Appendix Test Data

Report No.:	18220WC20193402	Test Sample No.:	1-2-2
Start Test Date:	2022.8.19	Finish Test Date:	2022.8.27
Test Engineer:	Tony.He	Auditor:	Edward.Pan
Temperature:	27.3℃	Relative Humidity:	47 %
Pressure:	1012 hPa		

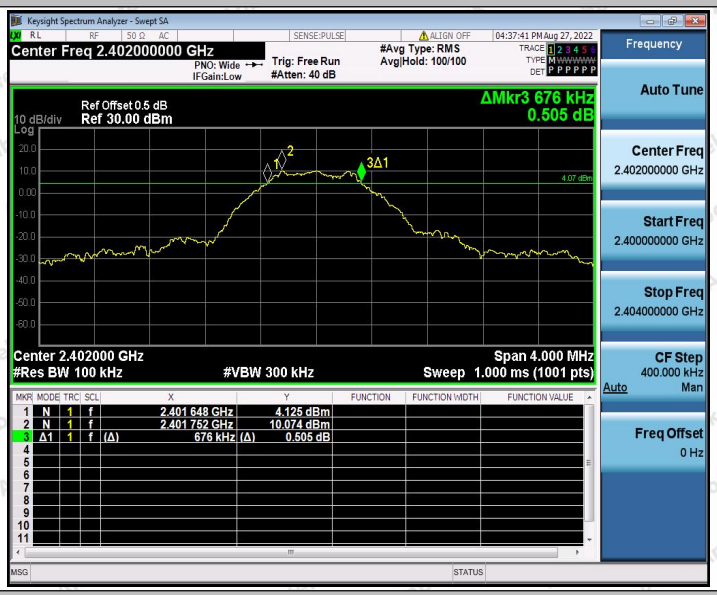
Appendix A: DTS Bandwidth

Test Result

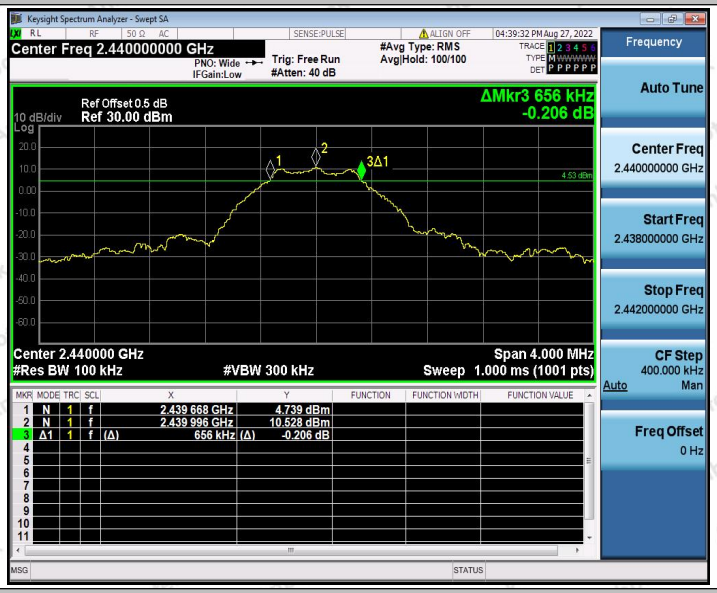
TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.676	2401.648	2402.324	0.5	PASS
		2440	0.656	2439.668	2440.324	0.5	PASS
		2480	0.664	2479.660	2480.324	0.5	PASS

Test Graphs

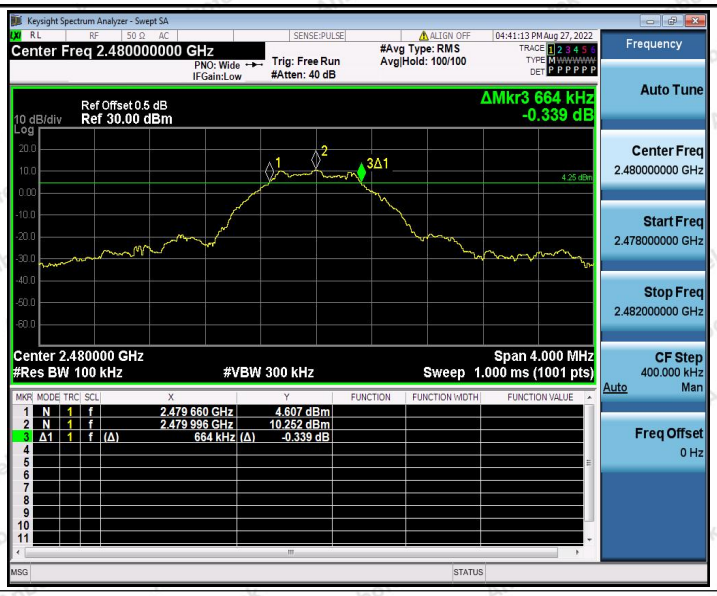
BLE_1M_Ant1_2402



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
04:41:13 PM Aug 27, 2022
Ref Offset 0.5 dB
10 dB/div
Ref 30.00 dBm
ΔMkr3 664 kHz
-0.339 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 2.479 660 GHz 4.607 dBm
2 N 1 f 2.479 996 GHz 10.252 dBm
3 Δ1 1 f (Δ) 664 kHz (Δ) -0.339 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

