

Appendix B

Product Name: Solar Smart Audio Hat

Test Model: PT-H-Y03

Environmental Conditions

Temperature:	24.5°C
Relative Humidity:	53.2%
ATM Pressure:	100.0 kPa
Test Engineer:	zhao xing hai
Supervised by:	Fengliu Tang

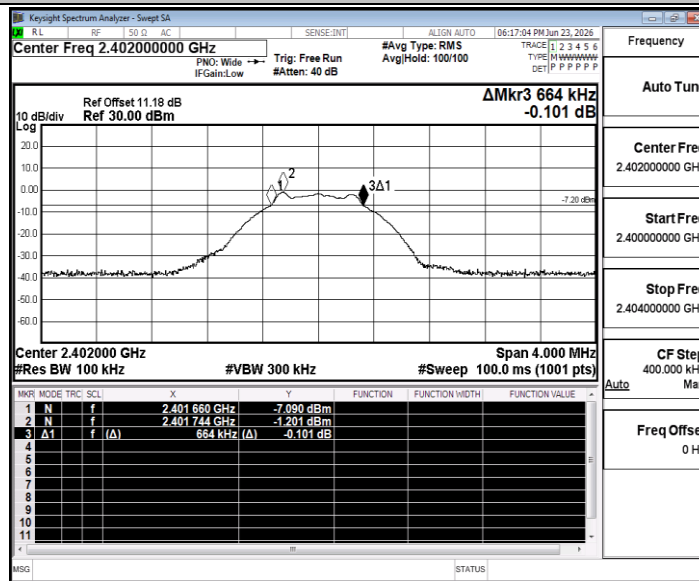
B.1 DTS Bandwidth

Test Result

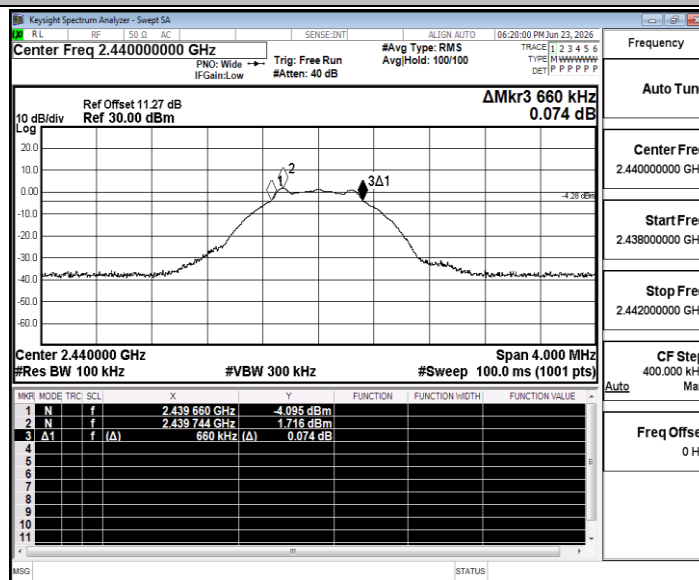
TestMode	Antenna	Freq(MHz)	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.664	2401.660	2402.324	0.5	PASS
		2440	0.660	2439.660	2440.320	0.5	PASS
		2480	0.660	2479.660	2480.320	0.5	PASS
BLE_2M	Ant1	2404	1.156	2403.404	2404.560	0.5	PASS
		2440	1.152	2439.404	2440.556	0.5	PASS
		2478	1.156	2477.400	2478.556	0.5	PASS

