

Appendix Test Data for BT(BLE) (Conducted Measurement)

Product Name: Smart Lock

Trade Mark: N/A

Test Model: Q106e

FCC ID: 2A2WS-Q106E

Environmental Conditions

Temperature:	25.5°C
Relative Humidity:	55%
ATM Pressure:	100.0 kPa
Test Engineer:	Anna Hu
Supervised by:	Hugo Chen
NOTE	N/A

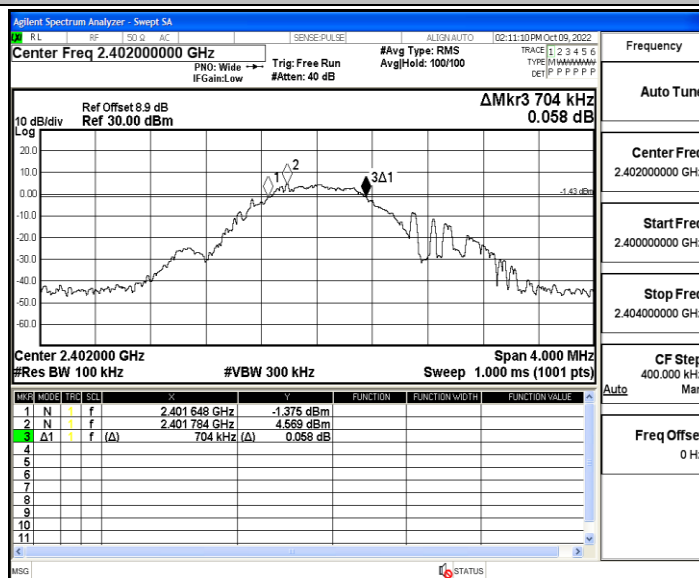
Appendix A: DTS Bandwidth

Test Result

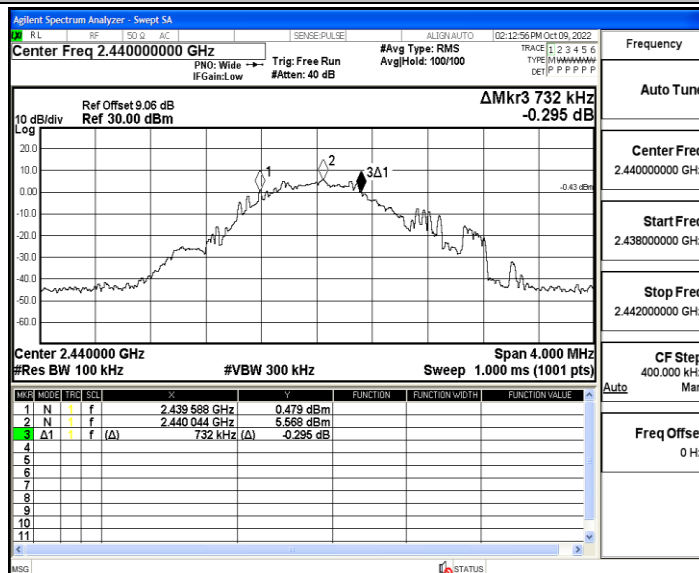
TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.704	2401.648	2402.352	0.5	PASS
		2440	0.732	2439.588	2440.320	0.5	PASS
		2480	0.672	2479.676	2480.348	0.5	PASS
BLE_2M	Ant1	2402	1.048	2401.512	2402.560	0.5	PASS
		2440	1.028	2439.548	2440.576	0.5	PASS
		2480	1.112	2479.452	2480.564	0.5	PASS

Test Graphs

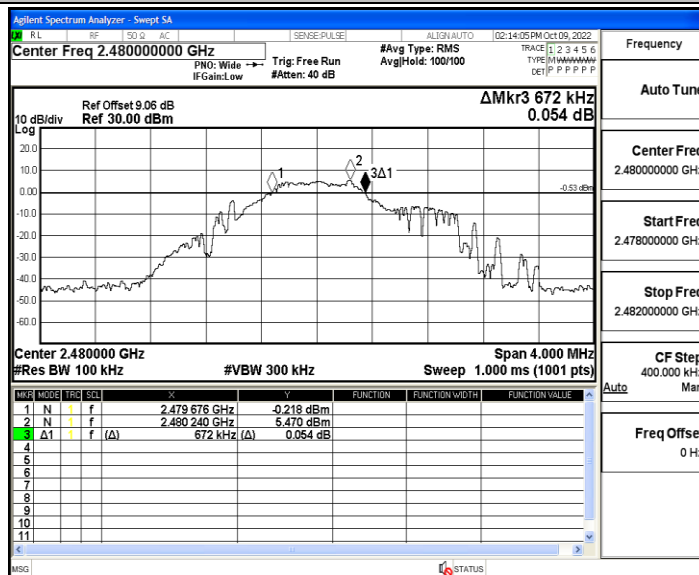
BLE_1M_Ant1_2402



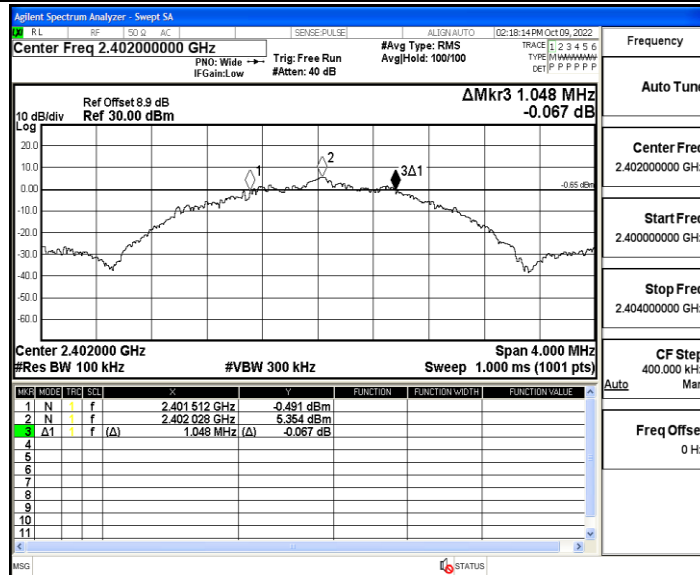
BLE_1M_Ant1_2440



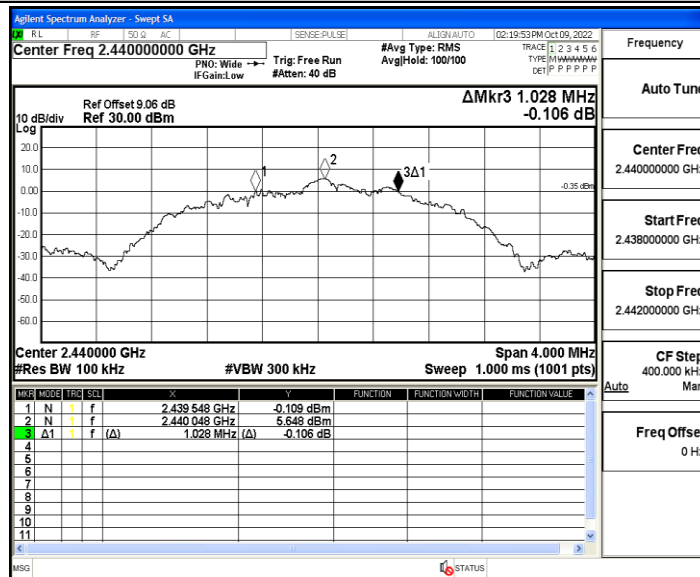
BLE_1M_Ant1_2480



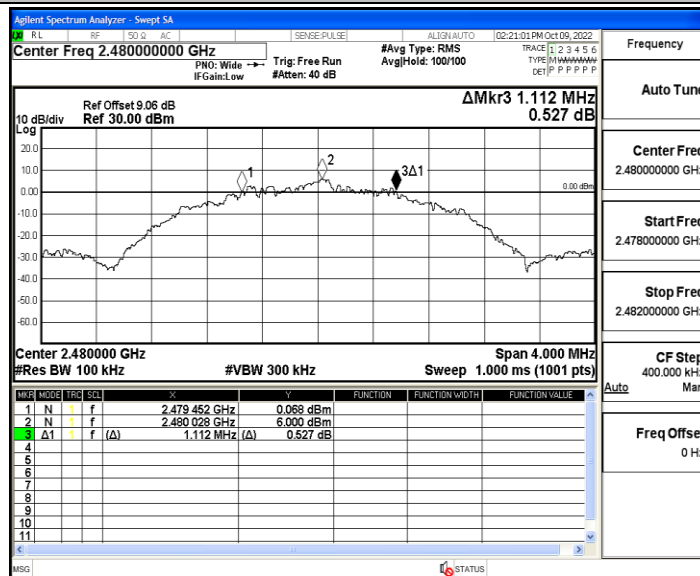
BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



BLE_2M_Ant1_2480



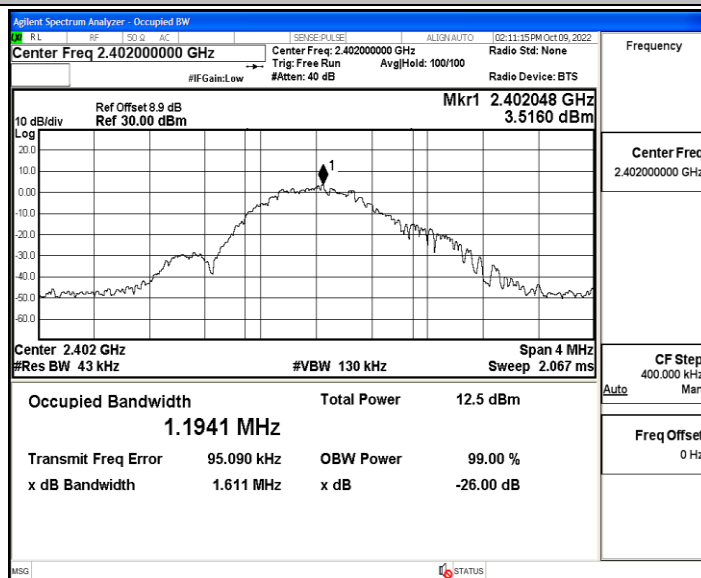
Appendix B: Occupied Channel Bandwidth

Test Result

TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	1.1941	2401.4980	2402.6921	---	---
		2440	1.3128	2439.4436	2440.7564	---	---
		2480	1.3742	2479.4286	2480.8028	---	---
BLE_2M	Ant1	2402	2.0398	2400.9994	2403.0392	---	---
		2440	2.0776	2438.9720	2441.0496	---	---
		2480	2.0496	2479.0020	2481.0516	---	---

