Appendix C

RF Test Data for 2.4GHz WIFI (Conducted Measurement)

Product Name: SMARTPHONE

Trade Mark: SIRAGON

Test Model: SP-7200

Environmental Conditions

Temperature:	24.6° C
Relative Humidity:	52.4%
ATM Pressure:	100.0 kPa
Test Engineer:	Simba Huang
Supervised by:	Seal Chen

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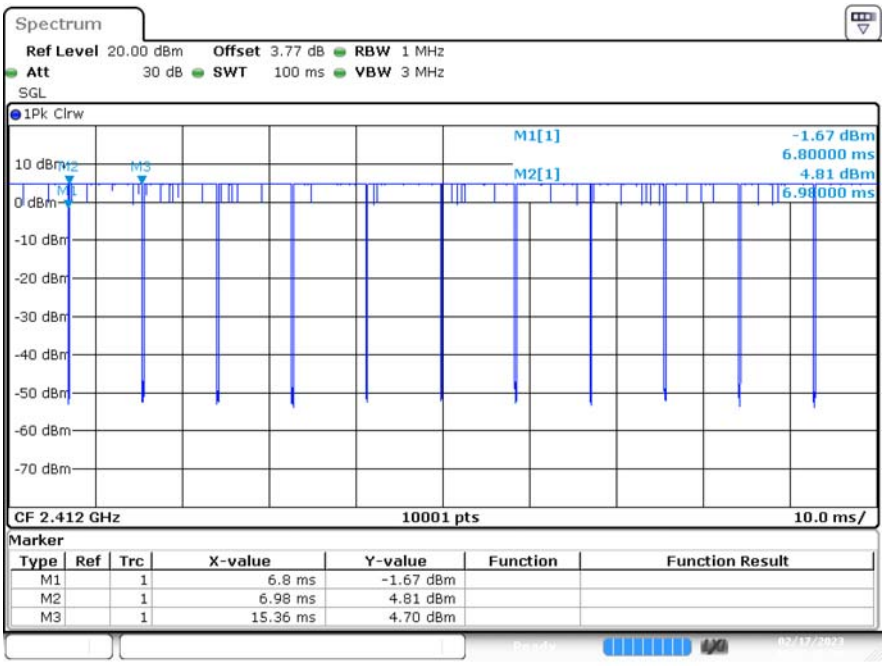
1 Duty Cycle

1.1 Test Result

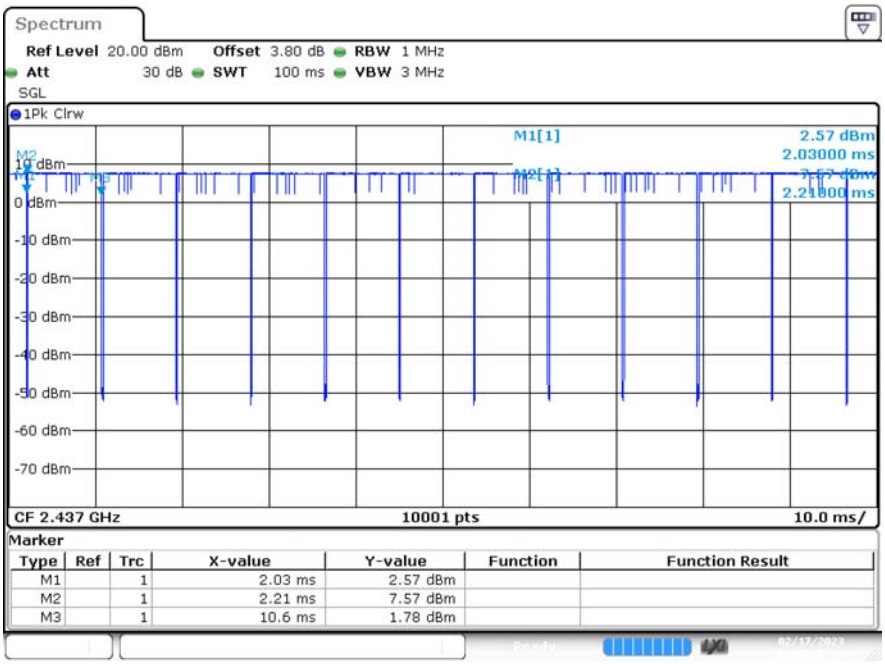
Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	1/T (kHz)
802.11b	2412	Ant1	97.88	0.12
802.11b	2437	Ant1	97.8	0.12
802.11b	2462	Ant1	97.76	0.12
802.11g	2412	Ant1	88.25	0.72
802.11g	2437	Ant1	88.26	0.71
802.11g	2462	Ant1	88.63	0.71
802.11n20	2412	Ant1	87	0.85
802.11n20	2437	Ant1	87.45	0.85
802.11n20	2462	Ant1	87.52	0.85
802.11n40	2422	Ant1	77.02	1.69
802.11n40	2437	Ant1	76.83	1.72
802.11n40	2452	Ant1	76.72	1.69

1.2 Test Graphs

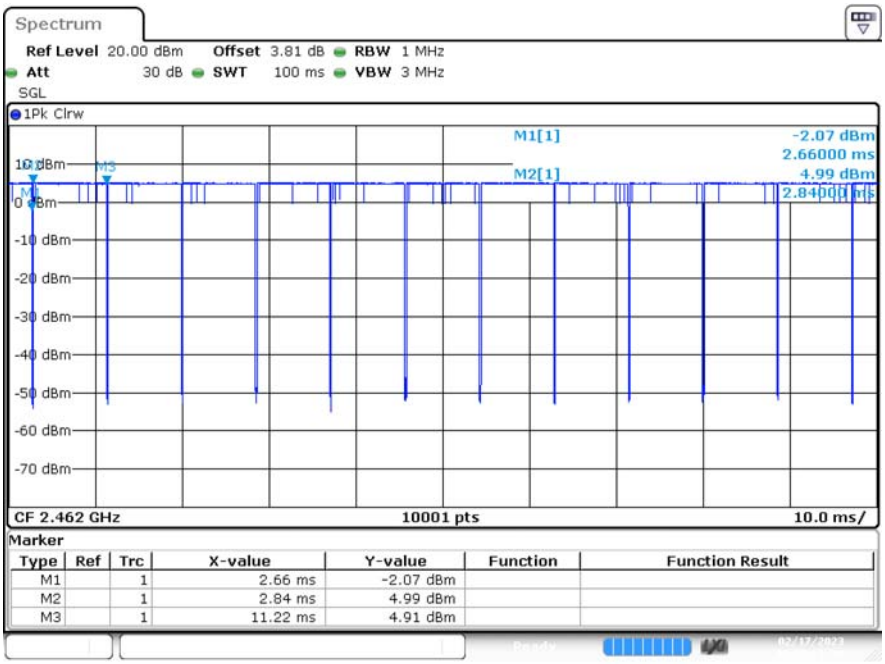
Test Graphs of Duty Cycle



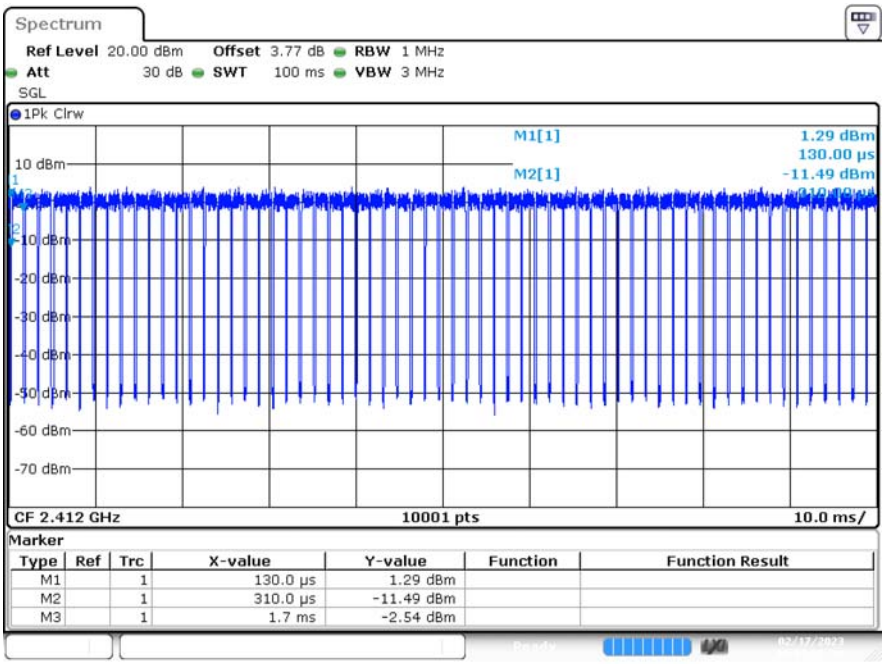
Test_Graph_802.11b_ANT1_2412



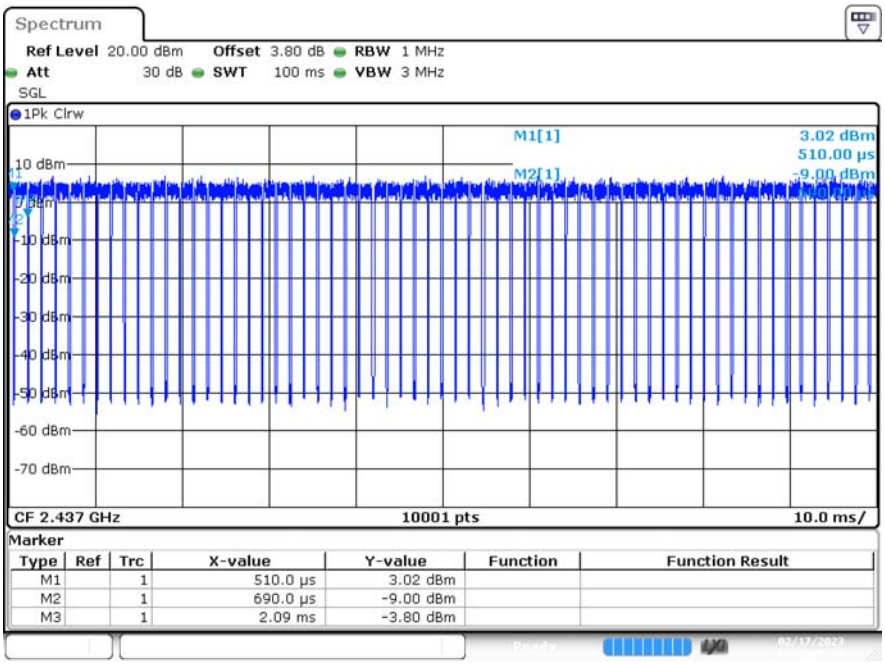
Test_Graph_802.11b_ANT1_2437



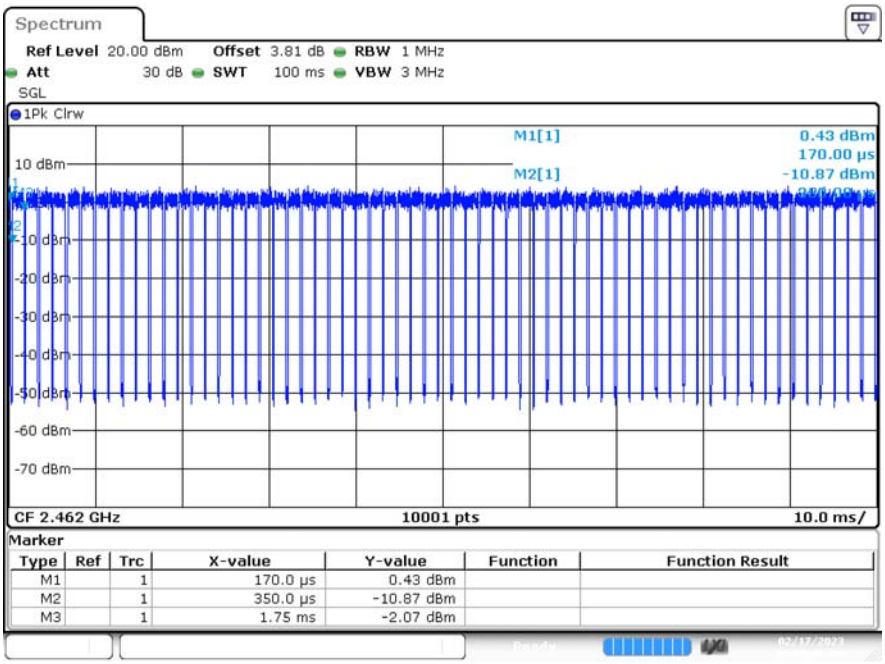
Test_Graph_802.11b_ANT1_2462



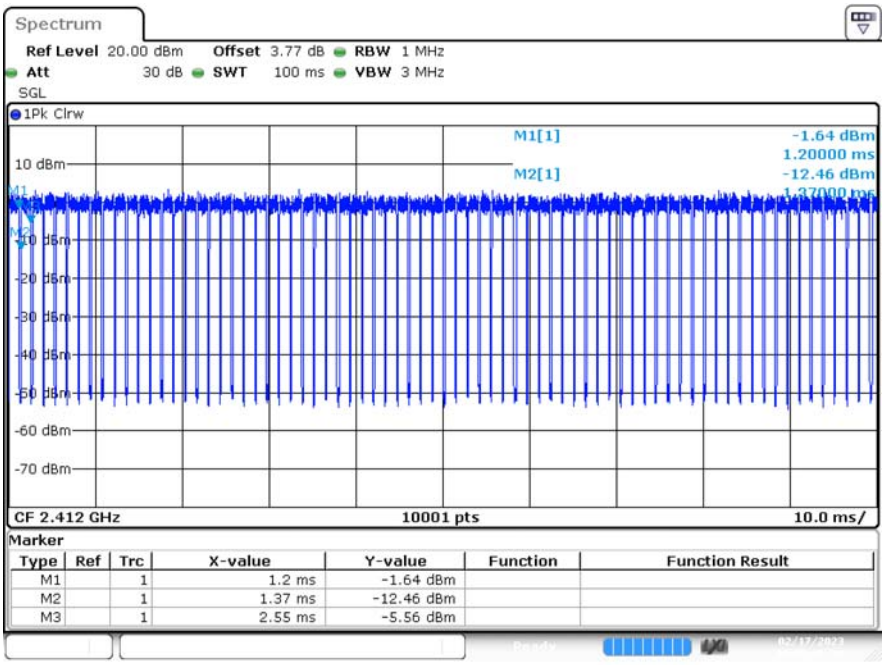
Test_Graph_802.11g_ANT1_2412



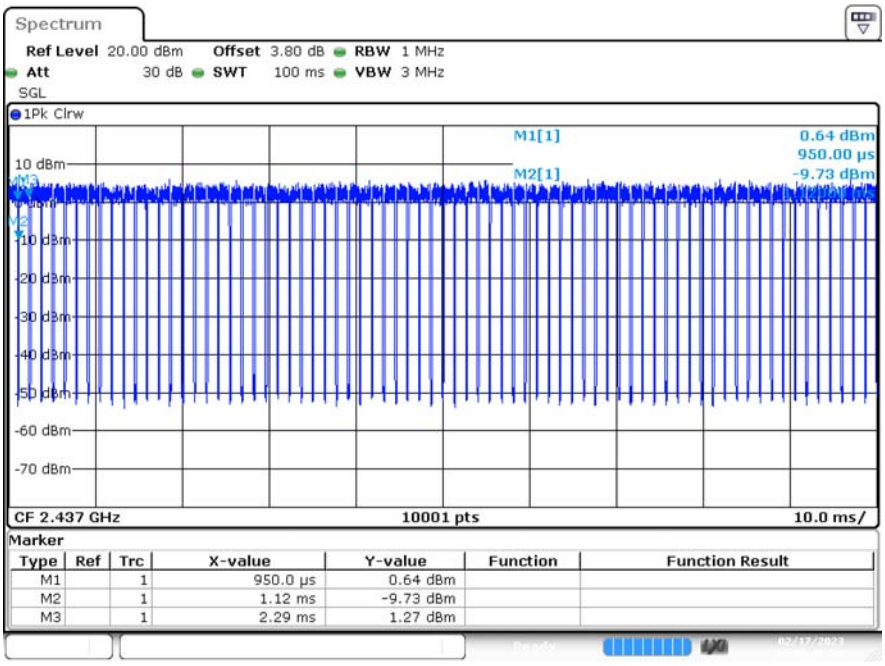
Test_Graph_802.11g_ANT1_2437



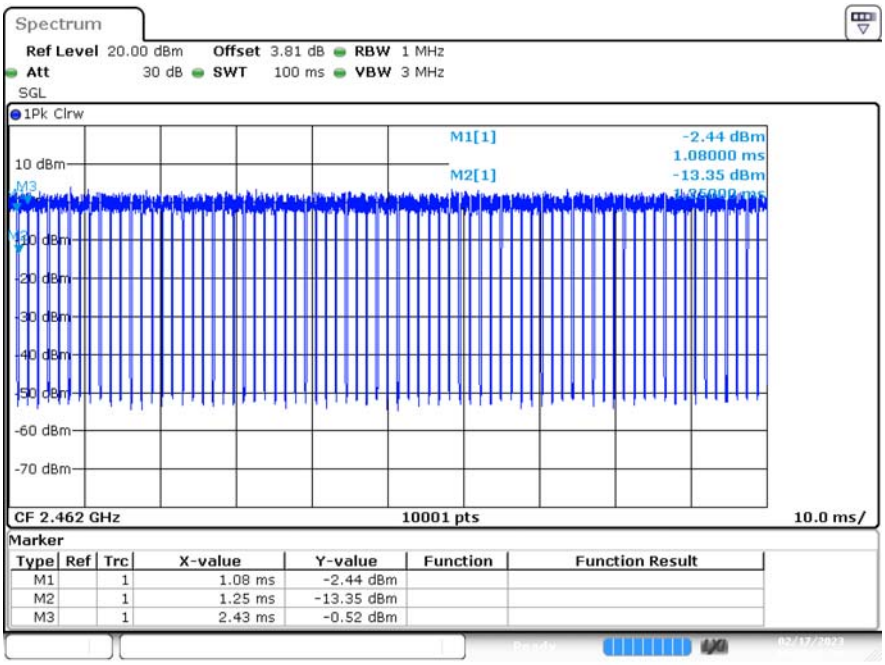
Test_Graph_802.11g_ANT1_2462



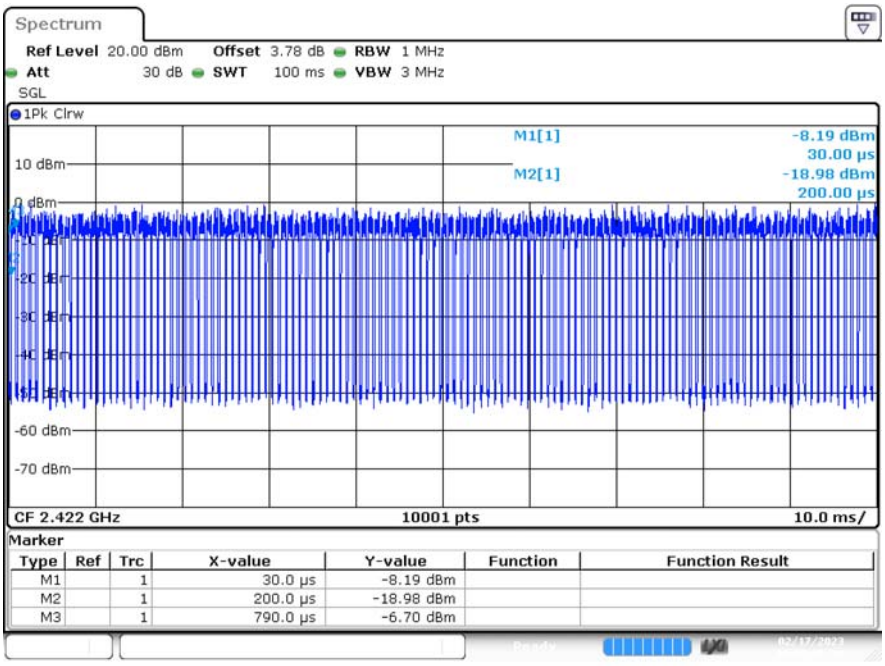
Test_Graph_802.11n20_ANT1_2412



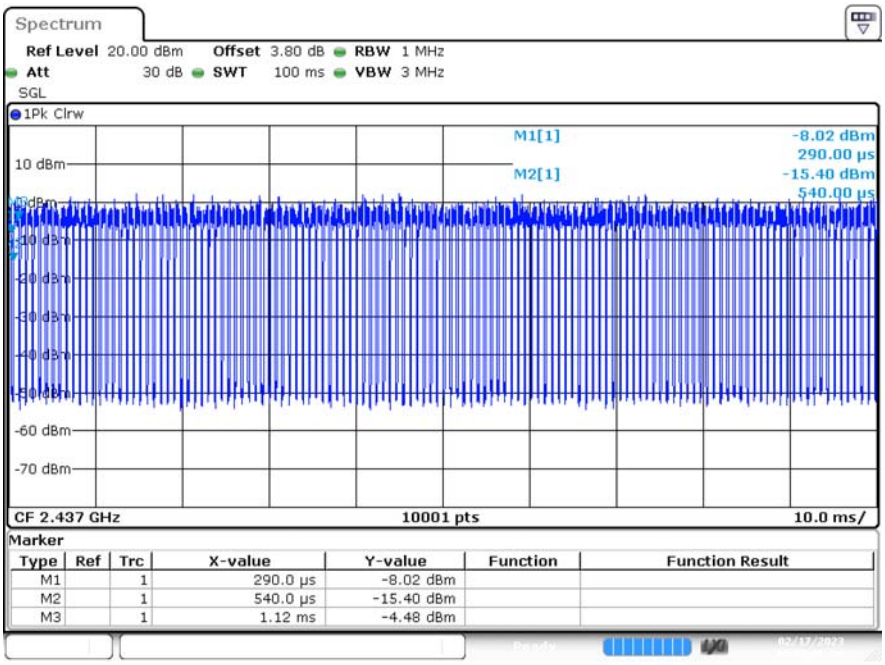
Test_Graph_802.11n20_ANT1_2437



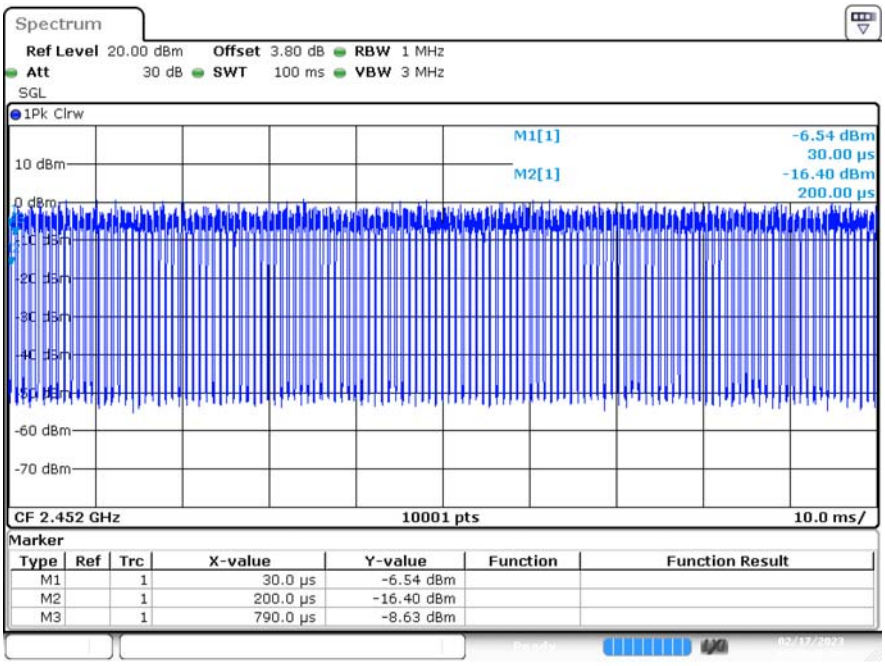
Test_Graph_802.11n20_ANT1_2462



Test_Graph_802.11n40_ANT1_2422



Test_Graph_802.11n40_ANT1_2437



Test_Graph_802.11n40_ANT1_2452

2 Maximum Conducted Output Power

2.1 Test Result

Test Data of Conducted Output Power				
Test Mode	Test Channel (MHz)	Peak Power (dBm)	Limits (dBm)	Pass or Fail
802.11b	2412	14.97	≤30	Pass
	2437	17.88	≤30	Pass
	2462	15.24	≤30	Pass
802.11g	2412	13.69	≤30	Pass
	2437	16.49	≤30	Pass
	2462	14.12	≤30	Pass
802.11n20	2412	12.75	≤30	Pass
	2437	15.67	≤30	Pass
	2462	13.39	≤30	Pass
802.11n40	2422	15.19	≤30	Pass
	2437	17.61	≤30	Pass
	2452	15.59	≤30	Pass

