

7.3. 6dB Bandwidth Measurement

7.3.1. Test Limit

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

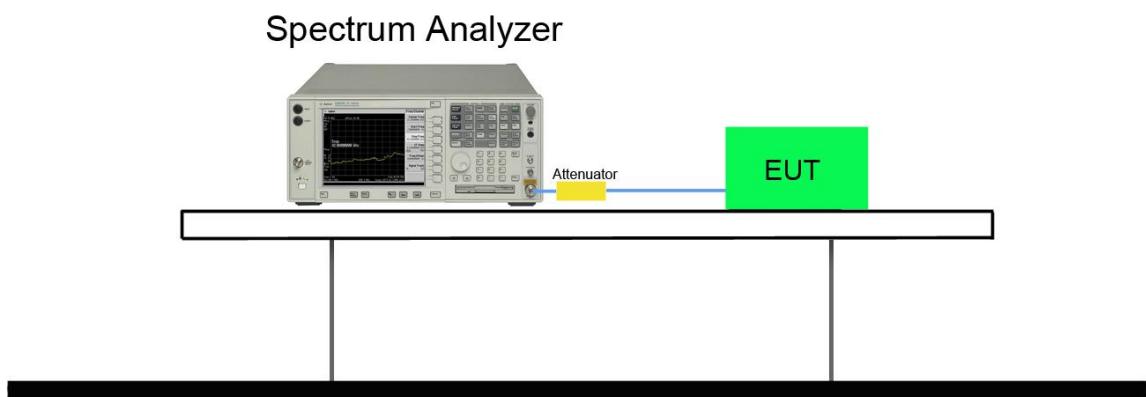
7.3.2. Test Procedure used

KDB 789033 D02v01r04 – 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 $\geq 3 \times$ 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.

