

Appendix A

RF Test Data for BT LE (Conducted Measurement)

Product Name: Permanent Outdoor Lights

Test Model: TM-PEL05-60M

Environmental Conditions

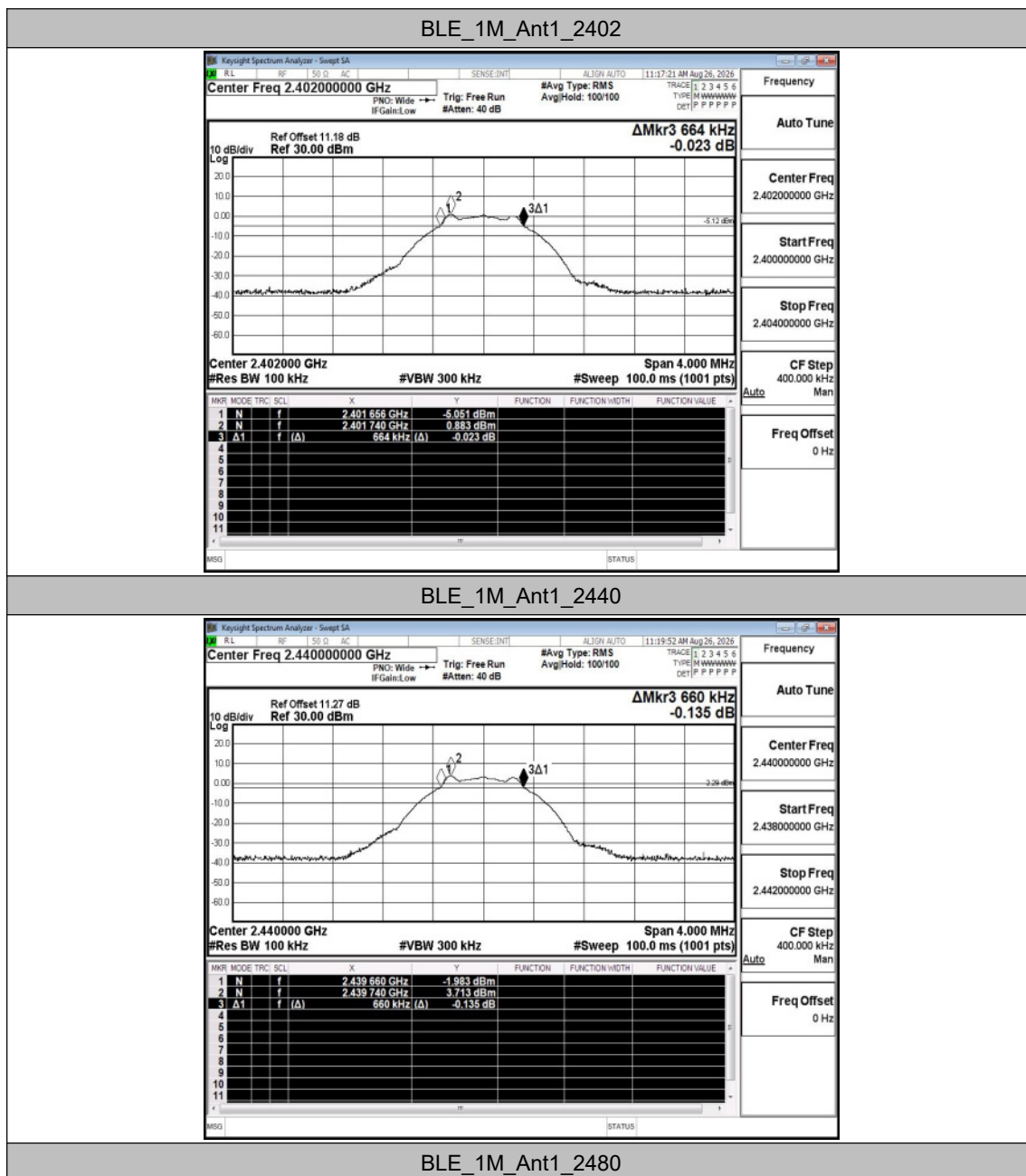
Temperature:	23.2°C
Relative Humidity:	54.3%
ATM Pressure:	100.0 kPa
Test Engineer:	Zhang hai
Supervised by:	Fengliu Tang

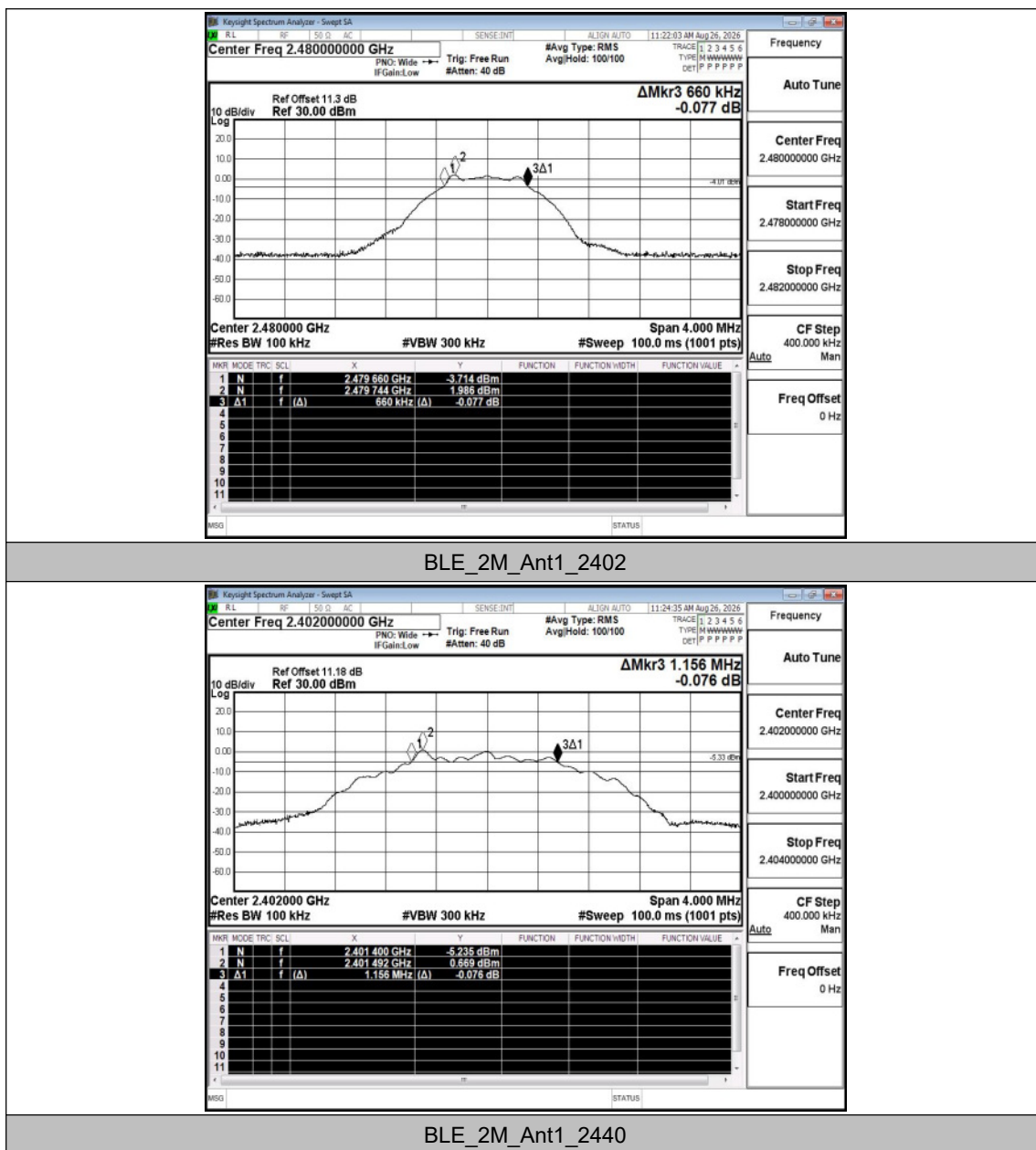
A.1 DTS Bandwidth

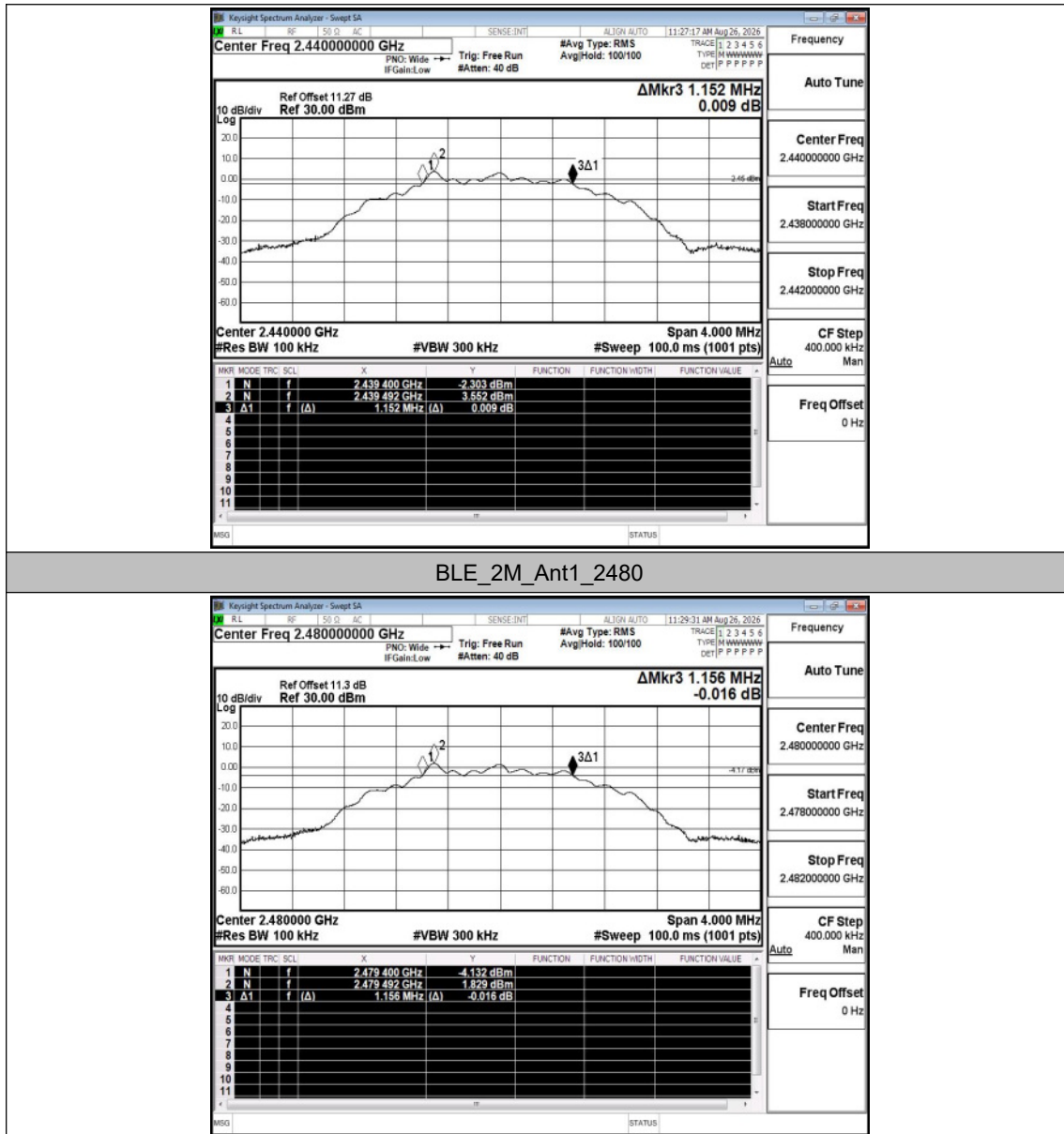
Test Result

TestMode	Antenna	Freq(MHz)	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.664	2401.656	2402.320	0.5	PASS
		2440	0.660	2439.660	2440.320	0.5	PASS
		2480	0.660	2479.660	2480.320	0.5	PASS
BLE_2M	Ant1	2402	1.156	2401.400	2402.556	0.5	PASS
		2440	1.152	2439.400	2440.552	0.5	PASS
		2480	1.156	2479.400	2480.556	0.5	PASS

