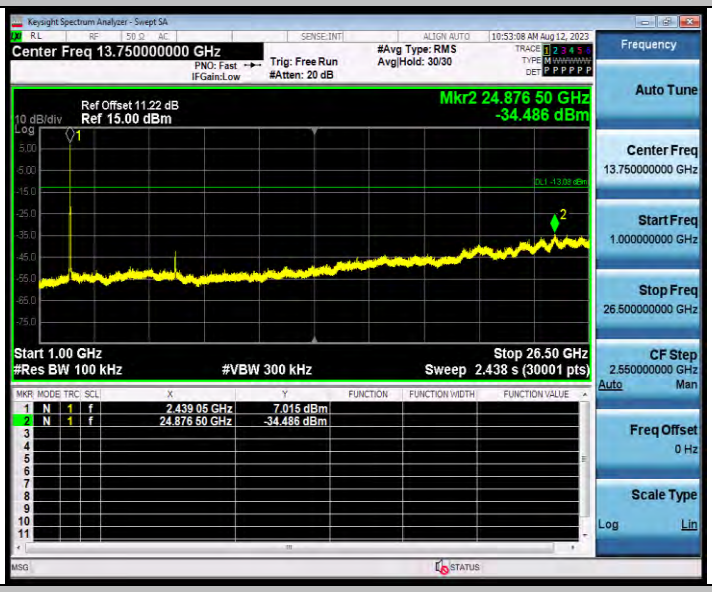
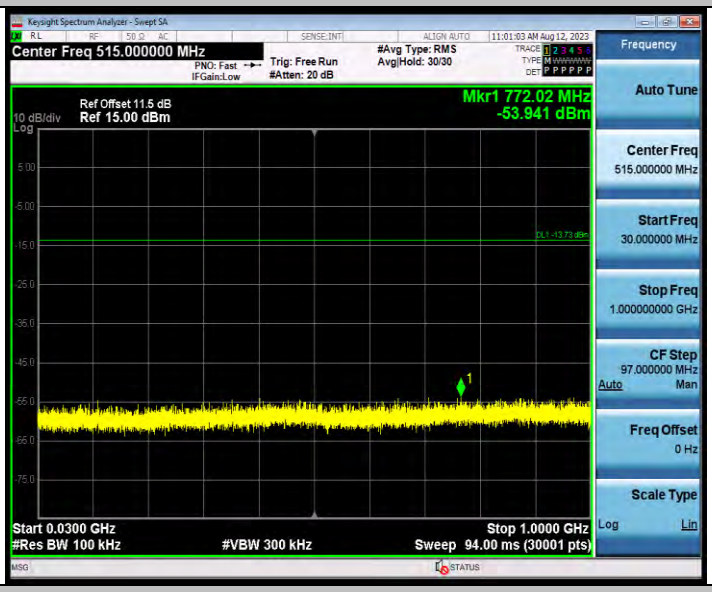
11N20SISO_Ant1_2437_1000~26500



11N20SISO_Ant1_2462_0~Reference

11N20SISO_Ant1_2462_30~1000



11N20SISO_Ant1_2462_1000~26500

Keysight Spectrum Analyzer - Swept SA
Center Freq 13.750000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
Avg|Hold: 30/30
11:02:26 AM Aug 12, 2023
Ref Offset 11.5 dB
10 dB/div
Ref 15.00 dBm
Log
Mkr2 24.857 80 GHz
-33.917 dBm
Start 1.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.50 GHz
Sweep 2.438 s (30001 pts)
1 N 1 f 2.462 85 GHz 5.930 dBm
2 N 1 f 24.857 80 GHz -33.917 dBm
Frequency
Auto Tune
Center Freq
13.750000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
26.500000000 GHz
CF Step
2.550000000 GHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

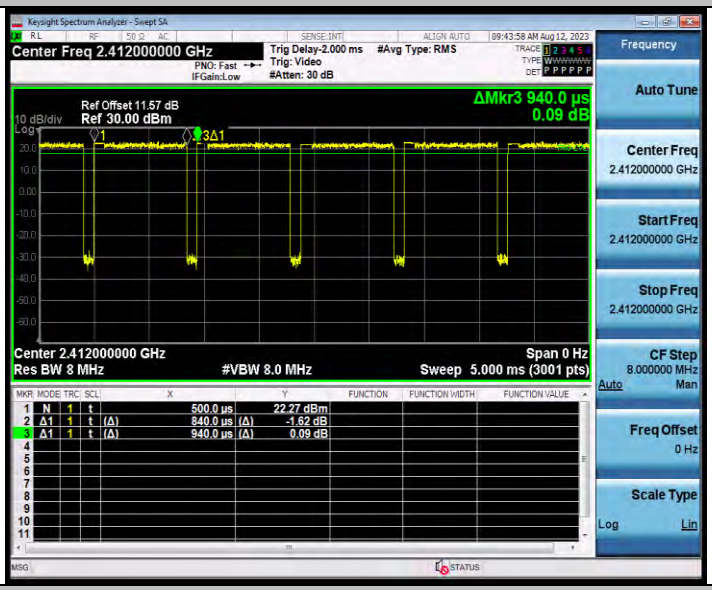
DUTY CYCLE

TEST RESULT

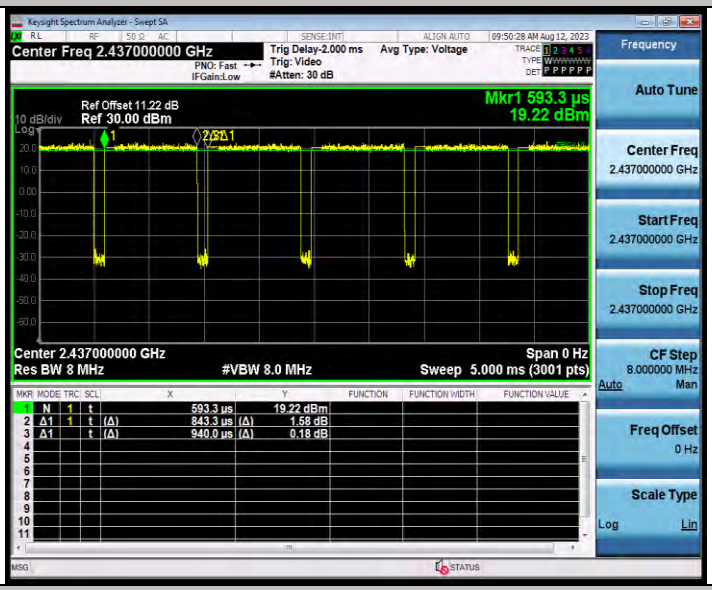
TestMode	Antenna	Frequency[MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	Factor
11B	Ant1	2412	0.84	0.94	89.36	0.49
		2437	0.85	0.94	90.43	0.44
		2462	0.85	0.94	90.43	0.44
11G	Ant1	2412	0.18	0.28	64.29	1.92
		2437	0.17	0.27	62.96	2.01
		2462	0.17	0.27	62.96	2.01
11N20SISO	Ant1	2412	0.16	0.27	59.26	2.27
		2437	0.17	0.27	62.96	2.01
		2462	0.16	0.26	61.54	2.11