Test Graphs

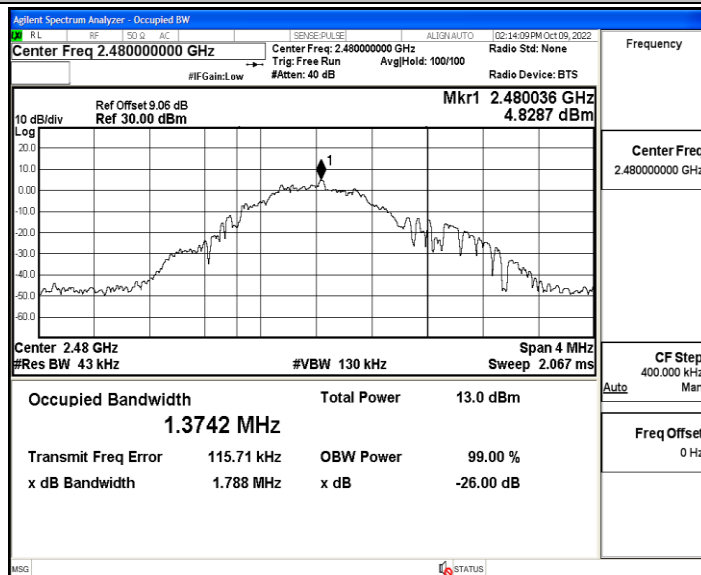
BLE_1M_Ant1_2402



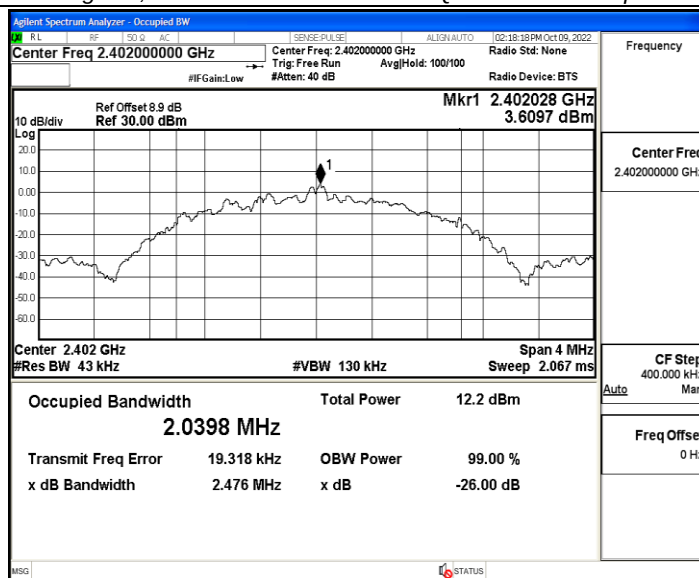
BLE_1M_Ant1_2440



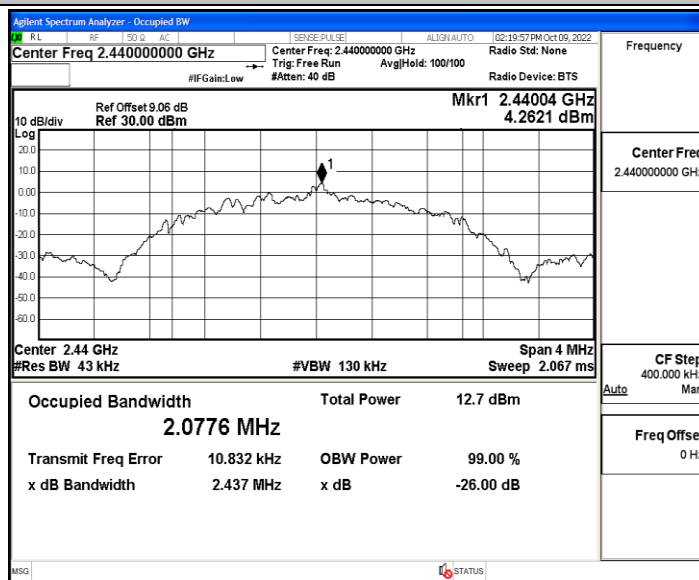
BLE_1M_Ant1_2480



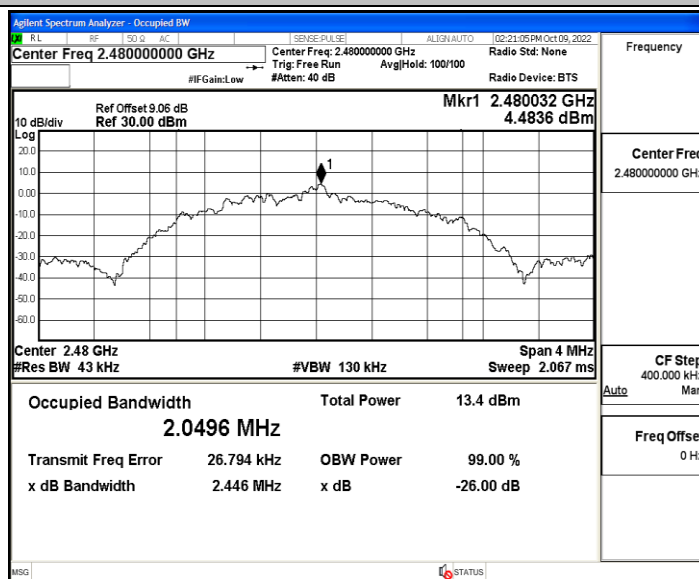
BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



BLE_2M_Ant1_2480



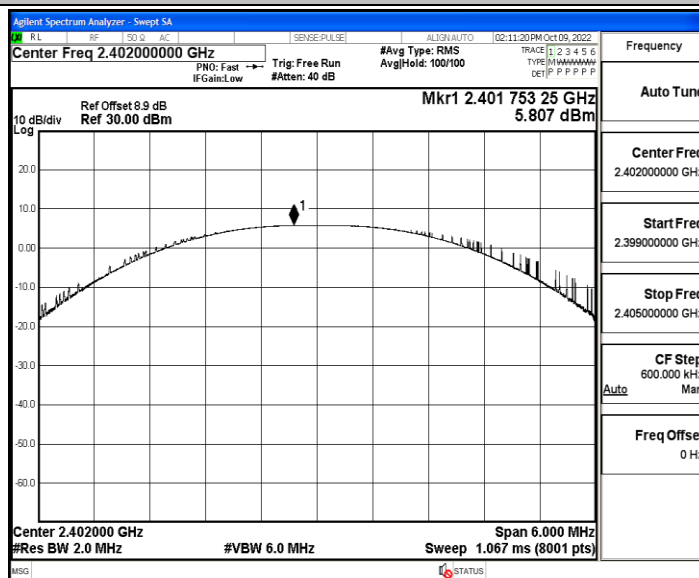
Appendix C: Maximum Peak conducted output power

Test Result

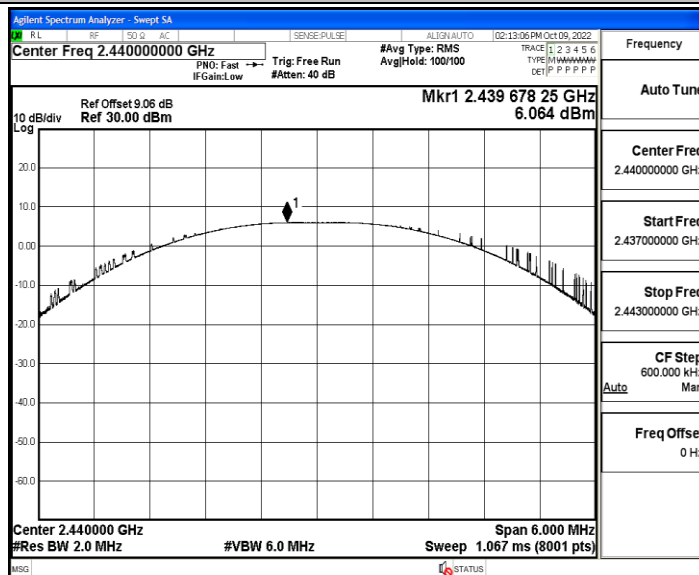
TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	5.81	≤30	PASS
		2440	6.06	≤30	PASS
		2480	6.41	≤30	PASS
BLE_2M	Ant1	2402	5.78	≤30	PASS
		2440	6.04	≤30	PASS
		2480	6.43	≤30	PASS