Test Graphs



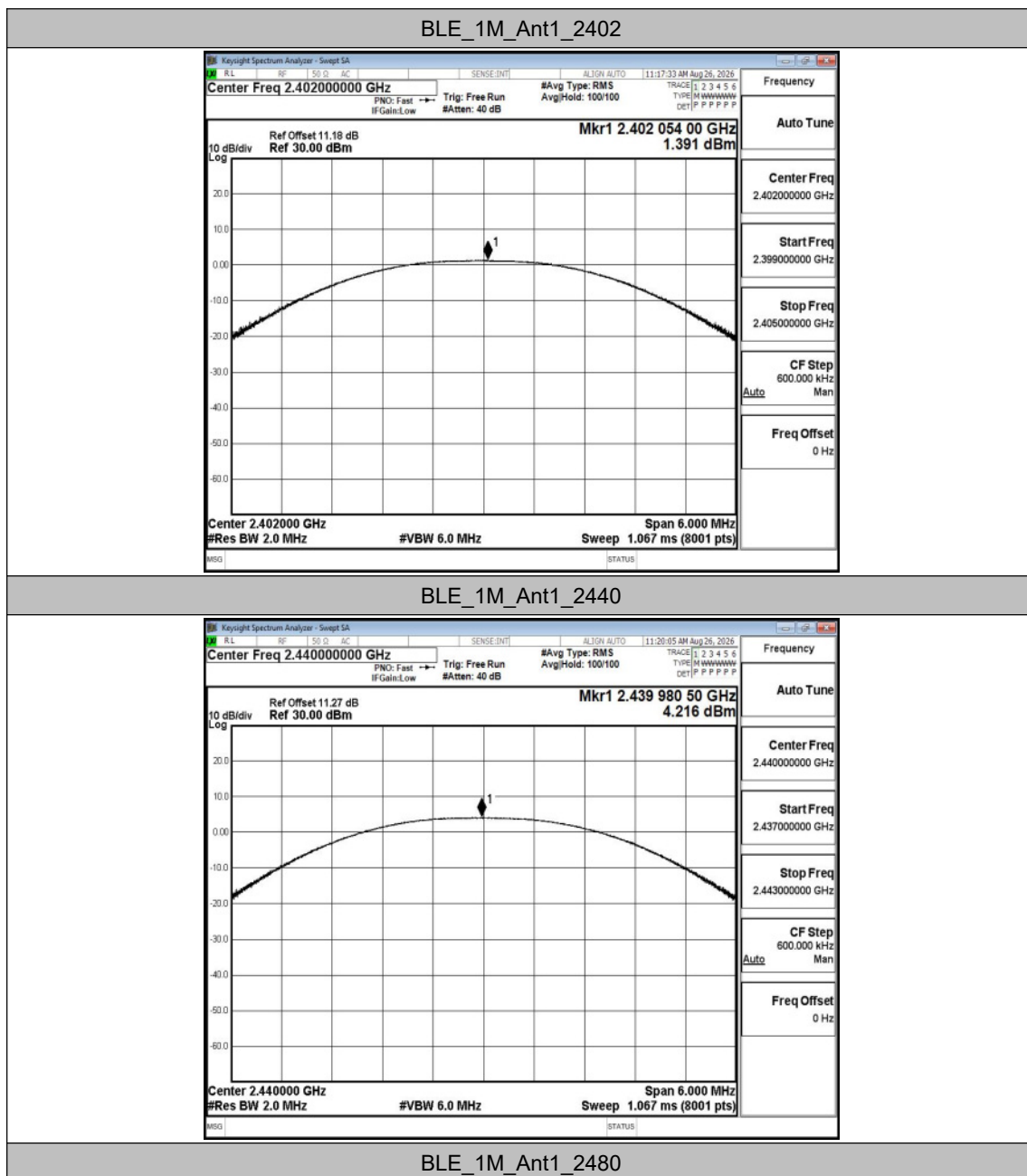


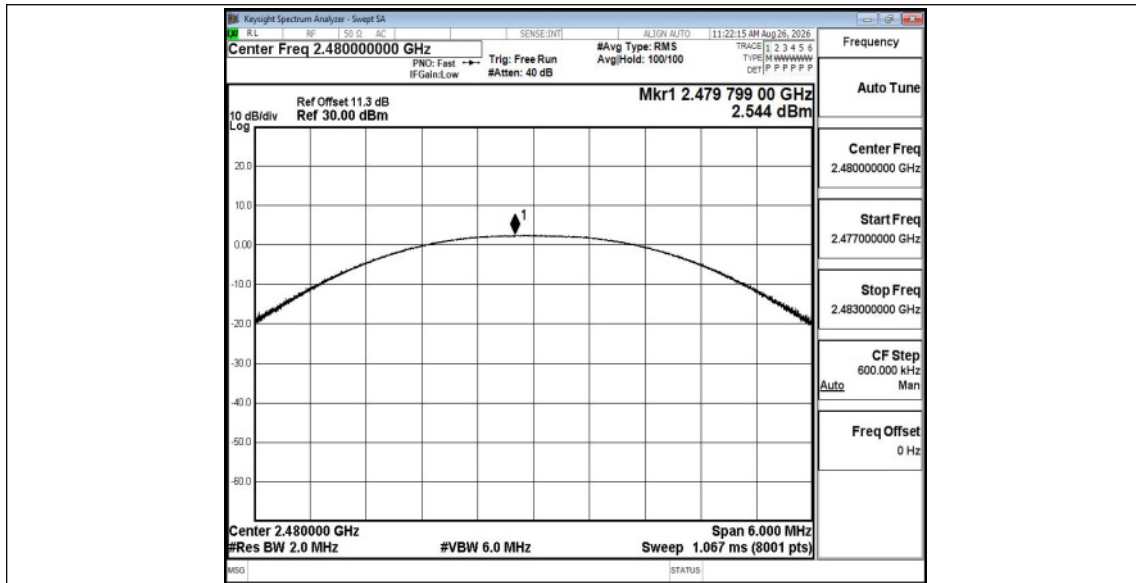


A.2 Maximum Peak conducted output power

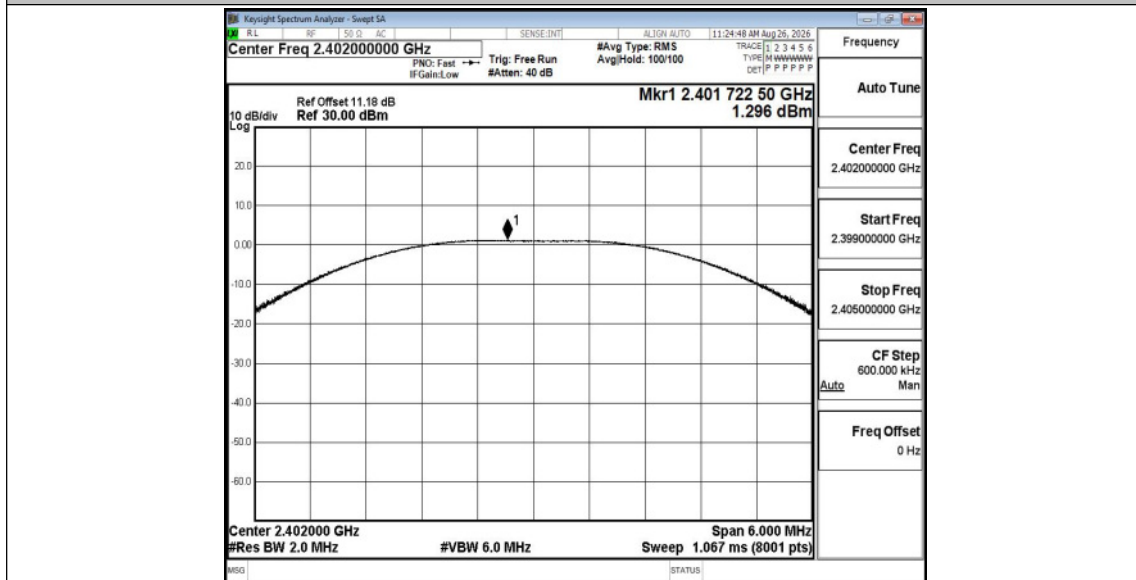
Test Result

TestMode	Antenna	Freq(MHz)	Conducted Peak Power[dBm]	Conducted Limit[dBm]
BLE_1M	Ant1	2402	1.39	≤30
		2440	4.22	≤30
		2480	2.54	≤30
BLE_2M	Ant1	2402	1.30	≤30
		2440	4.11	≤30
		2480	2.51	≤30

