Appendix Test Data

Report No.:	18220WC30160602	Test Sample No.:	1-2-2
Start Test Date:	2023.08.01	Finish Test Date:	2023.08.03
Test Engineer:	Hayman Chen	Auditor:	Rick Luo
Temperature:	25.3℃	Relative Humidity:	48%
Pressure:	1012 hPa		

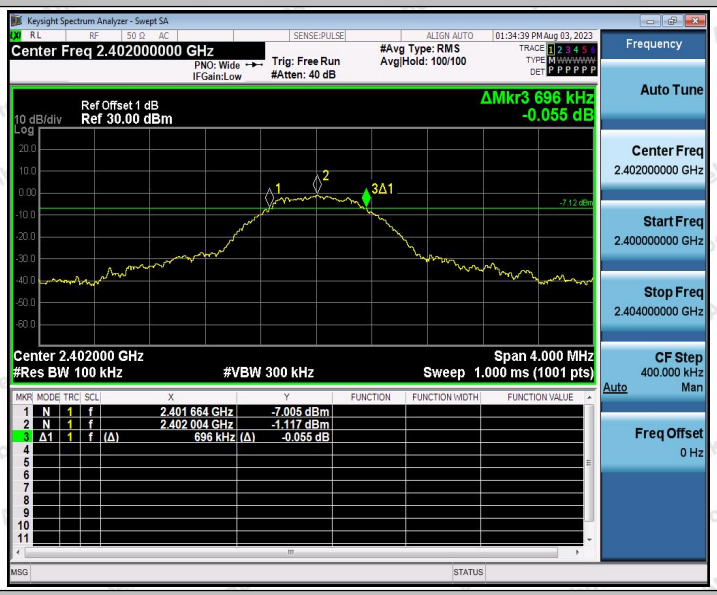
Appendix A: DTS Bandwidth

Test Result

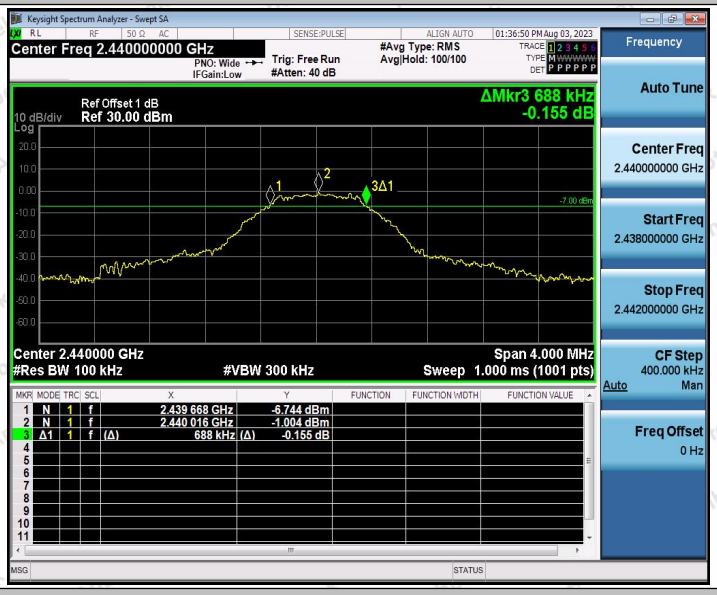
TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.696	2401.664	2402.360	0.5	PASS
		2440	0.688	2439.668	2440.356	0.5	PASS
		2480	0.692	2479.664	2480.356	0.5	PASS

