




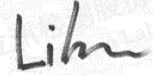
Appendix A

RF Test Data for BT LE (Conducted Measurement)

Product Name: Smart switch

Test Model: SHELLY Plus i4

Environmental Conditions

Temperature:	23.5 ° C
Relative Humidity:	52.2%
ATM Pressure:	100.0 kPa
Test Engineer:	 Kay Hu
Supervised by:	 Li Huan





A.1 DTS Bandwidth

Test Result

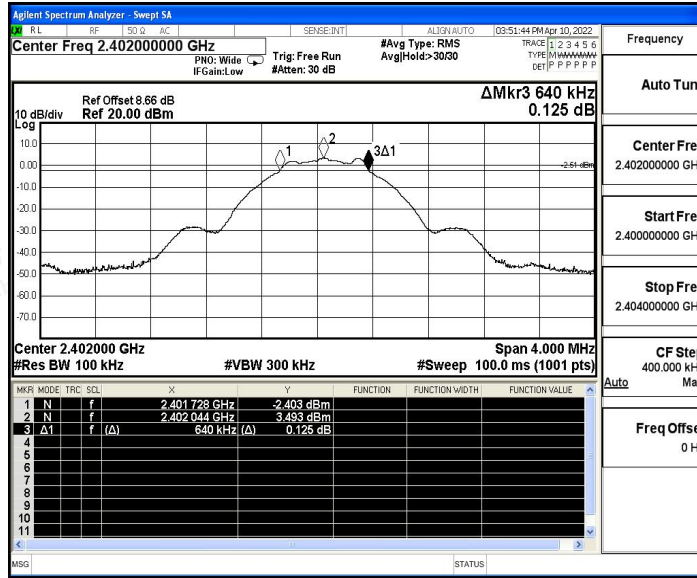
TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.640	2401.728	2402.368	0.5	PASS
		2440	0.640	2439.728	2440.368	0.5	PASS
		2480	0.640	2479.732	2480.372	0.5	PASS