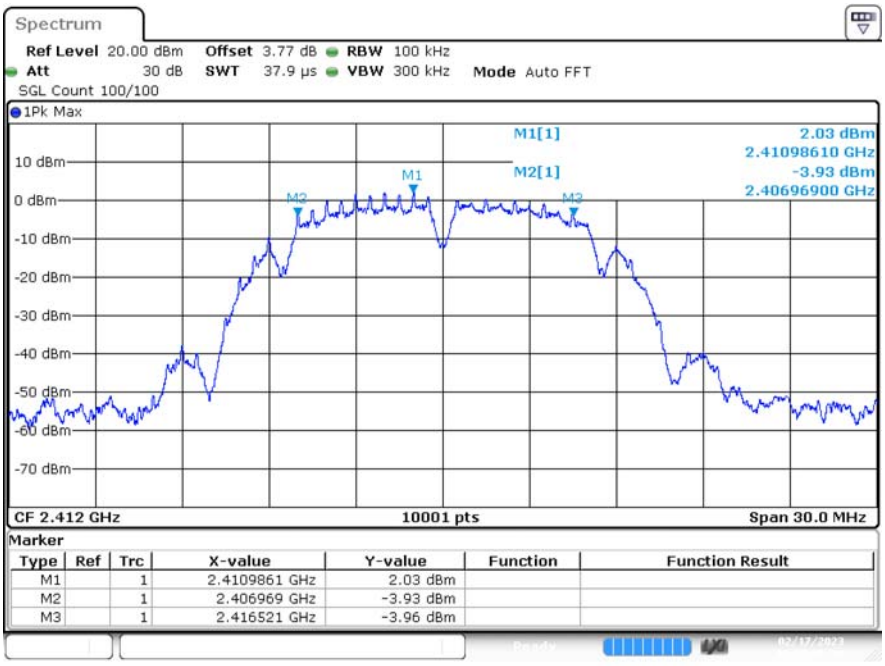
3 -6dB Bandwidth

3.1 Test Result

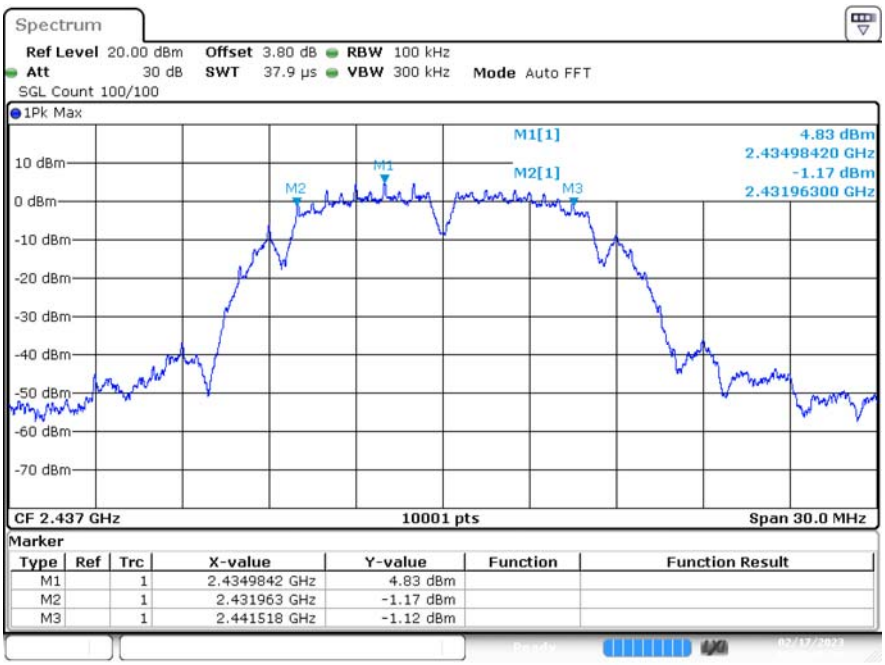
Test Data of Occupied Bandwidth and DTS Bandwidth				
Test Mode	Test Channel (MHz)	-6dB Bandwidth (MHz)	Limits (MHz)	Pass or Fail
802.11b	2412	9.552	⩾0.5	Pass
	2437	9.555	⩾0.5	Pass
	2462	9.699	⩾0.5	Pass
802.11g	2412	16.326	⩾0.5	Pass
	2437	16.533	⩾0.5	Pass
	2462	15.054	⩾0.5	Pass
802.11n20	2412	17.556	⩾0.5	Pass
	2437	16.986	⩾0.5	Pass
	2462	16.449	⩾0.5	Pass
802.11n40	2422	35.862	⩾0.5	Pass
	2437	34.356	⩾0.5	Pass
	2452	24.36	⩾0.5	Pass

