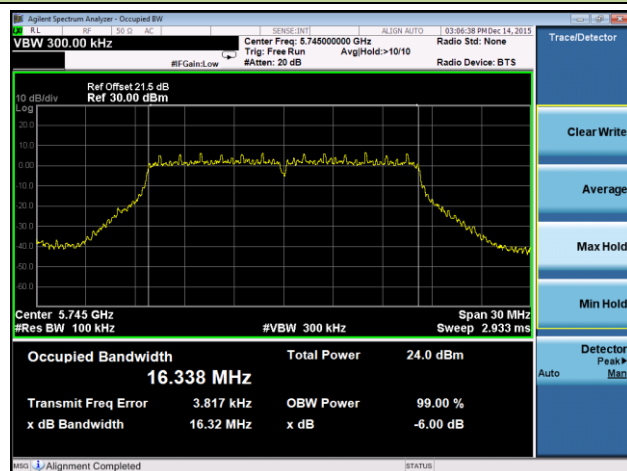
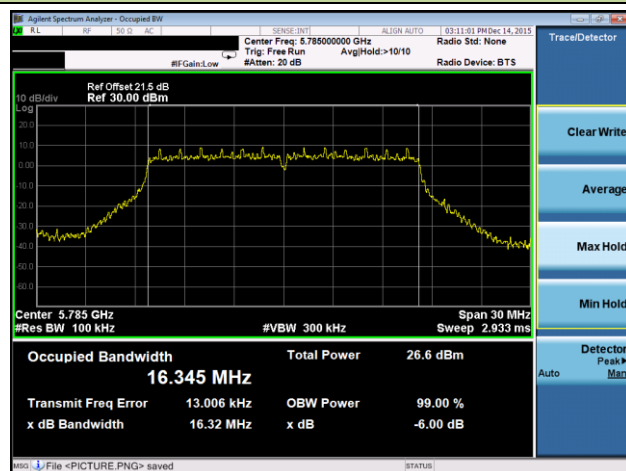


802.11a 6dB Bandwidth - Ant 0 / Ant 0 + 1 + 2 + 3

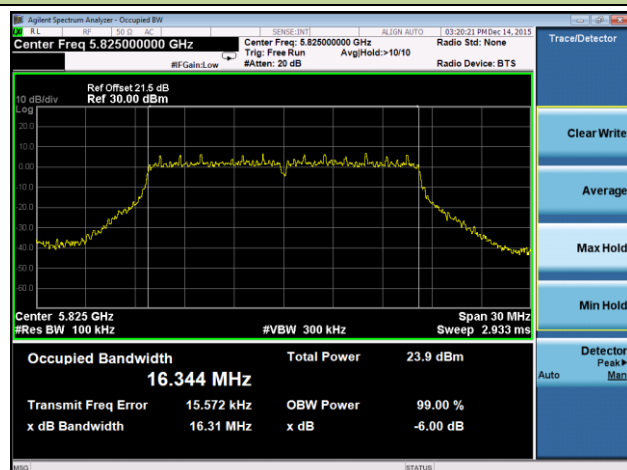
Channel 149 (5745MHz)



Channel 157 (5785MHz)

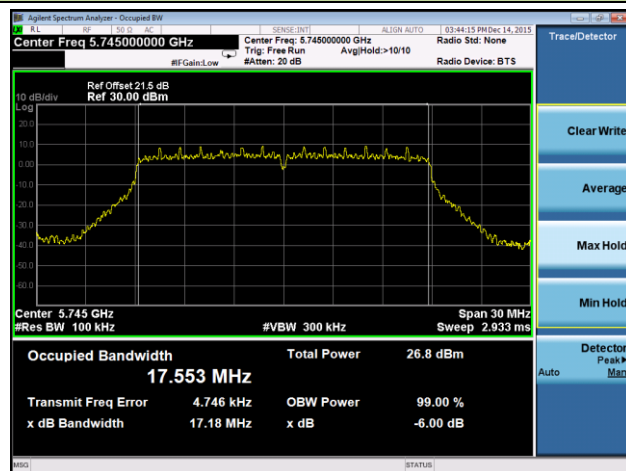


Channel 165 (5825MHz)

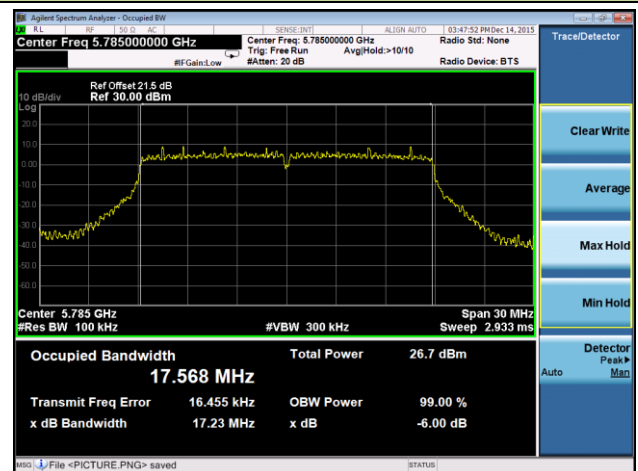


802.11n-HT20 6dB Bandwidth - Ant 0 / Ant 0 + 1 + 2 + 3

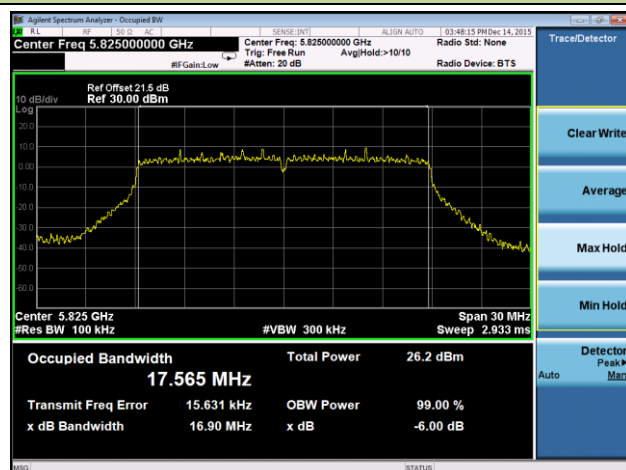
Channel 149 (5745MHz)



Channel 157 (5785MHz)

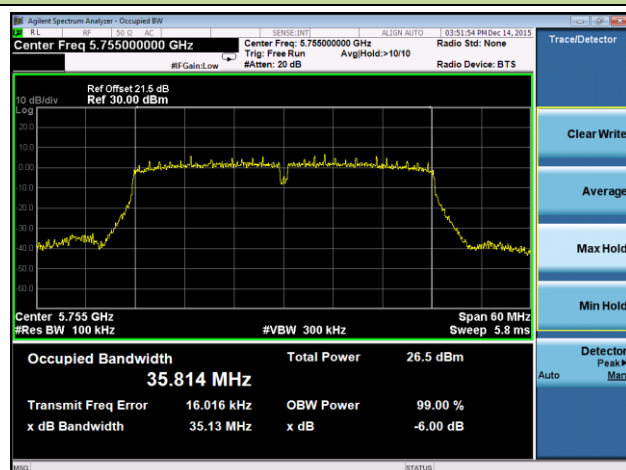


Channel 165 (5825MHz)

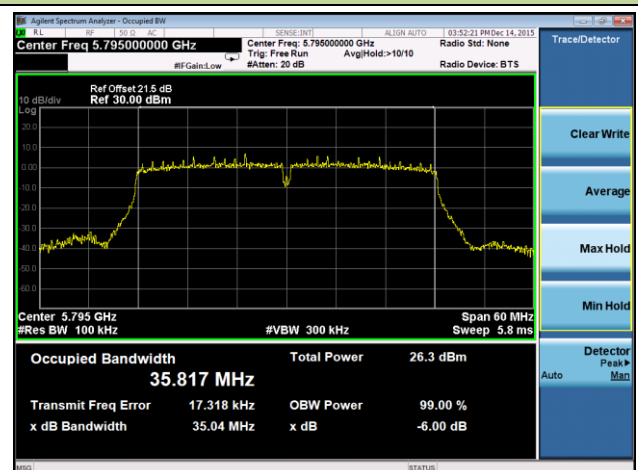


802.11n-HT40 6dB Bandwidth - Ant 0 / Ant 0 + 1 + 2 + 3

Channel 151 (5755MHz)

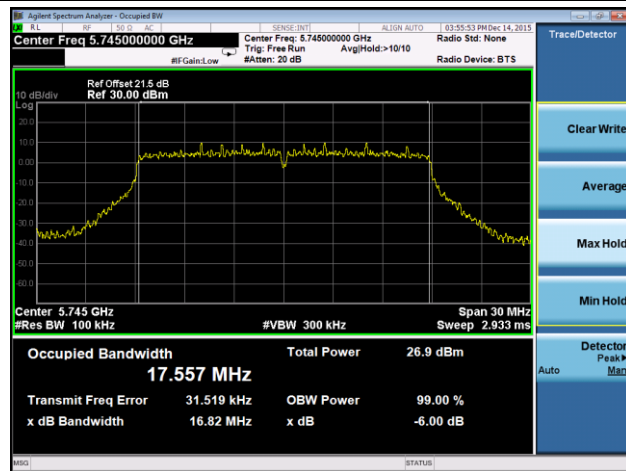


Channel 159 (5795MHz)