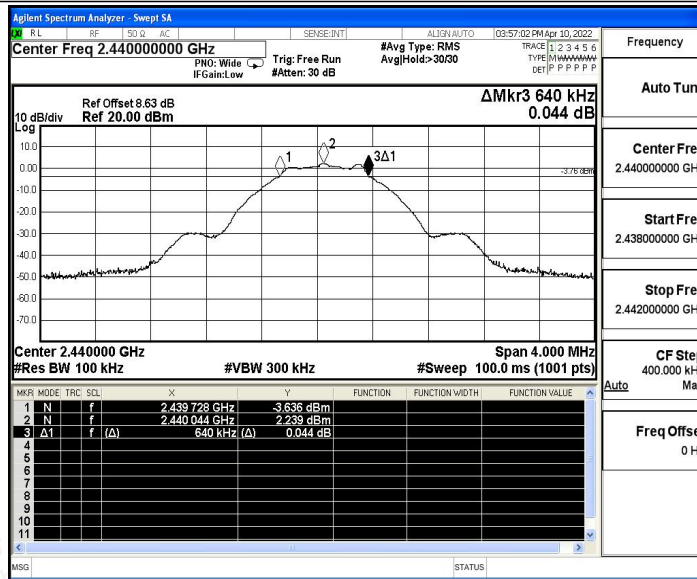


Test Graphs

BLE_1M_Ant1_2402

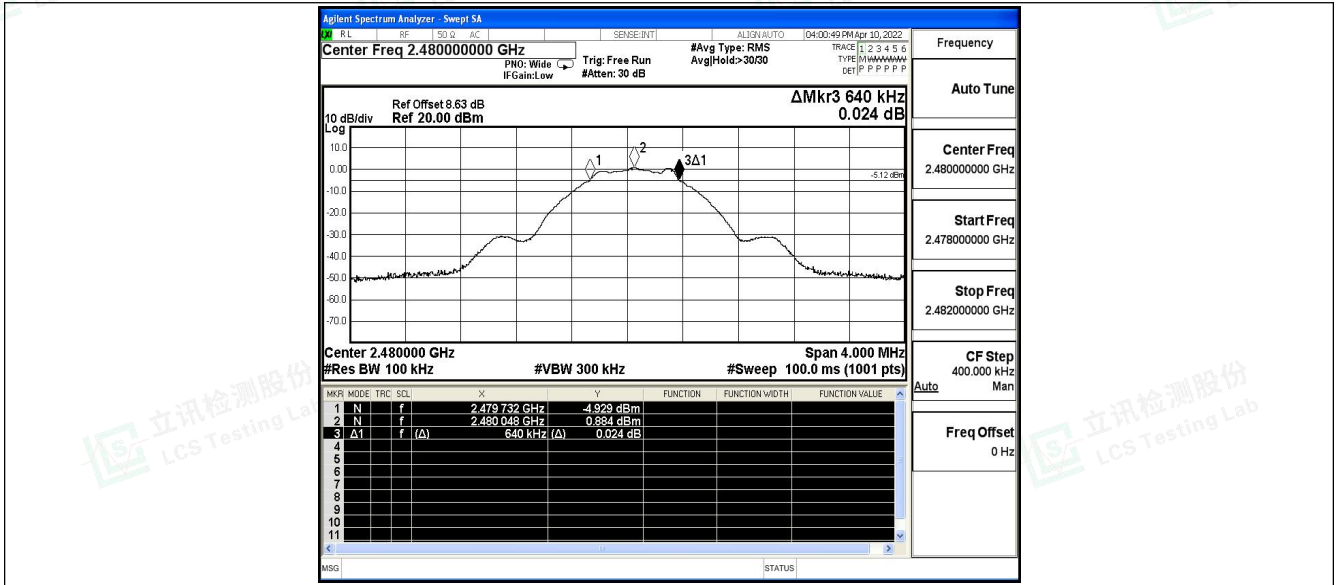


BLE_1M_Ant1_2440



BLE_1M_Ant1_2480







A.2 Maximum peak conducted output power

