

Appendix A

RF Test Data for BT LE (Conducted Measurement)

Product Name: Remote Control Bluetooth Module

Test Model: BT Nano

Environmental Conditions

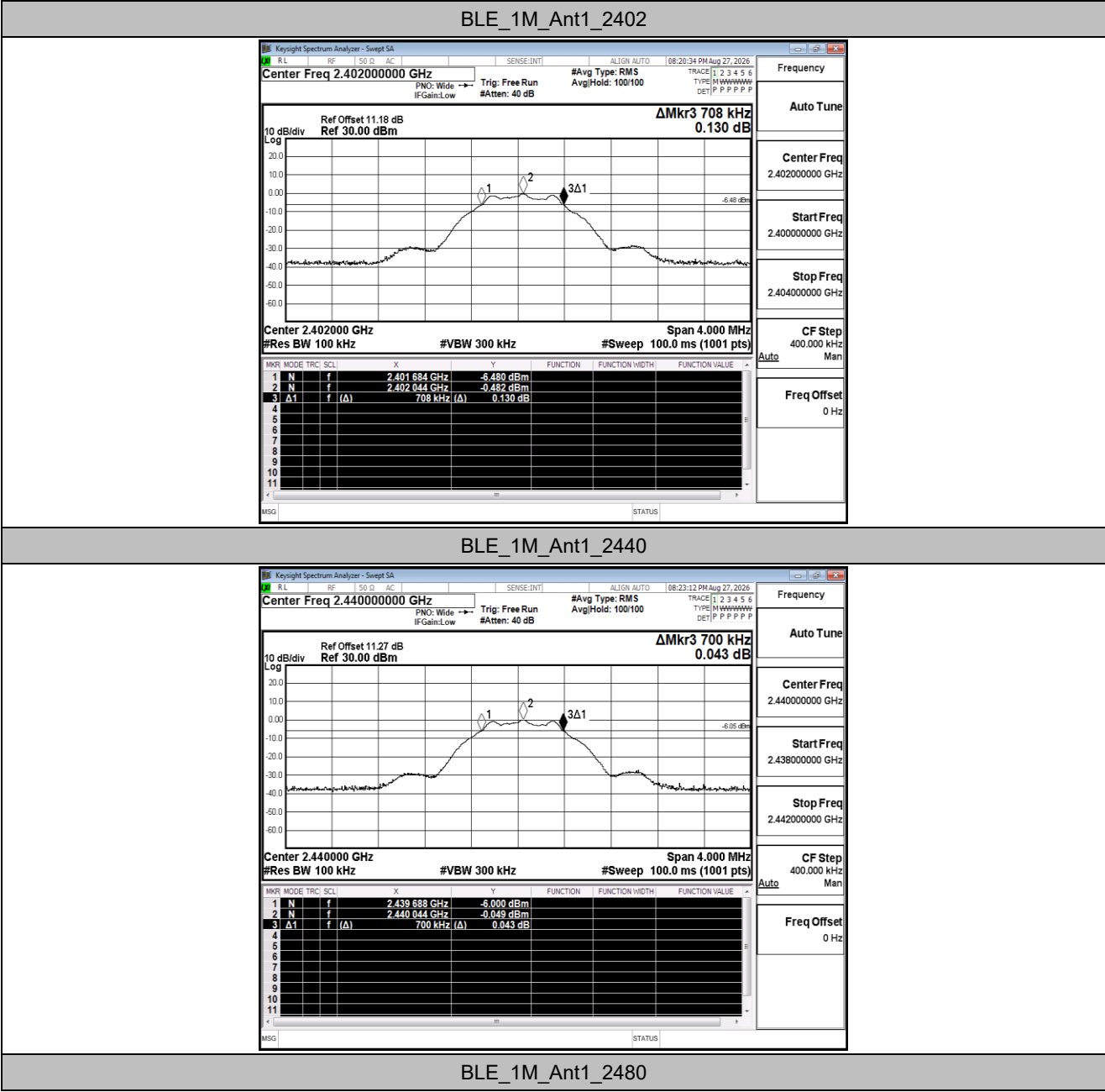
Temperature:	23.8°C
Relative Humidity:	52.4%
ATM Pressure:	100.0 kPa
Test Engineer:	Zhang hai
Supervised by:	Fengliu Tang

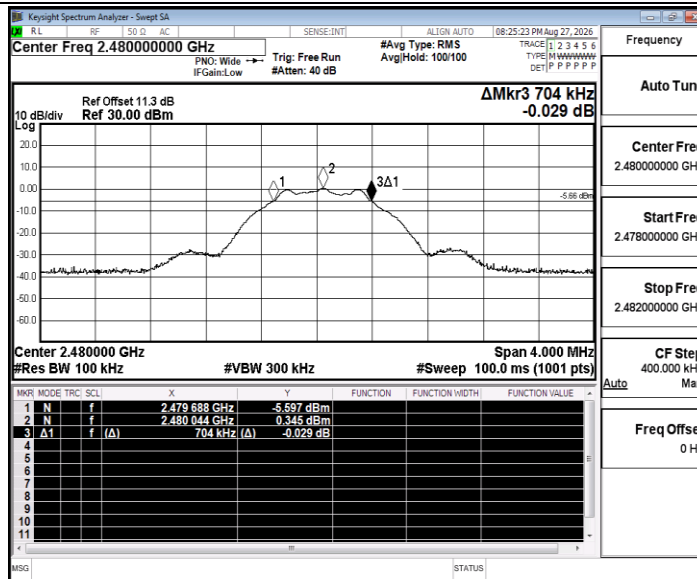
A.1 DTS Bandwidth

Test Result

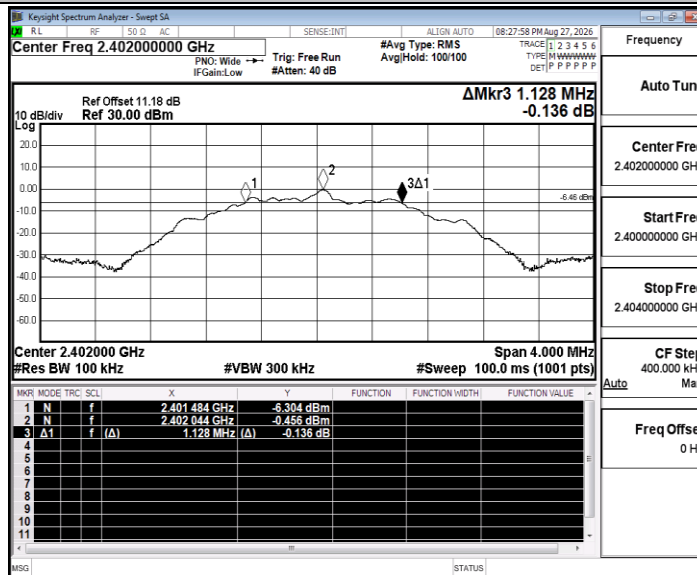
TestMode	Antenna	Freq (MHz)	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit [MHz]	Verdict
BLE_1M	Ant1	2402	0.708	2401.684	2402.392	0.5	PASS
		2440	0.700	2439.688	2440.388	0.5	PASS
		2480	0.704	2479.688	2480.392	0.5	PASS
BLE_2M	Ant1	2402	1.128	2401.484	2402.612	0.5	PASS
		2440	1.128	2439.484	2440.612	0.5	PASS
		2480	1.124	2479.488	2480.612	0.5	PASS