3.2 Test Graphs

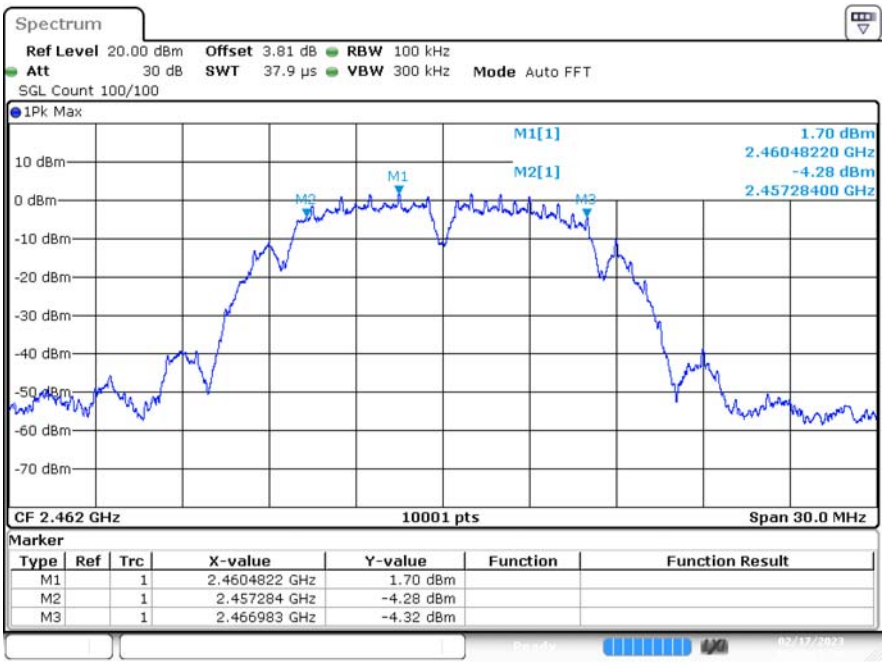
Test Graphs of Occupied Bandwidth



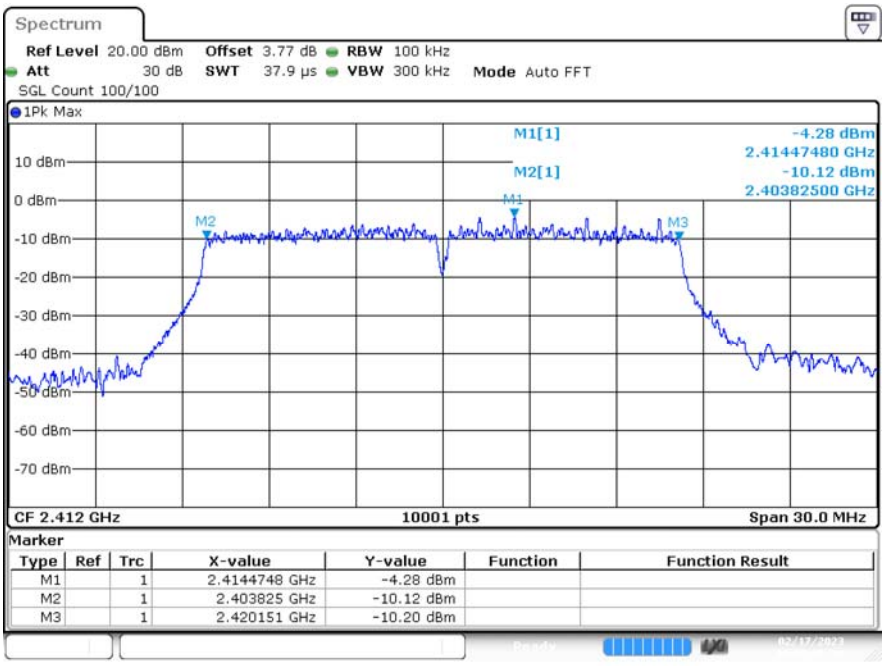
Test_Graph_802.11b_ANT1_2412



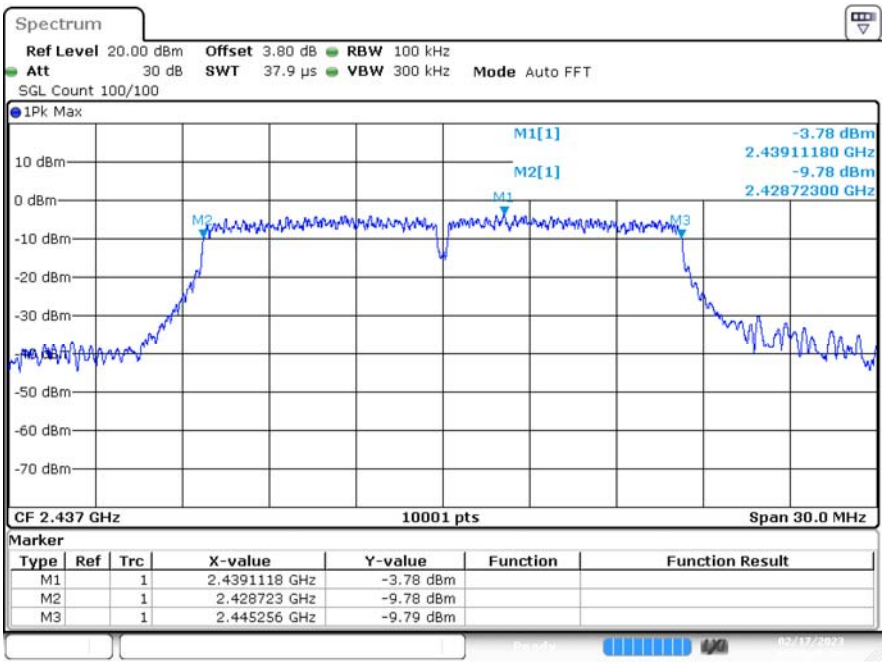
Test_Graph_802.11b_ANT1_2437



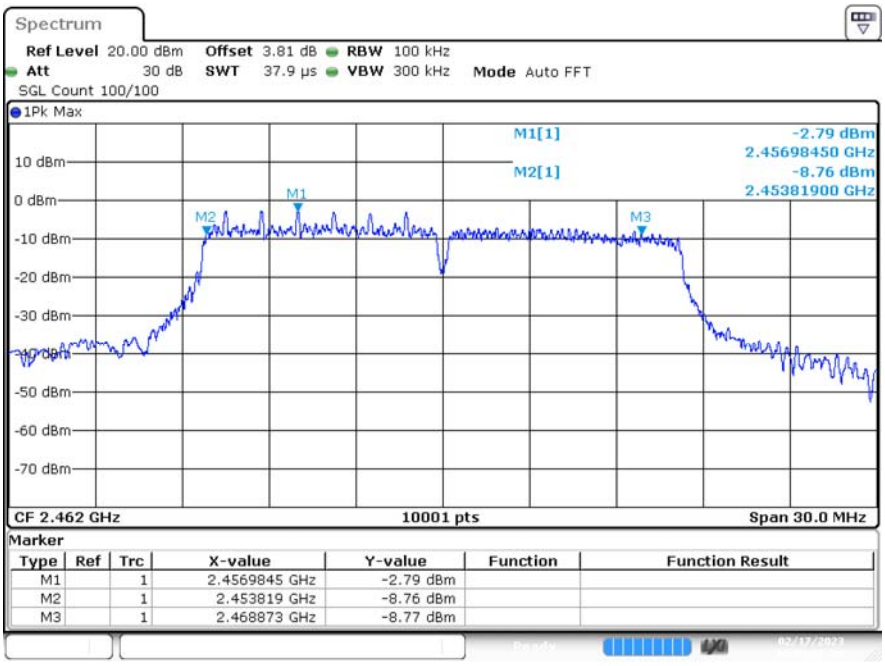
Test_Graph_802.11b_ANT1_2462



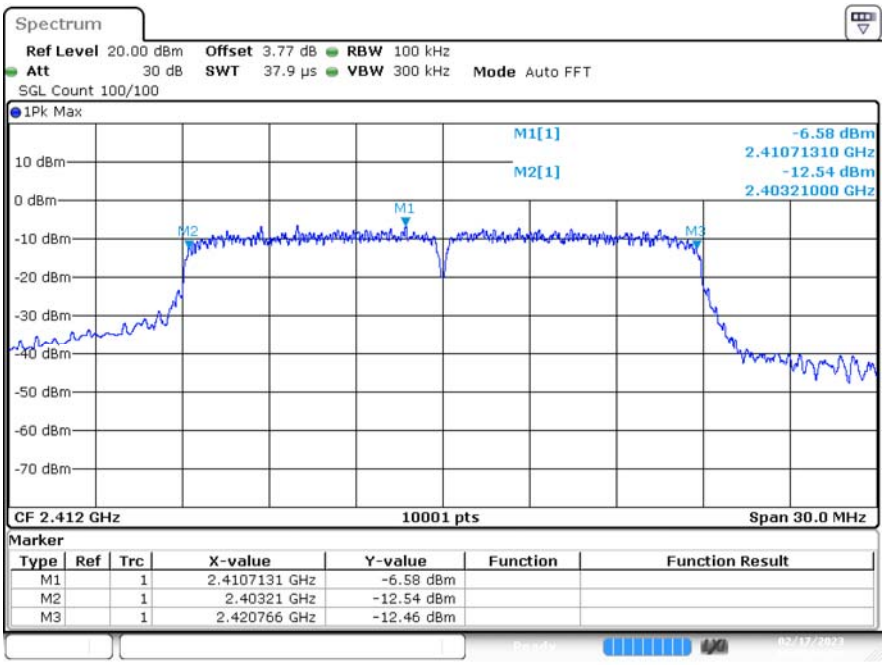
Test_Graph_802.11g_ANT1_2412



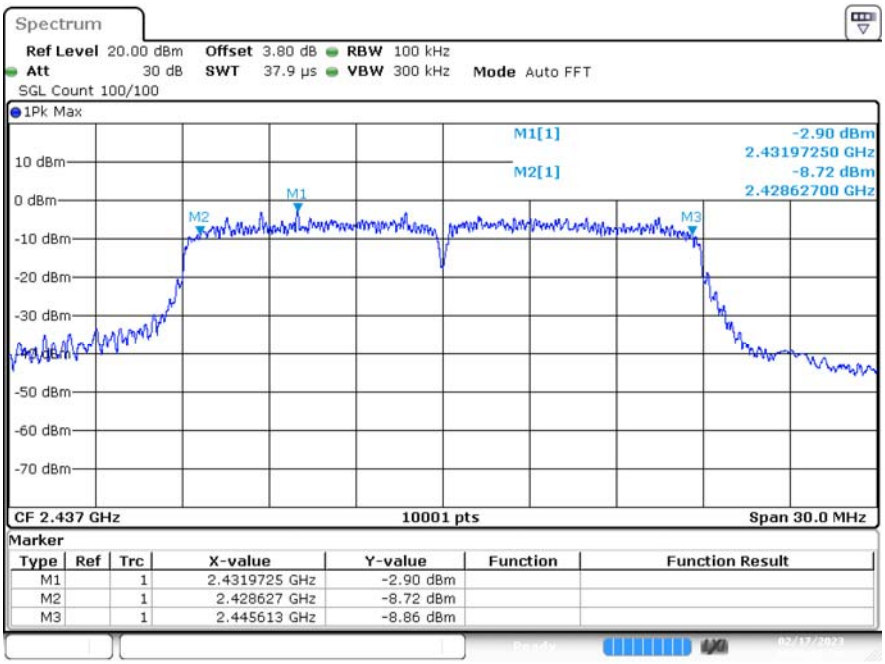
Test_Graph_802.11g_ANT1_2437



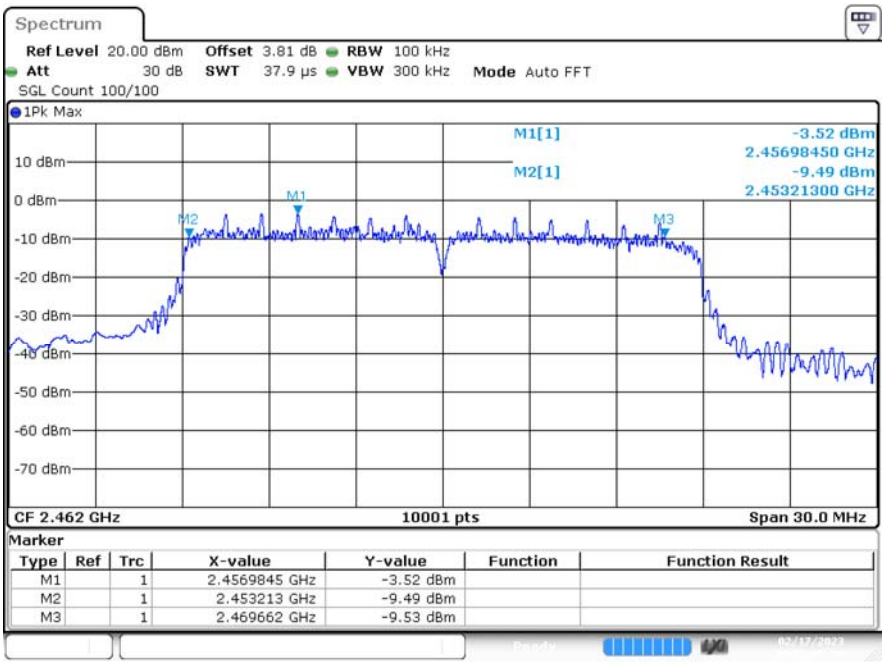
Test_Graph_802.11g_ANT1_2462



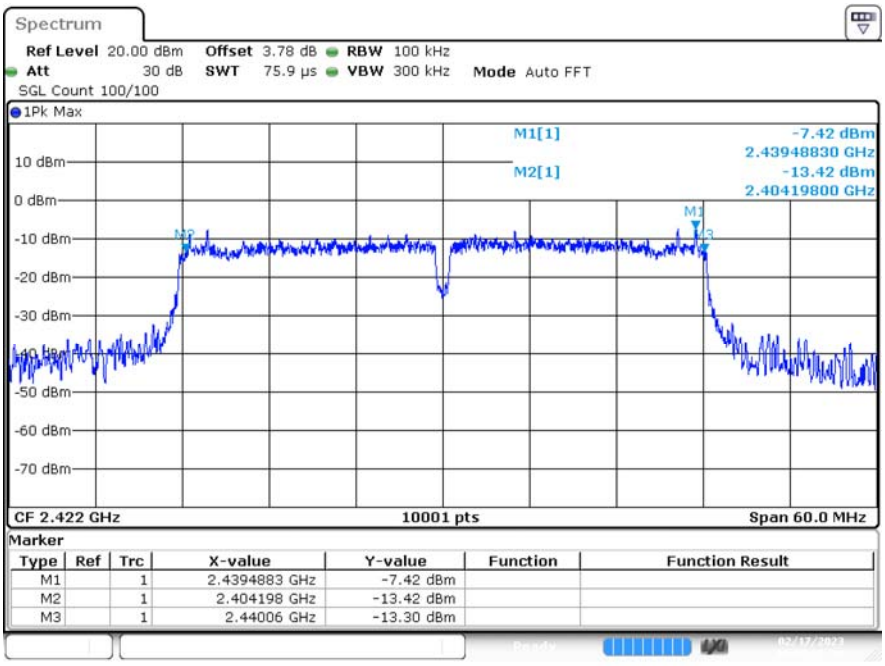
Test_Graph_802.11n20_ANT1_2412



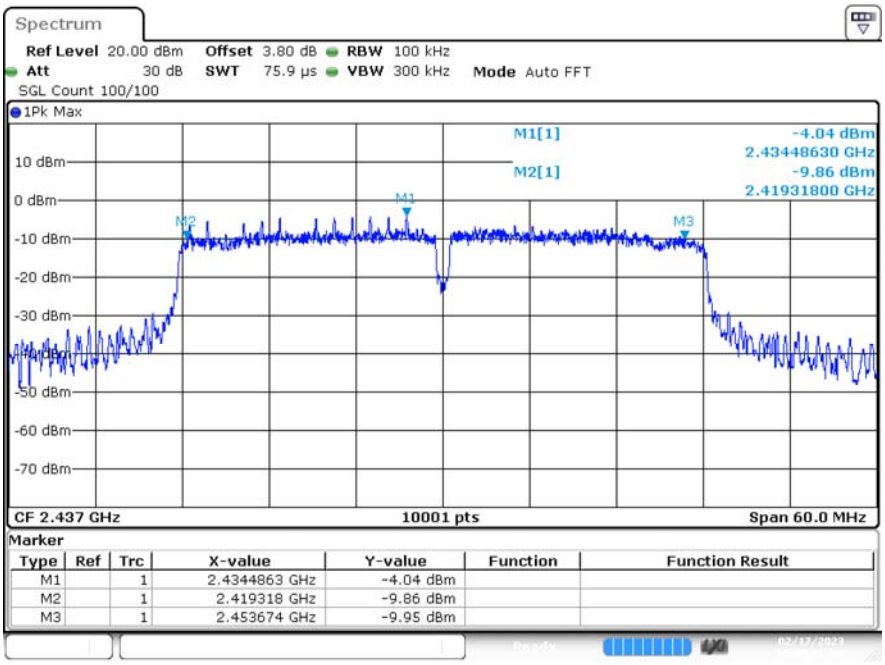
Test_Graph_802.11n20_ANT1_2437



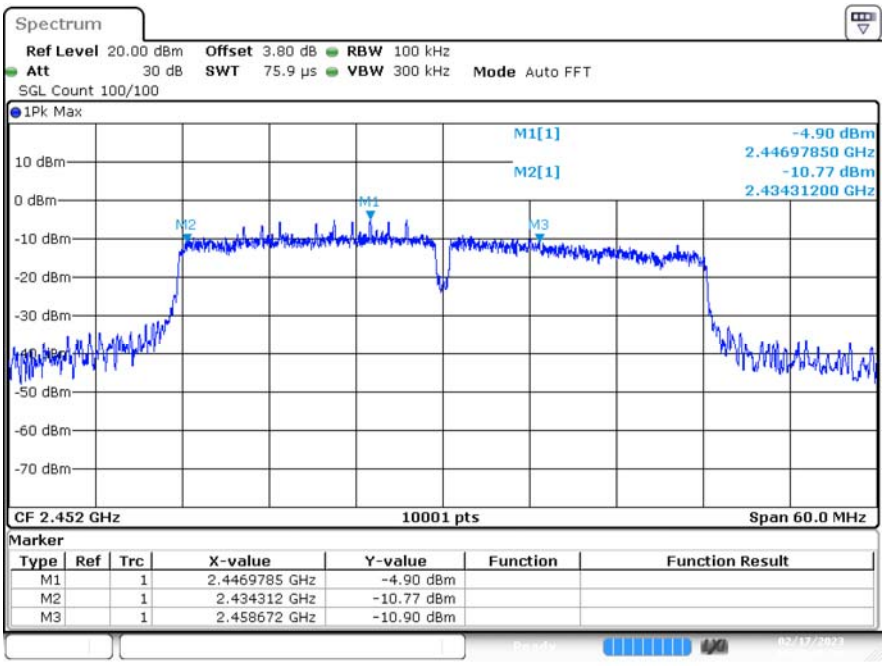
Test_Graph_802.11n20_ANT1_2462



Test_Graph_802.11n40_ANT1_2422



Test_Graph_802.11n40_ANT1_2437



Test_Graph_802.11n40_ANT1_2452

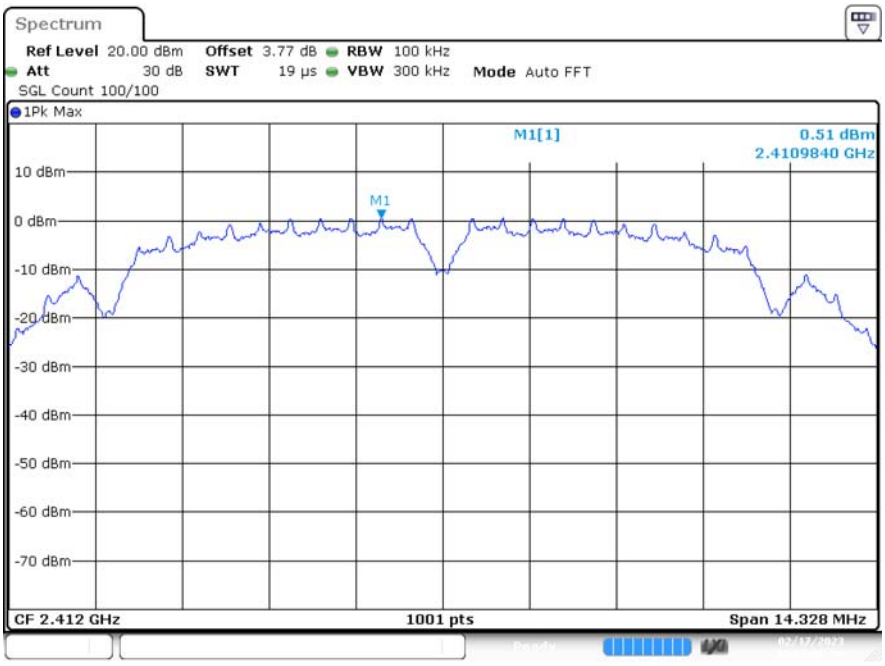
4 Maximum Power Spectral Density Level

4.1 Test Result

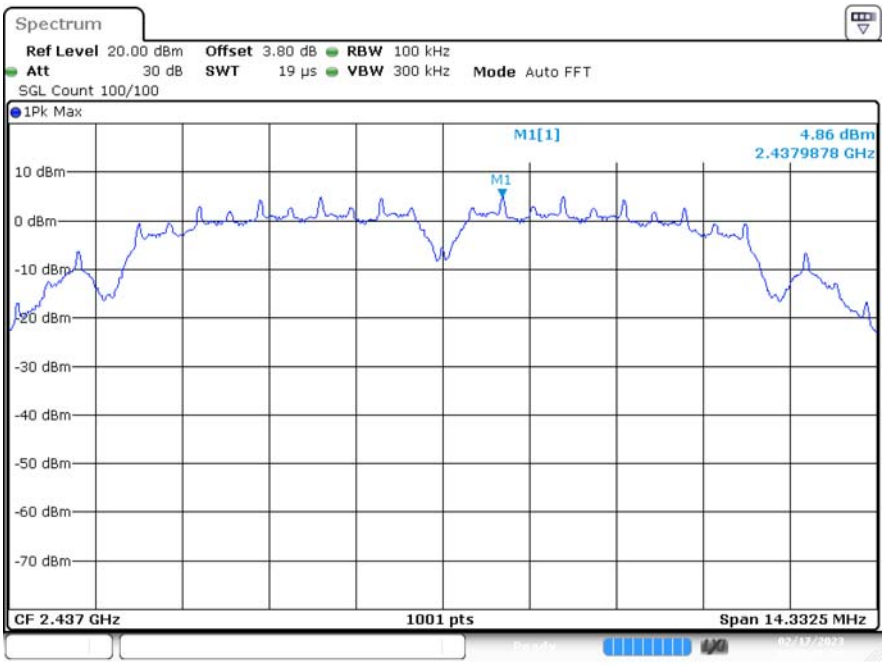
Test Data of Conducted Output Power Spectral Density				
Test Mode	Test Channel	Power density (dBm/3kHz)	Limit (dBm/3kHz)	Pass or Fail
802.11b	2412	0.51	≤8	Pass
	2437	4.86	≤8	Pass
	2462	0.74	≤8	Pass
802.11g	2412	-6.48	≤8	Pass
	2437	-3.48	≤8	Pass
	2462	-3.93	≤8	Pass
802.11n20	2412	-4.76	≤8	Pass
	2437	-1.65	≤8	Pass
	2462	-5.44	≤8	Pass
802.11n40	2422	-7.87	≤8	Pass
	2437	-3.85	≤8	Pass
	2452	-6.76	≤8	Pass

4.2 Test Graphs

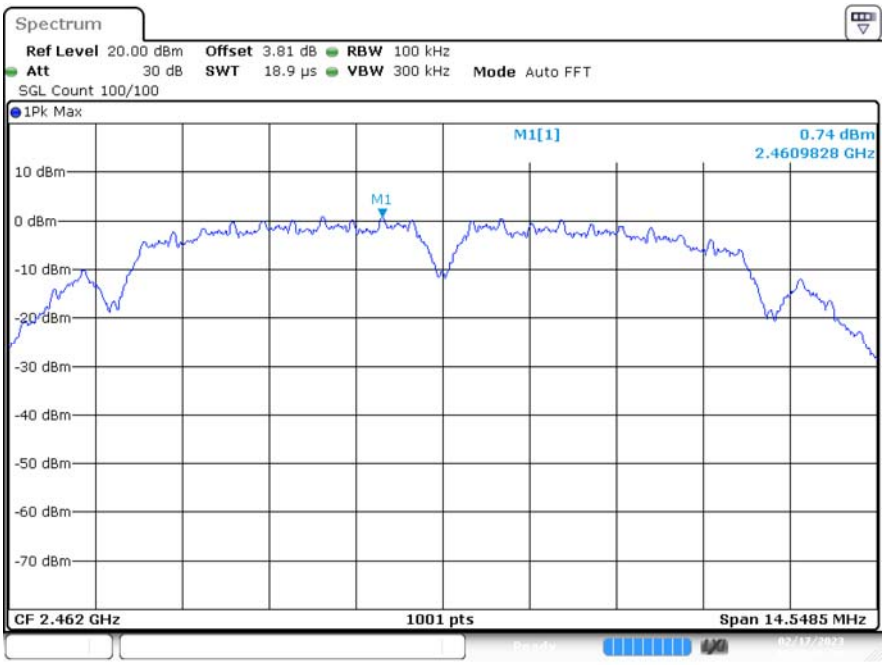
Test Graphs of Conducted Output Power Spectral Density