Test Graphs

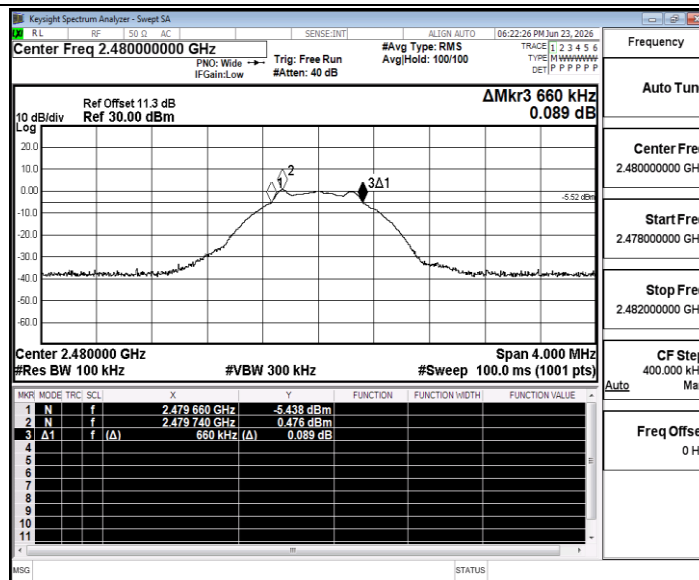
BLE_1M_Ant1_2402



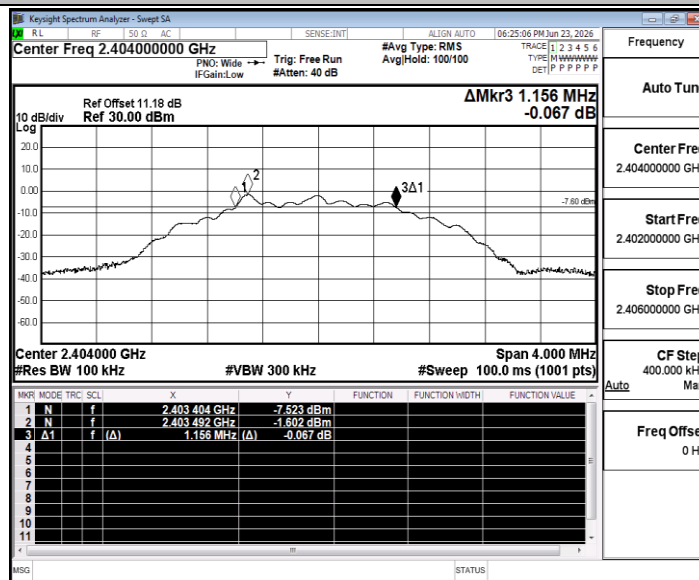
BLE_1M_Ant1_2440



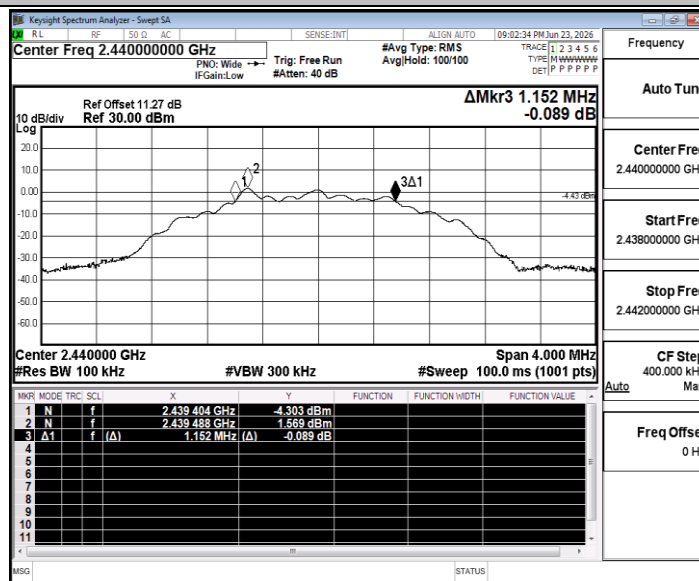
BLE_1M_Ant1_2480



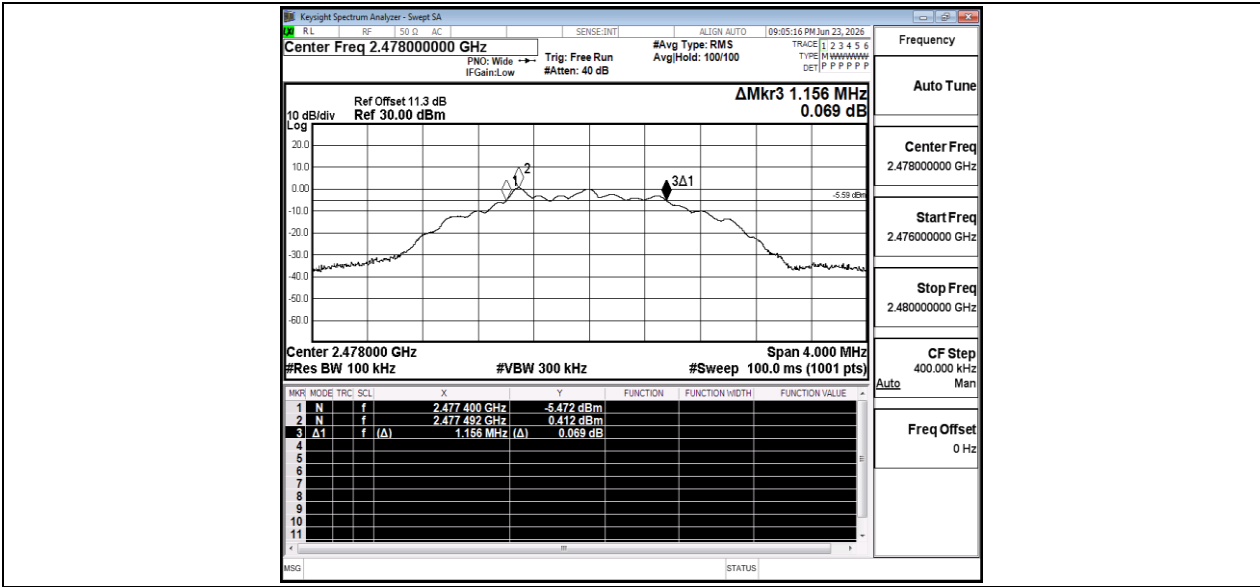
BLE_2M_Ant1_2404



BLE_2M_Ant1_2440



BLE_2M_Ant1_2478

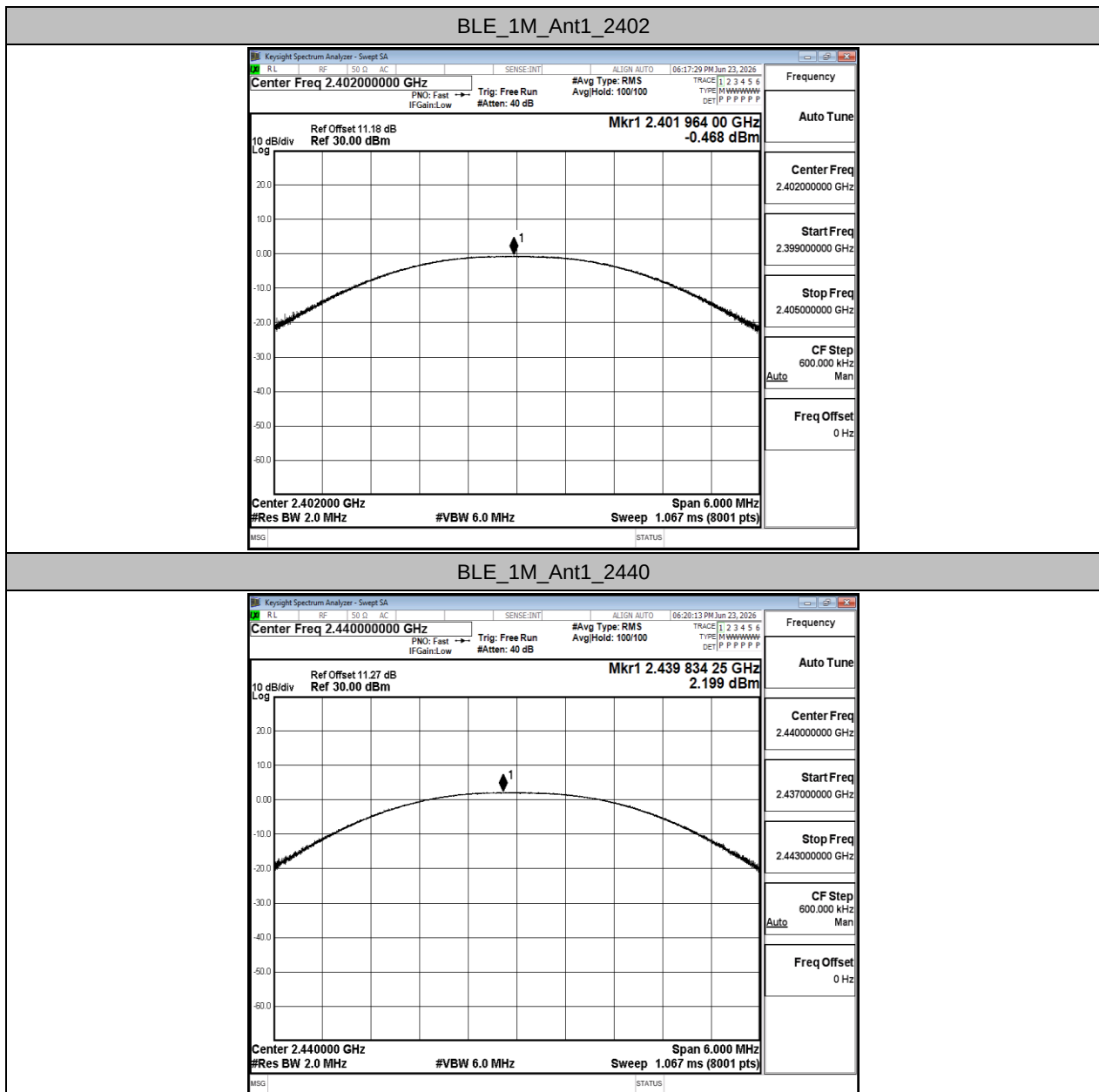


B.2 Maximum Peak conducted output power

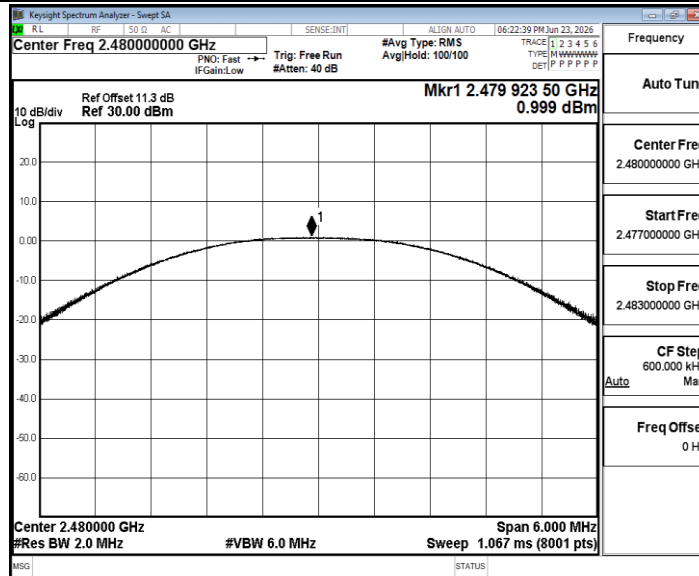
Test Result Peak

TestMode	Antenna	Freq(MHz)	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Verdict
BLE_1M	Ant1	2402	-0.47	≤30	PASS
		2440	2.20	≤30	PASS
		2480	1.00	≤30	PASS
BLE_2M	Ant1	2404	-0.89	≤30	PASS
		2440	2.20	≤30	PASS
		2478	1.11	≤30	PASS

