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.

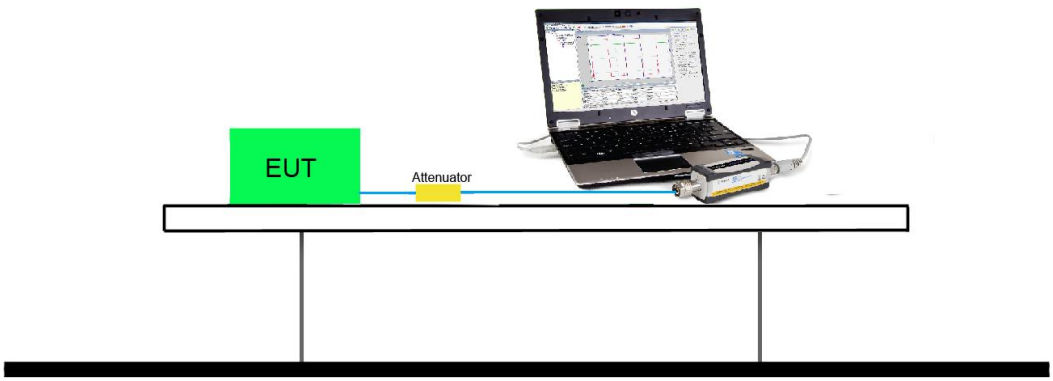
7.5.2.Test Procedure Used

KDB 789033 D02v01r03 - 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

TPC is not required for 5150 ~ 5250MHz & 5725 ~ 5850MHz.

7.6. Power Spectral Density Measurement

7.6.1.Test Limit

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band.

5150~5250MHz: Limit (dBm/MHz) = 17dBm/MHz - (9.91dBi - 6dBi) = 13.09dBm/MHz

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

5725~5850MHz: Limit (dBm/500KHz) = 30dBm/KHz - (10.13dBi - 6dBi) = 25.87dBm/500KHz

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.

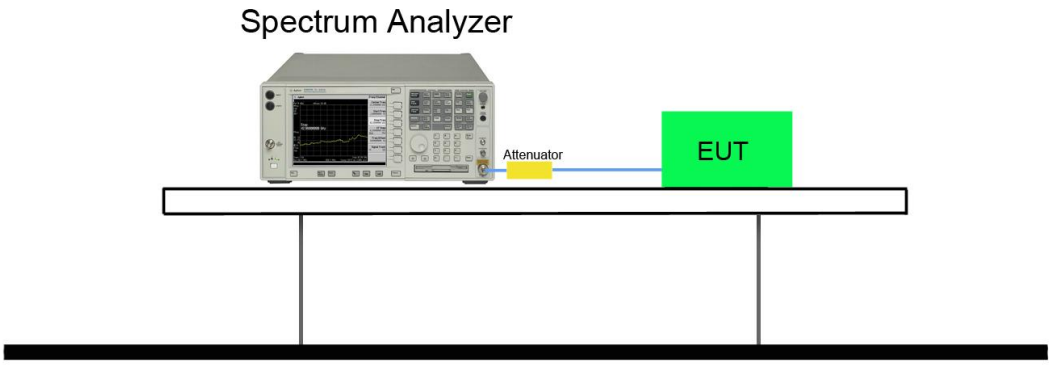
7.6.2.Test Procedure Used

KDB 789033 D02v01r03 - 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 EBW 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 (Average)
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.

7.6.4.Test Setup



7.6.5.Test Result

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	Ant 0 PSD (dBm/ MHz)	Ant 1 PSD (dBm/ MHz)	Ant 2 PSD (dBm/ MHz)	Ant 3 PSD (dBm/ MHz)	Duty Cycle (%)	Total PSD (dBm/ MHz)	PSD Limit (dBm/MHz)	Result
11a	6	36	5180	6.63	4.86	5.05	4.79	90.84	11.84	≤ 13.09	Pass
11a	6	44	5220	7.82	5.93	5.70	6.14	90.84	12.92	≤ 13.09	Pass
11a	6	48	5240	7.60	5.99	5.79	6.19	90.84	12.89	≤ 13.09	Pass
11n-HT20	26	36	5180	7.87	6.39	5.42	6.17	98.61	12.64	≤ 13.09	Pass
11n-HT20	26	44	5220	8.46	5.14	4.71	5.90	98.61	12.40	≤ 13.09	Pass
11n-HT20	26	48	5240	7.97	5.35	4.92	6.37	98.61	12.40	≤ 13.09	Pass
11n-HT40	54	38	5190	0.43	-0.30	0.00	0.49	96.77	6.33	≤ 13.09	Pass
11n-HT40	54	46	5230	4.50	1.99	2.17	3.02	96.77	9.20	≤ 13.09	Pass
11ac-VHT20	26	36	5180	5.33	4.87	5.38	5.83	98.81	11.44	≤ 13.09	Pass
11ac-VHT20	26	44	5220	7.56	4.96	5.13	6.30	98.81	12.19	≤ 13.09	Pass
11ac-VHT20	26	48	5240	7.13	5.35	5.26	6.28	98.81	12.14	≤ 13.09	Pass
11ac-VHT40	54	38	5190	0.37	-0.37	0.03	0.12	97.57	6.18	≤ 13.09	Pass
11ac-VHT40	54	46	5230	4.20	2.25	2.22	2.83	97.57	9.08	≤ 13.09	Pass
11ac-VHT80	117.2	42	5210	-1.66	-2.31	-1.97	-1.21	96.32	4.41	≤ 13.09	Pass

