



Appendix B

RF Test Data for BT (BLE) (Conducted Measurement)

Product Name: Flow Gateway v4

Trade Mark: M5STACK

Test Model: FGV4

Environmental Conditions

Temperature:	25.6° C
Relative Humidity:	52.5%
ATM Pressure:	100.0 kPa
Test Engineer:	Emiya lin
Supervised by:	Simba Haung



Contents

Page

COVER PAGE

1	Duty Cycle	3
1.1	Test Result	3
1.2	Test Graphs	4
2	Maximum Conducted Output Power	7
2.1	Test Result	7
2.2	Test Graphs	8
3	-6dB Bandwidth	11
3.1	Test Result	11
3.2	Test Graphs	12
4	Maximum Power Spectral Density Level	15
4.1	Test Result	15
4.2	Test Graphs	16
5	Band Edge	19
5.1	Test Result	19
5.2	Test Graphs	20
6	Conducted RF Spurious Emission	24
6.1	Test Result	24
6.2	Test Graphs	25
7	Restrict Band	31
7.1	Test Result	31
7.2	Test Graphs	32

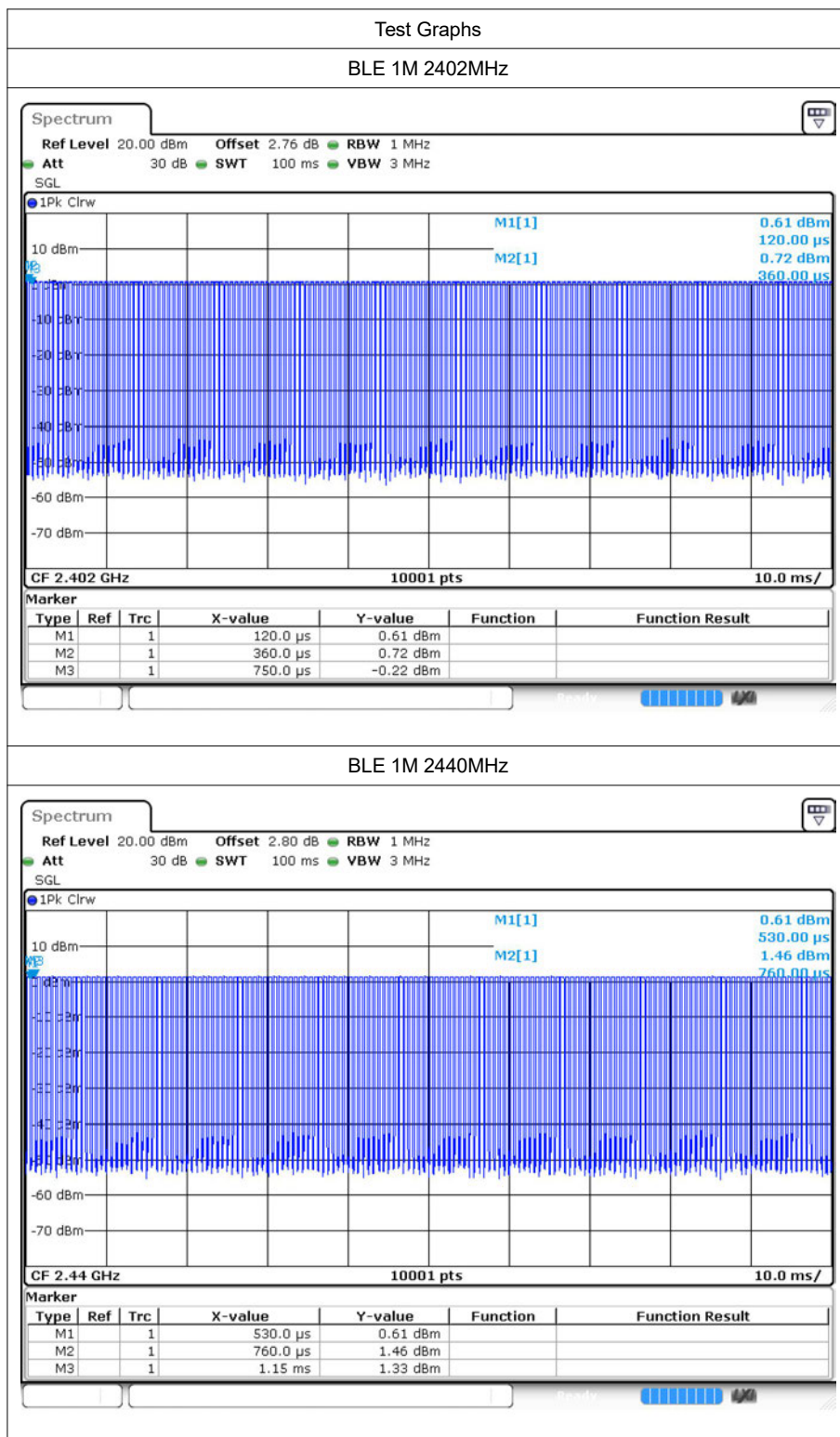


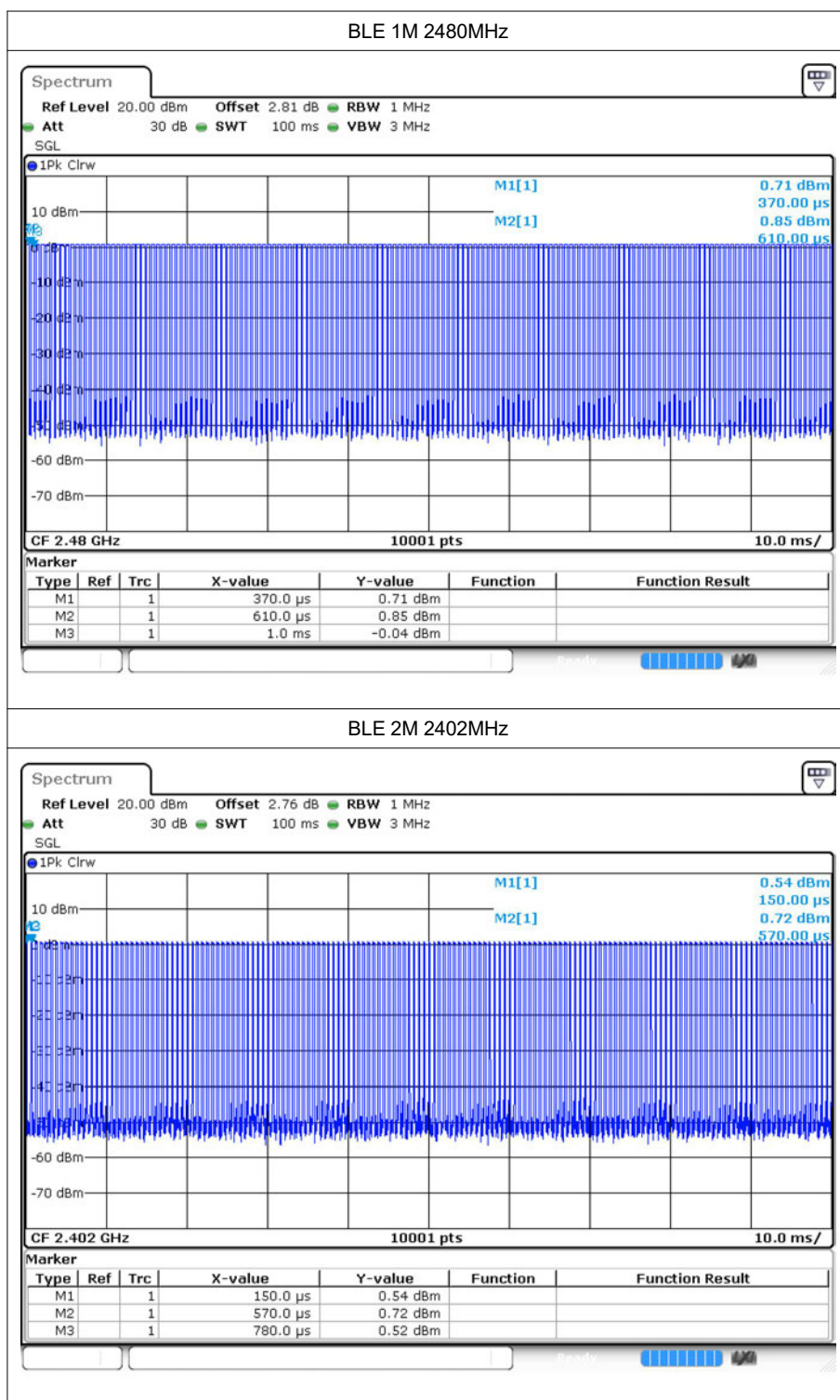
1 Duty Cycle

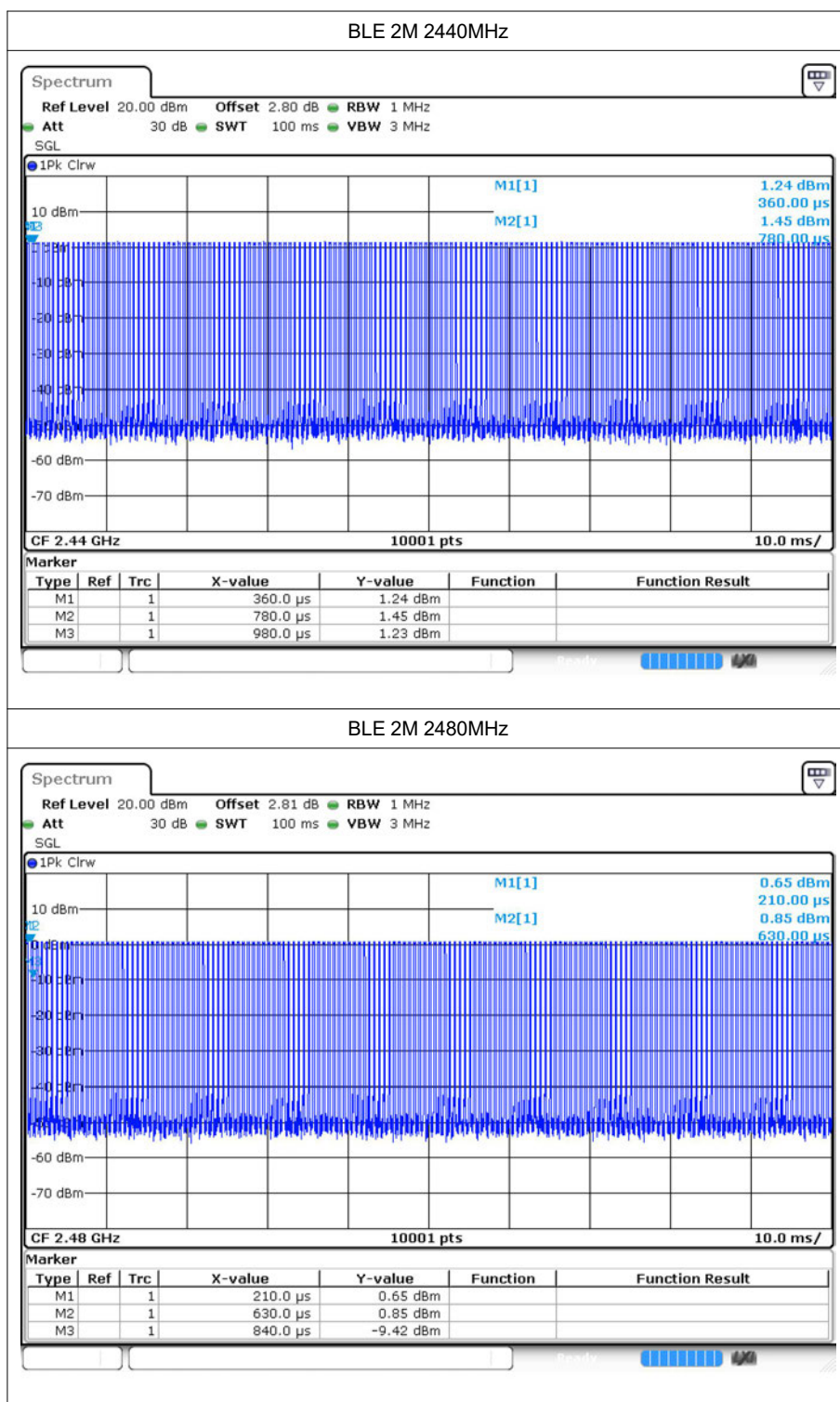
1.1 Test Result

Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor	1/T (kHz)
BLE 1M	2402	64	1.94	2.56
BLE 1M	2440	63.99	1.94	2.56
BLE 1M	2480	64	1.94	2.56
BLE 2M	2402	34.61	4.61	4.76
BLE 2M	2440	34.69	4.6	5
BLE 2M	2480	35.21	4.53	4.76