Test Graphs

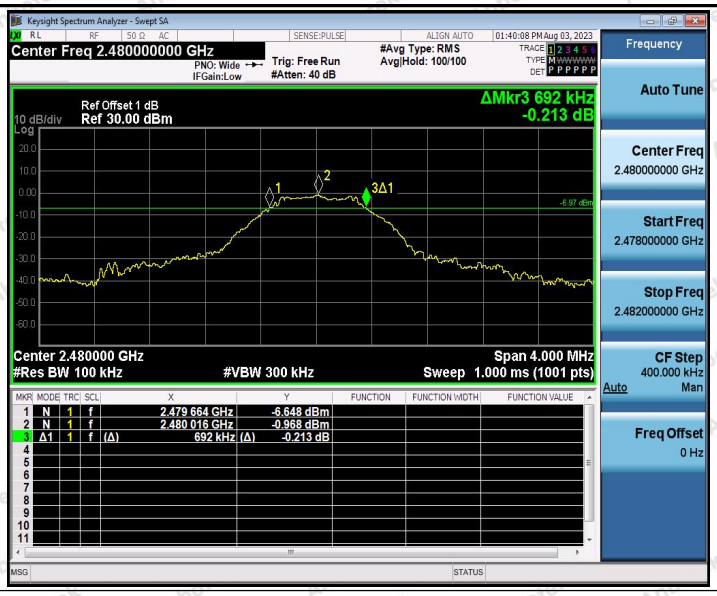
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
Avg|Hold: 100/100
01:40:08 PM Aug 03, 2023
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
ΔMkr3 692 kHz
-0.213 dB
-6.97 dBm
Center 2.480000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 4.000 MHz
Sweep 1.000 ms (1001 pts)
1 N 1 f 2.479 664 GHz -6.648 dBm
2 N 1 f 2.480 016 GHz -0.968 dBm
3 Δ1 1 f (Δ) 692 kHz (Δ) -0.213 dB
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.478000000 GHz
Stop Freq
2.482000000 GHz
CF Step
400.000 kHz
Auto Man
Freq Offset
0 Hz

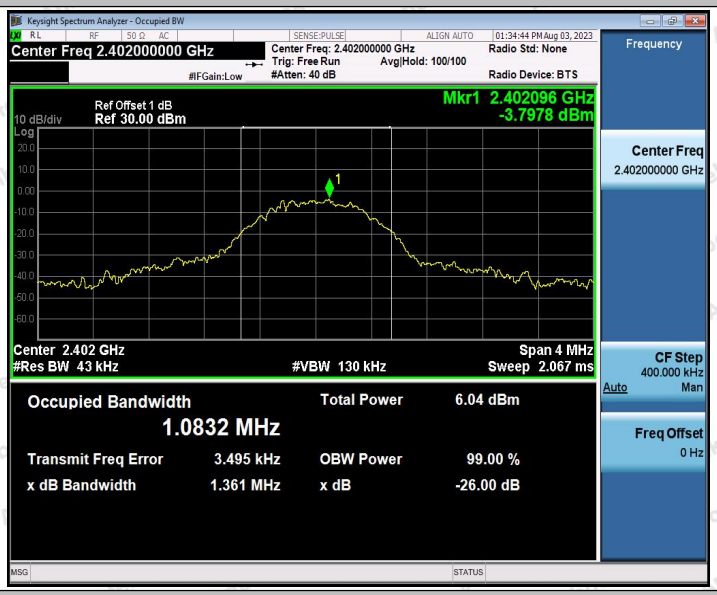
Appendix B: Occupied Channel Bandwidth

Test Result

Test Mode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]
BLE_1M	Ant1	2402	1.0832	2401.4619	2402.5451
		2440	1.0870	2439.4605	2440.5475
		2480	1.0920	2479.4571	2480.5491

Test Graphs

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440

BLE_1M_Ant1_2480

Keysight Spectrum Analyzer - Occupied BW
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#Atten: 40 dB
Radio Std: None
Radio Device: BTS
01:40:12 PM Aug 03, 2023
Frequency
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
Mkr1 2.4801 GHz
-3.7199 dBm
Center 2.48 GHz
#Res BW 43 kHz
#VBW 130 kHz
Span 4 MHz
Sweep 2.067 ms
Occupied Bandwidth
1.0920 MHz
Total Power 6.30 dBm
Transmit Freq Error 3.088 kHz
OBW Power 99.00 %
x dB Bandwidth 1.469 MHz
x dB -26.00 dB
Center Freq
2.480000000 GHz
CF Step
400.000 kHz
Auto Man
Freq Offset
0 Hz

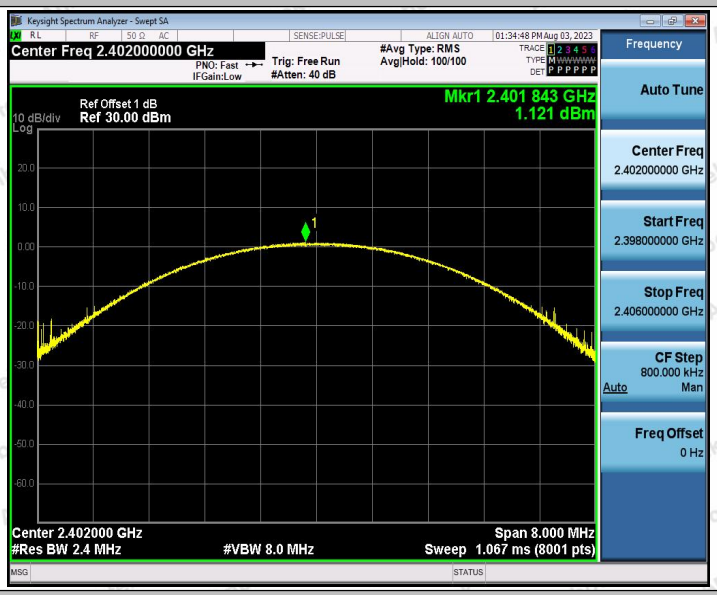
Appendix C: Maximum conducted output power

