Appendix A

RF Test Data for 5.2G WLAN (Conducted Measurement)

Product Name: Wireless Module for Portable Scanner
Trade Mark: N/A
Test Model: ZGFreeBox-T

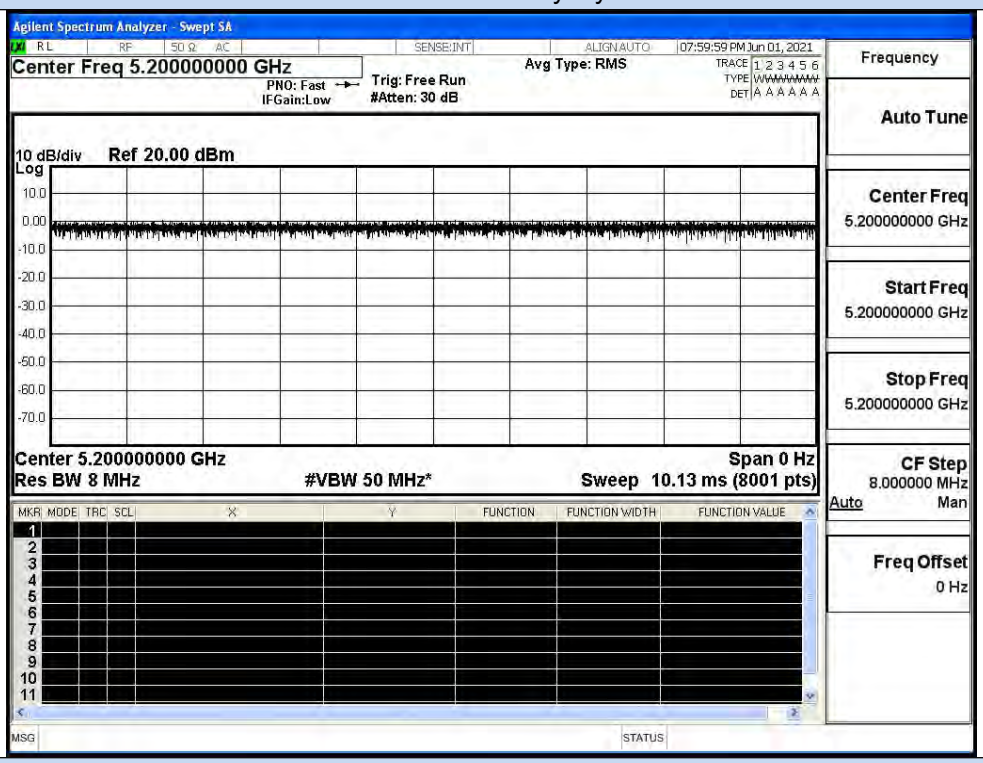
Environmental Conditions

Temperature:	21.5° C
Relative Humidity:	51.3%
ATM Pressure:	100.0 kPa
Test Engineer:	Carl Fu
Supervised by:	Li Huan

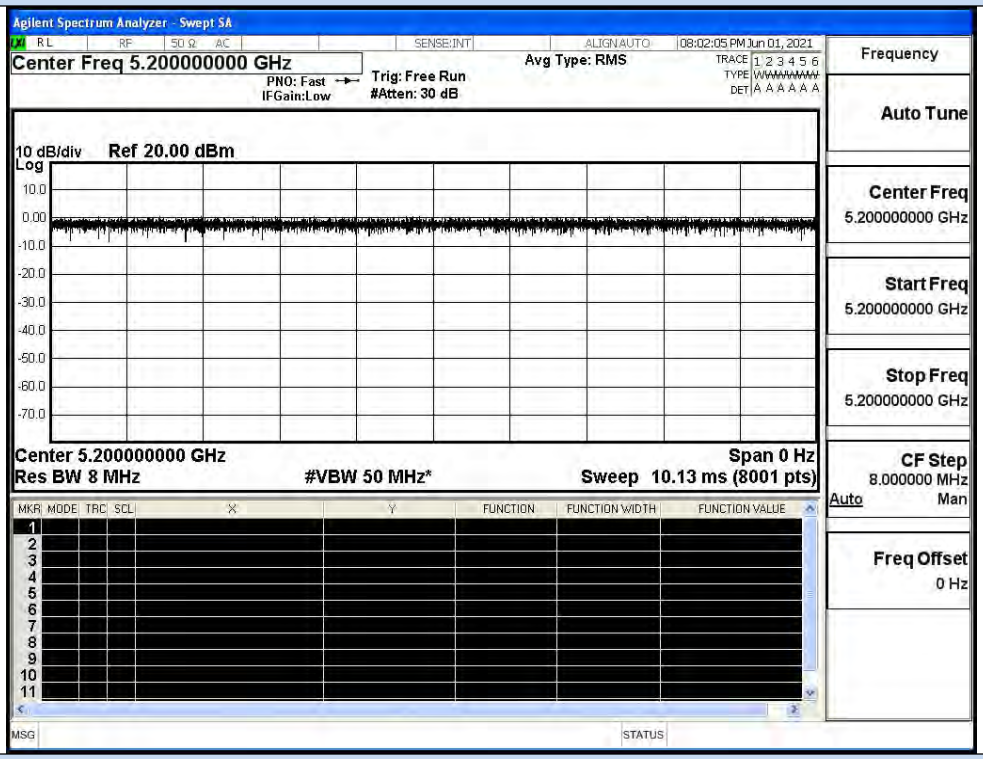
A.1 Duty Cycle

Test Mode	Test Frequency (MHz)	Duty Cycle (%)	10log(1/x) Factor (dB)	1/B Minimum VBW(KHz)
11A	5200	100	0.00	0.01
11N20 SISO	5200	100	0.00	0.01
11N40 SISO	5190	100	0.00	0.01
11AC20 SISO	5200	100	0.00	0.01
11AC40 SISO	5190	100	0.00	0.01
11AC80 SISO	5210	100	0.00	0.01

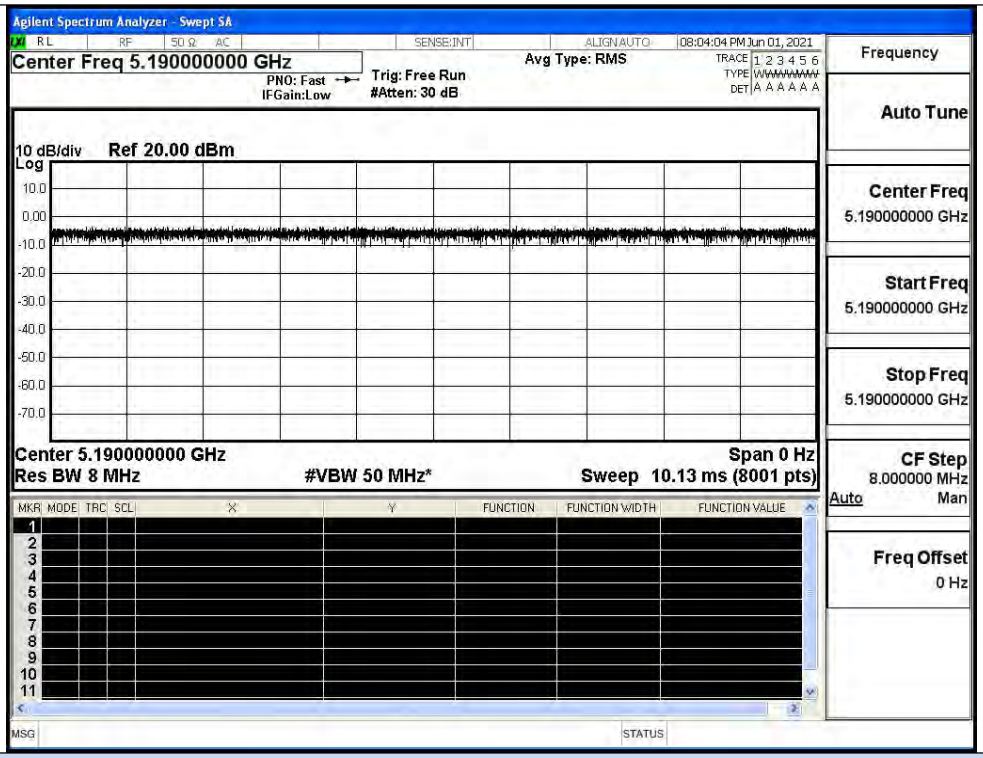
On Time and Duty Cycle



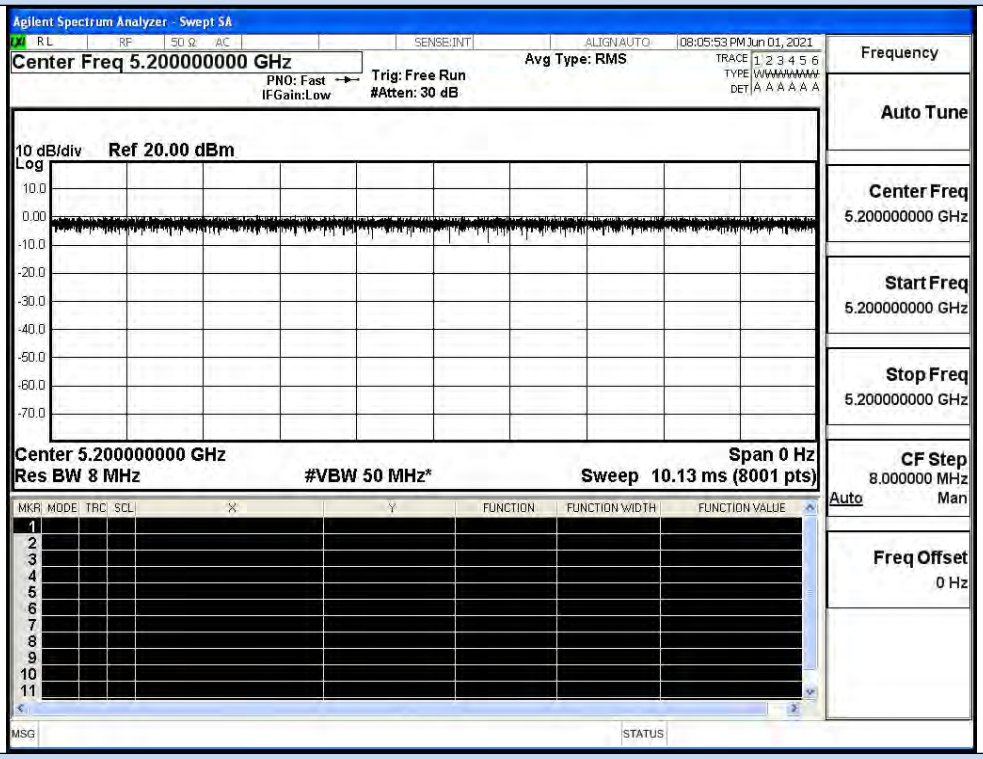
IEEE 802.11a



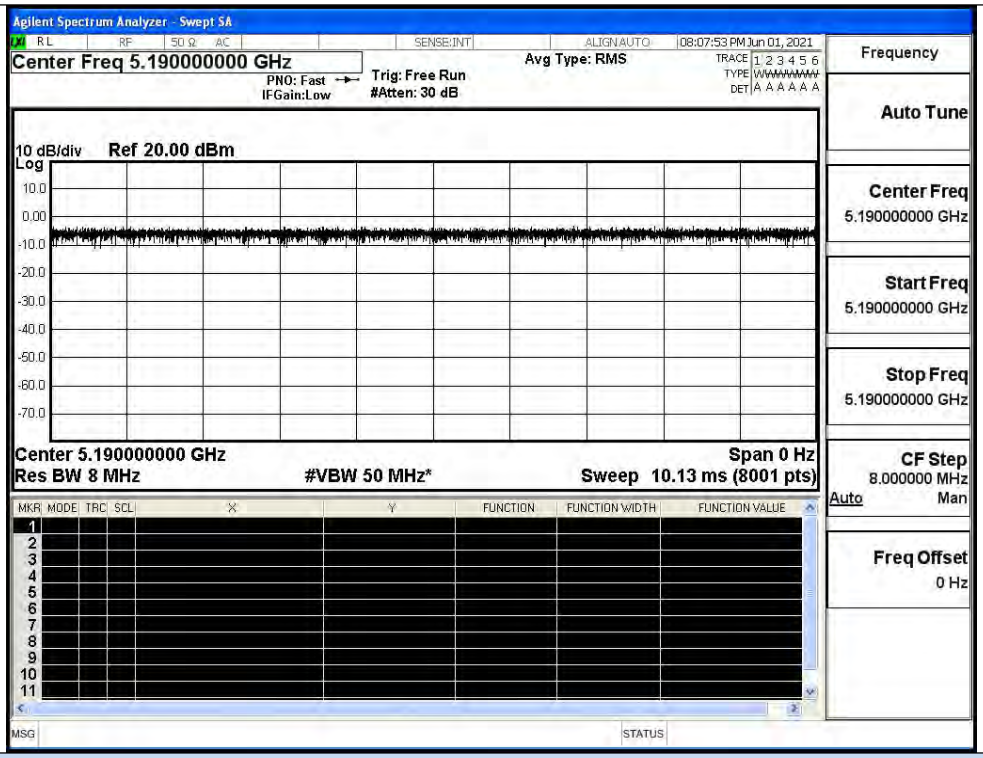
IEEE 802.11n HT20



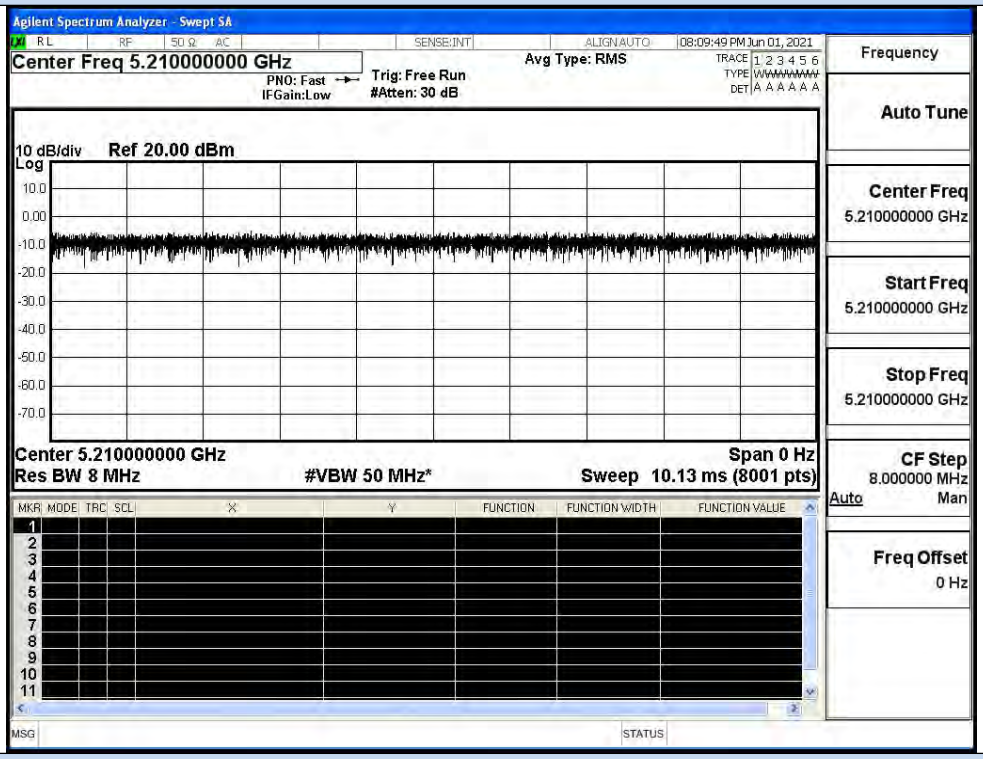
IEEE 802.11n HT40



IEEE 802.11AC20



IEEE 802.11 AC40



IEEE 802.11AC80

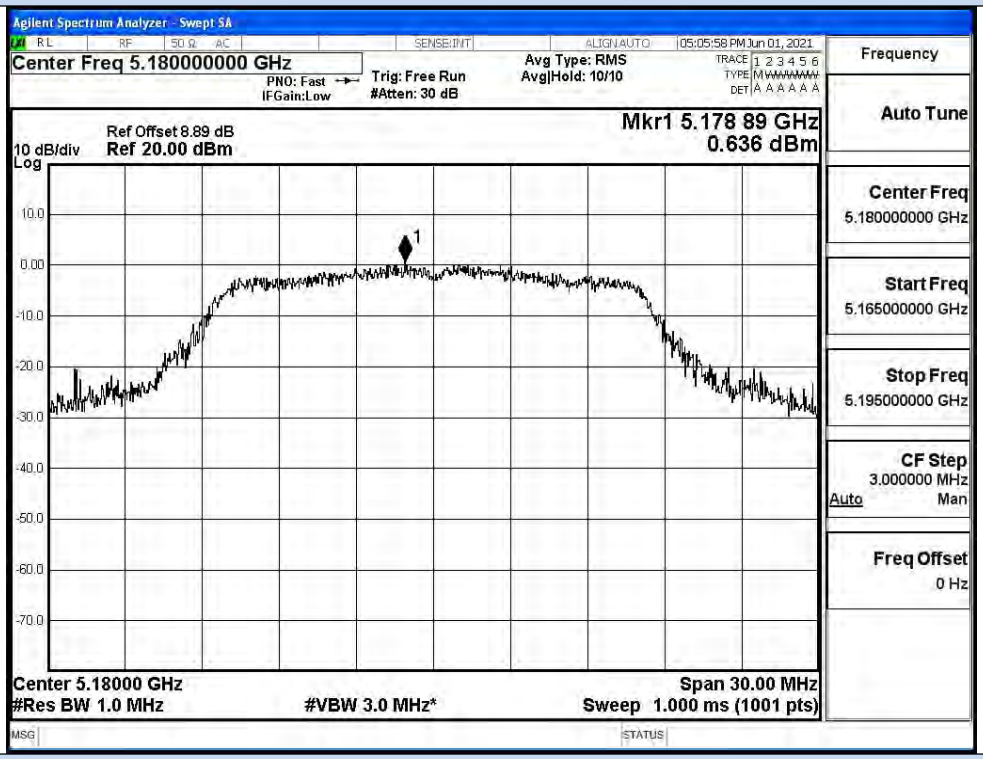
A.2 Maximum Conduct Output Power

Test Mode	Channel	Frequency (MHz)	AVG Conducted Power (dBm)	Duty Cycle Factor(dB)	Report Conducted Power(dBm)	Limit (dBm)	Verdict
11A	36	5180	10.18	0	10.18	24	Pass
	40	5200	10.39	0	10.39		Pass
	48	5240	9.05	0	9.05		Pass
11N20 SISO	36	5180	10.25	0	10.25	24	Pass
	40	5200	10.54	0	10.54		Pass
	48	5240	9.5	0	9.5		Pass
11N40 SISO	38	5190	10.14	0	10.14	24	Pass
	46	5230	9.58	0	9.58		Pass
11AC20 SISO	36	5180	9.76	0	9.76	24	Pass
	40	5200	10.12	0	10.12		Pass
	48	5240	9.13	0	9.13		Pass
11AC40 SISO	38	5190	10.08	0	10.08	24	Pass
	46	5230	9.41	0	9.41		Pass
11AC80 SISO	42	5210	10.33	0	10.33	24	Pass

