



Appendix A

RF Test Data for BLE (Conducted Measurement)

Product Name: Bluetooth module

Test Model: BT-50

Environmental Conditions

Temperature:	21.1 ° C
Relative Humidity:	52.2%
ATM Pressure:	100.0 kPa
Test Engineer:	monkey.Li
Supervised by:	Libin

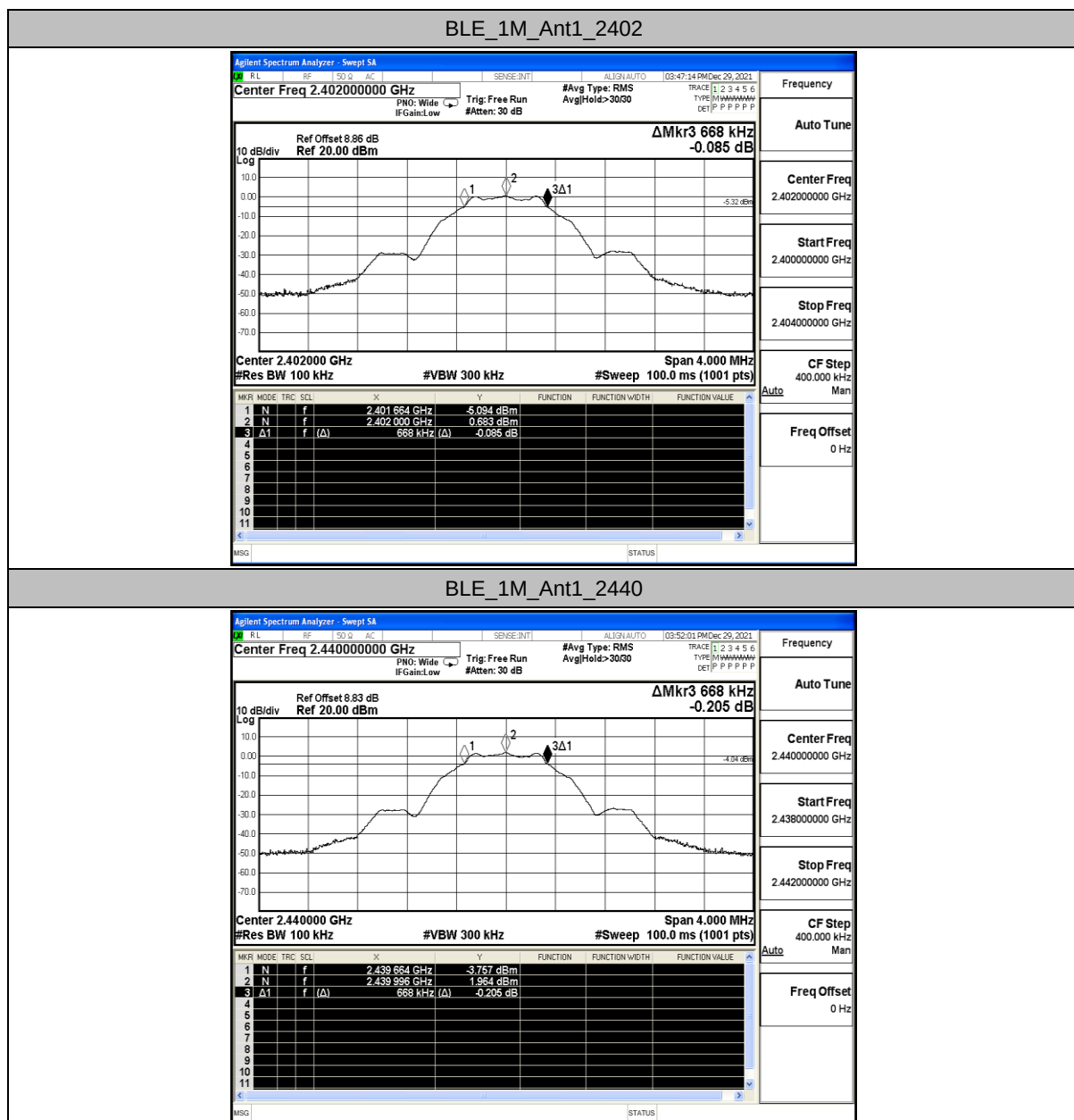


A.1 6dB Bandwidth

Test Result

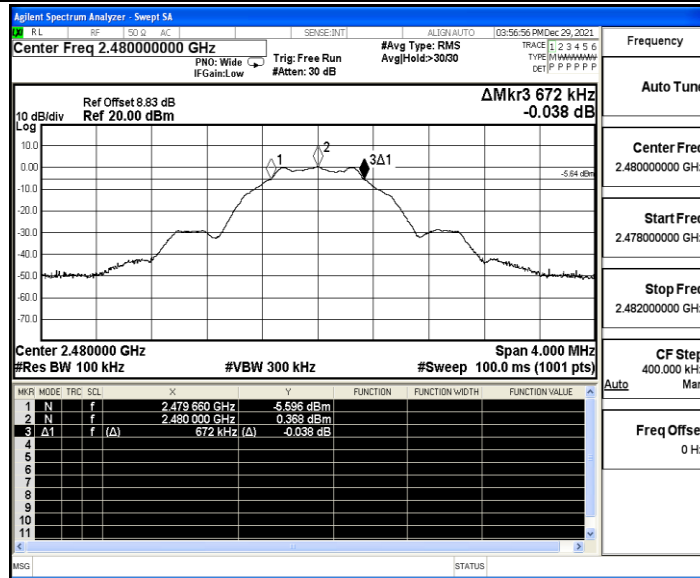
TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.668	2401.664	2402.332	≥0.5	PASS
		2440	0.668	2439.664	2440.332	≥0.5	PASS
		2480	0.672	2479.660	2480.332	≥0.5	PASS
BLE_2M	Ant1	2402	1.244	2401.284	2402.528	≥0.5	PASS
		2440	1.252	2439.280	2440.532	≥0.5	PASS
		2480	1.252	2479.280	2480.532	≥0.5	PASS

Test Graphs

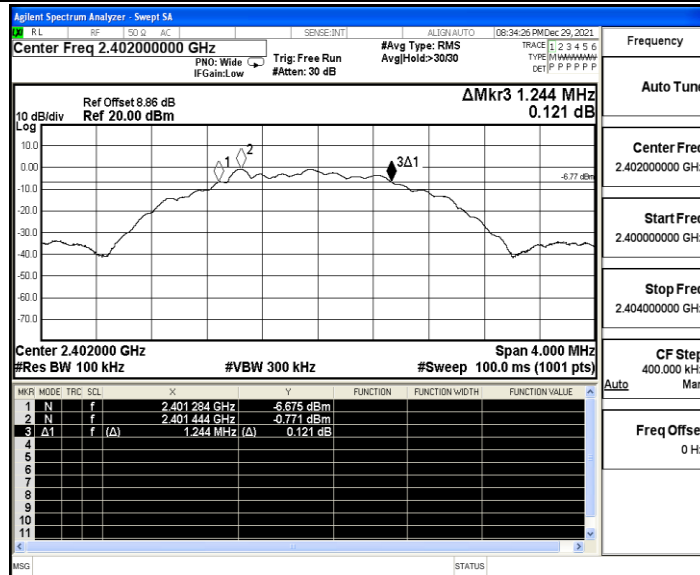




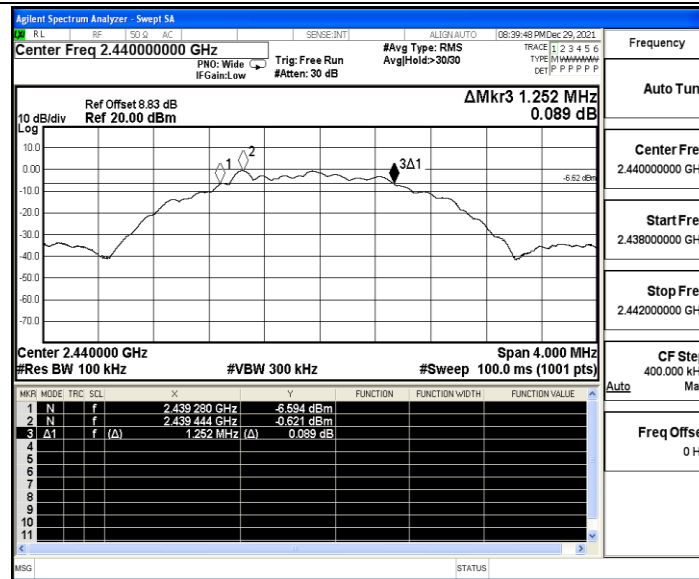
BLE_1M_Ant1_2480



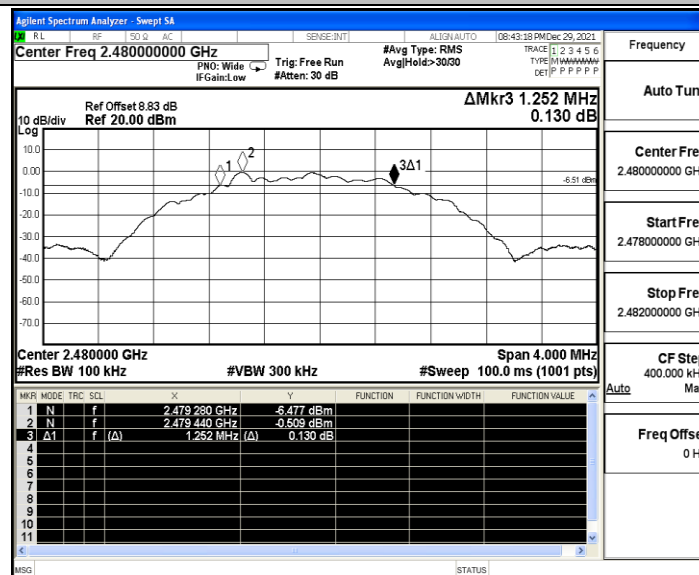
BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