1.2 Test Graphs







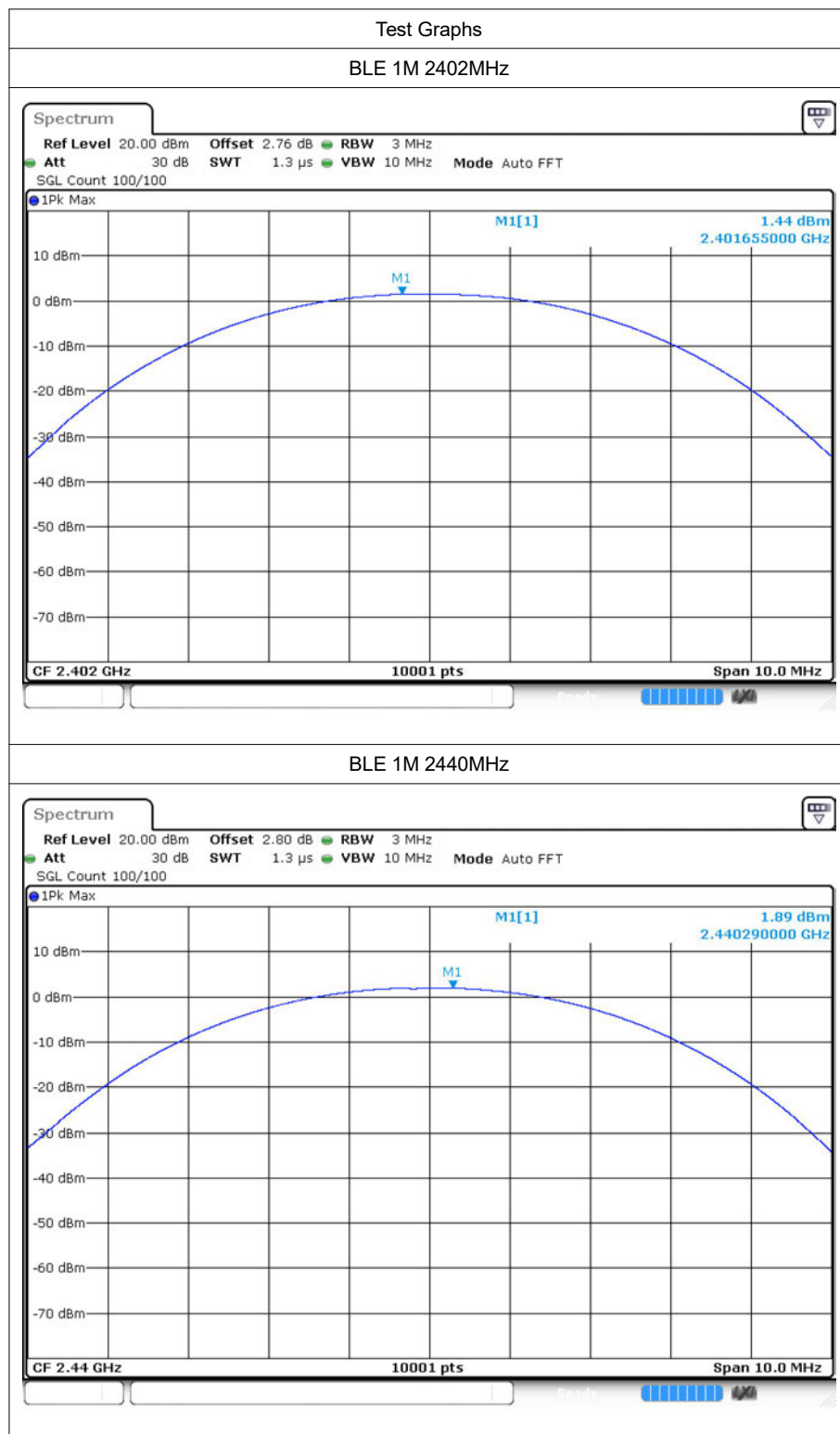


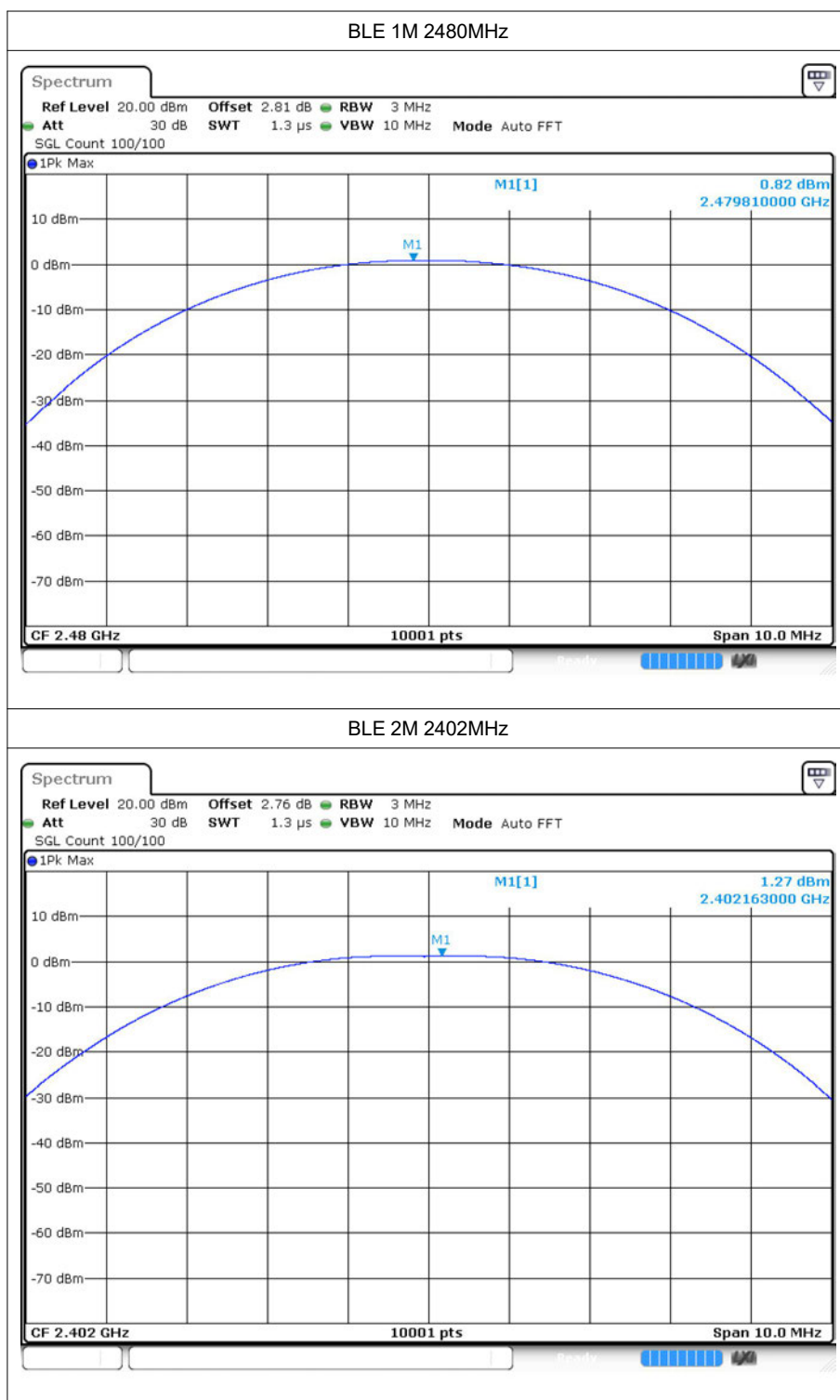
2 Maximum Conducted Output Power

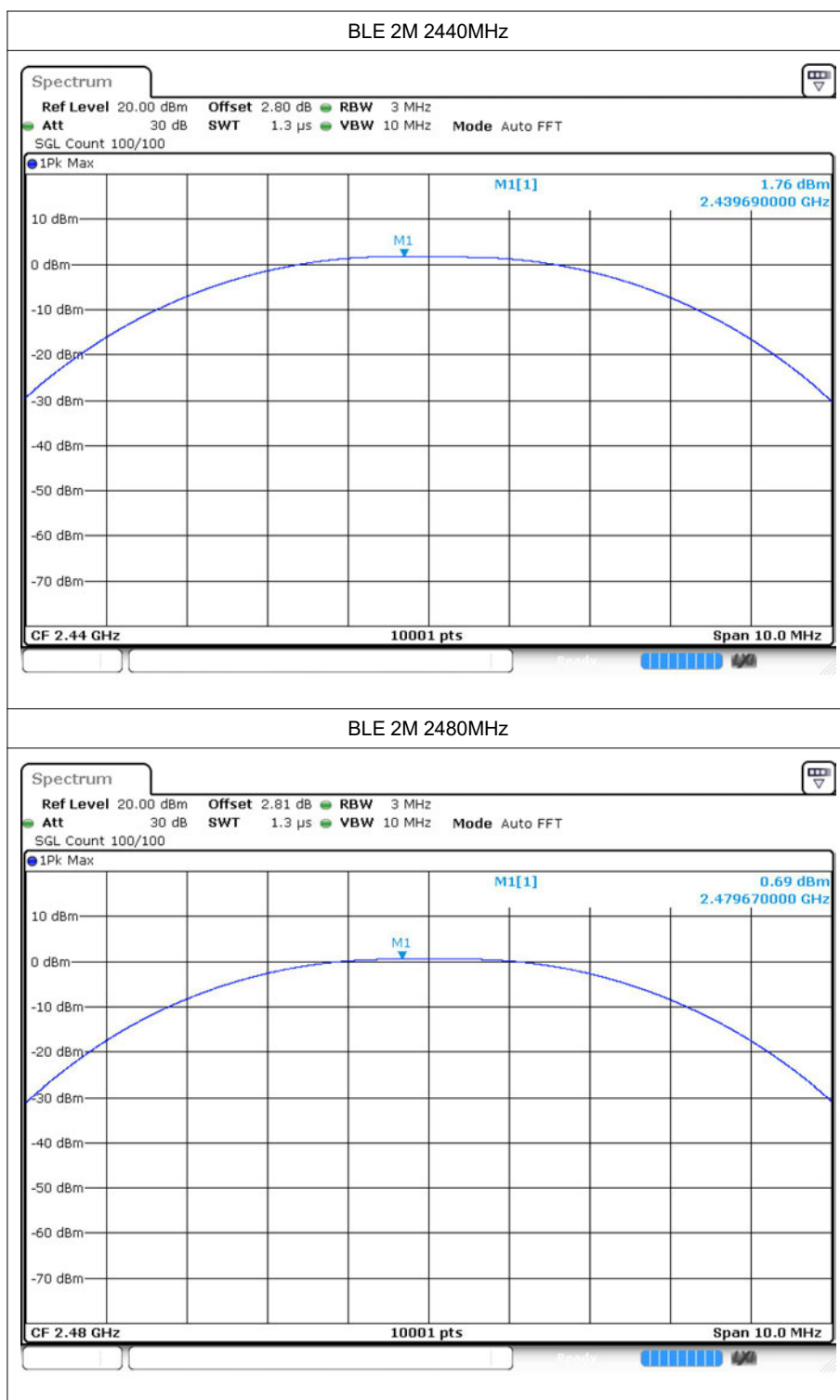
2.1 Test Result

Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Verdict
BLE 1M	2402	1.44	30	Pass
BLE 1M	2440	1.89	30	Pass
BLE 1M	2480	0.82	30	Pass
BLE 2M	2402	1.27	30	Pass
BLE 2M	2440	1.76	30	Pass
BLE 2M	2480	0.69	30	Pass

