Appendix Test Data

Report No.:	18220WC30075001	Test Sample No.:	1-2-2
Start Test Date:	2023.04.28	Finish Test Date:	2023.05.23
Test Engineer:	Rick Luo	Auditor:	Edward.Pan
Temperature:	23.8℃	Relative Humidity:	45%
Pressure:	1012 hPa		

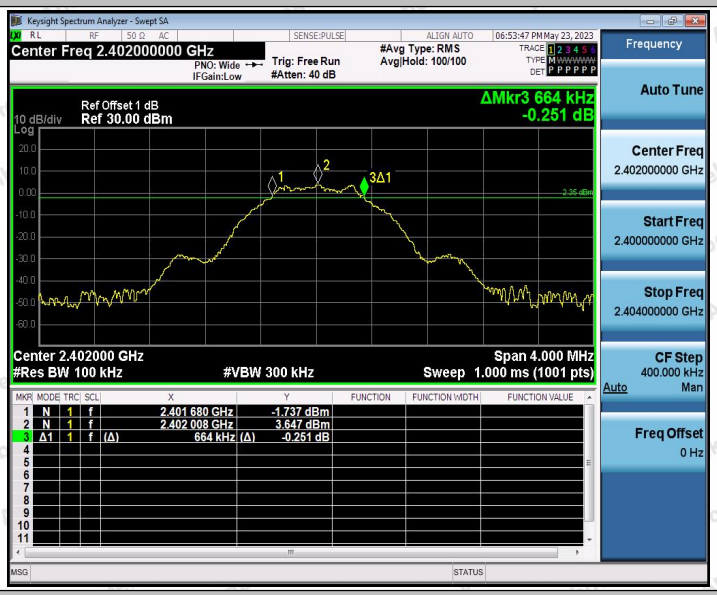
Appendix A: DTS Bandwidth

Test Result

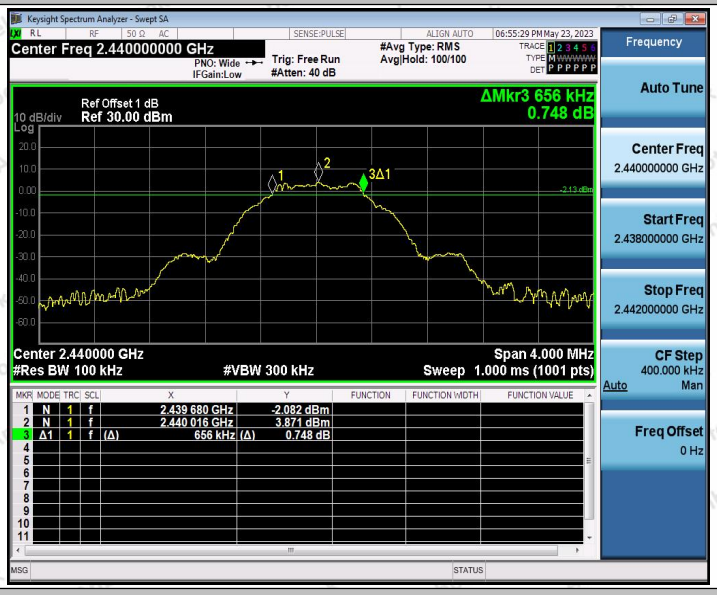
TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.664	2401.680	2402.344	0.5	PASS
		2440	0.656	2439.680	2440.336	0.5	PASS
		2480	0.660	2479.680	2480.340	0.5	PASS