TEST GRAPHS

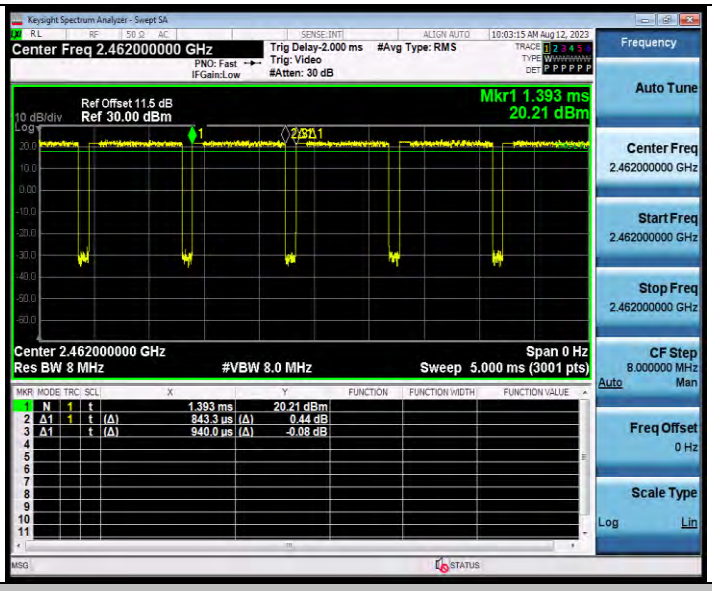
11B_Ant1_2412



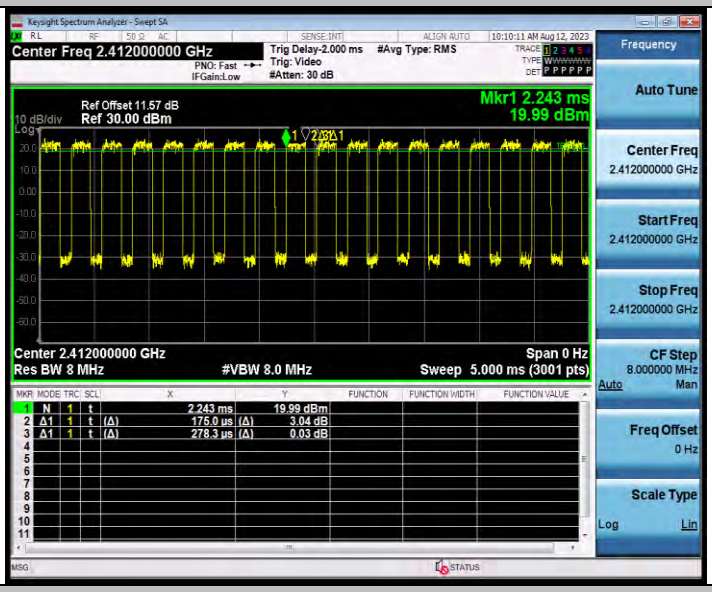
11B_Ant1_2437



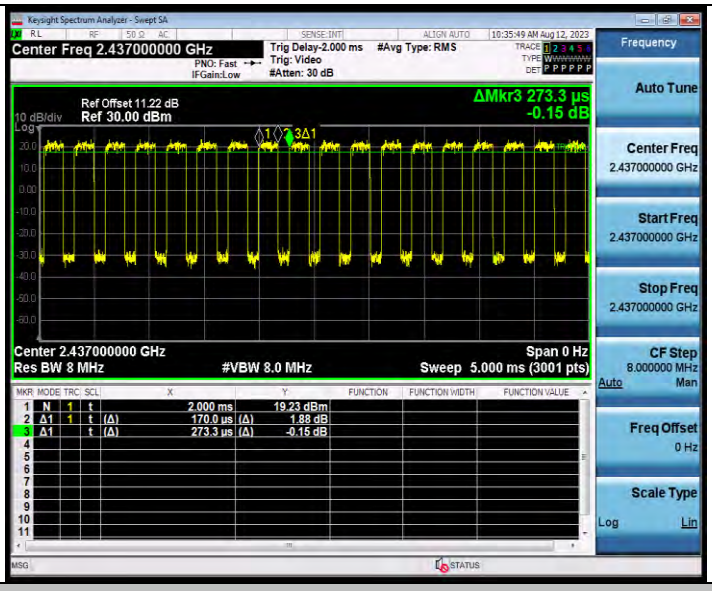
11B_Ant1_2462



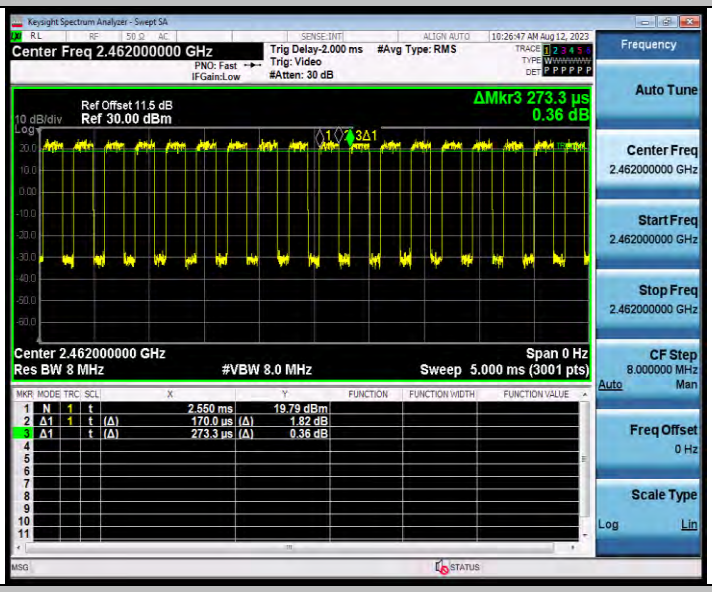
11G_Ant1_2412



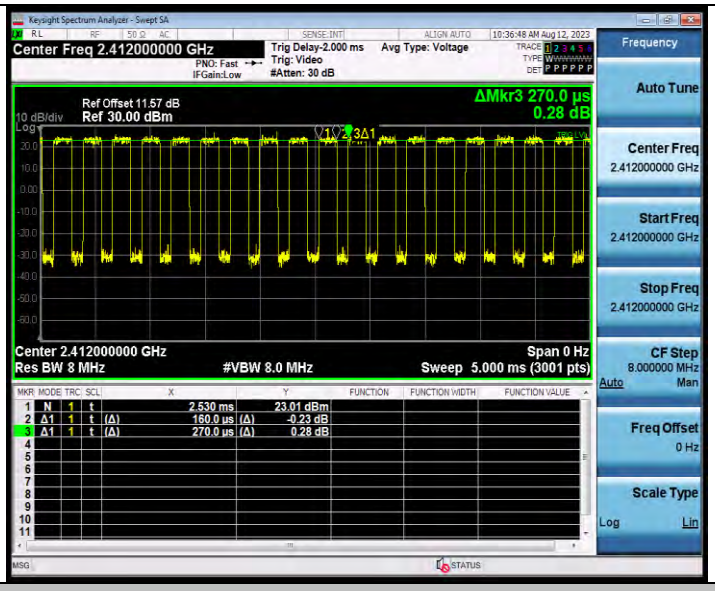
11G_Ant1_2437



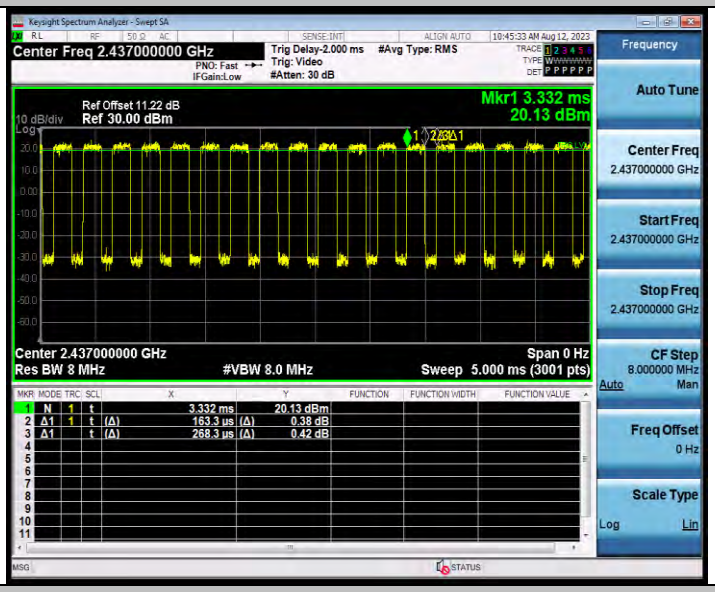
11G_Ant1_2462



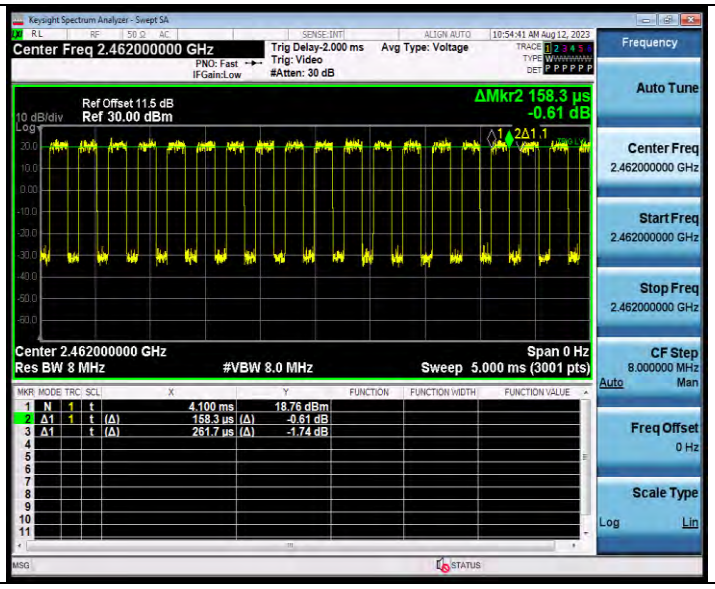
11N20SISO_Ant1_2412



11N20SISO_Ant1_2437



11N20SISO_Ant1_2462


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.462000000 GHz
Trig Delay-2.000 ms
Trig: Video
#Atten: 30 dB
Avg Type: Voltage
10:54:41 AM Aug 12, 2023
Ref Offset 11.5 dB
10 dB/div
Ref 30.00 dBm
ΔMkr2 158.3 µs
-0.61 dB
Center 2.462000000 GHz
Res BW 8 MHz
#VBW 8.0 MHz
Span 0 Hz
Sweep 5.000 ms (3001 pts)
1 N 1 t 4.100 ms 18.76 dBm
2 Δ1 1 t (Δ) 158.3 µs (Δ) -0.61 dB
3 Δ1 t (Δ) 261.7 µs (Δ) -1.74 dB
Frequency
Auto Tune
Center Freq
2.462000000 GHz
Start Freq
2.462000000 GHz
Stop Freq
2.462000000 GHz
CF Step
8.000000 MHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

