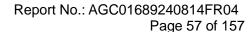
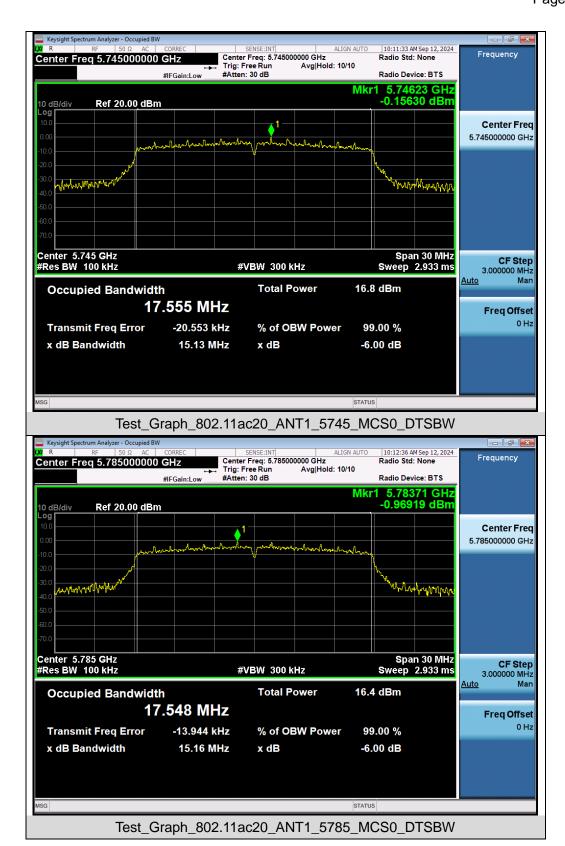
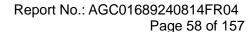


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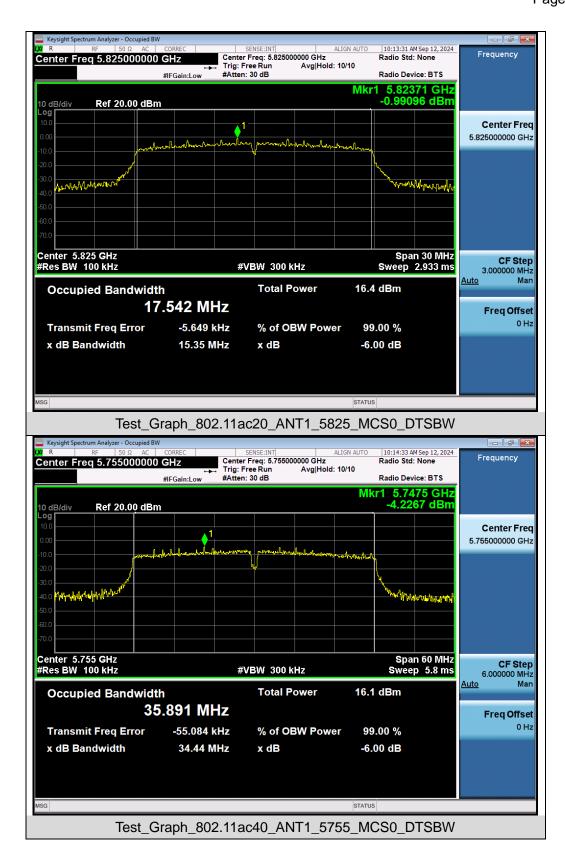




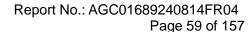




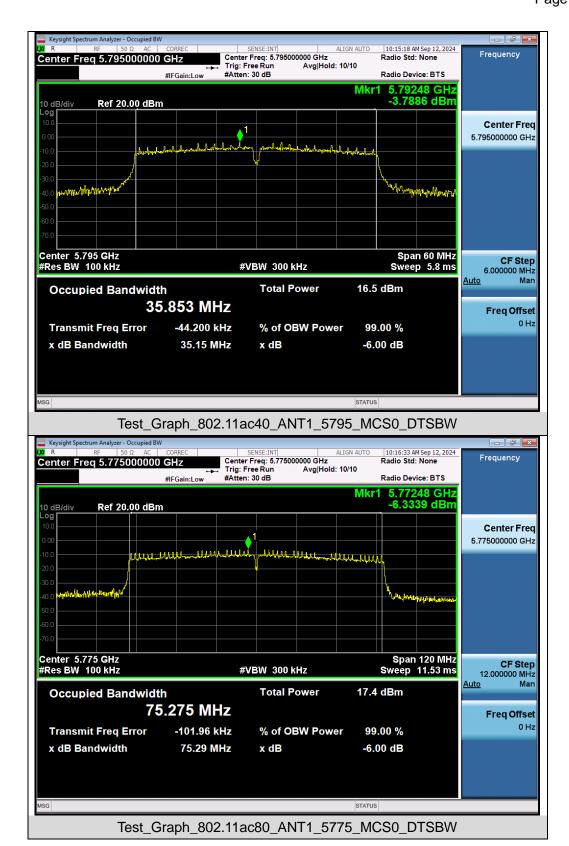




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# 9. Power Spectral Density Measurement

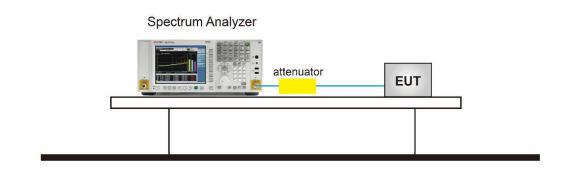
## 9.1 Provisions Applicable

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

#### 9.2 Measurement Procedure

- 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)

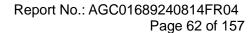




#### 9.4 Measurement Result

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
	5180	1.166	11	Pass
802.11a	5200	1.549	11	Pass
	5240	2.630	11	Pass
802.11n20	5180	-0.089	11	Pass
	5200	0.402	11	Pass
	5240	1.933	11	Pass
802.11n40	5190	-3.658	11	Pass
	5230	-3.170	11	Pass
802.11ac20	5180	0.295	11	Pass
	5200	0.875	11	Pass
	5240	1.978	11	Pass
802.11ac40	5190	-4.282	11	Pass
	5230	-3.178	11	Pass
802.11ac80	5210	-6.744	11	Pass

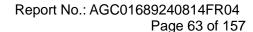
Test Data of Conducted Output Power Density for band 5.25-5.35 GHz				
Test Mode	Test Channel Average Power Density (dBm/MHz)		Limits (dBm/MHz)	Pass or Fail
	5260	3.682	11	Pass
802.11a	5300	2.924	11	Pass
	5320	2.613	11	Pass
	5260	2.160	11	Pass
802.11n20	5300	1.538	11	Pass
	5320	0.623	11	Pass
802.11n40	5270	-2.854	11	Pass
	5310	-3.441	11	Pass
	5260	2.222	11	Pass
802.11ac20	5300	1.533	11	Pass
	5320	0.915	11	Pass
802.11ac40	5270	-2.769	11	Pass
	5310	-3.795	11	Pass
802.11ac80	5290	-6.213	11	Pass





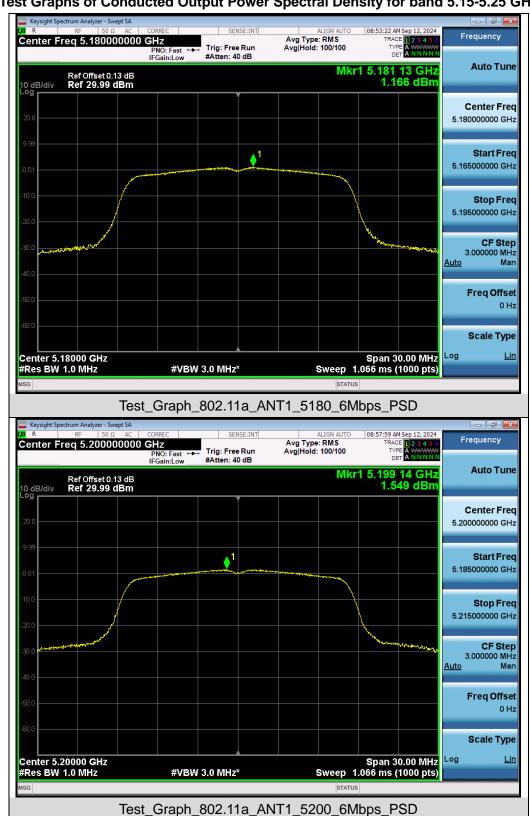
Test Data of Conducted Output Power Density for band 5.725-5.85 GHz					
Test Mode	Test Channel (MHz)	Average Power Density (dBm/100kHz)	Average Power Density (dBm/500kHz)	Limits (dBm/500kHz)	Pass or Fail
802.11a	5745	-7.741	-0.751	30	Pass
	5785	-8.436	-1.446	30	Pass
	5825	-8.277	-1.287	30	Pass
802.11n20	5745	-9.452	-2.462	30	Pass
	5785	-9.747	-2.757	30	Pass
	5825	-9.931	-2.941	30	Pass
802.11n40	5755	-12.343	-5.353	30	Pass
	5795	-12.743	-5.753	30	Pass
802.11ac20	5745	-9.067	-2.077	30	Pass
	5785	-9.501	-2.511	30	Pass
	5825	-9.662	-2.672	30	Pass
802.11ac40	5755	-12.588	-5.598	30	Pass
	5795	-12.878	-5.888	30	Pass
802.11ac80	5775	-15.592	-8.602	30	Pass

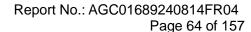
Note:1.Power density(dBm/500kHz) = Power density(dBm/100kHz)+10\*log(500/100).



