



Appendix C

RF Test Data for 2.4GWIFI (Conducted Measurement)

Product Name: M5PaperS3

Trade Mark: M5STACK

Test Model: PaperS3

Environmental Conditions

Temperature:	24.6° C
Relative Humidity:	52.4%
ATM Pressure:	100.0 kPa
Test Engineer:	Emiya lin
Supervised by:	Simba Haung



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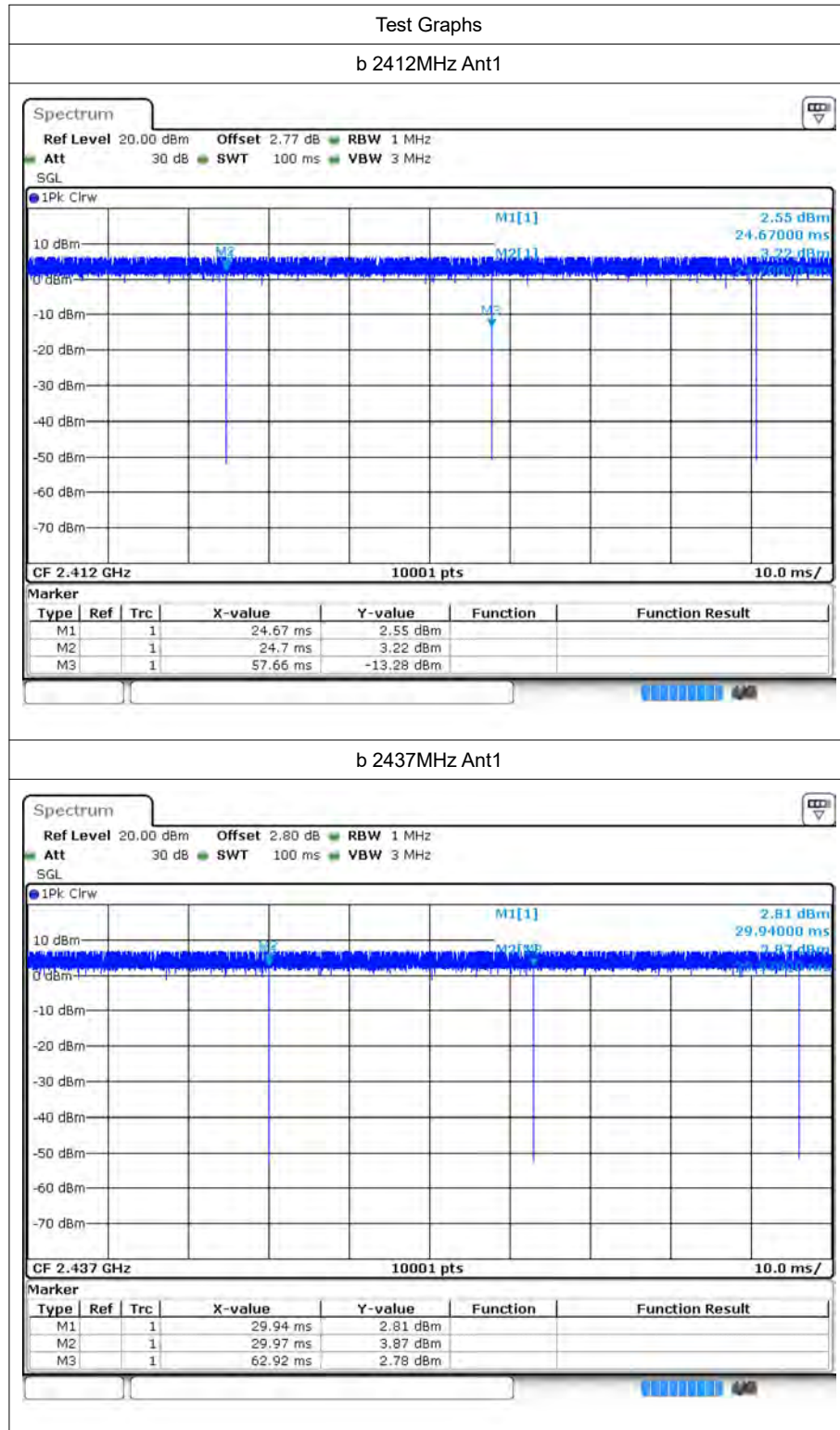


1 Duty Cycle

1.1 Test Result

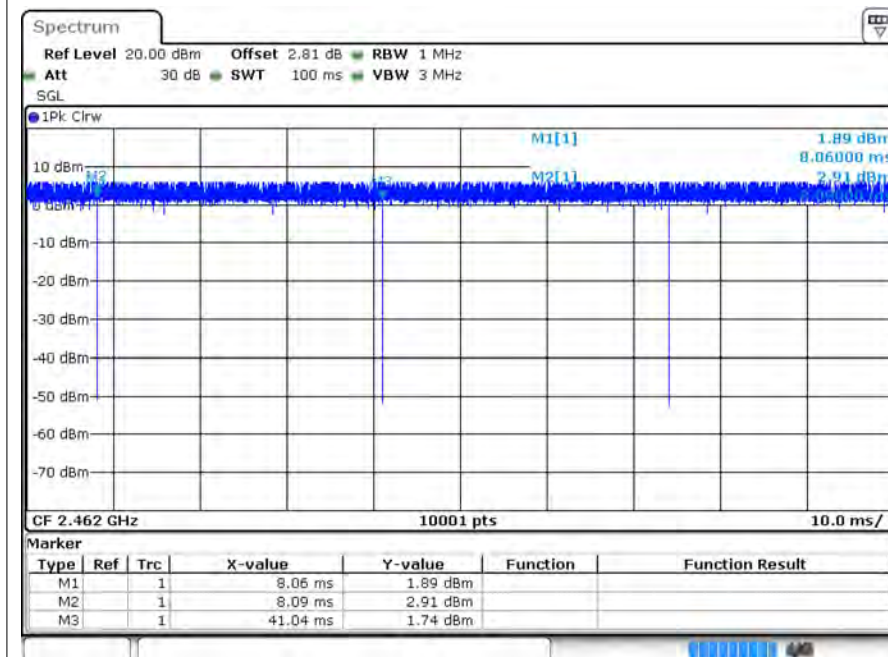
Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor	1/T (kHz)
b	2412	Ant1	99.95	0	0.03
b	2437	Ant1	99.94	0	0.03
b	2462	Ant1	99.94	0	0.03
g	2412	Ant1	99.79	0.01	0.18
g	2437	Ant1	99.68	0.01	0.18
g	2462	Ant1	99.64	0.02	0.18
n20	2412	Ant1	99.7	0.01	0.2
n20	2437	Ant1	99.69	0.01	0.2
n20	2462	Ant1	99.71	0.01	0.2
n40	2422	Ant1	99.39	0.03	0.4
n40	2437	Ant1	99.39	0.03	0.4
n40	2452	Ant1	99.38	0.03	0.4

1.2 Test Graphs

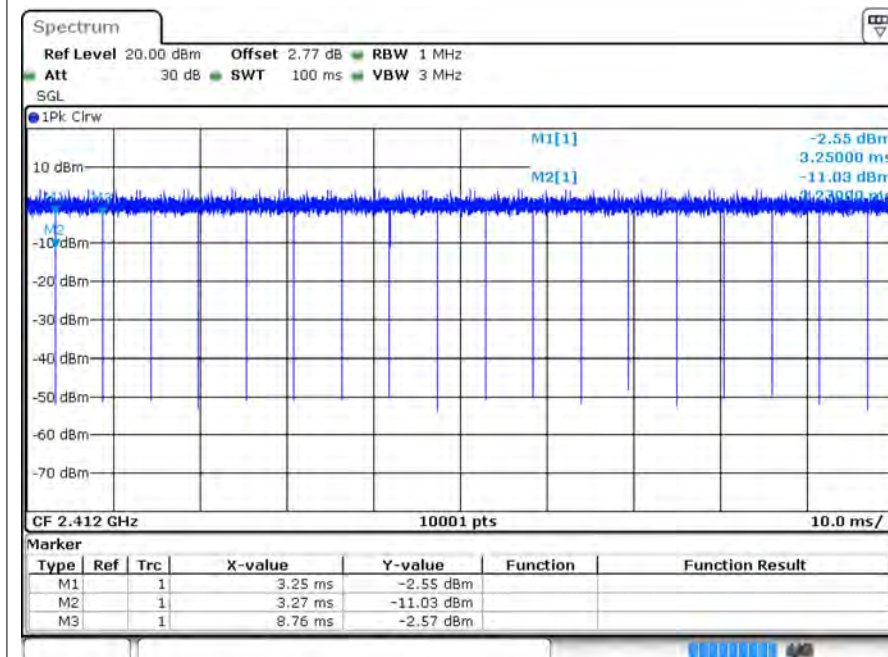


Test Graphs

b 2462MHz Ant1

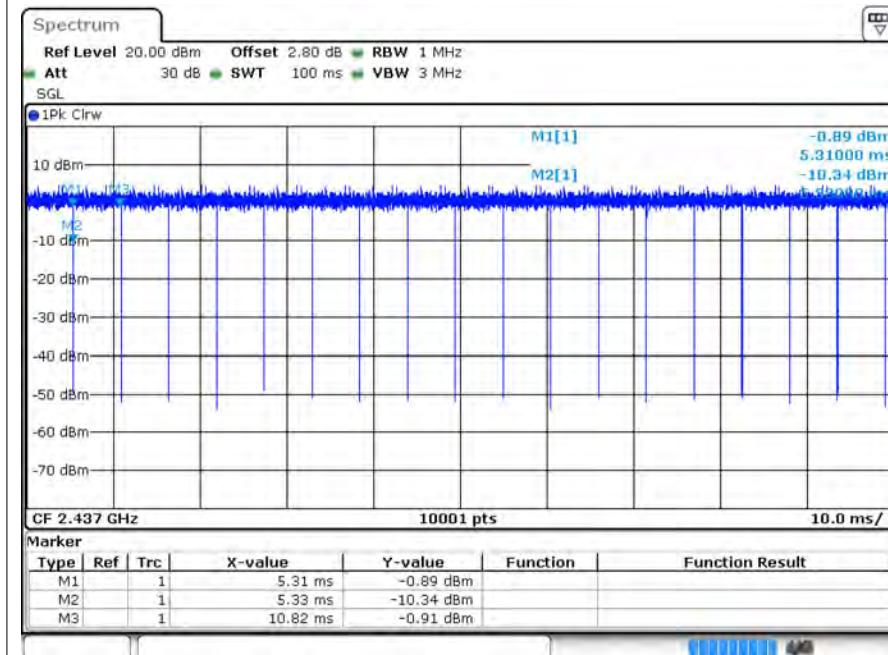


g 2412MHz Ant1

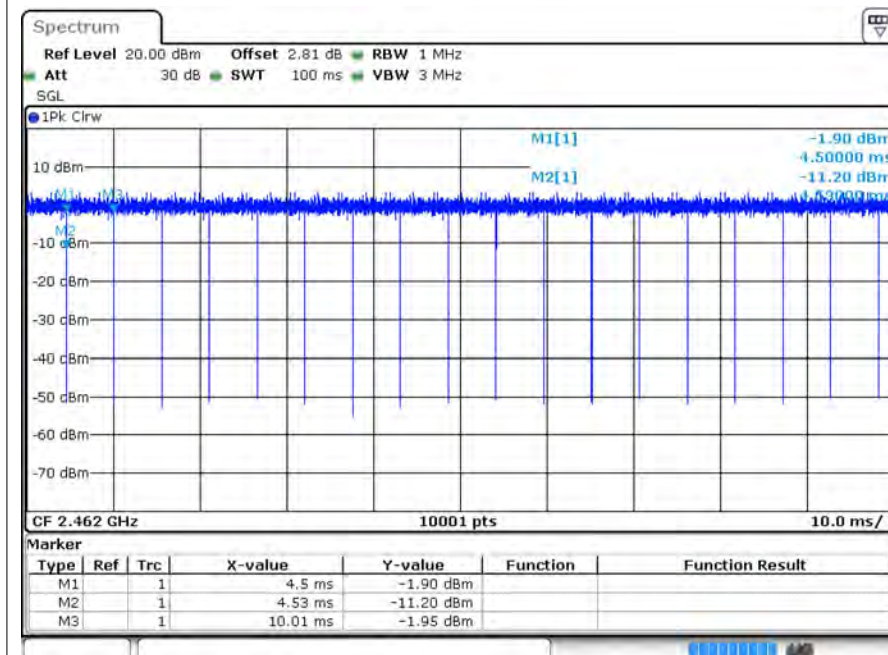


Test Graphs

g 2437MHz Ant1

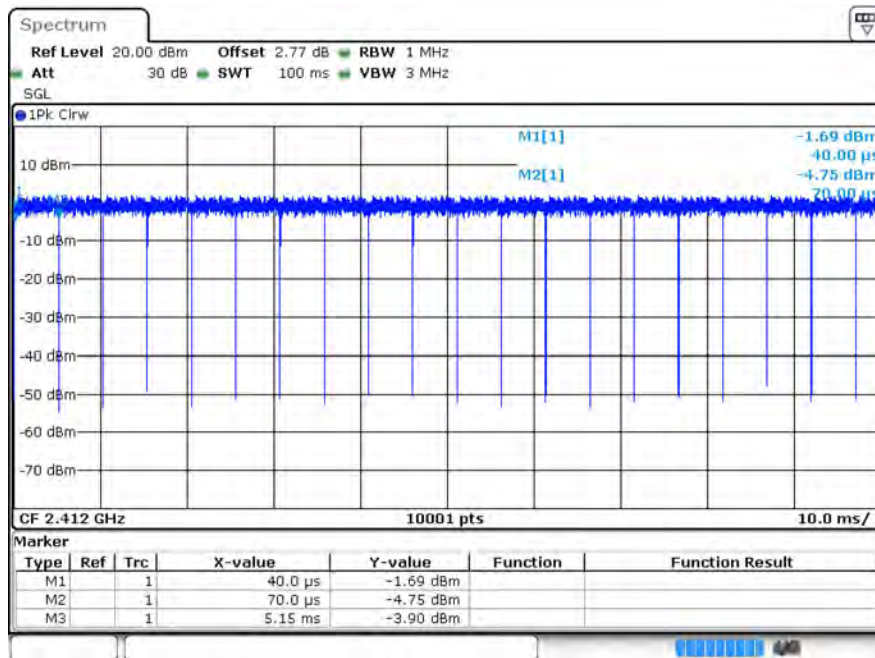


g 2462MHz Ant1

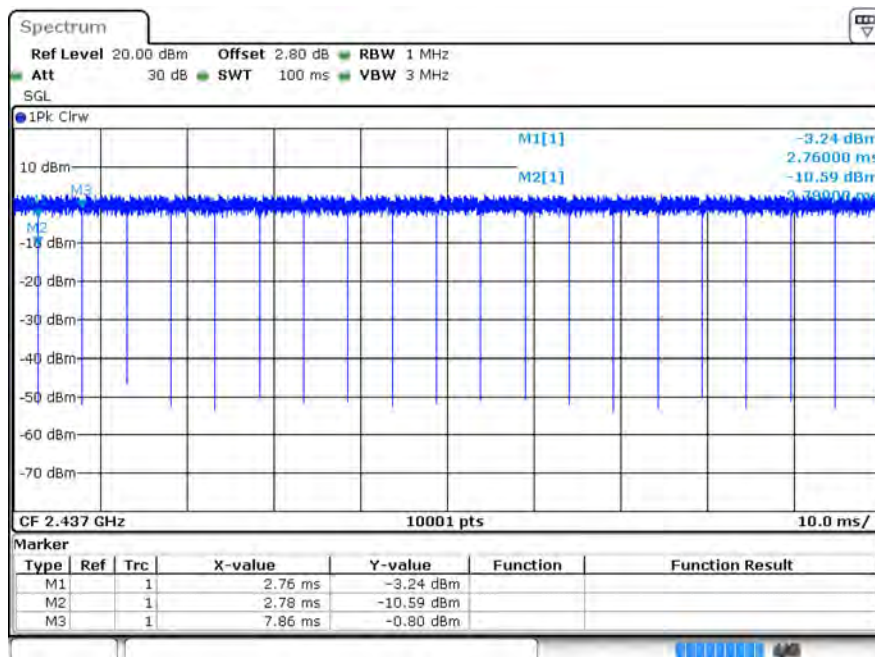


Test Graphs

n20 2412MHz Ant1

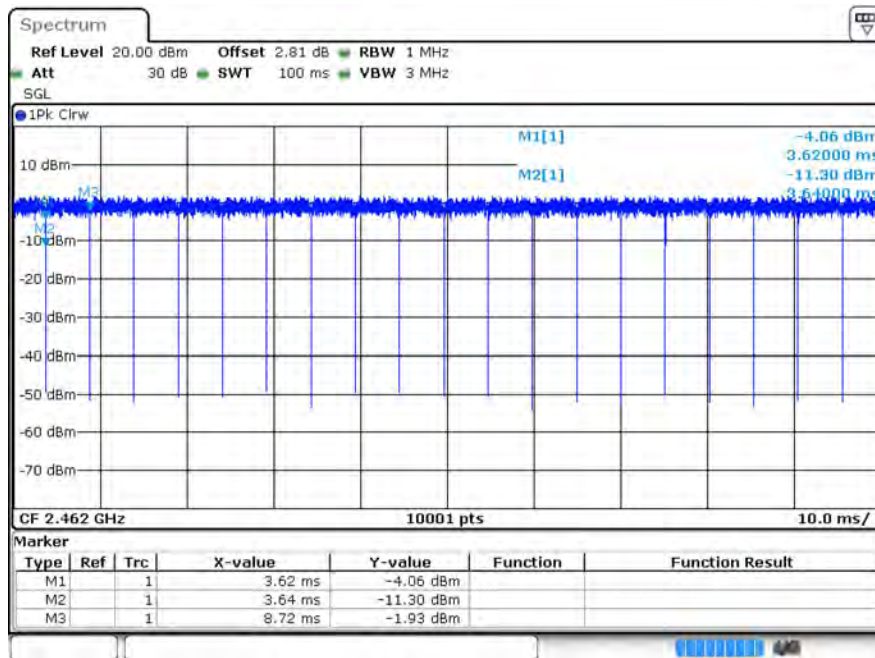


n20 2437MHz Ant1

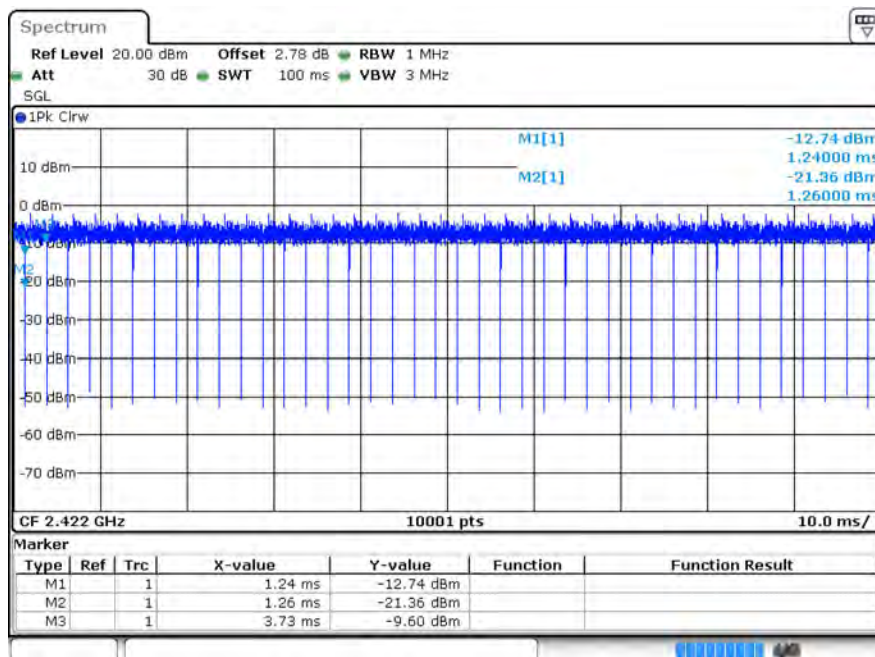


Test Graphs

n20 2462MHz Ant1

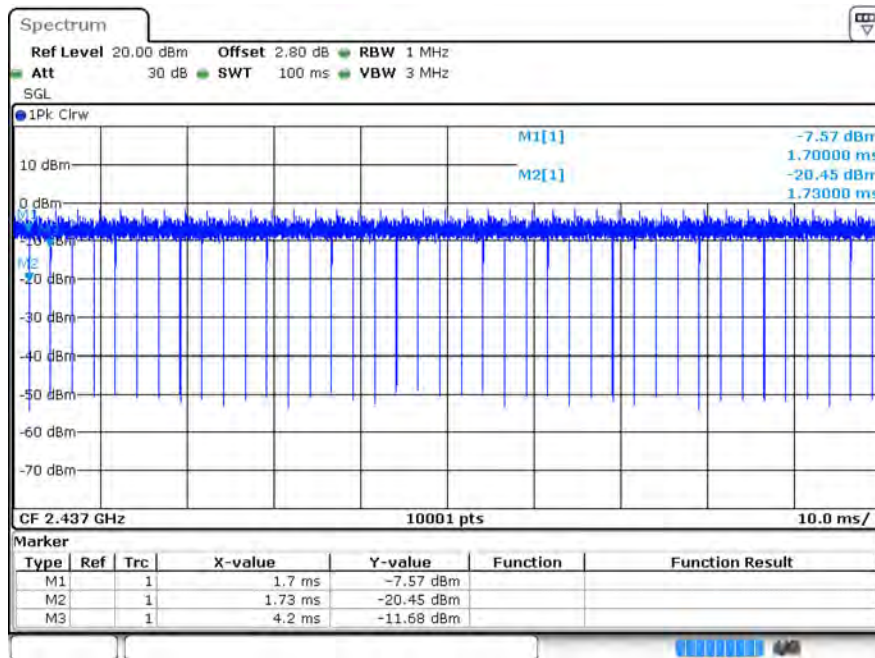


n40 2422MHz Ant1

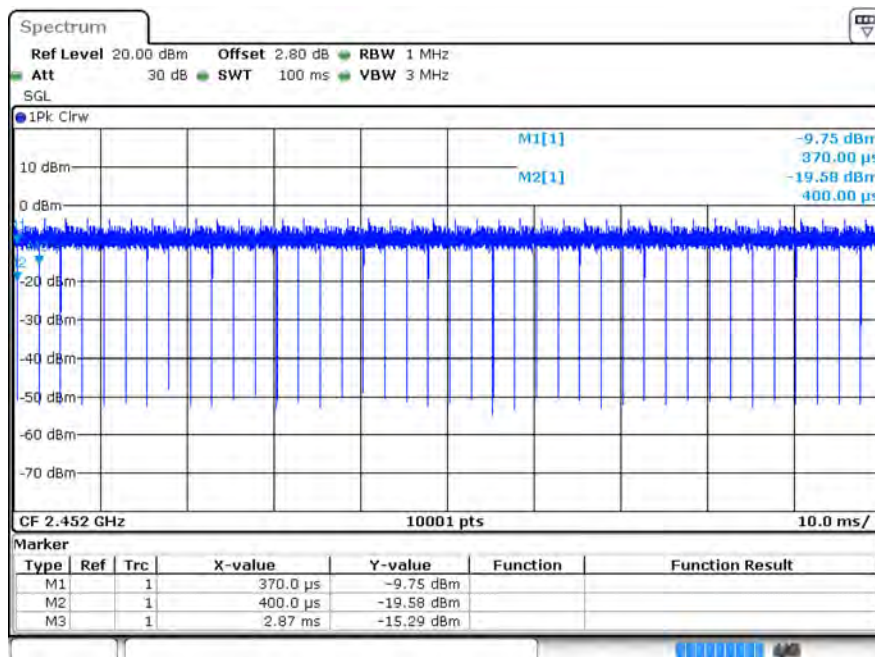


Test Graphs

n40 2437MHz Ant1



n40 2452MHz Ant1



2 Maximum Conducted Output Power

2.1 Test Result

Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
b	2412	Ant1	13.55	30	Pass
b	2437	Ant1	14.03	30	Pass
b	2462	Ant1	13.15	30	Pass
g	2412	Ant1	12.96	30	Pass
g	2437	Ant1	13.68	30	Pass
g	2462	Ant1	12.62	30	Pass
n20	2412	Ant1	12.42	30	Pass
n20	2437	Ant1	13.08	30	Pass
n20	2462	Ant1	11.99	30	Pass
n40	2422	Ant1	12.46	30	Pass
n40	2437	Ant1	12.85	30	Pass
n40	2452	Ant1	11.9	30	Pass

