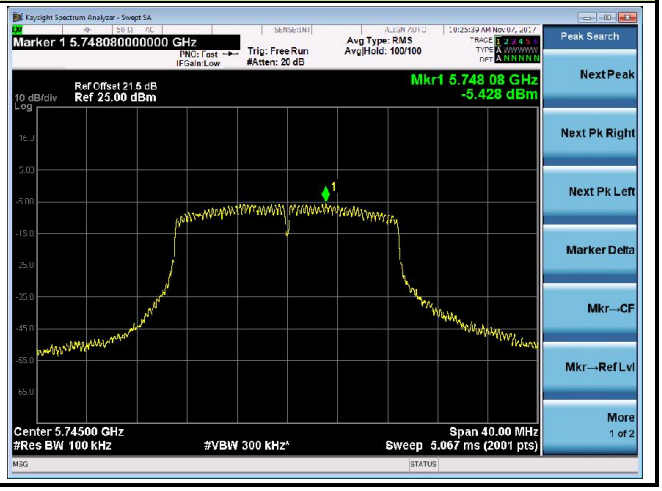


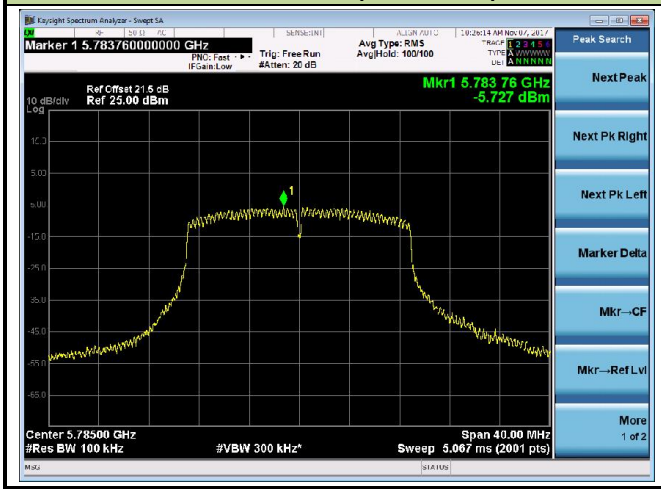
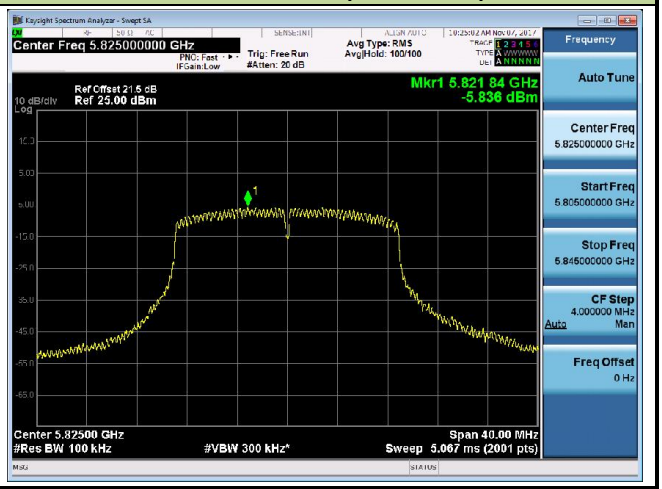
Channel 52 (5260MHz)

Channel 60 (5300MHz)



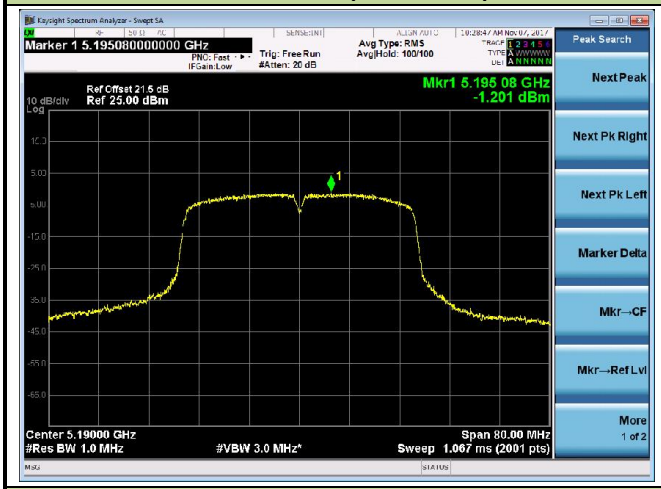
Channel 64 (5320MHz)

