

Appendix A

RF Test Data for BT LE (Conducted Measurement)

Product Name: Smart deadbolt

Test Model: DDL241X-1HW

Environmental Conditions

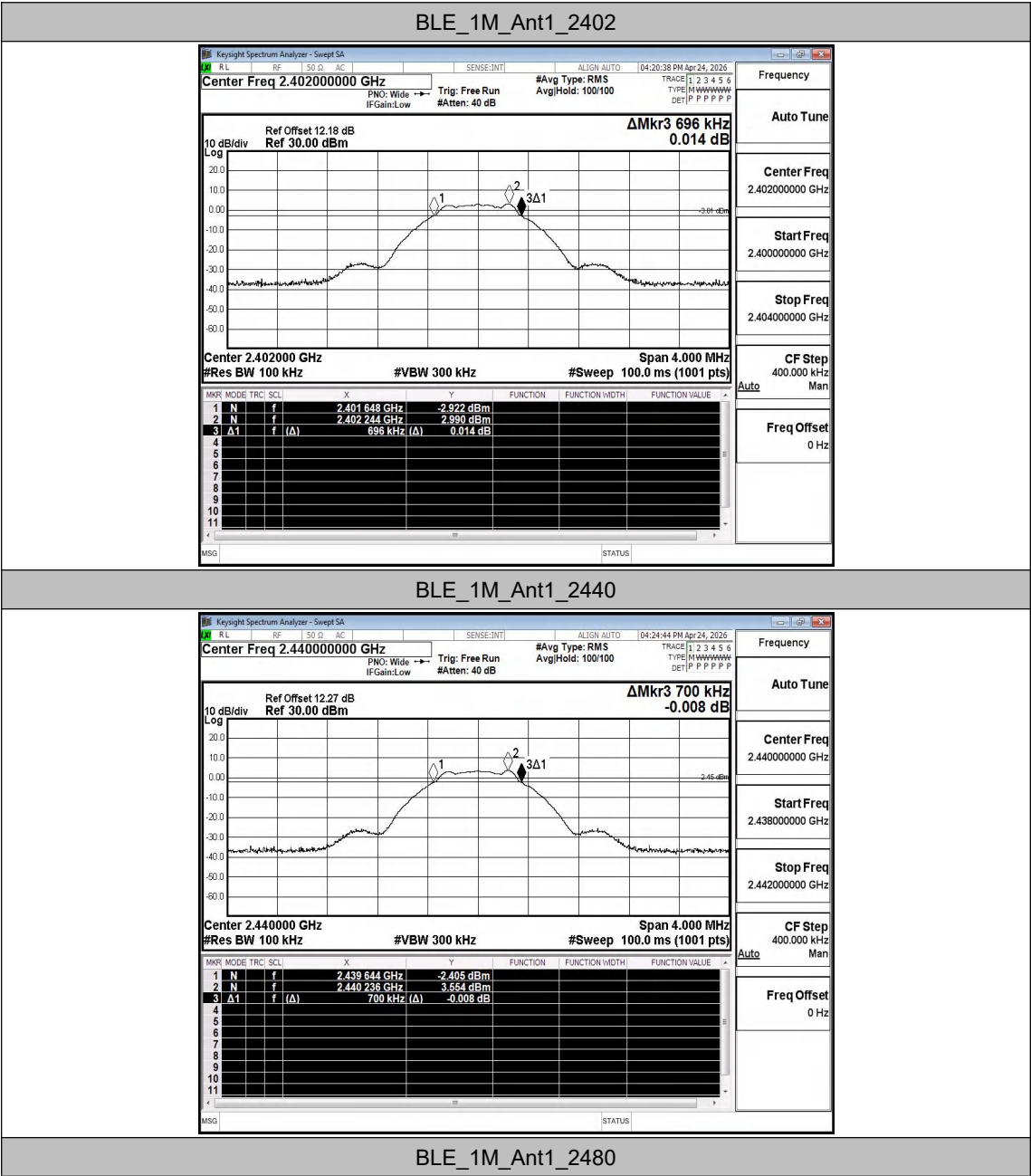
Temperature:	23.5°C
Relative Humidity:	54.3%
ATM Pressure:	100.0 kPa
Test Engineer:	Zhang hai
Supervised by:	Fengliu Tang

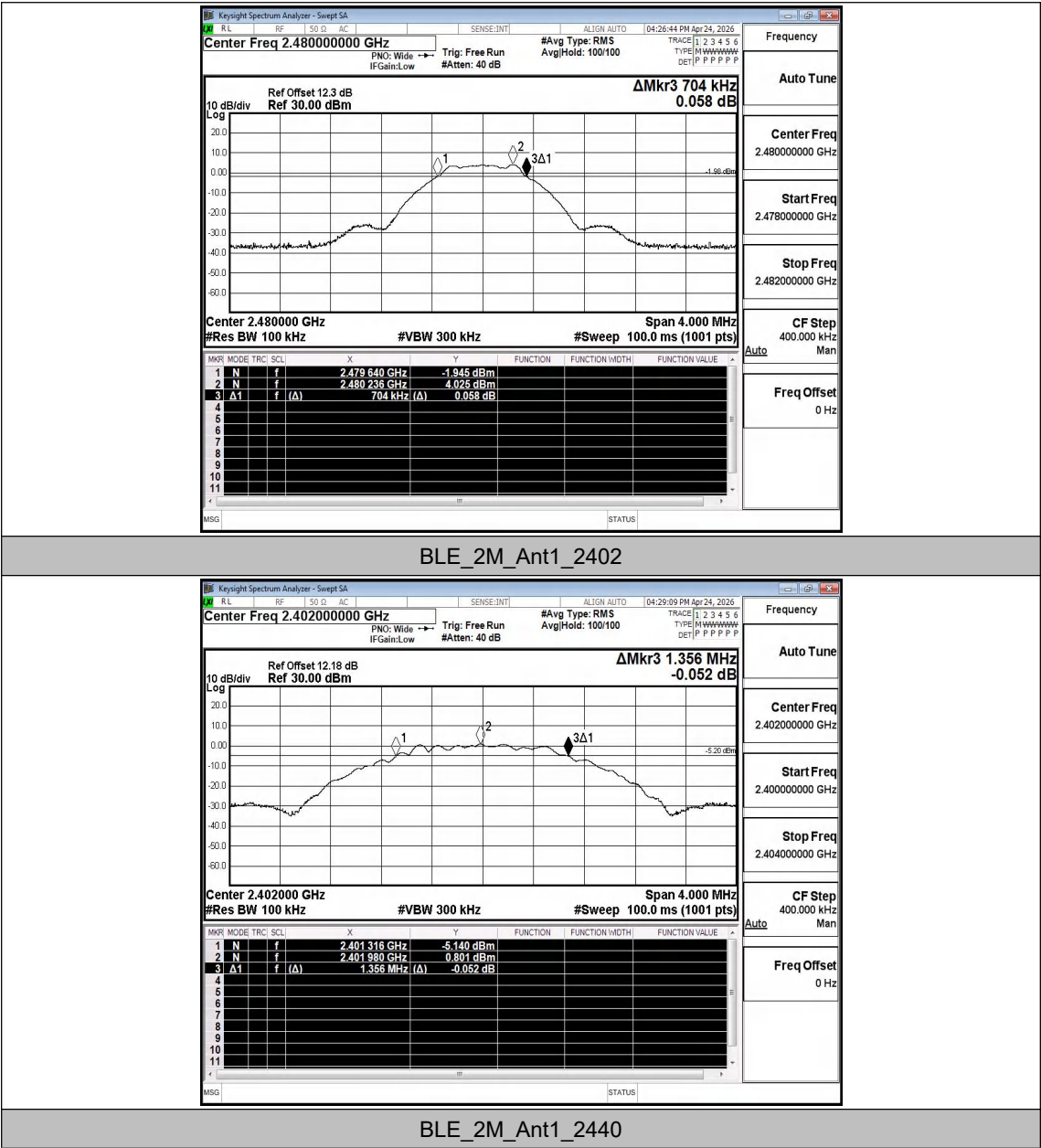
A.1 DTS Bandwidth

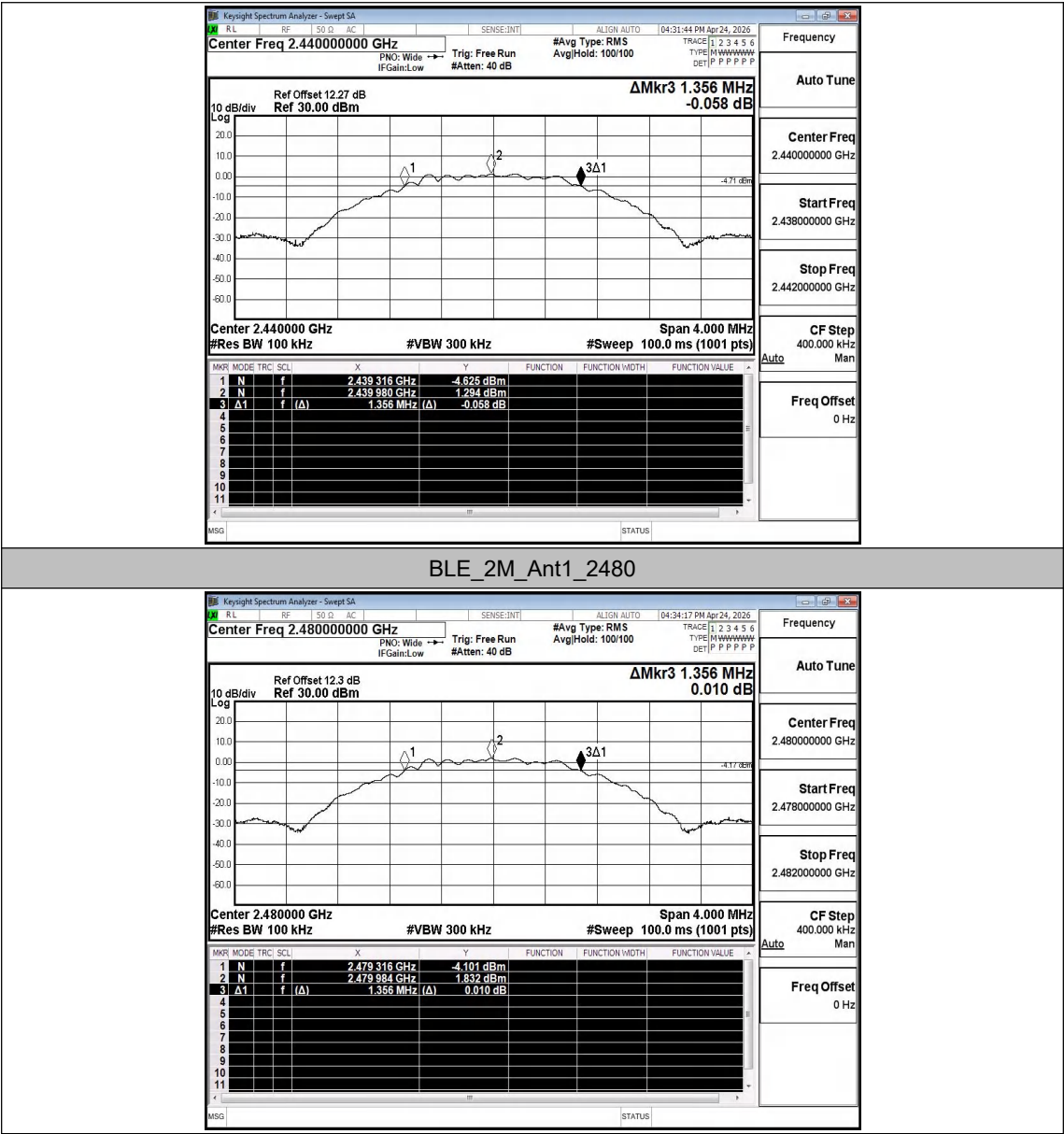
Test Result

TestMode	Antenna	Freq(MHz)	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.696	2401.648	2402.344	0.5	PASS
		2440	0.700	2439.644	2440.344	0.5	PASS
		2480	0.704	2479.640	2480.344	0.5	PASS
BLE_2M	Ant1	2402	1.356	2401.316	2402.672	0.5	PASS
		2440	1.356	2439.316	2440.672	0.5	PASS
		2480	1.356	2479.316	2480.672	0.5	PASS

