Appendix Test Data

Report No.:	18220WC30272101	Test Sample No.:	1-2-2
Start Test Date:	2023.12.24	Finish Test Date:	2023.12.25
Test Engineer:	Hayman Chen	Auditor:	Rock Luo
Temperature:	24.2℃	Relative Humidity:	45%
Pressure:	101kPa		

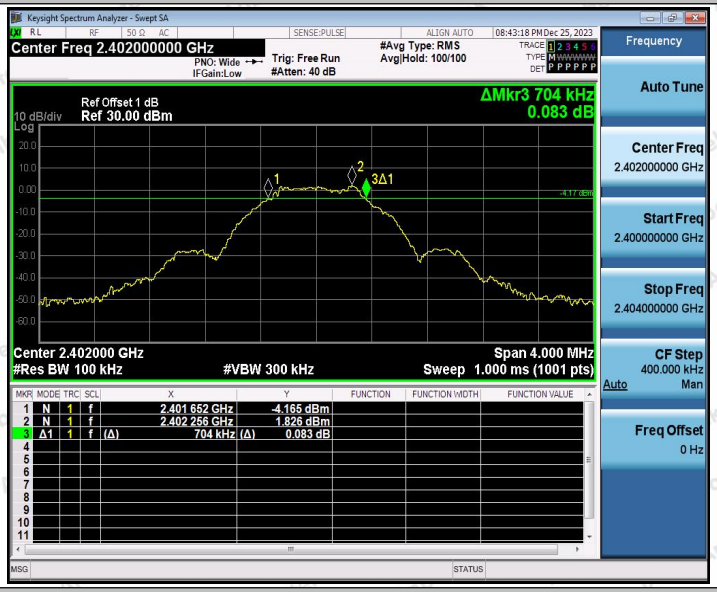
Appendix A: DTS Bandwidth

Test Result

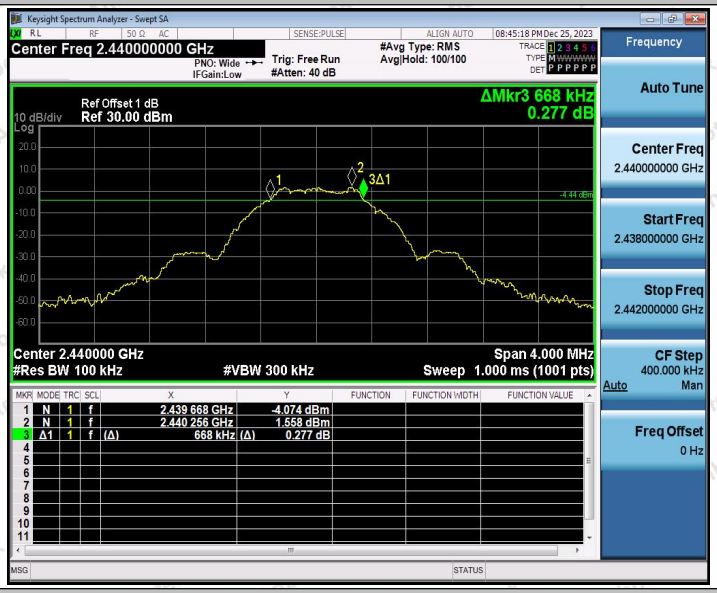
TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.704	2401.652	2402.356	0.5	PASS
		2440	0.668	2439.668	2440.336	0.5	PASS
		2480	0.668	2479.672	2480.340	0.5	PASS

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
08:47:32 PM Dec 25, 2023
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
ΔMkr3 668 kHz
-0.321 dB
-5.21 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 2.479 672 GHz -4.819 dBm
2 N 1 f 2.480 264 GHz 0.794 dBm
3 Δ1 1 f (Δ) 668 kHz (Δ) -0.321 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

TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]
BLE_1M	Ant1	2402	1.0261	2401.4998	2402.5259
		2440	1.0245	2439.5031	2440.5276
		2480	1.0306	2479.4980	2480.5286

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
#IFGain:Low
Radio Std: None
Radio Device: BTS
Frequency
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
Log
Mkr1 2.479976 GHz
-1.4427 dBm
Center Freq
2.480000000 GHz
Center 2.48 GHz
#Res BW 43 kHz
#VBW 130 kHz
Span 4 MHz
Sweep 2.067 ms
CF Step
400.000 kHz
Auto
Man
Freq Offset
0 Hz
Occupied Bandwidth
1.0306 MHz
Total Power
8.22 dBm
Transmit Freq Error
13.251 kHz
OBW Power
99.00 %
x dB Bandwidth
1.265 MHz
x dB
-26.00 dB
MSG
STATUS