Test Graphs

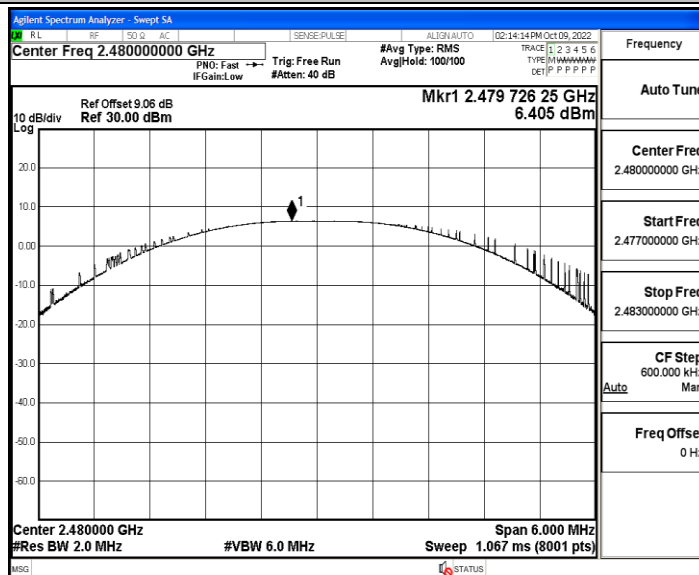
BLE_1M_Ant1_2402



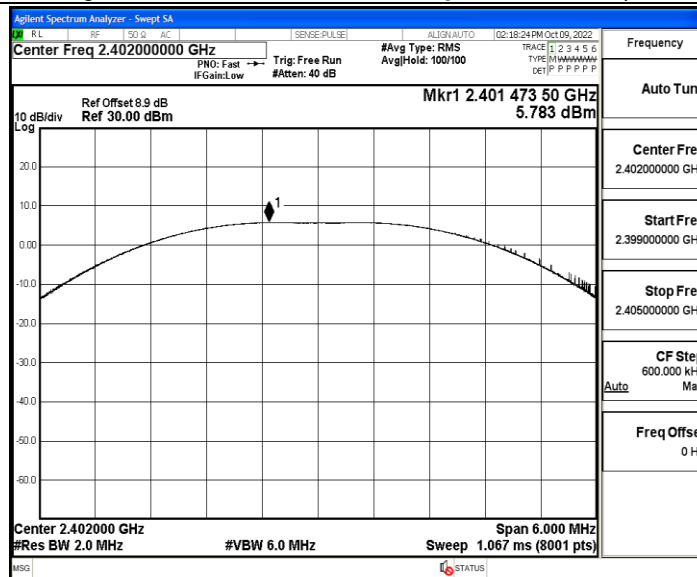
BLE_1M_Ant1_2440



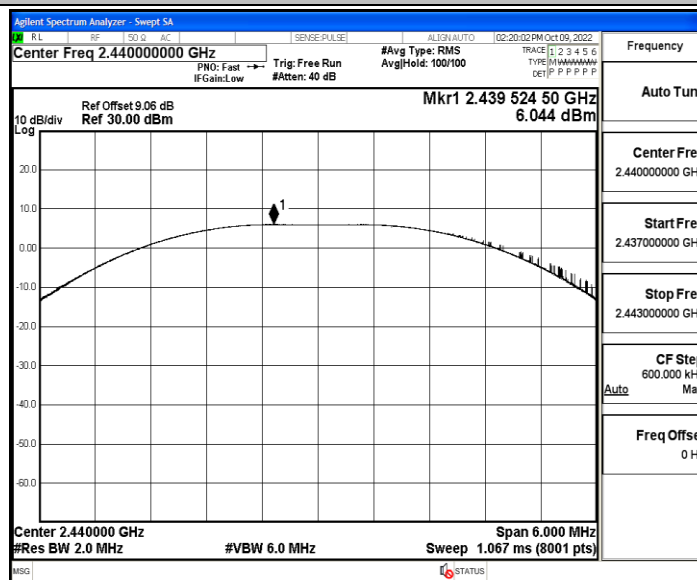
BLE_1M_Ant1_2480



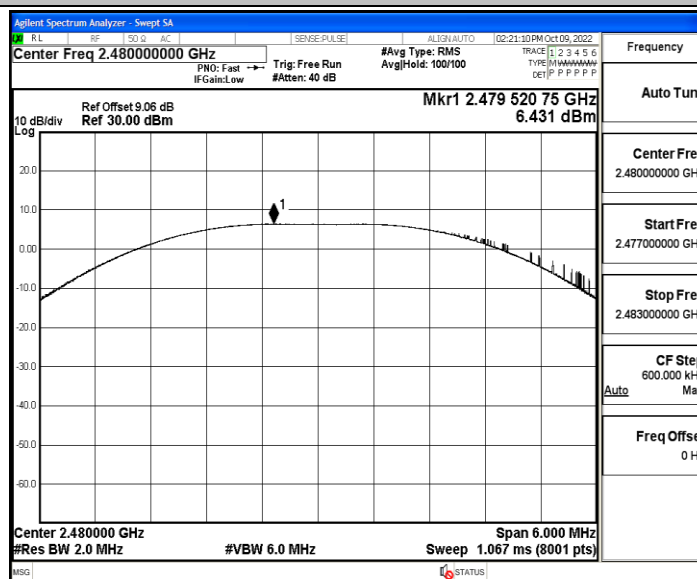
BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



BLE_2M_Ant1_2480



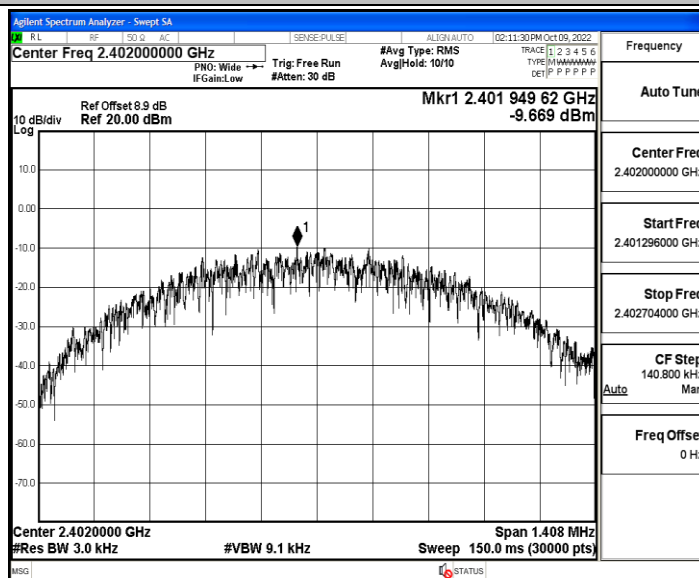
Appendix D: Maximum power spectral density

Test Result

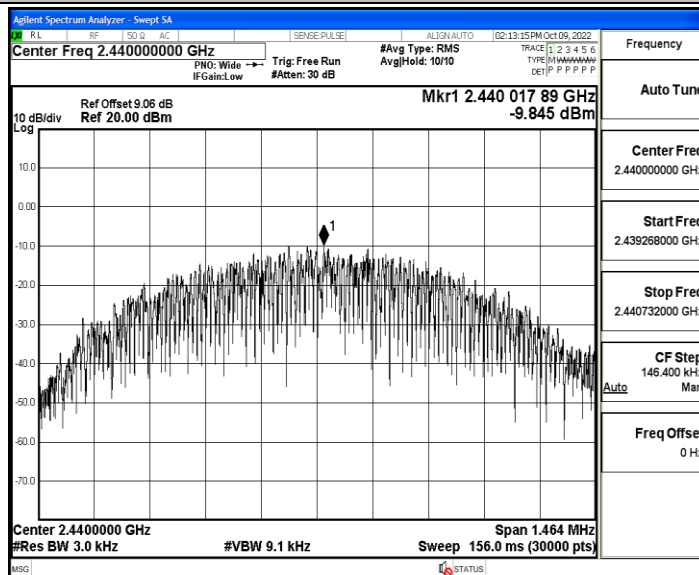
TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-9.67	≤8.00	PASS
		2440	-9.85	≤8.00	PASS
		2480	-8.88	≤8.00	PASS
BLE_2M	Ant1	2402	-11.64	≤8.00	PASS
		2440	-11.46	≤8.00	PASS
		2480	-11.98	≤8.00	PASS

Test Graphs

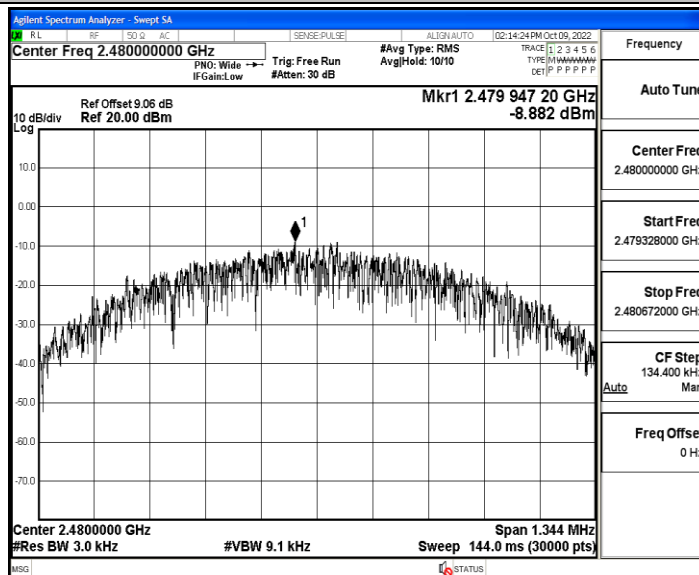
BLE_1M_Ant1_2402



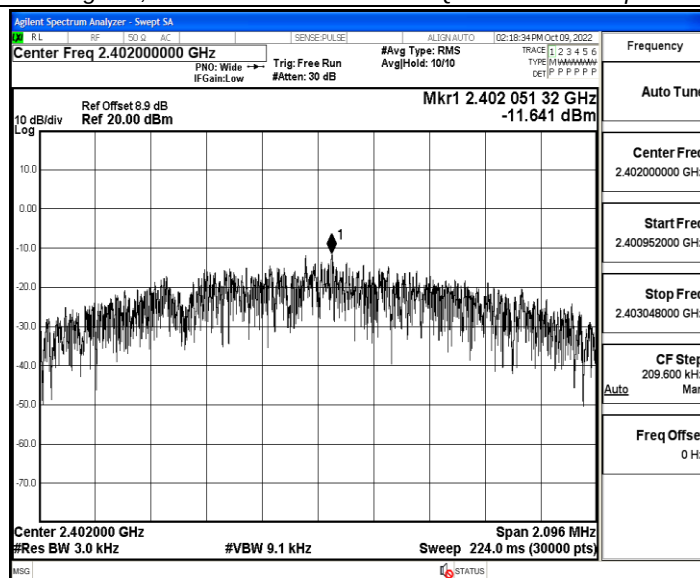
BLE_1M_Ant1_2440



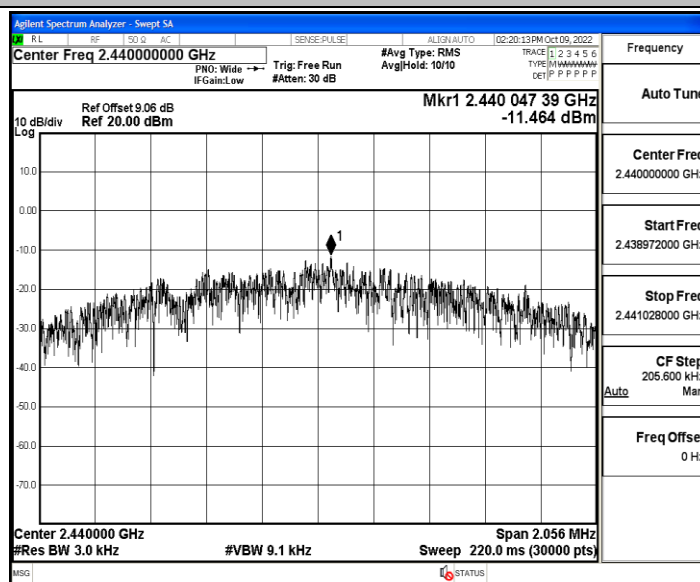
BLE_1M_Ant1_2480



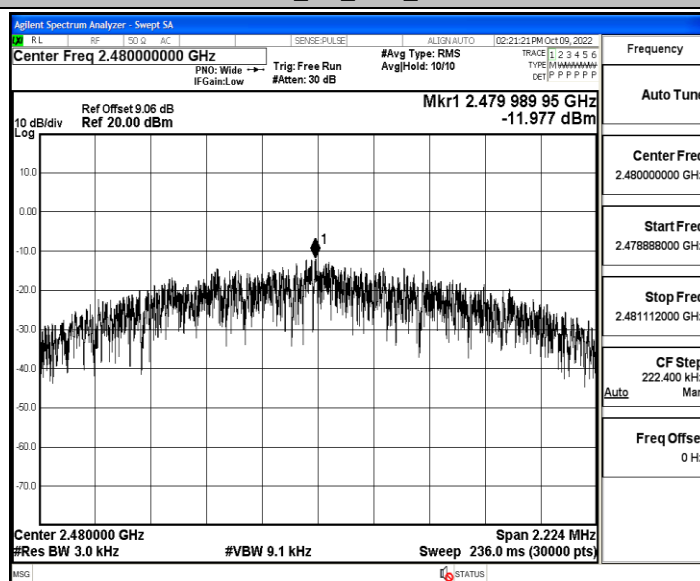
BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