Test Result Peak

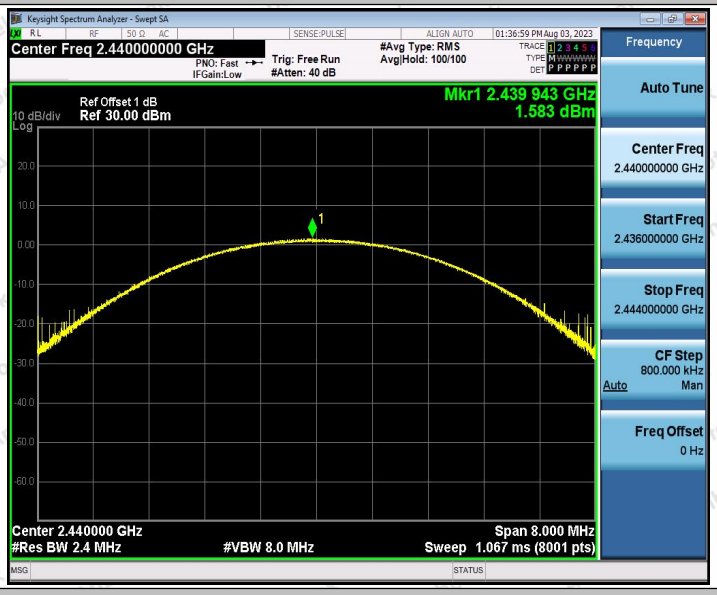
Test Mode	Antenna	Frequency[MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Verdict
BLE_1M	Ant1	2402	1.12	≤30	PASS
		2440	**1.58**	≤30	PASS
		2480	1.36	≤30	PASS

Test Graphs Peak

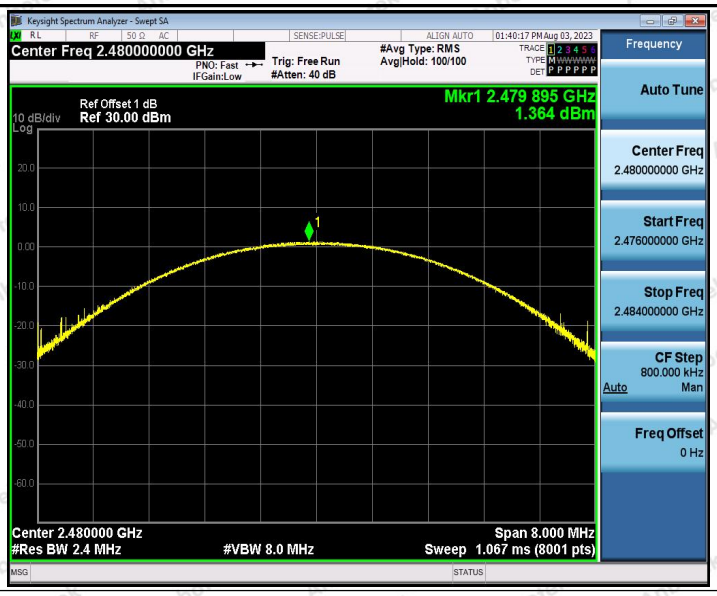
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
Avg|Hold: 100/100
01:40:17 PM Aug 03, 2023
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
Log
Mkr1 2.479 895 GHz
1.364 dBm
Center 2.480000 GHz
#Res BW 2.4 MHz
#VBW 8.0 MHz
Span 8.000 MHz
Sweep 1.067 ms (8001 pts)
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.476000000 GHz
Stop Freq
2.484000000 GHz
CF Step
800.000 kHz
Auto
Man
Freq Offset
0 Hz