Test Graphs





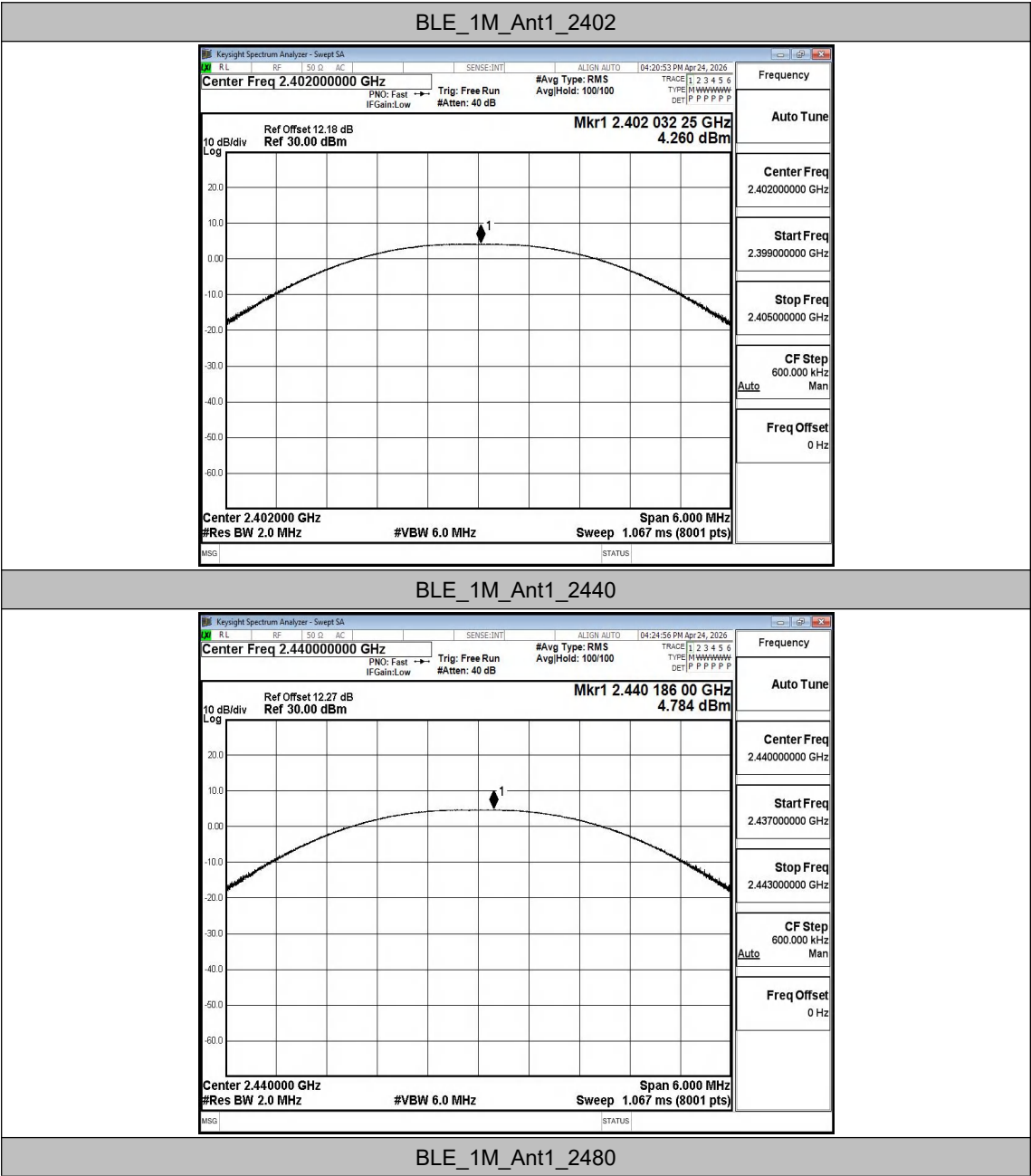


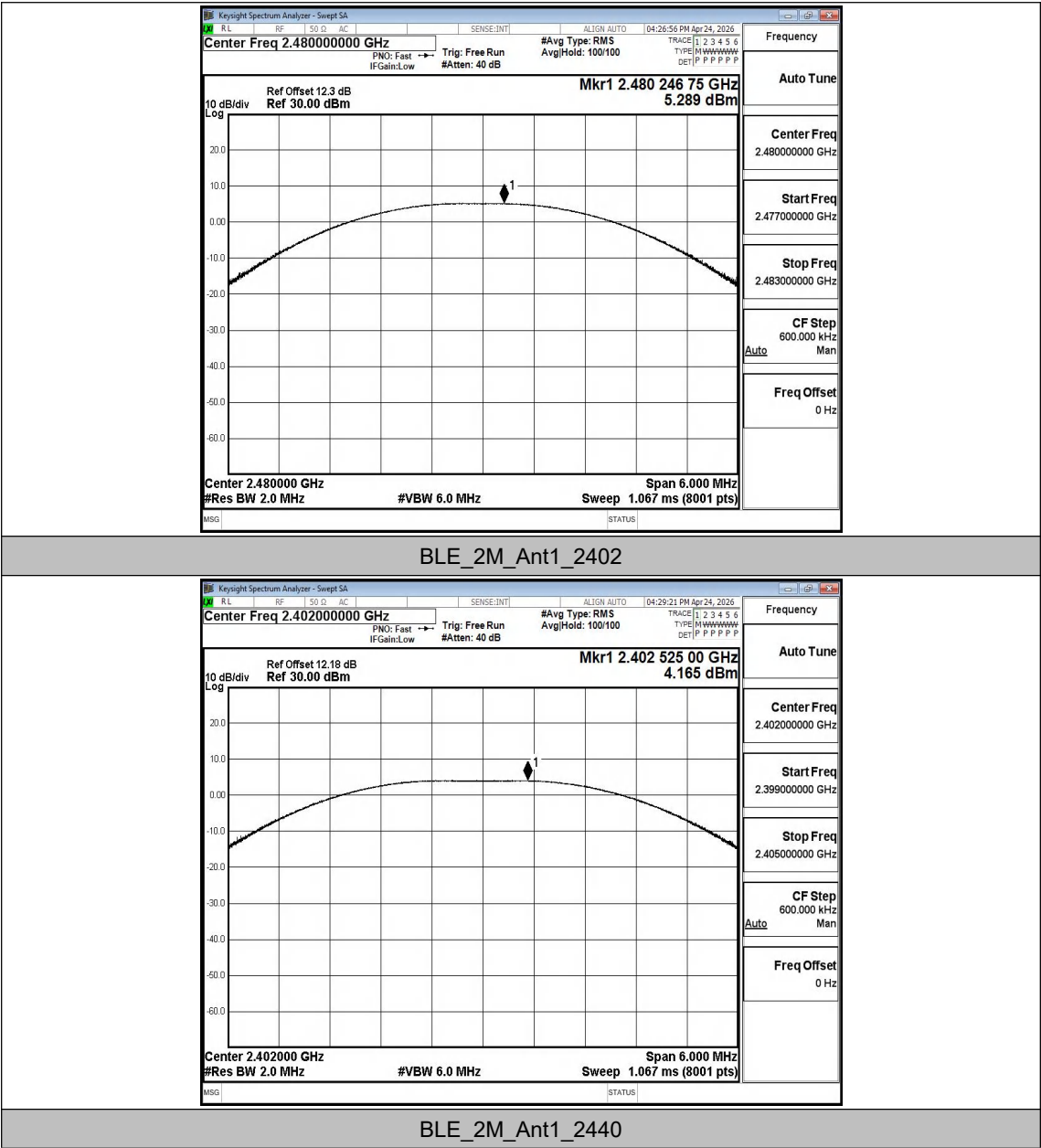
A.2 Maximum Peak conducted output power

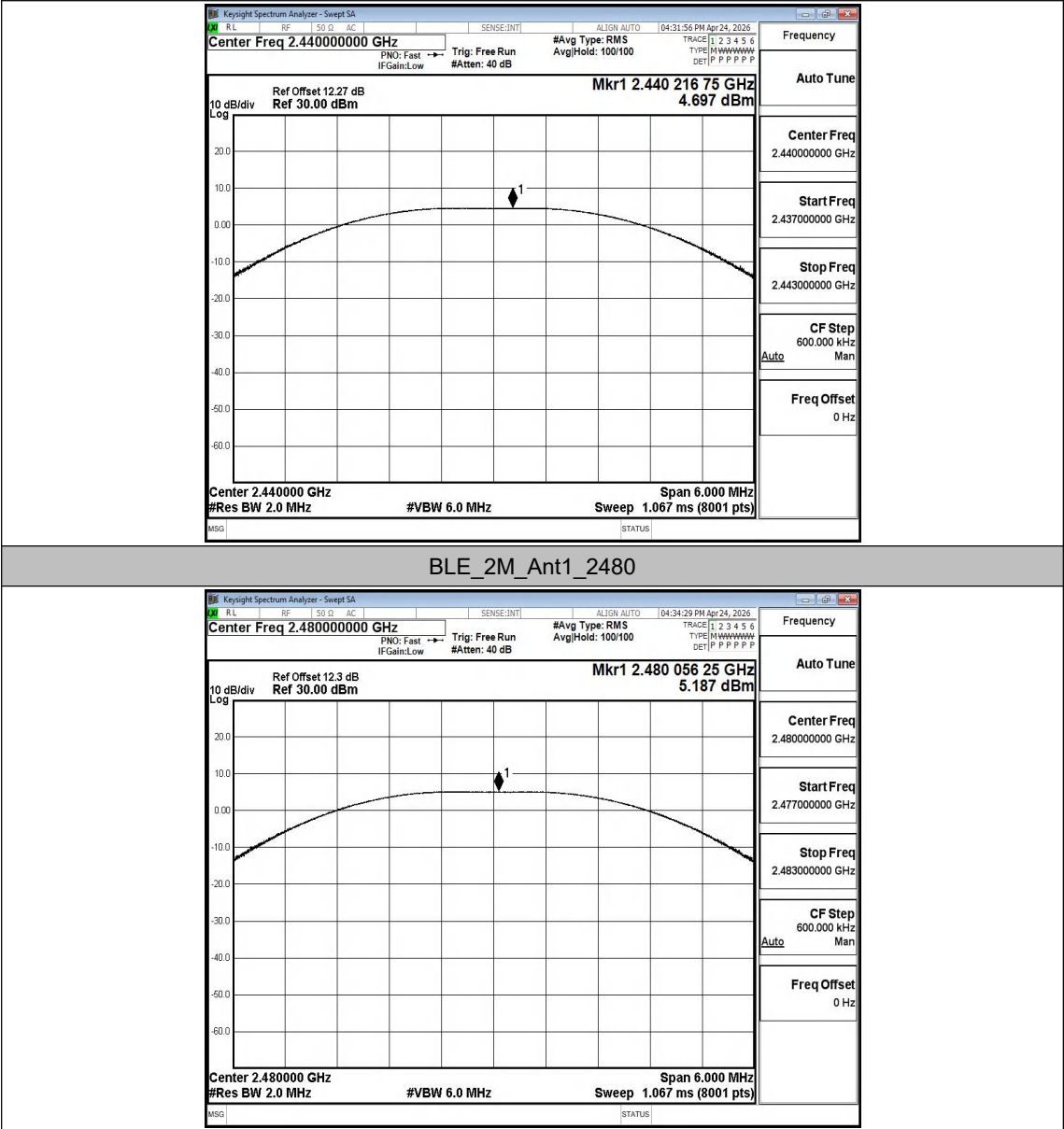
Test Result Peak

TestMode	Antenna	Freq(MHz)	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Verdict
BLE_1M	Ant1	2402	4.26	≤30	PASS
		2440	4.78	≤30	PASS
		2480	5.29	≤30	PASS
BLE_2M	Ant1	2402	4.17	≤30	PASS
		2440	4.70	≤30	PASS
		2480	5.19	≤30	PASS