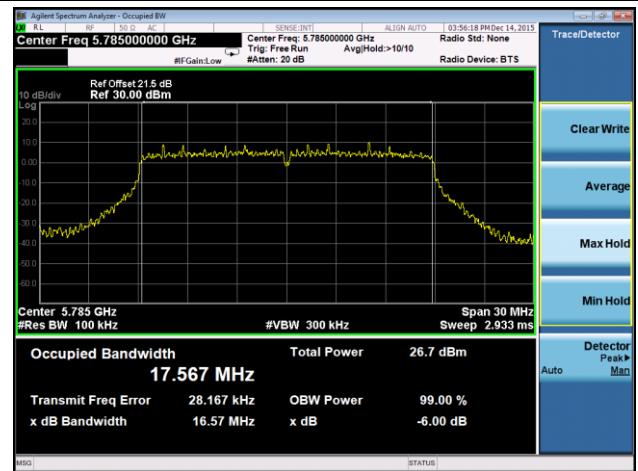


802.11ac-VHT20 6dB Bandwidth - Ant 0 / Ant 0 + 1 + 2 + 3

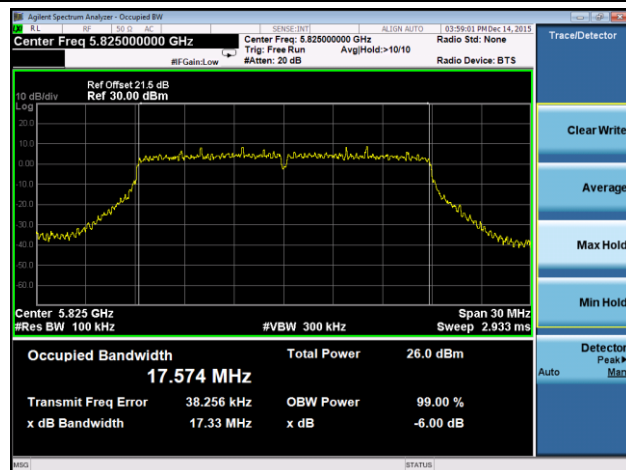
Channel 149 (5745MHz)



Channel 157 (5785MHz)

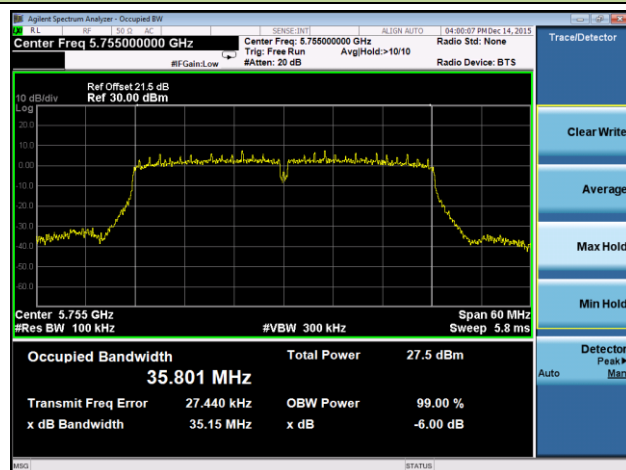


Channel 165 (5825MHz)

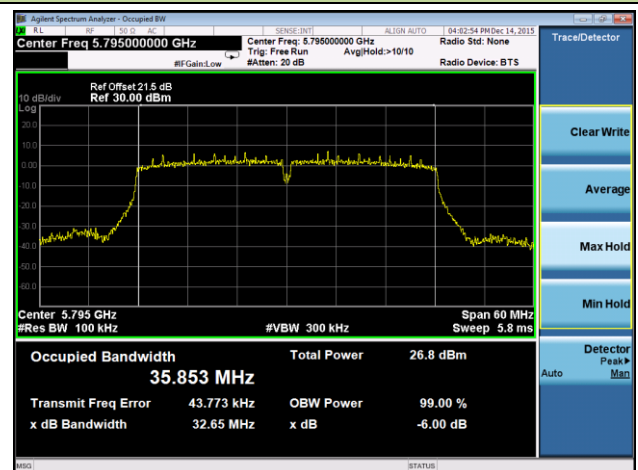


802.11ac-VHT40 6dB Bandwidth - Ant 0 / Ant 0 + 1 + 2 + 3

Channel 151 (5755MHz)

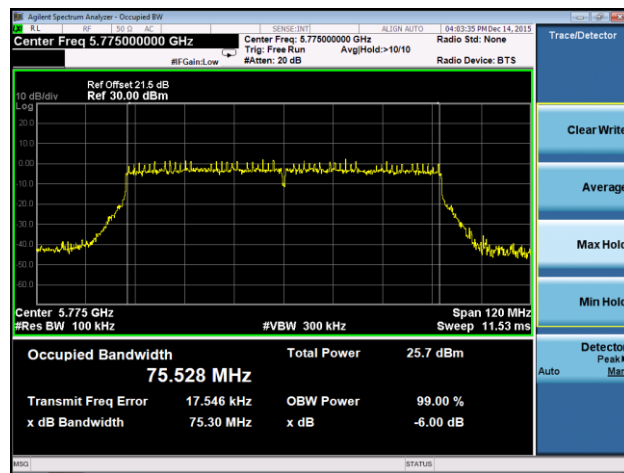


Channel 159 (5795MHz)



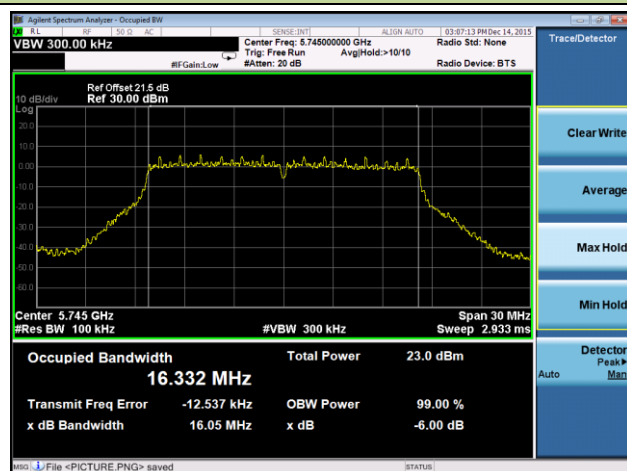
802.11ac-VHT80 6dB Bandwidth - Ant 0 / Ant 0 + 1 + 2 + 3

Channel 155 (5775MHz)

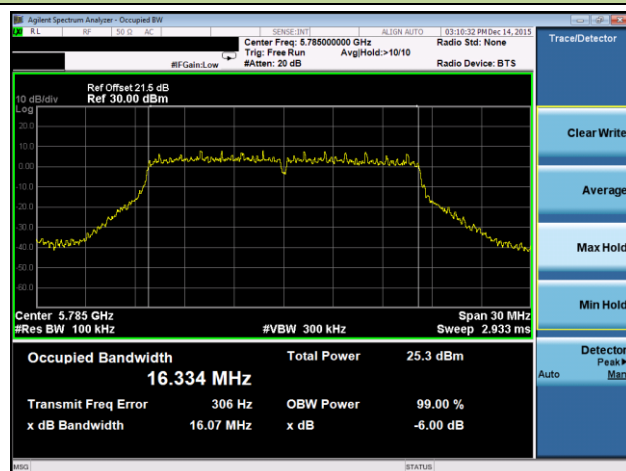


802.11a 6dB Bandwidth - Ant 1 / Ant 0 + 1 + 2 + 3

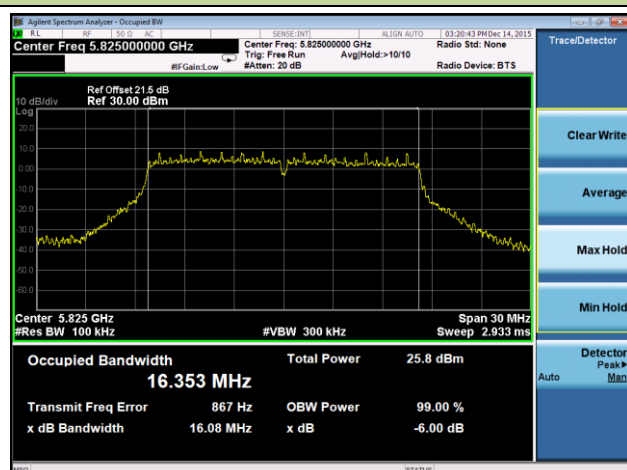
Channel 149 (5745MHz)



Channel 157 (5785MHz)

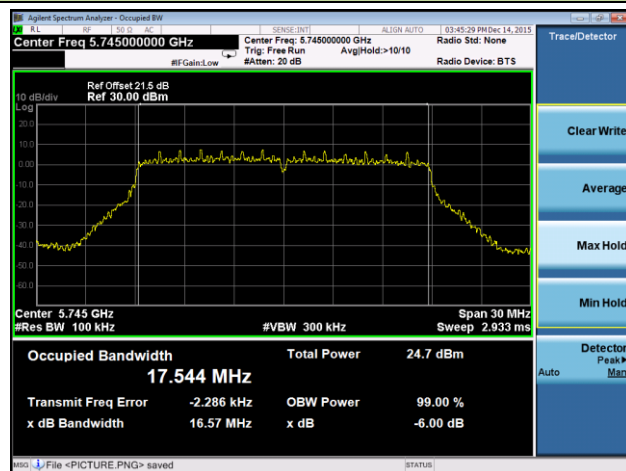


Channel 165 (5825MHz)

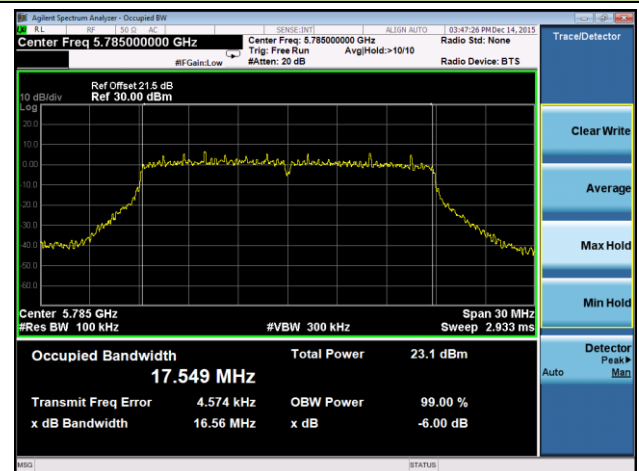


802.11n-HT20 6dB Bandwidth - Ant 1 / Ant 0 + 1 + 2 + 3

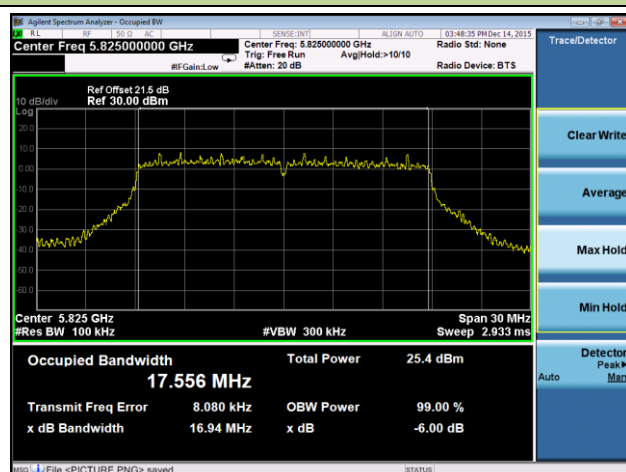
Channel 149 (5745MHz)



