Appendix Test Data for BLE (Conducted Measurement)

Product Name: Wireless Diagnostics Module / Vehicle Communication Interface

Trade Mark: XTOOL, AutoProPAD, Anyscan

Test Model: A104

FCC ID: 2AW3IA104

Environmental Conditions

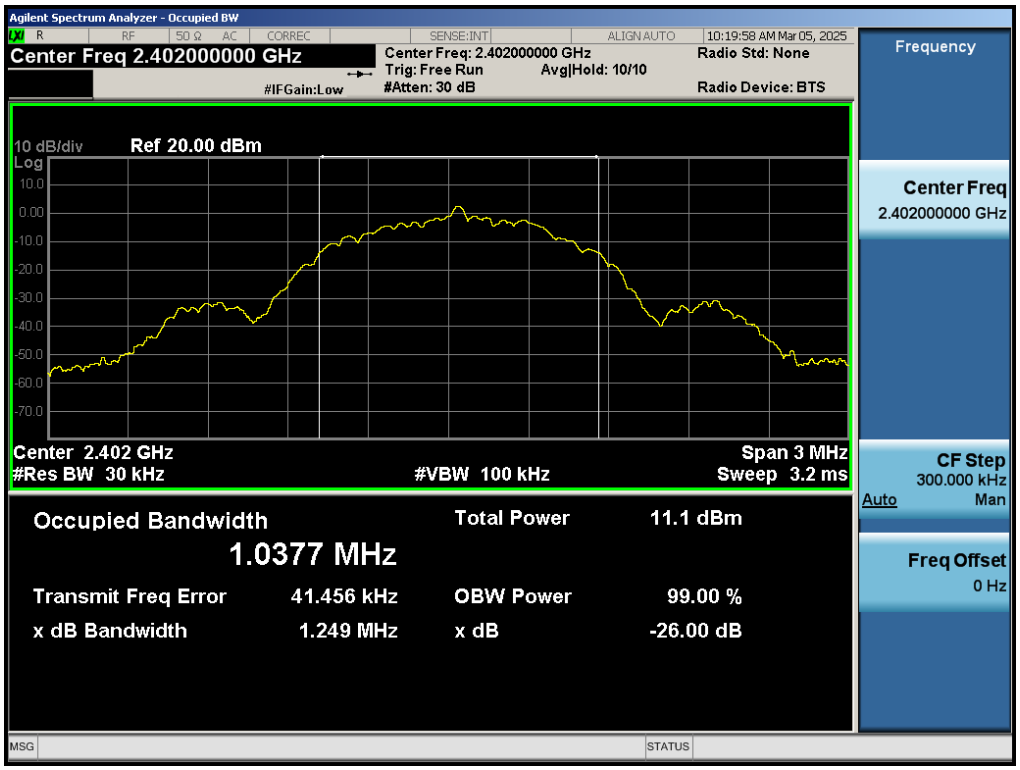
Temperature:	23.5℃
Relative Humidity:	58%
ATM Pressure:	100.0 kPa
Test Engineer:	Allen Lai
Supervised by:	Hugo Chen
NOTE	N/A

Appendix A: DTS Bandwidth& Occupied Channel Bandwidth

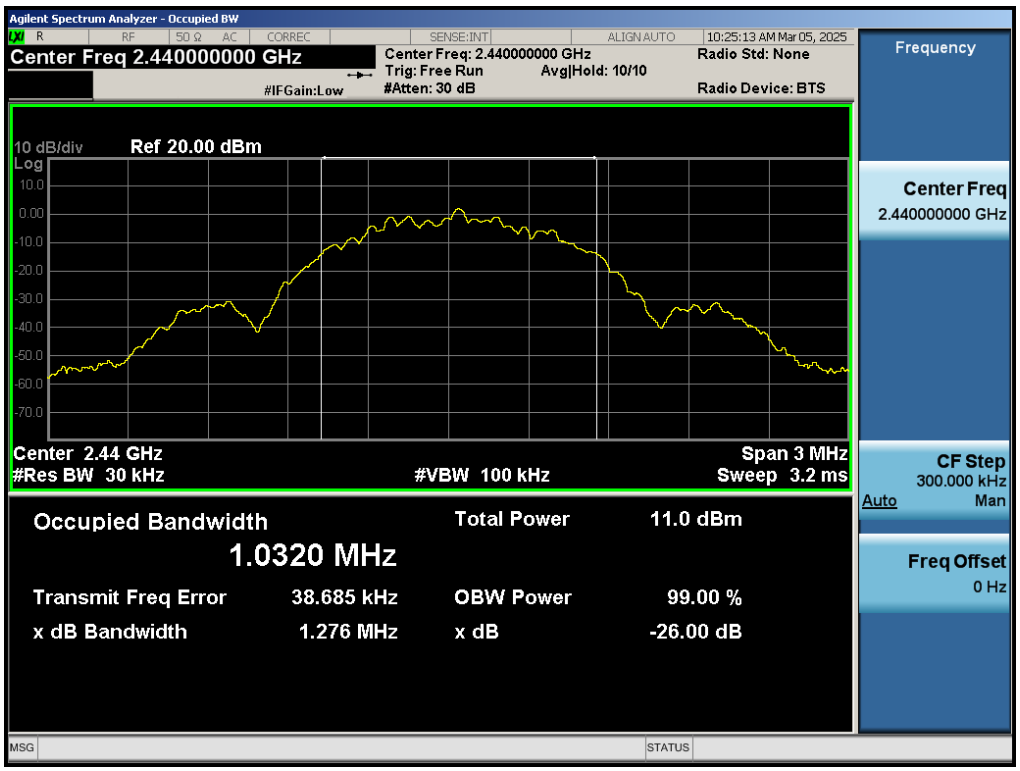
Test Result

Test Mode	Test Frequency	Occupied Bandwidth (MHz)	DTS BW (MHz)	DTS BW Limits	Pass or Fail
GFSK_1Mbps	2402	1.038	0.659	⩾0.5	Pass
	2440	1.032	0.670	⩾0.5	Pass
	2480	1.038	0.666	⩾0.5	Pass
GFSK_2Mbps	2402	2.063	1.139	⩾0.5	Pass
	2440	2.047	1.113	⩾0.5	Pass
	2480	2.042	1.142	⩾0.5	Pass

