



Appendix A

RF Test Data for BLE (Conducted Measurement)

Product Name: Smart Switch

Test Model: ESW-12TWNVB-US

Environmental Conditions

Temperature:	25° C
Relative Humidity:	50%
ATM Pressure:	100.0 kPa
Test Engineer:	Wunder Wu
Supervised by:	Jay Li

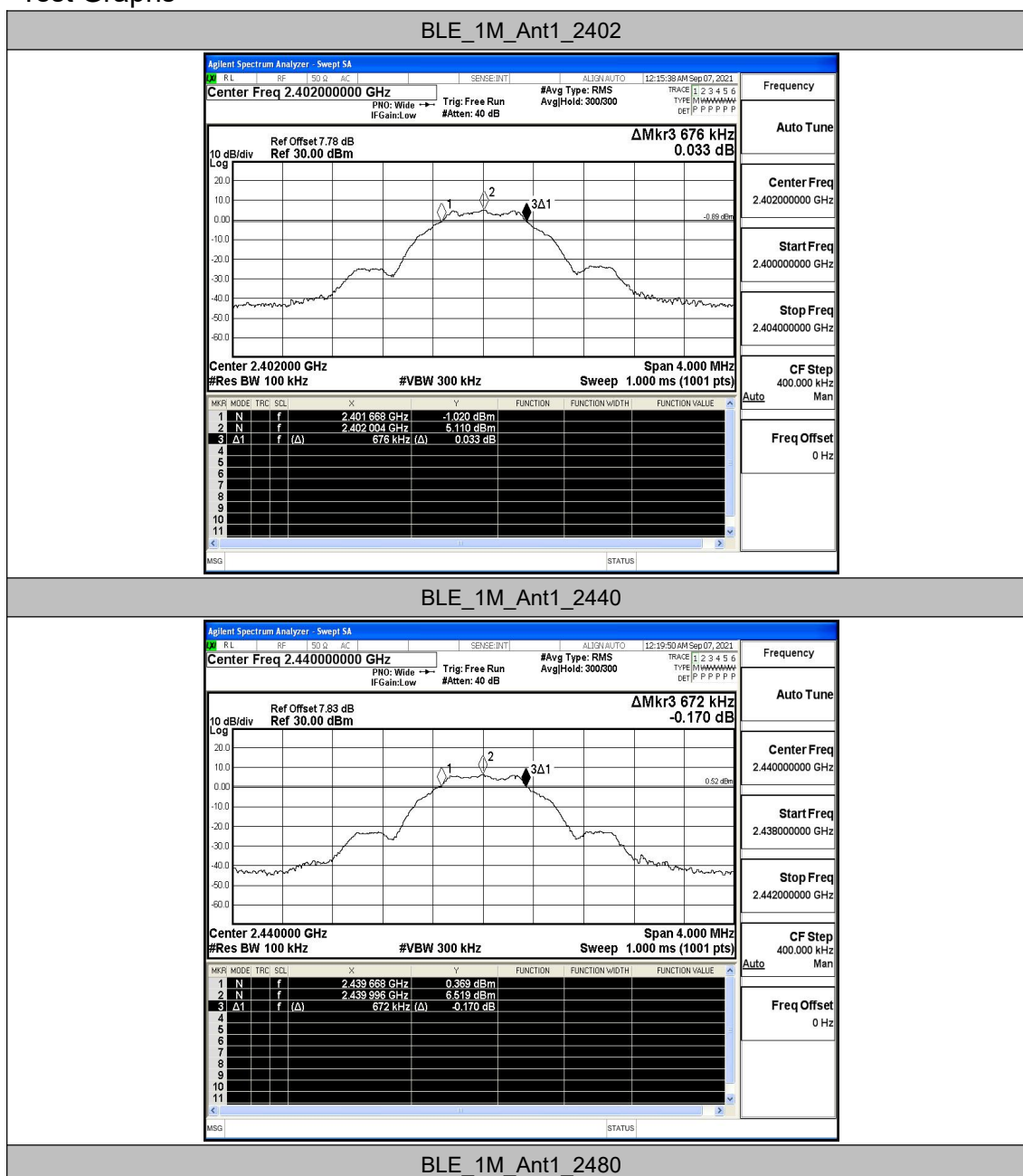


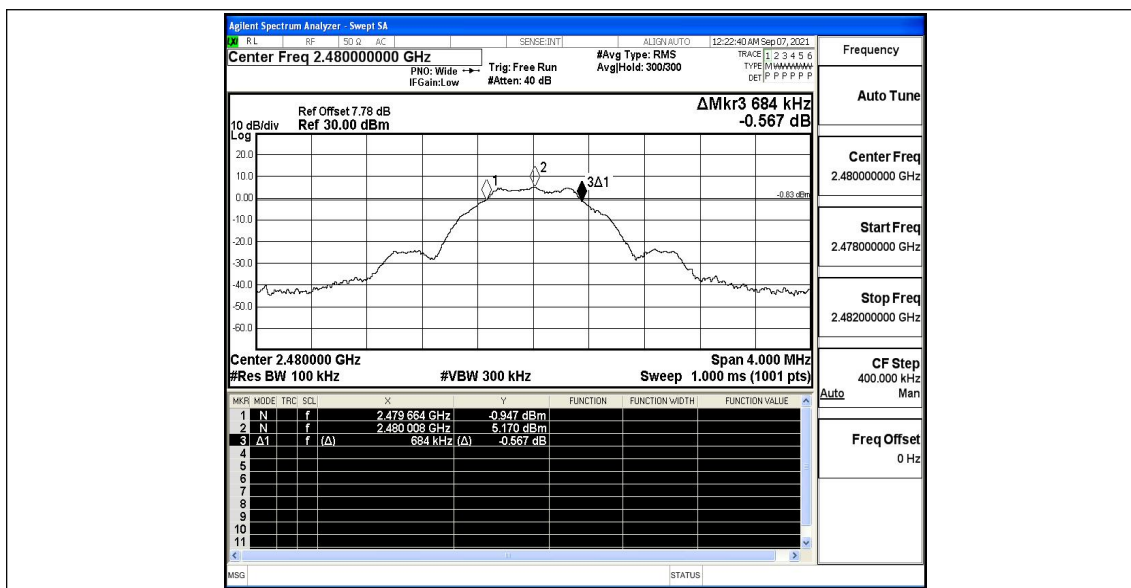
A.1 6dB Bandwidth

Test Result

TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.676	2401.668	2402.344	≥0.5	PASS
		2440	0.672	2439.668	2440.340	≥0.5	PASS
		2480	0.684	2479.664	2480.348	≥0.5	PASS

