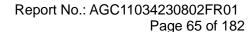
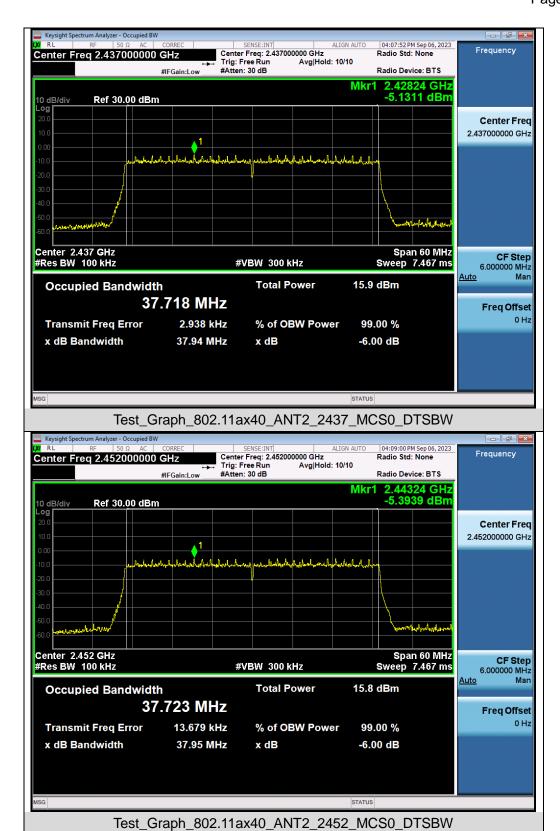


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9. Power Spectral Density Measurement

9.1 Provisions Applicable

The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

9.2 Measurement Procedure

⊠For Peak power spectral density test:

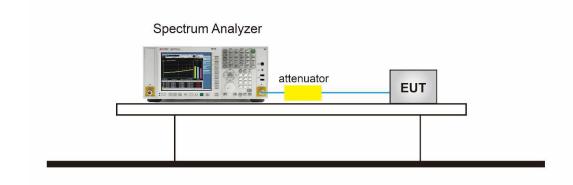
- 1. The testing follows the ANSI C63.10 Section 11.10.2 Method PKPSD.
- 2. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 3. Set the RBW = 20 kHz.
- 4. Set the VBW \geq [3 × RBW].
- 5. Set the Span ≥ [1.5 × DTS bandwidth].
- 6. Sweep time=Auto couple.
- 7. Detector function=Peak.
- 8. Trace Mode=Max hold.
- When the measurement bandwidth of Maximum PSD is specified in 3 kHz, add a constant factor 10*log(3kHz/20kHz) = -8.23 dB to the measured result.
- 10. Allow trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission.
- 11. The indicated level is the peak output power, after any corrections for external attenuators and cables.
- For Average power spectral density test:
- 1. The testing follows the ANSI C63.10 Section 11.10.5 Method AVPSD.
- 2. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator.
- 3. Set Span to at least 1.5 times the OBW.
- 4. Set RBW to:3 kHz ≤ RBW ≤ 100 kHz.
- 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 3 kHz, add a constant factor 10*log(3kHz/20kHz) = -8.23 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. Record the test results in the report.



Report No.: AGC11034230802FR01

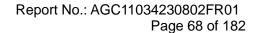
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9.3 Measurement Setup (Block Diagram of Configuration)



9.4 Measurement Result

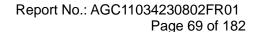
Test Data of Conducted Output Power Spectral Density-Antenna 1						
Test Mode	Test Channel (MHz)	Power density (dBm/20kHz)	Power density (dBm/3kHz)	Limit (dBm/3kHz)	Pass or Fail	
802.11b	2412	-3.266	-11.505	≤8	Pass	
	2437	-3.063	-11.302	≪8	Pass	
	2462	-3.228	-11.467	≤8	Pass	
802.11g	2412	-5.899	-14.138	≤8	Pass	
	2437	-5.312	-13.551	≤8	Pass	
	2462	-5.458	-13.697	≤8	Pass	
	2412	-6.016	-14.255	≤8	Pass	
802.11n20	2437	-6.060	-14.299	≤8	Pass	
	2462	-6.334	-14.573	≤8	Pass	
802.11n40	2422	-8.926	-17.165	≤8	Pass	
	2437	-8.848	-17.087	≤8	Pass	
	2452	-8.901	-17.14	≤8	Pass	
802.11ax20	2412	-6.160	-14.399	≤8	Pass	
	2437	-6.406	-14.645	≤8	Pass	
	2462	-6.226	-14.465	≤8	Pass	
802.11ax40	2422	-9.695	-17.934	≤8	Pass	
	2437	-9.636	-17.875	≤8	Pass	
	2452	-9.632	-17.871	≤8	Pass	





