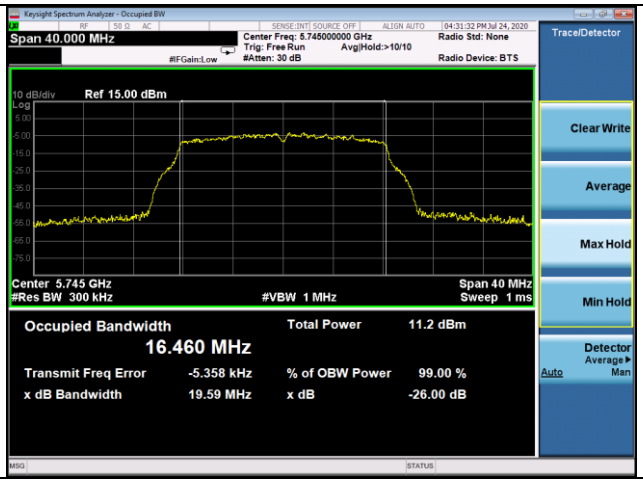
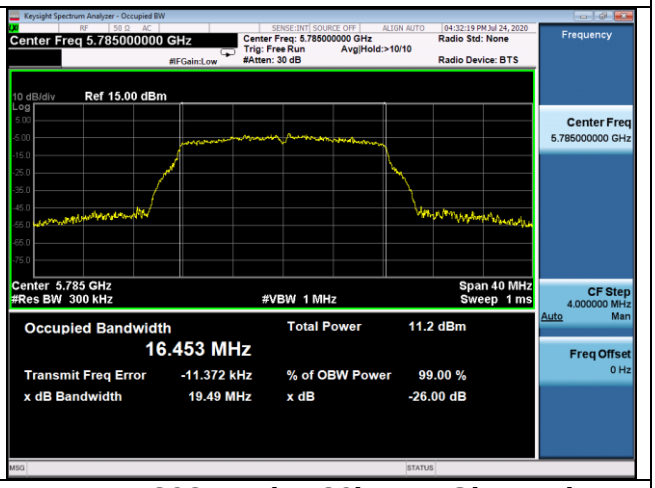
U-NII-3 Band