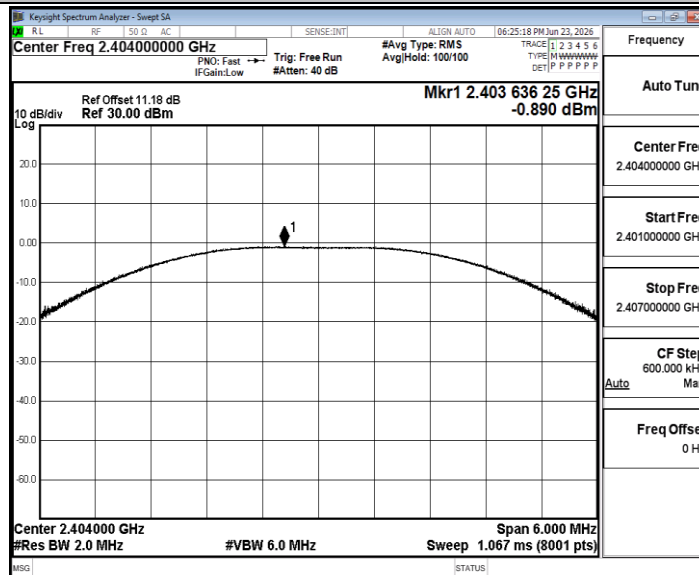
Test Graphs Peak



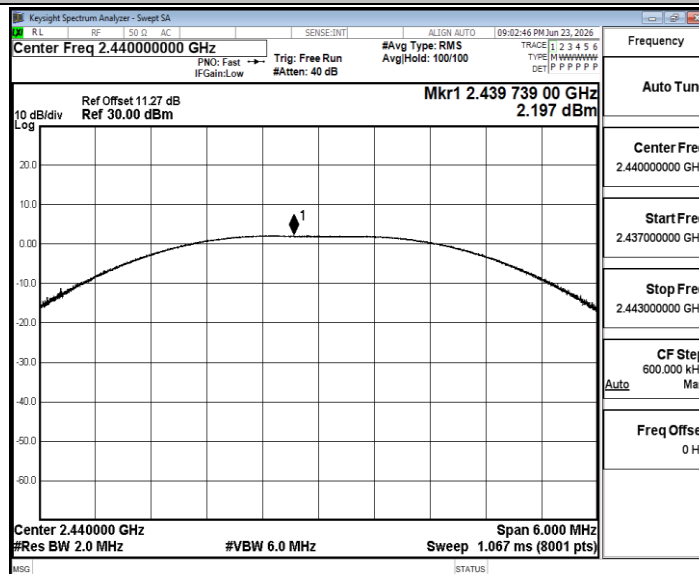
BLE_1M_Ant1_2480

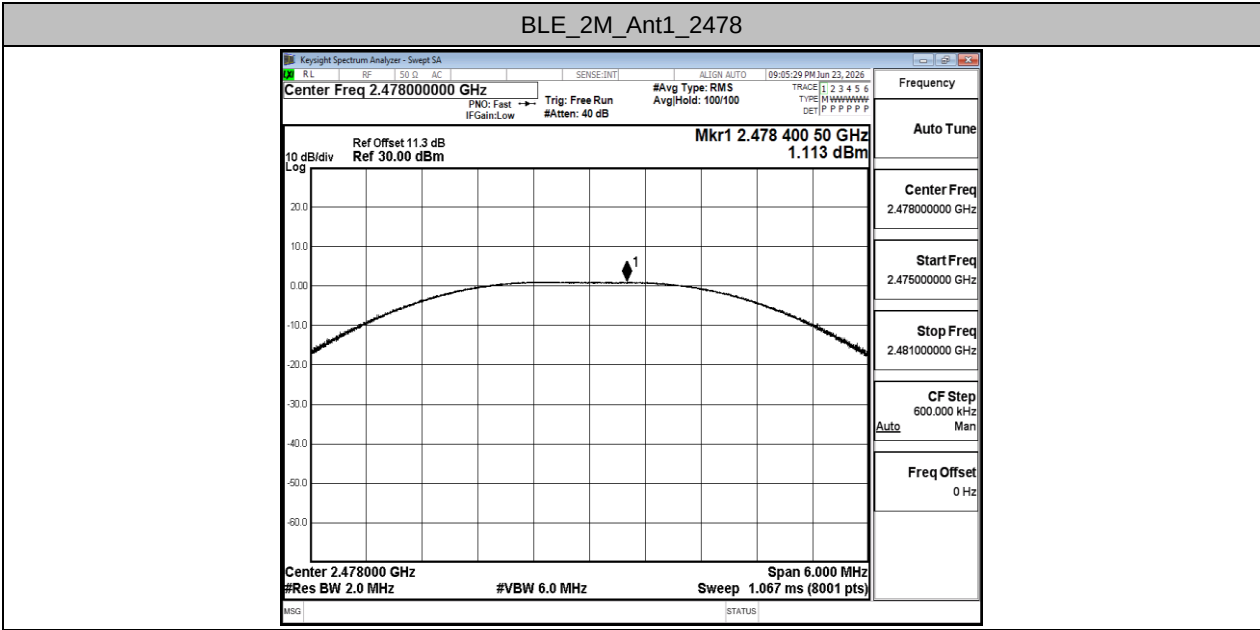


BLE_2M_Ant1_2404



BLE_2M_Ant1_2440





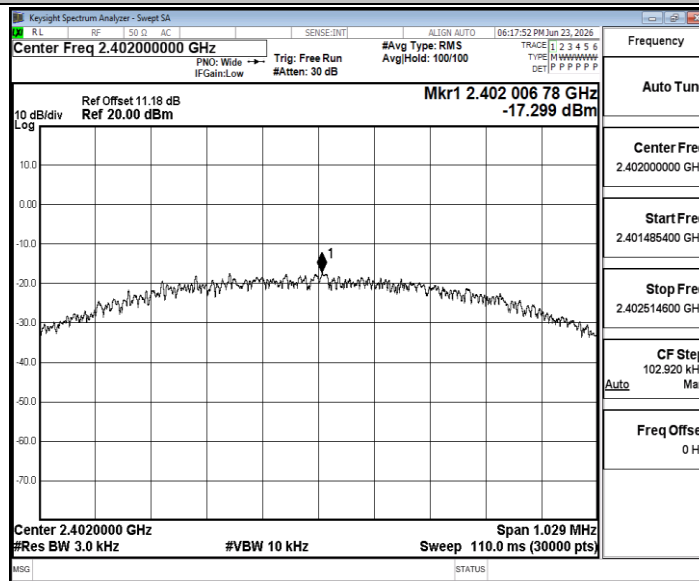
B.3 Maximum power spectral density

Test Result

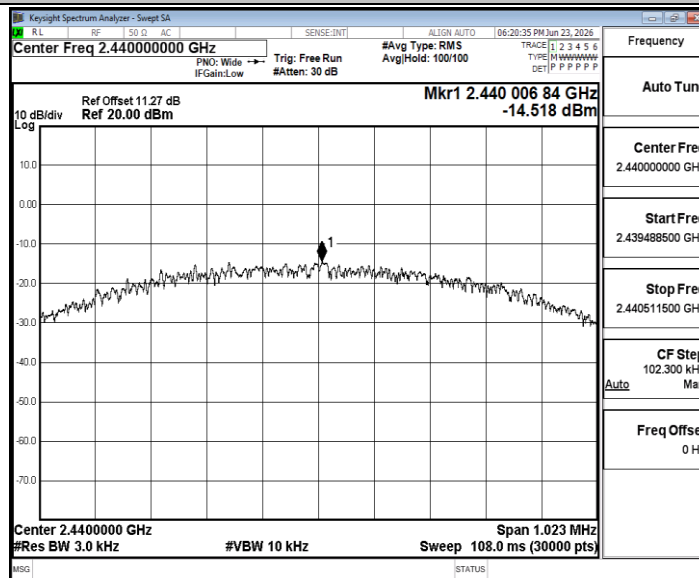
TestMode	Antenna	Freq(MHz)	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-17.30	≤8.00	PASS
		2440	-14.52	≤8.00	PASS
		2480	-15.67	≤8.00	PASS
BLE_2M	Ant1	2404	-20.77	≤8.00	PASS
		2440	-17.73	≤8.00	PASS
		2478	-18.67	≤8.00	PASS