Channel 157 (5785MHz)

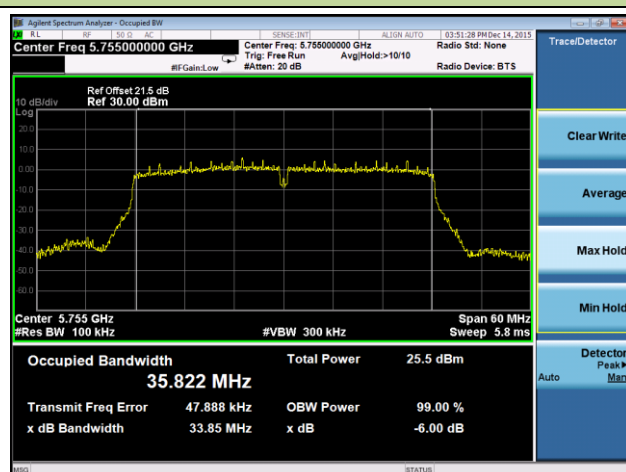


Channel 165 (5825MHz)

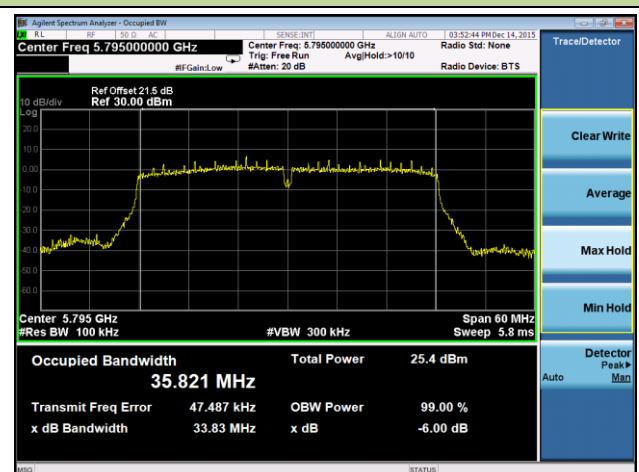


802.11n-HT40 6dB Bandwidth - Ant 1 / Ant 0 + 1 + 2 + 3

Channel 151 (5755MHz)

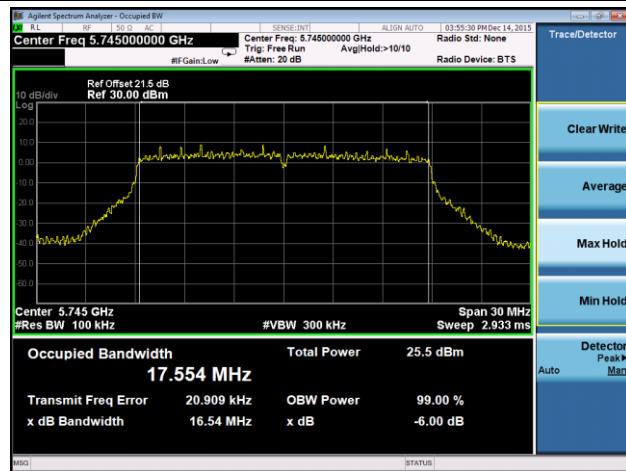


Channel 159 (5795MHz)

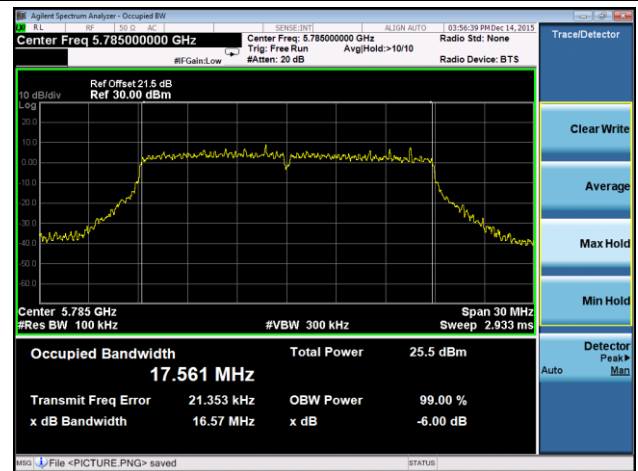


802.11ac-VHT20 6dB Bandwidth - Ant 1 / Ant 0 + 1 + 2 + 3

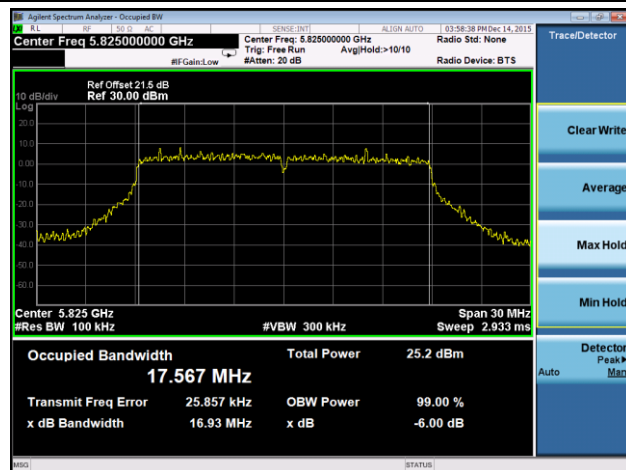
Channel 149 (5745MHz)



Channel 157 (5785MHz)

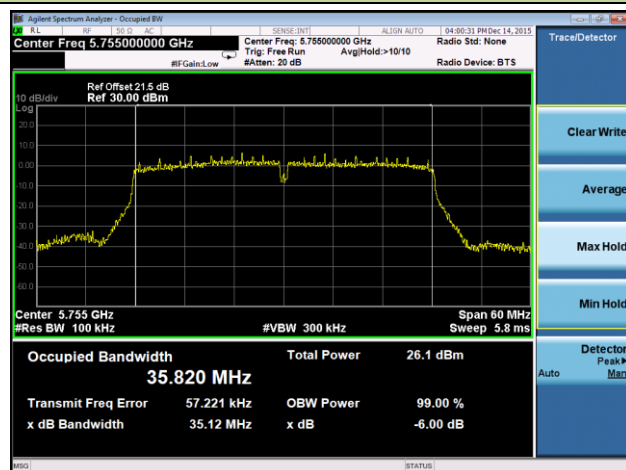


Channel 165 (5825MHz)

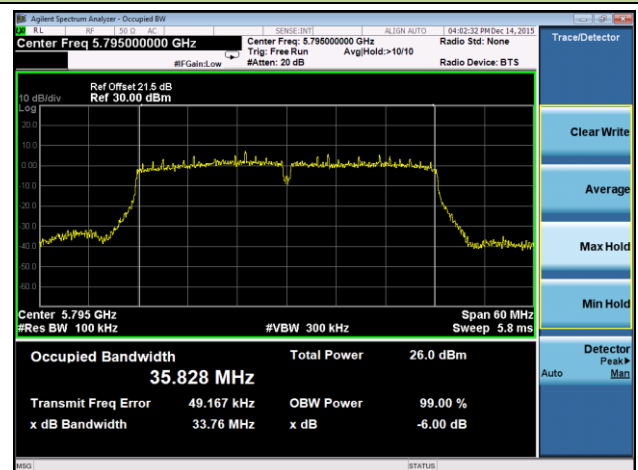


802.11ac-VHT40 6dB Bandwidth - Ant 1 / Ant 0 + 1 + 2 + 3

Channel 151 (5755MHz)

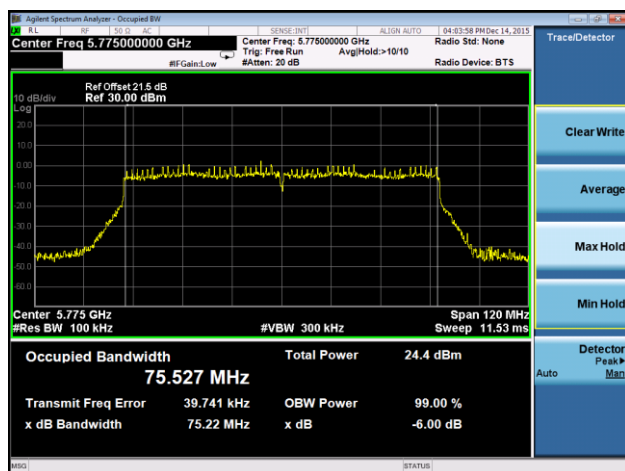


Channel 159 (5795MHz)



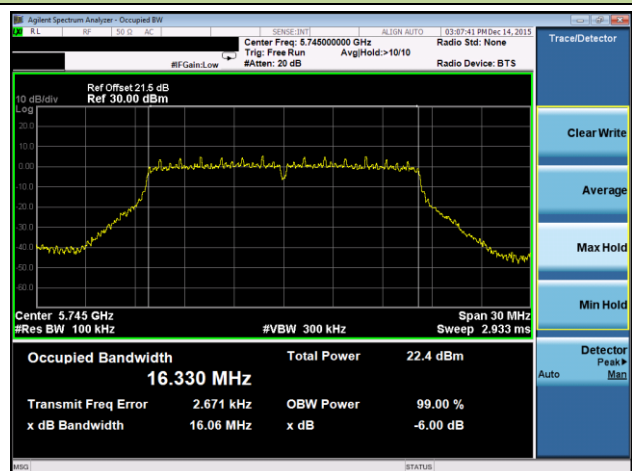
802.11ac-VHT80 6dB Bandwidth - Ant 1 / Ant 0 + 1 + 2 + 3

