



RF Test Report

For

Project No.:	ZKT-241025L13927E
Client:	YA LI ELECTRIC CO LTD
Manufacturer:	YA LI ELECTRIC CO LTD
Product Description:	LED CONTROLLER
Model No.	YL-LEDAPP-AJ01
Test Engineer:	Jim Liu
Test Date:	2024-9-11



Appendix A: DTS Bandwidth

Test Result

TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.684	2401.660	2402.344	0.5	PASS
BLE_1M	Ant1	2440	0.676	2439.660	2440.336	0.5	PASS
BLE_1M	Ant1	2480	0.668	2479.664	2480.332	0.5	PASS
BLE_2M	Ant1	2402	1.156	2401.424	2402.580	0.5	PASS
BLE_2M	Ant1	2440	1.140	2439.424	2440.564	0.5	PASS
BLE_2M	Ant1	2480	1.144	2479.428	2480.572	0.5	PASS



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

TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	1.0163	2401.4984	2402.5147	---	---
BLE_1M	Ant1	2440	1.0138	2439.4989	2440.5127	---	---
BLE_1M	Ant1	2480	1.0117	2479.5010	2480.5127	---	---
BLE_2M	Ant1	2402	2.0297	2401.0048	2403.0345	---	---
BLE_2M	Ant1	2440	2.0238	2439.0067	2441.0305	---	---
BLE_2M	Ant1	2480	2.0204	2479.0086	2481.0290	---	---



Test Graphs





BLE_1M-Ant1-2480



BLE_2M-Ant1-2402



BLE_2M-Ant1-2440



BLE_2M-Ant1-2480



Appendix C: Maximum conducted output power

Test Result Peak

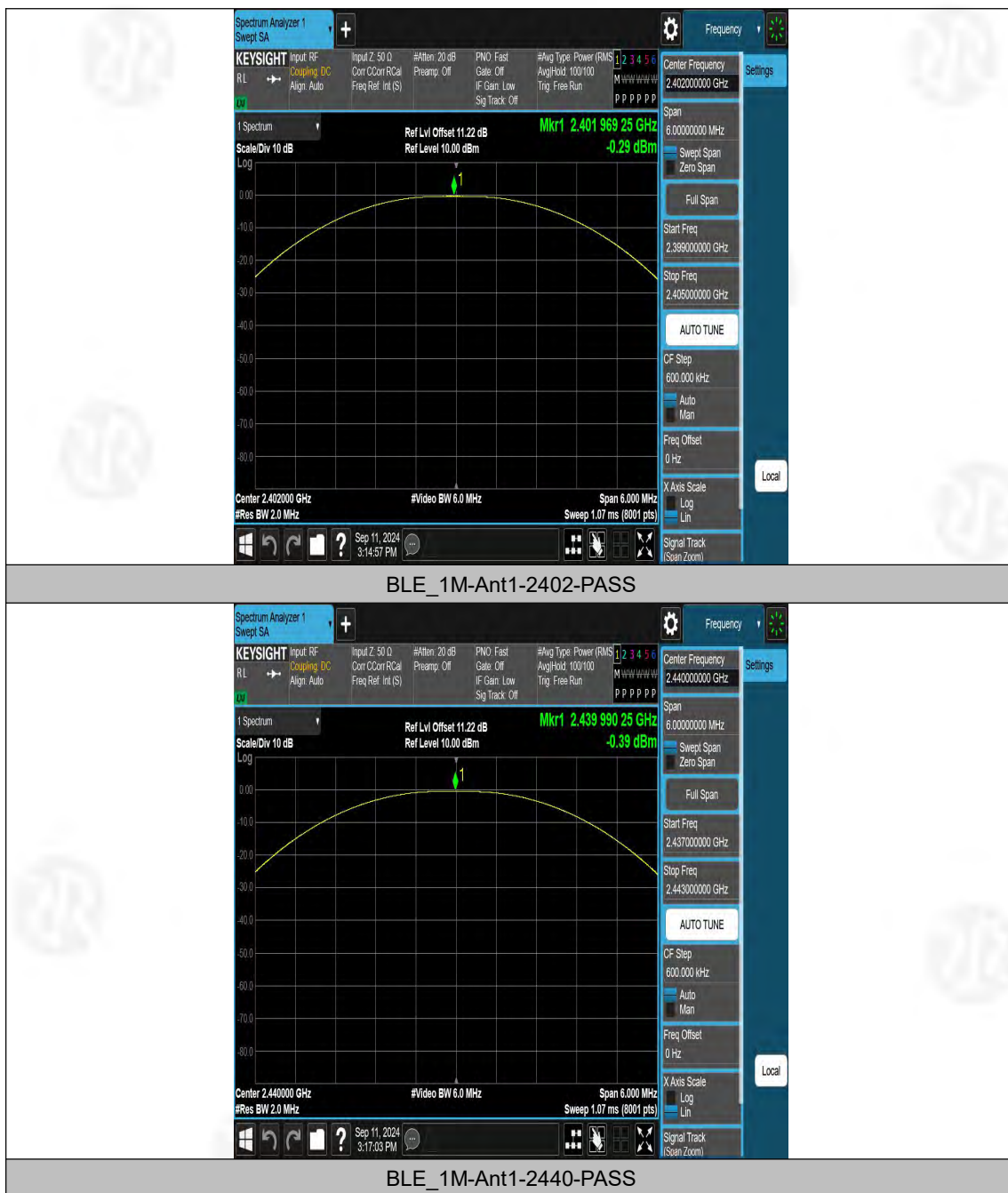
TestMode	Antenna	Frequency[MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	EIRP[dBm]	EIRP Limit[dBm]	Verdict
BLE_1M	Ant1	2402	-0.29	≤30	-0.29	≤36	PASS
BLE_1M	Ant1	2440	-0.39	≤30	-0.39	≤36	PASS
BLE_1M	Ant1	2480	-0.52	≤30	-0.52	≤36	PASS
BLE_2M	Ant1	2402	-0.29	≤30	-0.29	≤36	PASS
BLE_2M	Ant1	2440	-0.38	≤30	-0.38	≤36	PASS
BLE_2M	Ant1	2480	-0.54	≤30	-0.54	≤36	PASS

Test Result Average

Test Mode	Antenna	Frequency[MHz]	Conducted Sensor power[dBm]	Duty Cycle [%]	DC Factor [dBm]	Result [dBm]	Limit [dBm]	Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Verdict
TestMode	Antenna	Channel	RawPower	DC	DcFactor	Result	Limit	Gain	EIRP	Limit1	Verdict