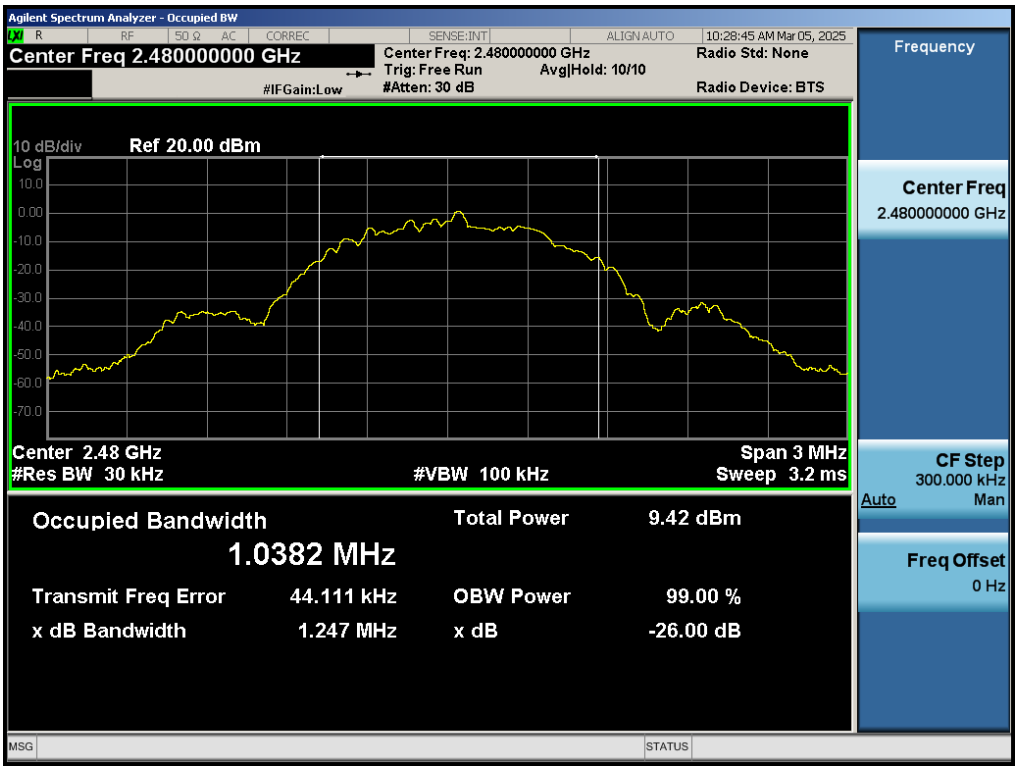
Test Graphs



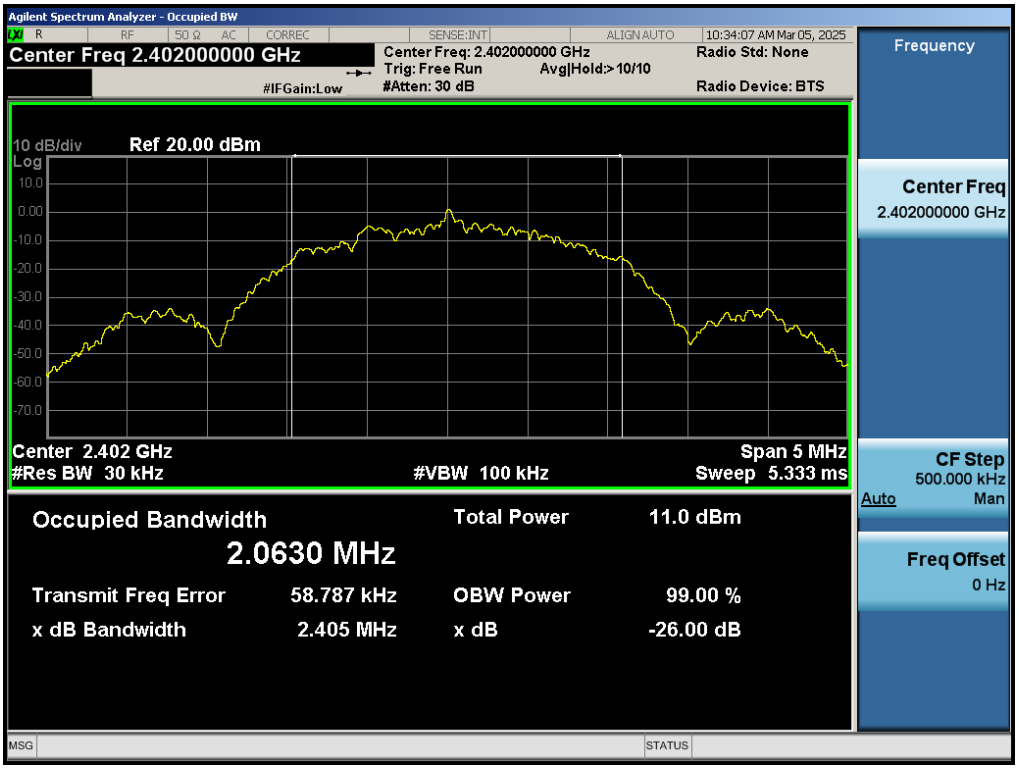
Test_Graph_LE1M_ANT1_2402_1Mbps_OBW



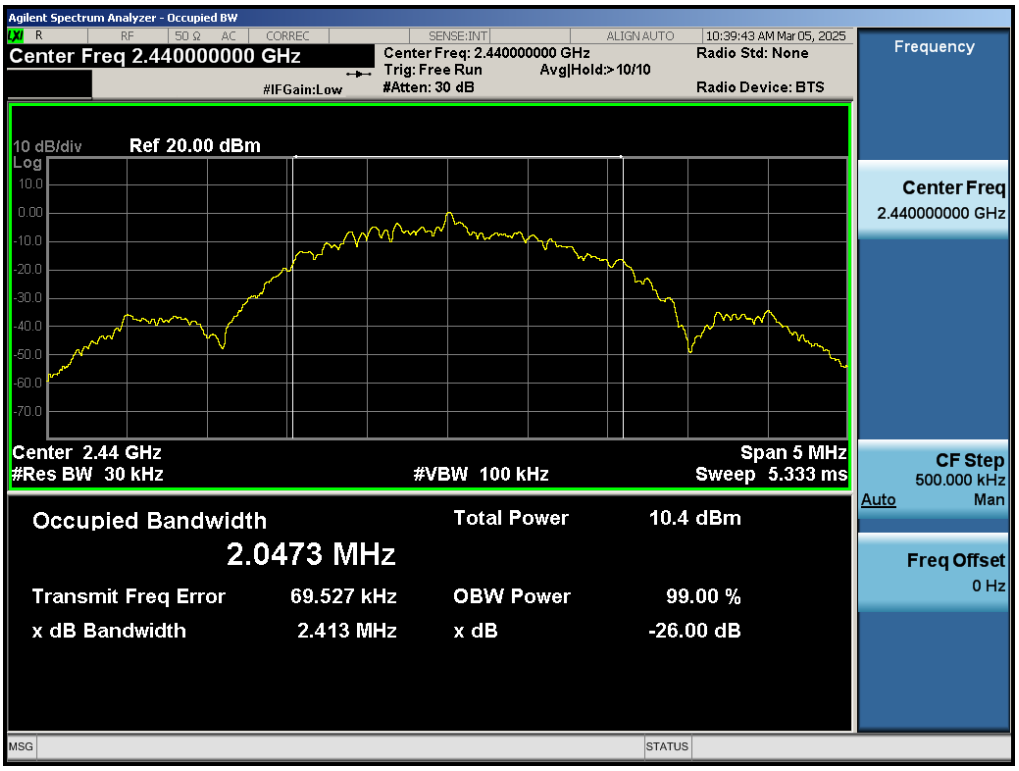
Test_Graph_LE1M_ANT1_2440_1Mbps_OBW



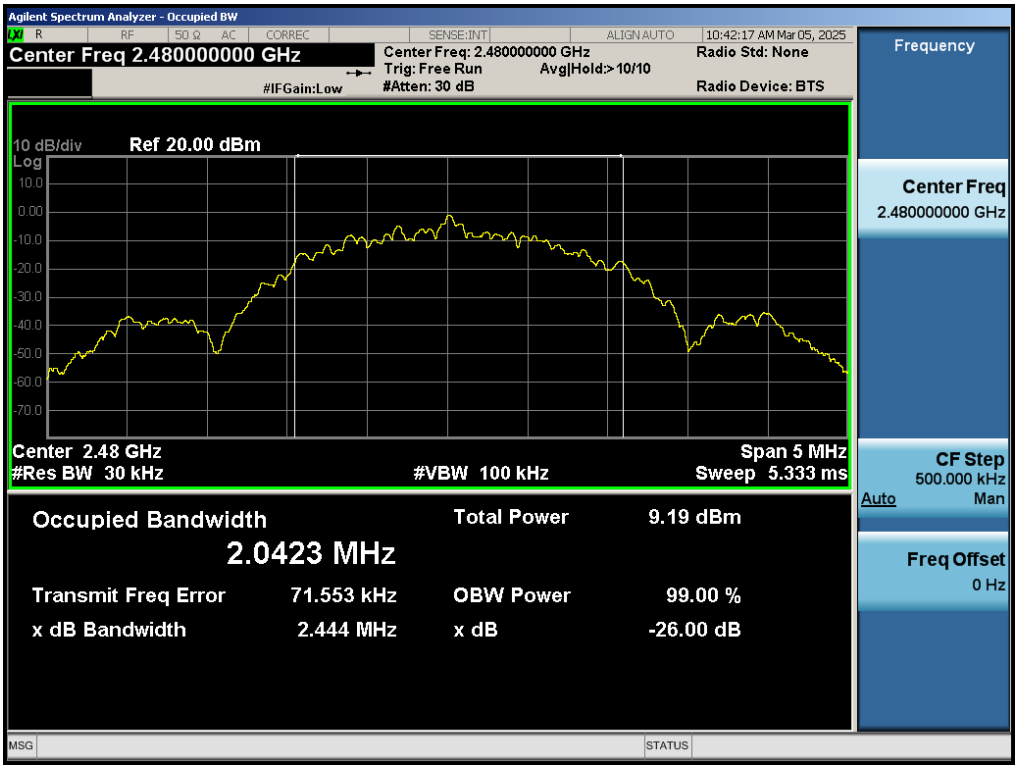
Test_Graph_LE1M_ANT1_2480_1Mbps_OBW



Test_Graph_LE2M_ANT1_2402_2Mbps_OBW

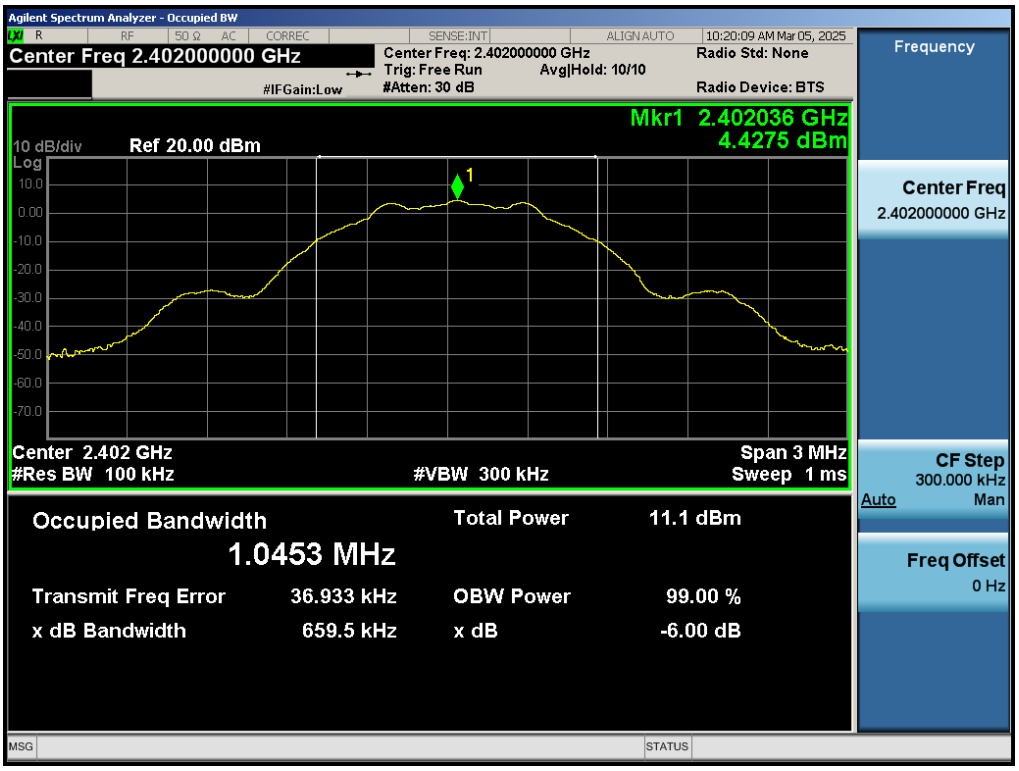


Test_Graph_LE2M_ANT1_2440_2Mbps_OBW

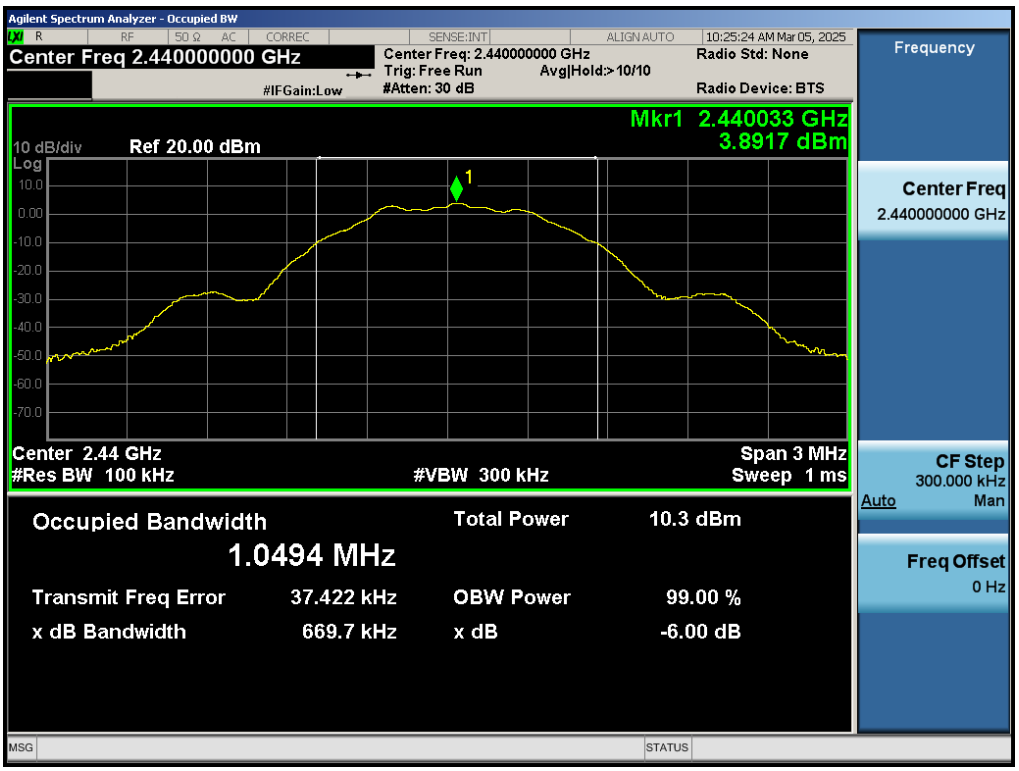


Test_Graph_LE2M_ANT1_2480_2Mbps_OBW

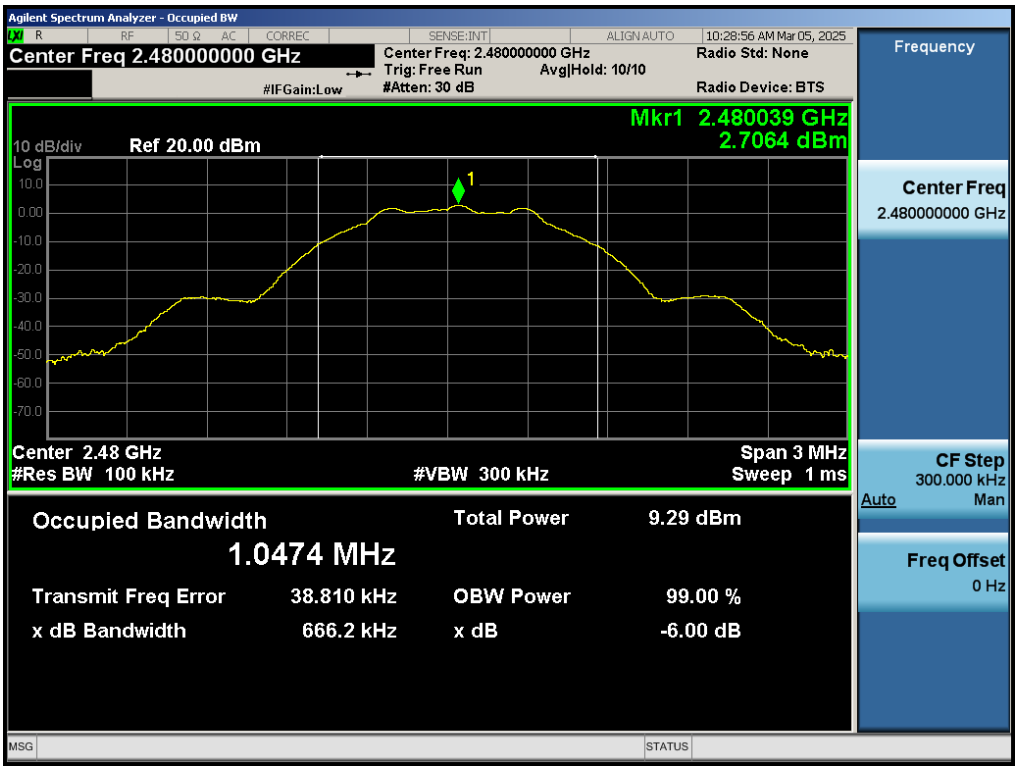
Test Graphs of DTS Bandwidth



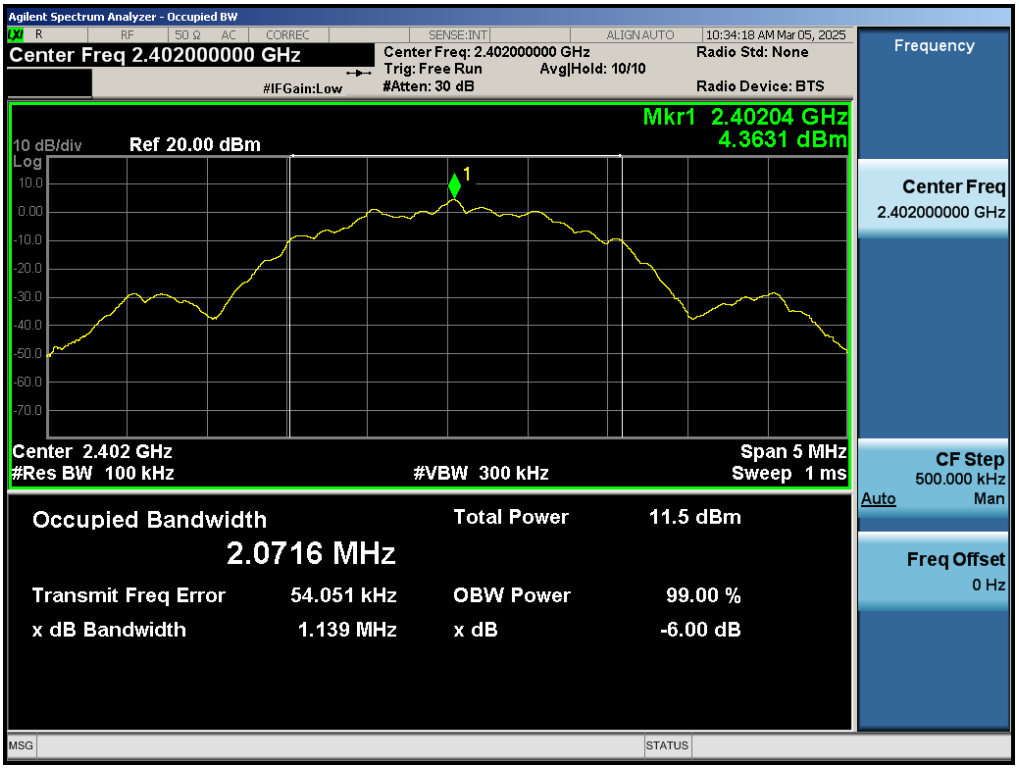
Test_Graph_LE1M_ANT1_2402_1Mbps_DTSBW



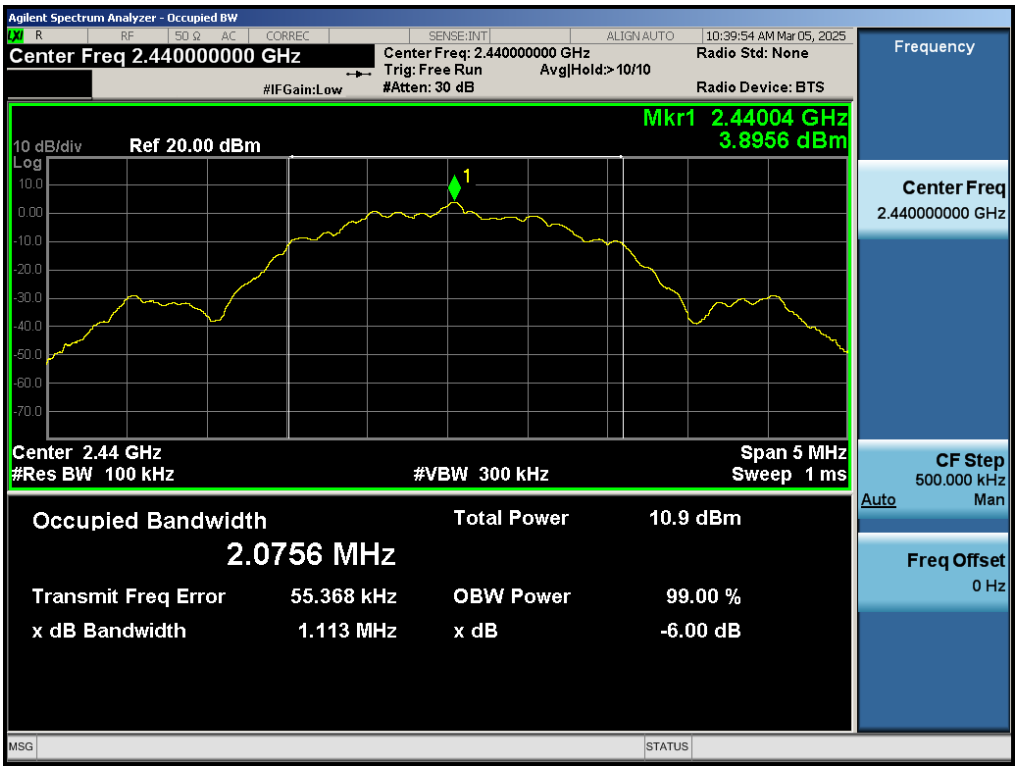
Test_Graph_LE1M_ANT1_2440_1Mbps_DTSBW



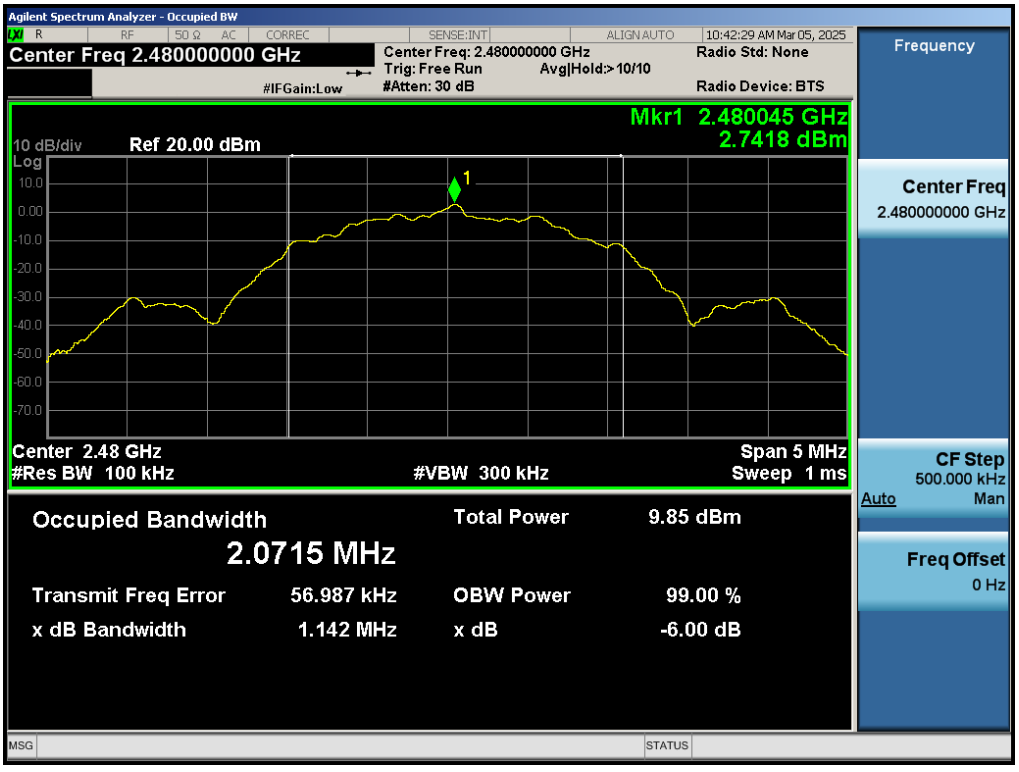
