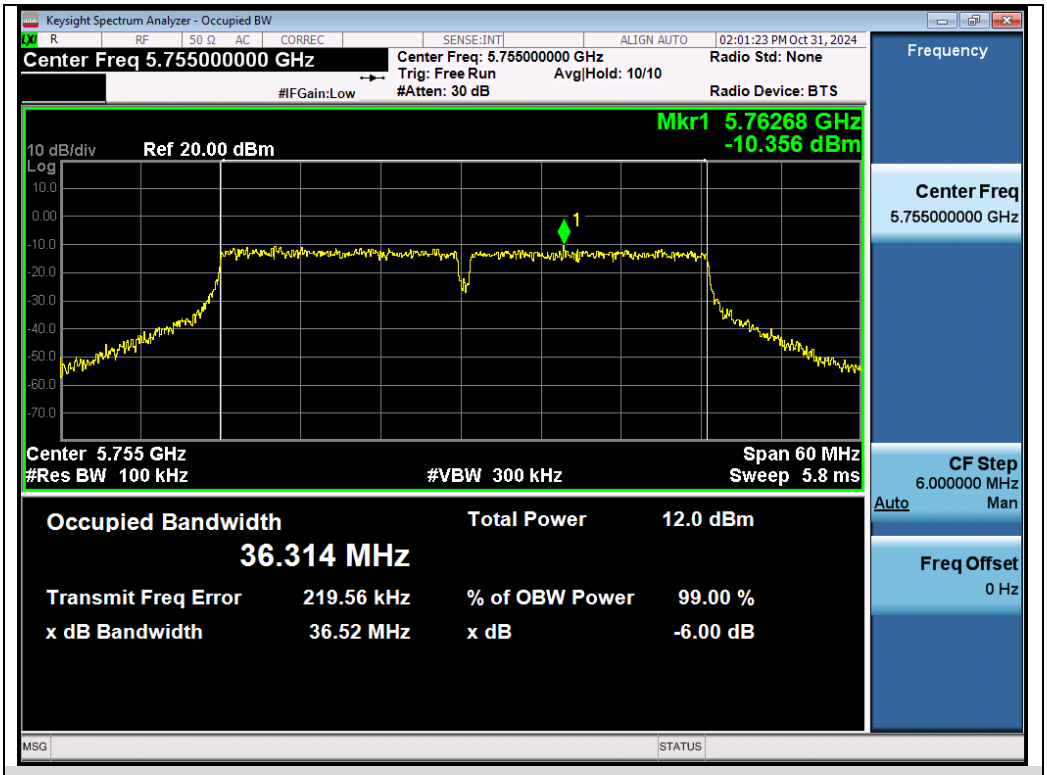
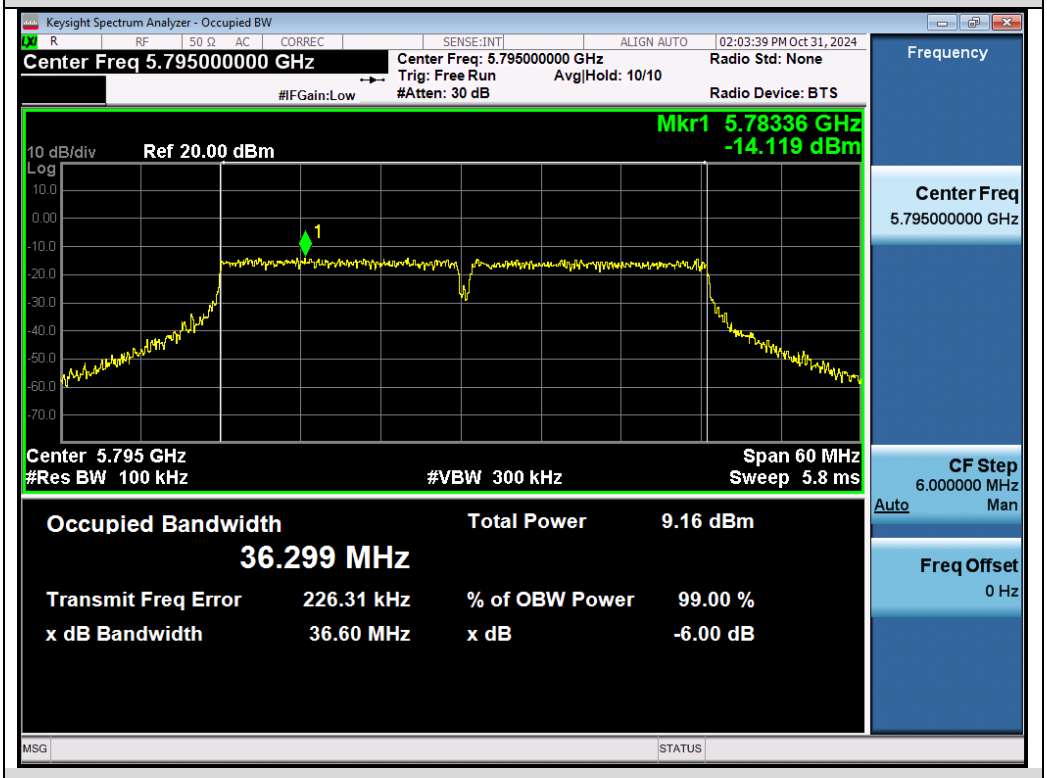
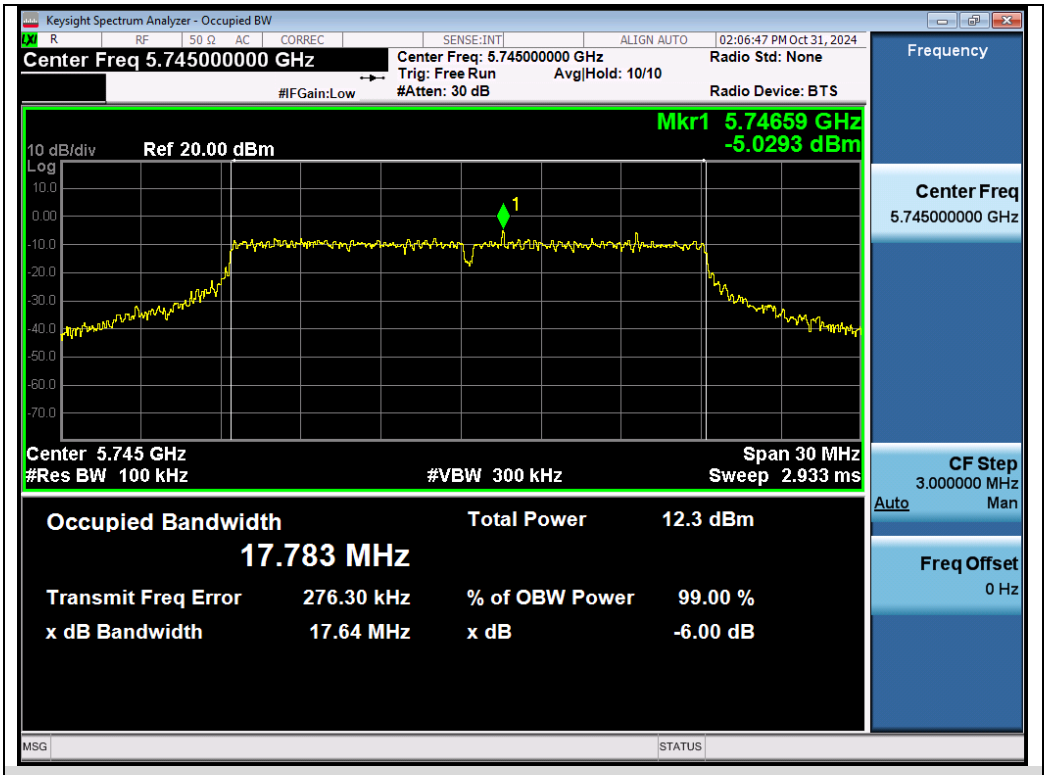


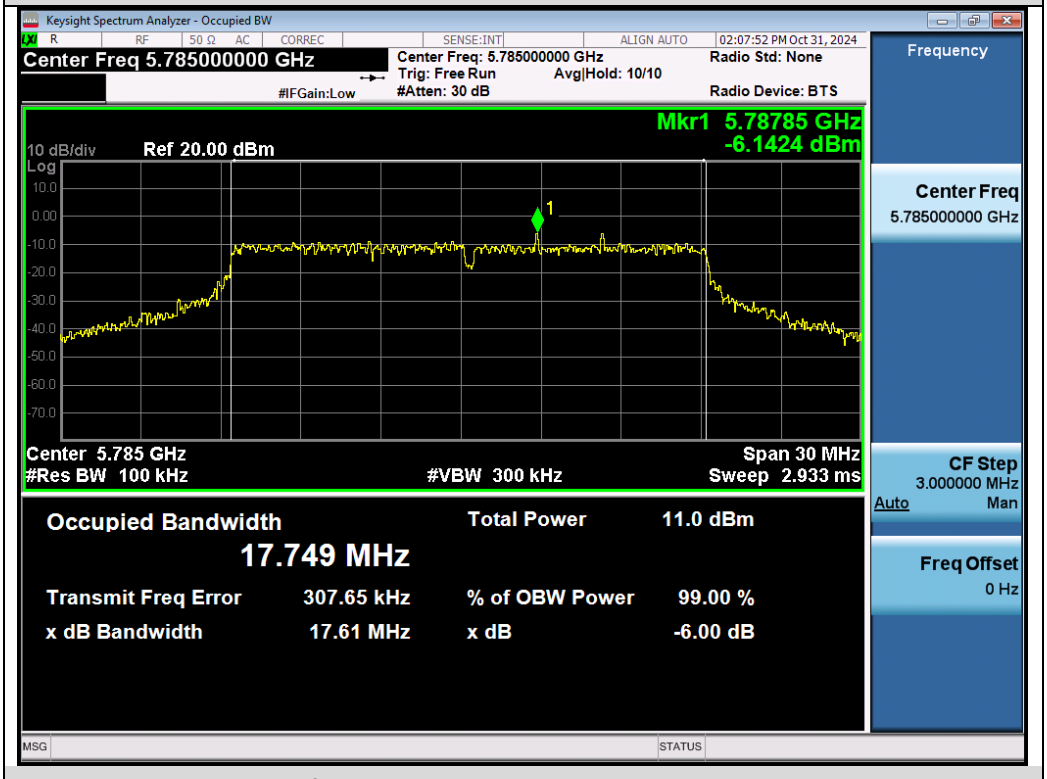
Test_Graph_802.11n40_ANT1_5755_MCS0_DTSBW



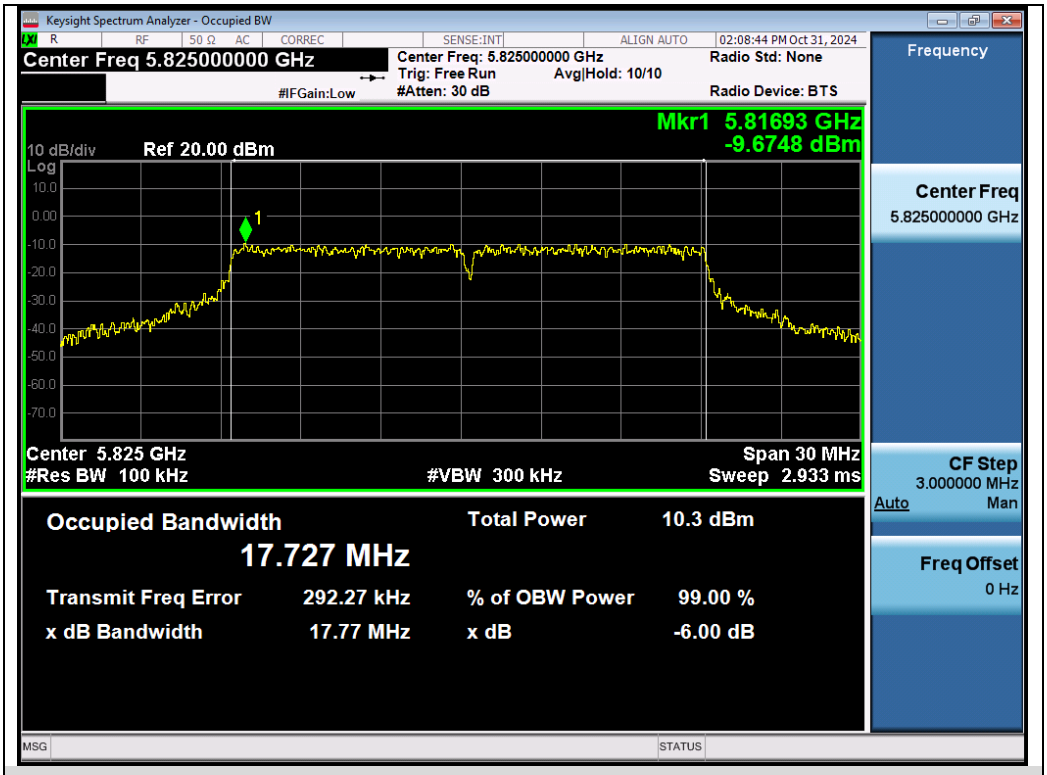
Test_Graph_802.11n40_ANT1_5795_MCS0_DTSBW



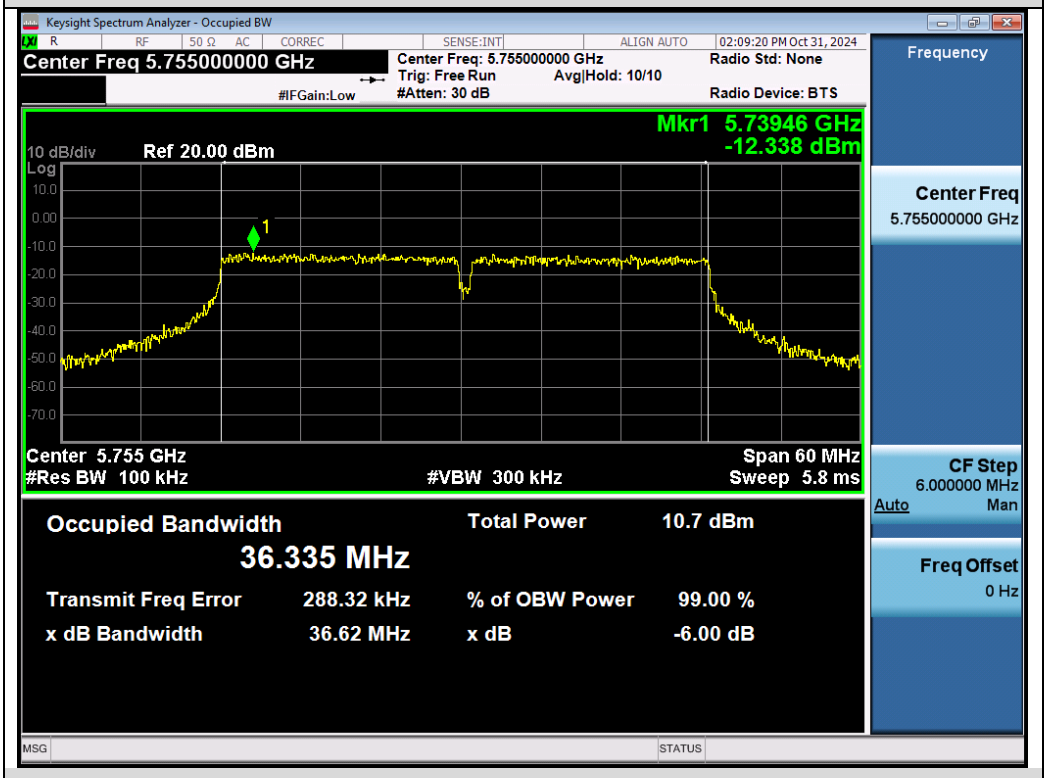
Test_Graph_802.11ac20_ANT1_5745_MCS0_DTSBW



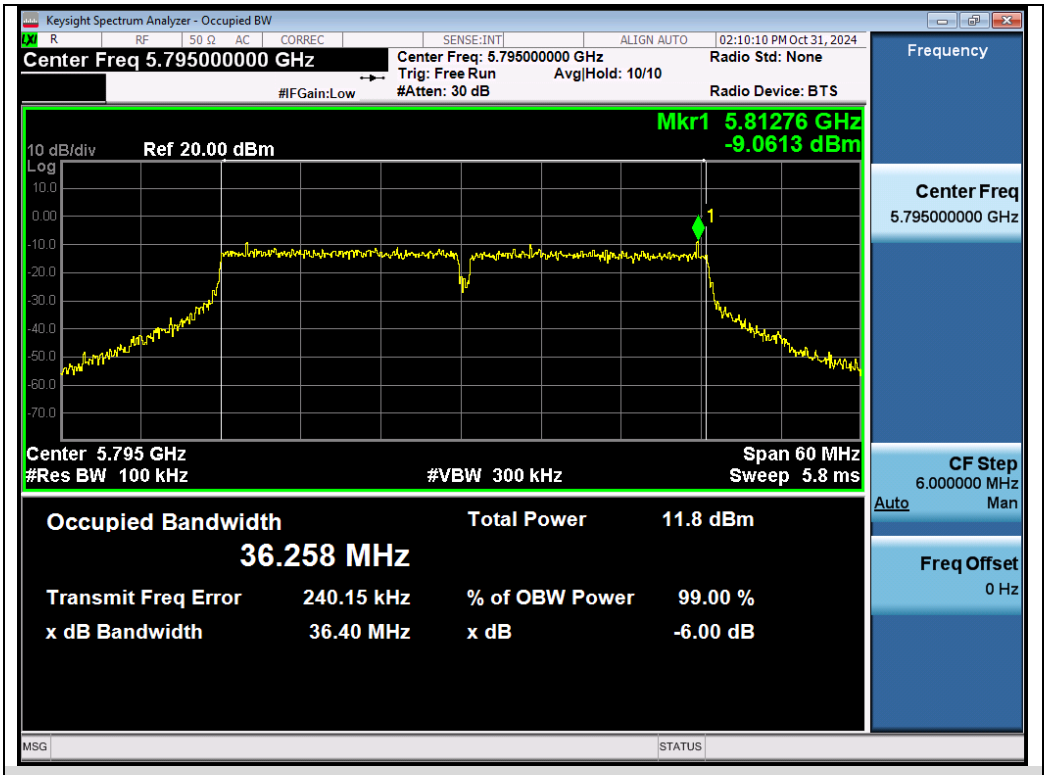
Test_Graph_802.11ac20_ANT1_5785_MCS0_DTSBW



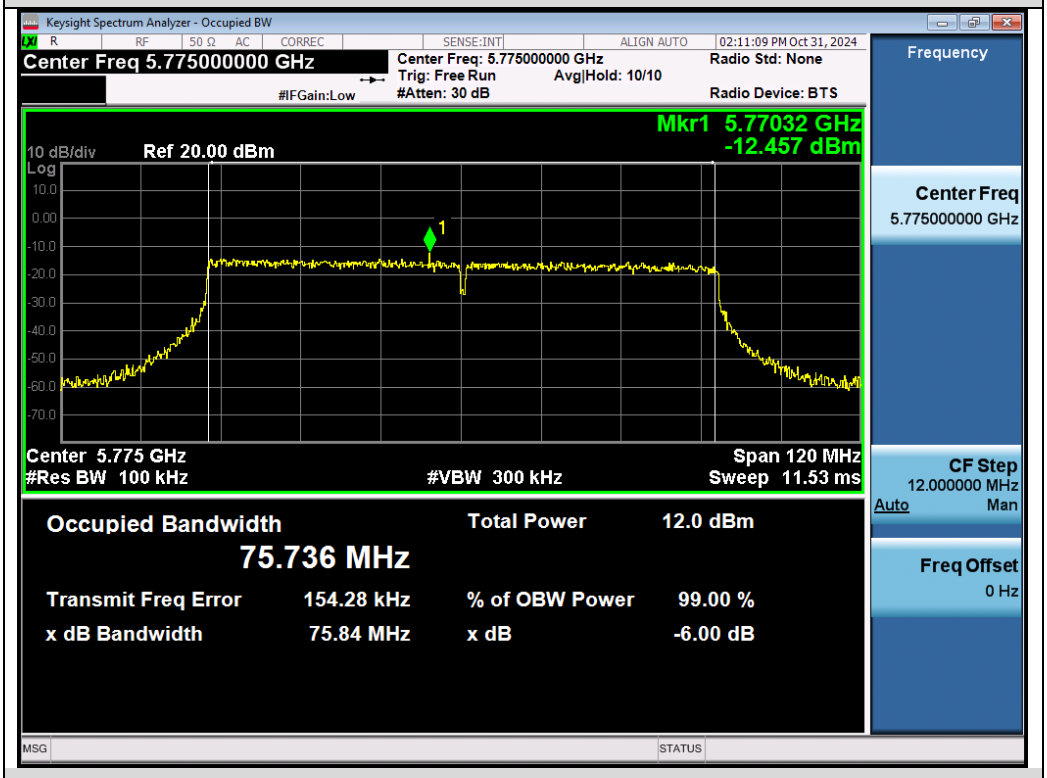
Test_Graph_802.11ac20_ANT1_5825_MCS0_DTSBW



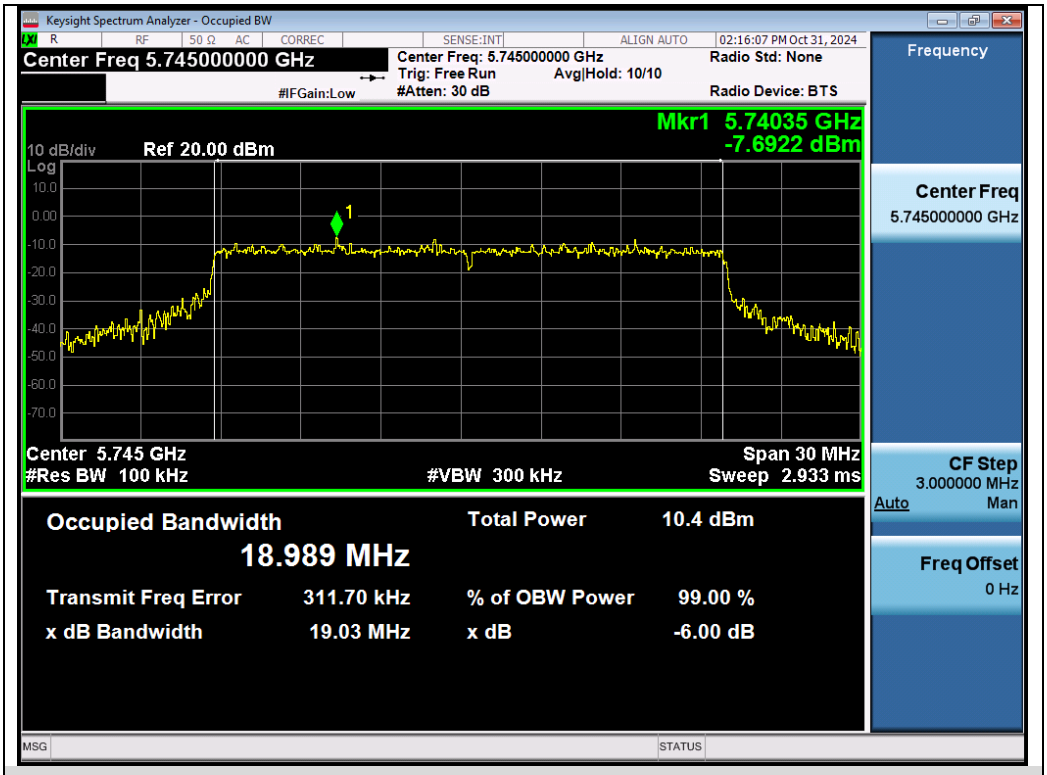
Test_Graph_802.11ac40_ANT1_5755_MCS0_DTSBW



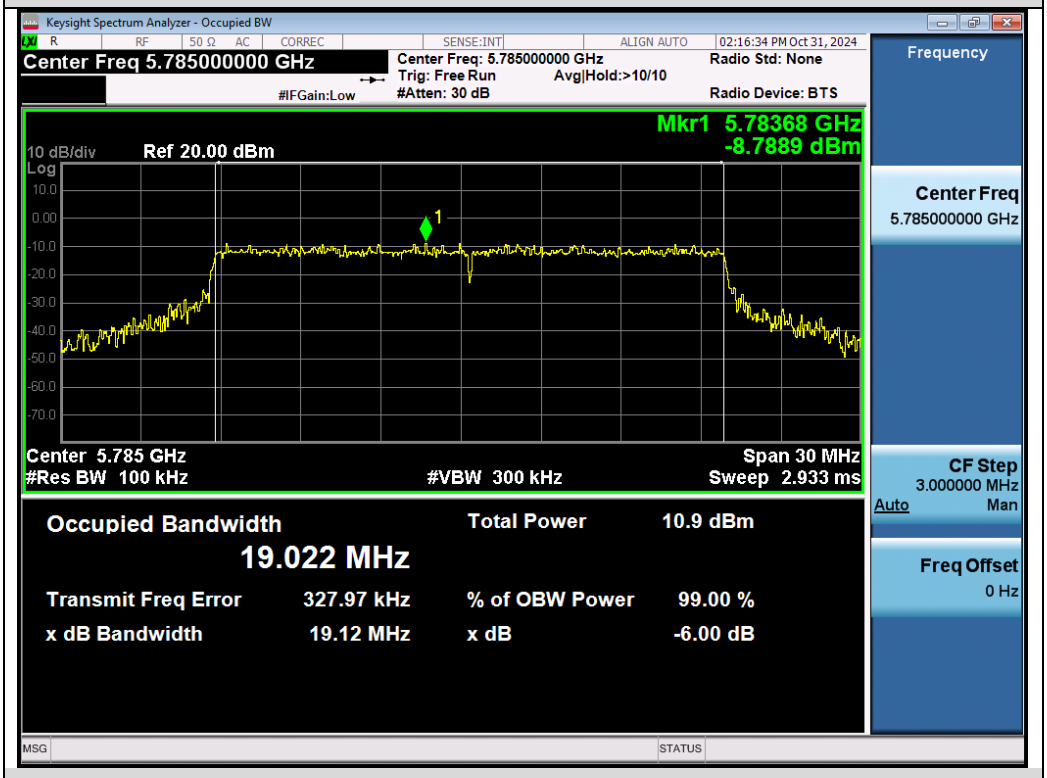
Test_Graph_802.11ac40_ANT1_5795_MCS0_DTSBW



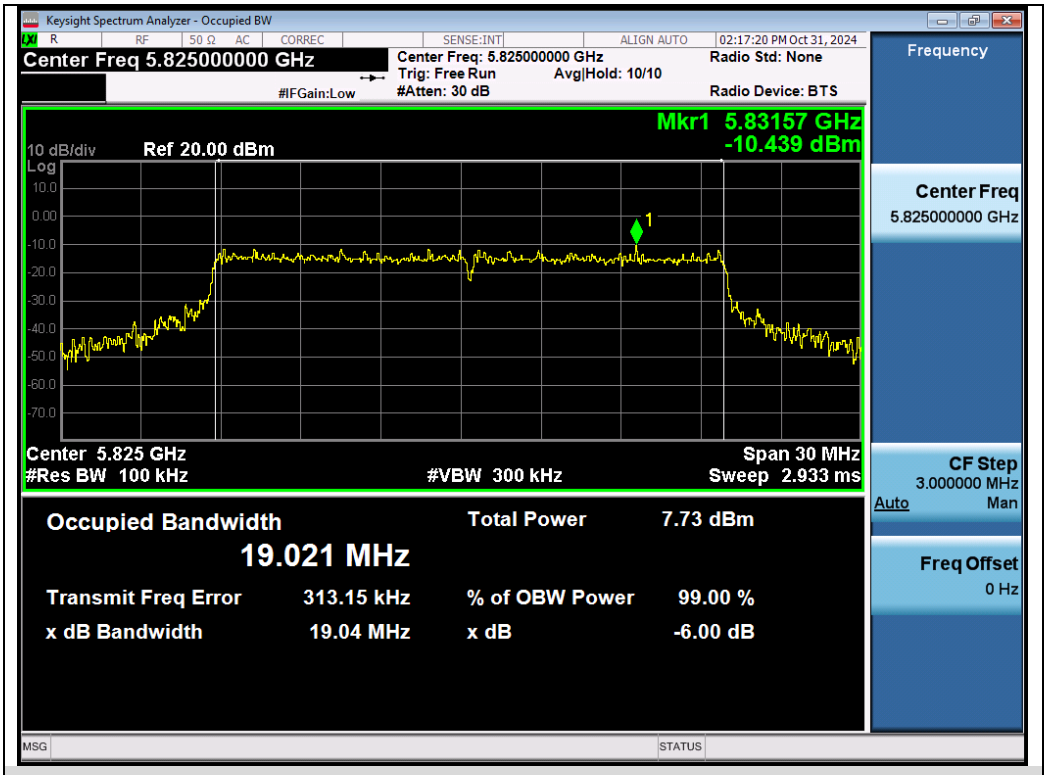
Test_Graph_802.11ac80_ANT1_5775_MCS0_DTSBW



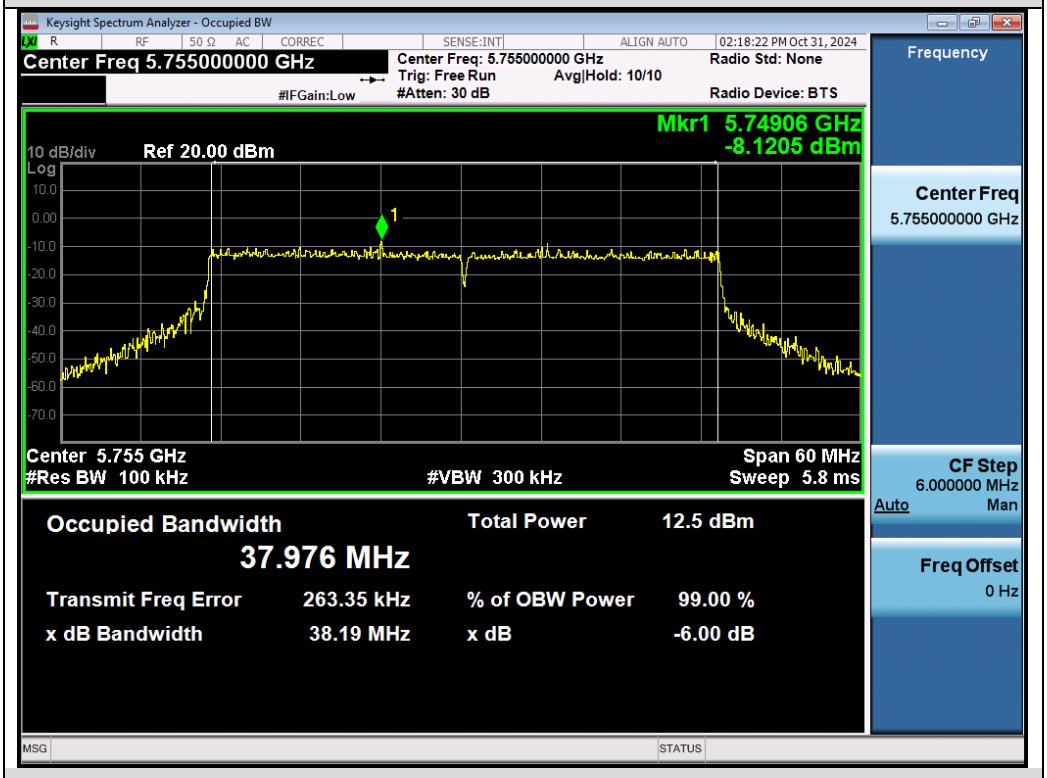
Test_Graph_802.11ax20_ANT1_5745_MCS0_DTSBW