2.2 Test Graphs







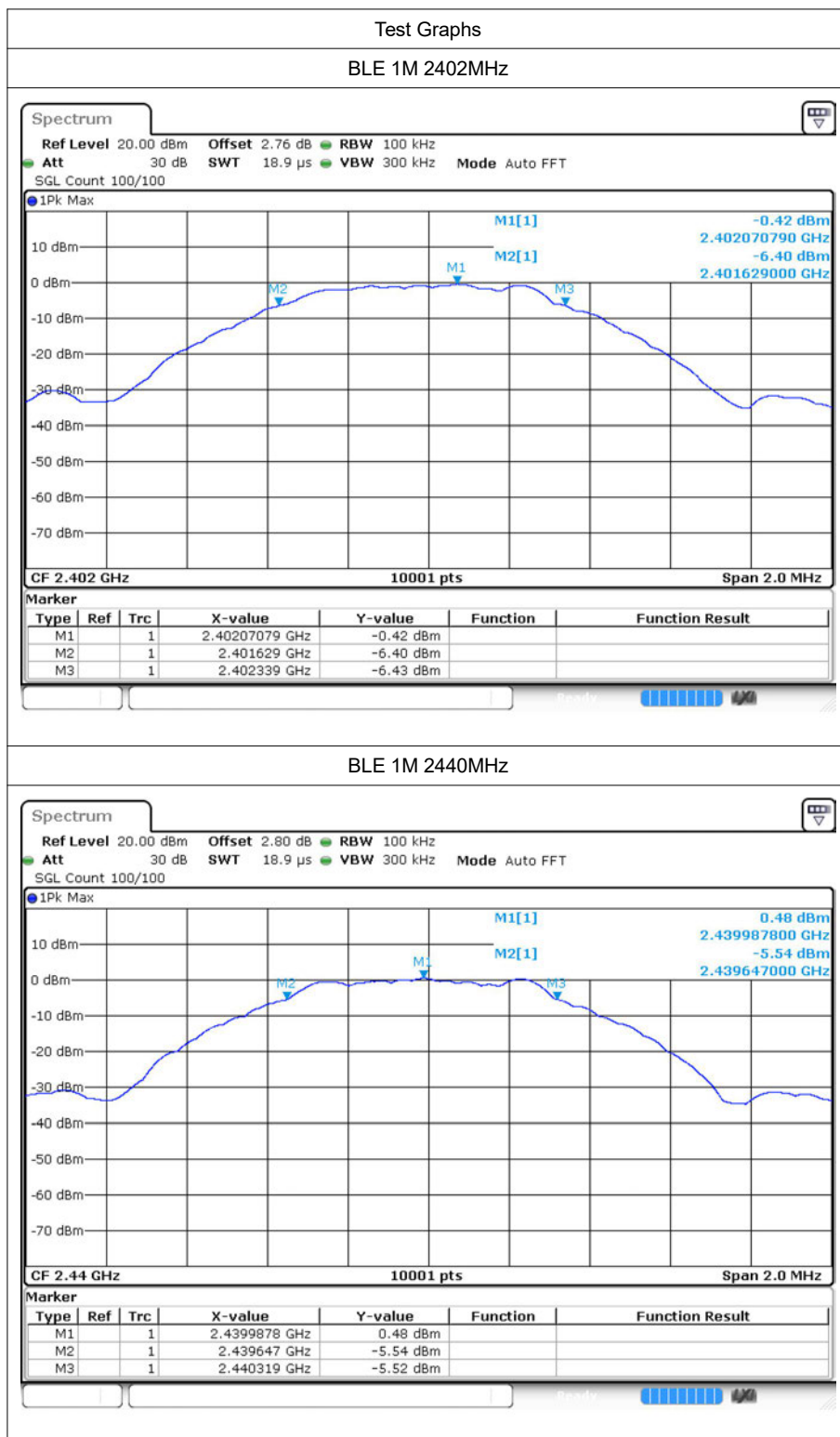


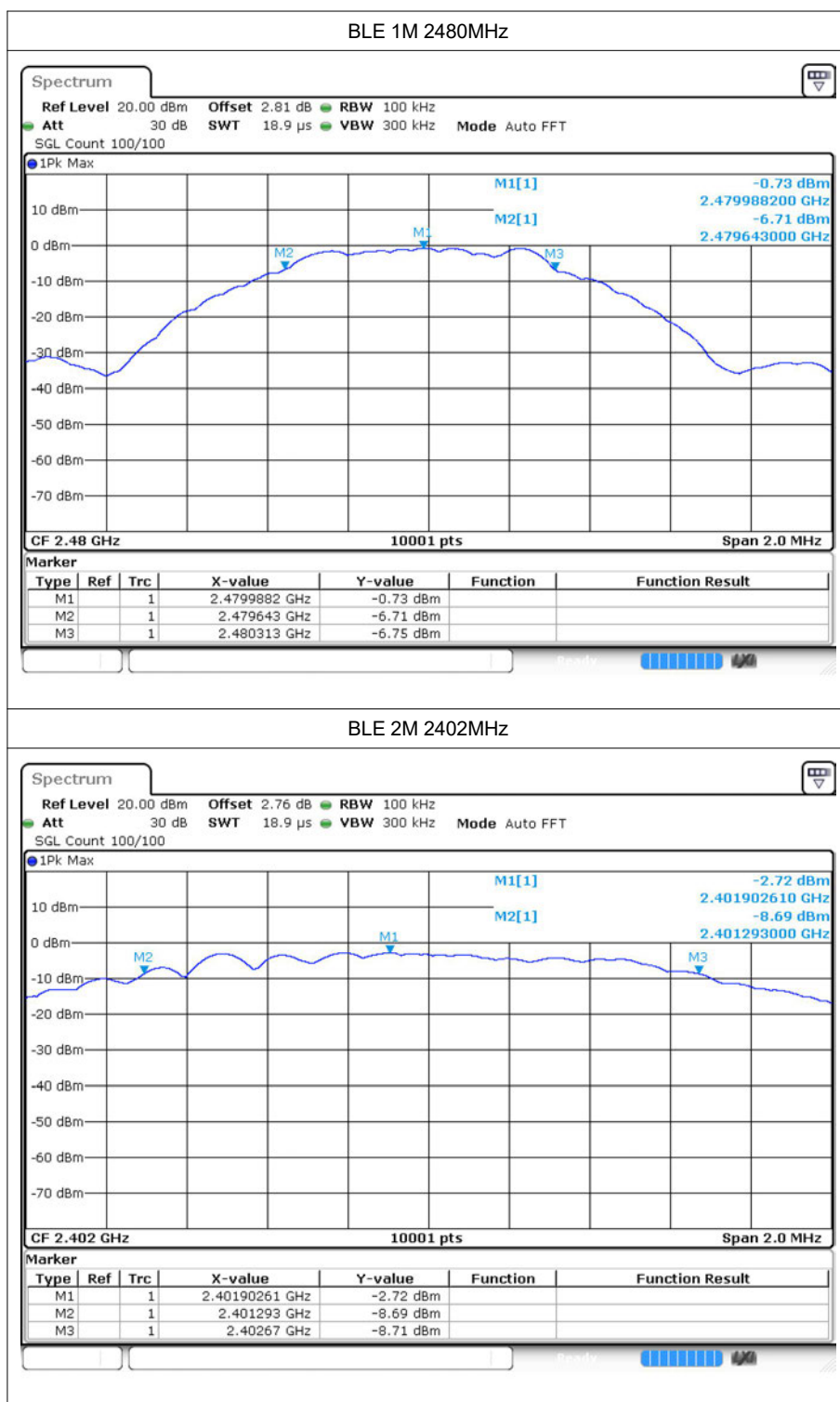
3 -6dB Bandwidth

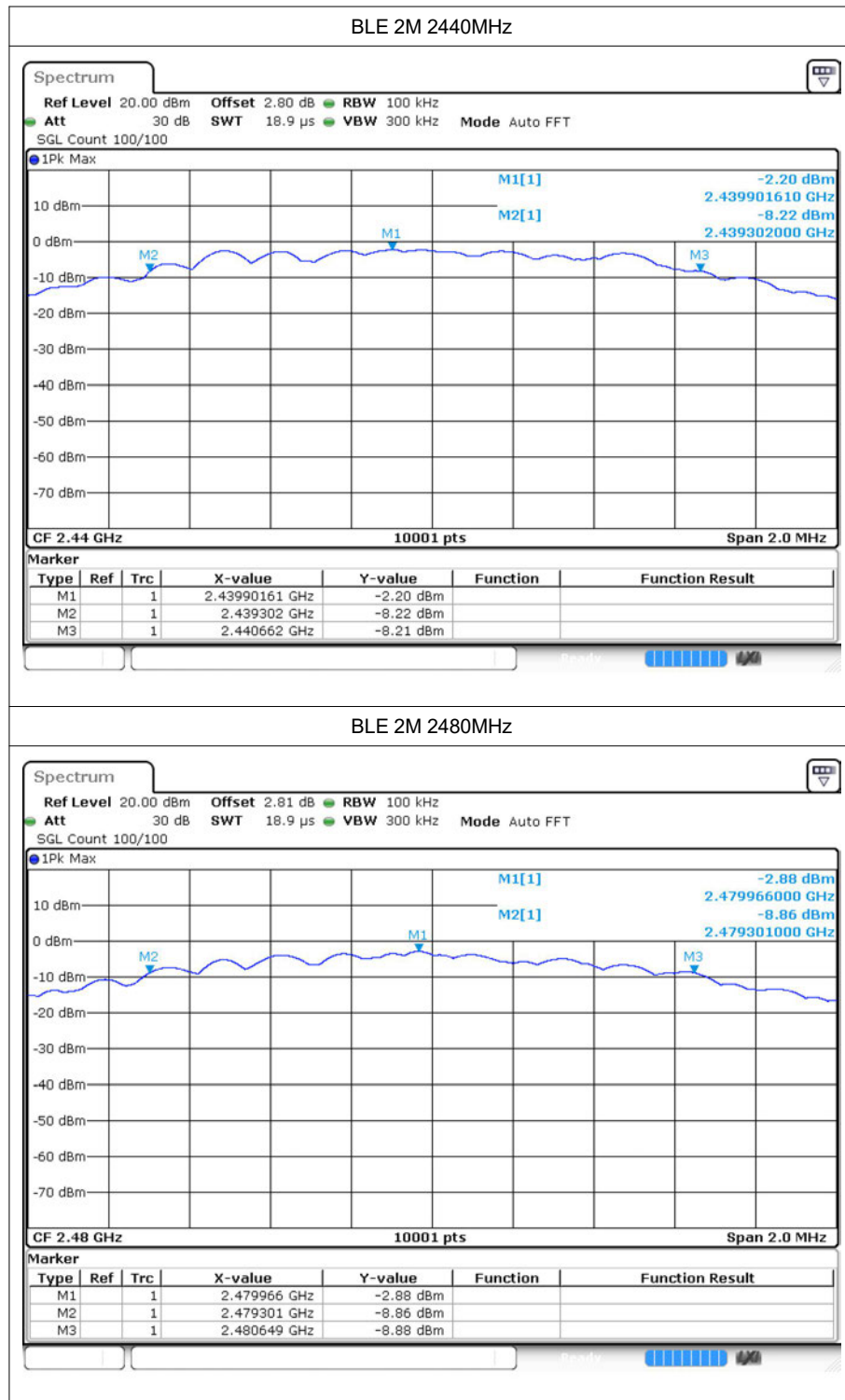
3.1 Test Result

Mode	Frequency (MHz)	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
BLE 1M	2402	0.71	0.5	Pass
BLE 1M	2440	0.671	0.5	Pass
BLE 1M	2480	0.67	0.5	Pass
BLE 2M	2402	1.377	0.5	Pass
BLE 2M	2440	1.36	0.5	Pass
BLE 2M	2480	1.348	0.5	Pass

