Appendix Test Data

Report No.:	18220WC30081901	Test Sample No.:	1-2-2
Start Test Date:	2023.05.10	Finish Test Date:	2023.05.10
Test Engineer:	Rick Luo	Auditor:	Edward. Pan
Temperature:	27.0℃	Relative Humidity:	48%
Pressure:	1012 hPa		

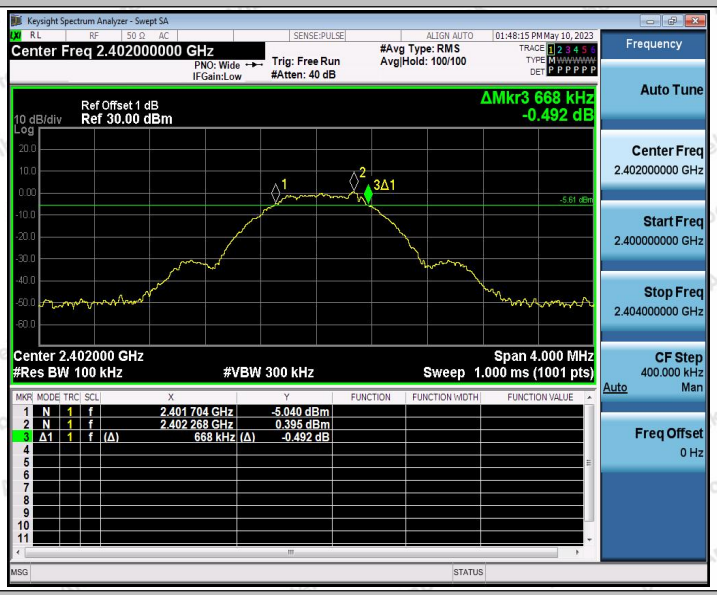
Appendix A: DTS Bandwidth

Test Result

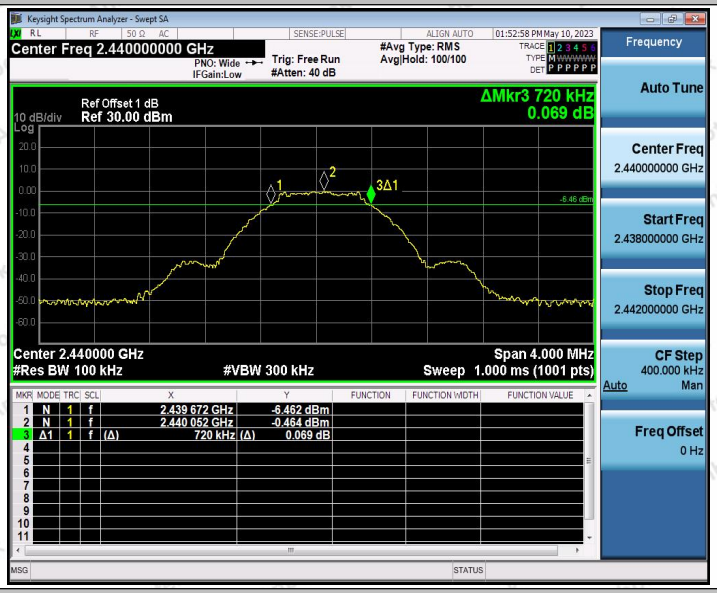
Test Mode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[kHz]	Verdict
BLE_1M	Ant1	2402	0.668	2401.704	2402.372	≥500	PASS
		2440	0.720	2439.672	2440.392	≥500	PASS
		2480	0.716	2479.676	2480.392	≥500	PASS

