



Appendix B

RF Test Data for BLE (Conducted Measurement)

Product Name: Rugged Handheld Computer

Test Model: EA520

Environmental Conditions

Temperature:	21.2° C
Relative Humidity:	52.1%
ATM Pressure:	100.0 kPa
Test Engineer:	Kay Hu
Supervised by:	Li Huan



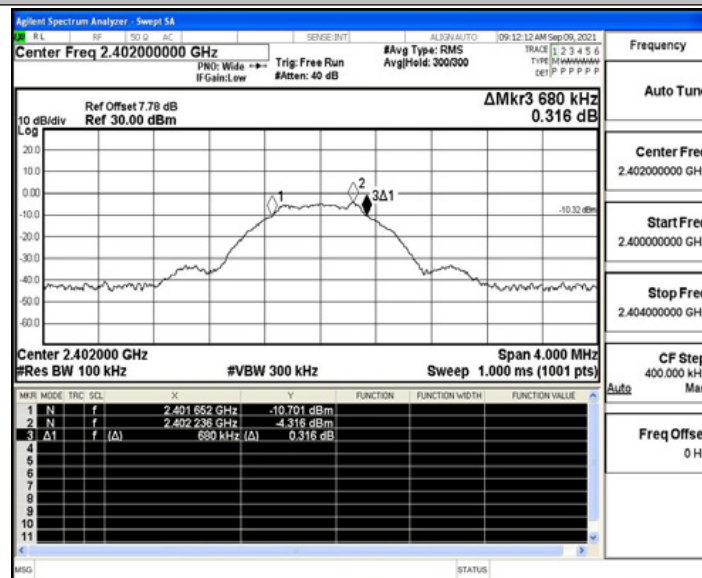
B.1 6dB Bandwidth

Test Result

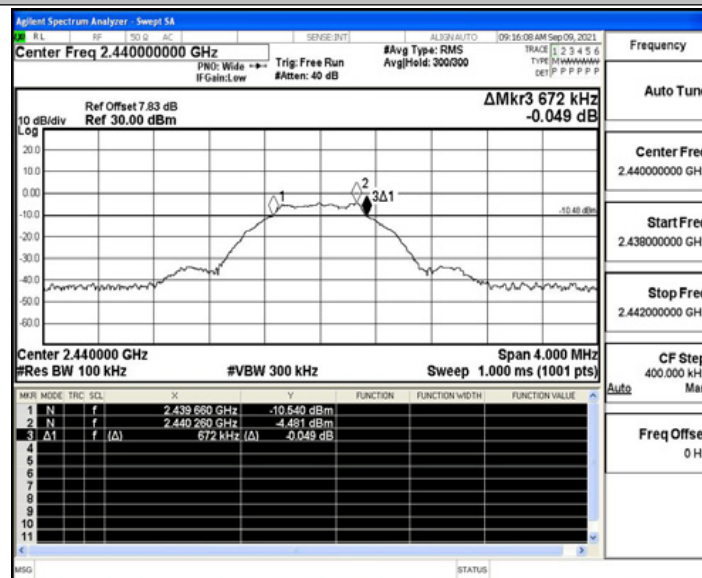
TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.680	2401.652	2402.332	≥ 0.5	PASS
		2440	0.672	2439.660	2440.332	≥ 0.5	PASS
		2480	0.704	2479.644	2480.348	≥ 0.5	PASS

Test Graphs

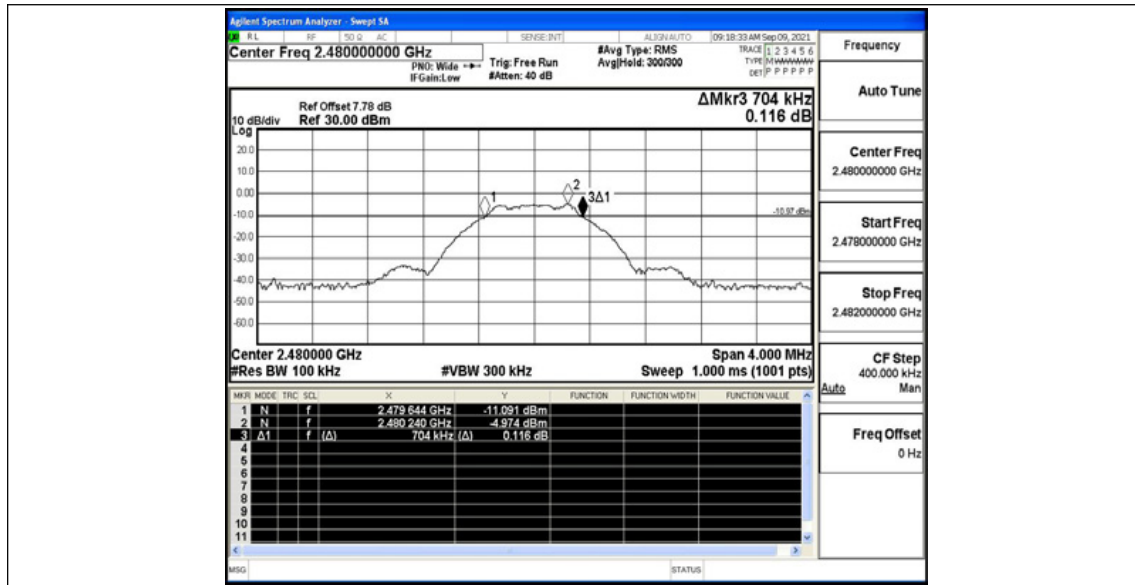
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480

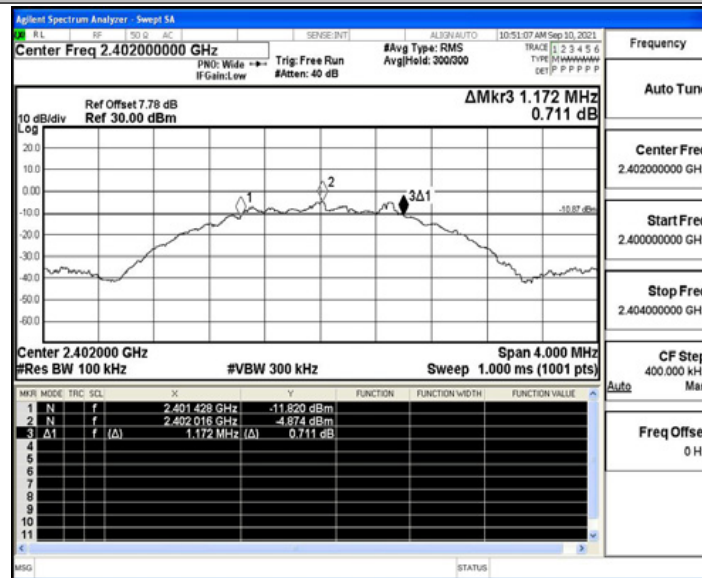




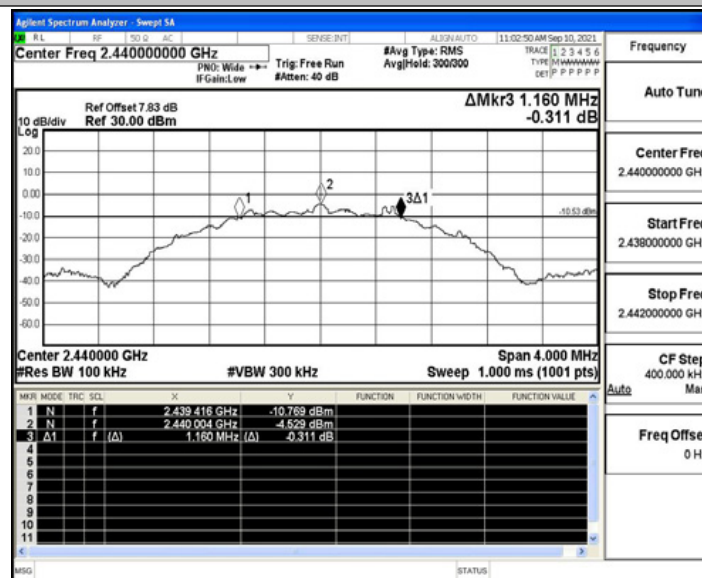
TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_2M	Ant1	2402	1.172	2401.428	2402.600	≥0.5	PASS
		2440	1.160	2439.416	2440.576	≥0.5	PASS
		2480	1.388	2479.308	2480.696	≥0.5	PASS

Test Graphs

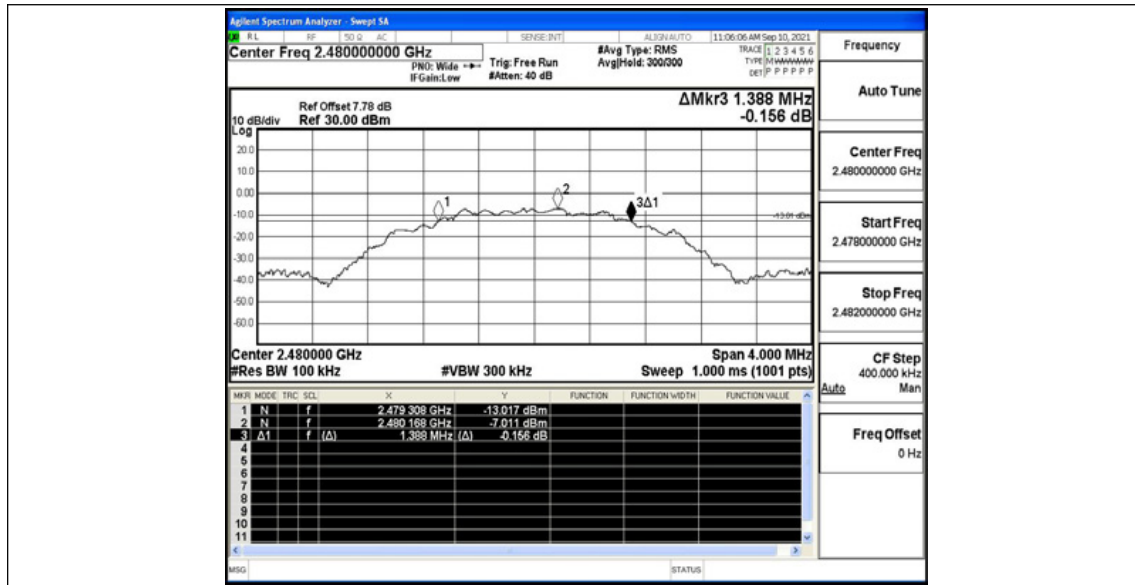
BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