802.11ac-VHT20 Power Spectral Density	
Channel 100 (5500MHz)	**Channel 116 (5580MHz)**
	
Channel 120 (5600MHz)	**Channel 140 (5700MHz)**
	
Channel 144 (5720MHz)	**Channel 149 (5745MHz)**
	

802.11ac-VHT20 Power Spectral Density	
Channel 157 (5785MHz)	Channel 165 (5825MHz)
	

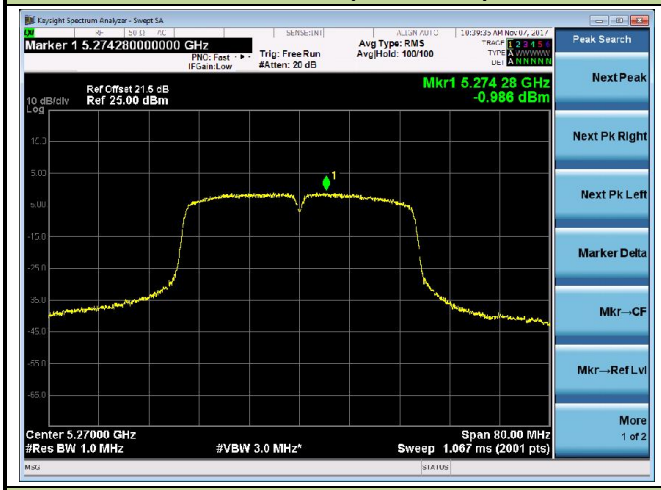
802.11ac-VHT40 Power Spectral Density

Channel 38 (5190MHz)



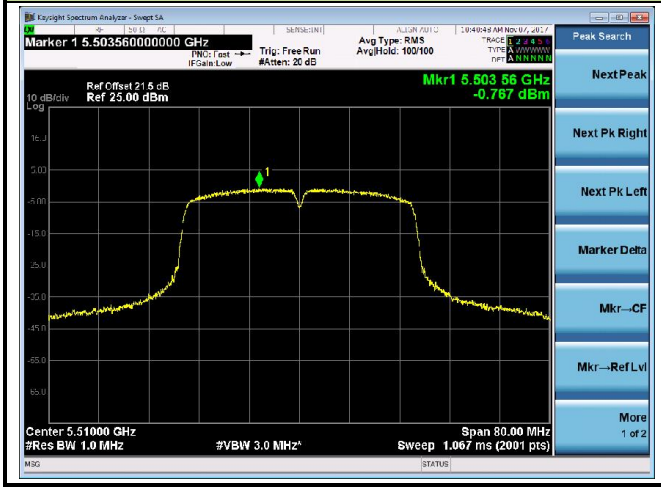
Channel 46 (5230MHz)

Channel 54 (5270MHz)

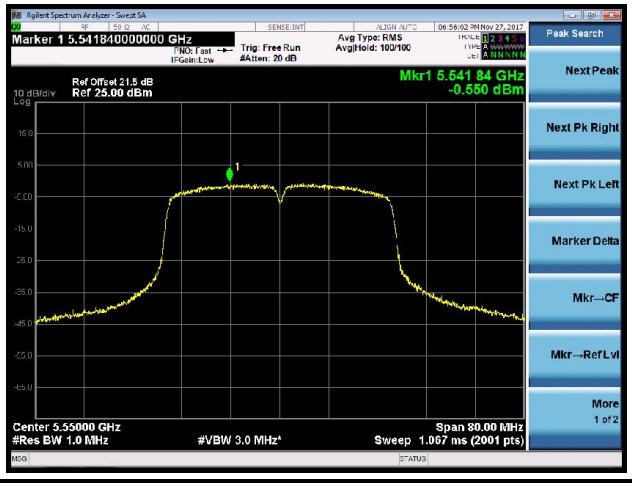


Channel 62 (5310MHz)

Channel 102 (5510MHz)