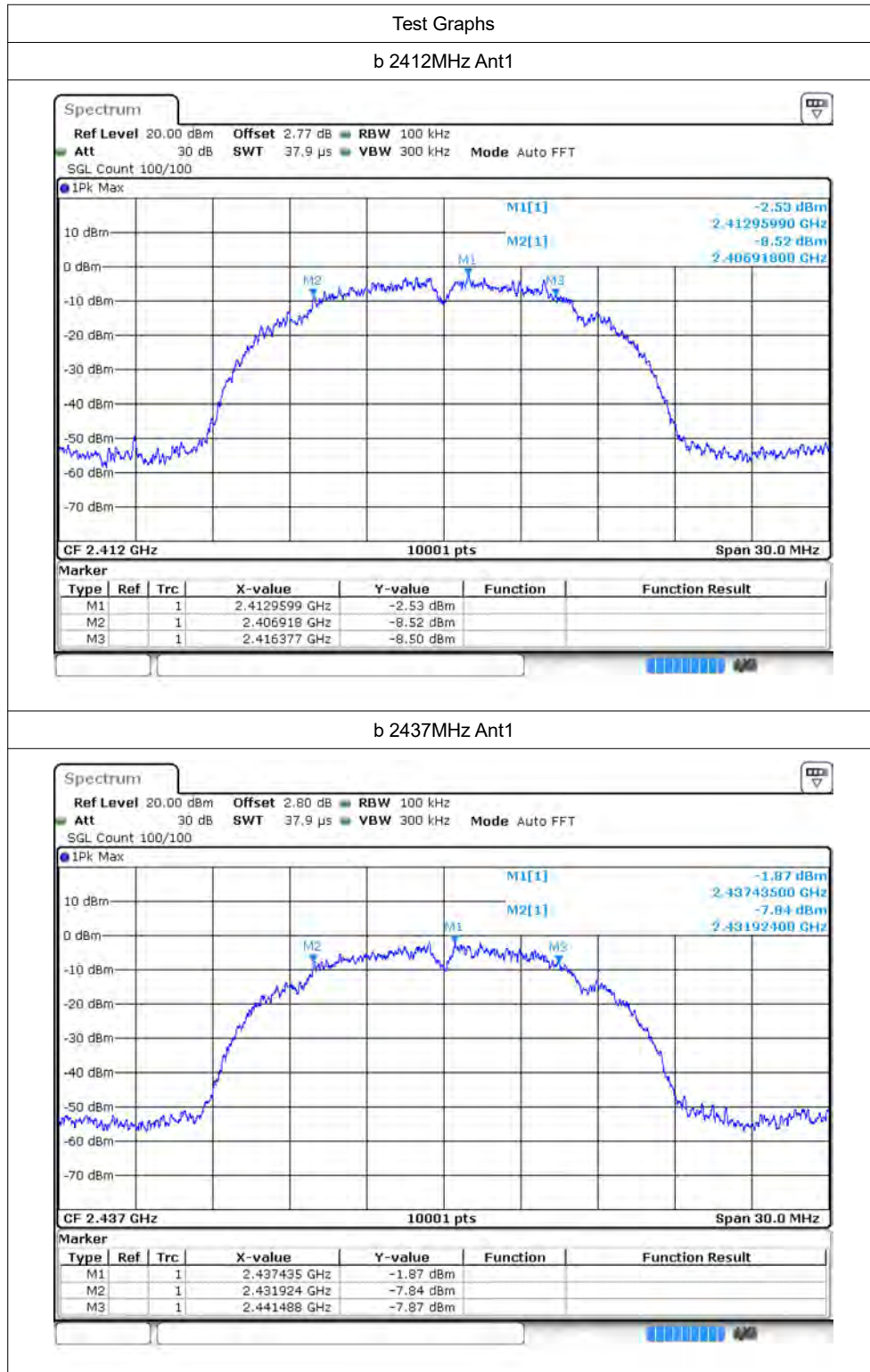


3 -6dB Bandwidth

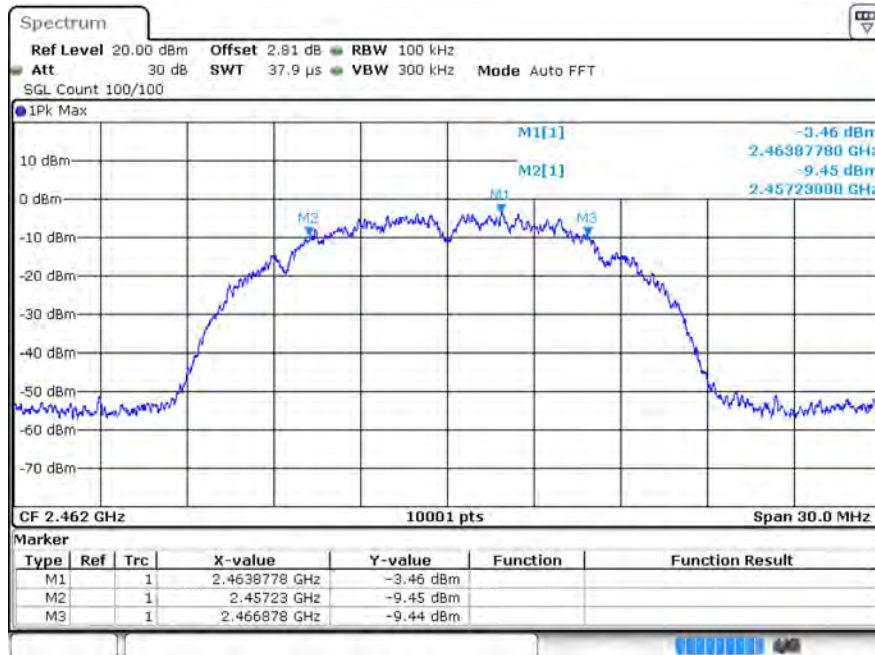
3.1 Test Result

Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
b	2412	Ant1	9.459	0.5	Pass
b	2437	Ant1	9.564	0.5	Pass
b	2462	Ant1	9.648	0.5	Pass
g	2412	Ant1	16.368	0.5	Pass
g	2437	Ant1	16.356	0.5	Pass
g	2462	Ant1	16.35	0.5	Pass
n20	2412	Ant1	16.914	0.5	Pass
n20	2437	Ant1	16.941	0.5	Pass
n20	2462	Ant1	17.028	0.5	Pass
n40	2422	Ant1	33.996	0.5	Pass
n40	2437	Ant1	35.058	0.5	Pass
n40	2452	Ant1	35.43	0.5	Pass