Test Graphs





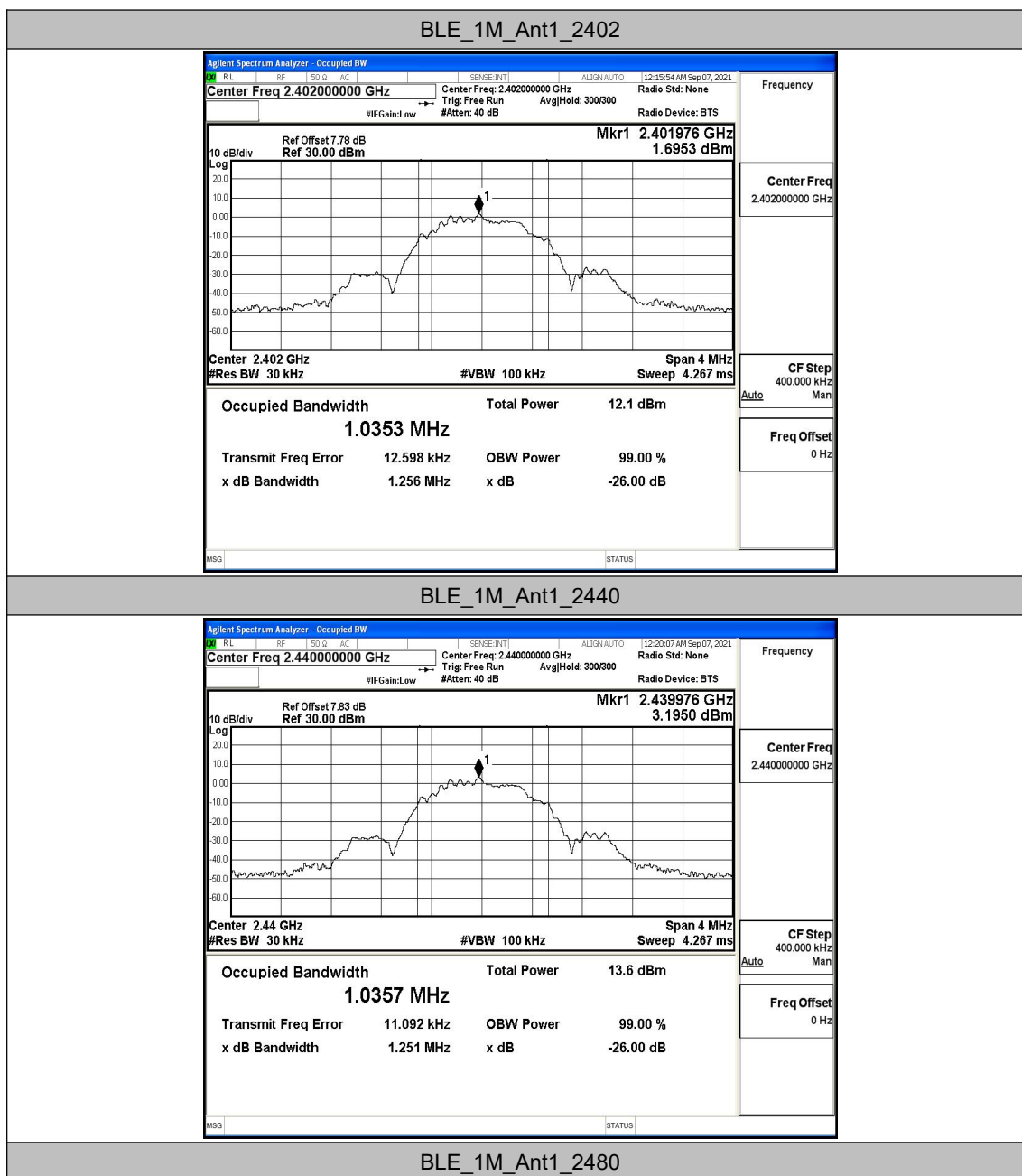


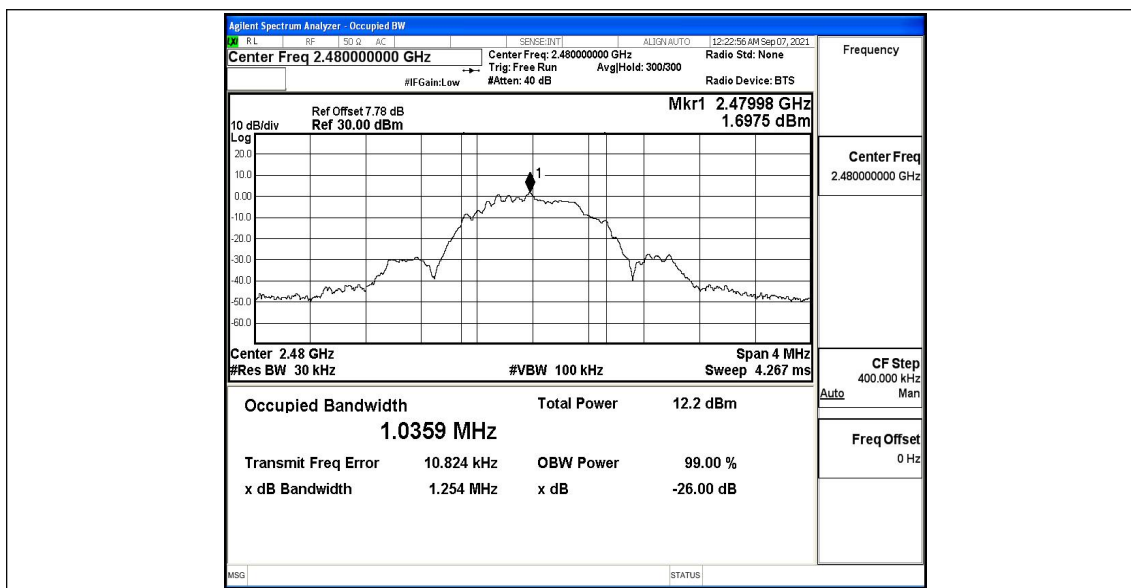
A.2 Occupied Channel Bandwidth

Test Result

TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	1.0353	2401.495	2402.530	---	PASS
		2440	1.0357	2439.493	2440.529	---	PASS
		2480	1.0359	2479.493	2480.529	---	PASS