BLE_2M_Ant1_2480



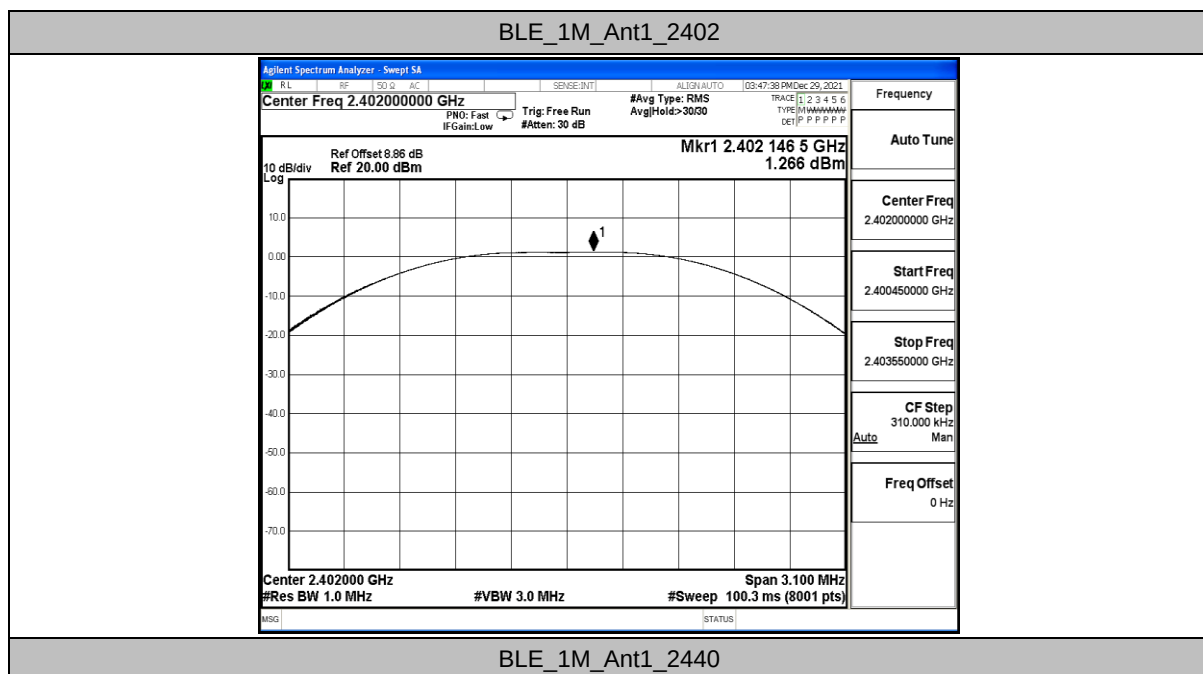


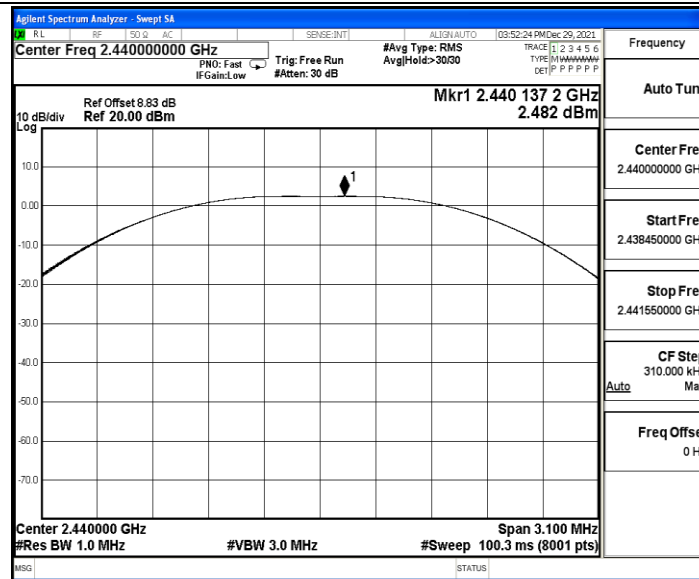
A.2 Maximum conducted output power

Test Result

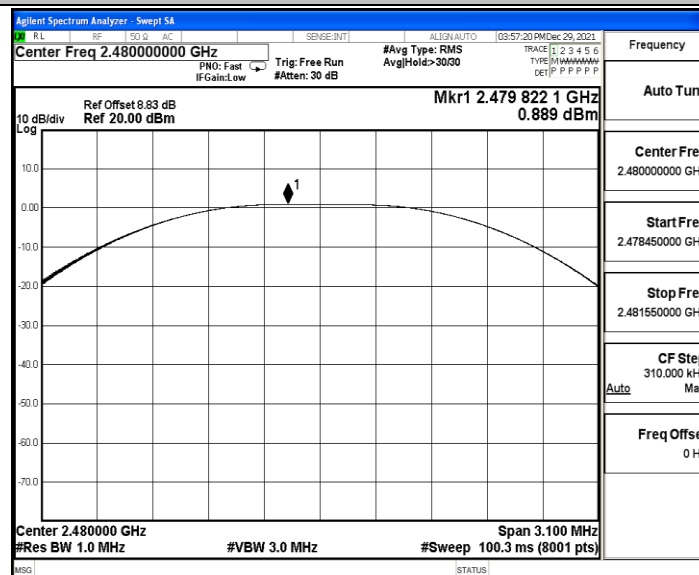
TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	1.27	≤30	PASS
		2440	2.48	≤30	PASS
		2480	0.89	≤30	PASS
BLE_2M	Ant1	2402	1.00	≤30	PASS
		2440	1.13	≤30	PASS
		2480	1.24	≤30	PASS