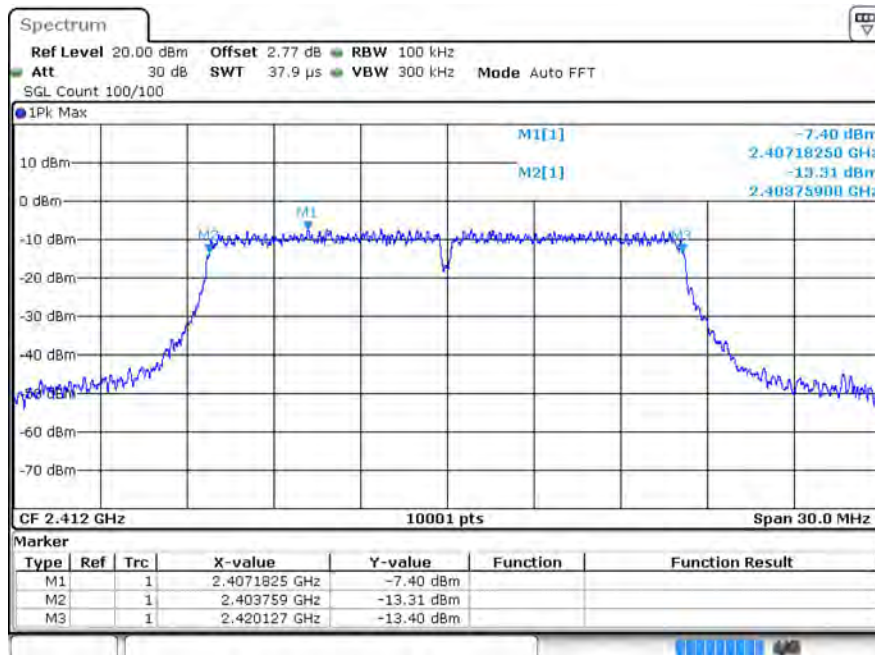
3.2 Test Graphs



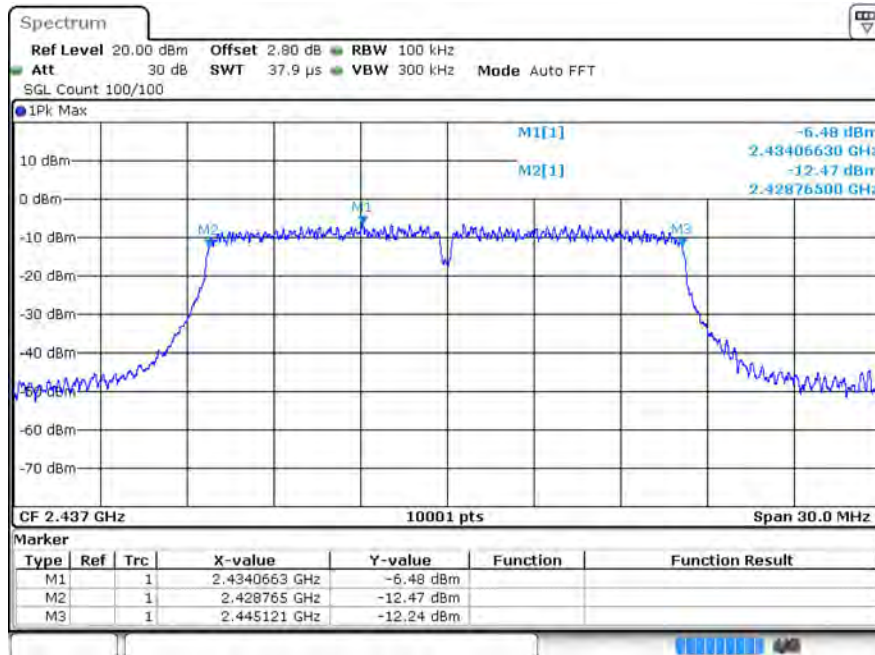
b 2462MHz Ant1



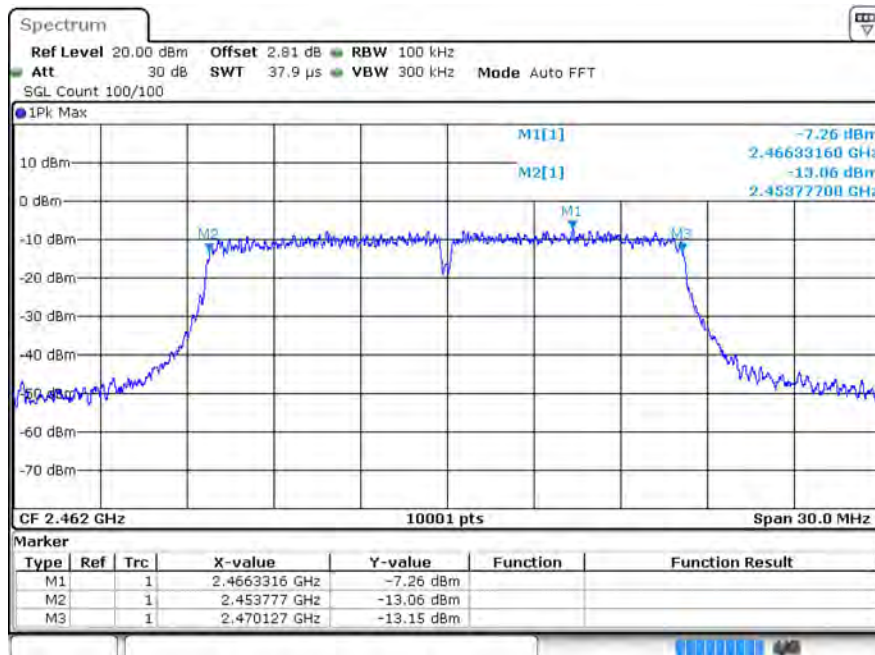
g 2412MHz Ant1



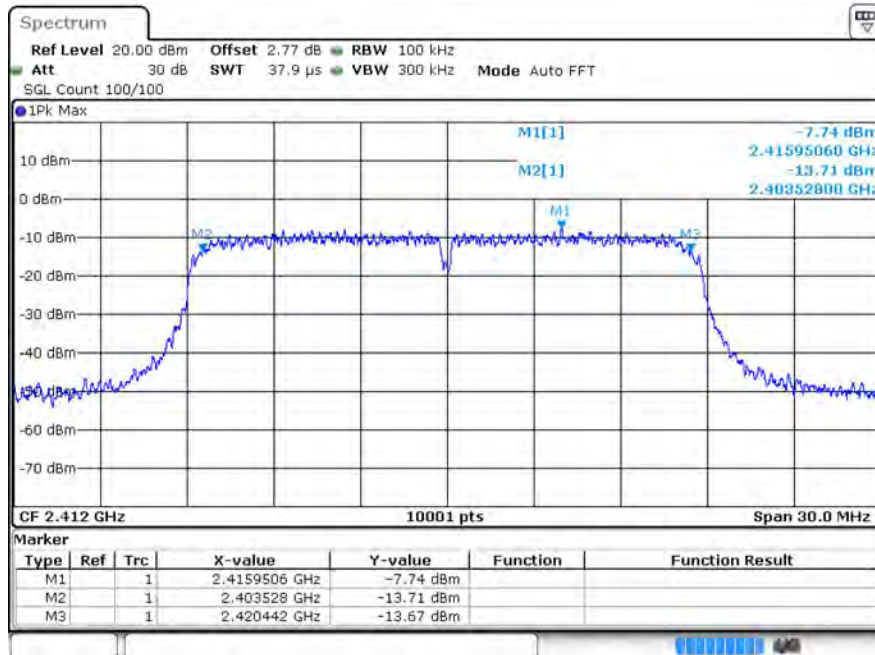
g 2437MHz Ant1



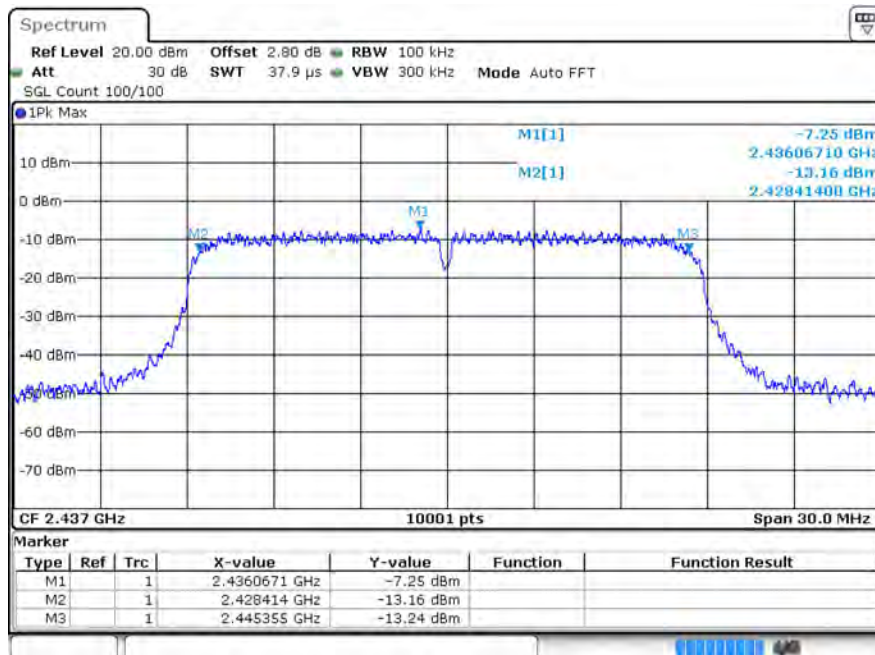
g 2462MHz Ant1



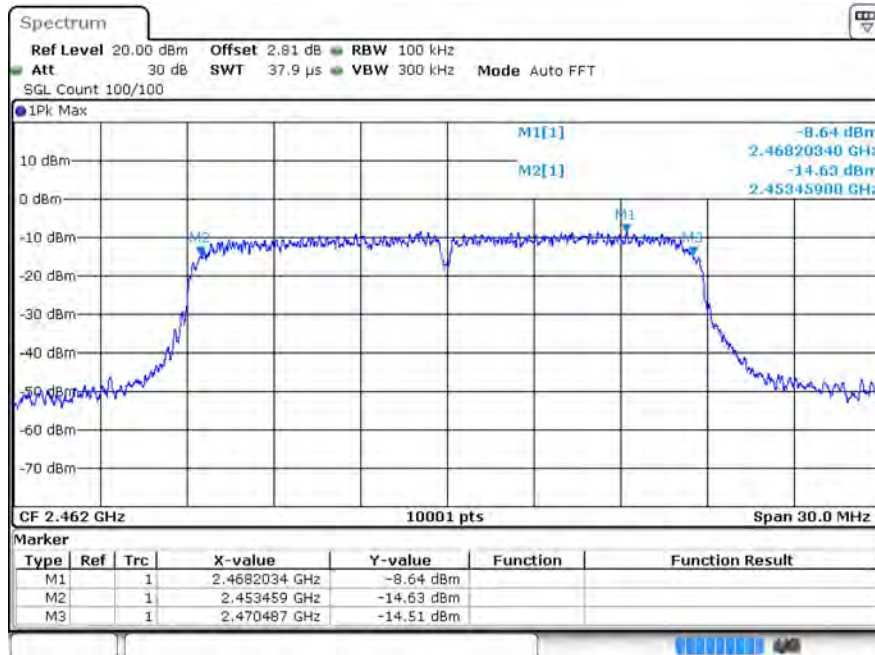
n20 2412MHz Ant1



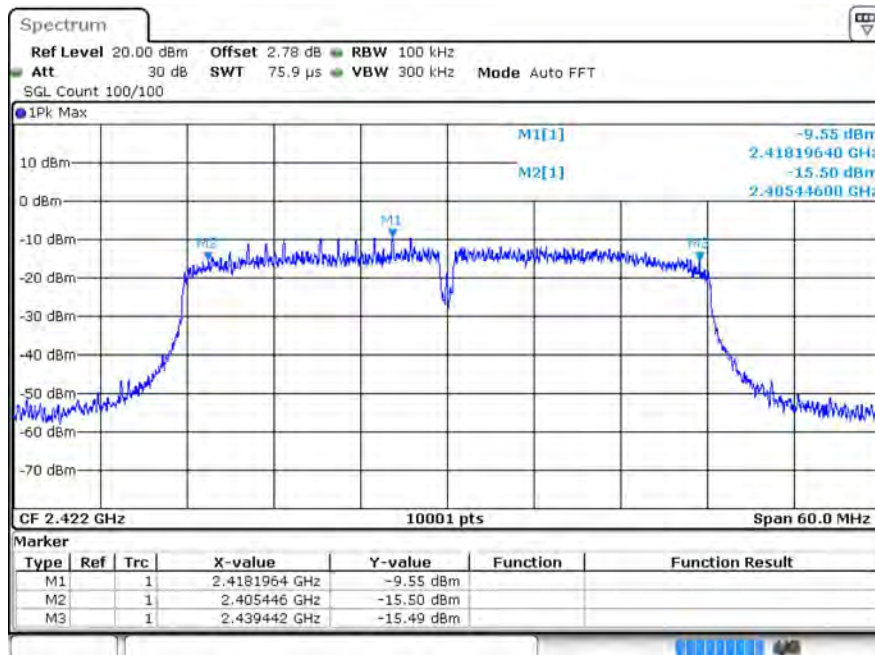
n20 2437MHz Ant1



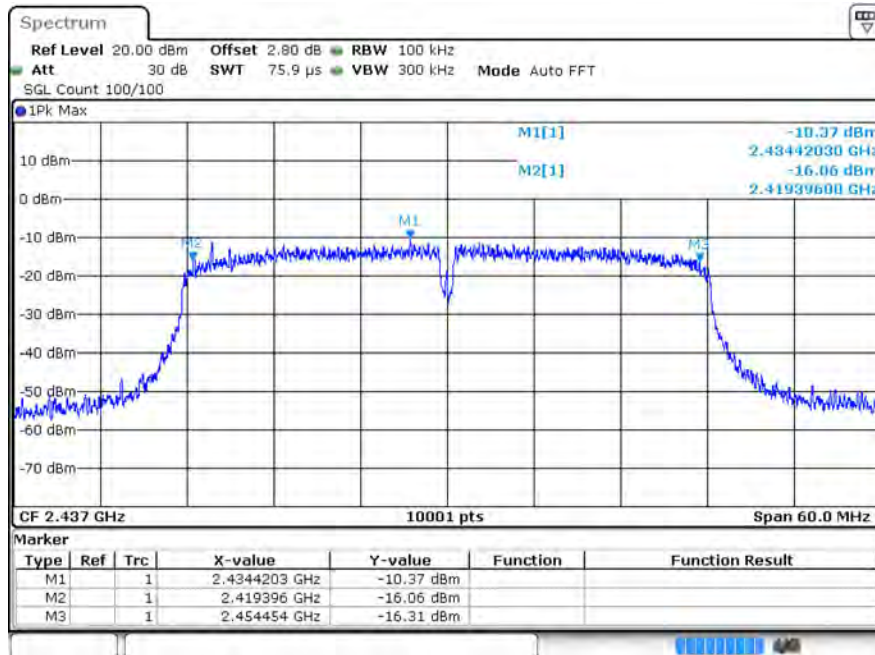
n20 2462MHz Ant1



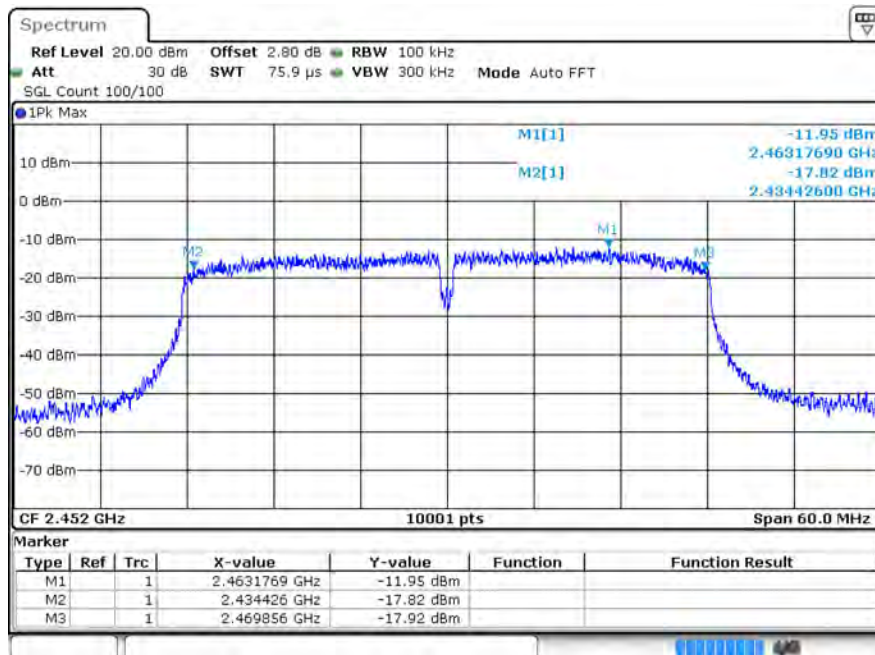
n40 2422MHz Ant1



n40 2437MHz Ant1



n40 2452MHz Ant1

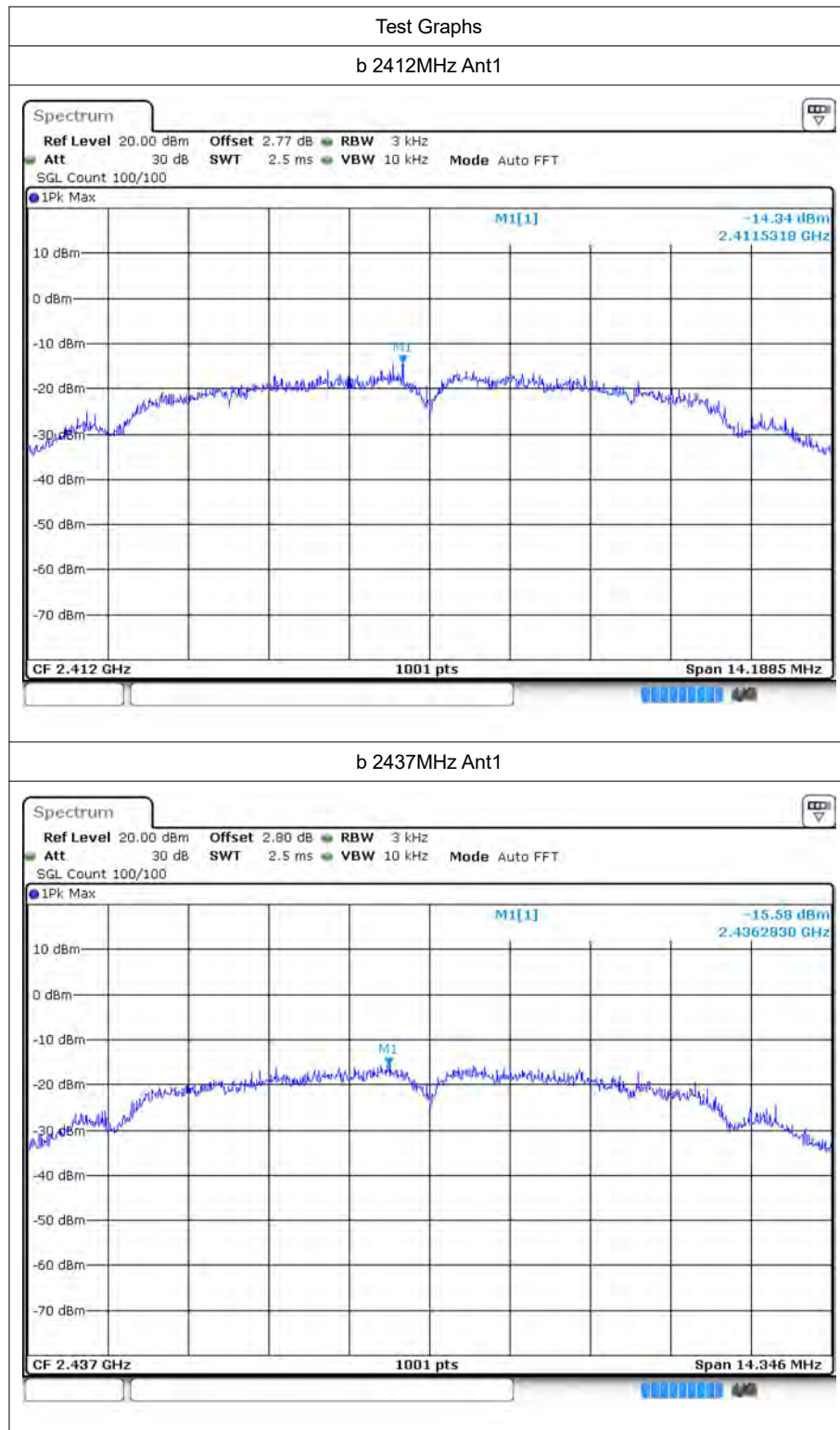


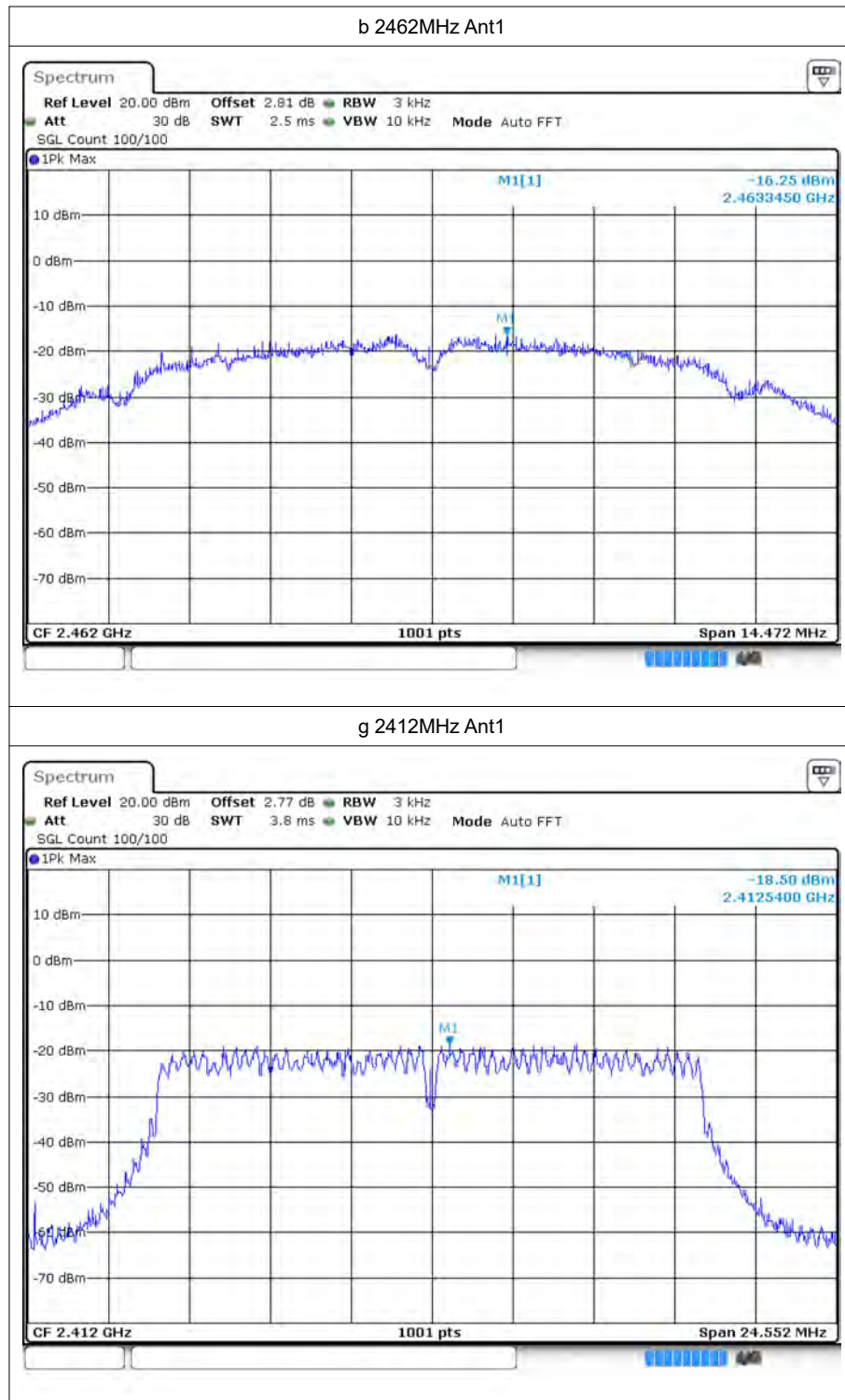
4 Maximum Power Spectral Density Level

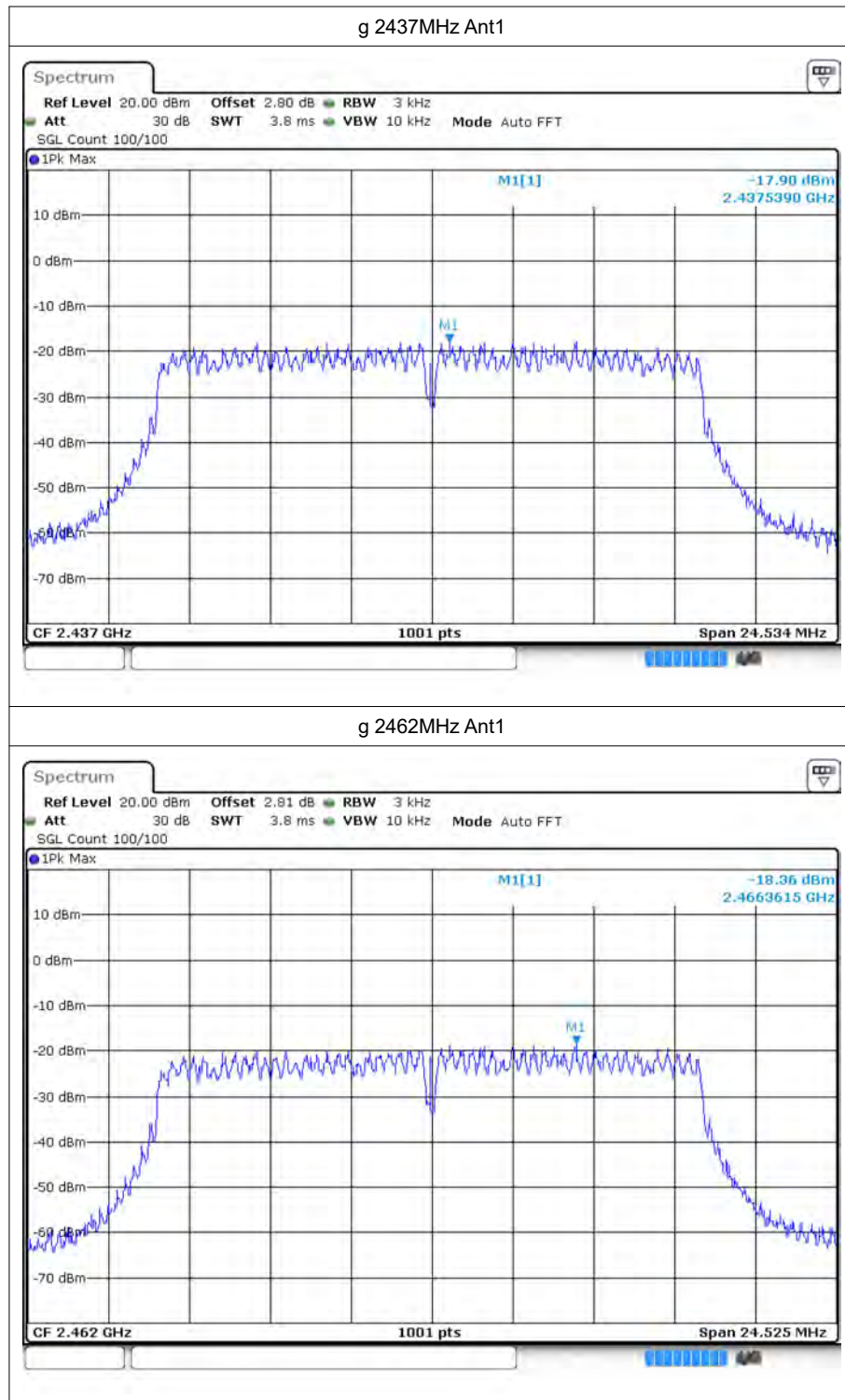
4.1 Test Result

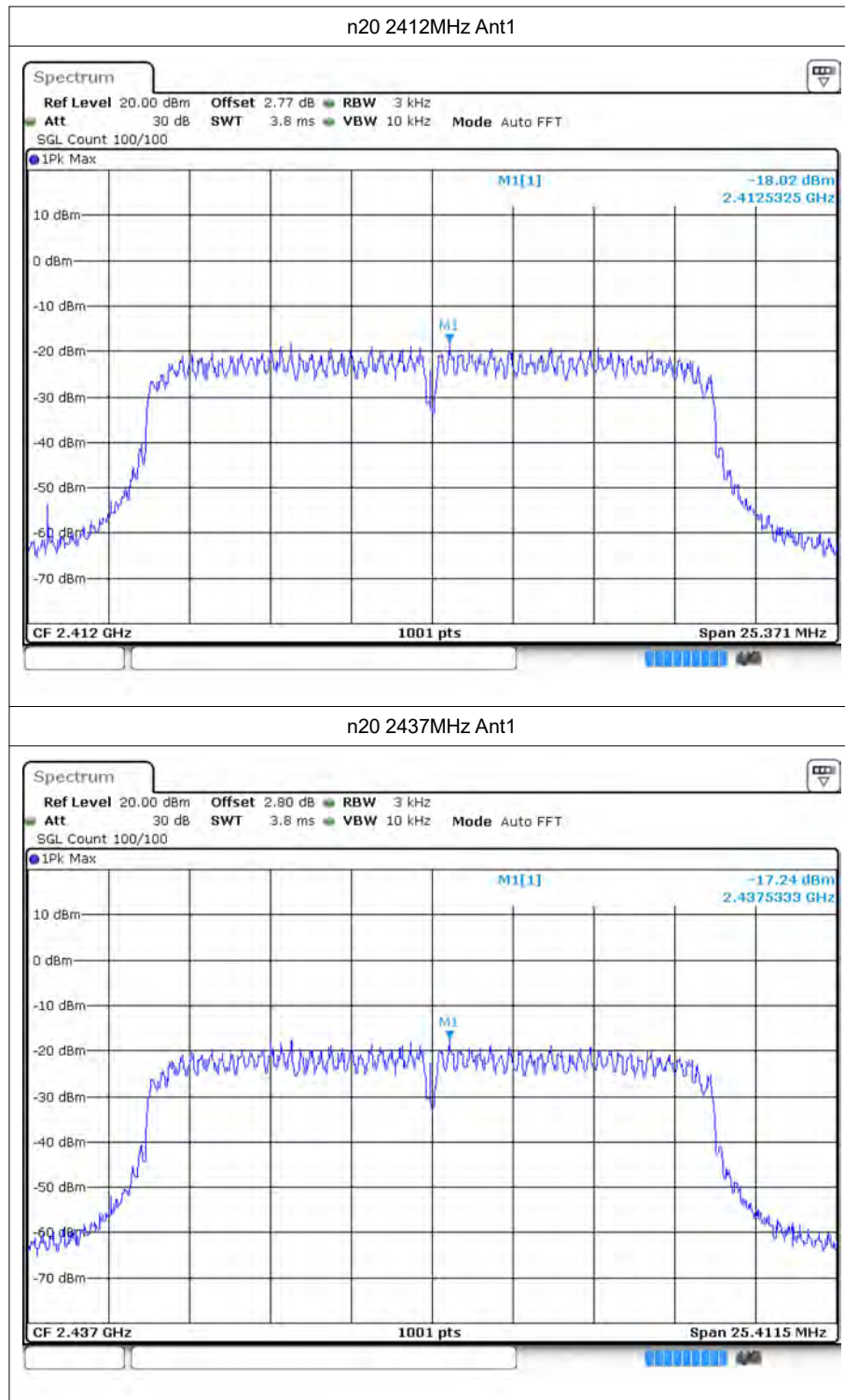
Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm/3-100kHz)	Limit (dBm/3kHz)	Verdict
b	2412	Ant1	-14.34	≤ 8	Pass
b	2437	Ant1	-15.58	≤ 8	Pass
b	2462	Ant1	-16.25	≤ 8	Pass
g	2412	Ant1	-18.5	≤ 8	Pass
g	2437	Ant1	-17.9	≤ 8	Pass
g	2462	Ant1	-18.36	≤ 8	Pass
n20	2412	Ant1	-18.02	≤ 8	Pass
n20	2437	Ant1	-17.24	≤ 8	Pass
n20	2462	Ant1	-18.3	≤ 8	Pass
n40	2422	Ant1	-22.08	≤ 8	Pass
n40	2437	Ant1	-21.84	≤ 8	Pass
n40	2452	Ant1	-22.99	≤ 8	Pass