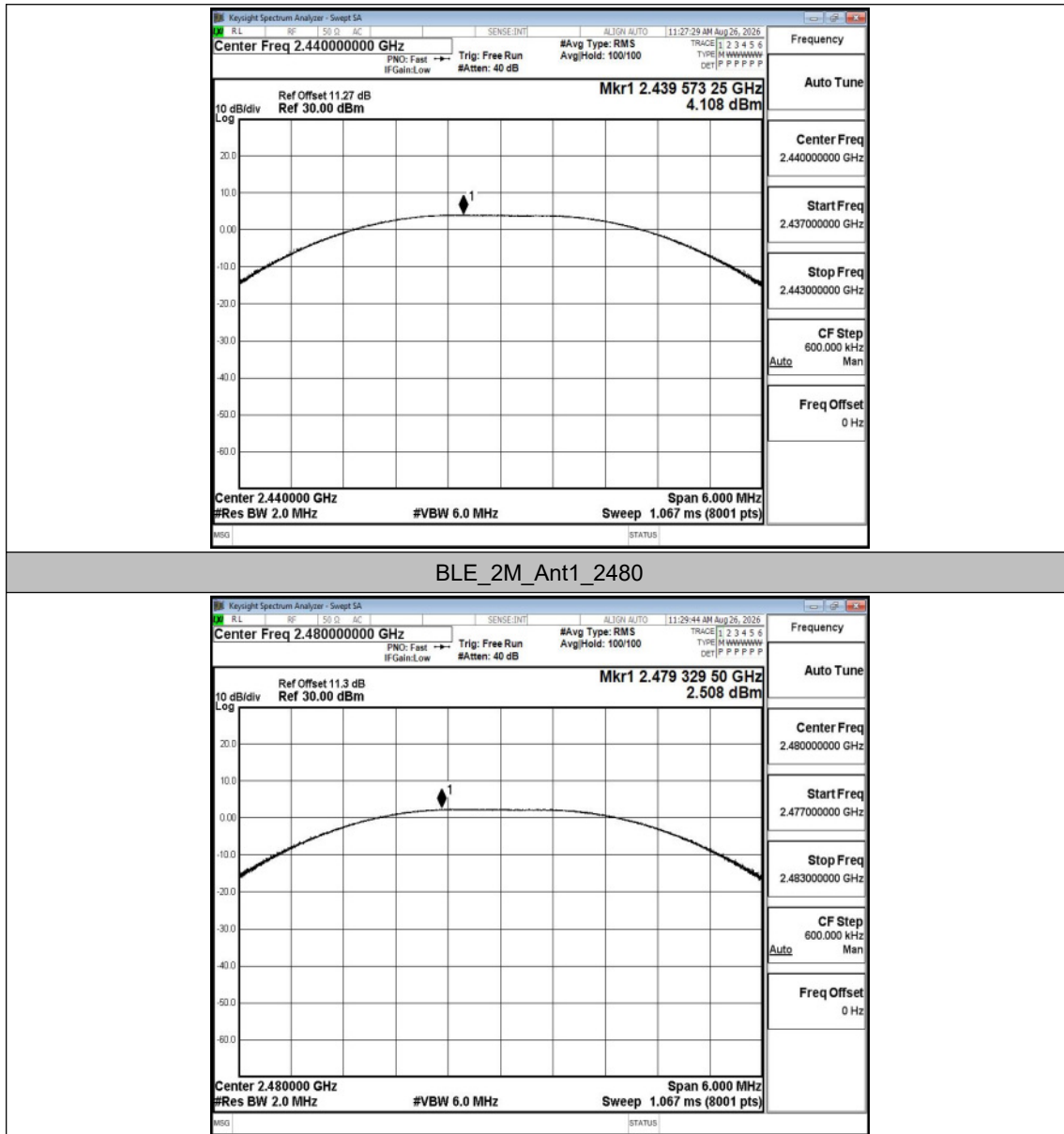
Test Graphs Peak



BLE_2M_Ant1_2402



BLE_2M_Ant1_2440

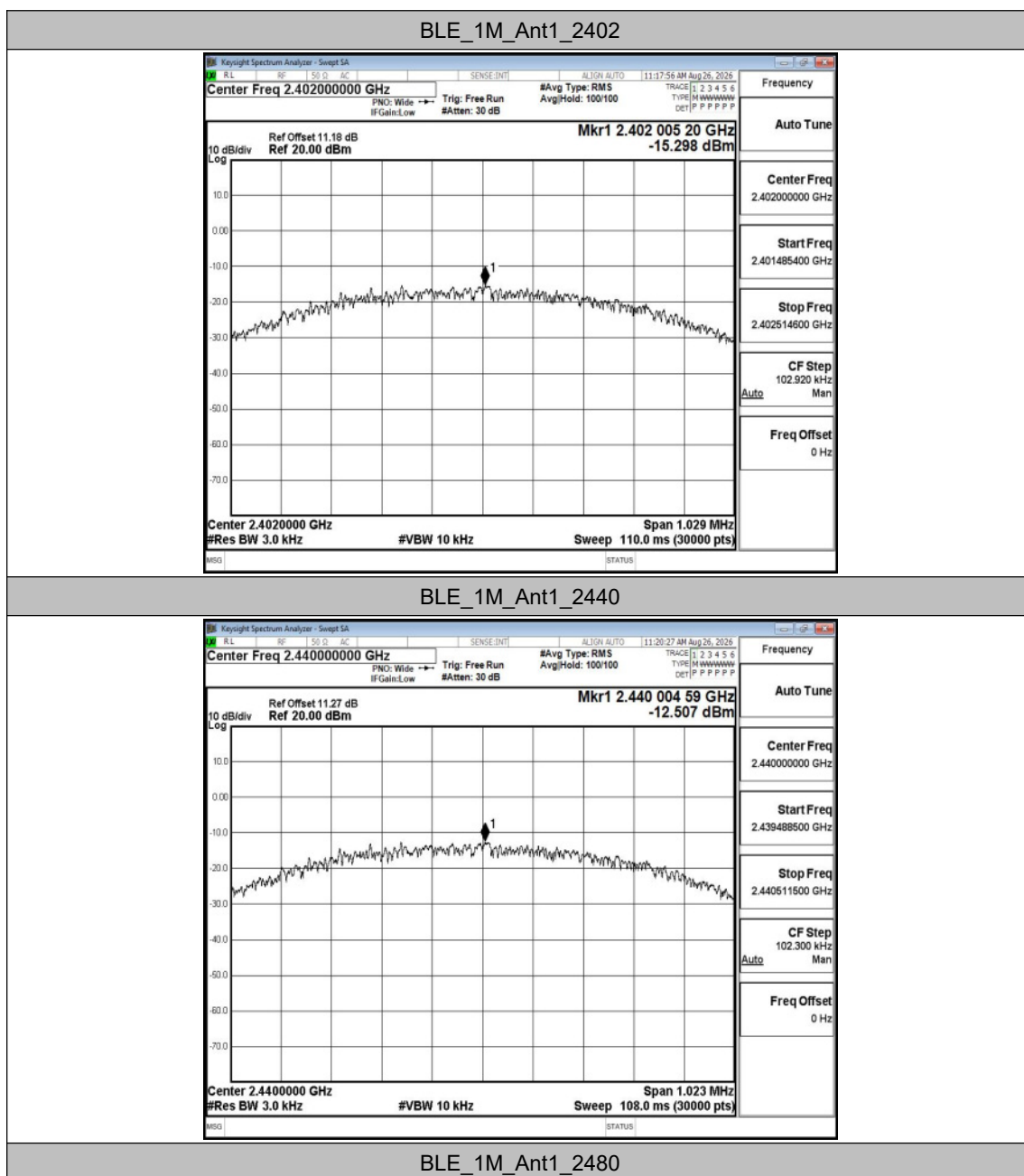


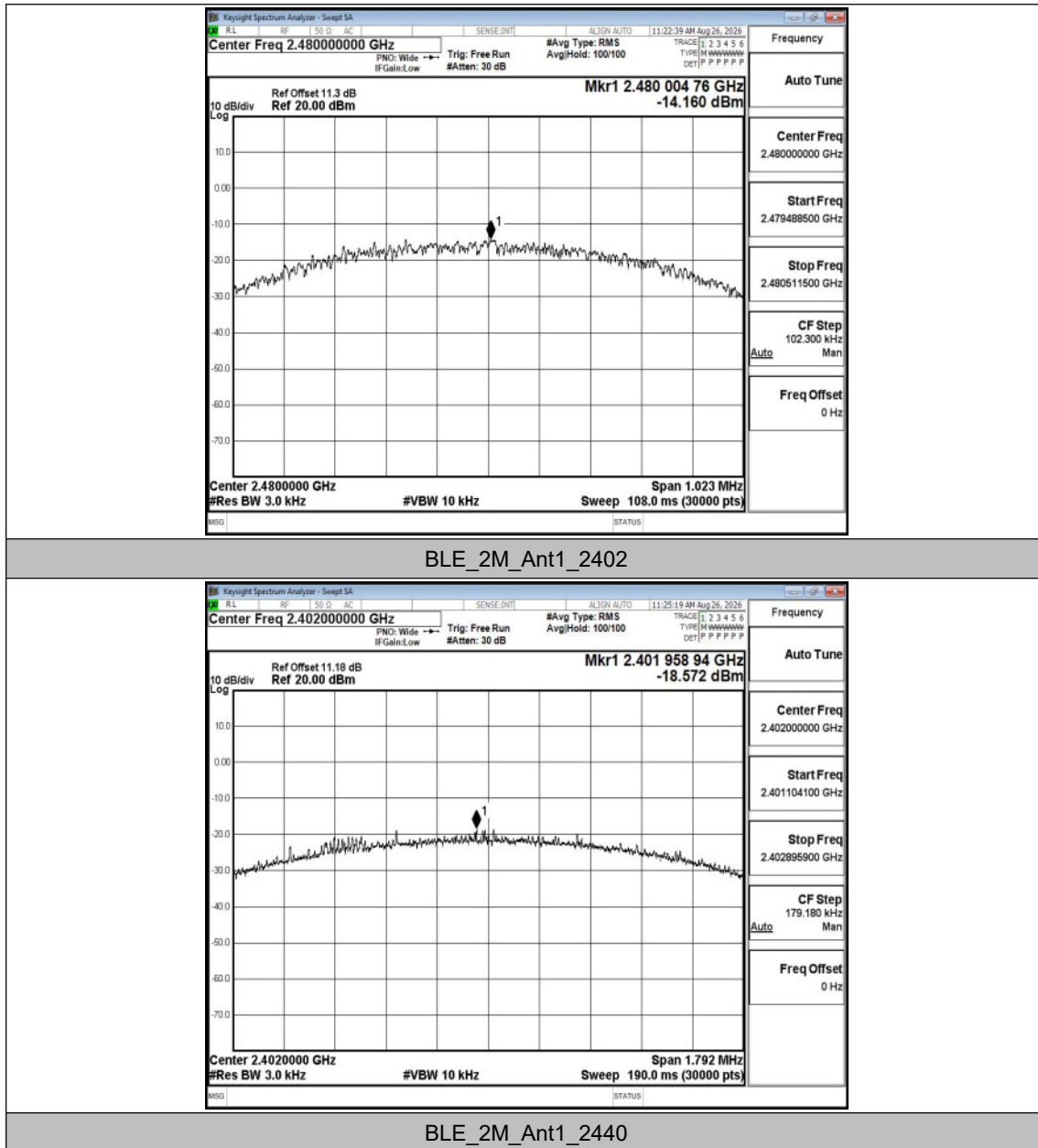
A.3 Maximum power spectral density

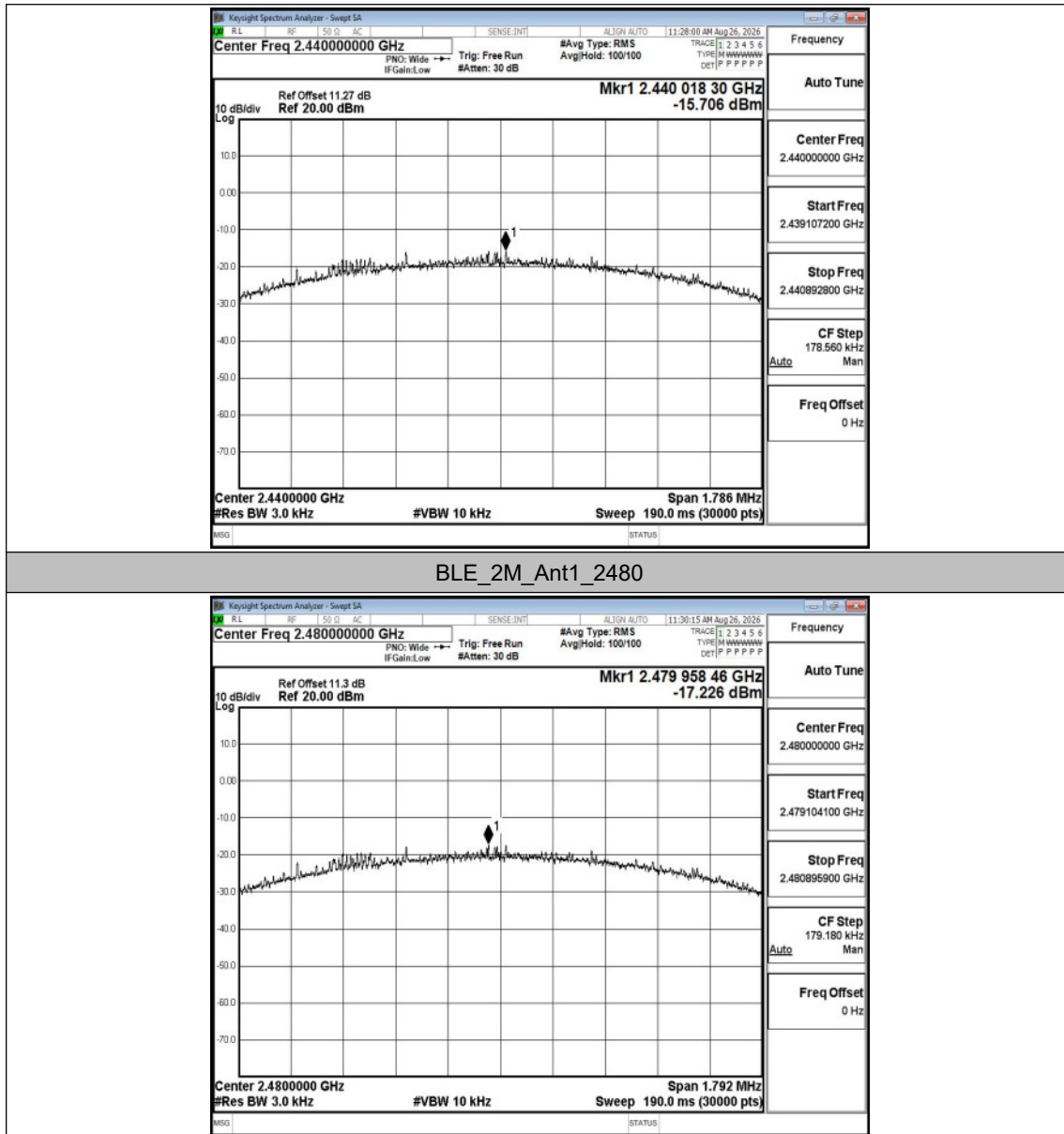
Test Result

TestMode	Antenna	Freq(MHz)	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-15.30	≤8.00	PASS
		2440	-12.51	≤8.00	PASS
		2480	-14.16	≤8.00	PASS
BLE_2M	Ant1	2402	-18.57	≤8.00	PASS