Test_Graph_LE1M_ANT1_2480_1Mbps_DTSBW



Test_Graph_LE2M_ANT1_2402_2Mbps_DTSBW



Test_Graph_LE2M_ANT1_2440_2Mbps_DTSBW



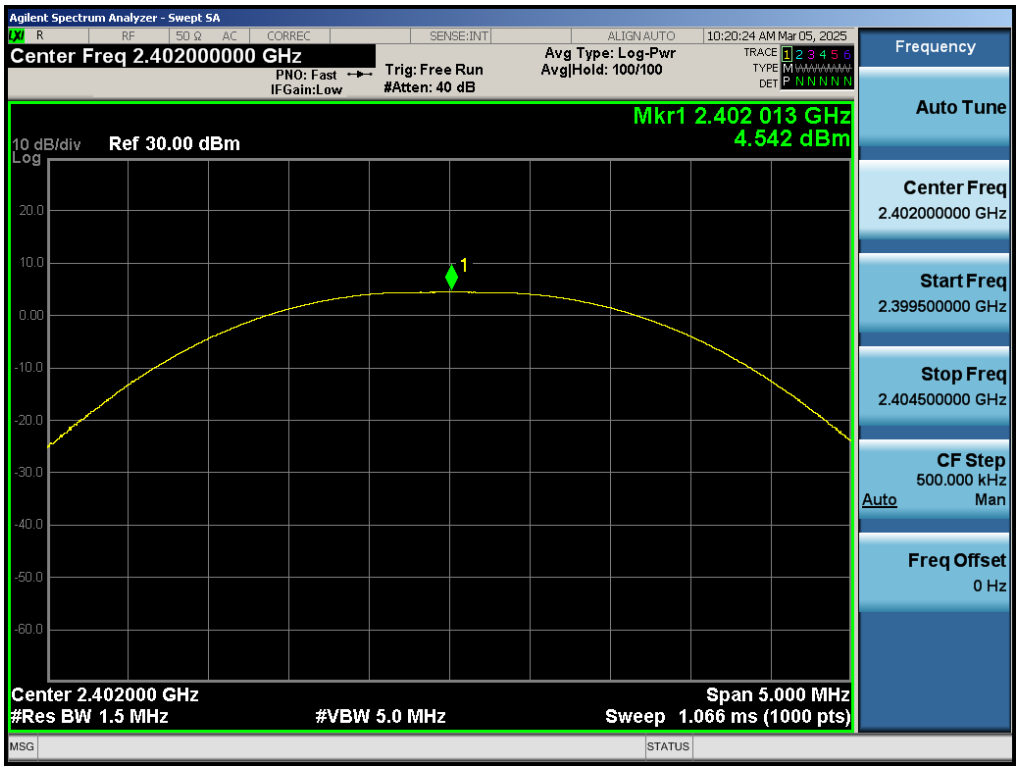
Test_Graph_LE2M_ANT1_2480_2Mbps_DTSBW

Appendix B: Maximum peak conducted output power

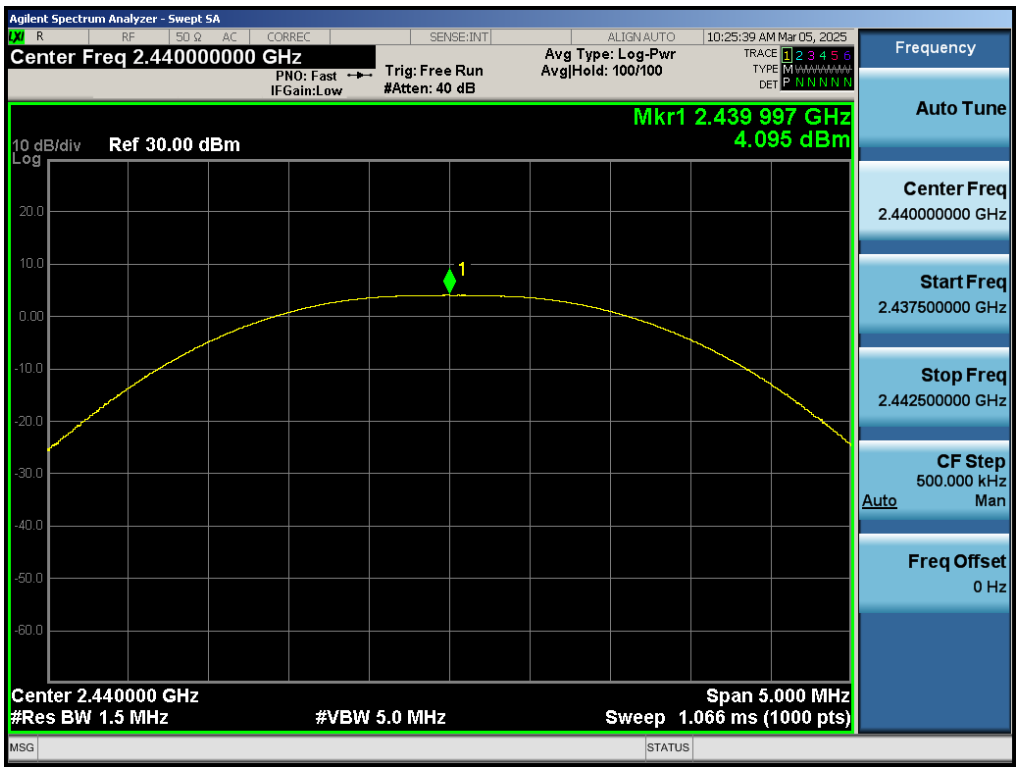
Test Result Peak

Test Mode	Test Frequency (MHz)	Peak Power (dBm)	Limits (dBm)	Pass or Fail
GFSK_1Mbps	2402	4.542	≤30	Pass
	2440	4.095	≤30	Pass
	2480	2.806	≤30	Pass
GFSK_2Mbps	2402	4.630	≤30	Pass
	2440	4.271	≤30	Pass
	2480	3.007	≤30	Pass

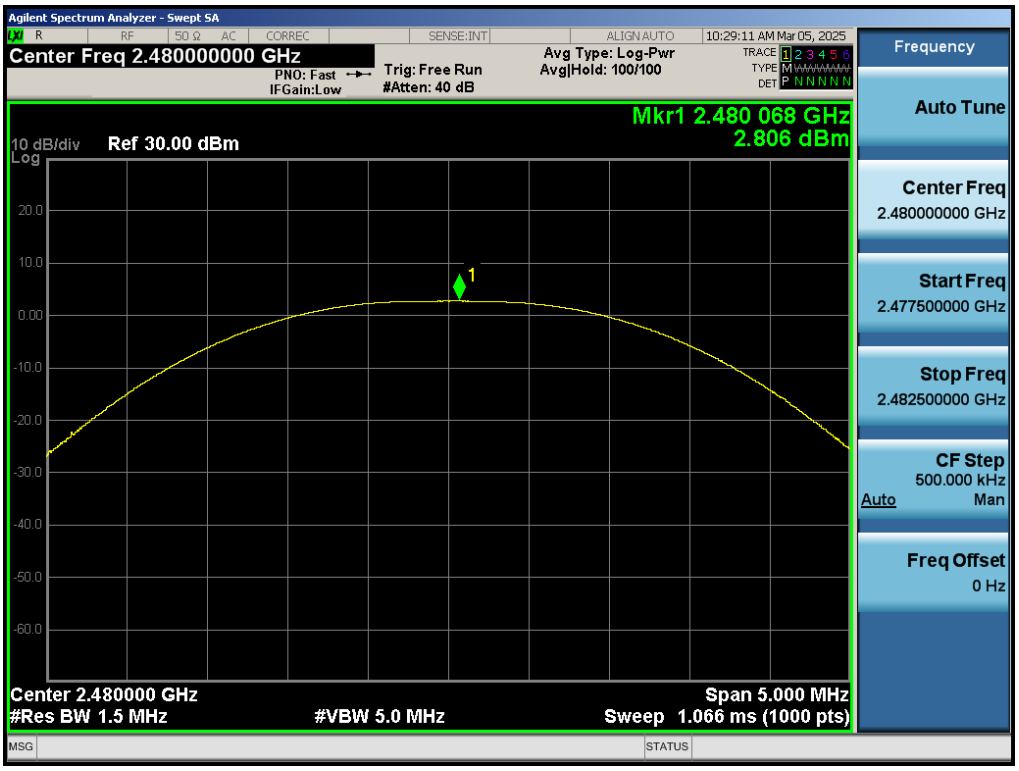
Test Graphs Peak



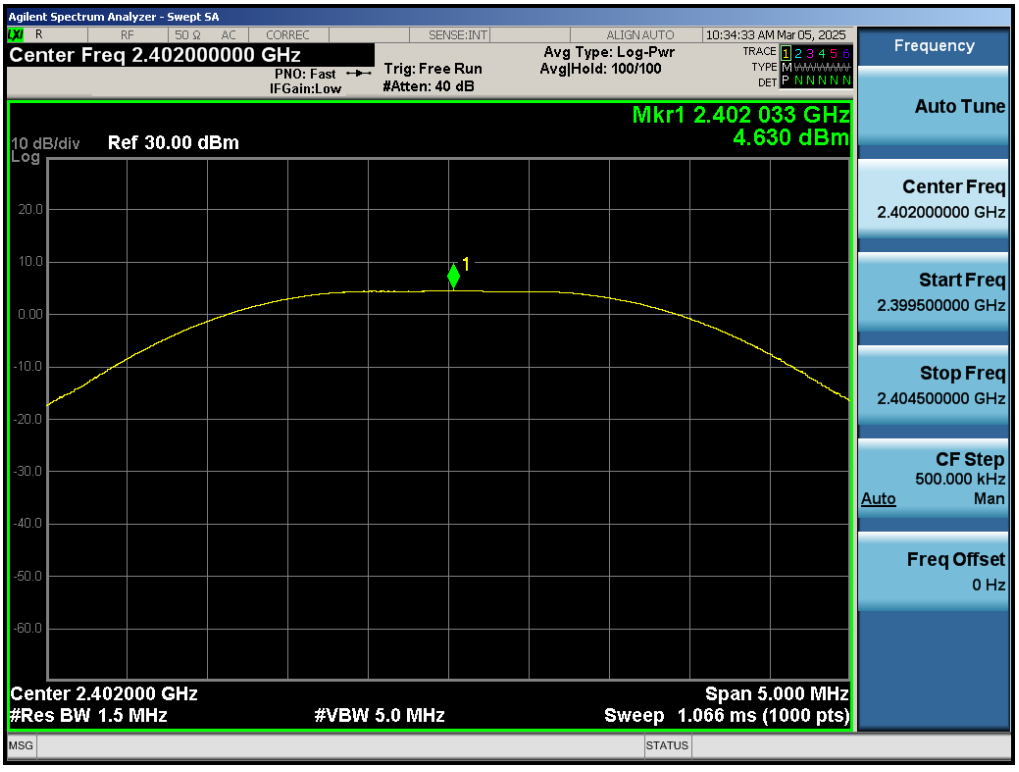
Test_Graph_LE1M_ANT1_2402_1Mbps_Peak Power



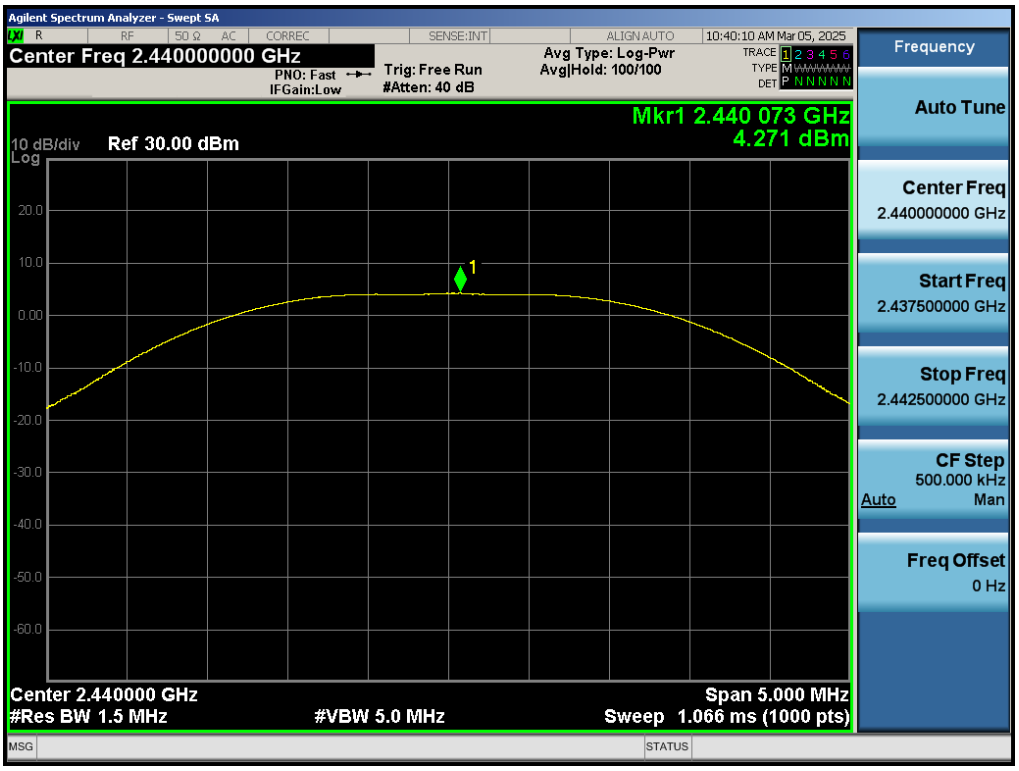
Test_Graph_LE1M_ANT1_2440_1Mbps_Peak Power