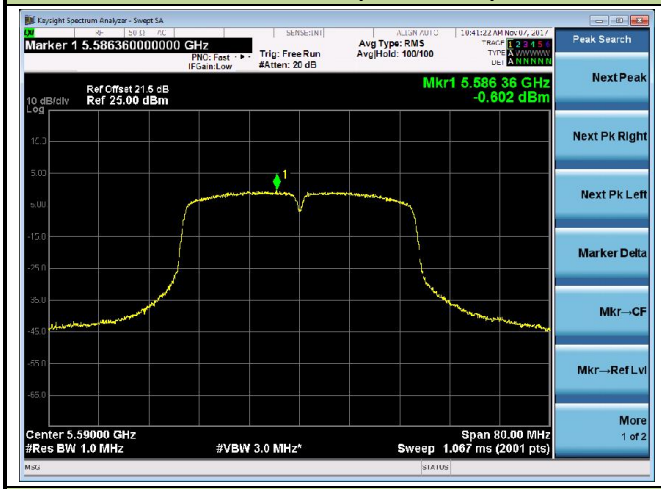


Channel 110 (5550MHz)

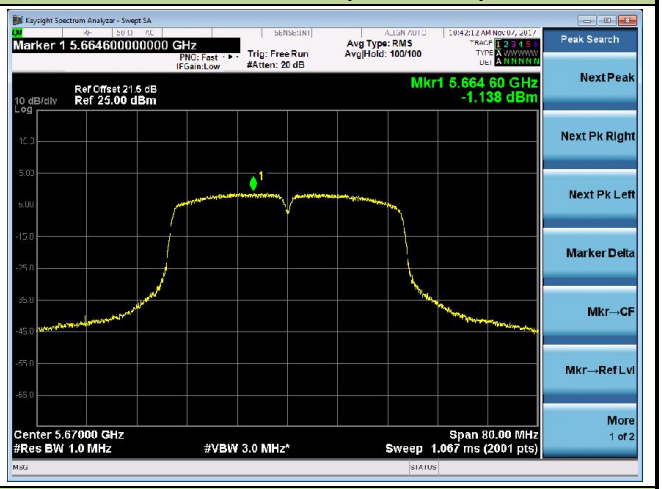


802.11ac-VHT40 Power Spectral Density

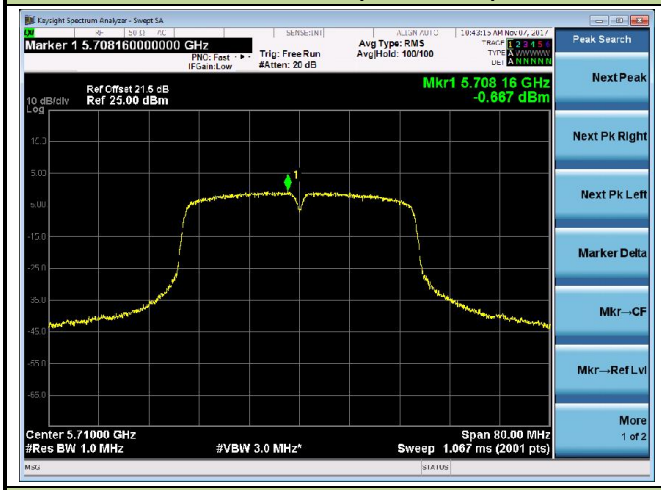
Channel 118 (5590MHz)



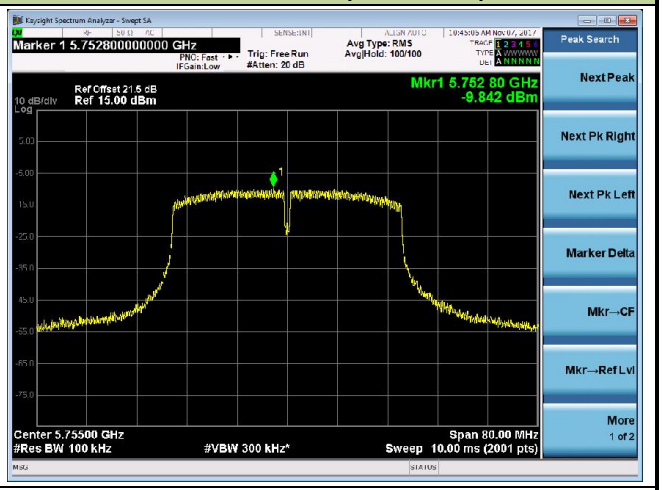
Channel 134 (5670MHz)



