



Appendix A

RF Test Data for BLE (Conducted Measurement)

Product Name: Mibro Lite

Trade Mark: **mibro**

Test Model: XPAW004

Environmental Conditions

Temperature:	21.2 ° C
Relative Humidity:	52.3%
ATM Pressure:	100.0 kPa
Test Engineer:	Jay Li
Supervised by:	Li Huan



Appendix A.1: DTS Bandwidth

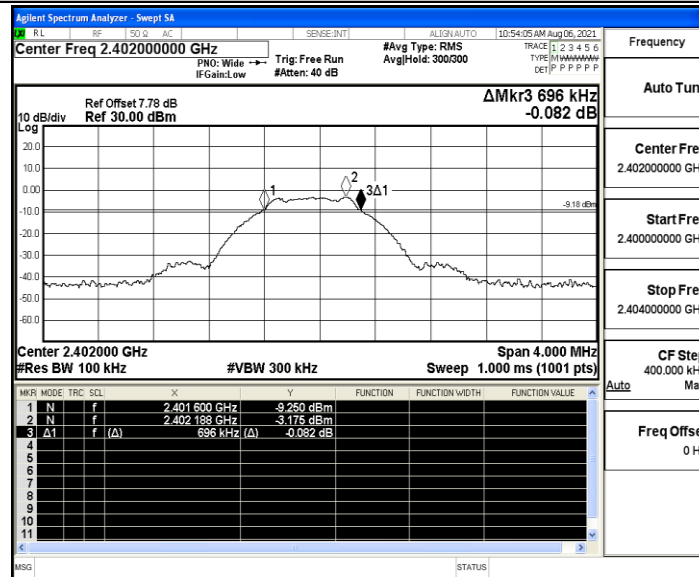
Test Result

TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.696	2401.600	2402.296	≥0.5	PASS
		2440	0.708	2439.592	2440.300	≥0.5	PASS
		2480	0.708	2479.584	2480.292	≥0.5	PASS
BLE_2M	Ant1	2402	1.372	2401.256	2402.628	≥0.5	PASS
		2440	1.244	2439.296	2440.540	≥0.5	PASS
		2480	1.244	2479.300	2480.544	≥0.5	PASS

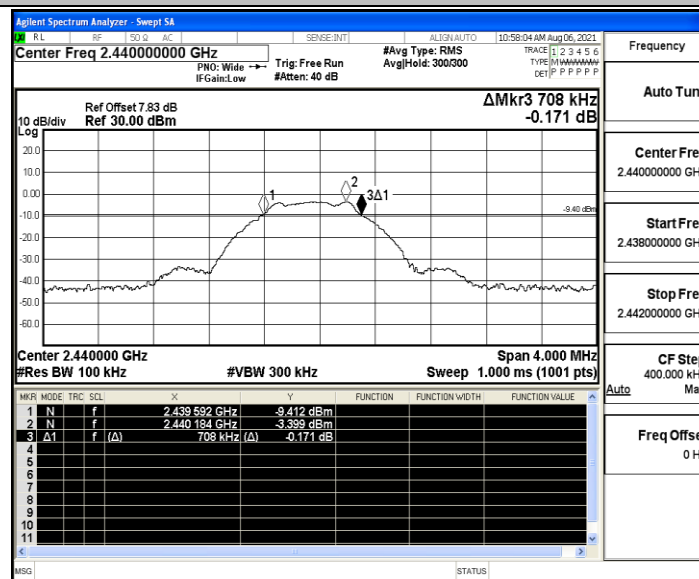


Test Graphs

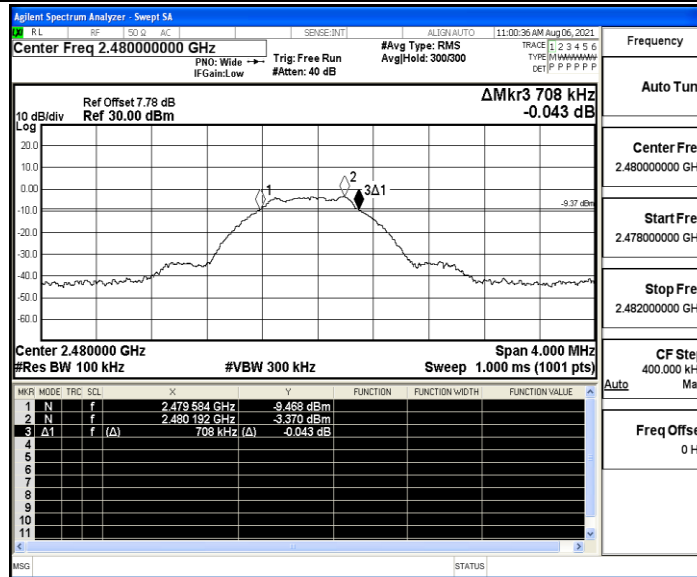
BLE_1M_Ant1_2402



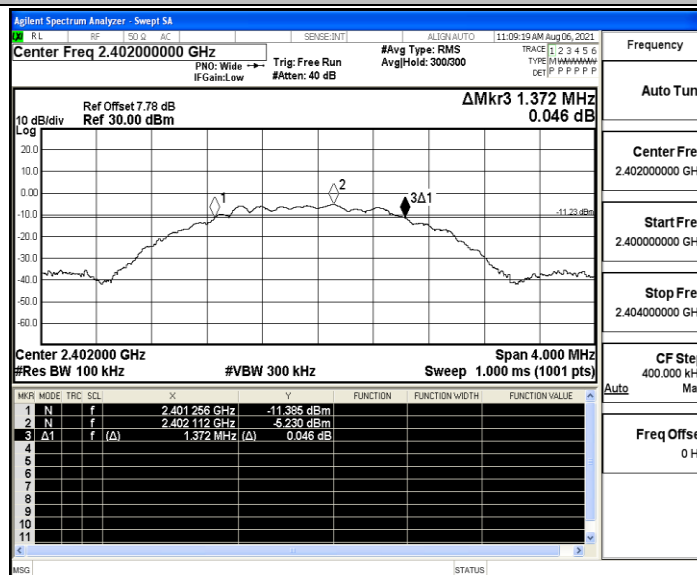
BLE_1M_Ant1_2440



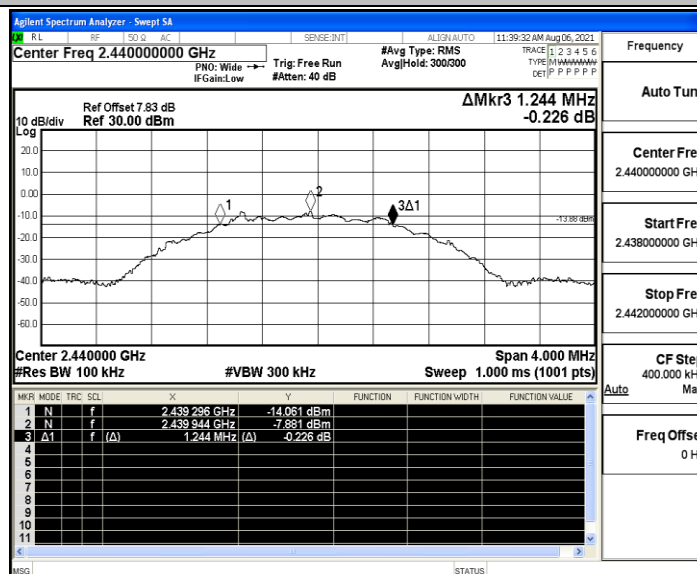
BLE_1M_Ant1_2480



BLE_2M_Ant1_2402

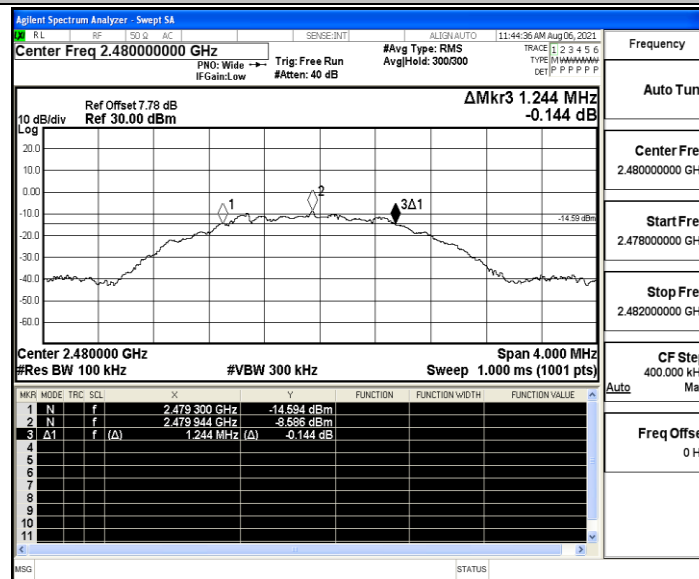


BLE_2M_Ant1_2440





BLE_2M_Ant1_2480





Appendix A.2: Maximum peak conducted output power

Test Result

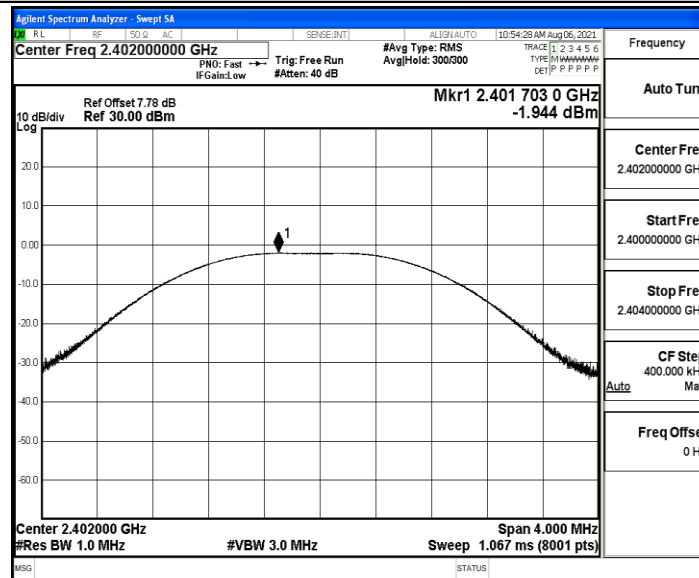
TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	-1.94	≤30	PASS
		2440	-2.16	≤30	PASS
		2480	-2.07	≤30	PASS
BLE_2M	Ant1	2402	-2.17	≤30	PASS
		2440	-2.59	≤30	PASS
		2480	-2.52	≤30	PASS

Note: The Duty Cycle Factor is compensated in the graph.