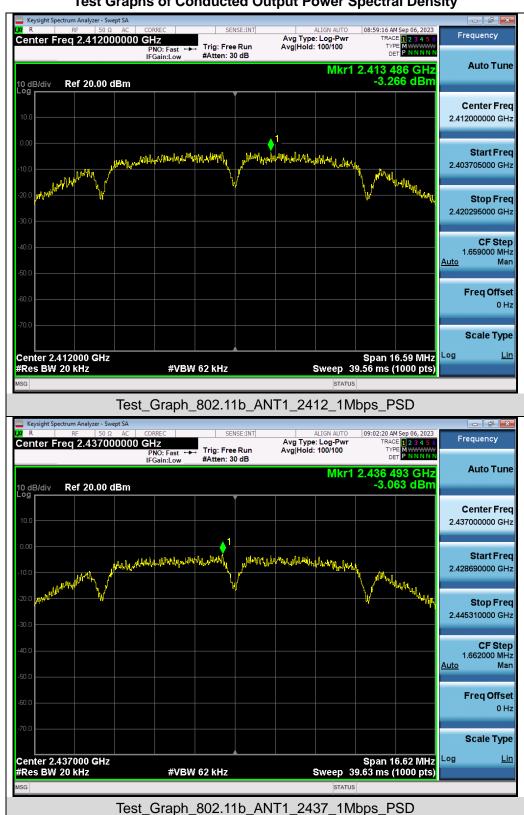
Test Data of Conducted Output Power Spectral Density-Antenna 2						
Test Mode	Test Channel (MHz)	Power density (dBm/20kHz)	Power density (dBm/3kHz)	Limit (dBm/3kHz)	Pass or Fail	
802.11b	2412	-3.730	-11.969	≤8	Pass	
	2437	-3.387	-11.626	≤8	Pass	
	2462	-3.564	-11.803	≤8	Pass	
802.11g	2412	-5.936	-14.175	≤8	Pass	
	2437	-5.808	-14.047	≤8	Pass	
	2462	-6.135	-14.374	≤8	Pass	
802.11n20	2412	-6.405	-14.644	≤8	Pass	
	2437	-6.006	-14.245	≤8	Pass	
	2462	-6.209	-14.448	≤8	Pass	
802.11n40	2422	-9.591	-17.83	≪8	Pass	
	2437	-9.369	-17.608	≤8	Pass	
	2452	-9.422	-17.661	≤8	Pass	
802.11ax20	2412	-6.873	-15.112	≪8	Pass	
	2437	-6.780	-15.019	≤8	Pass	
	2462	-7.121	-15.36	≤8	Pass	
802.11ax40	2422	-10.137	-18.376	≪8	Pass	
	2437	-10.059	-18.298	≤8	Pass	
	2452	-10.195	-18.434	≤8	Pass	

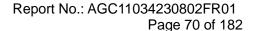
Test Data of Conducted Output Power Spectral Density-MIMO						
Test Mode	Test Channel (MHz)	Power density (dBm/20kHz)	Power density (dBm/3kHz)	Limit (dBm/3kHz)	Pass or Fail	
802.11n20	2412	-3.196	-11.435	≤7.04	Pass	
	2437	-3.023	-11.262	≤7.04	Pass	
	2462	-3.261	-11.500	≤7.04	Pass	
802.11n40	2422	-6.235	-14.474	≤7.04	Pass	
	2437	-6.090	-14.329	≤7.04	Pass	
	2452	-6.143	-14.382	≤7.04	Pass	
802.11ax20	2412	-3.492	-11.731	≤7.04	Pass	
	2437	-3.579	-11.818	≤7.04	Pass	
	2462	-3.640	-11.879	≤7.04	Pass	
802.11ax40	2422	-6.900	-15.139	≤7.04	Pass	
	2437	-6.832	-15.071	≤7.04	Pass	
	2452	-6.894	-15.133	≤7.04	Pass	





Test Graphs of Conducted Output Power Spectral Density





Stop Freq 2.424255000 GHz

CF Step 2.451000 MHz

Freq Offset 0 Hz

Scale Type

Mar

<u>Auto</u>

Log

Span 24.51 MHz Sweep 58.47 ms (1000 pts)



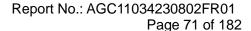


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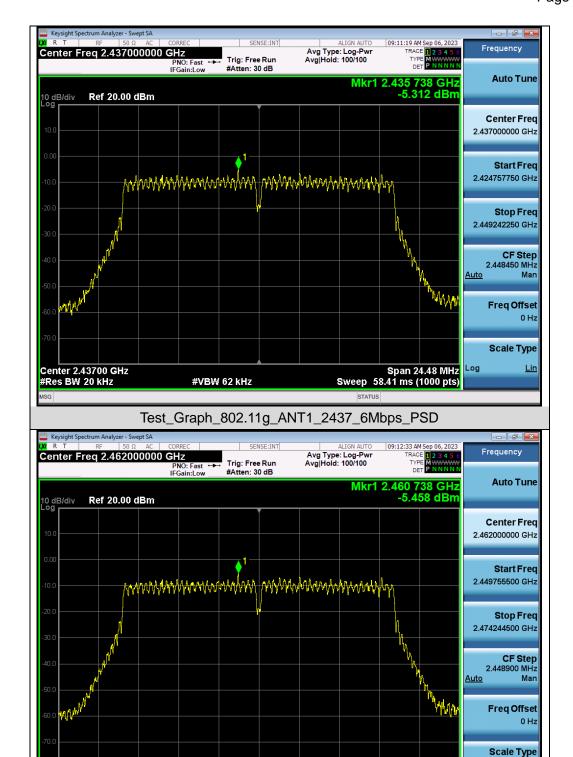
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#VBW 62 kHz

Center 2.41200 GHz #Res BW 20 kHz







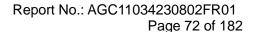
Test_Graph_802.11g_ANT1_2462_6Mbps_PSD

#VBW 62 kHz

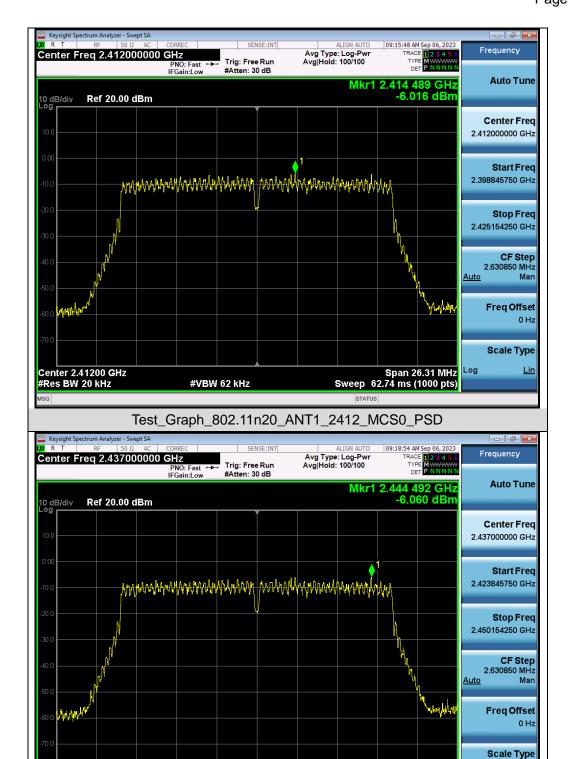
Span 24.49 MHz Sweep 58.41 ms (1000 pts)

