



Appendix Test Data for BLE (Conducted Measurement)

Product Name: Wanbo Projector

Trade Mark: wanbo

Test Model: Cube 2S

FCC ID: 2A7PI-CUBE2

Environmental Conditions

Temperature:	23.5°C
Relative Humidity:	58%
ATM Pressure:	100.0 kPa
Test Engineer:	Allen Lai
Supervised by:	Max Zhang
NOTE	N/A

Appendix A: DTS Bandwidth

Test Result

Test Mode	Antenna	Frequency [MHz]	DTS BW [MHz]	FL [MHz]	FH [MHz]	Limit [MHz]	Verdict
BLE_1M	Ant1	2402	0.692	2401.636	2402.328	0.5	PASS
BLE_1M	Ant1	2440	0.700	2439.628	2440.328	0.5	PASS
BLE_1M	Ant1	2480	0.684	2479.644	2480.328	0.5	PASS
BLE_2M	Ant1	2402	1.104	2401.472	2402.576	0.5	PASS
BLE_2M	Ant1	2440	1.128	2439.444	2440.572	0.5	PASS
BLE_2M	Ant1	2480	1.112	2479.452	2480.564	0.5	PASS

Note: offset(dB) = cable loss(dB) + attenuator factor(dB)



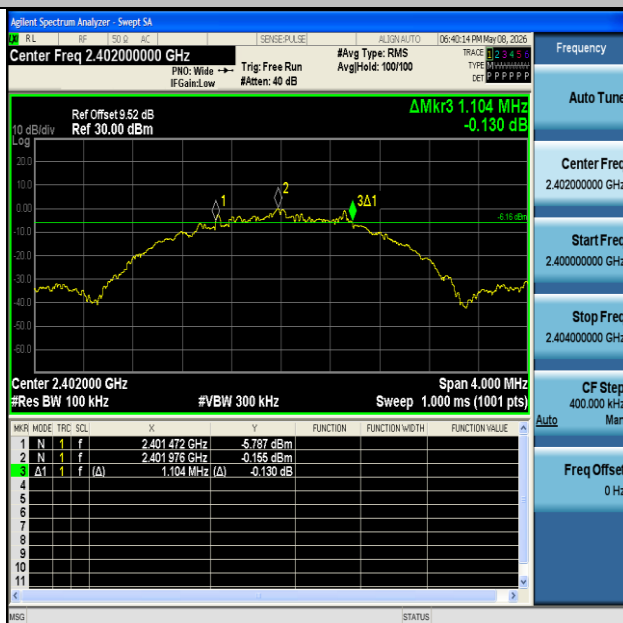


Test Graphs





BLE_1M-Ant1-2480-PASS



BLE_2M-Ant1-2402-PASS





BLE_2M-Ant1-2440-PASS



BLE_2M-Ant1-2480-PASS





Appendix B: Occupied Channel Bandwidth

Test Result

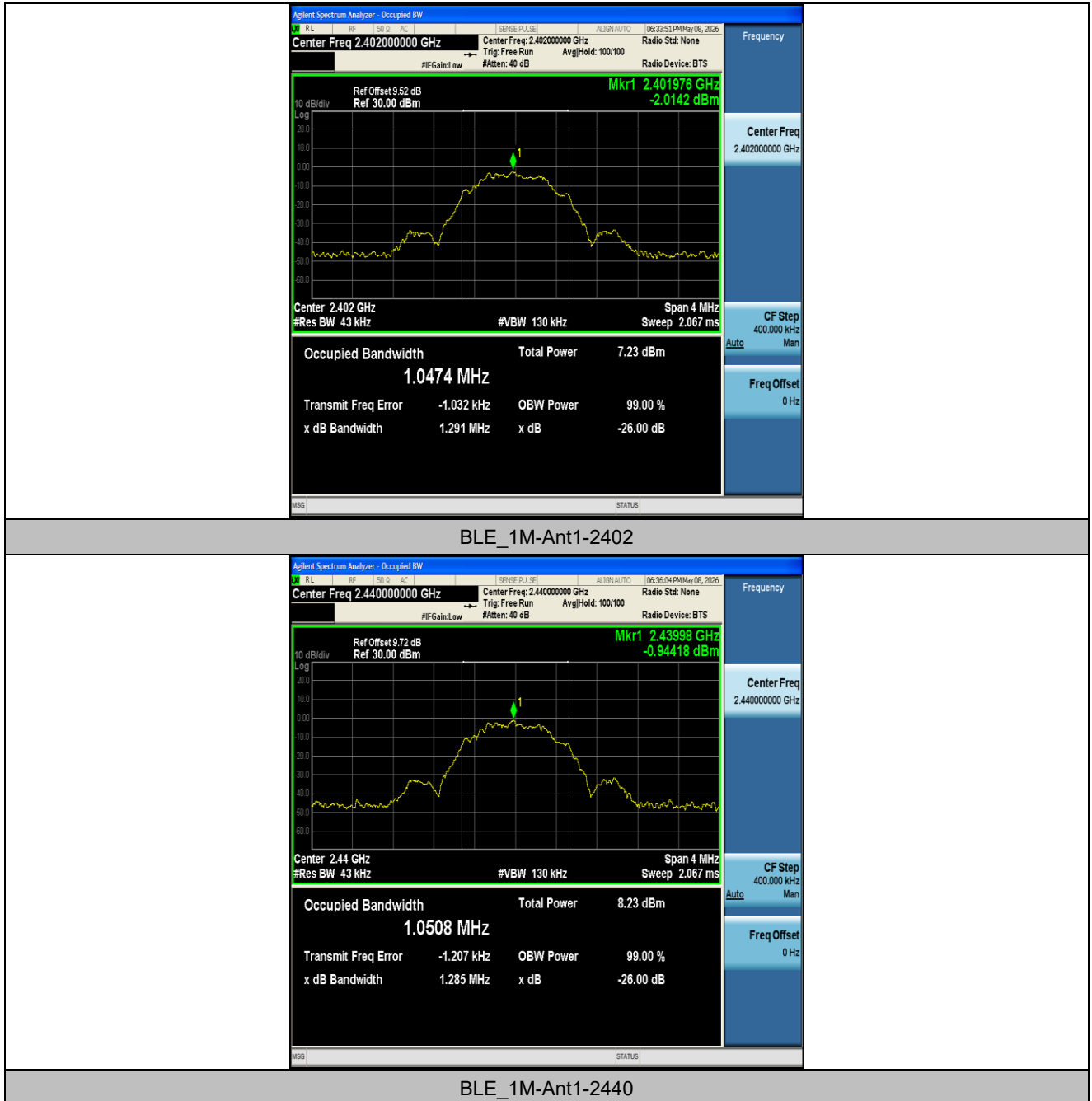
Test Mode	Antenna	Frequency [MHz]	OCB [MHz]	FL [MHz]	FH [MHz]	Limit [MHz]	Verdict
BLE_1M	Ant1	2402	1.0474	2401.4753	2402.5227	---	---
BLE_1M	Ant1	2440	1.0508	2439.4734	2440.5242	---	---
BLE_1M	Ant1	2480	1.0479	2479.4766	2480.5245	---	---
BLE_2M	Ant1	2402	2.1013	2400.9526	2403.0539	---	---
BLE_2M	Ant1	2440	2.0897	2438.9614	2441.0511	---	---
BLE_2M	Ant1	2480	2.1120	2478.9529	2481.0649	---	---