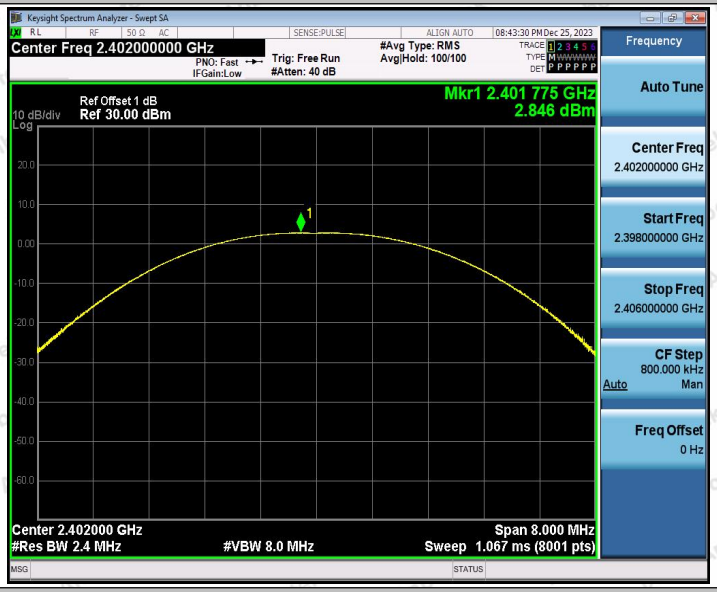
Appendix C: Maximum conducted output power

Test Result Peak

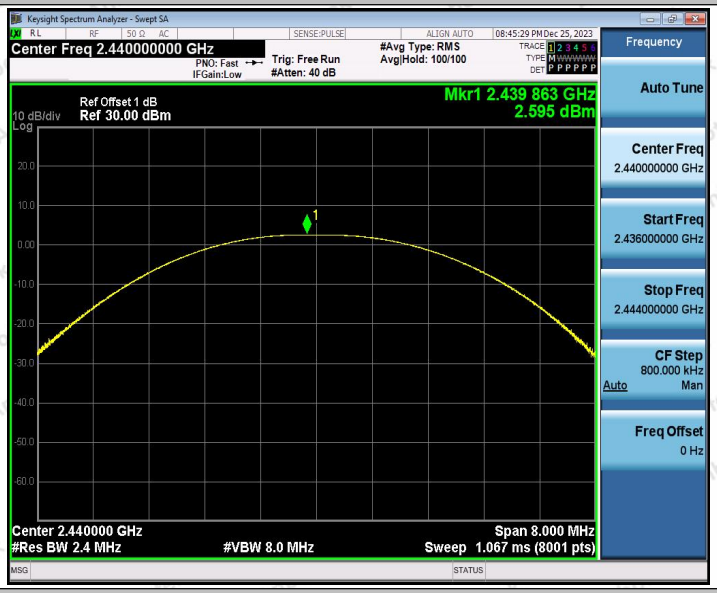
TestMode	Antenna	Frequency[MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Verdict
BLE_1M	Ant1	2402	2.85	≤30	PASS
		2440	2.60	≤30	PASS
		2480	1.86	≤30	PASS