Test Graphs





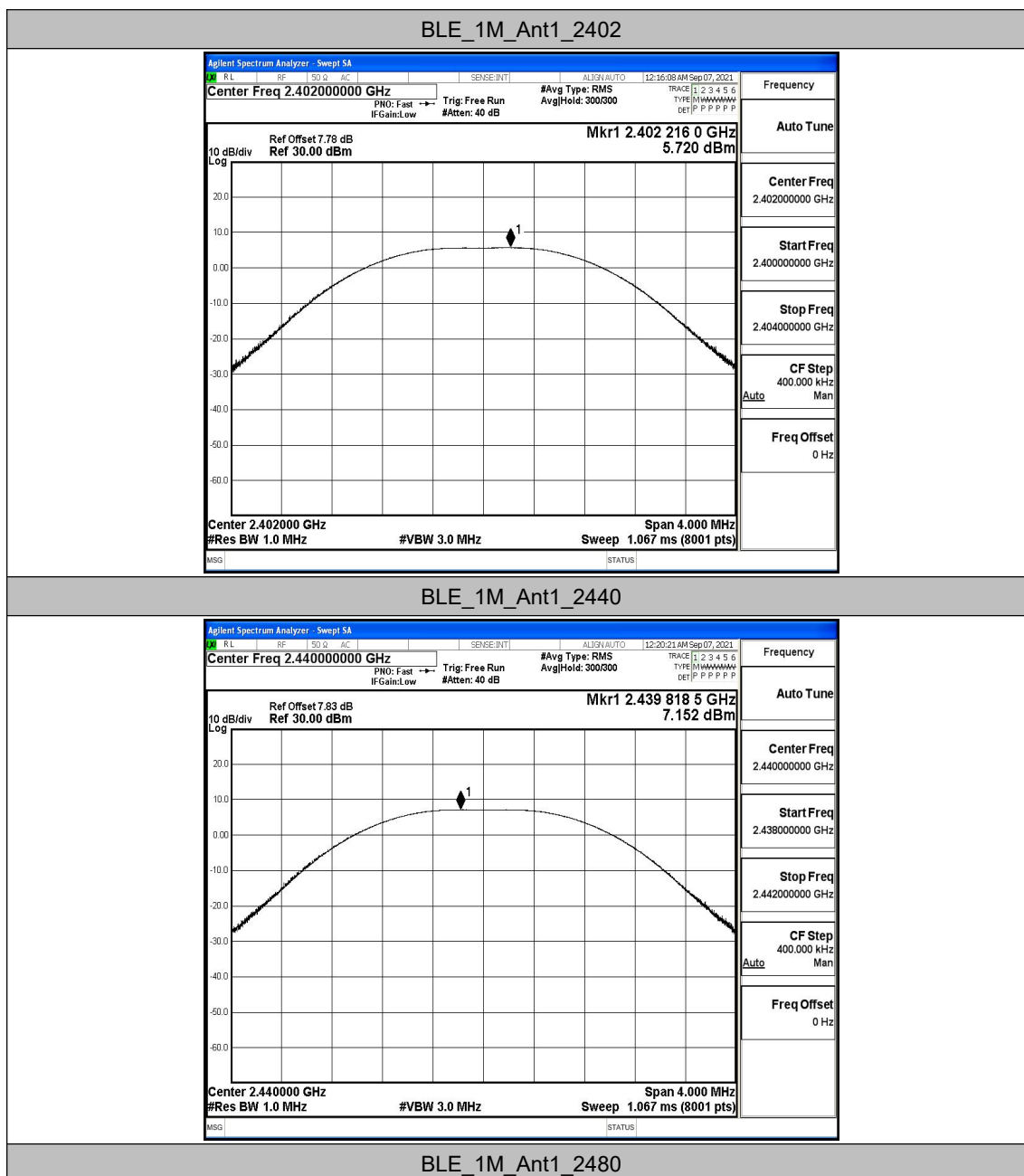


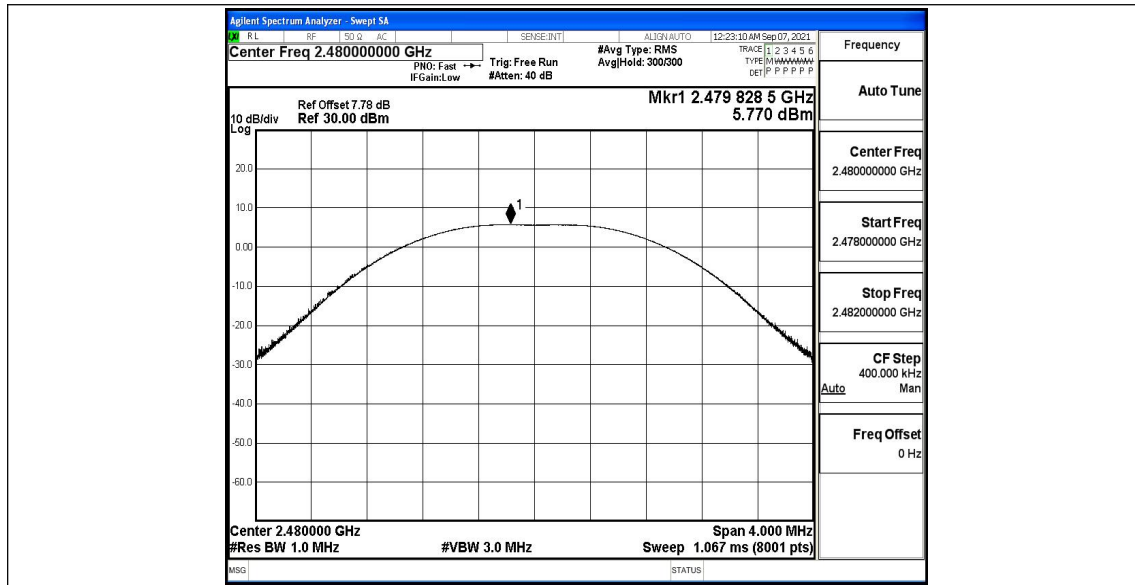
A.3 Maximum conducted output power

Test Result

TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	5.72	≤30	PASS
		2440	7.15	≤30	PASS
		2480	5.77	≤30	PASS