		2440	-15.71	≤8.00	PASS
		2480	-17.23	≤8.00	PASS

Test Graphs





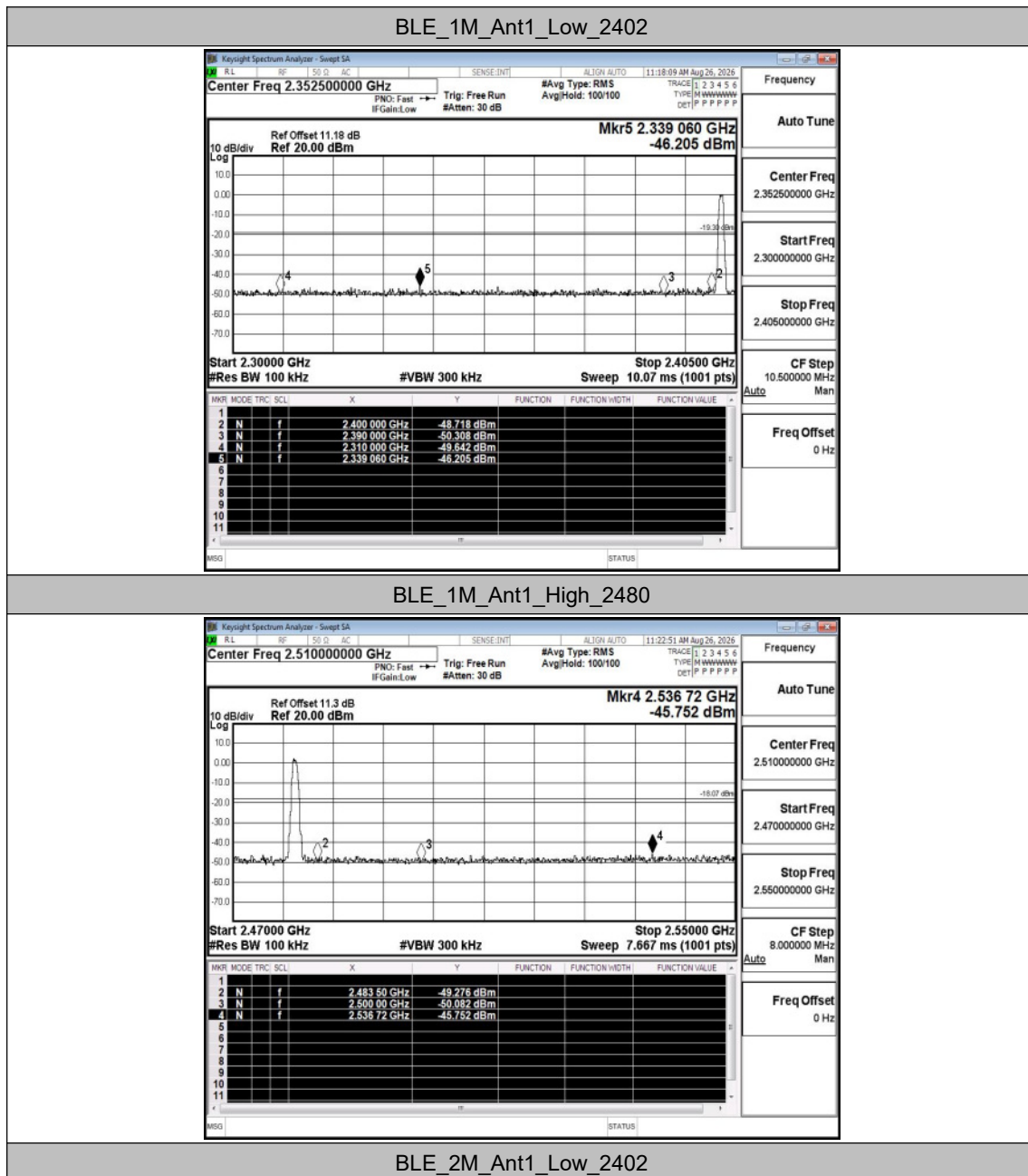


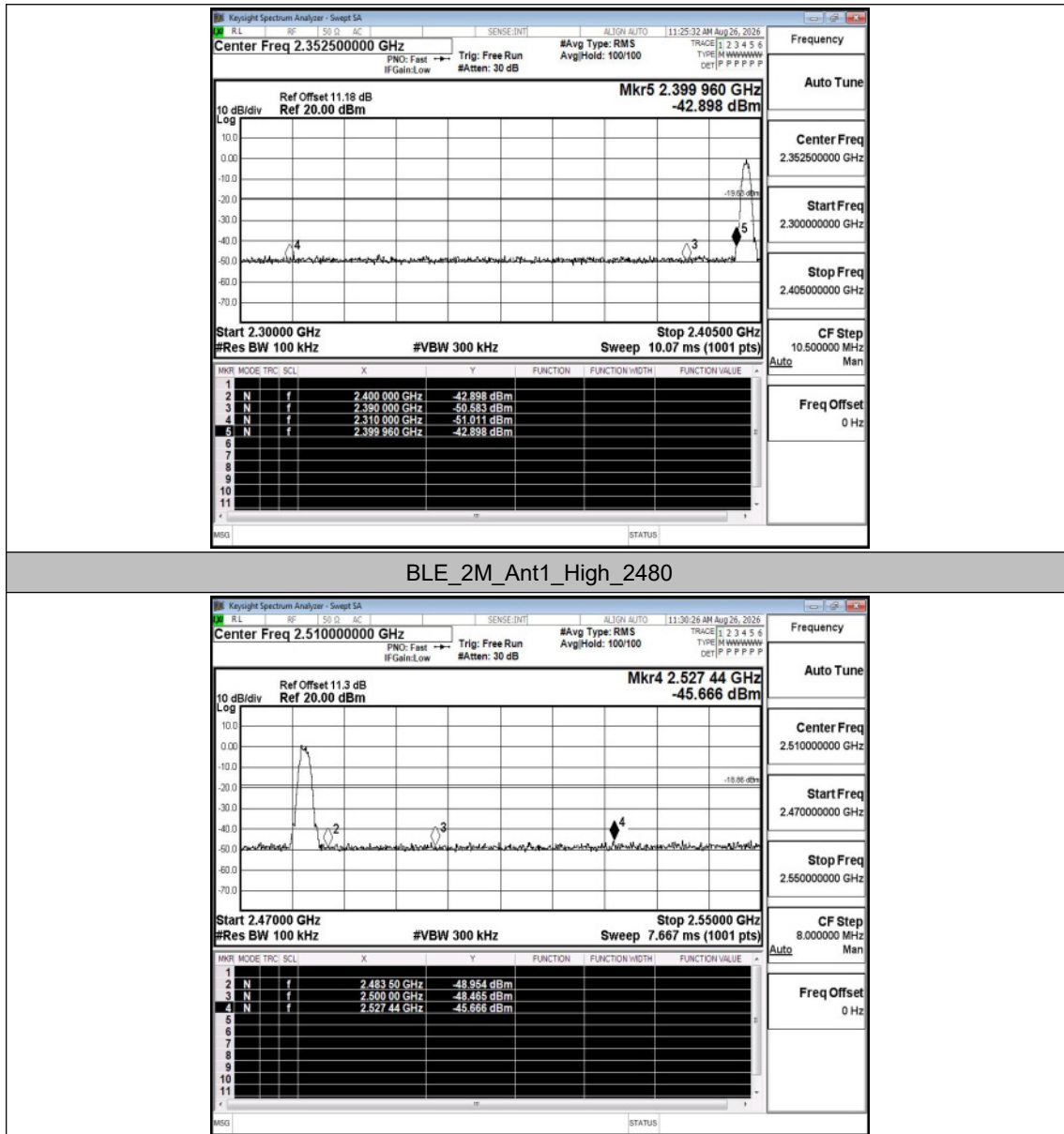
A.4 Band edge measurements

Test Result

TestMode	Antenna	ChName	Freq(MHz)	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	0.70	-46.21	≤-19.3	PASS
		High	2480	1.93	-45.75	≤-18.07	PASS
BLE_2M	Ant1	Low	2402	0.37	-42.9	≤-19.63	PASS
		High	2480	1.14	-45.67	≤-18.86	PASS

