

FCC Appendix RF Test Data for BLE

FCC ID : 2BP5V-ZK401

Company : Dong Guan Zhen Ke Technology Co., LTD

EUT : Weather Station

Model Number : WS-SA68-PLUS

Report No. : CTA26082701001

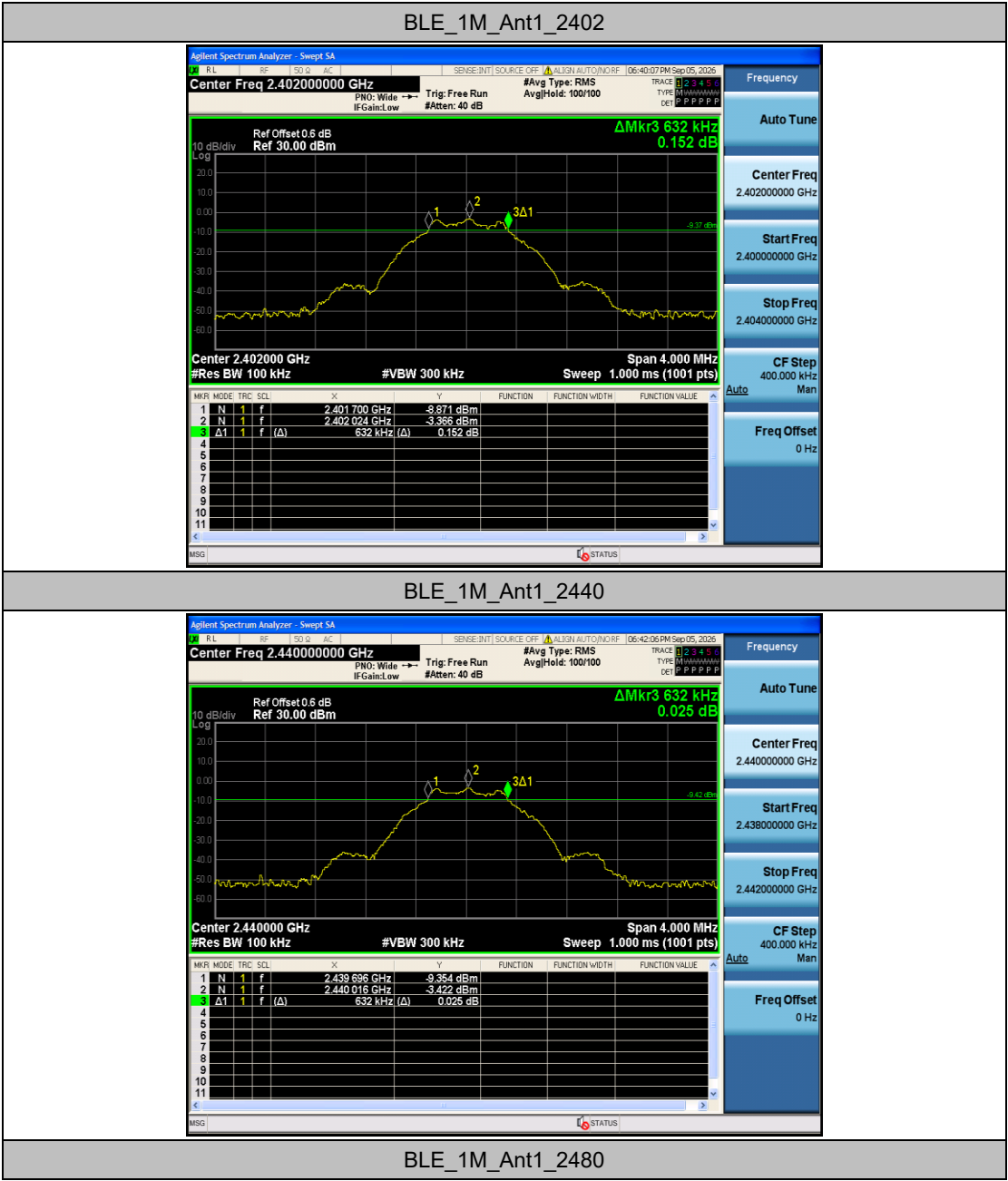
Reviewed By : Eric Wang

Appendix A: DTS Bandwidth

Test Result

TestMode	Antenna	Freq(MHz)	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.632	2401.700	2402.332	0.5	PASS
		2440	0.632	2439.696	2440.328	0.5	PASS
		2480	0.648	2479.688	2480.336	0.5	PASS
BLE_2M	Ant1	2402	1.124	2401.444	2402.568	0.5	PASS
		2440	1.128	2439.448	2440.576	0.5	PASS
		2480	1.140	2479.444	2480.584	0.5	PASS

Test Graphs





BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



BLE_2M_Ant1_2480

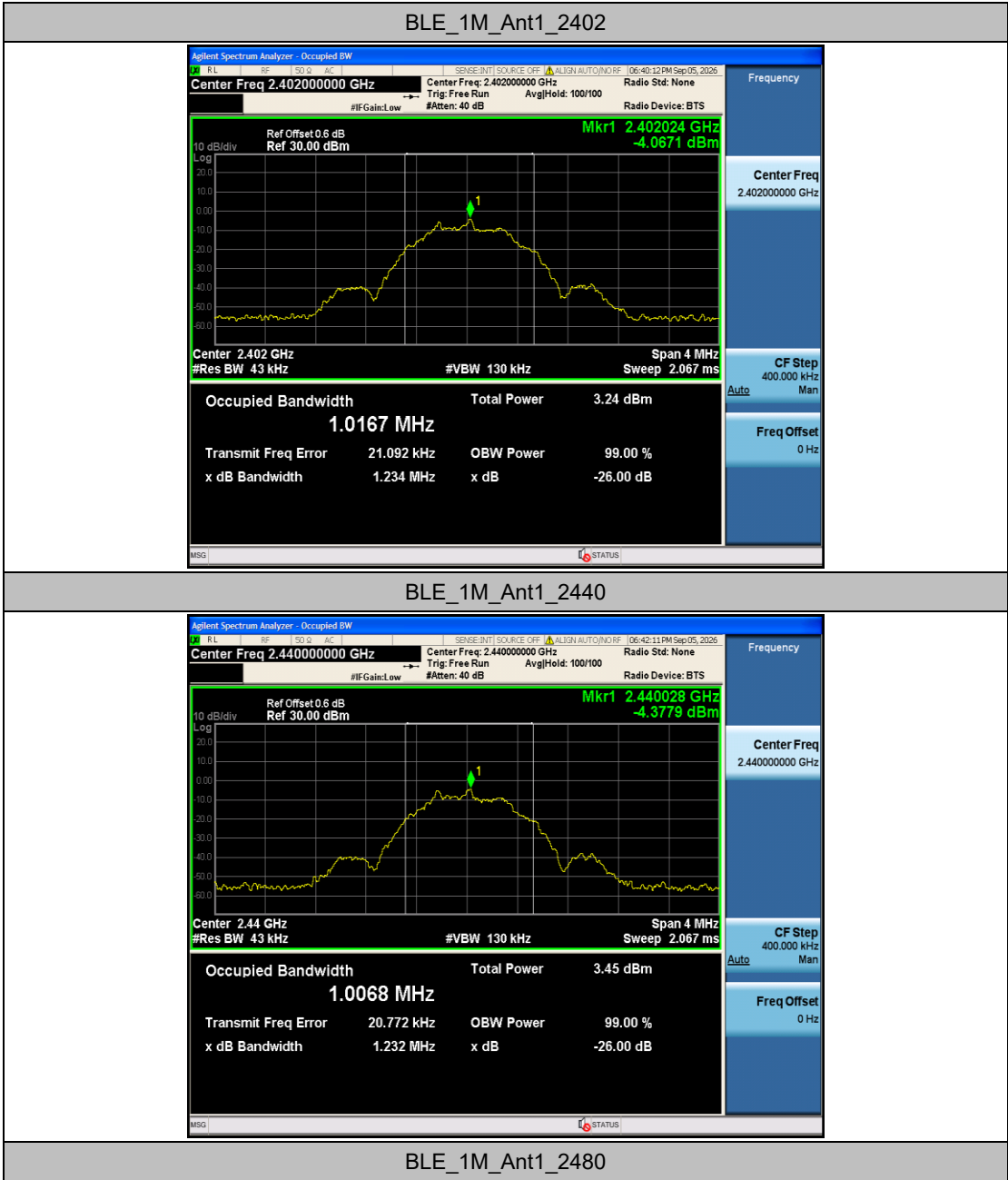


Appendix B: Occupied Channel Bandwidth

Test Result

TestMode	Antenna	Freq(MHz)	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	1.0167	2401.5127	2402.5294	---	---
		2440	1.0068	2439.5174	2440.5242	---	---
		2480	1.0104	2479.5153	2480.5257	---	---
BLE_2M	Ant1	2402	1.9996	2401.0249	2403.0245	---	---
		2440	2.0128	2439.0237	2441.0365	---	---
		2480	2.0303	2479.0211	2481.0514	---	---

