

Appendix D

RF Test Data for 5.2G WLAN (Conducted Measurement)

Product Name: Nreal Computing Unit

Trade Mark:  nreal

Test Model: NR-9100UGL

Environmental Conditions

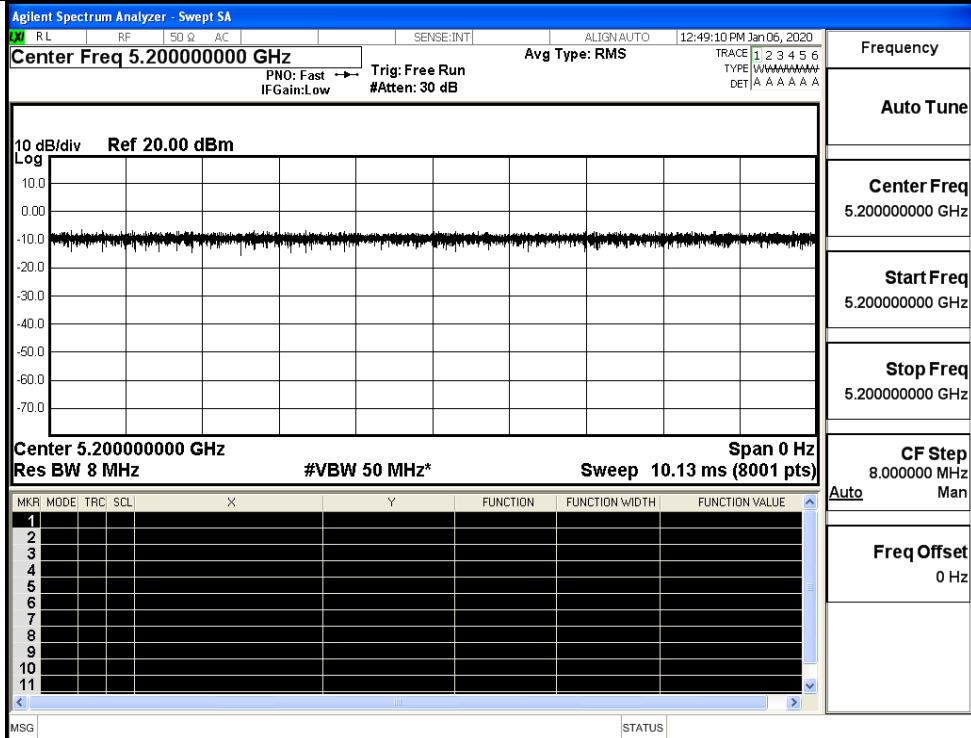
Temperature:	23.2 ° C
Relative Humidity:	53.5%
ATM Pressure:	100.0 kPa
Test Engineer:	Wang Chuang
Supervised by:	Tom.Liu

D.1 Duty Cycle

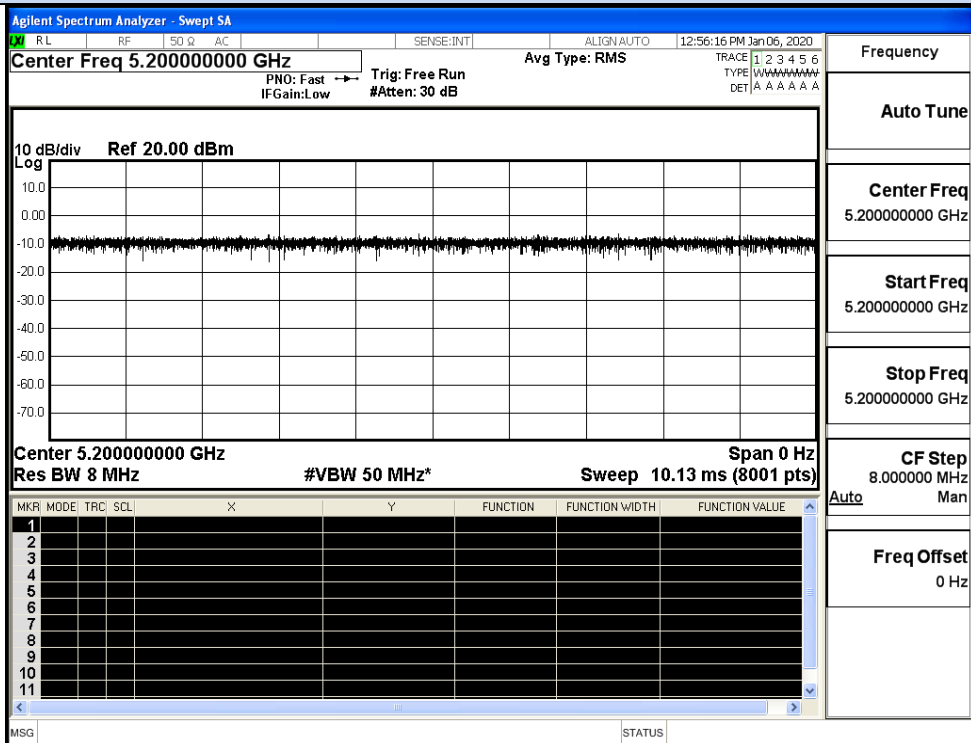
Ant0

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

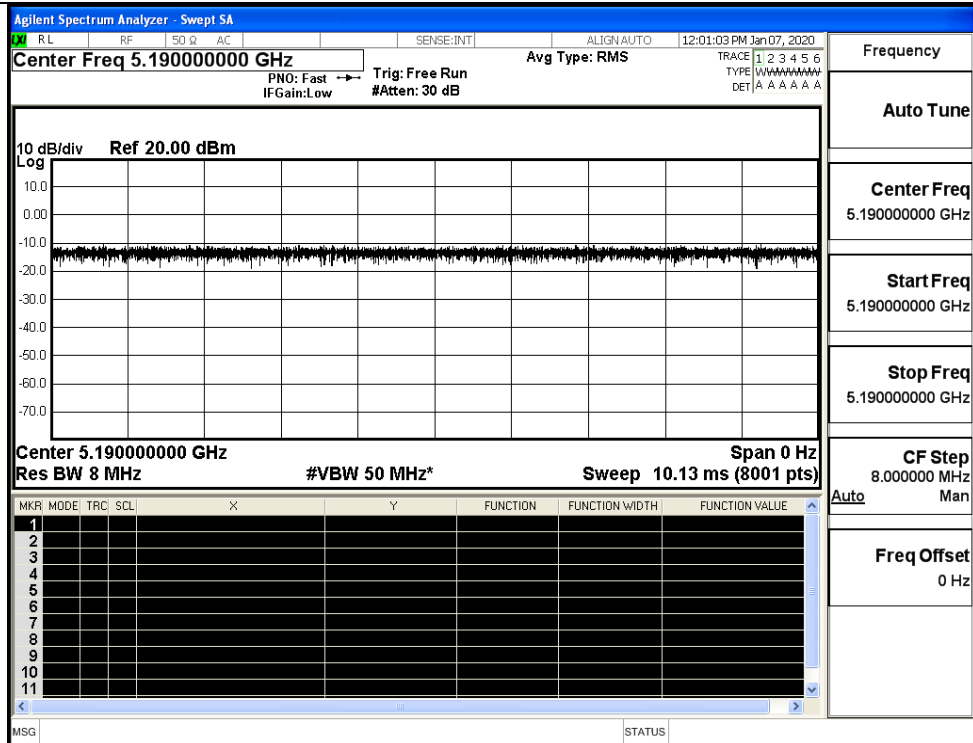
On Time and Duty Cycle



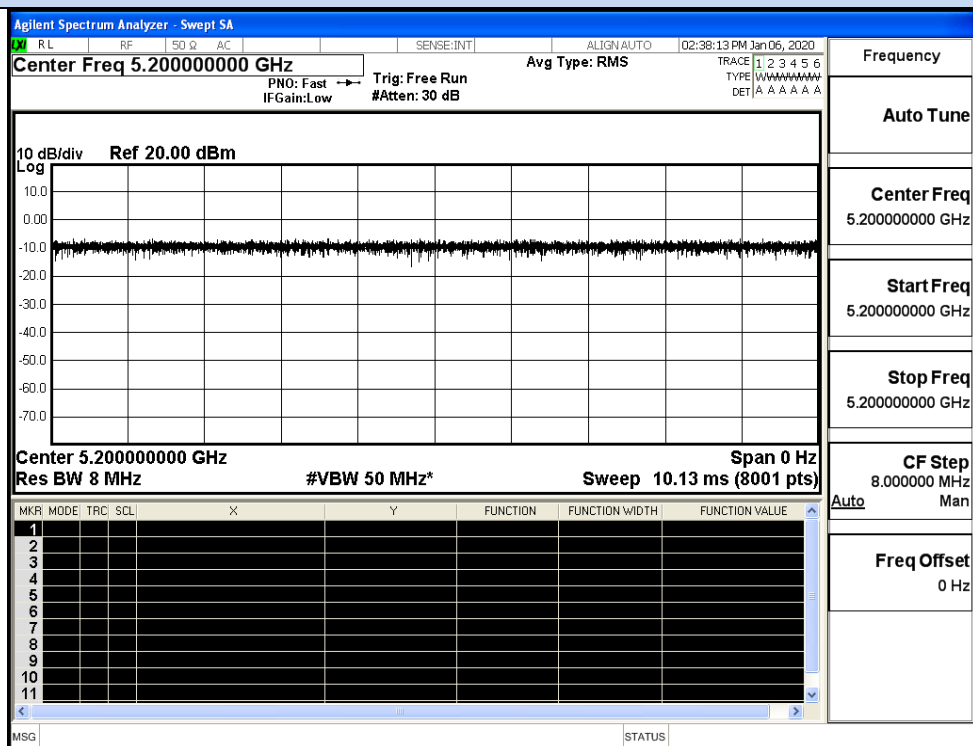
IEEE 802.11a



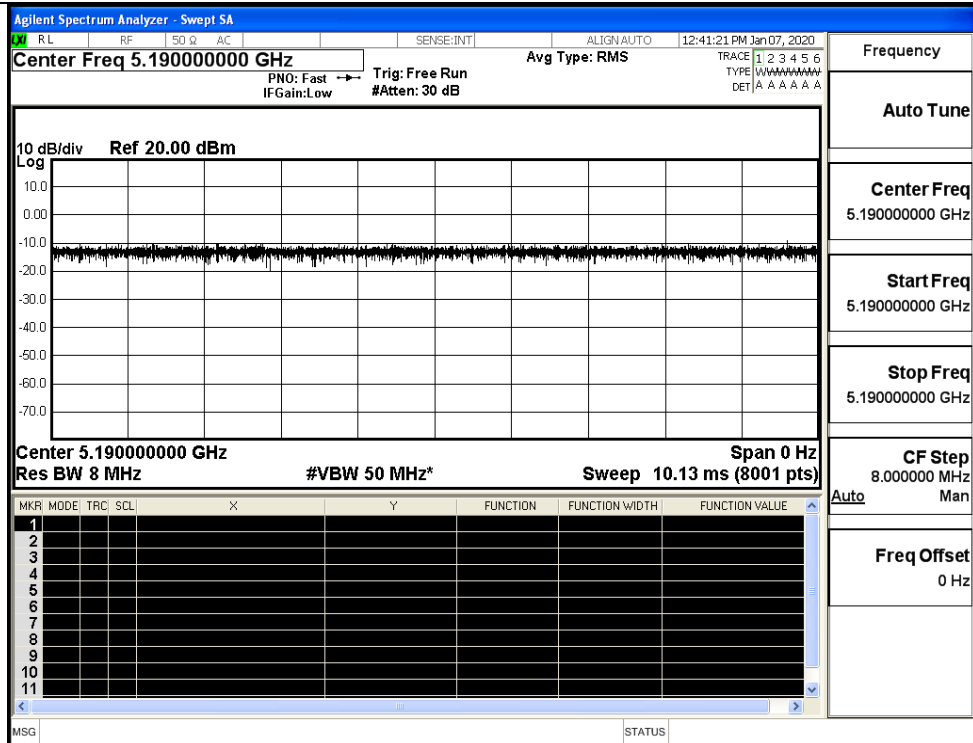
IEEE 802.11n HT20



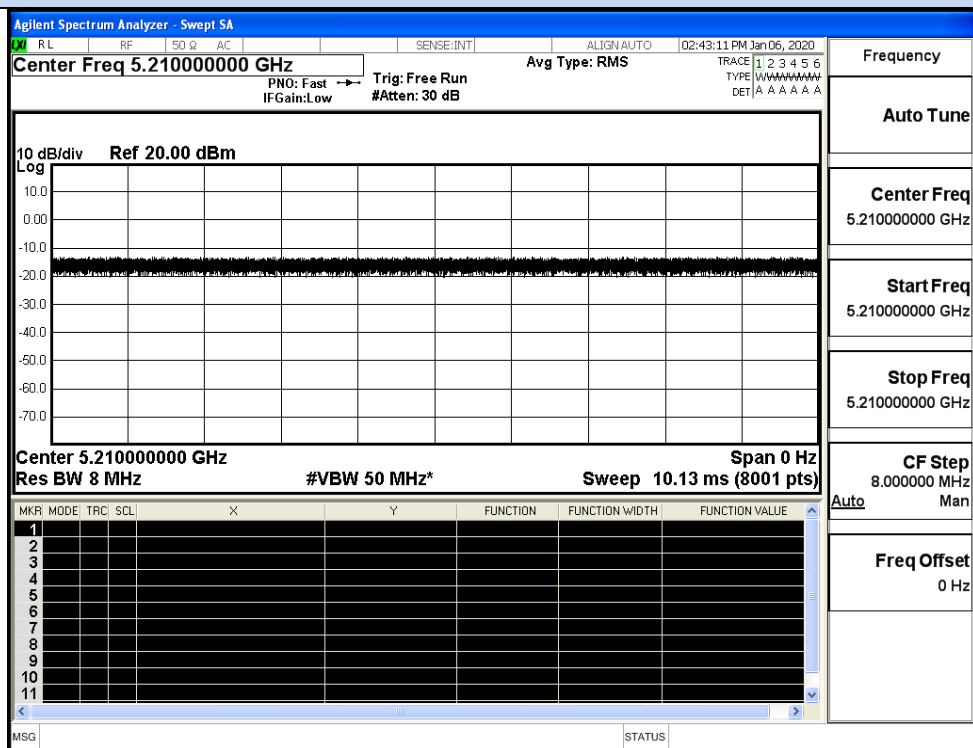
IEEE 802.11n HT40



IEEE 802.11AC20



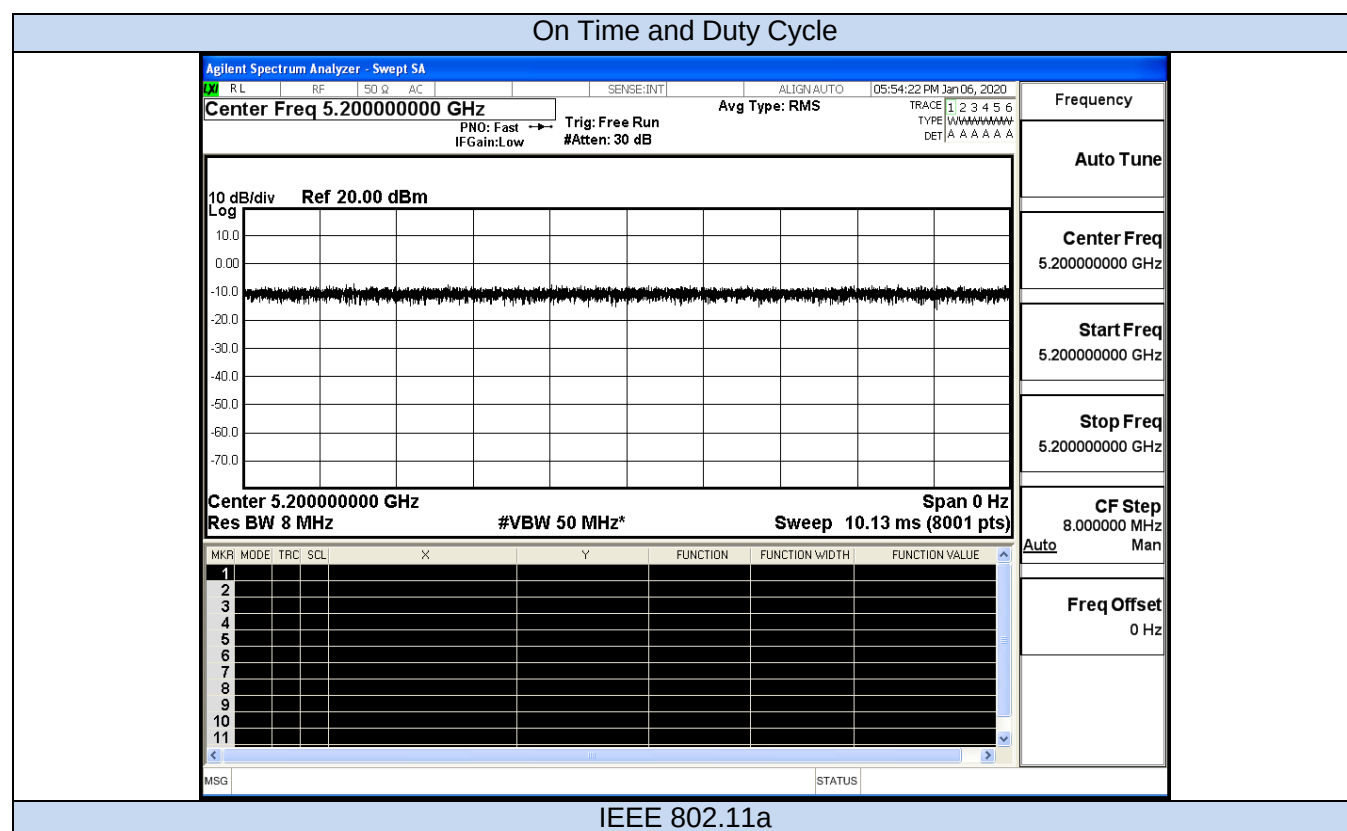
IEEE 802.11 AC40

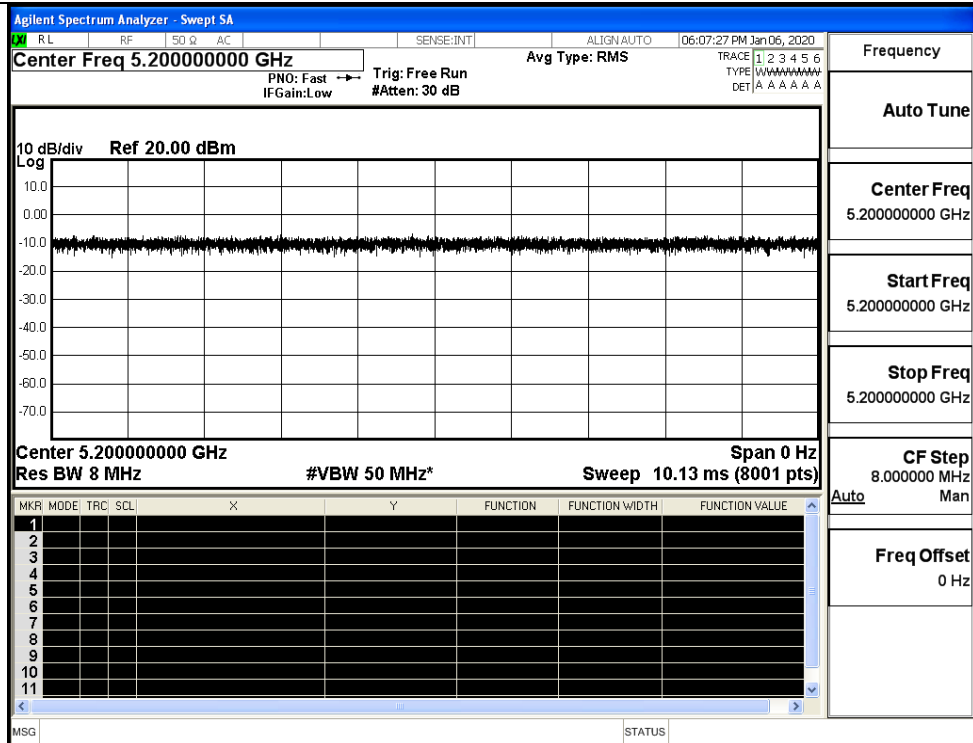


IEEE 802.11AC80

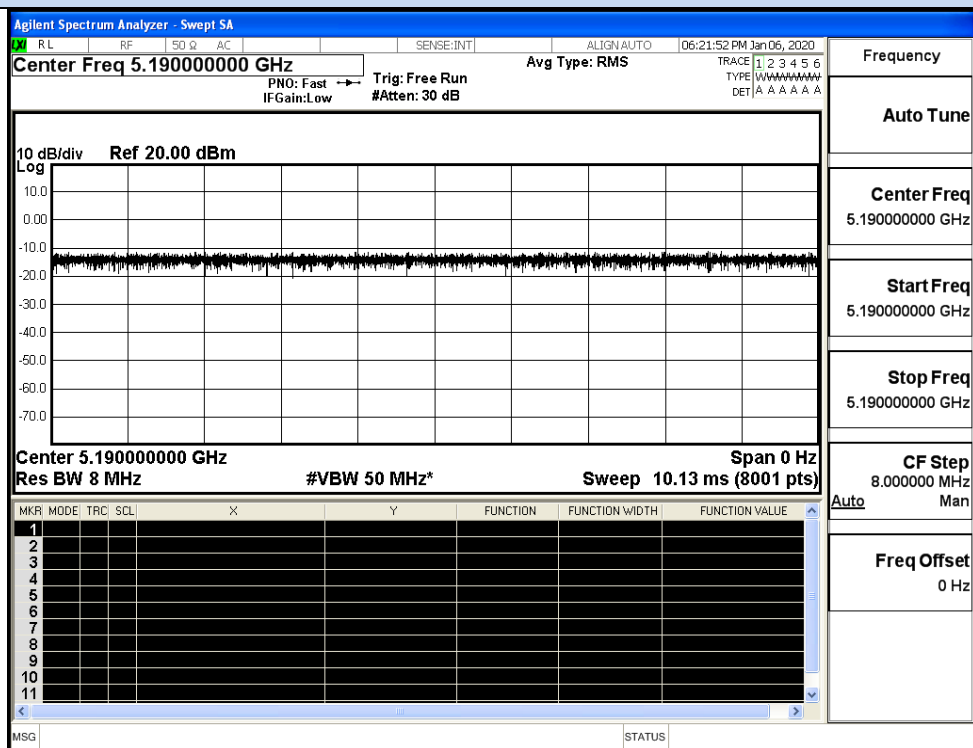
Ant1

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

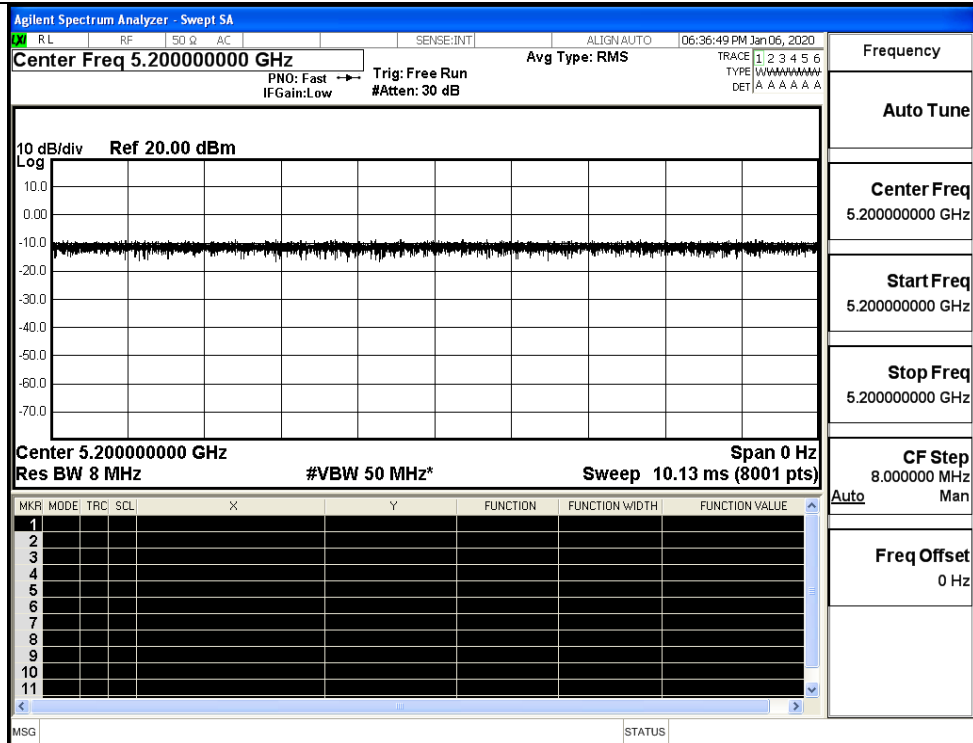




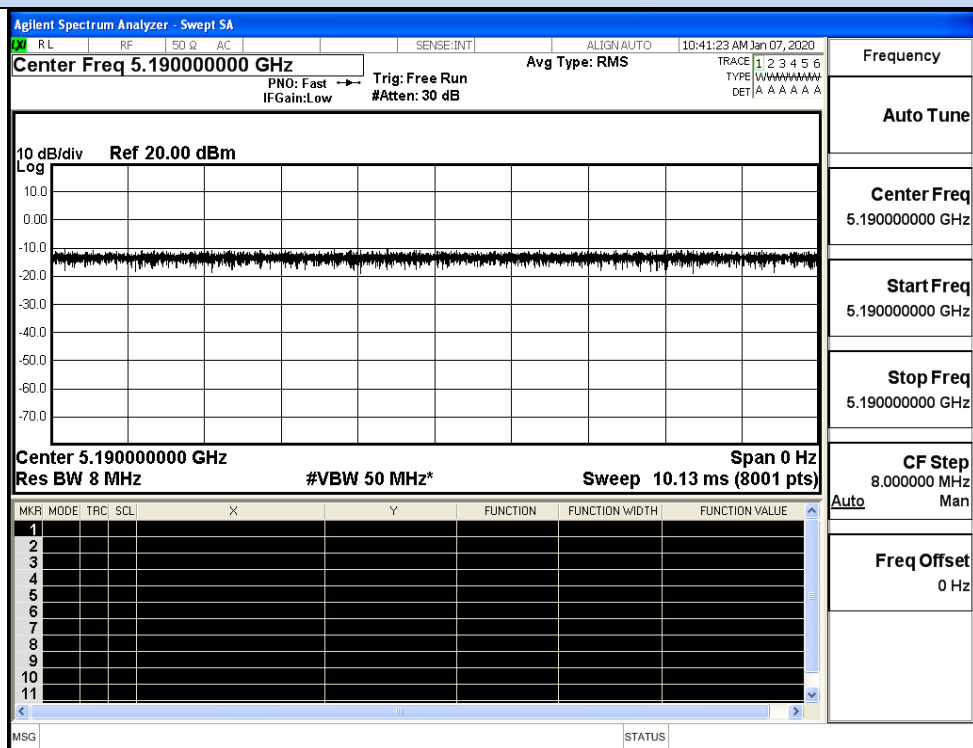
IEEE 802.11n HT20



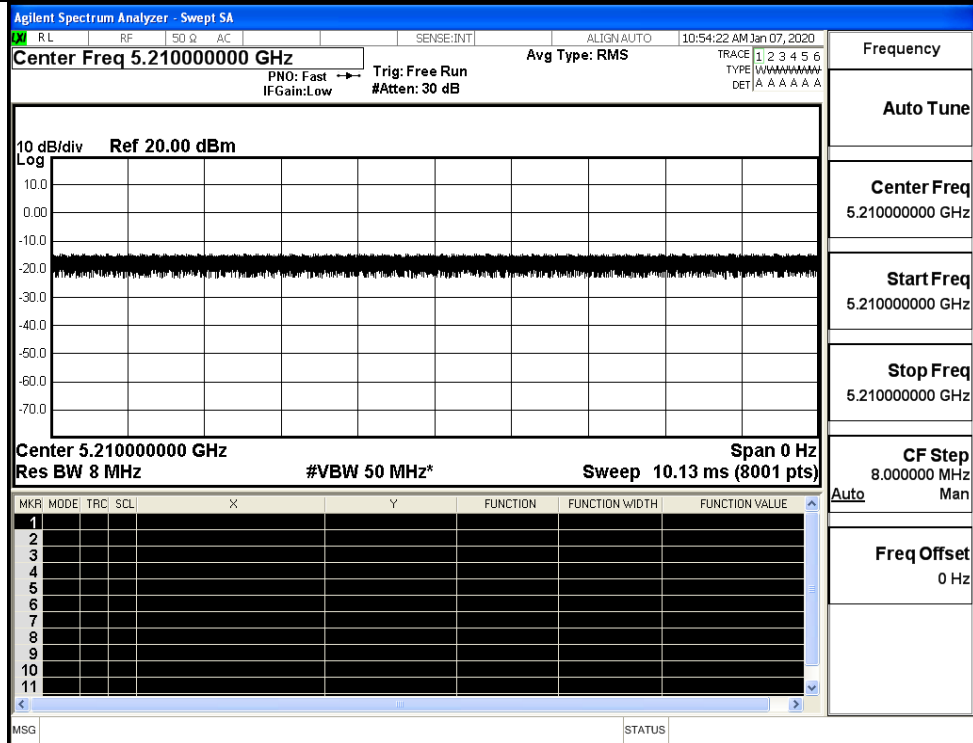
IEEE 802.11n HT40



IEEE 802.11AC20



IEEE 802.11 AC40



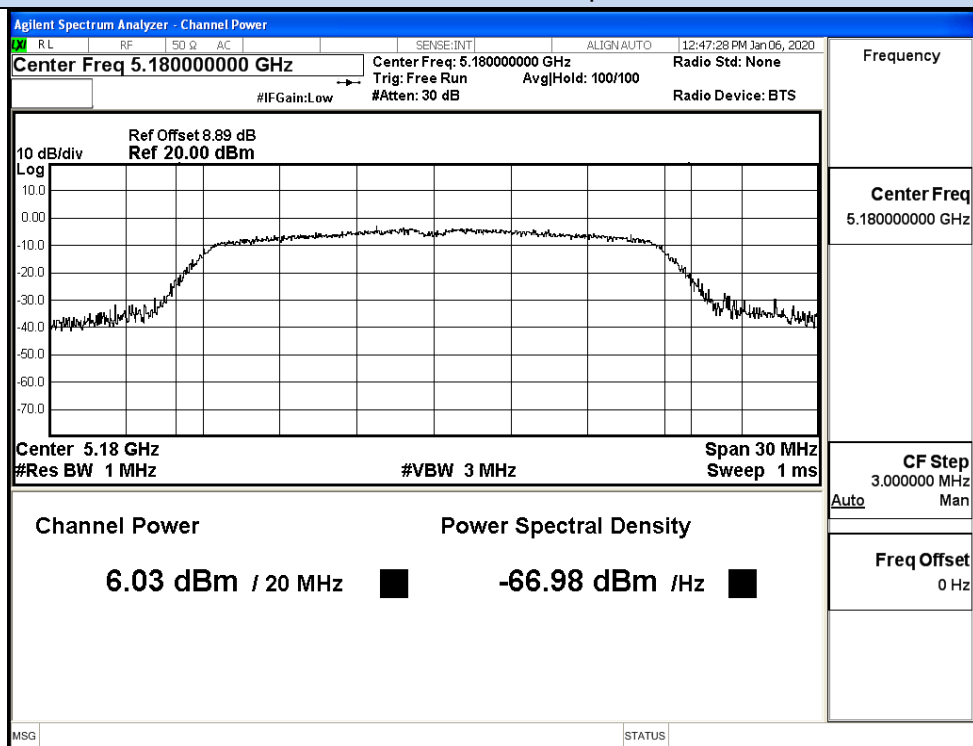
IEEE 802.11AC80

D.2 Maximum Conduct Output Power

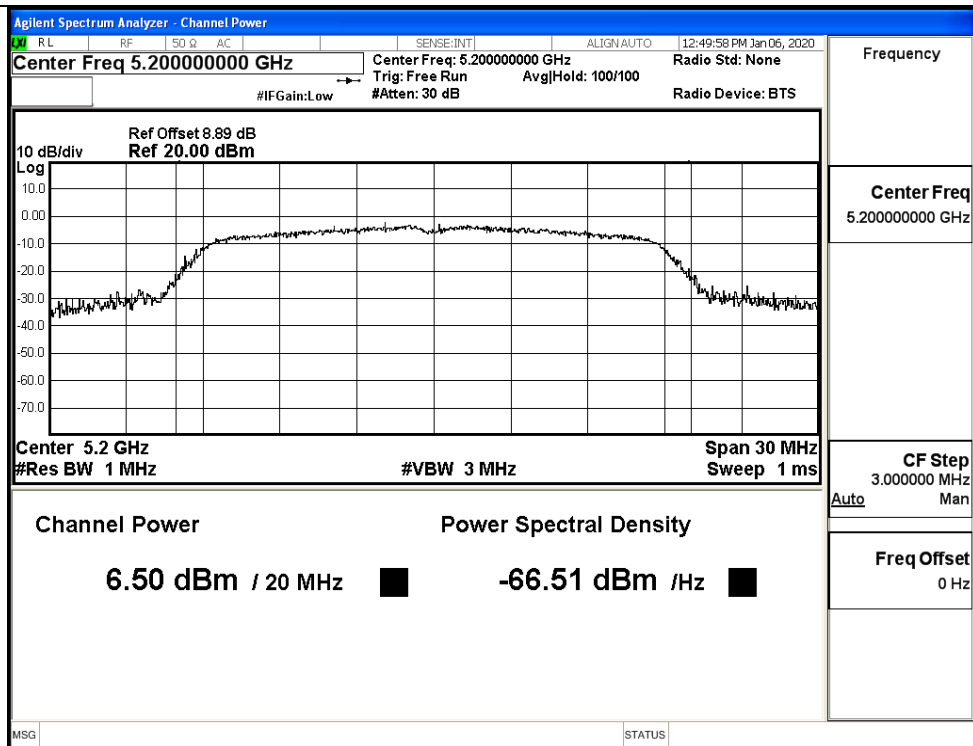
Ant0

Test Mode	Channel	Frequency (MHz)	AVG Conducted Power (dBm)	Duty Cycle Factor (dB)	Report Conducted Power (dBm)	Limit (dBm)	Verdict
11A	36	5180	6.03	0	6.03	24	Pass
	40	5200	6.5	0	6.5		Pass
	48	5240	4.72	0	4.72		Pass
11N20 SISO	36	5180	5.89	0	5.89	24	Pass
	40	5200	6.42	0	6.42		Pass
	48	5240	4.75	0	4.75		Pass
11N40 SISO	38	5190	5.73	0	5.73	24	Pass
	46	5230	4.31	0	4.31		Pass
11AC20 SISO	36	5180	5.74	0	5.74	24	Pass
	40	5200	6.46	0	6.46		Pass
	48	5240	4.82	0	4.82		Pass
11AC40 SISO	38	5190	5.88	0	5.88	24	Pass
	46	5230	4.31	0	4.31		Pass
11AC80 SISO	42	5210	5.37	0	5.37	24	Pass