BLE_2M_Ant1_2480





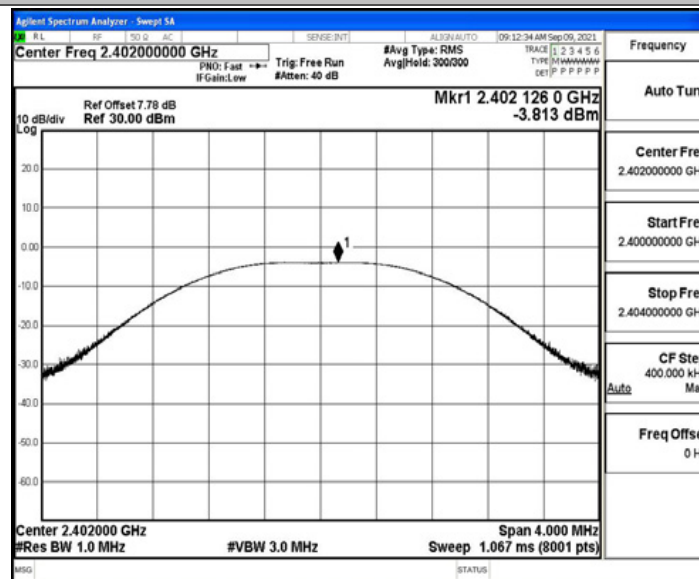
B.2 Maximum conducted output power

Test Result

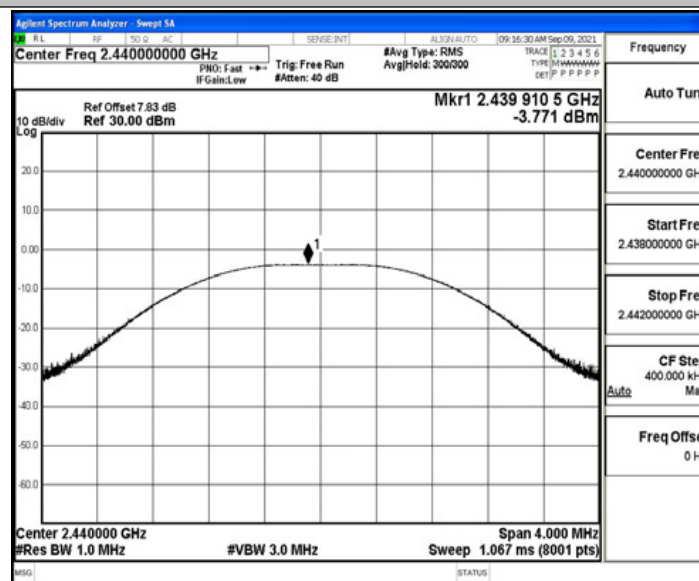
TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	-3.81	≤30	PASS
		2440	-3.77	≤30	PASS
		2480	-3.88	≤30	PASS

Test Graphs

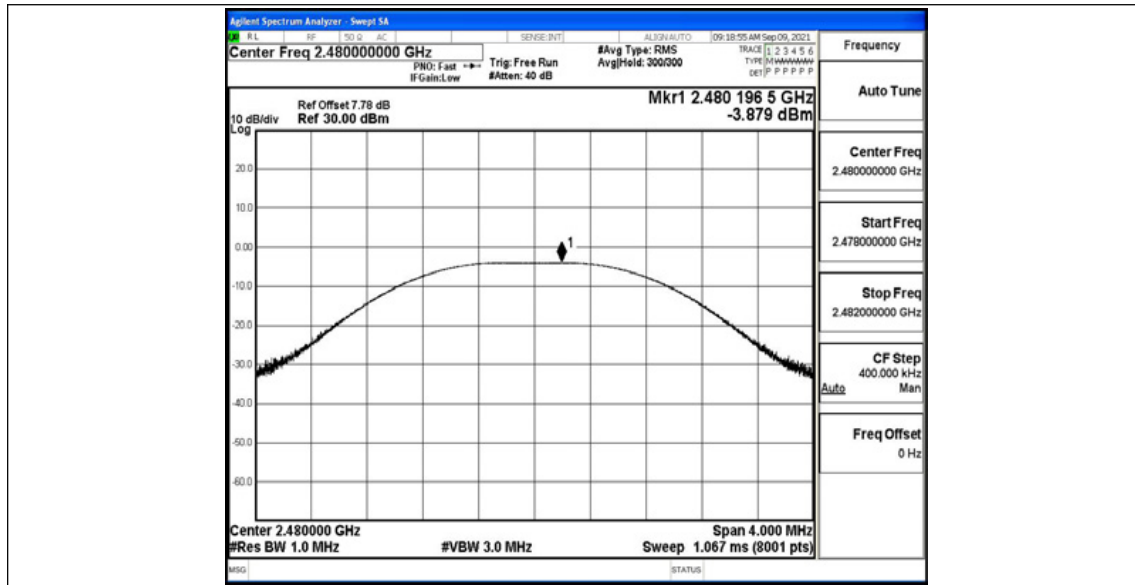
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480

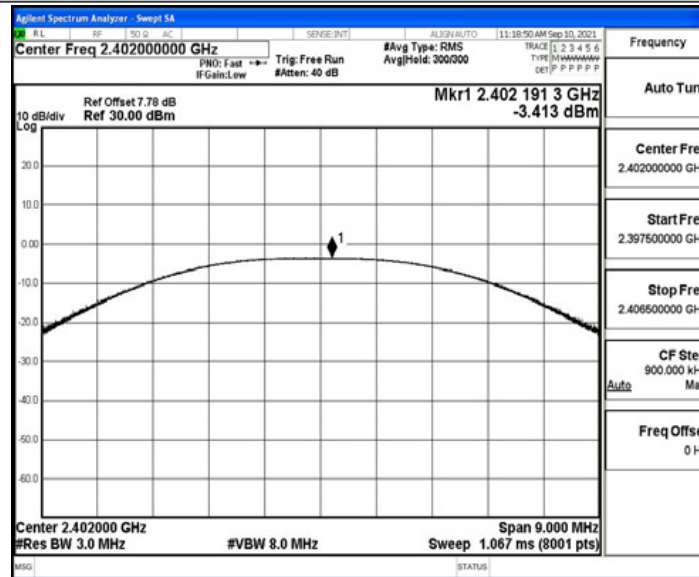




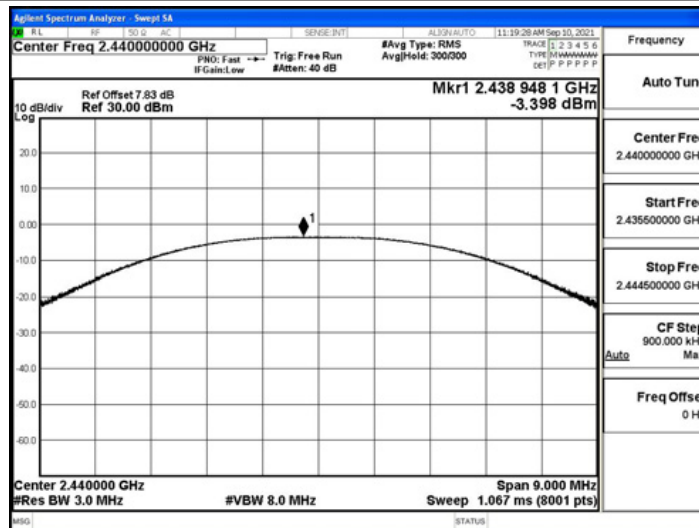
TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_2M	Ant1	2402	-3.41	≤30	PASS
		2440	-3.40	≤30	PASS
		2480	-3.38	≤30	PASS

Test Graphs

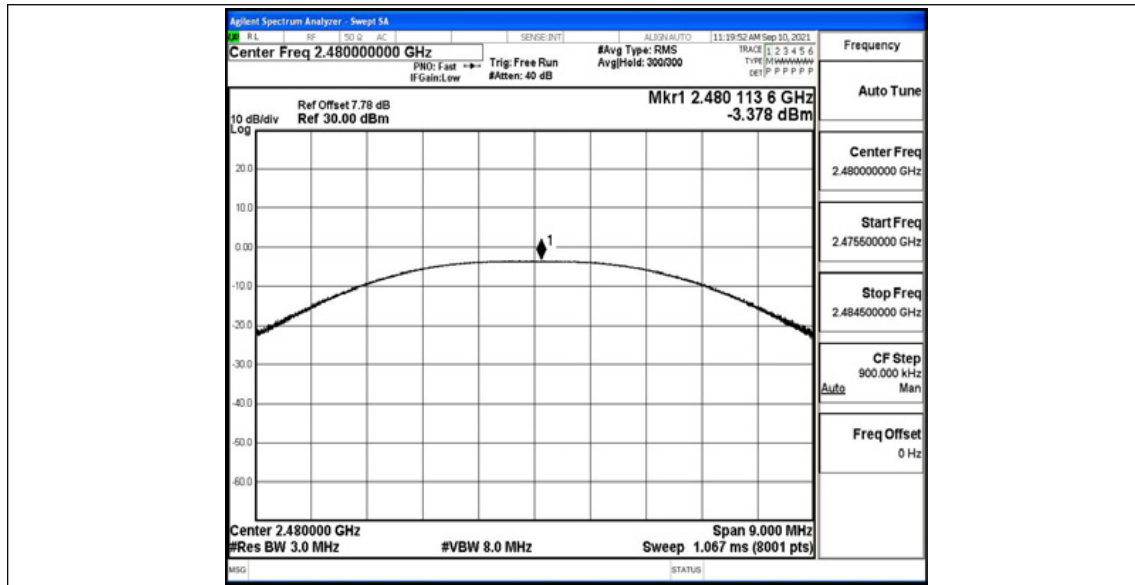
BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



