

FCC Appendix RF Test Data for BLE

FCC ID : 2BP5V-ZK301

Company : Dong Guan Zhen Ke Technology Co., LTD

EUT : Weather Station

Model Number : WS-SA9

Report No. : CTA26082700901

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	0.640	2401.696	2402.336	0.5	PASS
		2440	0.652	2439.684	2440.336	0.5	PASS
		2480	0.648	2479.692	2480.340	0.5	PASS
BLE_2M	Ant1	2402	1.120	2401.444	2402.564	0.5	PASS
		2440	1.152	2439.436	2440.588	0.5	PASS
		2480	1.124	2479.452	2480.576	0.5	PASS

Test Graphs





BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



BLE_2M_Ant1_2480

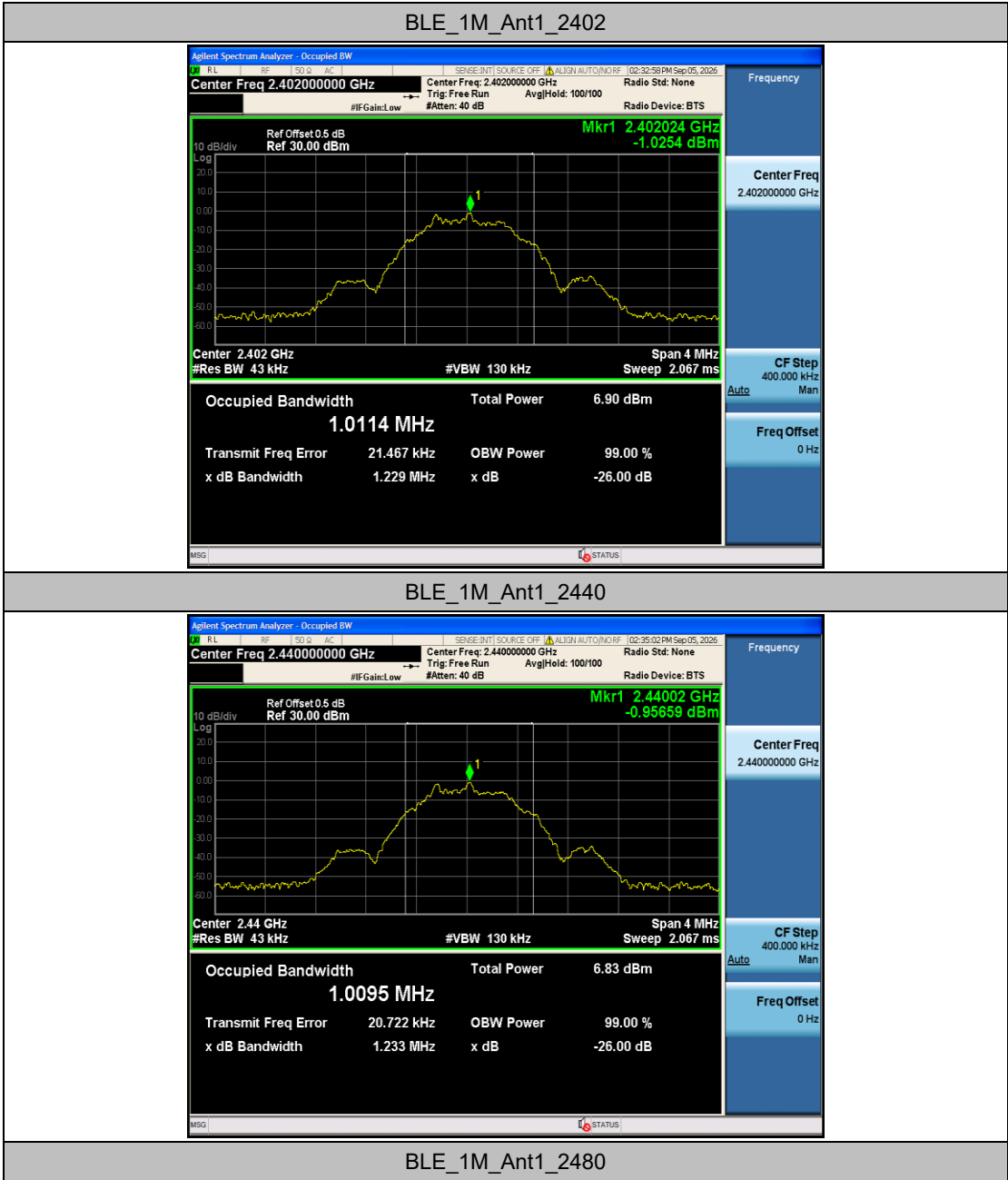


Appendix B: Occupied Channel Bandwidth

Test Result

TestMode	Antenna	Freq(MHz)	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	1.0114	2401.5158	2402.5272	---	---
		2440	1.0095	2439.5160	2440.5255	---	---
		2480	1.0064	2479.5177	2480.5241	---	---
BLE_2M	Ant1	2402	2.0225	2401.0233	2403.0458	---	---
		2440	2.0025	2439.0286	2441.0311	---	---
		2480	1.9996	2479.0314	2481.0310	---	---

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	0.18	≤30	PASS
		2440	0.08	≤30	PASS
		2480	-0.18	≤30	PASS
BLE_2M	Ant1	2402	0.17	≤30	PASS
		2440	0.07	≤30	PASS
		2480	-0.10	≤30	PASS

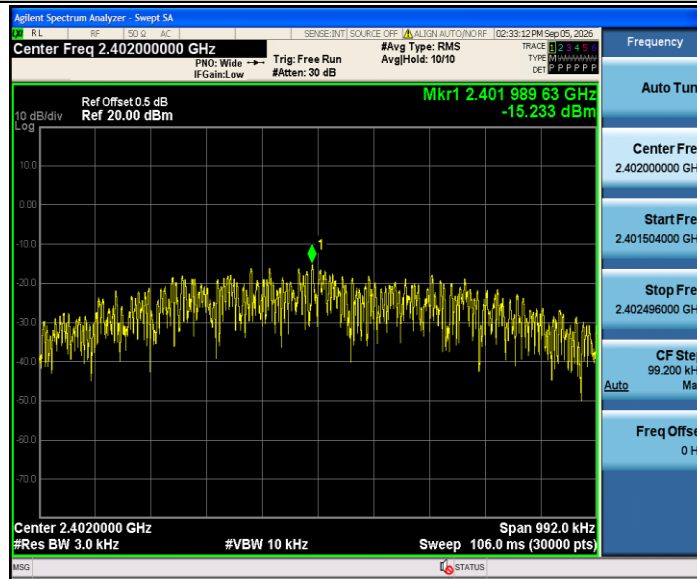
Appendix D: Maximum power spectral density

Test Result

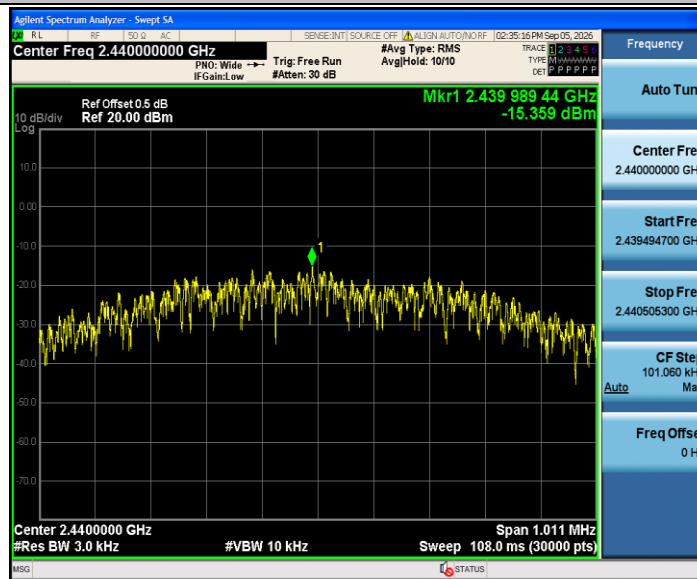
TestMode	Antenna	Freq(MHz)	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-15.23	≤8.00	PASS
		2440	-15.36	≤8.00	PASS
		2480	-15.75	≤8.00	PASS
BLE_2M	Ant1	2402	-17.19	≤8.00	PASS
		2440	-17.65	≤8.00	PASS
		2480	-17.63	≤8.00	PASS