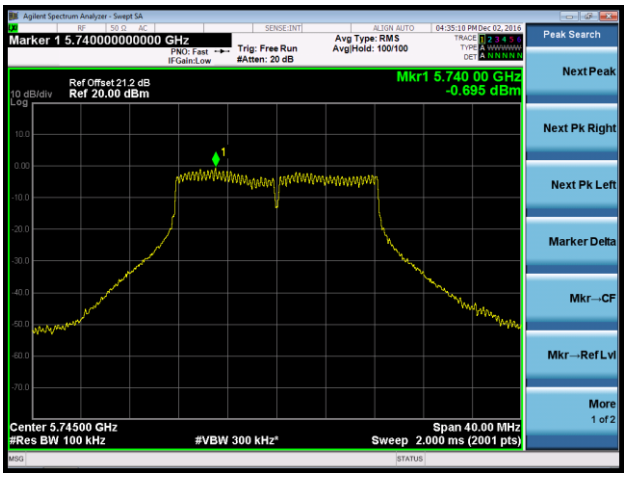
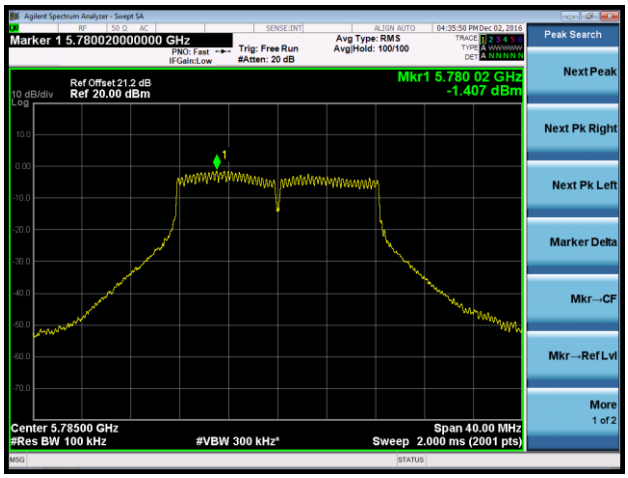
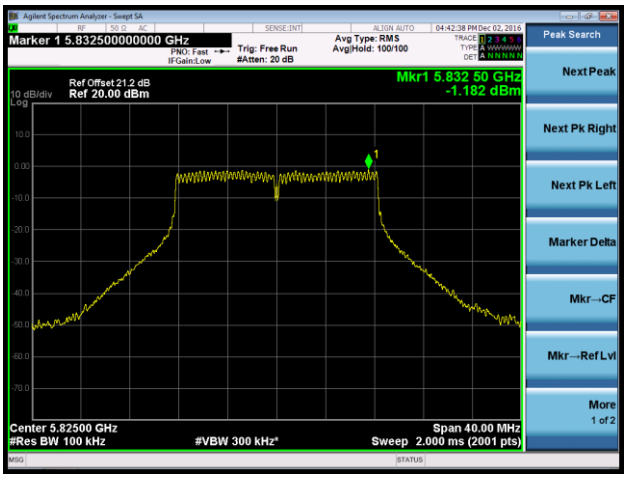
Note 1: When EUT duty cycle ≥ 98%, the Total PSD (dBm/MHz) = $10*\log\{10^{(\text{Ant 0 PSD}/10)} + 10^{(\text{Ant 1 PSD}/10)} + 10^{(\text{Ant 2 PSD}/10)} + 10^{(\text{Ant 3 PSD}/10)}\}$.

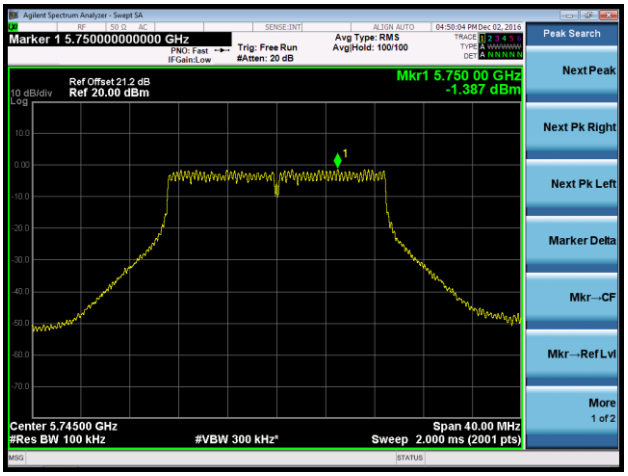
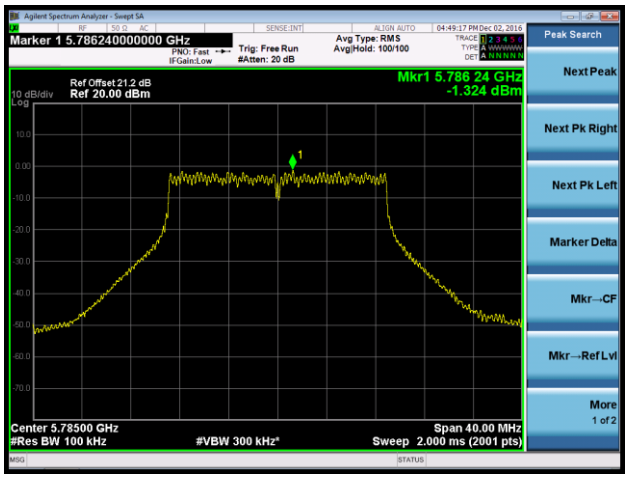
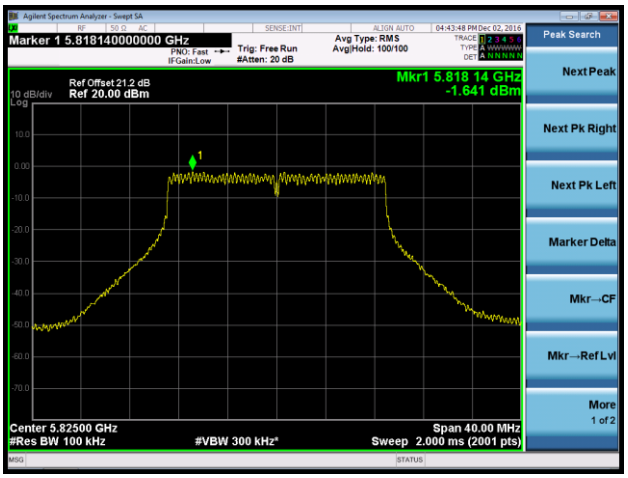
Note 2: When EUT duty cycle < 98%, the Total PSD (dBm/MHz) = $10*\log\{10^{(\text{Ant 0 PSD}/10)} + 10^{(\text{Ant 1 PSD}/10)} + 10^{(\text{Ant 2 PSD}/10)} + 10^{(\text{Ant 3 PSD}/10)}\} + 10*\log(1/\text{Duty Cycle})$.