Test Graphs





BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



BLE_2M_Ant1_2480



Appendix C: Maximum conducted output power

Test Result Peak

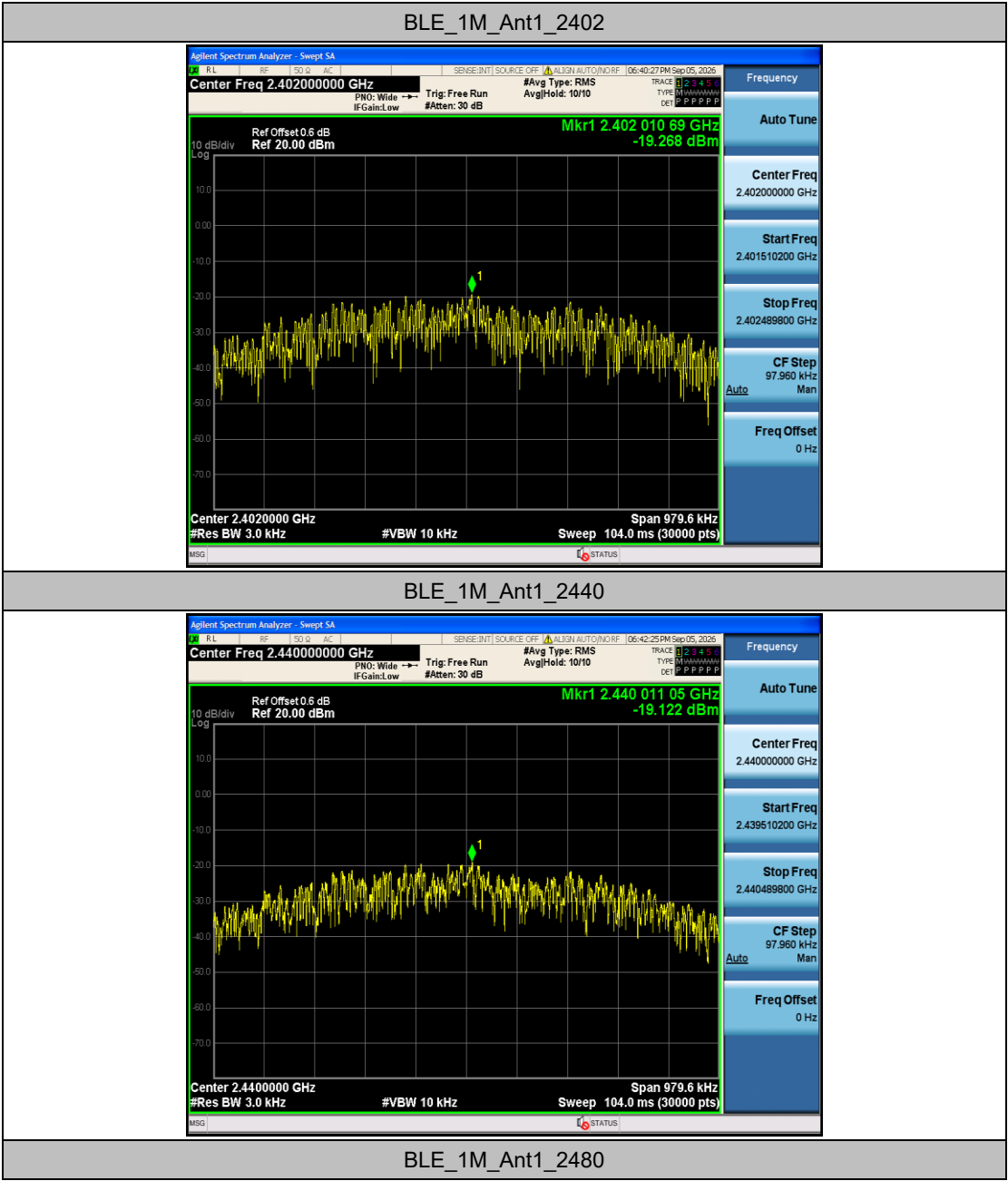
TestMode	Antenna	Freq(MHz)	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Verdict
BLE_1M	Ant1	2402	-3.21	≤30	PASS
		2440	-3.23	≤30	PASS
		2480	-3.50	≤30	PASS
BLE_2M	Ant1	2402	-3.23	≤30	PASS
		2440	-3.27	≤30	PASS
		2480	-3.52	≤30	PASS

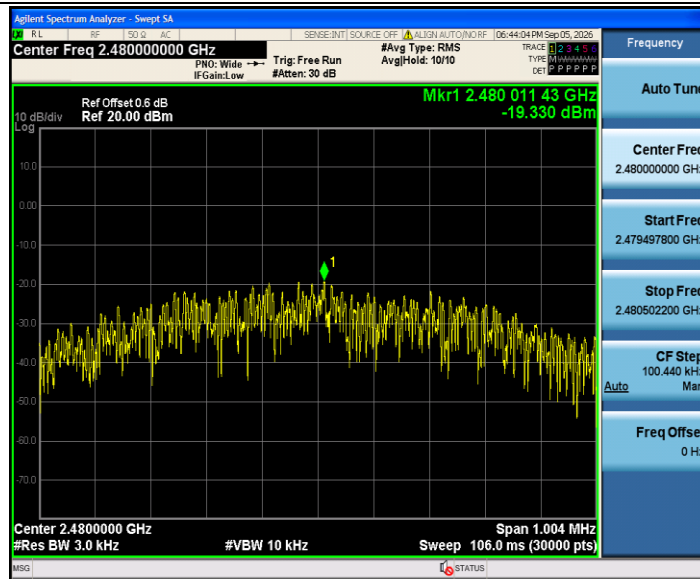
Appendix D: Maximum power spectral density

Test Result

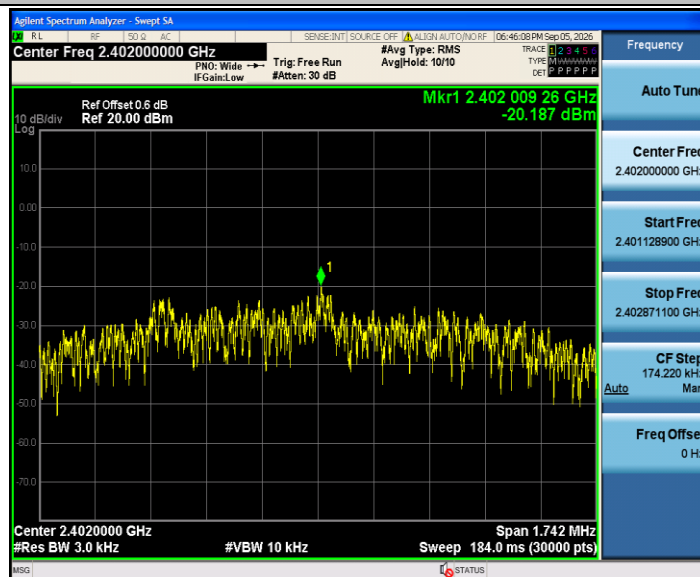
TestMode	Antenna	Freq(MHz)	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-19.27	≤8.00	PASS
		2440	-19.12	≤8.00	PASS
		2480	-19.33	≤8.00	PASS
BLE_2M	Ant1	2402	-20.19	≤8.00	PASS
		2440	-20.20	≤8.00	PASS
		2480	-20.31	≤8.00	PASS