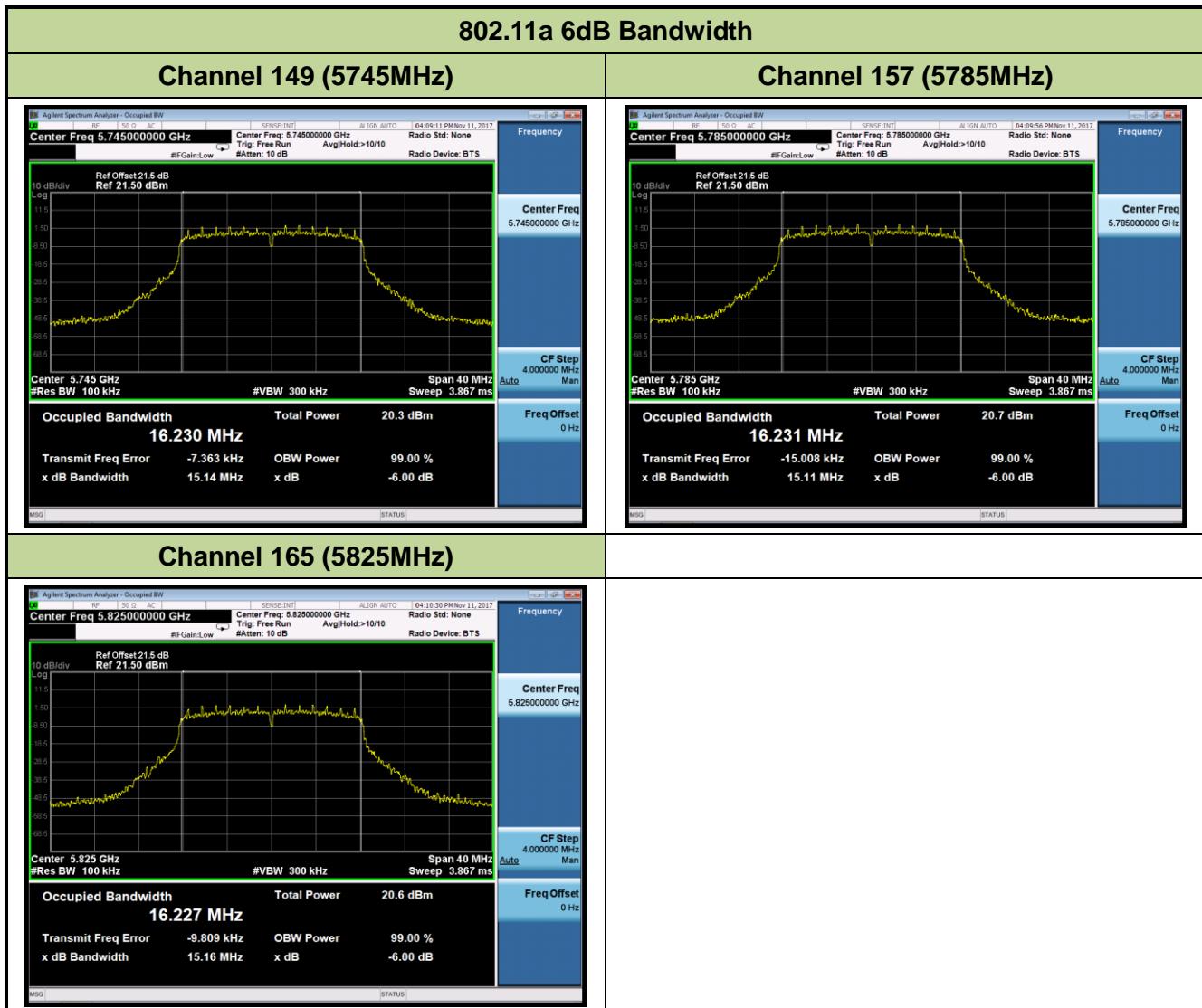
7.3.4. Test Setup



7.3.5. Test Result

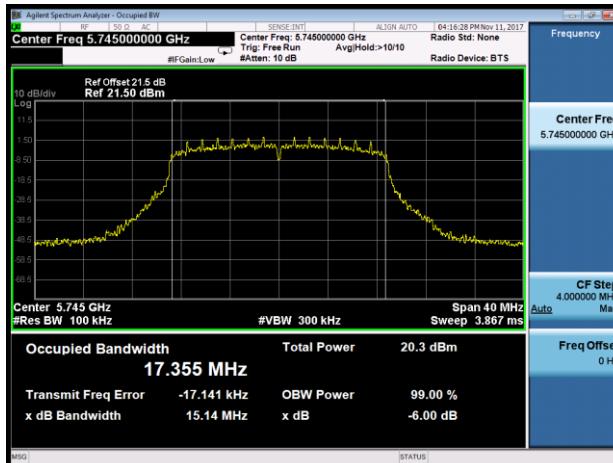
Product	VR All-In-One Headset	Temperature	23°C
Test Engineer	Hunk Li	Relative Humidity	52%
Test Site	TR3	Test Date	2017/11/11

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
802.11a	6	149	5745	15.14	≥ 0.5	Pass
802.11a	6	157	5785	15.11	≥ 0.5	Pass
802.11a	6	165	5825	15.16	≥ 0.5	Pass
802.11n-HT20	6.5	149	5745	15.14	≥ 0.5	Pass
802.11n-HT20	6.5	157	5785	15.17	≥ 0.5	Pass
802.11n-HT20	6.5	165	5825	15.16	≥ 0.5	Pass
802.11n-HT40	13.5	151	5755	35.14	≥ 0.5	Pass
802.11n-HT40	13.5	159	5795	35.17	≥ 0.5	Pass
802.11ac-VHT20	6.5	149	5745	15.17	≥ 0.5	Pass
802.11ac-VHT20	6.5	157	5785	15.15	≥ 0.5	Pass
802.11ac-VHT20	6.5	165	5825	15.16	≥ 0.5	Pass
802.11ac-VHT40	13.5	151	5755	35.17	≥ 0.5	Pass
802.11ac-VHT40	13.5	159	5795	35.17	≥ 0.5	Pass
802.11ac-VHT80	29.3	155	5775	75.33	≥ 0.5	Pass

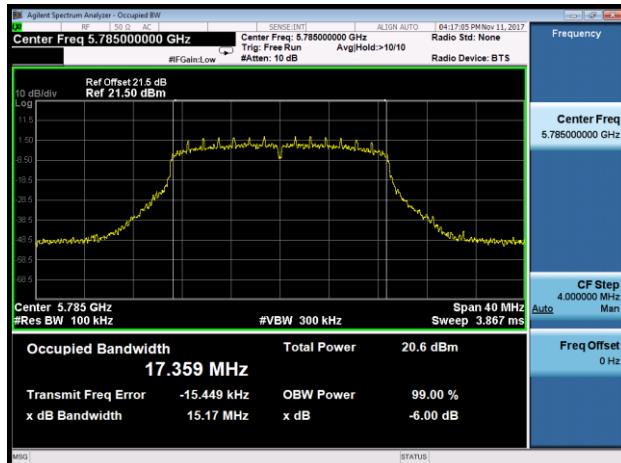


802.11n-HT20 6dB Bandwidth

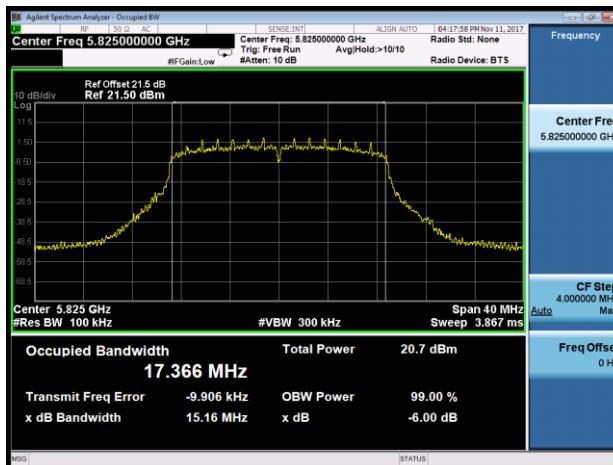
Channel 149 (5745MHz)