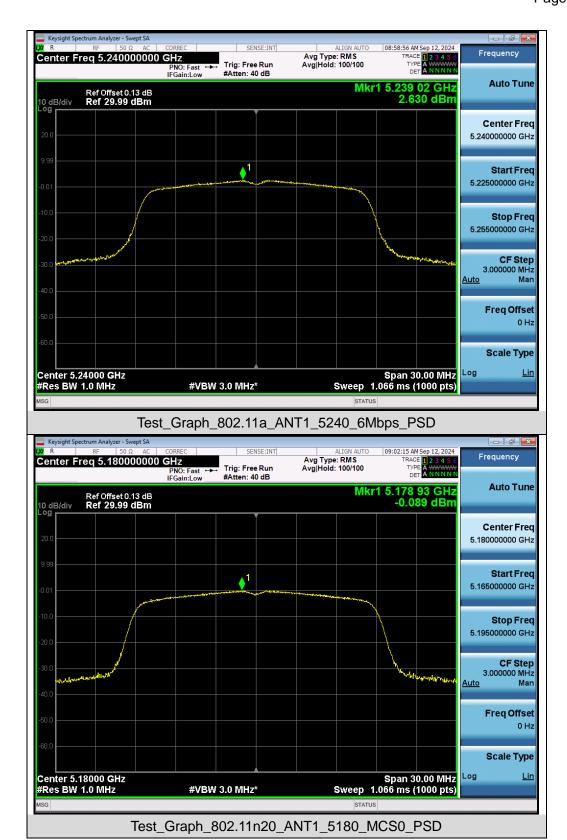


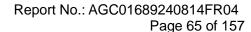
#### Test Graphs of Conducted Output Power Spectral Density for band 5.15-5.25 GHz



