

Appendix C

RF Test Data for 5.8G WLAN (Conducted Measurement)

Product Name: QHD Wireless IP Camera

Trade Mark: FOSCAM

Test Model: D4Z

Environmental Conditions

Temperature:	22.8 ° C
Relative Humidity:	54.5%
ATM Pressure:	100.0 kPa
Test Engineer:	Scout Wu
Supervised by:	Tom.Liu

C.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

Agilent Spectrum Analyzer - Swept SA

Center Freq 5.785000000 GHz

10 dB/div Ref 20.00 dBm

Center 5.785000000 GHz Res BW 8 MHz #VBW 50 MHz* Sweep 10.13 ms (8001 pts) Span 0 Hz

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								

Frequency: 5.785000000 GHz

Auto Tune

Center Freq: 5.785000000 GHz

Start Freq: 5.785000000 GHz

Stop Freq: 5.785000000 GHz

CF Step: 8.000000 MHz

Freq Offset: 0 Hz

IEEE 802.11a

Agilent Spectrum Analyzer - Swept SA

Center Freq 5.785000000 GHz

10 dB/div Ref 20.00 dBm

Center 5.785000000 GHz Res BW 8 MHz #VBW 50 MHz* Sweep 10.13 ms (8001 pts) Span 0 Hz

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								

Frequency: 5.785000000 GHz

Auto Tune

Center Freq: 5.785000000 GHz

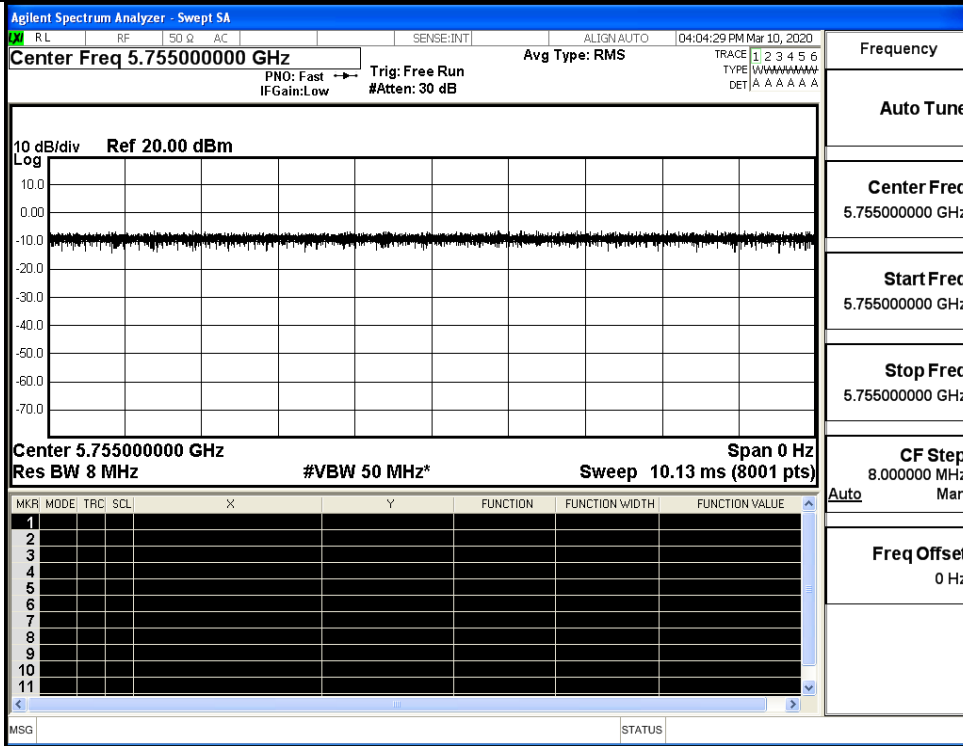
Start Freq: 5.785000000 GHz

Stop Freq: 5.785000000 GHz

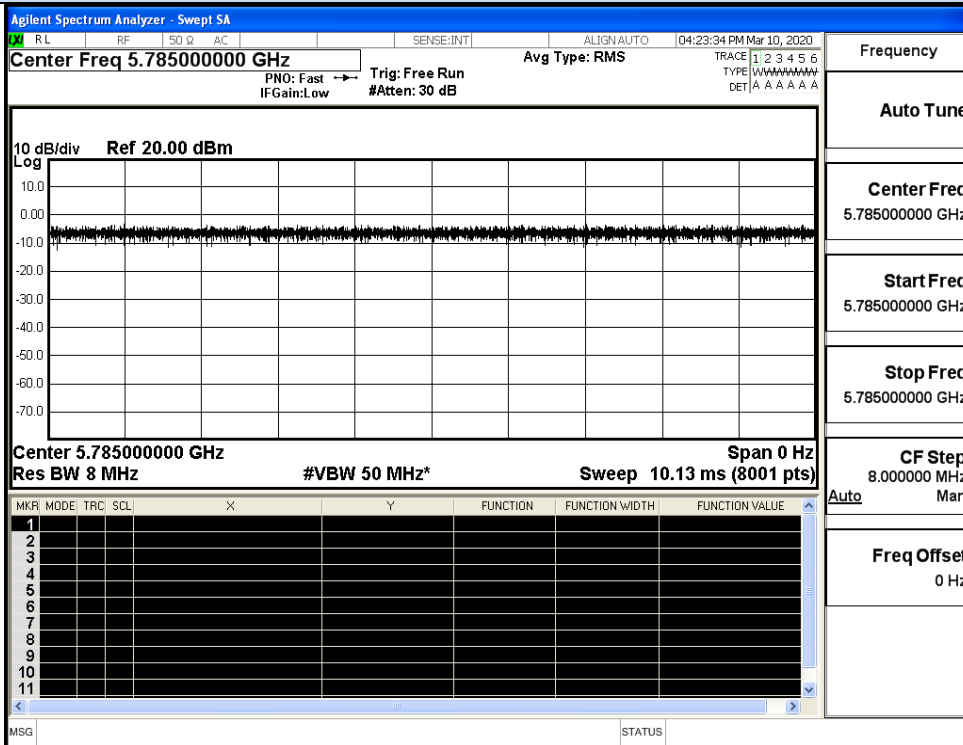
CF Step: 8.000000 MHz

Freq Offset: 0 Hz

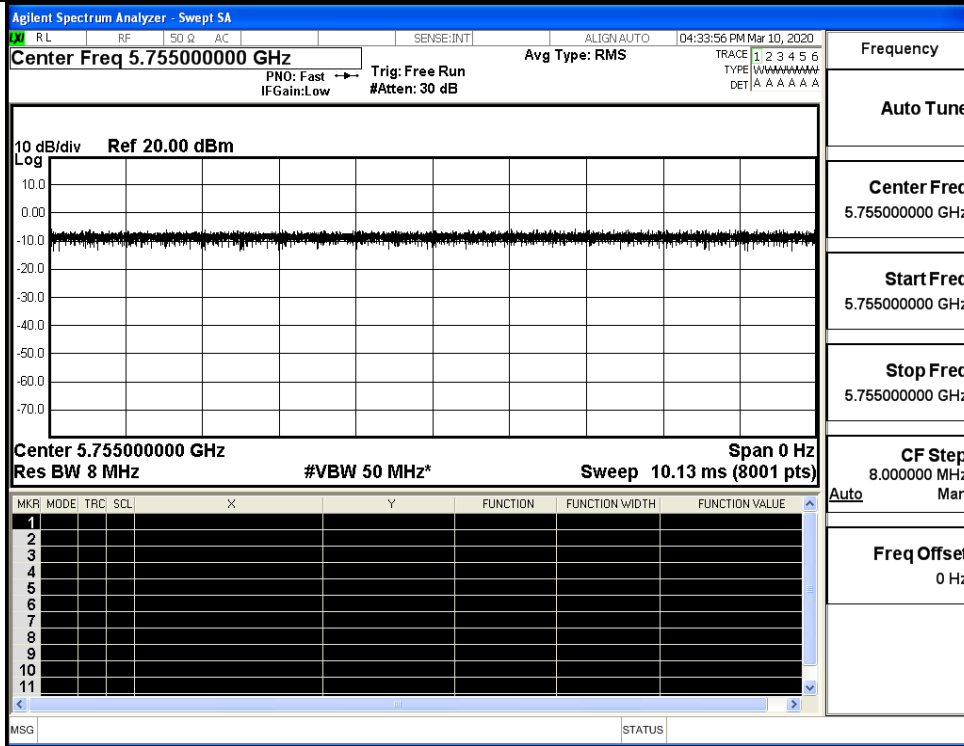
IEEE 802.11n HT20



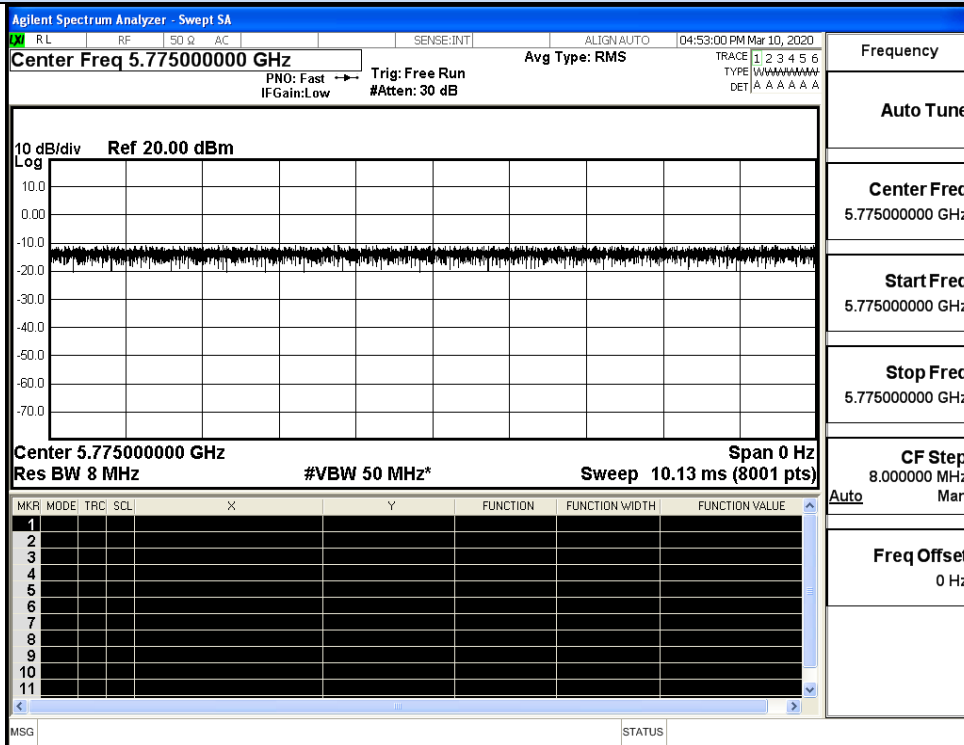
IEEE 802.11n HT40



IEEE 802.11AC20



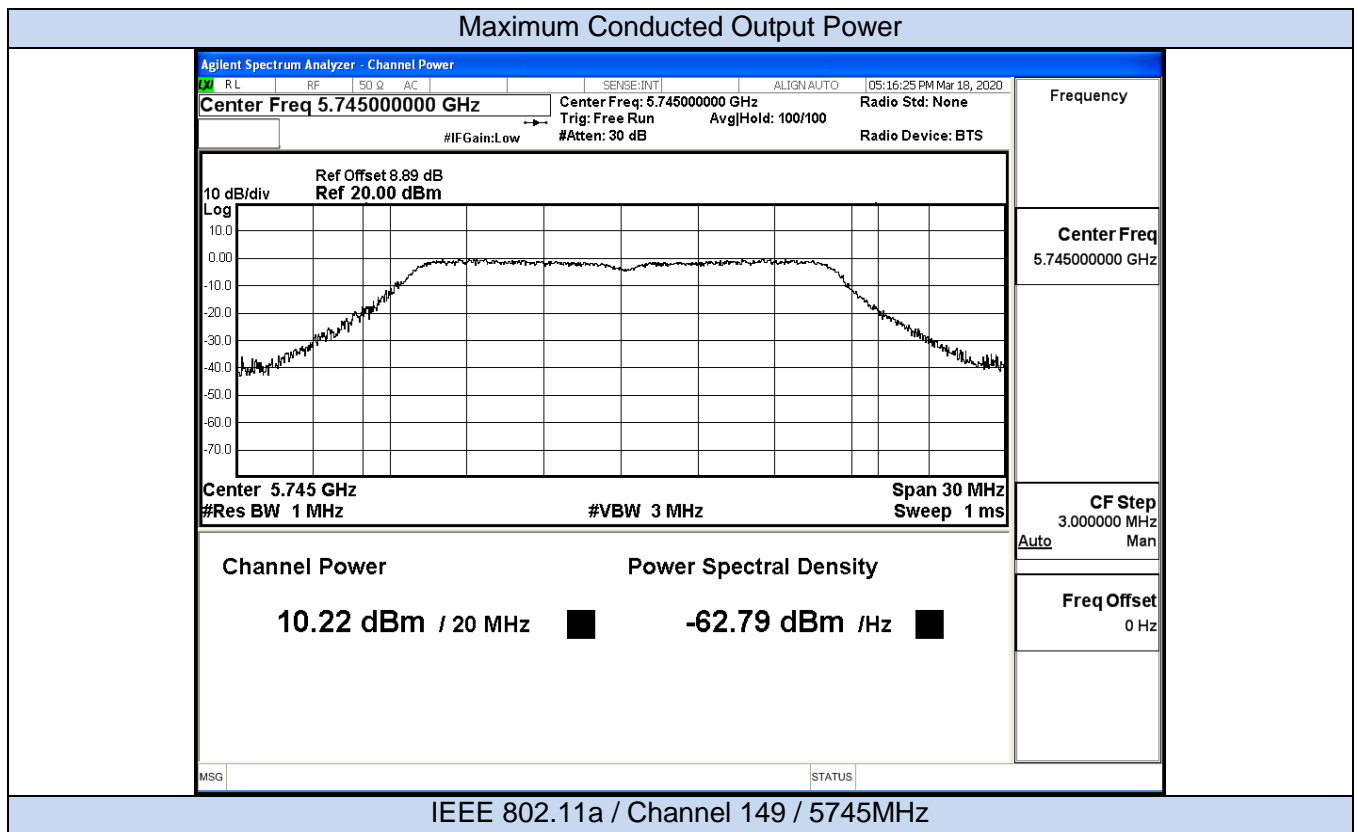
IEEE 802.11AC40

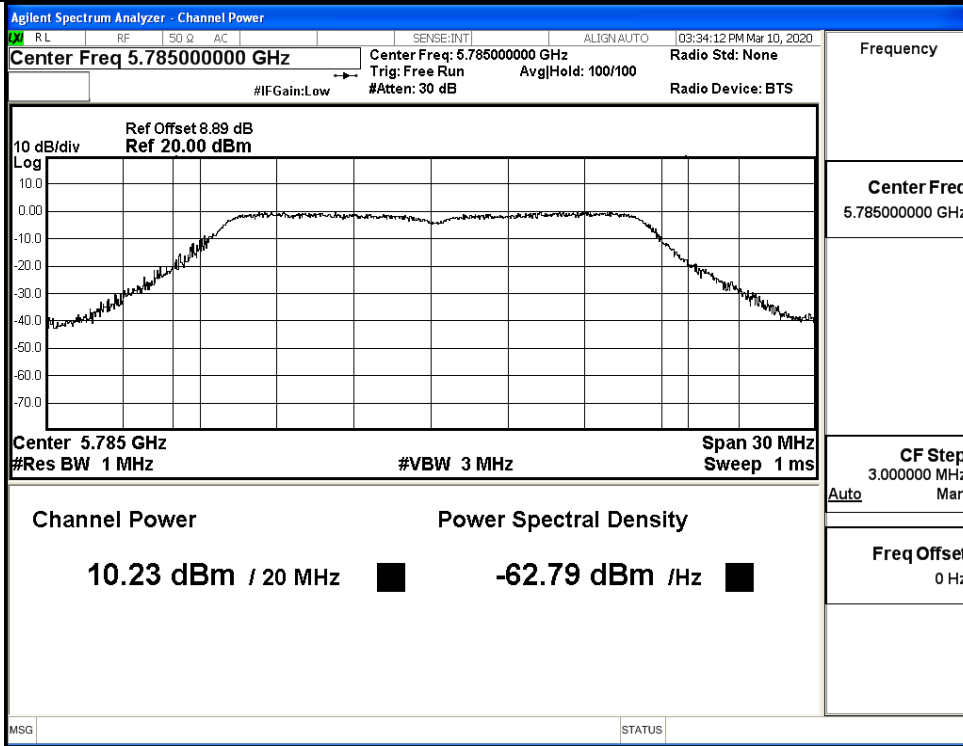


IEEE 802.11AC80

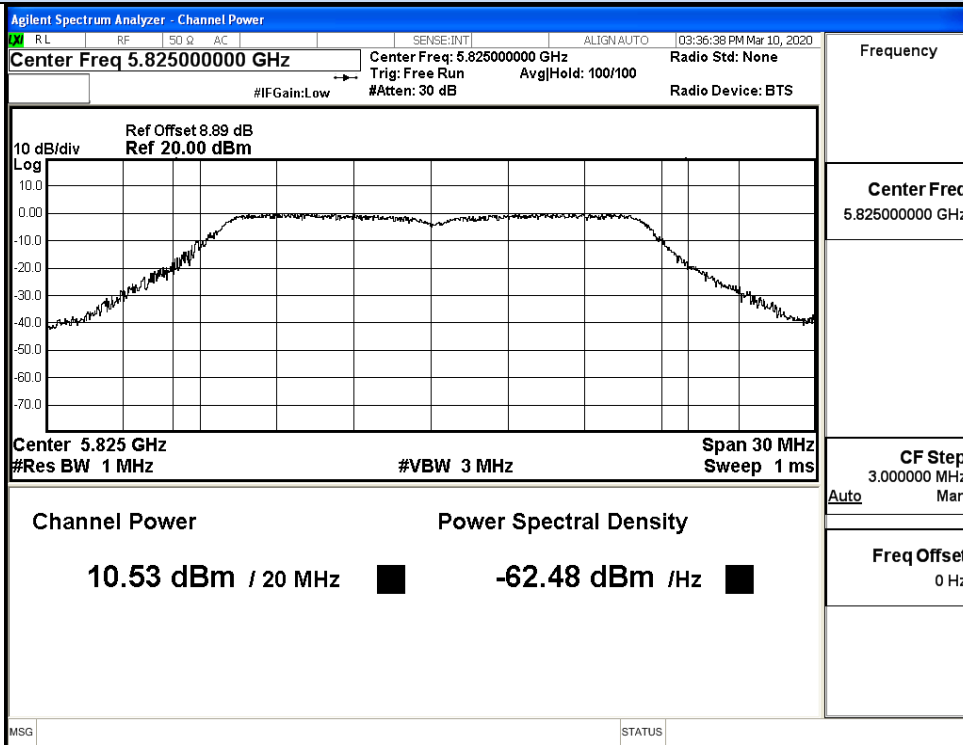
C.2 Maximum Conduct Output Power

Test Mode	Channel I	Frequency (MHz)	AVG Conducted Power (dBm)	Duty Cycle Factor(dB)	Report Conducted Power(dBm)	Limit (dBm)	Verdict
11A	149	5745	10.22	0	10.22	30	Pass
	157	5785	10.23	0	10.23		Pass
	165	5825	10.53	0	10.53		Pass
11N20 SISO	149	5745	11.68	0	11.68	30	Pass
	157	5785	11.45	0	11.45		Pass
	165	5825	10.82	0	10.82		Pass
11N40 SISO	151	5755	10.58	0	10.58	30	Pass
	159	5795	11.00	0	11.00		Pass
11AC20 SISO	149	5745	11.23	0	11.23	30	Pass
	157	5785	11.37	0	11.37		Pass
	165	5825	10.12	0	10.12		Pass
11AC40 SISO	151	5755	11.39	0	11.39	30	Pass
	159	5795	10.56	0	10.56		Pass
11AC80 SISO	155	5775	10.56	0	10.56	30	Pass