Test Graphs

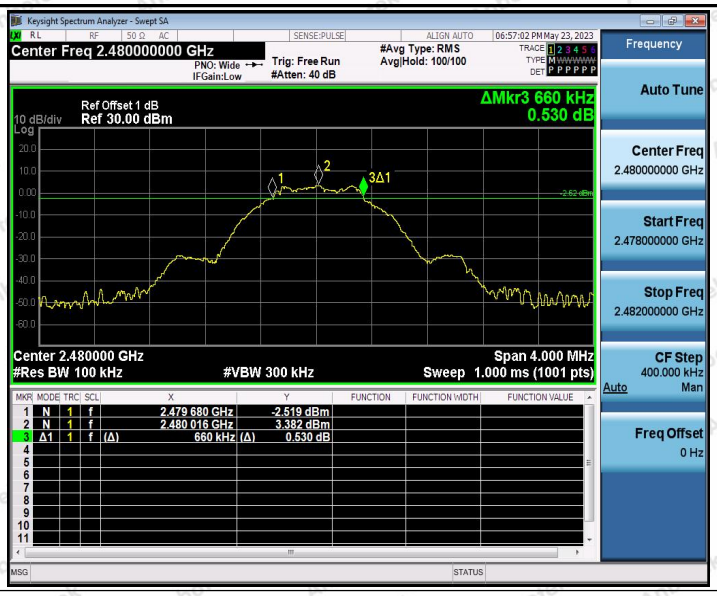
BLE_1M_Ant1_2402



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
06:57:02 PM May 23, 2023
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
ΔMkr3 660 kHz
0.530 dB
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 2.479 680 GHz -2.519 dBm
2 N 1 f 2.480 016 GHz 3.382 dBm
3 Δ1 1 f (Δ) 660 kHz (Δ) 0.530 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	1.0355	2401.5010	2402.5365
		2440	1.0343	2439.5031	2440.5374
		2480	1.0321	2479.5008	2480.5329

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
06:57:07 PM May 23, 2023
Frequency
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
Mkr1 2.48 GHz
0.92166 dBm
Center 2.48 GHz
#Res BW 43 kHz
#VBW 130 kHz
Span 4 MHz
Sweep 2.067 ms
Occupied Bandwidth
1.0321 MHz
Total Power 10.5 dBm
Transmit Freq Error 16.827 kHz
OBW Power 99.00 %
x dB Bandwidth 1.281 MHz
x dB -26.00 dB
Center Freq
2.480000000 GHz
CF Step
400.000 kHz
Auto Man
Freq Offset
0 Hz

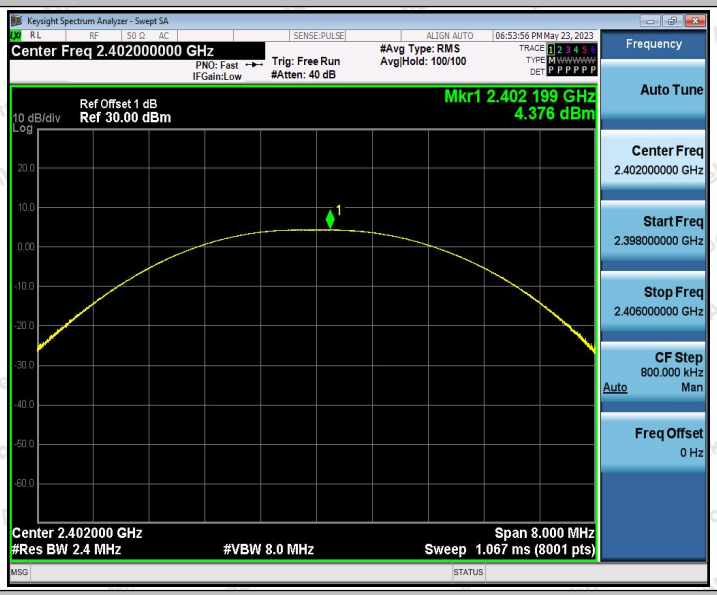
Appendix C: Maximum conducted output power

Test Result Peak

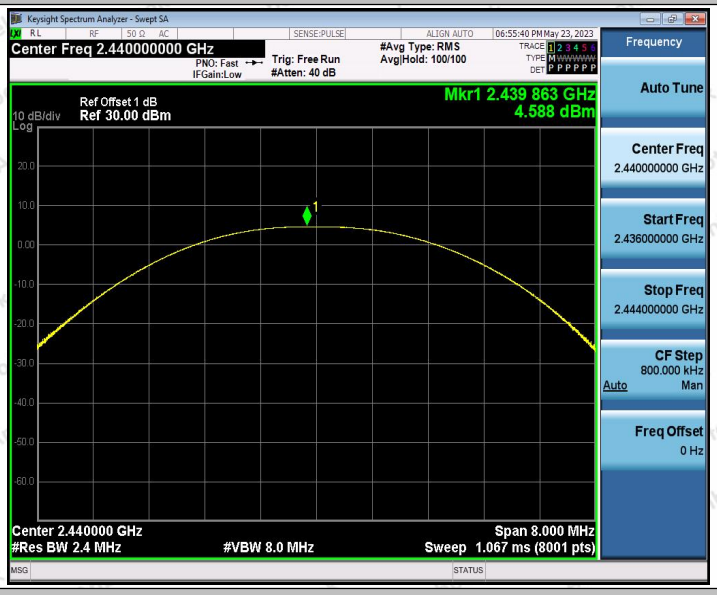
Test Mode	Antenna	Frequency[MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Verdict
BLE_1M	Ant1	2402	4.38	≤30	PASS
		2440	**4.59**	≤30	PASS
		2480	4.13	≤30	PASS