Test Graphs

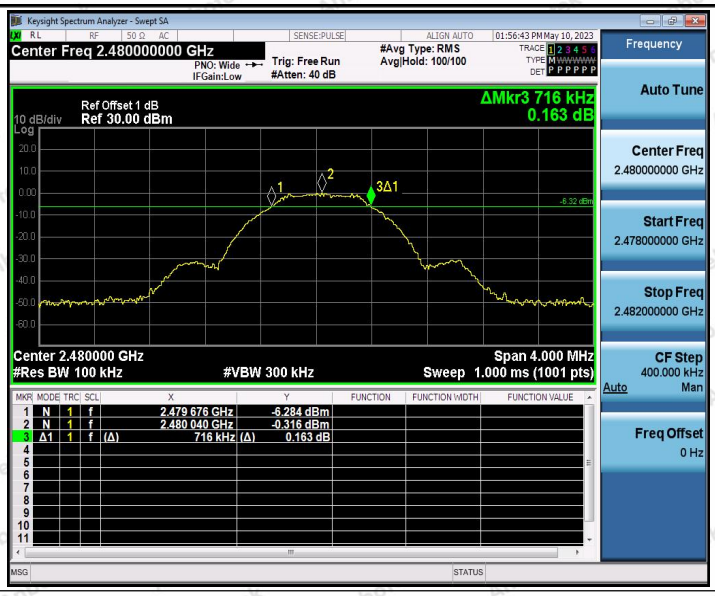
BLE_1M_Ant1_2402



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
01:56:43 PM May 10, 2023
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
ΔMkr3 716 kHz
0.163 dB
-6.32 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 2.479 676 GHz -6.284 dBm
2 N 1 f 2.480 040 GHz -0.316 dBm
3 Δ1 1 f (Δ) 716 kHz (Δ) 0.163 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

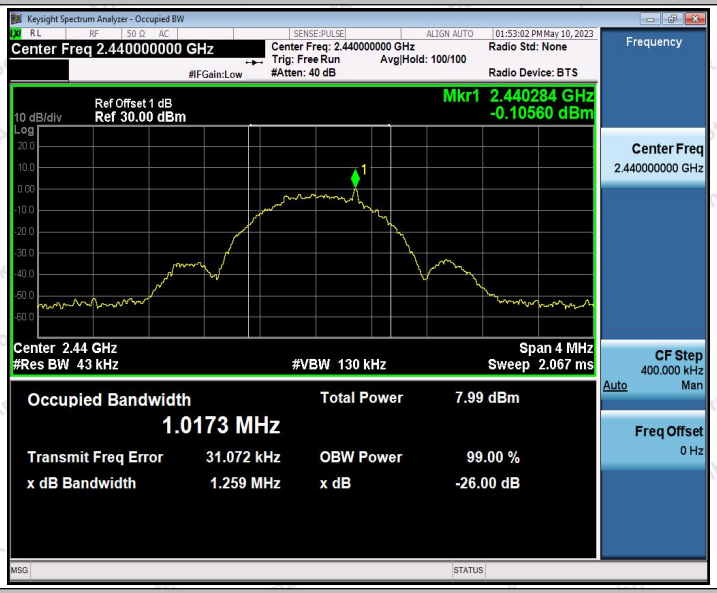
Test Result

Test Mode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]
BLE_1M	Ant1	2402	1.0364	2401.5110	2402.5474
		2440	1.0173	2439.5224	2440.5397
		2480	1.0307	2479.5149	2480.5456

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
01:56:47 PM May 10, 2023
Frequency
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
Log
Mkr1 2.479784 GHz
-2.2310 dBm
Center 2.48 GHz
#Res BW 43 kHz
#VBW 130 kHz
Span 4 MHz
Sweep 2.067 ms
Occupied Bandwidth
1.0307 MHz
Total Power 8.00 dBm
Transmit Freq Error 30.250 kHz
OBW Power 99.00 %
x dB Bandwidth 1.326 MHz
x dB -26.00 dB
Center Freq
2.480000000 GHz
CF Step
400.000 kHz
Auto Man
Freq Offset
0 Hz
MSG
STATUS

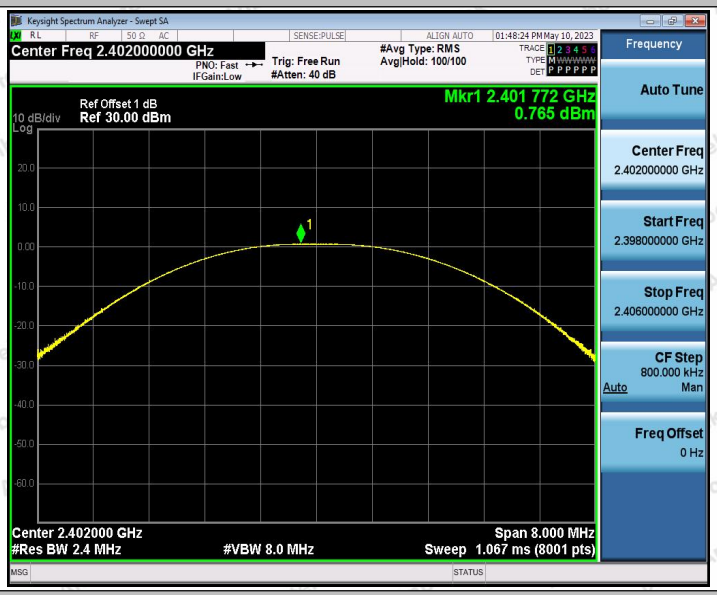
Appendix C: Maximum conducted output power