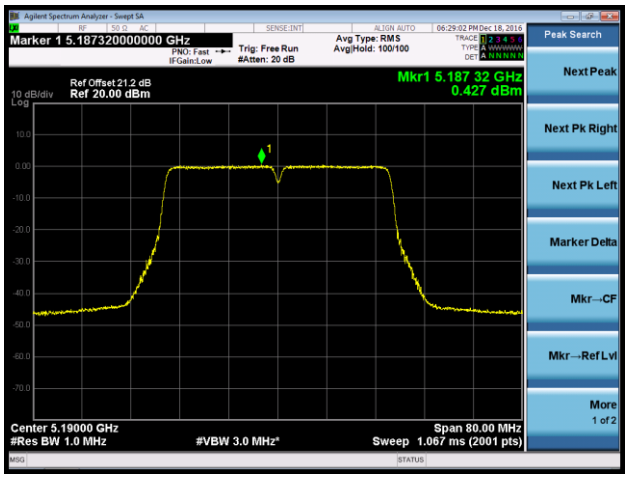
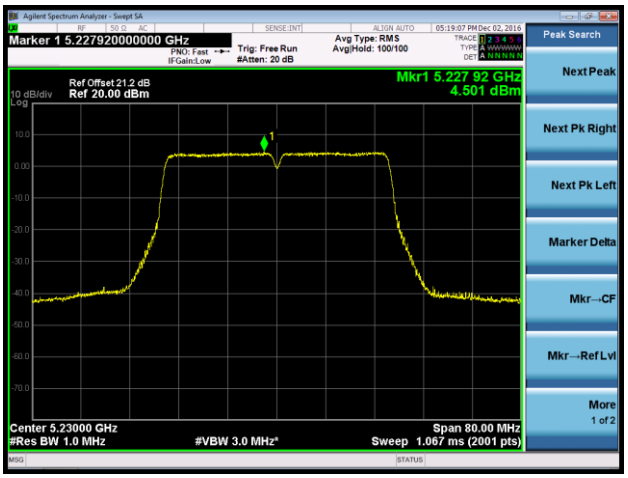
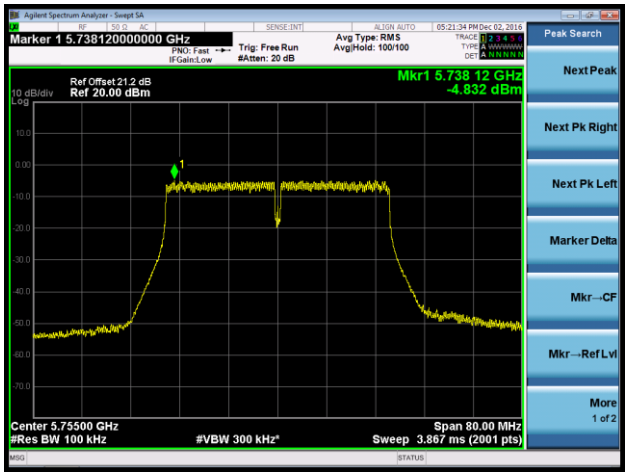
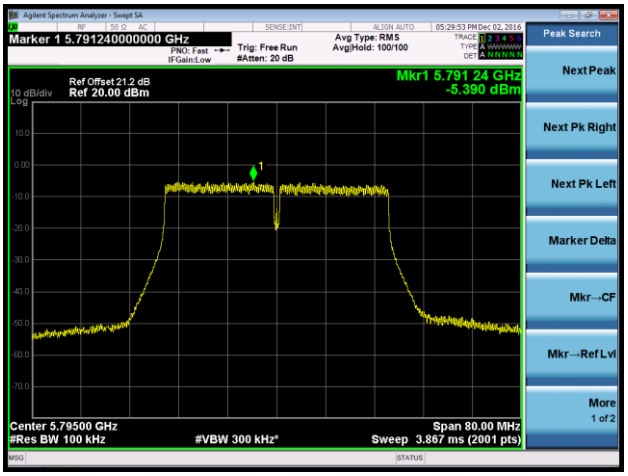
Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	Ant 0 PSD (dBm/ MHz)	Ant 1 PSD (dBm/ MHz)	Ant 2 PSD (dBm/ MHz)	Ant 3 PSD (dBm/ MHz)	Duty Cycle (%)	Constant Factor	Total PSD (dBm/ 500kHz)	Limit (dBm/ 500kHz)	Result
11a	6	149	5745	-0.70	-0.08	-1.23	-1.16	90.84	7.00	12.68	≤ 25.87	Pass
11a	6	157	5785	-1.41	-0.63	-1.36	-1.08	90.84	7.00	12.33	≤ 25.87	Pass
11a	6	165	5825	-1.18	0.34	-0.35	-0.39	90.84	7.00	13.08	≤ 25.87	Pass
11n-HT20	26	149	5745	-1.39	0.15	-1.82	-1.32	98.61	7.00	12.05	≤ 25.87	Pass
11n-HT20	26	157	5785	-1.32	-0.52	-1.25	-1.31	98.61	7.00	11.99	≤ 25.87	Pass
11n-HT20	26	165	5825	-1.64	0.15	-0.44	-0.49	98.61	7.00	12.52	≤ 25.87	Pass
11n-HT40	54	151	5755	-4.83	-3.35	-4.50	-4.44	96.77	7.00	8.92	≤ 25.87	Pass
11n-HT40	54	159	5795	-5.39	-3.88	-4.81	-4.85	96.77	7.00	8.46	≤ 25.87	Pass
11ac-VHT20	26	149	5745	-2.15	0.47	-1.53	-1.00	98.81	7.00	12.13	≤ 25.87	Pass
11ac-VHT20	26	157	5785	-2.34	0.26	-2.23	-1.36	98.81	7.00	11.78	≤ 25.87	Pass
11ac-VHT20	26	165	5825	-2.30	0.59	-0.12	-0.39	98.81	7.00	12.64	≤ 25.87	Pass
11ac-VHT40	54	151	5755	-4.69	-3.59	-4.35	-4.38	97.57	7.00	8.90	≤ 25.87	Pass
11ac-VHT40	54	159	5795	-3.84	-3.06	-4.05	-3.66	97.57	7.00	9.50	≤ 25.87	Pass
11ac-VHT80	117.2	155	5775	-6.53	-5.92	-6.73	-6.90	96.32	7.00	6.68	≤ 25.87	Pass

