

### 7.3.5. Test Result

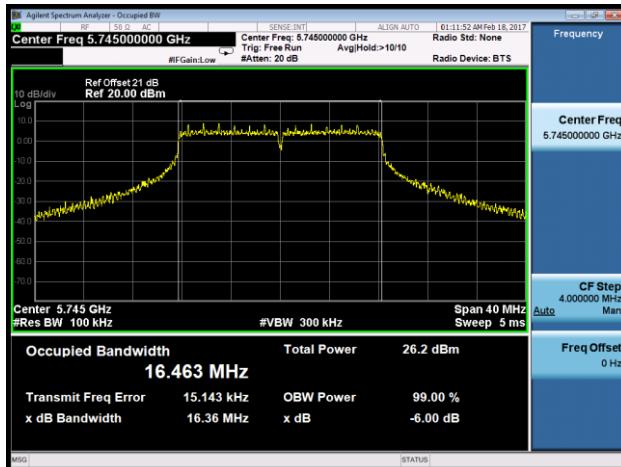
Product	US Wi-Fi AP 2x2 OD ext. antenna	Test Engineer	Johnson Liao
Test Site	SR2	Test Date	2017/02/18
Test Item	6dB Bandwidth		

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
<b>Ant 1</b>						
802.11a	6	149	5745	16.36	≥ 0.5	Pass
802.11a	6	157	5785	16.35	≥ 0.5	Pass
802.11a	6	165	5825	16.34	≥ 0.5	Pass
802.11n-HT20	6.5	149	5745	17.56	≥ 0.5	Pass
802.11n-HT20	6.5	157	5785	17.57	≥ 0.5	Pass
802.11n-HT20	6.5	165	5825	17.57	≥ 0.5	Pass
802.11n-HT40	13.5	151	5755	36.36	≥ 0.5	Pass
802.11n-HT40	13.5	159	5795	36.35	≥ 0.5	Pass
802.11ac-VHT20	6.5	149	5745	17.60	≥ 0.5	Pass
802.11ac-VHT20	6.5	157	5785	17.58	≥ 0.5	Pass
802.11ac-VHT20	6.5	165	5825	17.58	≥ 0.5	Pass
802.11ac-VHT40	13.5	151	5755	36.36	≥ 0.5	Pass
802.11ac-VHT40	13.5	159	5795	36.37	≥ 0.5	Pass
802.11ac-VHT80	29.3	155	5775	76.39	≥ 0.5	Pass

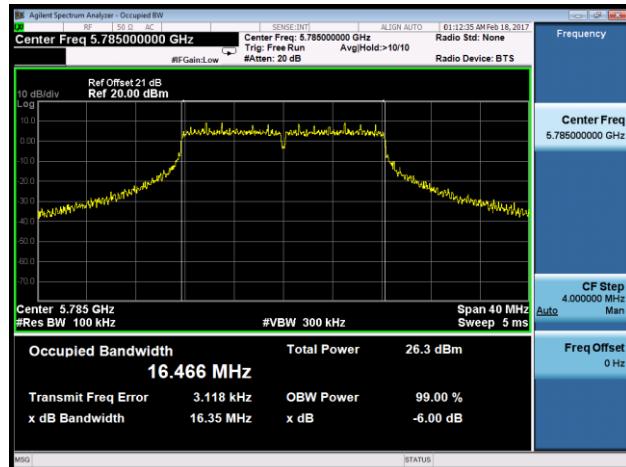
Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
Ant 2						
802.11a	6	149	5745	16.35	$\geq 0.5$	Pass
802.11a	6	157	5785	16.34	$\geq 0.5$	Pass
802.11a	6	165	5825	16.35	$\geq 0.5$	Pass
802.11n-HT20	6.5	149	5745	17.57	$\geq 0.5$	Pass
802.11n-HT20	6.5	157	5785	17.57	$\geq 0.5$	Pass
802.11n-HT20	6.5	165	5825	17.57	$\geq 0.5$	Pass
802.11n-HT40	13.5	151	5755	35.78	$\geq 0.5$	Pass
802.11n-HT40	13.5	159	5795	35.78	$\geq 0.5$	Pass
802.11ac-VHT20	6.5	149	5745	17.56	$\geq 0.5$	Pass
802.11ac-VHT20	6.5	157	5785	17.56	$\geq 0.5$	Pass
802.11ac-VHT20	6.5	165	5825	17.57	$\geq 0.5$	Pass
802.11ac-VHT40	13.5	151	5755	35.97	$\geq 0.5$	Pass
802.11ac-VHT40	13.5	159	5795	36.04	$\geq 0.5$	Pass
802.11ac-VHT80	29.3	155	5775	75.74	$\geq 0.5$	Pass

### 802.11a 6dB Bandwidth - Ant 1

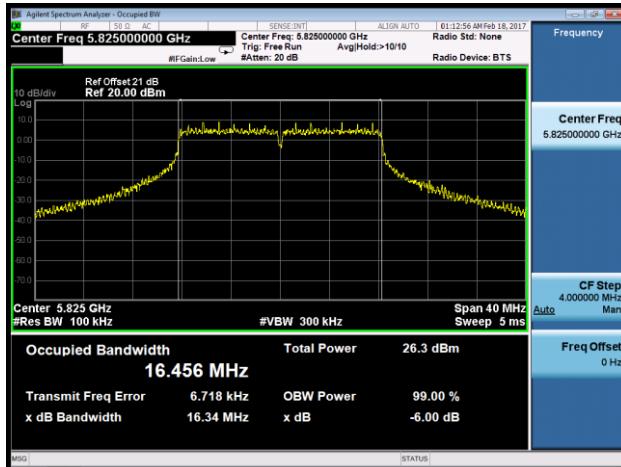
#### Channel 149 (5745MHz)



#### Channel 157 (5785MHz)



#### Channel 165 (5825MHz)

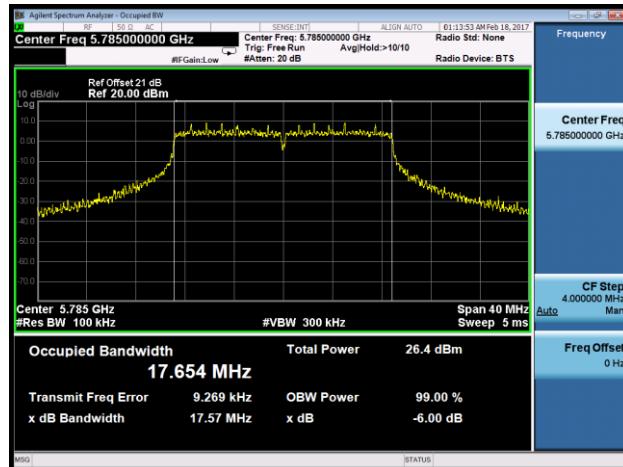


### 802.11n-HT20 6dB Bandwidth - Ant 1

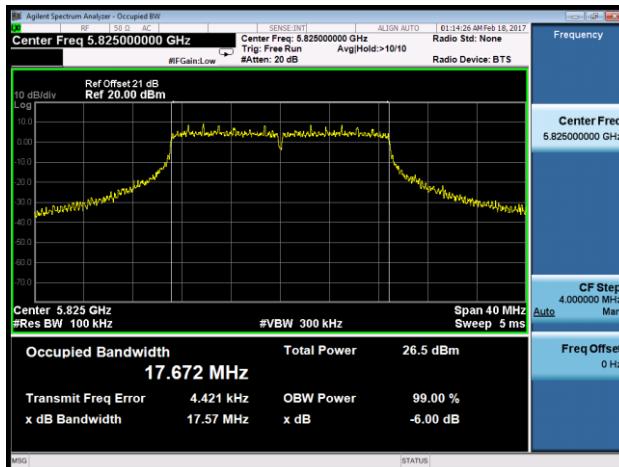
#### Channel 149 (5745MHz)



#### Channel 157 (5785MHz)

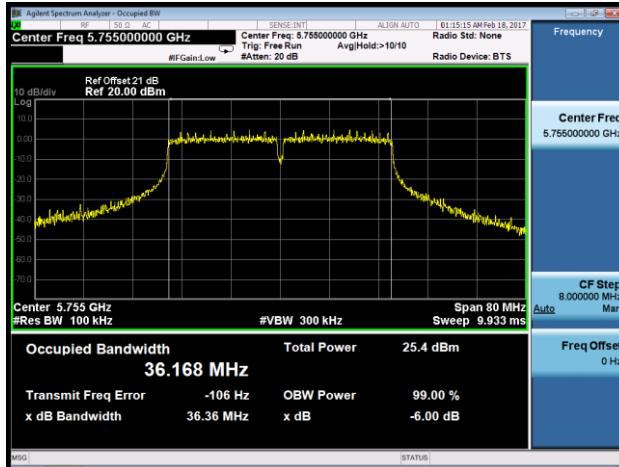


#### Channel 165 (5825MHz)

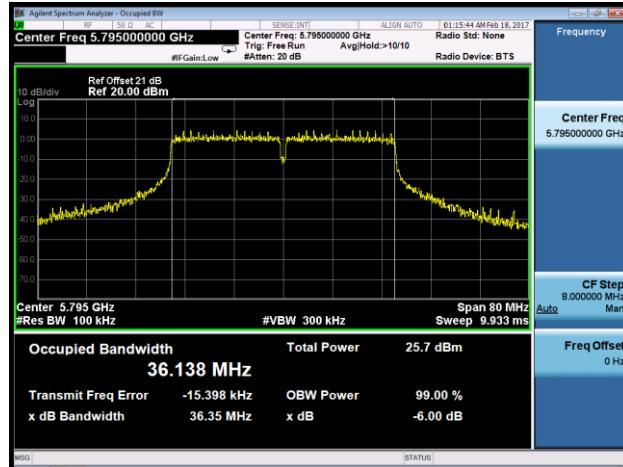


### 802.11n-HT40 6dB Bandwidth - Ant 1

#### Channel 151 (5755MHz)

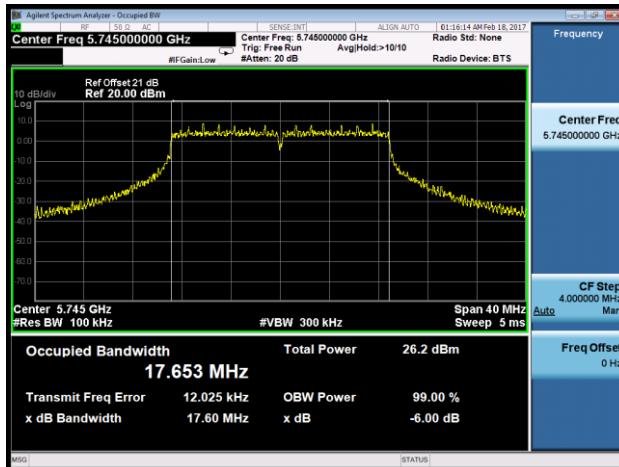


#### Channel 159 (5795MHz)



### 802.11ac-VHT20 6dB Bandwidth - Ant 1

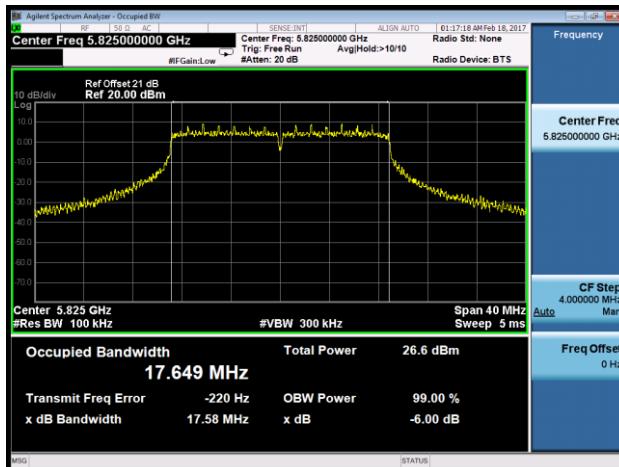
#### Channel 149 (5745MHz)