Test Graphs Peak





BLE_1M-Ant1-2480-PASS



BLE_2M-Ant1-2402-PASS



BLE_2M-Ant1-2440-PASS



BLE_2M-Ant1-2480-PASS



Appendix D: Maximum power spectral density

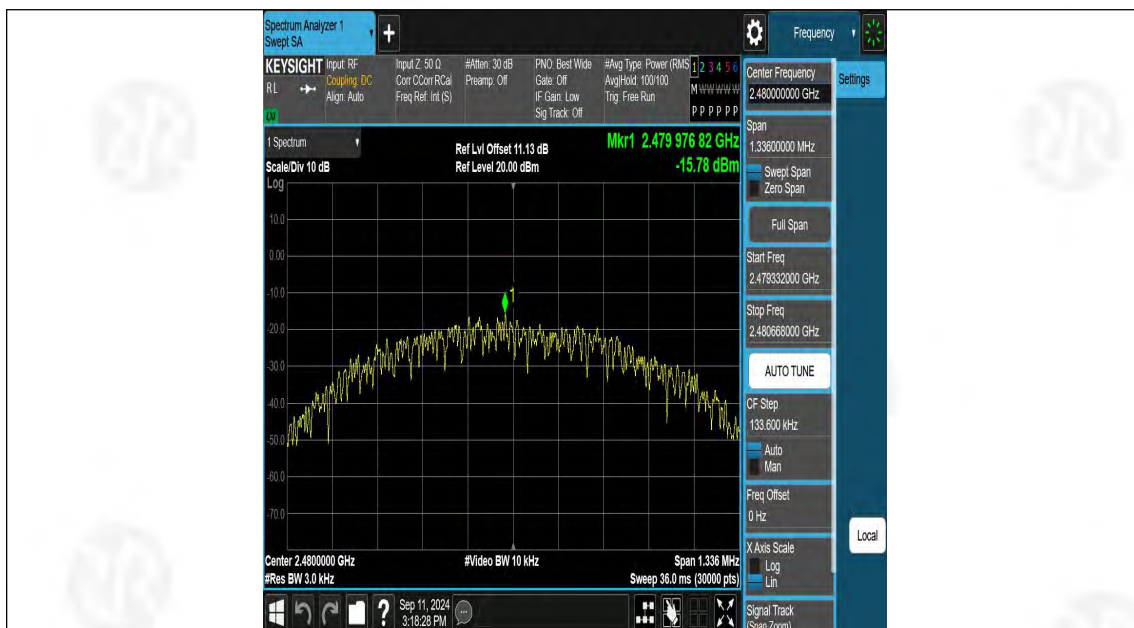
Test Result

TestMode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-15.53	≤8.00	PASS
BLE_1M	Ant1	2440	-15.62	≤8.00	PASS
BLE_1M	Ant1	2480	-15.78	≤8.00	PASS
BLE_2M	Ant1	2402	-17.86	≤8.00	PASS
BLE_2M	Ant1	2440	-17.98	≤8.00	PASS
BLE_2M	Ant1	2480	-18.14	≤8.00	PASS