Log

Center 2.46200 GHz #Res BW 20 kHz







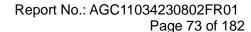
Test_Graph_802.11n20_ANT1_2437_MCS0_PSD

#VBW 62 kHz

Span 26.31 MHz Sweep 62.74 ms (1000 pts)

Log

Center 2.43700 GHz #Res BW 20 kHz



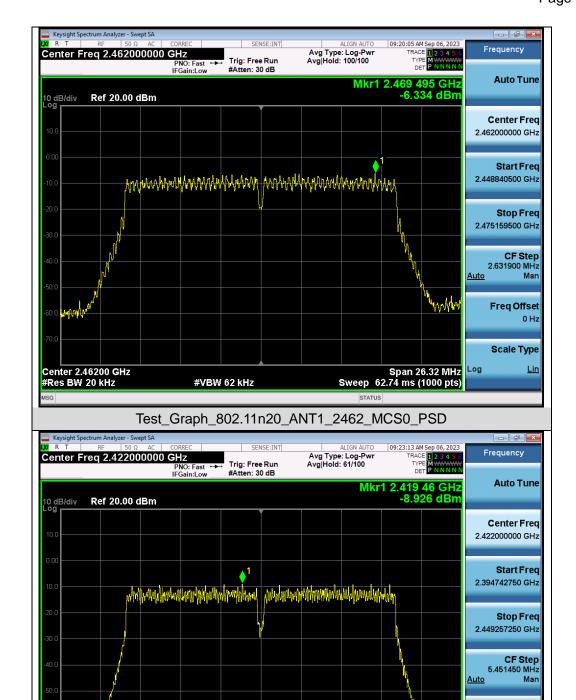
Freq Offset 0 Hz

Scale Type

Log

Span 54.51 MHz Sweep 130.0 ms (1000 pts)



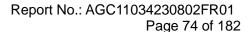


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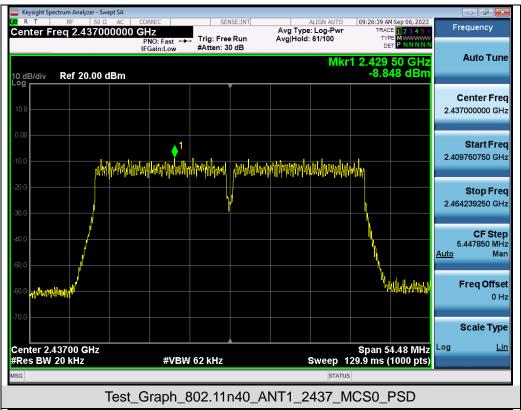
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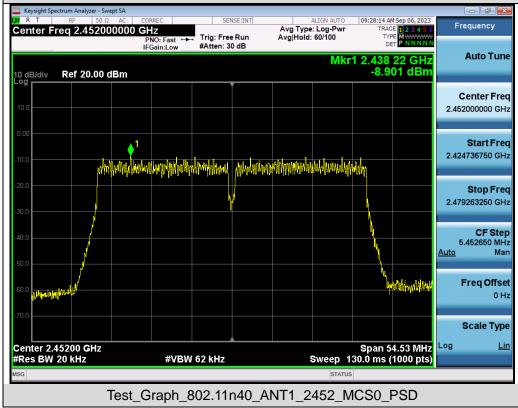
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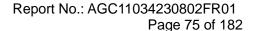
Center 2.42200 GHz #Res BW 20 kHz



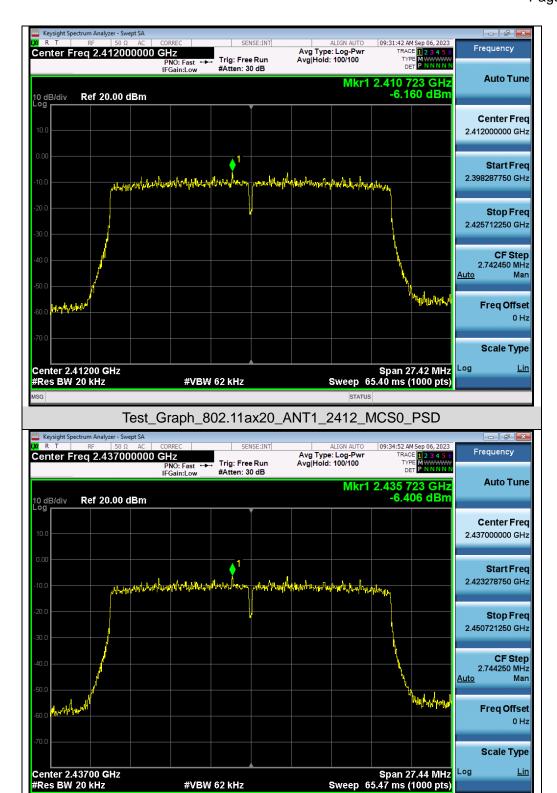




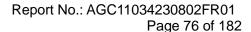








Test_Graph_802.11ax20_ANT1_2437_MCS0_PSD

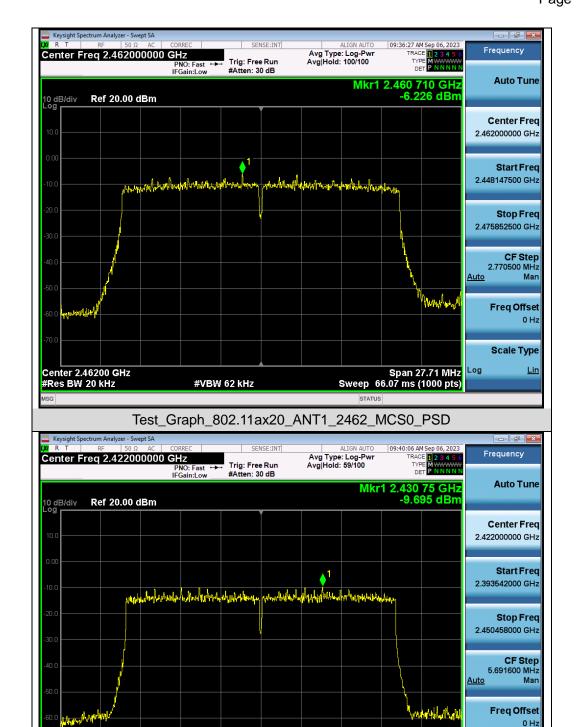


Scale Type

Log

Span 56.92 MHz Sweep 135.7 ms (1000 pts)