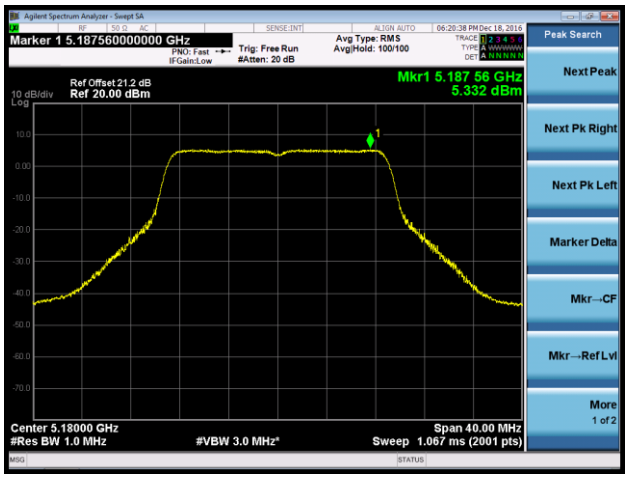
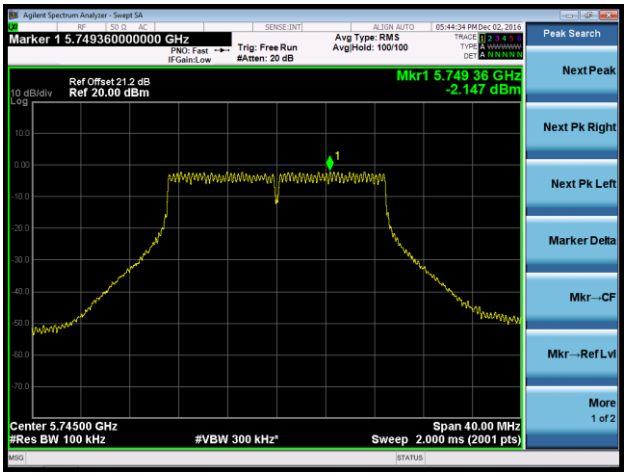
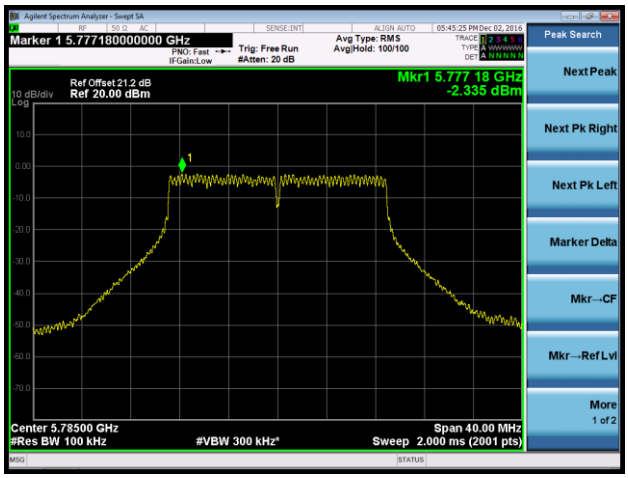
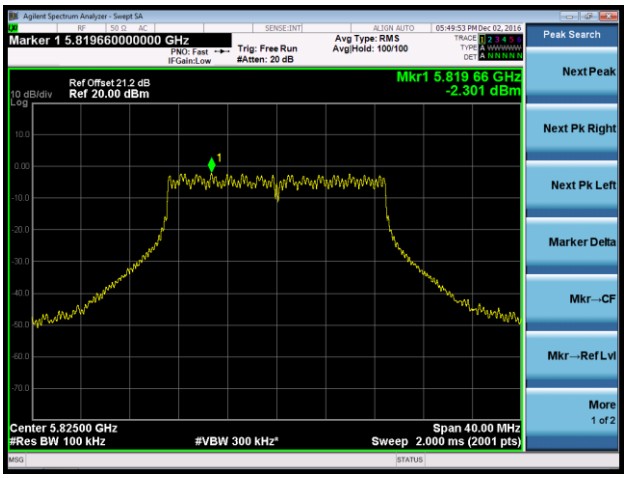
Note 1: When EUT duty cycle ≥ 98%, the Total PSD (dBm/MHz) = $10*\log\{10^{(\text{Ant 0 PSD}/10)} + 10^{(\text{Ant 1 PSD}/10)} + 10^{(\text{Ant 2 PSD}/10)} + 10^{(\text{Ant 3 PSD}/10)}\}$ + Constant Factor

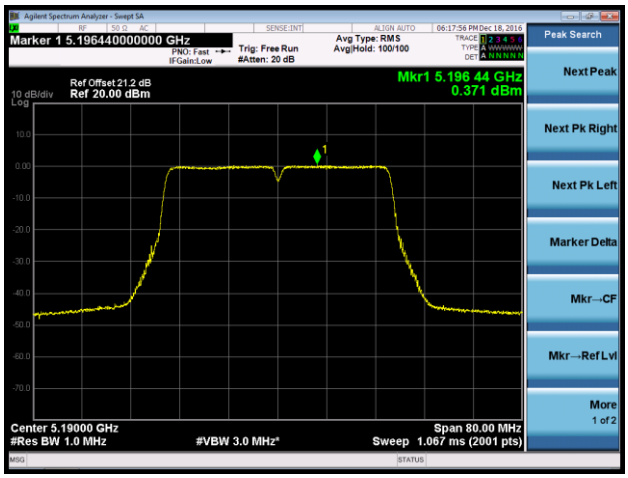
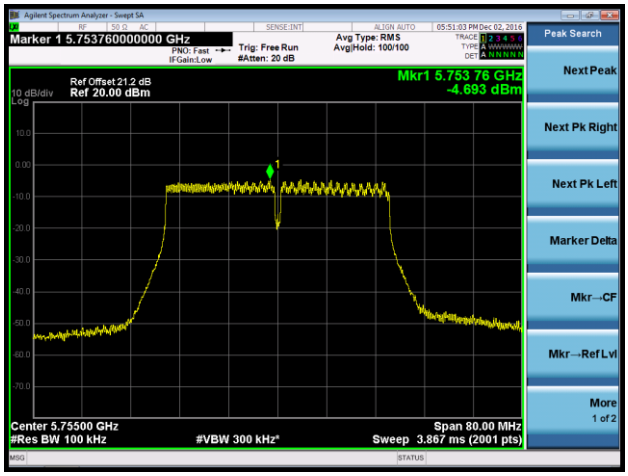
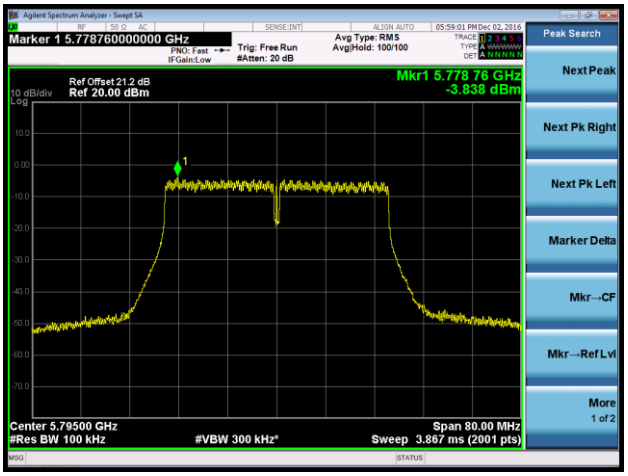
Note 2: When EUT duty cycle < 98%, the Total PSD (dBm/MHz) = $10*\log\{10^{(\text{Ant 0 PSD}/10)} + 10^{(\text{Ant 1 PSD}/10)} + 10^{(\text{Ant 2 PSD}/10)} + 10^{(\text{Ant 3 PSD}/10)}\}$ + 10*log(1/Duty Cycle) + Constant Factor.

