

Appendix E

RF Test Data for 5.8G WLAN (Conducted Measurement)

Product Name: HyBook Plus

Trade Mark: Hyundai

Test Model: HT14CBI581SG

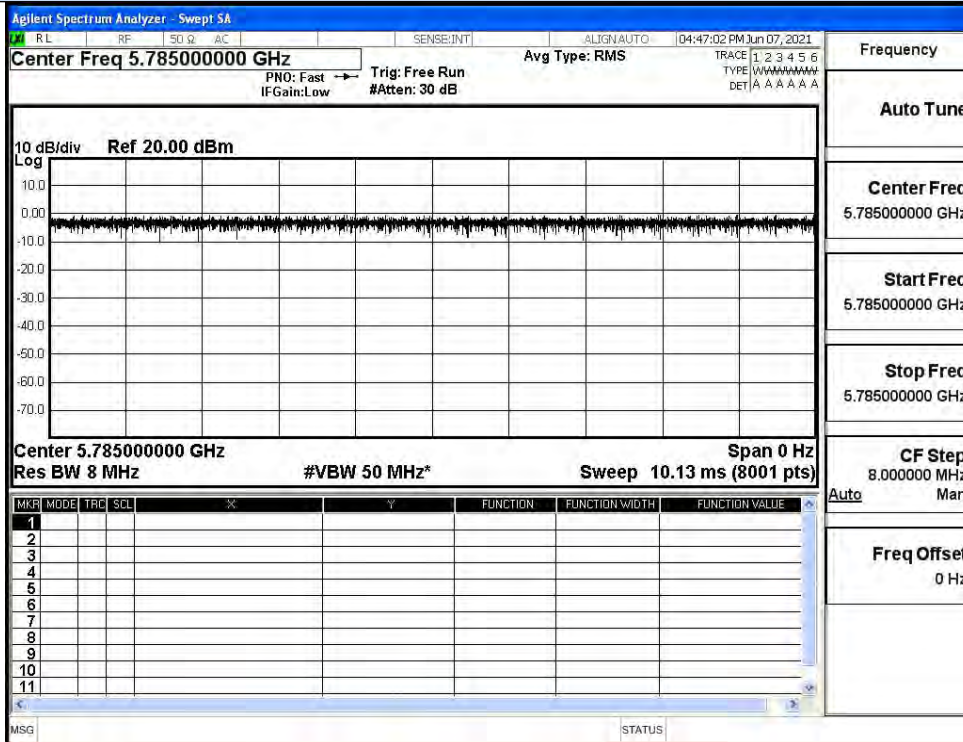
Environmental Conditions

Temperature:	24.6° C
Relative Humidity:	54.1%
ATM Pressure:	100.0 kPa
Test Engineer:	Ken He
Supervised by:	Li Huan

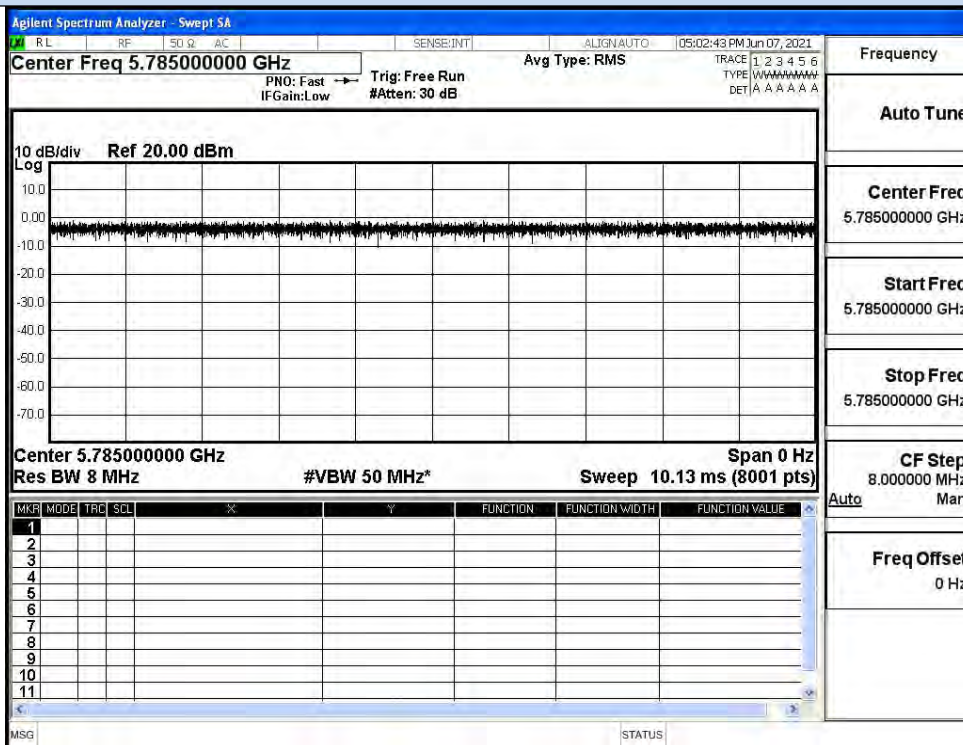
E.1 Duty Cycle

Test Mode	Test Frequency (MHz)	Duty Cycle (%)	10log(1/x) Factor (dB)	1/B Minimum VBW(KHz)
11A	5785	100	0.00	0.01
11N20 SISO	5785	100	0.00	0.01
11N40 SISO	5755	100	0.00	0.01
11AC20 SISO	5785	100	0.00	0.01
11AC40 SISO	5755	100	0.00	0.01
11AC80 SISO	5775	100	0.00	0.01