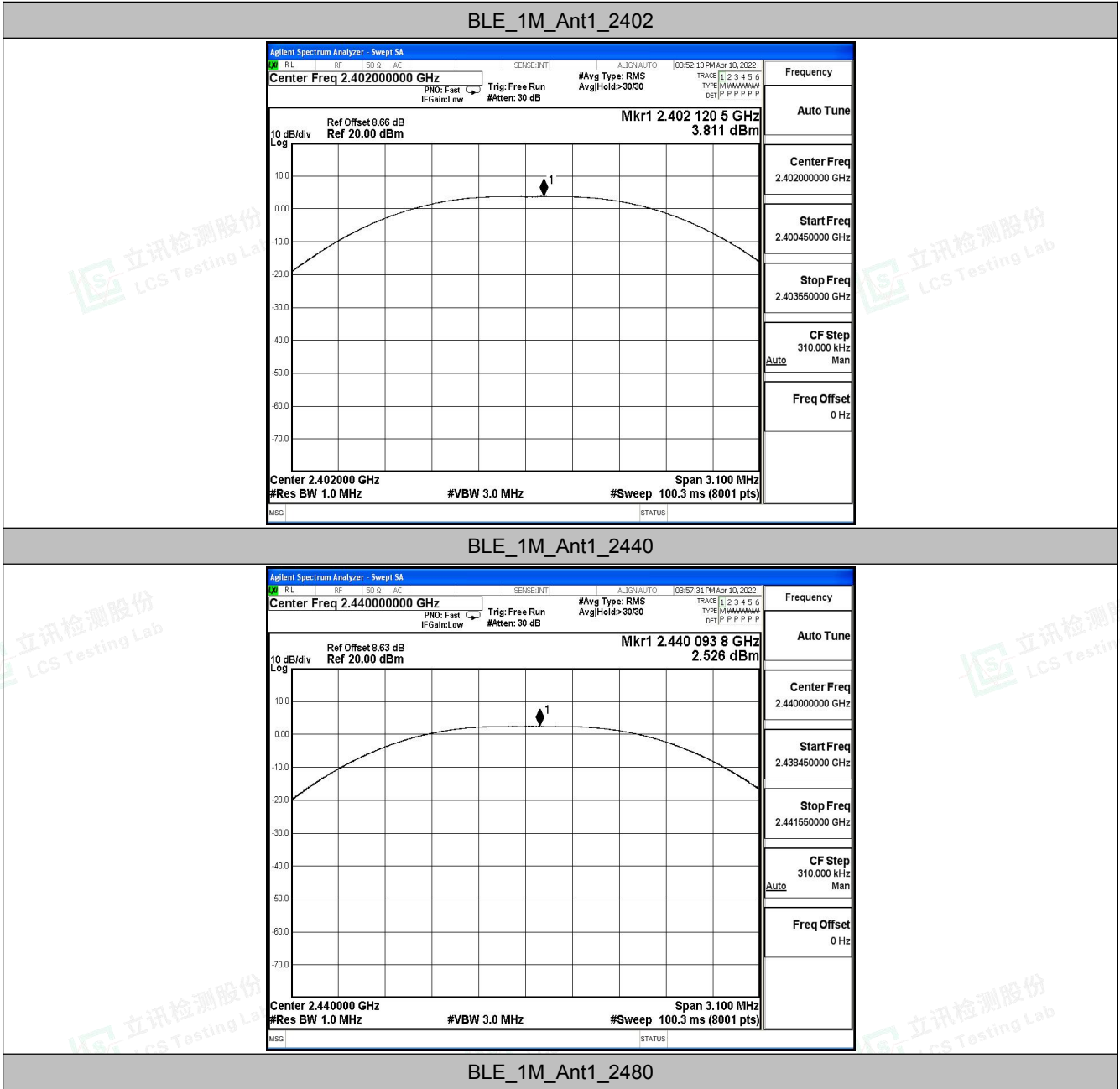
Test Result

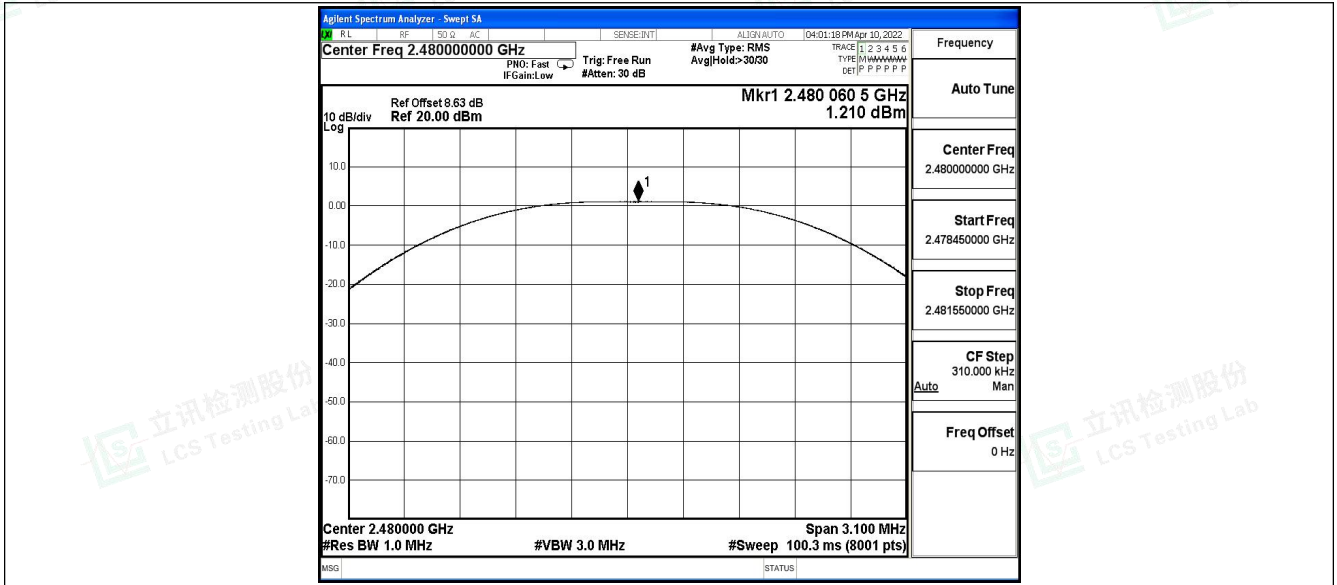
TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	3.81	≤30	PASS
		2440	2.53	≤30	PASS
		2480	1.21	≤30	PASS