Test Graphs





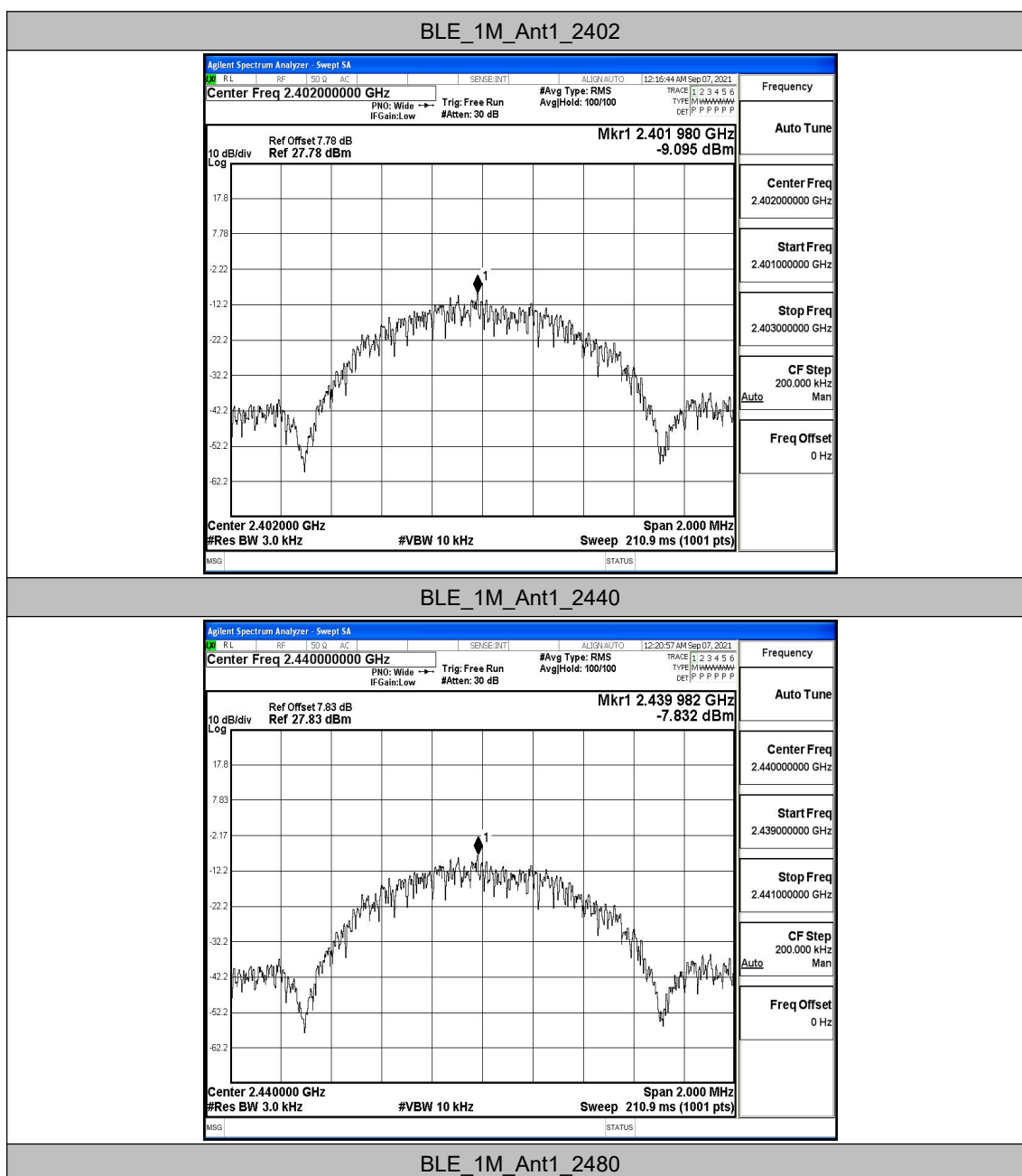


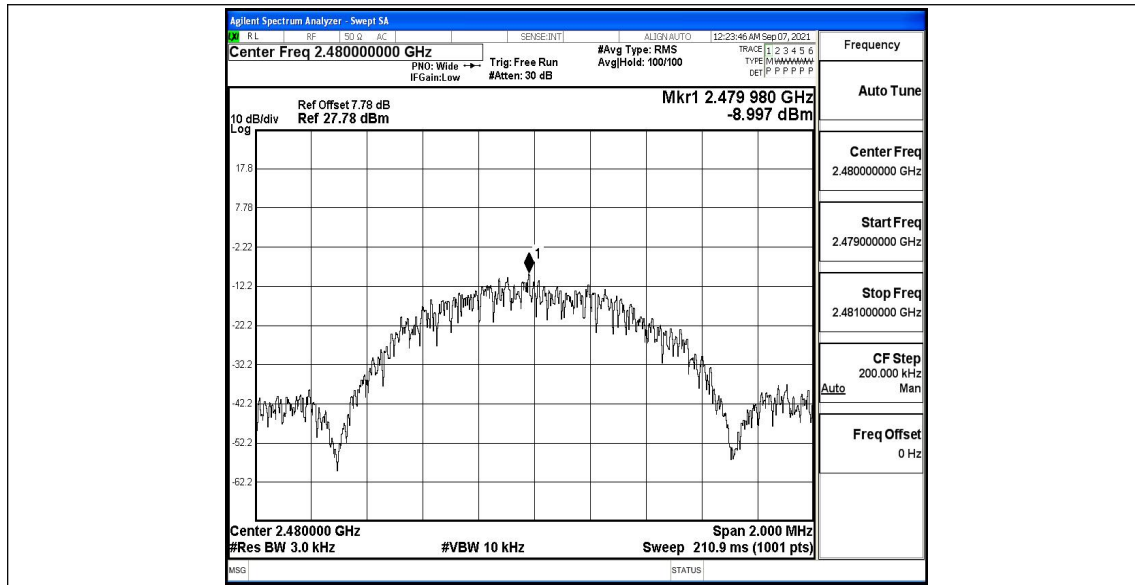
A.4 Maximum power spectral density

Test Result

TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-9.1	≤8	PASS
		2440	-7.83	≤8	PASS
		2480	-9	≤8	PASS

