



Appendix B

RF Test Data for 2.4G BLE (Conducted Measurement)

Product Name: TWS Headphones

Test Model: E05

Environmental Conditions

Temperature:	23.4° C
Relative Humidity:	51.3%
ATM Pressure:	100.0 kPa
Test Engineer:	monkey.Li
Supervised by:	Lihm



Appendix B.1: Duty Cycle

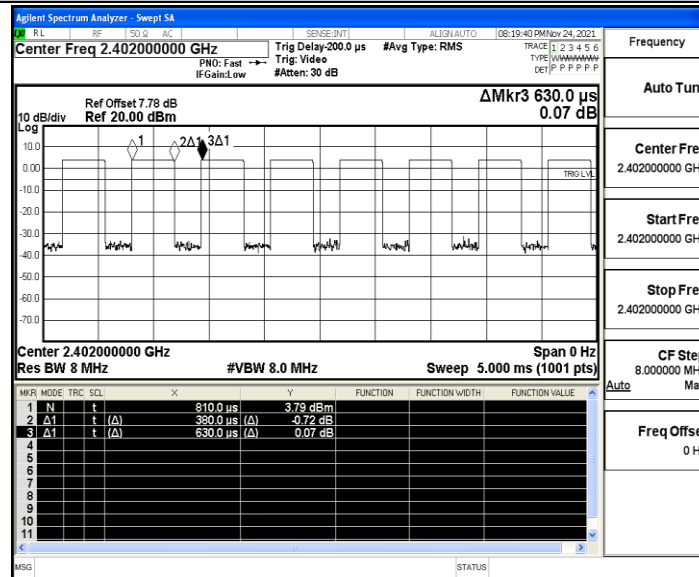
Test Result

TestMode	Antenna	Channel	ON Time [ms]	Period [ms]	X	DC [%]	xFactor	Limit	Verdict
BLE_1M	Ant1	2402	0.38	0.63	0.6032	60.32	2.20	---	PASS
		2440	0.38	0.63	0.6032	60.32	2.20	---	PASS
		2480	0.38	0.63	0.6032	60.32	2.20	---	PASS
BLE_2M	Ant1	2402	1.06	2.50	0.4240	42.40	3.73	---	PASS
		2440	1.07	2.50	0.4280	42.80	3.69	---	PASS
		2480	1.07	2.50	0.4280	42.80	3.69	---	PASS

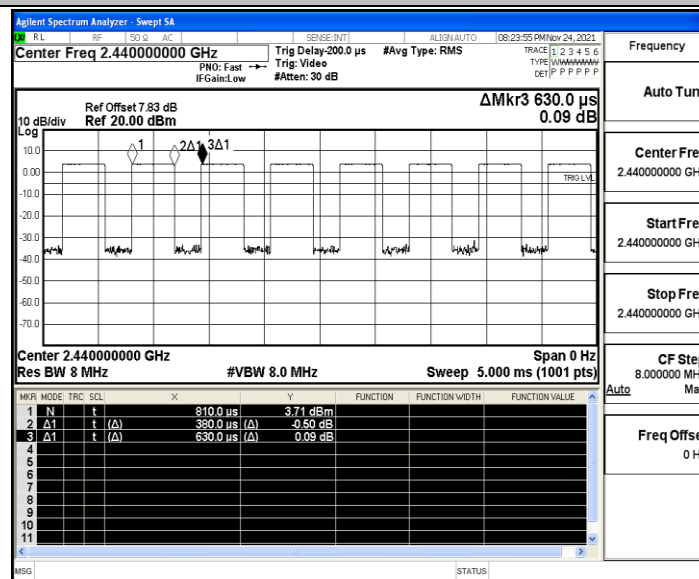


Test Graphs

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440





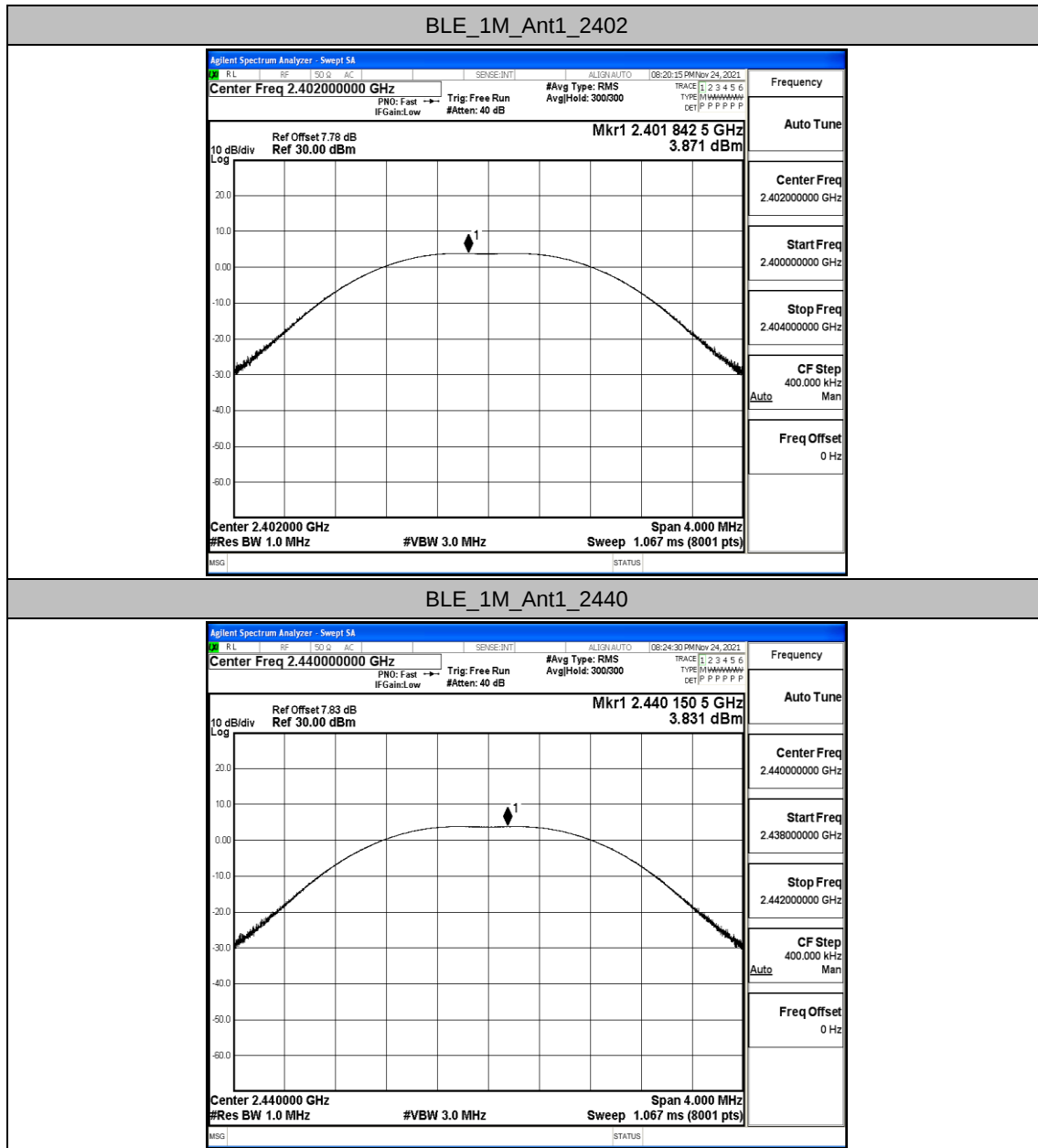
Appendix B.2: Maximum conducted output power

Test Result

TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	3.87	≤30	PASS
		2440	3.83	≤30	PASS
		2480	3.67	≤30	PASS
BLE_2M	Ant1	2402	4.98	≤30	PASS
		2440	4.97	≤30	PASS
		2480	4.80	≤30	PASS