Test Graphs

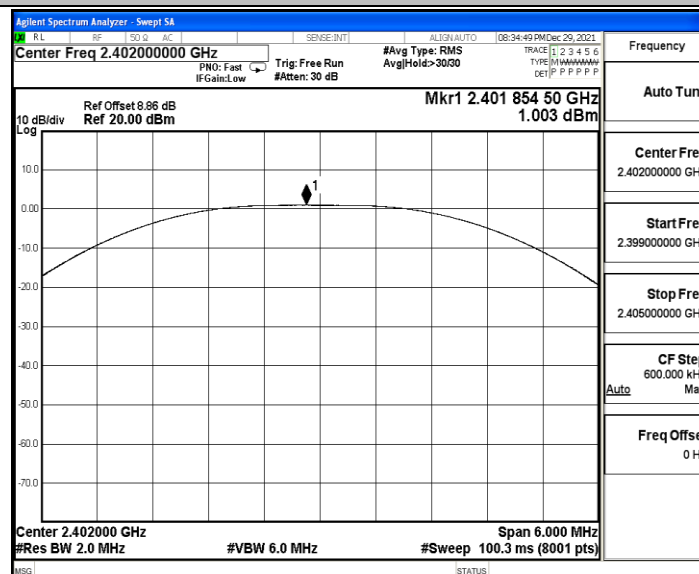




BLE_1M_Ant1_2480

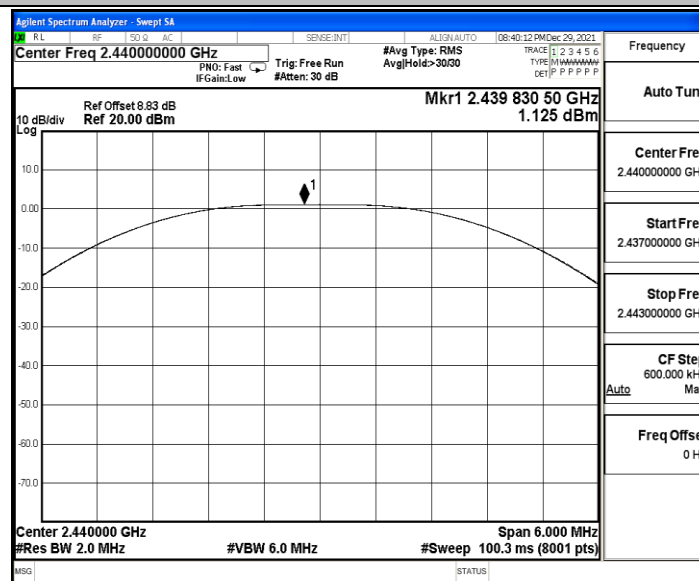


BLE_2M_Ant1_2402

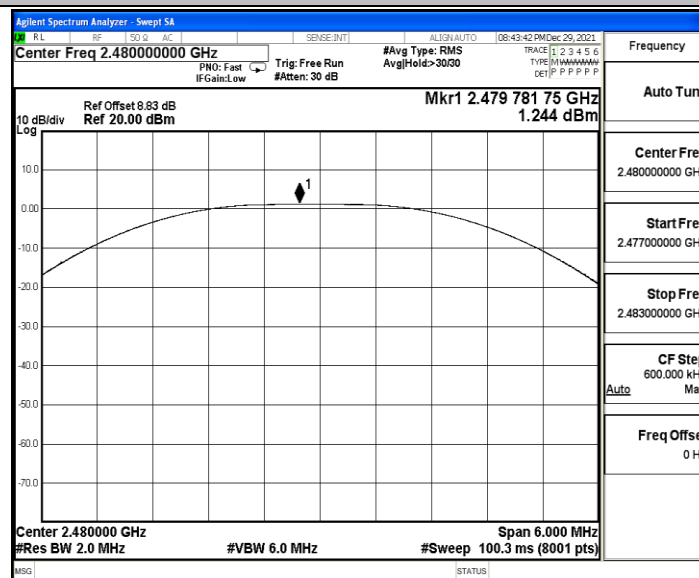




BLE_2M_Ant1_2440



BLE_2M_Ant1_2480



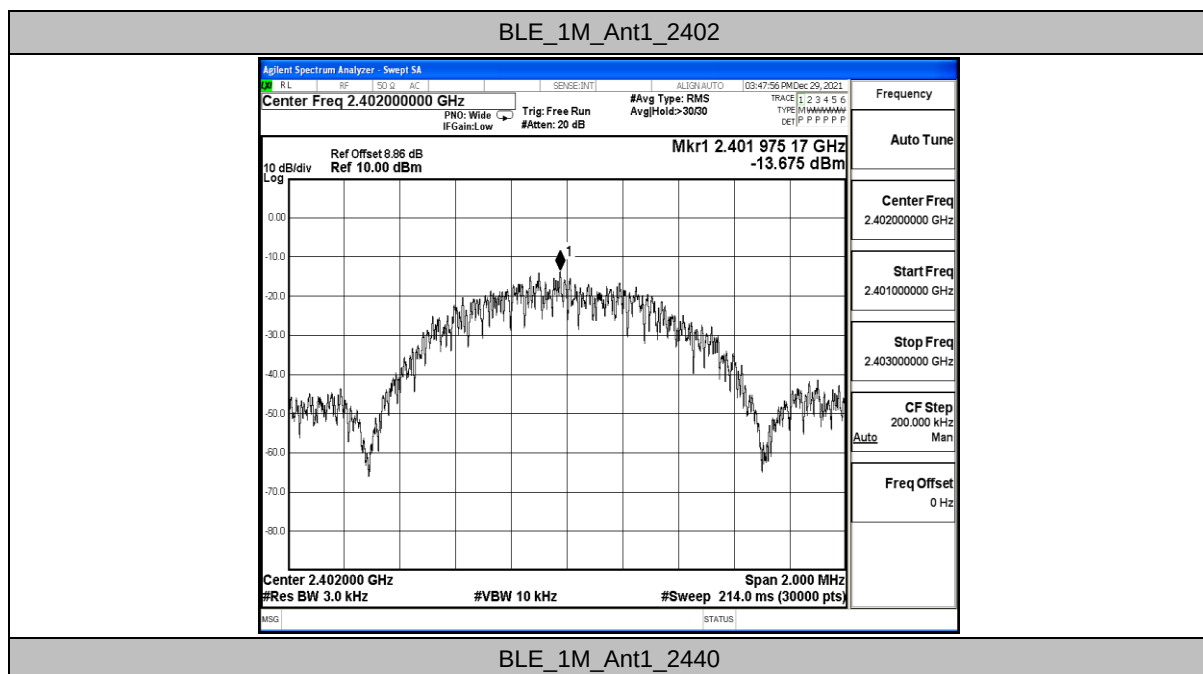


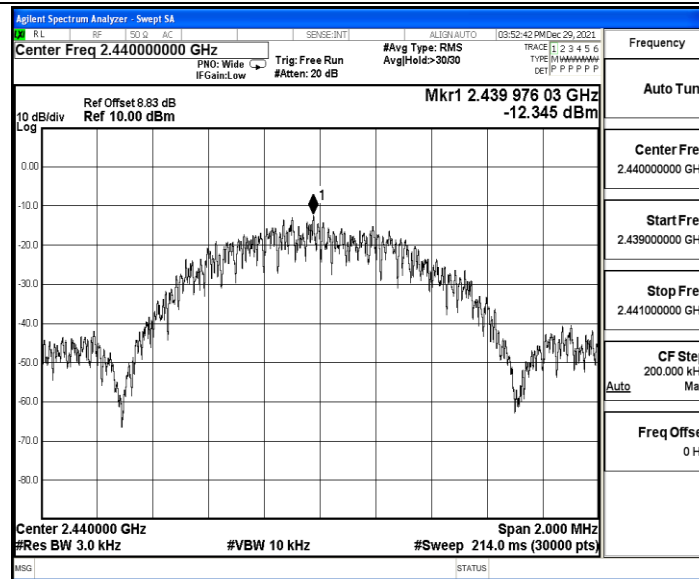
A.3 Maximum power spectral density

Test Result

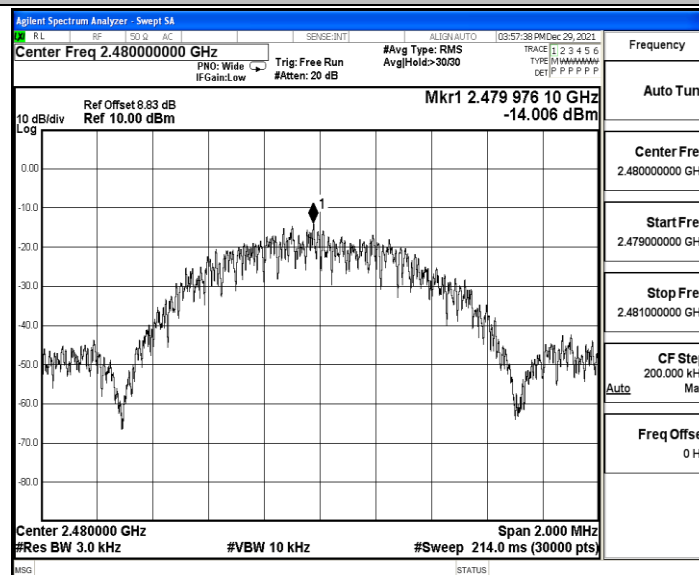
TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-13.68	≤8	PASS
		2440	-12.35	≤8	PASS
		2480	-14.01	≤8	PASS
BLE_2M	Ant1	2402	-17.81	≤8	PASS
		2440	-17.86	≤8	PASS
		2480	-17.47	≤8	PASS