#### Channel 157 (5785MHz)

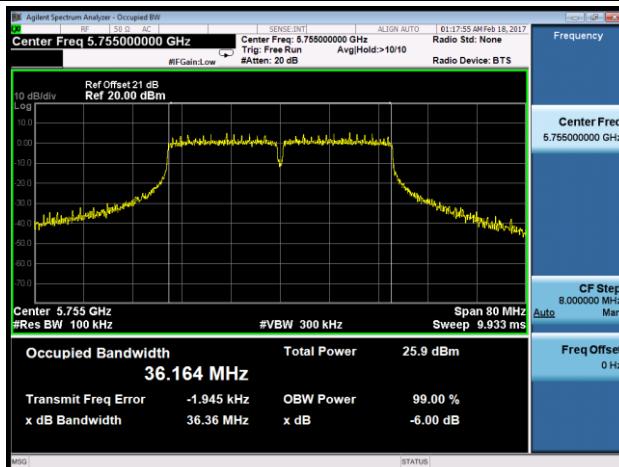


#### Channel 165 (5825MHz)

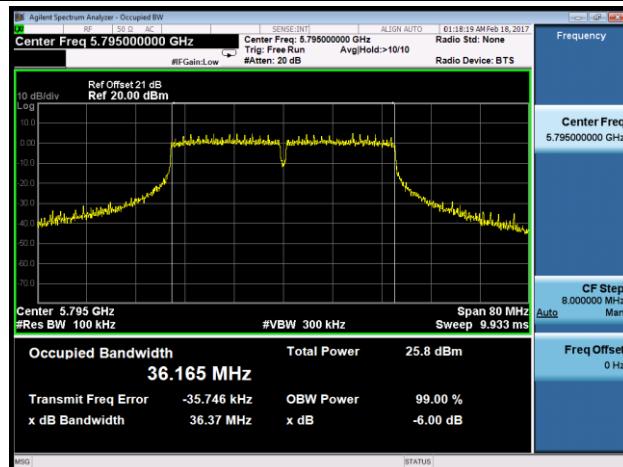


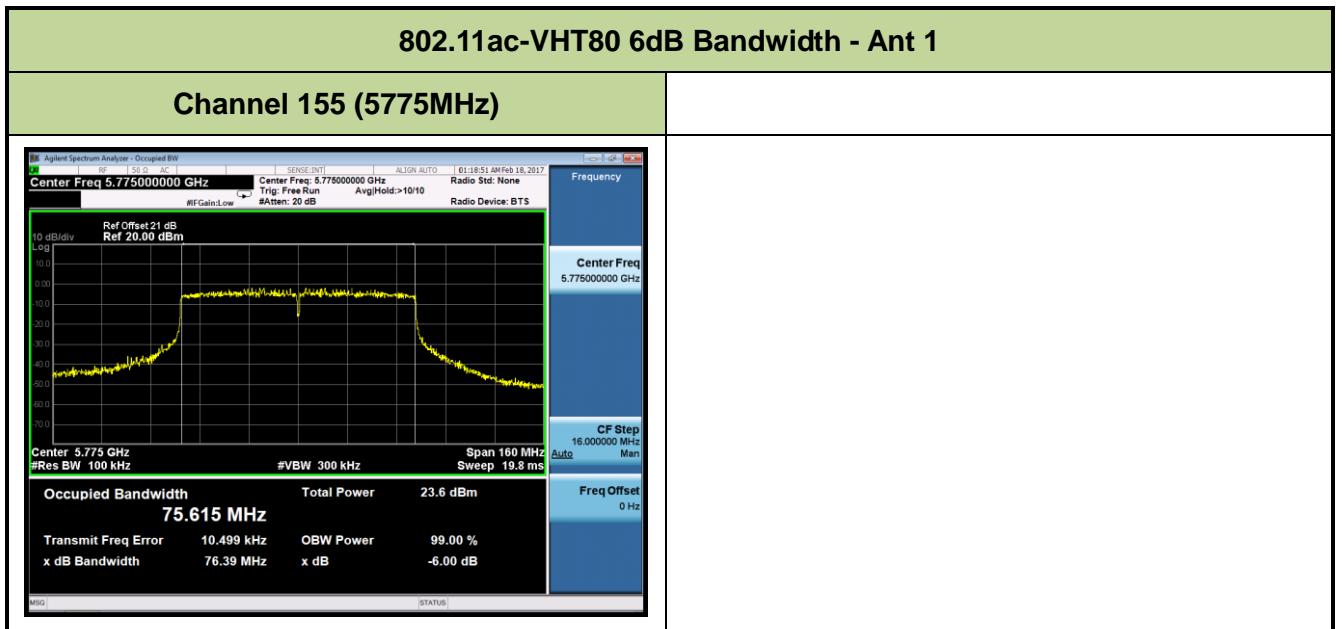
### 802.11ac-VHT40 6dB Bandwidth - Ant 1

#### Channel 151 (5755MHz)



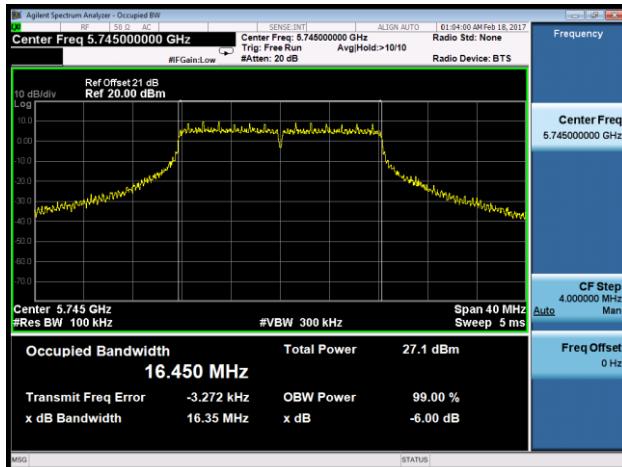
#### Channel 159 (5795MHz)



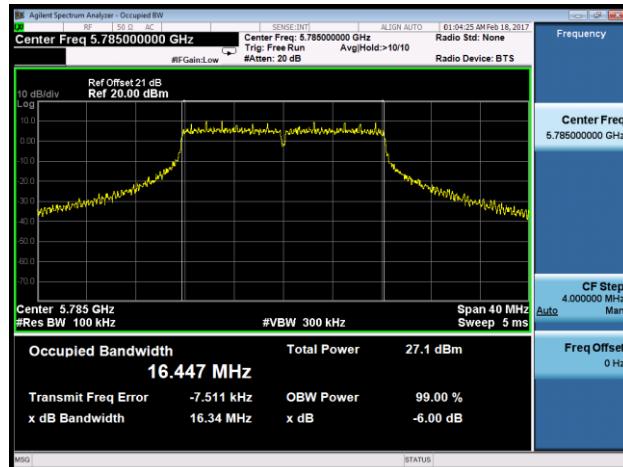


## 802.11a 6dB Bandwidth - Ant 2

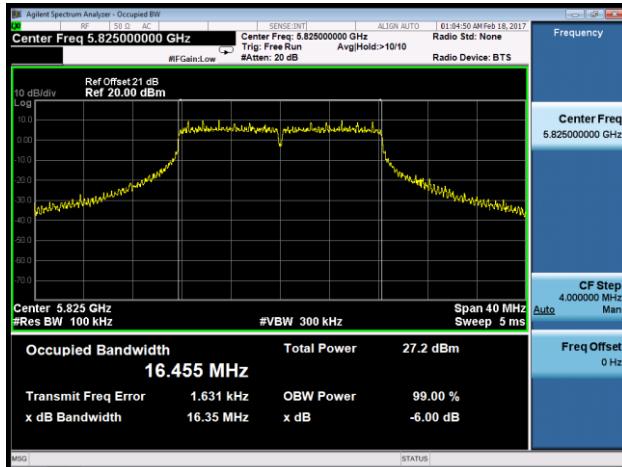
### Channel 149 (5745MHz)