Test Graphs Peak

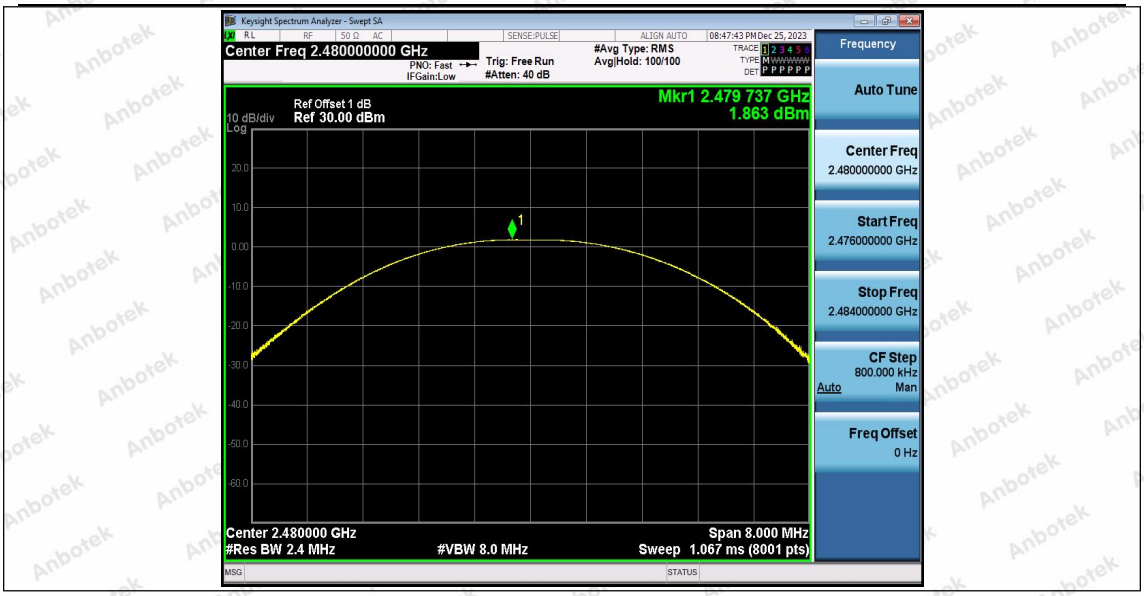
BLE_1M_Ant1_2402



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
08:47:43 PM Dec 25, 2023
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
Log
Mkr1 2.479 737 GHz
1.863 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
MSG
STATUS

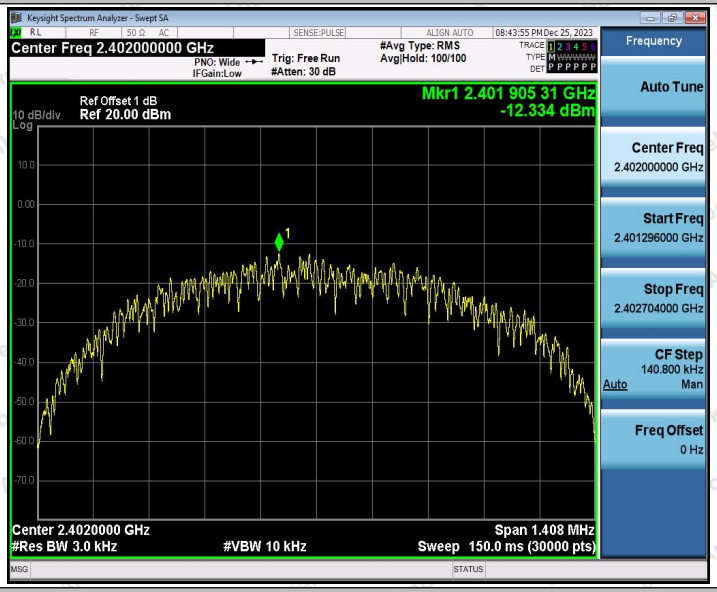
Appendix D: Maximum power spectral density

Test Result

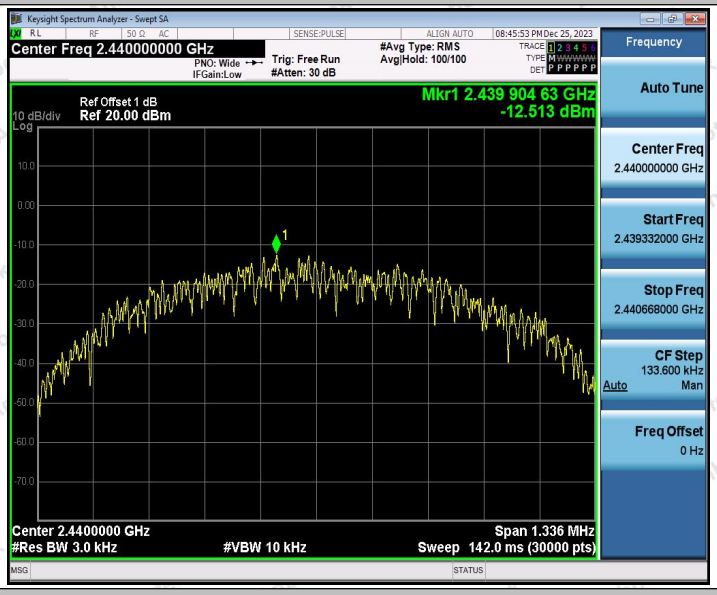
TestMode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-12.33	≤8.00	PASS
		2440	-12.51	≤8.00	PASS
		2480	-13.26	≤8.00	PASS