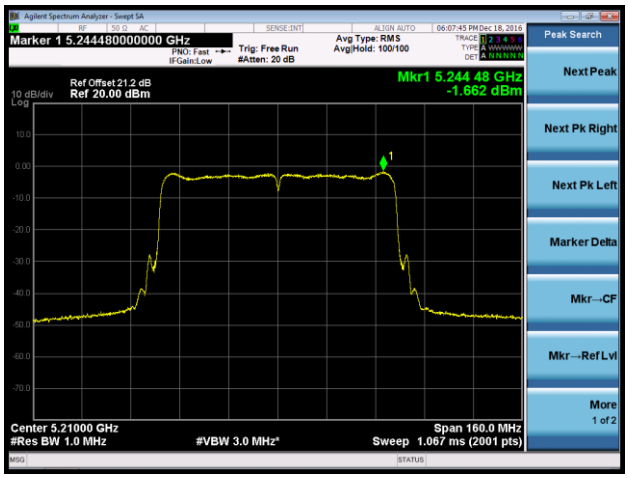
802.11a Power Spectral Density - Ant 0 / Ant 0 + 1 + 2 + 3	
Channel 36 (5180MHz)	**Channel 44 (5220MHz)**
	
Channel 48 (5240MHz)	**Channel 149 (5745MHz)**
	
Channel 157 (5785MHz)	**Channel 165 (5825MHz)**
	

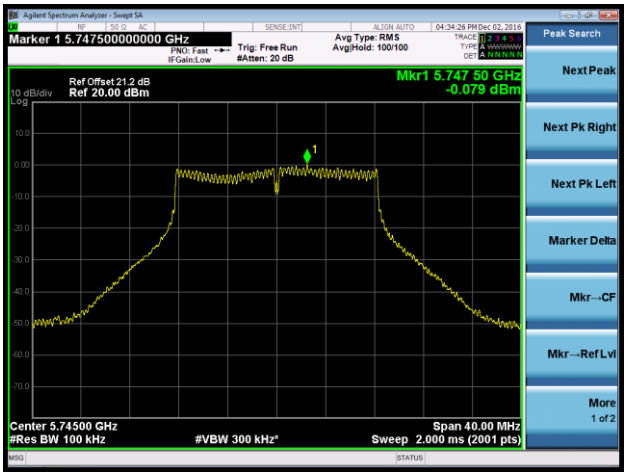
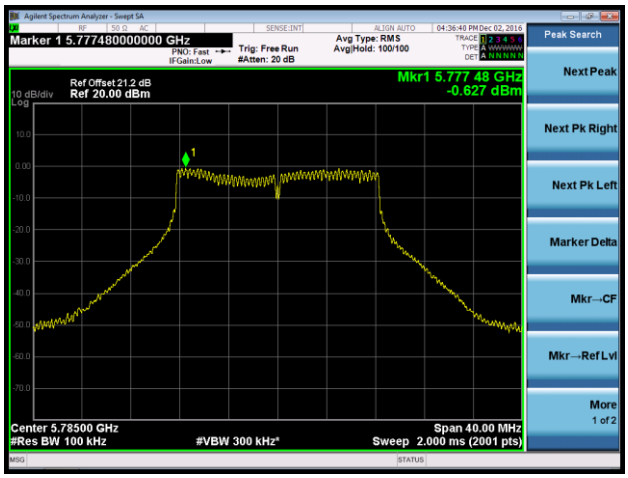
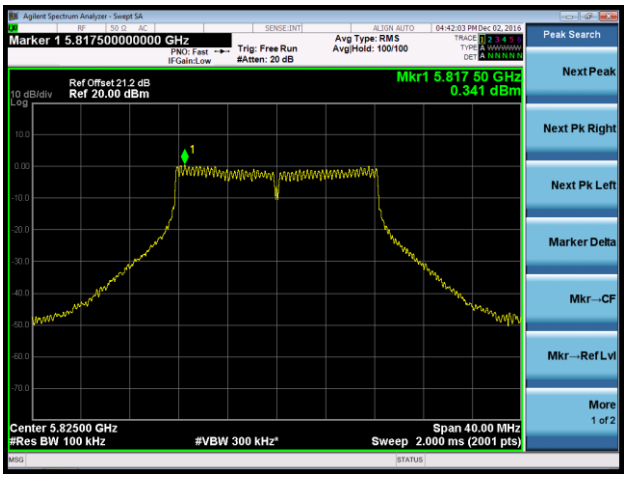
802.11n-HT20 Power Spectral Density - Ant 0 / Ant 0 + 1 + 2 + 3	
Channel 36 (5180MHz)	**Channel 44 (5220MHz)**
	
Channel 48 (5240MHz)	**Channel 149 (5745MHz)**
	
Channel 157 (5785MHz)	**Channel 165 (5825MHz)**
	

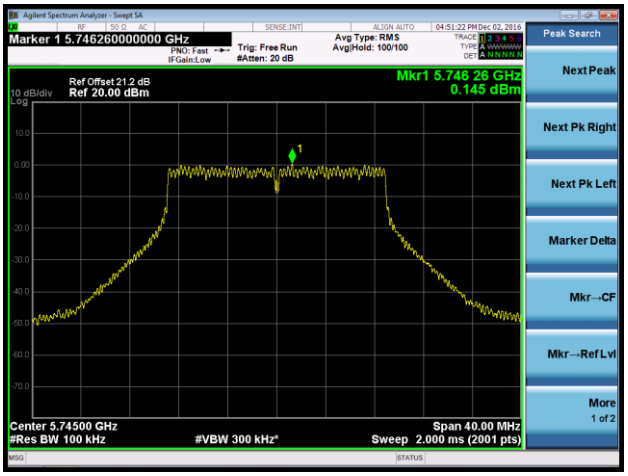
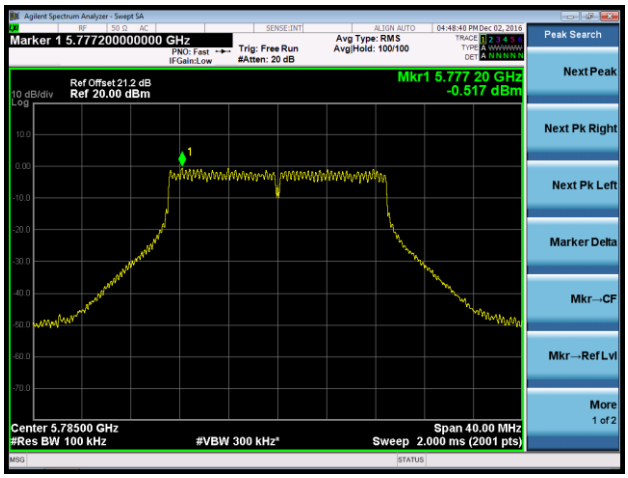
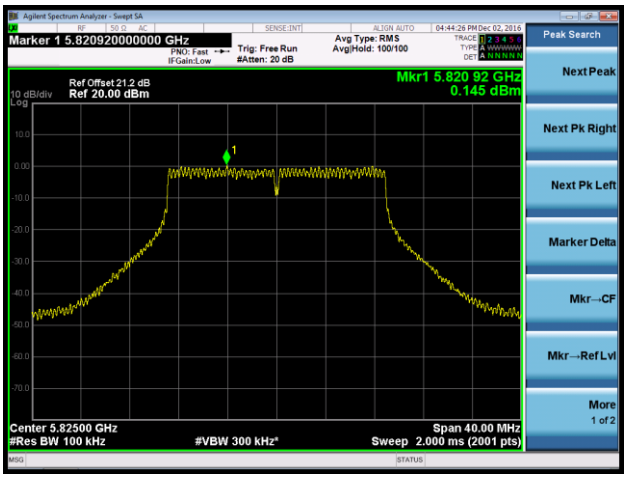
802.11n-HT40 Power Spectral Density - Ant 0 / Ant 0 + 1 + 2 + 3	
Channel 38 (5190MHz)	**Channel 46 (5230MHz)**
	