Test Graphs

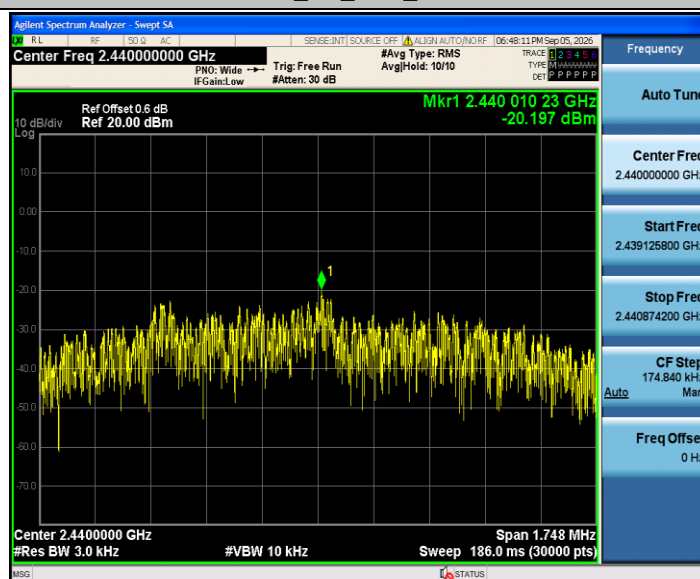




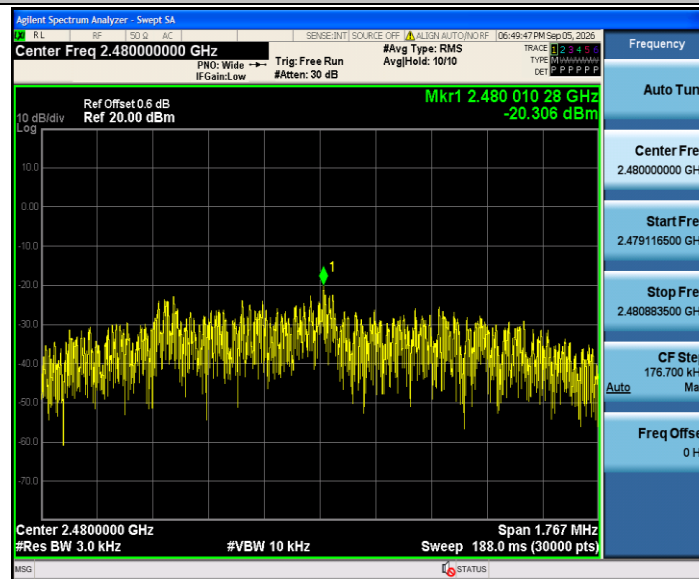
BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



BLE_2M_Ant1_2480



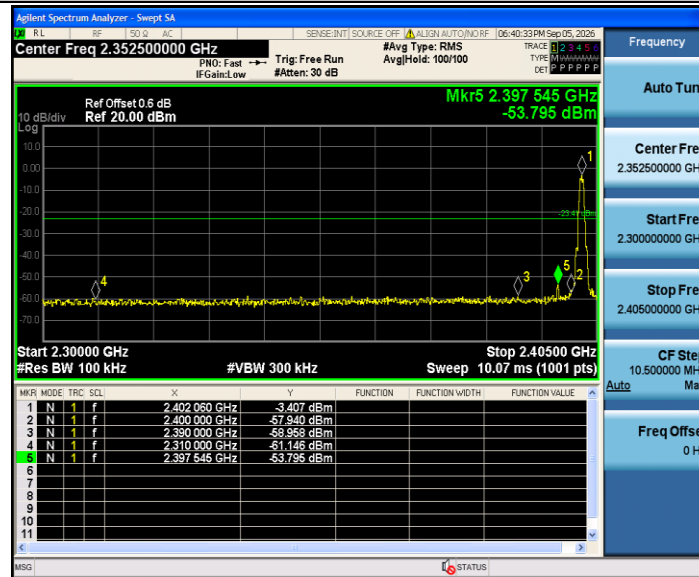
Appendix E: Band edge measurements

Test Result

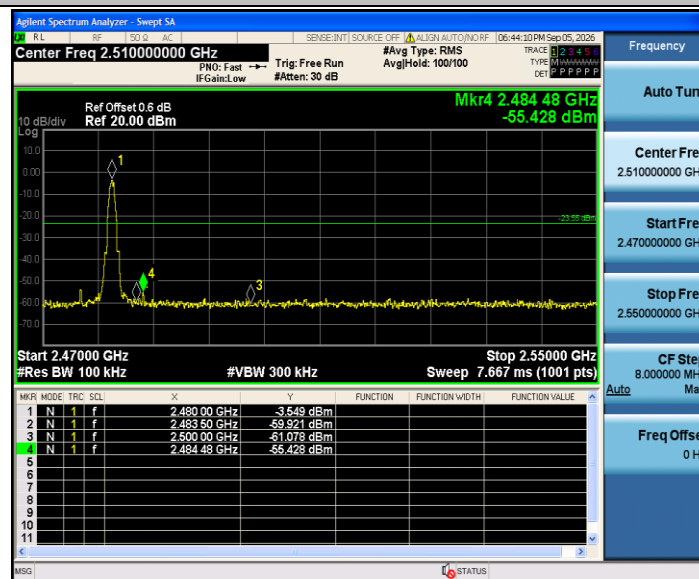
TestMode	Antenna	ChName	Freq(MHz)	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	-3.41	-53.8	≤ -23.41	PASS
		High	2480	-3.55	-55.43	≤ -23.55	PASS
BLE_2M	Ant1	Low	2402	-3.30	-42.05	≤ -23.3	PASS
		High	2480	-3.93	-54.32	≤ -23.93	PASS