Test Graphs







A.3 Maximum power spectral density

Test Result

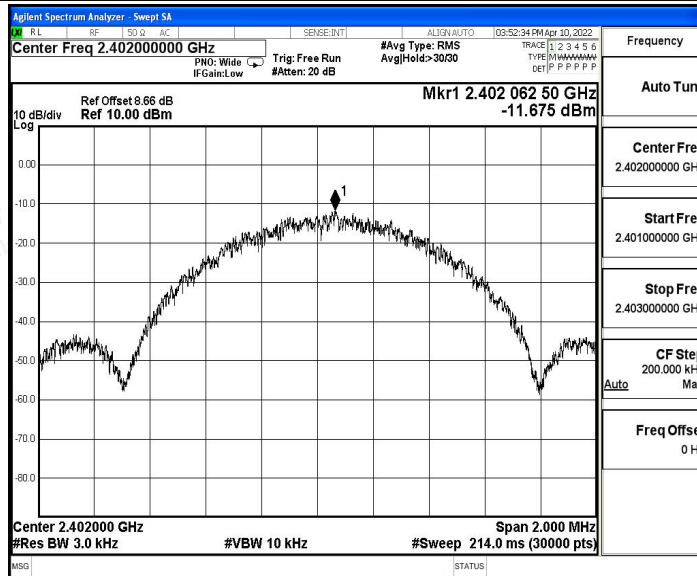
TestMode	Antenna	Channel	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-11.68	≤8.00	PASS
		2440	-12.24	≤8.00	PASS
		2480	-13.22	≤8.00	PASS