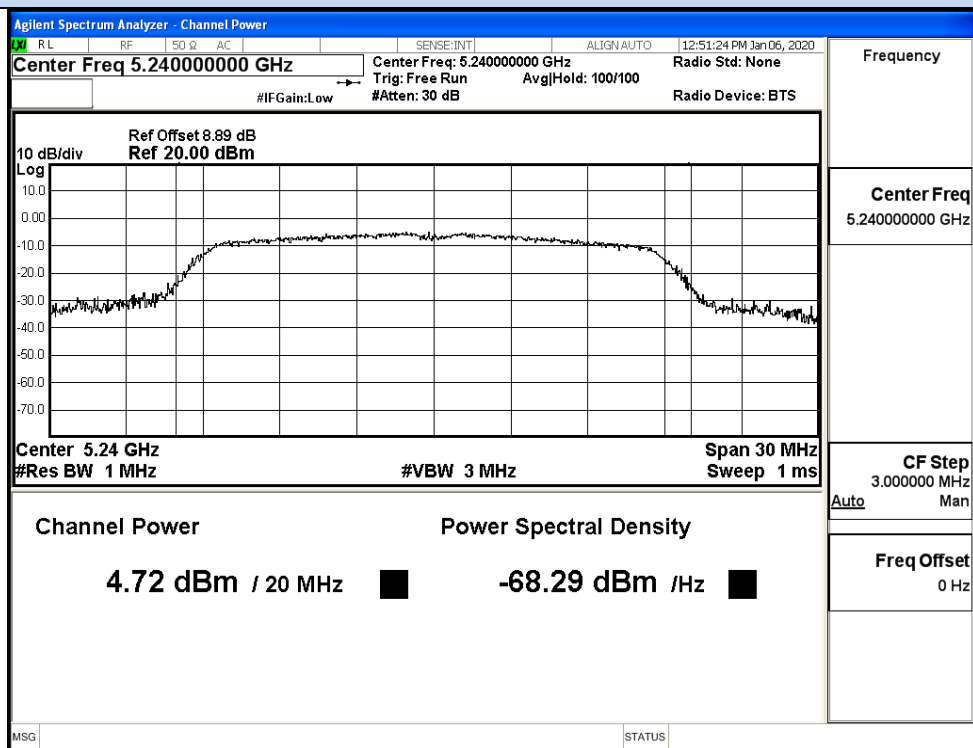
Maximum Conducted Output Power



IEEE 802.11a / Channel 36 / 5180MHz

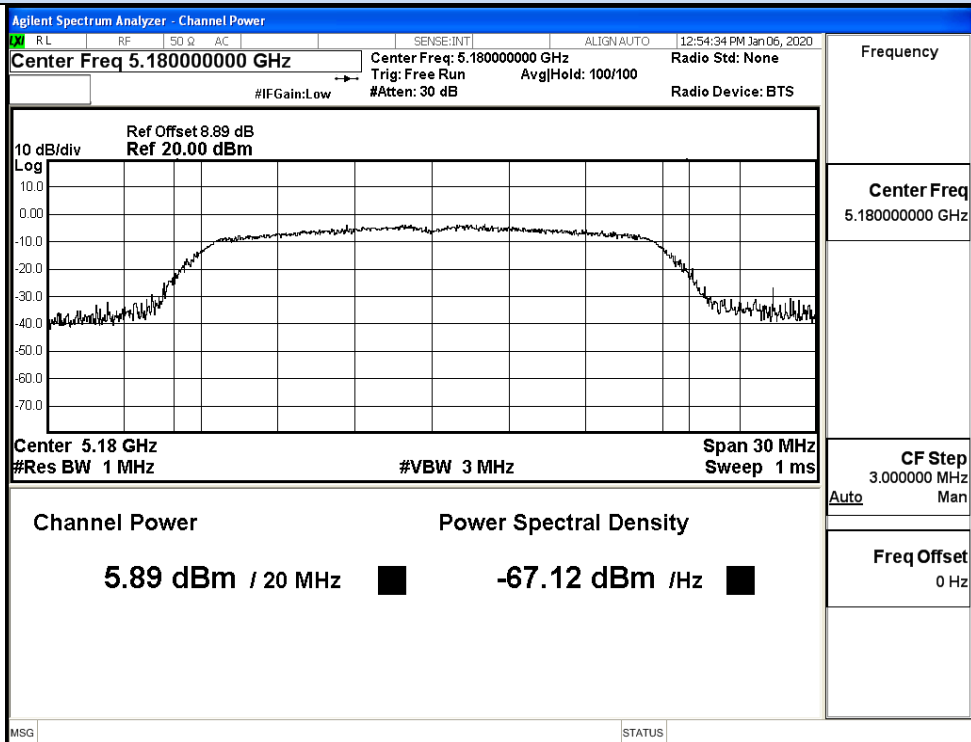


IEEE 802.11a / Channel 40 / 5200MHz

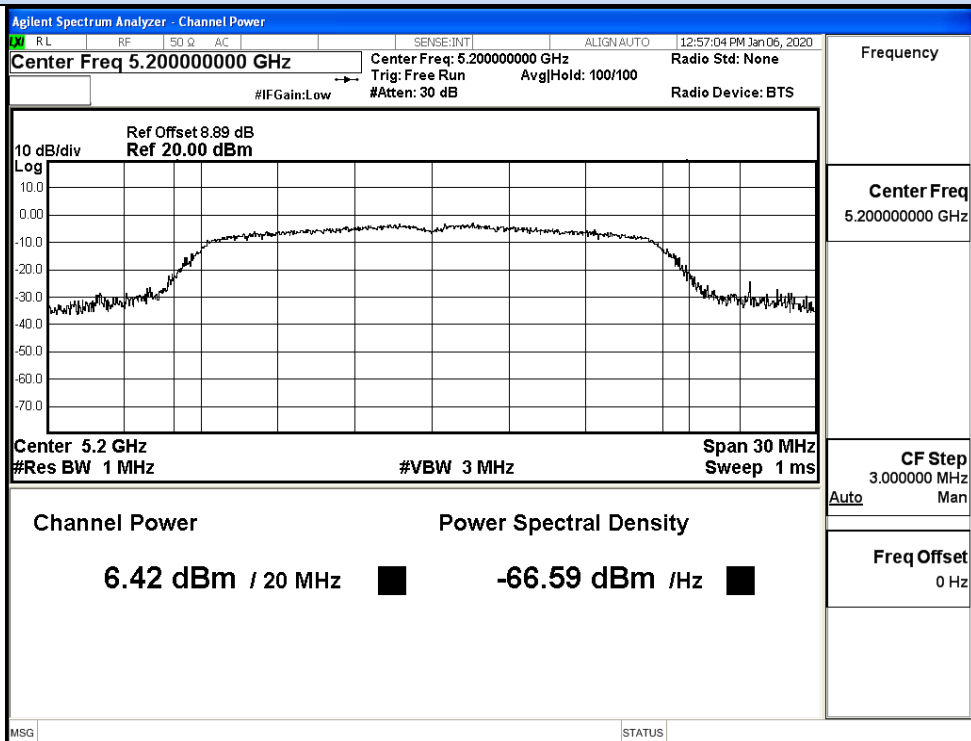


IEEE 802.11a / Channel 48 / 5240MHz

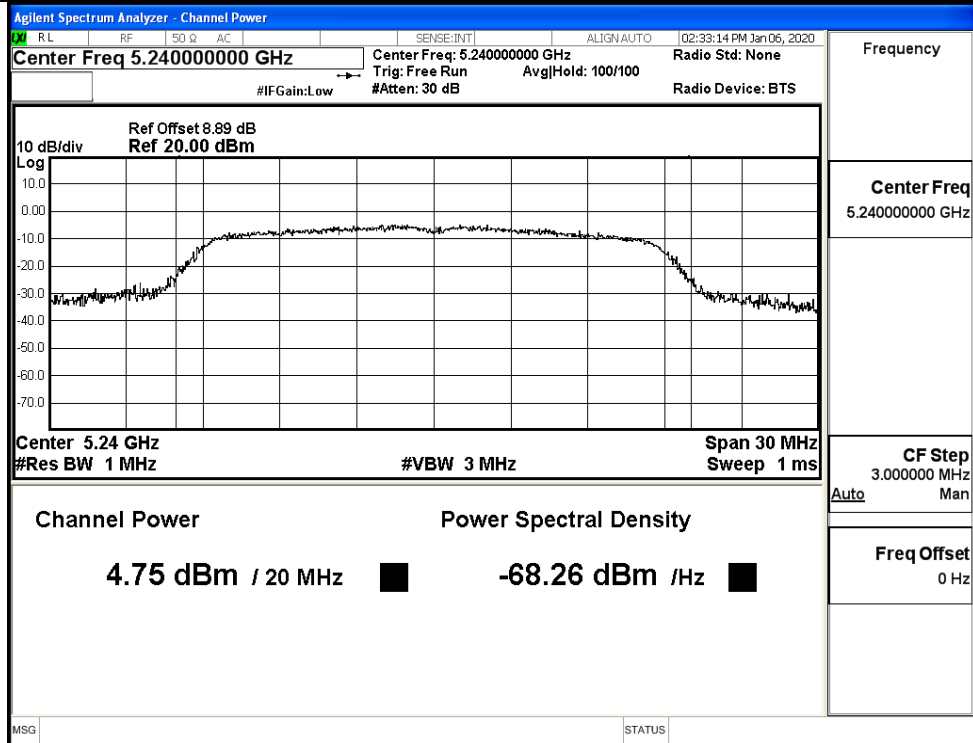
Maximum Conducted Output Power



IEEE 802.11n20 / Channel 36 / 5180MHz

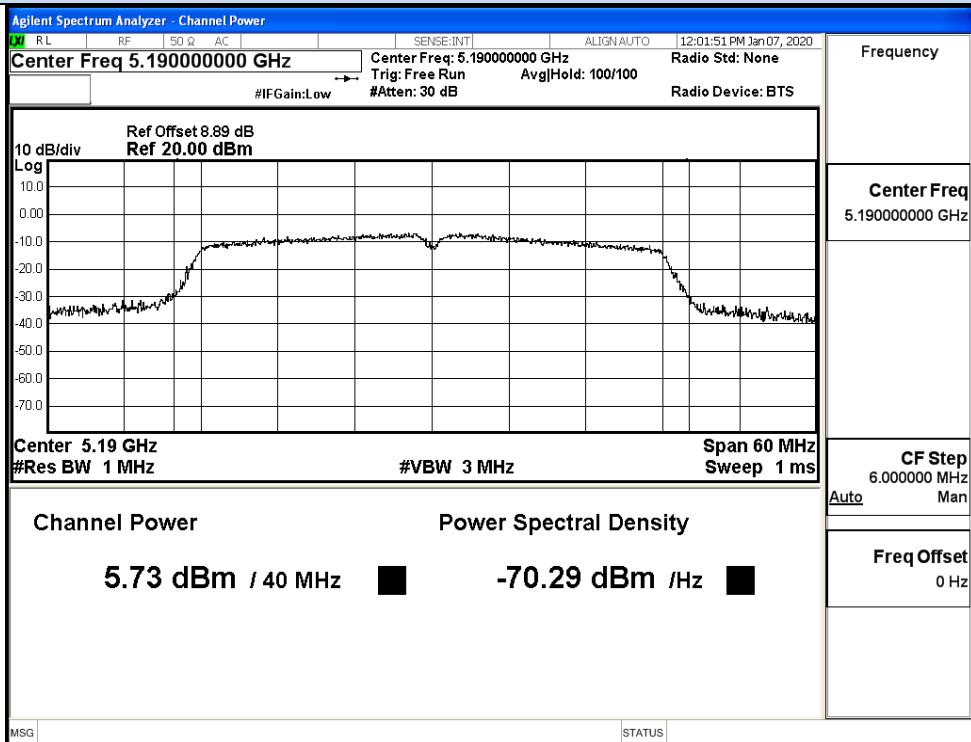


IEEE 802.11n20 / Channel 40 / 5200MHz

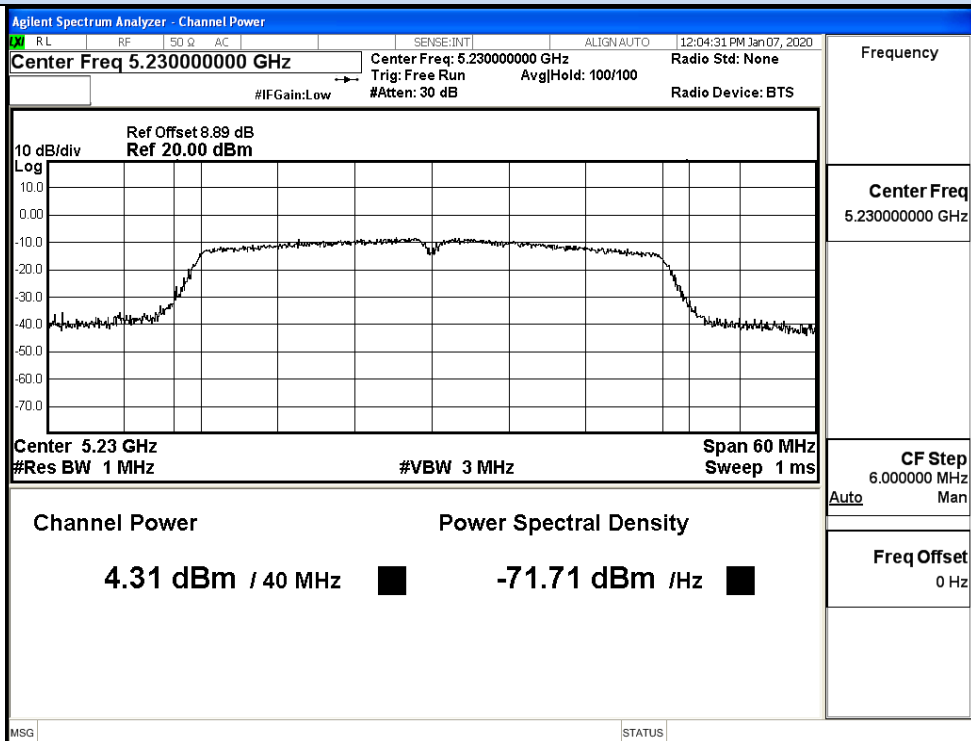


IEEE 802.11n20 / Channel 48 / 5240MHz

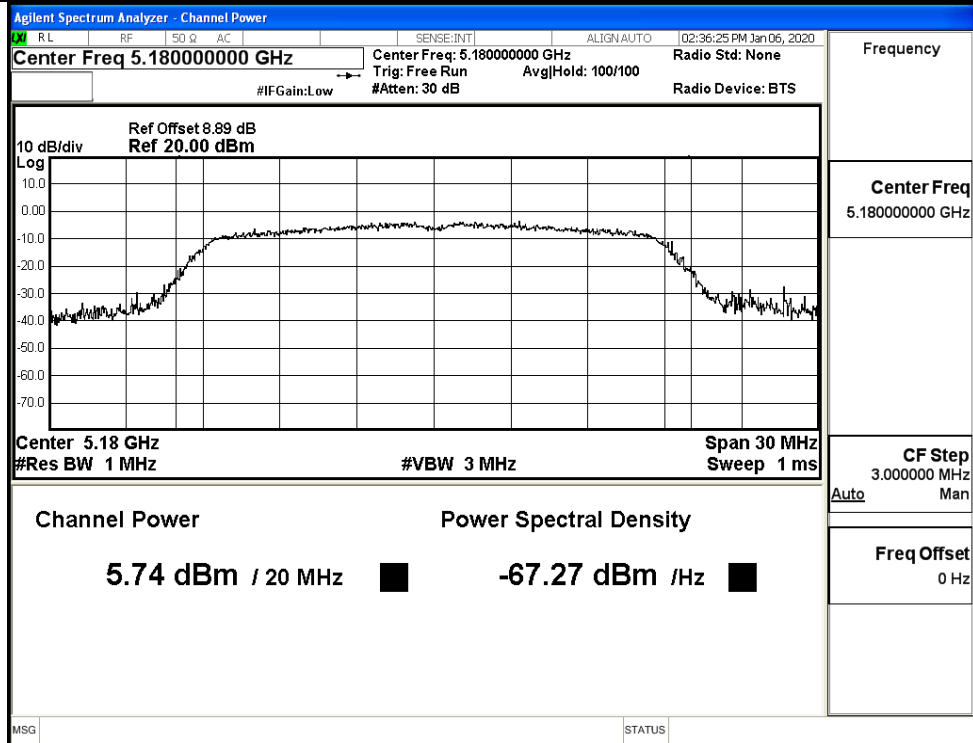
Maximum Conducted Output Power



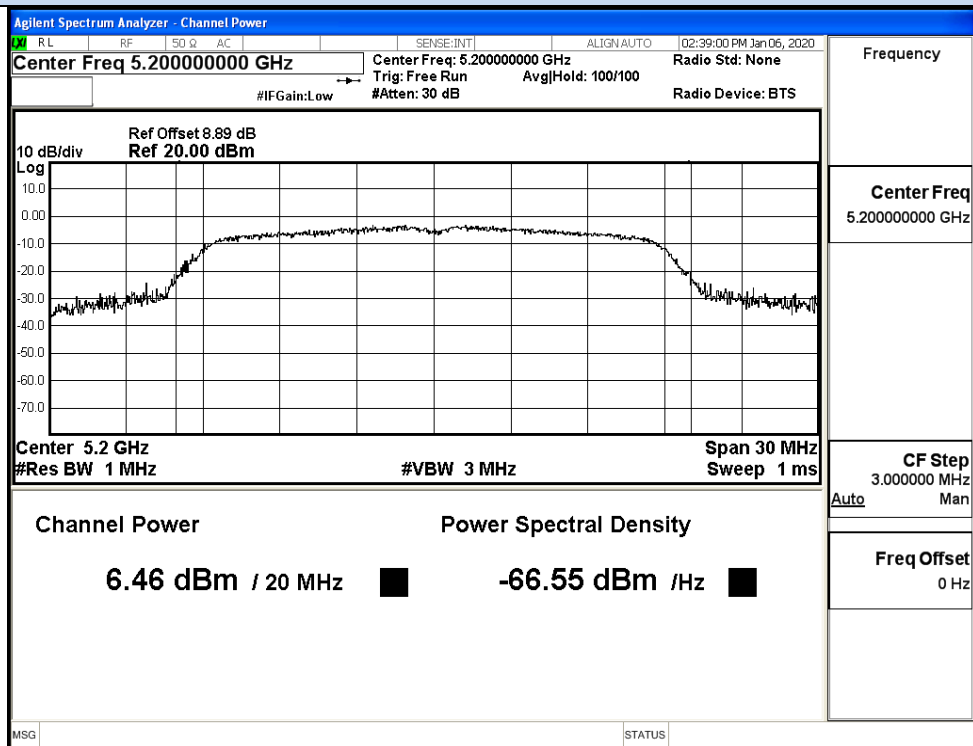
IEEE 802.11n40 / Channel 38 / 5190MHz



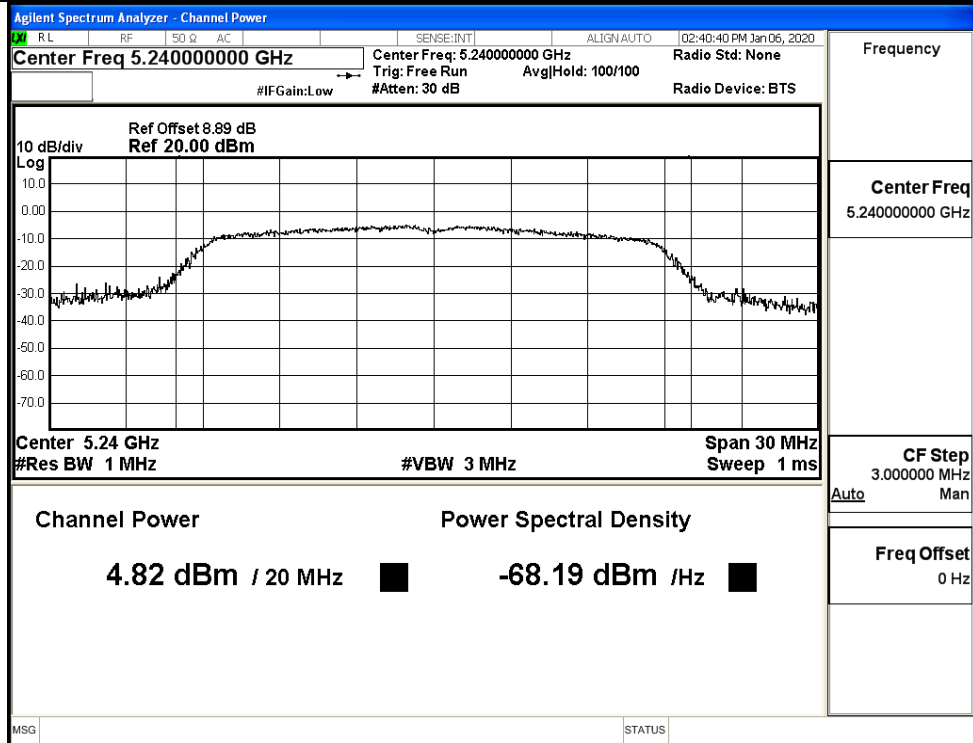
IEEE 802.11n40 / Channel 46 / 5230MHz



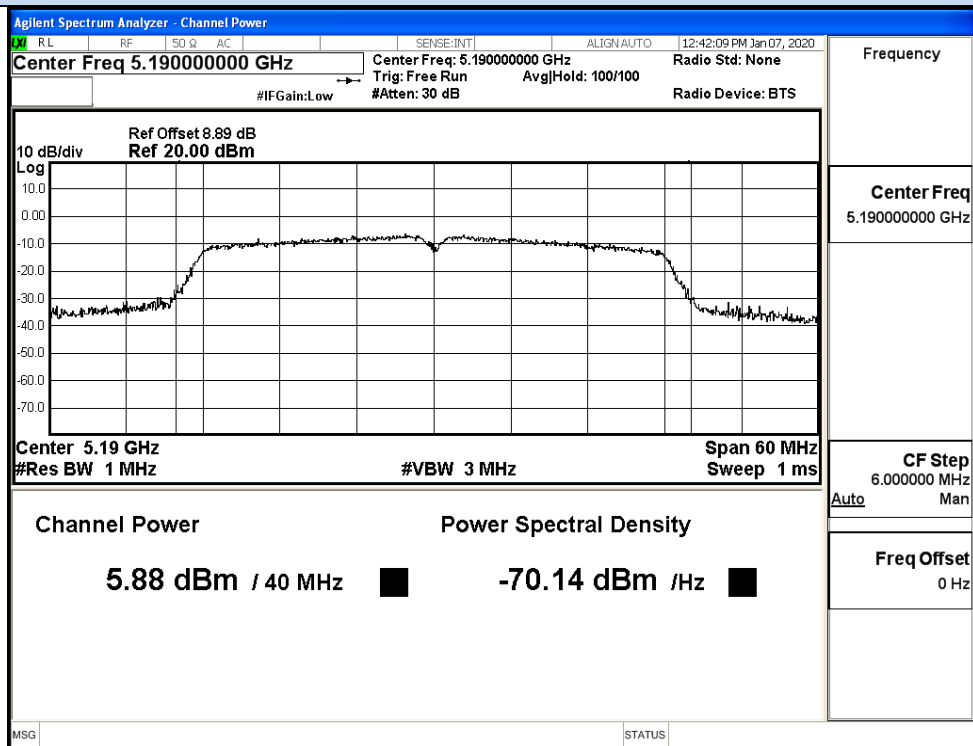
IEEE 802.11ac20 / Channel 36 / 5180MHz



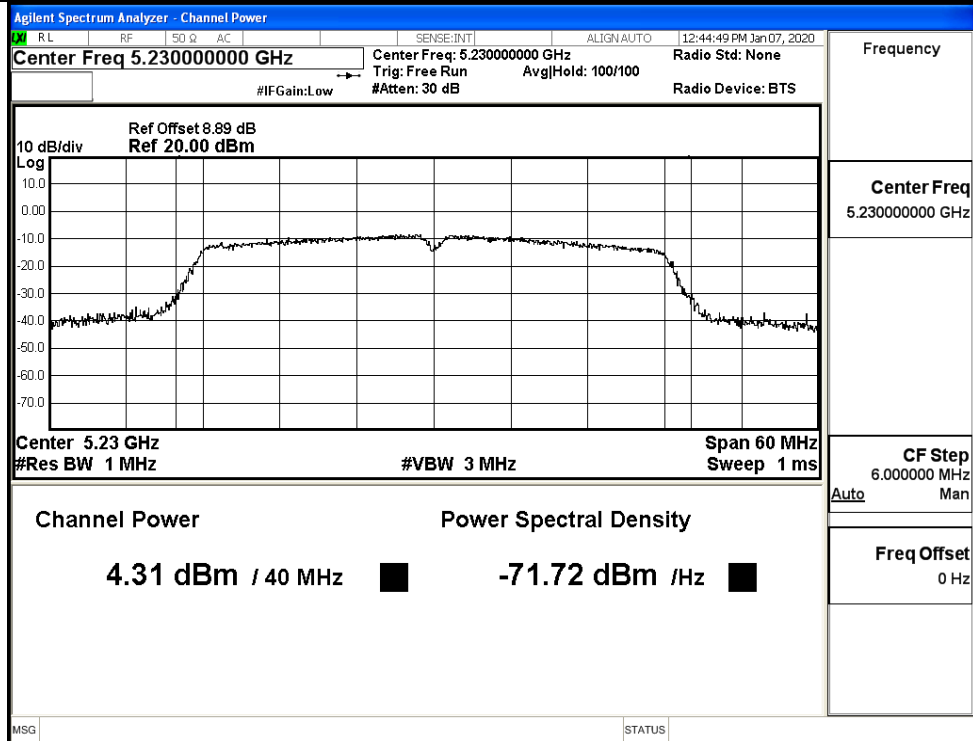
IEEE 802.11ac20 / Channel 40 / 5200MHz



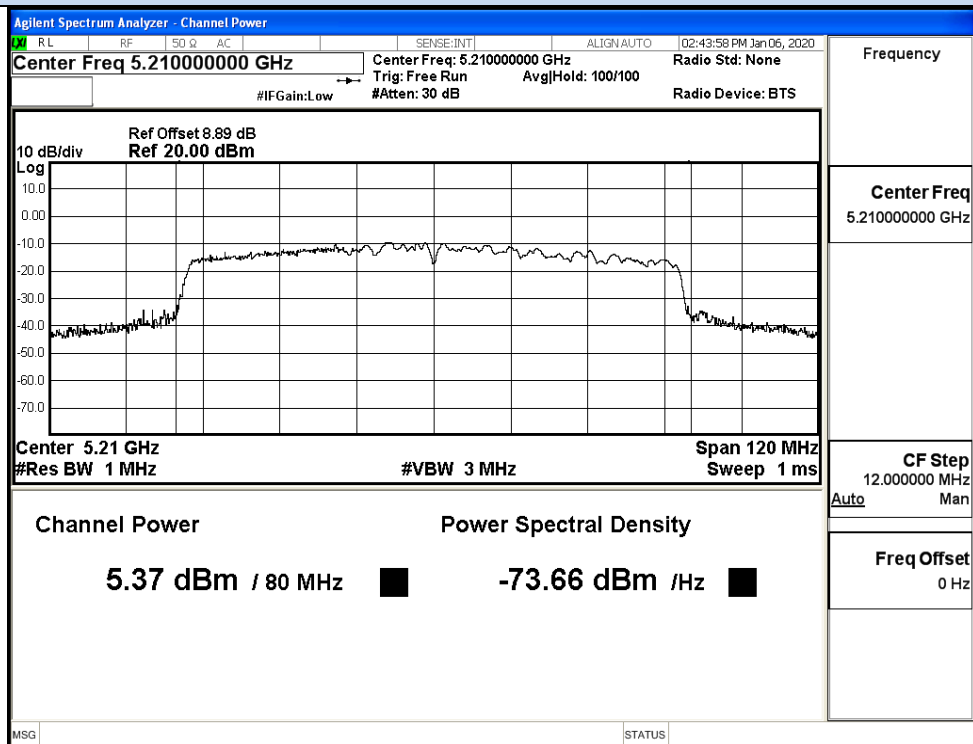
IEEE 802.11ac20 / Channel 48 / 5240MHz



IEEE 802.11ac40 / Channel 38 / 5190MHz



IEEE 802.11ac40 / Channel 46 / 5230MHz

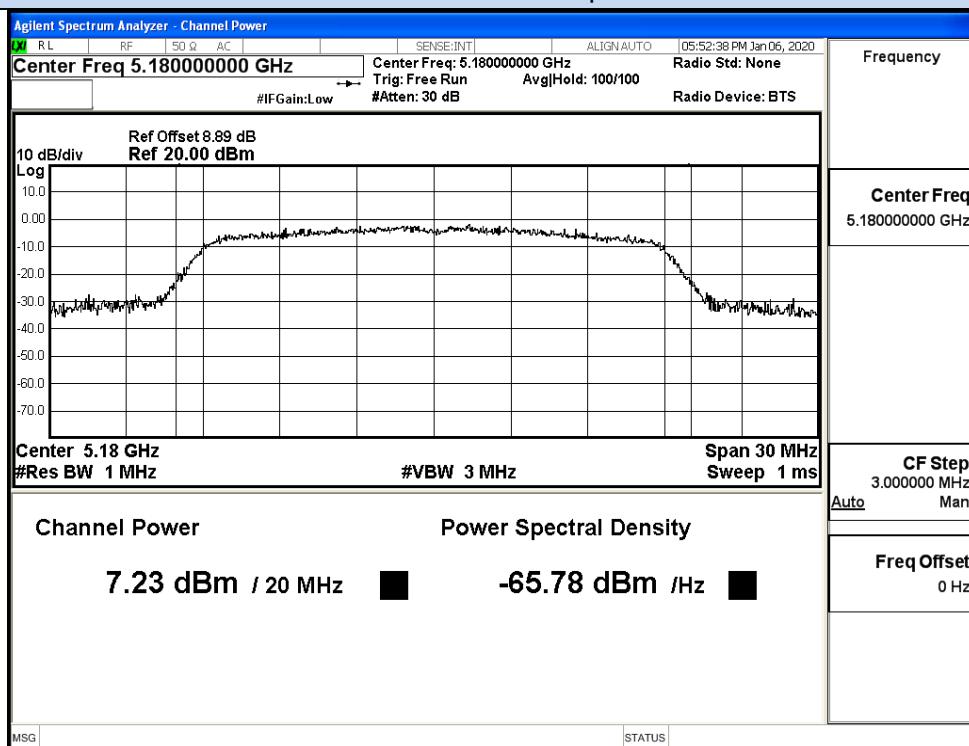


IEEE 802.11ac80 / Channel 42 / 5210MHz

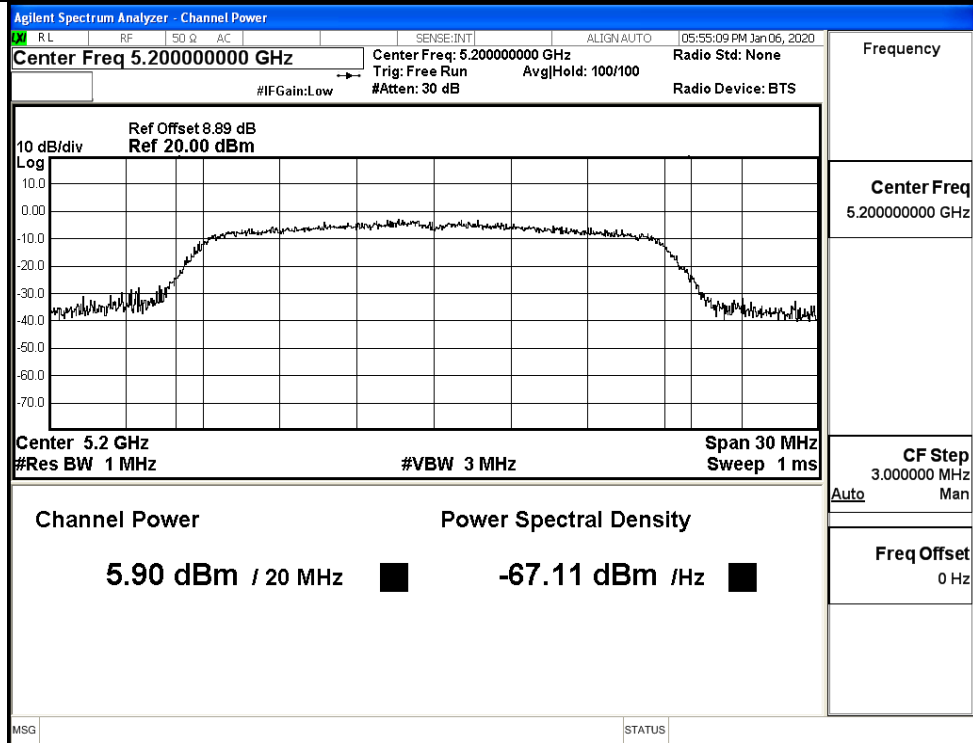
Ant1

Test Mode	Channel	Frequency (MHz)	AVG Conducted Power (dBm)	Duty Cycle Factor(dB)	Report Conducted Power(dBm)	Limit (dBm)	Verdict
11A	36	5180	7.23	0	7.23	24	Pass
	40	5200	5.9	0	5.9		Pass
	48	5240	3.97	0	3.97		Pass
11N20 SISO	36	5180	7.31	0	7.31	24	Pass
	40	5200	6.23	0	6.23		Pass
	48	5240	3.91	0	3.91		Pass
11N40 SISO	38	5190	5.04	0	5.04	24	Pass
	46	5230	3.22	0	3.22		Pass
11AC20 SISO	36	5180	5.46	0	5.46	24	Pass
	40	5200	4.49	0	4.49		Pass
	48	5240	2.79	0	2.79		Pass
11AC40 SISO	38	5190	5.47	0	5.47	24	Pass
	46	5230	3.97	0	3.97		Pass
11AC80 SISO	42	5210	4.84	0	4.84	24	Pass