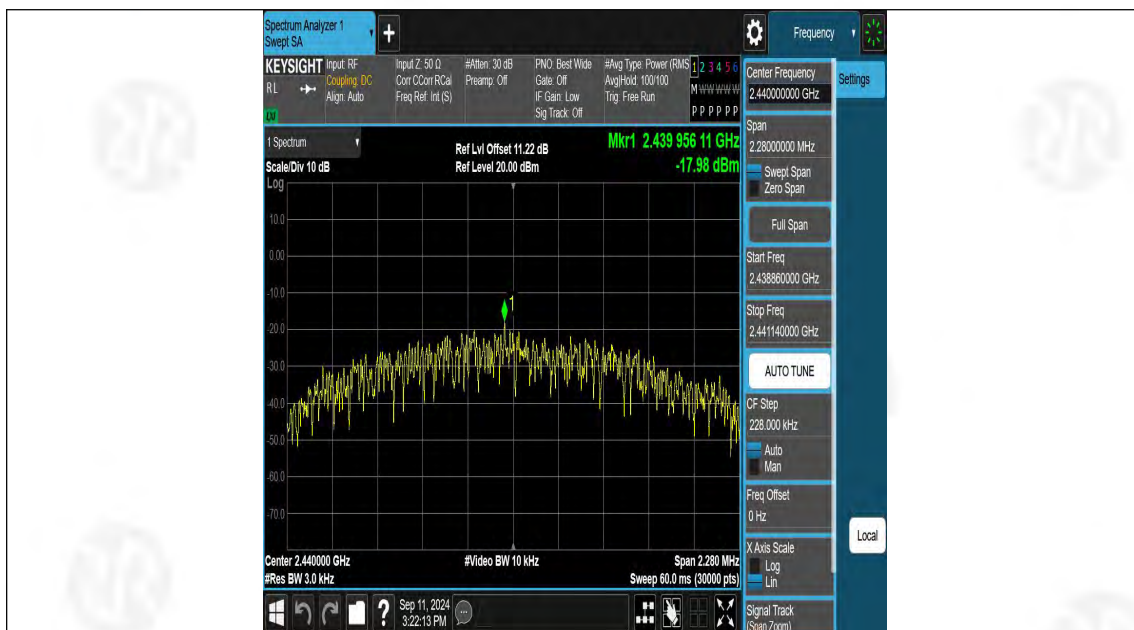


Test Graphs

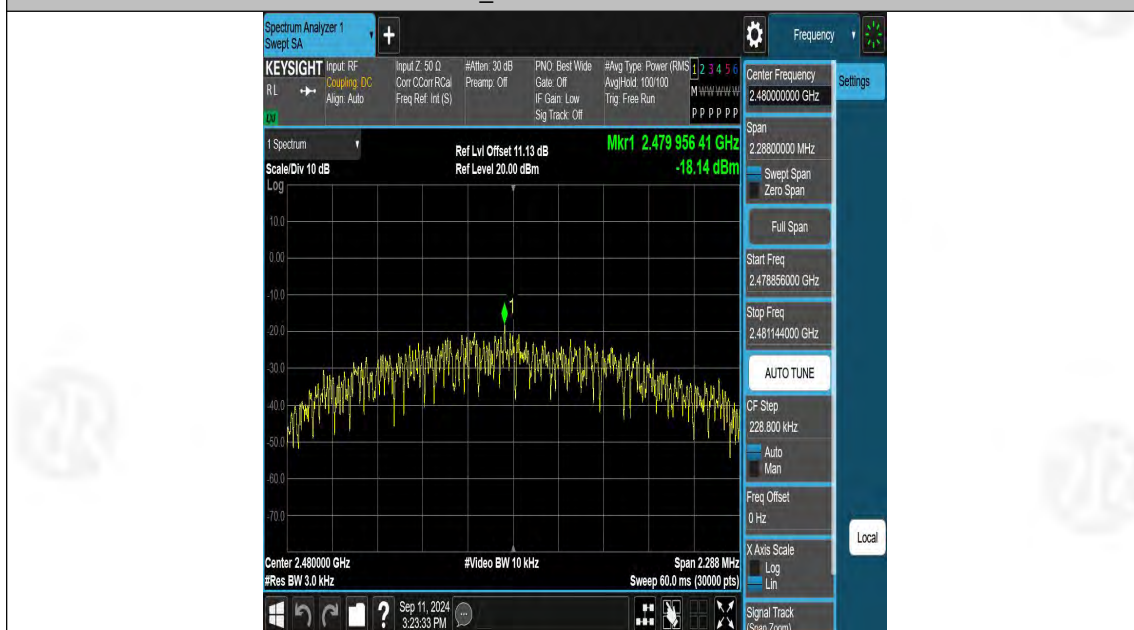




The screenshot displays a Spectrum Analyzer 1 interface. The main display shows a spectrum plot with a peak at 2.401956 GHz, labeled 'Mkr1 2.401956 26 GHz' and '-17.86 dBm'. The plot has a scale of 10 dB and a resolution bandwidth of 3.0 kHz. The center frequency is 2.402000 GHz, and the span is 2.312 MHz. The video bandwidth is 10 kHz, and the sweep time is 62.0 ms (30000 pts). The interface includes various settings and controls, such as 'Spectrum Analyzer 1', 'Swept SA', 'Input RF', 'Coupling: DC', 'Align: Auto', 'Input Z: 50 Ohm', 'Cont: CCN: RCal', 'Freq Ref: Int (S)', 'Attenu: 30 dB', 'Preamp: Off', 'PND: Best Wide', 'Gate: Off', 'IF Gain: Low', 'Sig Track: Off', 'Avg Type: Power (RMS)', 'Avg Hold: 100/100', 'Trig: Free Run', and 'Center Frequency: 2.40200000 GHz'. The Windows taskbar at the bottom shows the date and time as Sep 11, 2024, 3:20:25 PM.