Test Graphs

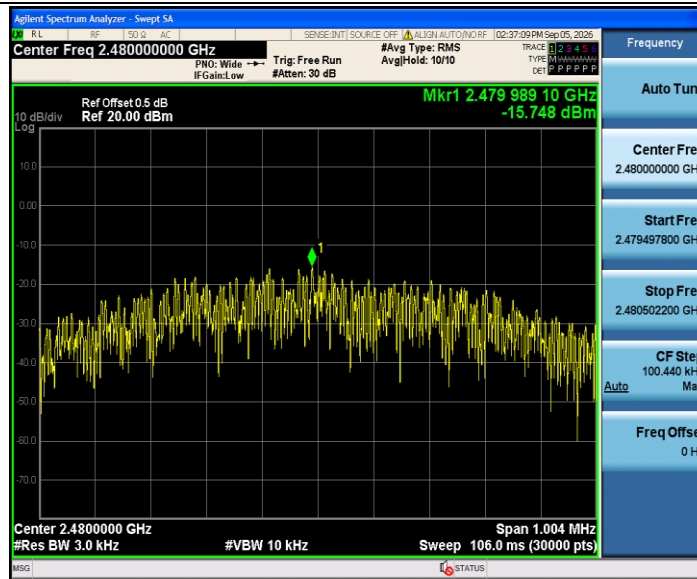
BLE_1M_Ant1_2402



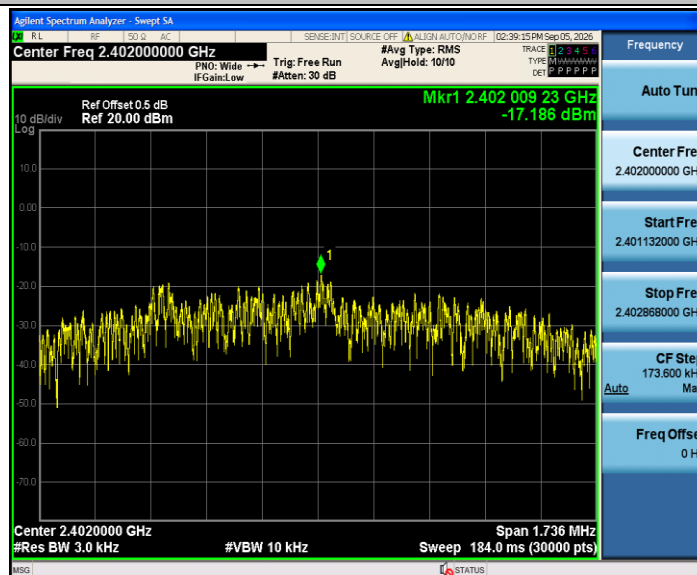
BLE_1M_Ant1_2440



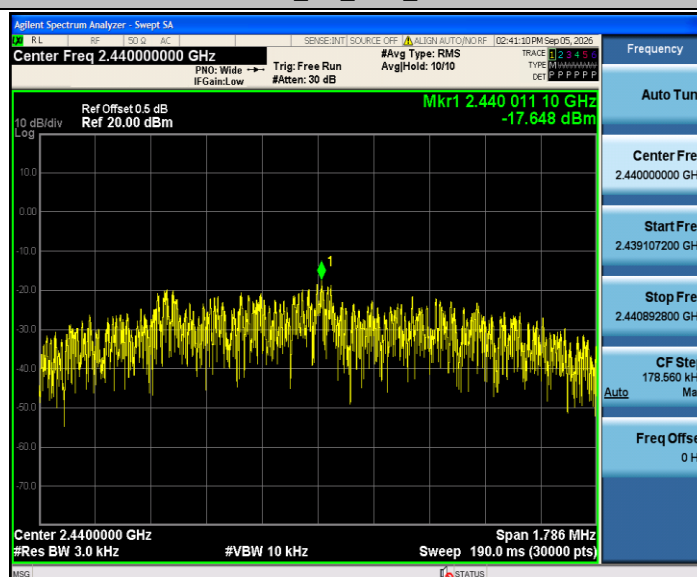
BLE_1M_Ant1_2480



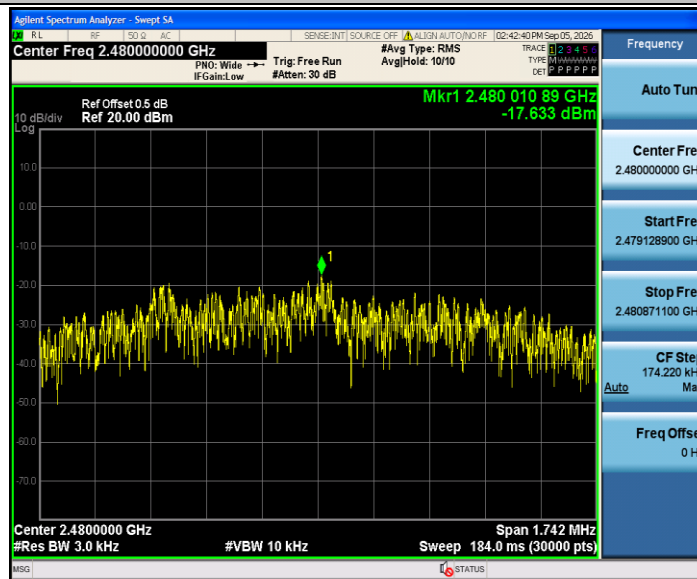
BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



BLE_2M_Ant1_2480



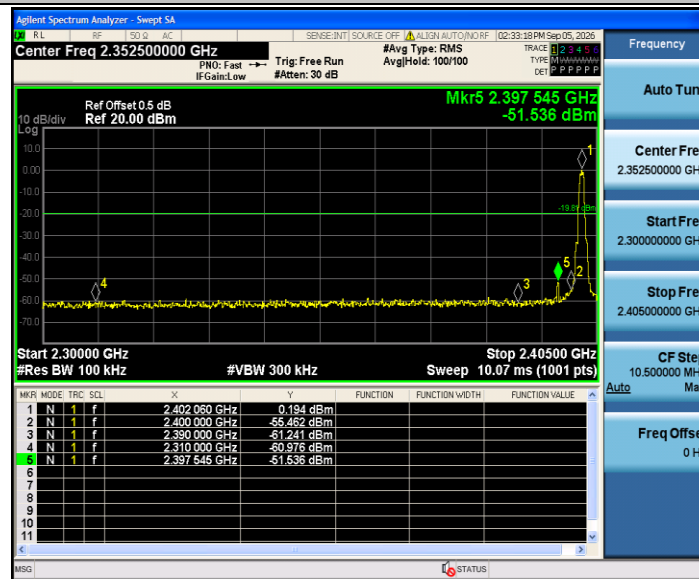
Appendix E: Band edge measurements

Test Result

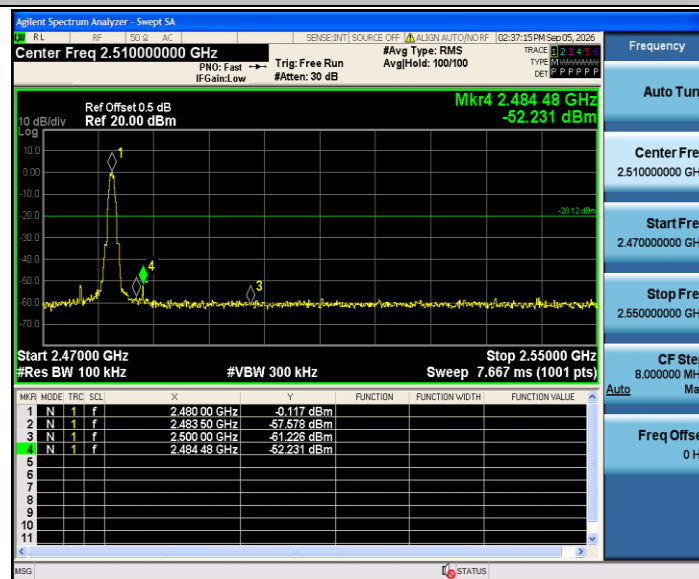
TestMode	Antenna	Channel	Freq(MHz)	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	0.19	-51.54	≤-19.81	PASS
		High	2480	-0.12	-52.23	≤-20.12	PASS
BLE_2M	Ant1	Low	2402	0.09	-38.25	≤-19.92	PASS
		High	2480	-0.09	-52.56	≤-20.09	PASS