BLE_2M_Ant1_2480





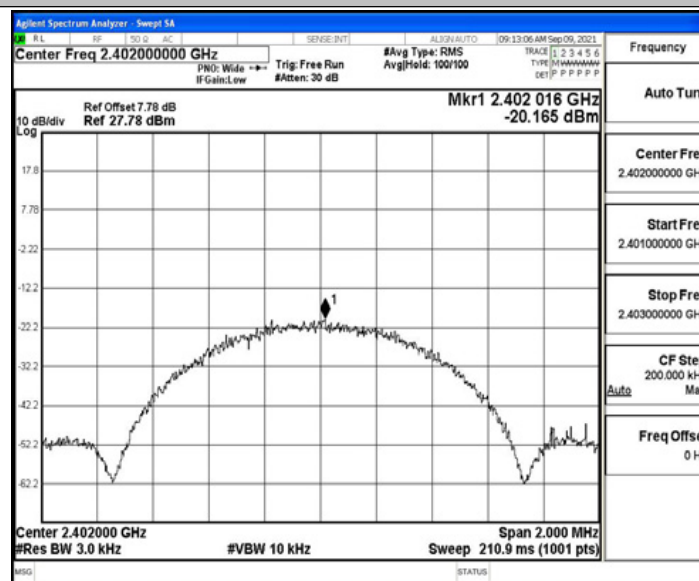
B.3 Maximum power spectral density

Test Result

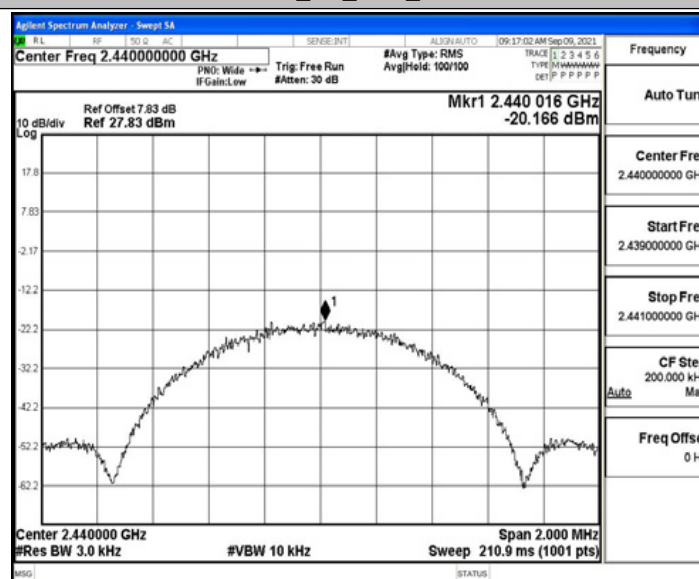
TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-20.17	≤8	PASS
		2440	-20.17	≤8	PASS
		2480	-20.35	≤8	PASS

Test Graphs

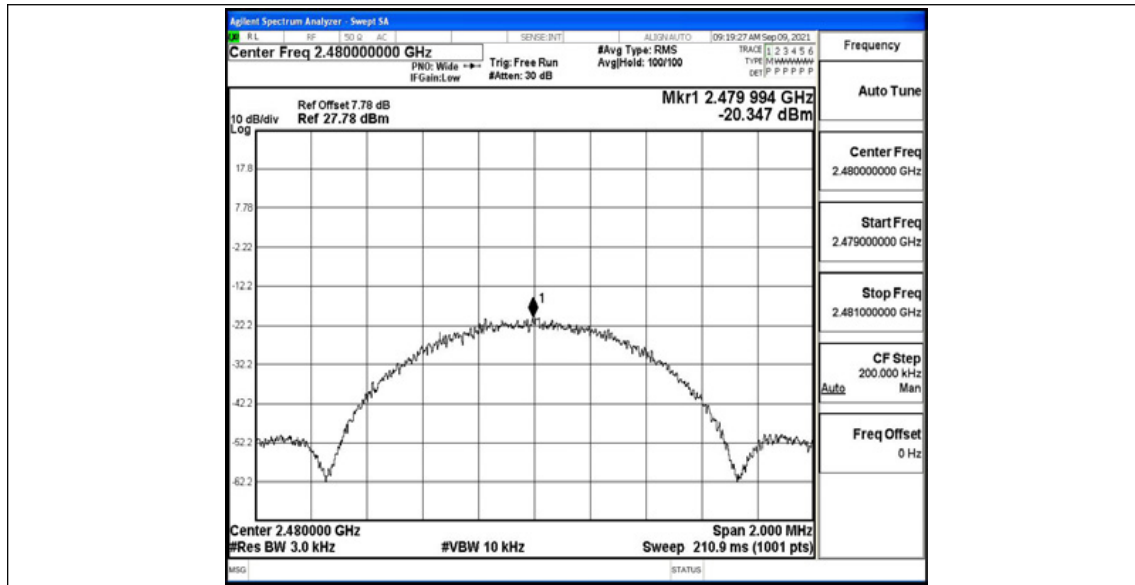
BLE_1M_Ant1_2402

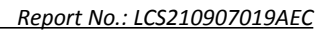


BLE_1M_Ant1_2440



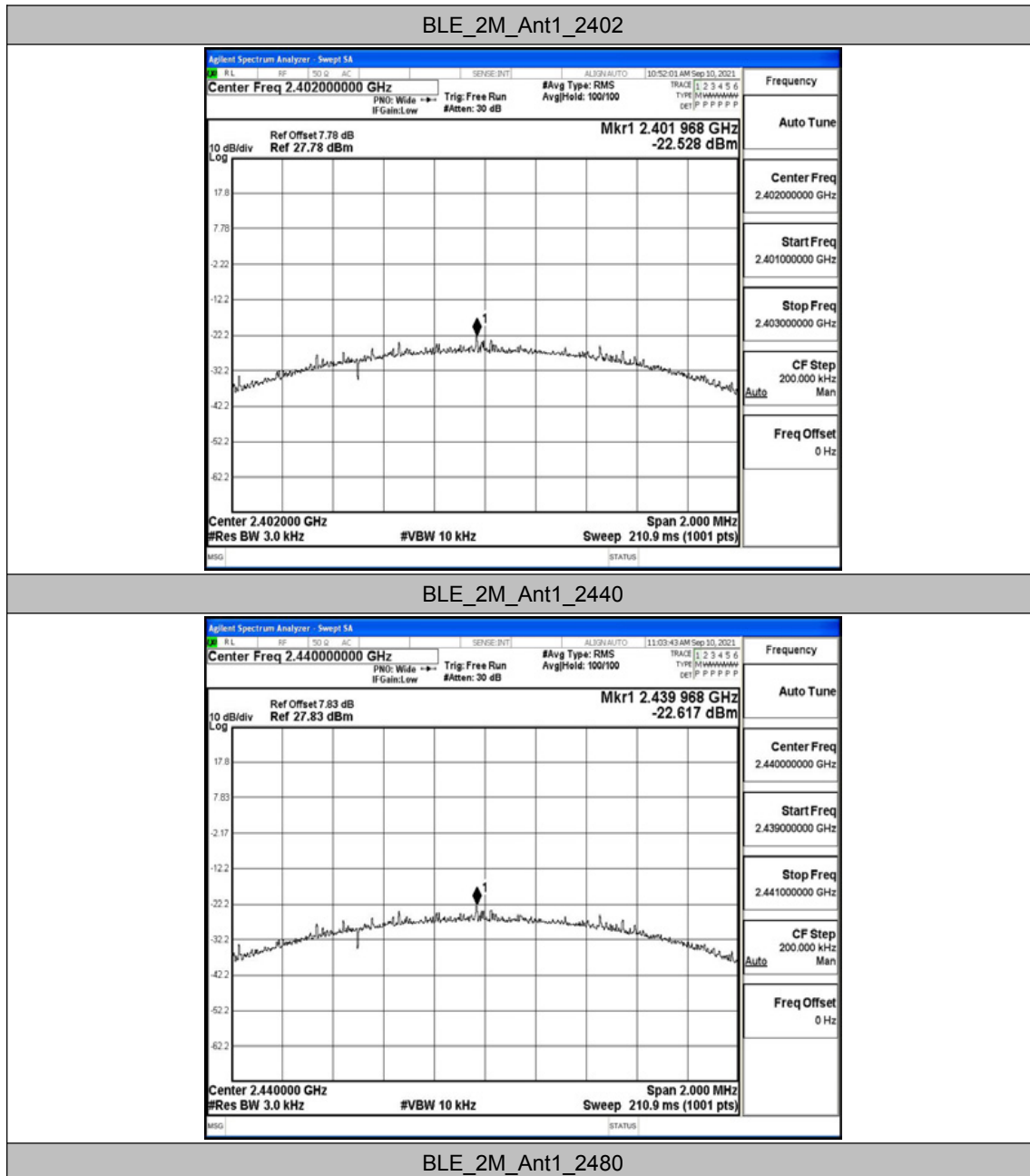
BLE_1M_Ant1_2480

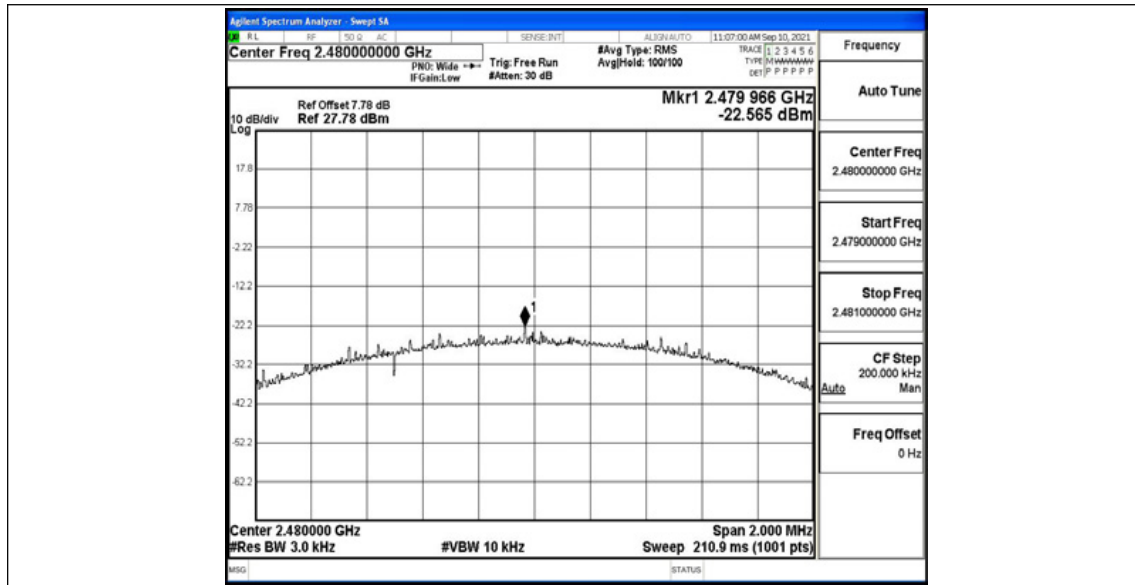




TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
BLE_2M	Ant1	2402	-22.53	≤8	PASS
		2440	-22.62	≤8	PASS
		2480	-22.57	≤8	PASS