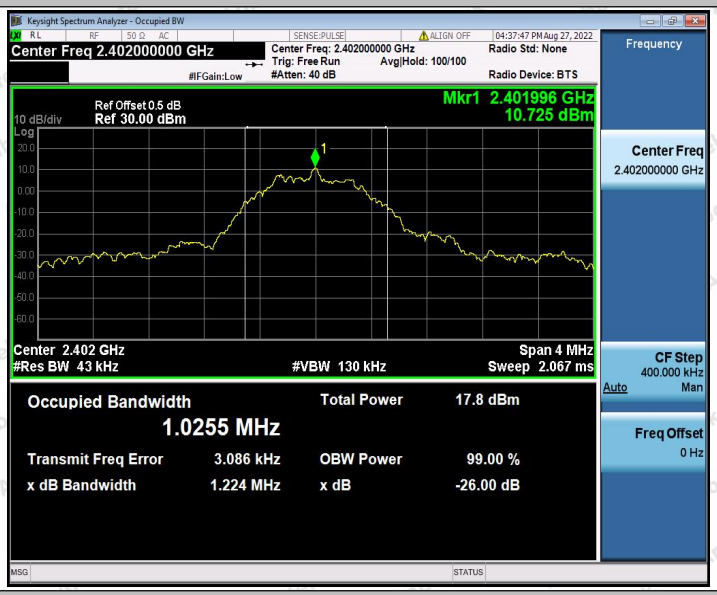
Appendix B: Occupied Channel Bandwidth

Test Result

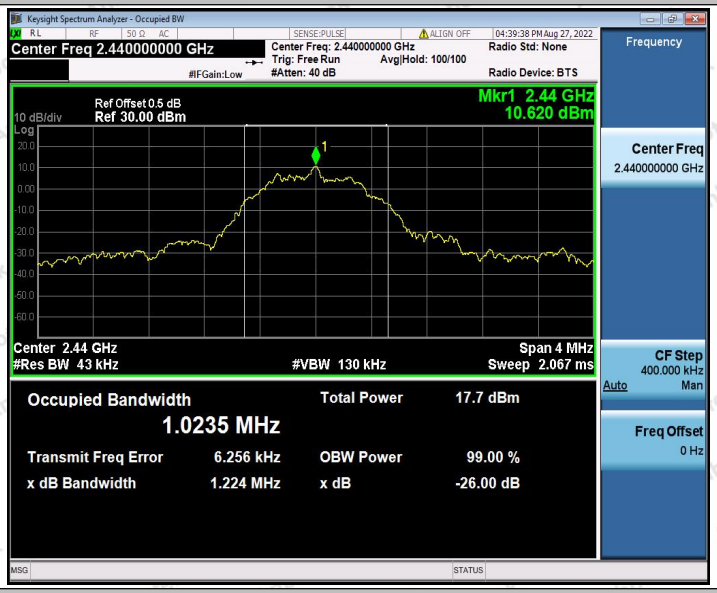
TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]
BLE_1M	Ant1	2402	1.0255	2401.4903	2402.5158
		2440	1.0235	2439.4945	2440.5180
		2480	1.0190	2479.4948	2480.5138

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
Frequency
Ref Offset 0.5 dB
10 dB/div
Ref 30.00 dBm
Log
Mkr1 2.48 GHz
10.172 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
Occupied Bandwidth
1.0190 MHz
Total Power
17.5 dBm
Transmit Freq Error
4.326 kHz
OBW Power
99.00 %
x dB Bandwidth
1.219 MHz
x dB
-26.00 dB
Freq Offset
0 Hz
MSG
STATUS