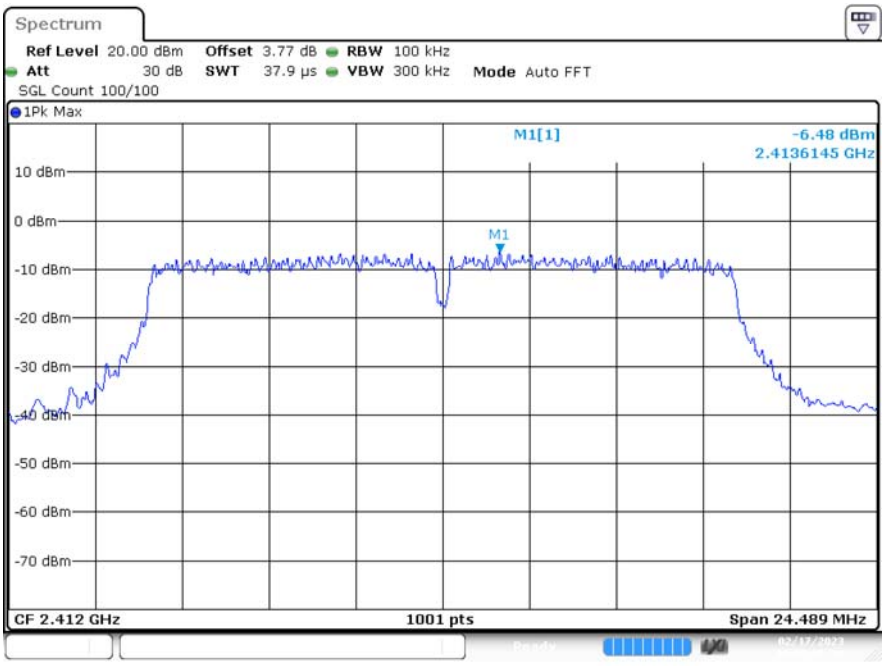
Test_Graph_802.11b_ANT1_2412



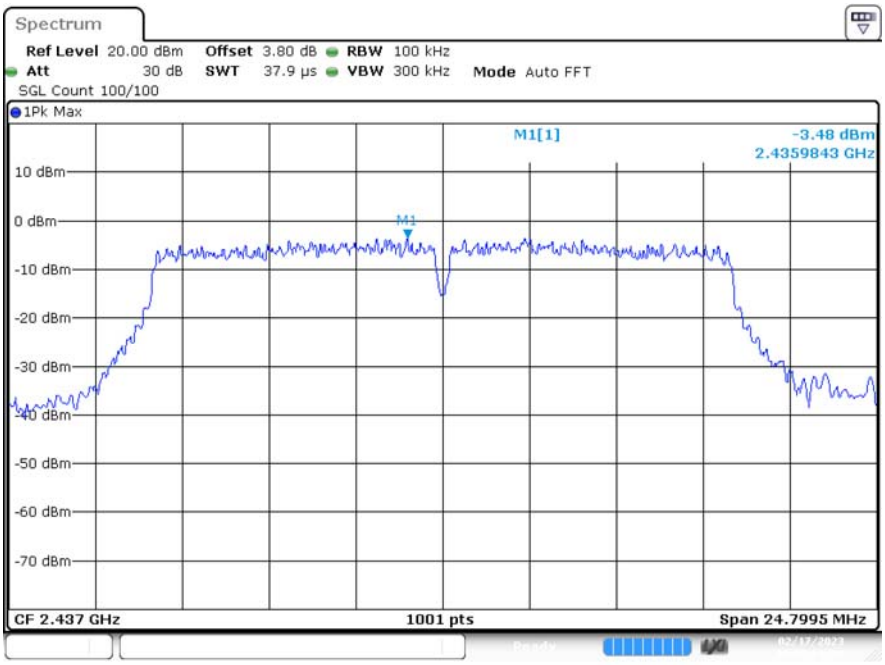
Test_Graph_802.11b_ANT1_2437



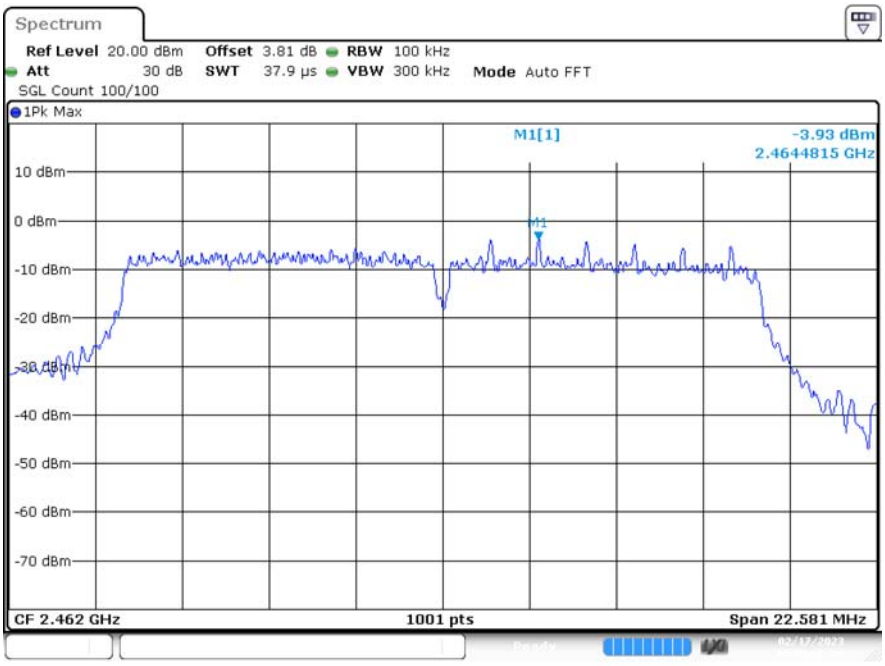
Test_Graph_802.11b_ANT1_2462



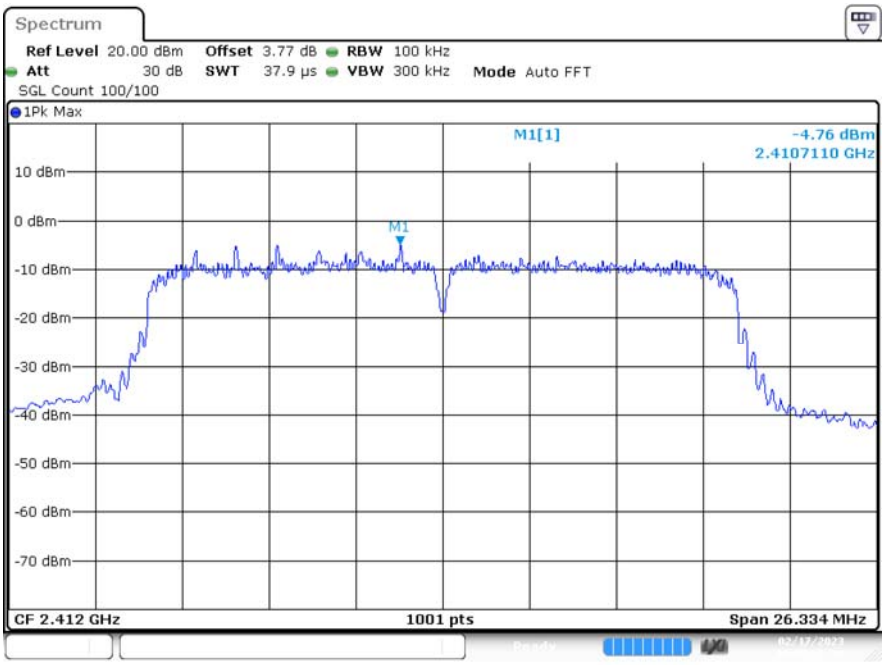
Test_Graph_802.11g_ANT1_2412



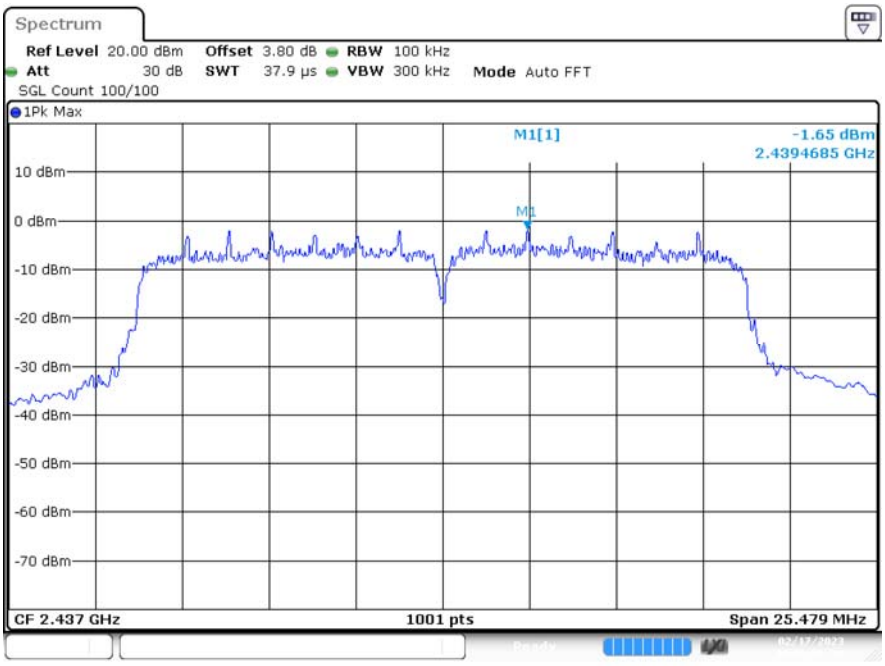
Test_Graph_802.11g_ANT1_2437



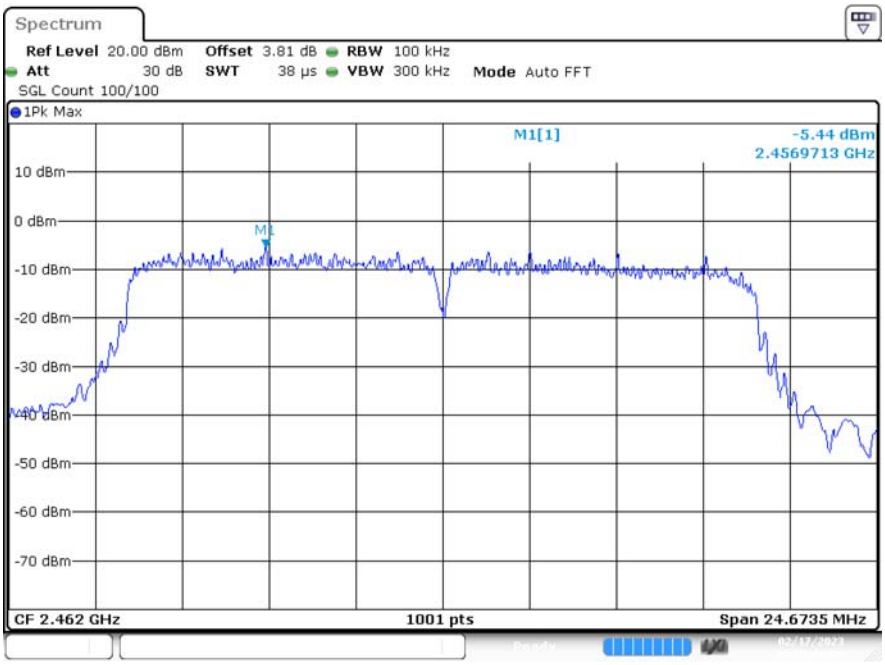
Test_Graph_802.11g_ANT1_2462



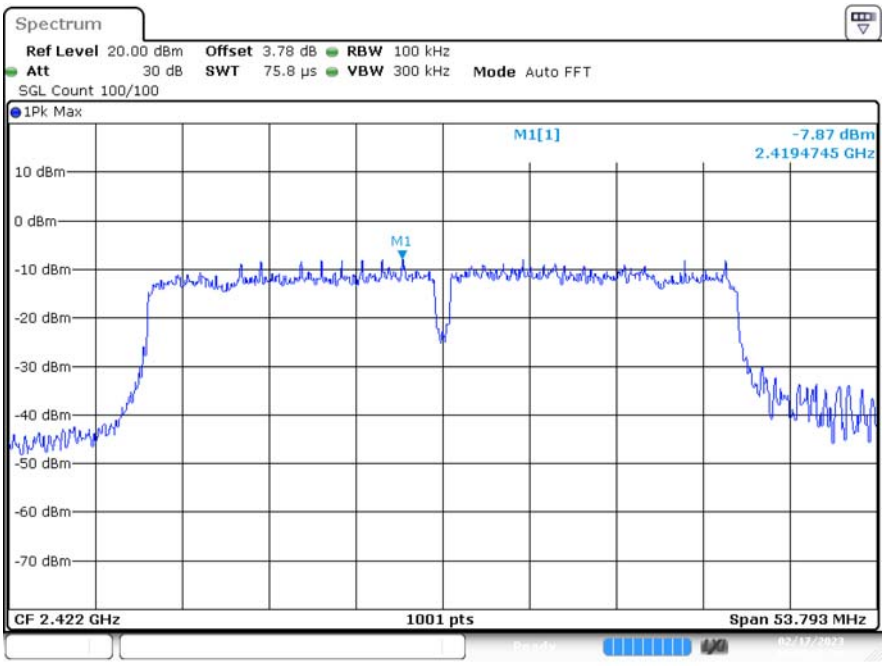
Test_Graph_802.11n20_ANT1_2412



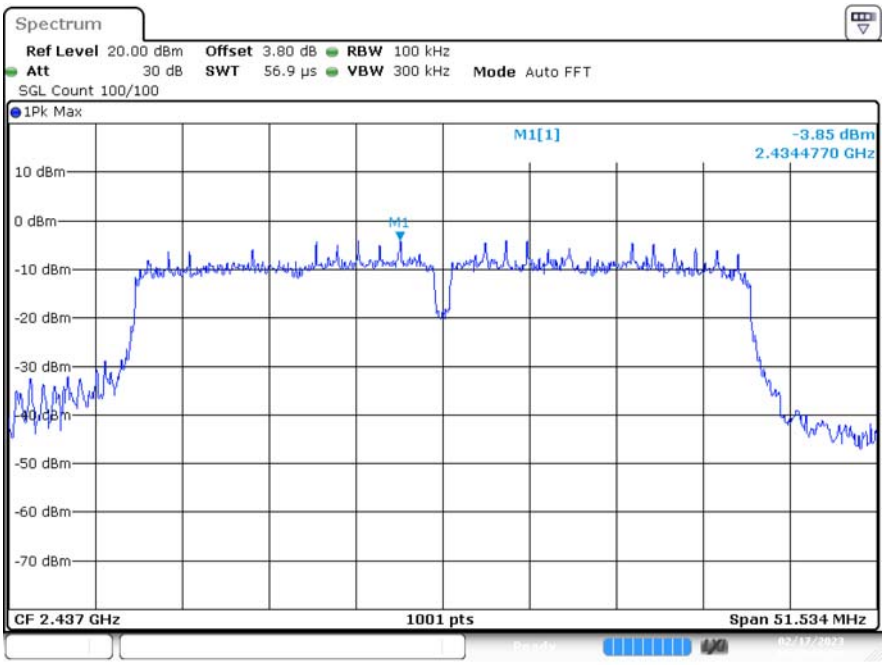
Test_Graph_802.11n20_ANT1_2437



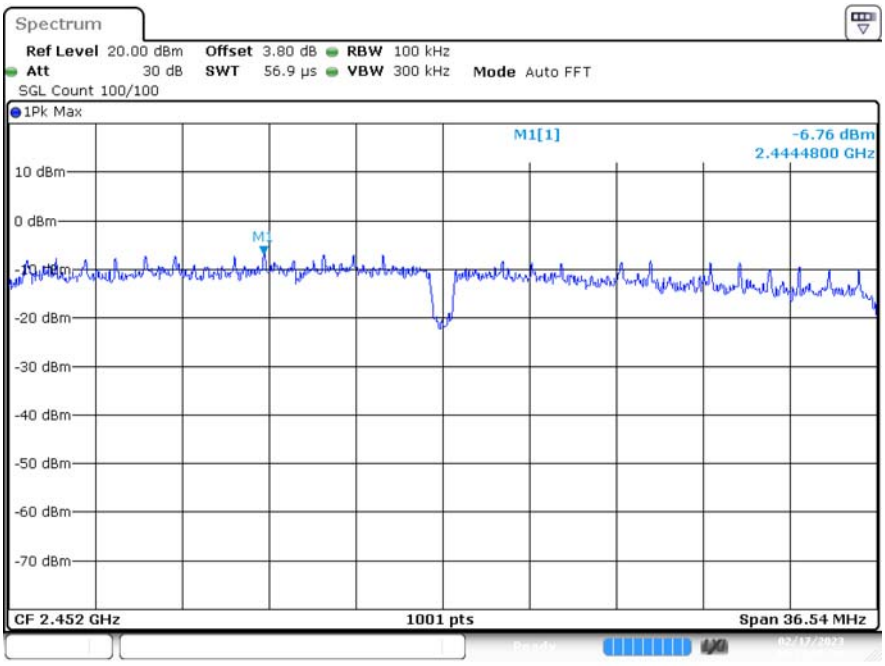
Test_Graph_802.11n20_ANT1_2462



Test_Graph_802.11n40_ANT1_2412



Test_Graph_802.11n40_ANT1_2437



Test_Graph_802.11n40_ANT1_2452

5 Band Edge

5.1 Test Result

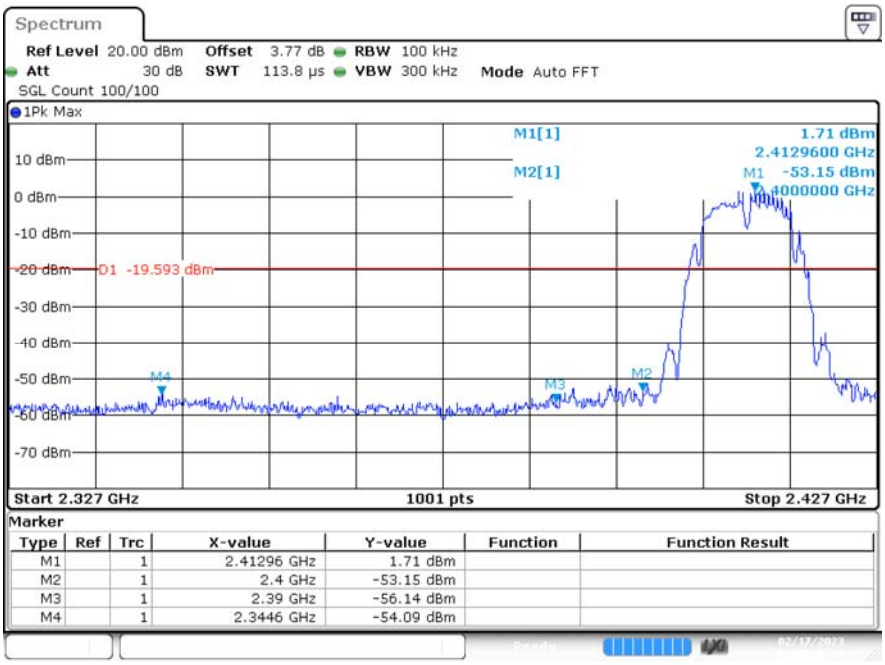
Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
802.11b	2412	Ant1	-54.5	-20	-54.5
802.11b	2462	Ant1	-55.79	-20	Pass
802.11g	2412	Ant1	-47.7	-20	Pass
802.11g	2462	Ant1	-46.05	-20	Pass
802.11n20	2412	Ant1	-47.39	-20	Pass
802.11n20	2462	Ant1	-47.82	-20	Pass
802.11n40	2422	Ant1	-32.98	-20	Pass
802.11n40	2452	Ant1	-33.74	-20	Pass

5.2 Test Graphs

Test Graphs

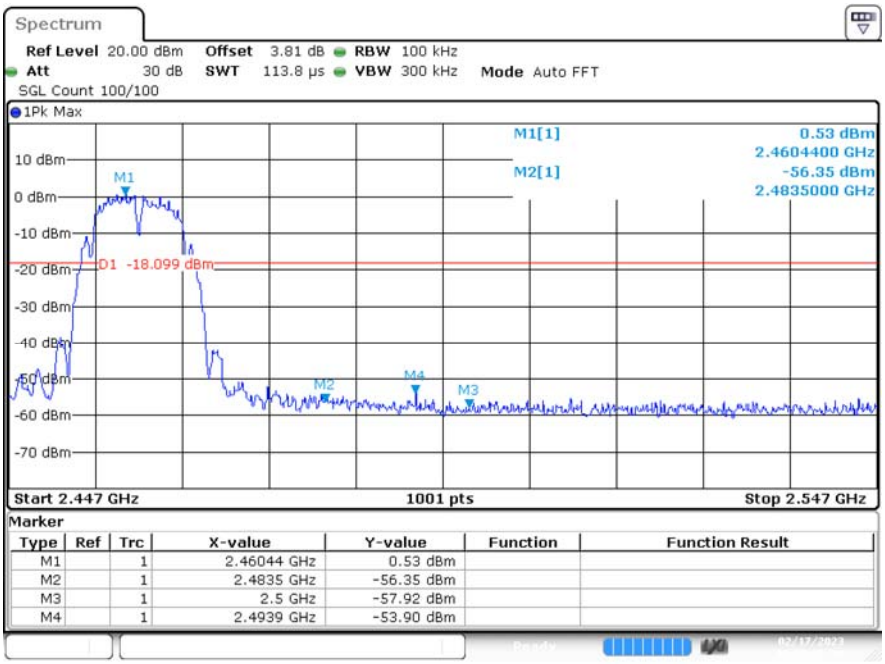
802.11b 2412MHz Ant1 Ref

802.11b 2412MHz Ant1 Emission



802.11b 2462MHz Ant1 Ref

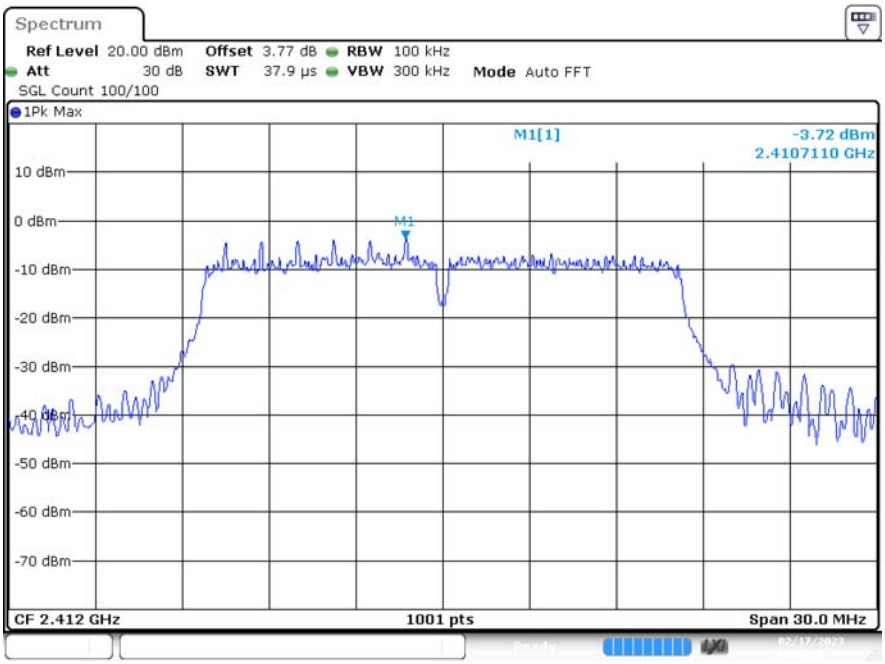
802.11b 2462MHz Ant1 Emission



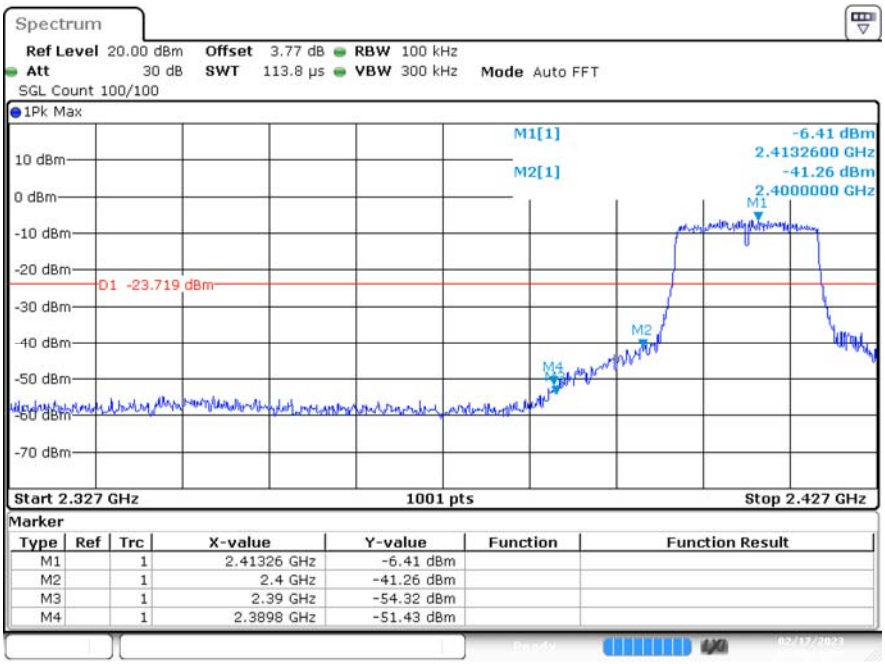
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.46044 GHz	0.53 dBm		
M2		1	2.4835 GHz	-56.35 dBm		
M3		1	2.5 GHz	-57.92 dBm		
M4		1	2.4939 GHz	-53.90 dBm		

802.11g 2412MHz Ant1 Ref



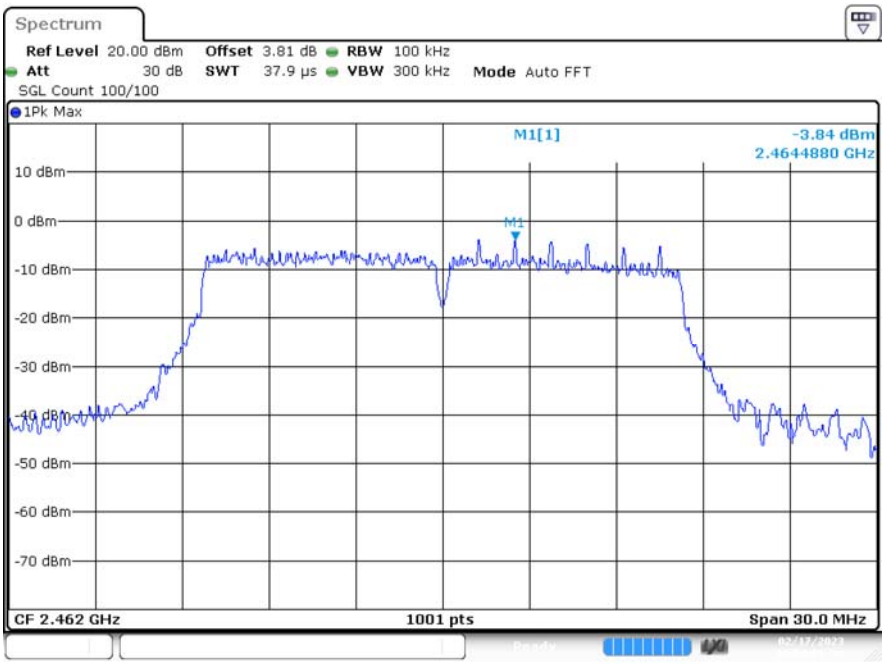
802.11g 2412MHz Ant1 Emission



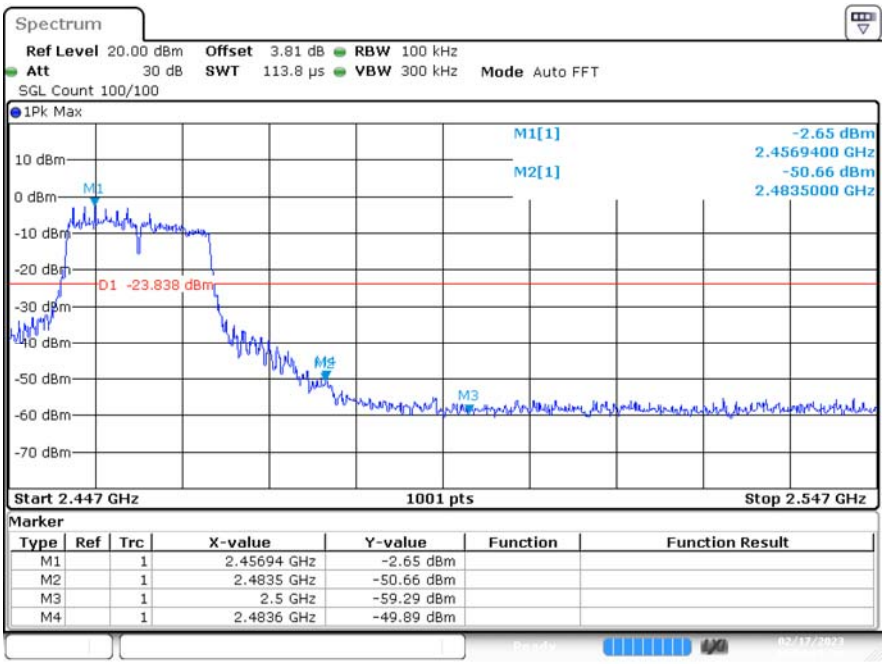
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.41326 GHz	-6.41 dBm		
M2		1	2.4 GHz	-41.26 dBm		
M3		1	2.39 GHz	-54.32 dBm		
M4		1	2.3898 GHz	-51.43 dBm		

802.11g 2462MHz Ant1 Ref



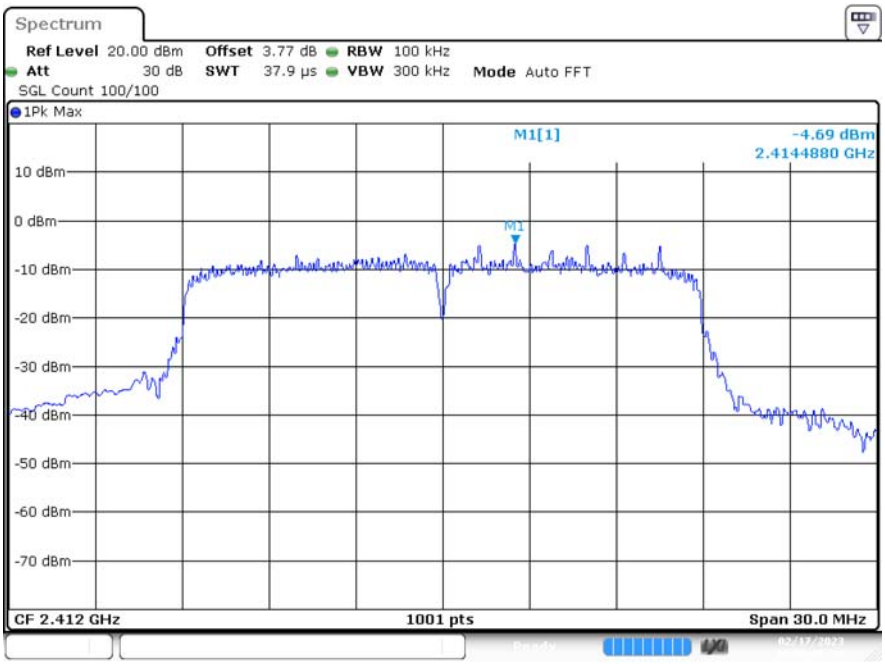
802.11g 2462MHz Ant1 Emission



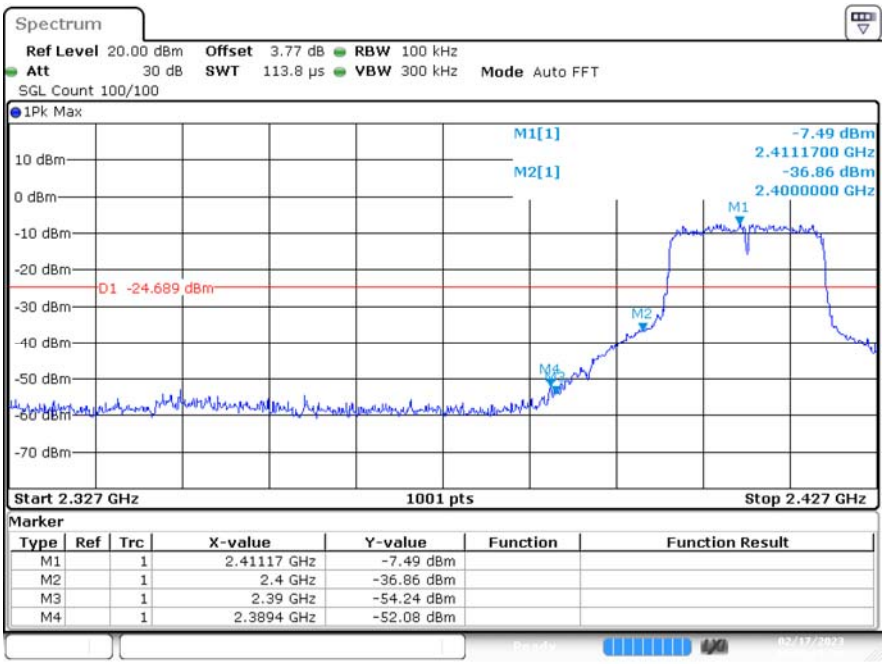
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.45694 GHz	-2.65 dBm		
M2		1	2.4835 GHz	-50.66 dBm		
M3		1	2.5 GHz	-59.29 dBm		
M4		1	2.4836 GHz	-49.89 dBm		

802.11n20 2412MHz Ant1 Ref



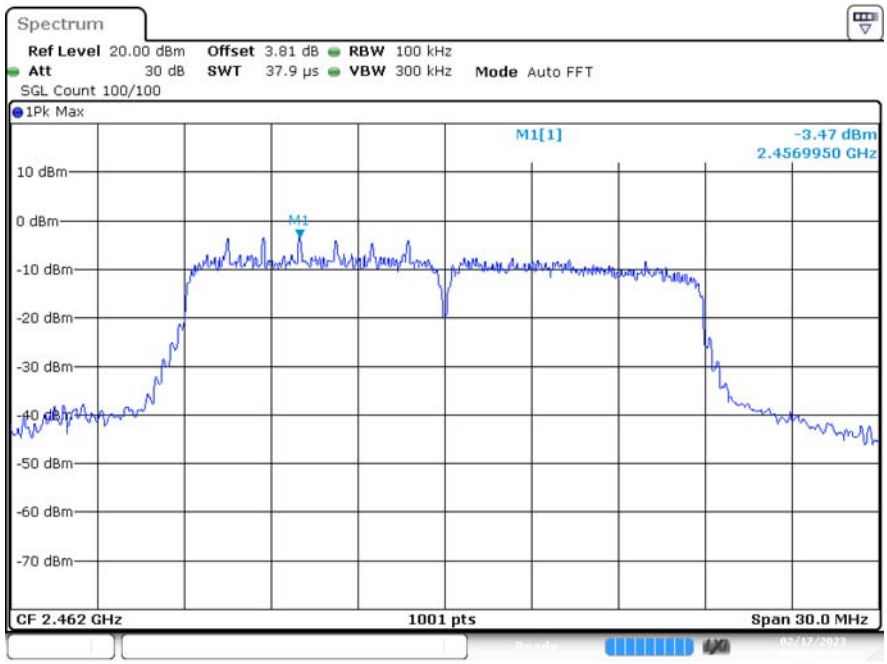
802.11n20 2412MHz Ant1 Emission



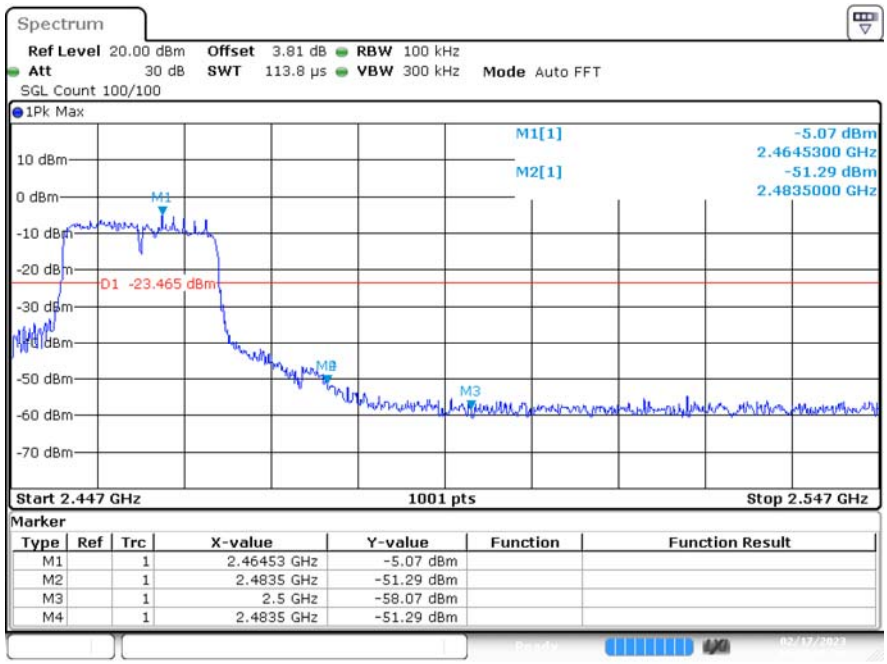
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.41117 GHz	-7.49 dBm		
M2		1	2.4 GHz	-36.86 dBm		
M3		1	2.39 GHz	-54.24 dBm		
M4		1	2.3894 GHz	-52.08 dBm		