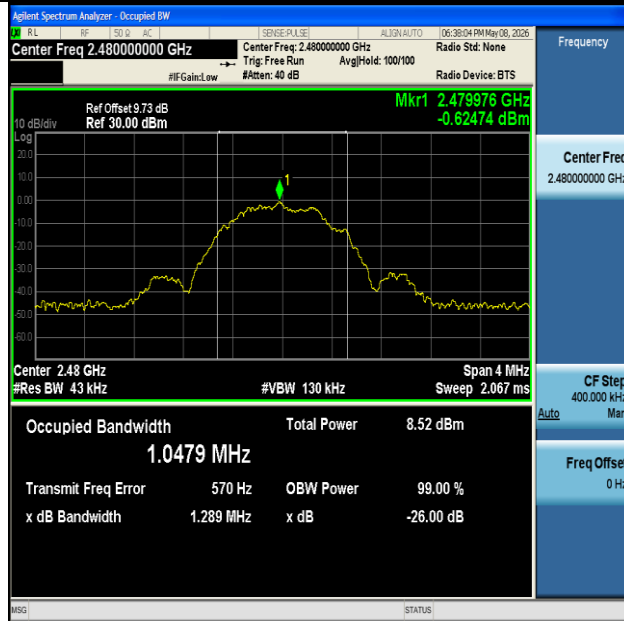
Note: offset(dB) = cable loss(dB) + attenuator factor(dB)





Test Graphs





BLE_1M-Ant1-2480



BLE_2M-Ant1-2402





BLE_2M-Ant1-2440



BLE_2M-Ant1-2480





Appendix C: Maximum peak conducted output power

Test Result Peak

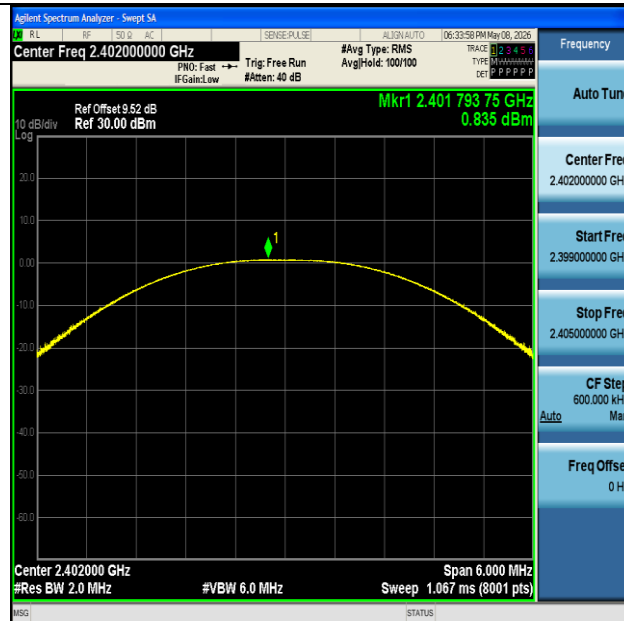
Test Mode	Antenna	Frequency [MHz]	Conducted Peak Power [dBm]	Conducted Limit [dBm]	Verdict
BLE_1M	Ant1	2402	0.84	≤30	PASS
BLE_1M	Ant1	2440	1.96	≤30	PASS
BLE_1M	Ant1	2480	2.14	≤30	PASS
BLE_2M	Ant1	2402	1.11	≤30	PASS
BLE_2M	Ant1	2440	1.90	≤30	PASS
BLE_2M	Ant1	2480	2.10	≤30	PASS

Note: offset(dB) = cable loss(dB) + attenuator factor(dB)