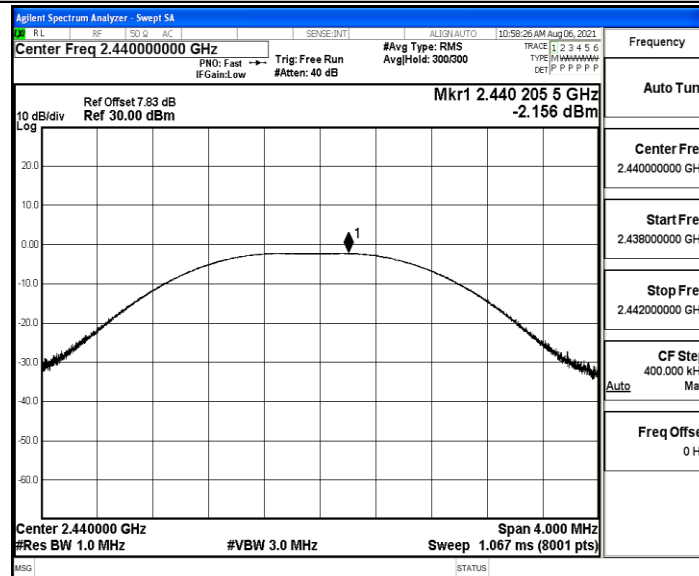


Test Graphs

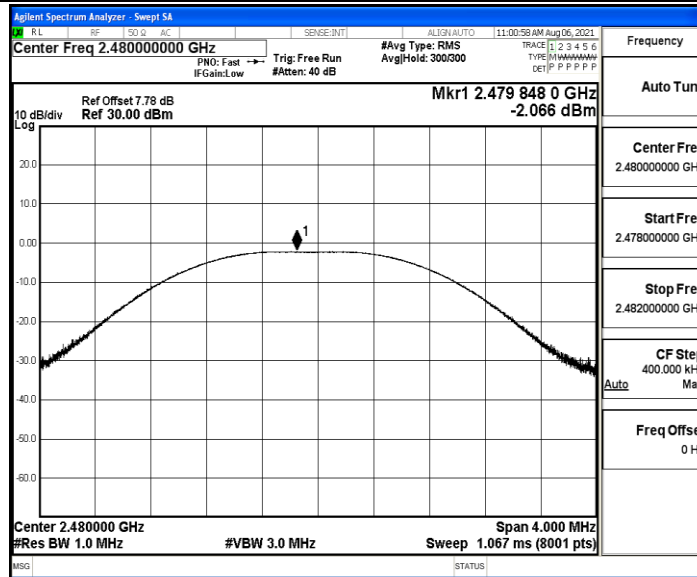
BLE_1M_Ant1_2402



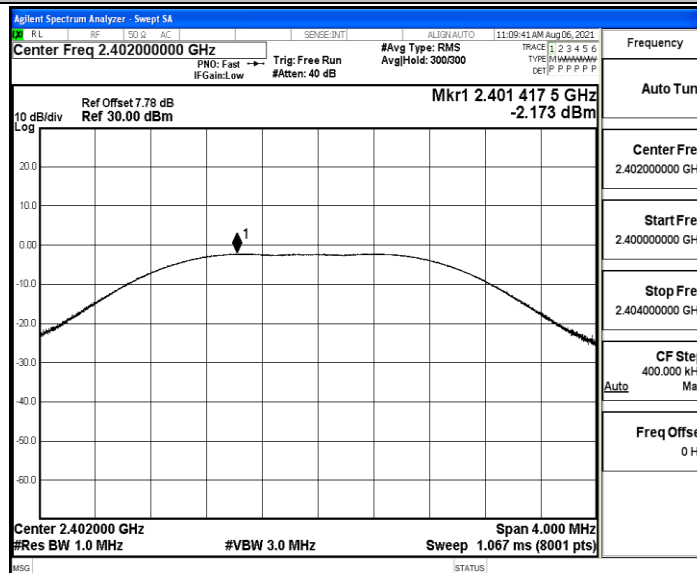
BLE_1M_Ant1_2440



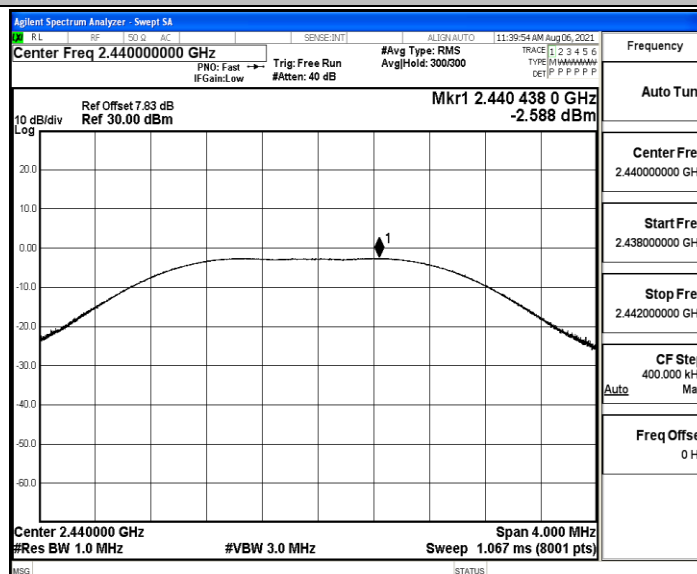
BLE_1M_Ant1_2480



BLE_2M_Ant1_2402

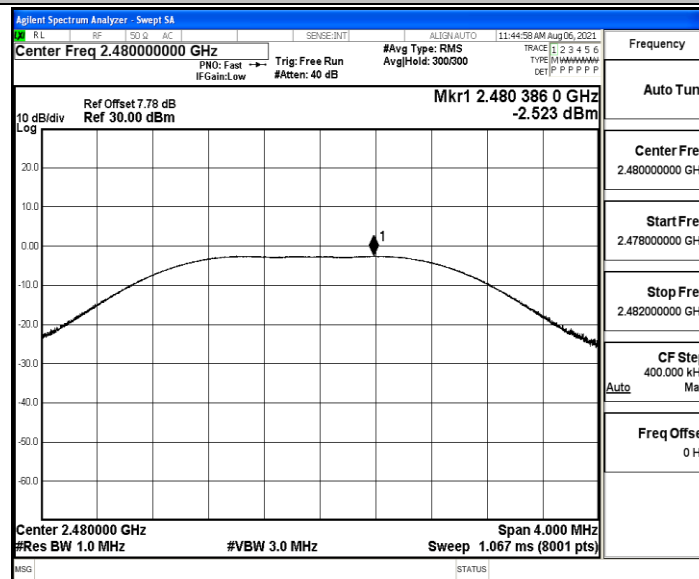


BLE_2M_Ant1_2440





BLE_2M_Ant1_2480





Appendix A.3: Maximum power spectral density

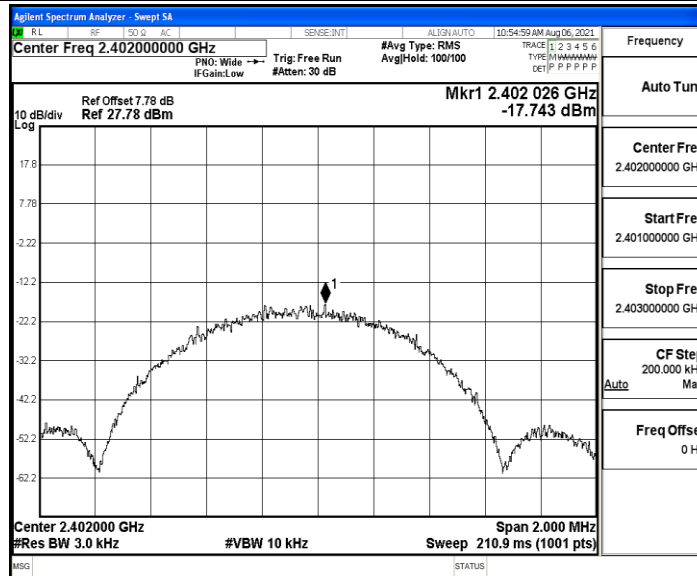
Test Result

TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-17.74	≤8	PASS
		2440	-18.04	≤8	PASS
		2480	-17.86	≤8	PASS
BLE_2M	Ant1	2402	-20.82	≤8	PASS
		2440	-21.25	≤8	PASS
		2480	-21.45	≤8	PASS