Channel 155 (5775MHz)

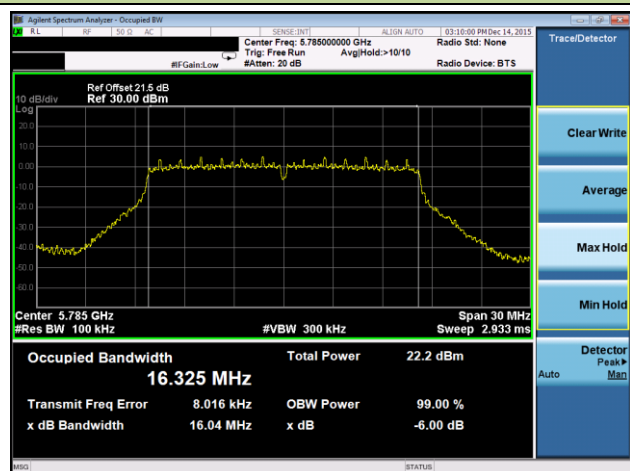


802.11a 6dB Bandwidth - Ant 2 / Ant 0 + 1 + 2 + 3

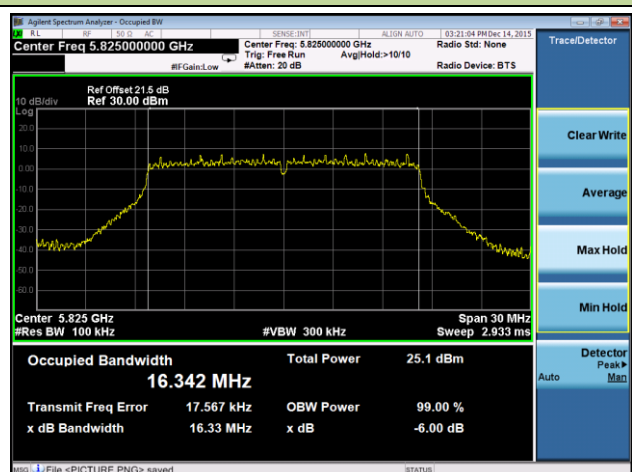
Channel 149 (5745MHz)



Channel 157 (5785MHz)

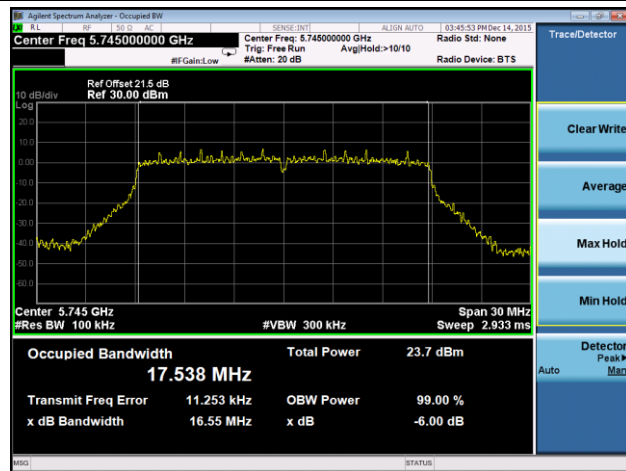


Channel 165 (5825MHz)

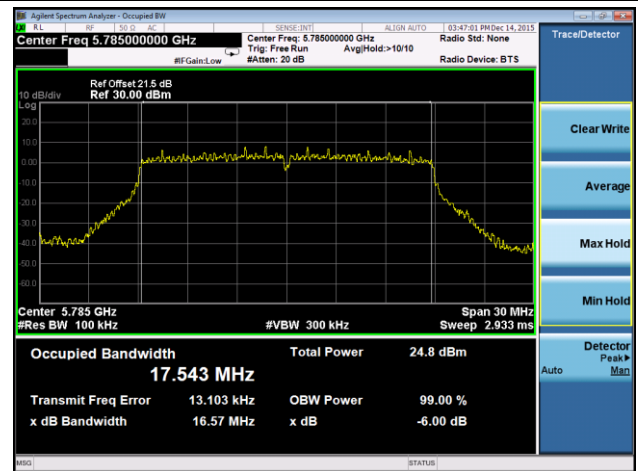


802.11n-HT20 6dB Bandwidth - Ant 2 / Ant 0 + 1 + 2 + 3

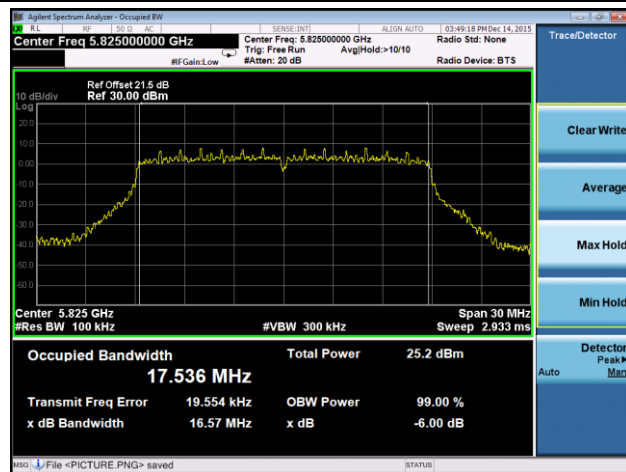
Channel 149 (5745MHz)



Channel 157 (5785MHz)

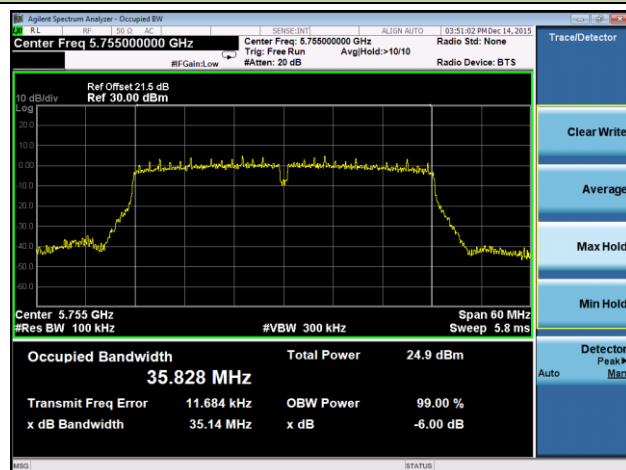


Channel 165 (5825MHz)

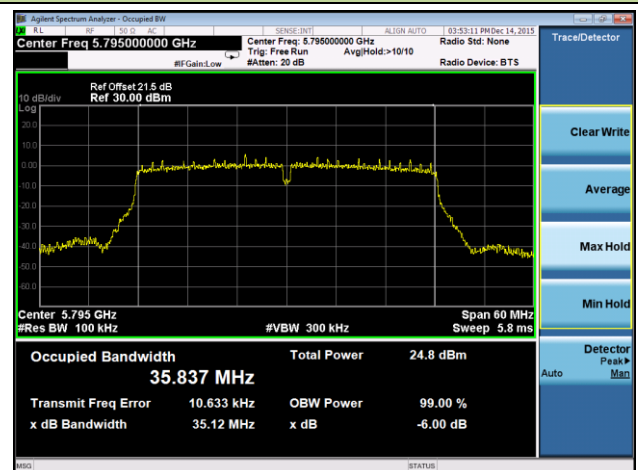


802.11n-HT40 6dB Bandwidth - Ant 2 / Ant 0 + 1 + 2 + 3

Channel 151 (5755MHz)

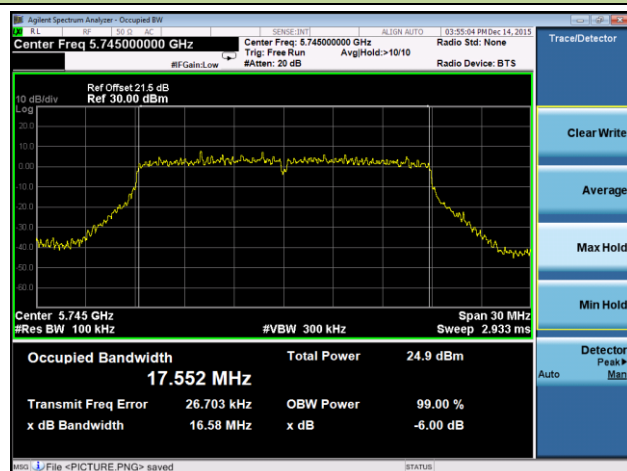


Channel 159 (5795MHz)

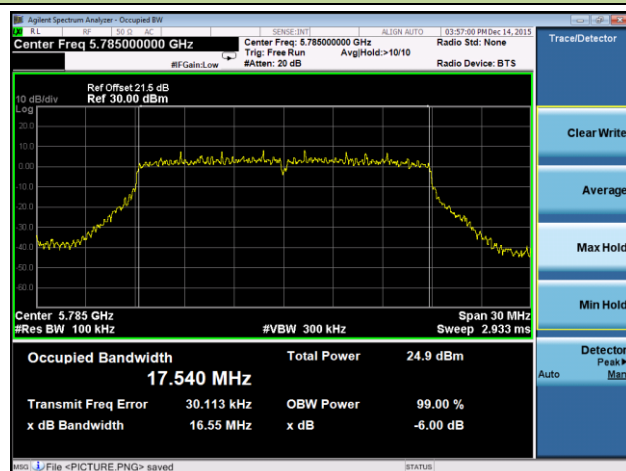


802.11ac-VHT20 6dB Bandwidth - Ant 2 / Ant 0 + 1 + 2 + 3

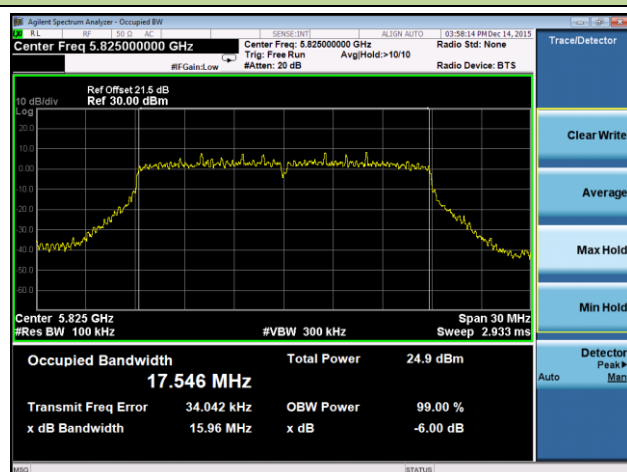
Channel 149 (5745MHz)