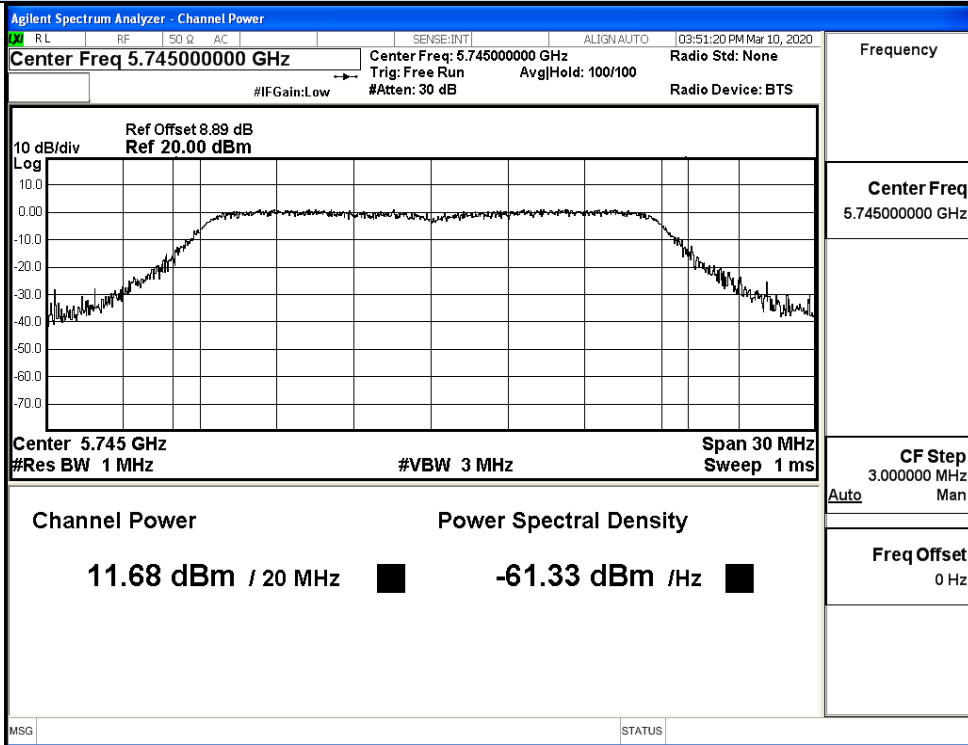


IEEE 802.11a / Channel 157 / 5785MHz

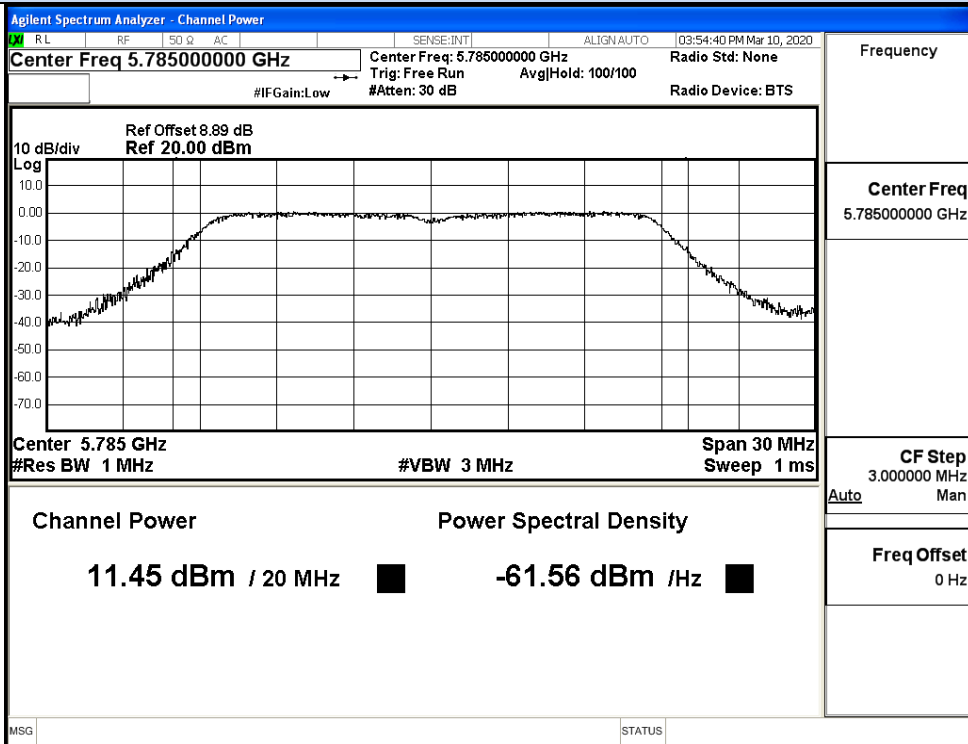


IEEE 802.11a / Channel 165 / 5825MHz

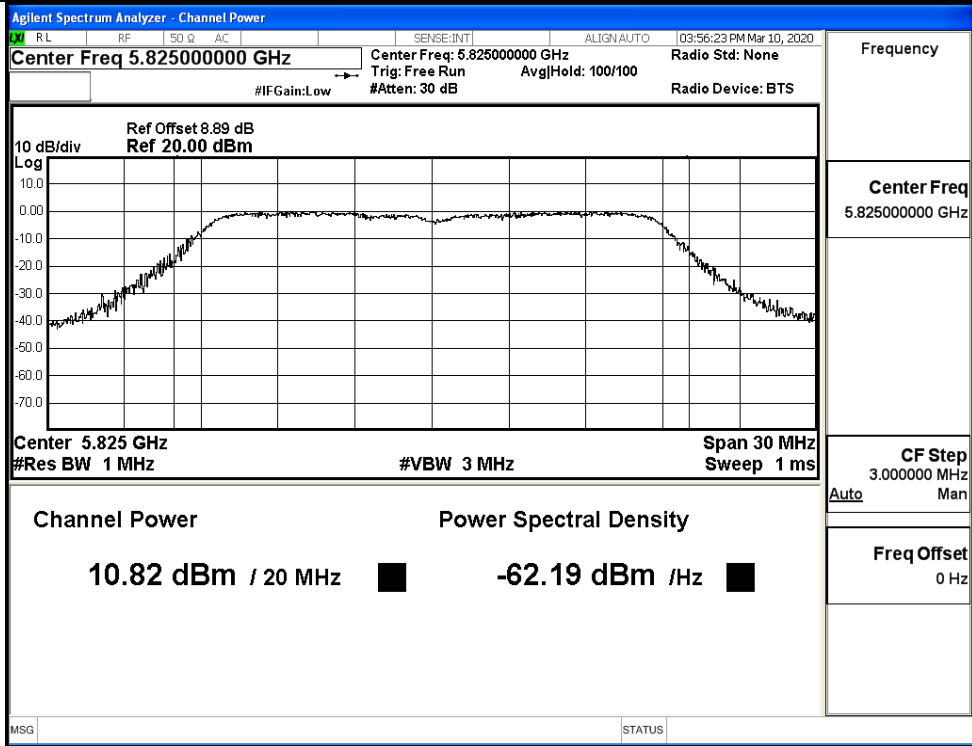
Maximum Conducted Output Power



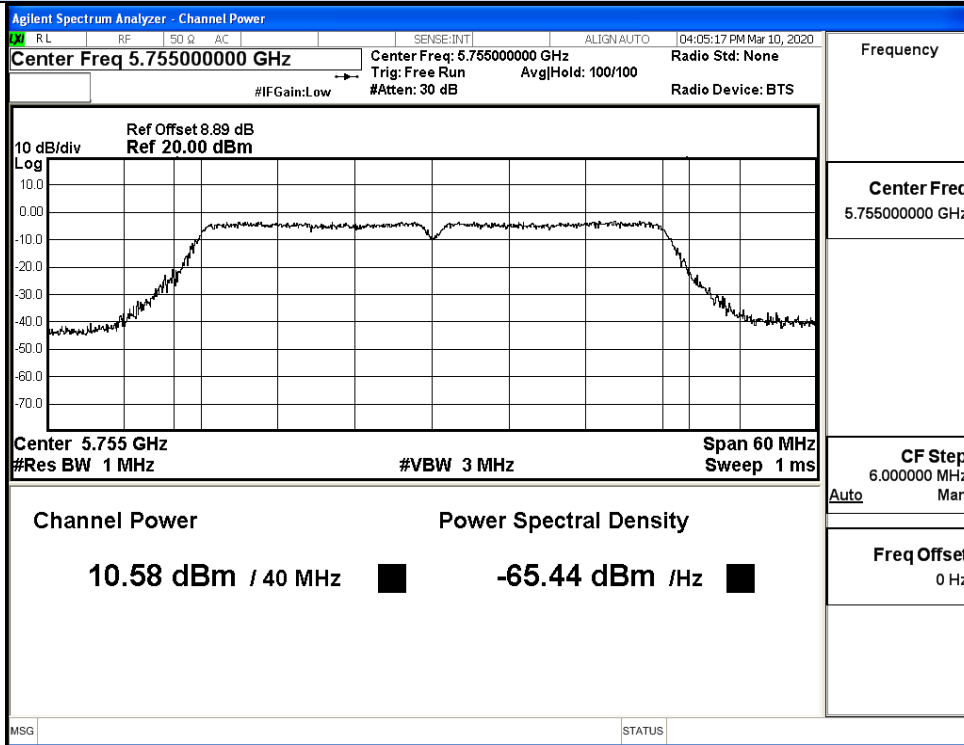
IEEE 802.11n20 / Channel 149 / 5745MHz



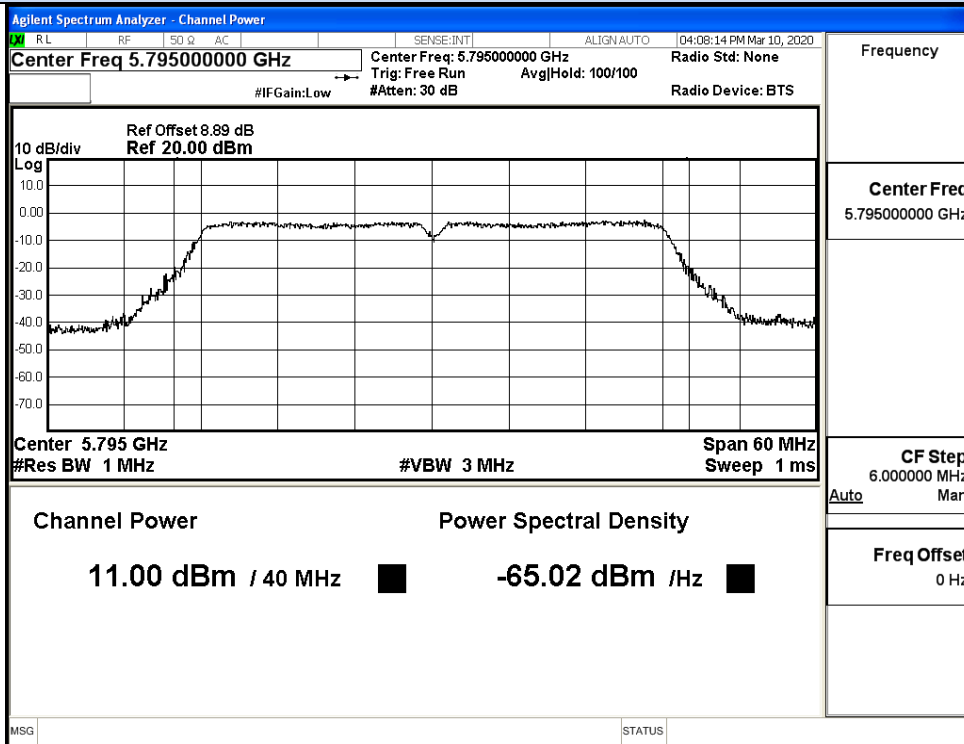
IEEE 802.11n20 / Channel 157 / 5785MHz



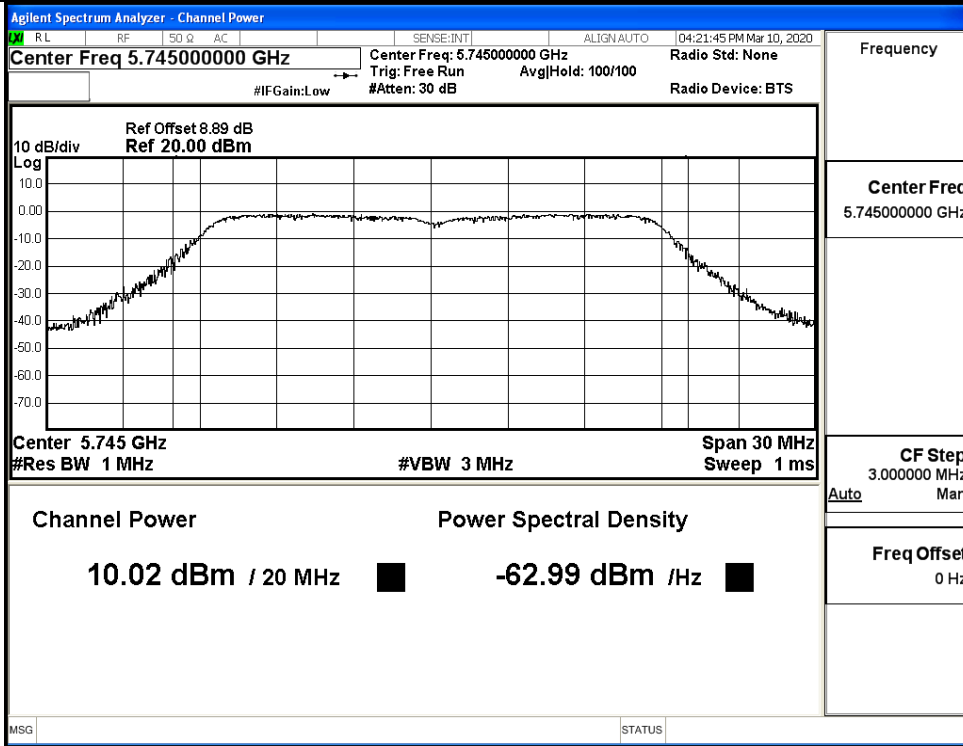
Maximum Conducted Output Power



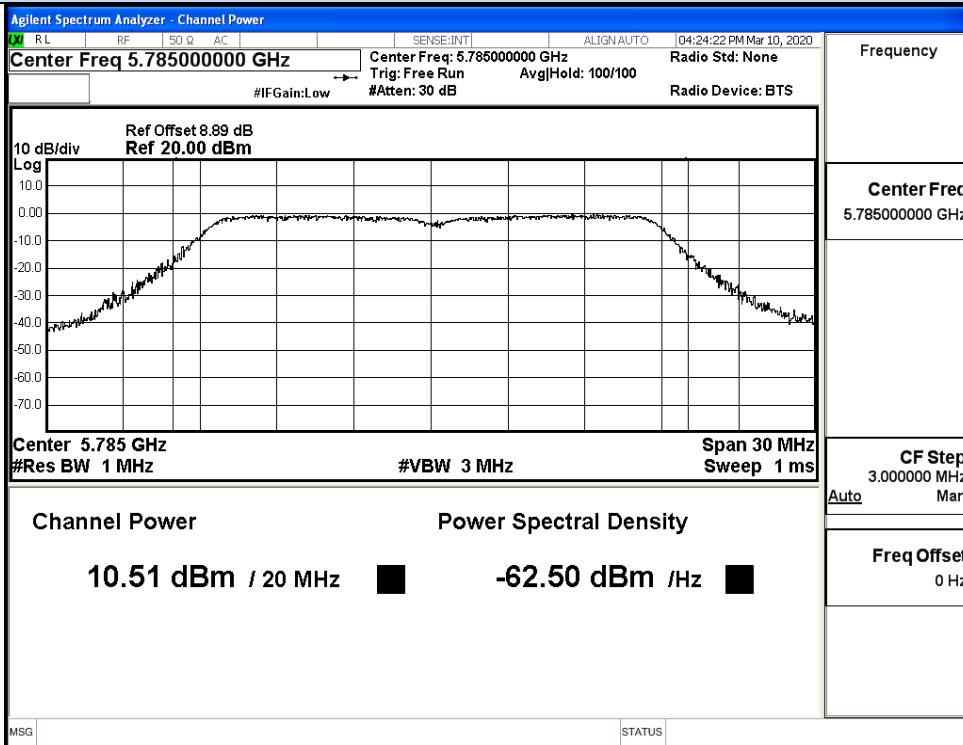
IEEE 802.11n40 / Channel 151 / 5755MHz



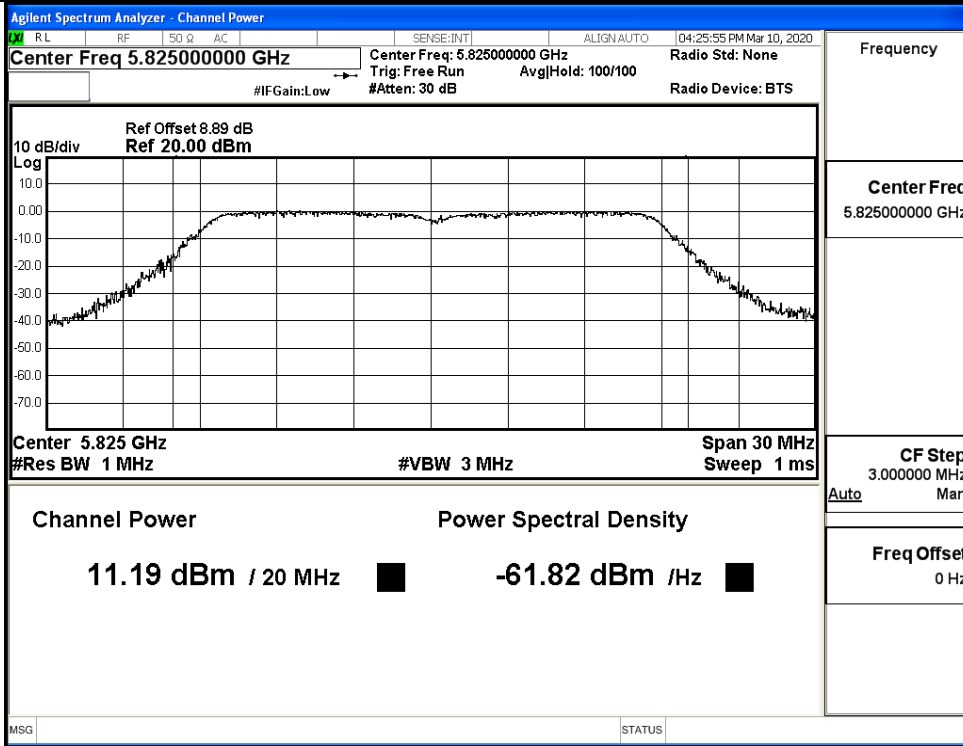
IEEE 802.11n40 / Channel 159 / 5795MHz



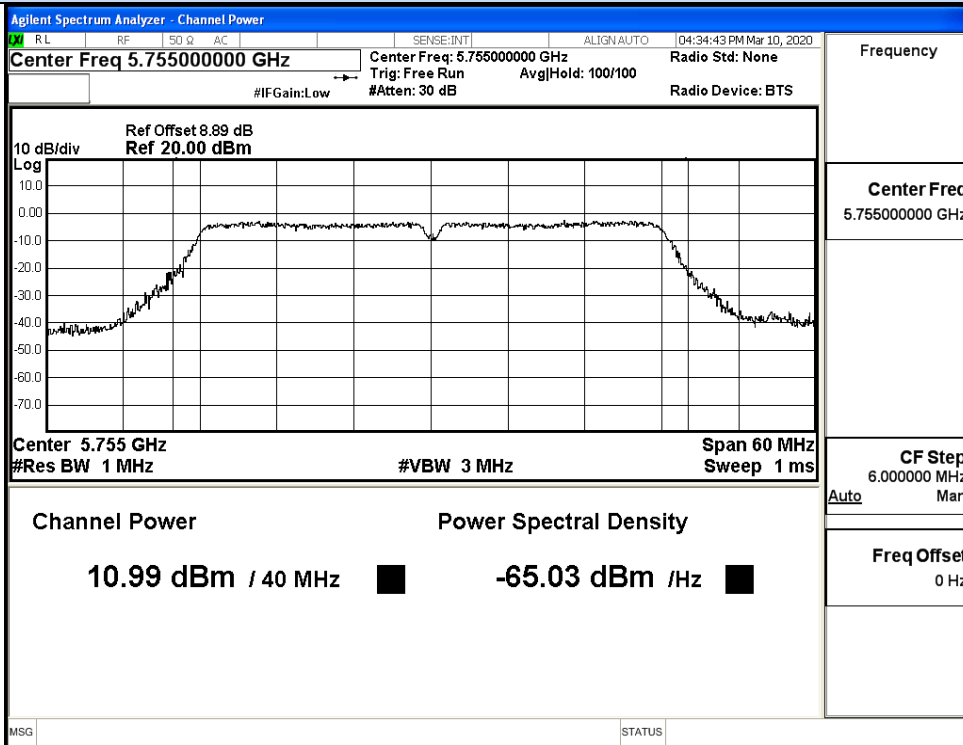
IEEE 802.11ac20 / Channel 149 / 5745MHz



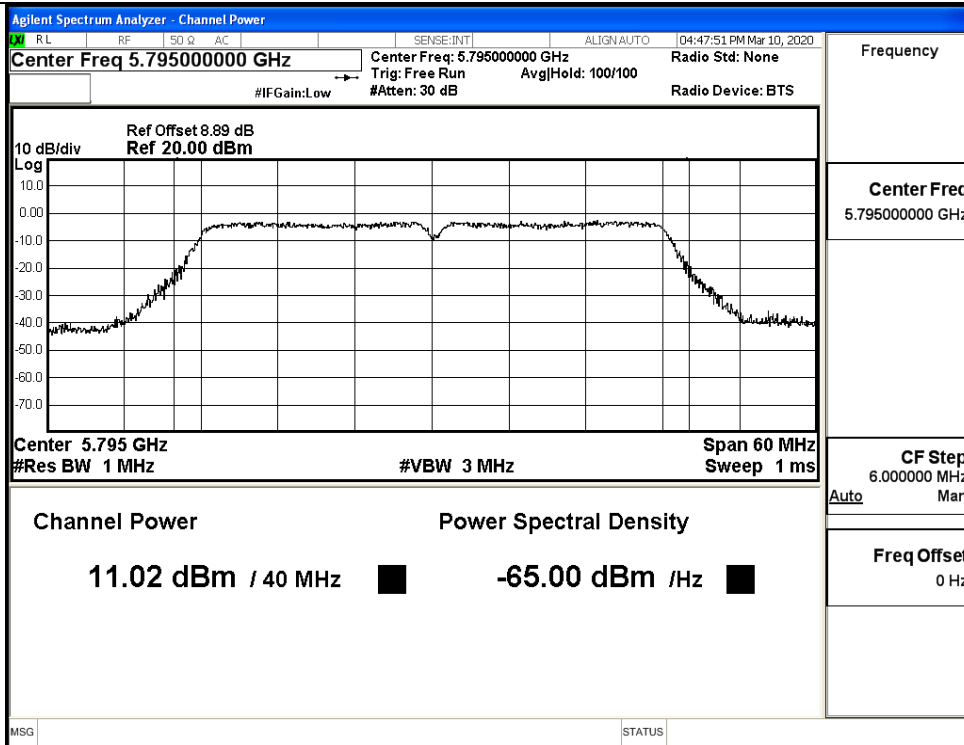
IEEE 802.11ac20 / Channel 157 / 5785MHz



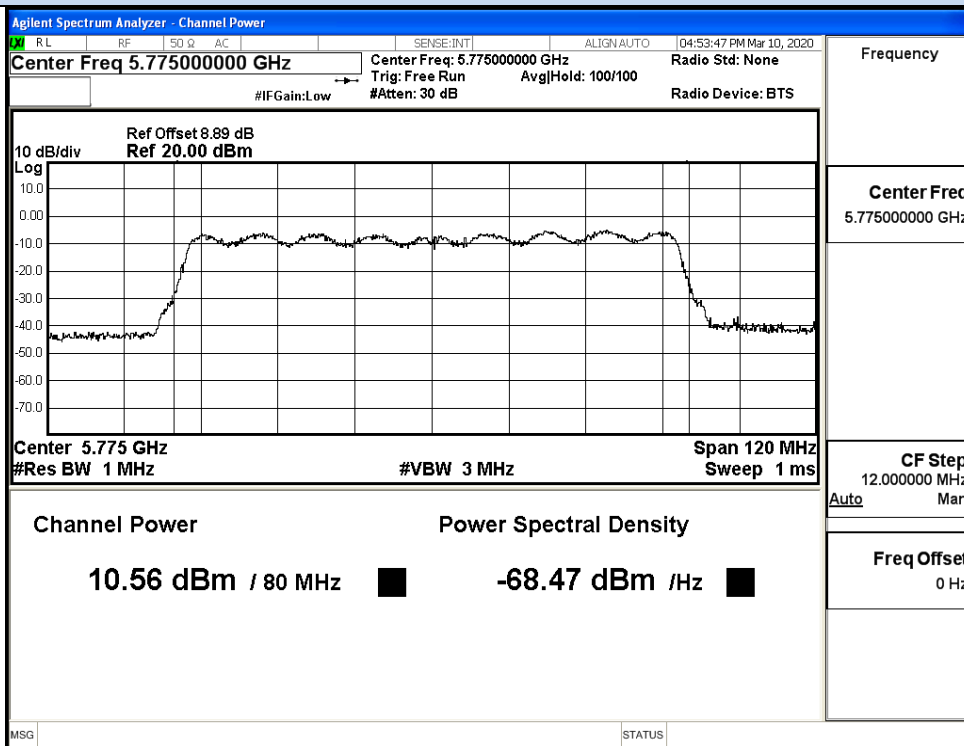
IEEE 802.11ac20 / Channel 165 / 5825MHz