Channel 157 (5785MHz)

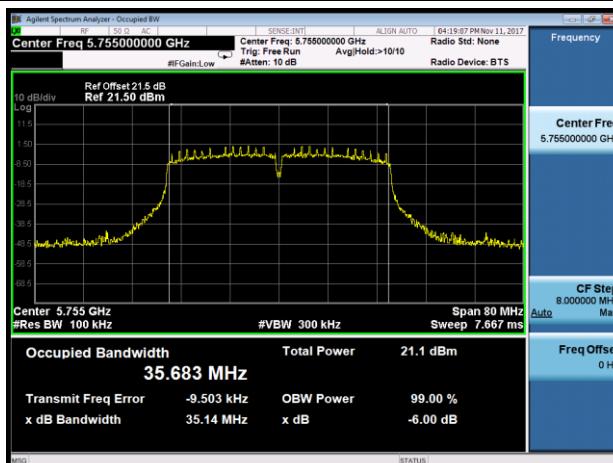


Channel 165 (5825MHz)

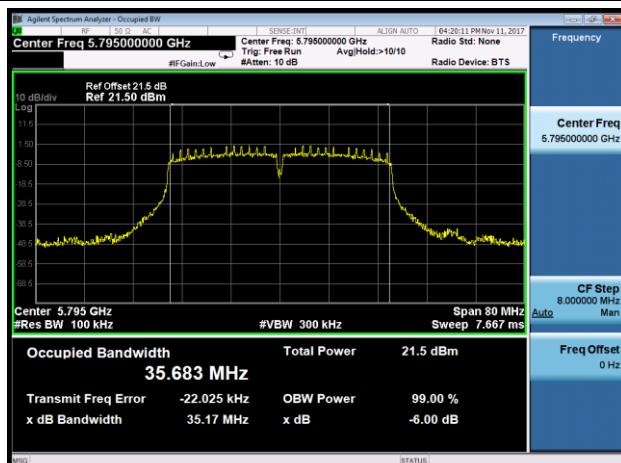


802.11n-HT40 6dB Bandwidth

Channel 151 (5755MHz)

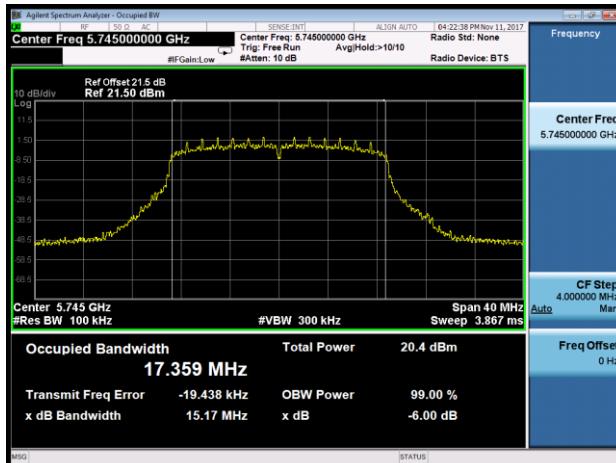


Channel 159 (5795MHz)