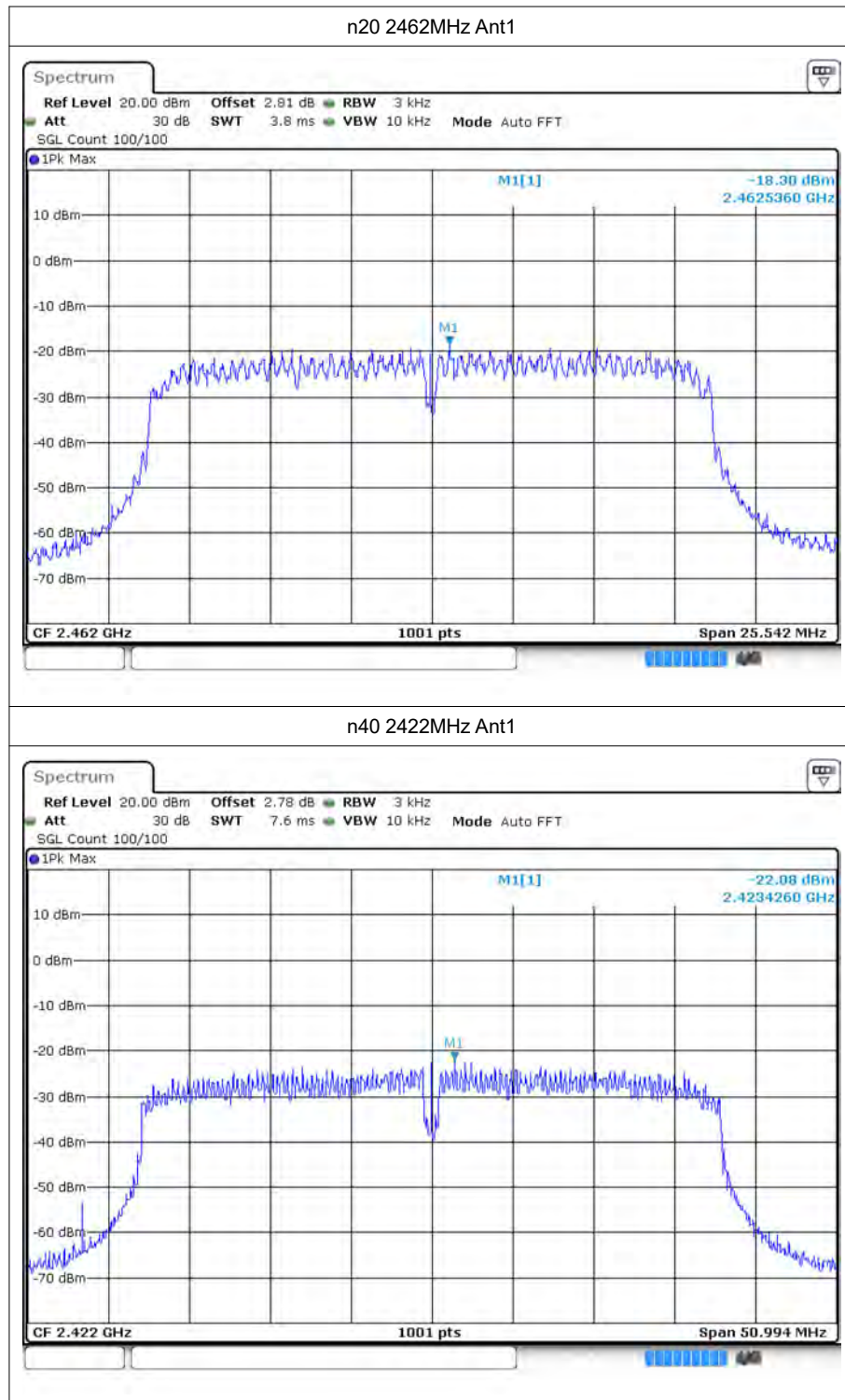
4.2 Test Graphs

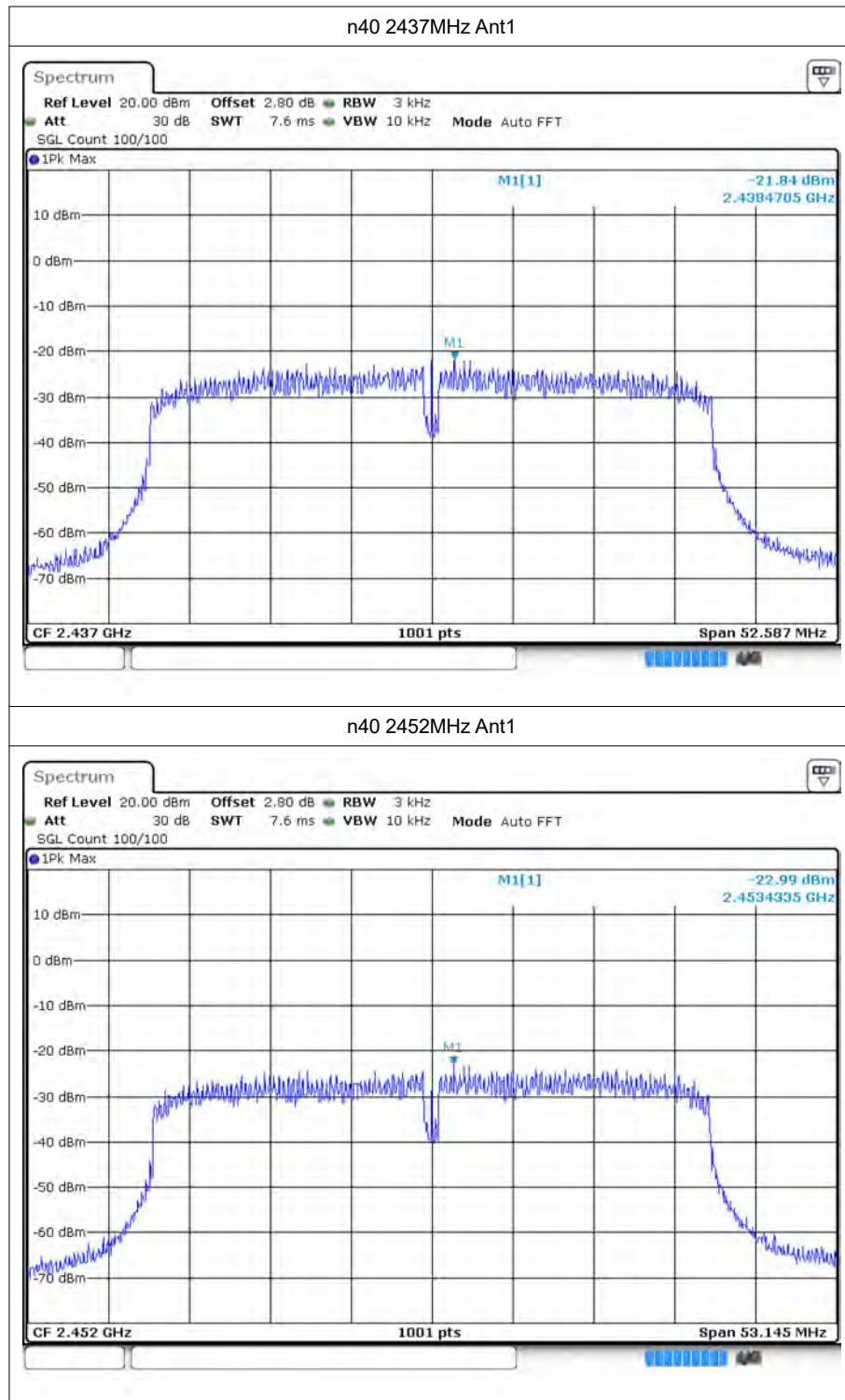












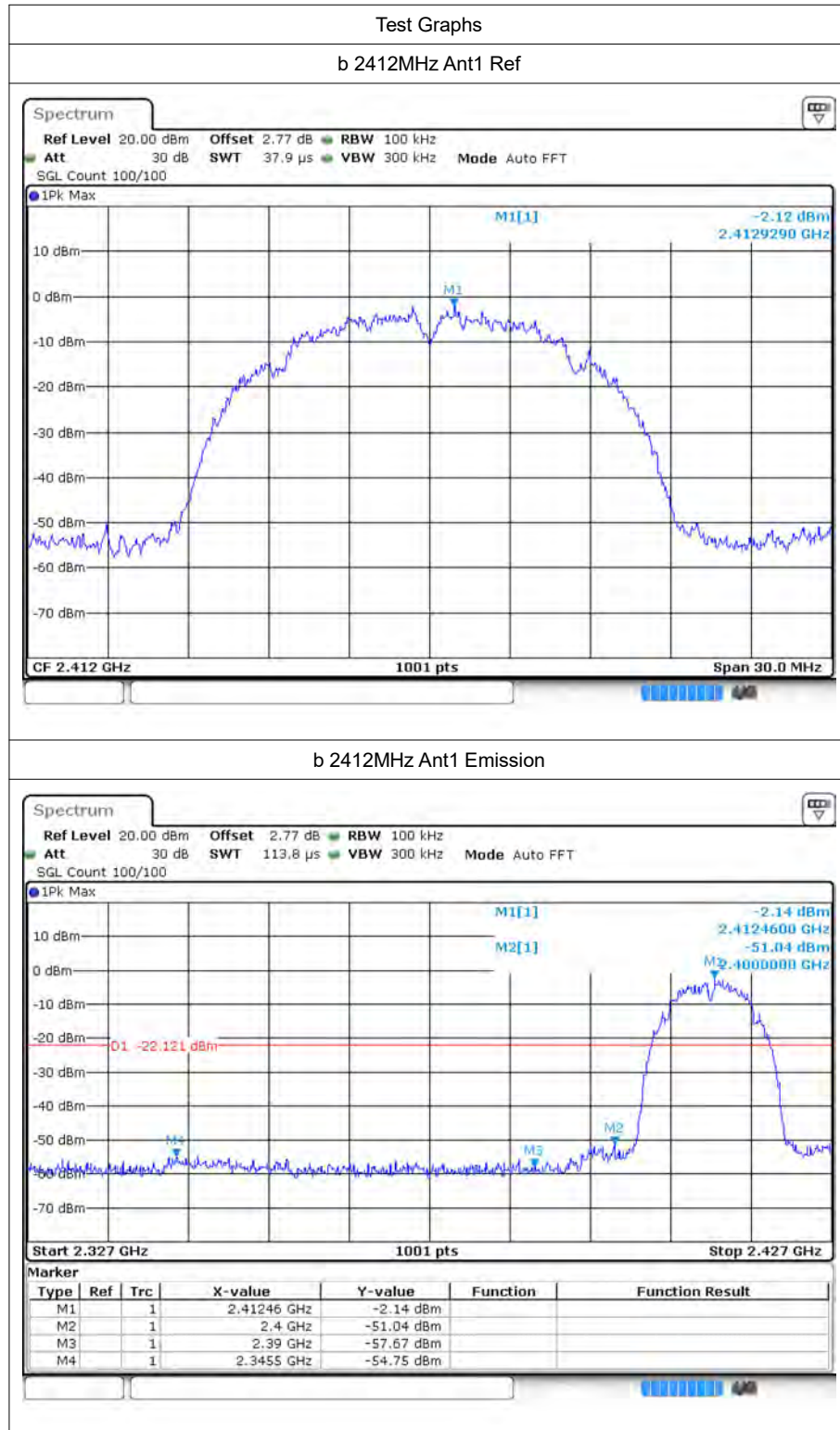


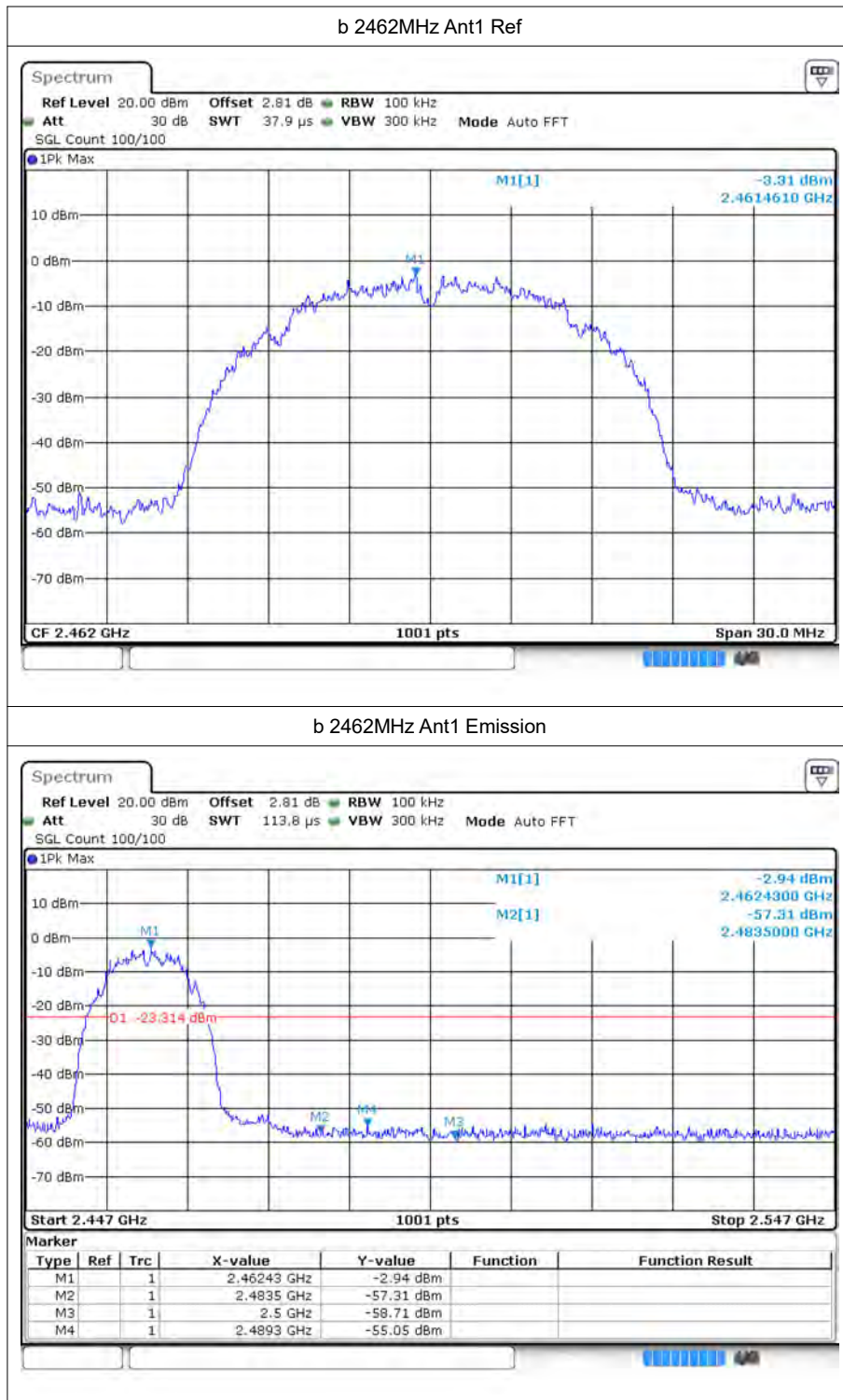
5 Band Edge

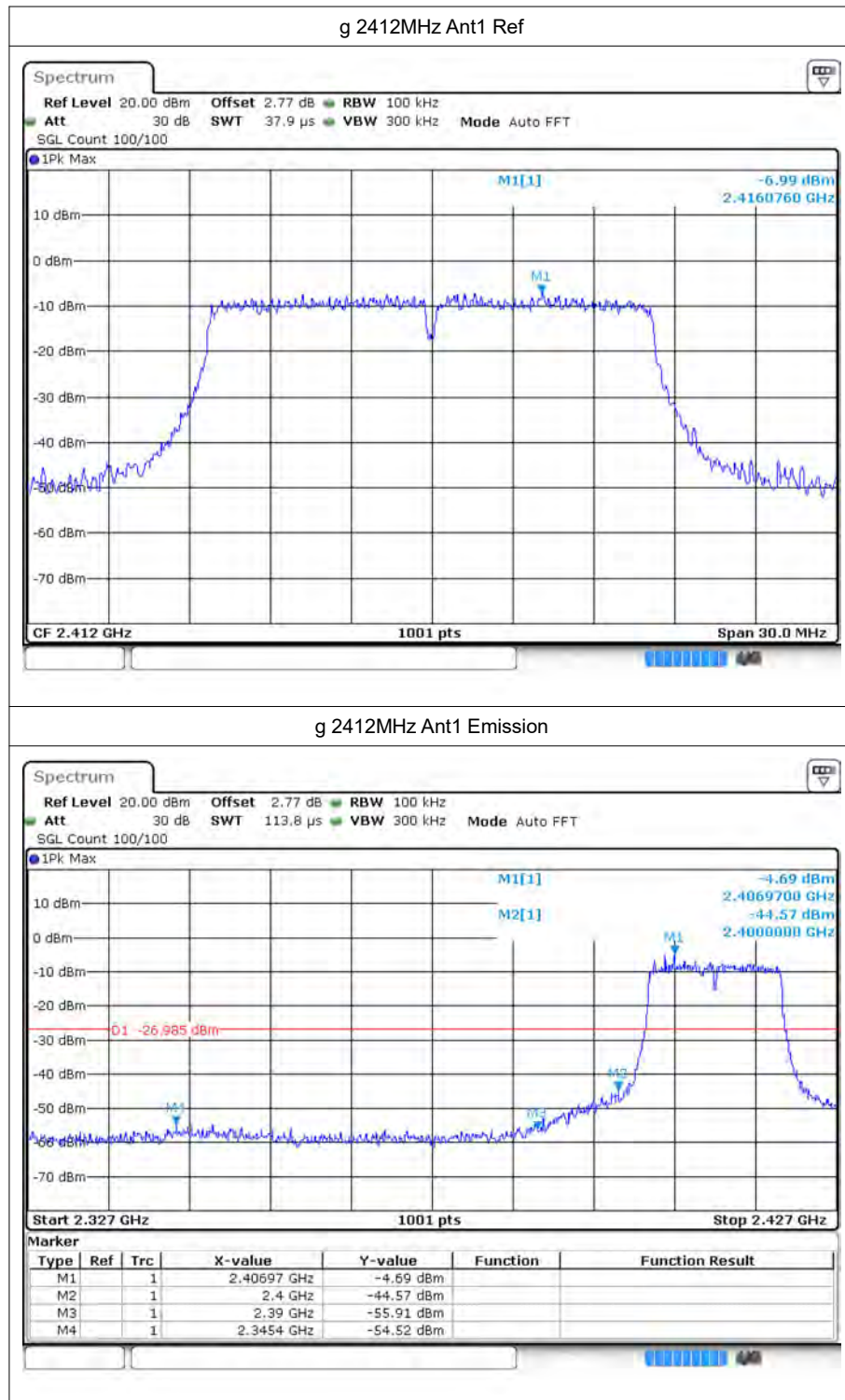
5.1 Test Result

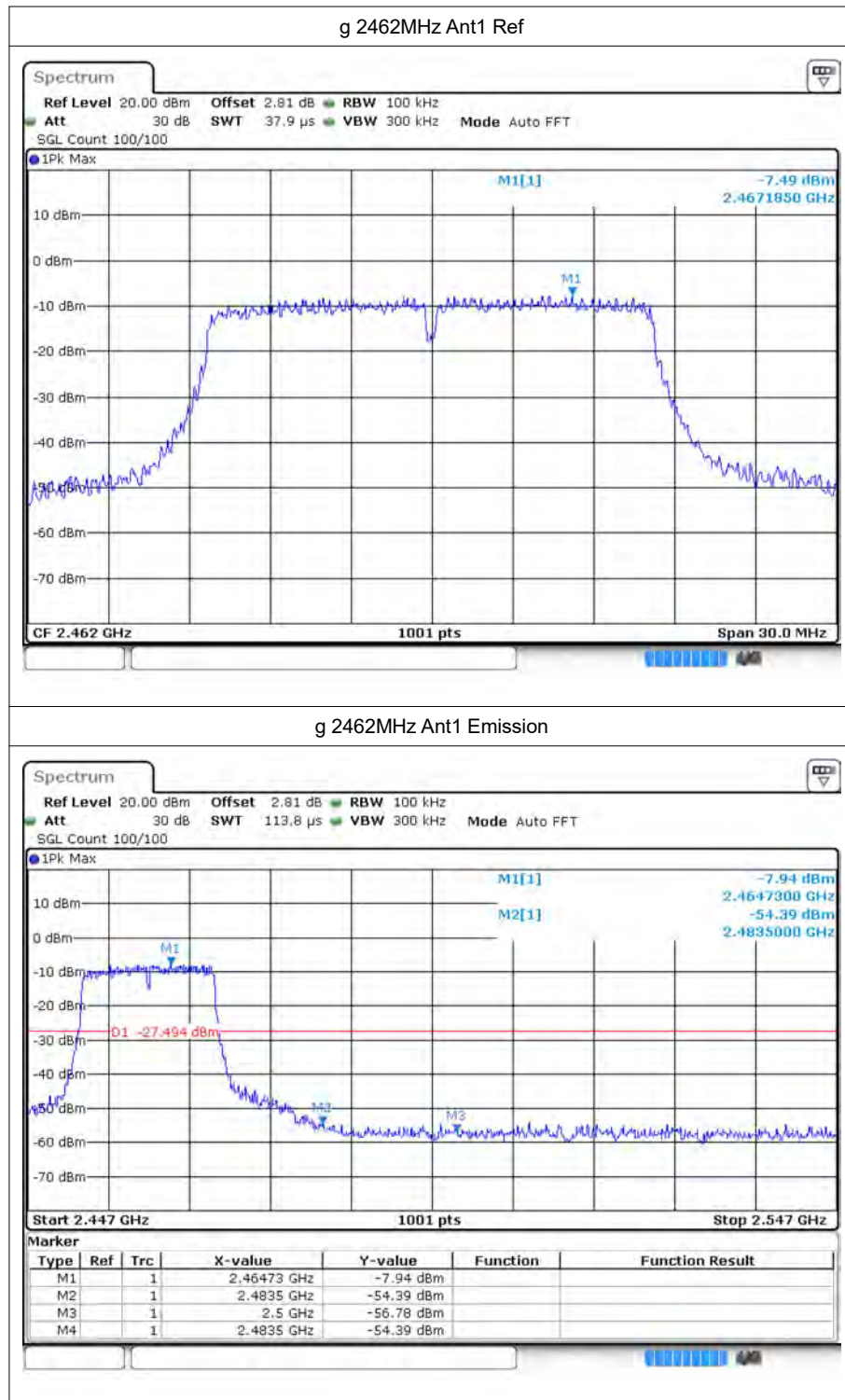
Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
b	2412	Ant1	-52.62	-20	Pass
b	2462	Ant1	-51.73	-20	Pass
g	2412	Ant1	-47.52	-20	Pass
g	2462	Ant1	-46.89	-20	Pass
n20	2412	Ant1	-45.82	-20	Pass
n20	2462	Ant1	-48.47	-20	Pass
n40	2422	Ant1	-43.02	-20	Pass
n40	2452	Ant1	-40.64	-20	Pass