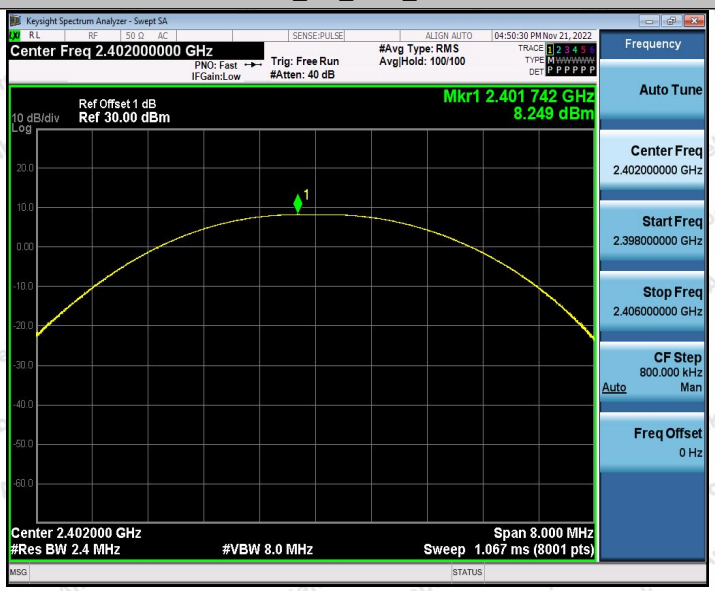
Appendix C: Maximum conducted output power

Test Result Peak

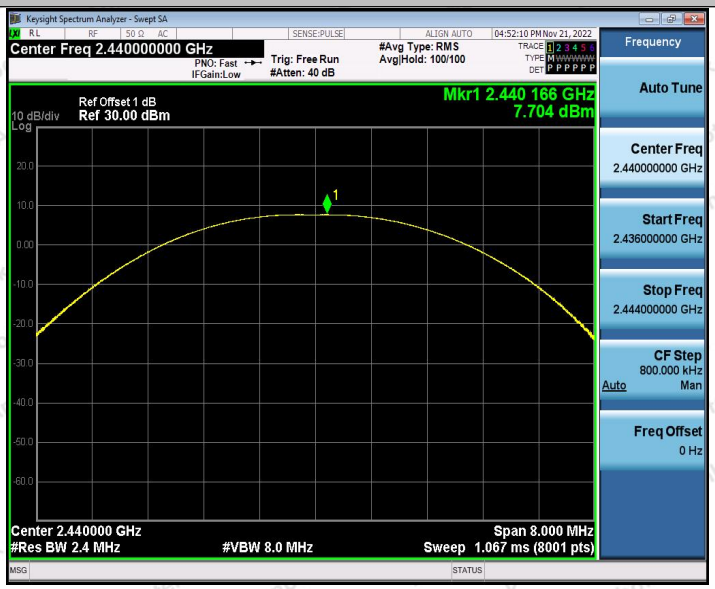
TestMode	Antenna	Frequency[MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Verdict
BLE_1M	Ant1	2402	8.25	≤30	PASS
		2440	7.7	≤30	PASS
		2480	7.13	≤30	PASS

Test Graphs Peak

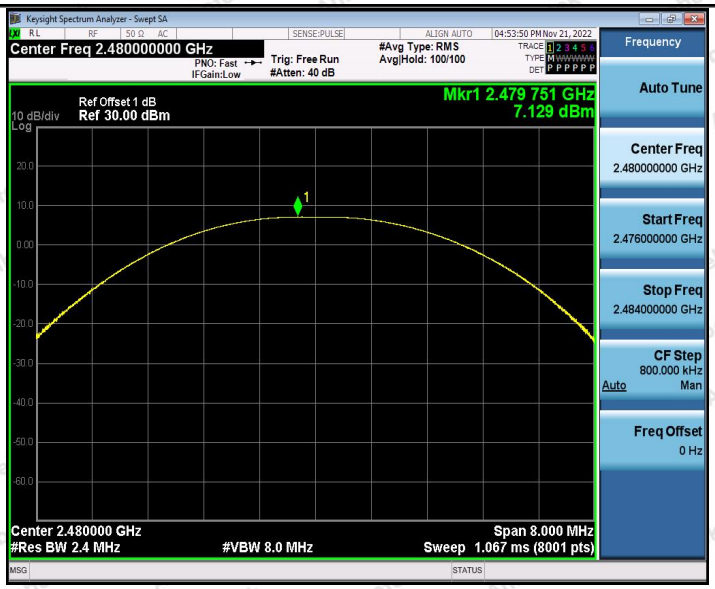
BLE_1M_Ant1_2402



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
Ref Offset 1 dB
10 dB/div
Ref 30.00 dBm
Mkr1 2.479 751 GHz
7.129 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