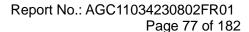


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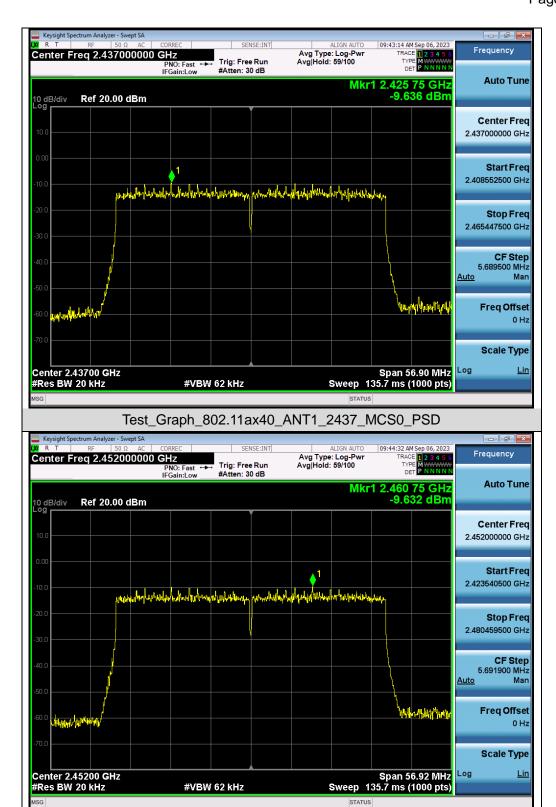
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#VBW 62 kHz

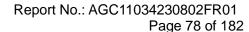
Center 2.42200 GHz #Res BW 20 kHz







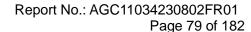
Test_Graph_802.11ax40_ANT1_2452_MCS0_PSD











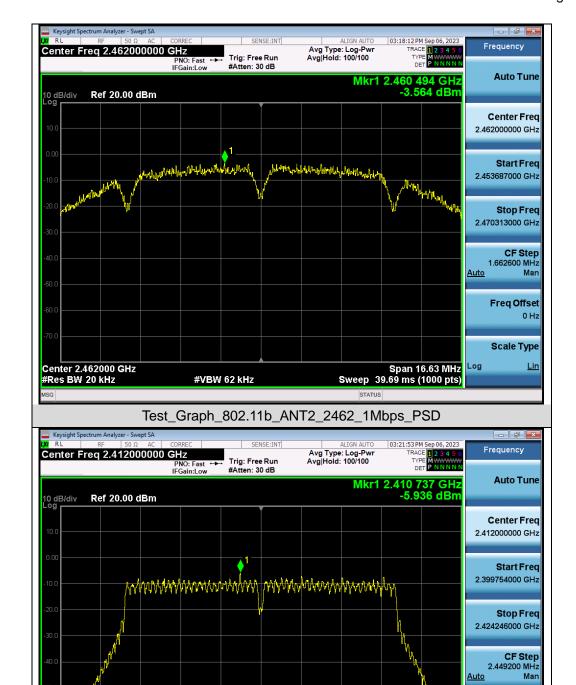
Freq Offset 0 Hz

Scale Type

Log

Span 24.49 MHz Sweep 58.41 ms (1000 pts)



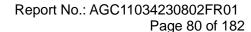


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Test_Graph_802.11g_ANT2_2412_6Mbps_PSD

#VBW 62 kHz

Center 2.41200 GHz #Res BW 20 kHz

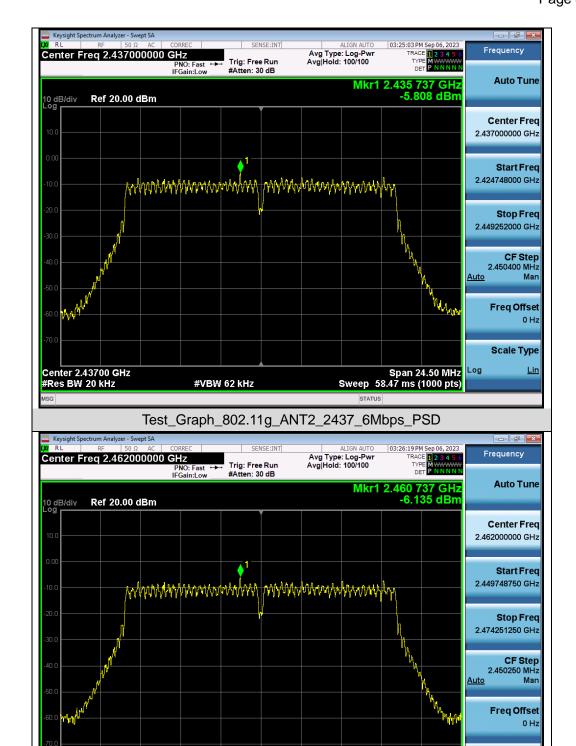


Scale Type

Log

Span 24.50 MHz Sweep 58.41 ms (1000 pts)