Channel 151 (5755MHz)	**Channel 159 (5795MHz)**
	

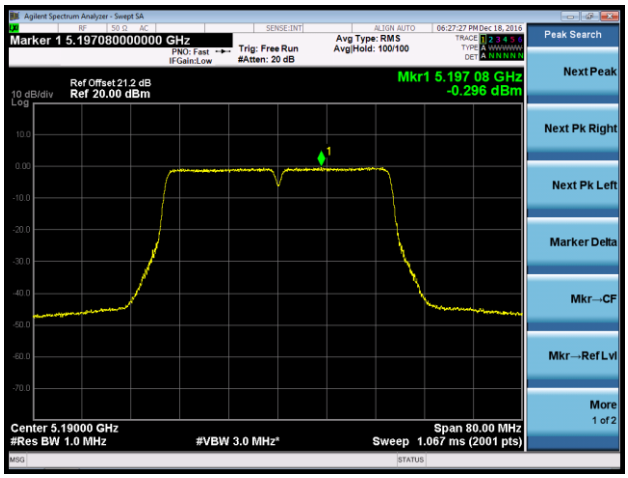
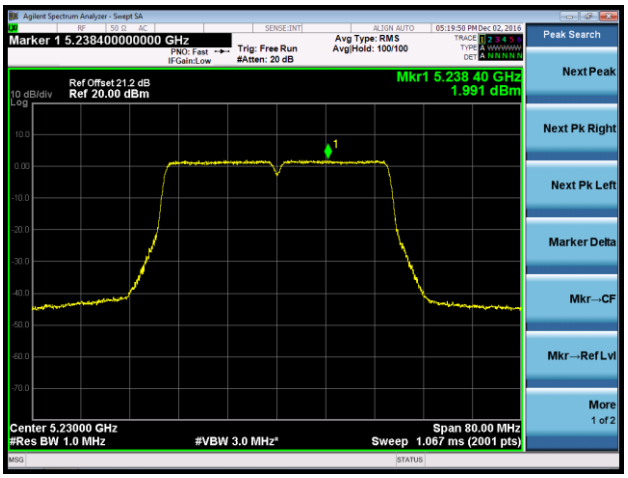
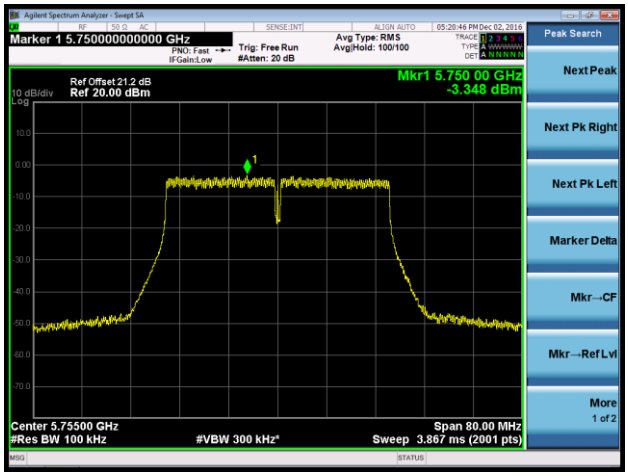
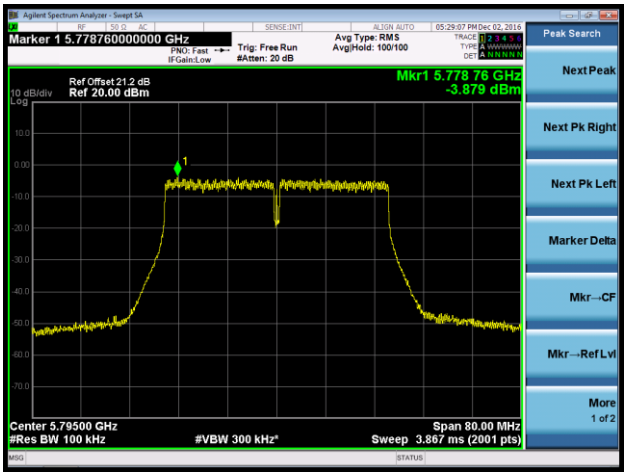
802.11ac-VHT20 Power Spectral Density - Ant 0 / Ant 0 + 1 + 2 + 3	
Channel 36 (5180MHz)	**Channel 44 (5220MHz)**
	