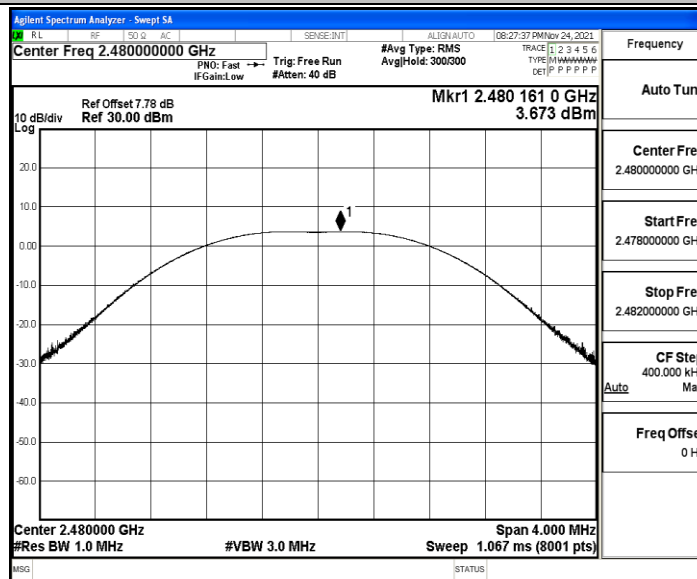


Test Graphs

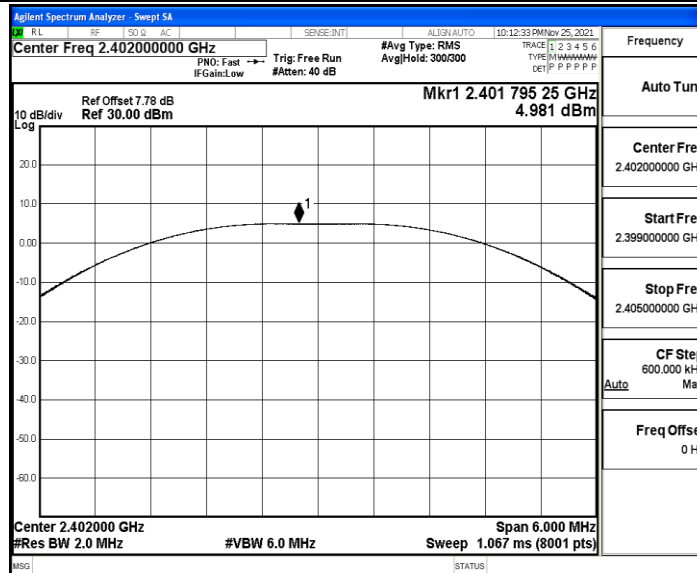




BLE_1M_Ant1_2480

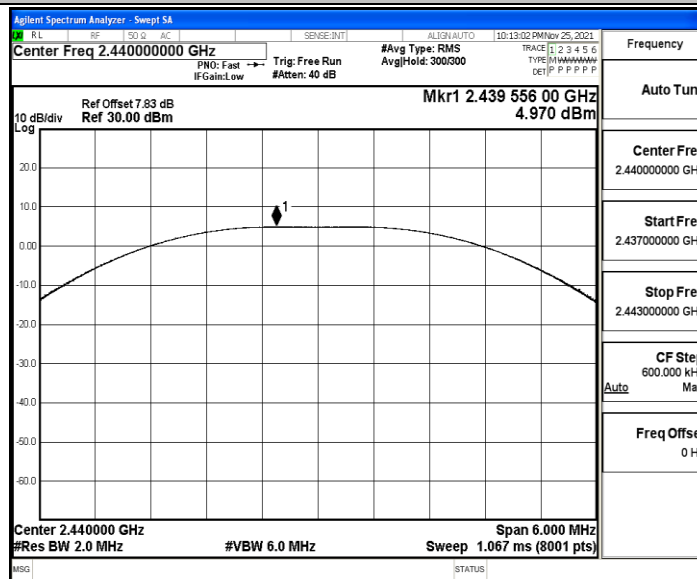


BLE_2M_Ant1_2402

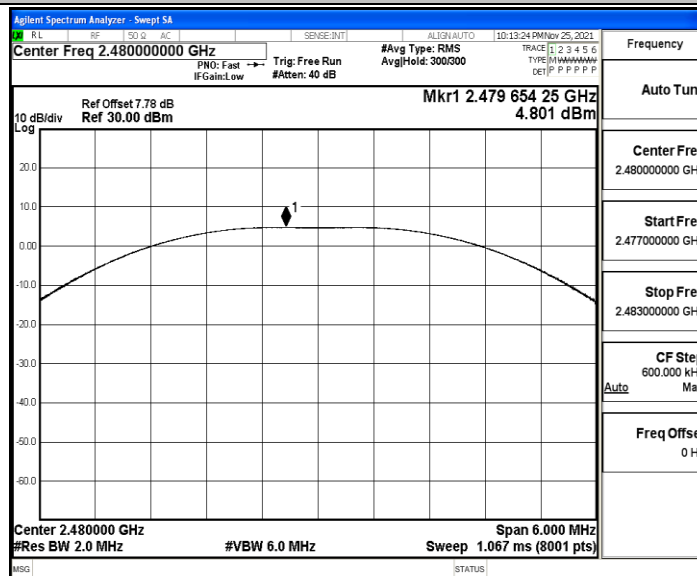




BLE_2M_Ant1_2440



BLE_2M_Ant1_2480





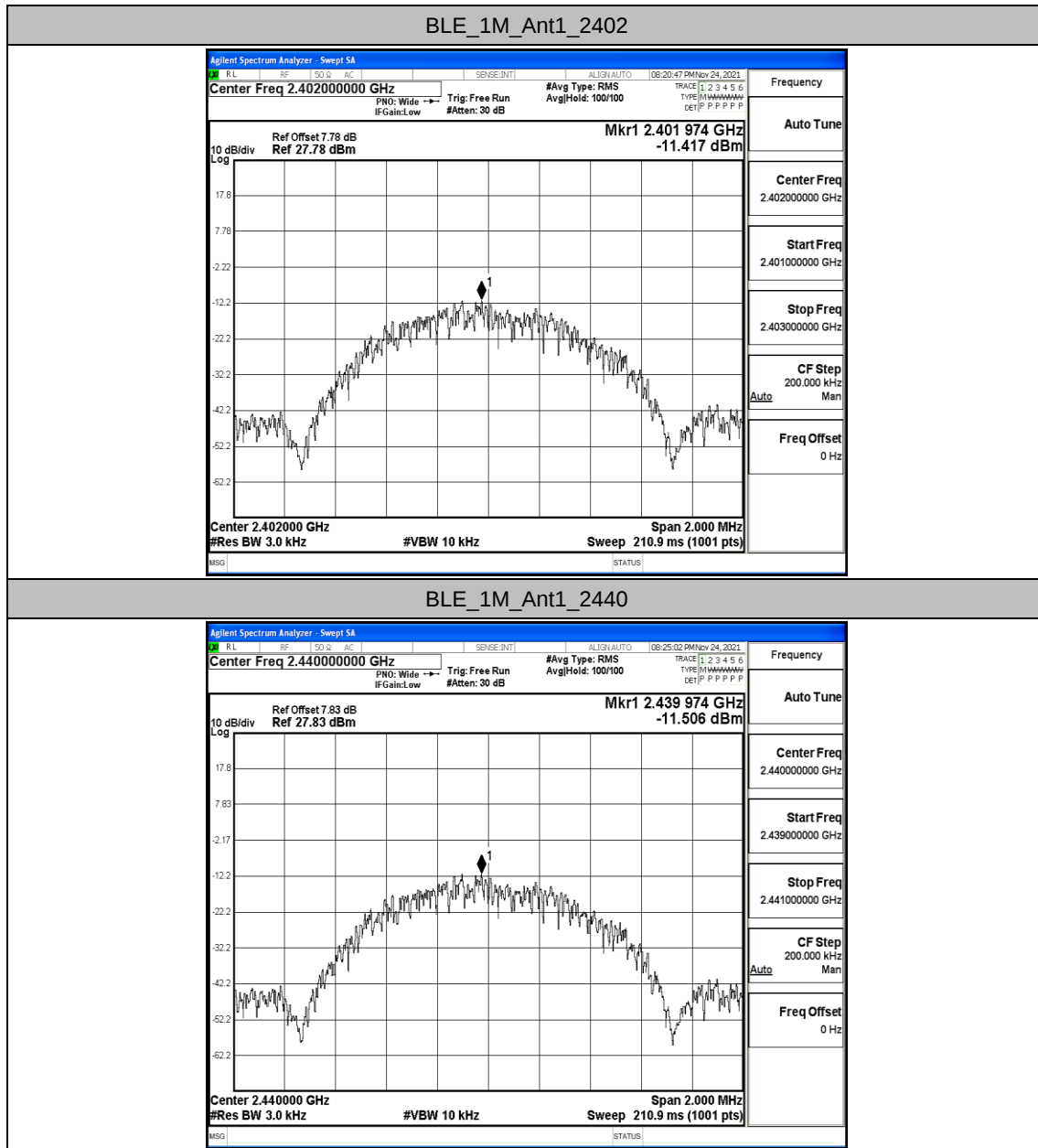
Appendix B.3: Maximum power spectral density

Test Result

TestMode	Antenna	Channel	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-11.42	≤8	PASS
		2440	-11.51	≤8	PASS
		2480	-11.58	≤8	PASS
BLE_2M	Ant1	2402	-12.61	≤8	PASS
		2440	-12.71	≤8	PASS
		2480	-12.73	≤8	PASS

