Appendix Test Data for BLE (Conducted Measurement)

Product Name: Motorcycle Helmet Bluetooth Communication System

Trade Mark: MIDLAND

Test Model: LS2-SPECTRUM EVO

FCC ID: K6M-LS2

Environmental Conditions

Temperature:	23.5℃
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	0.708	2401.648	2402.356	0.5	PASS
BLE_1M	Ant1	2440	0.664	2439.684	2440.348	0.5	PASS
BLE_1M	Ant1	2480	0.672	2479.672	2480.344	0.5	PASS
BLE_2M	Ant1	2402	1.136	2401.456	2402.592	0.5	PASS
BLE_2M	Ant1	2440	1.124	2439.468	2440.592	0.5	PASS
BLE_2M	Ant1	2480	1.228	2479.372	2480.600	0.5	PASS

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

Test Graphs

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

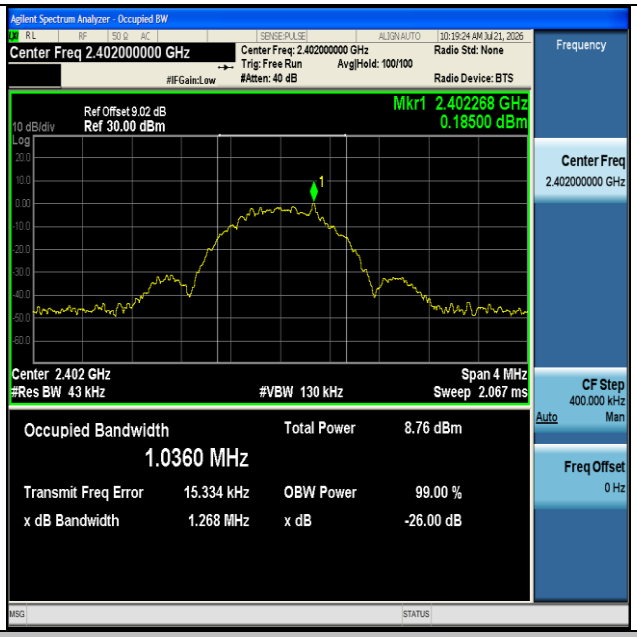
Appendix B: Occupied Channel Bandwidth

Test Result

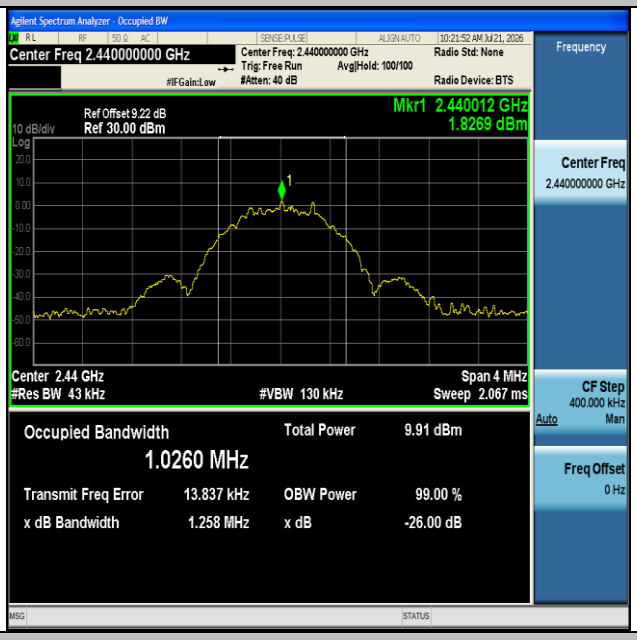
Test Mode	Antenna	Frequency [MHz]	OCB [MHz]	FL [MHz]	FH [MHz]	Limit [MHz]	Verdict
BLE_1M	Ant1	2402	1.0360	2401.4973	2402.5333	---	---
BLE_1M	Ant1	2440	1.0260	2439.5008	2440.5268	---	---
BLE_1M	Ant1	2480	1.0283	2479.5002	2480.5285	---	---
BLE_2M	Ant1	2402	2.0498	2401.0051	2403.0549	---	---
BLE_2M	Ant1	2440	2.0684	2438.9903	2441.0587	---	---
BLE_2M	Ant1	2480	2.0570	2478.9955	2481.0525	---	---