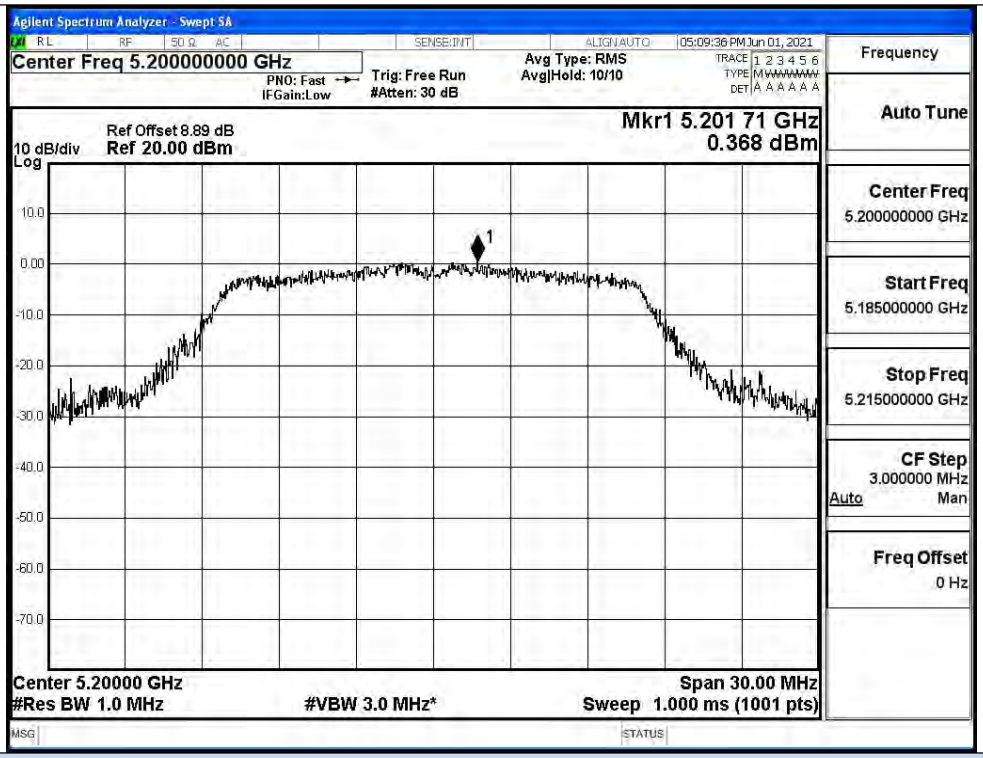
A.3 Power Spectral Density

Test Mode	Channel	Frequency (MHz)	Power Density (dBm/MHz)	Duty Cycle Factor(dB)	Report Power Density (dBm/MHz)	Limit (dBm/MHz)	Verdict
11A	36	5180	0.64	0	0.64	11	Pass
	40	5200	0.37	0	0.37		Pass
	48	5240	-0.37	0	-0.37		Pass
11N20 SISO	36	5180	0.00	0	0.00	11	Pass
	40	5200	0.79	0	0.79		Pass
	48	5240	-0.41	0	-0.41		Pass
11N40 SISO	38	5190	-3.16	0	-3.16	11	Pass
	46	5230	-3.59	0	-3.59		Pass
11AC20 SISO	36	5180	-0.61	0	-0.61	11	Pass
	40	5200	0.79	0	0.79		Pass
	48	5240	-1.19	0	-1.19		Pass
11AC40 SISO	38	5190	-2.79	0	-2.79	11	Pass
	46	5230	-3.05	0	-3.05		Pass
11AC80 SISO	42	5210	-6.02	0	-6.02	11	Pass