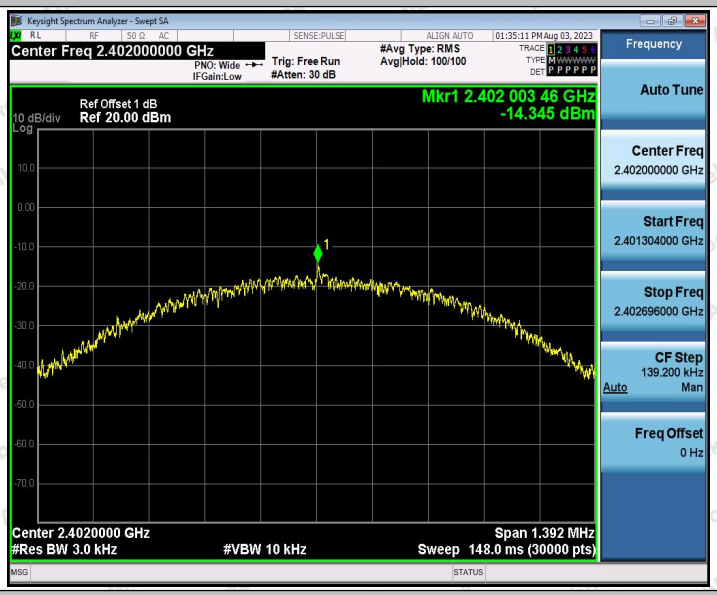
Appendix D: Maximum power spectral density

Test Result

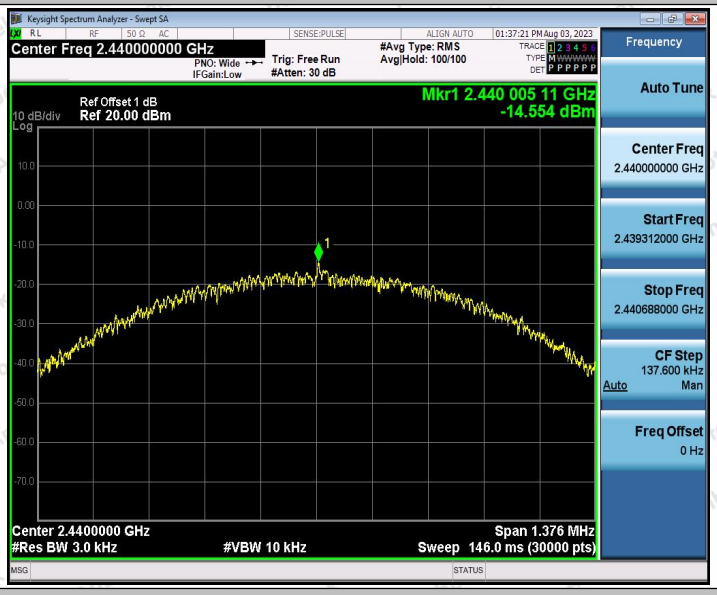
Test Mode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-14.35	≤8.00	PASS
		2440	-14.55	≤8.00	PASS
		2480	-13.92	≤8.00	PASS

Test Graphs

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480

Keysight Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 100/100
01:40:38 PM Aug 03, 2023
Ref Offset 1 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.480 004 08 GHz
-13.923 dBm
Center 2.4800000 GHz
#Res BW 3.0 kHz
#VBW 10 kHz
Span 1.384 MHz
Sweep 146.0 ms (30000 pts)
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.479308000 GHz
Stop Freq
2.480692000 GHz
CF Step
138.400 kHz
Auto
Man
Freq Offset
0 Hz