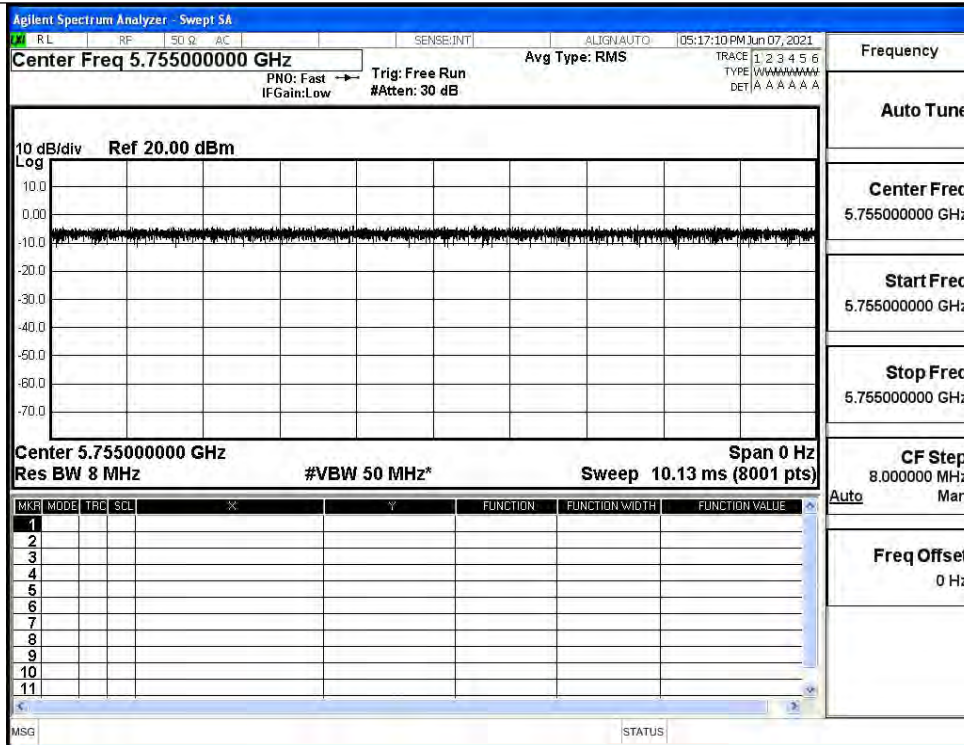
On Time and Duty Cycle



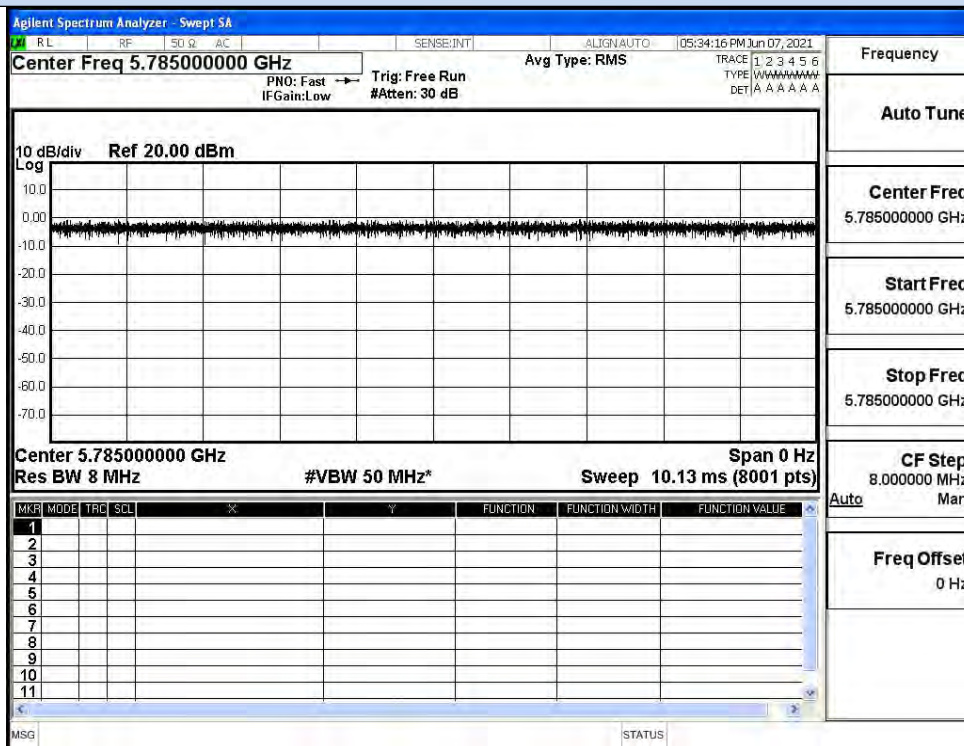
IEEE 802.11a



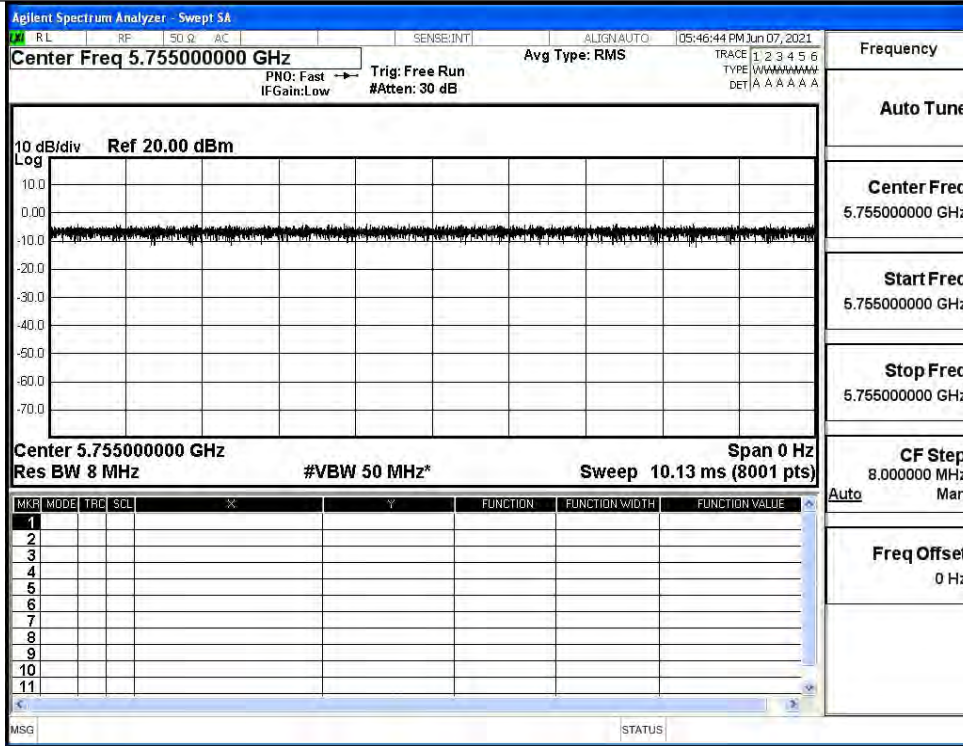
IEEE 802.11n HT20



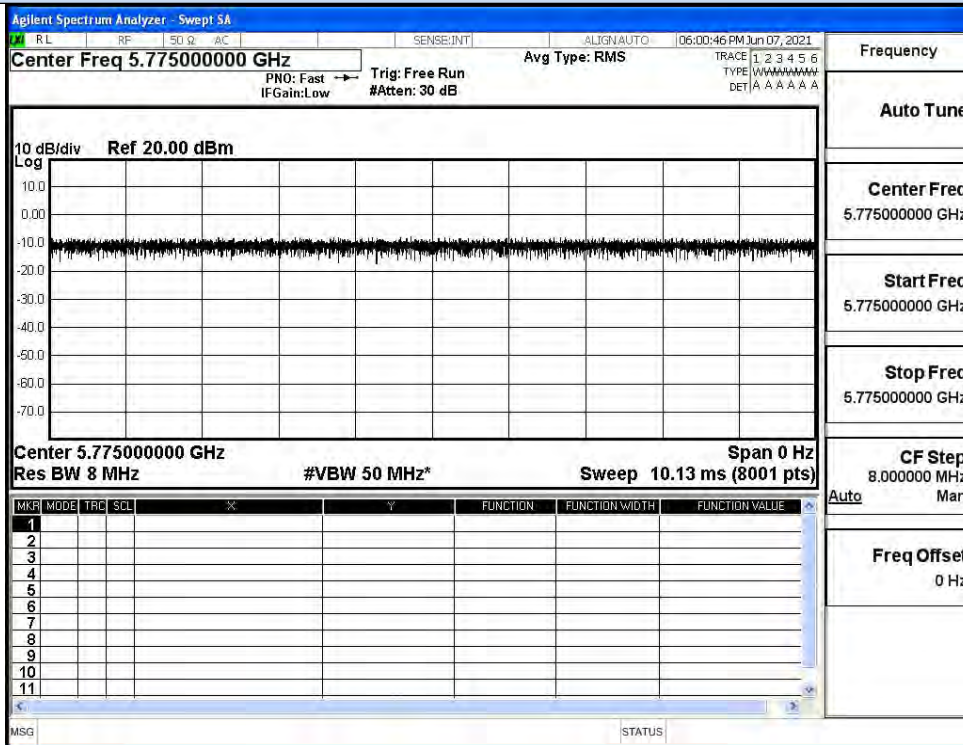
IEEE 802.11n HT40



IEEE 802.11AC20



IEEE 802.11AC40



IEEE 802.11AC80

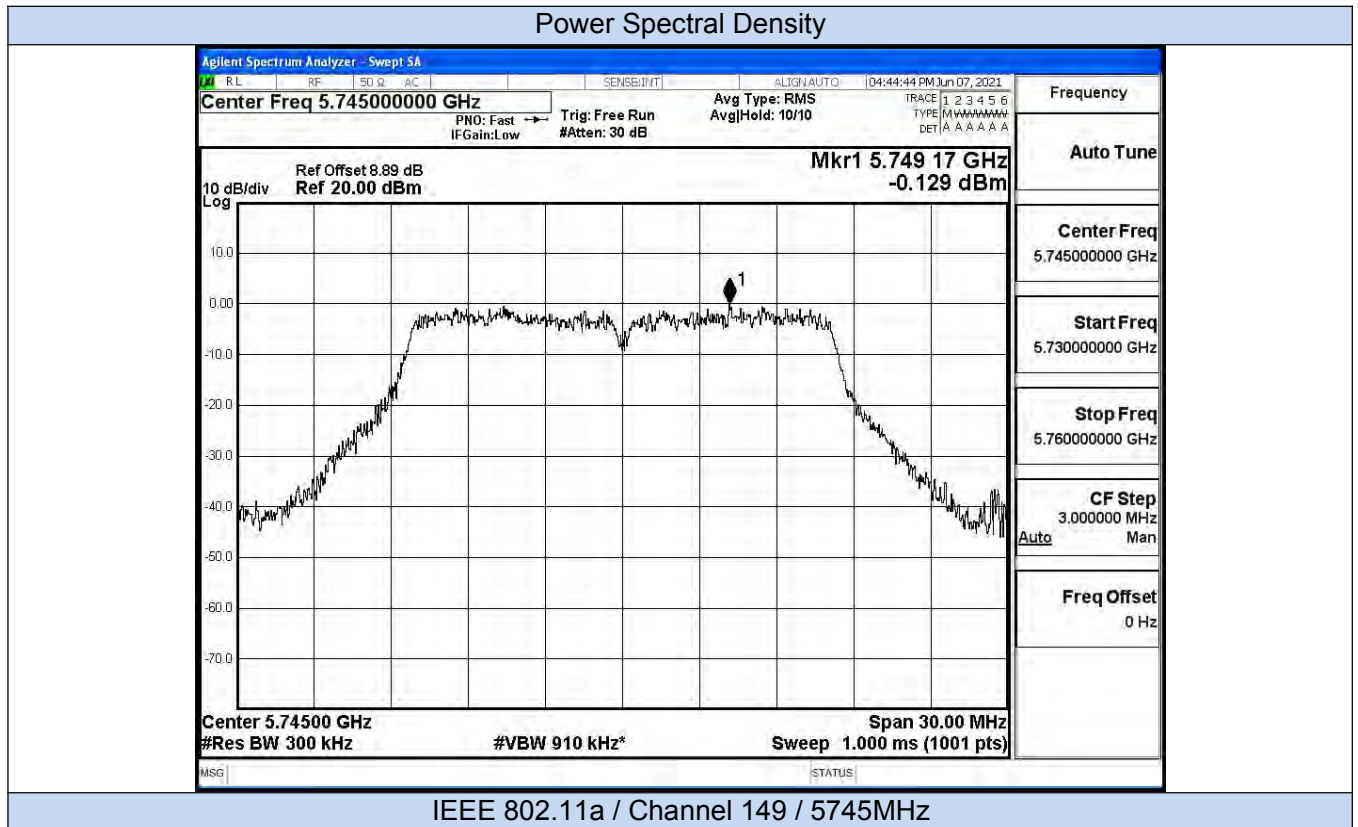
E.2 Maximum Conduct Output Power

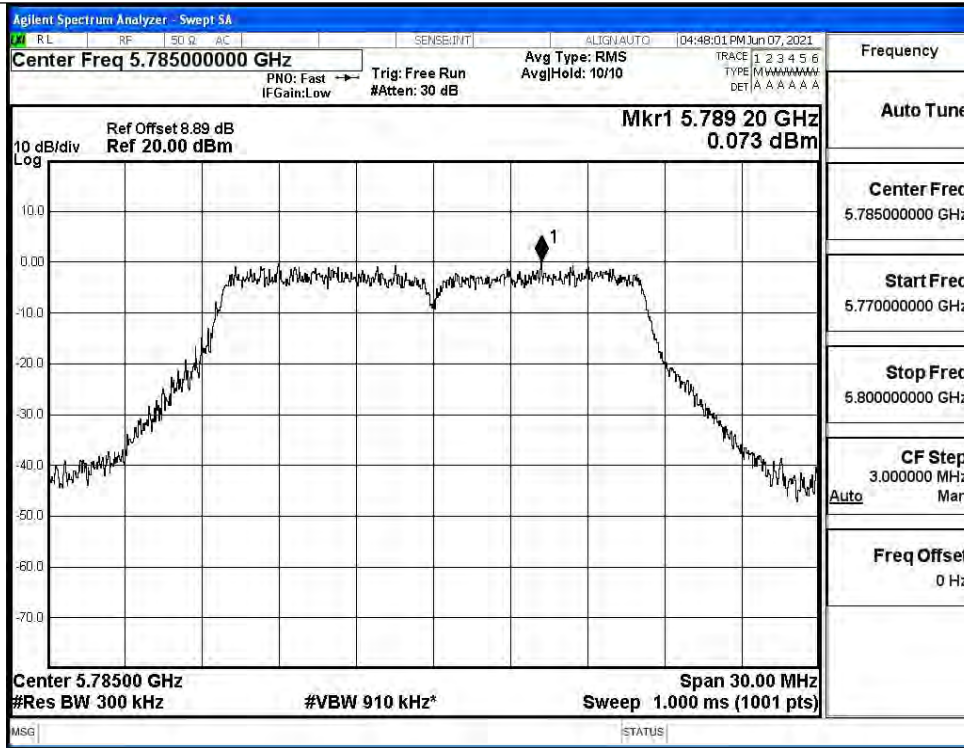
Test Mode	Channel	Frequency (MHz)	AVG Conducted Power (dBm)	Duty Cycle Factor(dB)	Report Conducted Power(dBm)	Limit (dBm)	Verdict
11A	149	5745	7.24	0	7.24	30	Pass
	157	5785	7.52	0	7.52		Pass
	165	5825	7.23	0	7.23		Pass
11N20 SISO	149	5745	7.12	0	7.12	30	Pass
	157	5785	7.21	0	7.21		Pass
	165	5825	7.23	0	7.23		Pass
11N40 SISO	151	5755	7.52	0	7.52	30	Pass
	159	5795	7.53	0	7.53		Pass
11AC20 SISO	149	5745	7.36	0	7.36	30	Pass
	157	5785	7.42	0	7.42		Pass
	165	5825	7.45	0	7.45		Pass
11AC40 SISO	151	5755	7.13	0	7.13	30	Pass
	159	5795	7.32	0	7.32		Pass
11AC80 SISO	155	5775	7.52	0	7.52	30	Pass

E.3 Power Spectral Density

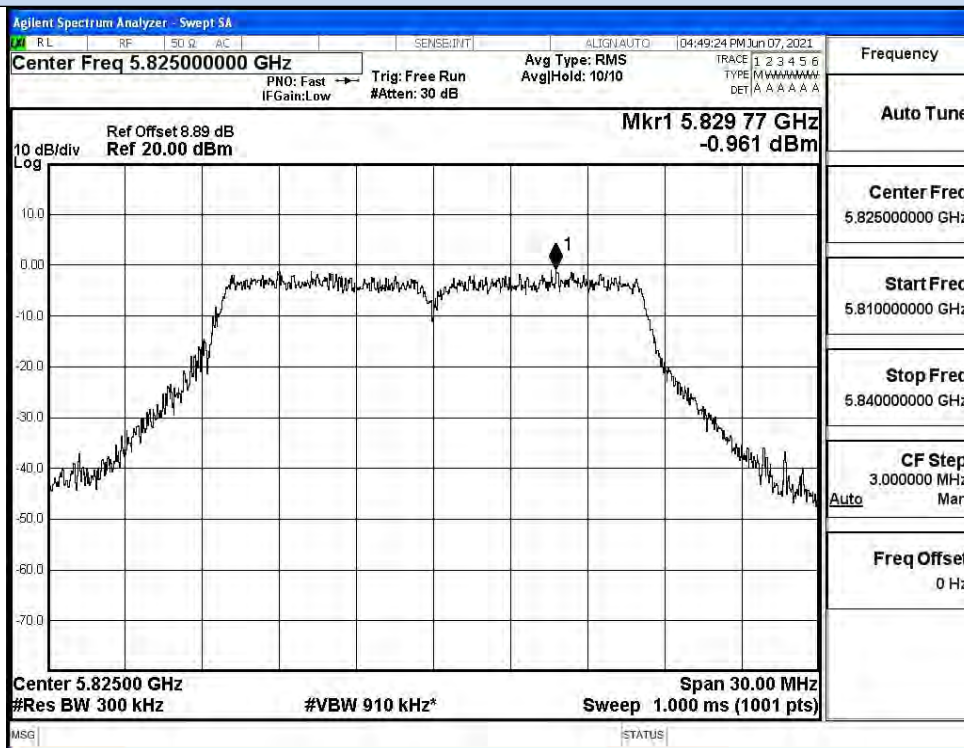
Test Mode	Channel	Frequency (MHz)	Power Density (dBm/300KHz)	Duty Cycle Factor (dB)	RBW Factor (dB)	Report Power Density (dBm/500KHz)	Limit (dBm/500KHz)	Verdict
11A	149	5745	-0.13	0	2.218	2.09	30	Pass
	157	5785	0.07	0	2.218	2.29		Pass
	165	5825	-0.96	0	2.218	1.26		Pass
11N20 SISO	149	5745	-1.19	0	2.218	1.03	30	Pass
	157	5785	-0.86	0	2.218	1.36		Pass
	165	5825	-1.93	0	2.218	0.29		Pass
11N40 SISO	151	5755	-3.70	0	2.218	-1.49	30	Pass
	159	5795	-3.74	0	2.218	-1.52		Pass
11AC20 SISO	149	5745	-0.80	0	2.218	1.42	30	Pass
	157	5785	-0.85	0	2.218	1.37		Pass
	165	5825	-1.71	0	2.218	0.51		Pass
11AC40 SISO	151	5755	-4.04	0	2.218	-1.82	30	Pass
	159	5795	-3.99	0	2.218	-1.77		Pass
11AC80 SISO	155	5775	-6.49	0	2.218	-4.27	30	Pass

Report conducted $PSD = \text{measured conducted PSD} + \text{Duty Cycle factor} + \text{RBW factor}$;
 $RBW \text{ factor} = 10 \log (500 \text{ KHz} / 300 \text{ KHz}) = 2.218 \text{ dB}$.