Channel 48 (5240MHz)	**Channel 149 (5745MHz)**
	
Channel 157 (5785MHz)	**Channel 165 (5825MHz)**
	

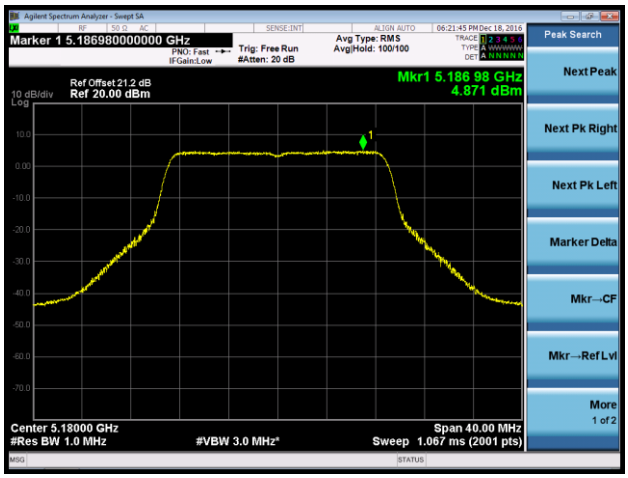
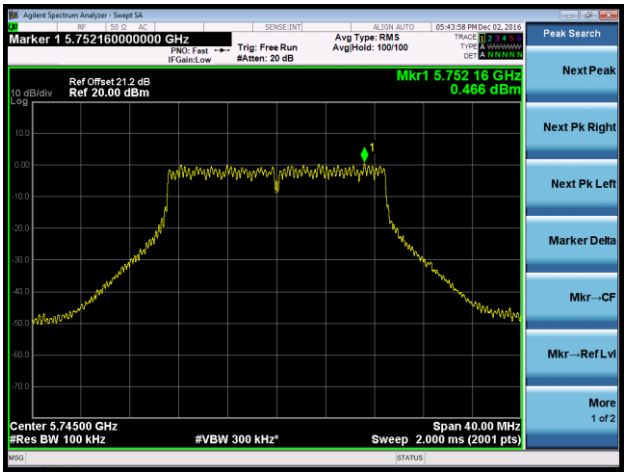
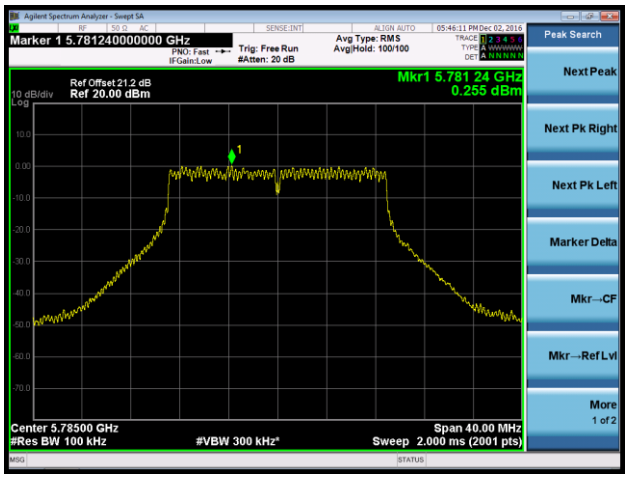
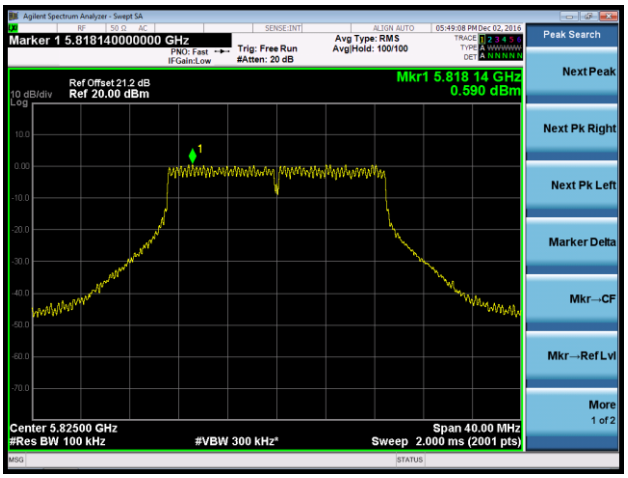
802.11ac-VHT40 Power Spectral Density - Ant 0 / Ant 0 + 1 + 2 + 3	
Channel 38 (5190MHz)	**Channel 46 (5230MHz)**
	
Channel 151 (5755MHz)	**Channel 159 (5795MHz)**
	

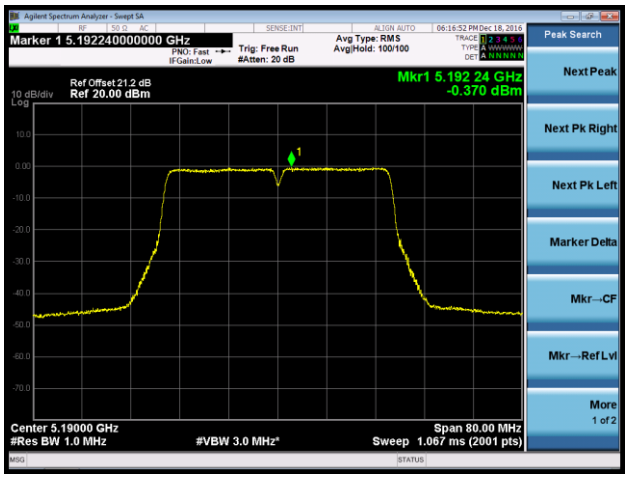
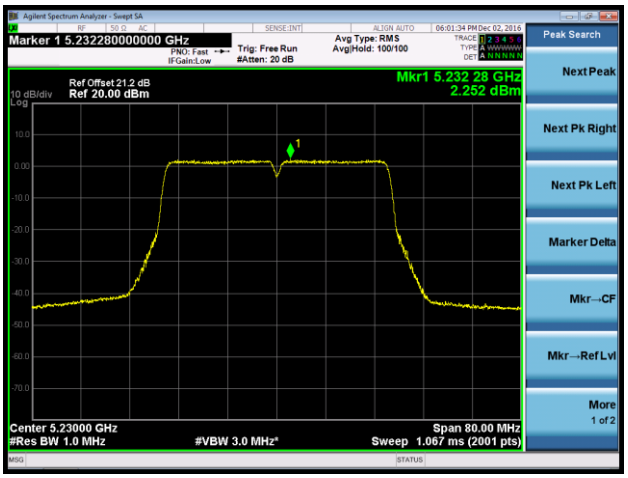
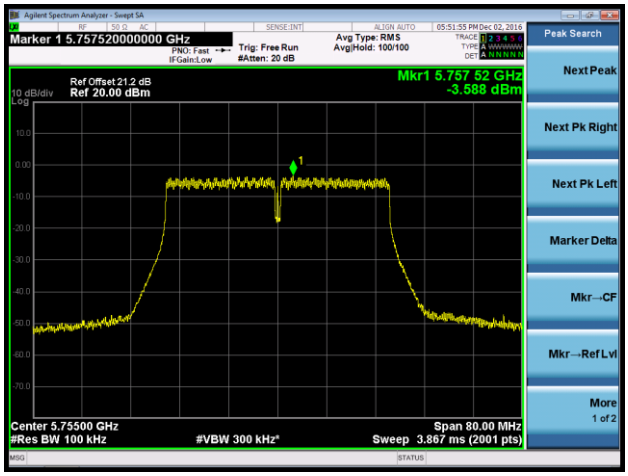
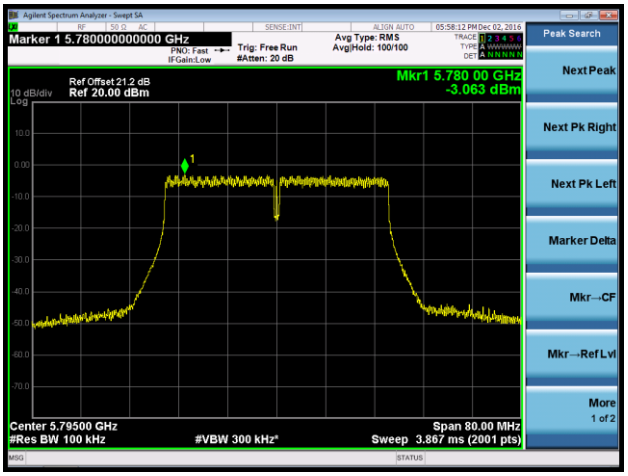
802.11ac-VHT80 Power Spectral Density - Ant 0 / Ant 0 + 1 + 2 + 3	
Channel 42 (5210MHz)	**Channel 155 (5775MHz)**
	