Test Graphs

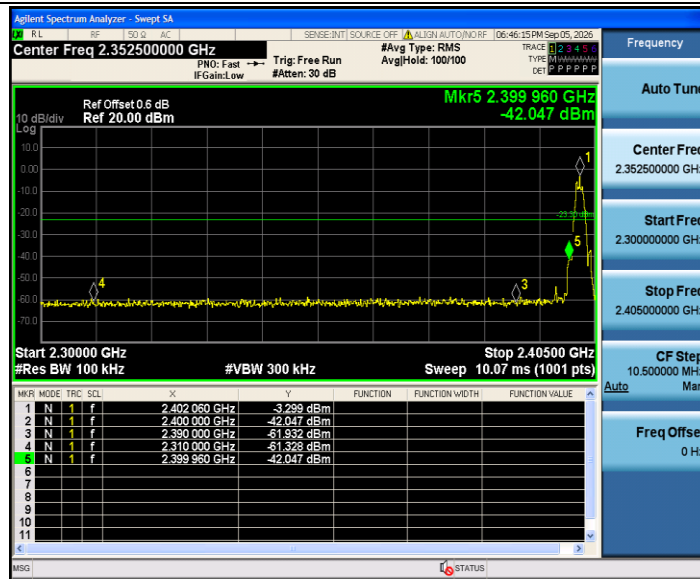
BLE_1M_Ant1_Low_2402



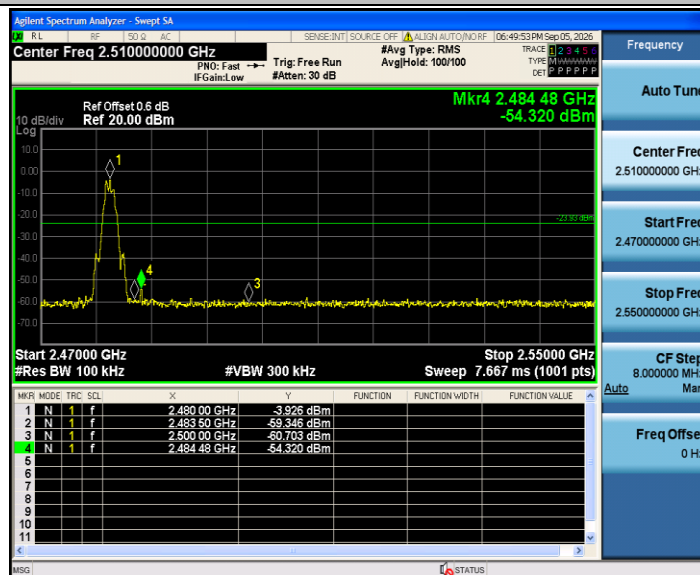
BLE_1M_Ant1_High_2480



BLE_2M_Ant1_Low_2402



BLE_2M_Ant1_High_2480

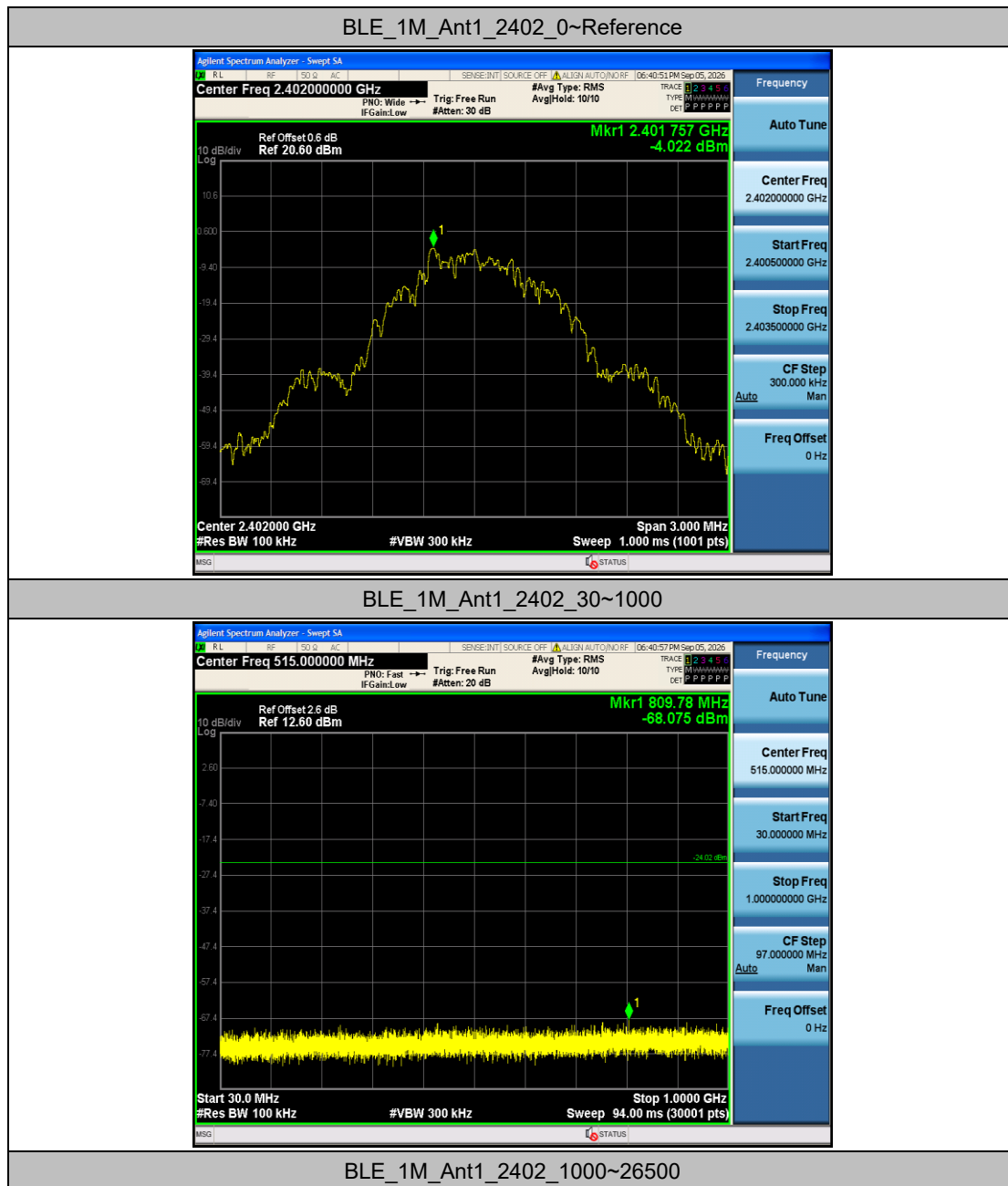


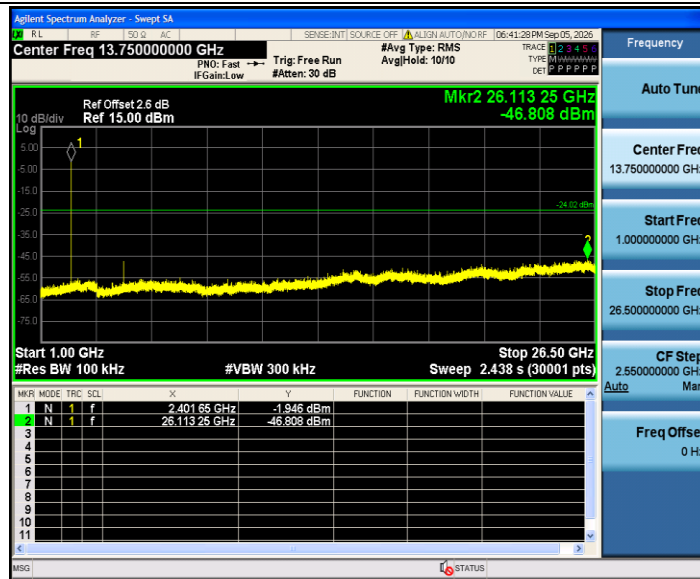
Appendix F: Conducted Spurious Emission

Test Result

TestMode	Antenna	Freq(MHz)	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	-4.02	-4.02	---	PASS
			30~1000	-4.02	-68.08	≤-24.02	PASS
			1000~26500	-4.02	-46.81	≤-24.02	PASS
		2440	Reference	-4.77	-4.77	---	PASS
			30~1000	-4.77	-67.98	≤-24.77	PASS
			1000~26500	-4.77	-44.11	≤-24.77	PASS
		2480	Reference	-4.32	-4.32	---	PASS
			30~1000	-4.32	-49.83	≤-24.32	PASS
			1000~26500	-4.32	-46.29	≤-24.32	PASS
BLE_2M	Ant1	2402	Reference	-7.55	-7.55	---	PASS
			30~1000	-7.55	-68.86	≤-27.55	PASS
			1000~26500	-7.55	-46.54	≤-27.55	PASS
		2440	Reference	-6.48	-6.48	---	PASS
			30~1000	-6.48	-54.98	≤-26.48	PASS
			1000~26500	-6.48	-46.65	≤-26.48	PASS
		2480	Reference	-4.26	-4.26	---	PASS
			30~1000	-4.26	-42.39	≤-24.26	PASS
			1000~26500	-4.26	-45.06	≤-24.26	PASS