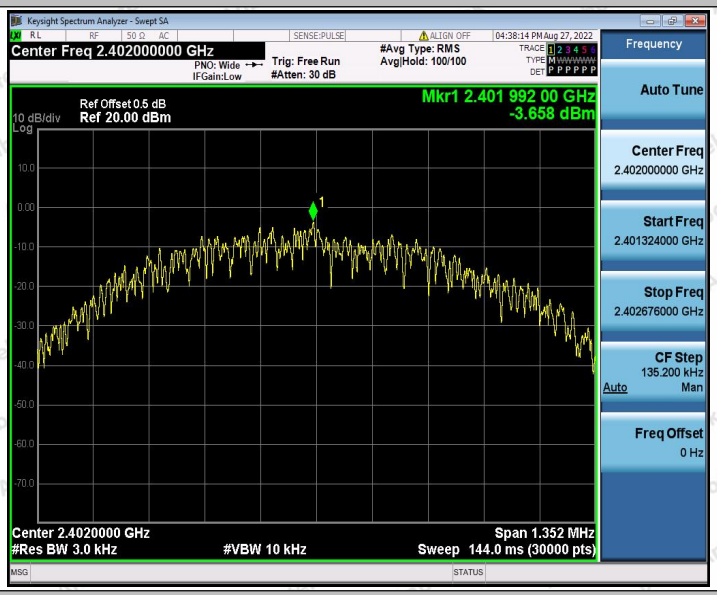
Appendix D: Maximum power spectral density

Test Result

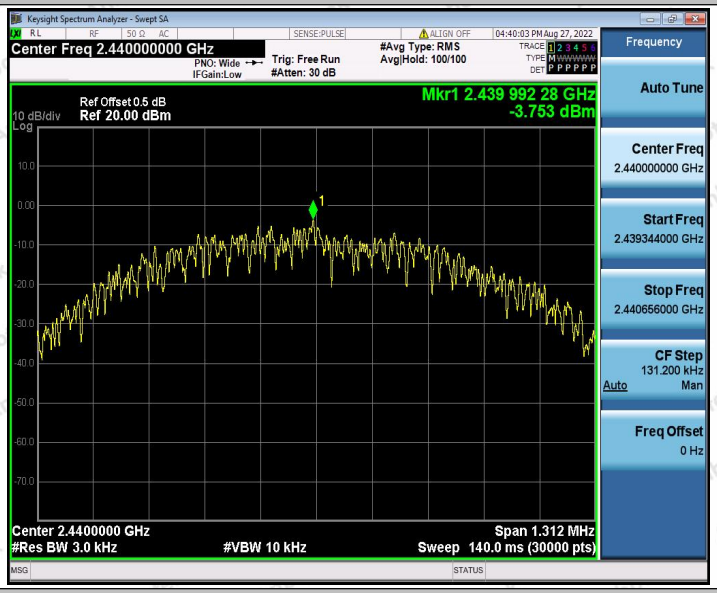
TestMode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-3.66	≤8.00	PASS
		2440	-3.75	≤8.00	PASS
		2480	-4.17	≤8.00	PASS

Test Graphs

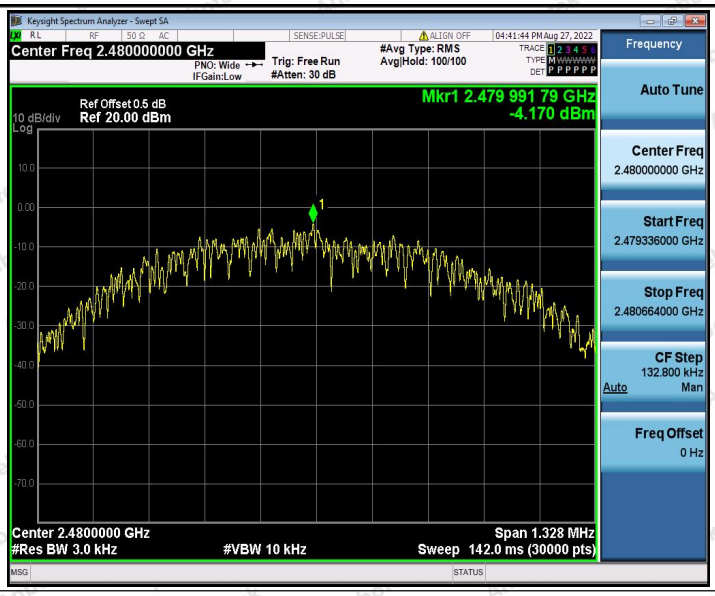
BLE_1M_Ant1_2402



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
04:41:44 PM Aug 27, 2022
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.479 991 79 GHz
-4.170 dBm
Center 2.4800000 GHz
#Res BW 3.0 kHz
#VBW 10 kHz
Span 1.328 MHz
Sweep 142.0 ms (30000 pts)
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.479336000 GHz
Stop Freq
2.480664000 GHz
CF Step
132.800 kHz
Auto
Man
Freq Offset
0 Hz