3.2 Test Graphs





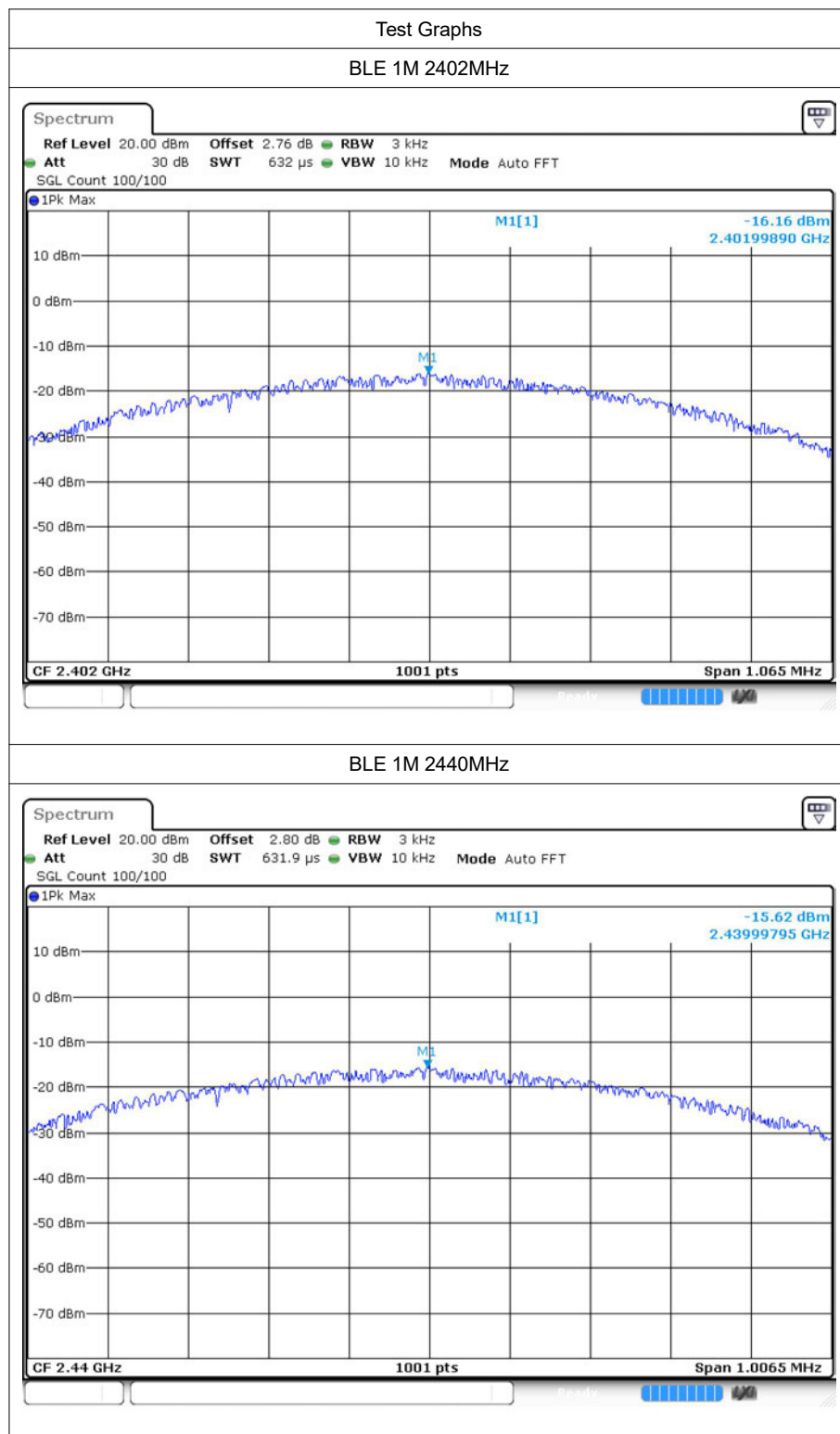


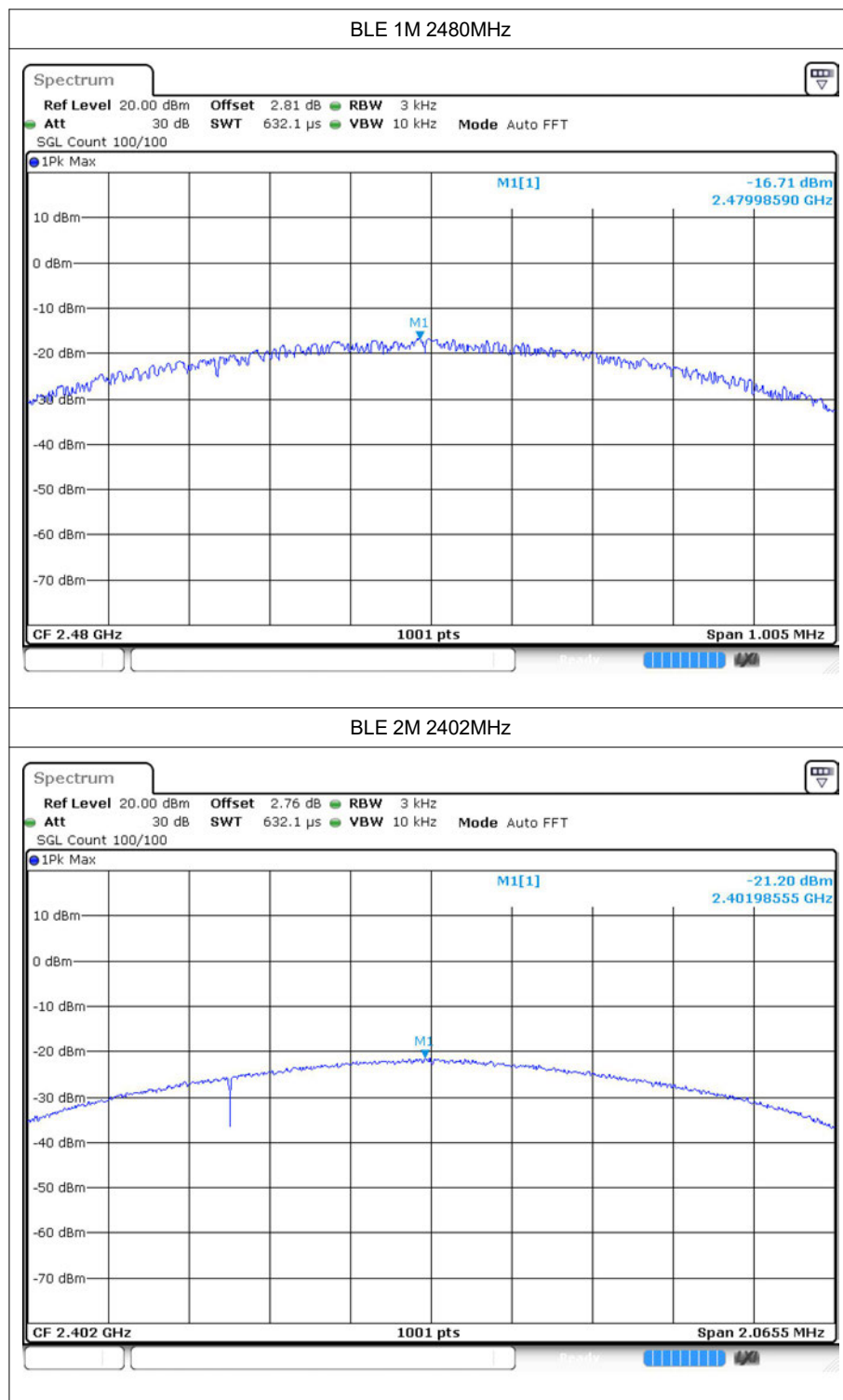
4 Maximum Power Spectral Density Level

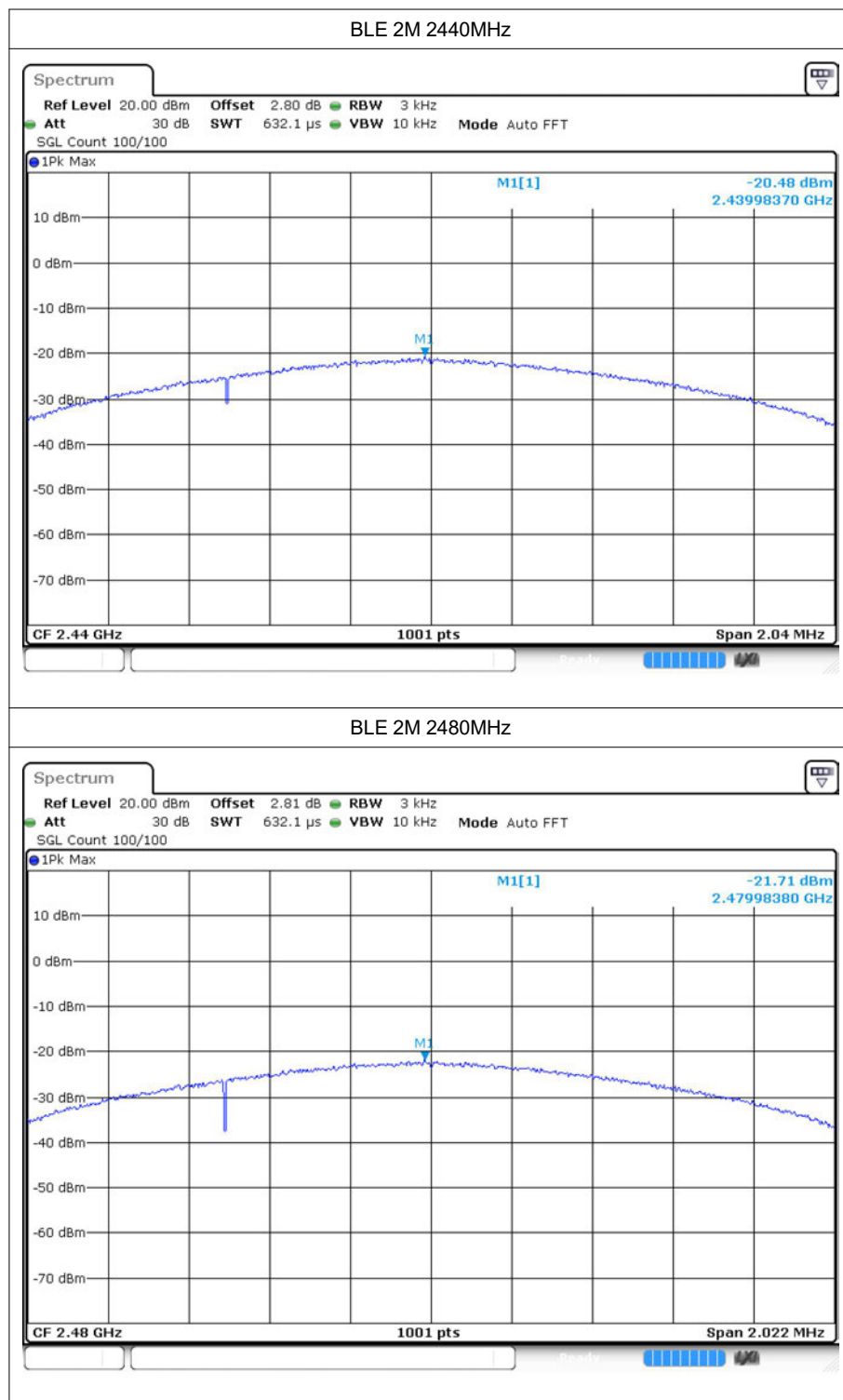
4.1 Test Result

Mode	Frequency (MHz)	Conducted PSD (dBm/3-100kHz)	Limit (dBm/3kHz)	Verdict
BLE 1M	2402	-16.16	≤ 8	Pass
BLE 1M	2440	-15.62	≤ 8	Pass
BLE 1M	2480	-16.71	≤ 8	Pass
BLE 2M	2402	-21.2	≤ 8	Pass
BLE 2M	2440	-20.48	≤ 8	Pass
BLE 2M	2480	-21.71	≤ 8	Pass