Test Graphs Peak

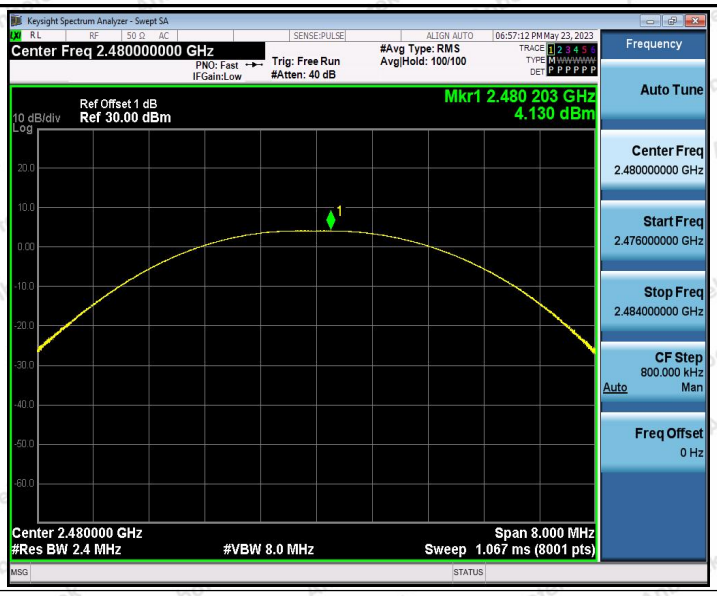
BLE_1M_Ant1_2402



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
06:57:12 PM May 23, 2023
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
Log
Mkr1 2.480 203 GHz
4.130 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

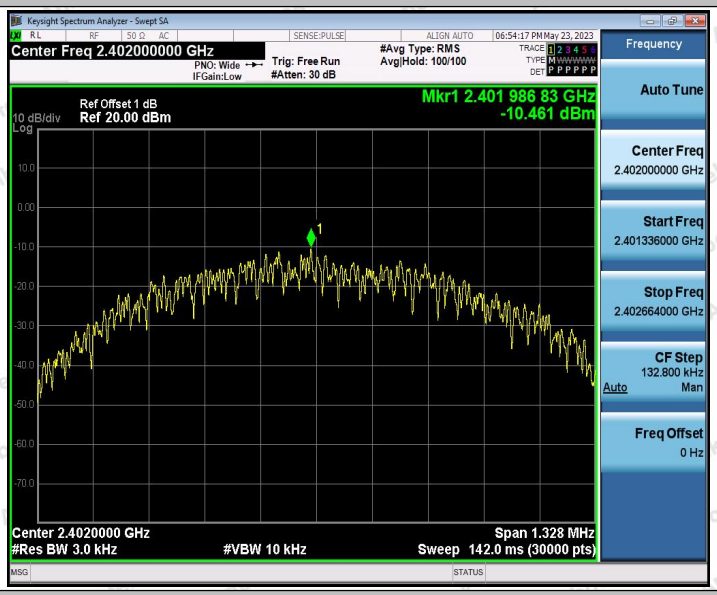
Appendix D: Maximum power spectral density

Test Result

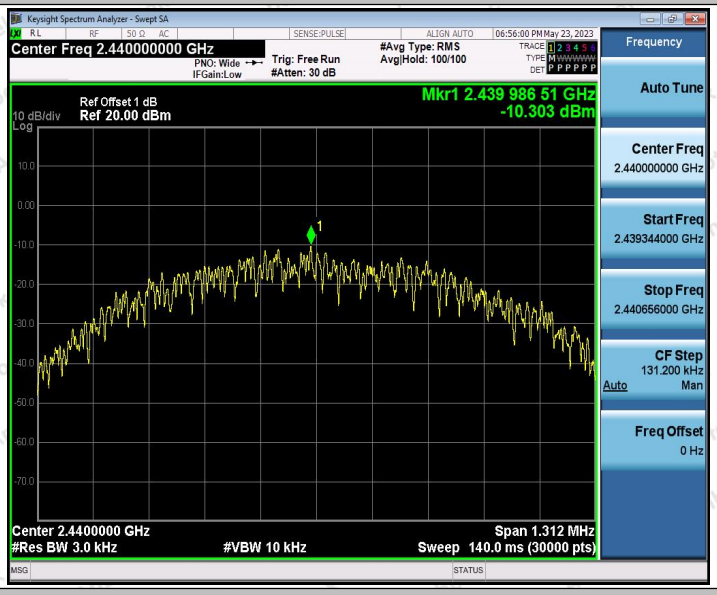
Test Mode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-10.46	≤8.00	PASS
		2440	-10.3	≤8.00	PASS
		2480	-10.69	≤8.00	PASS