Test Graphs

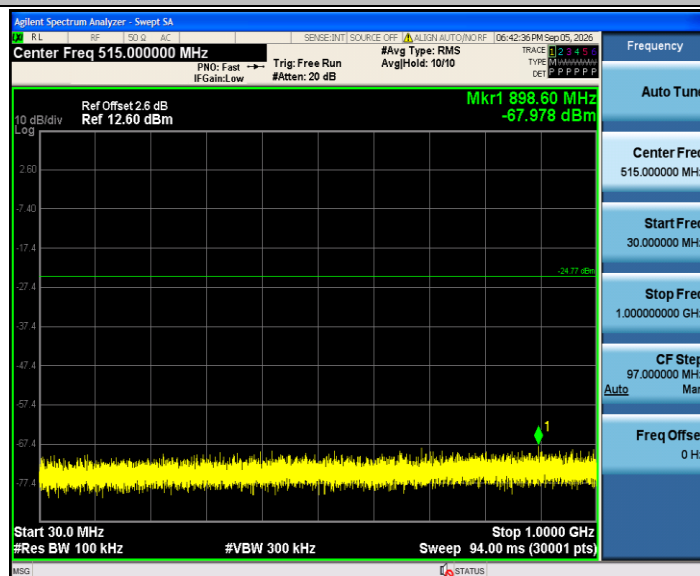




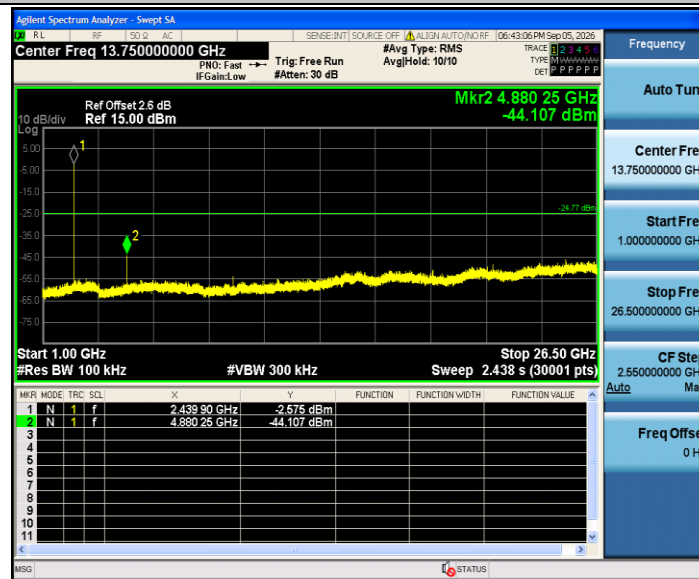
BLE_1M_Ant1_2440_0~Reference



BLE_1M_Ant1_2440_30~1000



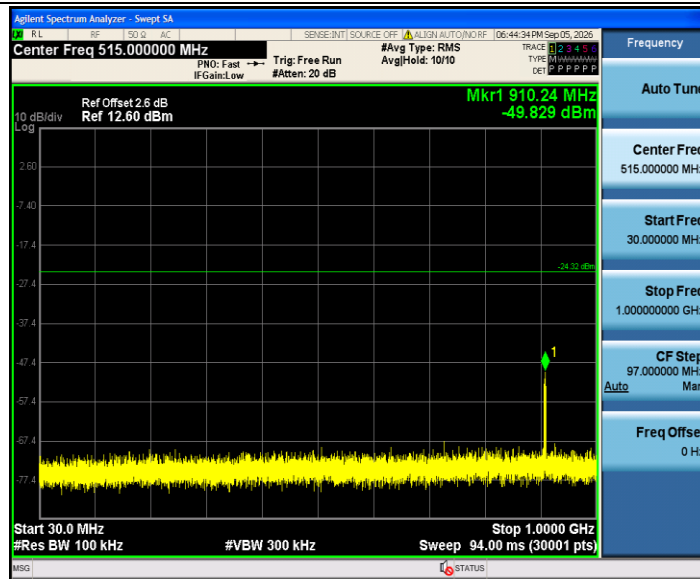
BLE_1M_Ant1_2440_1000~26500



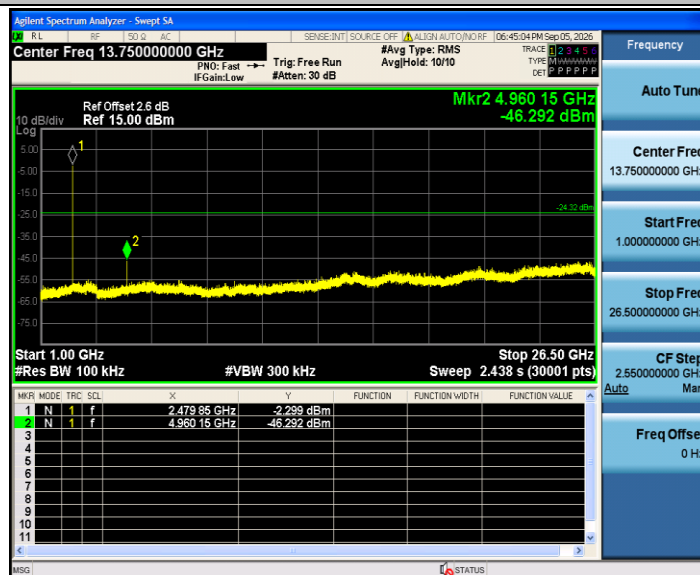
BLE_1M_Ant1_2480_0~Reference



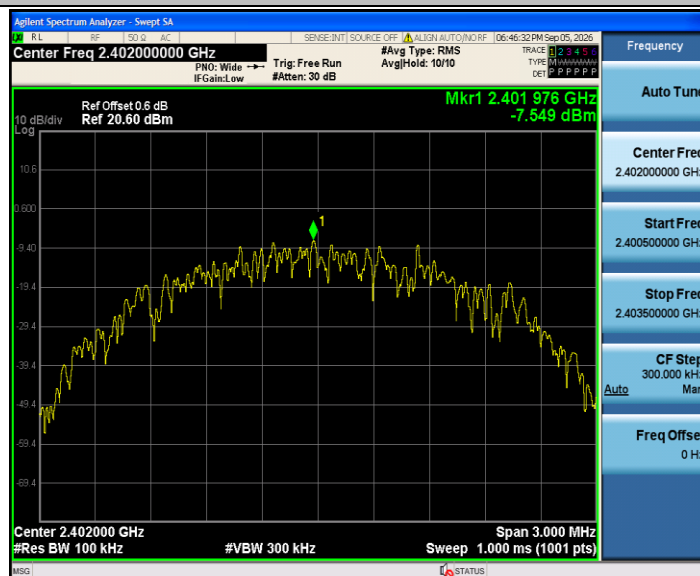
BLE_1M_Ant1_2480_30~1000



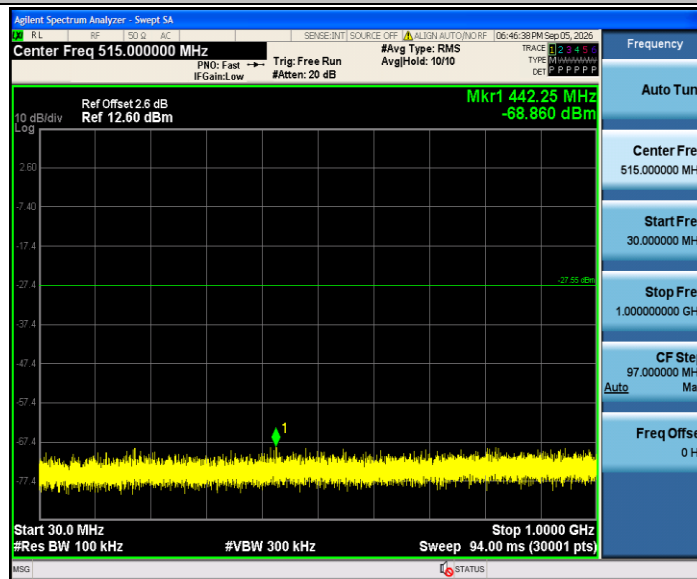
BLE_1M_Ant1_2480_1000~26500



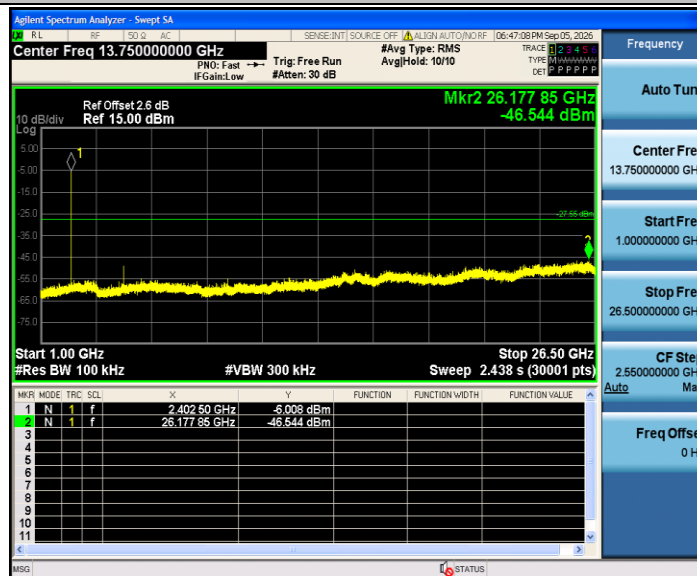
BLE_2M_Ant1_2402_0~Reference



BLE_2M_Ant1_2402_30~1000



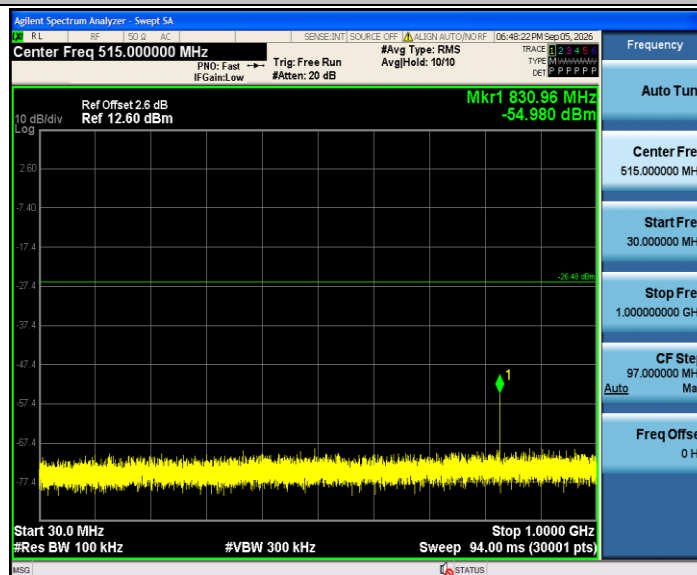
BLE_2M_Ant1_2402_1000~26500



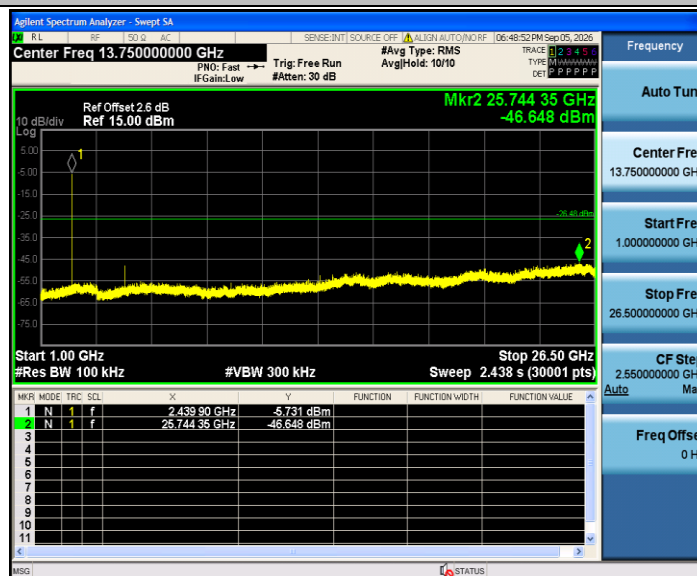
BLE_2M_Ant1_2440_0~Reference



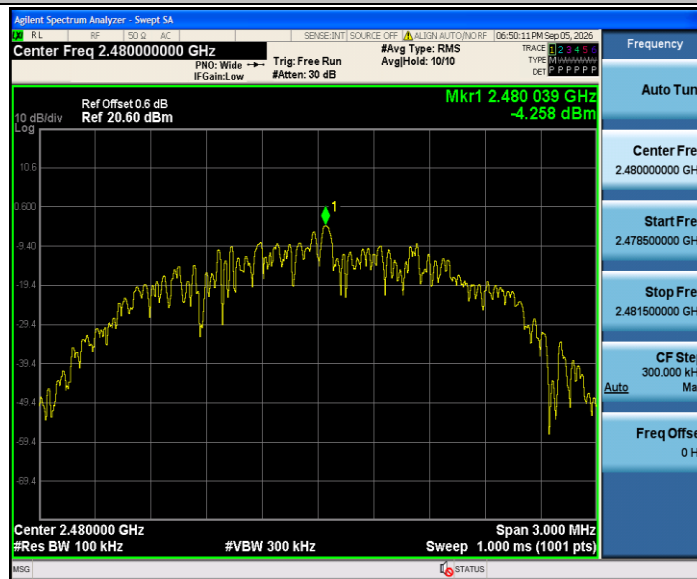