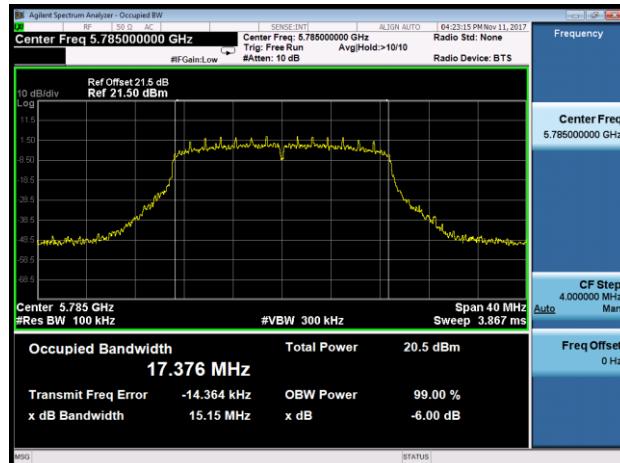


802.11ac-VHT20 6dB Bandwidth

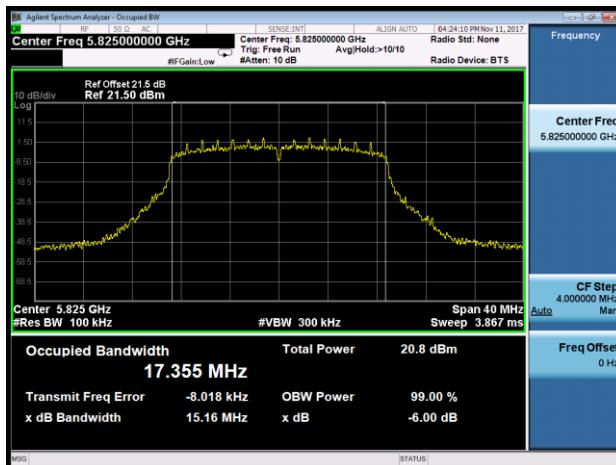
Channel 149 (5745MHz)



Channel 157 (5785MHz)

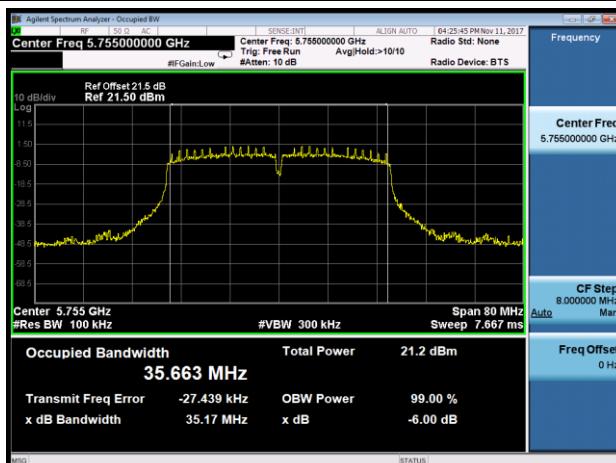


Channel 165 (5825MHz)