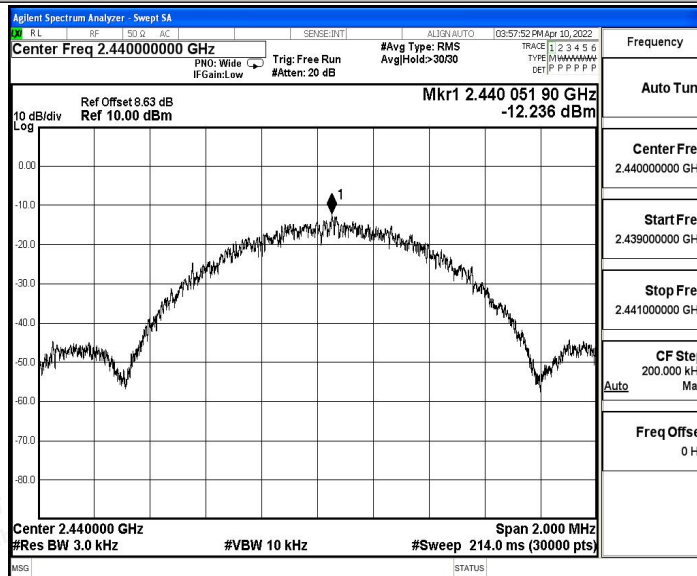


Test Graphs

BLE_1M_Ant1_2402

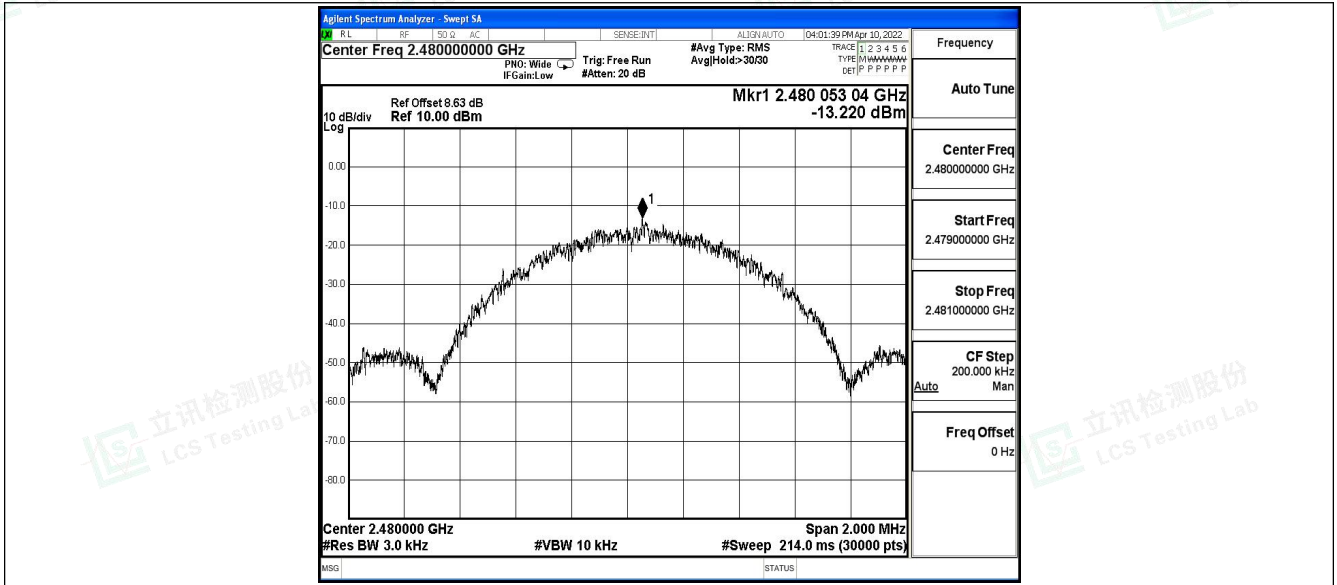


BLE_1M_Ant1_2440



BLE_1M_Ant1_2480







A.4 Band edge measurements

Test Result

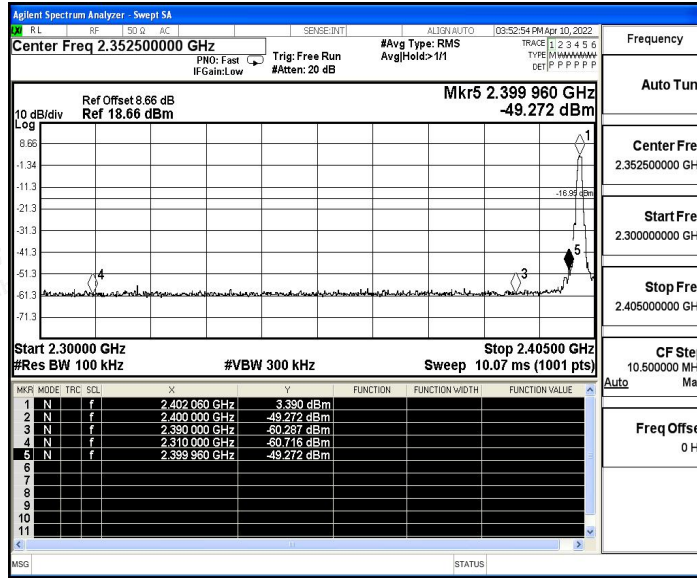
TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	3.05	-49.27	≤-16.95	PASS
		High	2480	0.59	-57.46	≤-19.41	PASS



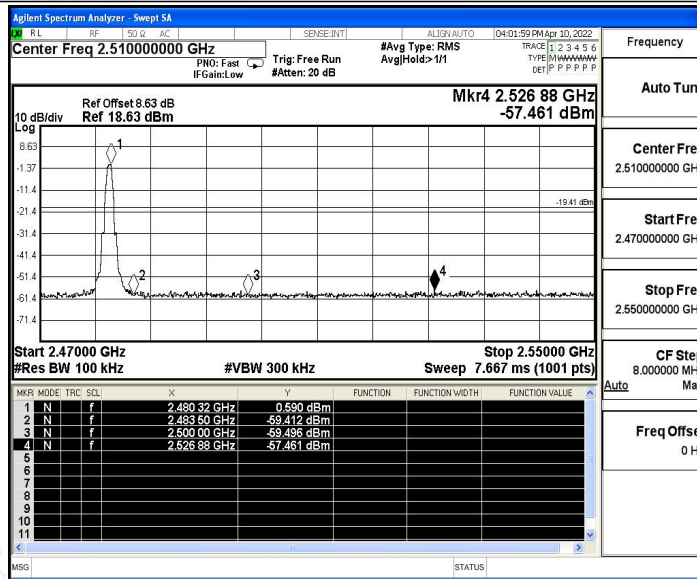


Test Graphs

BLE_1M_Ant1_Low_2402



BLE_1M_Ant1_High_2480





A.5 Conducted Spurious Emission

Test Result

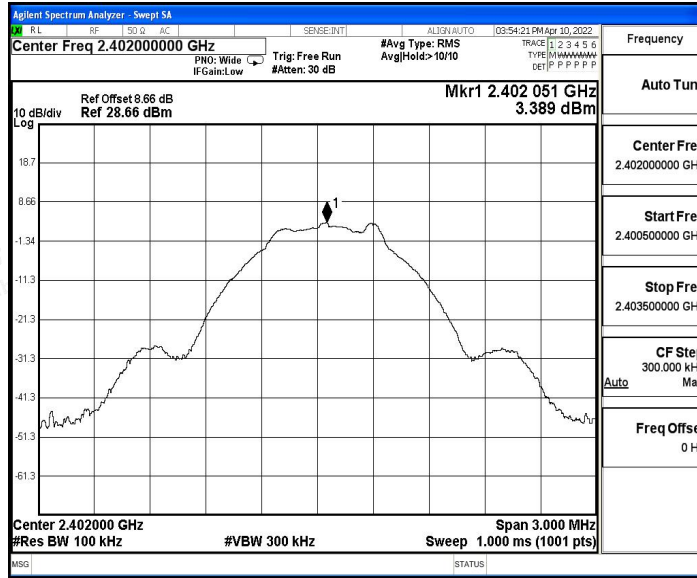
TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	3.39	3.39	---	PASS
			30~1000	3.39	-46.98	≤-16.61	PASS
			1000~26500	3.39	-44.61	≤-16.61	PASS
		2440	Reference	2.15	2.15	---	PASS
			30~1000	2.15	-47.53	≤-17.85	PASS
			1000~26500	2.15	-45.3	≤-17.85	PASS
		2480	Reference	0.51	0.51	---	PASS
			30~1000	0.51	-47.47	≤-19.49	PASS
			1000~26500	0.51	-45.57	≤-19.49	PASS



