APPENDIX C: TEST RESULTS OF BLUETOOTH (LOW ENERGY)

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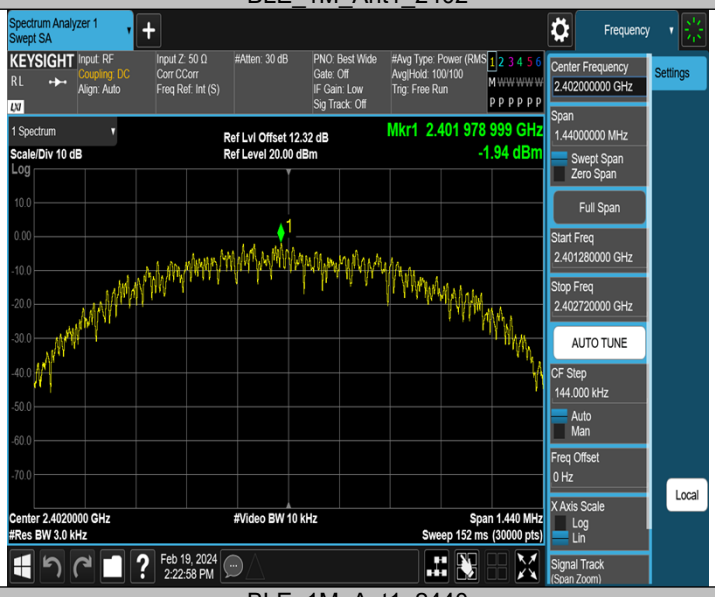
APPENDIX C.1: CONDUCTED POWER SPECTRAL DENSITY

Test Result

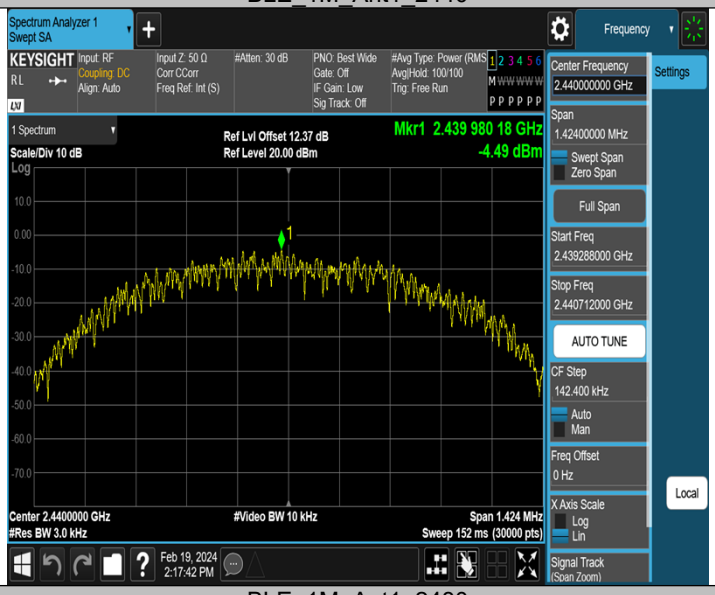
TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-1.94	≤8.00	PASS
		2440	-4.49	≤8.00	PASS
		2480	-2.68	≤8.00	PASS
BLE_2M	Ant1	2402	-4.59	≤8.00	PASS
		2440	-4.97	≤8.00	PASS
		2480	-5.35	≤8.00	PASS
BLE_125K	Ant1	2402	3.24	≤8.00	PASS
		2440	3.08	≤8.00	PASS
		2480	2.91	≤8.00	PASS
BLE_500K	Ant1	2402	3.04	≤8.00	PASS
		2440	2.91	≤8.00	PASS
		2480	2.67	≤8.00	PASS