Test Result Peak

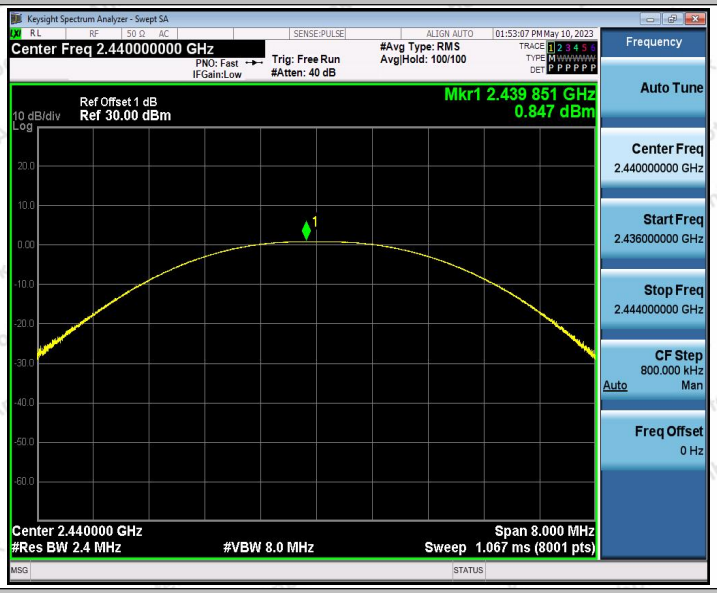
Test Mode	Antenna	Frequency[MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Verdict
BLE_1M	Ant1	2402	0.77	≤30	PASS
		2440	0.85	≤30	PASS
		2480	**0.99**	≤30	PASS

Test Graphs Peak

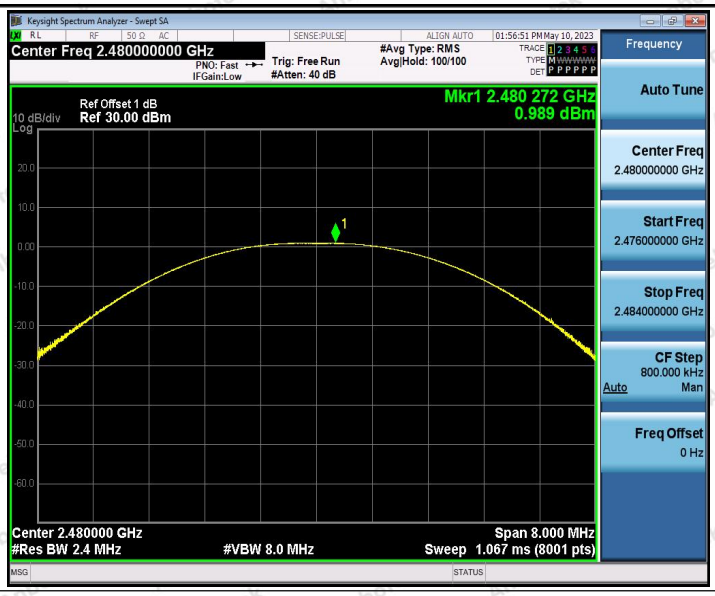
BLE_1M_Ant1_2402



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
01:56:51 PM May 10, 2023
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
Log
Mkr1 2.480 272 GHz
0.989 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

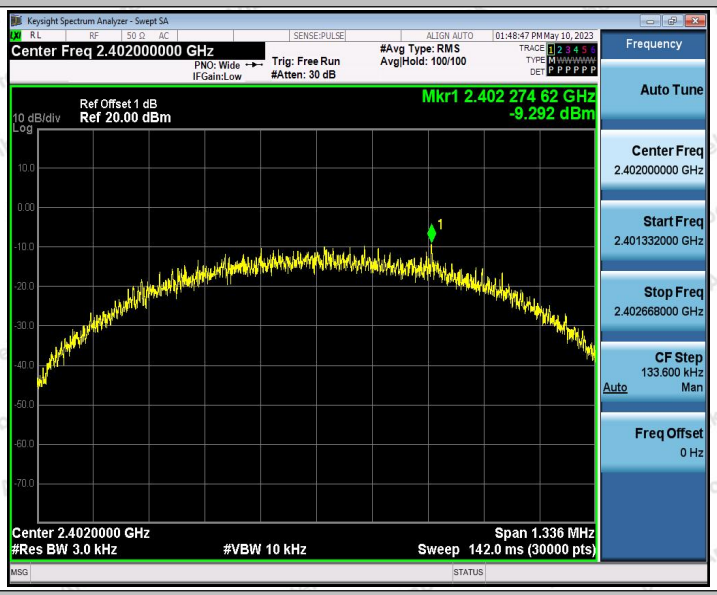
Appendix D: Maximum power spectral density