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

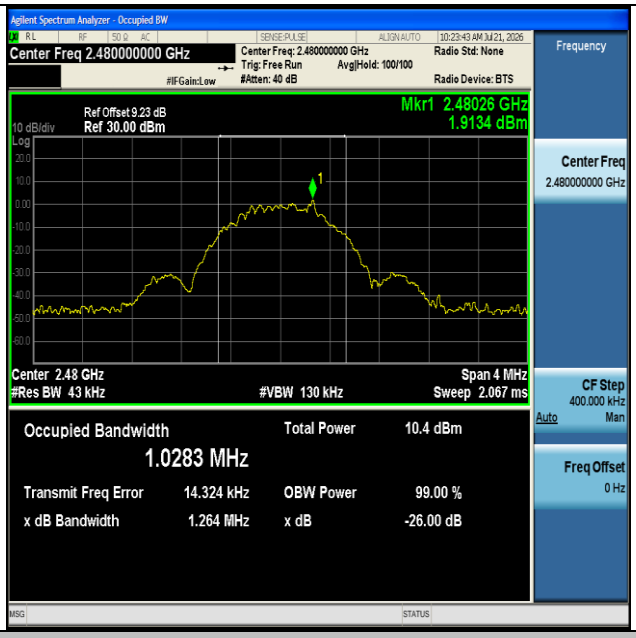
Test Graphs



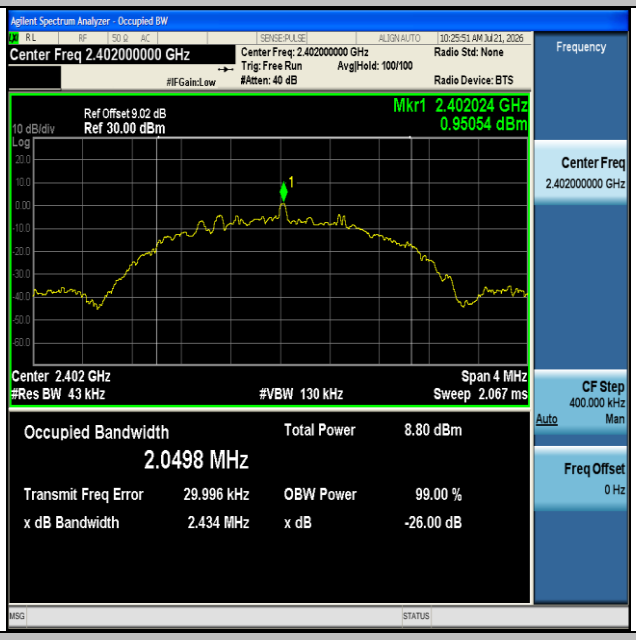
BLE_1M-Ant1-2402



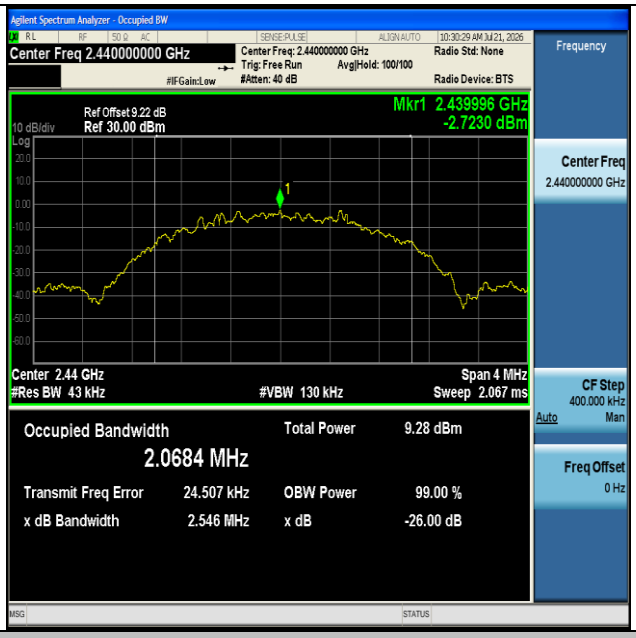
BLE_1M-Ant1-2440



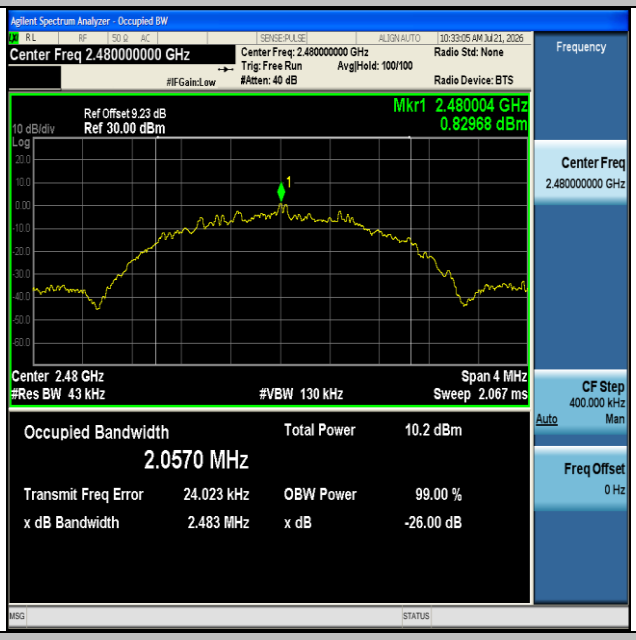
BLE_1M-Ant1-2480



BLE_2M-Ant1-2402



BLE_2M-Ant1-2440



BLE_2M-Ant1-2480

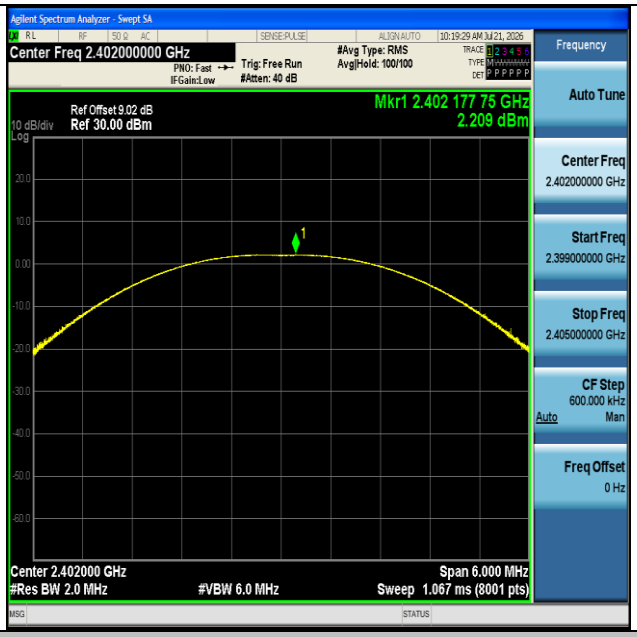
Appendix C: Maximum peak conducted output power

Test Result Peak

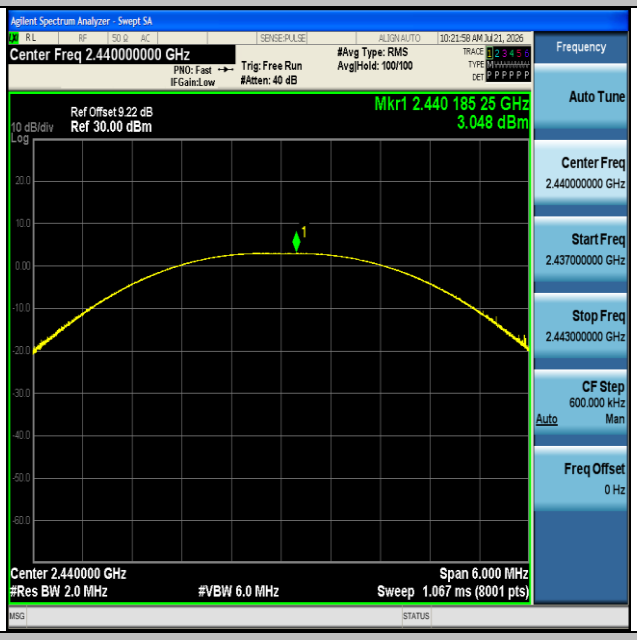
Test Mode	Antenna	Frequency [MHz]	Conducted Peak Power [dBm]	Conducted Limit [dBm]	Verdict
BLE_1M	Ant1	2402	2.21	≤30	PASS
BLE_1M	Ant1	2440	3.05	≤30	PASS
BLE_1M	Ant1	2480	3.61	≤30	PASS
BLE_2M	Ant1	2402	2.36	≤30	PASS
BLE_2M	Ant1	2440	3.44	≤30	PASS
BLE_2M	Ant1	2480	3.94	≤30	PASS