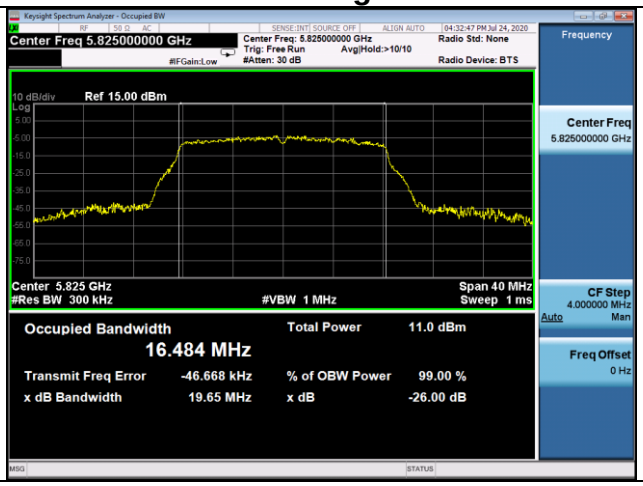
IEEE 802.11a Low Channel



IEEE 802.11a Middle Channel

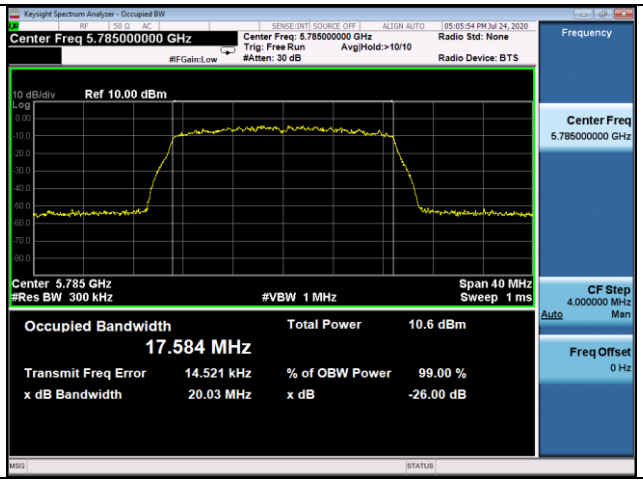


IEEE 802.11a High Channel



IEEE 802.11n(HT20) Low Channel

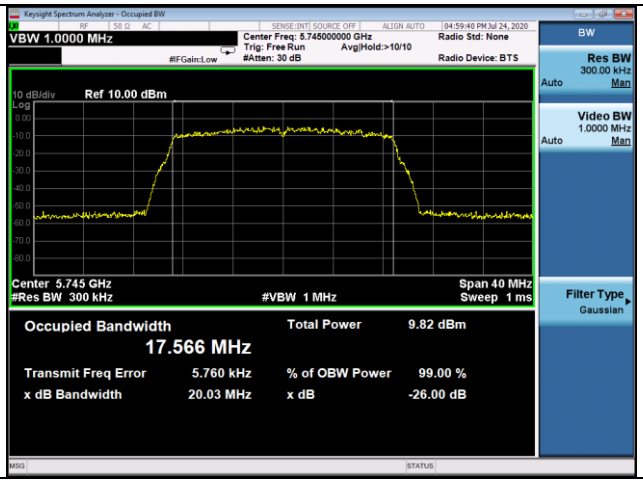
IEEE 802.11n(HT20) Middle Channel



IEEE 802.11n(HT20) High Channel

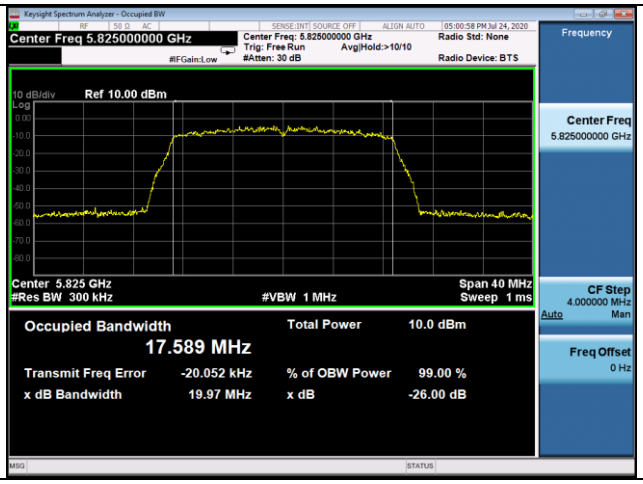
U-NII-3 Band

IEEE 802.11ac(VHT20) Low Channel

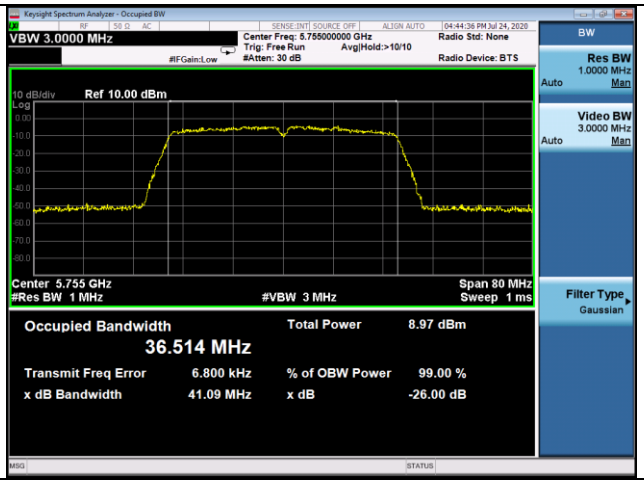


IEEE 802.11ac(VHT20) Middle Channel

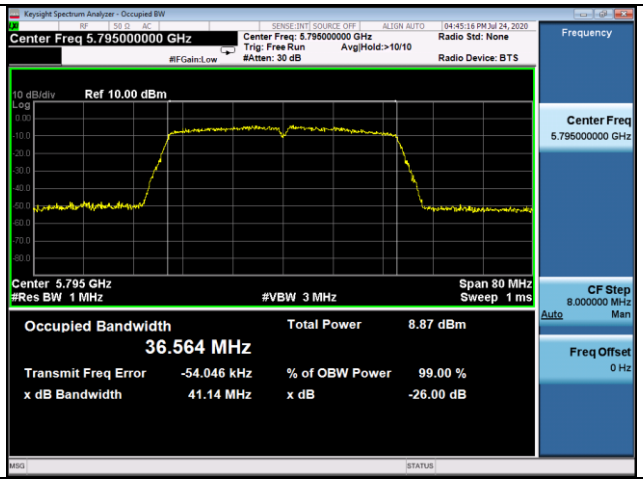
IEEE 802.11ac(VHT20) High Channel



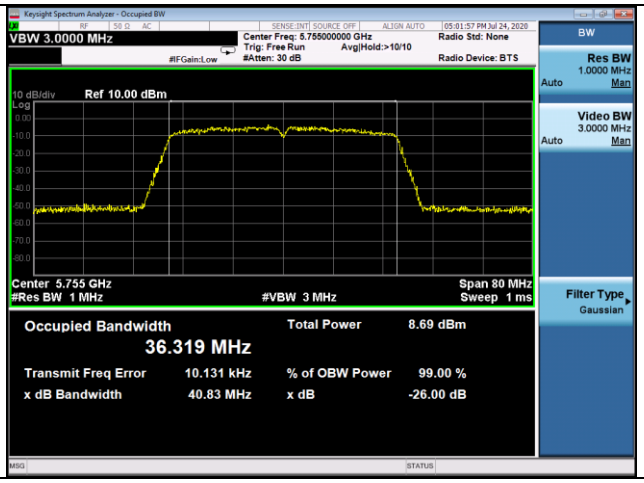
IEEE 802.11n(HT40) Low Channel

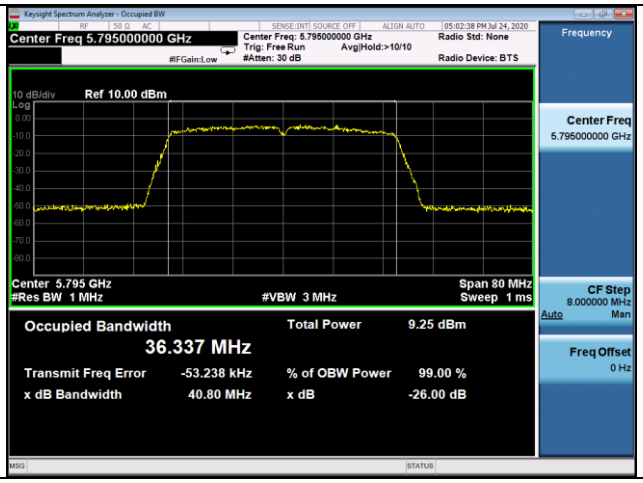


IEEE 802.11n(HT40) High Channel



IEEE 802.11ac(VHT40) Low Channel



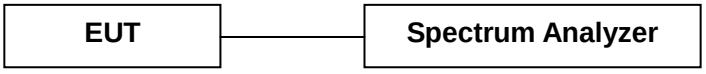
U-NII-3 Band	
IEEE 802.11ac(VHT40) High Channel	**IEEE 802.11ac(VHT80)**
	

7. Power Spectral Density

7.1 Limits

Operation Band		Limit
☒5180~5240MHz	☐Outdoor access point	17 dBm/MHz
	☒Indoor access point	17 dBm/MHz
	☐Fixed point-to-point access points	17 dBm/MHz
	☐Client devices	11 dBm/MHz
☒5260~5320MHz	-	11 dBm/MHz
☒5500~5700MHz	-	11 dBm/MHz
☒5745~5825MHz	-	30 dBm/500kHz

7.2 Test SET-UP (Block Diagram of Configuration)



7.3 Test Procedure

The antenna port of the EUT was connected to the input of a spectrum analyzer.
Analyzer was set as below according to FCC KDB789033 (v02r01):
1. Set analyzer center frequency to center frequency
2. Set the RBW to: 1MHz
3. Set the VBW to: 3MHz
4. Detector = RMS
5. Sweep time = auto couple
6. Trace Average = 100 times
7. If measured bandwidth of Maximum PSD is specified in 500kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (<500kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.