Test Result

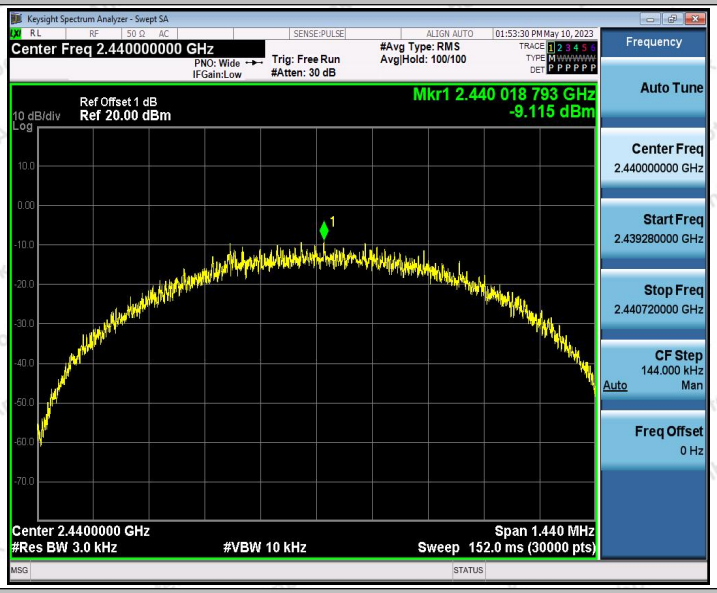
Test Mode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-9.29	≤8.00	PASS
		2440	-9.12	≤8.00	PASS
		2480	-8.16	≤8.00	PASS

Test Graphs

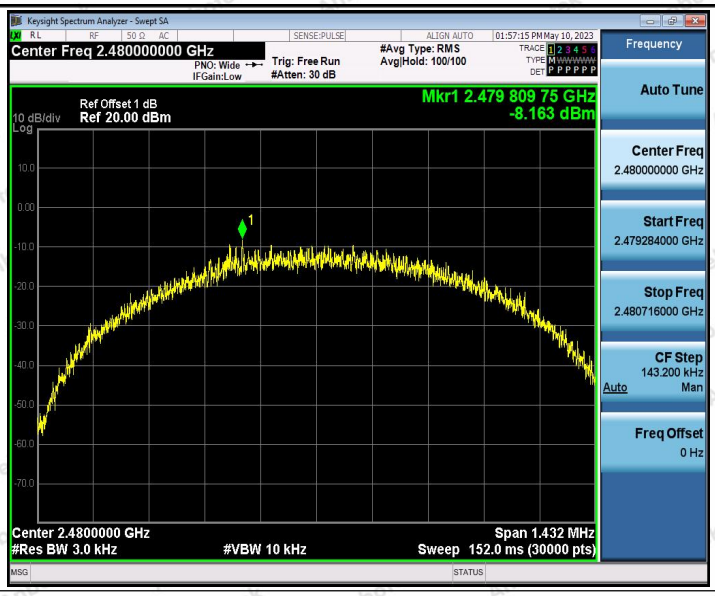
BLE_1M_Ant1_2402



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
01:57:15 PM May 10, 2023
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.479284000 GHz
Stop Freq
2.480716000 GHz
CF Step
143.200 kHz
Auto
Man
Freq Offset
0 Hz
Ref Offset 1 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.479 809 75 GHz
-8.163 dBm
Center 2.4800000 GHz
#Res BW 3.0 kHz
#VBW 10 kHz
Span 1.432 MHz
Sweep 152.0 ms (30000 pts)