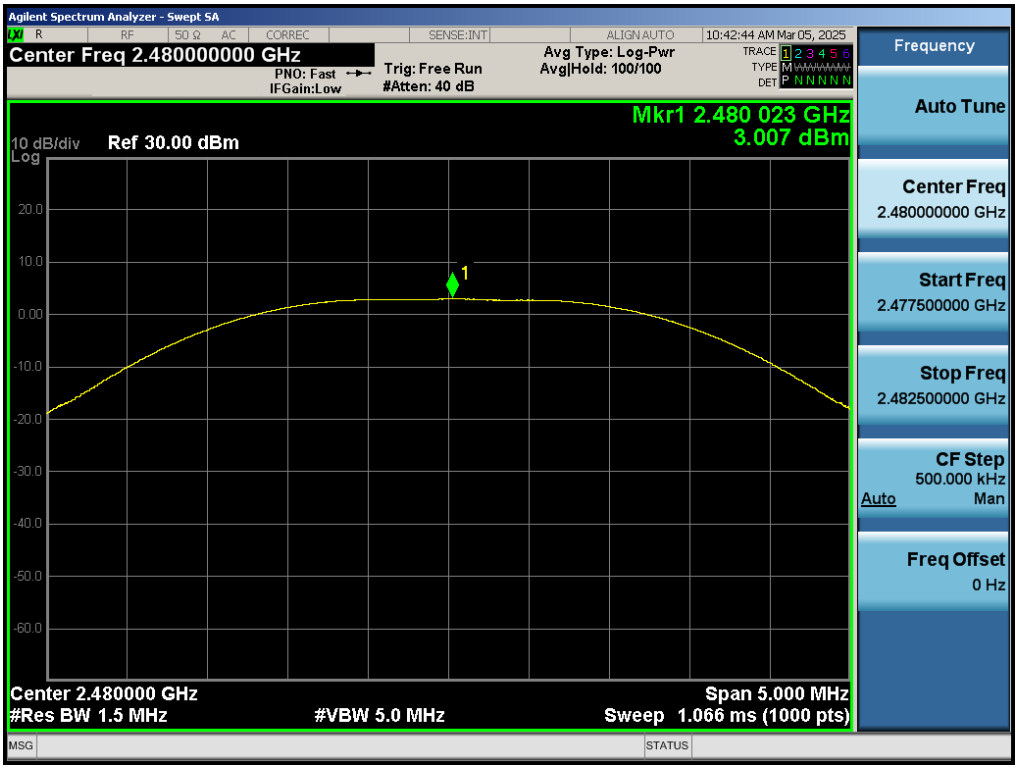
Test_Graph_LE1M_ANT1_2480_1Mbps_Peak Power



Test_Graph_LE2M_ANT1_2402_2Mbps_Peak Power



Test_Graph_LE2M_ANT1_2440_2Mbps_Peak Power



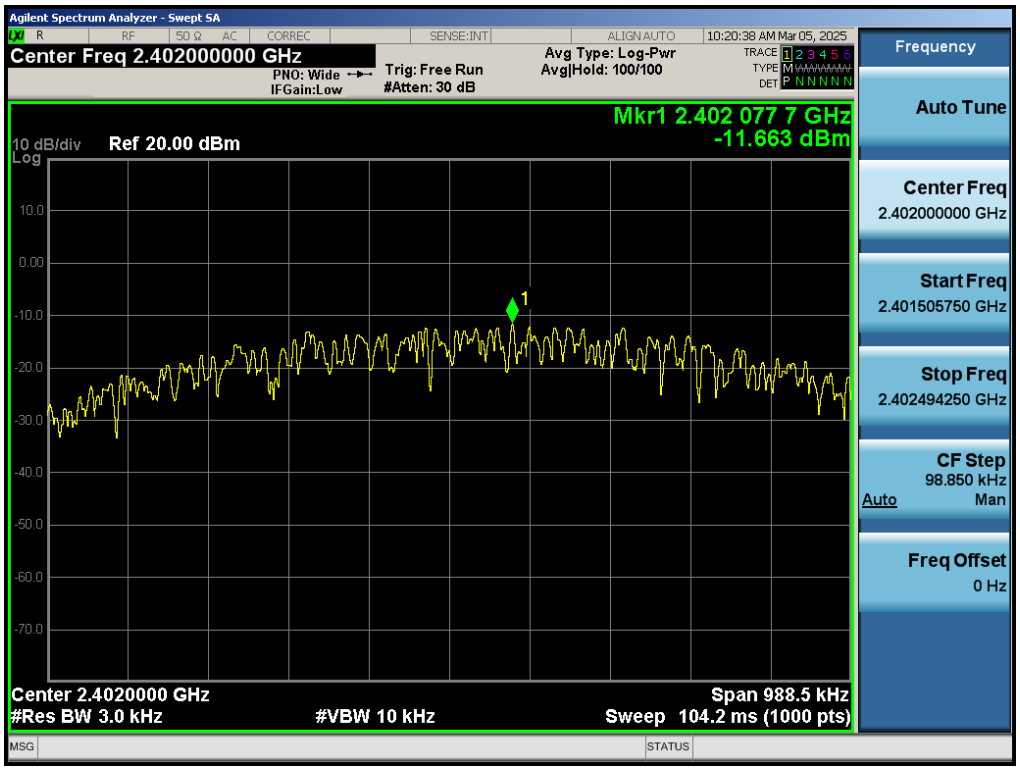
Test_Graph_LE2M_ANT1_2480_2Mbps_Peak Power

Appendix C: Maximum peak power spectral density

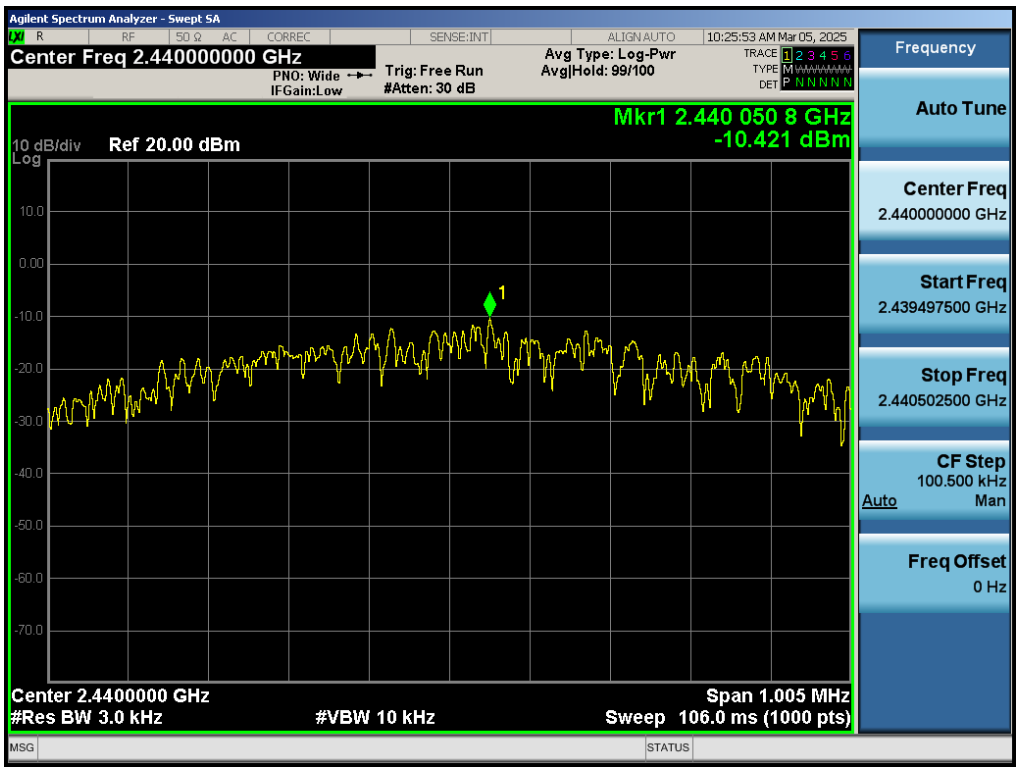
Test Result

Test Mode	Test Frequency (MHz)	Power density (dBm/3kHz)	Limit (dBm/3kHz)	Pass or Fail
GFSK_1Mbps	2402	-11.663	≤8	Pass
	2440	-10.421	≤8	Pass
	2480	-13.350	≤8	Pass
GFSK_2Mbps	2402	-13.363	≤8	Pass
	2440	-12.512	≤8	Pass
	2480	-15.098	≤8	Pass