Test Graphs

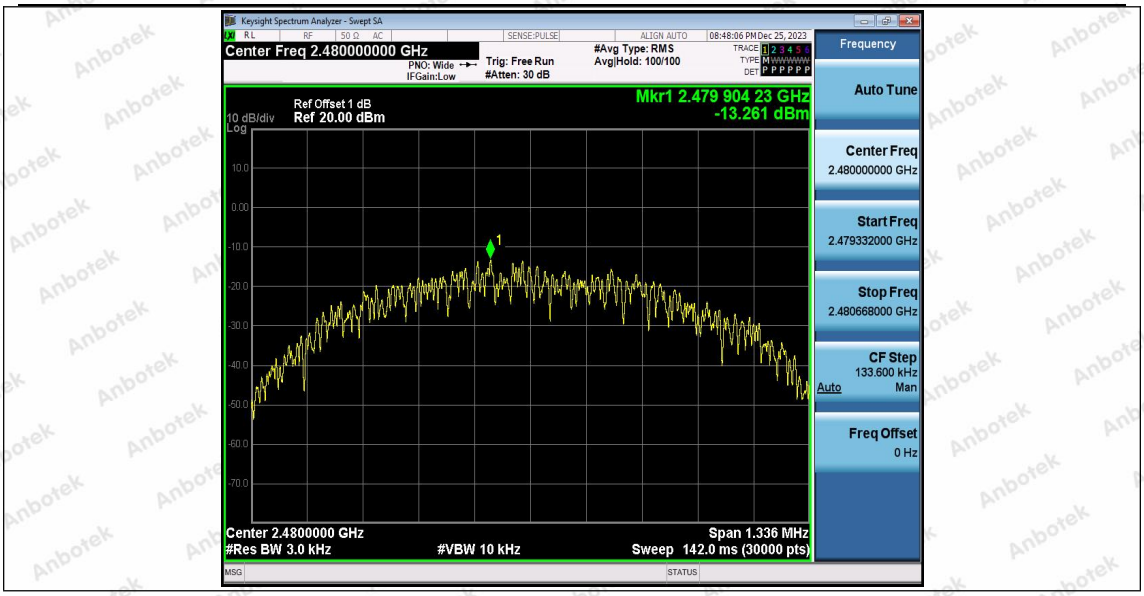
BLE_1M_Ant1_2402



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
08:48:06 PM Dec 25, 2023
Frequency
Ref Offset 1 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr1 2.479 904 23 GHz
-13.261 dBm
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.479332000 GHz
Stop Freq
2.480668000 GHz
CF Step
133.600 kHz
Auto
Man
Freq Offset
0 Hz
Center 2.4800000 GHz
#Res BW 3.0 kHz
#VBW 10 kHz
Span 1.336 MHz
Sweep 142.0 ms (30000 pts)
MSG
STATUS