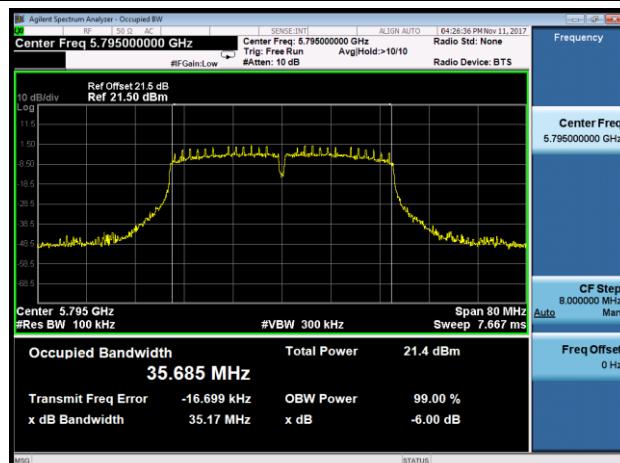


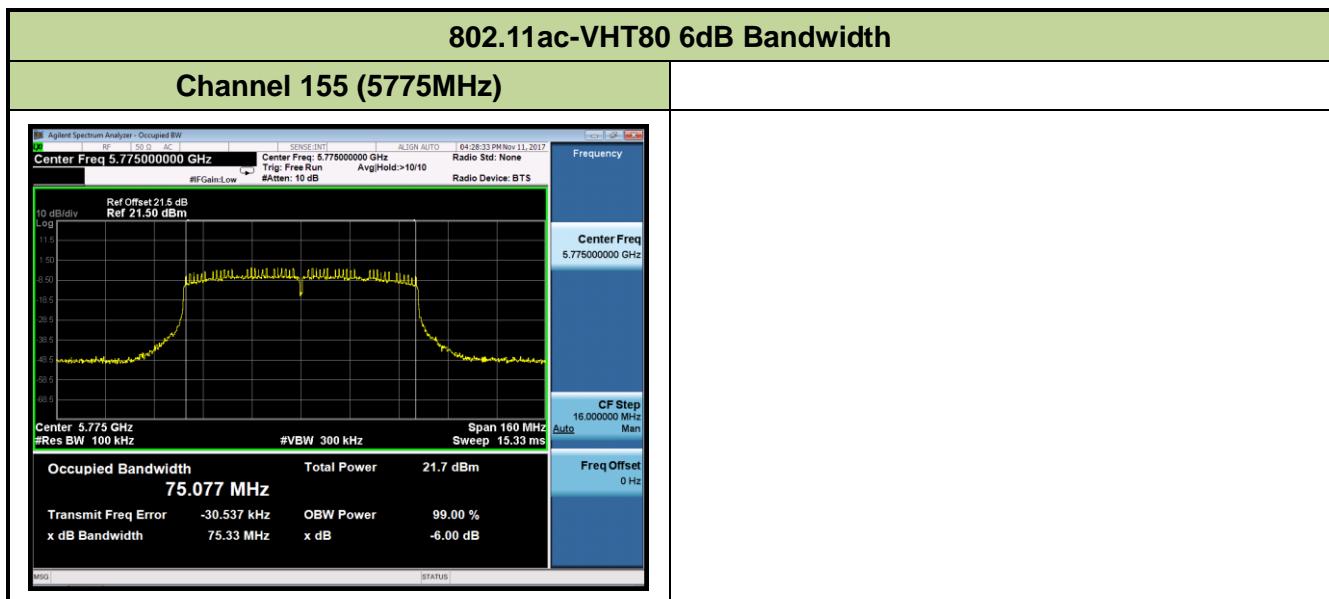
802.11ac-VHT40 6dB Bandwidth

Channel 151 (5755MHz)



Channel 159 (5795MHz)





7.4. Output Power Measurement

7.4.1. Test Limit

For client devices operating in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.

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 250 mW or $11 \text{ dBm} + 10 \log B$, 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 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

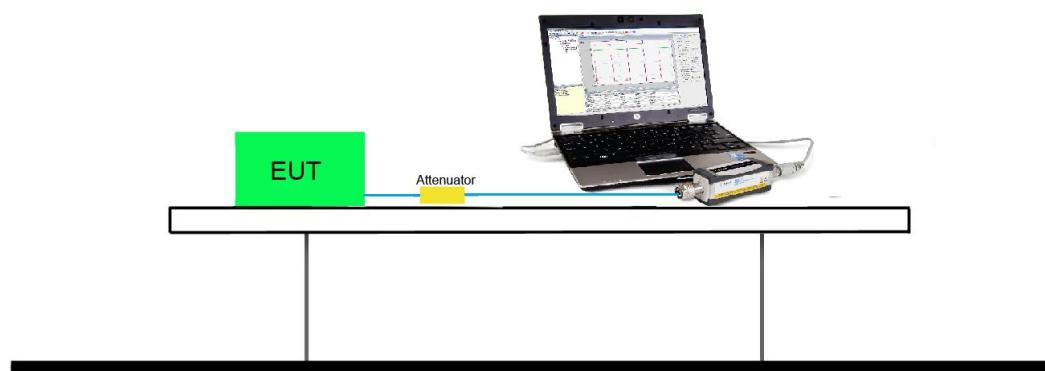
7.4.2. Test Procedure Used

KDB 789033 D02v01r04 - 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 (Gray 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
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 _{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
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

Output power at various data rates:

Test Mode	Bandwidth	Channel	Frequency (MHz)	Data Rate (Mbps)	Average Power (dBm)
802.11a	20	36	5180	6	12.91
				24	12.75
				54	12.53
802.11n	20	36	5180	6.5	12.68
				26.0	12.46
				65.0	12.21
802.11n	40	38	5190	13.5	12.99
				54.0	12.73
				135.0	12.56
802.11ac	20	36	5180	6.5	12.68
				39.0	12.43
				78.0	12.24
802.11ac	40	38	5190	13.5	13.00
				108.0	12.81
				180.0	12.64
802.11ac	80	42	5210	29.3	12.26
				234.0	12.03
				390.0	11.77

Product	VR All-In-One Headset	Temperature	22°C
Test Engineer	Hunk Li	Relative Humidity	54%
Test Site	TR3	Test Date	2017/11/10

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	Average Power (dBm)	Limit (dBm)	Result
11a	6	36	5180	12.91	≤ 23.98	Pass
11a	6	44	5220	12.87	≤ 23.98	Pass
11a	6	48	5240	12.83	≤ 23.98	Pass
11a	6	52	5260	12.82	≤ 23.63	Pass
11a	6	60	5300	12.80	≤ 23.63	Pass
11a	6	64	5320	12.77	≤ 23.63	Pass
11a	6	100	5500	12.96	≤ 23.63	Pass
11a	6	120	5600	12.85	≤ 23.63	Pass
11a	6	140	5700	12.82	≤ 23.63	Pass
11a	6	149	5745	13.03	≤ 30.00	Pass
11a	6	157	5785	13.27	≤ 30.00	Pass
11a	6	165	5825	13.21	≤ 30.00	Pass
11n-HT20	6.5	36	5180	12.68	≤ 23.98	Pass
11n-HT20	6.5	44	5220	12.61	≤ 23.98	Pass
11n-HT20	6.5	48	5240	12.59	≤ 23.98	Pass
11n-HT20	6.5	52	5260	12.56	≤ 23.86	Pass
11n-HT20	6.5	60	5300	12.55	≤ 23.86	Pass
11n-HT20	6.5	64	5320	12.52	≤ 23.86	Pass
11n-HT20	6.5	100	5500	12.73	≤ 23.86	Pass
11n-HT20	6.5	120	5600	12.62	≤ 23.86	Pass
11n-HT20	6.5	140	5700	12.58	≤ 23.86	Pass
11n-HT20	6.5	149	5745	12.76	≤ 30.00	Pass
11n-HT20	6.5	157	5785	13.01	≤ 30.00	Pass
11n-HT20	6.5	165	5825	12.96	≤ 30.00	Pass