7.5 Measurement Results

Pass

Please refer to following table and plots.

U-NII-1 Band						
Temperature :	23 ℃		Humidity :		52%	
Test By:	Sance		Test Date :		July 24, 2020	
Frequency MHz	Data Rate Mbps	Duty Cycle Factor (dB)	PSD dBm/MHz		Total PSD with duty cycle factor	Limit dBm/ MHz
IEEE 802.11a Mode (OFDM, Antenna Gain=2.3dBi)						
Channel: 5180	6	0.71	-3.109		-2.399	17
Channel: 5200	6		-3.099		-2.389	17
Channel: 5240	6		-3.461		-2.751	17
IEEE 802.11n(HT20)Mode (OFDM, Antenna Gain=2.3dBi)						
Channel: 5180	MCS0	2.84	ANT_0	ANT_1	Total	-
			-4.274	-4.351	1.54	17
Channel: 5200	MCS0		-4.319	-4.165	1.61	17
Channel: 5240	MCS0		-4.819	-4.550	1.17	17
IEEE 802.11n(HT40) Mode (OFDM, Antenna Gain=2.3Bi)						
Channel: 5190	MCS0	4.40	-7.703	-7.741	-0.31	17
Channel: 5230	MCS0		-8.286	-8.341	-0.90	17
IEEE 802.11ac (VHT20) Mode (OFDM, Antenna Gain=2.3dBi)						
Channel: 5180	MCS0	2.84	-4.313	-4.272	1.56	17
Channel: 5200	MCS0		-4.382	-4.382	1.47	17
Channel: 5240	MCS0		-4.715	-4.635	1.18	17
IEEE 802.11ac (VHT40) Mode (OFDM, Antenna Gain=2.3dBi)						
Channel: 5190	MCS0	3.95	-7.577	-7.714	-0.68	17
Channel: 5230	MCS0		-8.104	-8.173	-1.18	17
IEEE 802.11ac (VHT80) Mode (OFDM, Antenna Gain=2.3dBi)						
Channel: 5210	MCS0	5.02	-11.711	-11.764	-3.71	17

Note:
1. As for IEEE 802.11a mode, both of antennas have considered during pre-test, but only the worst case (ANT_0) was recorded.
2. As for IEEE 802.11n/ac mode, EUT working in MIMO mode.
3. Please refer to section 2.4 for duty cycle factor
4. Directional Gain = 2.3dBi + 10log(2) = 5.31 dBi ＜ 6 dBi, Therefore the limit does not change.