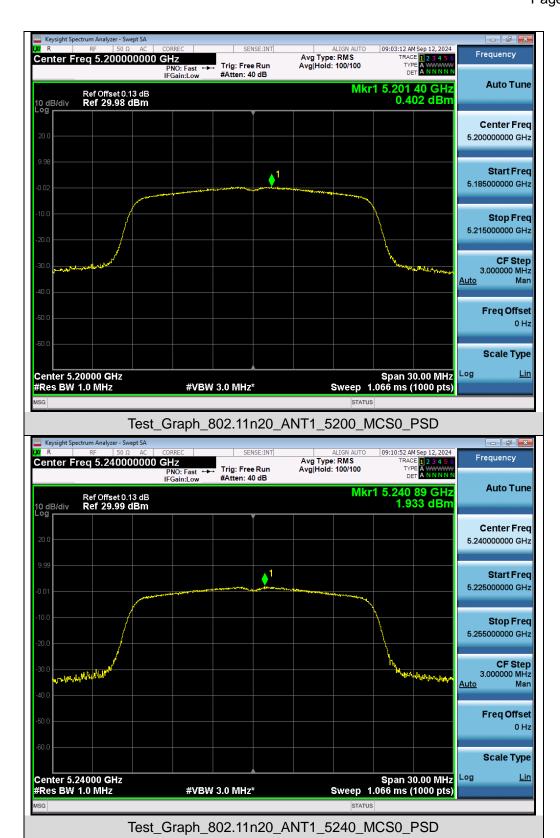


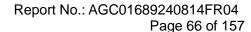




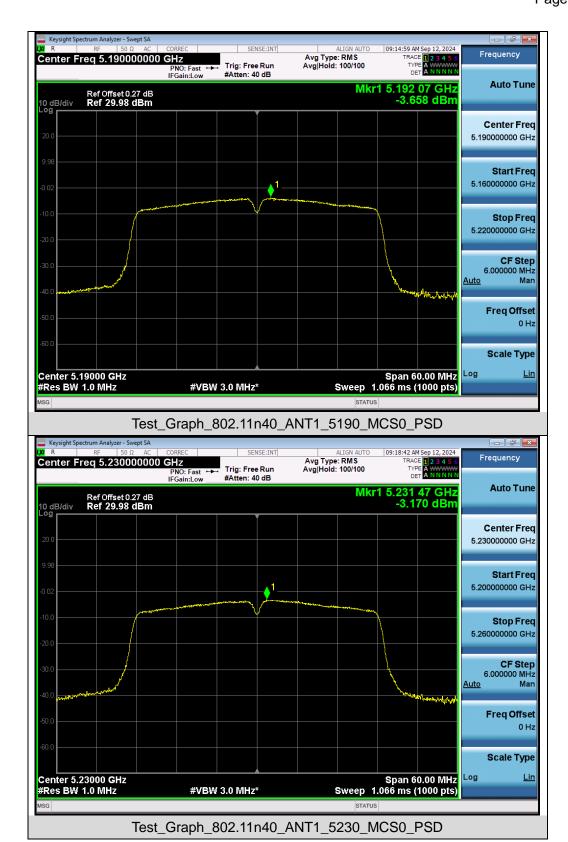


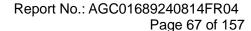






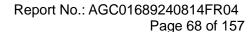




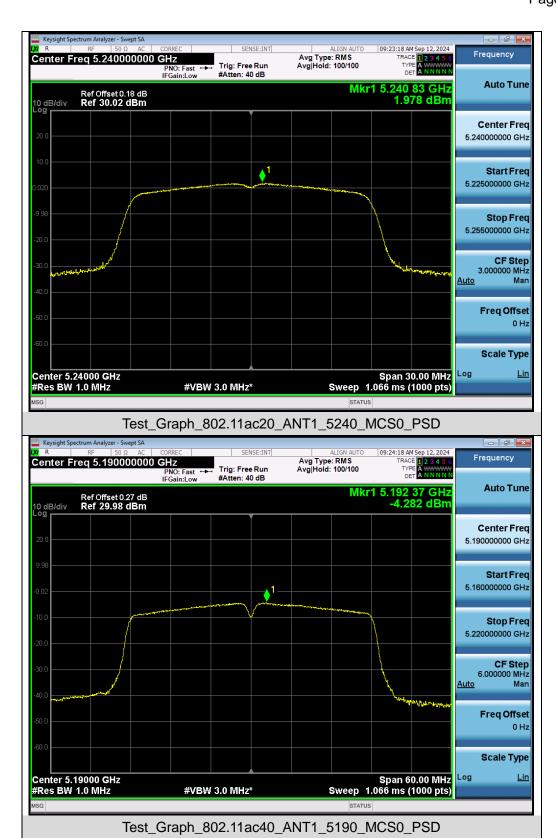


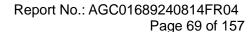




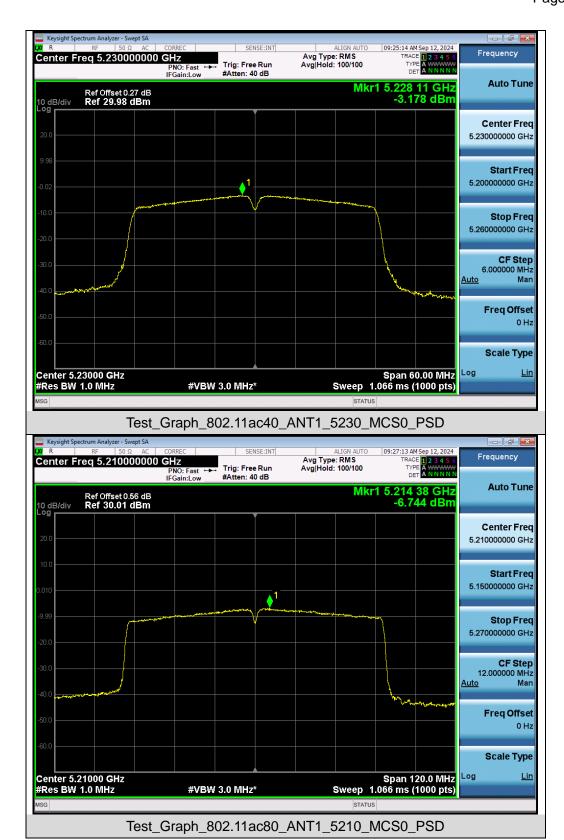


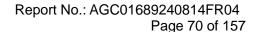






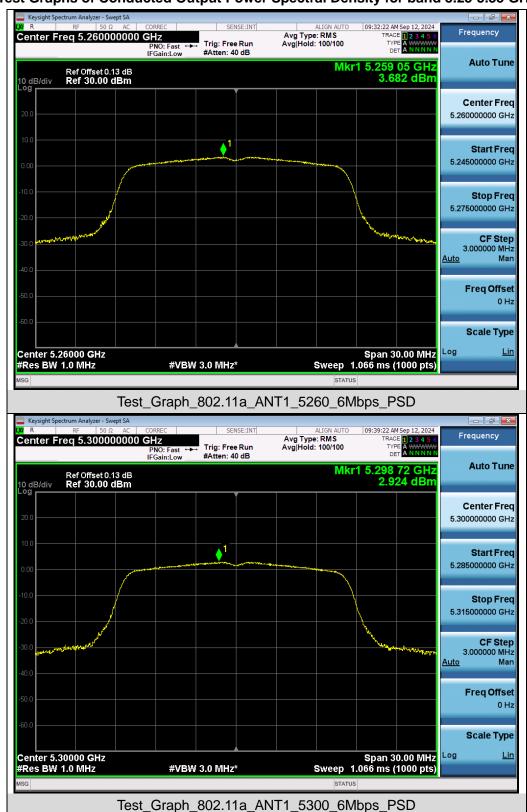


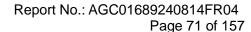




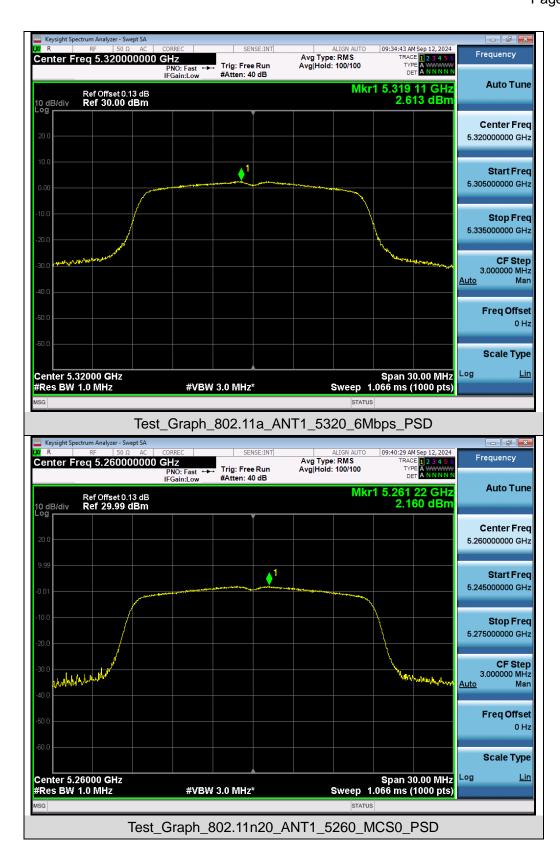


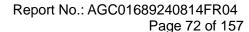
## Test Graphs of Conducted Output Power Spectral Density for band 5.25-5.35 GHz