4.2 Test Graphs





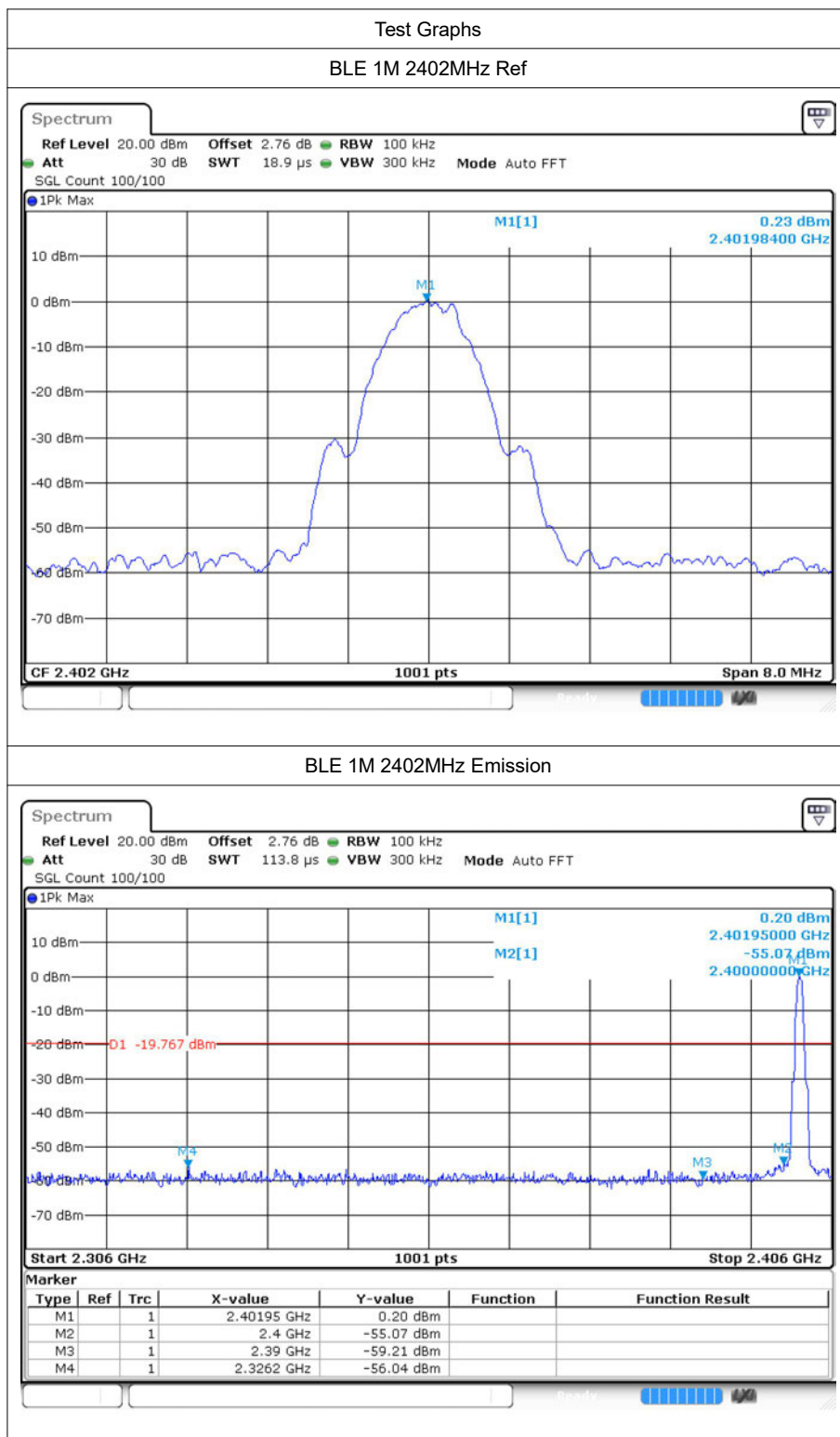


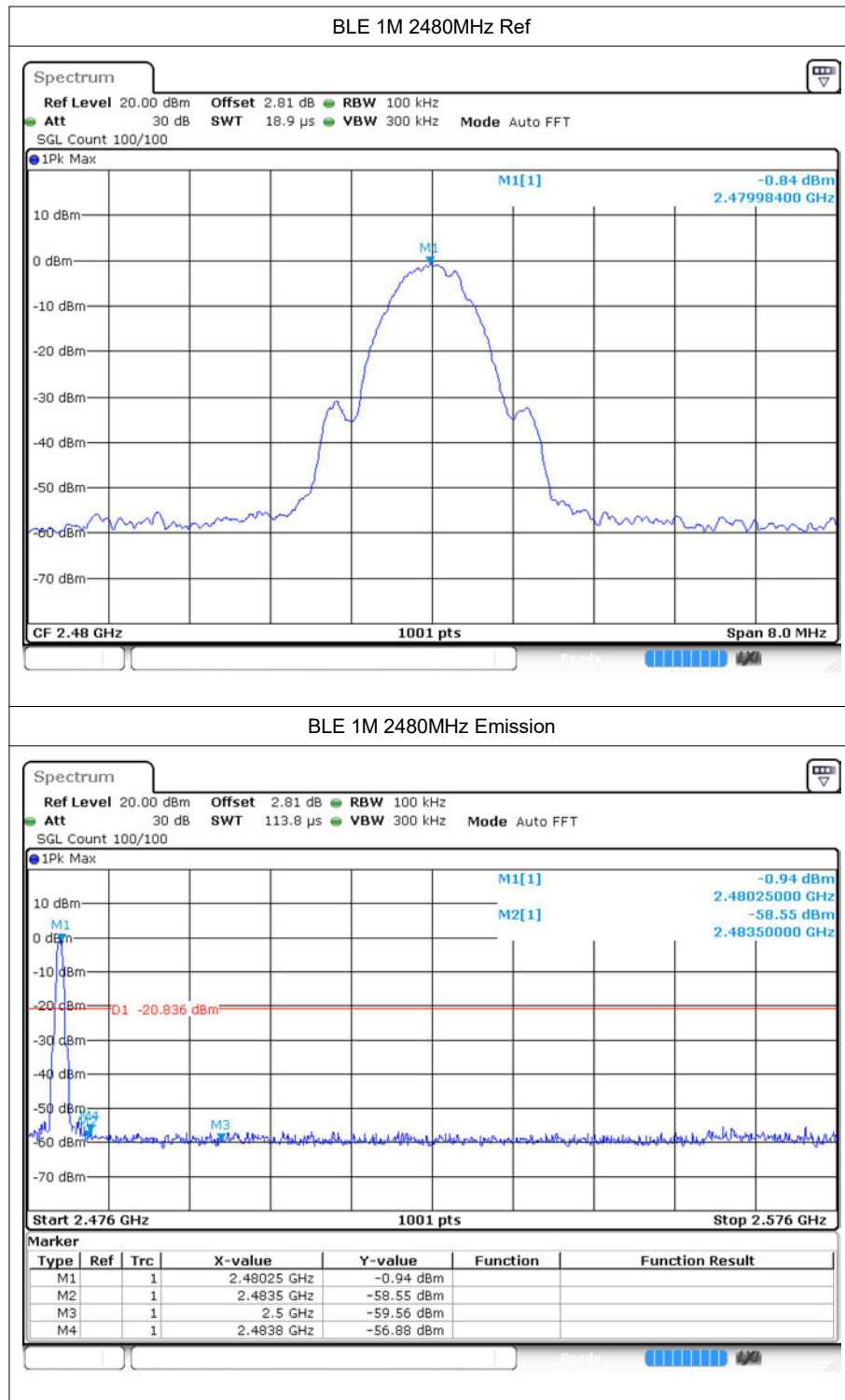
5 Band Edge

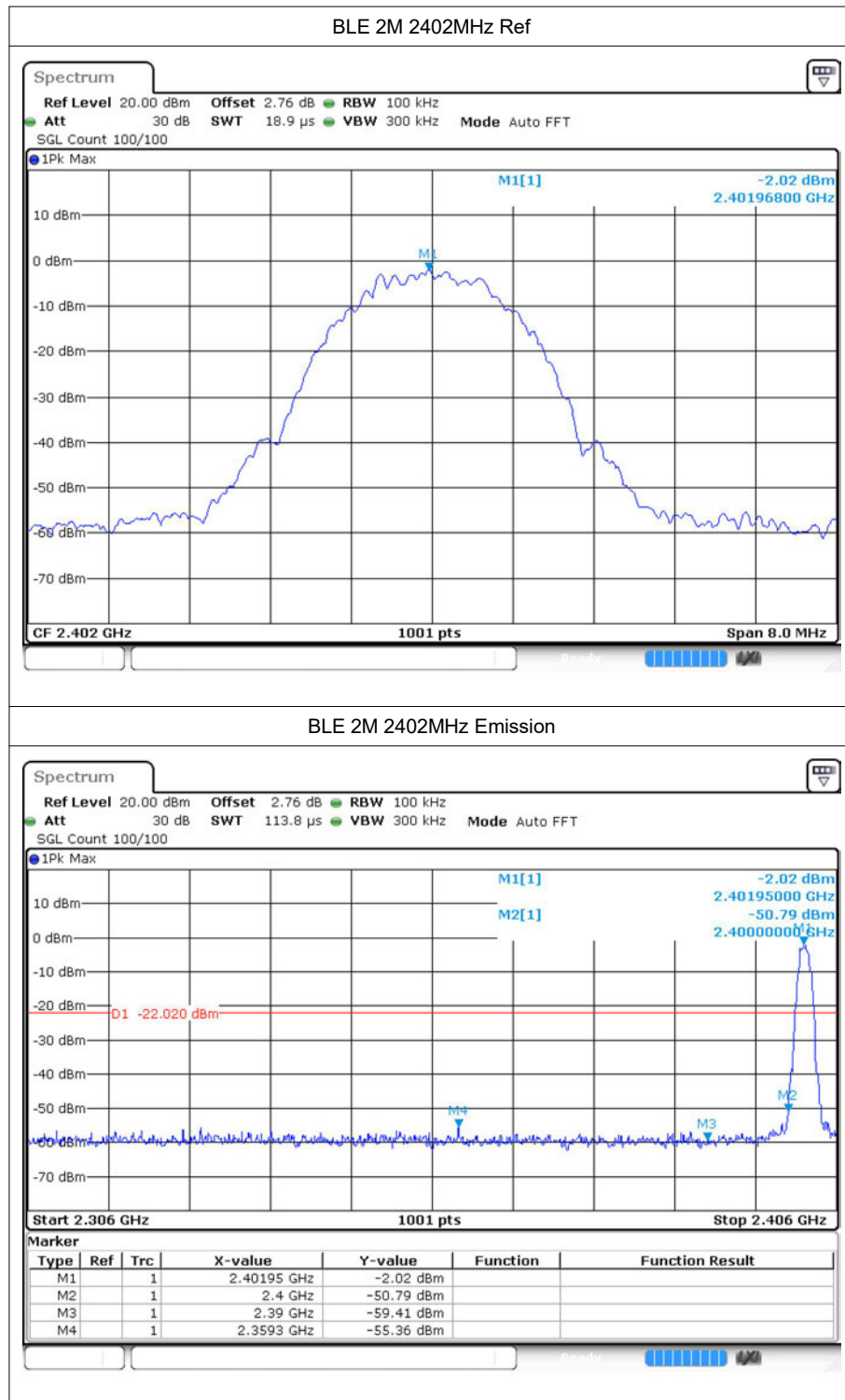
5.1 Test Result

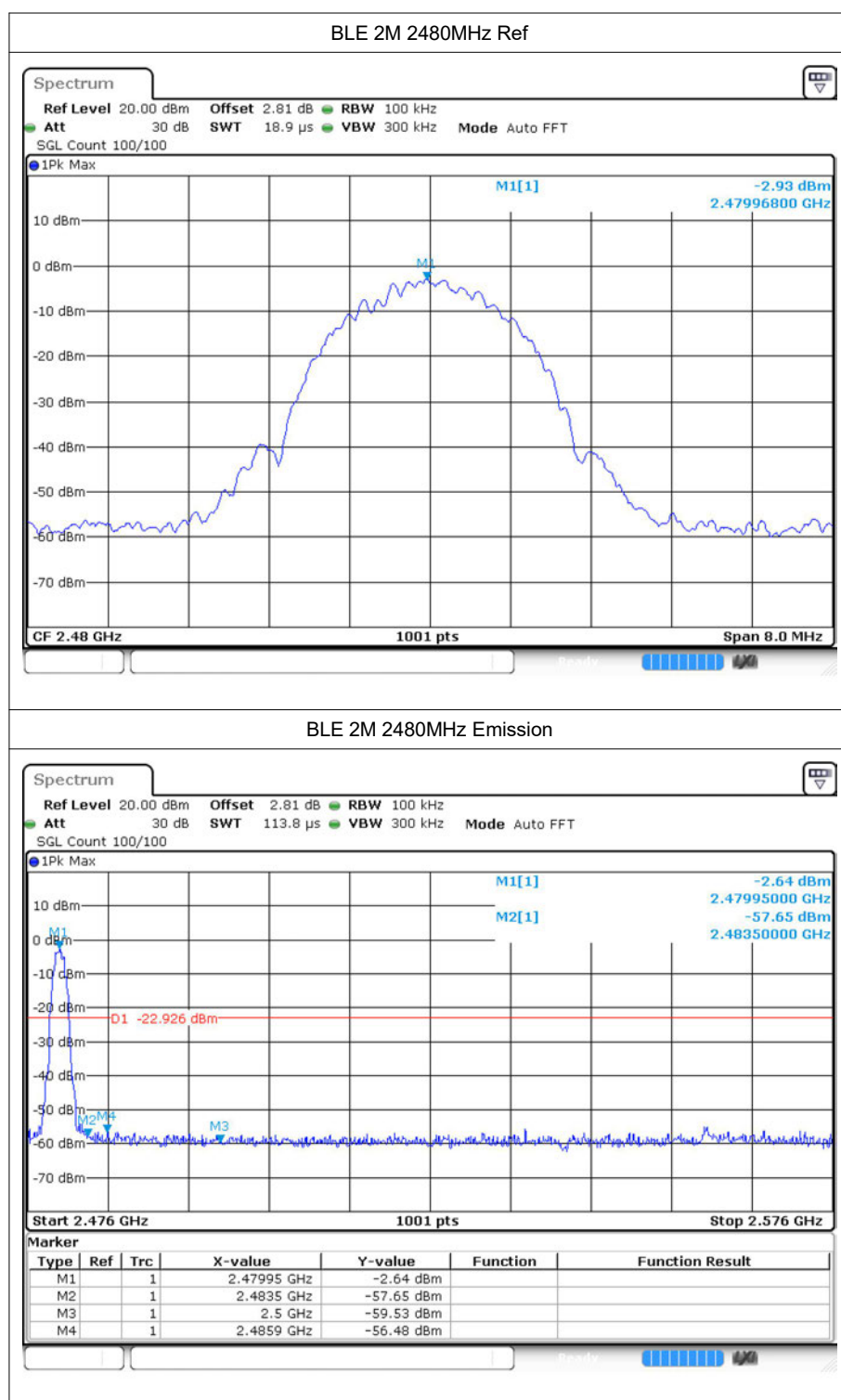
Mode	Frequency (MHz)	Max Value (dBc)	Limit (dBc)	Verdict
BLE 1M	2402	-56.26	-20	Pass
BLE 1M	2480	-56.04	-20	Pass
BLE 2M	2402	-53.34	-20	Pass
BLE 2M	2480	-53.54	-20	Pass