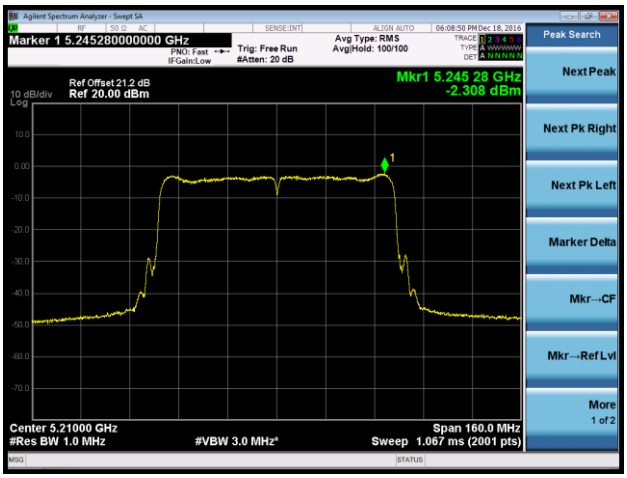
802.11a Power Spectral Density - Ant 1 / Ant 0 + 1 + 2 + 3	
Channel 36 (5180MHz)	**Channel 44 (5220MHz)**
	
Channel 48 (5240MHz)	**Channel 149 (5745MHz)**
	
Channel 157 (5785MHz)	**Channel 165 (5825MHz)**
	

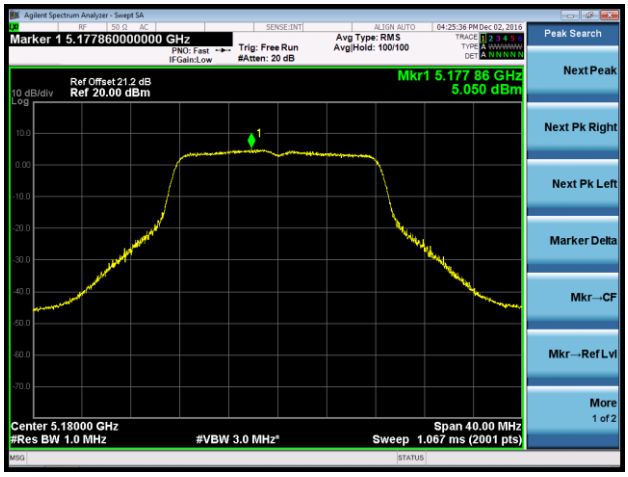
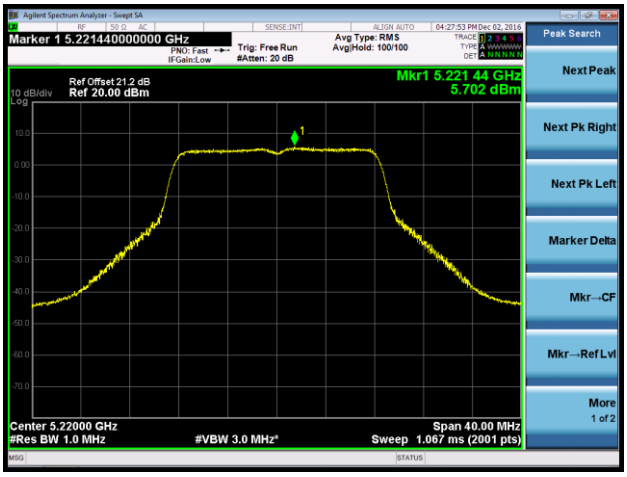
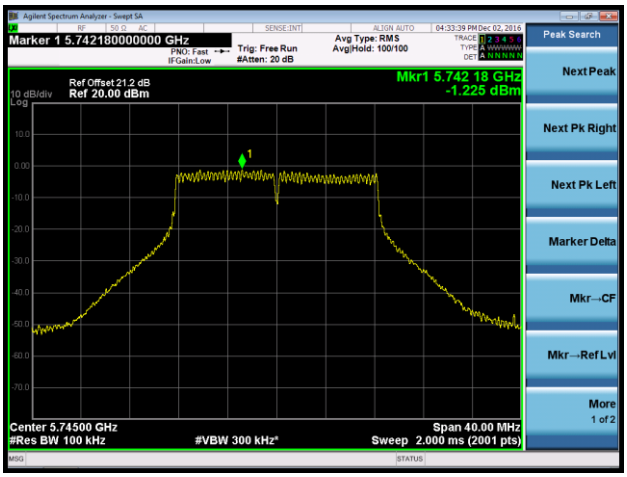
802.11n-HT20 Power Spectral Density - Ant 1 / Ant 0 + 1 + 2 + 3	
Channel 36 (5180MHz)	**Channel 44 (5220MHz)**
	
Channel 48 (5240MHz)	**Channel 149 (5745MHz)**
	
Channel 157 (5785MHz)	**Channel 165 (5825MHz)**
	

802.11n-HT40 Power Spectral Density - Ant 1 / Ant 0 + 1 + 2 + 3	
Channel 38 (5190MHz)	**Channel 46 (5230MHz)**
	
Channel 151 (5755MHz)	**Channel 159 (5795MHz)**
	

802.11ac-VHT20 Power Spectral Density - Ant 1 / Ant 0 + 1 + 2 + 3	
Channel 36 (5180MHz)	**Channel 44 (5220MHz)**
	
Channel 48 (5240MHz)	**Channel 149 (5745MHz)**
	
Channel 157 (5785MHz)	**Channel 165 (5825MHz)**
	

802.11ac-VHT40 Power Spectral Density - Ant 1 / Ant 0 + 1 + 2 + 3	
Channel 38 (5190MHz)	**Channel 46 (5230MHz)**
	
Channel 151 (5755MHz)	**Channel 159 (5795MHz)**
	

802.11ac-VHT80 Power Spectral Density - Ant 1 / Ant 0 + 1 + 2 + 3	
Channel 42 (5210MHz)	**Channel 155 (5775MHz)**
	

802.11a Power Spectral Density - Ant 2 / Ant 0 + 1 + 2 + 3	
Channel 36 (5180MHz)	**Channel 44 (5220MHz)**
	
Channel 48 (5240MHz)	**Channel 149 (5745MHz)**
	
Channel 157 (5785MHz)	**Channel 165 (5825MHz)**