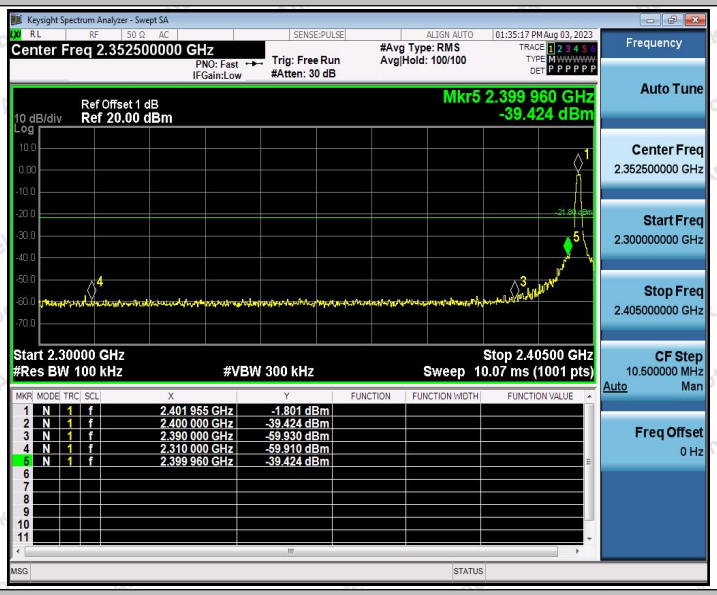
Appendix E: Band edge measurements

Test Result

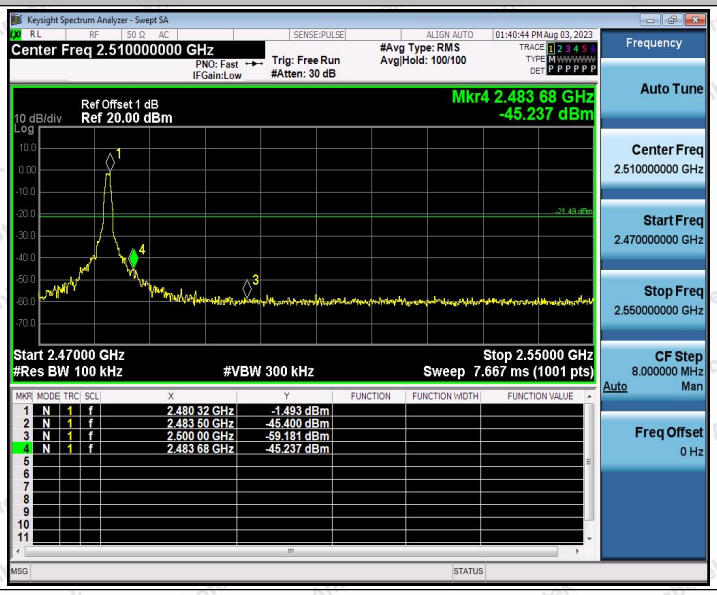
TestMode	Antenna	ChName	Frequency [MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	-1.80	-39.42	≤-21.8	PASS
		High	2480	-1.49	-45.24	≤-21.49	PASS

Test Graphs

BLE_1M_Ant1_Low_2402



BLE_1M_Ant1_High_2480



Appendix F: Conducted Spurious Emission

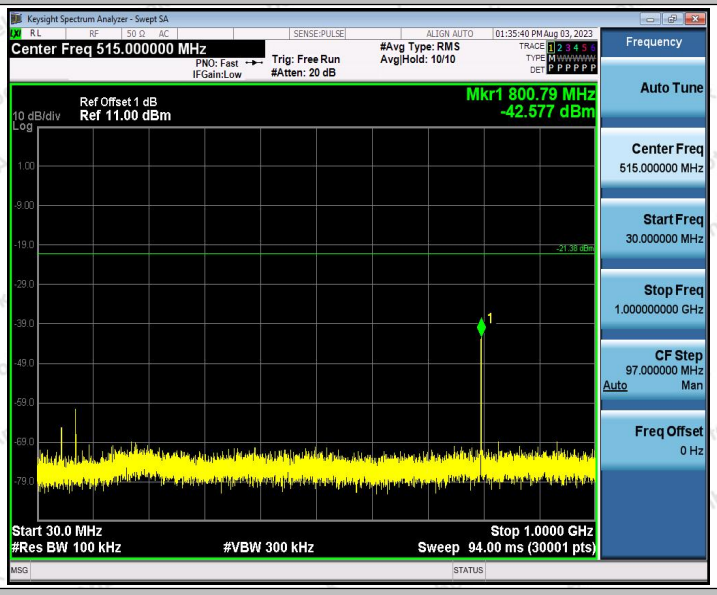
Test Result

TestMode	Antenna	Frequency [MHz]	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	-1.38	-1.38	---	PASS
			30~1000	-1.38	-42.58	≤-21.38	PASS
			1000~26500	-1.38	-39.51	≤-21.38	PASS
		2440	Reference	-1.79	-1.79	---	PASS
			30~1000	-1.79	-41.35	≤-21.79	PASS
			1000~26500	-1.79	-39.99	≤-21.79	PASS
		2480	Reference	-1.48	-1.48	---	PASS
			30~1000	-1.48	-42.04	≤-21.48	PASS
			1000~26500	-1.48	-41.6	≤-21.48	PASS