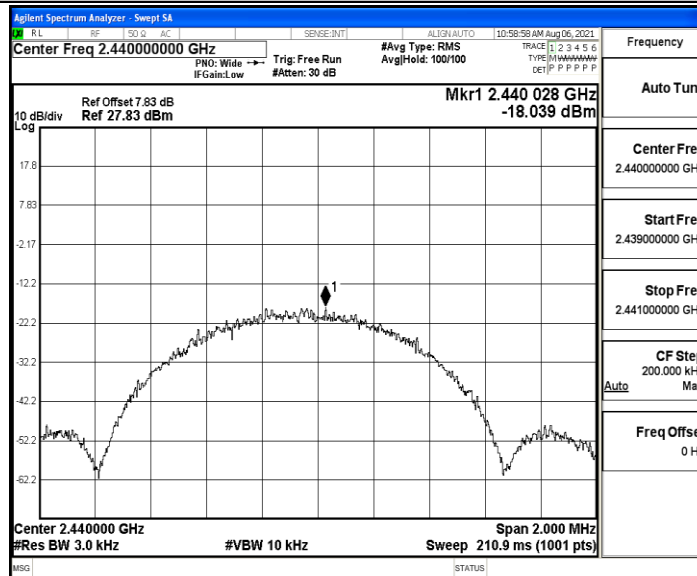


Test Graphs

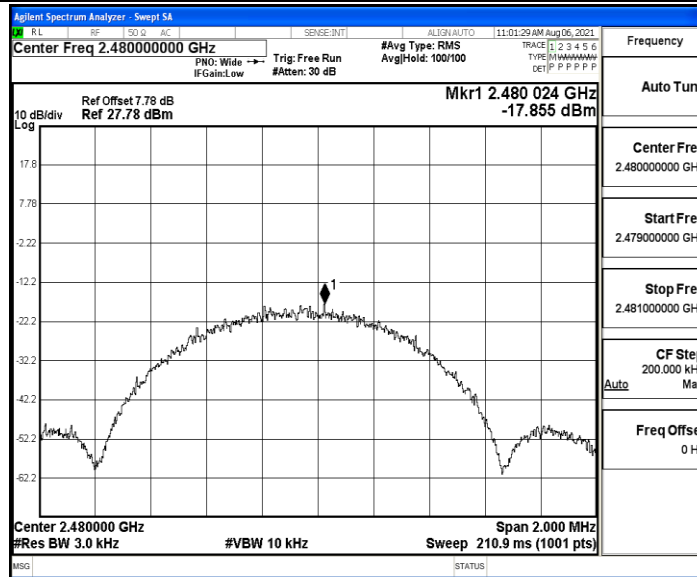
BLE_1M_Ant1_2402



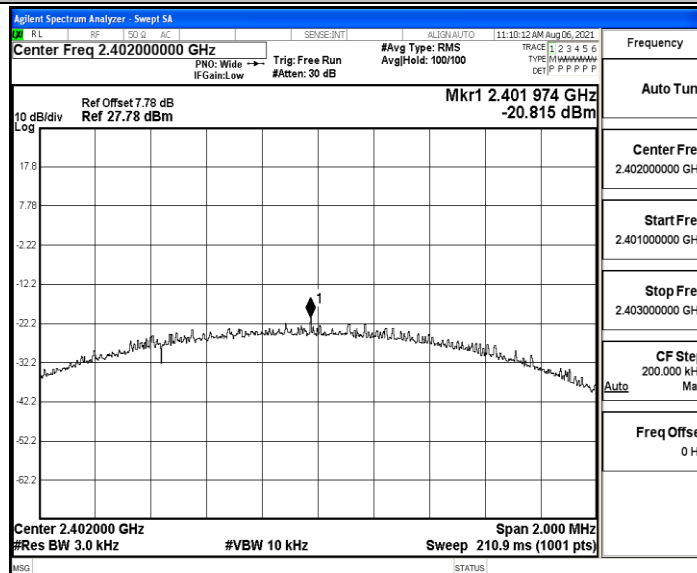
BLE_1M_Ant1_2440



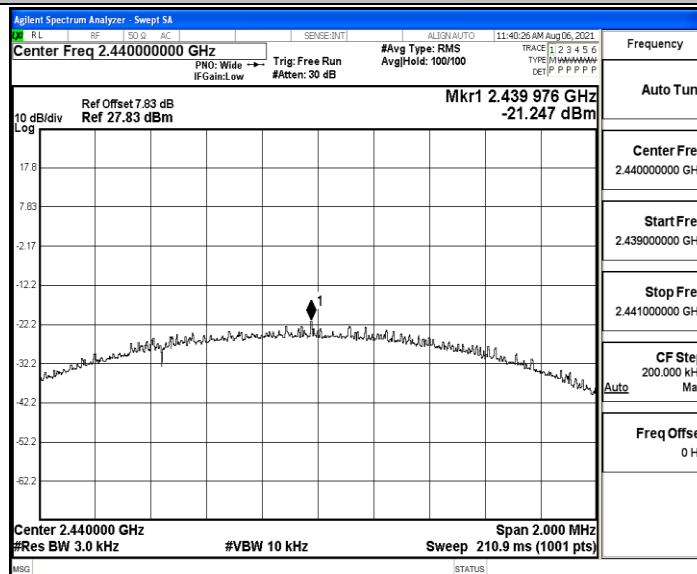
BLE_1M_Ant1_2480



BLE_2M_Ant1_2402

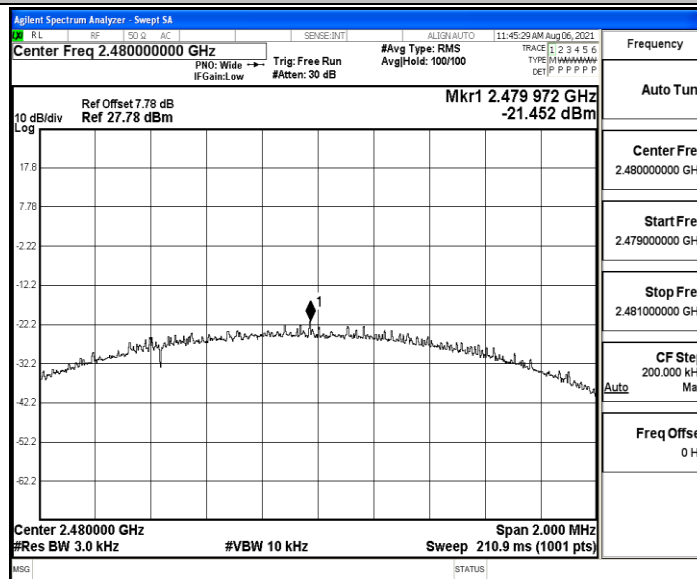


BLE_2M_Ant1_2440





BLE_2M_Ant1_2480





Appendix A.4: Band edge measurements

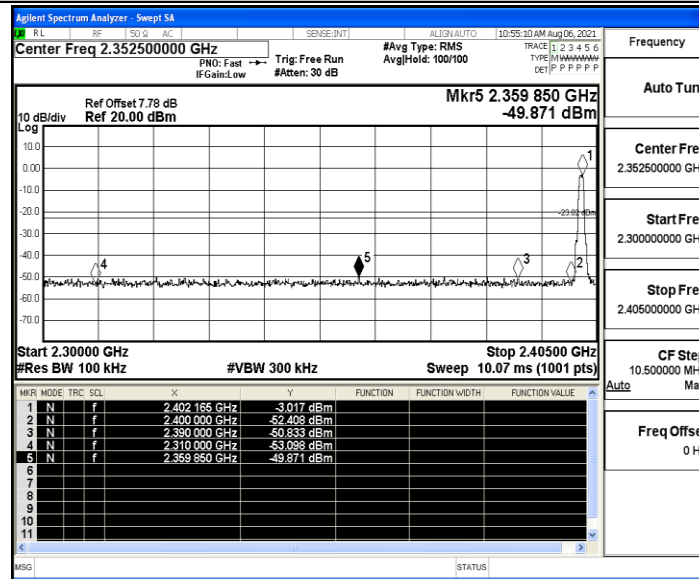
Test Result

TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	-3.02	-49.87	≤ -23.02	PASS
		High	2480	-3.57	-49.16	≤ -23.57	PASS
BLE_2M	Ant1	Low	2402	-4.95	-38.68	≤ -24.95	PASS
		High	2480	-4.95	-48.24	≤ -24.95	PASS