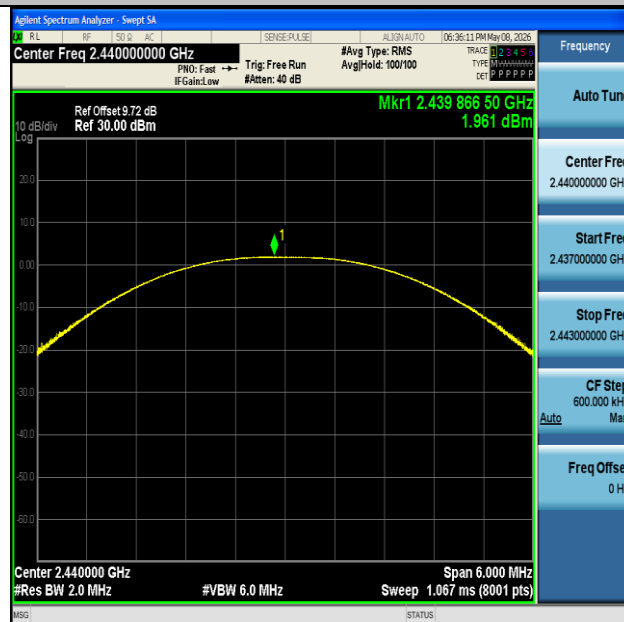




Test Graphs Peak

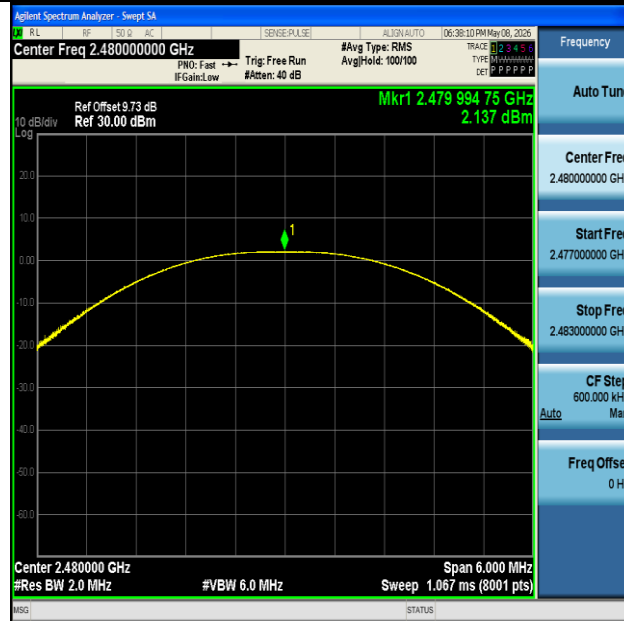


BLE_1M-Ant1-2402-PASS

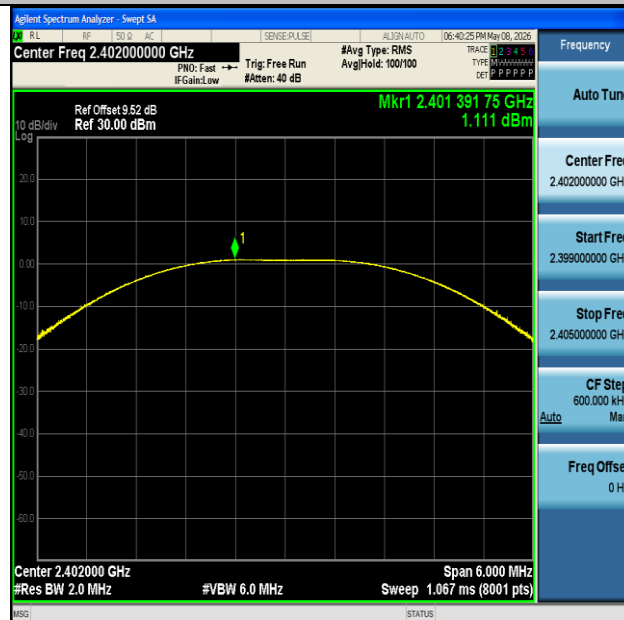


BLE_1M-Ant1-2440-PASS



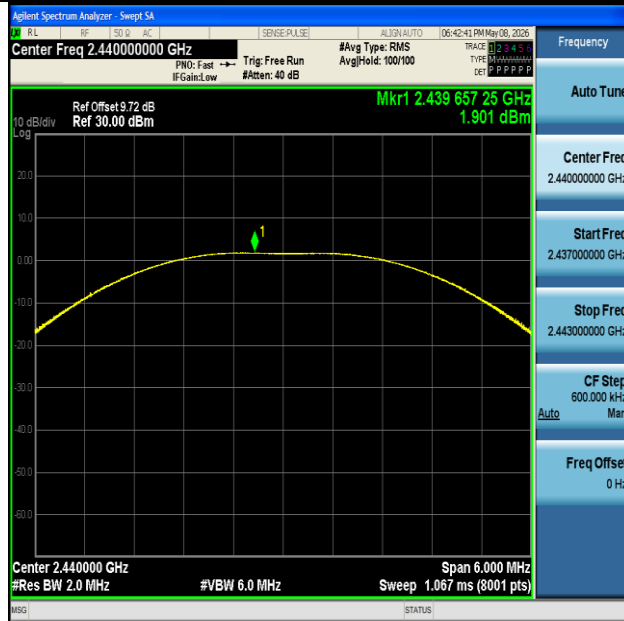


BLE_1M-Ant1-2480-PASS

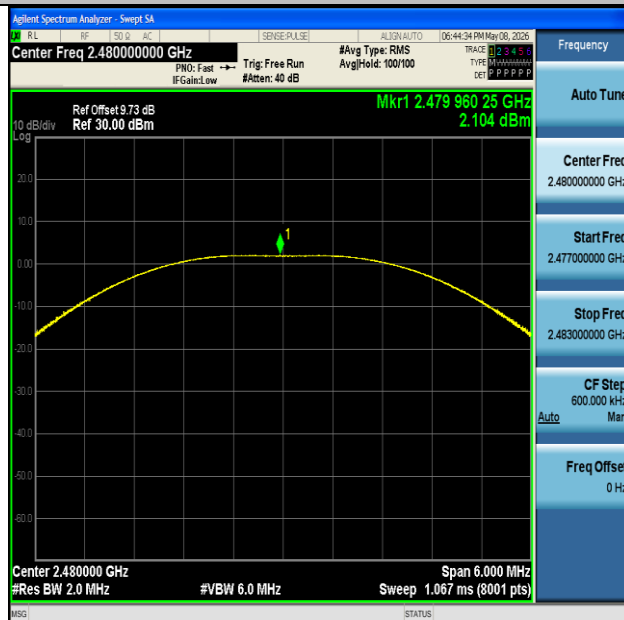


BLE_2M-Ant1-2402-PASS





BLE_2M-Ant1-2440-PASS



BLE_2M-Ant1-2480-PASS





Appendix D: Maximum peak power spectral density

Test Result

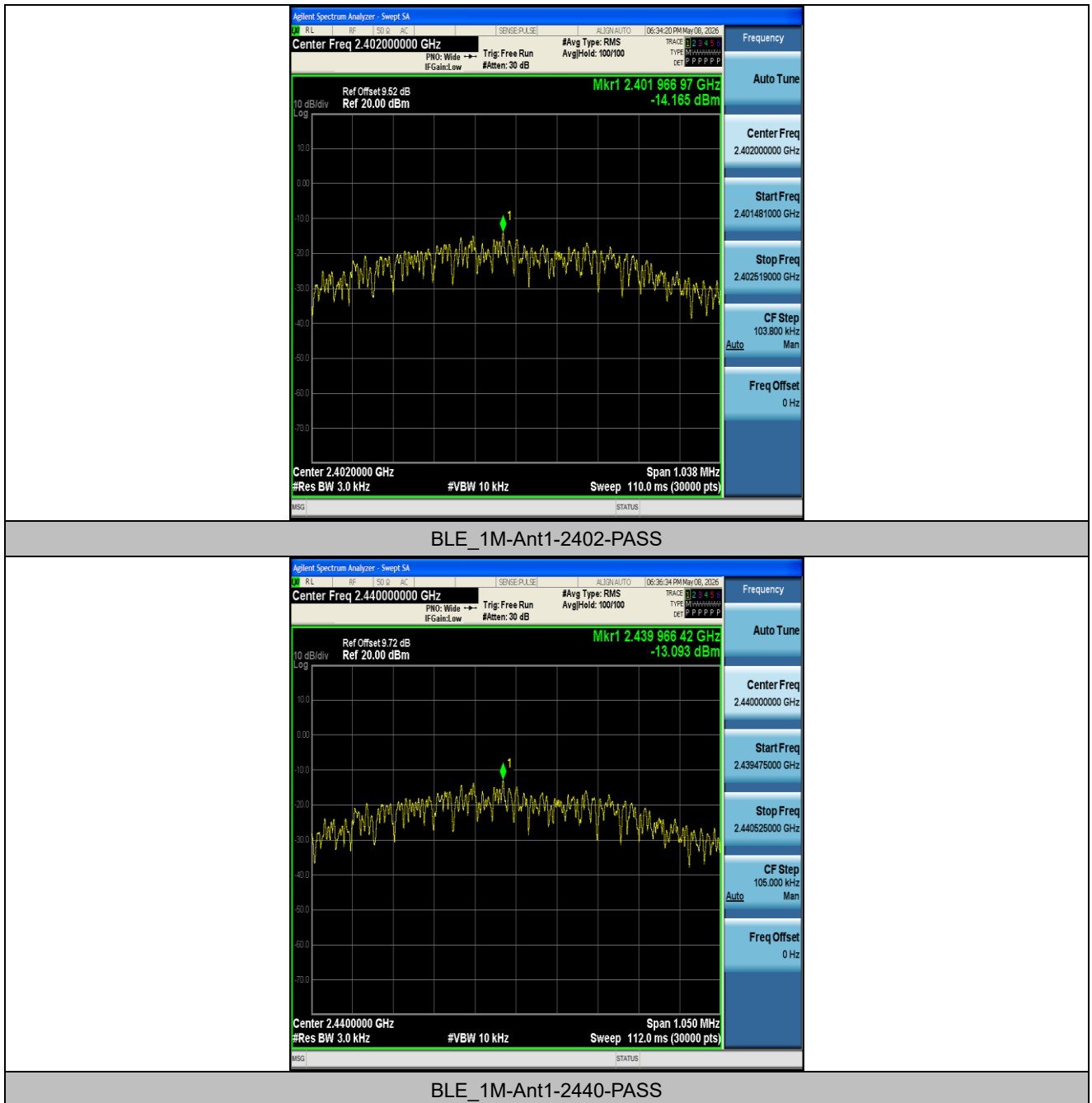
Test Mode	Antenna	Frequency [MHz]	Result [dBm/3kHz]	Limit [dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-14.17	≤8.00	PASS
BLE_1M	Ant1	2440	-13.09	≤8.00	PASS
BLE_1M	Ant1	2480	-12.80	≤8.00	PASS
BLE_2M	Ant1	2402	-17.73	≤8.00	PASS
BLE_2M	Ant1	2440	-17.00	≤8.00	PASS
BLE_2M	Ant1	2480	-16.66	≤8.00	PASS

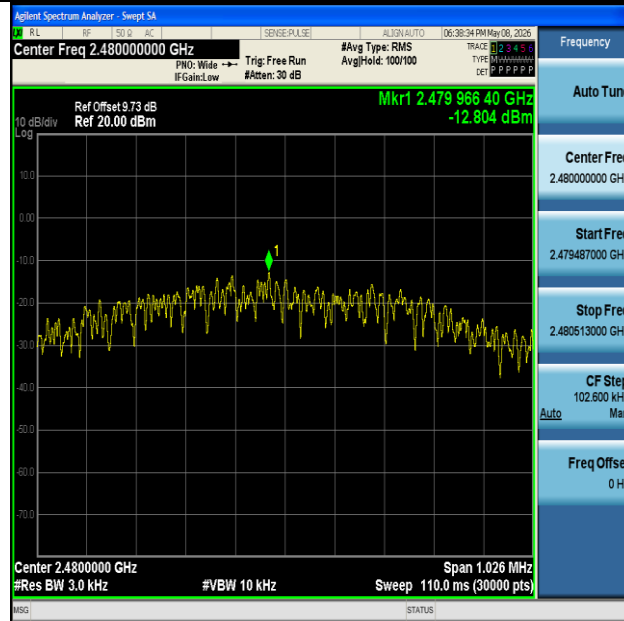
Note: offset(dB) = cable loss(dB) + attenuator factor(dB)