Test Graphs

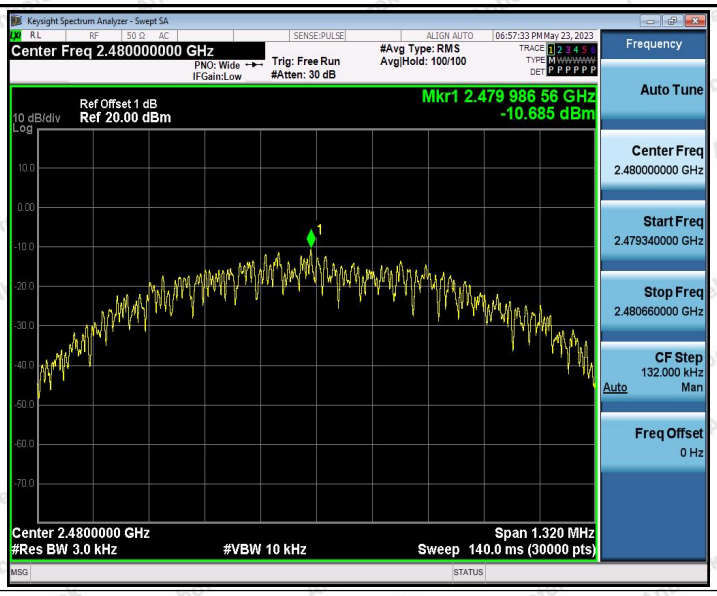
BLE_1M_Ant1_2402



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
06:57:33 PM May 23, 2023
Ref Offset 1 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.479 986 56 GHz
-10.685 dBm
Center 2.4800000 GHz
#Res BW 3.0 kHz
#VBW 10 kHz
Span 1.320 MHz
Sweep 140.0 ms (30000 pts)
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.479340000 GHz
Stop Freq
2.480660000 GHz
CF Step
132.000 kHz
Auto
Man
Freq Offset
0 Hz