Test Graphs



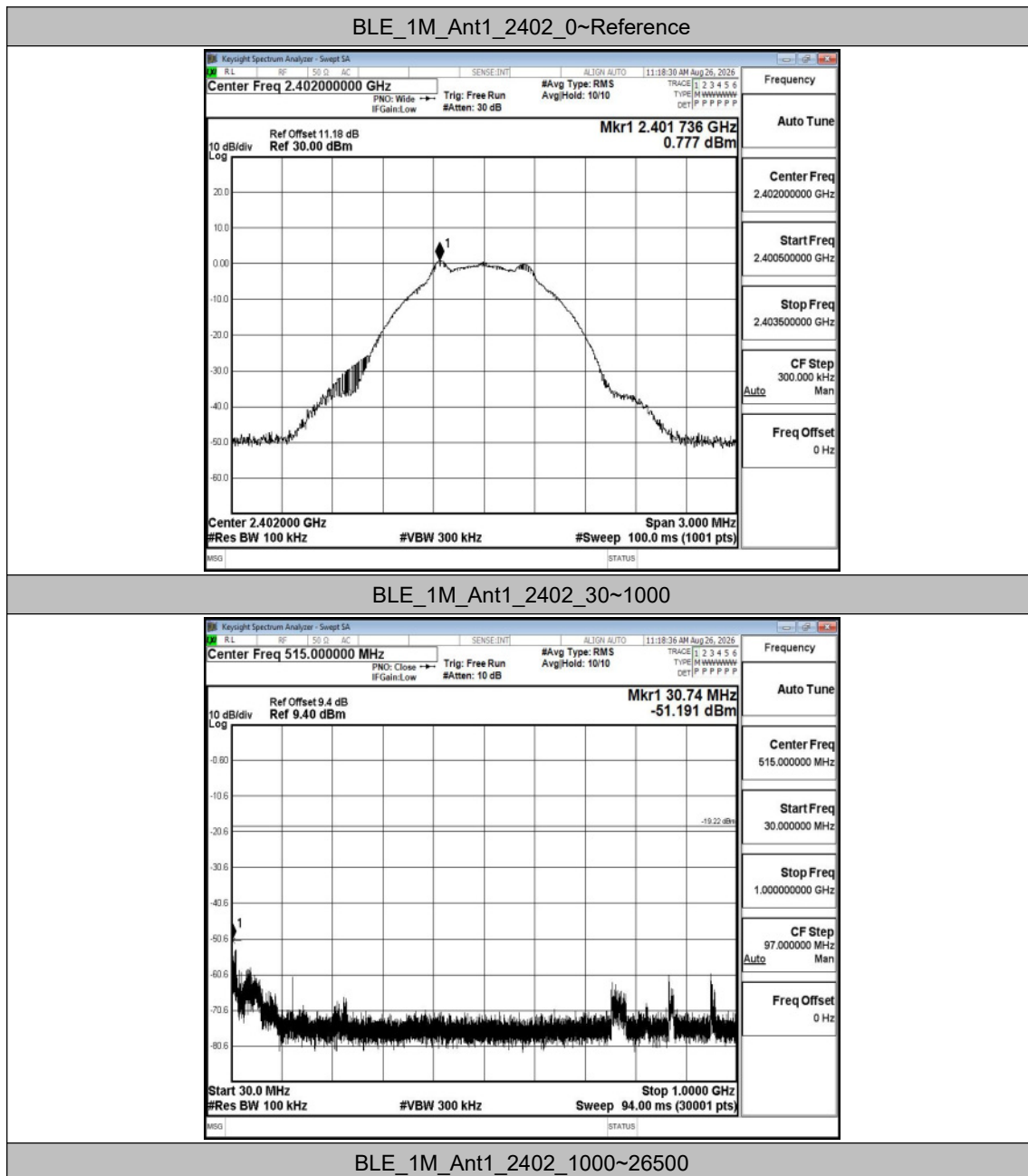


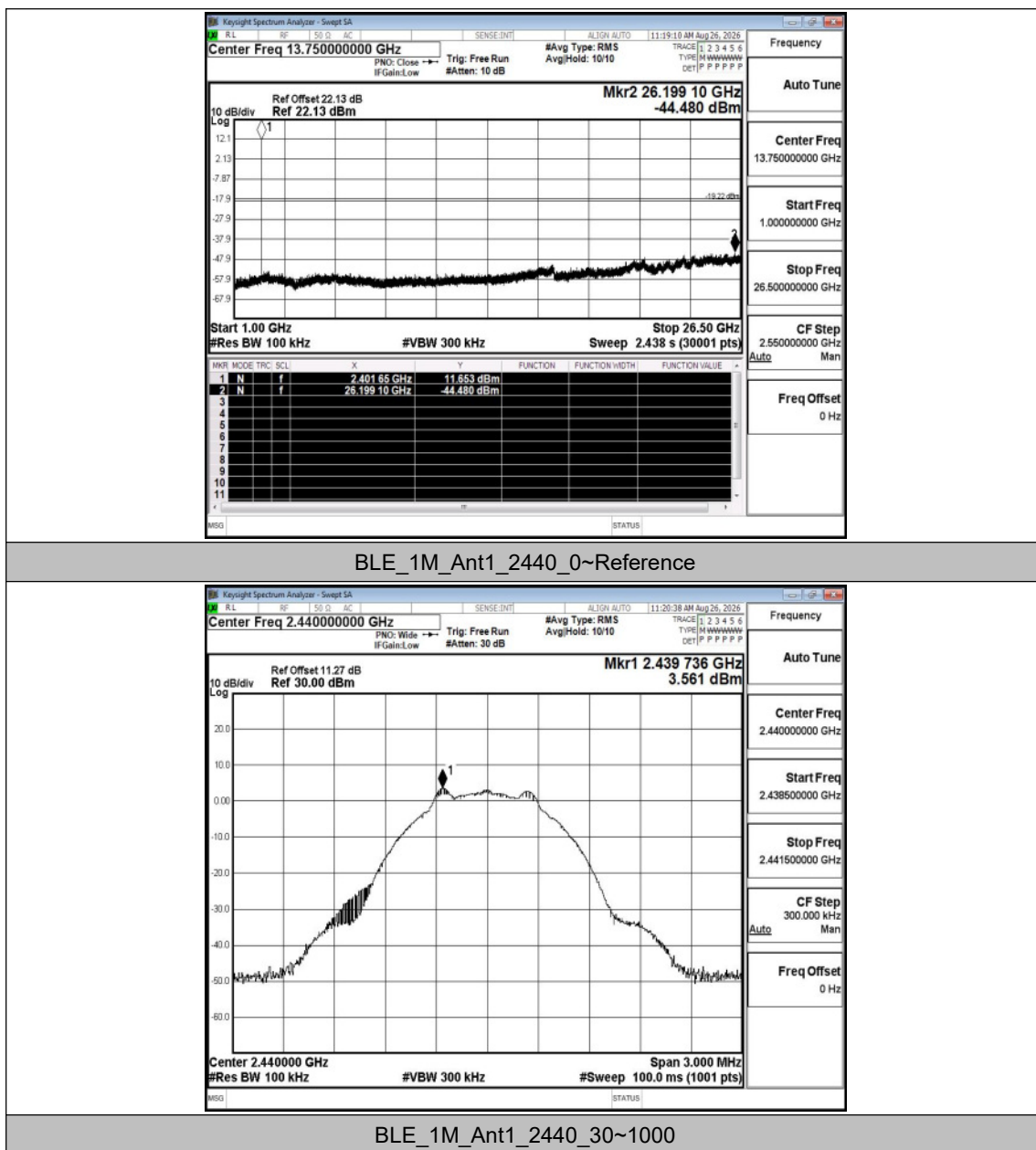
A.5 Conducted Spurious Emission

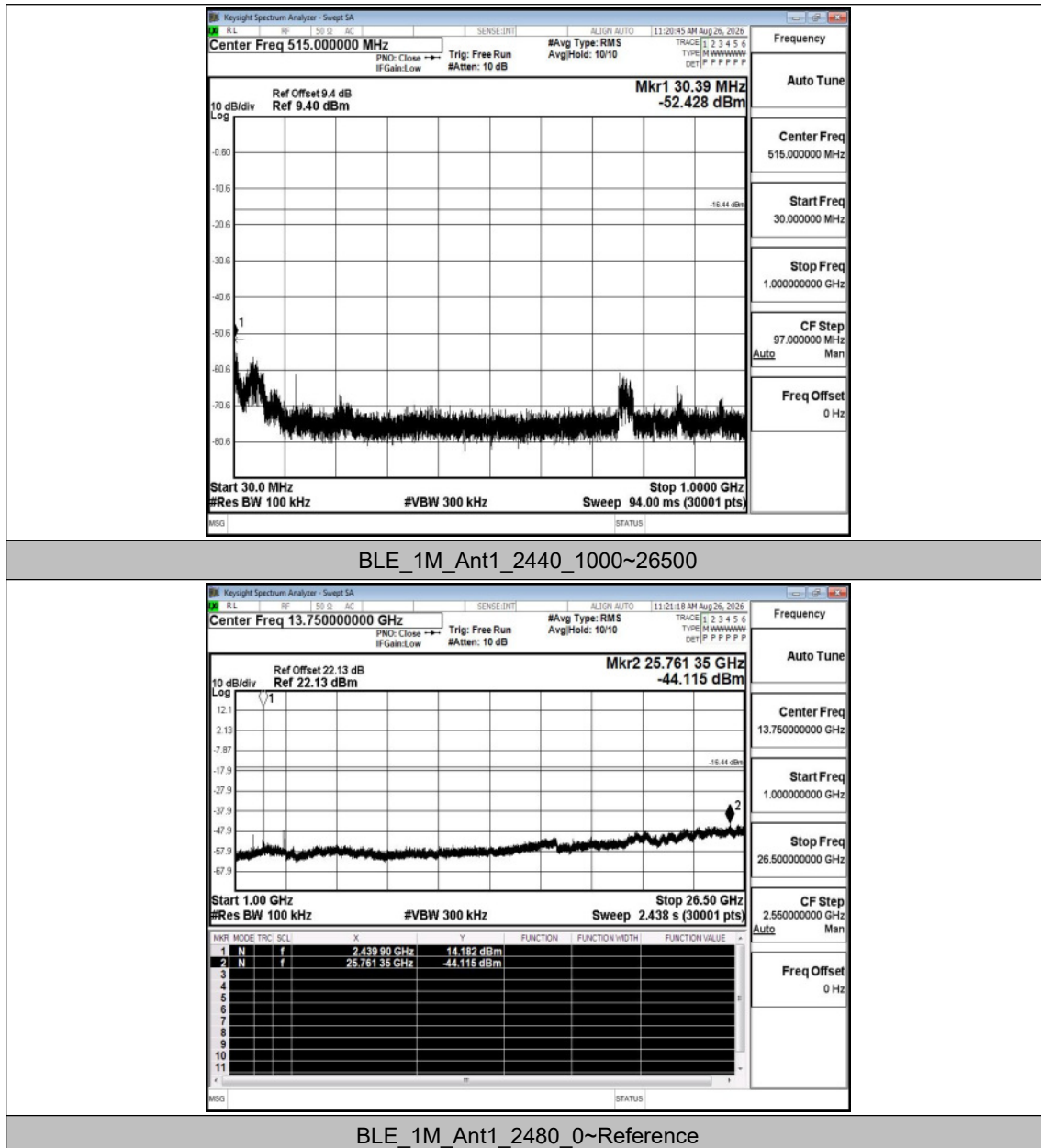
Test Result

TestMode	Antenna	Freq(MHz)	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	0.78	0.78	---	PASS
			30~1000	0.78	-51.19	≤-19.22	PASS
			1000~26500	0.78	-44.48	≤-19.22	PASS
		2440	Reference	3.56	3.56	---	PASS
			30~1000	3.56	-52.43	≤-16.44	PASS
			1000~26500	3.56	-44.12	≤-16.44	PASS
		2480	Reference	1.95	1.95	---	PASS
			30~1000	1.95	-52.04	≤-18.05	PASS
			1000~26500	1.95	-43.39	≤-18.05	PASS
BLE_2M	Ant1	2402	Reference	0.57	0.57	---	PASS
			30~1000	0.57	-51.72	≤-19.43	PASS
			1000~26500	0.57	-39.85	≤-19.43	PASS
		2440	Reference	3.44	3.44	---	PASS
			30~1000	3.44	-52.55	≤-16.56	PASS
			1000~26500	3.44	-38.58	≤-16.56	PASS
		2480	Reference	1.77	1.77	---	PASS
			30~1000	1.77	-49.85	≤-18.23	PASS
			1000~26500	1.77	-45.27	≤-18.23	PASS