Test Graphs





BLE_1M-Ant1-2480-PASS



BLE_2M-Ant1-2402-PASS





BLE_2M-Ant1-2440-PASS



BLE_2M-Ant1-2480-PASS





Appendix E: Band edge measurements

Test Result

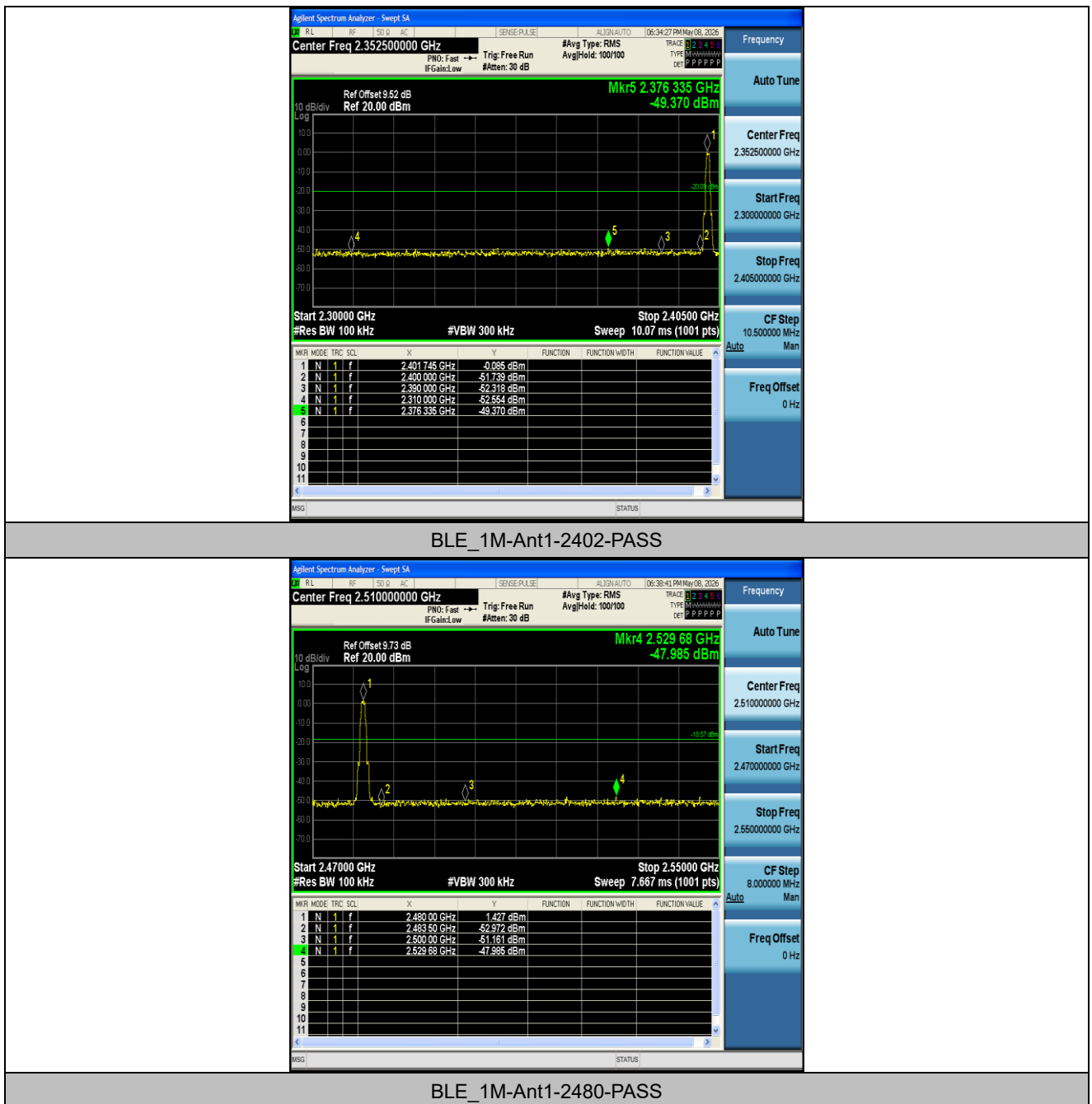
Test Mode	Antenna	Ch. Name	Frequency [MHz]	Ref. Level [dBm]	Result [dBm]	Limit [dBm]	Verdict
BLE_1M	Ant1	Low	2402	-0.09	-49.37	≤ -20.09	PASS
BLE_1M	Ant1	High	2480	1.43	-47.99	≤ -18.57	PASS
BLE_2M	Ant1	Low	2402	-1.65	-34.55	≤ -21.65	PASS
BLE_2M	Ant1	High	2480	0.56	-48.47	≤ -19.44	PASS

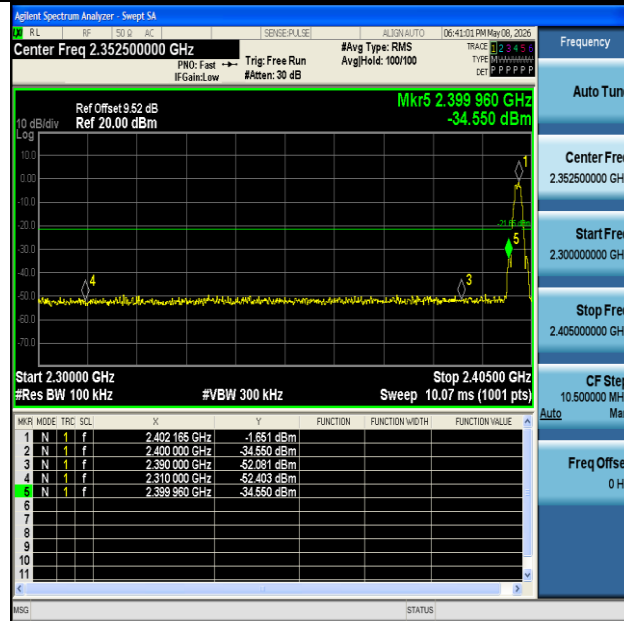
Note: offset(dB) = cable loss(dB) + attenuator factor(dB)