Channel 157 (5785MHz)

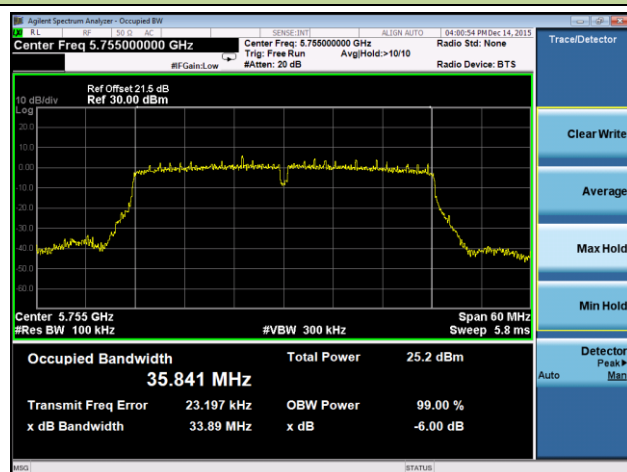


Channel 165 (5825MHz)

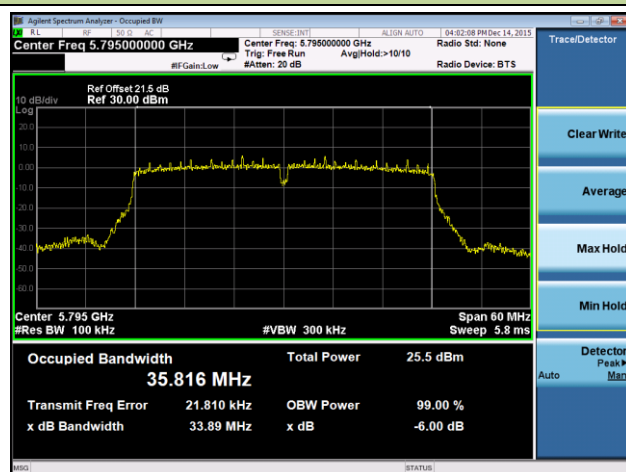


802.11ac-VHT40 6dB Bandwidth - Ant 2 / Ant 0 + 1 + 2 + 3

Channel 151 (5755MHz)

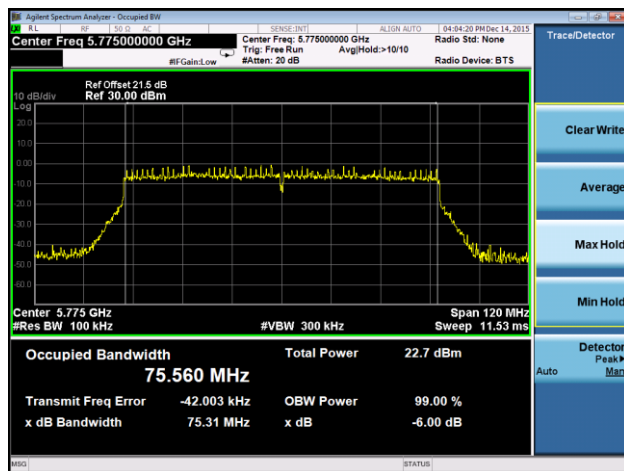


Channel 159 (5795MHz)



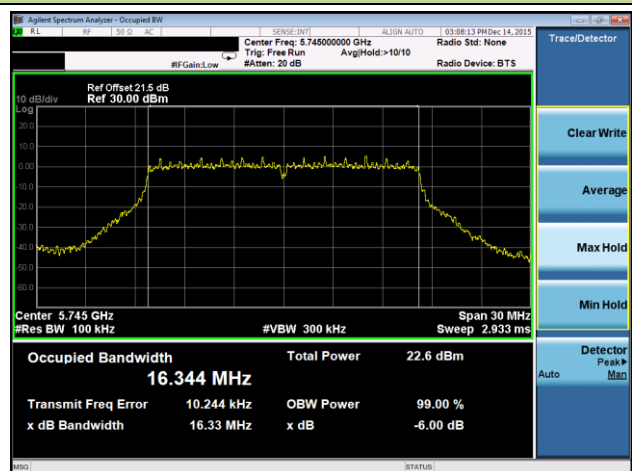
802.11ac-VHT80 6dB Bandwidth - Ant 2 / Ant 0 + 1 + 2 + 3

Channel 155 (5775MHz)

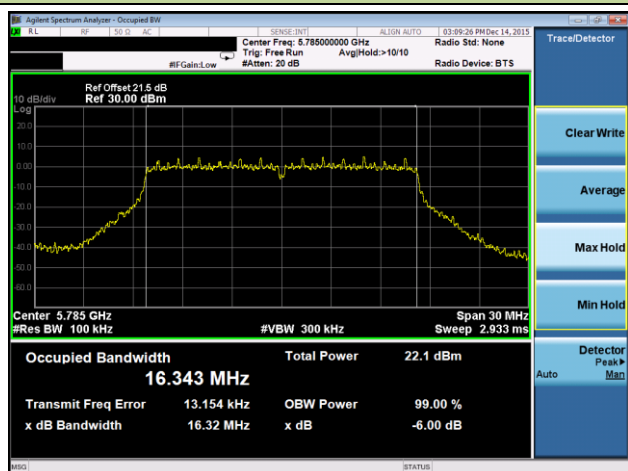


802.11a 6dB Bandwidth - Ant 3 / Ant 0 + 1 + 2 + 3

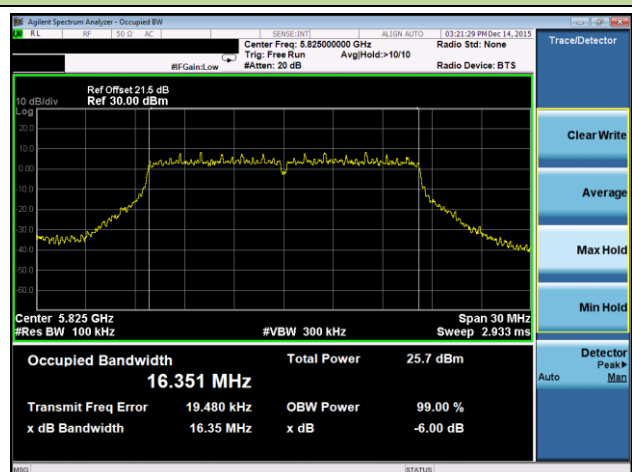
Channel 149 (5745MHz)



Channel 157 (5785MHz)

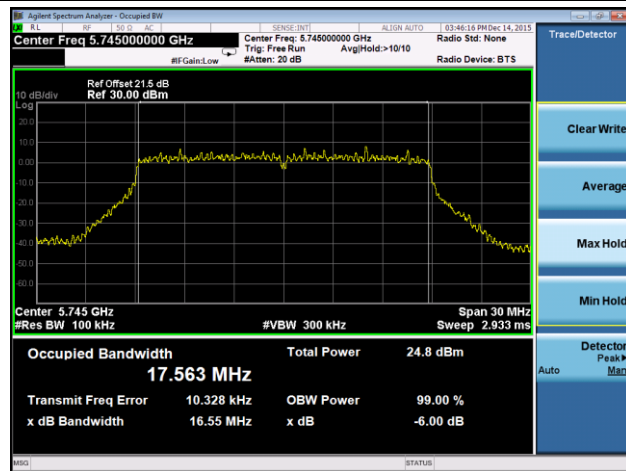


Channel 165 (5825MHz)

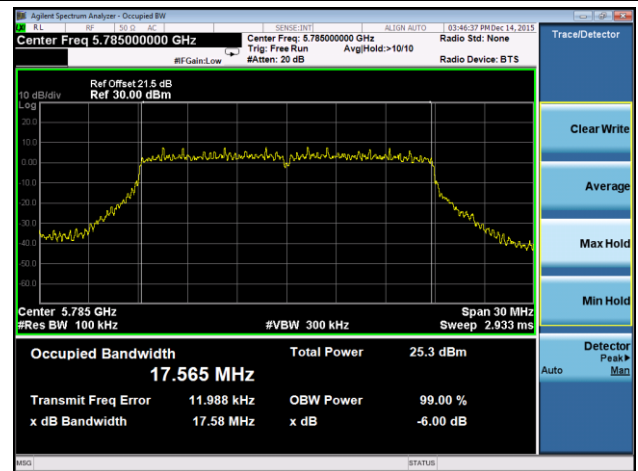


802.11n-HT20 6dB Bandwidth - Ant 3 / Ant 0 + 1 + 2 + 3

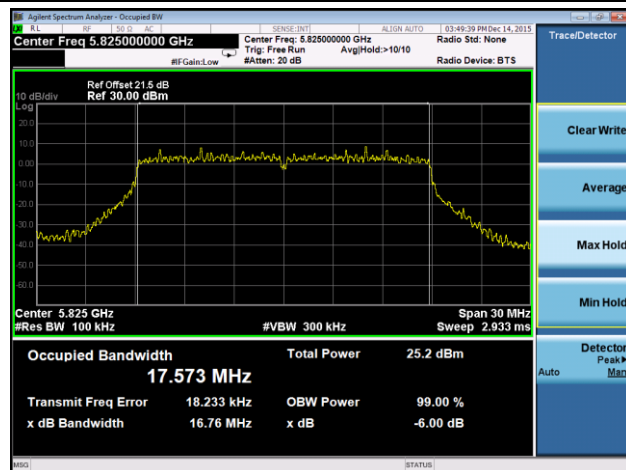
Channel 149 (5745MHz)