Test Graphs

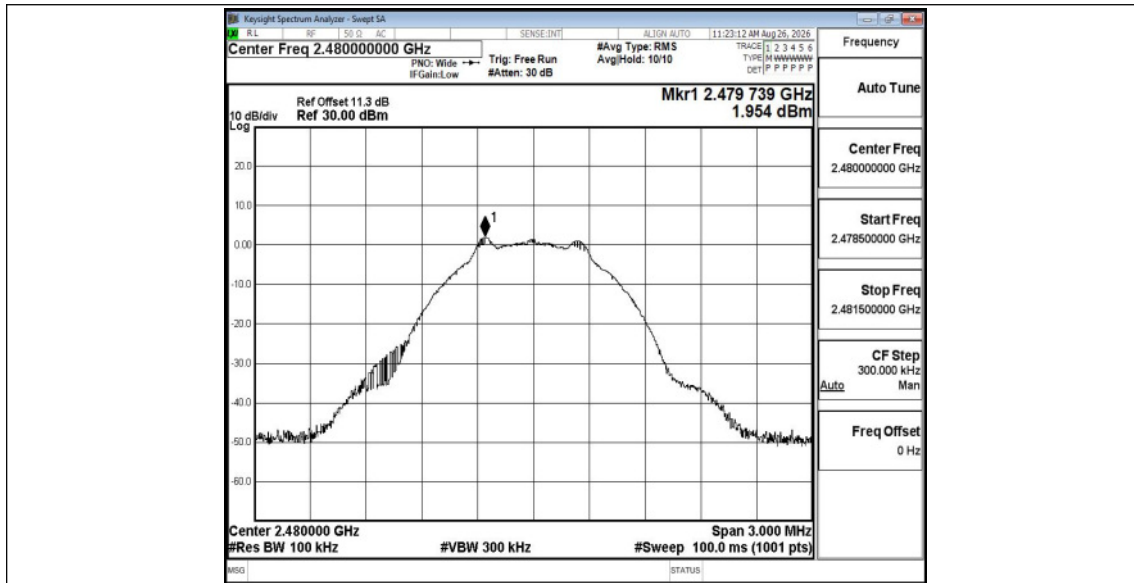




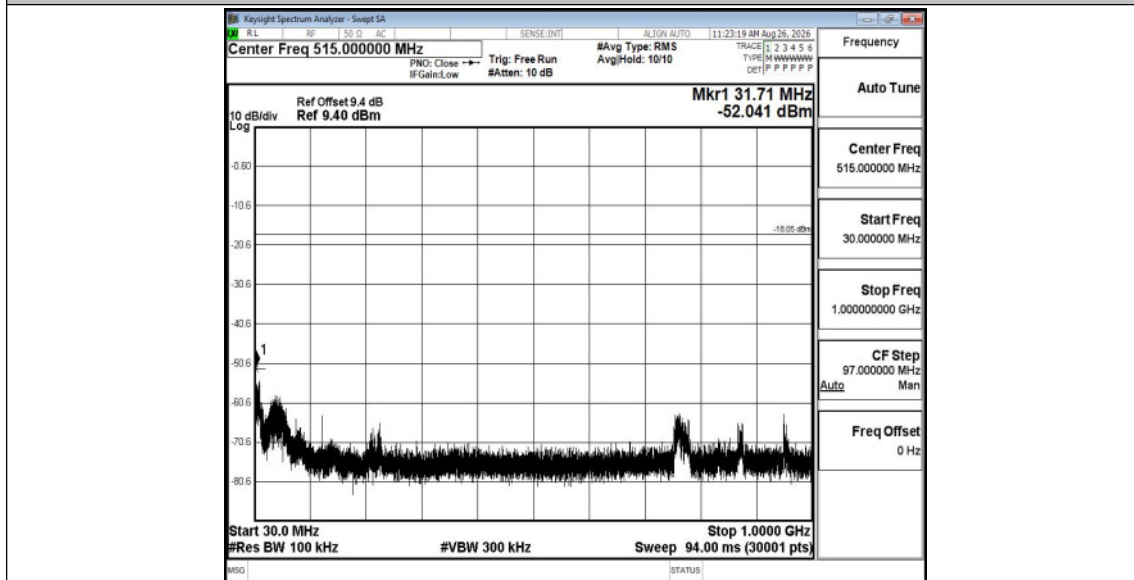


BLE_1M_Ant1_2440_1000~26500

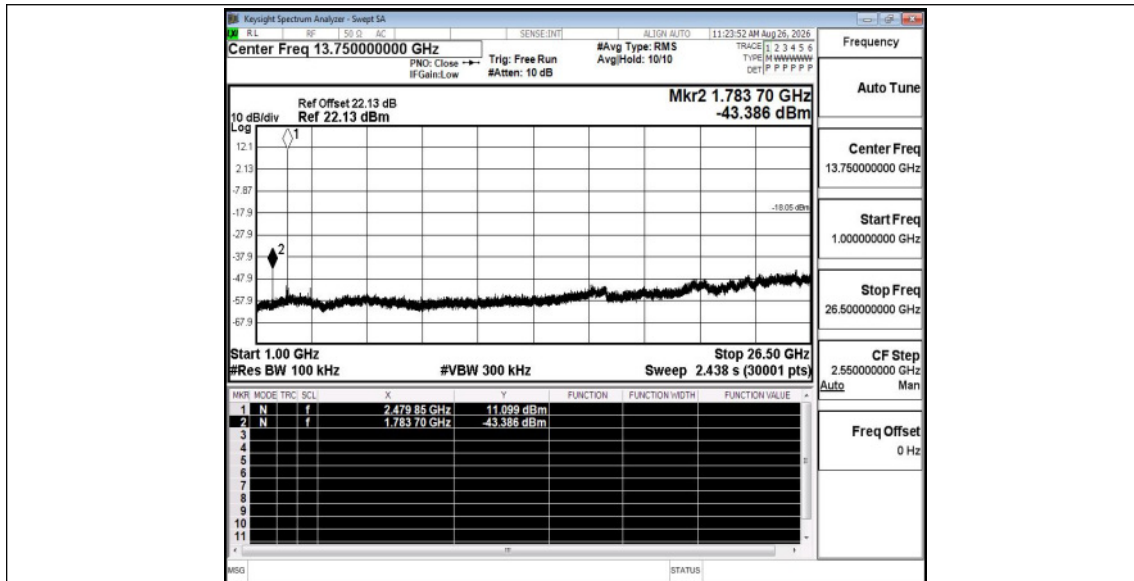
BLE_1M_Ant1_2480_0~Reference



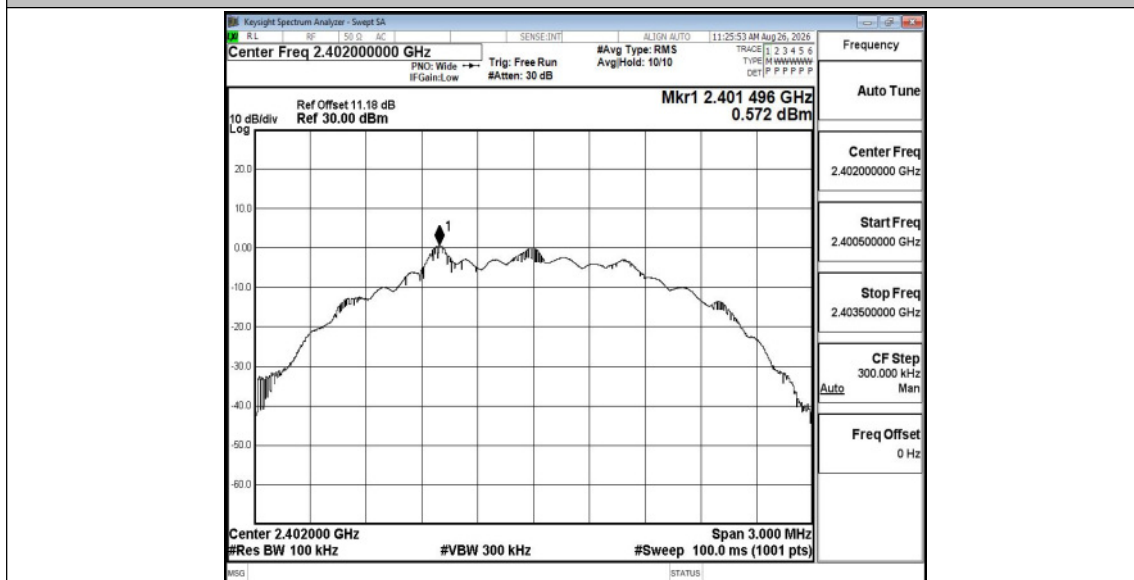
BLE_1M_Ant1_2480_30~1000



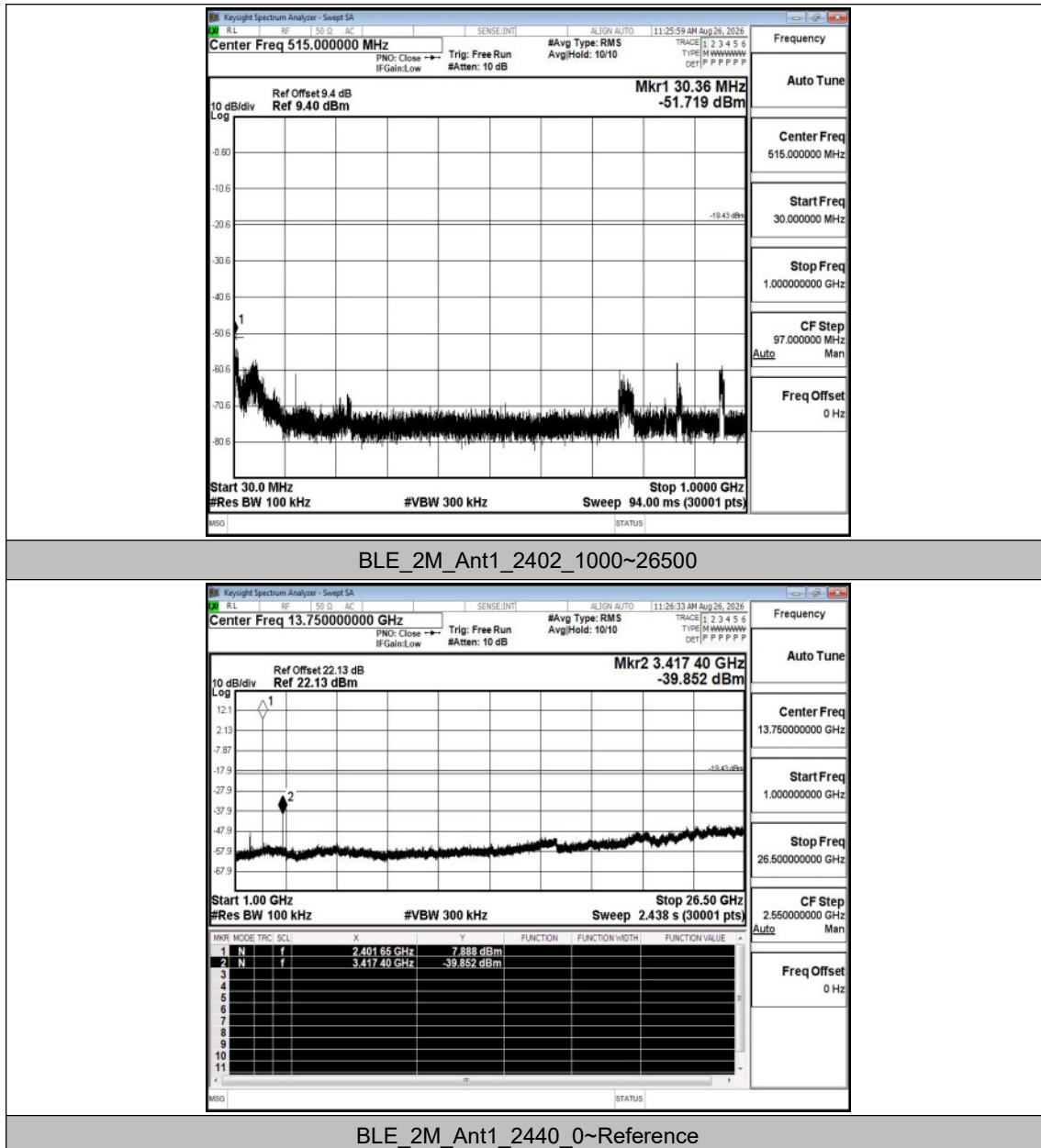
BLE_1M_Ant1_2480_1000~26500

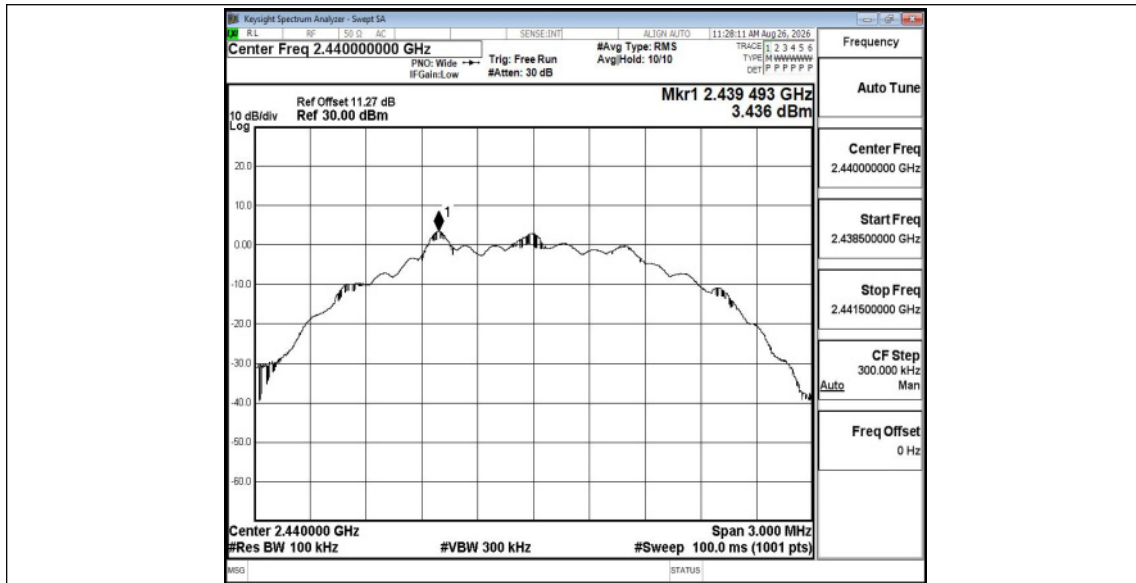


BLE_2M_Ant1_2402_0~Reference

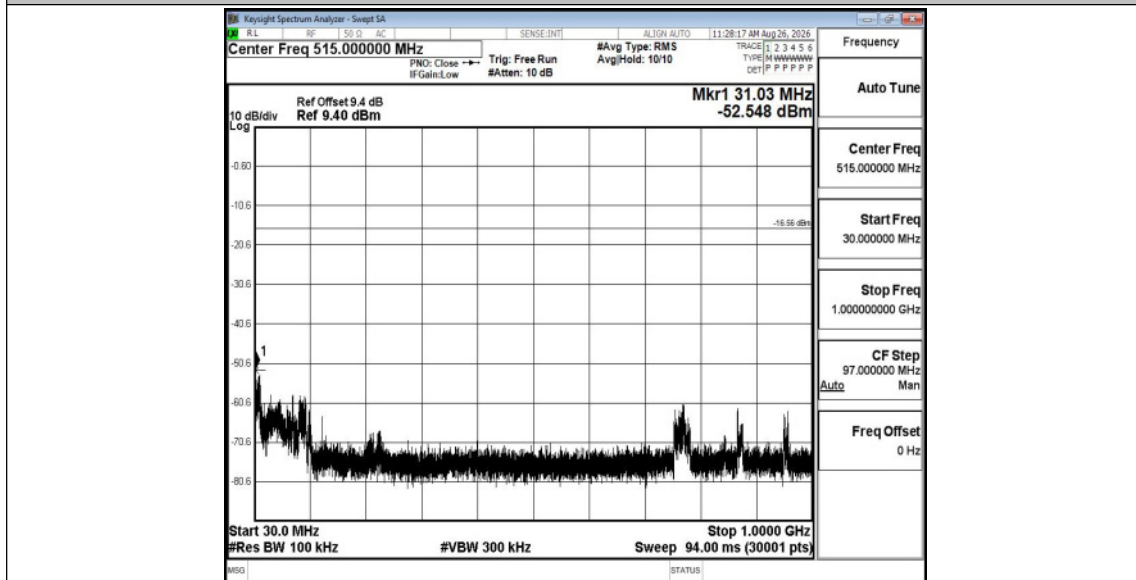


BLE_2M_Ant1_2402_30~1000

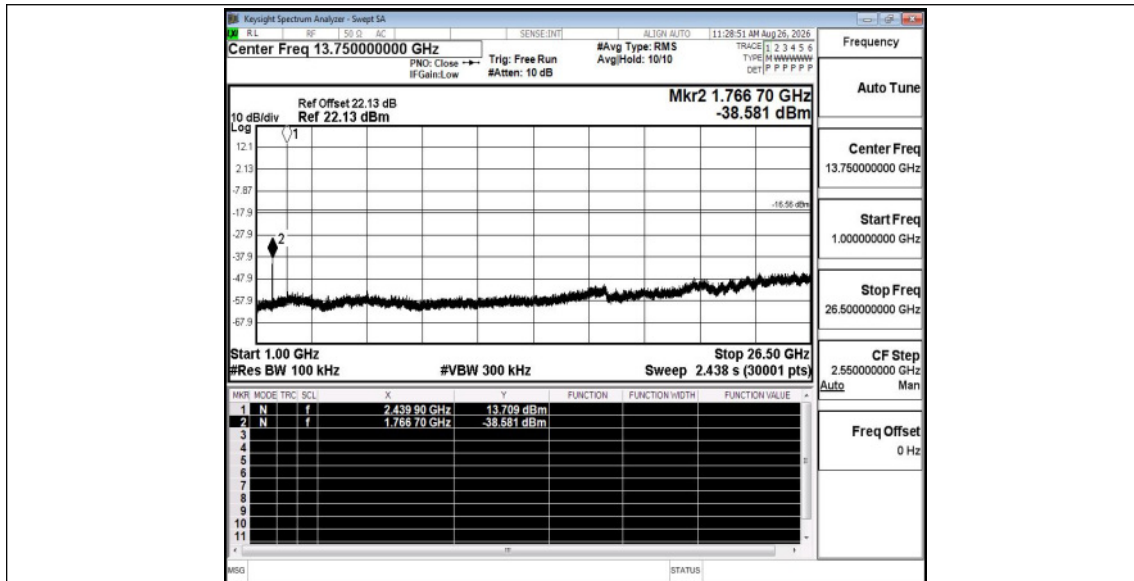




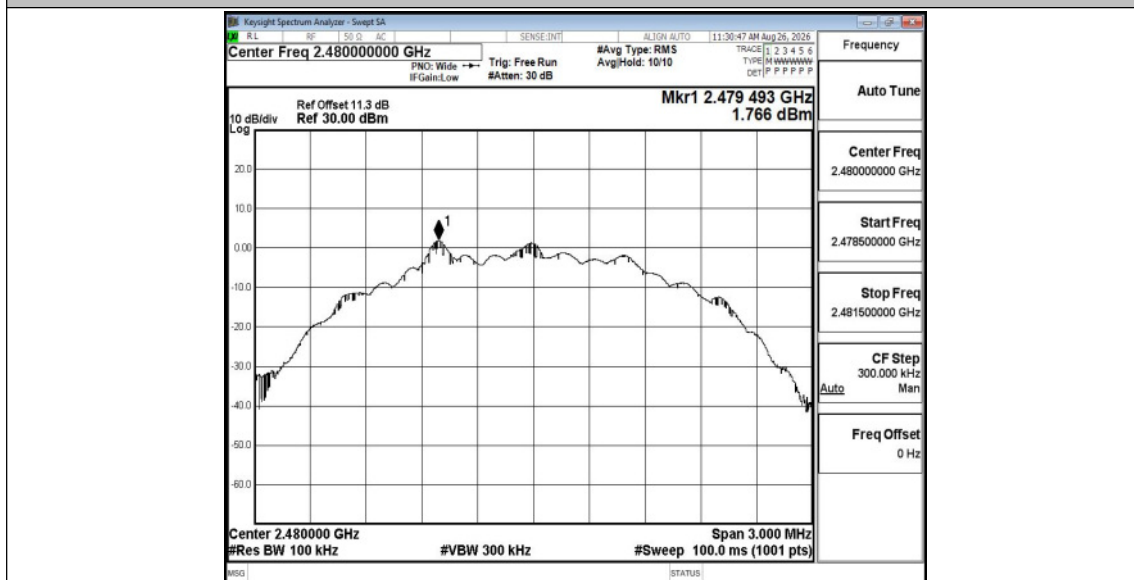
BLE_2M_Ant1_2440_30~1000



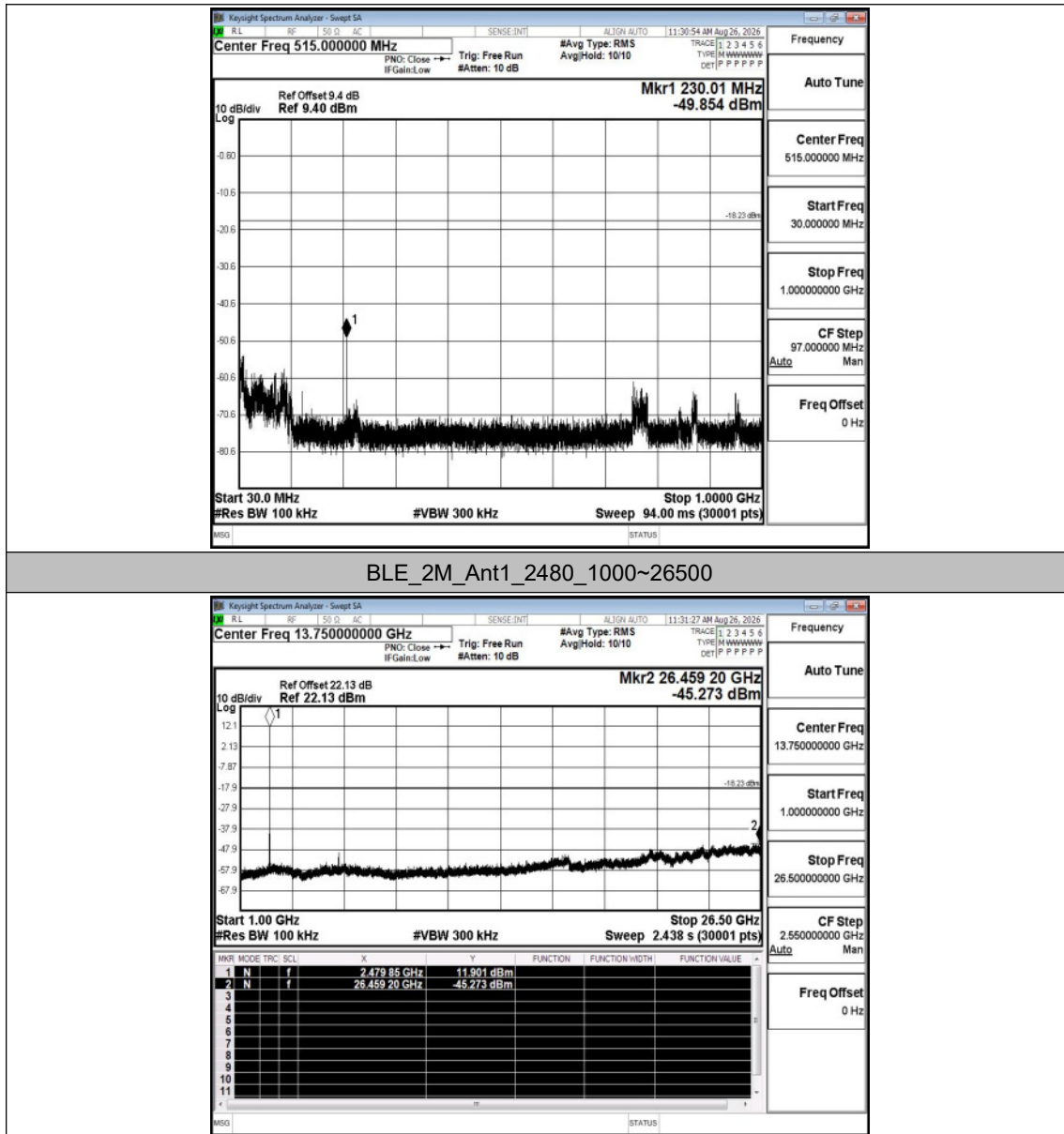