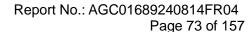




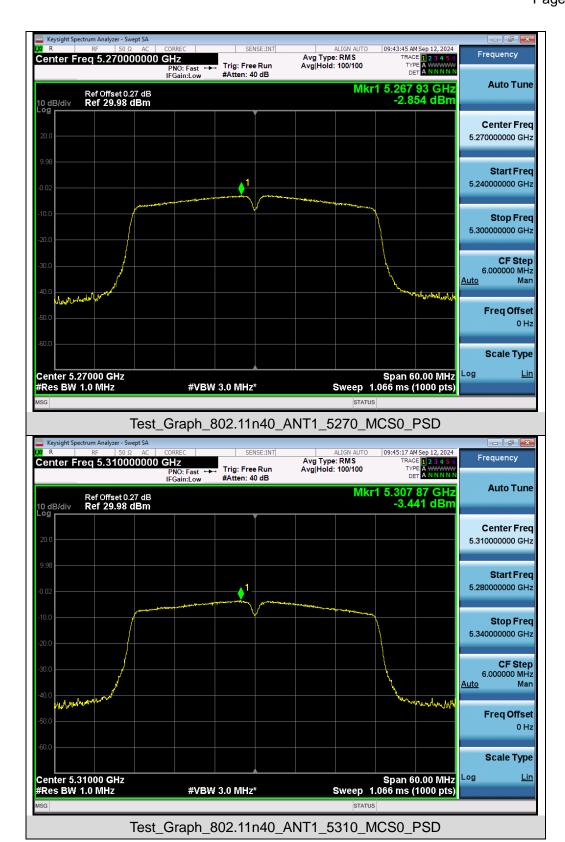


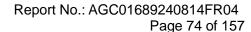




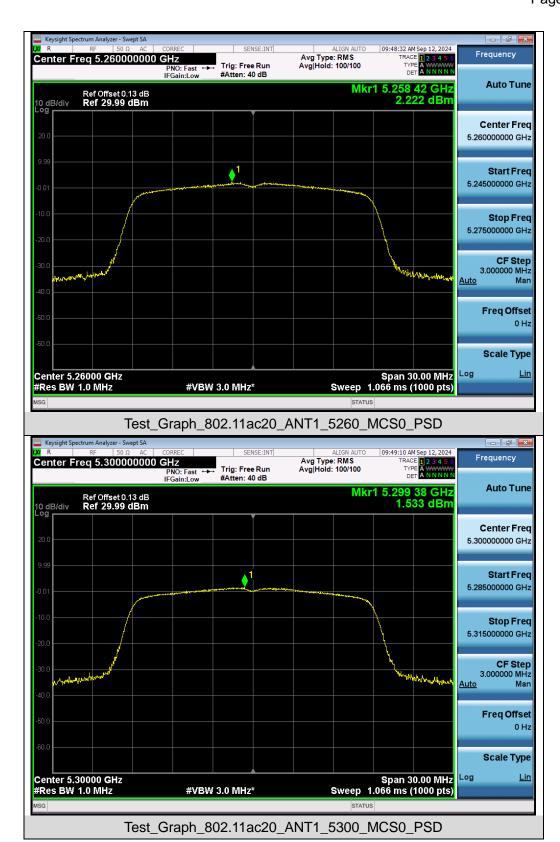


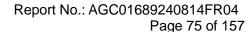




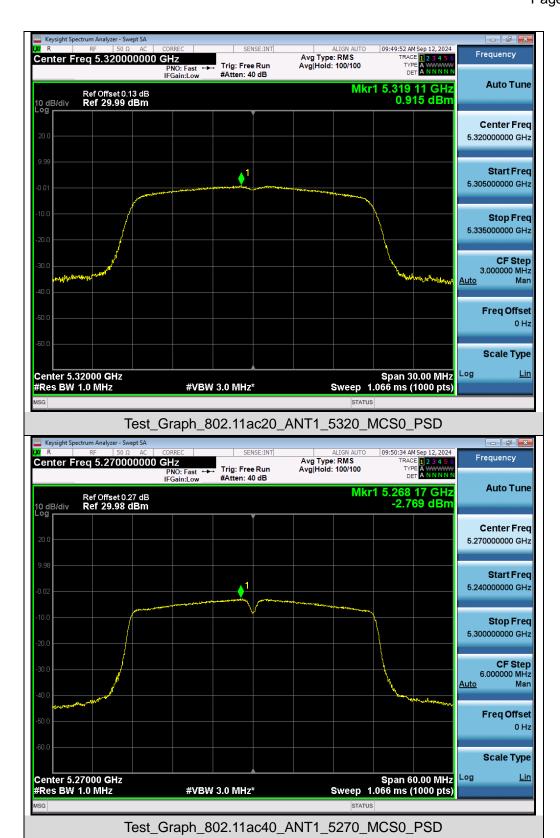


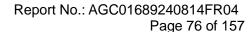




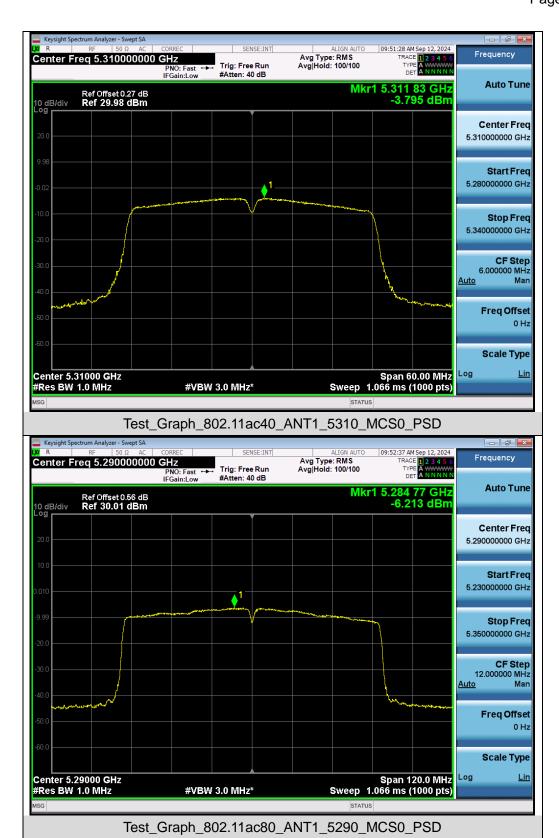


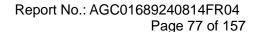






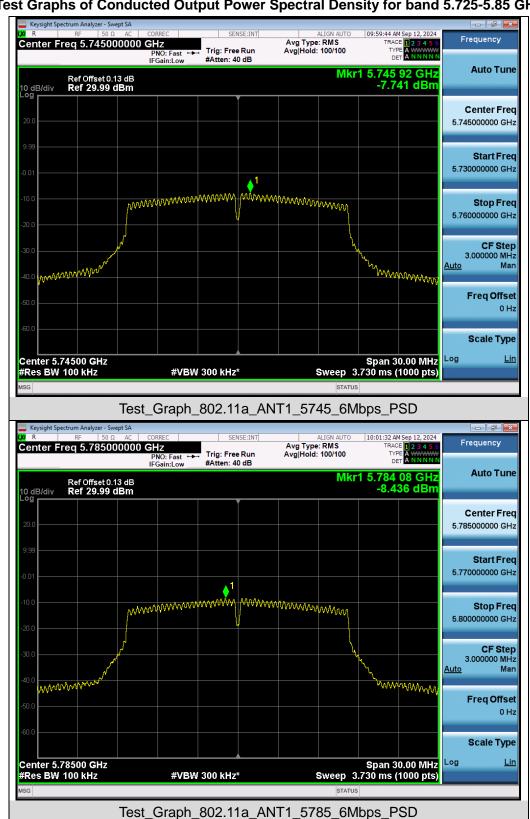


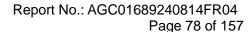




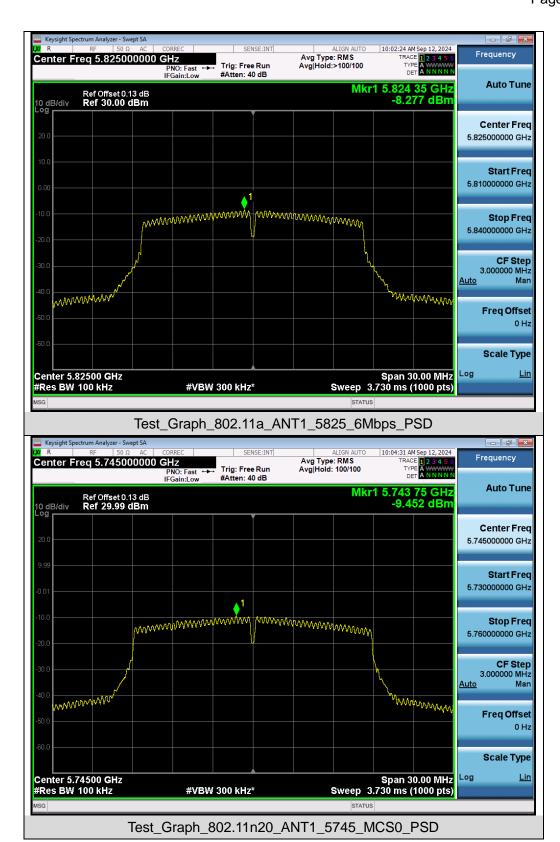


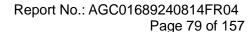
## Test Graphs of Conducted Output Power Spectral Density for band 5.725-5.85 GHz