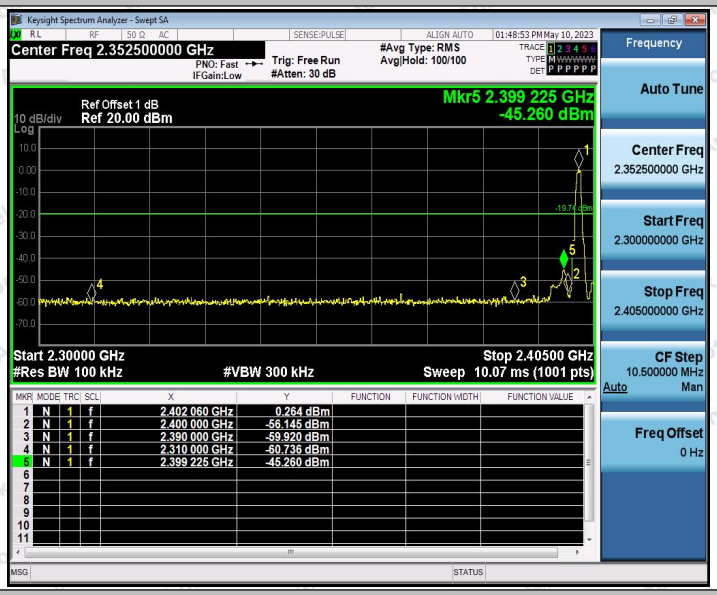
Appendix E: Band edge measurements

Test Result

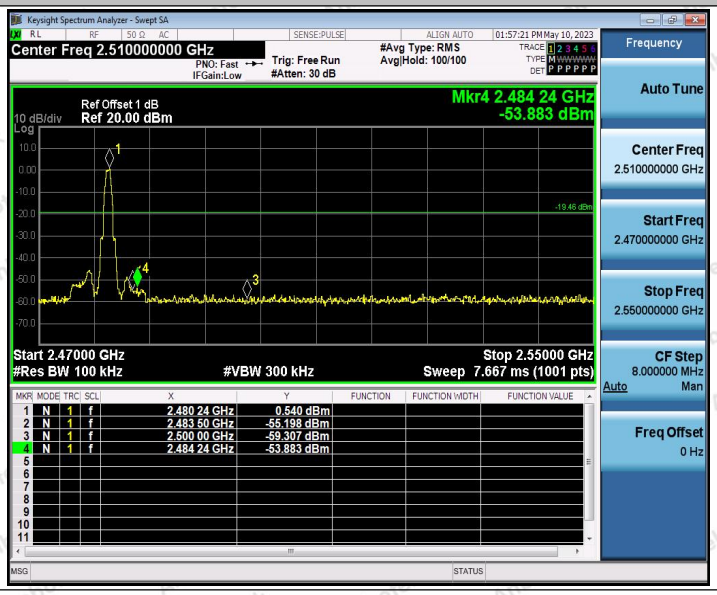
TestMode	Antenna	ChName	Frequency [MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	0.26	-45.26	≤-19.74	PASS
		High	2480	0.54	-53.88	≤-19.46	PASS

Test Graphs

BLE_1M_Ant1_Low_2402



BLE_1M_Ant1_High_2480



Appendix F: Conducted Spurious Emission

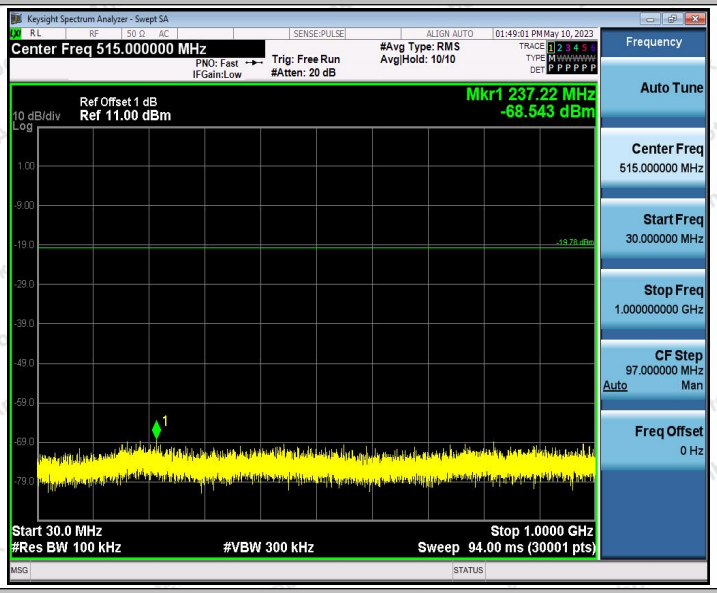
Test Result

TestMode	Antenna	Frequency [MHz]	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	0.22	0.22	---	PASS
			30~1000	0.22	-68.54	≤-19.78	PASS
			1000~26500	0.22	-52.15	≤-19.78	PASS
		2440	Reference	-0.22	-0.22	---	PASS
			30~1000	-0.22	-68.83	≤-20.22	PASS
			1000~26500	-0.22	-52.16	≤-20.22	PASS
		2480	Reference	-0.09	-0.09	---	PASS
			30~1000	-0.09	-68.11	≤-20.09	PASS
			1000~26500	-0.09	-51.5	≤-20.09	PASS