7 APPENDIX 2 : BLE

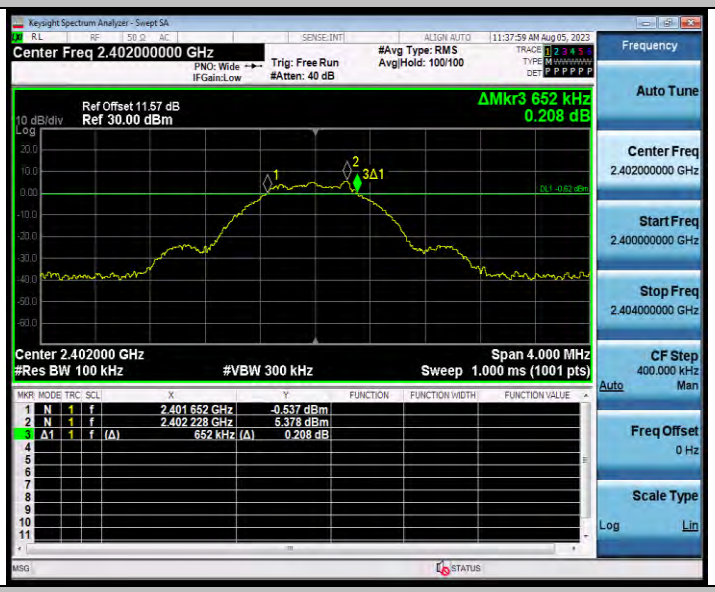
DTS BANDWIDTH

TEST RESULT

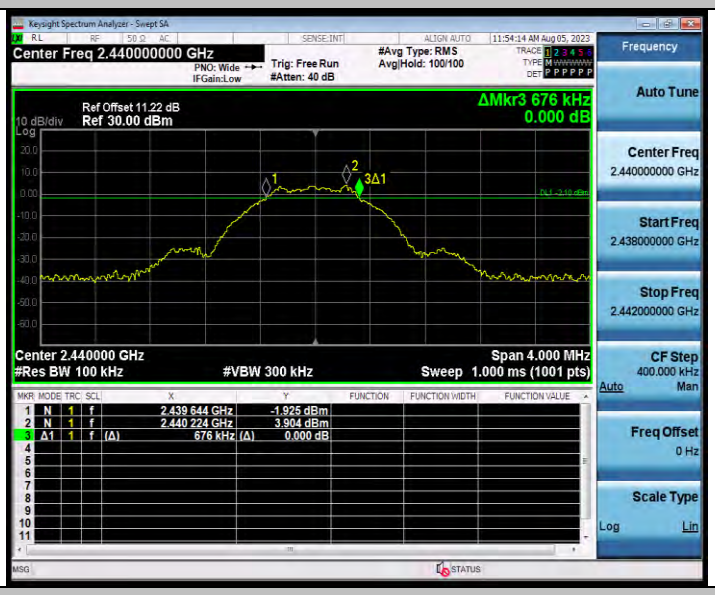
TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.652	2401.652	2402.304	0.5	PASS
		2440	0.676	2439.644	2440.320	0.5	PASS
		2480	0.644	2479.676	2480.320	0.5	PASS
BLE_2M	Ant1	2404	1.180	2403.364	2404.544	0.5	PASS
		2440	1.076	2439.448	2440.524	0.5	PASS
		2478	1.084	2477.444	2478.528	0.5	PASS

TEST GRAPHS

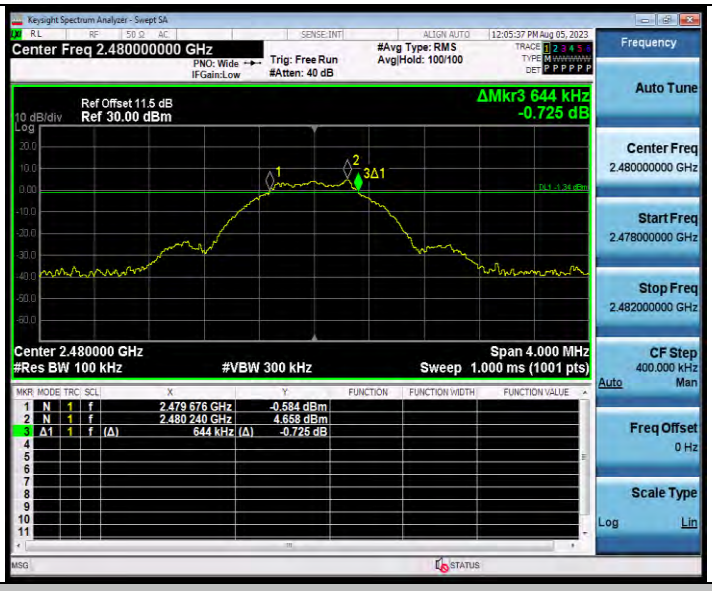
BLE_1M_Ant1_2402



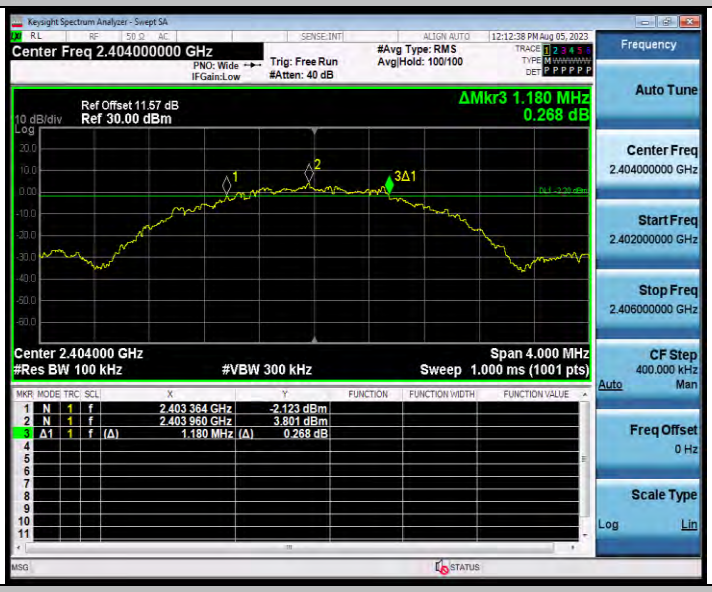
BLE_1M_Ant1_2440



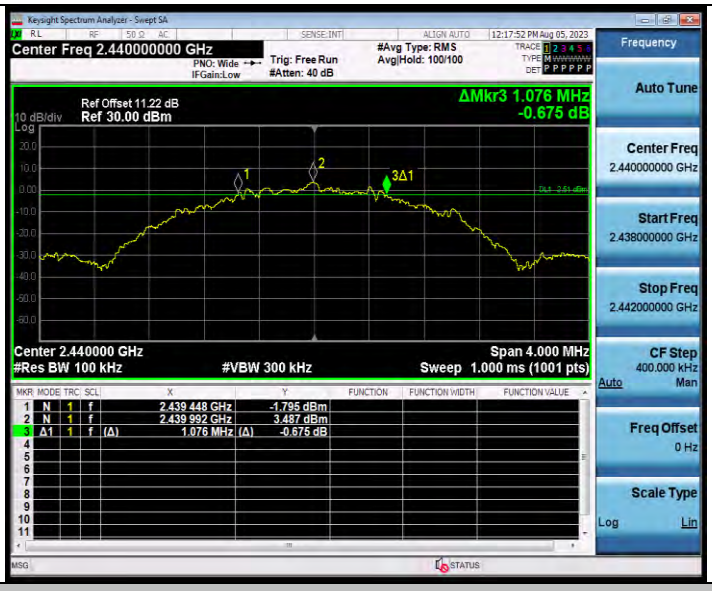
BLE_1M_Ant1_2480



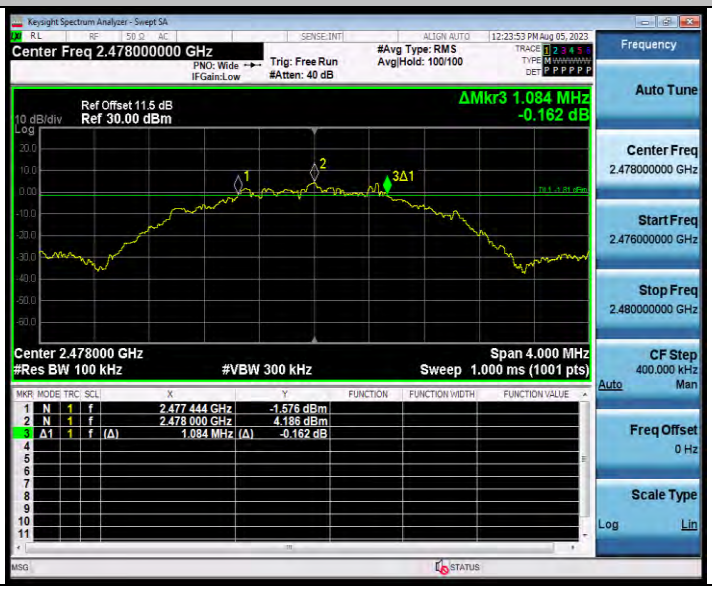
BLE_2M_Ant1_2404



BLE_2M_Ant1_2440



BLE_2M_Ant1_2478



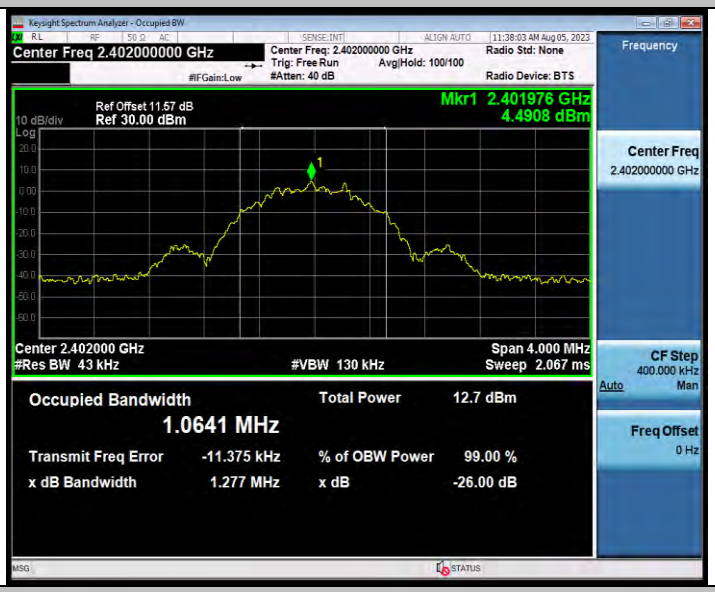
OCCUPIED CHANNEL BANDWIDTH

TEST RESULT

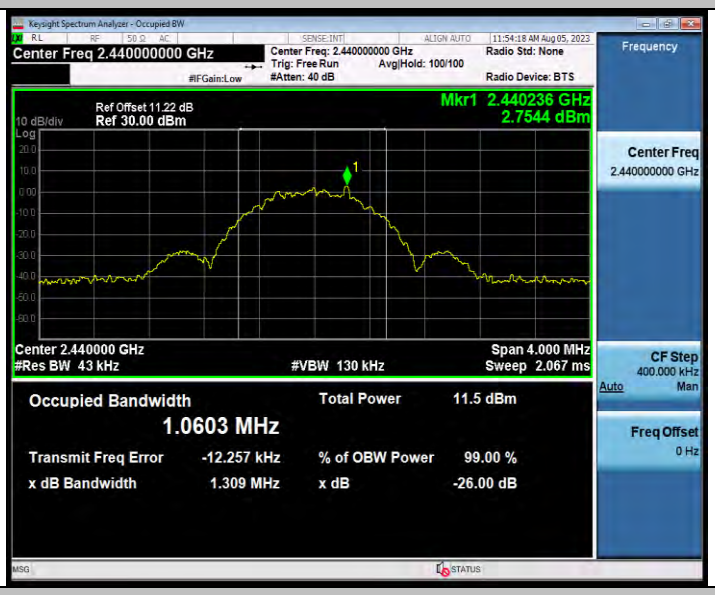
TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	1.0641	2401.4566	2402.5207	---	---
		2440	1.0603	2439.4576	2440.5179	---	---
		2480	1.0731	2479.4569	2480.5300	---	---
BLE_2M	Ant1	2404	2.1105	2402.9405	2405.0510	---	---
		2440	2.1237	2438.9388	2441.0625	---	---
		2478	2.1045	2476.9550	2479.0595	---	---