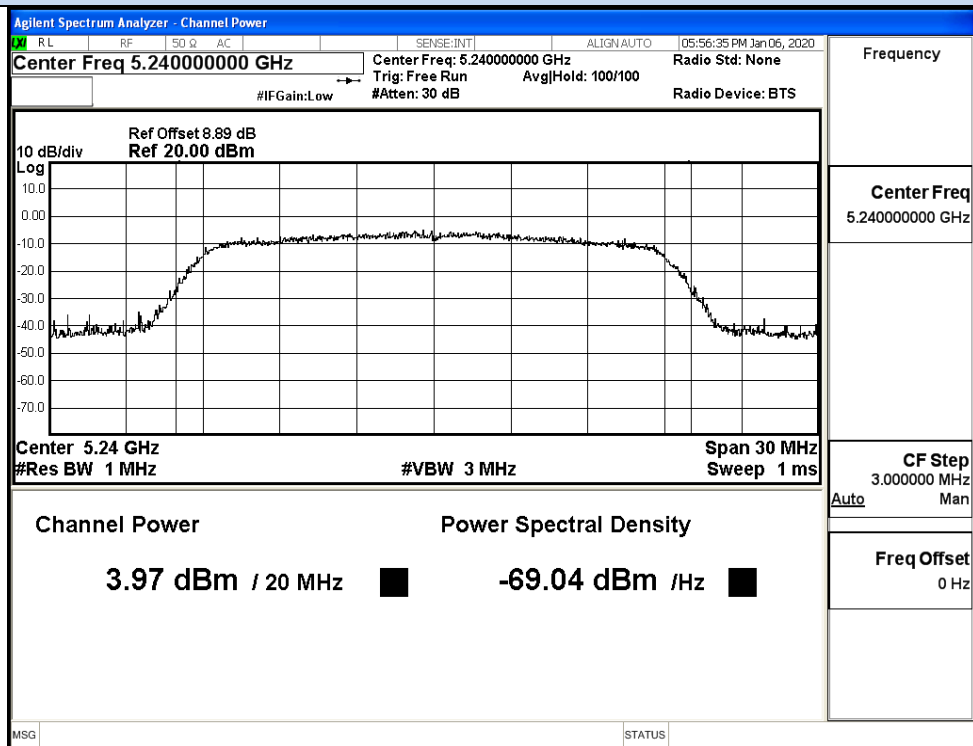
Maximum Conducted Output Power



IEEE 802.11a / Channel 36 / 5180MHz

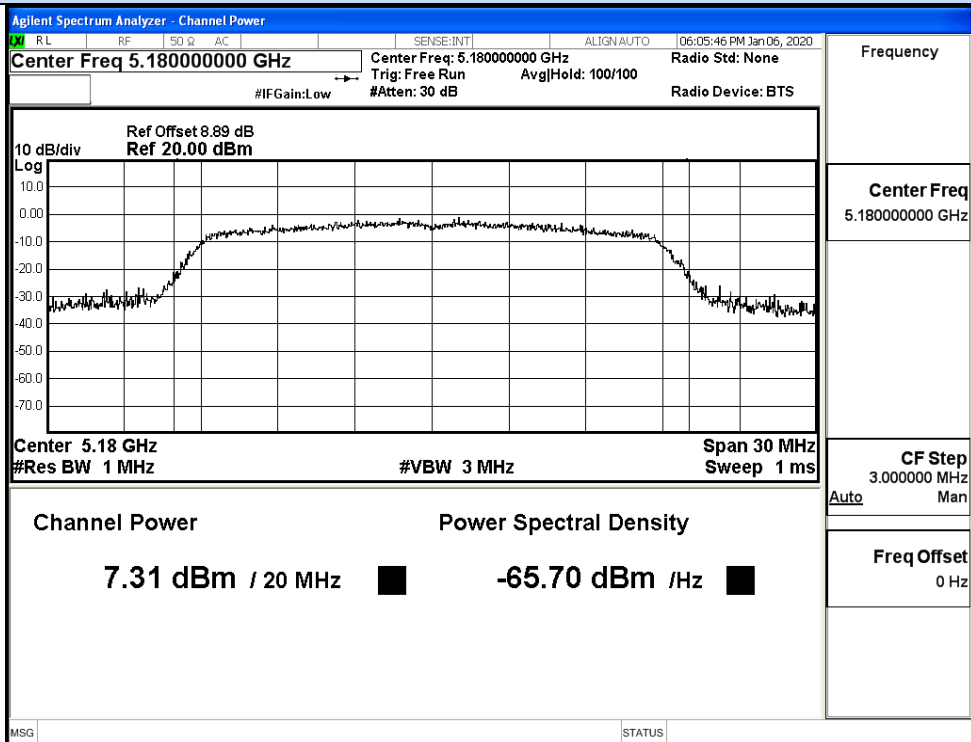


IEEE 802.11a / Channel 40 / 5200MHz

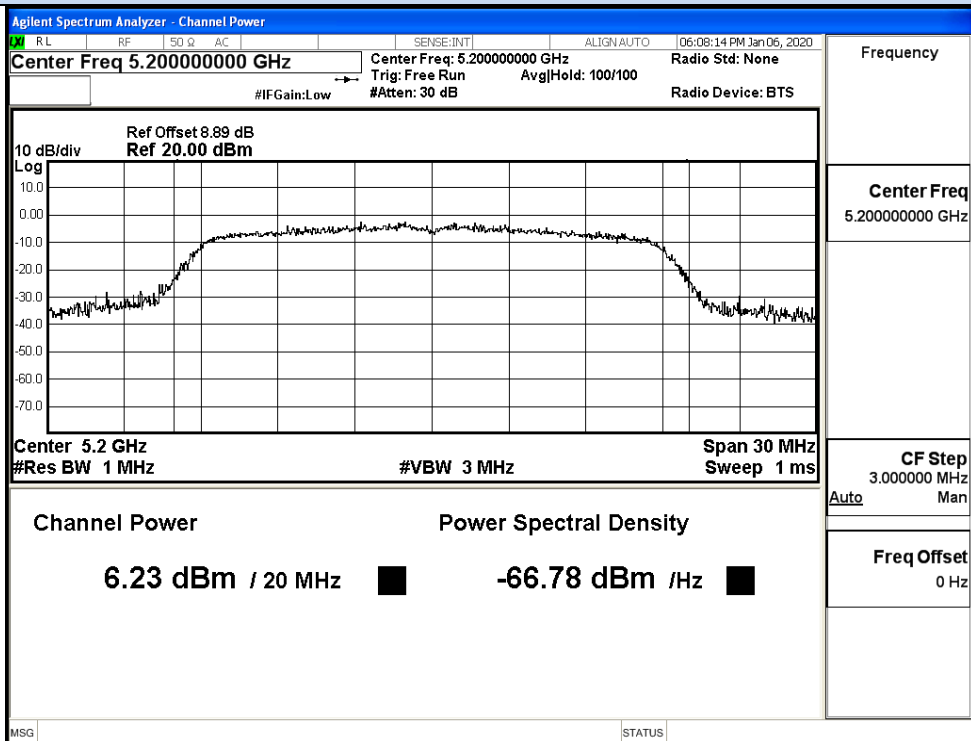


IEEE 802.11a / Channel 48 / 5240MHz

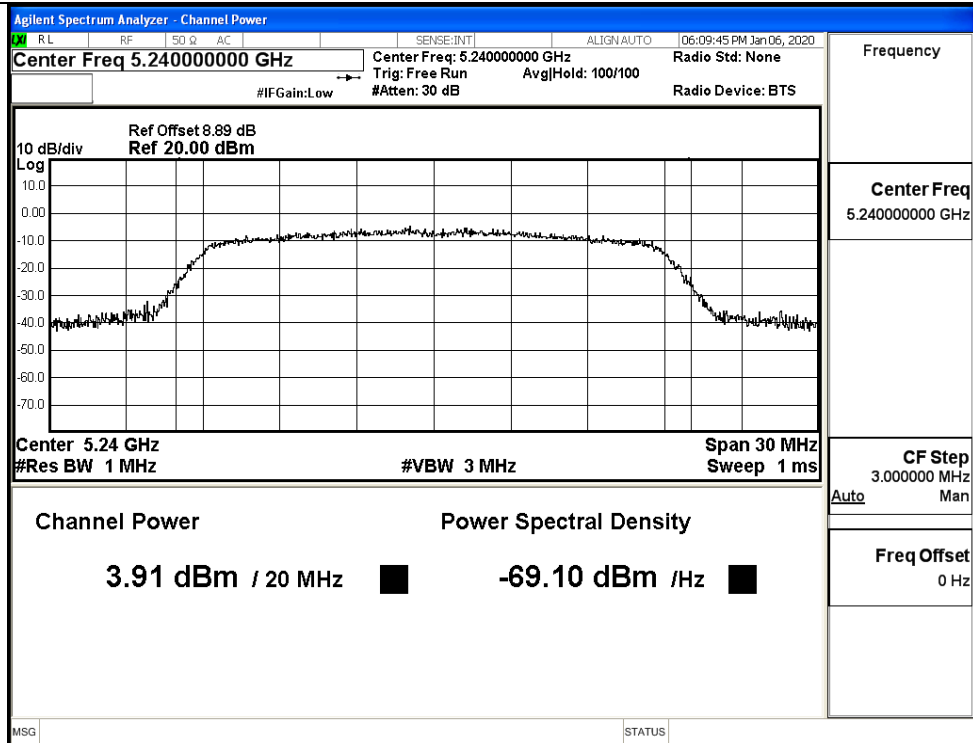
Maximum Conducted Output Power



IEEE 802.11n20 / Channel 36 / 5180MHz

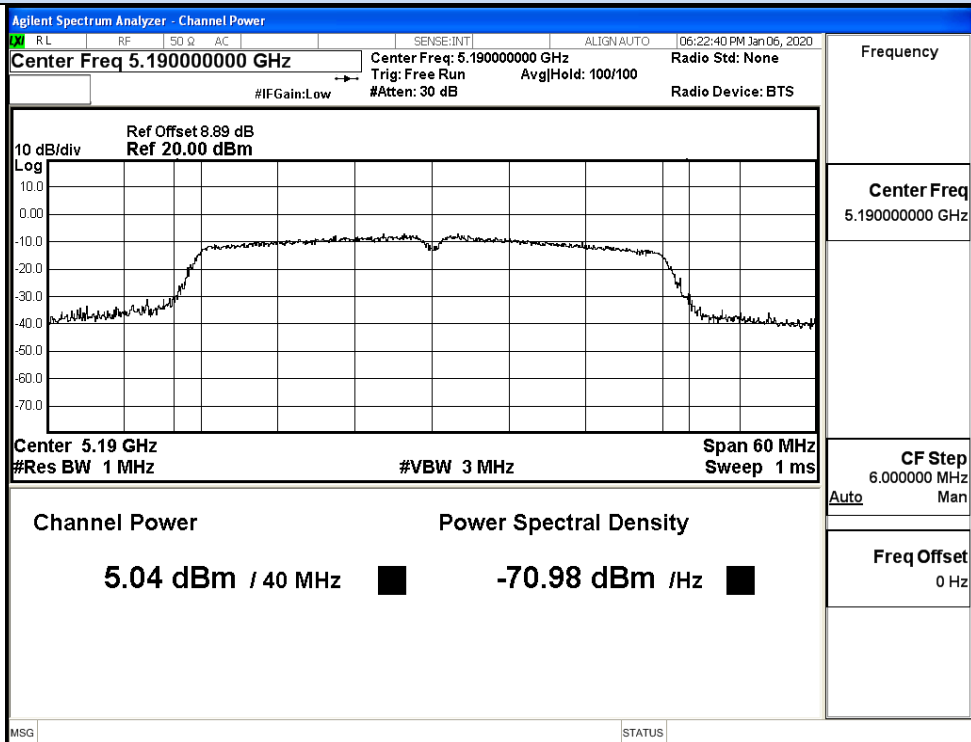


IEEE 802.11n20 / Channel 40 / 5200MHz

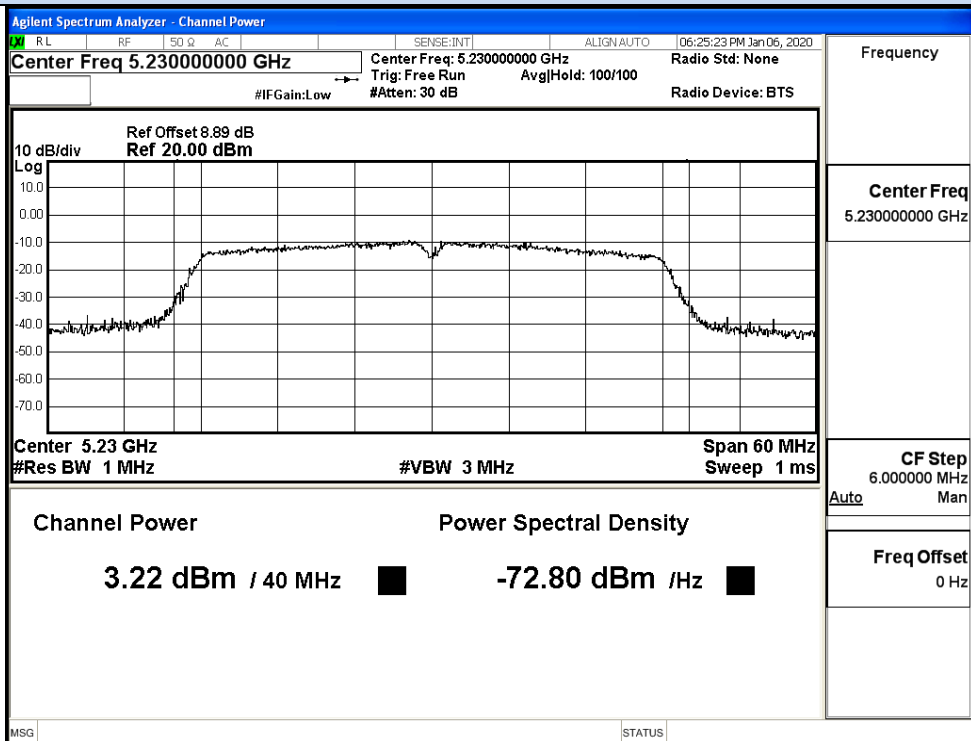


IEEE 802.11n20 / Channel 48 / 5240MHz

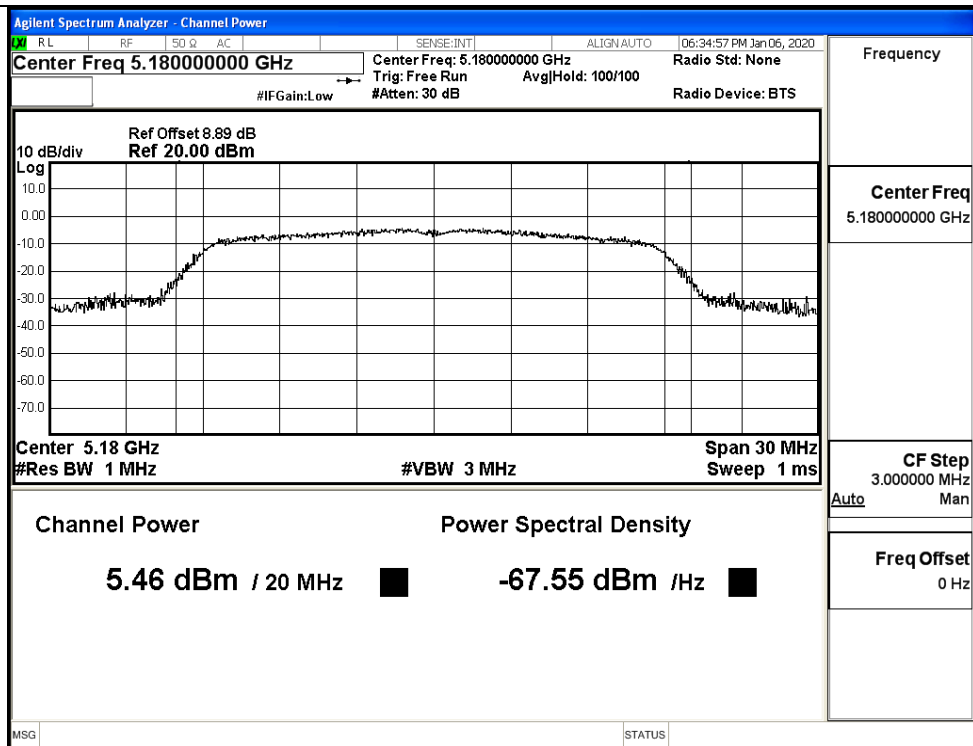
Maximum Conducted Output Power



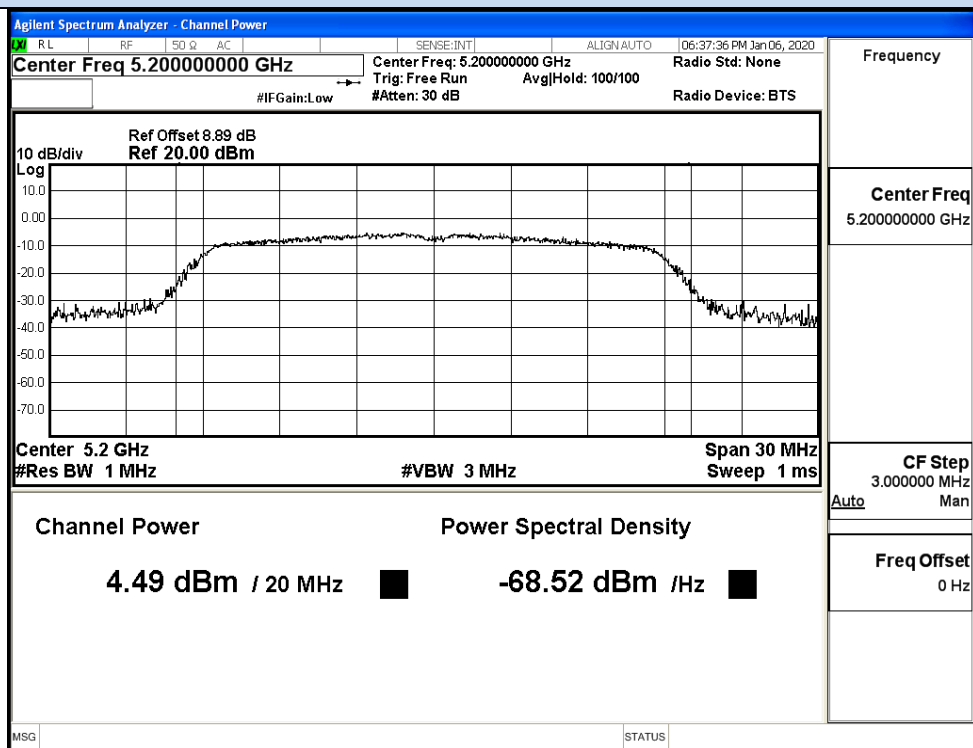
IEEE 802.11n40 / Channel 38 / 5190MHz



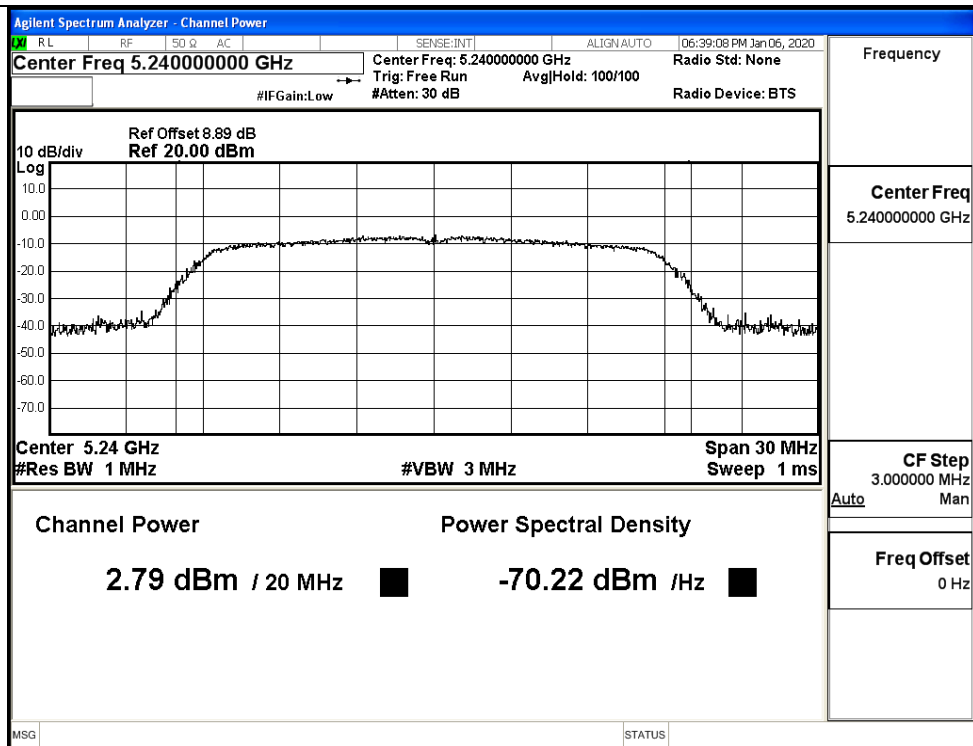
IEEE 802.11n40 / Channel 46 / 5230MHz



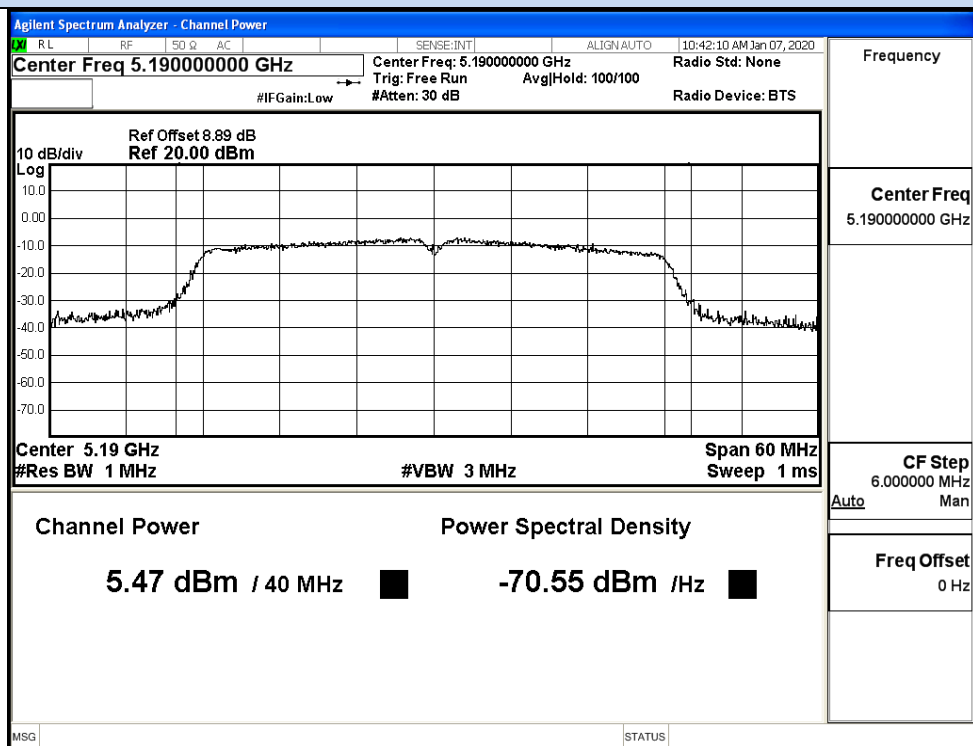
IEEE 802.11ac20 / Channel 36 / 5180MHz



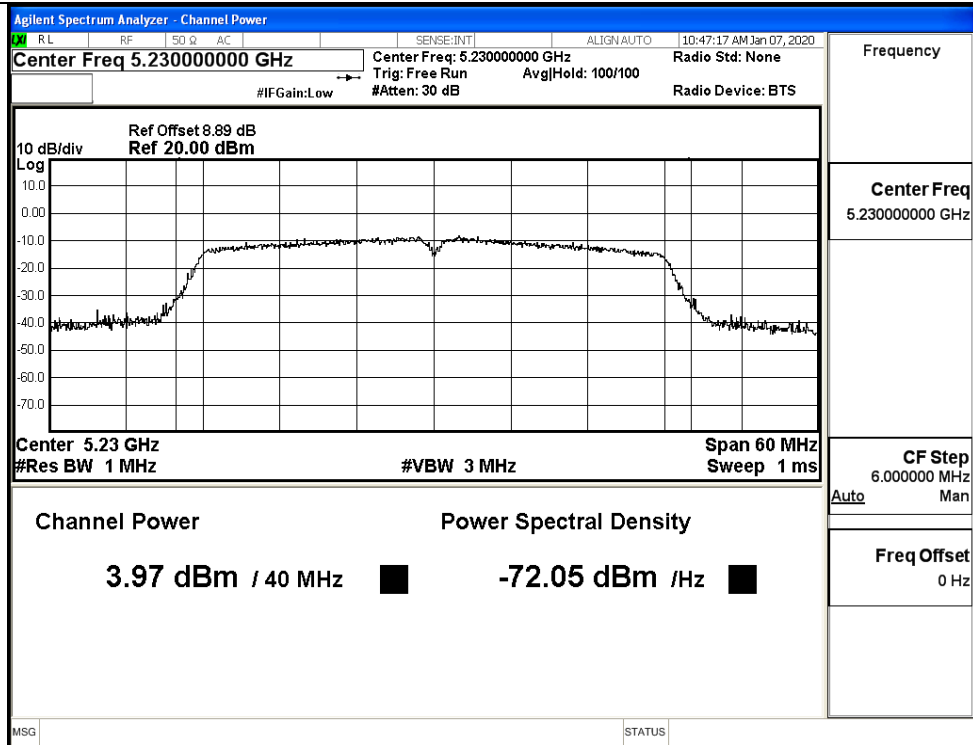
IEEE 802.11ac20 / Channel 40 / 5200MHz



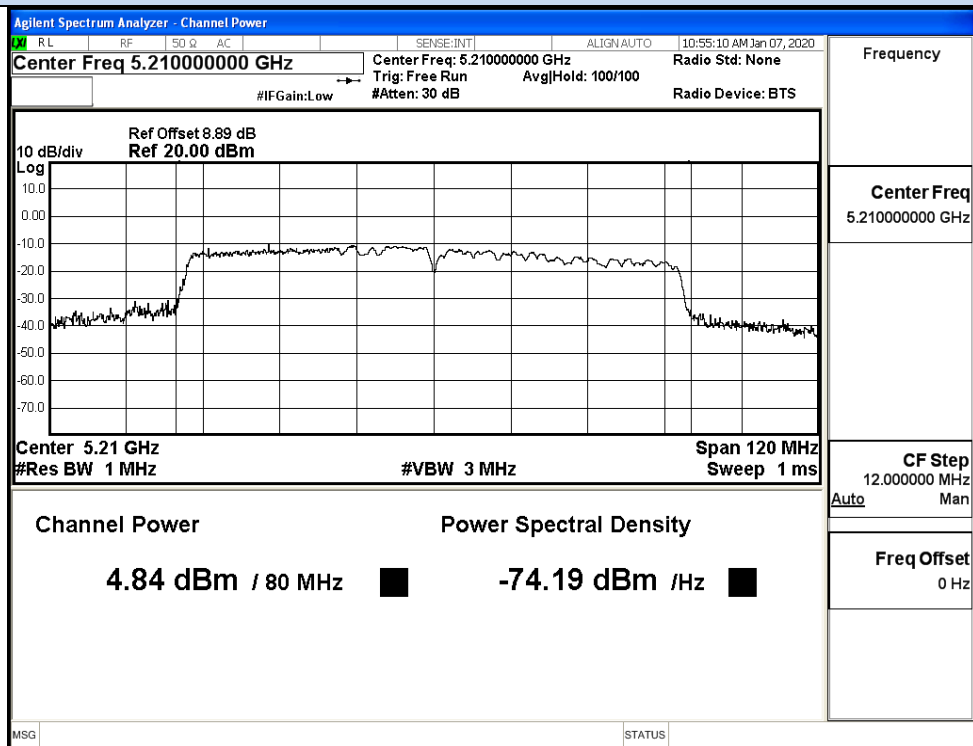
IEEE 802.11ac20 / Channel 48 / 5240MHz



IEEE 802.11ac40 / Channel 38 / 5190MHz



IEEE 802.11ac40 / Channel 46 / 5230MHz



IEEE 802.11ac80 / Channel 42 / 5210MHz

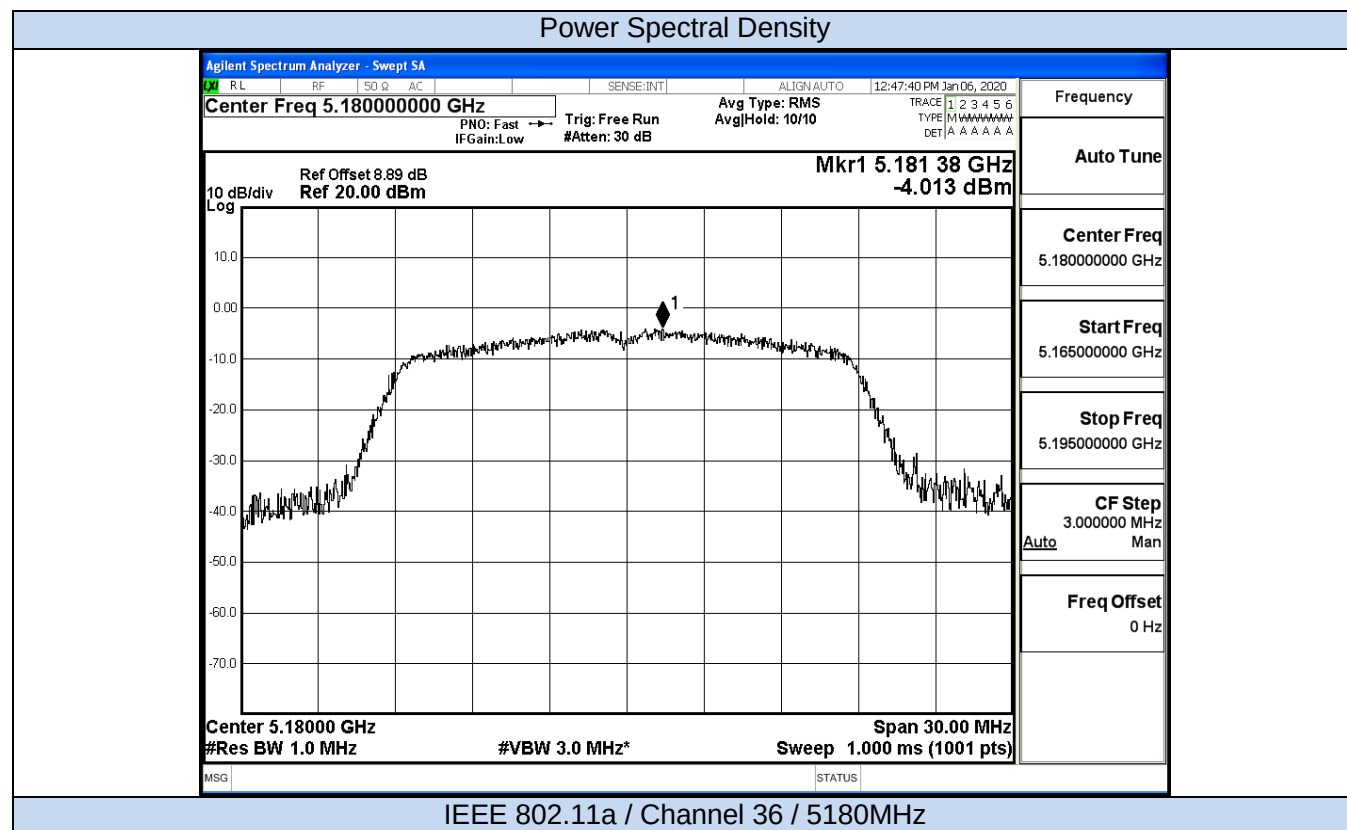
Ant0+1

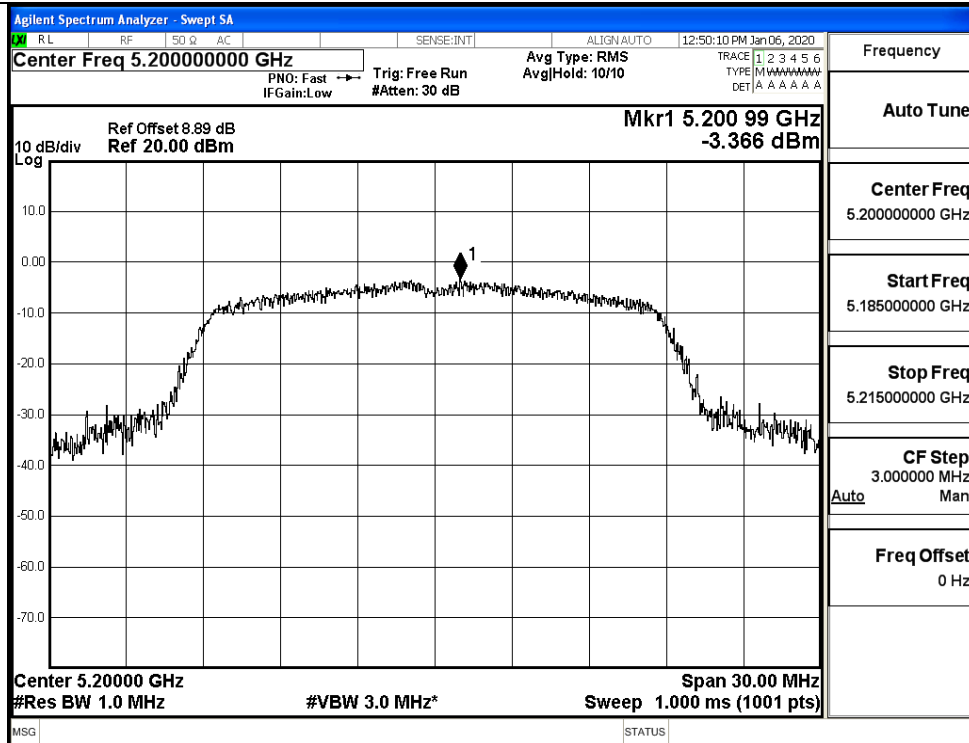
Test Mode	Channel	Frequency (MHz)	ANT 0 AVG Conducted Power (dBm)	ANT 1 AVG Conducted Power (dBm)	ANT 0+1 AVG Conducted Power (dBm)	Duty Cycle Factor (dB)	Report Conducted Power (dBm)	Limit (dBm)	Verdict
11N20 SISO	36	5180	5.89	7.31	9.67	0	9.67	24	Pass
	40	5200	6.42	6.23	9.34	0	9.34		Pass
	48	5240	4.75	3.91	7.36	0	7.36		Pass
11N40 SISO	38	5190	5.73	5.04	8.41	0	8.41	24	Pass
	46	5230	4.31	3.22	6.81	0	6.81		Pass
11AC20 SISO	36	5180	5.74	5.46	8.61	0	8.61	24	Pass
	40	5200	6.46	4.49	8.60	0	8.60		Pass
	48	5240	4.82	2.79	6.93	0	6.93		Pass
11AC40 SISO	38	5190	5.88	5.47	8.69	0	8.69	24	Pass
	46	5230	4.31	3.97	7.15	0	7.15		Pass
11AC80 SISO	42	5210	5.37	4.84	8.12	0	8.12	24	Pass

D.3 Power Spectral Density

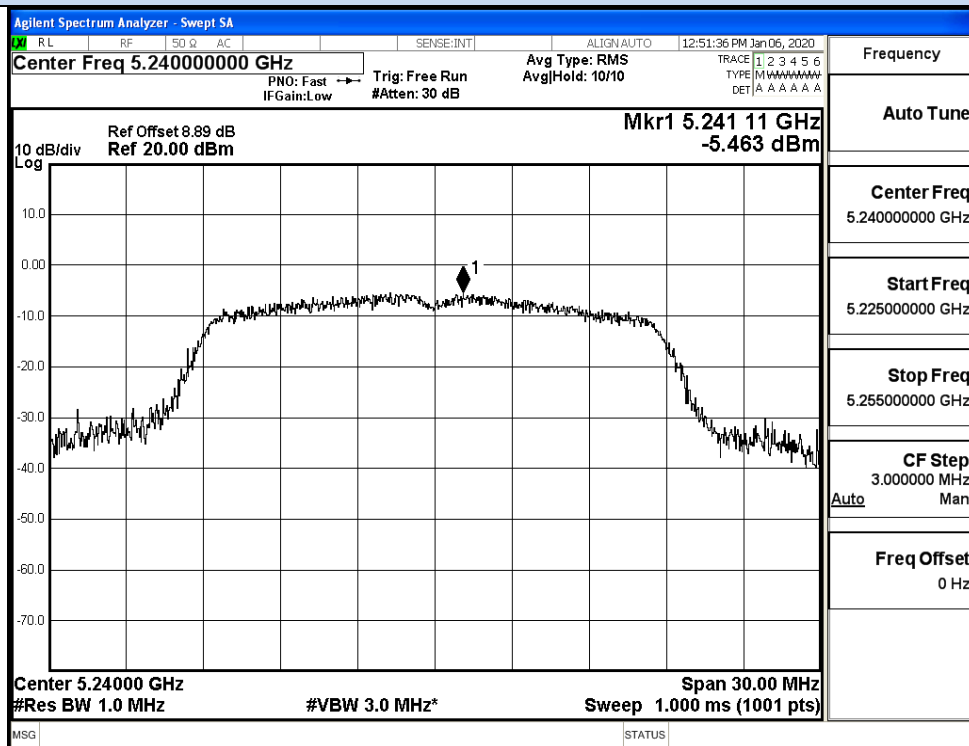
Ant0

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	-4.01	0	-4.01	11	Pass
	40	5200	-3.37	0	-3.37		Pass
	48	5240	-5.46	0	-5.46		Pass
11N20 SISO	36	5180	-4.04	0	-4.04	11	Pass
	40	5200	-3.47	0	-3.47		Pass
	48	5240	-4.90	0	-4.90		Pass
11N40 SISO	38	5190	-7.00	0	-7.00	11	Pass
	46	5230	-8.52	0	-8.52		Pass
11AC20 SISO	36	5180	-4.00	0	-4.00	11	Pass
	40	5200	-3.30	0	-3.30		Pass
	48	5240	-4.62	0	-4.62		Pass
11AC40 SISO	38	5190	-6.78	0	-6.78	11	Pass
	46	5230	-8.35	0	-8.35		Pass
11AC80 SISO	42	5210	-9.25	0	-9.25	11	Pass



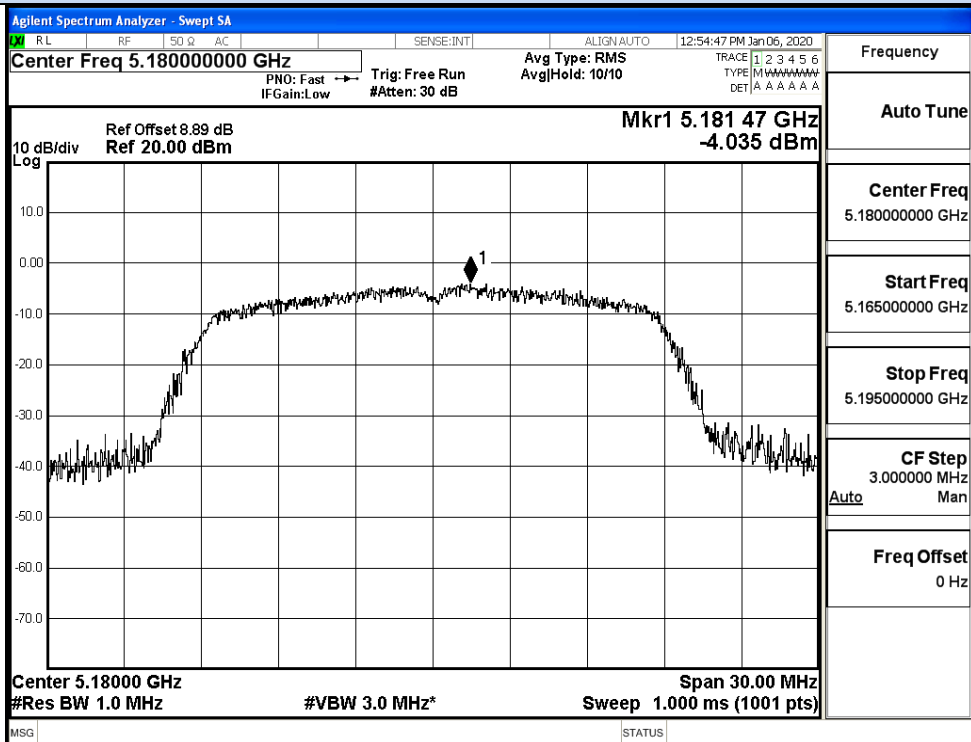


IEEE 802.11na / Channel 40 / 5200MHz

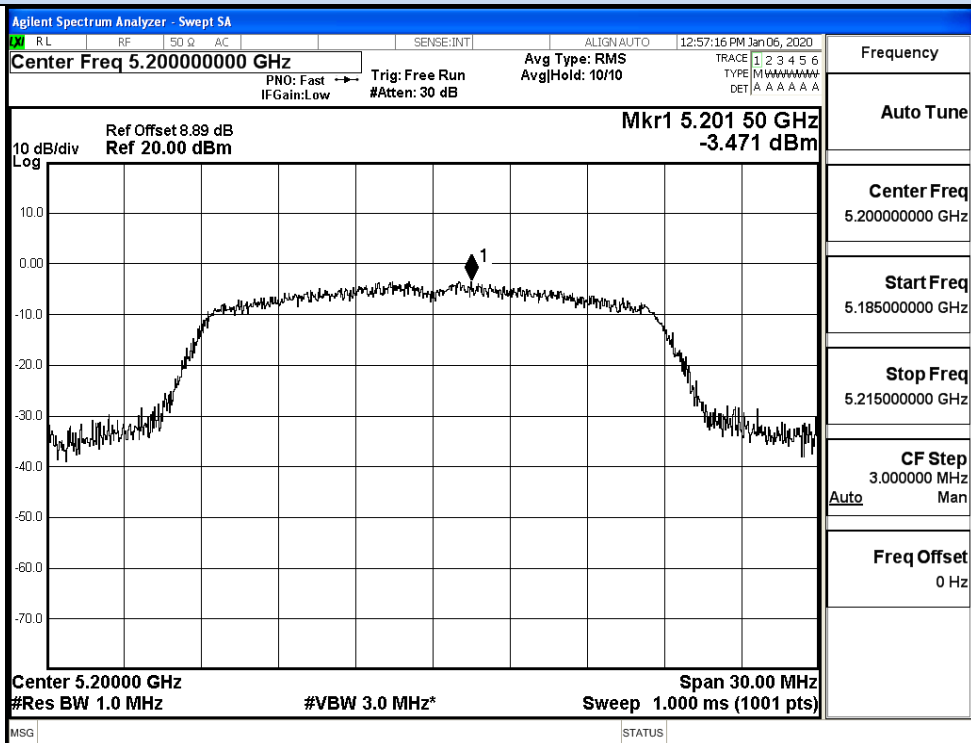


IEEE 802.11na / Channel 48 / 5240MHz

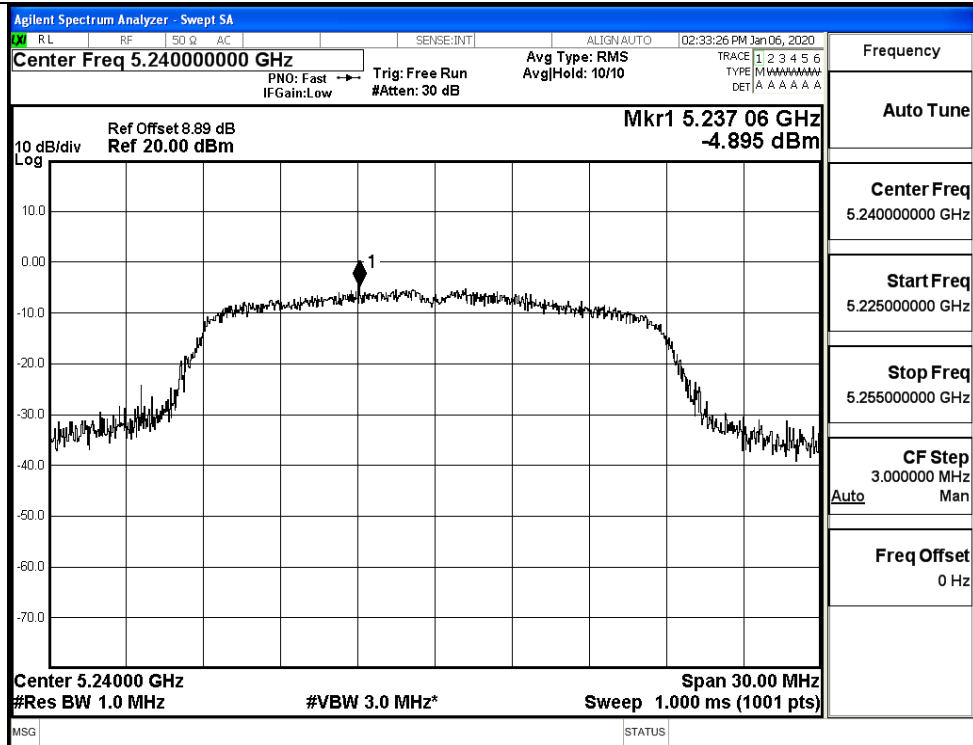
Power Spectral Density



IEEE 802.11n20 / Channel 36 / 5180MHz

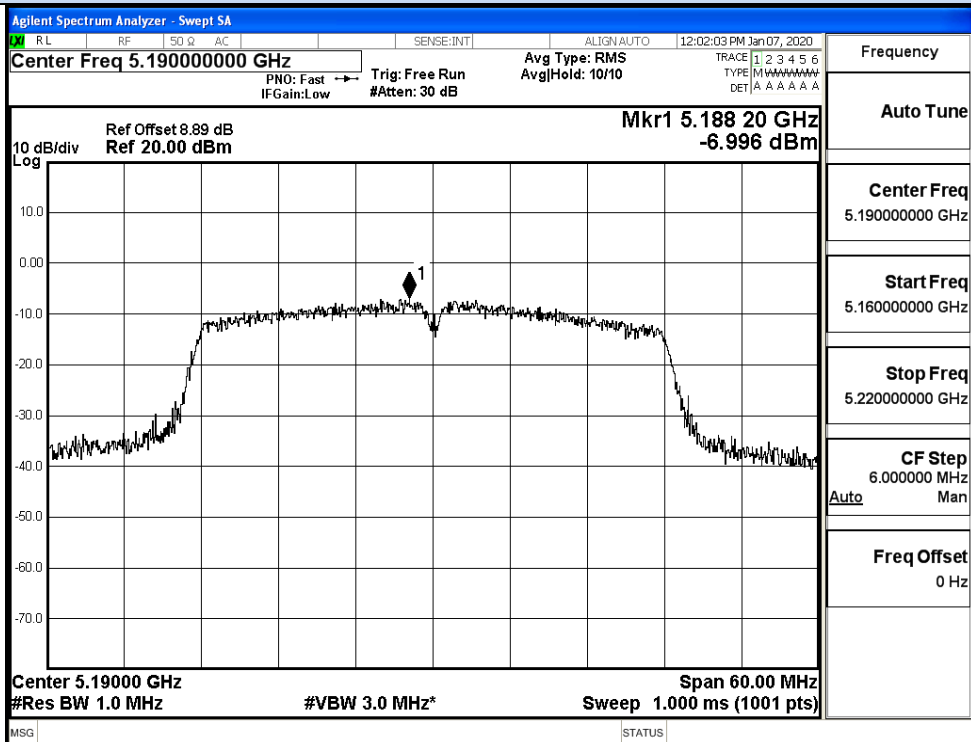


IEEE 802.11n20 / Channel 40 / 5200MHz

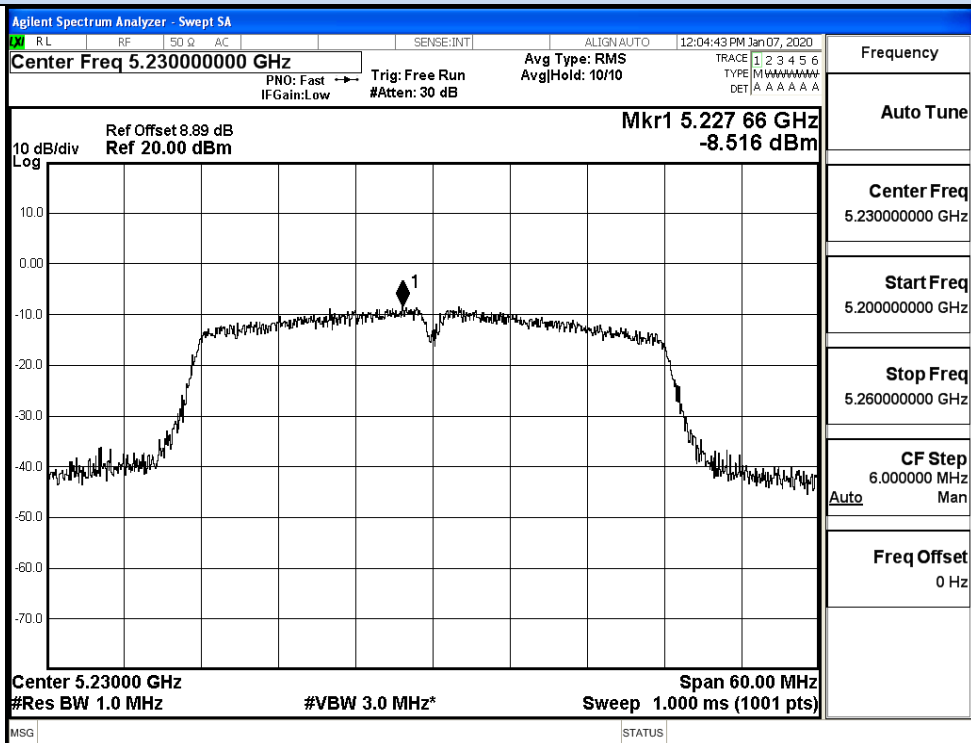


IEEE 802.11n20 / Channel 48 / 5240MHz

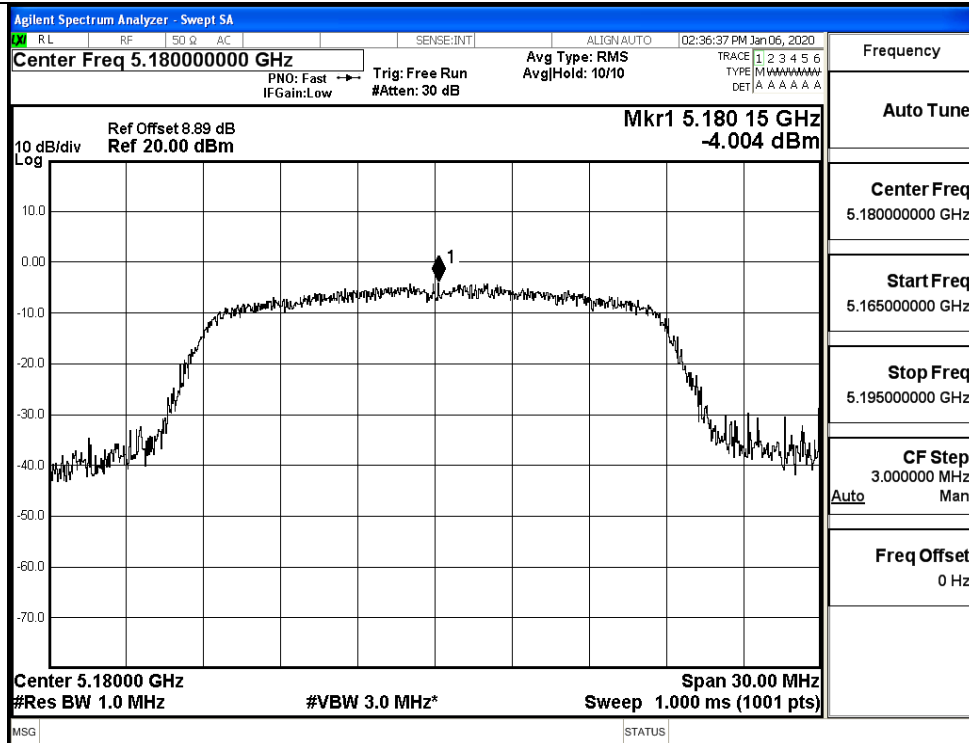
Power Spectral Density



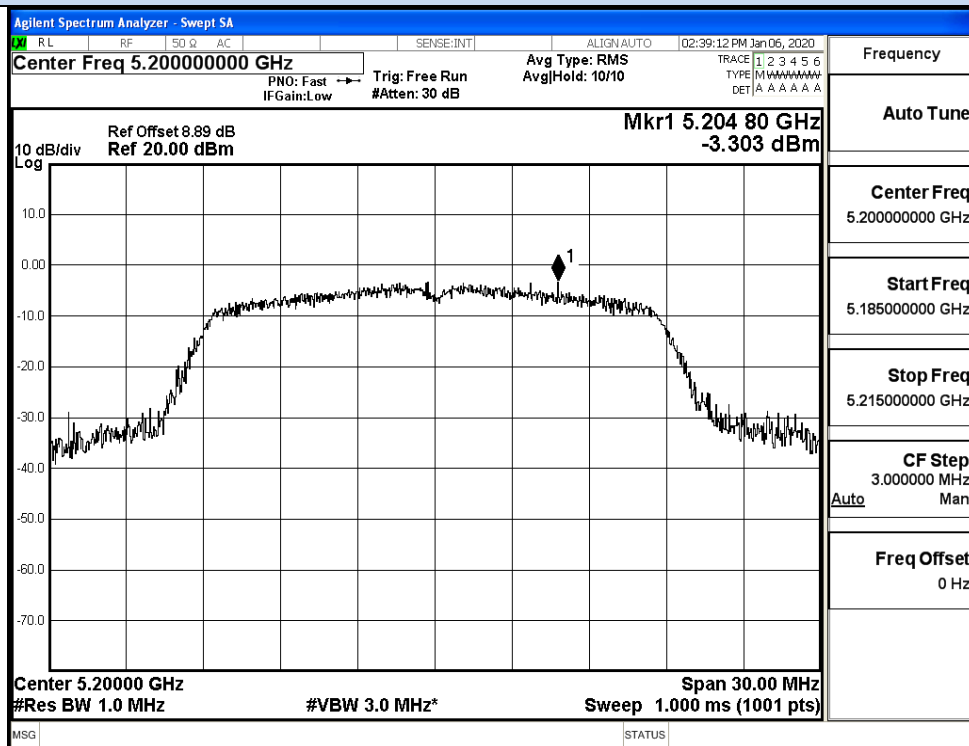
IEEE 802.11n40 / Channel 38 / 5190MHz



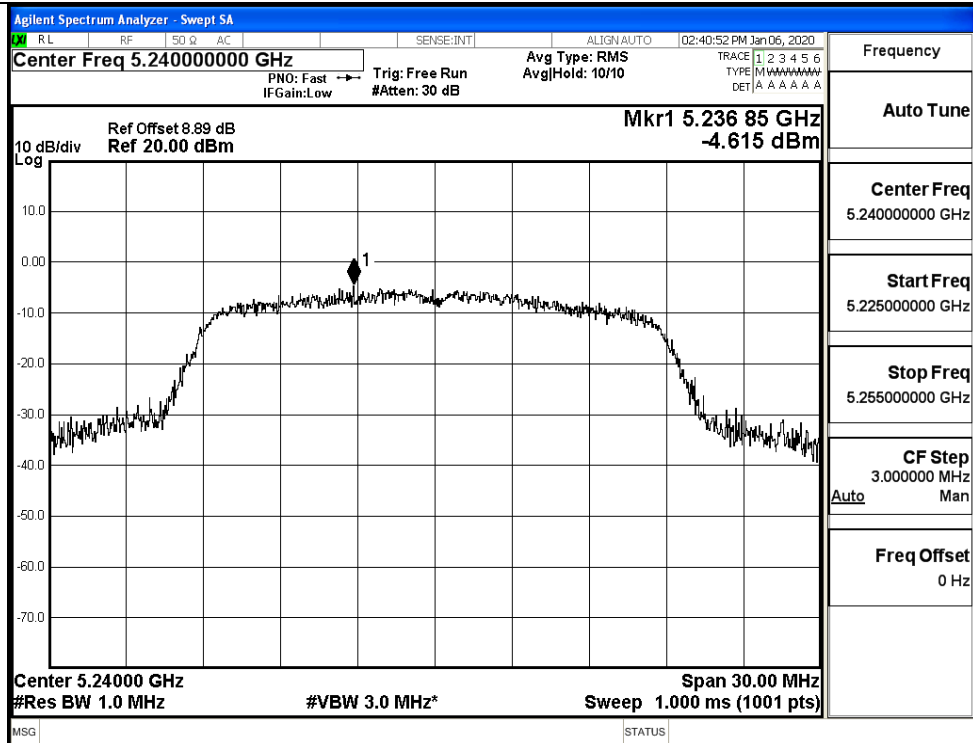
IEEE 802.11n40 / Channel 46 / 5230MHz



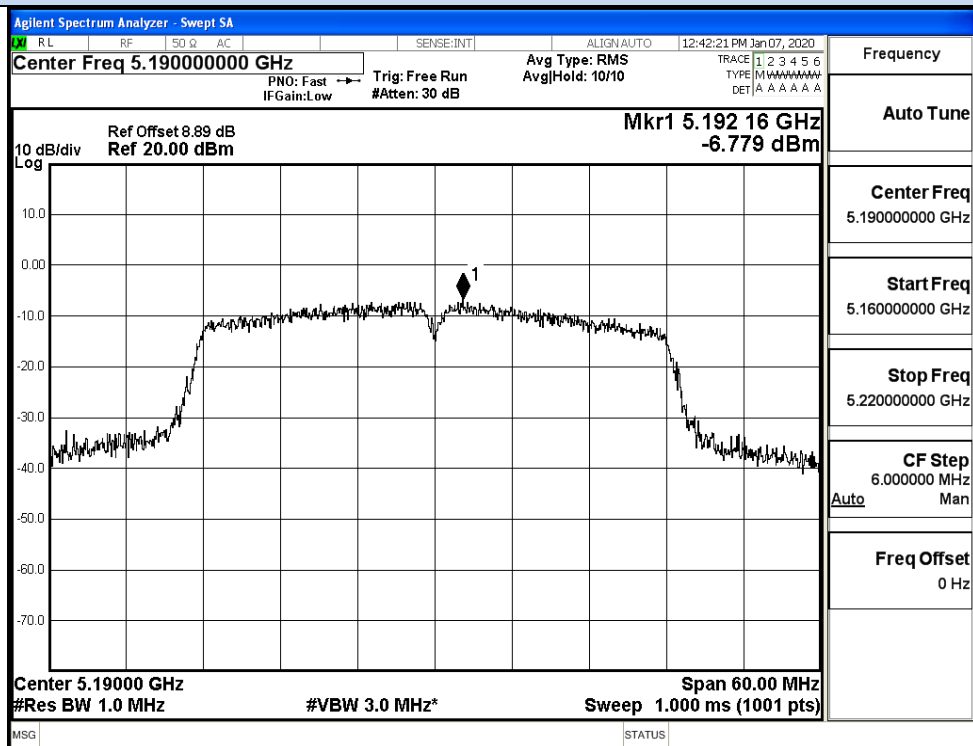
IEEE 802.11ac20 / Channel 36 / 5180MHz



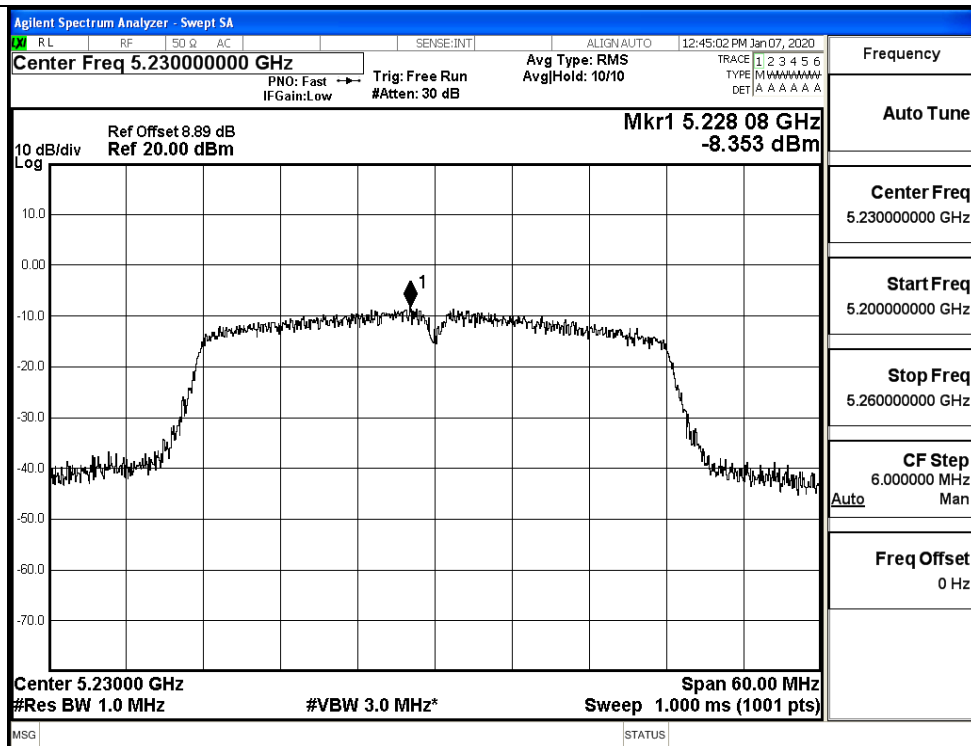
IEEE 802.11ac20 / Channel 40 / 5200MHz



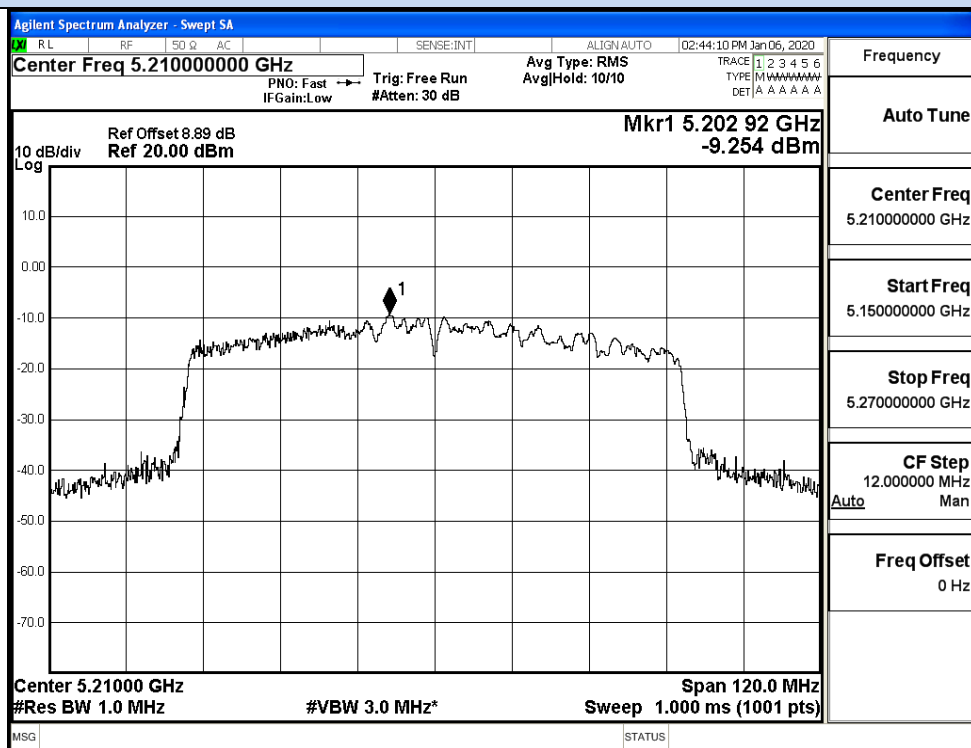
IEEE 802.11ac20 / Channel 48 / 5240MHz



IEEE 802.11ac40 / Channel 38 / 5190MHz



IEEE 802.11ac40 / Channel 46 / 5230MHz

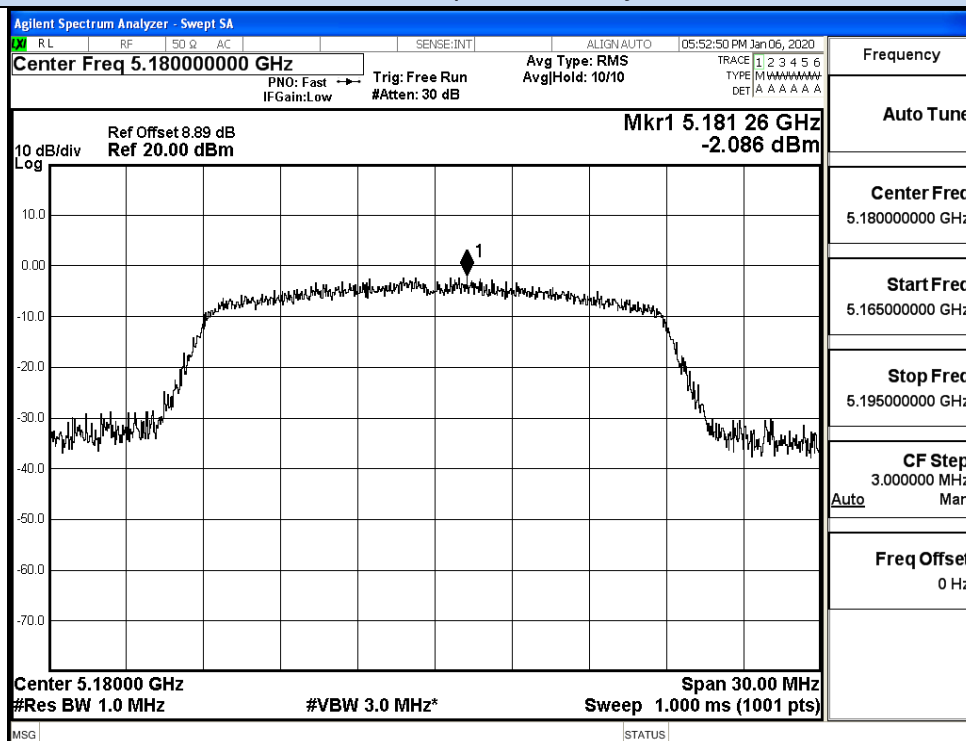


IEEE 802.11ac80 / Channel 42 / 5210MHz

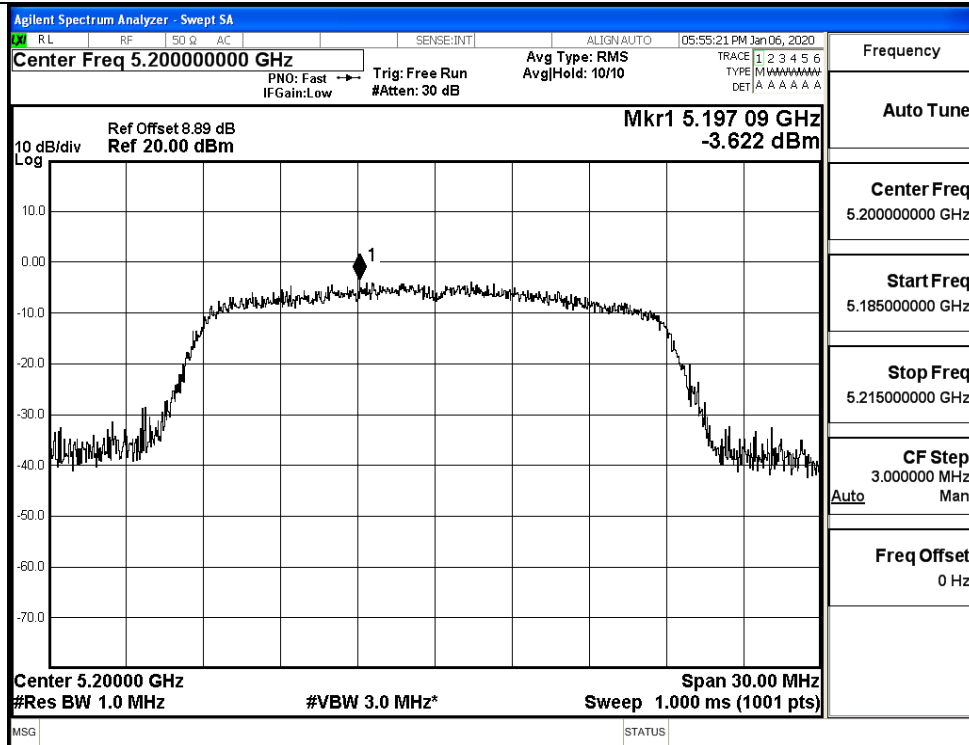
Ant1

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	-2.09	0	-2.09	11	Pass
	40	5200	-3.62	0	-3.62		Pass
	48	5240	-4.00	0	-4.00		Pass
11N20 SISO	36	5180	-1.58	0	-1.58	11	Pass
	40	5200	-2.86	0	-2.86		Pass
	48	5240	-5.67	0	-5.67		Pass
11N40 SISO	38	5190	-7.08	0	-7.08	11	Pass
	46	5230	-8.33	0	-8.33		Pass
11AC20 SISO	36	5180	-4.38	0	-4.38	11	Pass
	40	5200	-4.83	0	-4.83		Pass
	48	5240	-7.05	0	-7.05		Pass
11AC40 SISO	38	5190	-7.28	0	-7.28	11	Pass
	46	5230	-8.46	0	-8.46		Pass
11AC80 SISO	42	5210	-10.71	0	-10.71	11	Pass