Channel 157 (5785MHz)

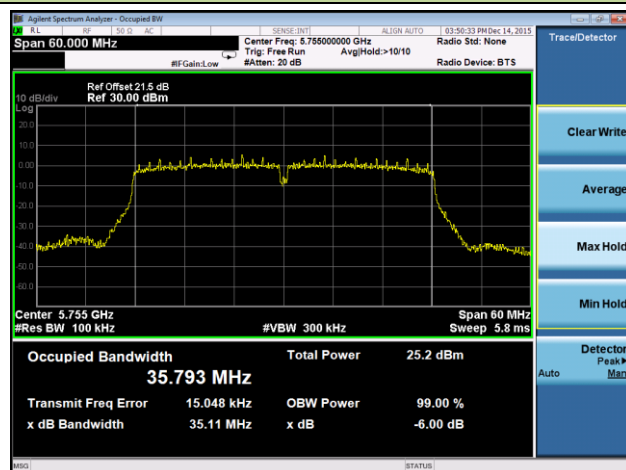


Channel 165 (5825MHz)

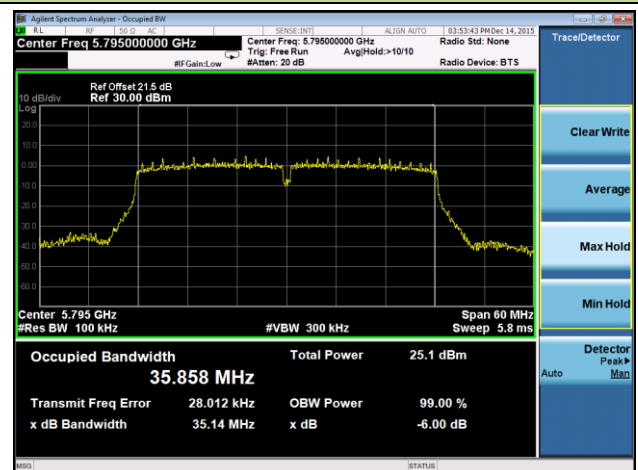


802.11n-HT40 6dB Bandwidth - Ant 3 / Ant 0 + 1 + 2 + 3

Channel 151 (5755MHz)

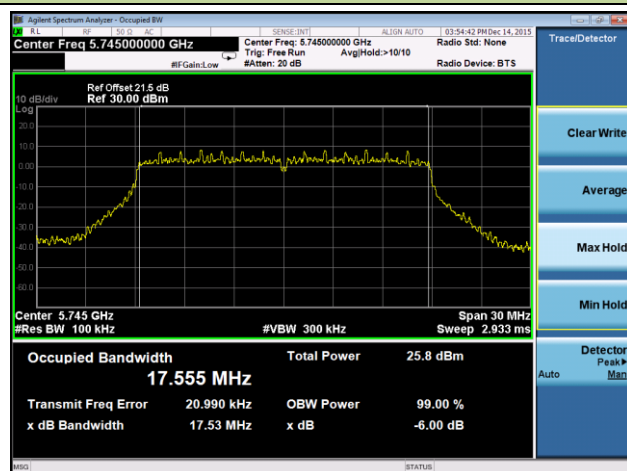


Channel 159 (5795MHz)

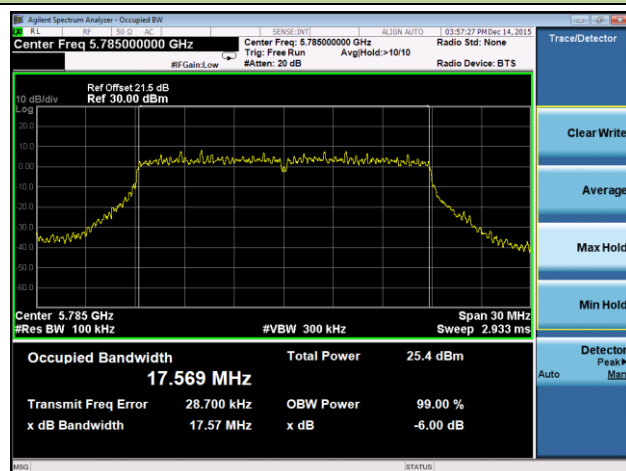


802.11ac-VHT20 6dB Bandwidth - Ant 3 / Ant 0 + 1 + 2 + 3

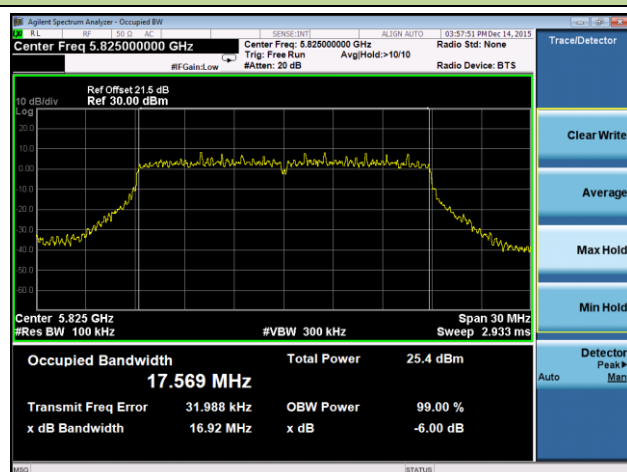
Channel 149 (5745MHz)



Channel 157 (5785MHz)

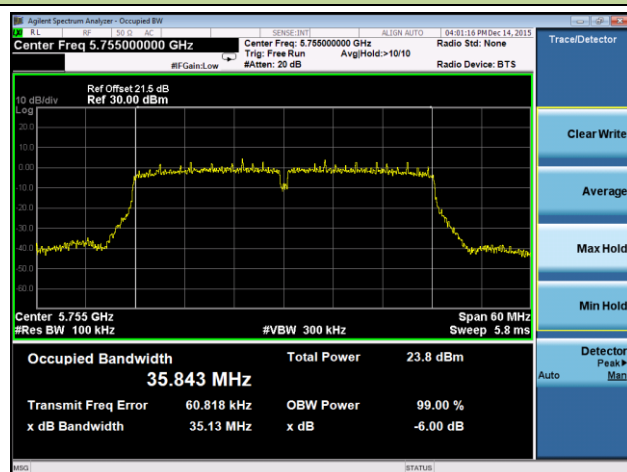


Channel 165 (5825MHz)

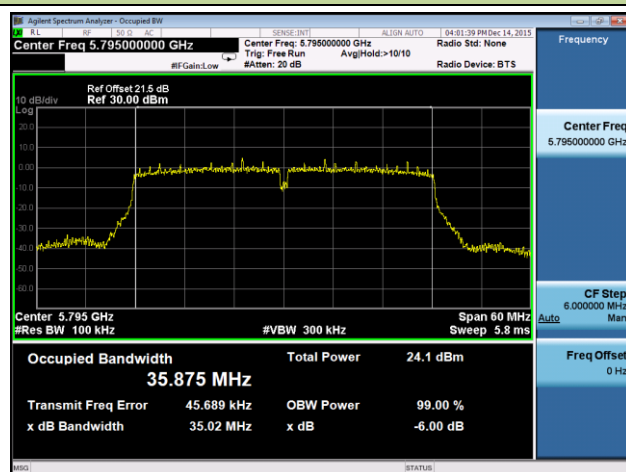


802.11ac-VHT40 6dB Bandwidth - Ant 3 / Ant 0 + 1 + 2 + 3

Channel 151 (5755MHz)

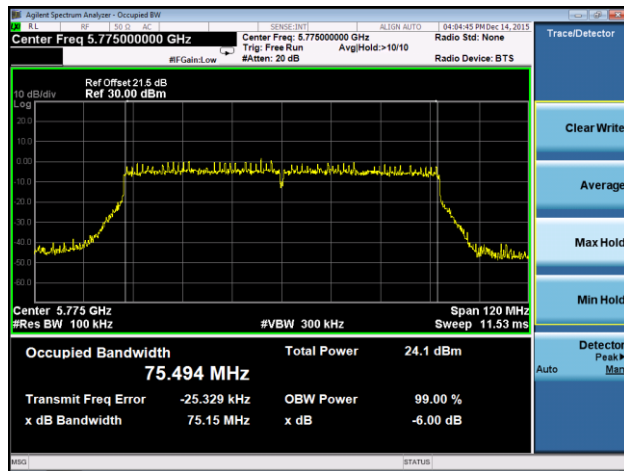


Channel 159 (5795MHz)



802.11ac-VHT80 6dB Bandwidth - Ant 3 / Ant 0 + 1 + 2 + 3

Channel 155 (5775MHz)



7.4. Output Power Measurement

7.4.1. Test Limit

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi.

5150~5250MHz: Limit (dBm) = 30dBm - (10.96dBi - 6dBi) = 25.04dBm

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).

5725~5850MHz: Limit (dBm) = 30dBm - (10.55dBi - 6dBi) = 25.45dBm

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.