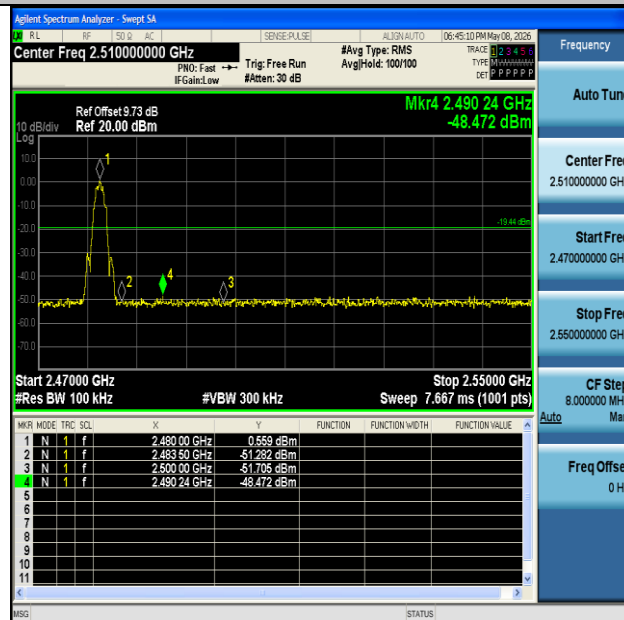


Test Graphs





BLE_2M-Ant1-2402-PASS



BLE_2M-Ant1-2480-PASS





Appendix F: Conducted Spurious Emission

Test Result

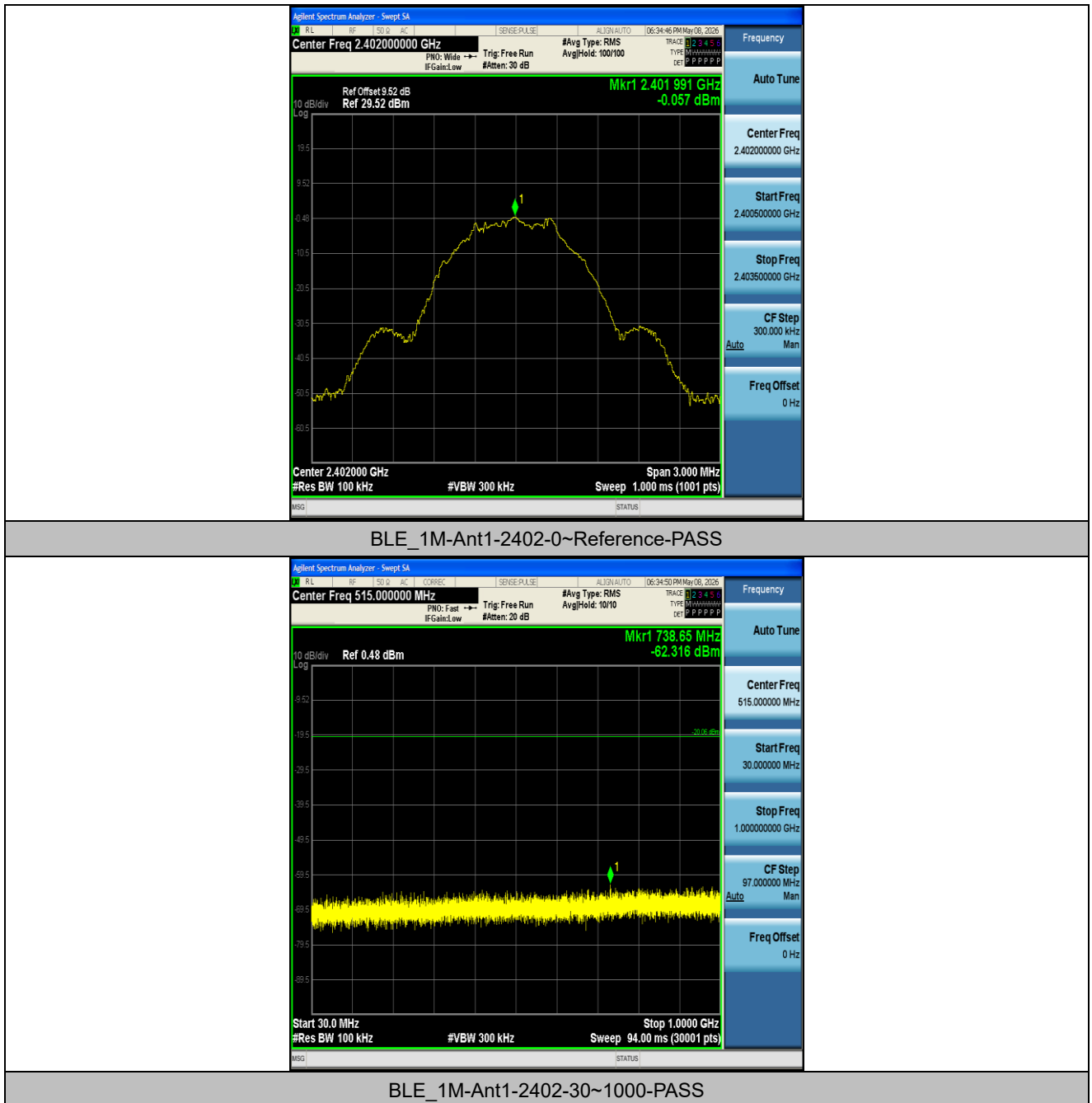
Test Mode	Antenna	Frequency [MHz]	Freq. Range [MHz]	Ref. Level [dBm]	Result [dBm]	Limit [dBm]	Verdict
BLE_1M	Ant1	2402	0~Reference	-0.06	-0.06	---	PASS
BLE_1M	Ant1	2402	30~1000	-0.06	-62.32	≤-20.06	PASS
BLE_1M	Ant1	2402	1000~26500	-0.06	-36.16	≤-20.06	PASS
BLE_1M	Ant1	2440	0~Reference	0.78	0.78	---	PASS
BLE_1M	Ant1	2440	30~1000	0.78	-62.3	≤-19.22	PASS
BLE_1M	Ant1	2440	1000~26500	0.78	-36.24	≤-19.22	PASS
BLE_1M	Ant1	2480	0~Reference	1.06	1.06	---	PASS
BLE_1M	Ant1	2480	30~1000	1.06	-62.51	≤-18.94	PASS
BLE_1M	Ant1	2480	1000~26500	1.06	-36.88	≤-18.94	PASS
BLE_2M	Ant1	2402	0~Reference	-0.10	-0.10	---	PASS
BLE_2M	Ant1	2402	30~1000	-0.10	-62.17	≤-20.1	PASS
BLE_2M	Ant1	2402	1000~26500	-0.10	-37.29	≤-20.1	PASS
BLE_2M	Ant1	2440	0~Reference	1.02	1.02	---	PASS
BLE_2M	Ant1	2440	30~1000	1.02	-61.8	≤-18.98	PASS
BLE_2M	Ant1	2440	1000~26500	1.02	-36.86	≤-18.98	PASS
BLE_2M	Ant1	2480	0~Reference	0.71	0.71	---	PASS
BLE_2M	Ant1	2480	30~1000	0.71	-62.09	≤-19.29	PASS
BLE_2M	Ant1	2480	1000~26500	0.71	-37	≤-19.29	PASS

Note: offset(dB) in Reference test plots = cable loss(dB) + attenuator factor(dB); For spurious emissions plots from 30MHz to 26.5GHz, the cable loss and attenuator factors have been set in the 'Input Correction' of the Spectrum Analyzer during the test.