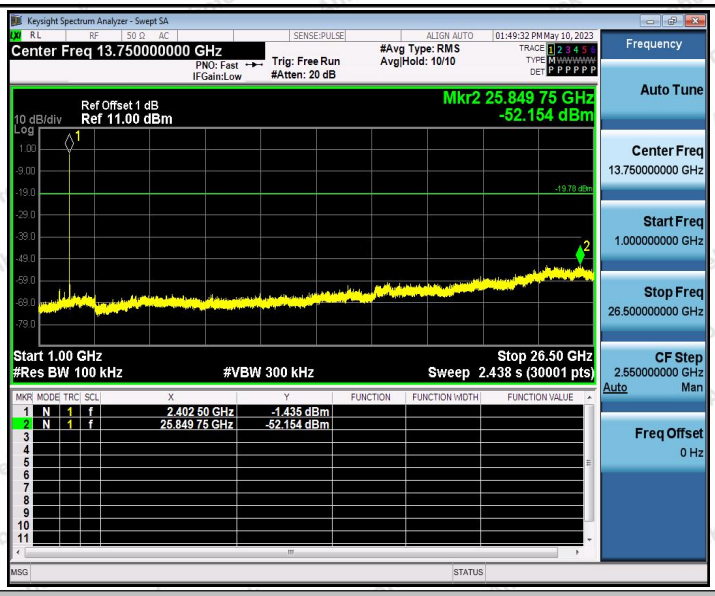
Test Graphs

BLE_1M_Ant1_2402_0~Reference

BLE_1M_Ant1_2402_30~1000

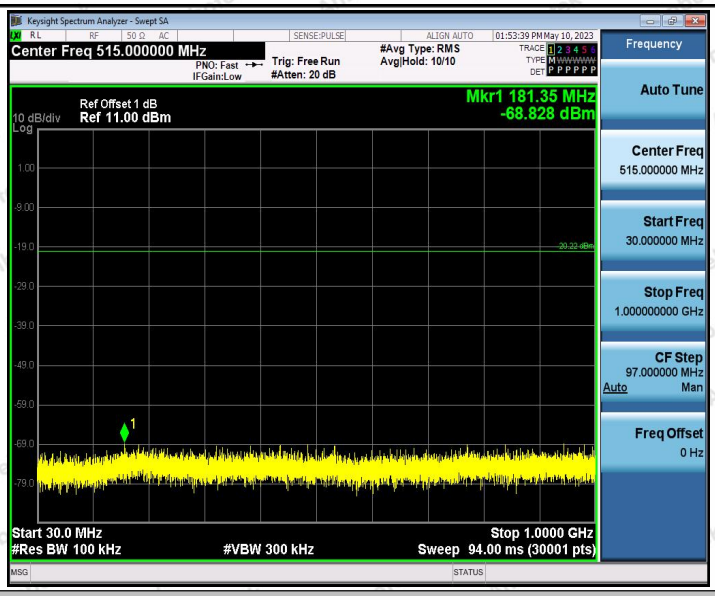


BLE_1M_Ant1_2402_1000~26500

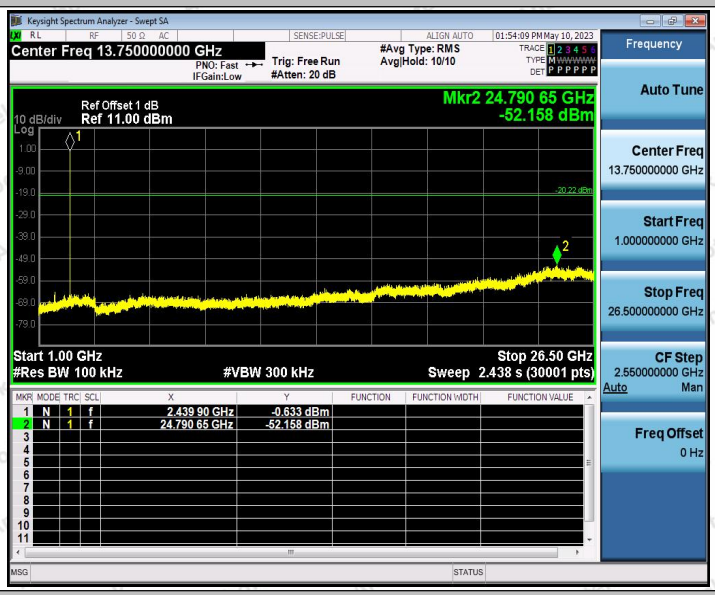


BLE_1M_Ant1_2440_0~Reference

BLE_1M_Ant1_2440_30~1000

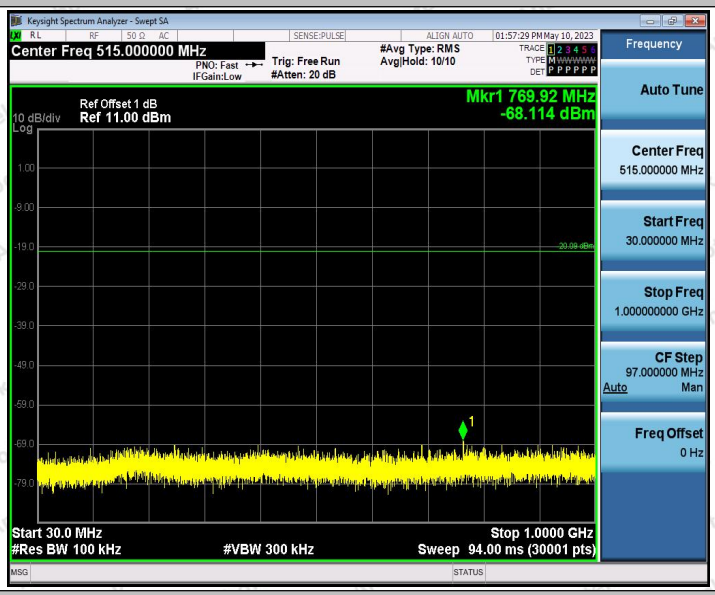


BLE_1M_Ant1_2440_1000~26500