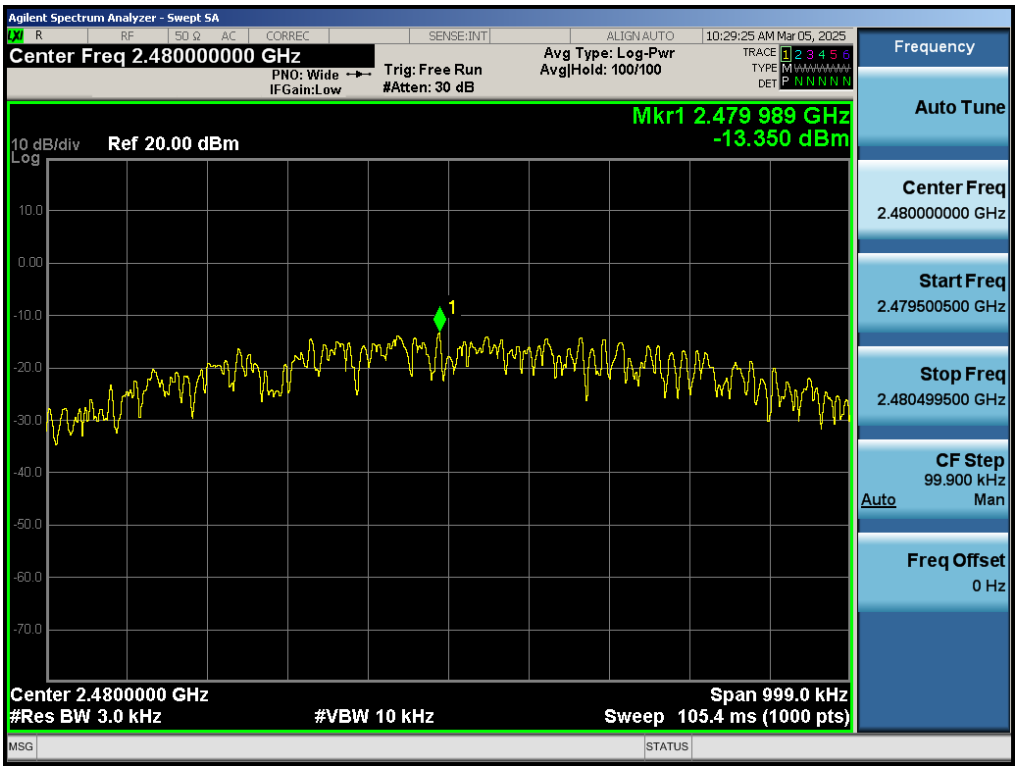
Test Graphs



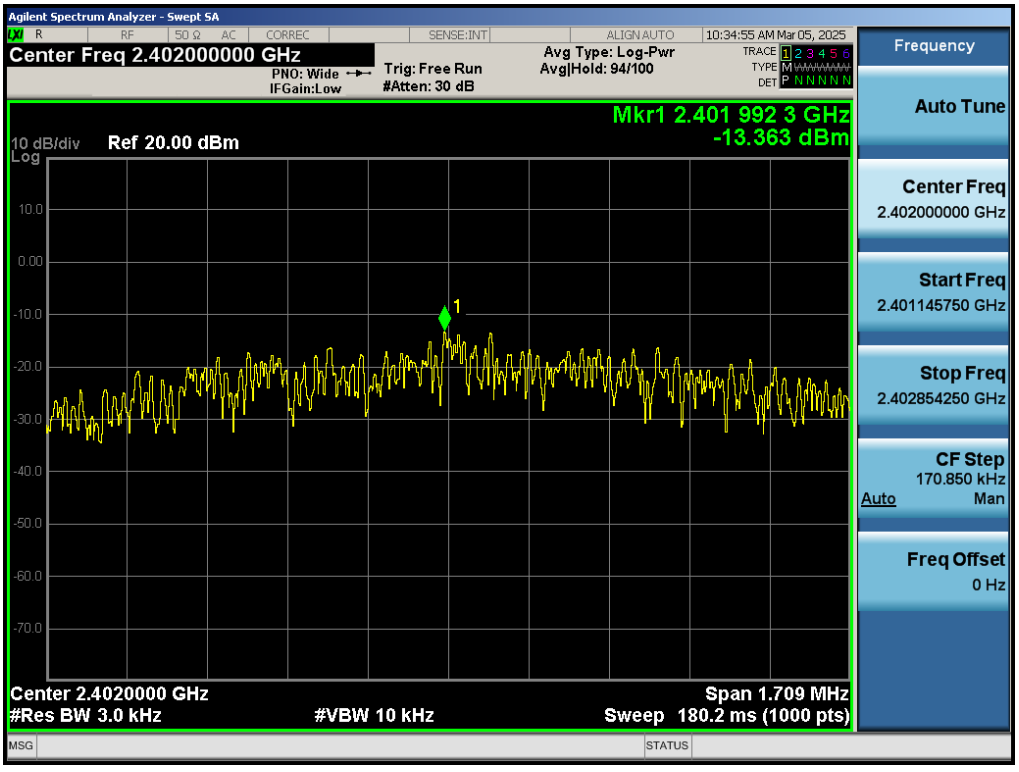
Test_Graph_LE1M_ANT1_2402_1Mbps_PSD



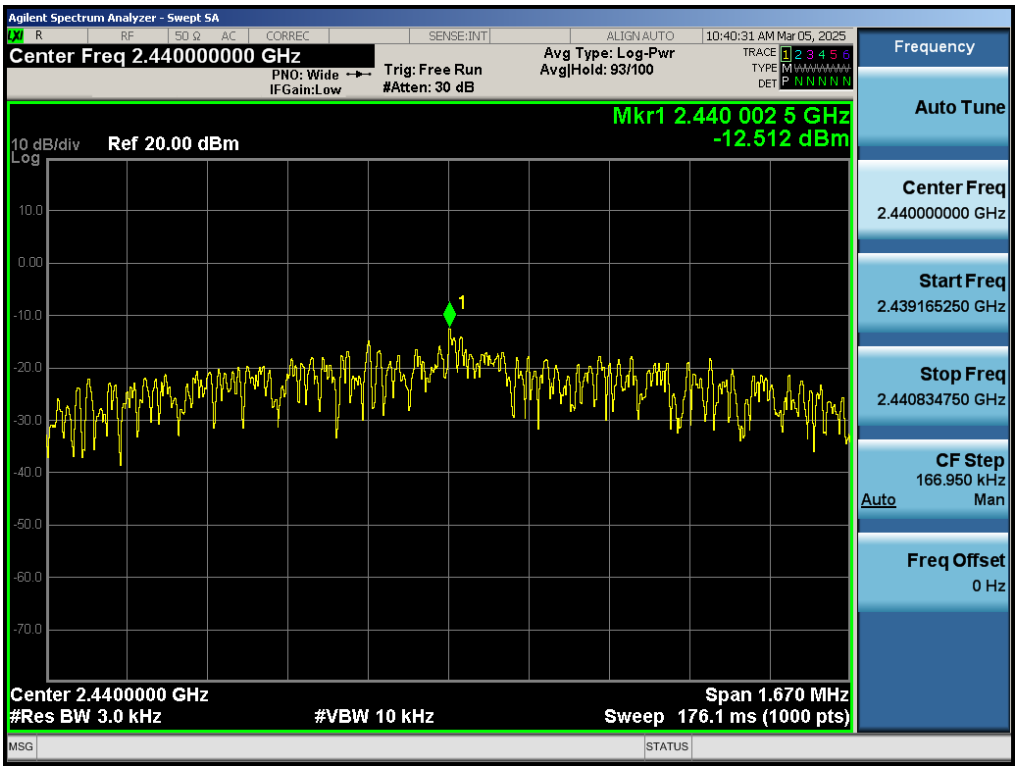
Test_Graph_LE1M_ANT1_2440_1Mbps_PSD



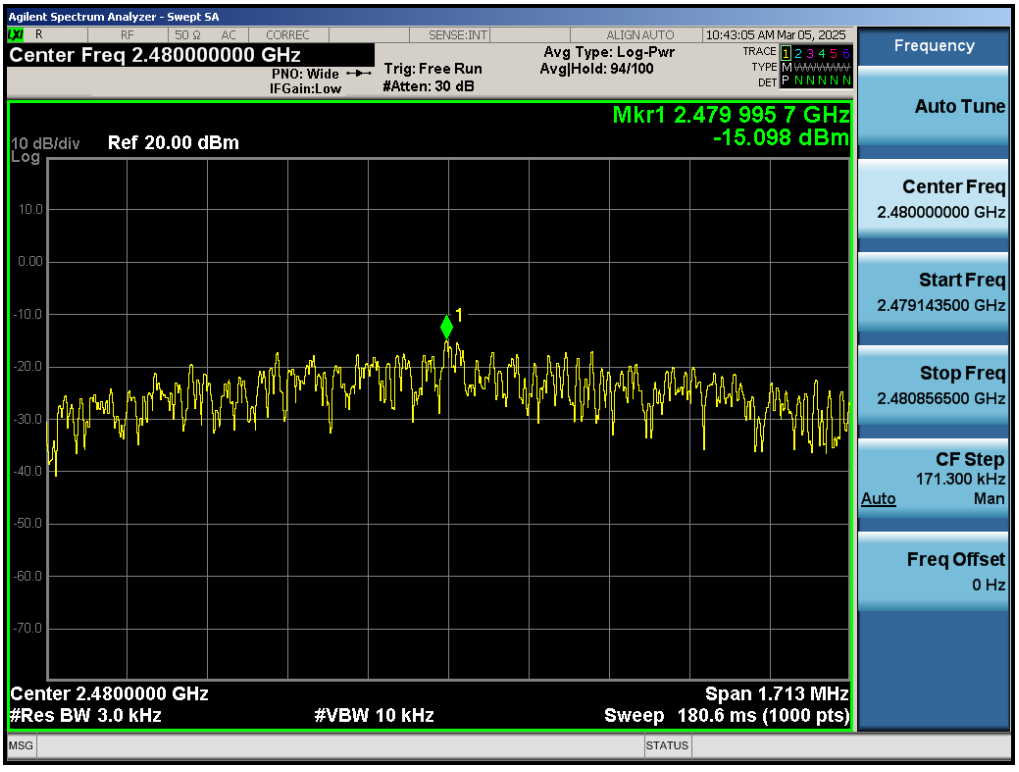
Test_Graph_LE1M_ANT1_2480_1Mbps_PSD



Test_Graph_LE2M_ANT1_2402_2Mbps_PSD



Test_Graph_LE2M_ANT1_2440_2Mbps_PSD



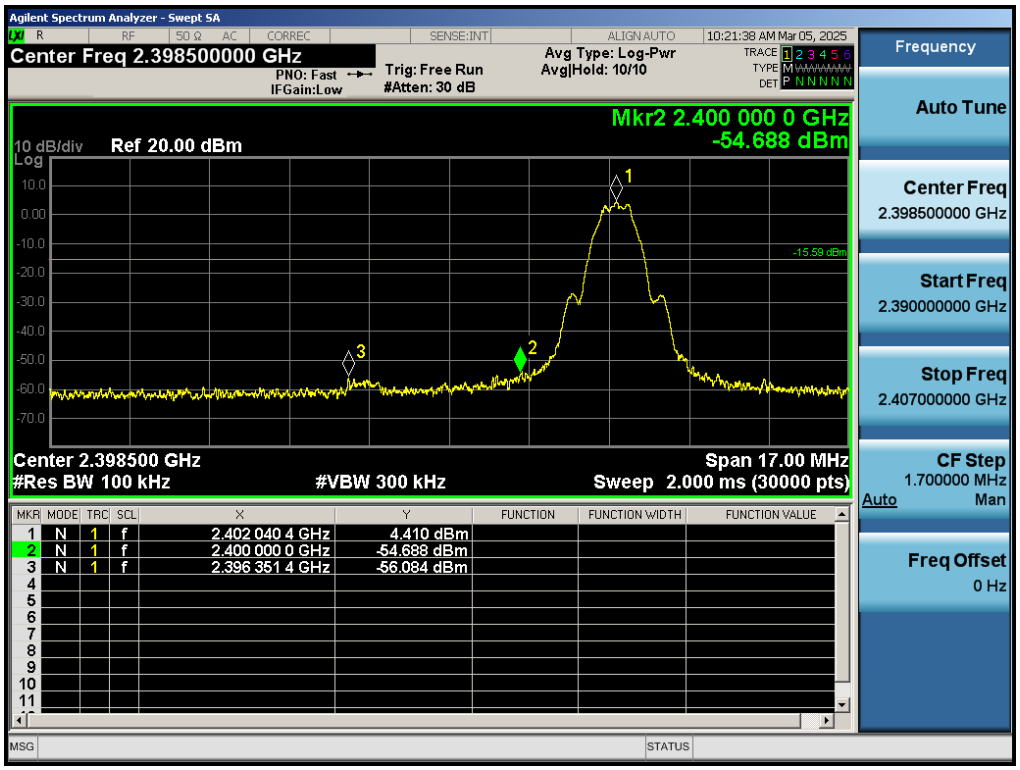
Test_Graph_LE2M_ANT1_2480_2Mbps_PSD

Appendix D: Band edge measurements

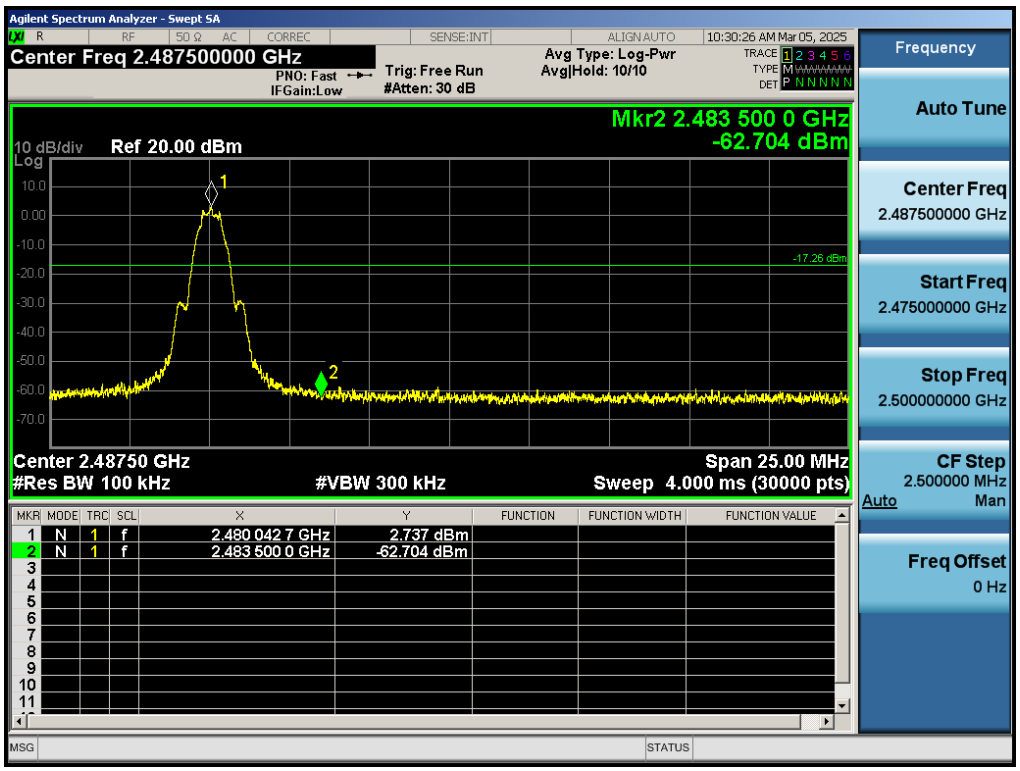
Test Result

Test Mode	Ch. Name	Frequency [MHz]	Ref. Level [dBm]	Result [dBm]	Limit [dBm]	Verdict
BLE_1M	Low	2402	4.410	-54.688	≤-15.59	PASS
BLE_1M	High	2480	2.737	-62.704	≤-17.26	PASS
BLE_2M	Low	2402	4.292	-30.398	≤-15.71	PASS
BLE_2M	High	2480	2.669	-59.438	≤-17.33	PASS

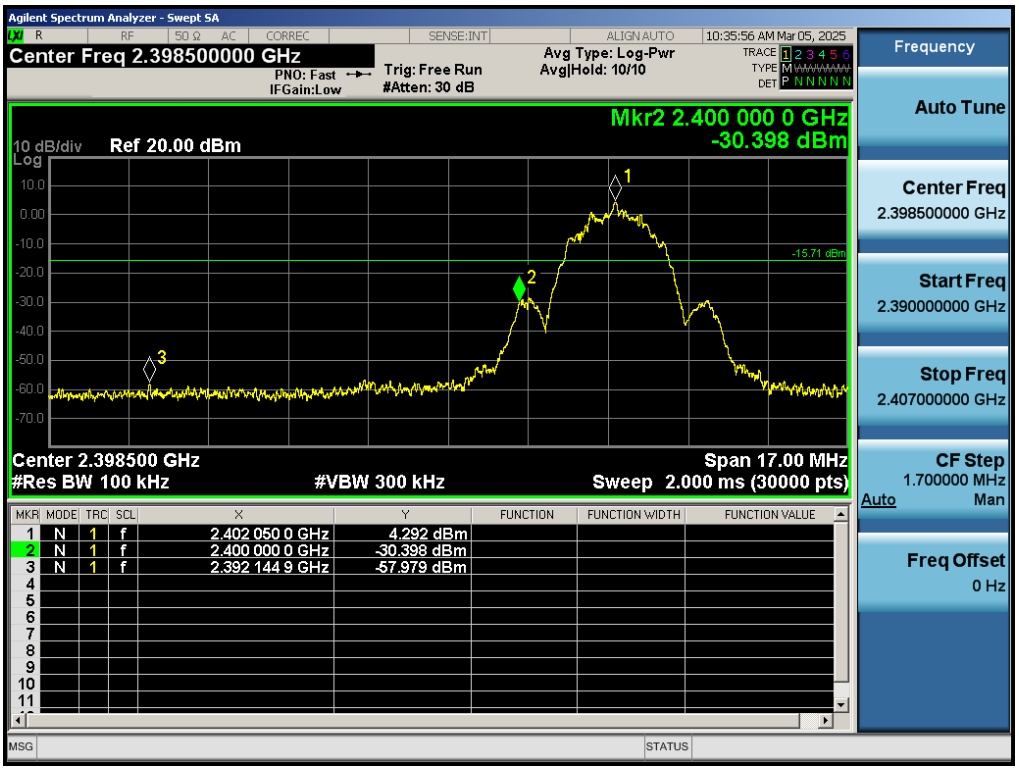
Test Graphs



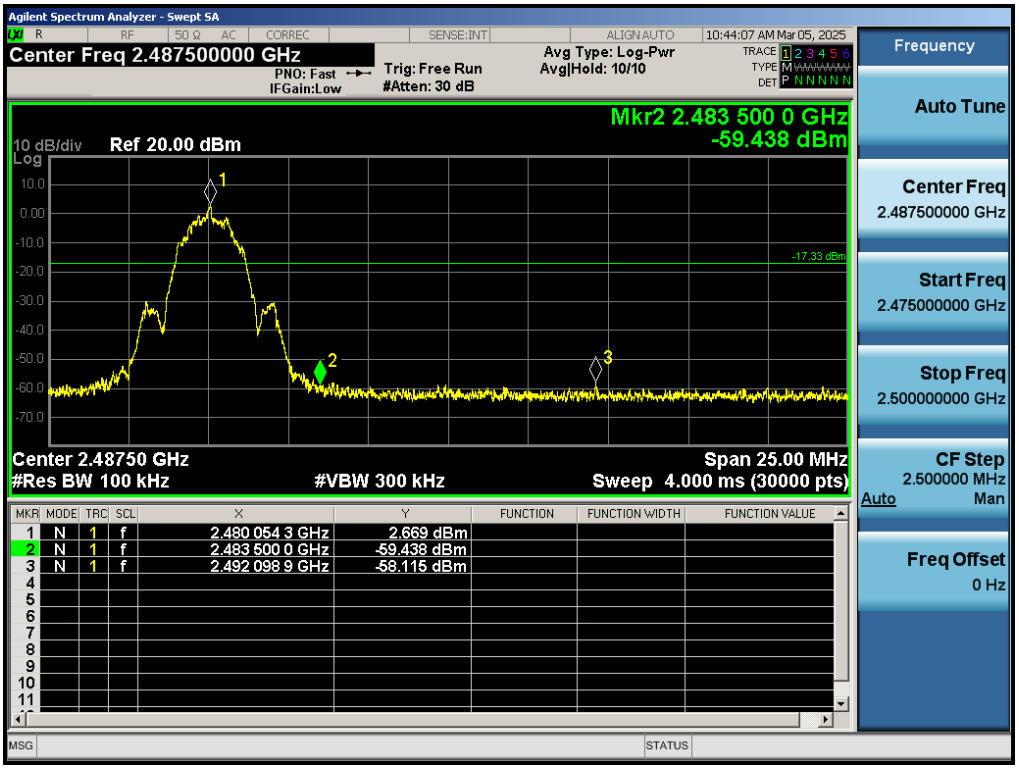
Test_Graph_LE1M_ANT1_2402_1Mbps_Lower Band Edge Emissions