BLE_2M_Ant1_2440_1000~26500



BLE_2M_Ant1_2480_0~Reference



BLE_2M_Ant1_2480_30~1000

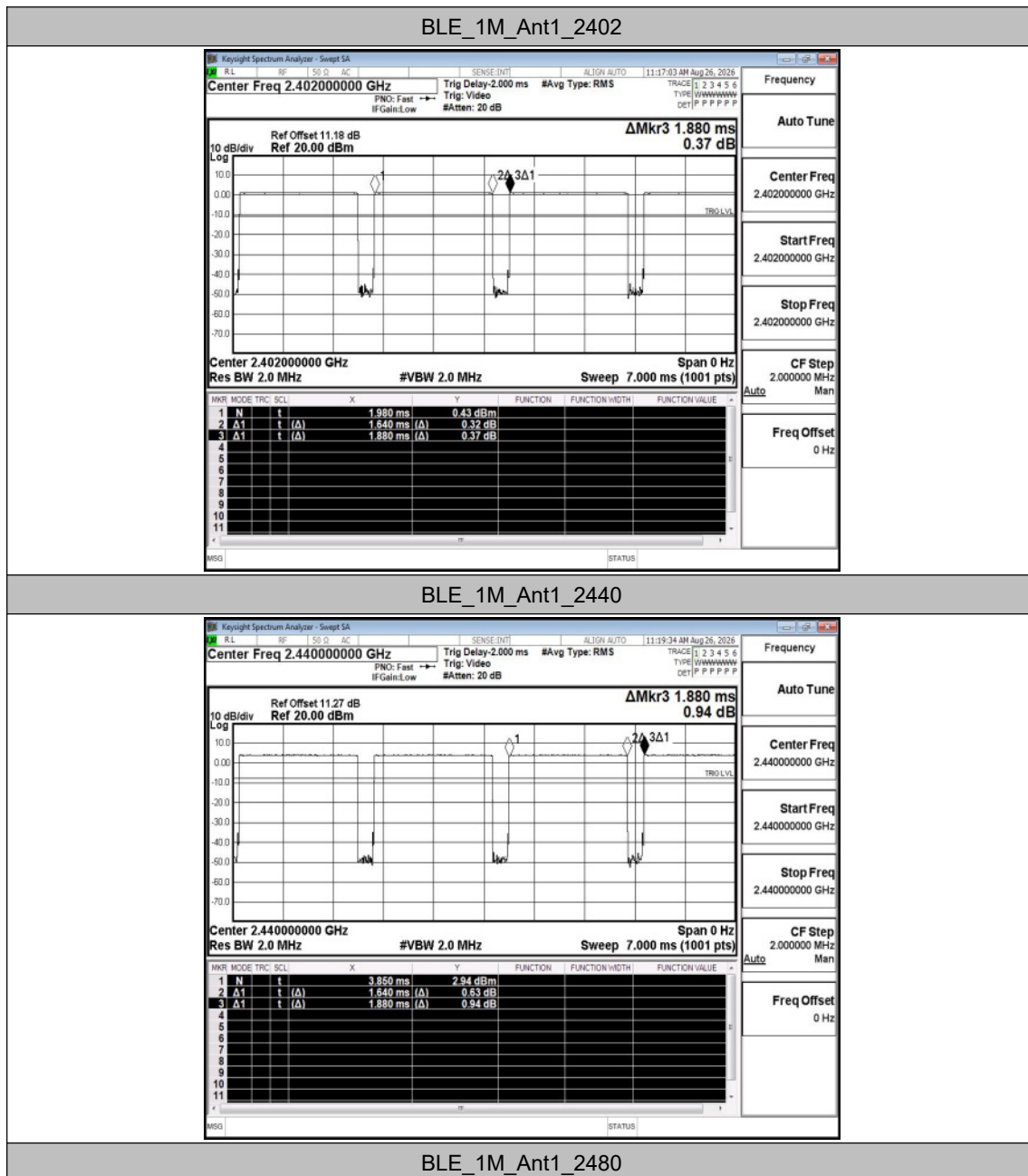


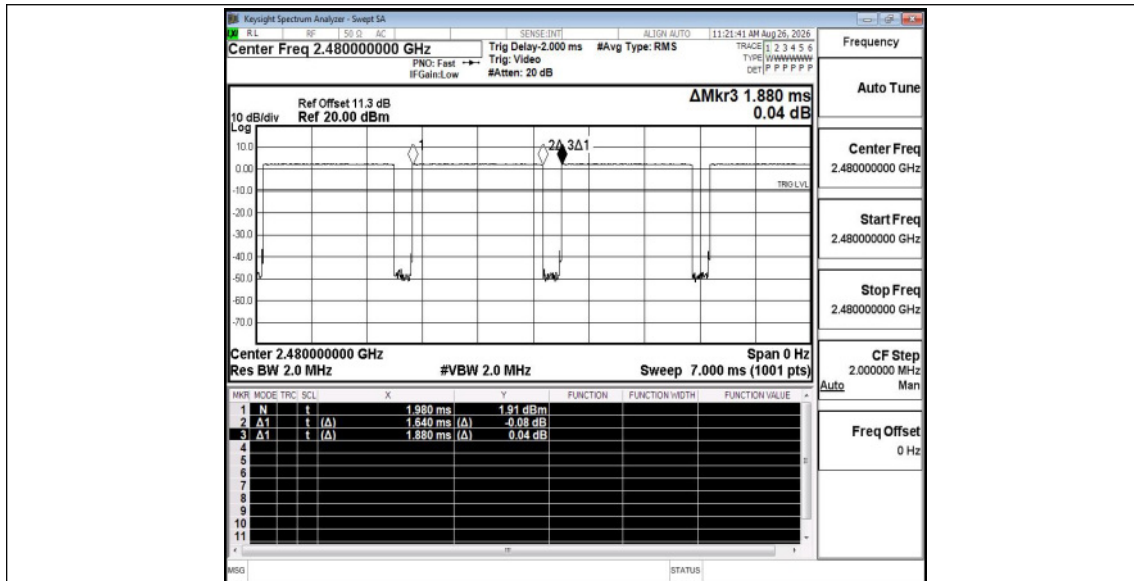
A.6 Duty Cycle

Test Result

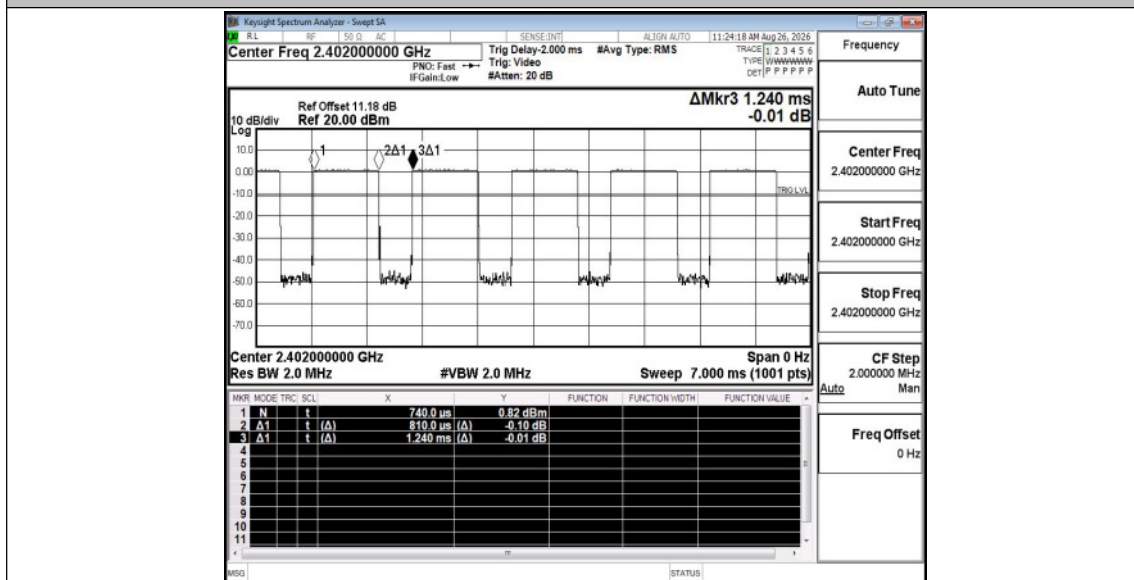
TestMode	Antenna	Freq(MHz)	ON Time [ms]	Period [ms]	X	DC [%]	xFactor	Limit	Verdict
BLE_1M	Ant1	2402	1.64	1.88	0.8723	87.23	0.59	---	---
		2440	1.64	1.88	0.8723	87.23	0.59	---	---
		2480	1.64	1.88	0.8723	87.23	0.59	---	---
BLE_2M	Ant1	2402	0.81	1.24	0.6532	65.32	1.85	---	---
		2440	0.82	1.24	0.6613	66.13	1.80	---	---
		2480	0.81	1.24	0.6532	65.32	1.85	---	---