### Channel 157 (5785MHz)

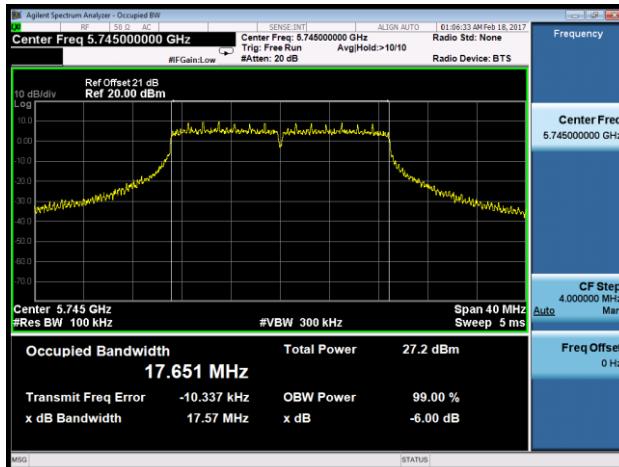


### Channel 165 (5825MHz)

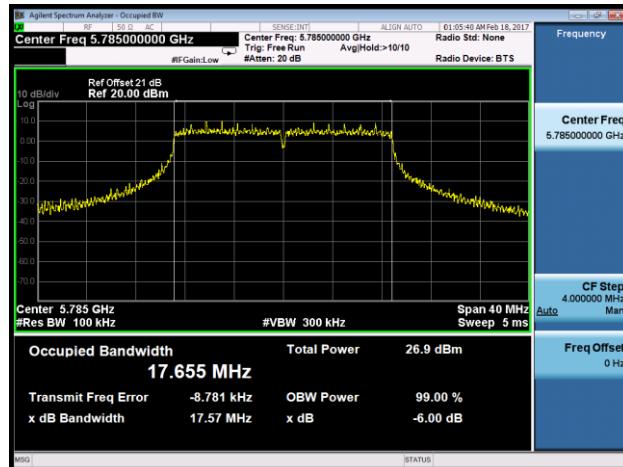


### 802.11n-HT20 6dB Bandwidth - Ant 2

#### Channel 149 (5745MHz)



#### Channel 157 (5785MHz)

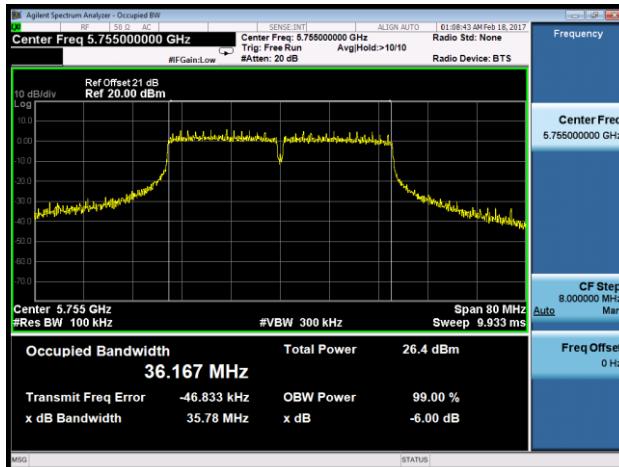


#### Channel 165 (5825MHz)

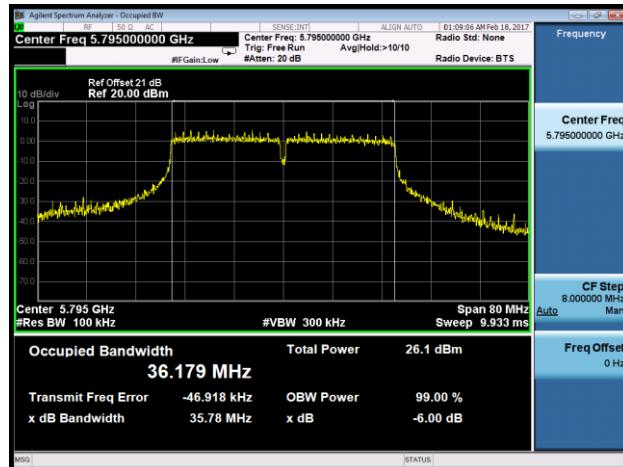


### 802.11n-HT40 6dB Bandwidth - Ant 2

#### Channel 151 (5755MHz)

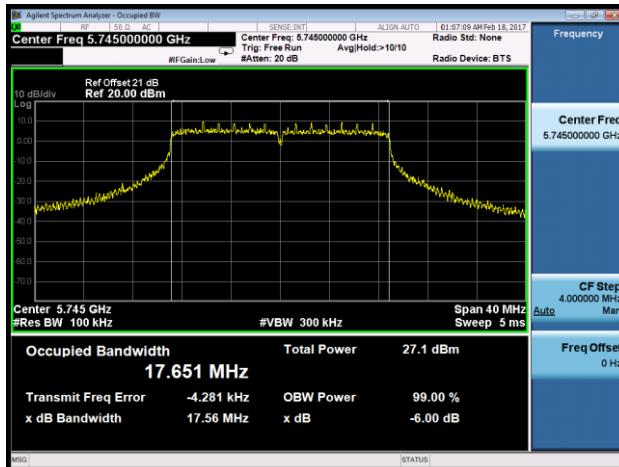


#### Channel 159 (5795MHz)

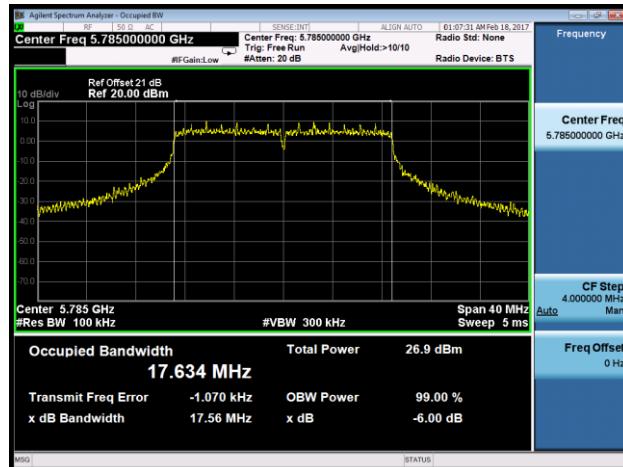


### 802.11ac-VHT20 6dB Bandwidth - Ant 2

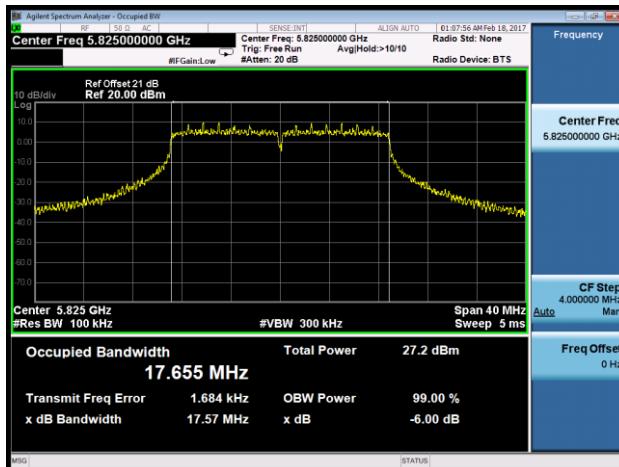
#### Channel 149 (5745MHz)



#### Channel 157 (5785MHz)

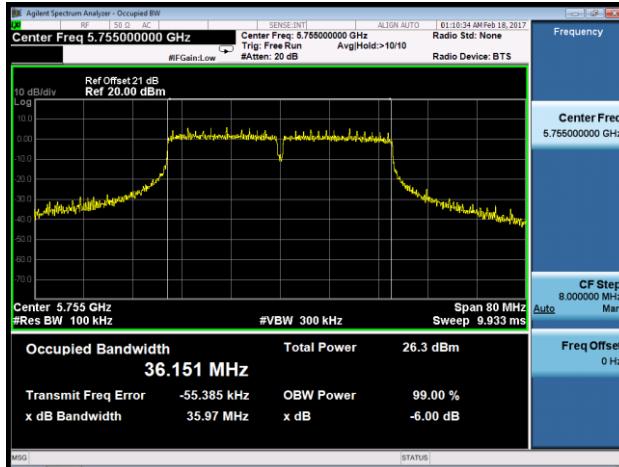


#### Channel 165 (5825MHz)

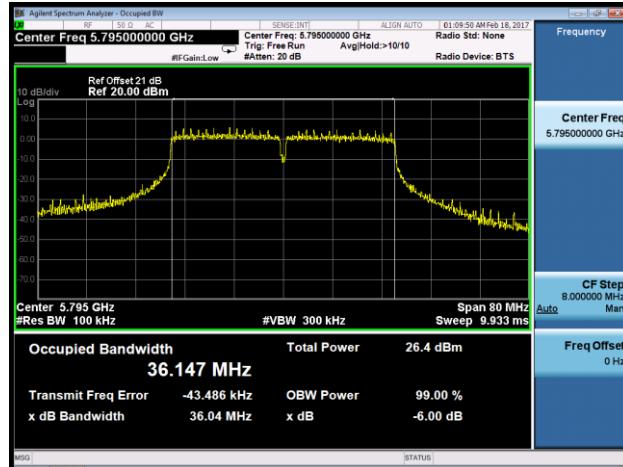


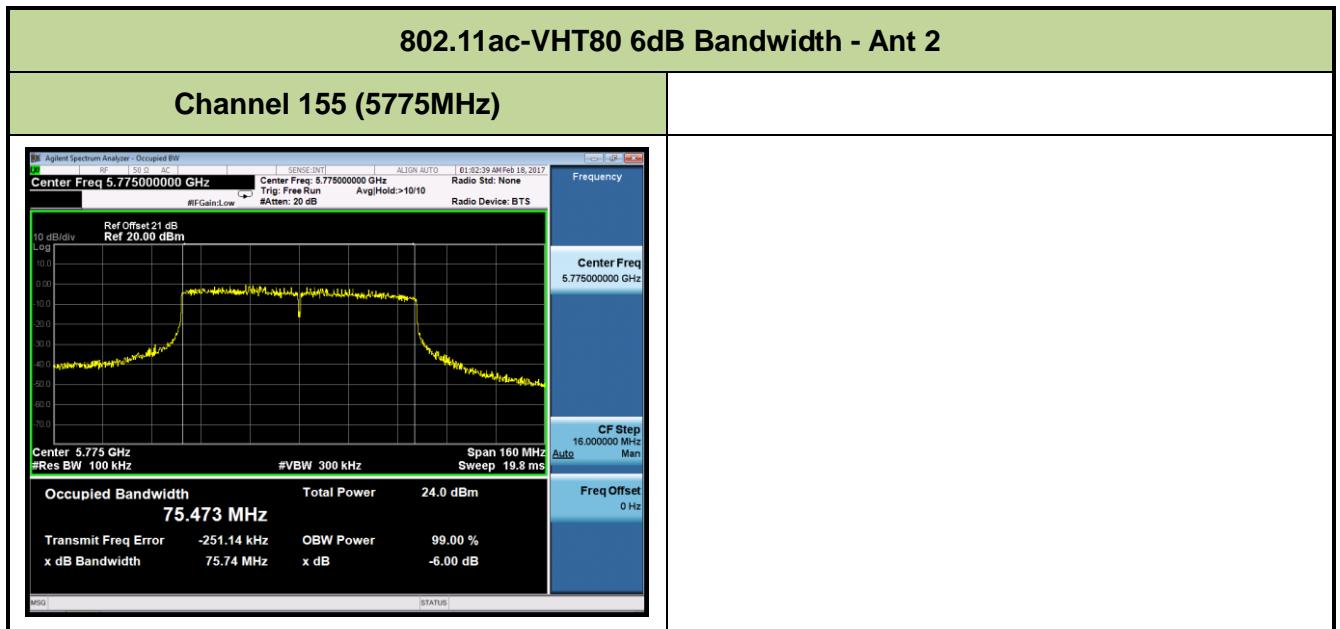
### 802.11ac-VHT40 6dB Bandwidth - Ant 2

#### Channel 151 (5755MHz)



#### Channel 159 (5795MHz)





## 7.4. Output Power Measurement

### 7.4.1. Test Limit

For an outdoor 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. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

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.

Frequency Band (MHz)	Per Chain Max Antenna Gain (dBi)		CDD & Beam Forming Directional Gain (dBi)	Limit of SISO (dBm)		Limit of MIMO (dBm)	
	Ant 1	Ant 2		Ant 1	Ant 2	CDD	Beam Forming
<b>WiFi WiFi Omni Ant</b>							
5150 ~ 5250	7.00	7.00	10.01	29.00	29.00	29.00	25.99
30°elevation angle	7.00	7.00	N/A	N/A	N/A	N/A	N/A
5725 ~ 5850	7.00	7.00	10.01	29.00	29.00	29.00	25.99

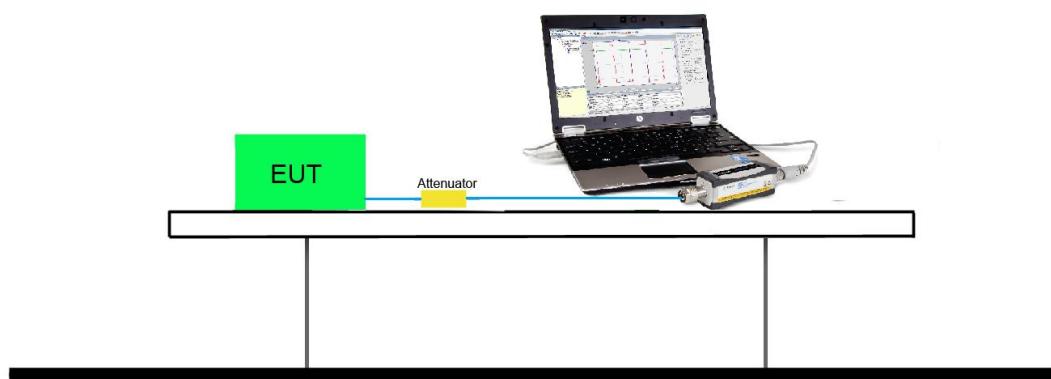
### 7.4.2. Test Procedure Used

KDB 789033 D02v01r03 - 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 Rate Assessment

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 <sub>Tx</sub>	802.11a	MCS Index for 802.11n	Data Rate (Mbps)			
			20MHz Bandwidth		40MHz Bandwidth	
			800ns GI	400ns GI	800ns GI	400ns GI
1	6	0	6.5	7.2	13.5	15.0
1	9	1	13.0	14.4	27.0	30.0
1	12	2	19.5	21.7	40.5	45.0
1	18	3	26.0	28.9	54.0	60.0
1	24	4	39.0	43.3	81.0	90.0
1	36	5	52.0	57.8	108.0	120.0
1	48	6	58.5	65.0	121.5	135.0
1	54	7	65.0	72.2	135.0	150.0