Test Graphs

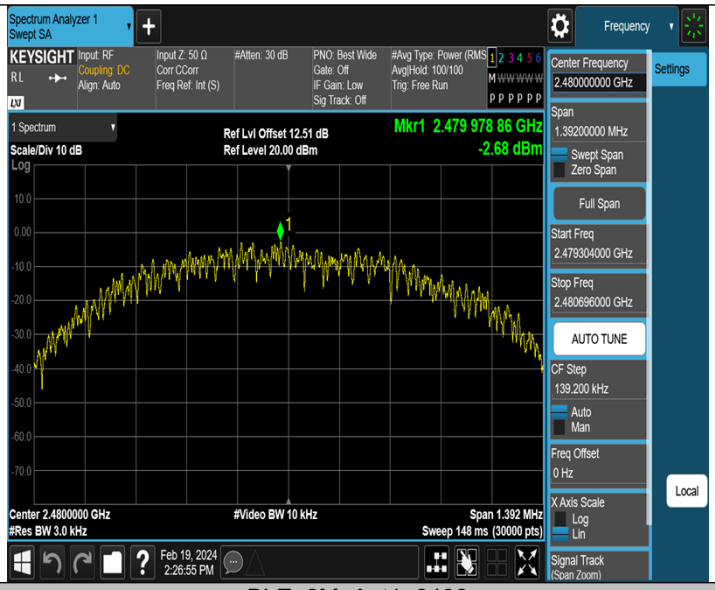
BLE_1M_Ant1_2402



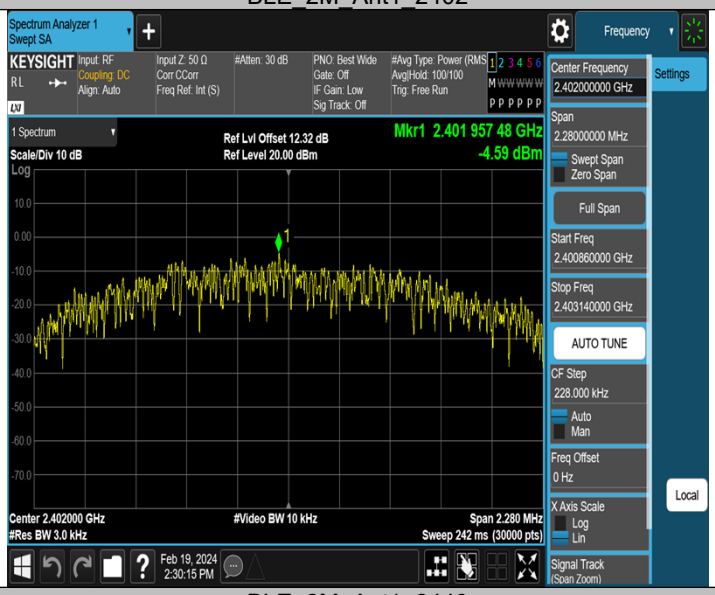
BLE_1M_Ant1_2440



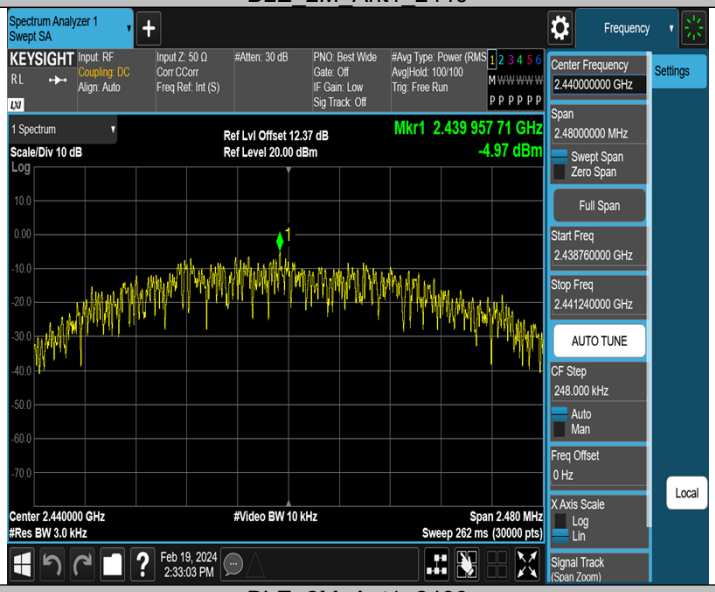
BLE_1M_Ant1_2480



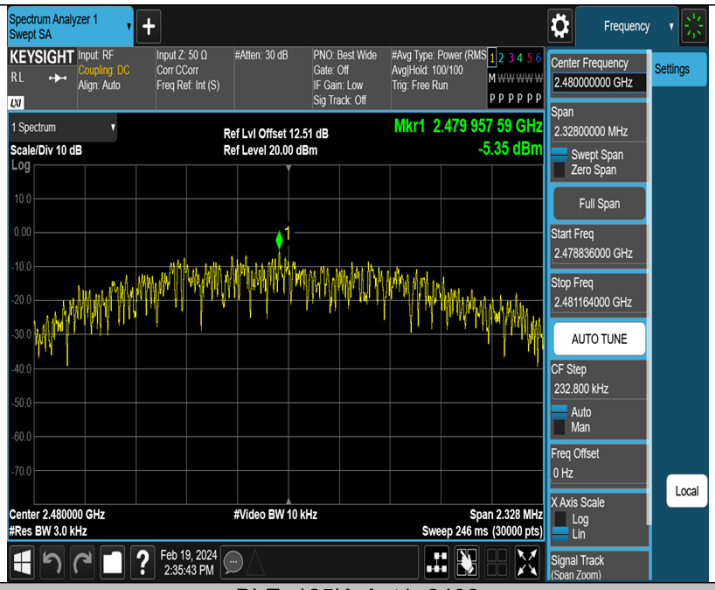
BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