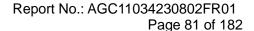


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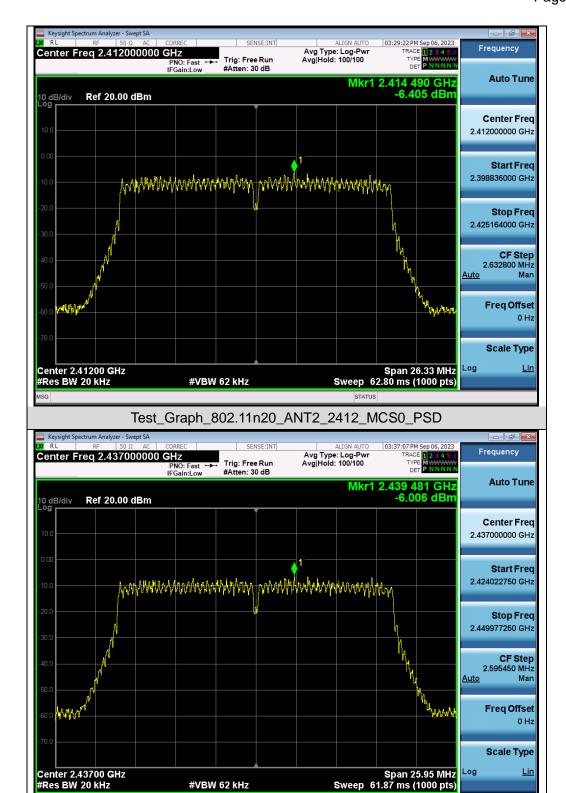
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#VBW 62 kHz

Center 2.46200 GHz #Res BW 20 kHz

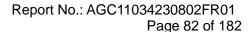






Test_Graph_802.11n20_ANT2_2437_MCS0_PSD

#VBW 62 kHz

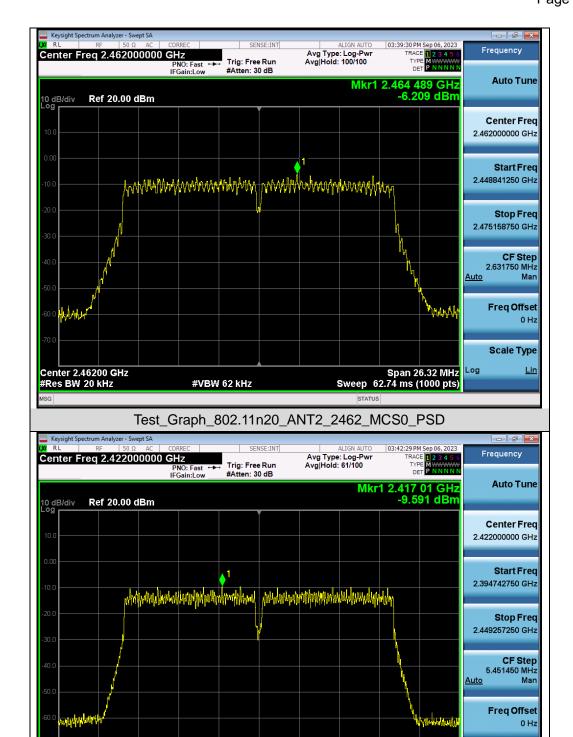


Scale Type

Log

Span 54.51 MHz Sweep 130.0 ms (1000 pts)



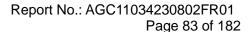


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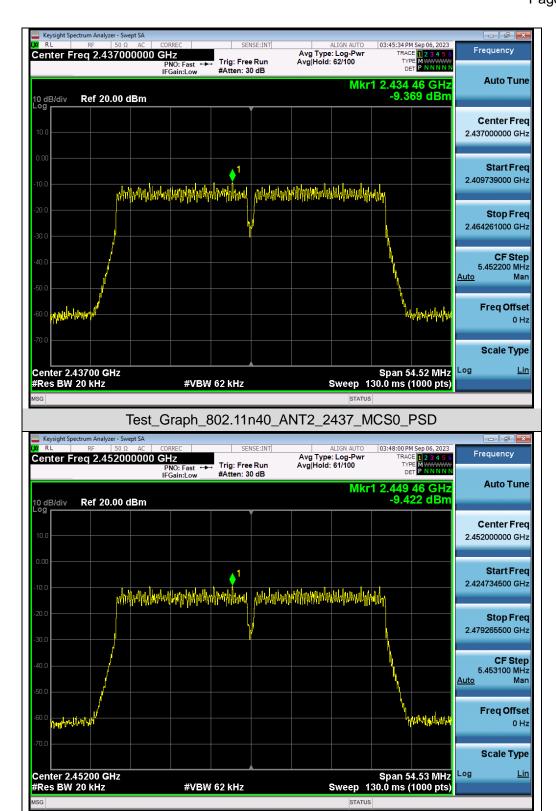
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#VBW 62 kHz