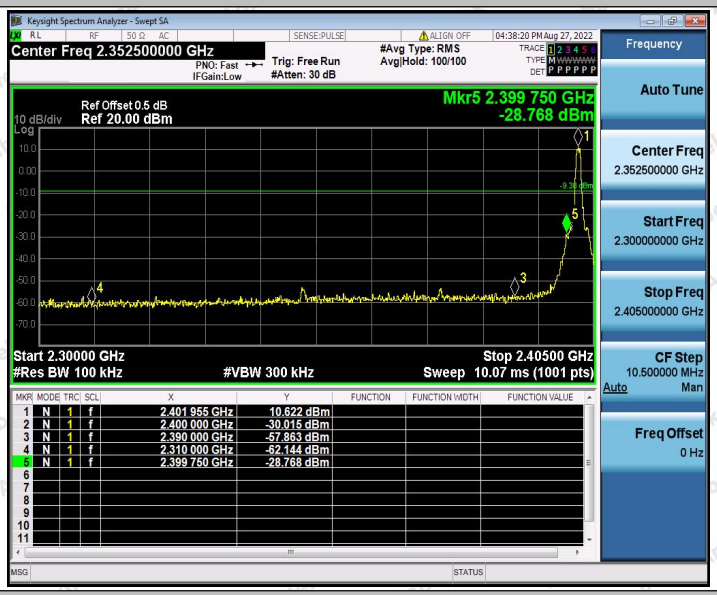
Appendix E: Band edge measurements

Test Result

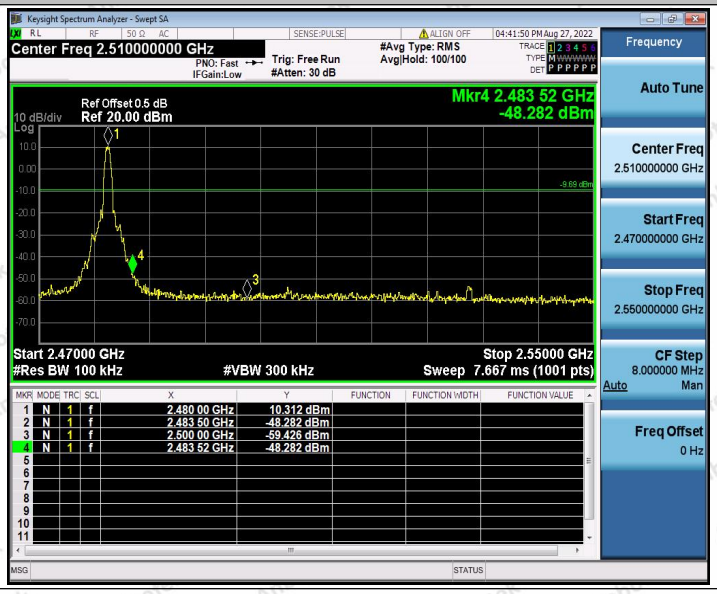
TestMode	Antenna	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	10.62	-28.77	≤-9.38	PASS
		High	2480	10.31	-48.28	≤-9.69	PASS

Test Graphs

BLE_1M_Ant1_Low_2402



BLE_1M_Ant1_High_2480



Appendix F: Conducted Spurious Emission

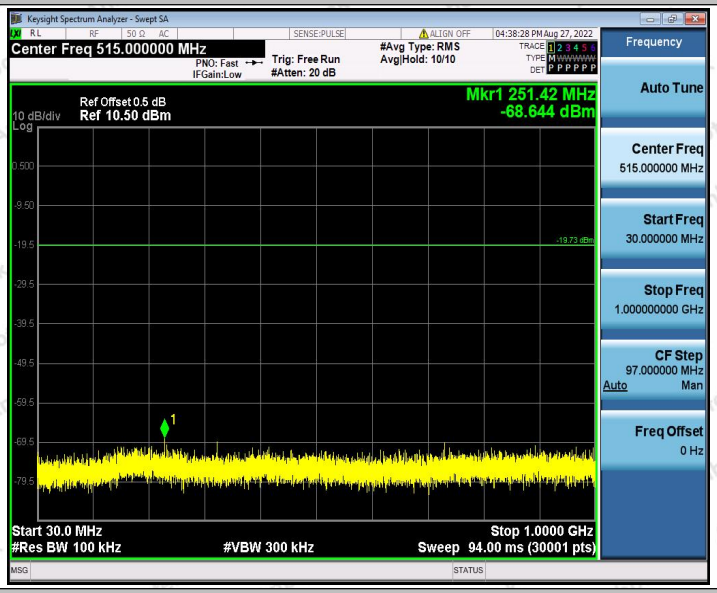
Test Result

TestMode	Antenna	Frequency[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	10.27	10.27	---	PASS
			30~1000	10.27	-68.64	≤-19.73	PASS
			1000~26500	10.27	-49.94	≤-19.73	PASS
		2440	Reference	9.64	9.64	---	PASS
			30~1000	9.64	-69.46	≤-20.36	PASS
			1000~26500	9.64	-46.75	≤-20.36	PASS
		2480	Reference	10.27	10.27	---	PASS
			30~1000	10.27	-69.54	≤-19.73	PASS
			1000~26500	10.27	-54.12	≤-19.73	PASS