Test Graphs

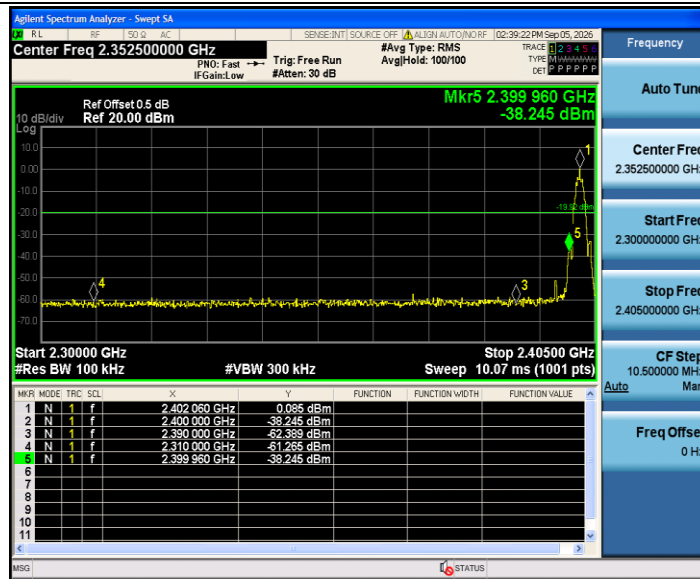
BLE_1M_Ant1_Low_2402



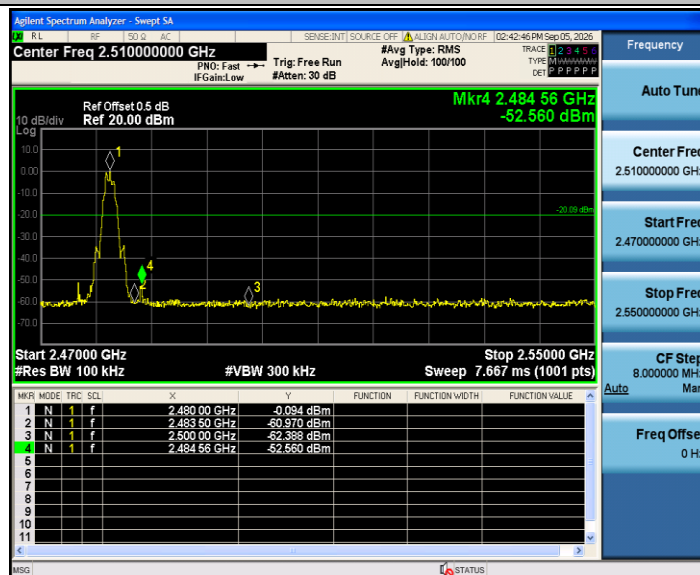
BLE_1M_Ant1_High_2480



BLE_2M_Ant1_Low_2402



BLE_2M_Ant1_High_2480

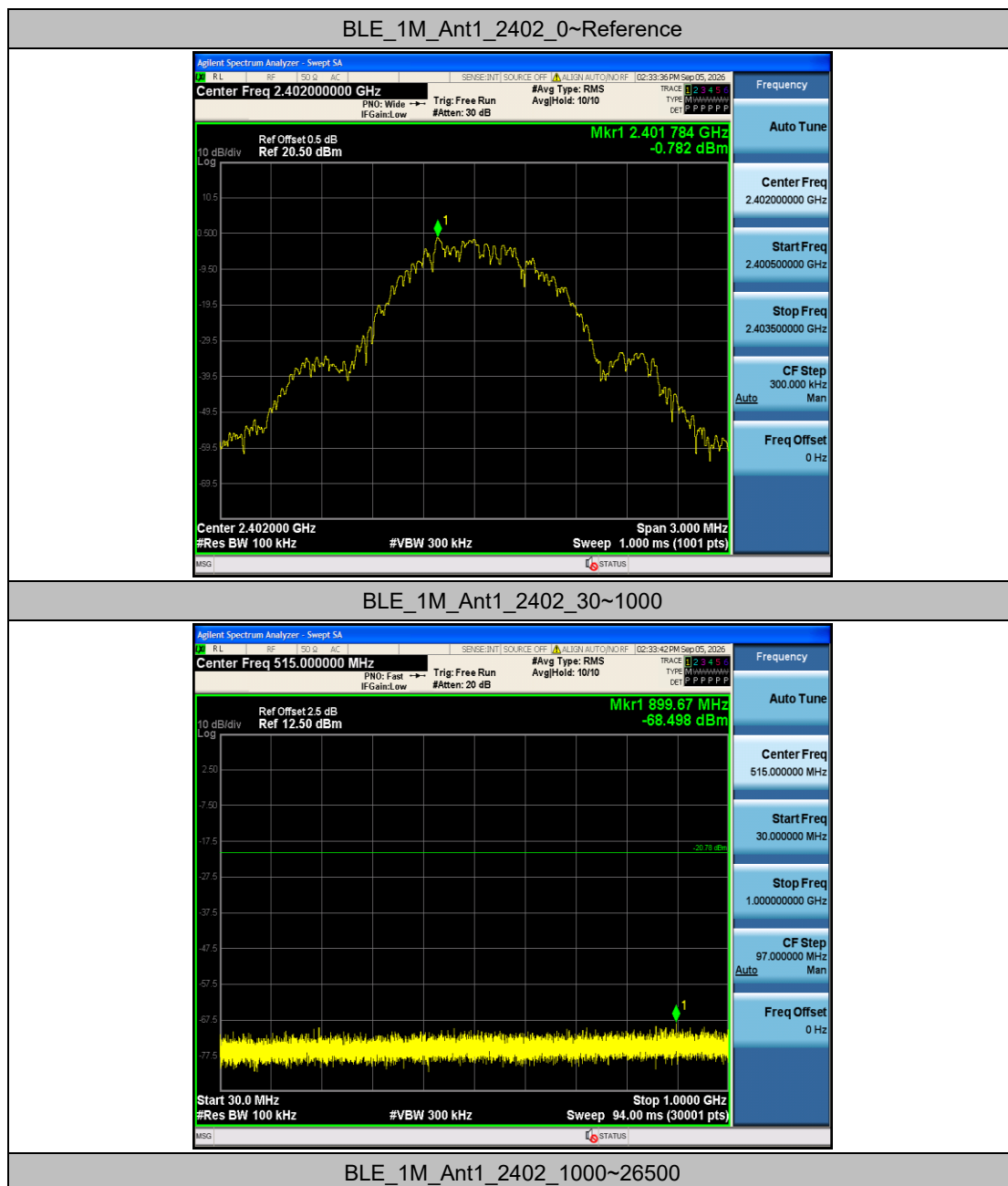


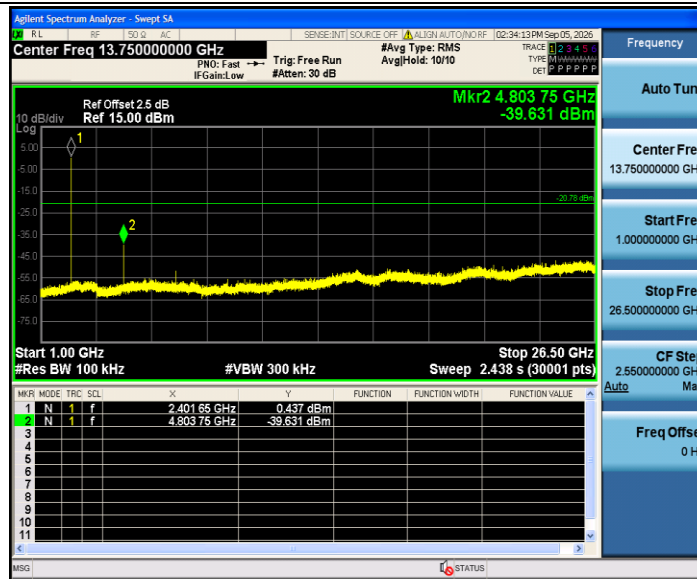
Appendix F: Conducted Spurious Emission

Test Result

TestMode	Antenna	Freq(MHz)	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	-0.78	-0.78	---	PASS
			30~1000	-0.78	-68.5	≤-20.78	PASS
			1000~26500	-0.78	-39.63	≤-20.78	PASS
		2440	Reference	-0.51	-0.51	---	PASS
			30~1000	-0.51	-68.71	≤-20.51	PASS
			1000~26500	-0.51	-42.01	≤-20.51	PASS
		2480	Reference	-0.54	-0.54	---	PASS
			30~1000	-0.54	-68.68	≤-20.54	PASS
			1000~26500	-0.54	-40.68	≤-20.54	PASS
BLE_2M	Ant1	2402	Reference	-3.11	-3.11	---	PASS
			30~1000	-3.11	-53.37	≤-23.11	PASS
			1000~26500	-3.11	-38.6	≤-23.11	PASS
		2440	Reference	-0.89	-0.89	---	PASS
			30~1000	-0.89	-55.7	≤-20.89	PASS
			1000~26500	-0.89	-39.94	≤-20.89	PASS
		2480	Reference	-4.26	-4.26	---	PASS
			30~1000	-4.26	-69.11	≤-24.26	PASS
			1000~26500	-4.26	-42.05	≤-24.26	PASS