IEEE 802.11ac40 / Channel 151 / 5755MHz



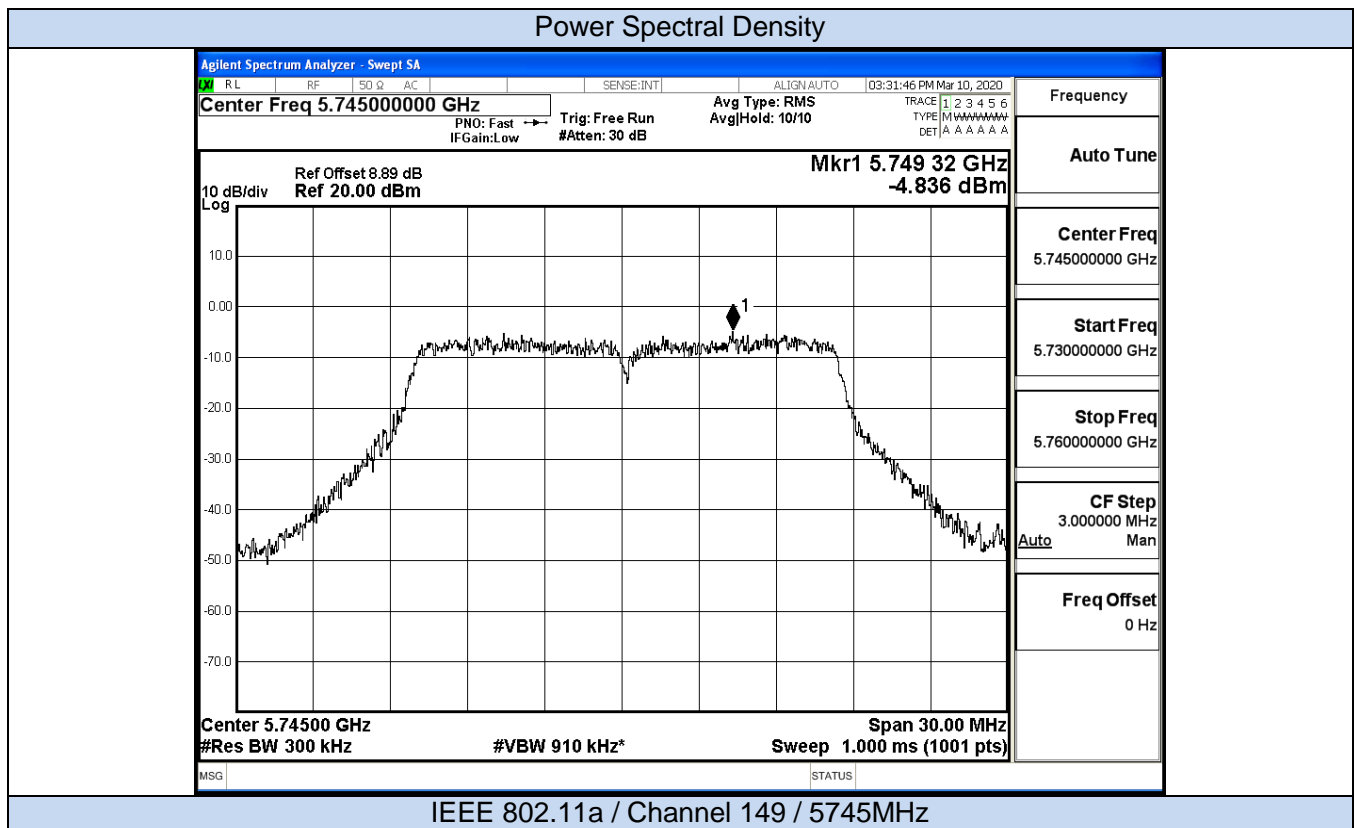
IEEE 802.11ac40 / Channel 159 / 5795MHz

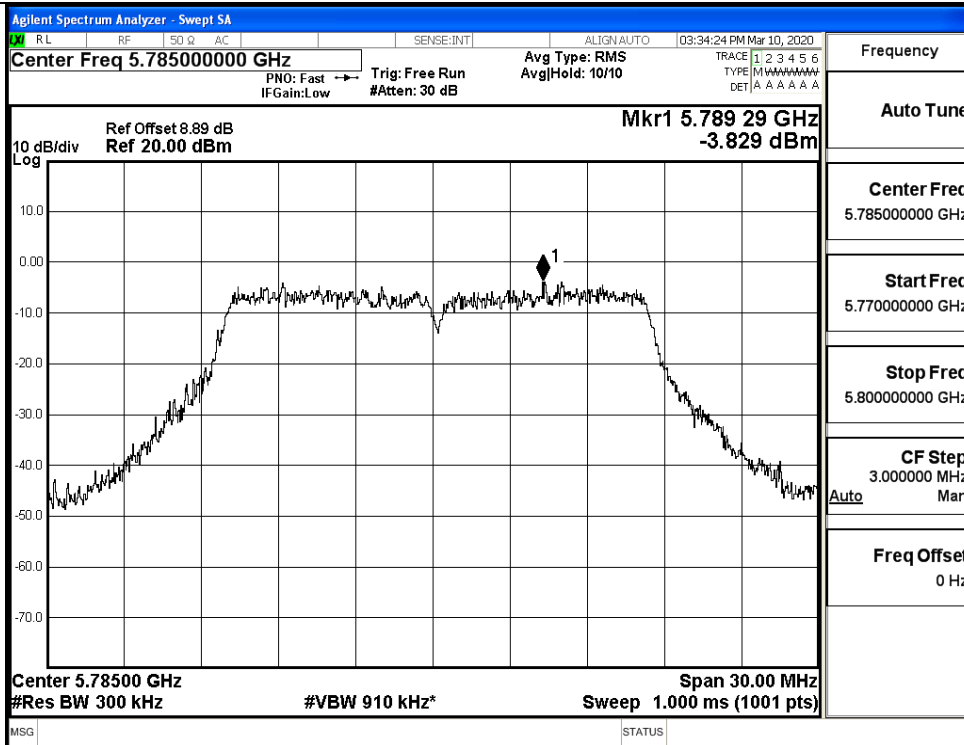


IEEE 802.11ac80 / Channel 155 / 5775MHz

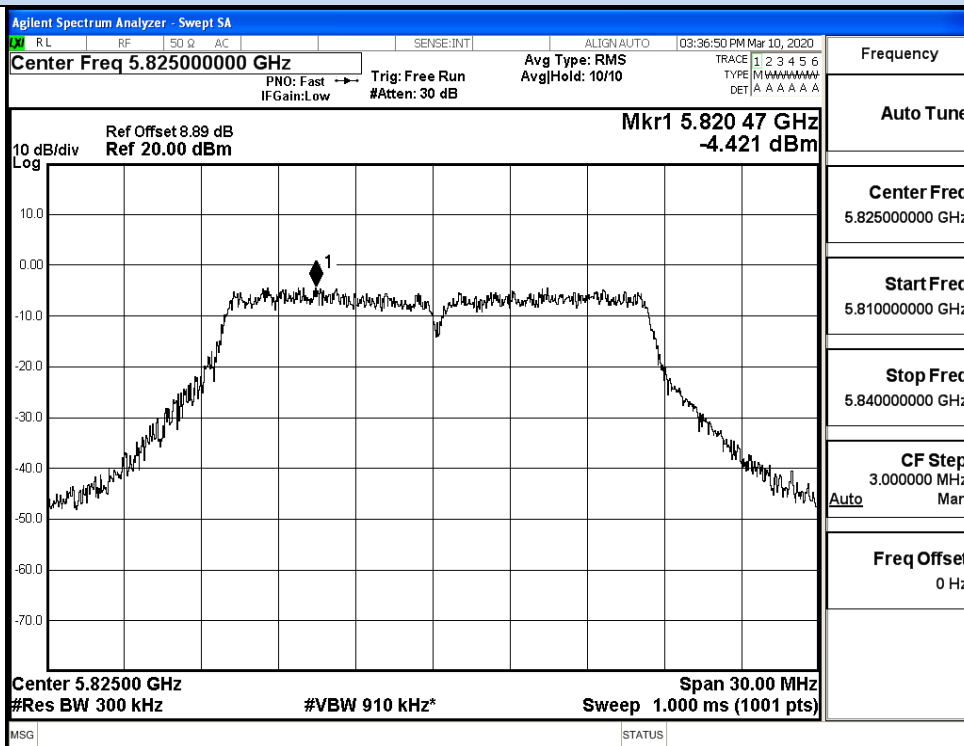
C.3 Power Spectral Density

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	-4.84	0	2.218	-2.62	30	Pass
	157	5785	-3.83	0	2.218	-1.61		Pass
	165	5825	-4.42	0	2.218	-2.20		Pass
11N20 SISO	149	5745	-2.18	0	2.218	0.04	30	Pass
	157	5785	-4.14	0	2.218	-1.92		Pass
	165	5825	-4.33	0	2.218	-2.11		Pass
11N40 SISO	151	5755	-7.22	0	2.218	-5.00	30	Pass
	159	5795	-7.43	0	2.218	-5.21		Pass
11AC20 SISO	149	5745	-4.56	0	2.218	-2.34	30	Pass
	157	5785	-4.64	0	2.218	-2.42		Pass
	165	5825	-4.32	0	2.218	-2.10		Pass
11AC40 SISO	151	5755	-6.64	0	2.218	-4.42	30	Pass
	159	5795	-6.29	0	2.218	-4.07		Pass
11AC80 SISO	155	5775	-9.16	0	2.218	-6.95	30	Pass