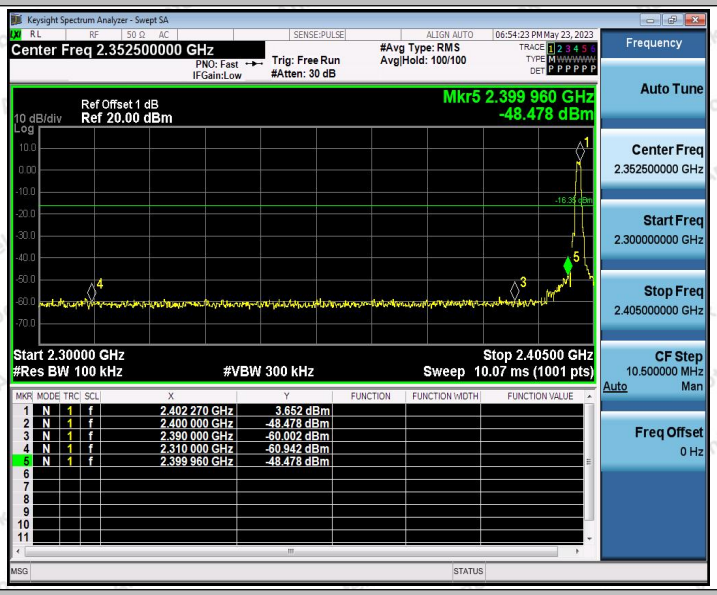
Appendix E: Band edge measurements

Test Result

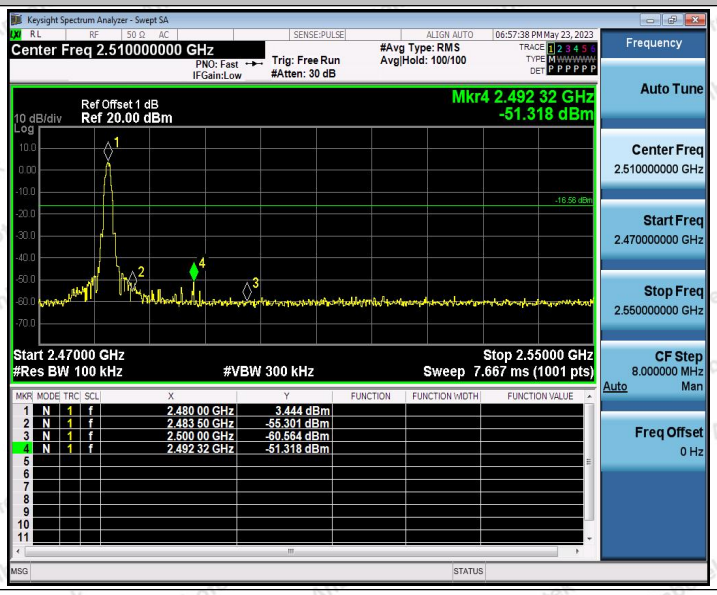
TestMode	Antenna	ChName	Frequency [MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	3.65	-48.48	≤-16.35	PASS
		High	2480	3.44	-51.32	≤-16.56	PASS

Test Graphs

BLE_1M_Ant1_Low_2402



BLE_1M_Ant1_High_2480



Appendix F: Conducted Spurious Emission

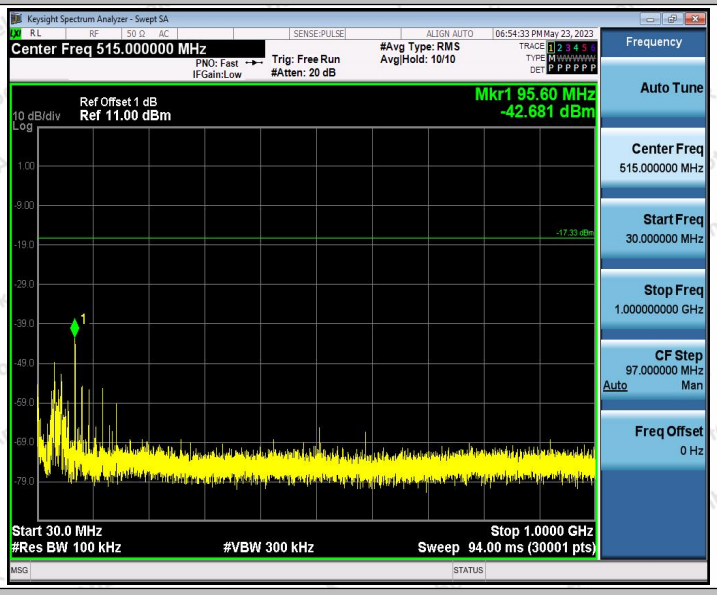
Test Result

TestMode	Antenna	Frequency [MHz]	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	2.67	2.67	---	PASS
			30~1000	2.67	-42.68	≤-17.33	PASS
			1000~26500	2.67	-52.66	≤-17.33	PASS
		2440	Reference	2.97	2.97	---	PASS
			30~1000	2.97	-42.61	≤-17.03	PASS
			1000~26500	2.97	-53.53	≤-17.03	PASS
		2480	Reference	2.76	2.76	---	PASS
			30~1000	2.76	-42.57	≤-17.24	PASS
			1000~26500	2.76	-53.39	≤-17.24	PASS