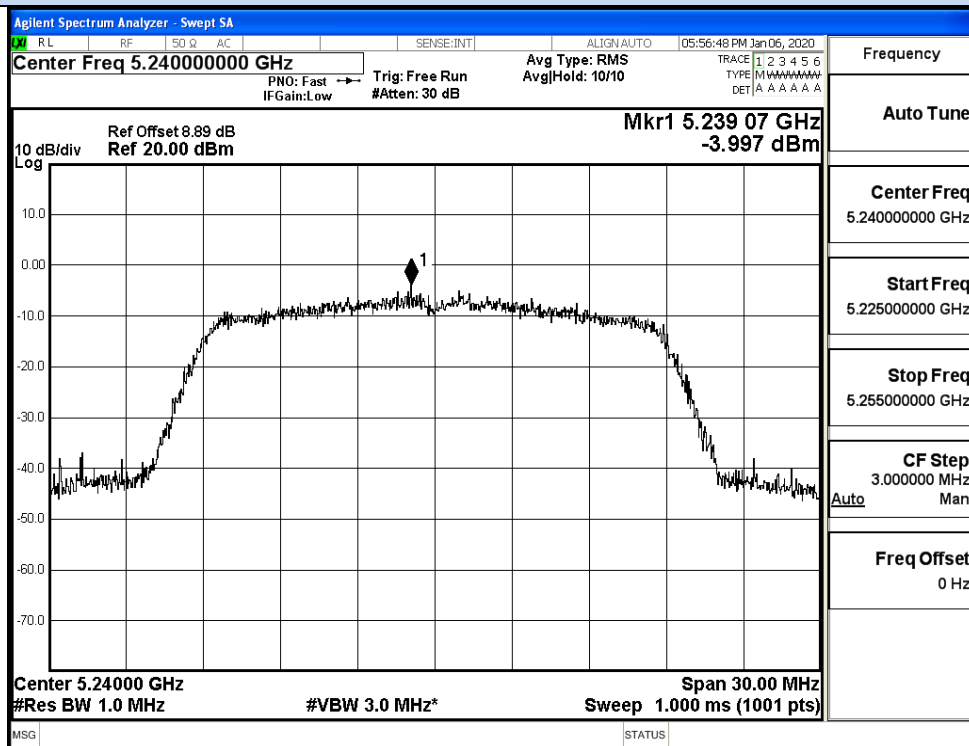
Power Spectral Density



IEEE 802.11a / Channel 36 / 5180MHz

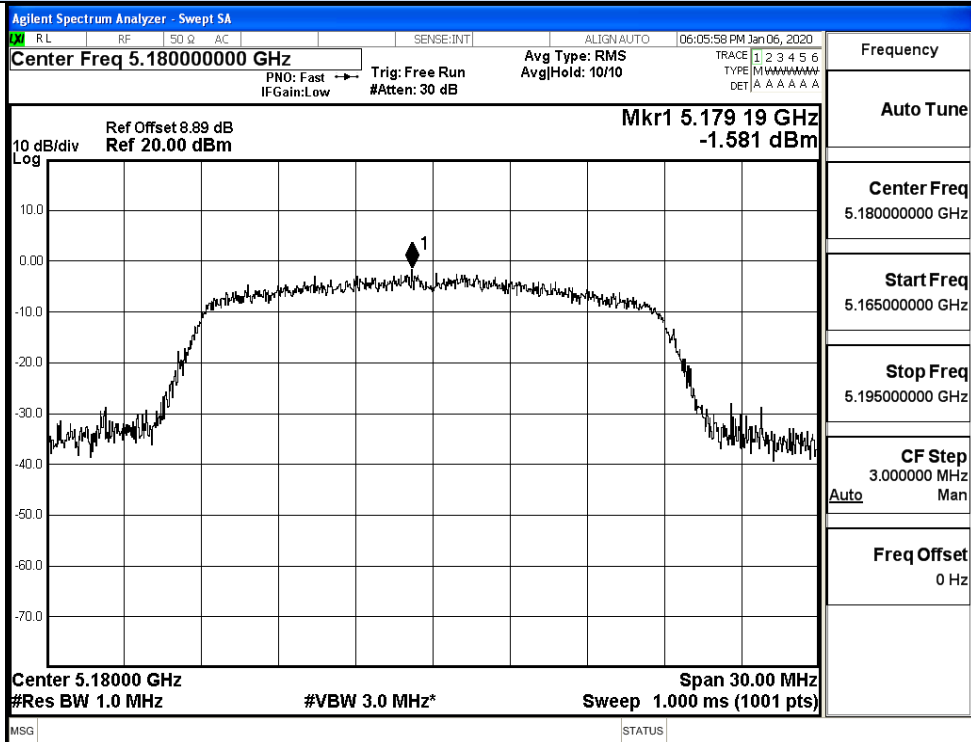


IEEE 802.11na / Channel 40 / 5200MHz

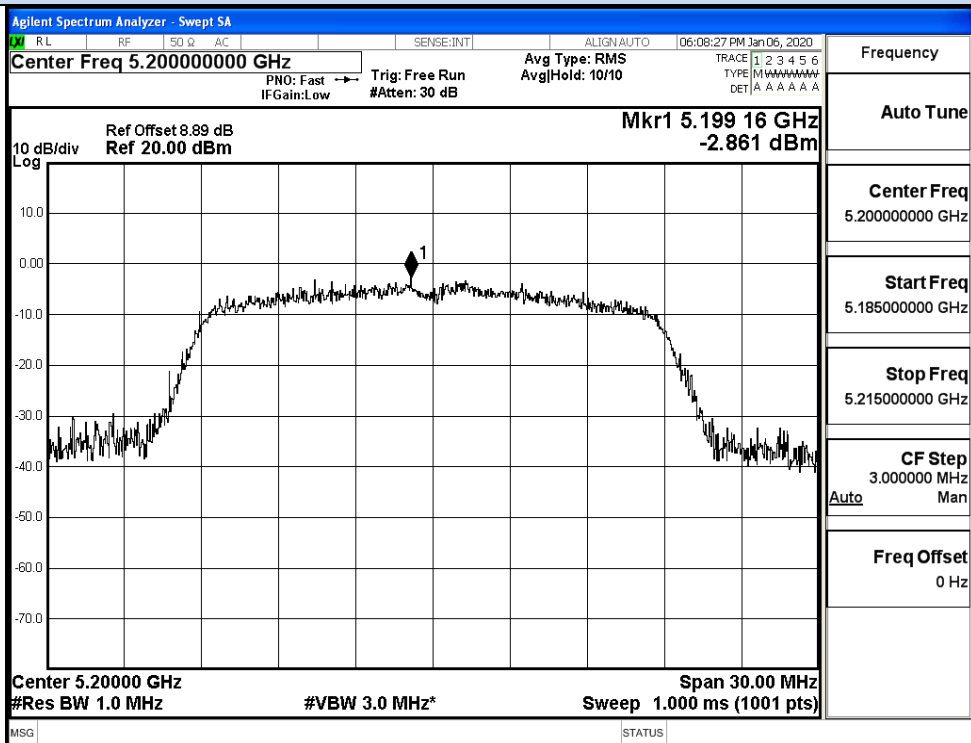


IEEE 802.11na / Channel 48 / 5240MHz

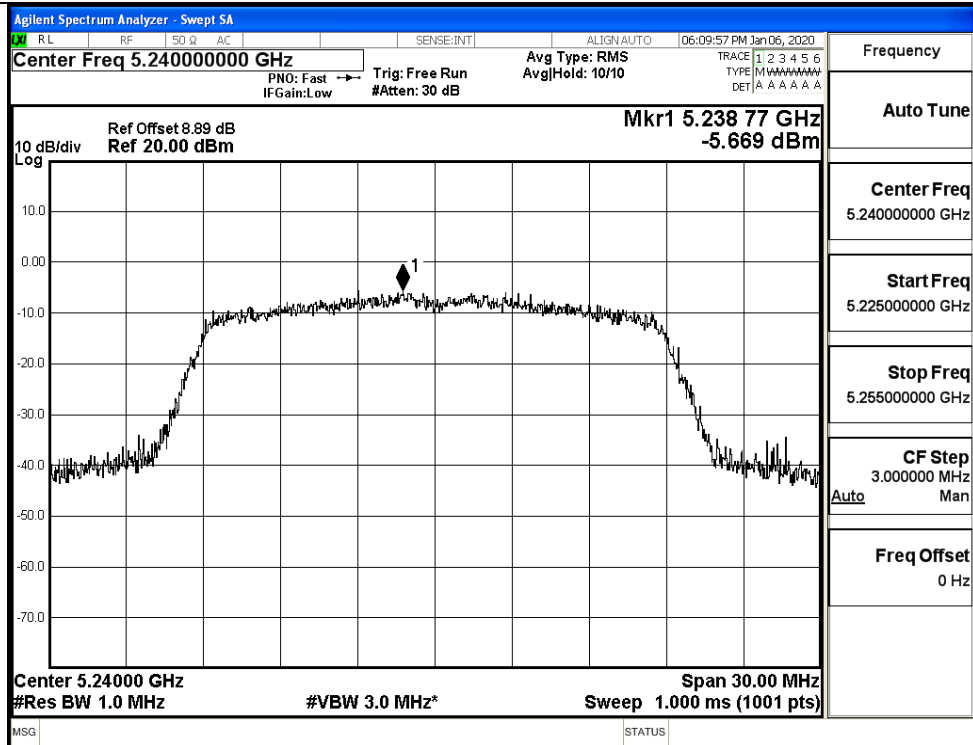
Power Spectral Density



IEEE 802.11n20 / Channel 36 / 5180MHz

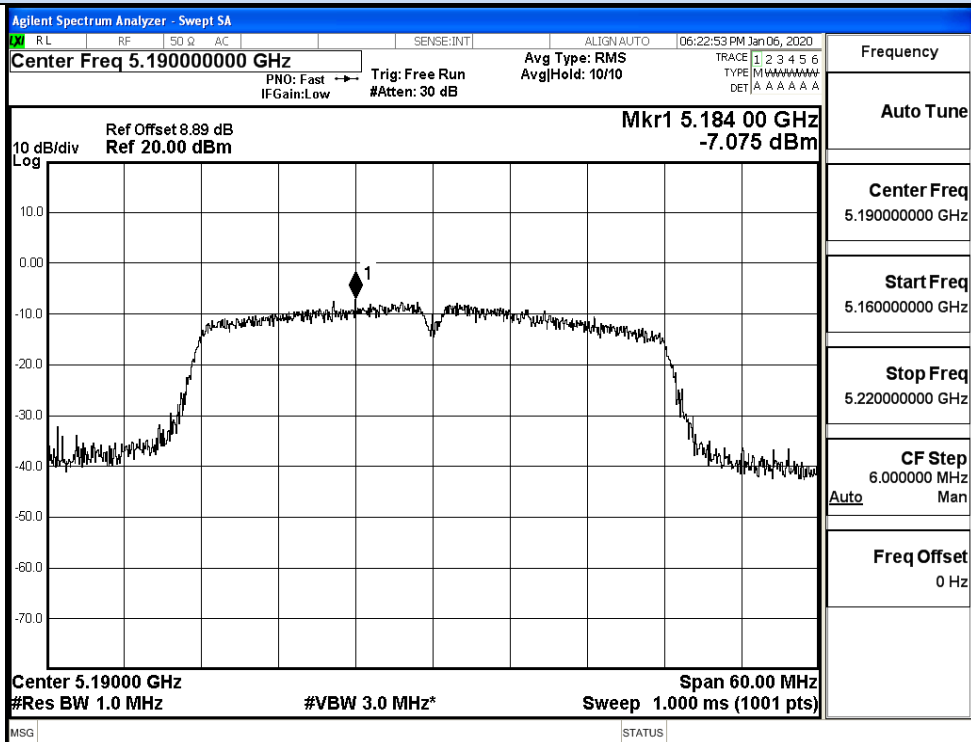


IEEE 802.11n20 / Channel 40 / 5200MHz

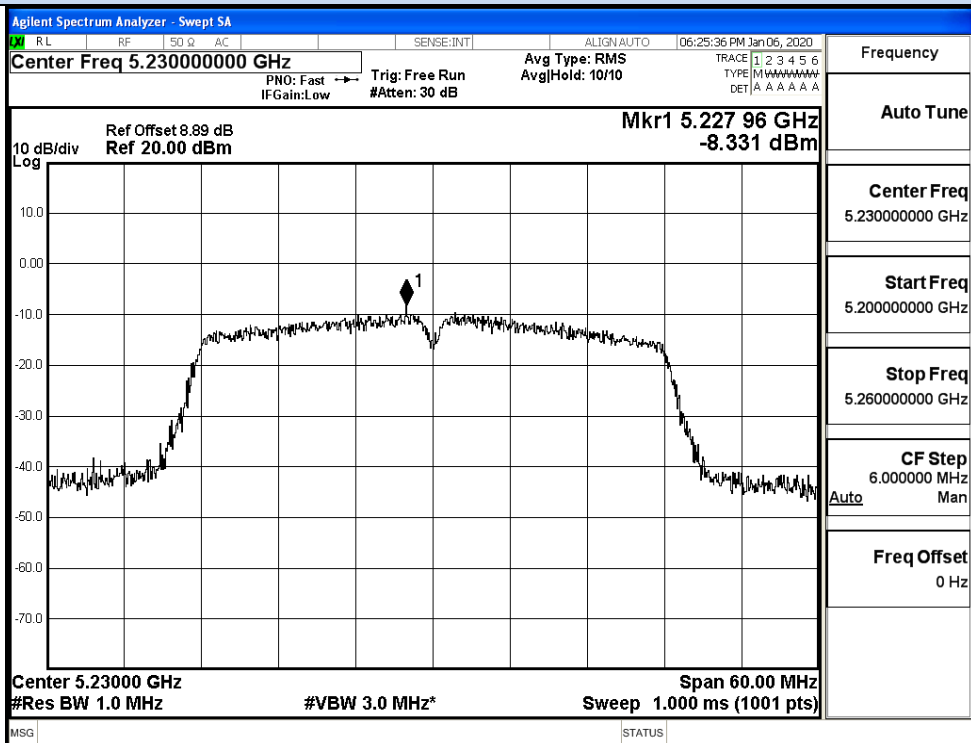


IEEE 802.11n20 / Channel 48 / 5240MHz

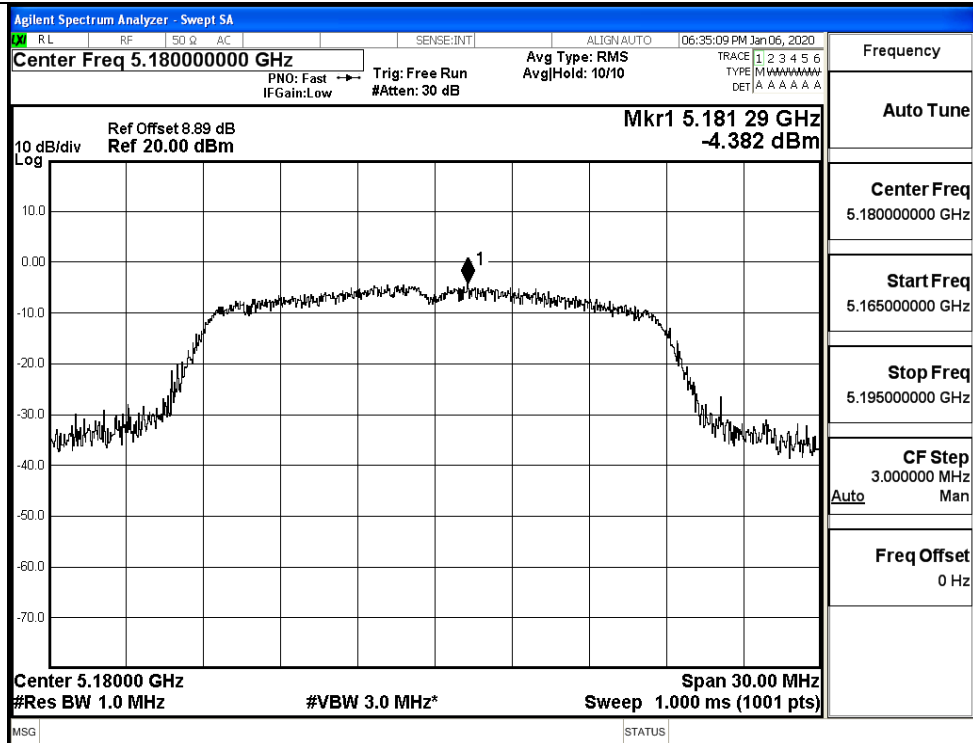
Power Spectral Density



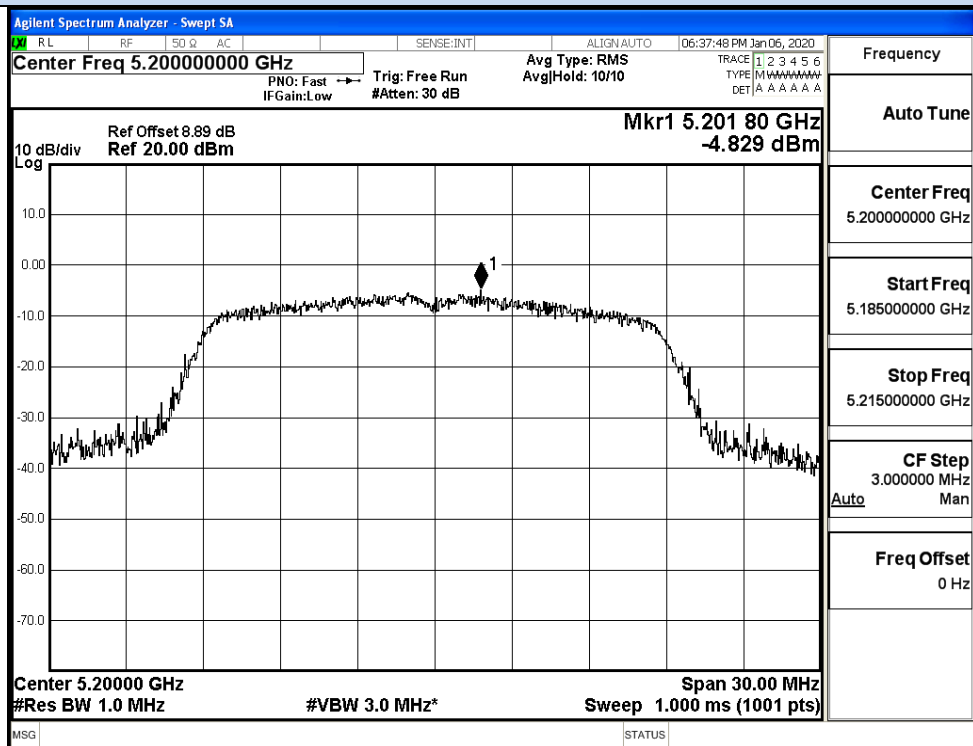
IEEE 802.11n40 / Channel 38 / 5190MHz



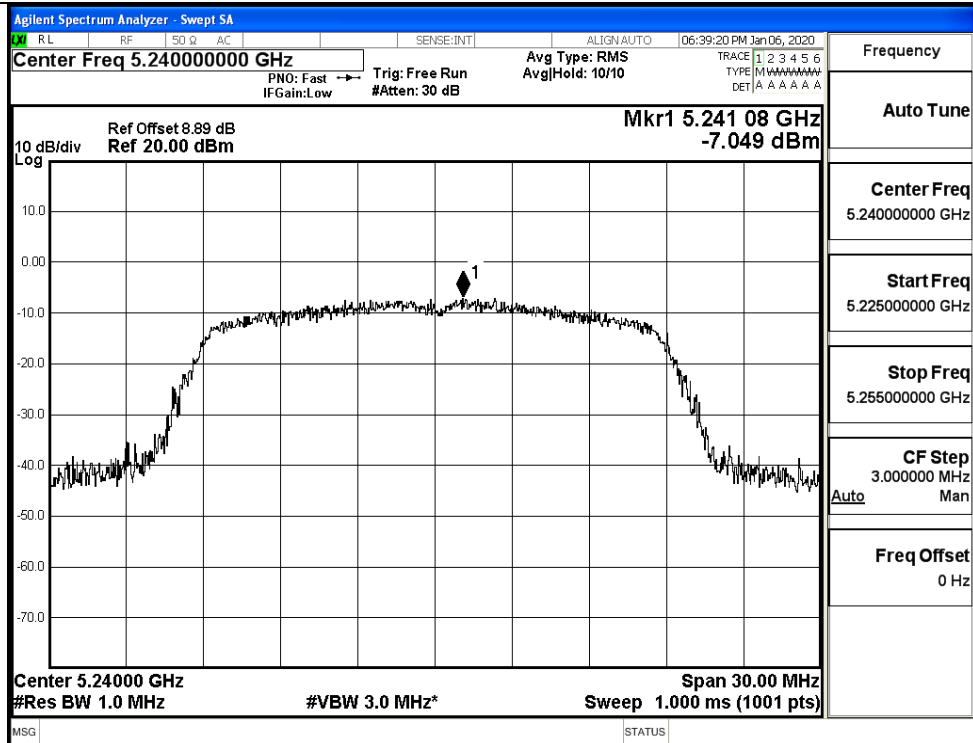
IEEE 802.11n40 / Channel 46 / 5230MHz



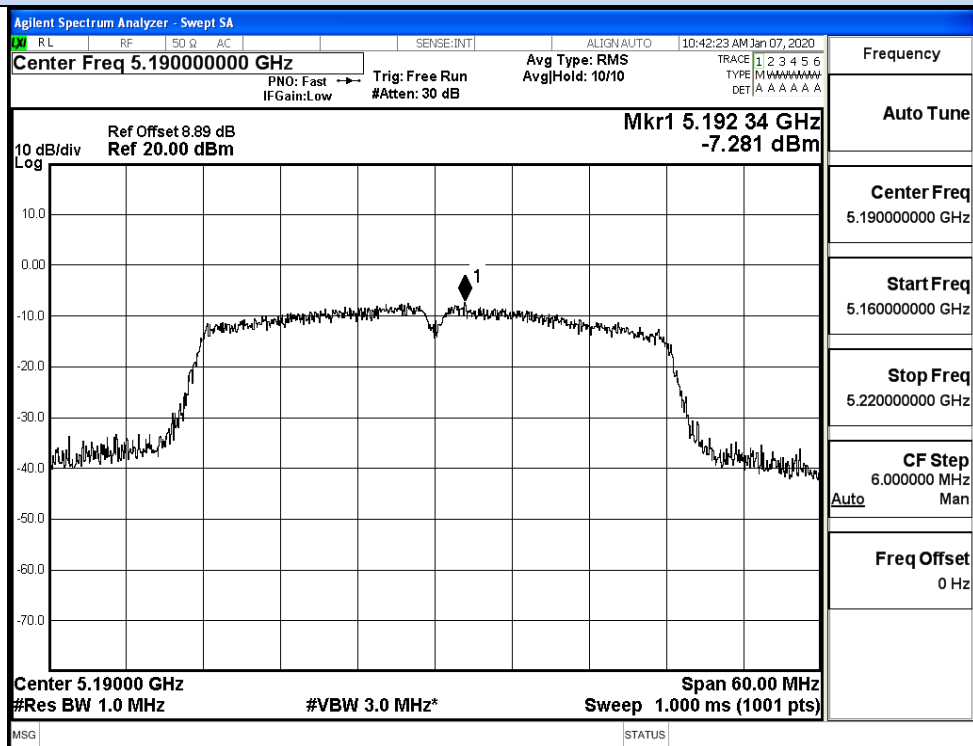
IEEE 802.11ac20 / Channel 36 / 5180MHz



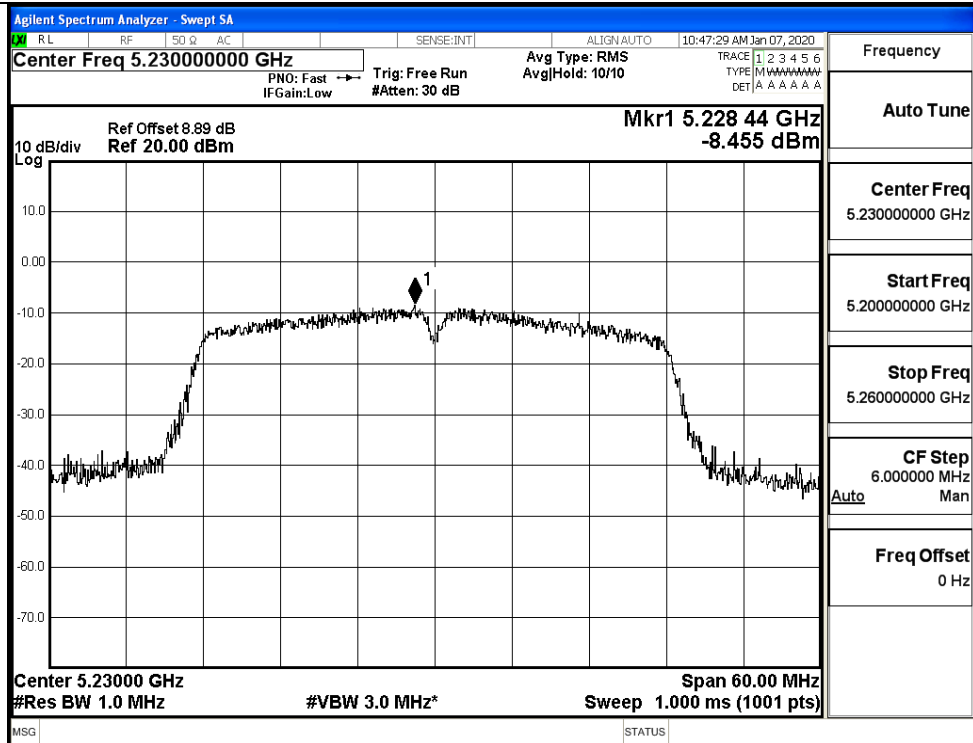
IEEE 802.11ac20 / Channel 40 / 5200MHz



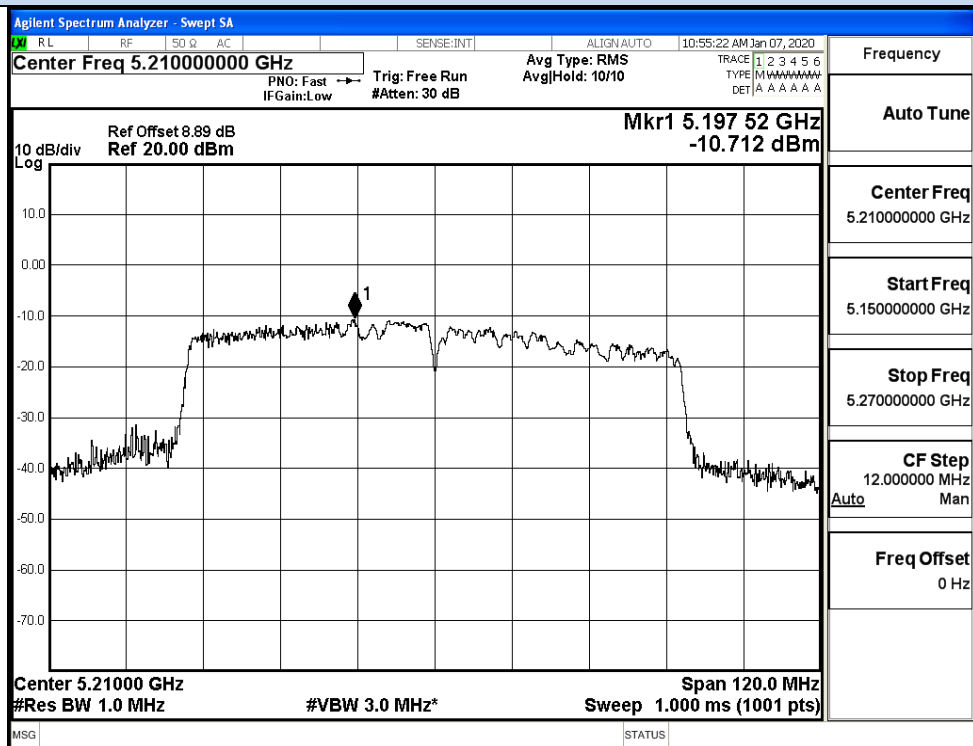
IEEE 802.11ac20 / Channel 48 / 5240MHz



IEEE 802.11ac40 / Channel 38 / 5190MHz



IEEE 802.11ac40 / Channel 46 / 5230MHz



IEEE 802.11ac80 / Channel 42 / 5210MHz

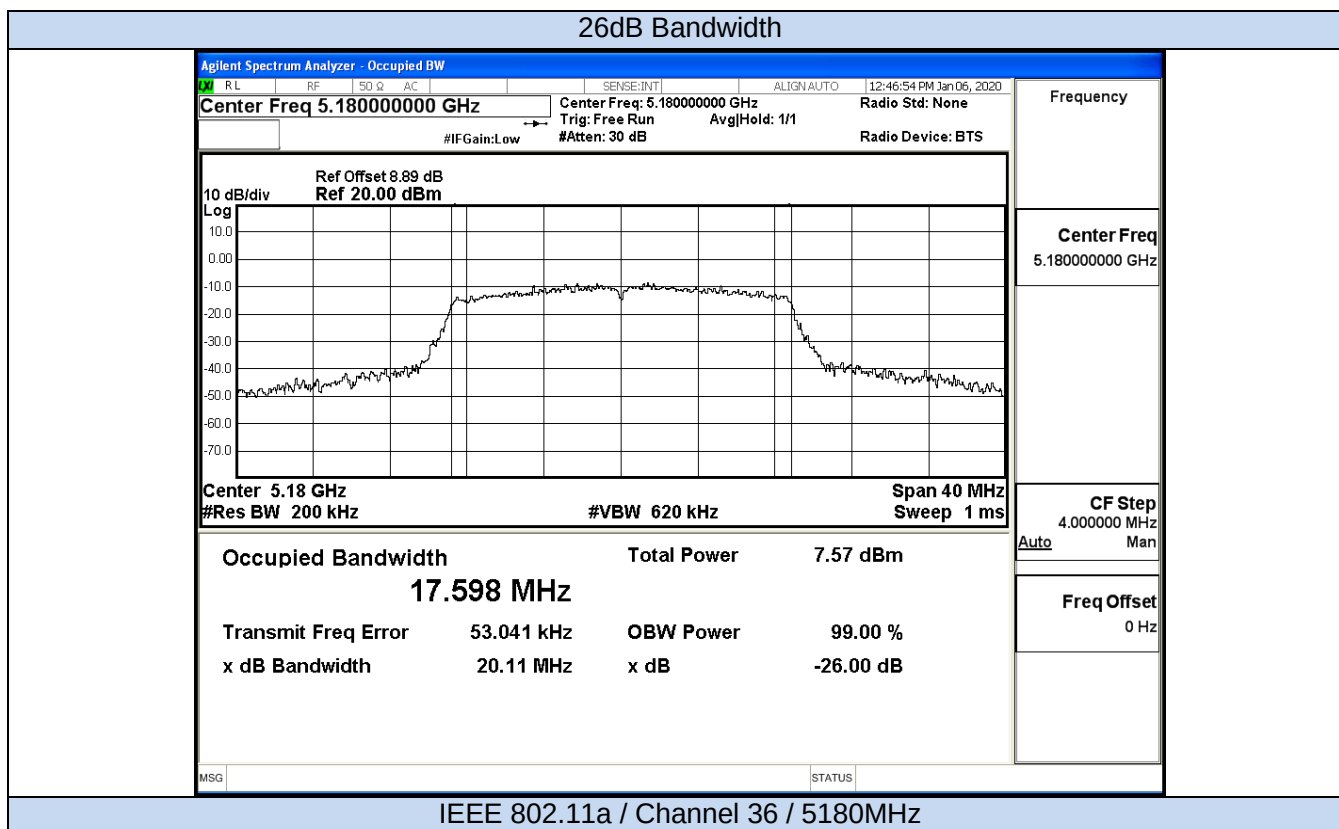
Ant0+1

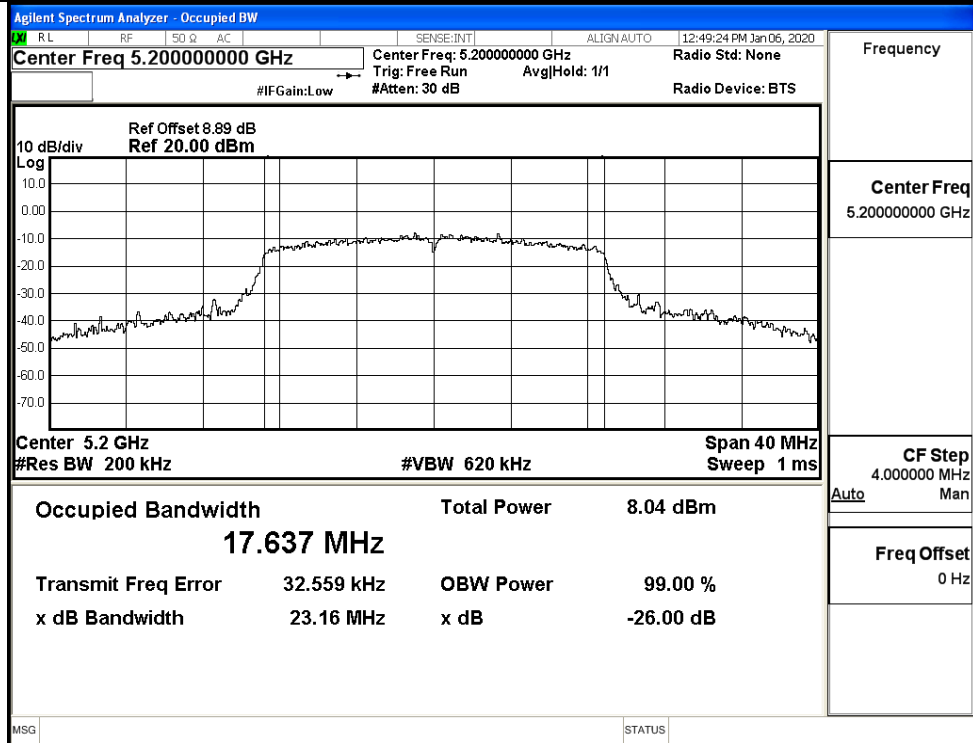
Test Mode	Channel	Frequency (MHz)	ANT 0 Power Density (dBm/MHz)	ANT 1 Power Density (dBm/MHz)	ANT 0+1 Power Density (dBm/MHz)	Duty Cycle Factor (dB)	Report Power Density (dBm/MHz)	Limit (dBm/MHz)	Verdict
11N20 SISO	36	5180	-4.04	-1.58	0.37	0	0.37	11	Pass
	40	5200	-3.47	-2.86	-0.14	0	-0.14		Pass
	48	5240	-4.90	-5.67	-2.26	0	-2.26		Pass
11N40 SISO	38	5190	-7.00	-7.08	-4.03	0	-4.03	11	Pass
	46	5230	-8.52	-8.33	-5.41	0	-5.41		Pass
11AC20 SISO	36	5180	-4.00	-4.38	-1.18	0	-1.18	11	Pass
	40	5200	-3.30	-4.83	-0.99	0	-0.99		Pass
	48	5240	-4.62	-7.05	-2.66	0	-2.66		Pass
11AC40 SISO	38	5190	-6.78	-7.28	-4.01	0	-4.01	11	Pass
	46	5230	-8.35	-8.46	-5.39	0	-5.39		Pass
11AC80 SISO	42	5210	-9.25	-10.71	-6.91	0	-6.91	11	Pass

D.4 Emission Bandwidth

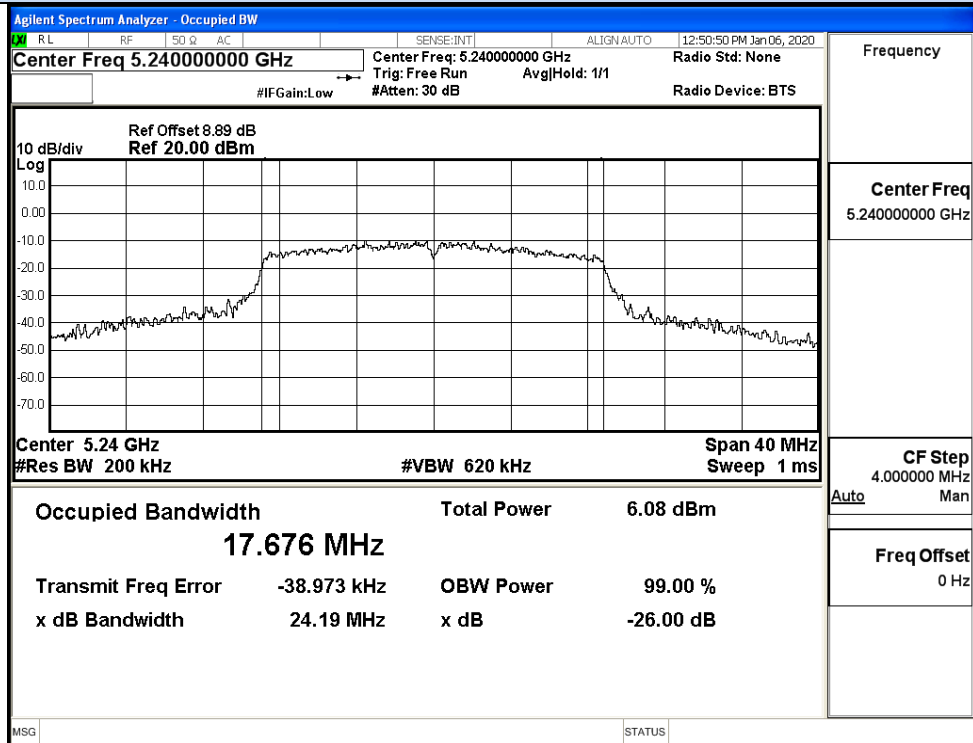
Ant0

Test Mode	Channel	Frequency (MHz)	26dB Bandwidth (MHz)	Limit (MHz)	Verdict
11A	36	5180	20.11	No Limit	Pass
	40	5200	23.16		Pass
	48	5240	24.19		Pass
11N20 SISO	36	5180	20.14	No Limit	Pass
	40	5200	22.05		Pass
	48	5240	23.90		Pass
11N40 SISO	38	5190	50.85	No Limit	Pass
	46	5230	41.58		Pass
11AC20 SISO	36	5180	20.58	No Limit	Pass
	40	5200	22.85		Pass
	48	5240	27.30		Pass
11AC40 SISO	38	5190	50.00	No Limit	Pass
	46	5230	40.61		Pass
11AC80 SISO	42	5210	90.29	No Limit	Pass