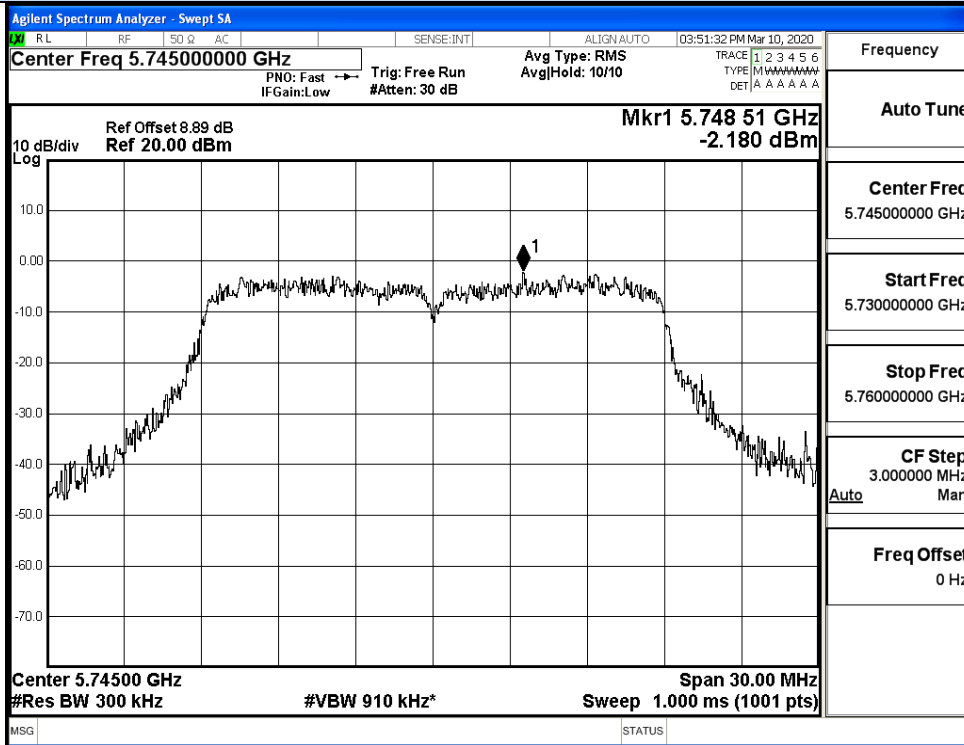


IEEE 802.11na / Channel 157 / 5785MHz

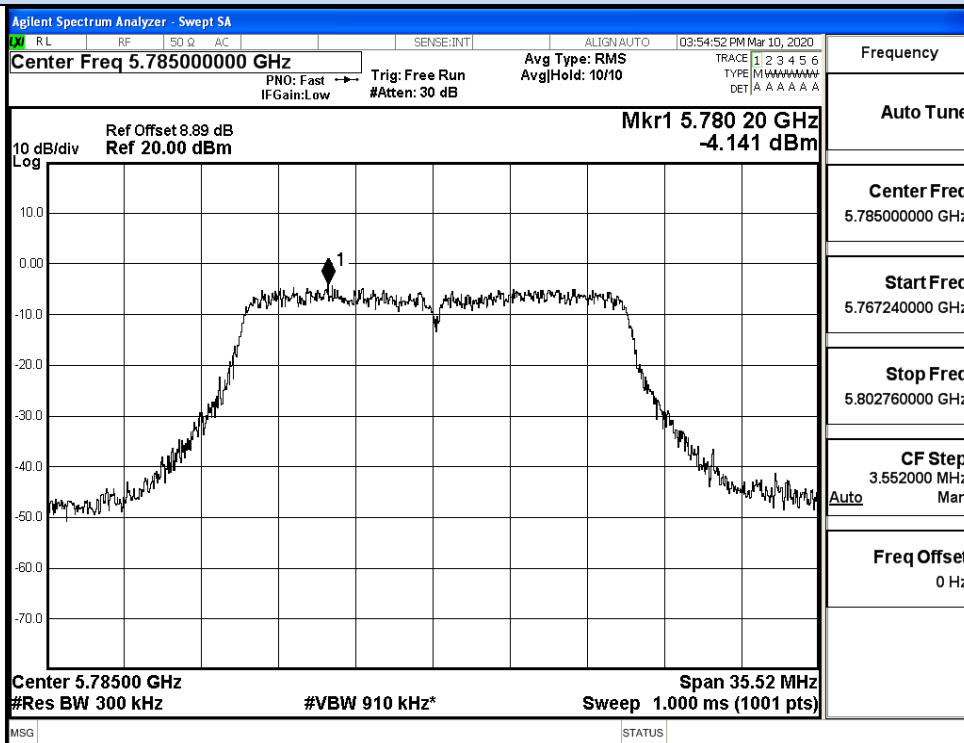


IEEE 802.11na / Channel 165 / 5825MHz

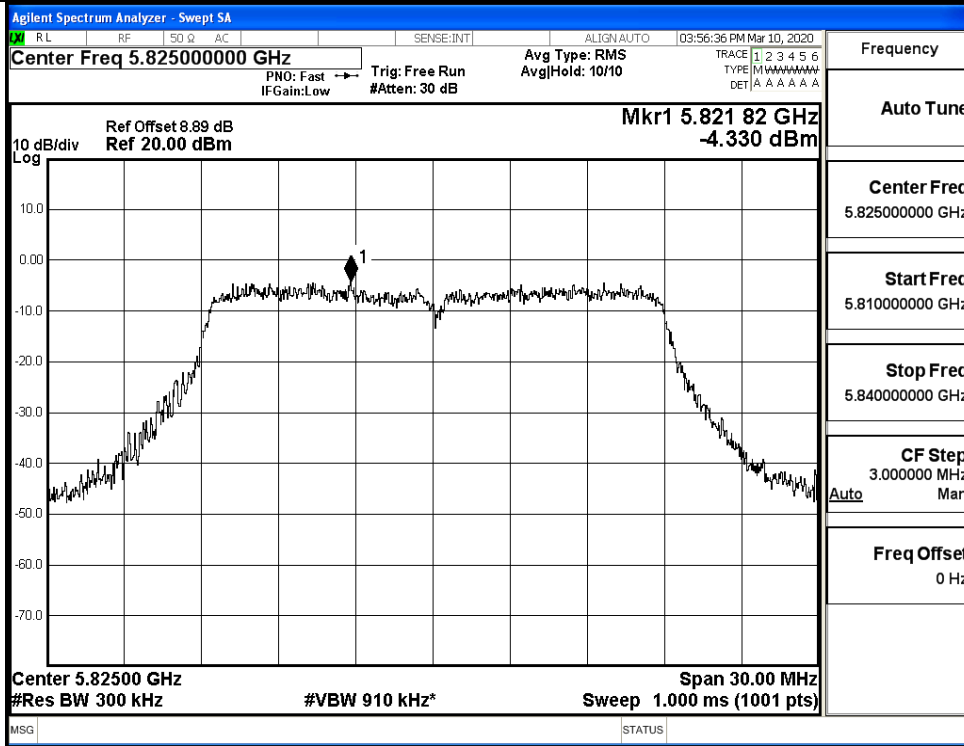
Power Spectral Density



IEEE 802.11n20 / Channel 149 / 5745MHz

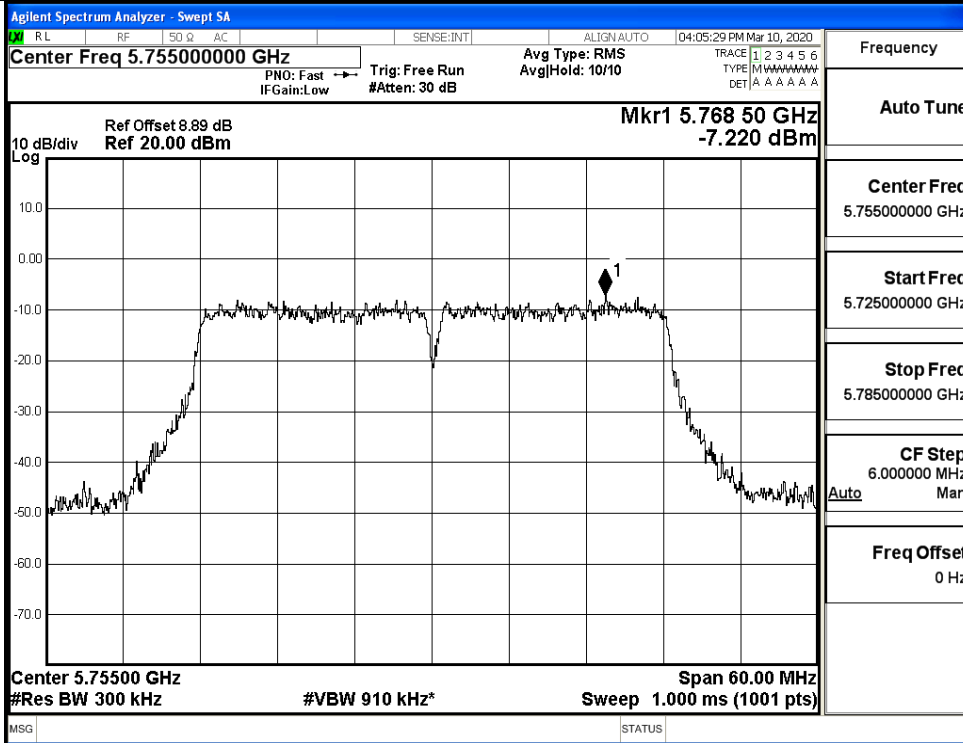


IEEE 802.11n20 / Channel 157 / 5785MHz

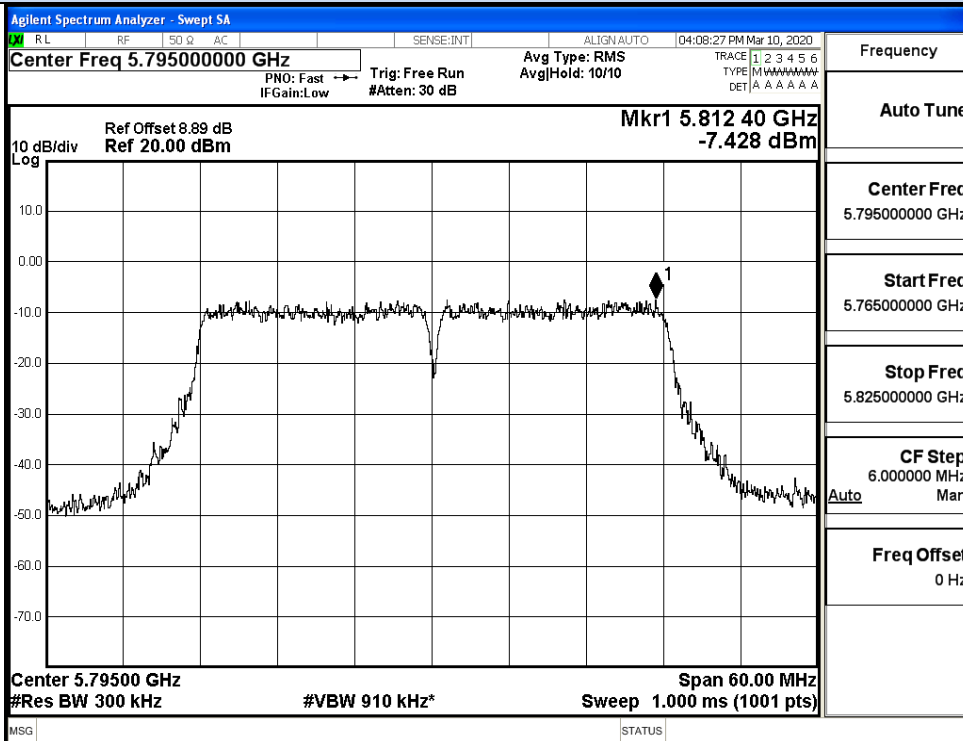


IEEE 802.11n20 / Channel 165 / 5825MHz

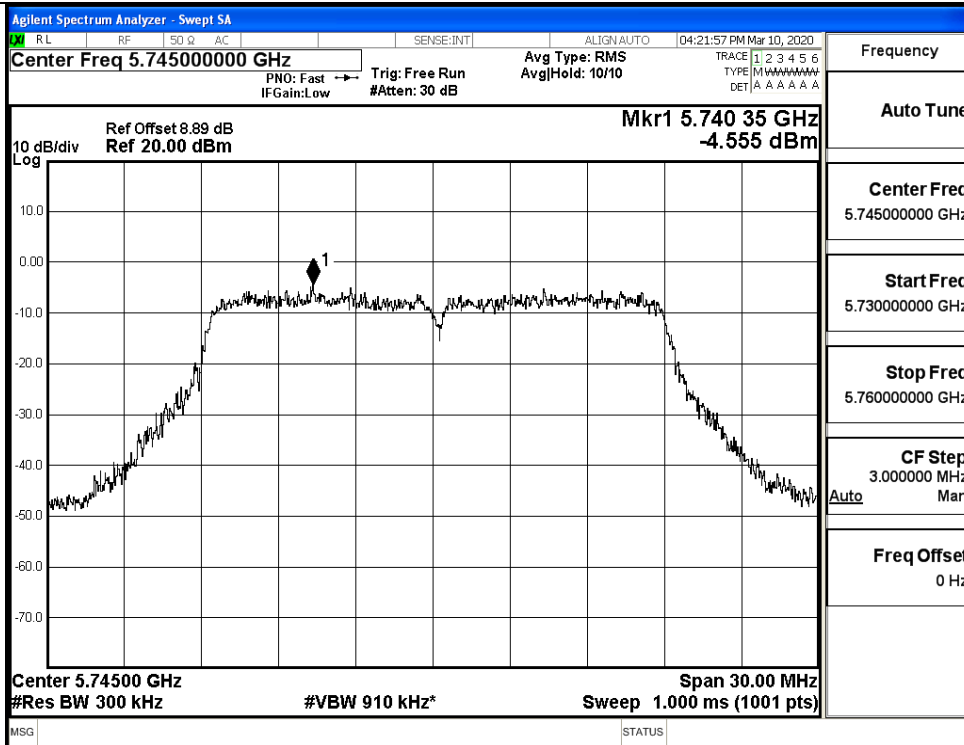
Power Spectral Density



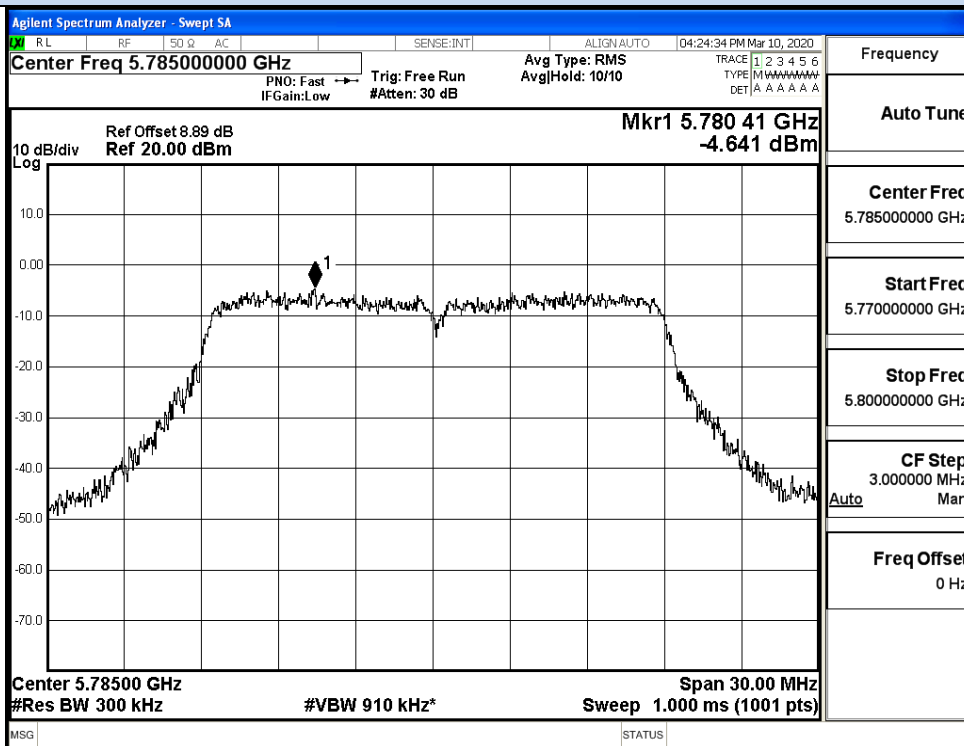
IEEE 802.11n40 / Channel 151 / 5755MHz



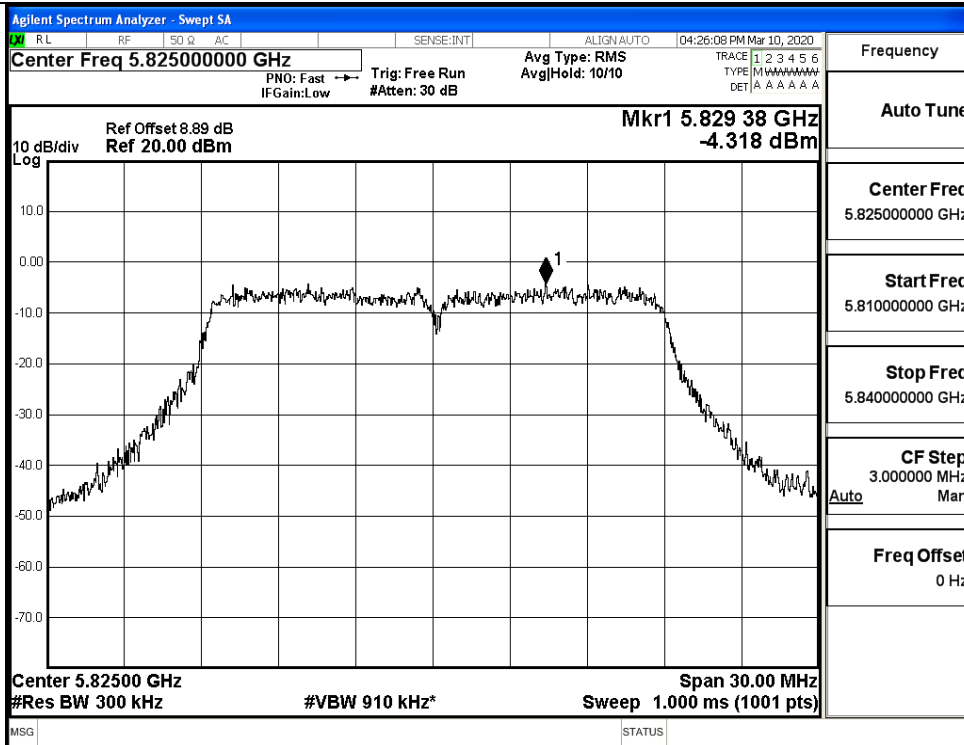
IEEE 802.11n40 / Channel 159 / 5795MHz



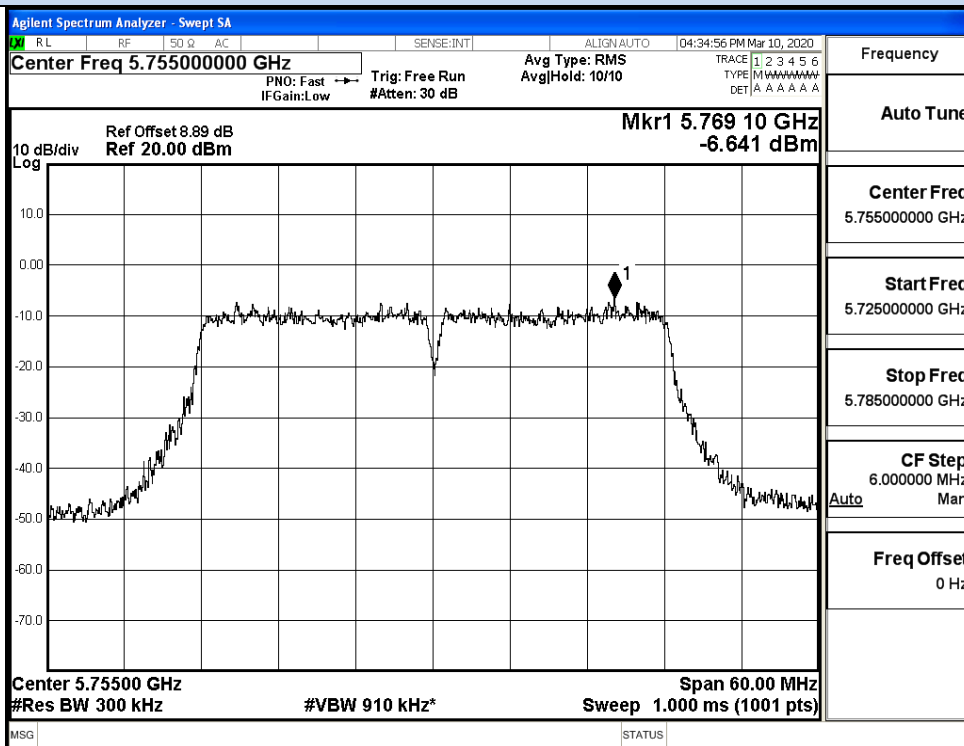
IEEE 802.11ac20 / Channel 149 / 5745MHz



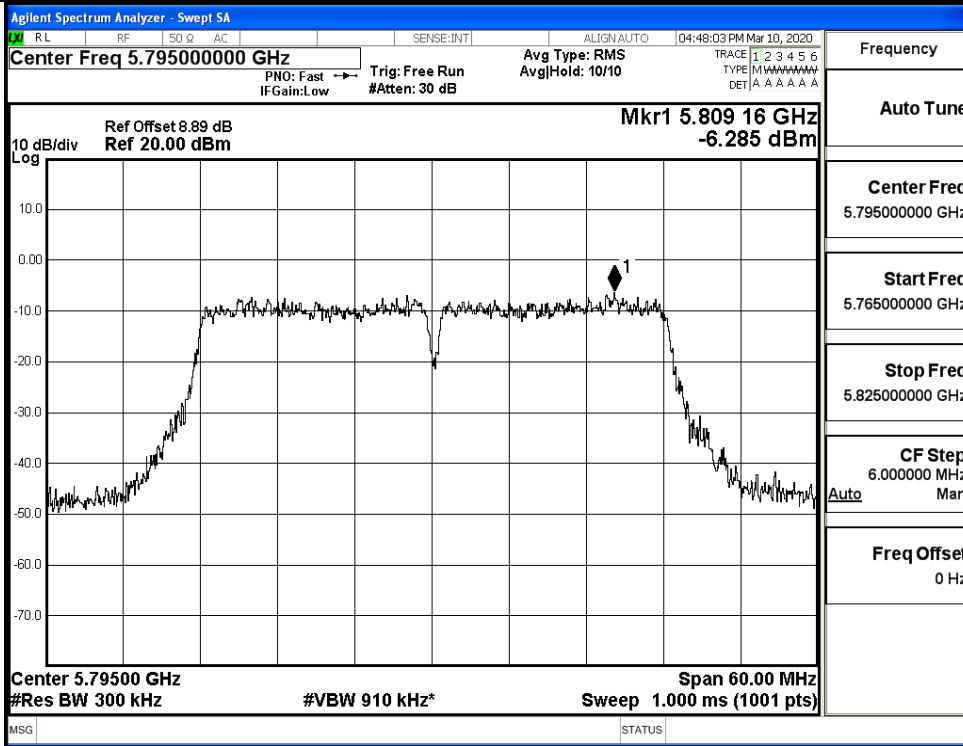
IEEE 802.11ac20 / Channel 157 / 5785MHz



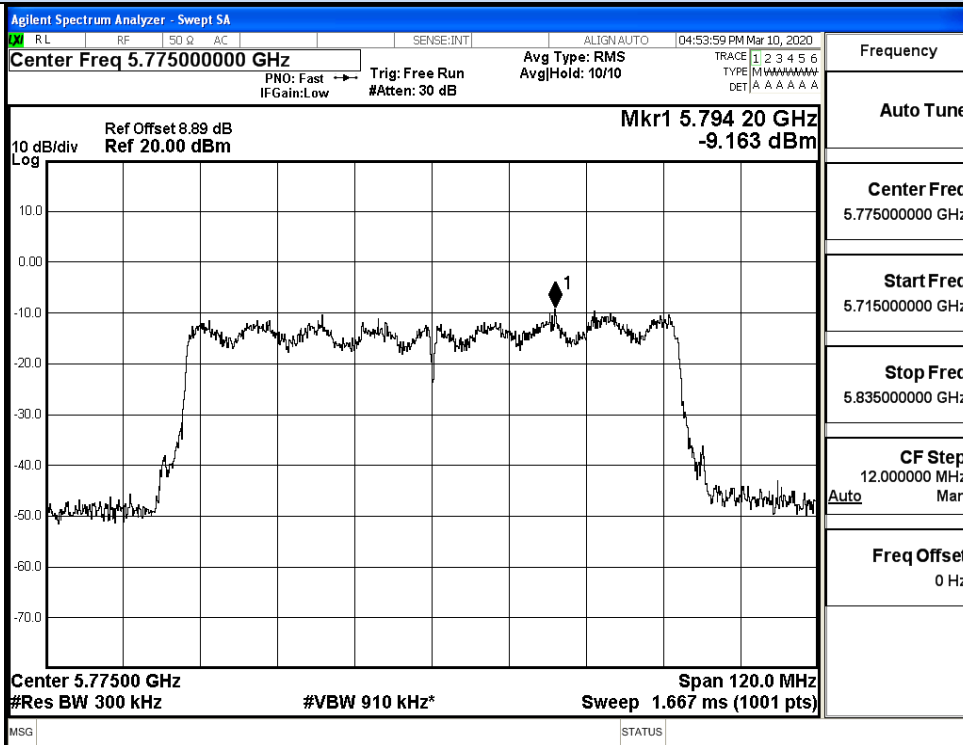
IEEE 802.11ac20 / Channel 165 / 5825MHz



IEEE 802.11ac40 / Channel 151 / 5755MHz



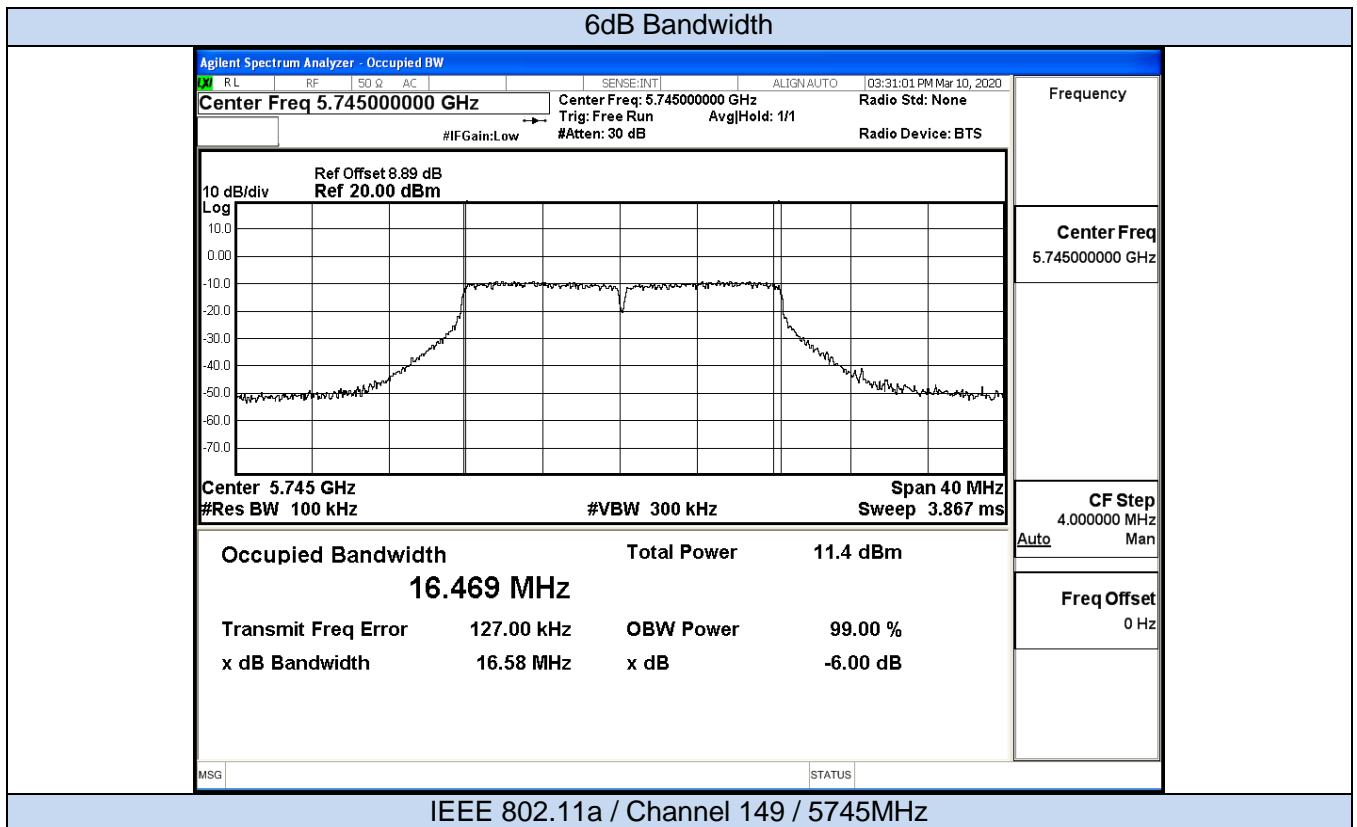
IEEE 802.11ac40 / Channel 159 / 5795MHz

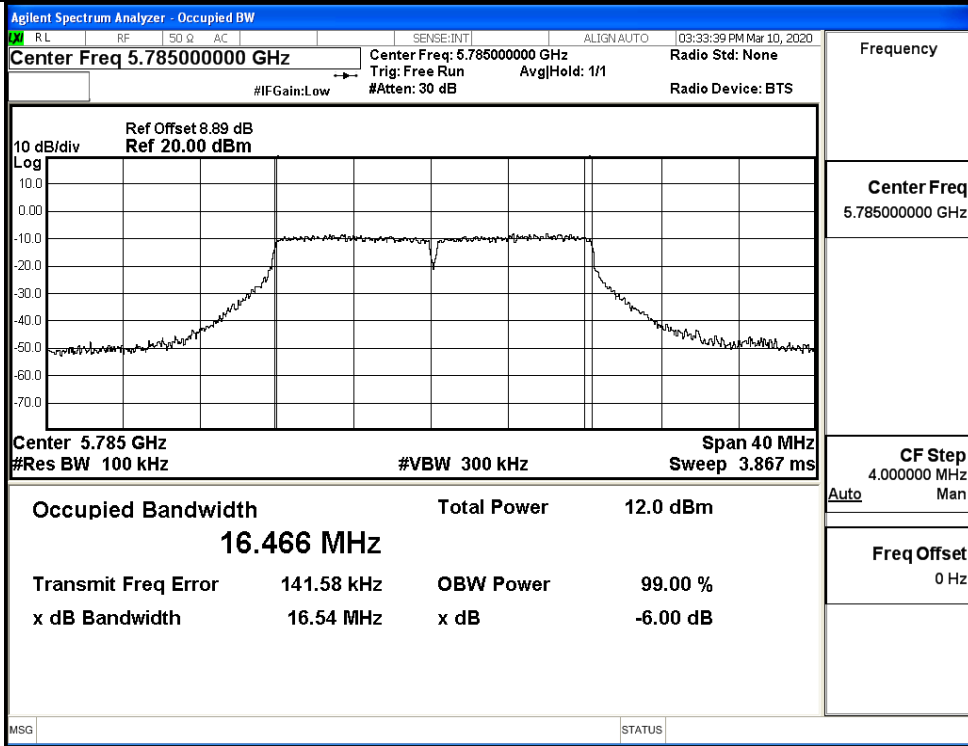


IEEE 802.11ac80 / Channel 155/ 5775MHz

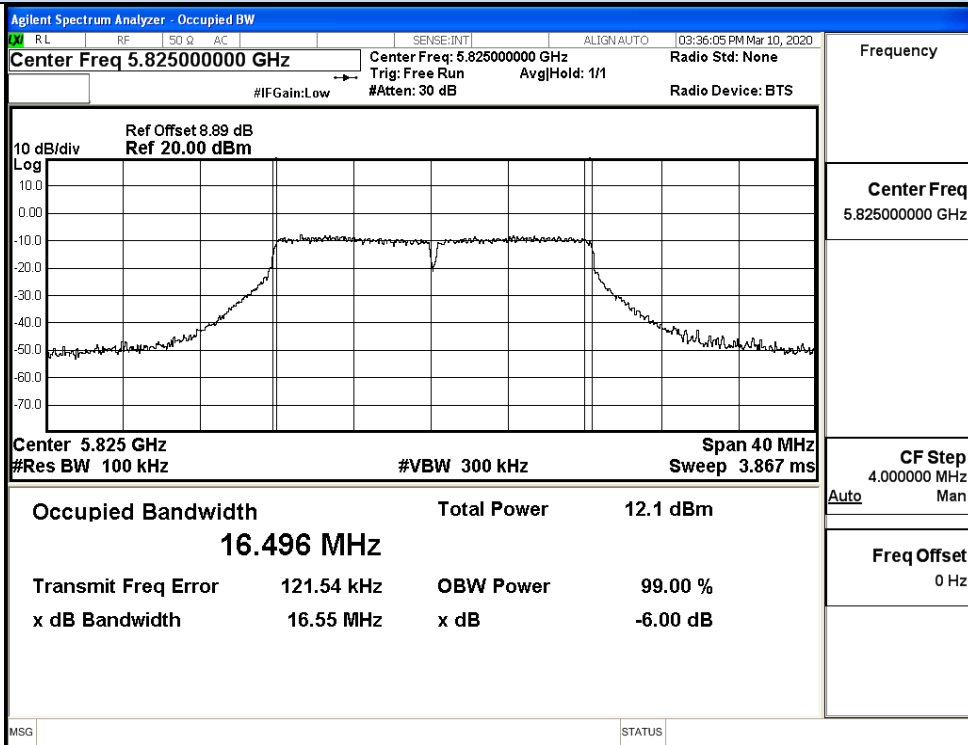
C.4 Emission Bandwidth

Test Mode	Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Verdict
11A	149	5745	16.58	>=0.5	Pass
	157	5785	16.54		Pass
	165	5825	16.55		Pass
11N20 SISO	149	5745	17.60	>=0.5	Pass
	157	5785	17.76		Pass
	165	5825	17.73		Pass
11N40 SISO	151	5755	36.55	>=0.5	Pass
	159	5795	36.54		Pass
11AC20S ISO	149	5745	17.76	>=0.5	Pass
	157	5785	17.81		Pass
	165	5825	17.72		Pass
11AC40S ISO	151	5755	36.57	>=0.5	Pass
	159	5795	36.55		Pass
11AC80S ISO	155	5775	76.56	>=0.5	Pass