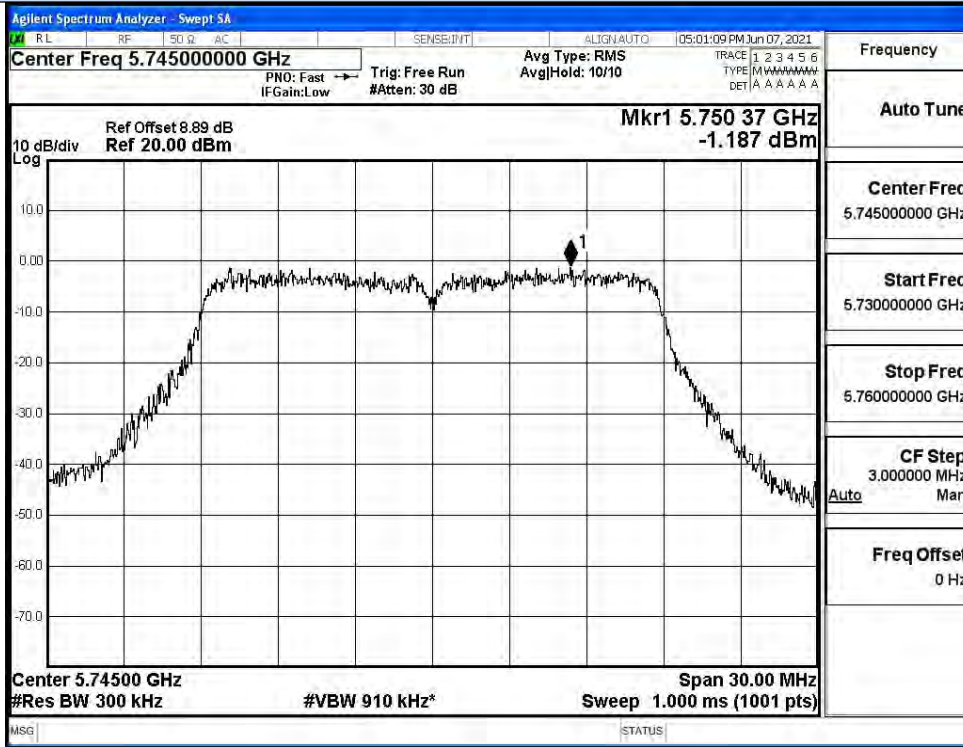


IEEE 802.11na / Channel 157 / 5785MHz

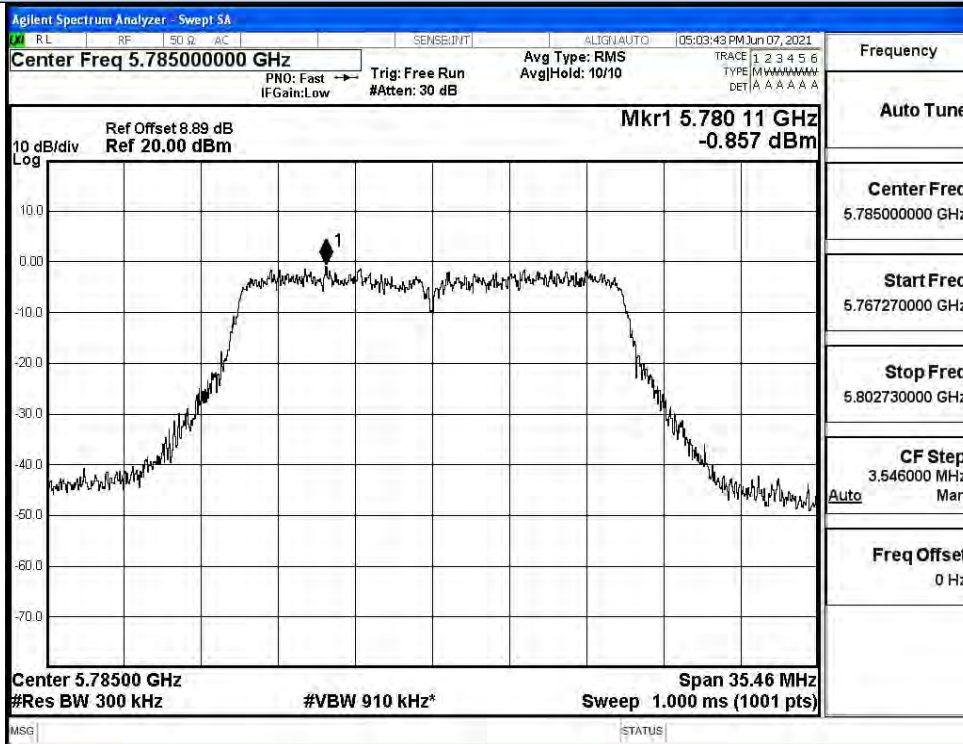


IEEE 802.11na / Channel 165 / 5825MHz

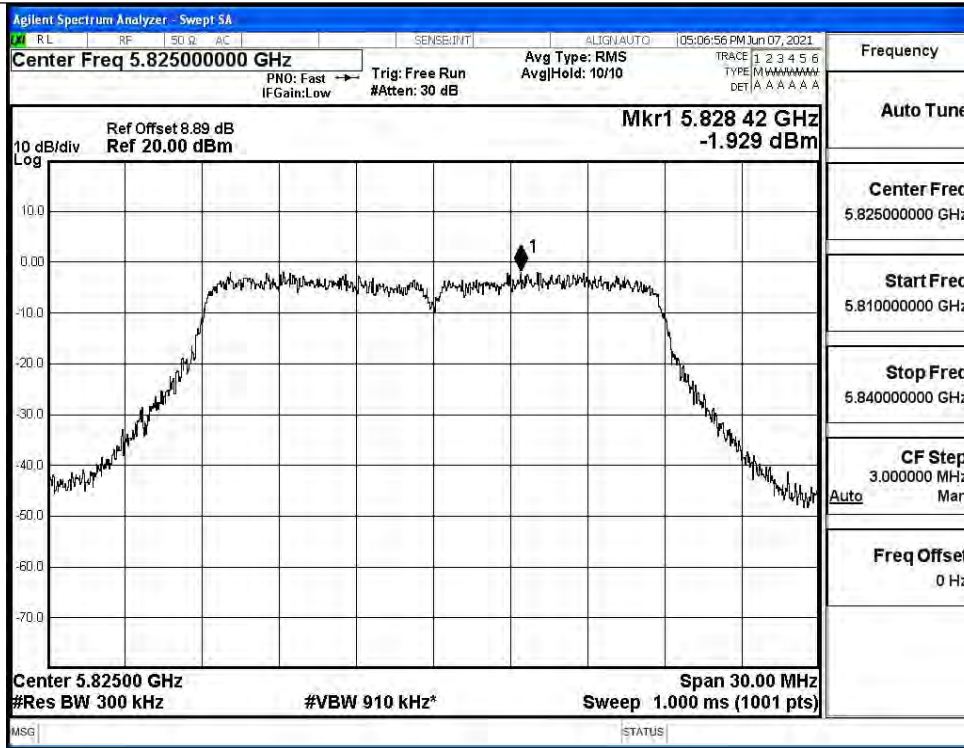
Power Spectral Density



IEEE 802.11n20 / Channel 149 / 5745MHz

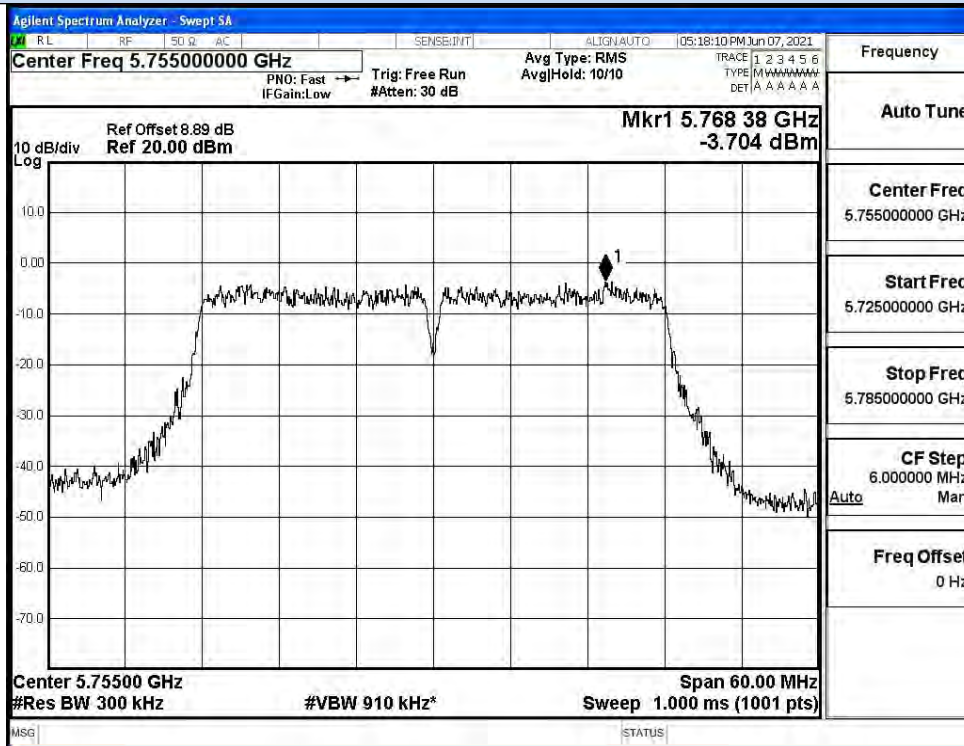


IEEE 802.11n20 / Channel 157 / 5785MHz

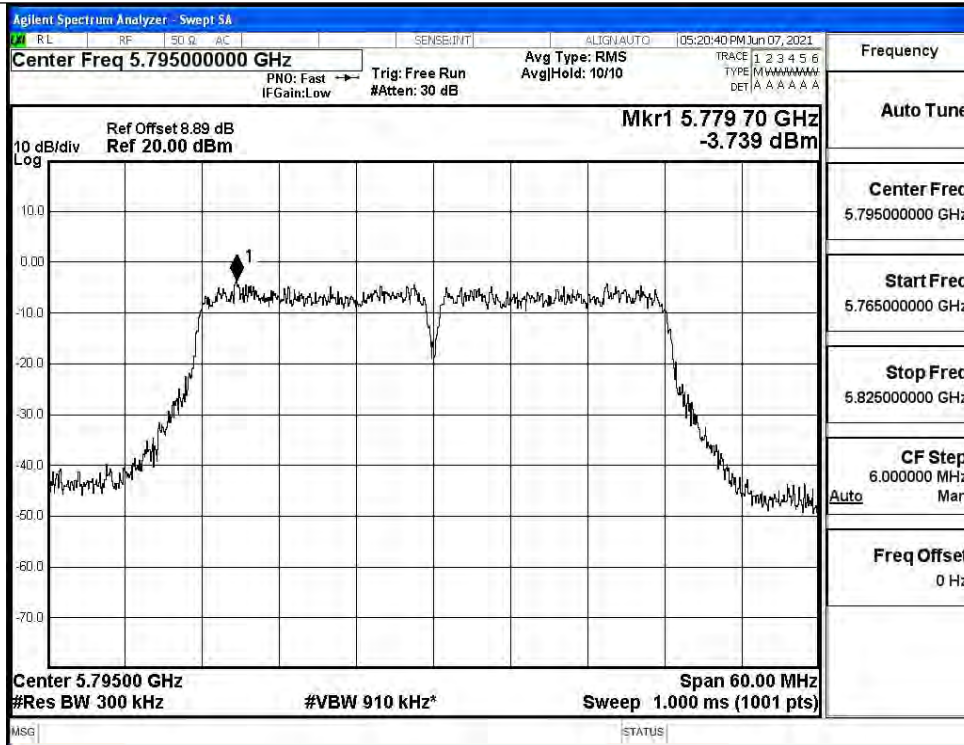


IEEE 802.11n20 / Channel 165 / 5825MHz

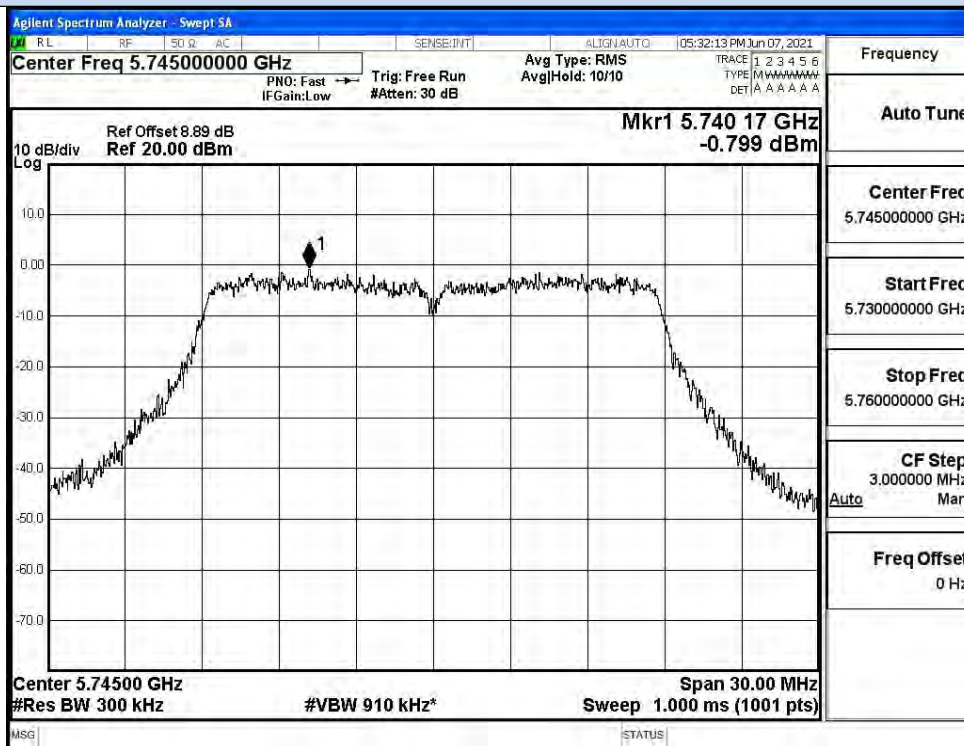
Power Spectral Density



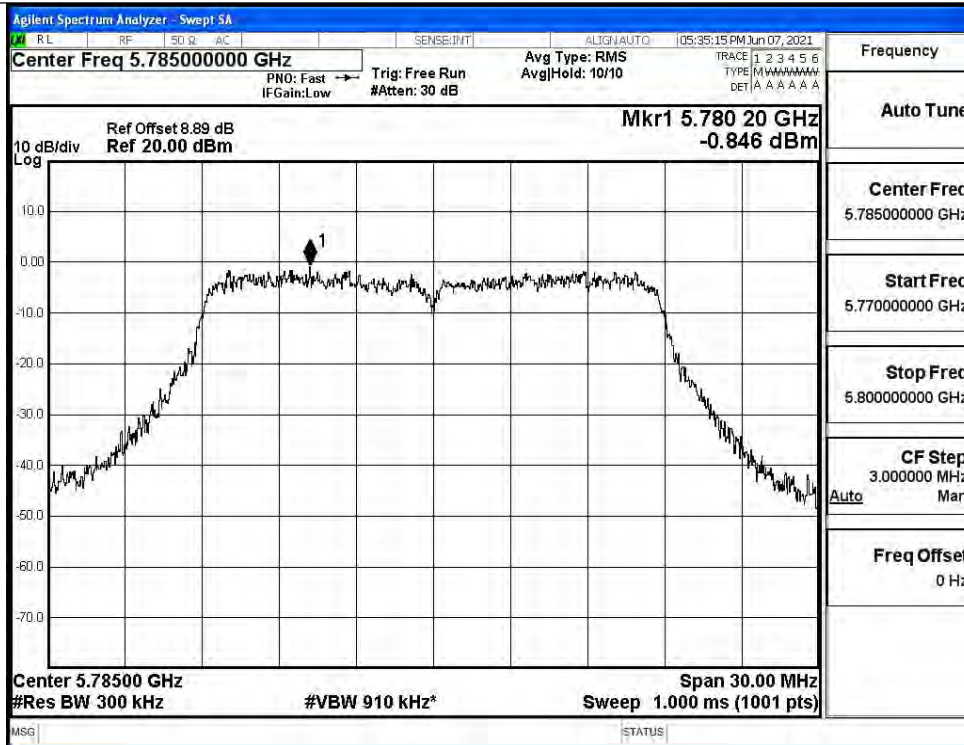
IEEE 802.11n40 / Channel 151 / 5755MHz



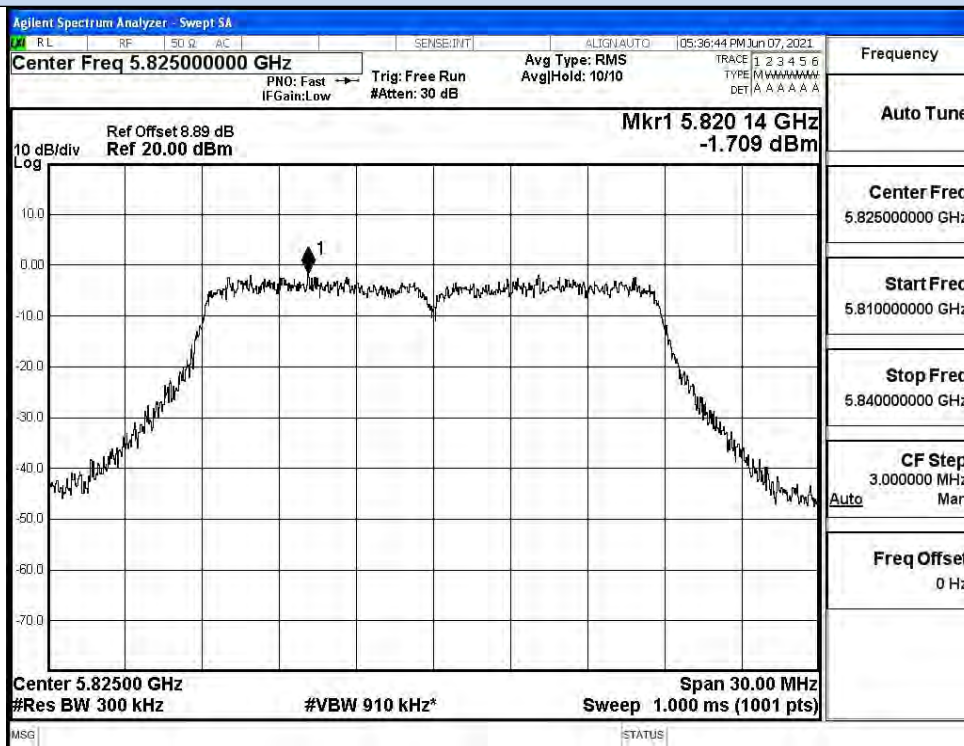
IEEE 802.11n40 / Channel 159 / 5795MHz



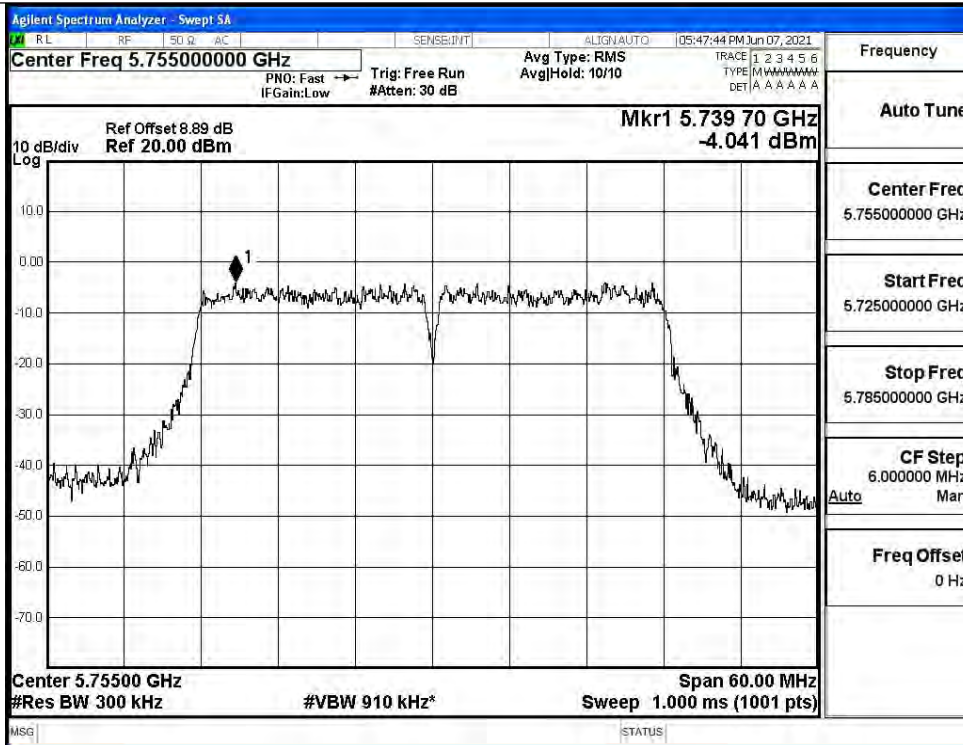
IEEE 802.11ac20 / Channel 149 / 5745MHz



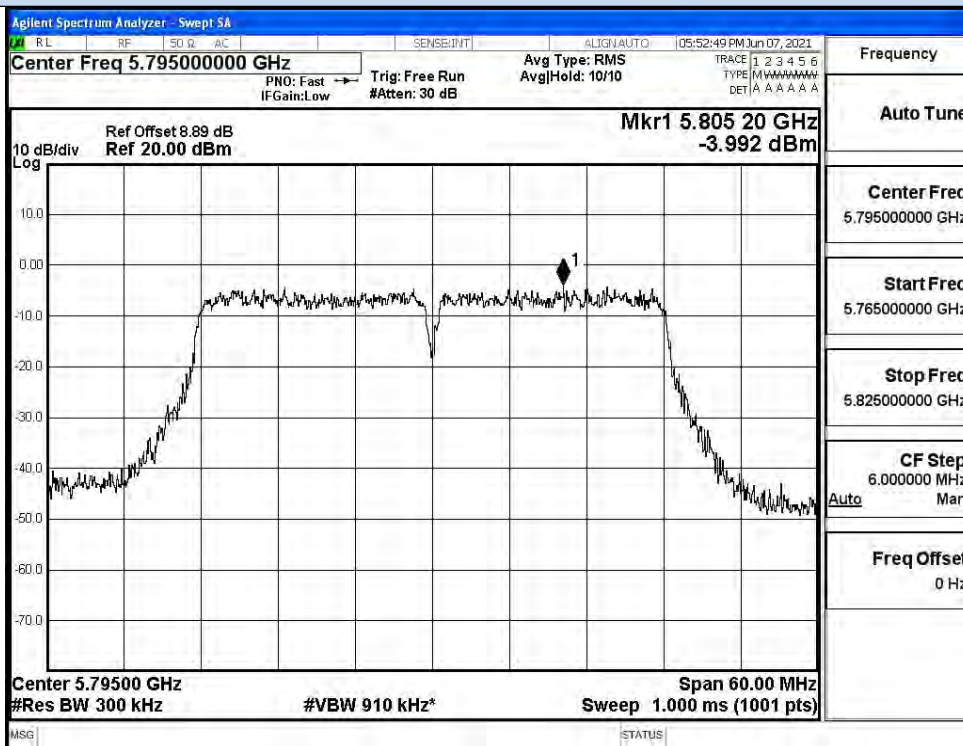
IEEE 802.11ac20 / Channel 157 / 5785MHz