802.11n20 2462MHz Ant1 Ref



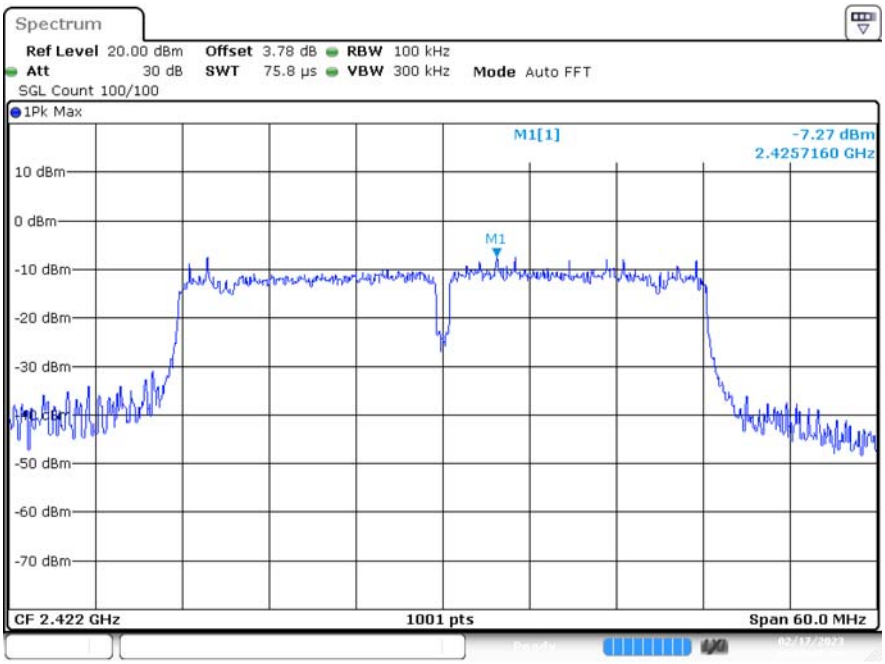
802.11n20 2462MHz Ant1 Emission



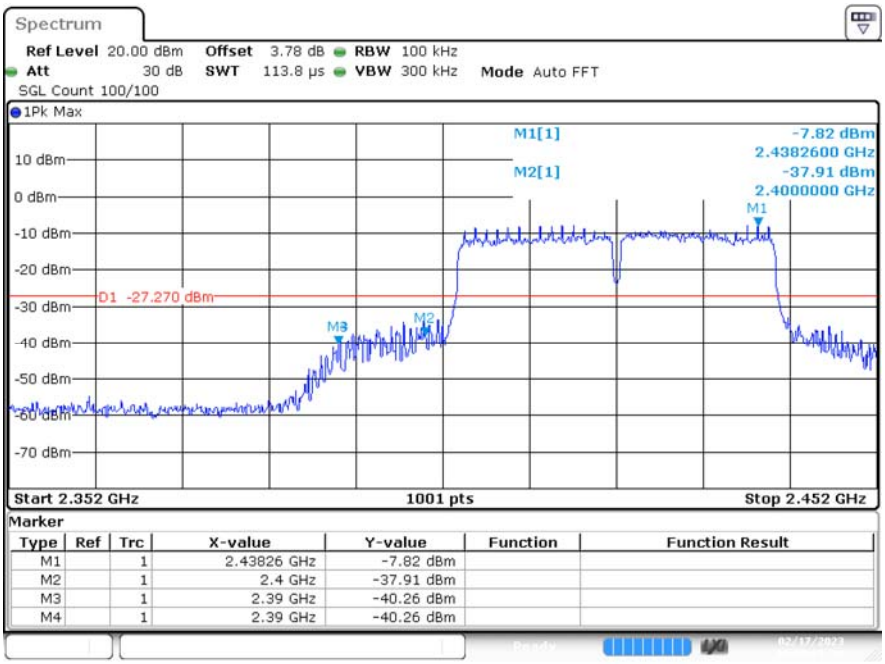
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.46453 GHz	-5.07 dBm		
M2		1	2.4835 GHz	-51.29 dBm		
M3		1	2.5 GHz	-58.07 dBm		
M4		1	2.4835 GHz	-51.29 dBm		

802.11n40 2422MHz Ant1 Ref



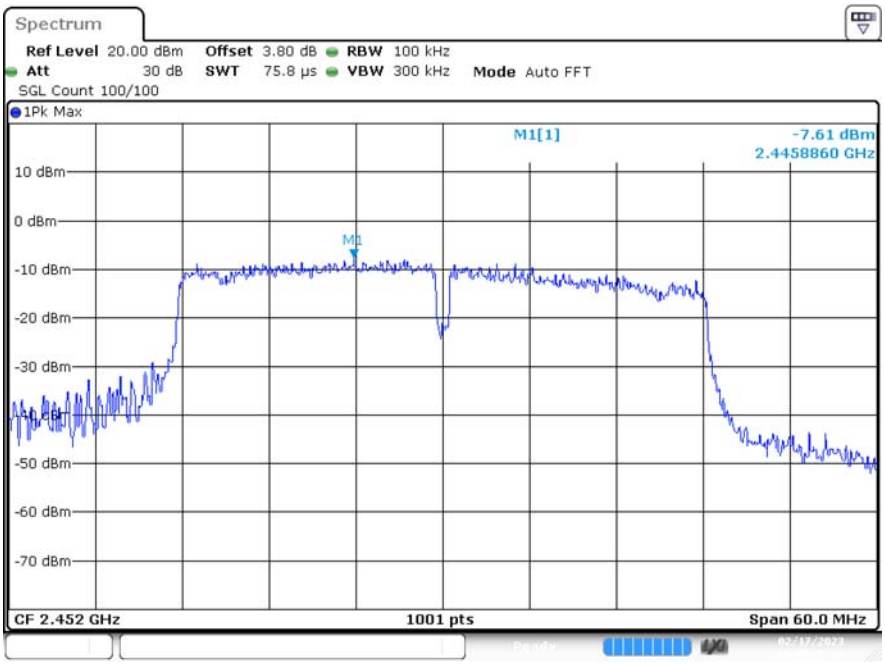
802.11n40 2422MHz Ant1 Emission



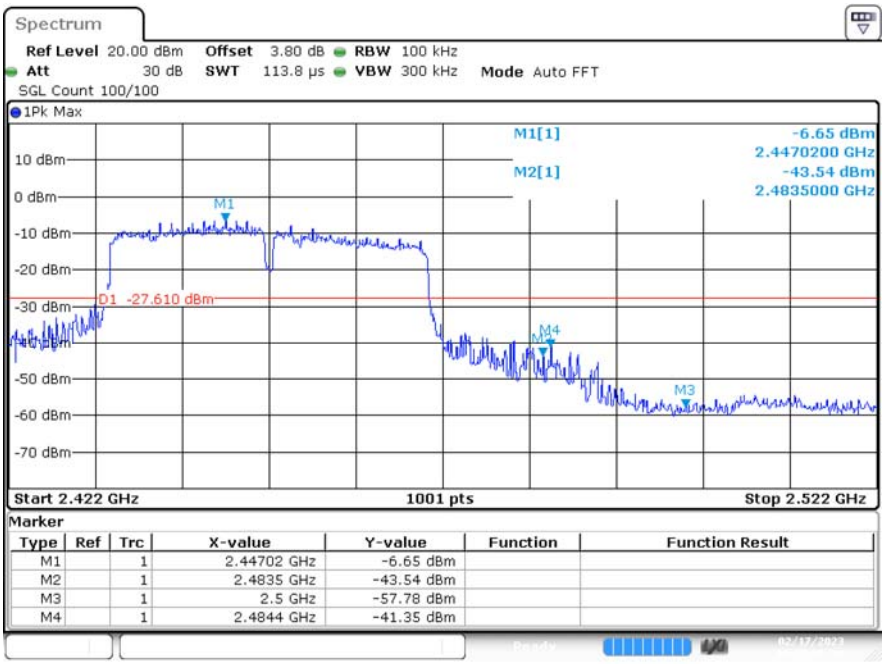
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.43826 GHz	-7.82 dBm		
M2		1	2.4 GHz	-37.91 dBm		
M3		1	2.39 GHz	-40.26 dBm		
M4		1	2.39 GHz	-40.26 dBm		

802.11n40 2452MHz Ant1 Ref



802.11n40 2452MHz Ant1 Emission



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.44702 GHz	-6.65 dBm		
M2		1	2.4835 GHz	-43.54 dBm		
M3		1	2.5 GHz	-57.78 dBm		
M4		1	2.4844 GHz	-41.35 dBm		

6 Conducted RF Spurious Emission

6.1 Test Result

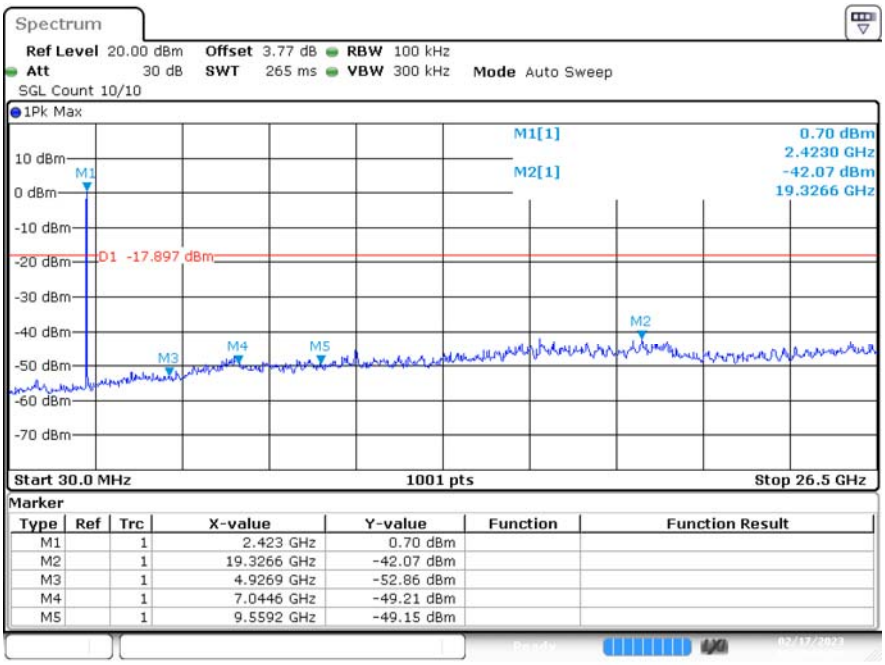
Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
802.11b	2412	Ant1	-44.16	-20	Pass
802.11b	2437	Ant1	-46.65	-20	Pass
802.11b	2462	Ant1	-45.03	-20	Pass
802.11g	2412	Ant1	-38.88	-20	Pass
802.11g	2437	Ant1	-40.15	-20	Pass
802.11g	2462	Ant1	-37.38	-20	Pass
802.11n20	2412	Ant1	-35.65	-20	Pass
802.11n20	2437	Ant1	-40.23	-20	Pass
802.11n20	2462	Ant1	-38.6	-20	Pass
802.11n40	2422	Ant1	-35.85	-20	Pass
802.11n40	2437	Ant1	-38.05	-20	Pass
802.11n40	2452	Ant1	-35.33	-20	Pass

6.2 Test Graphs

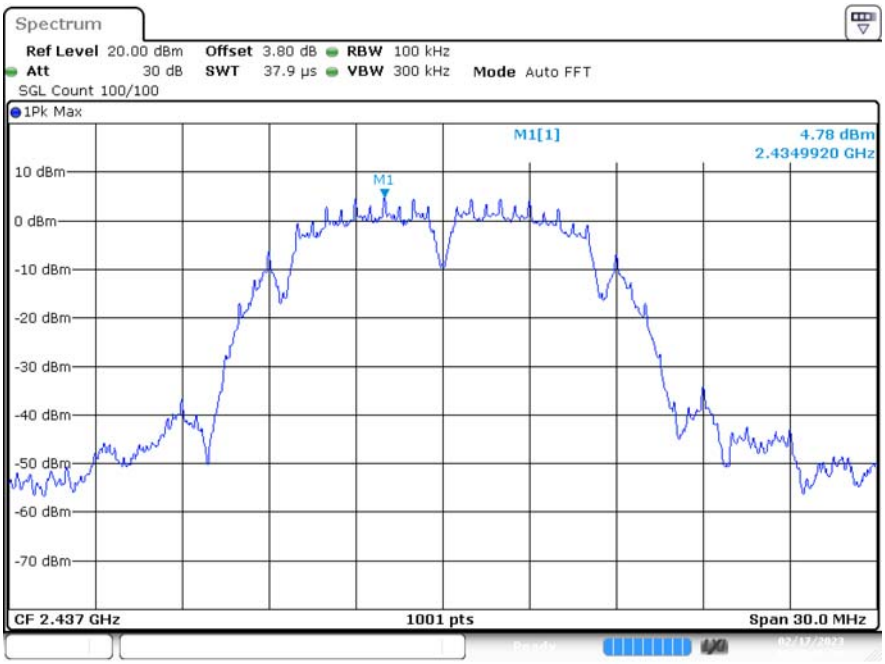
Test Graphs

802.11b 2412MHz Ant1 Ref

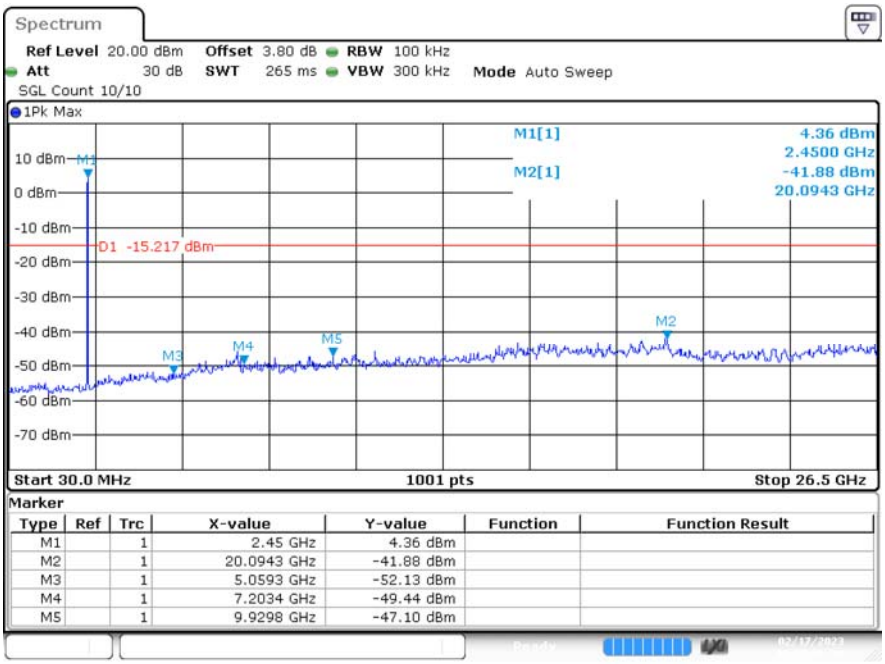
802.11b 2412MHz Ant1 Emission



802.11b 2437MHz Ant1 Ref



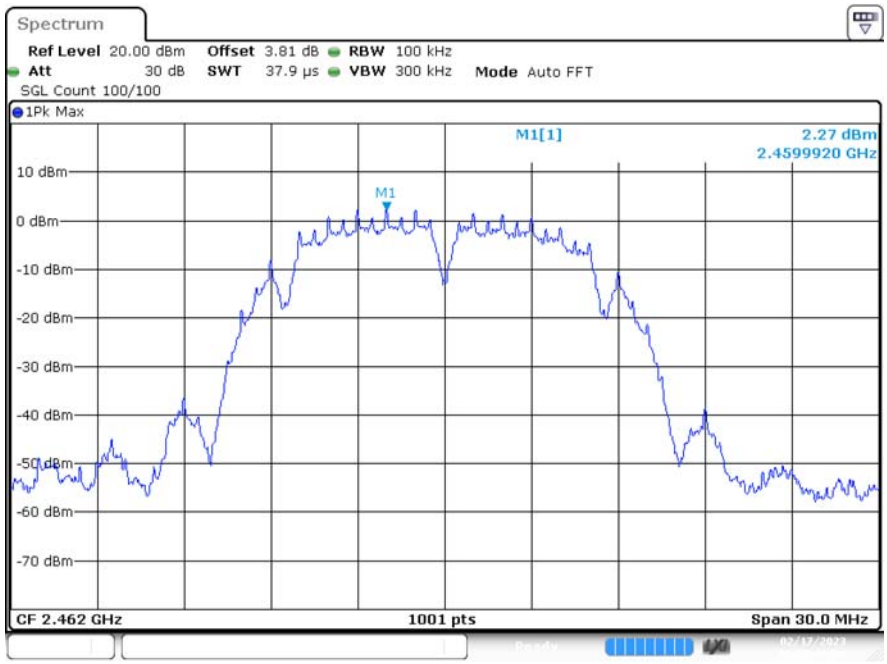
802.11b 2437MHz Ant1 Emission



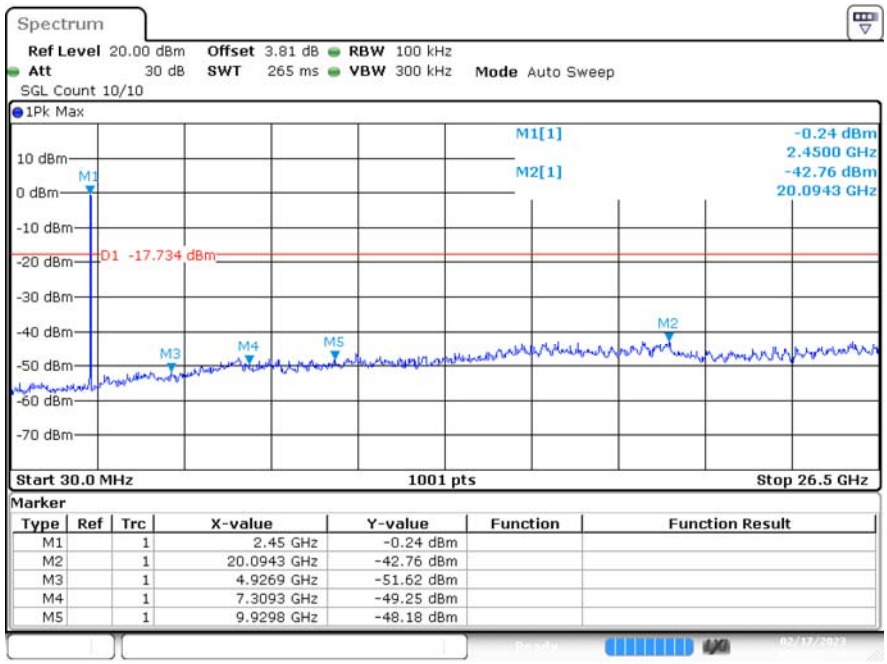
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.45 GHz	4.36 dBm		
M2		1	20.0943 GHz	-41.88 dBm		
M3		1	5.0593 GHz	-52.13 dBm		
M4		1	7.2034 GHz	-49.44 dBm		
M5		1	9.9298 GHz	-47.10 dBm		

802.11b 2462MHz Ant1 Ref



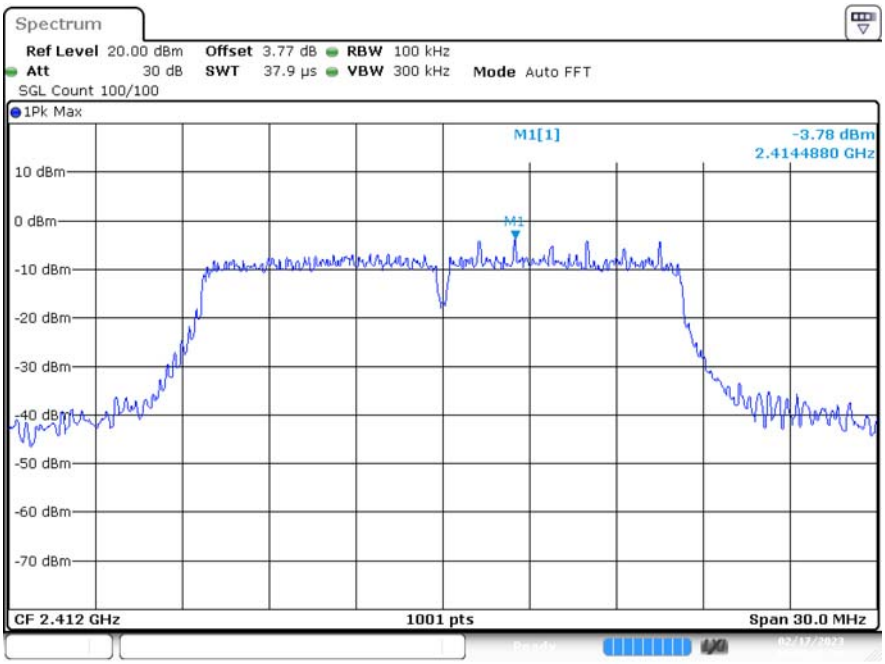
802.11b 2462MHz Ant1 Emission



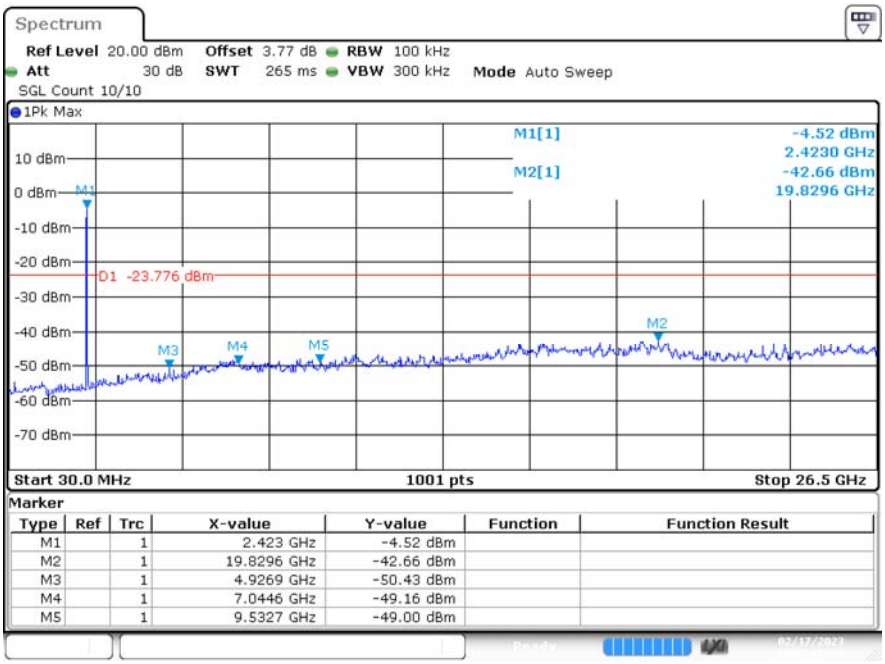
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.45 GHz	-0.24 dBm		
M2		1	20.0943 GHz	-42.76 dBm		
M3		1	4.9269 GHz	-51.62 dBm		
M4		1	7.3093 GHz	-49.25 dBm		
M5		1	9.9298 GHz	-48.18 dBm		