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	Average Power (dBm)	Limit (dBm)	Result
11n-HT40	13.5	38	5190	12.99	≤ 23.98	Pass
11n-HT40	13.5	46	5230	12.94	≤ 23.98	Pass
11n-HT40	13.5	54	5270	12.90	≤ 23.98	Pass
11n-HT40	13.5	62	5310	12.87	≤ 23.98	Pass
11n-HT40	13.5	102	5510	13.05	≤ 23.98	Pass
11n-HT40	13.5	118	5590	12.97	≤ 23.98	Pass
11n-HT40	13.5	134	5670	12.95	≤ 23.98	Pass
11n-HT40	13.5	151	5755	13.10	≤ 30.00	Pass
11n-HT40	13.5	159	5795	13.36	≤ 30.00	Pass
11ac-VHT20	6.5	36	5180	12.68	≤ 23.98	Pass
11ac-VHT20	6.5	44	5220	12.63	≤ 23.98	Pass
11ac-VHT20	6.5	48	5240	12.57	≤ 23.98	Pass
11ac-VHT20	6.5	52	5260	12.57	≤ 23.88	Pass
11ac-VHT20	6.5	60	5300	12.54	≤ 23.88	Pass
11ac-VHT20	6.5	64	5320	12.52	≤ 23.88	Pass
11ac-VHT20	6.5	100	5500	12.72	≤ 23.88	Pass
11ac-VHT20	6.5	120	5600	12.62	≤ 23.88	Pass
11ac-VHT20	6.5	140	5700	12.60	≤ 23.88	Pass
11ac-VHT20	6.5	144	5720	12.80	≤ 23.88	Pass
11ac-VHT20	6.5	149	5745	12.78	≤ 30.00	Pass
11ac-VHT20	6.5	157	5785	13.02	≤ 30.00	Pass
11ac-VHT20	6.5	165	5825	12.98	≤ 30.00	Pass
11ac-VHT40	13.5	38	5190	13.00	≤ 23.98	Pass
11ac-VHT40	13.5	46	5230	12.96	≤ 23.98	Pass
11ac-VHT40	13.5	54	5270	12.90	≤ 23.98	Pass
11ac-VHT40	13.5	62	5310	12.90	≤ 23.98	Pass
11ac-VHT40	13.5	102	5510	13.07	≤ 23.98	Pass
11ac-VHT40	13.5	118	5590	12.98	≤ 23.98	Pass
11ac-VHT40	13.5	134	5670	12.97	≤ 23.98	Pass
11ac-VHT40	13.5	142	5710	13.17	≤ 23.98	Pass
11ac-VHT40	13.5	151	5755	13.11	≤ 30.00	Pass
11ac-VHT40	13.5	159	5795	13.37	≤ 30.00	Pass

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	Average Power (dBm)	Limit (dBm)	Result
11ac-VHT80	29.3	42	5210	12.26	≤ 23.98	Pass
11ac-VHT80	29.3	58	5290	12.22	≤ 23.98	Pass
11ac-VHT80	29.3	106	5530	12.35	≤ 23.98	Pass
11ac-VHT80	29.3	122	5610	12.27	≤ 23.98	Pass
11ac-VHT80	29.3	138	5690	12.24	≤ 23.98	Pass
11ac-VHT80	29.3	155	5775	12.38	≤ 30.00	Pass

Note: Max Conducted Output Power Limit Calculation as below:

For 5250-5350MHz, 5470-5725MHz

802.11a: $11 + 10 \log_{10} (18.33\text{MHz}) = 23.63\text{dBm} < 23.98\text{dBm}$;

802.11n-HT20: $11 + 10 \log_{10} (19.30\text{MHz}) = 23.86\text{dBm} < 23.98\text{dBm}$;

802.11n-HT40: $11 + 10 \log_{10} B > 23.98\text{dBm}$;

802.11ac-VHT20: $11 + 10 \log_{10} (19.43\text{MHz}) = 23.88\text{dBm} < 23.98\text{dBm}$;

802.11ac-VHT40: $11 + 10 \log_{10} B > 23.98\text{dBm}$;

802.11ac-VHT80: $11 + 10 \log_{10} B > 23.98\text{dBm}$.

