Appendix A

RF Test Data for BLE (Conducted Measurement)

Product Name: Room workpoint

Test Model: SW9126

Environmental Conditions

Temperature:	23.8°C
Relative Humidity:	52.1%
ATM Pressure:	100.0 kPa
Test Engineer:	Jay Luo
Supervised by:	Nick Peng

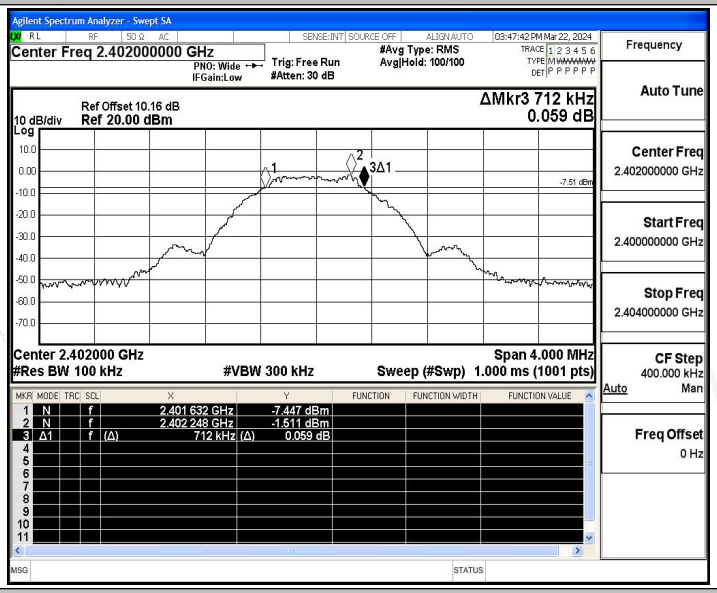
A.1 DTS Bandwidth

Test Result

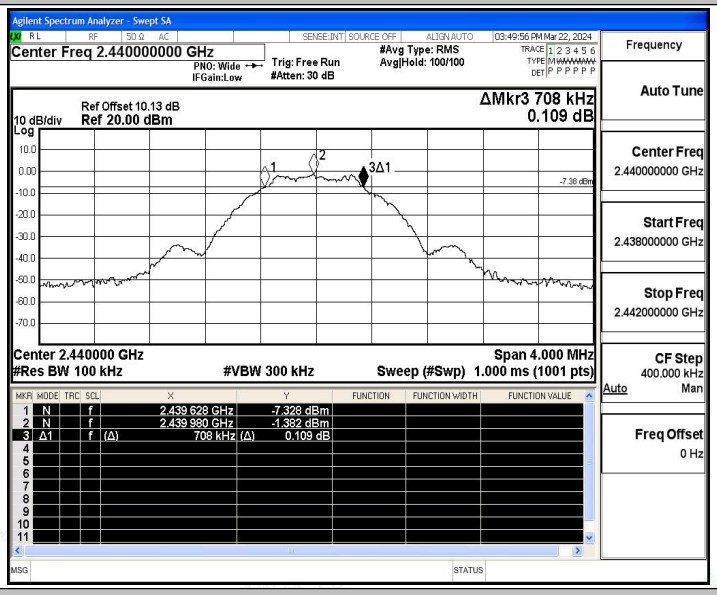
TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.712	2401.632	2402.344	0.5	PASS
		2440	0.708	2439.628	2440.336	0.5	PASS
		2480	0.720	2479.624	2480.344	0.5	PASS