Test Graphs

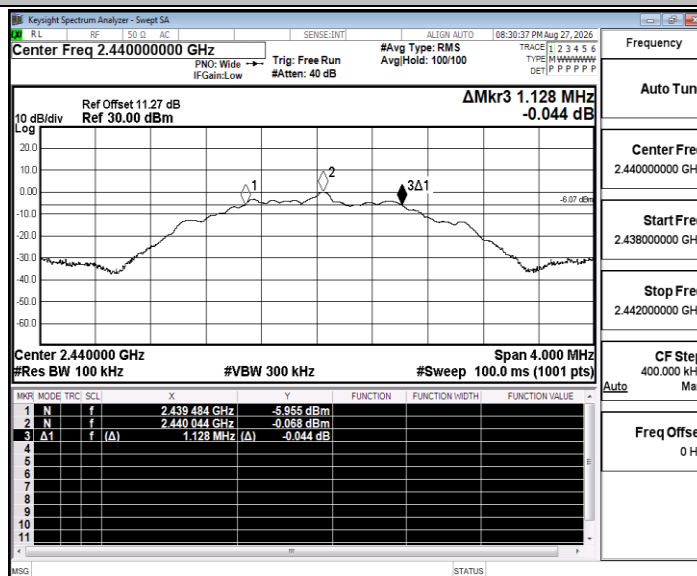


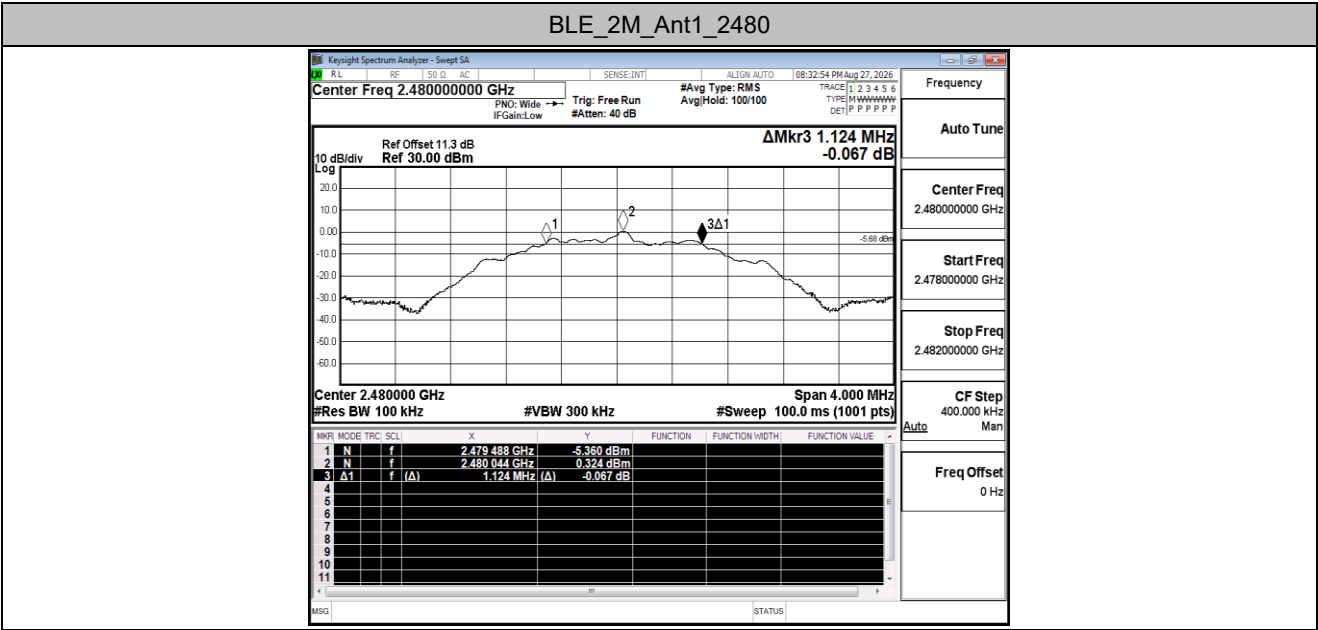


BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



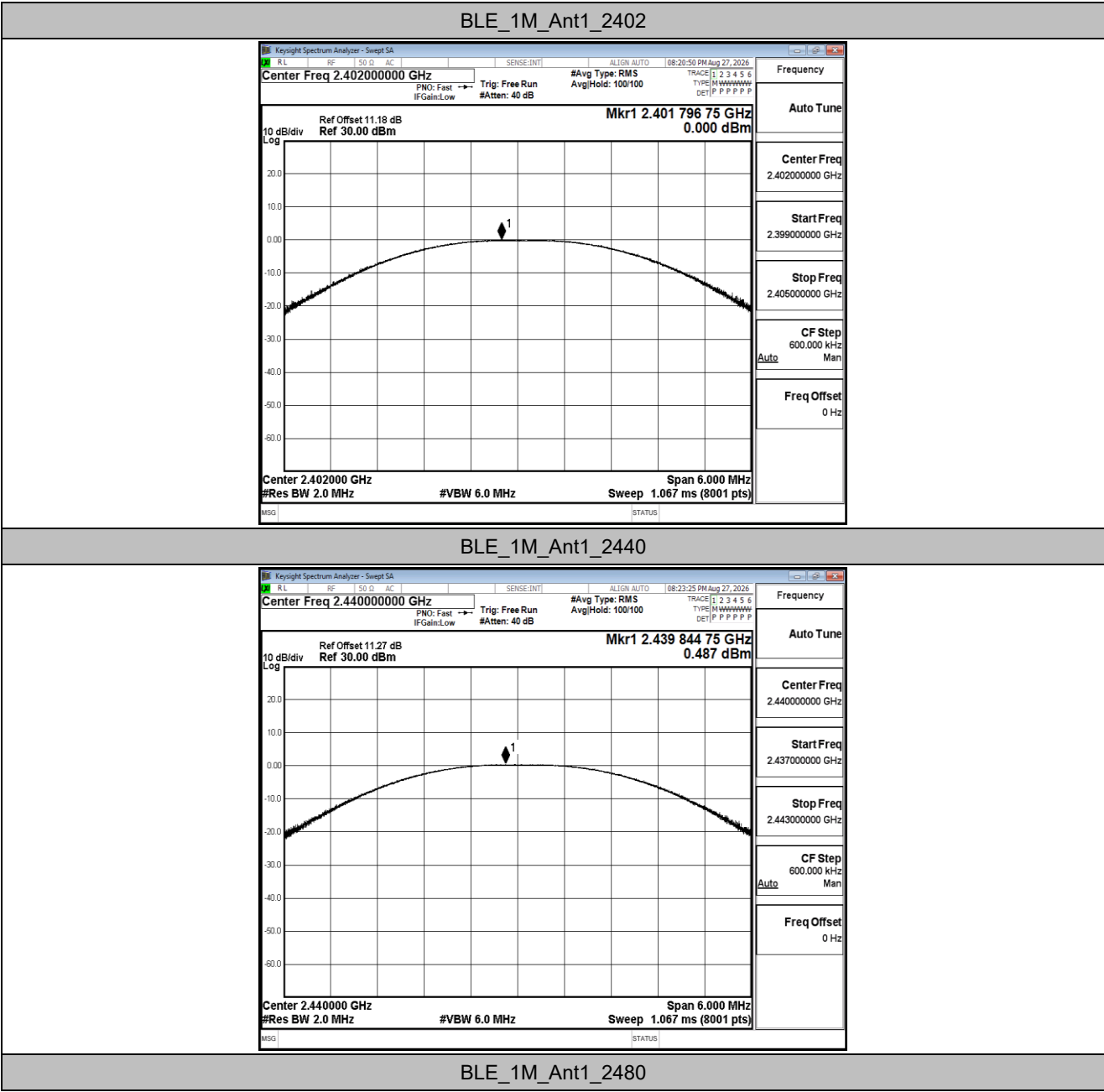


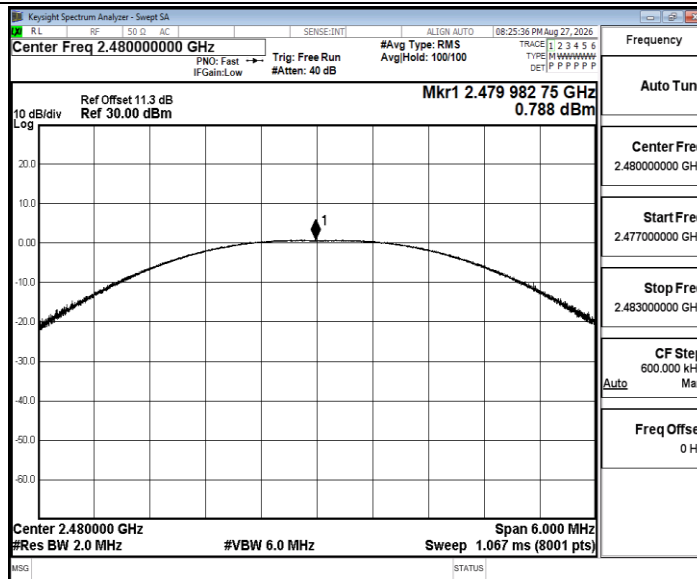
A.2 Maximum Peak Conducted Output Power

Test Result Peak

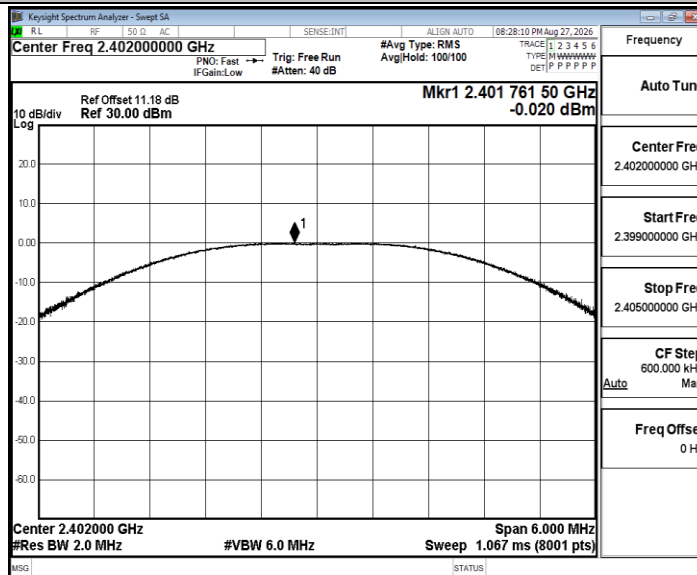
TestMode	Antenna	Freq (MHz)	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Verdict
BLE_1M	Ant1	2402	0.00	≤30	PASS
		2440	0.49	≤30	PASS
		2480	0.79	≤30	PASS
BLE_2M	Ant1	2402	-0.02	≤30	PASS
		2440	0.36	≤30	PASS
		2480	0.76	≤30	PASS