IEEE 802.11a / Channel 157 / 5785MHz



IEEE 802.11a / Channel 165 / 5825MHz

6dB Bandwidth

Agilent Spectrum Analyzer - Occupied BW

RL	RF	SO	Q	AC	SENSE:INT	ALIGN:AUTO	03:50:47 PM Mar 10, 2020
Center Freq 5.74500000 GHz					Center Freq: 5.745000000 GHz	Trig: Free Run	Avg/Hold: 1/1
#IFGain:Low					#Atten: 30 dB	Radio Std: None	Radio Device: BTS

Ref Offset 8.89 dB
Ref 20.00 dBm

Center 5.745 GHz	#Res BW 100 kHz	#VBW 300 kHz	Span 40 MHz	Sweep 3.867 ms
Occupied Bandwidth		Total Power		12.9 dBm
17.645 MHz				
Transmit Freq Error	107.61 kHz	OBW Power	99.00 %	
x dB Bandwidth	17.60 MHz	x dB	-6.00 dB	

Frequency: 5.74500000 GHz

CF Step: 4.000000 MHz (Auto)

Freq Offset: 0 Hz

IEEE 802.11n20 / Channel 149 / 5745MHz

Agilent Spectrum Analyzer - Occupied BW

RL	RF	SO	Q	AC	SENSE:INT	ALIGN:AUTO	03:54:07 PM Mar 10, 2020
Center Freq 5.78500000 GHz					Center Freq: 5.785000000 GHz	Trig: Free Run	Avg/Hold: 1/1
#IFGain:Low					#Atten: 30 dB	Radio Std: None	Radio Device: BTS

Ref Offset 8.89 dB
Ref 20.00 dBm

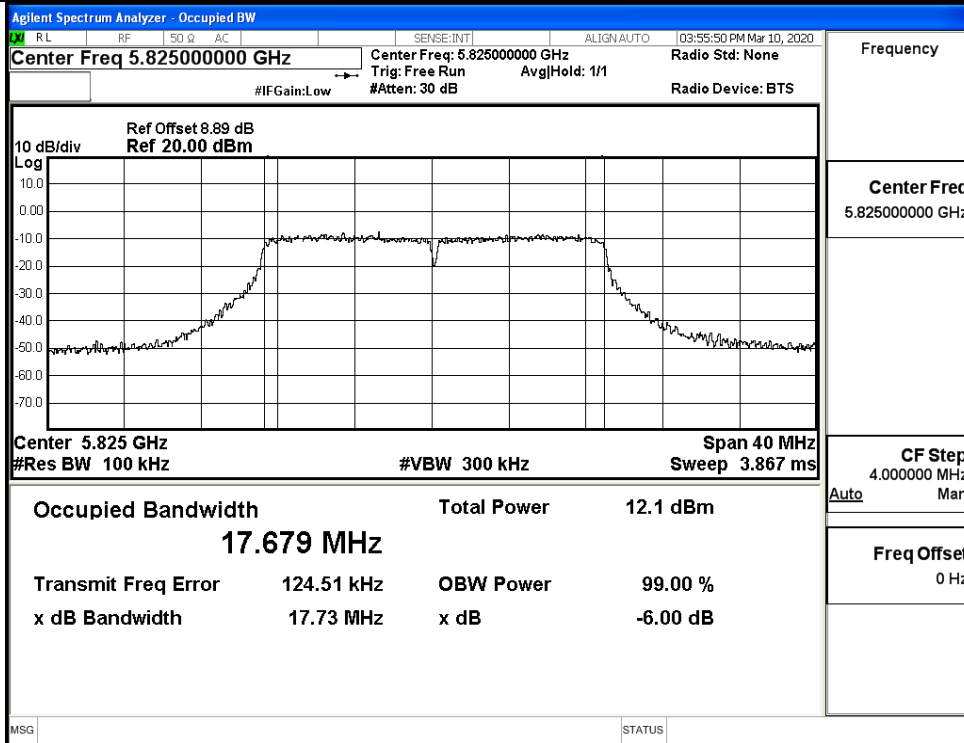
Center 5.785 GHz	#Res BW 100 kHz	#VBW 300 kHz	Span 40 MHz	Sweep 3.867 ms
Occupied Bandwidth		Total Power		13.2 dBm
17.665 MHz				
Transmit Freq Error	63.318 kHz	OBW Power	99.00 %	
x dB Bandwidth	17.76 MHz	x dB	-6.00 dB	

Frequency: 5.78500000 GHz

CF Step: 4.000000 MHz (Auto)

Freq Offset: 0 Hz

IEEE 802.11n20 / Channel 157 / 5785MHz



IEEE 802.11n20 / Channel 165 / 5825MHz

26dB Bandwidth

Agilent Spectrum Analyzer - Occupied BW

RL	RF	50 Ω	AC	SENSE:INT	ALIGN:AUTO	04:04:43 PM Mar 10, 2020
Center Freq 5.755000000 GHz				Center Freq: 5.755000000 GHz	Trig: Free Run	Avg/Hold: 1/1
#IFGain:Low				#Atten: 30 dB	Radio Std: None	Radio Device: BTS

10 dB/div
Ref Offset 8.89 dB
Ref 20.00 dBm

Center 5.755 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 80 MHz
Sweep 7.667 ms

Occupied Bandwidth	Total Power	12.6 dBm
36.176 MHz		
Transmit Freq Error	99.123 kHz	OBW Power
x dB Bandwidth	36.55 MHz	x dB
		99.00 %
		-6.00 dB

MSG STATUS

IEEE 802.11n40 / Channel 151 / 5755MHz

Agilent Spectrum Analyzer - Occupied BW

RL	RF	50 Ω	AC	SENSE:INT	ALIGN:AUTO	04:07:41 PM Mar 10, 2020
Center Freq 5.795000000 GHz				Center Freq: 5.795000000 GHz	Trig: Free Run	Avg/Hold: 1/1
#IFGain:Low				#Atten: 30 dB	Radio Std: None	Radio Device: BTS

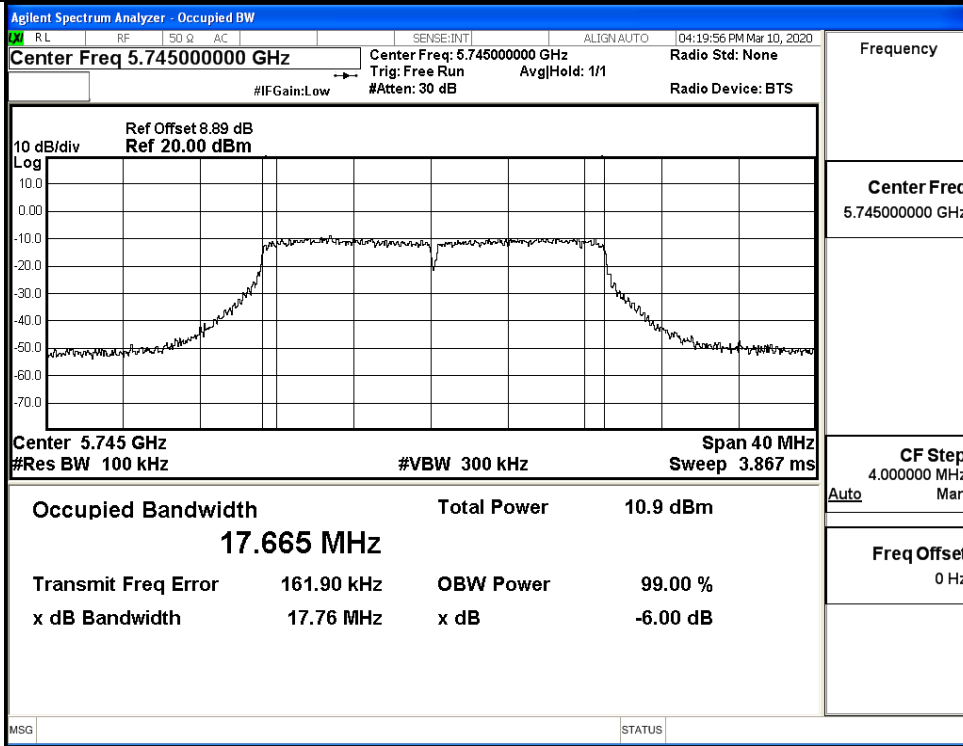
10 dB/div
Ref Offset 8.89 dB
Ref 20.00 dBm

Center 5.795 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 80 MHz
Sweep 7.667 ms

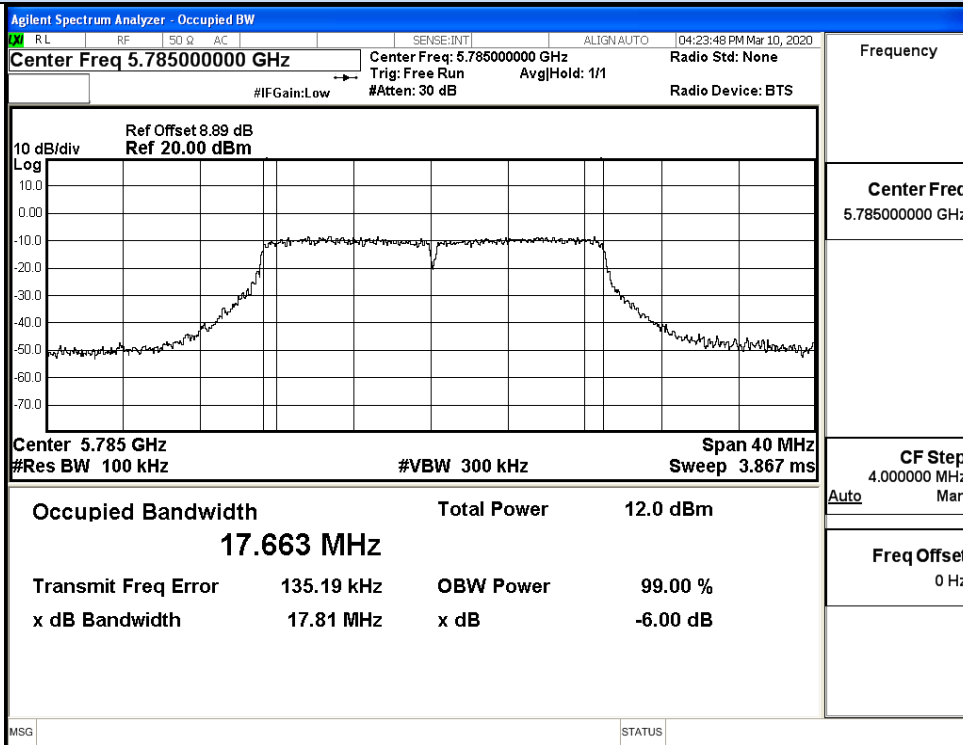
Occupied Bandwidth	Total Power	12.6 dBm
36.182 MHz		
Transmit Freq Error	140.31 kHz	OBW Power
x dB Bandwidth	36.54 MHz	x dB
		99.00 %
		-6.00 dB