U-NII-2A Band						
Temperature :	23 ℃		Humidity :		52%	
Test By:	Sance		Test Date :		July 24, 2020	
Frequency MHz	Data Rate Mbps	Duty Cycle Factor (dB)	PSD dBm/MHz		Total PSD with duty cycle factor	Limit dBm/ MHz
IEEE 802.11a Mode (OFDM, Antenna Gain=2.3dBi)						
Channel: 5260	6	0.72	-2.641		-1.921	11
Channel: 5300	6		-4.360		-3.640	11
Channel: 5320	6		-4.328		-3.608	11
IEEE 802.11n(HT20)Mode (OFDM, Antenna Gain=2.3dBi)						
Channel: 5260	MCS0	2.96	ANT_0	ANT_1	-	-
			-3.728	-3.708	2.25	11
Channel: 5300	MCS0		-5.518	-5.174	0.63	11
Channel: 5320	MCS0		-5.563	-5.159	0.61	11
IEEE 802.11n(HT40) Mode (OFDM, Antenna Gain=2.3Bi)						
Channel: 5270	MCS0	3.99	-7.322	-7.617	-0.47	11
Channel: 5310	MCS0		-8.952	-9.260	-2.10	11
IEEE 802.11ac (VHT20) Mode (OFDM, Antenna Gain=2.3dBi)						
Channel: 5260	MCS0	3.05	-3.966	-4.131	2.01	11
Channel: 5300	MCS0		-5.436	-5.586	0.55	11
Channel: 5320	MCS0		-5.538	-5.732	0.43	11
IEEE 802.11ac (VHT40) Mode (OFDM, Antenna Gain=2.3dBi)						
Channel: 5270	MCS0	4.17	-7.514	-7.652	-0.40	11
Channel: 5310	MCS0		-8.800	-8.953	-1.70	11
IEEE 802.11ac (VHT80) Mode (OFDM, Antenna Gain=2.3dBi)						
Channel: 5290	MCS0	5.17	-12.386	-12.378	-4.20	11

Note:
1. As for IEEE 802.11a mode, both of antennas have considered during pre-test, but only the worst case (ANT_0) was recorded.
2. As for IEEE 802.11n/ac mode, EUT working in MIMO mode.
3. Please refer to section 2.4 for duty cycle factor
4. Directional Gain = 2.3dBi + 10log(2) = 5.31 dBi ＜ 6 dBi, Therefore the limit does not change.

U-NII-2C Band					
Temperature :	23 ℃		Humidity :	52%	
Test By:	Sance		Test Date :	July 24, 2020	
Frequency MHz	Data Rate Mbps	Duty Cycle Factor (dB)	PSD dBm/MHz	Total PSD with duty cycle factor	Limit dBm/ MHz
IEEE 802.11a Mode (OFDM, Antenna Gain=2.3dBi)					
Channel: 5500	6	0.70	2.449	3.149	11
Channel: 5600	6		0.970	1.670	11
Channel: 5700	6		1.247	1.947	11
IEEE 802.11n(HT20)Mode (OFDM, Antenna Gain=2.3dBi)					
Channel: 5500	MCS0	2.77	ANT_0	ANT_1	-	-
			1.727	0.919	7.12	11
Channel: 5600	MCS0		-0.448	-0.415	5.35	11
Channel: 5700	MCS0		0.156	-0.261	5.73	11
IEEE 802.11n(HT40) Mode (OFDM, Antenna Gain=2.3Bi)					
Channel: 5510	MCS0	4.37	-1.683	-2.460	5.33	11
Channel: 5670	MCS0		-3.268	-3.615	3.94	11
IEEE 802.11ac (VHT20) Mode (OFDM, Antenna Gain=2.3dBi)					
Channel: 5500	MCS0	3.05	0.927	0.819	6.93	11
Channel: 5600	MCS0		-0.428	-0.410	5.64	11
Channel: 5700	MCS0		0.583	-0.388	6.18	11
IEEE 802.11ac (VHT40) Mode (OFDM, Antenna Gain=2.3dBi)					
Channel: 5510	MCS0	3.77	-1.972	-2.327	4.63	11
Channel: 5670	MCS0		-2.954	-3.116	3.75	11
IEEE 802.11ac (VHT80) Mode (OFDM, Antenna Gain=2.3dBi)					
Channel: 5610	MCS0	5.19	-7.193	-7.248	0.98	11

Note:
1. As for IEEE 802.11a mode, both of antennas have considered during pre-test, but only the worst case (ANT_0) was recorded.
2. As for IEEE 802.11n/ac mode, EUT working in MIMO mode.
3. Please refer to section 2.4 for duty cycle factor
4. Directional Gain = 2.3dBi + 10log(2) = 5.31 dBi ＜ 6 dBi, Therefore the limit does not change.