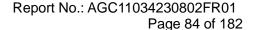
Center 2.42200 GHz #Res BW 20 kHz



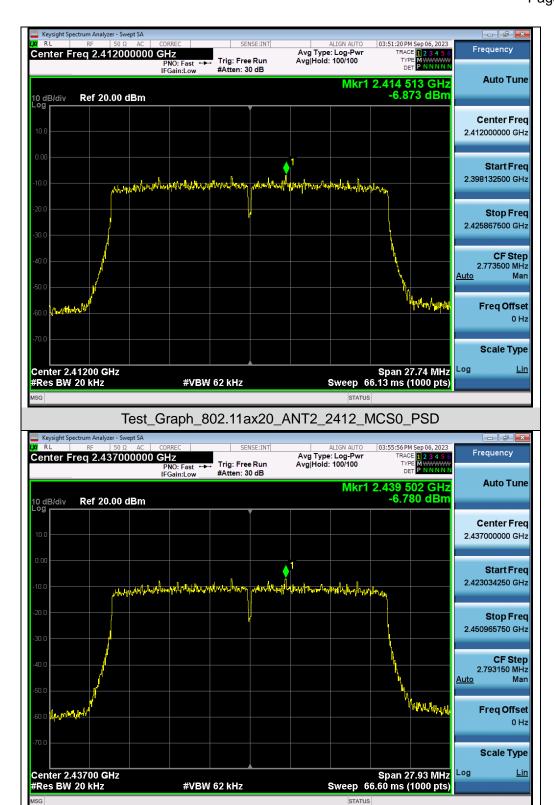




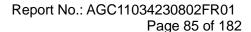
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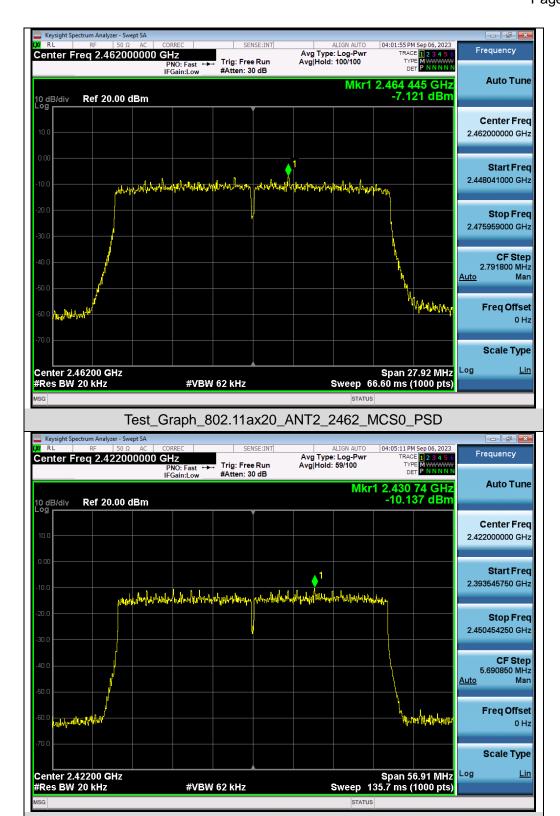




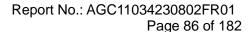
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Test_Graph_802.11ax40_ANT2_2422_MCS0_PSD

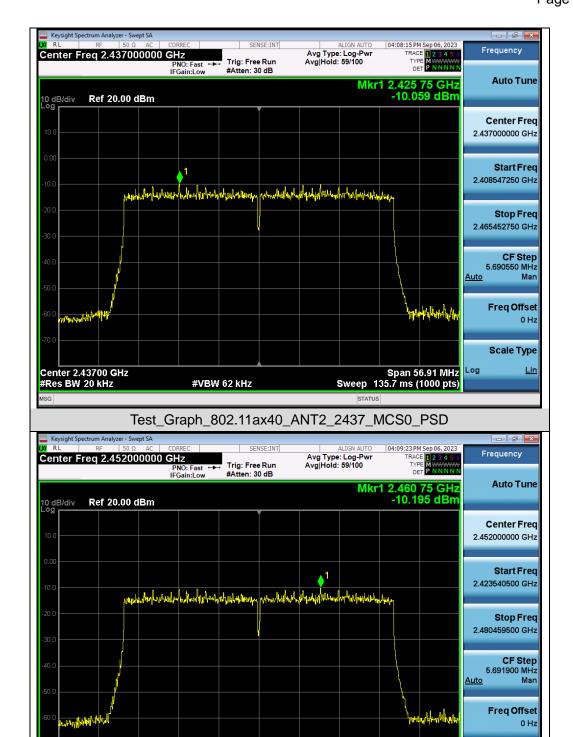


Scale Type

Log

Span 56.92 MHz Sweep 135.7 ms (1000 pts)





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Test_Graph_802.11ax40_ANT2_2452_MCS0_PSD

#VBW 62 kHz

Center 2.45200 GHz #Res BW 20 kHz



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

10.1 Provisions Applicable

In any 100kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

10.2 Measurement Procedure

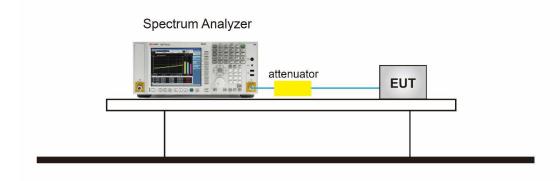
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

Use the following spectrum analyzer settings:

- Step 1: Measurement Procedure In-Band Reference Level
 - 1. Set instrument center frequency to DTS channel center frequency.
 - 2. Set the span to ≥ 1.5 times the DTS bandwidth.
 - 3. Set the RBW = 100 kHz.
 - 4. Set the VBW \geq 3 x RBW.
 - Detector = peak.
 - 6. Sweep time = auto couple.
 - 7. Trace mode = max hold.
 - 8. Allow trace to fully stabilize.
 - 9. Use the peak marker function to determine the maximum PSD level.
 - 10. Note that the channel found to contain the maximum PSD level can be used to establish the reference level.
- Step 2: Measurement Procedure Out of Band Emission
 - 1. Set RBW = 100 kHz.
 - 2. Set VBW ≥ 300 kHz.
 - 3. Detector = peak.
 - 4. Sweep = auto couple.
 - 5. Trace Mode = max hold.
 - 6. Allow trace to fully stabilize.
 - Use the peak marker function to determine the maximum amplitude level.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

10.3 Measurement Setup (Block Diagram of Configuration)



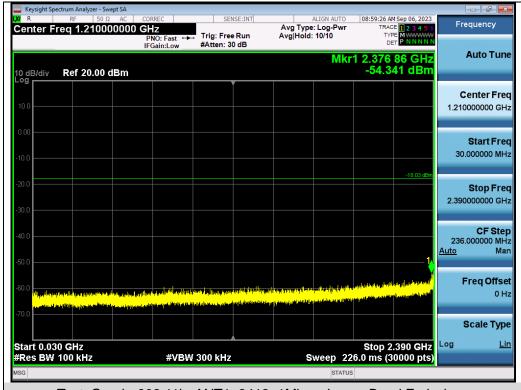
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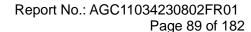
10.4 Measurement Results