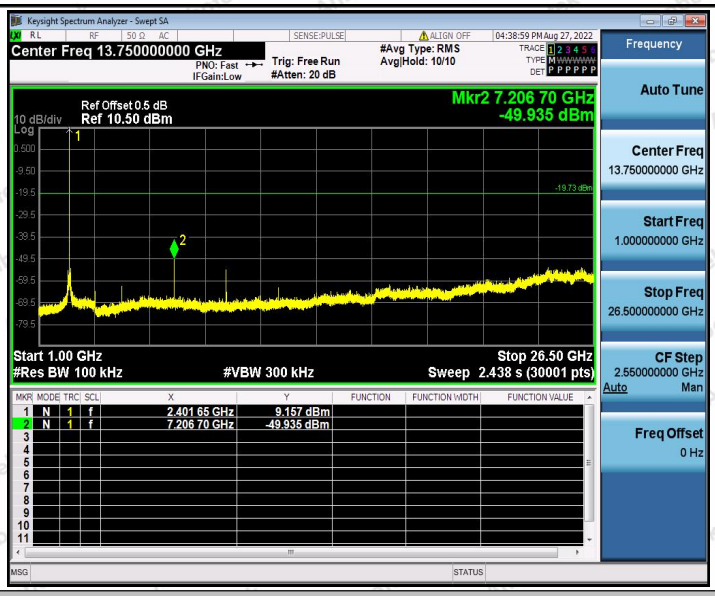
Test Graphs

BLE_1M_Ant1_2402_0~Reference

BLE_1M_Ant1_2402_30~1000

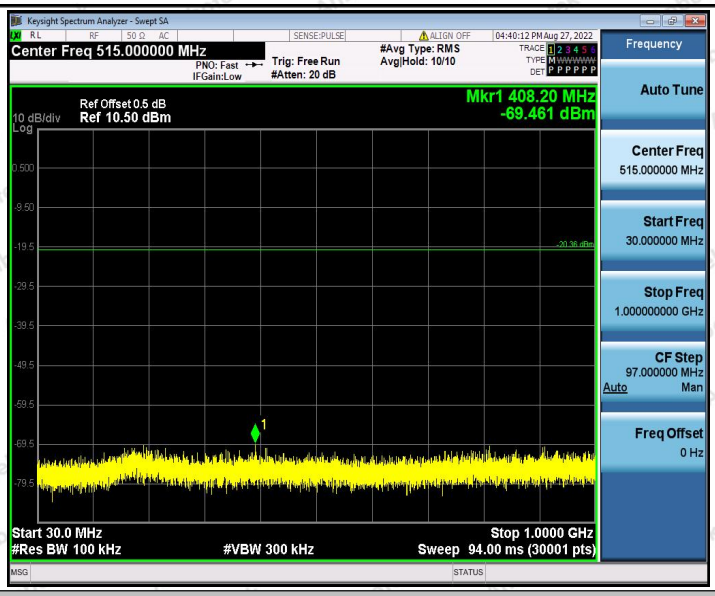


BLE_1M_Ant1_2402_1000~26500

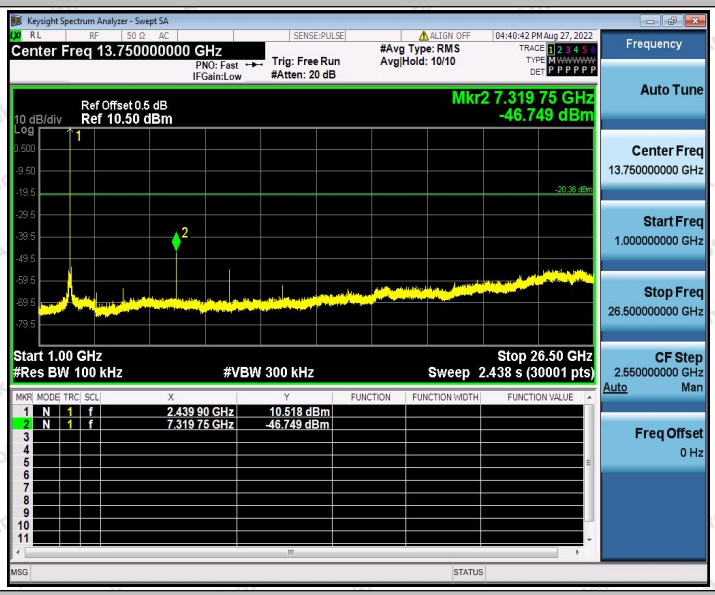


BLE_1M_Ant1_2440_0~Reference

BLE_1M_Ant1_2440_30~1000

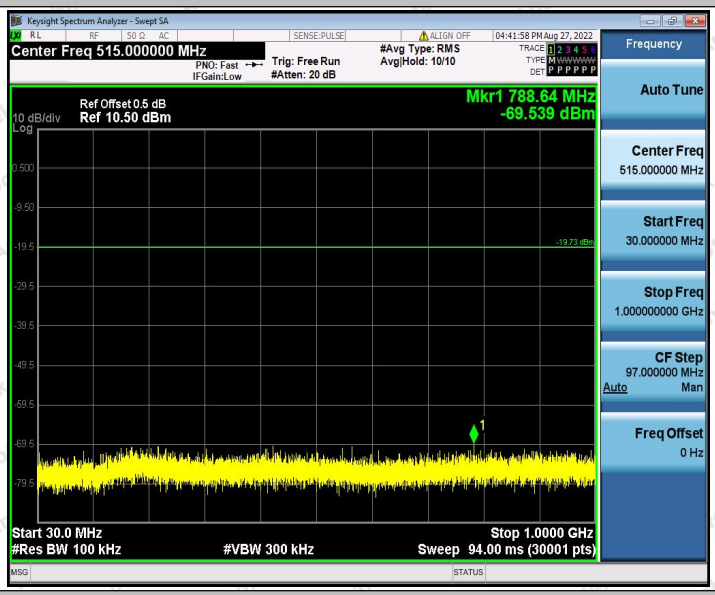


BLE_1M_Ant1_2440_1000~26500