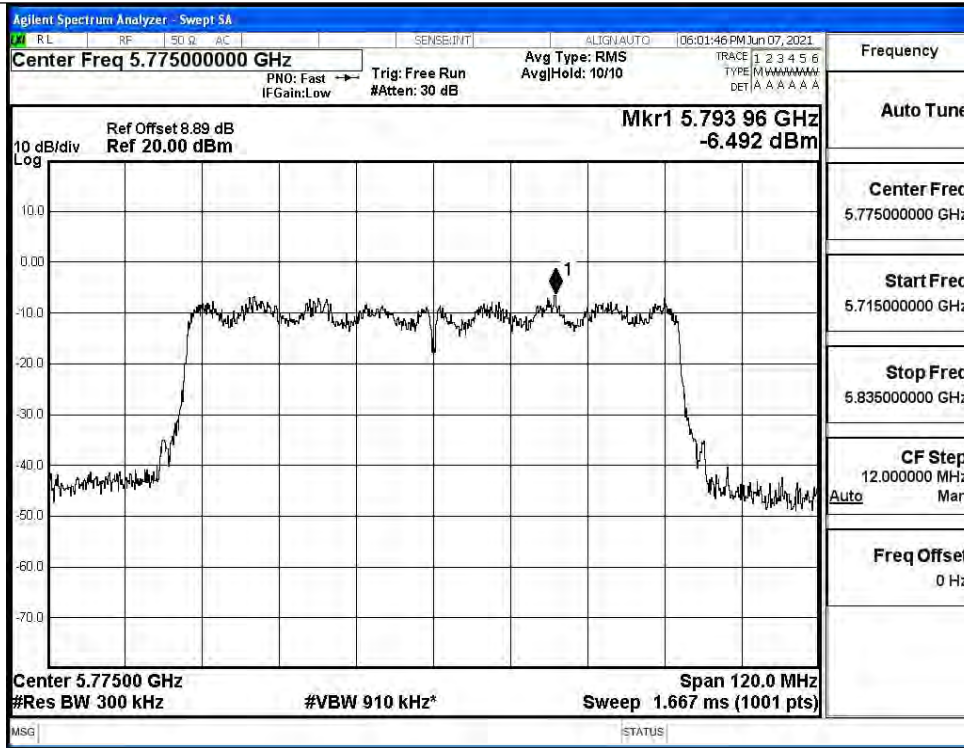
IEEE 802.11ac20 / Channel 165 / 5825MHz



IEEE 802.11ac40 / Channel 151 / 5755MHz



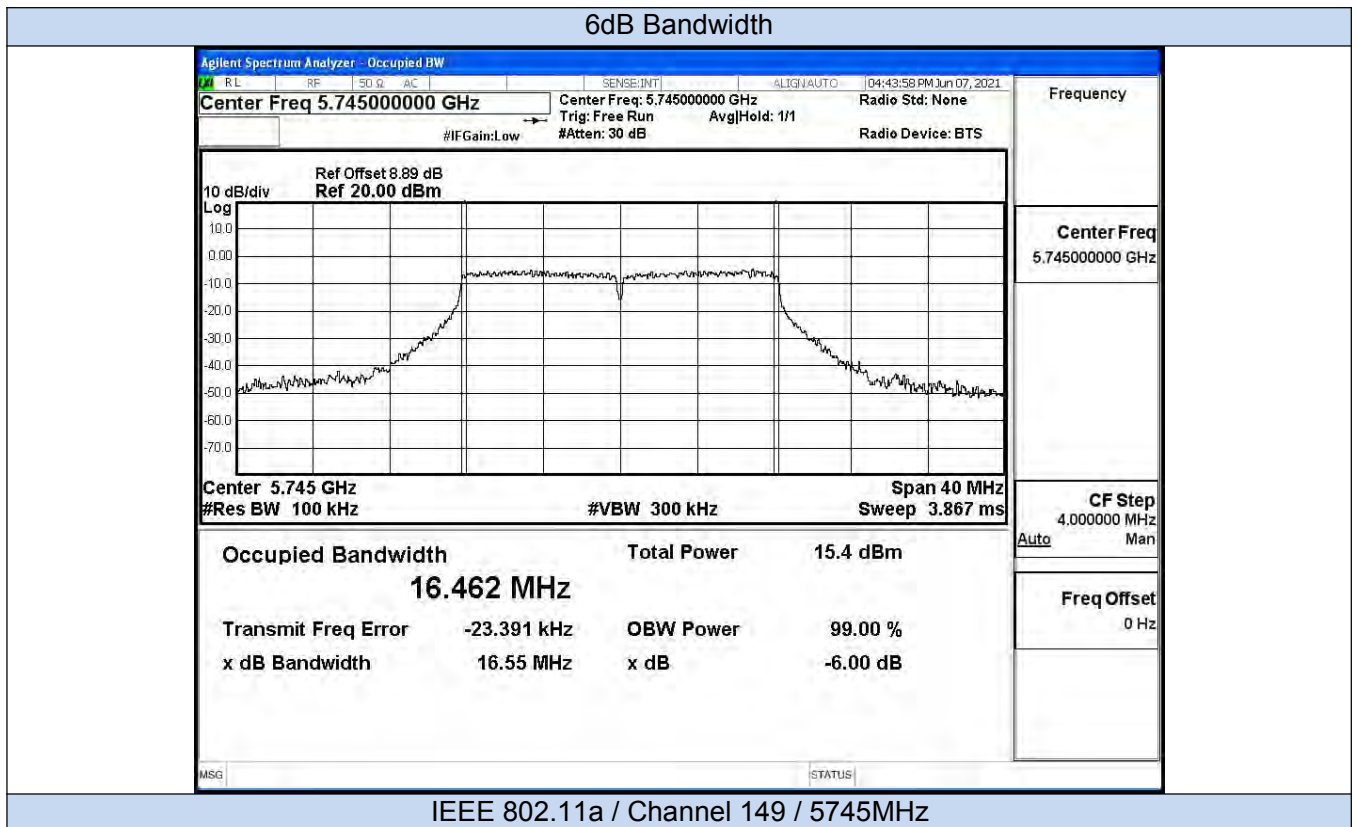
IEEE 802.11ac40 / Channel 159 / 5795MHz

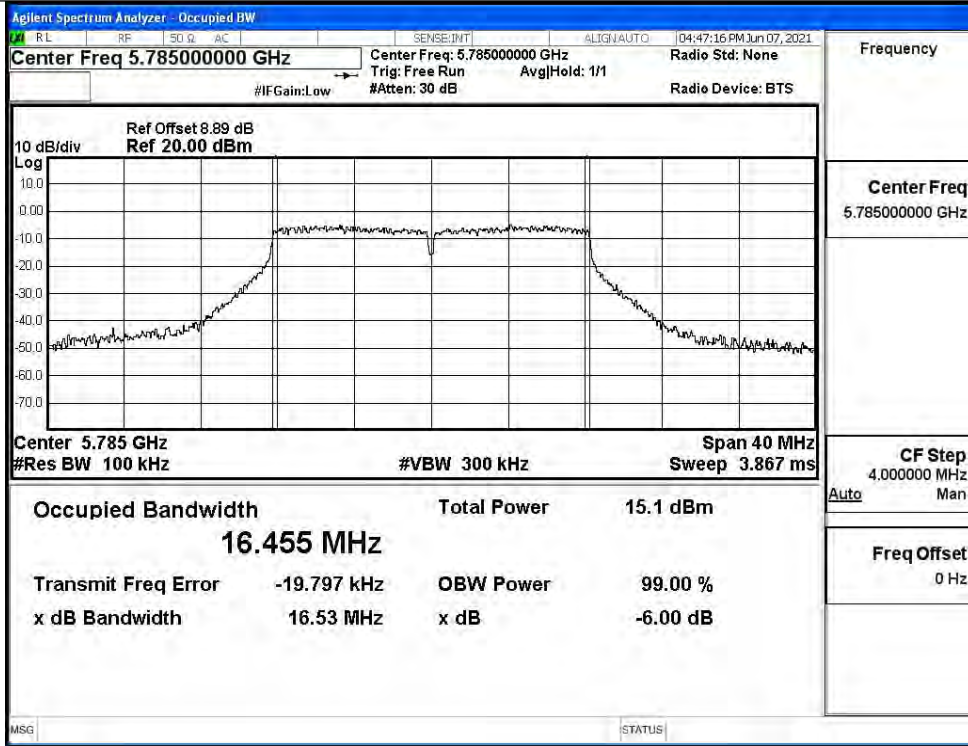


IEEE 802.11ac80 / Channel 155/ 5775MHz

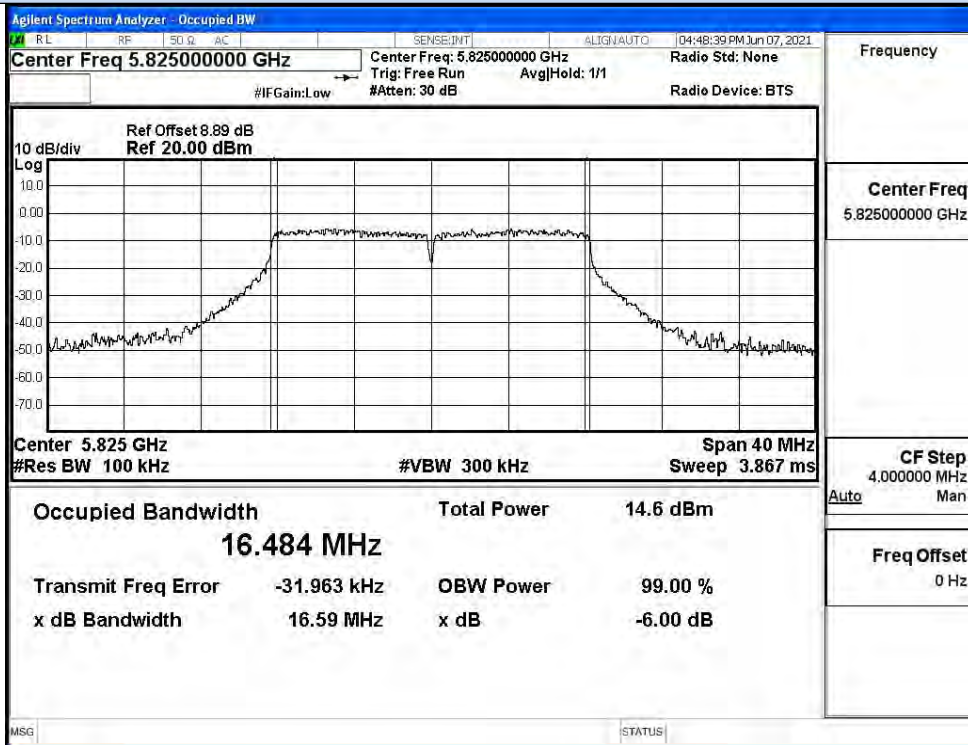
E.4 Emission Bandwidth

Test Mode	Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Verdict
11A	149	5745	16.55	>=0.5	Pass
	157	5785	16.53		Pass
	165	5825	16.59		Pass
11N20 SISO	149	5745	17.73	>=0.5	Pass
	157	5785	17.73		Pass
	165	5825	17.68		Pass
11N40 SISO	151	5755	36.55	>=0.5	Pass
	159	5795	36.55		Pass
11AC20S ISO	149	5745	17.69	>=0.5	Pass
	157	5785	17.74		Pass
	165	5825	17.81		Pass
11AC40S ISO	151	5755	36.51	>=0.5	Pass
	159	5795	36.56		Pass
11AC80S ISO	155	5775	76.55	>=0.5	Pass