802.11g 2412MHz Ant1 Ref



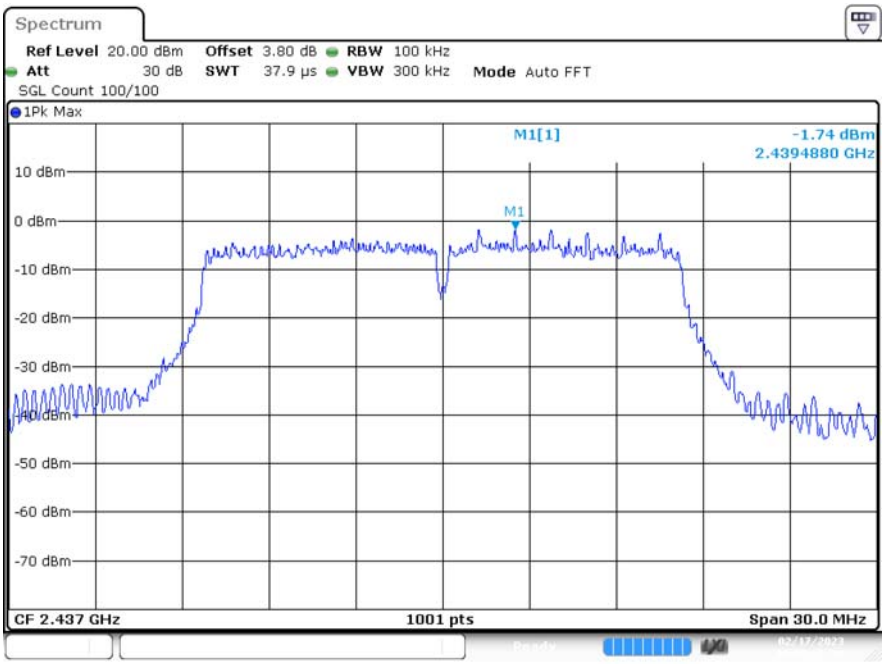
802.11g 2412MHz Ant1 Emission



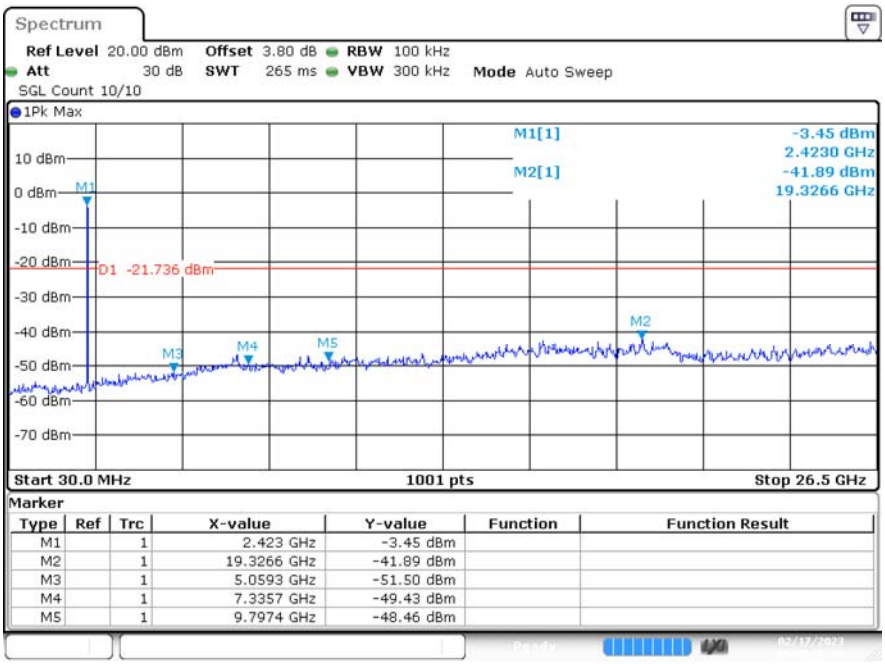
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.423 GHz	-4.52 dBm		
M2		1	19.8296 GHz	-42.66 dBm		
M3		1	4.9269 GHz	-50.43 dBm		
M4		1	7.0446 GHz	-49.16 dBm		
M5		1	9.5327 GHz	-49.00 dBm		

802.11g 2437MHz Ant1 Ref



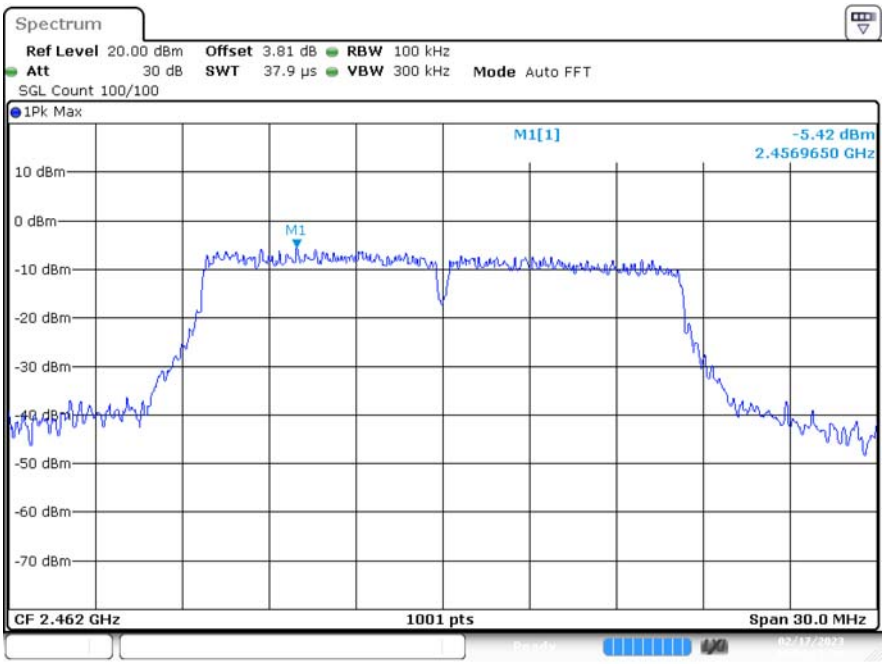
802.11g 2437MHz Ant1 Emission



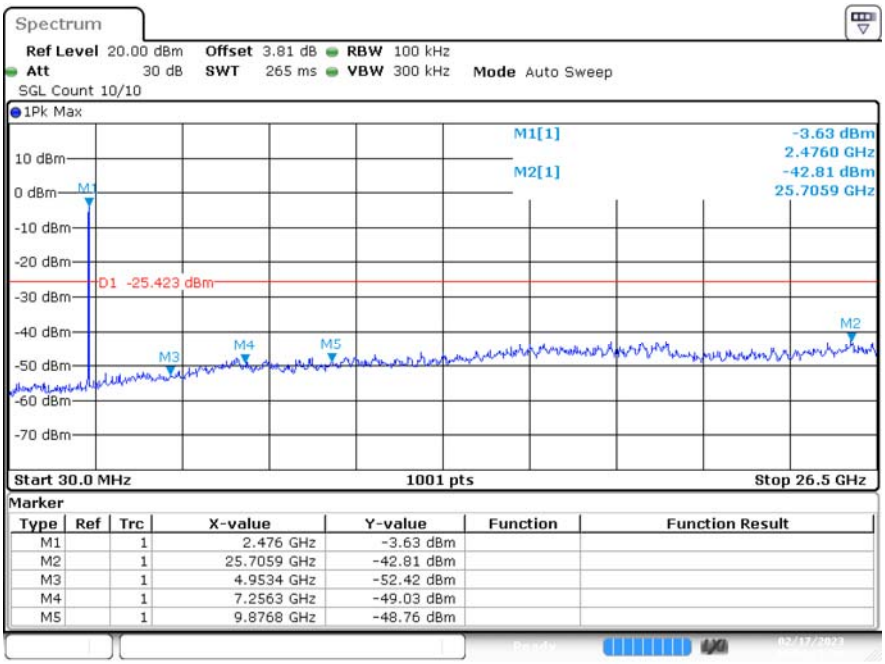
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.423 GHz	-3.45 dBm		
M2		1	19.3266 GHz	-41.89 dBm		
M3		1	5.0593 GHz	-51.50 dBm		
M4		1	7.3357 GHz	-49.43 dBm		
M5		1	9.7974 GHz	-48.46 dBm		

802.11g 2462MHz Ant1 Ref



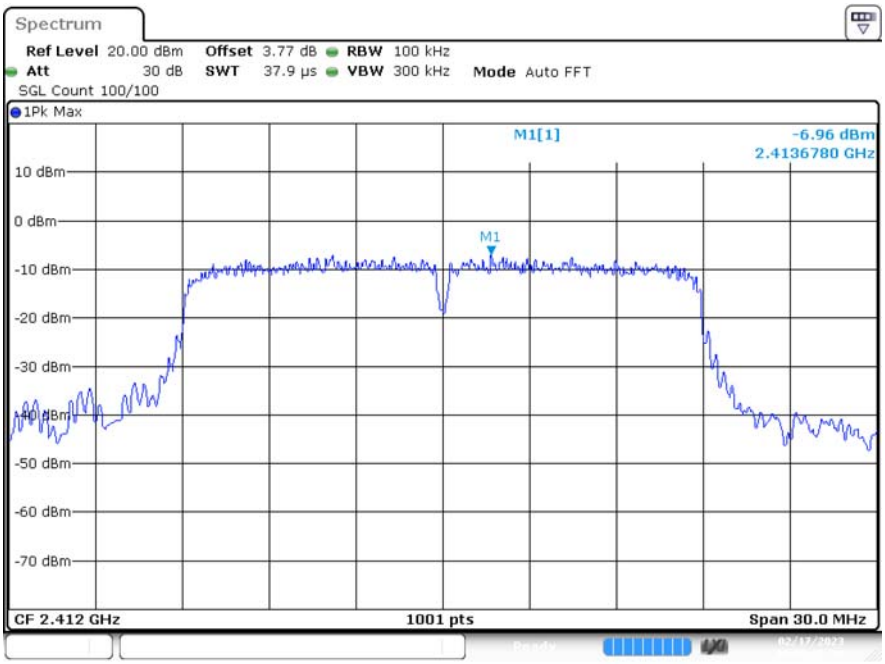
802.11g 2462MHz Ant1 Emission



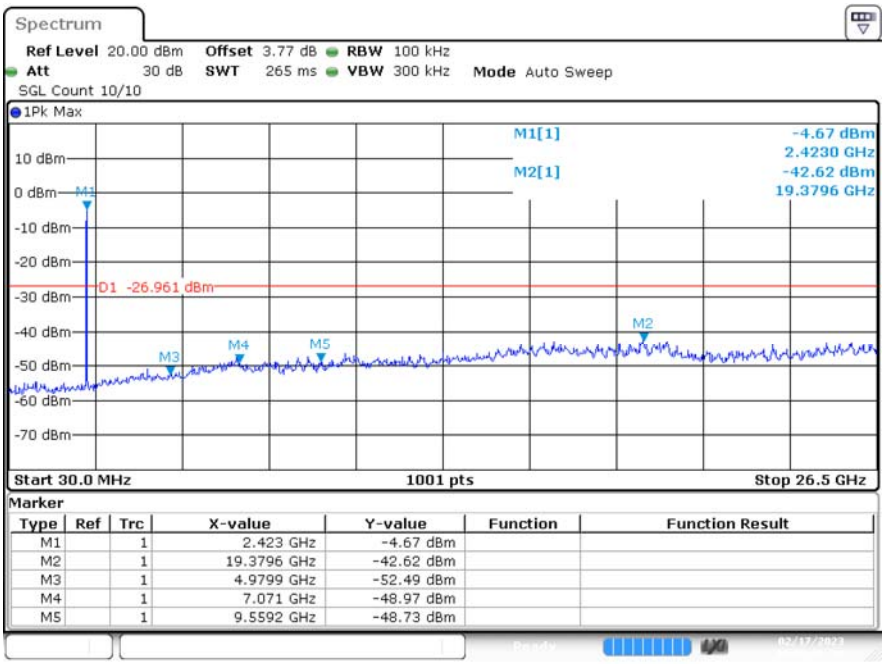
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.476 GHz	-3.63 dBm		
M2		1	25.7059 GHz	-42.81 dBm		
M3		1	4.9534 GHz	-52.42 dBm		
M4		1	7.2563 GHz	-49.03 dBm		
M5		1	9.8768 GHz	-48.76 dBm		

802.11n20 2412MHz Ant1 Ref



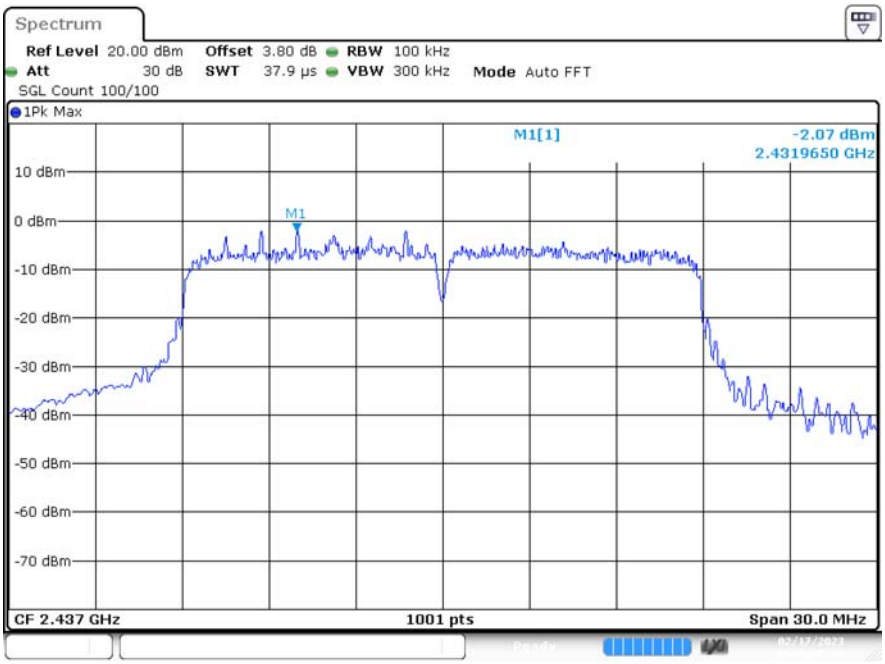
802.11n20 2412MHz Ant1 Emission



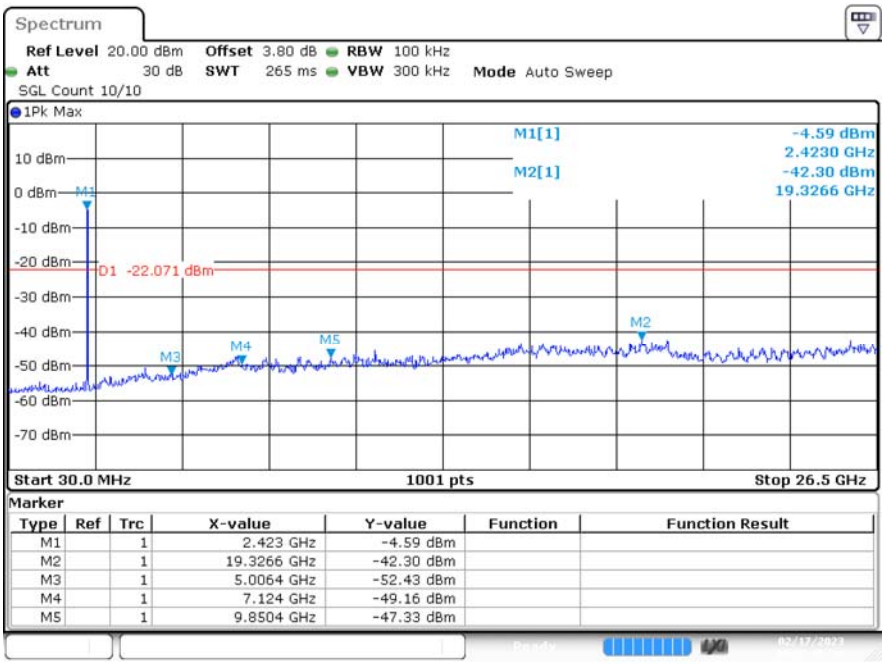
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.423 GHz	-4.67 dBm		
M2		1	19.3796 GHz	-42.62 dBm		
M3		1	4.9799 GHz	-52.49 dBm		
M4		1	7.071 GHz	-48.97 dBm		
M5		1	9.5592 GHz	-48.73 dBm		

802.11n20 2437MHz Ant1 Ref



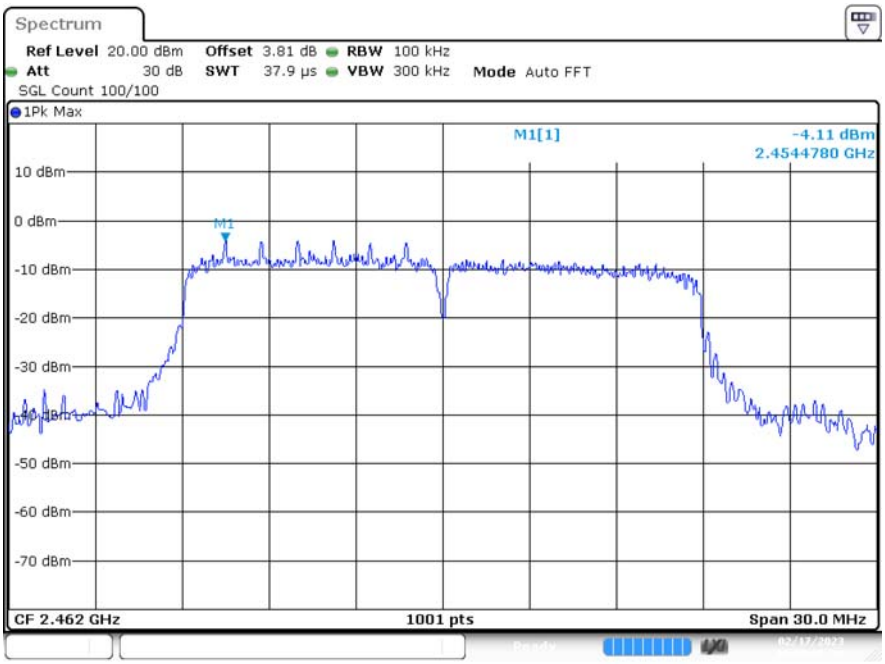
802.11n20 2437MHz Ant1 Emission



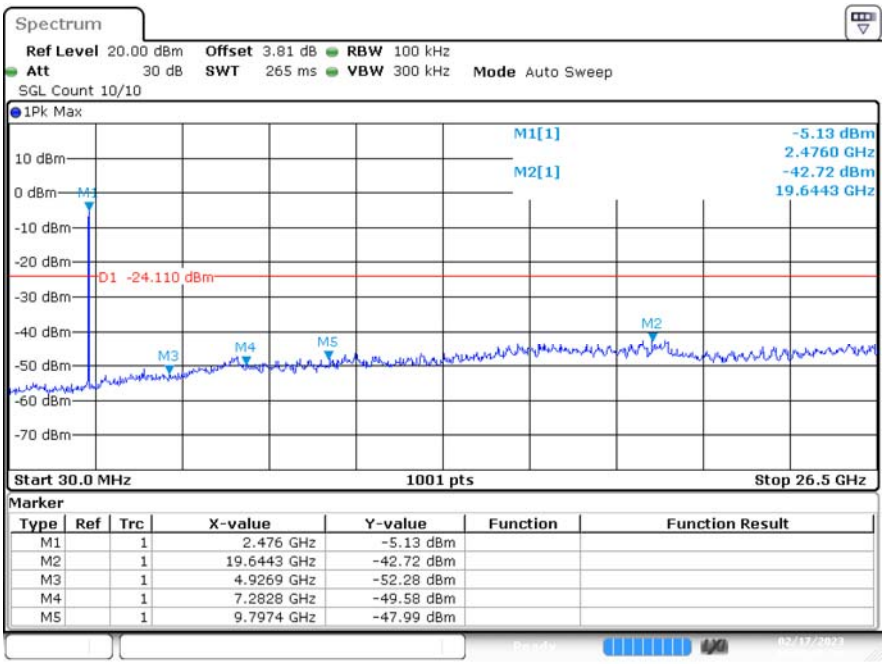
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.423 GHz	-4.59 dBm		
M2		1	19.3266 GHz	-42.30 dBm		
M3		1	5.0064 GHz	-52.43 dBm		
M4		1	7.124 GHz	-49.16 dBm		
M5		1	9.8504 GHz	-47.33 dBm		