Test Graphs of Spurious Emissions in Non-Restricted Frequency Bands

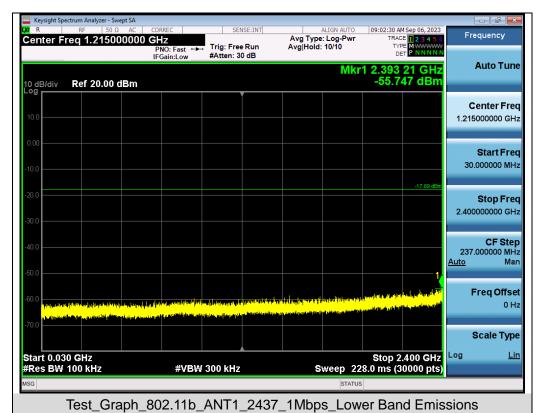


Test_Graph_802.11b_ANT1_2412_1Mbps_Lower Band Emissions

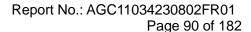




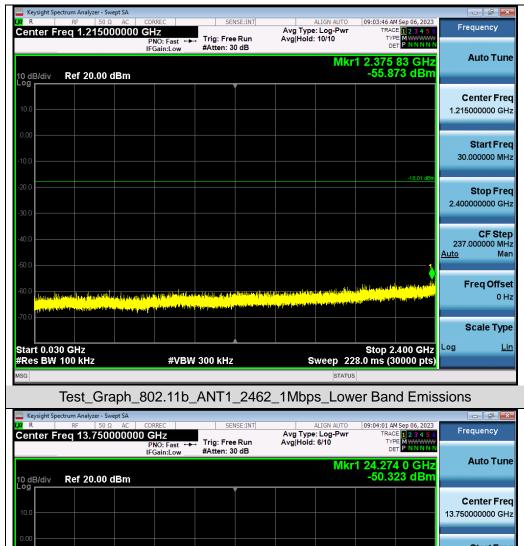


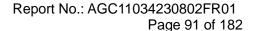




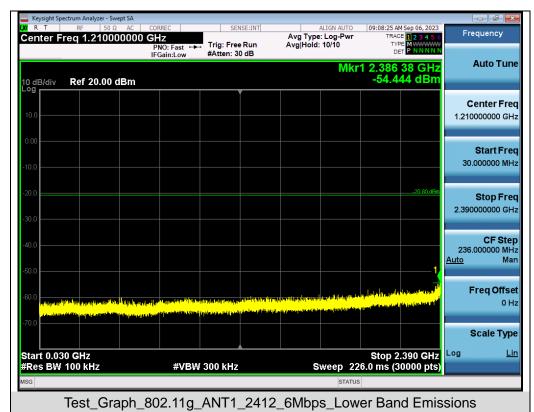




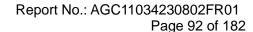








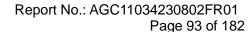








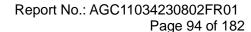




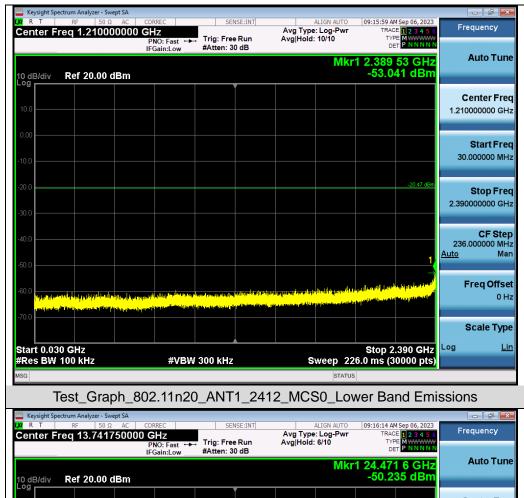




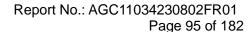




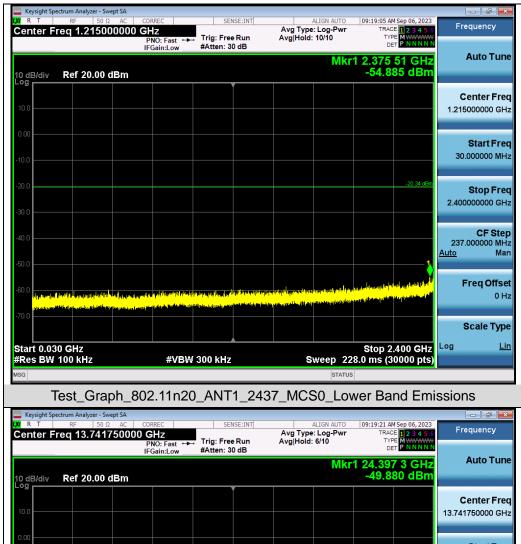




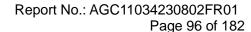




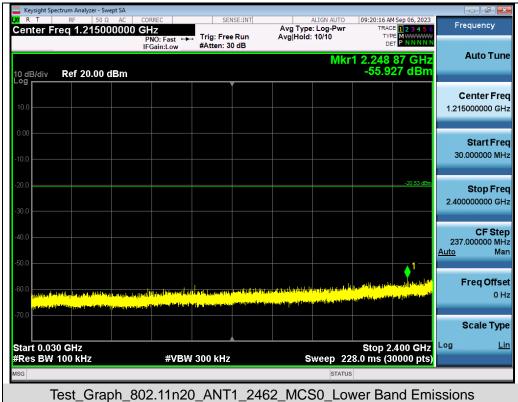




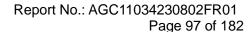
| Center Freq | 13.741750000 GHz | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10