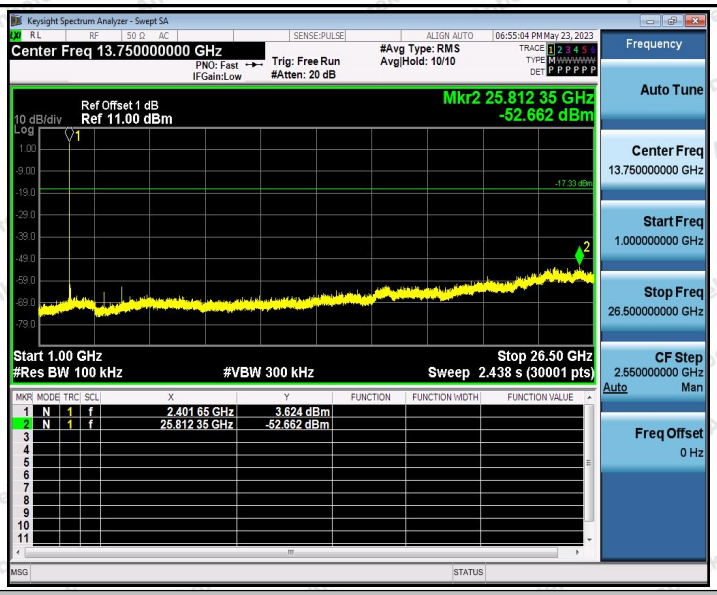
Test Graphs

BLE_1M_Ant1_2402_0~Reference

BLE_1M_Ant1_2402_30~1000

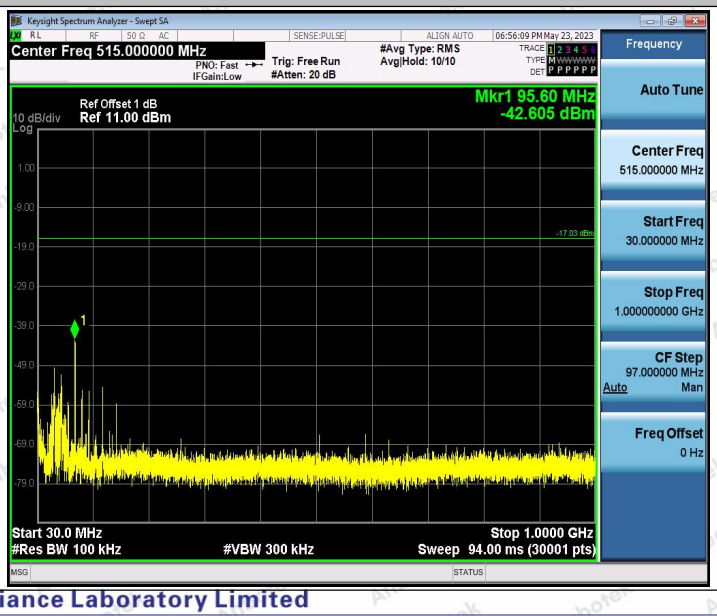


BLE_1M_Ant1_2402_1000~26500

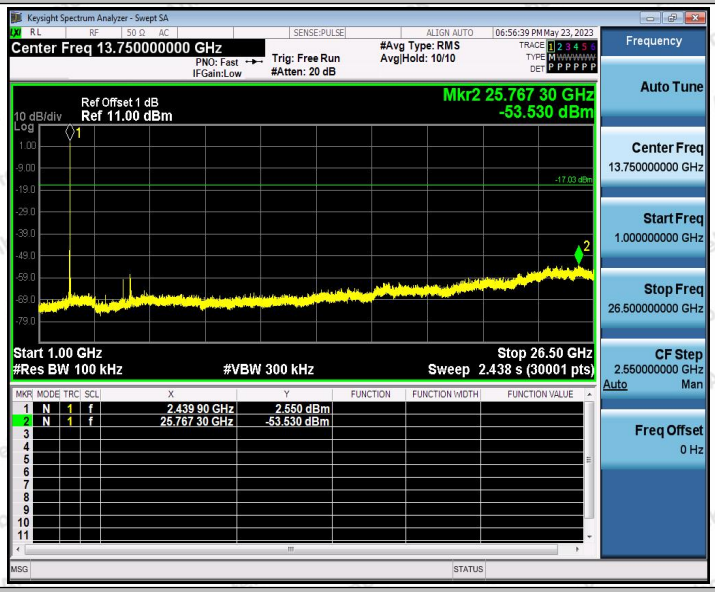


BLE_1M_Ant1_2440_0~Reference

BLE_1M_Ant1_2440_30~1000

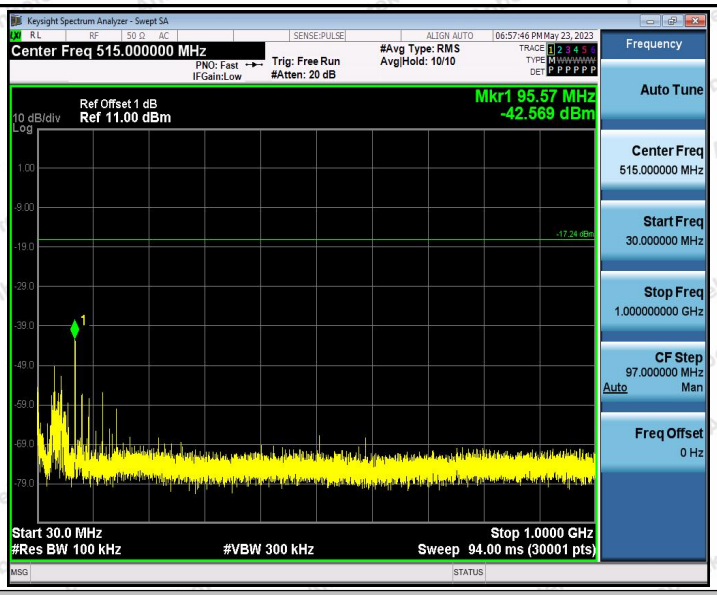


BLE_1M_Ant1_2440_1000~26500

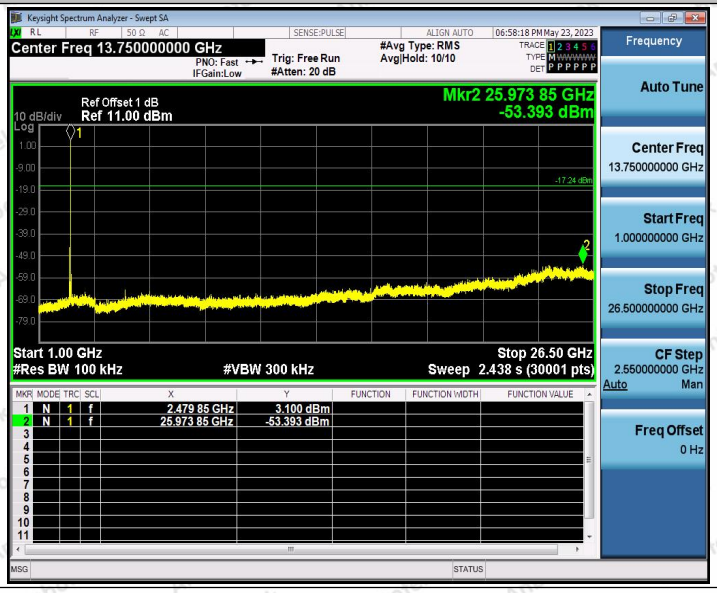


BLE_1M_Ant1_2480_0~Reference