Test Graphs

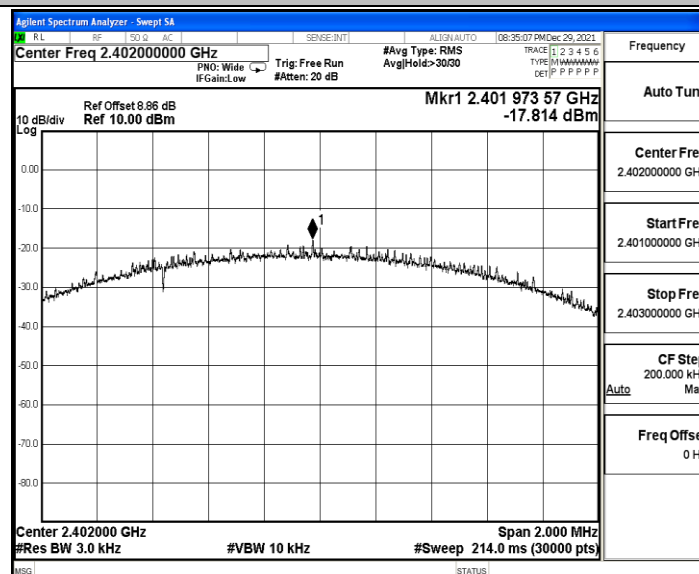




BLE_1M_Ant1_2480

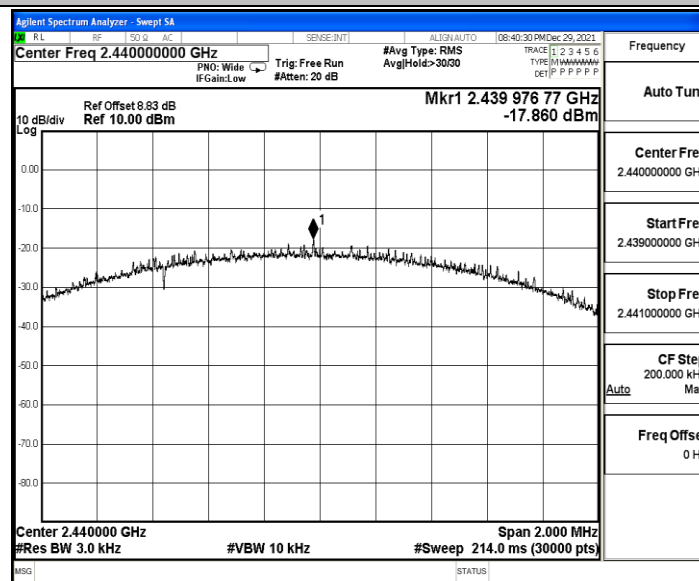


BLE_2M_Ant1_2402

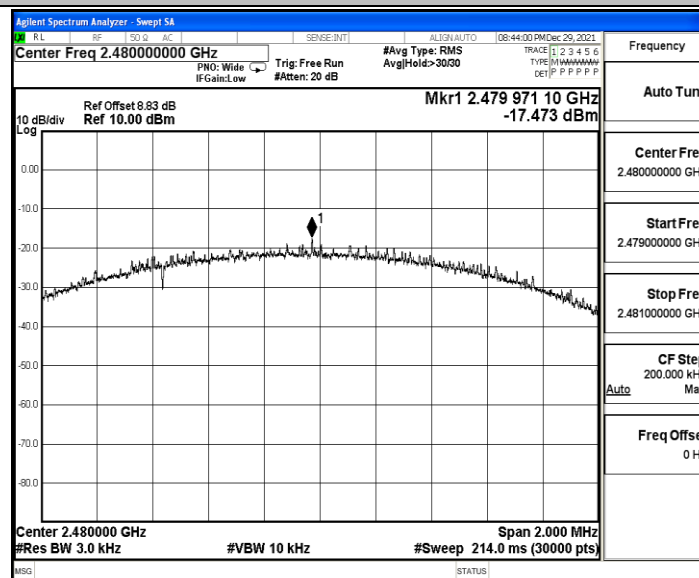




BLE_2M_Ant1_2440



BLE_2M_Ant1_2480



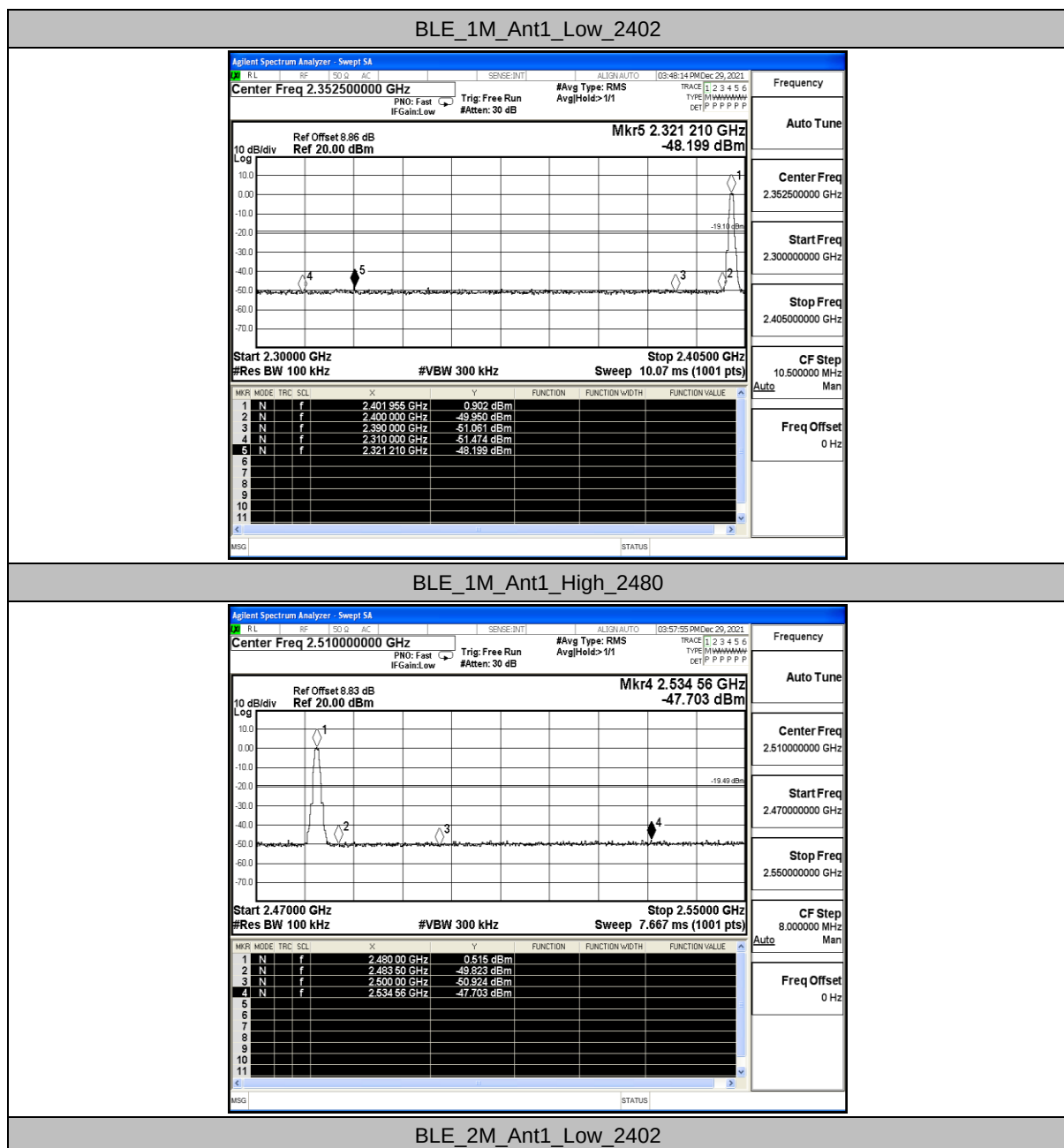


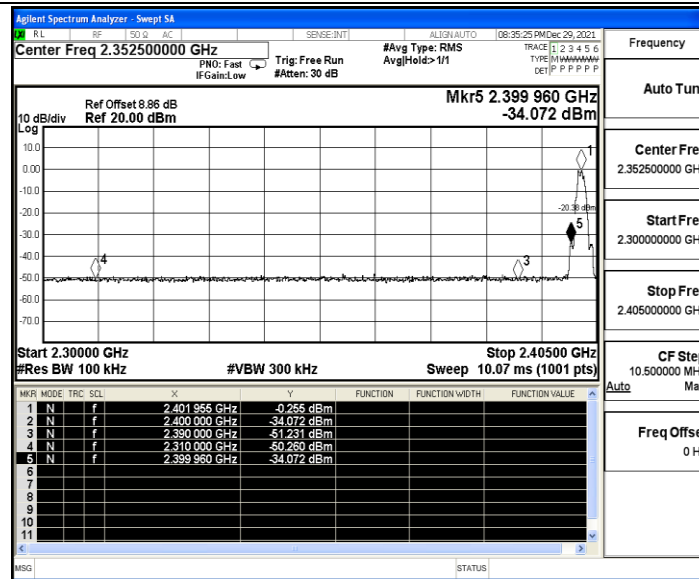
A.4 Band edge measurements

Test Result

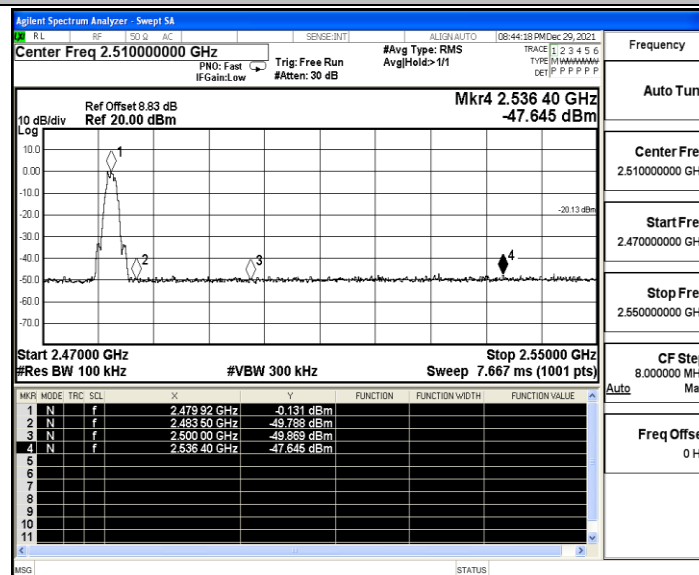
TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	0.90	-48.2	≤-19.1	PASS
		High	2480	0.52	-47.7	≤-19.49	PASS
BLE_2M	Ant1	Low	2402	-0.38	-34.07	≤-20.38	PASS
		High	2480	-0.13	-47.65	≤-20.13	PASS

Test Graphs





BLE_2M_Ant1_High_2480



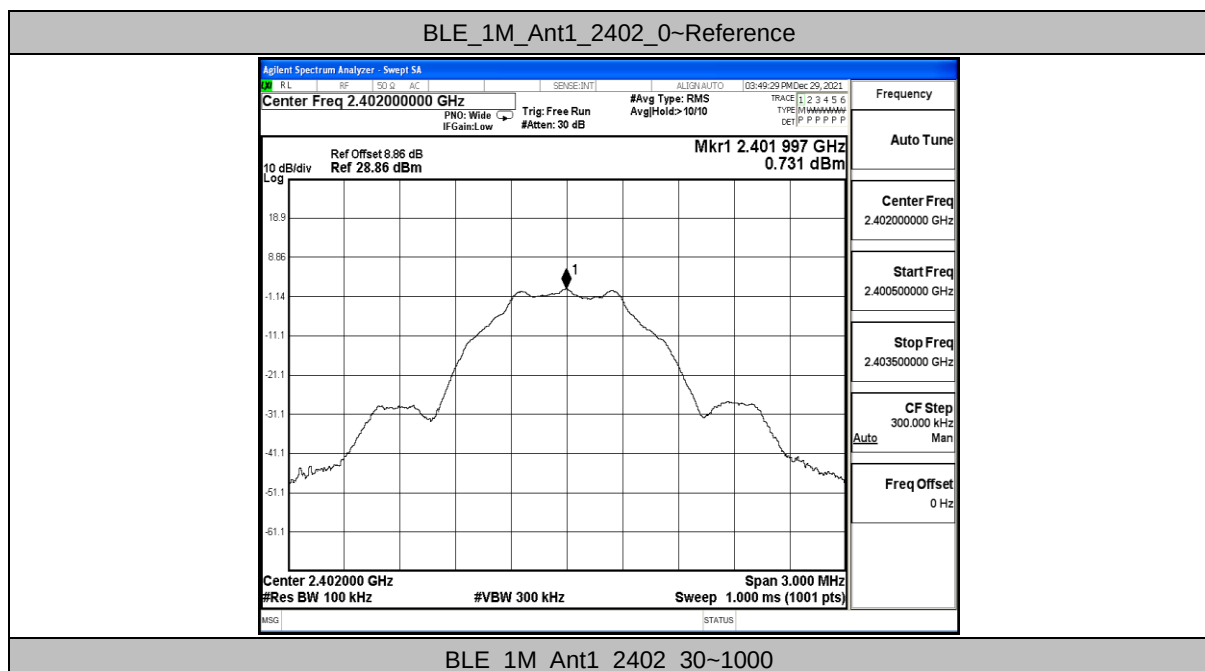


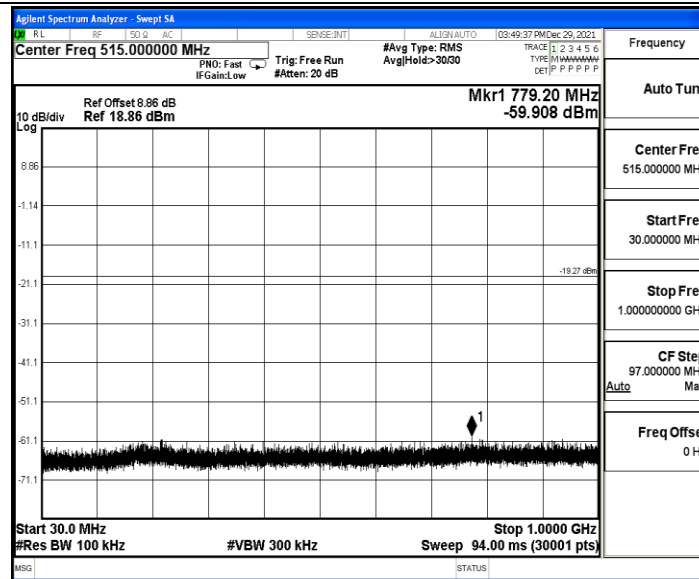
A.5 Conducted Spurious Emission

Test Result

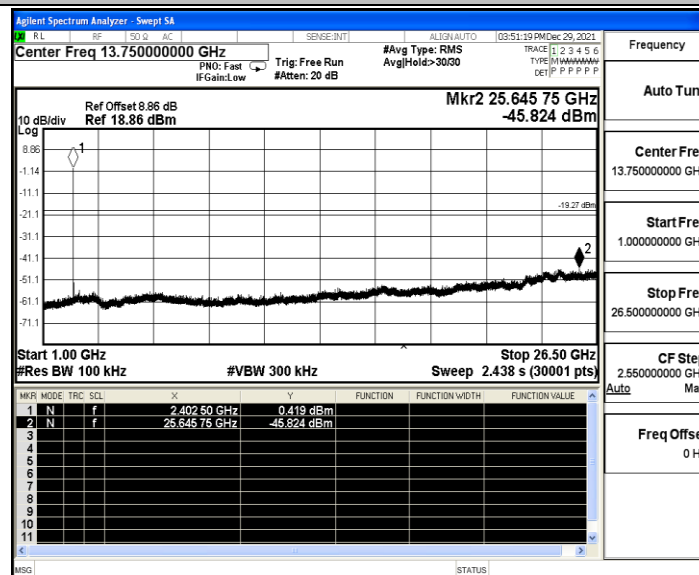
TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	0.73	0.73	---	PASS
			30~1000	0.73	-59.91	≤-19.27	PASS
			1000~26500	0.73	-45.82	≤-19.27	PASS
		2440	Reference	1.97	1.97	---	PASS
			30~1000	1.97	-60.33	≤-18.03	PASS
			1000~26500	1.97	-46.21	≤-18.03	PASS
		2480	Reference	0.38	0.38	---	PASS
			30~1000	0.38	-46.93	≤-19.62	PASS
			1000~26500	0.38	-46.08	≤-19.62	PASS
BLE_2M	Ant1	2402	Reference	-0.69	-0.69	---	PASS
			30~1000	-0.69	-60.03	≤-20.69	PASS
			1000~26500	-0.69	-45.09	≤-20.69	PASS
		2440	Reference	-0.57	-0.57	---	PASS
			30~1000	-0.57	-60.78	≤-20.57	PASS
			1000~26500	-0.57	-46.14	≤-20.57	PASS
		2480	Reference	-0.53	-0.53	---	PASS
			30~1000	-0.53	-60.4	≤-20.53	PASS
			1000~26500	-0.53	-45.83	≤-20.53	PASS