TEST GRAPHS

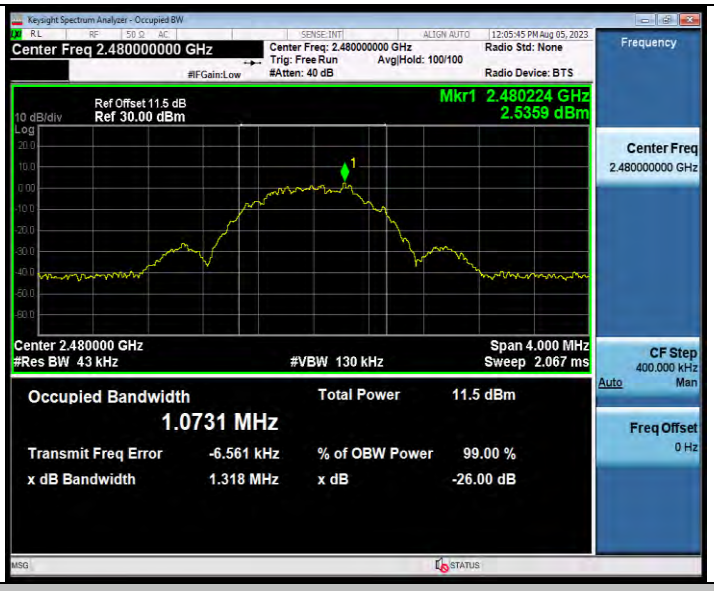
BLE_1M_Ant1_2402



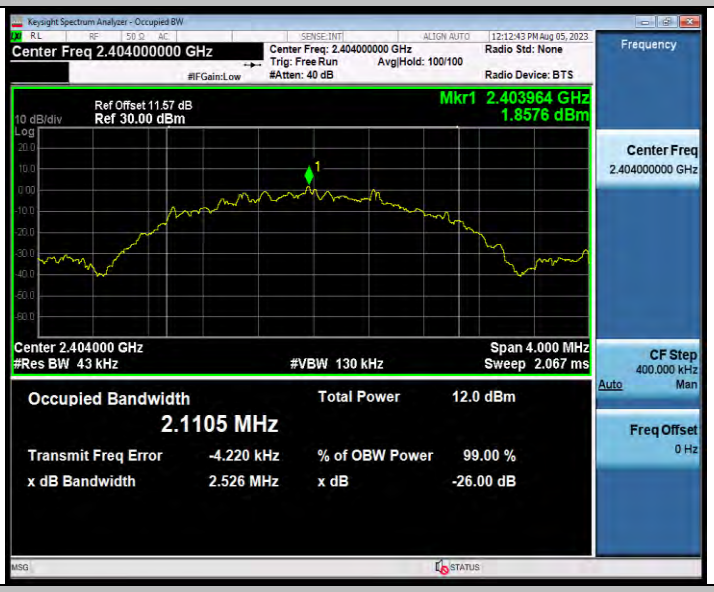
BLE_1M_Ant1_2440



BLE_1M_Ant1_2480



BLE_2M_Ant1_2404



BLE_2M_Ant1_2440

BLE_2M_Ant1_2478

MAXIMUM CONDUCTED OUTPUT POWER

TEST RESULT

Test Mode	Antenna	Channel	Average power [dBm]	Peak power [dBm]	Peak power [mw]	Conducted Limit [dBm]	EIRP [dBm]	EIRP [mw]	EIRP Limit [dBm]	Verdict	Power Setting
BLE_1M	Ant1	2402	3.74	4.42	2.77	≤30	5.49	3.54	≤36	PASS	Default
		2440	3.80	4.29	2.69	≤30	5.36	3.44	≤36	PASS	Default
		2480	3.86	4.33	2.71	≤30	5.40	3.47	≤36	PASS	Default
BLE_2M	Ant1	2402	4.44	4.69	2.94	≤30	5.76	3.77	≤36	PASS	Default
		2440	4.48	4.72	**2.96**	≤30	5.79	**3.79**	≤36	PASS	Default
		2480	4.33	4.63	2.90	≤30	5.70	3.72	≤36	PASS	Default
Note: EIRP= Peak Power + Gain											

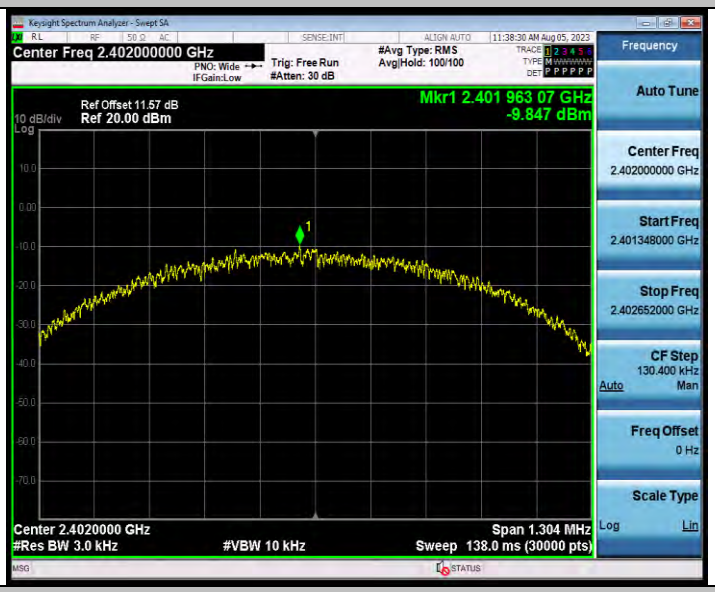
MAXIMUM POWER SPECTRAL DENSITY

TEST RESULT

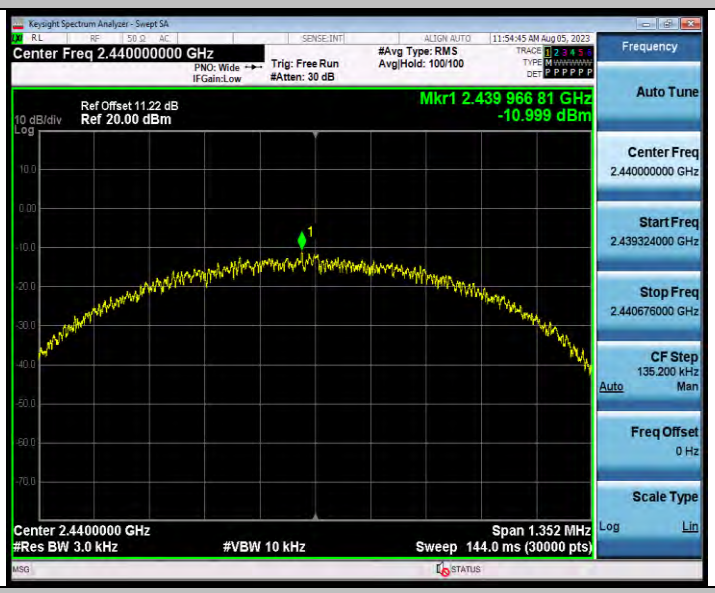
TestMode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-9.85	≤8.00	PASS
		2440	-11	≤8.00	PASS
		2480	-10.47	≤8.00	PASS
BLE_2M	Ant1	2404	-10.81	≤8.00	PASS
		2440	-12.23	≤8.00	PASS
		2478	-11.42	≤8.00	PASS