MSG STATUS

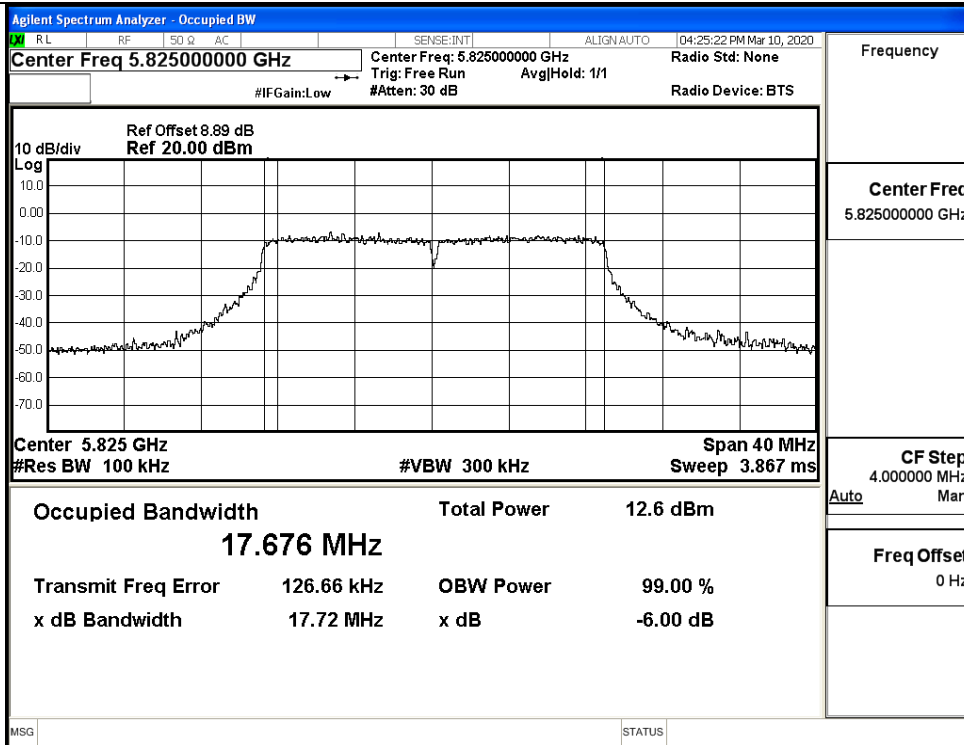
IEEE 802.11n40 / Channel 159 / 5795MHz



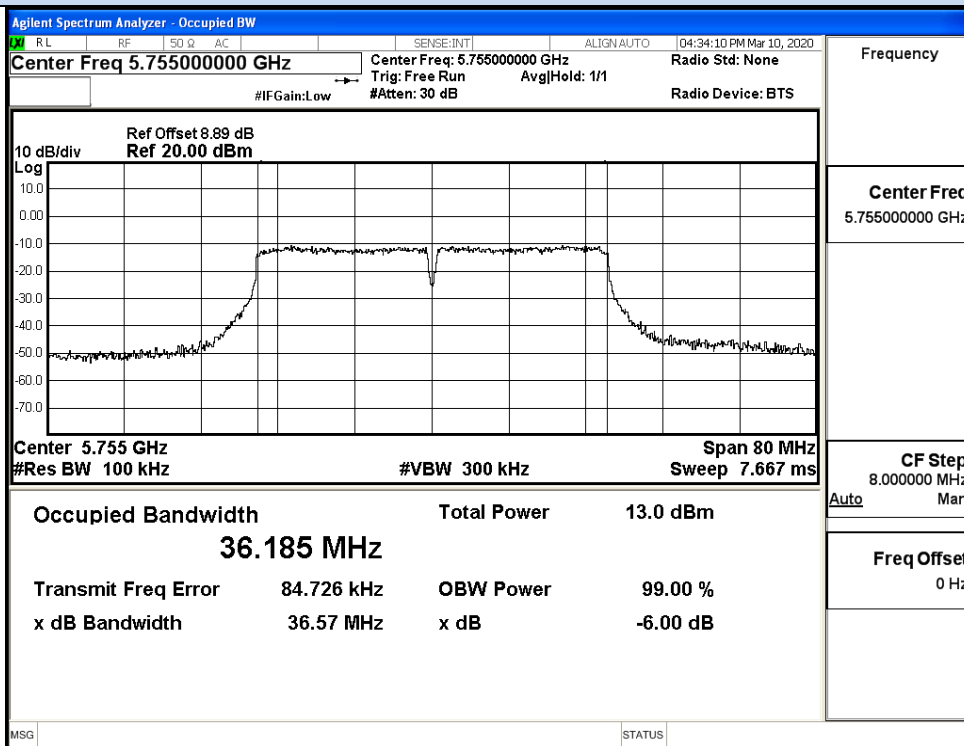
IEEE 802.11ac20 / Channel 149 / 5745MHz



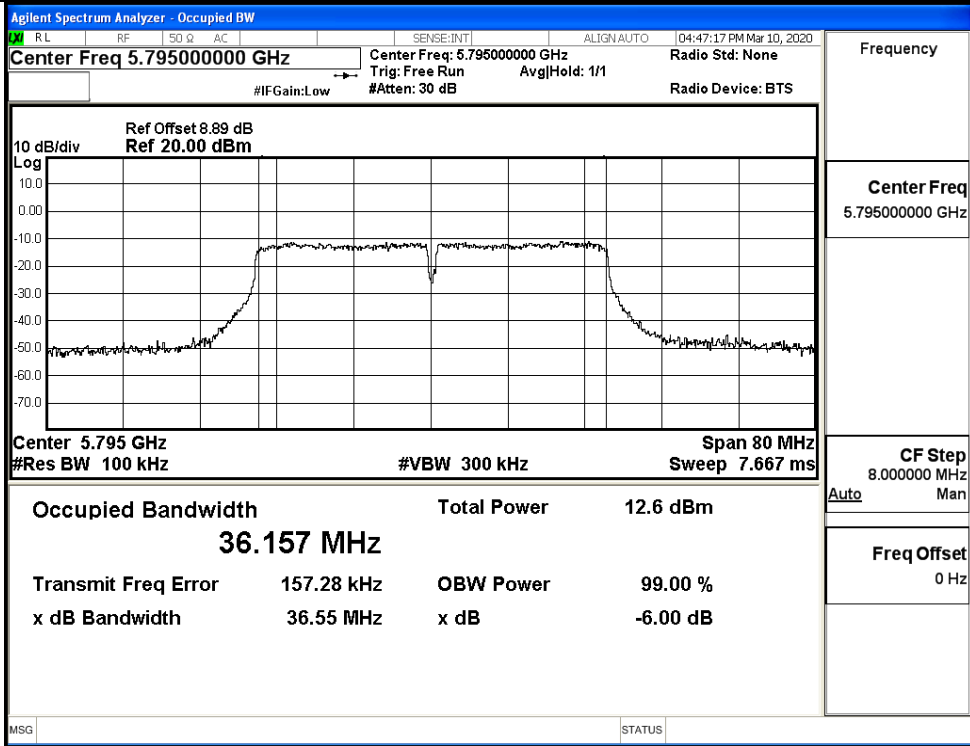
IEEE 802.11ac20 / Channel 157 / 5785MHz



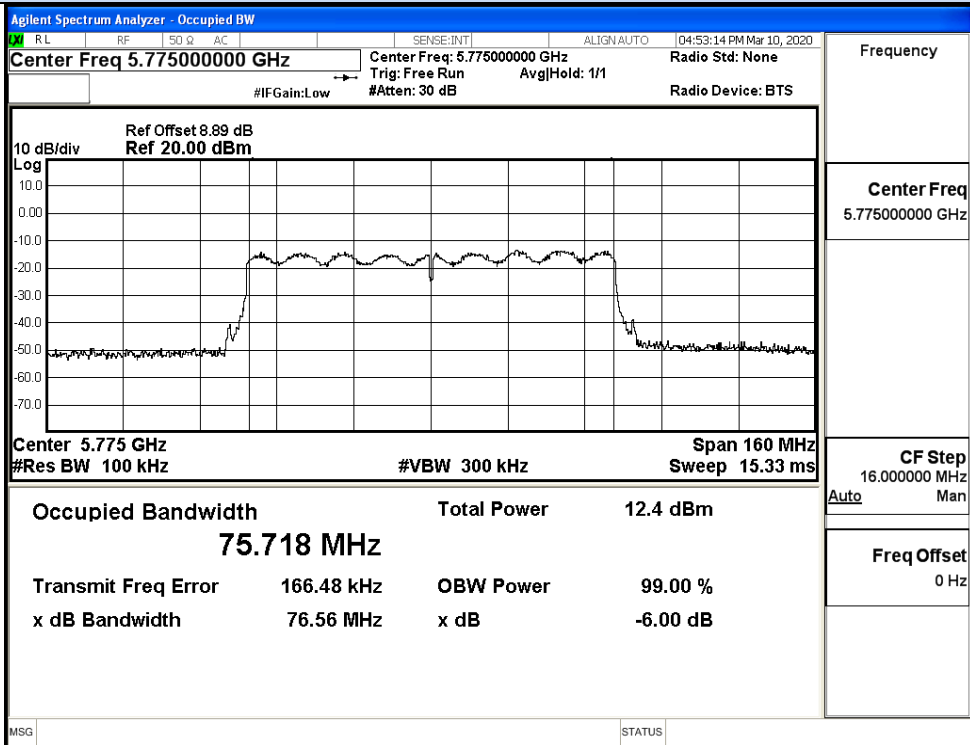
IEEE 802.11ac20 / Channel 165 / 5825MHz



IEEE 802.11ac40 / Channel 151 / 5755MHz



IEEE 802.11ac40 / Channel 159 / 5795MHz



IEEE 802.11ac80 / Channel 155 / 5775MHz

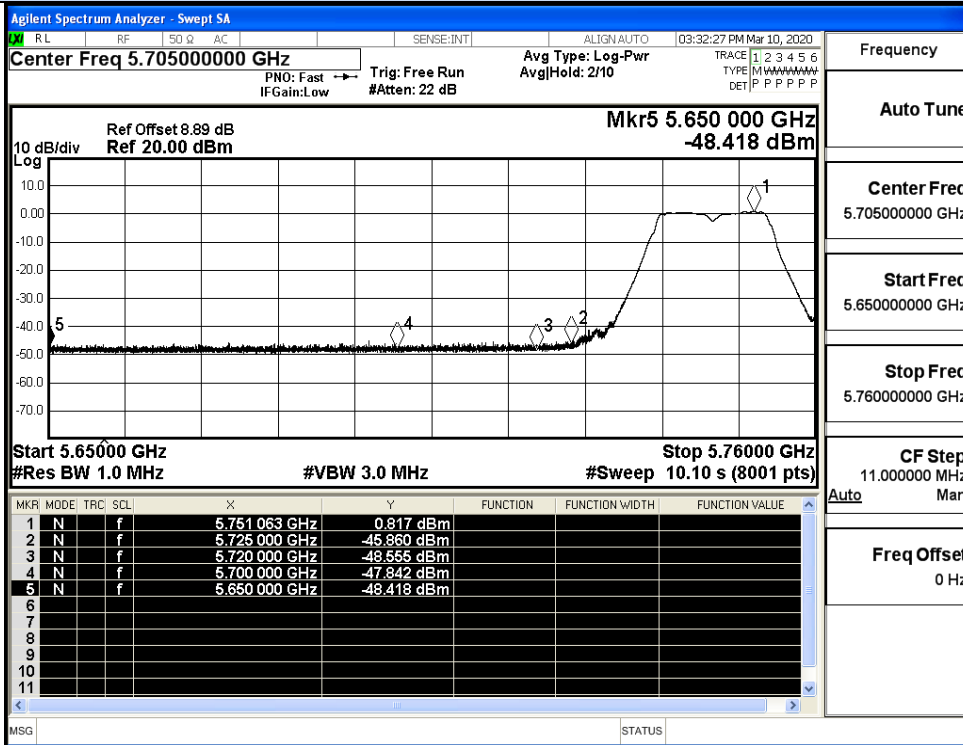
C.5 Undesirable Emissions Measurement

Test Mode	Channel	Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	EIRP (dBm/MHz)	Detector	Limit (dBm/MHz)	Verdict
11A	149	5650.0	-48.42	2.00	-48.42	Peak	-27.0	Pass
		5650.0	-60.36	2.00	-60.36	Average	-27.0	Pass
		5700.0	-47.84	2.00	-47.84	Peak	10	Pass
		5700.0	-59.90	2.00	-59.90	Average	10	Pass
		5720.0	-48.56	2.00	-48.56	Peak	15.6	Pass
		5720.0	-59.63	2.00	-59.63	Average	15.6	Pass
		5725.0	-45.86	2.00	-45.86	Peak	27.0	Pass
	5725.0	-59.08	2.00	-59.08	Average	27.0	Pass	
	165	5850.0	-46.72	2.00	-46.72	Peak	27.0	Pass
		5850.0	-59.14	2.00	-59.14	Average	27.0	Pass
		5855.0	-47.40	2.00	-47.40	Peak	15.6	Pass
		5855.0	-59.35	2.00	-59.35	Average	15.6	Pass
		5875.0	-46.67	2.00	-46.67	Peak	10	Pass
		5875.0	-59.73	2.00	-59.73	Average	10	Pass
5925.0		-48.11	2.00	-48.11	Peak	-27.0	Pass	
5925.0	-60.20	2.00	-60.20	Average	-27.0	Pass		
11N20 SISO	149	5650.0	-48.37	2.00	-48.37	Peak	-27.0	Pass
		5650.0	-60.45	2.00	-60.45	Average	-27.0	Pass
		5700.0	-46.43	2.00	-46.43	Peak	10	Pass
		5700.0	-59.36	2.00	-59.36	Average	10	Pass
		5720.0	-41.01	2.00	-41.01	Peak	15.6	Pass
		5720.0	-60.02	2.00	-60.02	Average	15.6	Pass
		5725.0	-32.59	2.00	-32.59	Peak	27.0	Pass
	5725.0	-57.19	2.00	-57.19	Average	27.0	Pass	
	165	5850.0	-43.56	2.00	-43.56	Peak	27.0	Pass
		5850.0	-58.71	2.00	-58.71	Average	27.0	Pass
		5855.0	-47.82	2.00	-47.82	Peak	15.6	Pass
		5855.0	-59.34	2.00	-59.34	Average	15.6	Pass
		5875.0	-46.83	2.00	-46.83	Peak	10	Pass
		5875.0	-59.72	2.00	-59.72	Average	10	Pass
5925.0		-49.04	2.00	-49.04	Peak	-27.0	Pass	
5925.0	-60.25	2.00	-60.25	Average	-27.0	Pass		

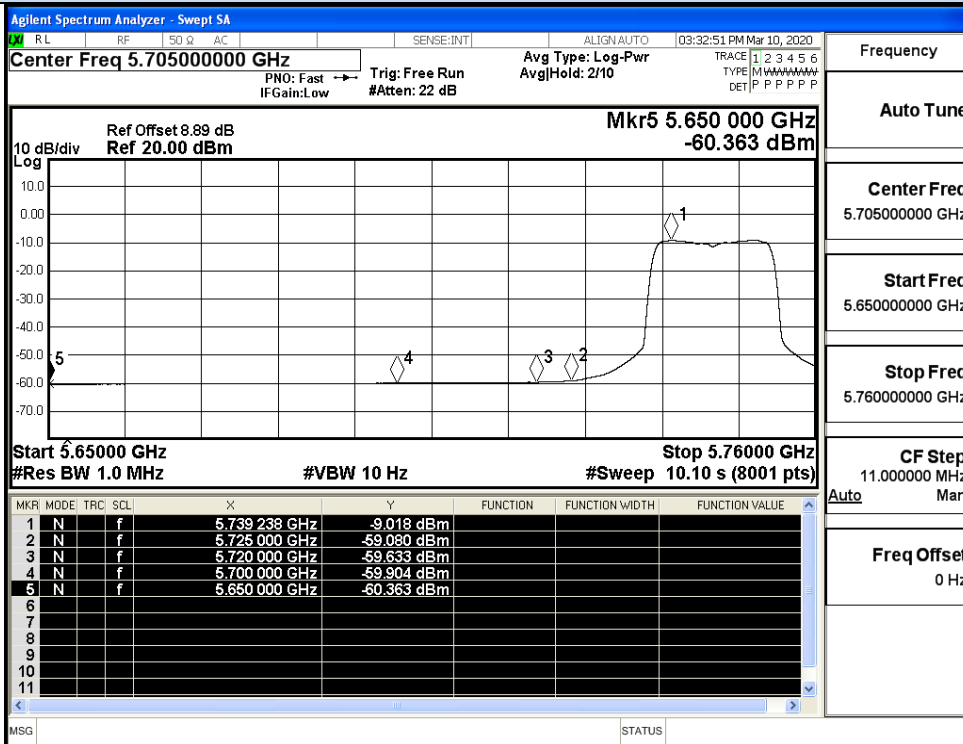
Test Mode	Channel	Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	EIRP (dBm/MHz)	Detector	Limit (dBm/MHz)	Verdict
11N40 SISO	151	5650.0	-48.64	2.00	-48.64	Peak	-27.0	Pass
		5650.0	-60.24	2.00	-60.24	Average	-27.0	Pass
		5700.0	-47.90	2.00	-47.90	Peak	10	Pass
		5700.0	-59.81	2.00	-59.81	Average	10	Pass
		5720.0	-47.50	2.00	-47.50	Peak	15.6	Pass
		5720.0	-58.97	2.00	-58.97	Average	15.6	Pass
		5725.0	-45.12	2.00	-45.12	Peak	27.0	Pass
	159	5725.0	-58.07	2.00	-58.07	Average	27.0	Pass
		5850.0	-45.64	2.00	-45.64	Peak	27.0	Pass
		5850.0	-59.05	2.00	-59.05	Average	27.0	Pass
		5855.0	-48.35	2.00	-48.35	Peak	15.6	Pass
		5855.0	-59.20	2.00	-59.20	Average	15.6	Pass
		5875.0	-48.75	2.00	-48.75	Peak	10	Pass
		5875.0	-59.44	2.00	-59.44	Average	10	Pass
11AC2 0 SISO	149	5925.0	-48.37	2.00	-48.37	Peak	-27.0	Pass
		5925.0	-59.90	2.00	-59.90	Average	-27.0	Pass
		5650.0	-48.28	2.00	-48.28	Peak	-27.0	Pass
		5650.0	-60.36	2.00	-60.36	Average	-27.0	Pass
		5700.0	-47.06	2.00	-47.06	Peak	10	Pass
		5700.0	-59.60	2.00	-59.60	Average	10	Pass
		5720.0	-47.67	2.00	-47.67	Peak	15.6	Pass
	165	5720.0	-59.92	2.00	-59.92	Average	15.6	Pass
		5725.0	-44.01	2.00	-44.01	Peak	27.0	Pass
		5725.0	-58.73	2.00	-58.73	Average	27.0	Pass
		5850.0	-46.52	2.00	-46.52	Peak	27.0	Pass
		5850.0	-58.61	2.00	-58.61	Average	27.0	Pass
		5855.0	-47.22	2.00	-47.22	Peak	15.6	Pass
		5855.0	-59.34	2.00	-59.34	Average	15.6	Pass
11AC4 0 SISO	151	5875.0	-47.64	2.00	-47.64	Peak	10	Pass
		5875.0	-59.74	2.00	-59.74	Average	10	Pass
		5925.0	-47.52	2.00	-47.52	Peak	-27.0	Pass
		5925.0	-60.21	2.00	-60.21	Average	-27.0	Pass
		5650.0	-48.42	2.00	-48.42	Peak	-27.0	Pass
		5650.0	-60.21	2.00	-60.21	Average	-27.0	Pass
		5700.0	-47.94	2.00	-47.94	Peak	10	Pass
	159	5700.0	-59.77	2.00	-59.77	Average	10	Pass
		5720.0	-46.50	2.00	-46.50	Peak	15.6	Pass
		5720.0	-58.83	2.00	-58.83	Average	15.6	Pass
		5725.0	-45.15	2.00	-45.15	Peak	27.0	Pass
		5725.0	-57.78	2.00	-57.78	Average	27.0	Pass
		5850.0	-47.69	2.00	-47.69	Peak	27.0	Pass
		5850.0	-59.08	2.00	-59.08	Average	27.0	Pass
11AC8 0 SISO	155	5855.0	-47.22	2.00	-47.22	Peak	15.6	Pass
		5855.0	-59.21	2.00	-59.21	Average	15.6	Pass
		5875.0	-47.71	2.00	-47.71	Peak	10	Pass
		5875.0	-59.46	2.00	-59.46	Average	10	Pass
		5925.0	-48.75	2.00	-48.75	Peak	-27.0	Pass
		5925.0	-59.92	2.00	-59.92	Average	-27.0	Pass
		5725.0	-41.43	2.00	-41.43	Peak	27.0	Pass
		5720.0	-43.89	2.00	-43.89	Peak	15.6	Pass
		5700.0	-46.33	2.00	-46.33	Peak	10	Pass
		5650.0	-47.40	2.00	-47.40	Peak	-27.0	Pass

		5855.0	-43.89	2.00	-43.89	Peak	15.6	Pass
		5875.0	-46.33	2.00	-46.33	Peak	10	Pass
		5925.0	-47.40	2.00	-47.40	Peak	-27.0	Pass
		5850.0	-55.02	2.00	-55.02	Average	27.0	Pass
		5855.0	-55.66	2.00	-55.66	Average	15.6	Pass
		5875.0	-58.22	2.00	-58.22	Average	10	Pass
		5925.0	-59.61	2.00	-59.61	Average	-27.0	Pass