802.11n20 2462MHz Ant1 Ref



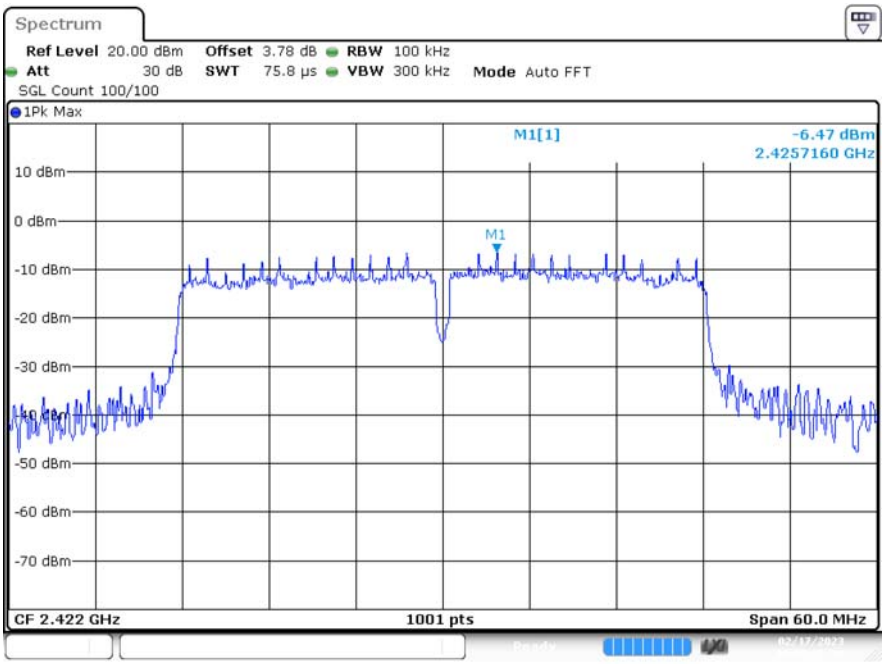
802.11n20 2462MHz Ant1 Emission



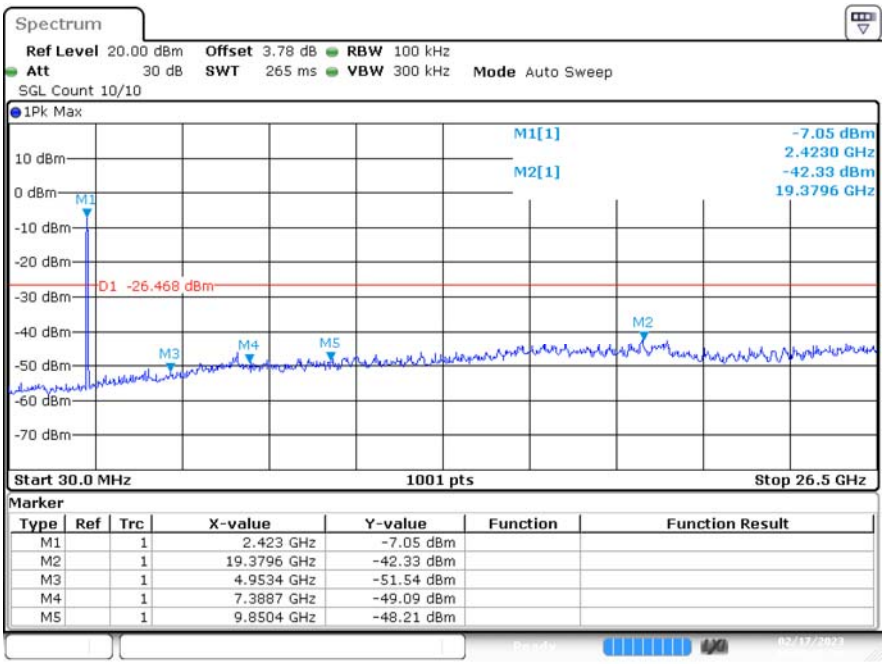
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.476 GHz	-5.13 dBm		
M2		1	19.6443 GHz	-42.72 dBm		
M3		1	4.9269 GHz	-52.28 dBm		
M4		1	7.2828 GHz	-49.58 dBm		
M5		1	9.7974 GHz	-47.99 dBm		

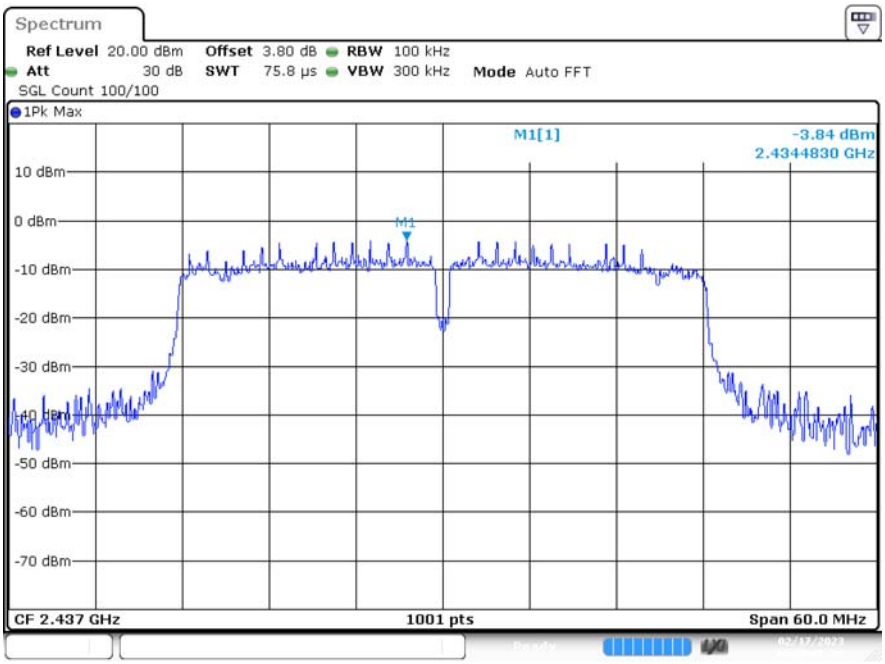
802.11n40 2422MHz Ant1 Ref



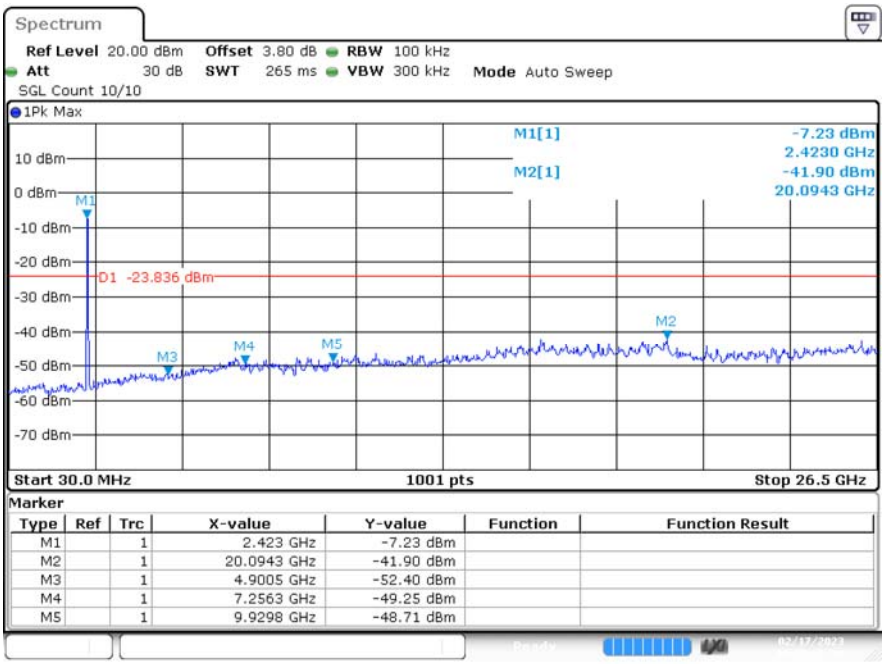
802.11n40 2422MHz Ant1 Emission



802.11n40 2437MHz Ant1 Ref



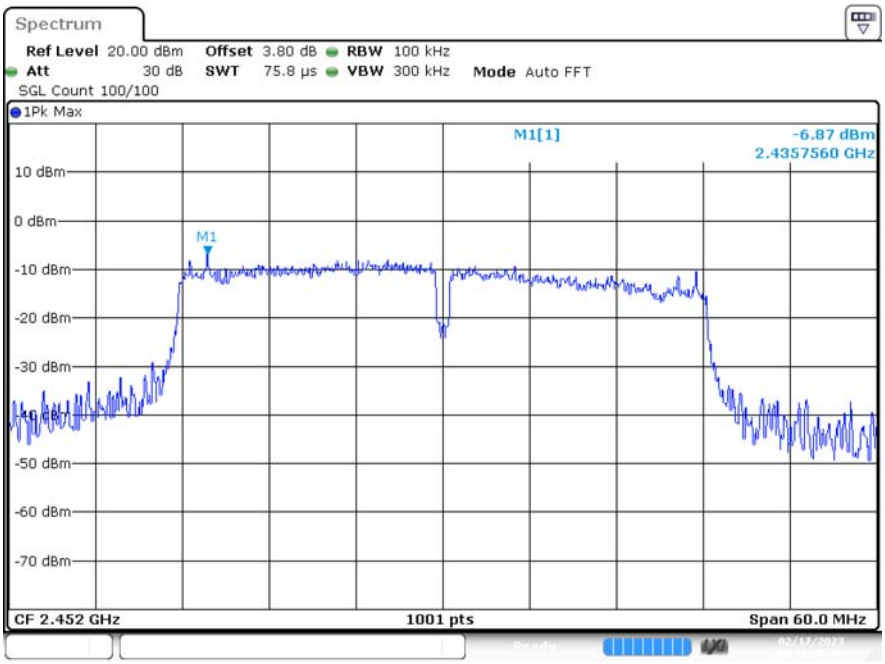
802.11n40 2437MHz Ant1 Emission



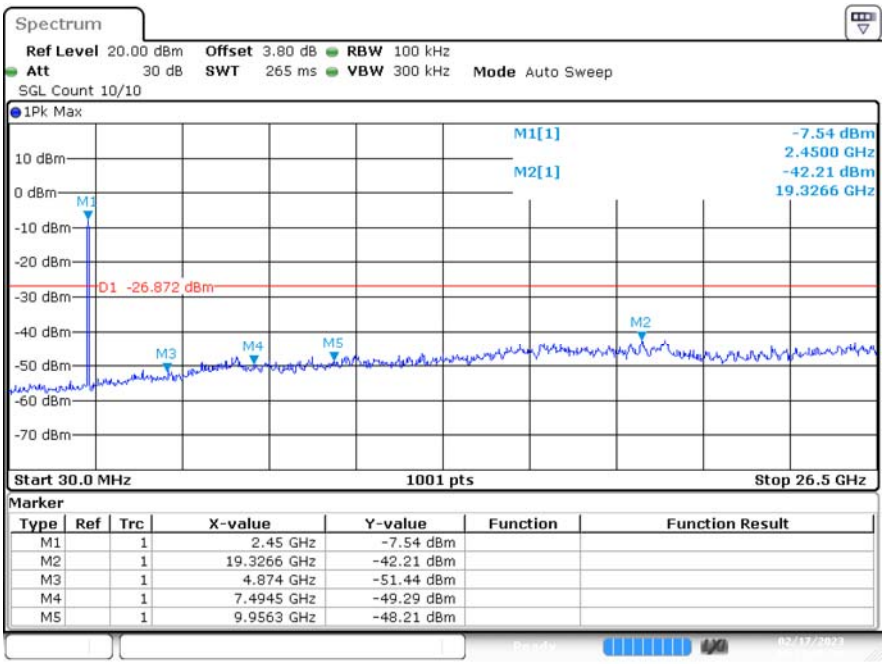
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.423 GHz	-7.23 dBm		
M2		1	20.0943 GHz	-41.90 dBm		
M3		1	4.9005 GHz	-52.40 dBm		
M4		1	7.2563 GHz	-49.25 dBm		
M5		1	9.9298 GHz	-48.71 dBm		

802.11n40 2452MHz Ant1 Ref



802.11n40 2452MHz Ant1 Emission



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.45 GHz	-7.54 dBm		
M2		1	19.3266 GHz	-42.21 dBm		
M3		1	4.874 GHz	-51.44 dBm		
M4		1	7.4945 GHz	-49.29 dBm		
M5		1	9.9563 GHz	-48.21 dBm		

7 Restrict Band

7.1 Test Result

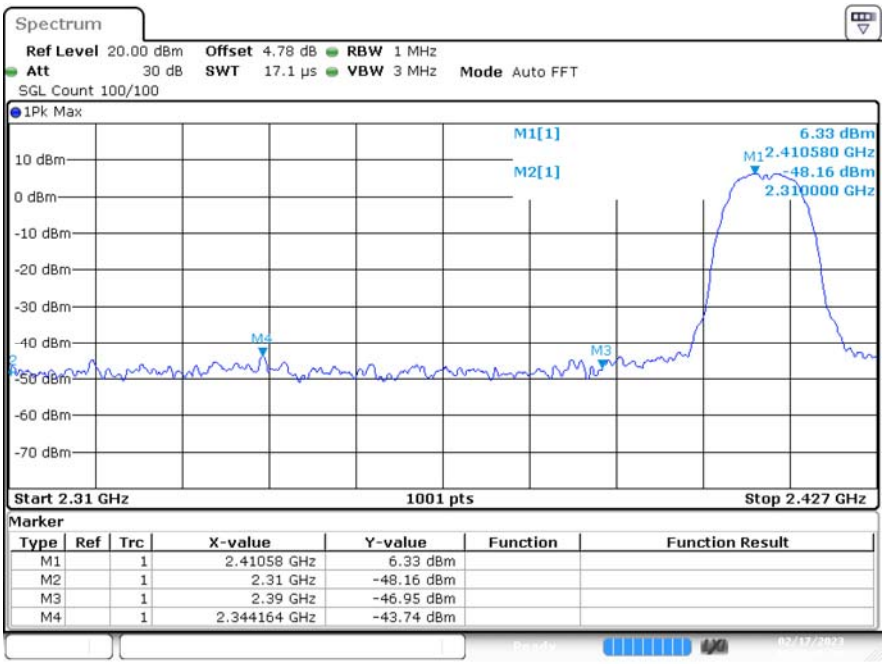
Mode	Frequency (MHz)	Ant.	Spur Freq (MHz)	Power (dBm)	Gain (dBi)	E (dBuV/m)	Detector	Limit (dBuV/m)	Verdict
802.11b	2412	Ant1	2310	-48.15	1.01	48.09	Peak	74	Pass
802.11b	2412	Ant1	2310	-57.03	1.01	39.21	Average	54	Pass
802.11b	2412	Ant1	2344.164	-43.73	1.01	52.51	Peak	74	Pass
802.11b	2412	Ant1	2389.911	-54.88	1.01	41.36	Average	54	Pass
802.11b	2412	Ant1	2390	-46.94	1.01	49.3	Peak	74	Pass
802.11b	2412	Ant1	2390	-54.86	1.01	41.38	Average	54	Pass
802.11b	2462	Ant1	2483.5	-45.79	1.01	50.45	Peak	74	51.47
802.11b	2462	Ant1	2483.5	-54.65	1.01	41.59	Average	54	Pass
802.11b	2462	Ant1	2493.057	-45.34	1.01	50.9	Peak	74	Pass
802.11b	2462	Ant1	2483.517	-54.65	1.01	41.59	Average	54	Pass
802.11b	2462	Ant1	2500	-47.61	1.01	48.63	Peak	74	Pass
802.11b	2462	Ant1	2500	-56.61	1.01	39.63	Average	54	Pass
802.11g	2412	Ant1	2310	-48.95	1.01	47.29	Peak	74	Pass
802.11g	2412	Ant1	2310	-56.67	1.01	39.57	Average	54	Pass
802.11g	2412	Ant1	2389.911	-35.52	1.01	60.72	Peak	74	Pass
802.11g	2412	Ant1	2389.911	-54.75	1.01	41.49	Average	54	Pass
802.11g	2412	Ant1	2390	-35.28	1.01	60.96	Peak	74	Pass
802.11g	2412	Ant1	2390	-54.73	1.01	41.51	Average	54	Pass
802.11g	2462	Ant1	2483.5	-37.84	1.01	58.4	Peak	74	Pass
802.11g	2462	Ant1	2483.5	-53.86	1.01	42.38	Average	54	Pass
802.11g	2462	Ant1	2493.057	-37.3	1.01	58.94	Peak	74	Pass
802.11g	2462	Ant1	2483.517	-53.86	1.01	42.38	Average	54	Pass
802.11g	2462	Ant1	2500	-48.51	1.01	47.73	Peak	74	Pass
802.11g	2462	Ant1	2500	-56.3	1.01	39.94	Average	54	Pass
802.11n20	2412	Ant1	2310	-48.97	1.01	47.27	Peak	74	Pass
802.11n20	2412	Ant1	2310	-56.68	1.01	39.56	Average	54	Pass
802.11n20	2412	Ant1	2388.741	-41.88	1.01	54.36	Peak	74	Pass
802.11n20	2412	Ant1	2336.676	-54.64	1.01	41.6	Average	54	Pass
802.11n20	2412	Ant1	2390	-42.42	1.01	53.82	Peak	74	Pass
802.11n20	2412	Ant1	2390	-54.69	1.01	41.55	Average	54	Pass
802.11n20	2462	Ant1	2483.5	-34.33	1.01	61.91	Peak	74	Pass
802.11n20	2462	Ant1	2483.5	-54.18	1.01	42.06	Average	54	Pass
802.11n20	2462	Ant1	2483.517	-34.33	1.01	61.91	Peak	74	Pass
802.11n20	2462	Ant1	2483.729	-54.01	1.01	42.23	Average	54	Pass
802.11n20	2462	Ant1	2500	-48.95	1.01	47.29	Peak	74	Pass

802.11n20	2462	Ant1	2500	-56.26	1.01	39.98	Average	54	Pass
802.11n40	2422	Ant1	2310	-46.61	1.01	49.63	Peak	74	Pass
802.11n40	2422	Ant1	2310	-56.16	1.01	40.08	Average	54	Pass
802.11n40	2422	Ant1	2389.946	-37.68	1.01	58.56	Peak	74	Pass
802.11n40	2422	Ant1	2389.946	-51.41	1.01	44.83	Average	54	Pass
802.11n40	2422	Ant1	2390	-36.63	1.01	59.61	Peak	74	Pass
802.11n40	2422	Ant1	2390	-50.99	1.01	45.25	Average	54	Pass
802.11n40	2452	Ant1	2483.5	-26.8	1.01	69.44	Peak	74	Pass
802.11n40	2452	Ant1	2483.5	-50.79	1.01	45.45	Average	54	Pass
802.11n40	2452	Ant1	2483.542	-26.8	1.01	69.44	Peak	74	Pass
802.11n40	2452	Ant1	2483.62	-50.78	1.01	45.46	Average	54	Pass
802.11n40	2452	Ant1	2500	-47.71	1.01	48.53	Peak	74	Pass
802.11n40	2452	Ant1	2500	-55.75	1.01	40.49	Average	54	Pass