Test Graphs Peak

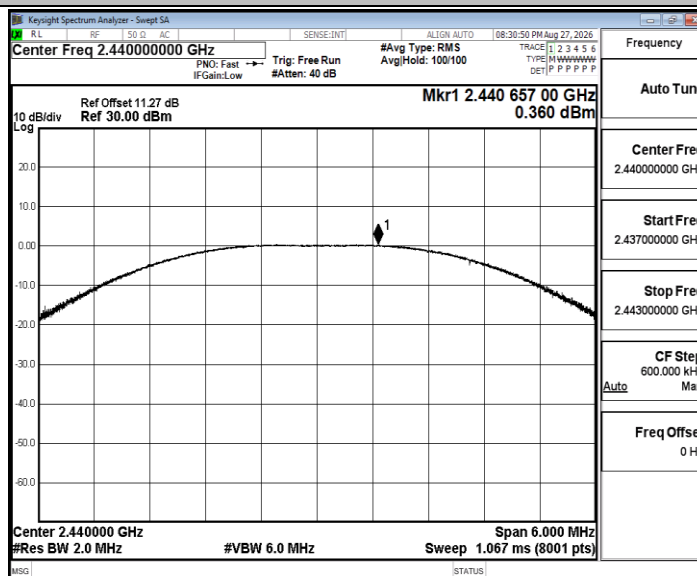




BLE_2M_Ant1_2402



BLE_2M_Ant1_2440

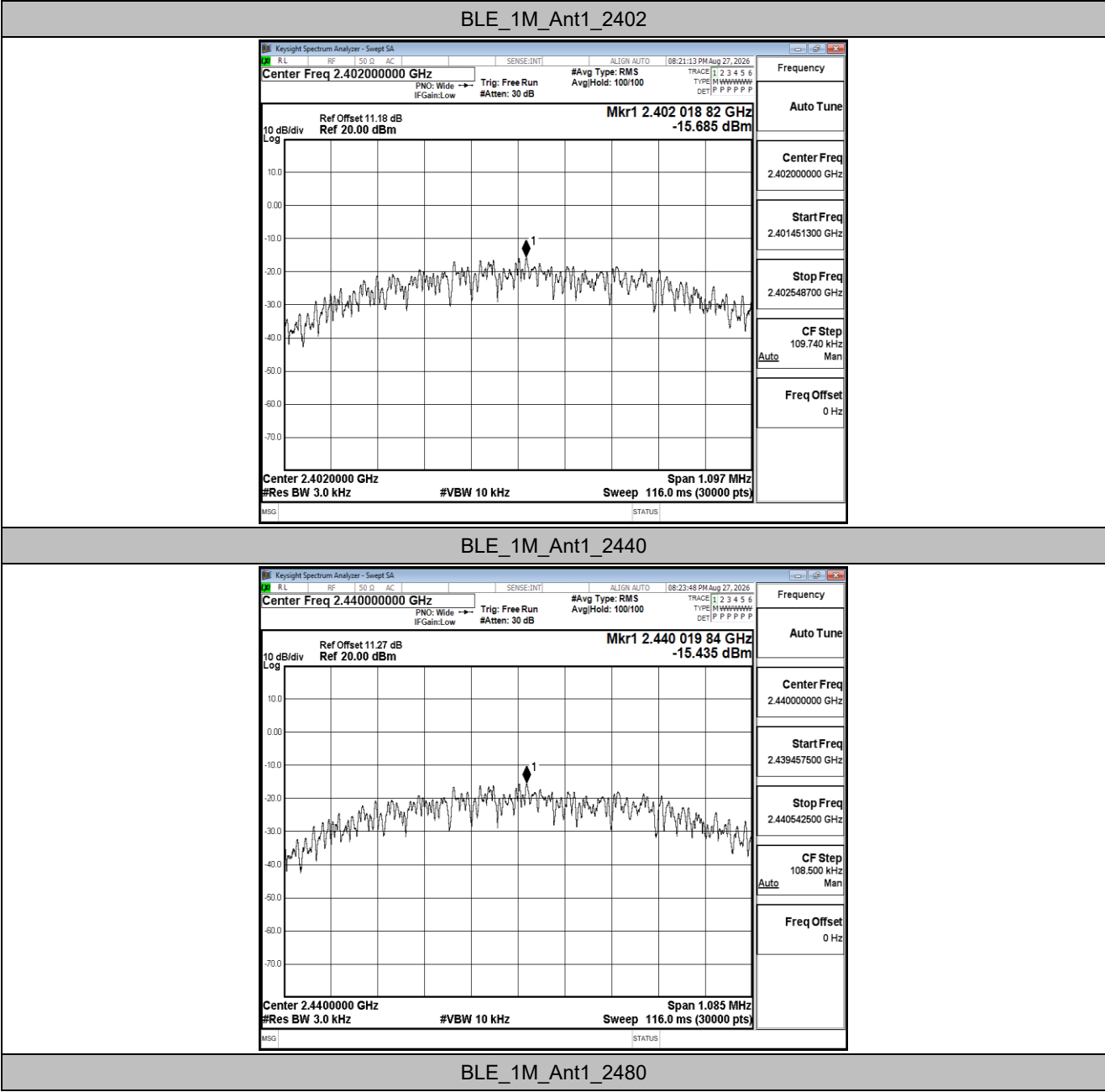


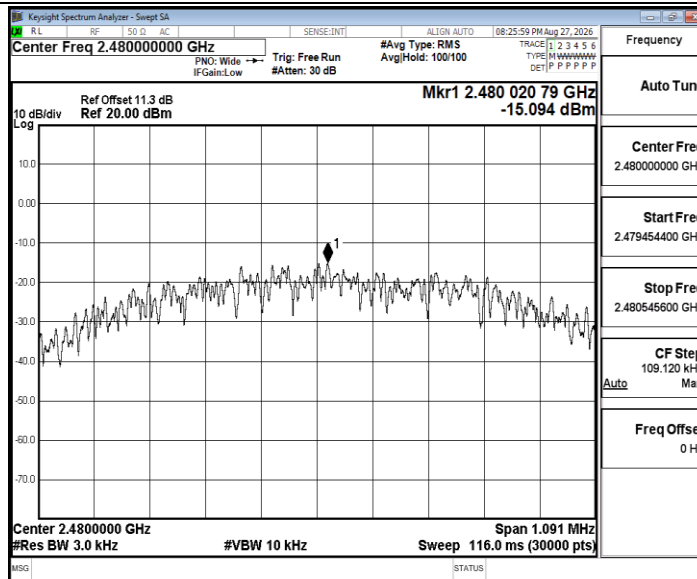
A.3 Maximum power spectral density

Test Result

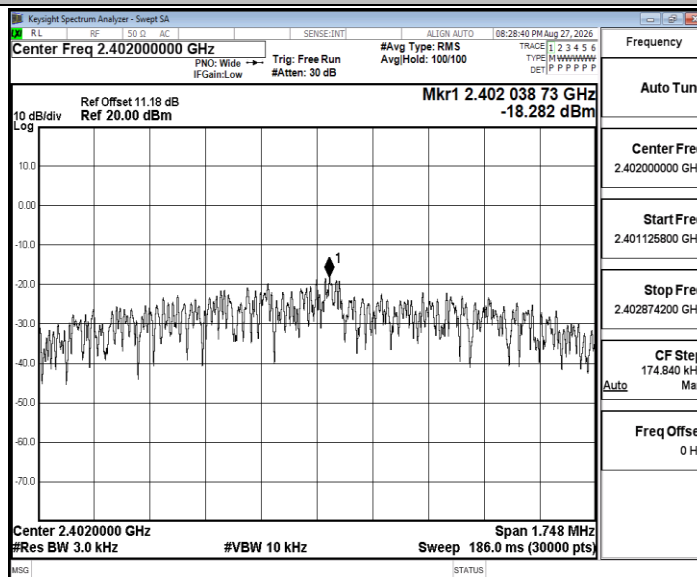
TestMode	Antenna	Freq (MHz)	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-15.69	≤8.00	PASS
		2440	-15.44	≤8.00	PASS
		2480	-15.09	≤8.00	PASS
BLE_2M	Ant1	2402	-18.28	≤8.00	PASS
		2440	-17.91	≤8.00	PASS
		2480	-17.56	≤8.00	PASS