Undesirable Emissions Measurement

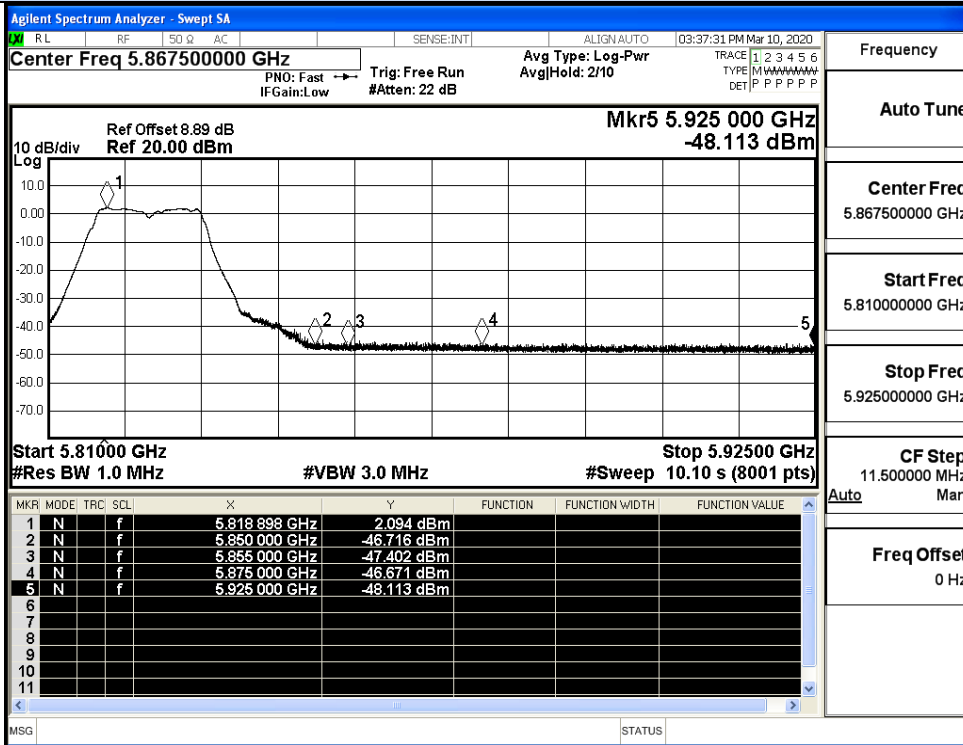


IEEE 802.11a / Channel 149 / 5745MHz / Peak

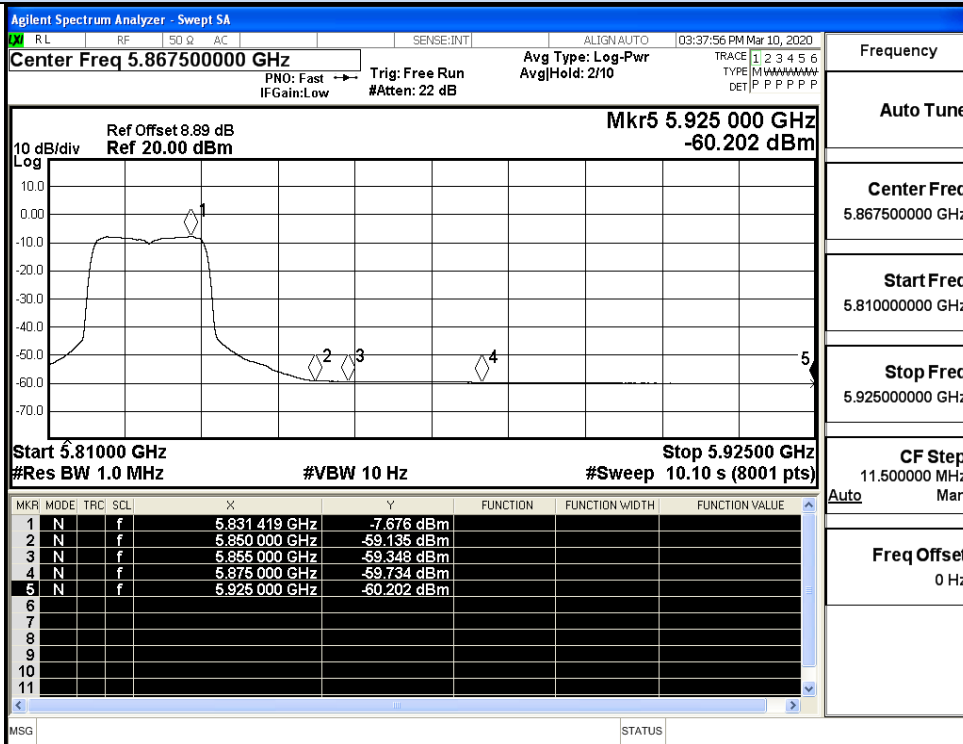


IEEE 802.11a / Channel 148 / 5745MHz / Average

Undesirable Emissions Measurement

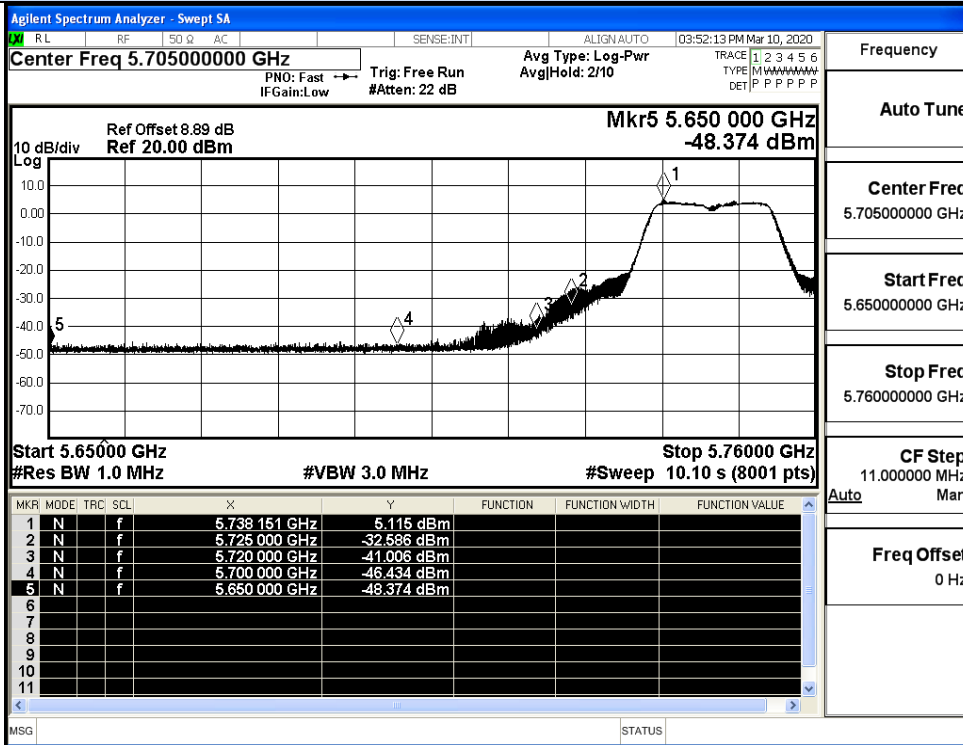


IEEE 802.11a / Channel 165 / 5825MHz / Peak

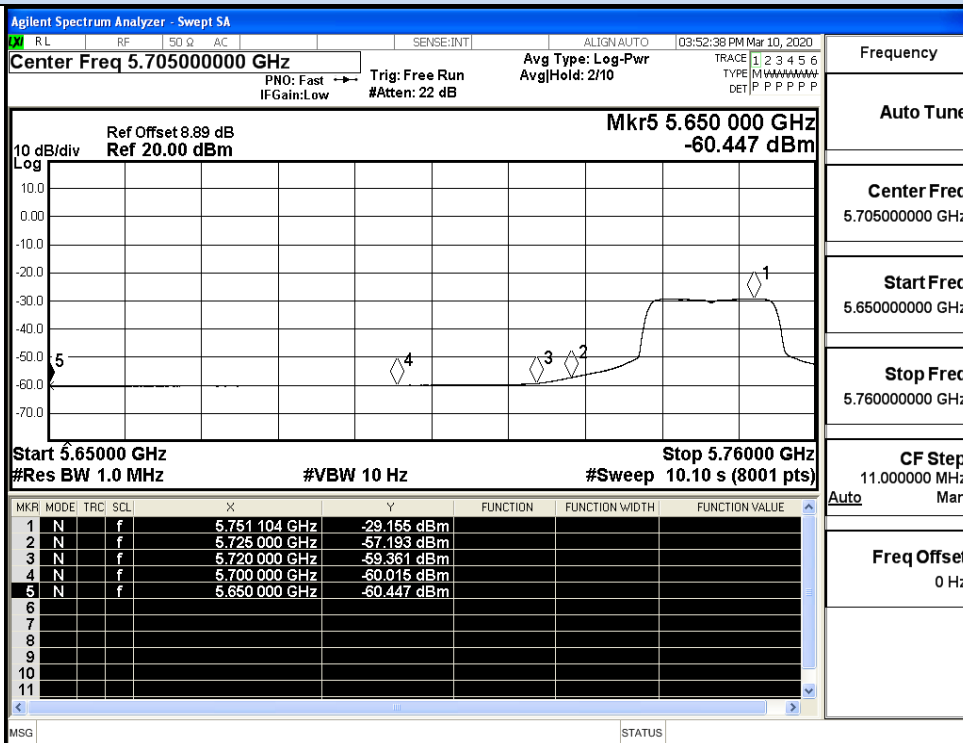


IEEE 802.11a / Channel 165 / 5825MHz / Average

Undesirable Emissions Measurement

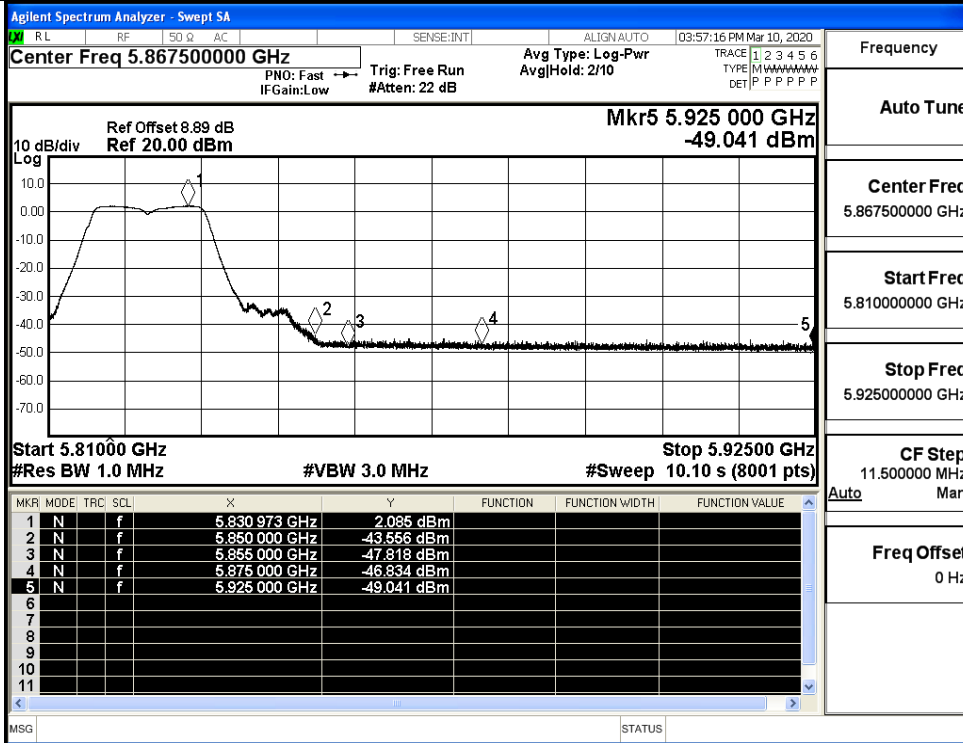


IEEE 802.11n20 / Channel 149 / 5745MHz / Peak

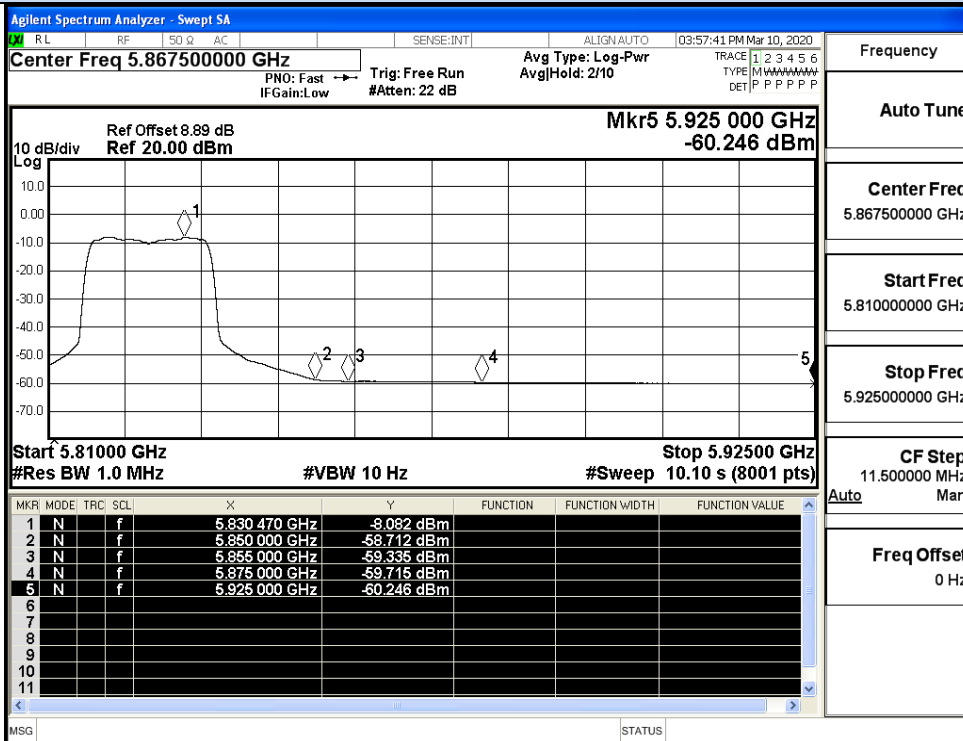


IEEE 802.11n20 / Channel 149 / 5745MHz / Average

Undesirable Emissions Measurement

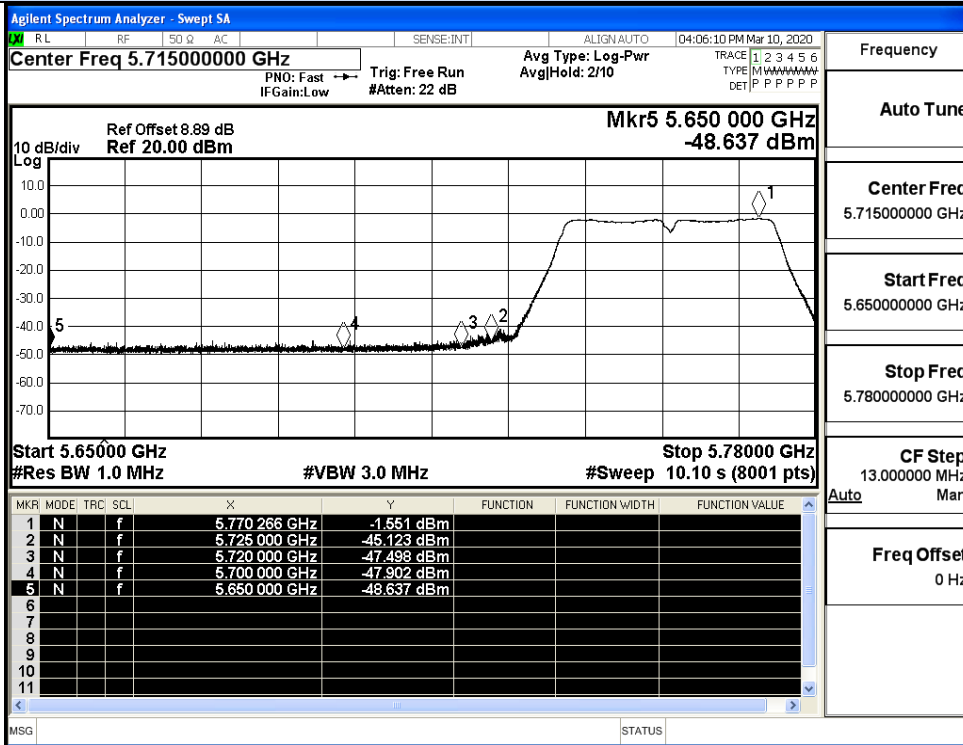


IEEE 802.11n20 / Channel 165 / 5825MHz / Peak

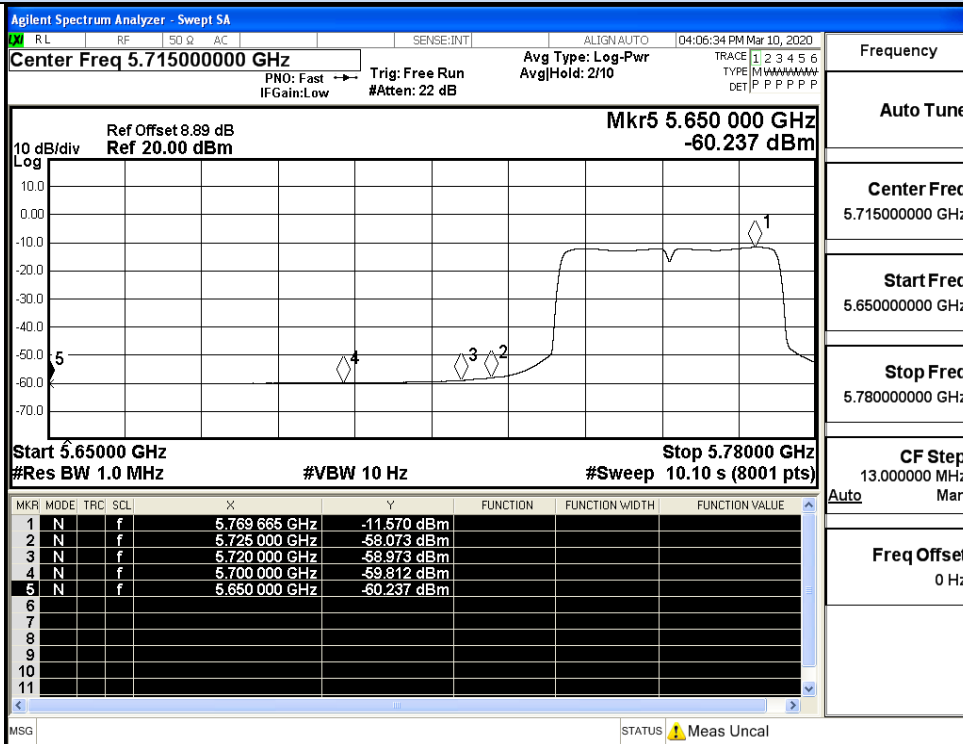


IEEE 802.11n20 / Channel 165 / 5825MHz / Average

Undesirable Emissions Measurement

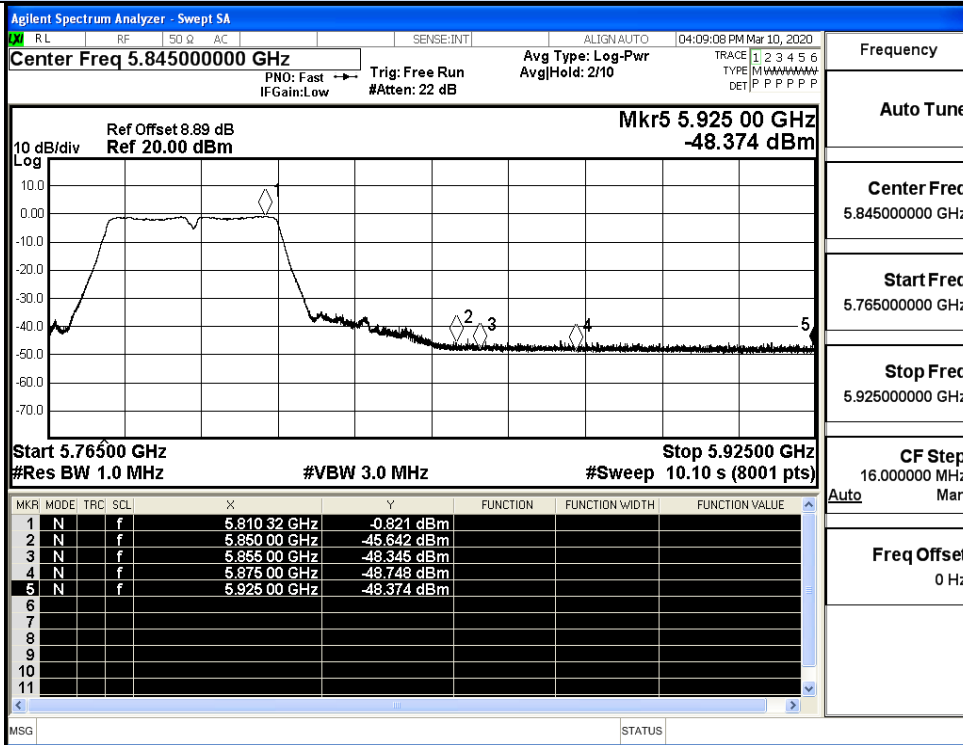


IEEE 802.11n40 / Channel 151 / 5755MHz / Peak

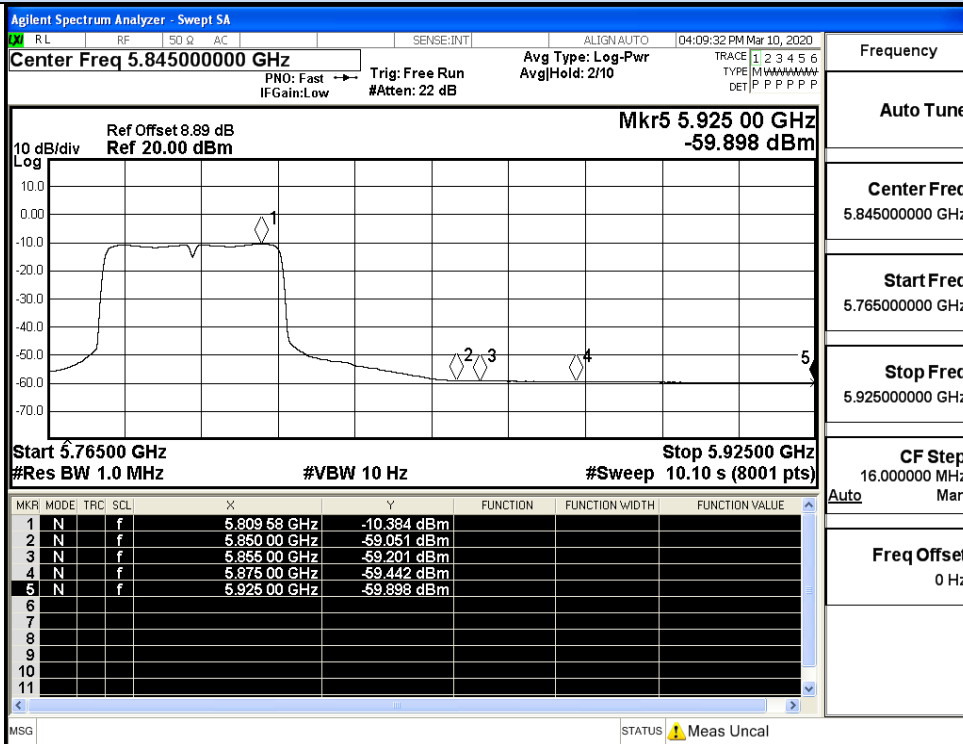


IEEE 802.11n40 / Channel 151 / 5755MHz / Average

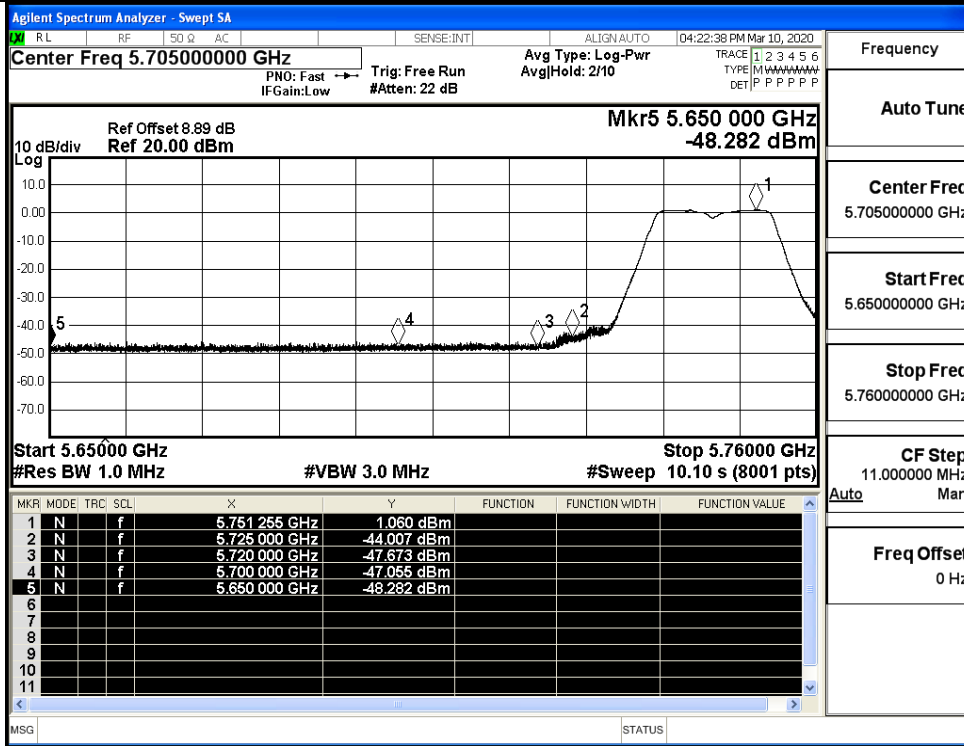
Undesirable Emissions Measurement



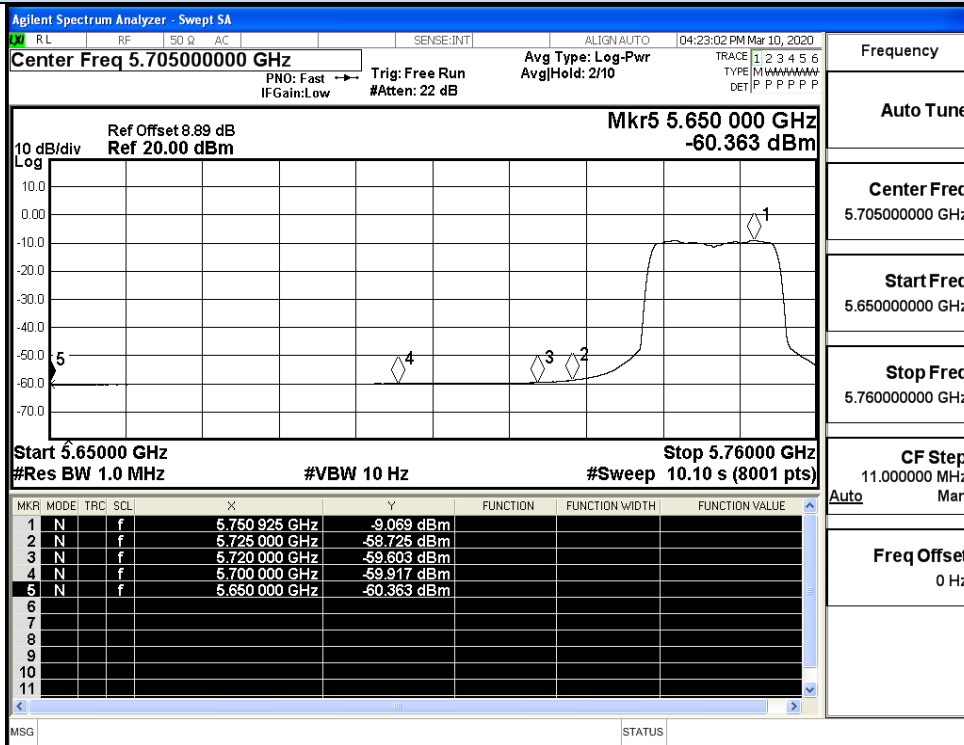
IEEE 802.11n40 / Channel 159 / 5795MHz / Peak



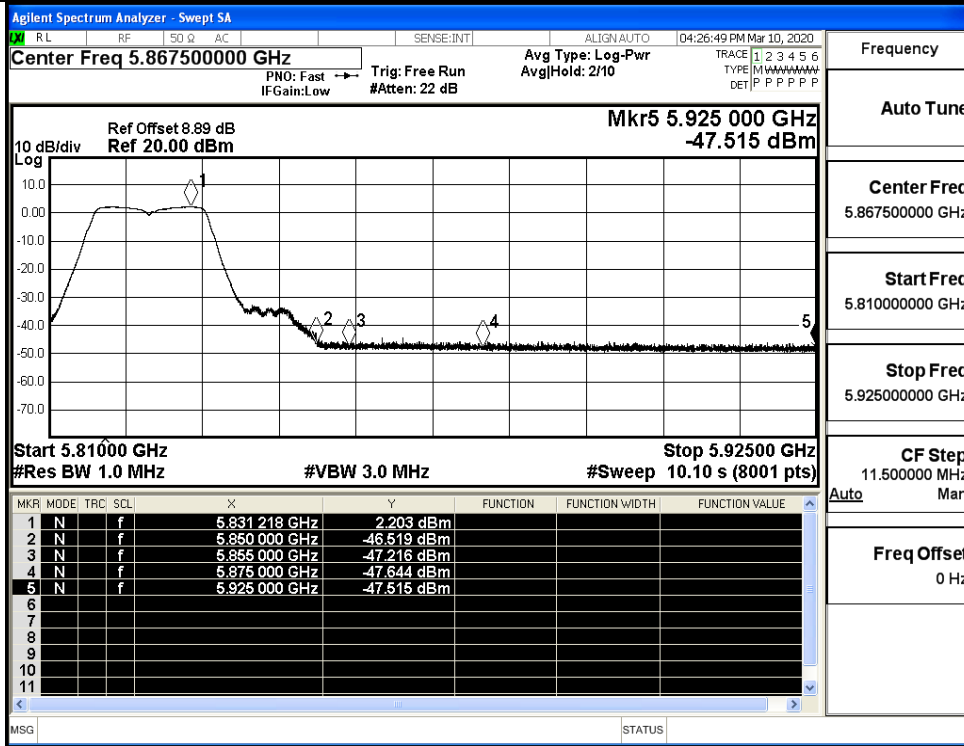
IEEE 802.11n40 / Channel 159 / 5795MHz / Average