Test Graphs

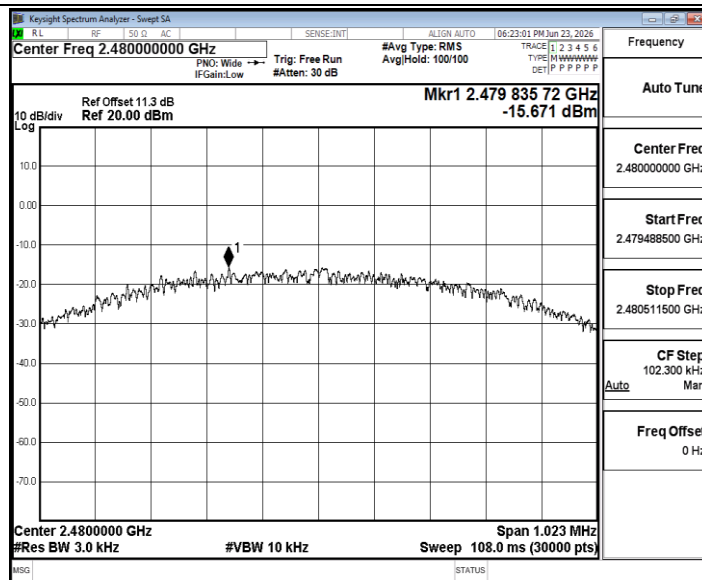
BLE_1M_Ant1_2402



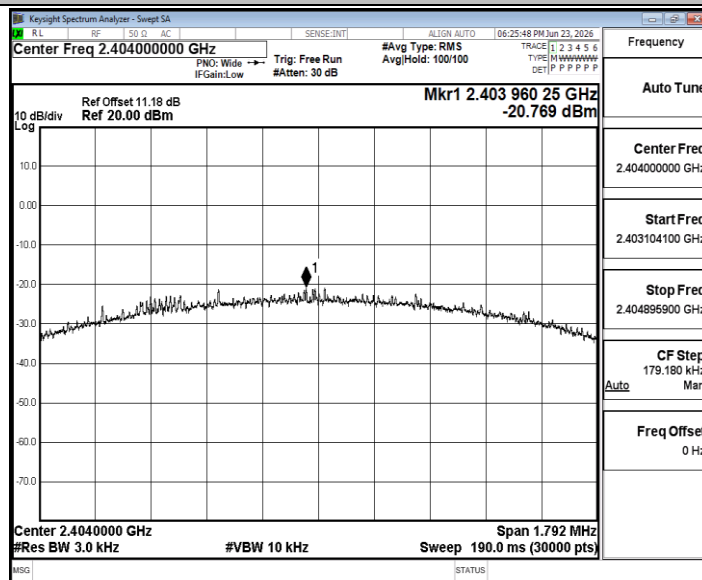
BLE_1M_Ant1_2440



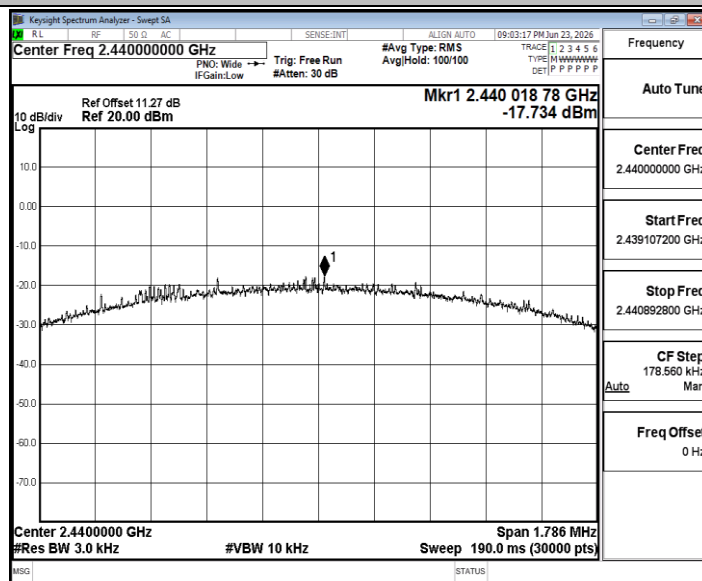
BLE_1M_Ant1_2480



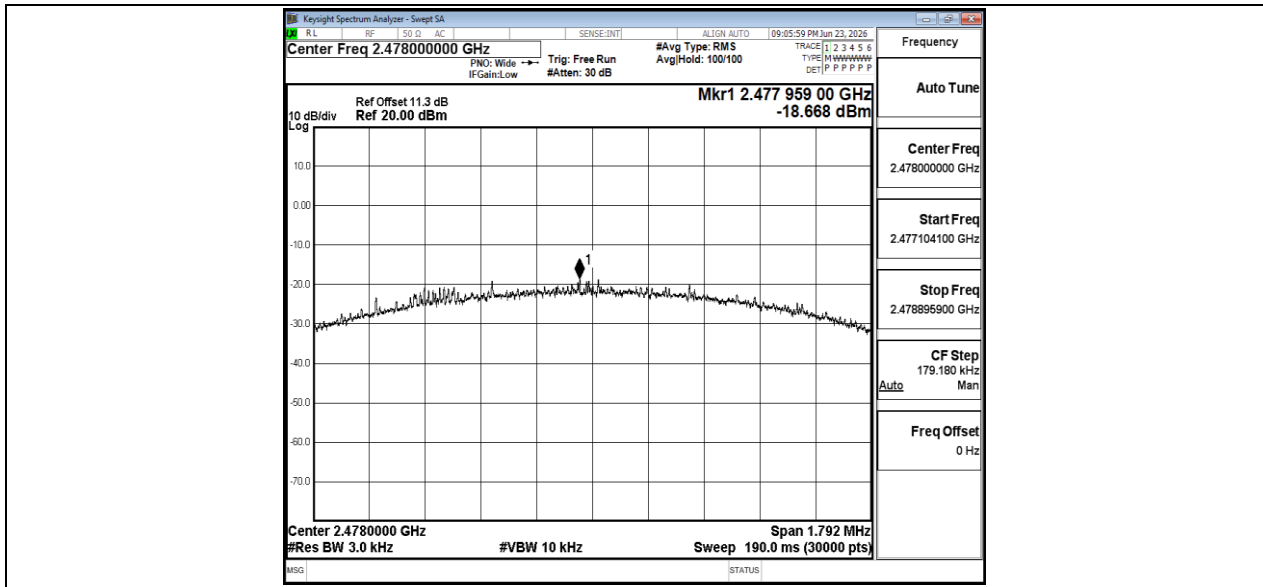
BLE_2M_Ant1_2404



BLE_2M_Ant1_2440



BLE_2M_Ant1_2478

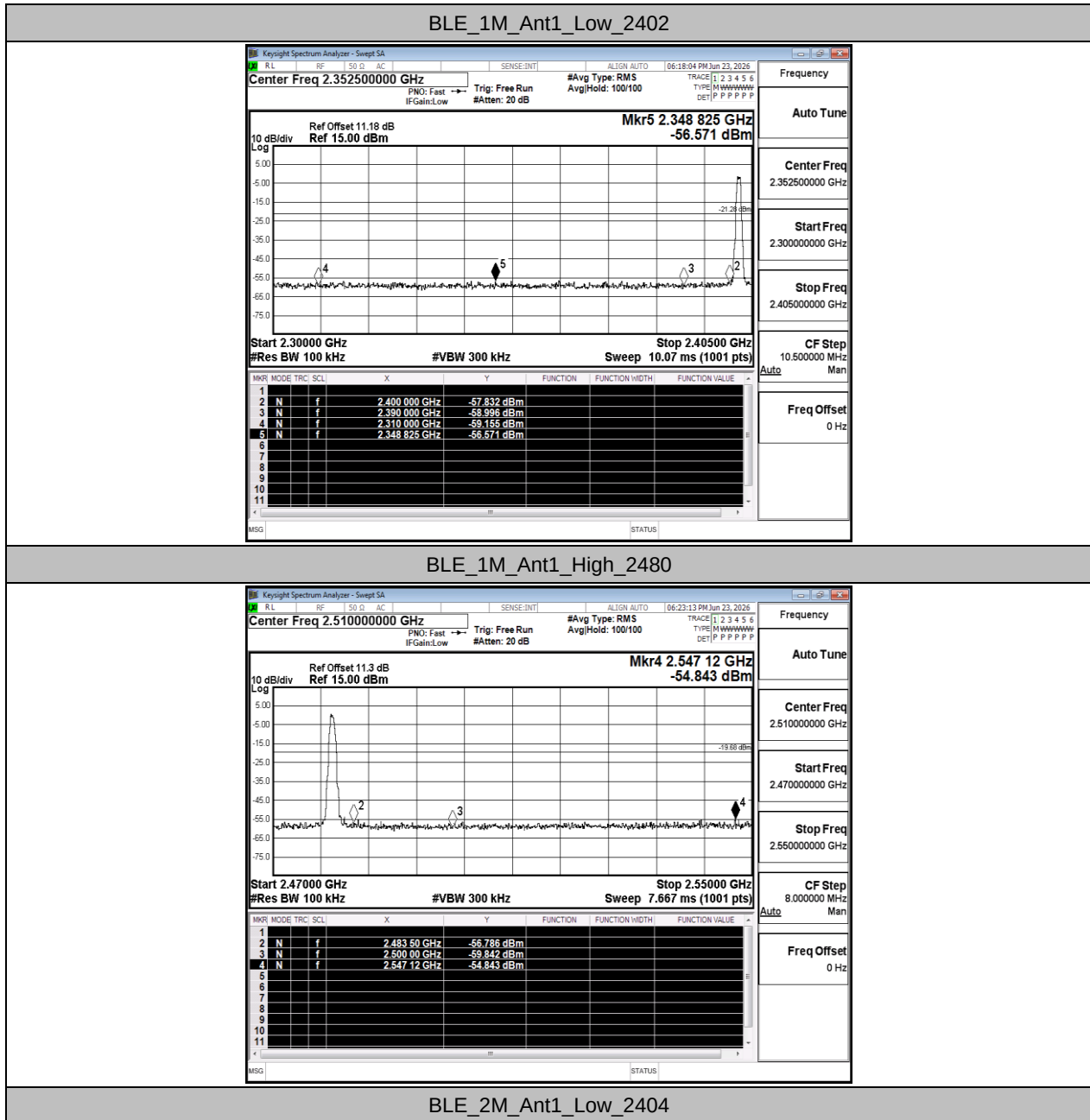


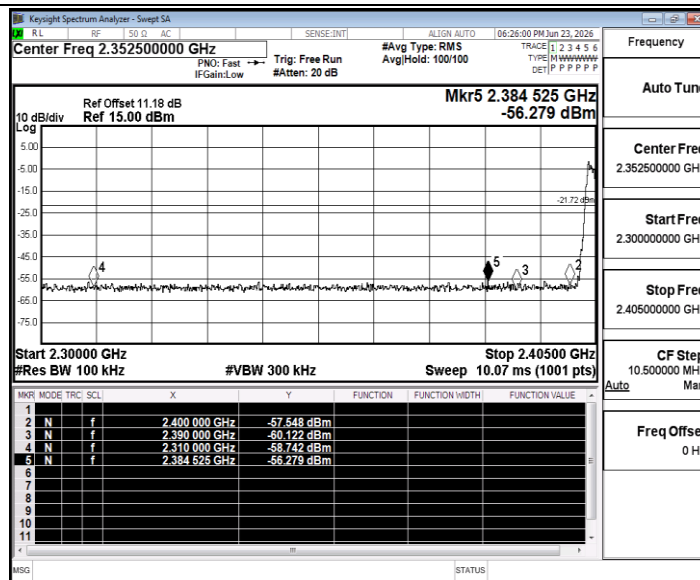
B.4 Band edge measurements

Test Result

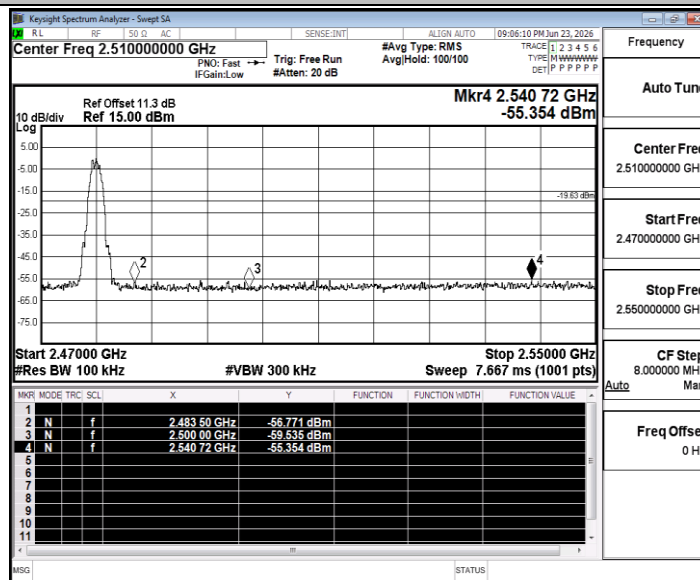
TestMode	Antenna	ChName	Freq(MHz)	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	-1.28	-56.57	≤ -21.28	PASS
		High	2480	0.32	-54.84	≤ -19.68	PASS
BLE_2M	Ant1	Low	2404	-1.72	-56.28	≤ -21.72	PASS
		High	2478	0.37	-55.35	≤ -19.63	PASS

Test Graphs





BLE_2M_Ant1_High_2478



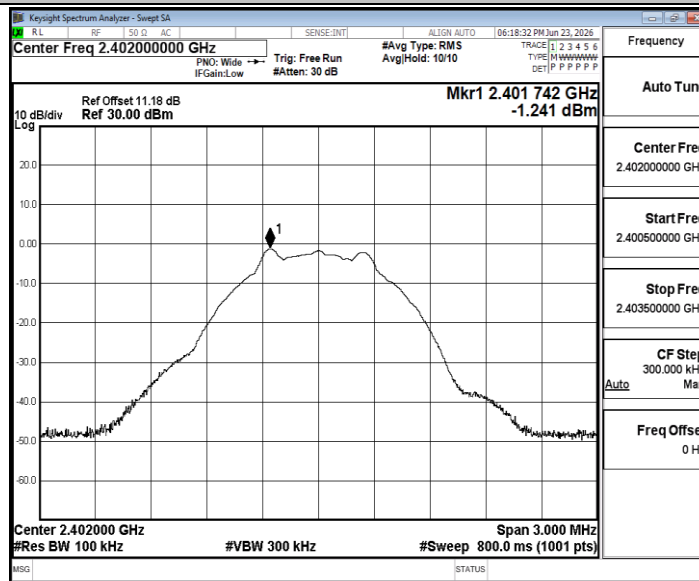
B.5 Conducted Spurious Emission

Test Result

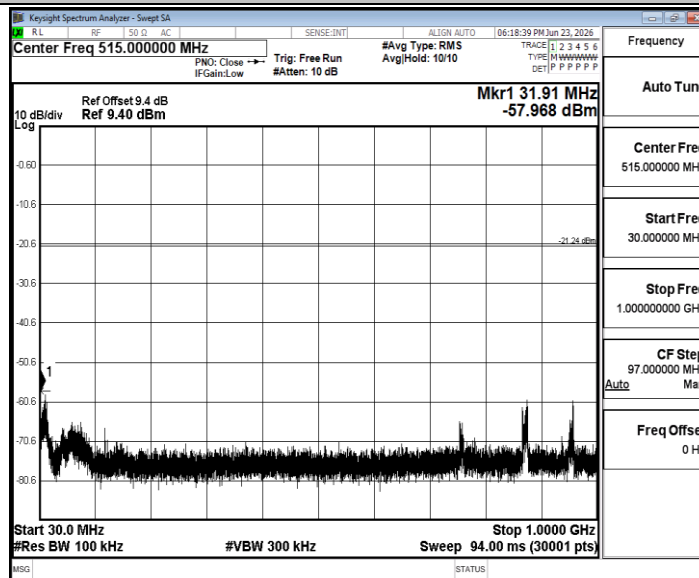
TestMode	Antenna	Freq(MHz)	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	-1.24	-1.24	---	PASS
			30~1000	-1.24	-57.97	≤-21.24	PASS
			1000~26500	-1.24	-44.4	≤-21.24	PASS
		2440	Reference	1.62	1.62	---	PASS
			30~1000	1.62	-54.71	≤-18.38	PASS
			1000~26500	1.62	-44.4	≤-18.38	PASS
		2480	Reference	0.38	0.38	---	PASS
			30~1000	0.38	-53.69	≤-19.62	PASS
			1000~26500	0.38	-44.87	≤-19.62	PASS
BLE_2M	Ant1	2404	Reference	-1.65	-1.65	---	PASS
			30~1000	-1.65	-53.22	≤-21.65	PASS
			1000~26500	-1.65	-43.84	≤-21.65	PASS
		2440	Reference	1.51	1.51	---	PASS
			30~1000	1.51	-50.72	≤-18.49	PASS
			1000~26500	1.51	-44.7	≤-18.49	PASS
		2478	Reference	0.38	0.38	---	PASS
			30~1000	0.38	-43.57	≤-19.62	PASS
			1000~26500	0.38	-44.76	≤-19.62	PASS