BLE_2M_Ant1_2480

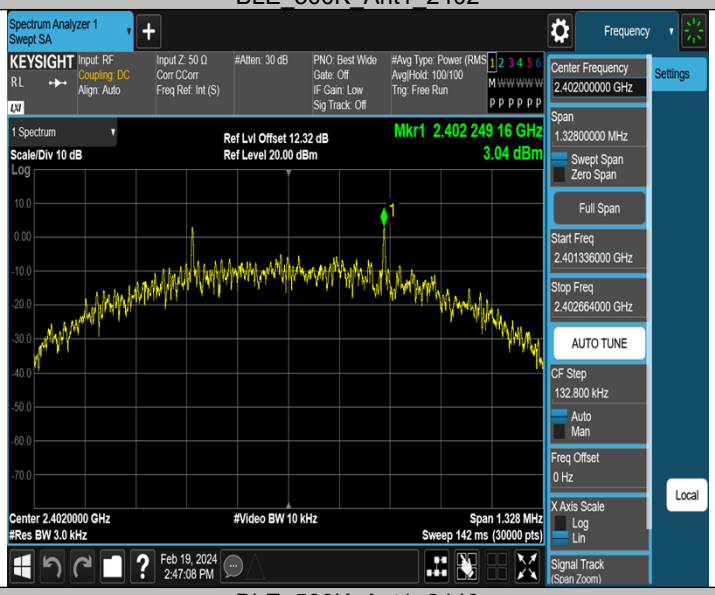


BLE_125K_Ant1_2402

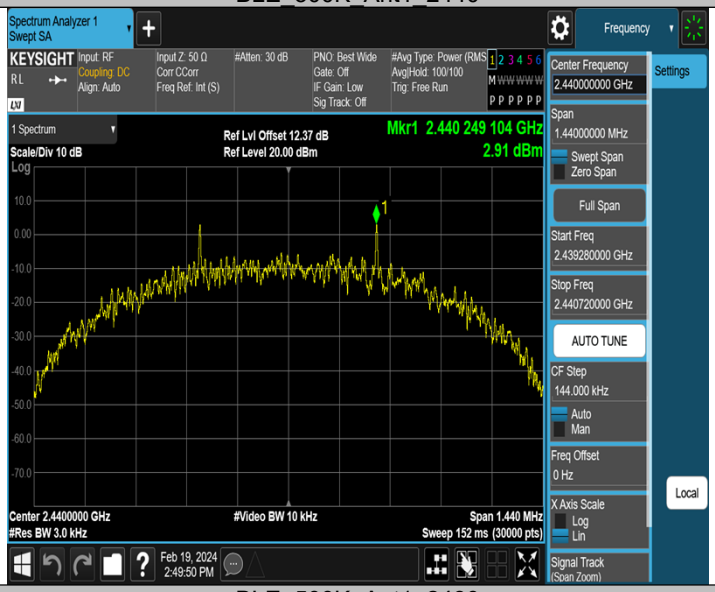
BLE_125K_Ant1_2440

BLE_125K_Ant1_2480

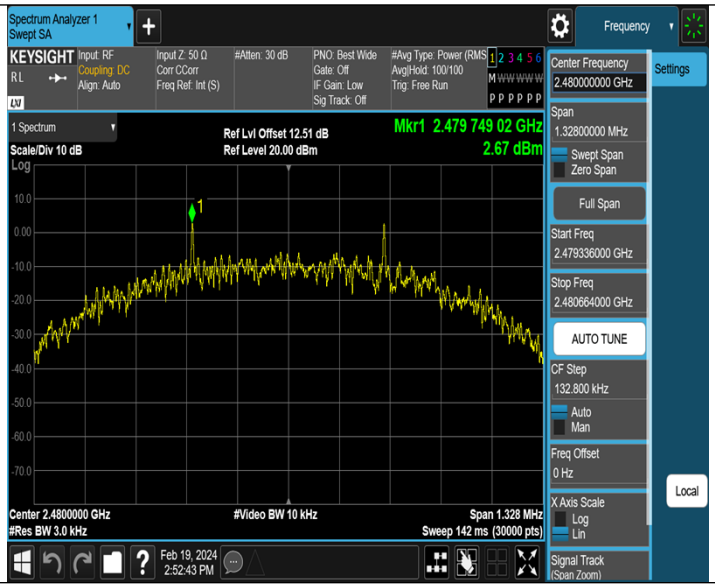
BLE_500K_Ant1_2402



BLE_500K_Ant1_2440



BLE_500K_Ant1_2480


Spectrum Analyzer 1
Swept SA
KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
PNO: Best Wide
Gate: Off
IF Gain: Low
Sig Track: Off
#Avg Type: Power (RMS)
Avg|Hold: 100/100
Trig: Free Run
1 Spectrum
Scale/Div 10 dB
Ref Lvl Offset 12.51 dB
Ref Level 20.00 dBm
Mkr1 2.479 749 02 GHz
2.67 dBm
Center 2.4800000 GHz
#Res BW 3.0 kHz
#Video BW 10 kHz
Span 1.328 MHz
Sweep 142 ms (30000 pts)
Feb 19, 2024
2:52:43 PM
Frequency
Settings
Center Frequency
2.480000000 GHz
Span
1.32800000 MHz
Swept Span
Zero Span
Full Span
Start Freq
2.479336000 GHz
Stop Freq
2.480664000 GHz
AUTO TUNE
CF Step
132.800 kHz
Auto
Man
Freq Offset
0 Hz
X Axis Scale
Log
Lin
Signal Track
(Span Zoom)
Local

APPENDIX C.2: 6DB BANDWIDTH

Test Result

TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.720	2401.640	2402.360	0.5	PASS
		2440	0.712	2439.640	2440.352	0.5	PASS
		2480	0.696	2479.652	2480.348	0.5	PASS
BLE_2M	Ant1	2402	1.140	2401.420	2402.560	0.5	PASS
		2440	1.240	2439.360	2440.600	0.5	PASS
		2480	1.164	2479.420	2480.584	0.5	PASS