N <sub>Tx</sub>	802.11a	MCS Index for 802.11n	Data Rate (Mbps)			
			20MHz Bandwidth		40MHz Bandwidth	
			800ns GI	400ns GI	800ns GI	400ns GI
2	6	12	13	14.4	27	30
2	9	12.5	26	28.9	54	60
2	12	13	39	43.3	81	90
2	18	13.5	52	57.8	108	120
2	24	14	78	86.7	162	180
2	36	14.5	104	115.6	216	240
2	48	15	117	130	243	270
2	54	15.5	130	144	270	300

N <sub>Tx</sub>	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
1	0	6.5	7.2	13.5	15.0	29.3	32.5
1	1	13.0	14.4	27.0	30.0	58.5	65.0
1	2	19.5	21.7	40.5	45.0	87.8	97.5
1	3	26.0	28.9	54.0	60.0	117.0	130.0
1	4	39.0	43.3	81.0	90.0	175.5	195.0
1	5	52.0	57.8	108.0	120.0	234.0	260.0
1	6	58.5	65.0	121.5	135.0	263.3	292.5
1	7	65.0	72.2	135.0	150.0	292.5	325.0
1	8	78.0	86.7	162.0	180.0	351.0	390.0
1	9	--	--	180.0	200.0	390.0	433.3

N <sub>Tx</sub>	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
2	0	13	14.4	27	30	58.6	65
2	1	26	28.8	54	60	117	130
2	2	39	43.4	81	90	175.6	195
2	3	52	57.8	108	120	234	260
2	4	78	86.6	162	180	351	390
2	5	104	115.6	216	240	468	520
2	6	117	130	243	270	526.6	585
2	7	130	144.4	270	300	585	650
2	8	156	173.4	324	360	702	780
2	9	--	--	360	400	780	866.6

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 1:**

Test Mode	Bandwidth	Channel	Frequency (MHz)	Data Rate (Mbps)	Average Power (dBm)
802.11a	20	36	5180	6	13.37
				24	13.11
				54	12.98
802.11n	20	36	5180	6.5	13.31
				7.2	13.19
				26	12.88
				28.9	12.90
				65	12.56
				72.2	12.52
802.11n	40	38	5190	13.5	13.55
				15	13.50
				54	13.26
				60	13.22
				135	13.03
				150	12.99
802.11ac	20	36	5180	6.5	13.32
				7.2	13.28
				39	13.09
				78	13.11
				81	12.90
				86.7	12.92
802.11ac	40	38	5190	13.5	13.61
				15	13.57
				108	13.36
				120	13.33
				180	13.10
				200	13.06

802.11ac	80	42	5210	29.3	13.48
				32.5	13.44
				260	13.28
				234	13.26
				390	13.04
				433.3	13.01

#### 7.4.6. Test Result

Product	US Wi-Fi AP 2x2 OD ext. antenna			Test Engineer	Johnson Liao			
Test Site	SR2			Test Date	2017/02/15			
Test Item	Output Power							

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	Average Power (dBm)	Total Average Power (dBm)	Average Power Limit (dBm)	Max EIRP of 30° Elevation Angle (dBm)	EIRP Limit of 30° Elevation Angle (dBm)	Result
<b>Ant 1</b>									
11a	6	36	5180	13.37	13.37	≤ 29.00	20.37	≤ 21.00	Pass
11a	6	44	5220	13.62	13.62	≤ 29.00	20.62	≤ 21.00	Pass
11a	6	48	5240	13.49	13.49	≤ 29.00	20.49	≤ 21.00	Pass
11a	6	149	5745	20.68	20.68	≤ 29.00	--	--	Pass
11a	6	157	5785	20.87	20.87	≤ 29.00	--	--	Pass
11a	6	165	5825	20.75	20.75	≤ 29.00	--	--	Pass
11n-HT20	6.5	36	5180	13.31	13.31	≤ 29.00	20.31	≤ 21.00	Pass
11n-HT20	6.5	44	5220	13.57	13.57	≤ 29.00	20.57	≤ 21.00	Pass
11n-HT20	6.5	48	5240	13.45	13.45	≤ 29.00	20.45	≤ 21.00	Pass
11n-HT20	6.5	149	5745	20.62	20.62	≤ 29.00	--	--	Pass
11n-HT20	6.5	157	5785	20.79	20.79	≤ 29.00	--	--	Pass
11n-HT20	6.5	165	5825	20.71	20.71	≤ 29.00	--	--	Pass
11n-HT40	13.5	38	5190	13.55	13.55	≤ 29.00	20.55	≤ 21.00	Pass
11n-HT40	13.5	46	5230	13.32	13.32	≤ 29.00	20.32	≤ 21.00	Pass
11n-HT40	13.5	151	5755	20.19	20.19	≤ 29.00	--	--	Pass
11n-HT40	13.5	159	5795	20.34	20.34	≤ 29.00	--	--	Pass
11ac-VHT20	6.5	36	5180	13.32	13.32	≤ 29.00	20.32	≤ 21.00	Pass
11ac-VHT20	6.5	44	5220	13.61	13.61	≤ 29.00	20.61	≤ 21.00	Pass
11ac-VHT20	6.5	48	5240	13.48	13.48	≤ 29.00	20.48	≤ 21.00	Pass
11ac-VHT20	6.5	149	5745	20.66	20.66	≤ 29.00	--	--	Pass
11ac-VHT20	6.5	157	5785	20.80	20.80	≤ 29.00	--	--	Pass
11ac-VHT20	6.5	165	5825	20.72	20.72	≤ 29.00	--	--	Pass

Note: Max EIRP of 30° Elevation Angle (dBm) = Total Average Power (dBm) + 30° Elevation Angle Gain (dBi).

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	Average Power (dBm)	Total Average Power (dBm)	Average Power Limit (dBm)	Max EIRP of 30° Elevation Angle (dBm)	EIRP Limit of 30° Elevation Angle (dBm)	Result
Ant 1									
11ac-VHT40	13.5	38	5190	13.61	13.61	≤ 29.00	20.61	≤ 21.00	Pass
11ac-VHT40	13.5	46	5230	13.29	13.29	≤ 29.00	20.29	≤ 21.00	Pass
11ac-VHT40	13.5	151	5755	20.29	20.29	≤ 29.00	--	--	Pass
11ac-VHT40	13.5	159	5795	20.38	20.38	≤ 29.00	--	--	Pass
11ac-VHT80	29.3	42	5210	13.48	13.48	≤ 29.00	20.48	≤ 21.00	Pass
11ac-VHT80	29.3	155	5775	19.96	19.96	≤ 29.00	--	--	Pass

Note: Max EIRP of 30° Elevation Angle (dBm) = Total Average Power (dBm) + 30° Elevation Angle Gain (dBi).

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	Average Power (dBm)	Total Average Power (dBm)	Average Power Limit (dBm)	Max EIRP of 30° Elevation Angle (dBm)	EIRP Limit of 30° Elevation Angle (dBm)	Result
Ant 2									
11a	6	36	5180	13.59	13.59	≤ 29.00	20.59	≤ 21.00	Pass
11a	6	44	5220	13.39	13.39	≤ 29.00	20.39	≤ 21.00	Pass
11a	6	48	5240	13.49	13.49	≤ 29.00	20.49	≤ 21.00	Pass
11a	6	149	5745	20.54	20.54	≤ 29.00	--	--	Pass
11a	6	157	5785	21.15	21.15	≤ 29.00	--	--	Pass
11a	6	165	5825	20.75	20.75	≤ 29.00	--	--	Pass
11n-HT20	6.5	36	5180	13.58	13.58	≤ 29.00	20.58	≤ 21.00	Pass
11n-HT20	6.5	44	5220	13.36	13.36	≤ 29.00	20.36	≤ 21.00	Pass
11n-HT20	6.5	48	5240	13.51	13.51	≤ 29.00	20.51	≤ 21.00	Pass
11n-HT20	6.5	149	5745	20.45	20.45	≤ 29.00	--	--	Pass
11n-HT20	6.5	157	5785	21.01	21.01	≤ 29.00	--	--	Pass
11n-HT20	6.5	165	5825	20.66	20.66	≤ 29.00	--	--	Pass
11n-HT40	13.5	38	5190	13.63	13.63	≤ 29.00	20.63	≤ 21.00	Pass
11n-HT40	13.5	46	5230	13.43	13.43	≤ 29.00	20.43	≤ 21.00	Pass
11n-HT40	13.5	151	5755	20.47	20.47	≤ 29.00	--	--	Pass
11n-HT40	13.5	159	5795	20.54	20.54	≤ 29.00	--	--	Pass
11ac-VHT20	6.5	36	5180	13.64	13.64	≤ 29.00	20.64	≤ 21.00	Pass
11ac-VHT20	6.5	44	5220	13.39	13.39	≤ 29.00	20.39	≤ 21.00	Pass
11ac-VHT20	6.5	48	5240	13.48	13.48	≤ 29.00	20.48	≤ 21.00	Pass
11ac-VHT20	6.5	149	5745	20.45	20.45	≤ 29.00	--	--	Pass
11ac-VHT20	6.5	157	5785	21.01	21.01	≤ 29.00	--	--	Pass
11ac-VHT20	6.5	165	5825	20.66	20.66	≤ 29.00	--	--	Pass
11ac-VHT40	13.5	38	5190	13.66	13.66	≤ 29.00	20.66	≤ 21.00	Pass
11ac-VHT40	13.5	46	5230	13.42	13.42	≤ 29.00	20.42	≤ 21.00	Pass
11ac-VHT40	13.5	151	5755	20.45	20.45	≤ 29.00	--	--	Pass
11ac-VHT40	13.5	159	5795	20.47	20.47	≤ 29.00	--	--	Pass
11ac-VHT80	29.3	42	5210	13.44	13.44	≤ 29.00	20.44	≤ 21.00	Pass
11ac-VHT80	29.3	155	5775	20.21	20.21	≤ 29.00	--	--	Pass

Note: Max EIRP of 30° Elevation Angle (dBm) = Total Average Power (dBm) + 30° Elevation Angle Gain (dBi).