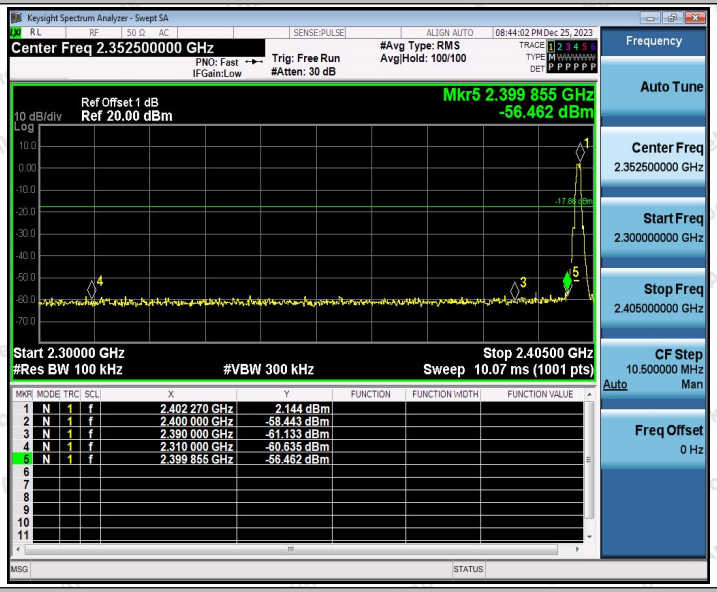
Appendix E: Band edge measurements

Test Result

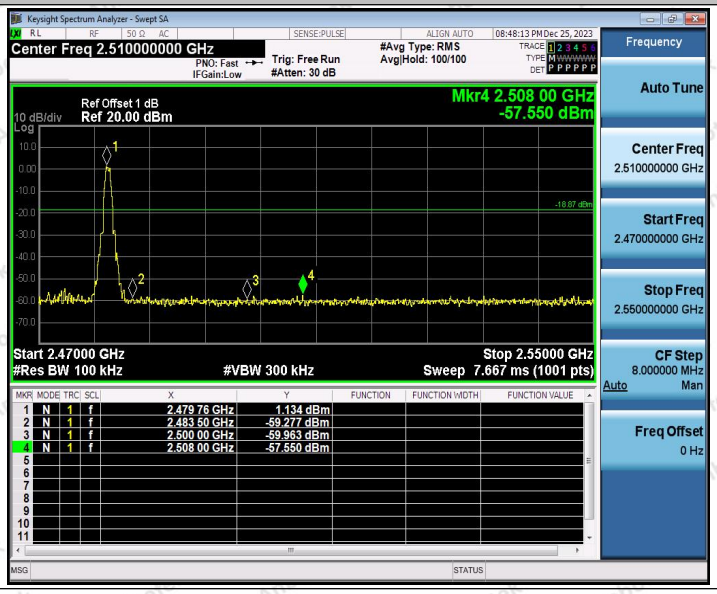
TestMode	Antenna	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	2.14	-56.46	≤-17.86	PASS
		High	2480	1.13	-57.55	≤-18.87	PASS

Test Graphs

BLE_1M_Ant1_Low_2402



BLE_1M_Ant1_High_2480



Appendix F: Conducted Spurious Emission

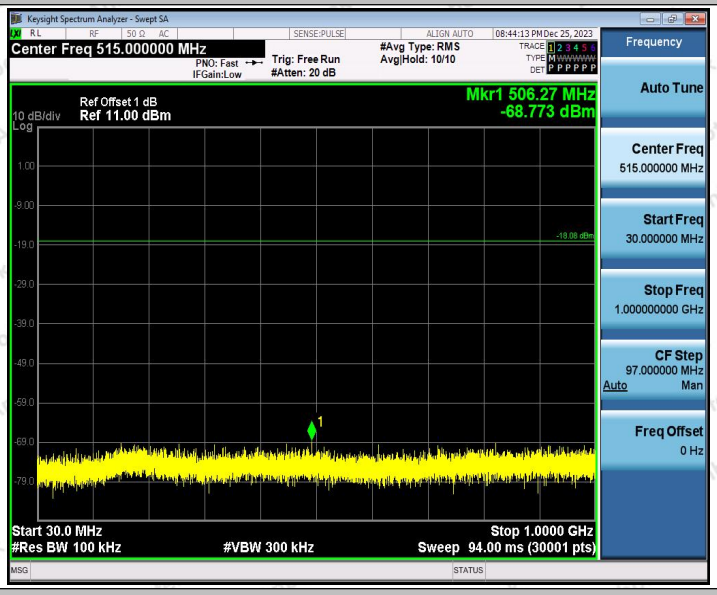
Test Result

TestMode	Antenna	Frequency[MHz]	FreqRange[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	1.92	1.92	---	PASS
			30~1000	1.92	-68.77	≤-18.08	PASS
			1000~26500	1.92	-52.7	≤-18.08	PASS
		2440	Reference	1.44	1.44	---	PASS
			30~1000	1.44	-68.94	≤-18.56	PASS
			1000~26500	1.44	-53.5	≤-18.56	PASS
		2480	Reference	0.03	0.03	---	PASS
			30~1000	0.03	-67.65	≤-19.97	PASS
			1000~26500	0.03	-53.3	≤-19.97	PASS