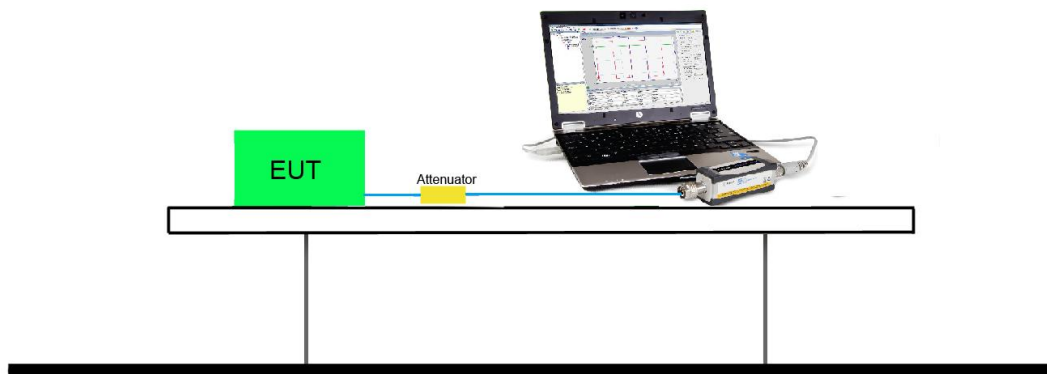
7.4.2. Test Procedure Used

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

7.4.3. Test Setting

Average power measurements were performed 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 (yellow marker) for final test of each channel.

N _{Tx}	802.11a	MCS Index for 802.11n	Data Rate (Mbps)			
			20MHz Bandwidth		40MHz Bandwidth	
			800ns GI	400ns GI	800ns GI	400ns GI
4	6	24	26	28.8	54	60
4	9	25	52	57.8	108	120
4	12	26	78	86.6	162	180
4	18	27	104	115.6	216	240
4	24	28	156	173.4	324	360
4	36	29	208	231.2	432	480
4	48	30	234	260	486	540
4	54	31	260	288.8	540	600

N _{Tx}	MCS Index for 802.11ac	Data Rate (Mbps)					
		20MHz Bandwidth		40MHz Bandwidth		80MHz Bandwidth	
		800ns GI	400ns GI	800ns GI	400ns GI	800ns GI	400ns GI
4	0	26	28.8	54	60	117.2	130
4	1	52	57.6	108	120	234	260
4	2	78	86.8	162	180	351.2	390
4	3	104	115.6	216	240	468	520
4	4	156	173.2	324	360	702	780
4	5	208	231.2	432	480	936	1040
4	6	234	260	486	540	1053.2	1170
4	7	260	288.8	540	600	1170	1300
4	8	312	346.8	648	720	1404	1560
4	9	--	--	720	800	1560	1733.2

Note: Power output test was verified over all data rates of each mode shown as above, and then choose the maximum power output (yellow marker) for final test of each channel.

Output power at various data rates for Ant 0 / Ant 0 + 1 + 2 + 3:

Test Mode	Bandwidth (MHz)	Channel	Frequency (MHz)	Data Rate (Mbps)	Average Power (dBm)
802.11a	20	60	5180	6	18.33
				24	18.13
				54	18.02
802.11n	20	60	5180	26	18.06
				28.8	17.98
				156	17.76
				173.4	17.58
				260	17.36
				288.8	17.21
802.11n	40	62	5190	54	18.22
				60	18.09
				324	17.96
				360	17.73
				540	17.58
				600	17.39
802.11ac	20	60	5180	26	18.03
				28.8	17.92
				156	17.81
				173.2	17.69
				312	17.29
				346.8	17.15
802.11ac	40	62	5190	54	18.08
				60	17.93
				324	17.69
				360	17.44
				720	17.20
				800	17.05

802.11ac	80	58	5210	117.2	17.96
				130	17.82
				702	17.68
				780	17.49
				1560	17.21
				1733.2	17.01

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	Ant 0 Average Power (dBm)	Ant 1 Average Power (dBm)	Ant 2 Average Power (dBm)	Ant 3 Average Power (dBm)	Total Average Power (dBm)	Average Power Limit (dBm)	Result
802.11a	6	36	5180	18.33	18.84	18.34	18.75	24.59	≤ 25.04	Pass
802.11a	6	44	5220	18.45	18.86	18.27	18.80	24.62	≤ 25.04	Pass
802.11a	6	48	5240	18.43	18.89	18.24	18.70	24.59	≤ 25.04	Pass
802.11a	6	149	5745	19.74	18.52	17.94	18.32	24.70	≤ 25.45	Pass
802.11a	6	157	5785	19.72	18.55	17.72	18.33	24.66	≤ 25.45	Pass
802.11a	6	165	5825	19.74	18.98	17.94	18.71	24.91	≤ 25.45	Pass
802.11n-HT20	26	36	5180	18.06	18.56	18.08	18.54	24.34	≤ 25.04	Pass
802.11n-HT20	26	44	5220	18.15	18.75	17.84	18.54	24.35	≤ 25.04	Pass
802.11n-HT20	26	48	5240	18.07	18.81	17.84	18.53	24.35	≤ 25.04	Pass
802.11n-HT20	26	149	5745	19.42	18.25	17.67	18.13	24.44	≤ 25.45	Pass
802.11n-HT20	26	157	5785	19.99	18.89	18.03	18.76	25.00	≤ 25.45	Pass
802.11n-HT20	26	165	5825	19.48	18.73	17.71	18.54	24.68	≤ 25.45	Pass
802.11n-HT40	54	38	5190	18.22	18.65	18.21	18.59	24.44	≤ 25.04	Pass
802.11n-HT40	54	46	5230	18.28	18.75	18.09	18.50	24.43	≤ 25.04	Pass
802.11n-HT40	54	151	5755	19.49	18.57	17.78	18.11	24.56	≤ 25.45	Pass
802.11n-HT40	54	159	5795	19.47	18.59	17.76	18.21	24.57	≤ 25.45	Pass
802.11ac-VHT20	26	36	5180	18.03	18.54	18.11	18.62	24.35	≤ 25.04	Pass
802.11ac-VHT20	26	44	5220	18.20	18.79	18.09	18.61	24.45	≤ 25.04	Pass
802.11ac-VHT20	26	48	5240	18.11	18.81	18.02	18.58	24.41	≤ 25.04	Pass
802.11ac-VHT20	26	149	5745	19.87	18.72	18.09	18.69	24.91	≤ 25.45	Pass
802.11ac-VHT20	26	157	5785	19.93	18.76	17.98	18.72	24.93	≤ 25.45	Pass
802.11ac-VHT20	26	165	5825	19.49	18.78	17.82	18.60	24.73	≤ 25.45	Pass
802.11ac-VHT40	54	38	5190	18.08	18.79	18.17	18.62	24.45	≤ 25.04	Pass
802.11ac-VHT40	54	46	5230	18.22	18.92	18.09	18.64	24.50	≤ 25.04	Pass
802.11ac-VHT40	54	151	5755	20.00	18.97	18.27	18.61	25.03	≤ 25.45	Pass
802.11ac-VHT40	54	159	5795	19.98	19.06	18.14	18.59	25.02	≤ 25.45	Pass
802.11ac-VHT80	117.2	42	5210	17.96	18.59	17.94	18.27	24.22	≤ 25.04	Pass
802.11ac-VHT80	117.2	155	5775	17.67	16.76	15.99	16.43	22.78	≤ 25.45	Pass

Note: The Total Average Power (dBm) = $10 \cdot \log\{10^{(\text{Ant 0 Average Power}/10)} + 10^{(\text{Ant 1 Average Power}/10)} + 10^{(\text{Ant 2 Average Power}/10)} + 10^{(\text{Ant 3 Average Power}/10)}\}$.

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.

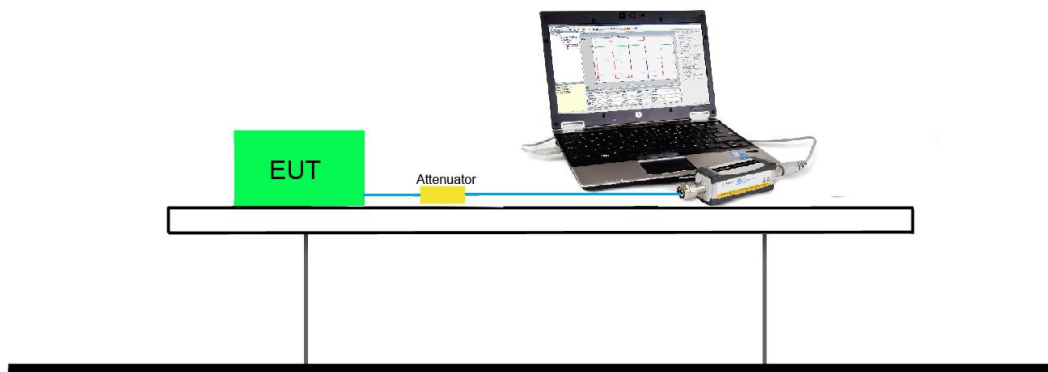
7.5.2. Test Procedure Used

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

7.5.3. Test Setting

Average power measurements were performed 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

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 - (10.96dBi - 6dBi) = 12.04dBm/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 - (10.55dBi - 6dBi) = 25.45dBm/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

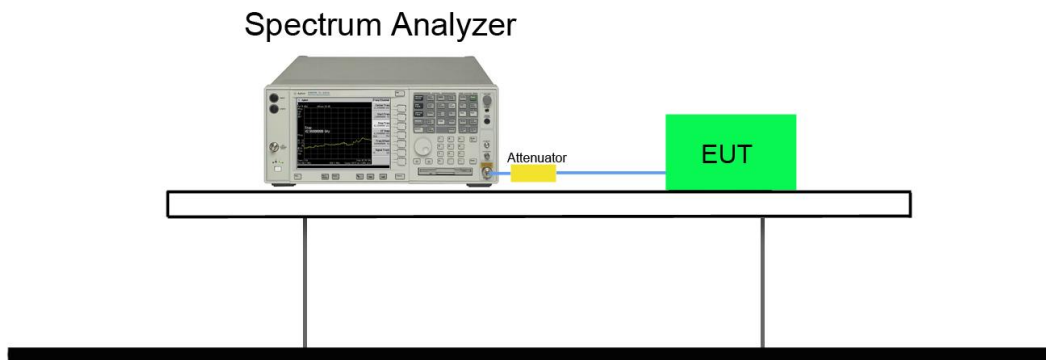
KDB 789033 D02v01 - Section F

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,
RBW = 100 kHz
4. VBW = 3MHz
5. Number of sweep points $\geq 2 \times (\text{span} / \text{RBW})$
6. Detector = power averaging (Average)
7. Sweep time = auto
8. Trigger = free run
9. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
10. Add $10 \cdot \log(1/x)$, 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 $10 \cdot \log(1/0.25) = 6$ dB if the duty cycle is 25 percent.
11. When the measurement bandwidth of Maximum PSD is specified in 500 kHz, add a constant

factor $10 \cdot \log(500\text{kHz}/100\text{kHz}) = 7 \text{ dB}$ to the measured result