BLE_125K	Ant1	2402	0.692	2401.660	2402.352	0.5	PASS
		2440	0.688	2439.660	2440.348	0.5	PASS
		2480	0.692	2479.660	2480.352	0.5	PASS
BLE_500K	Ant1	2402	0.664	2401.676	2402.340	0.5	PASS
		2440	0.720	2439.640	2440.360	0.5	PASS
		2480	0.664	2479.676	2480.340	0.5	PASS

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

BLE_125K_Ant1_2402

BLE_125K_Ant1_2440

BLE_125K_Ant1_2480

BLE_500K_Ant1_2402

BLE_500K_Ant1_2440

BLE_500K_Ant1_2480

Spectrum Analyzer 1
Swept SA
KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 40 dB
PNO: Best Wide
Gate: Off
IF Gain: Low
Sig Track: Off
#Avg Type: Power (RMS)
Avg|Hold: 100/100
Trig: Free Run
1 Spectrum
Scale/Div 10 dB
Ref Lvl Offset 12.51 dB
Ref Level 30.00 dBm
ΔMkr3 664 kHz
0.34 dB
Center 2.480000 GHz
#Res BW 100 kHz
#Video BW 300 kHz
Span 4.000 MHz
Sweep 1.00 ms (1001 pts)
5 Marker Table
Mode Trace Scale X Y Function Function Width Function Value
1 N 1 f 2.479 676 GHz 2.878 dBm
2 N 1 f 2.479 744 GHz 8.871 dBm
3 Δ1 1 f (Δ) 664 kHz (Δ) 0.3353 dB
Feb 19, 2024
2:11:20 PM
Frequency
Center Frequency
2.480000000 GHz
Settings
Span
4.00000000 MHz
Swept Span
Zero Span
Full Span
Start Freq
2.478000000 GHz
Stop Freq
2.482000000 GHz
AUTO TUNE
CF Step
400.000 kHz
Auto
Man
Freq Offset
0 Hz
X Axis Scale
Log
Lin
Signal Track
(Span Zoom)
Local