BLE_2M_Ant1_2480



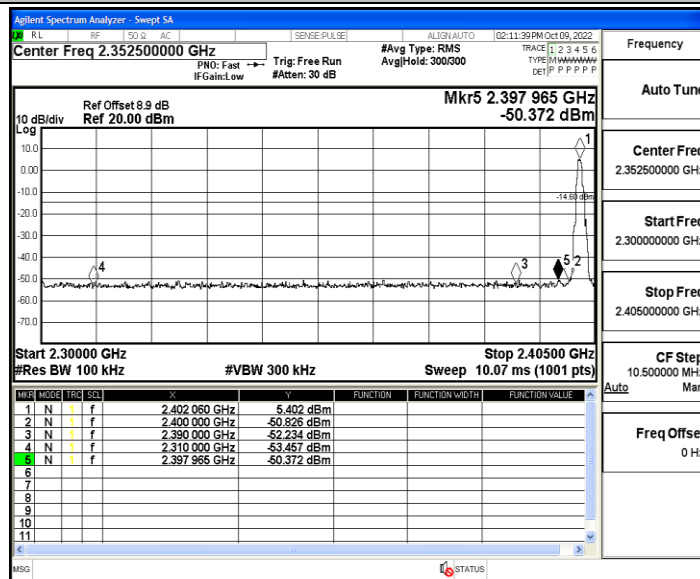
Appendix E: Band edge measurements

Test Result

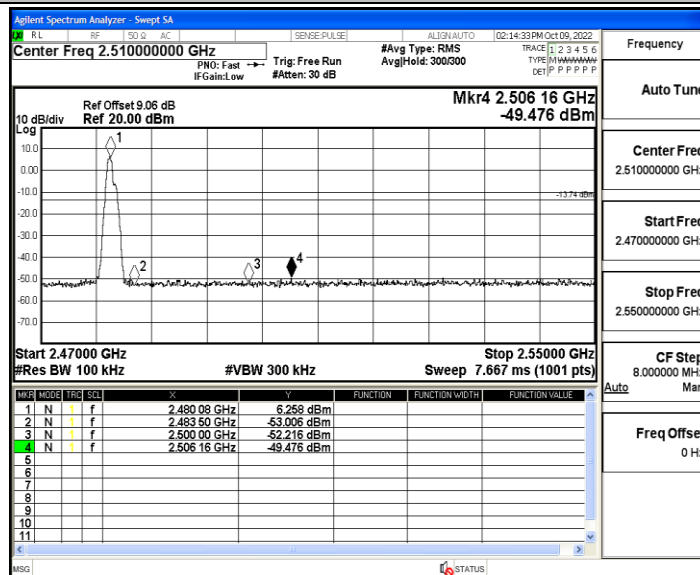
TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	5.40	-50.37	≤-14.6	PASS
		High	2480	6.26	-49.48	≤-13.74	PASS
BLE_2M	Ant1	Low	2402	5.45	-26.04	≤-14.55	PASS
		High	2480	6.03	-49.5	≤-13.97	PASS

Test Graphs

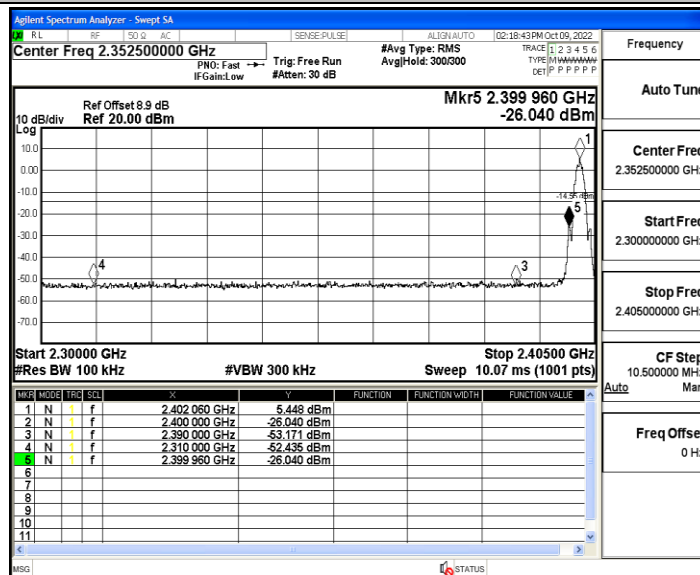
BLE_1M_Ant1_Low_2402



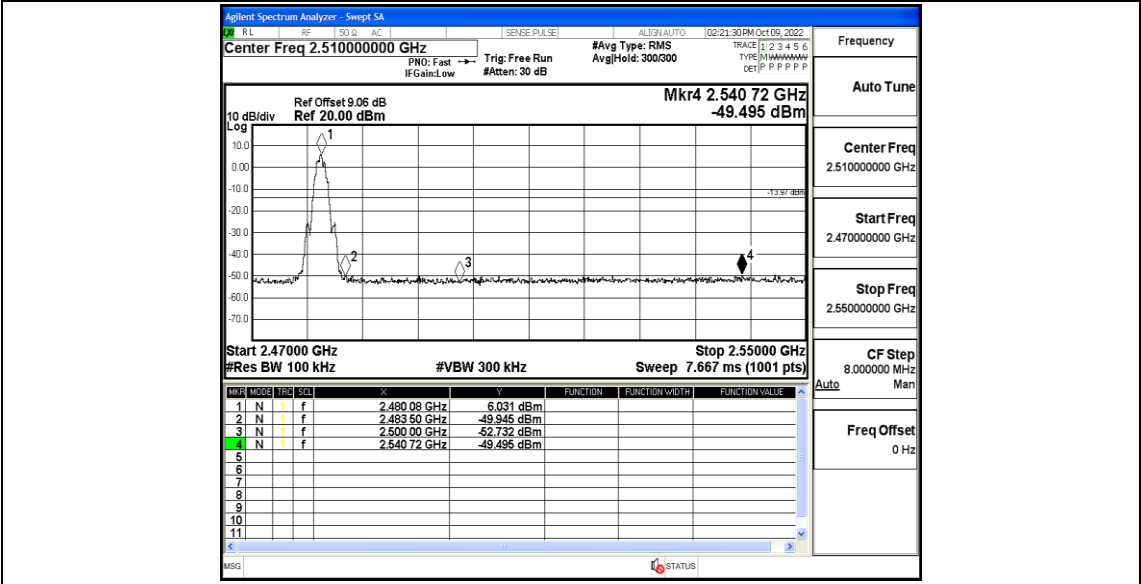
BLE_1M_Ant1_High_2480



BLE_2M_Ant1_Low_2402



BLE_2M_Ant1_High_2480



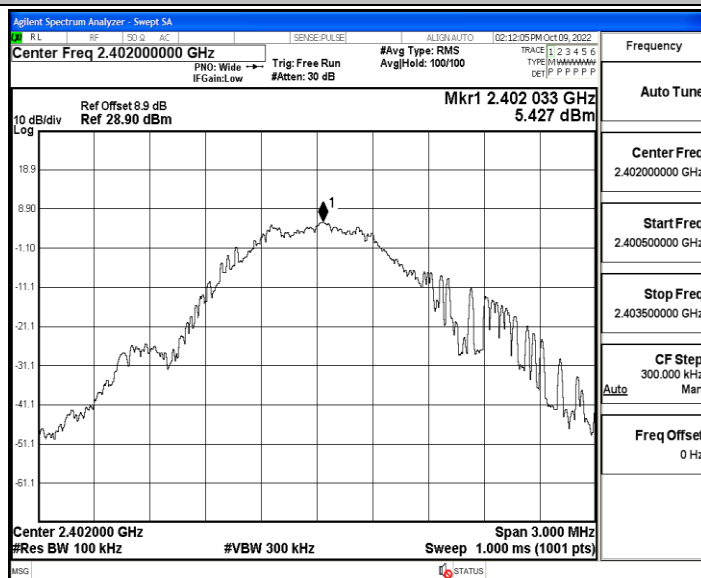
Appendix F: Conducted Spurious Emission

Test Result

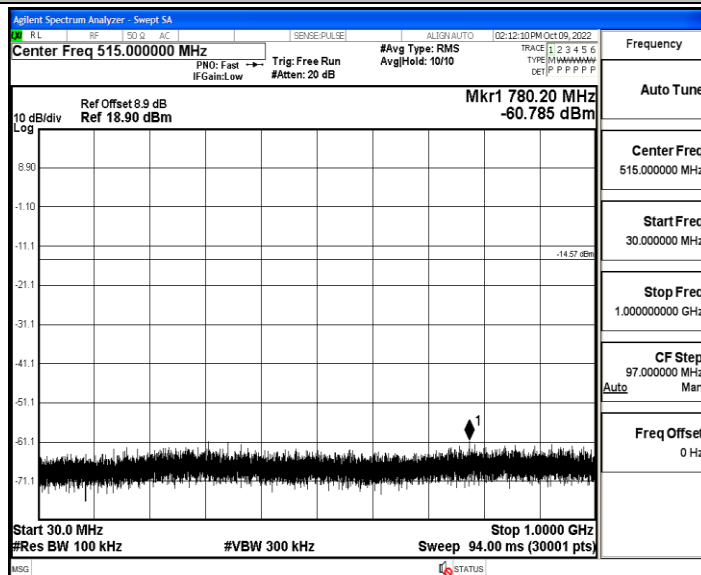
TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	5.43	5.43	---	PASS
			30~1000	5.43	-60.79	≤-14.57	PASS
			1000~26500	5.43	-45.86	≤-14.57	PASS
		2440	Reference	5.54	5.54	---	PASS
			30~1000	5.54	-61.38	≤-14.46	PASS
			1000~26500	5.54	-44.41	≤-14.46	PASS
		2480	Reference	6.09	6.09	---	PASS
			30~1000	6.09	-61.53	≤-13.91	PASS
			1000~26500	6.09	-45.73	≤-13.91	PASS
BLE_2M	Ant1	2402	Reference	5.38	5.38	---	PASS
			30~1000	5.38	-61.31	≤-14.62	PASS
			1000~26500	5.38	-44.7	≤-14.62	PASS
		2440	Reference	5.62	5.62	---	PASS
			30~1000	5.62	-61.35	≤-14.38	PASS
			1000~26500	5.62	-47.01	≤-14.38	PASS
		2480	Reference	6.07	6.07	---	PASS
			30~1000	6.07	-60.97	≤-13.93	PASS
			1000~26500	6.07	-49.18	≤-13.93	PASS