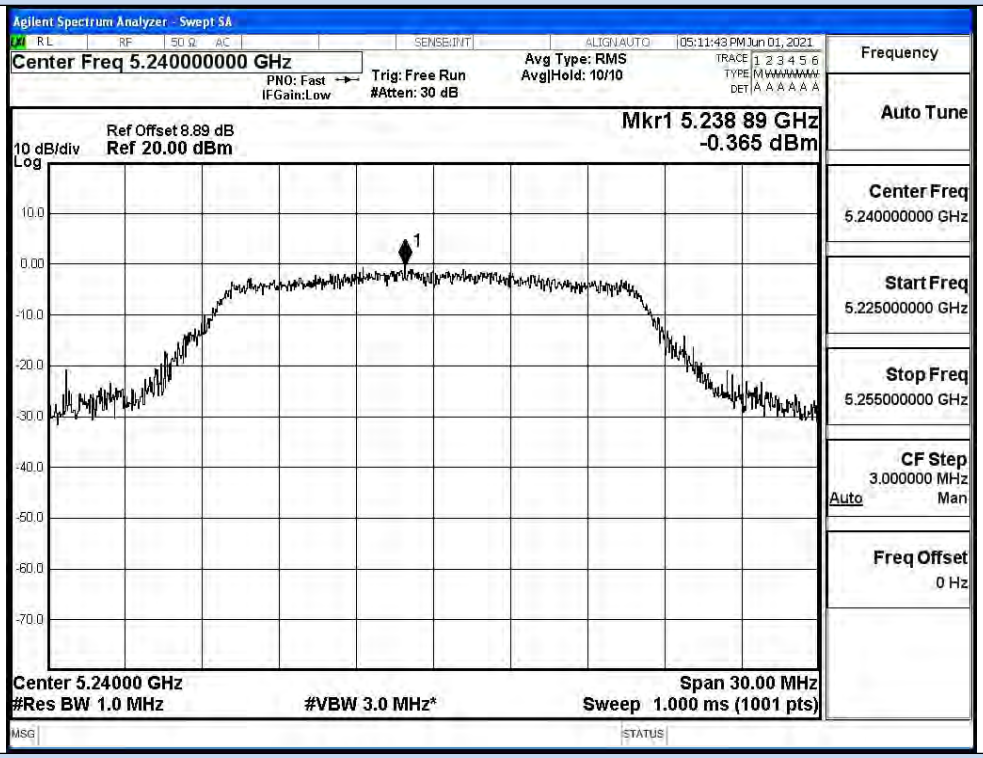
Power Spectral Density



IEEE 802.11a / Channel 36 / 5180MHz

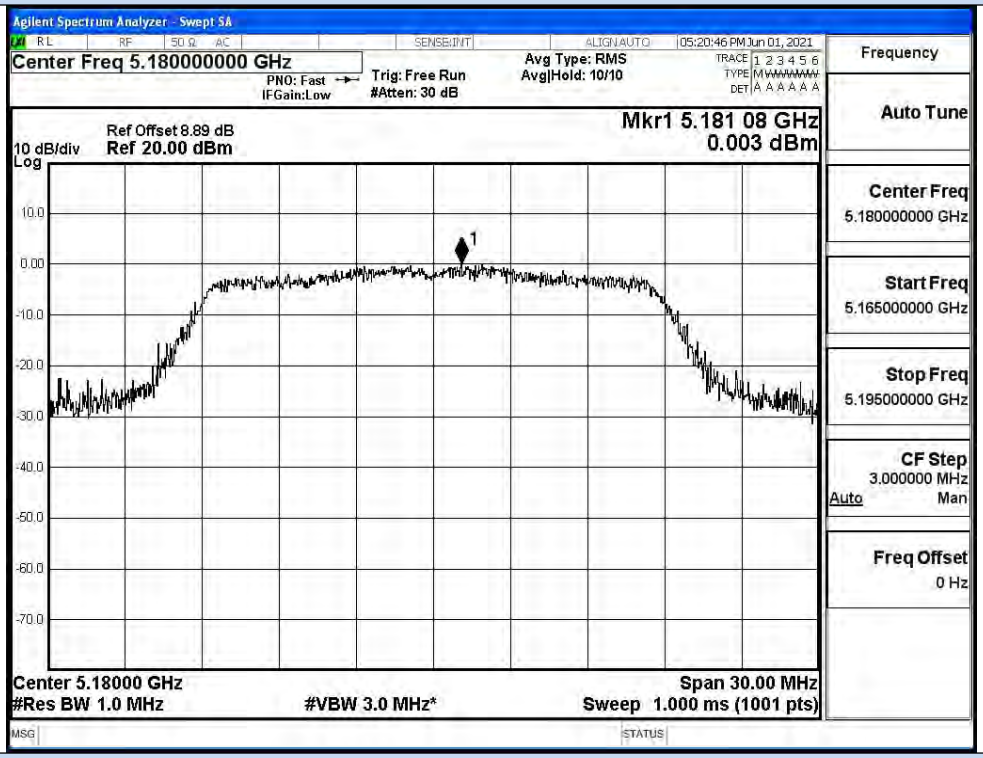


IEEE 802.11na / Channel 40 / 5200MHz

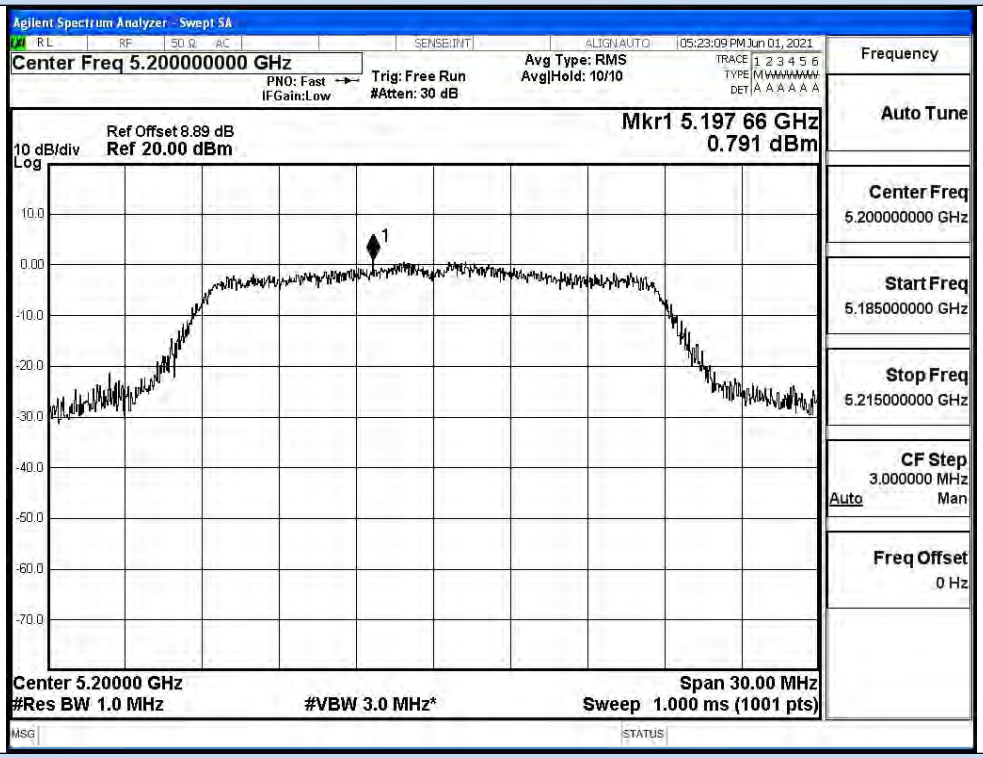


IEEE 802.11na / Channel 48 / 5240MHz

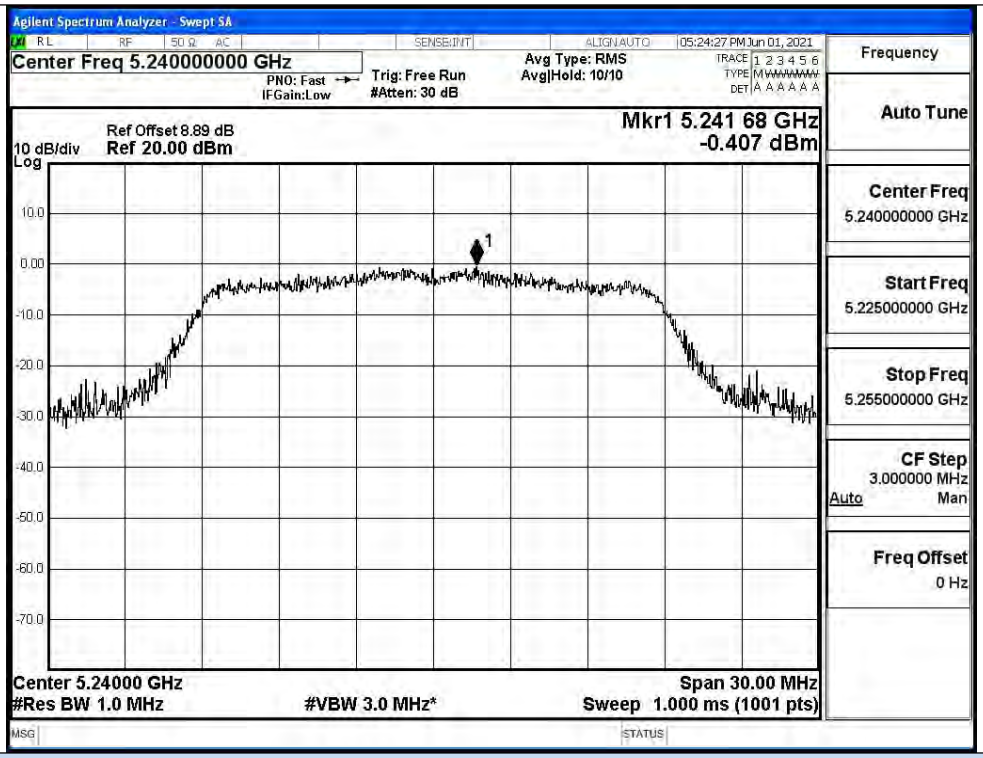
Power Spectral Density



IEEE 802.11n20 / Channel 36 / 5180MHz

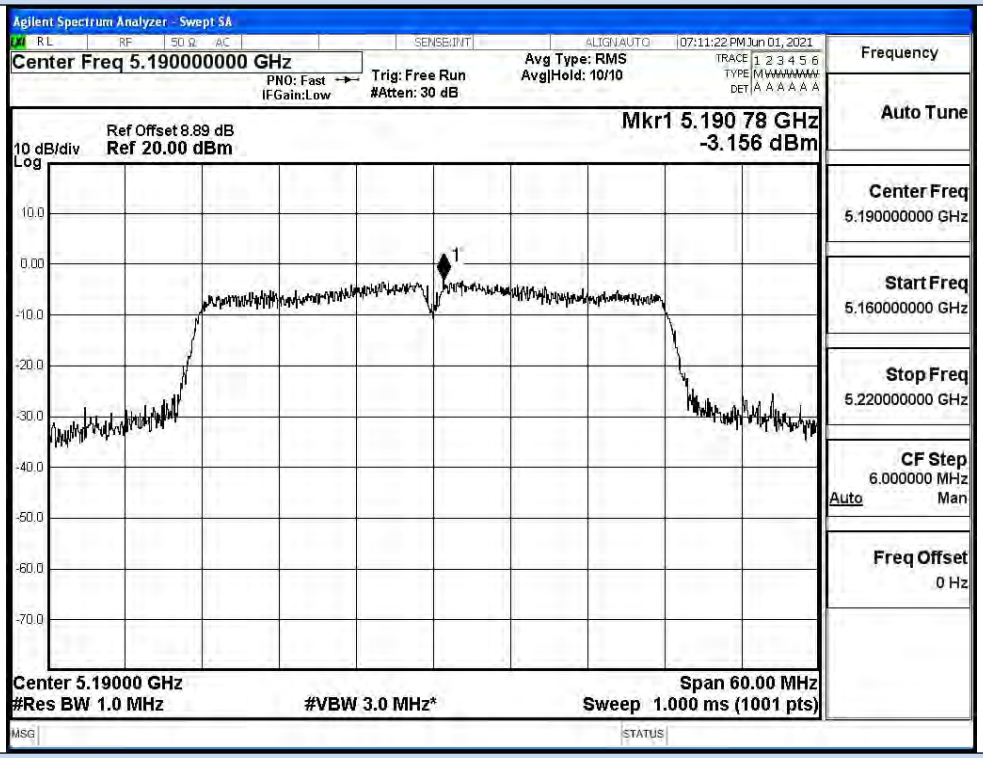


IEEE 802.11n20 / Channel 40 / 5200MHz

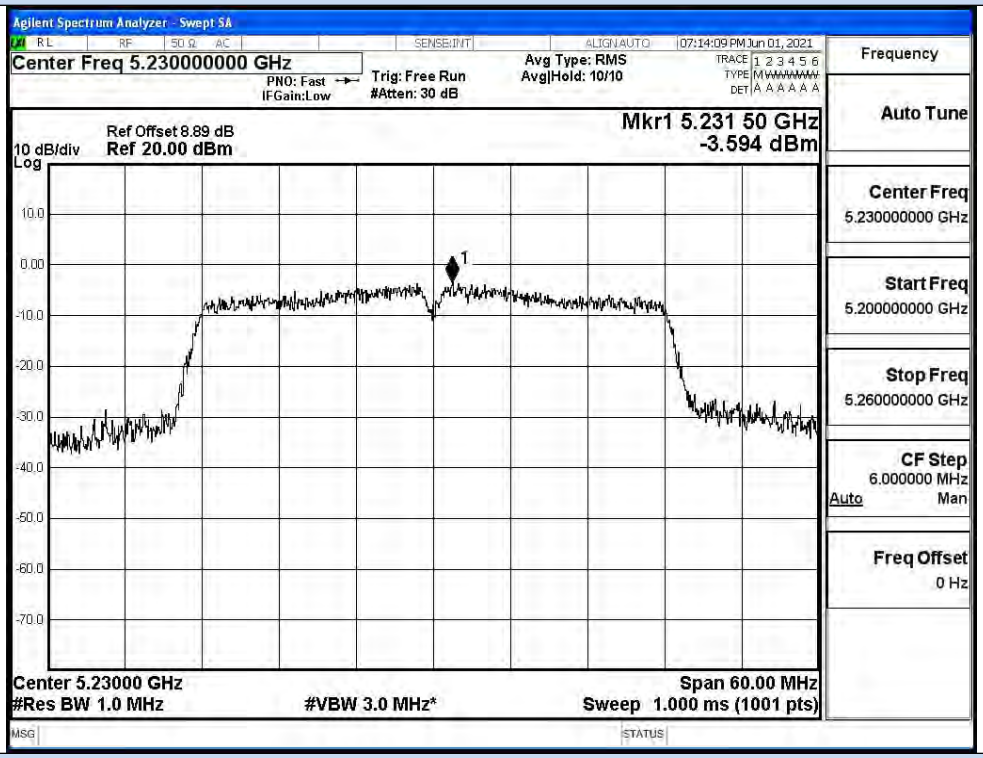


IEEE 802.11n20 / Channel 48 / 5240MHz

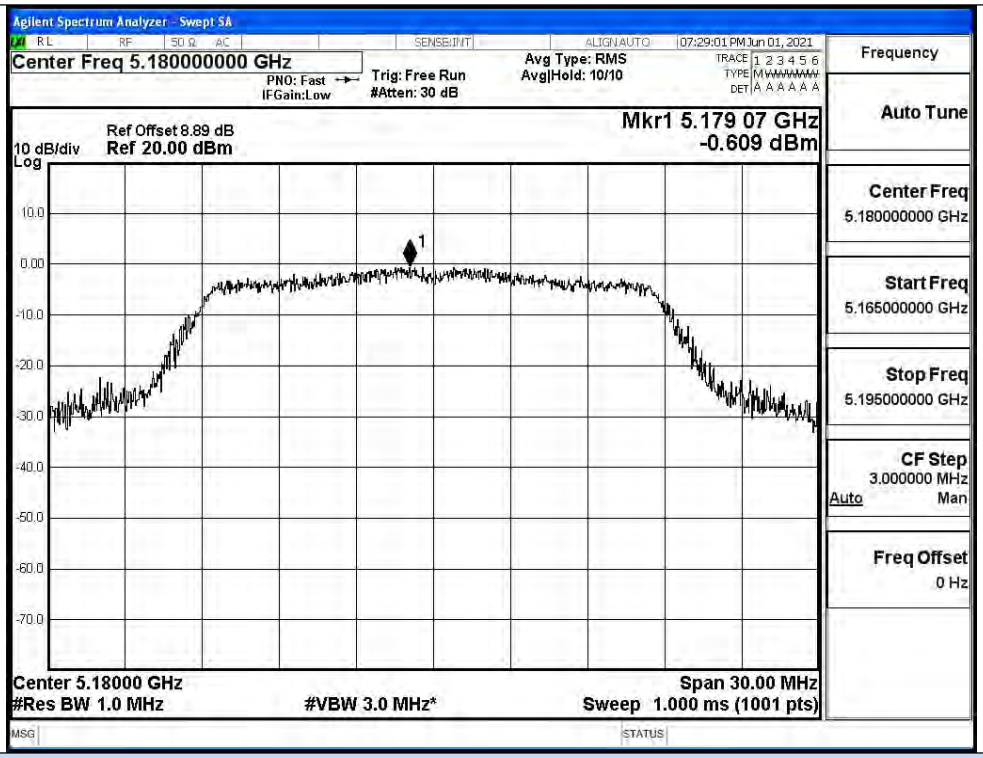
Power Spectral Density



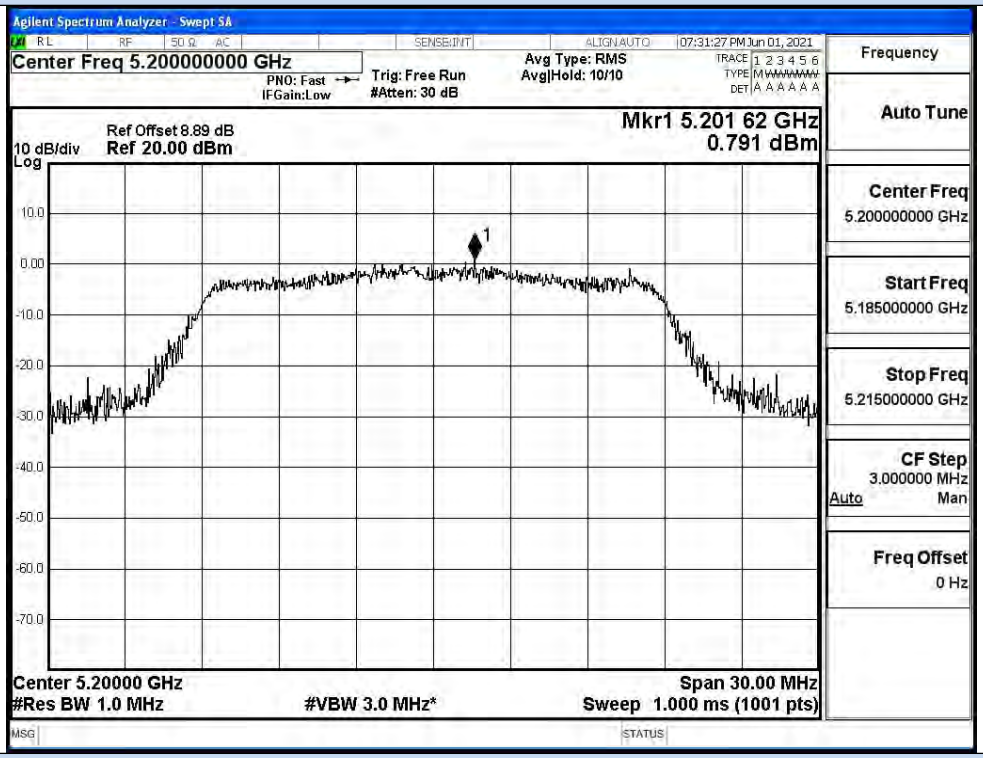
IEEE 802.11n40 / Channel 38 / 5190MHz



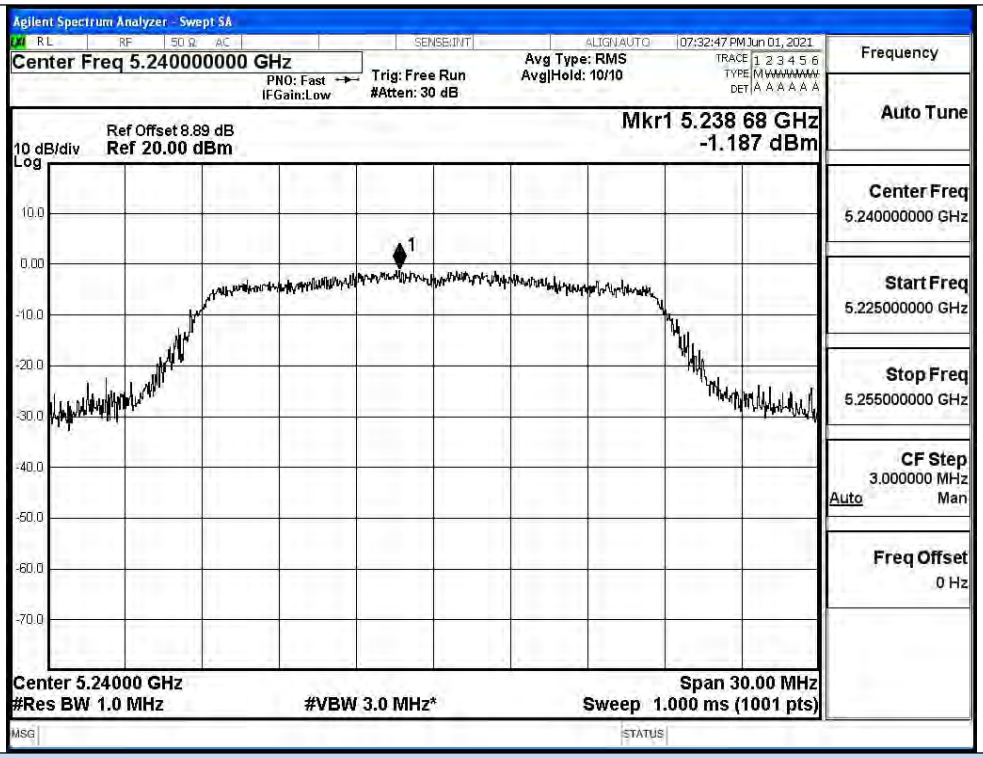
IEEE 802.11n40 / Channel 46 / 5230MHz



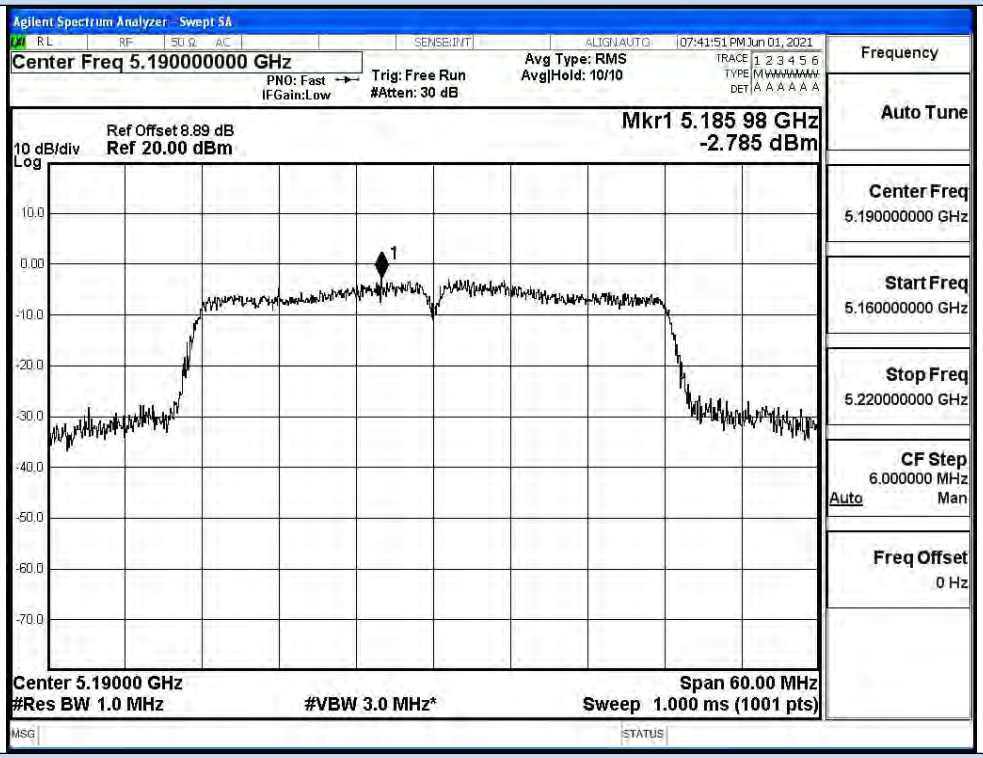
IEEE 802.11ac20 / Channel 36 / 5180MHz