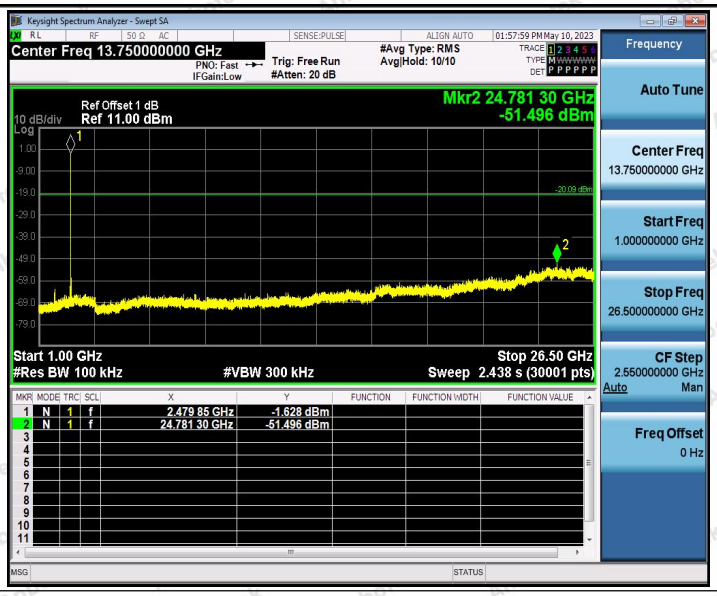


BLE_1M_Ant1_2480_0~Reference

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
01:57:59 PM May 10, 2023
Ref Offset 1 dB
10 dB/div
Ref 11.00 dBm
Mkr2 24.781 30 GHz
-51.496 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 -1.628 dBm
2 N 1 f 24.781 30 GHz -51.496 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