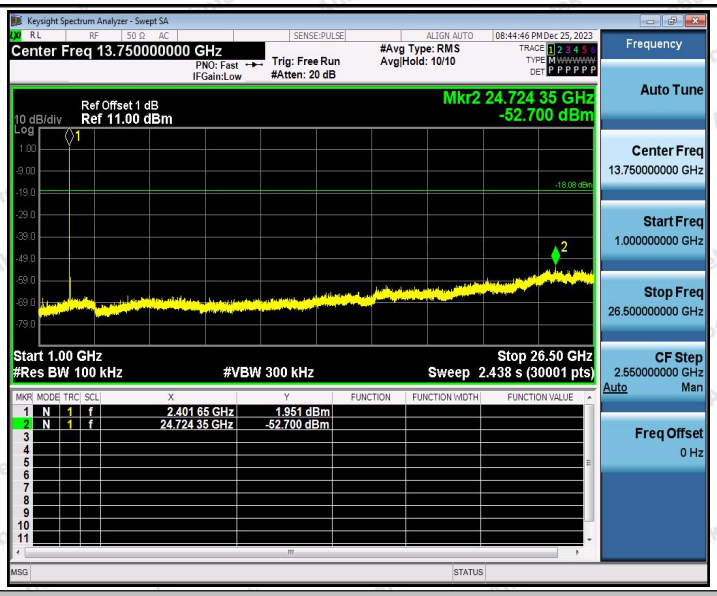
Test Graphs

BLE_1M_Ant1_2402_0~Reference

BLE_1M_Ant1_2402_30~1000

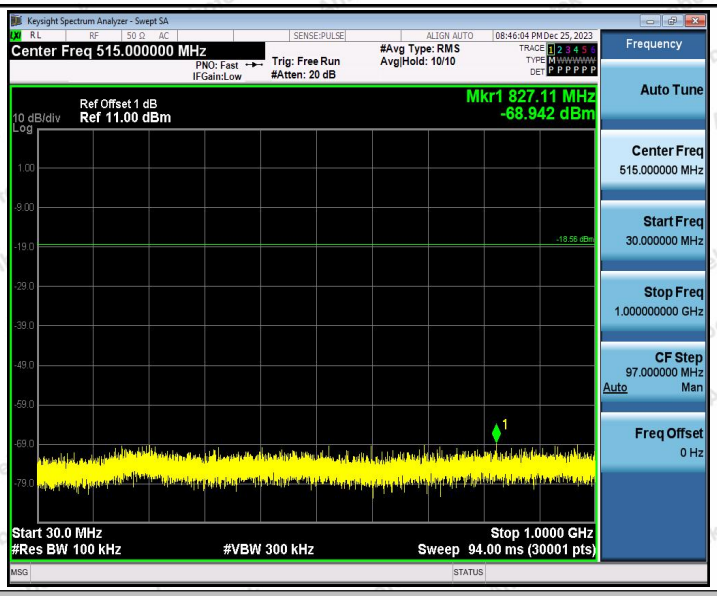


BLE_1M_Ant1_2402_1000~26500

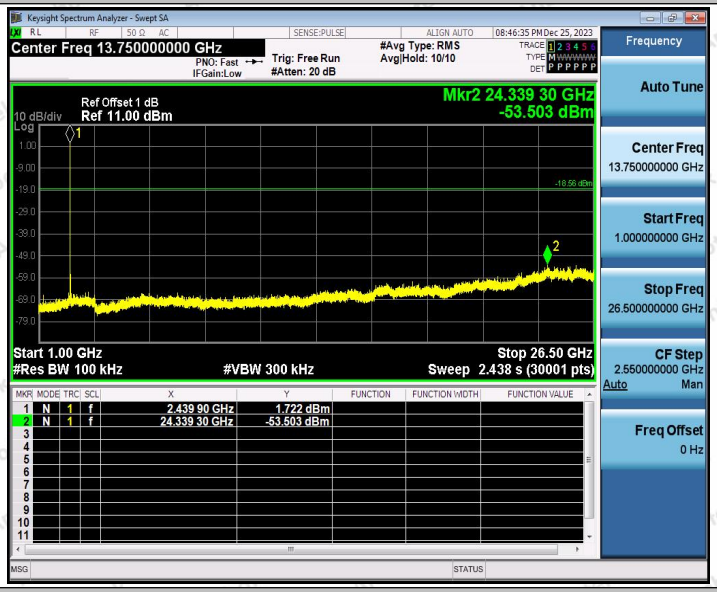


BLE_1M_Ant1_2440_0~Reference

BLE_1M_Ant1_2440_30~1000

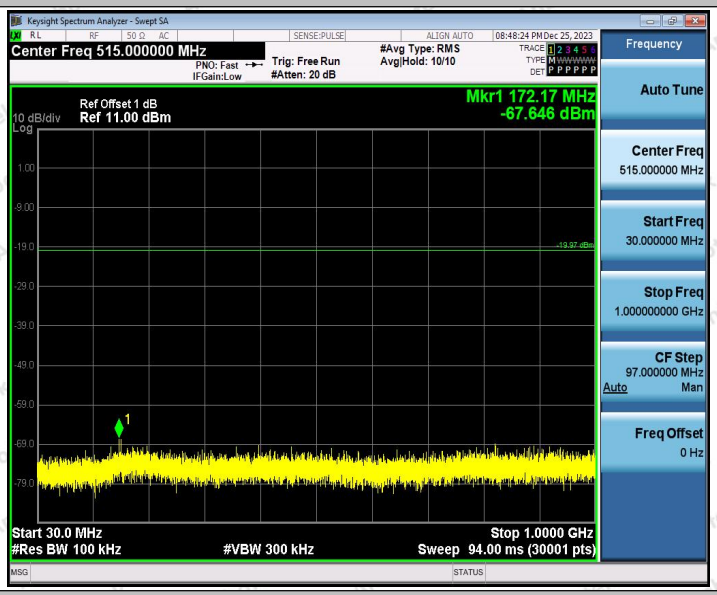


BLE_1M_Ant1_2440_1000~26500

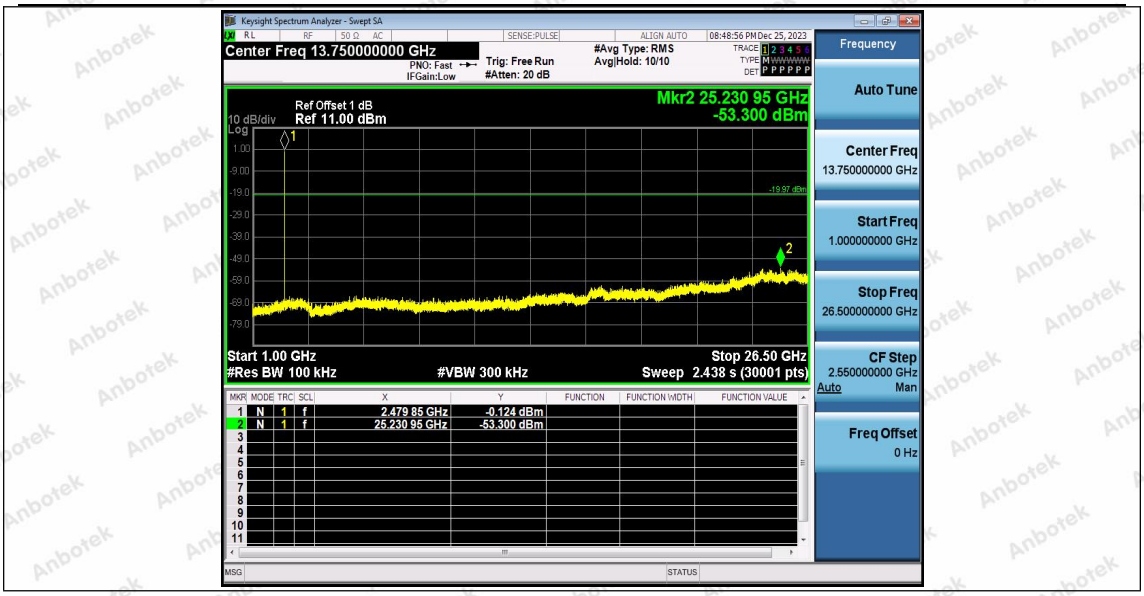


BLE_1M_Ant1_2480_0~Reference

BLE_1M_Ant1_2480_30~1000



BLE_1M_Ant1_2480_1000~26500


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: 10/10
08:48:56 PM Dec 25, 2023
Ref Offset 1 dB
10 dB/div
Ref 11.00 dBm
Log
Mkr2 25.230 95 GHz
-53.300 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 2.479 85 GHz -0.124 dBm
2 N 1 f 25.230 95 GHz -53.300 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