Test_Graph_LE1M_ANT1_2480_1Mbps_Higher Band Edge Emissions



Test_Graph_LE2M_ANT1_2402_2Mbps_Lower Band Edge Emissions



Test_Graph_LE2M_ANT1_2480_2Mbps_Higher Band Edge Emissions

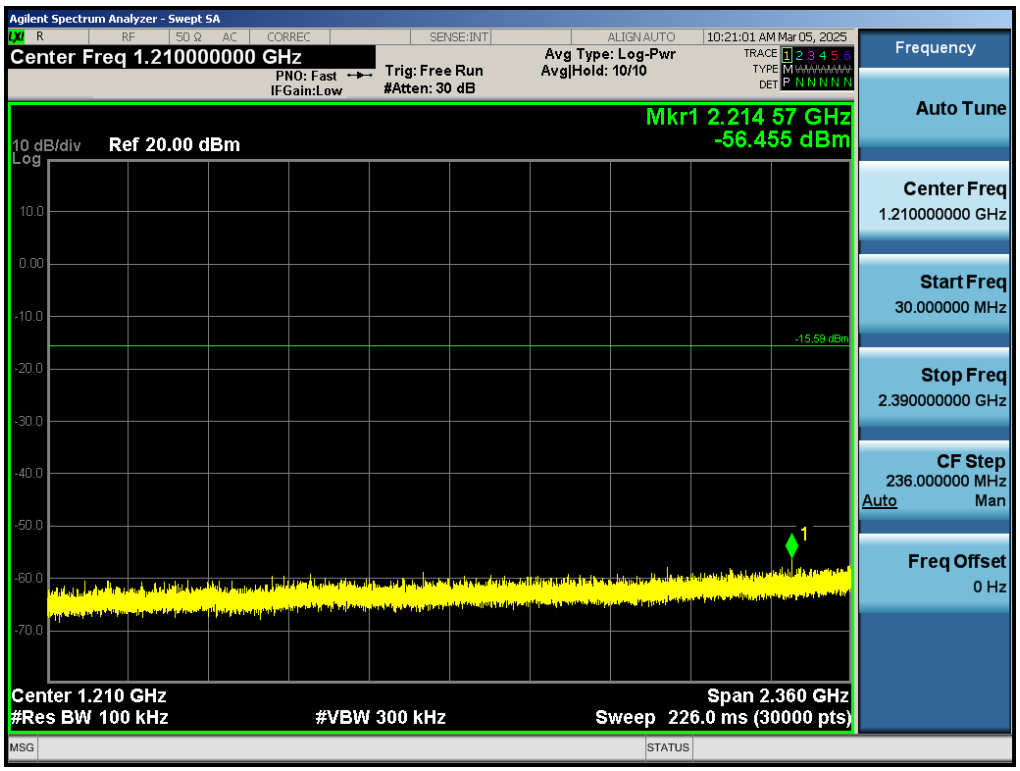
Appendix E: Conducted Spurious Emission

Test Result

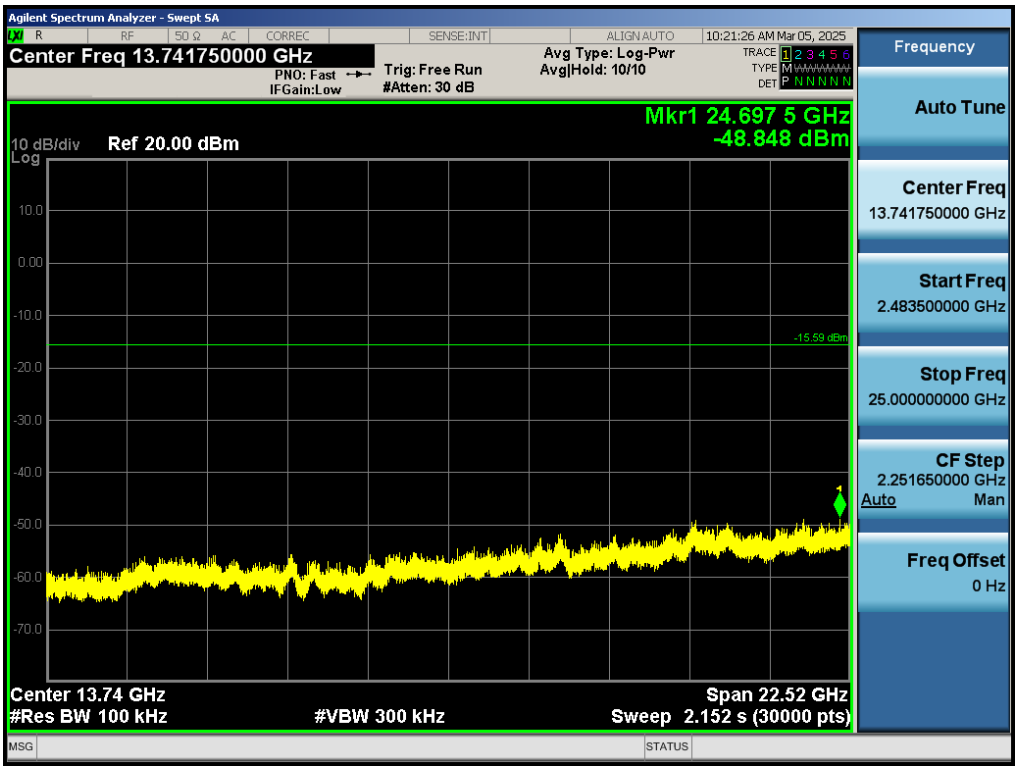
Test Mode	Frequency [MHz]	Freq. Range [MHz]	Ref. Level [dBm]	Result [dBm]	Limit [dBm]	Verdict
BLE_1M	2402	0~Reference	4.410	4.410	---	PASS
BLE_1M	2402	30~2390	4.410	-56.455	≤-15.59	PASS
BLE_1M	2402	2483.5~25000	4.410	-48.848	≤-15.59	PASS
BLE_1M	2440	0~Reference	3.873	3.873	---	PASS
BLE_1M	2440	30~2400	3.873	-56.564	≤-16.13	PASS
BLE_1M	2440	2483.5~25000	3.873	-49.188	≤-16.13	PASS
BLE_1M	2480	0~Reference	2.660	2.660	---	PASS
BLE_1M	2480	30~2400	2.660	-57.506	≤-17.34	PASS
BLE_1M	2480	2500~26500	2.660	-48.771	≤-17.34	PASS
BLE_2M	2402	0~Reference	4.347	4.347	---	PASS
BLE_2M	2402	30~2390	4.347	-56.080	≤-15.65	PASS
BLE_2M	2402	2483.5~25000	4.347	-48.353	≤-15.65	PASS
BLE_2M	2440	0~Reference	3.907	3.907	---	PASS
BLE_2M	2440	30~2400	3.907	-56.614	≤-16.09	PASS
BLE_2M	2440	2483.5~25000	3.907	-48.874	≤-16.09	PASS
BLE_2M	2480	0~Reference	2.725	2.725	---	PASS
BLE_2M	2480	30~2400	2.725	-56.921	≤-17.27	PASS
BLE_2M	2480	2500~26500	2.725	-48.481	≤-17.27	PASS