Test Graphs

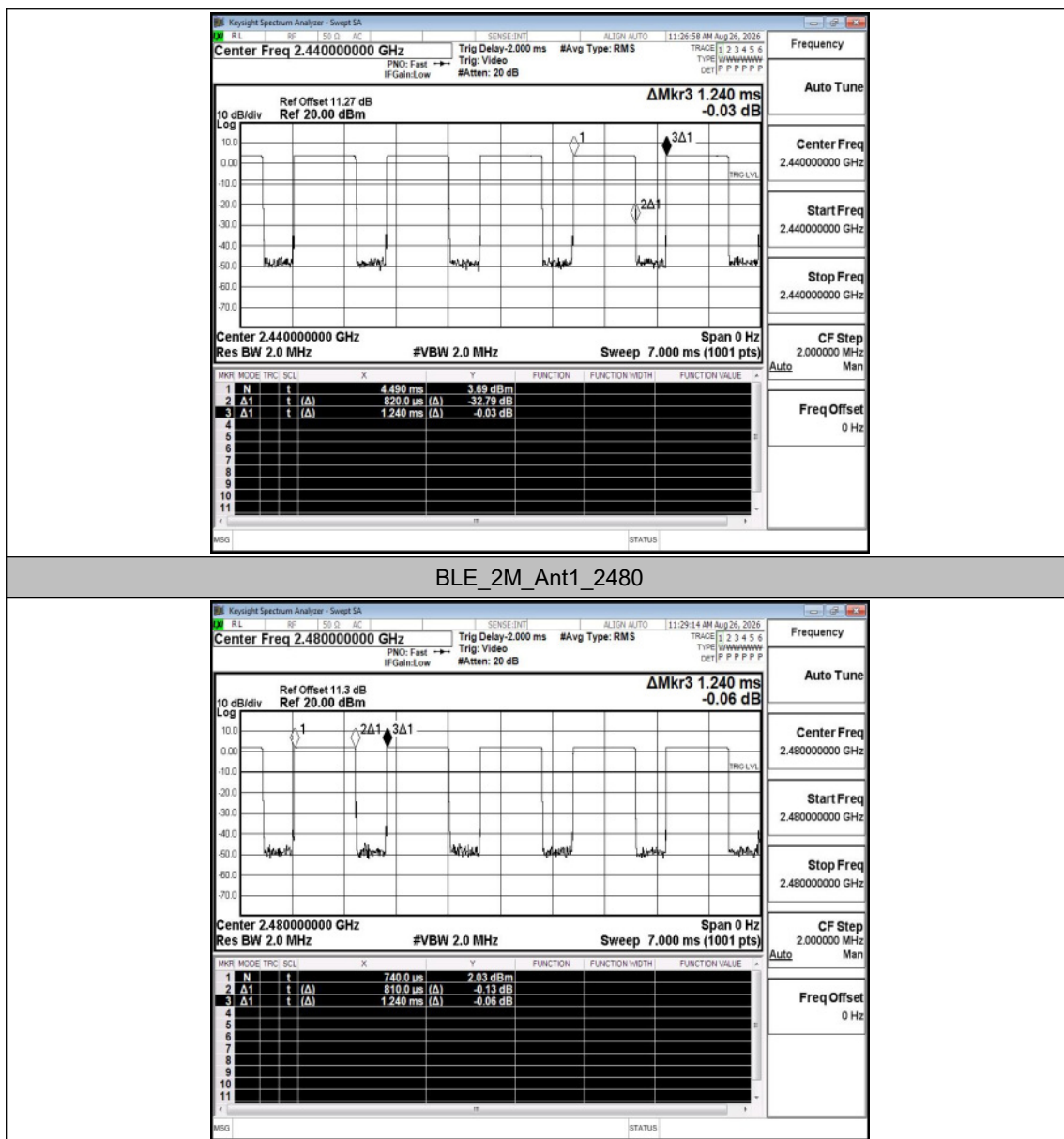




BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



A.7 Emissions in Restricted Bands

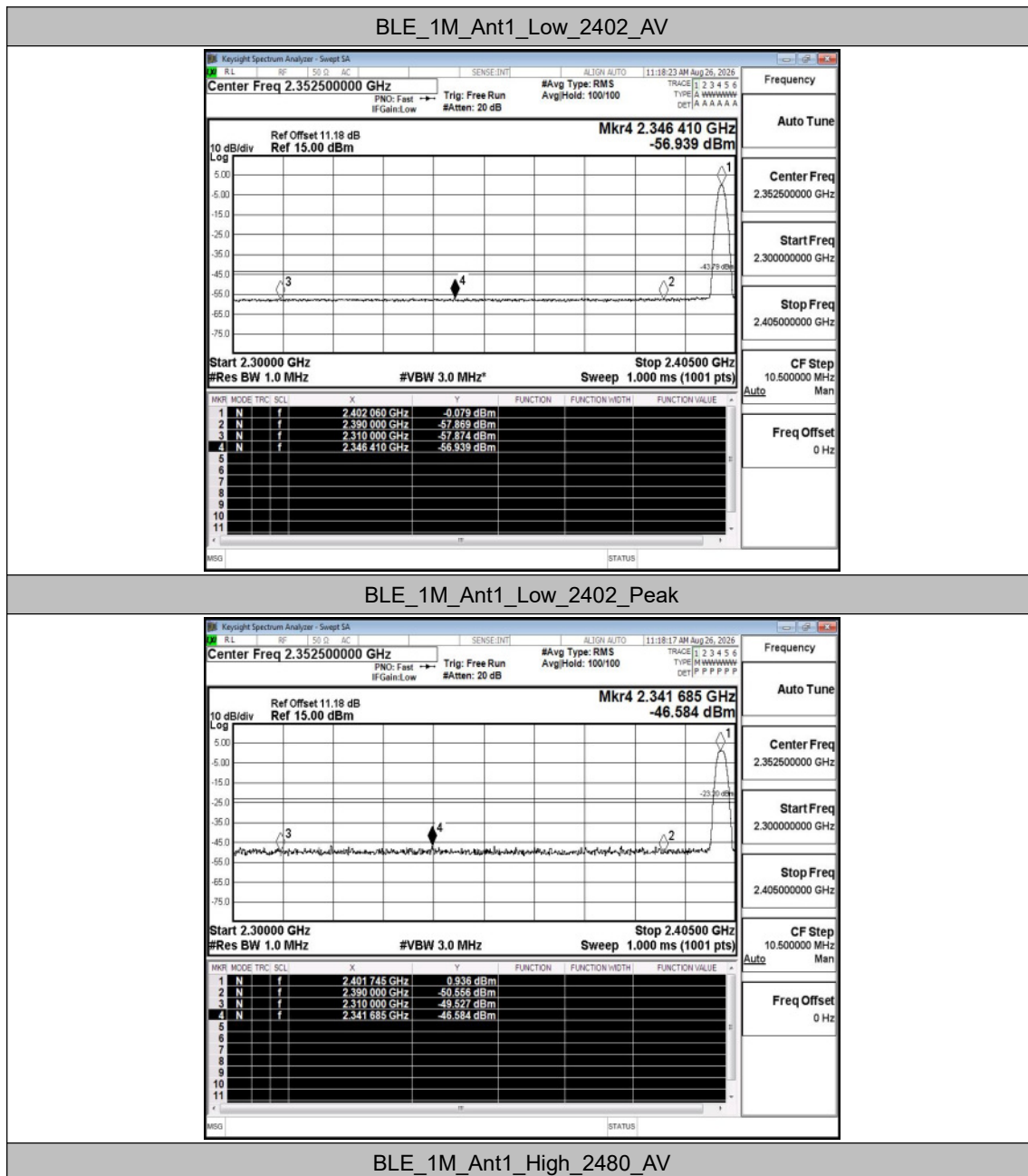
Test Result

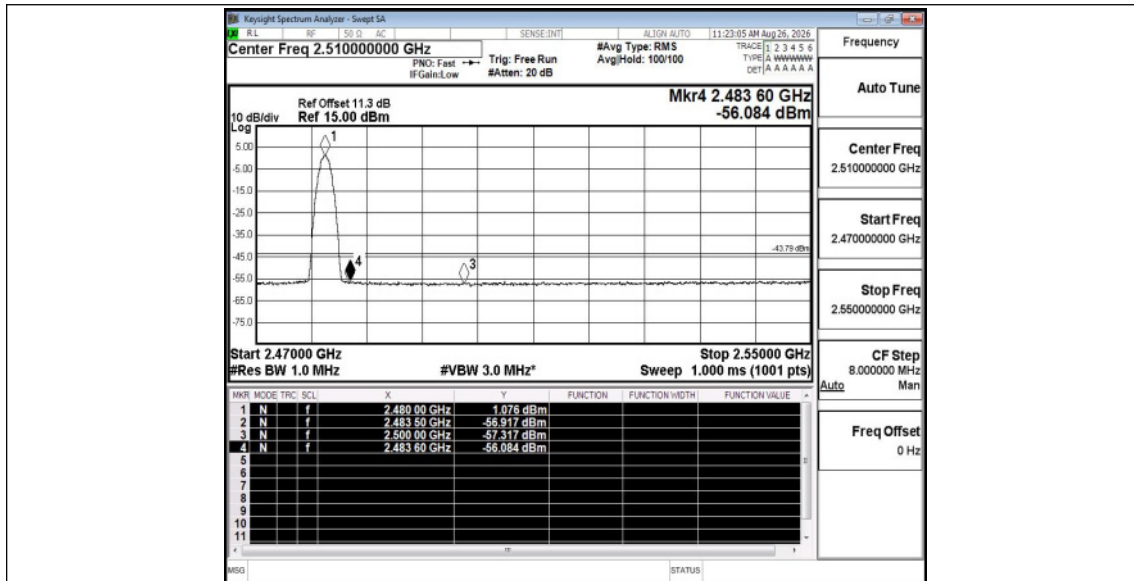
TestMode	Antenna	ChName	Freq(MHz)	Detector	Freq [MHz]	Result [dBm]	Limit [dBm]	Gain [dBi]	DC Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
BLE_1M	Ant1	Low	2402	AV	2310.000	-57.87	≤-43.79	2.00	0.59	39.92	≤54	PASS
				AV	2346.410	-56.94	≤-43.79	2.00	0.59	40.85	≤54	PASS
				AV	2390.000	-57.87	≤-43.79	2.00	0.59	39.92	≤54	PASS
				Peak	2310.000	-49.53	≤-23.20	2.00	0.00	47.67	≤74	PASS
				Peak	2341.685	-46.58	≤-23.20	2.00	0.00	50.62	≤74	PASS
				Peak	2390.000	-50.56	≤-23.20	2.00	0.00	46.64	≤74	PASS
		High	2480	AV	2483.500	-56.92	≤-43.79	2.00	0.59	40.87	≤54	PASS
				AV	2483.600	-56.08	≤-43.79	2.00	0.59	41.71	≤54	PASS
				AV	2500.000	-57.32	≤-43.79	2.00	0.59	40.47	≤54	PASS
				Peak	2483.500	-46.88	≤-23.20	2.00	0.00	50.32	≤74	PASS
				Peak	2487.680	-45.68	≤-23.20	2.00	0.00	51.52	≤74	PASS
				Peak	2500.000	-49.27	≤-23.20	2.00	0.00	47.93	≤74	PASS
BLE_2M	Ant1	Low	2402	AV	2310.000	-58.49	≤-45.05	2.00	1.85	40.56	≤54	PASS
				AV	2343.890	-57.02	≤-45.05	2.00	1.85	42.03	≤54	PASS
				AV	2390.000	-57.89	≤-45.05	2.00	1.85	41.16	≤54	PASS
				Peak	2310.000	-50.54	≤-23.20	2.00	0.00	46.66	≤74	PASS
				Peak	2328.560	-46.08	≤-23.20	2.00	0.00	51.12	≤74	PASS
				Peak	2390.000	-50.16	≤-23.20	2.00	0.00	47.04	≤74	PASS
		High	2480	AV	2483.500	-56.65	≤-45.05	2.00	1.85	42.40	≤54	PASS
				AV	2484.080	-56.46	≤-45.05	2.00	1.85	42.59	≤54	PASS
				AV	2500.000	-57.41	≤-45.05	2.00	1.85	41.64	≤54	PASS
				Peak	2483.500	-46.82	≤-23.20	2.00	0.00	50.38	≤74	PASS
				Peak	2483.600	-42.16	≤-23.20	2.00	0.00	55.04	≤74	PASS
				Peak	2500.000	-48.95	≤-23.20	2.00	0.00	48.25	≤74	PASS

Note:

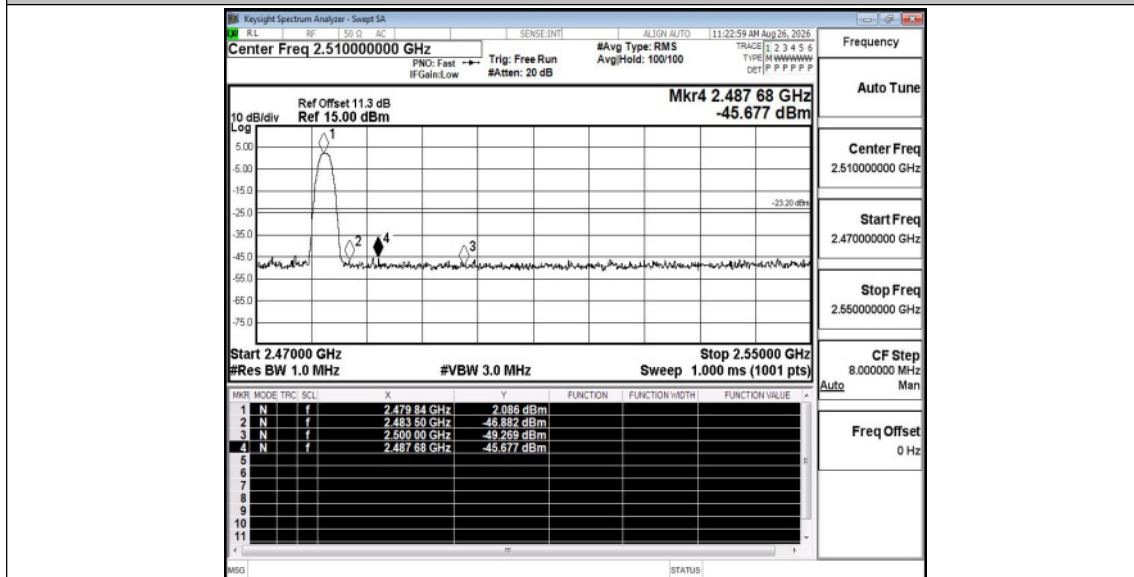
1. The Antenna Gain is compensated in the graph.
2. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

Test Graphs

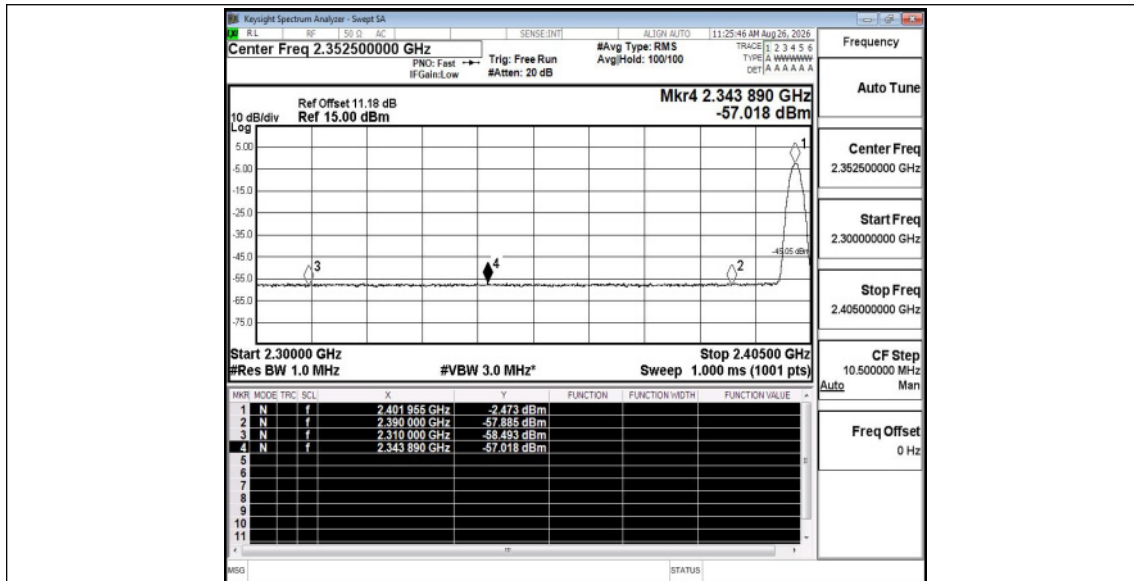




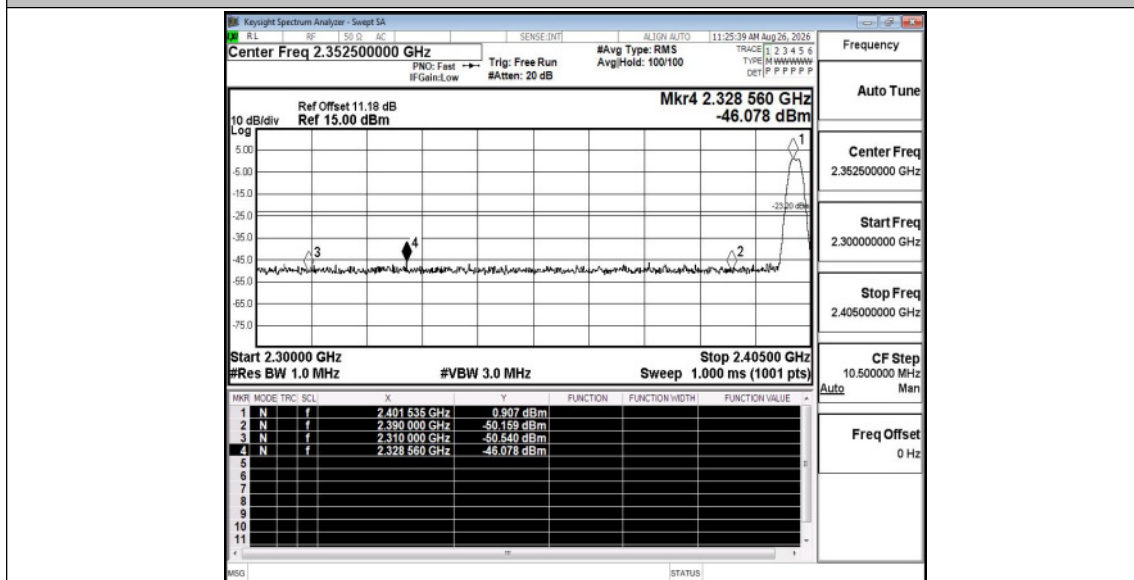
BLE_1M_Ant1_High_2480_Peak



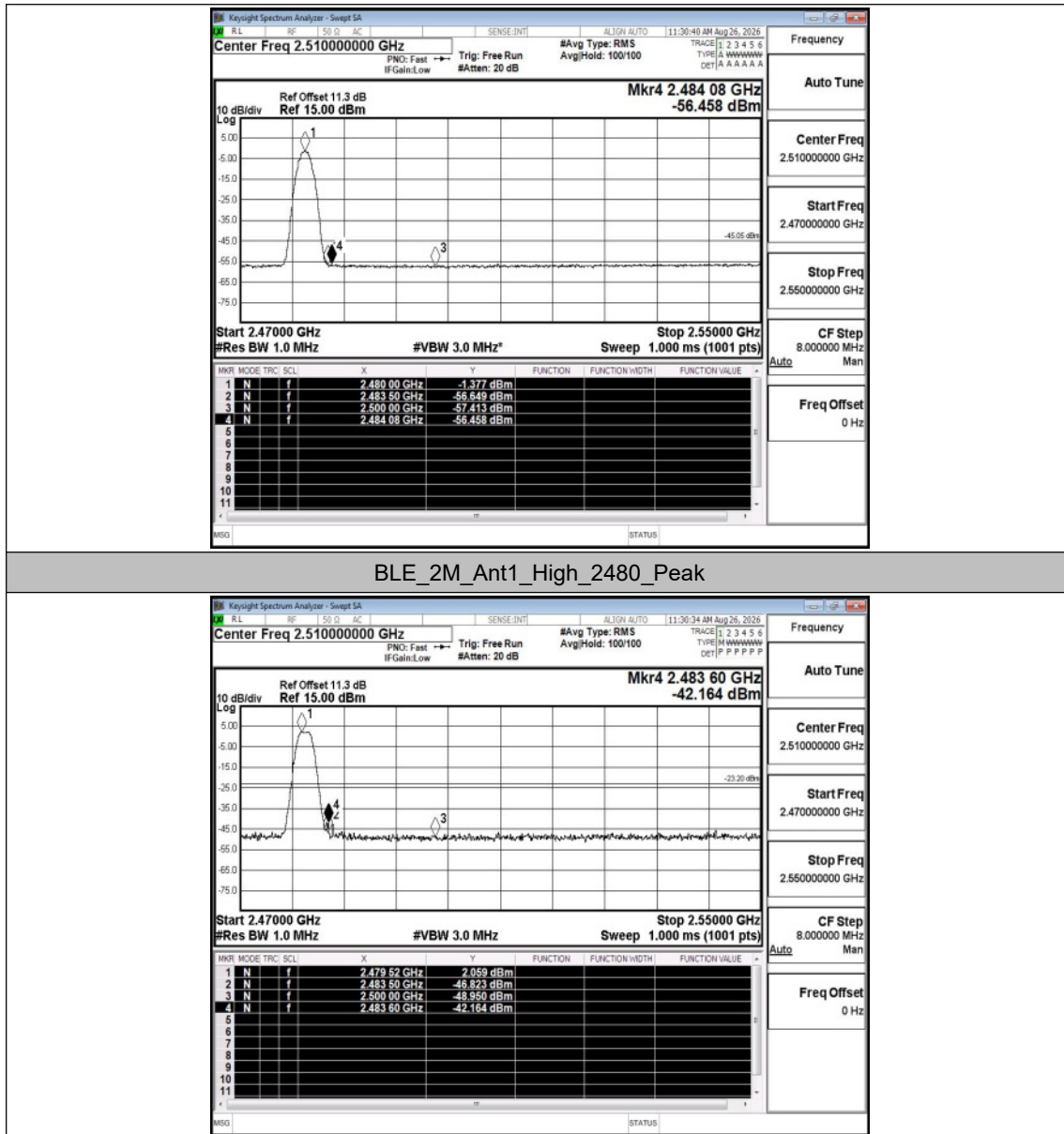
BLE_2M_Ant1_Low_2402_AV



BLE_2M_Ant1_Low_2402_Peak



BLE_2M_Ant1_High_2480_AV



Guangzhou LCS Compliance Testing Laboratory Ltd.

Add: No.44-1, Qianfeng North Road, Shiqi, Panyu District, Guangzhou, Guangdong, China

Tel: +(86) 020-39166689 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com