Test Graphs





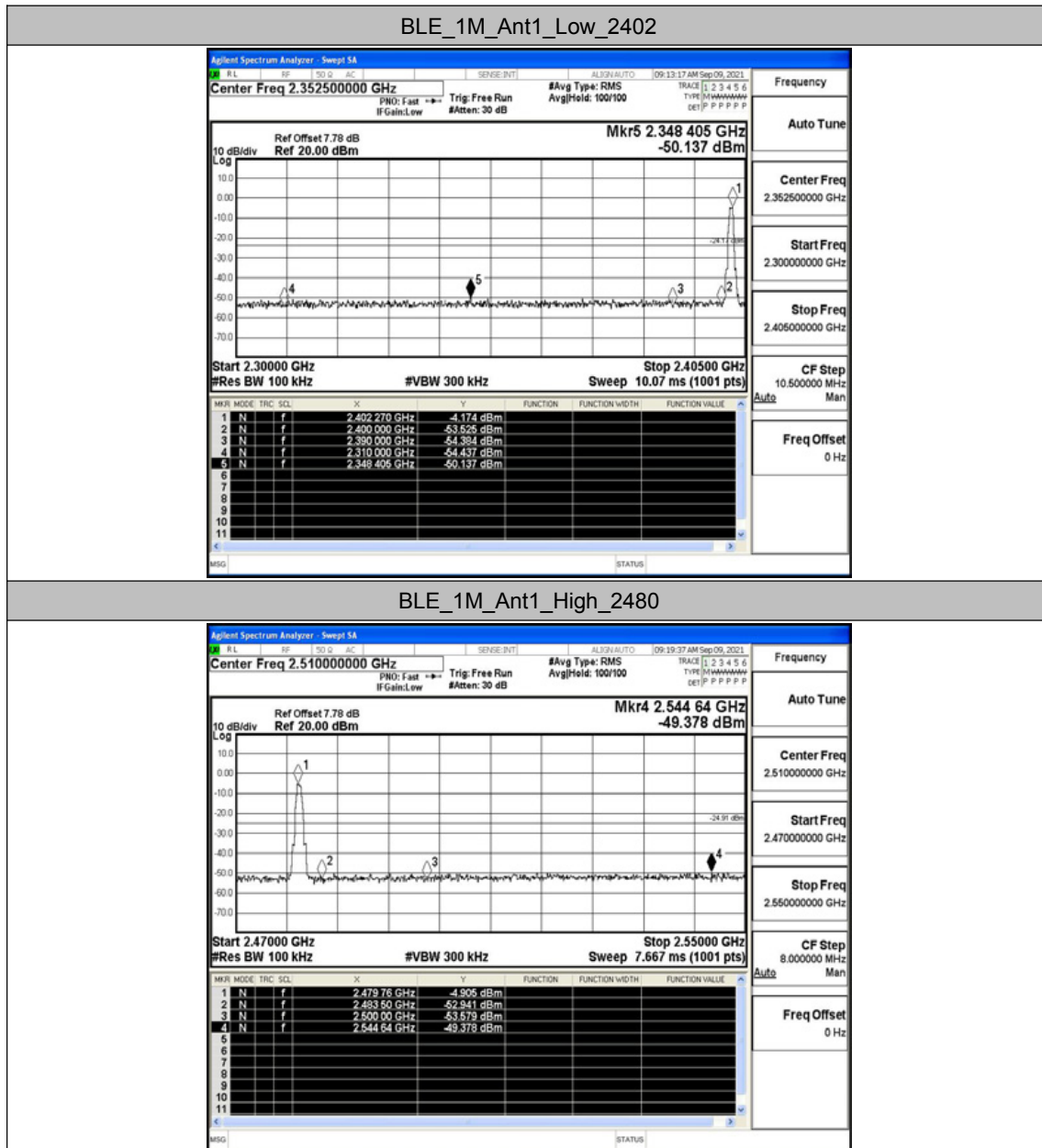


B.4 Band edge measurements

Test Result

TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	-4.17	-50.14	≤ -24.17	PASS
		High	2480	-4.91	-49.38	≤ -24.91	PASS

Test Graphs

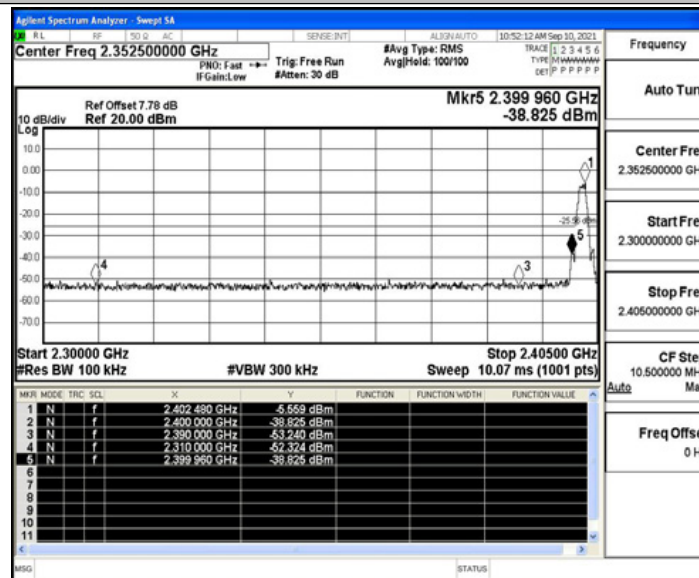




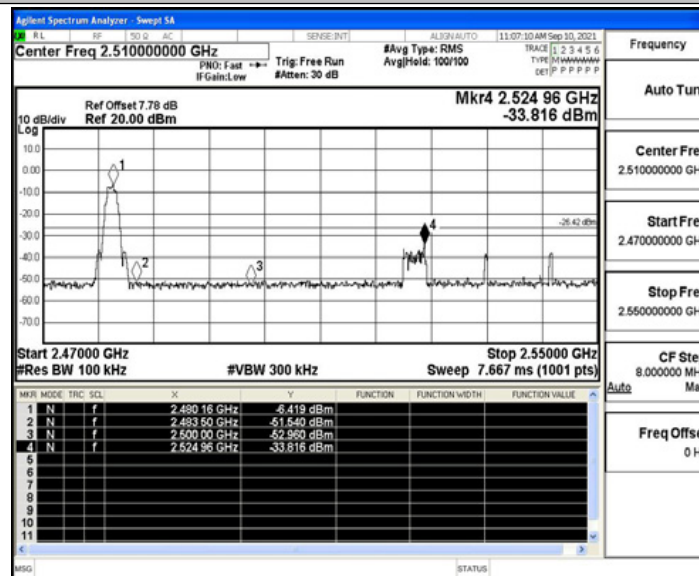
TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_2M	Ant1	Low	2402	-5.56	-38.83	≤-25.56	PASS
		High	2480	-6.42	-33.82	≤-26.42	PASS