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

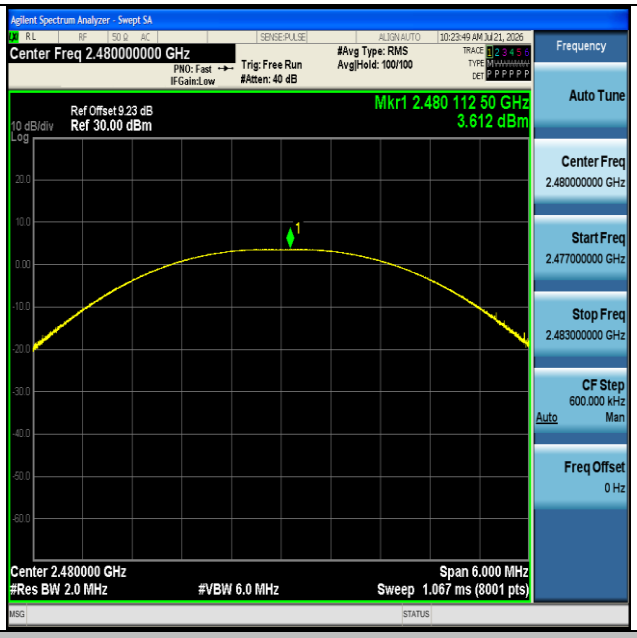
Test Graphs Peak



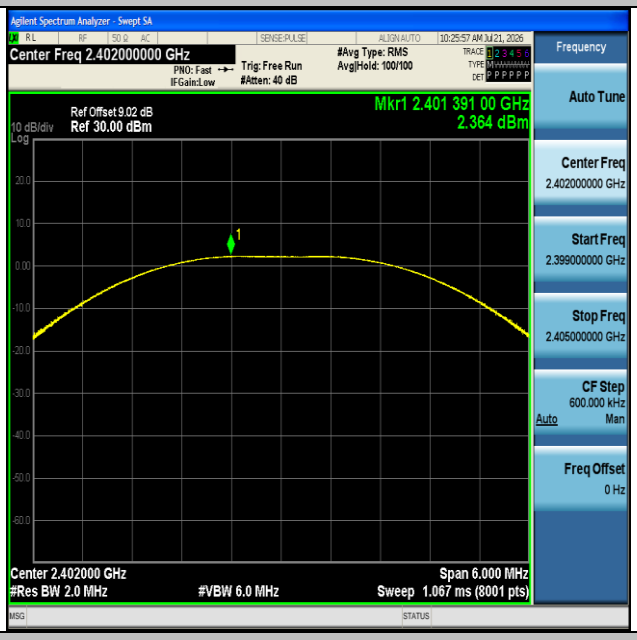
BLE_1M-Ant1-2402-PASS



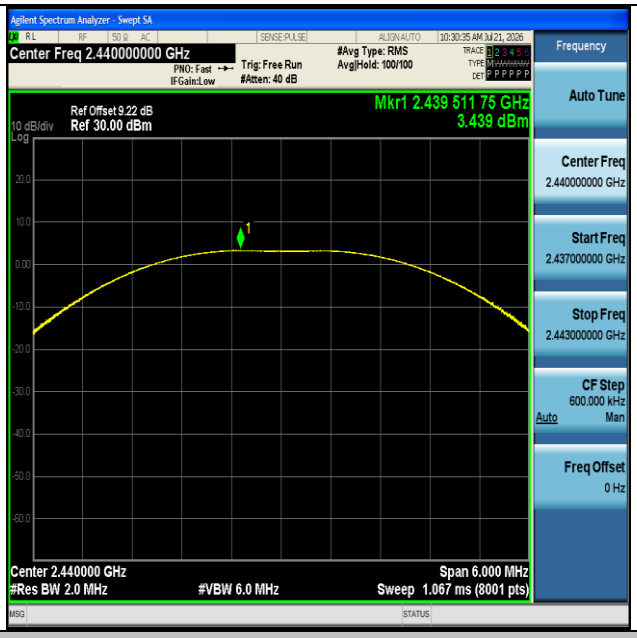
BLE_1M-Ant1-2440-PASS



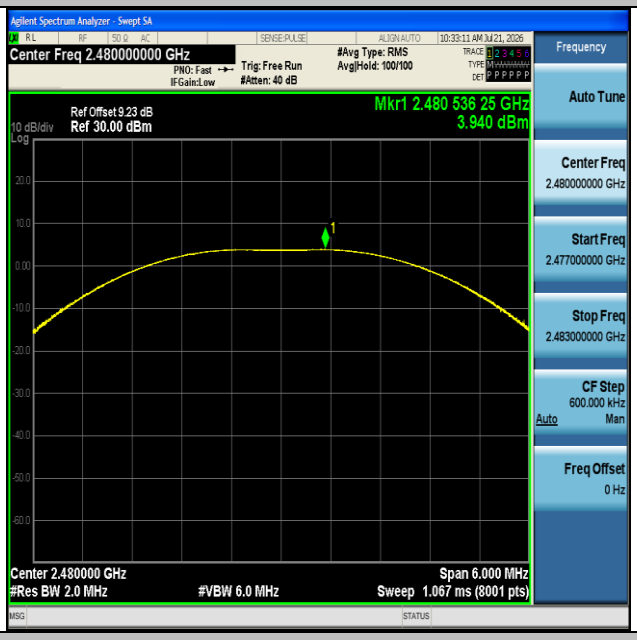
BLE_1M-Ant1-2480-PASS



BLE_2M-Ant1-2402-PASS



BLE_2M-Ant1-2440-PASS



BLE_2M-Ant1-2480-PASS

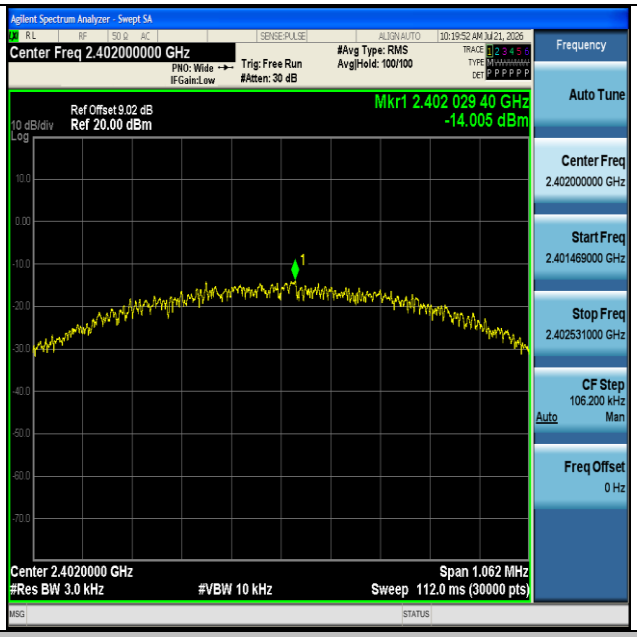
Appendix D: Maximum peak power spectral density

Test Result

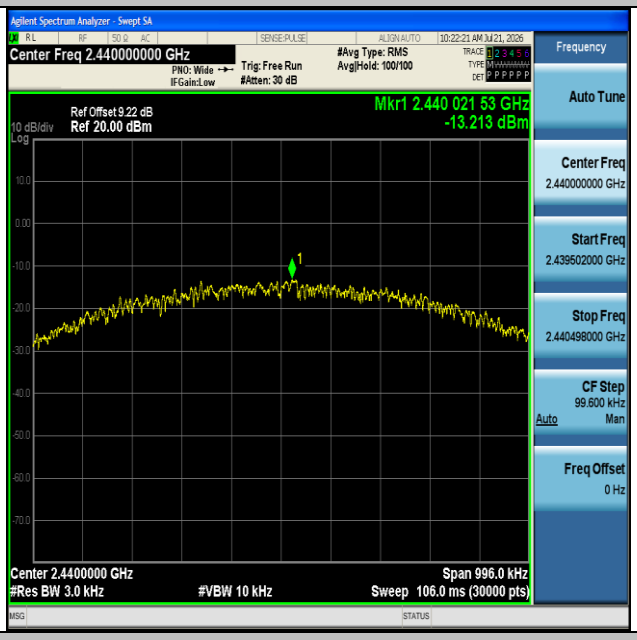
Test Mode	Antenna	Frequency [MHz]	Result [dBm/3kHz]	Limit [dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-14.01	≤8.00	PASS
BLE_1M	Ant1	2440	-13.21	≤8.00	PASS
BLE_1M	Ant1	2480	-12.57	≤8.00	PASS
BLE_2M	Ant1	2402	-15.47	≤8.00	PASS
BLE_2M	Ant1	2440	-14.47	≤8.00	PASS
BLE_2M	Ant1	2480	-14.03	≤8.00	PASS