Test Graphs Peak





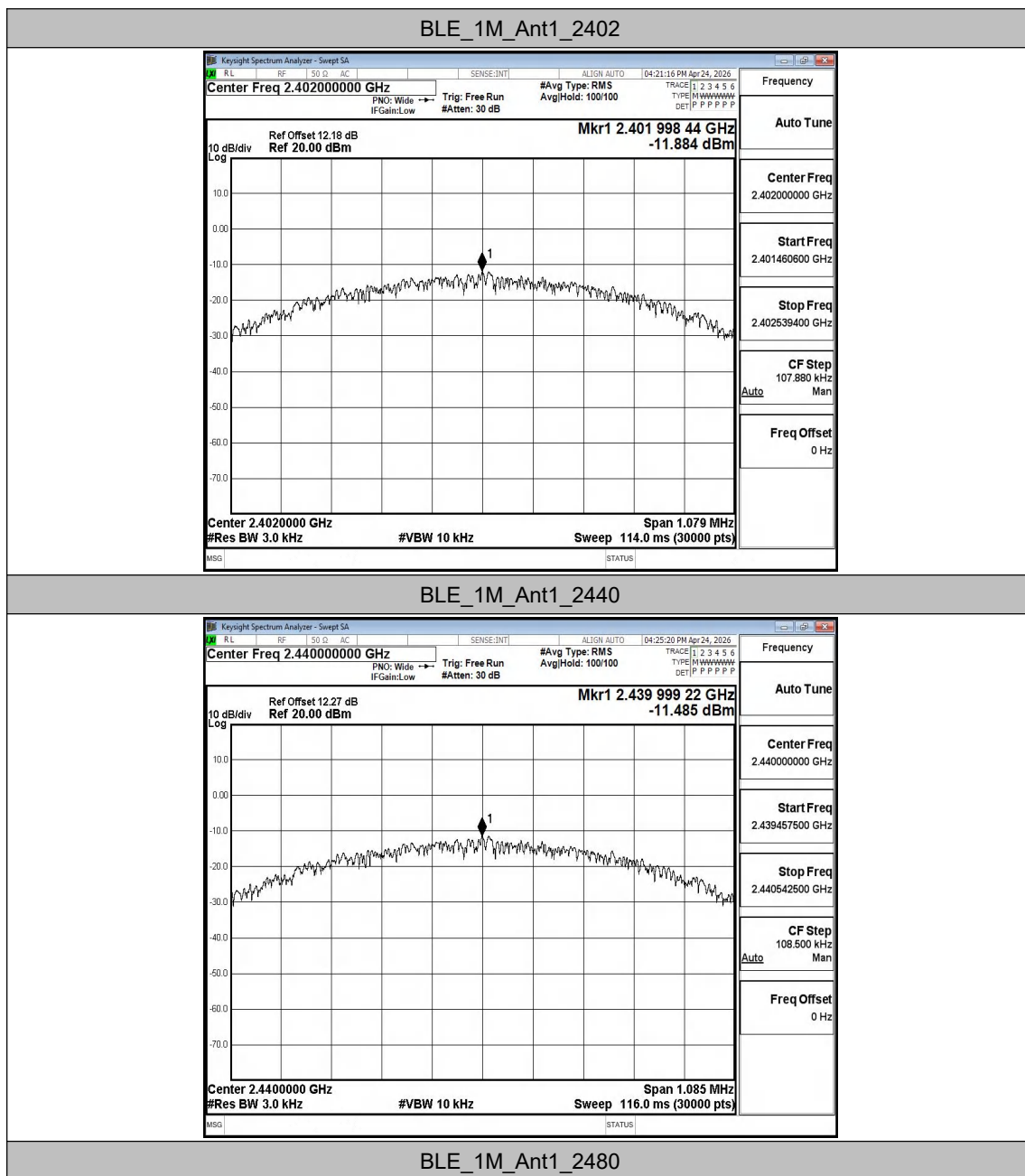


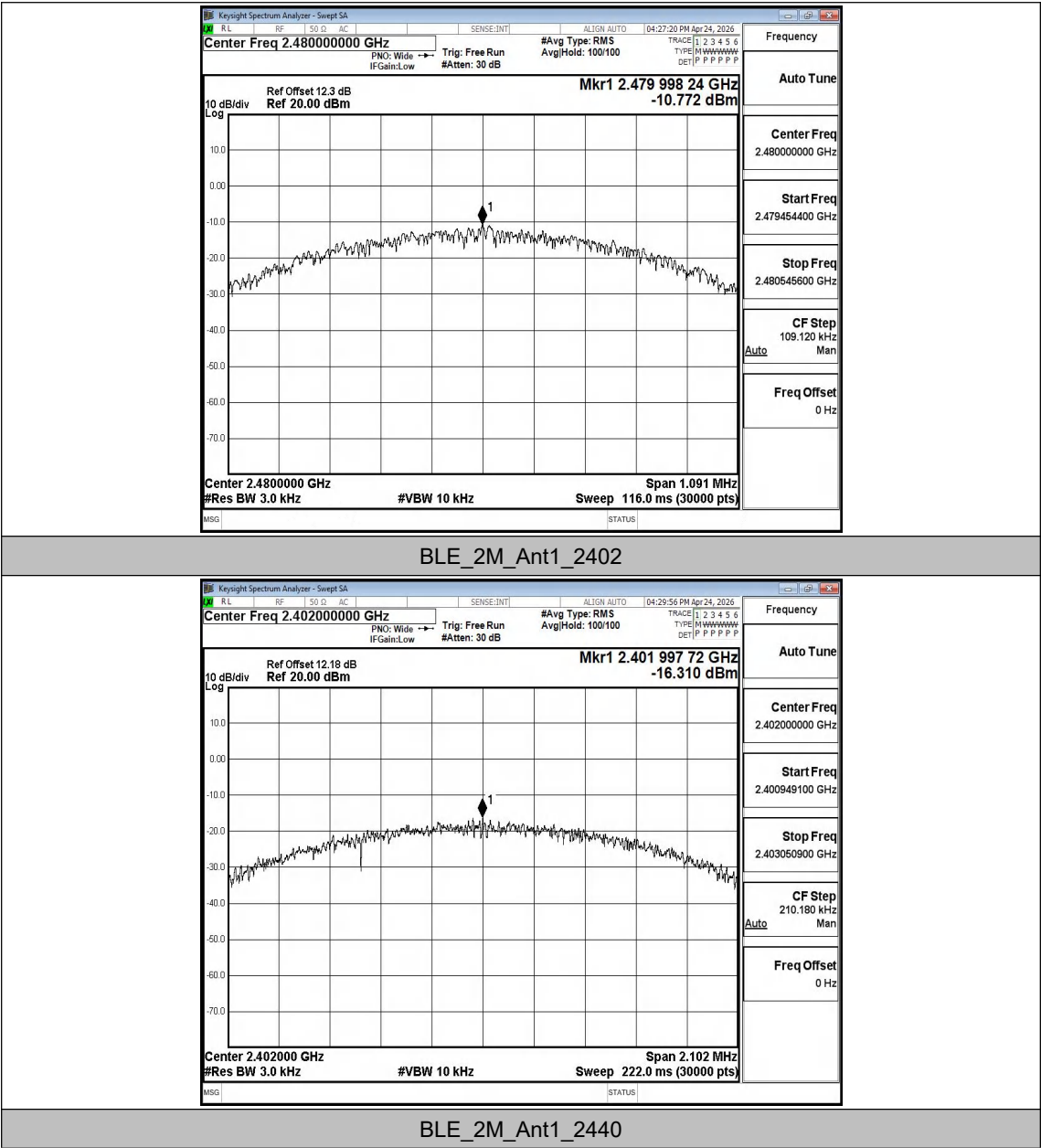
A.3 Maximum power spectral density

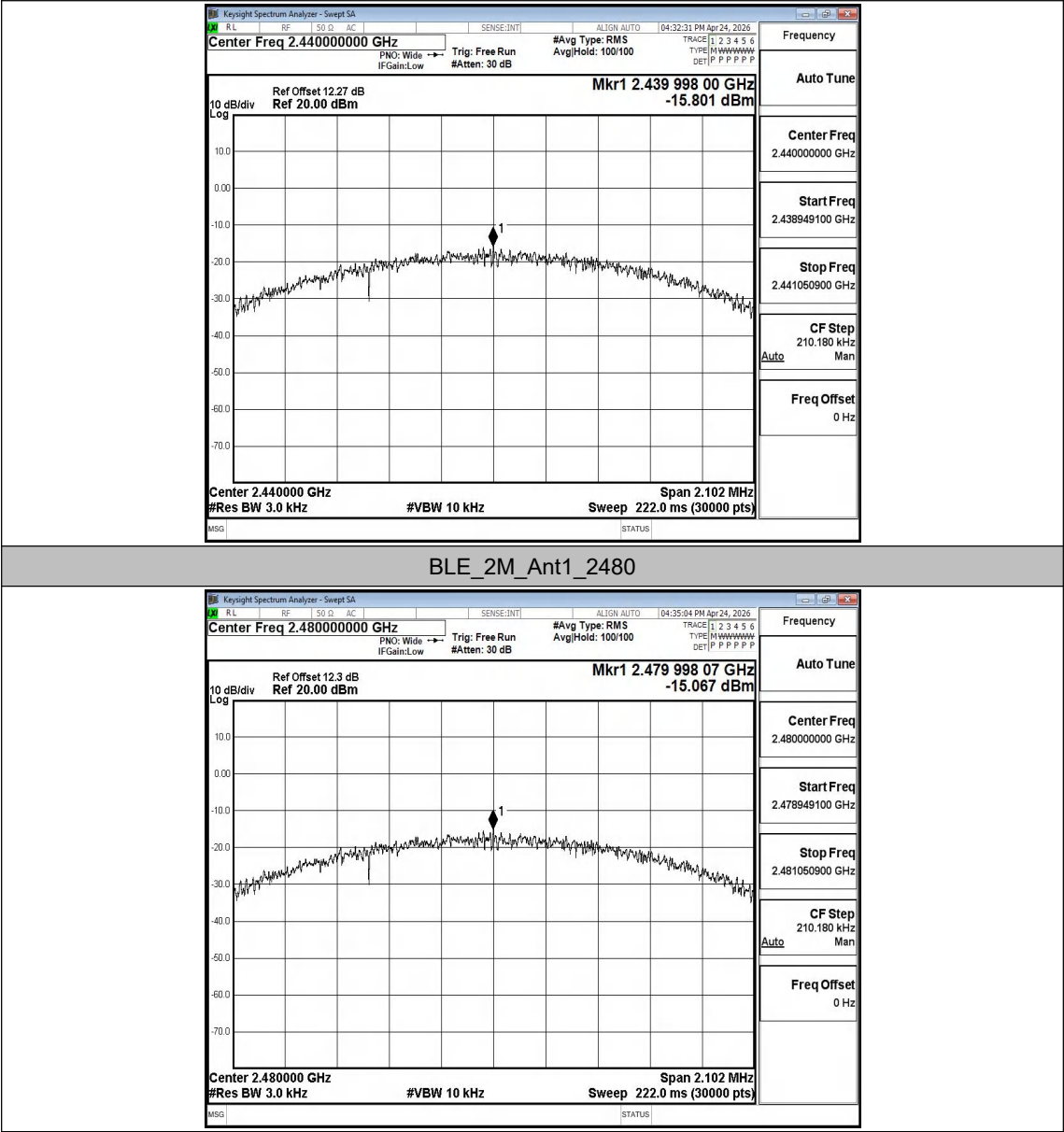
Test Result

TestMode	Antenna	Freq(MHz)	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-11.88	≤8.00	PASS
		2440	-11.49	≤8.00	PASS
		2480	-10.77	≤8.00	PASS
BLE_2M	Ant1	2402	-16.31	≤8.00	PASS
		2440	-15.80	≤8.00	PASS
		2480	-15.07	≤8.00	PASS