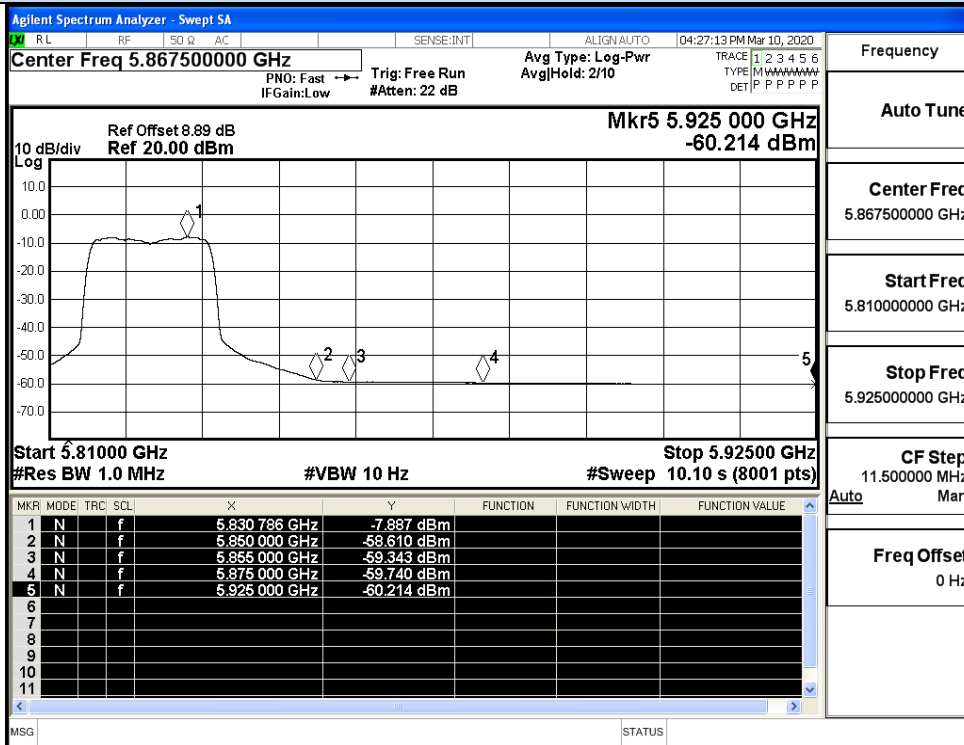
IEEE 802.11ac20 / Channel 149 / 5745MHz / Peak



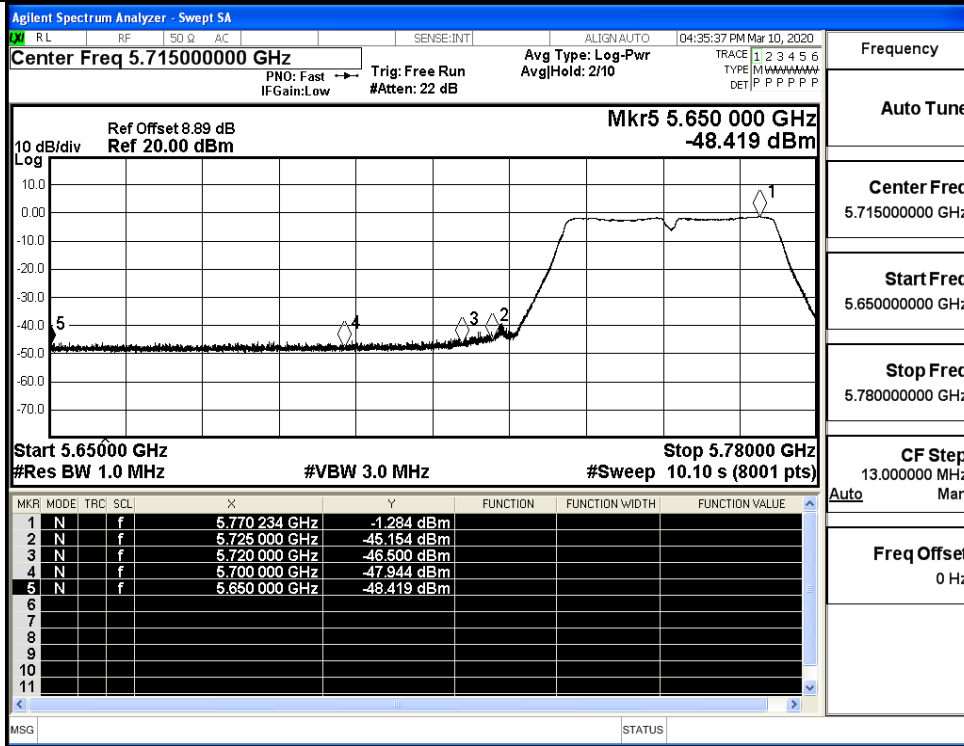
IEEE 802.11ac20 / Channel 149 / 5745MHz / Average



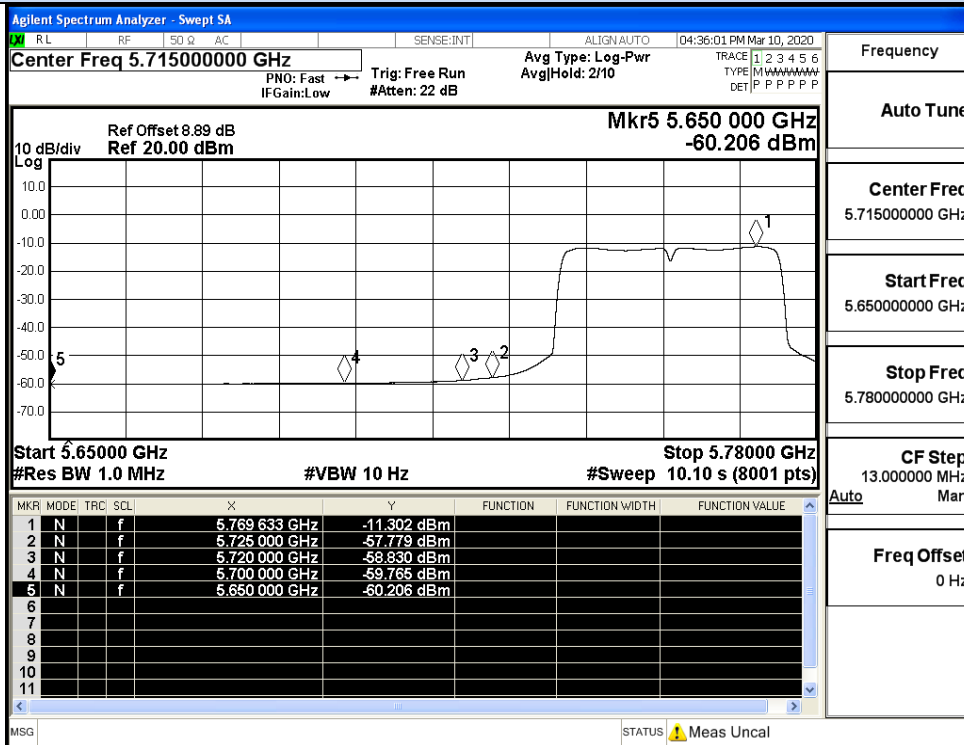
IEEE 802.11ac20 / Channel 165 / 5825MHz / Peak



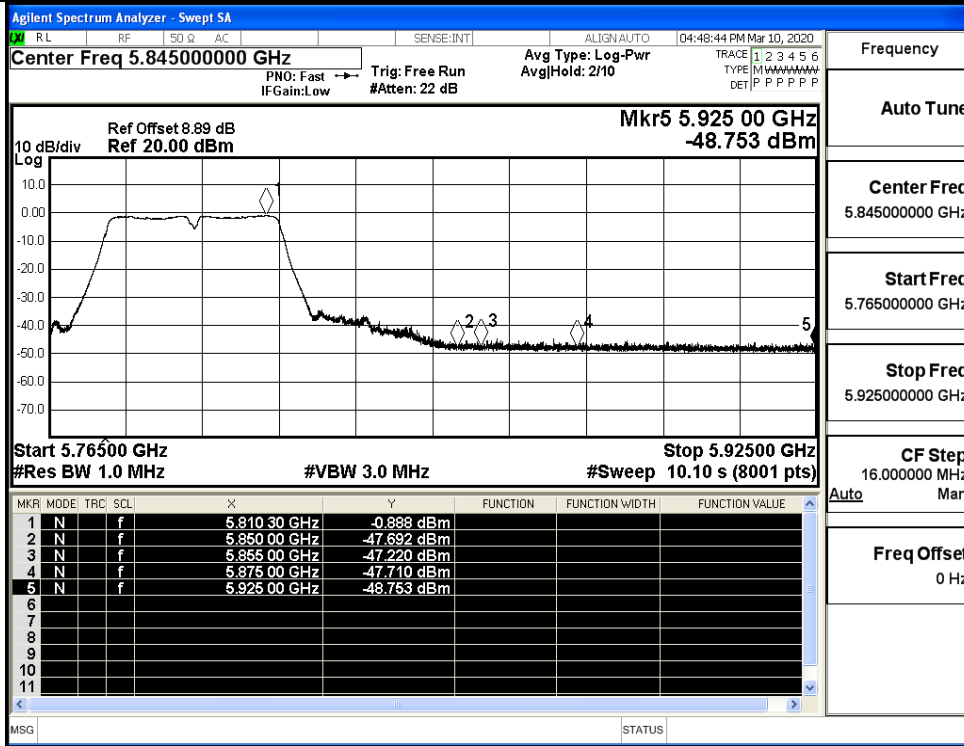
IEEE 802.11ac20 / Channel 165 / 5825MHz / Average



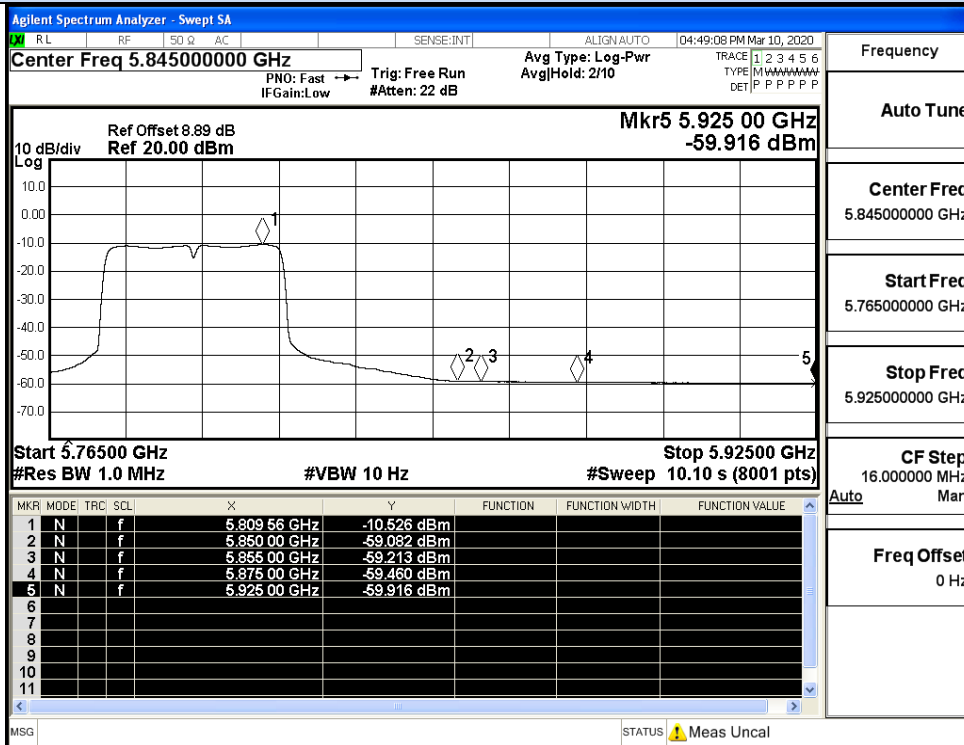
IEEE 802.11ac40 / Channel 151 / 5755MHz / Peak



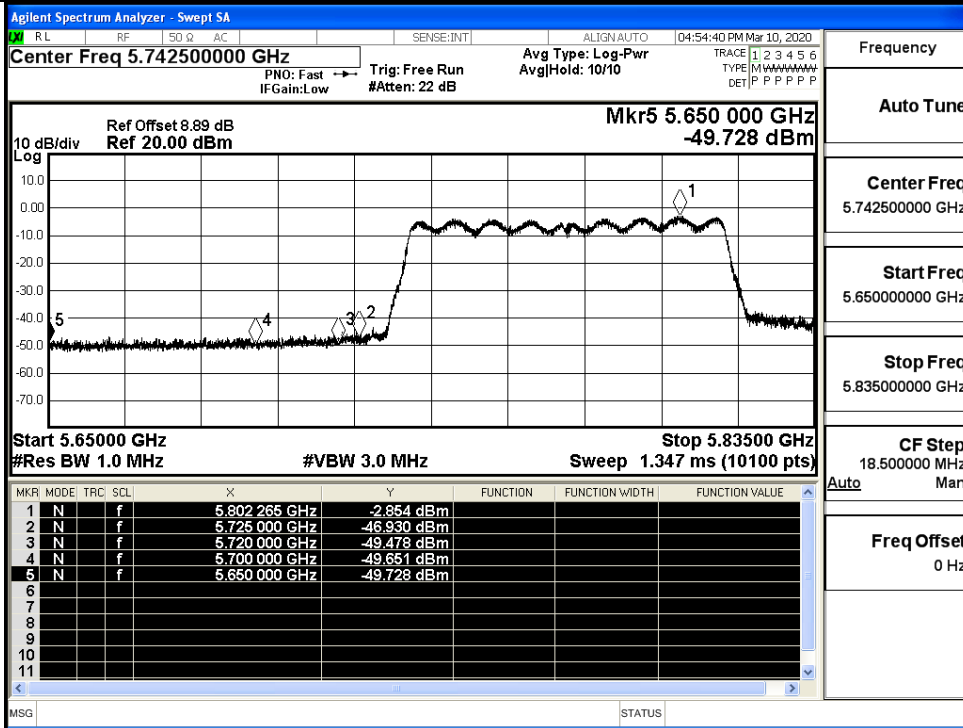
IEEE 802.11ac40 / Channel 151 / 5755MHz / Average



IEEE 802.11ac40 / Channel 159 / 5795MHz / Peak

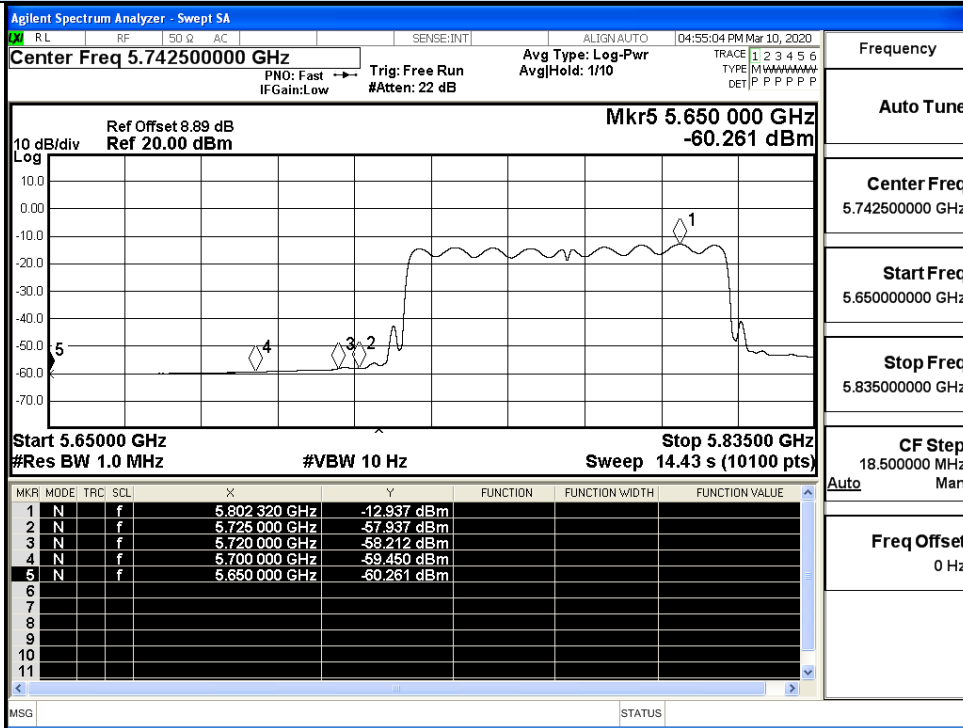


IEEE 802.11ac40 / Channel 159 / 5795MHz / Average



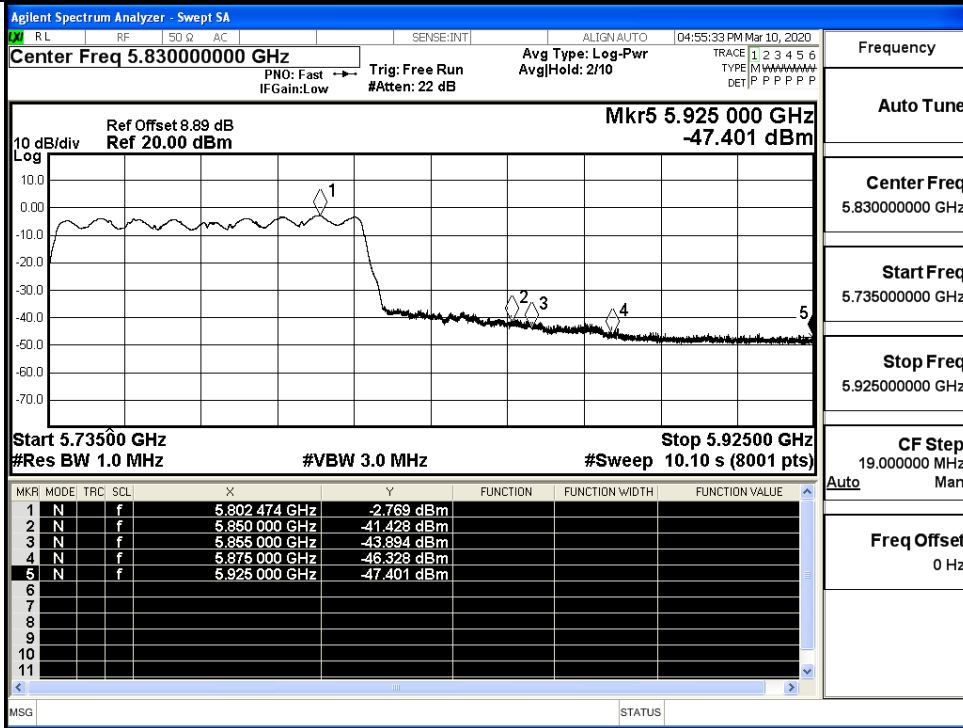
Frequency	
Auto Tune	
Center Freq	5.742500000 GHz
Start Freq	5.650000000 GHz
Stop Freq	5.835000000 GHz
CF Step	18.500000 MHz
Auto	Man
Freq Offset	0 Hz

IEEE 802.11ac80 / Channel 155 / 5775MHz / Peak

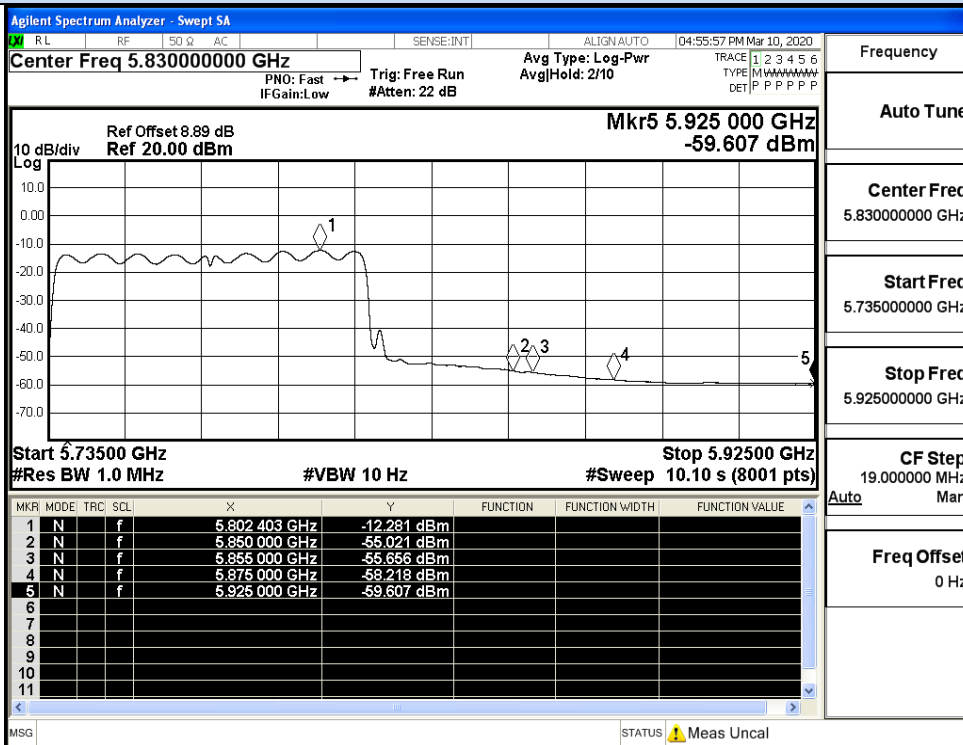


Frequency	
Auto Tune	
Center Freq	5.742500000 GHz
Start Freq	5.650000000 GHz
Stop Freq	5.835000000 GHz
CF Step	18.500000 MHz
Auto	Man
Freq Offset	0 Hz

IEEE 802.11ac80 / Channel 155 / 5775MHz / Average



IEEE 802.11ac80 / Channel 155 / 5775MHz / Peak



IEEE 802.11ac80 / Channel 155 / 5775MHz / Average