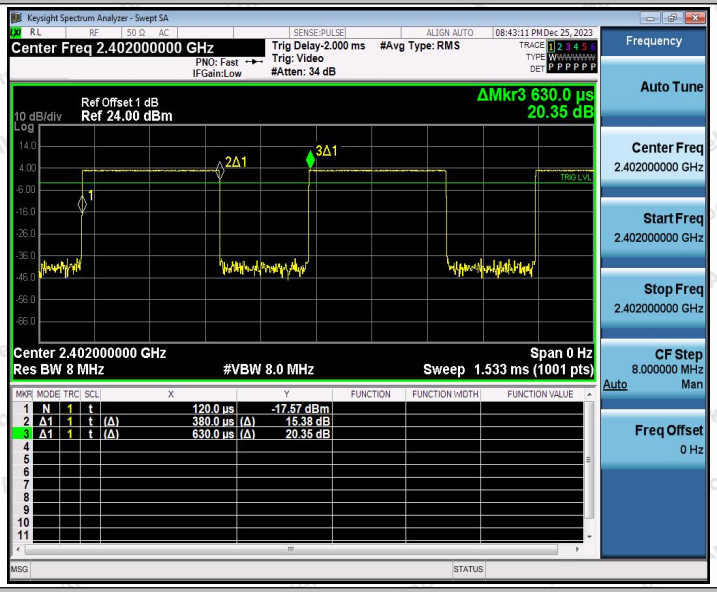
Appendix G: Duty Cycle

Test Result

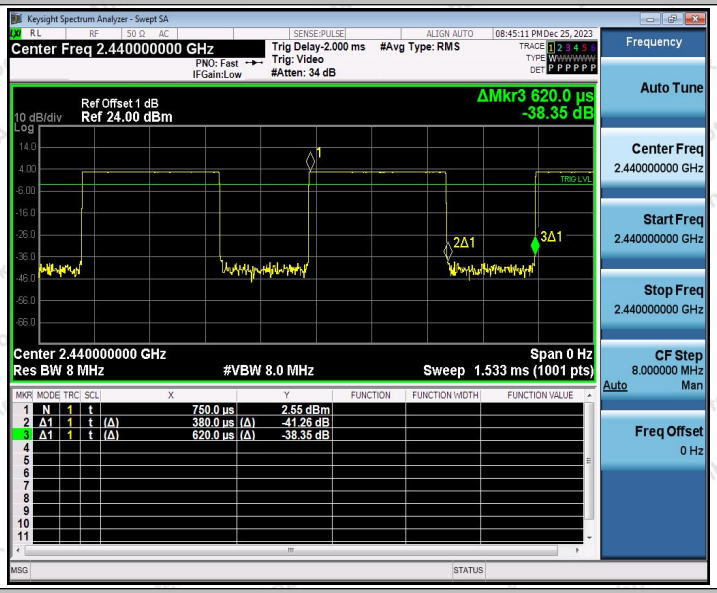
TestMode	Antenna	Frequency[MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor[dB]
BLE_1M	Ant1	2402	0.38	0.63	60.32	2.20
		2440	0.38	0.62	61.29	2.13
		2480	0.38	0.63	60.32	2.20

Test Graphs

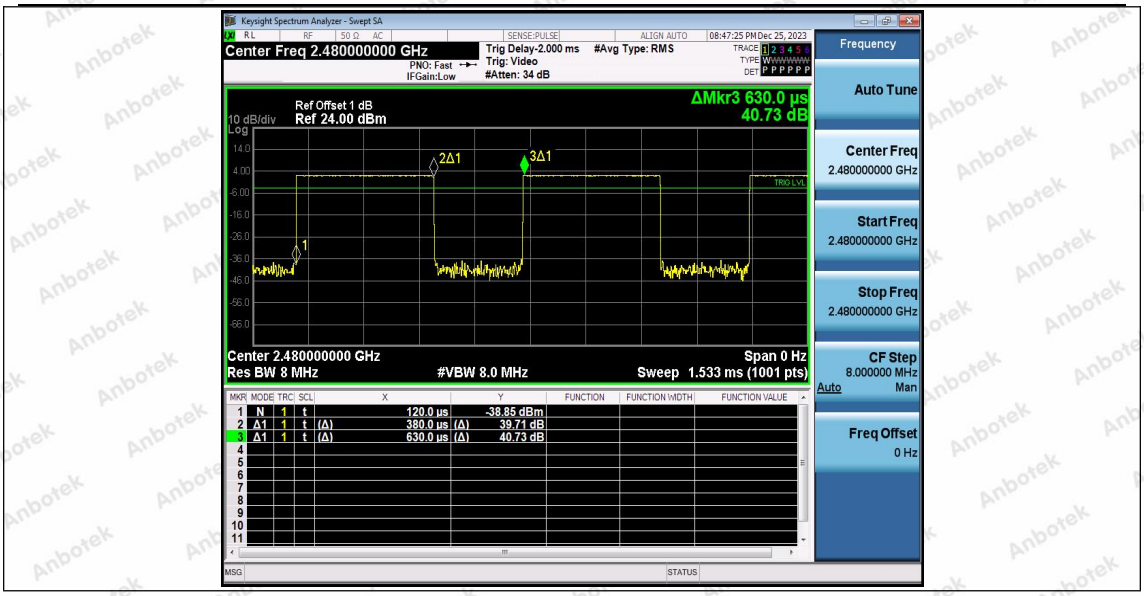
BLE_1M_Ant1_2402



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
08:47:25 PM Dec 25, 2023
Ref Offset 1 dB
10 dB/div
Ref 24.00 dBm
ΔMkr3 630.0 µs
40.73 dB
Center 2.480000000 GHz
Res BW 8 MHz
#VBW 8.0 MHz
Span 0 Hz
Sweep 1.533 ms (1001 pts)
1 N 1 t 120.0 µs -38.85 dBm
2 Δ1 1 t (Δ) 380.0 µs (Δ) 39.71 dB
3 Δ1 1 t (Δ) 630.0 µs (Δ) 40.73 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---