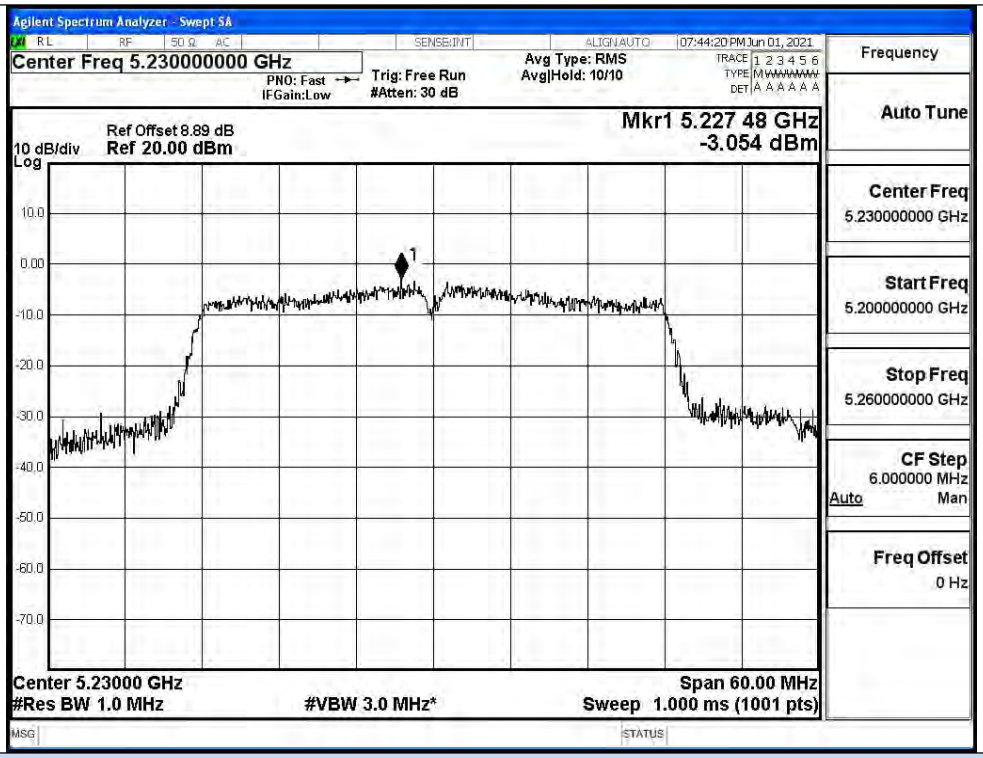
IEEE 802.11ac20 / Channel 40 / 5200MHz



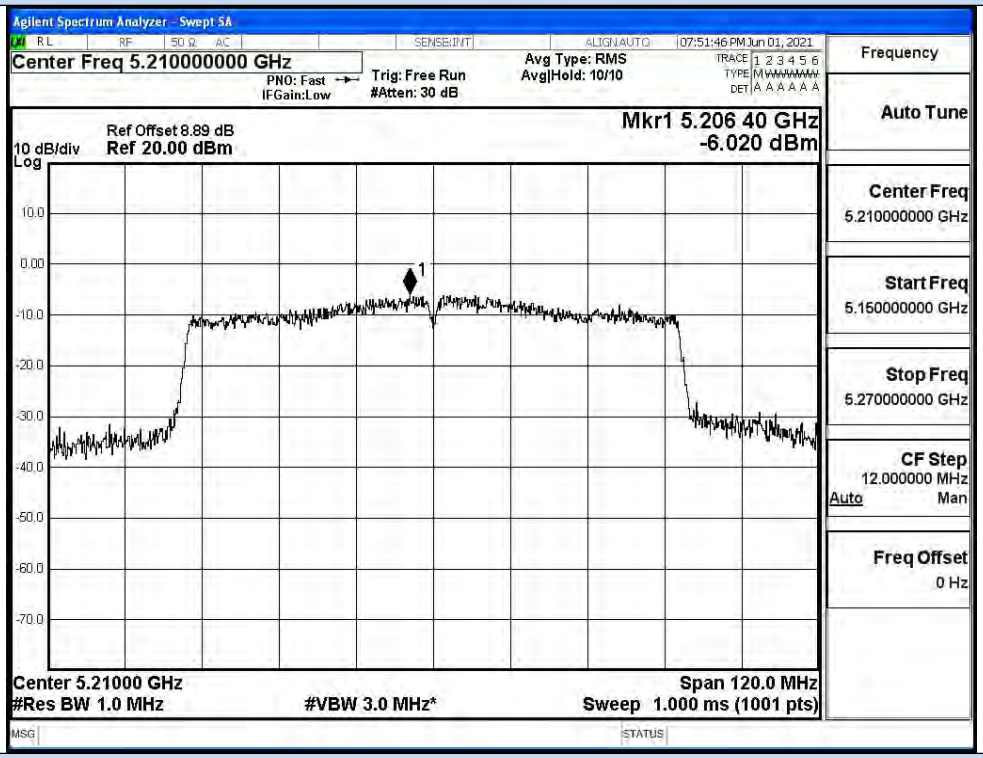
IEEE 802.11ac20 / Channel 48 / 5240MHz



IEEE 802.11ac40 / Channel 38 / 5190MHz



IEEE 802.11ac40 / Channel 46 / 5230MHz

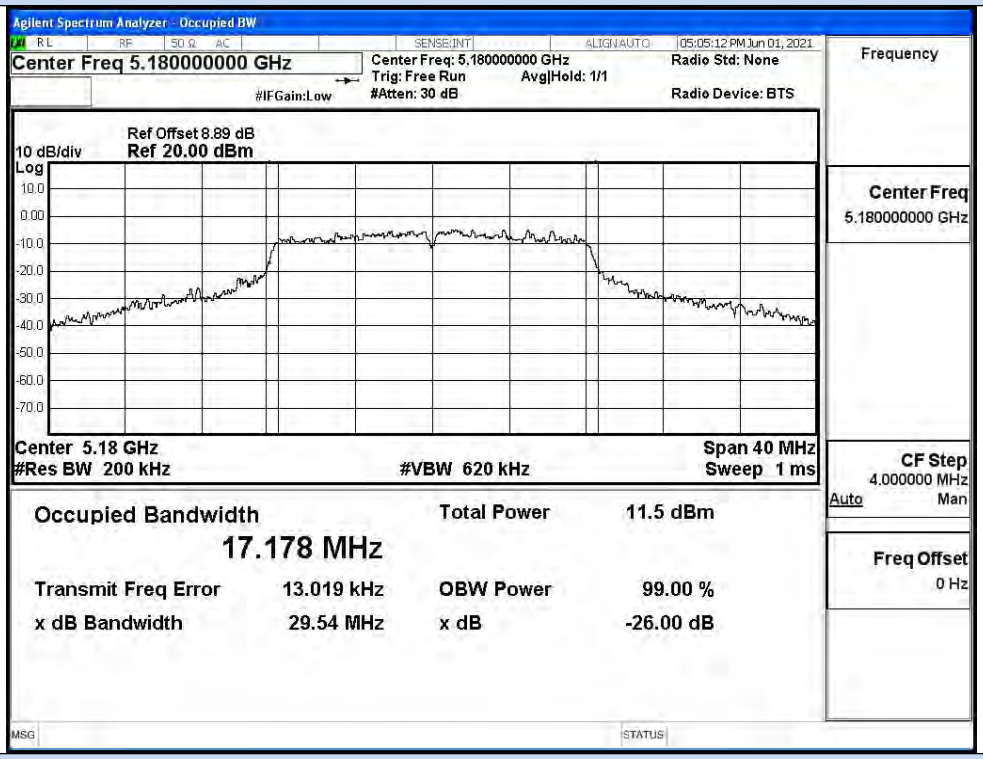


IEEE 802.11ac80 / Channel 42 / 5210MHz

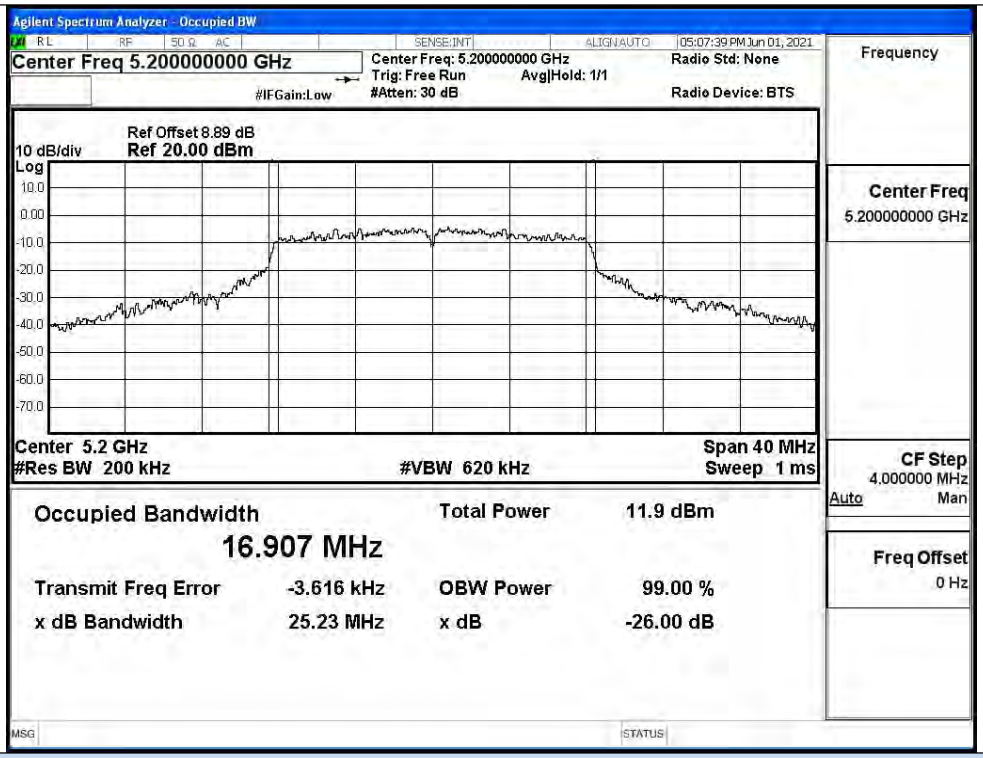
A.4 Emission Bandwidth

Test Mode	Channel	Frequency (MHz)	26dB Bandwidth (MHz)	Limit (MHz)	Verdict
11A	36	5180	29.54	No Limit	Pass
	40	5200	25.23		Pass
	48	5240	29.19		Pass
11N20 SISO	36	5180	26.60	No Limit	Pass
	40	5200	28.07		Pass
	48	5240	28.89		Pass
11N40 SISO	38	5190	54.61	No Limit	Pass
	46	5230	50.36		Pass
11AC20 SISO	36	5180	25.74	No Limit	Pass
	40	5200	25.62		Pass
	48	5240	27.97		Pass
11AC40 SISO	38	5190	56.62	No Limit	Pass
	46	5230	51.21		Pass
11AC80 SISO	42	5210	113.1	No Limit	Pass