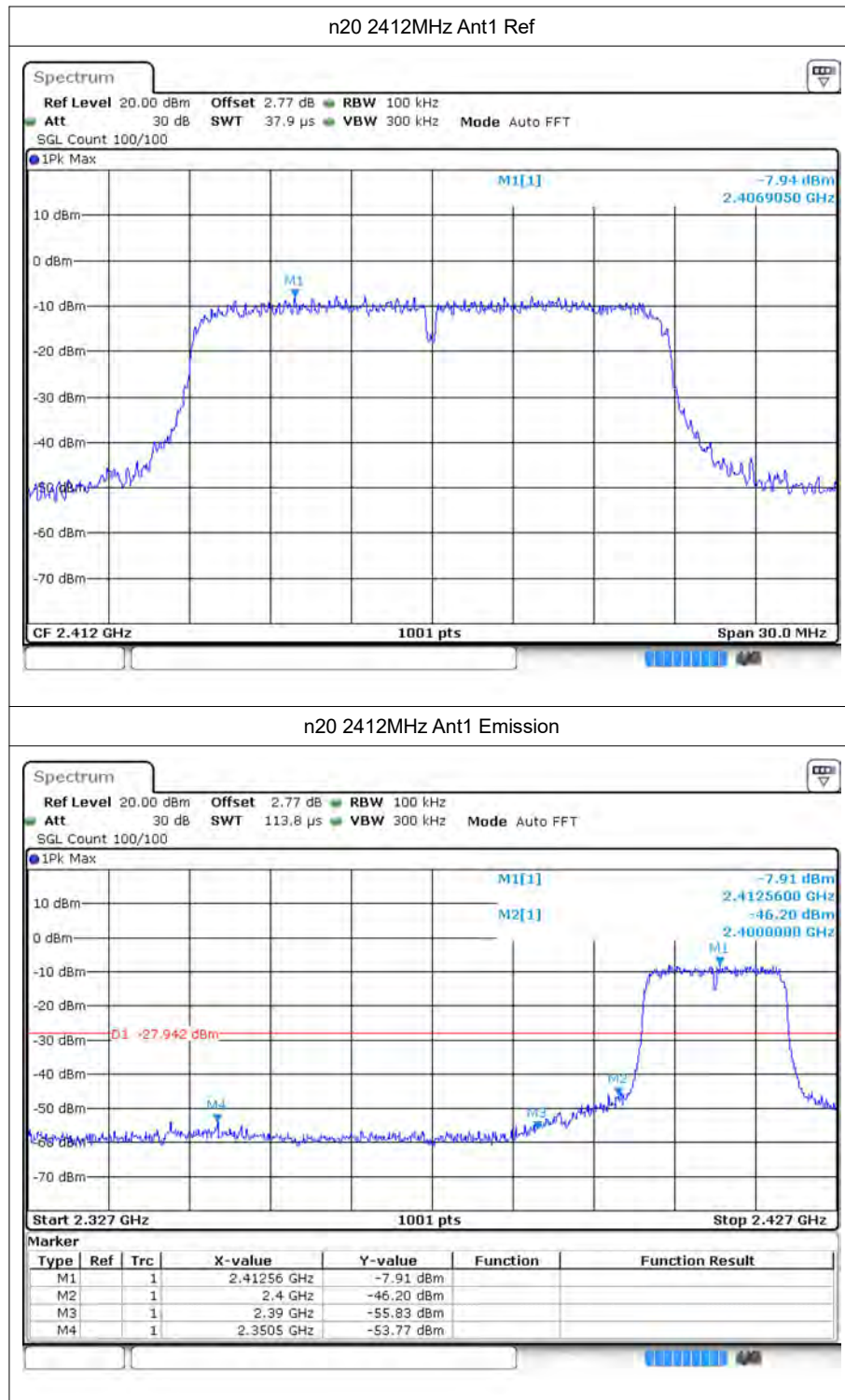
5.2 Test Graphs

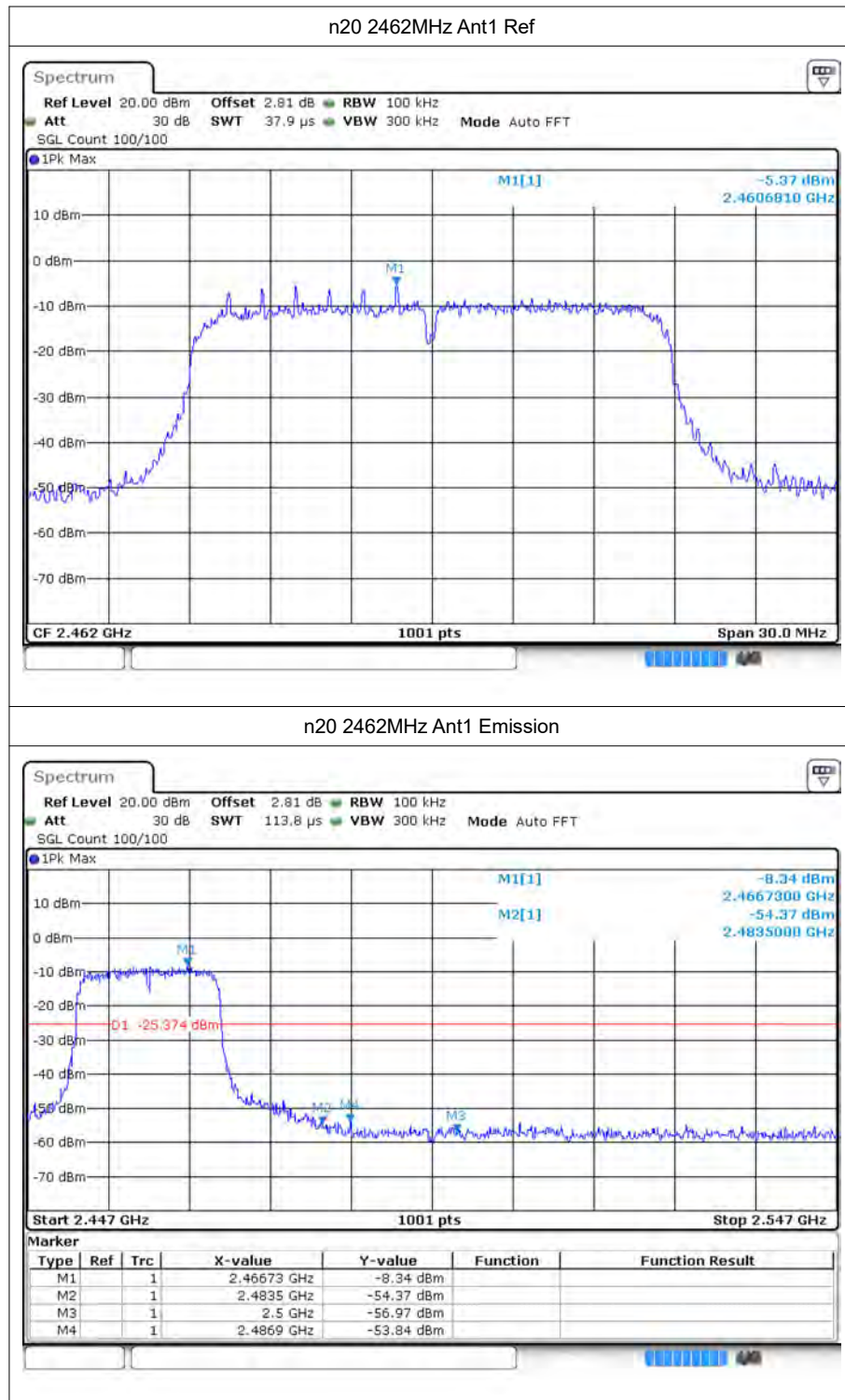


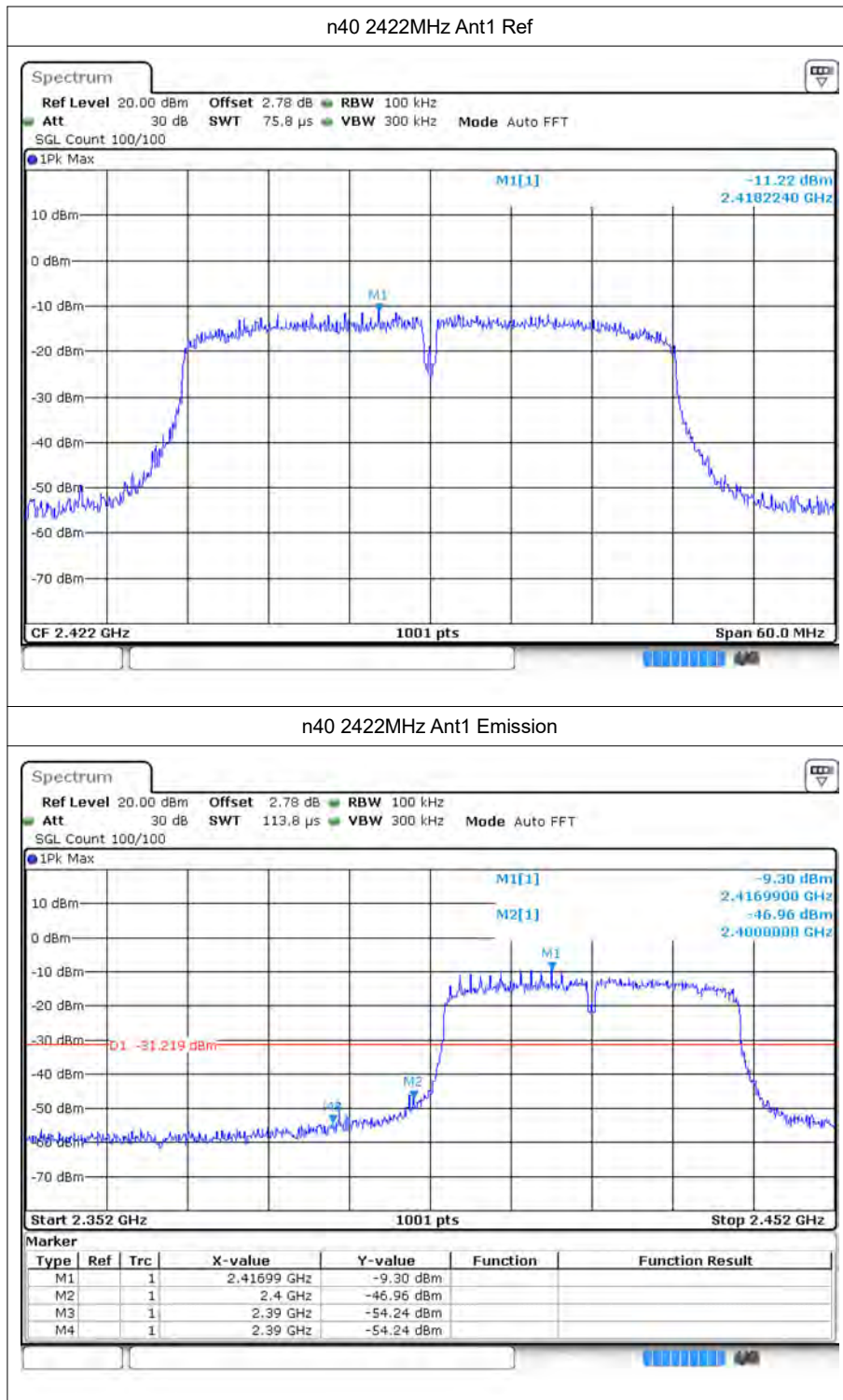


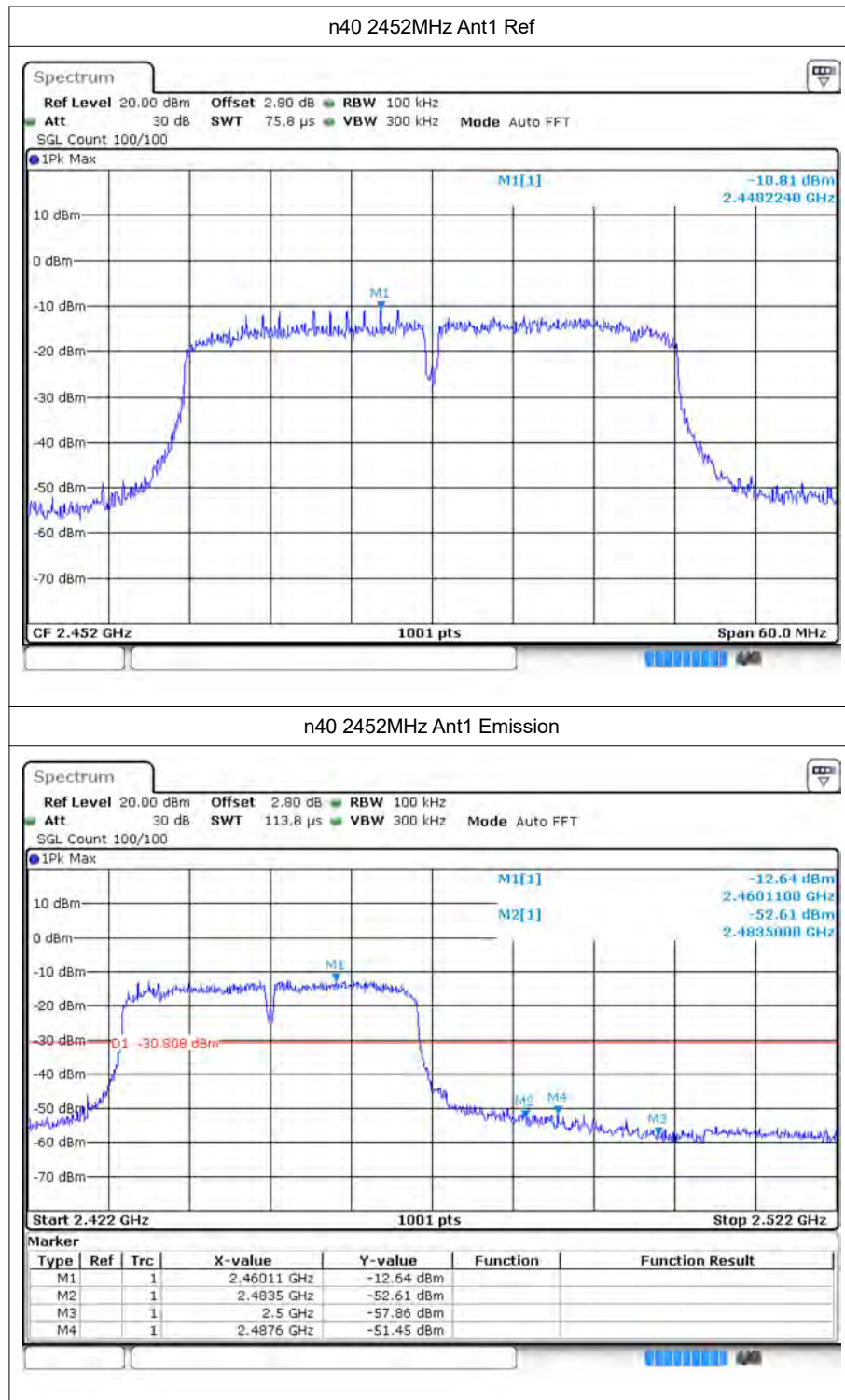












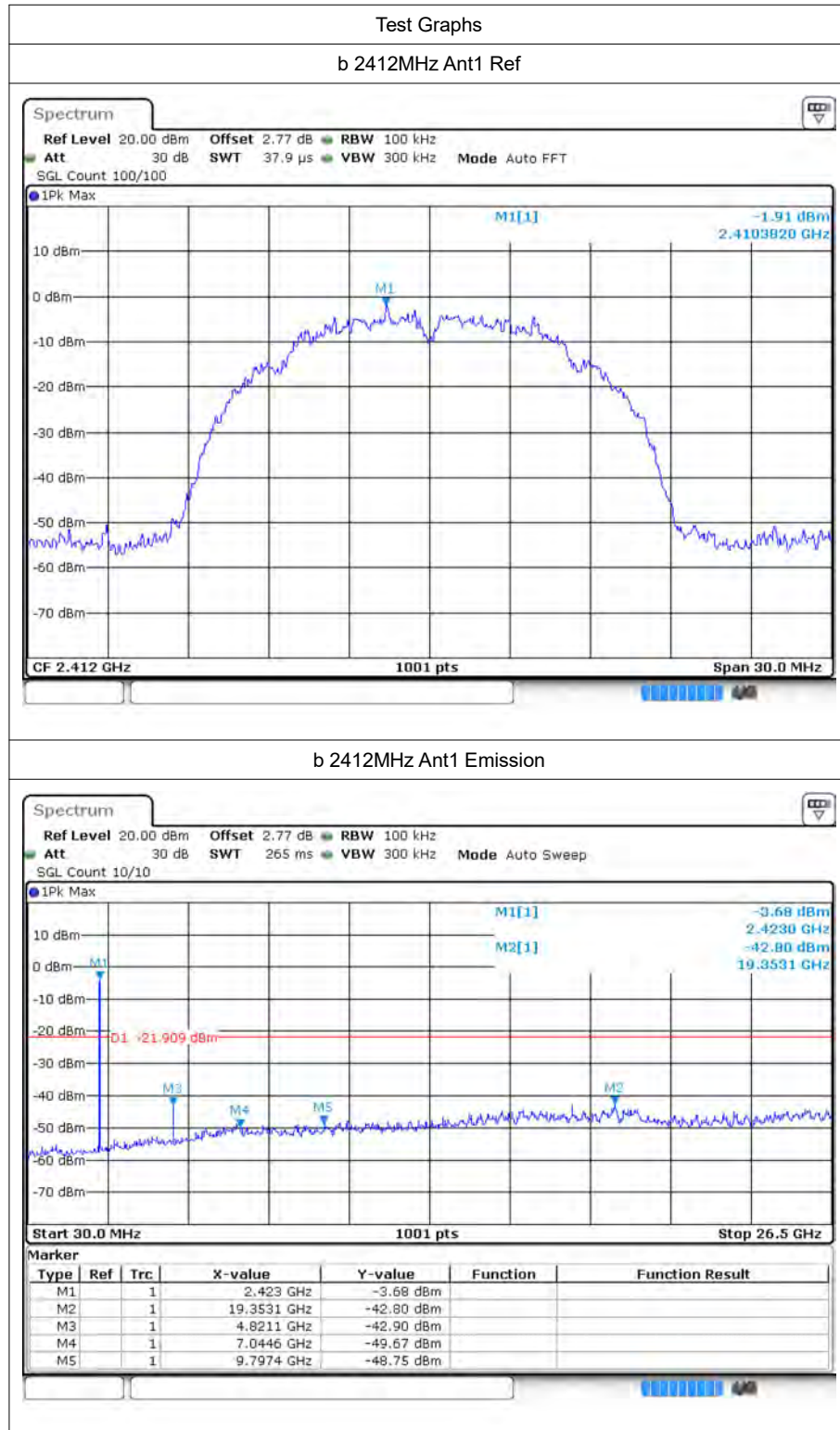


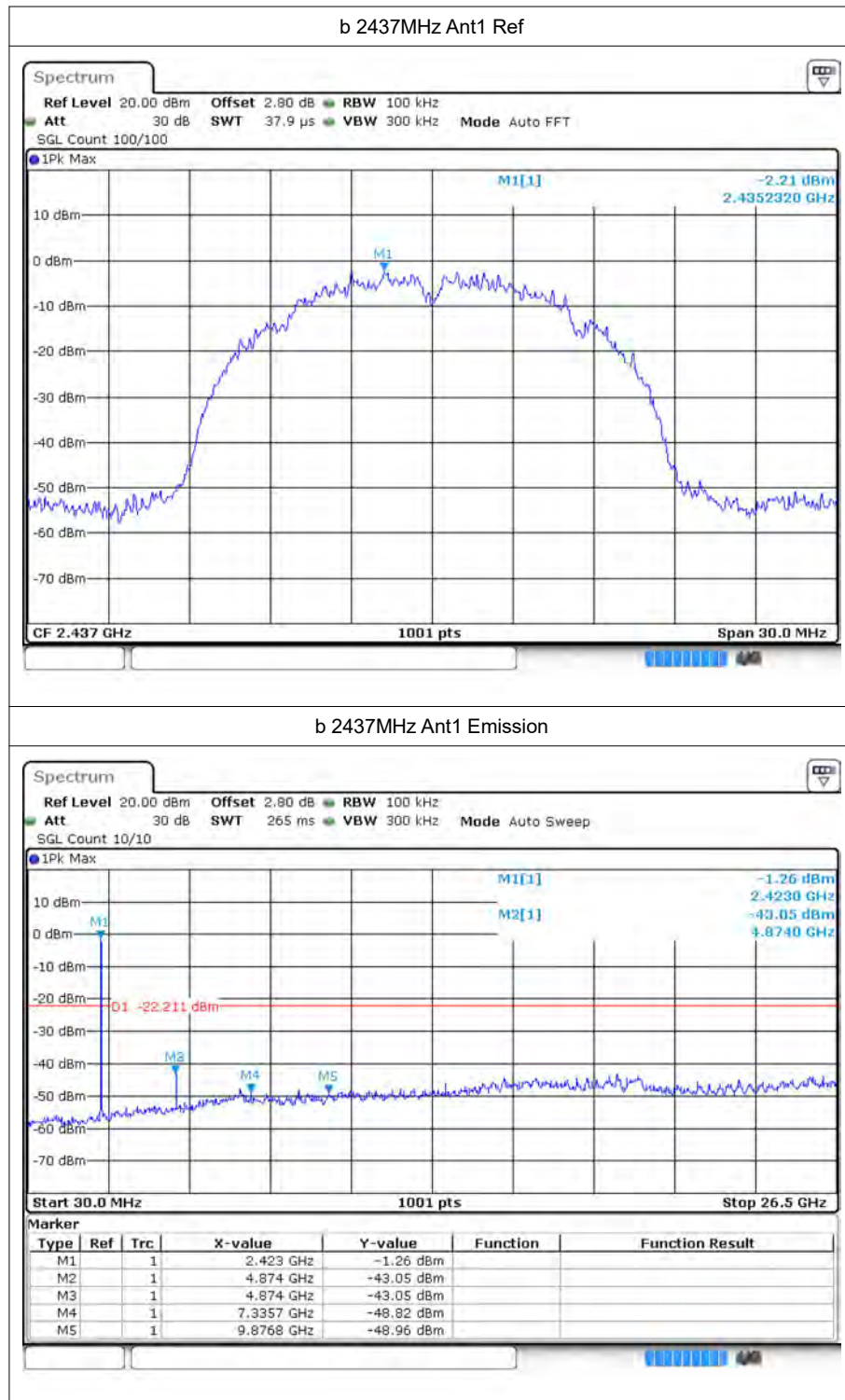
6 Conducted RF Spurious Emission

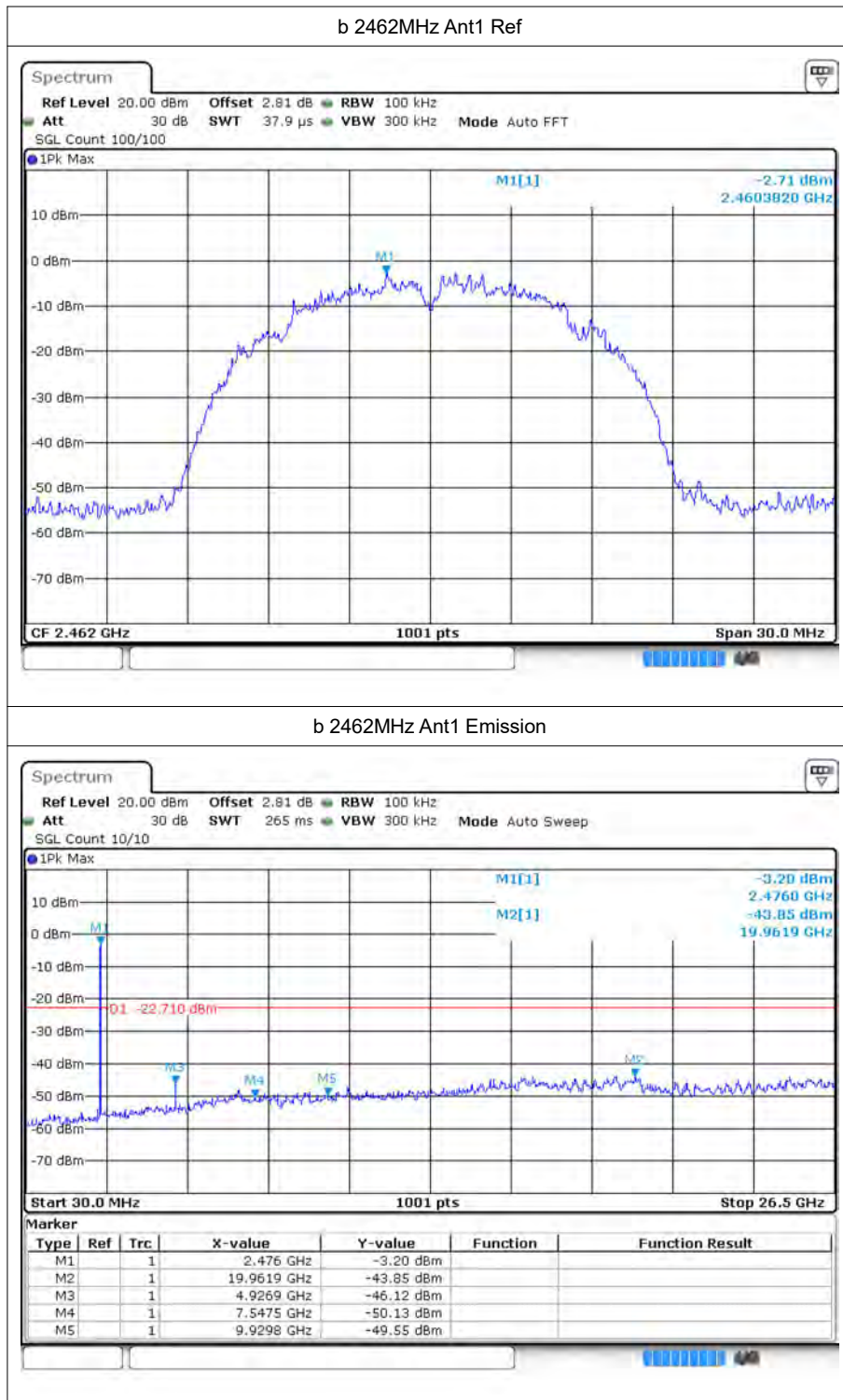
6.1 Test Result

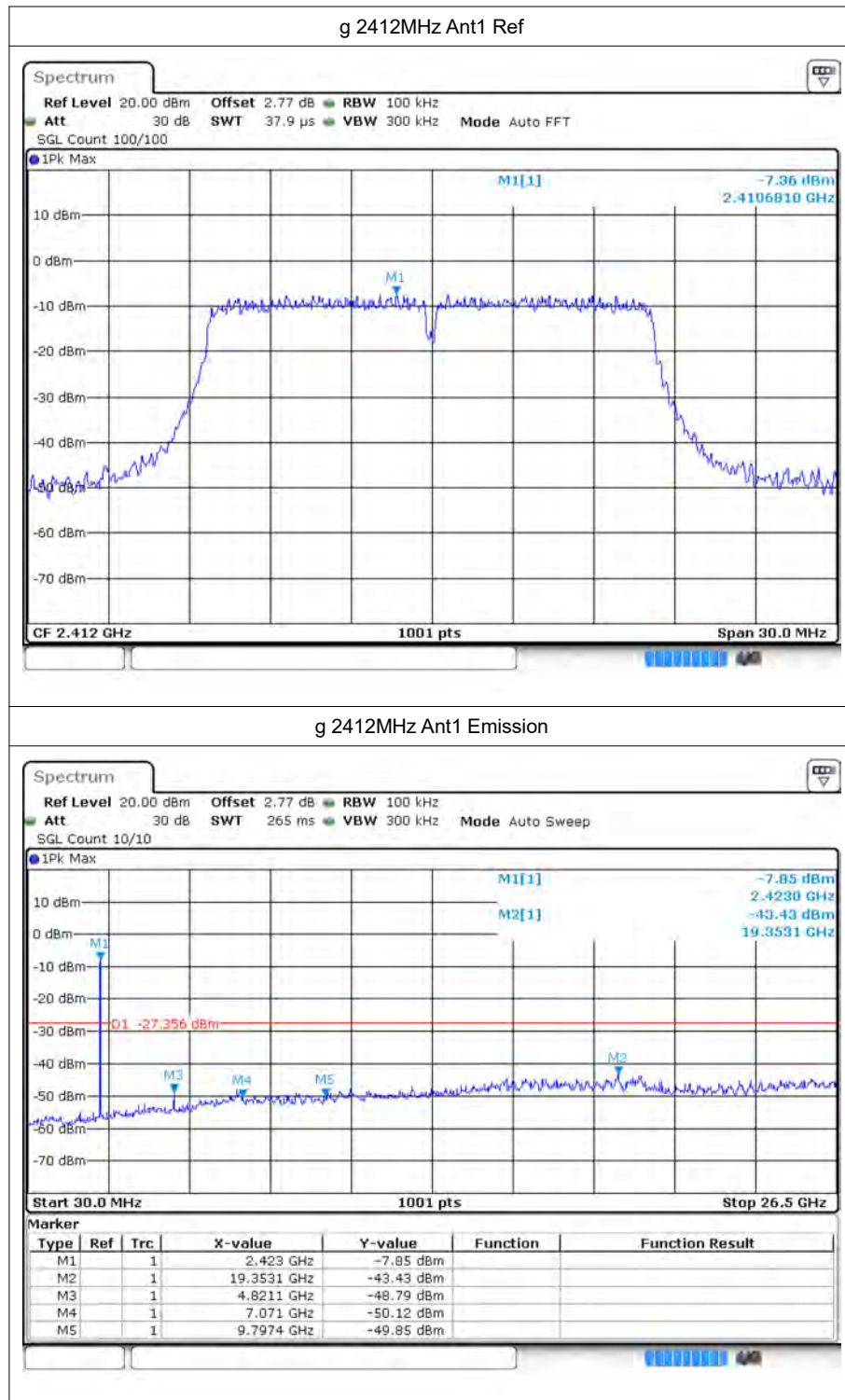
Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
b	2412	Ant1	-40.89	-20	Pass
b	2437	Ant1	-40.83	-20	Pass
b	2462	Ant1	-41.13	-20	Pass
g	2412	Ant1	-36.07	-20	Pass
g	2437	Ant1	-36.89	-20	Pass
g	2462	Ant1	-34.39	-20	Pass
n20	2412	Ant1	-35.55	-20	Pass
n20	2437	Ant1	-38.48	-20	Pass
n20	2462	Ant1	-35.24	-20	Pass
n40	2422	Ant1	-34.67	-20	Pass
n40	2437	Ant1	-32.99	-20	Pass
n40	2452	Ant1	-31.03	-20	Pass