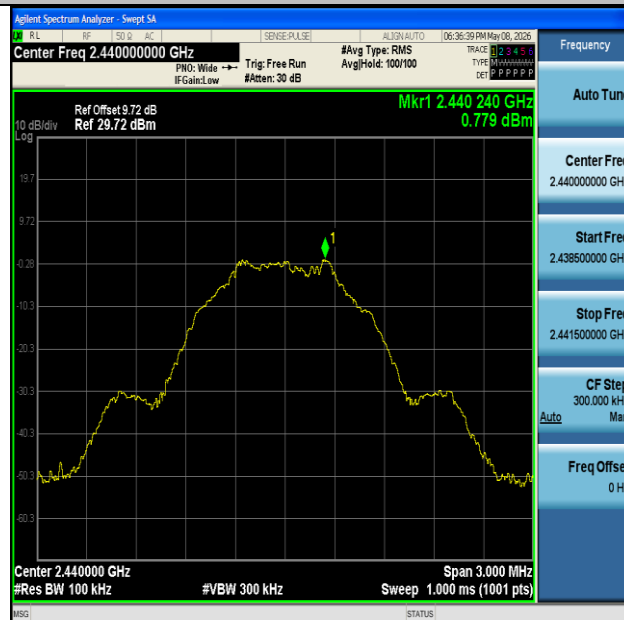


Test Graphs



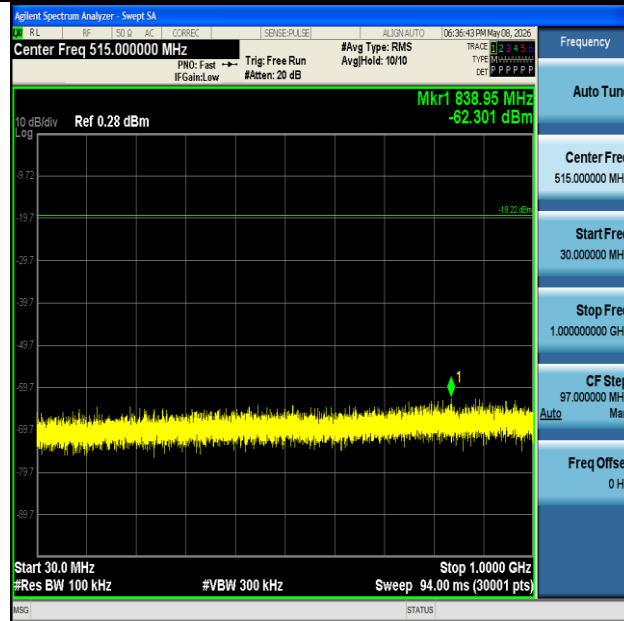


BLE_1M-Ant1-2402-1000~26500-PASS

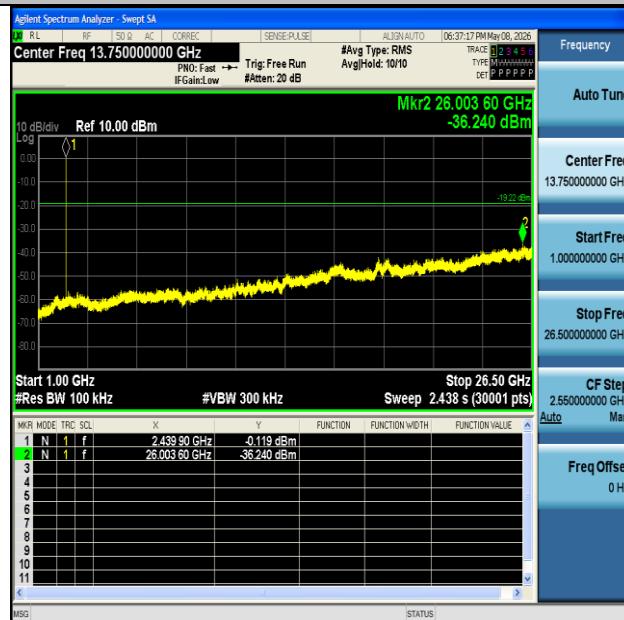


BLE_1M-Ant1-2440-0~Reference-PASS





BLE_1M-Ant1-2440-30~1000-PASS

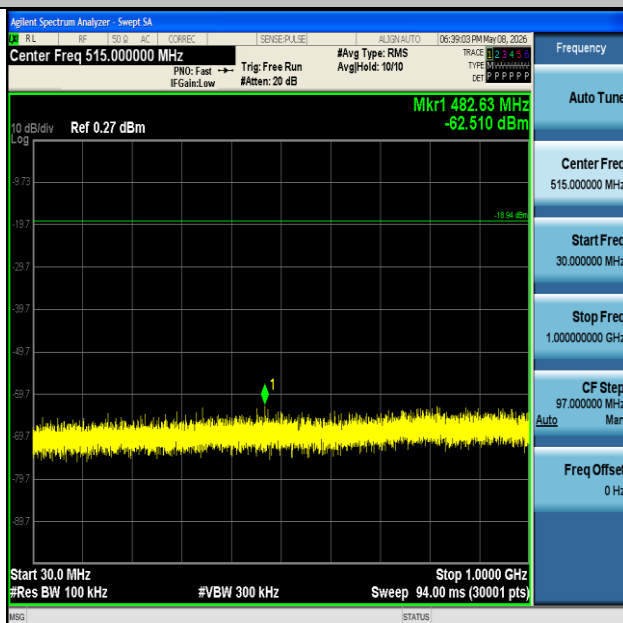


BLE_1M-Ant1-2440-1000~26500-PASS



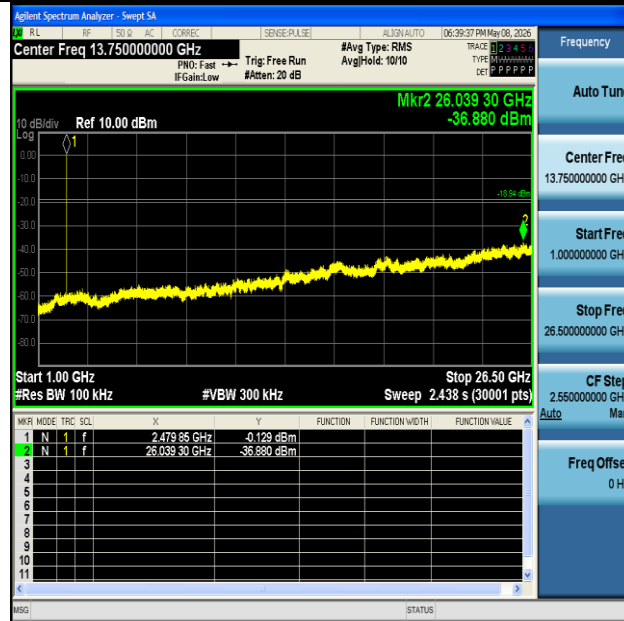


BLE_1M-Ant1-2480-0~Reference-PASS

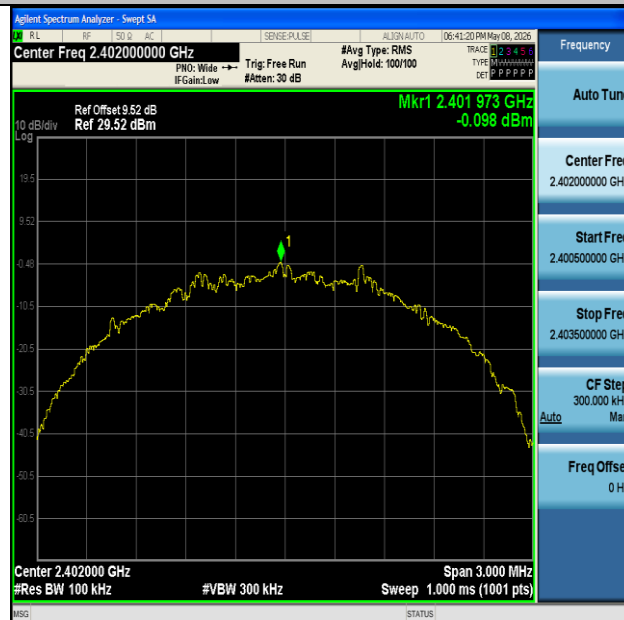


BLE_1M-Ant1-2480-30~1000-PASS



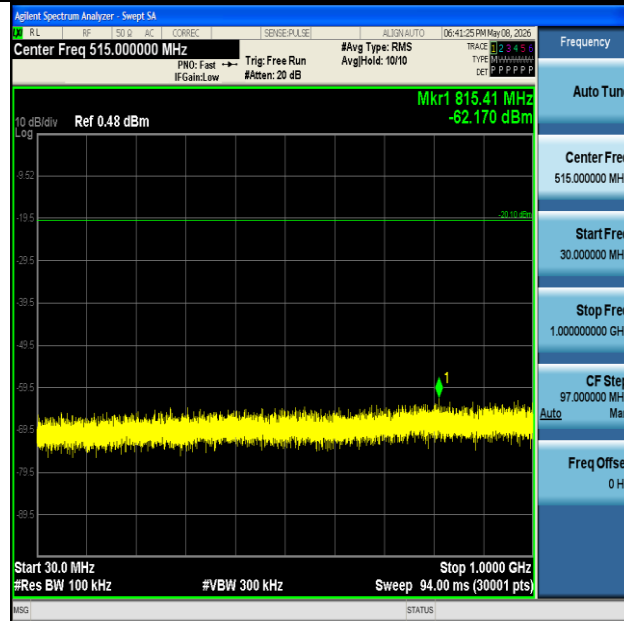


BLE_1M-Ant1-2480-1000~26500-PASS

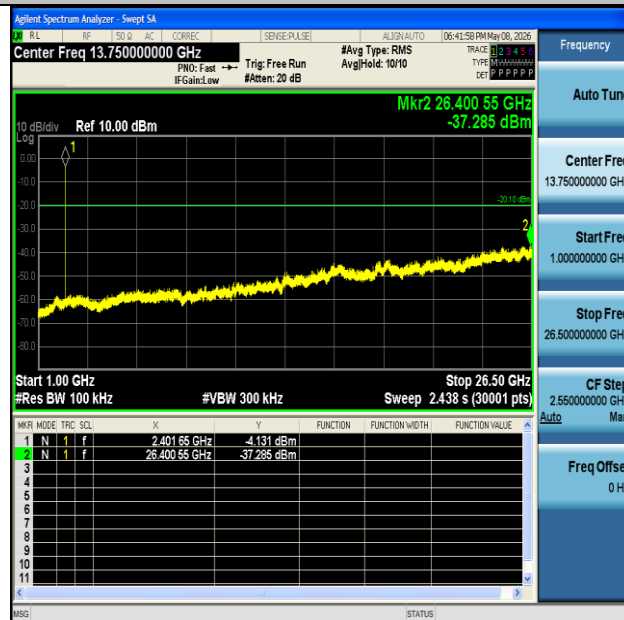