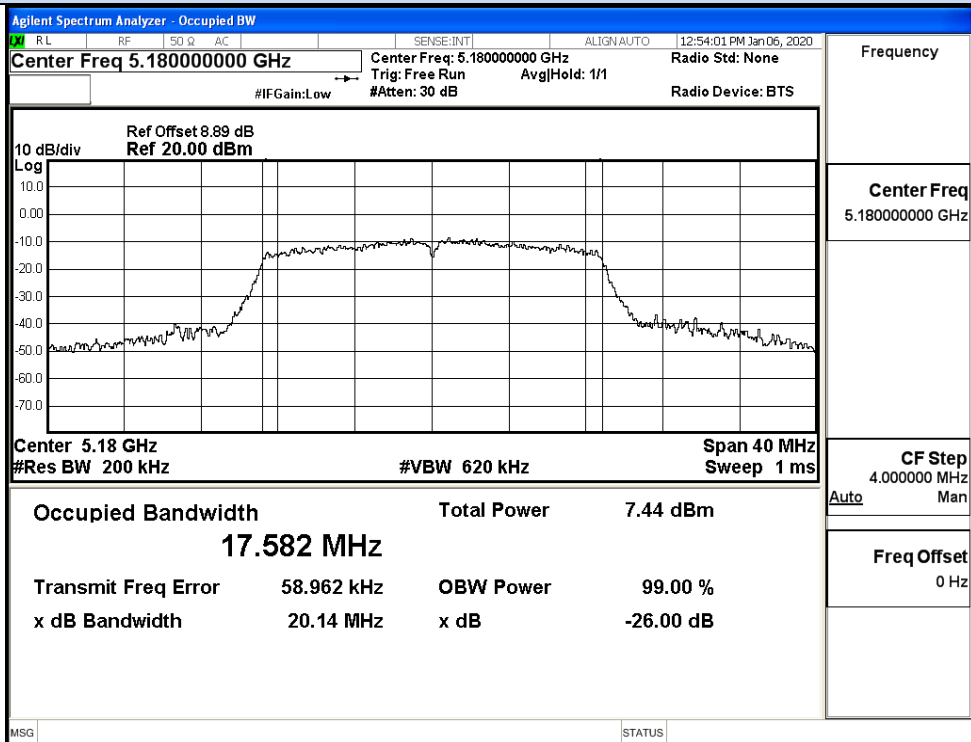


IEEE 802.11a / Channel 40 / 5200MHz

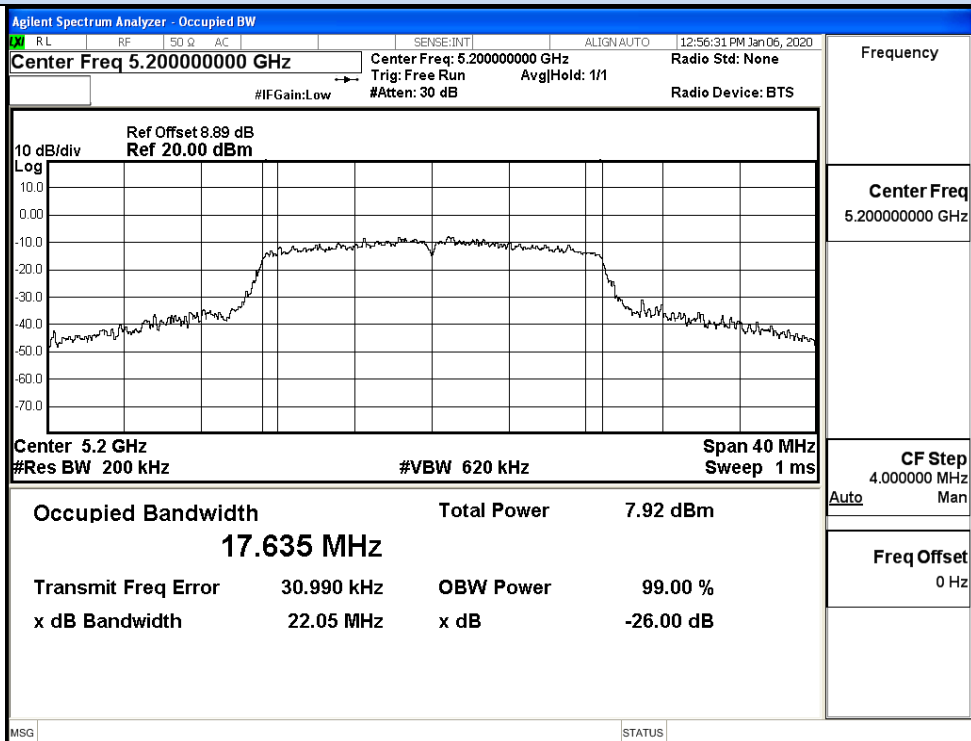


IEEE 802.11a / Channel 48 / 5240MHz

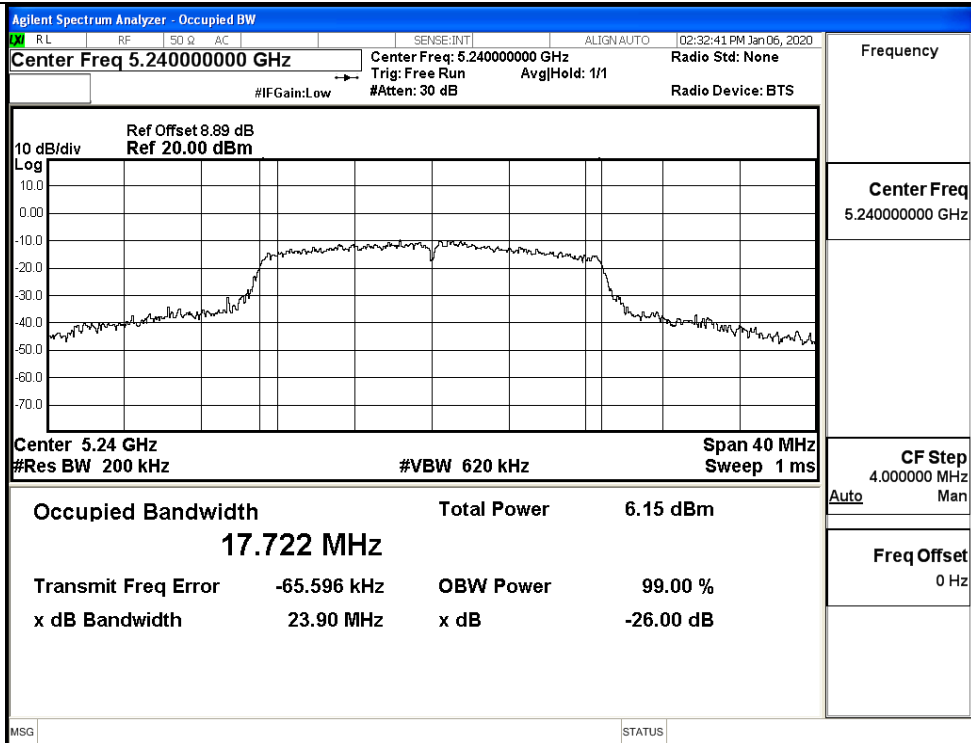
26dB Bandwidth



IEEE 802.11n20 / Channel 36 / 5180MHz

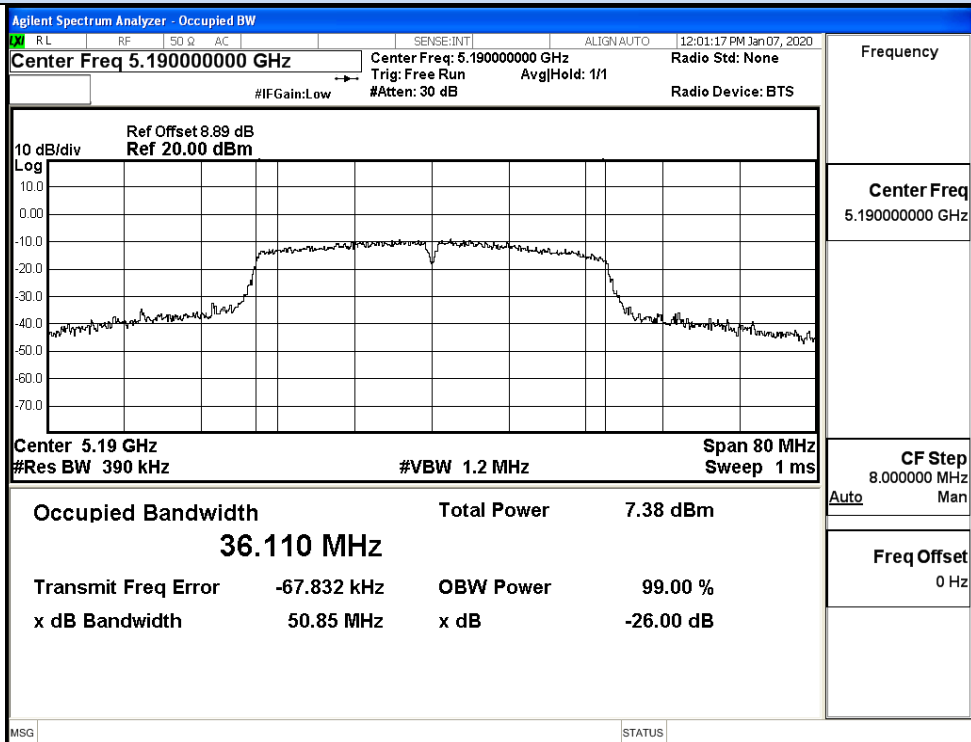


IEEE 802.11n20 / Channel 40 / 5200MHz

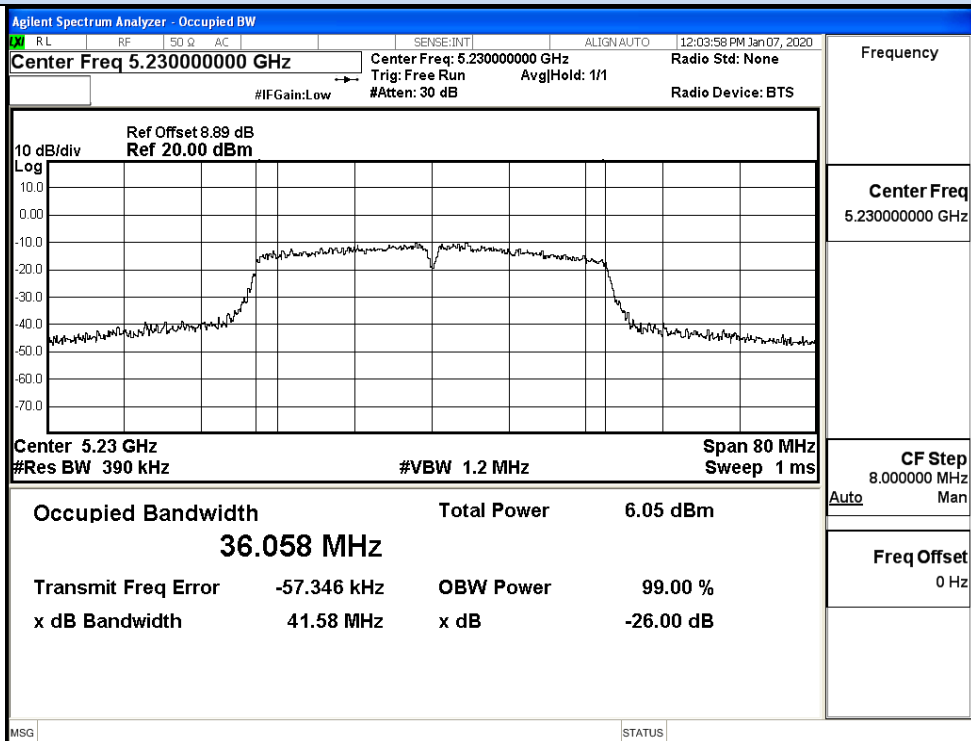


IEEE 802.11n20 / Channel 48 / 5240MHz

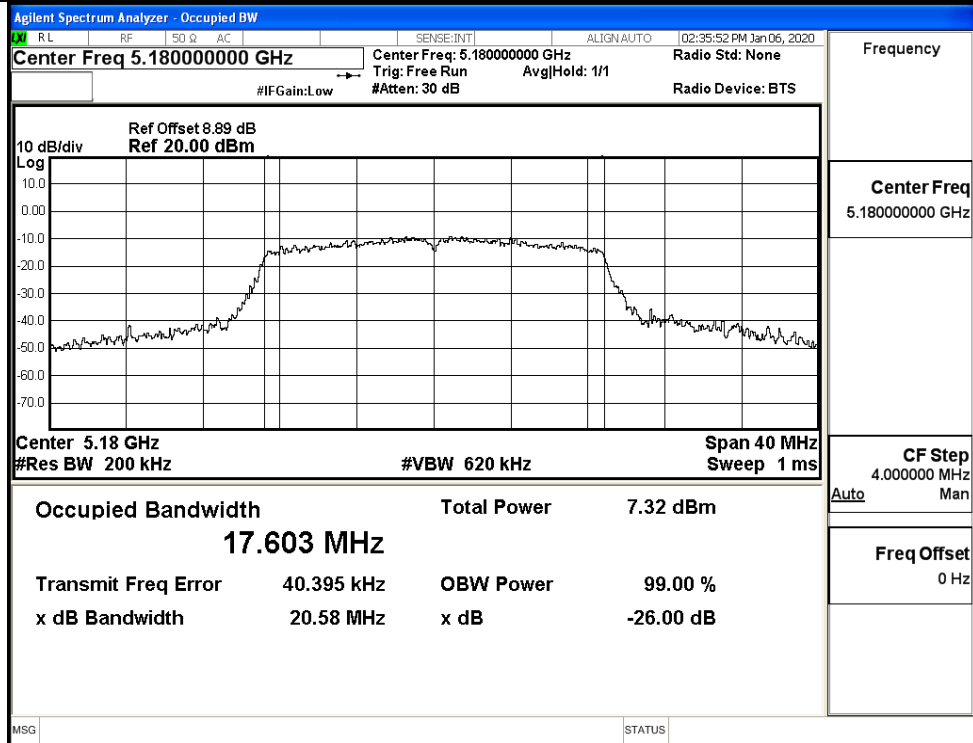
26dB Bandwidth



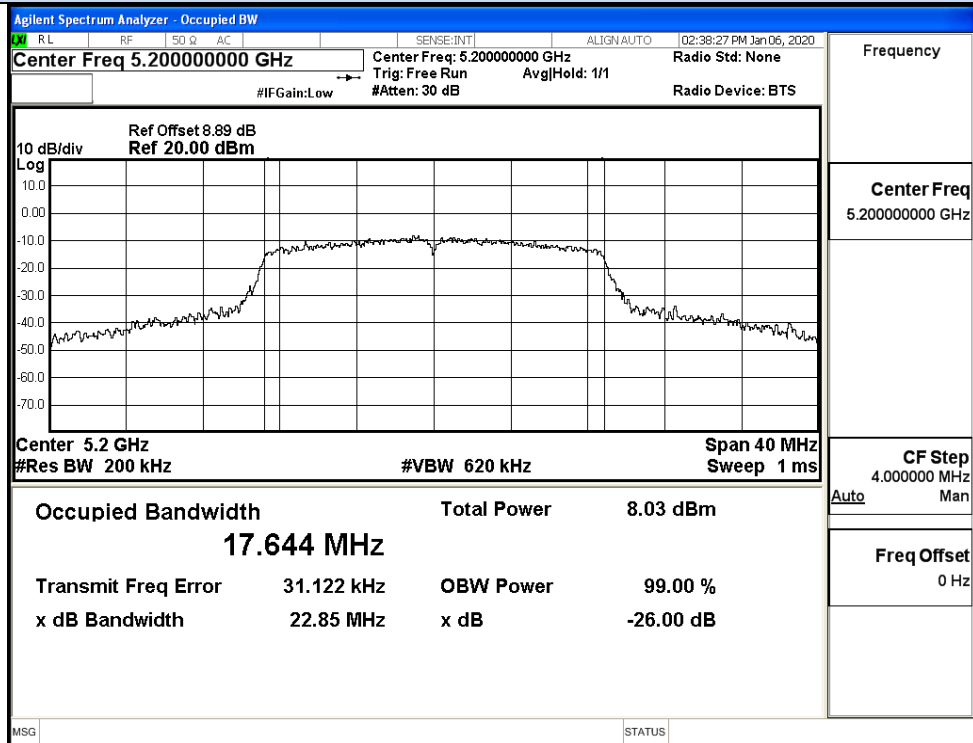
IEEE 802.11n40 / Channel 38 / 5190MHz



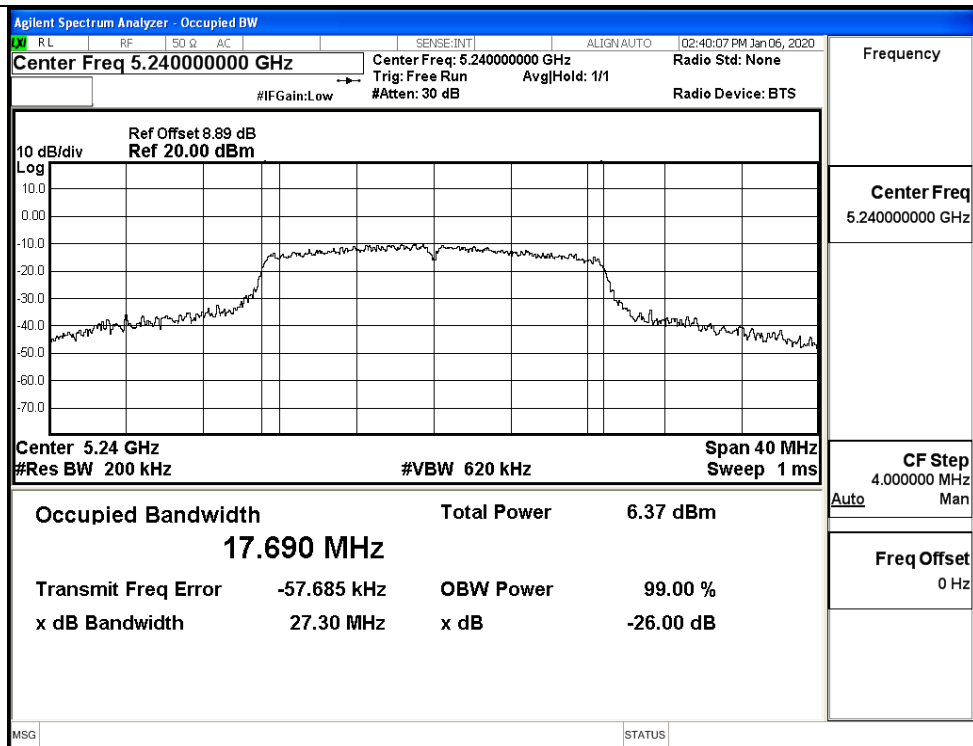
IEEE 802.11n40 / Channel 46 / 5230MHz



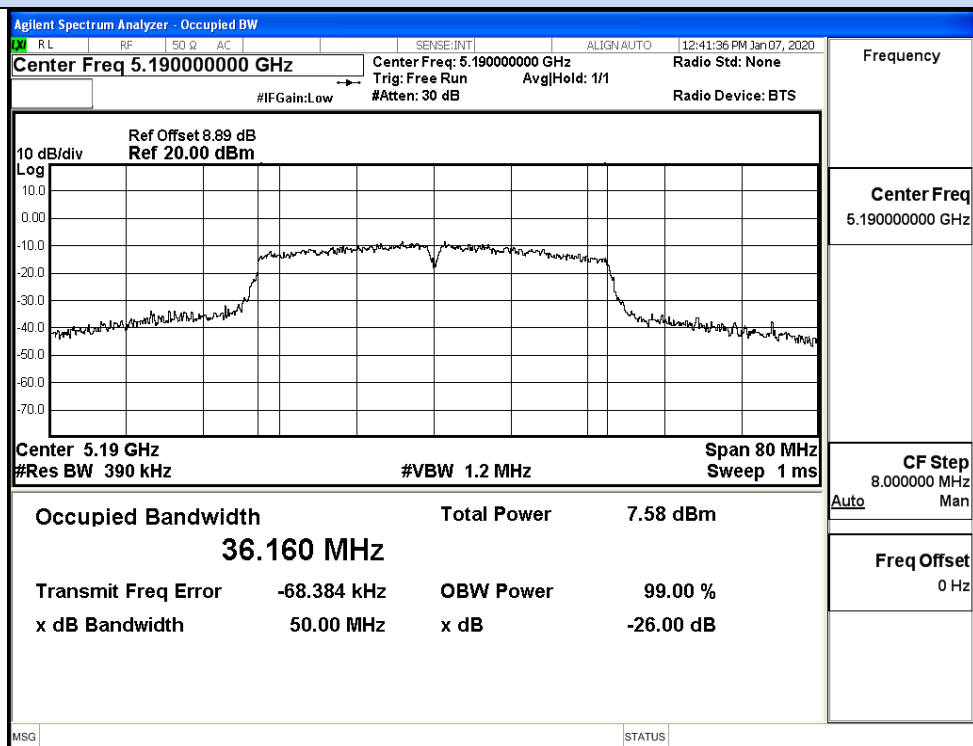
IEEE 802.11ac20 / Channel 36 / 5180MHz



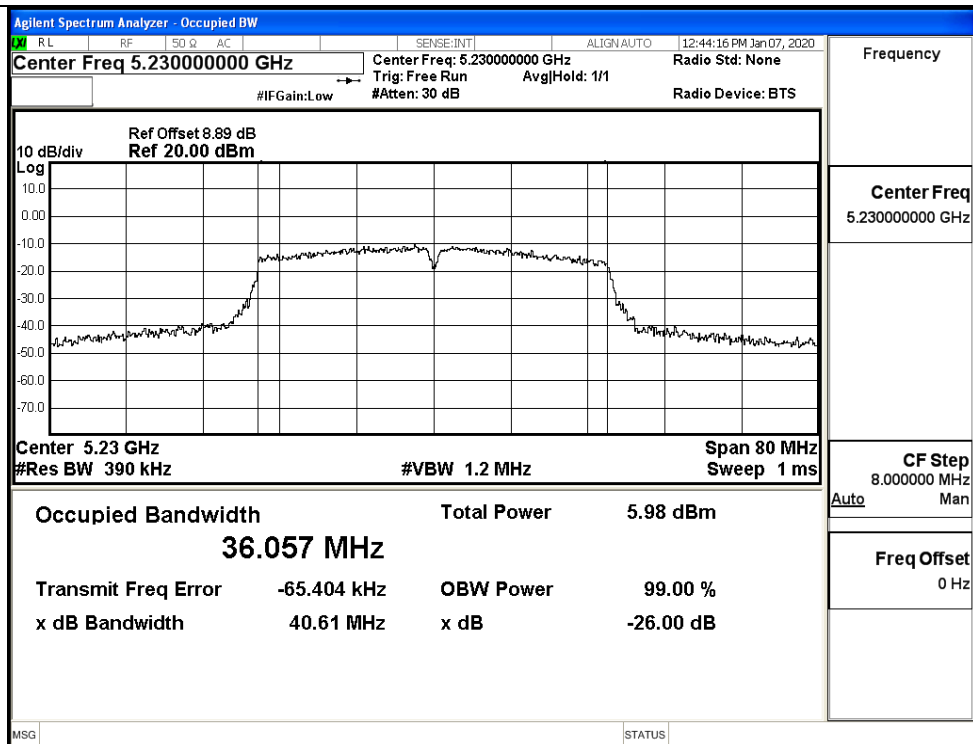
IEEE 802.11ac20 / Channel 40 / 5200MHz



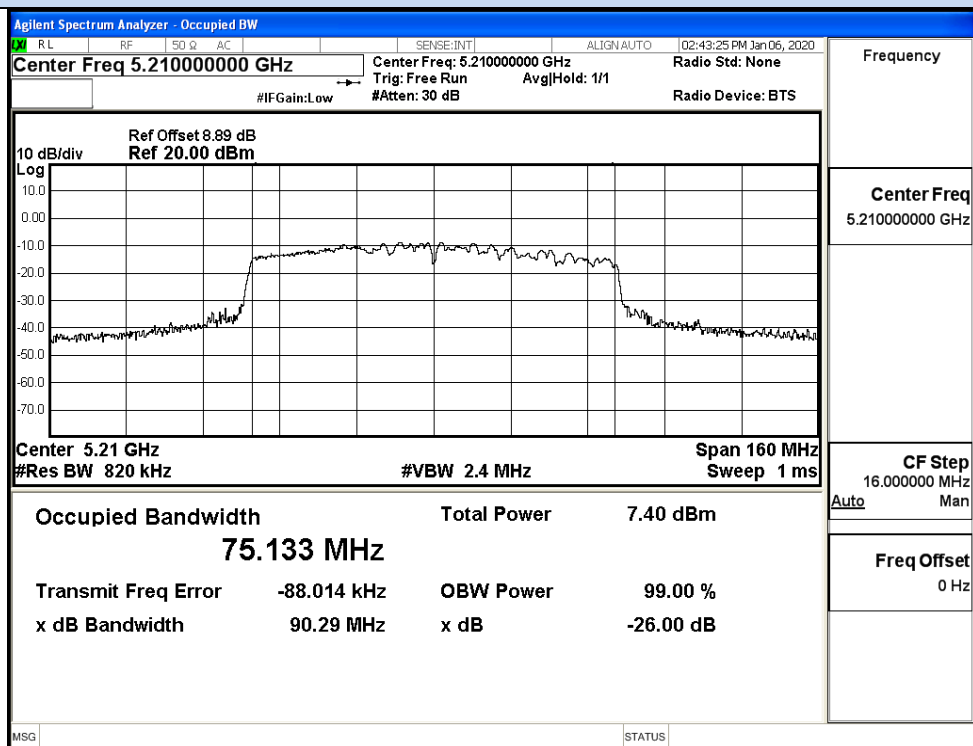
IEEE 802.11ac20 / Channel 48 / 5240MHz



IEEE 802.11ac40 / Channel 38 / 5190MHz



IEEE 802.11ac40 / Channel 46 / 5230MHz

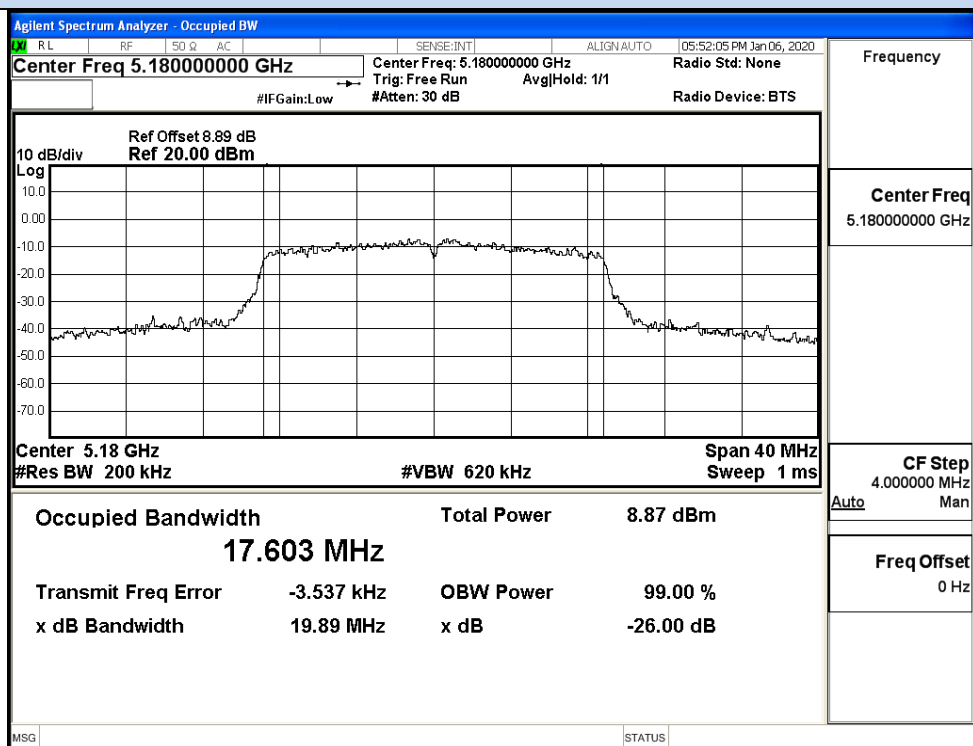


IEEE 802.11ac80 / Channel 42 / 5210MHz

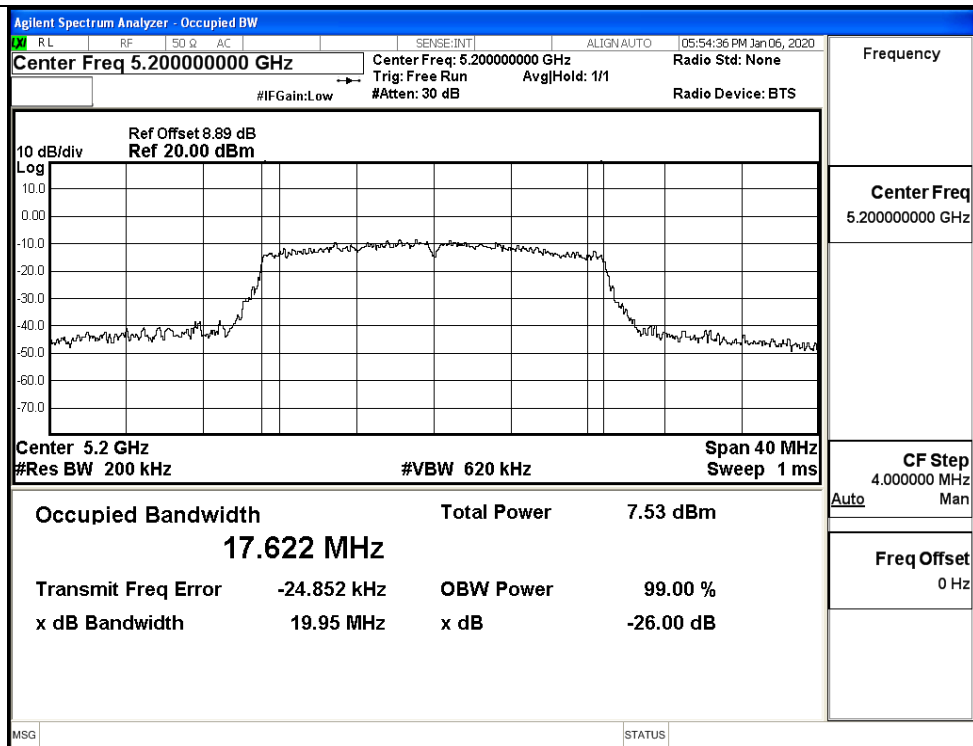
Ant1

Test Mode	Channel	Frequency (MHz)	26dB Bandwidth (MHz)	Limit (MHz)	Verdict
11A	36	5180	19.89	No Limit	Pass
	40	5200	19.95		Pass
	48	5240	19.81		Pass
11N20 SISO	36	5180	19.92	No Limit	Pass
	40	5200	19.71		Pass
	48	5240	19.96		Pass
11N40 SISO	38	5190	40.25	No Limit	Pass
	46	5230	40.72		Pass
11AC20 SISO	36	5180	22.56	No Limi	Pass
	40	5200	20.31		Pass
	48	5240	20.12		Pass
11AC40 SISO	38	5190	42.76	No Limi	Pass
	46	5230	40.25		Pass
11AC80 SISO	42	5210	108.7	No Limi	Pass