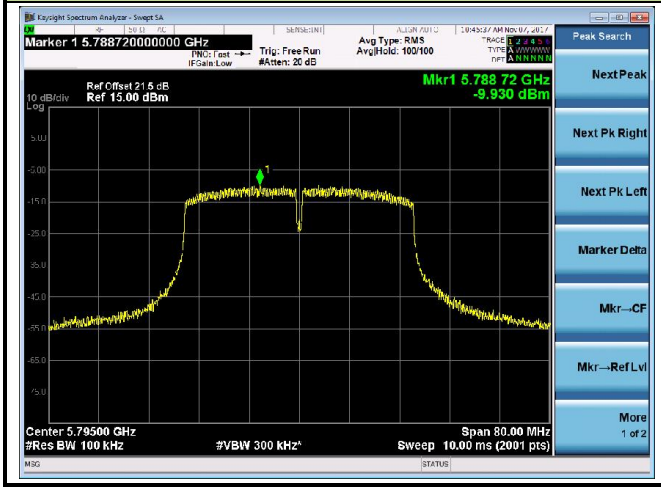
Channel 142 (5710MHz)



Channel 151 (5755MHz)

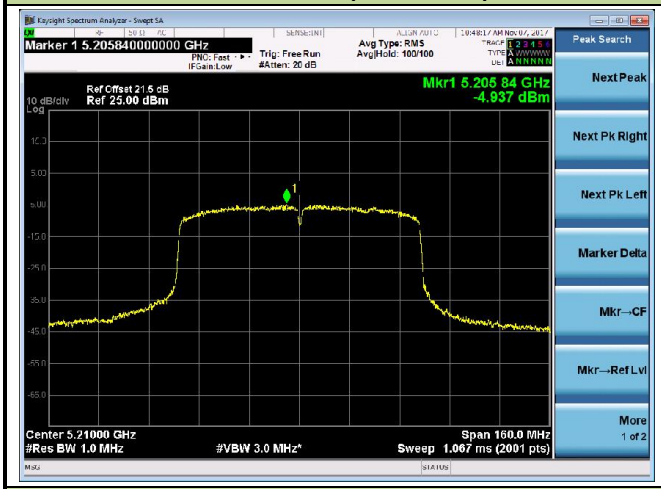


Channel 159 (5795MHz)



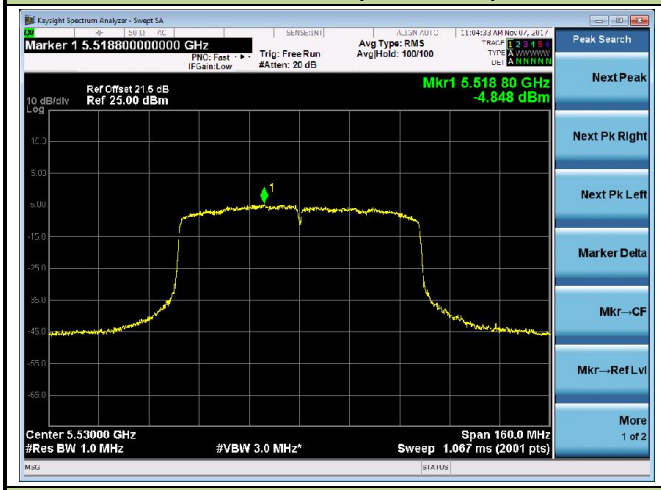
802.11ac-VHT80 Power Spectral Density

Channel 42 (5210MHz)

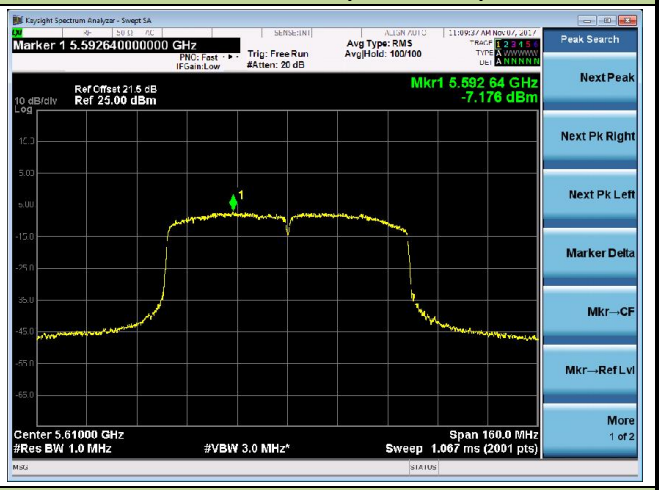


Channel 58 (5290MHz)