Test Graphs

Test_Graph_LE1M_ANT1_2402_1Mbps_Reference Level

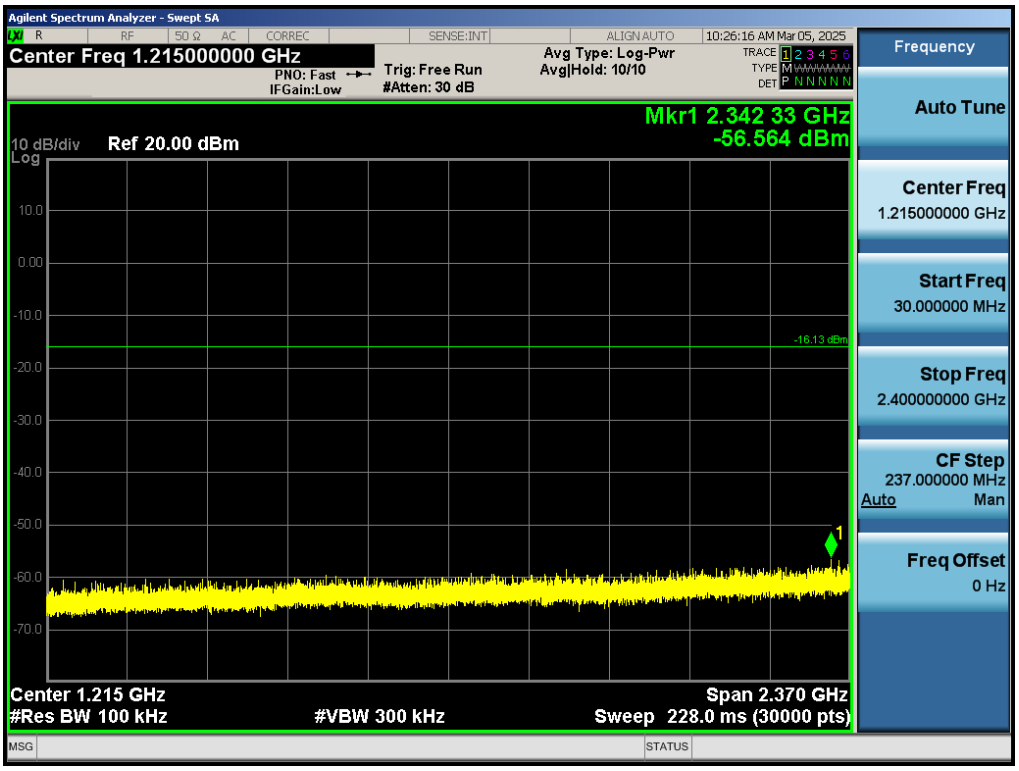


Test_Graph_LE1M_ANT1_2402_1Mbps_Lower Band Emissions

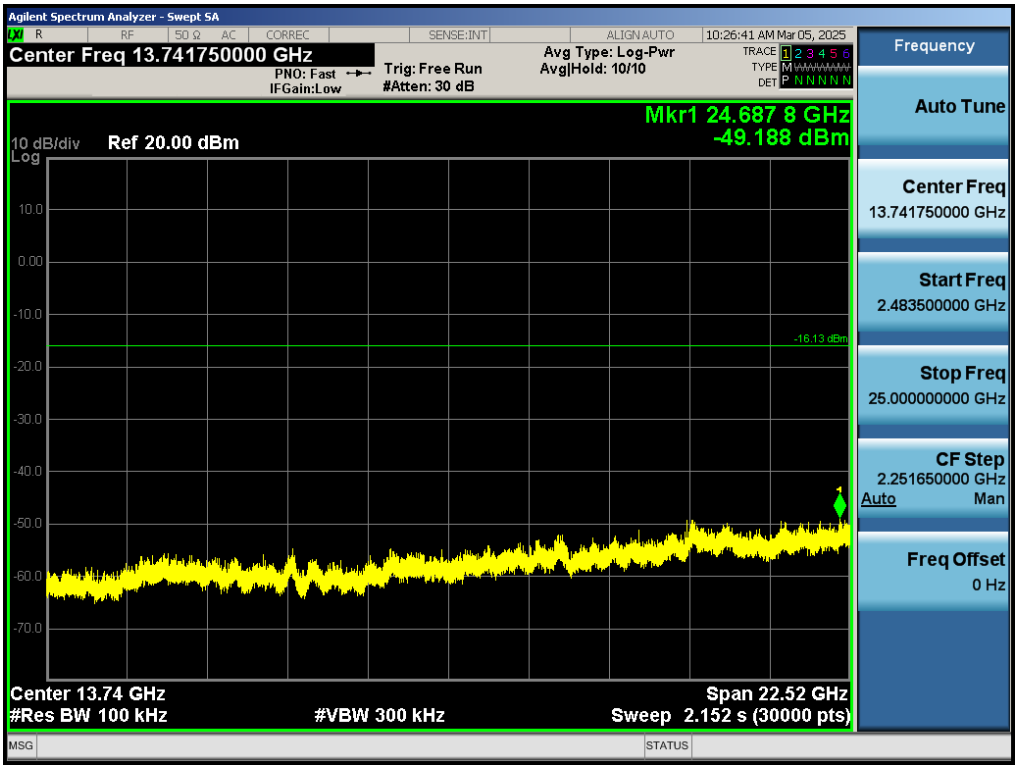


Test_Graph_LE1M_ANT1_2402_1Mbps_Higher Band Emissions

Test_Graph_LE1M_ANT1_2440_1Mbps_Reference Level

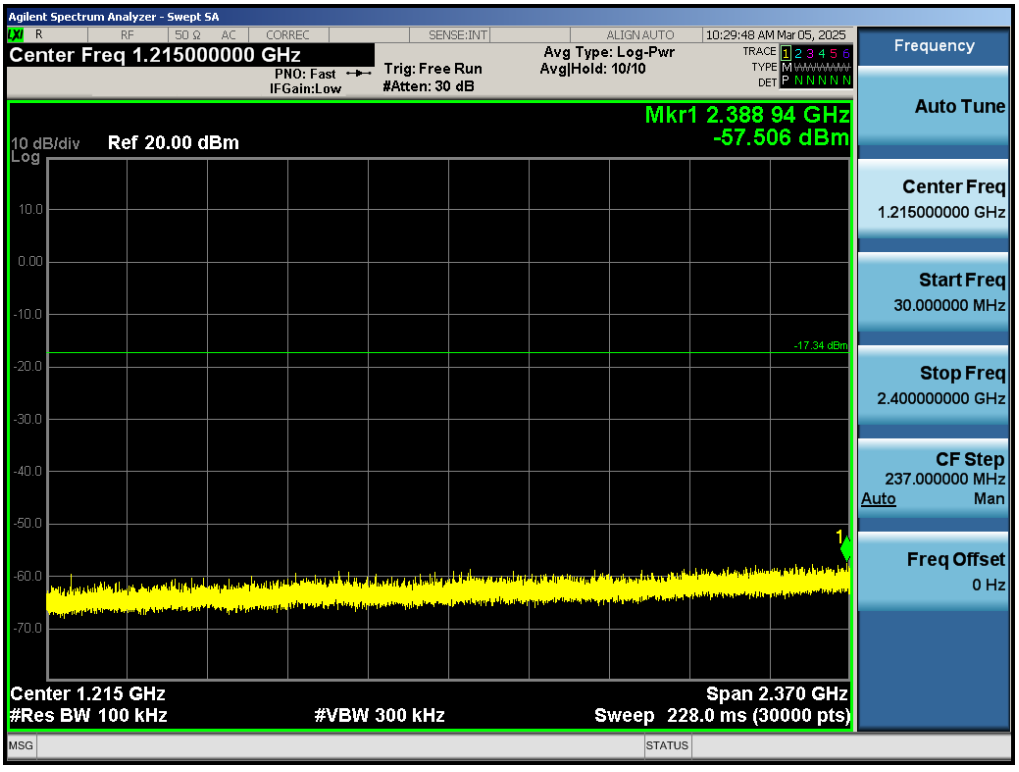


Test_Graph_LE1M_ANT1_2440_1Mbps_Lower Band Emissions

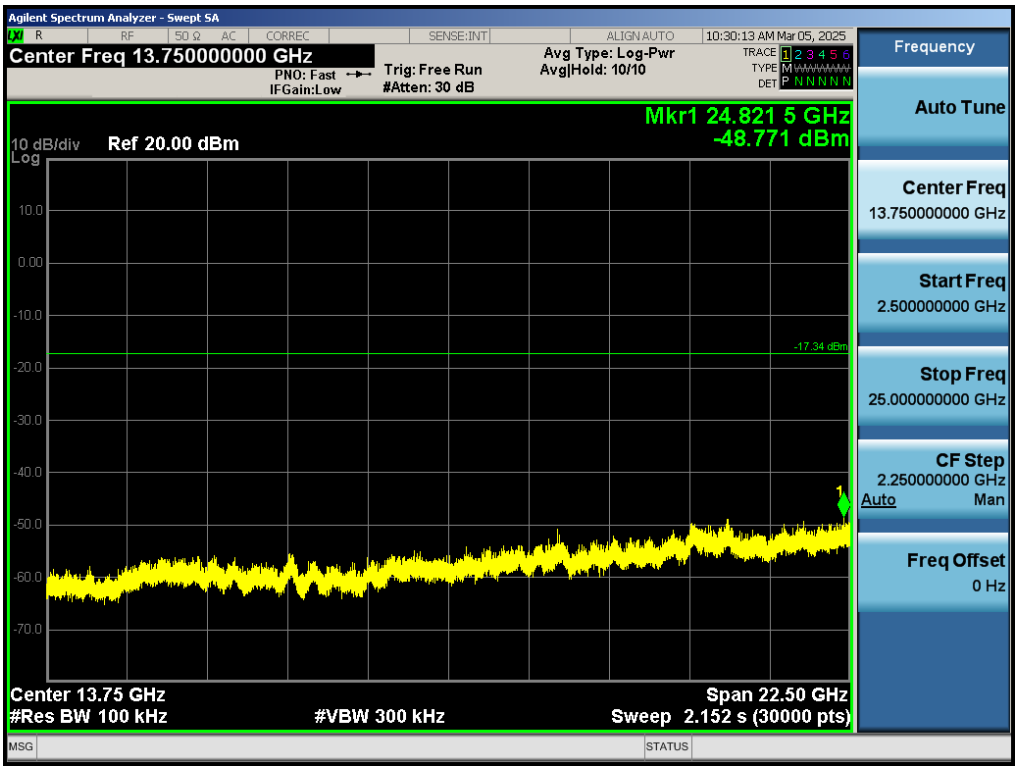


Test_Graph_LE1M_ANT1_2440_1Mbps_Higher Band Emissions

Test_Graph_LE1M_ANT1_2480_1Mbps_Reference Level

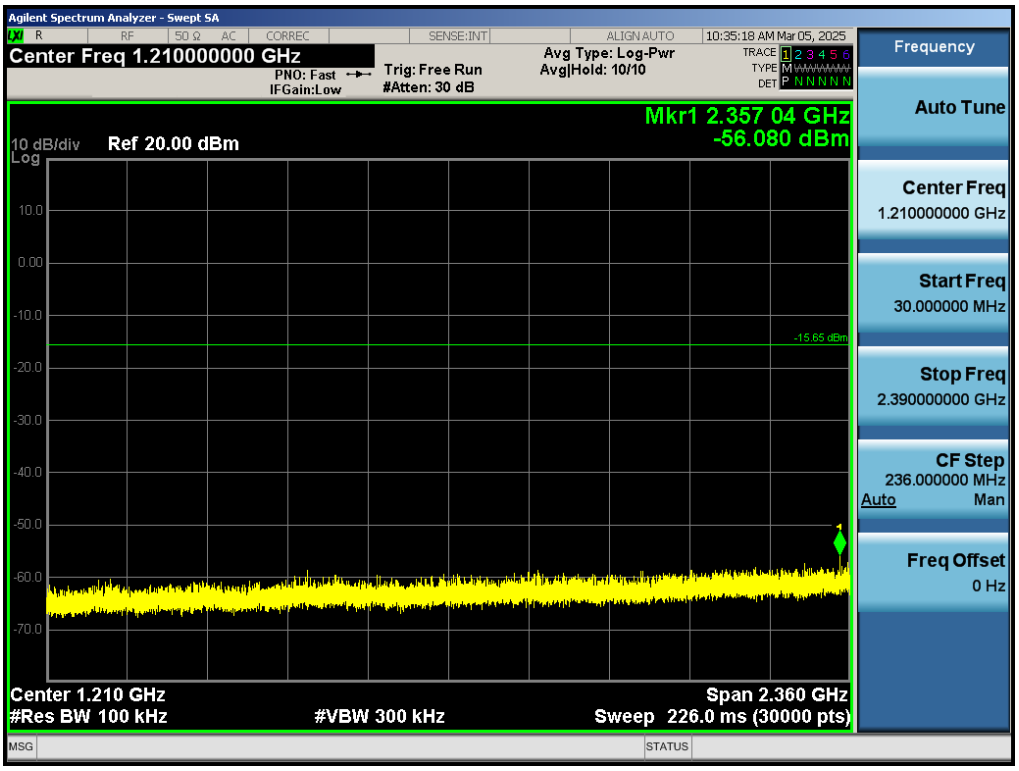


Test_Graph_LE1M_ANT1_2480_1Mbps_Lower Band Emissions

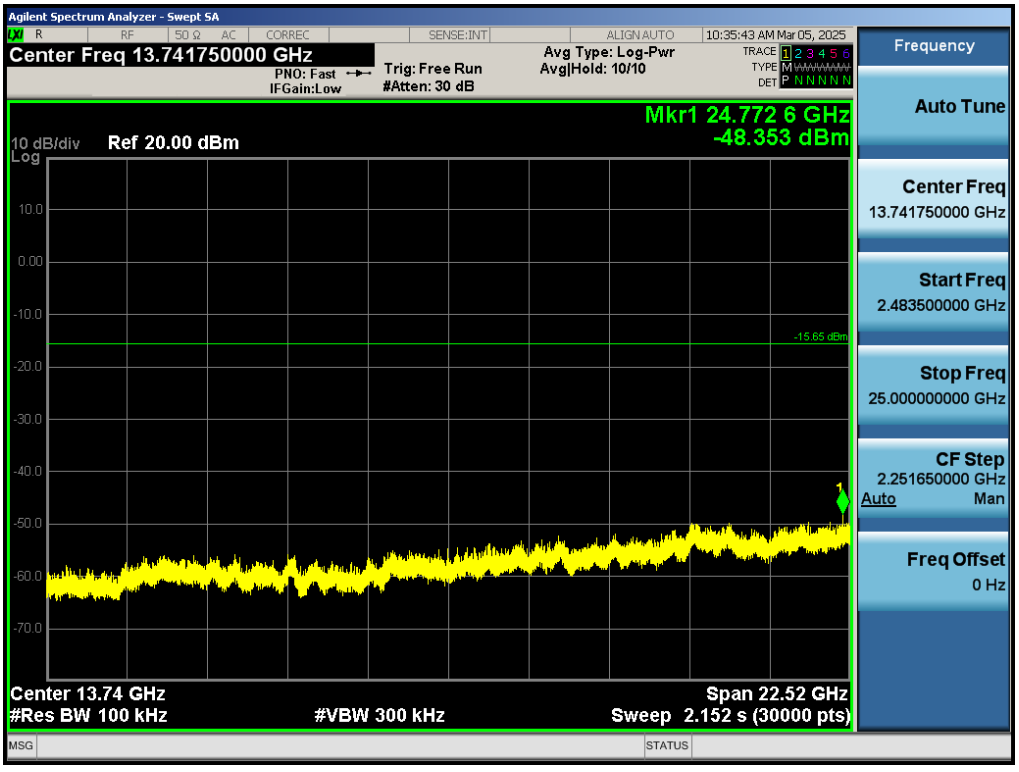


Test_Graph_LE1M_ANT1_2480_1Mbps_Higher Band Emissions

Test_Graph_LE2M_ANT1_2402_2Mbps_Reference Level

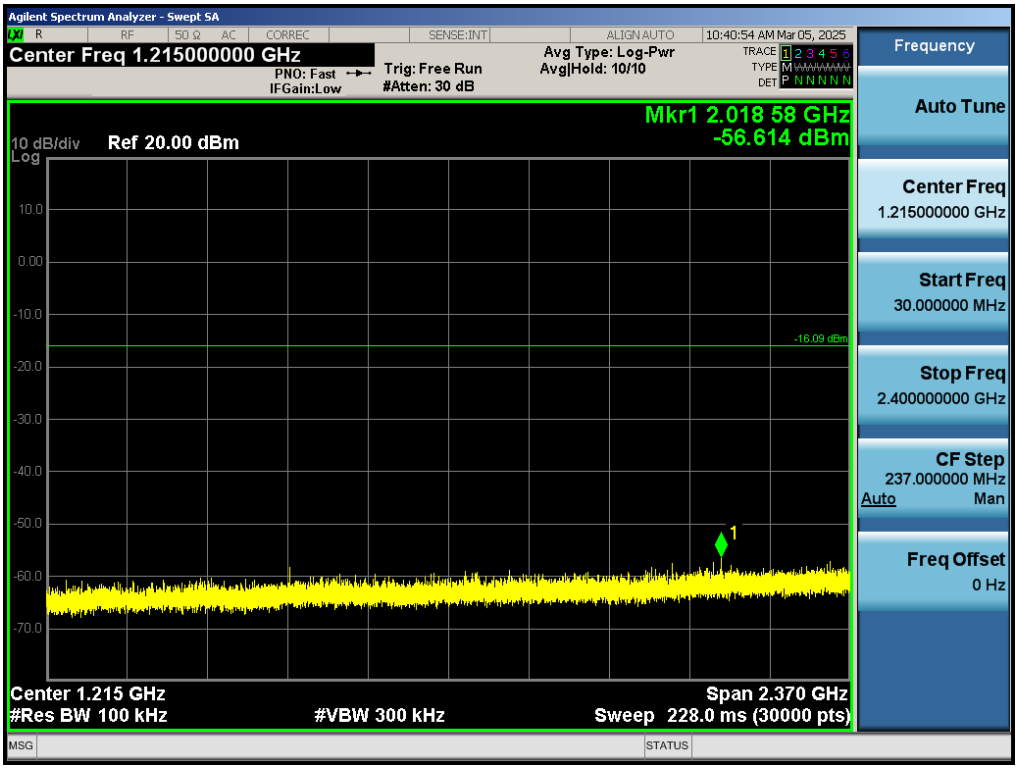


Test_Graph_LE2M_ANT1_2402_2Mbps_Lower Band Emissions

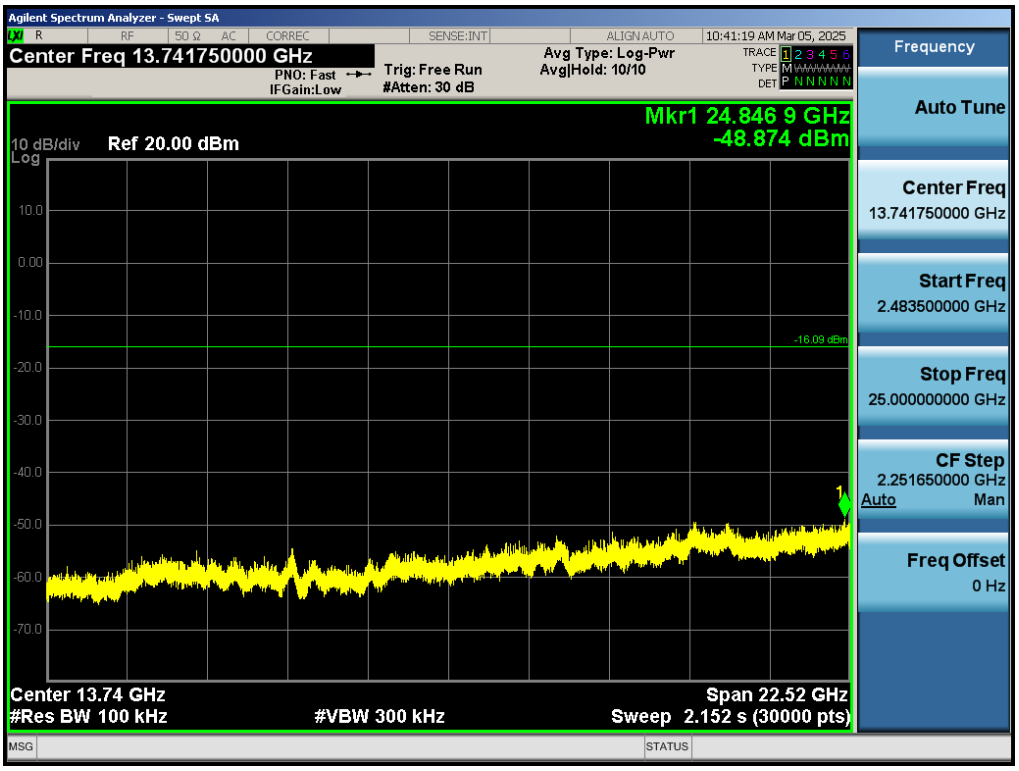


Test_Graph_LE2M_ANT1_2402_2Mbps_Higher Band Emissions

Test_Graph_LE2M_ANT1_2440_2Mbps_Reference Level

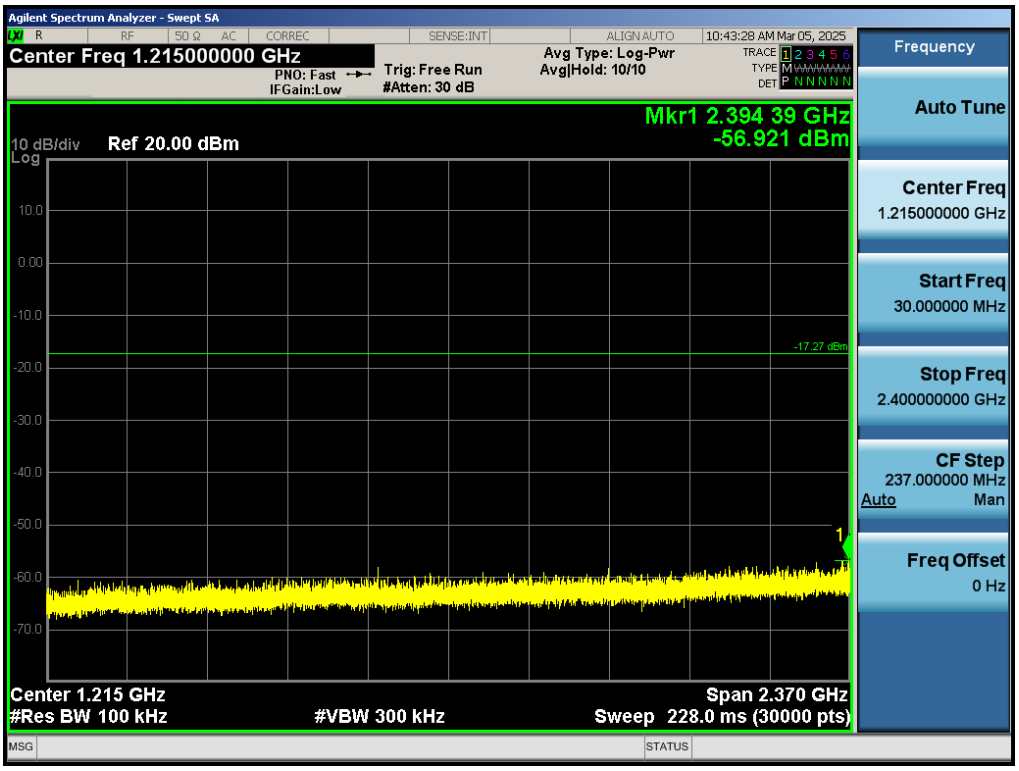


Test_Graph_LE2M_ANT1_2440_2Mbps_Lower Band Emissions

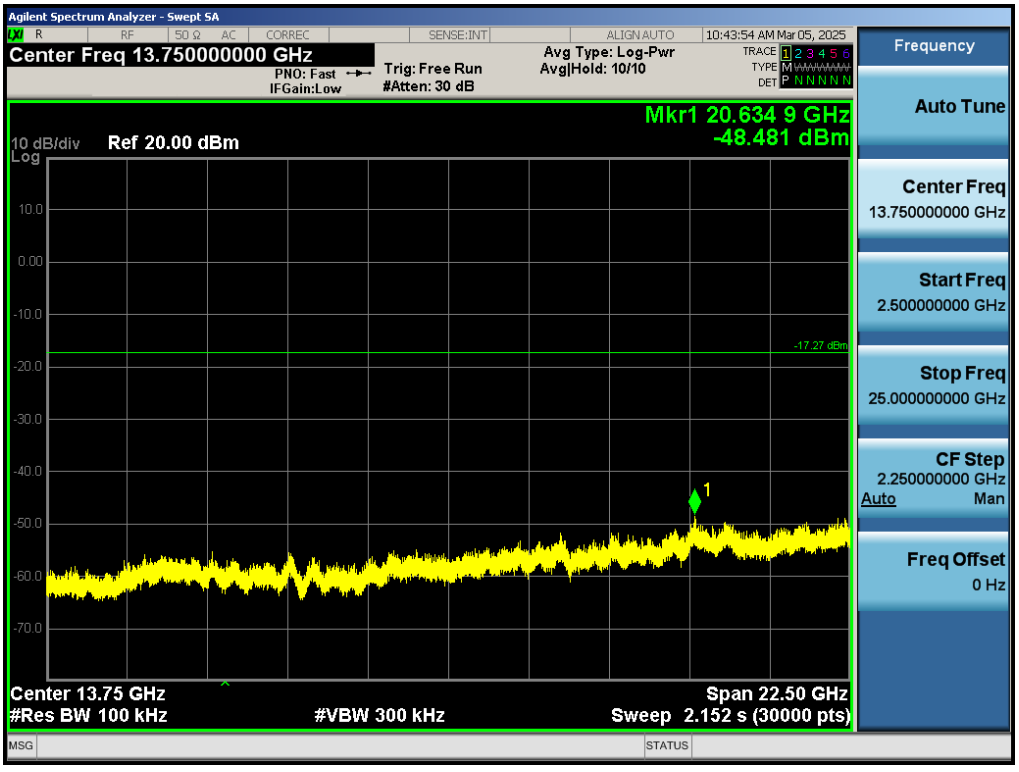


Test_Graph_LE2M_ANT1_2440_2Mbps_Higher Band Emissions

Test_Graph_LE2M_ANT1_2480_2Mbps_Reference Level



Test_Graph_LE2M_ANT1_2480_2Mbps_Lower Band Emissions



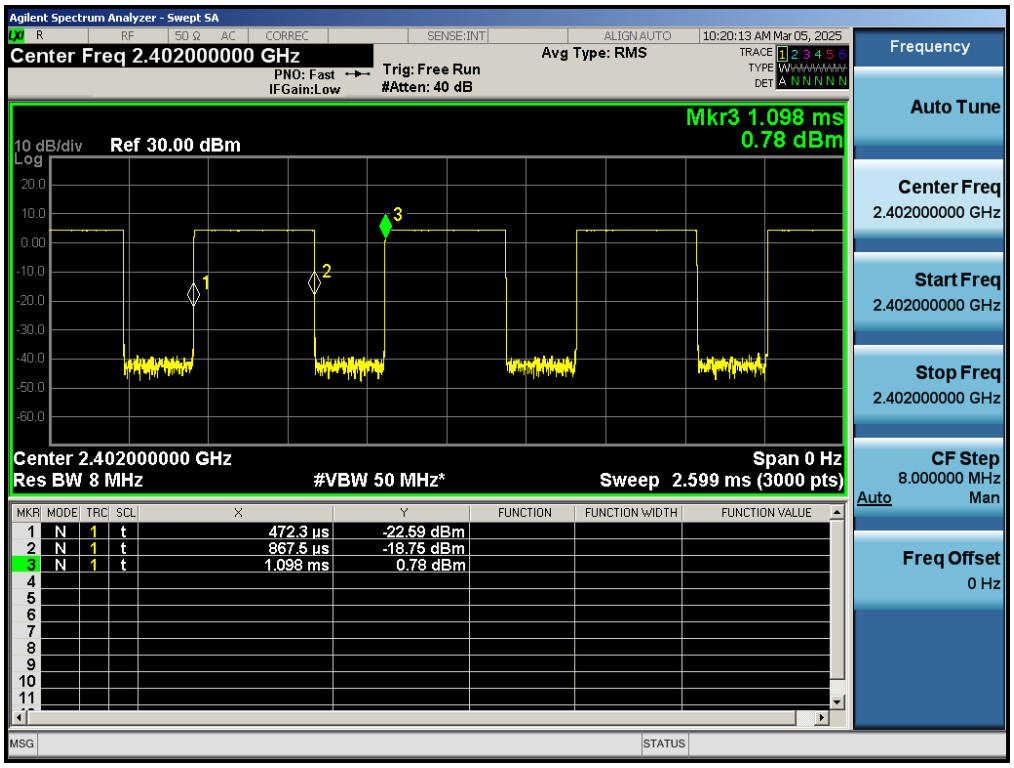
Test_Graph_LE2M_ANT1_2480_2Mbps_Higher Band Emissions