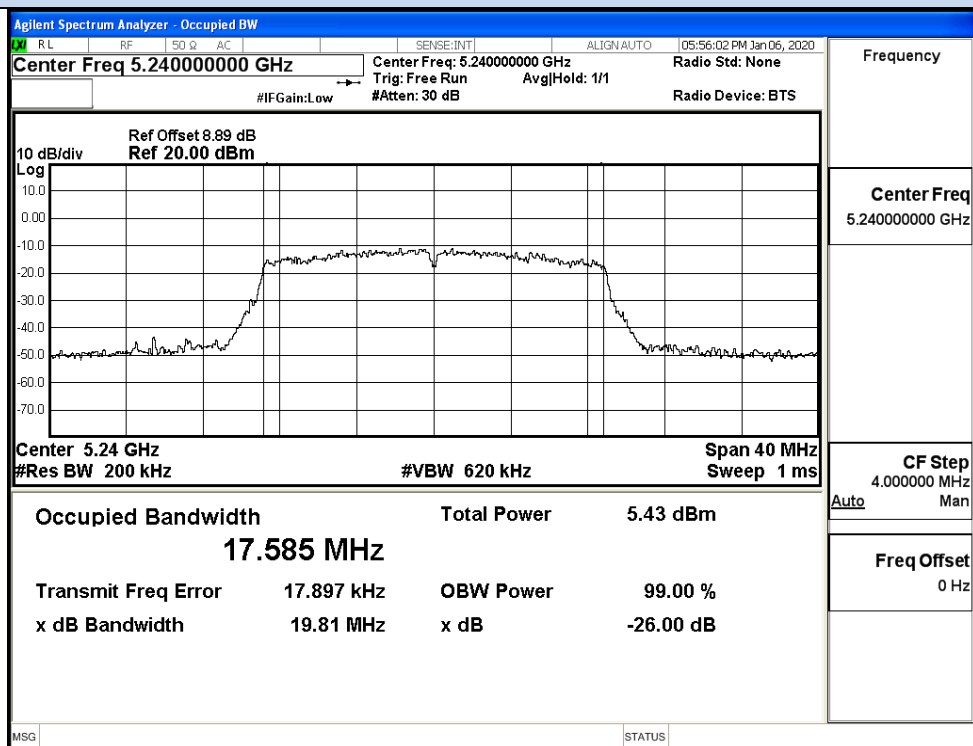
26dB Bandwidth



IEEE 802.11a / Channel 36 / 5180MHz

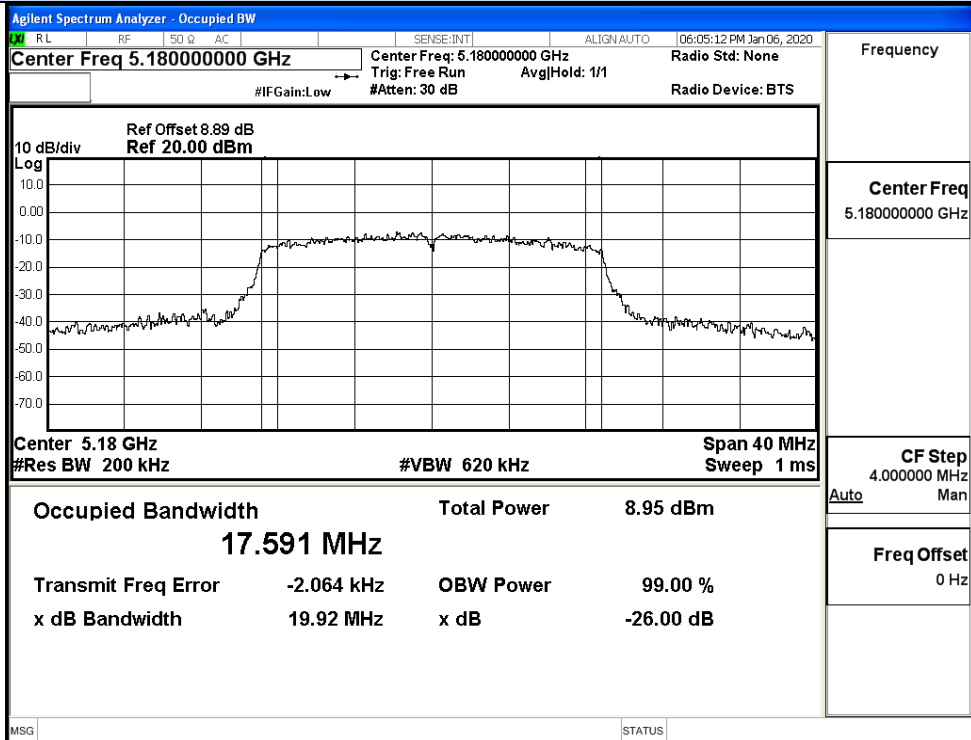


IEEE 802.11a / Channel 40 / 5200MHz

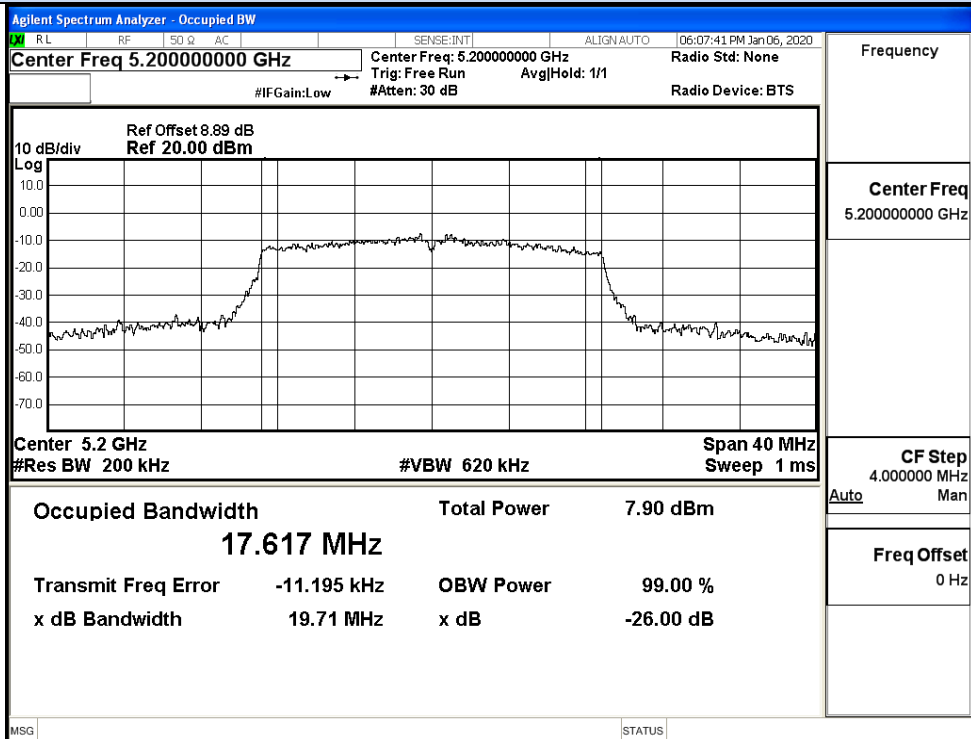


IEEE 802.11a / Channel 48 / 5240MHz

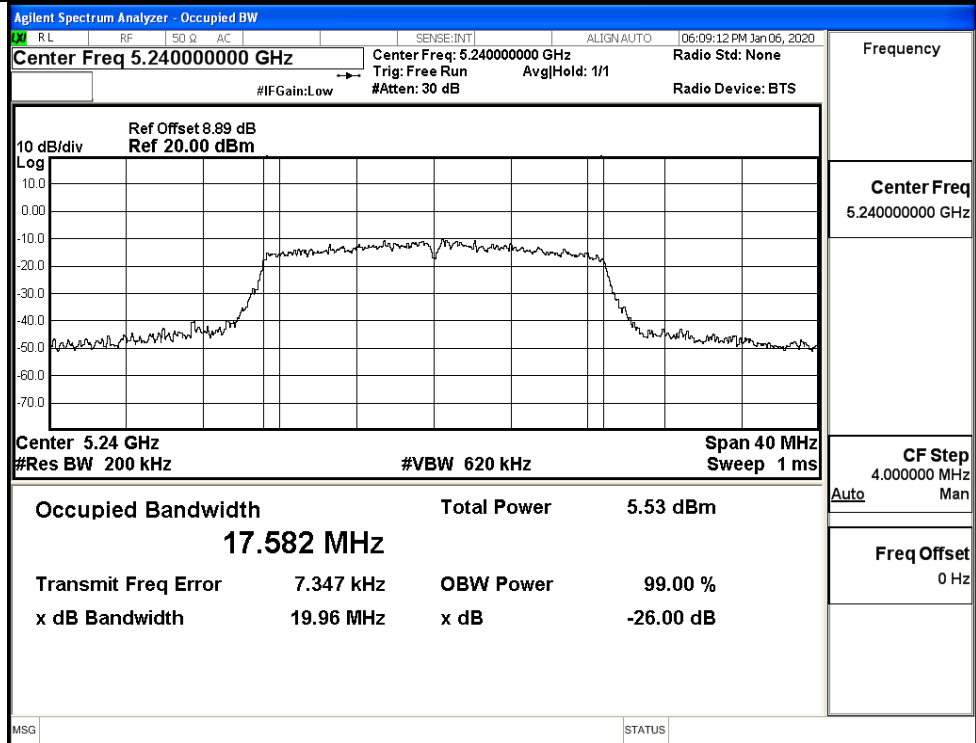
26dB Bandwidth



IEEE 802.11n20 / Channel 36 / 5180MHz

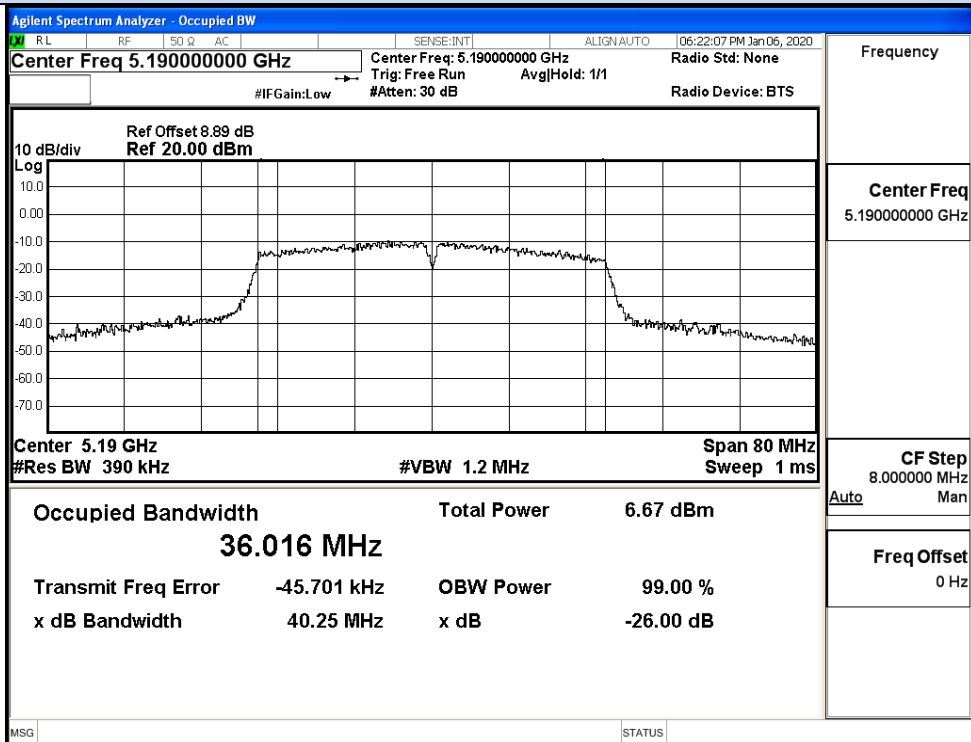


IEEE 802.11n20 / Channel 40 / 5200MHz

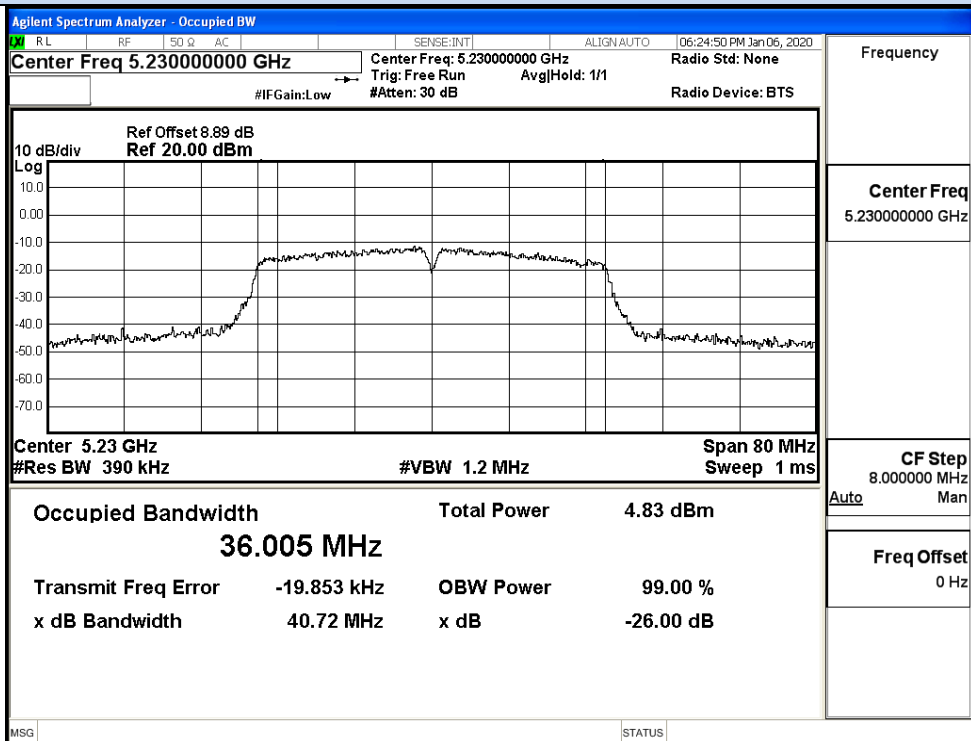


IEEE 802.11n20 / Channel 48 / 5240MHz

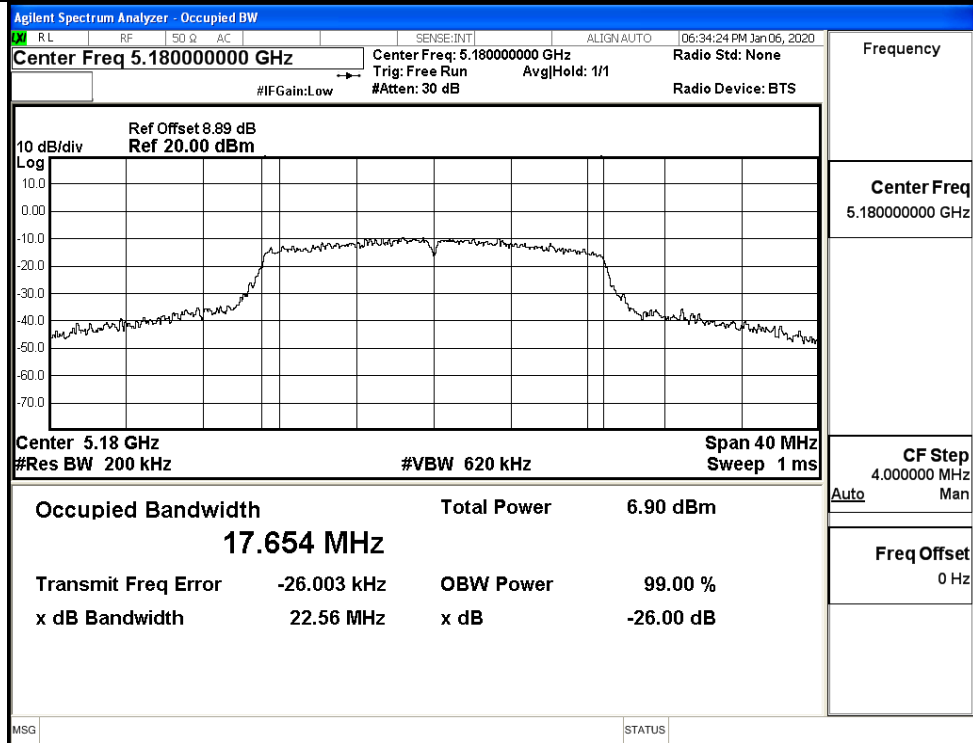
26dB Bandwidth



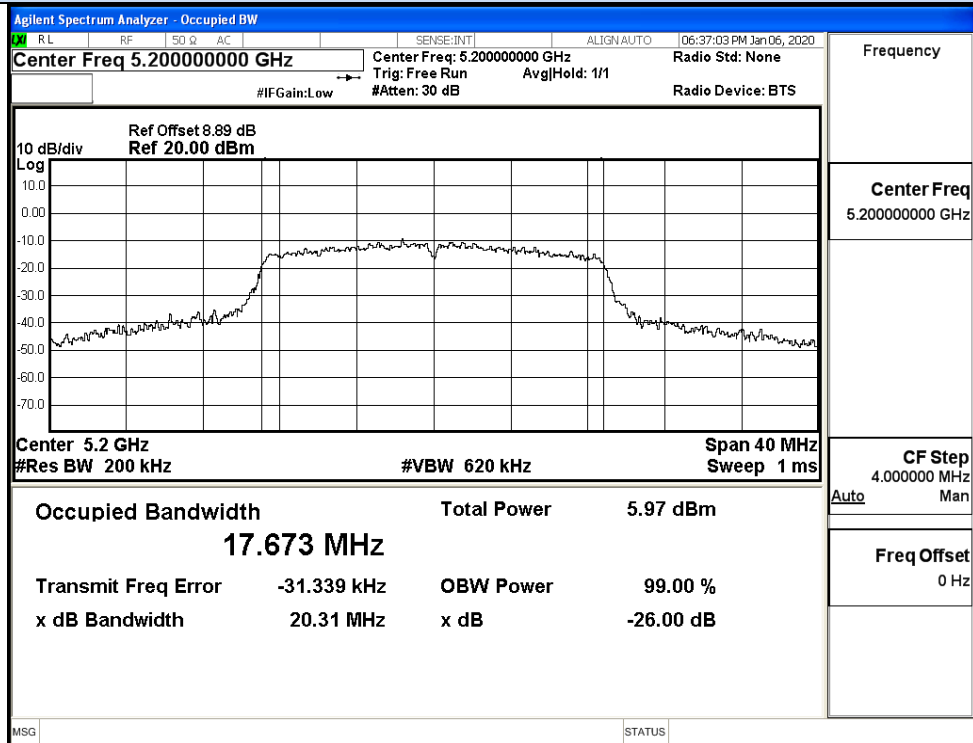
IEEE 802.11n40 / Channel 38 / 5190MHz



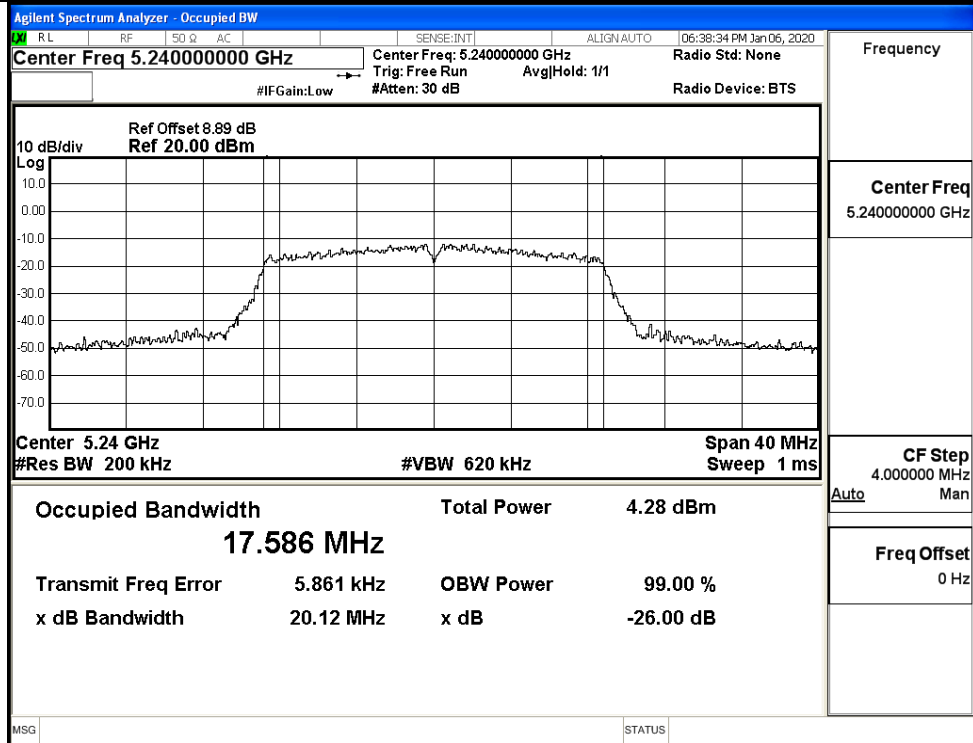
IEEE 802.11n40 / Channel 46 / 5230MHz



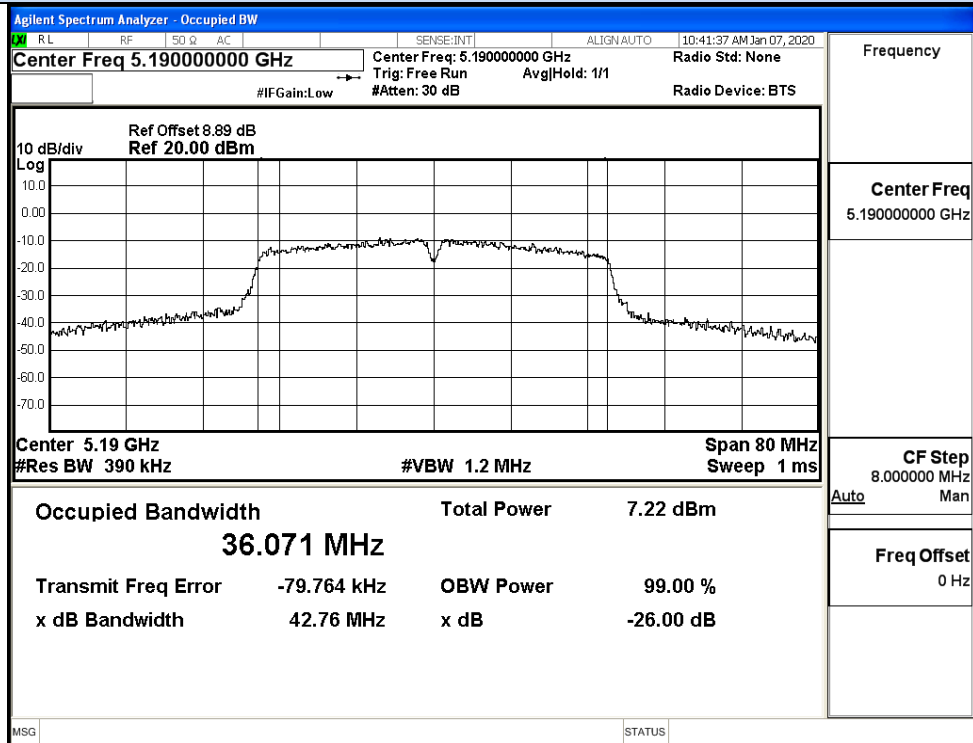
IEEE 802.11ac20 / Channel 36 / 5180MHz



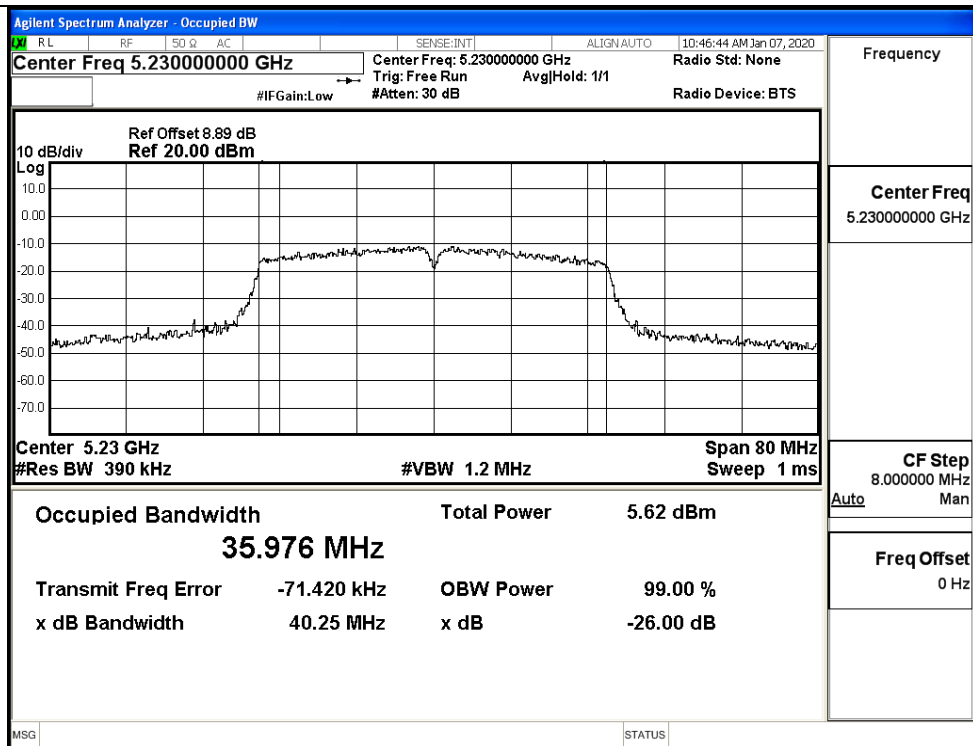
IEEE 802.11ac20 / Channel 40 / 5200MHz



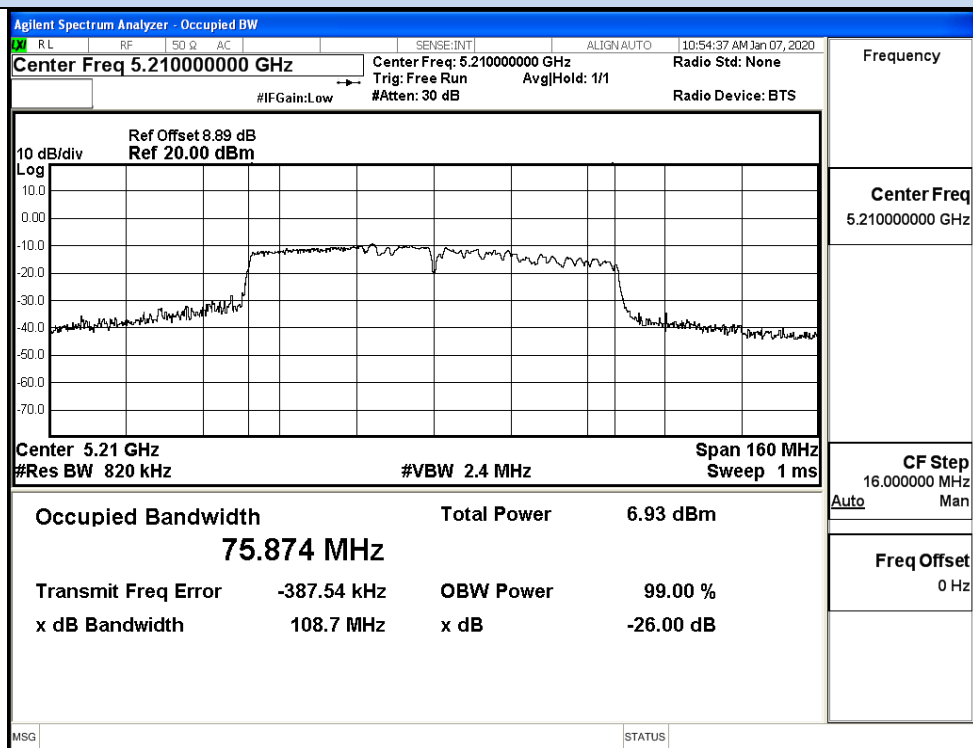
IEEE 802.11ac20 / Channel 48 / 5240MHz



IEEE 802.11ac40 / Channel 38 / 5190MHz



IEEE 802.11ac40 / Channel 46 / 5230MHz



IEEE 802.11ac80 / Channel 42 / 5210MHz

D.5 Undesirable Emissions Measurement

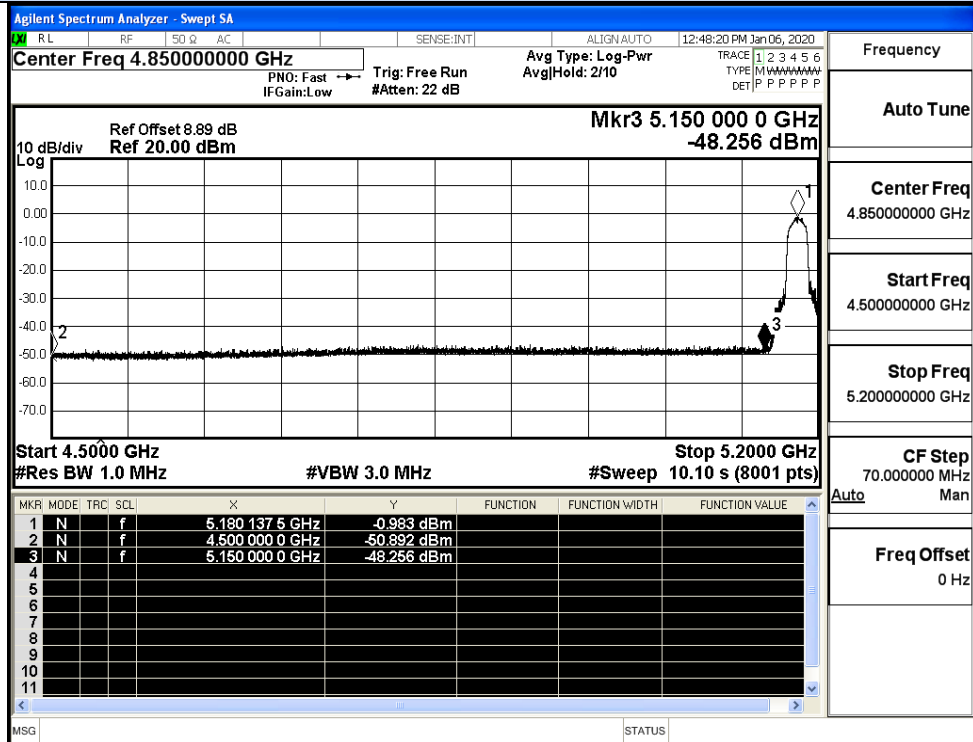
Ant0

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	-50.89	2.30	0	45.17	Peak	68.20	Pass
		4500.0	-60.38	2.30	0	35.68	Average	54.00	Pass
		5150.0	-48.26	2.30	0	47.8	Peak	68.20	Pass
		5150.0	-58.46	2.30	0	37.6	Average	54.00	Pass
	48	5350.0	-48.68	2.30	0	47.38	Peak	68.20	Pass
		5350.0	-59.54	2.30	0	36.52	Average	54.00	Pass
		5460.0	-49.40	2.30	0	46.66	Peak	68.20	Pass
		5460.0	-59.52	2.30	0	36.54	Average	54.00	Pass
11N2 0 SISO	36	4500.0	-50.74	2.30	0	45.32	Peak	68.20	Pass
		4500.0	-60.38	2.30	0	35.68	Average	54.00	Pass
		5150.0	-48.65	2.30	0	47.41	Peak	68.20	Pass
		5150.0	-58.46	2.30	0	37.6	Average	54.00	Pass
	48	5350.0	-48.66	2.30	0	47.4	Peak	68.20	Pass
		5350.0	-59.59	2.30	0	36.47	Average	54.00	Pass
		5460.0	-48.47	2.30	0	47.59	Peak	68.20	Pass
		5460.0	-59.59	2.30	0	36.47	Average	54.00	Pass
11N4 0 SISO	38	4500.0	-50.81	2.30	0	45.25	Peak	68.20	Pass
		4500.0	-60.35	2.30	0	35.71	Average	54.00	Pass
		5150.0	-37.61	2.30	0	58.45	Peak	68.20	Pass
		5150.0	-50.55	2.30	0	45.51	Average	54.00	Pass
	46	5350.0	-49.32	2.30	0	46.74	Peak	68.20	Pass
		5350.0	-59.21	2.30	0	36.85	Average	54.00	Pass
		5460.0	-48.41	2.30	0	47.65	Peak	68.20	Pass
		5460.0	-59.21	2.30	0	36.85	Average	54.00	Pass
11A C20 SIS O	36	4500.0	-49.74	2.30	0	46.32	Peak	68.20	Pass
		4500.0	-60.40	2.30	0	35.66	Average	54.00	Pass
		5150.0	-48.57	2.30	0	47.49	Peak	68.20	Pass
		5150.0	-58.45	2.30	0	37.61	Average	54.00	Pass
	48	4500.0	-49.74	2.30	0	46.32	Peak	68.20	Pass
		4500.0	-60.40	2.30	0	35.66	Average	54.00	Pass
		5150.0	-48.57	2.30	0	47.49	Peak	68.20	Pass
		5150.0	-58.45	2.30	0	37.61	Average	54.00	Pass
11A C40 SIS O	38	4500.0	-50.11	2.30	0	45.95	Peak	68.20	Pass
		4500.0	-60.33	2.30	0	35.73	Average	54.00	Pass
		5150.0	-35.54	2.30	0	60.52	Peak	68.20	Pass
		5150.0	-50.40	2.30	0	45.66	Average	54.00	Pass
	46	5350.0	-49.33	2.30	0	46.73	Peak	68.20	Pass
		5350.0	-59.17	2.30	0	36.89	Average	54.00	Pass
		5460.0	-49.27	2.30	0	46.79	Peak	68.20	Pass
		5460.0	-59.22	2.30	0	36.84	Average	54.00	Pass
11A C80 SIS O	42	4500.0	-49.50	2.30	0	46.56	Peak	68.20	Pass
		5150.0	-58.75	2.30	0	37.31	Average	54.00	Pass
		4500.0	-49.21	2.30	0	46.85	Peak	68.20	Pass
		5150.0	-58.80	2.30	0	37.26	Average	54.00	Pass
		5350.0	-49.50	2.30	0	46.56	Peak	68.20	Pass
		5460.0	-58.75	2.30	0	37.31	Average	54.00	Pass
		5350.0	-49.21	2.30	0	46.85	Peak	68.20	Pass
		5460.0	-58.80	2.30	0	37.26	Average	54.00	Pass

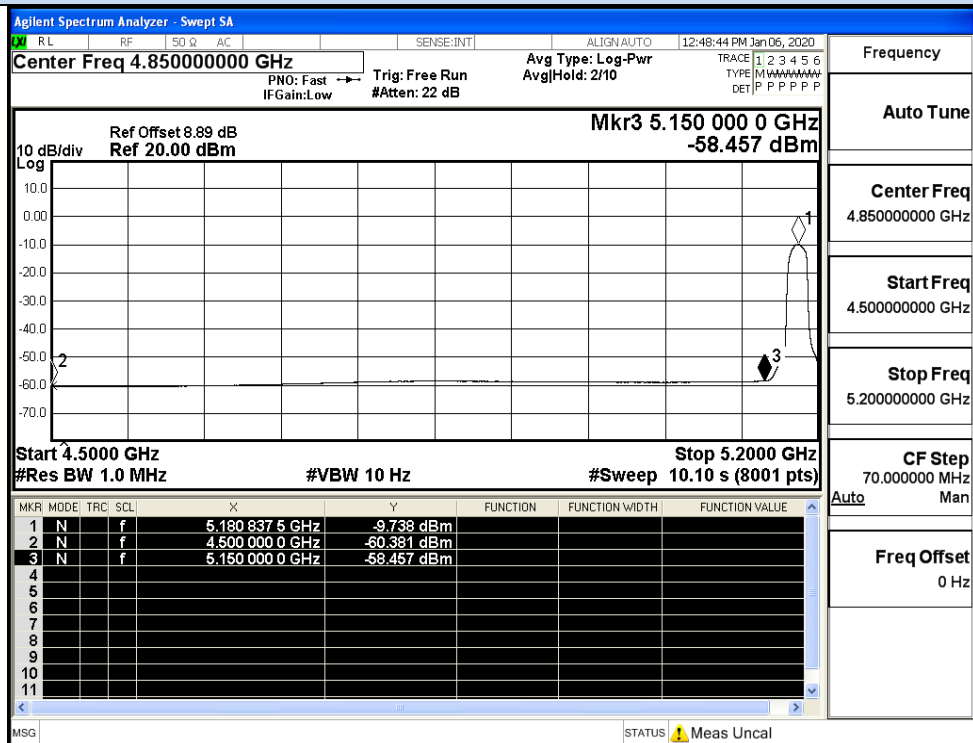
$E [dBuV/m] = \text{Power [dBm]} + \text{Gain} + \text{Ground Factor} + 93.76$

The upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands or 2 dBi, whichever is greater

Undesirable Emissions Measurement

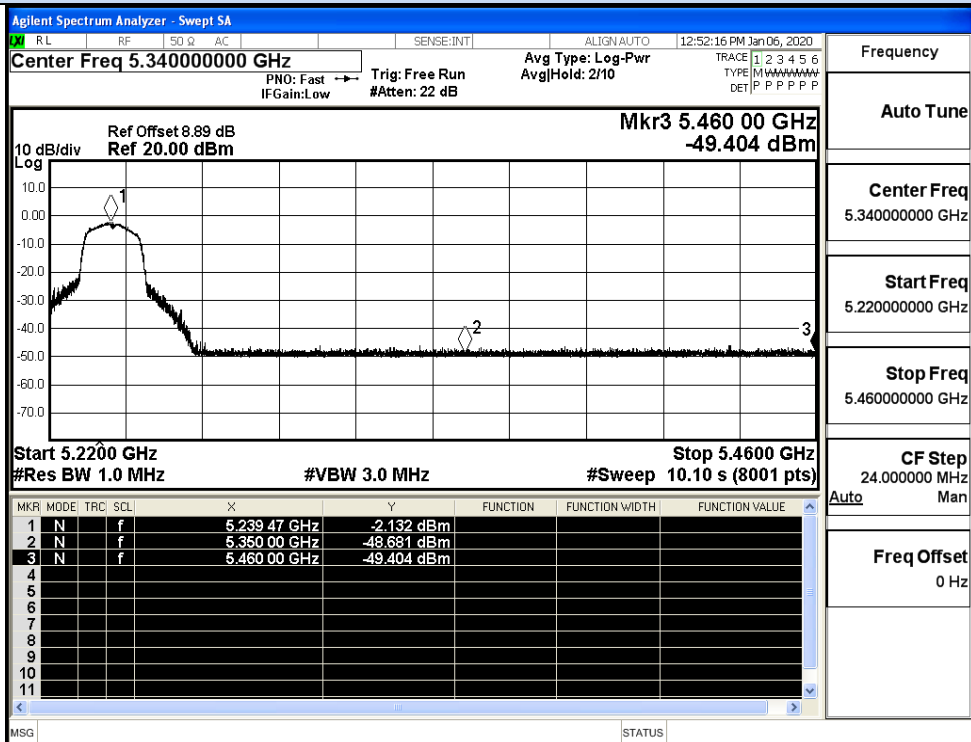


IEEE 802.11a / Channel 36 / 5180MHz / Peak

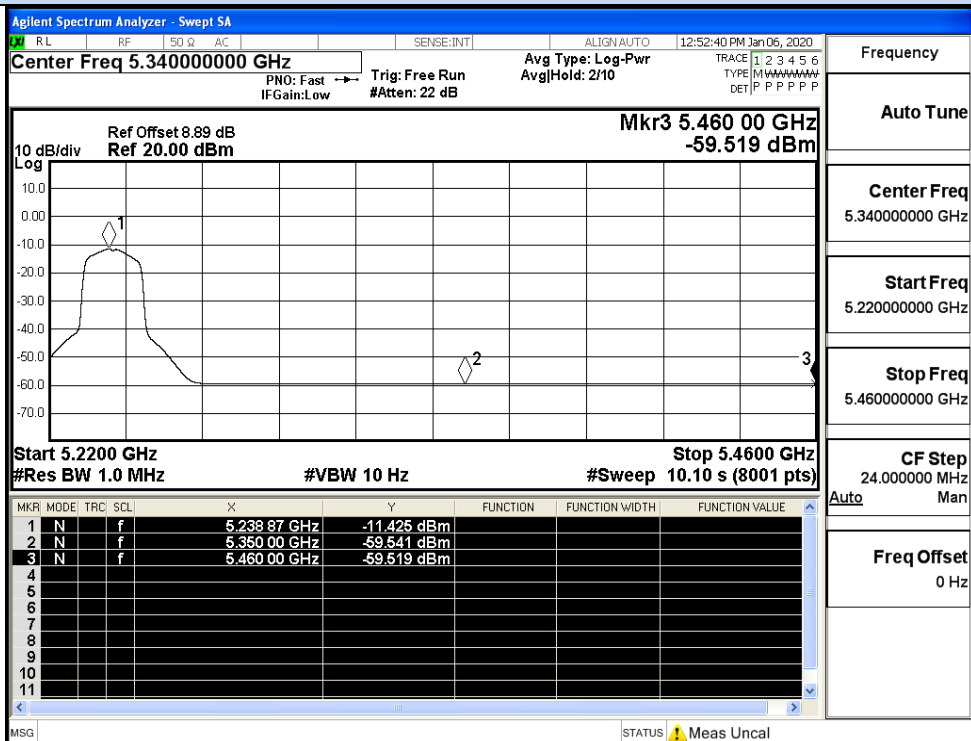


IEEE 802.11a / Channel 36 / 5180MHz / Average

Undesirable Emissions Measurement

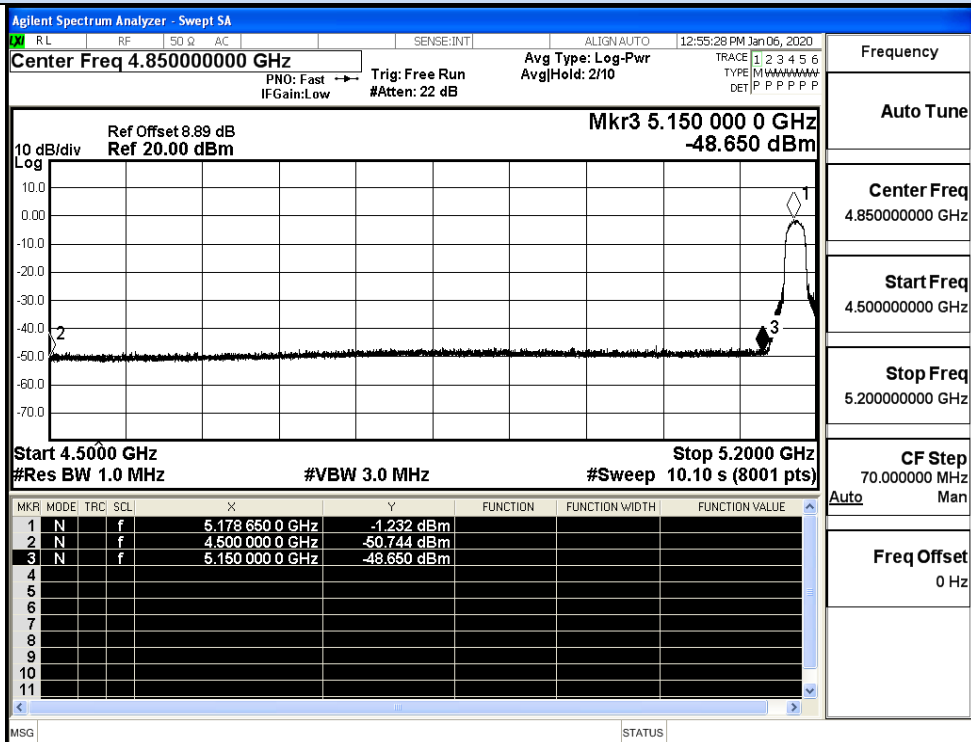


IEEE 802.11a / Channel 48 / 5240MHz / Peak

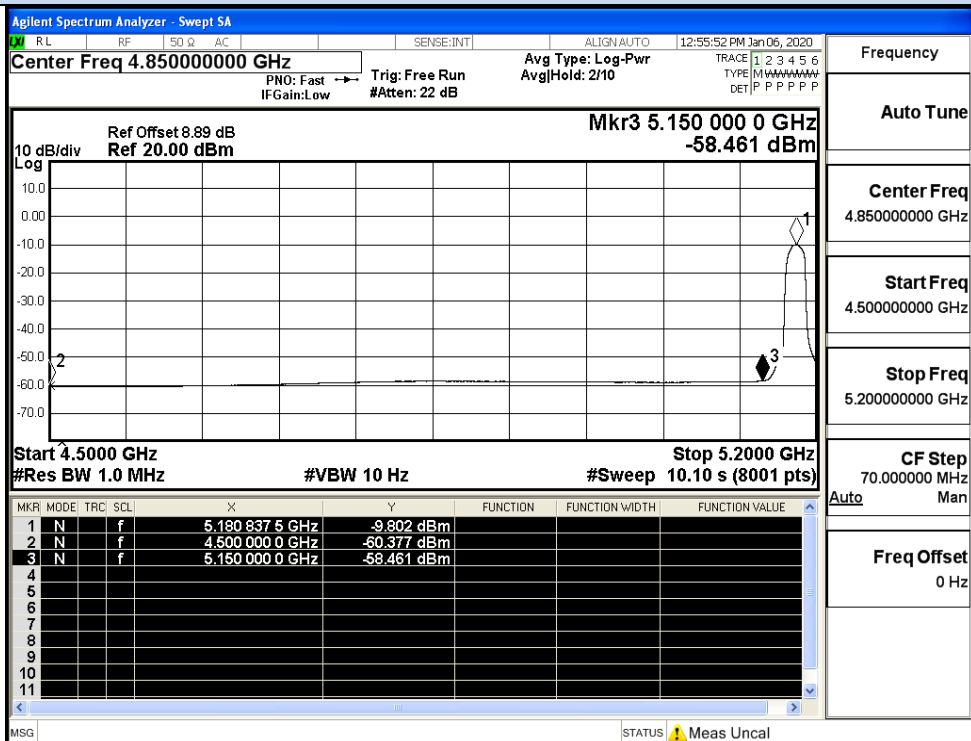


IEEE 802.11a / Channel 48 / 5240MHz / Average

Undesirable Emissions Measurement

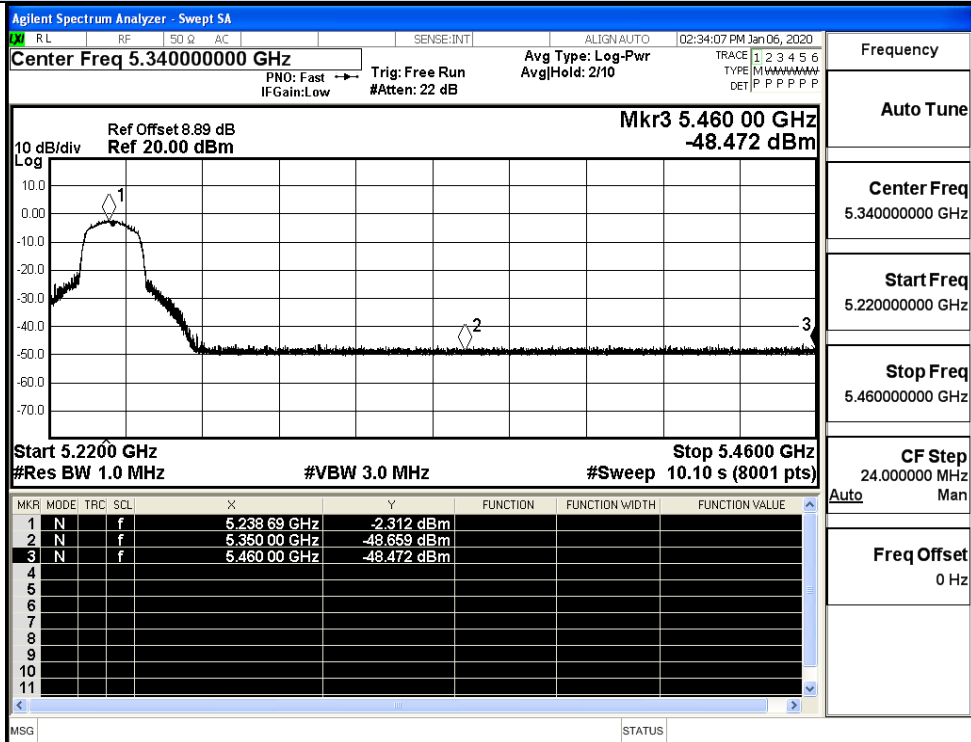


IEEE 802.11n20 / Channel 36 / 5180MHz / Peak

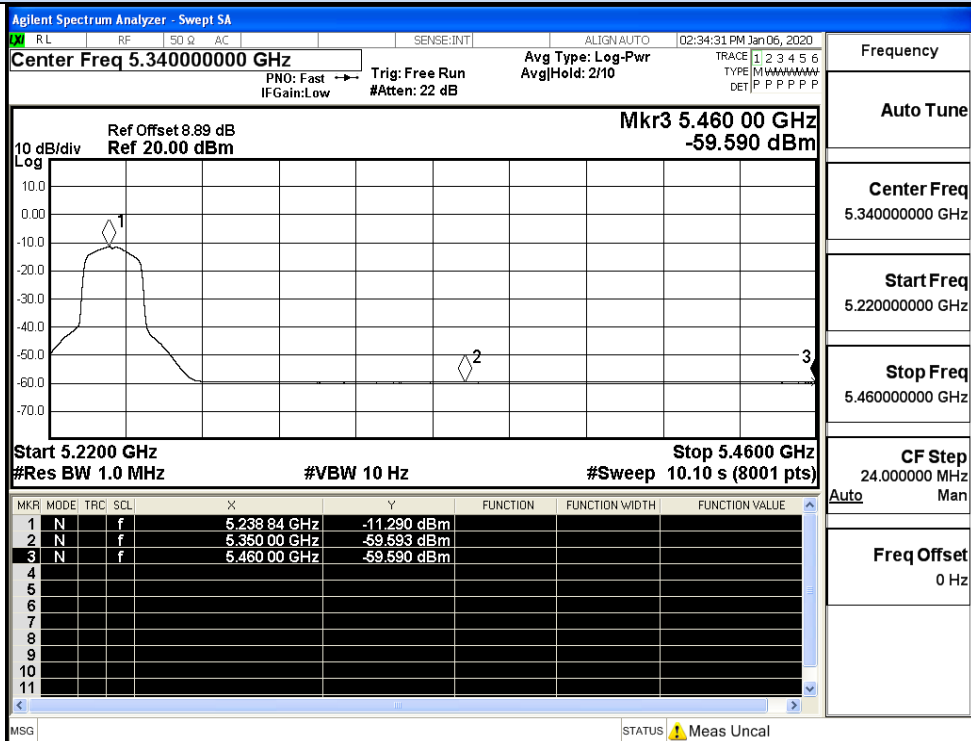


IEEE 802.11n20 / Channel 36 / 5180MHz / Average

Undesirable Emissions Measurement

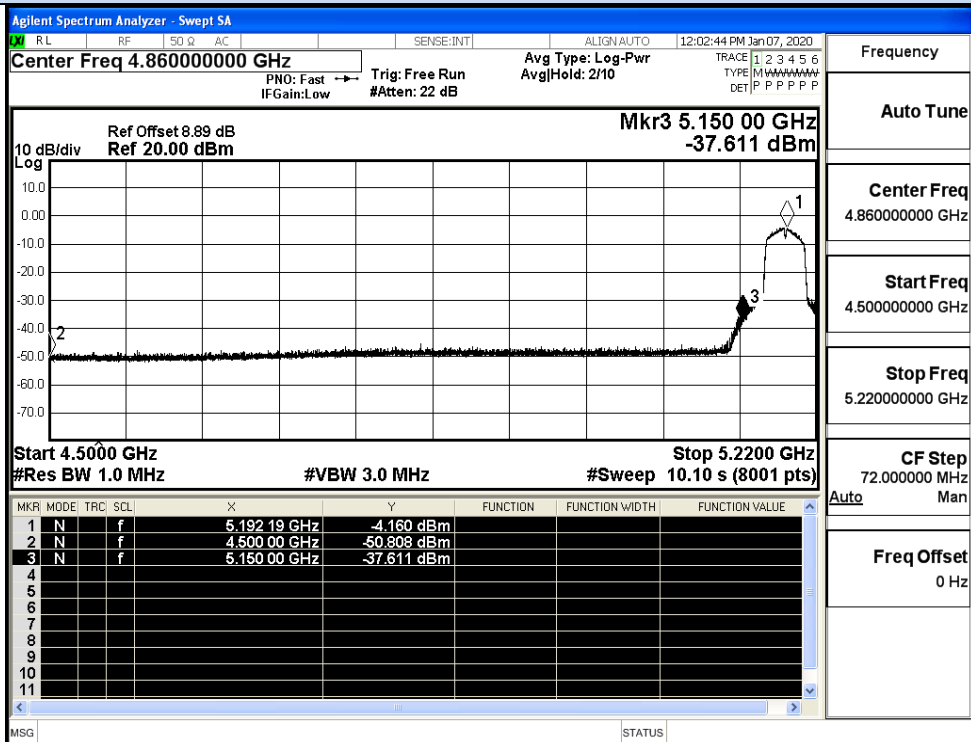


IEEE 802.11n20 / Channel 48 / 5240MHz / Peak

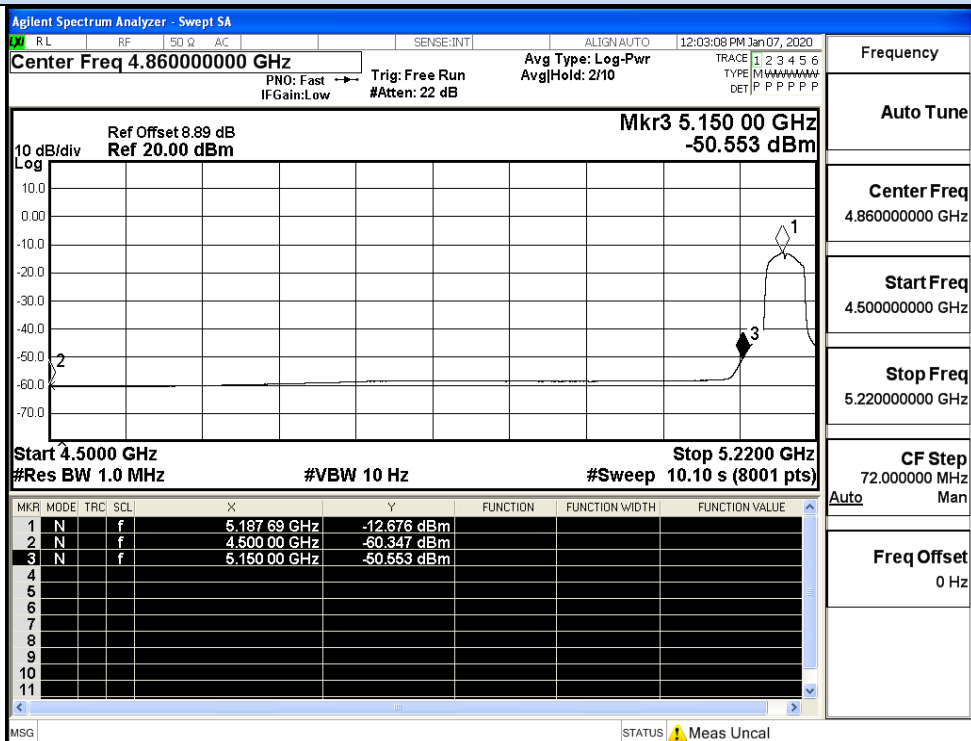


IEEE 802.11n20 / Channel 48 / 5240MHz / Average

Undesirable Emissions Measurement

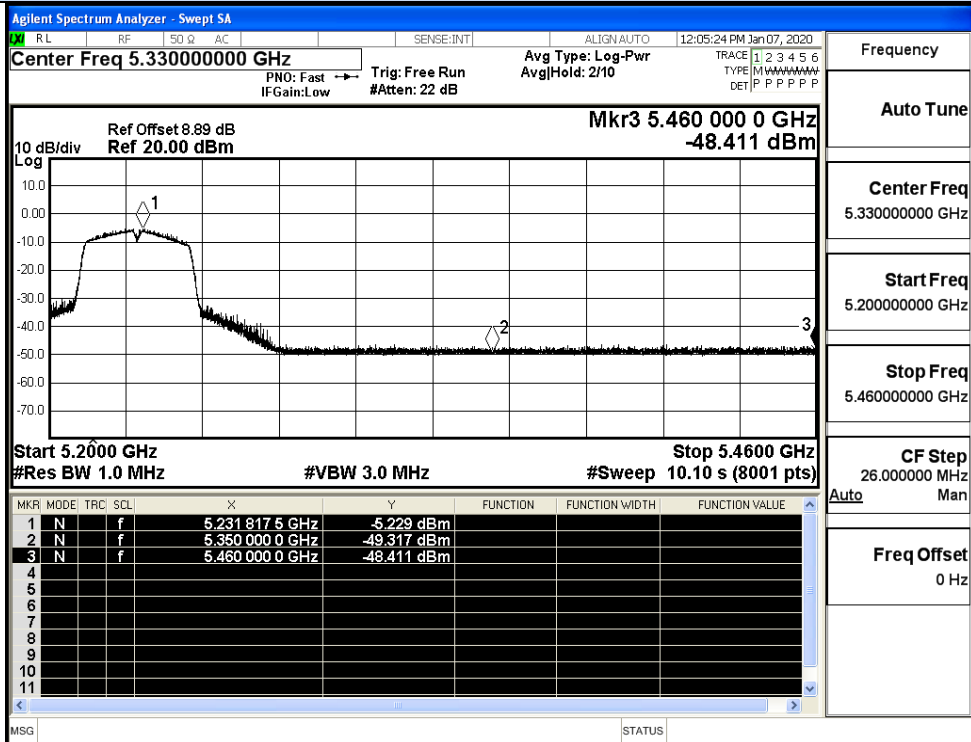


IEEE 802.11n40 / Channel 38 / 5190MHz / Peak

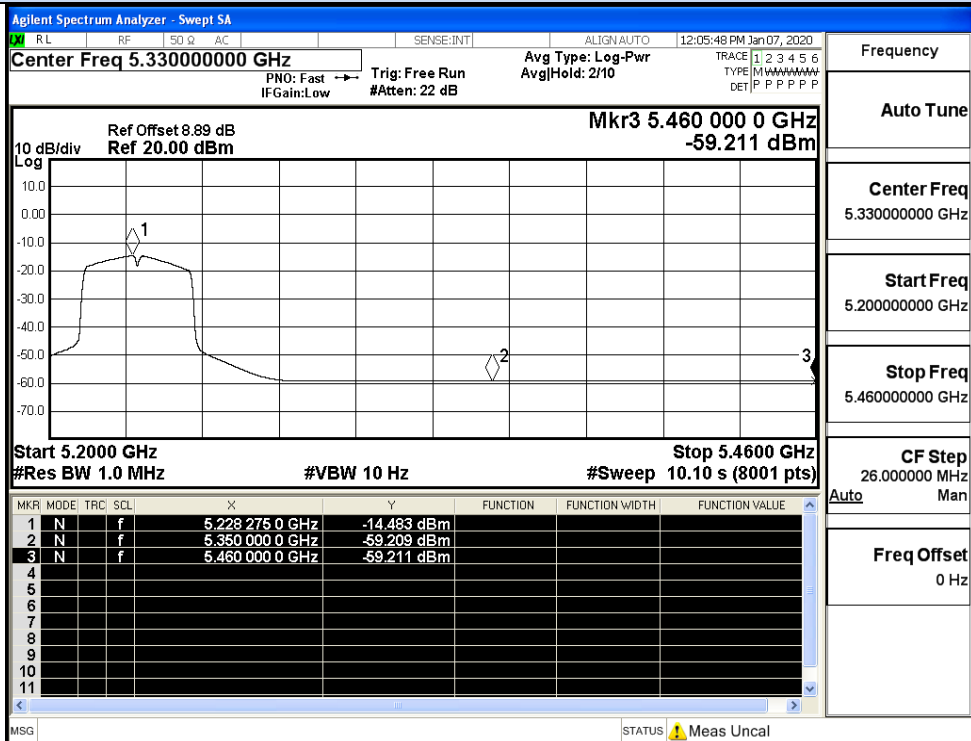


IEEE 802.11n40 / Channel 38 / 5190MHz / Average

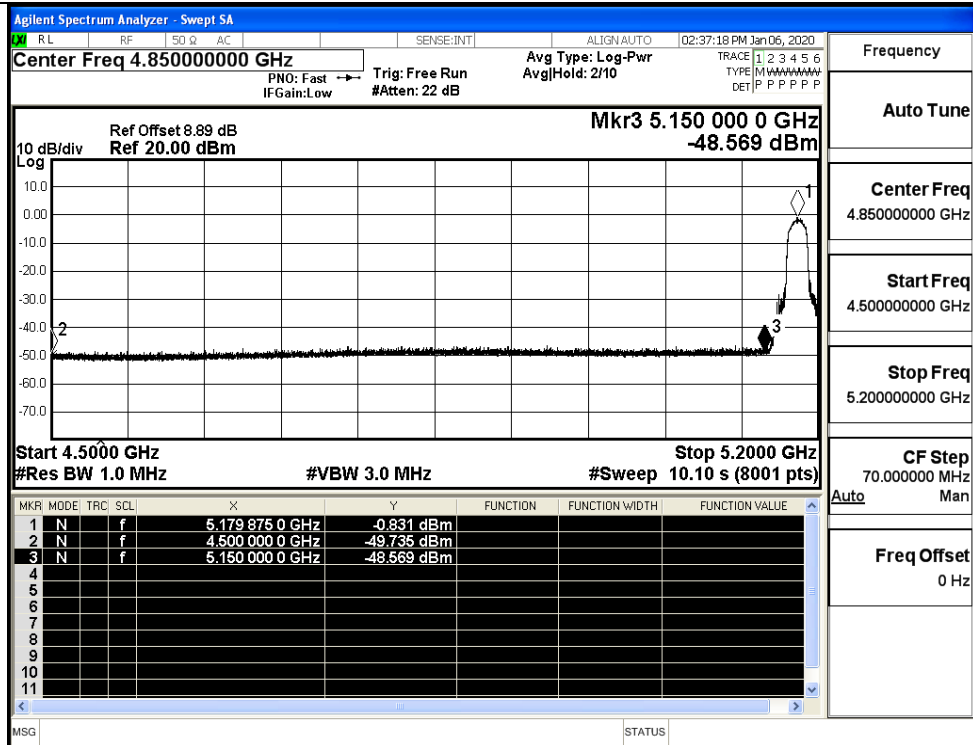
Undesirable Emissions Measurement



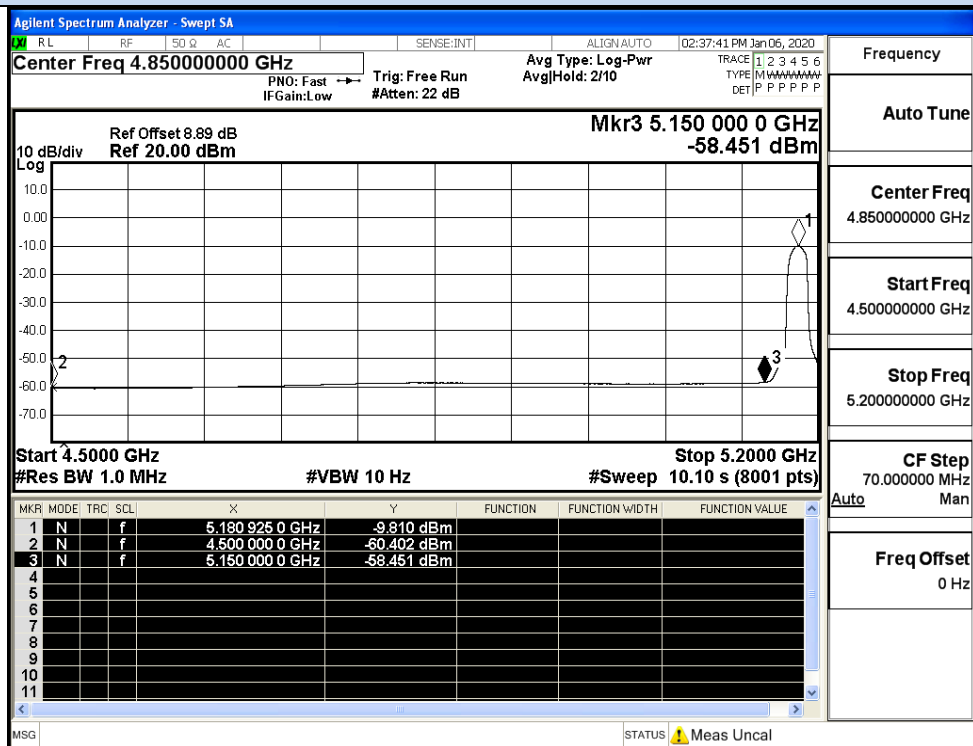
IEEE 802.11n40 / Channel 46 / 5230MHz / Peak