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

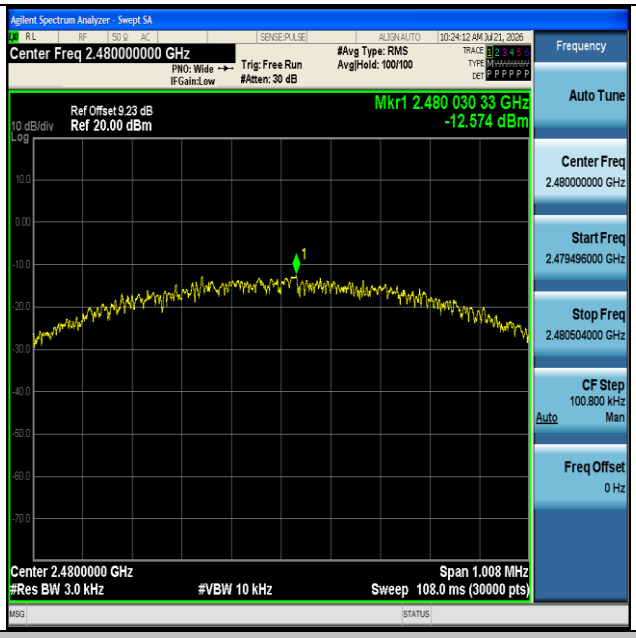
Test Graphs



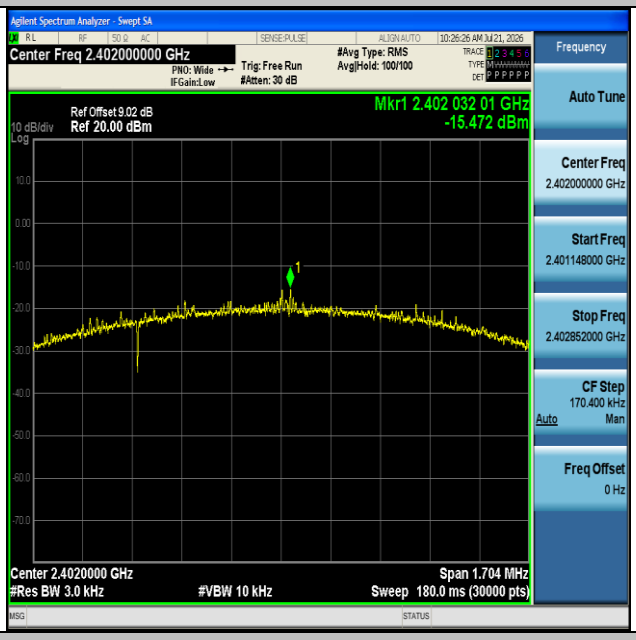
BLE_1M-Ant1-2402-PASS



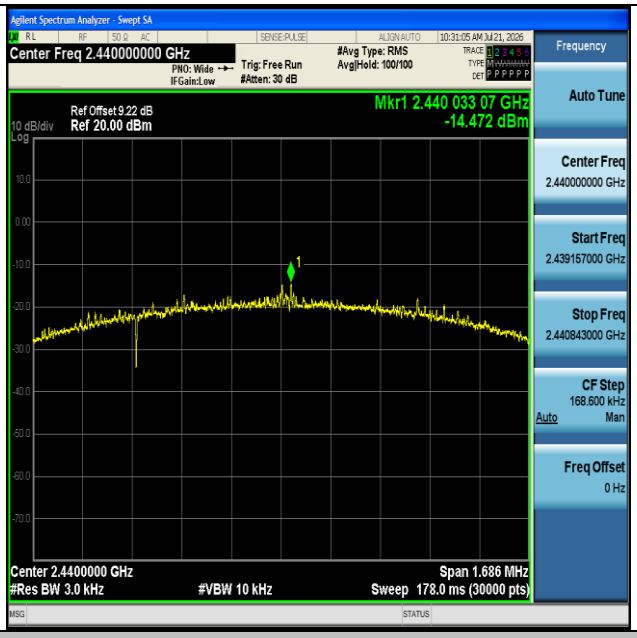
BLE_1M-Ant1-2440-PASS



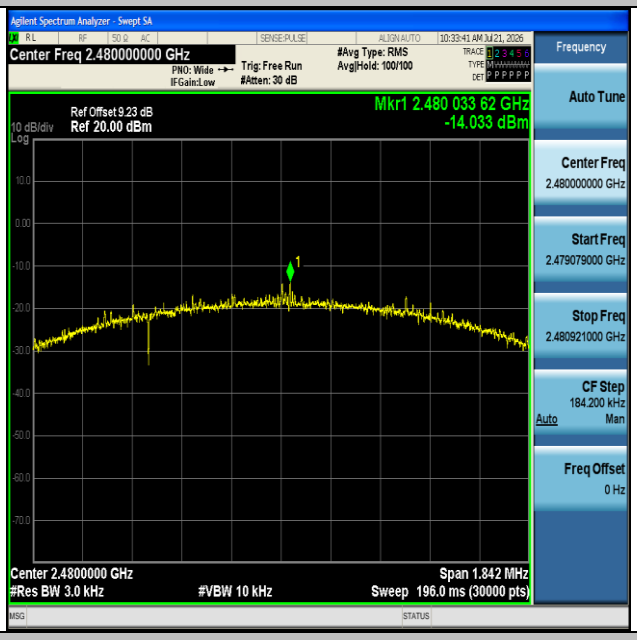
BLE_1M-Ant1-2480-PASS



BLE_2M-Ant1-2402-PASS



BLE_2M-Ant1-2440-PASS



BLE_2M-Ant1-2480-PASS

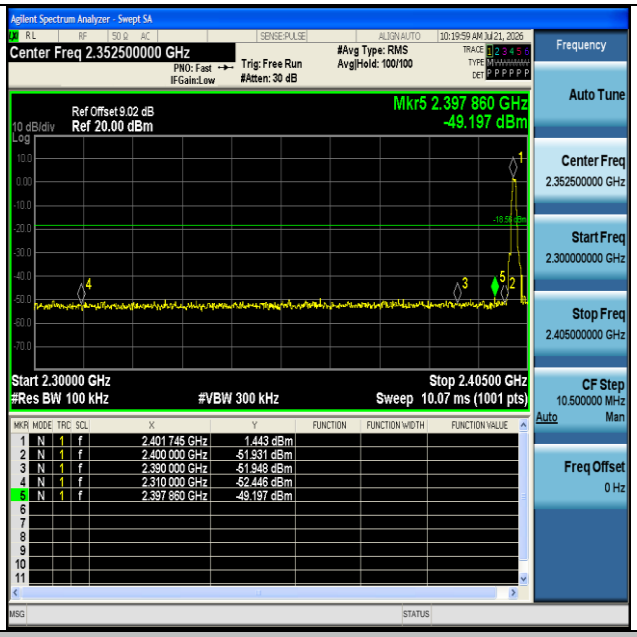
Appendix E: Band edge measurements

Test Result

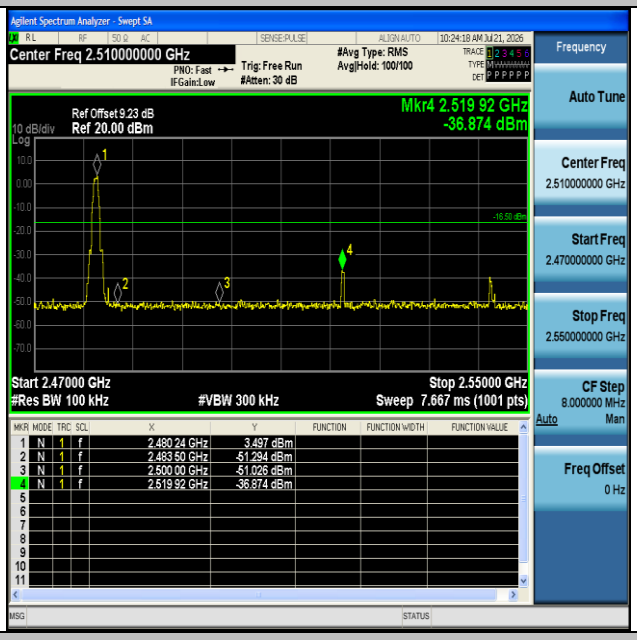
Test Mode	Antenna	Ch. Name	Frequency [MHz]	Ref. Level [dBm]	Result [dBm]	Limit [dBm]	Verdict
BLE_1M	Ant1	Low	2402	1.44	-49.2	≤-18.56	PASS
BLE_1M	Ant1	High	2480	3.50	-36.87	≤-16.5	PASS
BLE_2M	Ant1	Low	2402	0.58	-35.3	≤-19.42	PASS
BLE_2M	Ant1	High	2480	1.40	-44.16	≤-18.6	PASS