Test Graphs





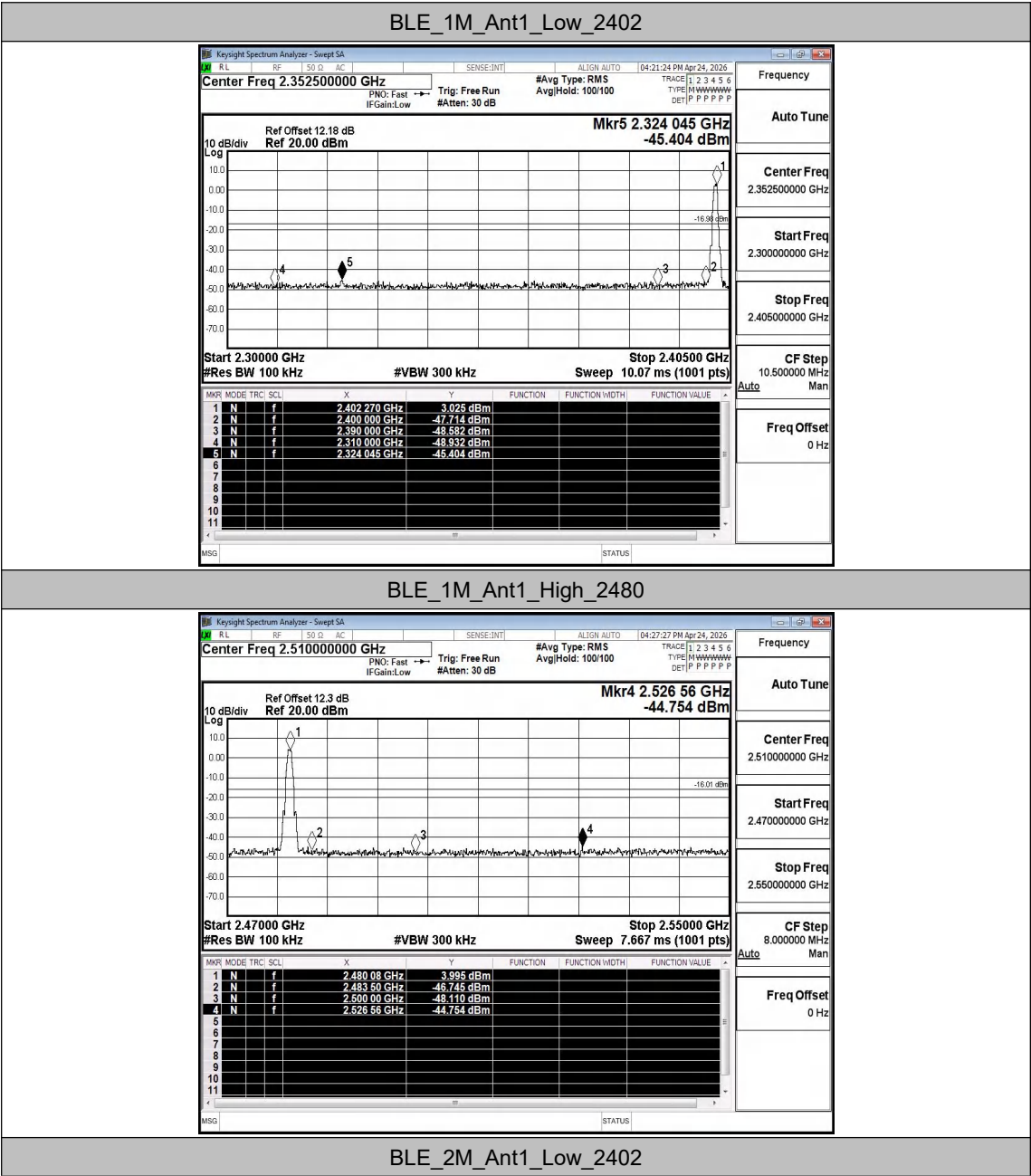


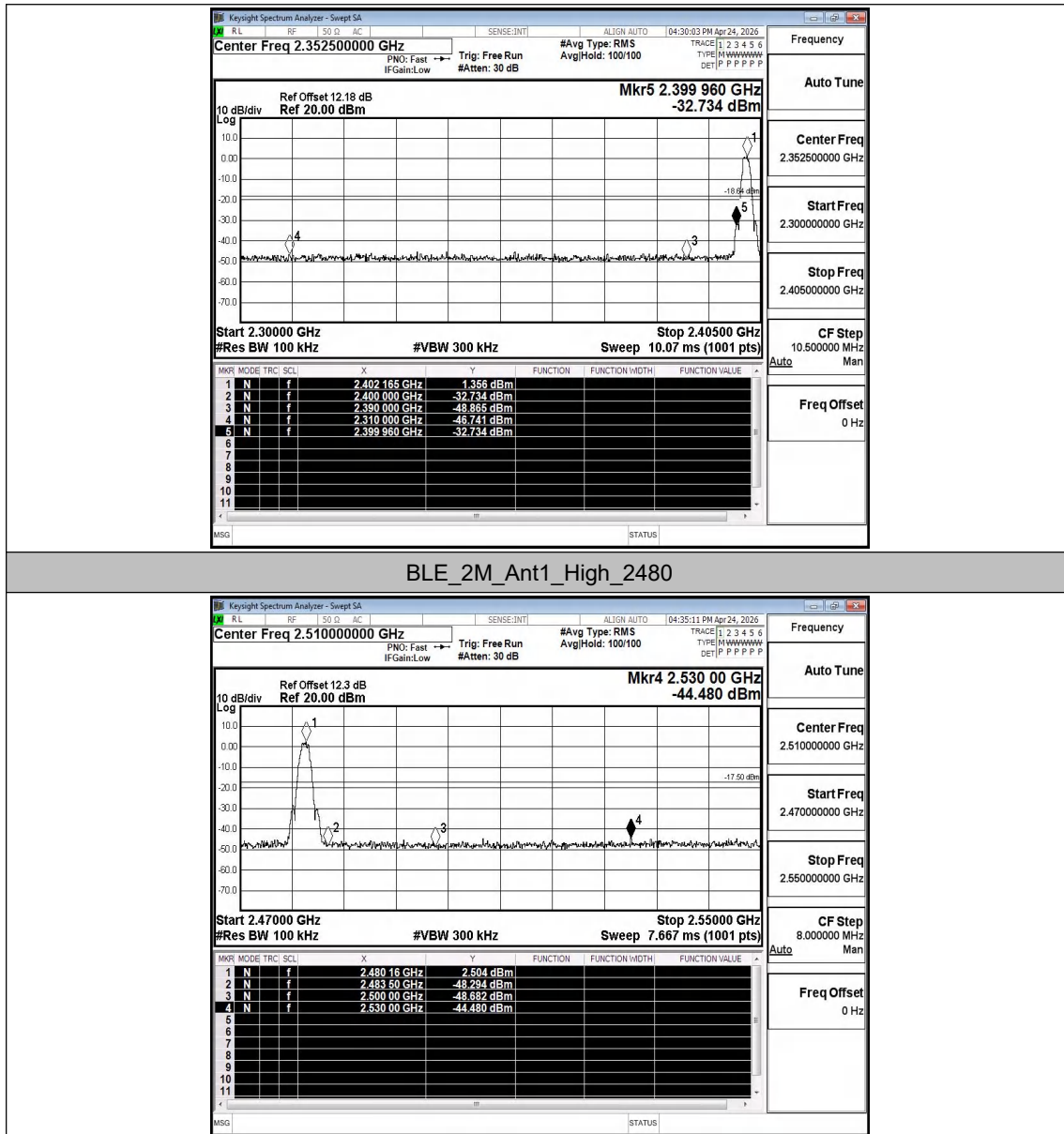
A.4 Band edge measurements

Test Result

TestMode	Antenna	ChName	Freq(MHz)	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	3.03	-45.4	≤-16.98	PASS
		High	2480	4.00	-44.75	≤-16.01	PASS
BLE_2M	Ant1	Low	2402	1.36	-32.73	≤-18.64	PASS
		High	2480	2.50	-44.48	≤-17.5	PASS