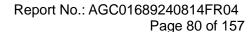




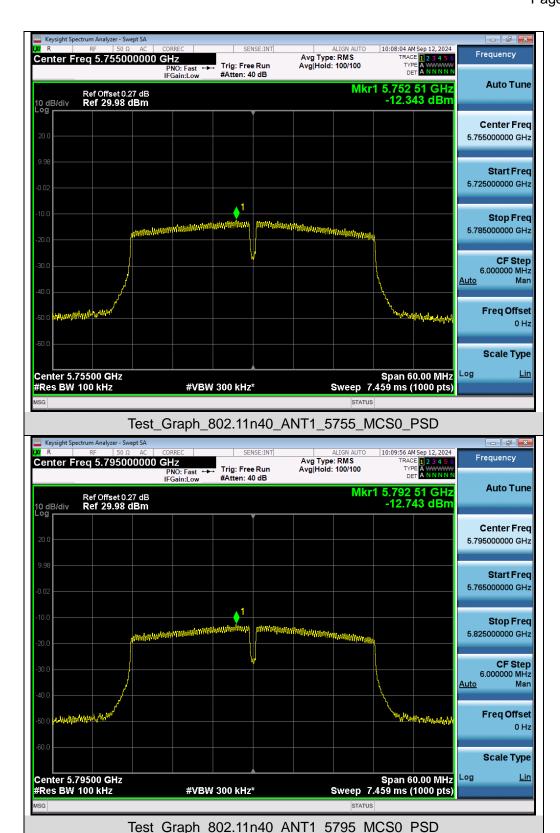


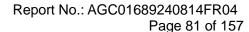






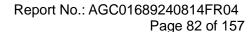




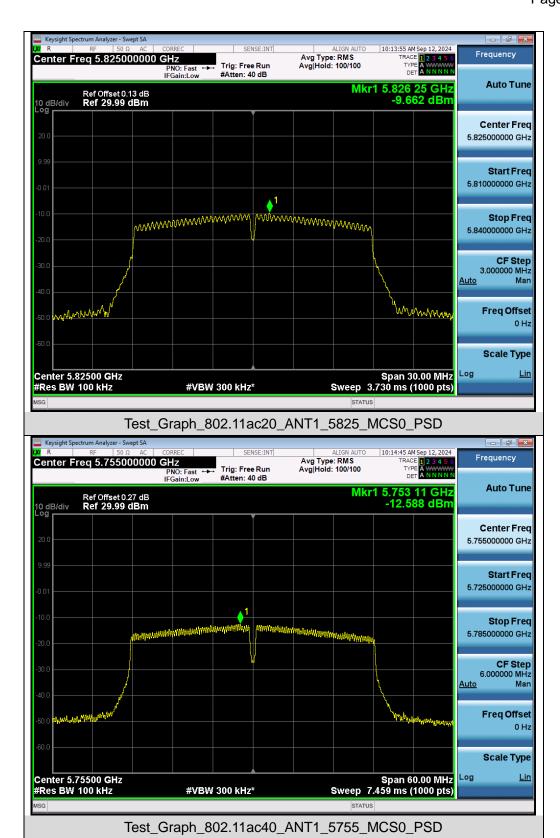


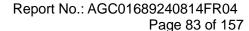




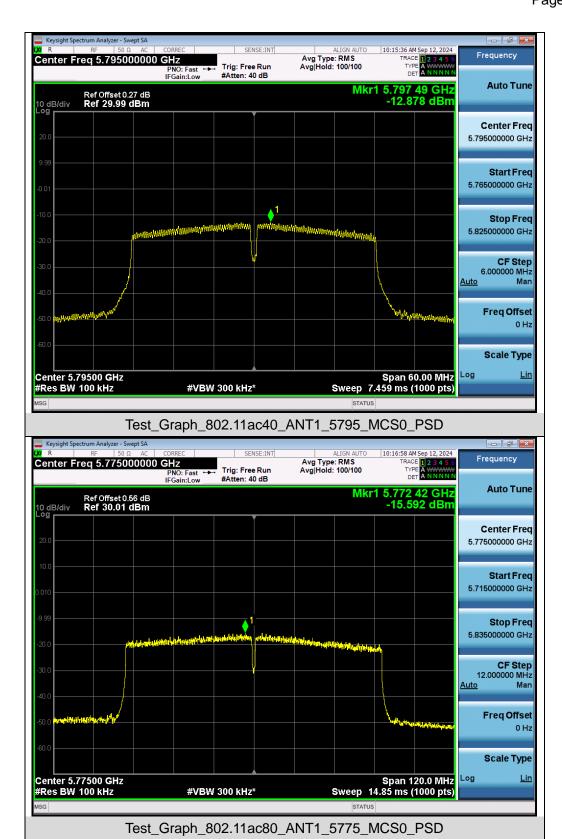














Report No.: AGC01689240814FR04

Page 84 of 157

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

## 10.1 Provisions Applicable

	Applicable to	Limit		
Restricted bands	789033 D02 General UNII Test	Field strength at 3m (dBuV/m)		
	Procedures New Rules v02r01	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: 68.2	
	15.407(b)(2)	PK: -27		
	15.407(b)(3)			
	15.407(b)(4)	See Note 2		

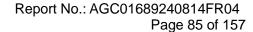
Note 1: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

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.

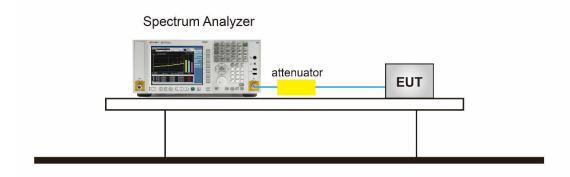
#### 10.2 Measurement Procedure

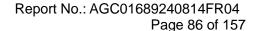
- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. Set the Span = wide enough to capture the peak level of the in-band emission and all spurious emissions from the lowest frequency generated in the EUT up through the 10th harmonic.
- 3. RBW = 1MHz; VBW= 3MHz; Sweep = 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)

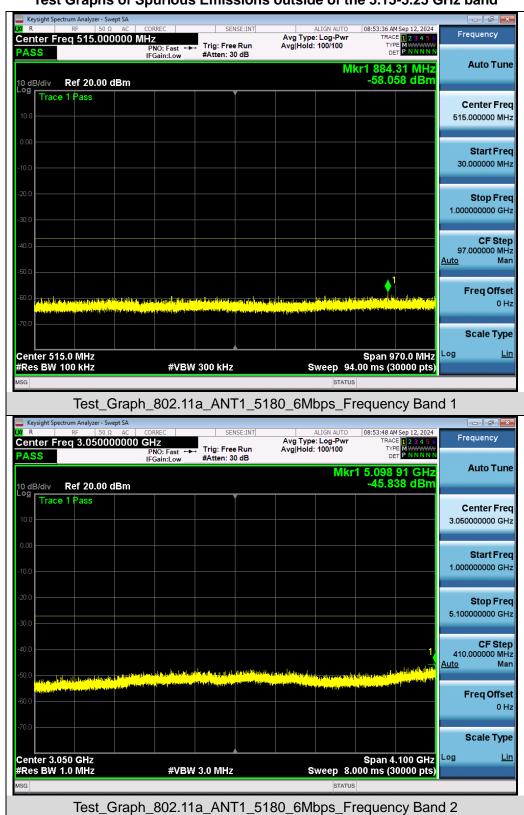


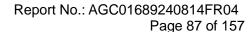




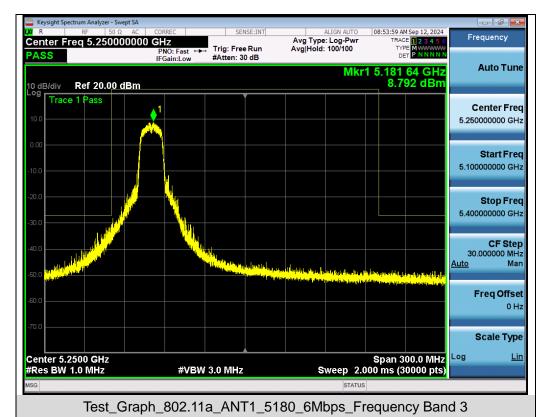
#### 10.4 Measurement Results

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

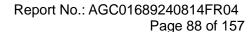




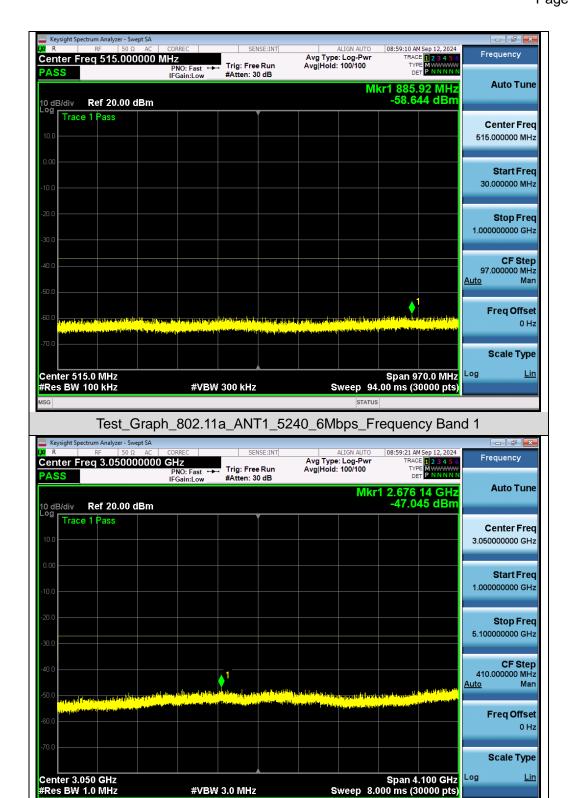




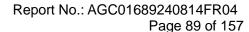




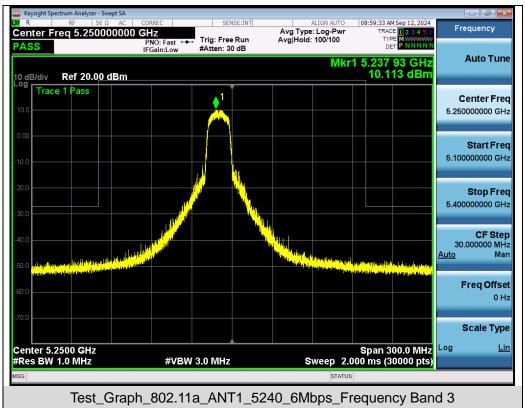




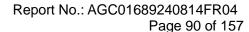
Test Graph 802.11a ANT1 5240 6Mbps Frequency Band 2