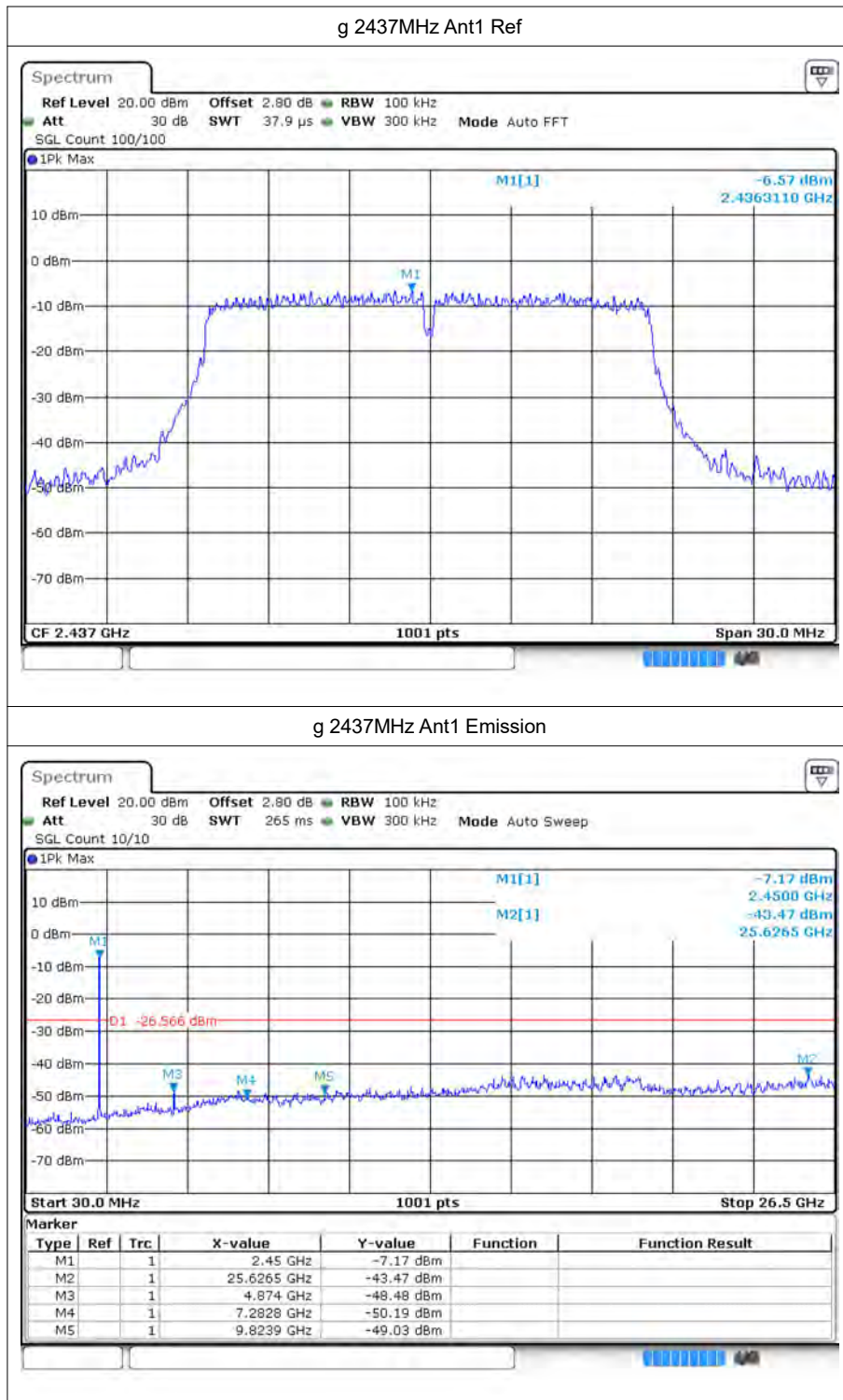
6.2 Test Graphs

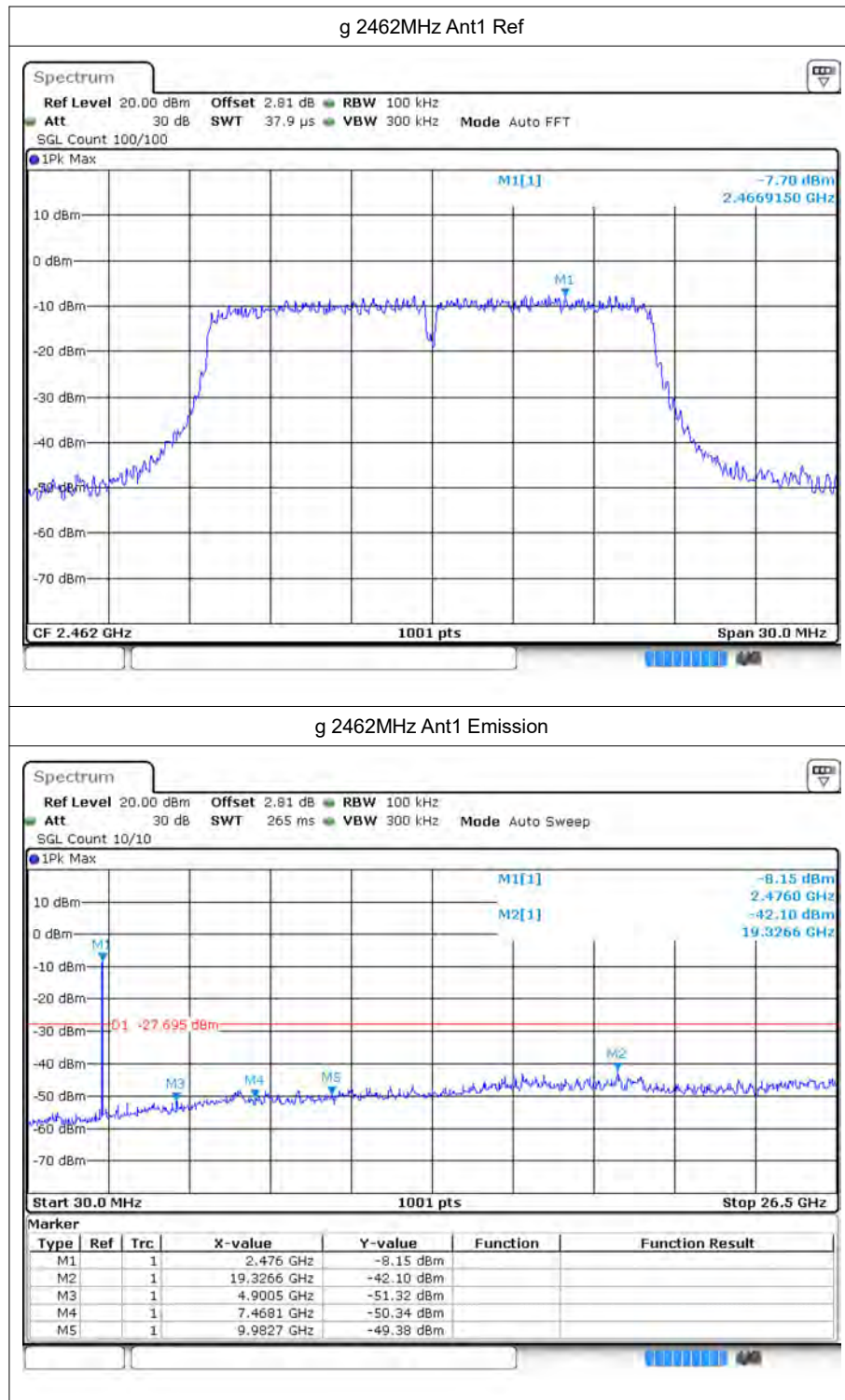


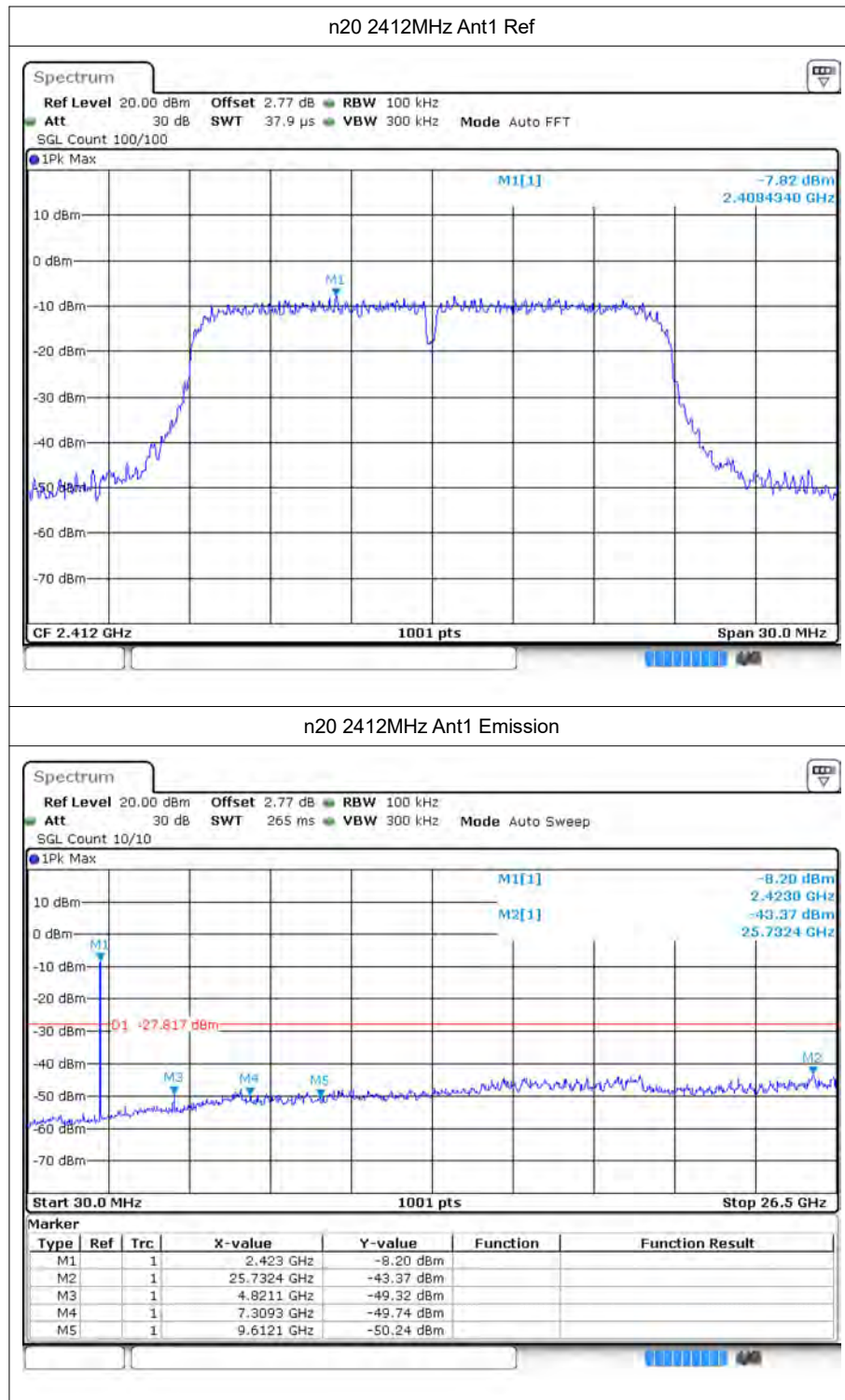


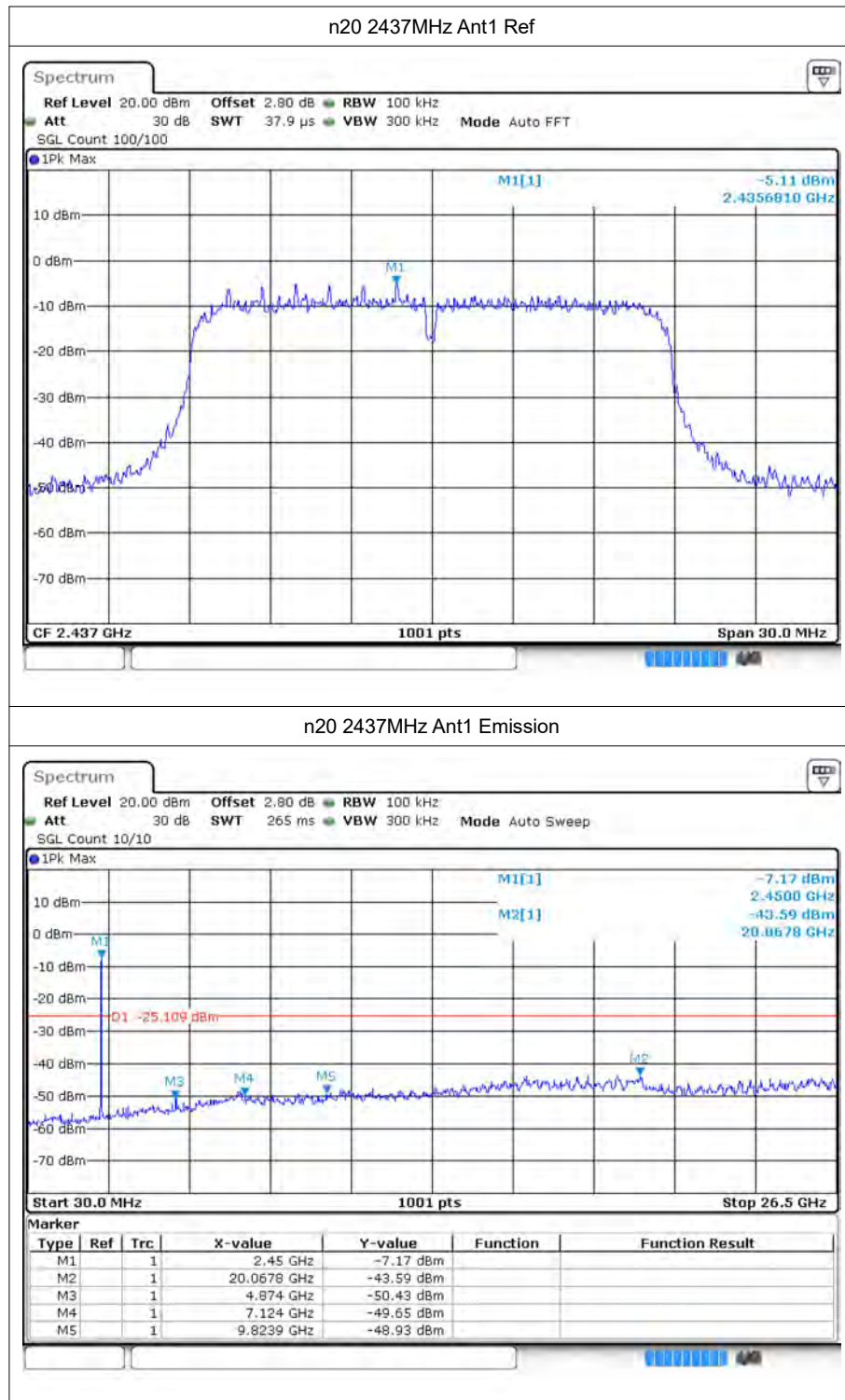


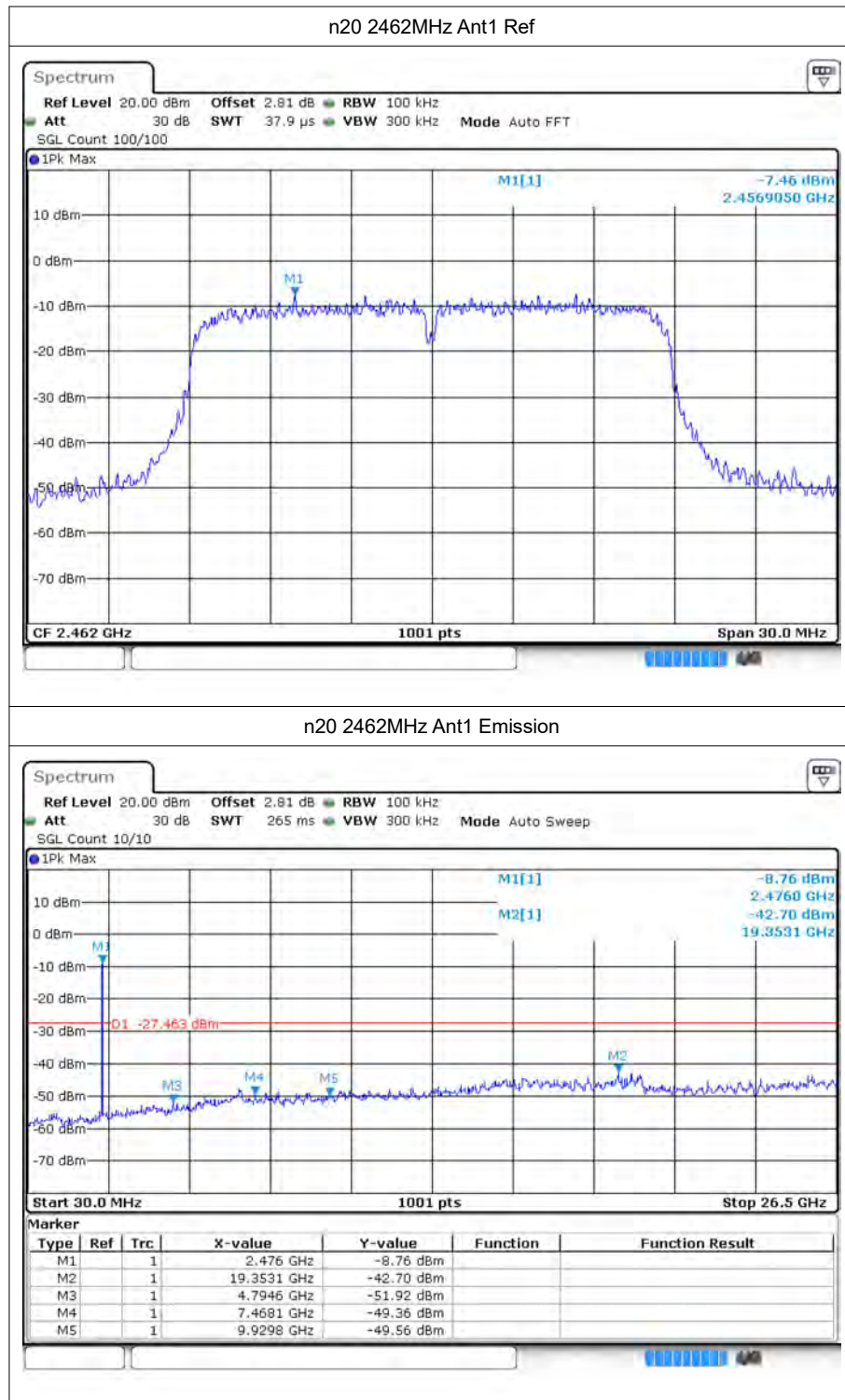


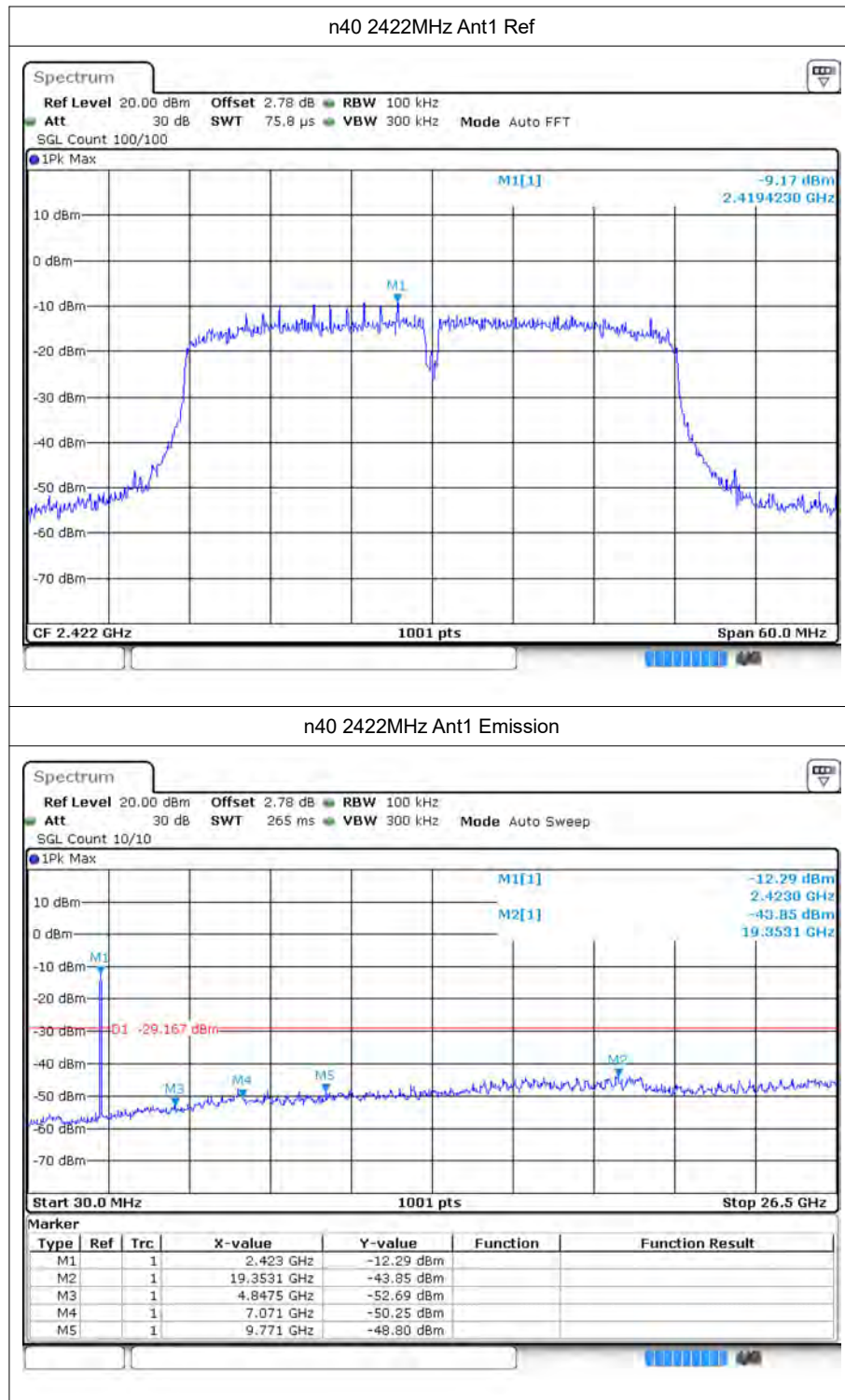


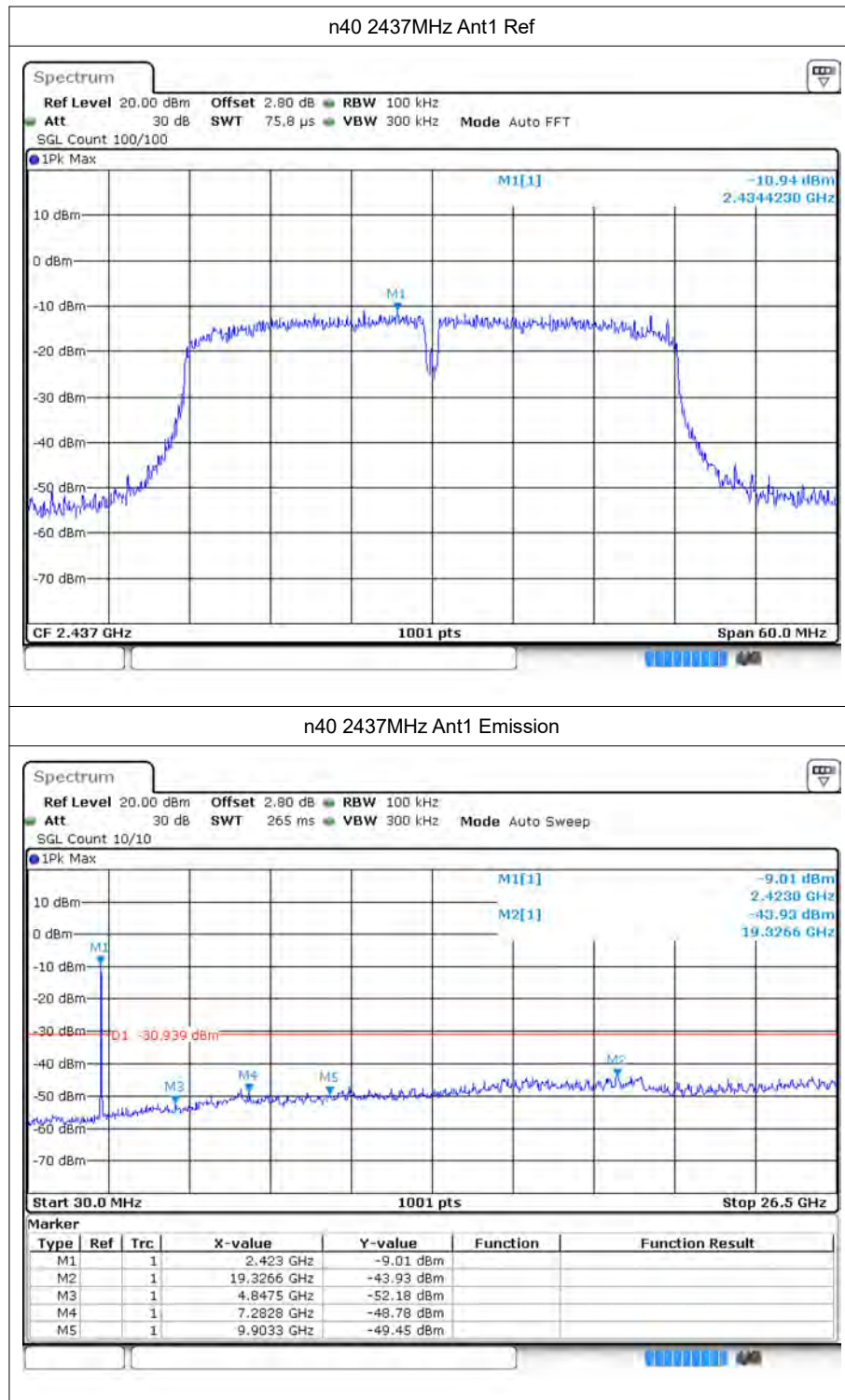


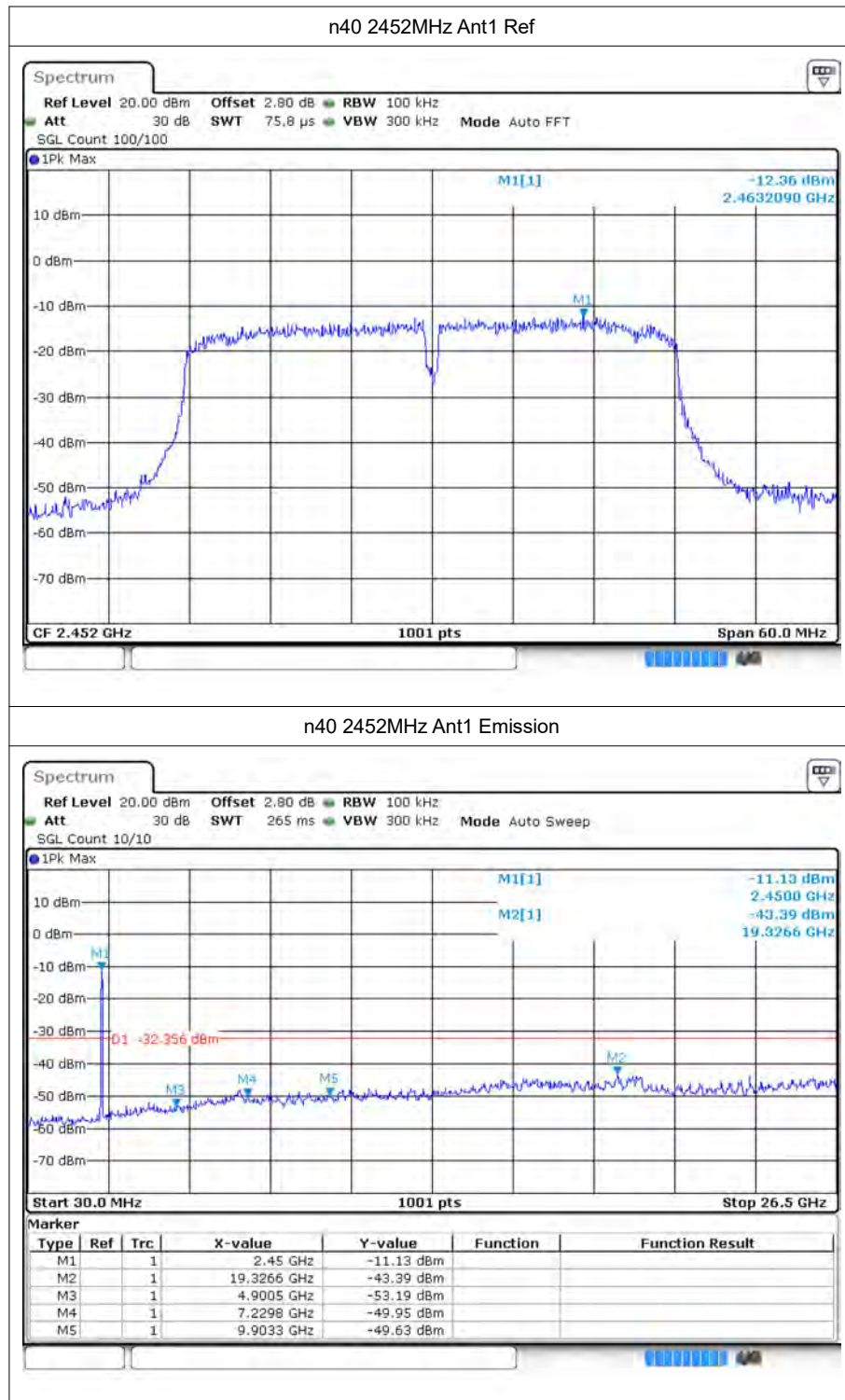














7 Restrict Band

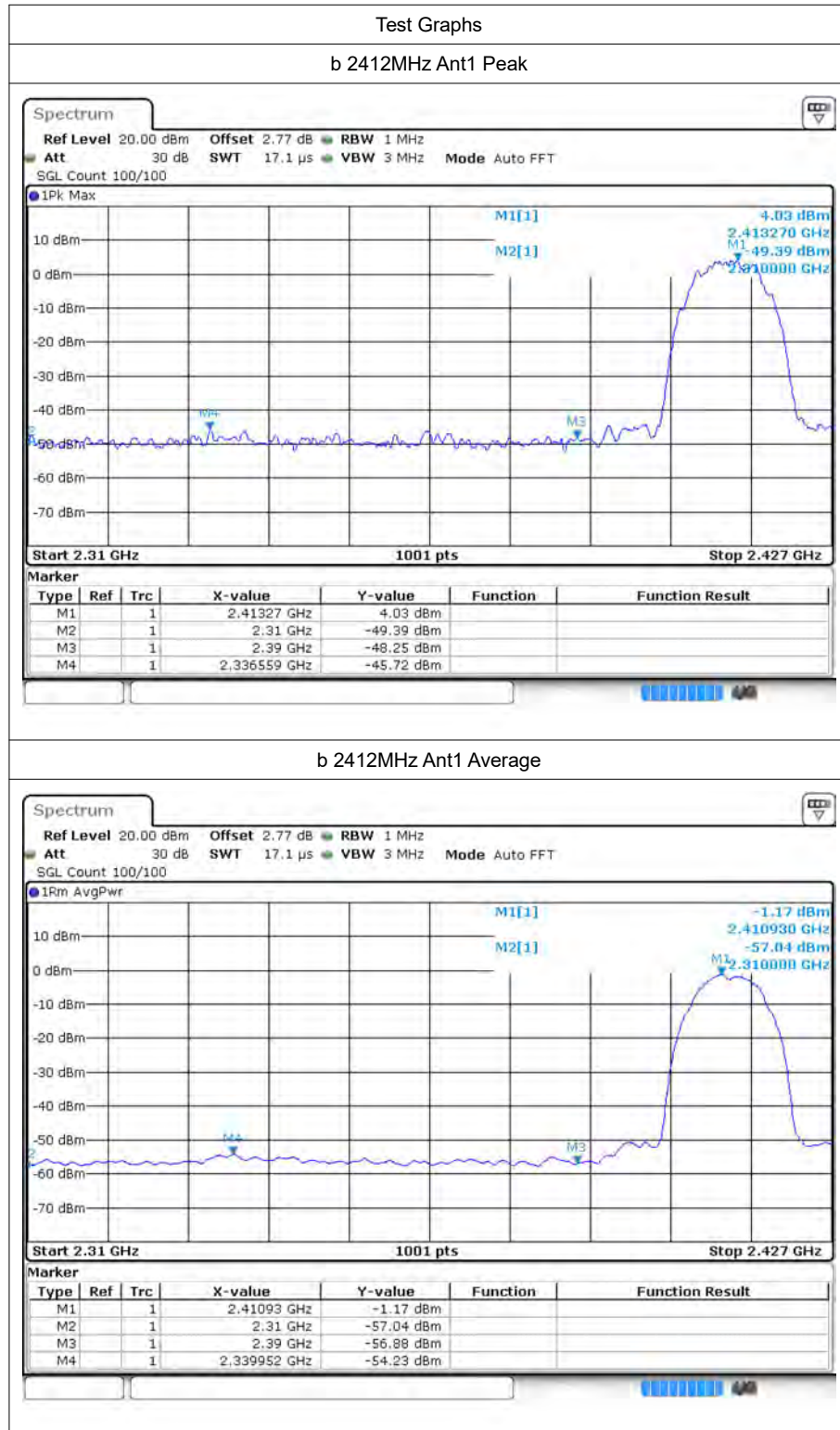
7.1 Test Result

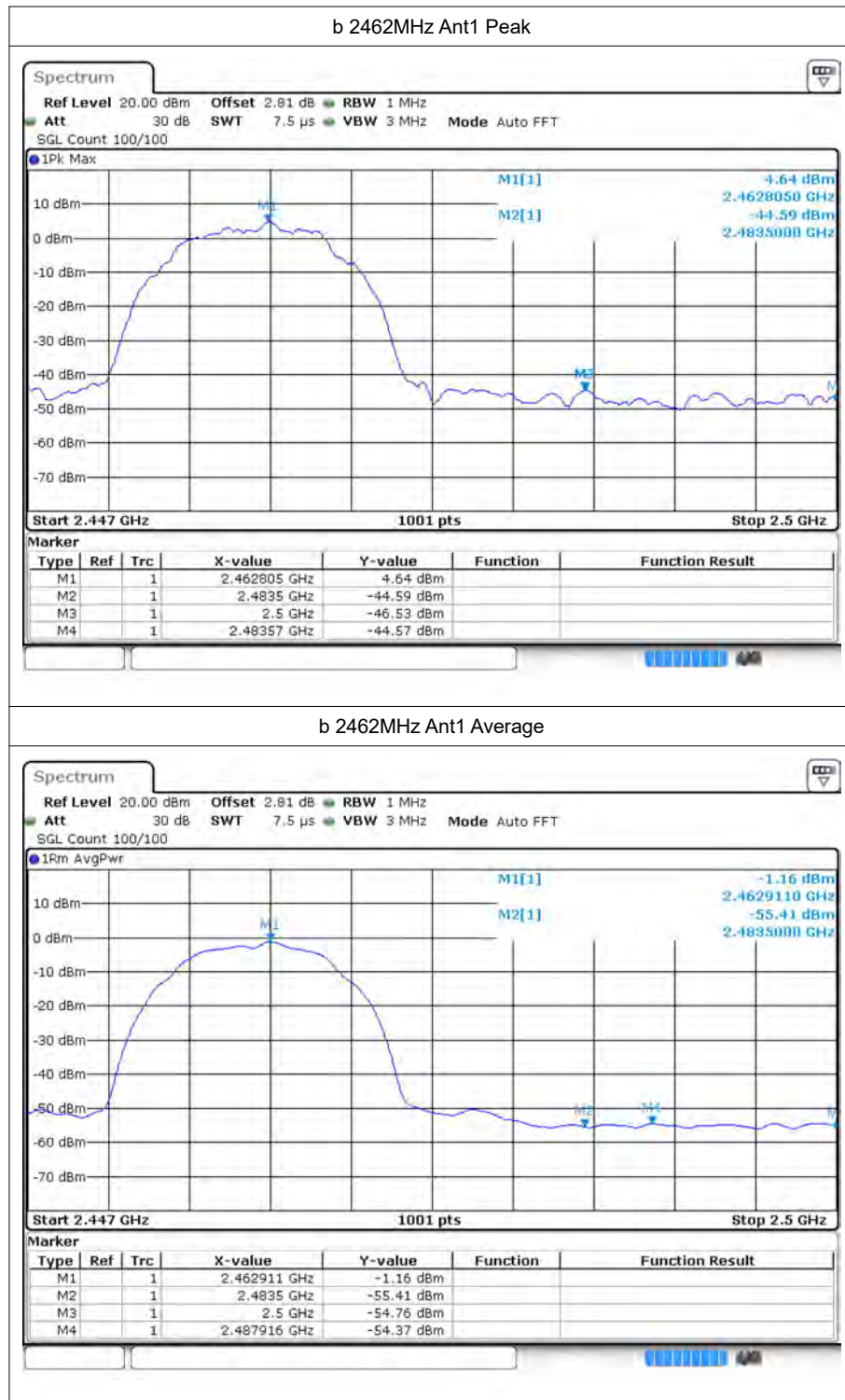
Mode	Frequency (MHz)	Antenna	Spur Freq (MHz)	Power (dBm)	Gain (dBi)	Duty Factor	E (dBuV/m)	Detector	Limit (dBuV/m)	Verdict
b	2412	Ant1	2310	-49.39	4.23	-	50.1	Peak	74	Pass
b	2412	Ant1	2310	-57.04	4.23	0	42.45	Average	54	Pass
b	2412	Ant1	2336.559	-45.72	4.23	-	53.77	Peak	74	Pass
b	2412	Ant1	2339.952	-54.22	4.23	0	45.27	Average	54	Pass
b	2412	Ant1	2390	-48.25	4.23	-	51.24	Peak	74	Pass
b	2412	Ant1	2390	-56.88	4.23	0	42.61	Average	54	Pass
b	2462	Ant1	2483.5	-44.59	4.23	-	54.9	Peak	74	Pass
b	2462	Ant1	2483.5	-55.41	4.23	0	44.08	Average	54	Pass
b	2462	Ant1	2483.57	-44.57	4.23	-	54.92	Peak	74	Pass
b	2462	Ant1	2487.916	-54.36	4.23	0	45.13	Average	54	Pass
b	2462	Ant1	2500	-46.53	4.23	-	52.96	Peak	74	Pass