Test Graphs

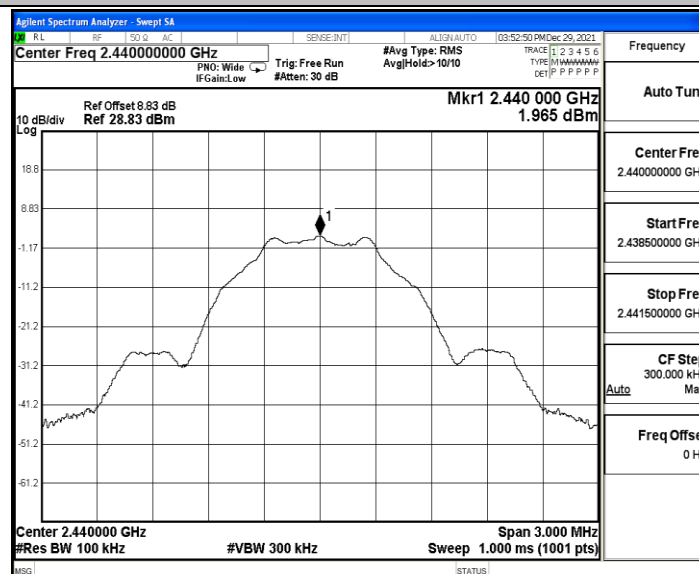




BLE_1M_Ant1_2402_1000~26500

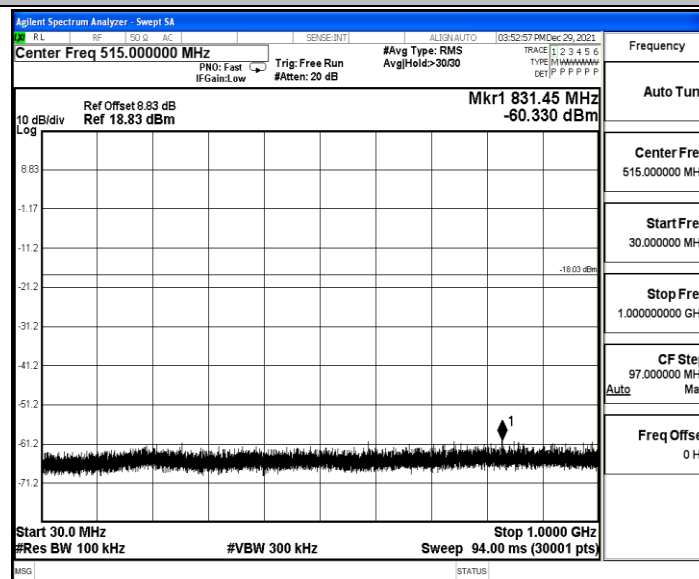


BLE_1M_Ant1_2440_0~Reference

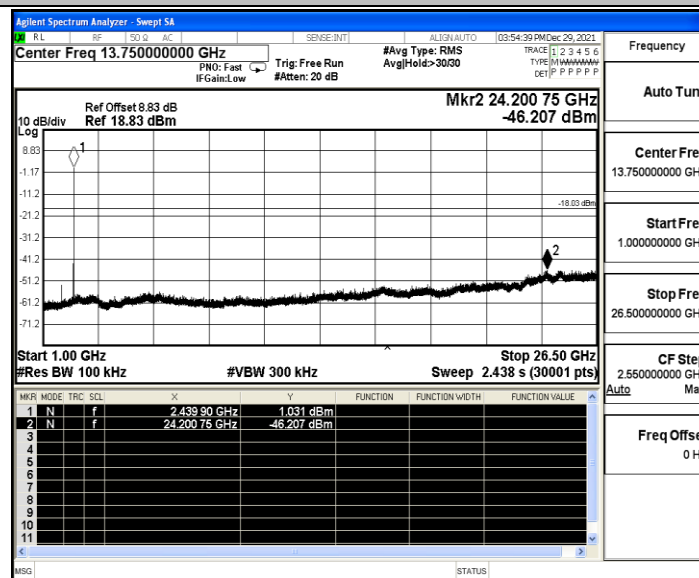




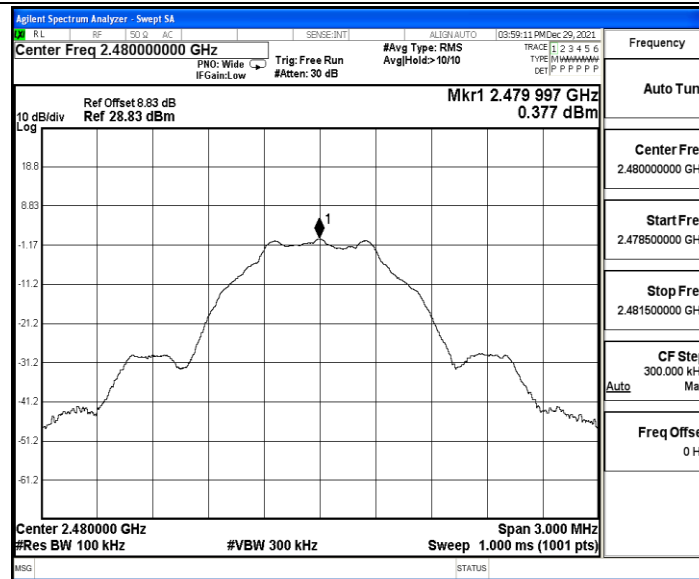
BLE_1M_Ant1_2440_30~1000



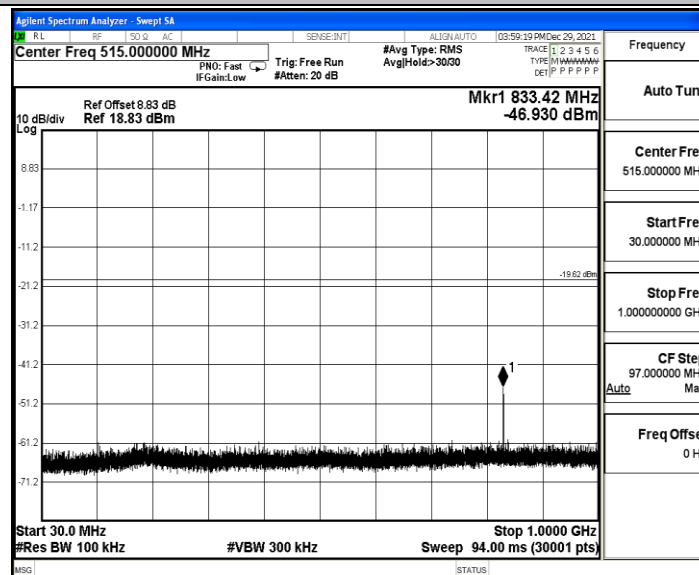
BLE_1M_Ant1_2440_1000~26500



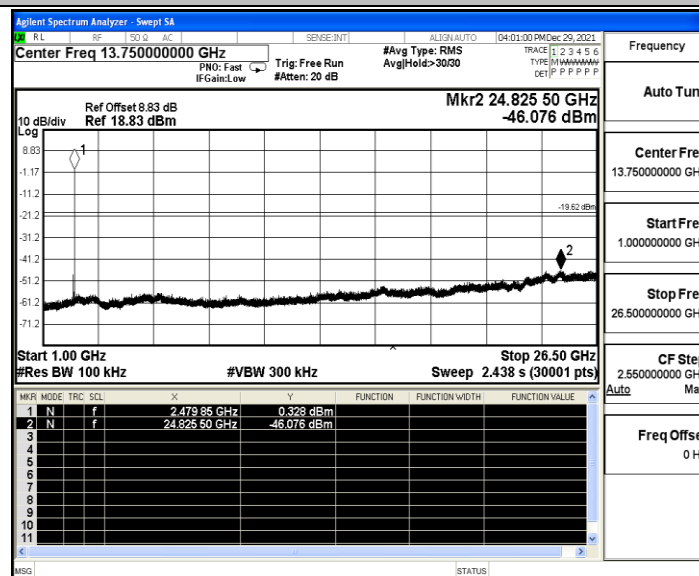
BLE_1M_Ant1_2480_0~Reference



BLE_1M_Ant1_2480_30~1000

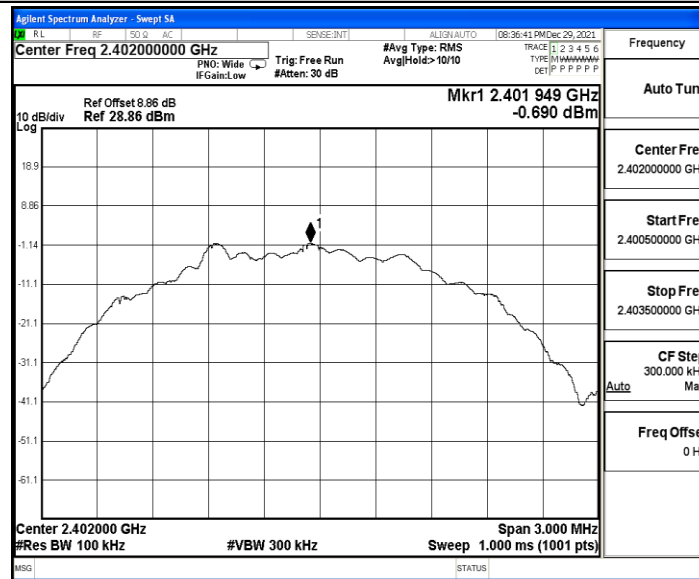


BLE_1M_Ant1_2480_1000~26500

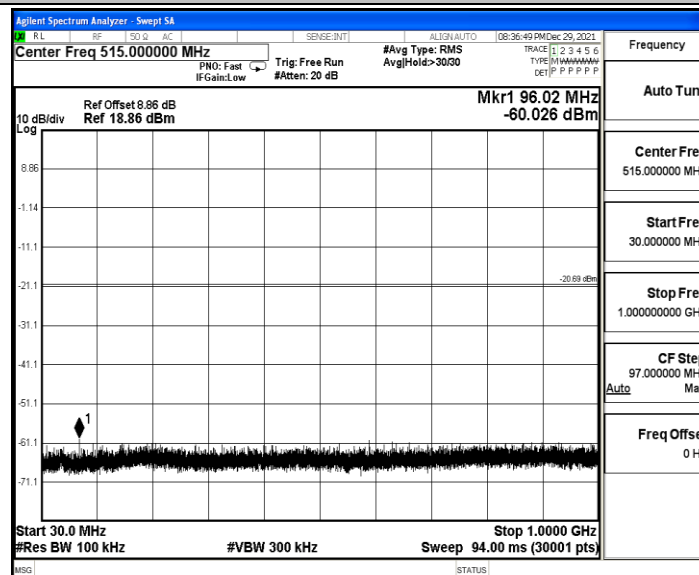




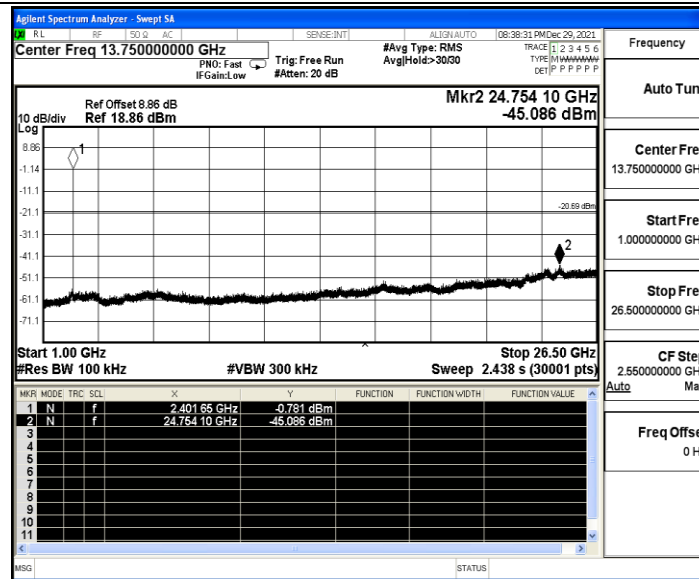
BLE_2M_Ant1_2402_0~Reference



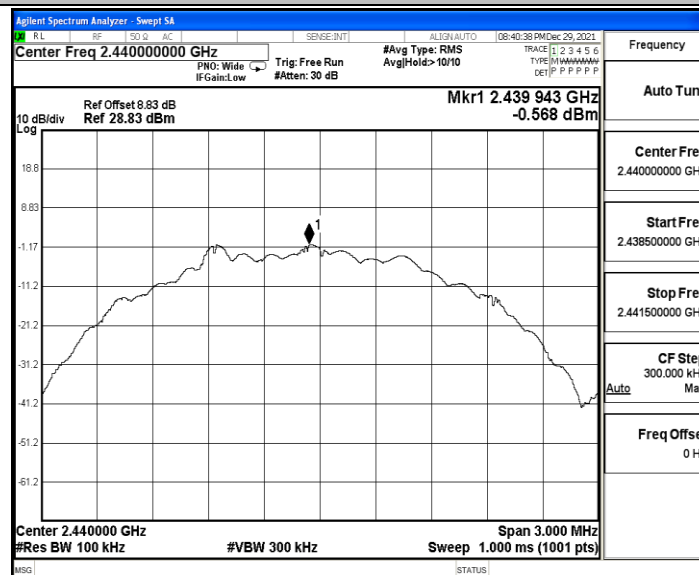
BLE_2M_Ant1_2402_30~1000



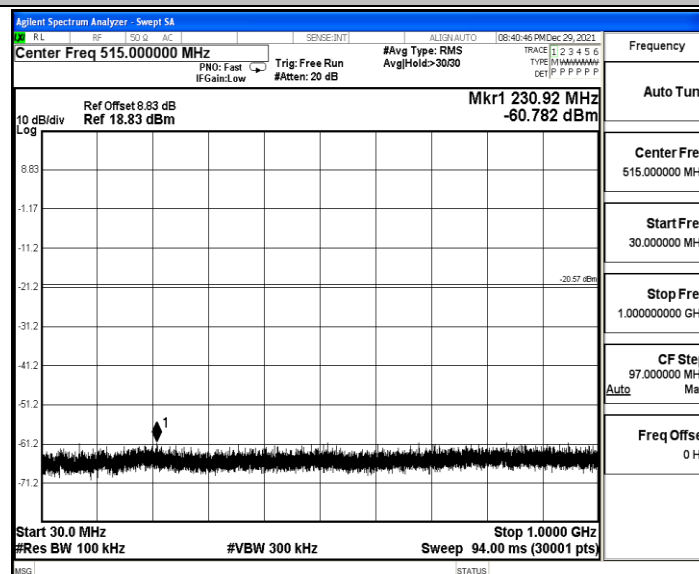
BLE_2M_Ant1_2402_1000~26500



BLE_2M_Ant1_2440_0~Reference

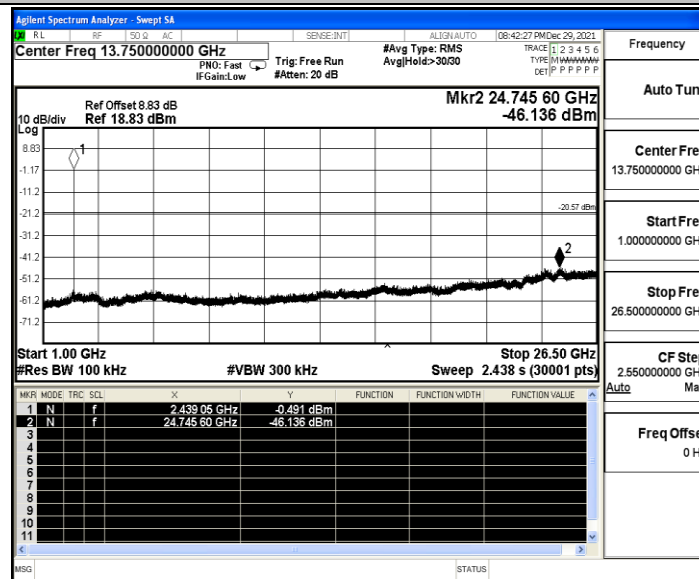


BLE_2M_Ant1_2440_30~1000

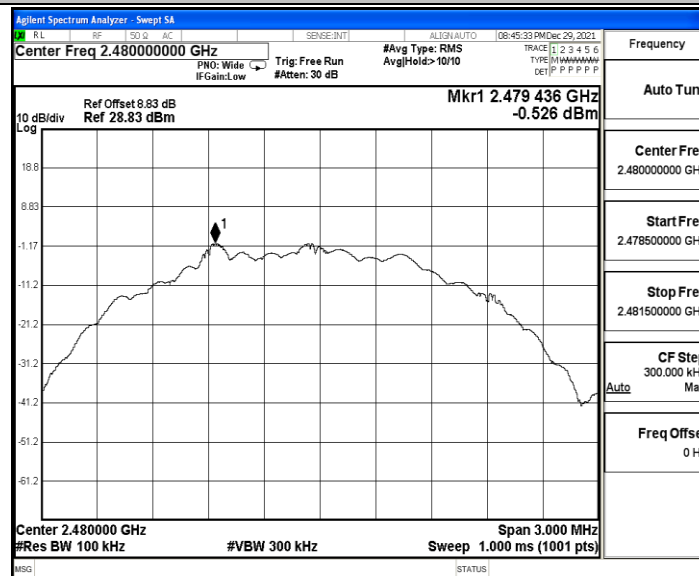




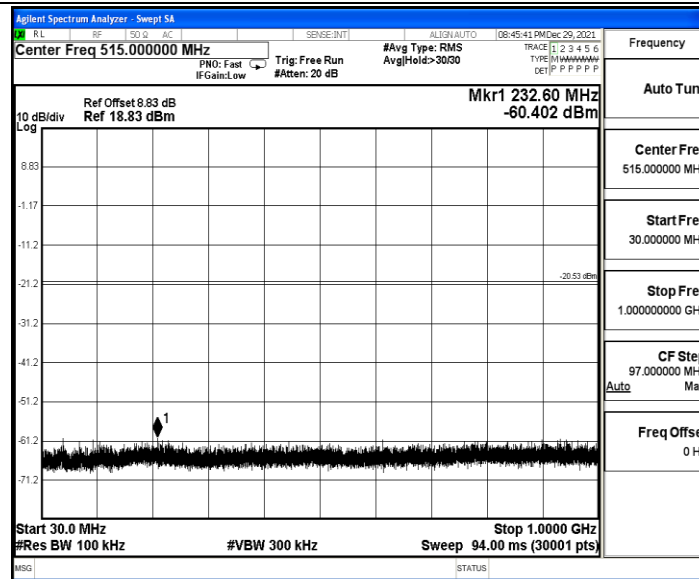
BLE_2M_Ant1_2440_1000~26500



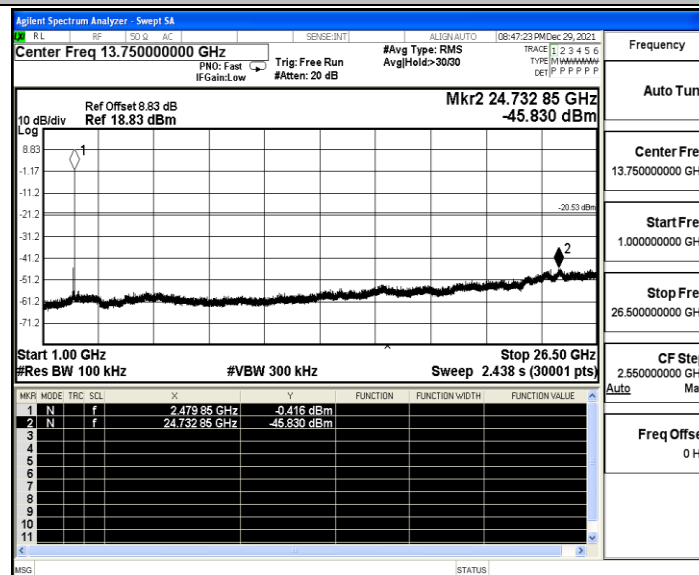