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	Ant 1 Average Power (dBm)	Ant 2 Average Power (dBm)	Total Average Power (dBm)	Average Power Limit (dBm)	Max EIRP of 30° Elevation Angle (dBm)	EIRP Limit of 30° Elevation Angle (dBm)	Result
<b>Ant 1 + 2</b>										
11a	6	36	5180	10.86	10.43	13.66	≤ 29.00	20.66	≤ 21.00	Pass
11a	6	44	5220	10.16	10.63	13.41	≤ 29.00	20.41	≤ 21.00	Pass
11a	6	48	5240	10.35	10.76	13.57	≤ 29.00	20.57	≤ 21.00	Pass
11a	6	149	5745	20.67	20.64	23.67	≤ 29.00	--	--	Pass
11a	6	157	5785	20.82	21.17	24.01	≤ 29.00	--	--	Pass
11a	6	165	5825	20.76	20.88	23.83	≤ 29.00	--	--	Pass
11n-HT20	27	36	5180	7.48	7.43	10.47	≤ 25.99	20.48	≤ 21.00	Pass
11n-HT20	27	44	5220	7.31	7.62	10.48	≤ 25.99	20.49	≤ 21.00	Pass
11n-HT20	27	48	5240	7.29	7.51	10.41	≤ 25.99	20.42	≤ 21.00	Pass
11n-HT20	27	149	5745	20.67	20.71	23.70	≤ 25.99	--	--	Pass
11n-HT20	27	157	5785	20.84	21.22	24.04	≤ 25.99	--	--	Pass
11n-HT20	27	165	5825	20.74	20.85	23.81	≤ 25.99	--	--	Pass
11n-HT40	54	38	5190	7.69	7.38	10.55	≤ 25.99	20.56	≤ 21.00	Pass
11n-HT40	54	46	5230	7.09	7.26	10.19	≤ 25.99	20.20	≤ 21.00	Pass
11n-HT40	54	151	5755	20.30	20.73	23.53	≤ 25.99	--	--	Pass
11n-HT40	54	159	5795	20.42	20.69	23.57	≤ 25.99	--	--	Pass
11ac-VHT20	27	36	5180	7.52	7.05	10.30	≤ 25.99	20.31	≤ 21.00	Pass
11ac-VHT20	27	44	5220	7.32	7.59	10.47	≤ 25.99	20.48	≤ 21.00	Pass
11ac-VHT20	27	48	5240	7.30	7.41	10.37	≤ 25.99	20.38	≤ 21.00	Pass
11ac-VHT20	27	149	5745	20.70	20.72	23.72	≤ 25.99	--	--	Pass
11ac-VHT20	27	157	5785	20.85	21.21	24.04	≤ 25.99	--	--	Pass
11ac-VHT20	27	165	5825	20.72	20.86	23.80	≤ 25.99	--	--	Pass
11ac-VHT40	54	38	5190	7.74	7.38	10.57	≤ 25.99	20.58	≤ 21.00	Pass
11ac-VHT40	54	46	5230	7.47	7.69	10.59	≤ 25.99	20.60	≤ 21.00	Pass
11ac-VHT40	54	151	5755	20.29	20.69	23.50	≤ 25.99	--	--	Pass
11ac-VHT40	54	159	5795	20.45	20.75	23.61	≤ 25.99	--	--	Pass
11ac-VHT80	117.2	42	5210	7.21	7.17	10.20	≤ 25.99	20.21	≤ 21.00	Pass
11ac-VHT80	117.2	155	5775	20.07	20.49	23.30	≤ 25.99	--	--	Pass

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

Note 2: Max EIRP of 30° Elevation Angle (dBm) =  $10 \times \log\{10^{(\text{Ant 1 Average Power} + \text{Ant 1 30° Elevation Angle Gain}) / 10} + 10^{(\text{Ant 2 Average Power} / 10)}\}$ .

Average Power + Ant 2 30° Elevation Angle Gain) /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.

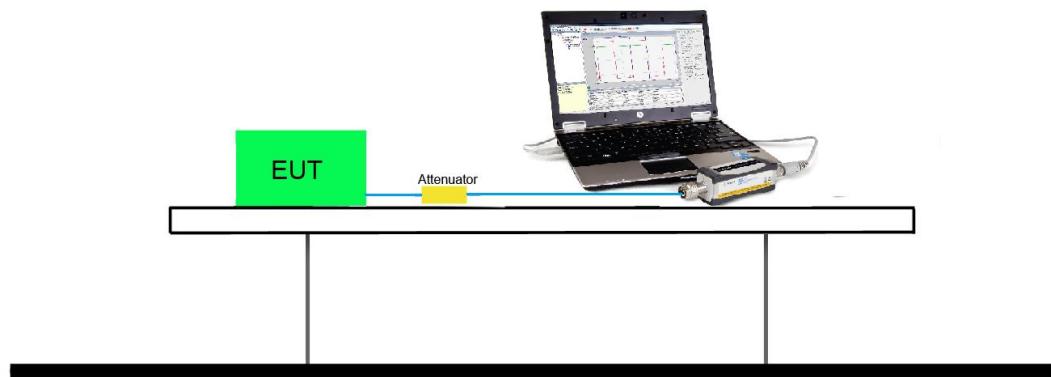
### 7.5.2. Test Procedure Used

KDB 789033 D02v01r03 - 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

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

## 7.6. Power Spectral Density Measurement

### 7.6.1. Test Limit

For an outdoor 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.

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.

#### Power Spectral Density Measurement Limit of WiFi WiFi Omni Ant

Frequency Band (MHz)	Per Chain Max Antenna Gain (dBi)		CDD & Beam Forming Directional Gain (dBi)	Limit of SISO (dBm/MHz)		Limit of MIMO (dBm/MHz)
	Ant 1	Ant 2		Ant 1	Ant 2	
5150 ~ 5250	7.00	7.00	10.01	16.00	16.00	12.99
Frequency Band (MHz)	Per Chain Max Antenna Gain (dBi)		CDD & Beam Forming Directional Gain (dBi)	Limit of SISO (dBm/500kHz)		Limit of MIMO (dBm/500kHz)
	Ant 1	Ant 2		Ant 1	Ant 2	
5725 ~ 5850	7.00	7.00	10.01	29.00	29.00	25.99

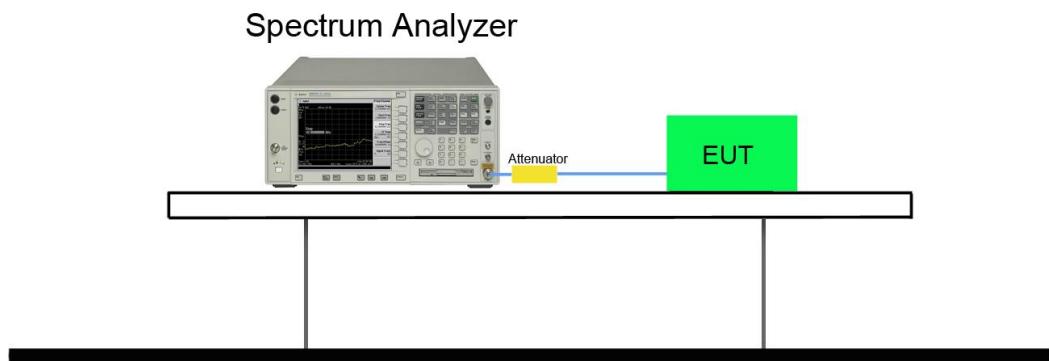
### 7.6.2. Test Procedure Used

KDB 789033 D02v01r03 - Section F

### 7.6.3. Test Setting

14. Analyzer was set to the center frequency of the UNII channel under investigation
15. Span was set to encompass the entire 26dB EBW of the signal.
16. RBW = 1MHz, if measurement bandwidth of Maximum PSD is specified in 500 kHz,
17. RBW = 100 kHz
18. VBW = 3MHz
19. Number of sweep points  $\geq 2 \times (\text{span} / \text{RBW})$
20. Detector = power averaging (Average)
21. Sweep time = auto
22. Trigger = free run
23. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
24. 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.
25. When the measurement bandwidth of Maximum PSD is specified in 500 kHz, add a constant factor  $10 \cdot \log(500\text{kHz}/100\text{kHz}) = 7$  dB to the measured result

### 7.6.4. Test Setup



### 7.6.5. Test Result

Product	US Wi-Fi AP 2x2 OD ext. antenna		Test Engineer	Johnson Liao
Test Site	SR2		Test Date	2017/02/21
Test Item	Power Spectral Density			

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	PSD (dBm/ MHz)	Duty Cycle (%)	Total PSD (dBm/ MHz)	PSD Limit (dBm/ MHz)	Result
<b>Ant 1</b>								
11a	6	36	5180	0.50	95.10	0.72	≤ 16.00	Pass
11a	6	44	5220	0.65	95.10	0.87	≤ 16.00	Pass
11a	6	48	5240	0.74	95.10	0.96	≤ 16.00	Pass
11n-HT20	6.5	36	5180	0.63	90.24	1.08	≤ 16.00	Pass
11n-HT20	6.5	44	5220	0.38	90.24	0.83	≤ 16.00	Pass
11n-HT20	6.5	48	5240	0.46	90.24	0.91	≤ 16.00	Pass
11n-HT40	13.5	38	5190	-2.79	81.66	-1.91	≤ 16.00	Pass
11n-HT40	13.5	46	5230	-3.06	81.66	-2.18	≤ 16.00	Pass
11ac-VHT20	6.5	36	5180	0.24	89.55	0.72	≤ 16.00	Pass
11ac-VHT20	6.5	44	5220	0.52	89.55	1.00	≤ 16.00	Pass
11ac-VHT20	6.5	48	5240	0.28	89.55	0.76	≤ 16.00	Pass
11ac-VHT40	13.5	38	5190	-2.71	82.89	-1.90	≤ 16.00	Pass
11ac-VHT40	13.5	46	5230	-3.02	82.89	-2.21	≤ 16.00	Pass
11ac-VHT80	29.3	42	5210	-5.80	72.78	-4.42	≤ 16.00	Pass

Note: Total PSD (dBm/MHz) = Ant PSD (dBm/MHz) + 10\*log(1/duty cycle)

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	PSD (dBm/ MHz)	Duty Cycle (%)	Total PSD (dBm/ MHz)	PSD Limit (dBm/ MHz)	Result
Ant 2								
11a	6	36	5180	0.50	95.10	0.72	≤ 16.00	Pass
11a	6	44	5220	0.19	95.10	0.41	≤ 16.00	Pass
11a	6	48	5240	0.19	95.10	0.41	≤ 16.00	Pass
11n-HT20	6.5	36	5180	0.23	90.24	0.68	≤ 16.00	Pass
11n-HT20	6.5	44	5220	-0.20	90.24	0.25	≤ 16.00	Pass
11n-HT20	6.5	48	5240	0.14	90.24	0.59	≤ 16.00	Pass
11n-HT40	13.5	38	5190	-2.52	81.66	-1.64	≤ 16.00	Pass
11n-HT40	13.5	46	5230	-3.55	81.66	-2.67	≤ 16.00	Pass
11ac-VHT20	6.5	36	5180	0.25	89.55	0.73	≤ 16.00	Pass
11ac-VHT20	6.5	44	5220	-0.37	89.55	0.11	≤ 16.00	Pass
11ac-VHT20	6.5	48	5240	-0.27	89.55	0.21	≤ 16.00	Pass
11ac-VHT40	13.5	38	5190	-2.56	82.89	-1.75	≤ 16.00	Pass
11ac-VHT40	13.5	46	5230	-3.46	82.89	-2.65	≤ 16.00	Pass
11ac-VHT80	29.3	42	5210	-6.20	72.78	-4.82	≤ 16.00	Pass

Note: Total PSD (dBm/MHz) = Ant PSD (dBm/MHz) + 10\*log(1/duty cycle)

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	Ant 1 PSD (dBm/MHz)	Ant 2 PSD (dBm/MHz)	Duty Cycle (%)	Total PSD (dBm/MHz)	PSD Limit (dBm/MHz)	Result
11a	6	36	5180	-2.28	-2.28	95.10	0.95	≤ 12.99	Pass
11a	6	44	5220	-3.04	-2.41	95.10	0.51	≤ 12.99	Pass
11a	6	48	5240	-2.30	-2.38	95.10	0.89	≤ 12.99	Pass
11n-HT20	13	36	5180	-2.73	-2.71	90.24	0.74	≤ 12.99	Pass
11n-HT20	13	44	5220	-3.56	-2.71	90.24	0.34	≤ 12.99	Pass
11n-HT20	13	48	5240	-2.85	-2.79	90.24	0.64	≤ 12.99	Pass
11n-HT40	27	38	5190	-6.21	-5.88	81.66	-2.15	≤ 12.99	Pass
11n-HT40	27	46	5230	-6.68	-5.84	81.66	-2.35	≤ 12.99	Pass
11ac-VHT20	13	36	5180	-2.85	-2.73	89.55	0.70	≤ 12.99	Pass
11ac-VHT20	13	44	5220	-3.66	-2.67	89.55	0.35	≤ 12.99	Pass
11ac-VHT20	13	48	5240	-3.02	-2.76	89.55	0.60	≤ 12.99	Pass
11ac-VHT40	27	38	5190	-6.06	-5.72	82.89	-2.06	≤ 12.99	Pass
11ac-VHT40	27	46	5230	-6.53	-6.02	82.89	-2.44	≤ 12.99	Pass
11ac-VHT80	58.6	42	5210	-9.20	-8.86	72.78	-4.64	≤ 12.99	Pass