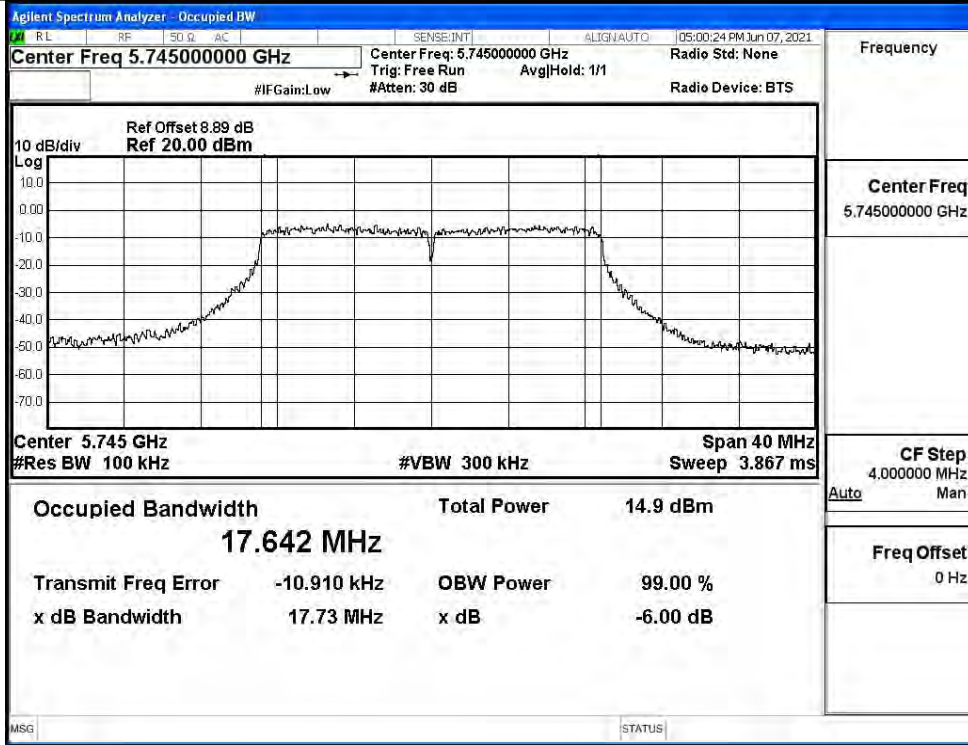


IEEE 802.11a / Channel 157 / 5785MHz

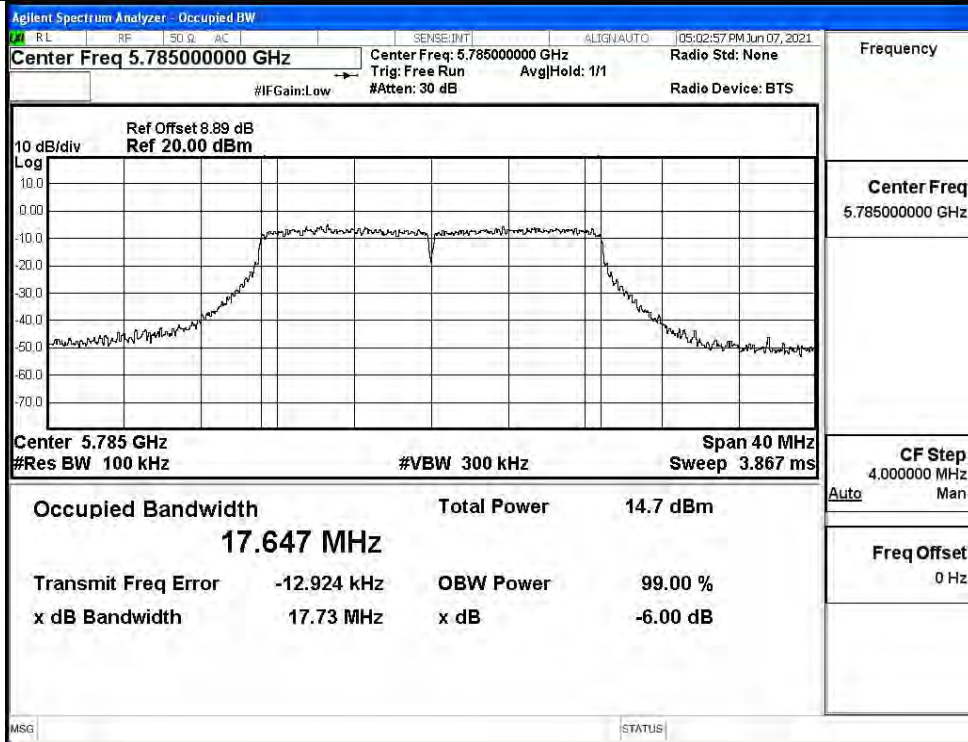


IEEE 802.11a / Channel 165 / 5825MHz

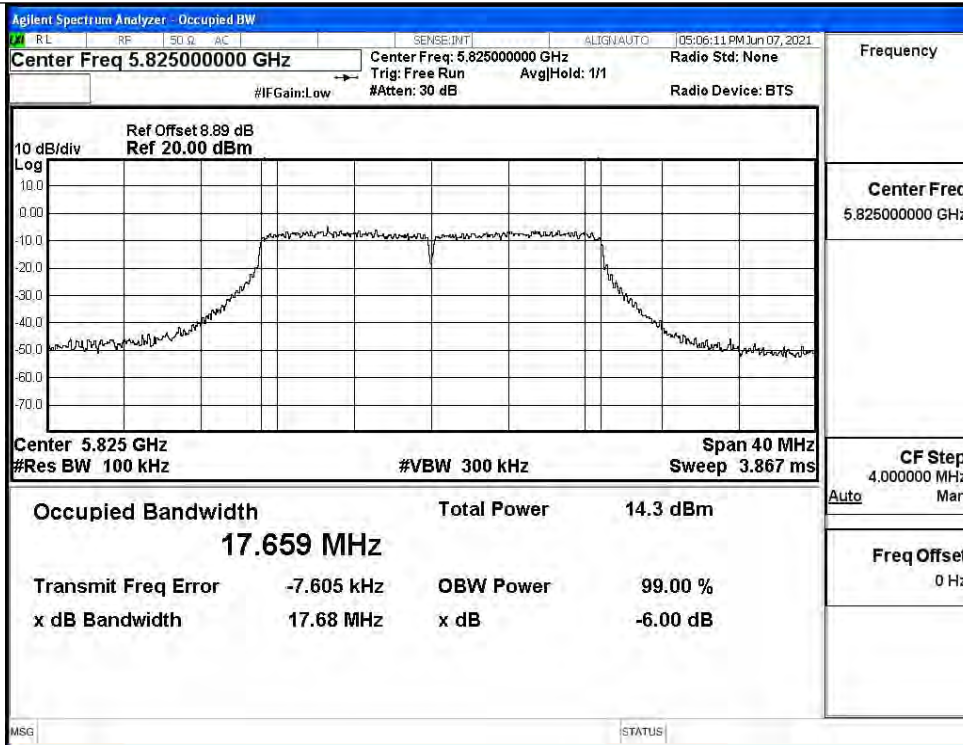
6dB Bandwidth



IEEE 802.11n20 / Channel 149 / 5745MHz

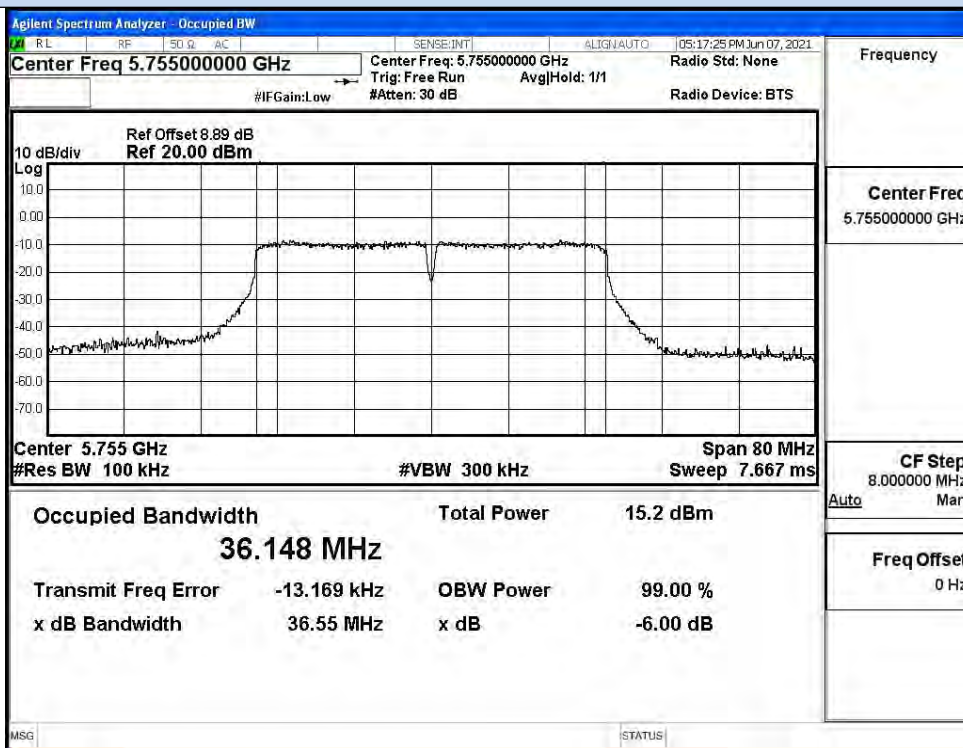


IEEE 802.11n20 / Channel 157 / 5785MHz

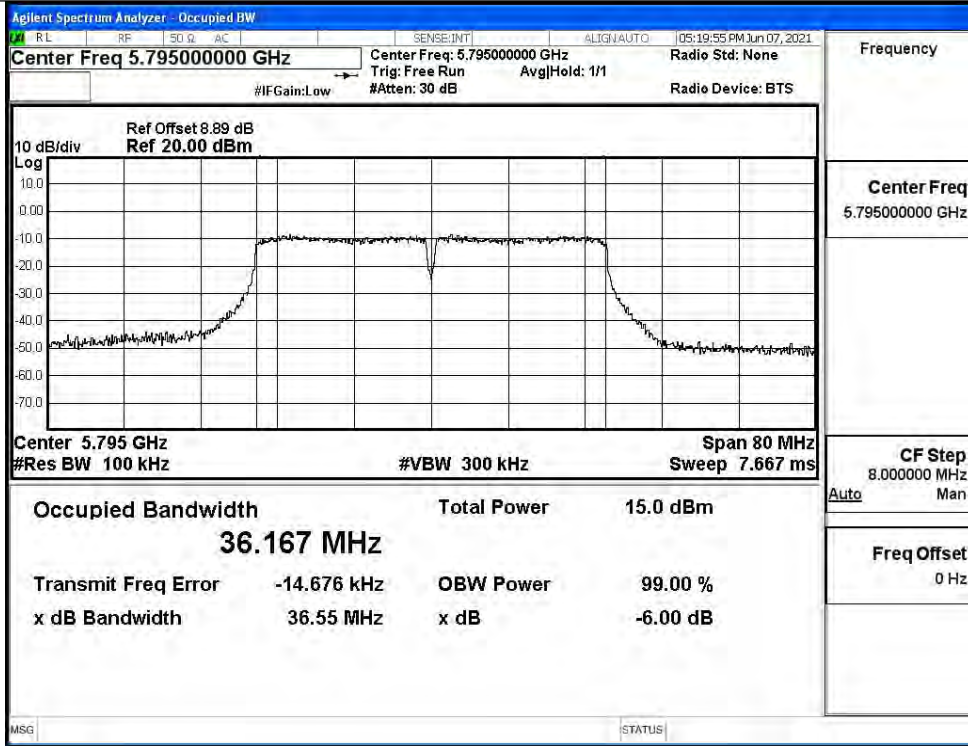


IEEE 802.11n20 / Channel 165 / 5825MHz

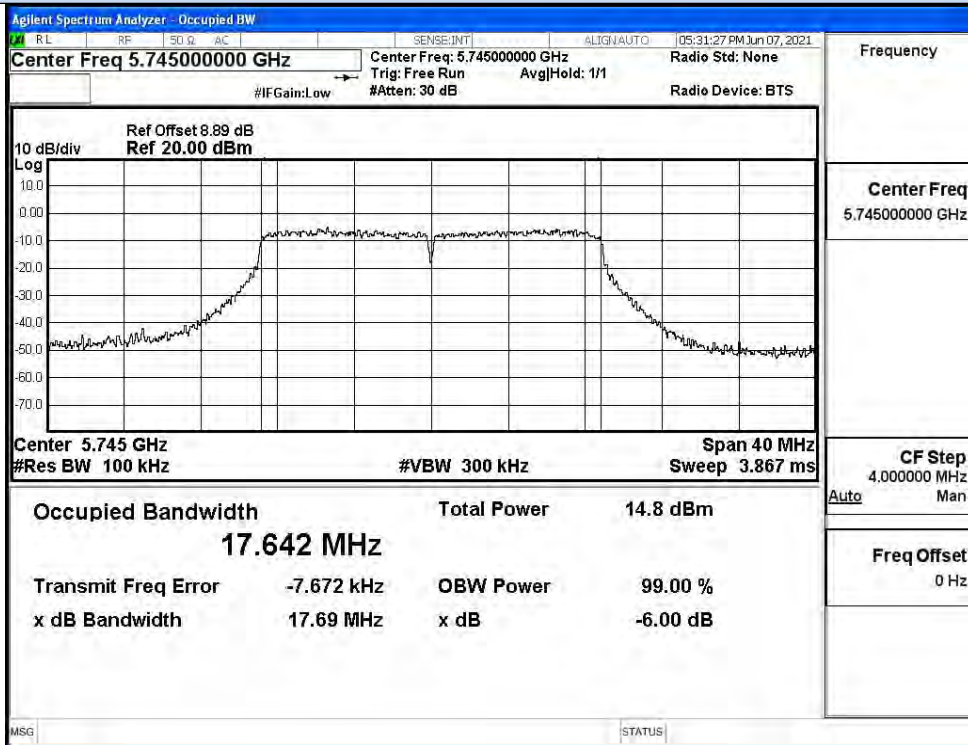
26dB Bandwidth



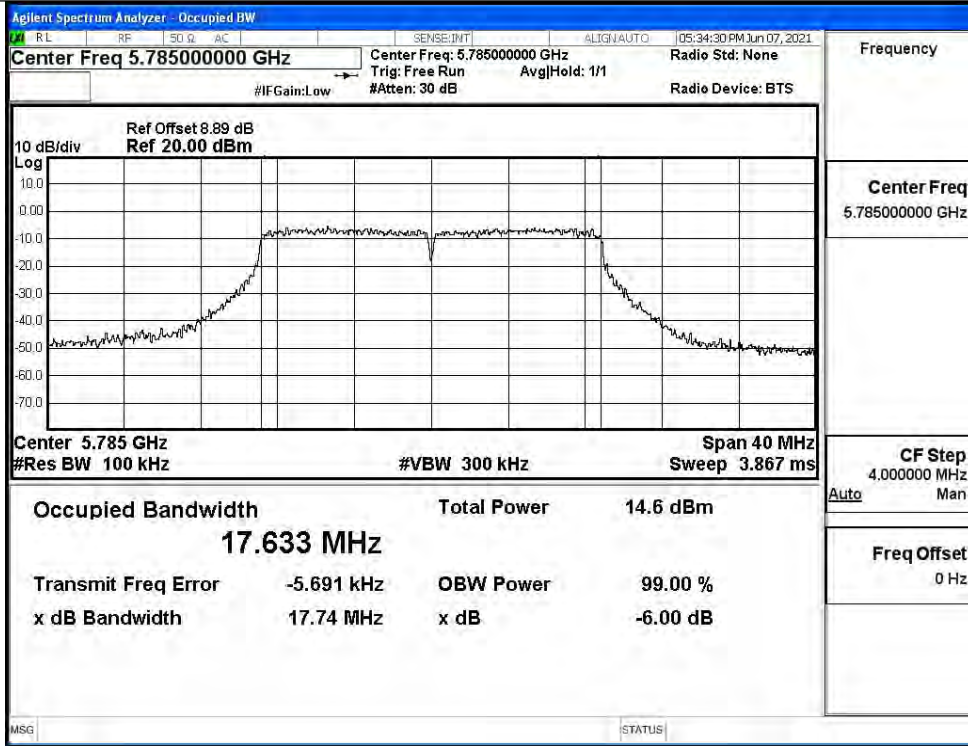
IEEE 802.11n40 / Channel 151 / 5755MHz



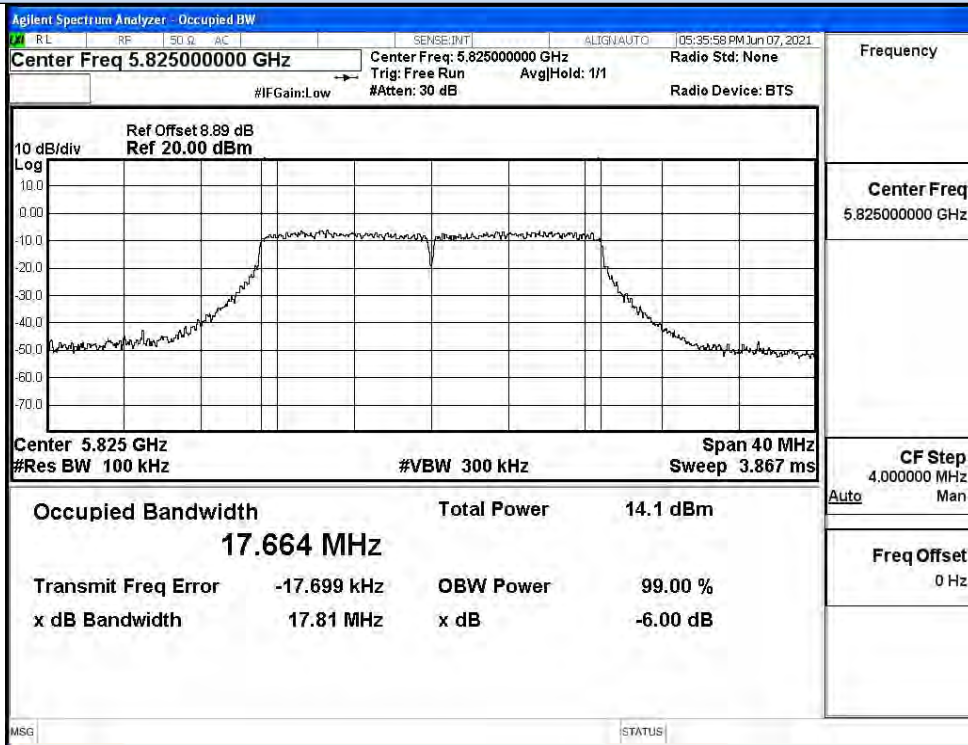
IEEE 802.11n40 / Channel 159 / 5795MHz



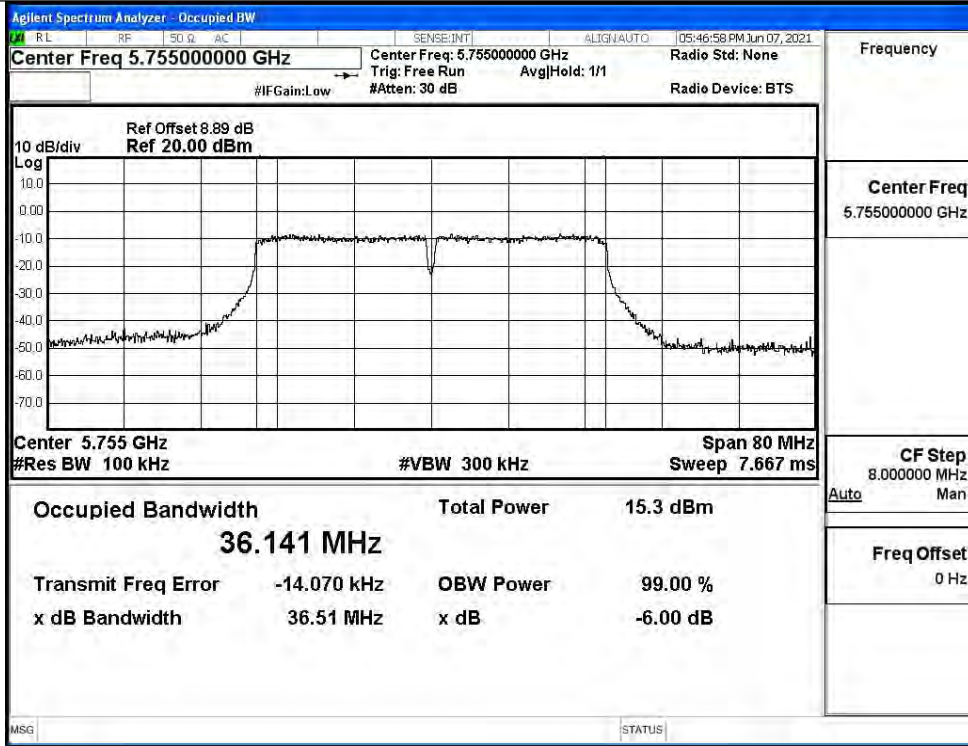
IEEE 802.11ac20 / Channel 149 / 5745MHz



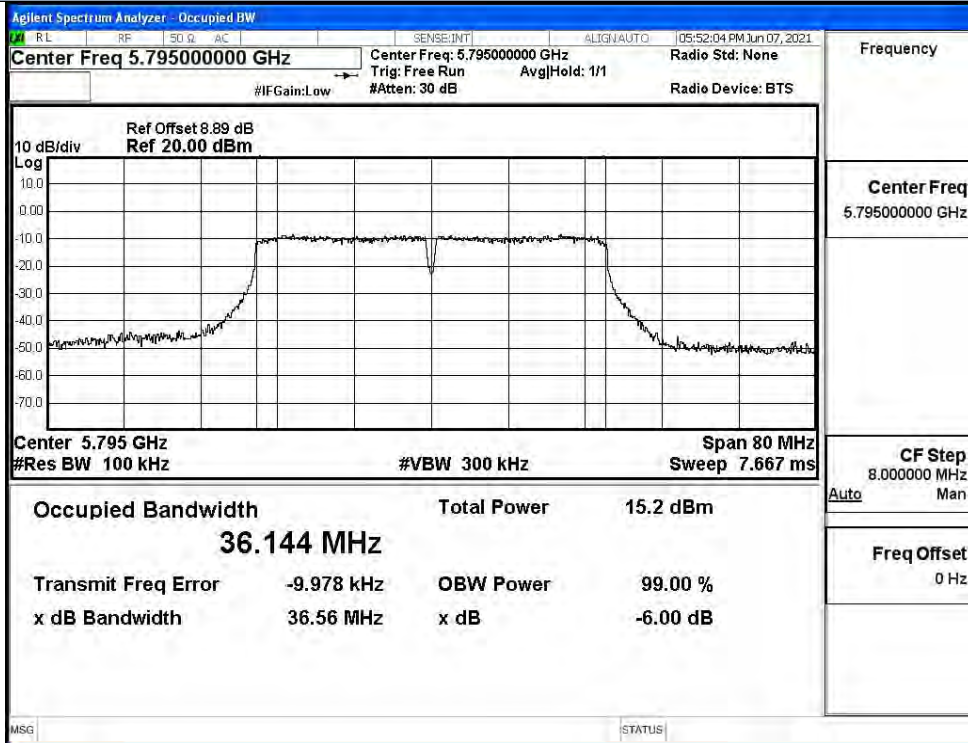
IEEE 802.11ac20 / Channel 157 / 5785MHz



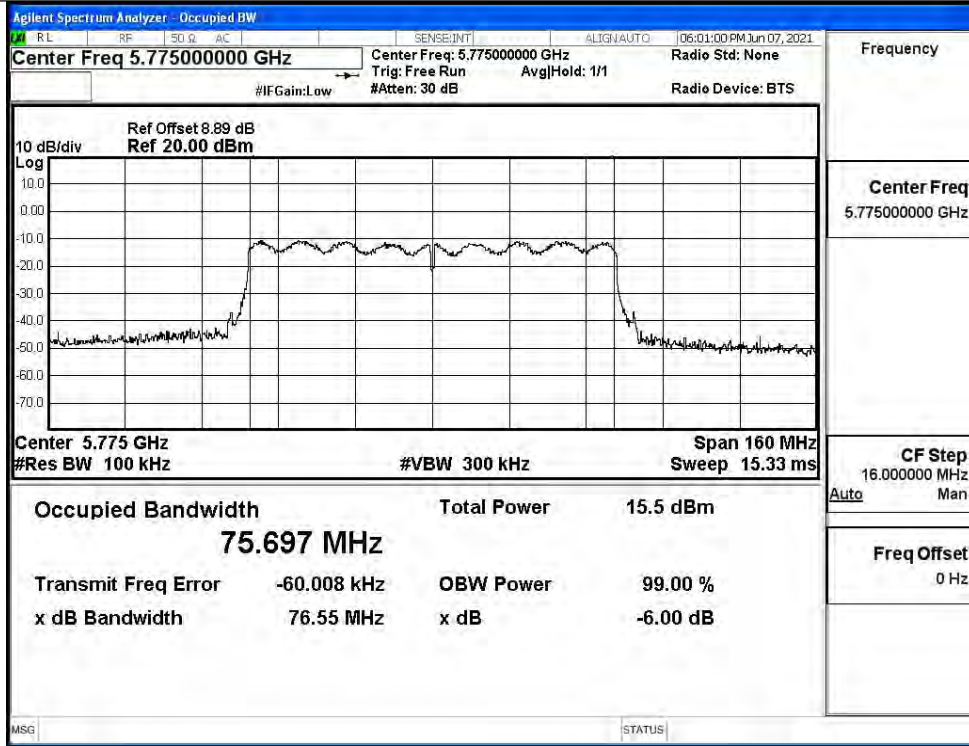
IEEE 802.11ac20 / Channel 165 / 5825MHz



IEEE 802.11ac40 / Channel 151 / 5755MHz



IEEE 802.11ac40 / Channel 159 / 5795MHz



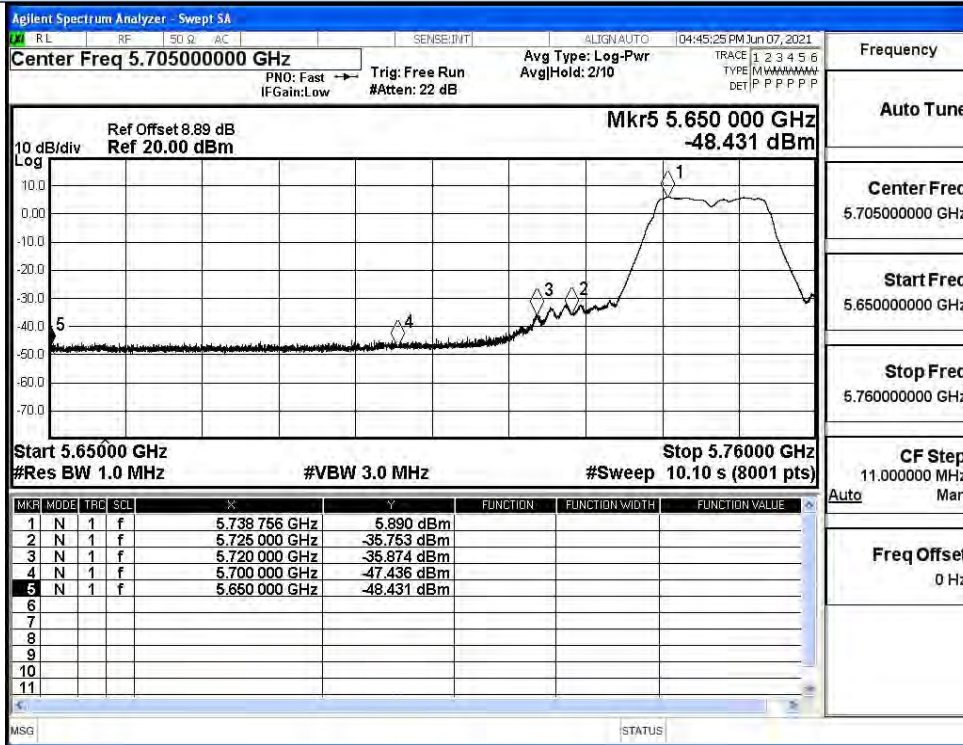
IEEE 802.11ac80 / Channel 155 / 5775MHz

E.5 Undesirable Emissions Measurement

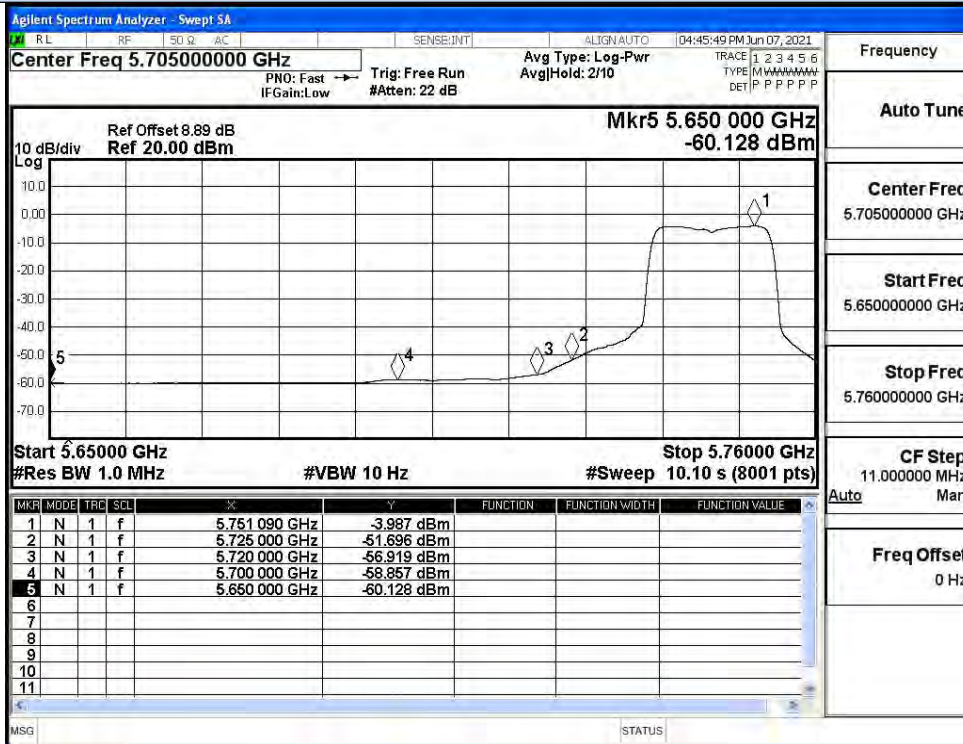
Test Mode	Channel	Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	EIRP (dBm/MHz)	Detector	Limit (dBm/MHz)	Verdict
11A	149	5650.0	-48.43	2.00	-46.43	Peak	-27.0	Pass
		5650.0	-60.13	2.00	-58.13	Average	-27.0	Pass
		5700.0	-47.44	2.00	-45.44	Peak	10	Pass
		5700.0	-58.86	2.00	-56.86	Average	10	Pass
		5720.0	-35.87	2.00	-33.87	Peak	15.6	Pass
		5720.0	-56.92	2.00	-54.92	Average	15.6	Pass
		5725.0	-35.75	2.00	-33.75	Peak	27.0	Pass
	5725.0	-51.70	2.00	-49.70	Average	27.0	Pass	
	165	5850.0	-42.98	2.00	-40.98	Peak	27.0	Pass
		5850.0	-57.69	2.00	-55.69	Average	27.0	Pass
		5855.0	-44.93	2.00	-42.93	Peak	15.6	Pass
		5855.0	-58.80	2.00	-56.80	Average	15.6	Pass
		5875.0	-47.08	2.00	-45.08	Peak	10	Pass
		5875.0	-59.66	2.00	-57.66	Average	10	Pass
5925.0		-48.27	2.00	-46.27	Peak	-27.0	Pass	
5925.0	-60.07	2.00	-58.07	Average	-27.0	Pass		
11N20 SISO	149	5650.0	-47.89	2.00	-45.89	Peak	-27.0	Pass
		5650.0	-60.19	2.00	-58.19	Average	-27.0	Pass
		5700.0	-48.01	2.00	-46.01	Peak	10	Pass
		5700.0	-56.92	2.00	-54.92	Average	10	Pass
		5720.0	-41.55	2.00	-39.55	Peak	15.6	Pass
		5720.0	-59.03	2.00	-57.03	Average	15.6	Pass
		5725.0	-34.25	2.00	-32.25	Peak	27.0	Pass
	5725.0	-51.17	2.00	-49.17	Average	27.0	Pass	
	165	5850.0	-44.40	2.00	-42.40	Peak	27.0	Pass
		5850.0	-57.98	2.00	-55.98	Average	27.0	Pass
		5855.0	-47.03	2.00	-45.03	Peak	15.6	Pass
		5855.0	-58.93	2.00	-56.93	Average	15.6	Pass
		5875.0	-47.48	2.00	-45.48	Peak	10	Pass
		5875.0	-59.65	2.00	-57.65	Average	10	Pass
5925.0		-48.58	2.00	-46.58	Peak	-27.0	Pass	
5925.0	-60.05	2.00	-58.05	Average	-27.0	Pass		