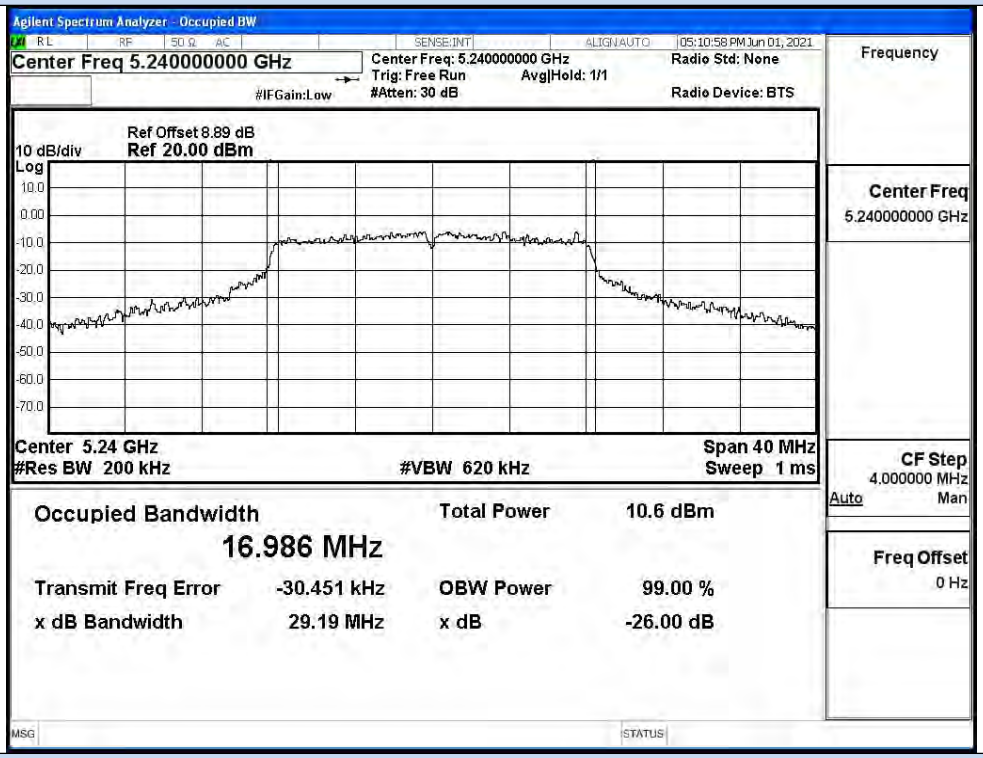
26dB Bandwidth



IEEE 802.11a / Channel 36 / 5180MHz

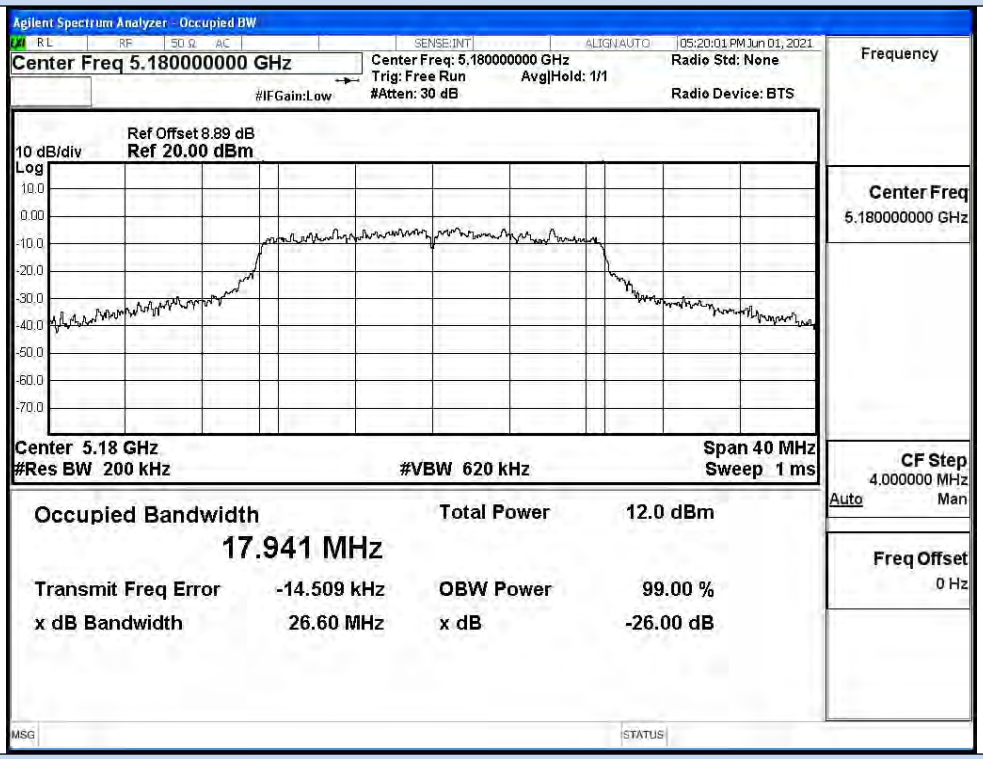


IEEE 802.11a / Channel 40 / 5200MHz

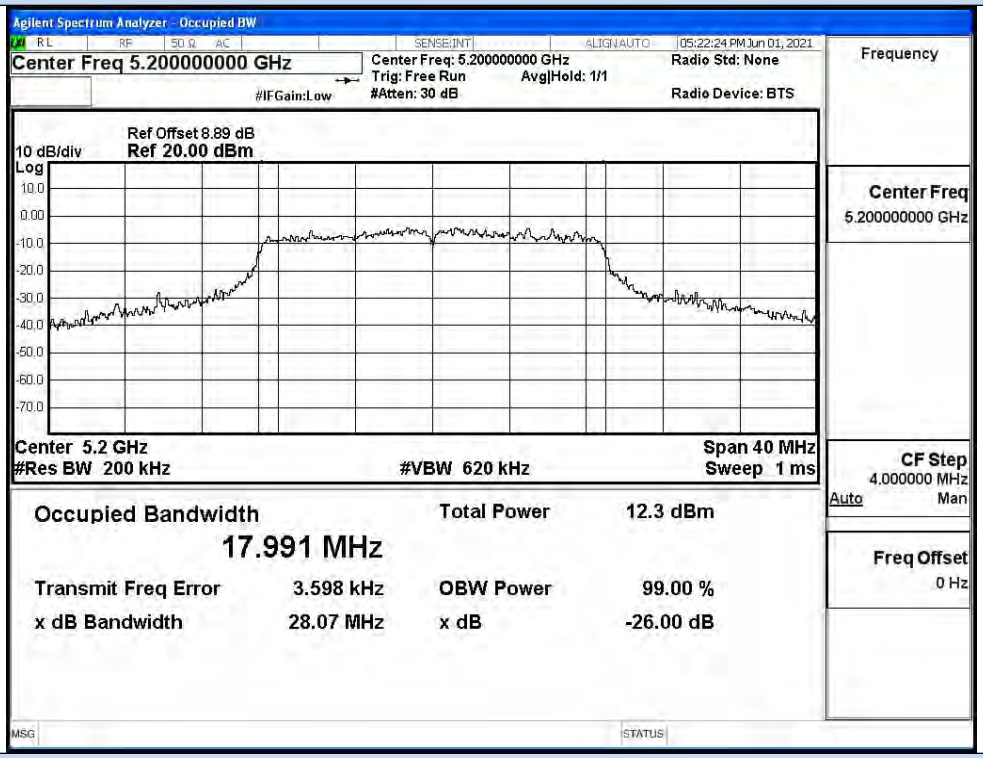


IEEE 802.11a / Channel 48 / 5240MHz

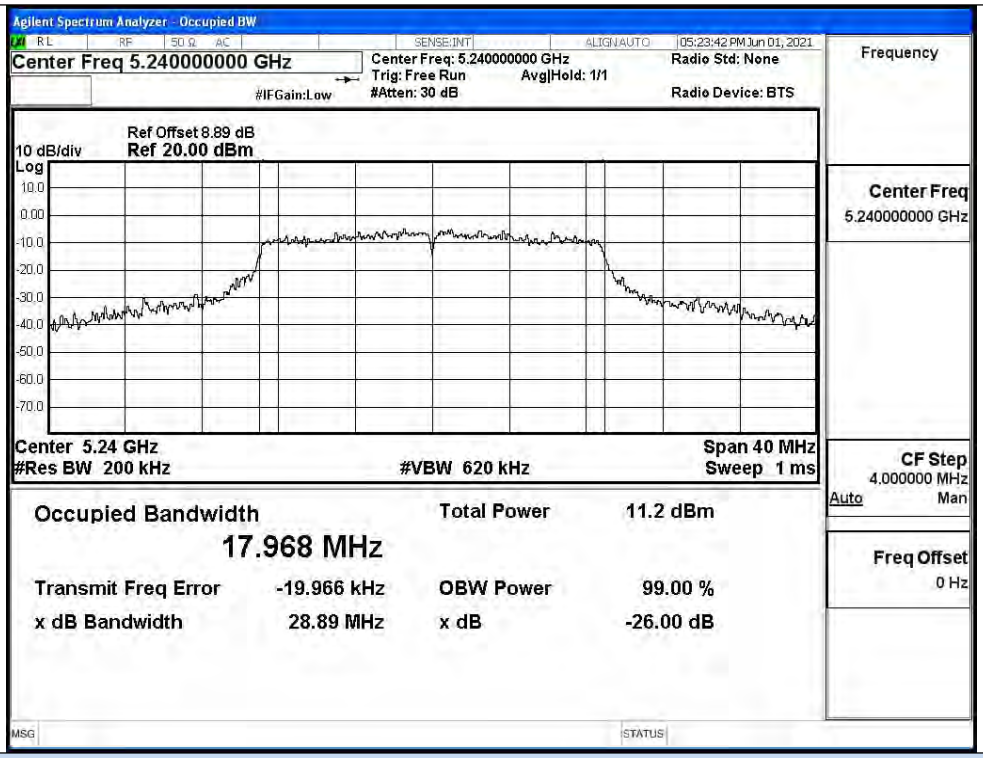
26dB Bandwidth



IEEE 802.11n20 / Channel 36 / 5180MHz

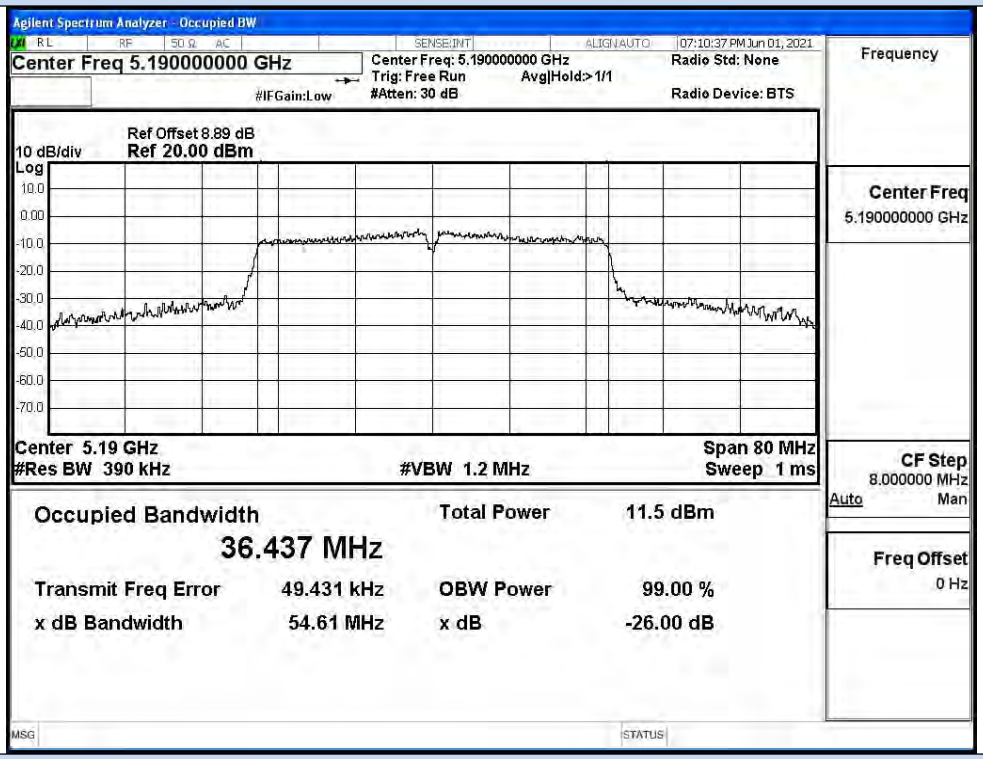


IEEE 802.11n20 / Channel 40 / 5200MHz

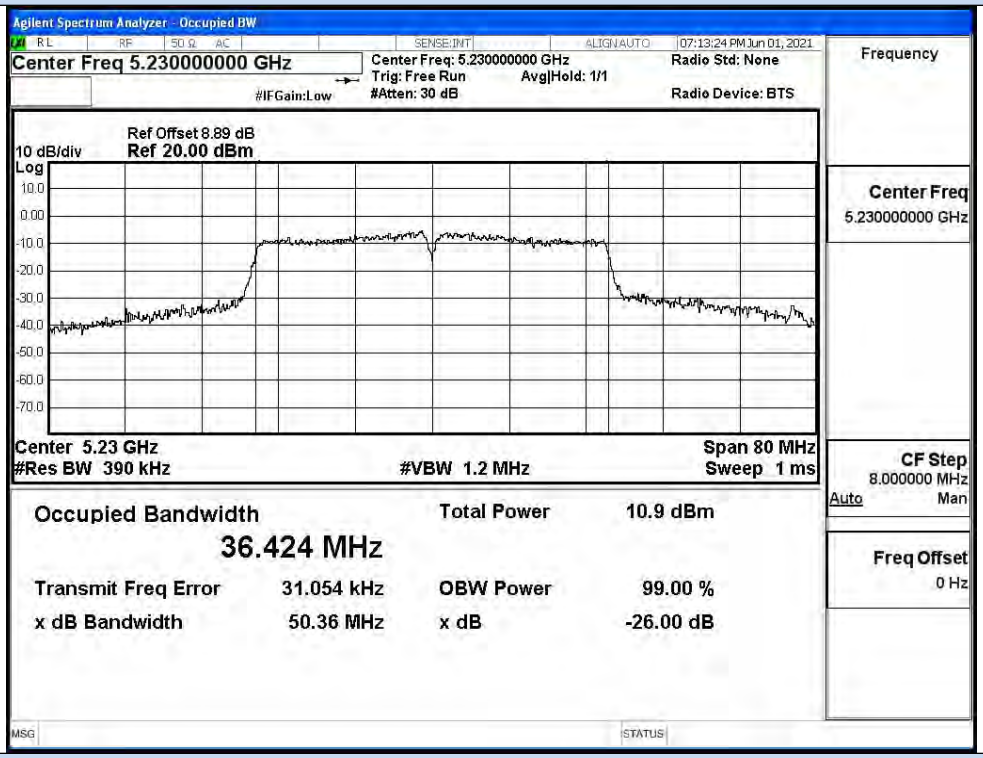


IEEE 802.11n20 / Channel 48 / 5240MHz

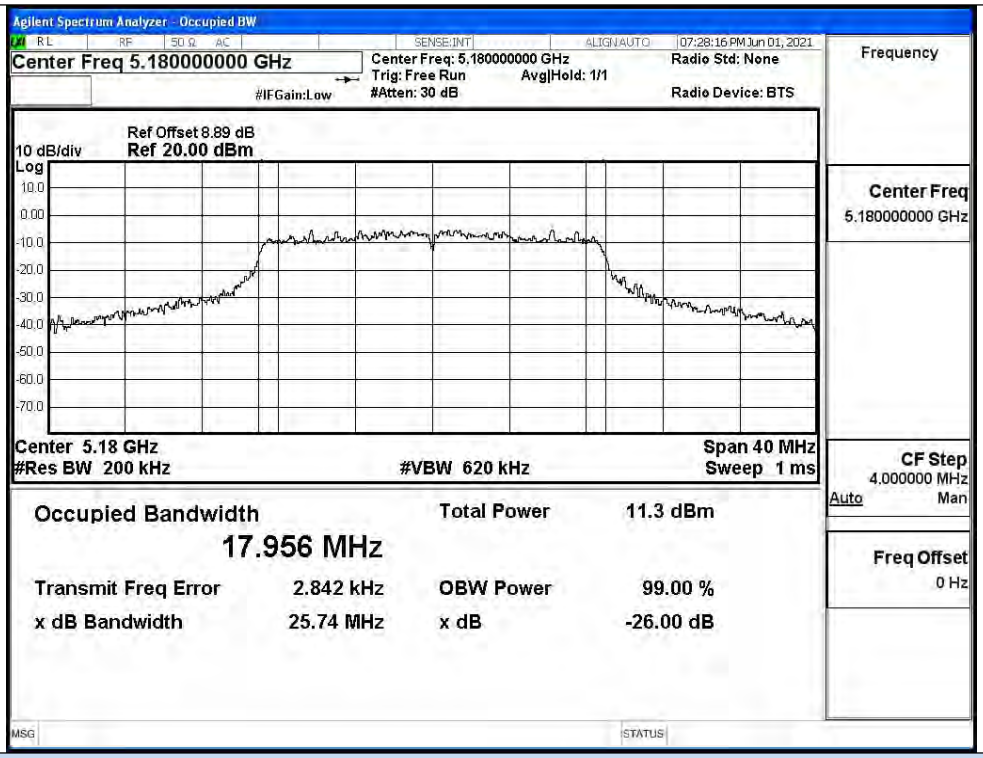
26dB Bandwidth



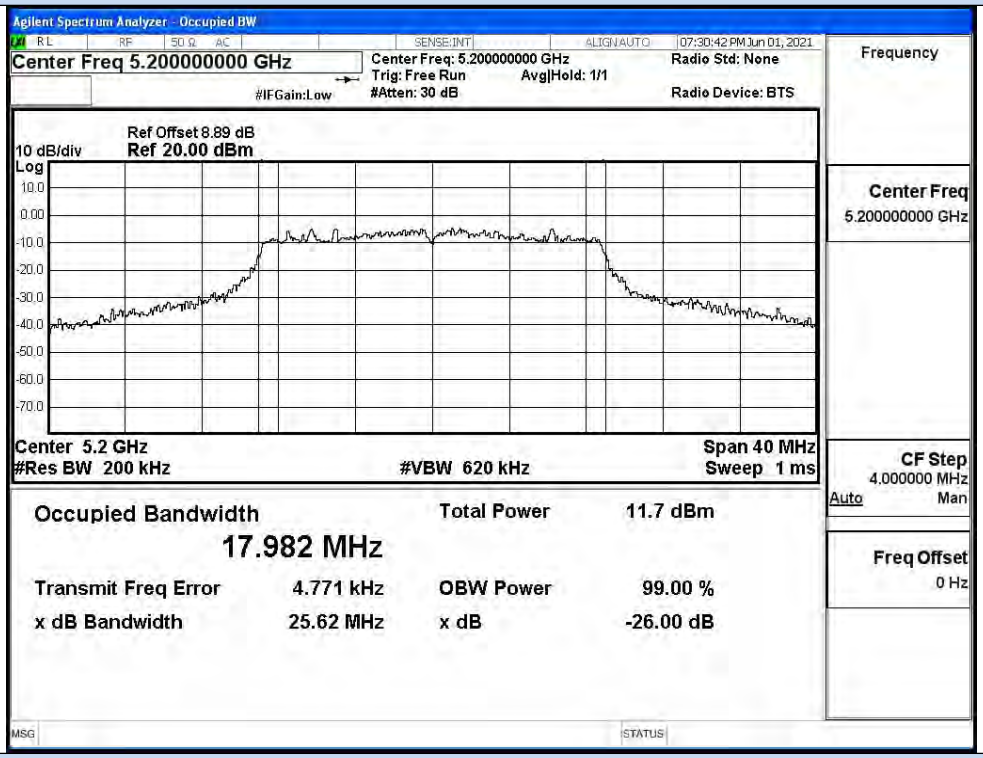
IEEE 802.11n40 / Channel 38 / 5190MHz



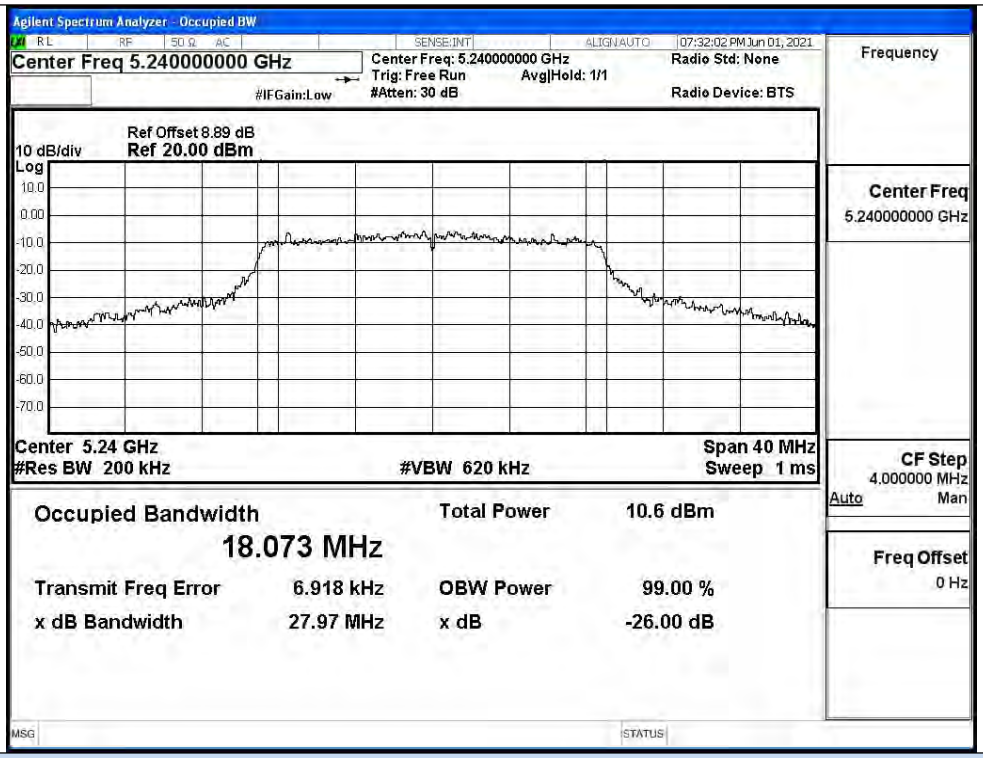
IEEE 802.11n40 / Channel 46 / 5230MHz



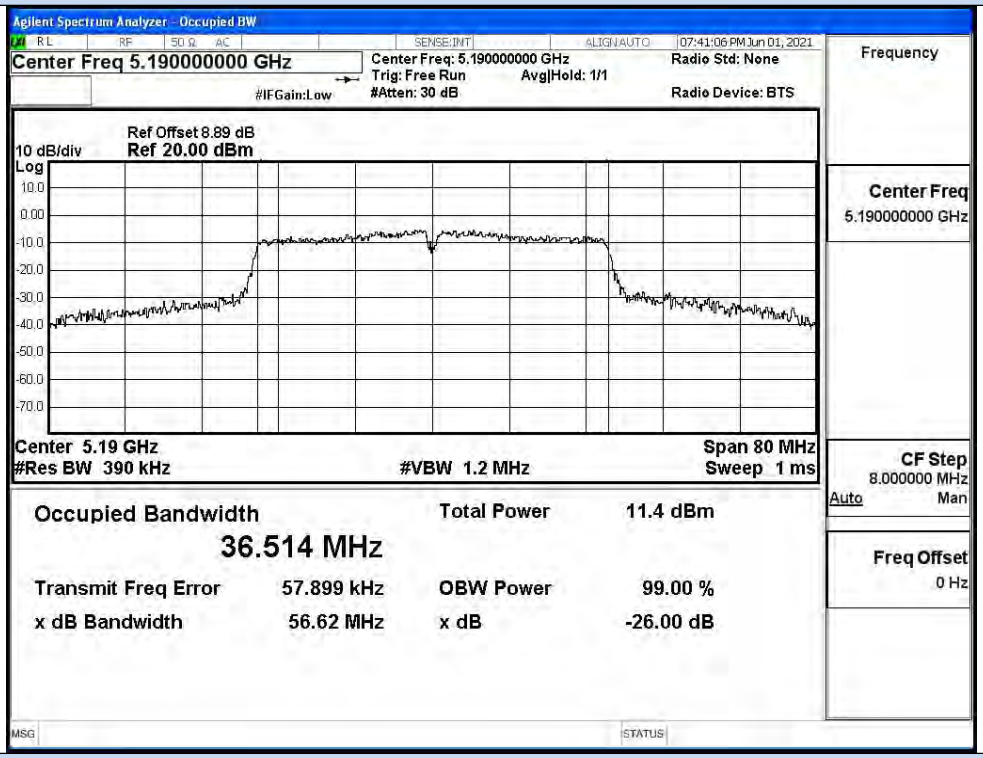
IEEE 802.11ac20 / Channel 36 / 5180MHz



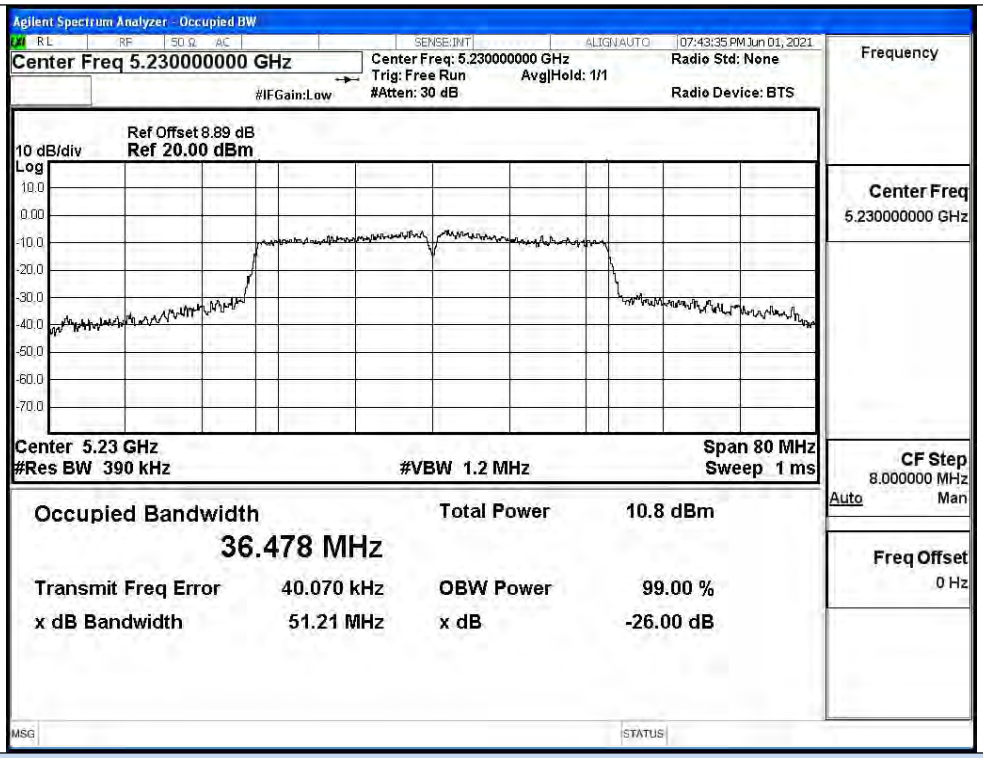
IEEE 802.11ac20 / Channel 40 / 5200MHz



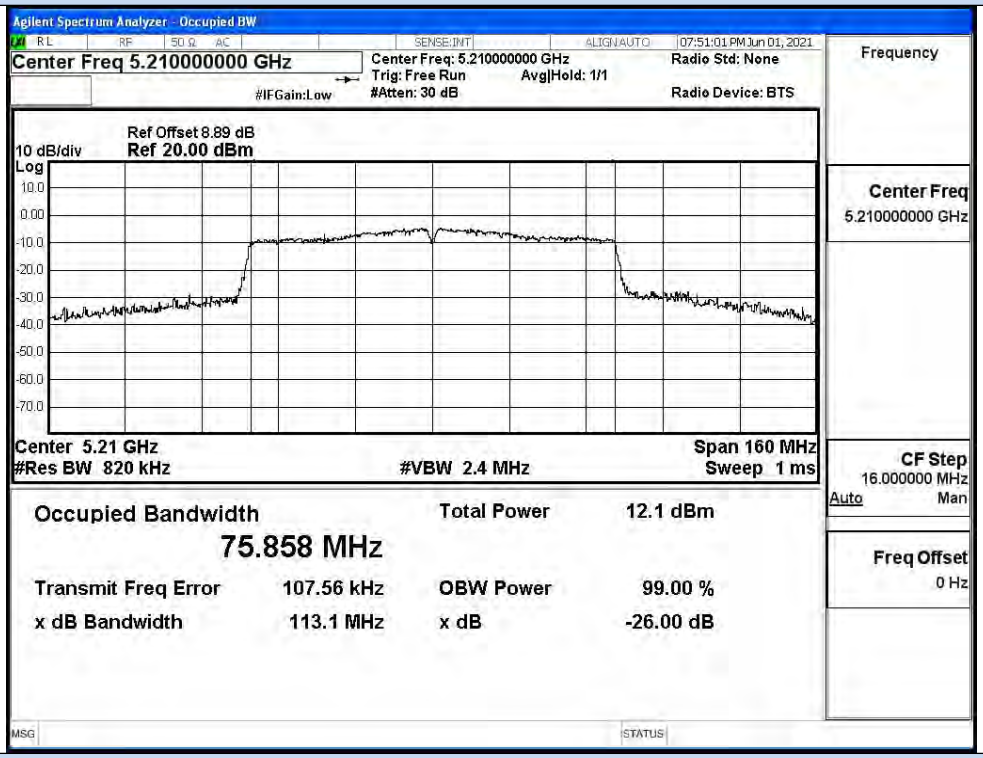
IEEE 802.11ac20 / Channel 48 / 5240MHz



IEEE 802.11ac40 / Channel 38 / 5190MHz



IEEE 802.11ac40 / Channel 46 / 5230MHz

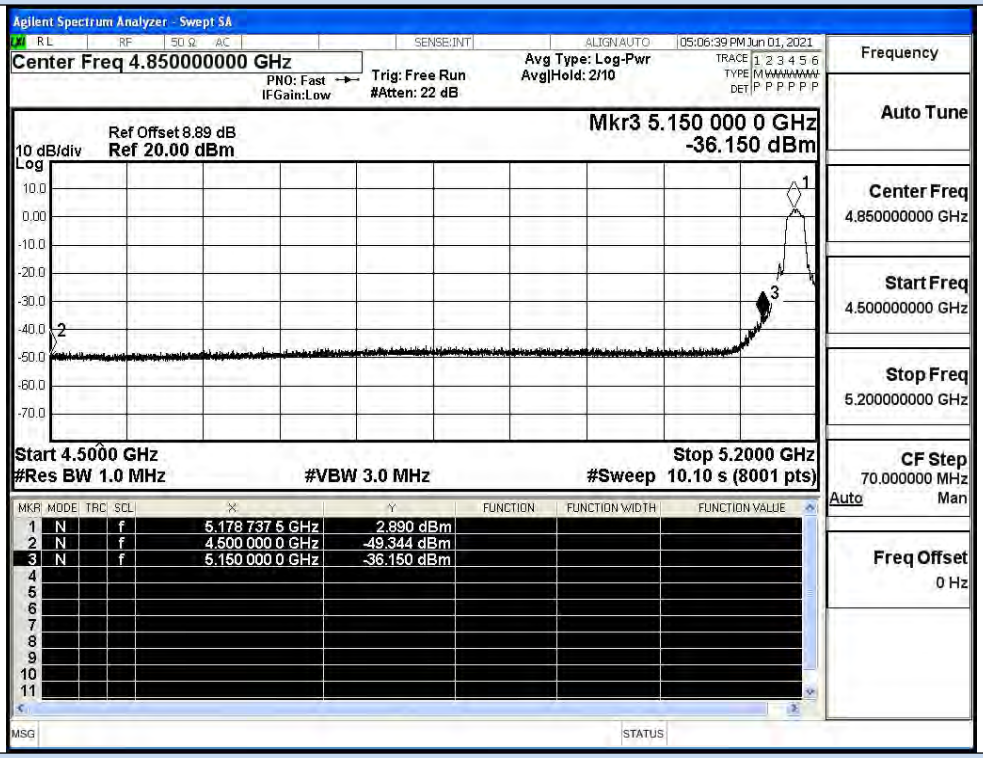


IEEE 802.11ac80 / Channel 42 / 5210MHz

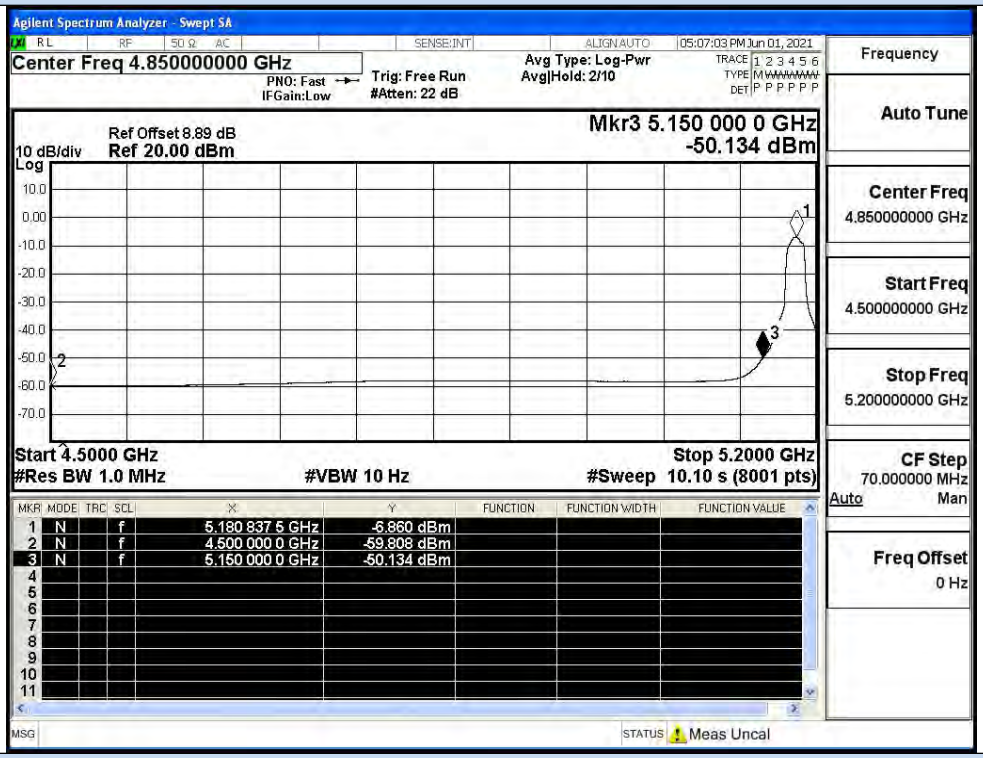
A.5 Undesirable Emissions Measurement

Test Mode	Channel	Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	Ground Reflection Factor (dB)	Covert Radiated E Level At 3m (dBuV/m)	Detector	Limit (dBuV/m)	Verdict
11A	36	4500.0	-49.34	2.00	0	50.89	Peak	68.20	Pass
		4500.0	-59.81	2.00	0	40.42	Average	54.00	Pass
		5150.0	-36.15	2.00	0	64.08	Peak	68.20	Pass
		5150.0	-50.13	2.00	0	50.10	Average	54.00	Pass
	48	5350.0	-49.45	2.00	0	50.78	Peak	68.20	Pass
		5350.0	-59.83	2.00	0	40.40	Average	54.00	Pass
		5460.0	-48.46	2.00	0	51.77	Peak	68.20	Pass
		5460.0	-59.79	2.00	0	40.44	Average	54.00	Pass
11N20 SISO	36	4500.0	-50.38	2.00	0	49.85	Peak	68.20	Pass