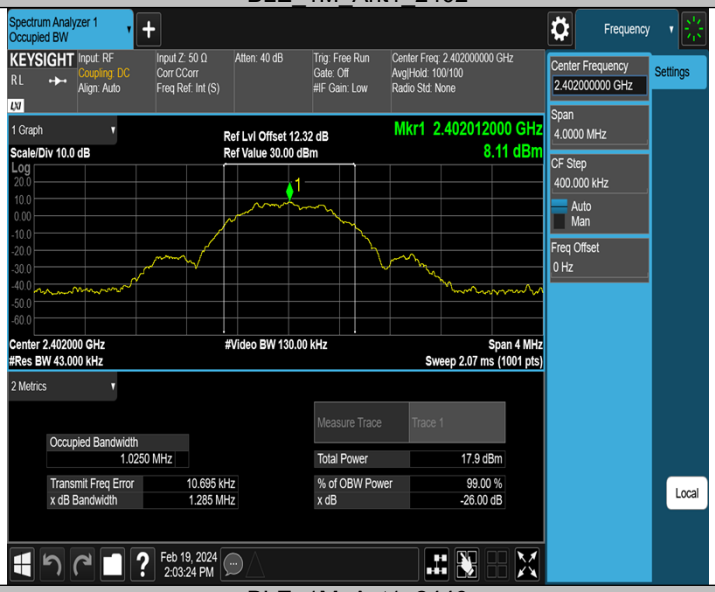
APPENDIX C.3: 99% BANDWIDTH

Test Result

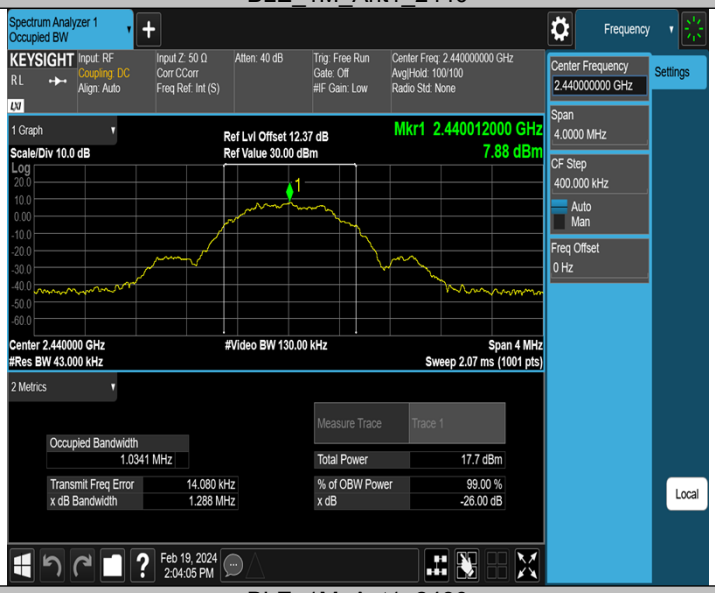
TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	1.0250	2401.4982	2402.5232	---	---
		2440	1.0341	2439.4970	2440.5311	---	---
		2480	1.0360	2479.4961	2480.5321	---	---
BLE_2M	Ant1	2402	2.0548	2400.9958	2403.0506	---	---
		2440	2.0711	2438.9903	2441.0614	---	---
		2480	2.0686	2480.9882	2481.0568	---	---
BLE_125K	Ant1	2402	1.0584	2401.4729	2402.5313	---	---
		2440	1.0531	2439.4759	2440.5290	---	---
		2480	1.0576	2479.4730	2480.5306	---	---
BLE_500K	Ant1	2402	1.0239	2401.4905	2402.5144	---	---
		2440	1.0225	2439.4965	2440.5190	---	---
		2480	1.0190	2479.4937	2480.5127	---	---