BLE_2M-Ant1-2440-PASS



BLE_2M-Ant1-2480-PASS



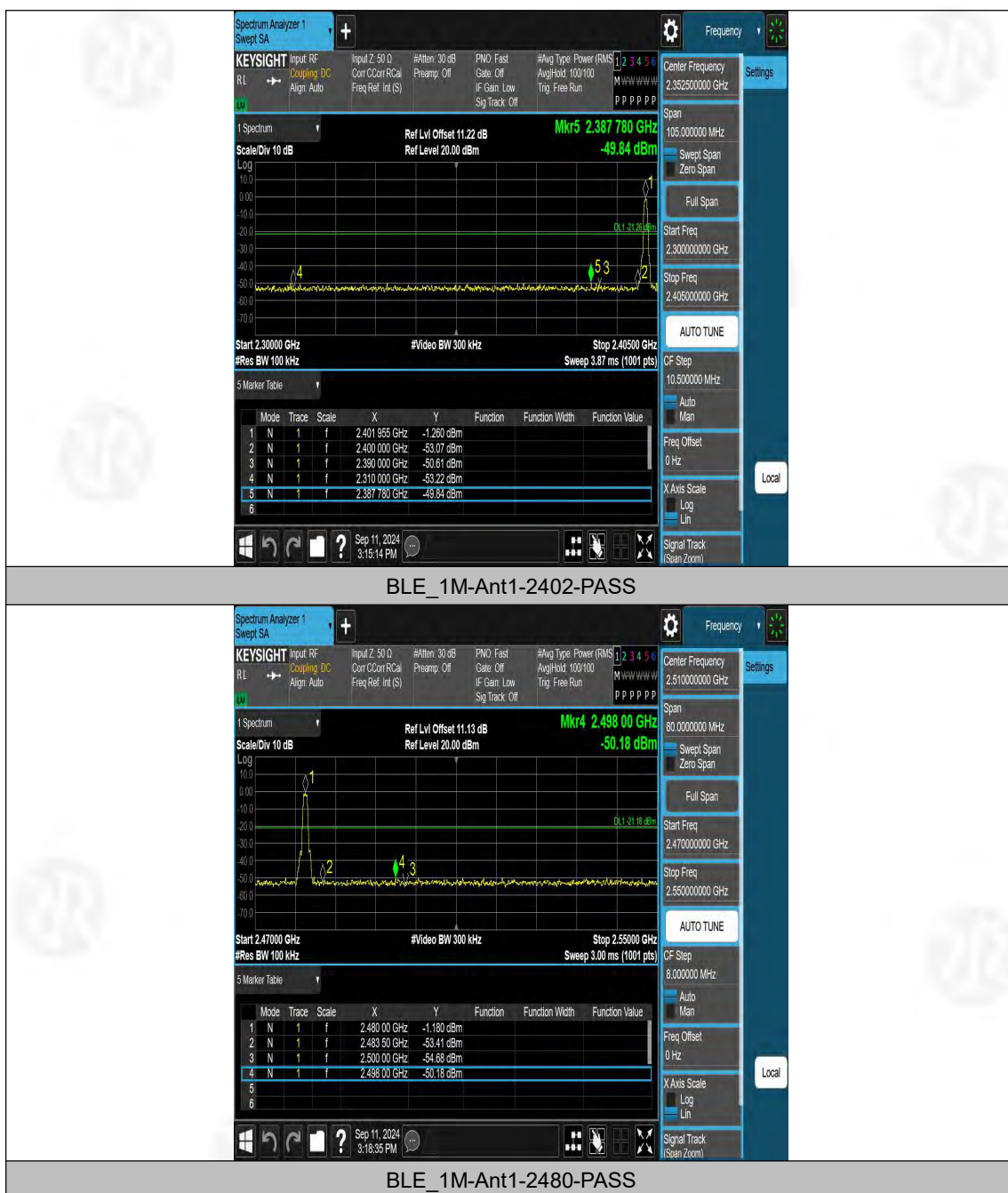
Appendix F: Band edge measurements

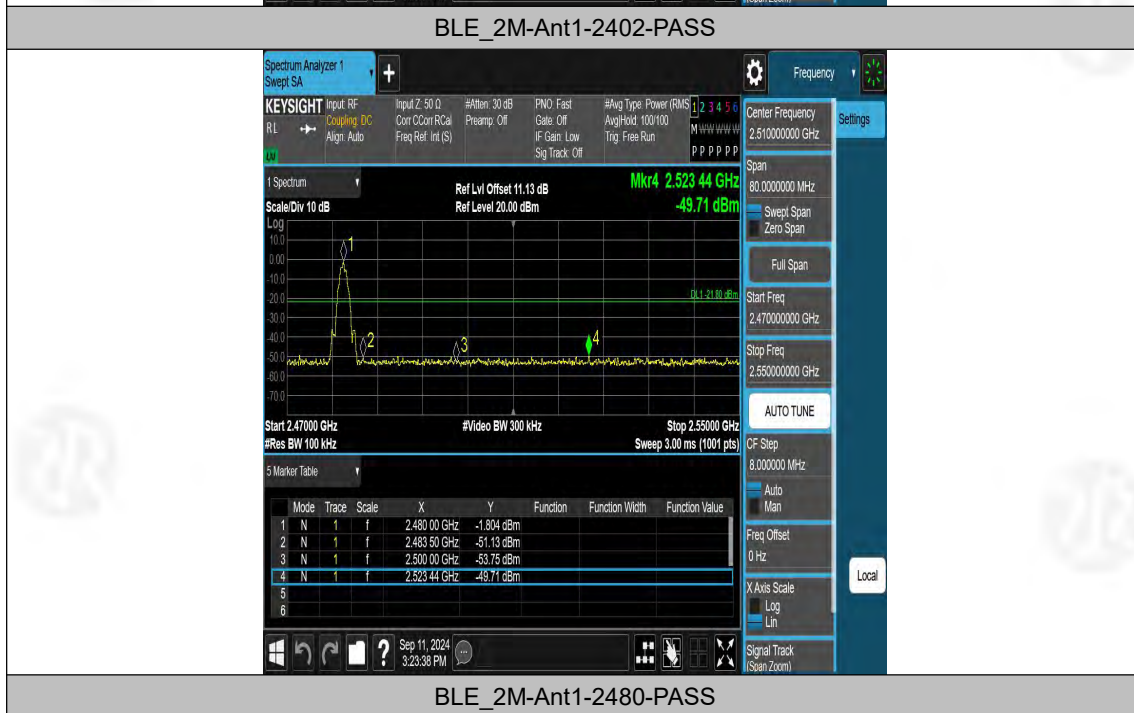
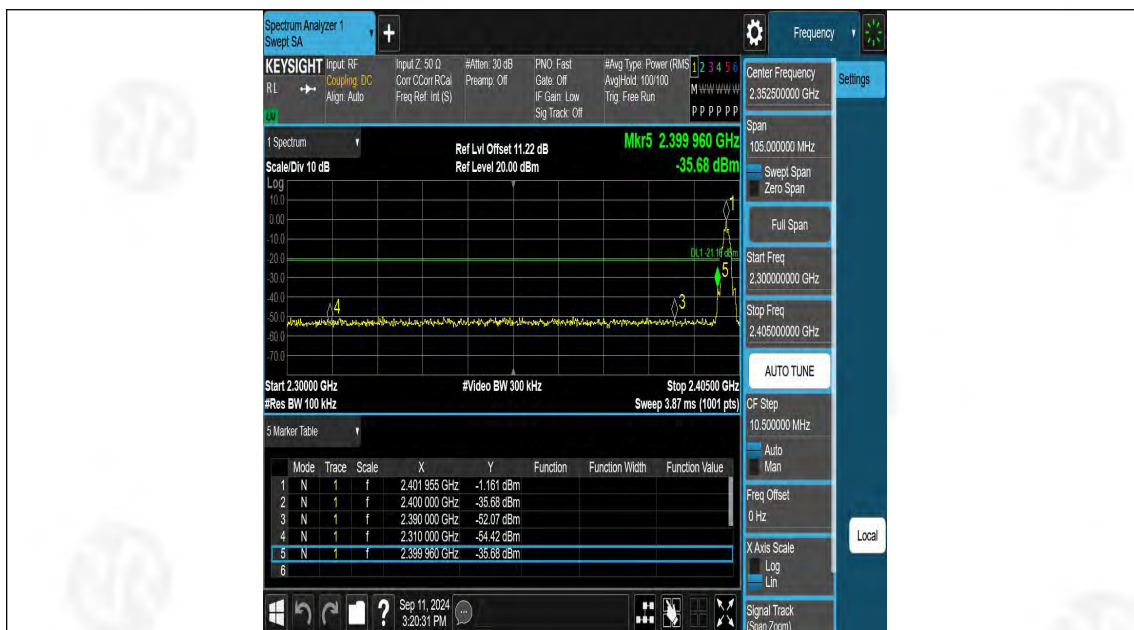
Test Result

TestMod e	Antenn a	ChNam e	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdic t
BLE_1M	Ant1	Low	2402	-1.26	-49.85	≤-21.26	PASS
BLE_1M	Ant1	High	2480	-1.18	-50.19	≤-21.18	PASS
BLE_2M	Ant1	Low	2402	-1.16	-35.68	≤-21.16	PASS
BLE_2M	Ant1	High	2480	-1.80	-49.71	≤-21.8	PASS