Test Graphs





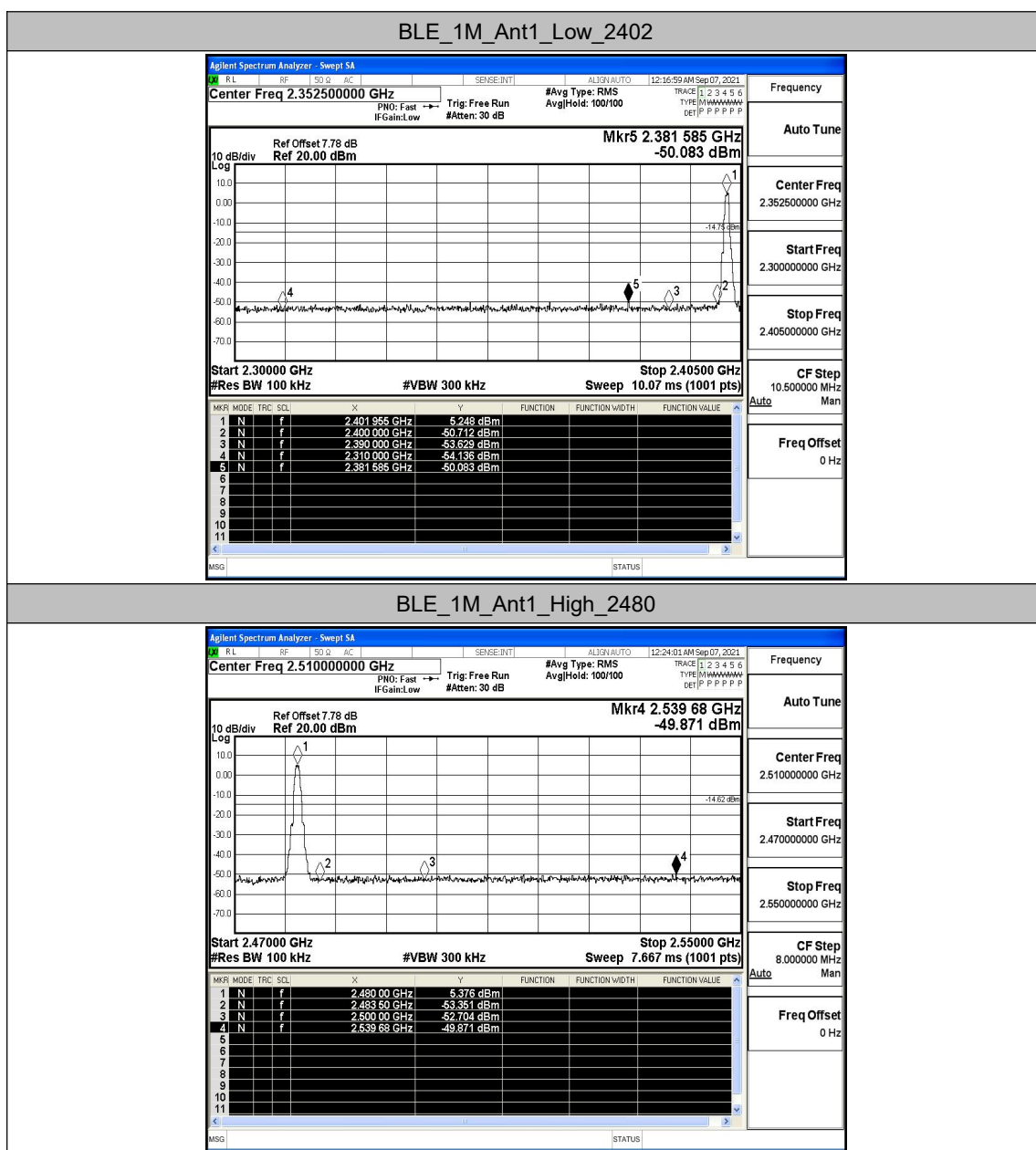


A.5 Band edge measurements

Test Result

TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	5.25	-50.08	≤-14.75	PASS
		High	2480	5.38	-49.87	≤-14.62	PASS

Test Graphs



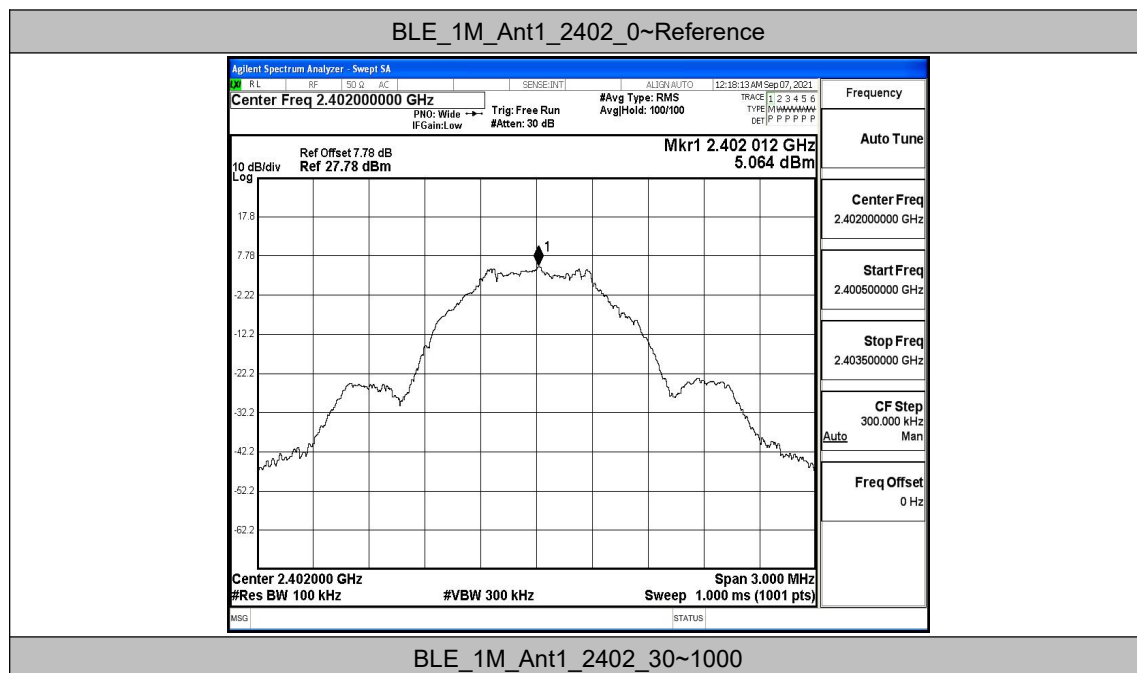


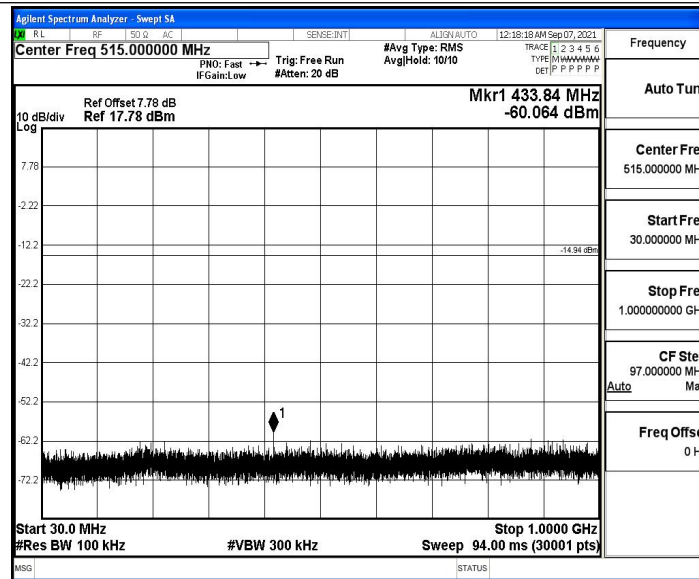
A.6 Conducted Spurious Emission

Test Result

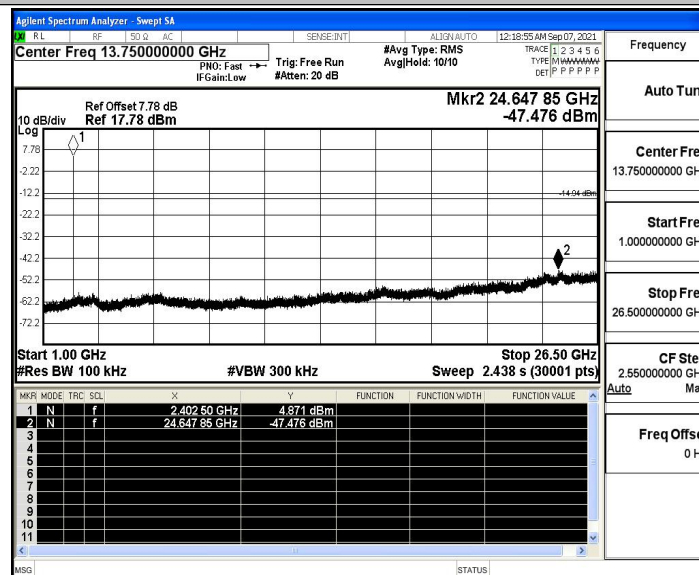
TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	5.06	5.06	---	PASS
			30~1000	5.06	-60.06	≤-14.94	PASS
			1000~26500	5.06	-47.48	≤-14.94	PASS
		2440	Reference	6.13	6.13	---	PASS
			30~1000	6.13	-61.89	≤-13.87	PASS
			1000~26500	6.13	-47.43	≤-13.87	PASS
		2480	Reference	4.70	4.70	---	PASS
			30~1000	4.70	-61.69	≤-15.3	PASS
			1000~26500	4.70	-47.32	≤-15.3	PASS