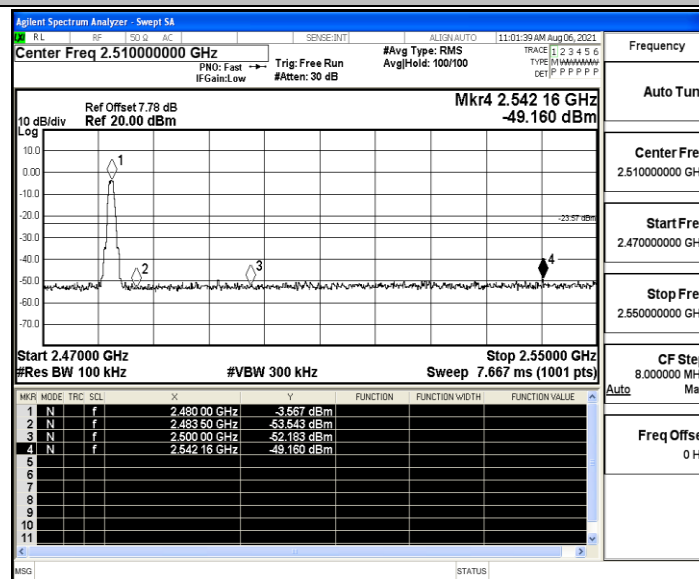


Test Graphs

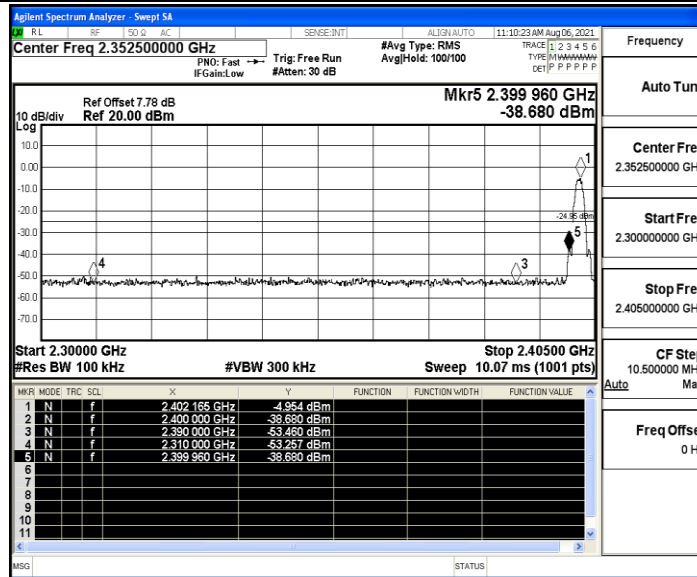
BLE_1M_Ant1_Low_2402



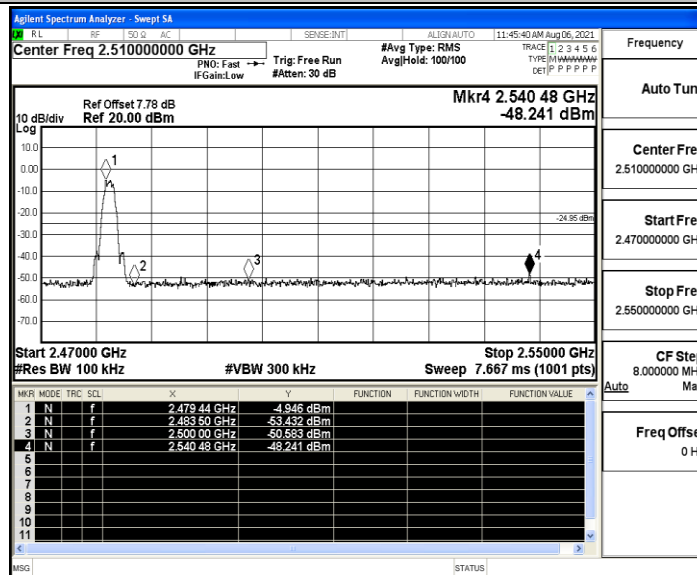
BLE_1M_Ant1_High_2480



BLE_2M_Ant1_Low_2402



BLE_2M_Ant1_High_2480





Appendix A.5: Conducted Spurious Emission

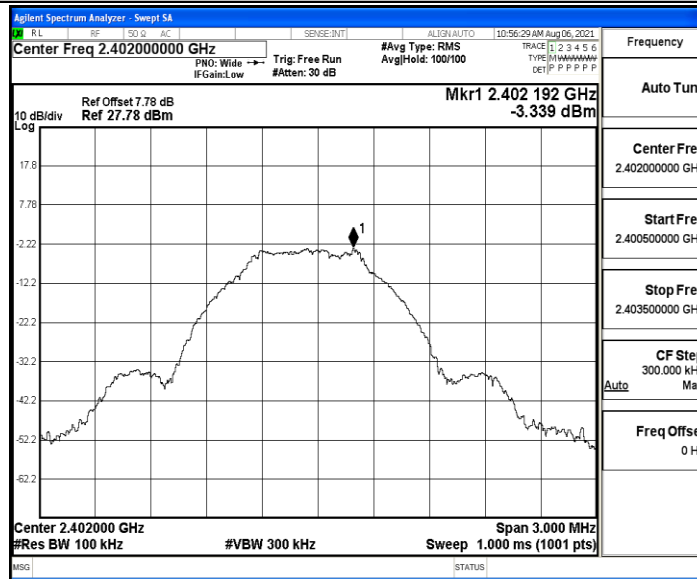
Test Result

TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	-3.34	-3.34	---	PASS
			30~1000	-3.34	-61.58	≤-23.34	PASS
			1000~26500	-3.34	-47.5	≤-23.34	PASS
		2440	Reference	-3.58	-3.58	---	PASS
			30~1000	-3.58	-61.76	≤-23.58	PASS
			1000~26500	-3.58	-46.5	≤-23.58	PASS
		2480	Reference	-3.42	-3.42	---	PASS
			30~1000	-3.42	-61.79	≤-23.42	PASS
			1000~26500	-3.42	-47.68	≤-23.42	PASS
BLE_2M	Ant1	2402	Reference	-5.42	-5.42	---	PASS
			30~1000	-5.42	-60.98	≤-25.42	PASS
			1000~26500	-5.42	-47.91	≤-25.42	PASS
		2440	Reference	-4.54	-4.54	---	PASS
			30~1000	-4.54	-60.58	≤-24.54	PASS
			1000~26500	-4.54	-47.76	≤-24.54	PASS
		2480	Reference	-4.34	-4.34	---	PASS
			30~1000	-4.34	-61.01	≤-24.34	PASS
			1000~26500	-4.34	-47.75	≤-24.34	PASS