Test Graphs







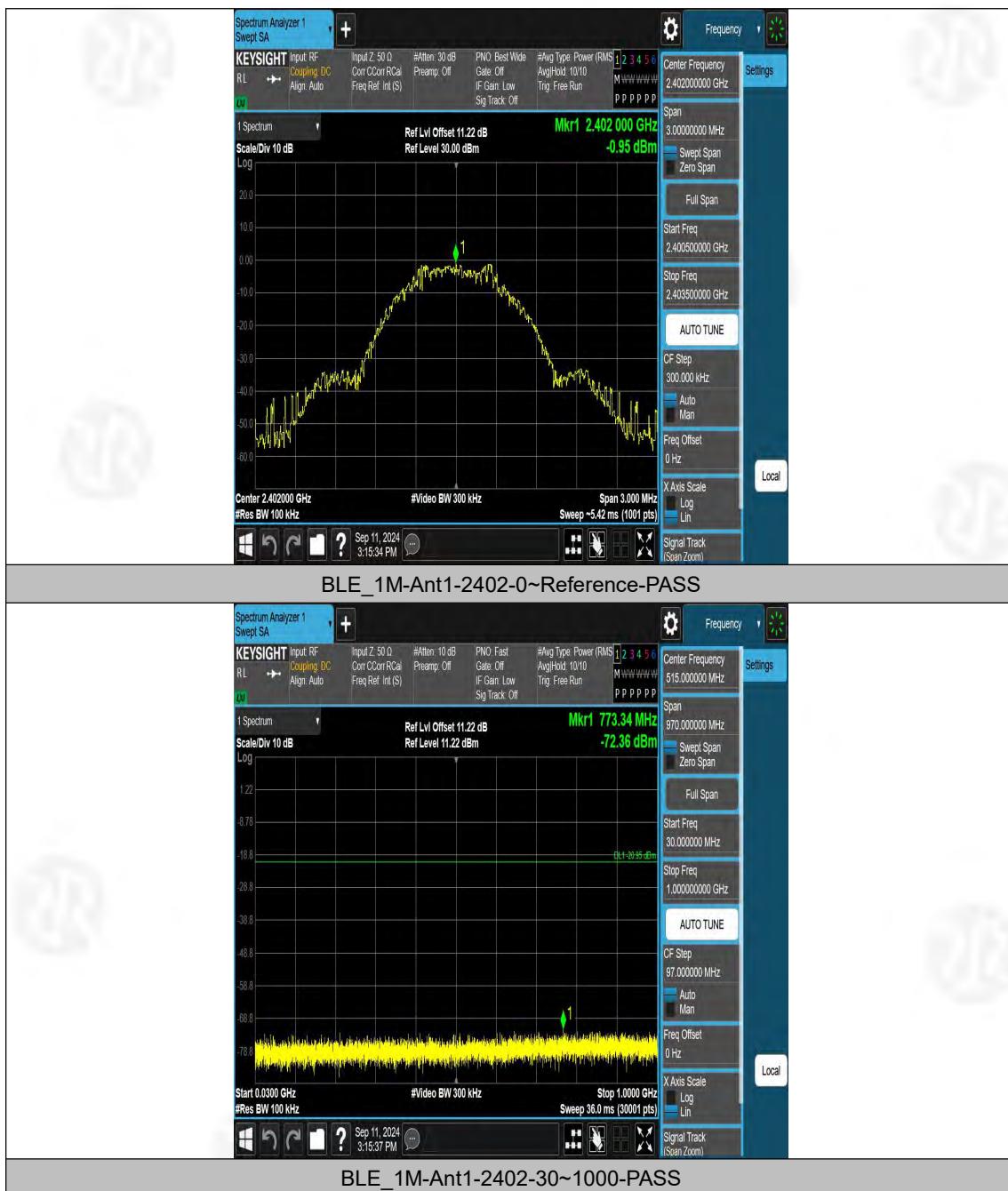
Appendix G: Conducted Spurious Emission

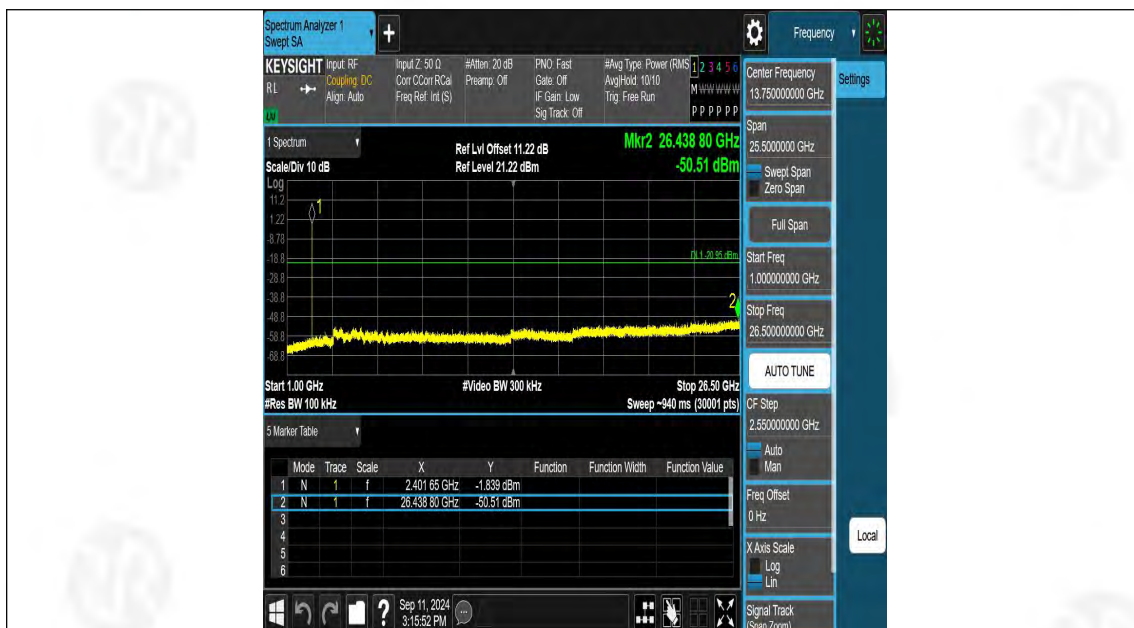
Test Result

TestMode	Antenna	Frequency[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	0~Reference	-0.95	-0.95	---	PASS
BLE_1M	Ant1	2402	30~1000	-0.95	-72.36	≤-20.95	PASS
BLE_1M	Ant1	2402	1000~26500	-0.95	-50.51	≤-20.95	PASS
BLE_1M	Ant1	2440	0~Reference	-1.18	-1.18	---	PASS
BLE_1M	Ant1	2440	30~1000	-1.18	-71.77	≤-21.18	PASS
BLE_1M	Ant1	2440	1000~26500	-1.18	-50.1	≤-21.18	PASS
BLE_1M	Ant1	2480	0~Reference	-1.18	-1.18	---	PASS
BLE_1M	Ant1	2480	30~1000	-1.18	-70.95	≤-21.18	PASS
BLE_1M	Ant1	2480	1000~26500	-1.18	-49.76	≤-21.18	PASS
BLE_2M	Ant1	2402	0~Reference	-1.27	-1.27	---	PASS
BLE_2M	Ant1	2402	30~1000	-1.27	-72.39	≤-21.27	PASS
BLE_2M	Ant1	2402	1000~26500	-1.27	-50.01	≤-21.27	PASS
BLE_2M	Ant1	2440	0~Reference	-1.75	-1.75	---	PASS
BLE_2M	Ant1	2440	30~1000	-1.75	-72.5	≤-21.75	PASS
BLE_2M	Ant1	2440	1000~26500	-1.75	-49.71	≤-21.75	PASS
BLE_2M	Ant1	2480	0~Reference	-1.54	-1.54	---	PASS
BLE_2M	Ant1	2480	30~1000	-1.54	-72.01	≤-21.54	PASS
BLE_2M	Ant1	2480	1000~26500	-1.54	-49.98	≤-21.54	PASS



Test Graphs





The screenshot displays the Spectrum Analyzer 1 interface. The main plot shows a signal spectrum with a peak at 2.439991 GHz and -1.17 dBm. The interface includes various control panels for settings, span, frequency, and signal tracking.

Top Panel:

- Spectrum Analyzer 1** (Sweep SA)
- KEYSIGHT** (Input: RF, Coupling: DC, Align: Auto)
- Input Z:** 50 Ω
- Attenuation:** 30 dB
- Preamp:** Off
- Bandwidth:** PNO: Best Wide, Gate: Off
- IF Gain:** Low
- Sig Track:** Off
- Avg Type:** Power (RMS)
- Avg Hold:** 10/10
- Trig:** Free Run
- Marker 1:** 2.439 991 GHz, -1.17 dBm

Right Panel (Settings):

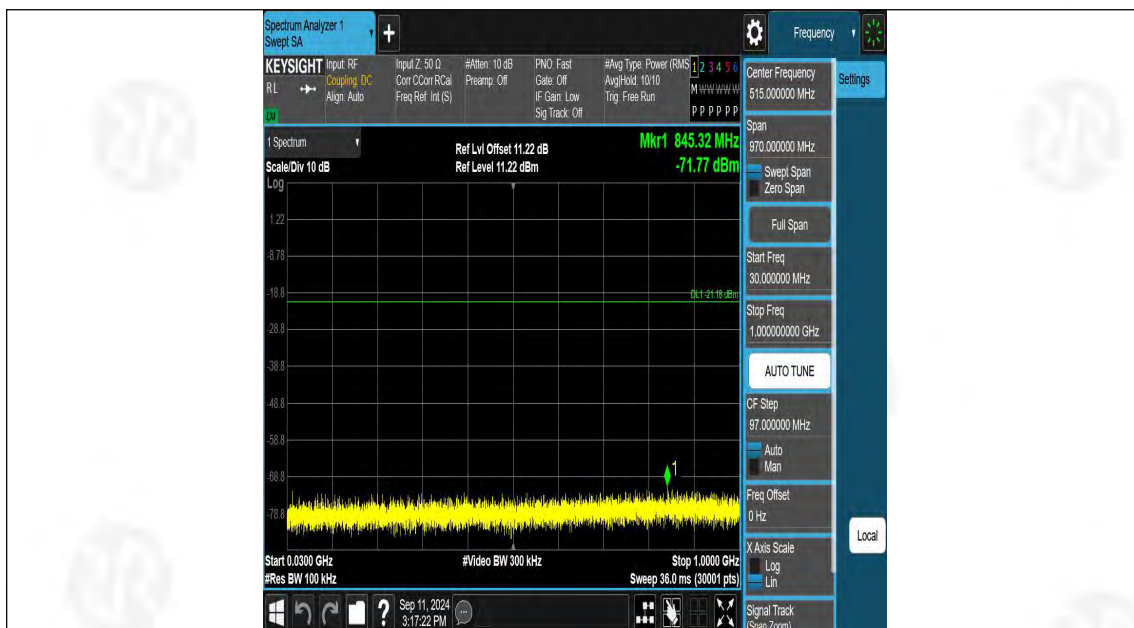
- Center Frequency:** 2.44000000 GHz
- Span:** 3.00000000 MHz
- Sweep Span:** Zero Span
- Full Span:** (Button)
- Start Freq:** 2.438500000 GHz
- Stop Freq:** 2.441500000 GHz
- AUTO TUNE:** (Button)
- CF Step:** 300.000 kHz
- Auto Man:** (Buttons)
- Freq Offset:** 0 Hz
- X Axis Scale:** Log (selected), Lin
- Signal Track:** (Span Zoom)