BLE_2M_Ant1_2480_0~Reference



BLE_2M_Ant1_2480_30~1000



BLE_2M_Ant1_2480_1000~26500



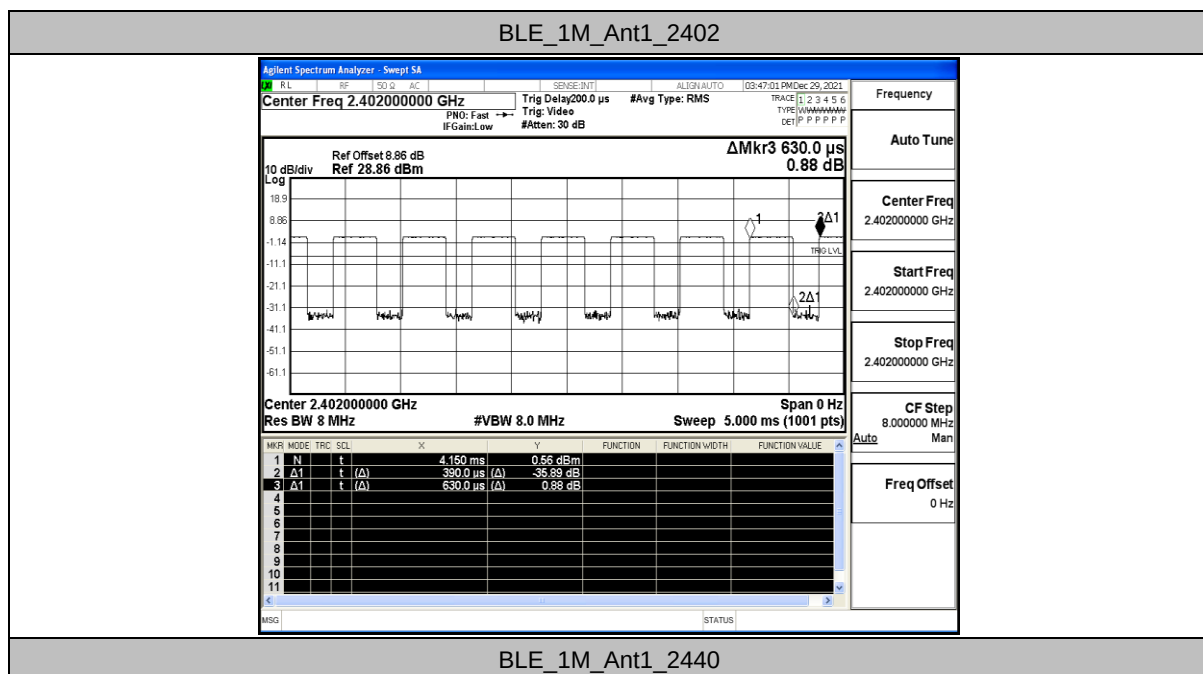


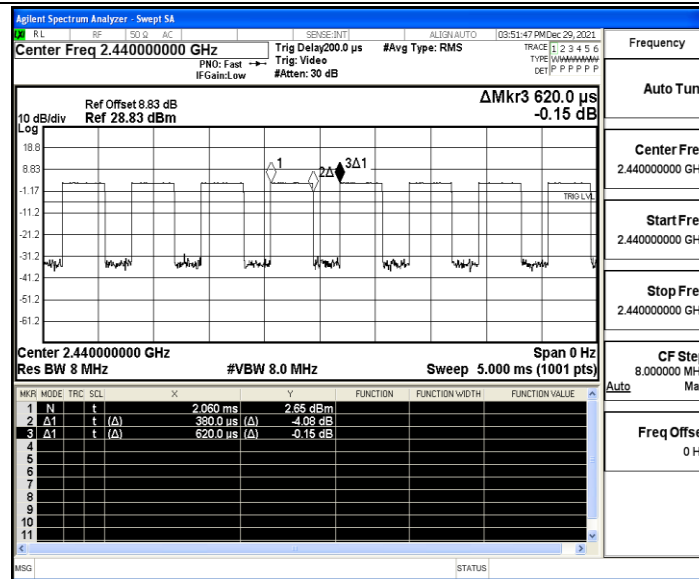
A.6 Duty Cycle

Test Result

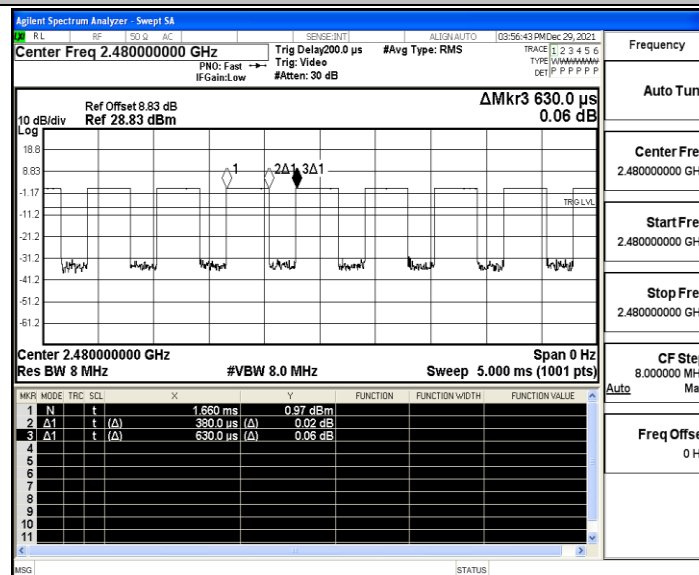
TestMode	Antenna	Channel	ON Time [ms]	Period [ms]	X	DC [%]	xFactor	Limit	Verdict
BLE_1M	Ant1	2402	0.39	0.63	0.6190	61.90	2.08	---	---
		2440	0.38	0.62	0.6129	61.29	2.13	---	---
		2480	0.38	0.63	0.6032	60.32	2.20	---	---
BLE_2M	Ant1	2402	1.07	1.25	0.8560	85.60	0.68	---	---
		2440	1.07	1.25	0.8560	85.60	0.68	---	---
		2480	1.08	1.25	0.8540	86.40	0.63	---	---

Test Graphs

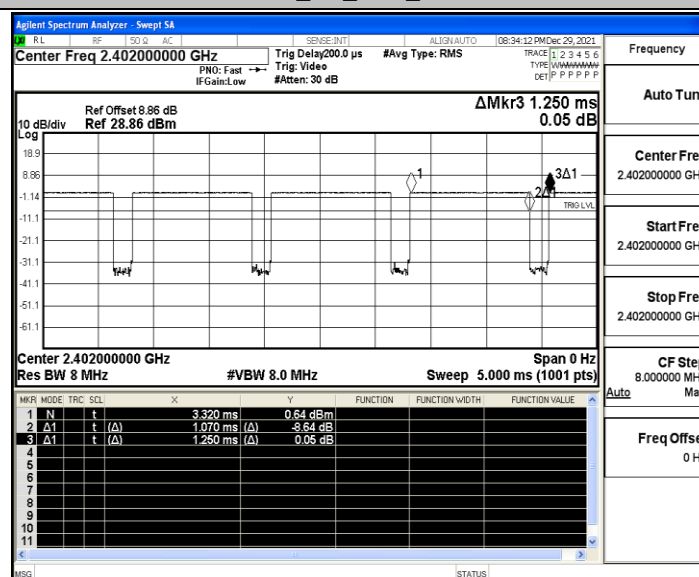




BLE_1M_Ant1_2480

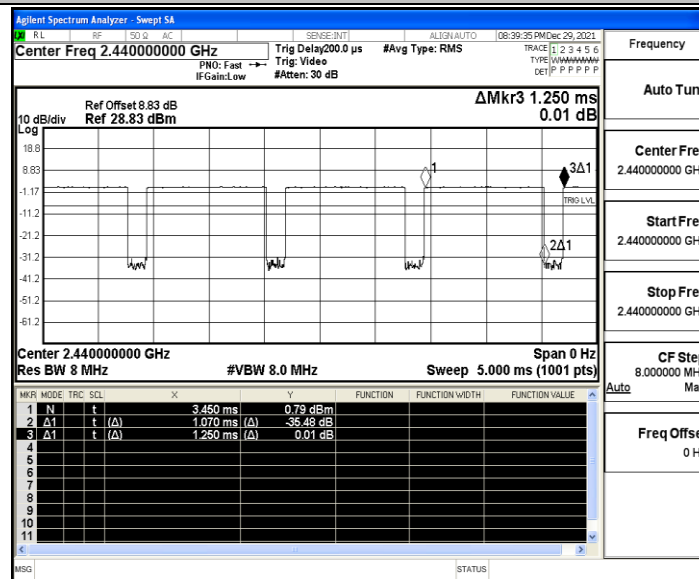


BLE_2M_Ant1_2402

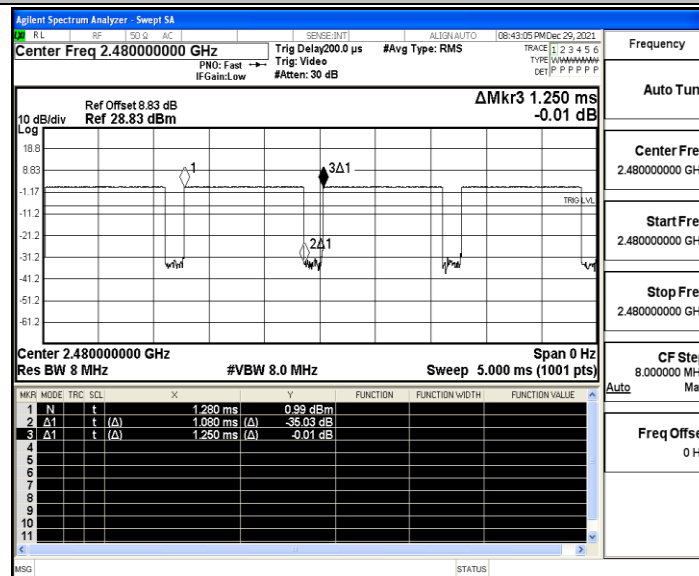




BLE_2M_Ant1_2440



BLE_2M_Ant1_2480





A.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	-47.08	≤-41.20	48.12	≤54	PASS
				AV	2351.030	-46.56	≤-41.20	48.64	≤54	PASS
				AV	2390.000	-46.88	≤-41.20	48.32	≤54	PASS