Test Graphs

BLE_2M_Ant1_Low_2402



BLE_2M_Ant1_High_2480



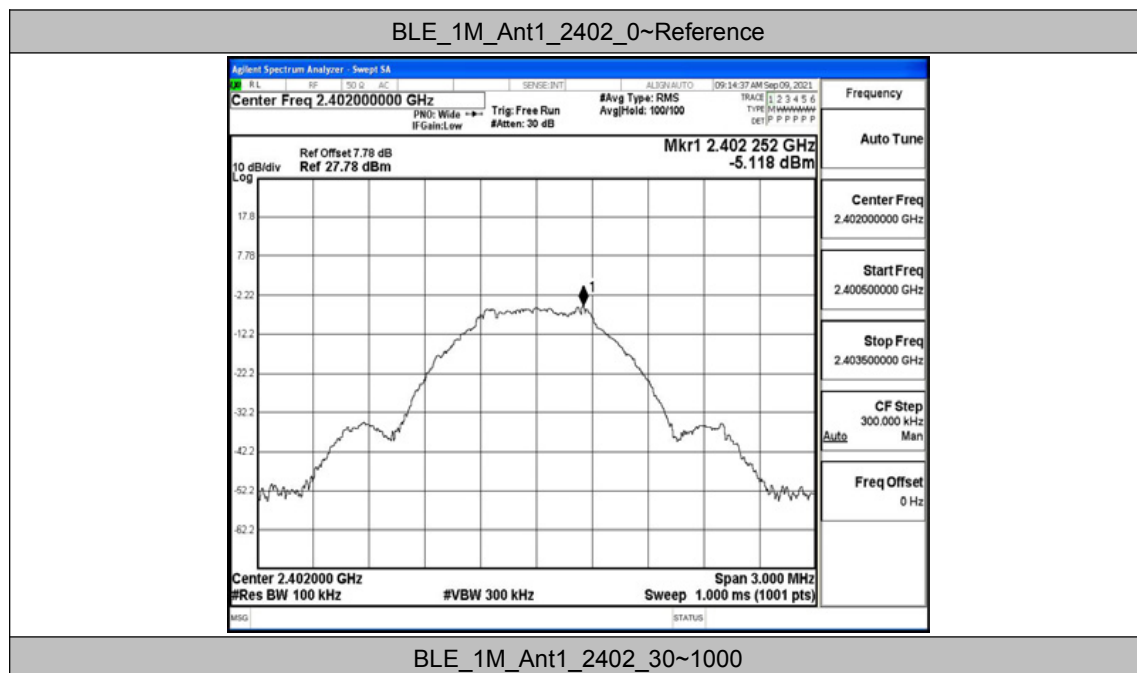


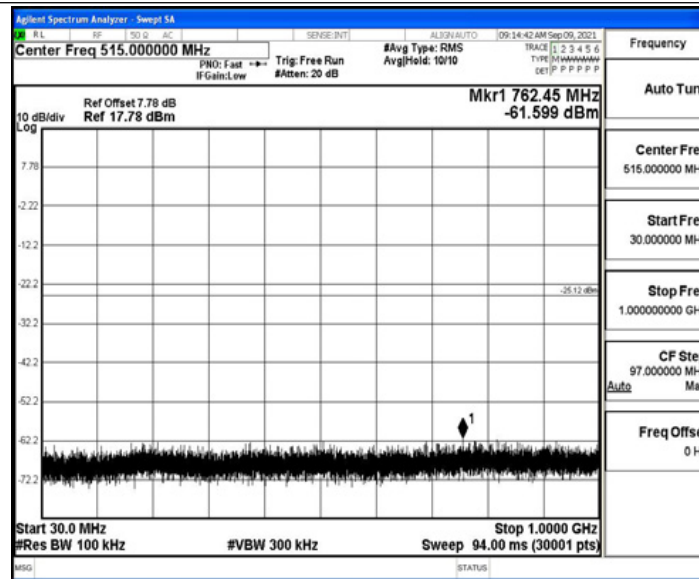
B.5 Conducted Spurious Emission

Test Result

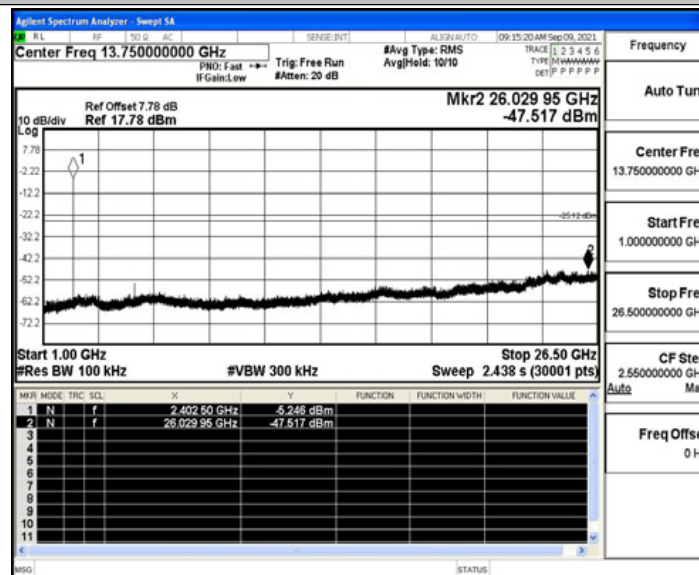
TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	-5.12	-5.12	---	PASS
			30~1000	-5.12	-61.6	≤-25.12	PASS
			1000~26500	-5.12	-47.52	≤-25.12	PASS
		2440	Reference	-4.30	-4.30	---	PASS
			30~1000	-4.30	-61.94	≤-24.3	PASS
			1000~26500	-4.30	-47.8	≤-24.3	PASS
		2480	Reference	-4.69	-4.69	---	PASS
			30~1000	-4.69	-60.39	≤-24.69	PASS
			1000~26500	-4.69	-39.31	≤-24.69	PASS