Appendix F: Duty Cycle

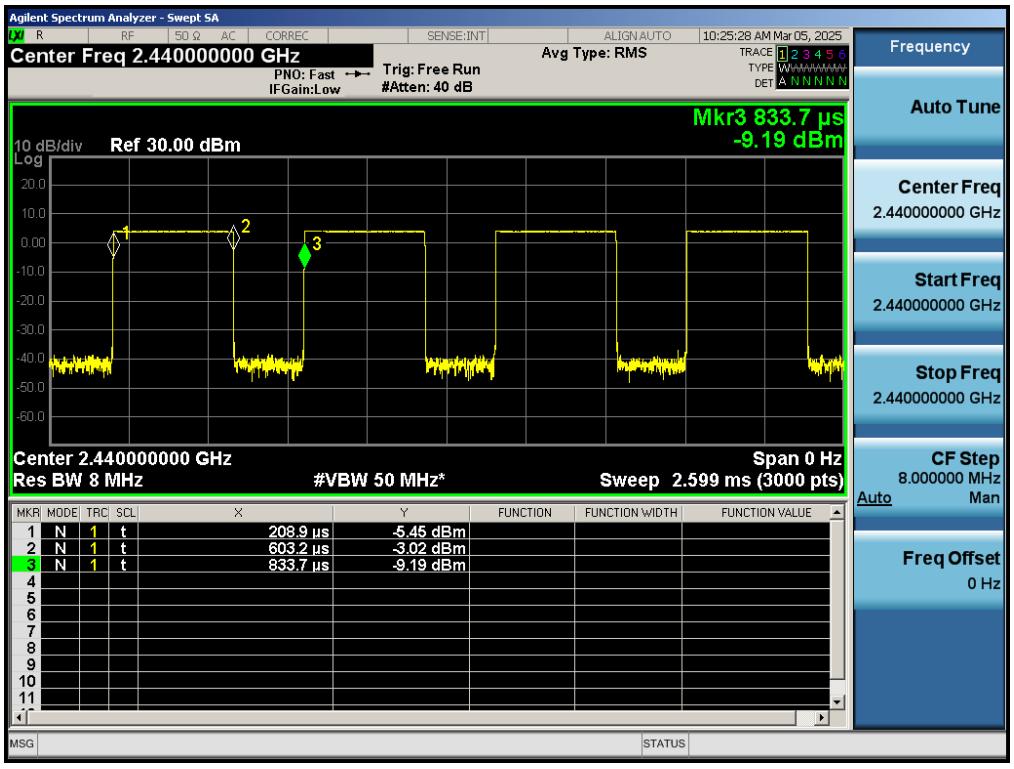
Test Result

Test Mode	Frequency [MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor [dB]
BLE_1M	2402	0.40	0.63	63.16	2.01
BLE_1M	2440	0.39	0.62	63.11	2.01
BLE_1M	2480	0.39	0.63	63.09	2.01
BLE_2M	2402	0.21	0.62	33.43	4.81
BLE_2M	2440	0.21	0.62	33.42	4.81
BLE_2M	2480	0.21	0.62	33.42	4.81

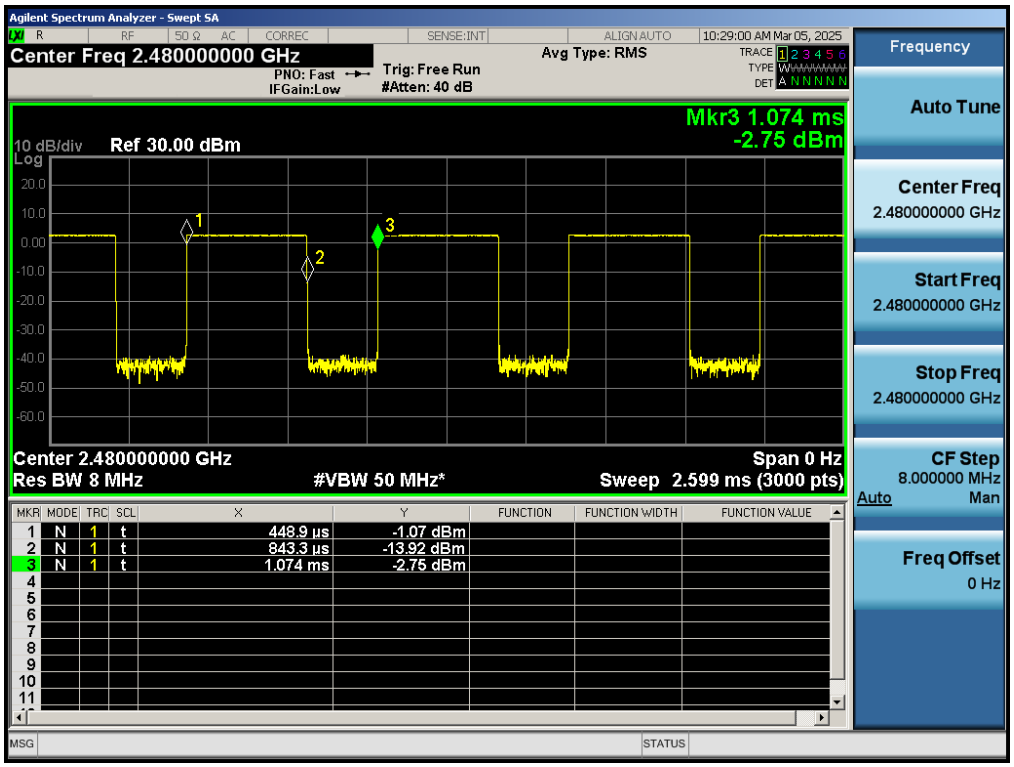
Test Graphs



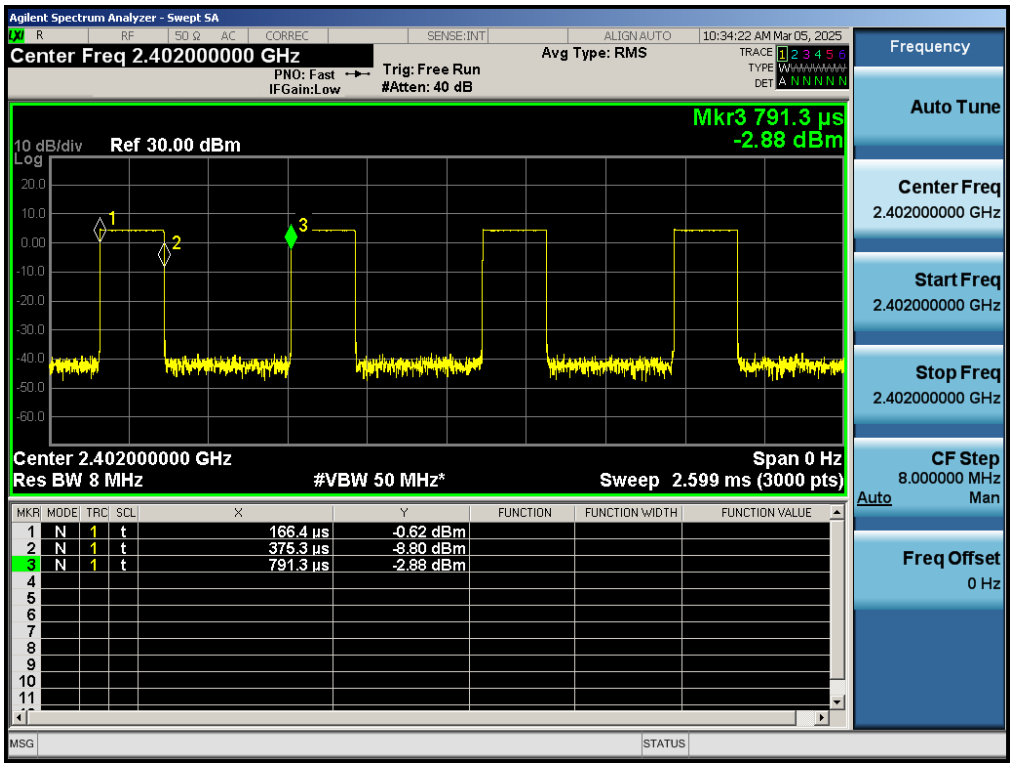
BLE_1M-Ant1-2402



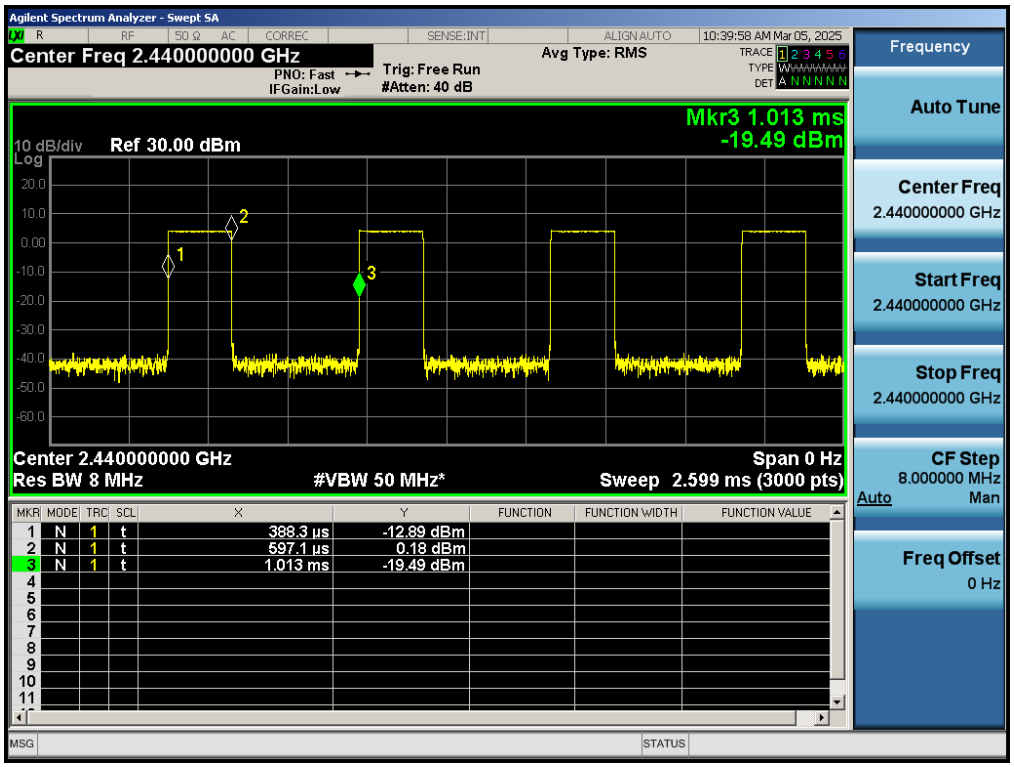
BLE_1M-Ant1-2440



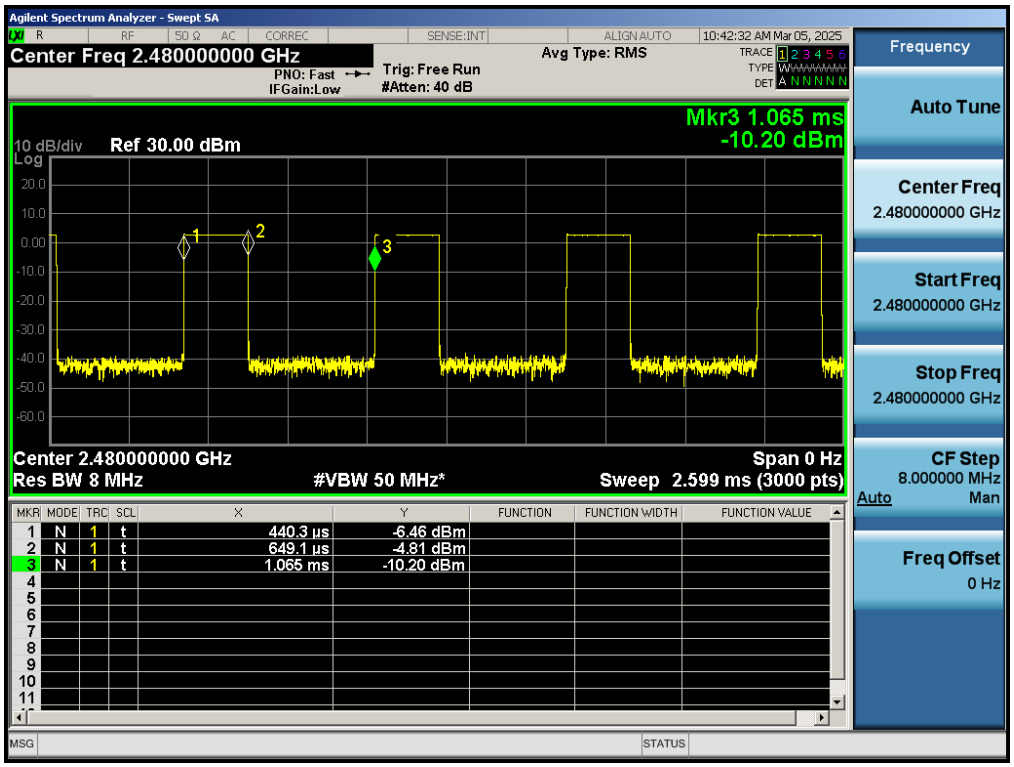
BLE_1M-Ant1-2480



BLE_2M-Ant1-2402



BLE_2M-Ant1-2440



BLE_2M-Ant1-2480