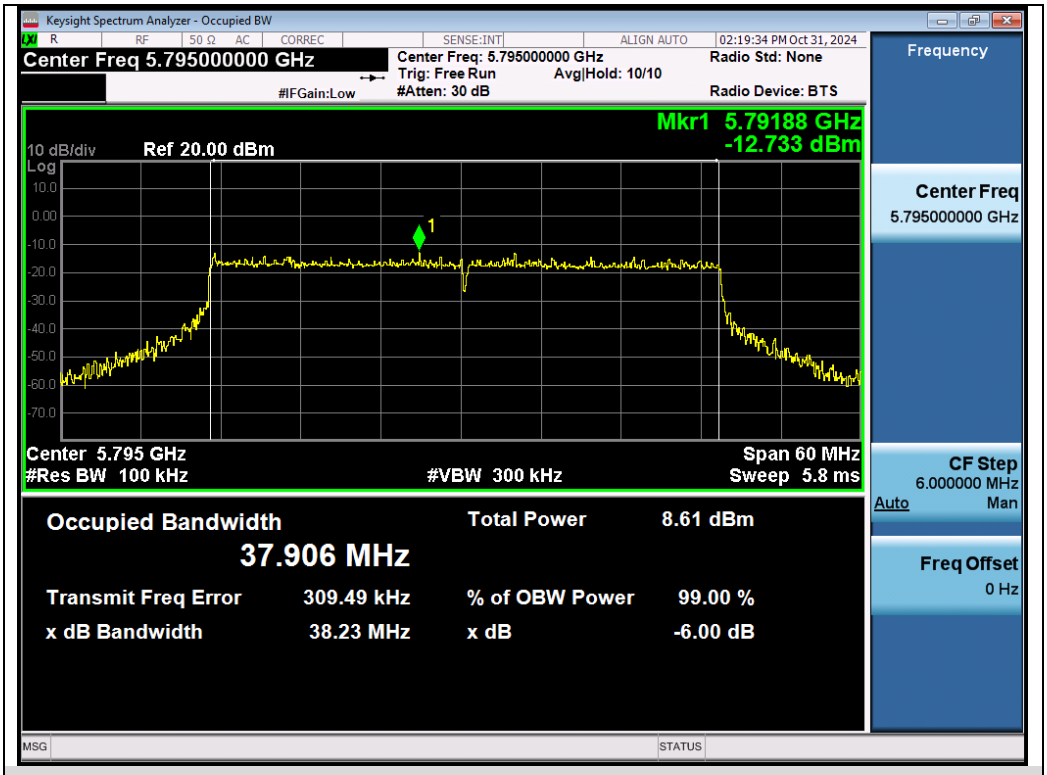
Test_Graph_802.11ax20_ANT1_5785_MCS0_DTSBW



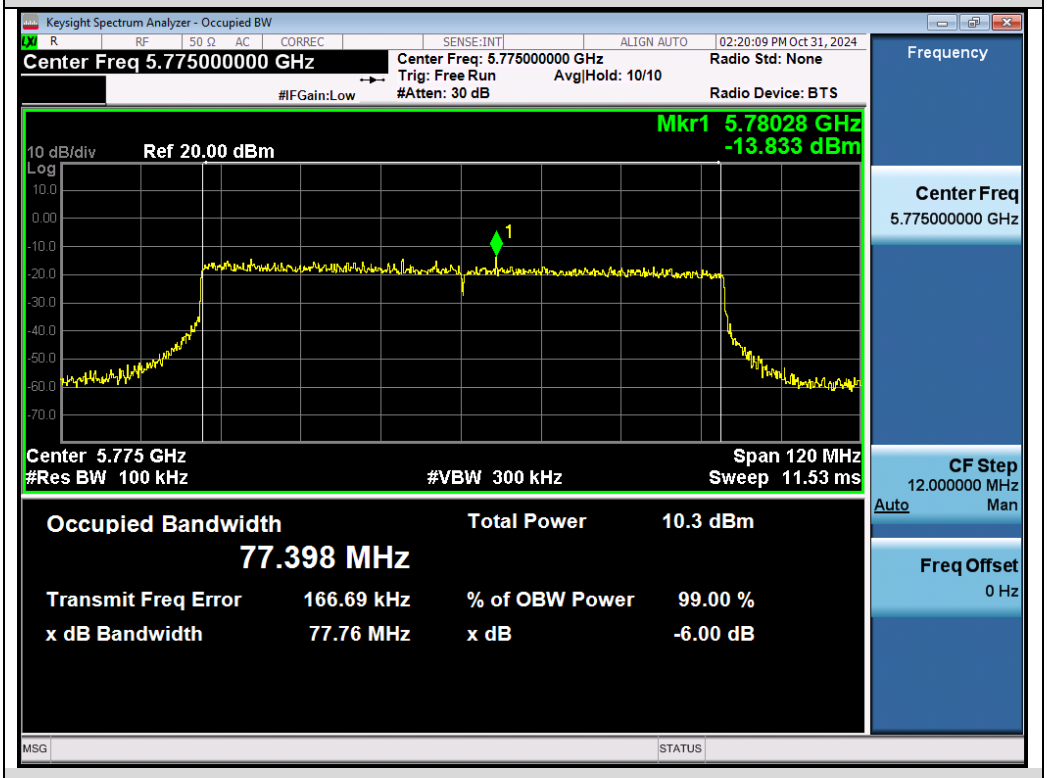
Test_Graph_802.11ax20_ANT1_5825_MCS0_DTSBW



Test_Graph_802.11ax40_ANT1_5755_MCS0_DTSBW



Test_Graph_802.11ax40_ANT1_5795_MCS0_DTSBW



Test_Graph_802.11ax80_ANT1_5775_MCS0_DTSBW

9. Power Spectral Density Measurement

9.1 Provisions Applicable

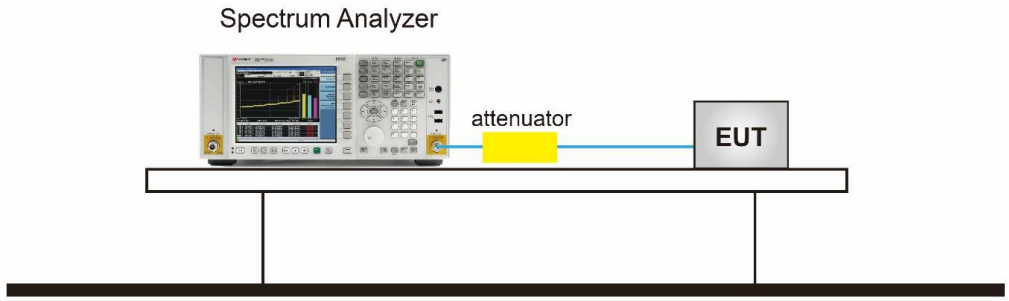
Operation Band	EUT Category		LIMIT
U-NII-1	☐	Outdoor Access Point	17dBm/ MHz
	☐	Fixed point-to-point Access Point	17dBm/ MHz
	☐	Indoor Access Point	17dBm/ MHz
	☒	Client devices	11dBm/ MHz
U-NII-2A	/		11dBm/ MHz
U-NII-2C	/		11dBm/ MHz
U-NII-3	/		30 dBm/500kHz

9.2 Measurement Procedure

☒For Average power spectral density test:

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator.
2. Span was set to encompass the entire 26dB EBW of the signal.
3. RBW = 1MHz.
4. If measurement bandwidth of Maximum PSD is specified in 500 kHz, RBW = 100KHz
5. Set VBW≥[3×RBW].
6. Sweep Time=Auto couple.
7. Detector function=RMS (i.e., power averaging).
8. Trace average at least 100 traces in power averaging (rms) mode.
9. When the measurement bandwidth of Maximum PSD is specified in 100 kHz, add a constant factor 10*log(500kHz/100kHz) = 6.99 dB to the measured result.
10. Determine according to the duty cycle of the equipment: when it is less than 98%, follow the steps below.
11. Add [10 log (1/D)], where D is the duty cycle, to the measured power to compute the average power during the actual transmission times (because the measurement represents an average over both the ON and OFF times of the transmission). For example, add [10 log (1/0.25)] = 6 dB if the duty cycle is 25%.
12. The final test results have been increased by the duty cycle factor and recorded in the report

9.3 Measurement Setup (Block Diagram of Configuration)



9.4 Measurement Result

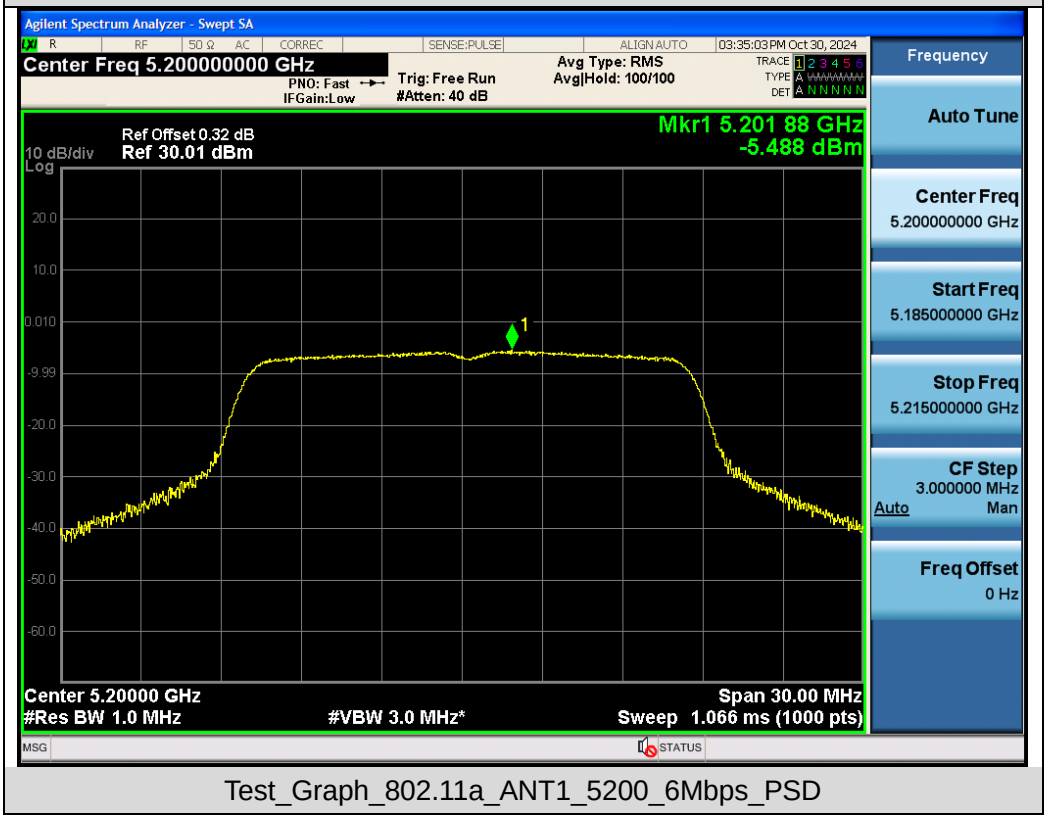
Test Data of Conducted Output Power Density for band 5.15-5.25 GHz				
Test Mode	Test Channel (MHz)	Average Power Density (dBm/MHz)	Limits (dBm/MHz)	Pass or Fail
802.11a	5180	-3.668	11	Pass
	5200	-5.488	11	Pass
	5240	-5.390	11	Pass
802.11n20	5180	-4.279	11	Pass
	5200	-4.664	11	Pass
	5240	-4.002	11	Pass
802.11n40	5190	-6.853	11	Pass
	5230	-7.027	11	Pass
802.11ac20	5180	-4.649	11	Pass
	5200	-4.864	11	Pass
	5240	-4.879	11	Pass
802.11ac40	5190	-8.448	11	Pass
	5230	-7.754	11	Pass
802.11ac80	5210	-11.808	11	Pass
802.11ax20	5180	-4.269	11	Pass
	5200	-5.000	11	Pass
	5240	-4.986	11	Pass
802.11ax40	5190	-8.103	11	Pass
	5230	-8.359	11	Pass
802.11ax80	5210	-11.808	11	Pass

Test Data of Conducted Output Power Density for band 5.725-5.85 GHz					
Test Mode	Test Channel (MHz)	Average Power Density (dBm/100kHz)	Average Power Density (dBm/500kHz)	Limits (dBm/500kHz)	Pass or Fail
802.11a	5745	-13.155	-6.165	30	Pass
	5785	-14.105	-7.115	30	Pass
	5825	-16.461	-9.471	30	Pass
802.11n20	5745	-13.676	-6.686	30	Pass
	5785	-17.224	-10.234	30	Pass
	5825	-15.230	-8.240	30	Pass
802.11n40	5755	-19.388	-12.398	30	Pass
	5795	-20.299	-13.309	30	Pass
802.11ac20	5745	-16.289	-9.299	30	Pass
	5785	-14.485	-7.495	30	Pass
	5825	-16.681	-9.691	30	Pass
802.11ac40	5755	-20.630	-13.640	30	Pass
	5795	-17.700	-10.710	30	Pass
802.11ac80	5775	-23.341	-16.351	30	Pass
802.11ax20	5745	-22.071	-11.690	30	Pass
	5785	-18.680	-10.919	30	Pass
	5825	-17.909	-11.082	30	Pass
802.11ax40	5755	-18.072	-13.125	30	Pass
	5795	-20.1150	-14.500	30	Pass
802.11ax80	5775	-21.490	-16.351	30	Pass

Note:1.Power density(dBm/500kHz) = Power density(dBm/100kHz)+10*log(500/100).

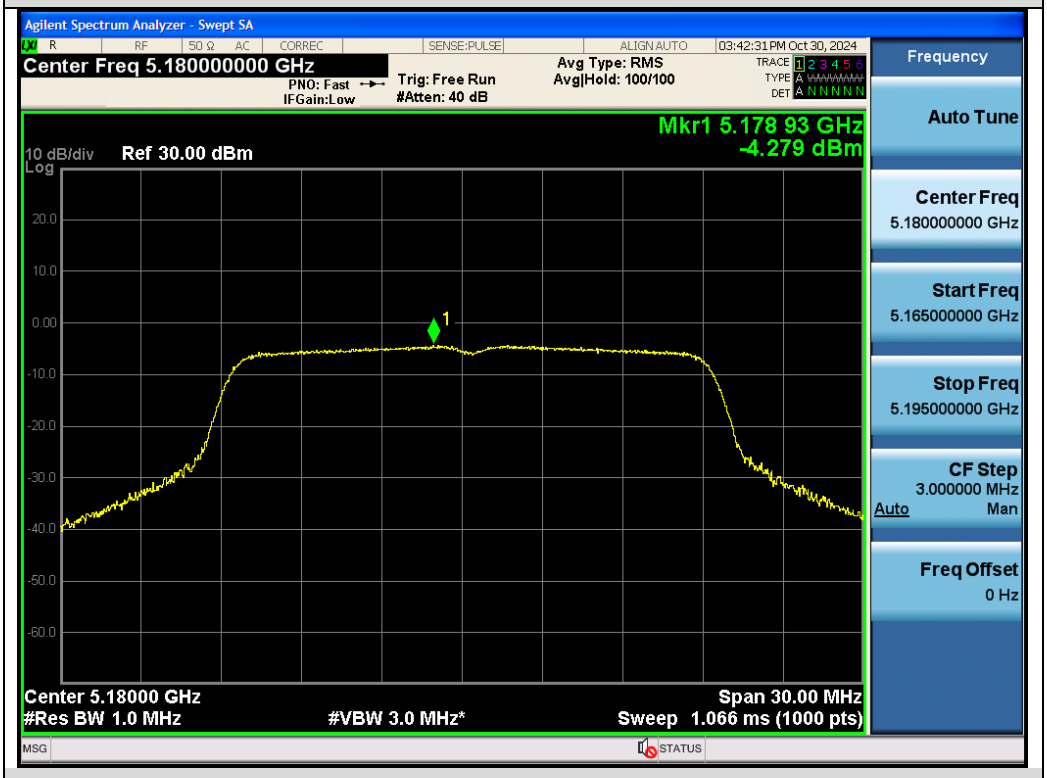
Test Graphs of Conducted Output Power Spectral Density for band 5.15-5.25 GHz

Test_Graph_802.11a_ANT1_5180_6Mbps_PSD



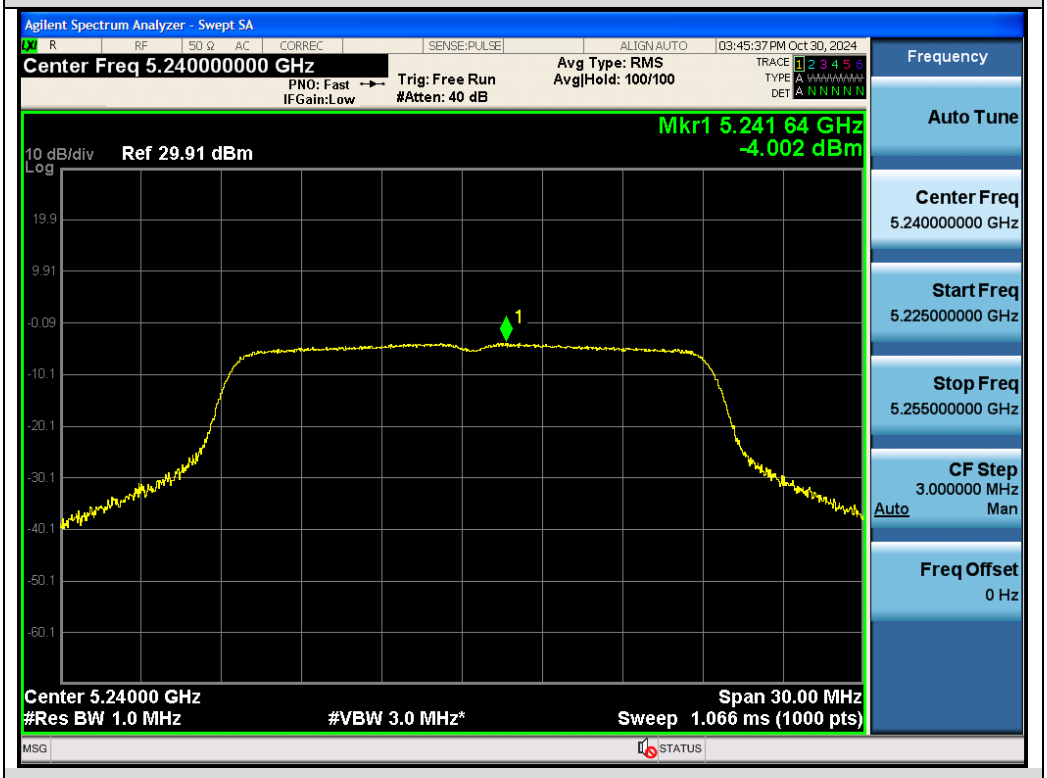
Test_Graph_802.11a_ANT1_5200_6Mbps_PSD

Test_Graph_802.11a_ANT1_5240_6Mbps_PSD

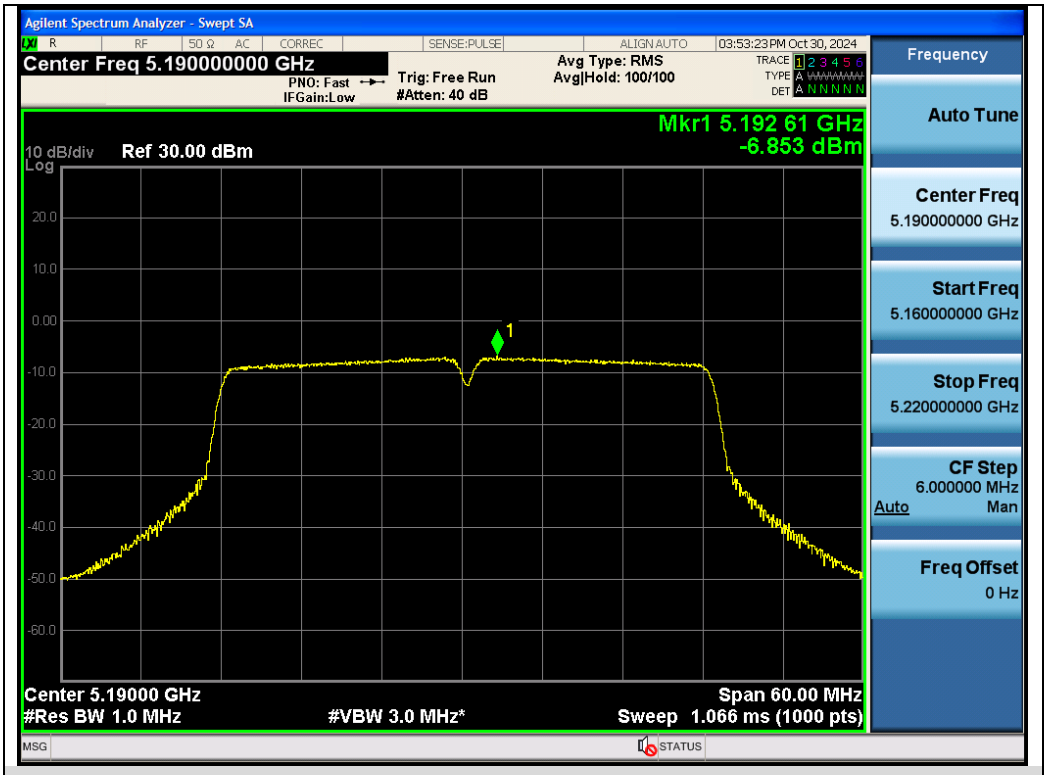


Test_Graph_802.11n20_ANT1_5180_MCS0_PSD

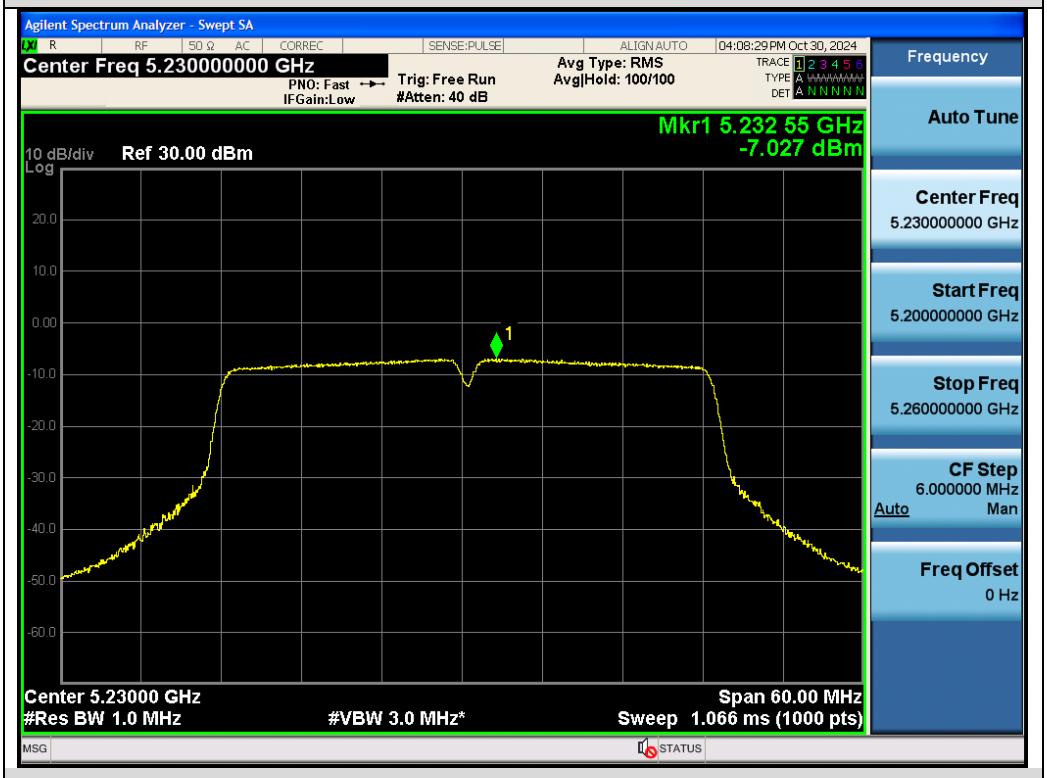
Test_Graph_802.11n20_ANT1_5200_MCS0_PSD



Test_Graph_802.11n20_ANT1_5240_MCS0_PSD

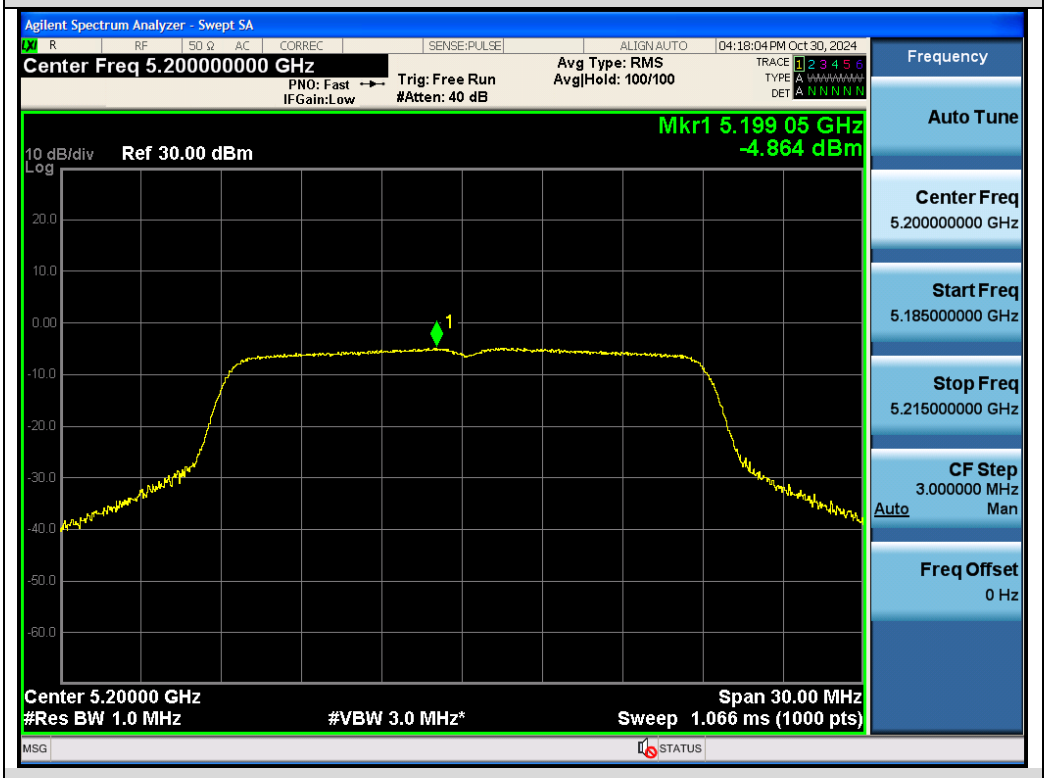


Test_Graph_802.11n40_ANT1_5190_MCS0_PSD

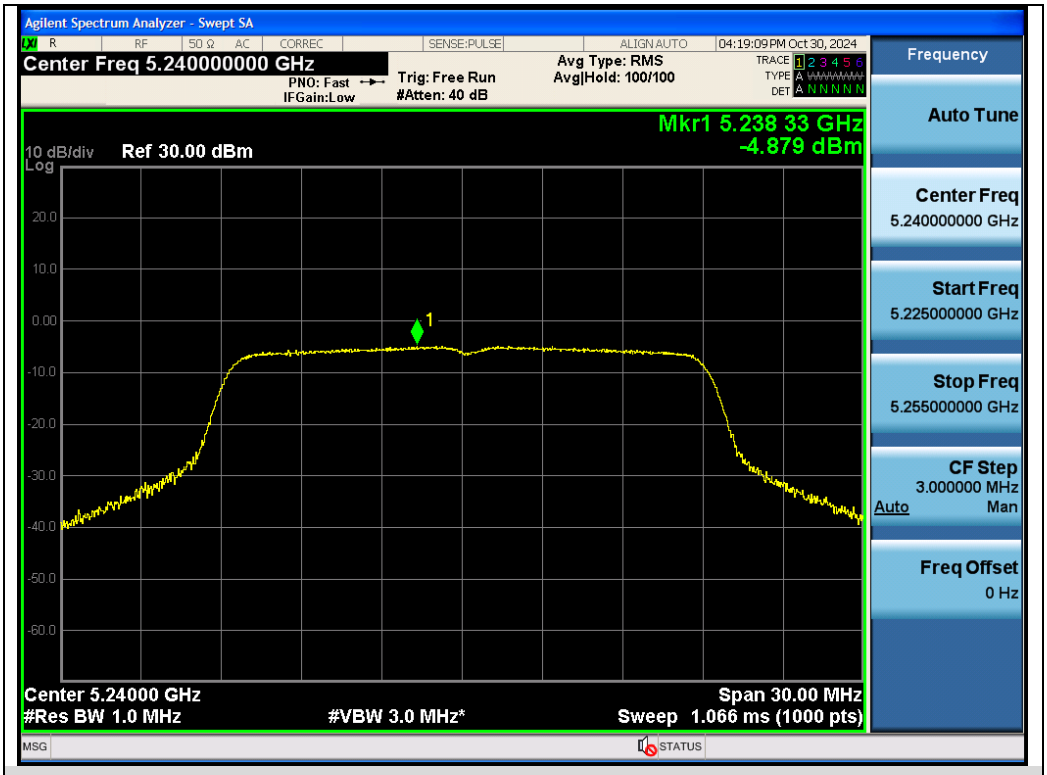


Test_Graph_802.11n40_ANT1_5230_MCS0_PSD

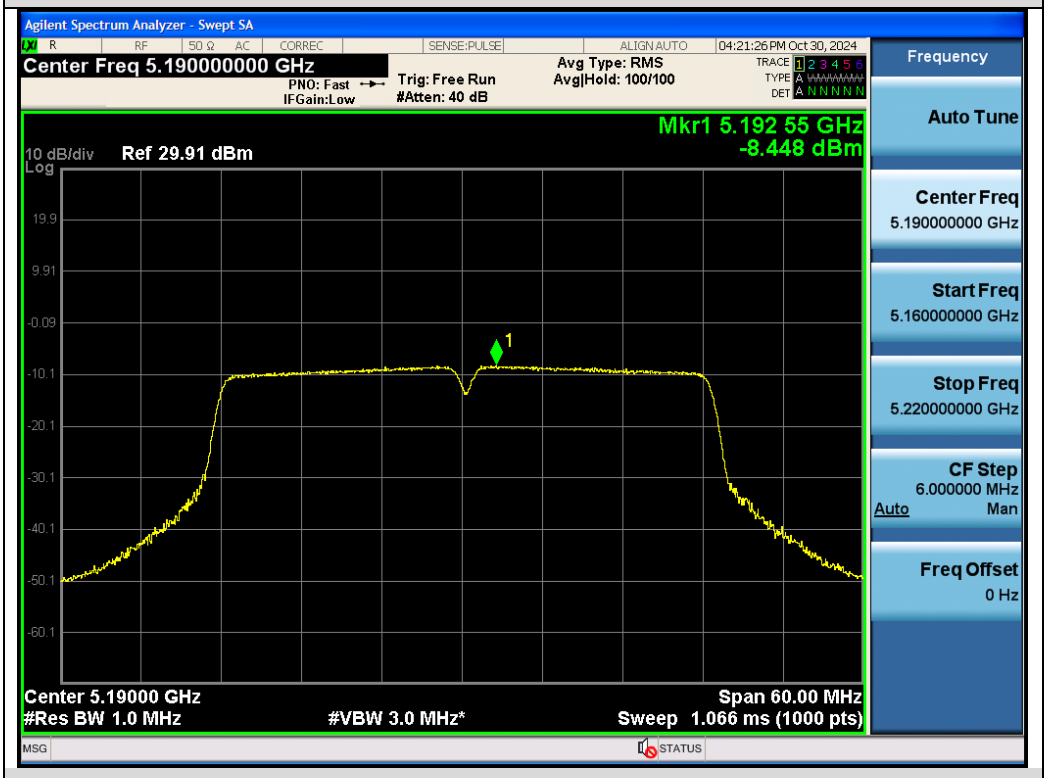
Test_Graph_802.11ac20_ANT1_5180_MCS0_PSD