U-NII-3 Band						
Temperature :	23 ℃			Humidity :	52%	
Test By:	Sance			Test Date :	July 24, 2020	
Frequency MHz	Data Rate Mbps	Duty Cycle Factor (dB)	PSD dBm/MHz		Total PSD with duty cycle factor dBm/ 500KHz	Limit dBm/ 500KHz
IEEE 802.11a Mode (OFDM, Antenna Gain=2.3dBi)						
Channel: 5745	6	0.68	1.017		-1.313	30
Channel: 5785	6		1.065		-1.265	30
Channel: 5825	6		1.305		-1.025	30
IEEE 802.11n(HT20)Mode (OFDM, Antenna Gain=2.3dBi)						
Channel: 5745	MCS0	2.97	ANT_0	ANT_1	-	-
			-0.377	-0.243	2.66	30
Channel: 5785	MCS0		-0.273	-0.151	2.76	30
Channel: 5825	MCS0		-0.086	-0.263	2.80	30
IEEE 802.11n(HT40) Mode (OFDM, Antenna Gain=2.3Bi)						
Channel: 5755	MCS0	4.21	-3.159	-3.507	0.88	30
Channel: 5795	MCS0		-3.664	-3.582	0.59	30
IEEE 802.11ac (VHT20) Mode (OFDM, Antenna Gain=2.3dBi)						
Channel: 5745	MCS0	2.71	-0.711	-0.077	2.33	30
Channel: 5785	MCS0		-0.614	-0.034	2.40	30
Channel: 5825	MCS0		-0.339	0.005	2.55	30
IEEE 802.11ac (VHT40) Mode (OFDM, Antenna Gain=2.3dBi)						
Channel: 5755	MCS0	3.97	-3.863	-3.083	0.51	30
Channel: 5795	MCS0		-3.975	-3.761	0.10	30
IEEE 802.11ac (VHT80) Mode (OFDM, Antenna Gain=2.3dBi)						
Channel: 5775	MCS0	4.84	-6.890	-6.467	-1.83	30

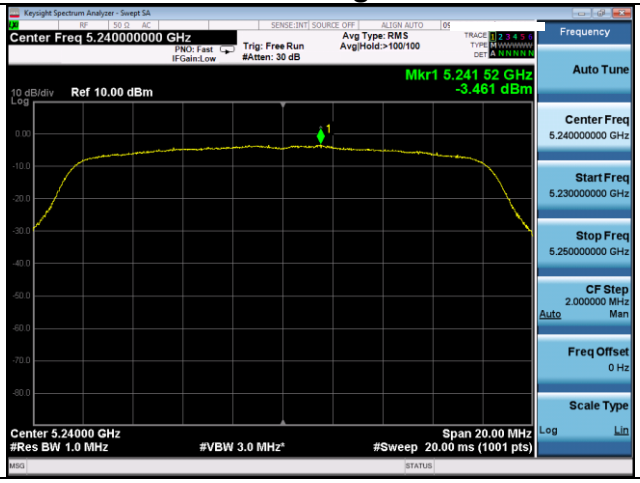
Note:
1. As for IEEE 802.11a mode, both of antennas have considered during pre-test, but only the worst case (ANT_0) was recorded.
2. As for IEEE 802.11n/ac mode, EUT working in MIMO mode.
3. 10log(500kHz/RBW) Factor = -3.01dB, RBW=1MHz.
4. Please refer to section 2.4 for duty cycle factor
5. Directional Gain = 2.3dBi + 10log(2) = 5.31 dBi ＜ 6 dBi, Therefore the limit does not change.