Test Graphs

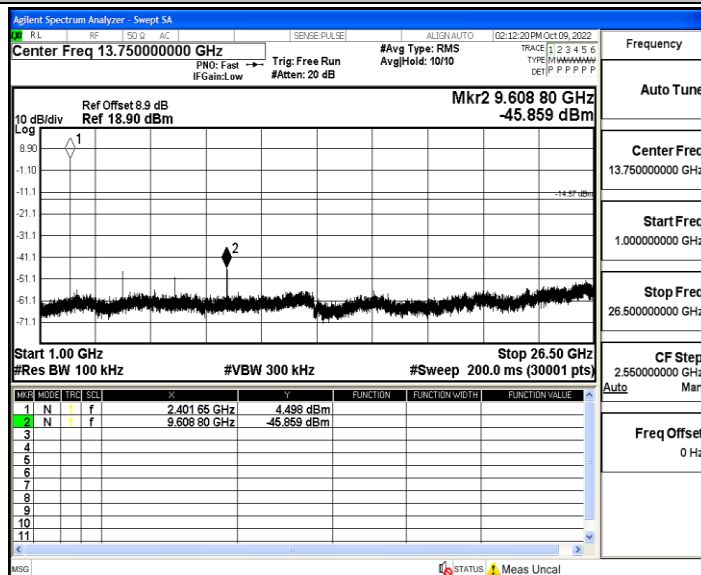
BLE_1M_Ant1_2402_0~Reference



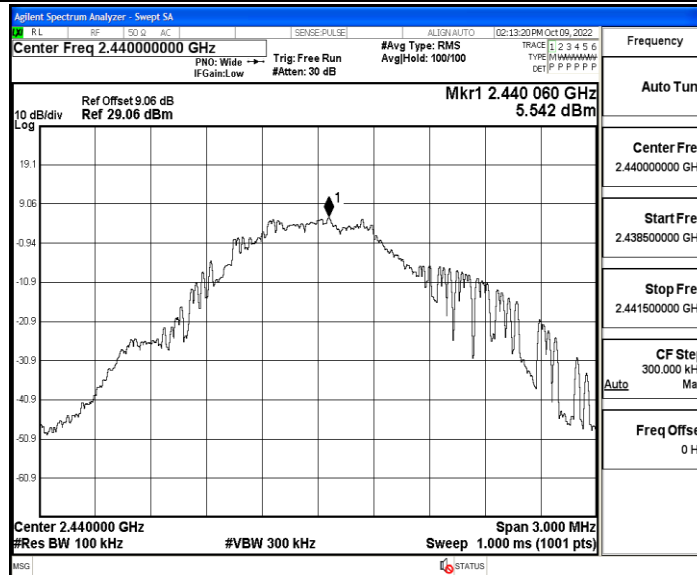
BLE_1M_Ant1_2402_30~1000



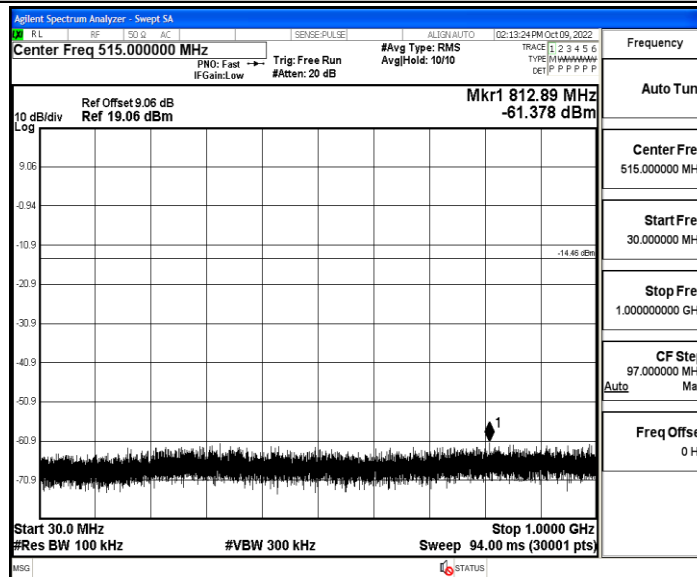
BLE_1M_Ant1_2402_1000~26500



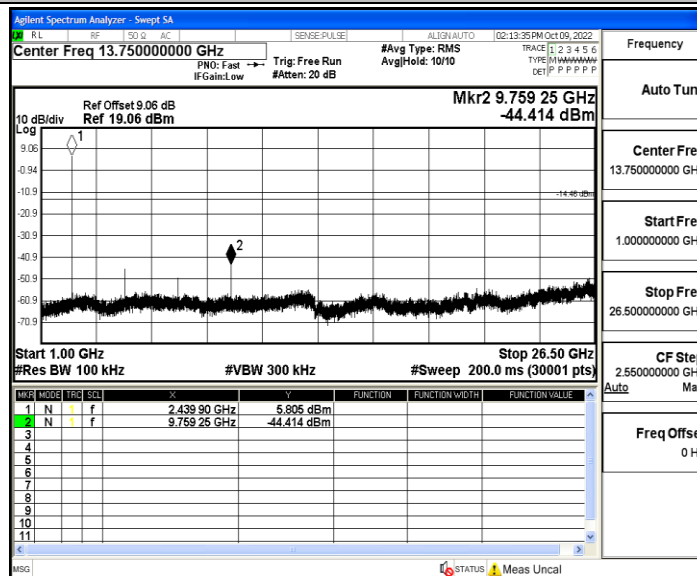
BLE_1M_Ant1_2440_0~Reference



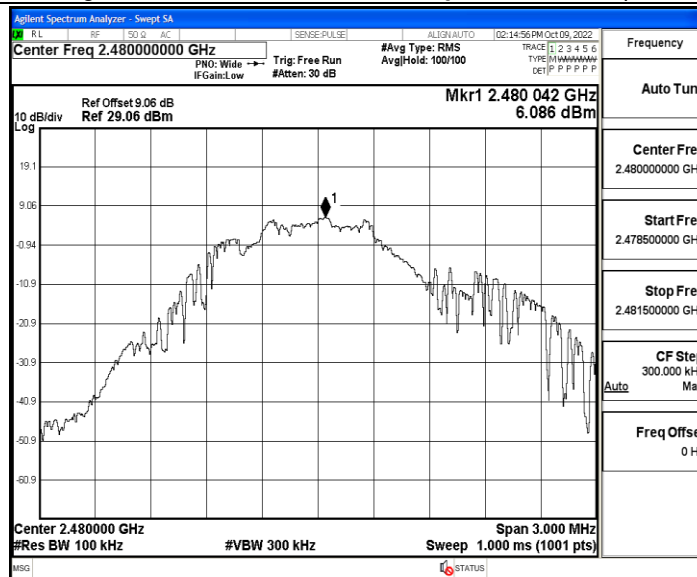
BLE_1M_Ant1_2440_30~1000



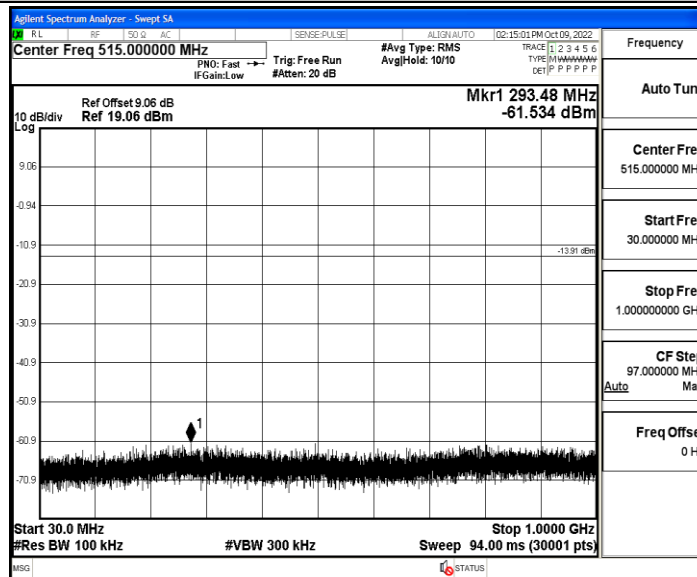
BLE_1M_Ant1_2440_1000~26500



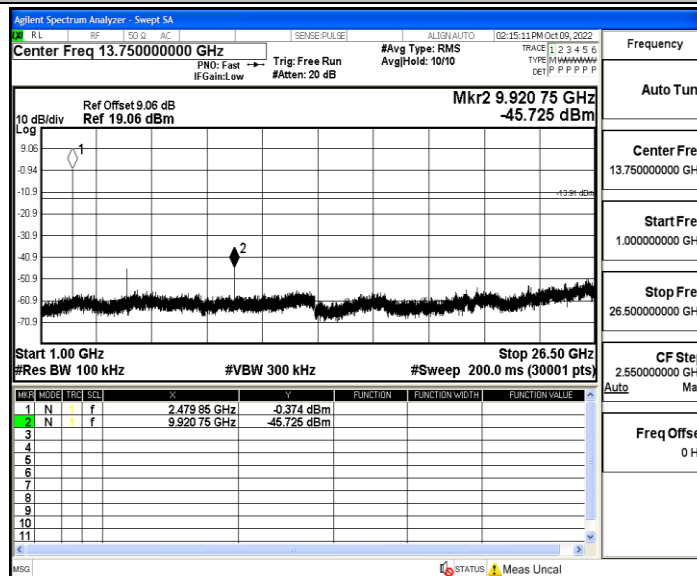
BLE_1M_Ant1_2480_0~Reference



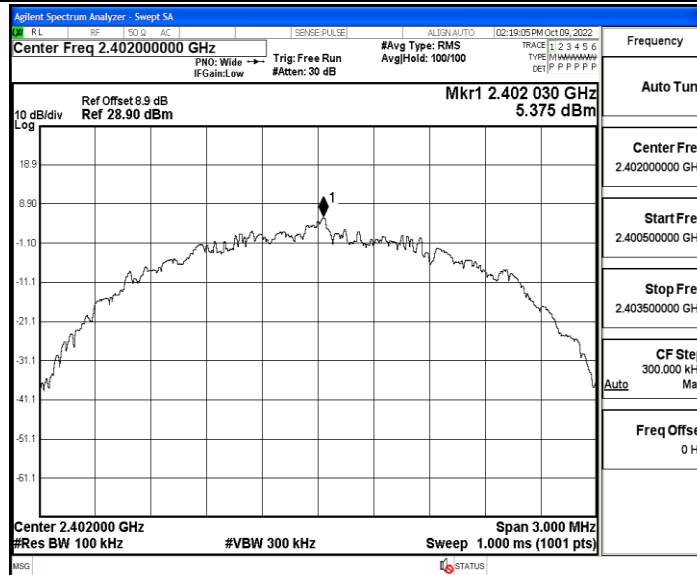
BLE_1M_Ant1_2480_30~1000



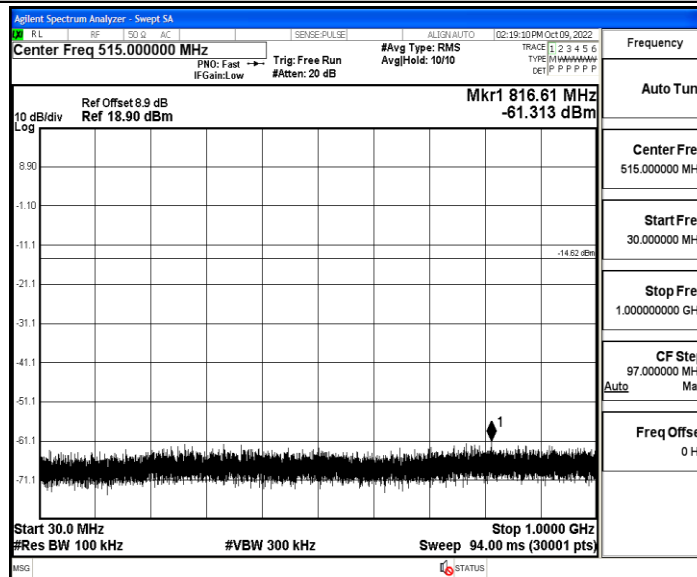