Test_Graph_802.11ac20_ANT1_5200_MCS0_PSD

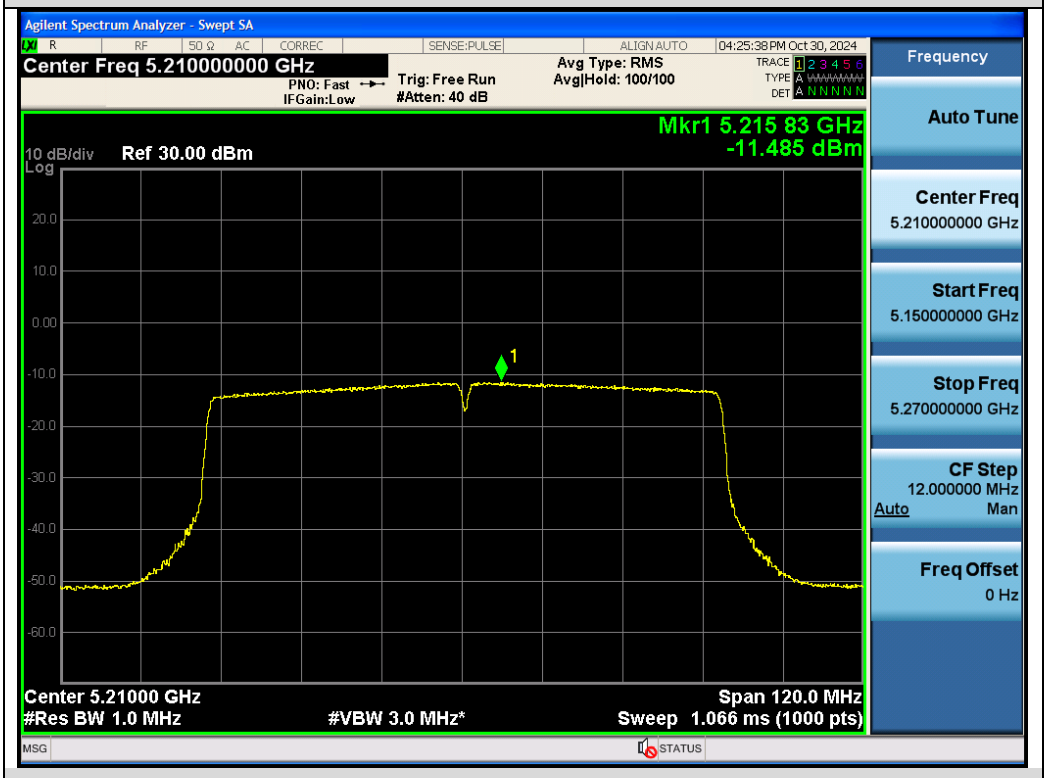


Test_Graph_802.11ac20_ANT1_5240_MCS0_PSD



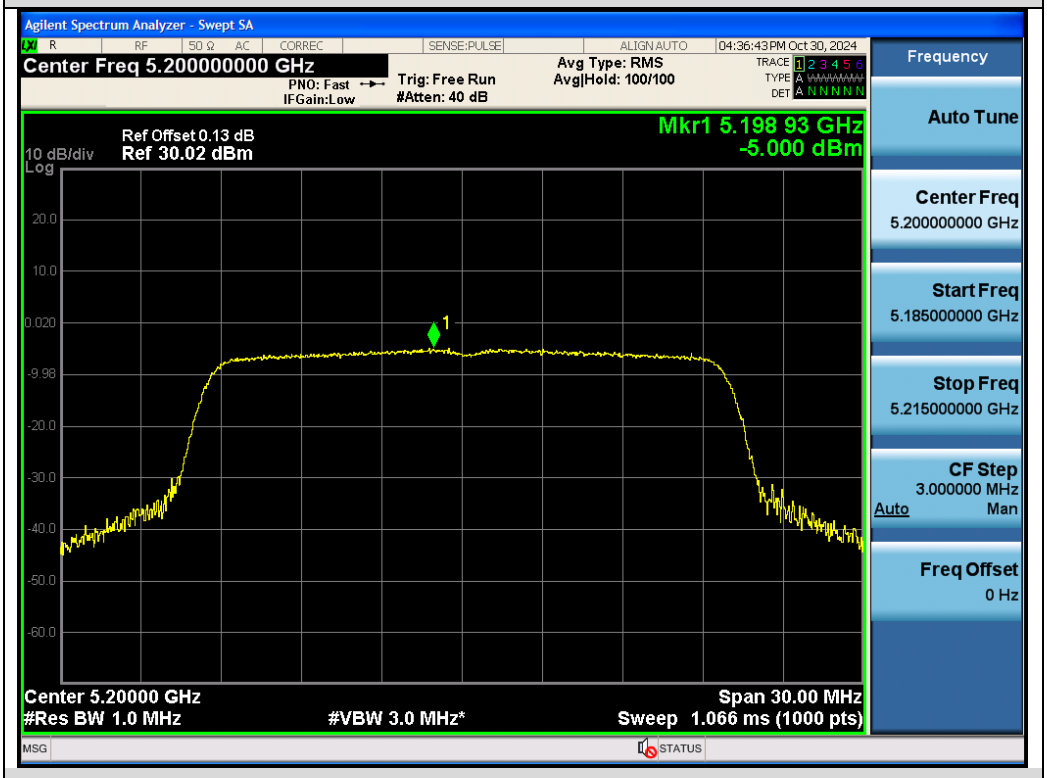
Test_Graph_802.11ac40_ANT1_5190_MCS0_PSD

Test_Graph_802.11ac40_ANT1_5230_MCS0_PSD



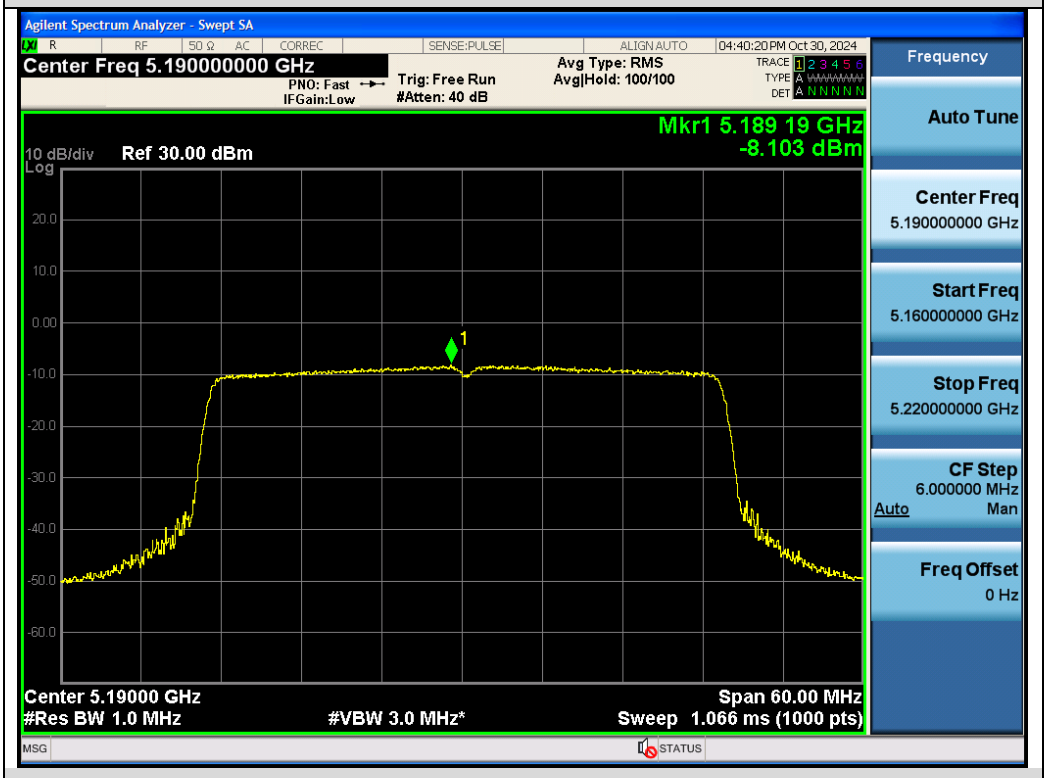
Test_Graph_802.11ac80_ANT1_5210_MCS0_PSD

Test_Graph_802.11ax20_ANT1_5180_MCS0_PSD

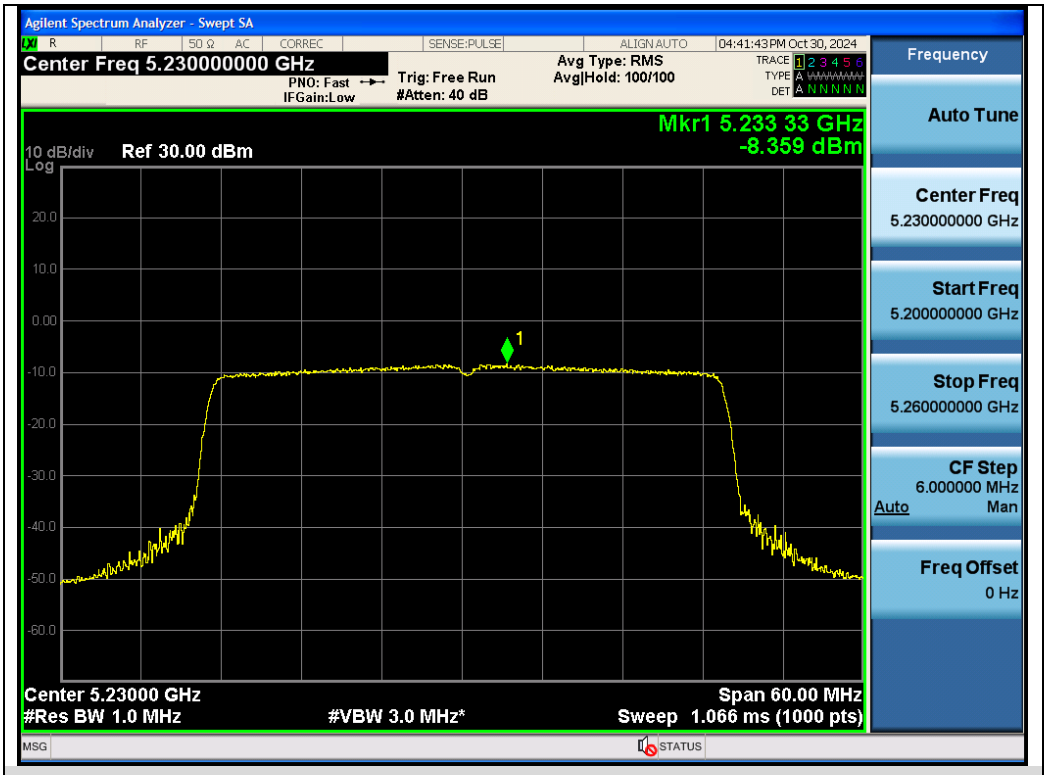


Test_Graph_802.11ax20_ANT1_5200_MCS0_PSD

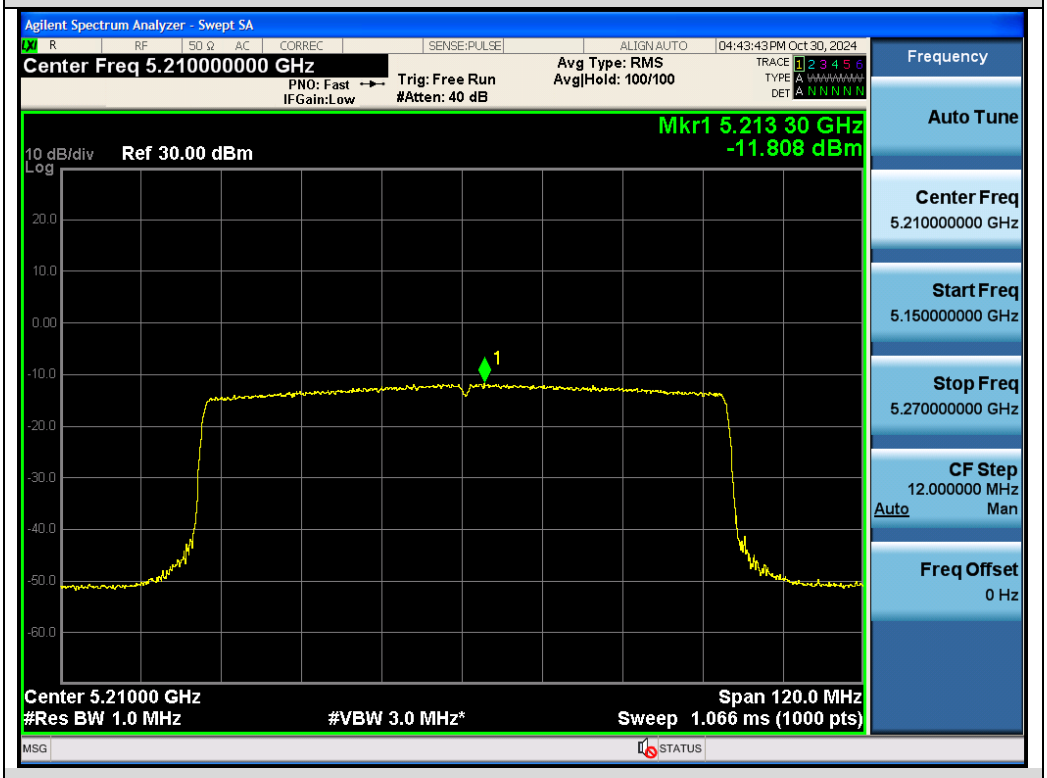
Test_Graph_802.11ax20_ANT1_5240_MCS0_PSD



Test_Graph_802.11ax40_ANT1_5190_MCS0_PSD

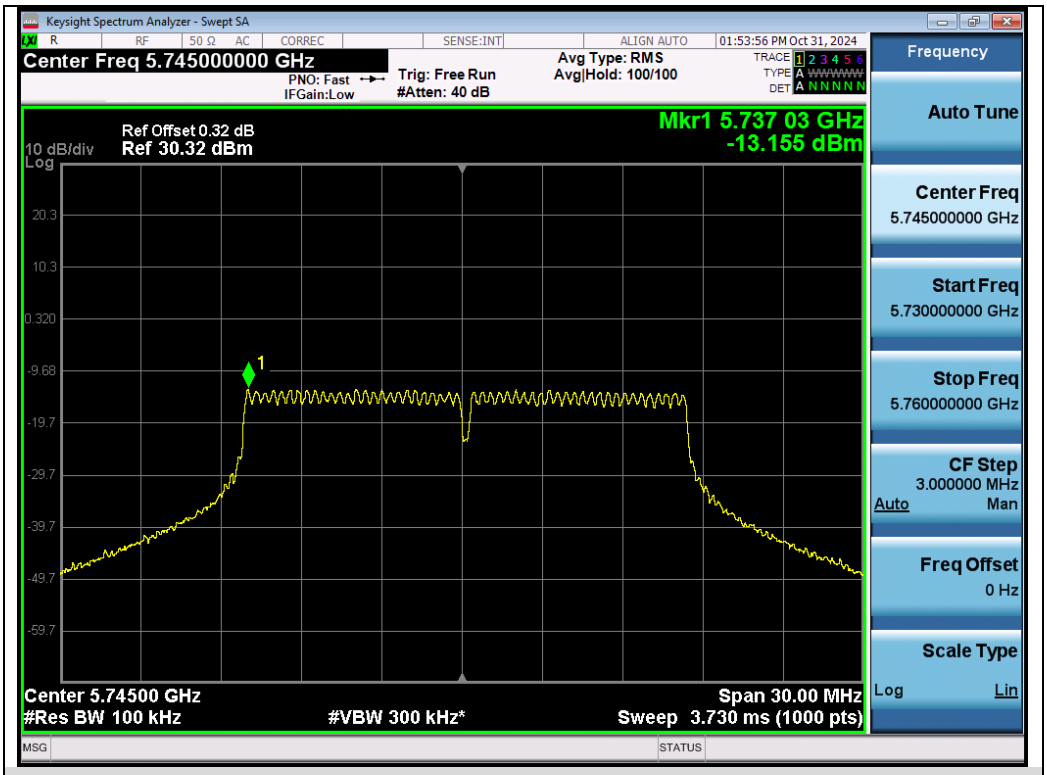


Test_Graph_802.11ax40_ANT1_5230_MCS0_PSD

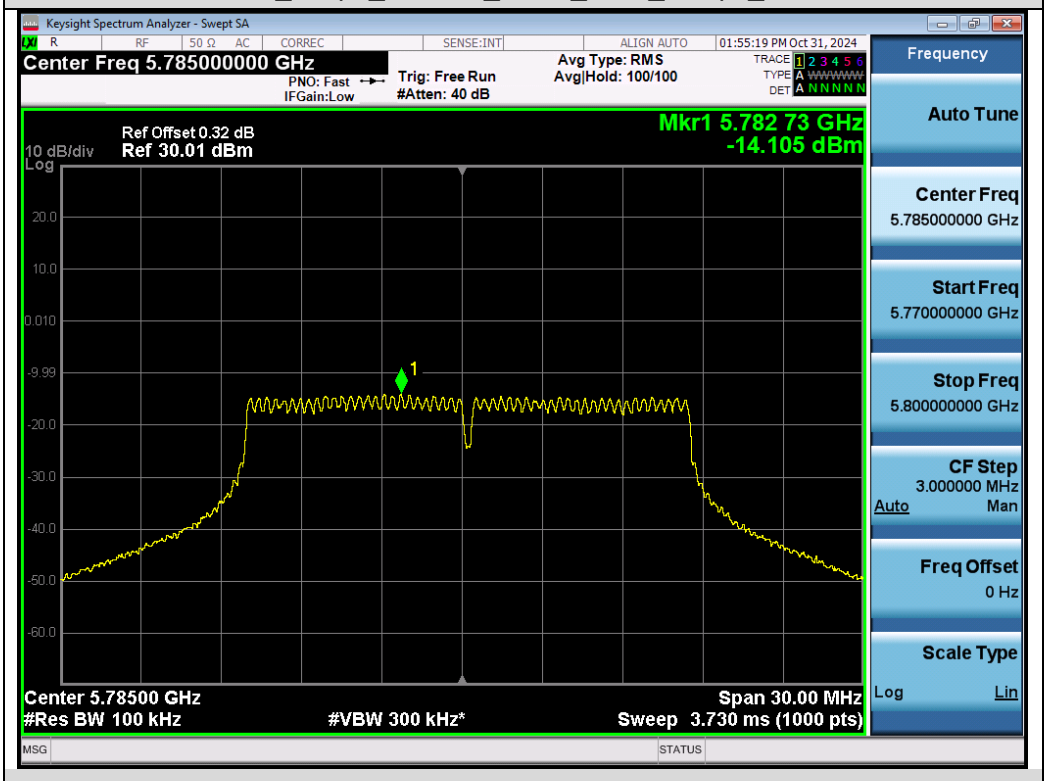


Test_Graph_802.11ax80_ANT1_5210_MCS0_PSD

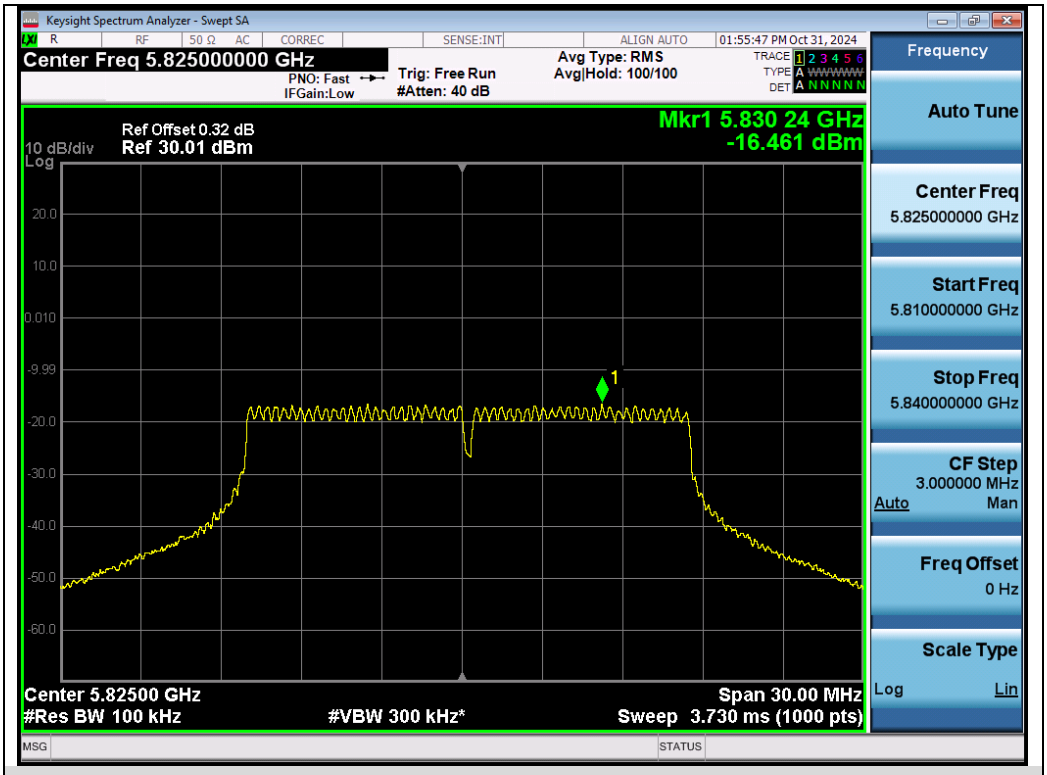
Test Graphs of Conducted Output Power Spectral Density for band 5.725-5.85 GHz