Note: Total PSD (dBm/MHz) =  $10^{\log\{10^{(\text{Ant 1 PSD}/10)} + 10^{(\text{Ant 2 PSD}/10)}\}} + 10^{\log(1/\text{duty cycle})}$

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	PSD (dBm/100kHz)	Duty Cycle (%)	Constant Factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Result
Ant 1									
11a	6	149	5745	1.17	95.10	6.99	8.38	≤ 29.00	Pass
11a	6	157	5785	1.41	95.10	6.99	8.62	≤ 29.00	Pass
11a	6	165	5825	1.55	95.10	6.99	8.76	≤ 29.00	Pass
11n-HT20	6.5	149	5745	0.50	90.24	6.99	7.94	≤ 29.00	Pass
11n-HT20	6.5	157	5785	0.64	90.24	6.99	8.08	≤ 29.00	Pass
11n-HT20	6.5	165	5825	0.51	90.24	6.99	7.95	≤ 29.00	Pass
11n-HT40	13.5	151	5755	-2.61	81.66	6.99	5.26	≤ 29.00	Pass
11n-HT40	13.5	159	5795	-2.60	81.66	6.99	5.27	≤ 29.00	Pass
11ac-VHT20	6.5	149	5745	0.69	89.55	6.99	8.16	≤ 29.00	Pass
11ac-VHT20	6.5	157	5785	0.84	89.55	6.99	8.31	≤ 29.00	Pass
11ac-VHT20	6.5	165	5825	1.04	89.55	6.99	8.51	≤ 29.00	Pass
11ac-VHT40	13.5	151	5755	-2.60	82.89	6.99	5.20	≤ 29.00	Pass
11ac-VHT40	13.5	159	5795	-2.69	82.89	6.99	5.11	≤ 29.00	Pass
11ac-VHT80	29.3	155	5775	-6.61	72.78	6.99	1.76	≤ 29.00	Pass
Ant 2									
11a	6	149	5745	0.90	95.10	6.99	8.11	≤ 29.00	Pass
11a	6	157	5785	1.61	95.10	6.99	8.82	≤ 29.00	Pass
11a	6	165	5825	1.13	95.10	6.99	8.34	≤ 29.00	Pass
11n-HT20	6.5	149	5745	0.83	90.24	6.99	8.27	≤ 29.00	Pass
11n-HT20	6.5	157	5785	1.40	90.24	6.99	8.84	≤ 29.00	Pass
11n-HT20	6.5	165	5825	0.82	90.24	6.99	8.26	≤ 29.00	Pass
11n-HT40	13.5	151	5755	-2.17	81.66	6.99	5.70	≤ 29.00	Pass
11n-HT40	13.5	159	5795	-1.60	81.66	6.99	6.27	≤ 29.00	Pass
11ac-VHT20	6.5	149	5745	1.27	89.55	6.99	8.74	≤ 29.00	Pass
11ac-VHT20	6.5	157	5785	1.46	89.55	6.99	8.93	≤ 29.00	Pass
11ac-VHT20	6.5	165	5825	0.98	89.55	6.99	8.45	≤ 29.00	Pass
11ac-VHT40	13.5	151	5755	-2.19	82.89	6.99	5.61	≤ 29.00	Pass
11ac-VHT40	13.5	159	5795	-2.21	82.89	6.99	5.59	≤ 29.00	Pass
11ac-VHT80	29.3	155	5775	-5.23	72.78	6.99	3.14	≤ 29.00	Pass

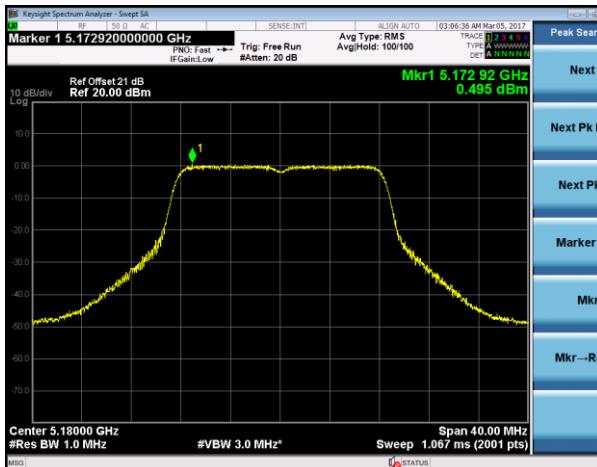
Note: Total PSD (dBm/500kHz) = Ant PSD (dBm/100kHz) + 10\*log(1/duty cycle) + Constant Factor.

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	Ant 1 PSD (dBm/100kHz)	Ant 2 PSD (dBm/100kHz)	Duty Cycle (%)	Constant Factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Result
Ant 1 + 2										
11a	6	149	5745	1.28	0.92	95.10	6.99	11.32	≤ 25.99	Pass
11a	6	157	5785	1.59	1.99	95.10	6.99	12.01	≤ 25.99	Pass
11a	6	165	5825	1.08	1.19	95.10	6.99	11.35	≤ 25.99	Pass
11n-HT20	13	149	5745	1.17	1.51	90.24	6.99	11.79	≤ 25.99	Pass
11n-HT20	13	157	5785	0.84	1.47	90.24	6.99	11.61	≤ 25.99	Pass
11n-HT20	13	165	5825	0.83	1.34	90.24	6.99	11.54	≤ 25.99	Pass
11n-HT40	27	151	5755	-2.63	-1.46	81.66	6.99	8.87	≤ 25.99	Pass
11n-HT40	27	159	5795	-2.33	-2.66	81.66	6.99	8.39	≤ 25.99	Pass
11ac-VHT20	13	149	5745	1.03	1.90	89.55	6.99	11.97	≤ 25.99	Pass
11ac-VHT20	13	157	5785	1.33	1.97	89.55	6.99	12.14	≤ 25.99	Pass
11ac-VHT20	13	165	5825	1.15	1.25	89.55	6.99	11.68	≤ 25.99	Pass
11ac-VHT40	27	151	5755	-2.62	-1.84	82.89	6.99	8.60	≤ 25.99	Pass
11ac-VHT40	27	159	5795	-2.60	-2.05	82.89	6.99	8.50	≤ 25.99	Pass
11ac-VHT80	58.6	155	5775	-6.26	-4.80	72.78	6.99	5.91	≤ 25.99	Pass

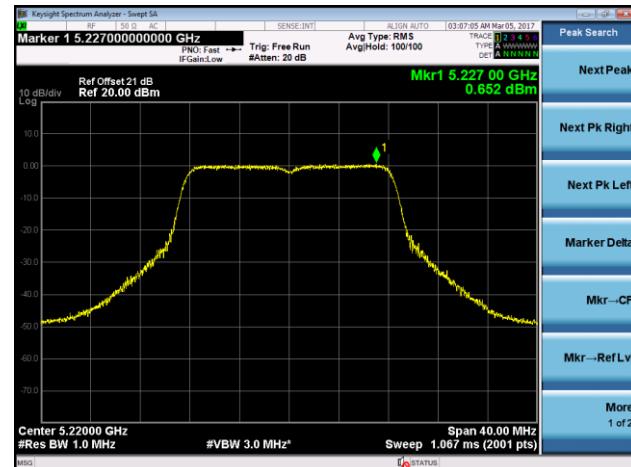
Note: Total PSD (dBm/500kHz) =  $10^{\log\{10^{(\text{Ant 1 PSD}/10)} + 10^{(\text{Ant 2 PSD}/10)}\}} + 10^{\log(1/\text{duty cycle})} + \text{Constant Factor.}$

### 802.11a Power Spectral Density - Ant 1

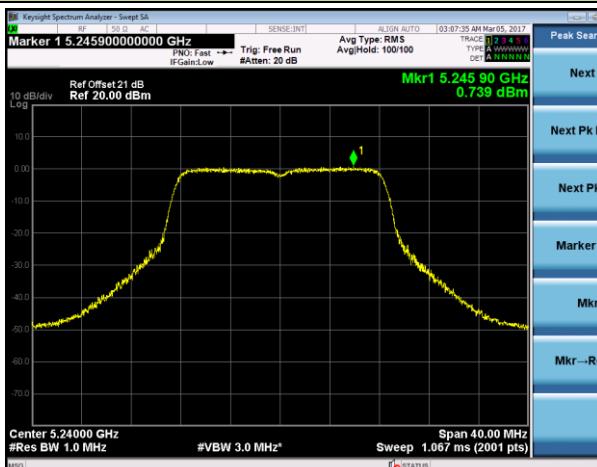
#### Channel 36 (5180MHz)



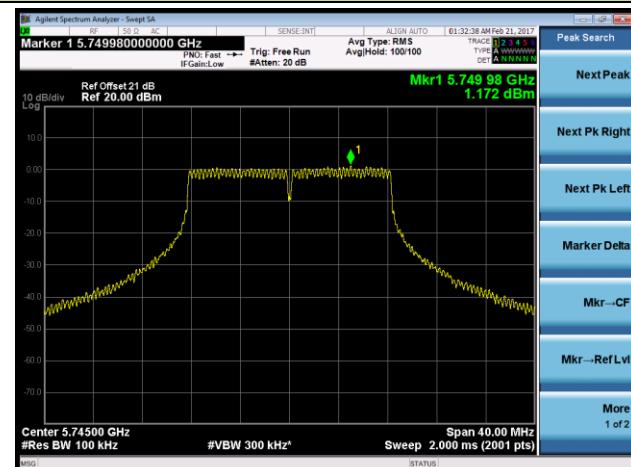
#### Channel 44 (5220MHz)



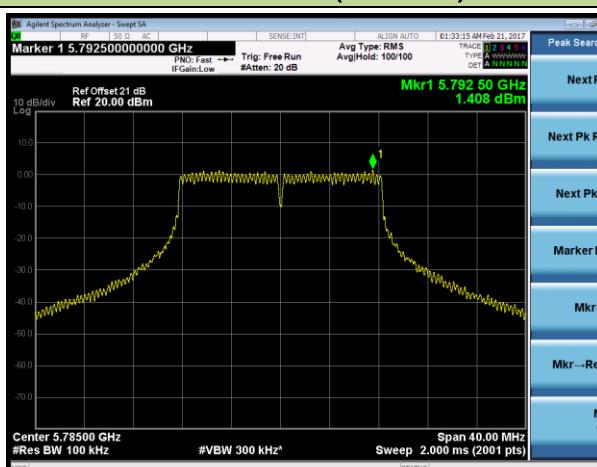
#### Channel 48 (5240MHz)



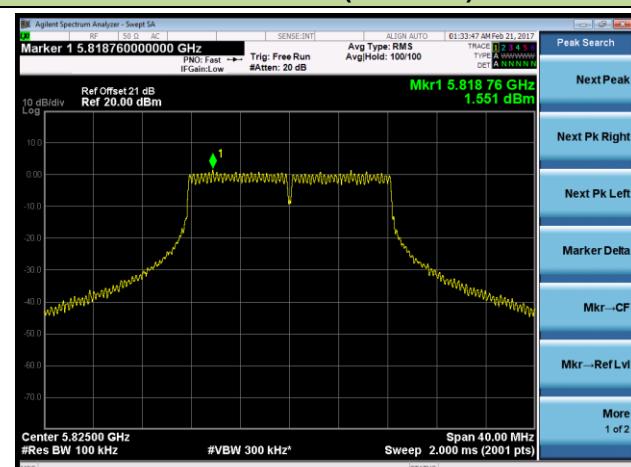
#### Channel 149 (5745MHz)