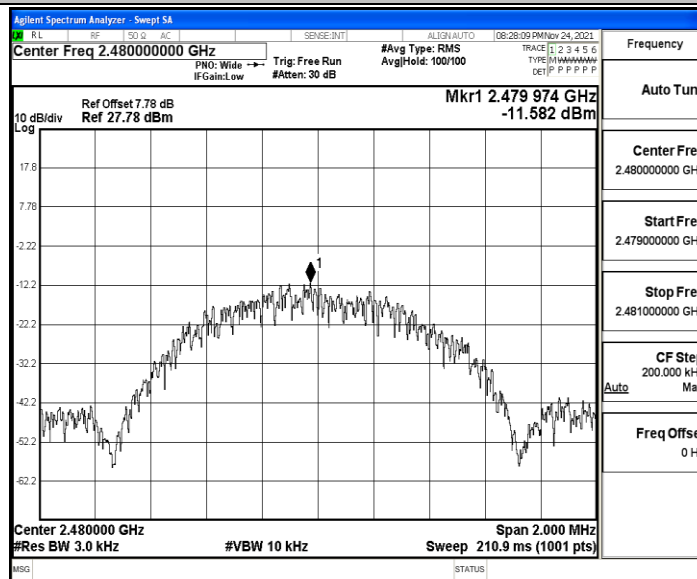


Test Graphs

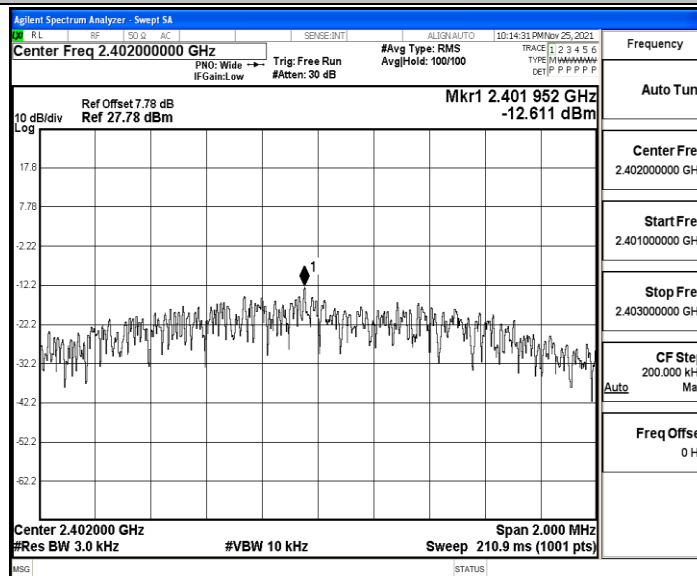




BLE_1M_Ant1_2480

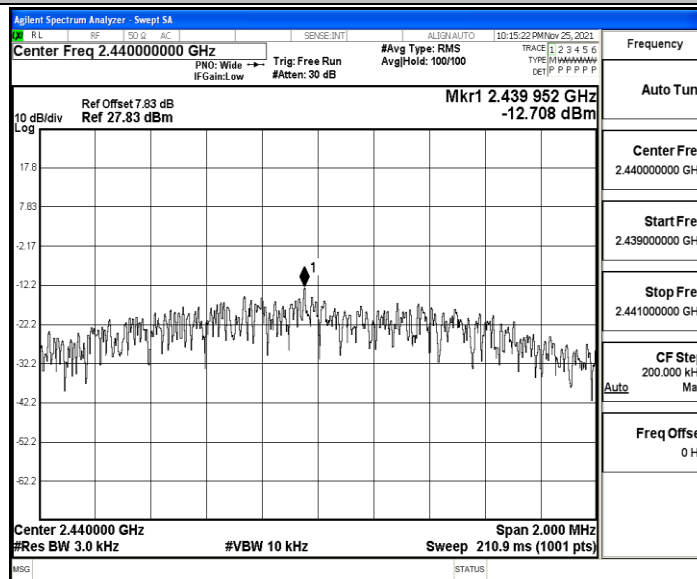


BLE_2M_Ant1_2402

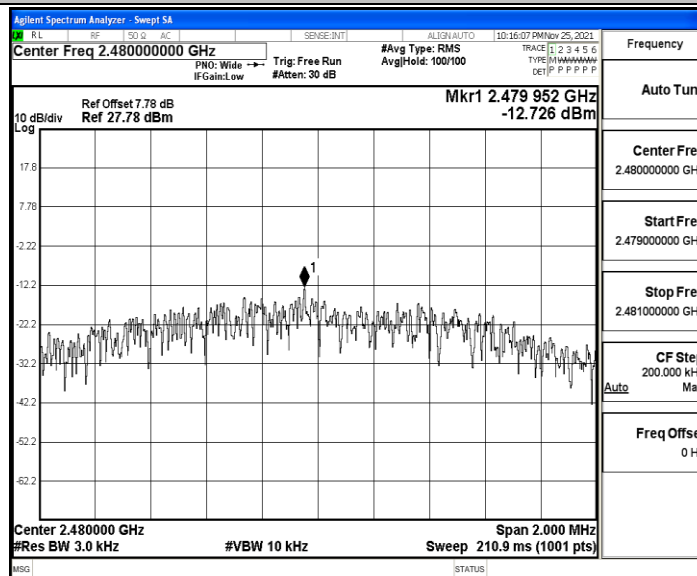




BLE_2M_Ant1_2440



BLE_2M_Ant1_2480





Appendix B.4.1: DTS Bandwidth

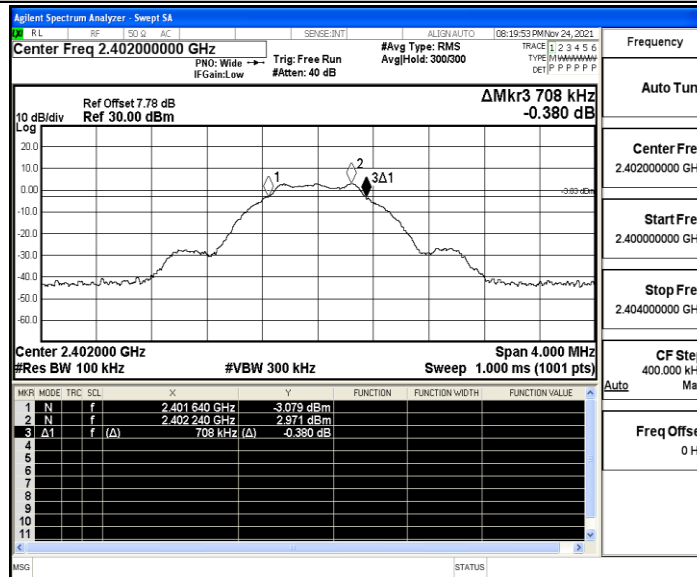
Test Result

TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.708	2401.640	2402.348	≥0.5	PASS
		2440	0.712	2439.636	2440.348	≥0.5	PASS
		2480	0.716	2479.636	2480.352	≥0.5	PASS
BLE_2M	Ant1	2402	1.276	2401.328	2402.604	≥0.5	PASS
		2440	1.260	2439.336	2440.596	≥0.5	PASS
		2480	1.252	2479.348	2480.600	≥0.5	PASS