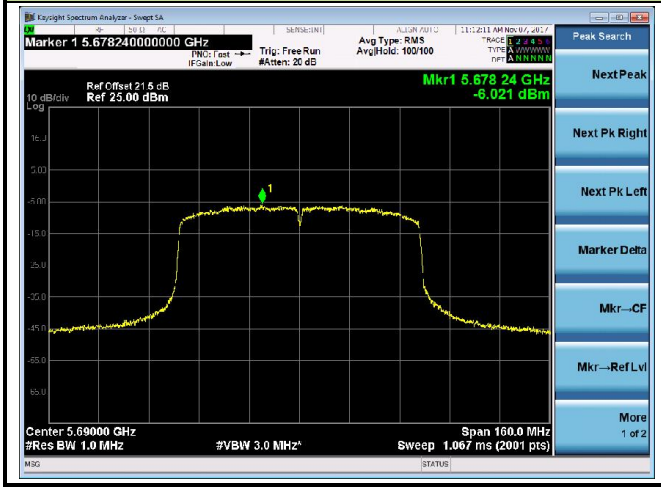
Channel 106 (5530MHz)



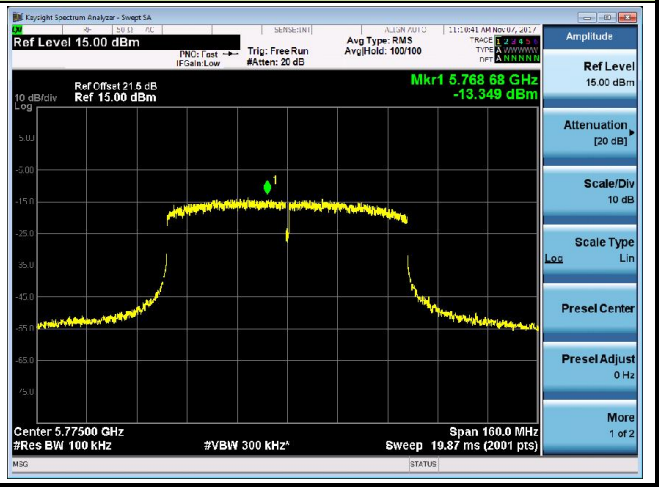
Channel 122 (5610MHz)



Channel 138 (5690MHz)



Channel 155 (5775MHz)



7.7. Frequency Stability Measurement

7.7.1.Test Limit

Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

7.7.2.Test Procedure Used

Frequency Stability Under Temperature Variations:

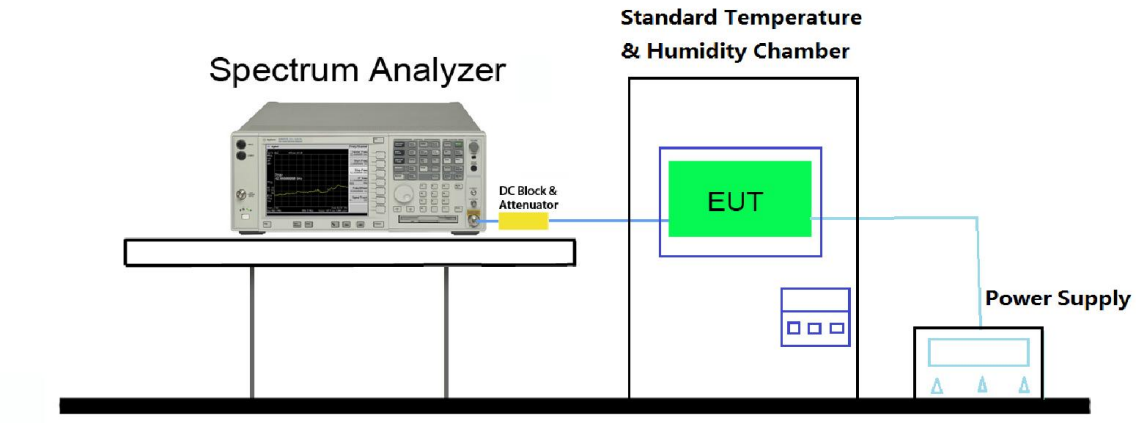
The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to highest. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C decreased per stage until the lowest temperature reached.