BLE_2M_Ant1_2440_30~1000



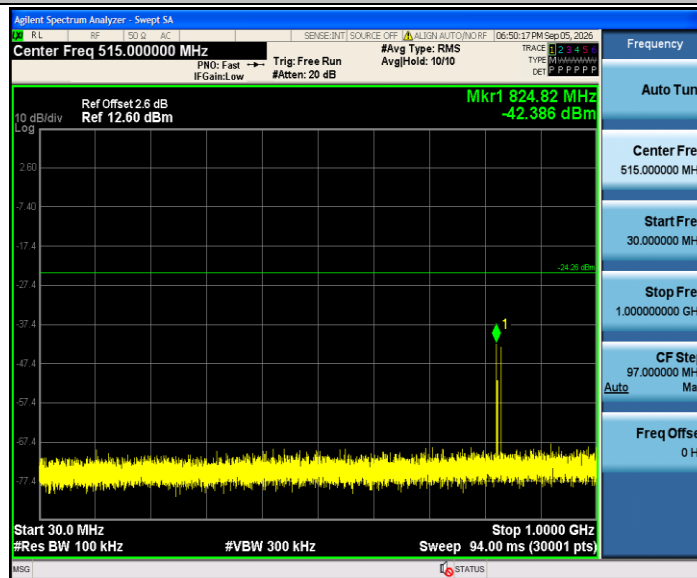
BLE_2M_Ant1_2440_1000~26500



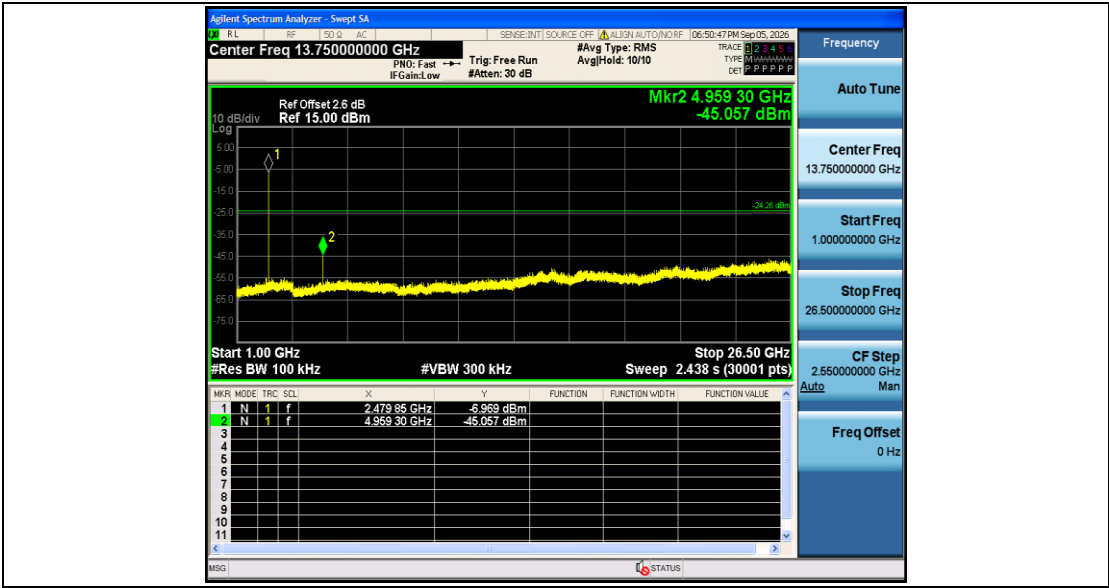
BLE_2M_Ant1_2480_0~Reference



BLE_2M_Ant1_2480_30~1000



BLE_2M_Ant1_2480_1000~26500



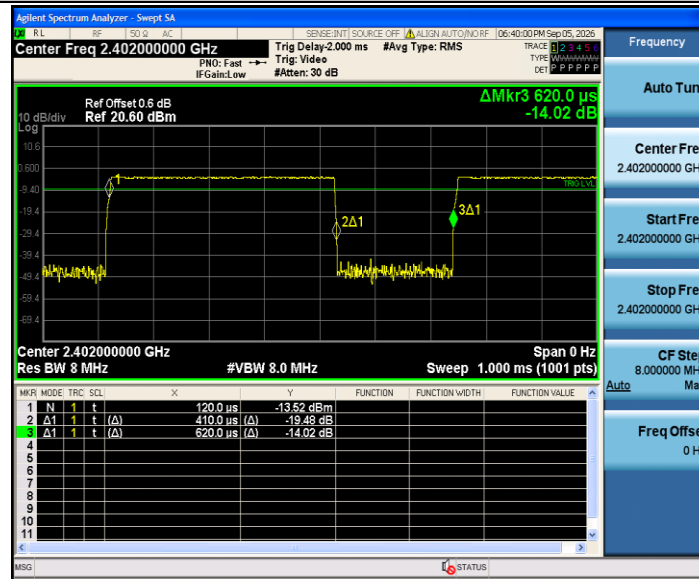
Appendix G: Duty Cycle

Test Result

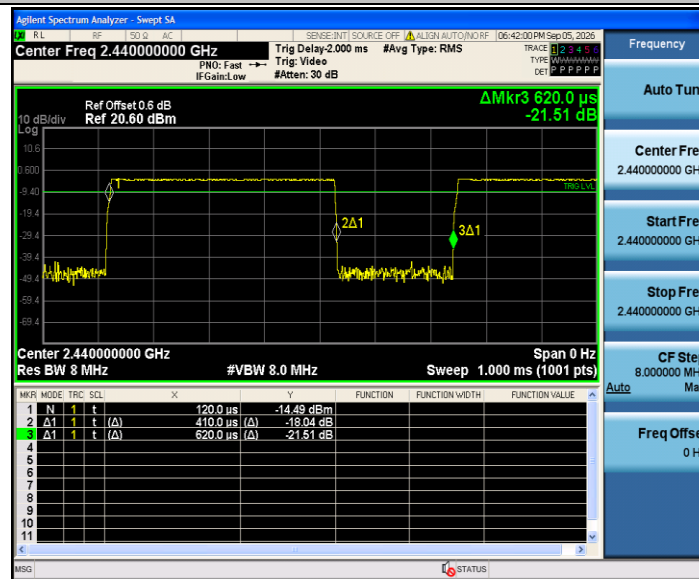
TestMode	Antenna	Freq(MHz)	ON Time [ms]	Period [ms]	X	DC [%]	xFactor	Limit	Verdict
BLE_1M	Ant1	2402	0.41	0.62	0.6613	66.13	1.80	---	---
		2440	0.41	0.62	0.6613	66.13	1.80	---	---
		2480	0.41	0.62	0.6613	66.13	1.80	---	---
BLE_2M	Ant1	2402	0.23	0.62	0.3710	37.10	4.31	---	---
		2440	0.23	0.62	0.3710	37.10	4.31	---	---
		2480	0.23	0.62	0.3710	37.10	4.31	---	---