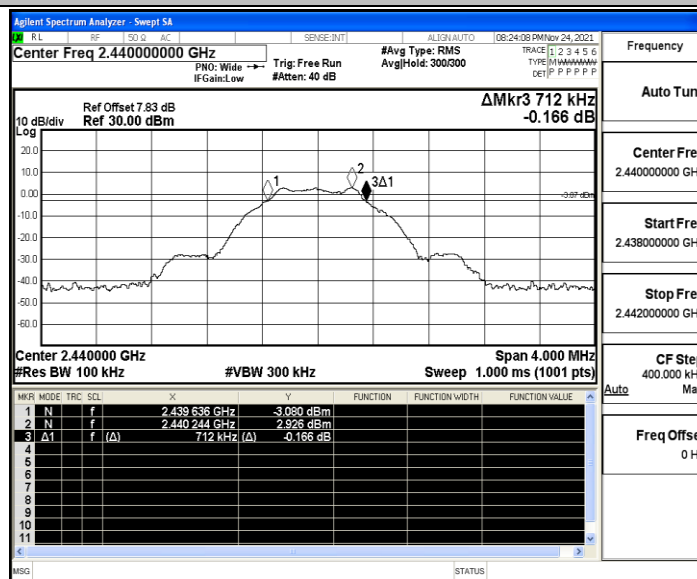


Test Graphs

BLE_1M_Ant1_2402

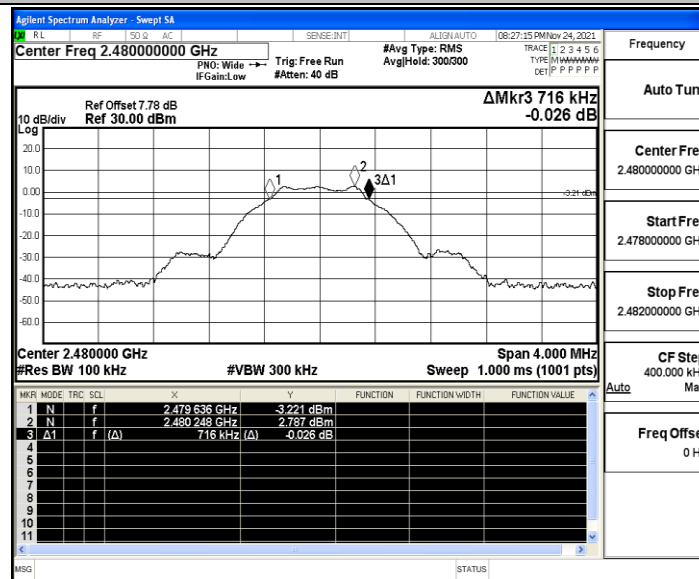


BLE_1M_Ant1_2440

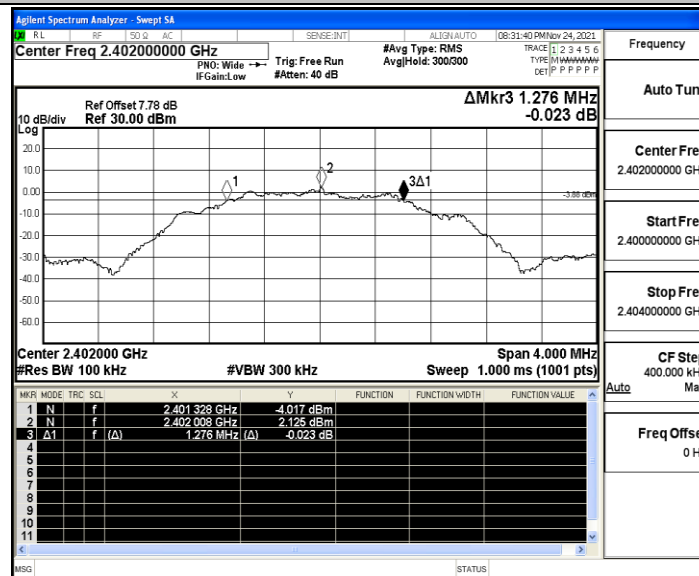




BLE_1M_Ant1_2480

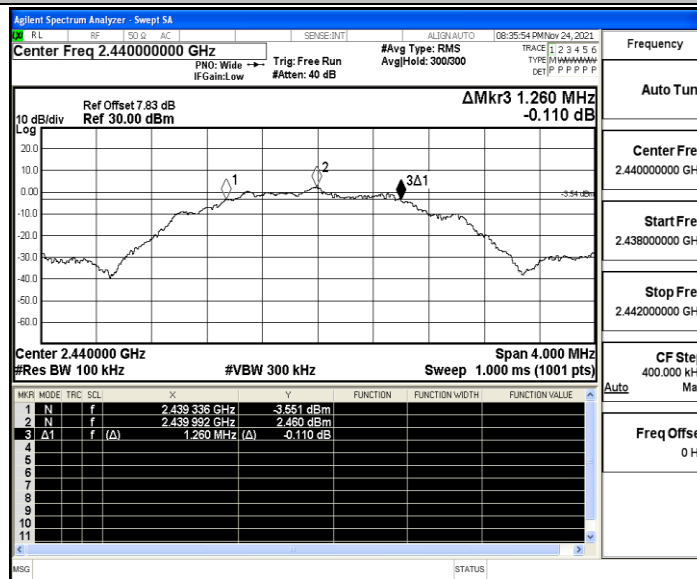


BLE_2M_Ant1_2402

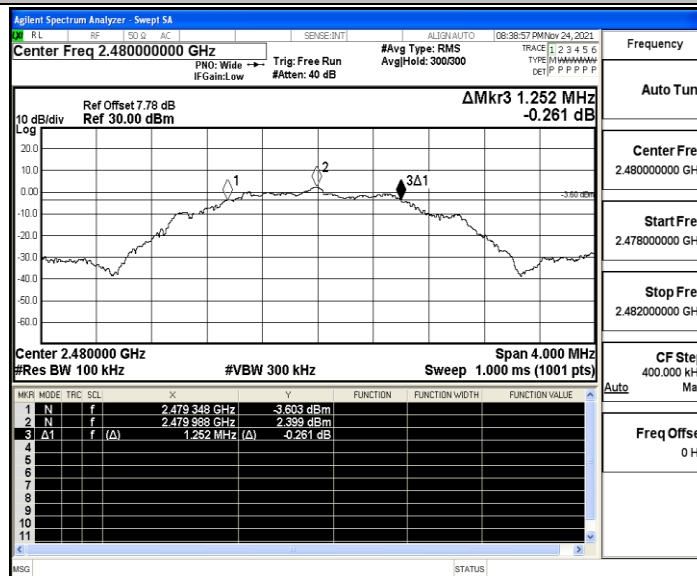




BLE_2M_Ant1_2440



BLE_2M_Ant1_2480





Appendix B.4.2: Occupied Channel Bandwidth

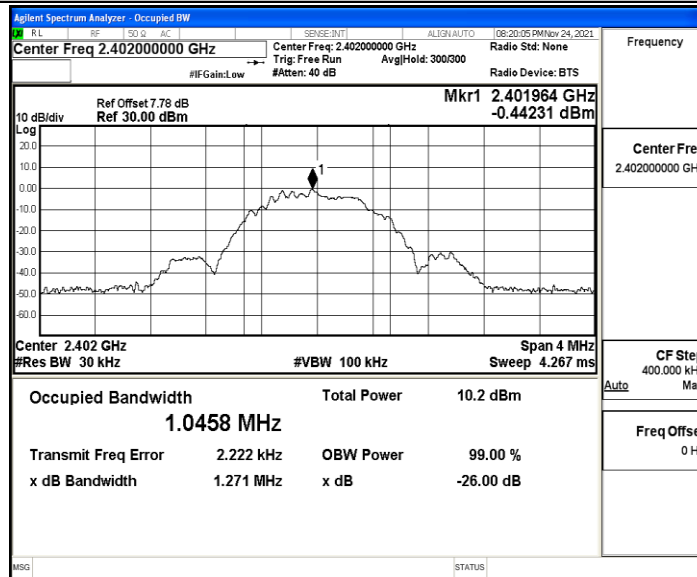
Test Result

TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	1.0458	2401.479	2402.525	---	PASS
		2440	1.0452	2439.480	2440.525	---	PASS
		2480	1.0436	2479.481	2480.524	---	PASS
BLE_2M	Ant1	2402	2.0661	2400.986	2403.053	---	PASS
		2440	2.0673	2438.985	2441.052	---	PASS
		2480	2.0659	2478.986	2481.052	---	PASS

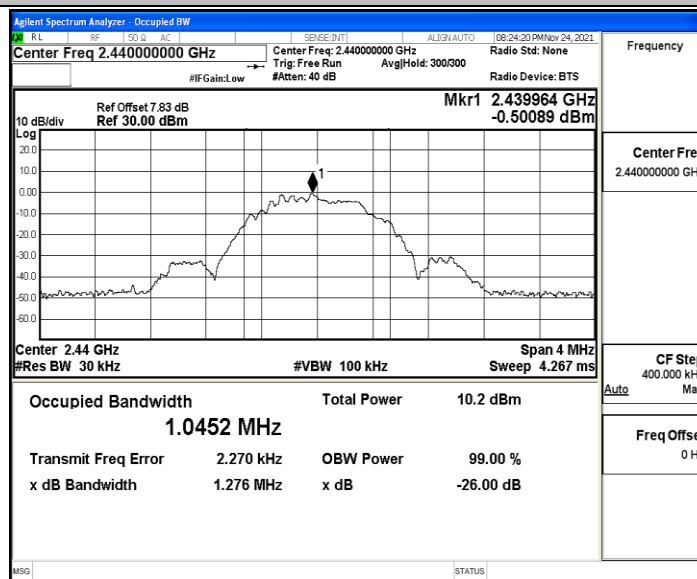


Test Graphs

BLE_1M_Ant1_2402

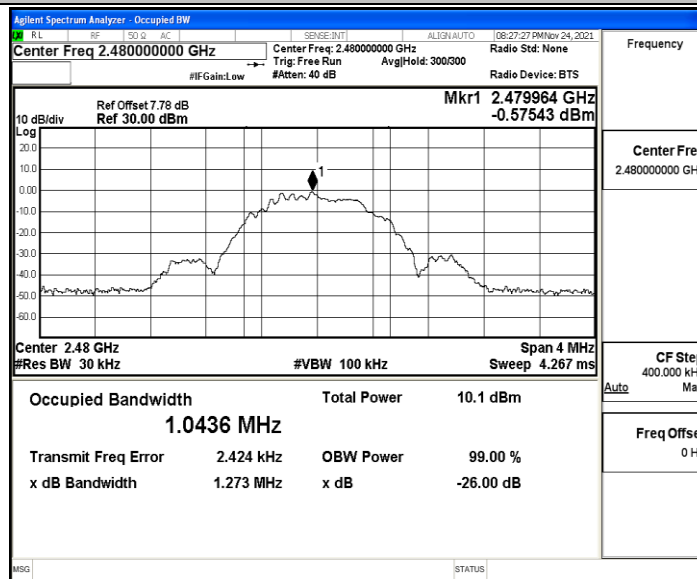


BLE_1M_Ant1_2440

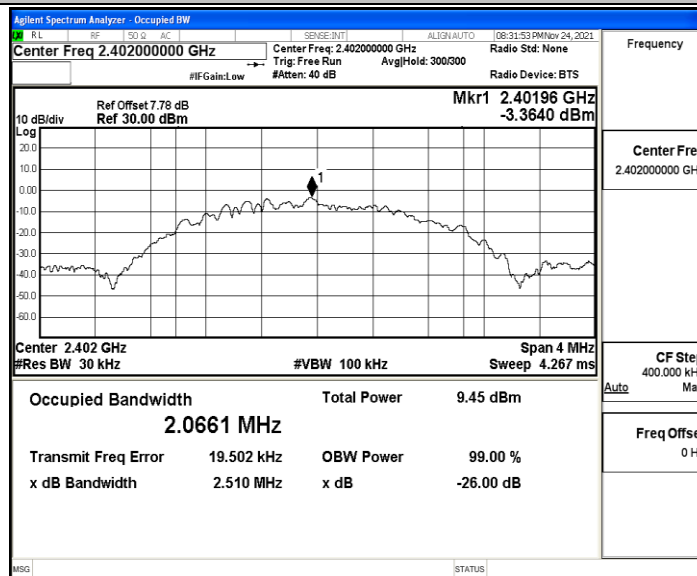




BLE_1M_Ant1_2480

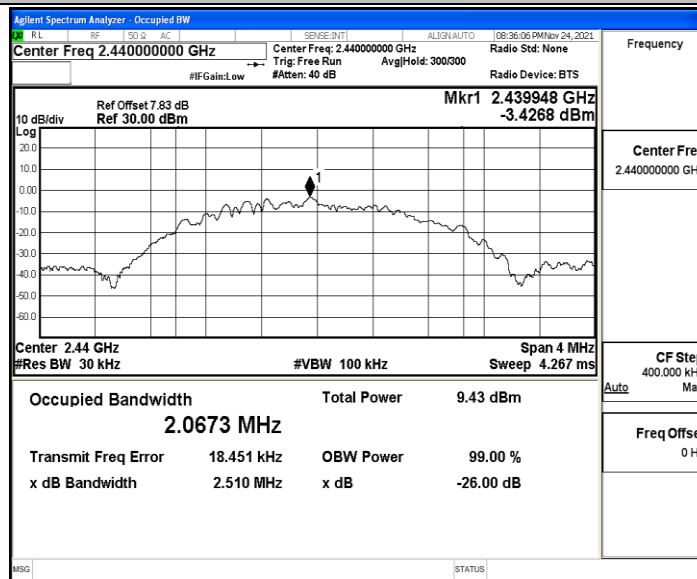


BLE_2M_Ant1_2402

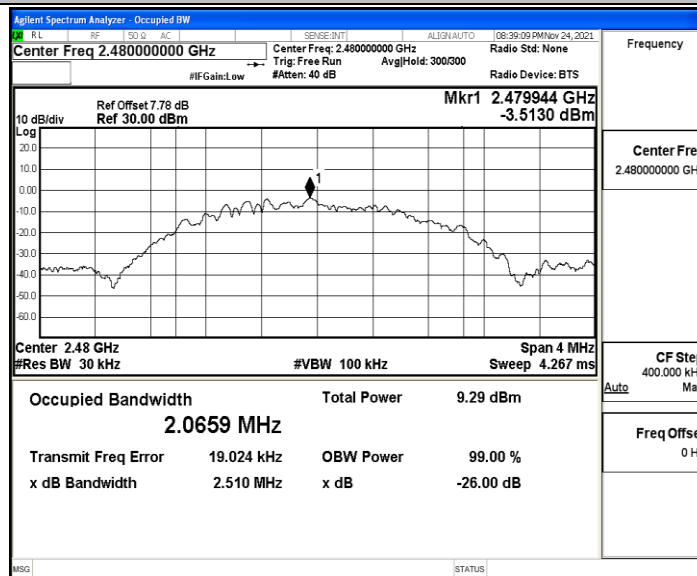




BLE_2M_Ant1_2440



BLE_2M_Ant1_2480





Appendix B.5: Band edge measurements

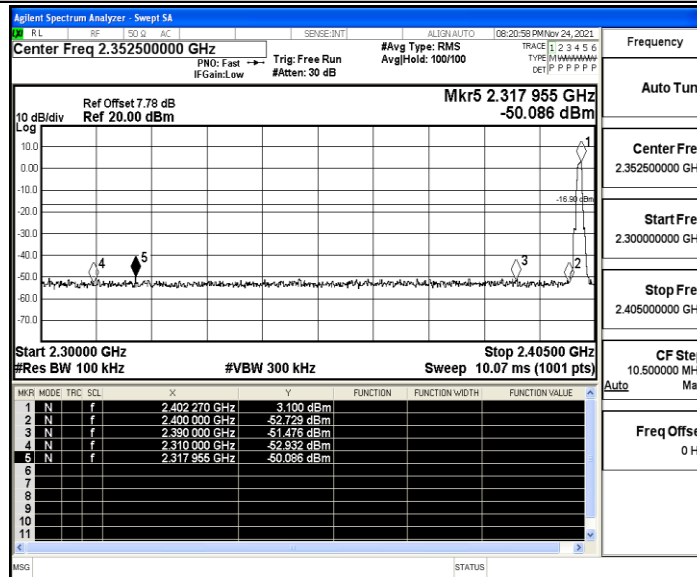
Test Result

TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	3.10	-50.09	≤ -16.9	PASS
		High	2480	2.88	-49.22	≤ -17.12	PASS
BLE_2M	Ant1	Low	2402	2.52	-29.13	≤ -17.48	PASS
		High	2480	0.57	-49.58	≤ -19.43	PASS