Test Graphs

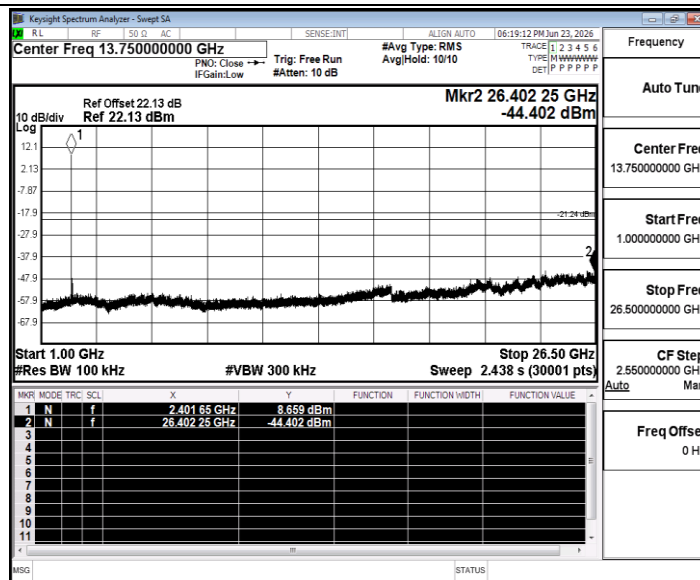
BLE_1M_Ant1_2402_0~Reference



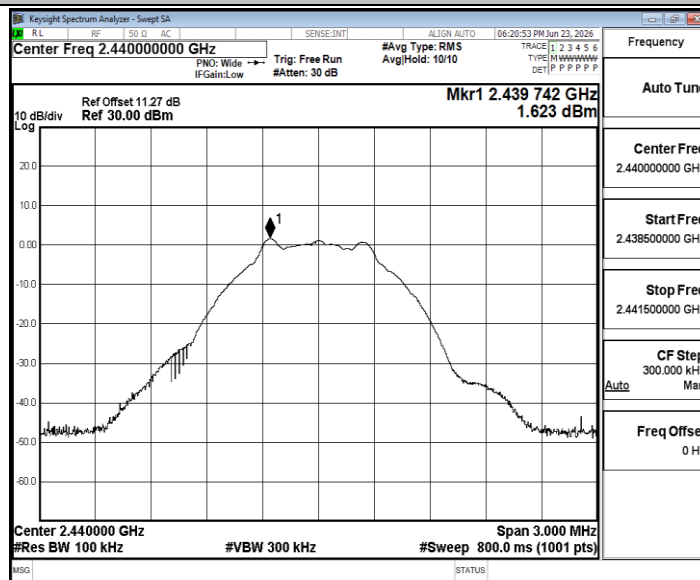
BLE_1M_Ant1_2402_30~1000



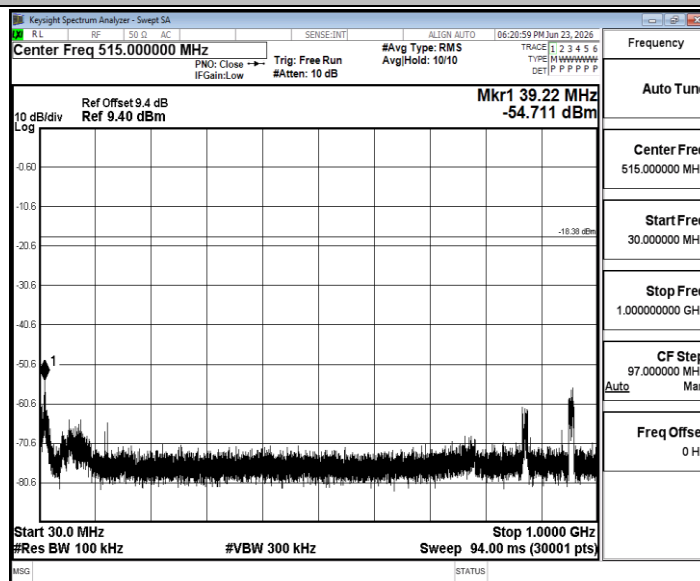
BLE_1M_Ant1_2402_1000~26500



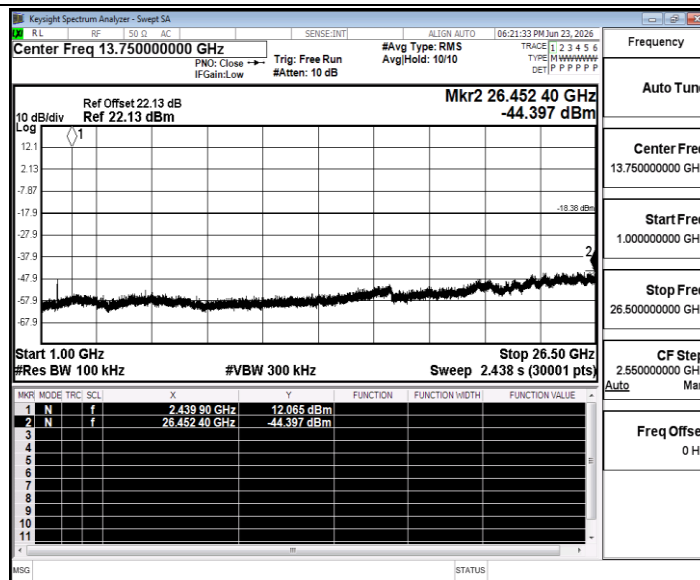
BLE_1M_Ant1_2440_0~Reference



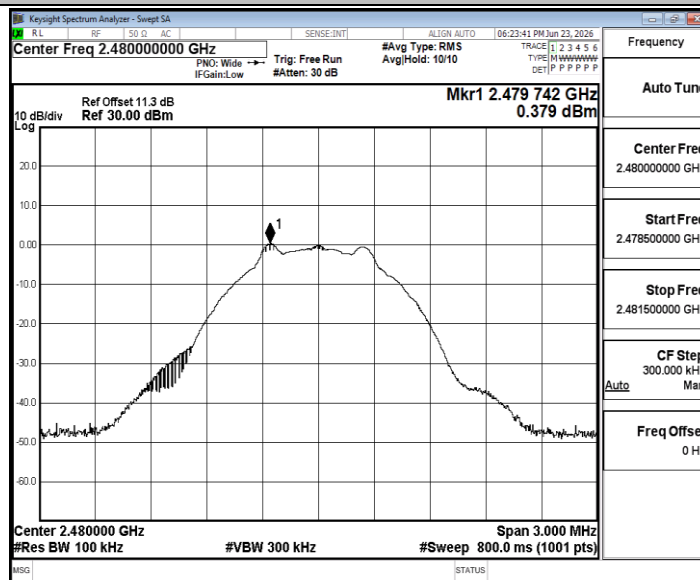
BLE_1M_Ant1_2440_30~1000



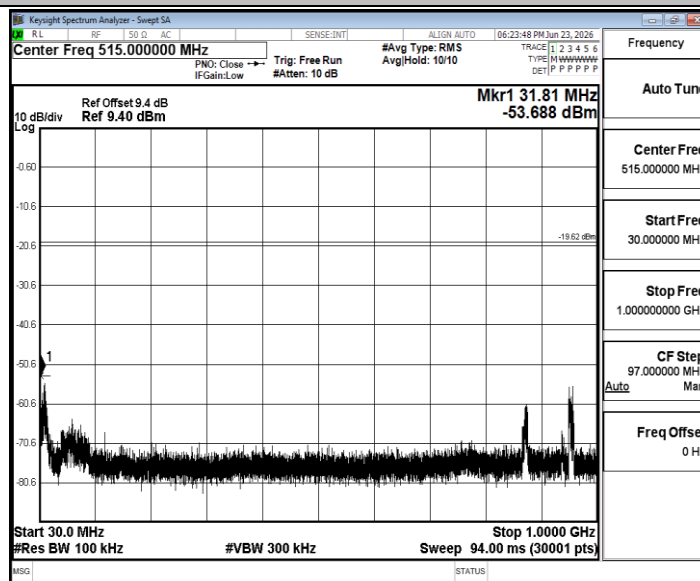
BLE_1M_Ant1_2440_1000~26500



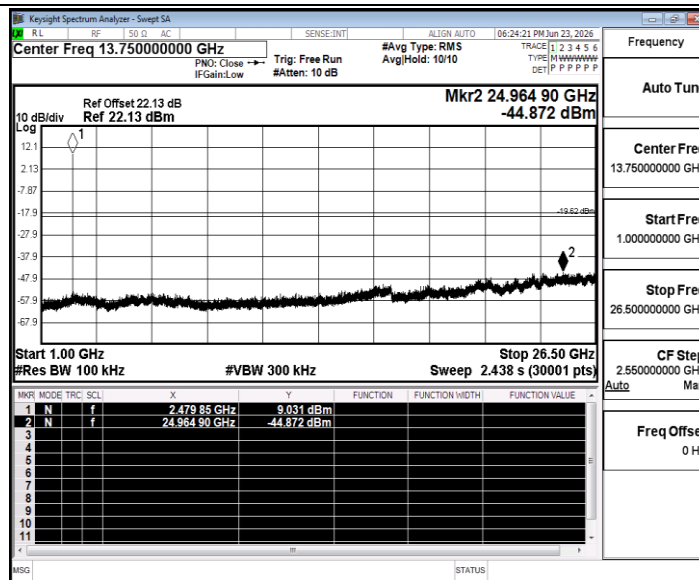
BLE_1M_Ant1_2480_0~Reference



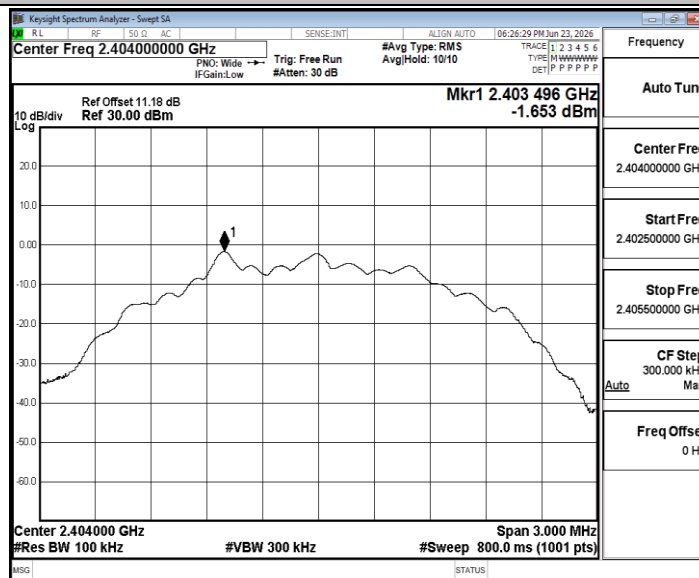
BLE_1M_Ant1_2480_30~1000



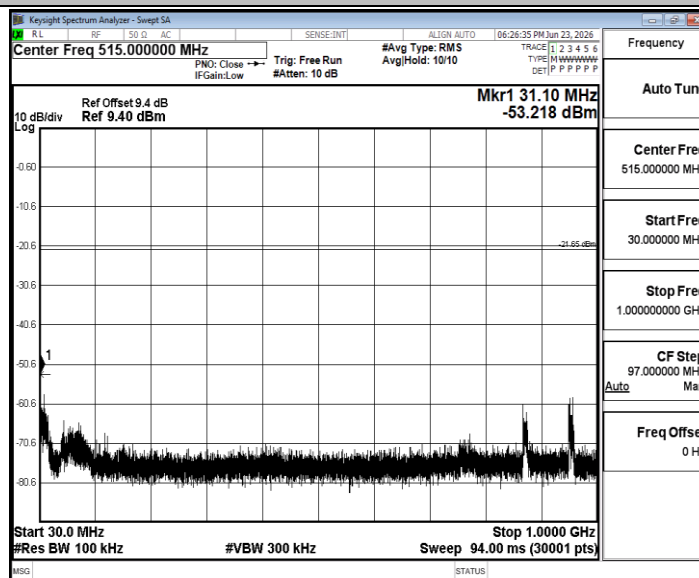
BLE_1M_Ant1_2480_1000~26500



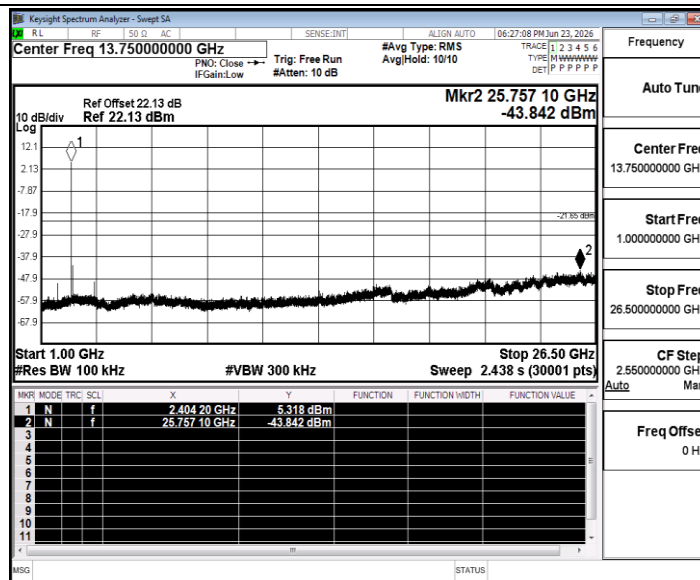
BLE_2M_Ant1_2404_0~Reference



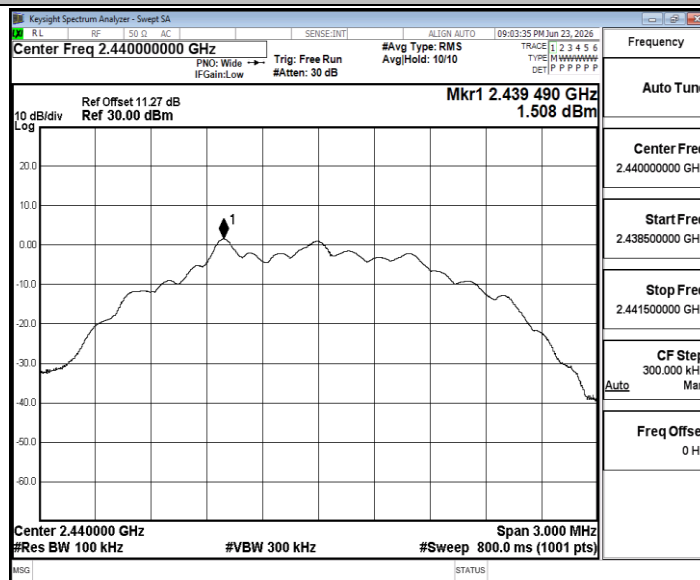
BLE_2M_Ant1_2404_30~1000



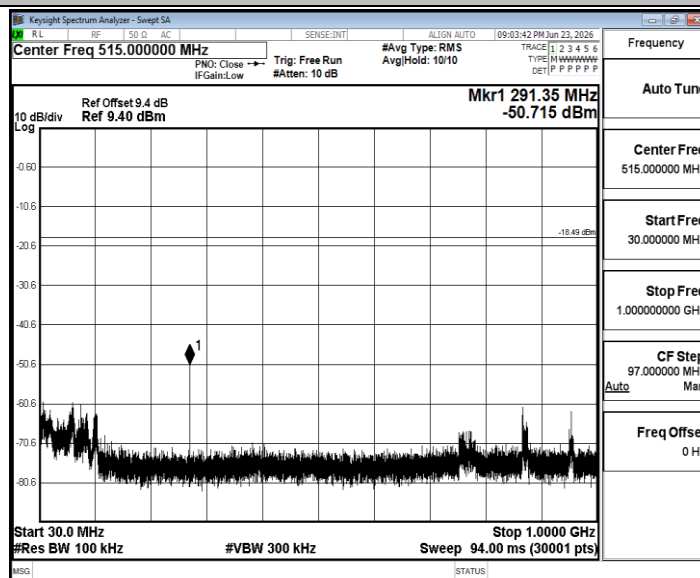