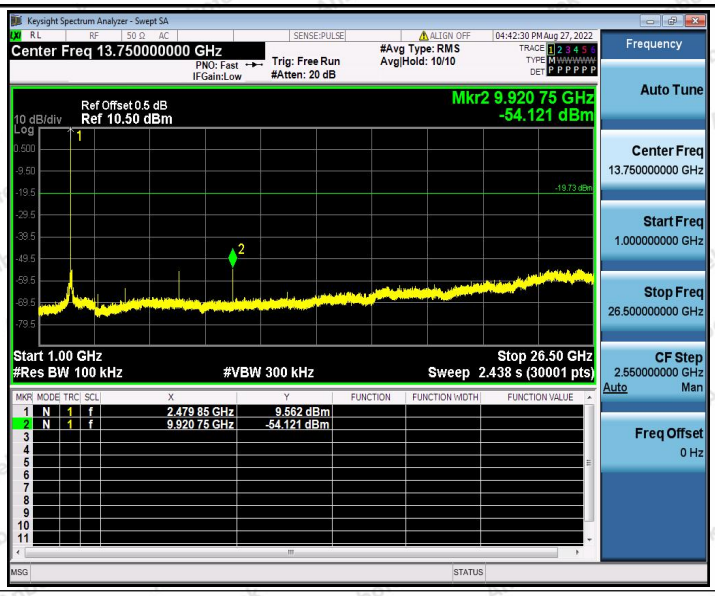


BLE_1M_Ant1_2480_0~Reference

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
04:42:30 PM Aug 27, 2022
Ref Offset 0.5 dB
10 dB/div
Ref 10.50 dBm
Mkr2 9.920 75 GHz
-54.121 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 9.562 dBm
2 N 1 f 9.920 75 GHz -54.121 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