		4500.0	-59.85	2.00	0	40.38	Average	54.00	Pass
		5150.0	-39.30	2.00	0	60.93	Peak	68.20	Pass
		5150.0	-53.09	2.00	0	47.14	Average	54.00	Pass
	48	5350.0	-49.55	2.00	0	50.68	Peak	68.20	Pass
		5350.0	-59.77	2.00	0	40.46	Average	54.00	Pass
		5460.0	-49.29	2.00	0	50.94	Peak	68.20	Pass
		5460.0	-59.78	2.00	0	40.45	Average	54.00	Pass
11N40 SISO	38	4500.0	-50.20	2.00	0	50.03	Peak	68.20	Pass
		4500.0	-59.84	2.00	0	40.39	Average	54.00	Pass
		5150.0	-32.96	2.00	0	67.27	Peak	68.20	Pass
		5150.0	-46.34	2.00	0	53.89	Average	54.00	Pass
	46	5350.0	-49.37	2.00	0	50.86	Peak	68.20	Pass
		5350.0	-59.38	2.00	0	40.85	Average	54.00	Pass
		5460.0	-49.25	2.00	0	50.98	Peak	68.20	Pass
		5460.0	-59.47	2.00	0	40.76	Average	54.00	Pass
11AC20 SISO	36	4500.0	-50.68	2.00	0	49.55	Peak	68.20	Pass
		4500.0	-59.83	2.00	0	40.40	Average	54.00	Pass
		5150.0	-39.80	2.00	0	60.43	Peak	68.20	Pass
		5150.0	-53.56	2.00	0	46.67	Average	54.00	Pass
	48	4500.0	-50.68	2.00	0	49.55	Peak	68.20	Pass
		4500.0	-59.83	2.00	0	40.40	Average	54.00	Pass
		5150.0	-39.80	2.00	0	60.43	Peak	68.20	Pass
		5150.0	-53.56	2.00	0	46.67	Average	54.00	Pass
11AC40 SISO	38	4500.0	-50.39	2.00	0	49.84	Peak	68.20	Pass
		4500.0	-59.82	2.00	0	40.41	Average	54.00	Pass
		5150.0	-33.73	2.00	0	66.50	Peak	68.20	Pass
		5150.0	-46.55	2.00	0	53.68	Average	54.00	Pass
	46	5350.0	-49.59	2.00	0	50.64	Peak	68.20	Pass
		5350.0	-59.38	2.00	0	40.85	Average	54.00	Pass
		5460.0	-48.93	2.00	0	51.30	Peak	68.20	Pass
		5460.0	-59.47	2.00	0	40.76	Average	54.00	Pass
11AC80 SISO	42	4500.0	-47.20	2.00	0	53.03	Peak	68.20	Pass
		4500.0	-58.45	2.00	0	41.78	Average	54.00	Pass
		5150.0	-49.44	2.00	0	50.79	Peak	68.20	Pass
		5150.0	-58.95	2.00	0	41.28	Average	54.00	Pass
		5350.0	-47.20	2.00	0	53.03	Peak	68.20	Pass
		5350.0	-58.45	2.00	0	41.78	Average	54.00	Pass
		5460.0	-49.44	2.00	0	50.79	Peak	68.20	Pass
		5460.0	-58.95	2.00	0	41.28	Average	54.00	Pass