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

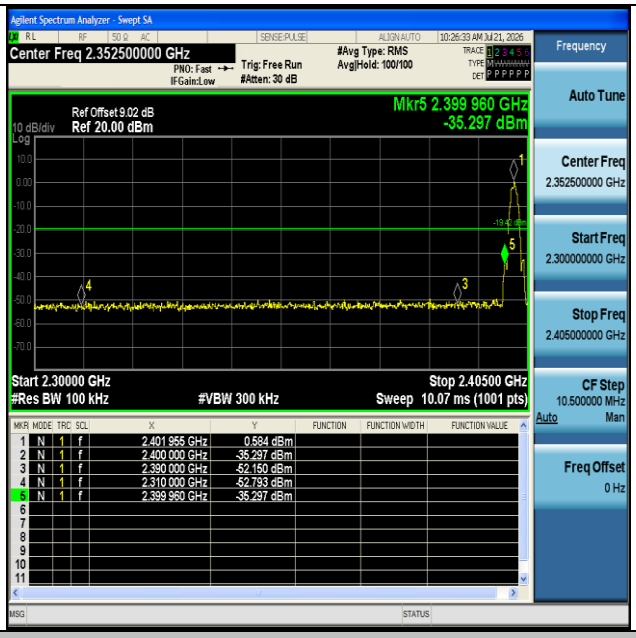
Test Graphs



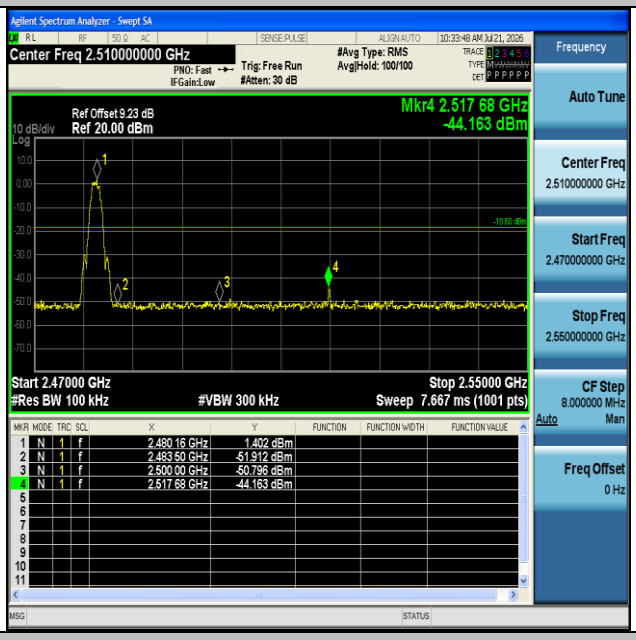
BLE_1M-Ant1-2402-PASS



BLE_1M-Ant1-2480-PASS



BLE_2M-Ant1-2402-PASS



BLE_2M-Ant1-2480-PASS

Appendix F: Conducted Spurious Emission

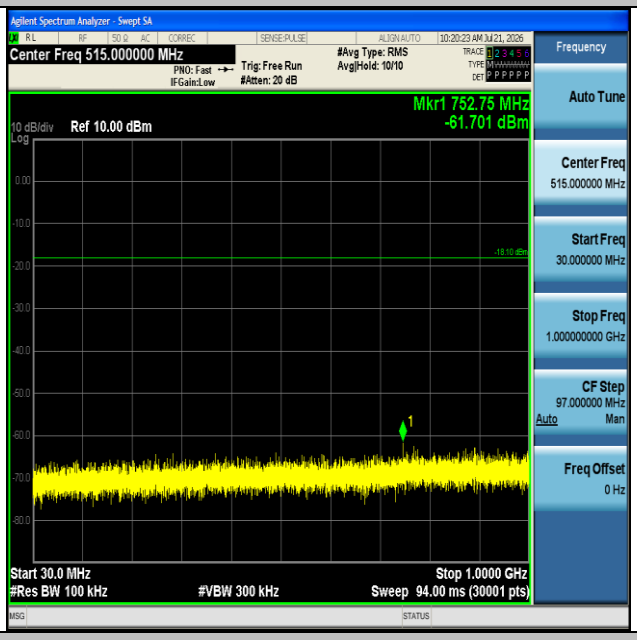
Test Result

Test Mode	Antenna	Frequency [MHz]	Freq. Range [MHz]	Ref. Level [dBm]	Result [dBm]	Limit [dBm]	Verdict
BLE_1M	Ant1	2402	0~Reference	1.90	1.90	---	PASS
BLE_1M	Ant1	2402	30~1000	1.90	-61.7	≤-18.1	PASS
BLE_1M	Ant1	2402	1000~26500	1.90	-37.38	≤-18.1	PASS
BLE_1M	Ant1	2440	0~Reference	2.82	2.82	---	PASS
BLE_1M	Ant1	2440	30~1000	2.82	-62.8	≤-17.18	PASS
BLE_1M	Ant1	2440	1000~26500	2.82	-37.3	≤-17.18	PASS
BLE_1M	Ant1	2480	0~Reference	3.46	3.46	---	PASS
BLE_1M	Ant1	2480	30~1000	3.46	-62.57	≤-16.54	PASS
BLE_1M	Ant1	2480	1000~26500	3.46	-37.62	≤-16.54	PASS
BLE_2M	Ant1	2402	0~Reference	1.82	1.82	---	PASS
BLE_2M	Ant1	2402	30~1000	1.82	-63.2	≤-18.18	PASS
BLE_2M	Ant1	2402	1000~26500	1.82	-37.49	≤-18.18	PASS
BLE_2M	Ant1	2440	0~Reference	3.06	3.06	---	PASS
BLE_2M	Ant1	2440	30~1000	3.06	-62.73	≤-16.94	PASS
BLE_2M	Ant1	2440	1000~26500	3.06	-37.35	≤-16.94	PASS
BLE_2M	Ant1	2480	0~Reference	2.74	2.74	---	PASS
BLE_2M	Ant1	2480	30~1000	2.74	-62.64	≤-17.26	PASS
BLE_2M	Ant1	2480	1000~26500	2.74	-37.13	≤-17.26	PASS

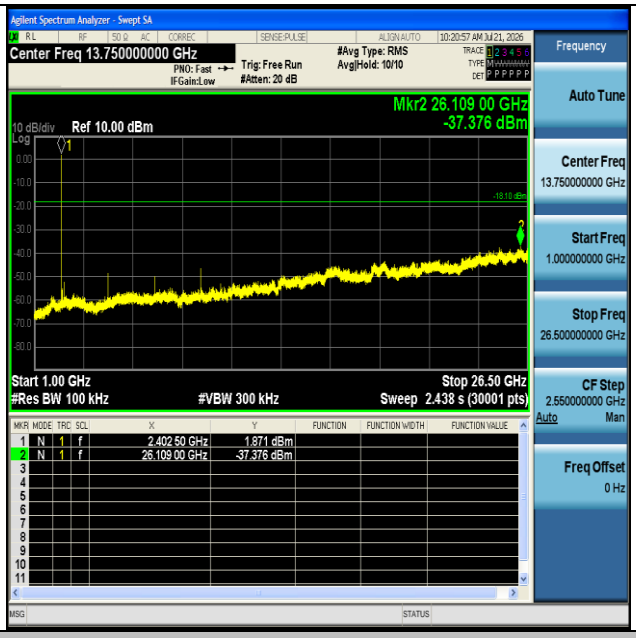
Note: offset(dB) in Reference test plots = cable loss(dB) + attenuator factor(dB); For spurious emissions plots from 30MHz to 26.5GHz, the cable loss and attenuator factors have been set in the 'Input Correction' of the Spectrum Analyzer during the test.