				Peak	2310.000	-39.05	≤-21.20	56.15	≤74	PASS
				Peak	2354.075	-36.13	≤-21.20	59.07	≤74	PASS
				Peak	2390.000	-38.93	≤-21.20	56.27	≤74	PASS
		High	2480	AV	2483.500	-45.93	≤-41.20	49.27	≤54	PASS
				AV	2497.120	-45.86	≤-41.20	49.34	≤54	PASS
				AV	2500.000	-46.39	≤-41.20	48.81	≤54	PASS
				Peak	2483.500	-38.26	≤-21.20	56.94	≤74	PASS
				Peak	2487.920	-35.7	≤-21.20	59.50	≤74	PASS
				Peak	2500.000	-37.22	≤-21.20	57.98	≤74	PASS
BLE_2M	Ant1	Low	2402	AV	2310.000	-47.27	≤-41.20	47.93	≤54	PASS
				AV	2384.000	-46.69	≤-41.20	48.51	≤54	PASS
				AV	2390.000	-47.33	≤-41.20	47.87	≤54	PASS
				Peak	2310.000	-38.46	≤-21.20	56.74	≤74	PASS
				Peak	2328.560	-36.17	≤-21.20	59.03	≤74	PASS
				Peak	2390.000	-38.36	≤-21.20	56.84	≤74	PASS
		High	2480	AV	2483.500	-45.54	≤-41.20	49.66	≤54	PASS
				AV	2483.520	-45.54	≤-41.20	49.66	≤54	PASS
				AV	2500.000	-46.84	≤-41.20	48.36	≤54	PASS
				Peak	2483.500	-36.66	≤-21.20	58.54	≤74	PASS
				Peak	2493.840	-35.96	≤-21.20	59.24	≤74	PASS
				Peak	2500.000	-37.68	≤-21.20	57.52	≤74	PASS