U-NII-1 Band

IEEE 802.11a Low Channel

IEEE 802.11a Middle Channel

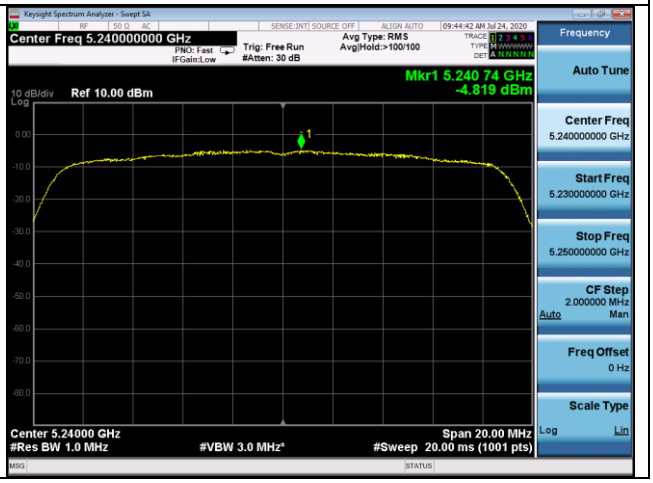
IEEE 802.11a High Channel



IEEE 802.11n(HT20) Low Channel

IEEE 802.11n(HT20) Middle Channel

IEEE 802.11n(HT20) High Channel

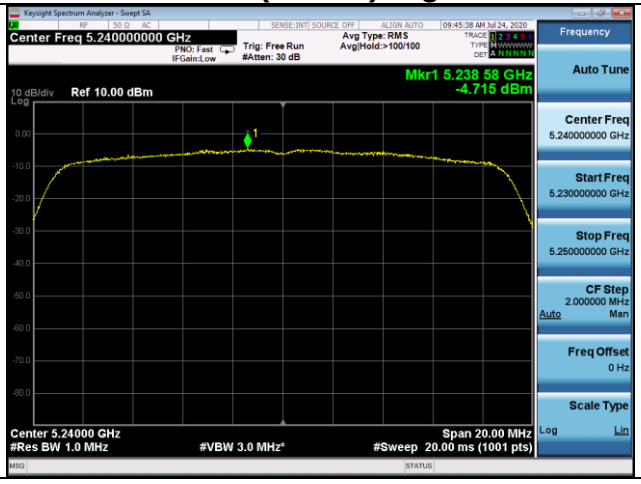


U-NII-1 Band

IEEE 802.11ac(VHT20) Low Channel

IEEE 802.11ac(VHT20) Middle Channel

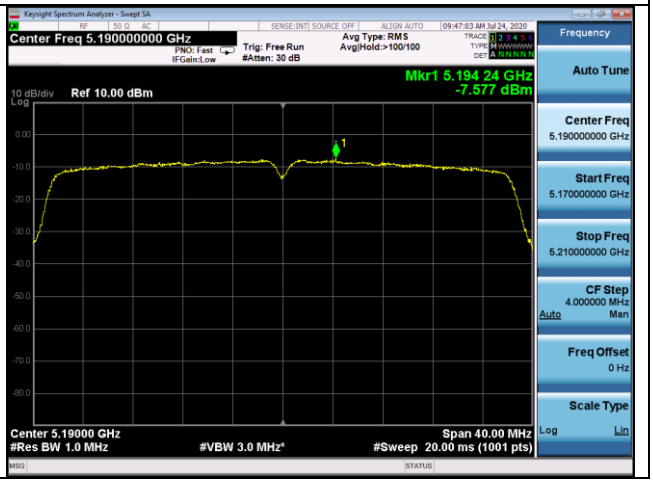
IEEE 802.11ac(VHT20) High Channel



IEEE 802.11n(HT40) Low Channel

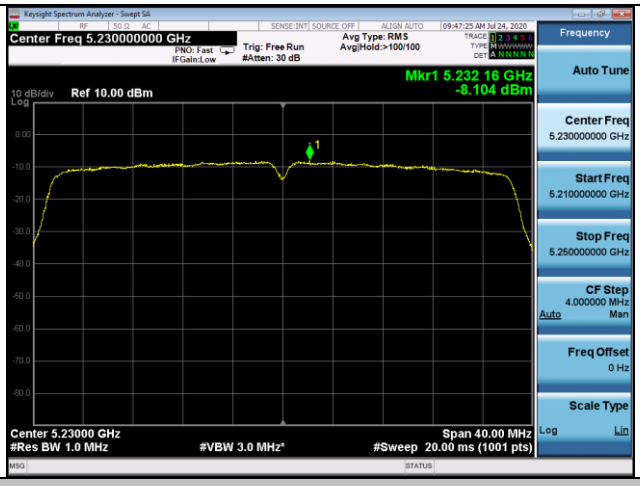
IEEE 802.11n(HT40) High Channel

IEEE 802.11ac(VHT40) Low Channel

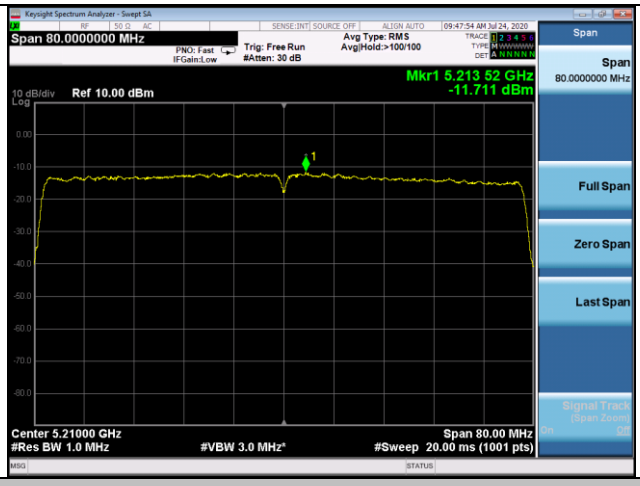


U-NII-1 Band

IEEE 802.11ac(VHT40) High Channel

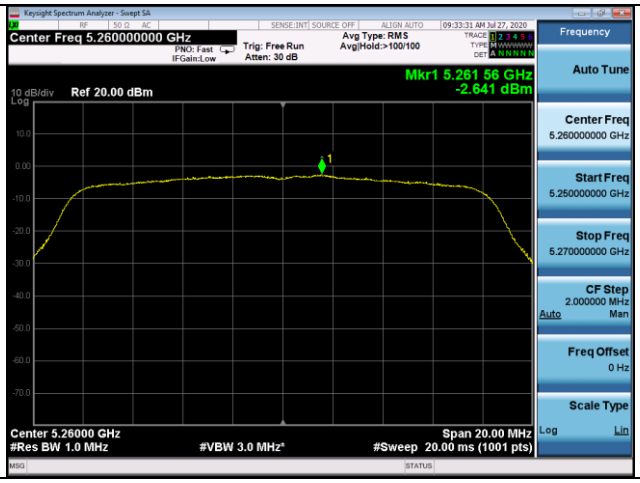


IEEE 802.11ac(VHT80)