Test Graphs

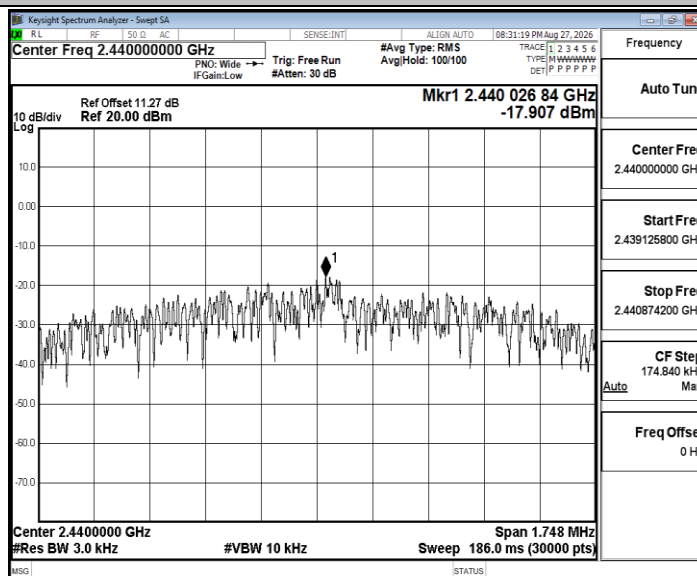


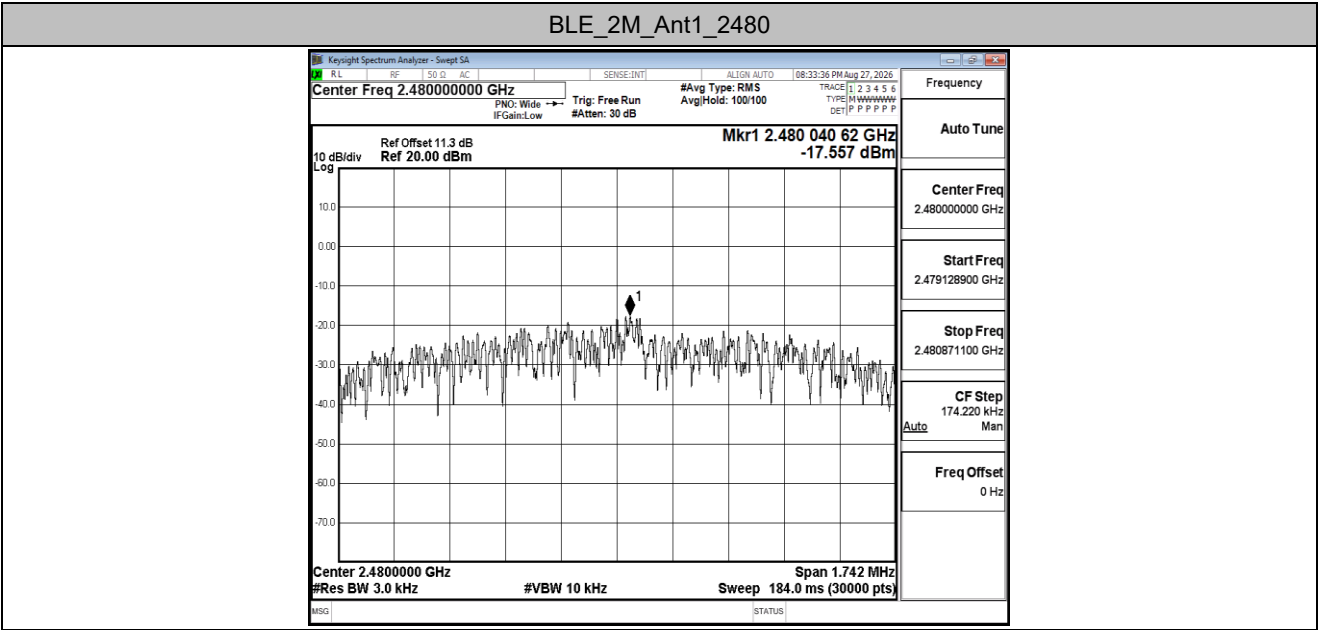


BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



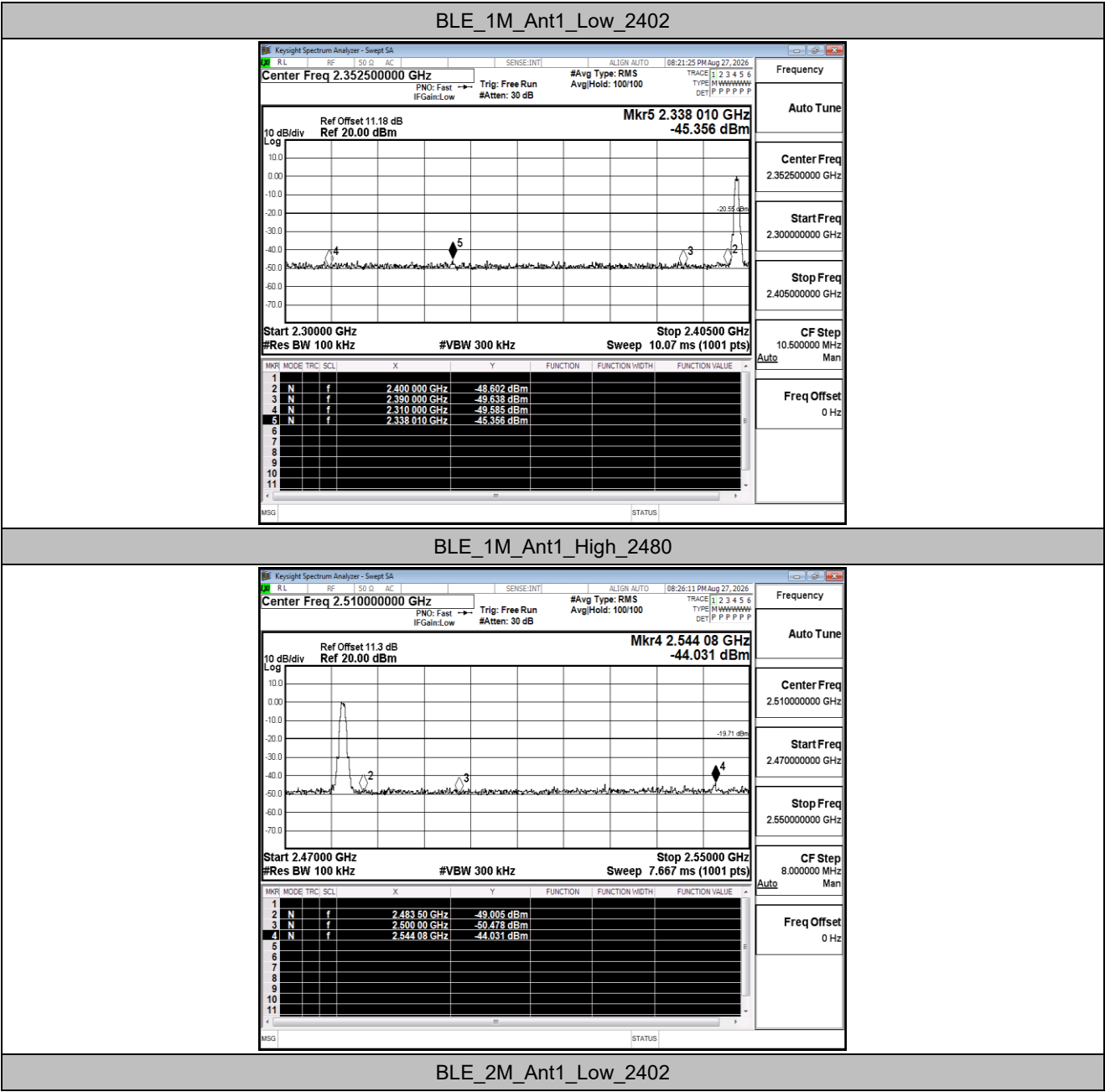


A.4 Band edge measurements

Test Result

TestMode	Antenna	ChName	Freq (MHz)	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	-0.55	-45.36	≤-20.55	PASS
		High	2480	0.29	-44.03	≤-19.71	PASS
BLE_2M	Ant1	Low	2402	-0.53	-33.51	≤-20.53	PASS
		High	2480	0.27	-45.05	≤-19.73	PASS

Test Graphs





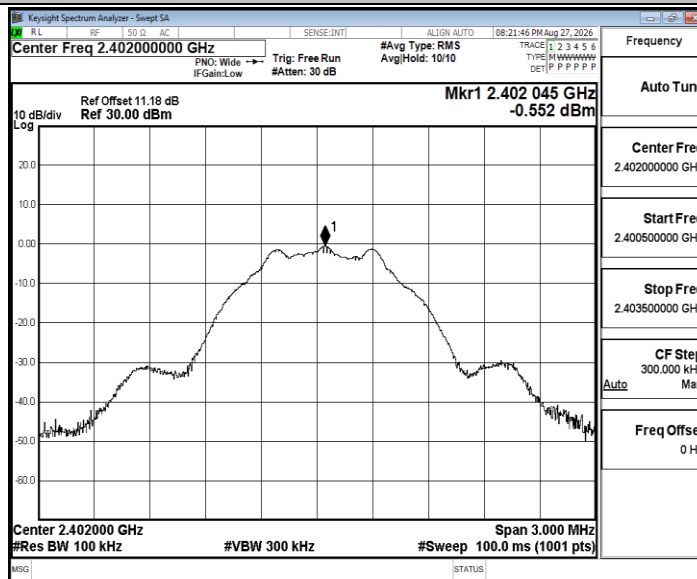
A.5 Conducted Spurious Emission

Test Result

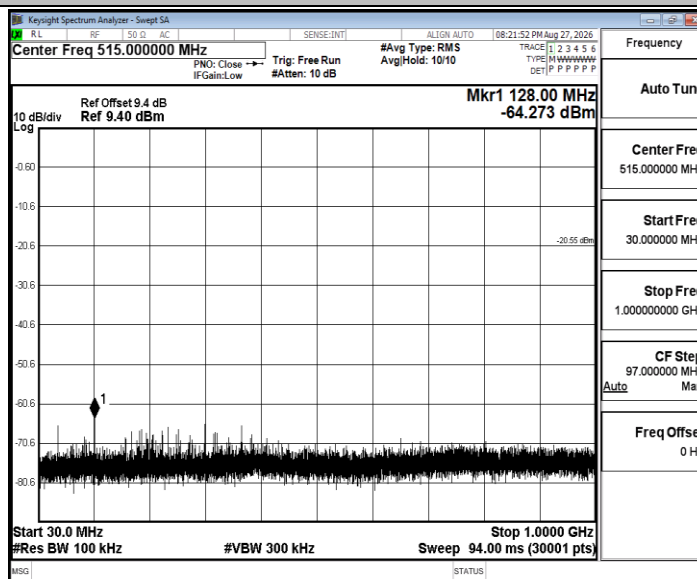
TestMode	Antenna	Freq (MHz)	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	-0.55	-0.55	---	PASS
			30~1000	-0.55	-64.27	≤-20.55	PASS
			1000~26500	-0.55	-34.61	≤-20.55	PASS
		2440	Reference	-0.17	-0.17	---	PASS
			30~1000	-0.17	-64.77	≤-20.17	PASS
			1000~26500	-0.17	-34.25	≤-20.17	PASS
		2480	Reference	0.30	0.30	---	PASS
			30~1000	0.30	-63.92	≤-19.7	PASS
			1000~26500	0.30	-33.01	≤-19.7	PASS
BLE_2M	Ant1	2402	Reference	-0.55	-0.55	---	PASS
			30~1000	-0.55	-64.71	≤-20.55	PASS
			1000~26500	-0.55	-32.89	≤-20.55	PASS
		2440	Reference	-0.18	-0.18	---	PASS
			30~1000	-0.18	-64.2	≤-20.18	PASS
			1000~26500	-0.18	-36.32	≤-20.18	PASS
		2480	Reference	0.26	0.26	---	PASS
			30~1000	0.26	-64.51	≤-19.74	PASS
			1000~26500	0.26	-32.47	≤-19.74	PASS