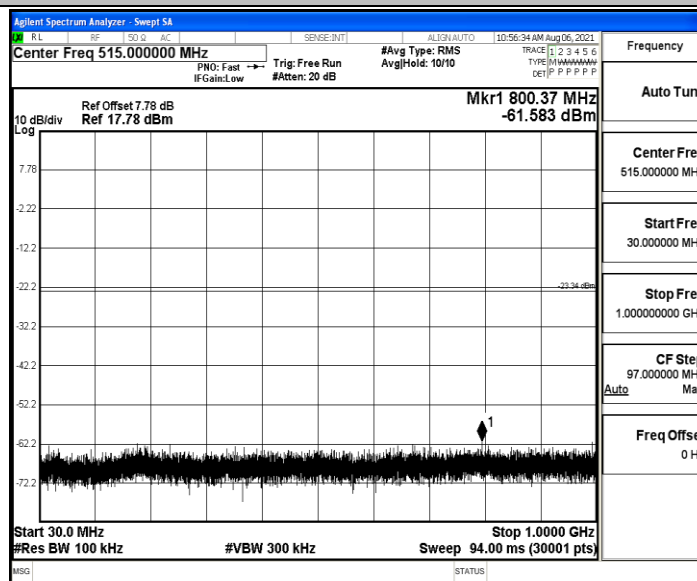


Test Graphs

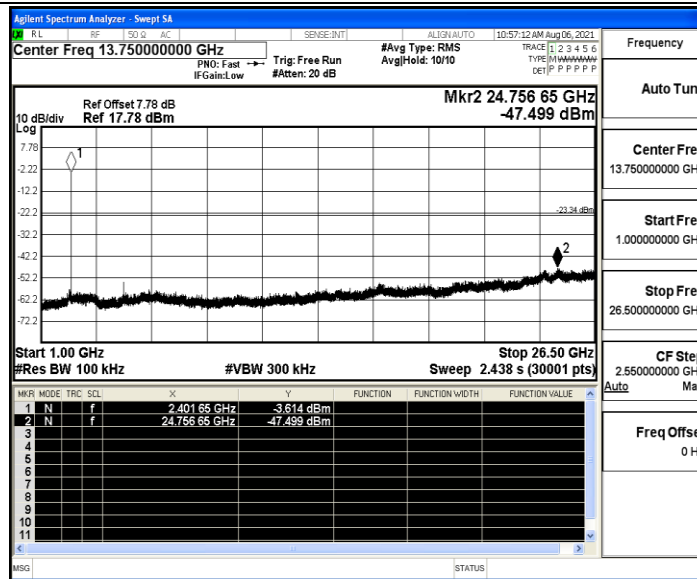
BLE_1M_Ant1_2402_0~Reference



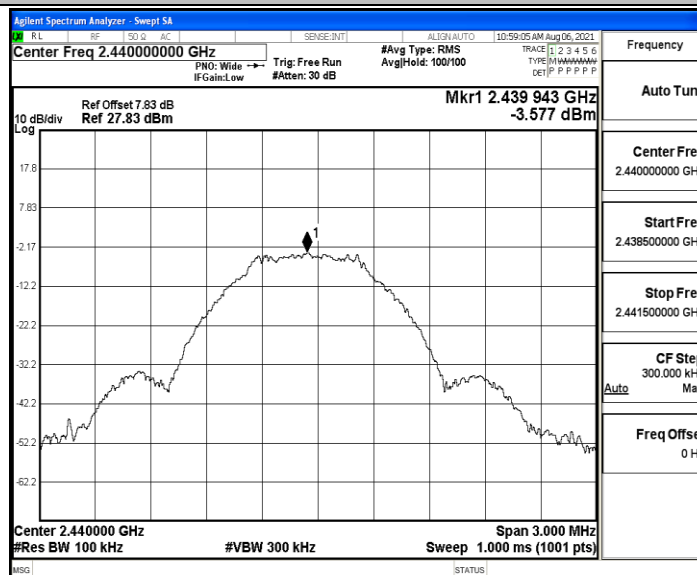
BLE_1M_Ant1_2402_30~1000



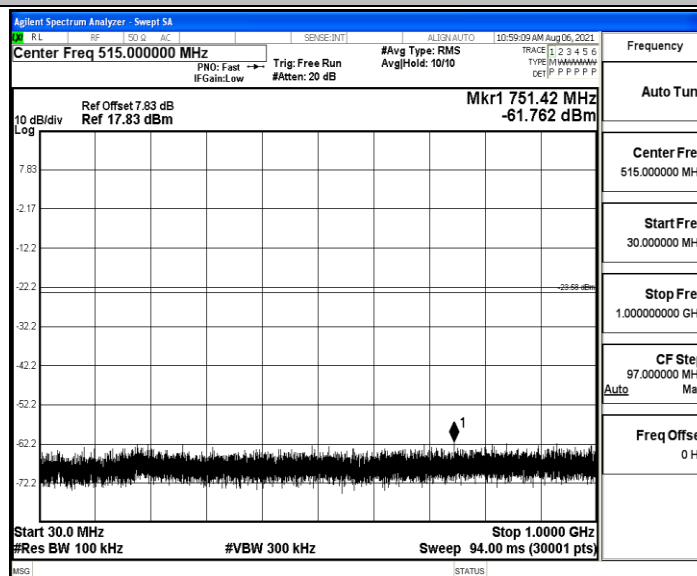
BLE_1M_Ant1_2402_1000~26500



BLE_1M_Ant1_2440_0~Reference

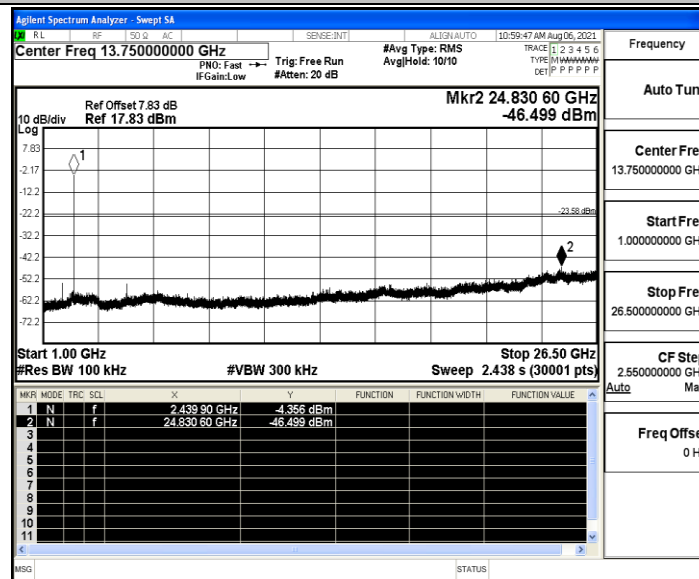


BLE_1M_Ant1_2440_30~1000

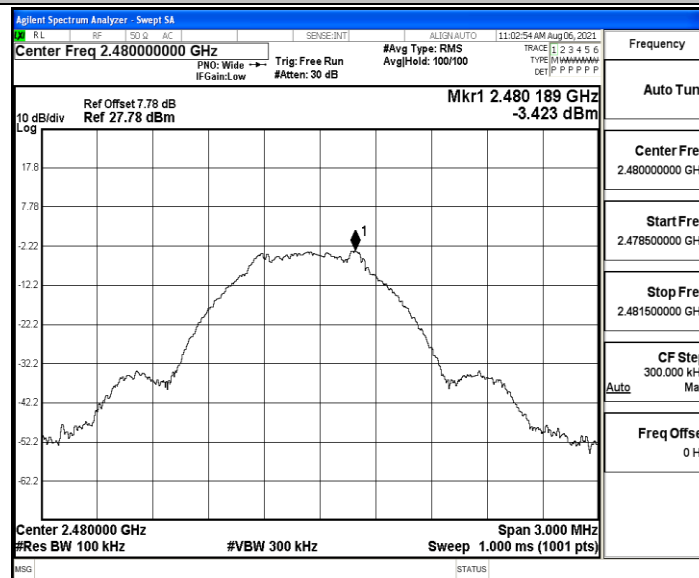




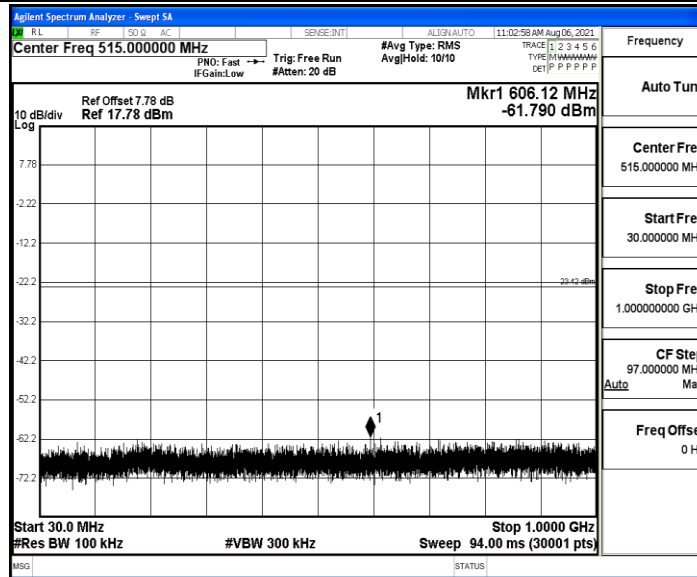
BLE_1M_Ant1_2440_1000~26500



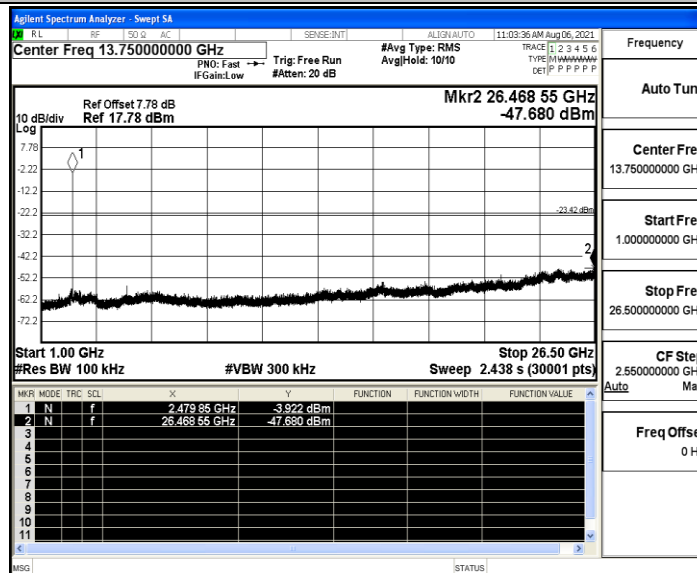
BLE_1M_Ant1_2480_0~Reference



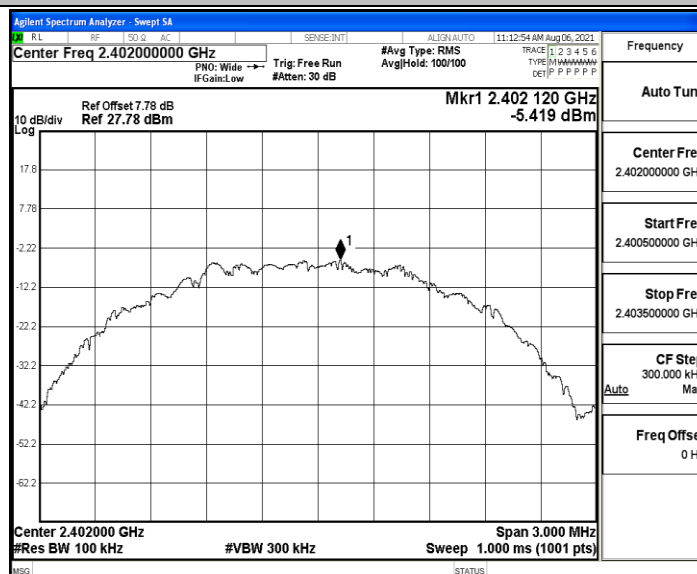
BLE_1M_Ant1_2480_30~1000



BLE_1M_Ant1_2480_1000~26500

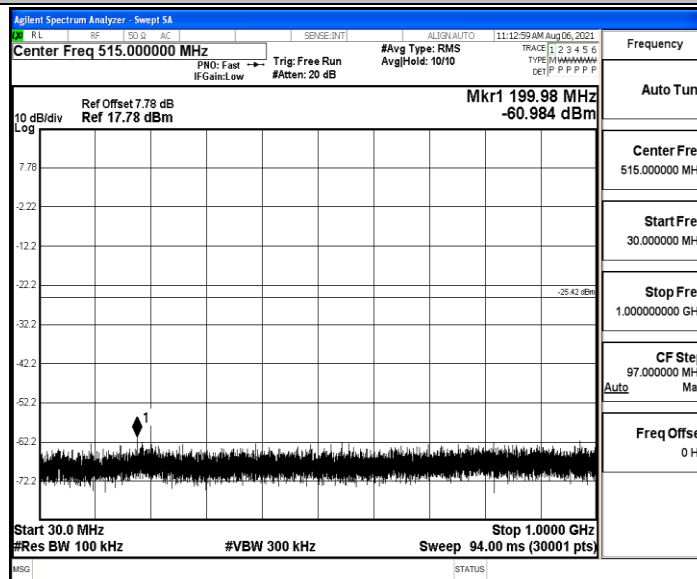


BLE_2M_Ant1_2402_0~Reference

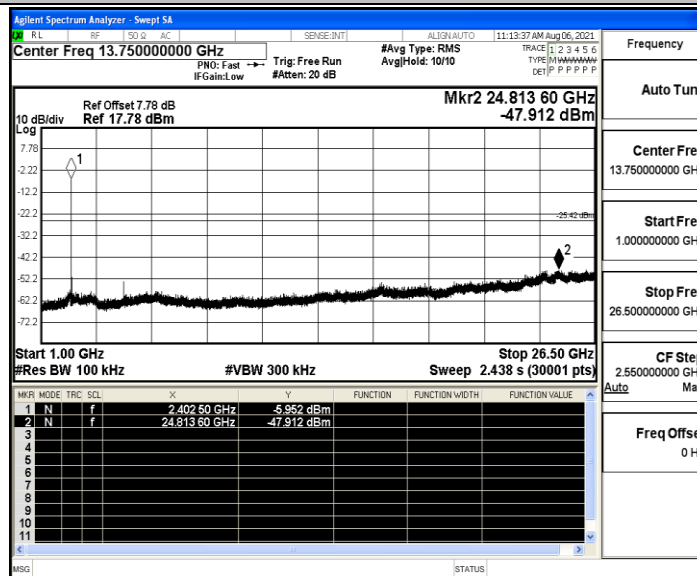




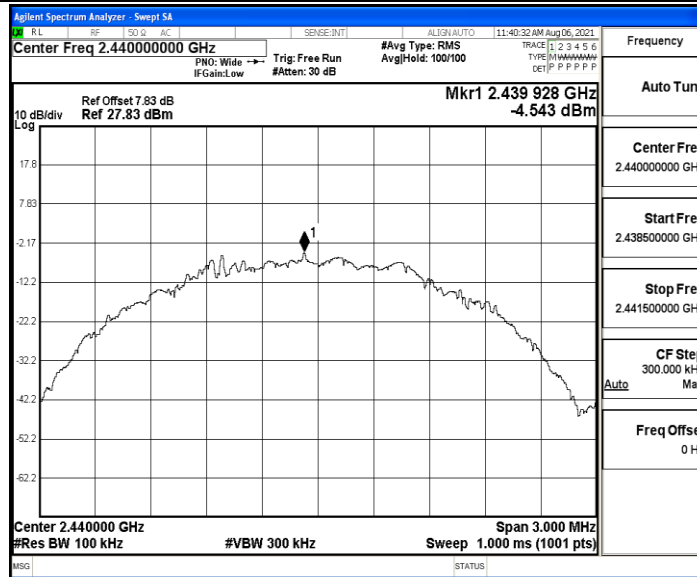
BLE_2M_Ant1_2402_30~1000