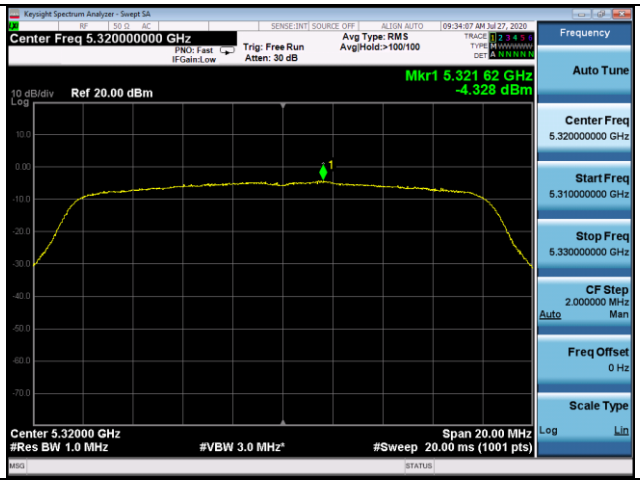
U-NII-2A Band

IEEE 802.11a Low Channel

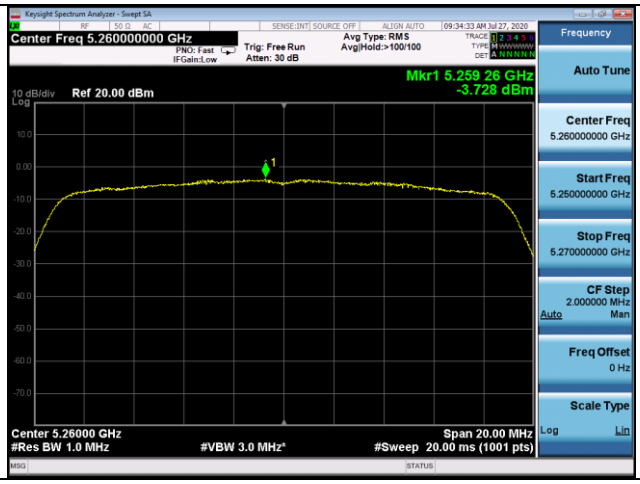


IEEE 802.11a Middle Channel

IEEE 802.11a High Channel

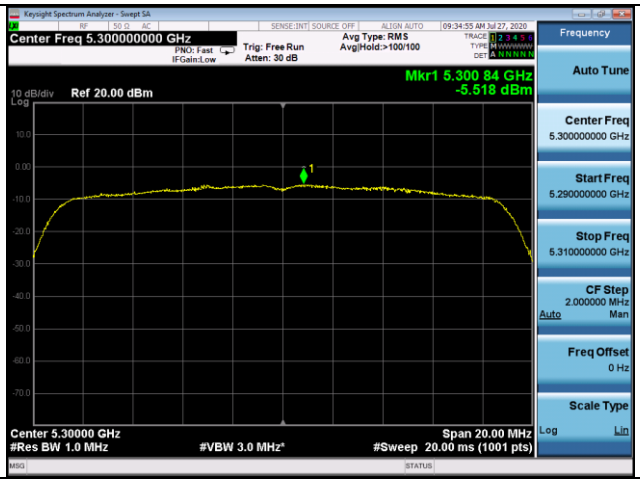


IEEE 802.11n(HT20) Low Channel



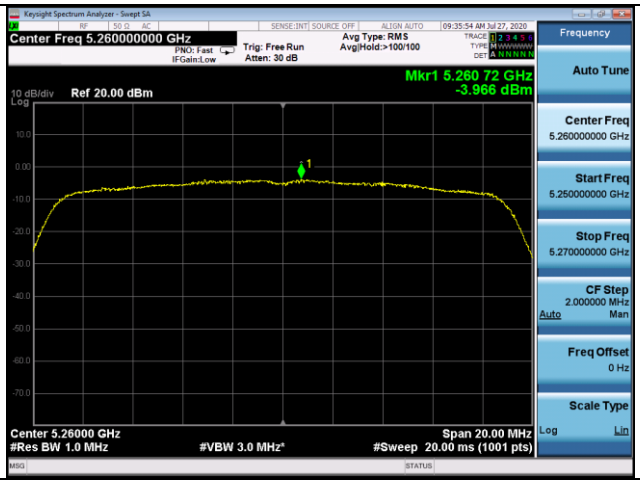
U-NII-2A Band

IEEE 802.11n(HT20) Middle Channel



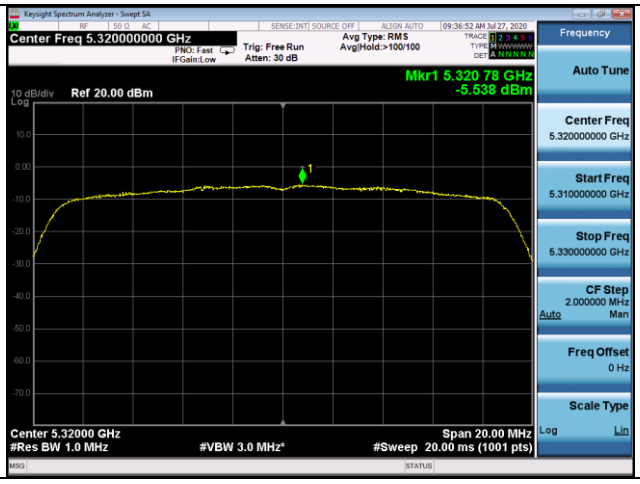
IEEE 802.11n(HT20) High Channel

IEEE 802.11ac(VHT20) Low Channel



IEEE 802.11ac(VHT20) Middle Channel

IEEE 802.11ac(VHT20) High Channel



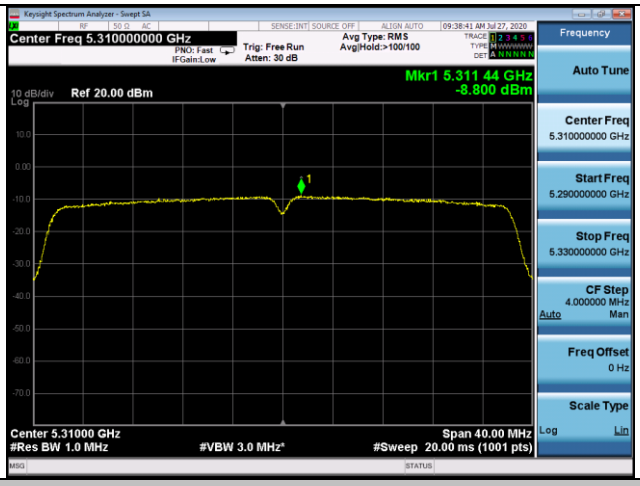
IEEE 802.11n(HT40) Low Channel

U-NII-2A Band

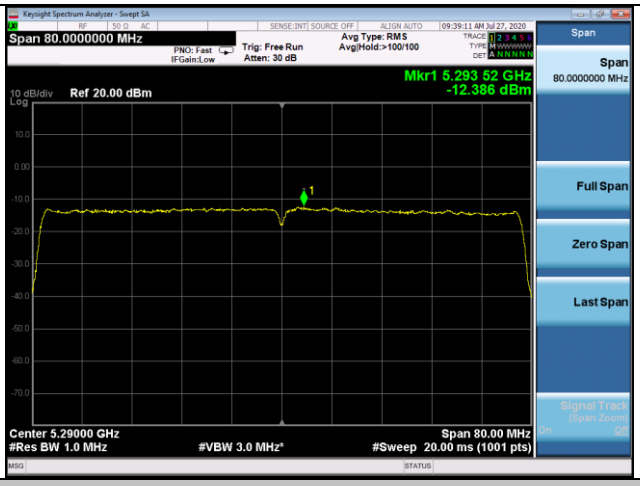