Test Graphs

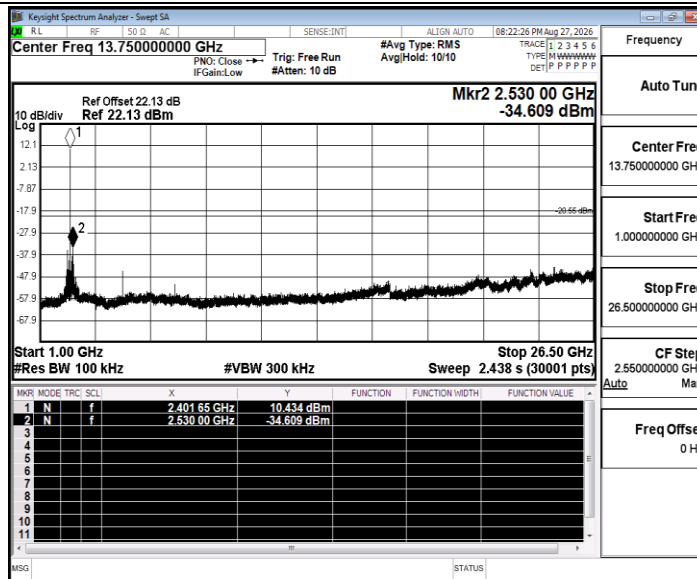
BLE_1M_Ant1_2402_0~Reference



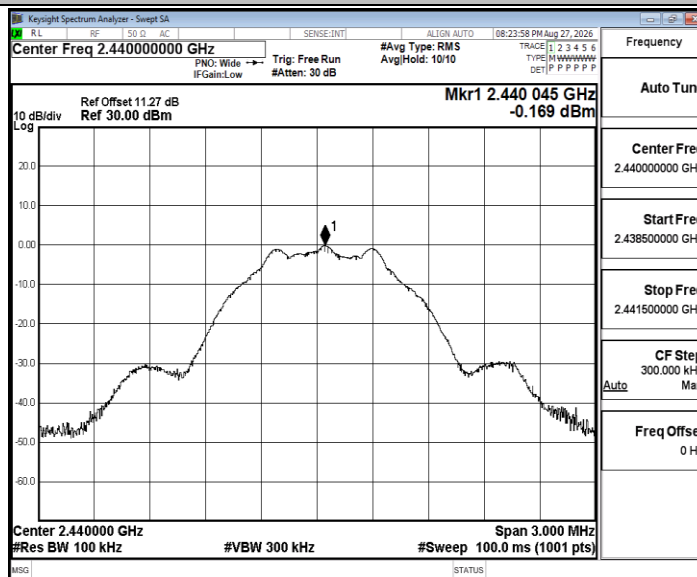
BLE_1M_Ant1_2402_30~1000



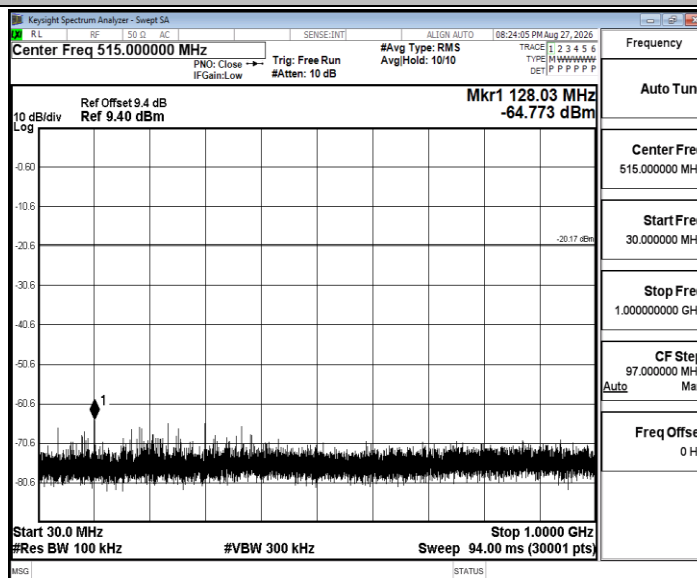
BLE_1M_Ant1_2402_1000~26500

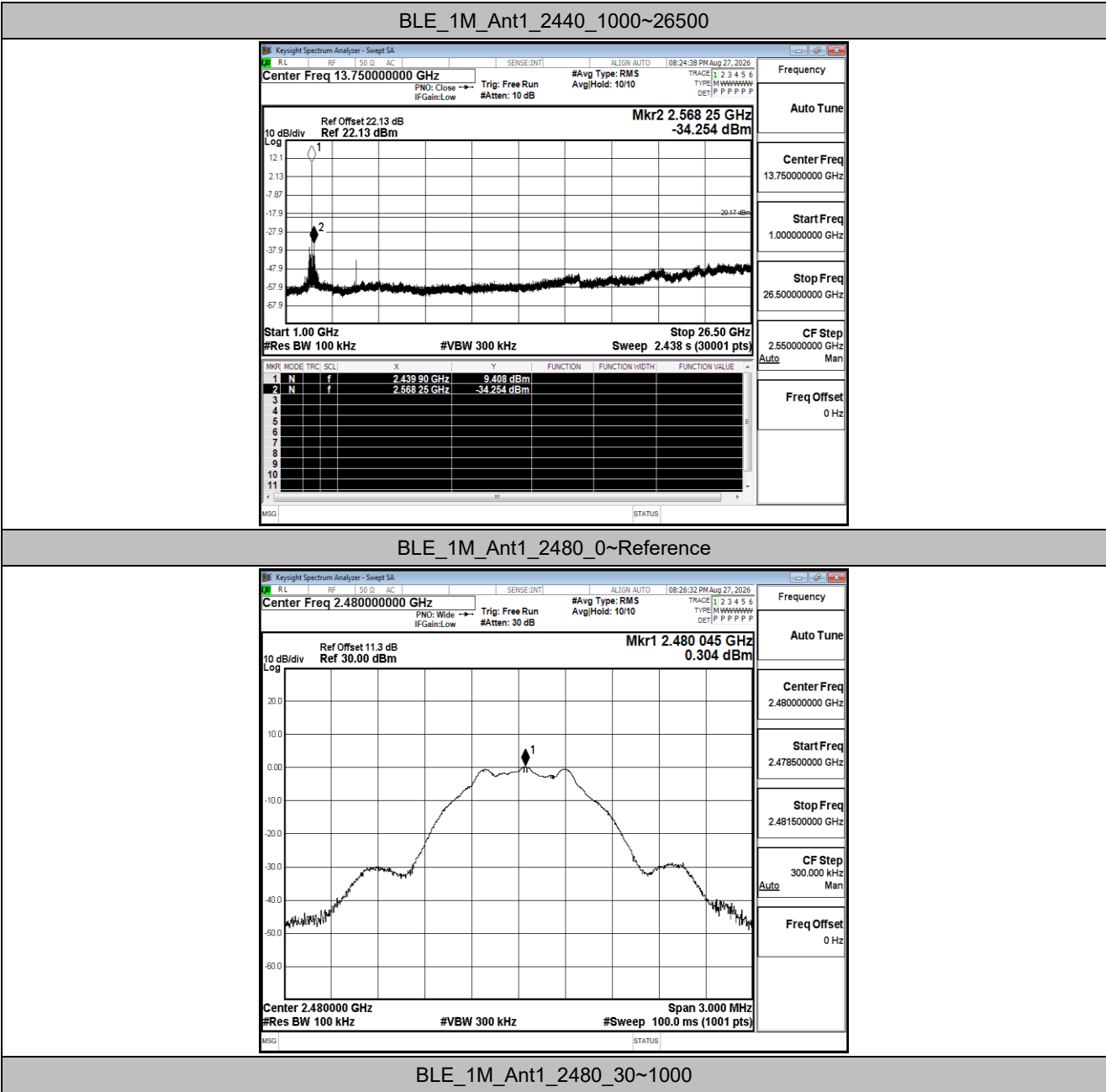


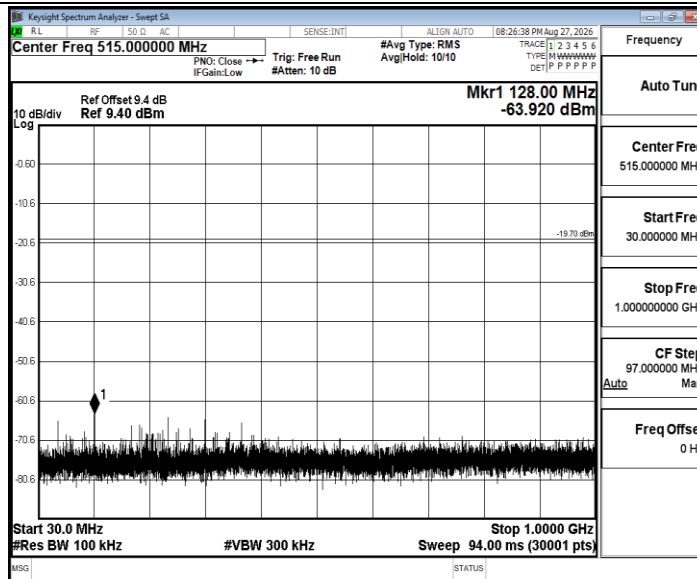
BLE_1M_Ant1_2440_0~Reference



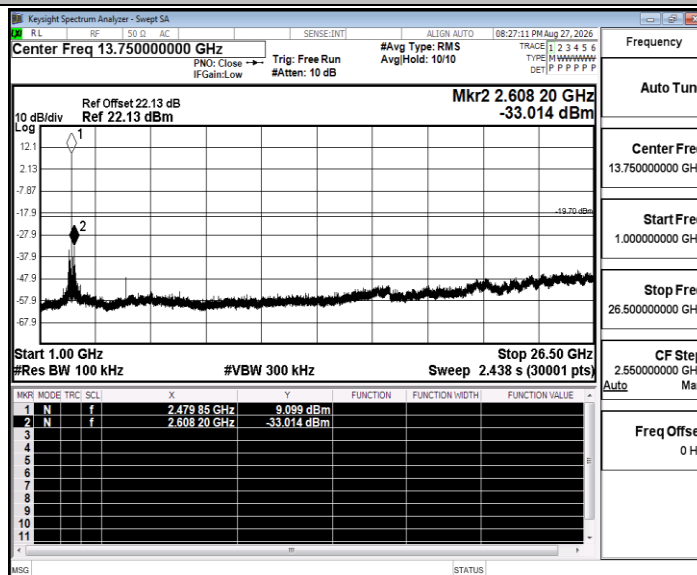
BLE_1M_Ant1_2440_30~1000



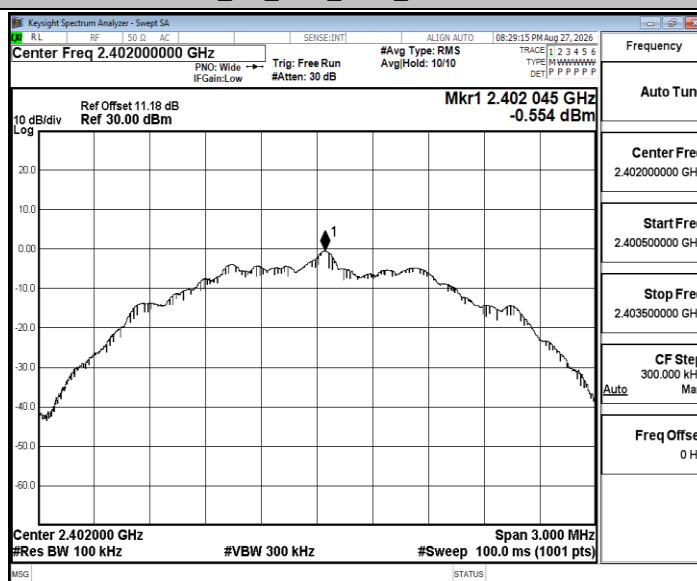




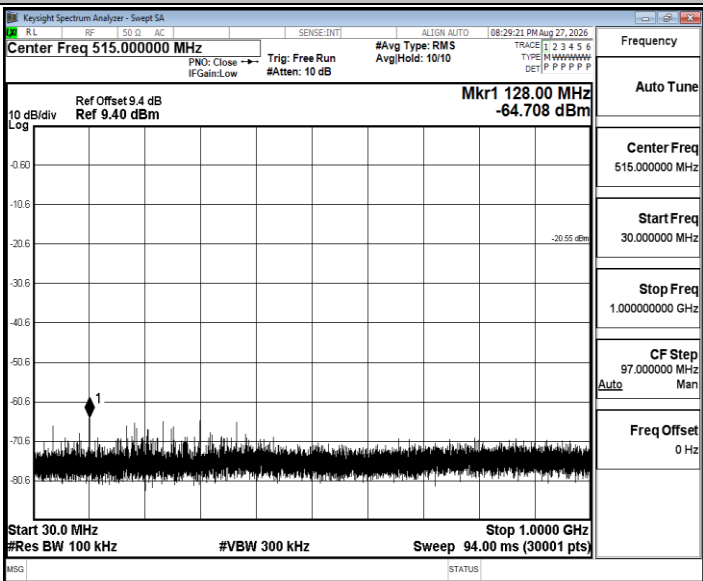
BLE_1M_Ant1_2480_1000~26500



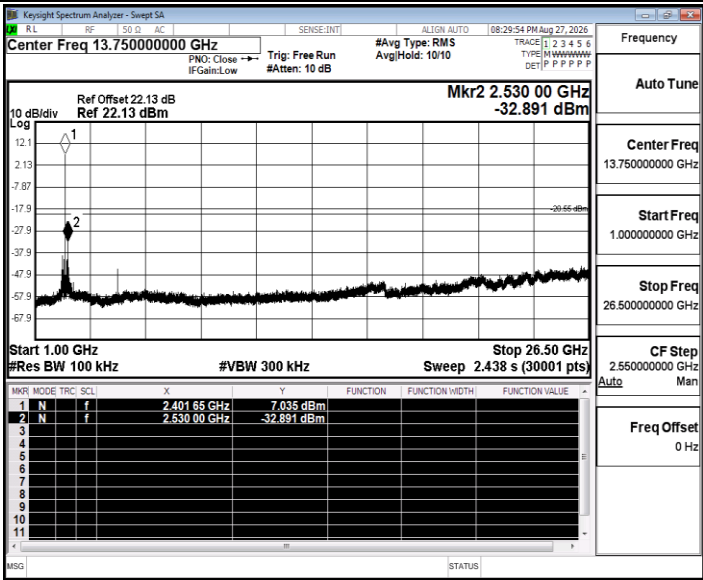
BLE_2M_Ant1_2402_0~Reference



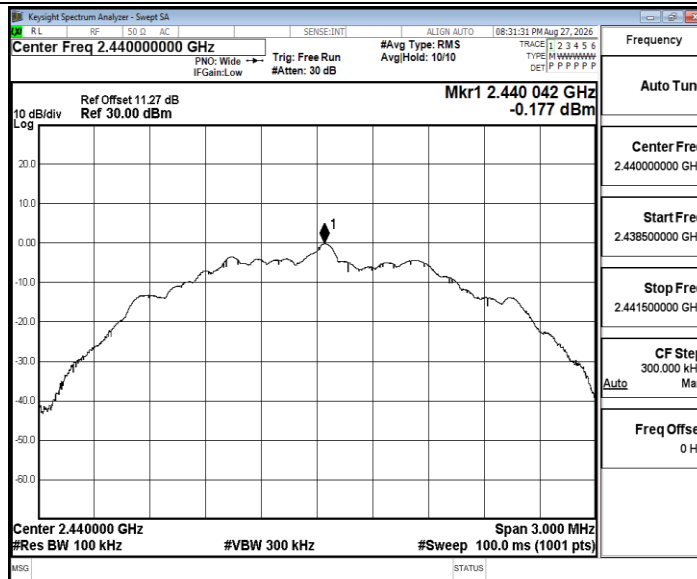
BLE_2M_Ant1_2402_30~1000



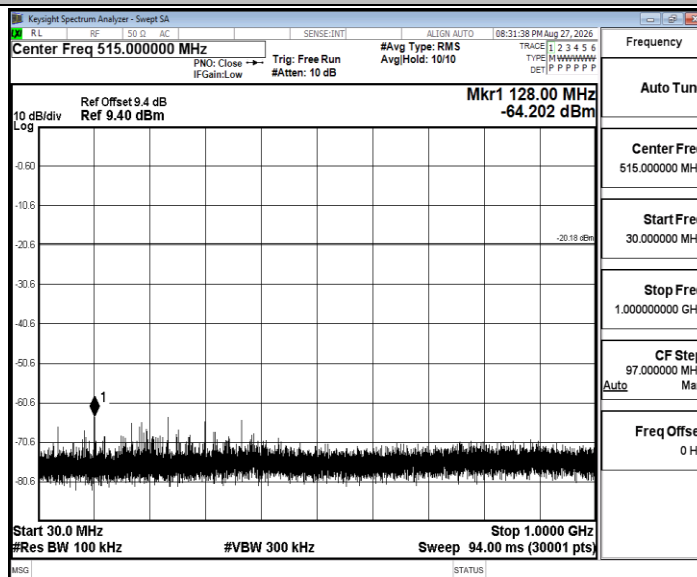
BLE_2M_Ant1_2402_1000~26500



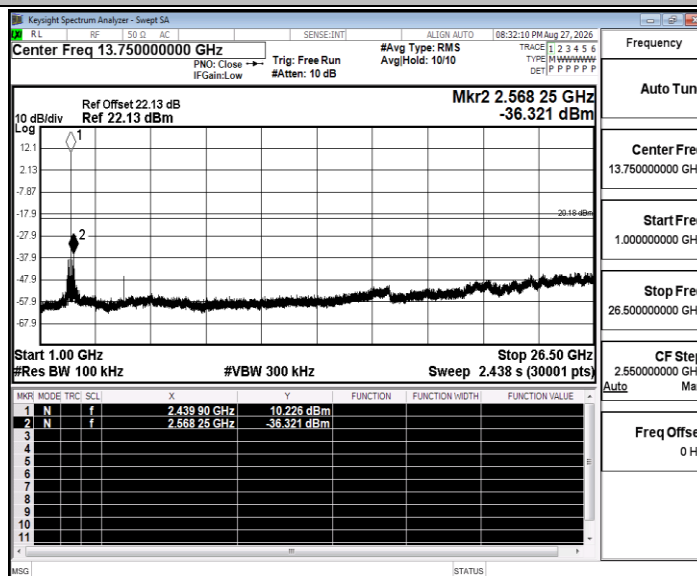
BLE_2M_Ant1_2440_0~Reference



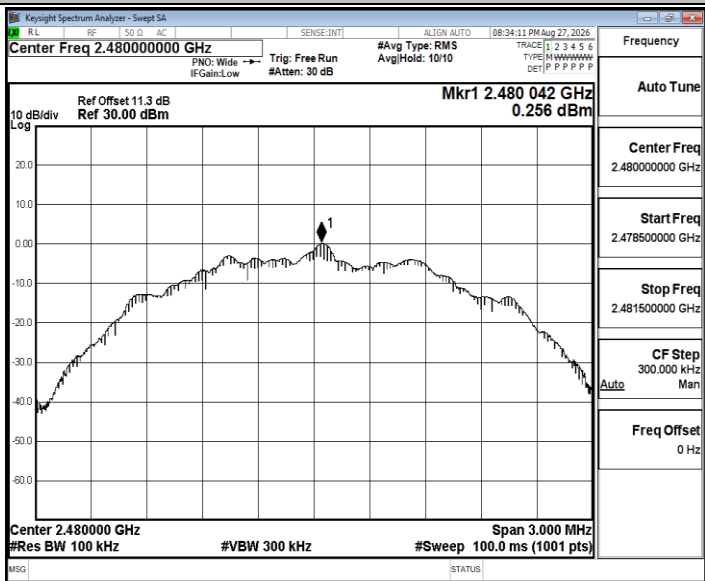
BLE_2M_Ant1_2440_30~1000



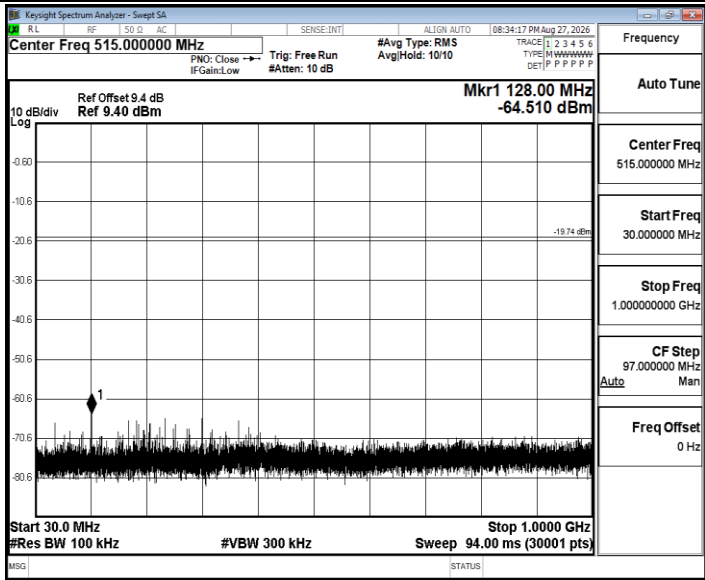
BLE_2M_Ant1_2440_1000~26500



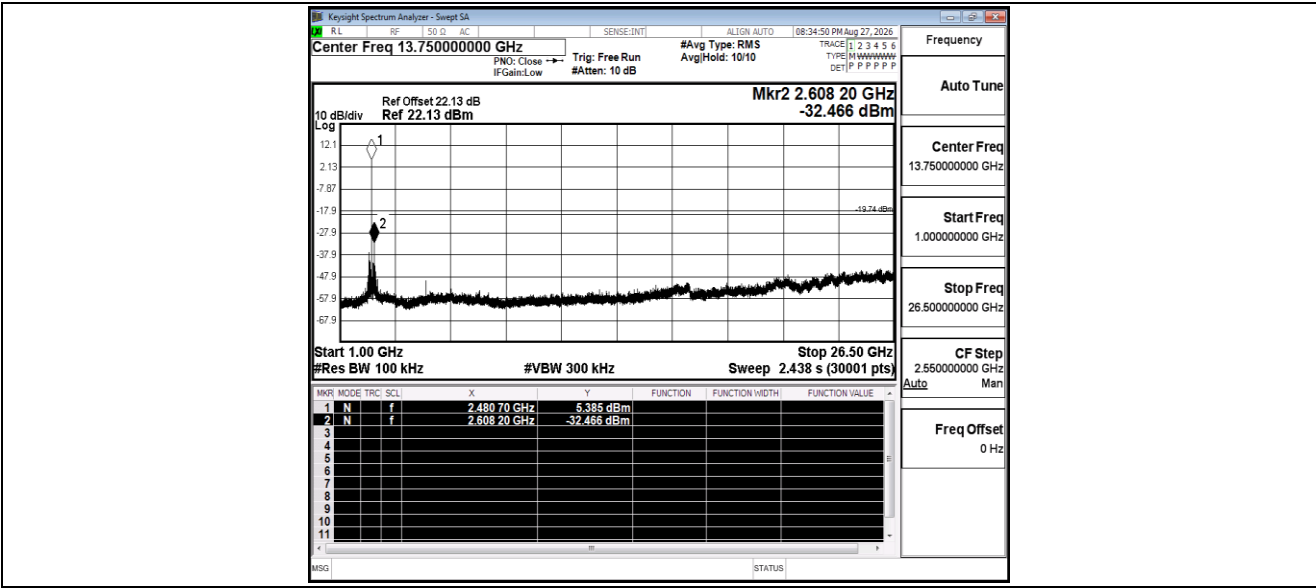
BLE_2M_Ant1_2480_0~Reference



BLE_2M_Ant1_2480_30~1000



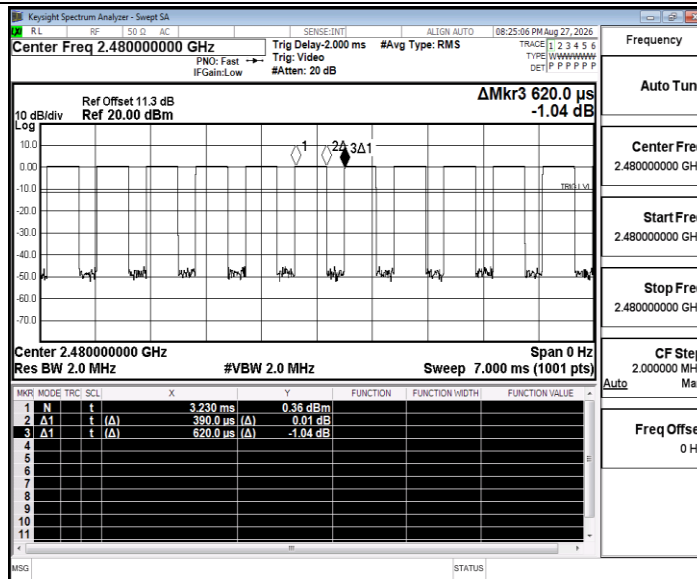
BLE_2M_Ant1_2480_1000~26500