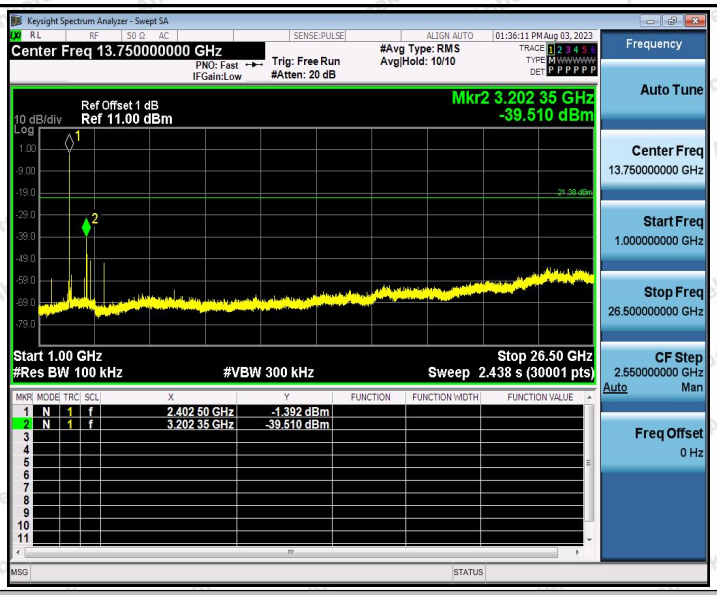
Test Graphs

BLE_1M_Ant1_2402_0~Reference

BLE_1M_Ant1_2402_30~1000

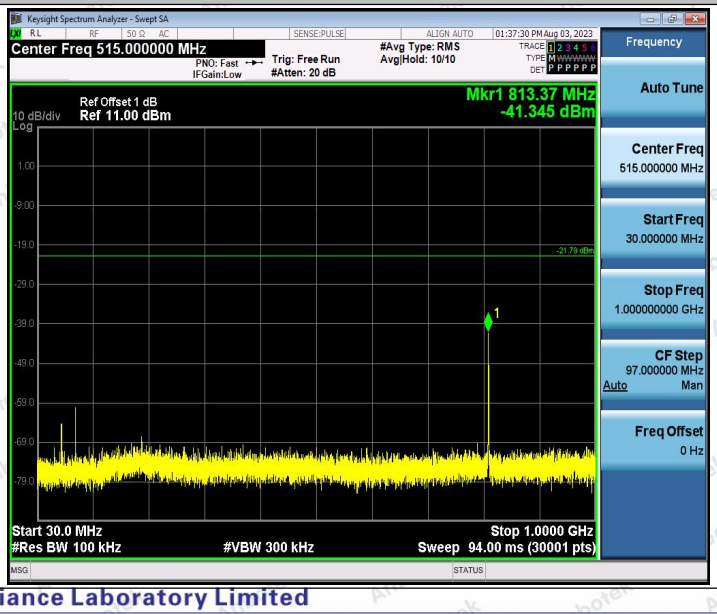


BLE_1M_Ant1_2402_1000~26500

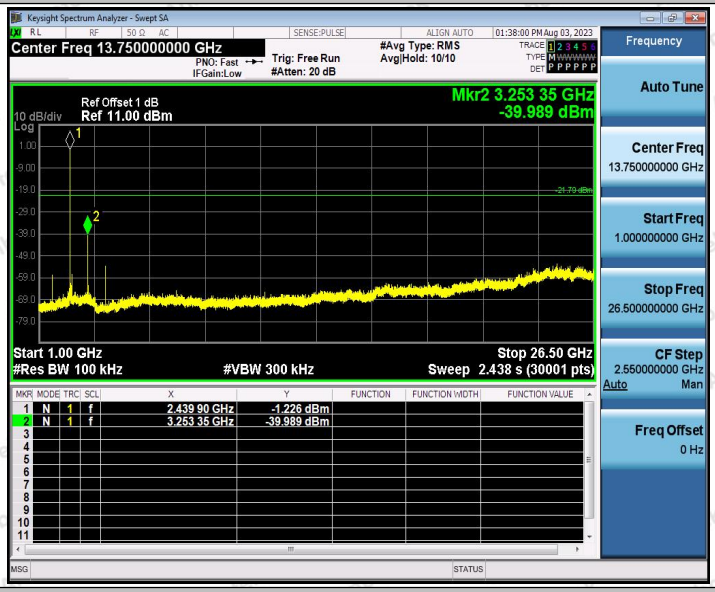


BLE_1M_Ant1_2440_0~Reference

BLE_1M_Ant1_2440_30~1000

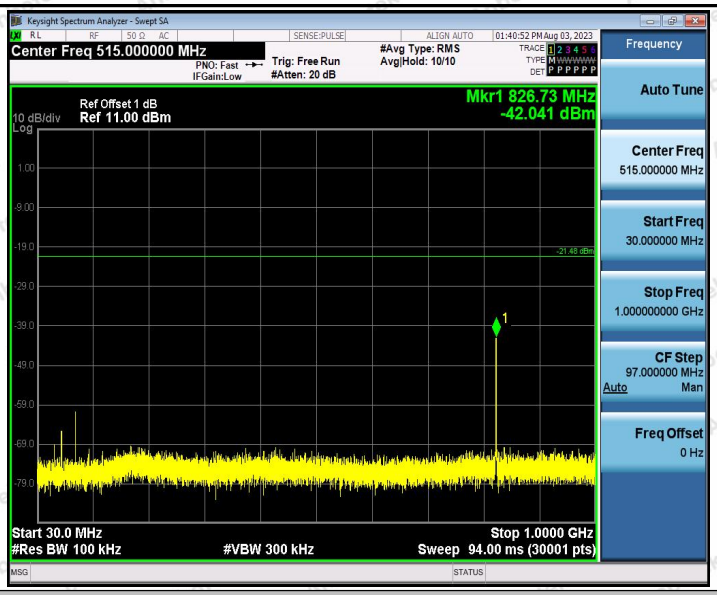


BLE_1M_Ant1_2440_1000~26500

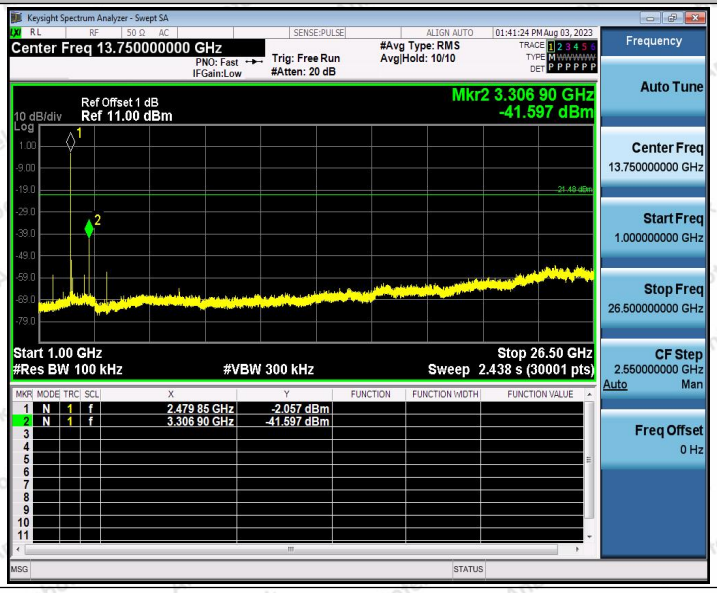


BLE_1M_Ant1_2480_0~Reference

BLE_1M_Ant1_2480_30~1000