Undesirable Emissions Measurement

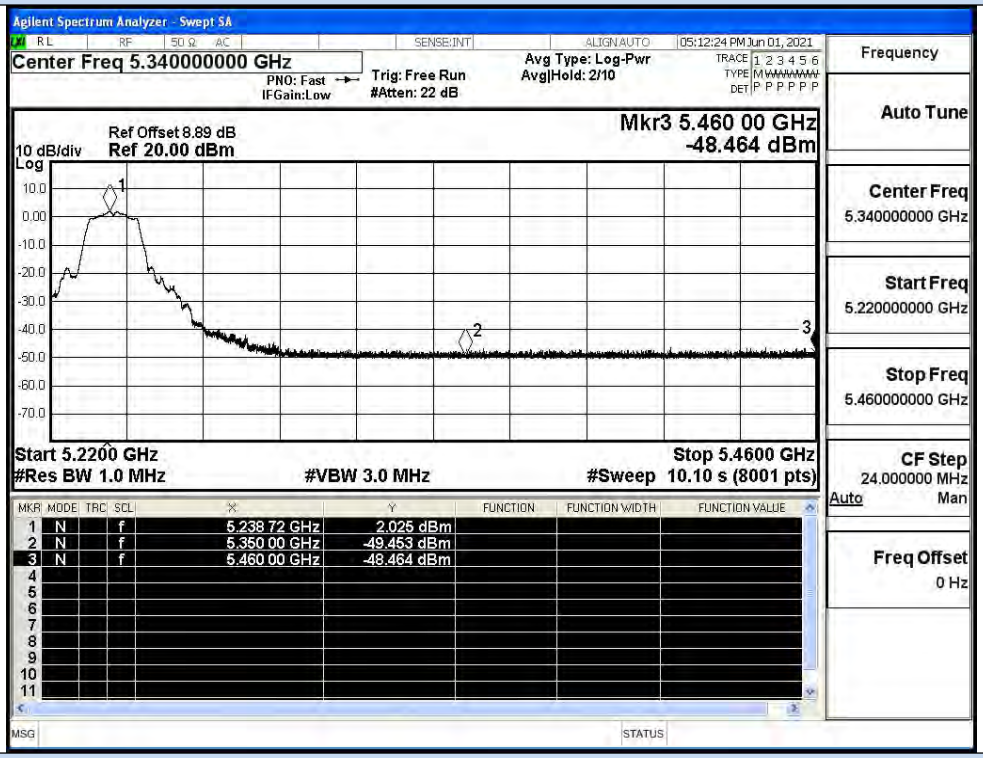


IEEE 802.11a / Channel 36 / 5180MHz / Peak

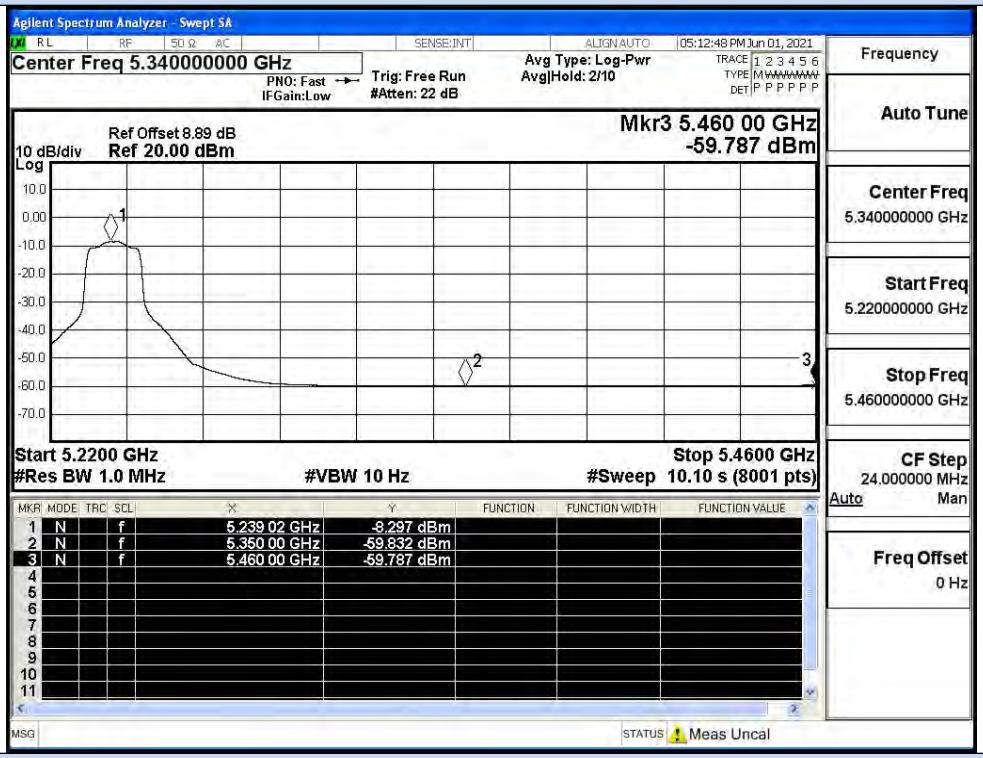


IEEE 802.11a / Channel 36 / 5180MHz / Average

Undesirable Emissions Measurement

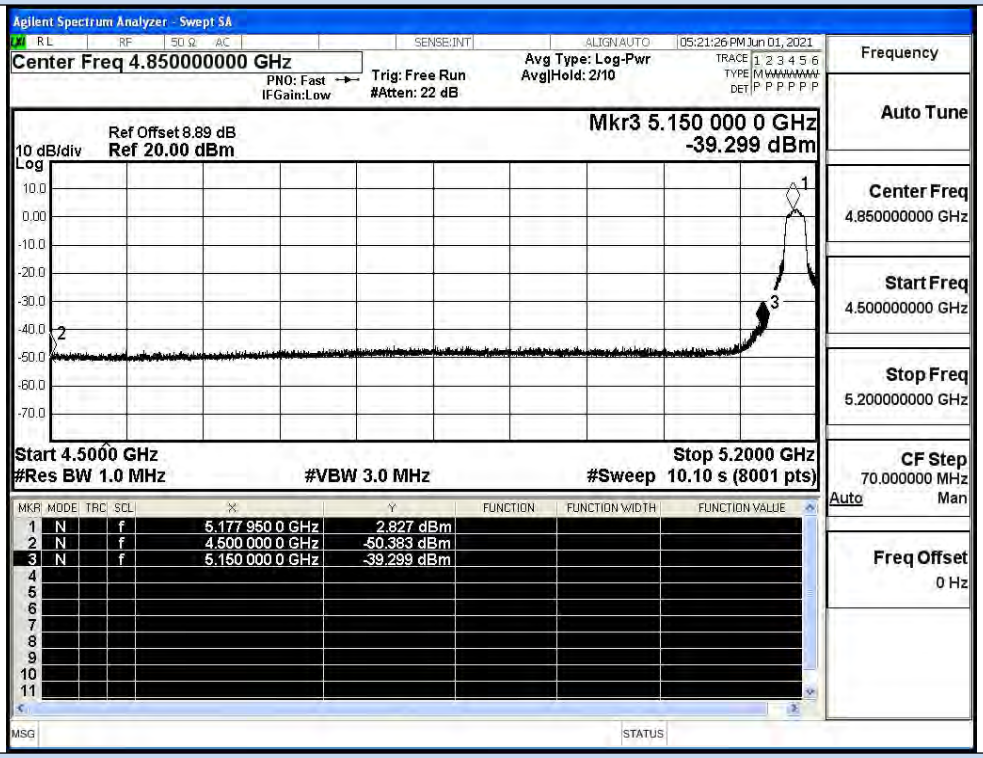


IEEE 802.11a / Channel 48 / 5240MHz / Peak

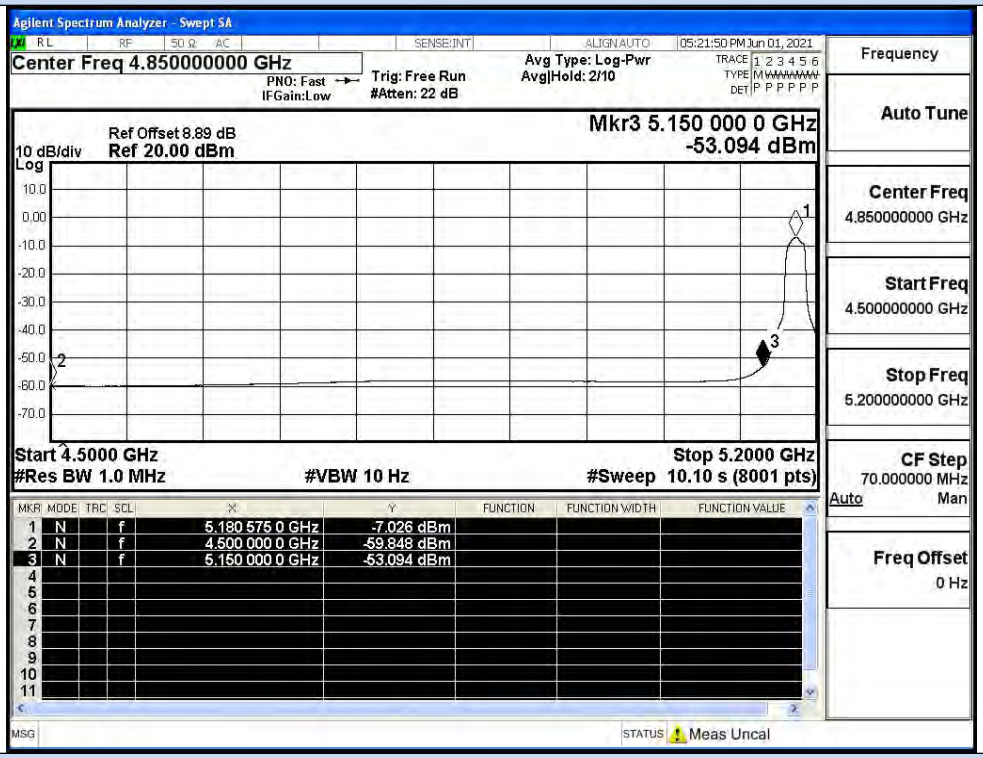


IEEE 802.11a / Channel 48 / 5240MHz / Average

Undesirable Emissions Measurement

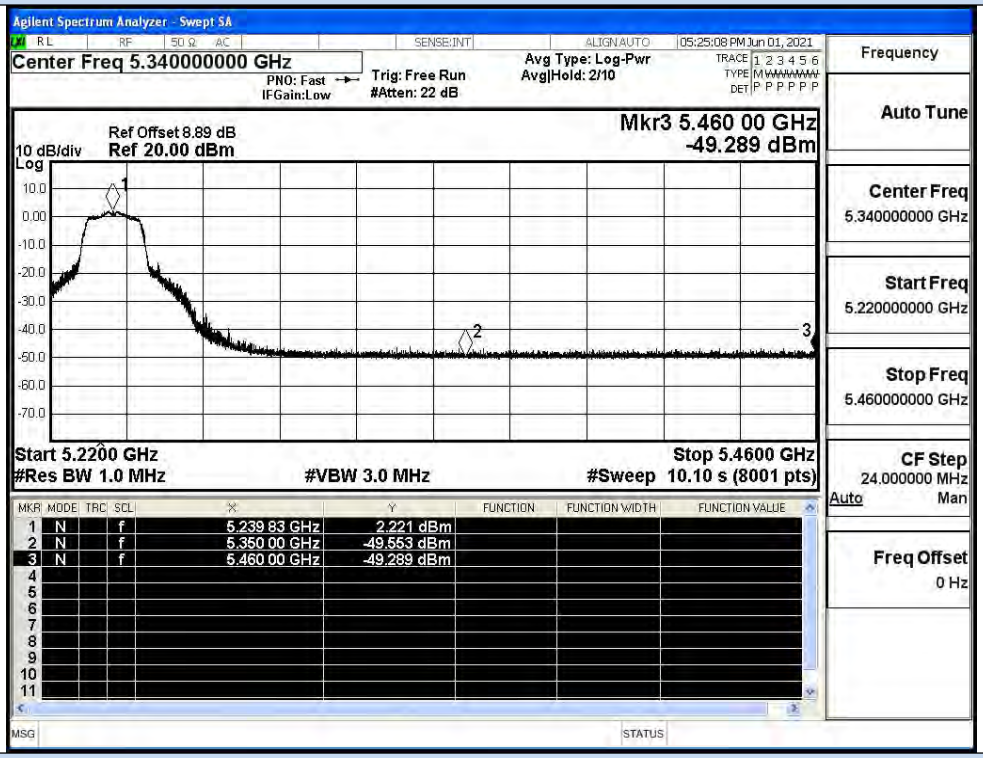


IEEE 802.11n20 / Channel 36 / 5180MHz / Peak

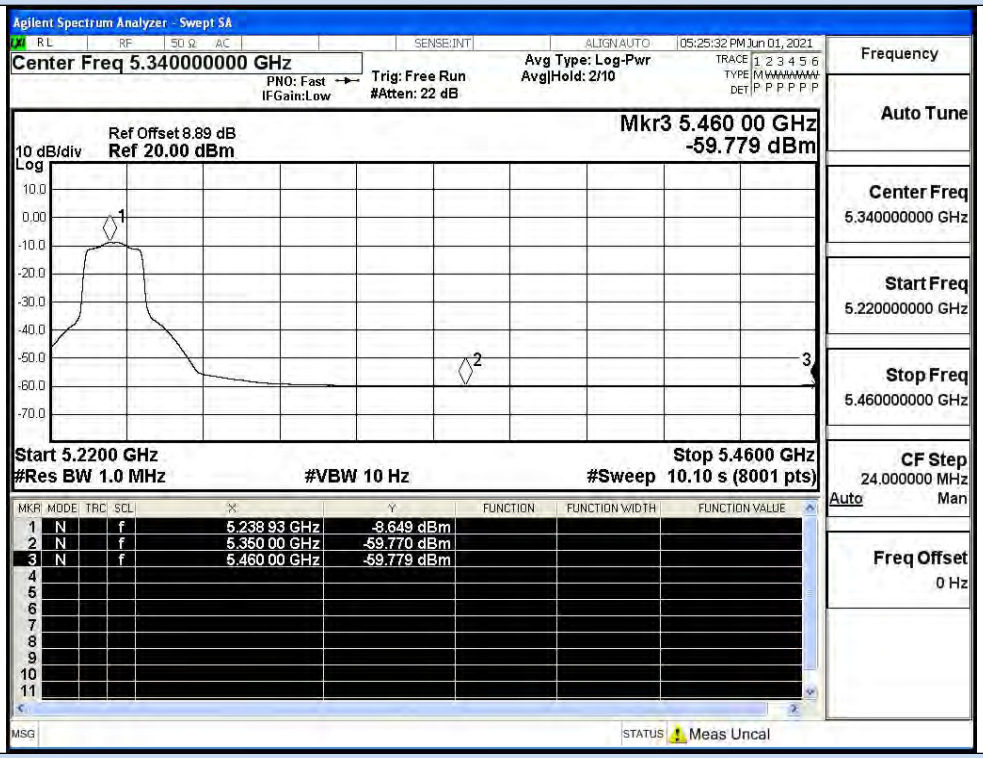


IEEE 802.11n20 / Channel 36 / 5180MHz / Average

Undesirable Emissions Measurement

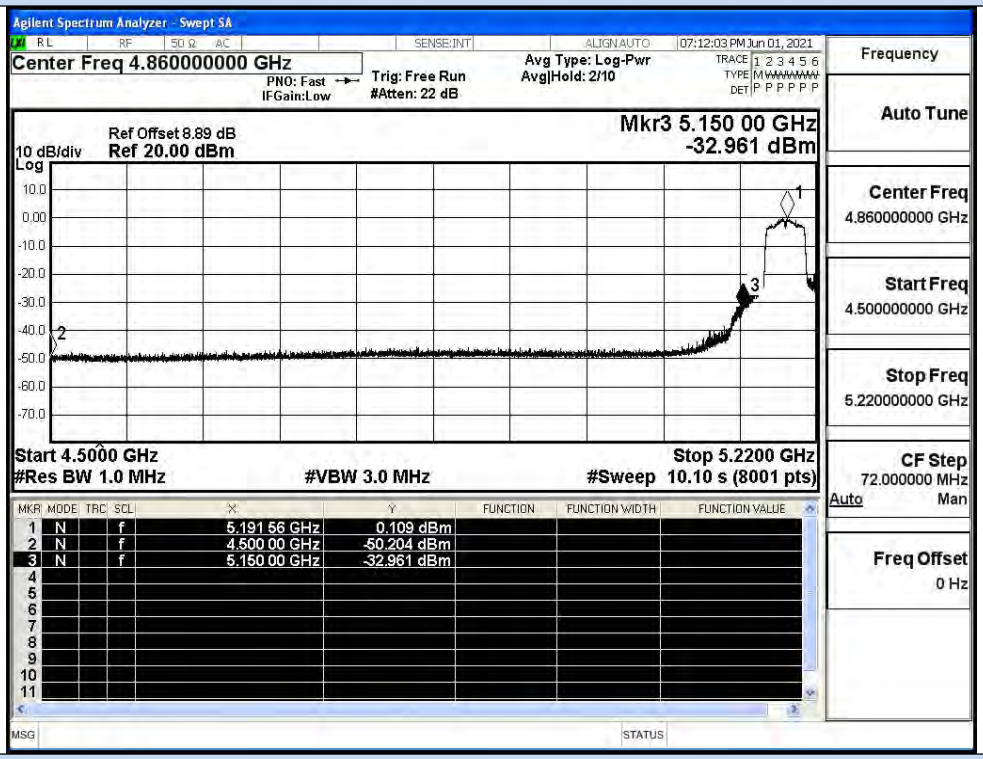


IEEE 802.11n20 / Channel 48 / 5240MHz / Peak

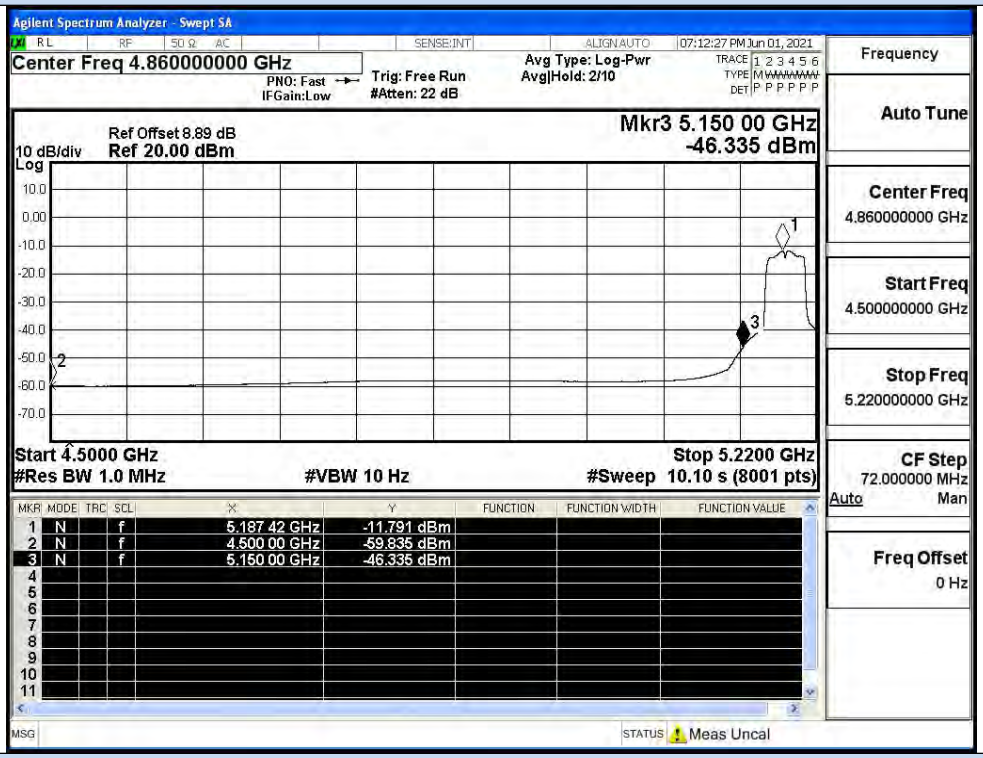


IEEE 802.11n20 / Channel 48 / 5240MHz / Average

Undesirable Emissions Measurement

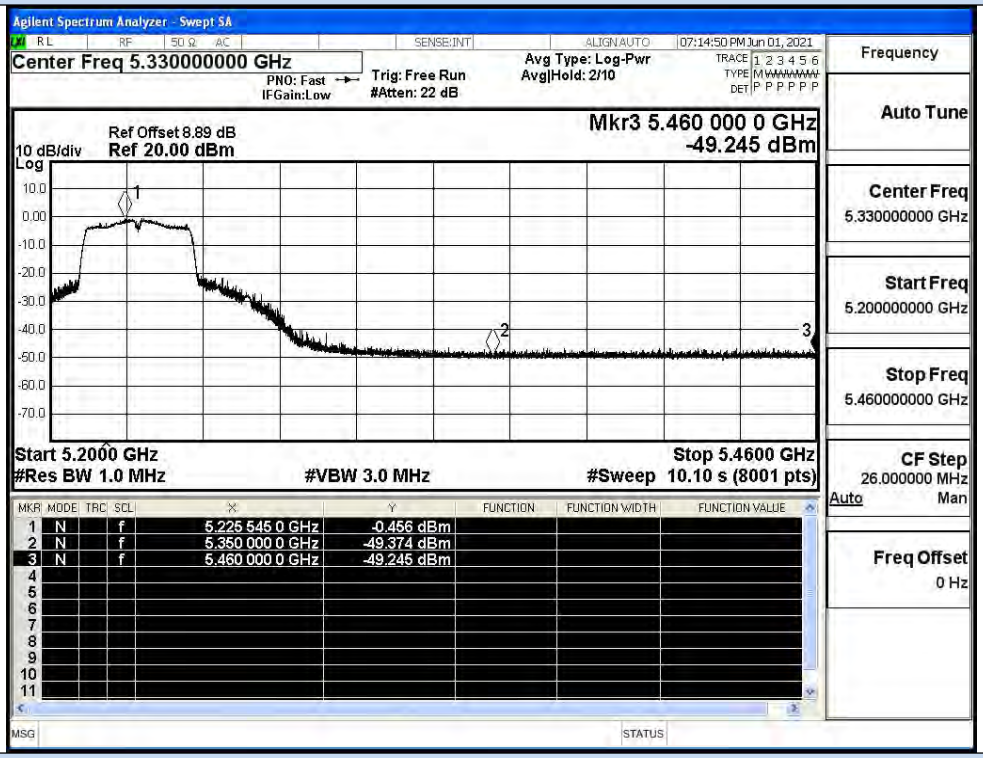


IEEE 802.11n40 / Channel 38 / 5190MHz / Peak

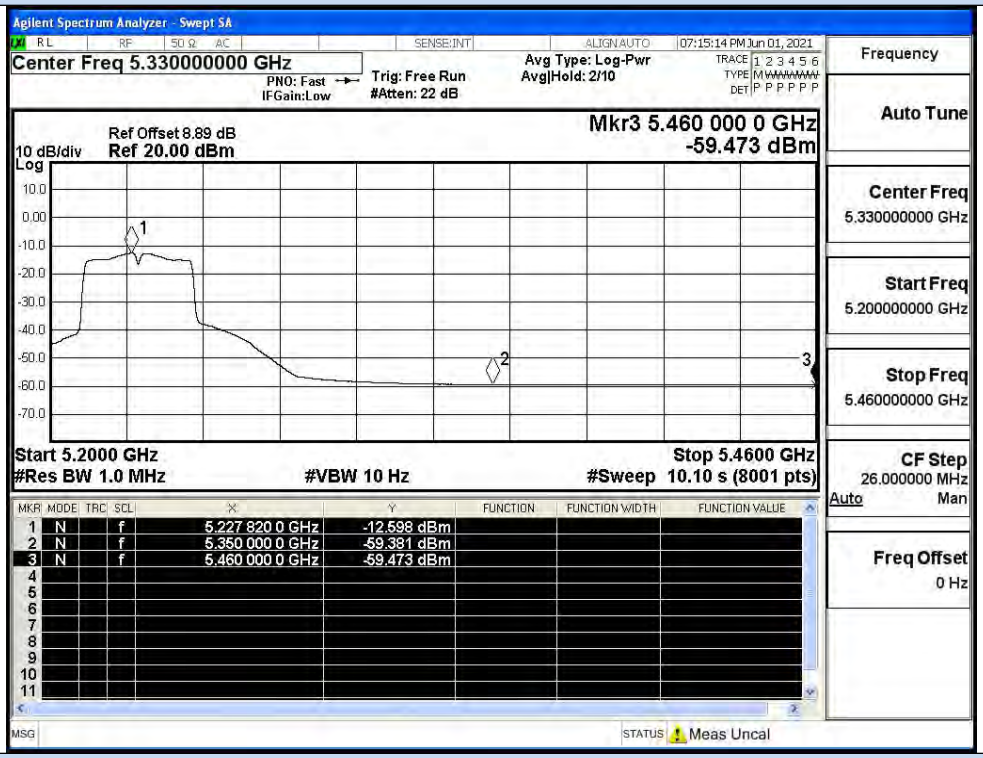


IEEE 802.11n40 / Channel 38 / 5190MHz / Average

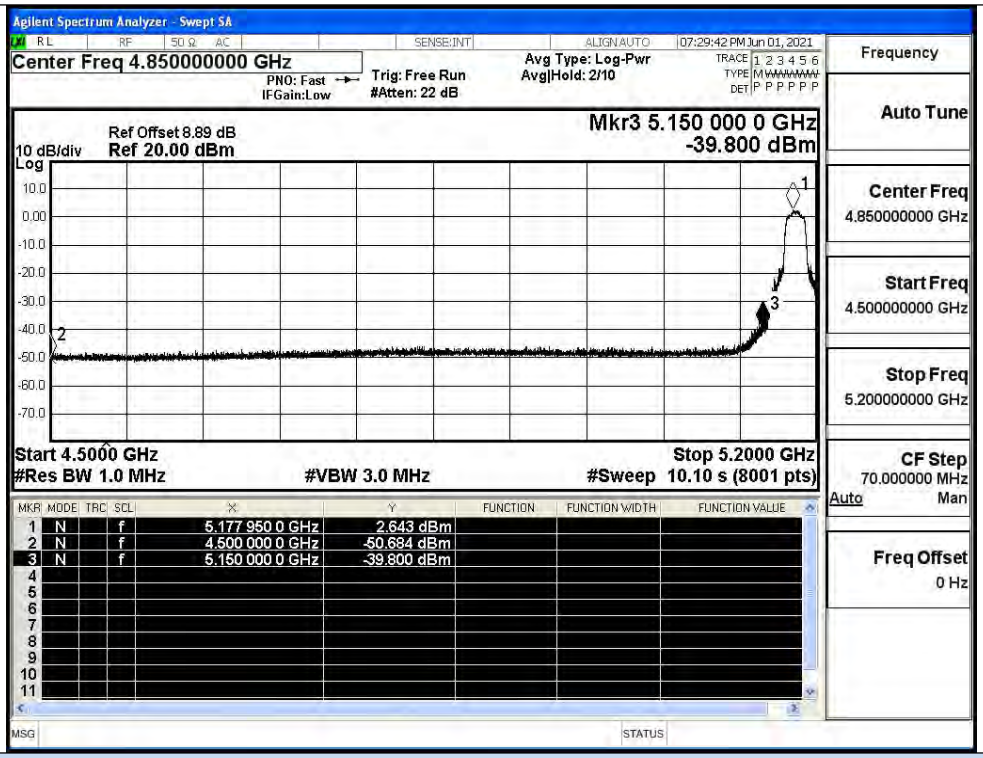
Undesirable Emissions Measurement



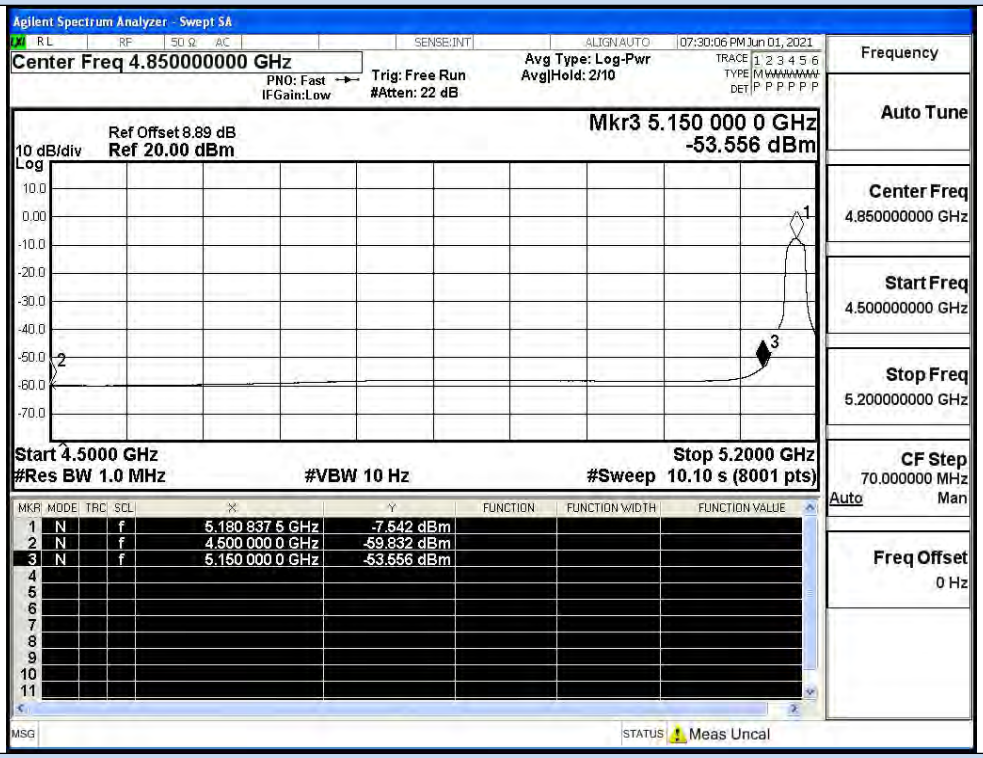
IEEE 802.11n40 / Channel 46 / 5230MHz / Peak



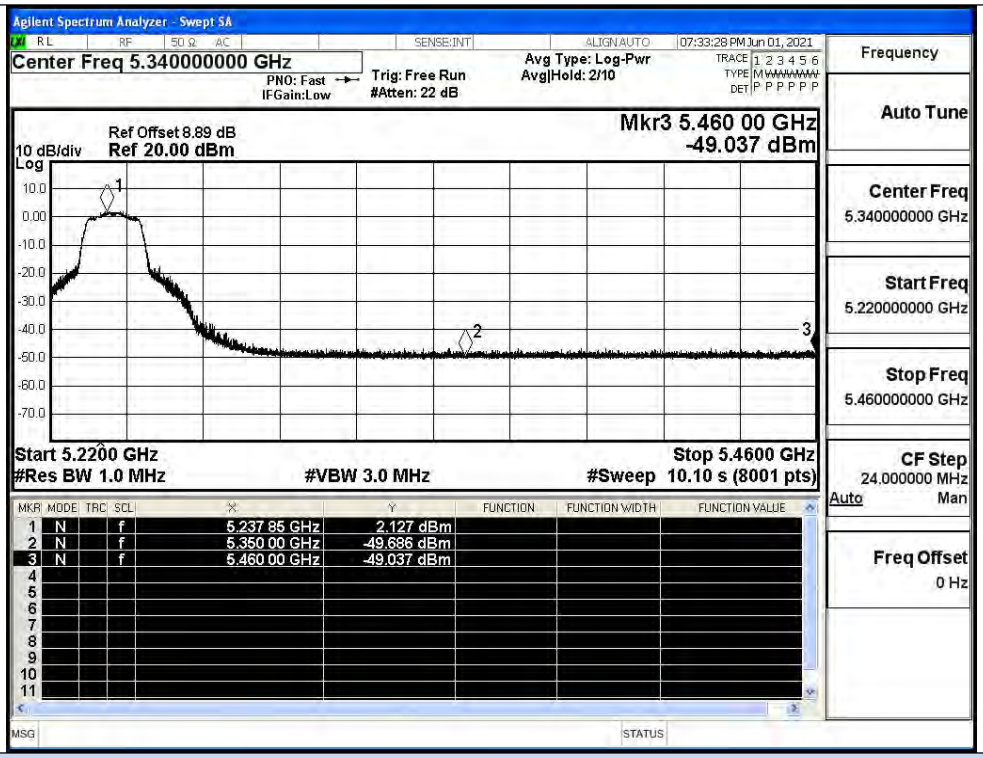
IEEE 802.11n40 / Channel 46 / 5230MHz / Average