Test Graphs

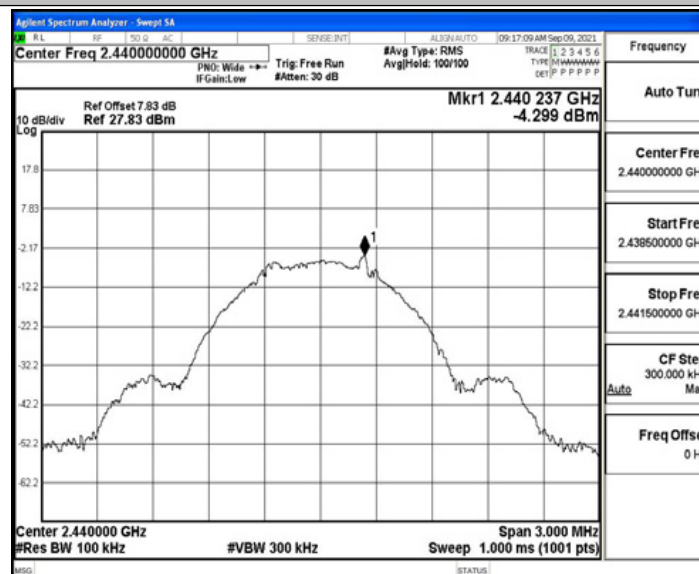




BLE_1M_Ant1_2402_1000~26500

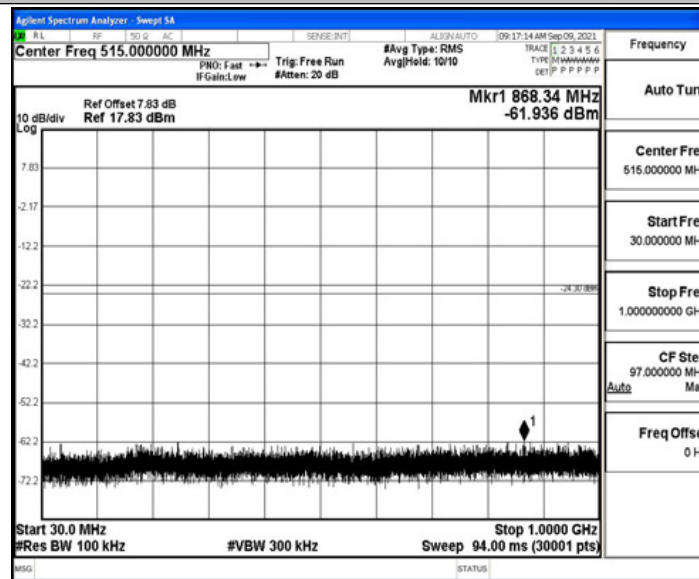


BLE_1M_Ant1_2440_0~Reference

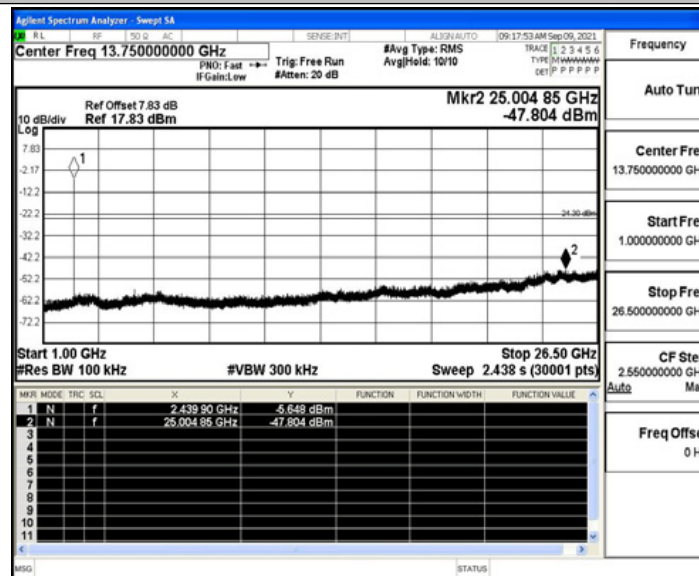




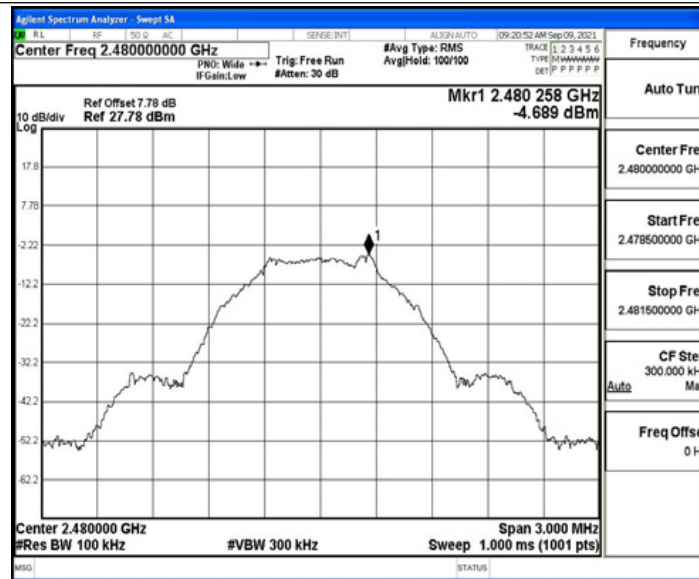
BLE_1M_Ant1_2440_30~1000



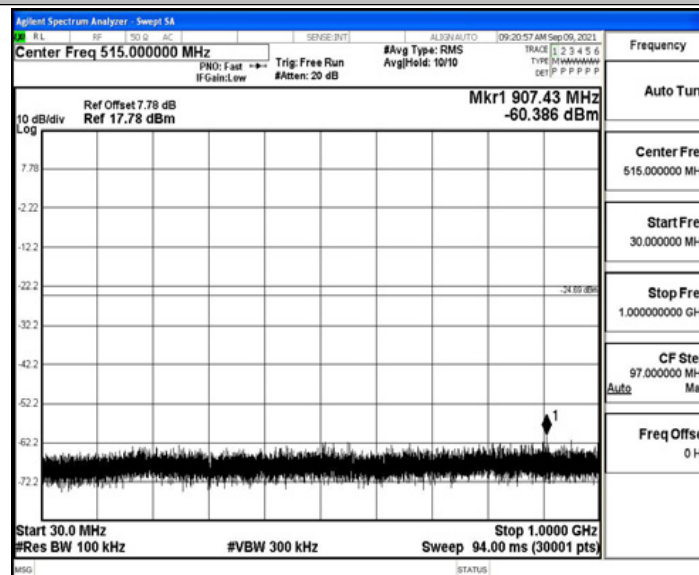
BLE_1M_Ant1_2440_1000~26500



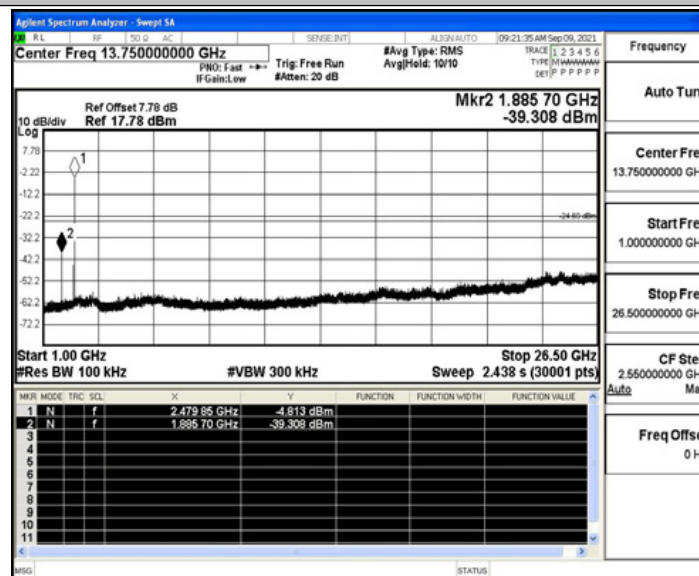
BLE_1M_Ant1_2480_0~Reference



BLE_1M_Ant1_2480_30~1000



BLE_1M_Ant1_2480_1000~26500



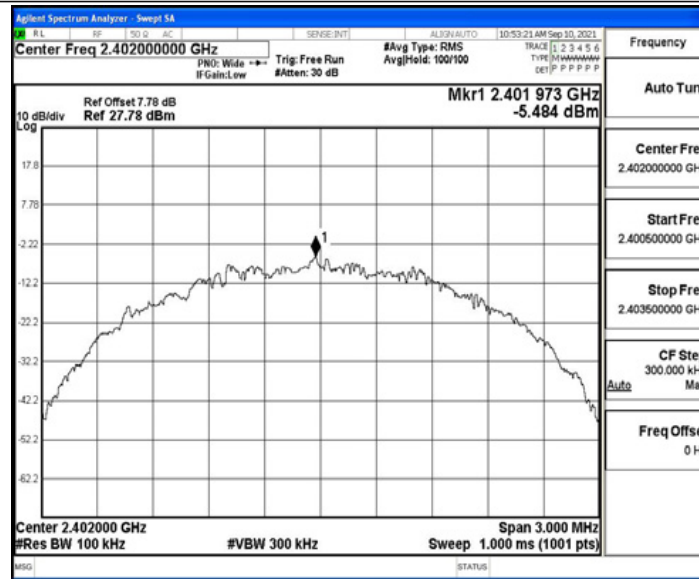


TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_2M	Ant1	2402	Reference	-5.48	-5.48	---	PASS
			30~1000	-5.48	-43.51	≤-25.48	PASS
			1000~26500	-5.48	-47.08	≤-25.48	PASS
		2440	Reference	-7.17	-7.17	---	PASS
			30~1000	-7.17	-43.41	≤-27.17	PASS
			1000~26500	-7.17	-47.1	≤-27.17	PASS
		2480	Reference	-4.77	-4.77	---	PASS
			30~1000	-4.77	-43.32	≤-24.77	PASS
			1000~26500	-4.77	-44.15	≤-24.77	PASS