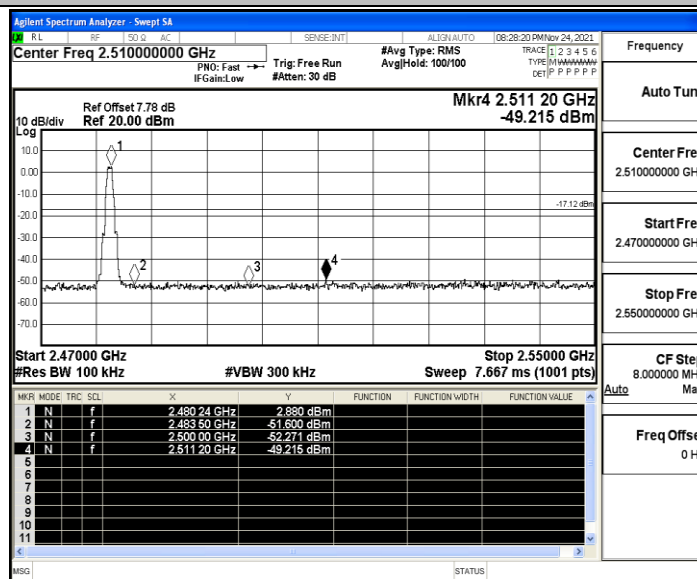


Test Graphs

BLE_1M_Ant1_Low_2402

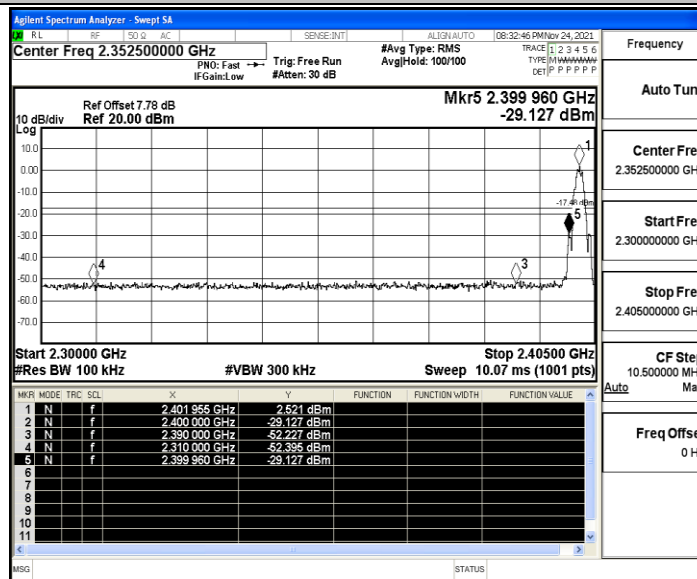


BLE_1M_Ant1_High_2480

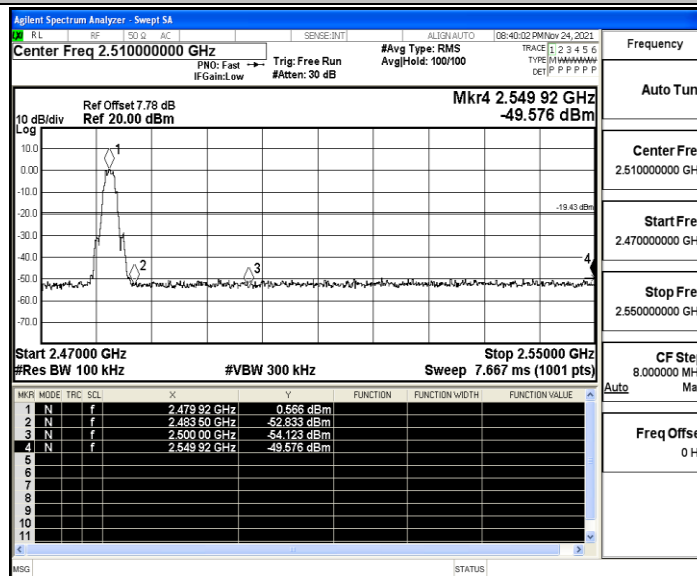




BLE_2M_Ant1_Low_2402



BLE_2M_Ant1_High_2480





Appendix B.6: Conducted Spurious Emission

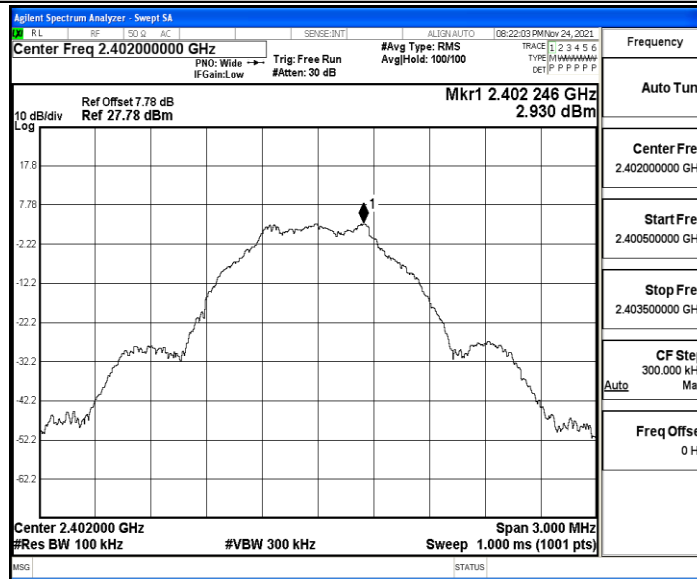
Test Result

TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	2.93	2.93	---	PASS
			30~1000	2.93	-61.07	≤ -17.07	PASS
			1000~26500	2.93	-47.12	≤ -17.07	PASS
		2440	Reference	2.88	2.88	---	PASS
			30~1000	2.88	-61.52	≤ -17.12	PASS
			1000~26500	2.88	-46.66	≤ -17.12	PASS
		2480	Reference	2.75	2.75	---	PASS
			30~1000	2.75	-61.79	≤ -17.25	PASS
			1000~26500	2.75	-46.89	≤ -17.25	PASS
BLE_2M	Ant1	2402	Reference	2.48	2.48	---	PASS
			30~1000	2.48	-61.14	≤ -17.52	PASS
			1000~26500	2.48	-46.62	≤ -17.52	PASS
		2440	Reference	2.50	2.50	---	PASS
			30~1000	2.50	-43.84	≤ -17.5	PASS
			1000~26500	2.50	-46.76	≤ -17.5	PASS
		2480	Reference	2.38	2.38	---	PASS
			30~1000	2.38	-61.83	≤ -17.62	PASS
			1000~26500	2.38	-46.95	≤ -17.62	PASS