b	2462	Ant1	2500	-54.76	4.23	0	44.73	Average	54	Pass
g	2412	Ant1	2310	-49.28	4.23	-	50.21	Peak	74	Pass
g	2412	Ant1	2310	-56.61	4.23	0	42.88	Average	54	Pass
g	2412	Ant1	2345.451	-45.42	4.23	-	54.07	Peak	74	Pass
g	2412	Ant1	2338.431	-53.84	4.23	0	45.65	Average	54	Pass
g	2412	Ant1	2390	-45.81	4.23	-	51.24	Peak	74	Pass
g	2412	Ant1	2390	-53.98	4.23	0	45.51	Average	54	Pass
g	2462	Ant1	2483.5	-43.37	4.23	-	56.12	Peak	74	Pass
g	2462	Ant1	2483.5	-52.75	4.23	0	46.74	Average	54	Pass
g	2462	Ant1	2483.57	-43.37	4.23	-	56.12	Peak	74	Pass
g	2462	Ant1	2483.517	-52.74	4.23	0	46.75	Average	54	Pass
g	2462	Ant1	2500	-46.95	4.23	-	52.96	Peak	74	Pass
g	2462	Ant1	2500	-54.6	4.23	0	44.89	Average	54	Pass
n20	2412	Ant1	2310	-48.4	4.23	-	51.09	Peak	74	Pass
n20	2412	Ant1	2310	-56.94	4.23	0	42.55	Average	54	Pass
n20	2412	Ant1	2389.911	-45.35	4.23	-	54.14	Peak	74	Pass
n20	2412	Ant1	2337.495	-54.37	4.23	0	45.12	Average	54	Pass
n20	2412	Ant1	2390	-44.91	4.23	-	54.58	Peak	74	Pass
n20	2412	Ant1	2390	-54.39	4.23	0	45.1	Average	54	Pass
n20	2462	Ant1	2483.5	-47.61	4.23	-	51.88	Peak	74	Pass
n20	2462	Ant1	2483.5	-52.59	4.23	0	46.9	Average	54	Pass
n20	2462	Ant1	2484.683	-44.92	4.23	-	54.57	Peak	74	Pass
n20	2462	Ant1	2483.517	-52.58	4.23	0	46.91	Average	54	Pass