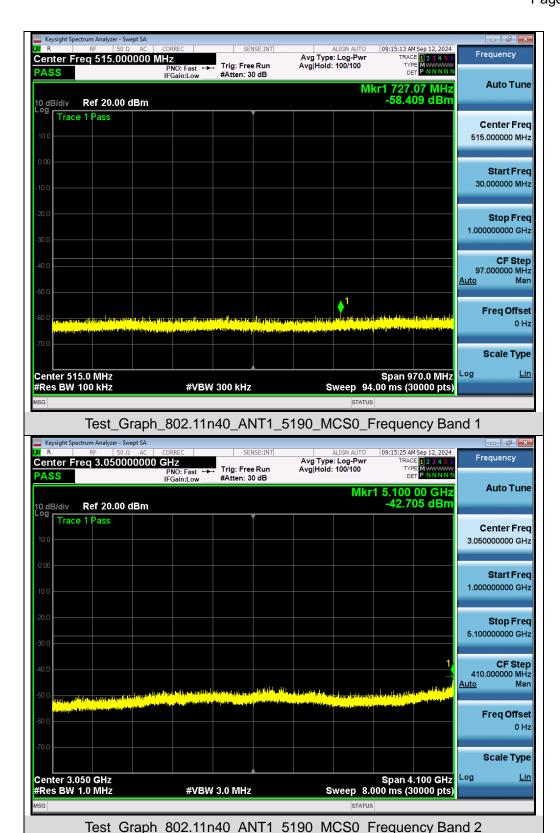


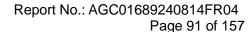




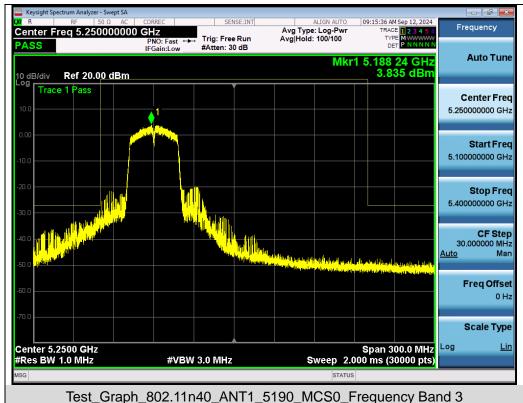




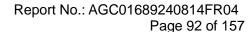




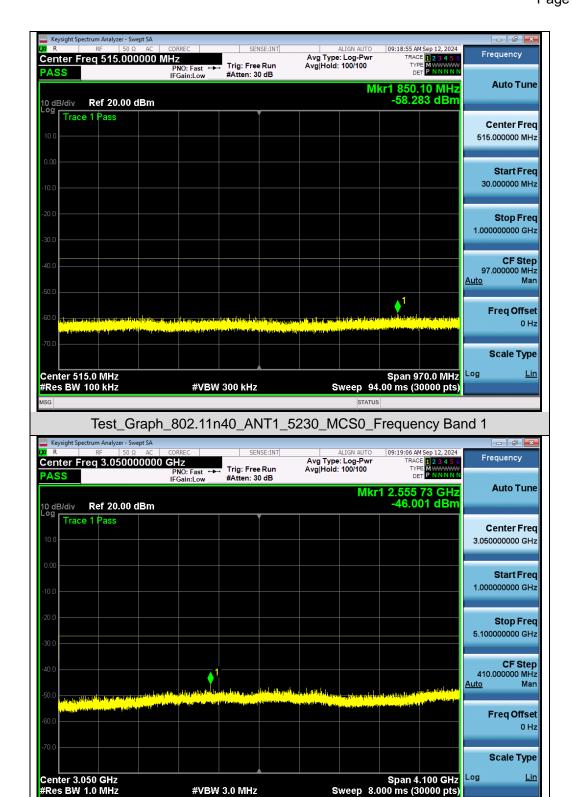




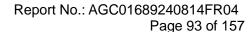




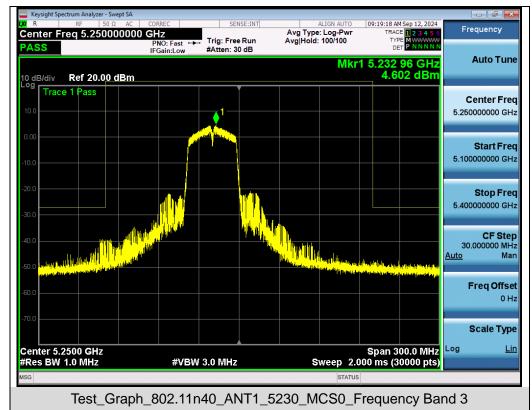




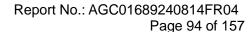
Test Graph 802.11n40 ANT1 5230 MCS0 Frequency Band 2







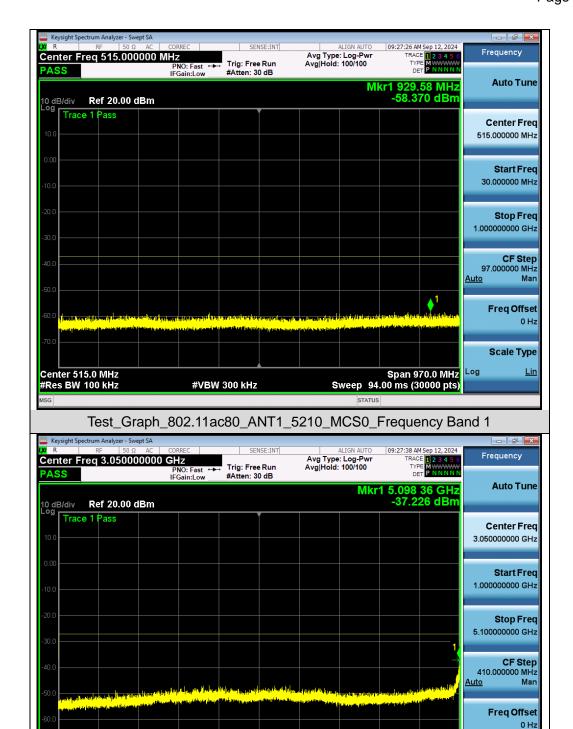




Scale Type

Span 4.100 GHz Sweep 8.000 ms (30000 pts)



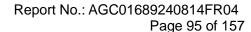


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Test\_Graph\_802.11ac80\_ANT1\_5210\_MCS0\_Frequency Band 2

#VBW 3.0 MHz

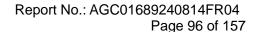
Center 3.050 GHz #Res BW 1.0 MHz





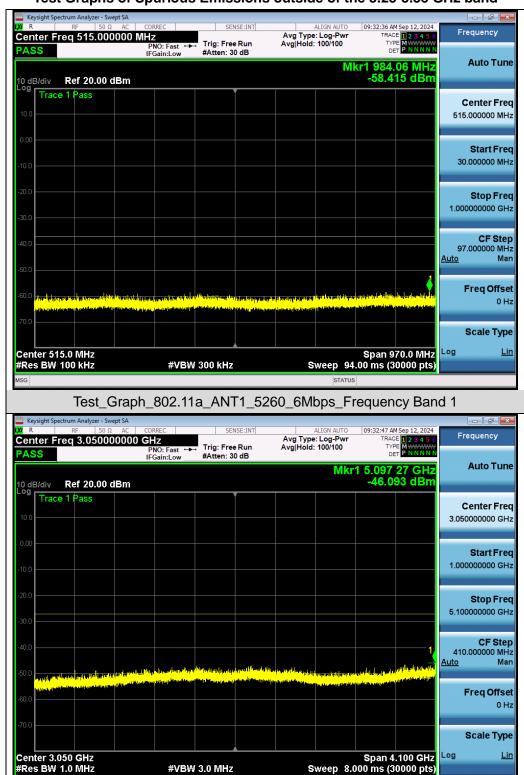






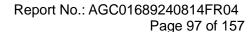


## Test Graphs of Spurious Emissions outside of the 5.25-5.35 GHz band

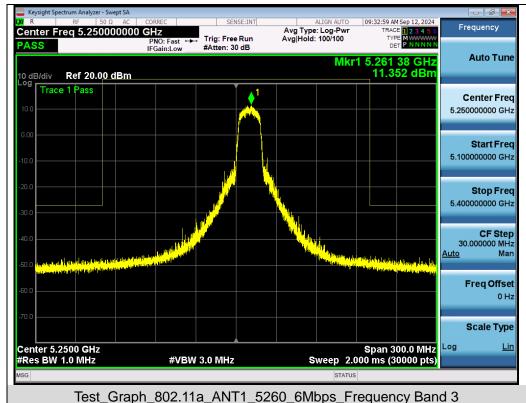


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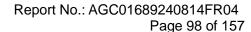
Test\_Graph\_802.11a\_ANT1\_5260\_6Mbps\_Frequency Band 2