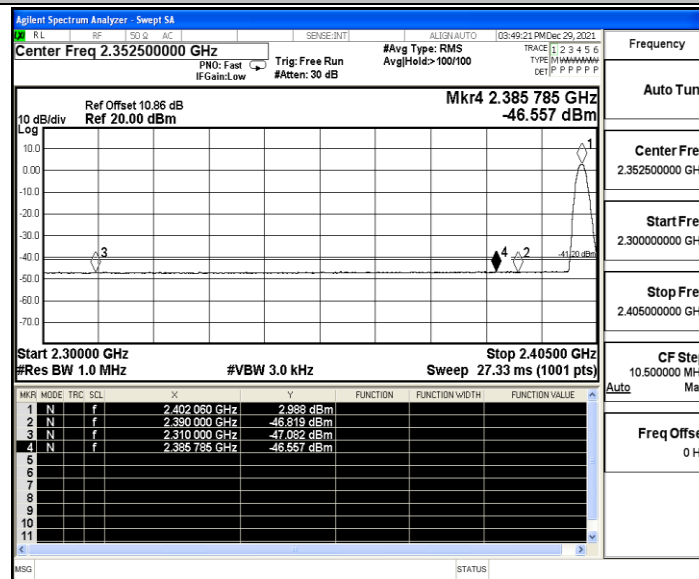
Note:

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.

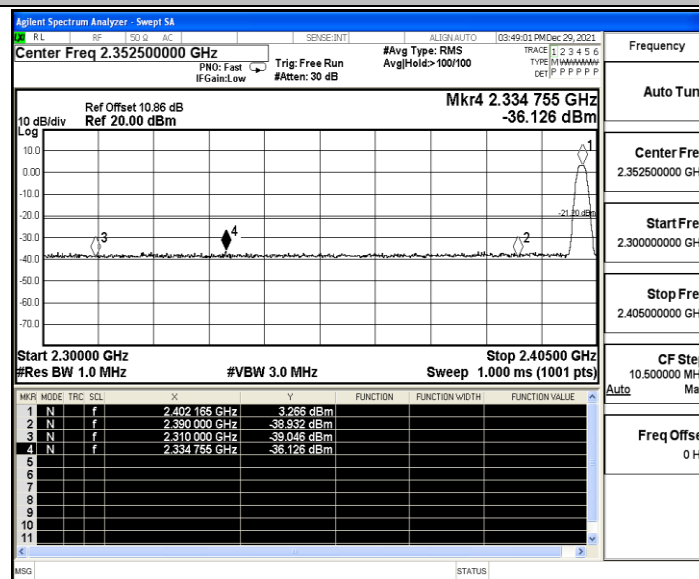


Test Graphs

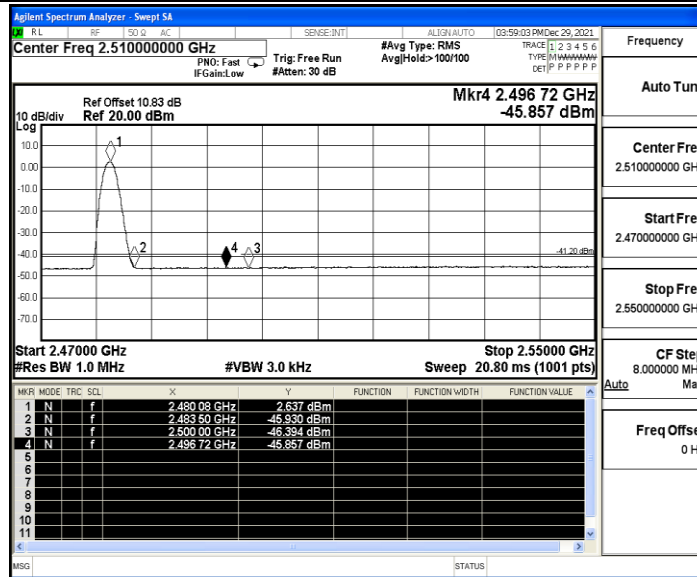
BLE_1M_Ant1_Low_2402_AV



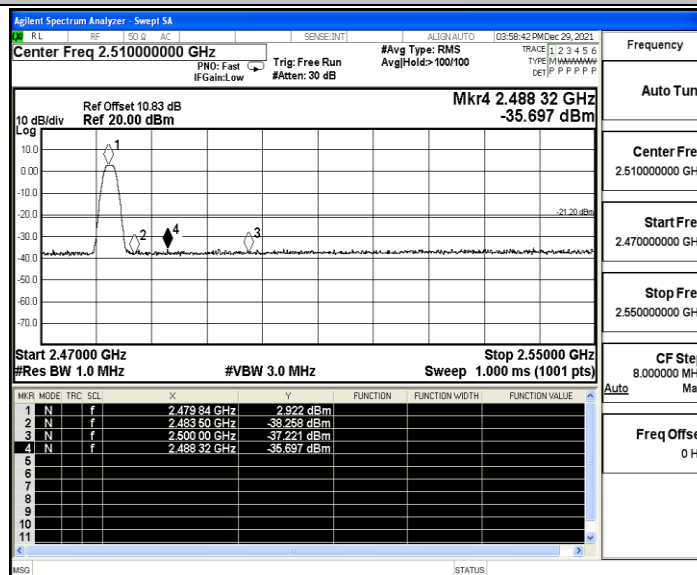
BLE_1M_Ant1_Low_2402_Peak



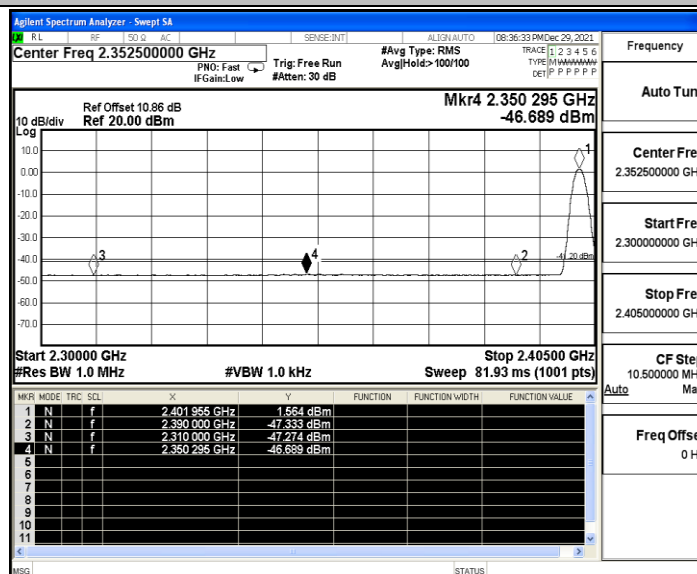
BLE_1M_Ant1_High_2480_AV



BLE_1M_Ant1_High_2480_Peak

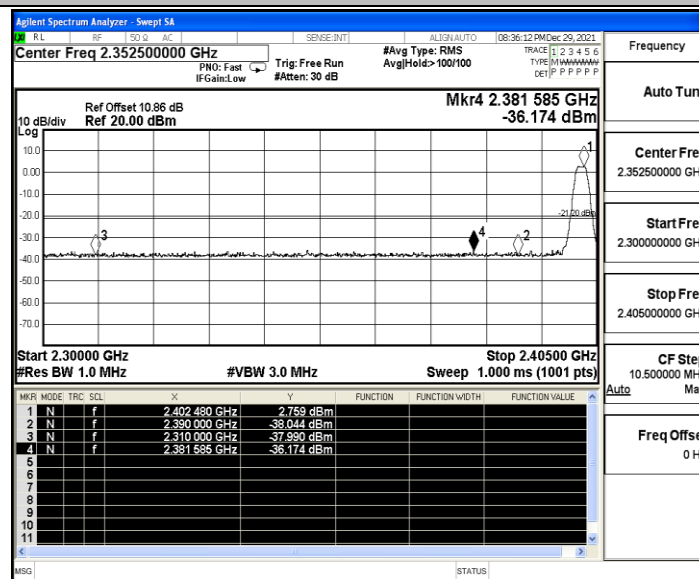


BLE_2M_Ant1_Low_2402_AV

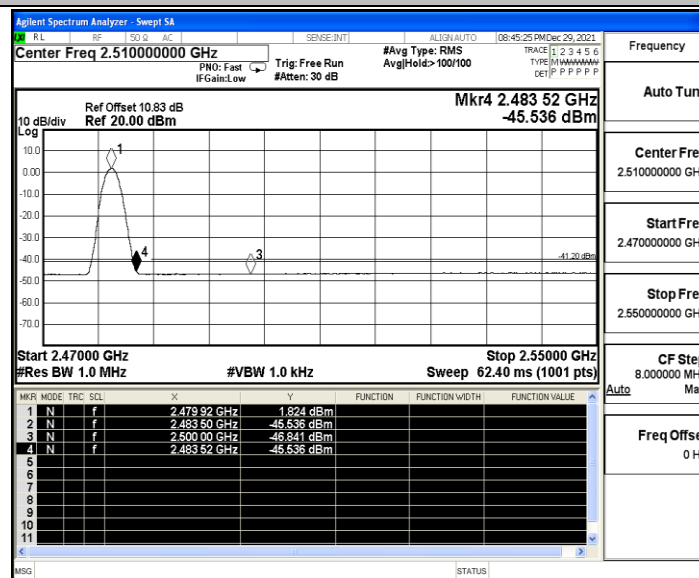




BLE_2M_Ant1_Low_2402_Peak



BLE_2M_Ant1_High_2480_AV



BLE_2M_Ant1_High_2480_Peak