Bottom Panel:

- Center:** 2.440000 GHz
- #Res BW:** 100 kHz
- #Video BW:** 300 kHz
- Sweep:** -5.42 ms (1001 pts)
- Scale/Div:** 10 dB
- Ref Lvl Offset:** 11.22 dB
- Ref Level:** 30.00 dBm
- Log:** (Button)
- Local:** (Button)

Bottom Bar:

- Windows taskbar icons (Start, Back, Forward, Home, Search, Task View, etc.)
- Date and Time: Sep 11, 2024, 3:17:19 PM
- System tray icons (Network, Volume, etc.)



BLE_1M-Ant1-2440-30~1000-PASS



BLE_1M-Ant1-2440-1000~26500-PASS

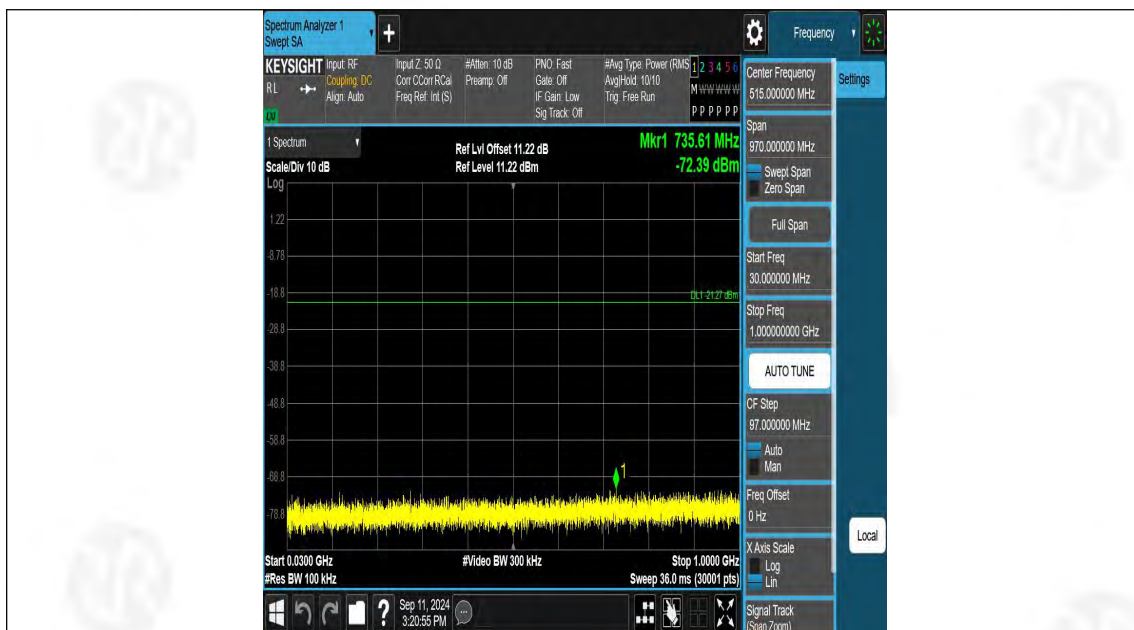


BLE_1M-Ant1-2480-0~Reference-PASS



BLE_1M-Ant1-2480-30~1000-PASS