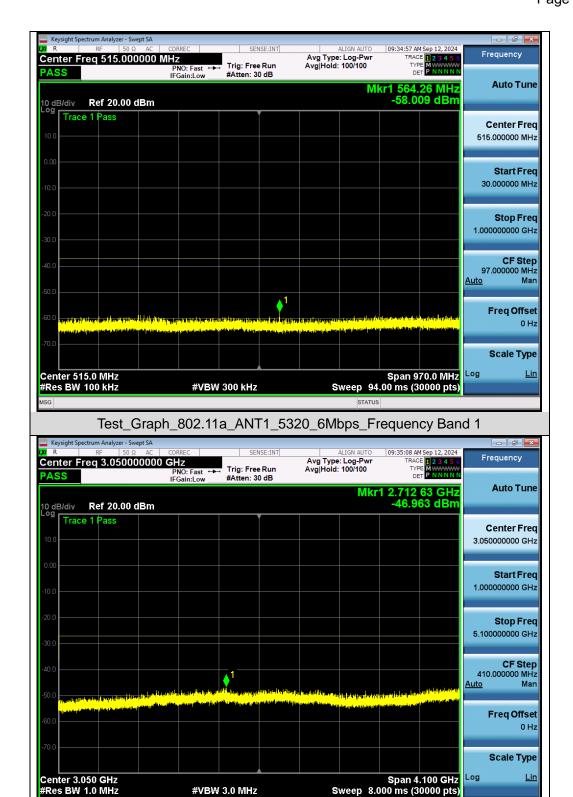




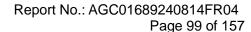




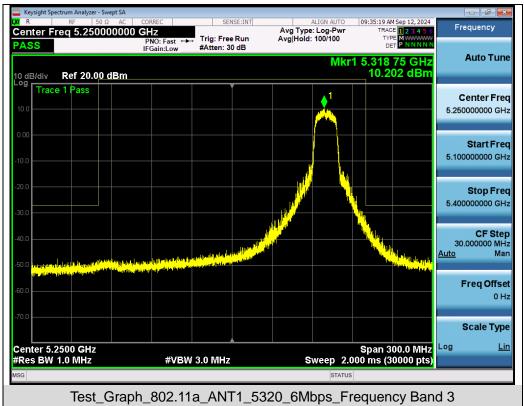




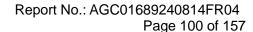
Test Graph 802.11a ANT1 5320 6Mbps Frequency Band 2







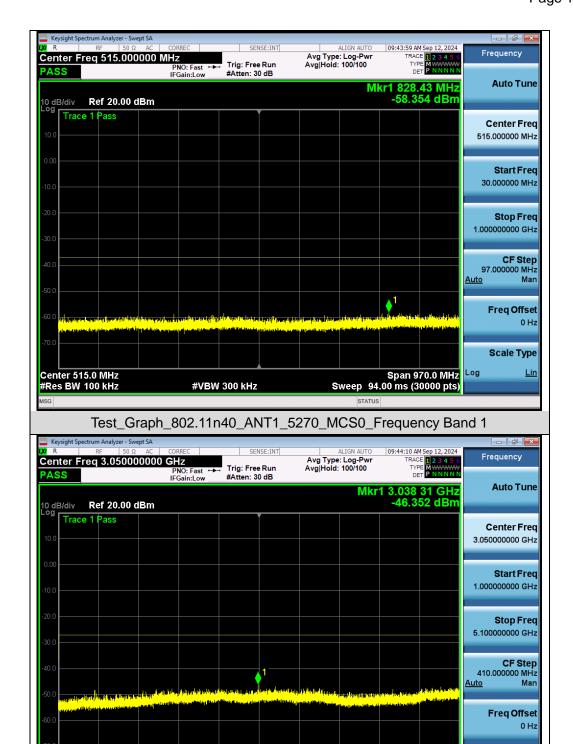




Scale Type

Span 4.100 GHz Sweep 8.000 ms (30000 pts)



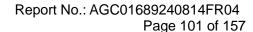


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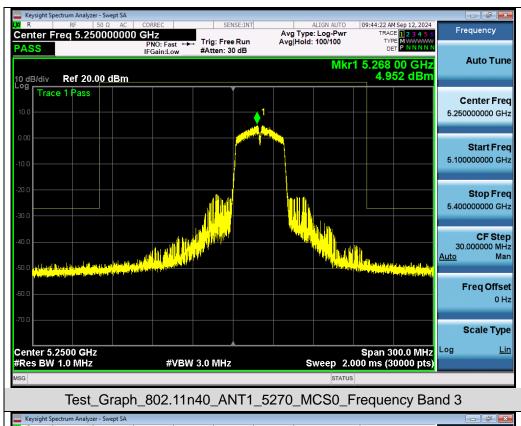
Test Graph 802.11n40 ANT1 5270 MCS0 Frequency Band 2

#VBW 3.0 MHz

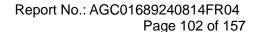
Center 3.050 GHz #Res BW 1.0 MHz



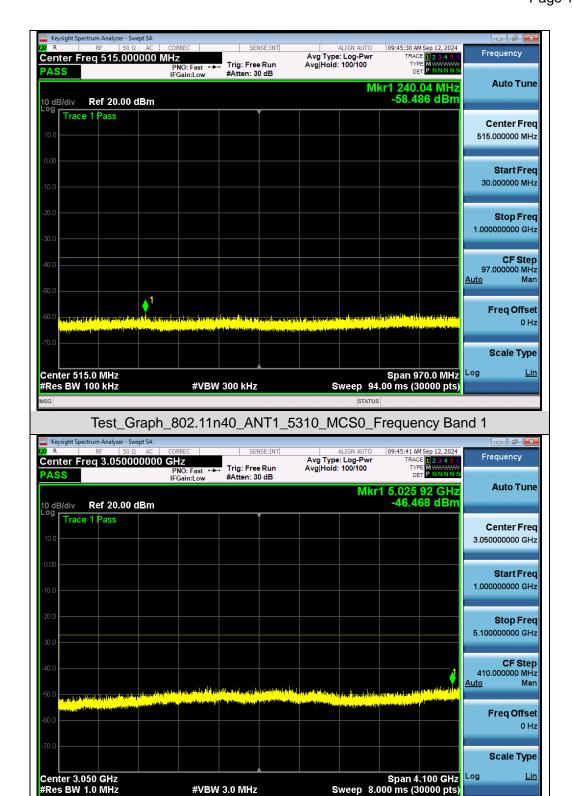






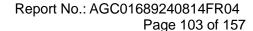




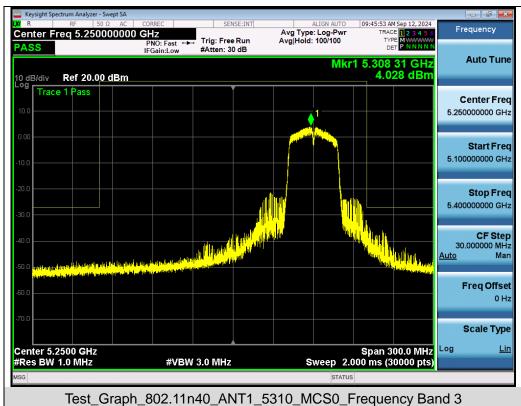


Test Graph 802.11n40 ANT1 5310 MCS0 Frequency Band 2

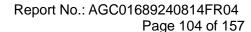
#VBW 3.0 MHz



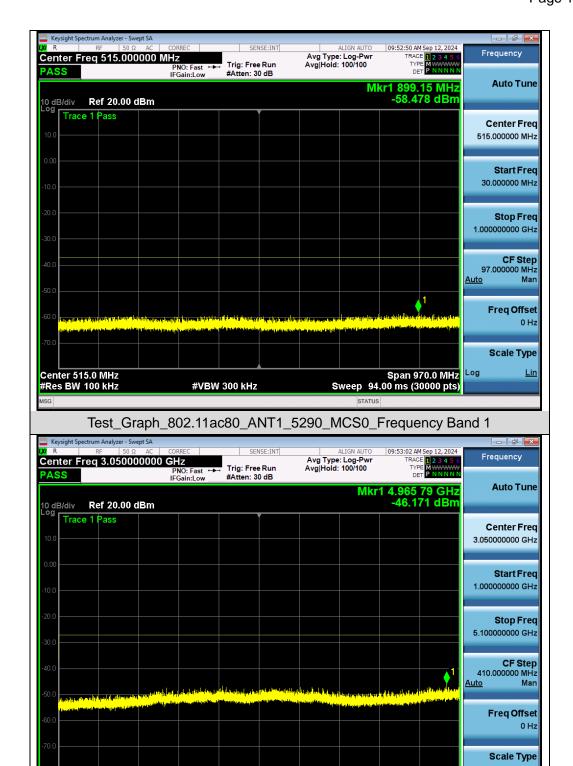










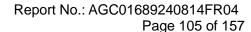


Test Graph 802.11ac80 ANT1 5290 MCS0 Frequency Band 2

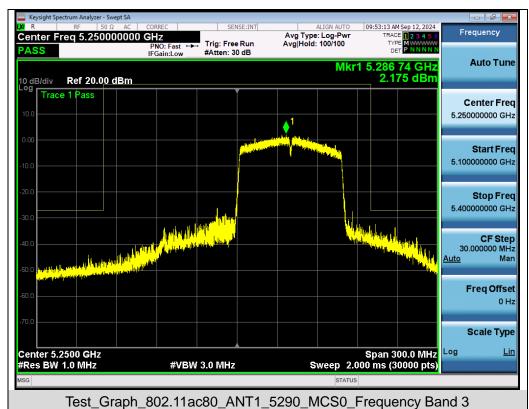
#VBW 3.0 MHz

Span 4.100 GHz Sweep 8.000 ms (30000 pts)