7.5. Power Spectral Density Measurement

7.5.1. Test Limit

For client device operating 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.

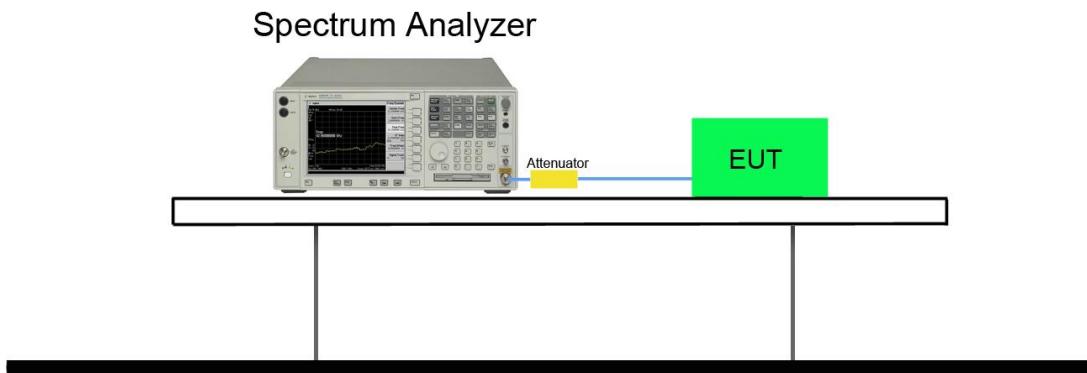
If transmitting antennas of directional gain greater than 6dBi are used, the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

7.5.2. Test Procedure Used

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7.5.3. 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 $\geq 2 \times (\text{span} / \text{RBW})$
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 $10 * \log(500\text{kHz}/100\text{kHz}) = 6.99$ dB to the measured result

7.5.4. Test Setup

7.5.5. Test Result

Product	VR All-In-One Headset			Temperature	22°C		
Test Engineer	Hunk Li			Relative Humidity	54%		
Test Site	TR3			Test Date	2017/11/11		

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	PSD (dBm/MHz)	Duty Cycle (%)	Final PSD (dBm/MHz)	Limit (dBm/MHz)	Result
11a	6	36	5180	2.94	95.07	3.16	≤ 11.00	Pass
11a	6	44	5220	2.38	95.07	2.60	≤ 11.00	Pass
11a	6	48	5240	2.62	95.07	2.84	≤ 11.00	Pass
11a	6	52	5260	2.71	95.07	2.93	≤ 11.00	Pass
11a	6	60	5300	3.05	95.07	3.27	≤ 11.00	Pass
11a	6	64	5320	2.86	95.07	3.08	≤ 11.00	Pass
11a	6	100	5500	3.15	95.07	3.37	≤ 11.00	Pass
11a	6	120	5600	3.09	95.07	3.31	≤ 11.00	Pass
11a	6	140	5700	2.44	95.07	2.66	≤ 11.00	Pass
11n-HT20	6.5	36	5180	2.45	94.78	2.68	≤ 11.00	Pass
11n-HT20	6.5	44	5220	2.30	94.78	2.53	≤ 11.00	Pass
11n-HT20	6.5	48	5240	2.34	94.78	2.57	≤ 11.00	Pass
11n-HT20	6.5	52	5260	2.26	94.78	2.49	≤ 11.00	Pass
11n-HT20	6.5	60	5300	2.43	94.78	2.66	≤ 11.00	Pass
11n-HT20	6.5	64	5320	2.61	94.78	2.84	≤ 11.00	Pass
11n-HT20	6.5	100	5500	2.85	94.78	3.08	≤ 11.00	Pass
11n-HT20	6.5	120	5600	2.85	94.78	3.08	≤ 11.00	Pass
11n-HT20	6.5	140	5700	2.12	94.78	2.35	≤ 11.00	Pass
11n-HT40	13.5	38	5190	-0.61	90.80	-0.19	≤ 11.00	Pass
11n-HT40	13.5	46	5230	-0.43	90.80	-0.01	≤ 11.00	Pass
11n-HT40	13.5	54	5270	-0.28	90.80	0.14	≤ 11.00	Pass
11n-HT40	13.5	62	5310	-0.05	90.80	0.37	≤ 11.00	Pass
11n-HT40	13.5	102	5510	0.31	90.80	0.73	≤ 11.00	Pass
11n-HT40	13.5	118	5590	0.19	90.80	0.60	≤ 11.00	Pass
11n-HT40	13.5	134	5670	-0.75	90.80	-0.33	≤ 11.00	Pass