Test Graphs

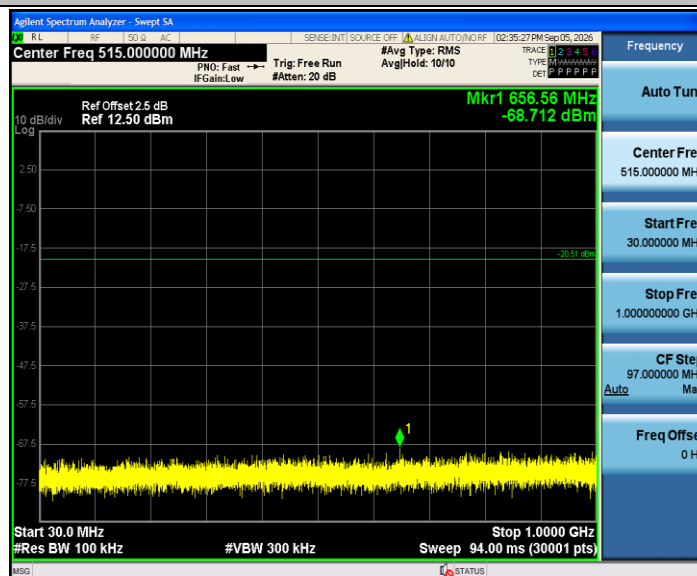




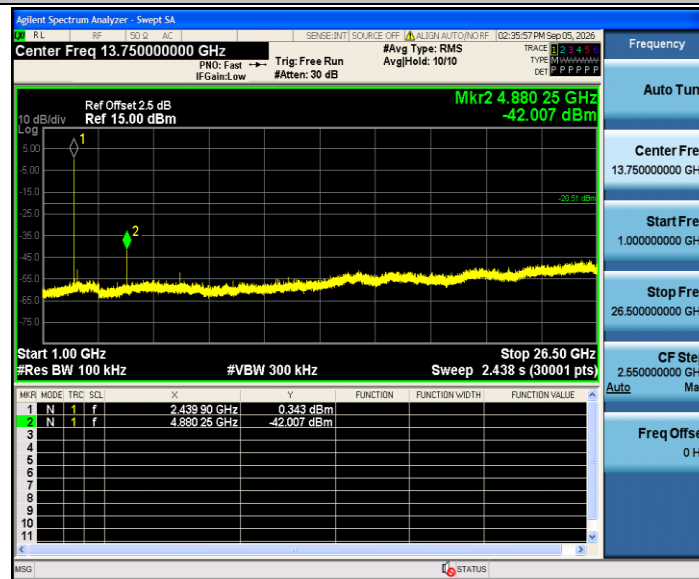
BLE_1M_Ant1_2440_0~Reference



BLE_1M_Ant1_2440_30~1000



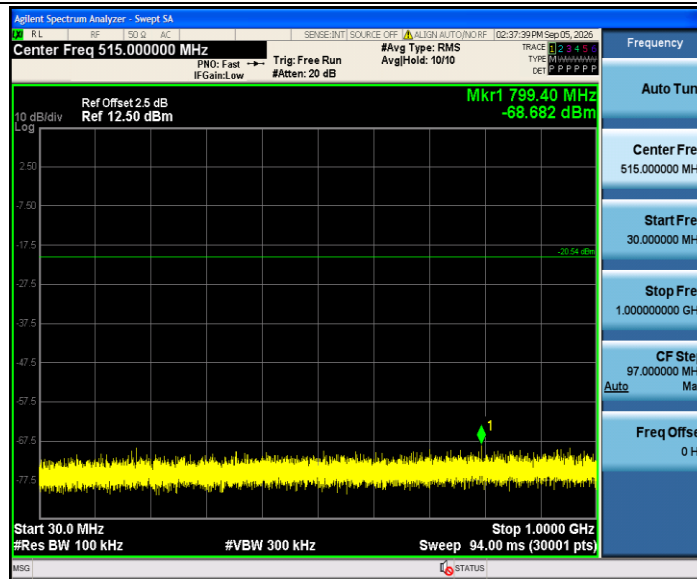
BLE_1M_Ant1_2440_1000~26500



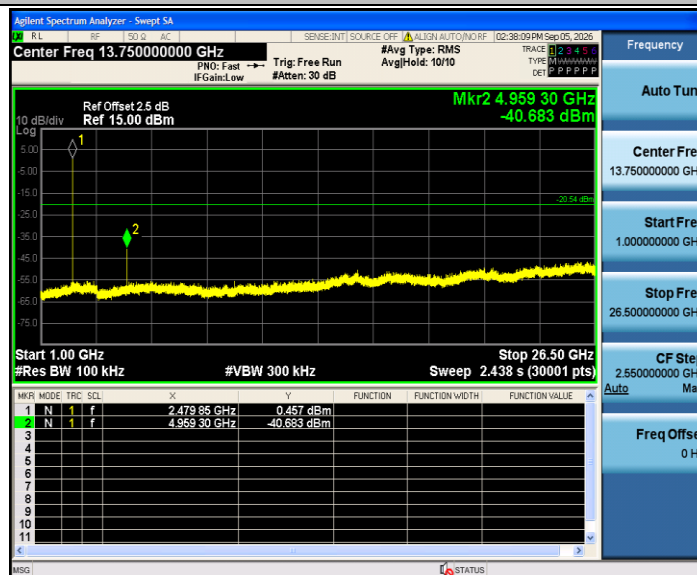
BLE_1M_Ant1_2480_0~Reference



BLE_1M_Ant1_2480_30~1000



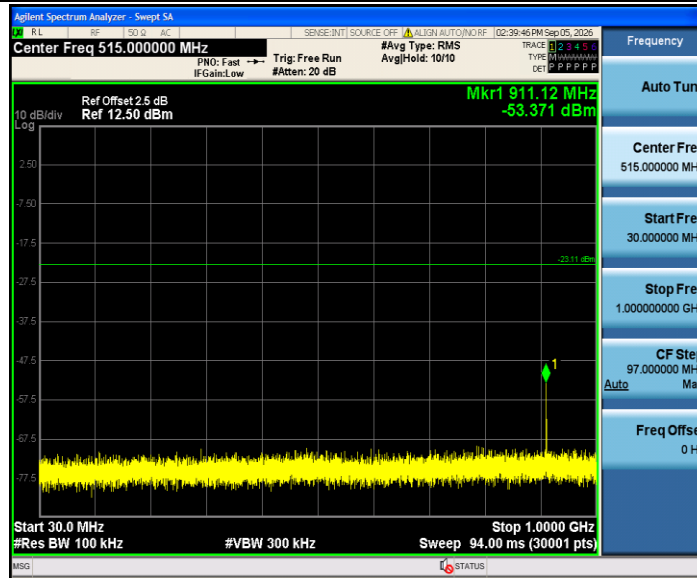
BLE_1M_Ant1_2480_1000~26500



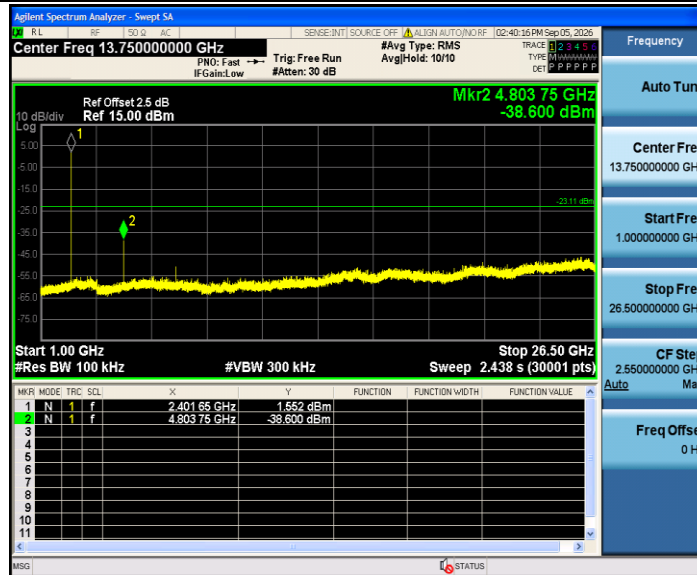
BLE_2M_Ant1_2402_0~Reference