Test Mode	Channel	Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	EIRP (dBm/MHz)	Detector	Limit (dBm/MHz)	Verdict
11N40 SISO	151	5650.0	-47.86	2.00	-45.86	Peak	-27.0	Pass
		5650.0	-60.07	2.00	-58.07	Average	-27.0	Pass
		5700.0	-46.00	2.00	-44.00	Peak	10	Pass
		5700.0	-58.45	2.00	-56.45	Average	10	Pass
		5720.0	-35.27	2.00	-33.27	Peak	15.6	Pass
		5720.0	-49.46	2.00	-47.46	Average	15.6	Pass
		5725.0	-35.29	2.00	-33.29	Peak	27.0	Pass
	5725.0	-47.69	2.00	-45.69	Average	27.0	Pass	
	159	5850.0	-46.21	2.00	-44.21	Peak	27.0	Pass
		5850.0	-58.61	2.00	-56.61	Average	27.0	Pass
		5855.0	-47.23	2.00	-45.23	Peak	15.6	Pass
		5855.0	-58.91	2.00	-56.91	Average	15.6	Pass
		5875.0	-47.99	2.00	-45.99	Peak	10	Pass
		5875.0	-59.40	2.00	-57.40	Average	10	Pass
5925.0		-48.57	2.00	-46.57	Peak	-27.0	Pass	
5925.0	-59.79	2.00	-57.79	Average	-27.0	Pass		
11AC2 0 SISO	149	5650.0	-48.32	2.00	-46.32	Peak	-27.0	Pass
		5650.0	-60.18	2.00	-58.18	Average	-27.0	Pass
		5700.0	-47.18	2.00	-45.18	Peak	10	Pass
		5700.0	-57.00	2.00	-55.00	Average	10	Pass
		5720.0	-41.97	2.00	-39.97	Peak	15.6	Pass
		5720.0	-59.53	2.00	-57.53	Average	15.6	Pass
		5725.0	-34.82	2.00	-32.82	Peak	27.0	Pass
	5725.0	-51.29	2.00	-49.29	Average	27.0	Pass	
	165	5850.0	-44.09	2.00	-42.09	Peak	27.0	Pass
		5850.0	-58.15	2.00	-56.15	Average	27.0	Pass
		5855.0	-46.68	2.00	-44.68	Peak	15.6	Pass
		5855.0	-59.01	2.00	-57.01	Average	15.6	Pass
		5875.0	-48.04	2.00	-46.04	Peak	10	Pass
		5875.0	-59.71	2.00	-57.71	Average	10	Pass
5925.0		-47.64	2.00	-45.64	Peak	-27.0	Pass	
5925.0	-60.11	2.00	-58.11	Average	-27.0	Pass		
11AC4 0 SISO	151	5650.0	-46.64	2.00	-44.64	Peak	-27.0	Pass
		5650.0	-59.86	2.00	-57.86	Average	-27.0	Pass
		5700.0	-44.82	2.00	-42.82	Peak	10	Pass
		5700.0	-58.24	2.00	-56.24	Average	10	Pass
		5720.0	-34.31	2.00	-32.31	Peak	15.6	Pass
		5720.0	-49.29	2.00	-47.29	Average	15.6	Pass
		5725.0	-34.87	2.00	-32.87	Peak	27.0	Pass
	5725.0	-47.46	2.00	-45.46	Average	27.0	Pass	
	159	5850.0	-44.96	2.00	-42.96	Peak	27.0	Pass
		5850.0	-58.53	2.00	-56.53	Average	27.0	Pass
		5855.0	-47.40	2.00	-45.40	Peak	15.6	Pass
		5855.0	-58.90	2.00	-56.90	Average	15.6	Pass
		5875.0	-46.99	2.00	-44.99	Peak	10	Pass
		5875.0	-59.37	2.00	-57.37	Average	10	Pass
5925.0		-49.02	2.00	-47.02	Peak	-27.0	Pass	
5925.0	-59.75	2.00	-57.75	Average	-27.0	Pass		
11AC8 0 SISO	155	5725.0	-41.23	2.00	-39.23	Peak	27.0	Pass
		5720.0	-42.76	2.00	-40.76	Peak	15.6	Pass
		5700.0	-45.80	2.00	-43.80	Peak	10	Pass
		5650.0	-48.70	2.00	-46.70	Peak	-27.0	Pass
		5725.0	-55.38	2.00	-53.38	Average	27.0	Pass
		5720.0	-55.90	2.00	-53.90	Average	15.6	Pass
		5700.0	-57.85	2.00	-55.85	Average	10	Pass
		5650.0	-59.36	2.00	-57.36	Average	-27.0	Pass
		5850.0	-41.23	2.00	-39.23	Peak	27.0	Pass
		5855.0	-42.76	2.00	-40.76	Peak	15.6	Pass
		5875.0	-45.80	2.00	-43.80	Peak	10	Pass
		5925.0	-48.70	2.00	-46.70	Peak	-27.0	Pass
		5850.0	-55.38	2.00	-53.38	Average	27.0	Pass
		5855.0	-55.90	2.00	-53.90	Average	15.6	Pass
5875.0	-57.85	2.00	-55.85	Average	10	Pass		
5925.0	-59.36	2.00	-57.36	Average	-27.0	Pass		