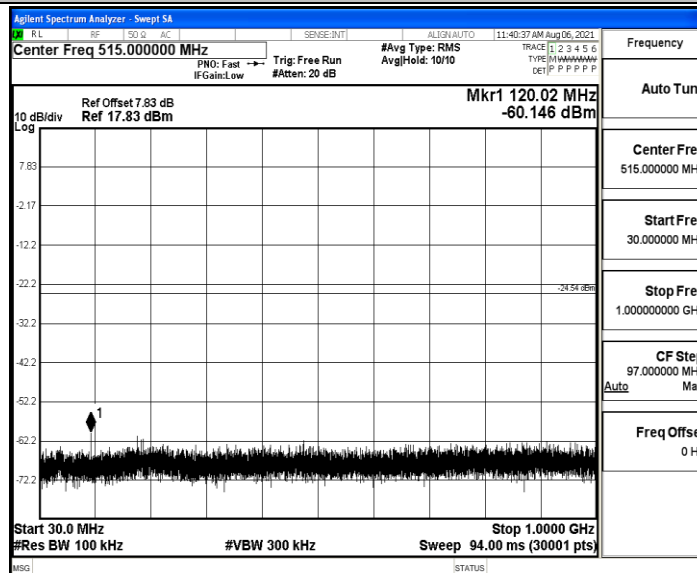
BLE_2M_Ant1_2402_1000~26500



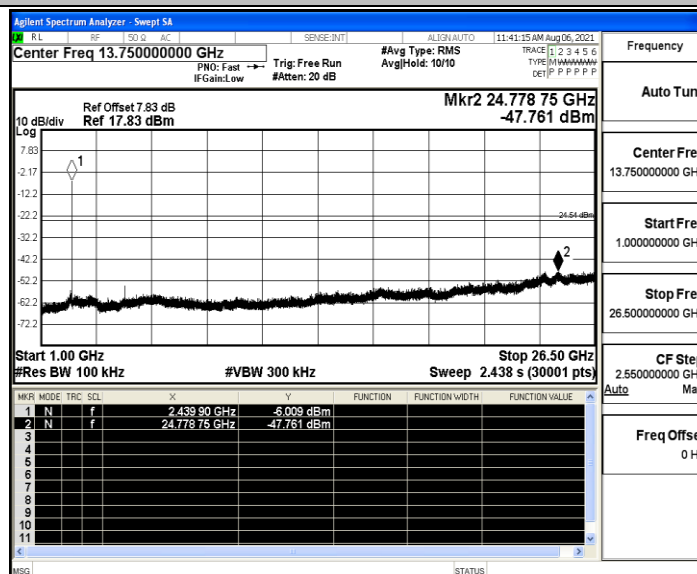
BLE_2M_Ant1_2440_0~Reference



BLE_2M_Ant1_2440_30~1000

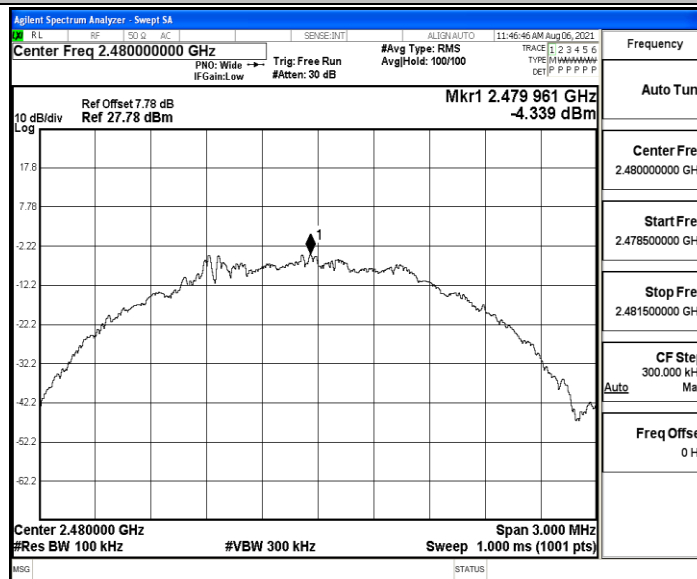


BLE_2M_Ant1_2440_1000~26500

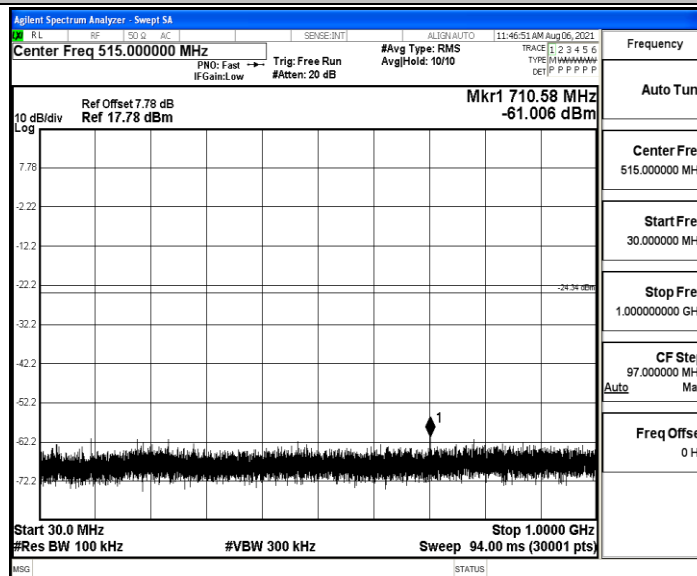




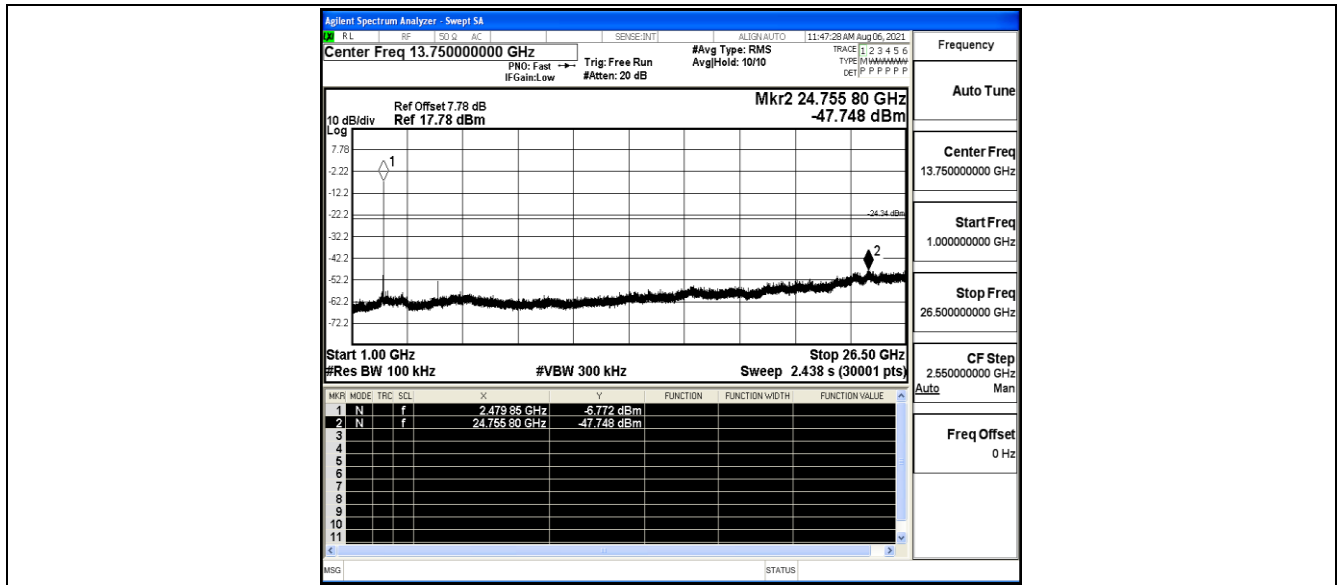
BLE_2M_Ant1_2480_0~Reference



BLE_2M_Ant1_2480_30~1000



BLE_2M_Ant1_2480_1000~26500





Appendix A.6: Duty Cycle

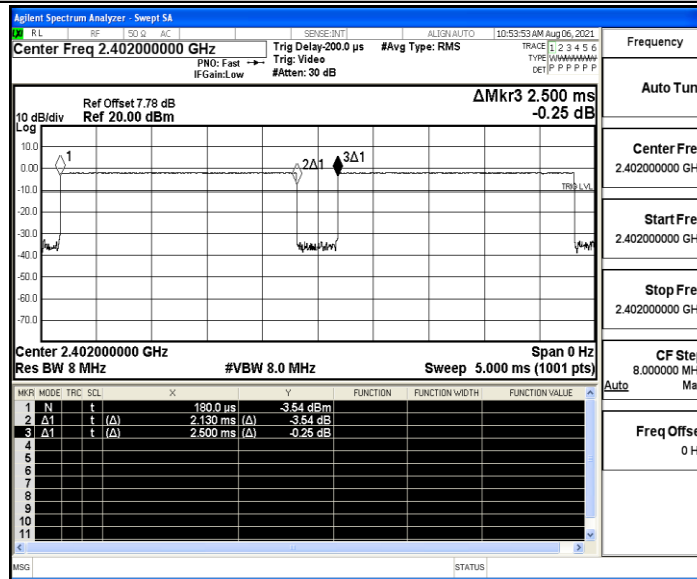
Test Result

TestMode	Antenna	Channel	ON Time [ms]	Period [ms]	X	DC [%]	xFactor	Limit	Verdict
BLE_1M	Ant1	2402	2.13	2.50	0.8520	85.20	0.70	---	PASS
		2440	2.12	2.50	0.8480	84.80	0.72	---	PASS
		2480	2.12	2.50	0.8480	84.80	0.72	---	PASS
BLE_2M	Ant1	2402	1.07	1.25	0.8560	85.60	0.68	---	PASS
		2440	1.07	1.25	0.8560	85.60	0.68	---	PASS
		2480	1.07	1.25	0.8560	85.60	0.68	---	PASS