Test Graphs

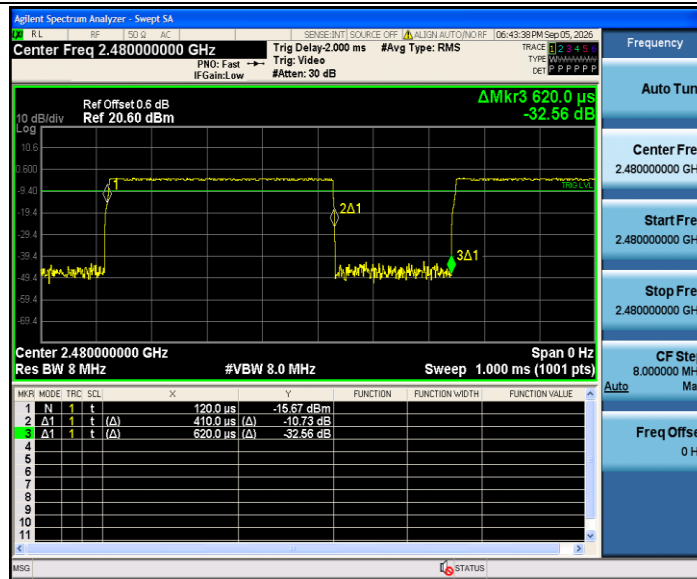
BLE_1M_Ant1_2402



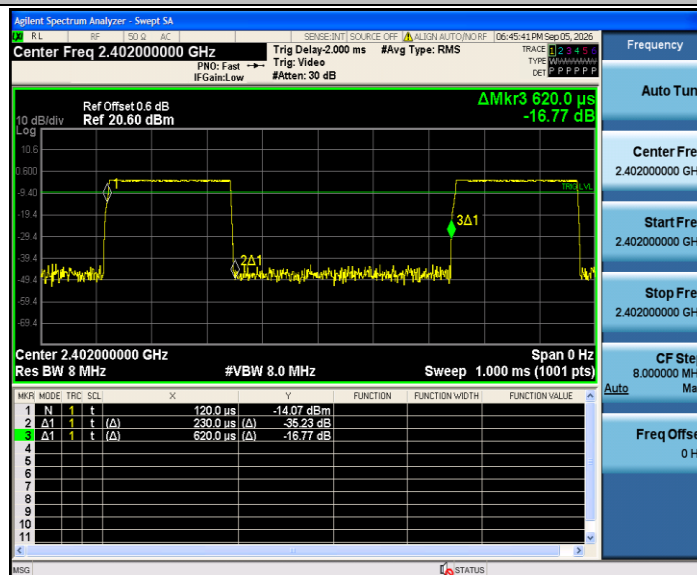
BLE_1M_Ant1_2440



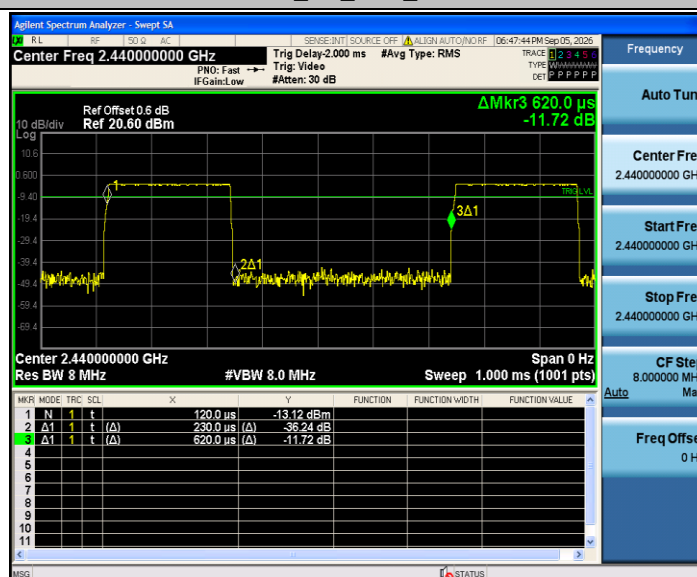
BLE_1M_Ant1_2480



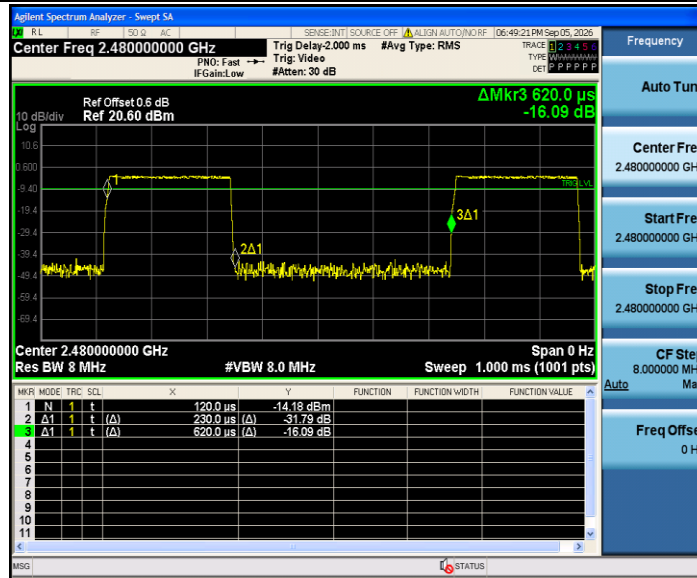
BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