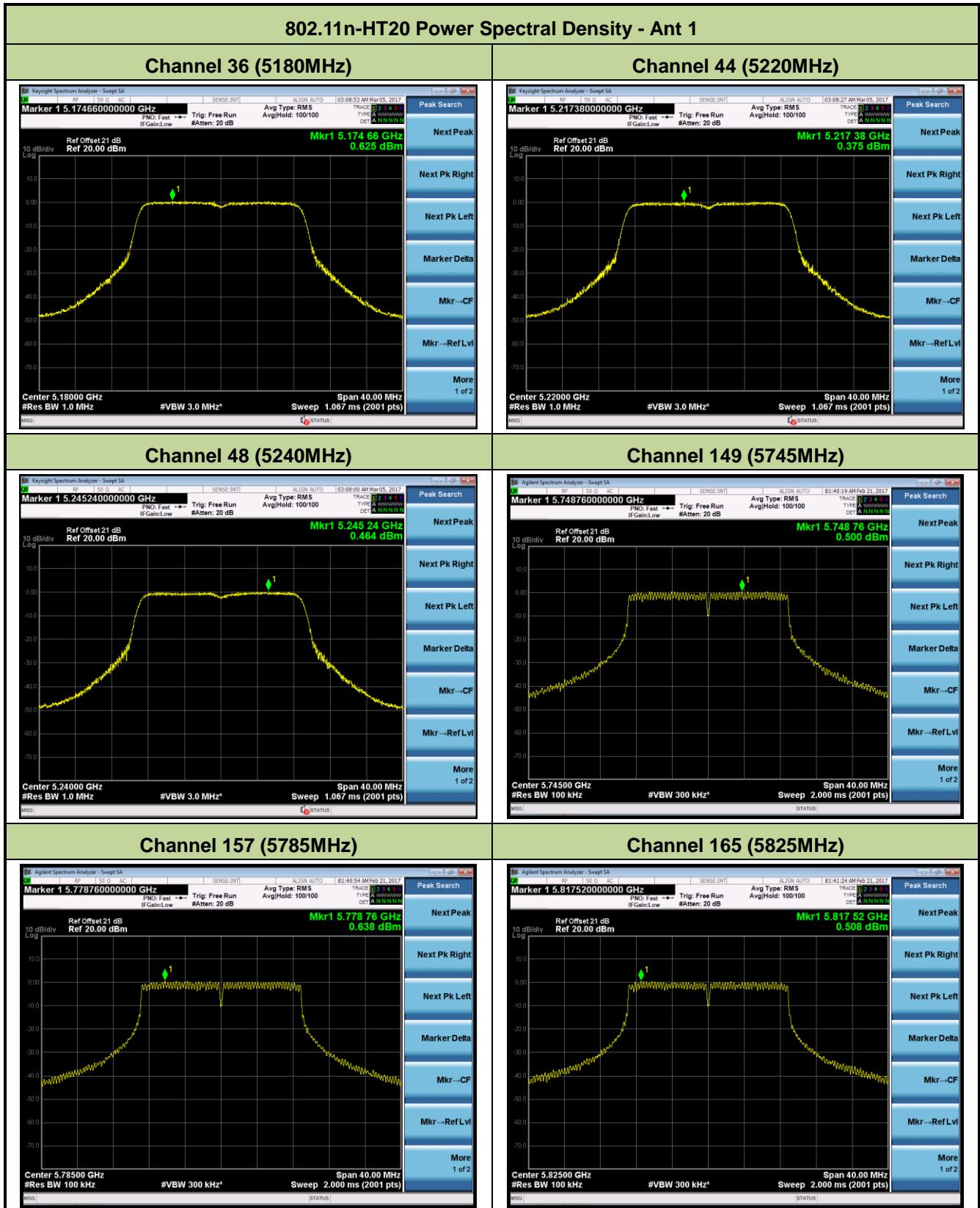


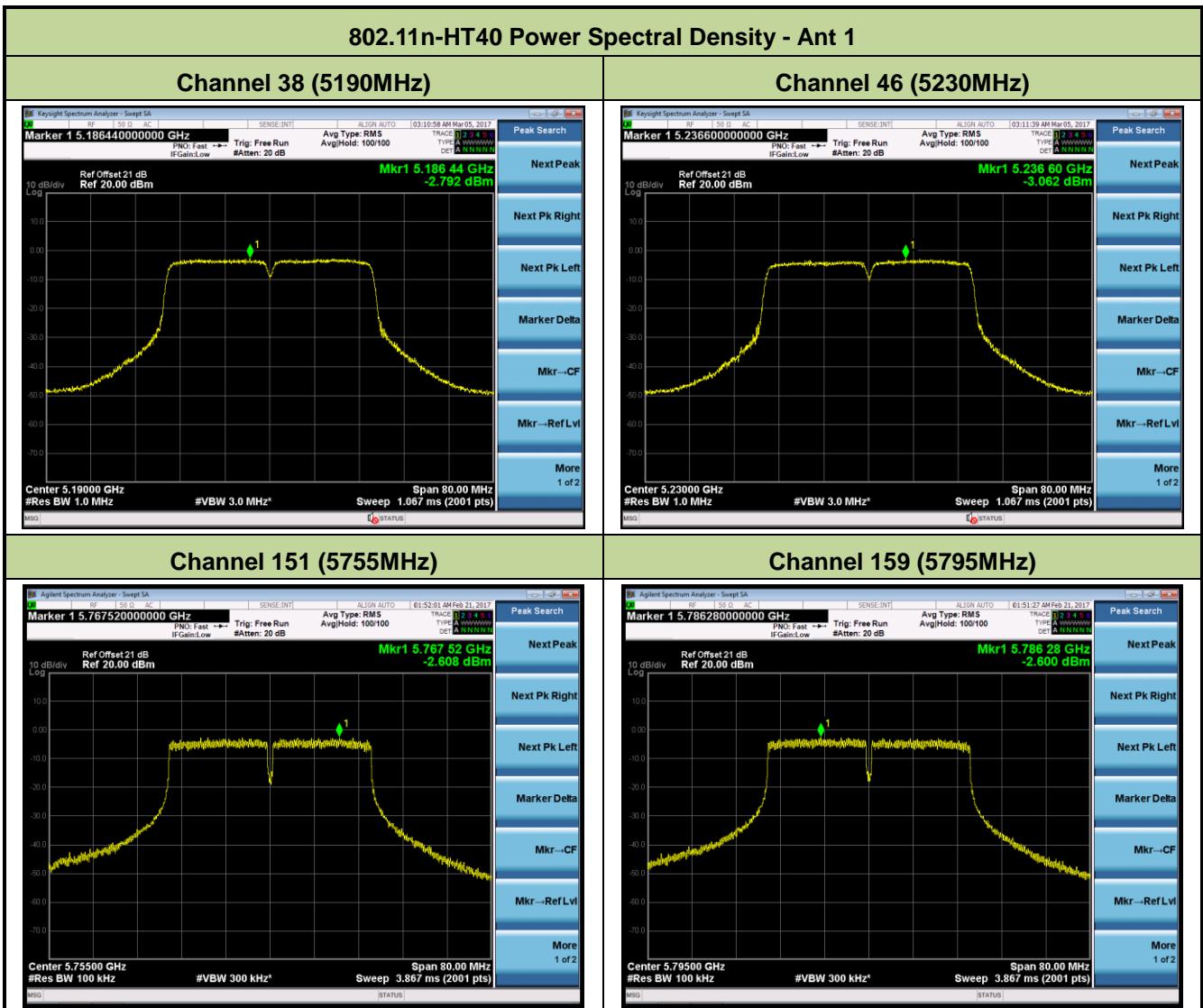
#### Channel 157 (5785MHz)