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	PSD (dBm/MHz)	Duty Cycle (%)	Final PSD (dBm/MHz)	Limit (dBm/MHz)	Result
11ac-VHT20	6.5	36	5180	2.27	94.75	2.50	≤ 11.00	Pass
11ac-VHT20	6.5	44	5220	2.13	94.75	2.36	≤ 11.00	Pass
11ac-VHT20	6.5	48	5240	2.52	94.75	2.75	≤ 11.00	Pass
11ac-VHT20	6.5	52	5260	2.35	94.75	2.58	≤ 11.00	Pass
11ac-VHT20	6.5	60	5300	2.73	94.75	2.96	≤ 11.00	Pass
11ac-VHT20	6.5	64	5320	2.72	94.75	2.95	≤ 11.00	Pass
11ac-VHT20	6.5	100	5500	2.83	94.75	3.06	≤ 11.00	Pass
11ac-VHT20	6.5	120	5600	2.82	94.75	3.05	≤ 11.00	Pass
11ac-VHT20	6.5	140	5700	2.15	94.75	2.38	≤ 11.00	Pass
11ac-VHT20	6.5	144	5720	2.50	94.75	2.73	≤ 11.00	Pass
11ac-VHT40	13.5	38	5190	-0.74	89.98	-0.28	≤ 11.00	Pass
11ac-VHT40	13.5	46	5230	-0.38	89.98	0.08	≤ 11.00	Pass
11ac-VHT40	13.5	54	5270	-0.49	89.98	-0.03	≤ 11.00	Pass
11ac-VHT40	13.5	62	5310	-0.17	89.98	0.29	≤ 11.00	Pass
11ac-VHT40	13.5	102	5510	0.21	89.98	0.67	≤ 11.00	Pass
11ac-VHT40	13.5	118	5590	0.09	89.98	0.55	≤ 11.00	Pass
11ac-VHT40	13.5	134	5670	-0.55	89.98	-0.09	≤ 11.00	Pass
11ac-VHT40	13.5	142	5710	-0.31	89.98	0.15	≤ 11.00	Pass
11ac-VHT80	29.3	42	5210	-4.09	82.39	-3.25	≤ 11.00	Pass
11ac-VHT80	29.3	58	5290	-4.04	82.39	-3.20	≤ 11.00	Pass
11ac-VHT80	29.3	106	5530	-3.70	82.39	-2.86	≤ 11.00	Pass
11ac-VHT80	29.3	122	5610	-3.94	82.39	-3.10	≤ 11.00	Pass
11ac-VHT80	29.3	138	5690	-4.59	82.39	-3.75	≤ 11.00	Pass

Note 1: When EUT duty cycle $\geq 98\%$, the Final PSD (dBm/MHz) = PSD (dBm/MHz)

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

Test Mode	Data Rate (Mbps)	Channel No.	Freq. (MHz)	PSD (dBm/100KHz)	Duty Cycle (%)	Constant Factor	Final PSD (dBm/MHz)	Limit (dBm/MHz)	Result
11a	6	149	5745	-6.53	95.07	6.99	0.68	≤ 30.00	Pass
11a	6	157	5785	-6.11	95.07	6.99	1.10	≤ 30.00	Pass
11a	6	165	5825	-5.84	95.07	6.99	1.37	≤ 30.00	Pass
11n-HT20	6.5	149	5745	-6.90	94.78	6.99	0.32	≤ 30.00	Pass
11n-HT20	6.5	157	5785	-6.63	94.78	6.99	0.59	≤ 30.00	Pass
11n-HT20	6.5	165	5825	-6.27	94.78	6.99	0.95	≤ 30.00	Pass
11n-HT40	13.5	151	5755	-9.49	90.80	6.99	-2.08	≤ 30.00	Pass
11n-HT40	13.5	159	5795	-8.71	90.80	6.99	-1.30	≤ 30.00	Pass
11ac-VHT20	6.5	149	5745	-6.85	94.75	6.99	0.37	≤ 30.00	Pass
11ac-VHT20	6.5	157	5785	-6.21	94.75	6.99	1.01	≤ 30.00	Pass
11ac-VHT20	6.5	165	5825	-6.00	94.75	6.99	1.22	≤ 30.00	Pass
11ac-VHT40	13.5	151	5755	-9.37	89.98	6.99	-1.92	≤ 30.00	Pass
11ac-VHT40	13.5	159	5795	-8.94	89.98	6.99	-1.49	≤ 30.00	Pass
11ac-VHT80	29.3	155	5775	-12.74	82.39	6.99	-4.91	≤ 30.00	Pass

Note 1: When EUT duty cycle $\geq 98\%$, the Final PSD (dBm/MHz) = PSD (dBm/MHz).

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