BLE_2M-Ant1-2402-0~Reference-PASS





BLE_2M-Ant1-2402-30~1000-PASS

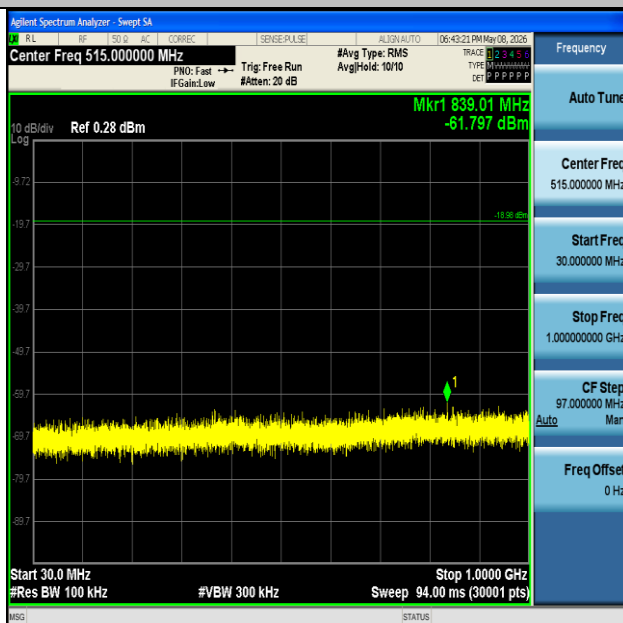


BLE_2M-Ant1-2402-1000~26500-PASS



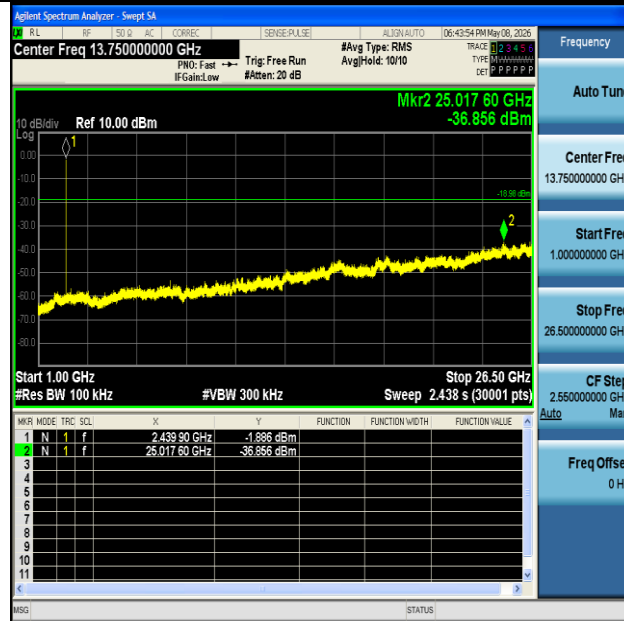


BLE_2M-Ant1-2440-0~Reference-PASS

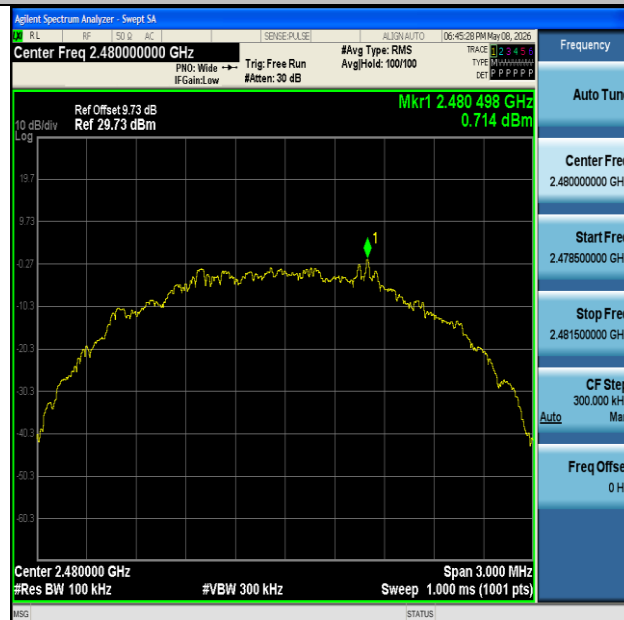


BLE_2M-Ant1-2440-30~1000-PASS





BLE_2M-Ant1-2440-1000~26500-PASS



BLE_2M-Ant1-2480-0~Reference-PASS





BLE_2M-Ant1-2480-30~1000-PASS



BLE_2M-Ant1-2480-1000~26500-PASS





Appendix G: Duty Cycle

Test Result

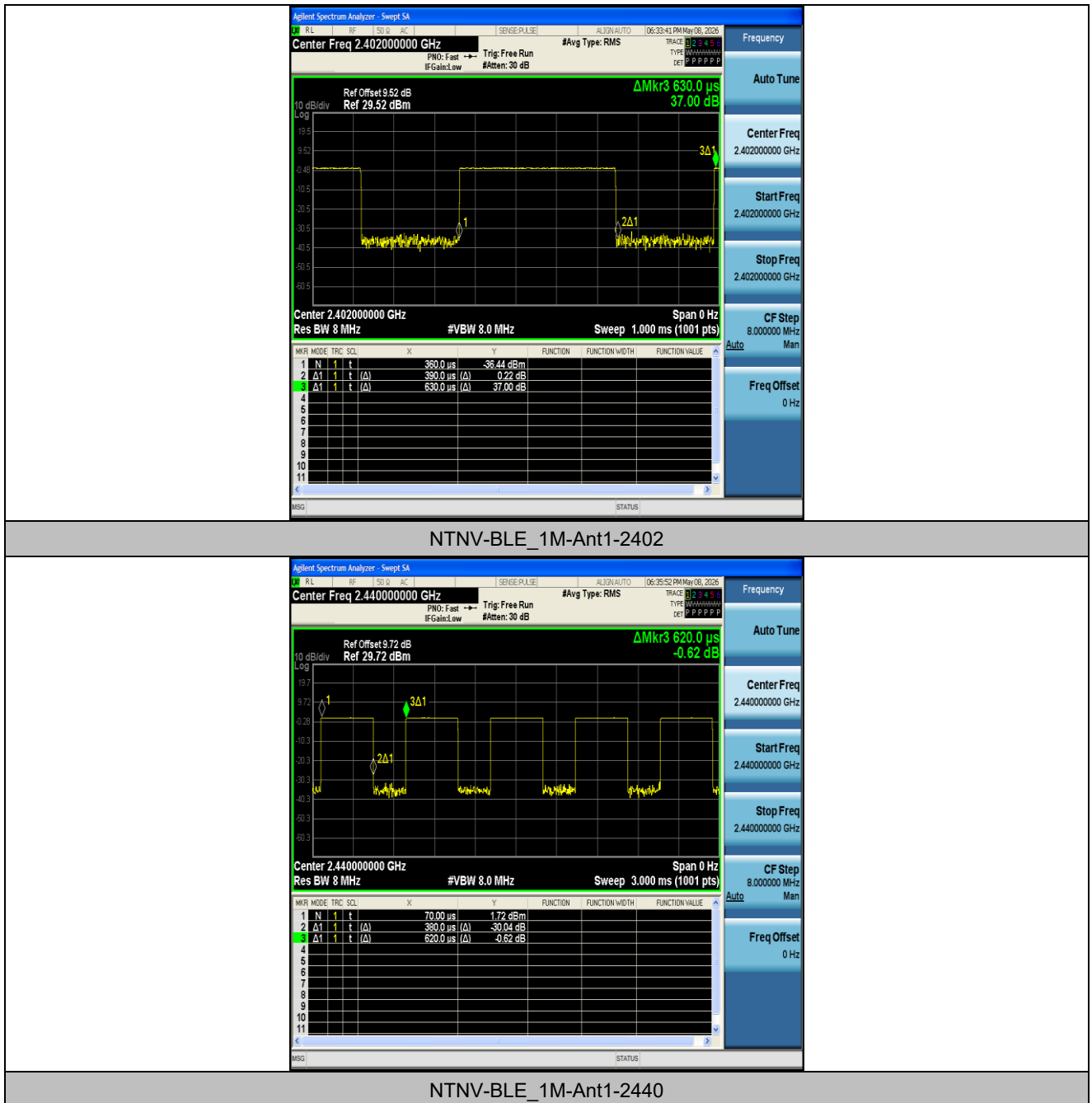
Test Mode	Antenna	Frequency [MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor [dB]