BLE_2M_Ant1_2402_30~1000



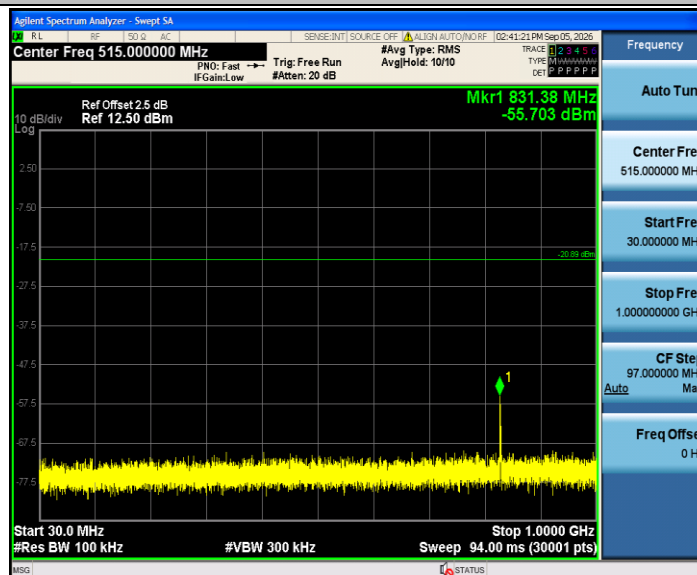
BLE_2M_Ant1_2402_1000~26500



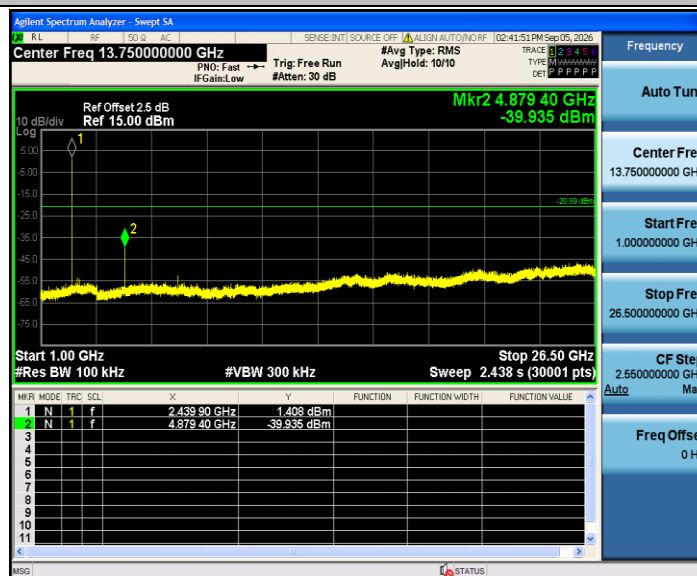
BLE_2M_Ant1_2440_0~Reference



BLE_2M_Ant1_2440_30~1000



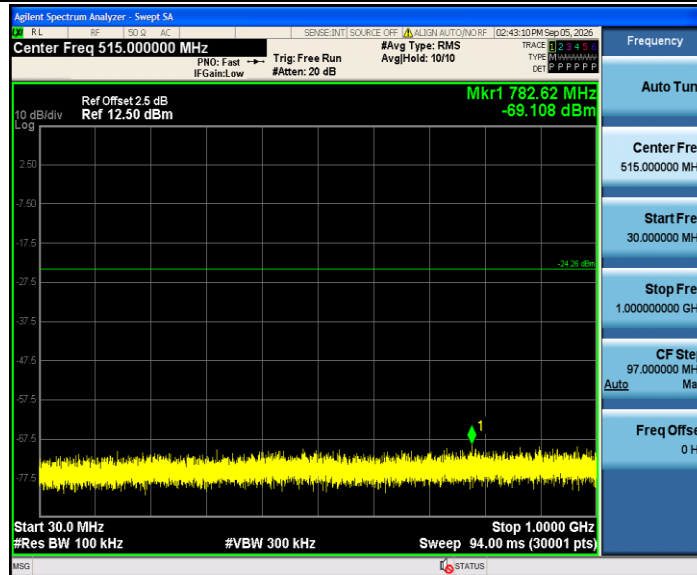
BLE_2M_Ant1_2440_1000~26500



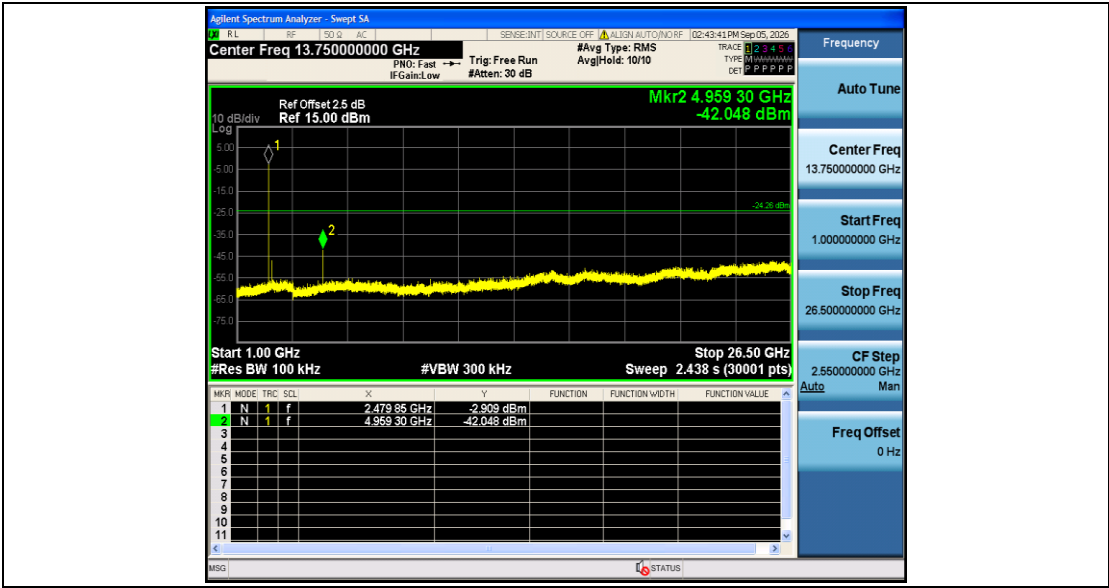
BLE_2M_Ant1_2480_0~Reference



BLE_2M_Ant1_2480_30~1000



BLE_2M_Ant1_2480_1000~26500

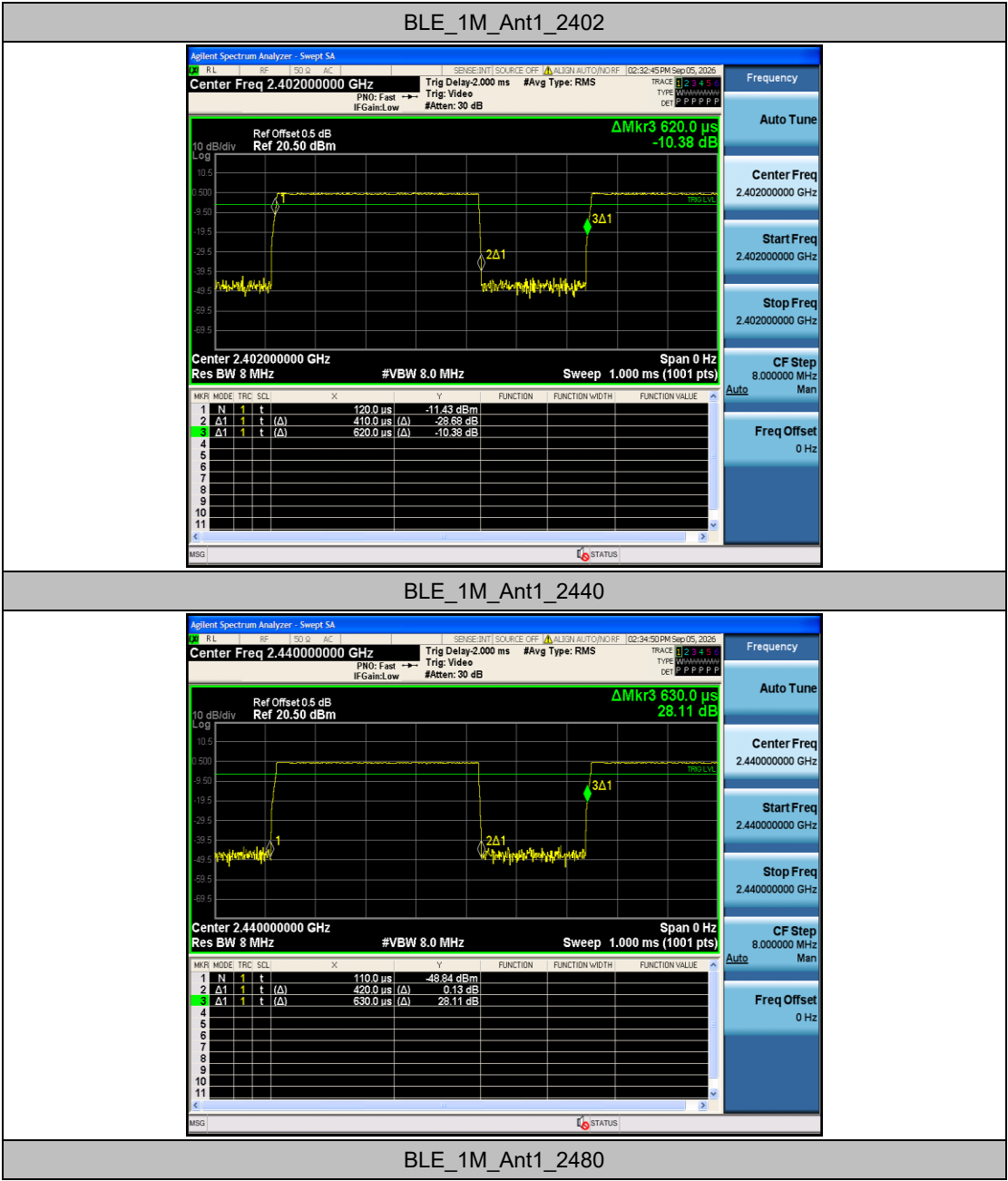