5.2 Test Graphs









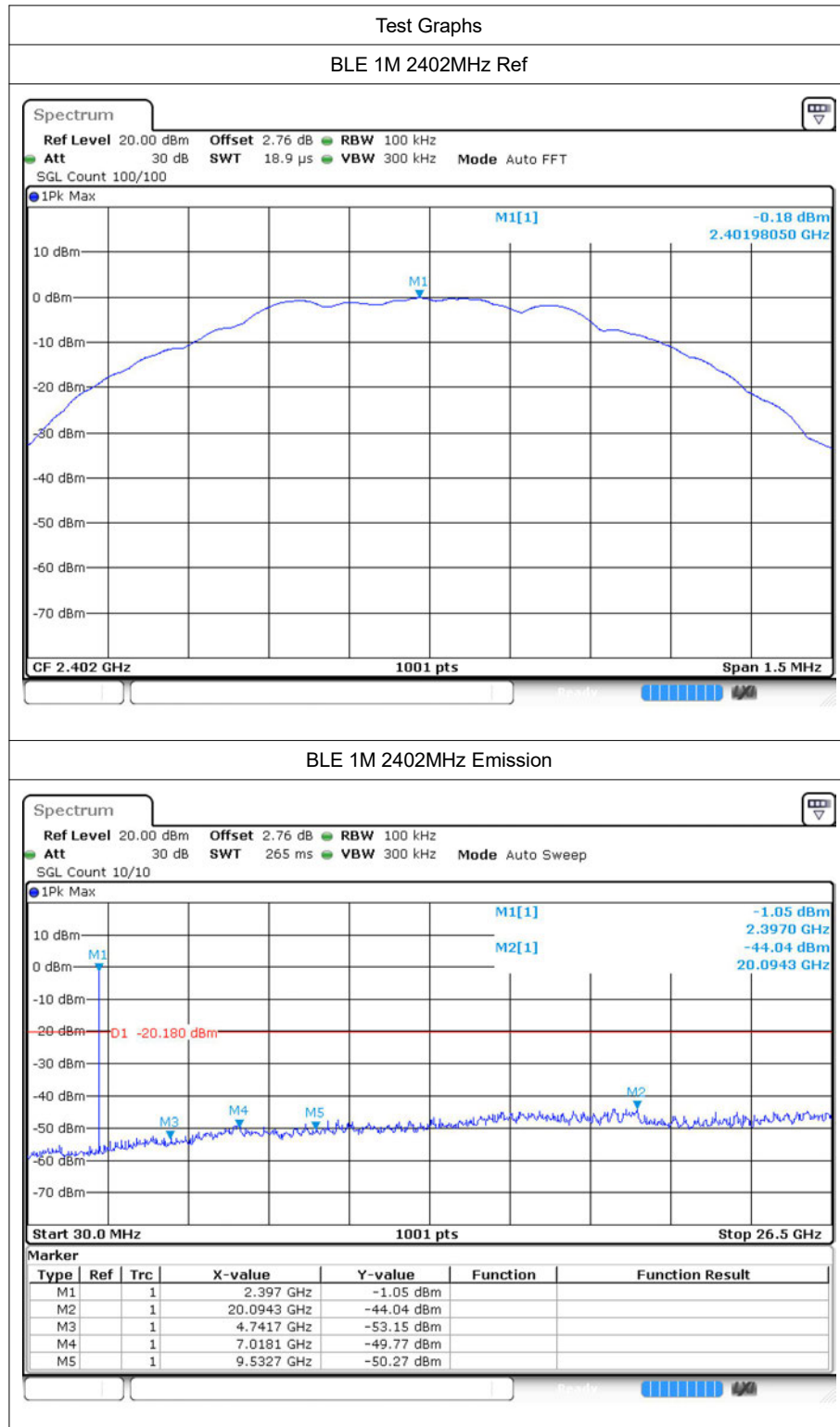


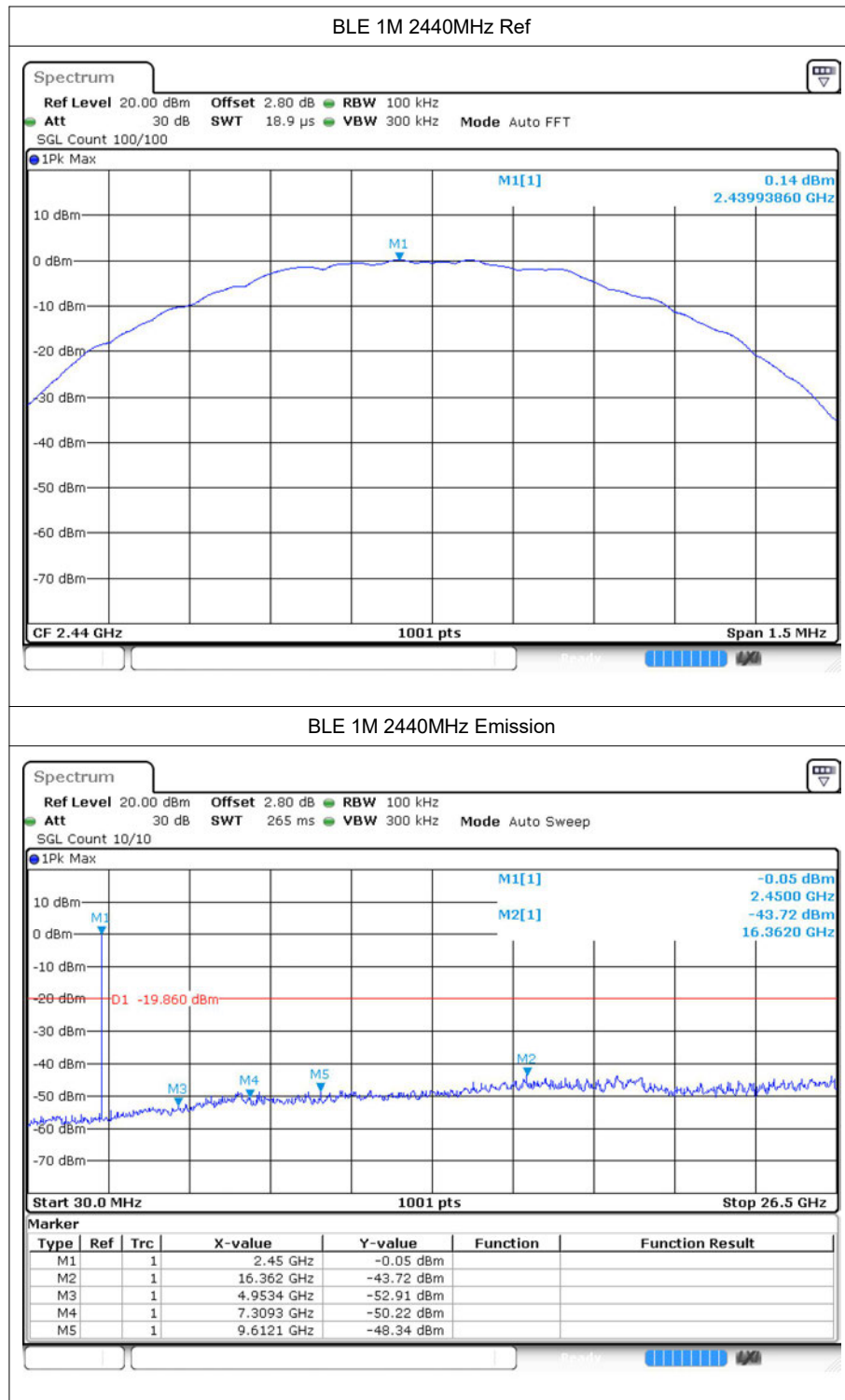
6 Conducted RF Spurious Emission

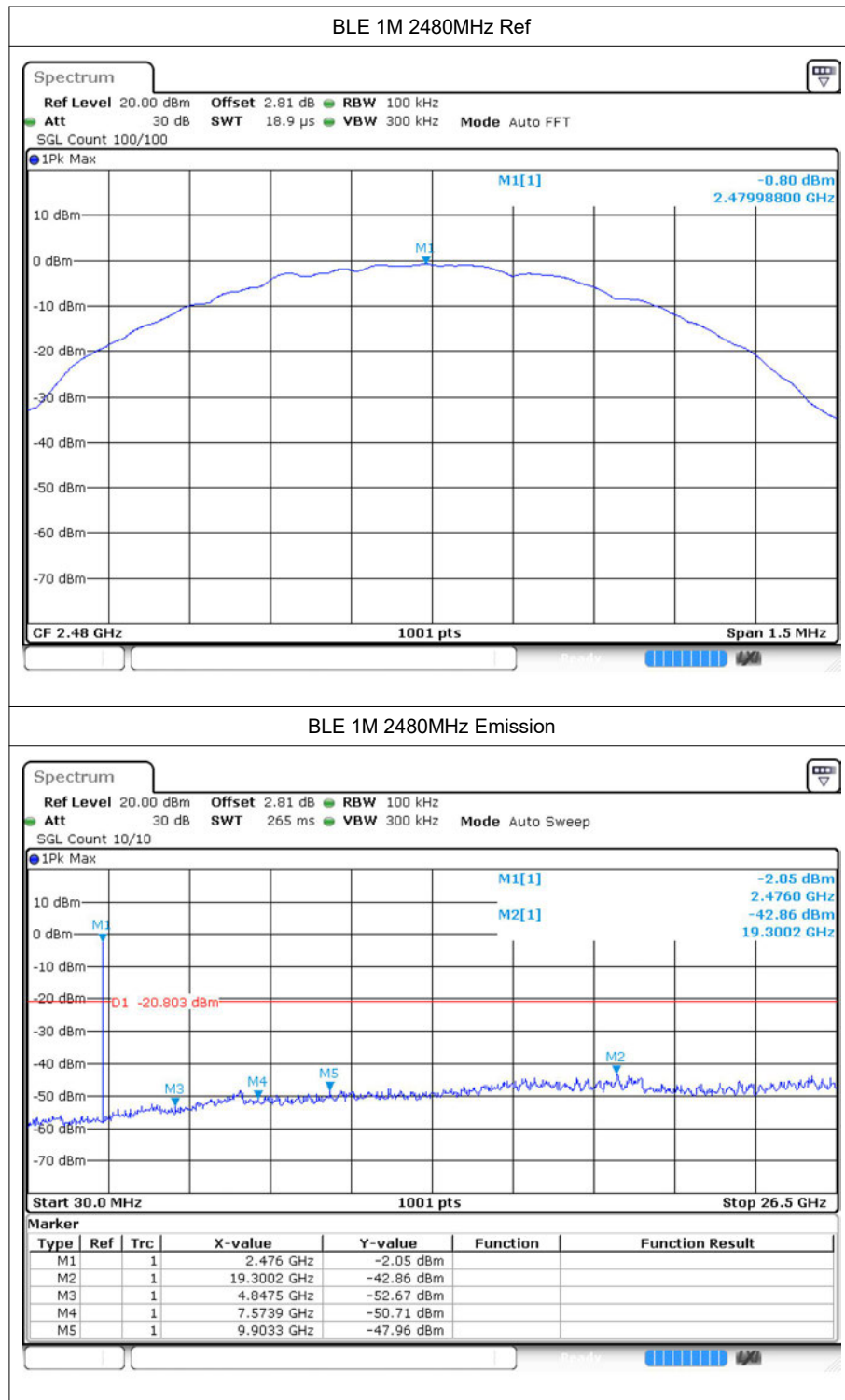
6.1 Test Result

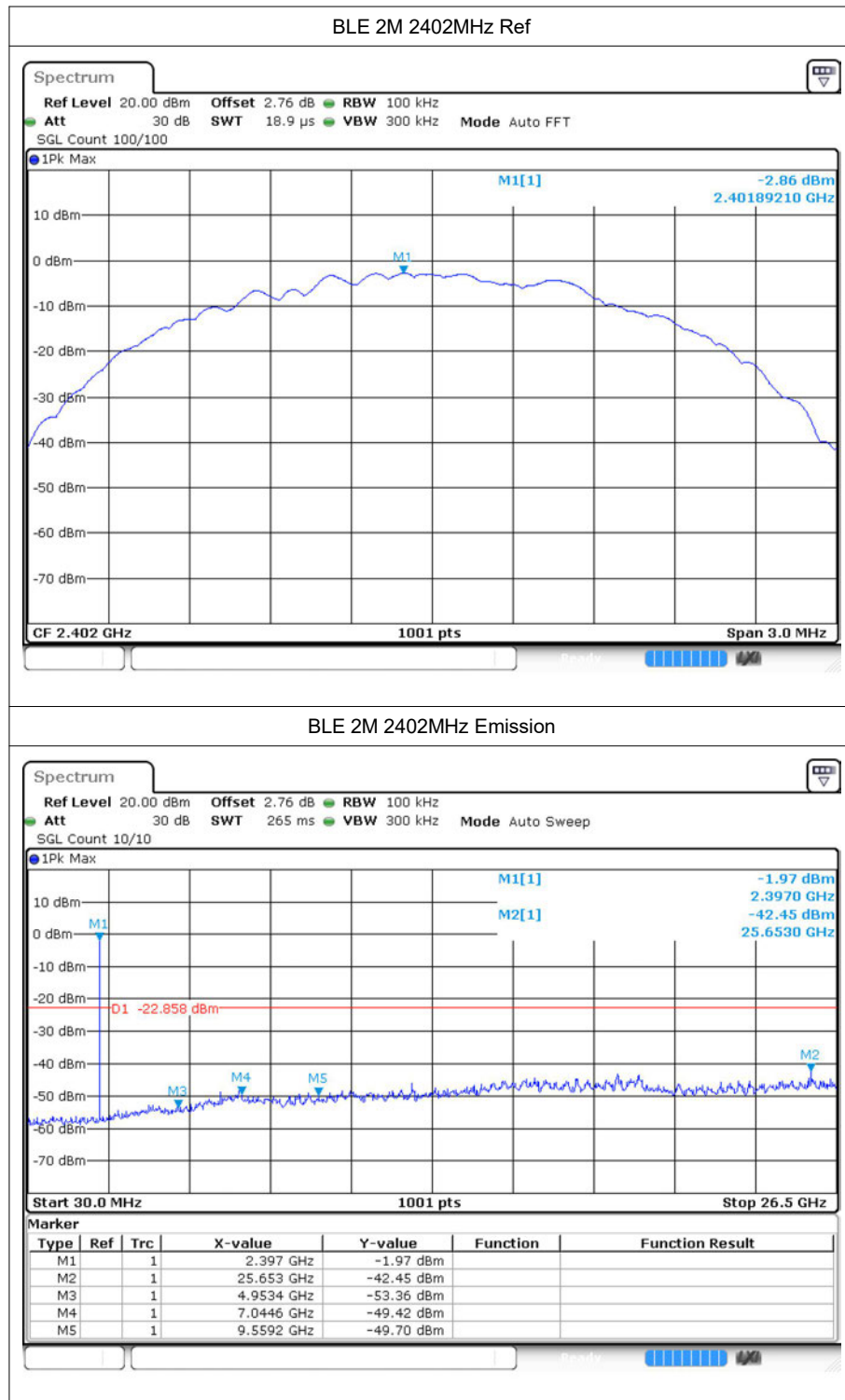
Mode	Frequency (MHz)	Max Value (dBc)	Limit (dBc)	Verdict
BLE 1M	2402	-43.86	-20	Pass
BLE 1M	2440	-43.86	-20	Pass
BLE 1M	2480	-42.05	-20	Pass
BLE 2M	2402	-39.59	-20	Pass
BLE 2M	2440	-41.81	-20	Pass
BLE 2M	2480	-40.58	-20	Pass