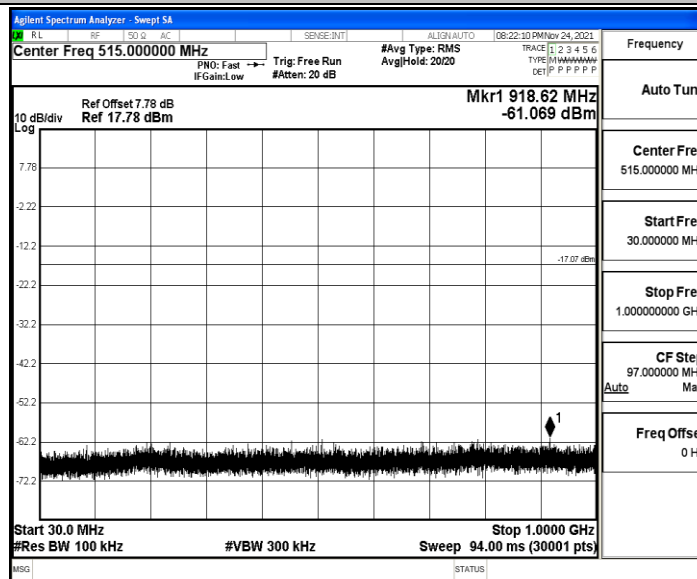


Test Graphs

BLE_1M_Ant1_2402_0~Reference

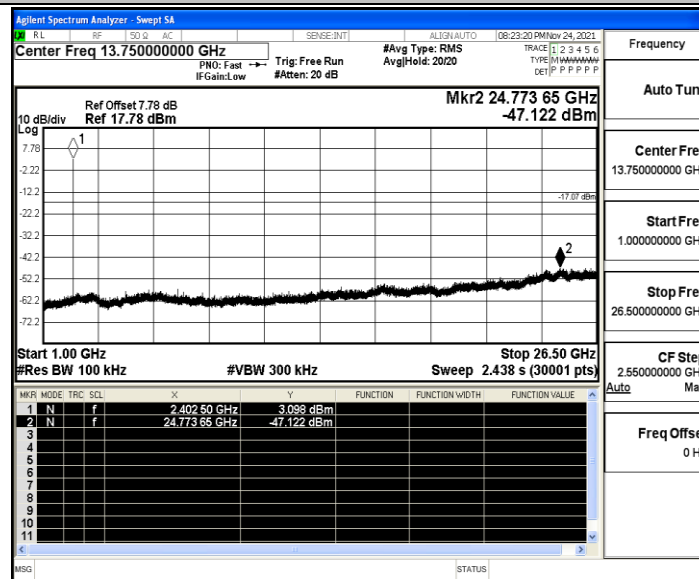


BLE_1M_Ant1_2402_30~1000

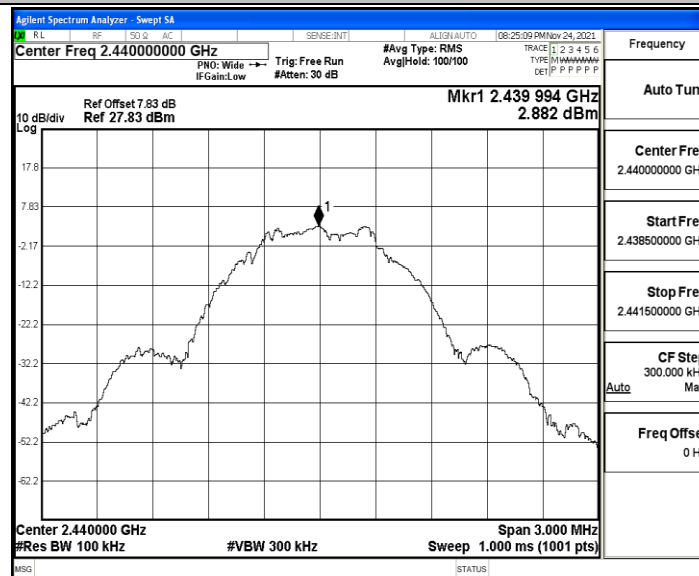




BLE_1M_Ant1_2402_1000-26500

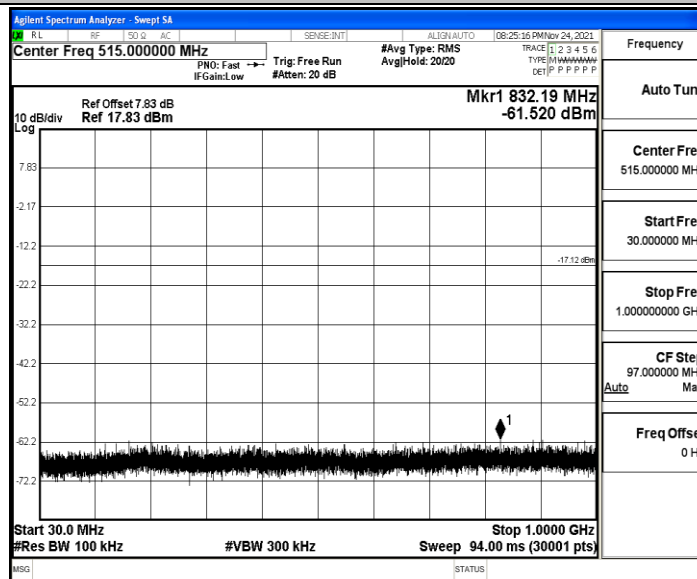


BLE_1M_Ant1_2440_0~Reference

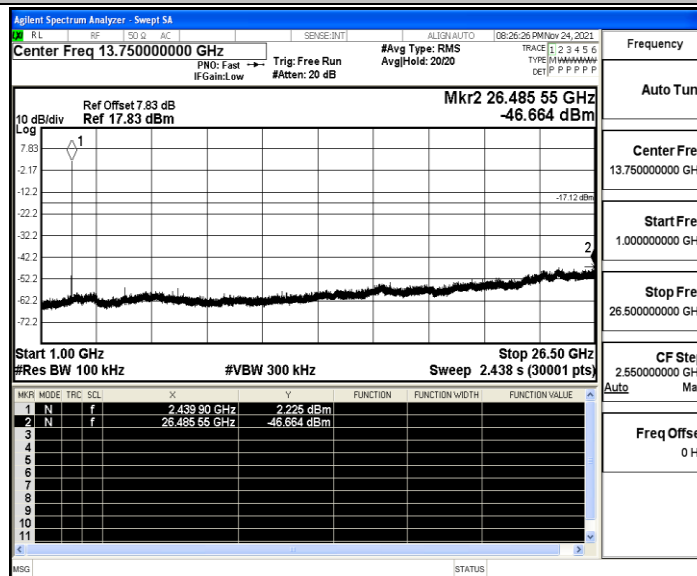




BLE_1M_Ant1_2440_30~1000

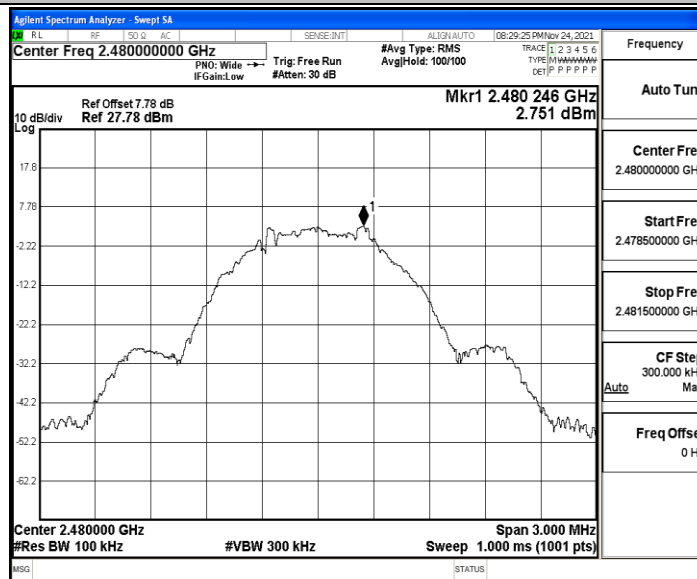


BLE_1M_Ant1_2440_1000~26500

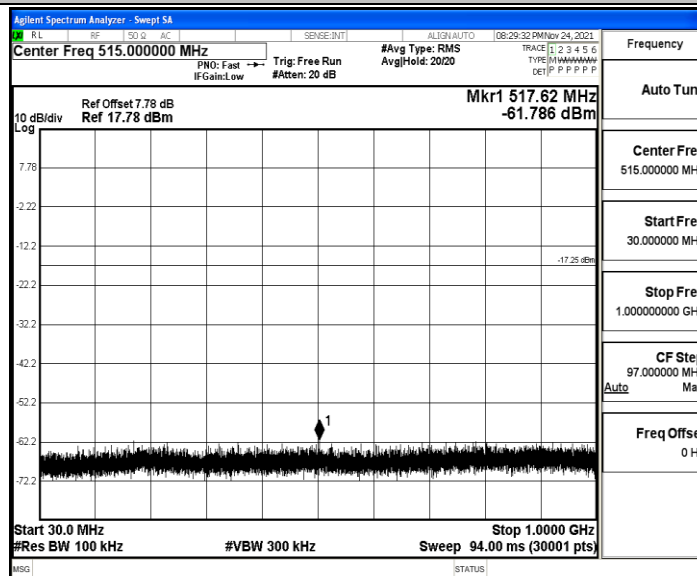




BLE_1M_Ant1_2480_0~Reference

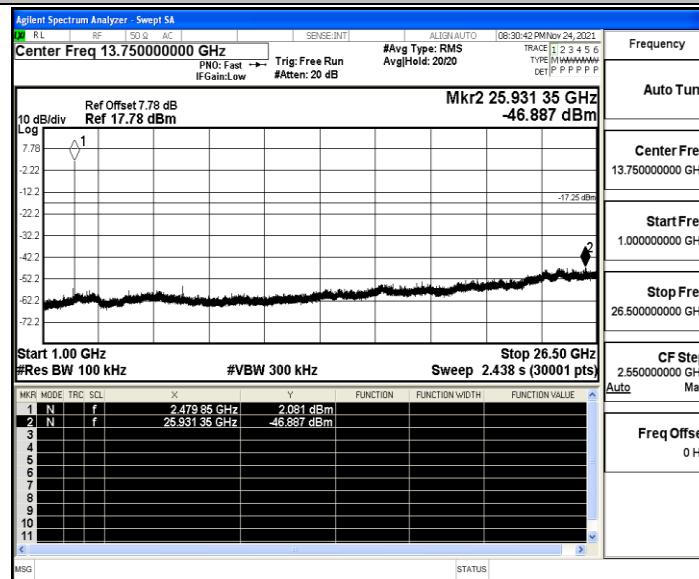


BLE_1M_Ant1_2480_30~1000

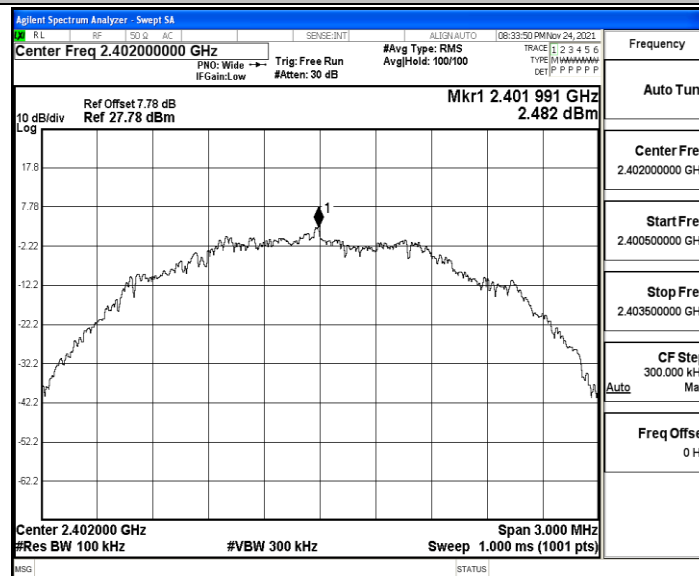




BLE_1M_Ant1_2480_1000-26500

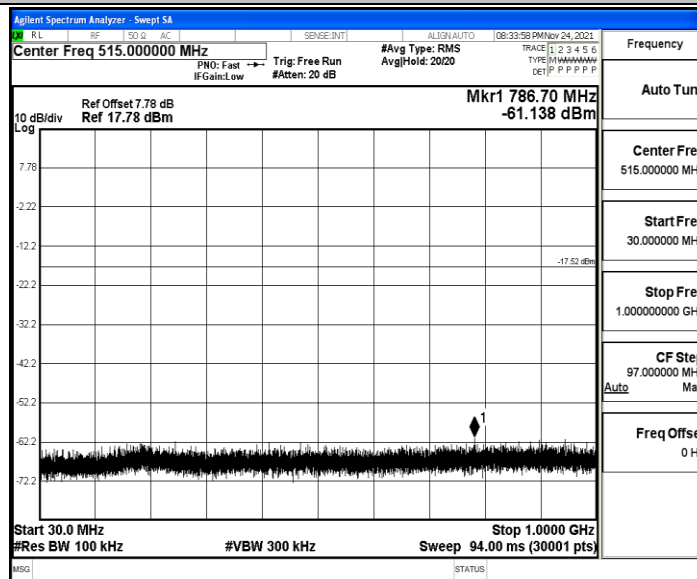


BLE_2M_Ant1_2402_0~Reference

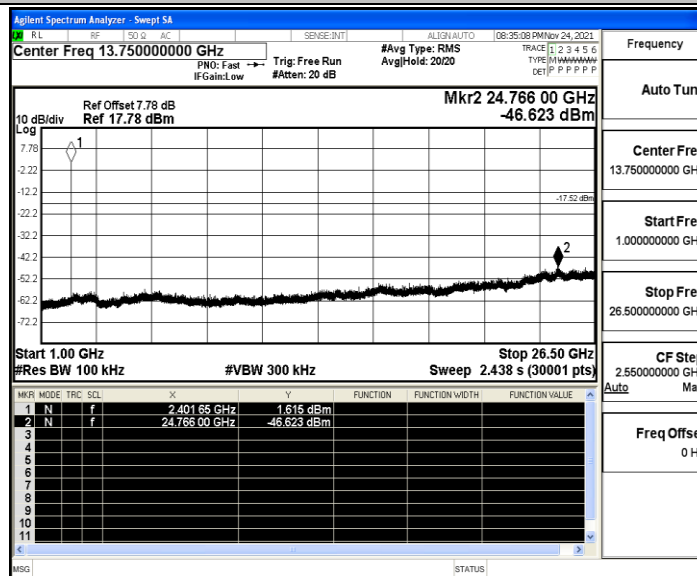




BLE_2M_Ant1_2402_30~1000

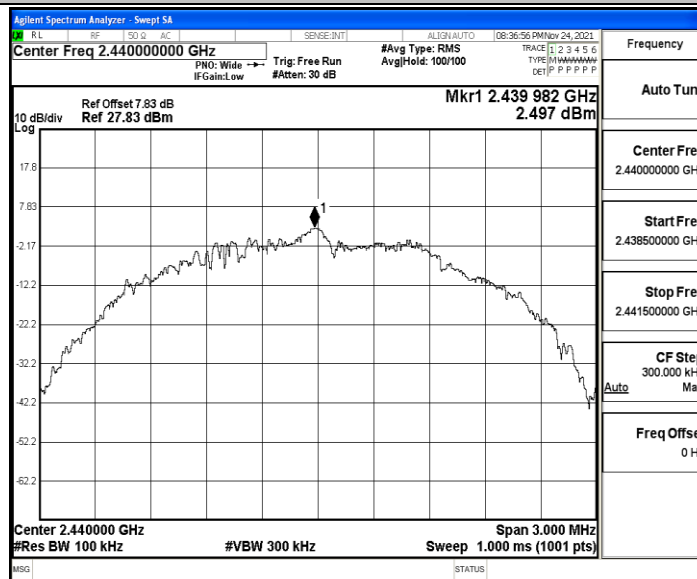


BLE_2M_Ant1_2402_1000~26500

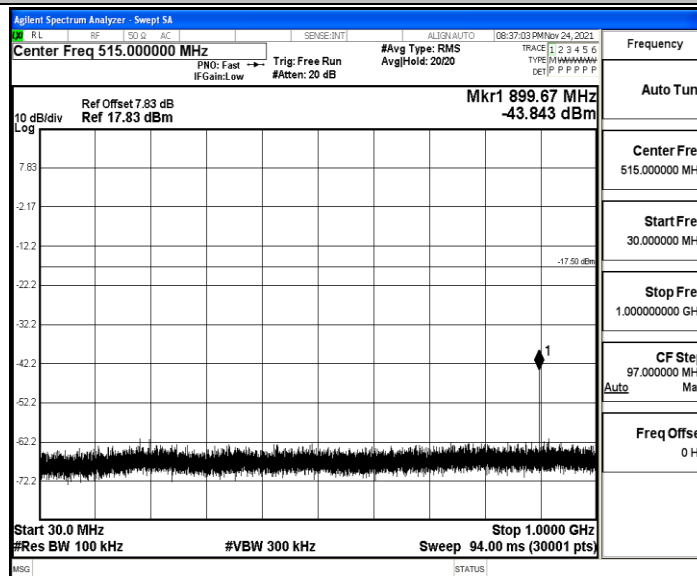




BLE_2M_Ant1_2440_0~Reference

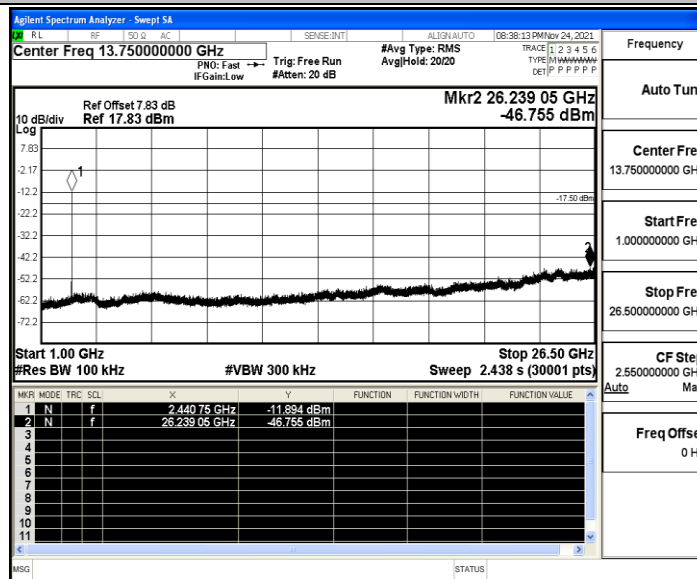


BLE_2M_Ant1_2440_30~1000

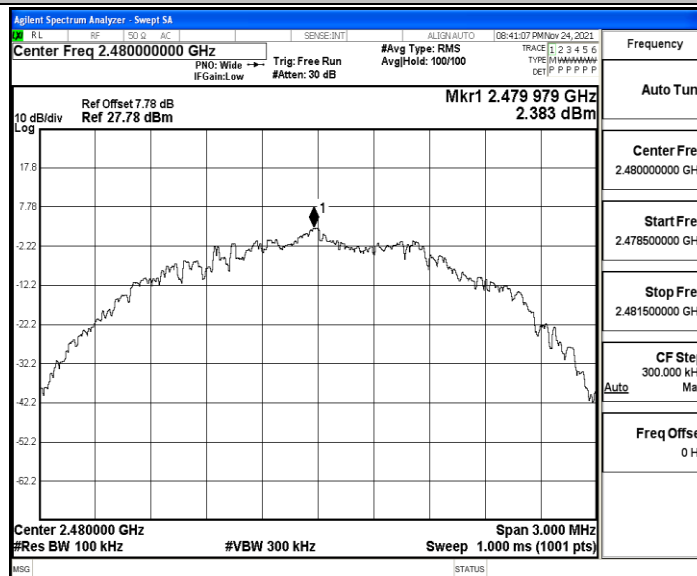




BLE_2M_Ant1_2440_1000-26500

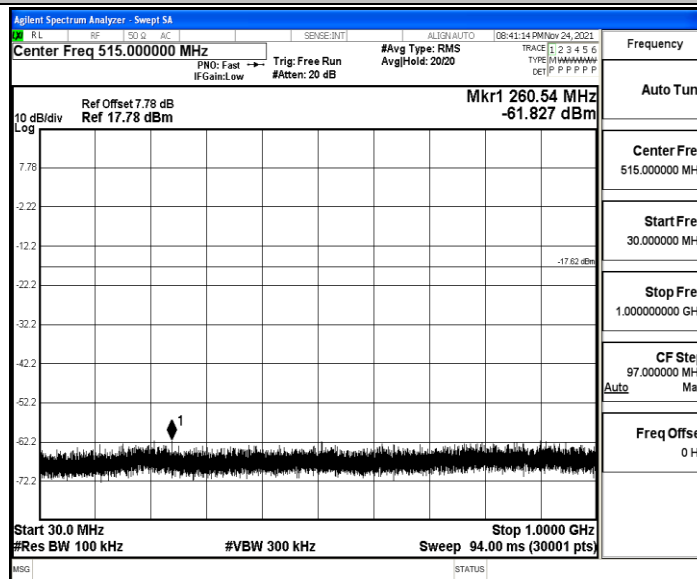


BLE_2M_Ant1_2480_0~Reference

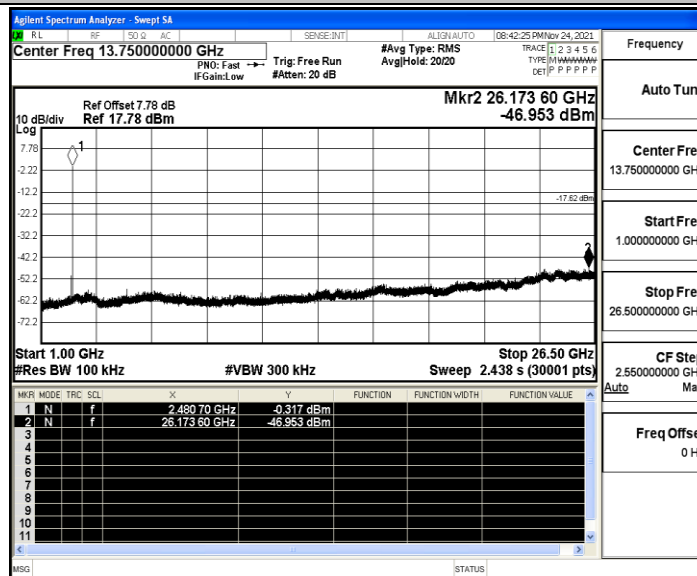




BLE_2M_Ant1_2480_30~1000



BLE_2M_Ant1_2480_1000~26500





Appendix B.7: Emissions in Restricted Bands