Test Graphs



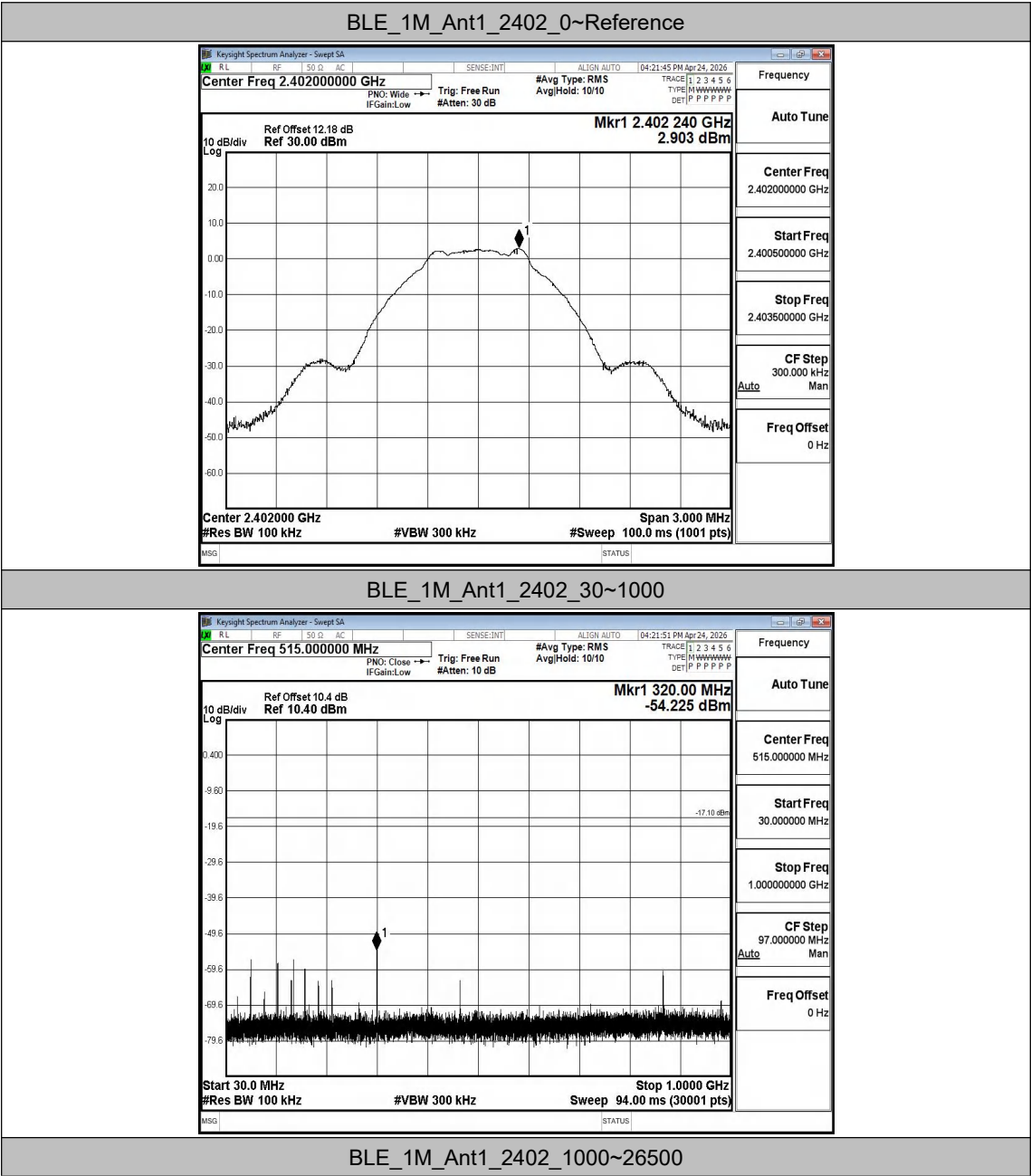


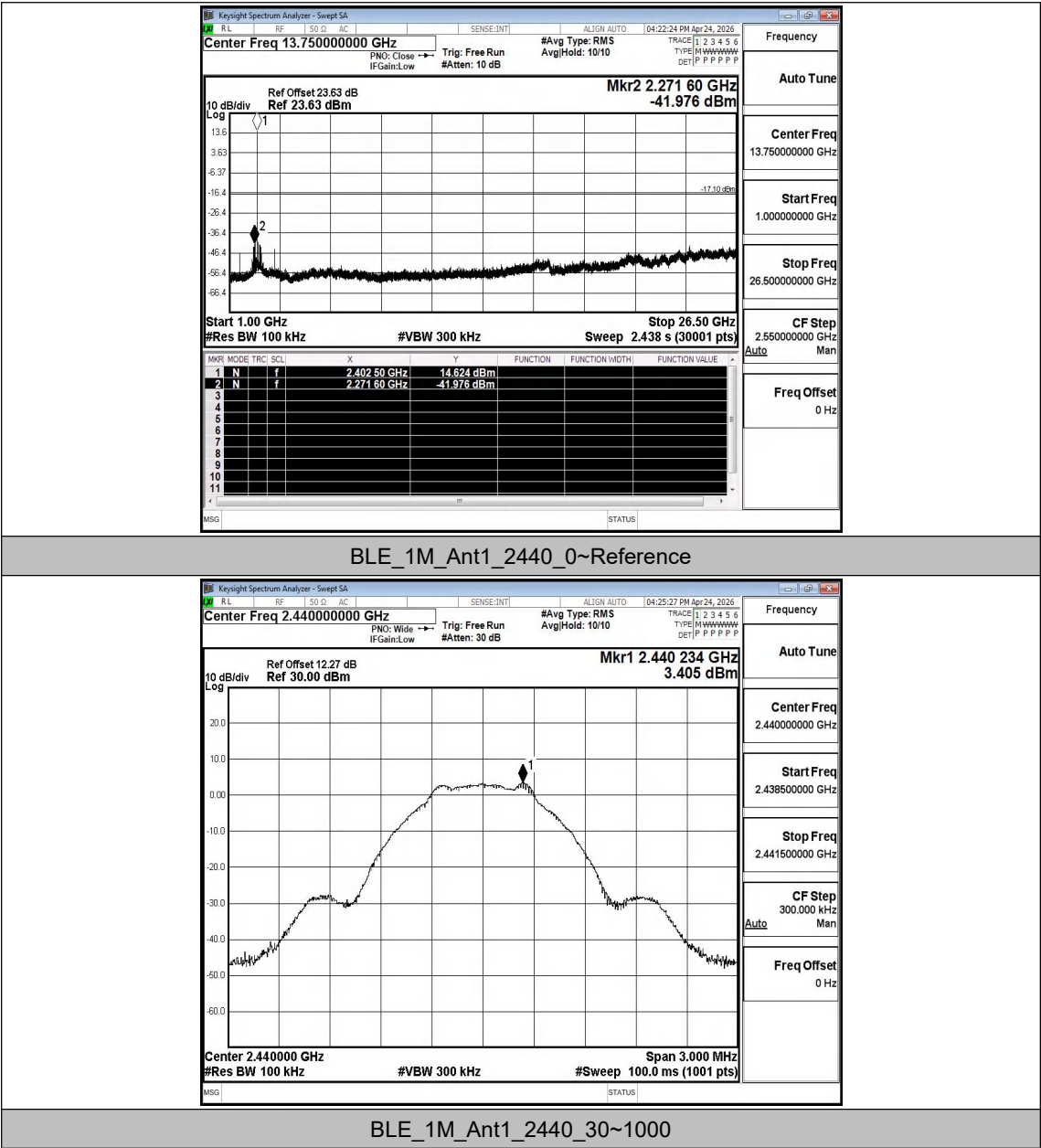
A.5 Conducted Spurious Emission

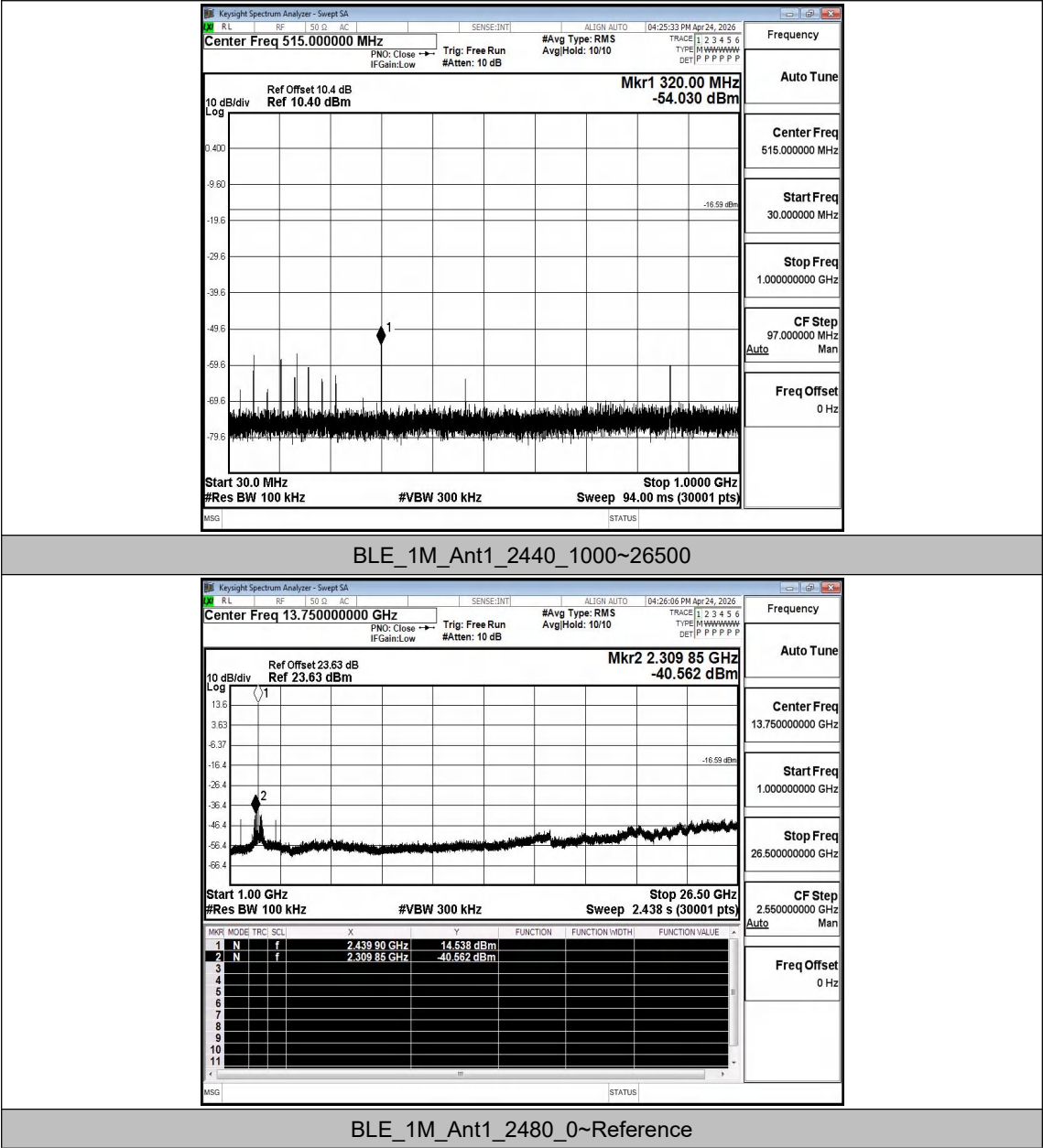
Test Result

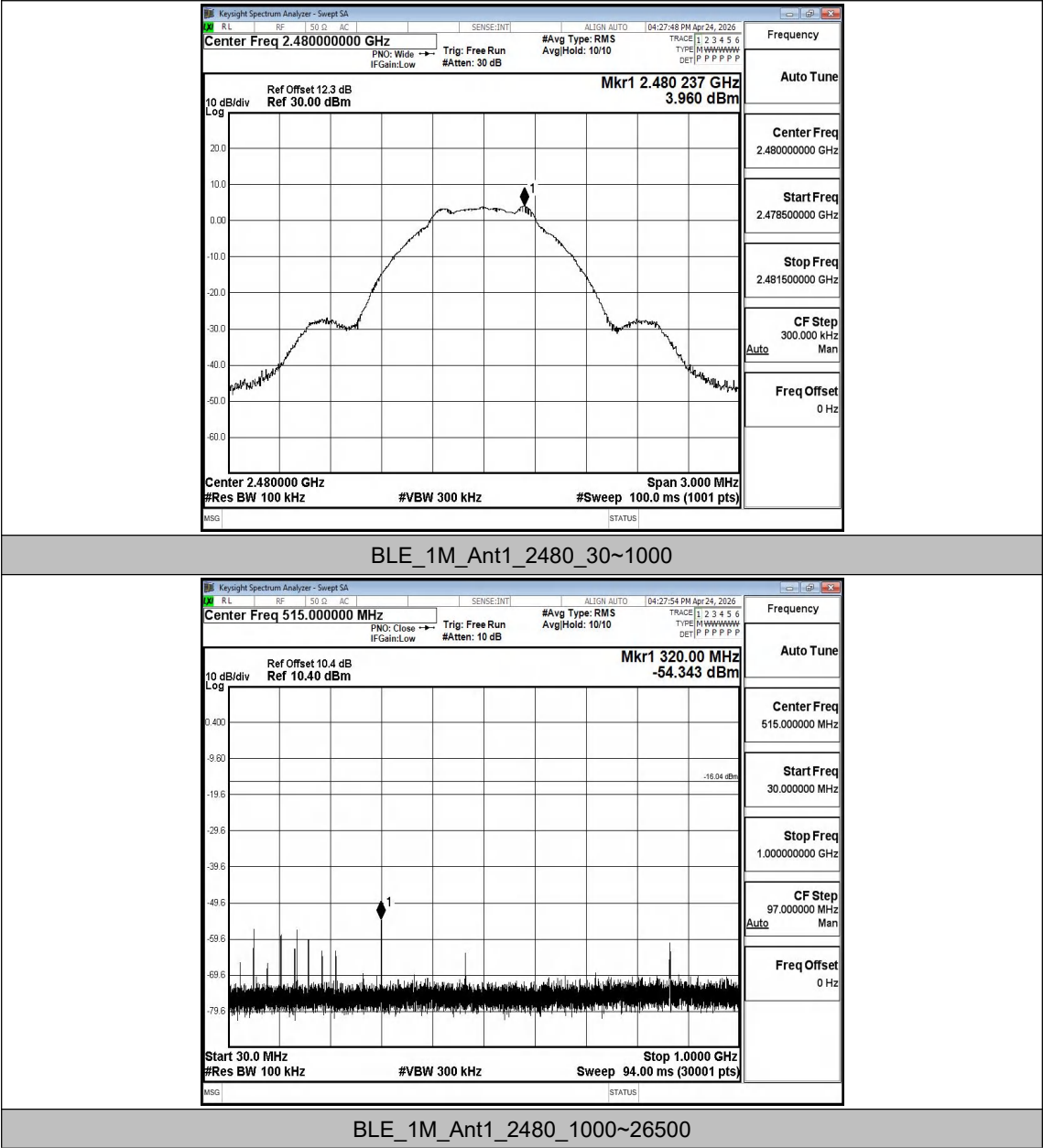
TestMode	Antenna	Freq(MHz)	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	2.90	2.90	---	PASS
			30~1000	2.90	-54.23	≤-17.1	PASS
			1000~26500	2.90	-41.98	≤-17.1	PASS
		2440	Reference	3.41	3.41	---	PASS
			30~1000	3.41	-54.03	≤-16.59	PASS
			1000~26500	3.41	-40.56	≤-16.59	PASS
		2480	Reference	3.96	3.96	---	PASS
			30~1000	3.96	-54.34	≤-16.04	PASS
			1000~26500	3.96	-41.02	≤-16.04	PASS
BLE_2M	Ant1	2402	Reference	0.66	0.66	---	PASS
			30~1000	0.66	-54.46	≤-19.34	PASS
			1000~26500	0.66	-43.29	≤-19.34	PASS
		2440	Reference	1.22	1.22	---	PASS
			30~1000	1.22	-54.67	≤-18.78	PASS
			1000~26500	1.22	-40.55	≤-18.78	PASS
		2480	Reference	1.74	1.74	---	PASS
			30~1000	1.74	-54.64	≤-18.26	PASS
			1000~26500	1.74	-41.69	≤-18.26	PASS