BLE_1M_Ant1_2480_1000~26500



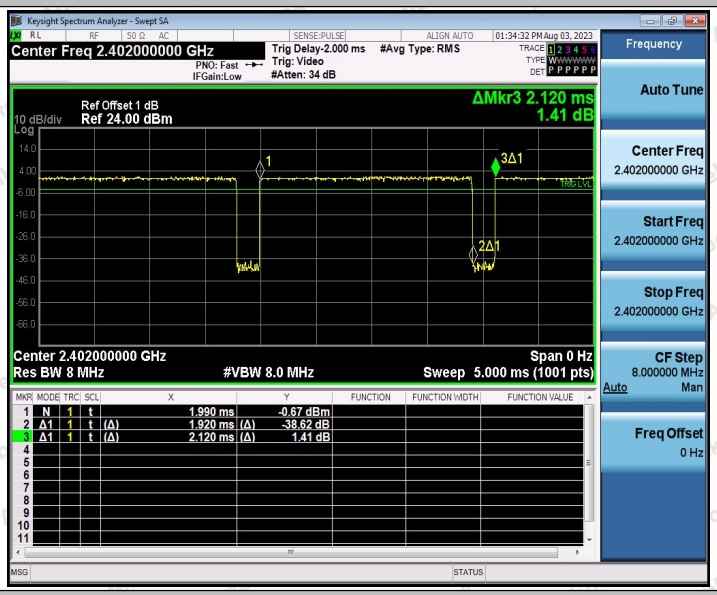
Appendix G: Duty Cycle

Test Result

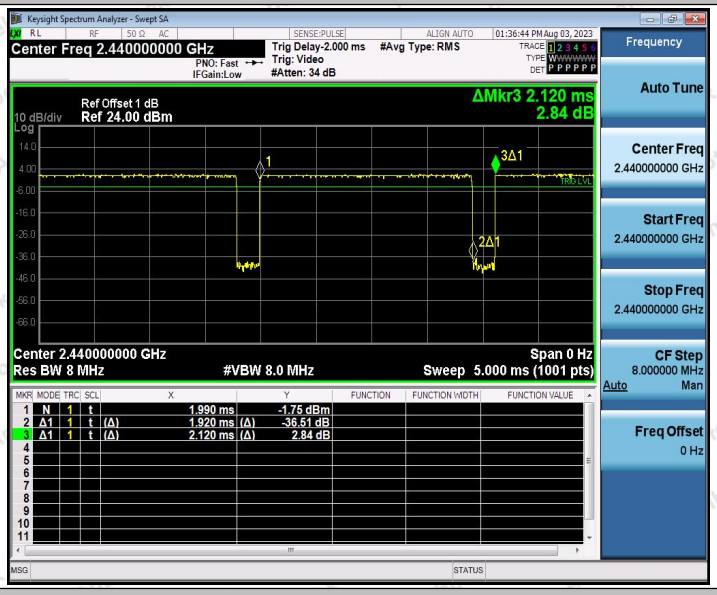
Test Mode	Antenna	Frequency[MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor[dB]
BLE_1M	Ant1	2402	1.92	2.12	90.57	0.43
		2440	1.92	2.12	90.57	0.43
		2480	1.92	2.12	90.57	0.43

Test Graphs

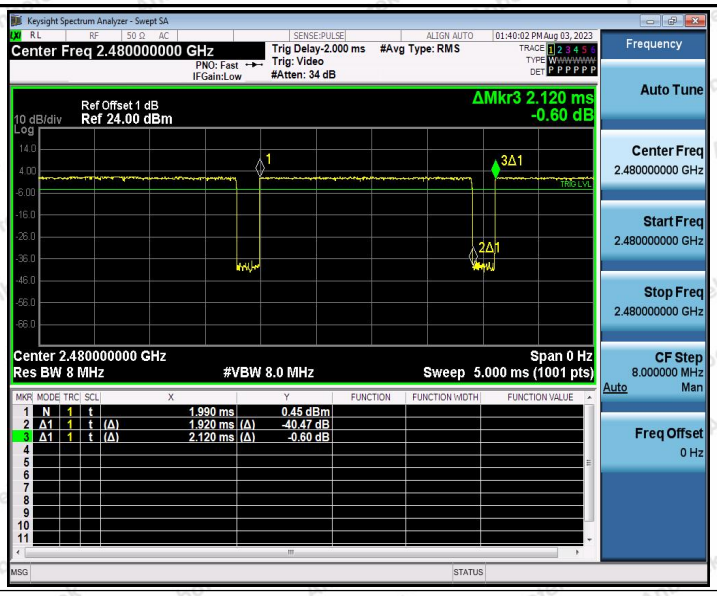
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig Delay-2.000 ms
Trig: Video
#Atten: 34 dB
#Avg Type: RMS
01:40:02 PM Aug 03, 2023
Ref Offset 1 dB
10 dB/div
Ref 24.00 dBm
ΔMkr3 2.120 ms
-0.60 dB
Center 2.480000000 GHz
Res BW 8 MHz
#VBW 8.0 MHz
Span 0 Hz
Sweep 5.000 ms (1001 pts)
1 N 1 t 1.990 ms 0.45 dBm
2 Δ1 1 t (Δ) 1.920 ms (Δ) -40.47 dB
3 Δ1 1 t (Δ) 2.120 ms (Δ) -0.60 dB
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.480000000 GHz
Stop Freq
2.480000000 GHz
CF Step
8.000000 MHz
Auto Man
Freq Offset
0 Hz

---End---