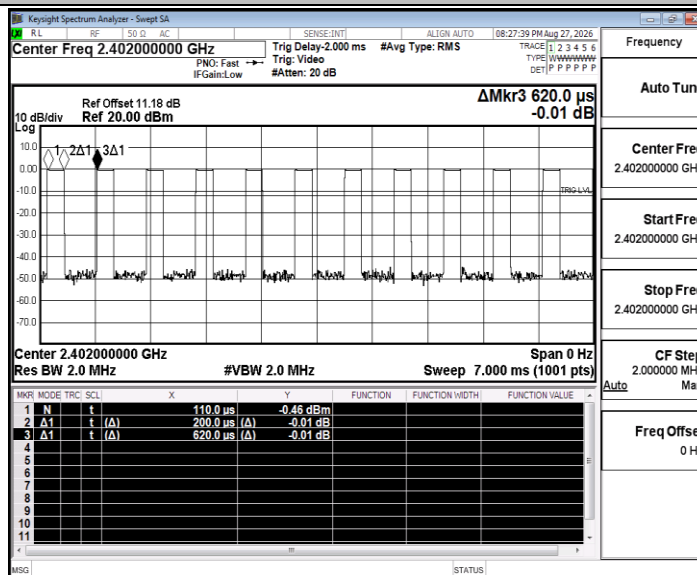
A.6 Duty Cycle

Test Result

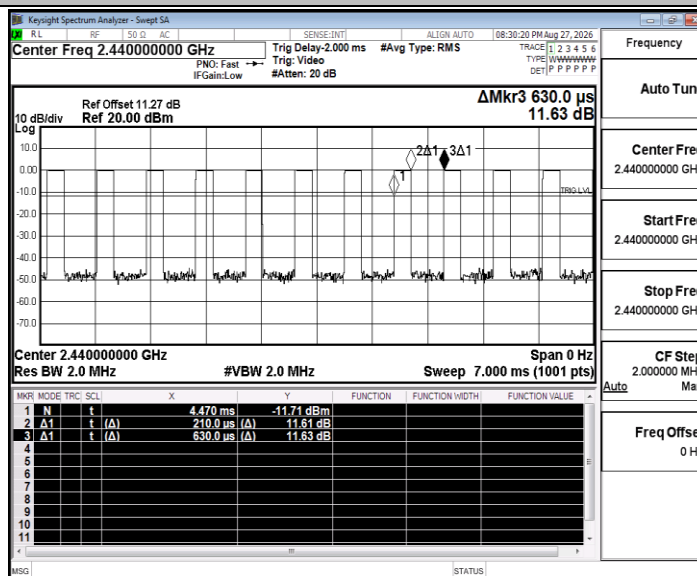
TestMode	Antenna	Freq (MHz)	ON Time [ms]	Period [ms]	X	DC [%]	xFactor	Limit	Verdict
BLE_1M	Ant1	2402	0.39	0.62	0.6290	62.90	2.01	---	---
		2440	0.40	0.63	0.6349	63.49	1.97	---	---
		2480	0.39	0.62	0.6290	62.90	2.01	---	---
BLE_2M	Ant1	2402	0.20	0.62	0.3226	32.26	4.91	---	---
		2440	0.21	0.63	0.3333	33.33	4.77	---	---
		2480	0.20	0.62	0.3226	32.26	4.91	---	---

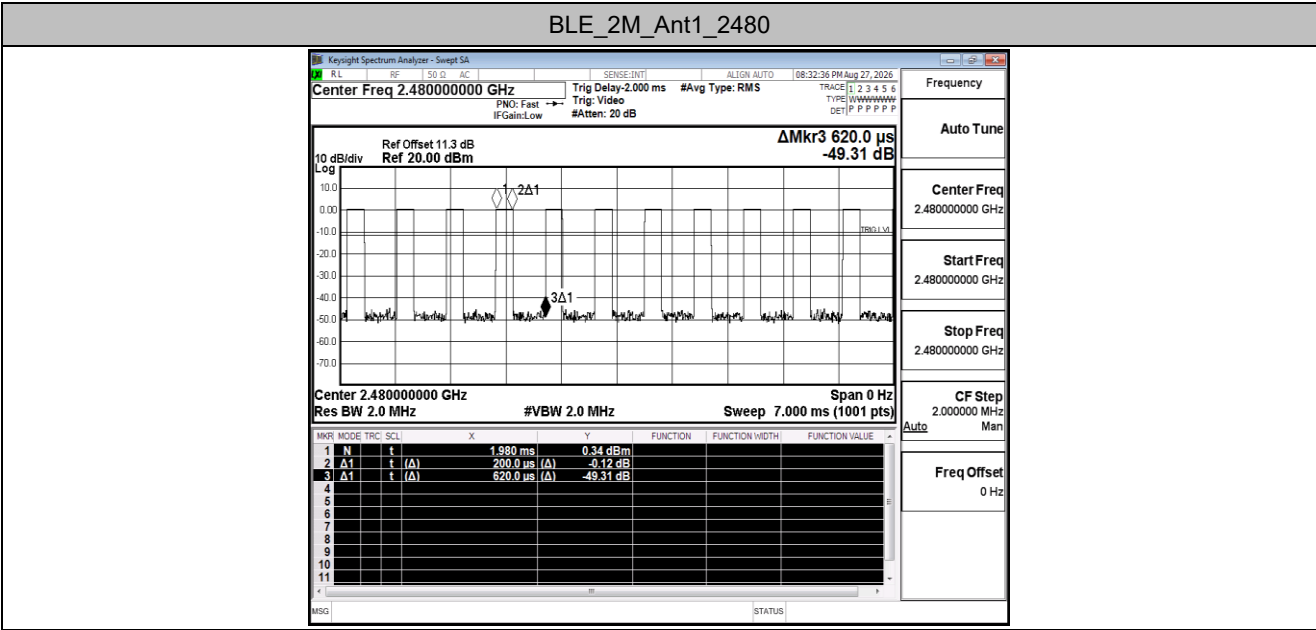


BLE_2M_Ant1_2402



BLE_2M_Ant1_2440





A.7 Emissions in Restricted Bands

Test Result

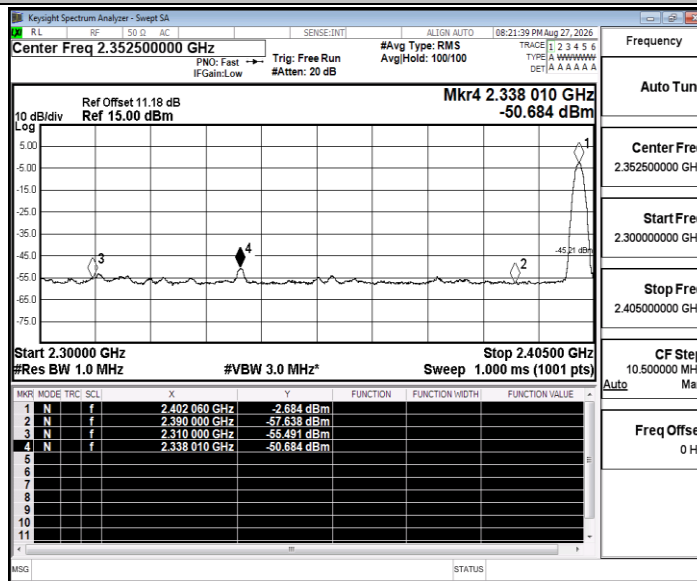
TestM ode	Anten na	ChNa me	Freq (MHz)	Detect or	Freq [MHz]	Result [dBm]	Limit [dBm]	Gain [dBi]	DC Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
BLE_ 1M	Ant1	Low	2402	AV	2310.000	-55.49	≤-45.21	2.00	2.01	43.72	≤54	PASS
				AV	2338.010	-50.68	≤-45.21	2.00	2.01	48.53	≤54	PASS
				AV	2390.000	-57.64	≤-45.21	2.00	2.01	41.57	≤54	PASS
				Peak	2310.000	-47.28	≤-23.20	2.00	0.00	49.92	≤74	PASS
				Peak	2338.430	-43.94	≤-23.20	2.00	0.00	53.26	≤74	PASS