Test Graphs

BLE_1M-Ant1-2402-0~Reference-PASS

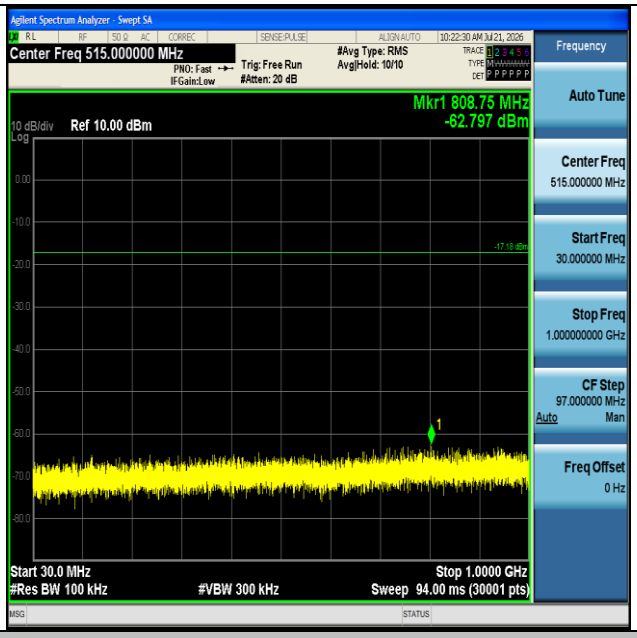


BLE_1M-Ant1-2402-30~1000-PASS

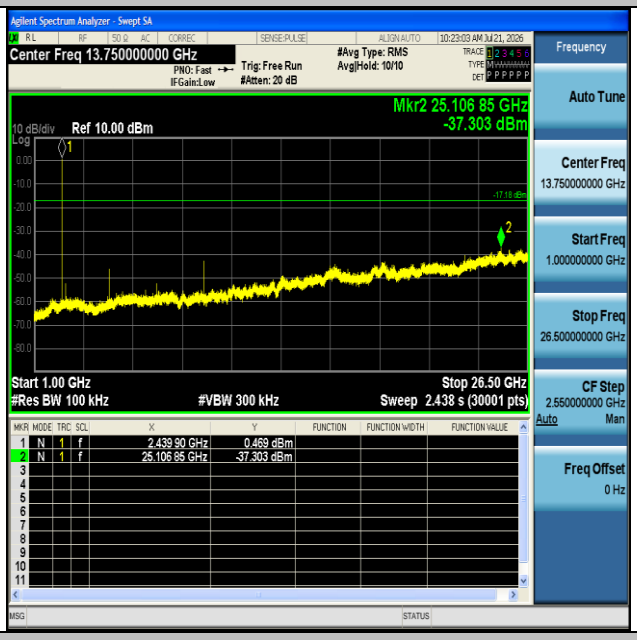


BLE_1M-Ant1-2402-1000~26500-PASS

BLE_1M-Ant1-2440-0~Reference-PASS

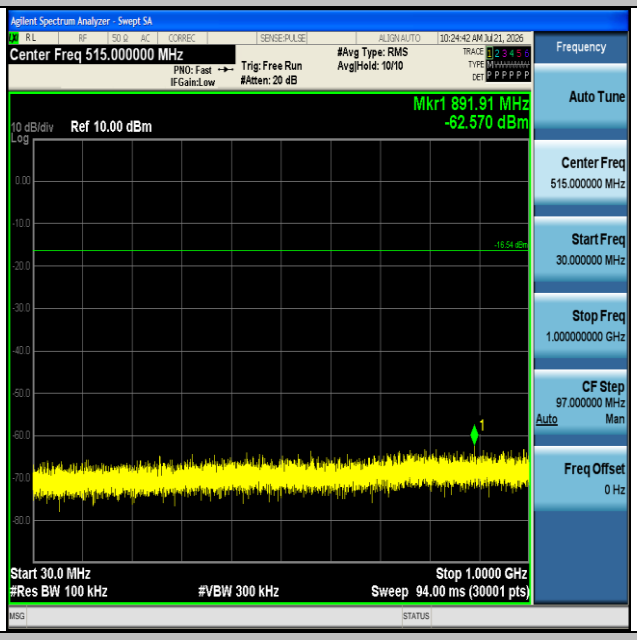


BLE_1M-Ant1-2440-30~1000-PASS

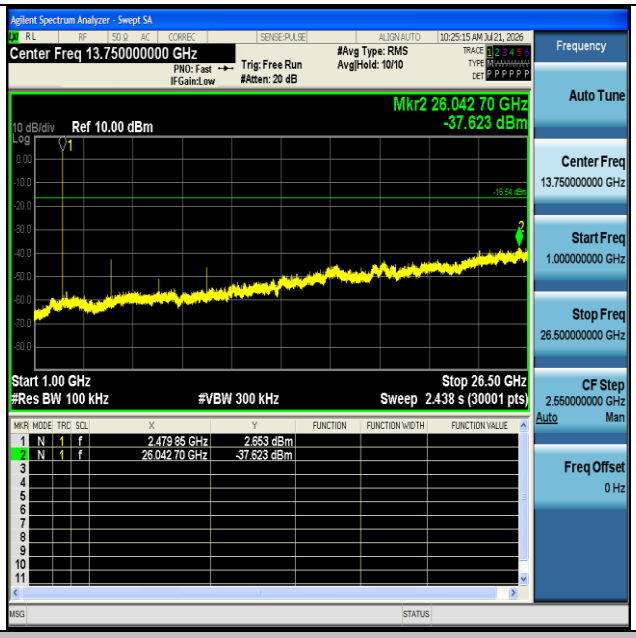


BLE_1M-Ant1-2440-1000~26500-PASS

BLE_1M-Ant1-2480-0~Reference-PASS

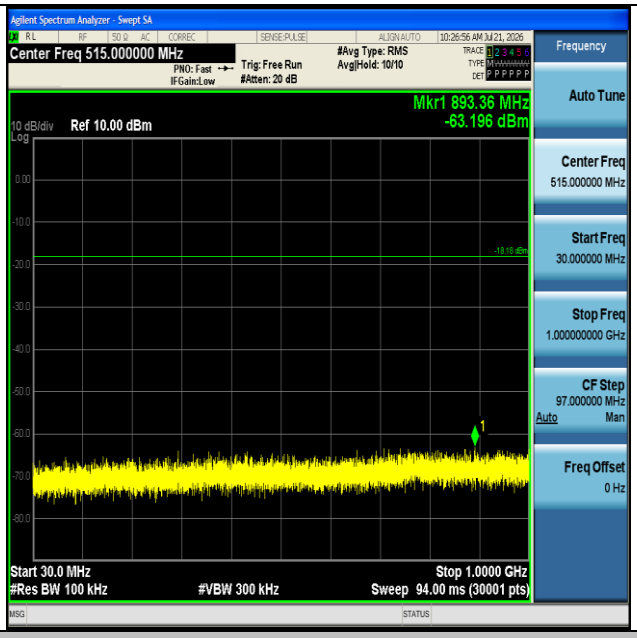


BLE_1M-Ant1-2480-30~1000-PASS

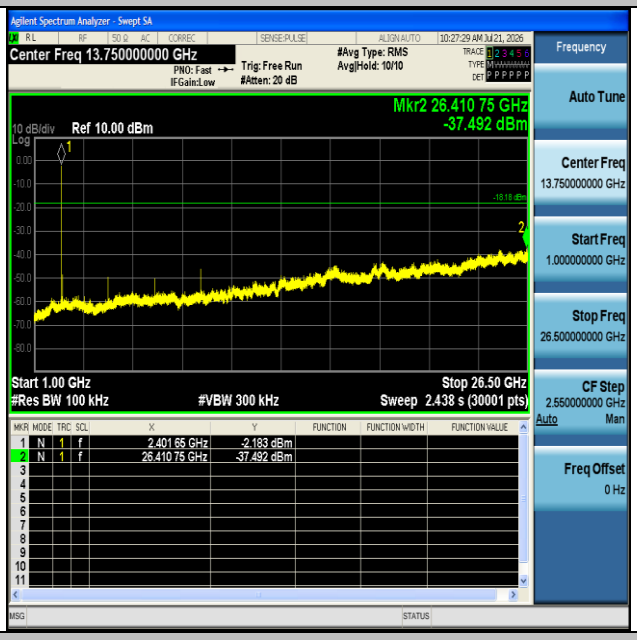


BLE_1M-Ant1-2480-1000~26500-PASS

BLE_2M-Ant1-2402-0~Reference-PASS