Test Result

TestMode	Antenna	ChName	Channel	Detector	Freq. [MHz]	Result [dBm]	Limit [dBm]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
BLE_1M	Ant1	Low	2402	AV	2310.000	-48.64	≤-41.20	46.56	≤54	PASS
				AV	2382.530	-47.58	≤-41.20	47.62	≤54	PASS
				AV	2390.000	-48.02	≤-41.20	47.18	≤54	PASS
				Peak	2310.000	-42.23	≤-21.20	52.97	≤74	PASS
				Peak	2377.805	-39.2	≤-21.20	56.00	≤74	PASS
				Peak	2390.000	-42.37	≤-21.20	52.83	≤74	PASS
		High	2480	AV	2483.500	-46.59	≤-41.20	48.61	≤54	PASS
				AV	2483.520	-46.59	≤-41.20	48.61	≤54	PASS
				AV	2500.000	-47.6	≤-41.20	47.60	≤54	PASS
				Peak	2483.500	-40.58	≤-21.20	54.62	≤74	PASS
				Peak	2493.760	-37.79	≤-21.20	57.41	≤74	PASS
				Peak	2500.000	-41.32	≤-21.20	53.88	≤74	PASS
BLE_2M	Ant1	Low	2402	AV	2310.000	-48.29	≤-41.20	46.91	≤54	PASS
				AV	2384.315	-46.92	≤-41.20	48.28	≤54	PASS
				AV	2390.000	-47.29	≤-41.20	47.91	≤54	PASS
				Peak	2310.000	-41.73	≤-21.20	53.47	≤74	PASS
				Peak	2357.015	-38.64	≤-21.20	56.56	≤74	PASS
				Peak	2390.000	-41.61	≤-21.20	53.59	≤74	PASS
		High	2480	AV	2483.500	-44.83	≤-41.20	50.37	≤54	PASS
				AV	2483.520	-44.83	≤-41.20	50.37	≤54	PASS
				AV	2500.000	-46.86	≤-41.20	48.34	≤54	PASS
				Peak	2483.500	-39.18	≤-21.20	56.02	≤74	PASS
				Peak	2484.720	-38.42	≤-21.20	56.78	≤74	PASS
				Peak	2500.000	-41.28	≤-21.20	53.92	≤74	PASS