Test Graphs

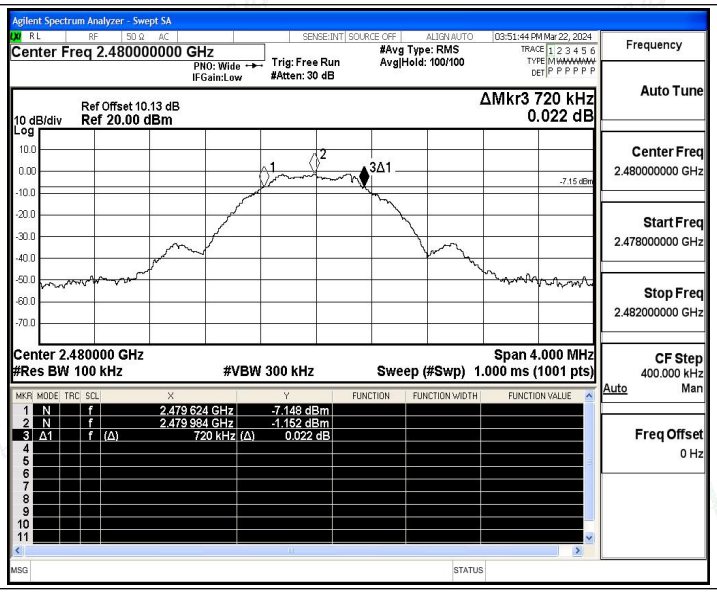
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480


Agilent 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
03:51:44 PM Mar 22, 2024
Ref Offset 10.13 dB
10 dB/div Ref 20.00 dBm
Log
ΔMkr3 720 kHz
0.022 dB
-7.15 dBm
Center 2.480000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 4.000 MHz
Sweep (#Swp) 1.000 ms (1001 pts)
1 N f 2.479 624 GHz -7.148 dBm
2 N f 2.479 984 GHz -1.152 dBm
3 Δ1 f (Δ) 720 kHz (Δ) 0.022 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

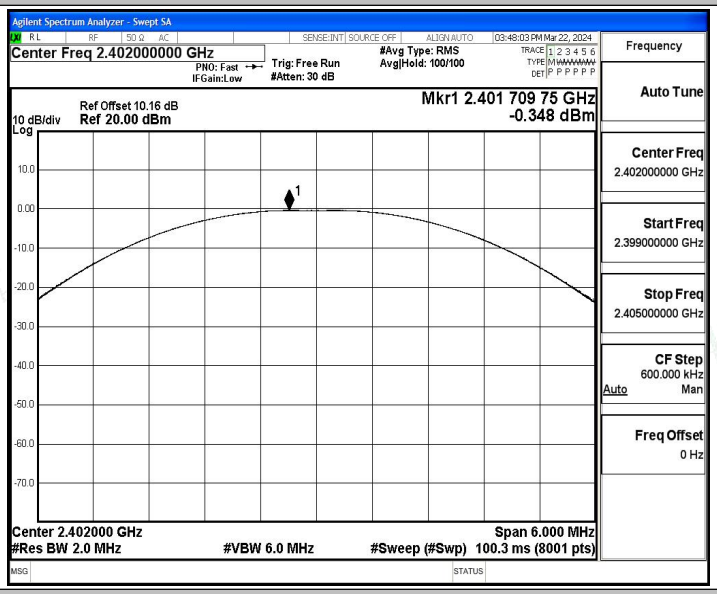
A.2 Maximum conducted output power

Test Result

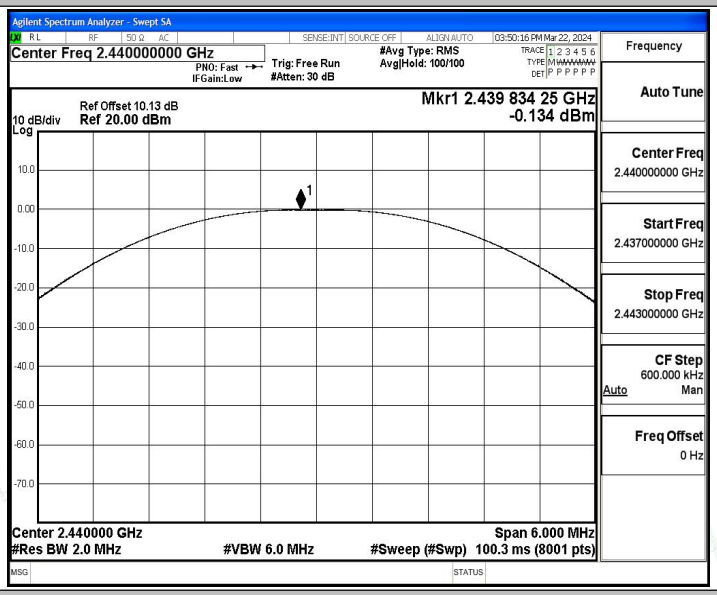
TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	-0.35	≤30	PASS
		2440	-0.13	≤30	PASS
		2480	0.04	≤30	PASS