BLE_1M_Ant1_2480_1000~26500



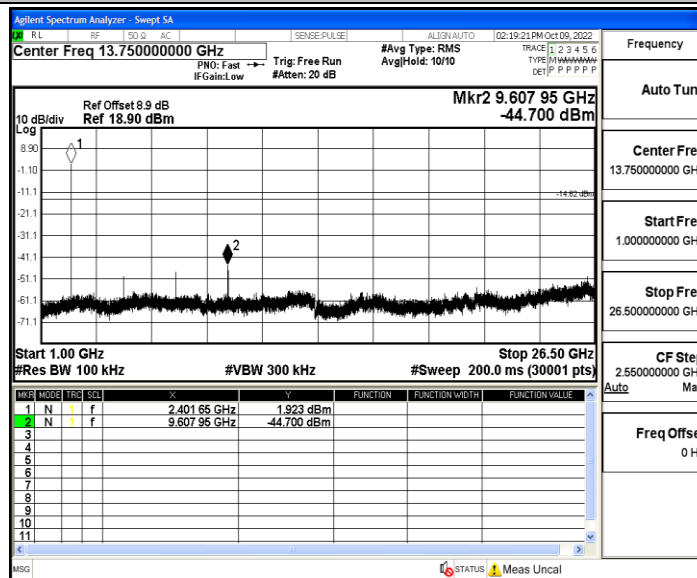
BLE_2M_Ant1_2402_0~Reference



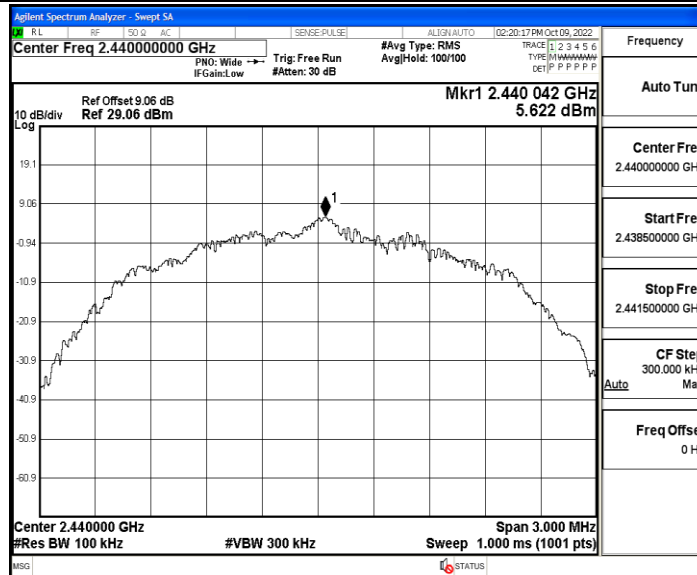
BLE_2M_Ant1_2402_30~1000



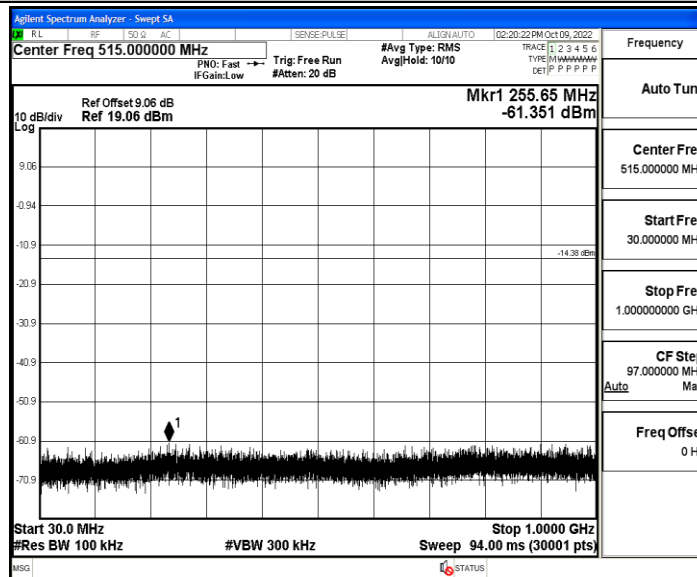
BLE_2M_Ant1_2402_1000~26500



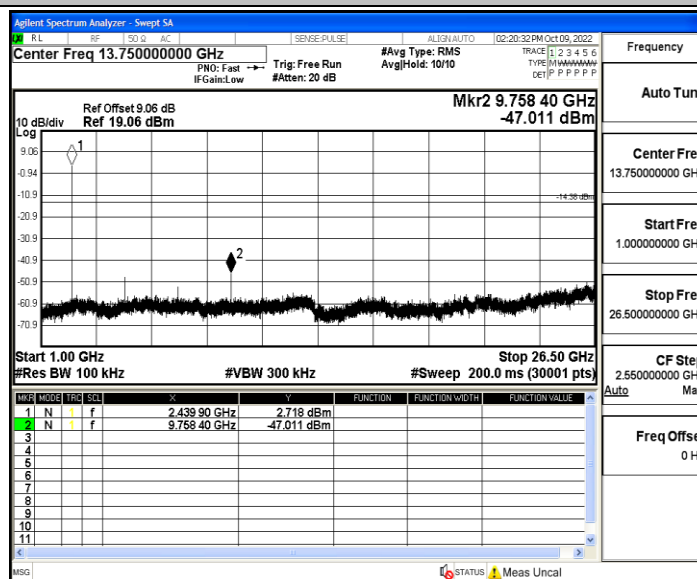
BLE_2M_Ant1_2440_0~Reference



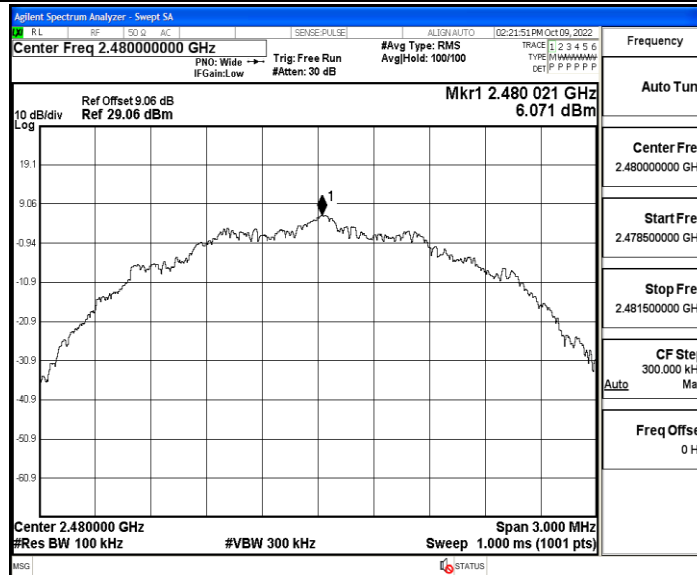
BLE_2M_Ant1_2440_30~1000



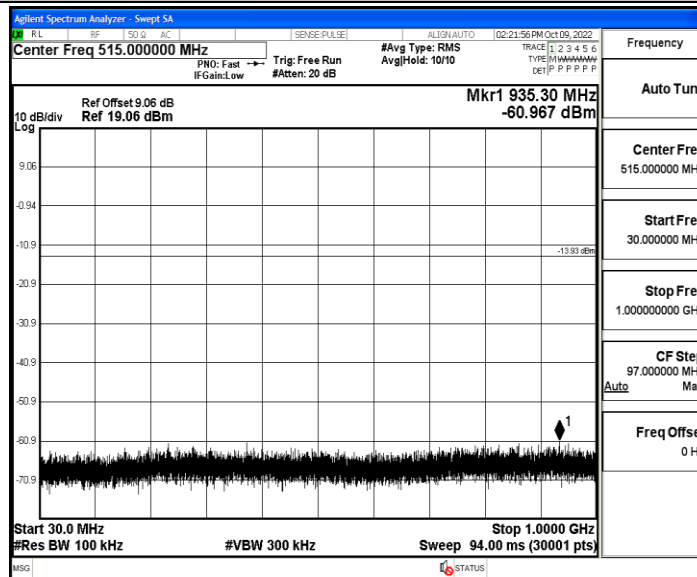
BLE_2M_Ant1_2440_1000~26500



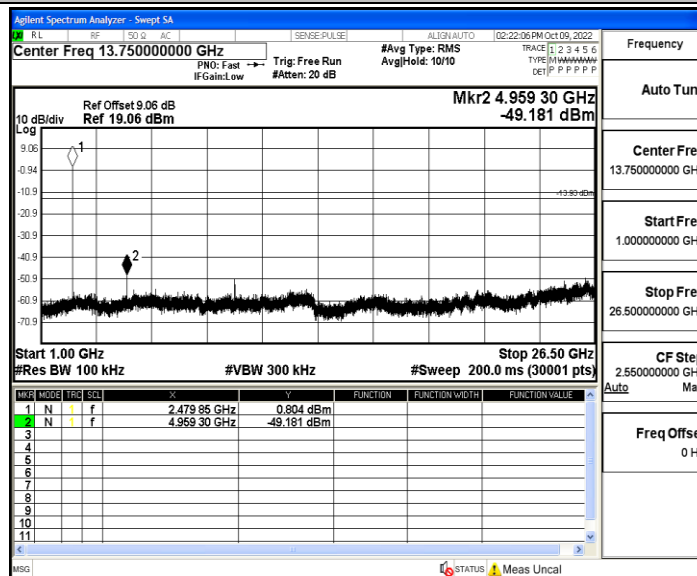
BLE_2M_Ant1_2480_0~Reference



BLE_2M_Ant1_2480_30~1000



BLE_2M_Ant1_2480_1000~26500



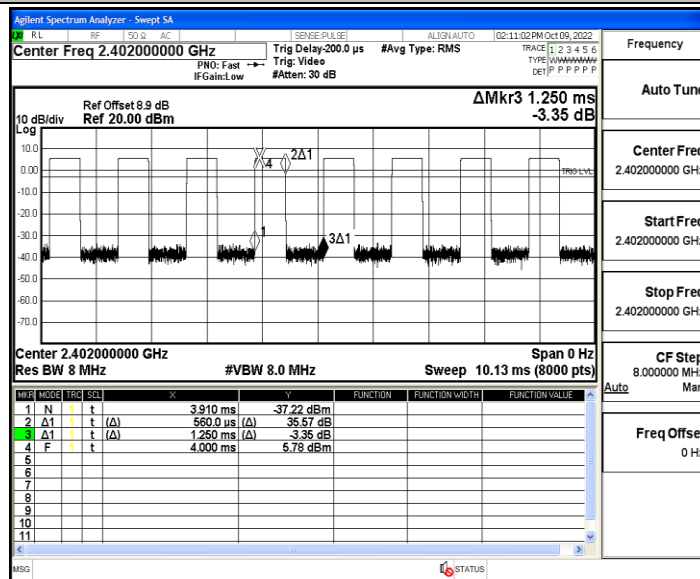
Appendix G: Duty Cycle