BLE_2M_Ant1_2404_1000~26500



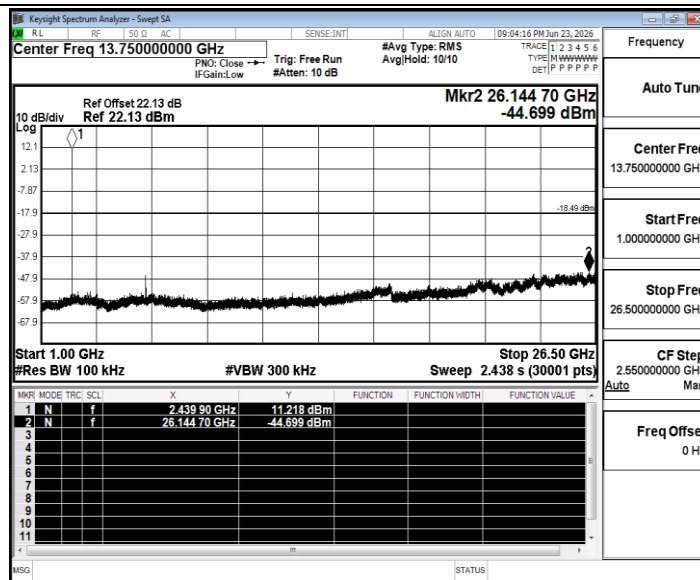
BLE_2M_Ant1_2440_0~Reference



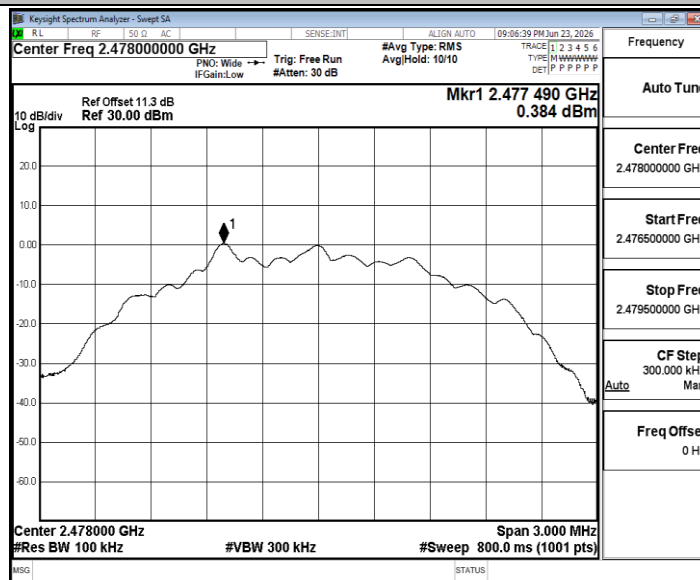
BLE_2M_Ant1_2440_30~1000



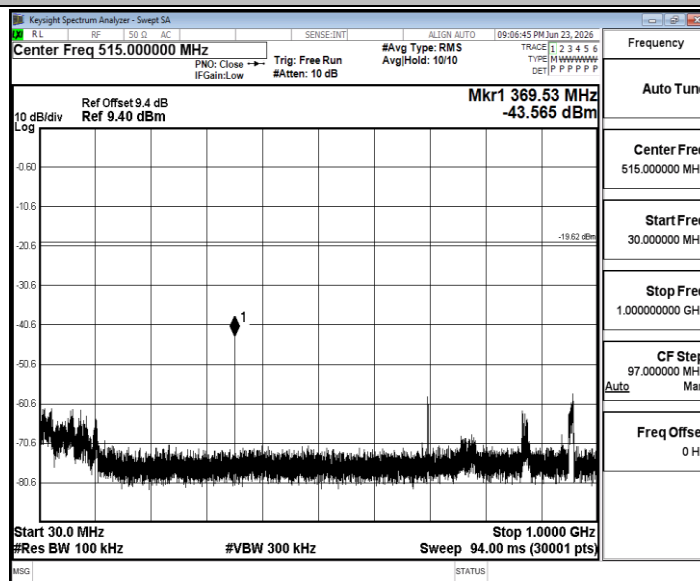
BLE_2M_Ant1_2440_1000~26500



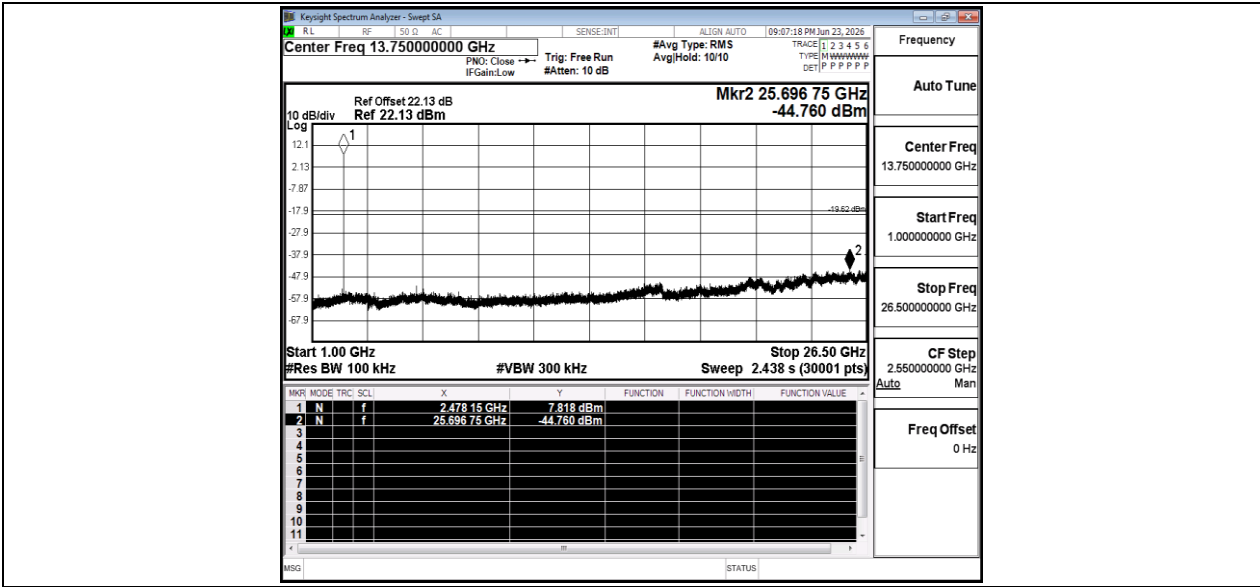
BLE_2M_Ant1_2478_0~Reference



BLE_2M_Ant1_2478_30~1000



BLE_2M_Ant1_2478_1000~26500



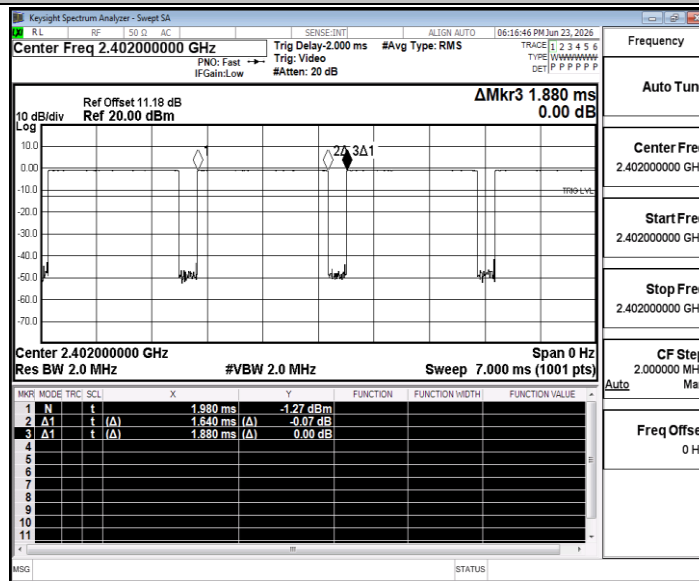
B.6 Duty Cycle

Test Result

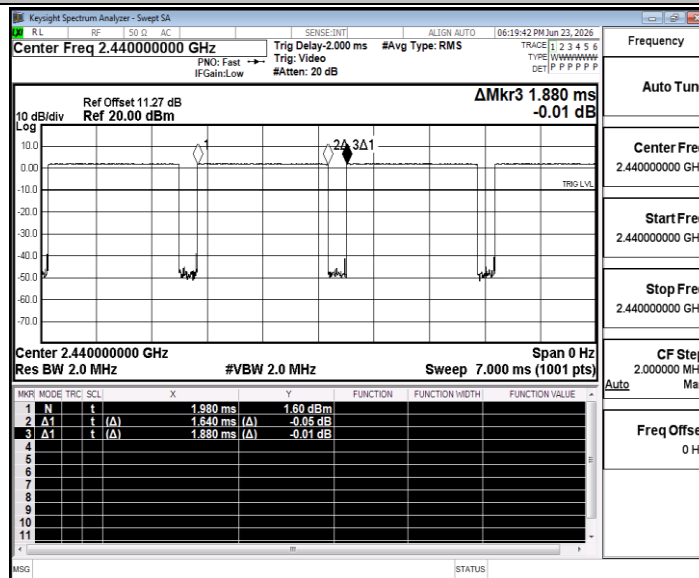
TestMode	Antenna	Freq(MHz)	ON Time [ms]	Period [ms]	X	DC [%]	xFactor	Limit	Verdict
BLE_1M	Ant1	2402	1.64	1.88	0.8723	87.23	0.59	---	---
		2440	1.64	1.88	0.8723	87.23	0.59	---	---
		2480	1.64	1.88	0.8723	87.23	0.59	---	---
BLE_2M	Ant1	2404	0.82	1.25	0.6560	65.60	1.83	---	---
		2440	0.82	1.25	0.6560	65.60	1.83	---	---
		2478	0.82	1.25	0.6560	65.60	1.83	---	---