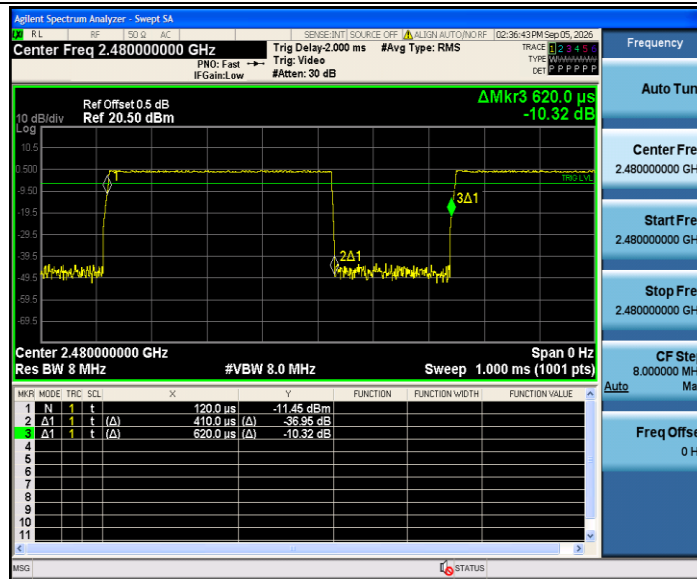
Appendix G: Duty Cycle

Test Result

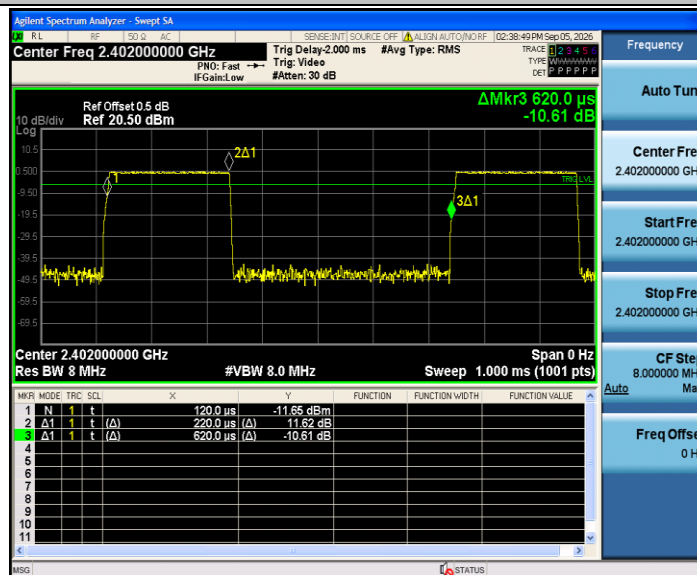
TestMode	Antenna	Freq(MHz)	ON Time [ms]	Period [ms]	X	DC [%]	xFactor	Limit	Verdict
BLE_1M	Ant1	2402	0.41	0.62	0.6613	66.13	1.80	---	---
		2440	0.42	0.63	0.6667	66.67	1.76	---	---
		2480	0.41	0.62	0.6613	66.13	1.80	---	---
BLE_2M	Ant1	2402	0.22	0.62	0.3548	35.48	4.50	---	---
		2440	0.23	0.62	0.3710	37.10	4.31	---	---
		2480	0.22	0.62	0.3548	35.48	4.50	---	---