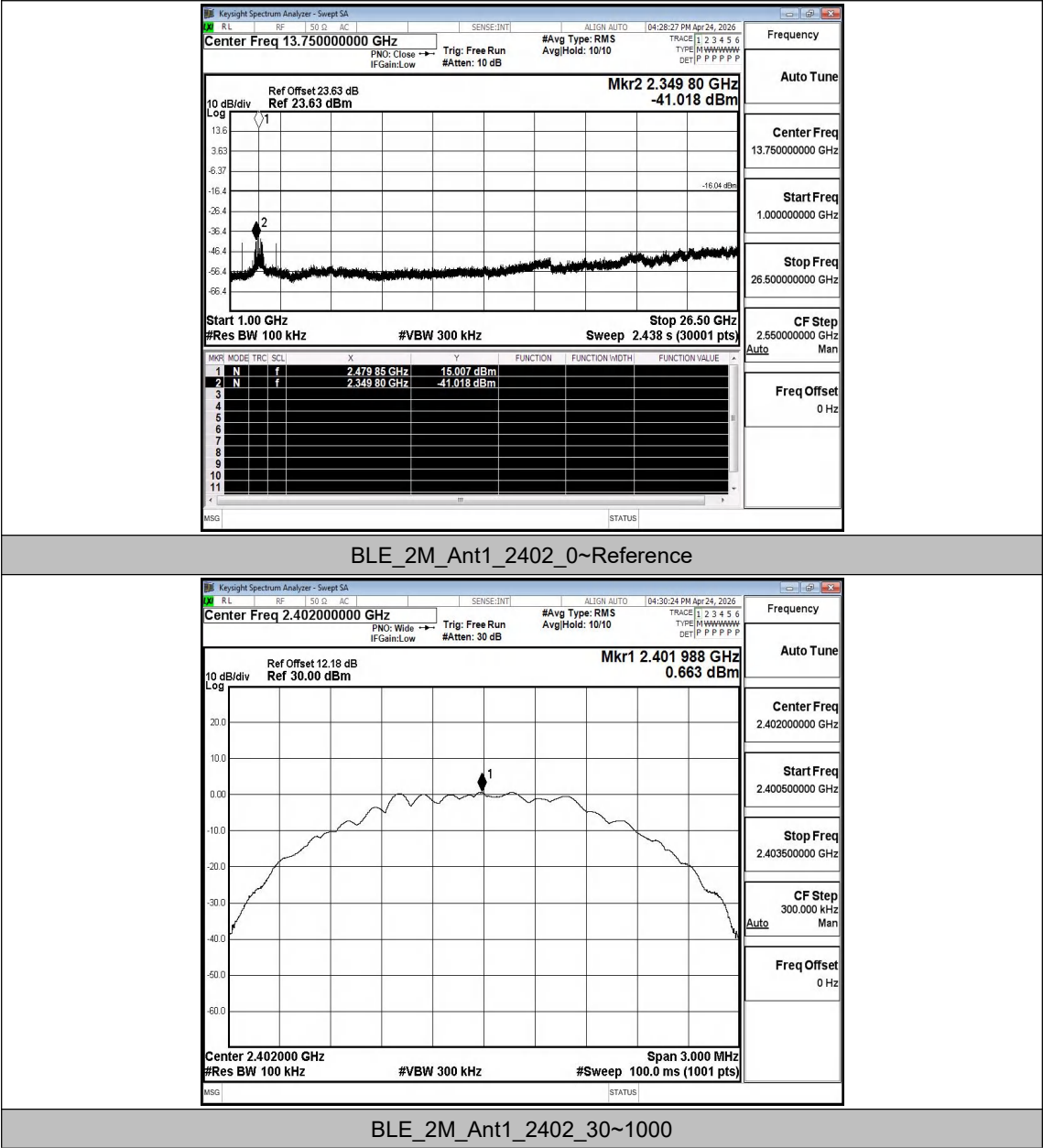
Test Graphs

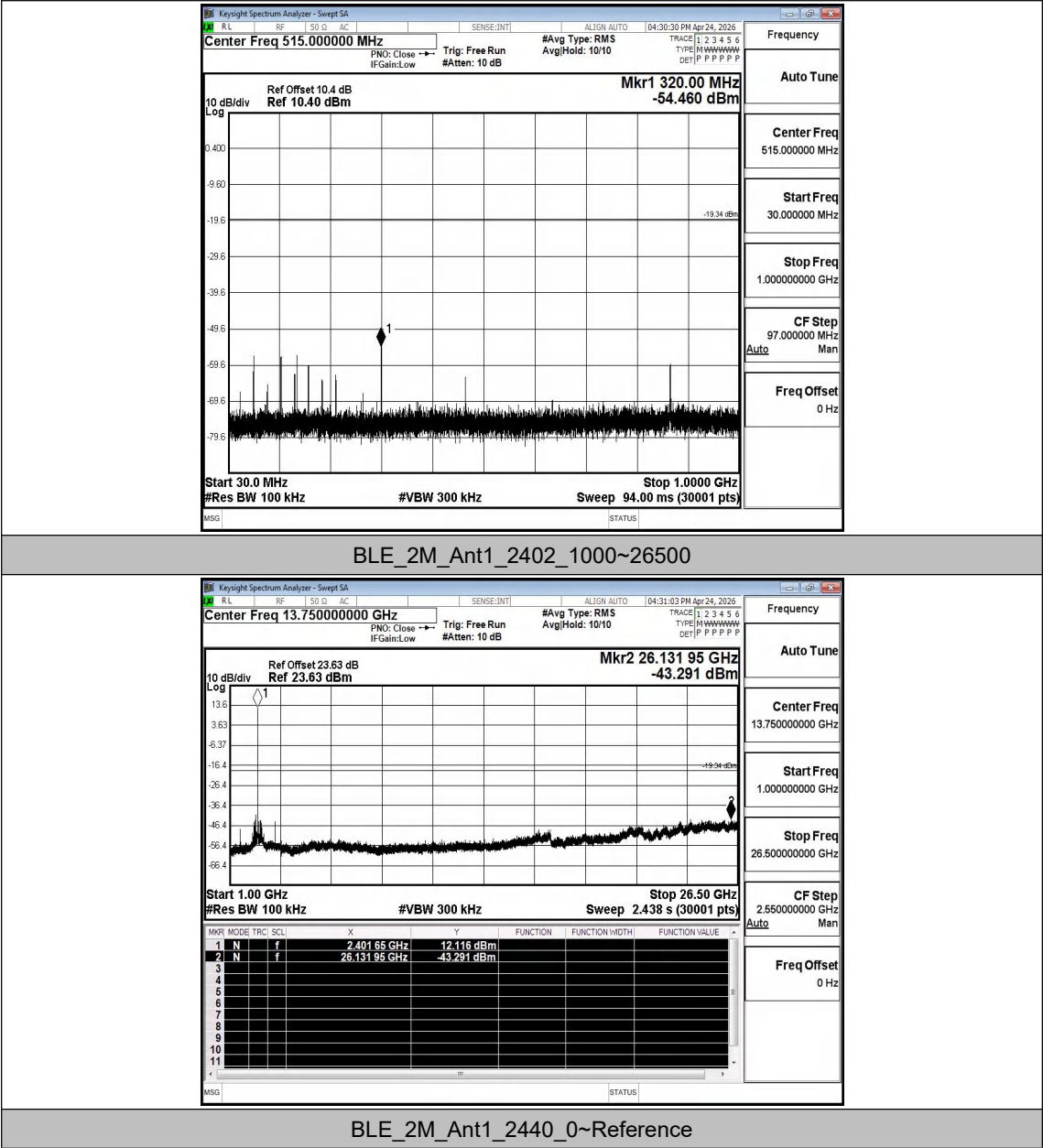


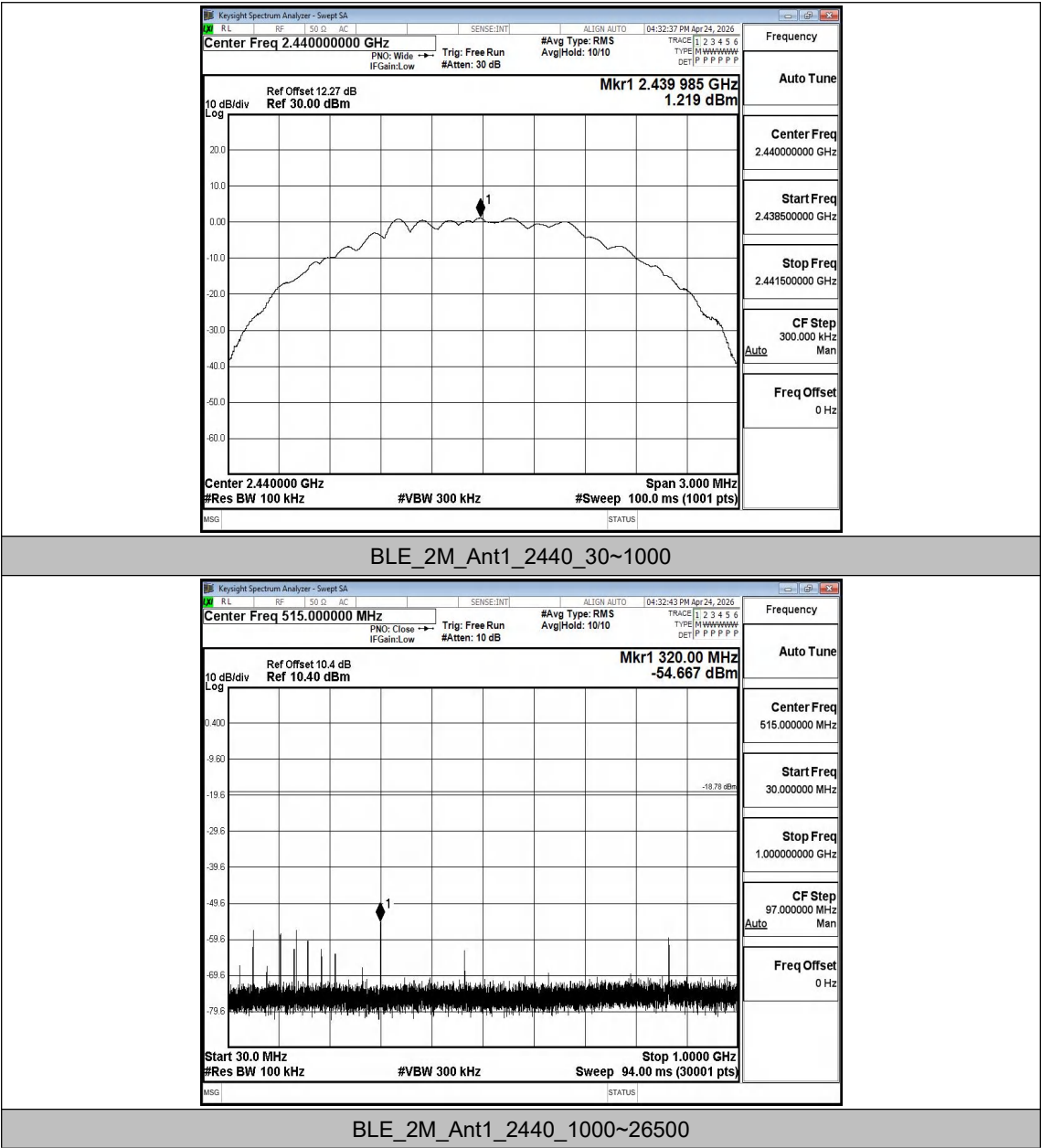


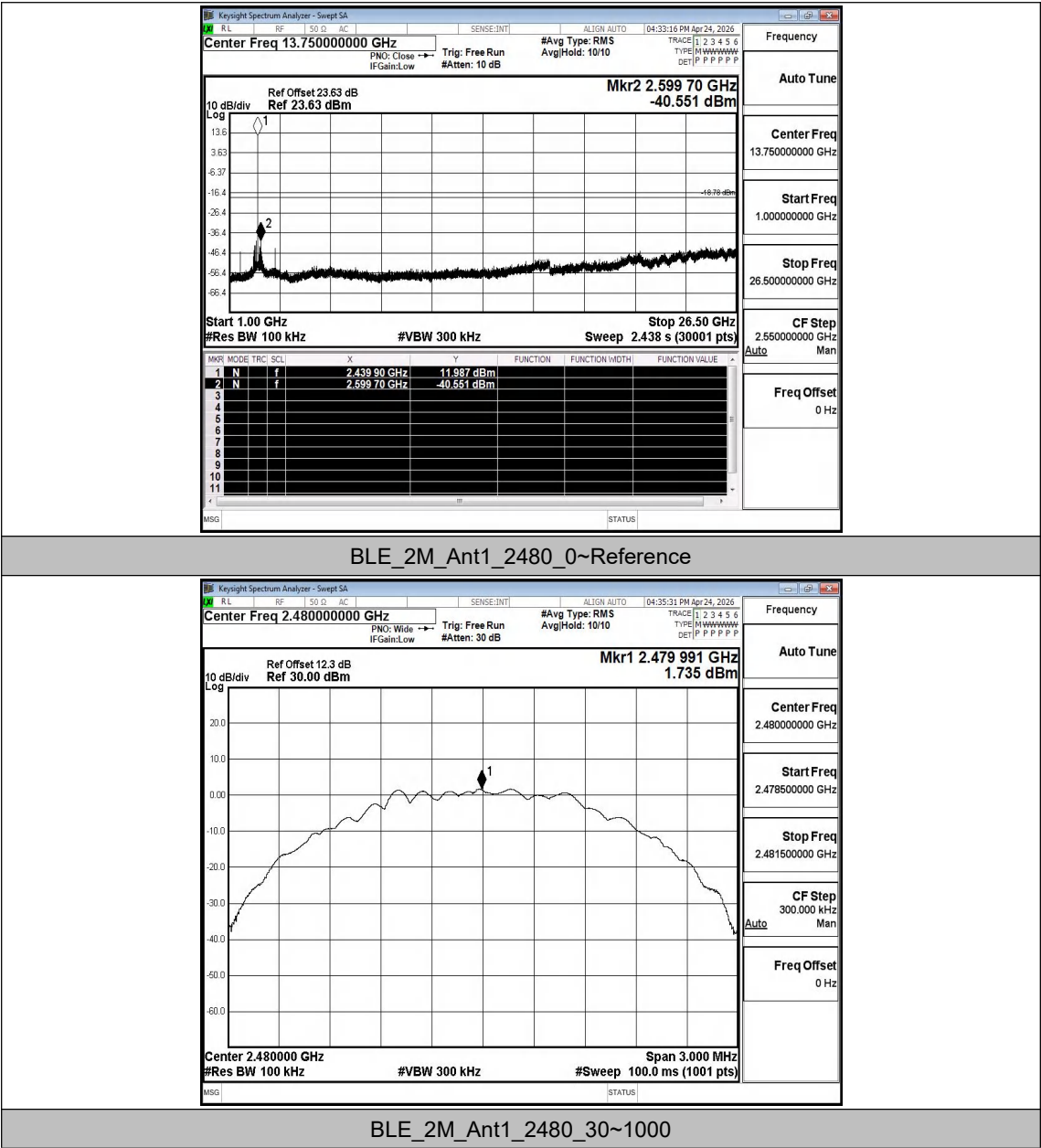


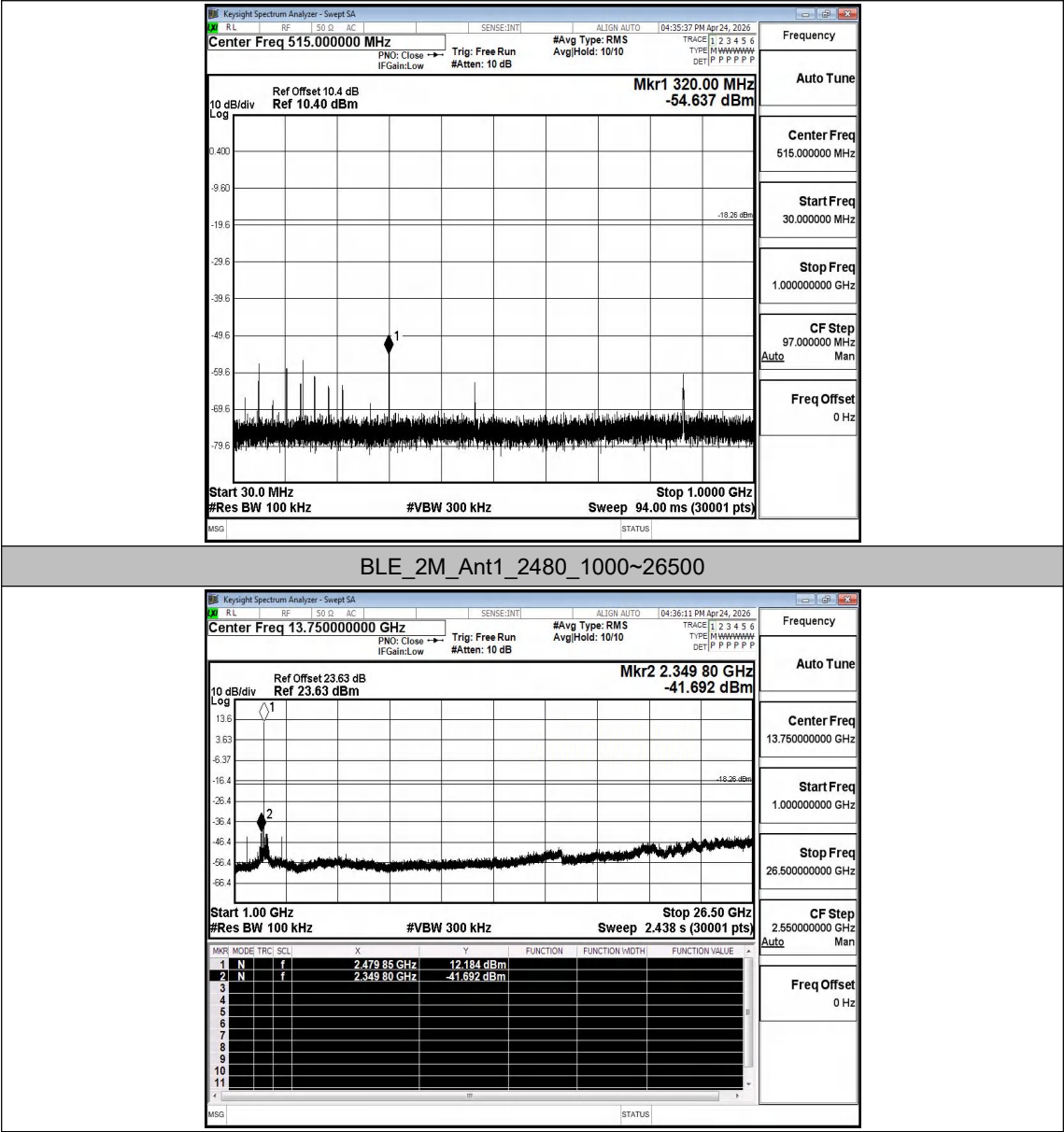










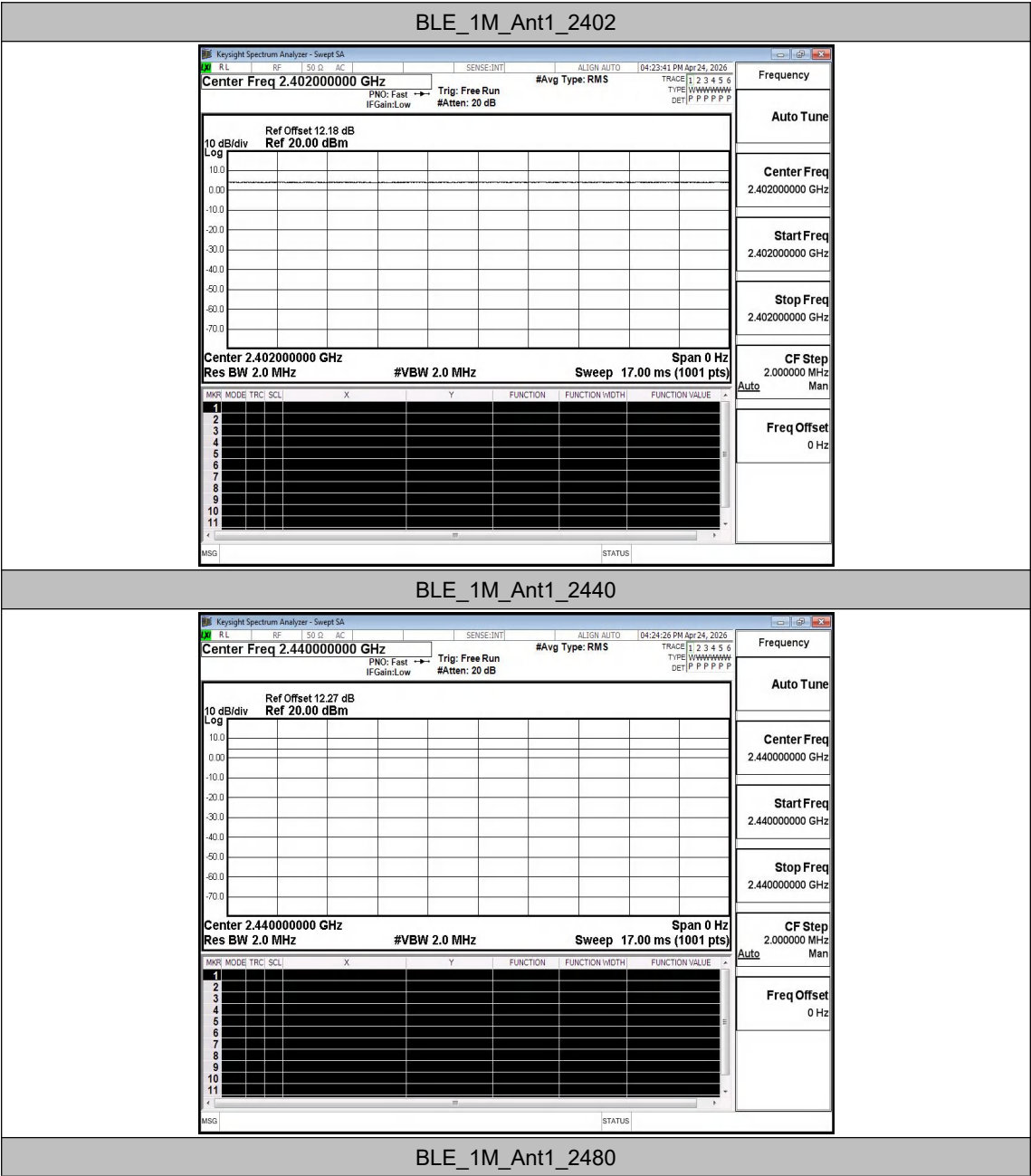


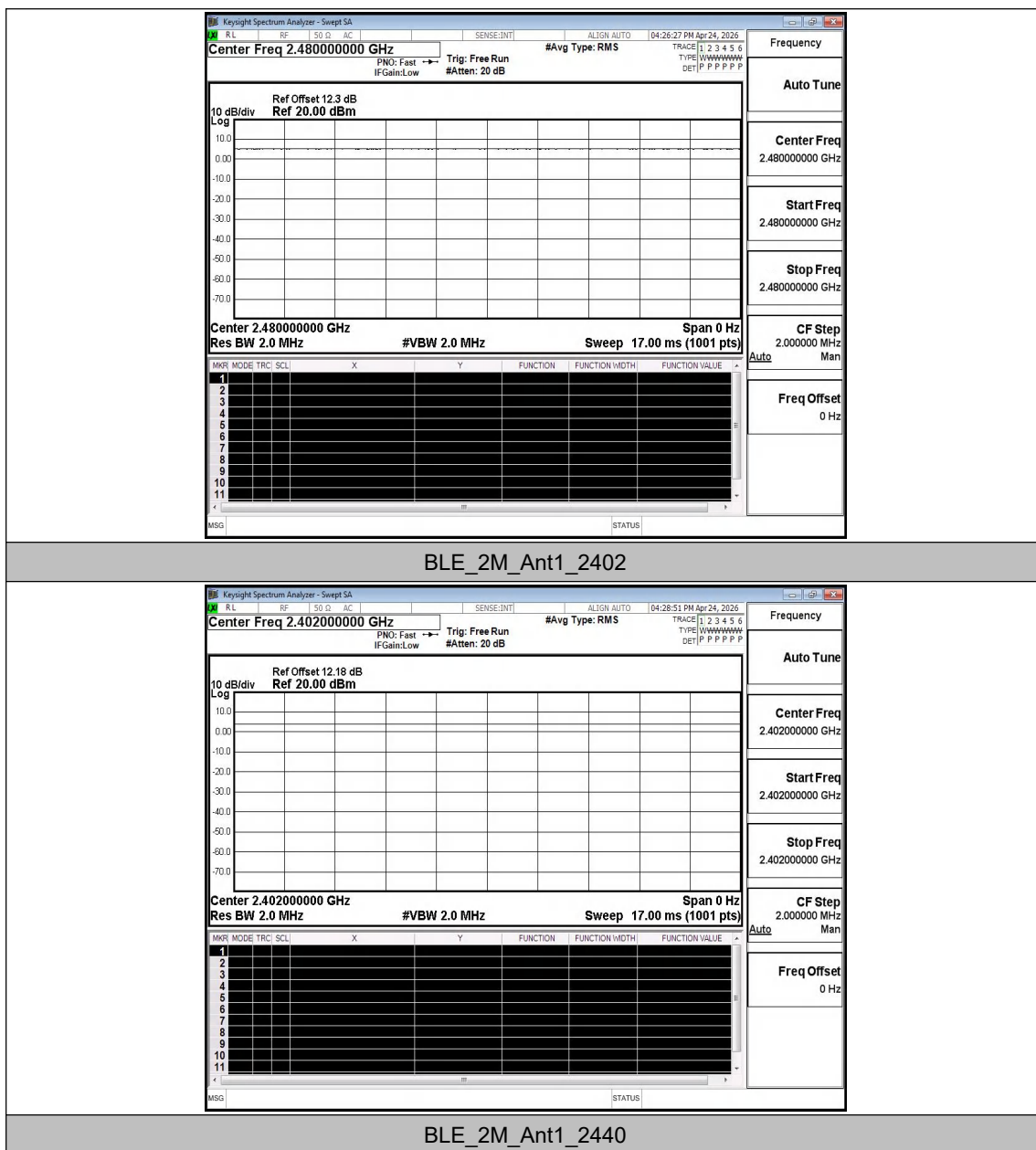
A.6 Duty Cycle

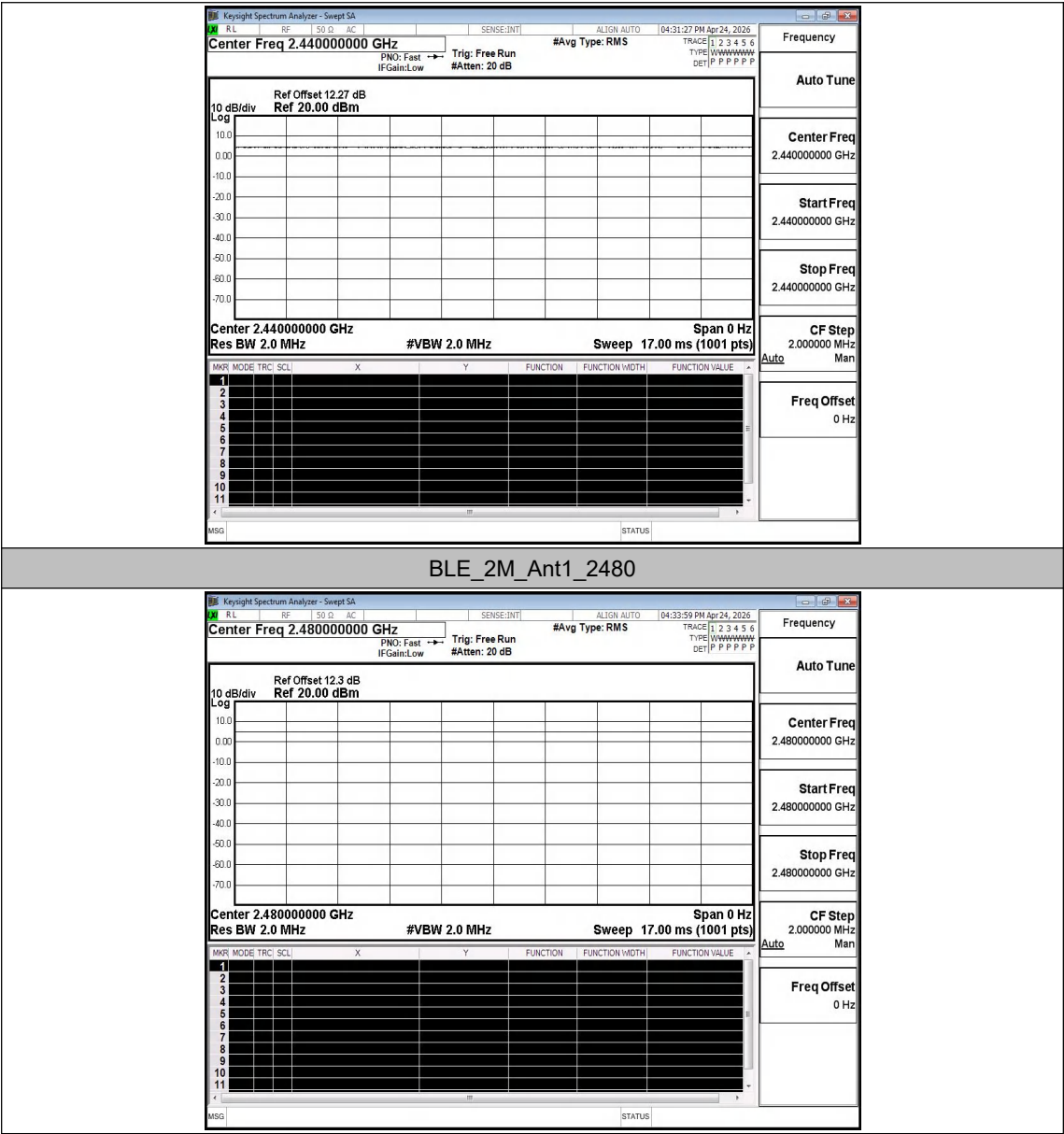
Test Result

TestMode	Antenna	Freq(MHz)	ON Time [ms]	Period [ms]	X	DC [%]	xFactor	Limit	Verdict
BLE_1M	Ant1	2402	17.00	17.00	1.0000	100.00	0.00	---	---
		2440	17.00	17.00	1.0000	100.00	0.00	---	---
		2480	17.00	17.00	1.0000	100.00	0.00	---	---
BLE_2M	Ant1	2402	17.00	17.00	1.0000	100.00	0.00	---	---
		2440	17.00	17.00	1.0000	100.00	0.00	---	---
		2480	17.00	17.00	1.0000	100.00	0.00	---	---

Test Graphs







A.7 Emissions in Restricted Bands

Test Result