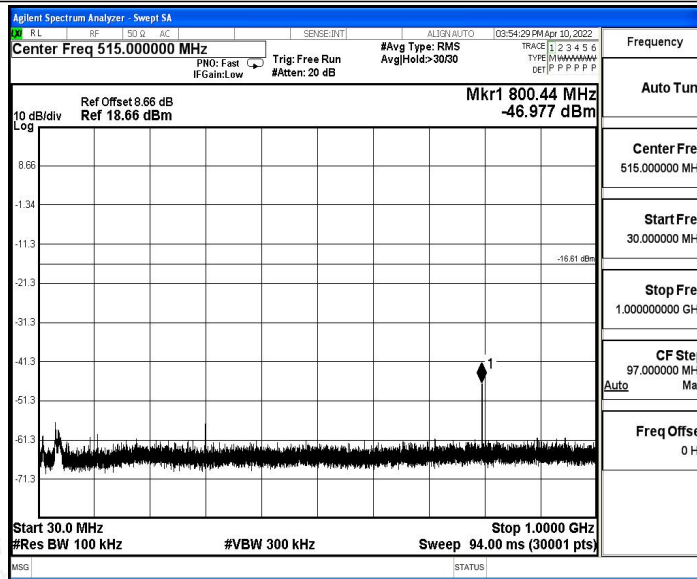


Test Graphs

BLE_1M_Ant1_2402_0~Reference

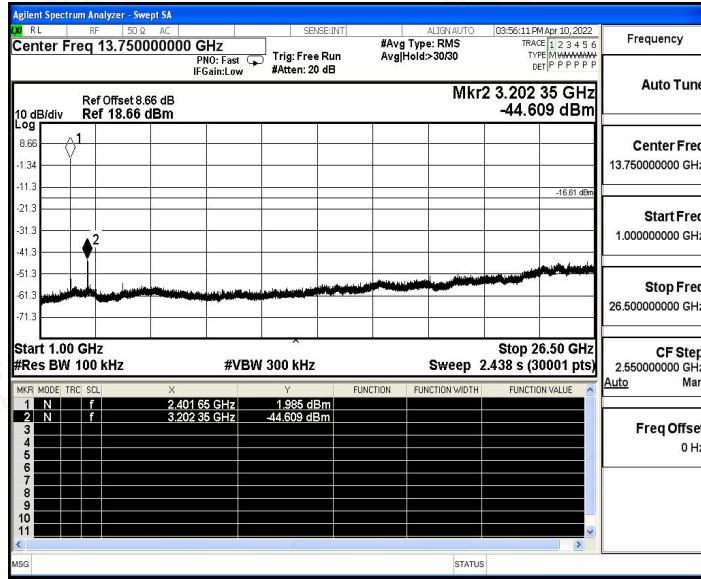


BLE_1M_Ant1_2402_30~1000

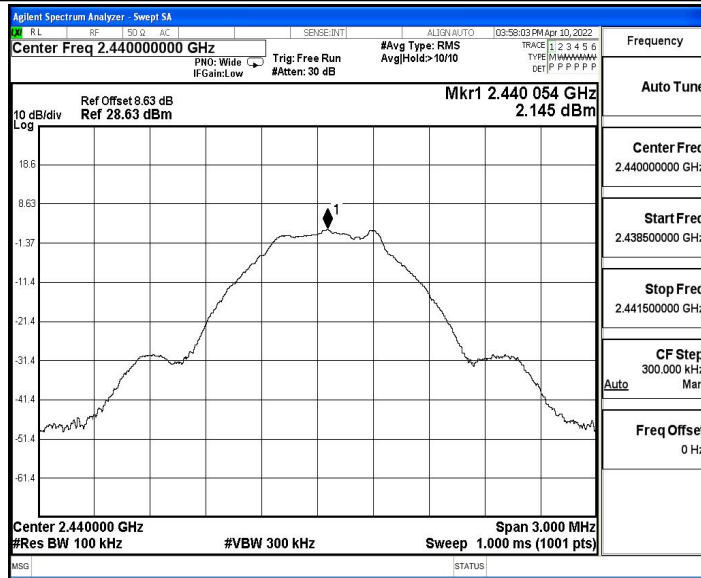


BLE_1M_Ant1_2402_1000~26500



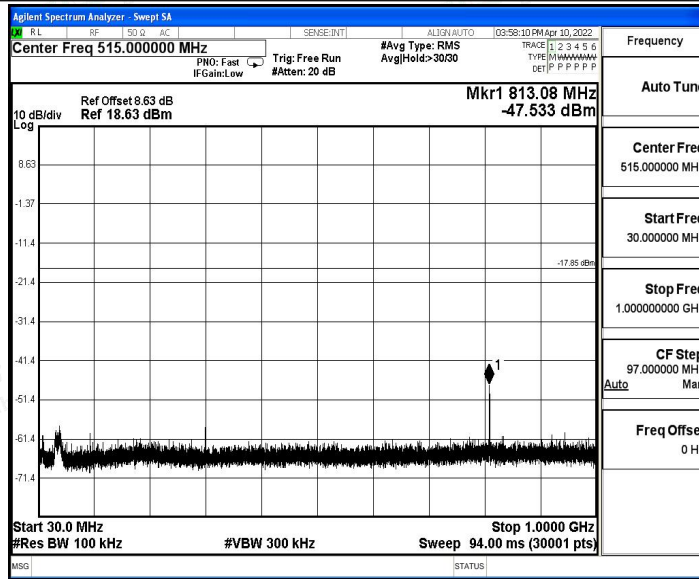


BLE_1M_Ant1_2440_0~Reference

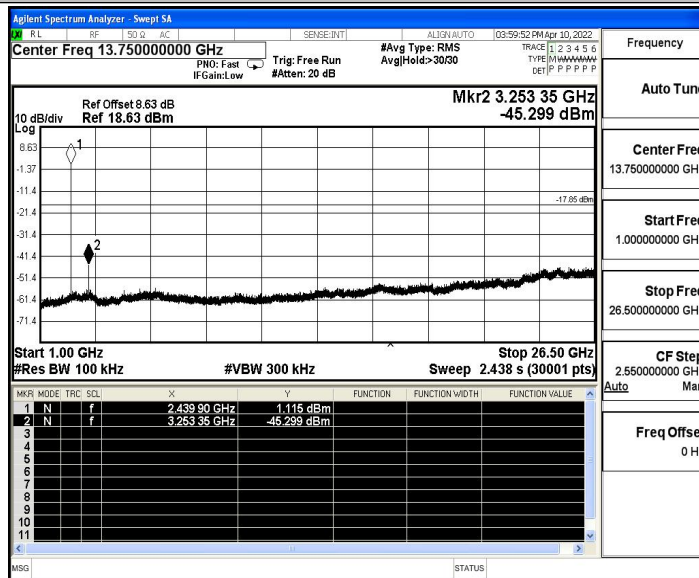


BLE_1M_Ant1_2440_30~1000



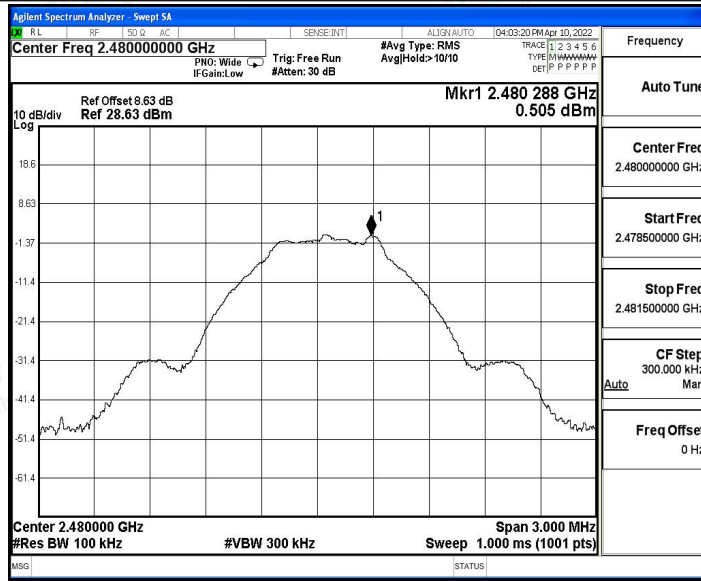


BLE_1M_Ant1_2440_1000~26500