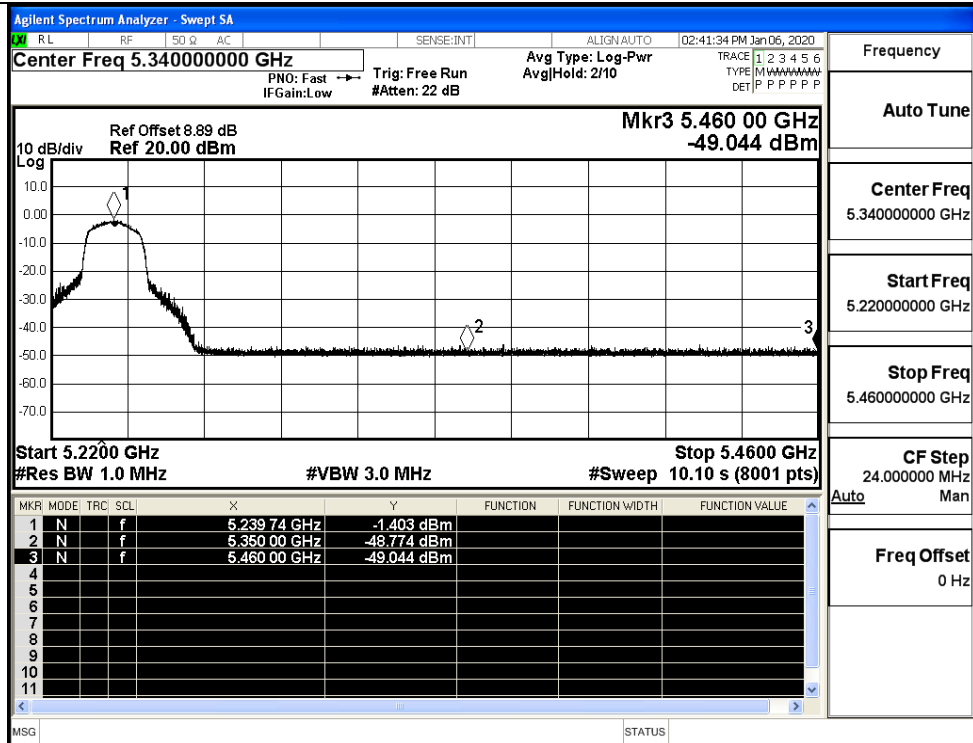
IEEE 802.11n40 / Channel 46 / 5230MHz / Average



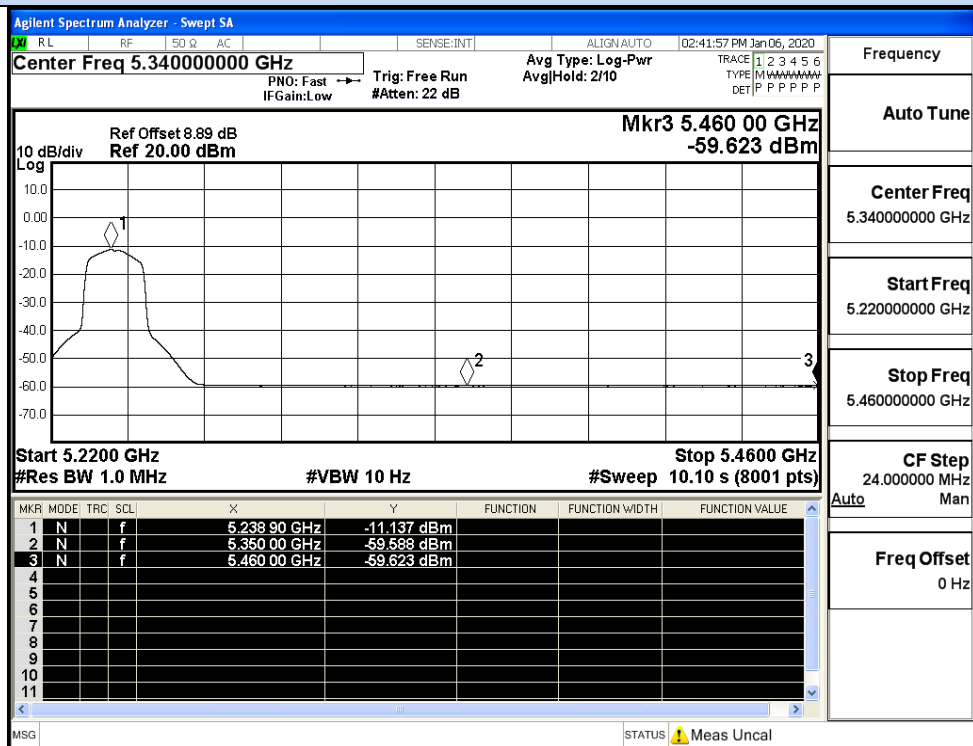
IEEE 802.11ac20 / Channel 36 / 5180MHz / Peak



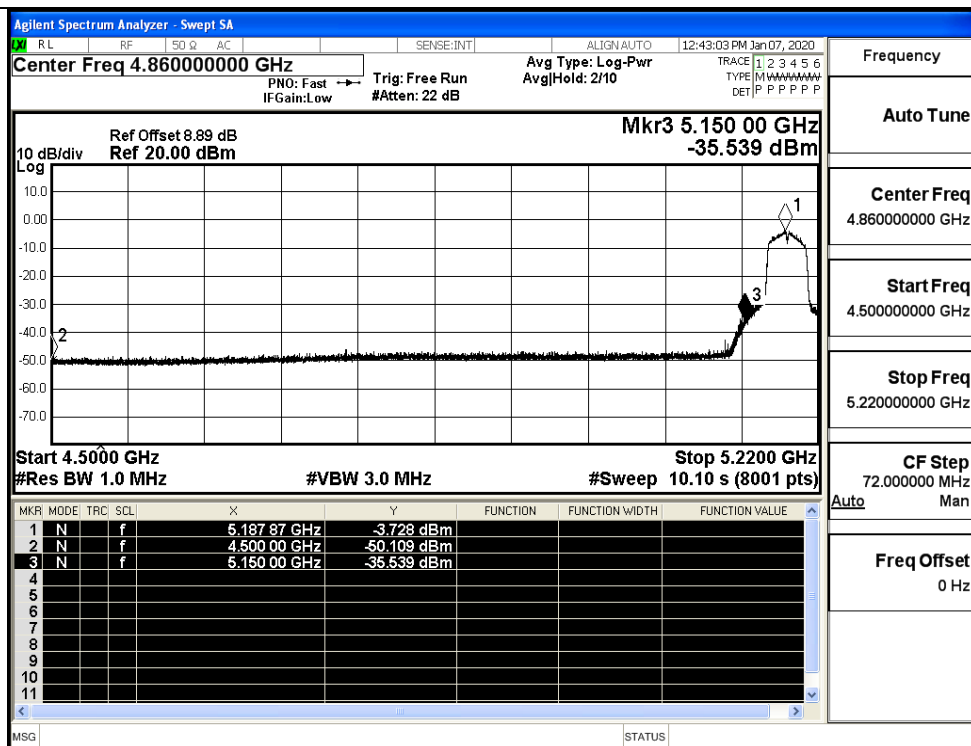
IEEE 802.11ac20 / Channel 36 / 5180MHz / Average



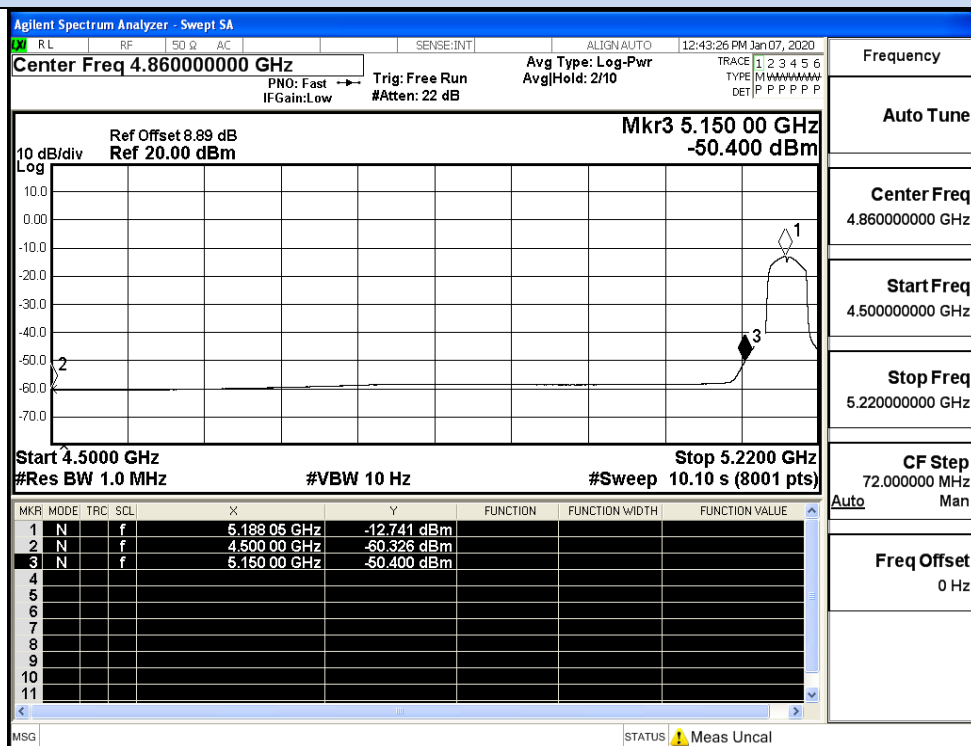
IEEE 802.11ac20 / Channel 48 / 5240MHz / Peak



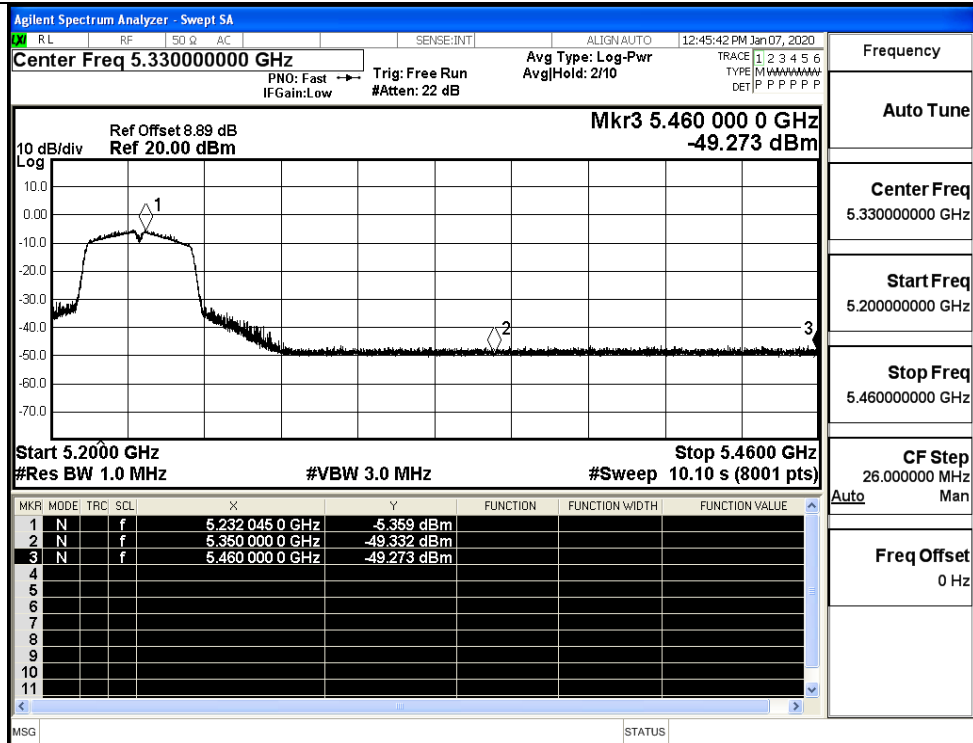
IEEE 802.11ac20 / Channel 48 / 5240MHz / Average



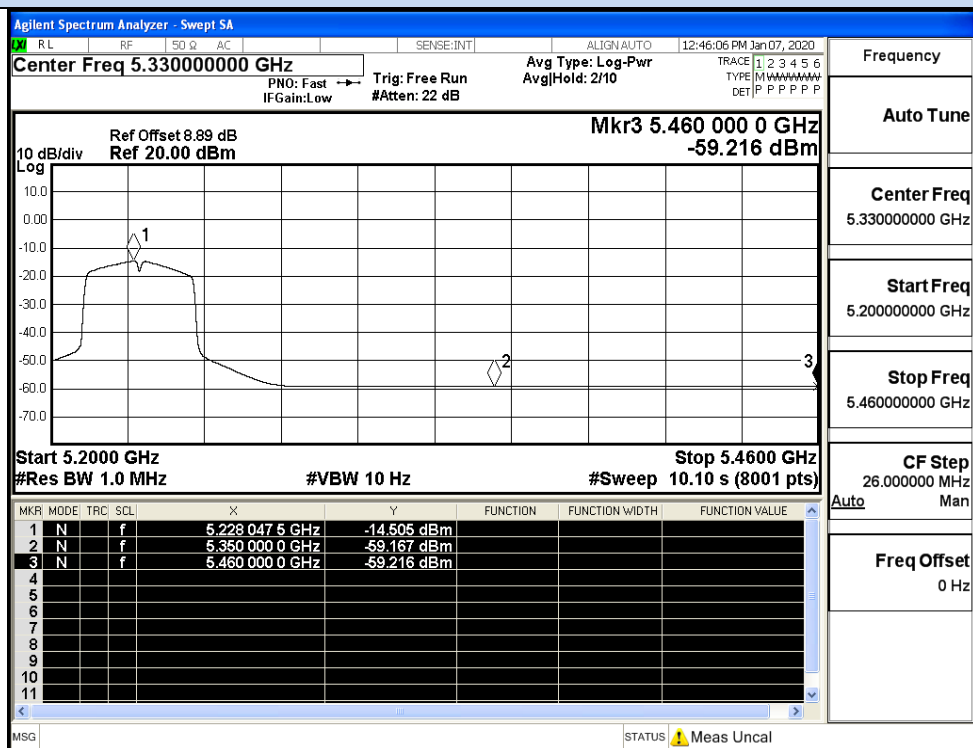
IEEE 802.11ac40 / Channel 38/ 5190MHz / Peak



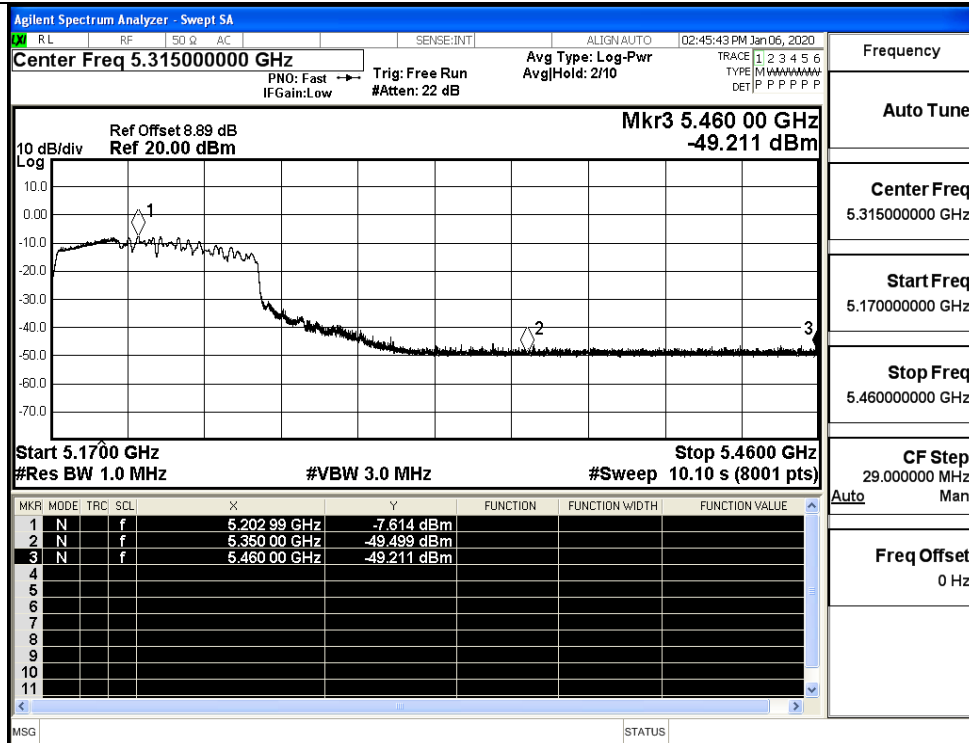
IEEE 802.11ac40 / Channel 38 / 5190MHz / Average



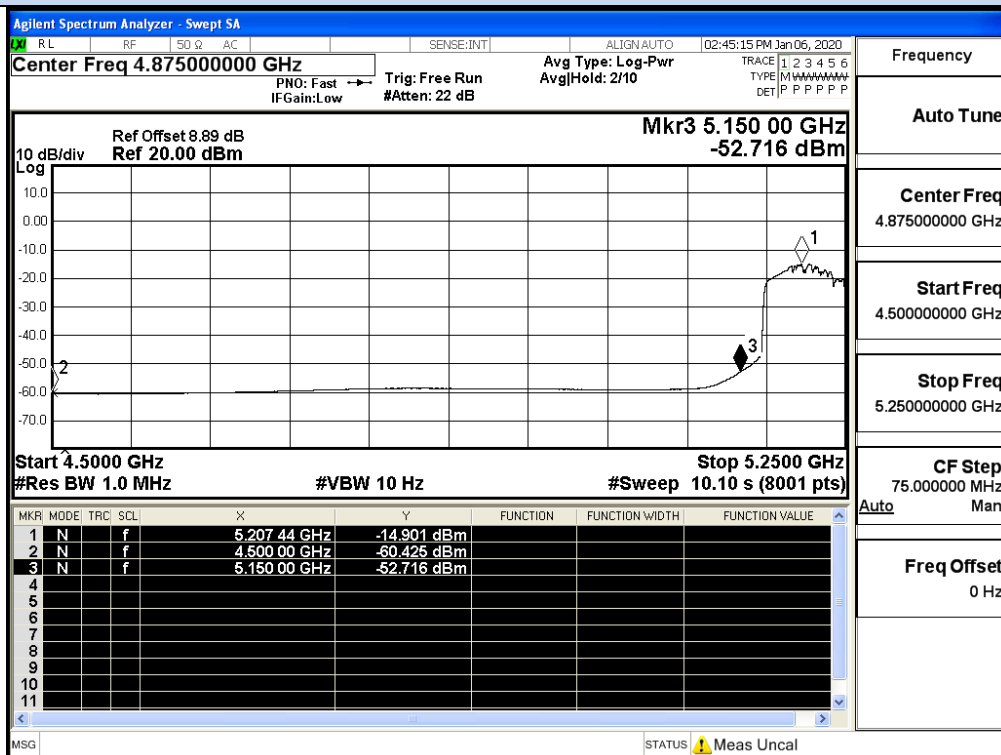
IEEE 802.11ac40 / Channel 46 / 5230MHz / Peak



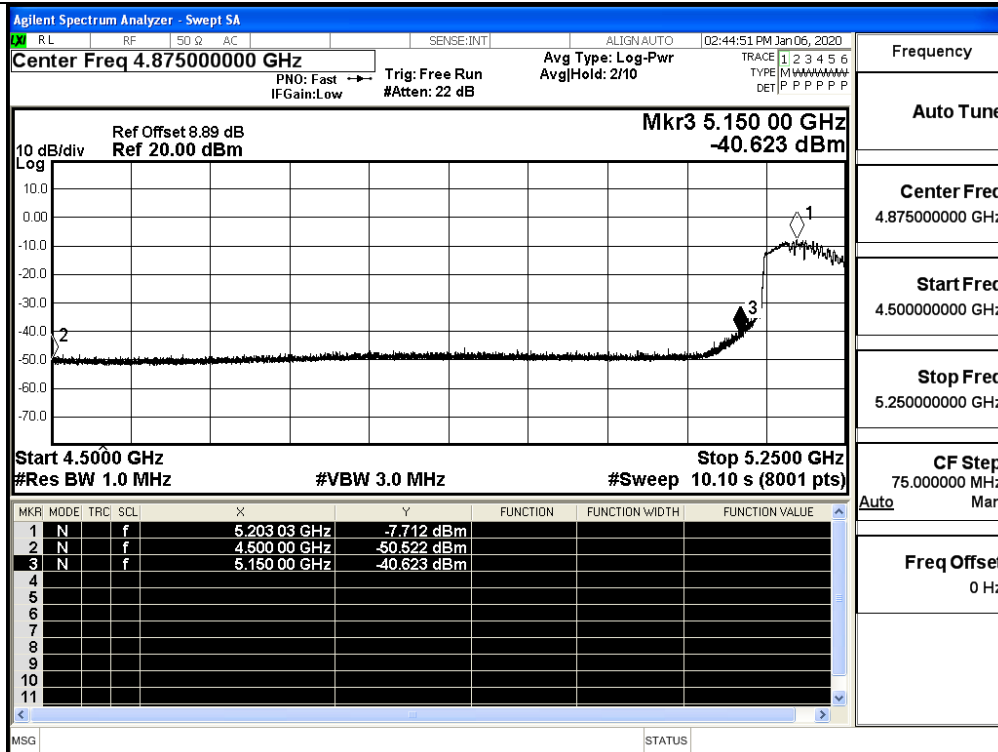
IEEE 802.11ac40 / Channel 46 / 5230MHz / Average



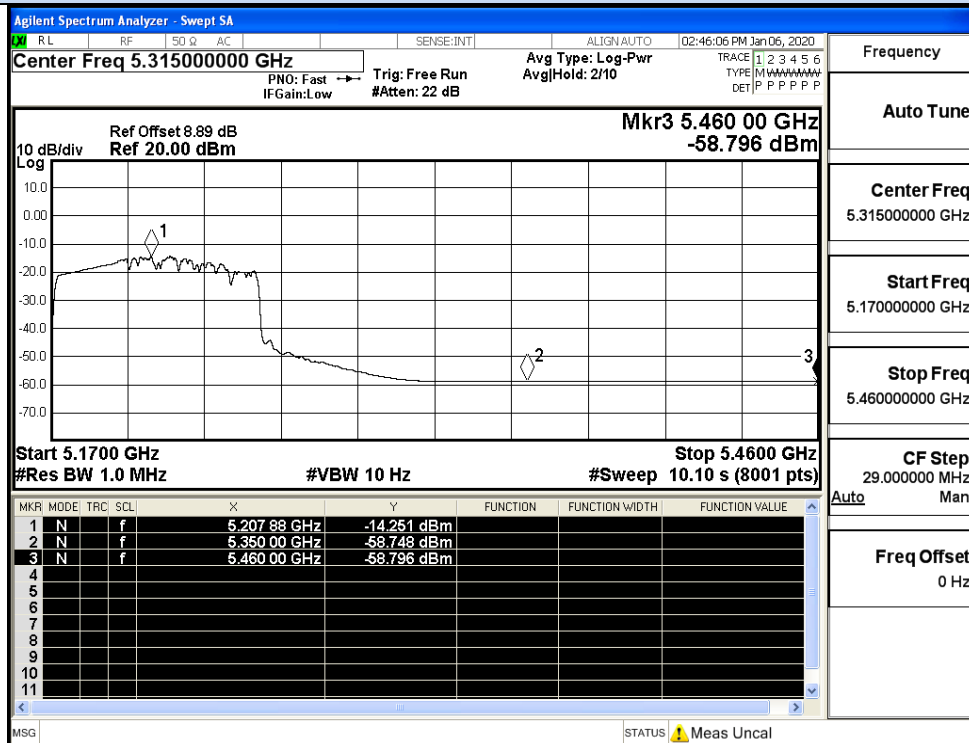
IEEE 802.11ac80 / Channel 42 / 5210MHz / Peak



IEEE 802.11ac80 / Channel 42 / 5210MHz / Average



IEEE 802.11ac80 / Channel 42/ 5210MHz / Peak



IEEE 802.11ac80 / Channel 42 / 5210MHz / Average

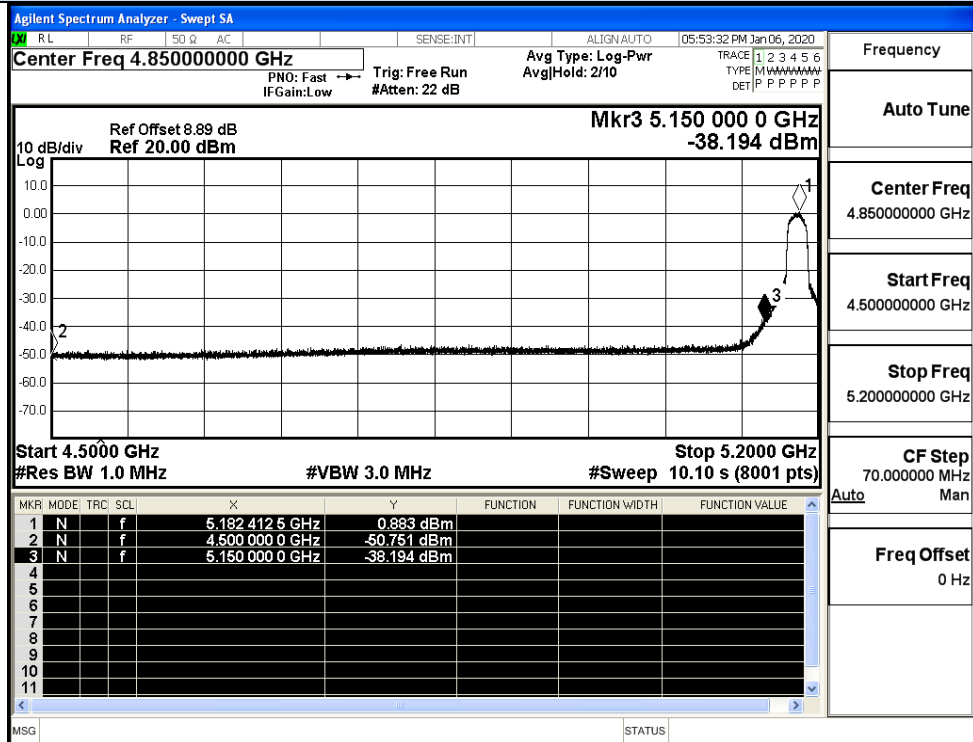
Ant1

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	-50.75	2.30	0	45.31	Peak	68.20	Pass
		4500.0	-60.33	2.30	0	35.73	Average	54.00	Pass
		5150.0	-38.19	2.30	0	57.87	Peak	68.20	Pass
		5150.0	-52.26	2.30	0	43.8	Average	54.00	Pass
	48	5350.0	-48.88	2.30	0	47.18	Peak	68.20	Pass
		5350.0	-59.48	2.30	0	36.58	Average	54.00	Pass
		5460.0	-47.93	2.30	0	48.13	Peak	68.20	Pass
		5460.0	-59.48	2.30	0	36.58	Average	54.00	Pass
11N2 0 SISO	36	4500.0	-50.35	2.30	0	45.71	Peak	68.20	Pass
		4500.0	-60.34	2.30	0	35.72	Average	54.00	Pass
		5150.0	-39.64	2.30	0	56.42	Peak	68.20	Pass
		5150.0	-52.49	2.30	0	43.57	Average	54.00	Pass
	48	5350.0	-49.11	2.30	0	46.95	Peak	68.20	Pass
		5350.0	-59.44	2.30	0	36.62	Average	54.00	Pass
		5460.0	-49.94	2.30	0	46.12	Peak	68.20	Pass
		5460.0	-59.49	2.30	0	36.57	Average	54.00	Pass
11N4 0 SISO	38	4500.0	-49.95	2.30	0	46.11	Peak	68.20	Pass
		4500.0	-60.32	2.30	0	35.74	Average	54.00	Pass
		5150.0	-39.92	2.30	0	56.14	Peak	68.20	Pass
		5150.0	-52.55	2.30	0	43.51	Average	54.00	Pass
	46	5350.0	-49.44	2.30	0	46.62	Peak	68.20	Pass
		5350.0	-59.19	2.30	0	36.87	Average	54.00	Pass
		5460.0	-49.78	2.30	0	46.28	Peak	68.20	Pass
		5460.0	-59.20	2.30	0	36.86	Average	54.00	Pass
11A C20 SIS O	36	4500.0	-51.35	2.30	0	44.71	Peak	68.20	Pass
		4500.0	-60.36	2.30	0	35.7	Average	54.00	Pass
		5150.0	-48.52	2.30	0	47.54	Peak	68.20	Pass
		5150.0	-57.81	2.30	0	38.25	Average	54.00	Pass
	48	4500.0	-51.35	2.30	0	44.71	Peak	68.20	Pass
		4500.0	-60.36	2.30	0	35.7	Average	54.00	Pass
		5150.0	-48.52	2.30	0	47.54	Peak	68.20	Pass
		5150.0	-57.81	2.30	0	38.25	Average	54.00	Pass
11A C40 SIS O	38	4500.0	-50.51	2.30	0	45.55	Peak	68.20	Pass
		4500.0	-60.46	2.30	0	35.6	Average	54.00	Pass
		5150.0	-37.51	2.30	0	58.55	Peak	68.20	Pass
		5150.0	-52.12	2.30	0	43.94	Average	54.00	Pass
	46	5350.0	-49.59	2.30	0	46.47	Peak	68.20	Pass
		5350.0	-59.26	2.30	0	36.8	Average	54.00	Pass
		5460.0	-49.17	2.30	0	46.89	Peak	68.20	Pass
		5460.0	-59.32	2.30	0	36.74	Average	54.00	Pass
11A C80 SIS O	42	4500.0	-49.18	2.30	0	46.88	Peak	68.20	Pass
		5150.0	-58.79	2.30	0	37.27	Average	54.00	Pass
		4500.0	-48.11	2.30	0	47.95	Peak	68.20	Pass
		5150.0	-58.84	2.30	0	37.22	Average	54.00	Pass
		5350.0	-49.18	2.30	0	46.88	Peak	68.20	Pass
		5460.0	-58.79	2.30	0	37.27	Average	54.00	Pass
		5350.0	-48.11	2.30	0	47.95	Peak	68.20	Pass
		5460.0	-58.84	2.30	0	37.22	Average	54.00	Pass

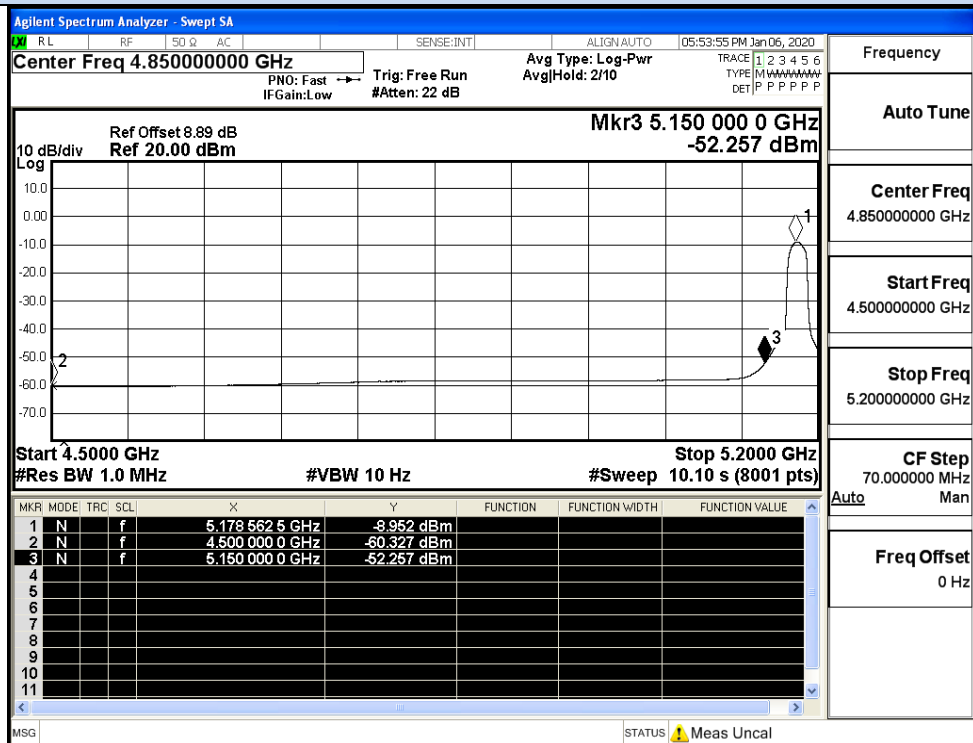
E [dBuV/m]= Power [dBm] + Gain + Ground Factor + 93.76

The upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands or 2 dBi, whichever is greater