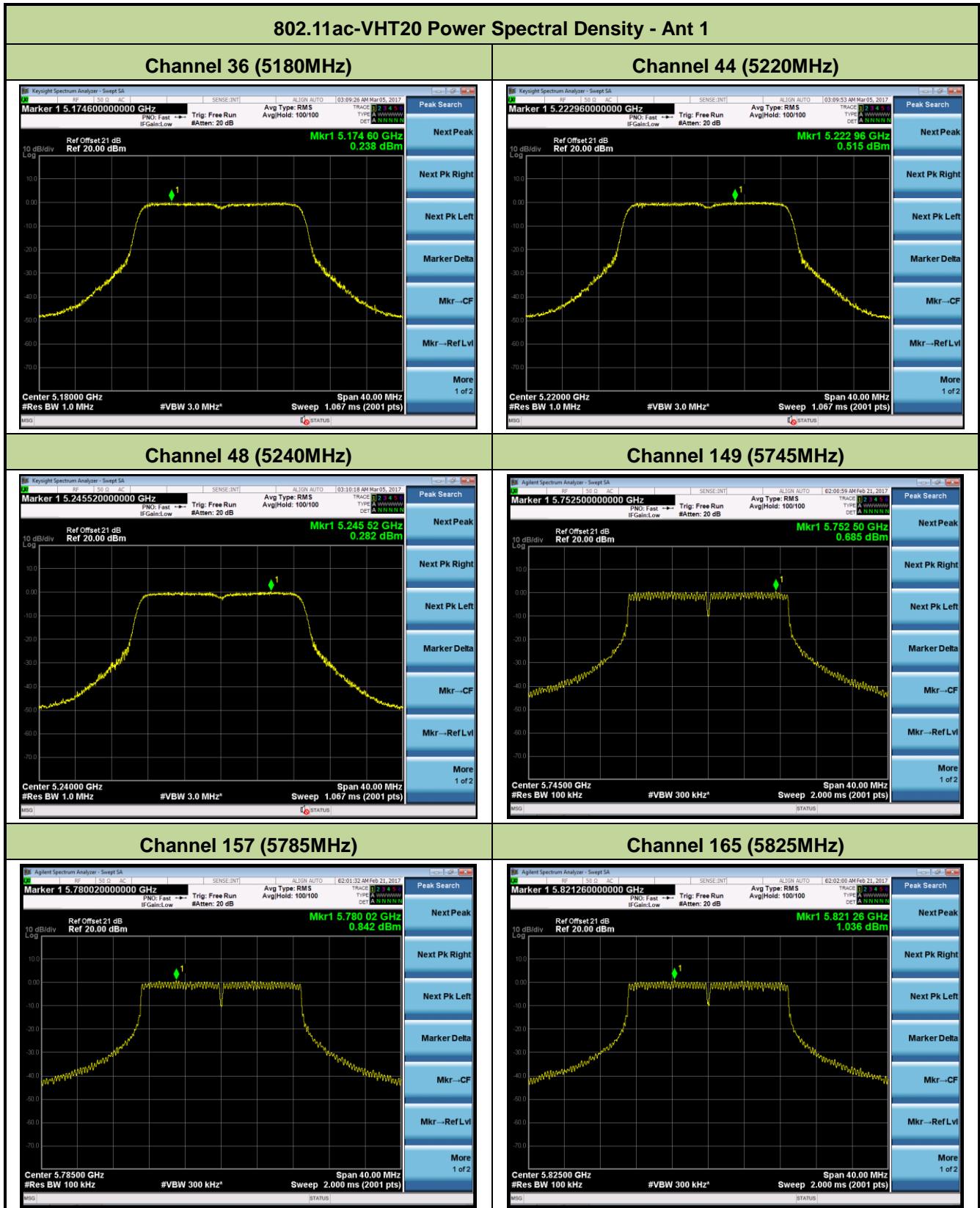


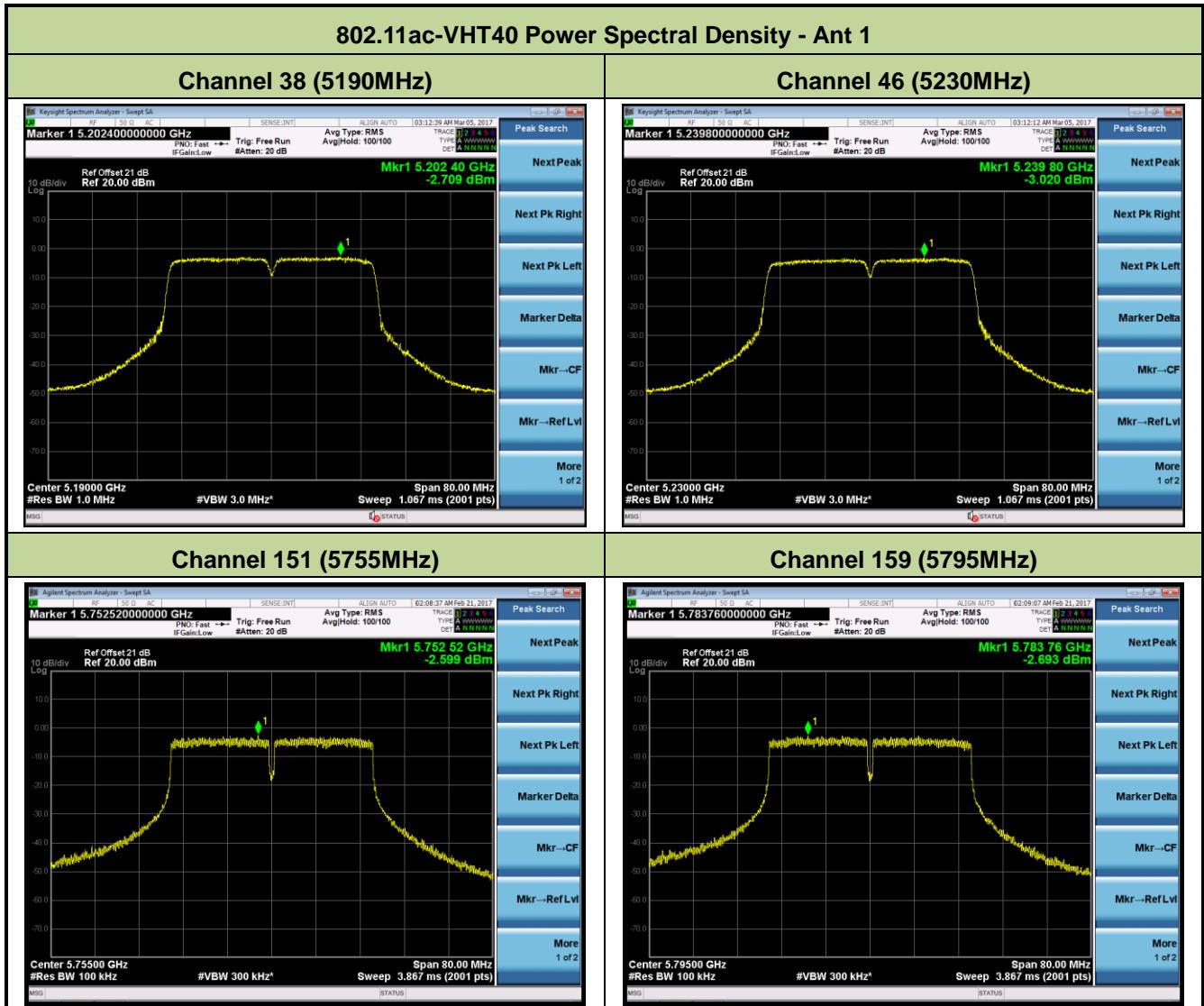
#### Channel 165 (5825MHz)

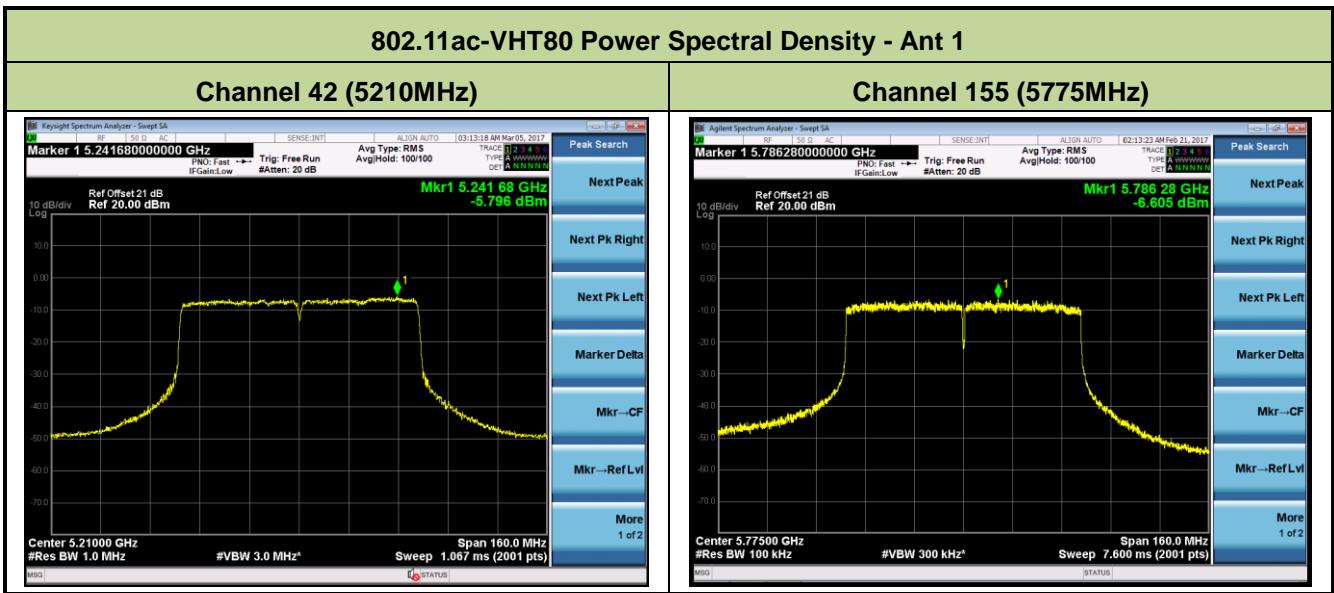






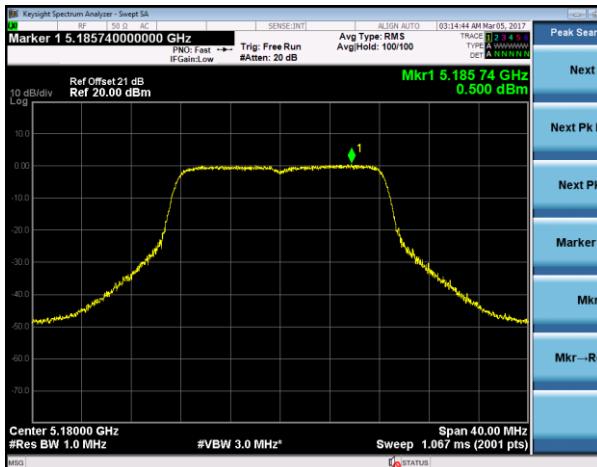




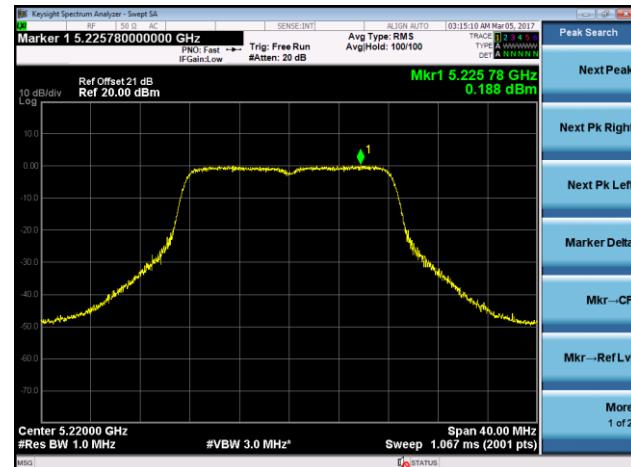


### 802.11a Power Spectral Density - Ant 2

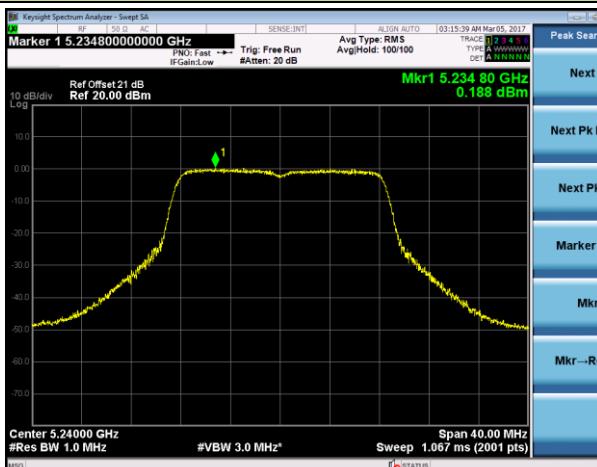
#### Channel 36 (5180MHz)



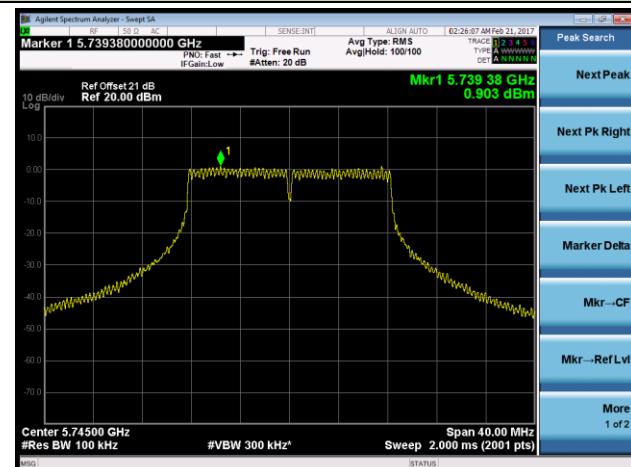
#### Channel 44 (5220MHz)



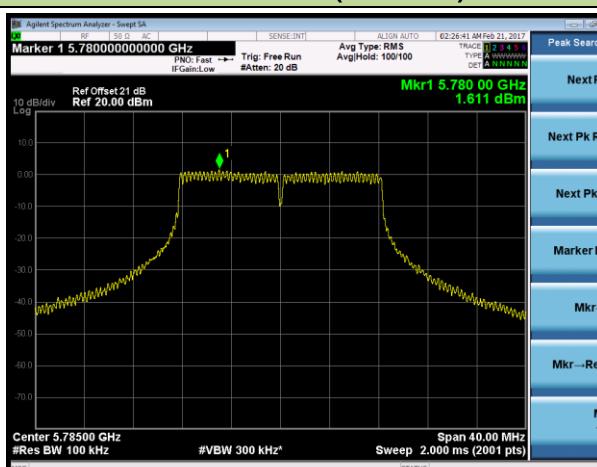
#### Channel 48 (5240MHz)



#### Channel 149 (5745MHz)



#### Channel 157 (5785MHz)



#### Channel 165 (5825MHz)