Test Graphs

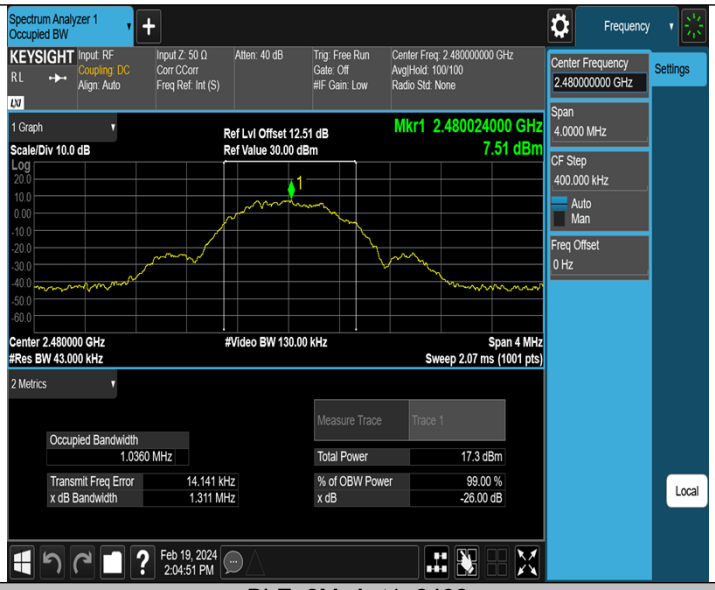
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