Test Graphs

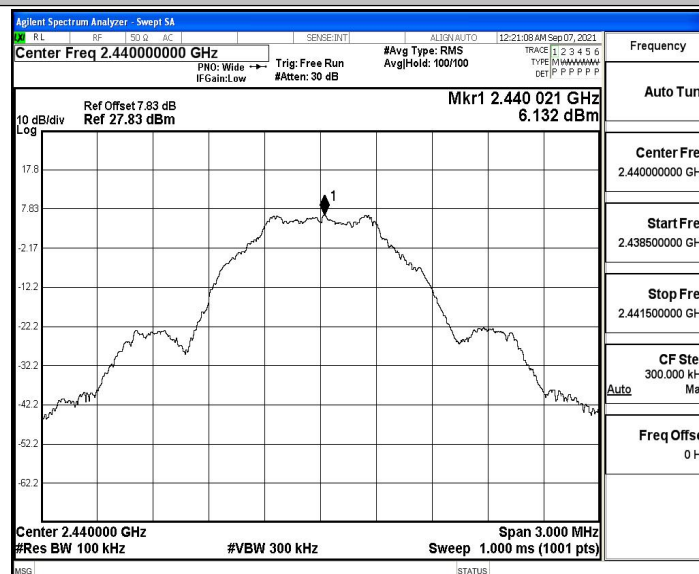




BLE_1M_Ant1_2402_1000~26500

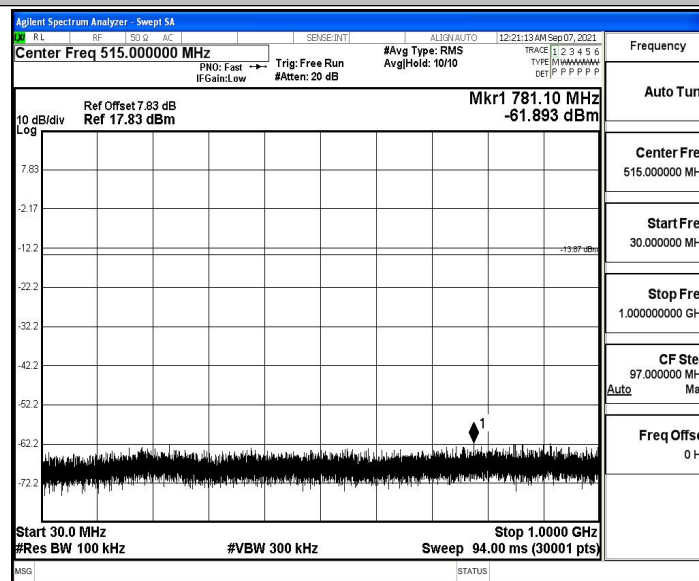


BLE_1M_Ant1_2440_0~Reference

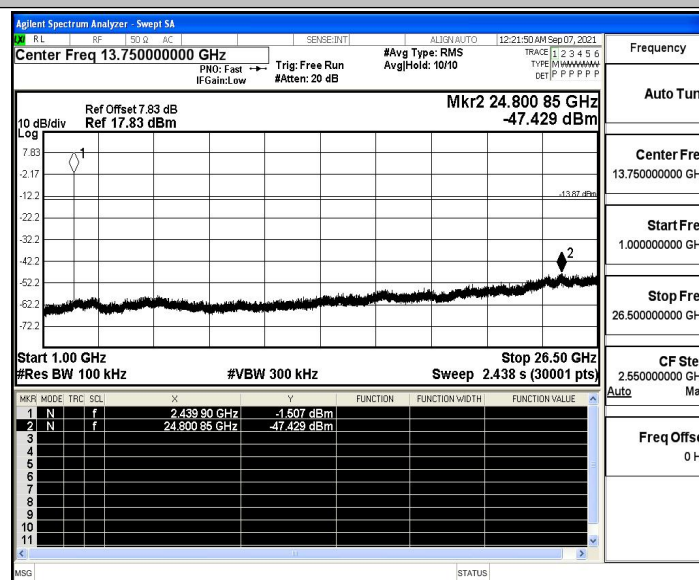




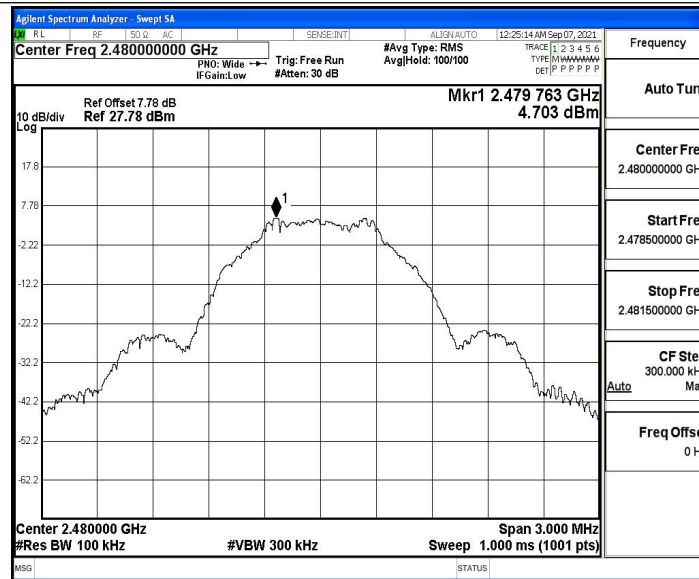
BLE_1M_Ant1_2440_30~1000



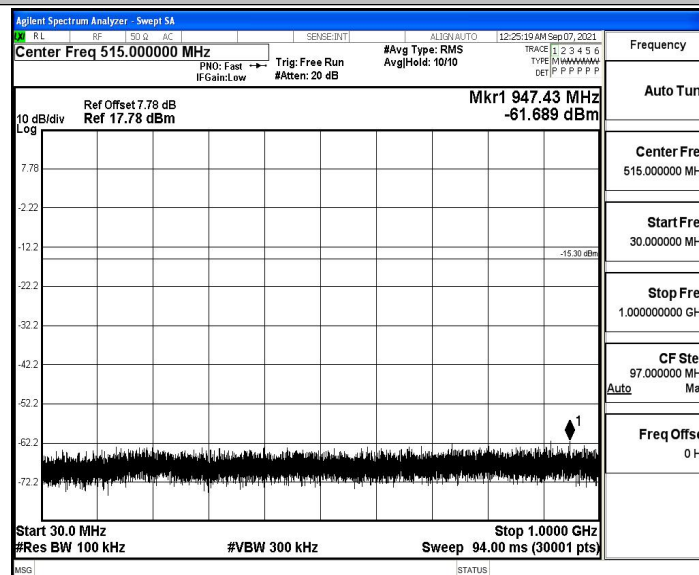
BLE_1M_Ant1_2440_1000~26500



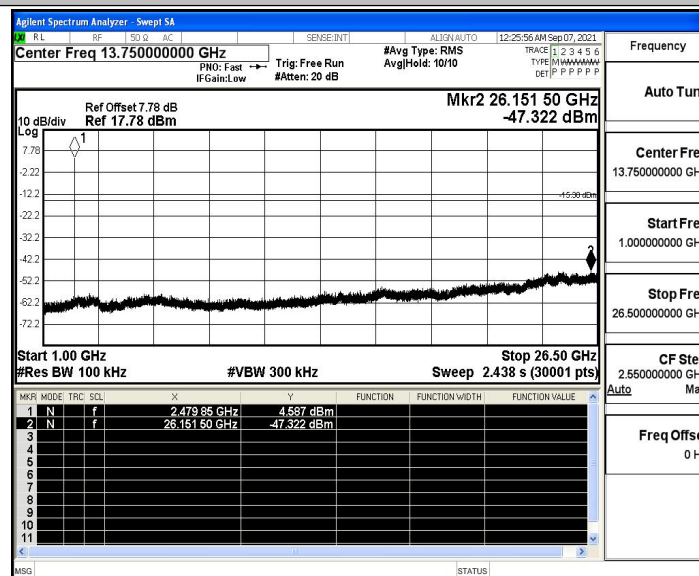
BLE_1M_Ant1_2480_0~Reference



BLE_1M_Ant1_2480_30~1000



BLE_1M_Ant1_2480_1000~26500



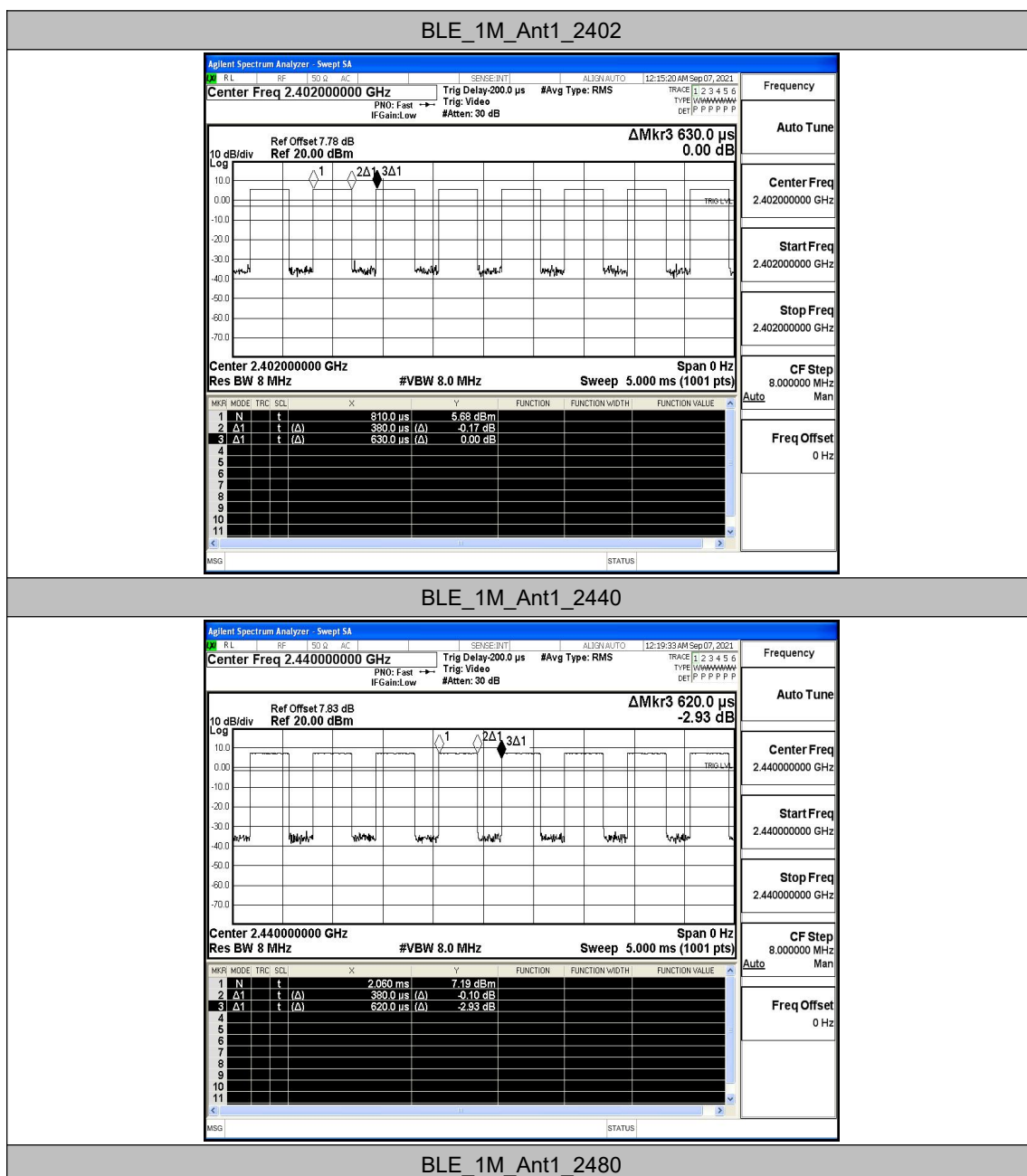


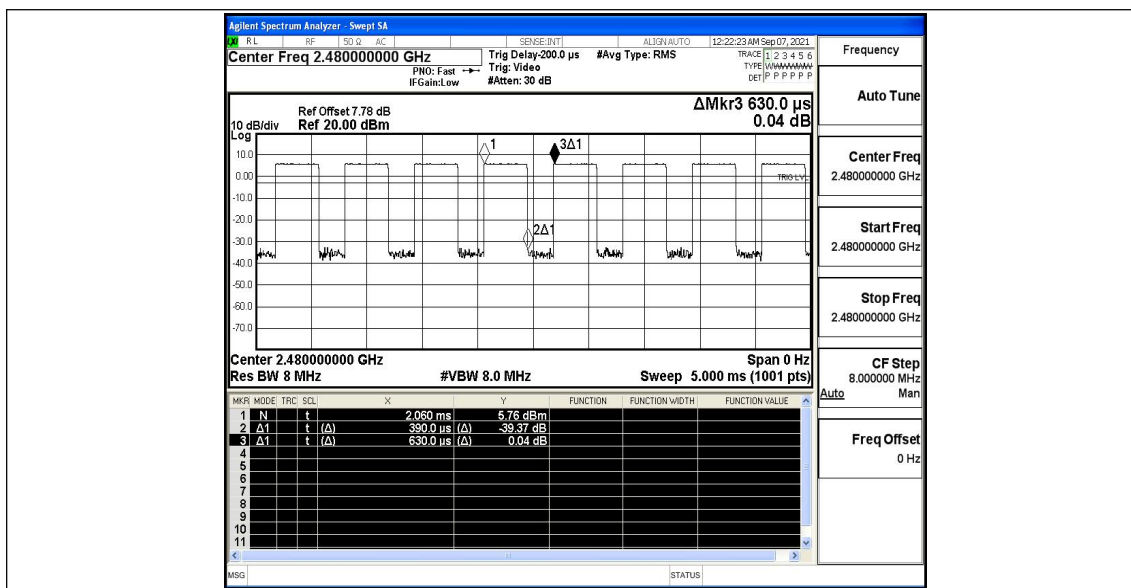