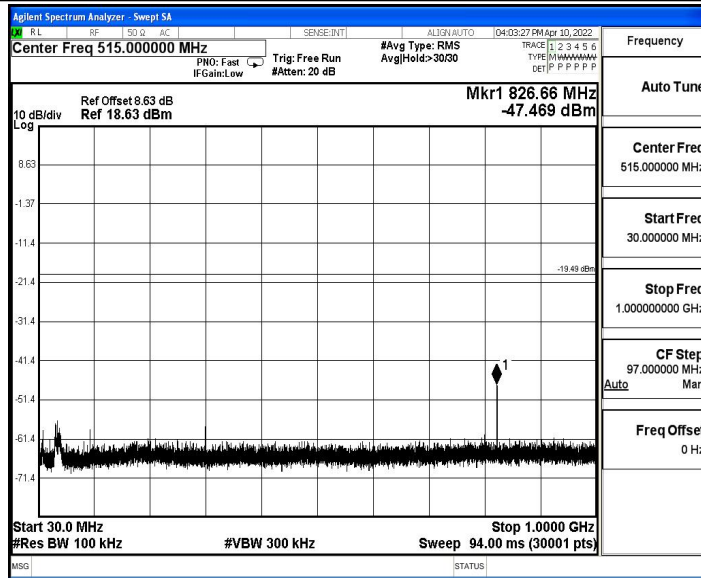


BLE_1M_Ant1_2480_0~Reference



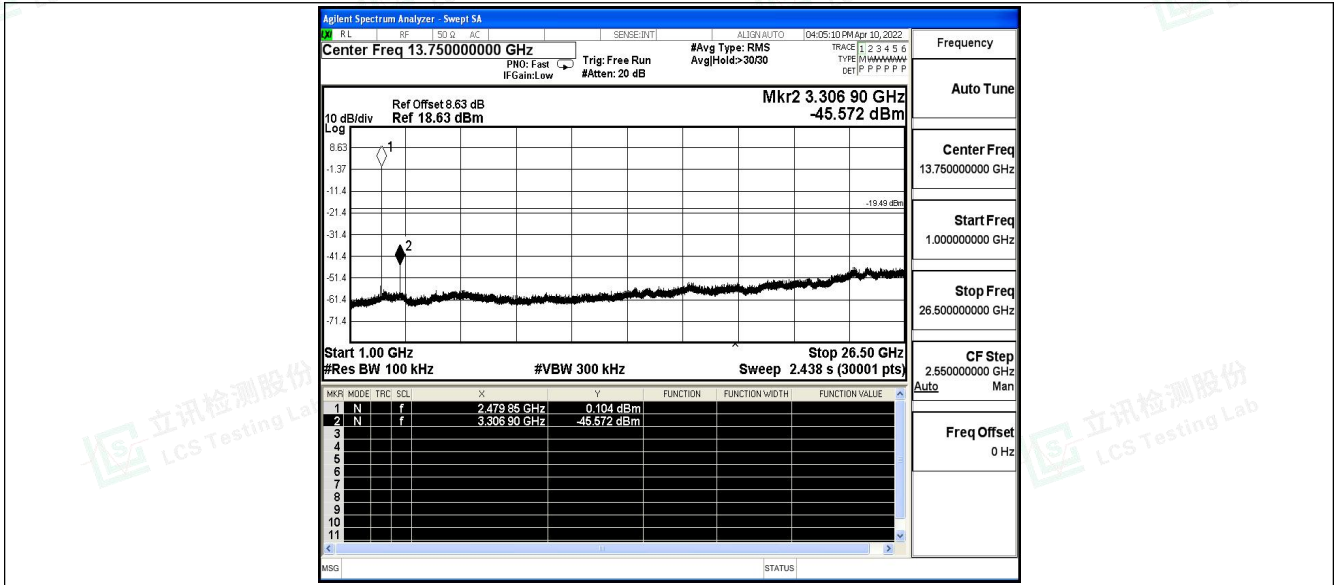


BLE_1M_Ant1_2480_30~1000



BLE_1M_Ant1_2480_1000~26500







A.6 Duty Cycle

Test Result

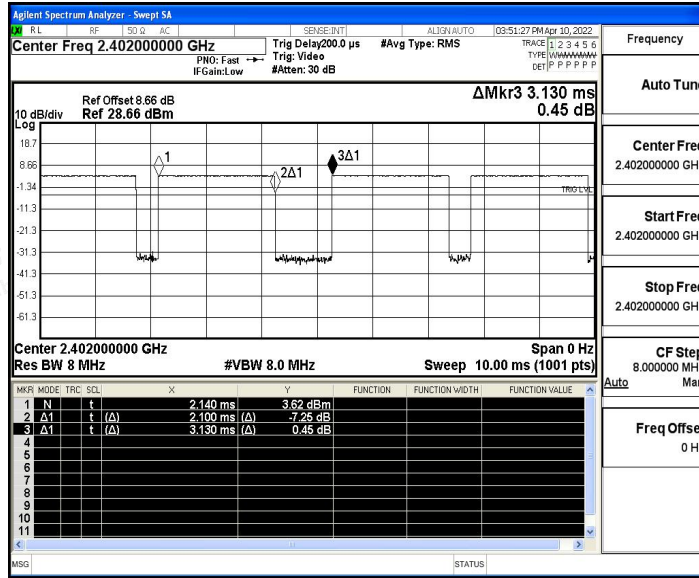
TestMode	Antenna	Channel	ON Time [ms]	Period [ms]	X	DC [%]	xFactor	1/T[kHz]
BLE_1M	Ant1	2402	2.10	3.13	0.6709	67.09	1.73	0.476
		2440	2.10	2.50	0.8400	84.00	0.76	0.476
		2480	2.10	3.13	0.6709	67.09	1.73	0.476