Test Graphs

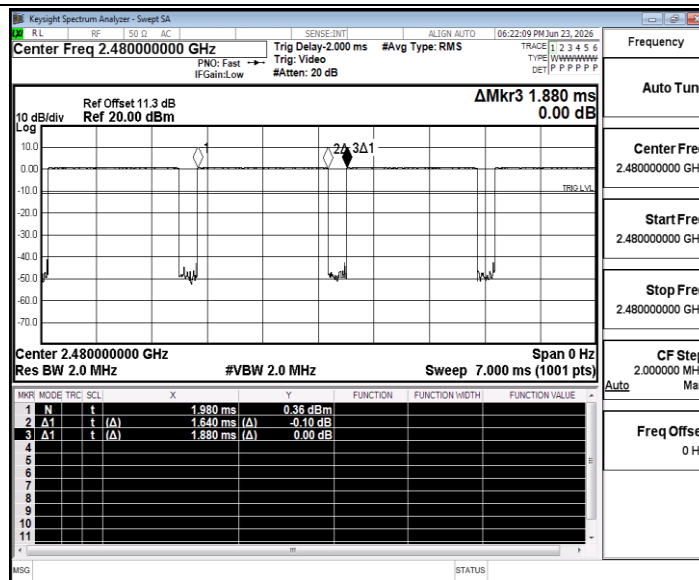
BLE_1M_Ant1_2402



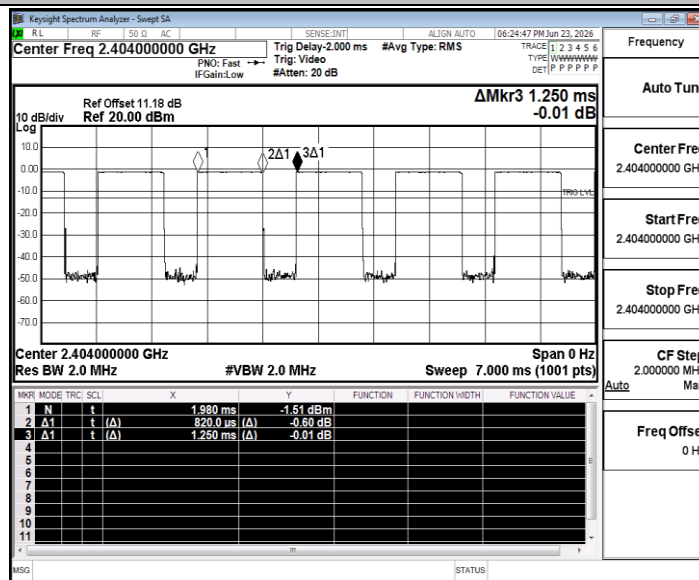
BLE_1M_Ant1_2440



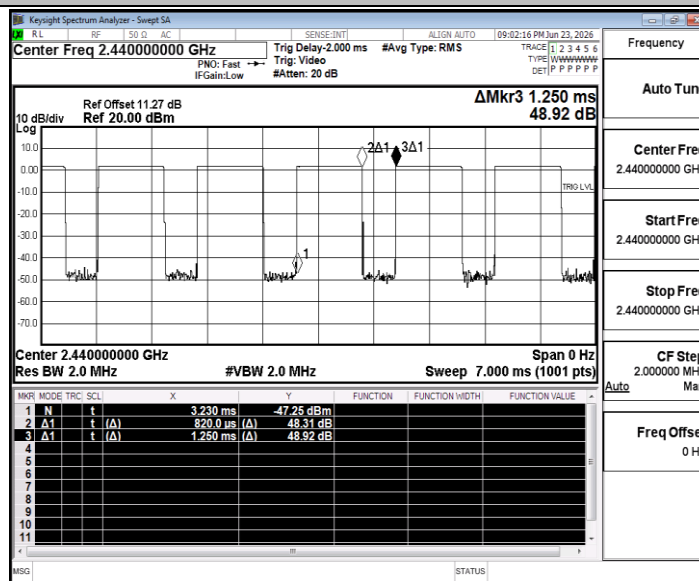
BLE_1M_Ant1_2480



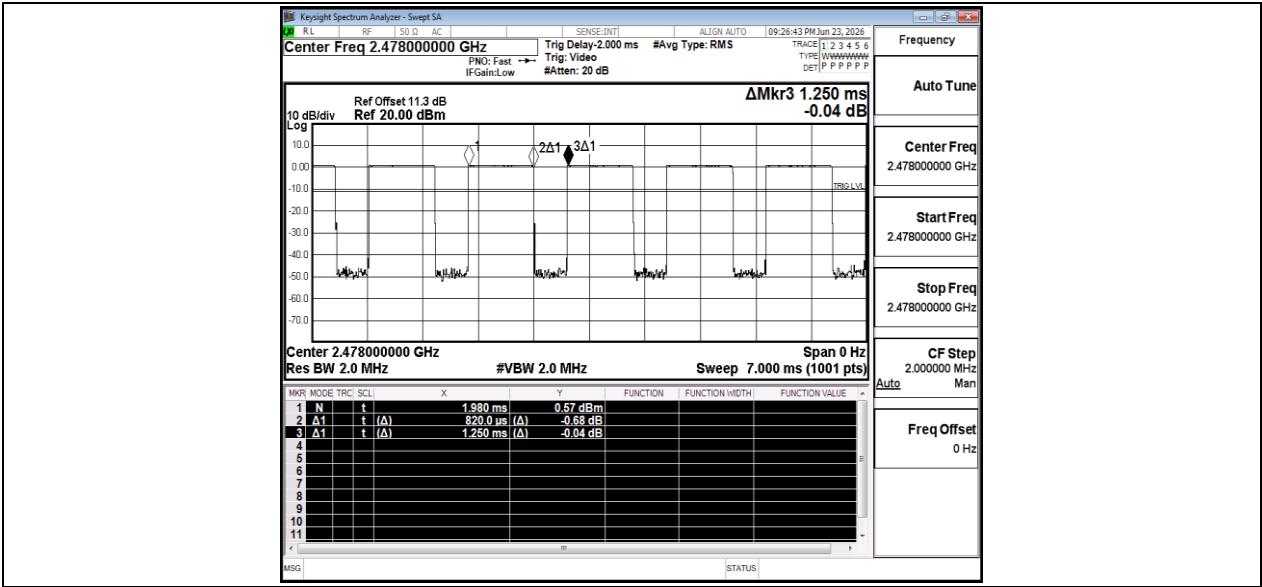
BLE_2M_Ant1_2404



BLE_2M_Ant1_2440



BLE_2M_Ant1_2478



B.7 Emissions in Restricted Bands

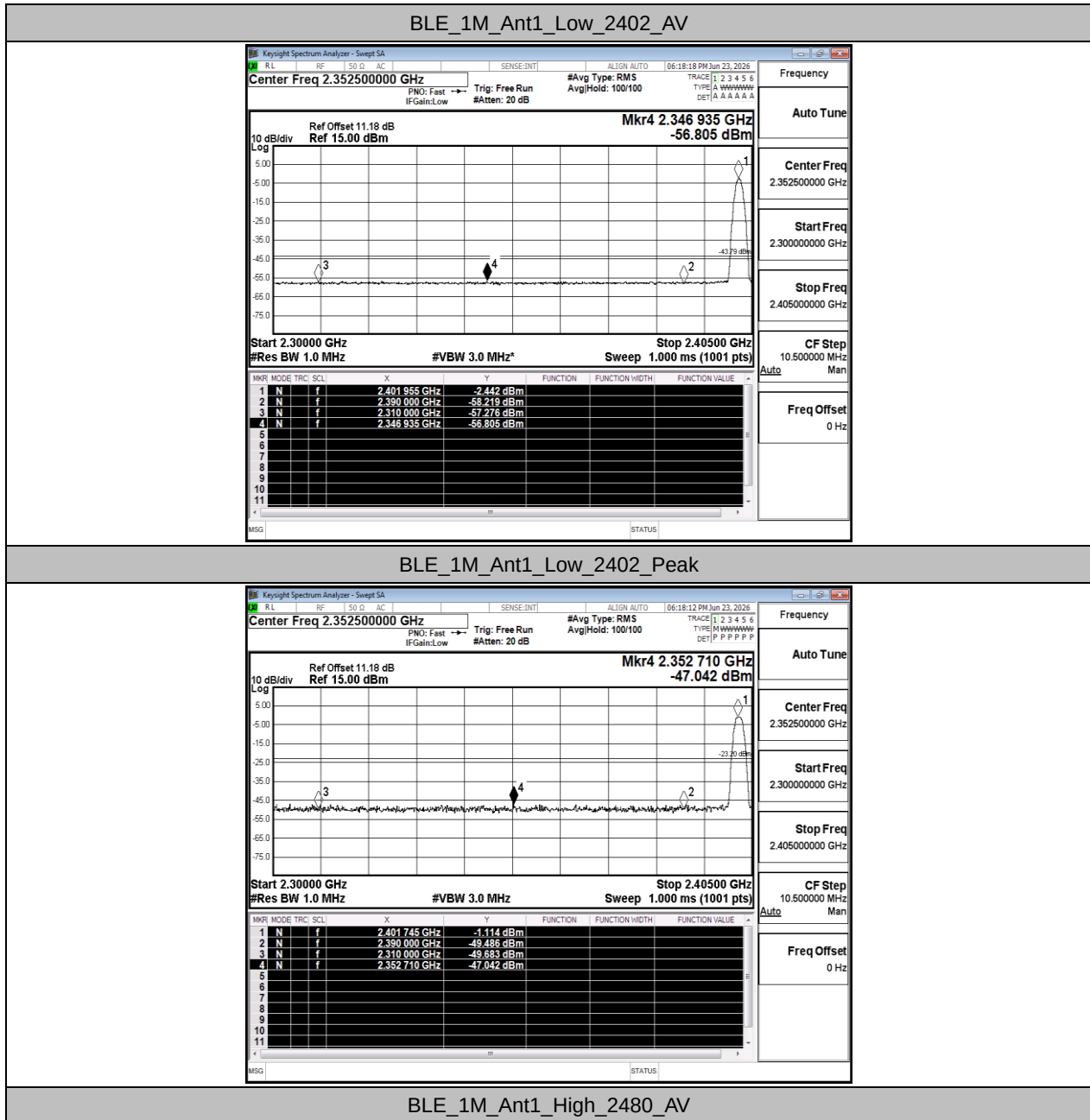
Test Result

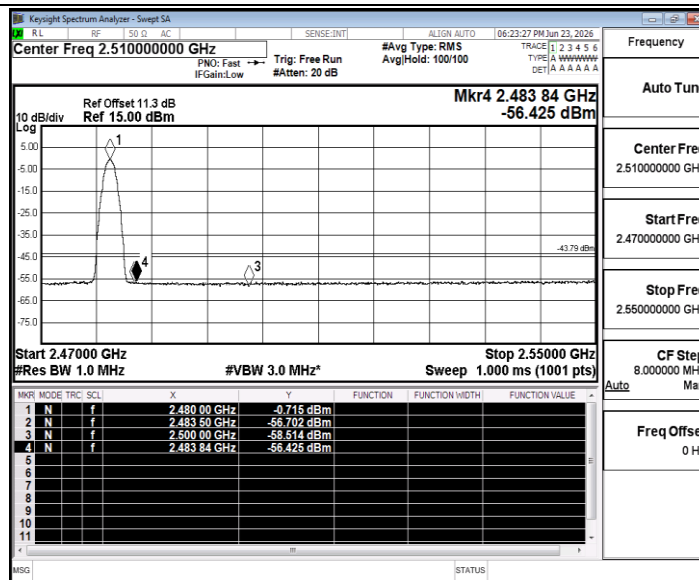
Test Mode	Antenna	Channel Name	Freq (MHz)	Detector	Freq [MHz]	Result [dBm]	Limit [dBm]	Gain [dBi]	DC Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
BLE_1M	Ant1	Low	2402	AV	2310.000	-57.28	≤-43.79	2.00	0.59	40.51	≤54	PASS
				AV	2346.935	-56.81	≤-43.79	2.00	0.59	40.98	≤54	PASS
				AV	2390.000	-58.22	≤-43.79	2.00	0.59	39.57	≤54	PASS
				Peak	2310.000	-49.68	≤-23.20	2.00	0.00	47.52	≤74	PASS
				Peak	2352.710	-47.04	≤-23.20	2.00	0.00	50.16	≤74	PASS
				Peak	2390.000	-49.49	≤-23.20	2.00	0.00	47.71	≤74	PASS
		High	2480	AV	2483.500	-56.7	≤-43.79	2.00	0.59	41.09	≤54	PASS
				AV	2483.840	-56.42	≤-43.79	2.00	0.59	41.37	≤54	PASS
				AV	2500.000	-58.51	≤-43.79	2.00	0.59	39.28	≤54	PASS
				Peak	2483.500	-46.96	≤-23.20	2.00	0.00	50.24	≤74	PASS
				Peak	2483.520	-46.96	≤-23.20	2.00	0.00	50.24	≤74	PASS