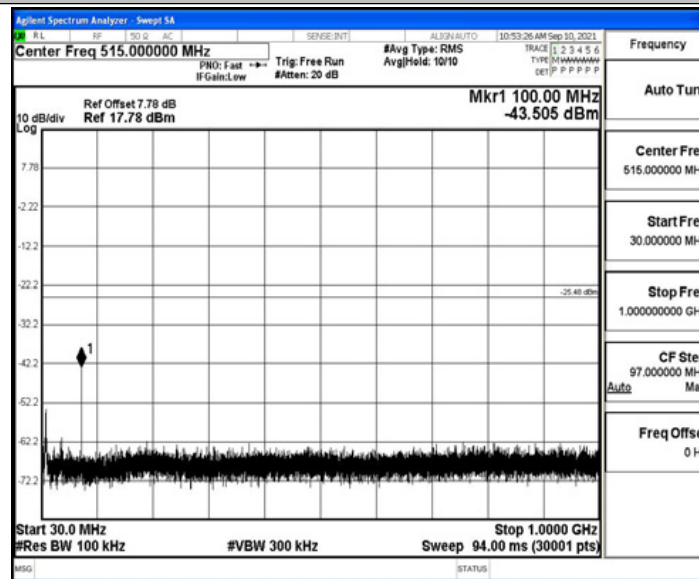


Test Graphs

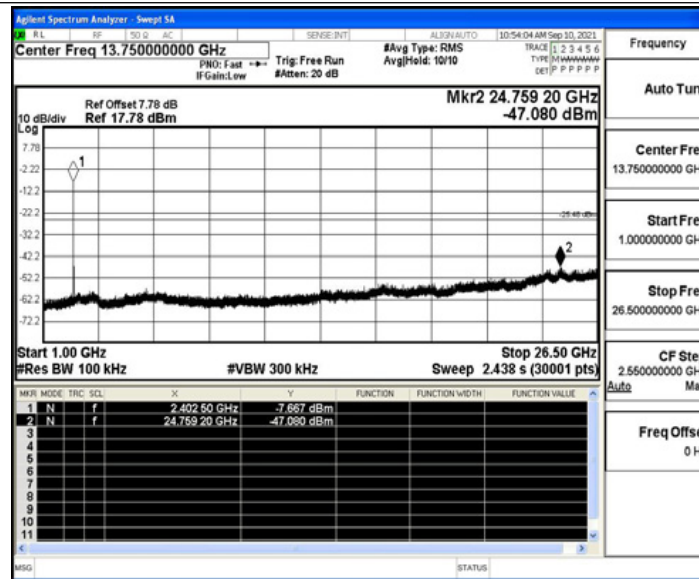
BLE_2M_Ant1_2402_0~Reference



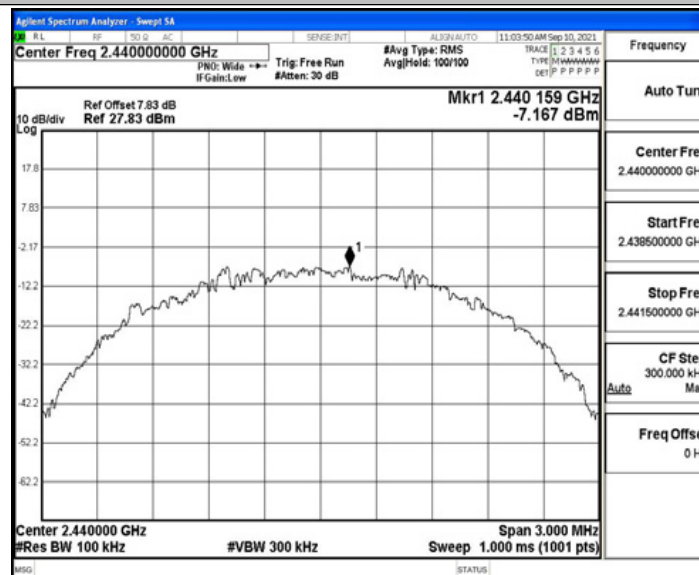
BLE_2M_Ant1_2402_30~1000



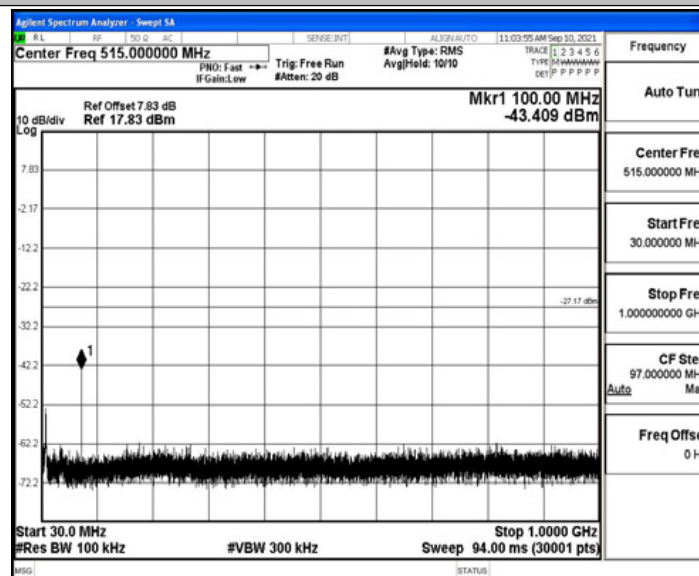
BLE_2M_Ant1_2402_1000~26500



BLE_2M_Ant1_2440_0~Reference

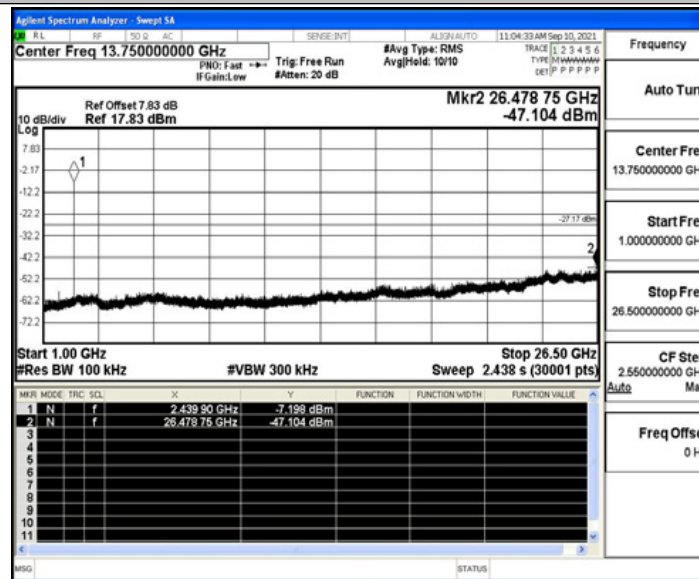


BLE_2M_Ant1_2440_30~1000

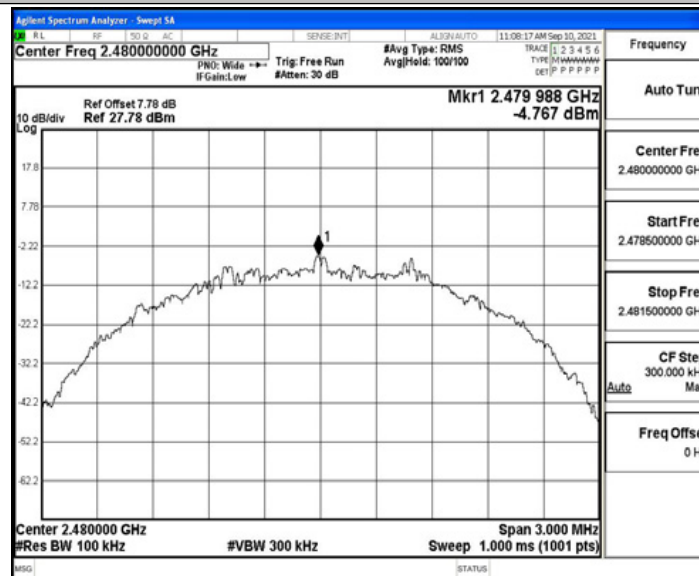




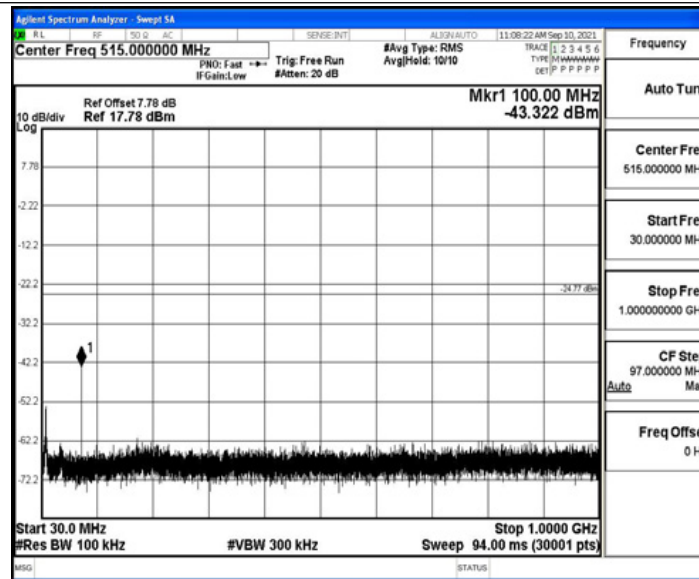
BLE_2M_Ant1_2440_1000~26500



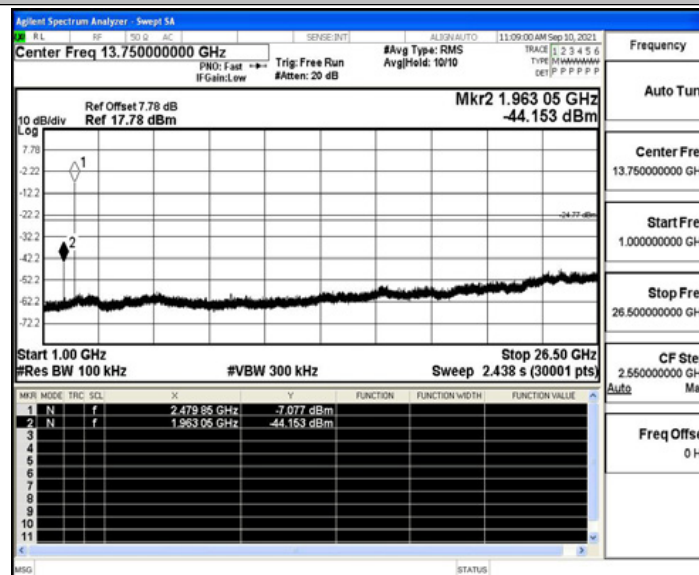
BLE_2M_Ant1_2480_0~Reference



BLE_2M_Ant1_2480_30~1000



BLE_2M_Ant1_2480_1000~26500



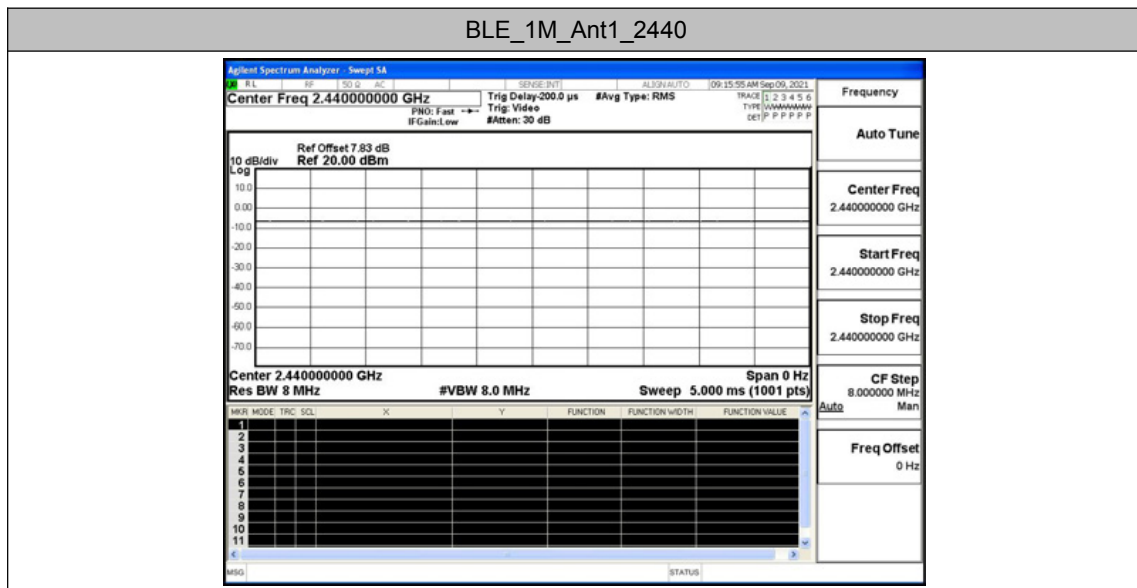


B.6 Duty Cycle

Test Result

Test Mode	Test Channel	Ant	Duty Cycle[%]	Verdict
BLE_1M	2440	Ant1	100	PASS

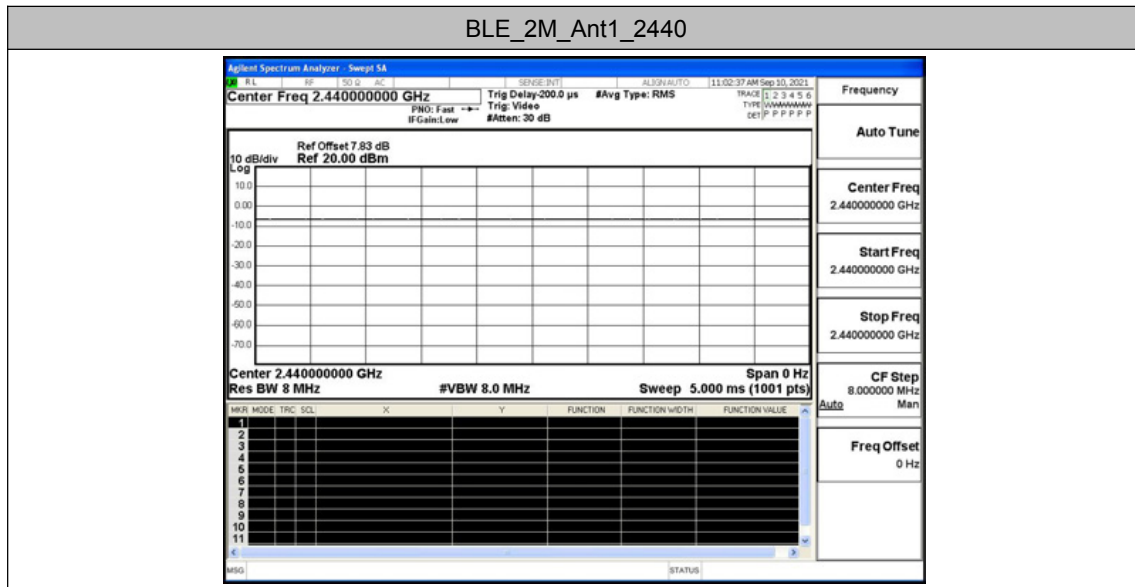
Test Graphs



Test Mode	Test Channel	Ant	Duty Cycle[%]	Verdict
BLE_2M	2440	Ant1	100	PASS



Test Graphs





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	-49.03	≤-41.20	46.17	≤54	PASS
				AV	2388.305	-48.47	≤-41.20	46.73	≤54	PASS
				AV	2390.000	-48.62	≤-41.20	46.58	≤54	PASS
				Peak	2310.000	-41.78	≤-21.20	53.42	≤74	PASS
				Peak	2358.275	-38.24	≤-21.20	56.96	≤74	PASS
				Peak	2390.000	-41.62	≤-21.20	53.58	≤74	PASS
		High	2480	AV	2483.500	-48.05	≤-41.20	47.15	≤54	PASS
				AV	2493.200	-47.89	≤-41.20	47.31	≤54	PASS
				AV	2500.000	-47.93	≤-41.20	47.27	≤54	PASS
				Peak	2483.500	-40.67	≤-21.20	54.53	≤74	PASS
				Peak	2488.320	-38.13	≤-21.20	57.07	≤74	PASS
				Peak	2500.000	-40.46	≤-21.20	54.74	≤74	PASS

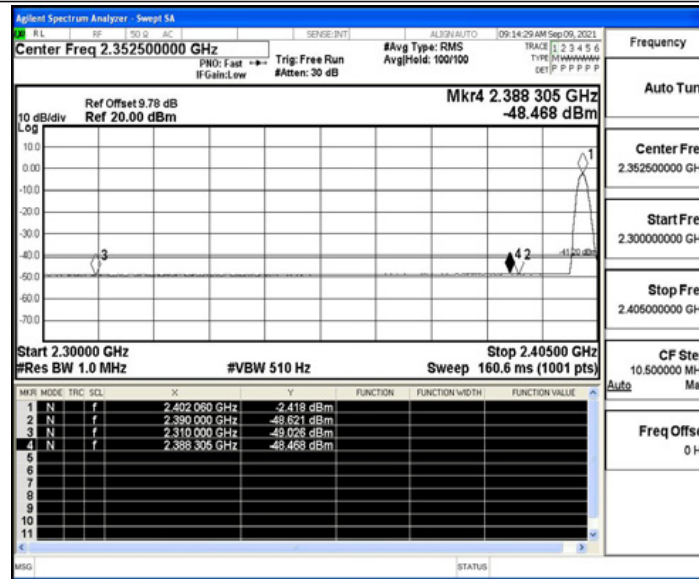
Note:

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.