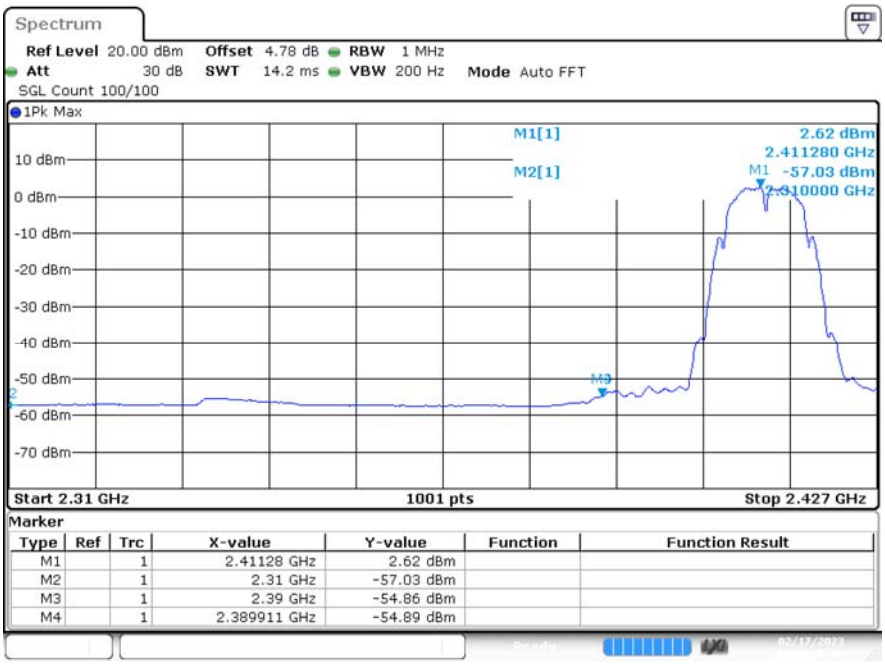
7.2 Test Graphs

Test Graphs

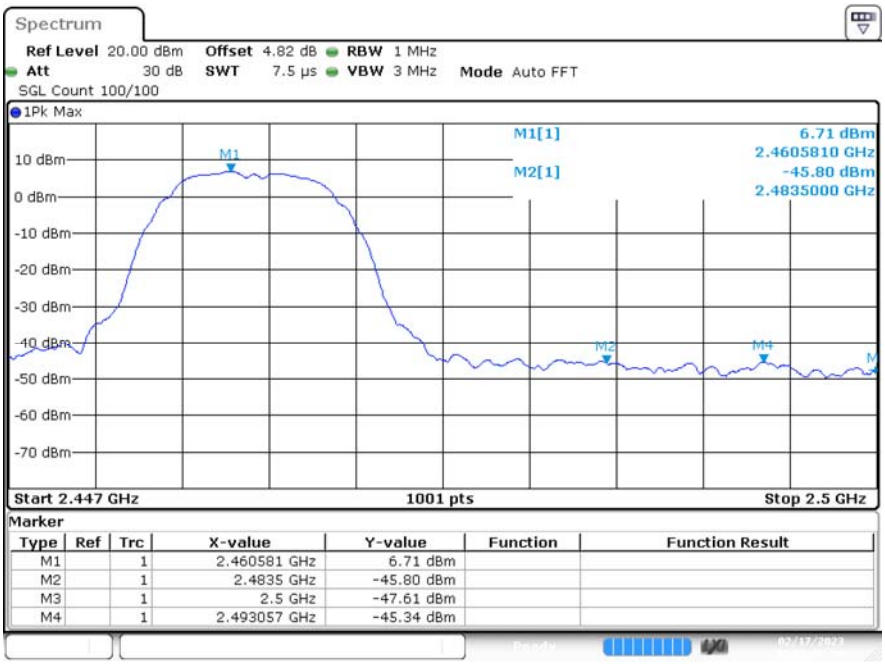
b 2412MHz Ant1 Peak



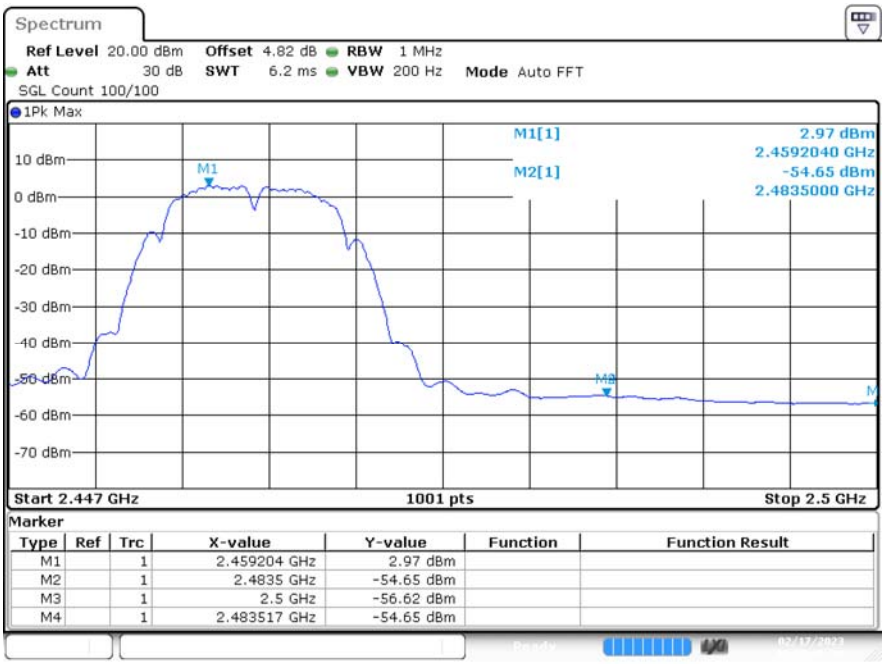
b 2412MHz Ant1 Average



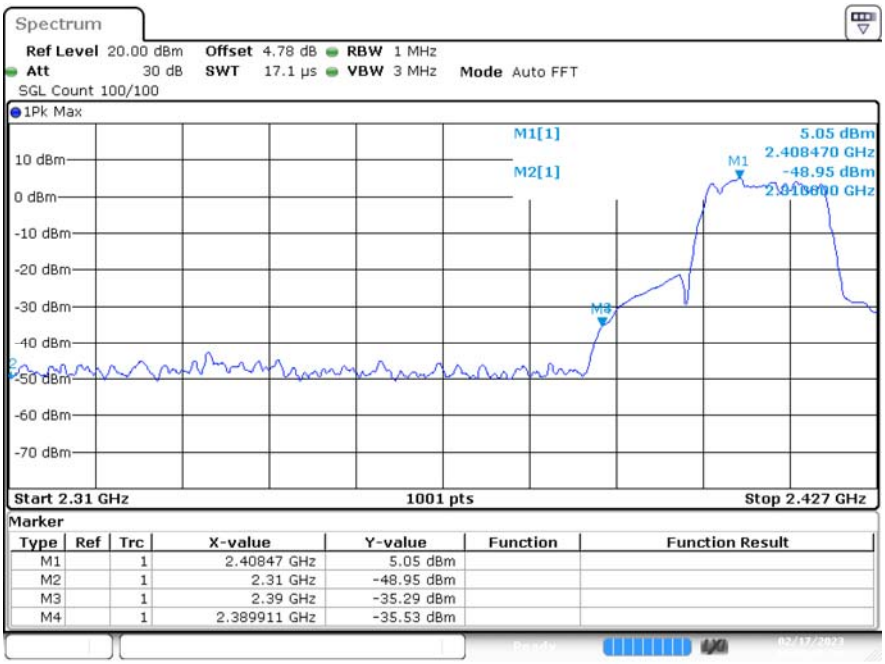
b 2462MHz Ant1 Peak



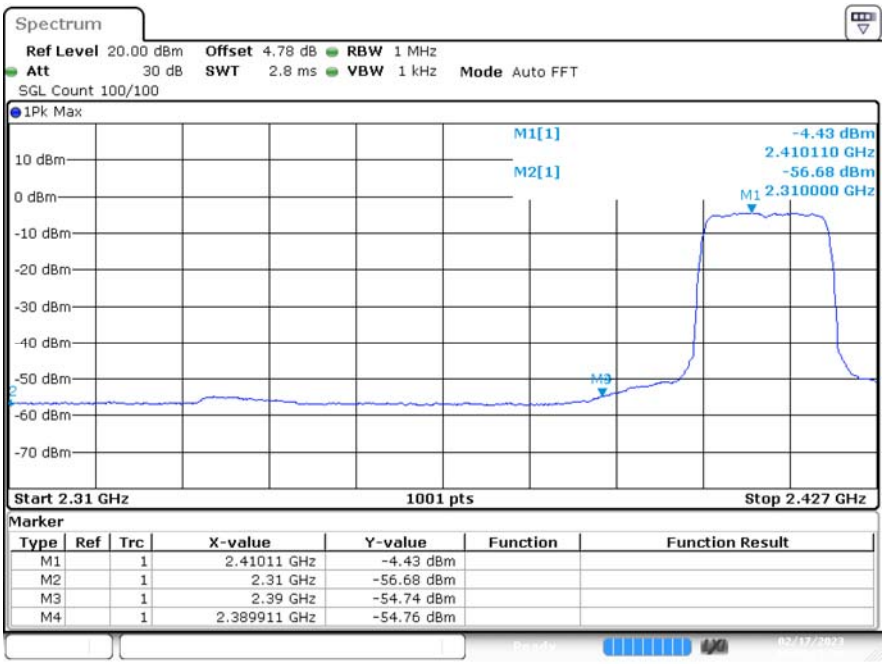
b 2462MHz Ant1 Average



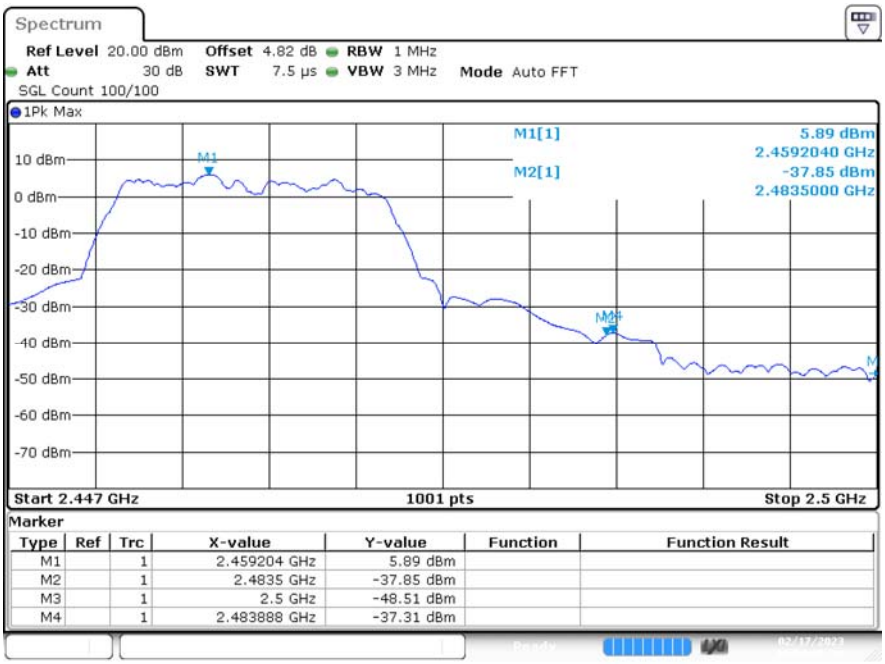
g 2412MHz Ant1 Peak



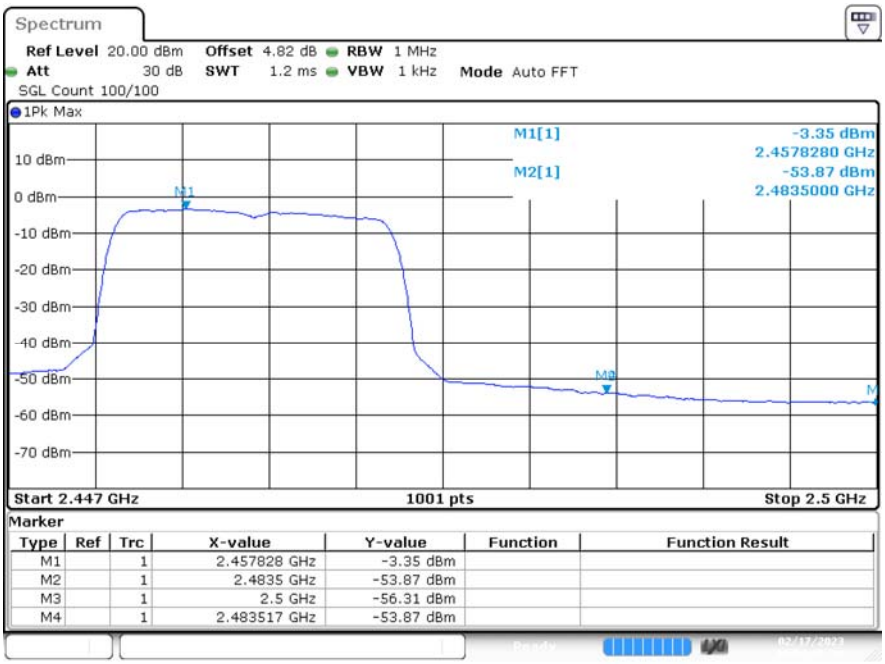
g 2412MHz Ant1 Average



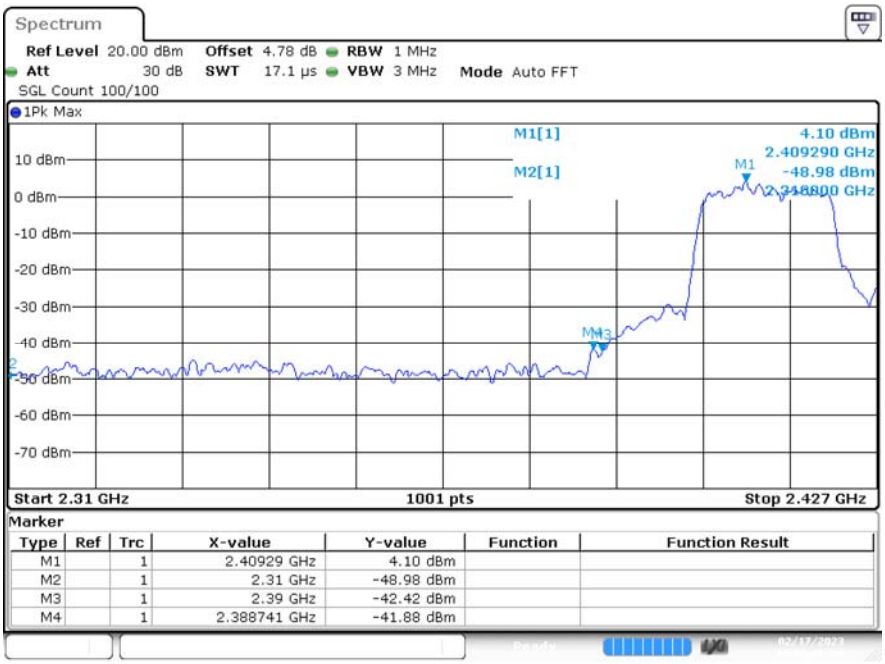
g 2462MHz Ant1 Peak



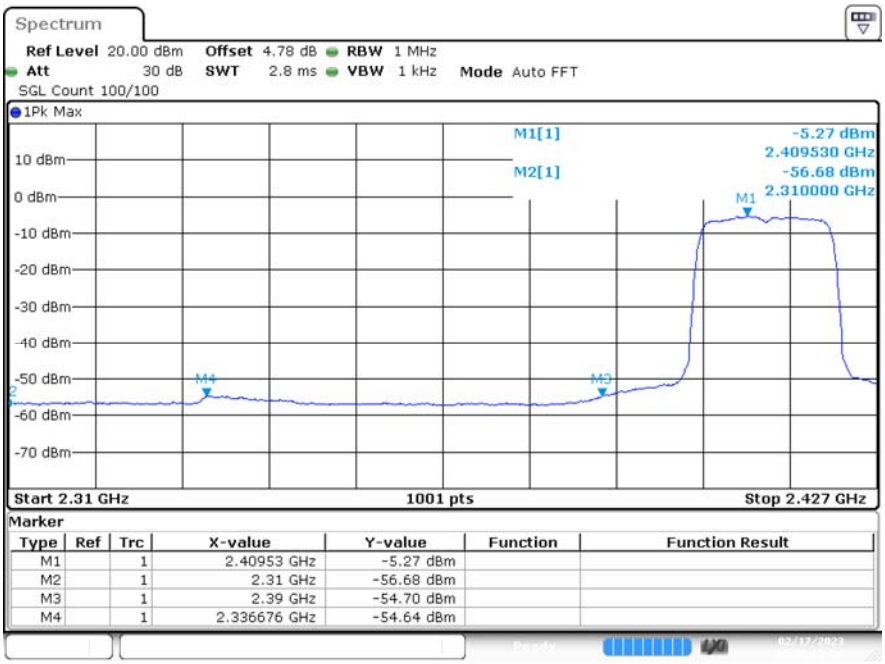
g 2462MHz Ant1 Average



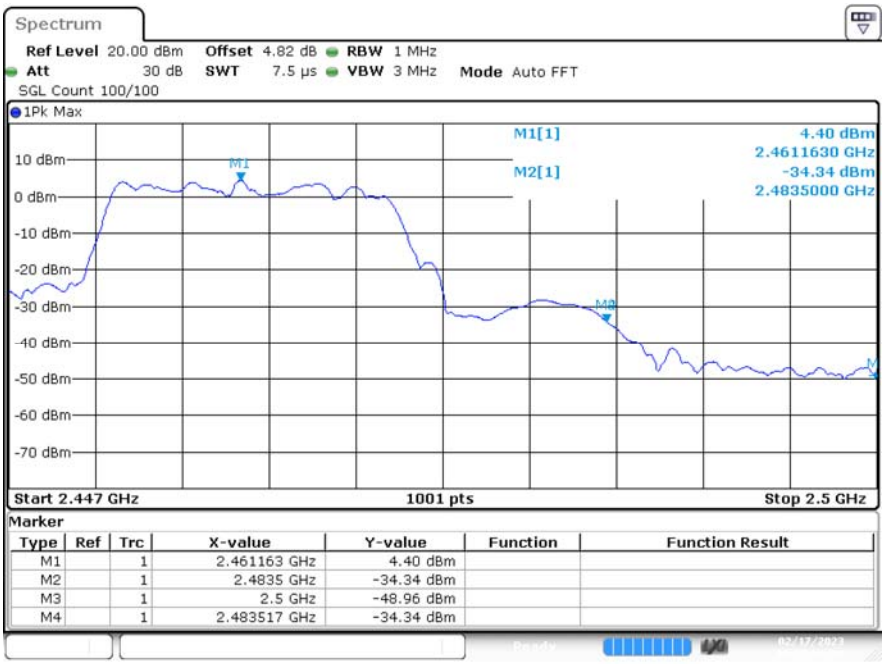
n20 2412MHz Ant1 Peak



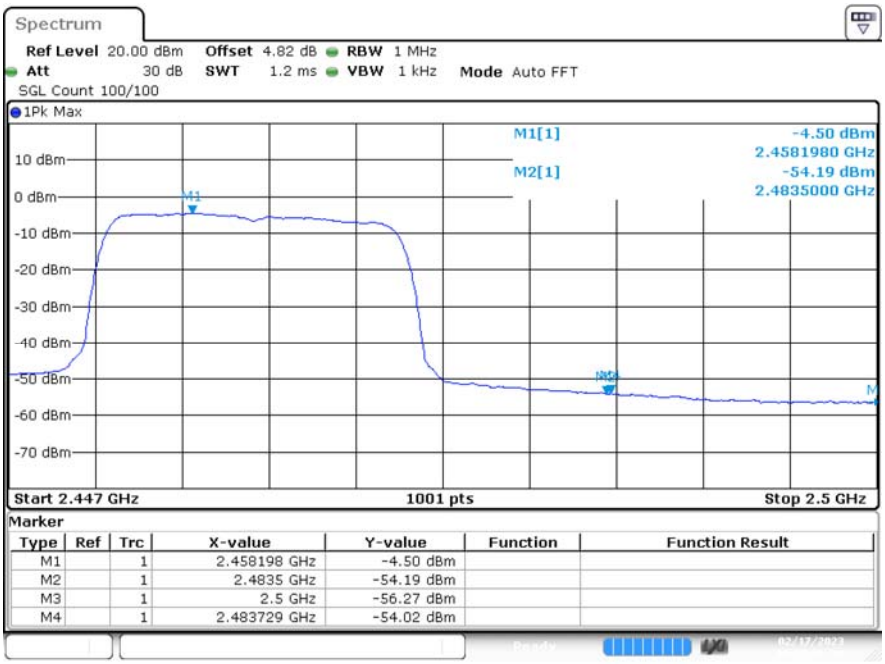
n20 2412MHz Ant1 Average



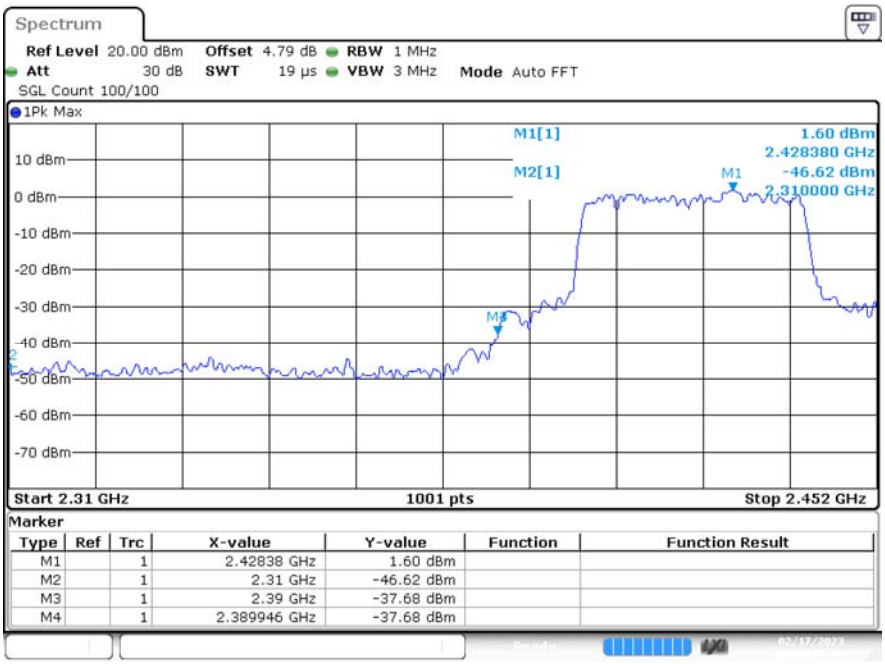
n20 2462MHz Ant1 Peak



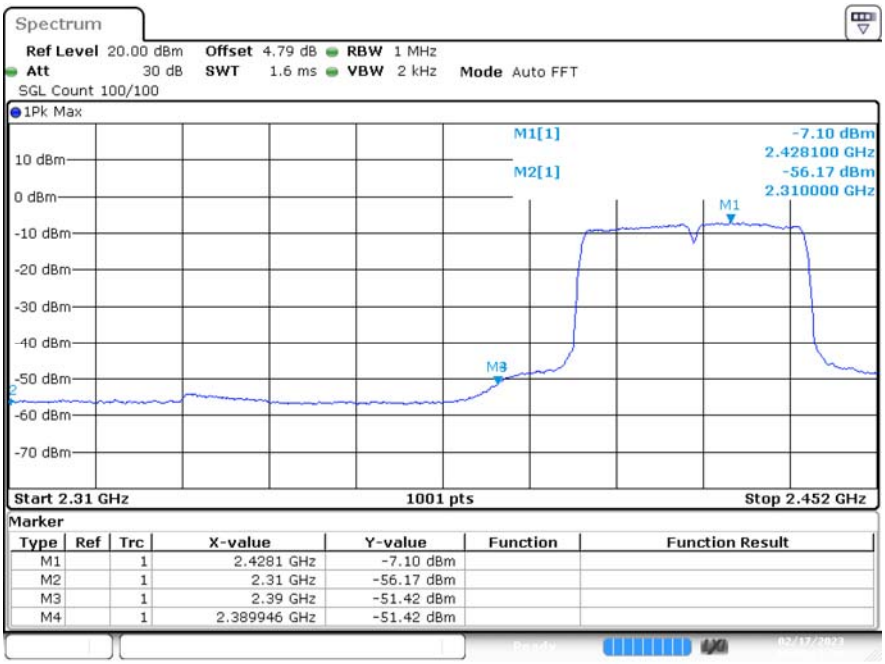
n20 2462MHz Ant1 Average



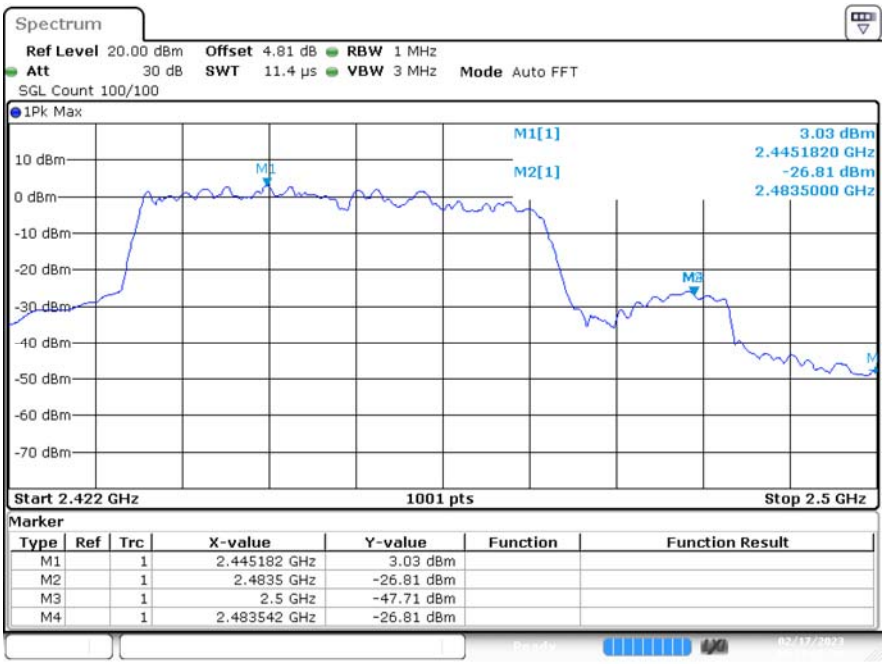
n40 2422MHz Ant1 Peak



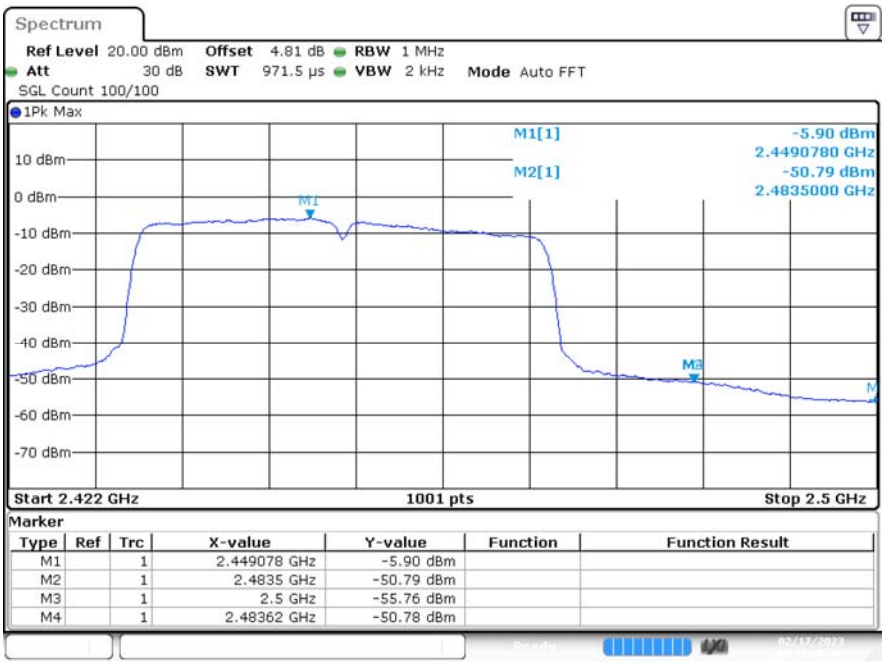
n40 2422MHz Ant1 Average



n40 2452MHz Ant1 Peak



n40 2452MHz Ant1 Average



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