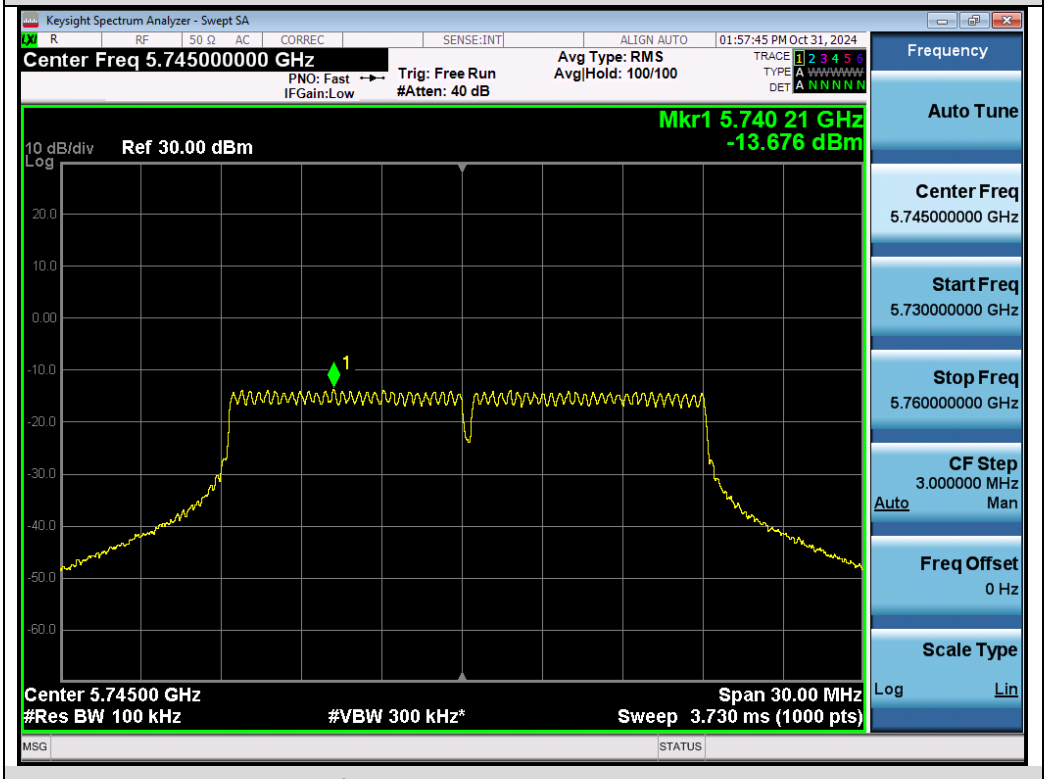
Test_Graph_802.11a_ANT1_5745_6Mbps_PSD



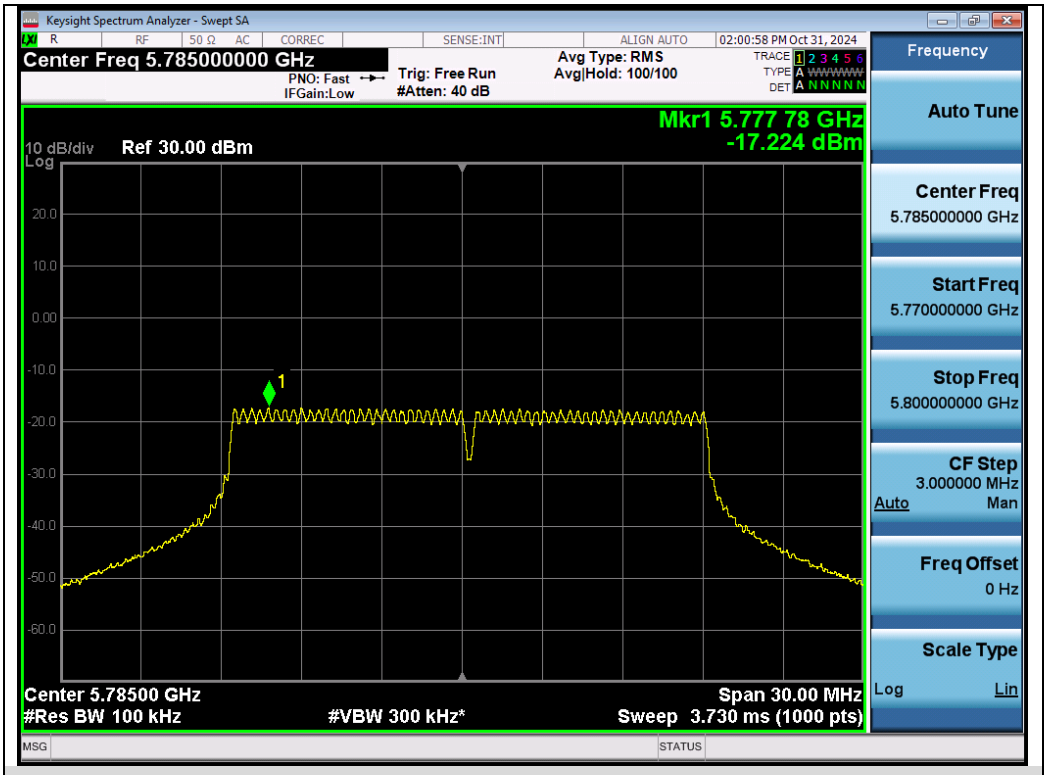
Test_Graph_802.11a_ANT1_5785_6Mbps_PSD



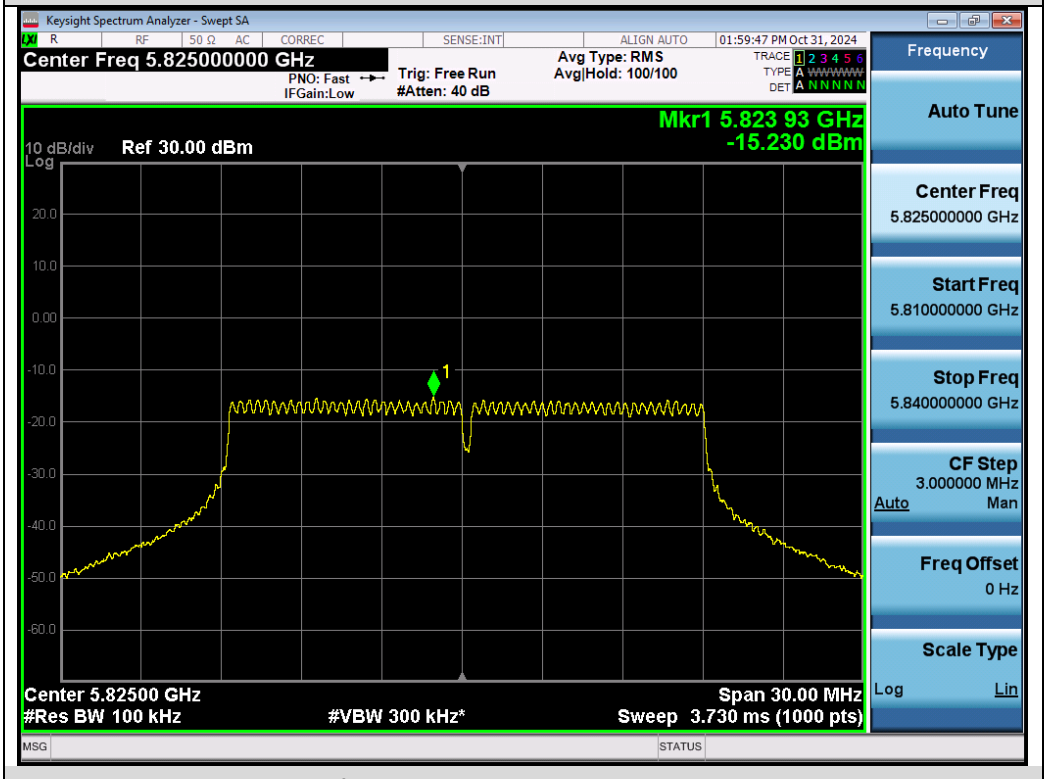
Test_Graph_802.11a_ANT1_5825_6Mbps_PSD



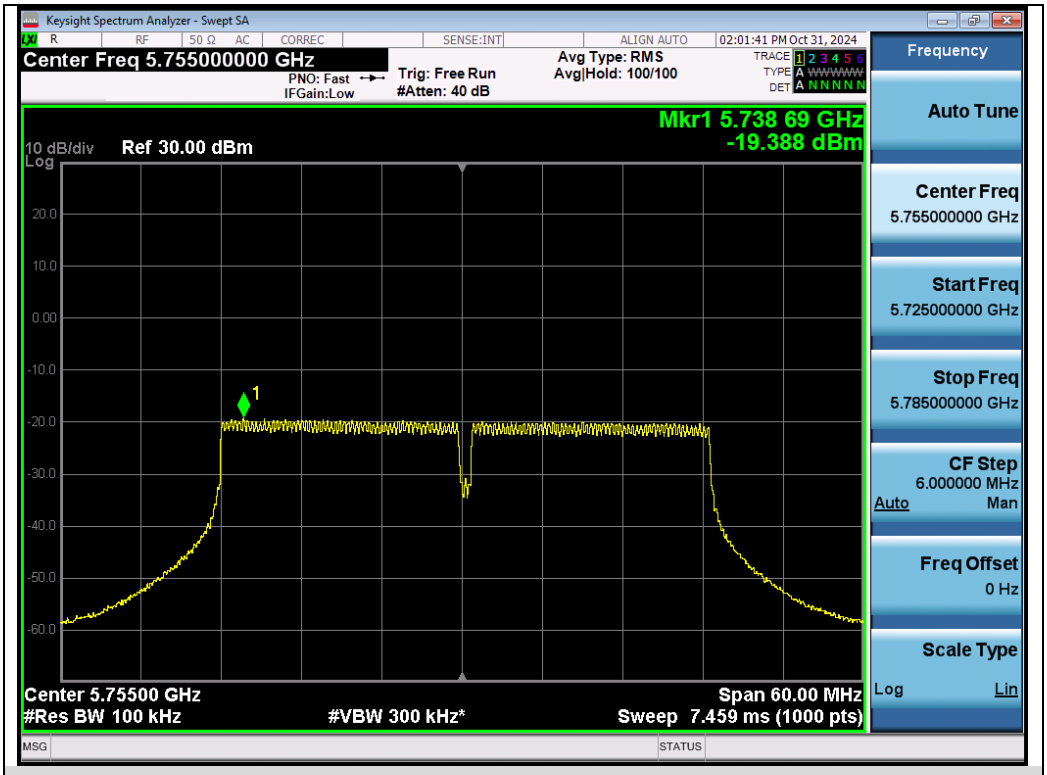
Test_Graph_802.11n20_ANT1_5745_MCS0_PSD



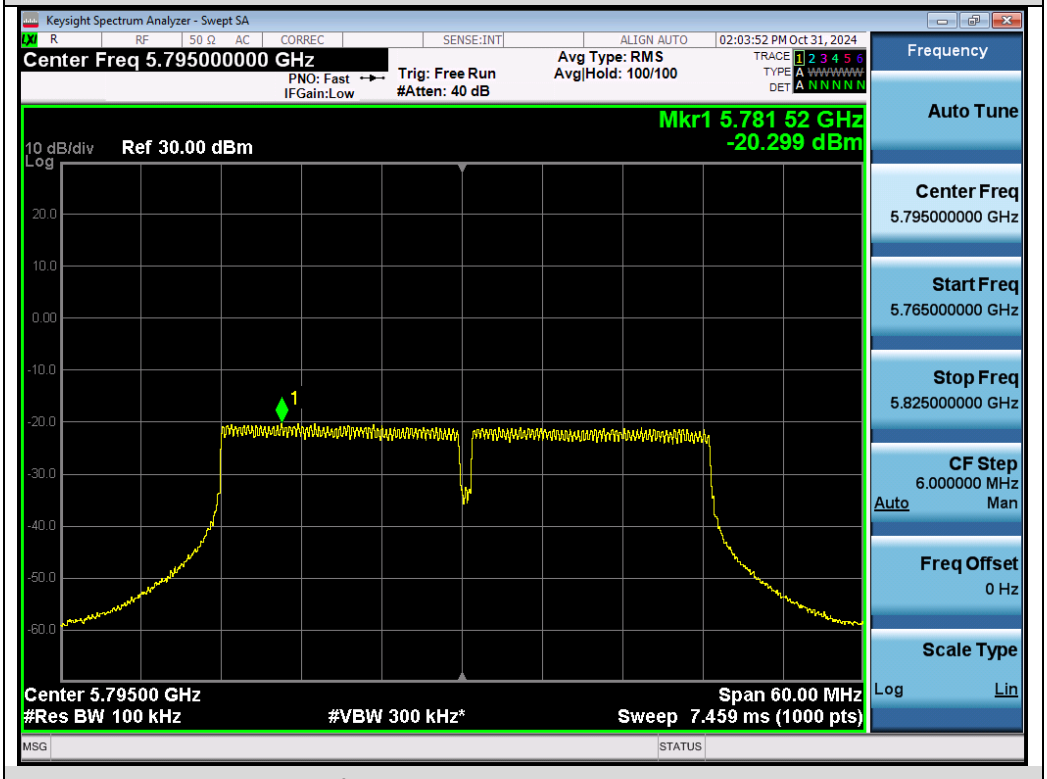
Test_Graph_802.11n20_ANT1_5785_MCS0_PSD



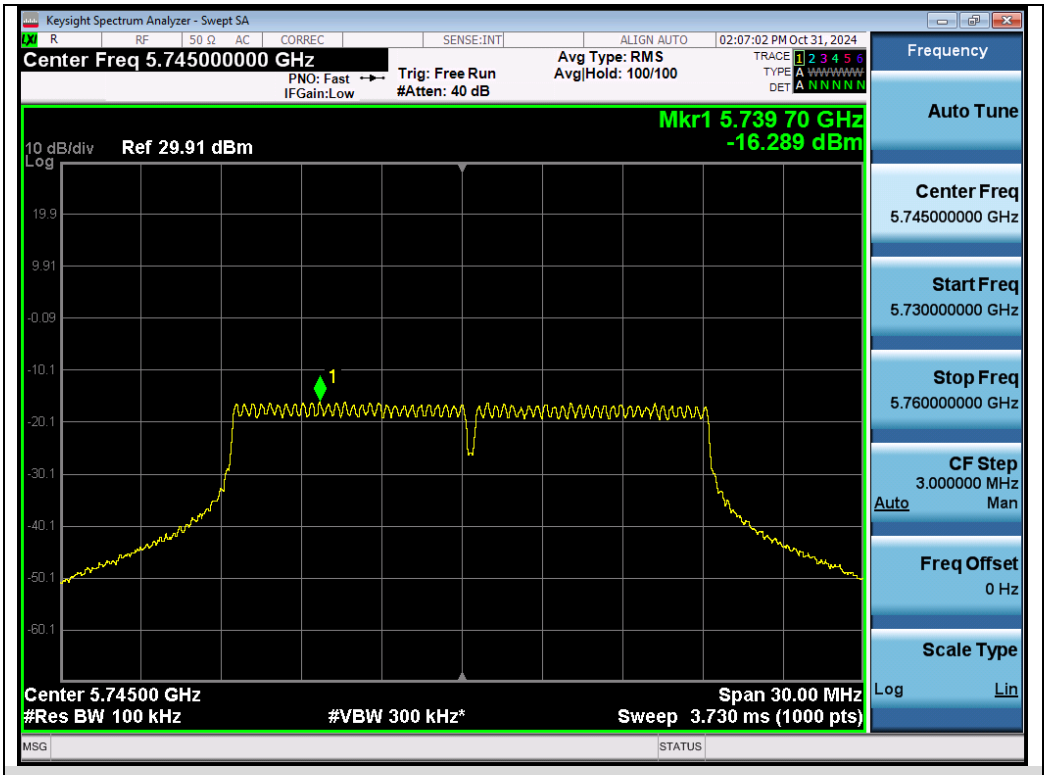
Test_Graph_802.11n20_ANT1_5825_MCS0_PSD



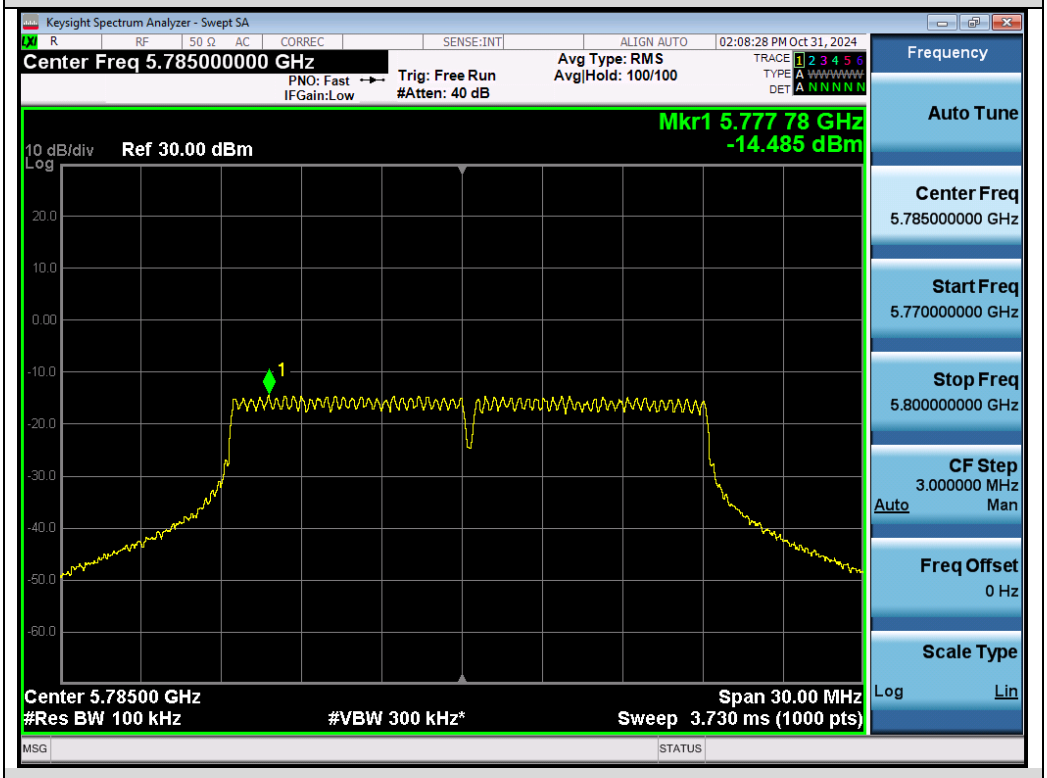
Test_Graph_802.11n40_ANT1_5755_MCS0_PSD



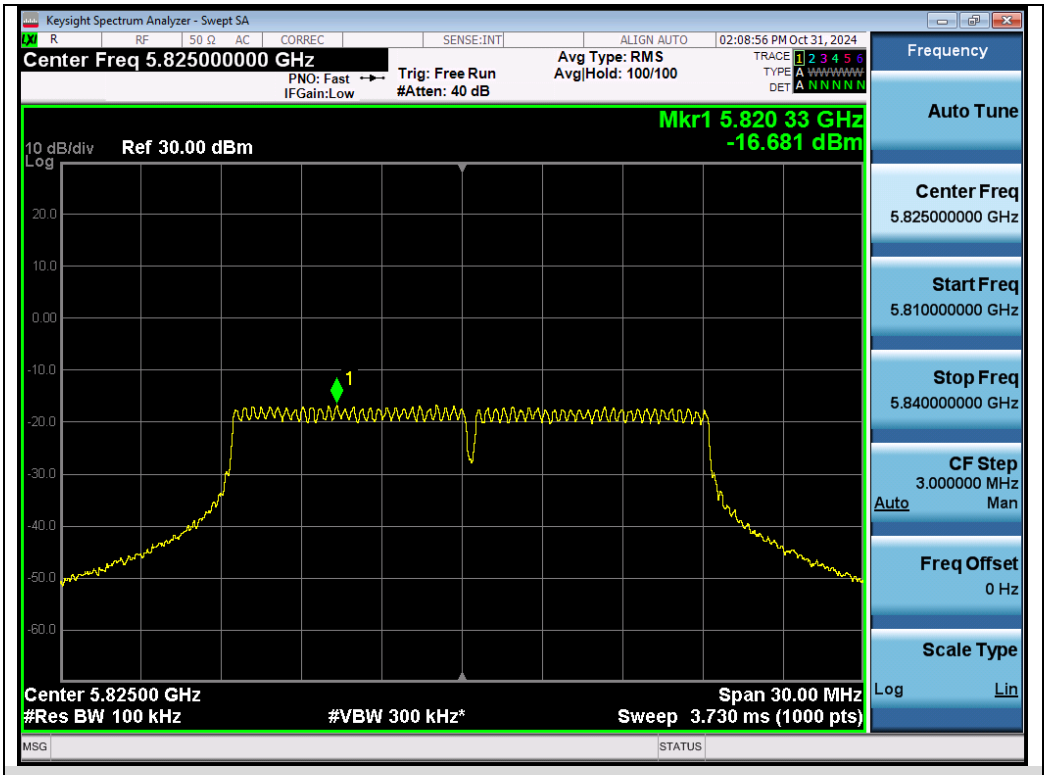
Test_Graph_802.11n40_ANT1_5795_MCS0_PSD



Test_Graph_802.11ac20_ANT1_5745_MCS0_PSD

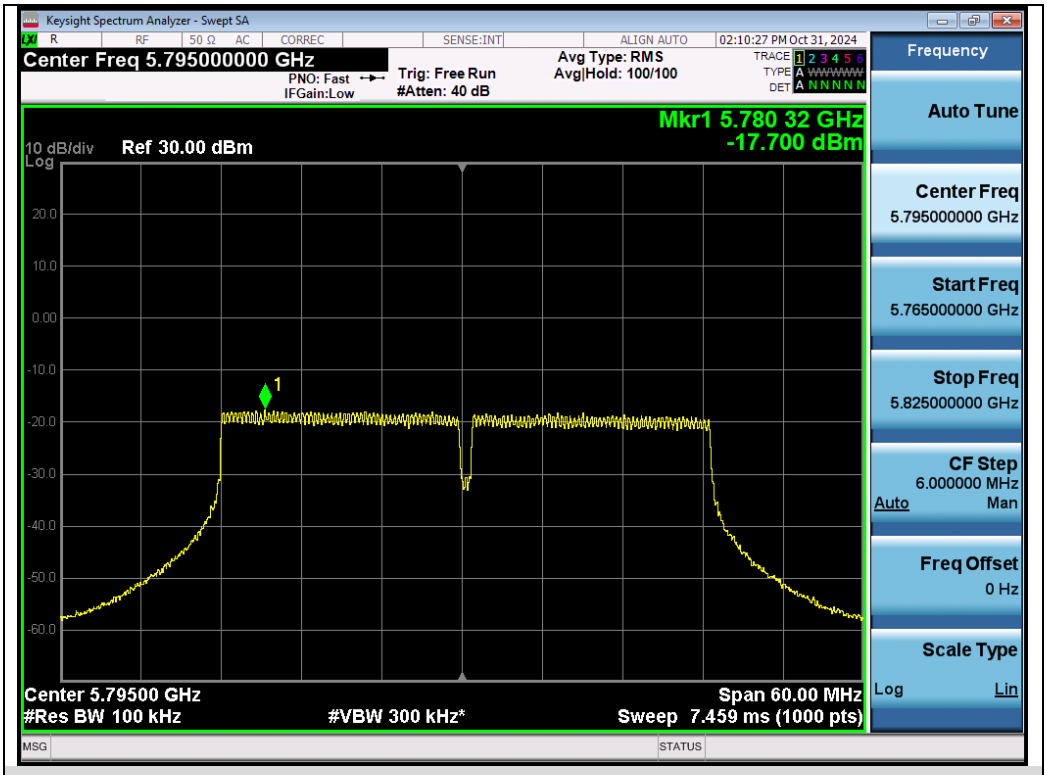


Test_Graph_802.11ac20_ANT1_5785_MCS0_PSD

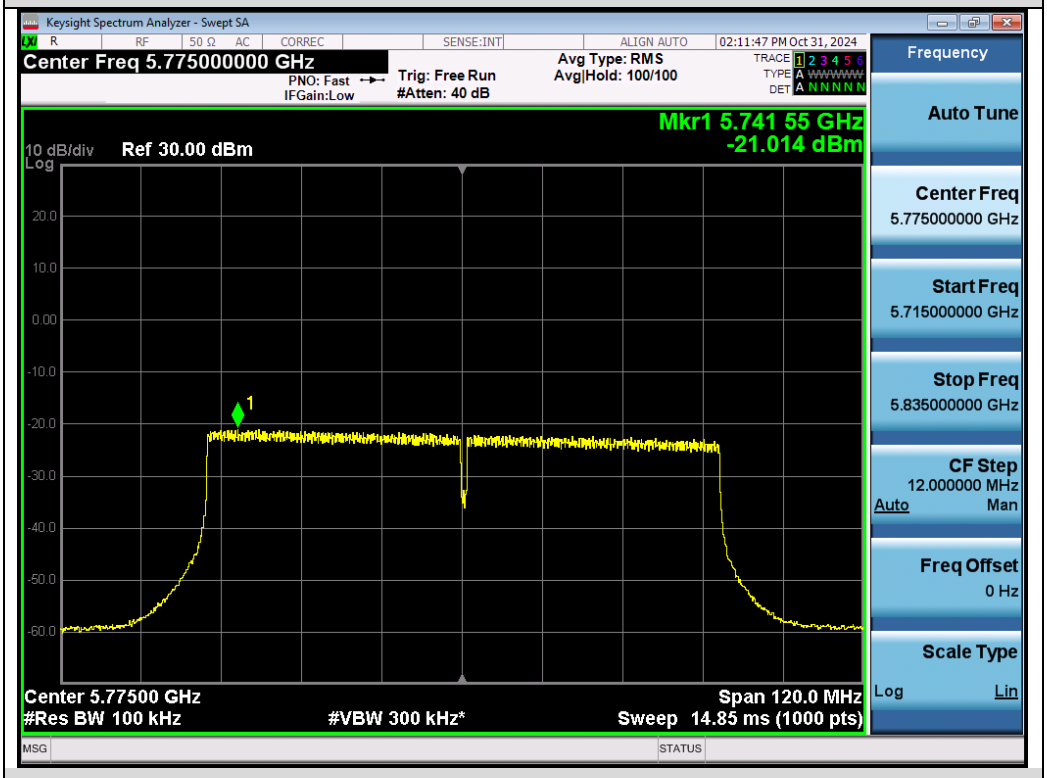


Test_Graph_802.11ac20_ANT1_5825_MCS0_PSD

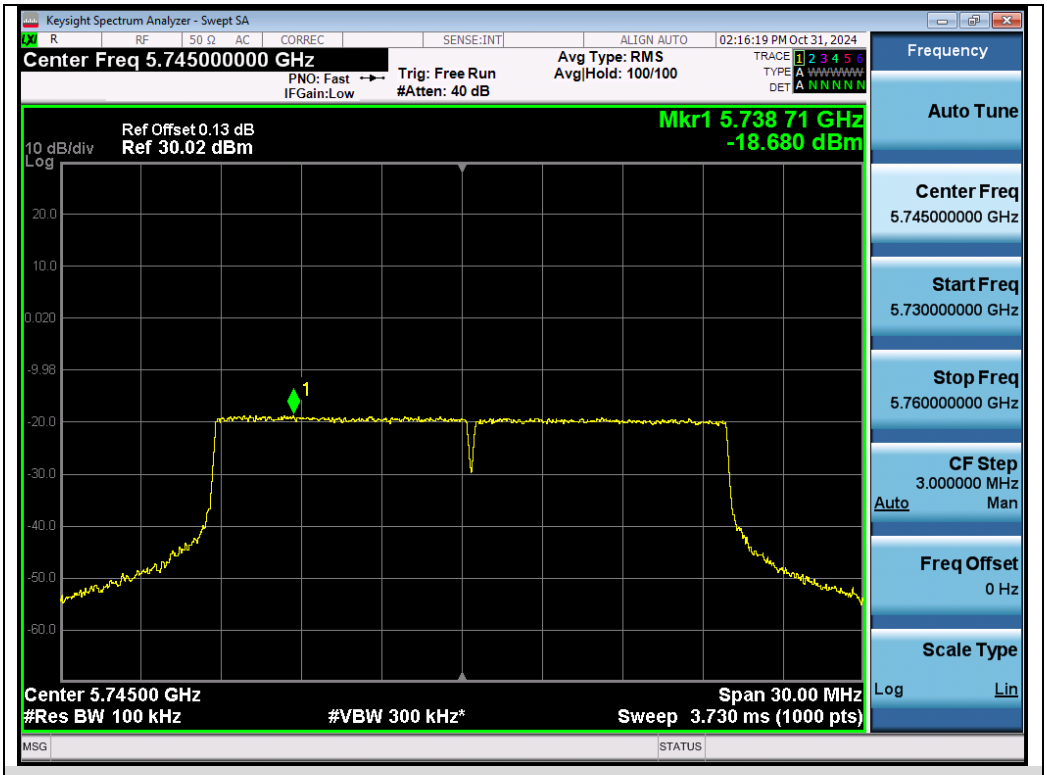
Test_Graph_802.11ac40_ANT1_5755_MCS0_PSD



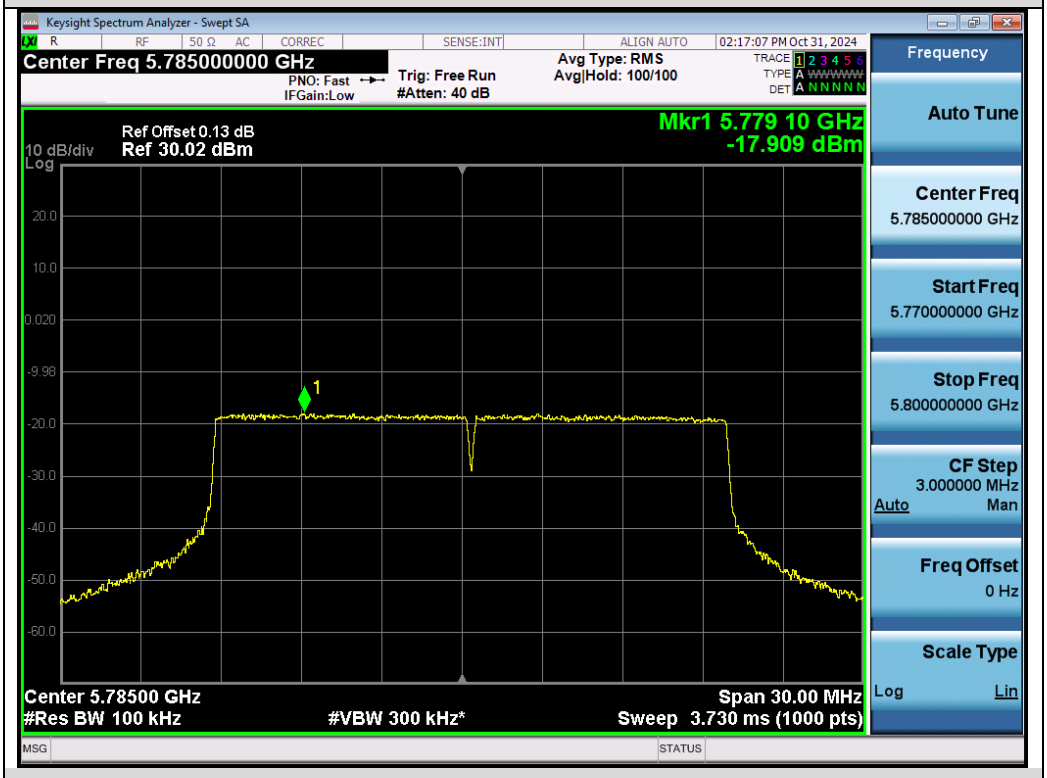
Test_Graph_802.11ac40_ANT1_5795_MCS0_PSD



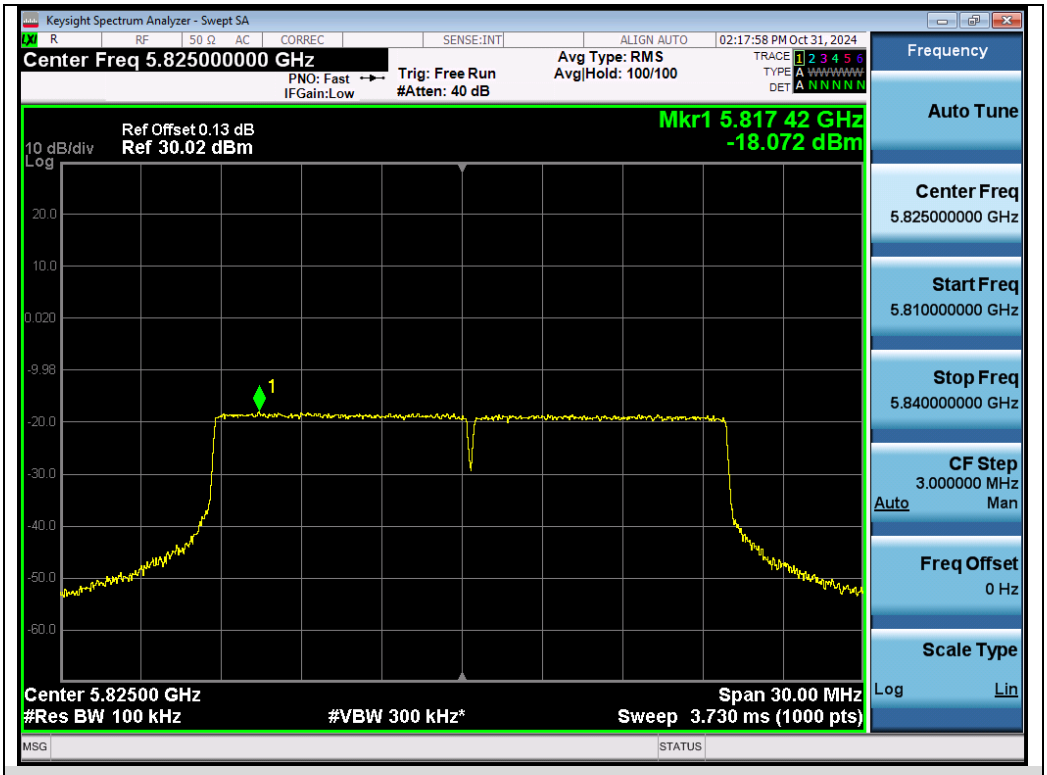
Test_Graph_802.11ac80_ANT1_5775_MCS0_PSD



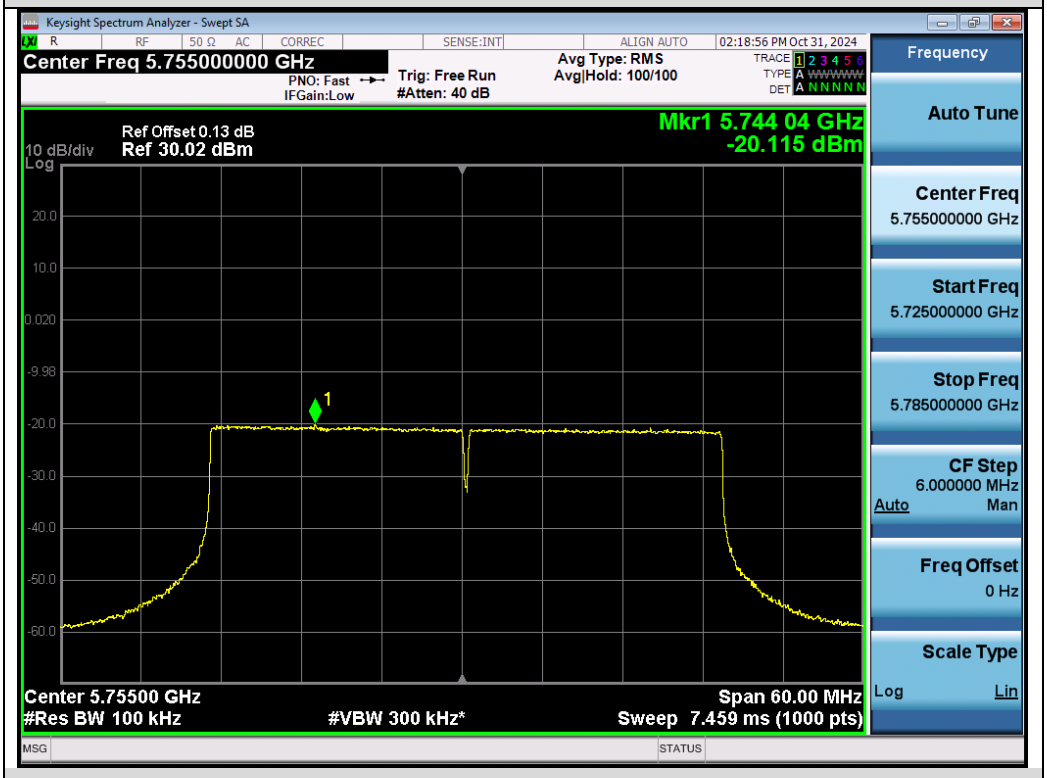
Test_Graph_802.11ax20_ANT1_5745_MCS0_PSD