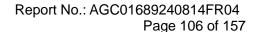
Center 3.050 GHz #Res BW 1.0 MHz





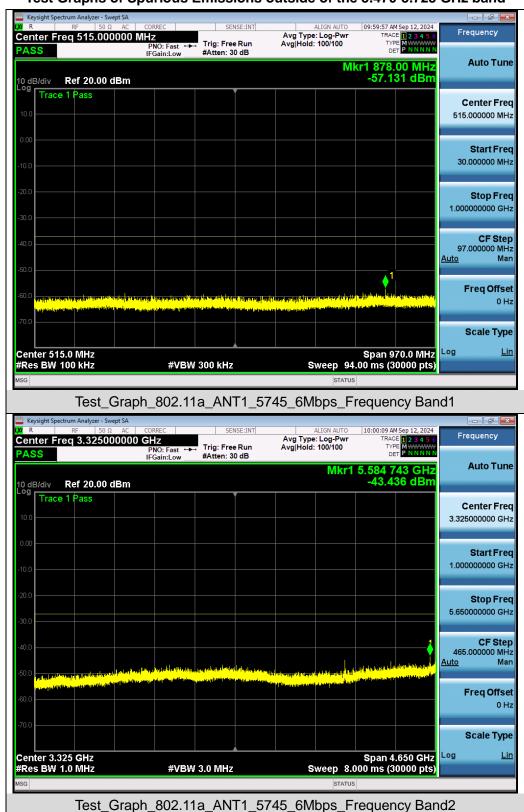


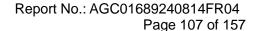




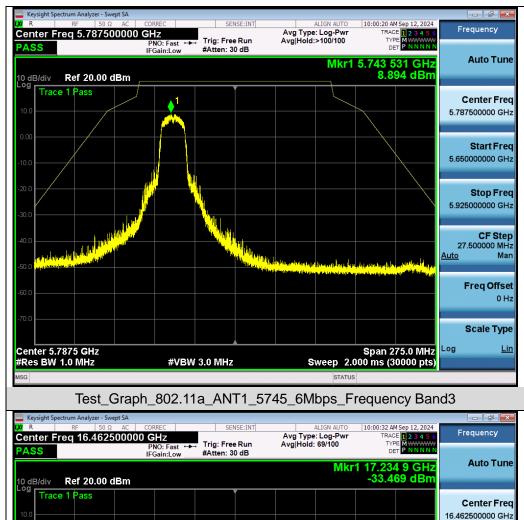


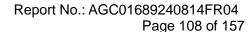
## Test Graphs of Spurious Emissions outside of the 5.470-5.725 GHz band







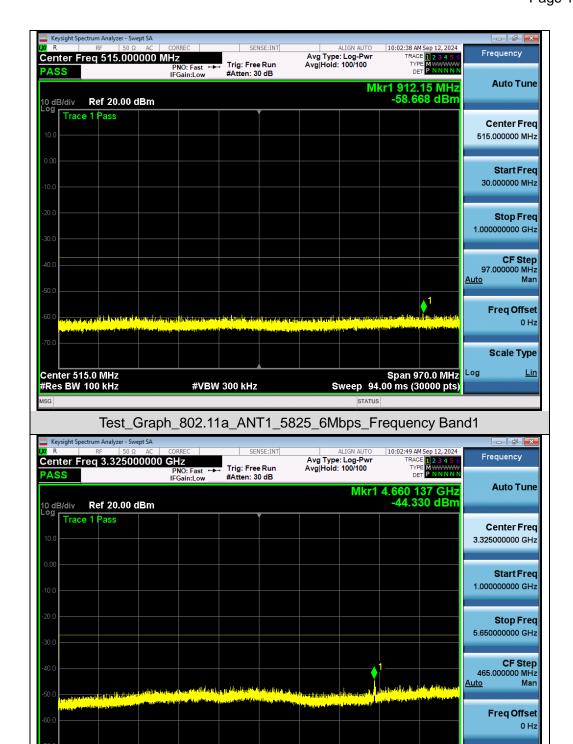




Scale Type

Span 4.650 GHz Sweep 8.000 ms (30000 pts)



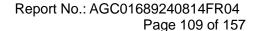


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Test Graph 802.11a ANT1 5825 6Mbps Frequency Band2

#VBW 3.0 MHz

Center 3.325 GHz #Res BW 1.0 MHz



**CF Step** 2.107500000 GHz

Freq Offset 0 Hz

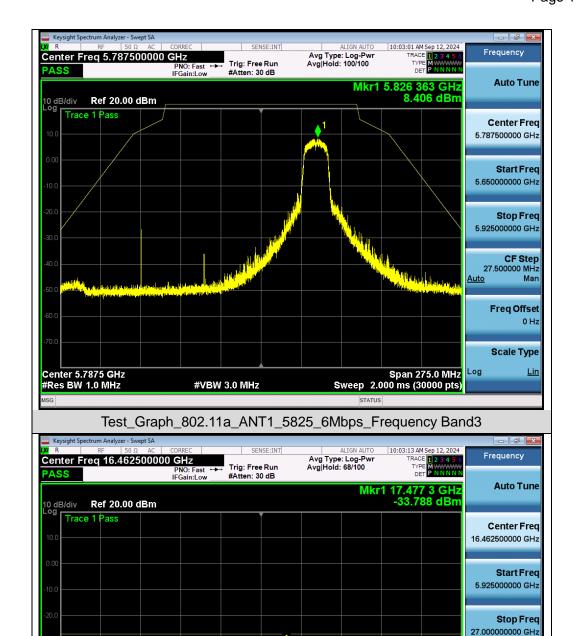
Scale Type

Man

<u>Auto</u>

Span 21.08 GHz Sweep 54.00 ms (30000 pts)



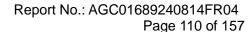


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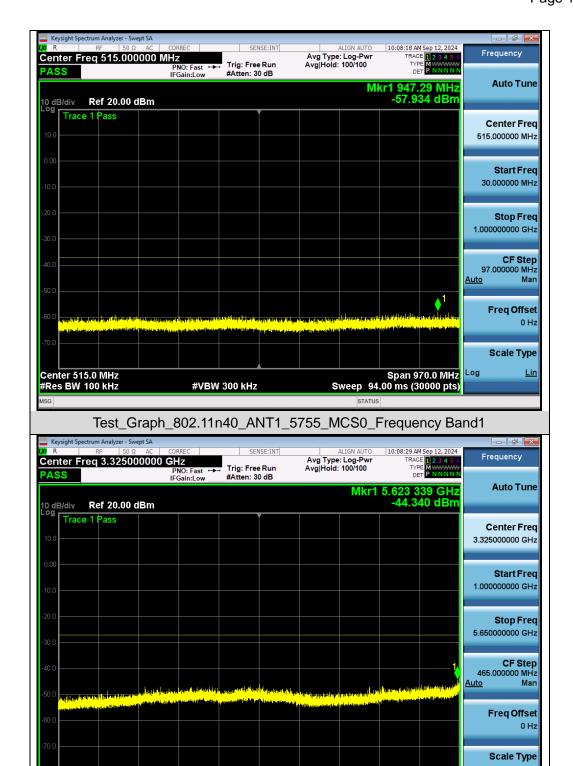
Test Graph 802.11a ANT1 5825 6Mbps Frequency Band4

#VBW 3.0 MHz

Center 16.46 GHz #Res BW 1.0 MHz







Test Graph 802.11n40 ANT1 5755 MCS0 Frequency Band2

#VBW 3.0 MHz

Span 4.650 GHz Sweep 8.000 ms (30000 pts)

Center 3.325 GHz #Res BW 1.0 MHz