TEST GRAPHS

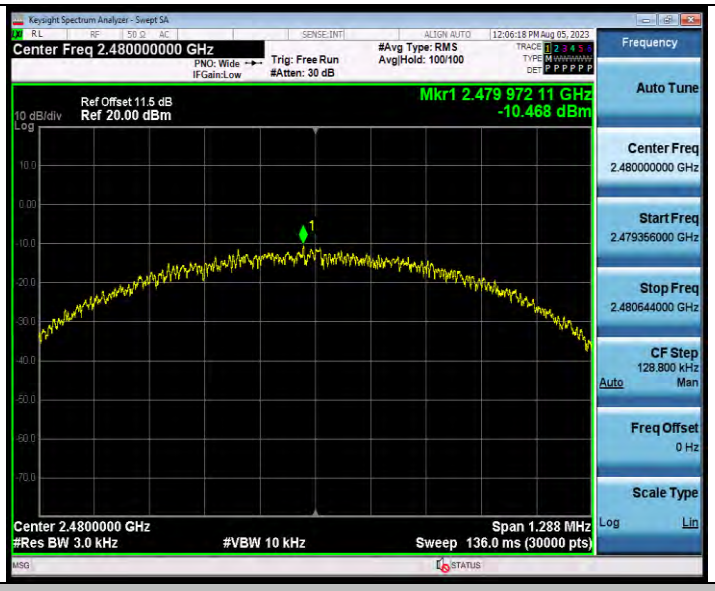
BLE_1M_Ant1_2402



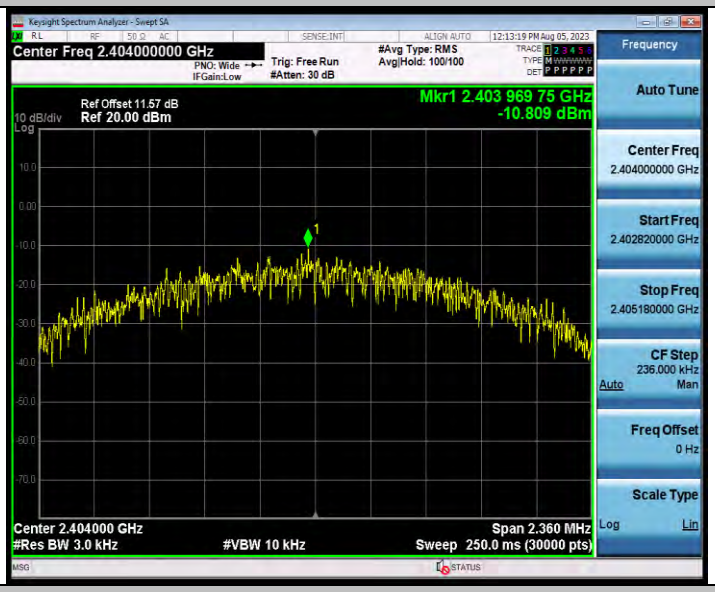
BLE_1M_Ant1_2440



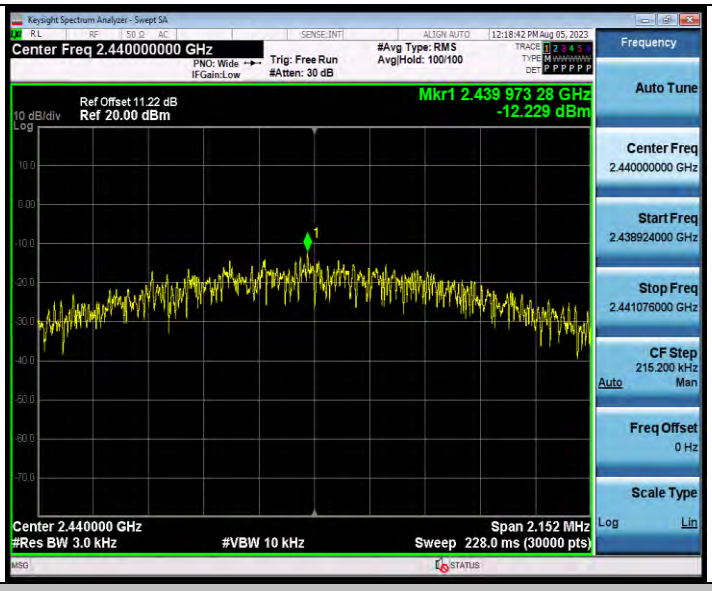
BLE_1M_Ant1_2480



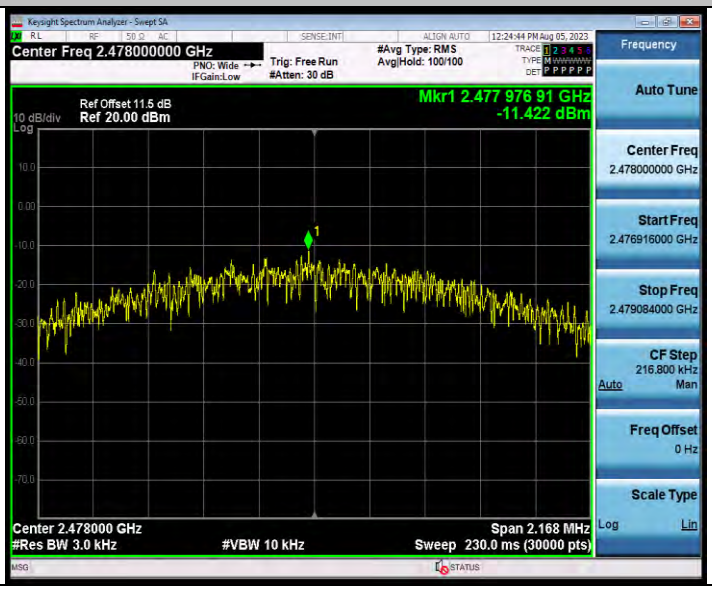
BLE_2M_Ant1_2404



BLE_2M_Ant1_2440



BLE_2M_Ant1_2478



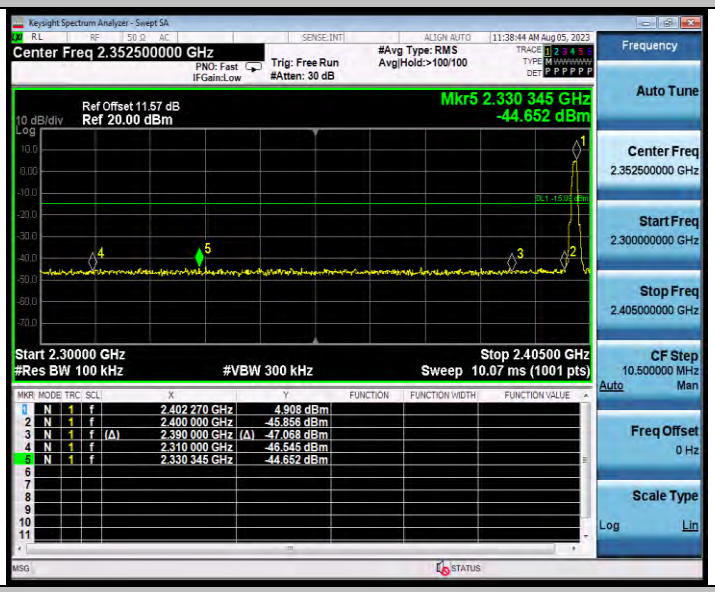
BAND EDGE MEASUREMENTS

TEST RESULT

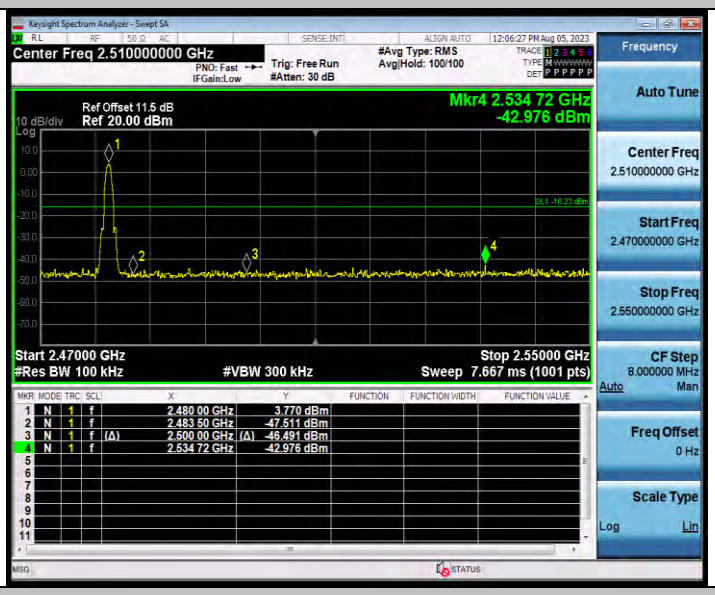
TestMode	Antenna	ChName	Frequency [MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	4.91	-44.65	≤-15.09	PASS
		High	2480	3.77	-42.98	≤-16.23	PASS
BLE_2M	Ant1	Low	2404	3.63	-43.95	≤-16.37	PASS
		High	2478	4.18	-43.84	≤-15.82	PASS