Test Result

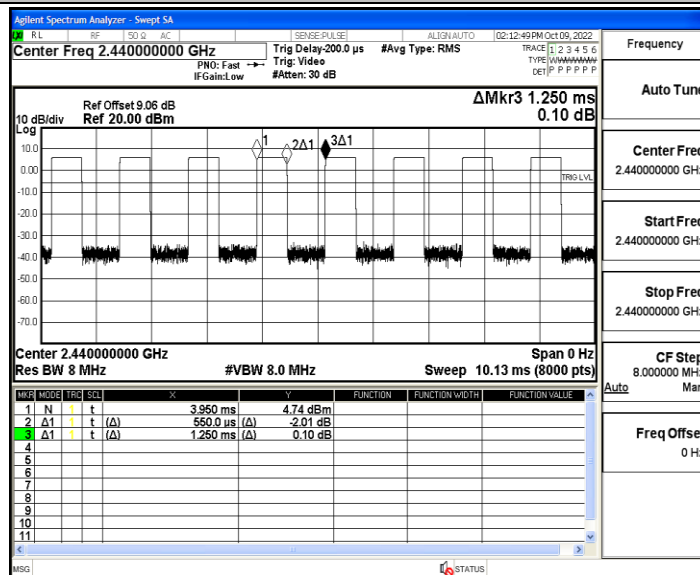
TestMode	Antenna	Channel	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	1/T[kHz]
BLE_1M	Ant1	2402	0.56	1.25	44.80	1.79
		2440	0.55	1.25	44.00	1.82
		2480	0.56	1.25	44.80	1.79
BLE_2M	Ant1	2402	0.31	0.63	49.21	3.23
		2440	0.30	0.62	48.39	3.33
		2480	0.31	0.62	50.00	3.23

Test Graphs

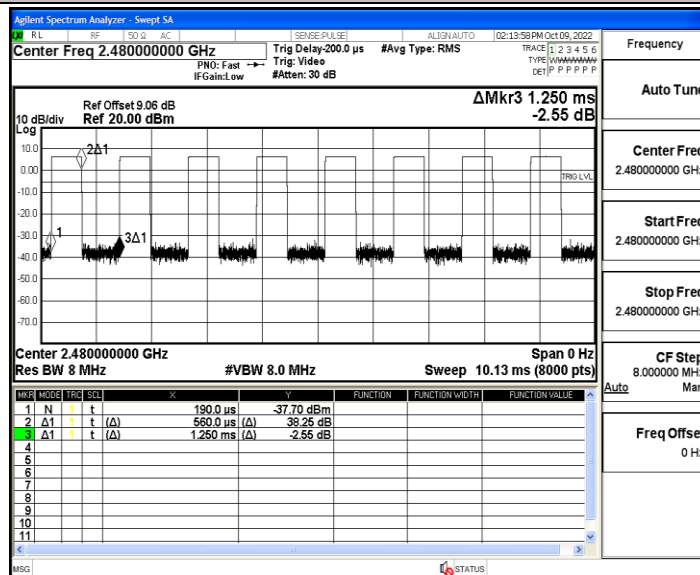
BLE_1M_Ant1_2402



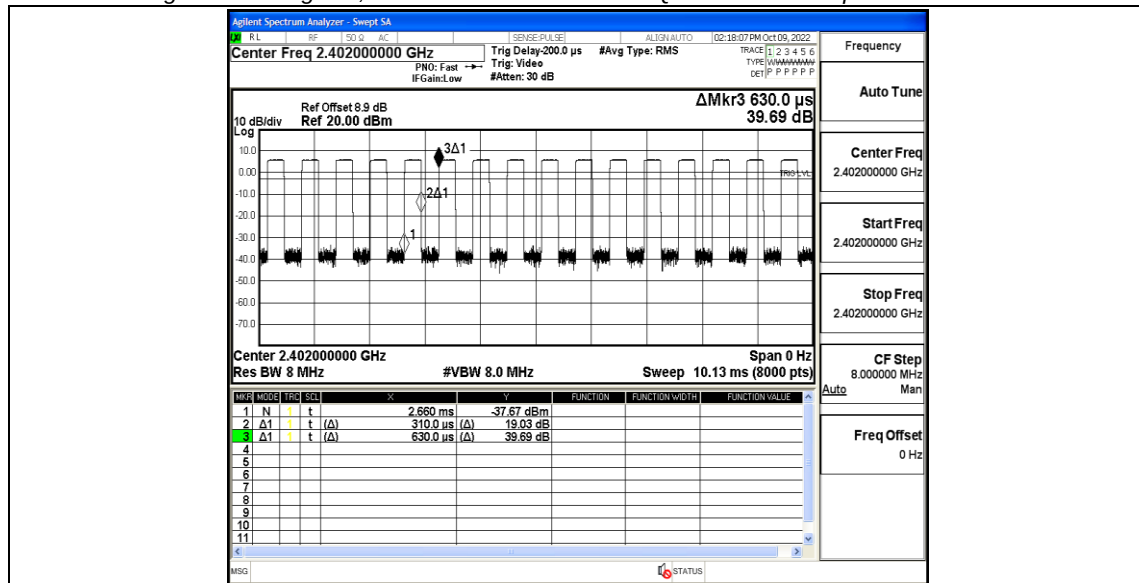
BLE_1M_Ant1_2440



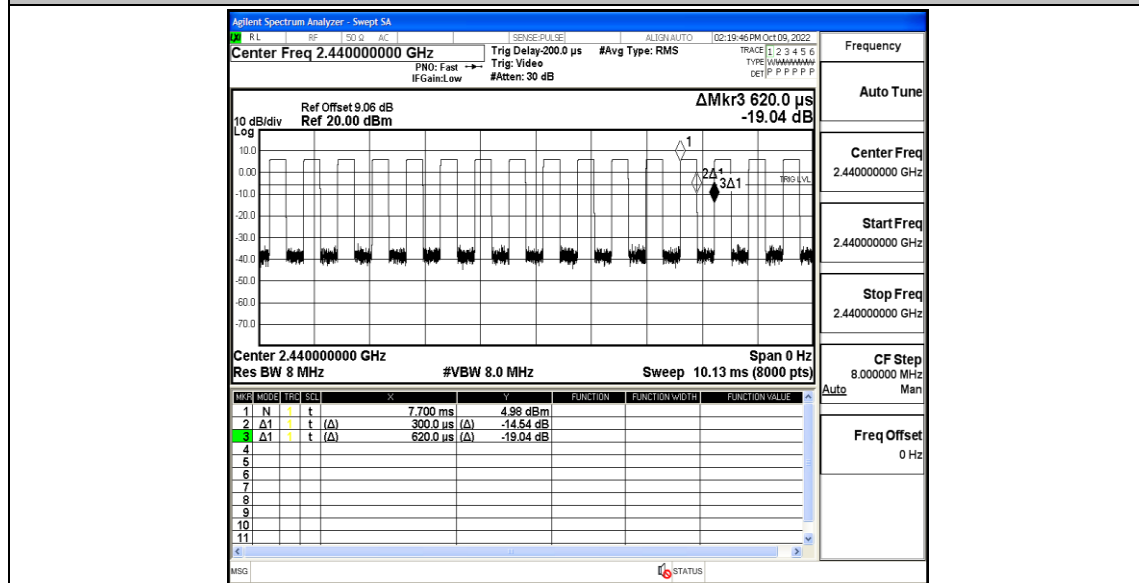
BLE_1M_Ant1_2480



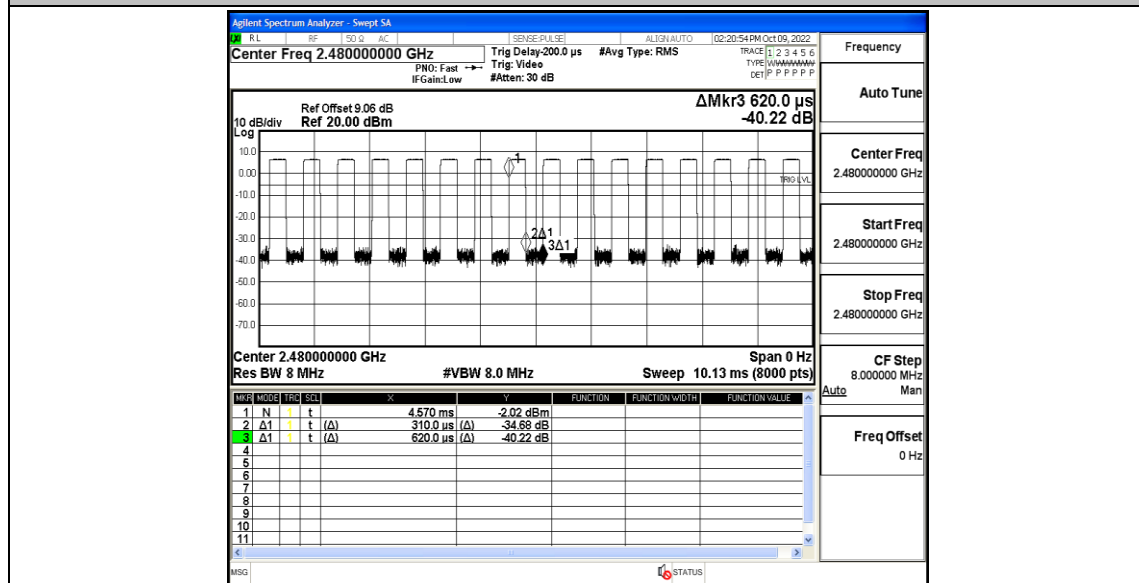
BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