				Peak	2500.000	-48.42	≤-23.20	2.00	0.00	48.78	≤74	PASS
BLE_2M	Ant1	Low	2404	AV	2310.000	-58.05	≤-45.03	2.00	1.83	40.98	≤54	PASS
				AV	2383.790	-56.92	≤-45.03	2.00	1.83	42.11	≤54	PASS
				AV	2390.000	-58.03	≤-45.03	2.00	1.83	41.00	≤54	PASS
				Peak	2310.000	-50.32	≤-23.20	2.00	0.00	46.88	≤74	PASS
				Peak	2363.945	-46.26	≤-23.20	2.00	0.00	50.94	≤74	PASS
				Peak	2390.000	-48.6	≤-23.20	2.00	0.00	48.60	≤74	PASS
		High	2478	AV	2483.500	-56.84	≤-45.03	2.00	1.83	42.19	≤54	PASS
				AV	2487.680	-56.6	≤-45.03	2.00	1.83	42.43	≤54	PASS
				AV	2500.000	-57.52	≤-45.03	2.00	1.83	41.51	≤54	PASS
				Peak	2483.500	-47.76	≤-23.20	2.00	0.00	49.44	≤74	PASS
				Peak	2494.160	-46.54	≤-23.20	2.00	0.00	50.66	≤74	PASS
				Peak	2500.000	-49.05	≤-23.20	2.00	0.00	48.15	≤74	PASS

Note:

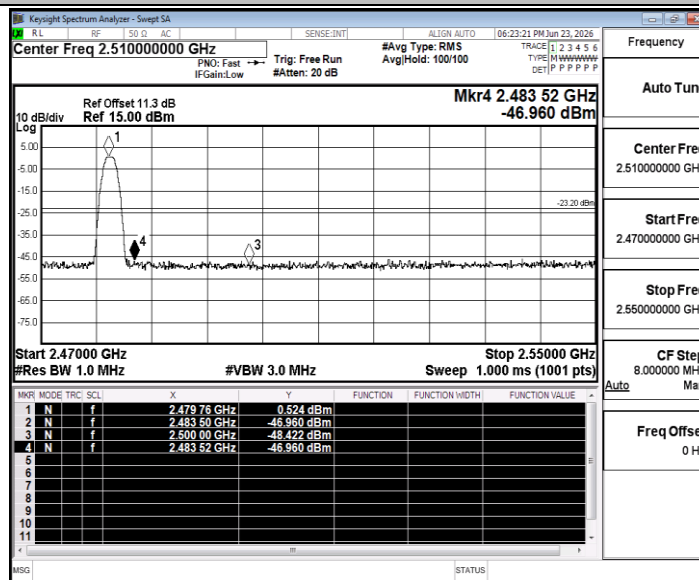
1. The Antenna Gain is compensated in the graph.
2. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

Test Graphs

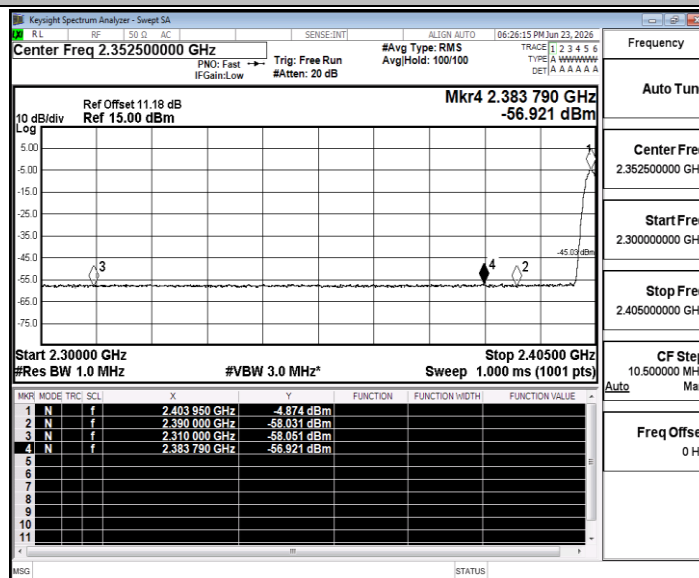




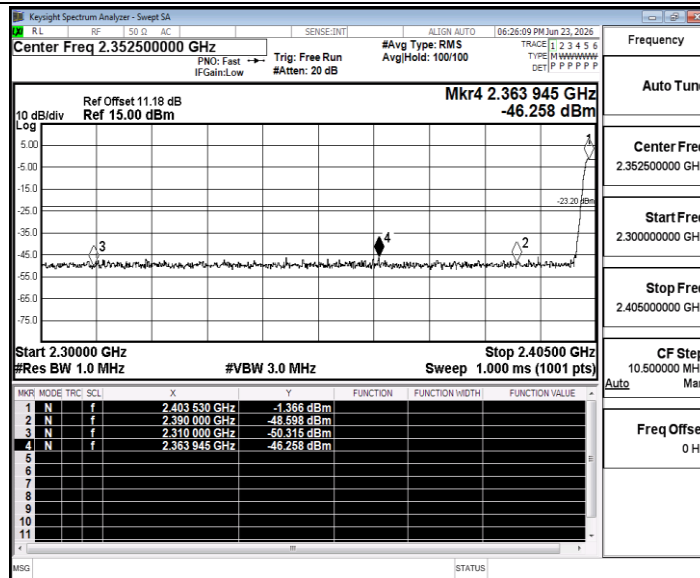
BLE_1M_Ant1_High_2480_Peak



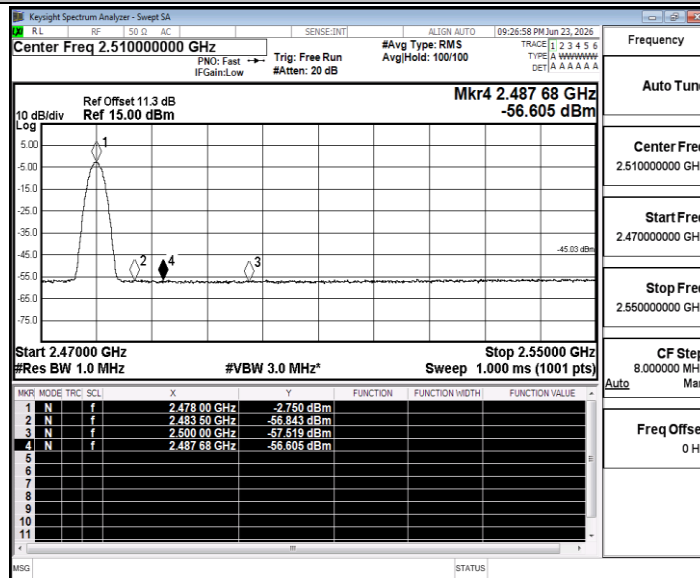
BLE_2M_Ant1_Low_2404_AV



BLE_2M_Ant1_Low_2404_Peak



BLE_2M_Ant1_High_2478_AV



BLE_2M_Ant1_High_2478_Peak