TEST GRAPHS

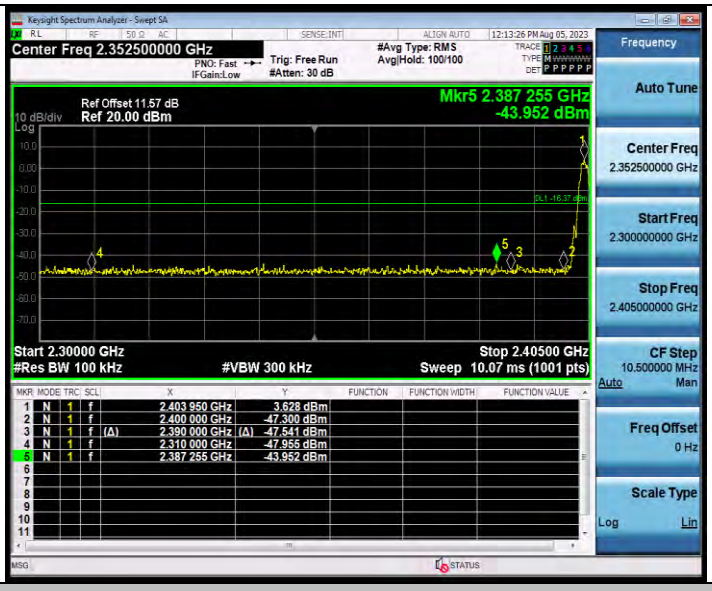
BLE_1M_Ant1_Low_2402



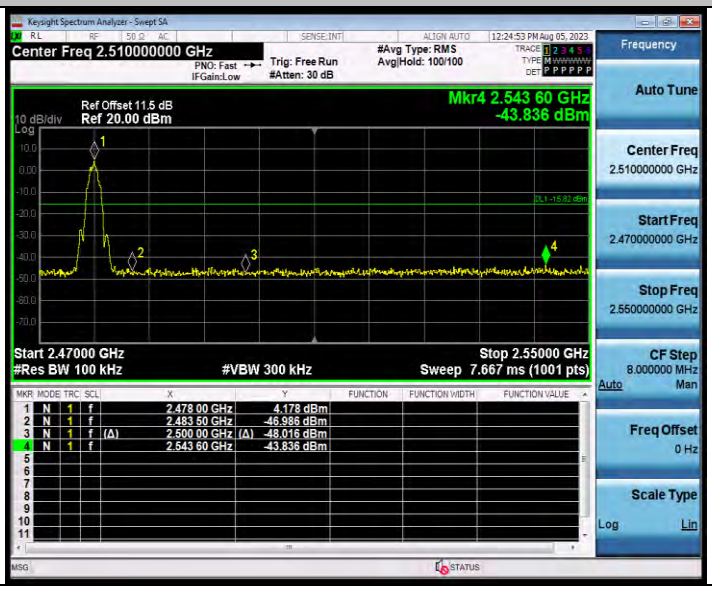
BLE_1M_Ant1_High_2480



BLE_2M_Ant1_Low_2404



BLE_2M_Ant1_High_2478



CONDUCTED SPURIOUS EMISSION

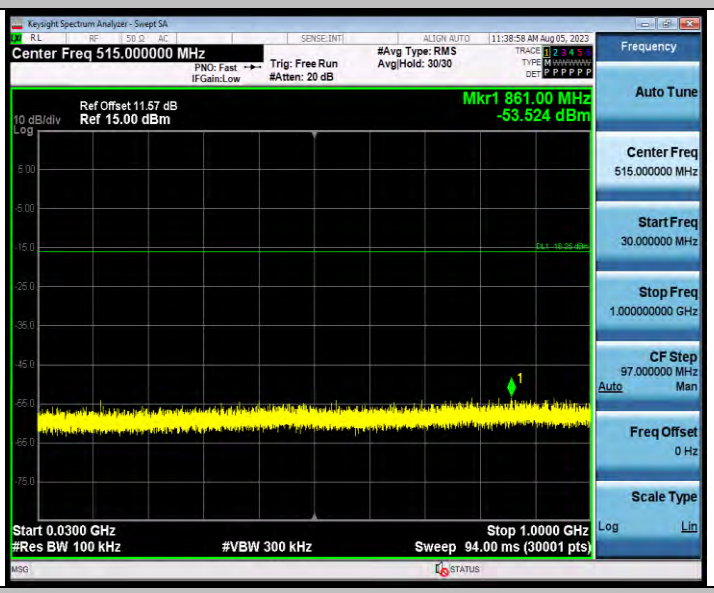
TEST RESULT

TestMode	Antenna	Frequency [MHz]	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	3.75	3.75	---	PASS
			30~1000	3.75	-53.52	≤-16.25	PASS
			1000~26500	3.75	-34.05	≤-16.25	PASS
		2440	Reference	2.60	2.60	---	PASS
			30~1000	2.60	-53.63	≤-17.4	PASS
			1000~26500	2.60	-34.25	≤-17.4	PASS
		2480	Reference	2.77	2.77	---	PASS
			30~1000	2.77	-53.39	≤-17.23	PASS
			1000~26500	2.77	-34.27	≤-17.23	PASS
BLE_2M	Ant1	2404	Reference	1.76	1.76	---	PASS
			30~1000	1.76	-52.96	≤-18.24	PASS
			1000~26500	1.76	-34.47	≤-18.24	PASS
		2440	Reference	0.61	0.61	---	PASS
			30~1000	0.61	-53.54	≤-19.39	PASS
			1000~26500	0.61	-34.48	≤-19.39	PASS
		2478	Reference	1.46	1.46	---	PASS
			30~1000	1.46	-53.74	≤-18.54	PASS
			1000~26500	1.46	-34.01	≤-18.54	PASS