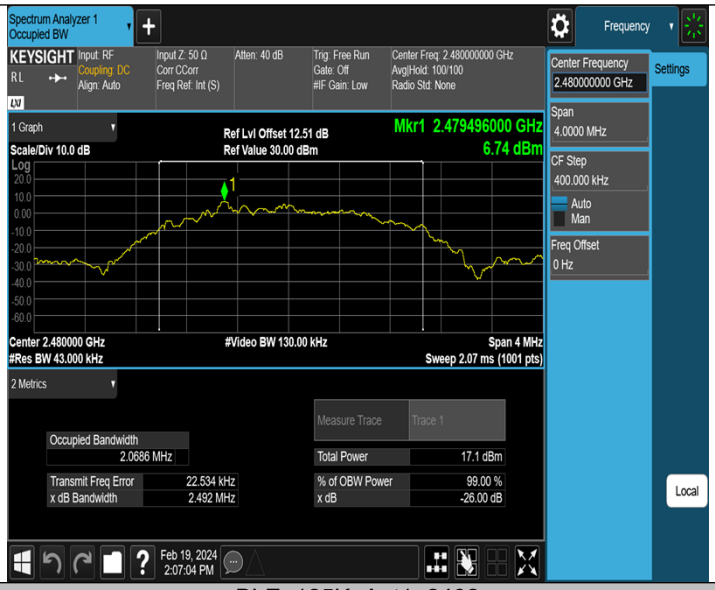
BLE_1M_Ant1_2480



BLE_2M_Ant1_2402

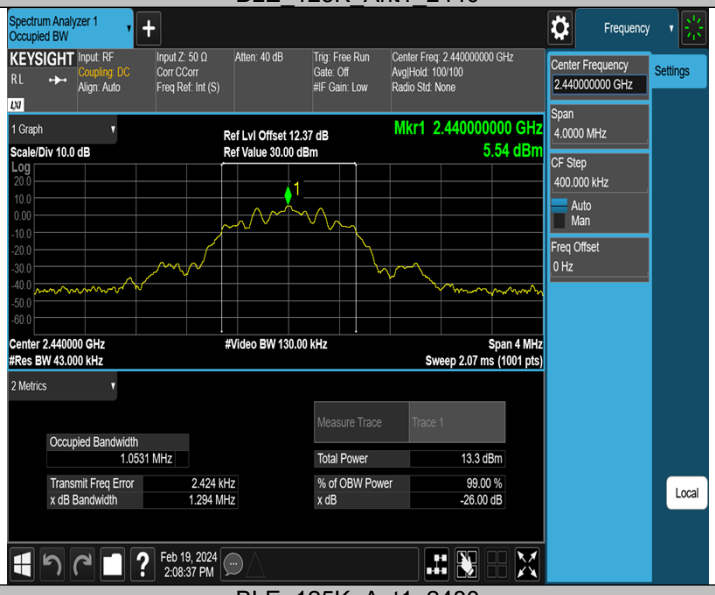
BLE_2M_Ant1_2440

BLE_2M_Ant1_2480

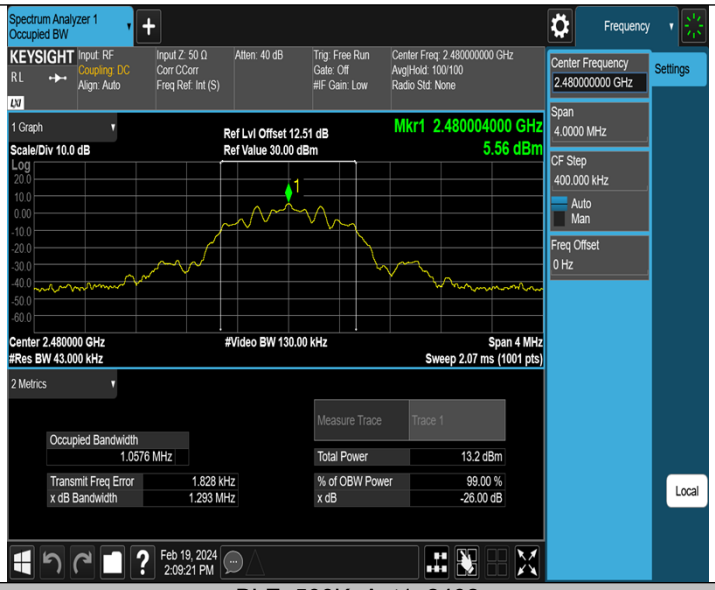


BLE_125K_Ant1_2402

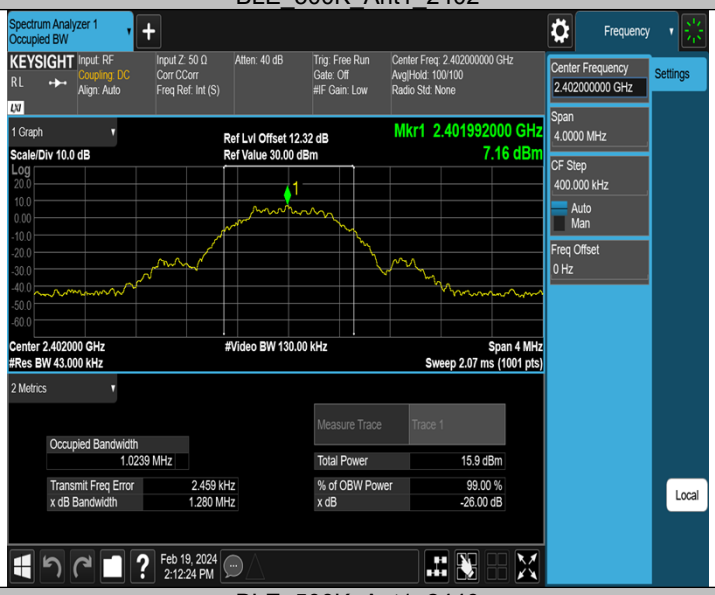
BLE_125K_Ant1_2440



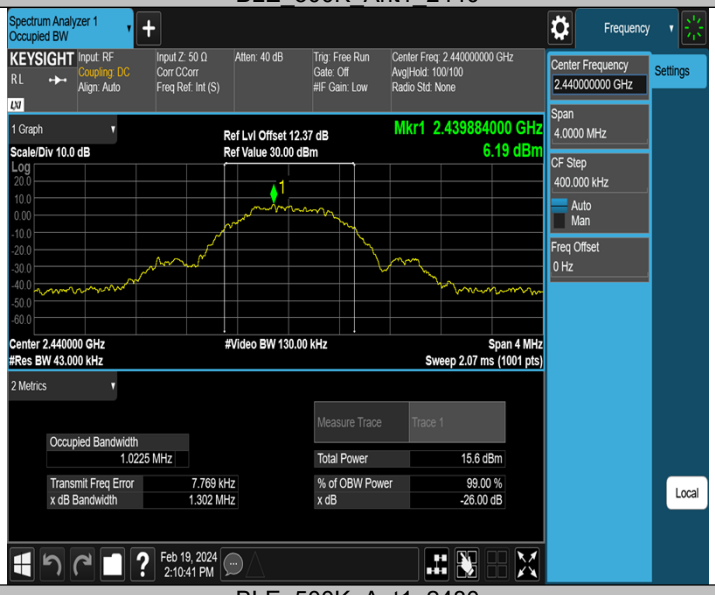
BLE_125K_Ant1_2480



BLE_500K_Ant1_2402



BLE_500K_Ant1_2440



BLE_500K_Ant1_2480