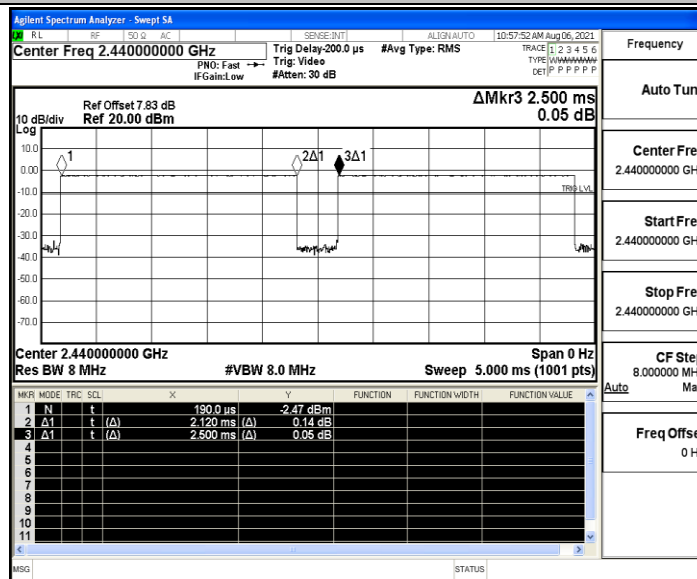


Test Graphs

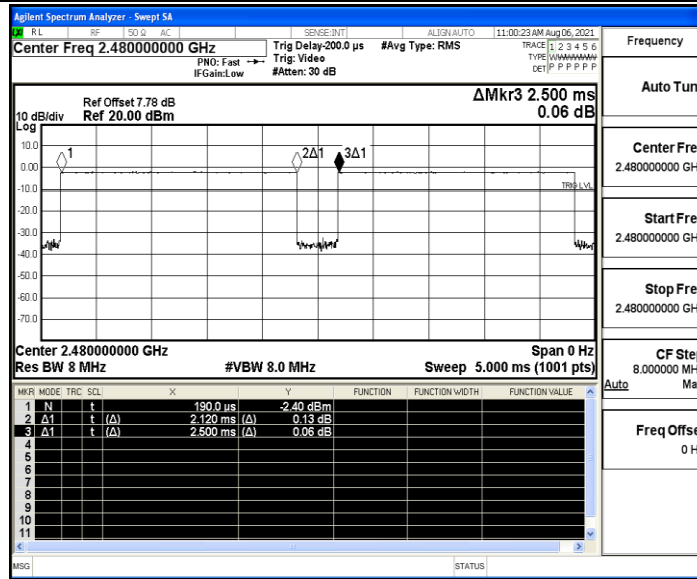
BLE_1M_Ant1_2402



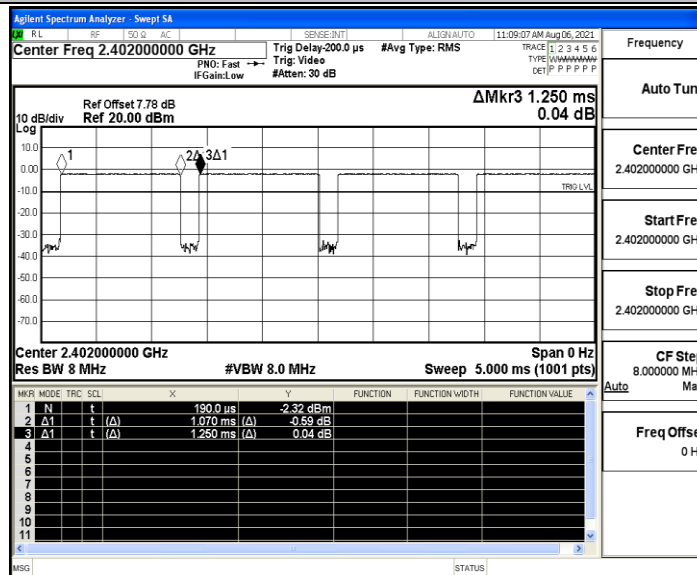
BLE_1M_Ant1_2440



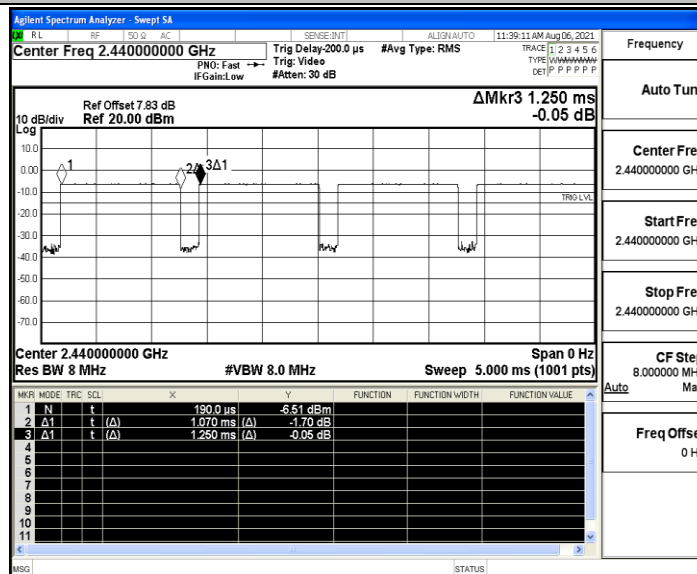
BLE_1M_Ant1_2480



BLE_2M_Ant1_2402

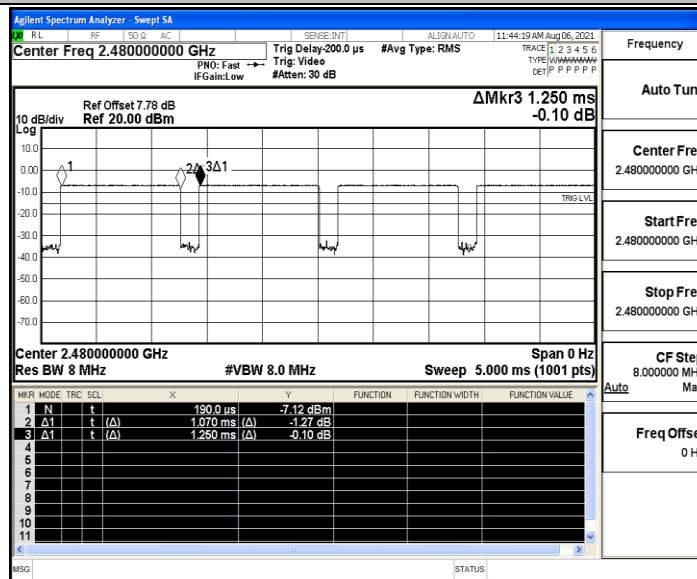


BLE_2M_Ant1_2440





BLE_2M_Ant1_2480





Appendix A.7: Emissions in Restricted Bands

Test Result

TestMode	Antenna	Channel Name	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	2357.225	-47.79	≤-41.20	47.41	≤54	PASS
				AV	2390.000	-48.67	≤-41.20	46.53	≤54	PASS
				Peak	2310.000	-43.48	≤-21.20	51.72	≤74	PASS
				Peak	2322.050	-37.96	≤-21.20	57.24	≤74	PASS
				Peak	2390.000	-41.58	≤-21.20	53.62	≤74	PASS
		High	2480	AV	2483.500	-48.01	≤-41.20	47.19	≤54	PASS
				AV	2499.360	-47.94	≤-41.20	47.26	≤54	PASS
				AV	2500.000	-48.14	≤-41.20	47.06	≤54	PASS
				Peak	2483.500	-42.43	≤-21.20	52.77	≤74	PASS
				Peak	2498.000	-38.09	≤-21.20	57.11	≤74	PASS
				Peak	2500.000	-40.84	≤-21.20	54.36	≤74	PASS
BLE_2M	Ant1	Low	2402	AV	2310.000	-48.55	≤-41.20	46.65	≤54	PASS
				AV	2352.920	-47.55	≤-41.20	47.65	≤54	PASS
				AV	2390.000	-48.38	≤-41.20	46.82	≤54	PASS
				Peak	2310.000	-40.66	≤-21.20	54.54	≤74	PASS
				Peak	2361.425	-38.47	≤-21.20	56.73	≤74	PASS
				Peak	2390.000	-42.68	≤-21.20	52.52	≤74	PASS
		High	2480	AV	2483.500	-47.19	≤-41.20	48.01	≤54	PASS
				AV	2483.520	-47.19	≤-41.20	48.01	≤54	PASS
				AV	2500.000	-47.73	≤-41.20	47.47	≤54	PASS
				Peak	2483.500	-41.55	≤-21.20	53.65	≤74	PASS
				Peak	2497.360	-38.18	≤-21.20	57.02	≤74	PASS
				Peak	2500.000	-41.43	≤-21.20	53.77	≤74	PASS