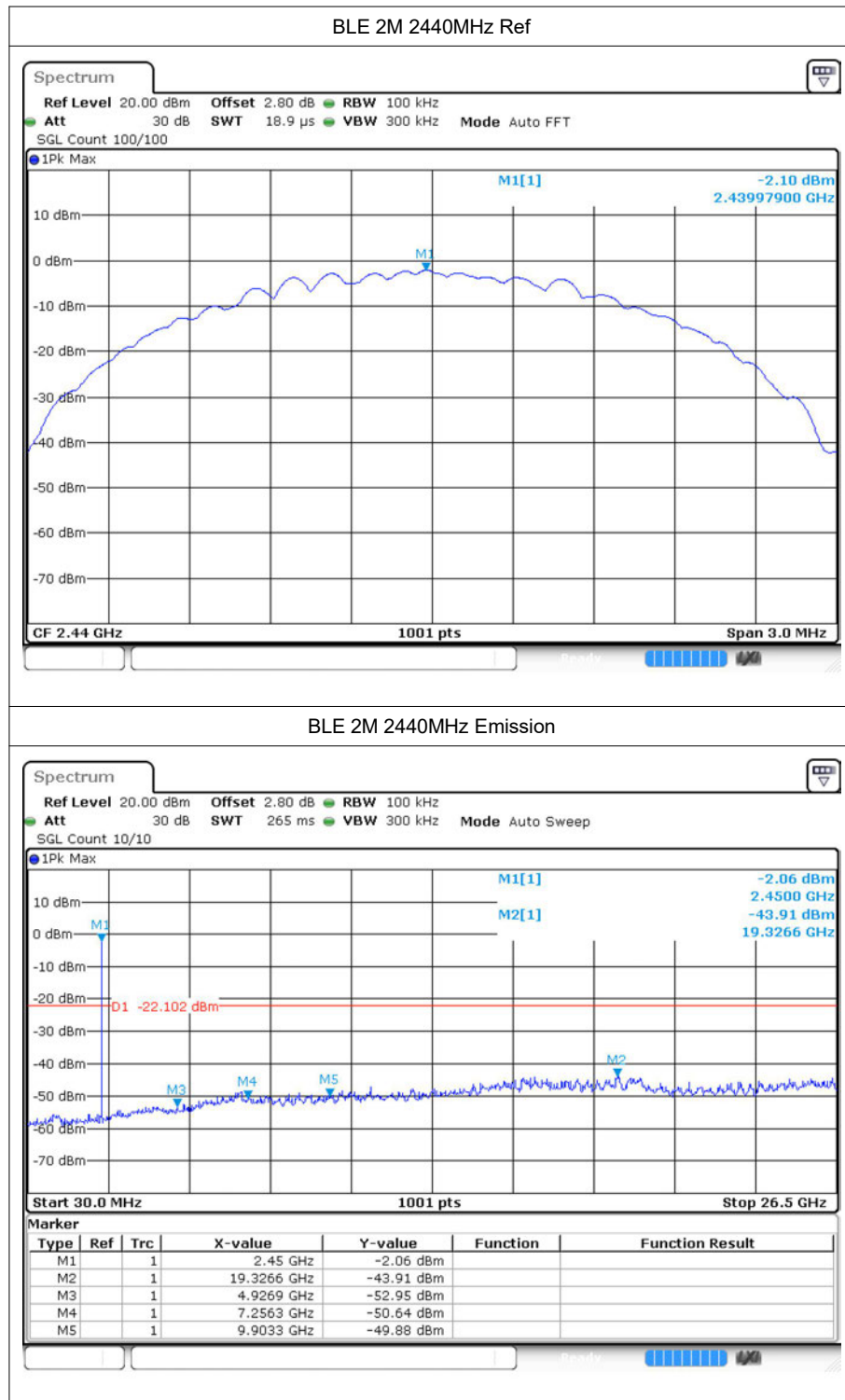
6.2 Test Graphs

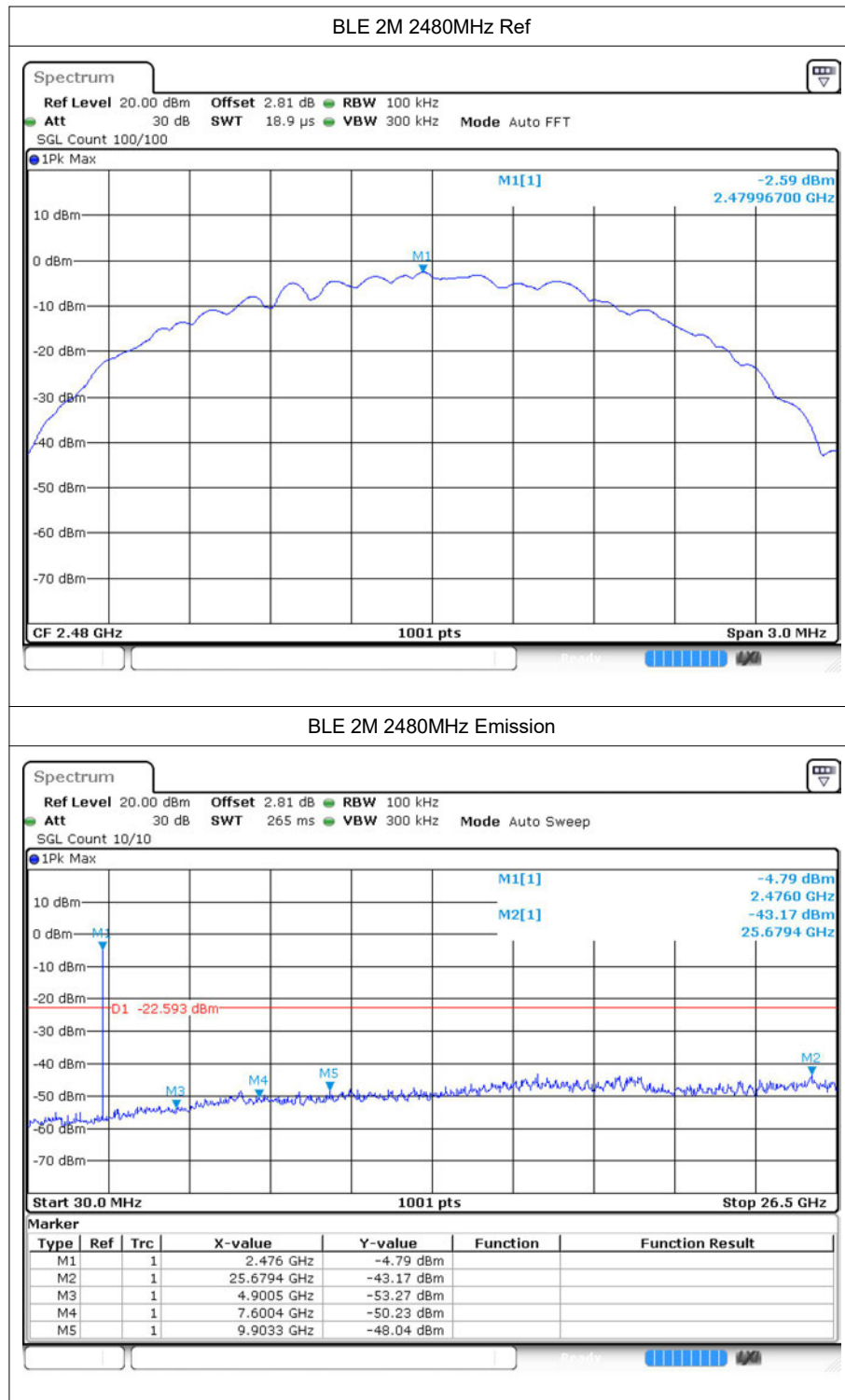












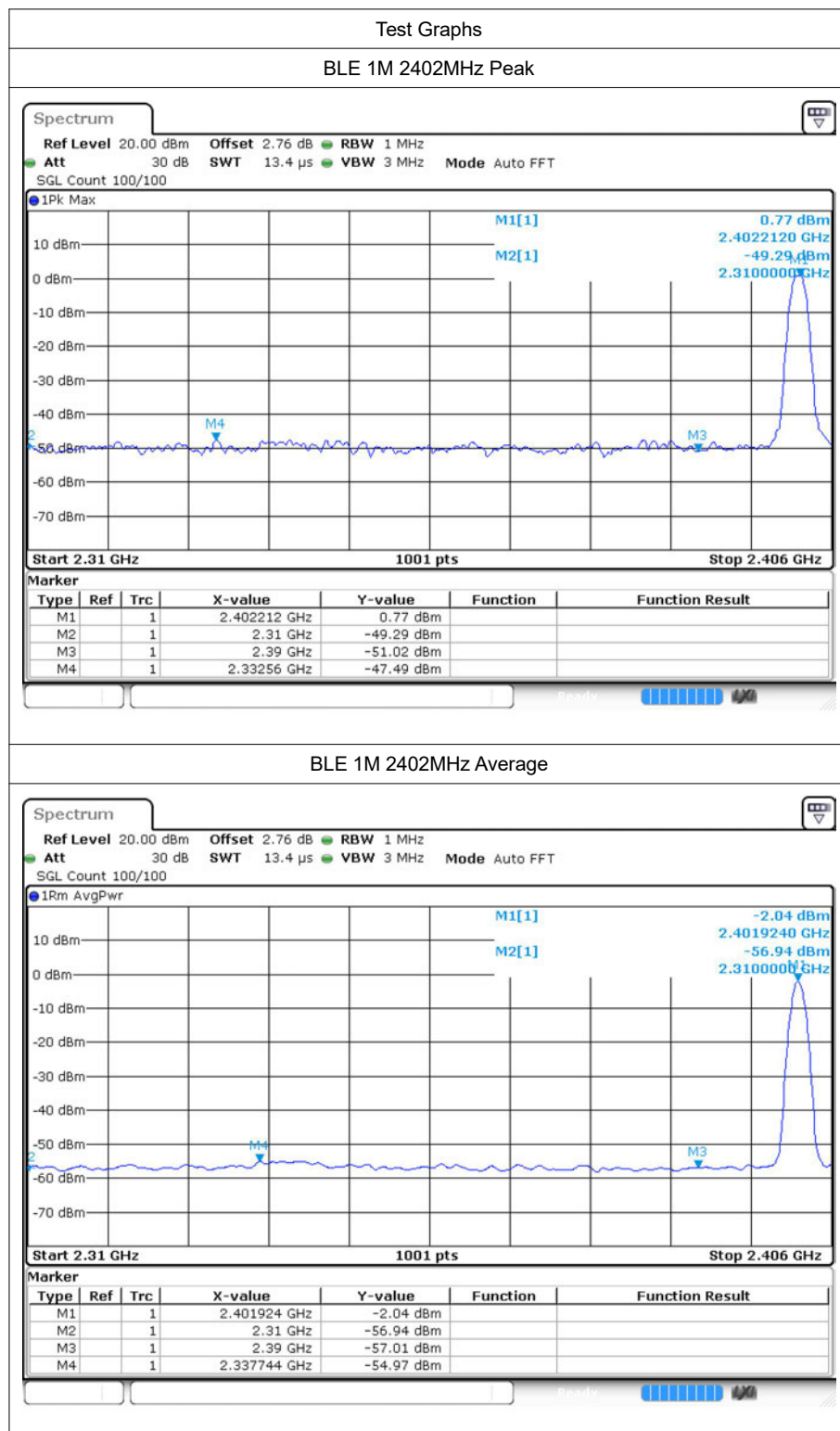


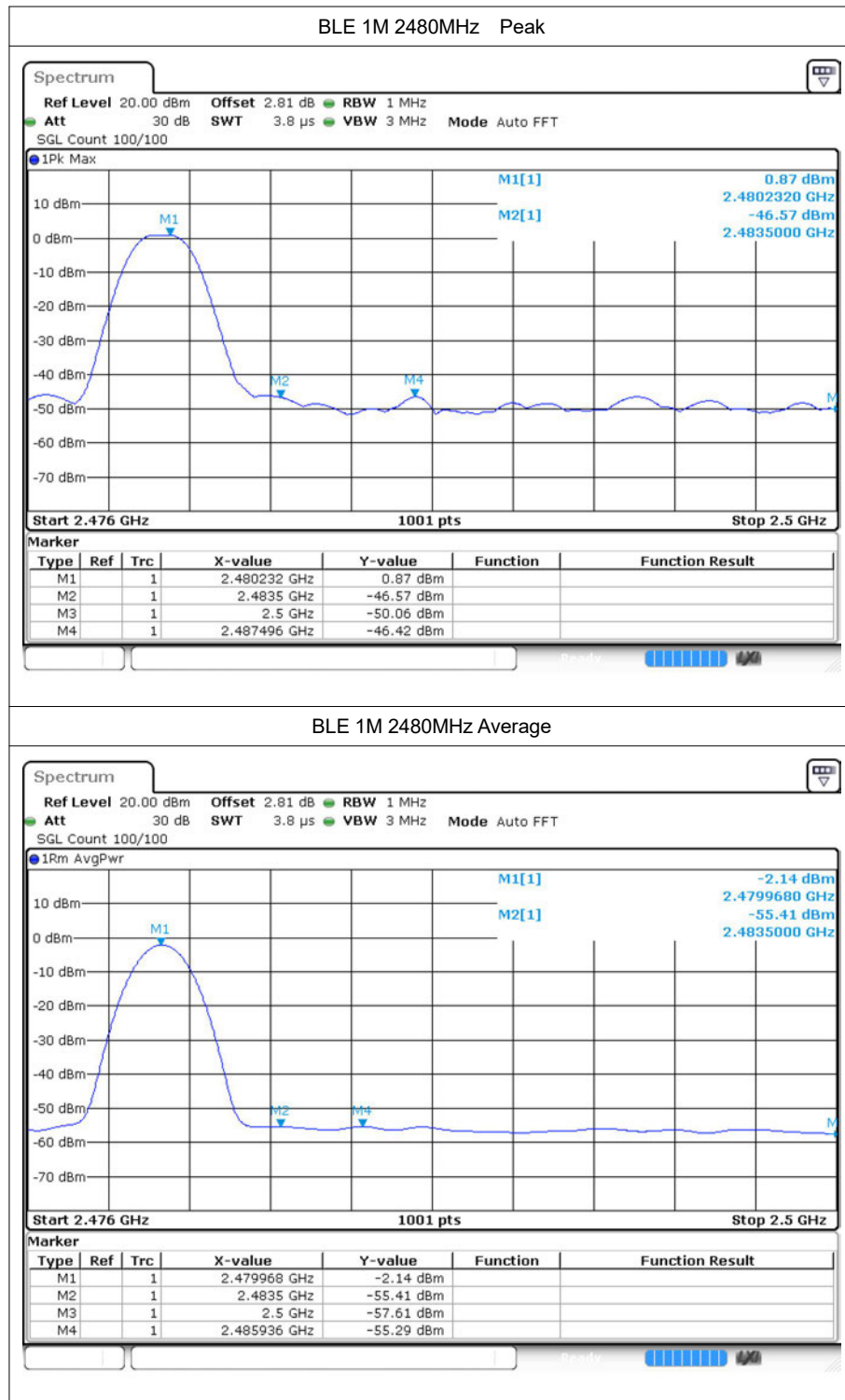
7 Restrict Band

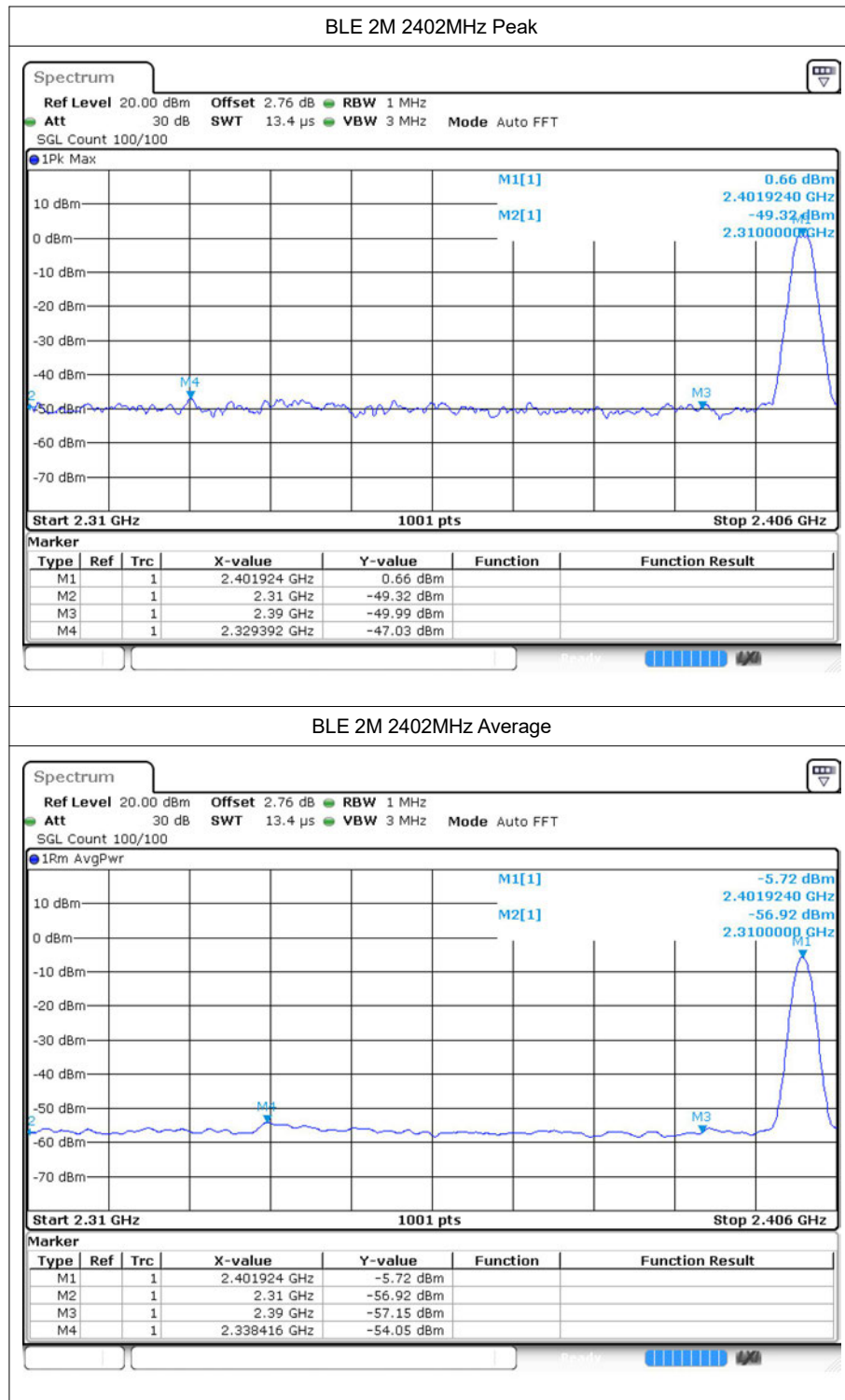
7.1 Test Result

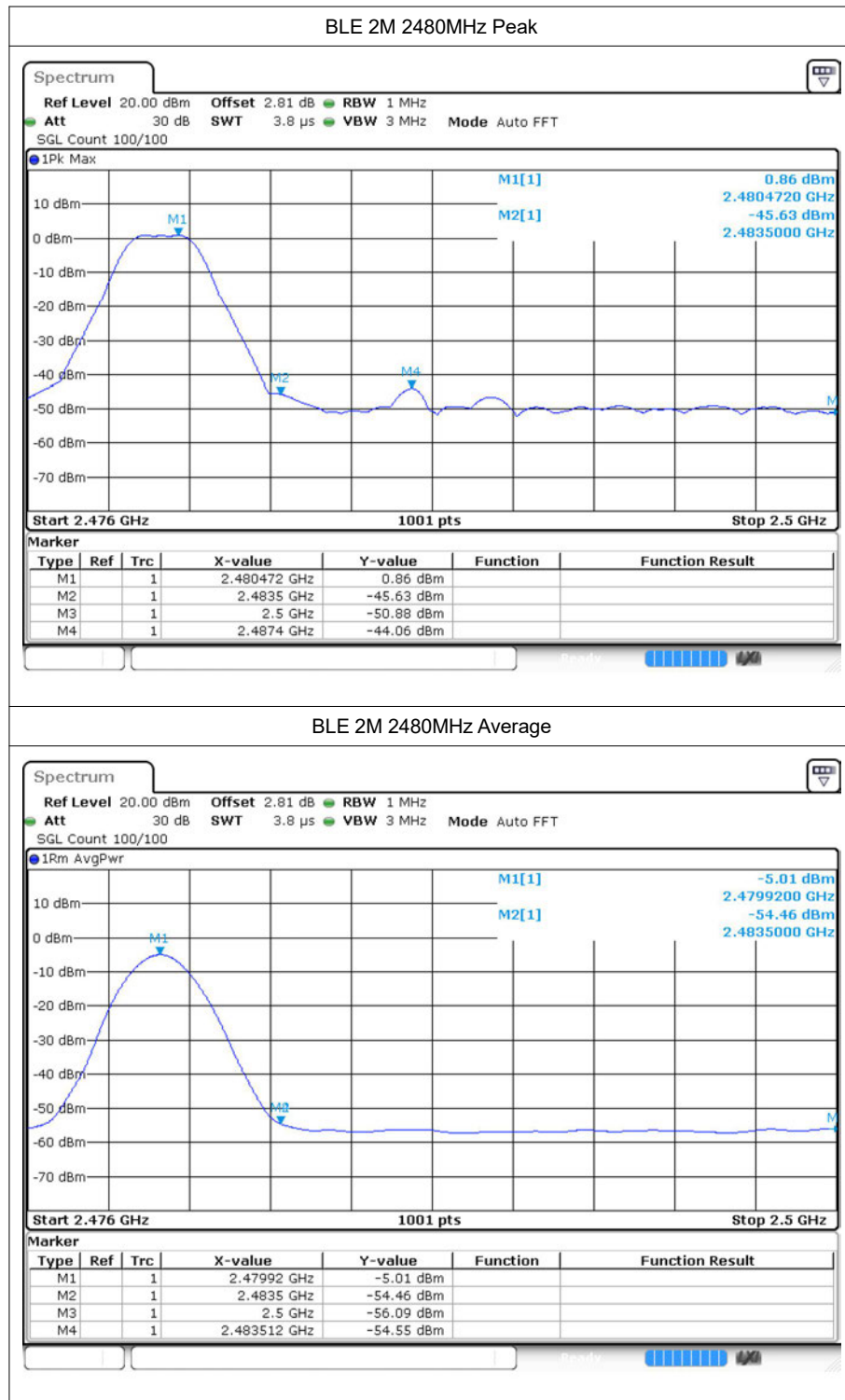
Mode	Frequency (MHz)	Spur Freq (MHz)	Power (dBm)	Gain (dBi)	Duty Factor	E (dBuV/m)	Detector	Limit (dBuV/m)	Verdict
BLE 1M	2402	2310	-49.29	3.0	-	48.94	Peak	74	Pass
BLE 1M	2402	2310	-56.94	3.0	1.94	43.23	Average	54	Pass
BLE 1M	2402	2332.56	-47.48	3.0	-	50.75	Peak	74	Pass
BLE 1M	2402	2337.744	-54.96	3.0	1.94	45.21	Average	54	Pass
BLE 1M	2402	2390	-51.02	3.0	-	47.21	Peak	74	Pass
BLE 1M	2402	2390	-57.01	3.0	1.94	43.16	Average	54	Pass
BLE 1M	2480	2483.5	-46.57	3.0	-	51.66	Peak	74	Pass
BLE 1M	2480	2483.5	-55.41	3.0	1.94	44.76	Average	54	Pass