Test Graphs

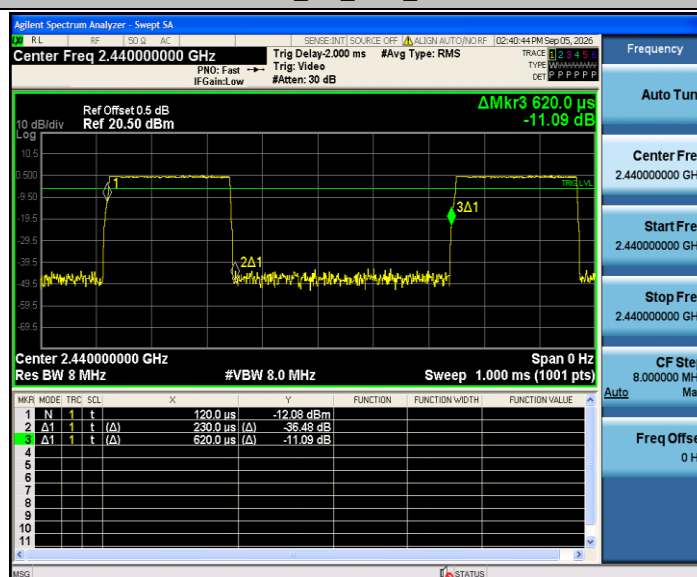




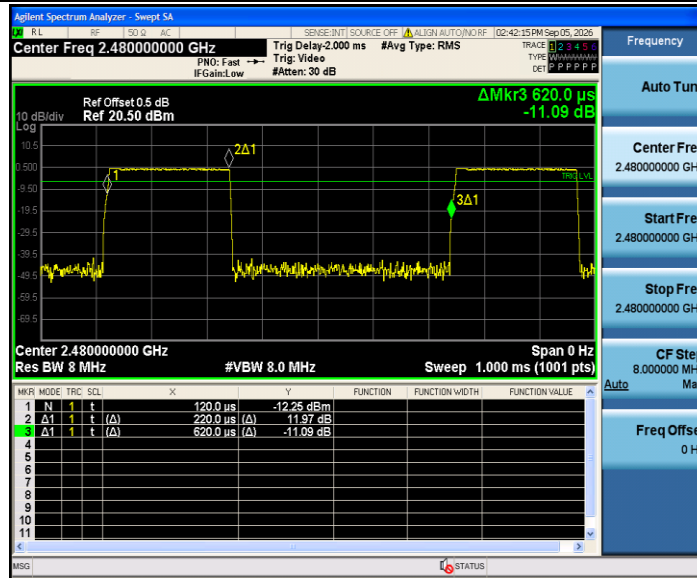
BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



BLE_2M_Ant1_2480



Appendix H: Emissions in Restricted Bands

Test Result

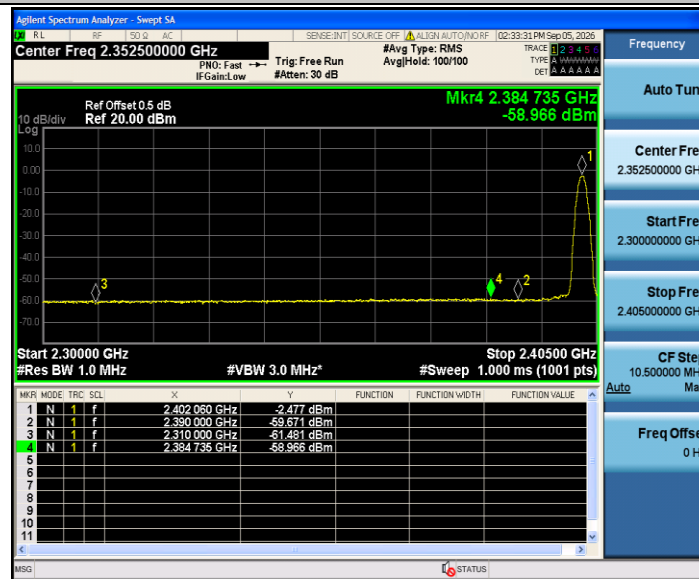
TestMode	Antenna	ChName	Freq(MHz)	Detector	Freq [MHz]	Result [dBm]	Gain [dB]	DC Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
BLE_1M	Ant1	Low	2402	AV	2310.000	-61.48	3.43	1.80	38.95	≤54	PASS
				AV	2384.735	-58.97	3.43	1.80	41.46	≤54	PASS
				AV	2390.000	-59.67	3.43	1.80	40.76	≤54	PASS
				Peak	2310.000	-50.89	3.43	0.00	47.74	≤74	PASS
				Peak	2336.960	-49.05	3.43	0.00	49.58	≤74	PASS
				Peak	2390.000	-51.81	3.43	0.00	46.82	≤74	PASS
		High	2480	AV	2483.500	-58.28	3.43	1.80	42.15	≤54	PASS
				AV	2484.480	-57.88	3.43	1.80	42.55	≤54	PASS
				AV	2500.000	-59.12	3.43	1.80	41.31	≤54	PASS
				Peak	2483.500	-48.28	3.43	0.00	50.35	≤74	PASS
				Peak	2484.000	-45.9	3.43	0.00	52.73	≤74	PASS
				Peak	2500.000	-51.28	3.43	0.00	47.35	≤74	PASS
BLE_2M	Ant1	Low	2402	AV	2310.000	-60.71	3.43	4.50	42.42	≤54	PASS
				AV	2375.180	-59.32	3.43	4.50	43.81	≤54	PASS
				AV	2390.000	-59.64	3.43	4.50	43.49	≤54	PASS
				Peak	2310.000	-51.27	3.43	0.00	47.36	≤74	PASS
				Peak	2386.835	-49.07	3.43	0.00	49.56	≤74	PASS
				Peak	2390.000	-52.02	3.43	0.00	46.61	≤74	PASS
		High	2480	AV	2483.500	-58.02	3.43	4.50	45.11	≤54	PASS
				AV	2484.720	-57.45	3.43	4.50	45.68	≤54	PASS
				AV	2500.000	-59.74	3.43	4.50	43.39	≤54	PASS
				Peak	2483.500	-47.64	3.43	0.00	50.99	≤74	PASS
				Peak	2484.480	-43.5	3.43	0.00	55.13	≤74	PASS
				Peak	2500.000	-51.32	3.43	0.00	47.31	≤74	PASS

Note:

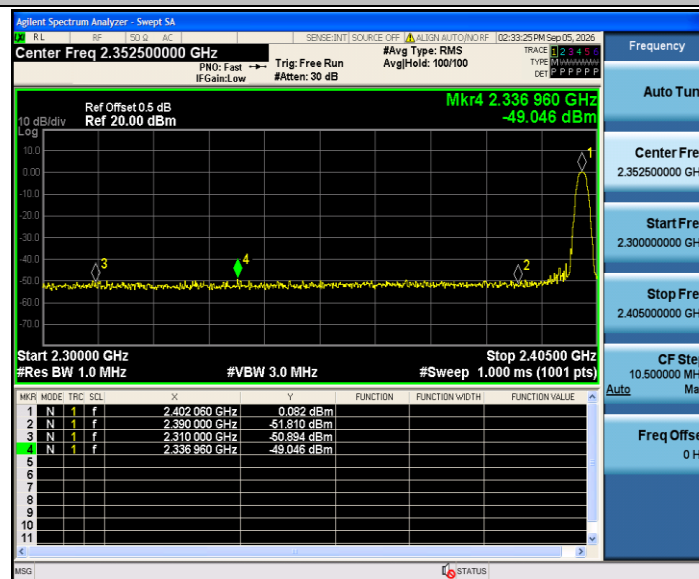
The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

Test Graphs

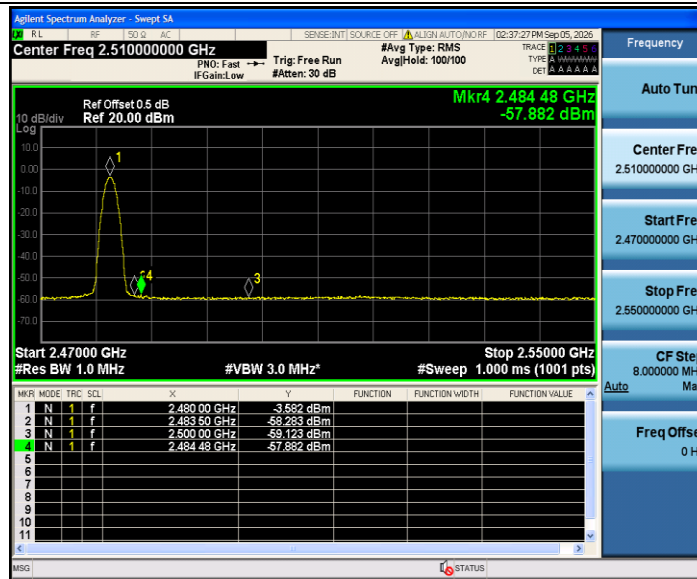
BLE_1M_Ant1_Low_2402_AV



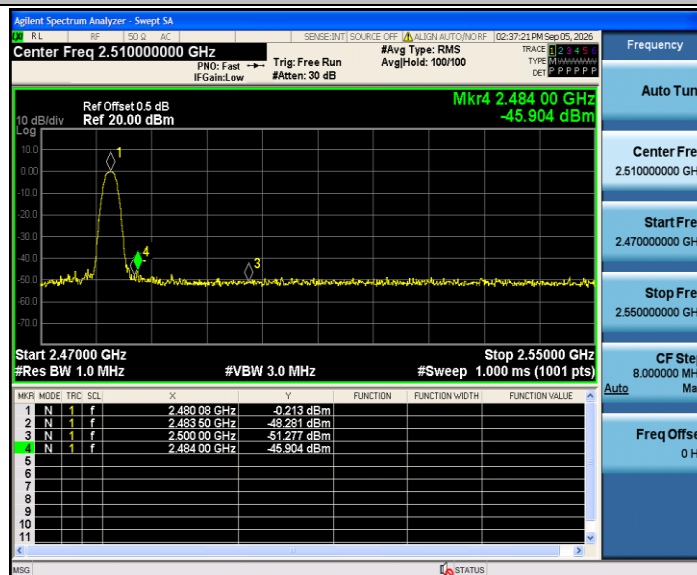
BLE_1M_Ant1_Low_2402_Peak



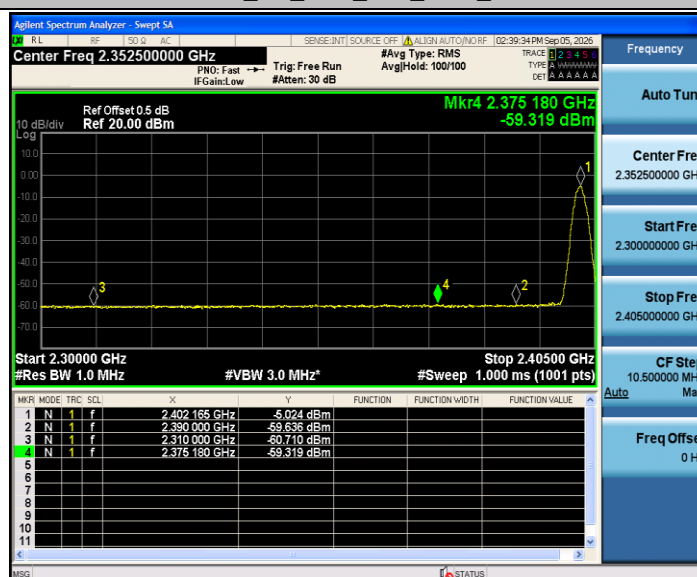
BLE_1M_Ant1_High_2480_AV



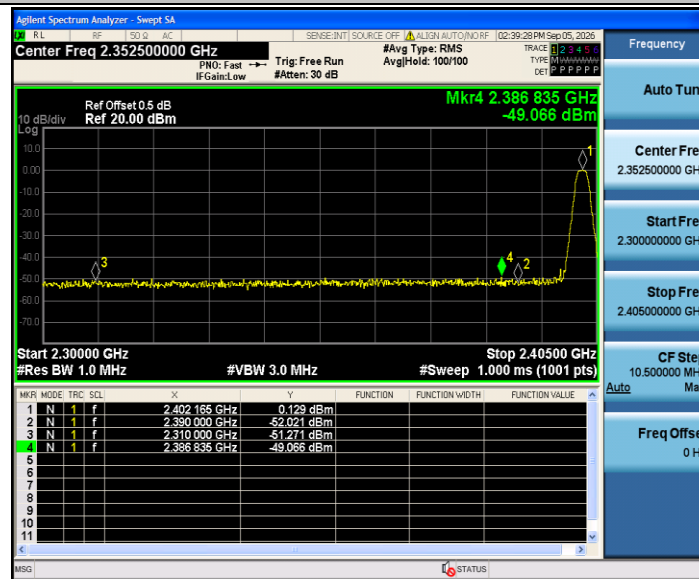
BLE_1M_Ant1_High_2480_Peak



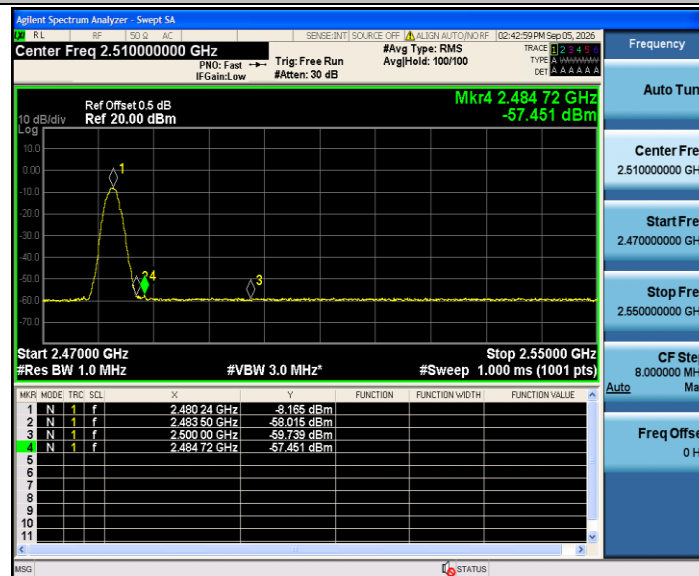
BLE_2M_Ant1_Low_2402_AV



BLE_2M_Ant1_Low_2402_Peak



BLE_2M_Ant1_High_2480_AV



BLE_2M_Ant1_High_2480_Peak