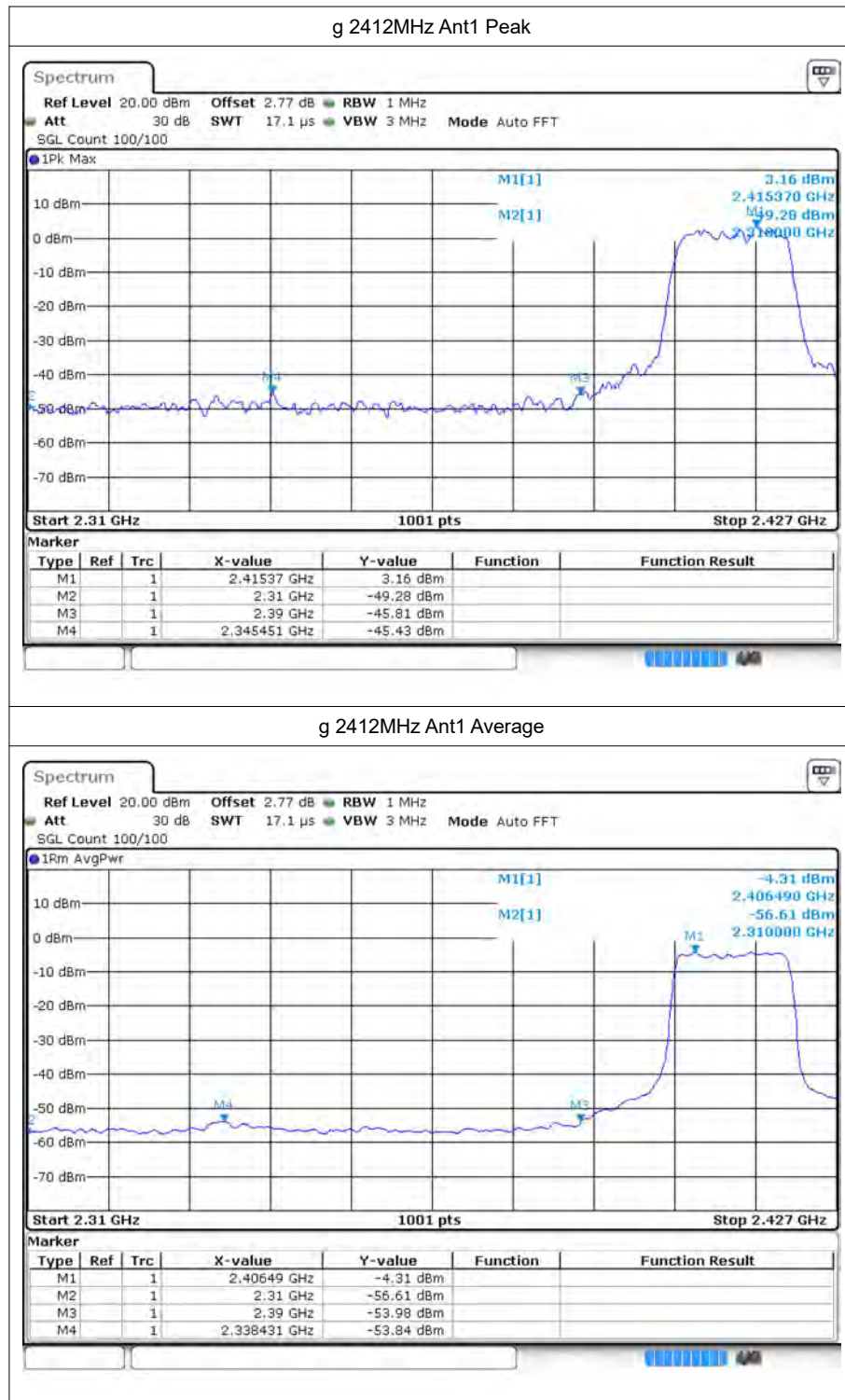


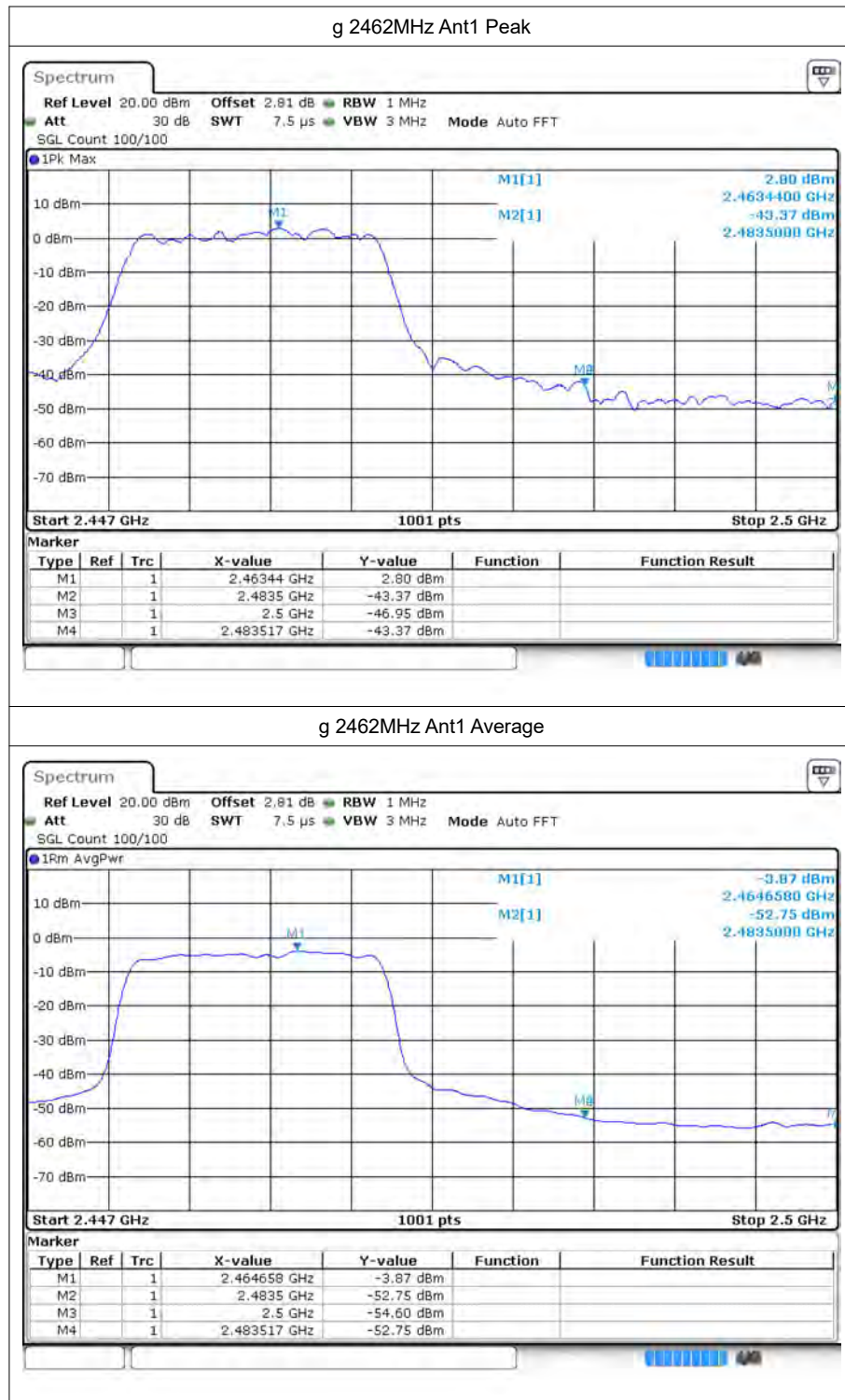
n20	2462	Ant1	2500	-49.13	4.23	-	50.36	Peak	74	Pass
n20	2462	Ant1	2500	-54.71	4.23	0	44.78	Average	54	Pass
n40	2422	Ant1	2310	-48.91	4.23	-	50.58	Peak	74	Pass
n40	2422	Ant1	2310	-56.6	4.23	0	42.89	Average	54	Pass
n40	2422	Ant1	2389.946	-44.77	4.23	-	54.72	Peak	74	Pass
n40	2422	Ant1	2389.946	-53.24	4.23	0	46.25	Average	54	Pass
n40	2422	Ant1	2390	-44.77	4.23	-	54.72	Peak	74	Pass
n40	2422	Ant1	2390	-53.24	4.23	0	46.25	Average	54	Pass
n40	2452	Ant1	2483.5	-44.72	4.23	-	54.77	Peak	74	Pass
n40	2452	Ant1	2483.5	-51.32	4.23	0	48.17	Average	54	Pass
n40	2452	Ant1	2487.754	-42.33	4.23	-	57.16	Peak	74	Pass
n40	2452	Ant1	2484.79	-50.29	4.23	0	49.2	Average	54	Pass
n40	2452	Ant1	2500	-48.19	4.23	-	51.3	Peak	74	Pass
n40	2452	Ant1	2500	-54.8	4.23	0	44.69	Average	54	Pass

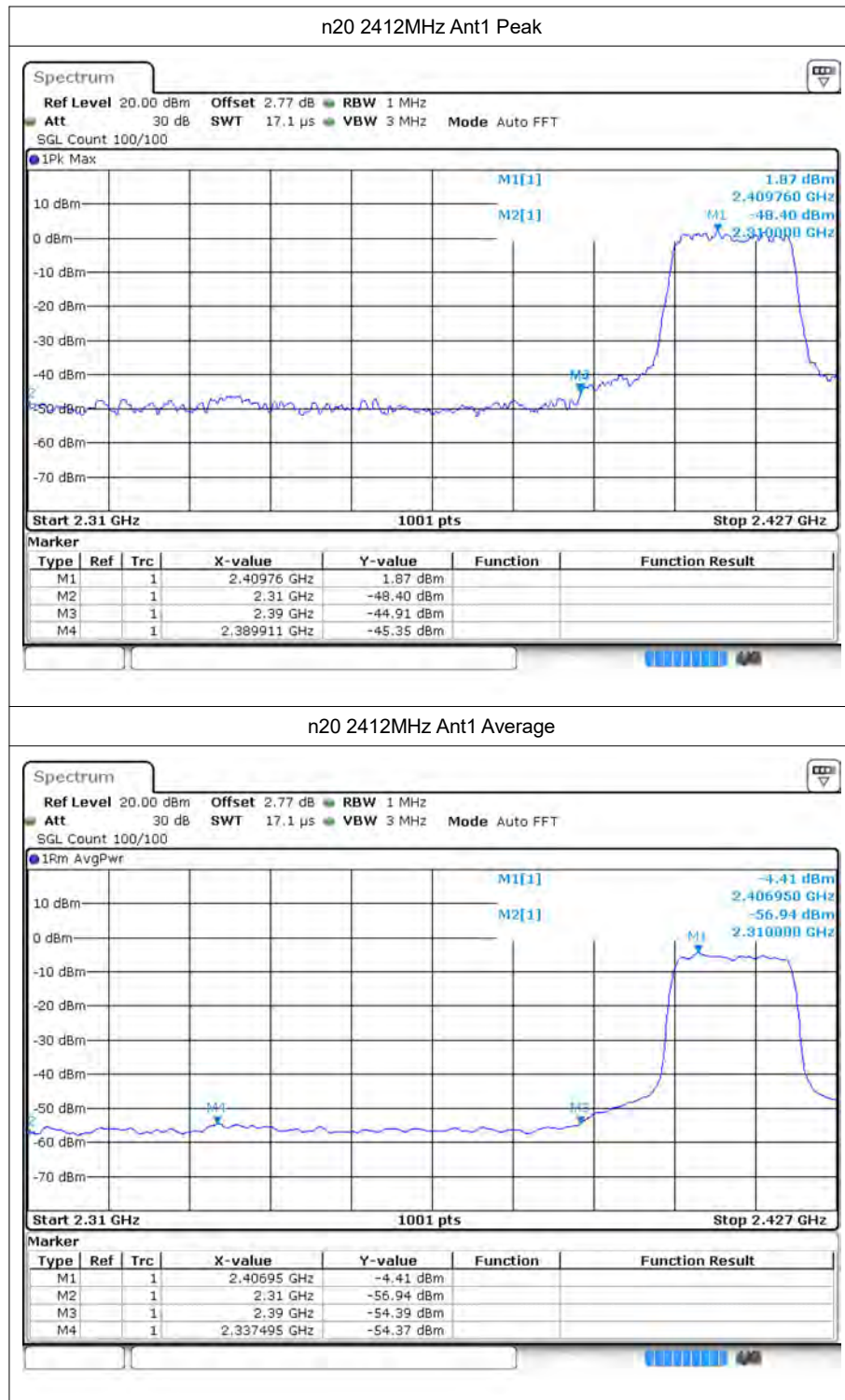
7.2 Test Graphs

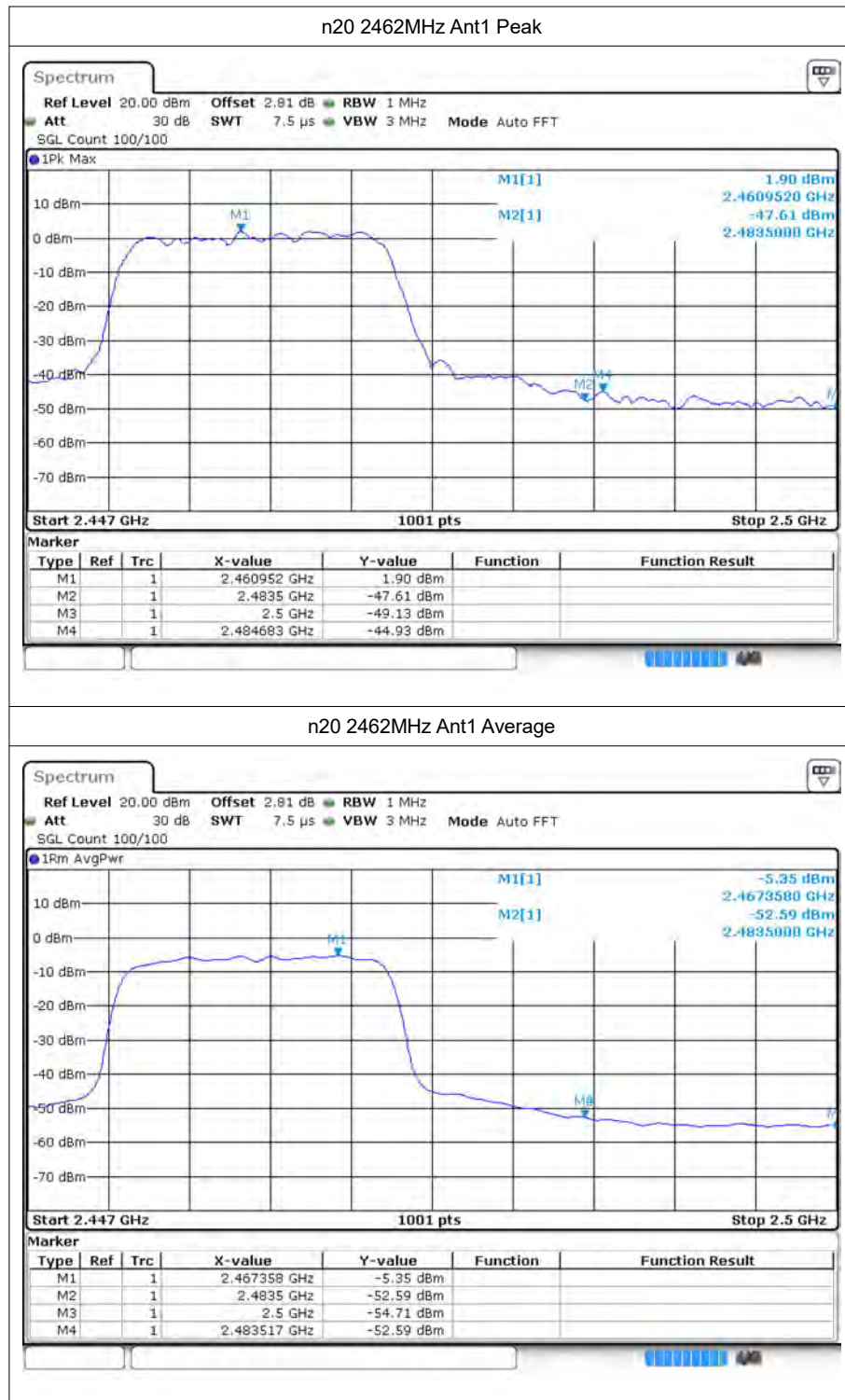


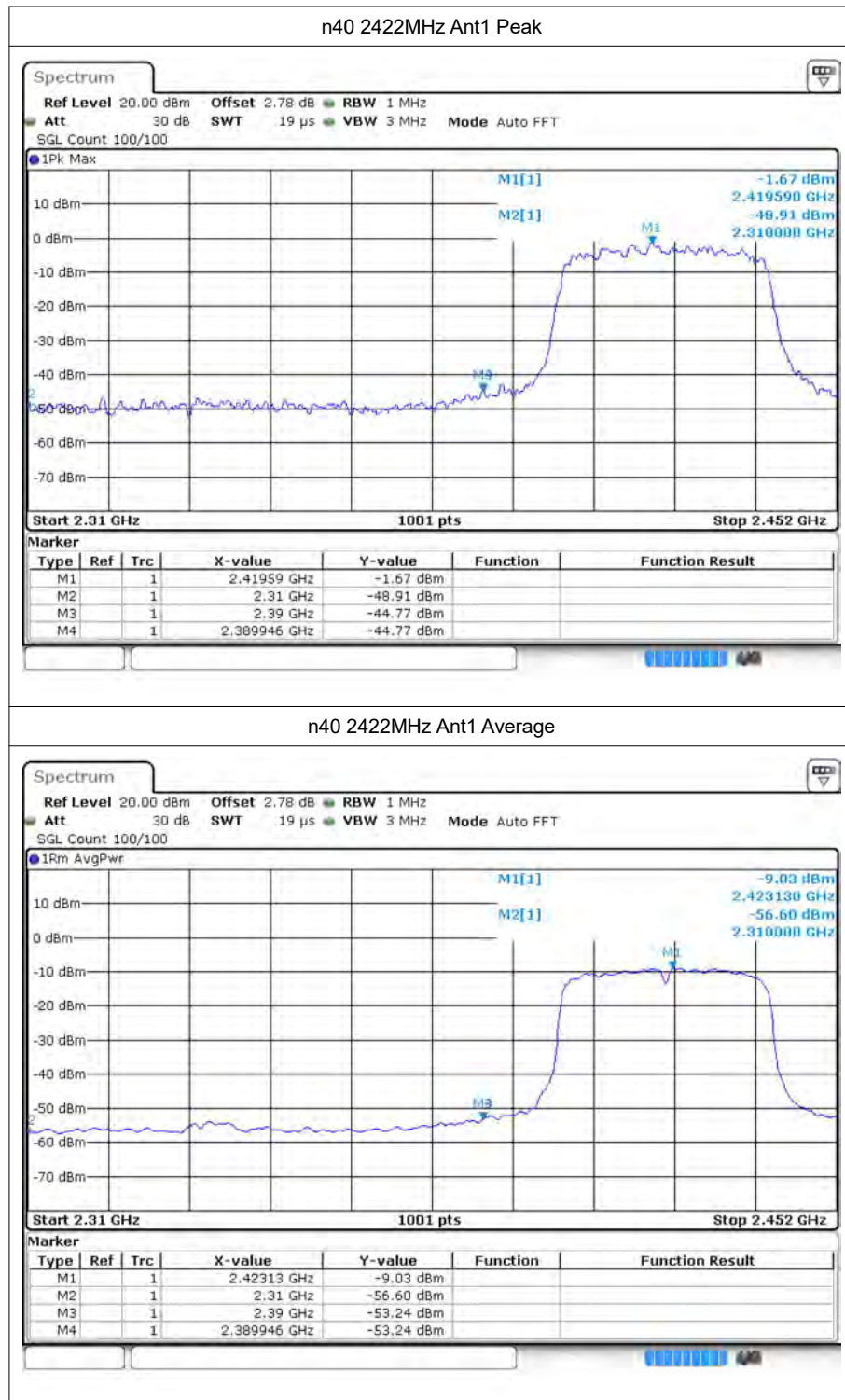


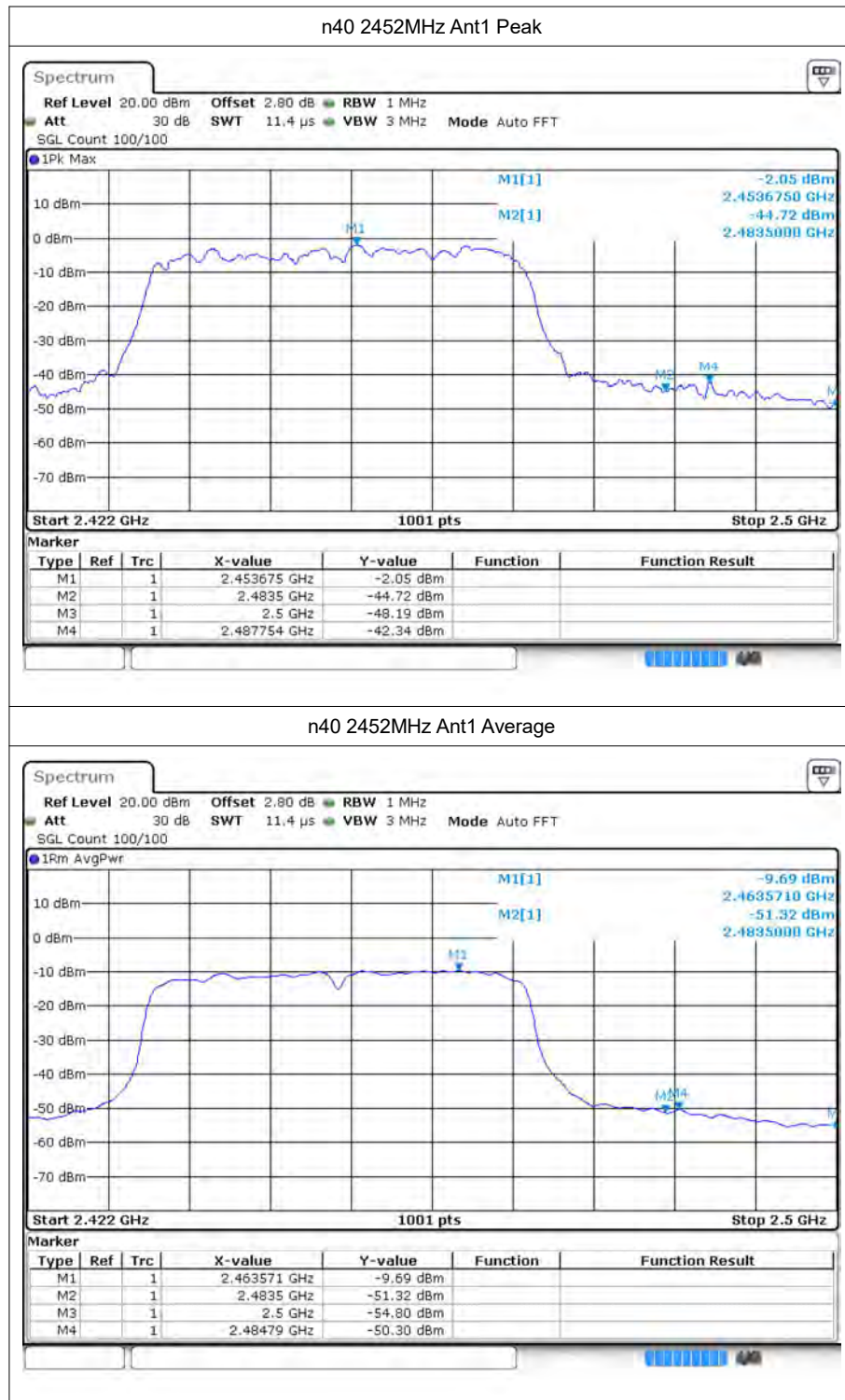












---The End---