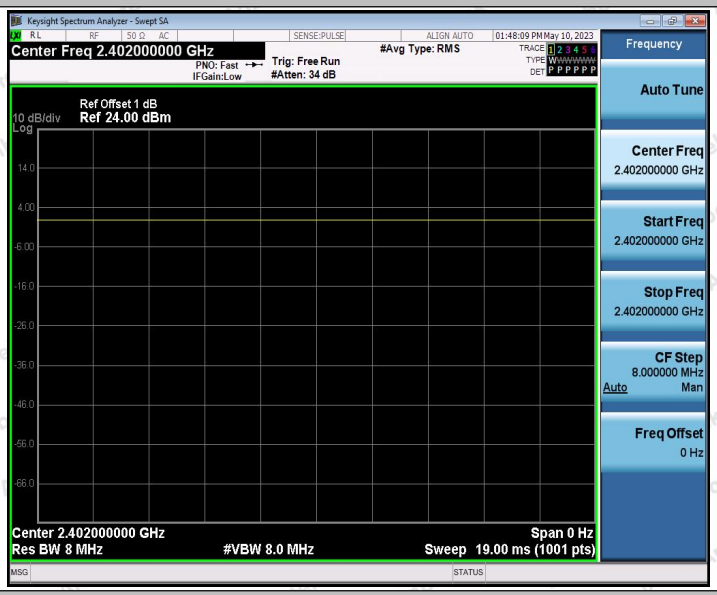
Appendix G: Duty Cycle

Test Result

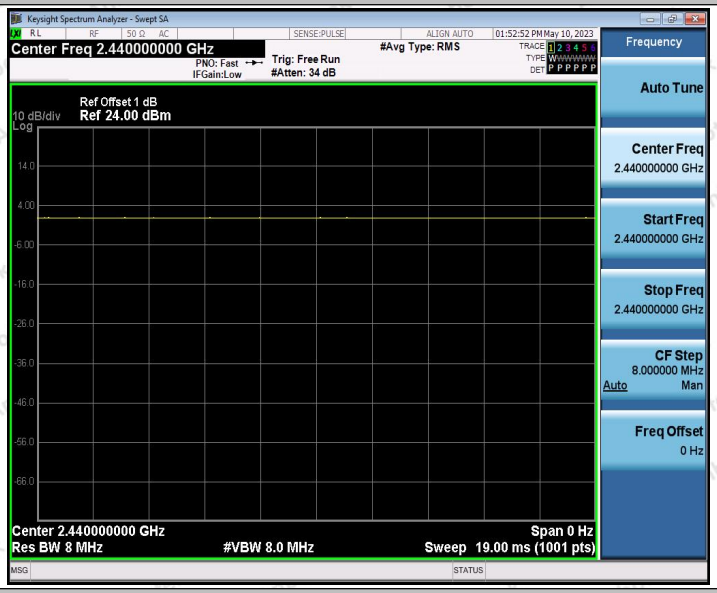
Test Mode	Antenna	Frequency[MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor[dB]
BLE_1M	Ant1	2402	19.00	19.00	100	0.00
		2440	19.00	19.00	100	0.00
		2480	19.00	19.00	100	0.00

Test Graphs

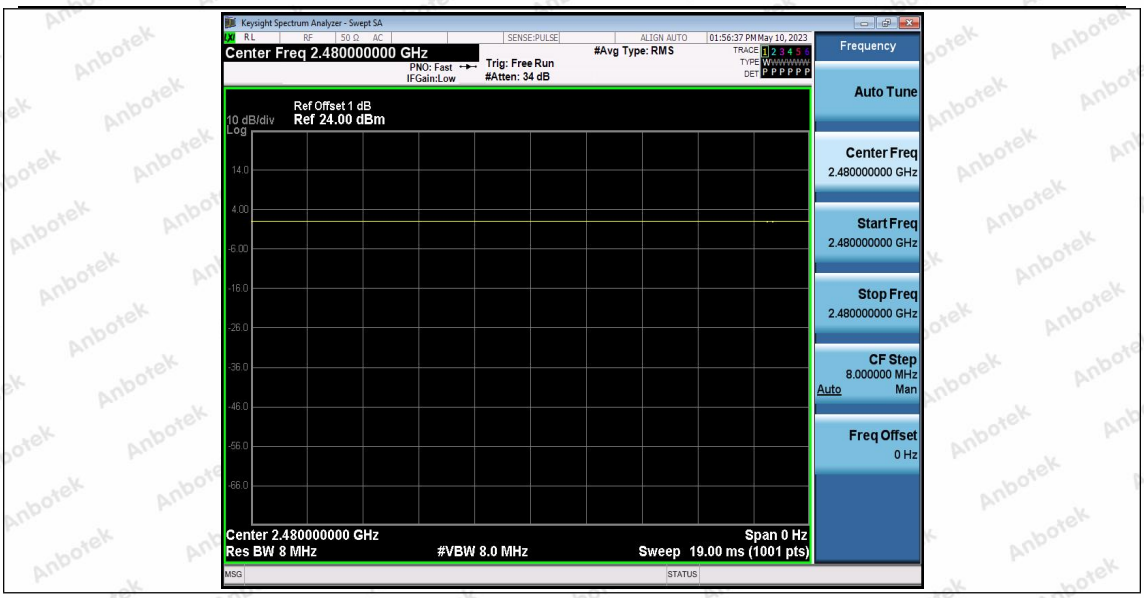
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 34 dB
#Avg Type: RMS
01:56:37 PM May 10, 2023
Ref Offset 1 dB
10 dB/div
Ref 24.00 dBm
Log
Center 2.480000000 GHz
Res BW 8 MHz
#VBW 8.0 MHz
Span 0 Hz
Sweep 19.00 ms (1001 pts)
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---