BLE_1M	Ant1	2402	0.39	0.63	61.90	2.08
BLE_1M	Ant1	2440	0.38	0.62	61.29	2.13
BLE_1M	Ant1	2480	0.39	0.63	61.90	2.08
BLE_2M	Ant1	2402	1.07	1.87	57.22	2.42
BLE_2M	Ant1	2440	1.08	1.88	57.45	2.41
BLE_2M	Ant1	2480	1.07	1.88	56.91	2.45

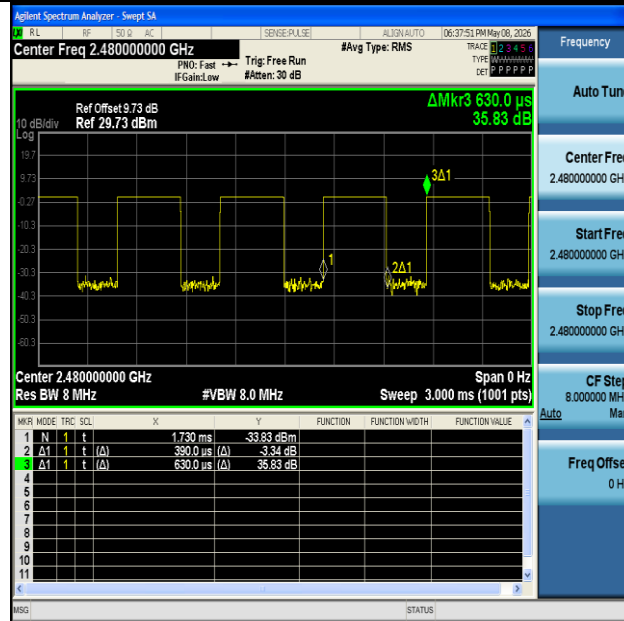
Note: offset(dB) = cable loss(dB) + attenuator factor(dB)



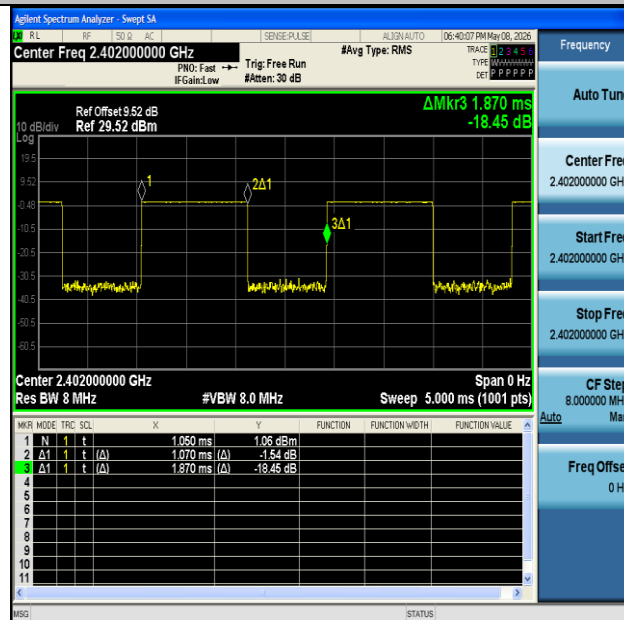


Test Graphs



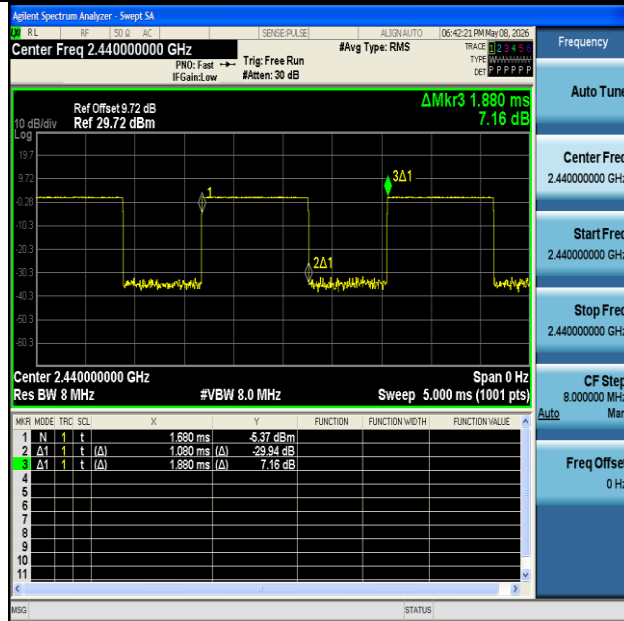


NTNV-BLE_1M-Ant1-2480

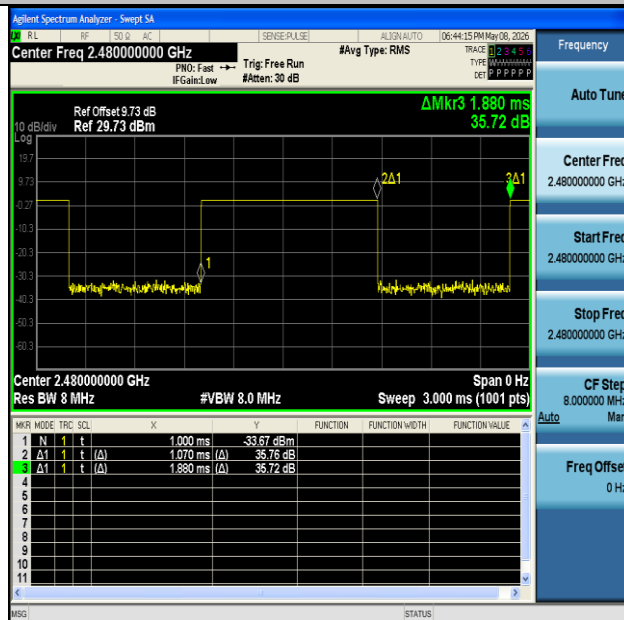


NTNV-BLE_2M-Ant1-2402





NTNV-BLE_2M-Ant1-2440



NTNV-BLE_2M-Ant1-2480