Undesirable Emissions Measurement

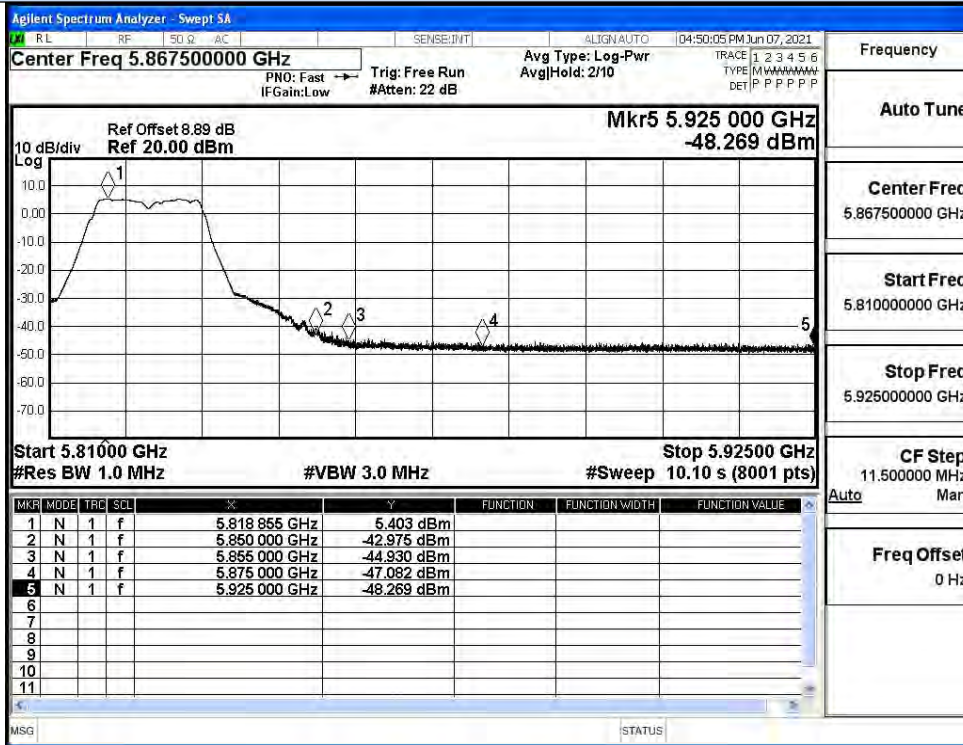


IEEE 802.11a / Channel 149 / 5745MHz / Peak

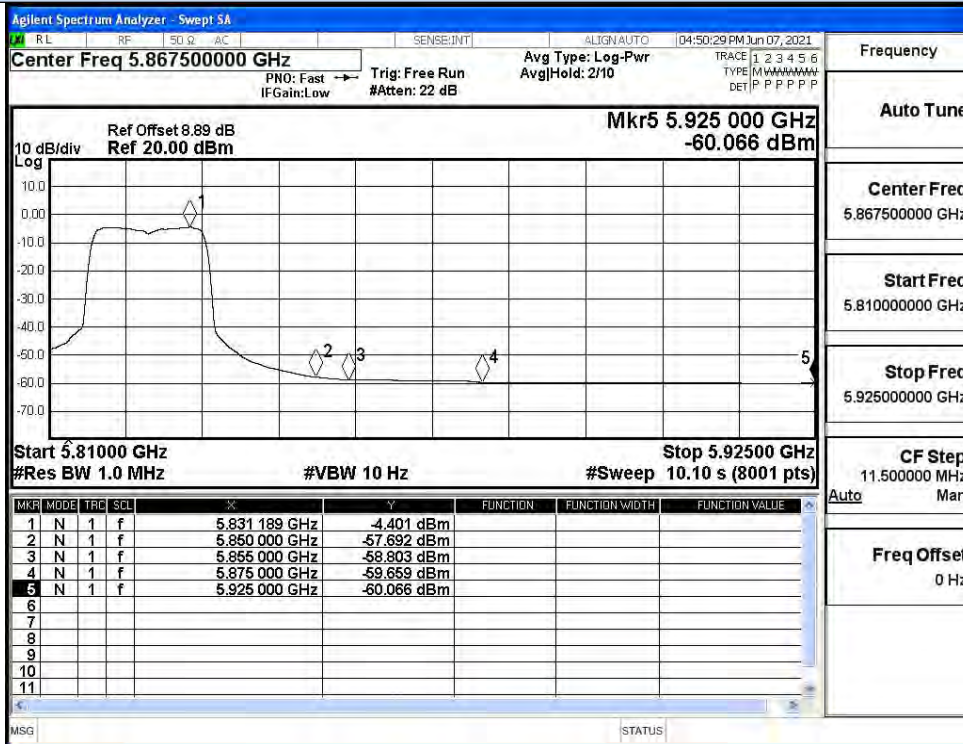


IEEE 802.11a / Channel 148 / 5745MHz / Average

Undesirable Emissions Measurement

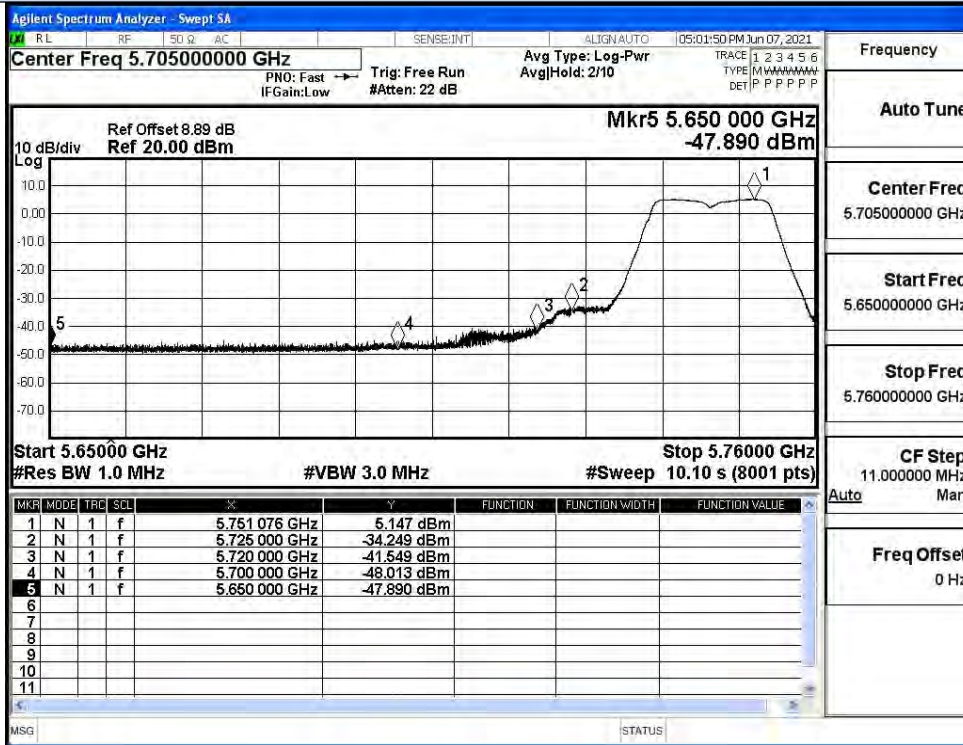


IEEE 802.11a / Channel 165 / 5825MHz / Peak

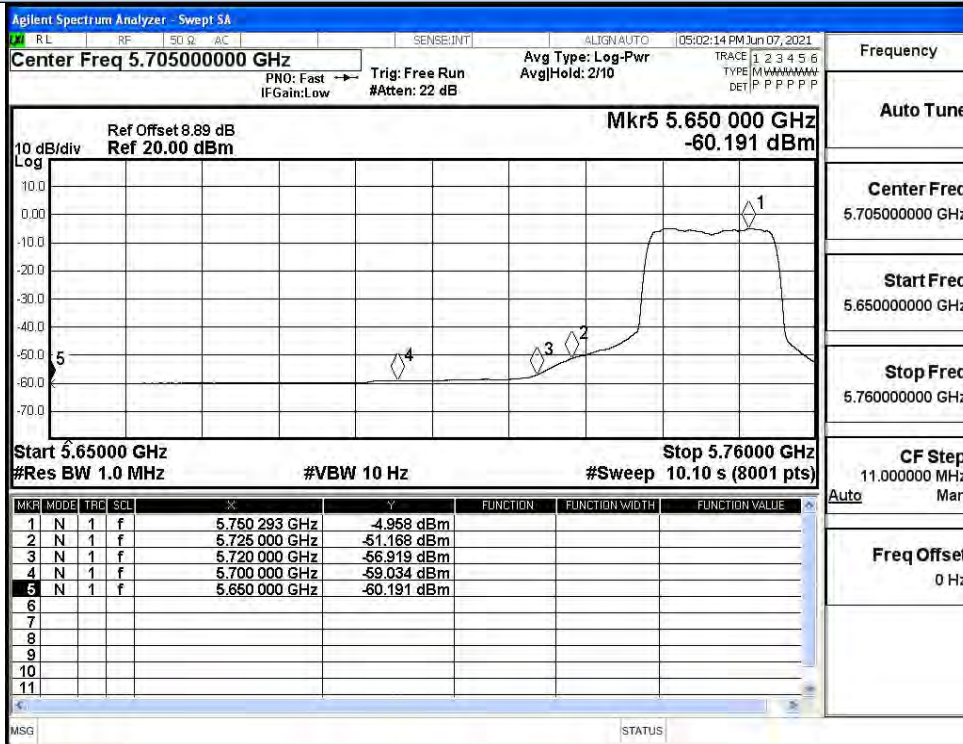


IEEE 802.11a / Channel 165 / 5825MHz / Average

Undesirable Emissions Measurement

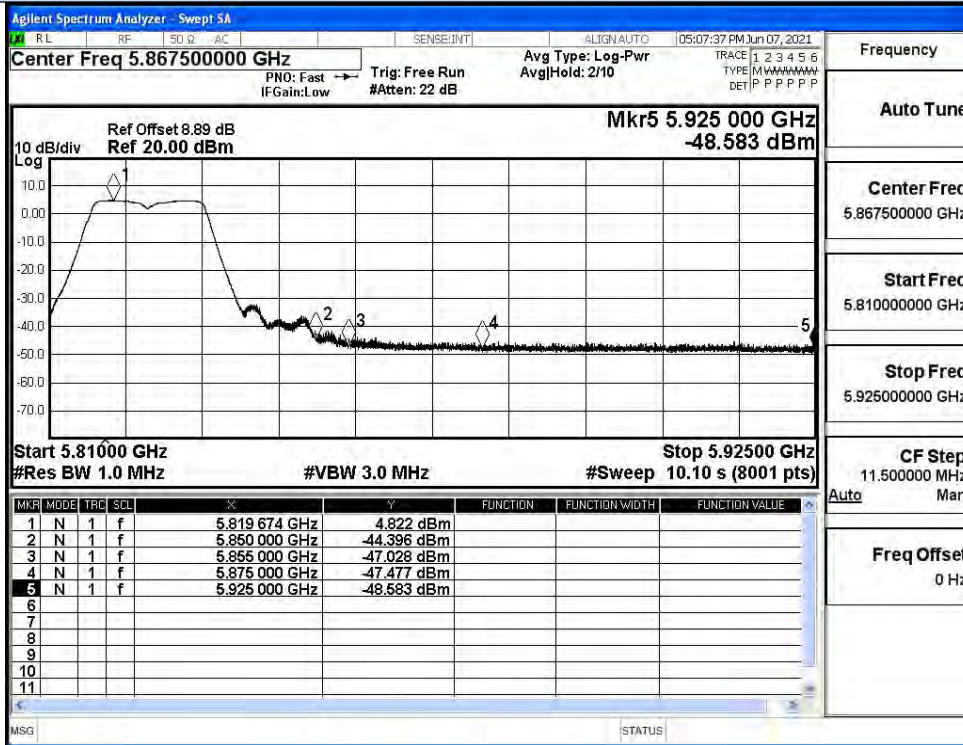


IEEE 802.11n20 / Channel 149 / 5745MHz / Peak

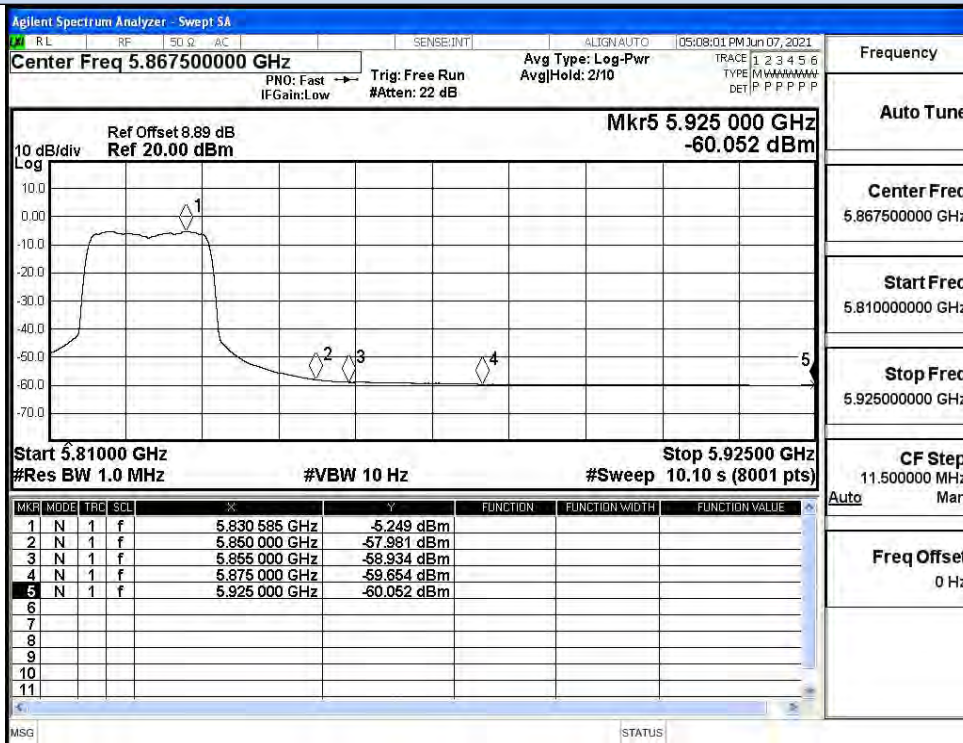


IEEE 802.11n20 / Channel 149 / 5745MHz / Average

Undesirable Emissions Measurement

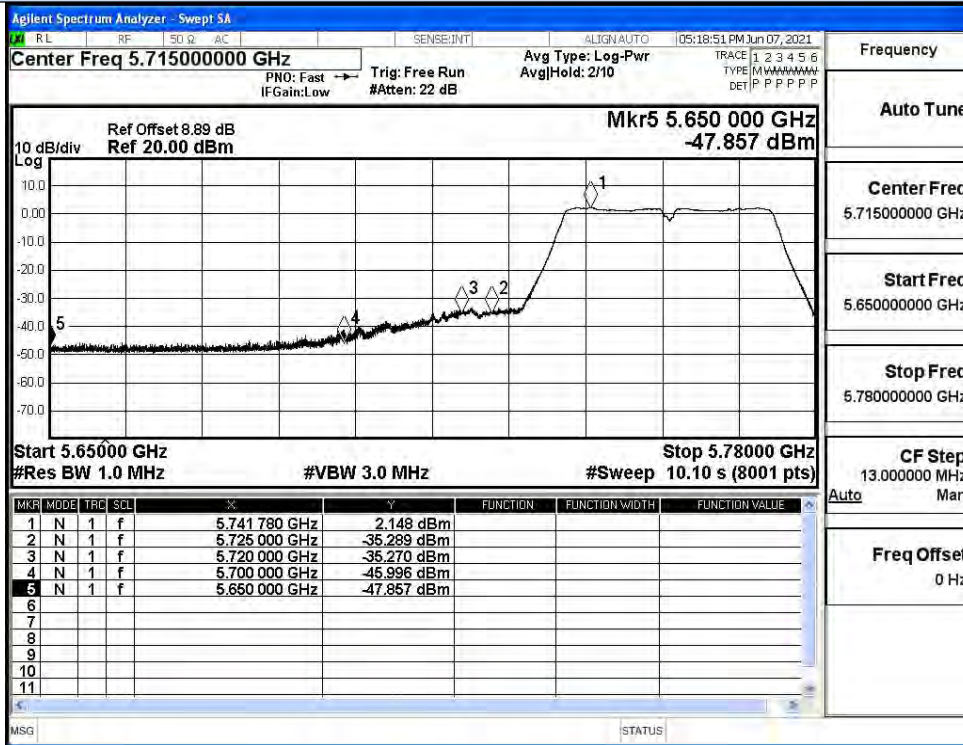


IEEE 802.11n20 / Channel 165 / 5825MHz / Peak

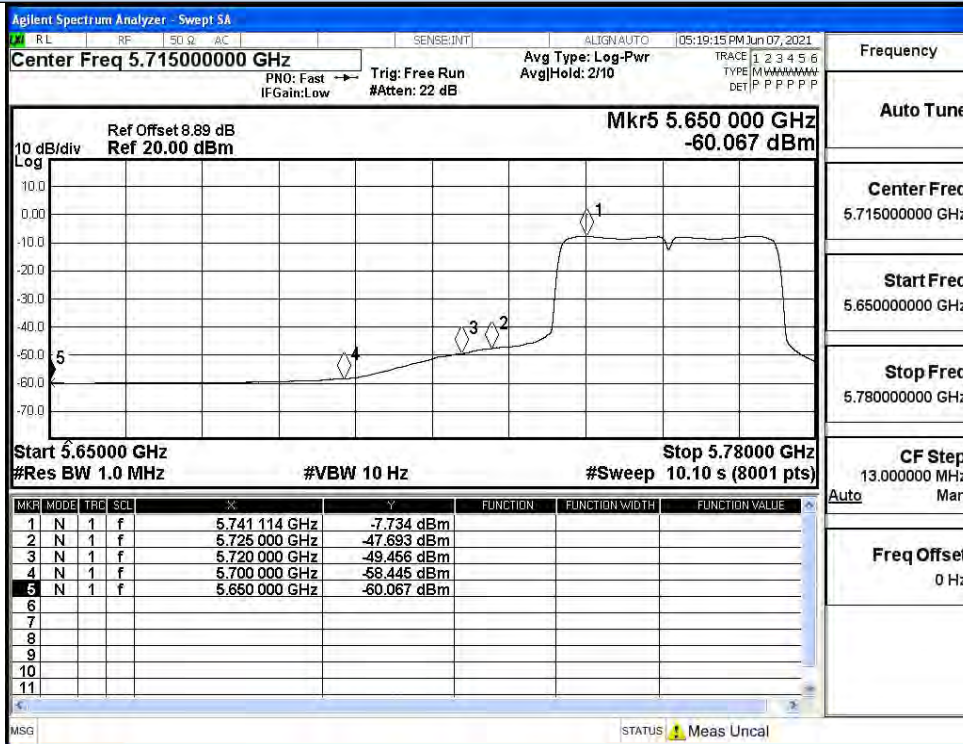


IEEE 802.11n20 / Channel 165 / 5825MHz / Average

Undesirable Emissions Measurement

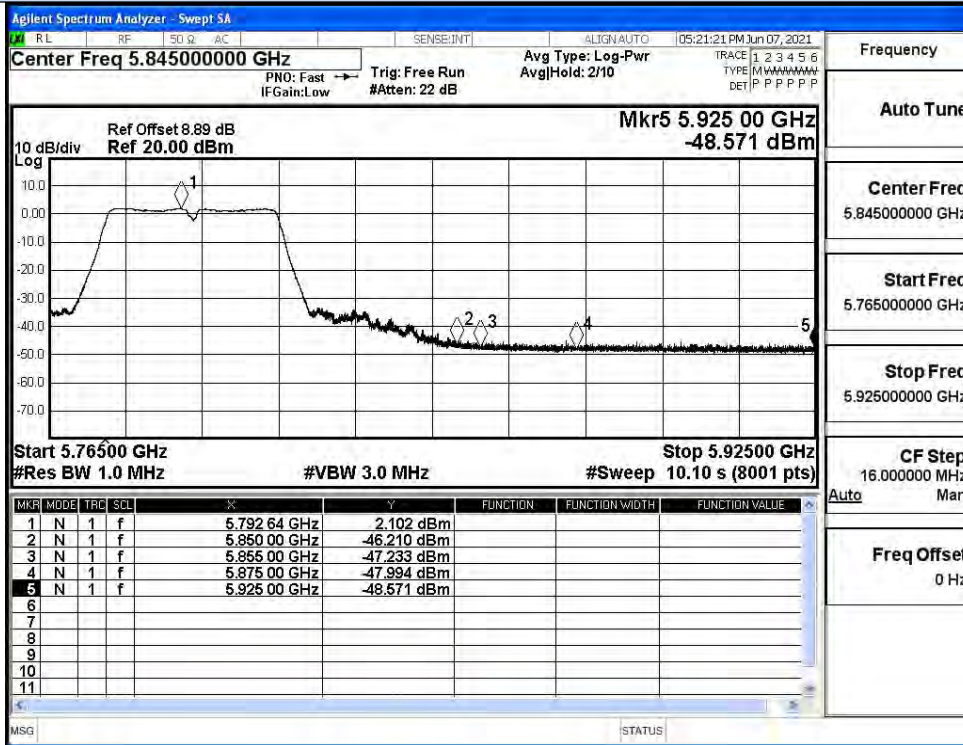


IEEE 802.11n40 / Channel 151 / 5755MHz / Peak

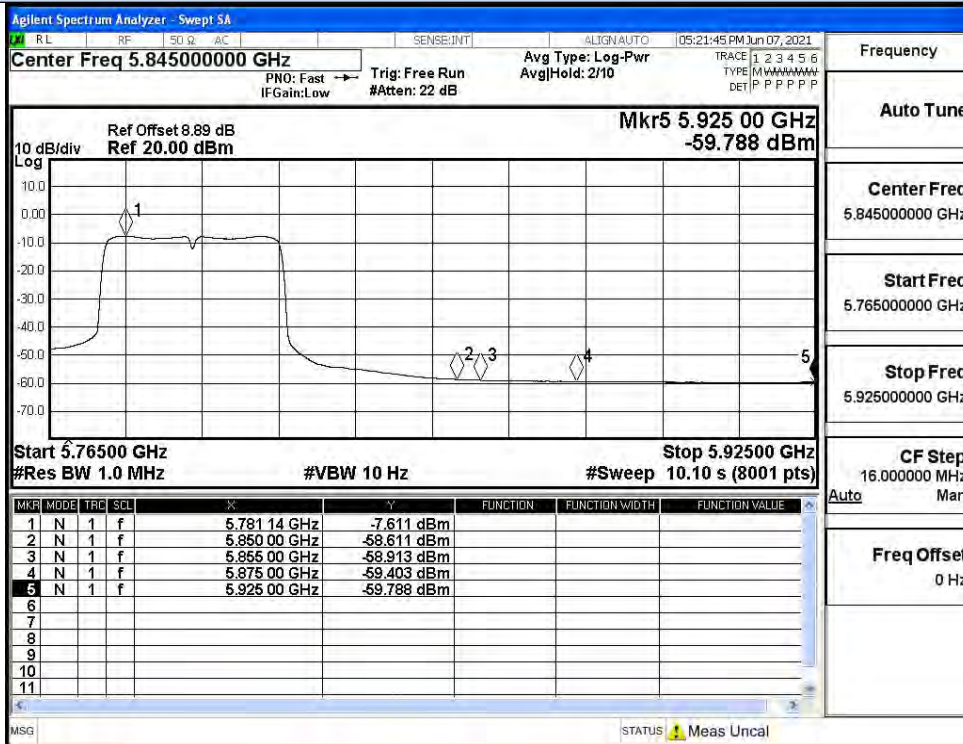


IEEE 802.11n40 / Channel 151 / 5755MHz / Average

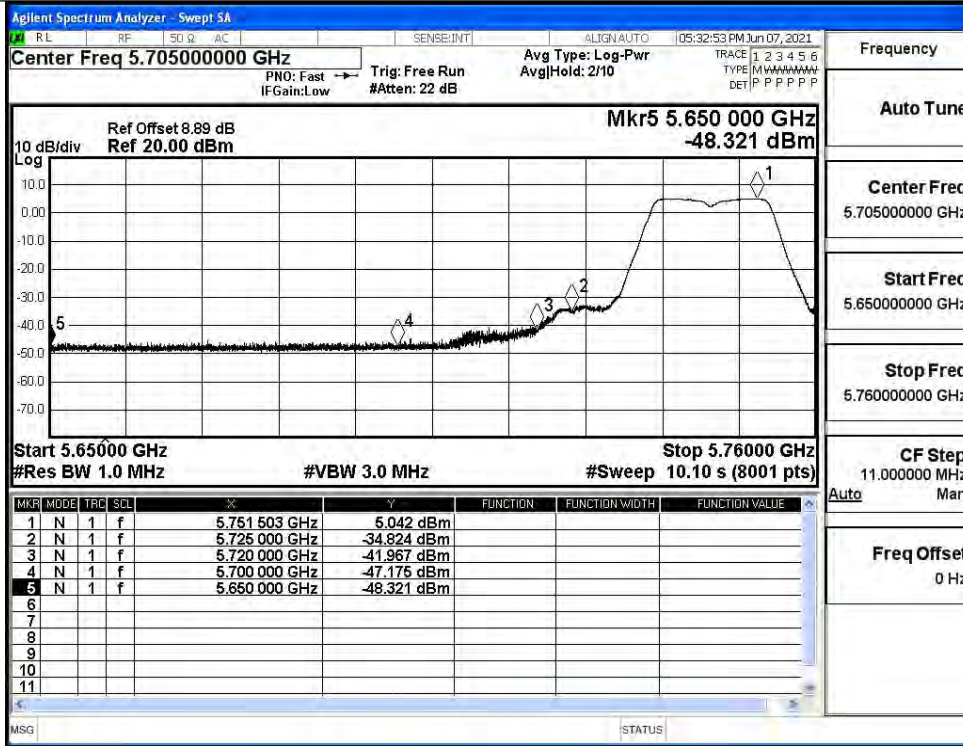
Undesirable Emissions Measurement



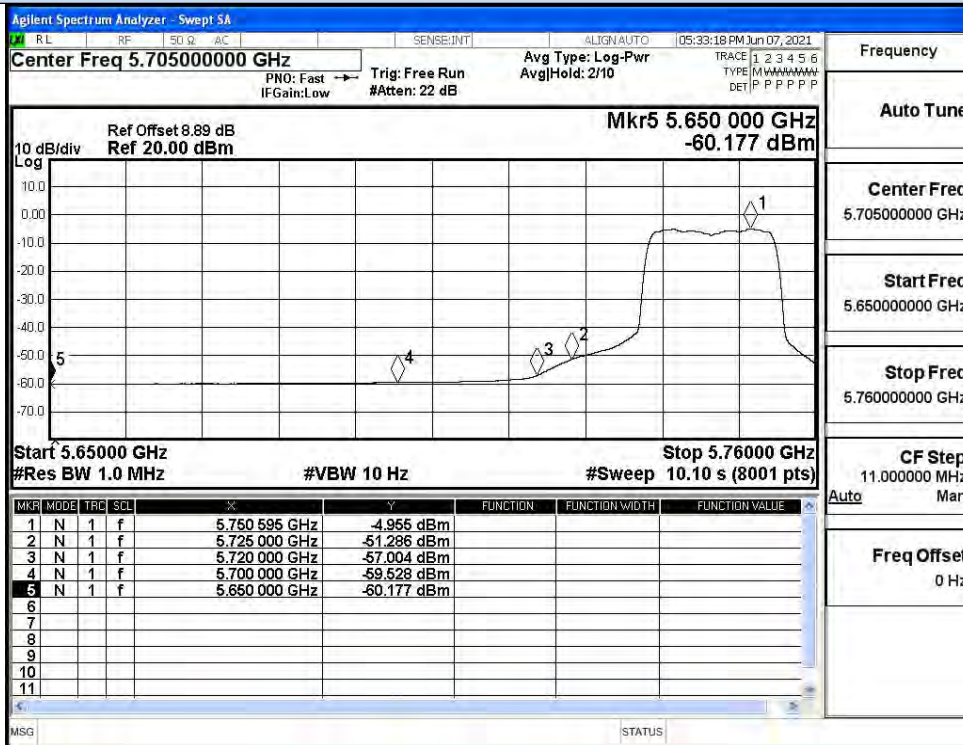
IEEE 802.11n40 / Channel 159 / 5795MHz / Peak



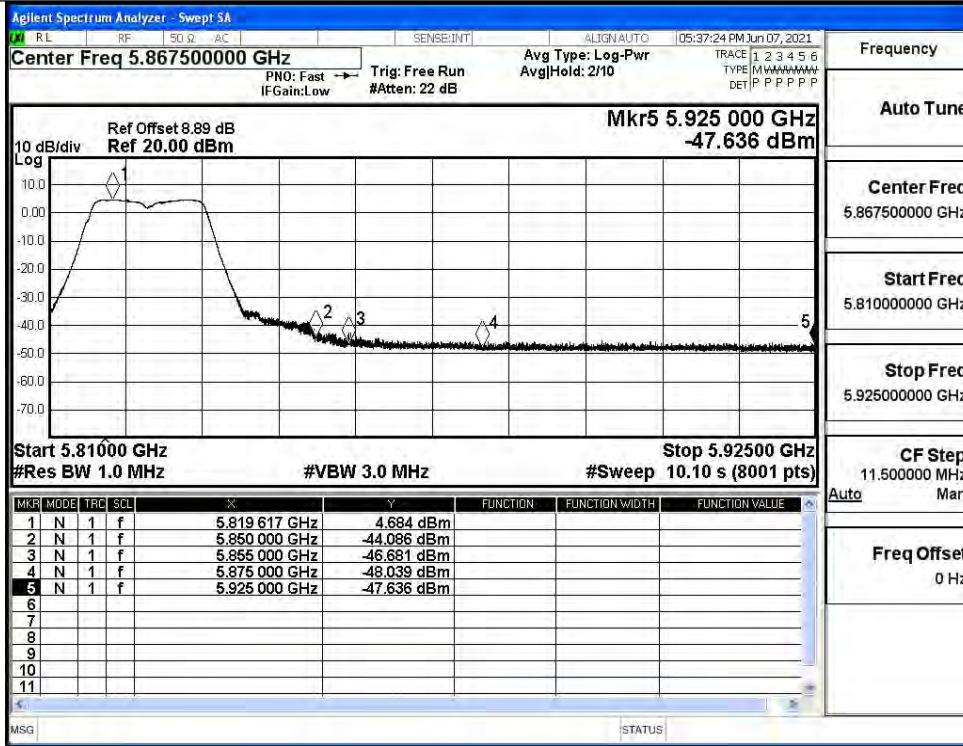
IEEE 802.11n40 / Channel 159 / 5795MHz / Average