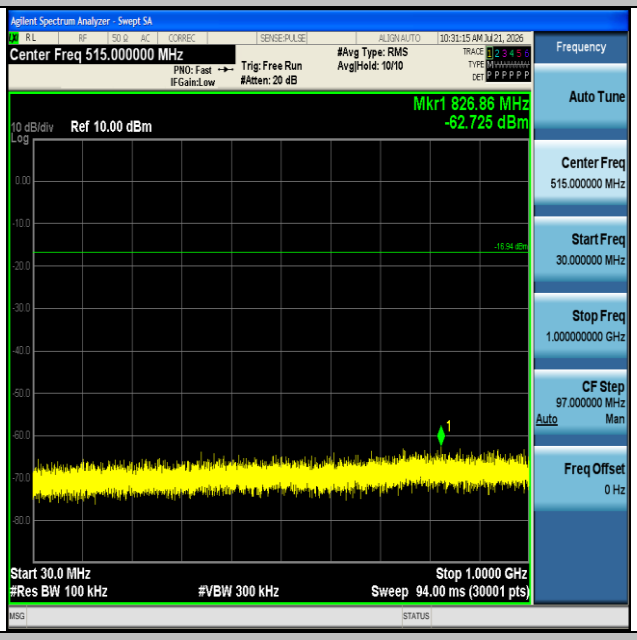


BLE_2M-Ant1-2402-30~1000-PASS

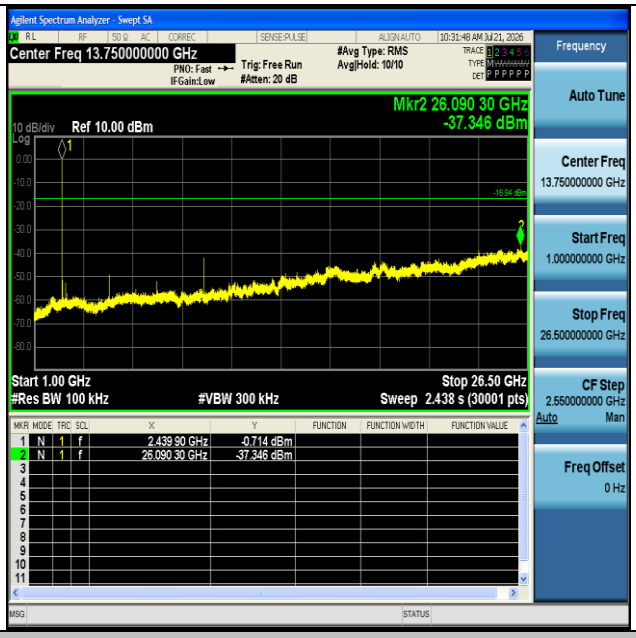


BLE_2M-Ant1-2402-1000~26500-PASS

BLE_2M-Ant1-2440-0~Reference-PASS

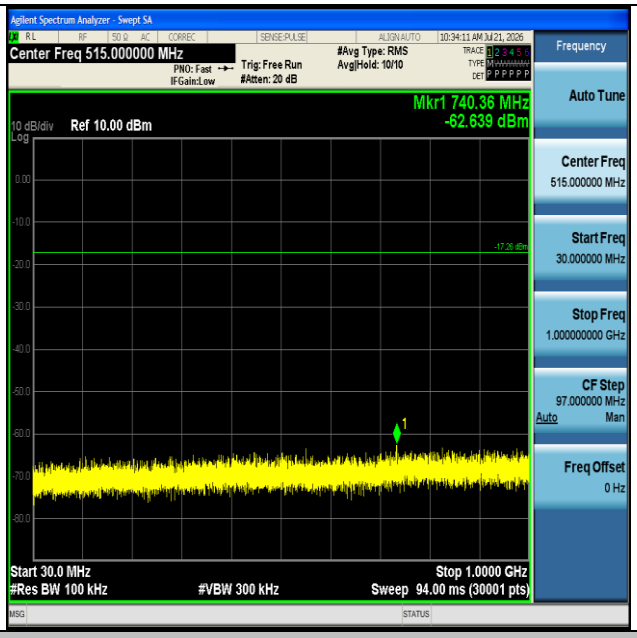


BLE_2M-Ant1-2440-30~1000-PASS

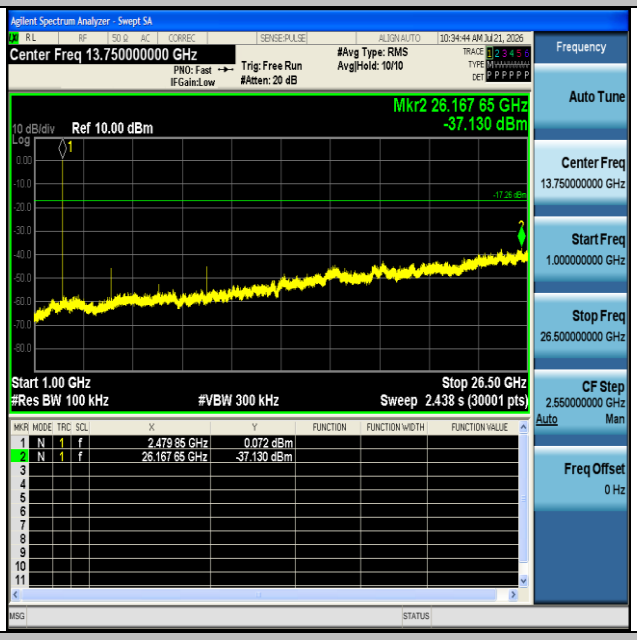


BLE_2M-Ant1-2440-1000~26500-PASS

BLE_2M-Ant1-2480-0~Reference-PASS



BLE_2M-Ant1-2480-30~1000-PASS



BLE_2M-Ant1-2480-1000~26500-PASS

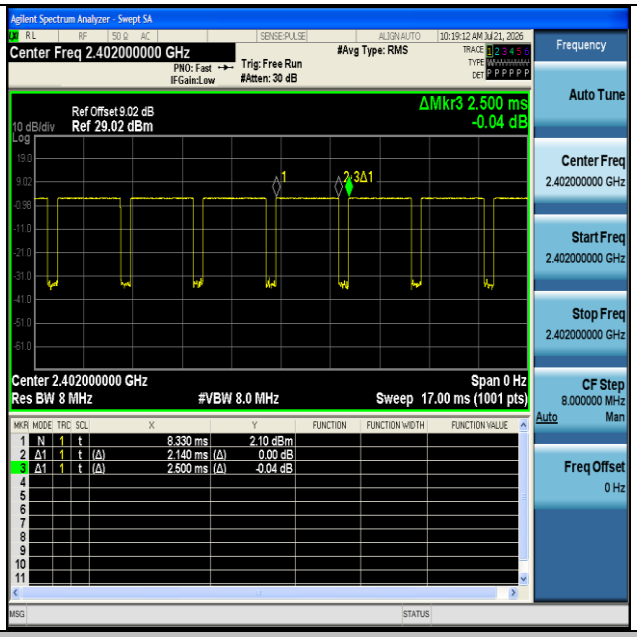
Appendix G: Duty Cycle

Test Result

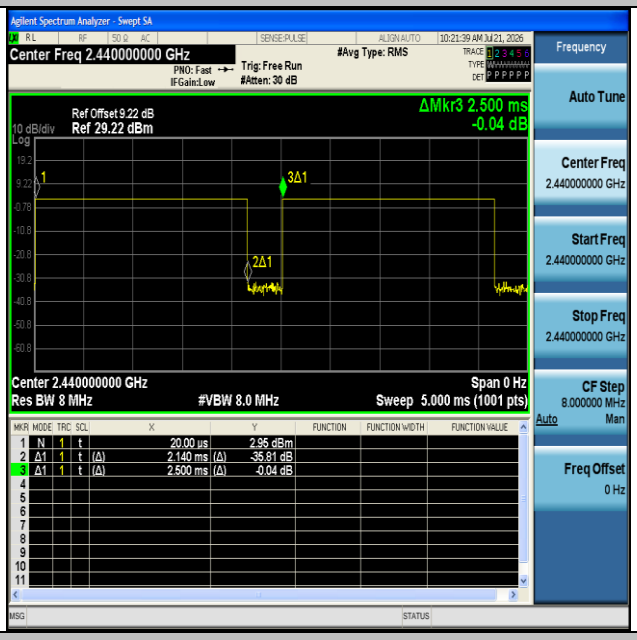
Test Mode	Antenna	Frequency [MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor [dB]