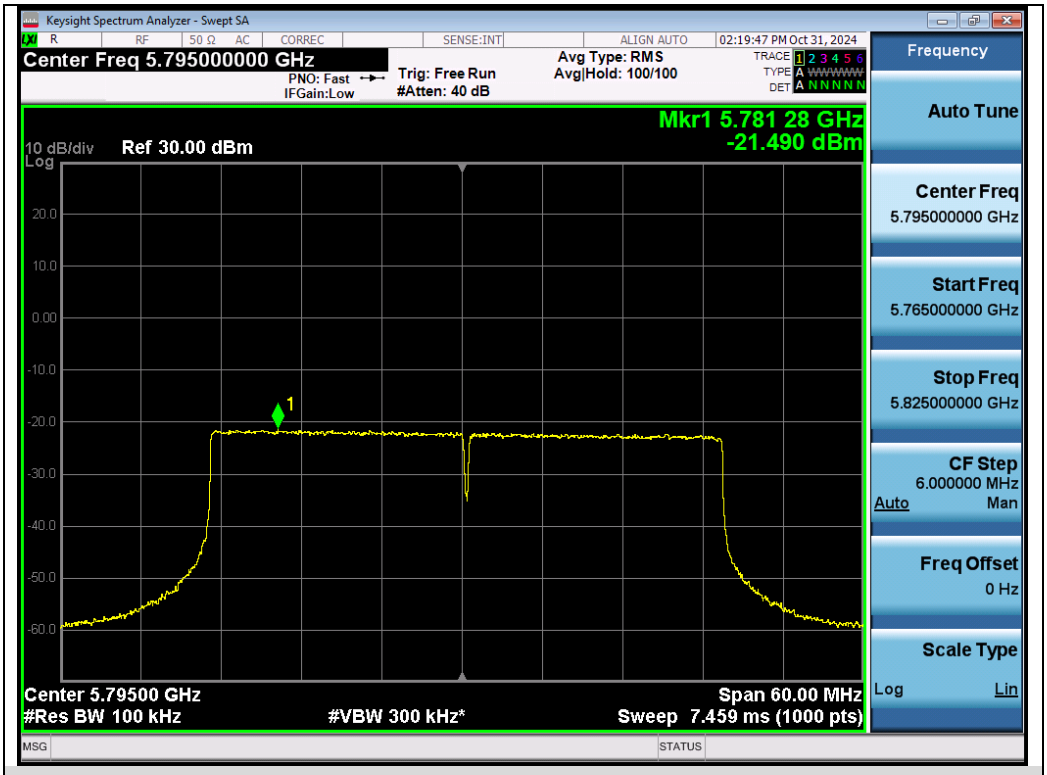
Test_Graph_802.11ax20_ANT1_5785_MCS0_PSD



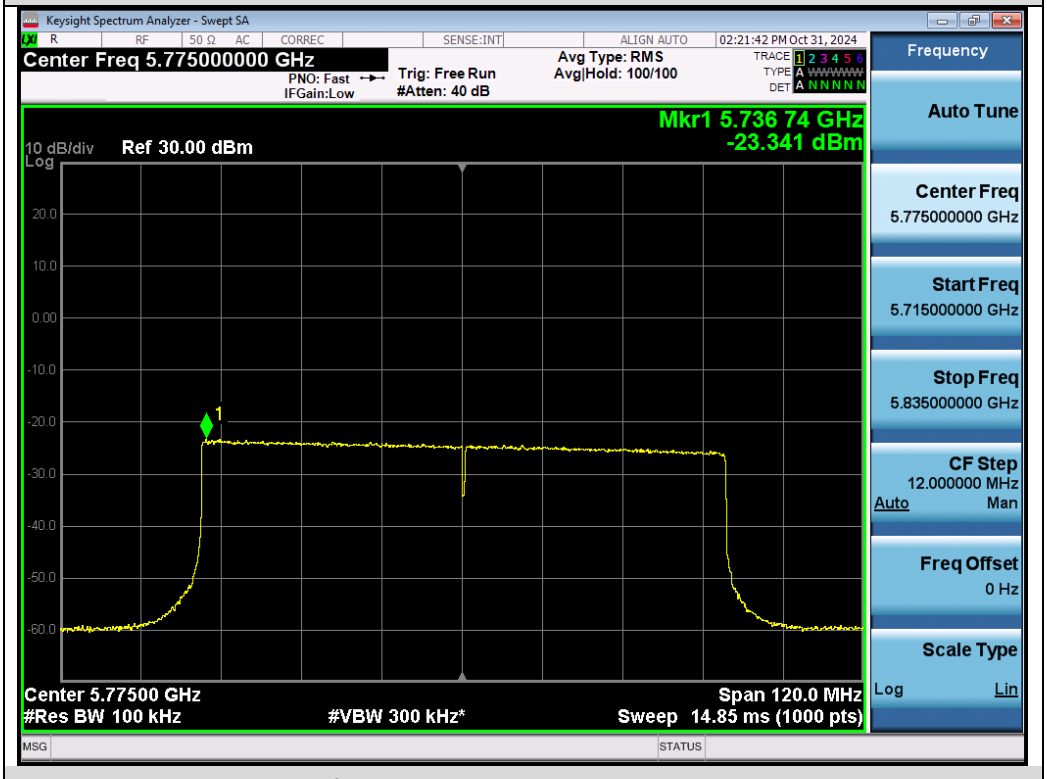
Test_Graph_802.11ax20_ANT1_5825_MCS0_PSD



Test_Graph_802.11ax40_ANT1_5755_MCS0_PSD



Test_Graph_802.11ax40_ANT1_5795_MCS0_PSD



Test_Graph_802.11ax80_ANT1_5775_MCS0_PSD

10. Conducted Band Edge and Out-of-Band Emissions

10.1 Provisions Applicable

Restricted bands	Applicable to	Limit	
	789033 D02 General UNII Test Procedures New Rules v02r01	Field strength at 3m (dBuV/m)	
		PK: 74	AV: 54
Out of the restricted bands	Applicable to	EIRP Limit (dBm/MHz)	Equivalent field Strength at 3m (dBuV/m)
	FCC 15.407(b)(1)	PK: -27	PK: 68.2
	15.407(b)(2)		
	15.407(b)(3)		
	15.407(b)(4)	See Note 2	

Note 1: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

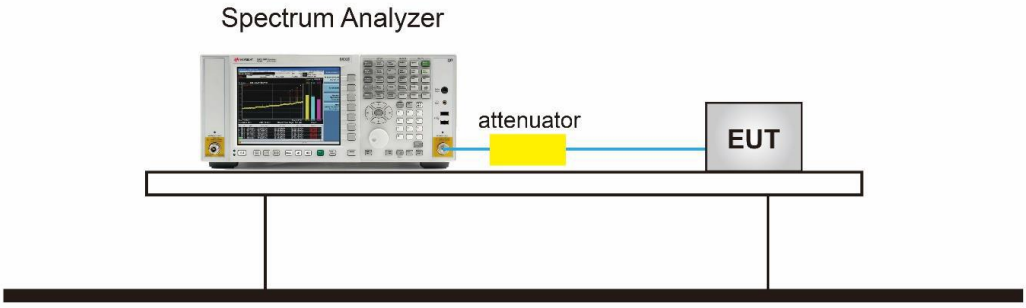
$$E = \frac{1000000 \quad \sqrt{30\ P}}{3}$$ μV/m, where P is the eirp (Watts).

Note 2: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

10.2 Measurement Procedure

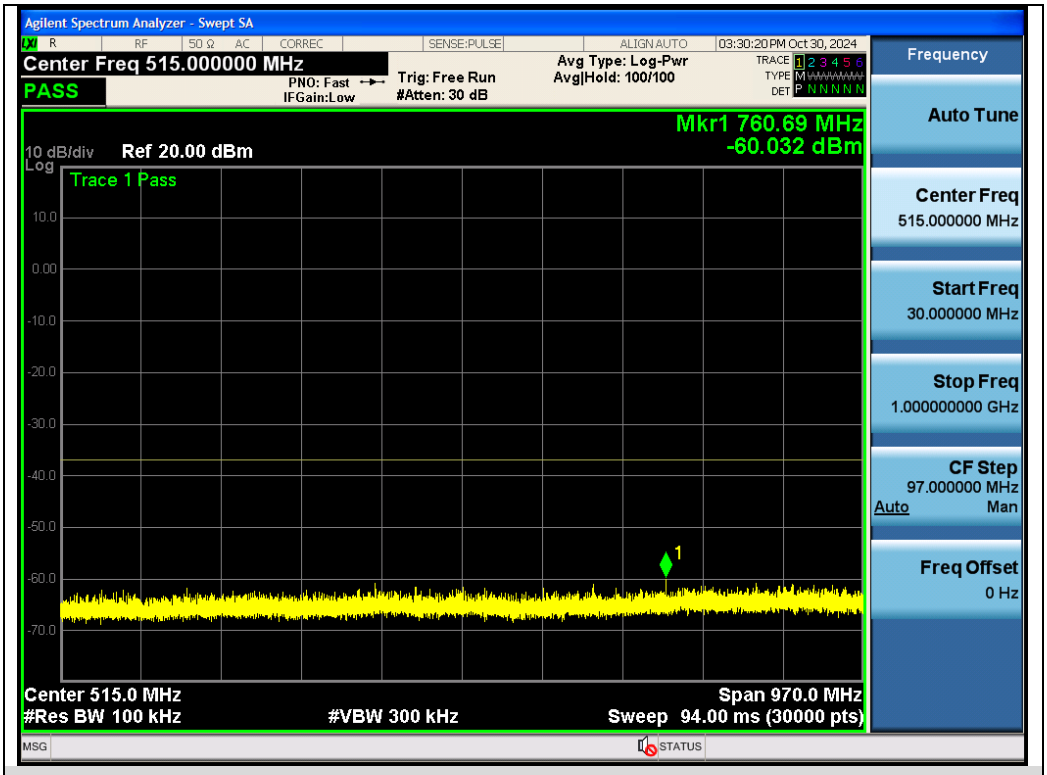
1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the Span = wide enough to capture the peak level of the in-band emission and all spurious emissions from the lowest frequency generated in the EUT up through the 10th harmonic.
3. RBW = 1MHz; VBW= 3MHz; Sweep = auto; Detector function = Peak. (Test frequency below 1GHz)
4. RBW = 1 MHz; VBW= 3 MHz; Sweep = auto; Detector function = Peak. (Test frequency Above 1GHz)
5. Set SPA Trace 1 Max hold, then View.
6. Antenna gain and path loss have been compensated to the Correction factor.
7. Mark the maximum useless stray point and compare it with the limit value to record the result.

10.3 Measurement Setup (Block Diagram of Configuration)

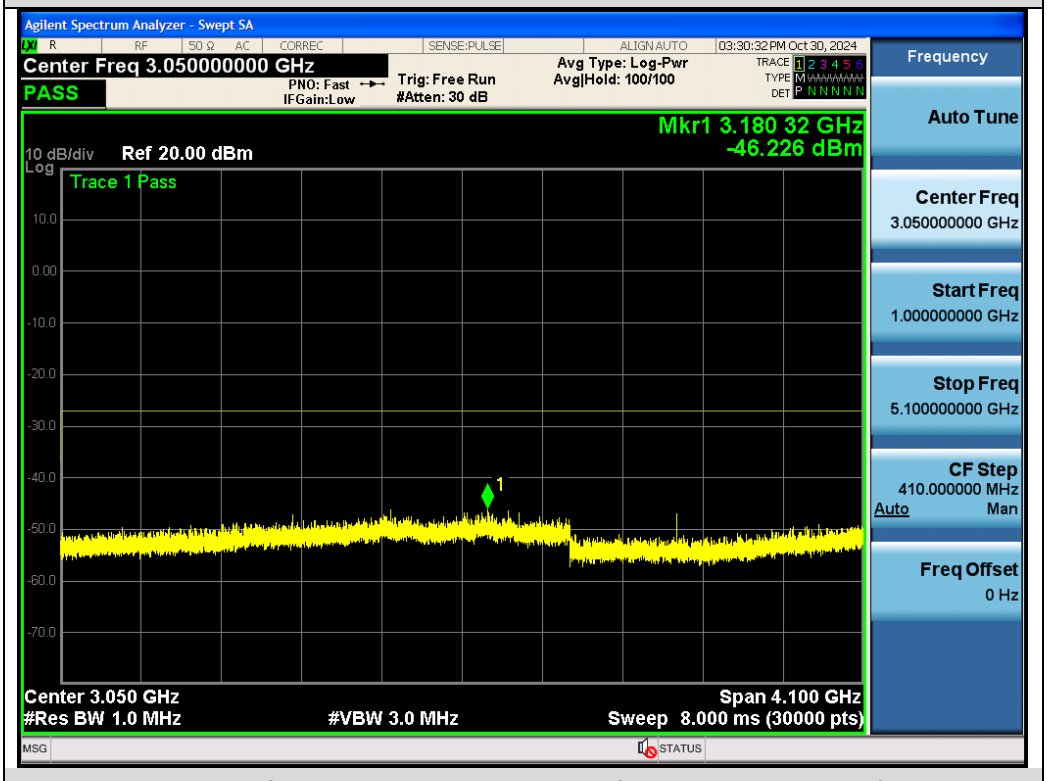


10.4 Measurement Results

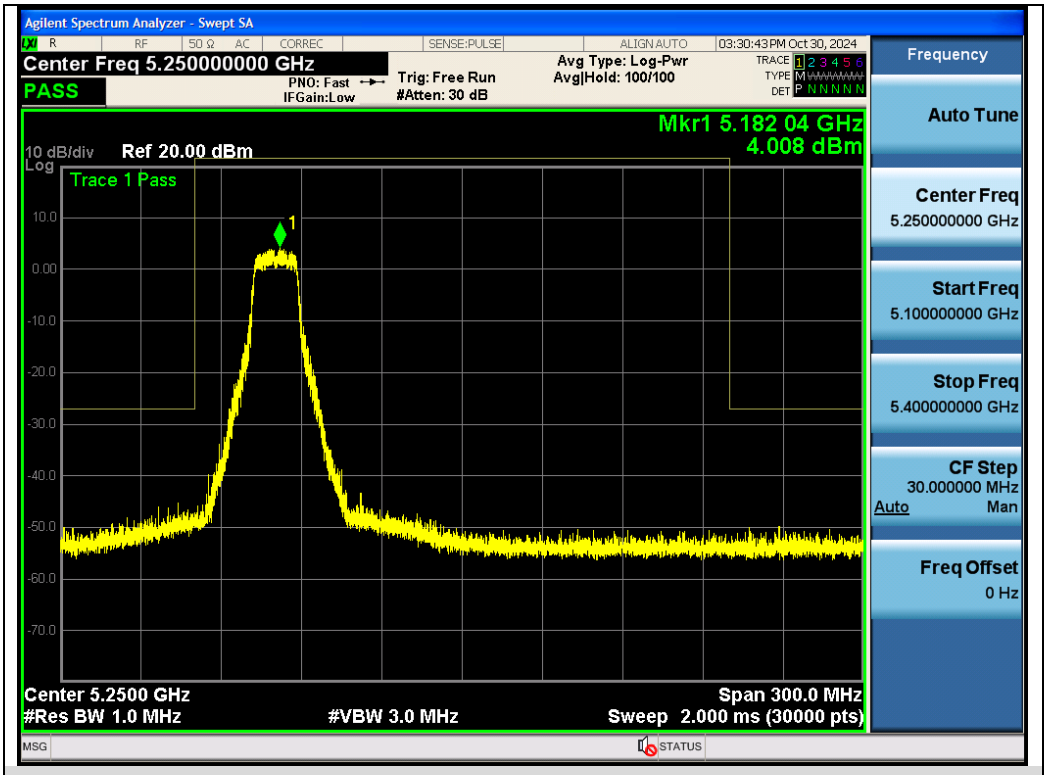
Test Graphs of Spurious Emissions outside of the 5.15-5.25 GHz band



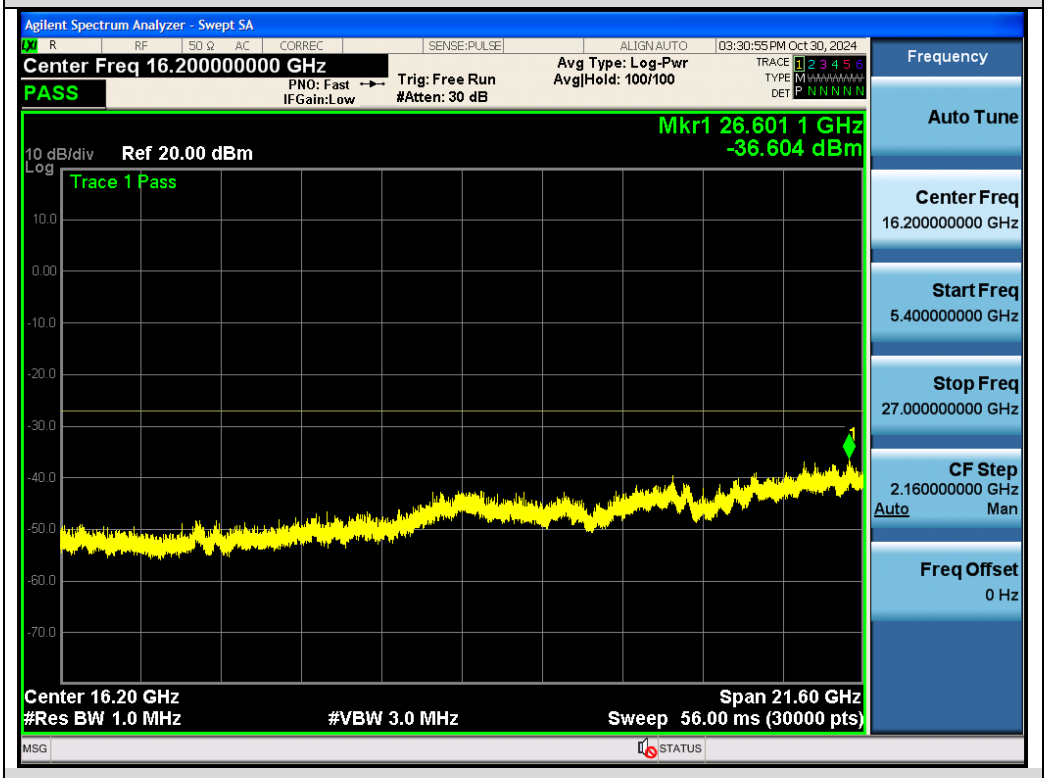
Test_Graph_802.11a_ANT1_5180_6Mbps_Frequency Band 1



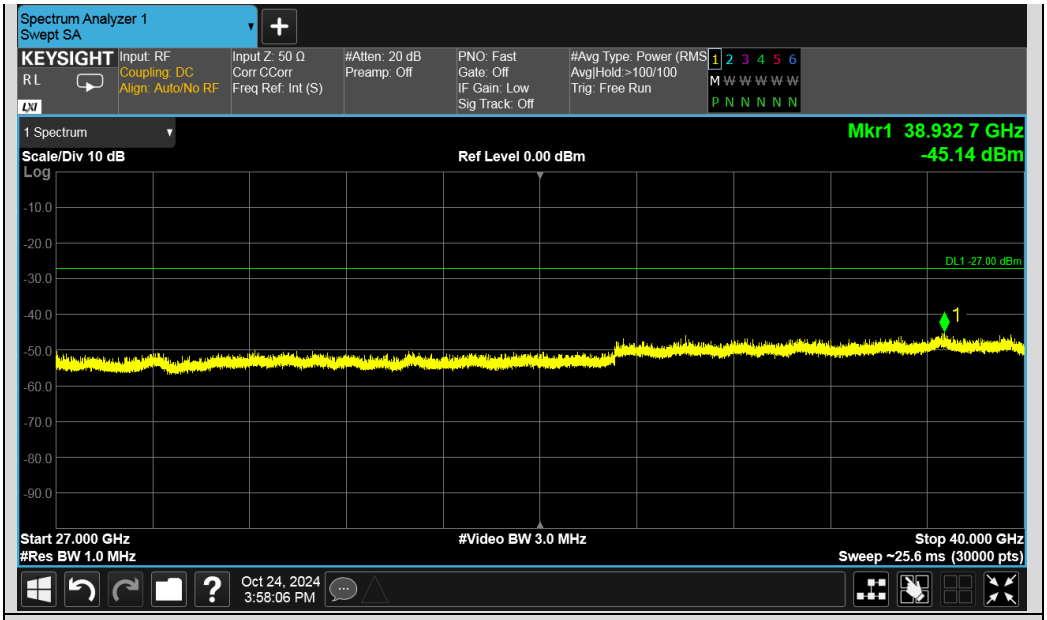
Test_Graph_802.11a_ANT1_5180_6Mbps_Frequency Band 2



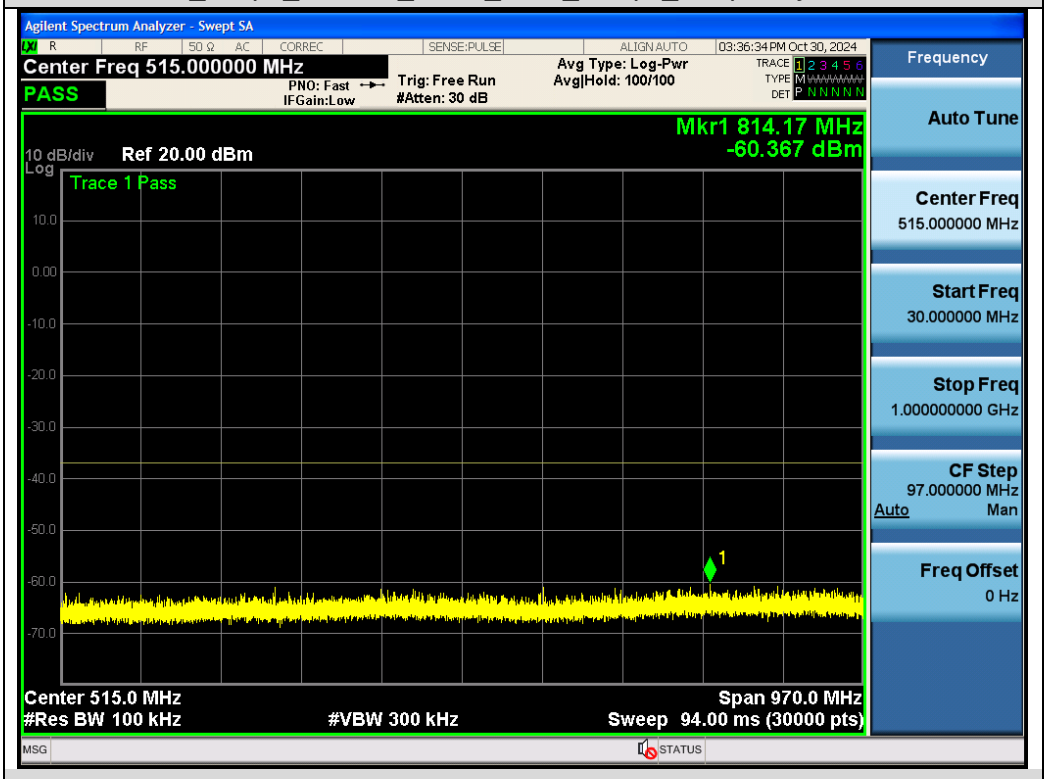
Test_Graph_802.11a_ANT1_5180_6Mbps_Frequency Band 3



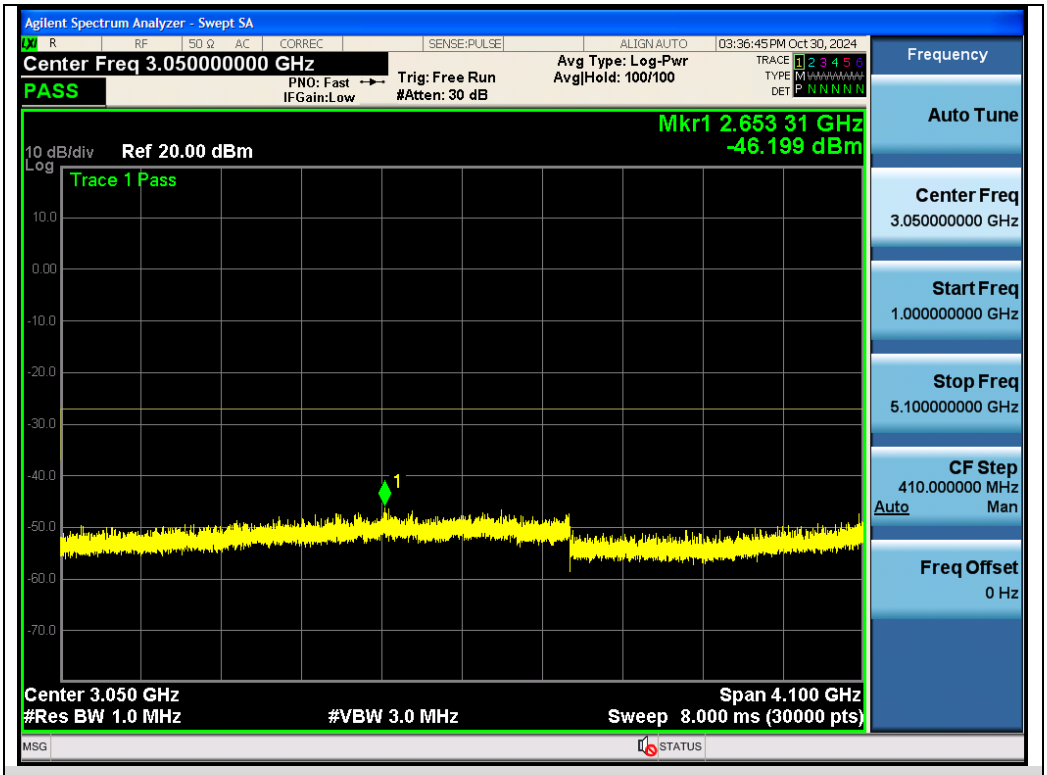
Test_Graph_802.11a_ANT1_5180_6Mbps_Frequency Band 4



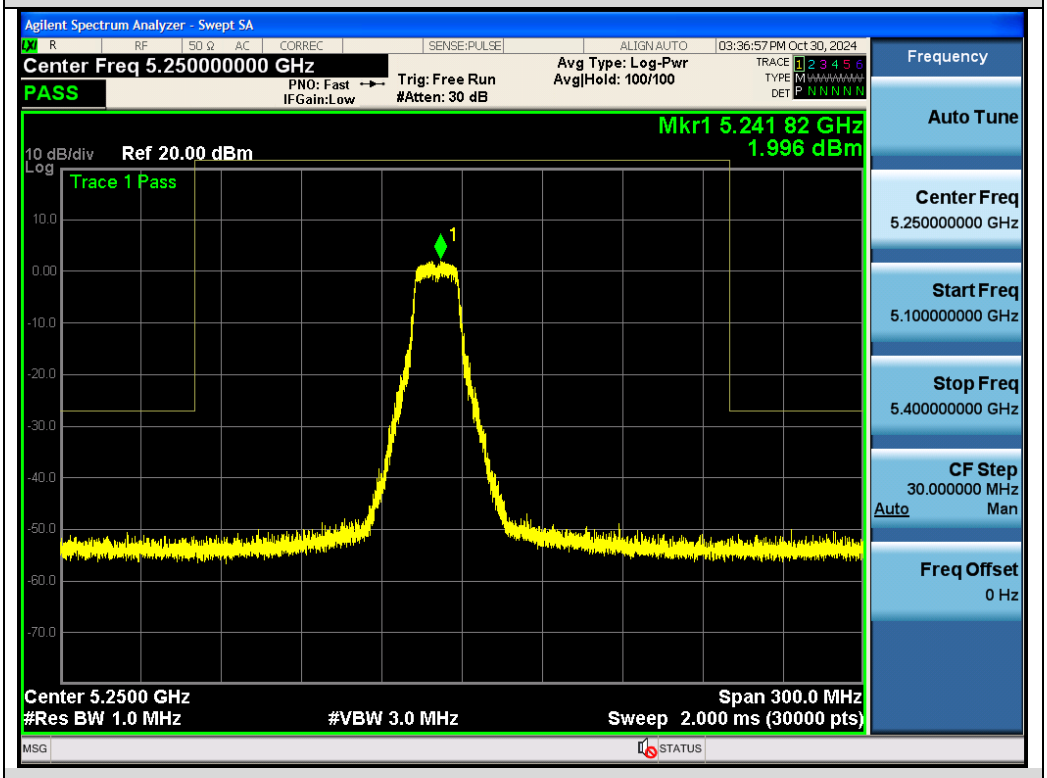
Test_Graph_802.11a_ANT1_5180_6Mbps_Frequency Band 5



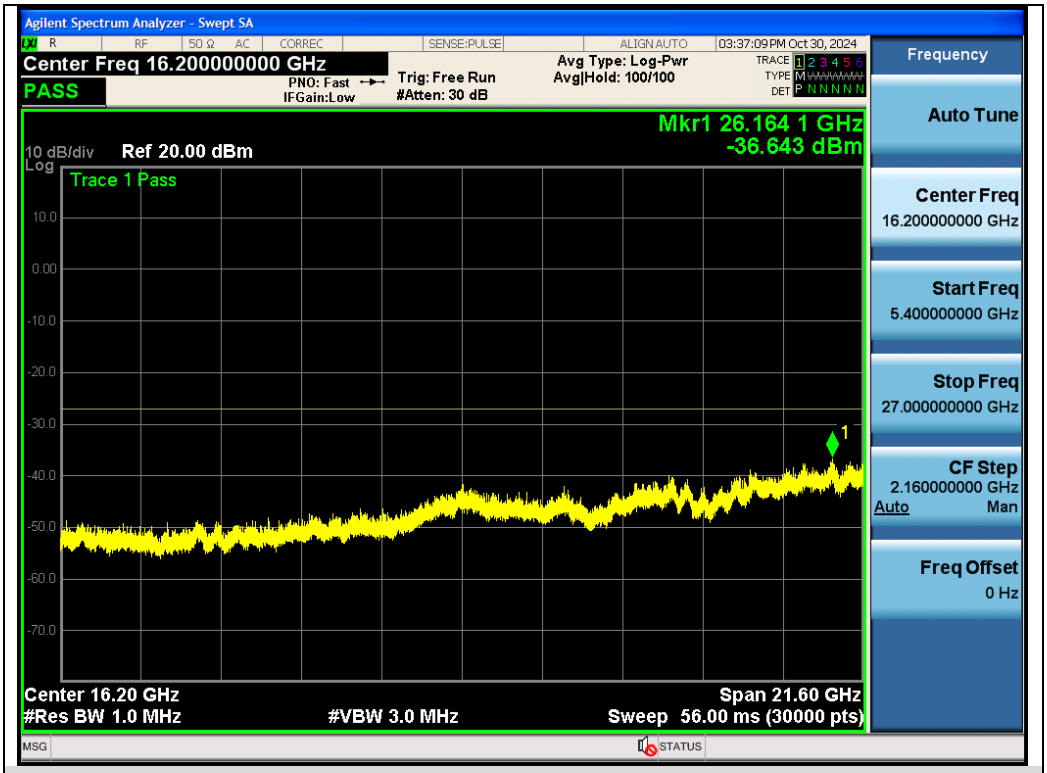
Test_Graph_802.11a_ANT1_5240_6Mbps_Frequency Band 1