				Peak	2390.000	-46.48	≤-23.20	2.00	0.00	50.72	≤74	PASS
		High	2480	AV	2483.500	-55.8	≤-45.21	2.00	2.01	43.41	≤54	PASS
				AV	2483.520	-55.8	≤-45.21	2.00	2.01	43.41	≤54	PASS
				AV	2500.000	-57.16	≤-45.21	2.00	2.01	42.05	≤54	PASS
				Peak	2483.500	-47.85	≤-23.20	2.00	0.00	49.35	≤74	PASS
				Peak	2483.760	-41.9	≤-23.20	2.00	0.00	55.30	≤74	PASS
				Peak	2500.000	-49.17	≤-23.20	2.00	0.00	48.03	≤74	PASS
BLE_ 2M	Ant1	Low	2402	AV	2310.000	-56.73	≤-48.11	2.00	4.91	45.38	≤54	PASS
				AV	2338.115	-53.49	≤-48.11	2.00	4.91	48.62	≤54	PASS
				AV	2390.000	-57.58	≤-48.11	2.00	4.91	44.53	≤54	PASS
				Peak	2310.000	-46.23	≤-23.20	2.00	0.00	50.97	≤74	PASS
				Peak	2338.745	-44.31	≤-23.20	2.00	0.00	52.89	≤74	PASS
				Peak	2390.000	-48.46	≤-23.20	2.00	0.00	48.74	≤74	PASS
		High	2480	AV	2483.500	-55.67	≤-48.11	2.00	4.91	46.44	≤54	PASS
				AV	2483.600	-55.21	≤-48.11	2.00	4.91	46.90	≤54	PASS
				AV	2500.000	-56.87	≤-48.11	2.00	4.91	45.24	≤54	PASS
				Peak	2483.500	-42.61	≤-23.20	2.00	0.00	54.59	≤74	PASS
				Peak	2483.600	-39.52	≤-23.20	2.00	0.00	57.68	≤74	PASS
				Peak	2500.000	-49.32	≤-23.20	2.00	0.00	47.88	≤74	PASS