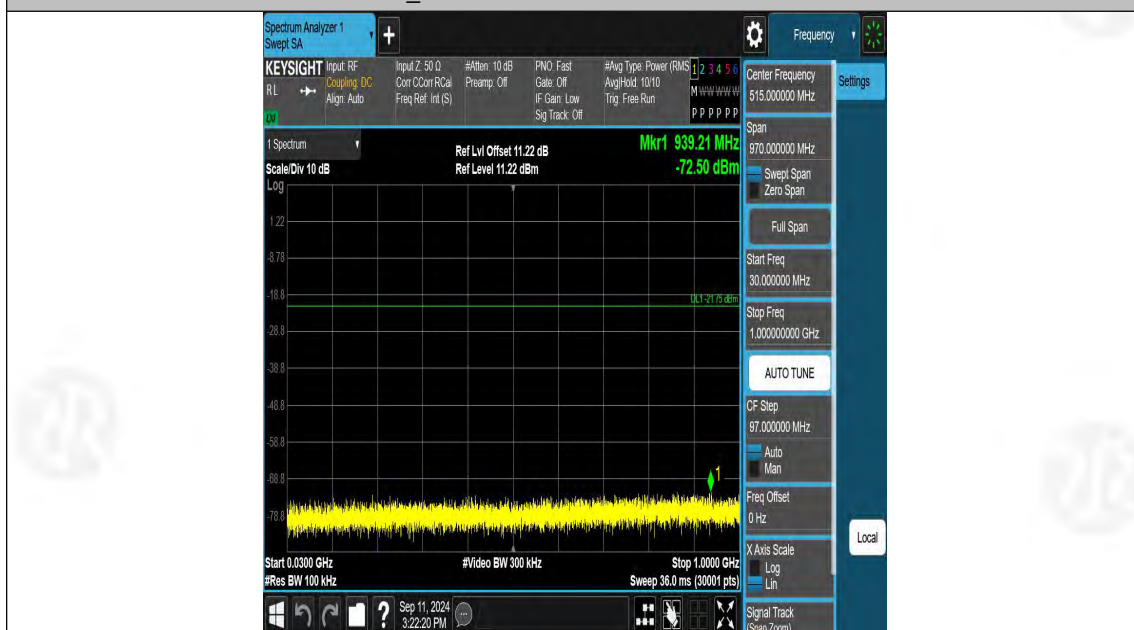
BLE_2M-Ant1-2402-30~1000-PASS



BLE_2M-Ant1-2402-1000~26500-PASS



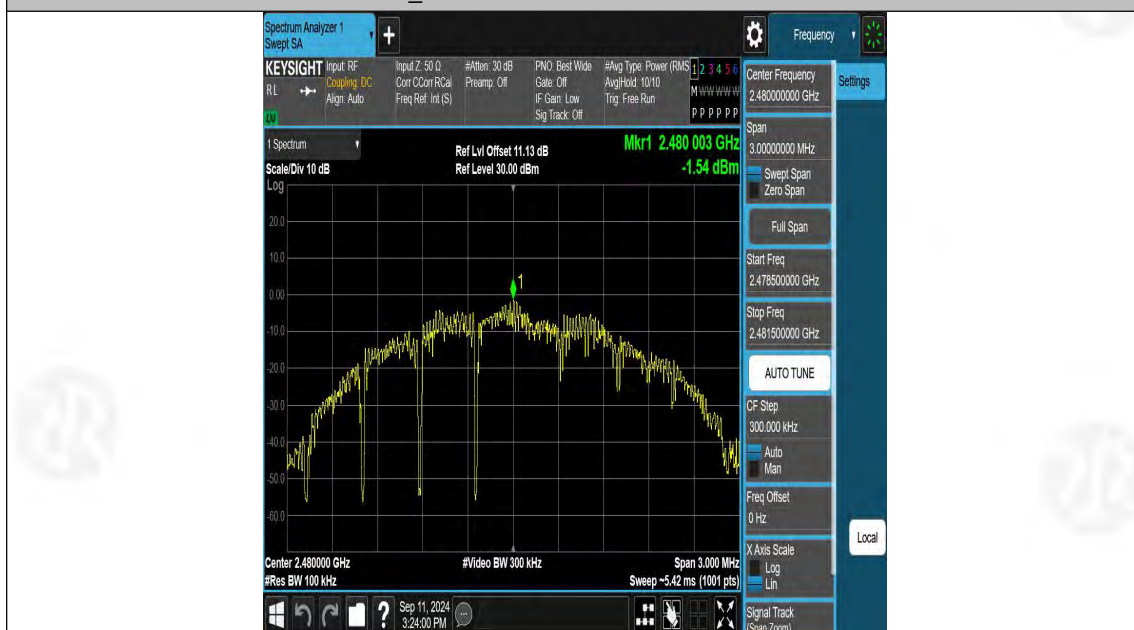
BLE_2M-Ant1-2440-0~Reference-PASS



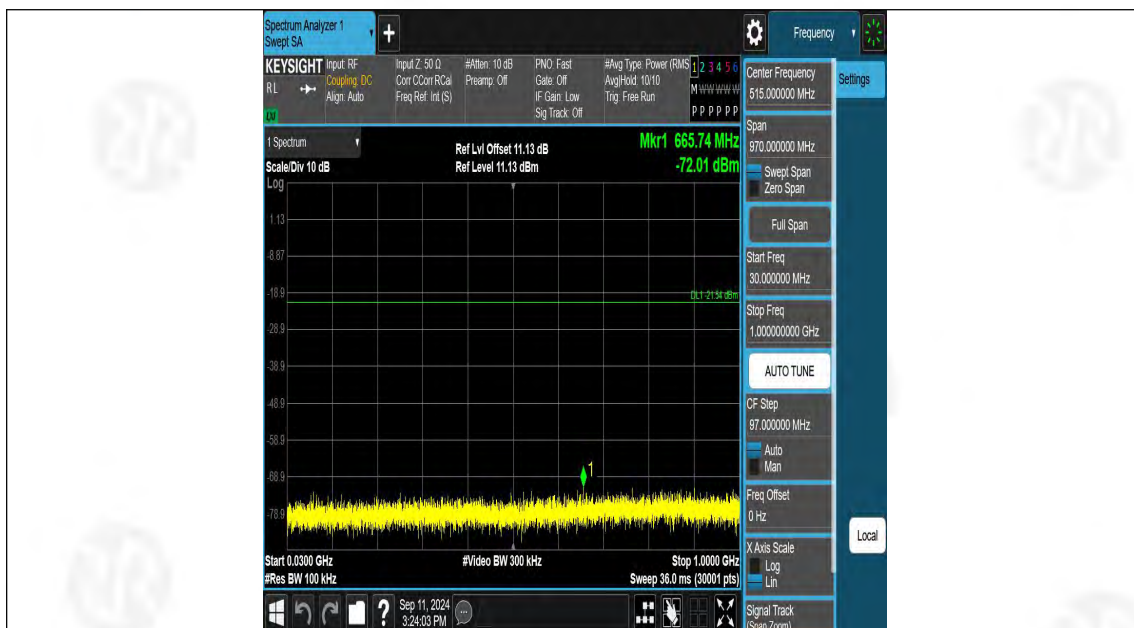
BLE_2M-Ant1-2440-30~1000-PASS



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 H: Duty Cycle

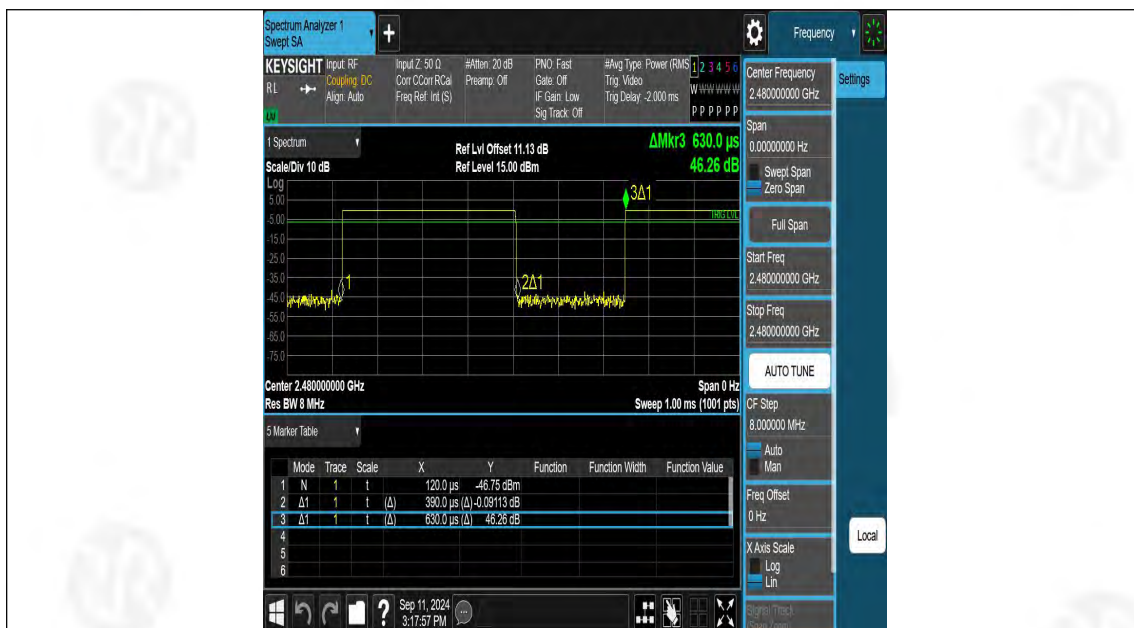
Test Result

TestMode	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	0.39	0.63	61.90	2.08
BLE_1M	Ant1	2480	0.39	0.63	61.90	2.08
BLE_2M	Ant1	2402	0.20	0.63	31.75	4.98
BLE_2M	Ant1	2440	0.20	0.63	31.75	4.98
BLE_2M	Ant1	2480	0.20	0.63	31.75	4.98