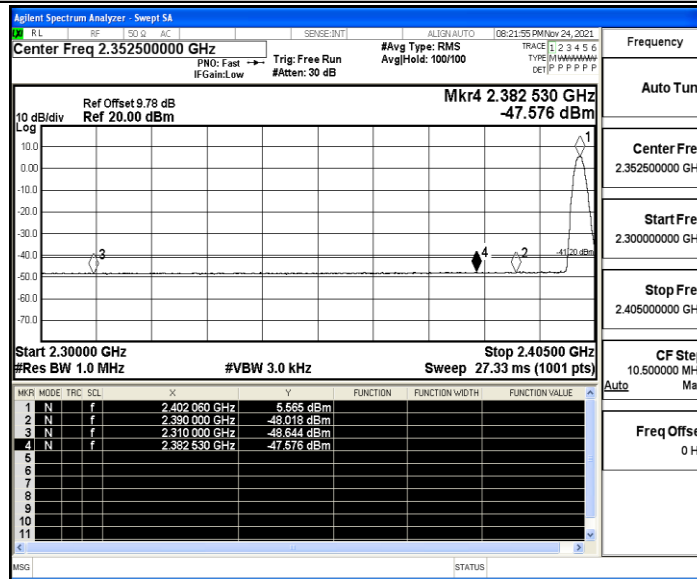
Note:

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.

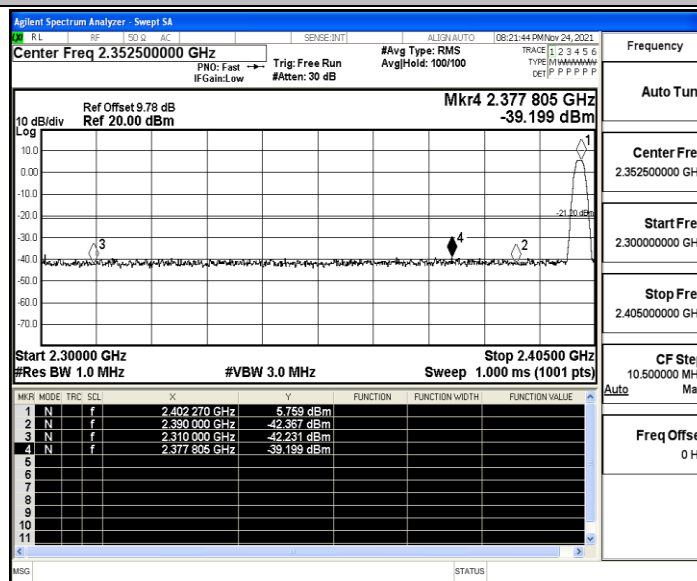


Test Graphs

BLE_1M_Ant1_Low_2402_AV

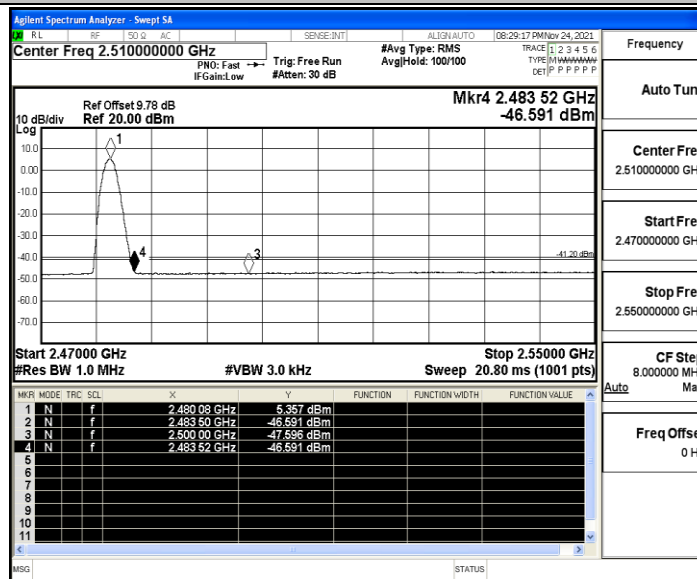


BLE_1M_Ant1_Low_2402_Peak

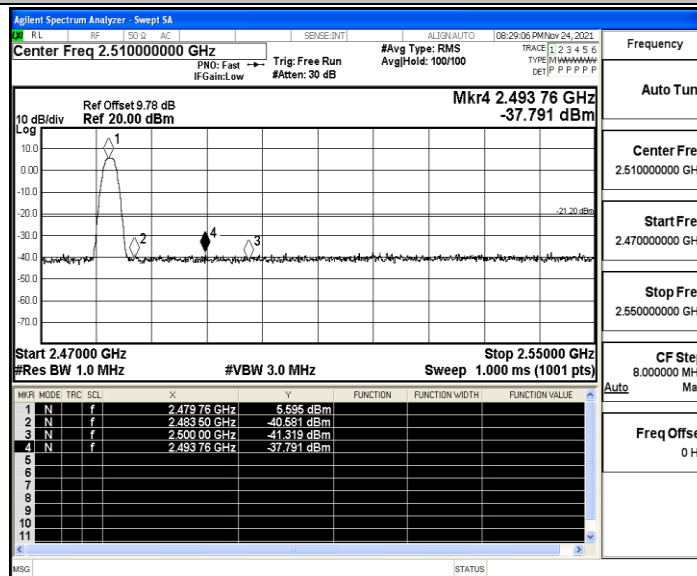




BLE_1M_Ant1_High_2480_AV

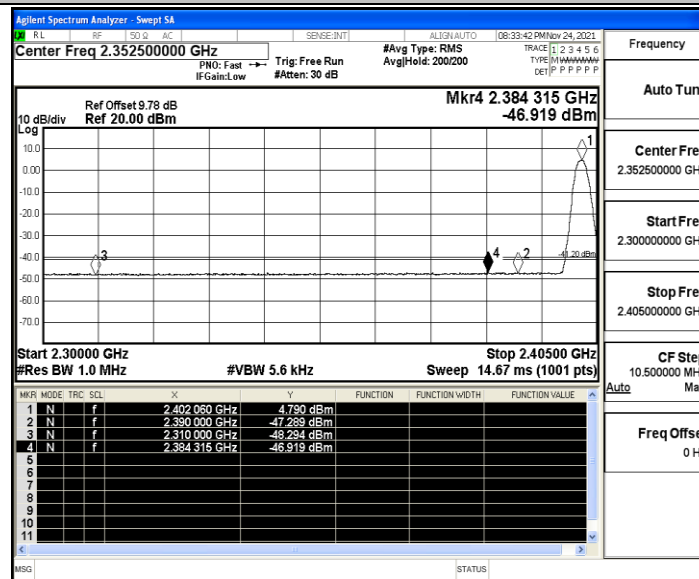


BLE_1M_Ant1_High_2480_Peak

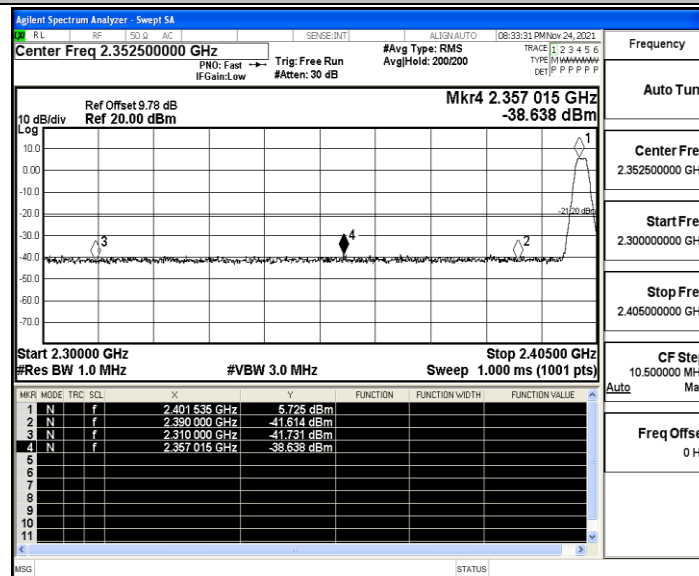




BLE_2M_Ant1_Low_2402_AV

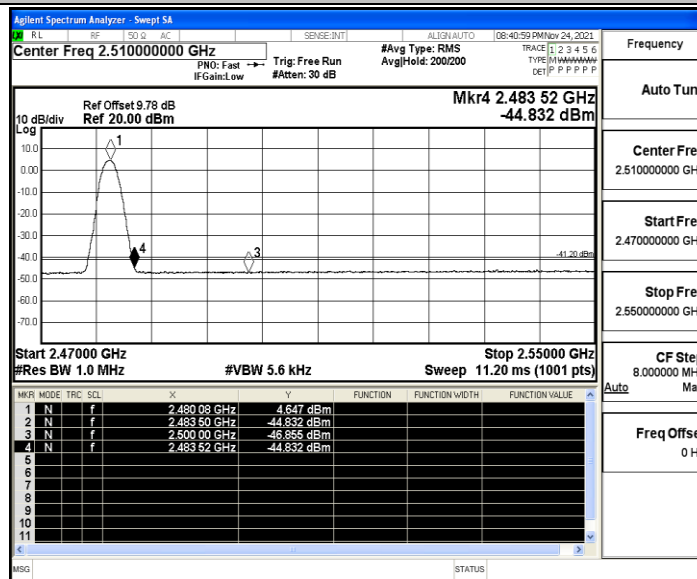


BLE_2M_Ant1_Low_2402_Peak





BLE_2M_Ant1_High_2480_AV



BLE_2M_Ant1_High_2480_Peak