A.7 Duty Cycle

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	0.62	0.6129	61.29	2.13	---	PASS
		2480	0.39	0.63	0.6190	61.90	2.08	---	PASS

Test Graphs







A.8 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	-48.53	≤-41.20	46.67	≤54	PASS
				AV	2379.170	-47.77	≤-41.20	47.43	≤54	PASS
				AV	2390.000	-48.17	≤-41.20	47.03	≤54	PASS
				Peak	2310.000	-41.35	≤-21.20	53.85	≤74	PASS
				Peak	2377.805	-38.3	≤-21.20	56.90	≤74	PASS
				Peak	2390.000	-40.17	≤-21.20	55.03	≤74	PASS
		High	2480	AV	2483.500	-46.02	≤-41.20	49.18	≤54	PASS
				AV	2483.520	-46.02	≤-41.20	49.18	≤54	PASS
				AV	2500.000	-47.67	≤-41.20	47.53	≤54	PASS
				Peak	2483.500	-41.08	≤-21.20	54.12	≤74	PASS
				Peak	2485.440	-38.75	≤-21.20	56.45	≤74	PASS
				Peak	2500.000	-41.09	≤-21.20	54.11	≤74	PASS

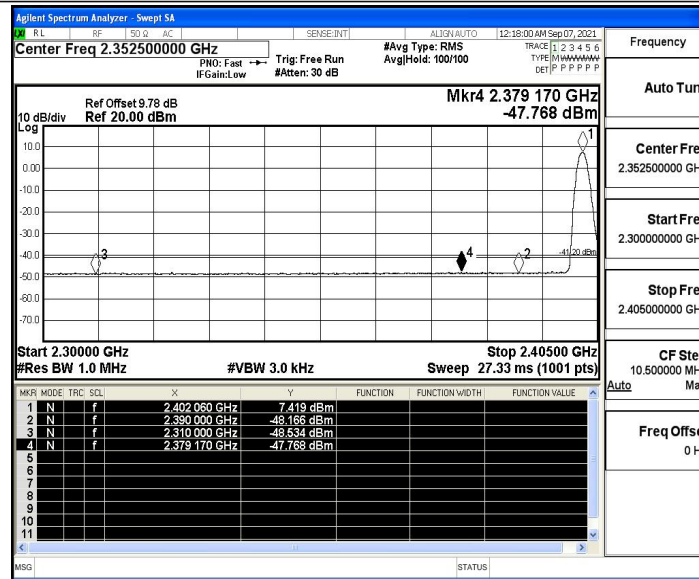
Note:

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.

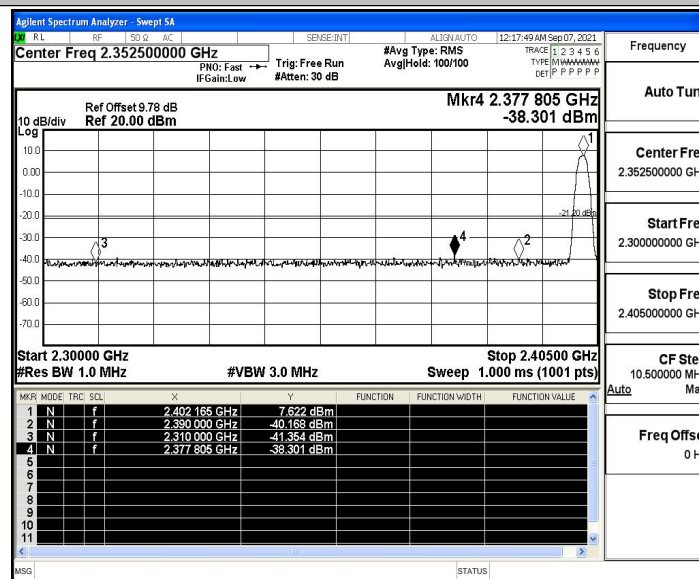


Test Graphs

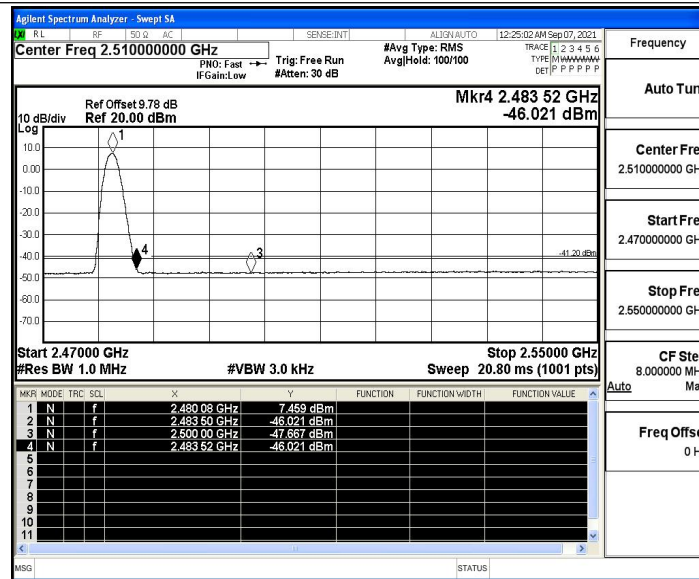
BLE_1M_Ant1_Low_2402_AV



BLE_1M_Ant1_Low_2402_Peak



BLE_1M_Ant1_High_2480_AV



BLE_1M_Ant1_High_2480_Peak