BLE_1M	Ant1	2402	2.14	2.50	85.60	0.68
BLE_1M	Ant1	2440	2.14	2.50	85.60	0.68
BLE_1M	Ant1	2480	2.14	2.50	85.60	0.68
BLE_2M	Ant1	2402	1.09	2.50	43.60	3.61
BLE_2M	Ant1	2440	1.09	2.50	43.60	3.61
BLE_2M	Ant1	2480	1.08	2.50	43.20	3.65

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

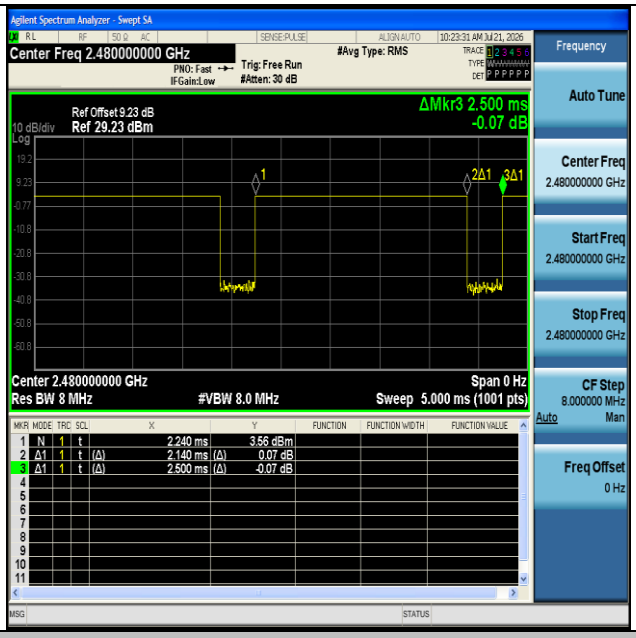
Test Graphs



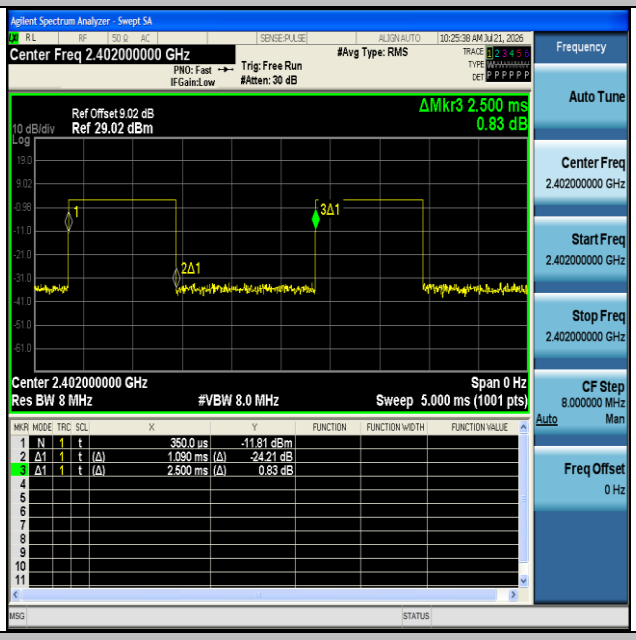
NTNV-BLE_1M-Ant1-2402



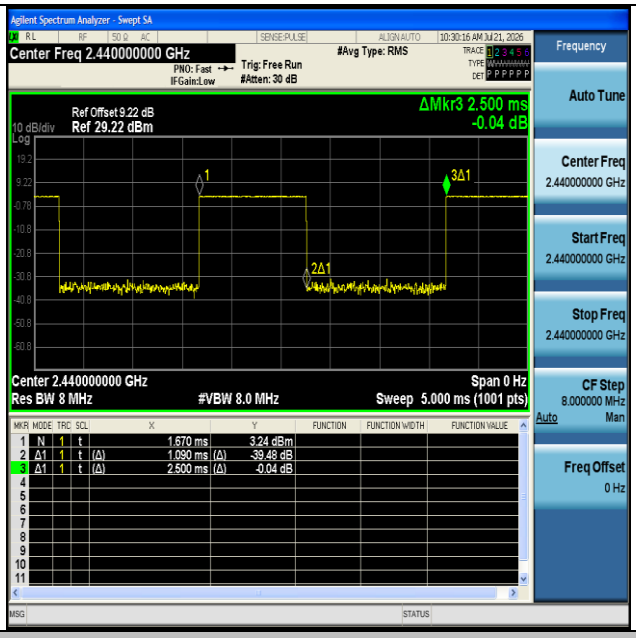
NTNV-BLE_1M-Ant1-2440



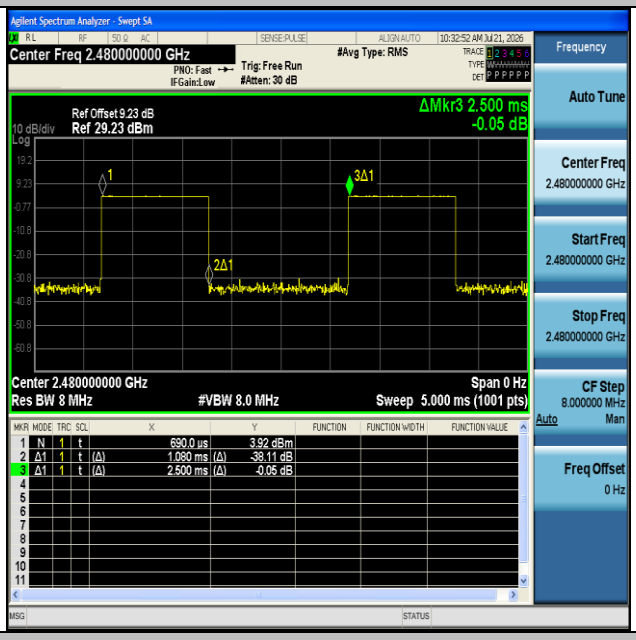
NTNV-BLE_1M-Ant1-2480



NTNV-BLE_2M-Ant1-2402



NTNV-BLE_2M-Ant1-2440



NTNV-BLE_2M-Ant1-2480