BLE_2M_Ant1_2480



Appendix H: Emissions in Restricted Bands

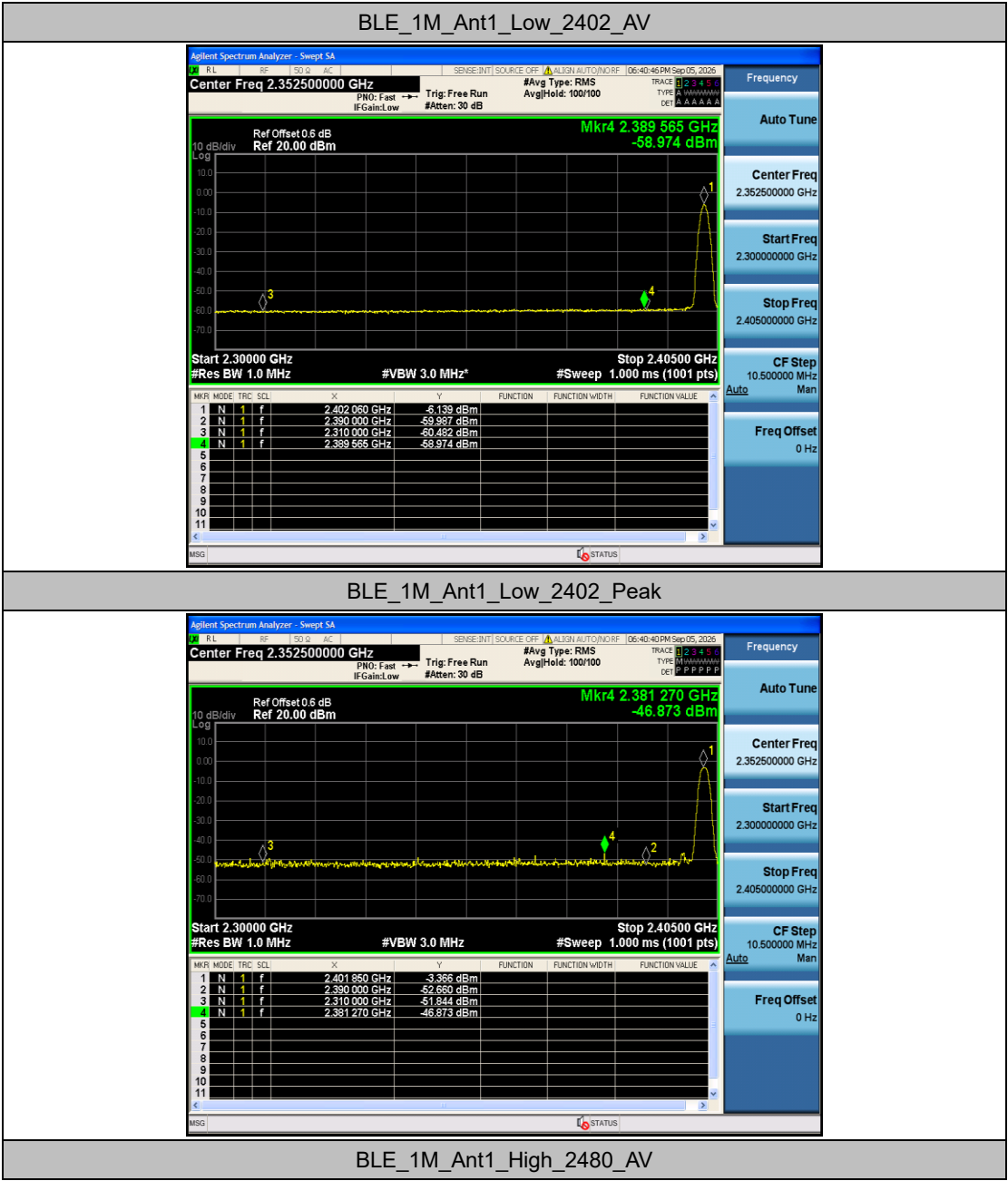
Test Result

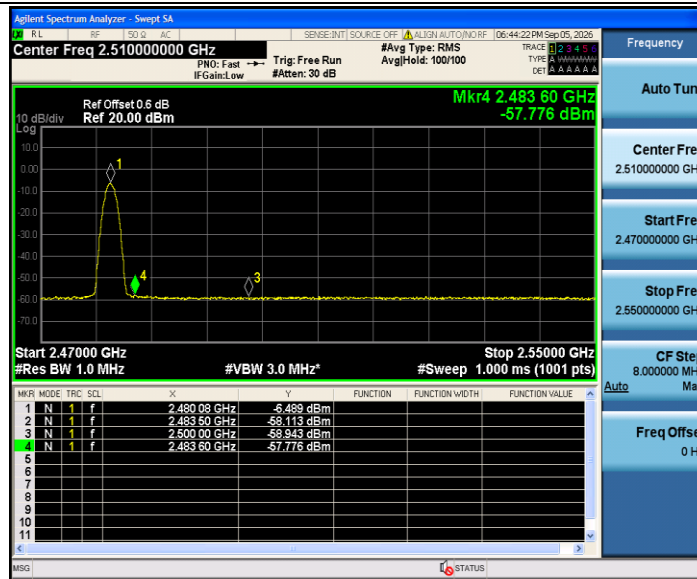
TestMode	Antenna	ChName	Freq(MHz)	Detector	Freq [MHz]	Result [dBm]	Gain [dB]	DC Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
BLE_1M	Ant1	Low	2402	AV	2310.000	-60.48	3.43	1.80	39.95	≤54	PASS
				AV	2389.565	-58.97	3.43	1.80	41.46	≤54	PASS
				AV	2390.000	-59.99	3.43	1.80	40.44	≤54	PASS
				Peak	2310.000	-51.84	3.43	0.00	46.79	≤74	PASS
				Peak	2381.270	-46.87	3.43	0.00	51.76	≤74	PASS
				Peak	2390.000	-52.66	3.43	0.00	45.97	≤74	PASS
		High	2480	AV	2483.500	-58.11	3.43	1.80	42.32	≤54	PASS
				AV	2483.600	-57.78	3.43	1.80	42.65	≤54	PASS
				AV	2500.000	-58.94	3.43	1.80	41.49	≤54	PASS
				Peak	2483.500	-48	3.43	0.00	50.63	≤74	PASS
				Peak	2484.960	-46.88	3.43	0.00	51.75	≤74	PASS
				Peak	2500.000	-52.38	3.43	0.00	46.25	≤74	PASS
BLE_2M	Ant1	Low	2402	AV	2310.000	-60.85	3.43	4.31	42.09	≤54	PASS
				AV	2389.670	-59.19	3.43	4.31	43.75	≤54	PASS
				AV	2390.000	-60.59	3.43	4.31	42.35	≤54	PASS
				Peak	2310.000	-51.5	3.43	0.00	47.13	≤74	PASS
				Peak	2373.710	-48.5	3.43	0.00	50.13	≤74	PASS
				Peak	2390.000	-49.88	3.43	0.00	48.75	≤74	PASS
		High	2480	AV	2483.500	-58.18	3.43	4.31	44.76	≤54	PASS
				AV	2484.880	-58.1	3.43	4.31	44.84	≤54	PASS
				AV	2500.000	-59.25	3.43	4.31	43.69	≤54	PASS
				Peak	2483.500	-49.7	3.43	0.00	48.93	≤74	PASS
				Peak	2483.840	-47.38	3.43	0.00	51.25	≤74	PASS
				Peak	2500.000	-52.02	3.43	0.00	46.61	≤74	PASS

Note:

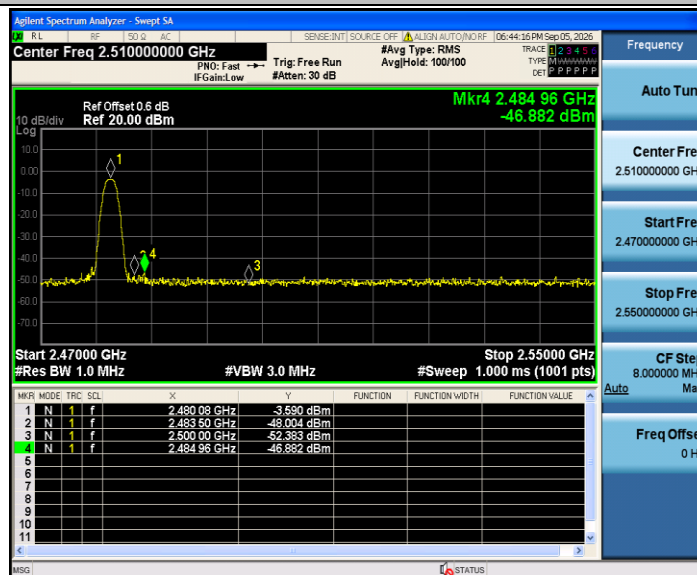
The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

Test Graphs

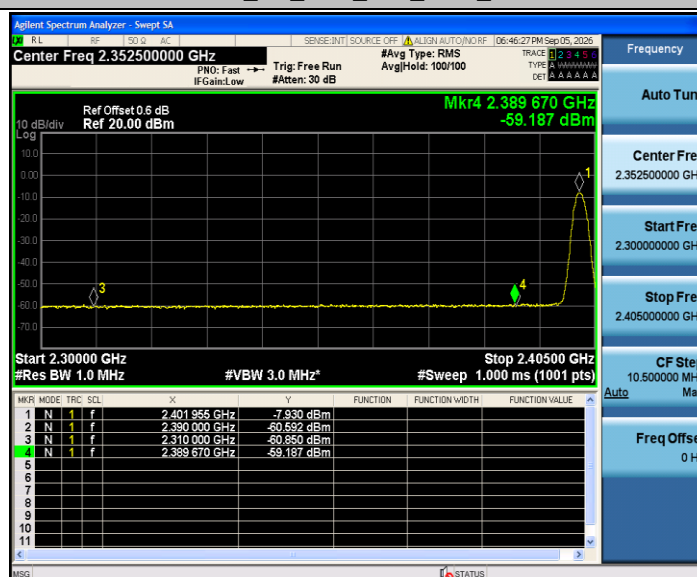




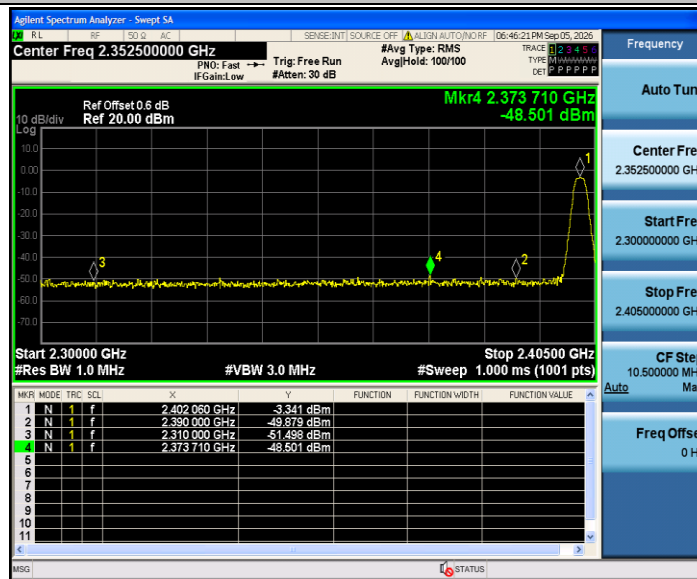
BLE_1M_Ant1_High_2480_Peak



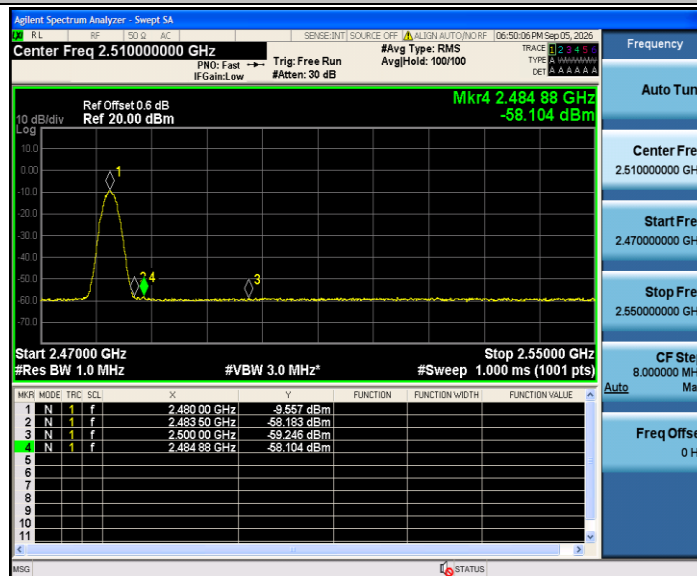
BLE_2M_Ant1_Low_2402_AV



BLE_2M_Ant1_Low_2402_Peak



BLE_2M_Ant1_High_2480_AV



BLE_2M_Ant1_High_2480_Peak