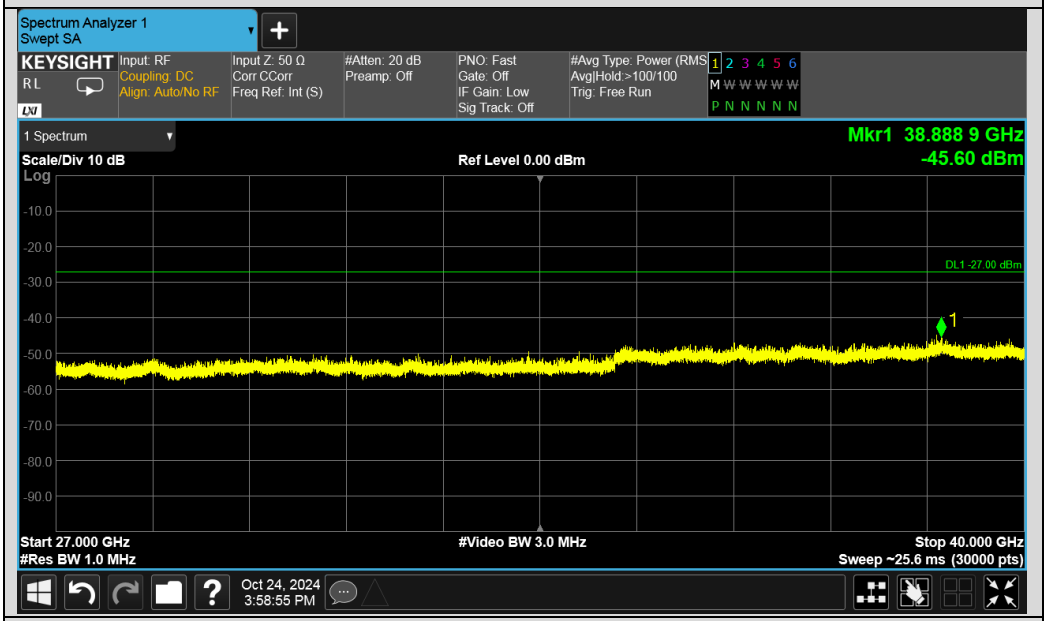
Test_Graph_802.11a_ANT1_5240_6Mbps_Frequency Band 2



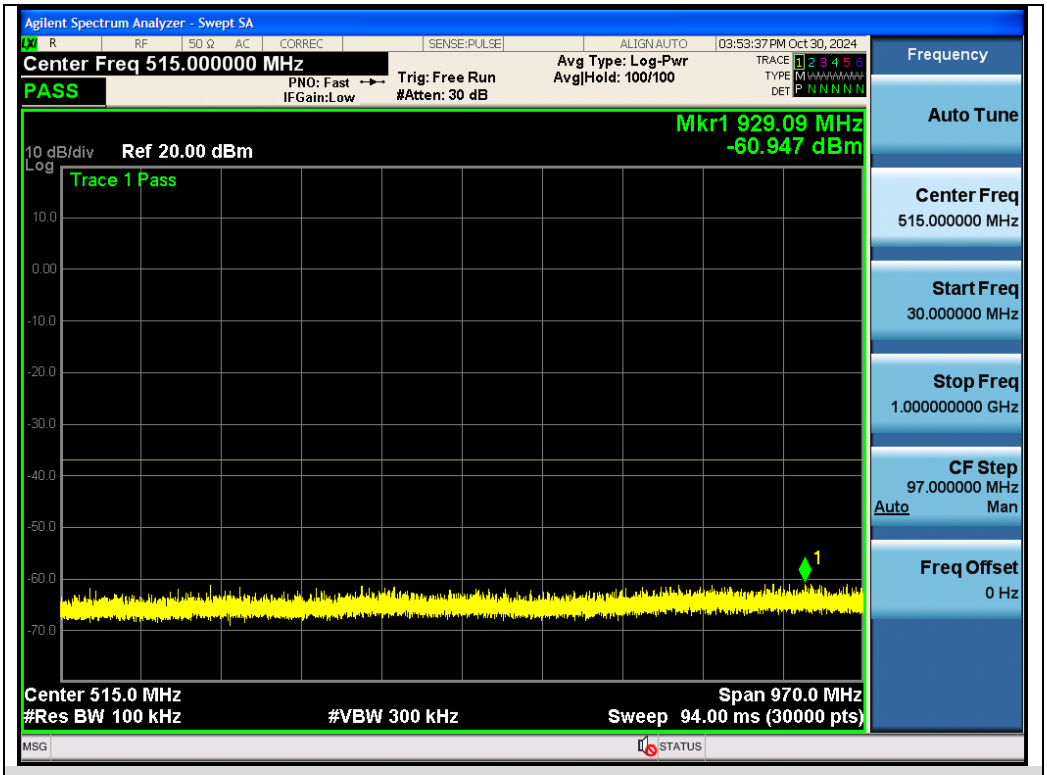
Test_Graph_802.11a_ANT1_5240_6Mbps_Frequency Band 3



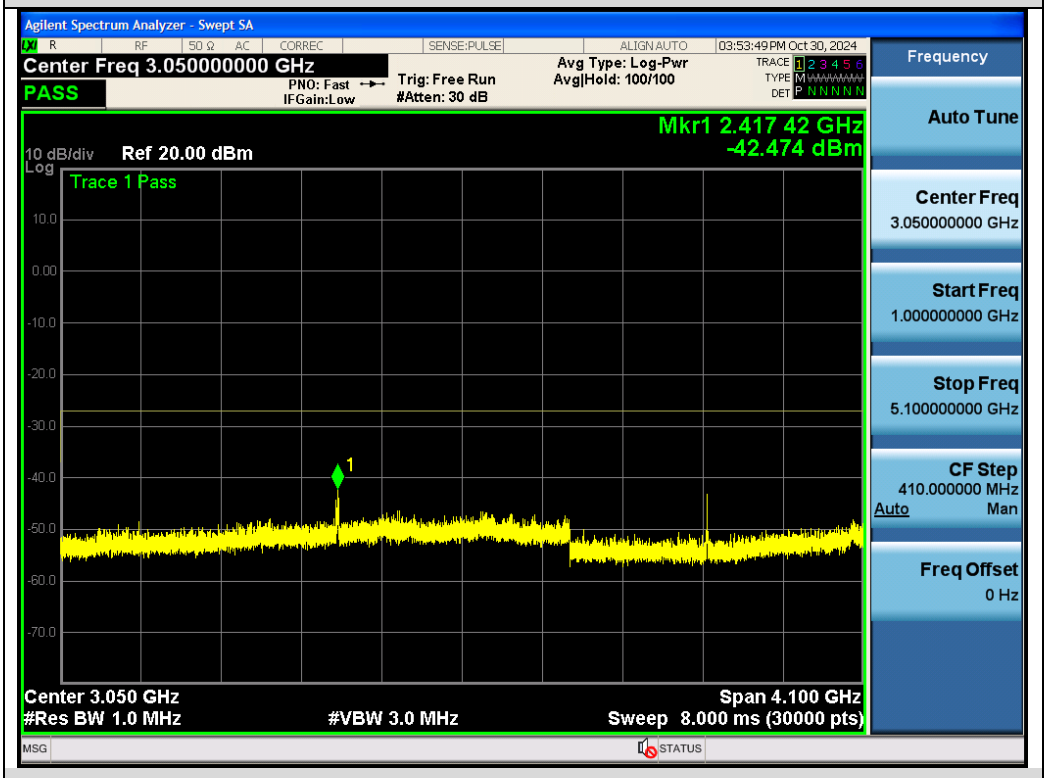
Test_Graph_802.11a_ANT1_5240_6Mbps_Frequency Band 4



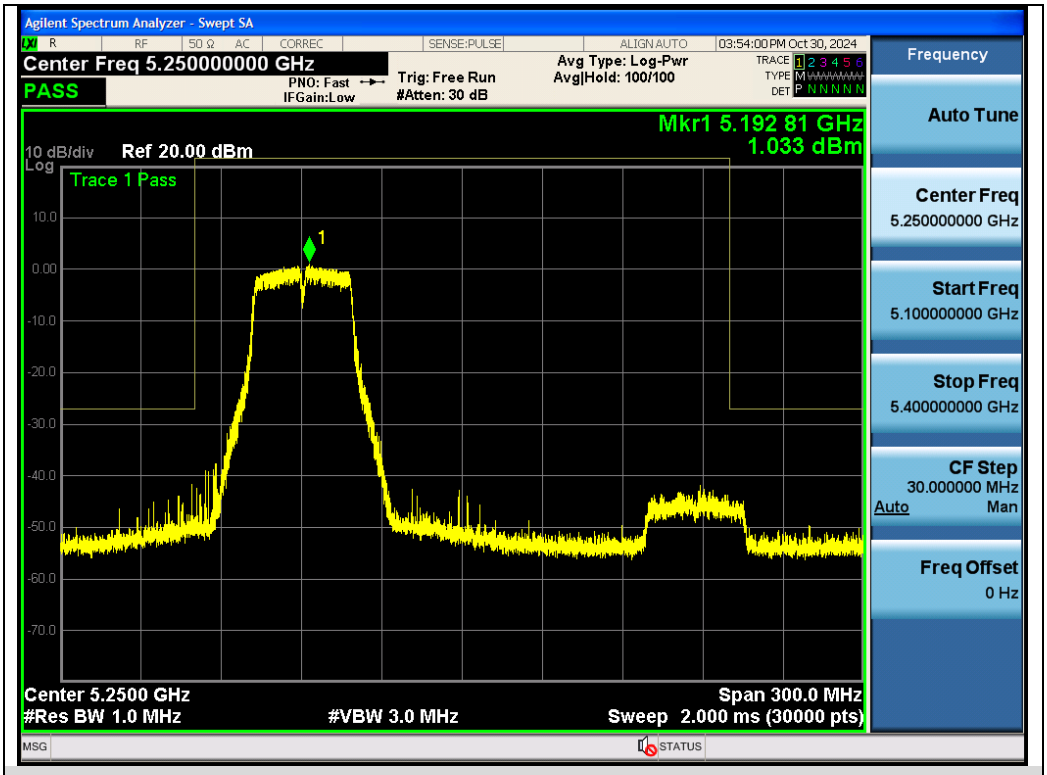
Test_Graph_802.11a_ANT1_5240_6Mbps_Frequency Band 5



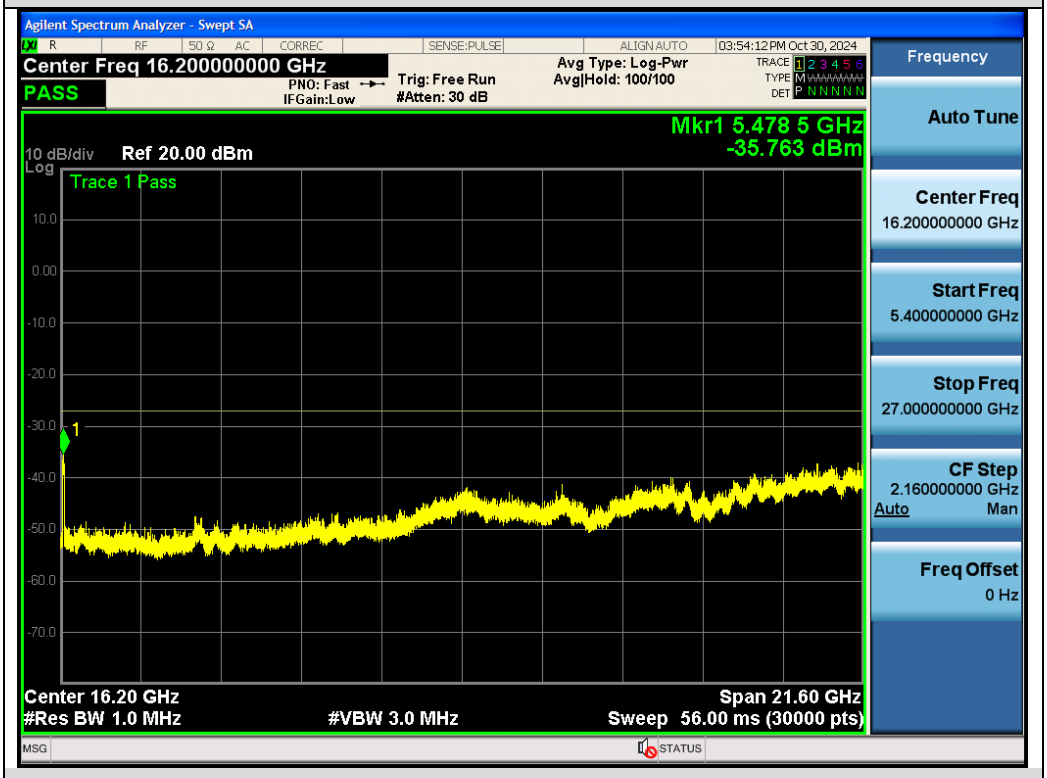
Test_Graph_802.11n40_ANT1_5190_MCS0_Frequency Band 1



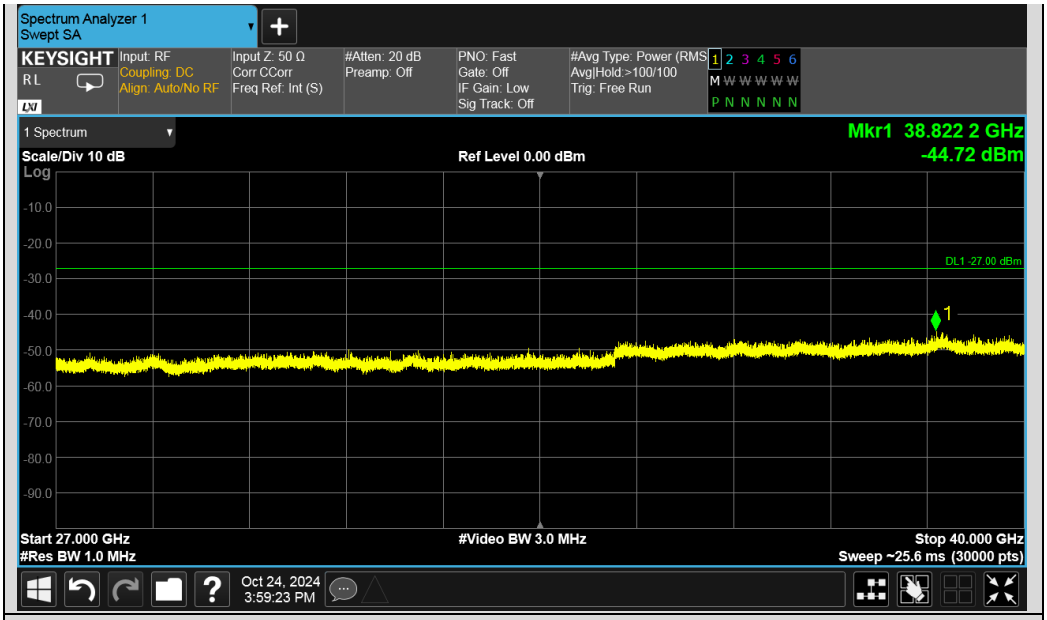
Test_Graph_802.11n40_ANT1_5190_MCS0_Frequency Band 2



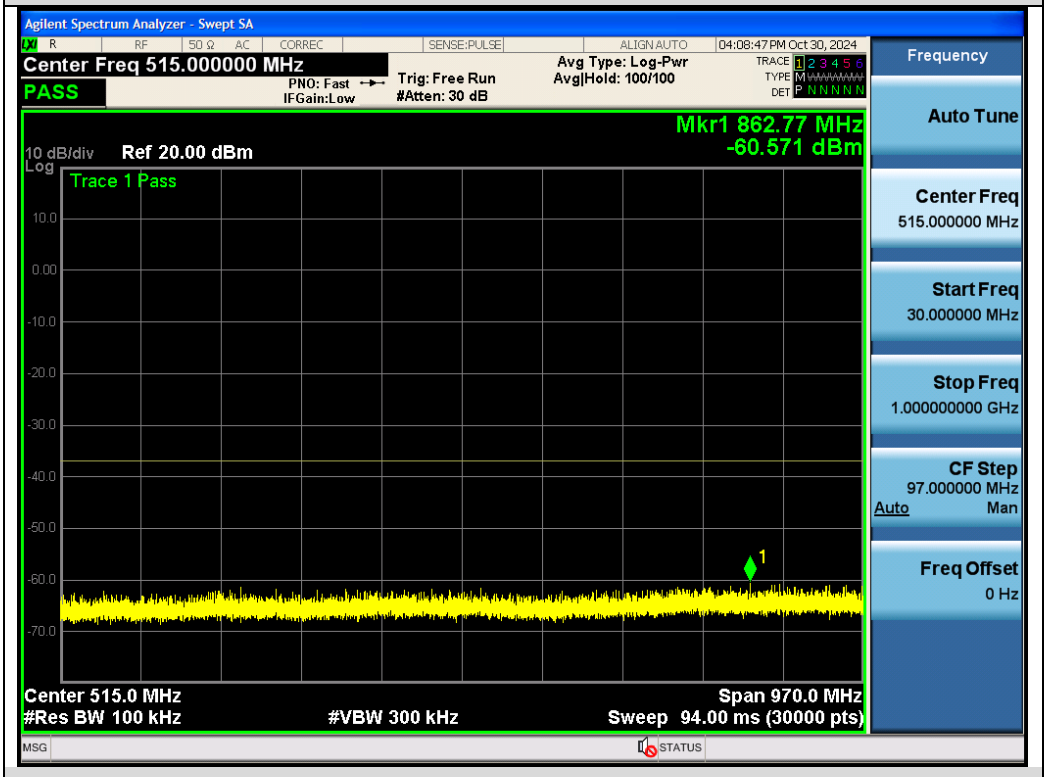
Test_Graph_802.11n40_ANT1_5190_MCS0_Frequency Band 3



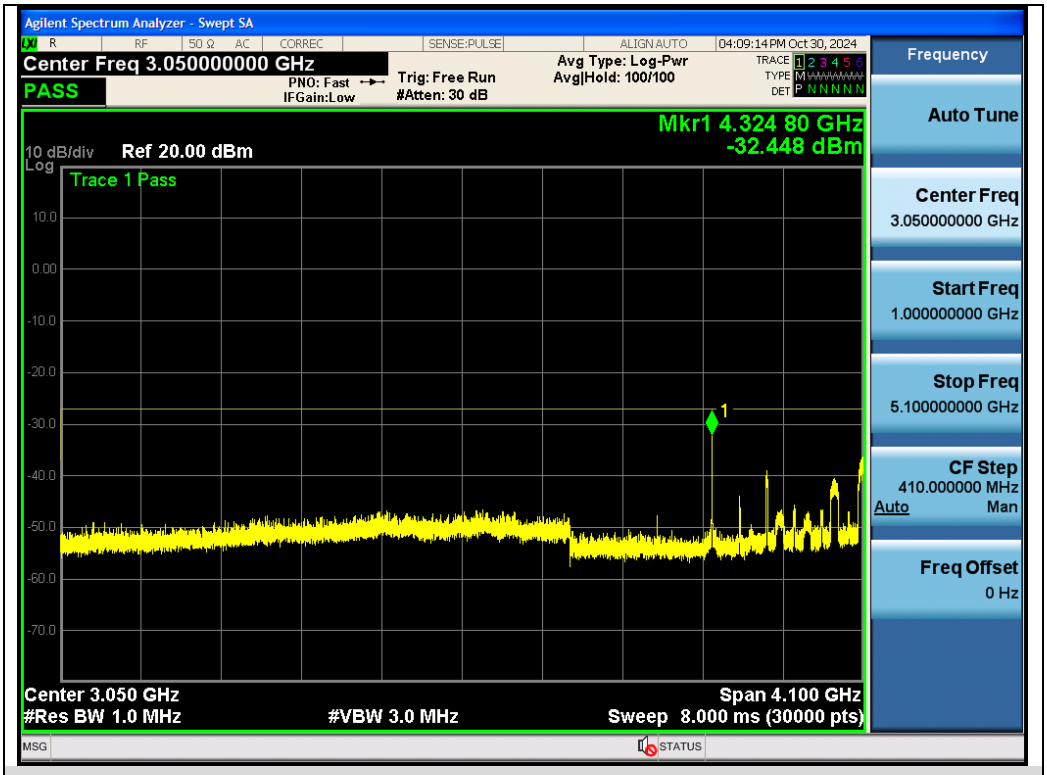
Test_Graph_802.11n40_ANT1_5190_MCS0_Frequency Band 4



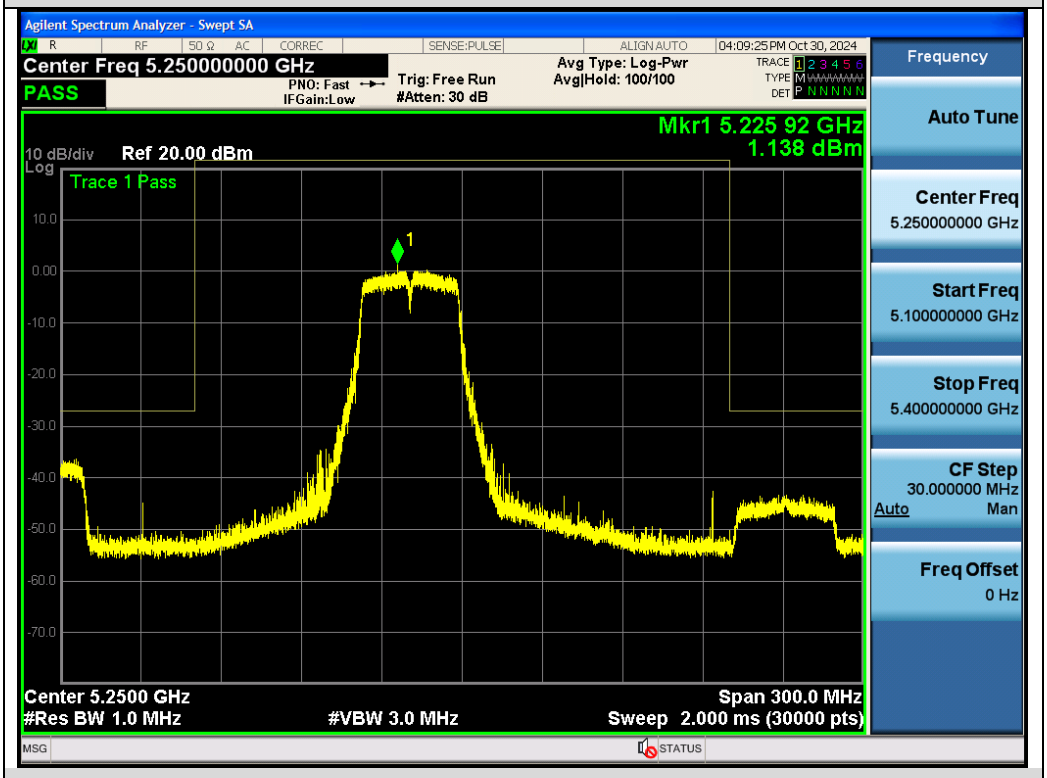
Test_Graph_802.11n40_ANT1_5190_MCS0_Frequency Band 5



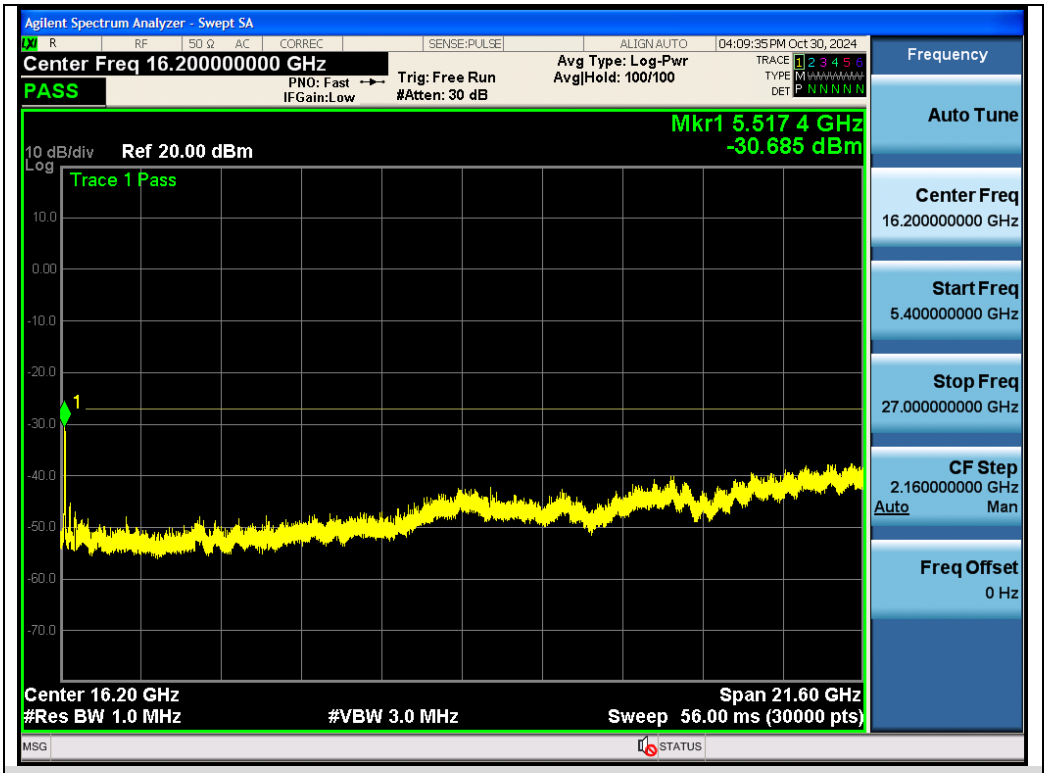
Test_Graph_802.11n40_ANT1_5230_MCS0_Frequency Band 1



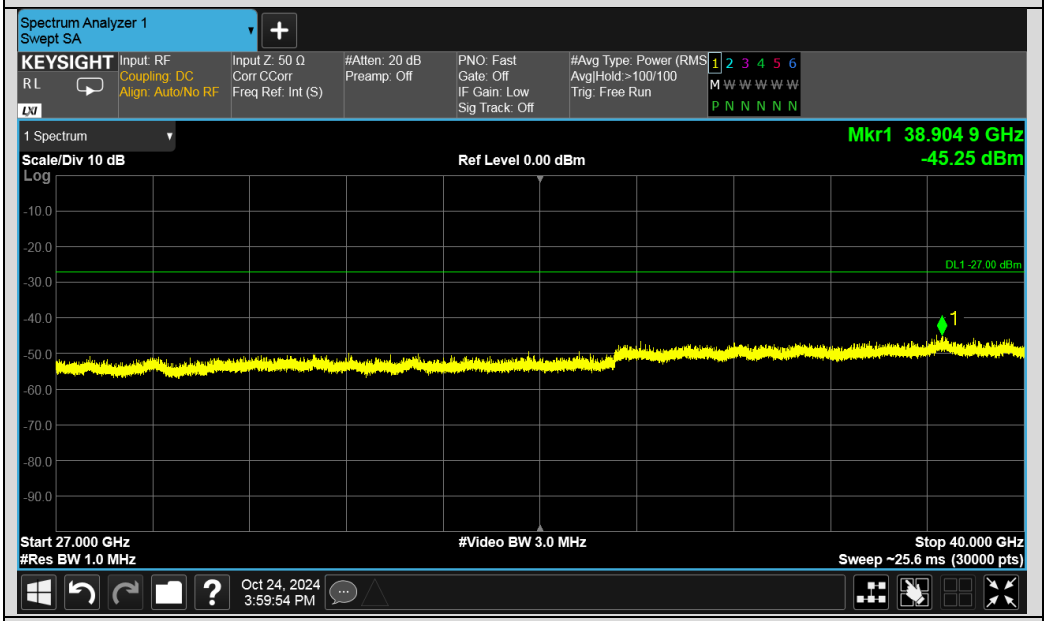
Test_Graph_802.11n40_ANT1_5230_MCS0_Frequency Band 2



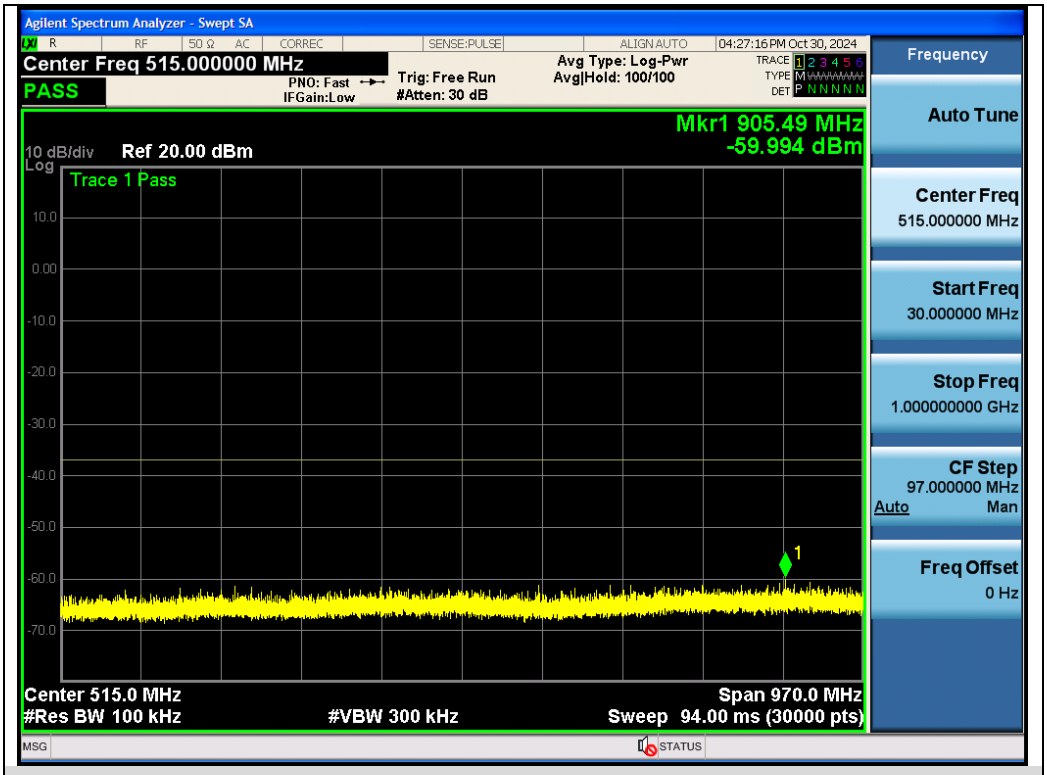
Test_Graph_802.11n40_ANT1_5230_MCS0_Frequency Band 3