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	4.85	5.31	3.03	5.25	95.88	10.91	≤ 12.04	Pass
11a	6	44	5220	2.70	5.83	4.81	4.98	95.88	10.93	≤ 12.04	Pass
11a	6	48	5240	4.41	5.95	4.98	5.37	95.88	11.42	≤ 12.04	Pass
11n-HT20	26	36	5180	4.48	5.05	4.66	5.14	98.23	10.86	≤ 12.04	Pass
11n-HT20	26	44	5220	4.78	5.28	4.19	5.18	98.23	10.90	≤ 12.04	Pass
11n-HT20	26	48	5240	4.97	4.27	4.42	4.89	98.23	10.67	≤ 12.04	Pass
11n-HT40	54	38	5190	0.89	2.63	1.80	2.32	95.60	8.17	≤ 12.04	Pass
11n-HT40	54	46	5230	1.83	2.53	1.99	2.44	95.60	8.42	≤ 12.04	Pass
11ac-VHT20	26	36	5180	3.87	4.81	4.27	4.81	98.23	10.48	≤ 12.04	Pass
11ac-VHT20	26	44	5220	4.27	5.34	4.58	5.04	98.23	10.85	≤ 12.04	Pass
11ac-VHT20	26	48	5240	4.73	4.91	4.52	5.27	98.23	10.89	≤ 12.04	Pass
11ac-VHT40	54	38	5190	1.48	1.72	1.98	2.32	95.62	8.10	≤ 12.04	Pass
11ac-VHT40	54	46	5230	1.68	1.13	0.74	2.56	95.62	7.80	≤ 12.04	Pass
11ac-VHT80	117.2	42	5210	0.50	1.50	0.91	1.14	94.00	7.32	≤ 12.04	Pass

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

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

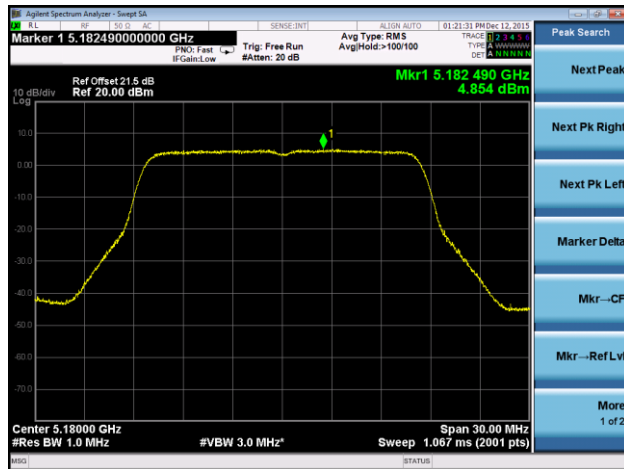
Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	Ant 0 PSD (dBm/MHz)	Ant 1 PSD (dBm/MHz)	Ant 2 PSD (dBm/MHz)	Ant 3 PSD (dBm/MHz)	Duty Cycle (%)	Constant Factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Result
11a	6	149	5745	-0.48	-1.59	-1.94	-1.69	95.88	7.00	11.81	≤ 25.45	Pass
11a	6	157	5785	-0.25	-1.29	-2.32	-1.71	95.88	7.00	11.87	≤ 25.45	Pass
11a	6	165	5825	-0.68	-1.08	-1.60	-1.42	95.88	7.00	12.01	≤ 25.45	Pass
11n-HT20	26	149	5745	-0.84	-1.86	-2.37	-2.11	98.23	7.00	11.26	≤ 25.45	Pass
11n-HT20	26	157	5785	-0.97	-0.88	-1.80	-1.40	98.23	7.00	11.76	≤ 25.45	Pass
11n-HT20	26	165	5825	-1.80	-1.55	-2.52	-4.14	98.23	7.00	10.62	≤ 25.45	Pass
11n-HT40	54	151	5755	-4.66	-4.36	-5.59	-7.32	95.60	7.00	7.87	≤ 25.45	Pass
11n-HT40	54	159	5795	-4.50	-4.41	-5.43	-5.46	95.60	7.00	8.29	≤ 25.45	Pass
11ac-VHT20	26	149	5745	0.05	-1.03	-1.67	-1.27	98.23	7.00	12.08	≤ 25.45	Pass
11ac-VHT20	26	157	5785	-0.58	-1.03	-1.45	-0.94	98.23	7.00	12.02	≤ 25.45	Pass
11ac-VHT20	26	165	5825	-1.09	-1.26	-2.24	-1.54	98.23	7.00	11.50	≤ 25.45	Pass
11ac-VHT40	54	151	5755	-3.19	-3.65	-4.44	-4.72	95.62	7.00	9.25	≤ 25.45	Pass
11ac-VHT40	54	159	5795	-2.75	-3.71	-4.22	-4.74	95.62	7.00	9.41	≤ 25.45	Pass
11ac-VHT80	117.2	155	5775	-8.56	-9.32	-9.56	-9.19	94.00	7.00	4.14	≤ 25.45	Pass

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

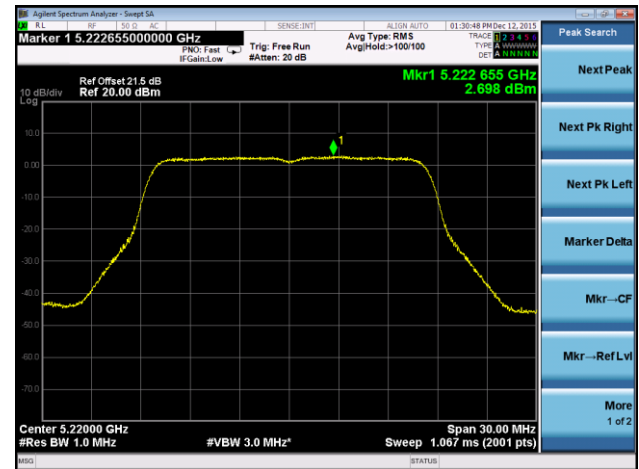
Note 2: When EUT duty cycle < 98%, the Total PSD (dBm/MHz) = $10 \cdot \log\{10^{(\text{Ant 0 PSD}/10)} + 10^{(\text{Ant 1 PSD}/10)} + 10^{(\text{Ant 2 PSD}/10)} + 10^{(\text{Ant 3 PSD}/10)}\} + 10 \cdot \log(1/\text{Duty Cycle})$.

802.11a Power Spectral Density - Ant 0 / Ant 0 + 1 + 2 + 3

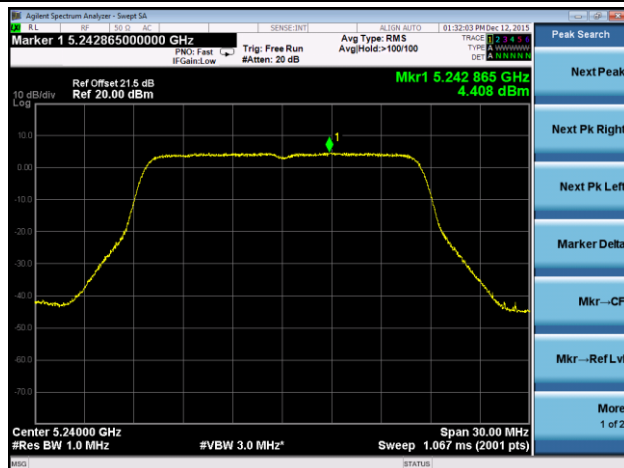
Channel 36 (5180MHz)



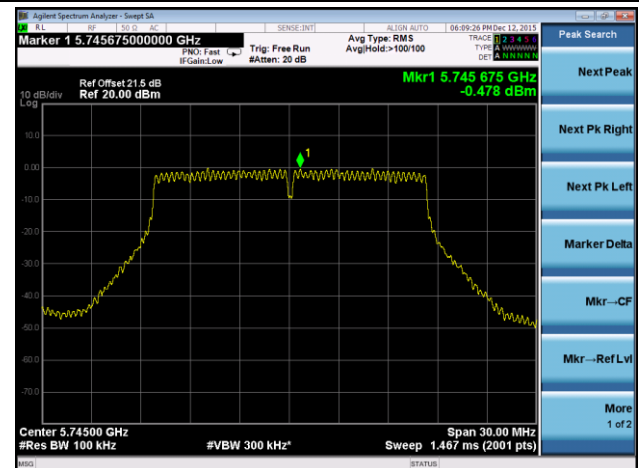
Channel 44 (5220MHz)



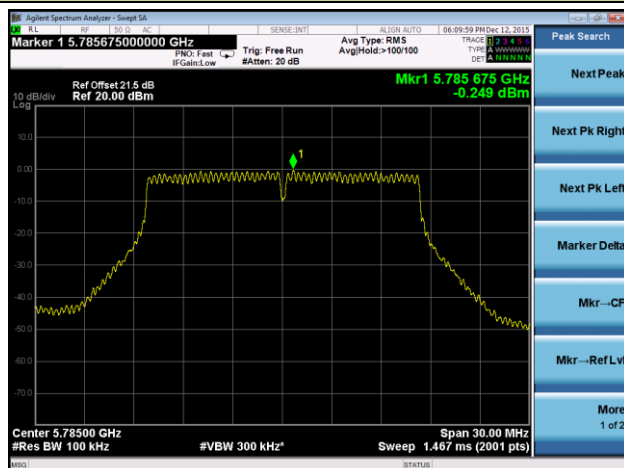
Channel 48 (5240MHz)



Channel 149 (5745MHz)



Channel 157 (5785MHz)



Channel 165 (5825MHz)