Frequency Stability Under Voltage Variations:

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation (±15%) and endpoint, record the maximum frequency change.

7.7.3.Test Setup



7.7.4.Test Result

Test Engineer	Hunk Li	Temperature	-30 ~ 50°C
Test Time	2017/11/27	Relative Humidity	48 ~ 55%RH
Test Mode	5180MHz (Carrier Mode)	Test Site	TR3

Voltage (%)	Power (V_{DC})	Temp (°C)	Frequency Tolerance (ppm)			
			0 minutes	2 minutes	5 minutes	10 minutes
100%	3.3	- 30	4.27	4.31	4.26	3.78
		- 20	3.43	4.27	4.28	4.11
		- 10	3.69	4.10	4.33	4.35
		0	3.88	4.22	3.97	4.11
		+ 10	4.01	4.16	3.89	3.43
		+ 20 (Ref)	1.34	1.62	1.22	1.17
		+ 30	-1.07	-0.87	-1.02	-1.35
		+ 40	-1.35	-1.45	-1.86	-1.95
		+ 50	-2.02	-2.41	-2.55	-2.87
115%	3.8	+ 20	-1.32	-1.44	-2.33	-2.41
85%	2.8	+ 20	-2.23	-2.64	-3.13	-3.39

Note: Frequency Tolerance (ppm) = {[Measured Frequency (Hz) – Declared Frequency (Hz)] / Declared Frequency (Hz)} *10^6.

Test Engineer	Hunk Li	Temperature	-30 ~ 50°C
Test Time	2018/01/31	Relative Humidity	48 ~ 55%RH
Test Mode	5825MHz (Carrier Mode)	Test Site	TR3

Voltage (%)	Power (V_{DC})	Temp (°C)	Frequency Tolerance (ppm)			
			0 minutes	2 minutes	5 minutes	10 minutes
100%	3.3	- 30	3.03	2.84	2.51	2.39
		- 20	3.27	3.31	3.39	3.58
		- 10	3.54	3.53	3.81	3.59
		0	4.54	4.21	4.61	4.50
		+ 10	4.90	4.53	4.91	5.08
		+ 20 (Ref)	1.47	1.32	1.50	1.45
		+ 30	-2.18	-2.19	-2.83	-2.89
		+ 40	-2.57	-2.67	-2.62	-2.69
		+ 50	-3.48	-3.85	-3.48	-3.78
115%	3.8	+ 20	-2.08	-2.65	-2.81	-2.36
85%	2.8	+ 20	-4.13	-4.87	-4.89	-4.62

Note: Frequency Tolerance (ppm) = {[Measured Frequency (Hz) – Declared Frequency (Hz)] / Declared Frequency (Hz)} *10^6.

7.8. Radiated Spurious Emission Measurement

7.8.1.Test Limit

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [uV/m]	Measured Distance [Meters]
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

7.8.2.Test Procedure Used

KDB 789033 D02v02r01 – Section G

7.8.3.Test Setting

Quasi-Peak& Average Measurements below 30MHz

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = 200Hz for 9kHz to 150kHz frequency; RBW = 9kHz for 0.15MHz to 30MHz frequency
4. Detector = CISPR quasi-peak or power average (Average)
5. Sweep time = auto couple
6. Trace was allowed to stabilize

Quasi-Peak Measurements below 1GHz

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = 120 kHz
4. Detector = CISPR quasi-peak
5. Sweep time = auto couple
6. Trace was allowed to stabilize

Peak Measurements above 1GHz

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Average Measurements above 1GHz (Method AD)

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. If duty cycle ≥ 98%, VBW ≤ RBW/100 but not less than 10Hz; If duty cycle < 98%, set VBW ≥ 1/T.
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% duty cycle. For lower duty cycles, increase the minimum number of traces by a factor of 1/x, where x is the duty cycle.