Undesirable Emissions Measurement

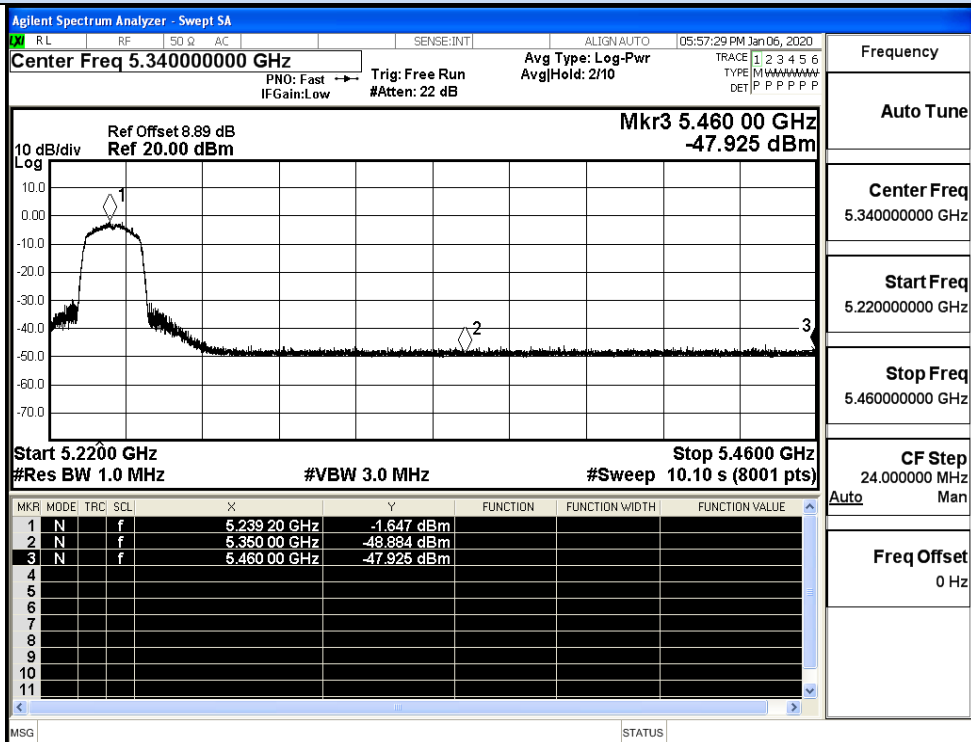


IEEE 802.11a / Channel 36 / 5180MHz / Peak

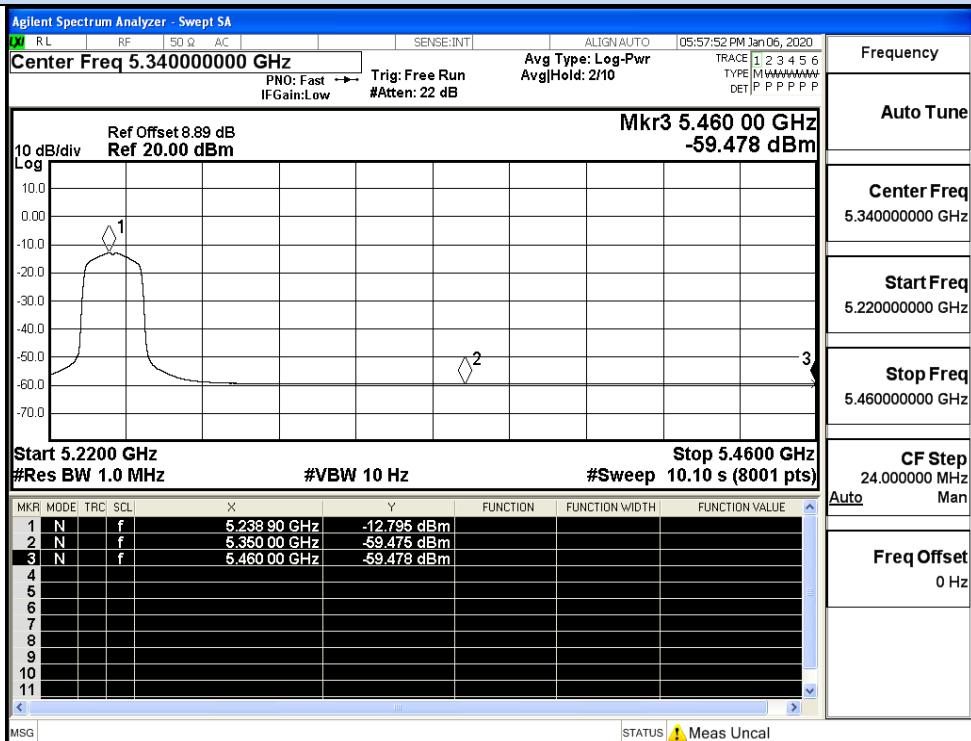


IEEE 802.11a / Channel 36 / 5180MHz / Average

Undesirable Emissions Measurement

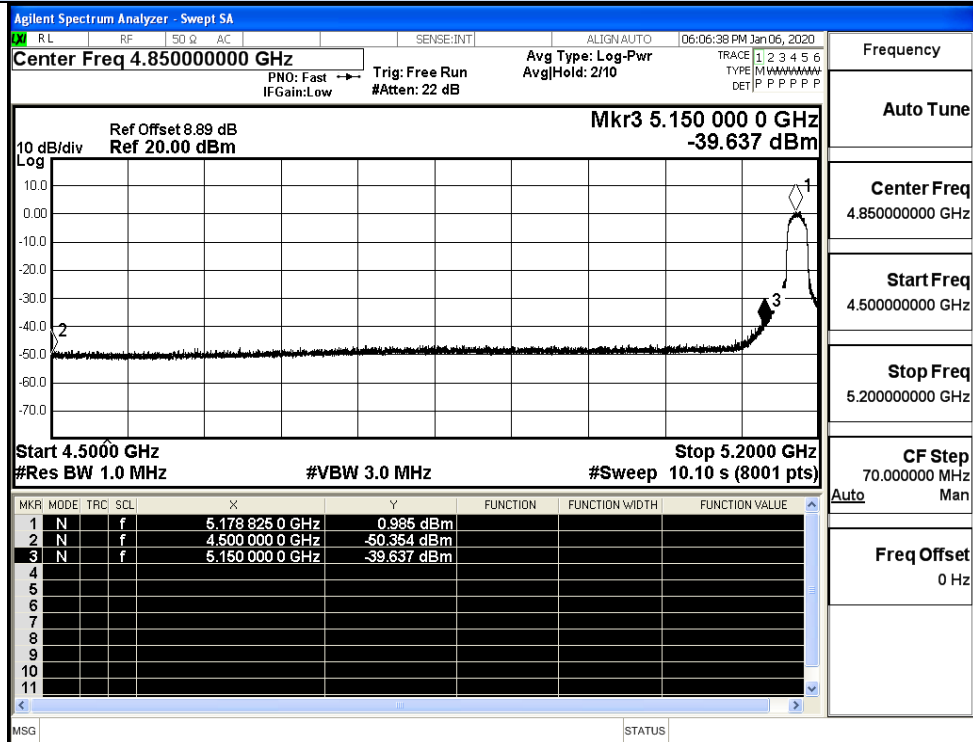


IEEE 802.11a / Channel 48 / 5240MHz / Peak

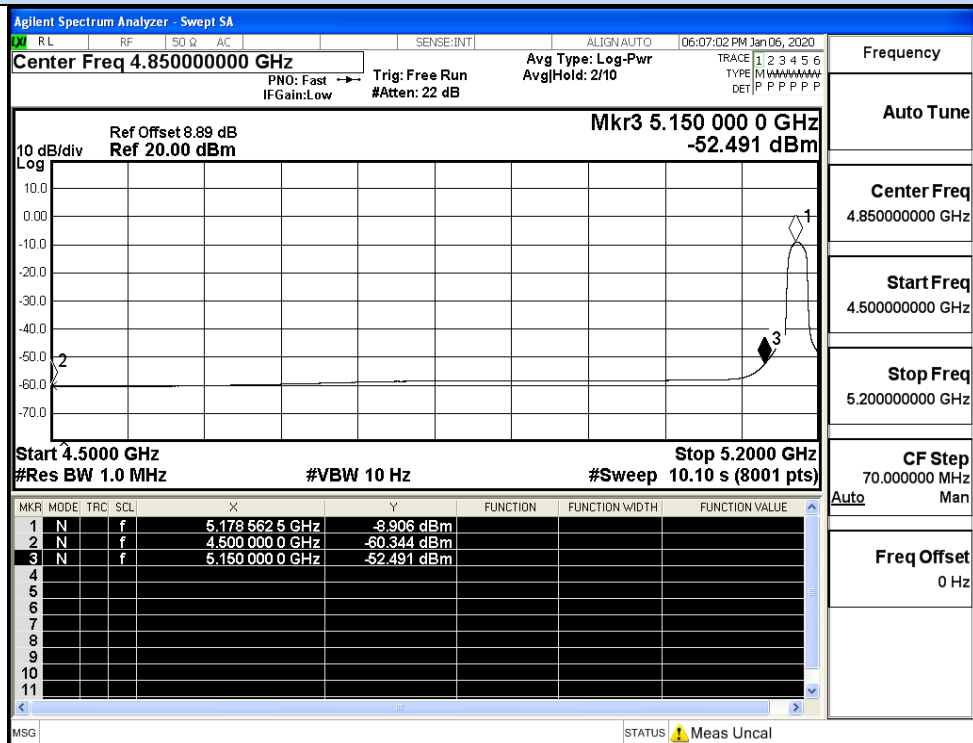


IEEE 802.11a / Channel 48 / 5240MHz / Average

Undesirable Emissions Measurement

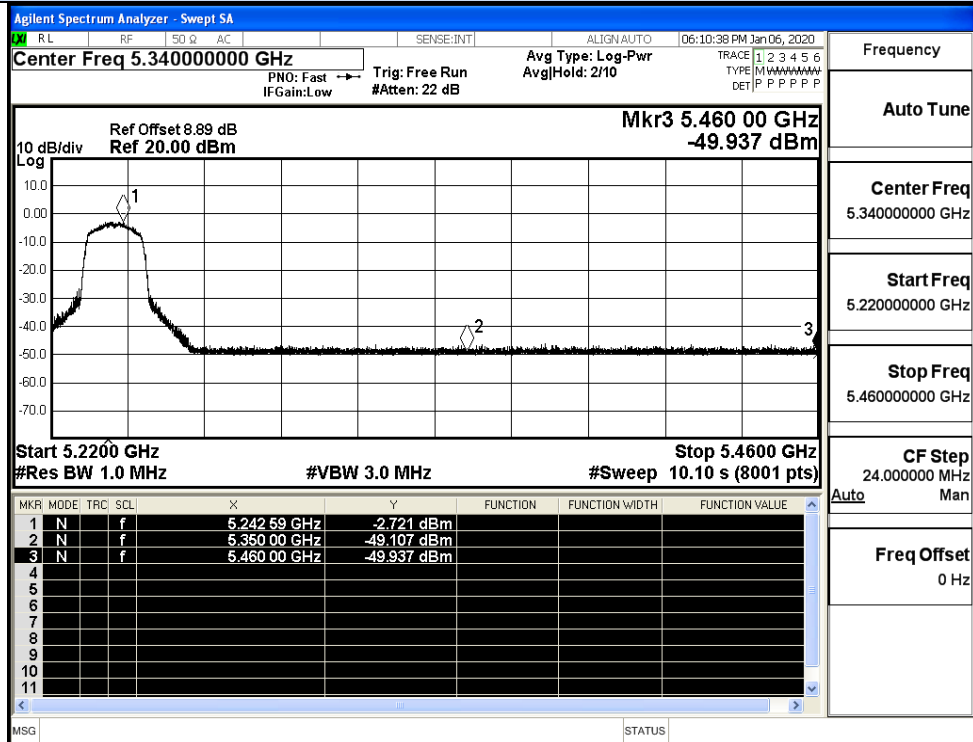


IEEE 802.11n20 / Channel 36 / 5180MHz / Peak

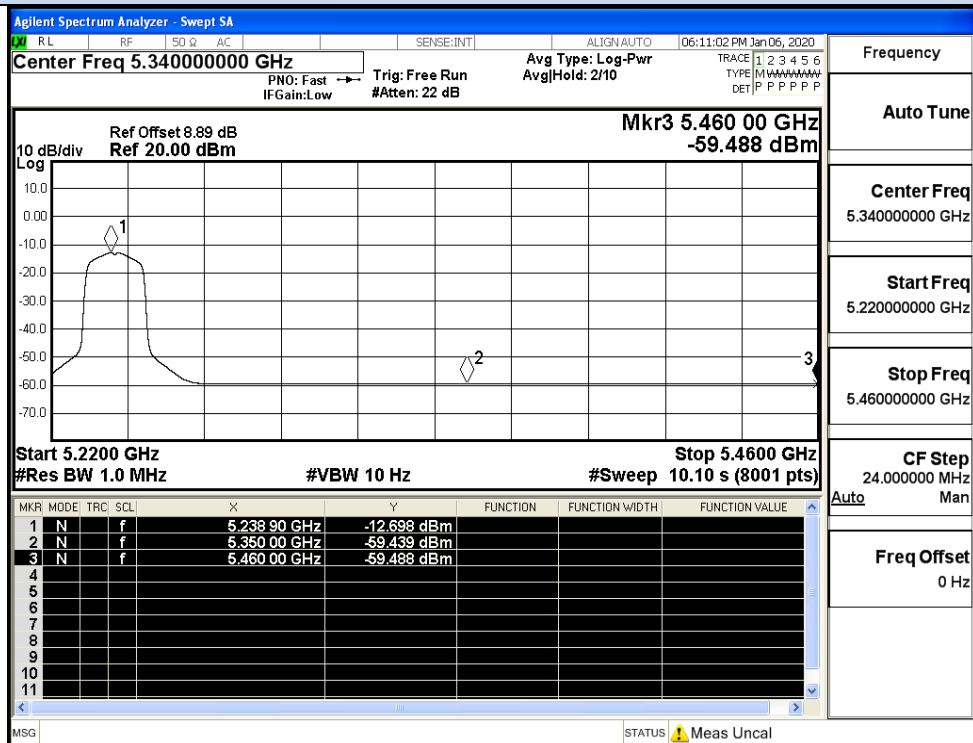


IEEE 802.11n20 / Channel 36 / 5180MHz / Average

Undesirable Emissions Measurement

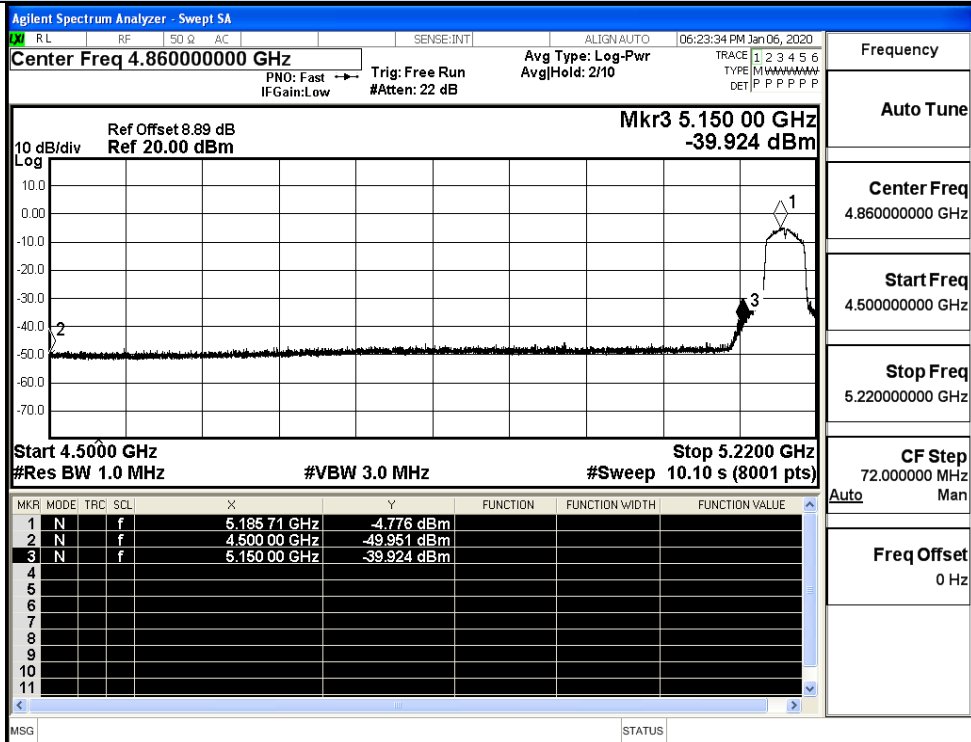


IEEE 802.11n20 / Channel 48 / 5240MHz / Peak

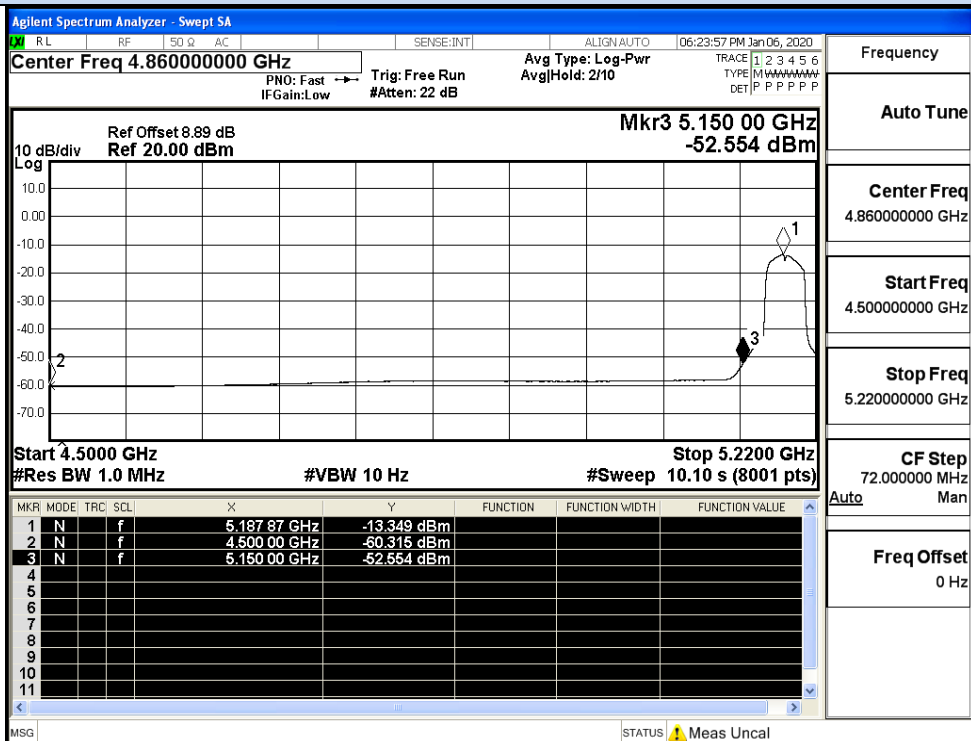


IEEE 802.11n20 / Channel 48 / 5240MHz / Average

Undesirable Emissions Measurement

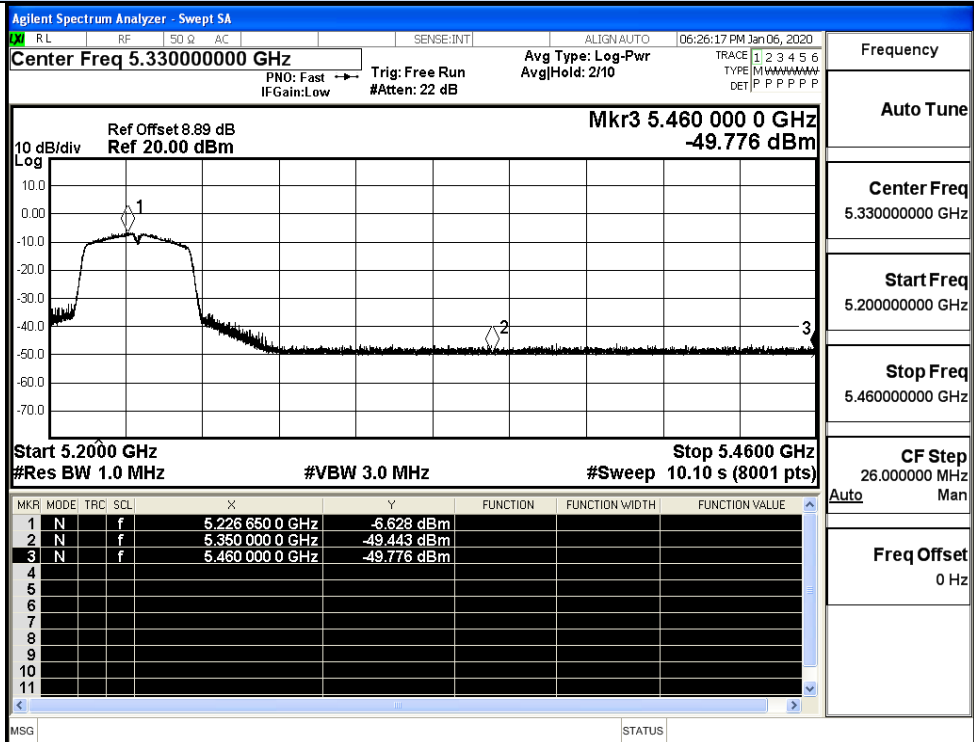


IEEE 802.11n40 / Channel 38 / 5190MHz / Peak

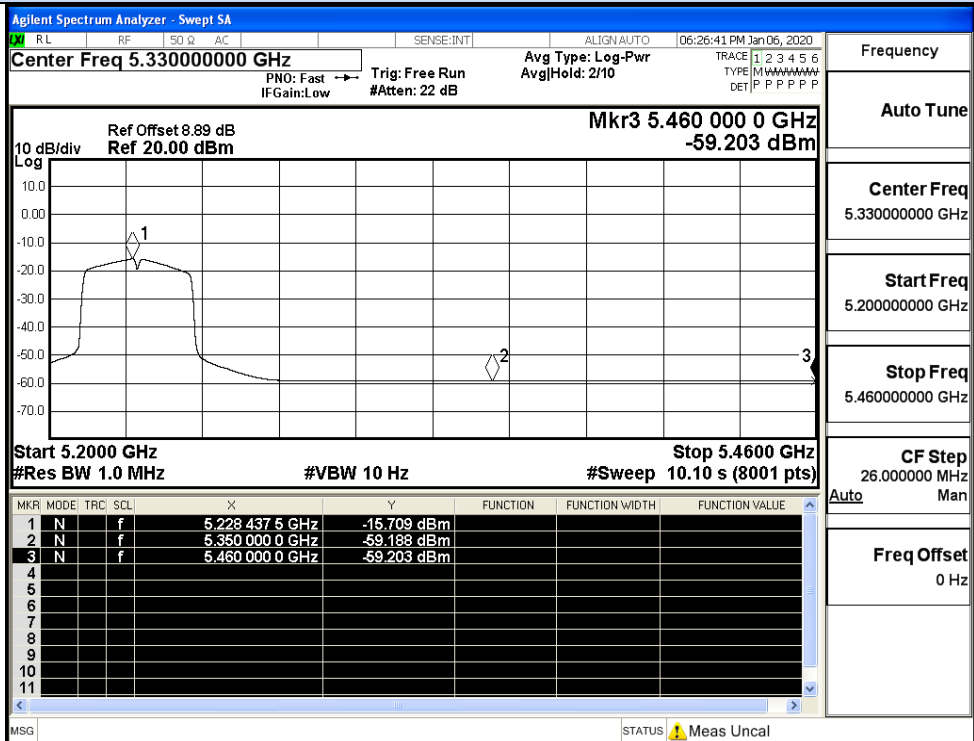


IEEE 802.11n40 / Channel 38 / 5190MHz / Average

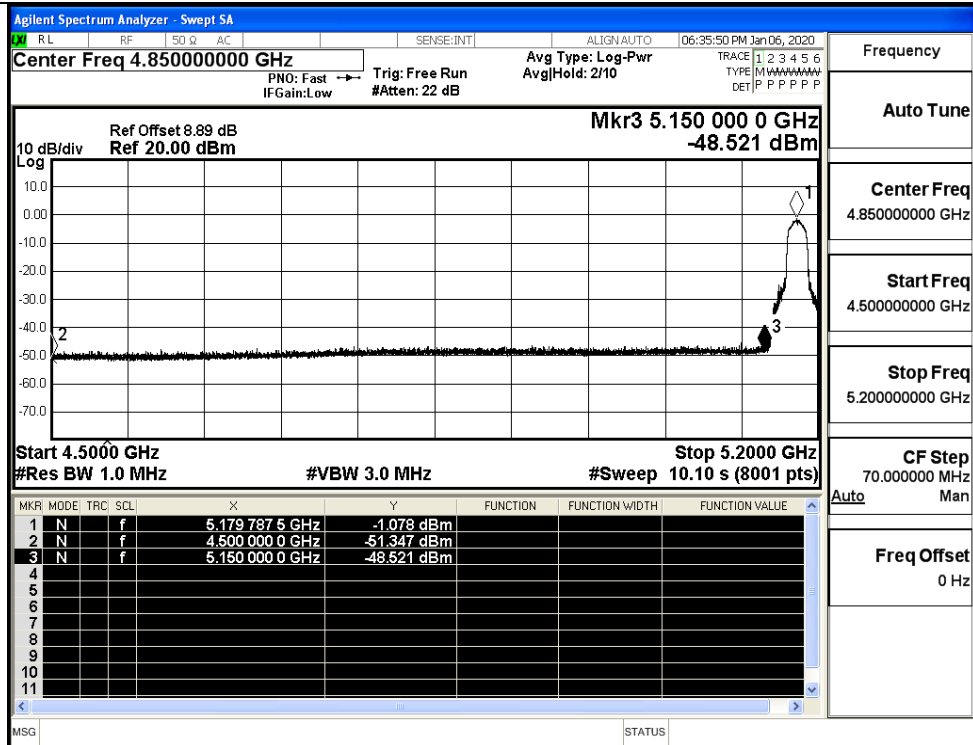
Undesirable Emissions Measurement



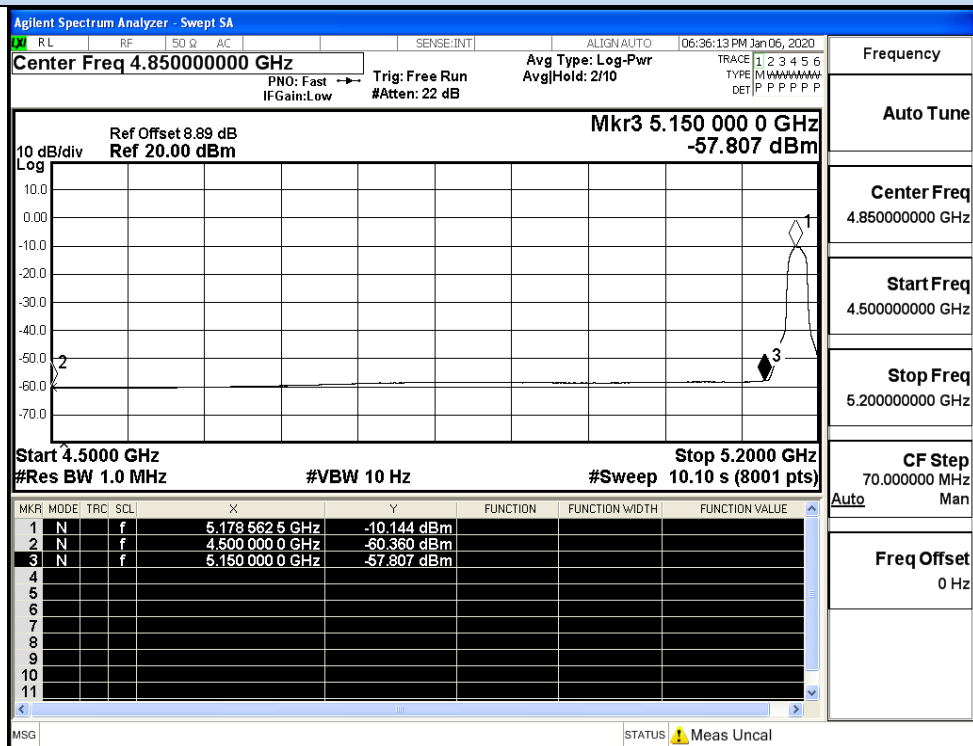
IEEE 802.11n40 / Channel 46 / 5230MHz / Peak



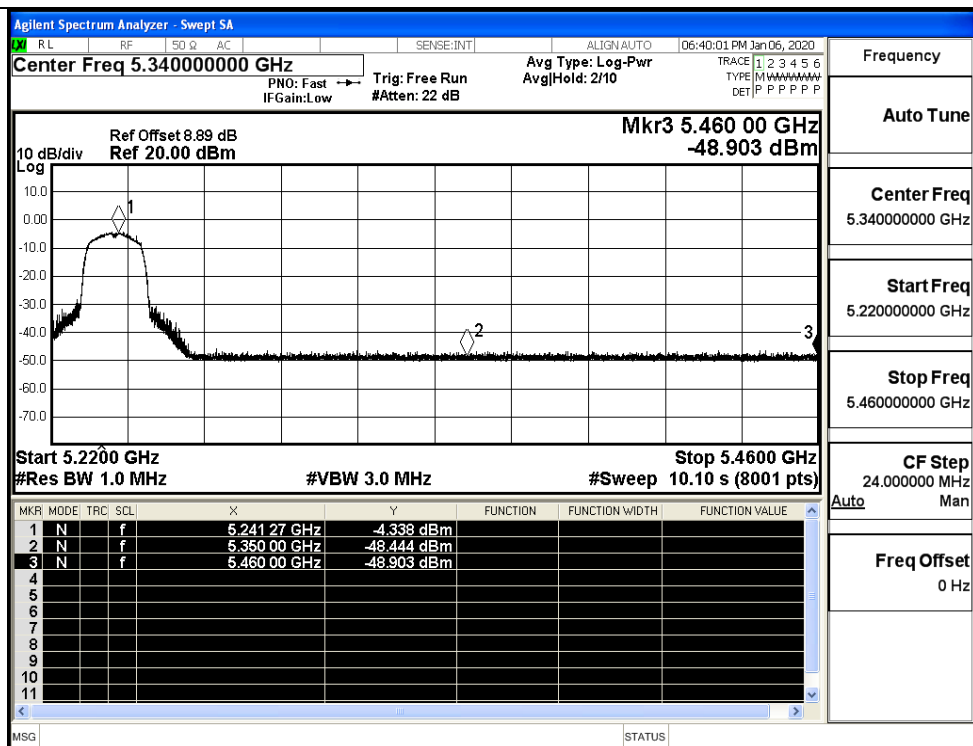
IEEE 802.11n40 / Channel 46 / 5230MHz / Average



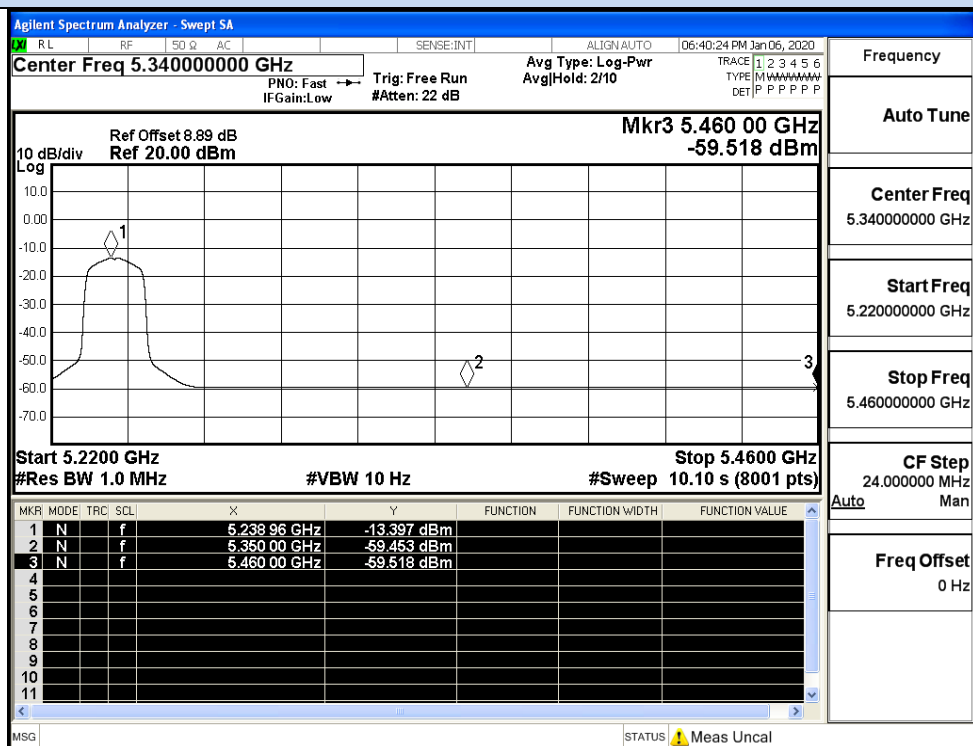
IEEE 802.11ac20 / Channel 36 / 5180MHz / Peak



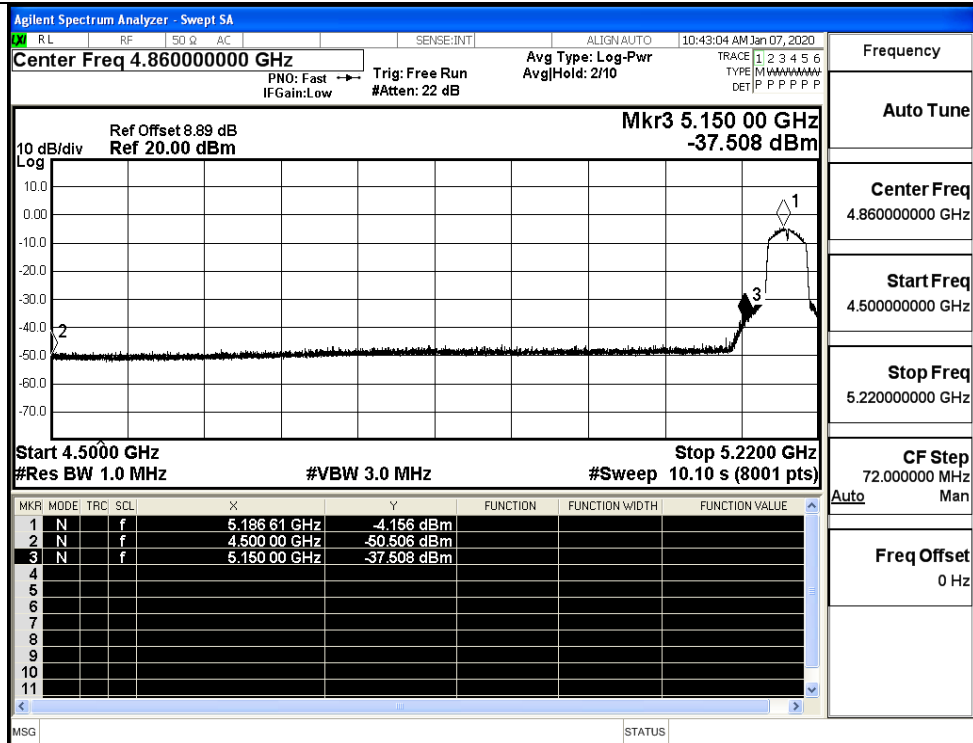
IEEE 802.11ac20 / Channel 36 / 5180MHz / Average



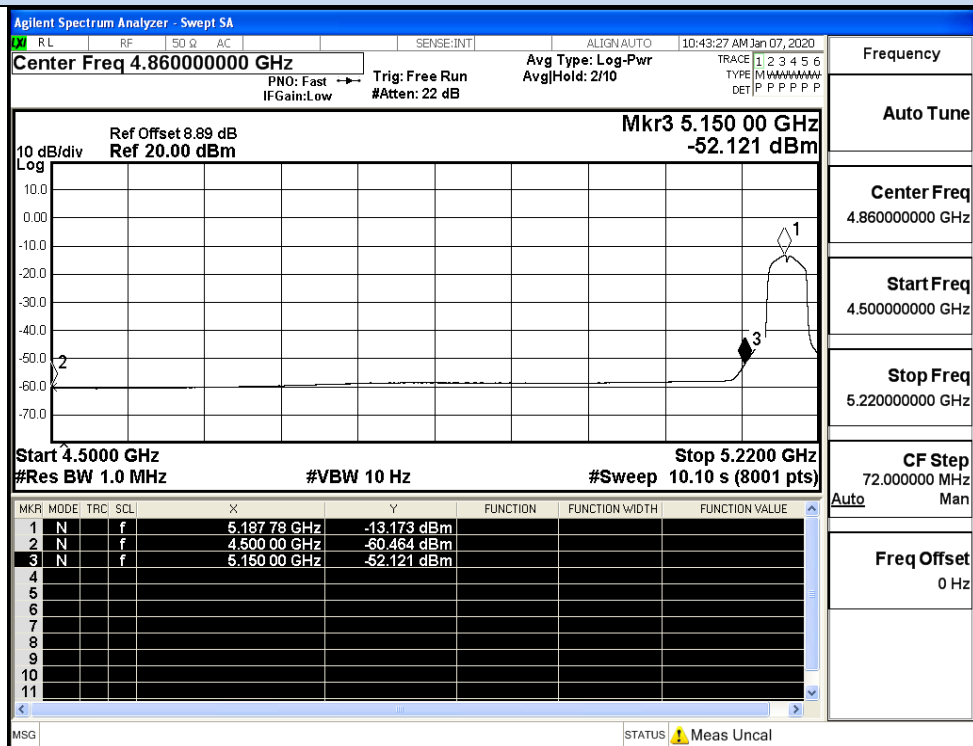
IEEE 802.11ac20 / Channel 48 / 5240MHz / Peak



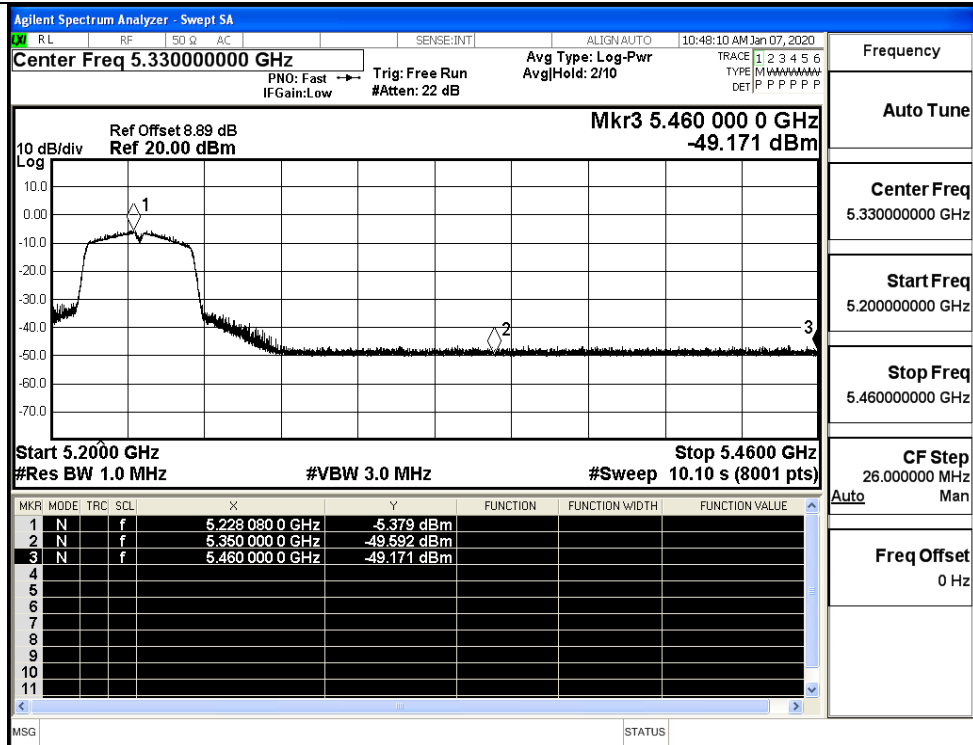
IEEE 802.11ac20 / Channel 48 / 5240MHz / Average



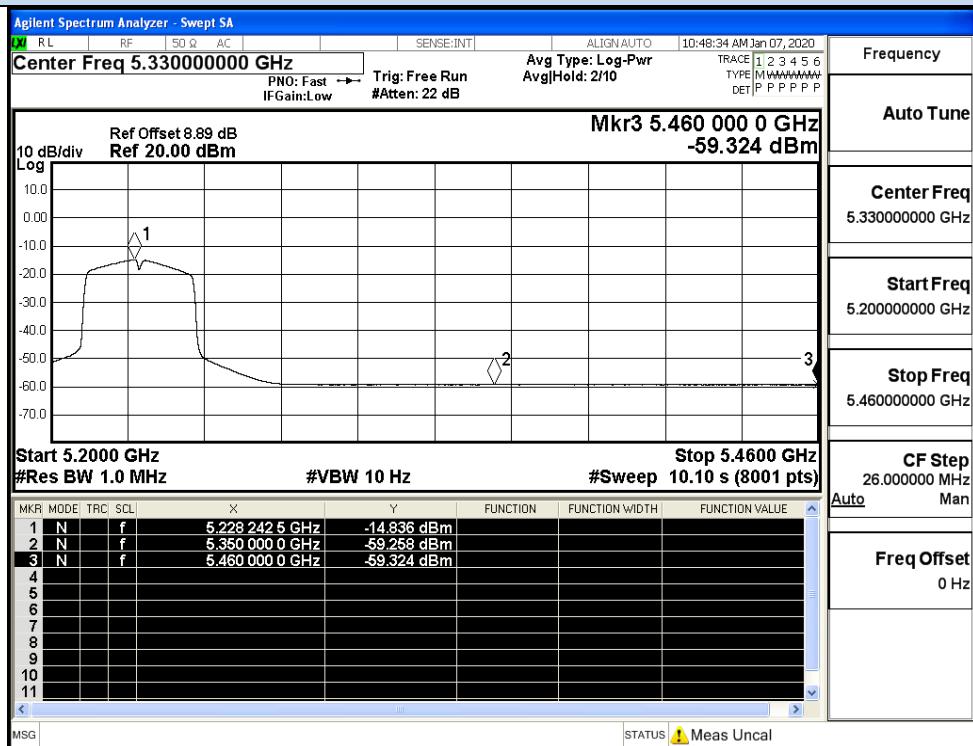
IEEE 802.11ac40 / Channel 38/ 5190MHz / Peak



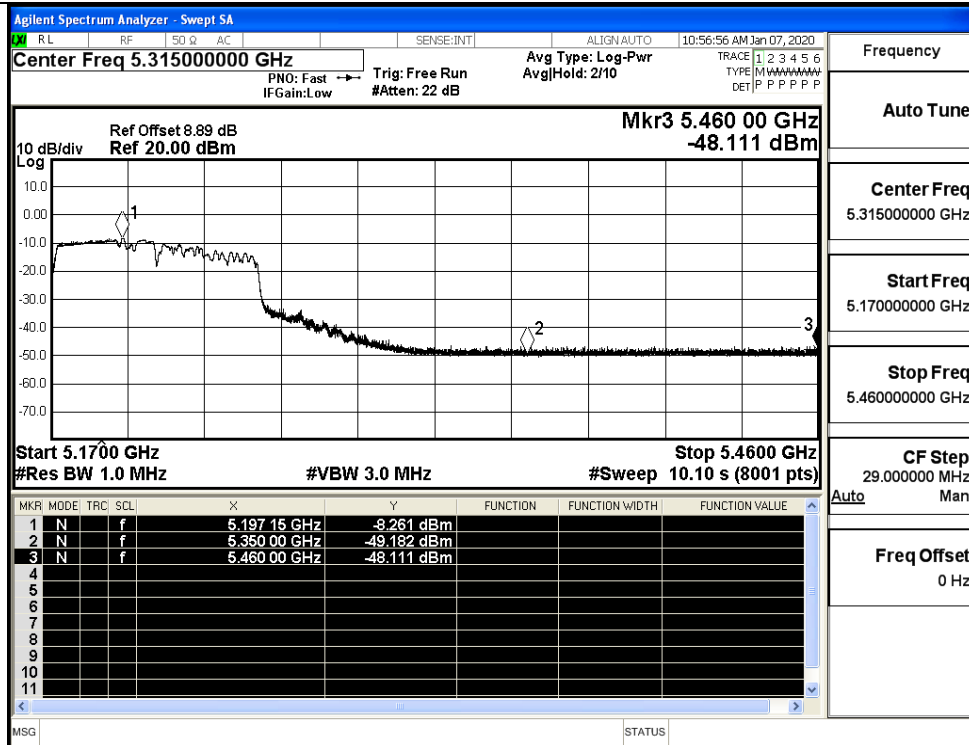
IEEE 802.11ac40 / Channel 38 / 5190MHz / Average



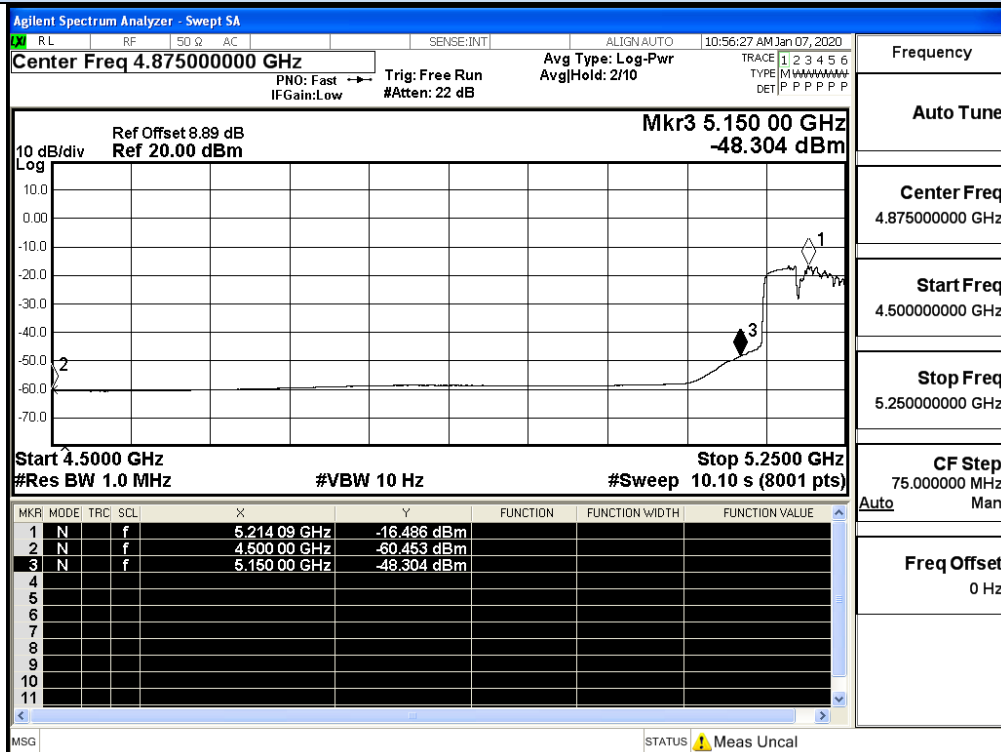
IEEE 802.11ac40 / Channel 46 / 5230MHz / Peak



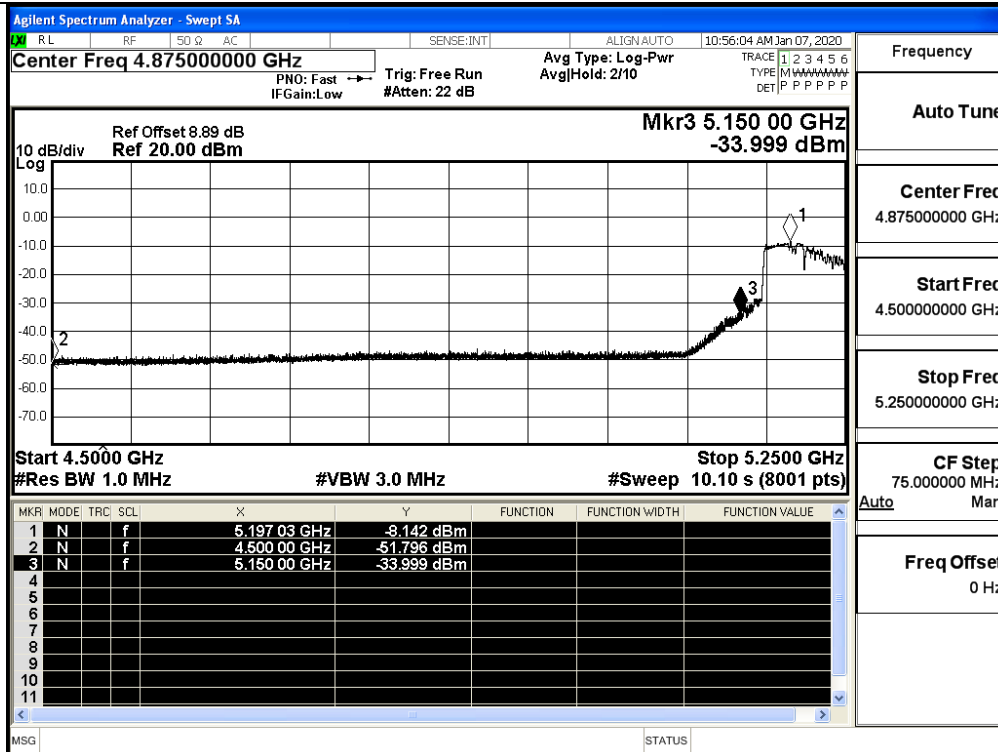
IEEE 802.11ac40 / Channel 46 / 5230MHz / Average



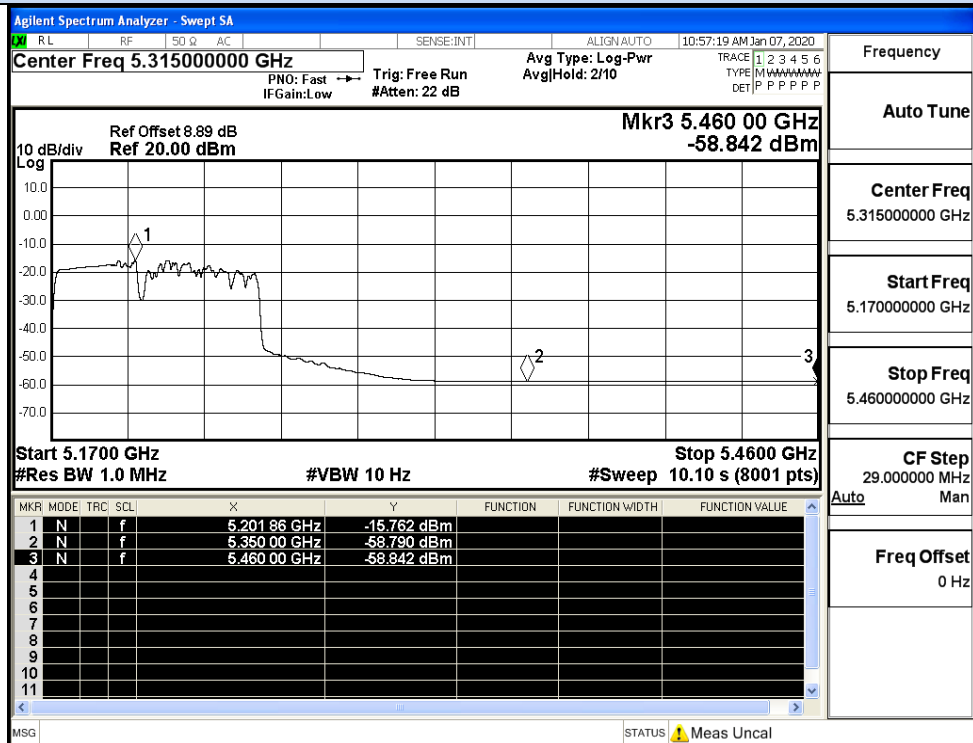
IEEE 802.11ac80 / Channel 42 / 5210MHz / Peak



IEEE 802.11ac80 / Channel 42 / 5210MHz / Average



IEEE 802.11ac80 / Channel 42/ 5210MHz / Peak



IEEE 802.11ac80 / Channel 42 / 5210MHz / Average

Ant 0+1

Test Mode	Channel	Frequency (MHz)	ANT 0 Conducted Power (dBm)	ANT 1 Conducted Power (dBm)	ANT 0+1 Conducted Power (dBm)	Antenna Gain (dBi)	Ground Reflection Factor (dB)	Covert Radiated E Level At 3m (dBuV/m)	Detector	Limit (dBuV/m)	Verdict
11N20 SISO	36	4500.0	-50.74	-50.35	-50.35	5.31	0	51.54	Peak	68.20	Pass
		4500.0	-60.38	-60.34	-60.34	5.31	0	41.72	Average	54.00	Pass
		5150.0	-48.65	-39.64	-39.64	5.31	0	59.94	Peak	68.20	Pass
		5150.0	-58.46	-52.49	-52.49	5.31	0	47.56	Average	54.00	Pass
	48	5350.0	-48.66	-49.11	-49.11	5.31	0	53.20	Peak	68.20	Pass
		5350.0	-59.59	-59.44	-59.44	5.31	0	42.57	Average	54.00	Pass
		5460.0	-48.47	-49.94	-49.94	5.31	0	52.94	Peak	68.20	Pass
		5460.0	-59.59	-59.49	-59.49	5.31	0	42.54	Average	54.00	Pass
11N40 SISO	38	4500.0	-50.81	-49.95	-49.95	5.31	0	51.72	Peak	68.20	Pass
		4500.0	-60.35	-60.32	-60.32	5.31	0	41.75	Average	54.00	Pass
		5150.0	-37.61	-39.92	-39.92	5.31	0	63.47	Peak	68.20	Pass
		5150.0	-50.55	-52.55	-52.55	5.31	0	50.64	Average	54.00	Pass
	46	5350.0	-49.32	-49.44	-49.44	5.31	0	52.70	Peak	68.20	Pass
		5350.0	-59.21	-59.19	-59.19	5.31	0	42.88	Average	54.00	Pass
		5460.0	-48.41	-49.78	-49.78	5.31	0	53.04	Peak	68.20	Pass
		5460.0	-59.21	-59.20	-59.20	5.31	0	42.88	Average	54.00	Pass
11AC20 SISO	36	4500.0	-49.74	-51.35	-51.35	5.31	0	51.61	Peak	68.20	Pass
		4500.0	-60.40	-60.36	-60.36	5.31	0	41.70	Average	54.00	Pass
		5150.0	-48.57	-48.52	-48.52	5.31	0	53.54	Peak	68.20	Pass
		5150.0	-58.45	-57.81	-57.81	5.31	0	43.96	Average	54.00	Pass
	48	4500.0	-49.74	-51.35	-51.35	5.31	0	51.61	Peak	68.20	Pass
		4500.0	-60.40	-60.36	-60.36	5.31	0	41.70	Average	54.00	Pass
		5150.0	-48.57	-48.52	-48.52	5.31	0	53.54	Peak	68.20	Pass
		5150.0	-58.45	-57.81	-57.81	5.31	0	43.96	Average	54.00	Pass
11AC40 SISO	38	4500.0	-50.11	-50.51	-50.51	5.31	0	51.77	Peak	68.20	Pass
		4500.0	-60.33	-60.46	-60.46	5.31	0	41.69	Average	54.00	Pass
		5150.0	-35.54	-37.51	-37.51	5.31	0	65.67	Peak	68.20	Pass
		5150.0	-50.40	-52.12	-52.12	5.31	0	50.90	Average	54.00	Pass
	46	5350.0	-49.33	-49.59	-49.59	5.31	0	52.62	Peak	68.20	Pass
		5350.0	-59.17	-59.26	-59.26	5.31	0	42.87	Average	54.00	Pass
		5460.0	-49.27	-49.17	-49.17	5.31	0	52.86	Peak	68.20	Pass
		5460.0	-59.22	-59.32	-59.32	5.31	0	42.81	Average	54.00	Pass
11AC80 SISO	42	4500.0	-49.50	-49.18	-49.18	5.31	0	52.74	Peak	68.20	Pass
		5150.0	-58.75	-58.79	-58.79	5.31	0	43.31	Average	54.00	Pass
		4500.0	-49.21	-48.11	-48.11	5.31	0	53.46	Peak	68.20	Pass
		5150.0	-58.80	-58.84	-58.84	5.31	0	43.26	Average	54.00	Pass
		5350.0	-49.50	-49.18	-49.18	5.31	0	52.74	Peak	68.20	Pass
		5460.0	-58.75	-58.79	-58.79	5.31	0	43.31	Average	54.00	Pass
		5350.0	-49.21	-48.11	-48.11	5.31	0	53.46	Peak	68.20	Pass
		5460.0	-58.80	-58.84	-58.84	5.31	0	43.26	Average	54.00	Pass

$E [dBuV/m] = \text{Power [dBm]} + \text{Gain} + \text{Ground Factor} + 93.76$

The upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands or 2 dBi, whichever is greater

Directional gain = $2.3dBi + 10 \log(2) = 5.31dBi$