TestMode	Antenna	ChName	Freq(MHz)	Detector	Freq [MHz]	Result [dBm]	Limit [dBm]	Gain [dBi]	DC Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
BLE_1M	Ant1	Low	2402	AV	2310.000	-55.82	≤-44.28	4.23	0.00	43.61	≤54	PASS
				AV	2324.045	-49.03	≤-44.28	4.23	0.00	50.40	≤54	PASS
				AV	2390.000	-55.1	≤-44.28	4.23	0.00	44.33	≤54	PASS
				Peak	2310.000	-50.49	≤-24.28	4.23	0.00	48.94	≤74	PASS
				Peak	2324.045	-44.9	≤-24.28	4.23	0.00	54.53	≤74	PASS
				Peak	2390.000	-49.68	≤-24.28	4.23	0.00	49.75	≤74	PASS
		High	2480	AV	2483.500	-51.61	≤-44.28	4.23	0.00	47.82	≤54	PASS
				AV	2483.680	-50.82	≤-44.28	4.23	0.00	48.61	≤54	PASS
				AV	2500.000	-56.36	≤-44.28	4.23	0.00	43.07	≤54	PASS
				Peak	2483.500	-46.01	≤-24.28	4.23	0.00	53.42	≤74	PASS
				Peak	2484.320	-42.36	≤-24.28	4.23	0.00	57.07	≤74	PASS
				Peak	2500.000	-48.07	≤-24.28	4.23	0.00	51.36	≤74	PASS