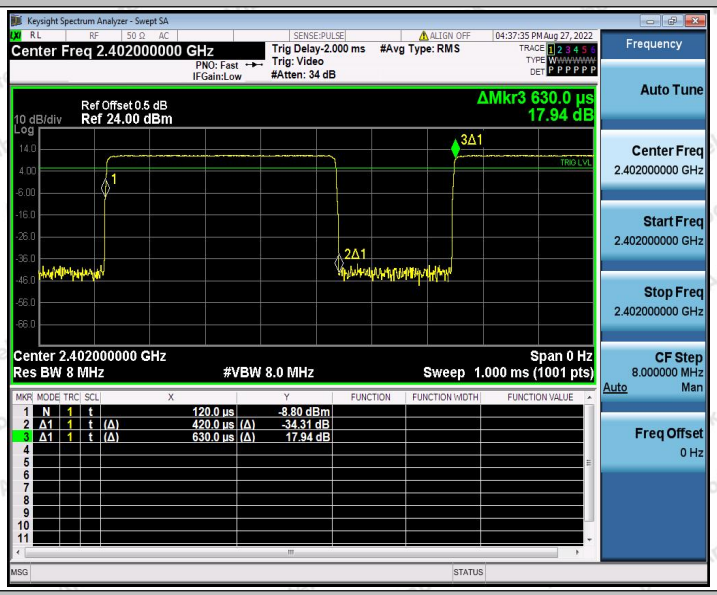
Appendix G: Duty Cycle

Test Result

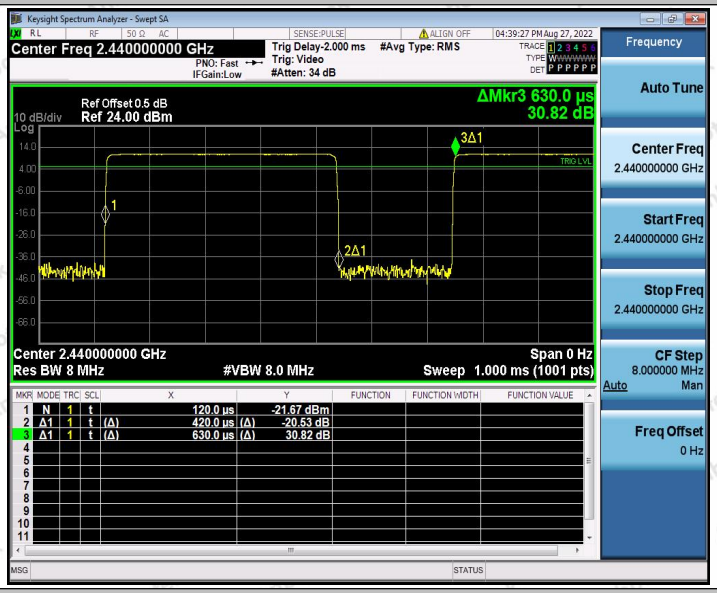
TestMode	Antenna	Frequency[MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor[dB]
BLE_1M	Ant1	2402	0.42	0.63	66.67	1.76
		2440	0.42	0.63	66.67	1.76
		2480	0.42	0.63	66.67	1.76

Test Graphs

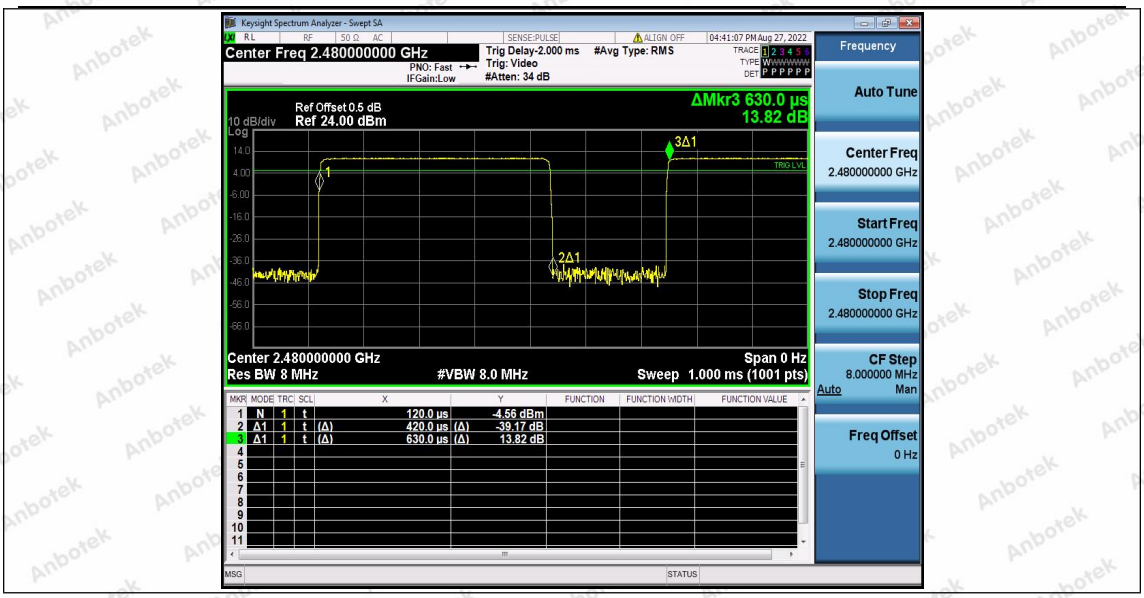
BLE_1M_Ant1_2402



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
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.480000000 GHz
Stop Freq
2.480000000 GHz
CF Step
8.000000 MHz
Freq Offset
0 Hz
ΔMkr3 630.0 µs
13.82 dB
Ref Offset 0.5 dB
10 dB/div
Ref 24.00 dBm
Center 2.480000000 GHz
Res BW 8 MHz
#VBW 8.0 MHz
Span 0 Hz
Sweep 1.000 ms (1001 pts)
1 N 1 t 120.0 µs -4.56 dBm
2 Δ1 1 t (Δ) 420.0 µs (Δ) -39.17 dB
3 Δ1 1 t (Δ) 630.0 µs (Δ) 13.82 dB

---End---