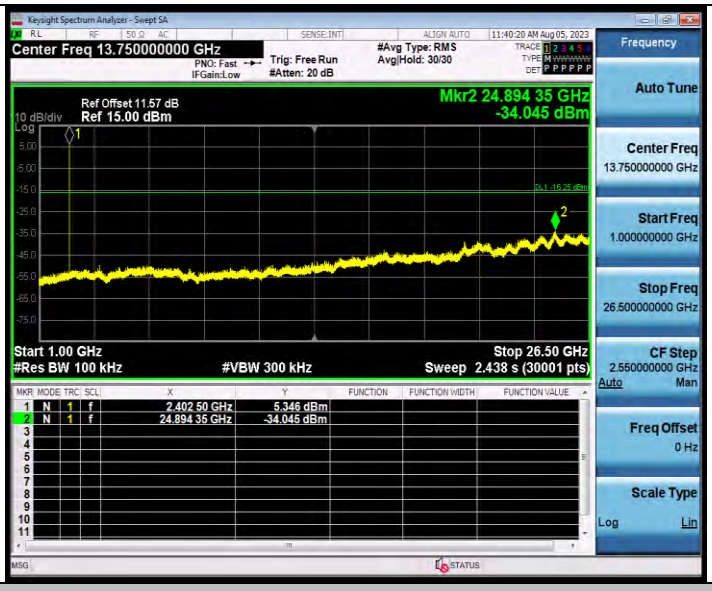
TEST GRAPHS

BLE_1M_Ant1_2402_0~Reference

BLE_1M_Ant1_2402_30~1000

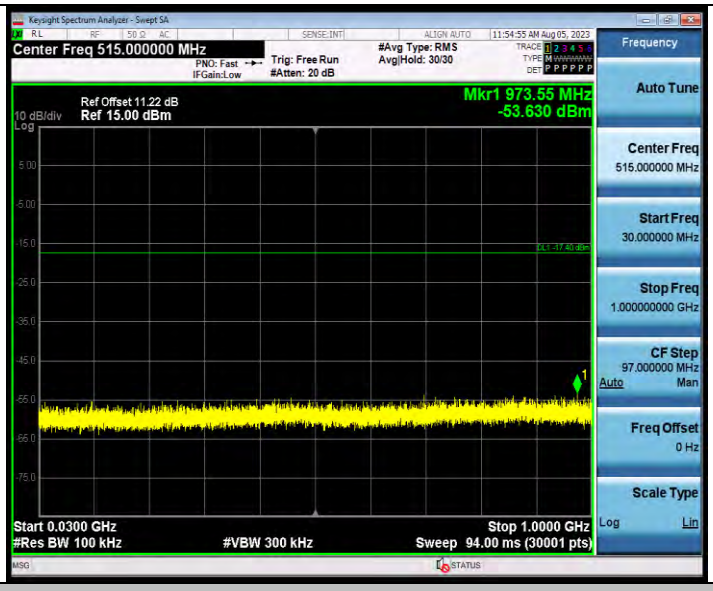


BLE_1M_Ant1_2402_1000~26500

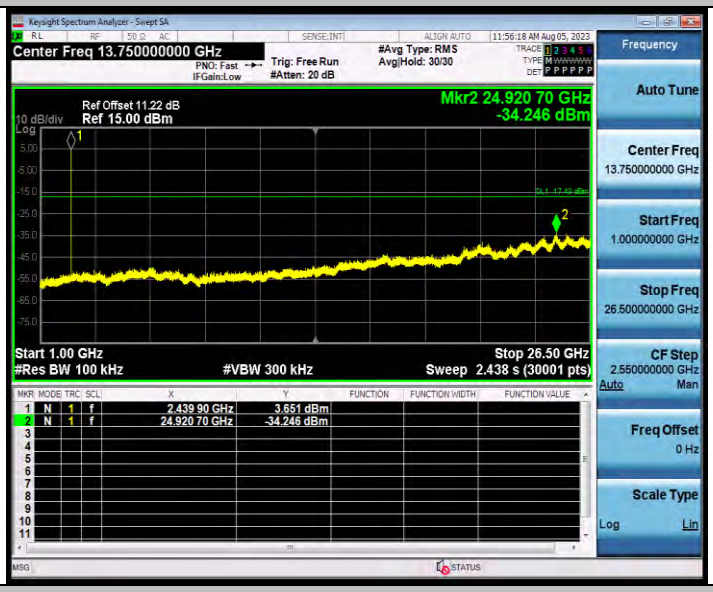


BLE_1M_Ant1_2440_0~Reference

BLE_1M_Ant1_2440_30~1000

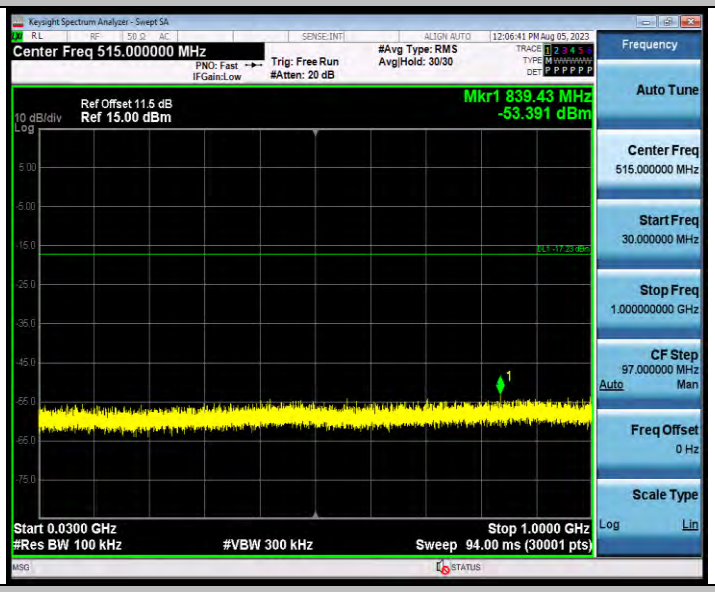


BLE_1M_Ant1_2440_1000~26500

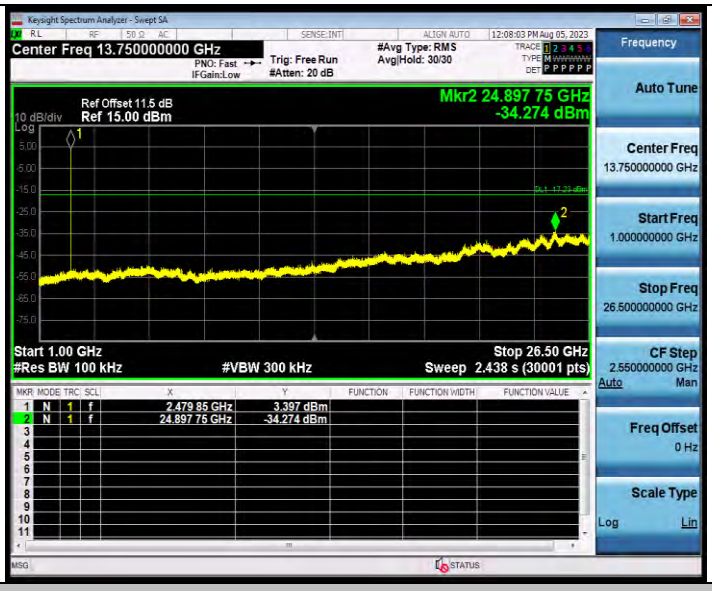


BLE_1M_Ant1_2480_0~Reference

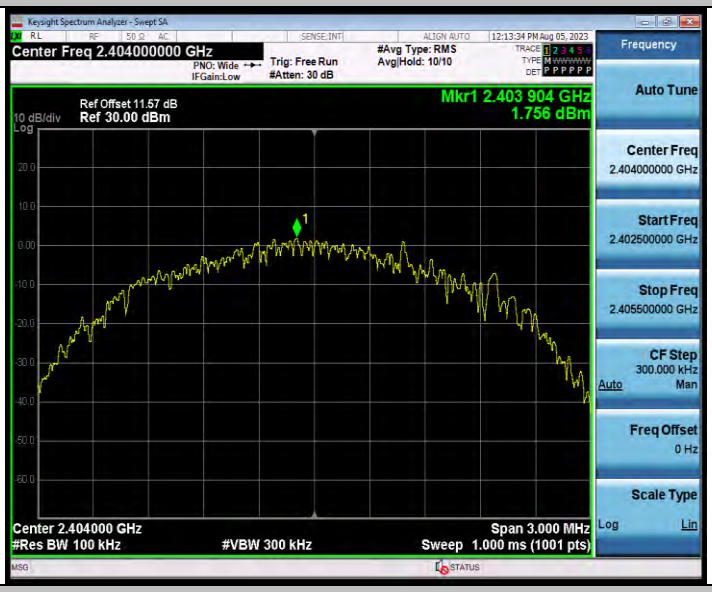
BLE_1M_Ant1_2480_30~1000



BLE_1M_Ant1_2480_1000~26500

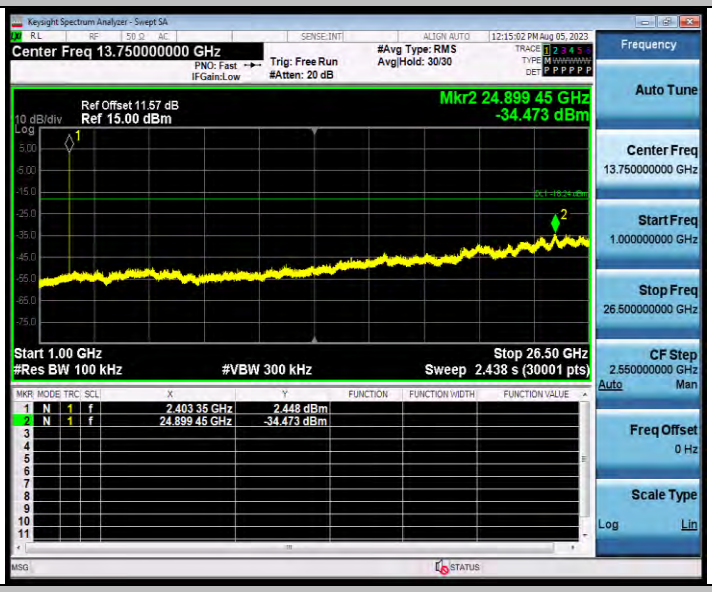


BLE_2M_Ant1_2404_0~Reference



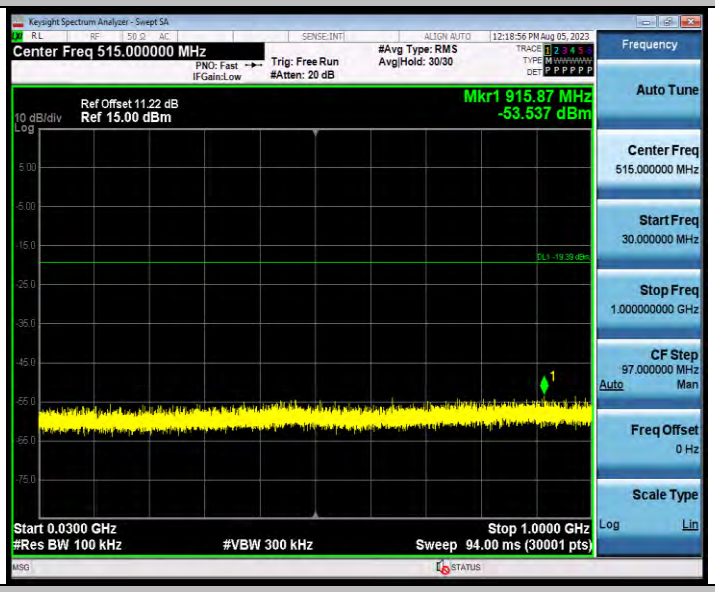
BLE_2M_Ant1_2404_30~1000

BLE_2M_Ant1_2404_1000~26500

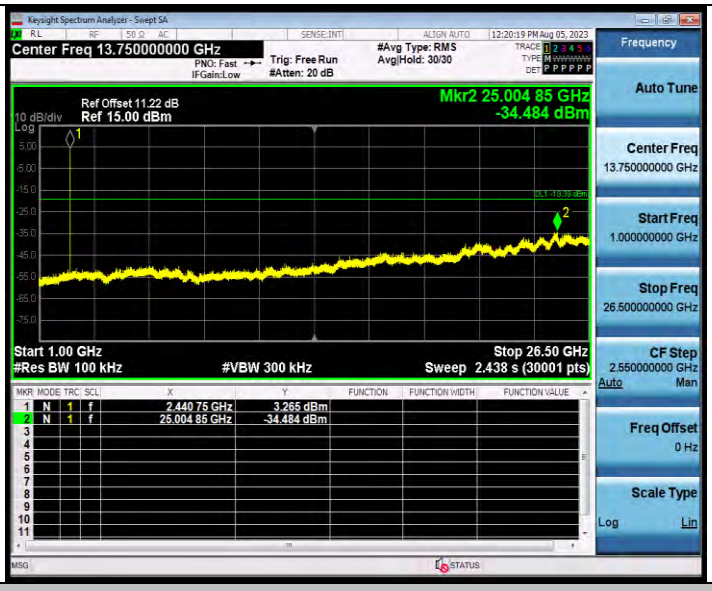


BLE_2M_Ant1_2440_0~Reference

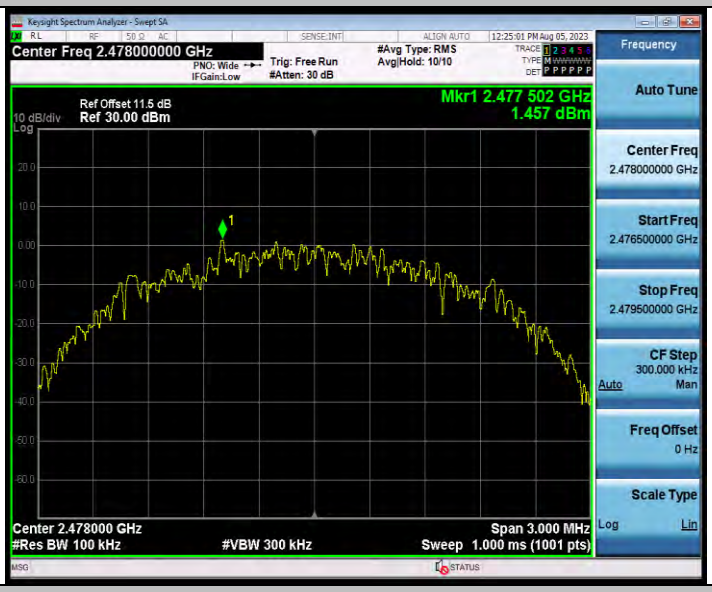
BLE_2M_Ant1_2440_30~1000



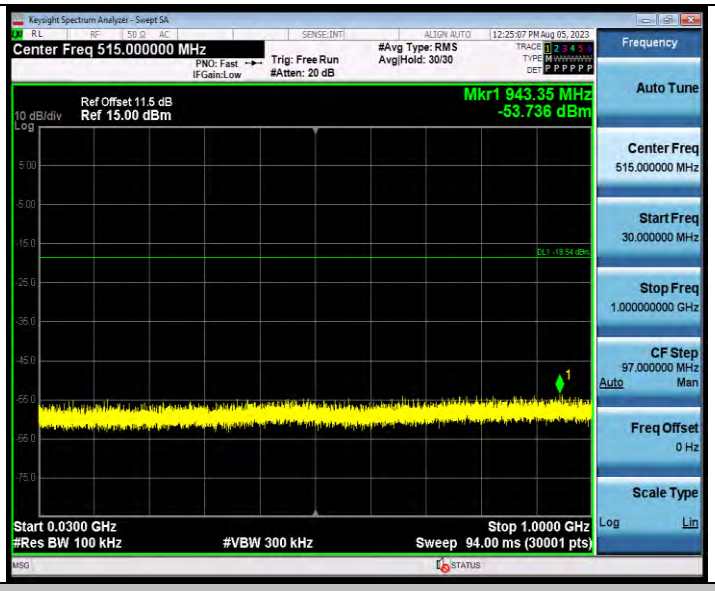