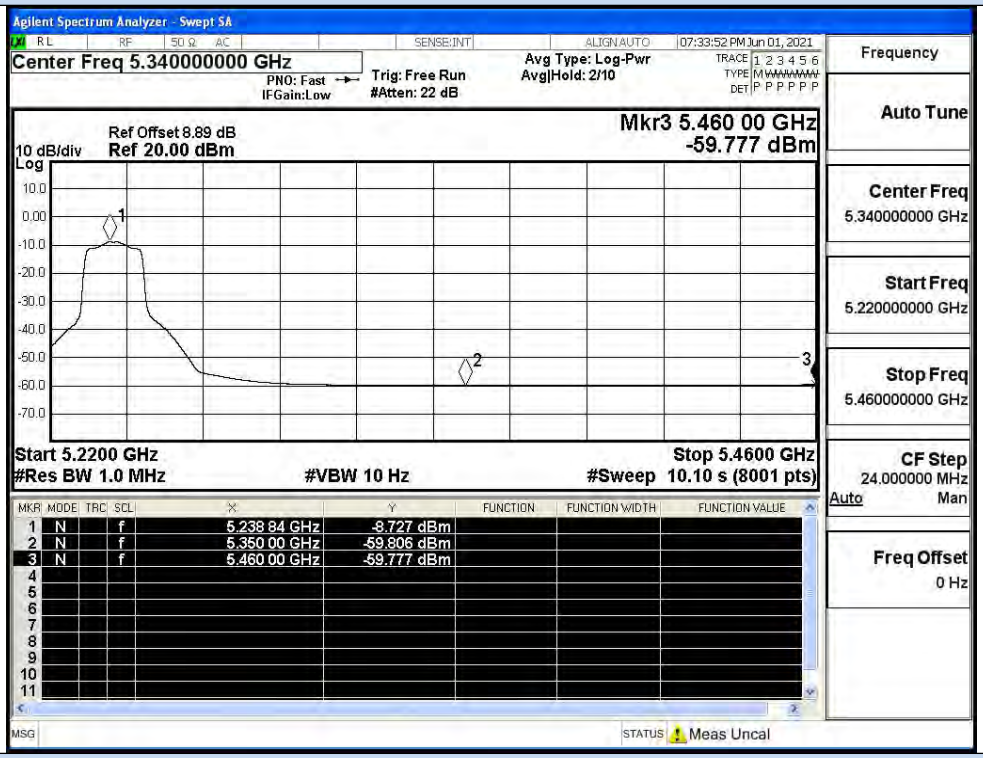
IEEE 802.11ac20 / Channel 36 / 5180MHz / Peak



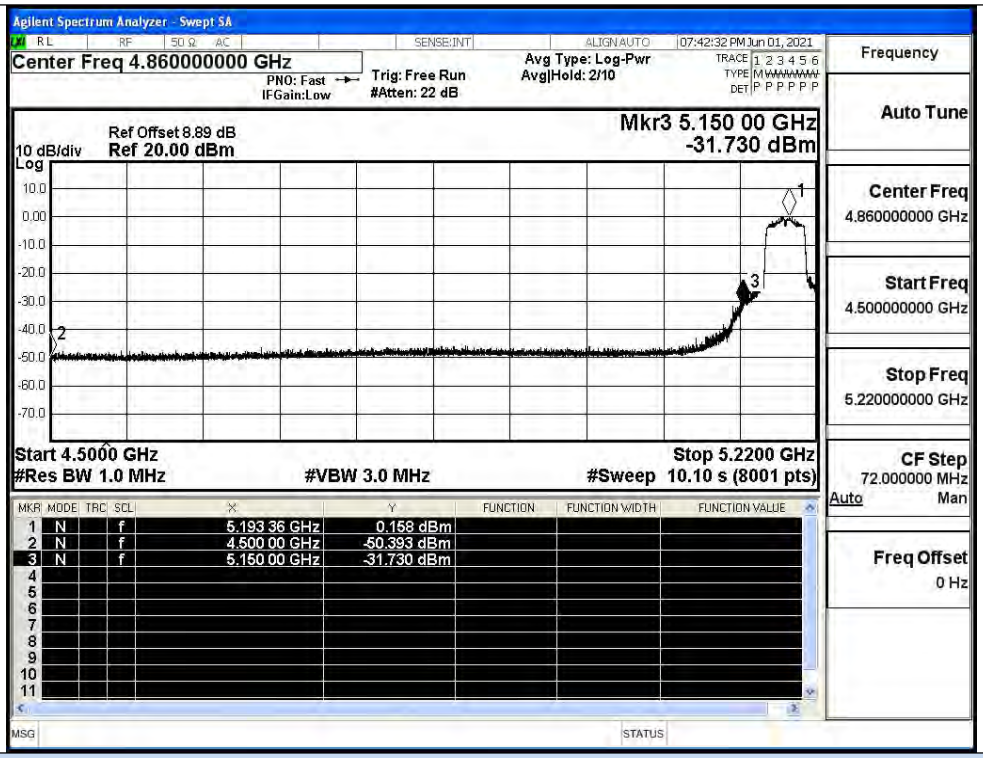
IEEE 802.11ac20 / Channel 36 / 5180MHz / Average



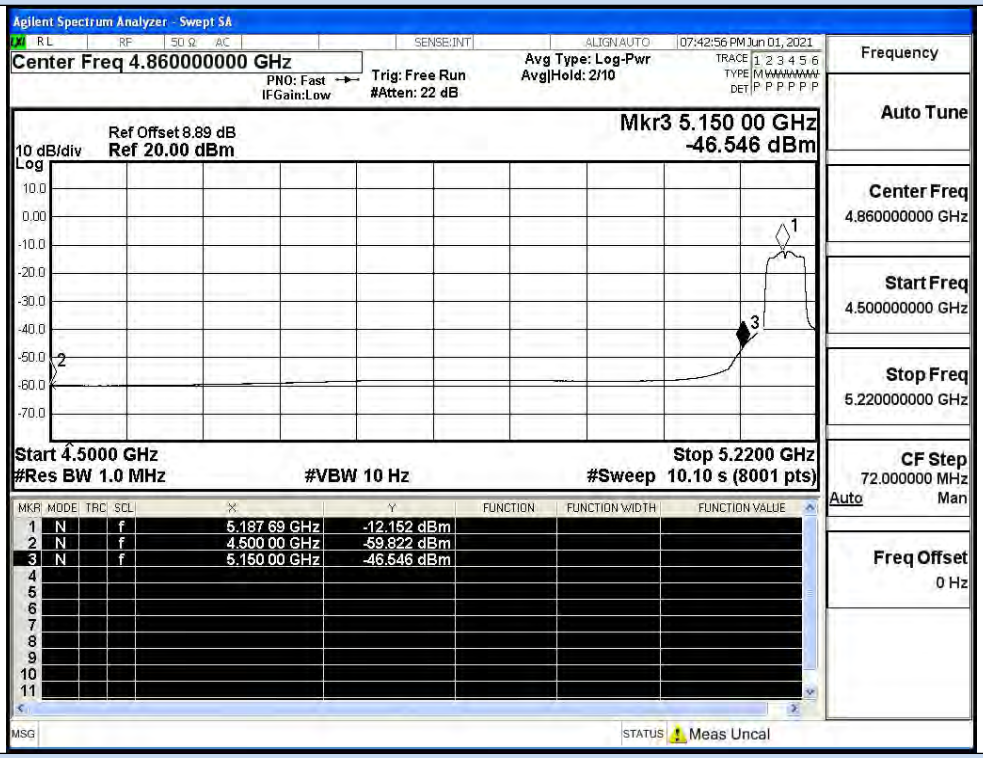
IEEE 802.11ac20 / Channel 48 / 5240MHz / Peak



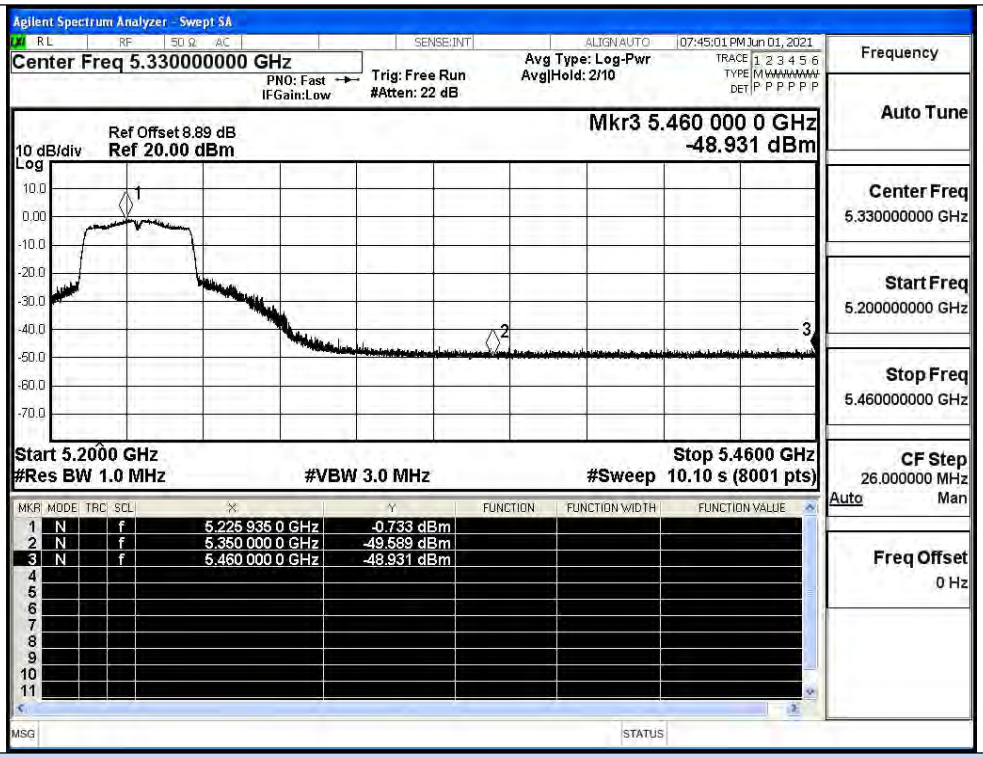
IEEE 802.11ac20 / Channel 48 / 5240MHz / Average



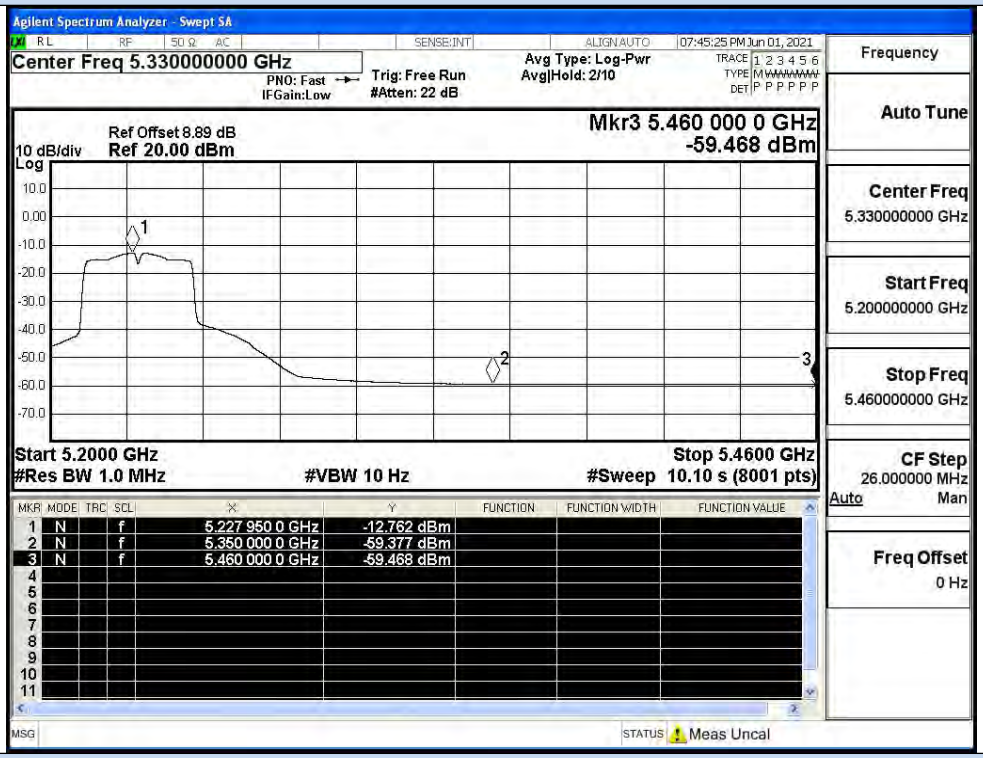
IEEE 802.11ac40 / Channel 38/ 5190MHz / Peak



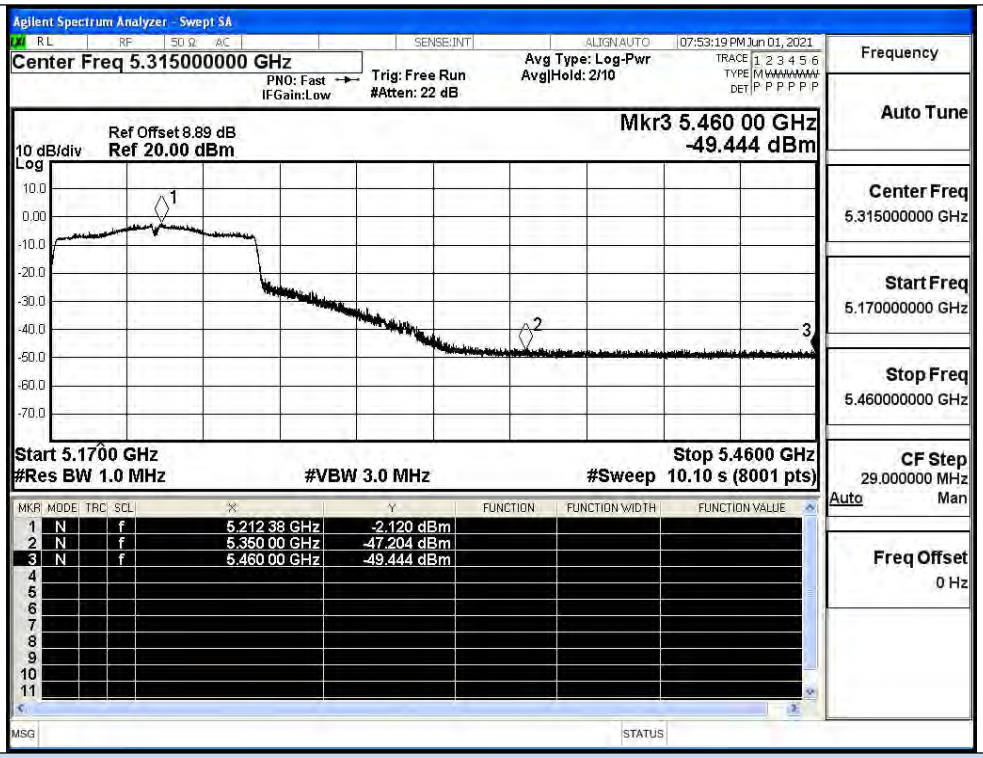
IEEE 802.11ac40 / Channel 38 / 5190MHz / Average



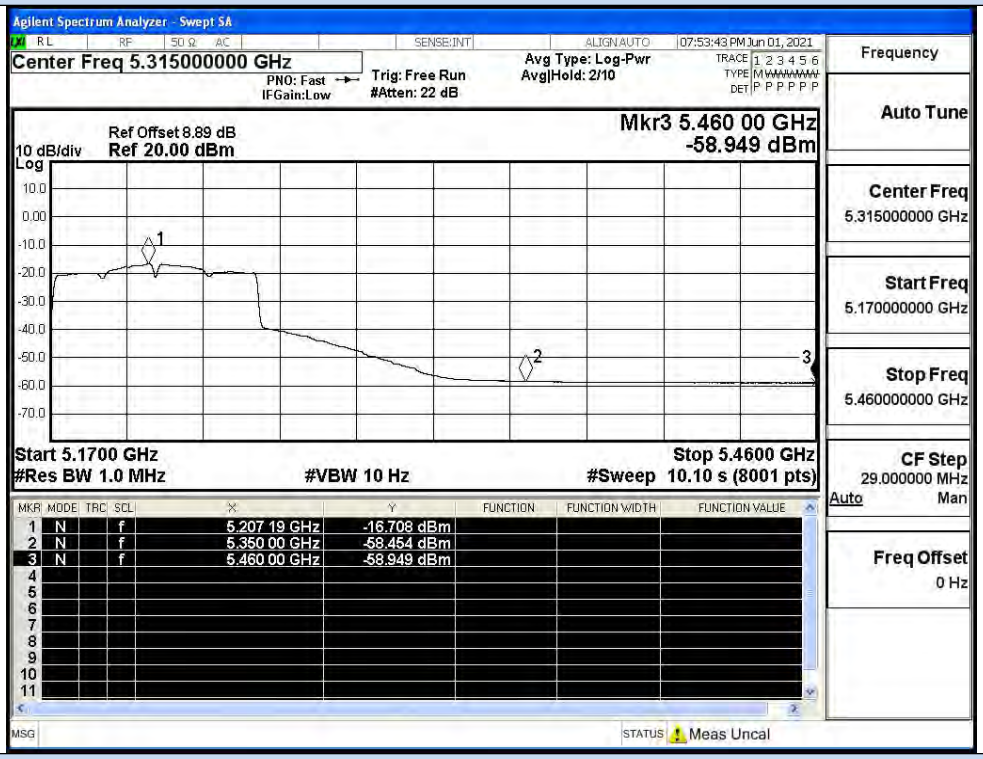
IEEE 802.11ac40 / Channel 46/ 5230MHz / Peak



IEEE 802.11ac40 / Channel 46 / 5230MHz / Average



IEEE 802.11ac80 / Channel 42 / 5210MHz / Peak



IEEE 802.11ac80 / Channel 42 / 5210MHz / Average