BLE_2M_Ant1_2480



Appendix H: Emissions in Restricted Bands

Test Result

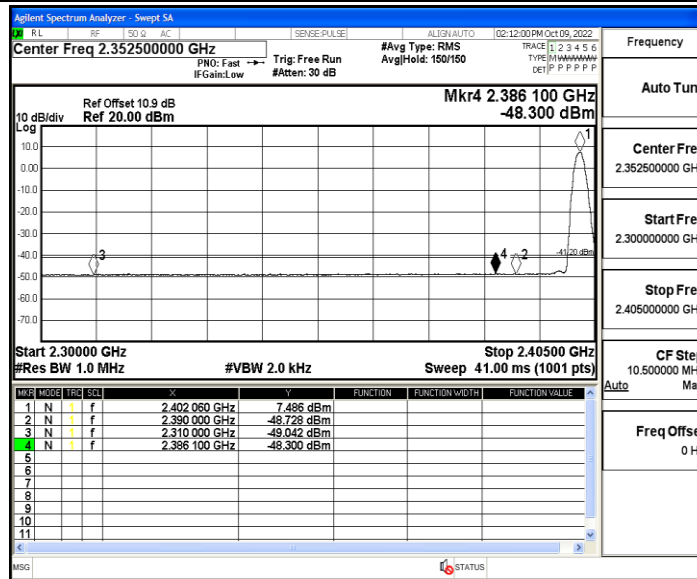
TestMode	Antenna	ChName	Channel	Detector	Freq. [MHz]	Result [dBm]	Limit [dBm]	Verdict
BLE_1M	Ant1	Low	2402	AV	2310.000	-49.04	≤-41.20	PASS
				AV	2386.100	-48.3	≤-41.20	PASS
				AV	2390.000	-48.73	≤-41.20	PASS
				Peak	2310.000	-42.71	≤-21.20	PASS
				Peak	2387.780	-39.41	≤-21.20	PASS
				Peak	2390.000	-41.82	≤-21.20	PASS
		High	2480	AV	2483.500	-46.59	≤-41.20	PASS
				AV	2483.520	-46.59	≤-41.20	PASS
				AV	2500.000	-48.08	≤-41.20	PASS
				Peak	2483.500	-40.23	≤-21.20	PASS
				Peak	2487.040	-38.63	≤-21.20	PASS
				Peak	2500.000	-39.72	≤-21.20	PASS
BLE_2M	Ant1	Low	2402	AV	2310.000	-48.58	≤-41.20	PASS
				AV	2389.565	-47.98	≤-41.20	PASS
				AV	2390.000	-48.6	≤-41.20	PASS
				Peak	2310.000	-42.79	≤-21.20	PASS
				Peak	2344.310	-38.94	≤-21.20	PASS
				Peak	2390.000	-41.33	≤-21.20	PASS
		High	2480	AV	2483.500	-43.15	≤-41.20	PASS
				AV	2483.520	-43.15	≤-41.20	PASS
				AV	2500.000	-47.59	≤-41.20	PASS
				Peak	2483.500	-39.48	≤-21.20	PASS
				Peak	2484.560	-36.03	≤-21.20	PASS
				Peak	2500.000	-40.89	≤-21.20	PASS

Note:

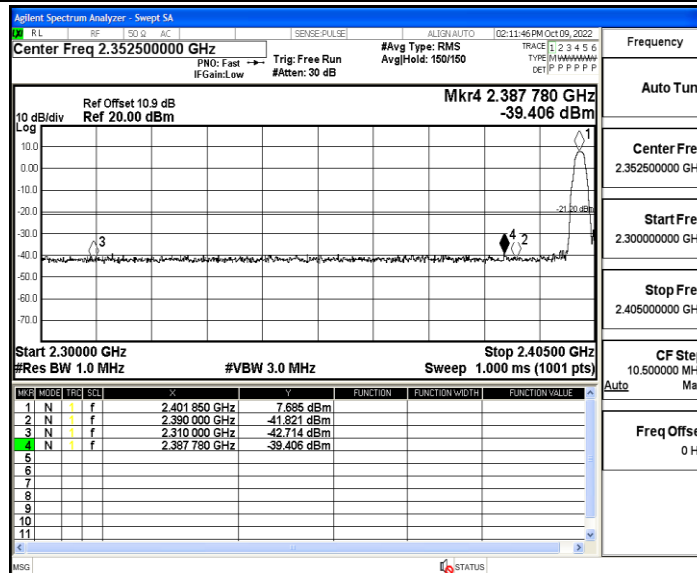
1. The Antenna Gain is compensated in the graph with 2dBi and Antenna Gain which is Higher.
2. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

Test Graphs

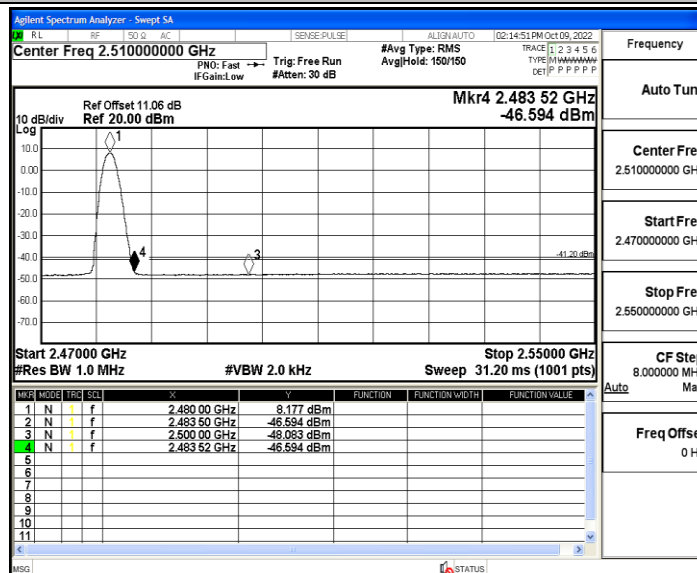
BLE_1M_Ant1_Low_2402_AV



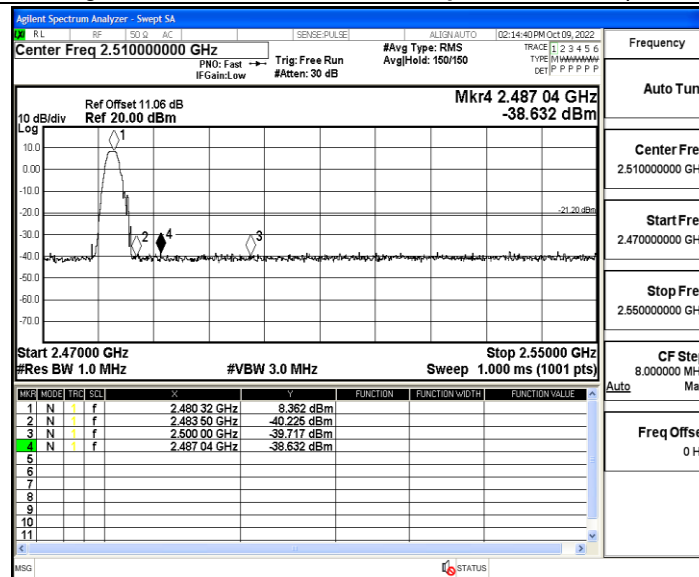
BLE_1M_Ant1_Low_2402_Peak



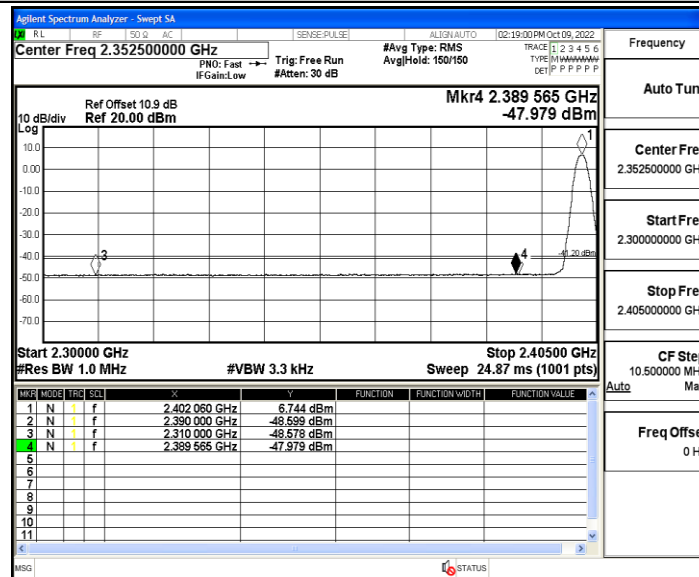
BLE_1M_Ant1_High_2480_AV



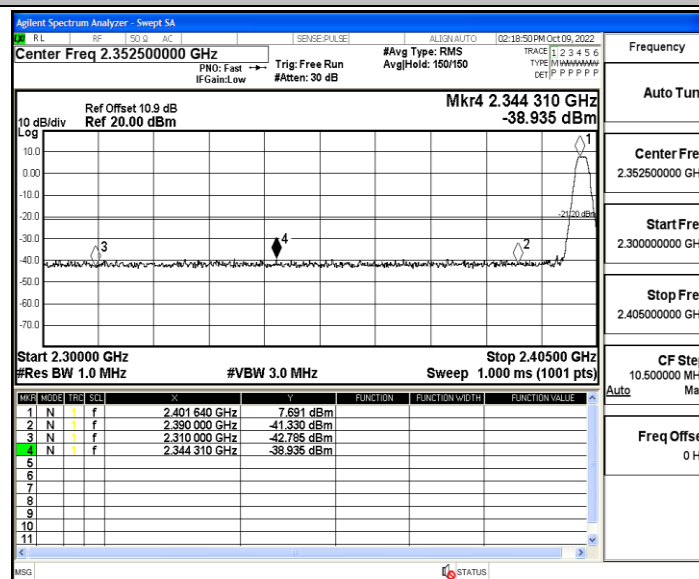
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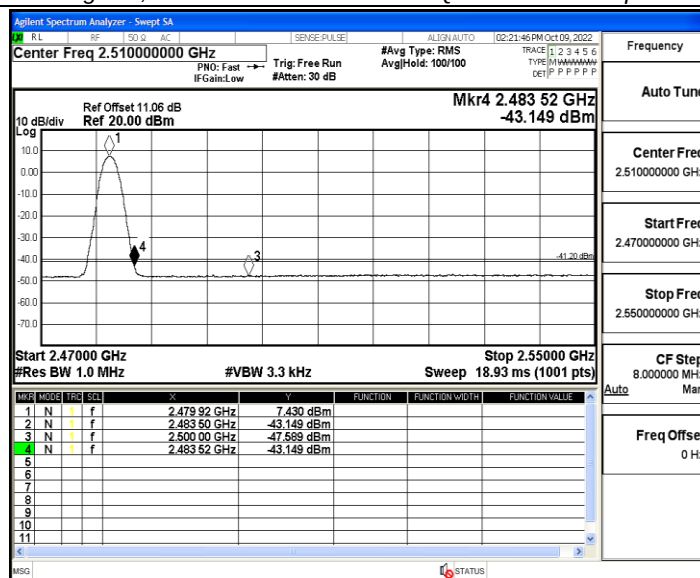
BLE_2M_Ant1_Low_2402_AV



BLE_2M_Ant1_Low_2402_Peak



BLE_2M_Ant1_High_2480_AV



BLE_2M_Ant1_High_2480_Peak