BLE 1M	2480	2487.496	-46.42	3.0	-	51.81	Peak	74	Pass
BLE 1M	2480	2485.936	-55.28	3.0	1.94	44.89	Average	54	Pass
BLE 1M	2480	2500	-50.06	3.0	-	48.17	Peak	74	Pass
BLE 1M	2480	2500	-57.61	3.0	1.94	42.56	Average	54	Pass
BLE 2M	2402	2310	-49.32	3.0	-	48.91	Peak	74	Pass
BLE 2M	2402	2310	-56.92	3.0	4.61	45.92	Average	54	Pass
BLE 2M	2402	2329.392	-47.03	3.0	-	51.2	Peak	74	Pass
BLE 2M	2402	2338.416	-54.04	3.0	4.61	48.8	Average	54	Pass
BLE 2M	2402	2390	-49.99	3.0	-	48.24	Peak	74	Pass
BLE 2M	2402	2390	-57.15	3.0	4.61	45.69	Average	54	Pass
BLE 2M	2480	2483.5	-45.63	3.0	-	52.6	Peak	74	Pass
BLE 2M	2480	2483.5	-54.46	3.0	4.53	48.3	Average	54	Pass
BLE 2M	2480	2487.4	-44.06	3.0	-	54.17	Peak	74	Pass
BLE 2M	2480	2483.512	-54.55	3.0	4.53	48.21	Average	54	Pass
BLE 2M	2480	2500	-50.88	3.0	-	47.35	Peak	74	Pass
BLE 2M	2480	2500	-56.09	3.0	4.53	46.67	Average	54	Pass

7.2 Test Graphs









---The End---