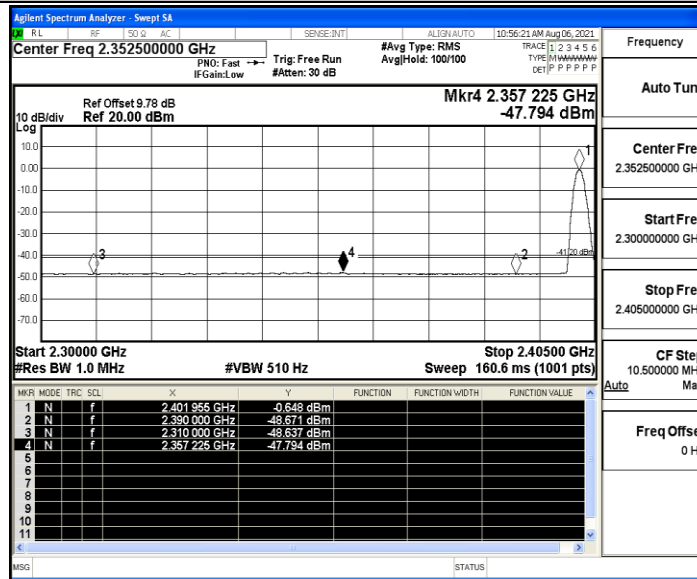
Note:

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.

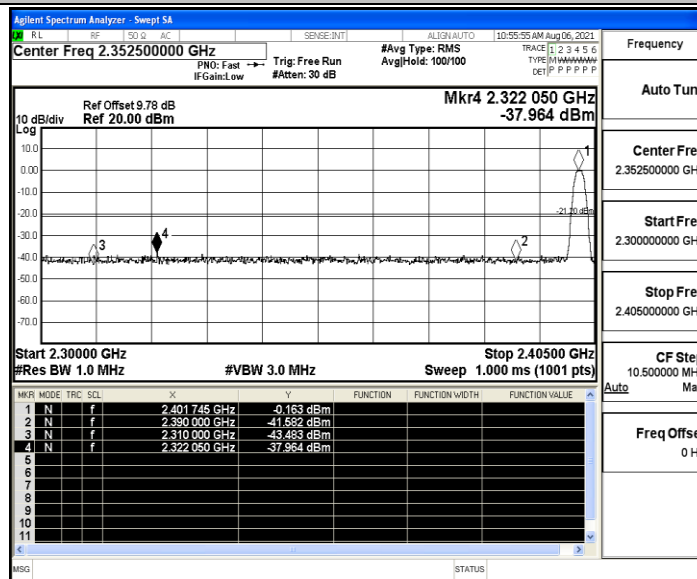


Test Graphs

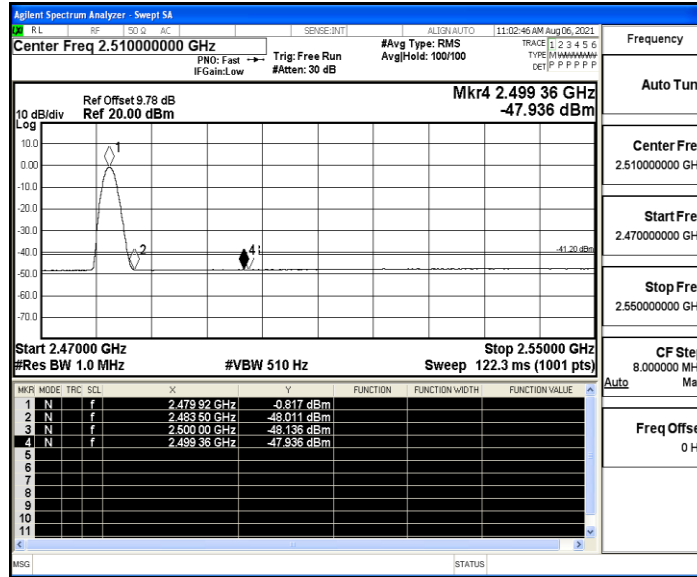
BLE_1M_Ant1_Low_2402_AV



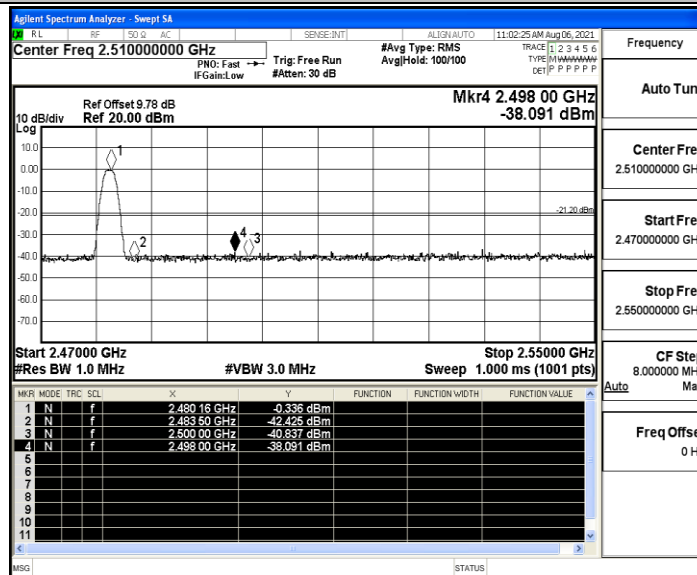
BLE_1M_Ant1_Low_2402_Peak



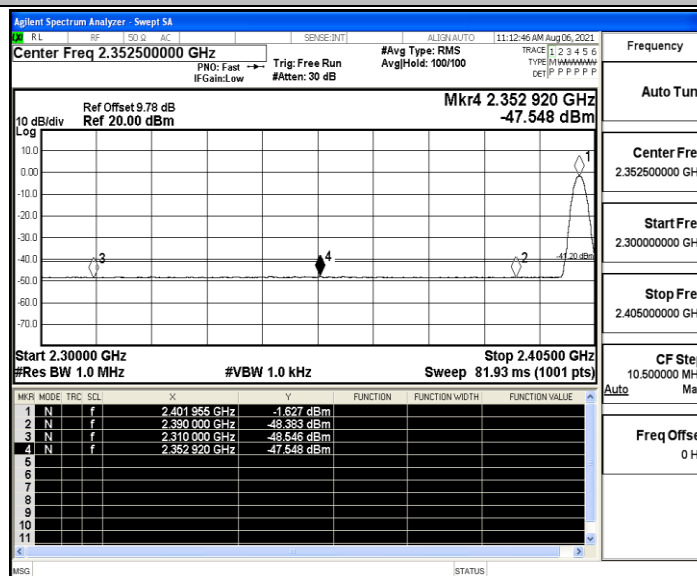
BLE_1M_Ant1_High_2480_AV



BLE_1M_Ant1_High_2480_Peak

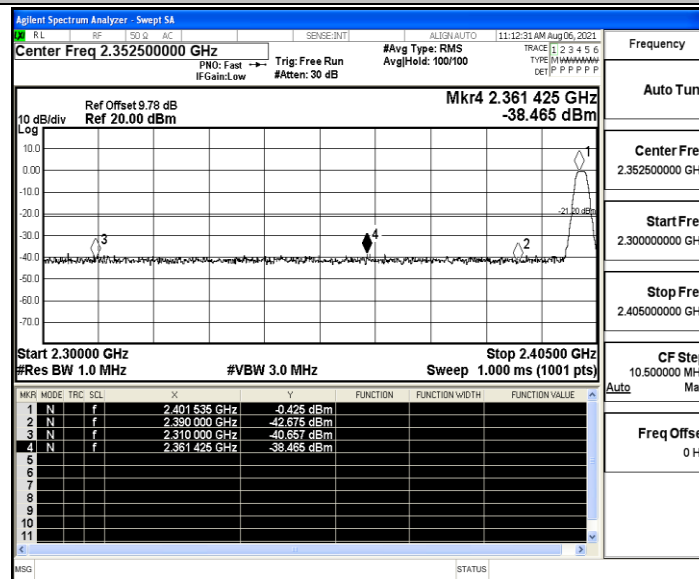


BLE_2M_Ant1_Low_2402_AV

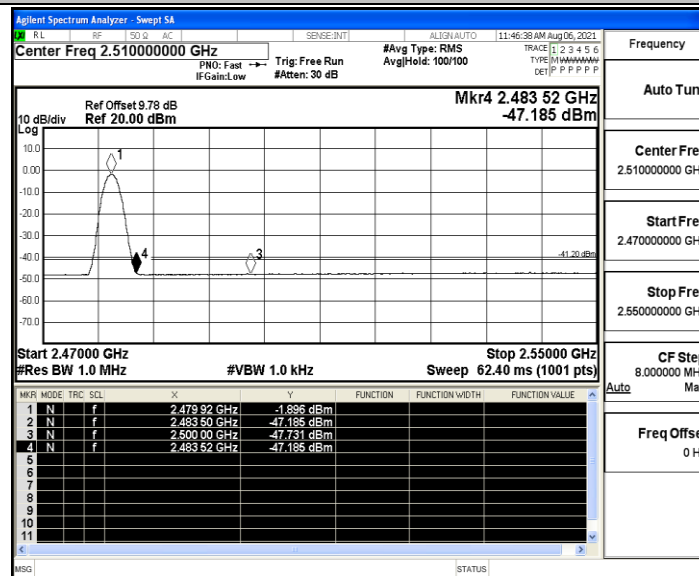




BLE_2M_Ant1_Low_2402_Peak



BLE_2M_Ant1_High_2480_AV



BLE_2M_Ant1_High_2480_Peak