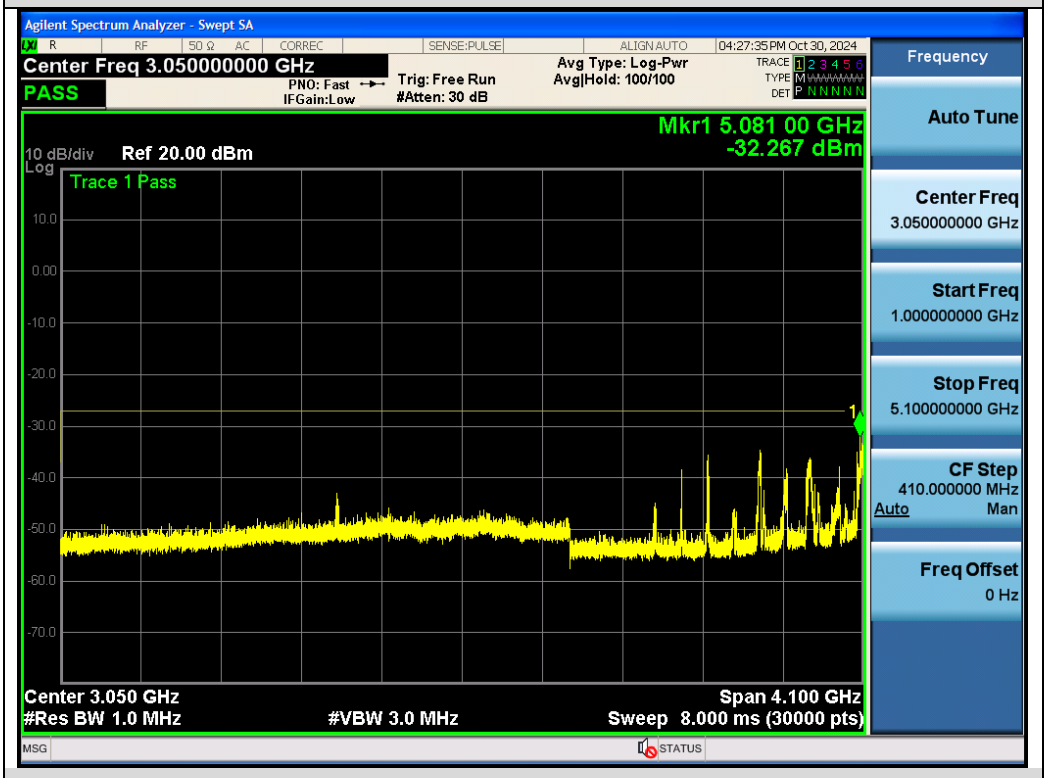
Test_Graph_802.11n40_ANT1_5230_MCS0_Frequency Band 4



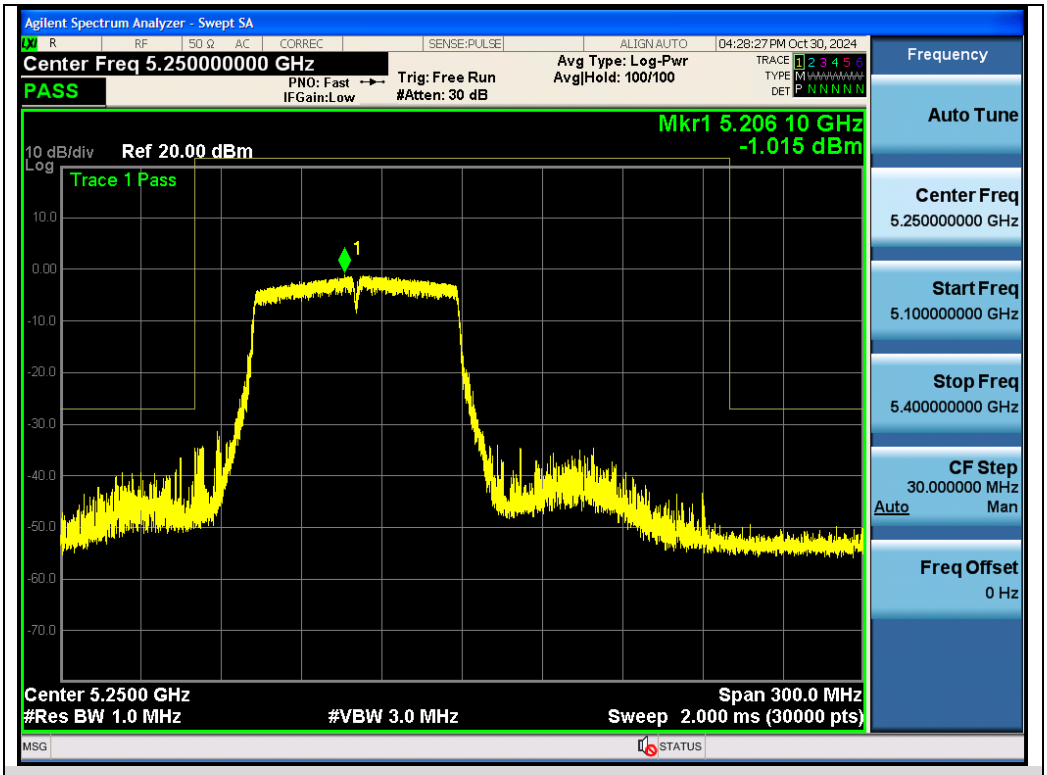
Test_Graph_802.11n40_ANT1_5230_MCS0_Frequency Band 5



Test_Graph_802.11ac80_ANT1_5210_MCS0_Frequency Band 1

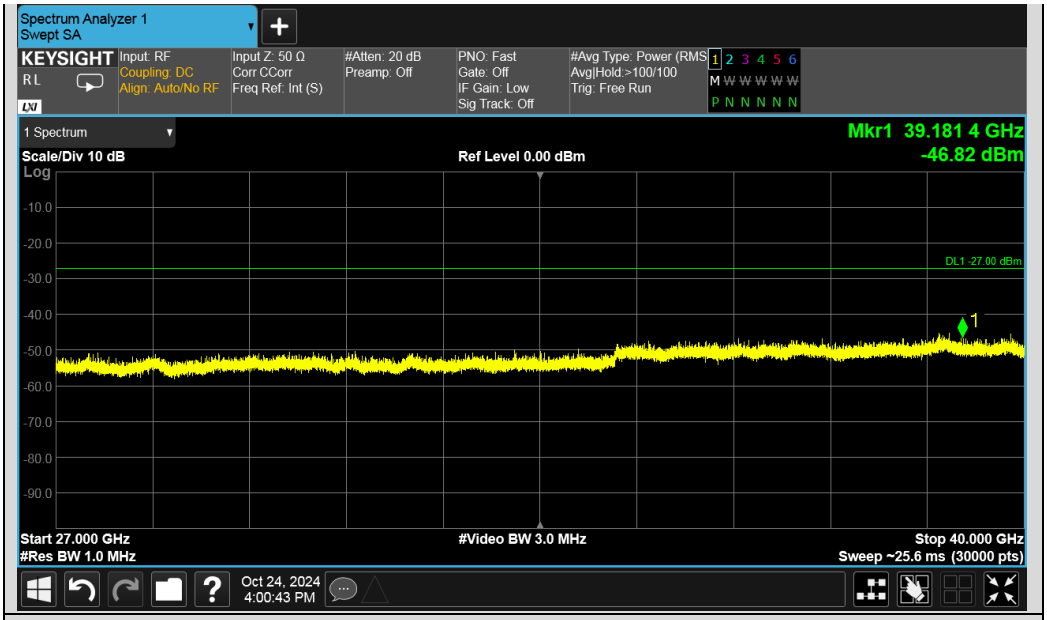


Test_Graph_802.11ac80_ANT1_5210_MCS0_Frequency Band 2

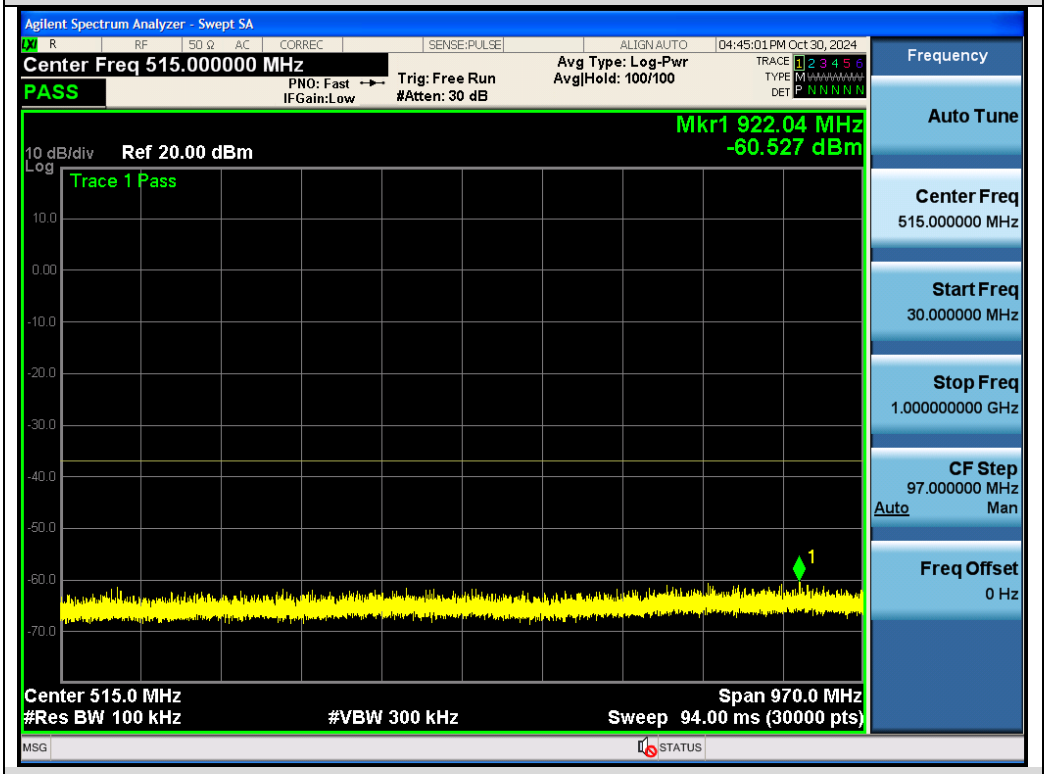


Test_Graph_802.11ac80_ANT1_5210_MCS0_Frequency Band 3

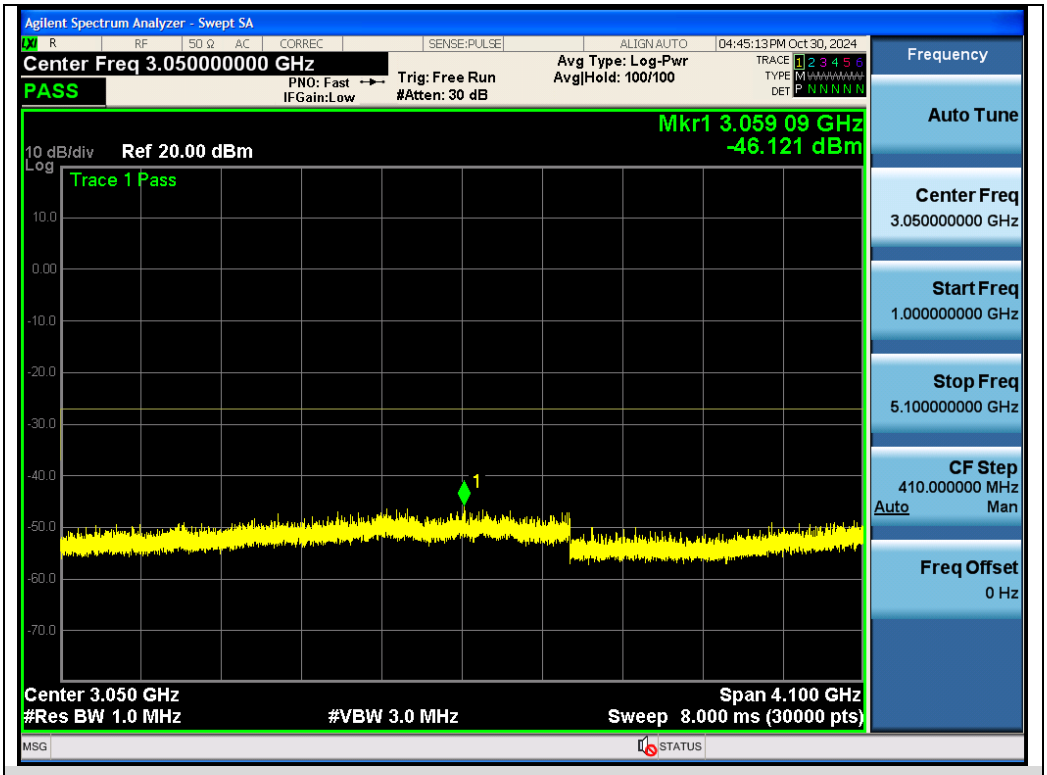
Test_Graph_802.11ac80_ANT1_5210_MCS0_Frequency Band 4



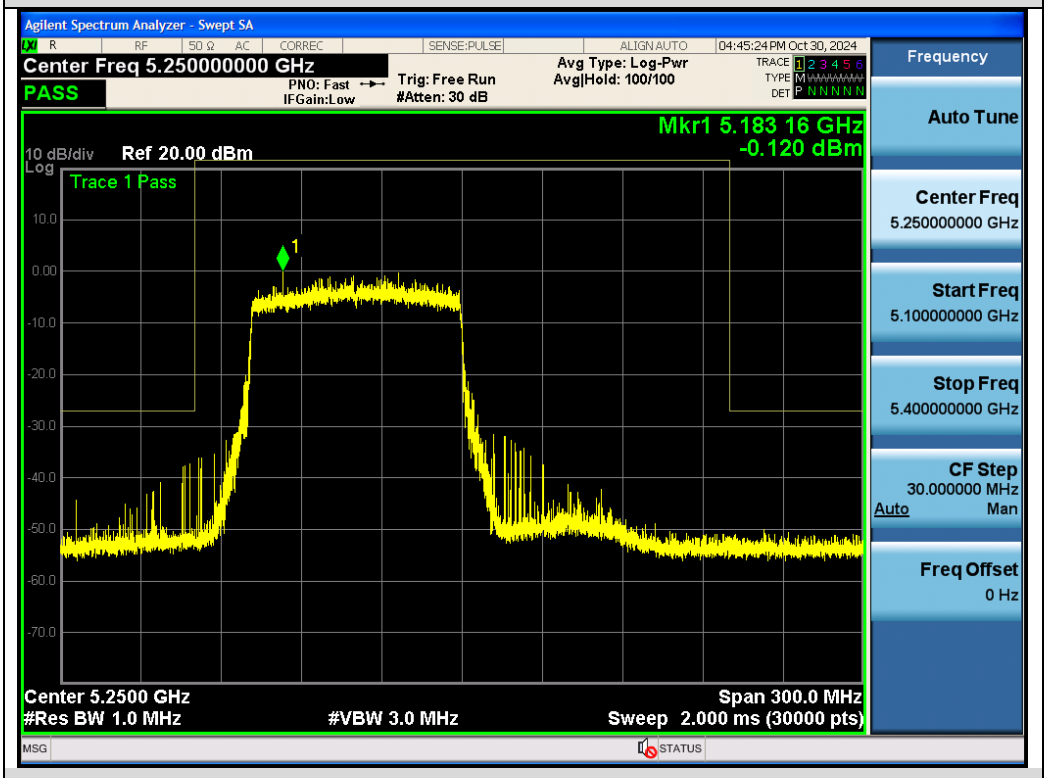
Test_Graph_802.11ac80_ANT1_5210_MCS9_Frequency Band 5



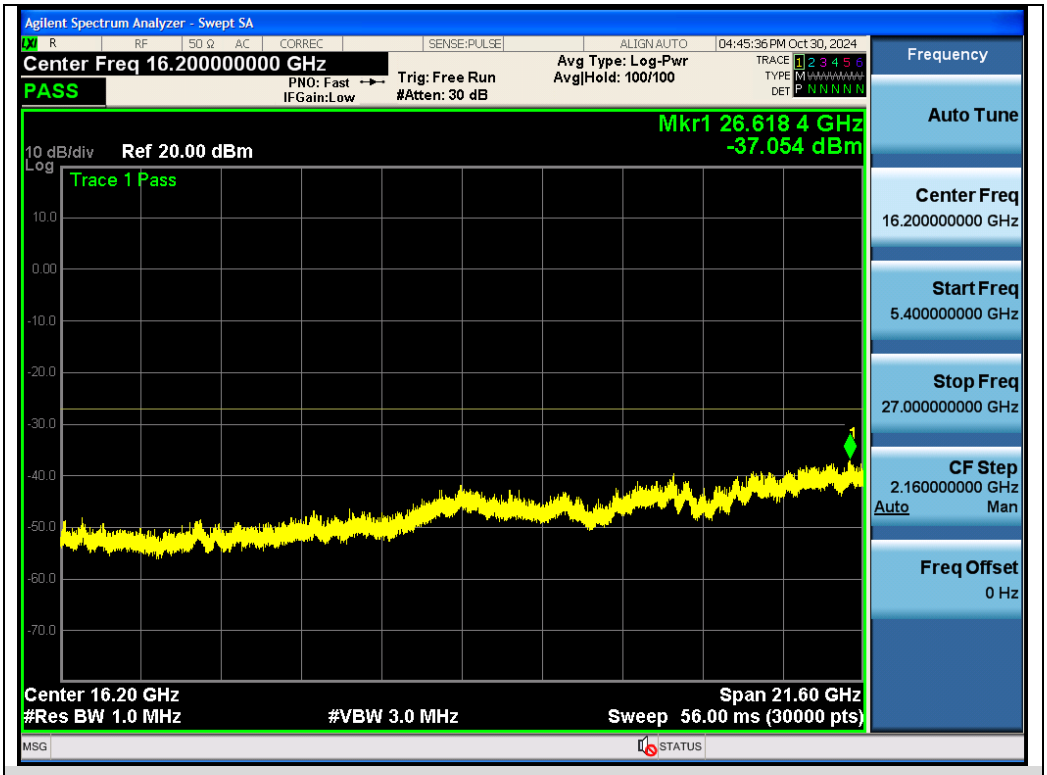
Test_Graph_802.11ax80_ANT1_5210_MCS0_Frequency Band 1



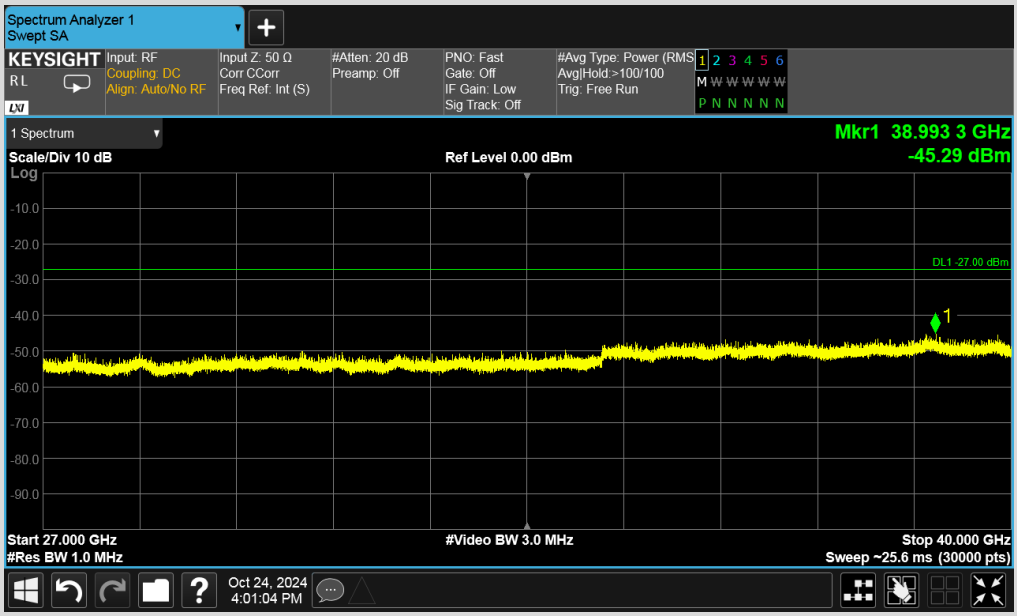
Test_Graph_802.11ax80_ANT1_5210_MCS0_Frequency Band 2



Test_Graph_802.11ax80_ANT1_5210_MCS0_Frequency Band 3

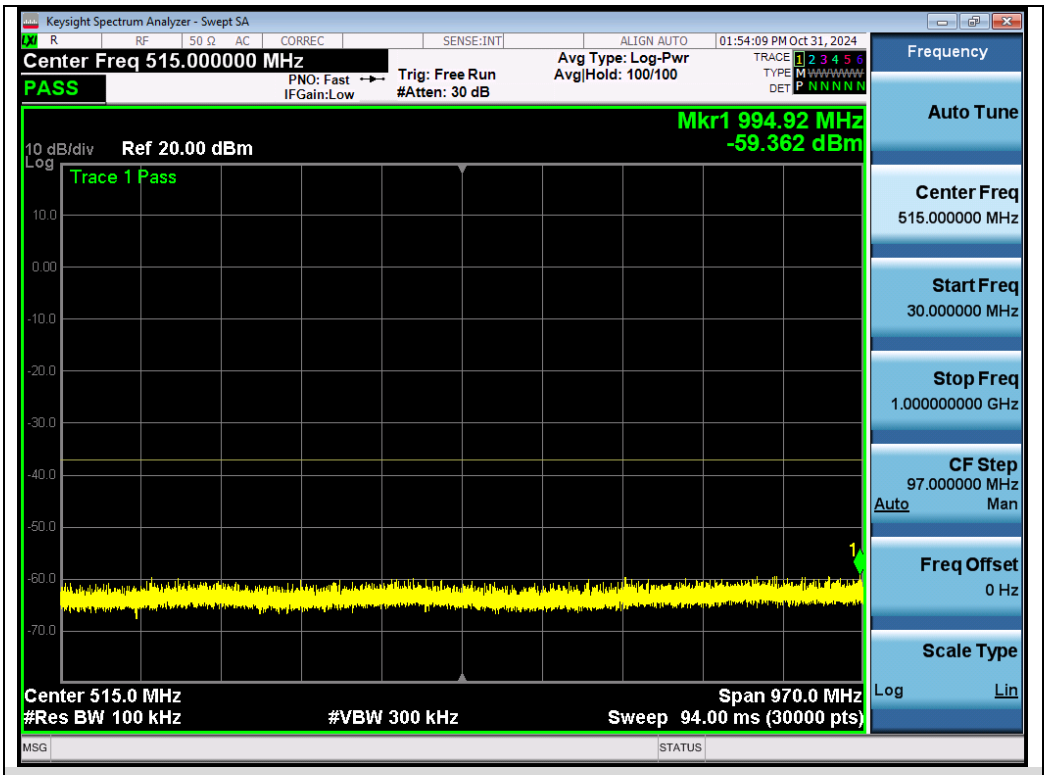


Test_Graph_802.11ax80_ANT1_5210_MCS0_Frequency Band 4

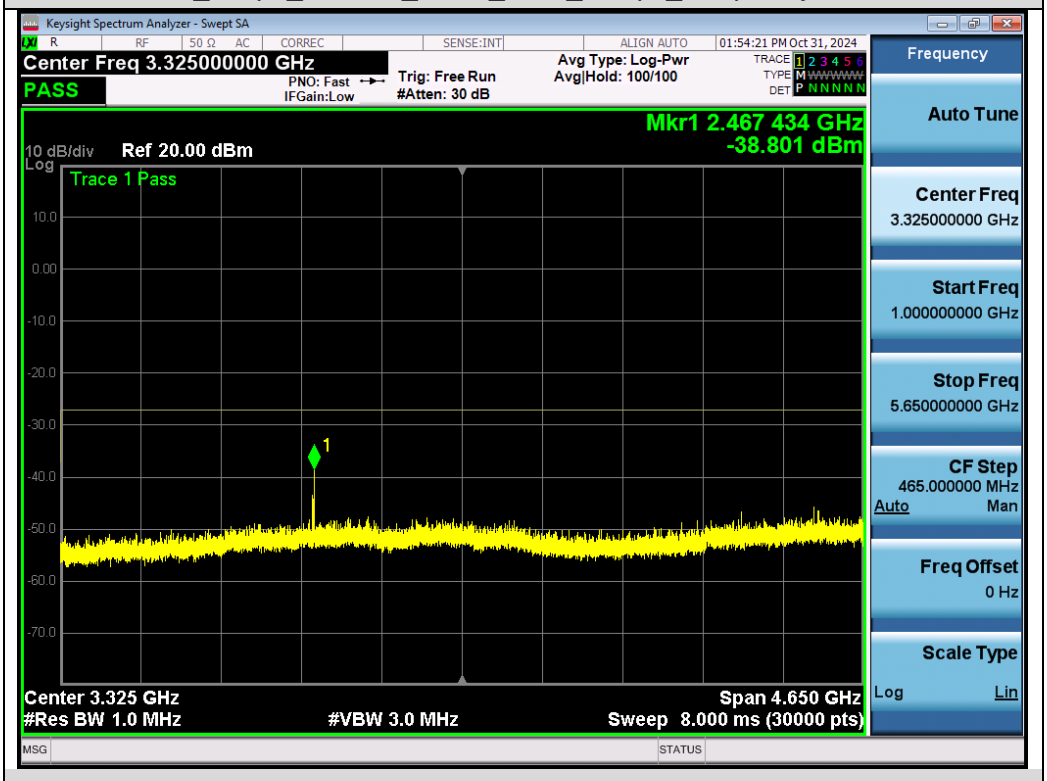


Test_Graph_802.11ax80_ANT1_5210_MCS0_Frequency Band 5

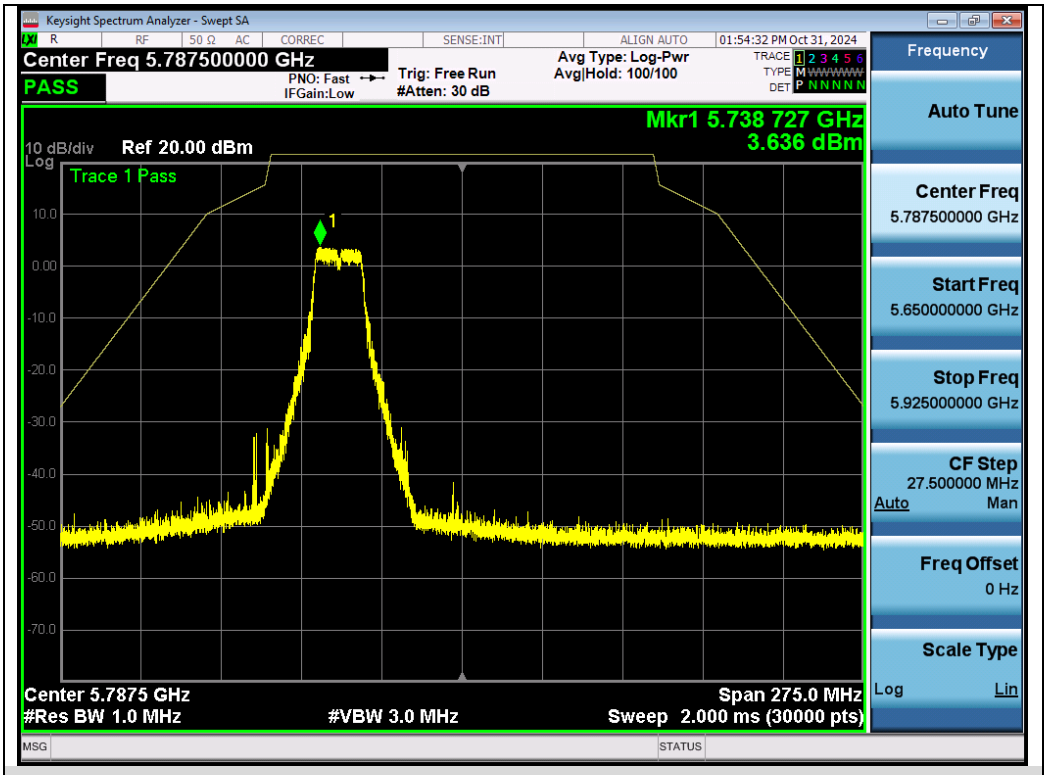
Test Graphs of Spurious Emissions outside of the 5.725-5.85 GHz band