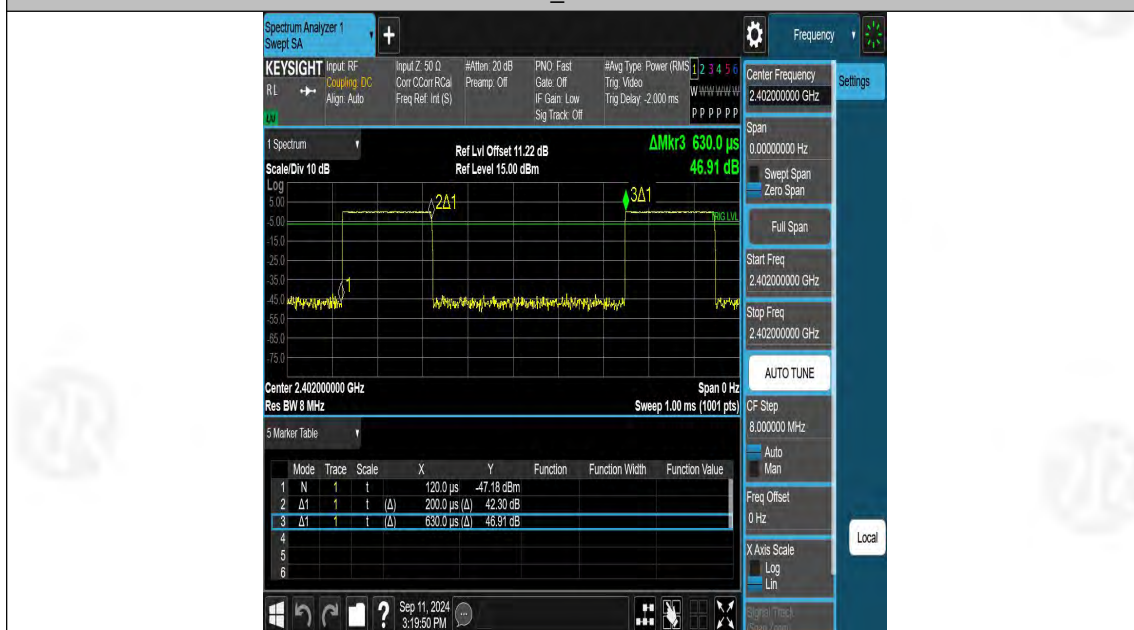


Test Graphs

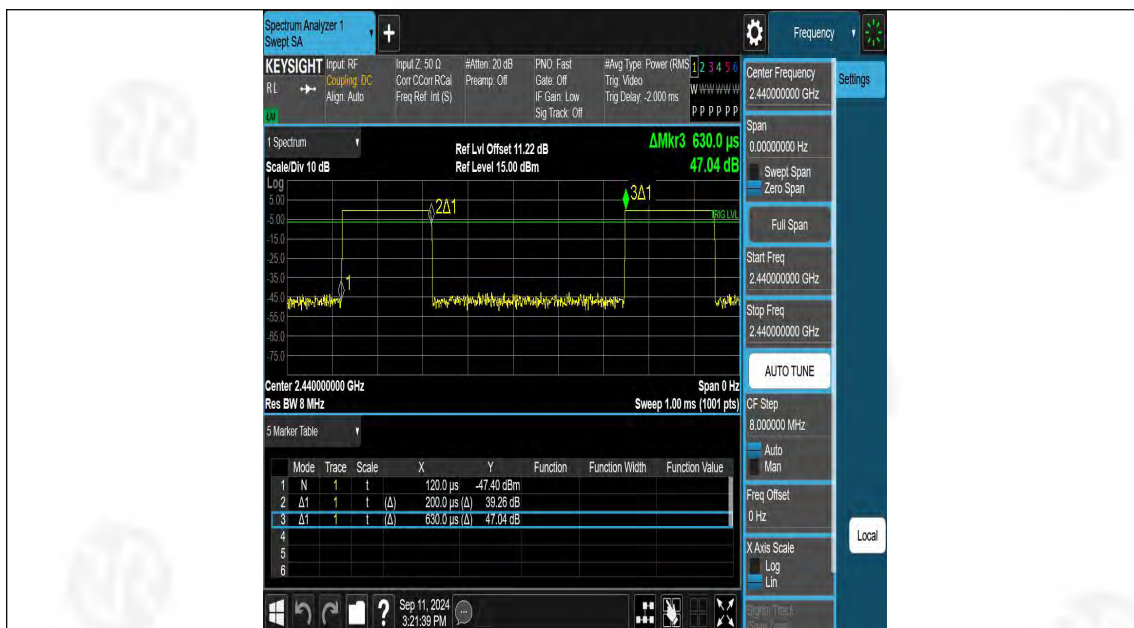




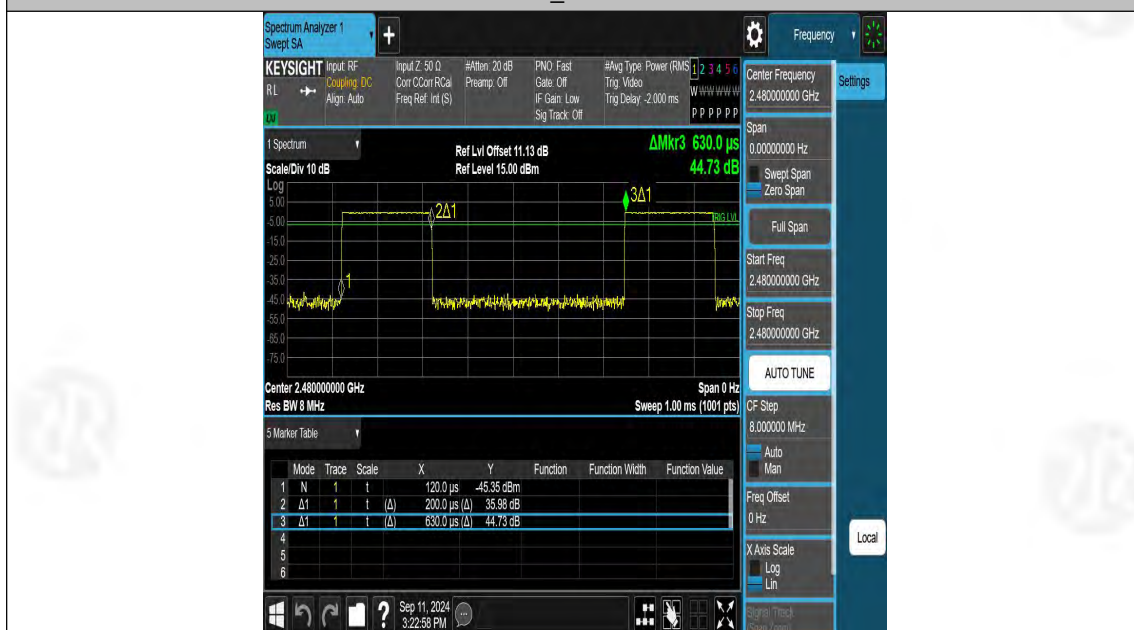
NTNV-BLE_1M-Ant1-2480



NTNV-BLE_2M-Ant1-2402



NTNV-BLE_2M-Ant1-2440



NTNV-BLE_2M-Ant1-2480