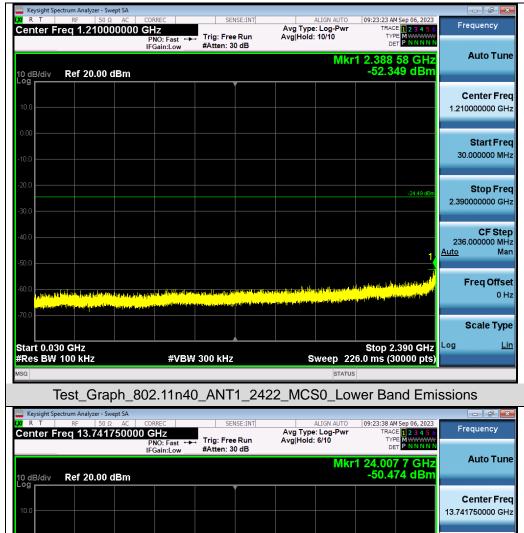


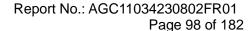








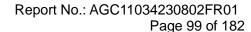








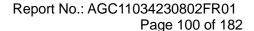




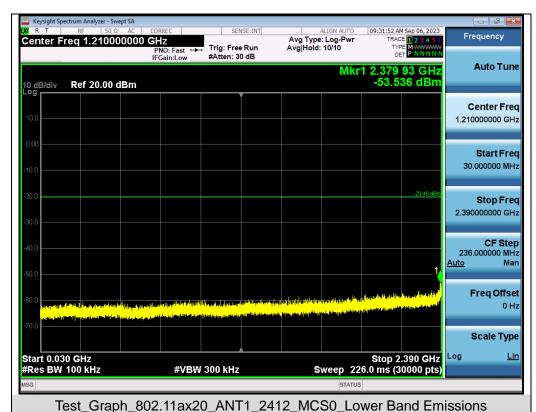




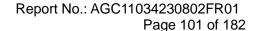




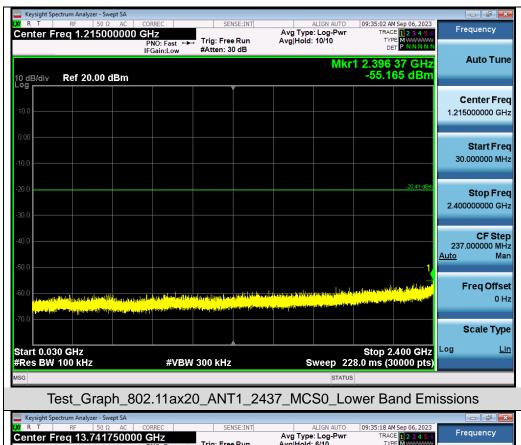




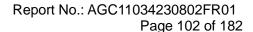
09:32:07 AM Sep 06, 2023 Center Freq 13.741750000 GHz
PNO: Fast PIGain:Low Avg Type: Log-Pwr Avg|Hold: 6/10 Trig: Free Run #Atten: 30 dB **Auto Tune** Mkr1 24.097 8 GHz -49.705 dBm 10 dB/div Ref 20.00 dBm Center Freq 13.741750000 GHz Start Fred 2.483500000 GHz 25.000000000 GHz **CF Step** 2.251650000 GHz <u>Auto</u> Mar Freq Offset 0 Hz Scale Type Start 2.48 GHz #Res BW 100 kHz Stop 25.00 GHz Sweep 2.152 s (30000 pts) Log #VBW 300 kHz Test_Graph_802.11ax20_ANT1_2412_MCS0_Higher Band Emissions



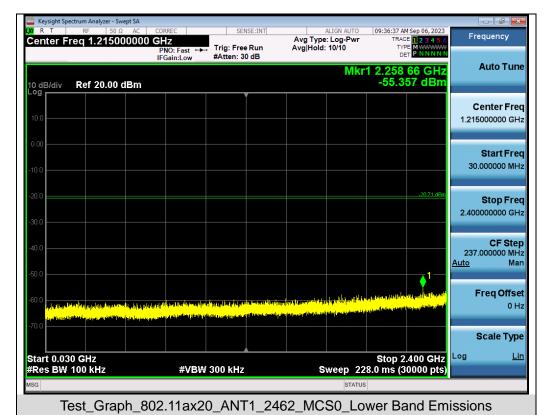




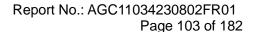








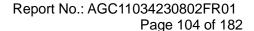








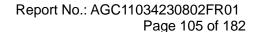
09:40:32 AM Sep 06, 2023 Center Freq 13.741750000 GHz
PNO: Fast PIGain:Low Avg Type: Log-Pwr Avg|Hold: 6/10 Trig: Free Run #Atten: 30 dB **Auto Tune** Mkr1 24.458 8 GHz -49.290 dBm 10 dB/div Ref 20.00 dBm Center Freq 13.741750000 GHz Start Fred 2.483500000 GHz 25.000000000 GHz **CF Step** 2.251650000 GHz <u>Auto</u> Mar Freq Offset 0 Hz Scale Type Start 2.48 GHz #Res BW 100 kHz Stop 25.00 GHz Sweep 2.152 s (30000 pts) Log #VBW 300 kHz Test_Graph_802.11ax40_ANT1_2422_MCS0_Higher Band Emissions







Keysight Spectrum Analyzer - Swept SA Center Freq 13.741750000 GHz
PNO: Fast PIGain:Low Avg Type: Log-Pwr Avg|Hold: 6/10 Trig: Free Run #Atten: 30 dB **Auto Tune** Mkr1 24.266 7 GHz -50.059 dBm 10 dB/div Ref 20.00 dBm Center Freq 13.741750000 GHz Start Fred 2.483500000 GHz 25.000000000 GHz **CF Step** 2.251650000 GHz <u>Auto</u> Mar Freq Offset 0 Hz Scale Type Start 2.48 GHz #Res BW 100 kHz Stop 25.00 GHz Sweep 2.152 s (30000 pts) Log #VBW 300 kHz Test_Graph_802.11ax40_ANT1_2437_MCS0_Higher Band Emissions







Keysight Spectrum Analyzer - Swept SA Center Freq 13.750000000 GHz
PN0: Fast
IFGain:Low Avg Type: Log-Pwr Avg|Hold: 6/10 Trig: Free Run #Atten: 30 dB **Auto Tune** Mkr1 24.217 0 GHz -49.758 dBm 10 dB/div Ref 20.00 dBm Center Freq 13.750000000 GHz Start Fred 2.500000000 GHz 25.000000000 GHz **CF Step** 2.250000000 GHz <u>Auto</u> Mar Freq Offset 0 Hz Scale Type Start 2.50 GHz #Res BW 100 kHz Stop 25.00 GHz Sweep 2.152 s (30000 pts) Log #VBW 300 kHz Test_Graph_802.11ax40_ANT1_2452_MCS0_Higher Band Emissions