IEEE 802.11ac20 / Channel 149 / 5745MHz / Peak

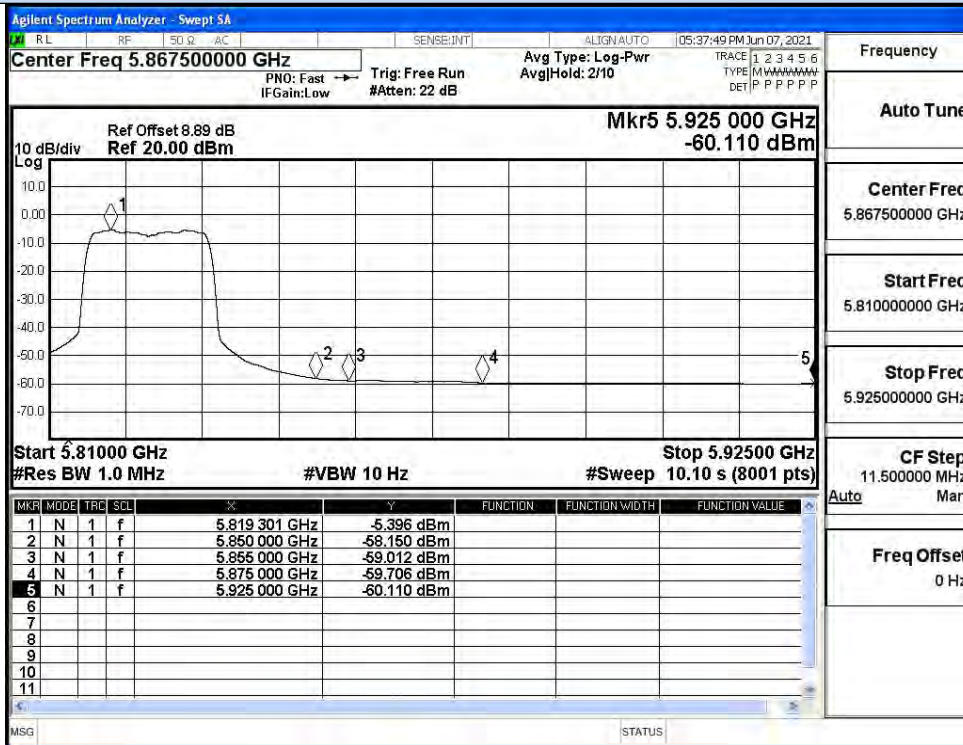


IEEE 802.11ac20 / Channel 149 / 5745MHz / Average



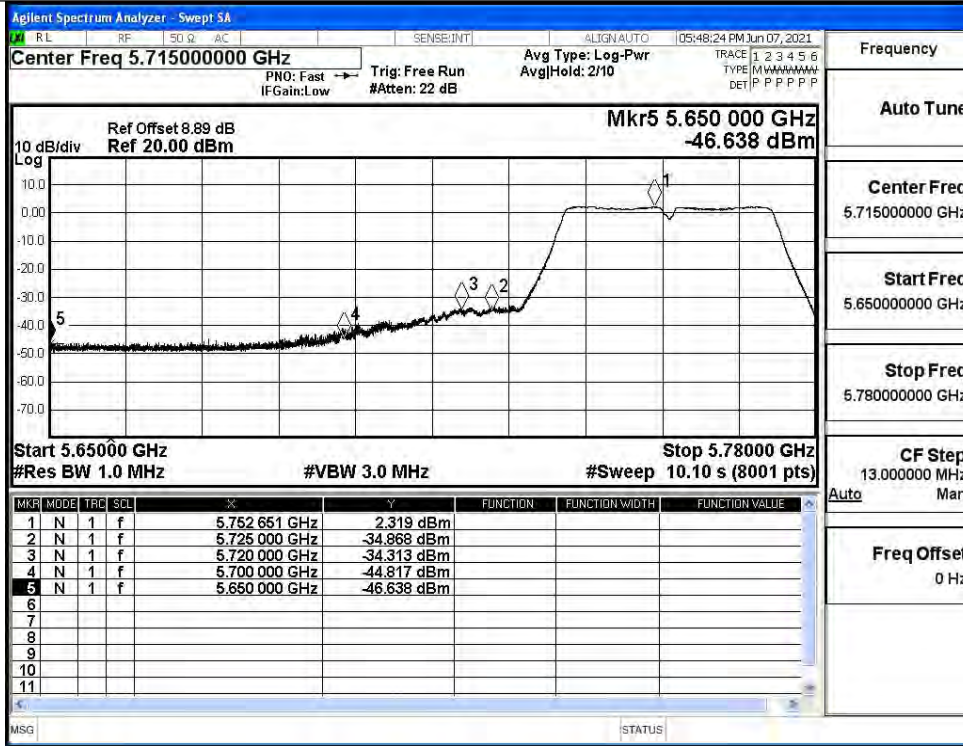
Frequency	
Auto Tune	
Center Freq	5.867500000 GHz
Start Freq	5.810000000 GHz
Stop Freq	5.925000000 GHz
CF Step	11.500000 MHz
Auto	Man
Freq Offset	0 Hz

IEEE 802.11ac20 / Channel 165 / 5825MHz / Peak

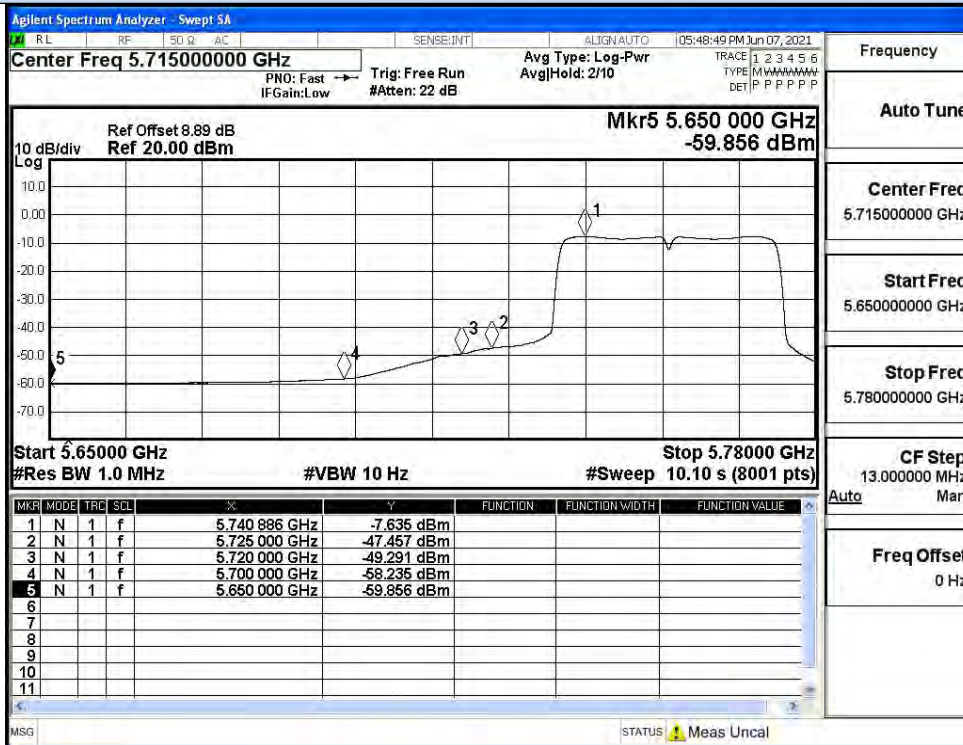


Frequency	
Auto Tune	
Center Freq	5.867500000 GHz
Start Freq	5.810000000 GHz
Stop Freq	5.925000000 GHz
CF Step	11.500000 MHz
Auto	Man
Freq Offset	0 Hz

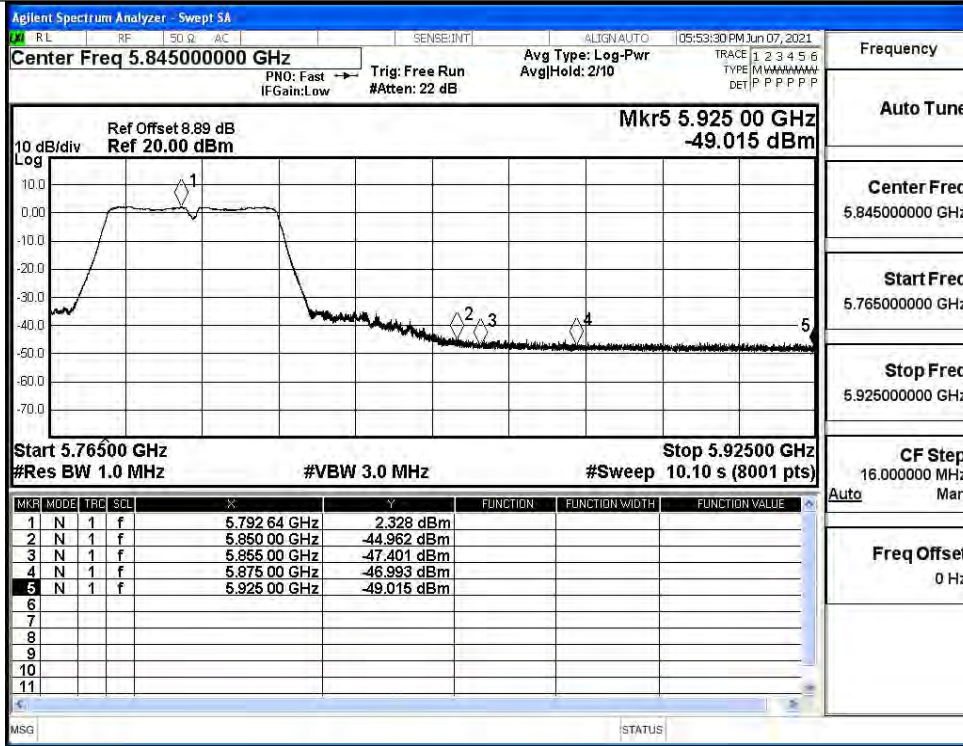
IEEE 802.11ac20 / Channel 165 / 5825MHz / Average



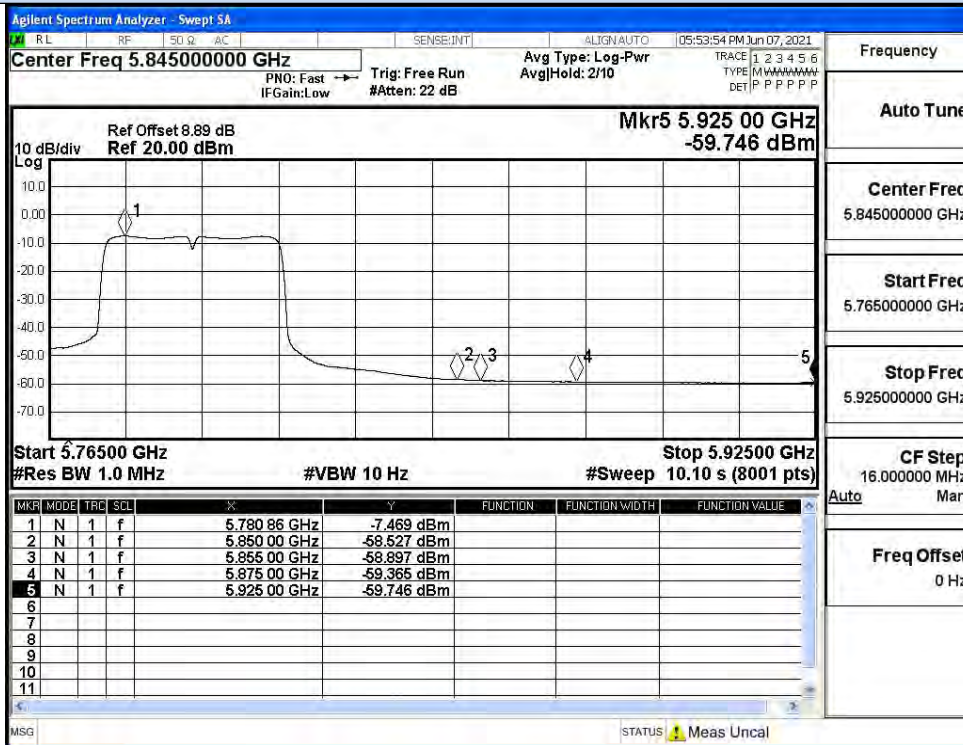
IEEE 802.11ac40 / Channel 151 / 5755MHz / Peak



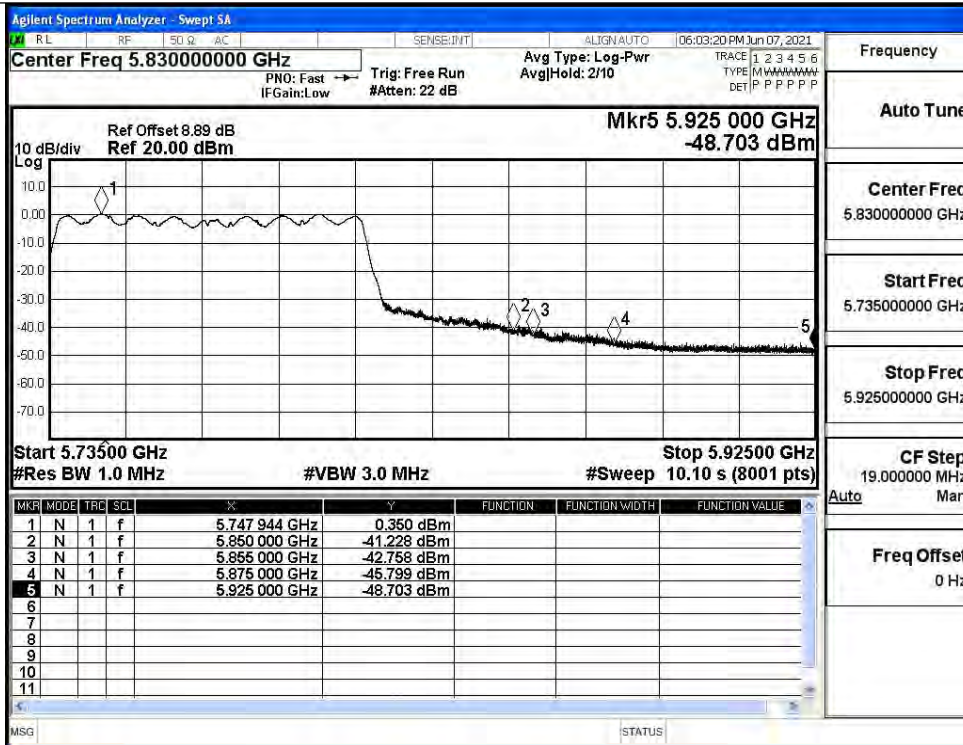
IEEE 802.11ac40 / Channel 151 / 5755MHz / Average



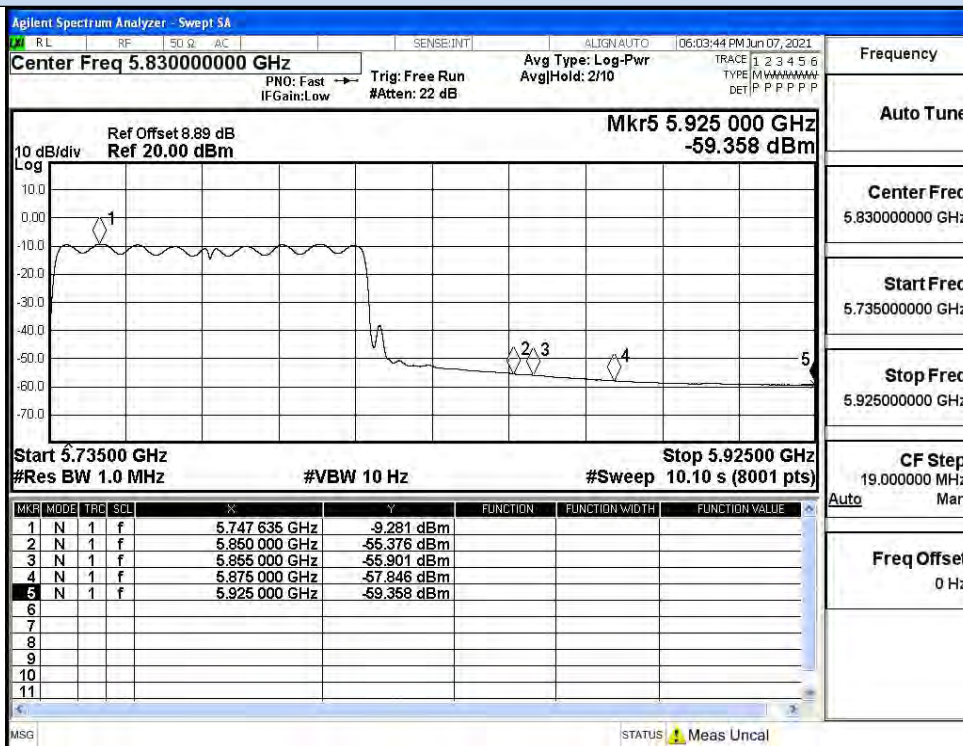
IEEE 802.11ac40 / Channel 159 / 5795MHz / Peak



IEEE 802.11ac40 / Channel 159 / 5795MHz / Average



IEEE 802.11ac80 / Channel 155 / 5775MHz / Peak



IEEE 802.11ac80 / Channel 155 / 5775MHz / Average