BLE_1M_Ant1_2480_30~1000



BLE_1M_Ant1_2480_1000~26500



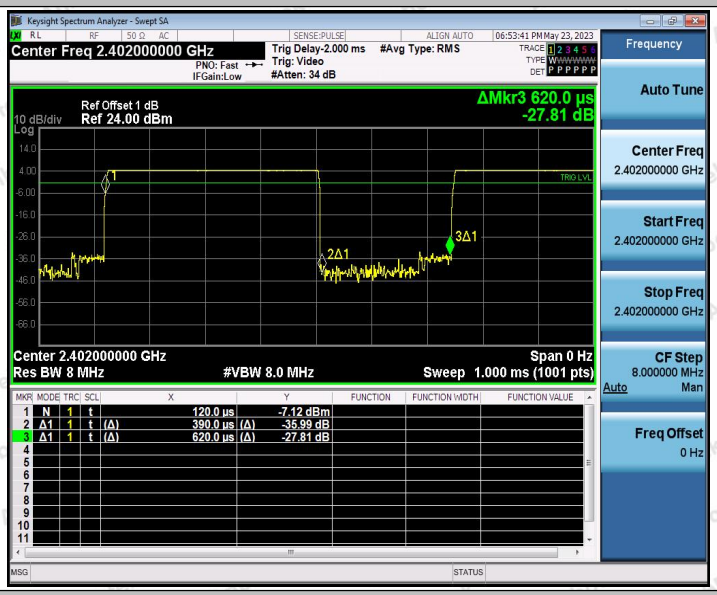
Appendix G: Duty Cycle

Test Result

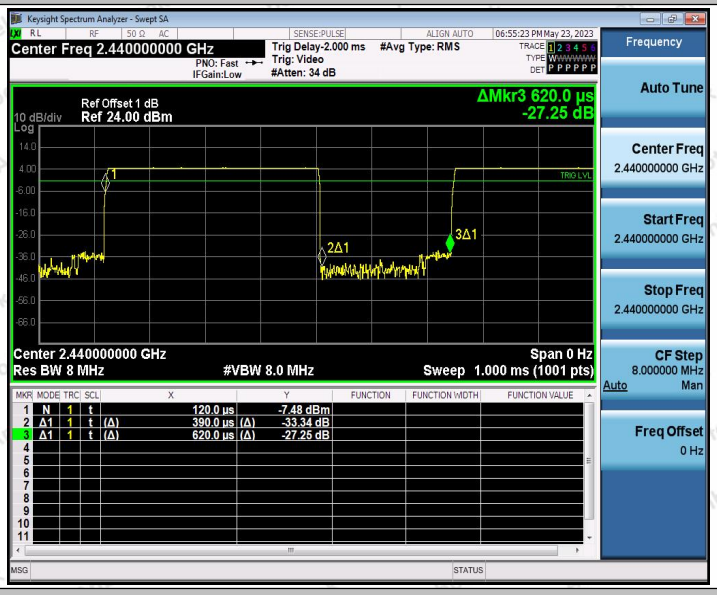
Test Mode	Antenna	Frequency[MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor[dB]
BLE_1M	Ant1	2402	0.39	0.62	62.90	2.01
		2440	0.39	0.62	62.90	2.01
		2480	0.39	0.62	62.90	2.01

Test Graphs

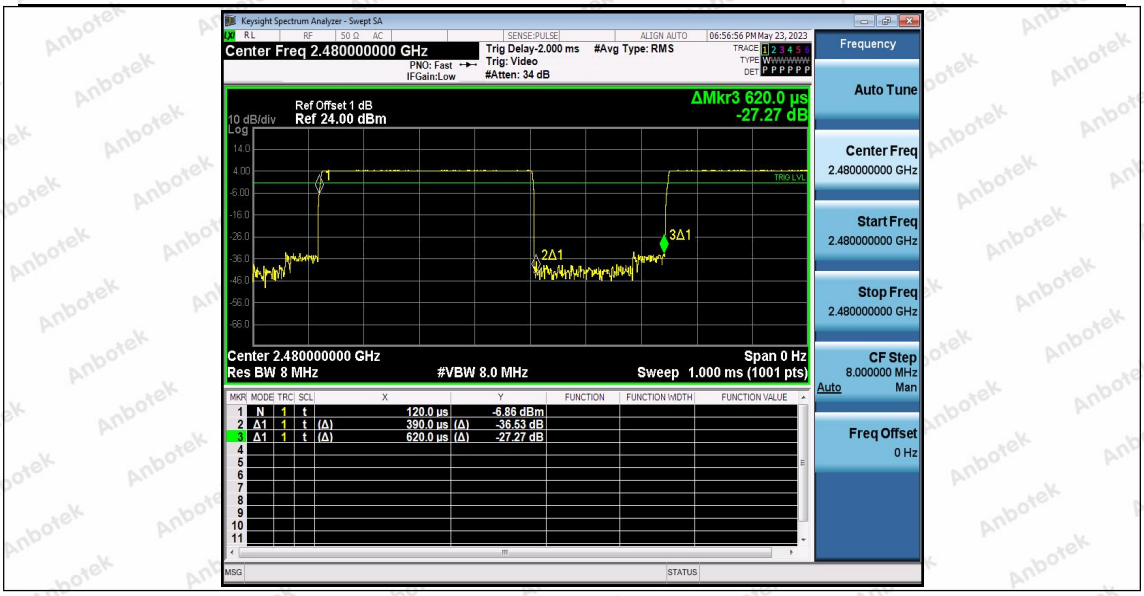
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
Trig Delay-2.000 ms
Trig: Video
#Atten: 34 dB
#Avg Type: RMS
06:56:56 PM May 23, 2023
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
ΔMkr3 620.0 µs
-27.27 dB
Ref Offset 1 dB
10 dB/div
Ref 24.00 dBm
Center 2.480000000 GHz
Span 0 Hz
Res BW 8 MHz
#VBW 8.0 MHz
Sweep 1.000 ms (1001 pts)
1 N 1 t 120.0 µs -6.86 dBm
2 Δ1 1 t (Δ) 390.0 µs (Δ) -36.53 dB
3 Δ1 1 t (Δ) 620.0 µs (Δ) -27.27 dB

---End---