IEEE 802.11n(HT40) High Channel

IEEE 802.11ac(VHT40) Low Channel

IEEE 802.11ac(VHT40) High Channel



IEEE 802.11ac(VHT80)



U-NII-2C Band

IEEE 802.11a Low Channel

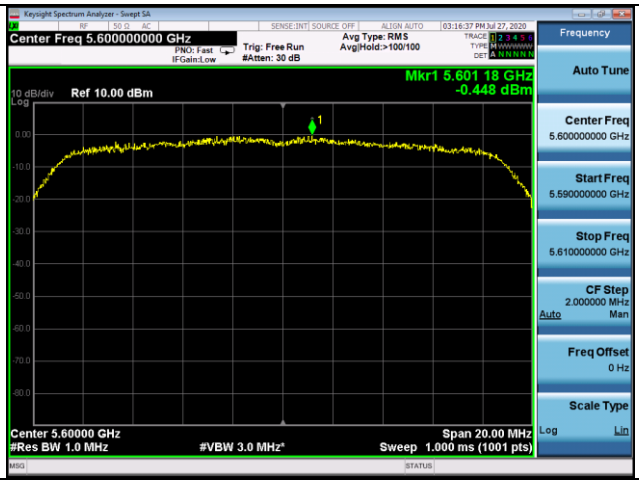
IEEE 802.11a Middle Channel

U-NII-2C Band

IEEE 802.11a High Channel

IEEE 802.11n(HT20) Low Channel

IEEE 802.11n(HT20) Middle Channel



IEEE 802.11n(HT20) High Channel

IEEE 802.11ac(VHT20) Low Channel

IEEE 802.11ac(VHT20) Middle Channel

U-NII-2C Band

IEEE 802.11ac(VHT20) High Channel

IEEE 802.11n(HT40) Low Channel

IEEE 802.11n(HT40) High Channel

IEEE 802.11ac(VHT40) Low Channel

IEEE 802.11ac(VHT40) High Channel

IEEE 802.11ac(VHT80)