BLE_2M_Ant1_2440_1000~26500



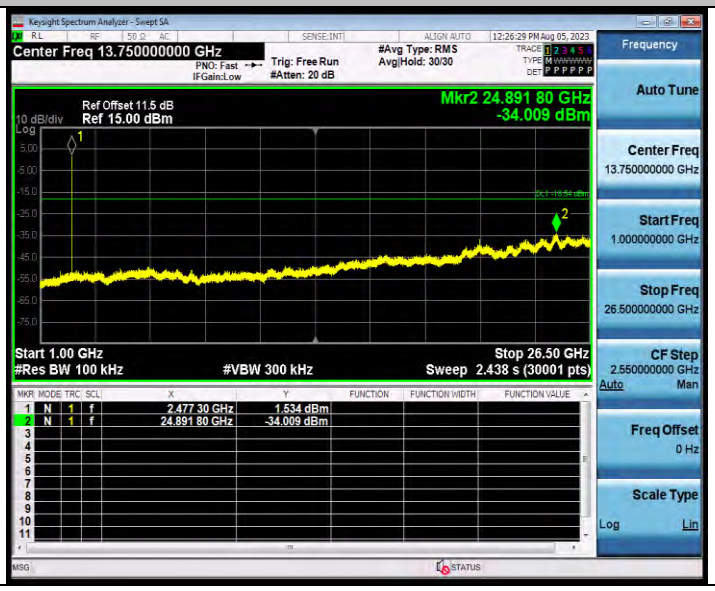
BLE_2M_Ant1_2478_0~Reference



BLE_2M_Ant1_2478_30~1000



BLE_2M_Ant1_2478_1000~26500



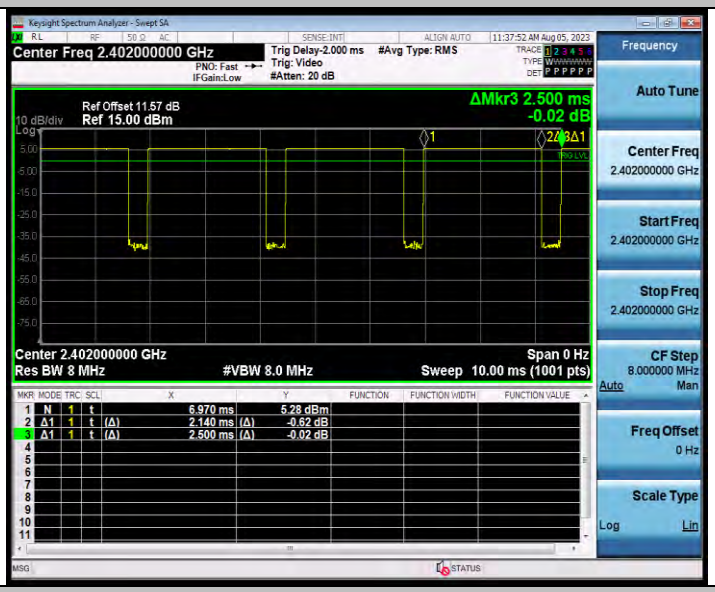
DUTY CYCLE

TEST RESULT

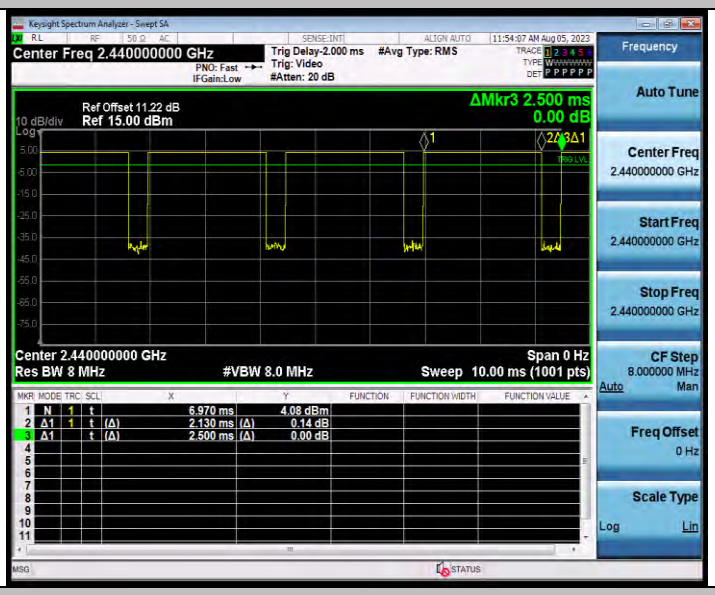
TestMode	Antenna	Frequency[MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor[dB]
BLE_1M	Ant1	2402	2.14	2.50	85.60	0.68
		2440	2.13	2.50	85.20	0.70
		2480	2.14	2.50	85.60	0.68
BLE_2M	Ant1	2404	1.08	1.88	57.45	2.41
		2440	1.08	1.88	57.45	2.41
		2478	1.08	1.88	57.45	2.41

TEST GRAPHS

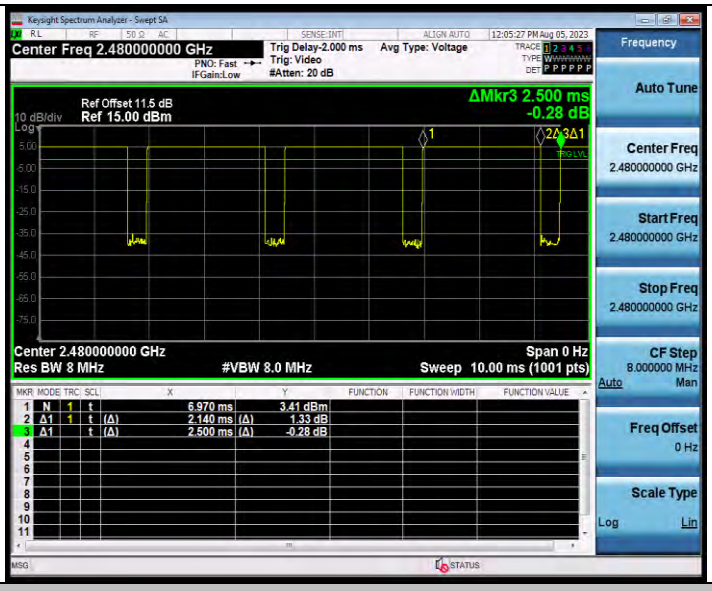
BLE_1M_Ant1_2402



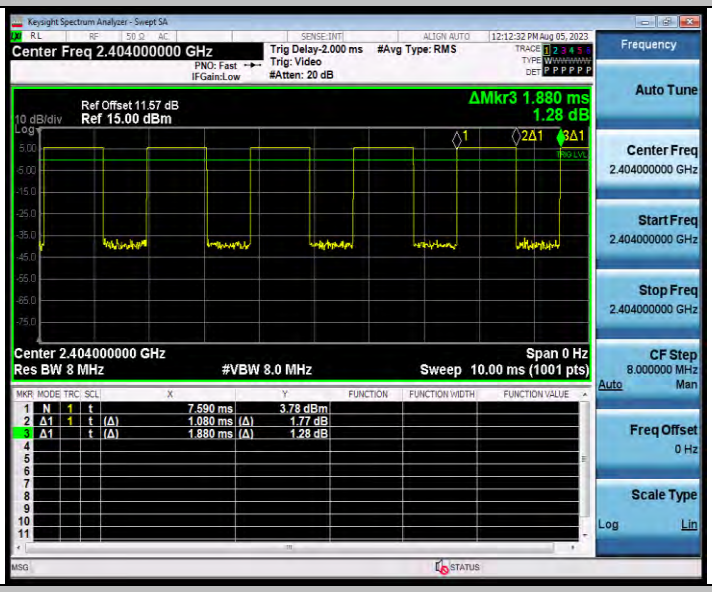
BLE_1M_Ant1_2440



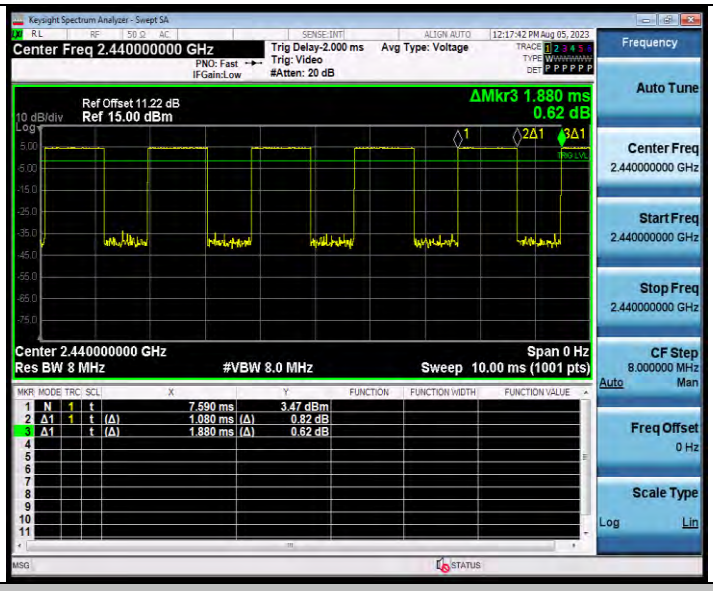
BLE_1M_Ant1_2480



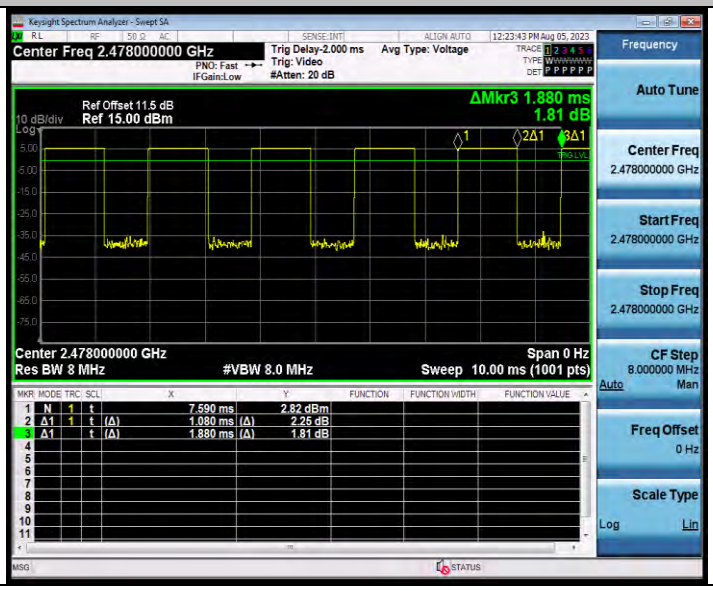
BLE_2M_Ant1_2404



BLE_2M_Ant1_2440



BLE_2M_Ant1_2478



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