Test_Graph_802.11a_ANT1_5745_6Mbps_Frequency Band1

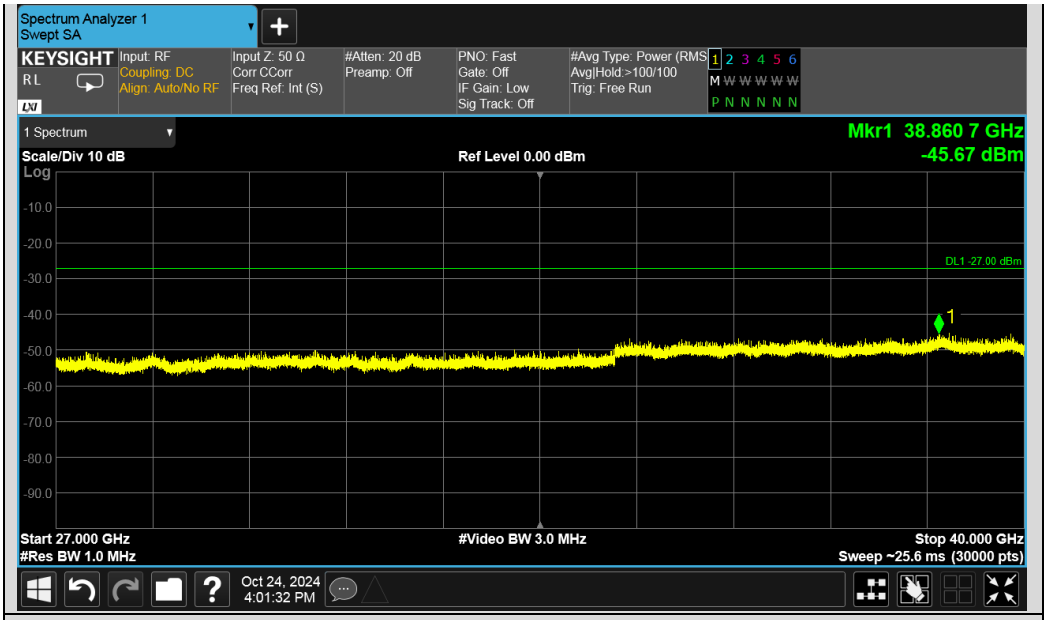


Test_Graph_802.11a_ANT1_5745_6Mbps_Frequency Band2

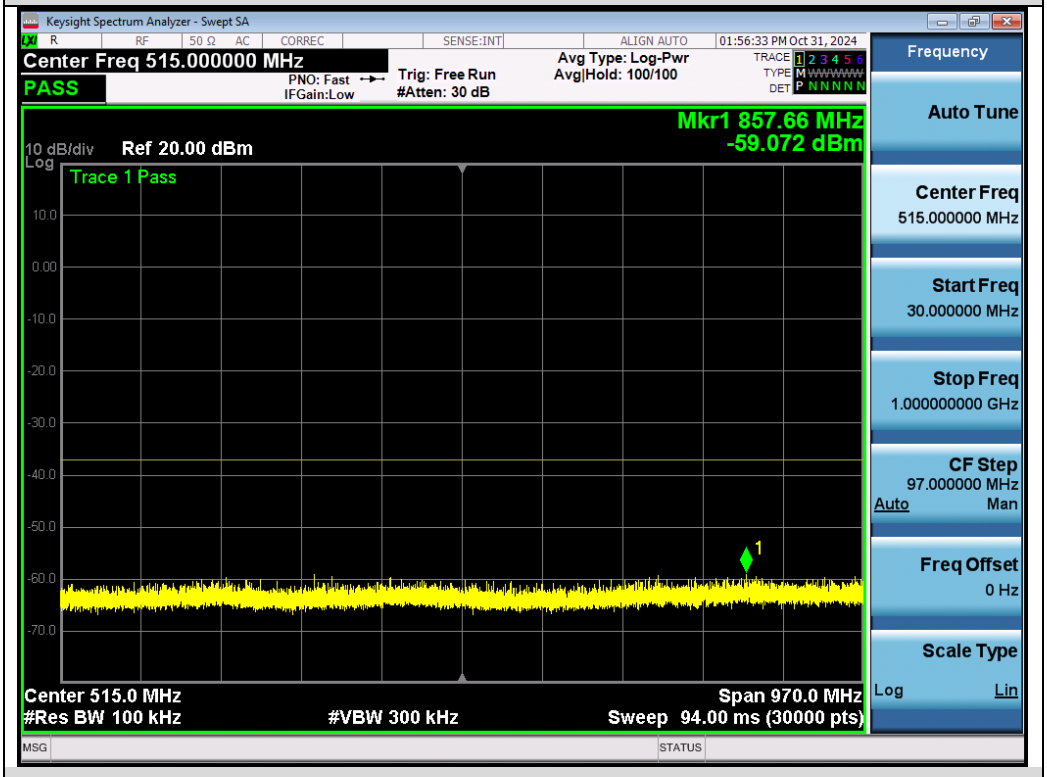


Test_Graph_802.11a_ANT1_5745_6Mbps_Frequency Band3

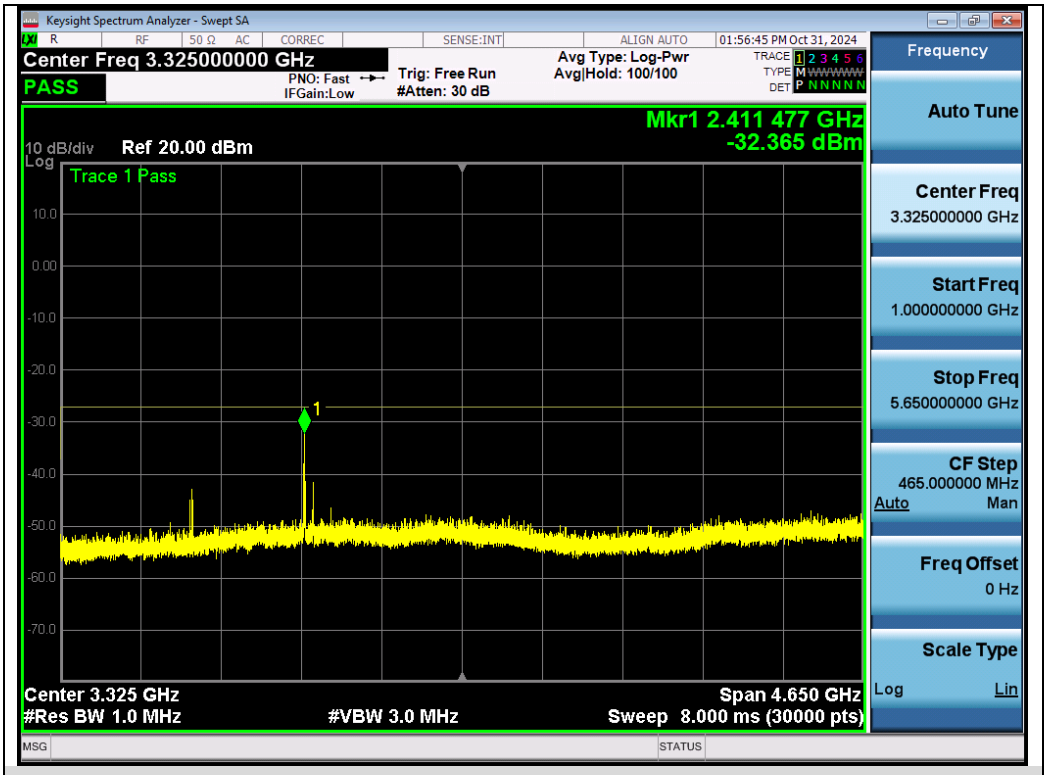
Test_Graph_802.11a_ANT1_5745_6Mbps_Frequency Band4



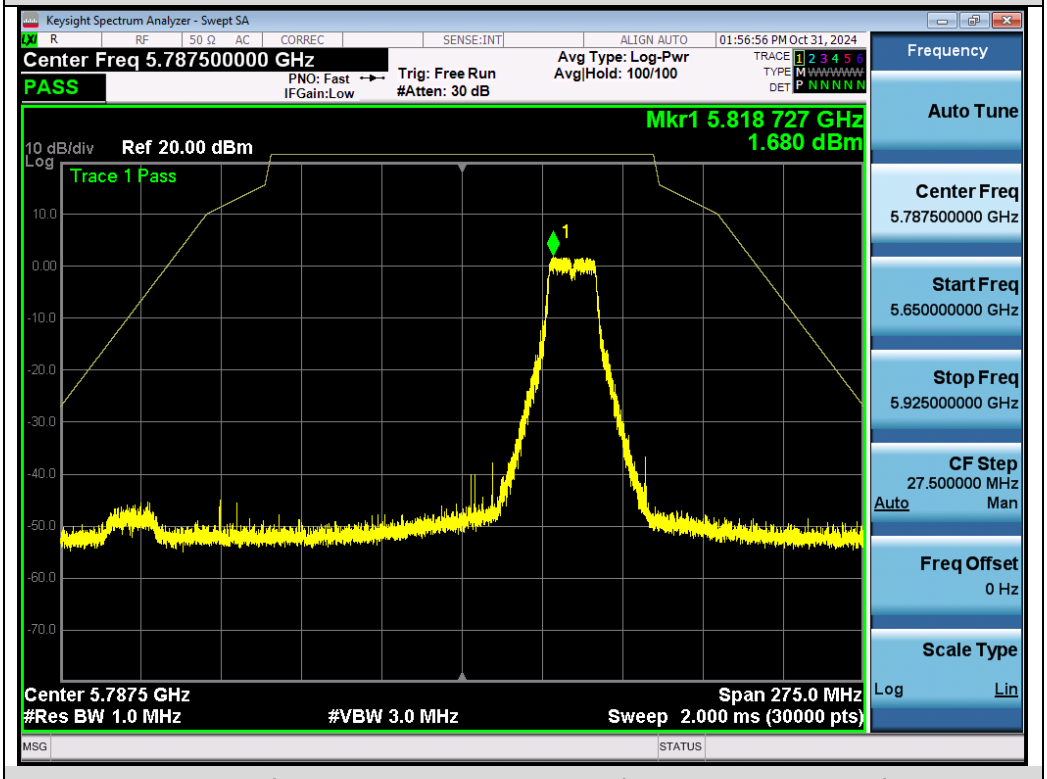
Test_Graph_802.11a_ANT1_5745_6Mbps_Frequency Band5



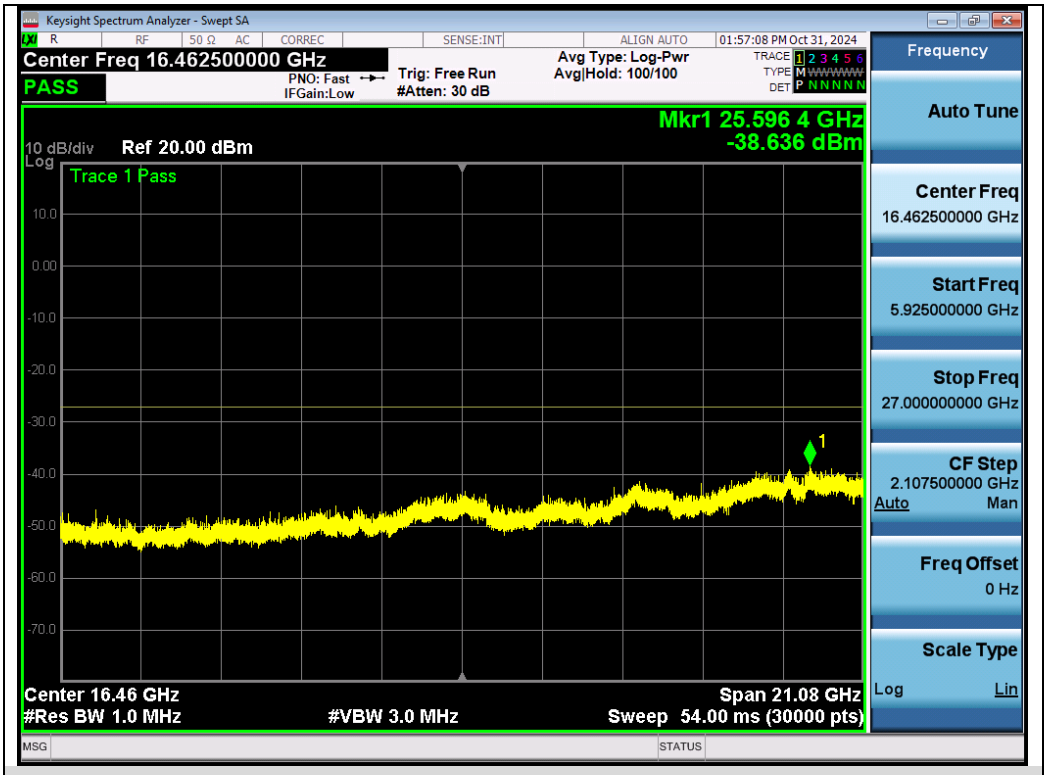
Test_Graph_802.11a_ANT1_5825_6Mbps_Frequency Band1



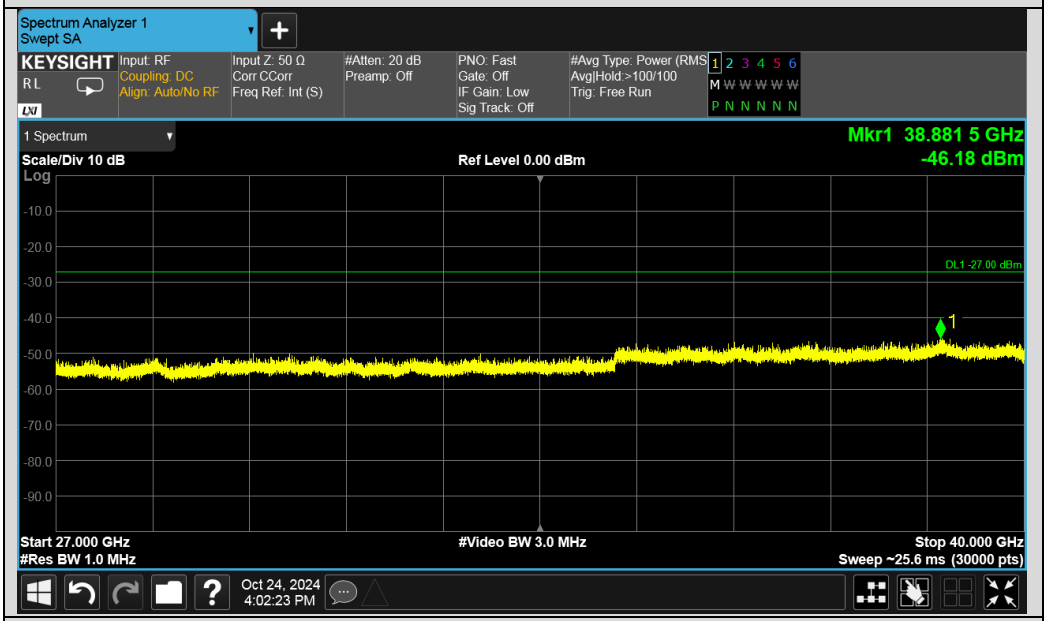
Test_Graph_802.11a_ANT1_5825_6Mbps_Frequency Band2



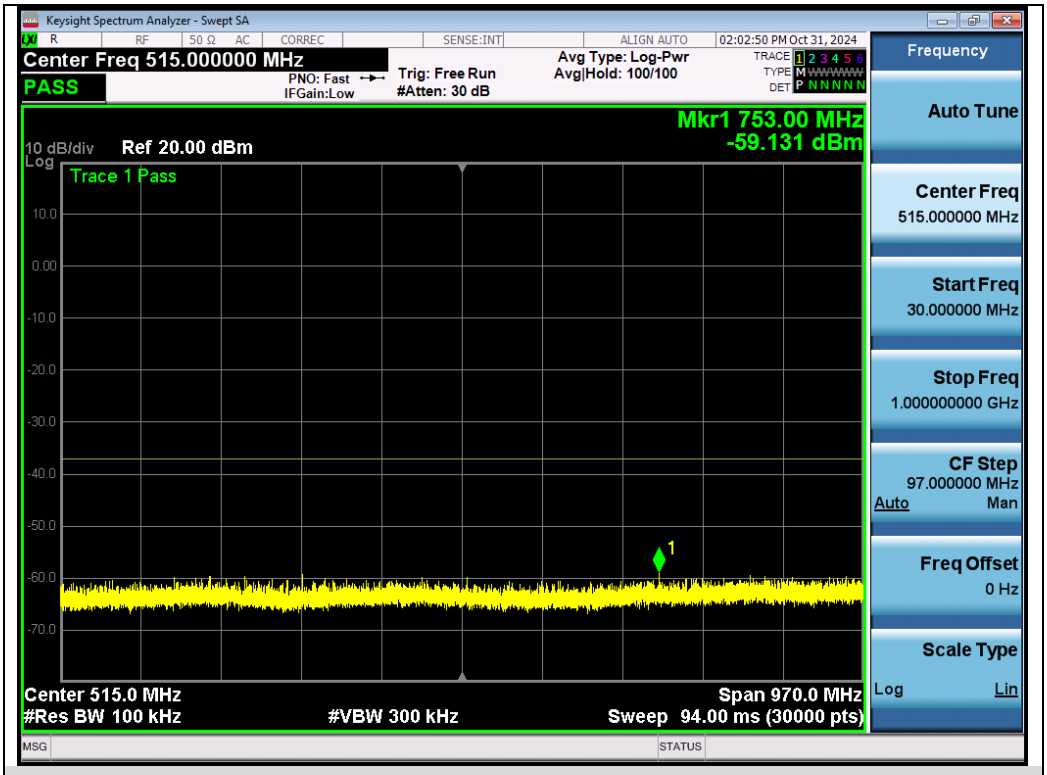
Test_Graph_802.11a_ANT1_5825_6Mbps_Frequency Band3



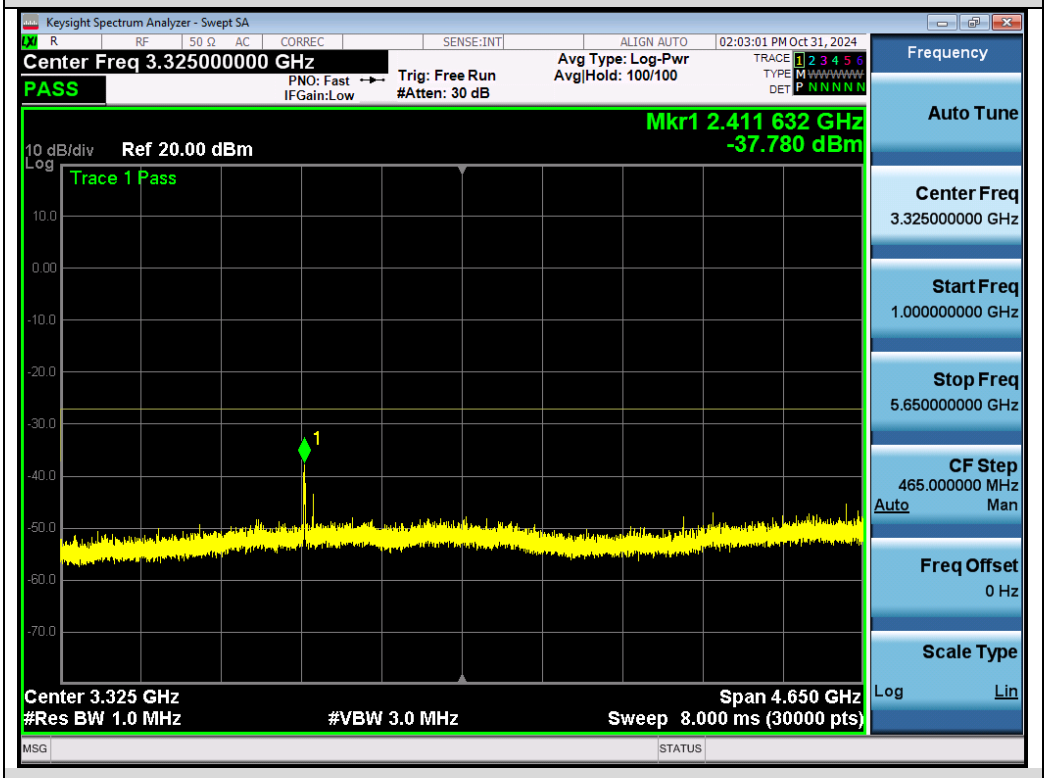
Test_Graph_802.11a_ANT1_5825_6Mbps_Frequency Band4



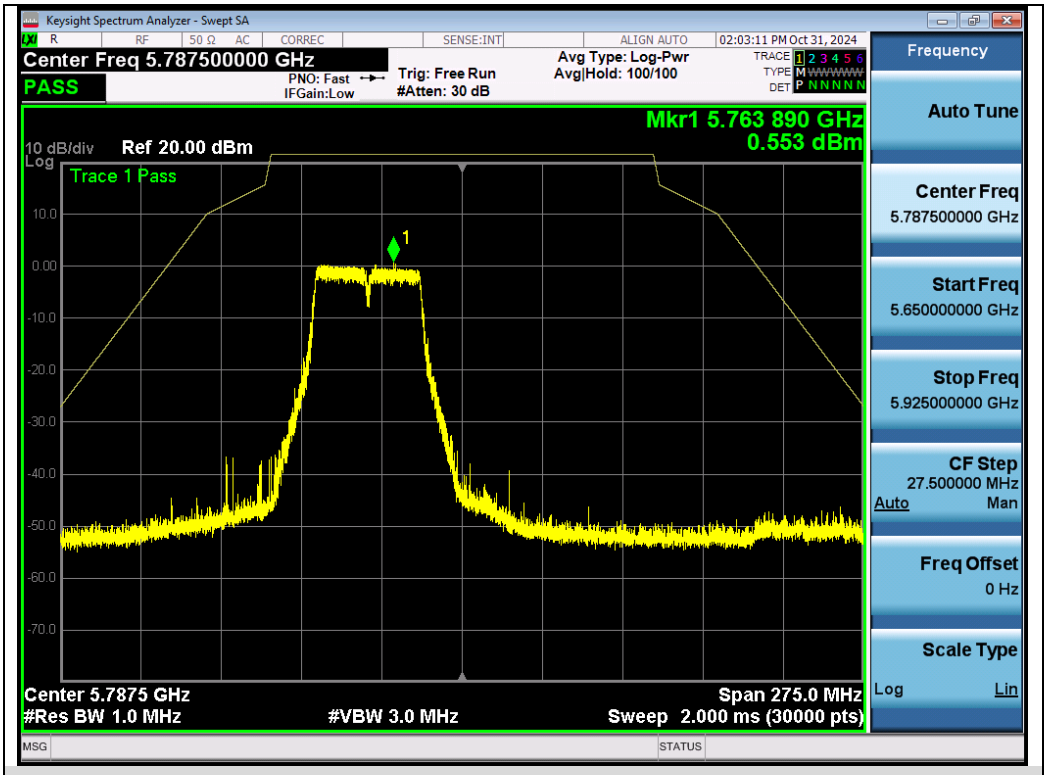
Test_Graph_802.11a_ANT1_5825_6Mbps_Frequency Band5



Test_Graph_802.11n40_ANT1_5755_MCS0_Frequency Band1

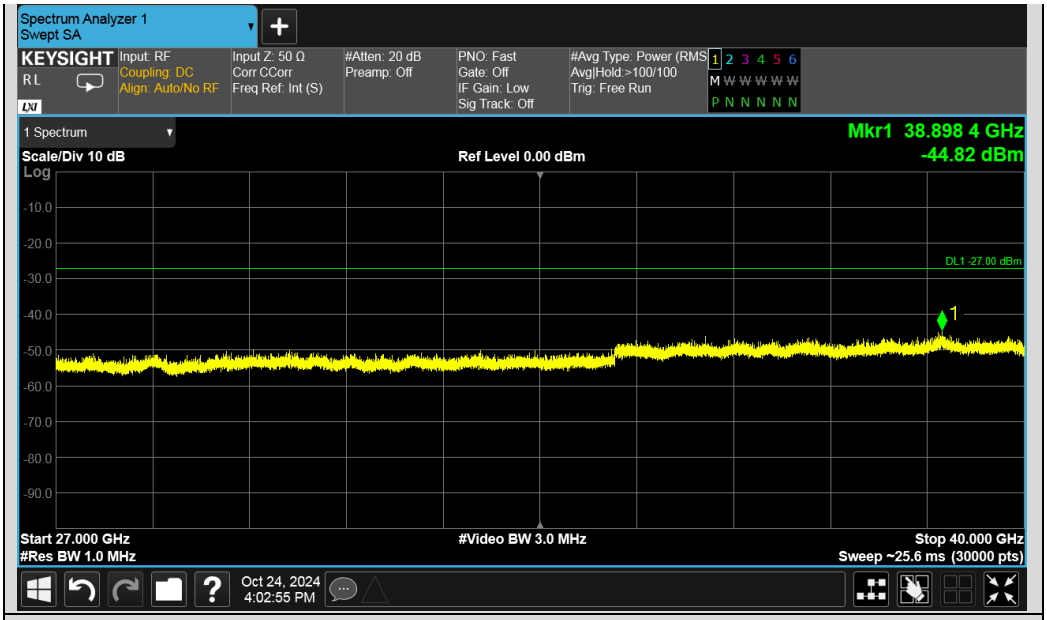


Test_Graph_802.11n40_ANT1_5755_MCS0_Frequency Band2

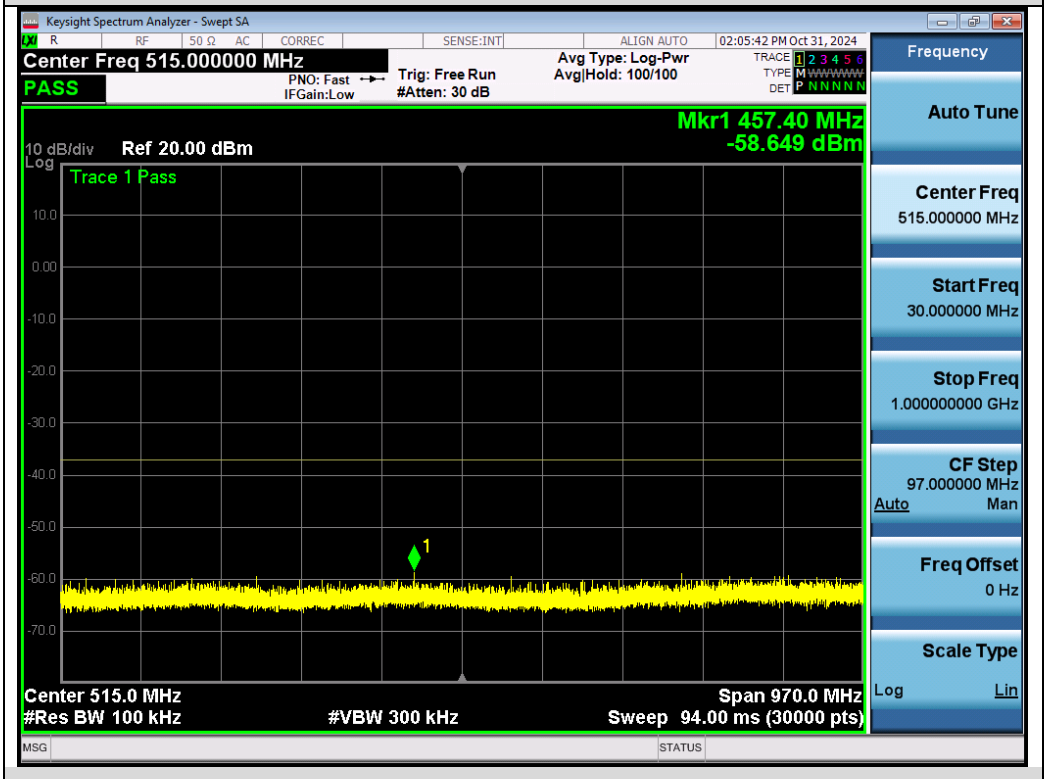


Test_Graph_802.11n40_ANT1_5755_MCS0_Frequency Band3

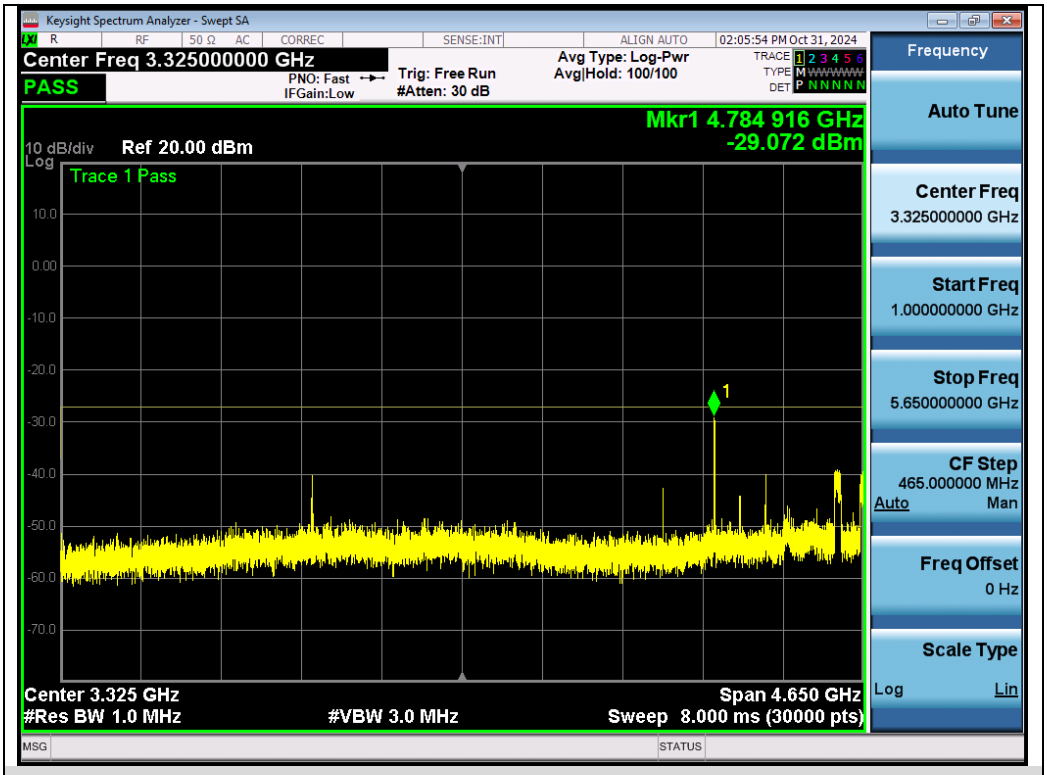
Test_Graph_802.11n40_ANT1_5755_MCS0_Frequency Band4



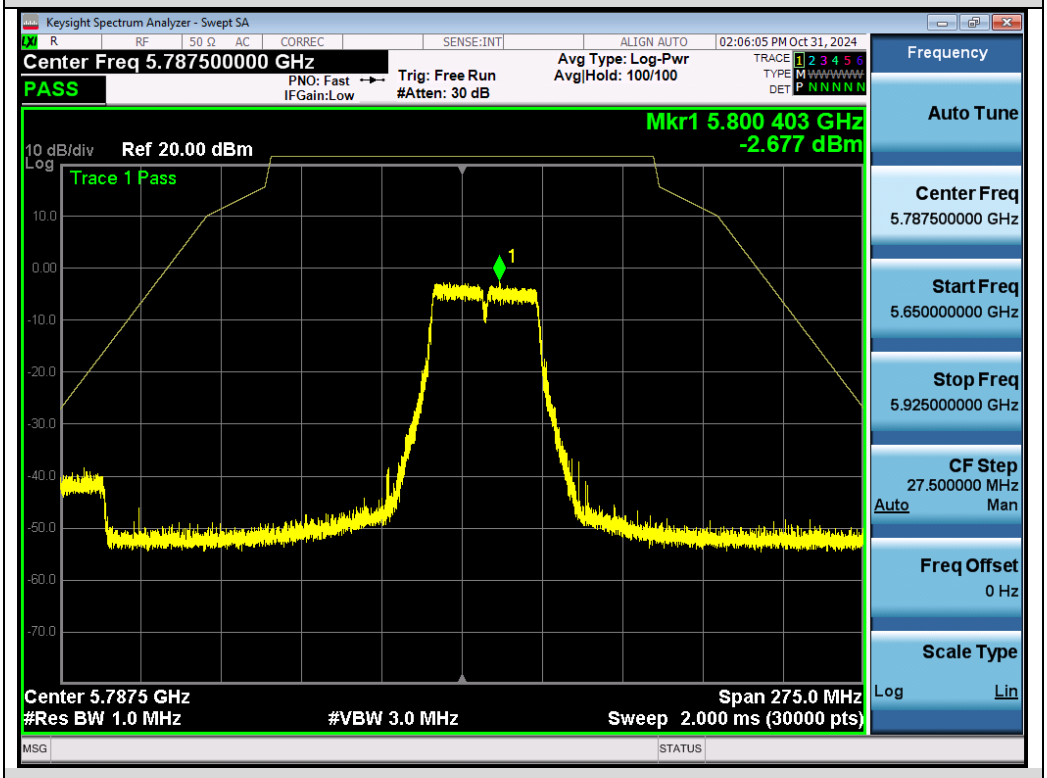
Test_Graph_802.11n40_ANT1_5755_MCS0_Frequency Band5



Test_Graph_802.11n40_ANT1_5795_MCS0_Frequency Band1



Test_Graph_802.11n40_ANT1_5795_MCS0_Frequency Band2



Test_Graph_802.11n40_ANT1_5795_MCS0_Frequency Band3