Note:

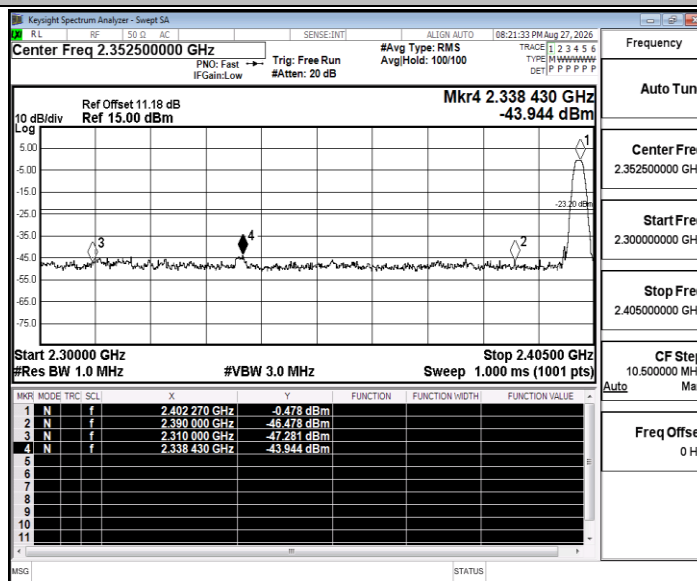
1. The Antenna Gain is compensated in the graph.
2. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

Test Graphs

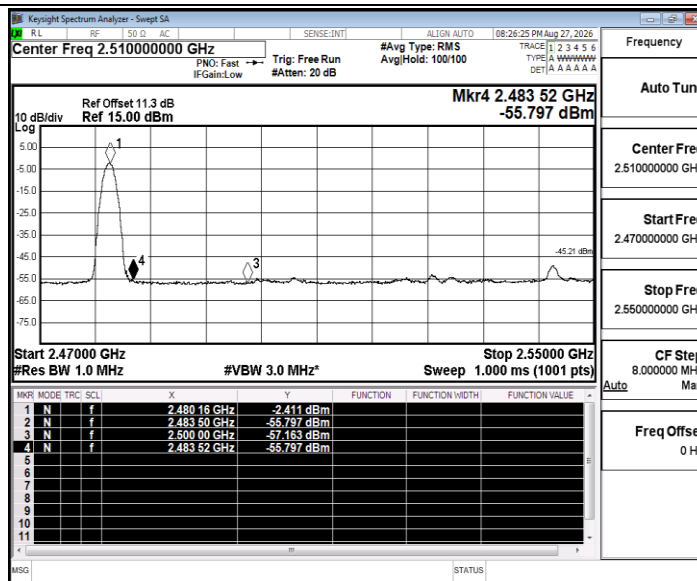
BLE_1M_Ant1_Low_2402_AV



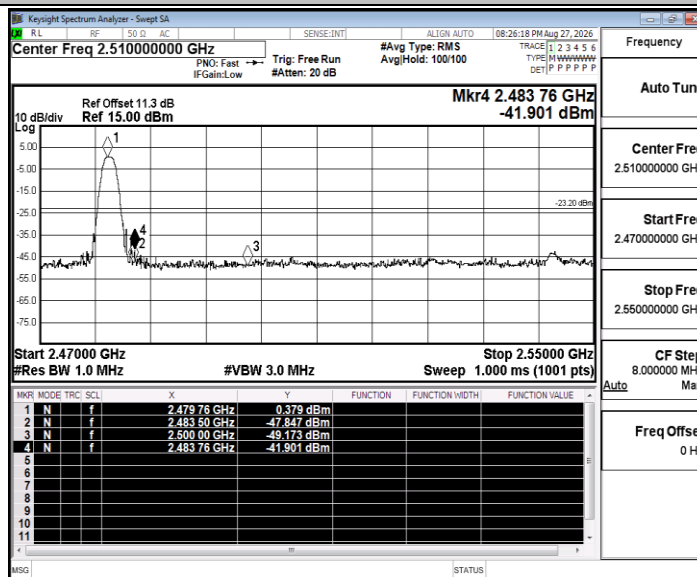
BLE_1M_Ant1_Low_2402_Peak



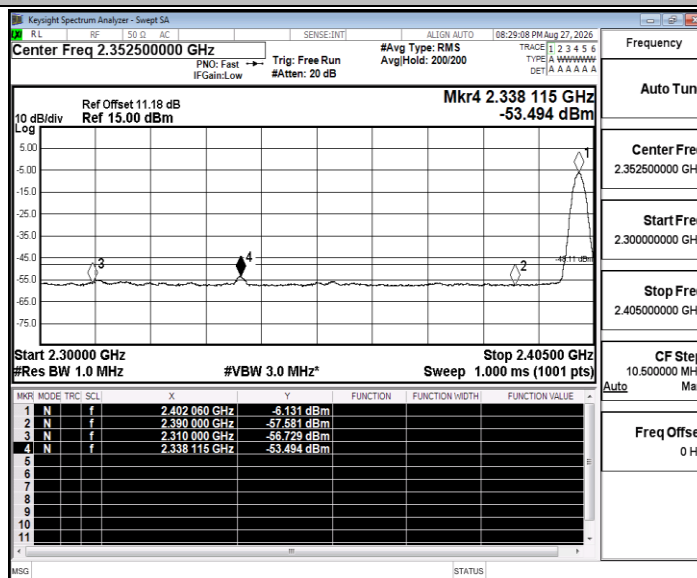
BLE_1M_Ant1_High_2480_AV



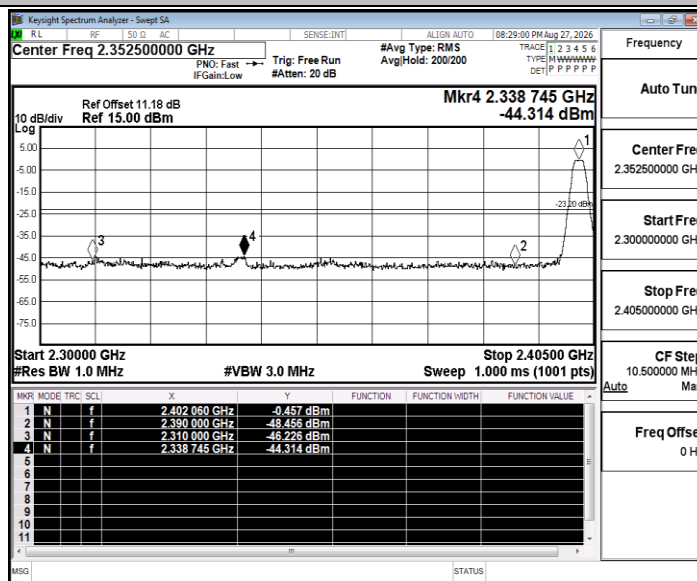
BLE_1M_Ant1_High_2480_Peak



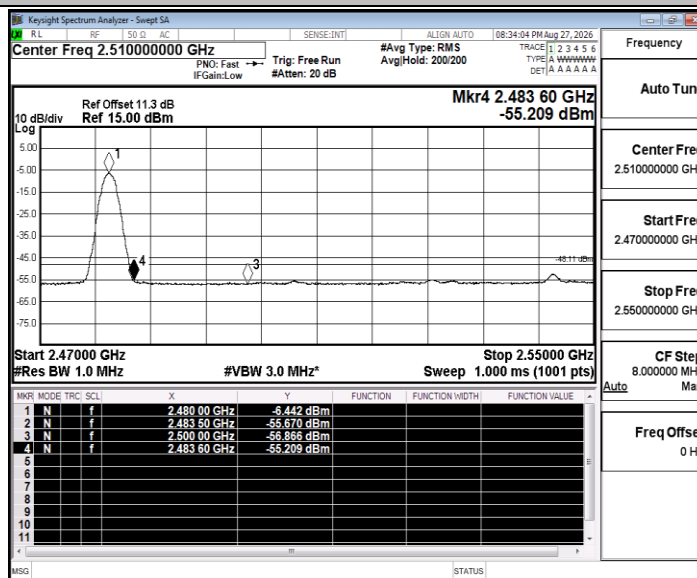
BLE_2M_Ant1_Low_2402_AV



BLE_2M_Ant1_Low_2402_Peak



BLE_2M_Ant1_High_2480_AV



BLE_2M_Ant1_High_2480_Peak