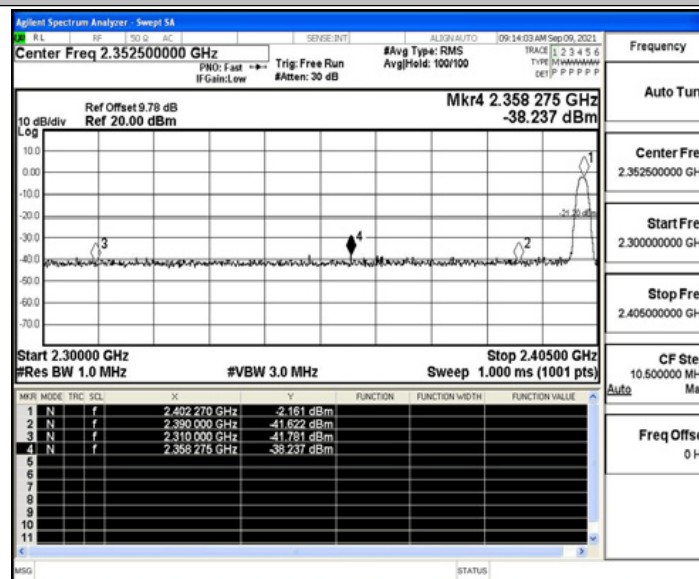


Test Graphs

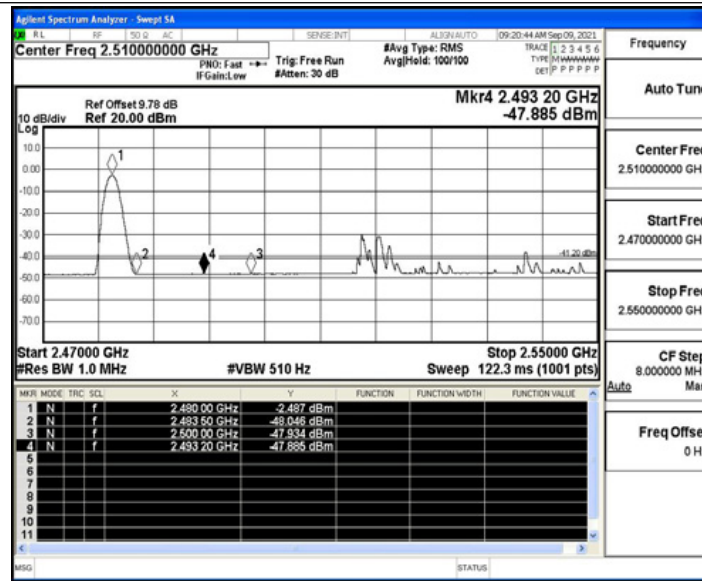
BLE_1M_Ant1_Low_2402_AV



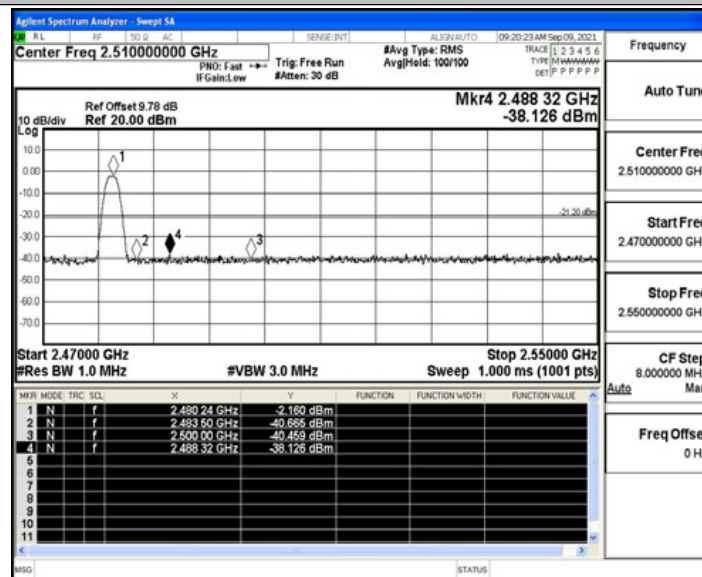
BLE_1M_Ant1_Low_2402_Peak



BLE_1M_Ant1_High_2480_AV



BLE_1M_Ant1_High_2480_Peak



TestMode	Antenna	ChName	Channel	Detector	Freq. [MHz]	Result [dBm]	Limit [dBm]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
BLE_2M	Ant1	Low	2402	AV	2310.000	-49	≤-41.20	46.20	≤54	PASS
				AV	2387.570	-48.35	≤-41.20	46.85	≤54	PASS
				AV	2390.000	-48.44	≤-41.20	46.76	≤54	PASS
				Peak	2310.000	-42.15	≤-21.20	53.05	≤74	PASS
				Peak	2362.265	-39.17	≤-21.20	56.03	≤74	PASS
				Peak	2390.000	-41.6	≤-21.20	53.60	≤74	PASS
		High	2480	AV	2483.500	-47.36	≤-41.20	47.84	≤54	PASS
				AV	2483.520	-47.36	≤-41.20	47.84	≤54	PASS
				AV	2500.000	-48.09	≤-41.20	47.11	≤54	PASS
				Peak	2483.500	-39.96	≤-21.20	55.24	≤74	PASS
				Peak	2485.680	-38.97	≤-21.20	56.23	≤74	PASS
				Peak	2500.000	-41.83	≤-21.20	53.37	≤74	PASS



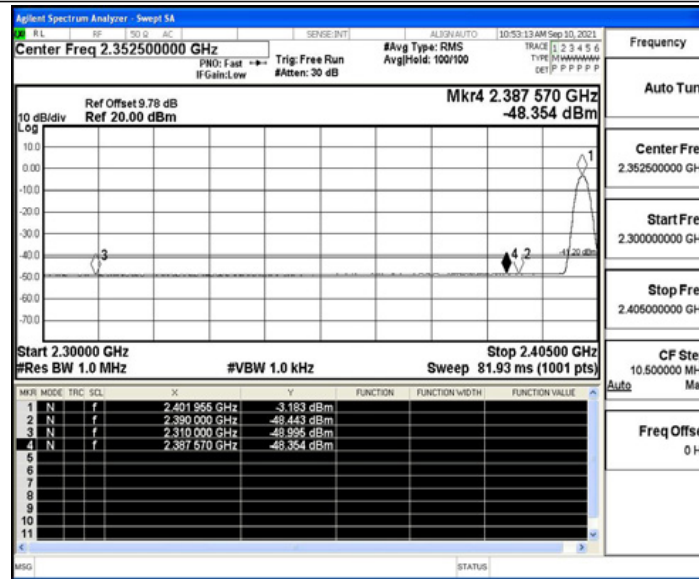
Note:

3. The Antenna Gain is compensated in the graph.
4. 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.

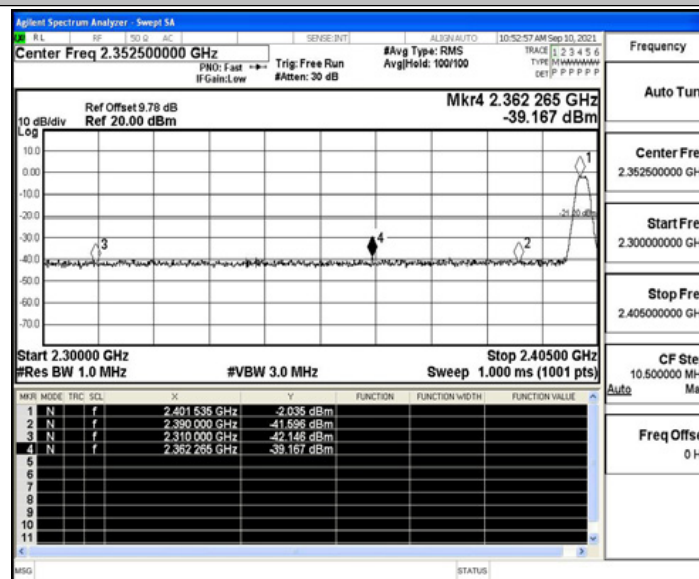


Test Graphs

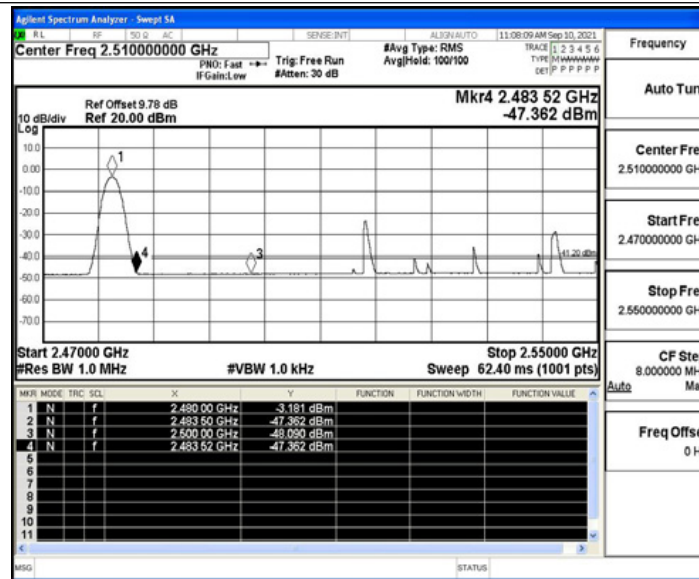
BLE_2M_Ant1_Low_2402_AV



BLE_2M_Ant1_Low_2402_Peak



BLE_2M_Ant1_High_2480_AV



BLE_2M_Ant1_High_2480_Peak