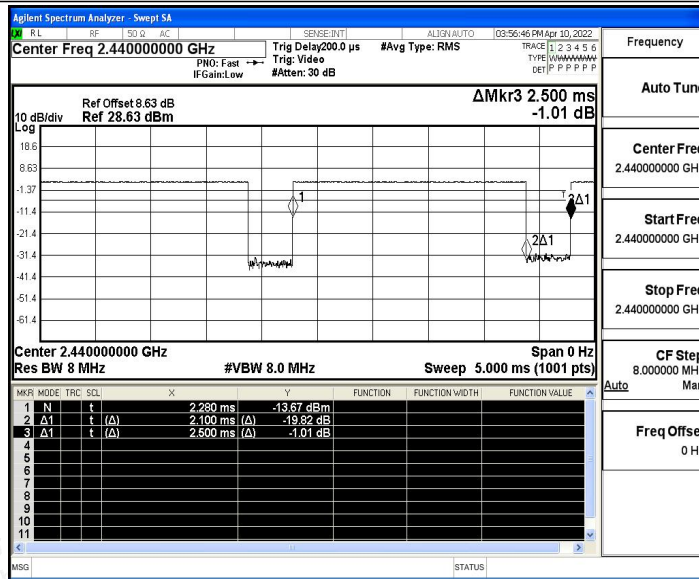


Test Graphs

BLE_1M_Ant1_2402

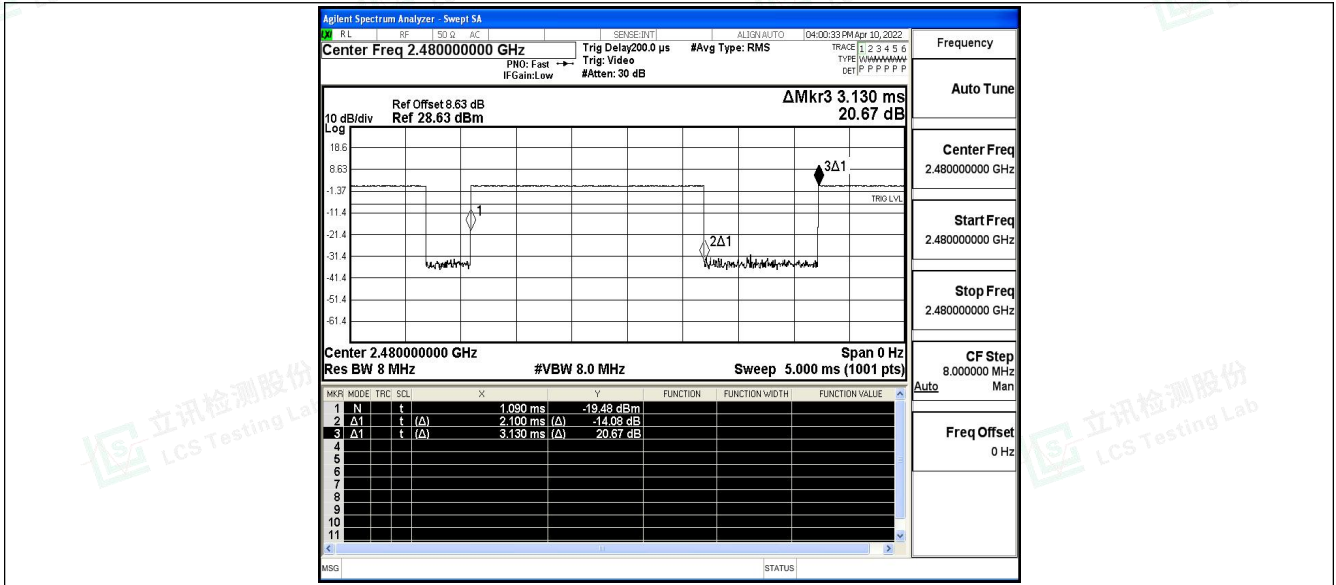


BLE_1M_Ant1_2440



BLE_1M_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	-57.57	≤-41.20	37.63	≤54	PASS
				AV	2388.830	-56.86	≤-41.20	38.34	≤54	PASS
				AV	2390.000	-57.08	≤-41.20	38.12	≤54	PASS
				Peak	2310.000	-48.04	≤-21.20	47.16	≤74	PASS
				Peak	2350.400	-46.13	≤-21.20	49.07	≤74	PASS
				Peak	2390.000	-46.89	≤-21.20	48.31	≤74	PASS
		High	2480	AV	2483.500	-52.83	≤-41.20	42.37	≤54	PASS
				AV	2483.520	-52.83	≤-41.20	42.37	≤54	PASS
				AV	2500.000	-56.66	≤-41.20	38.54	≤54	PASS
				Peak	2483.500	-46.86	≤-21.20	48.34	≤74	PASS
				Peak	2484.640	-44.86	≤-21.20	50.34	≤74	PASS
				Peak	2500.000	-47.28	≤-21.20	47.92	≤74	PASS

Note:

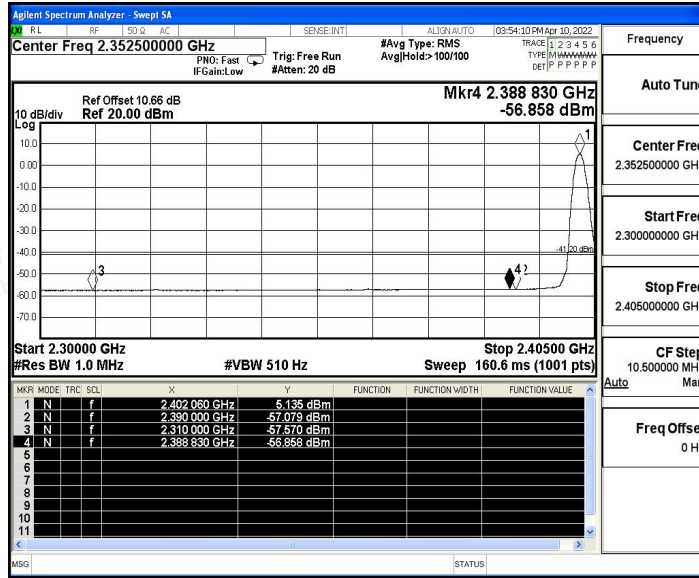
- The Antenna Gain is compensated in the graph.
- The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.



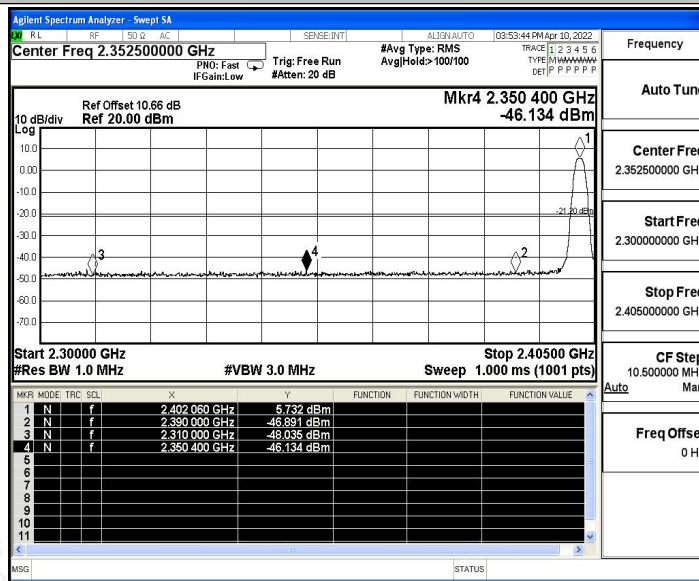


Test Graphs

BLE_1M_Ant1_Low_2402_AV

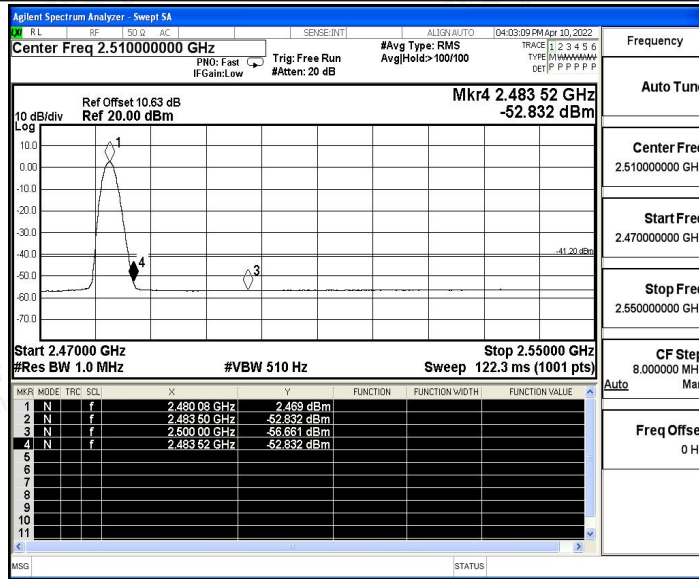


BLE_1M_Ant1_Low_2402_Peak



BLE_1M_Ant1_High_2480_AV





BLE_1M_Ant1_High_2480_Peak