BLE_2M	Ant1	Low	2402	AV	2310.000	-57.29	≤-44.28	4.23	0.00	42.14	≤54	PASS
				AV	2324.360	-49.5	≤-44.28	4.23	0.00	49.93	≤54	PASS
				AV	2390.000	-53.12	≤-44.28	4.23	0.00	46.31	≤54	PASS
				Peak	2310.000	-50.83	≤-24.28	4.23	0.00	48.60	≤74	PASS
				Peak	2323.835	-44.63	≤-24.28	4.23	0.00	54.80	≤74	PASS
				Peak	2390.000	-49.61	≤-24.28	4.23	0.00	49.82	≤74	PASS
		High	2480	AV	2483.500	-51.04	≤-44.28	4.23	0.00	48.39	≤54	PASS
				AV	2485.680	-50.61	≤-44.28	4.23	0.00	48.82	≤54	PASS
				AV	2500.000	-56.25	≤-44.28	4.23	0.00	43.18	≤54	PASS
				Peak	2483.500	-44.58	≤-24.28	4.23	0.00	54.85	≤74	PASS
				Peak	2483.600	-44.22	≤-24.28	4.23	0.00	55.21	≤74	PASS
				Peak	2500.000	-48.38	≤-24.28	4.23	0.00	51.05	≤74	PASS

Note:

1. The Antenna Gain is compensated in the graph.
2. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

Test Graphs