Test Graphs

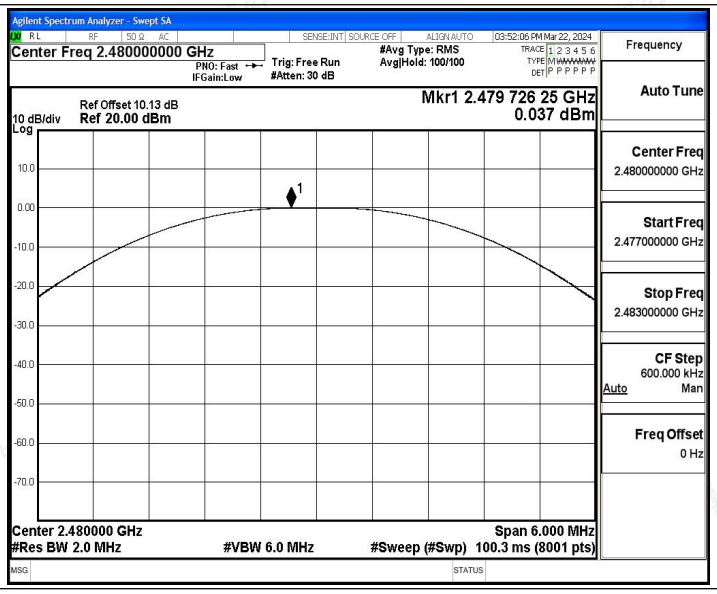
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 100/100
03:52:06 PM Mar 22, 2024
Ref Offset 10.13 dB
10 dB/div Ref 20.00 dBm
Log
Mkr1 2.479 726 25 GHz
0.037 dBm
Center 2.480000 GHz
#Res BW 2.0 MHz
#VBW 6.0 MHz
Span 6.000 MHz
#Sweep (#Swp) 100.3 ms (8001 pts)
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.477000000 GHz
Stop Freq
2.483000000 GHz
CF Step
600.000 kHz
Auto Man
Freq Offset
0 Hz

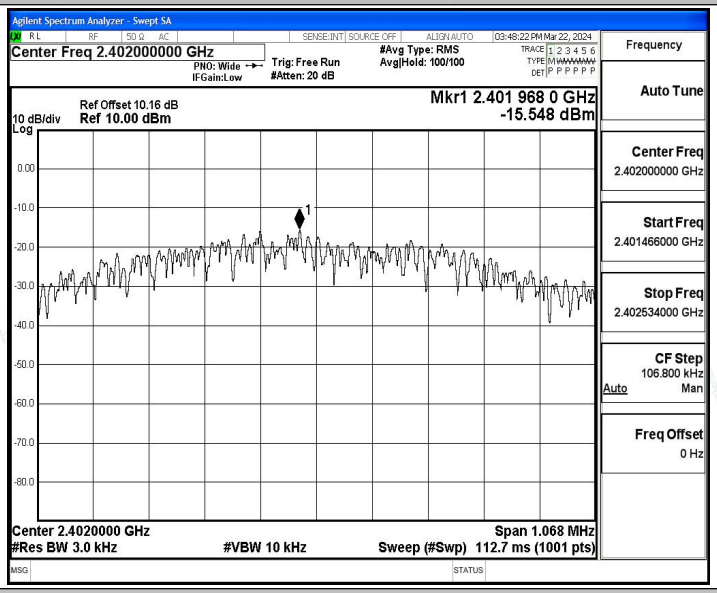
A.3 Maximum power spectral density

Test Result

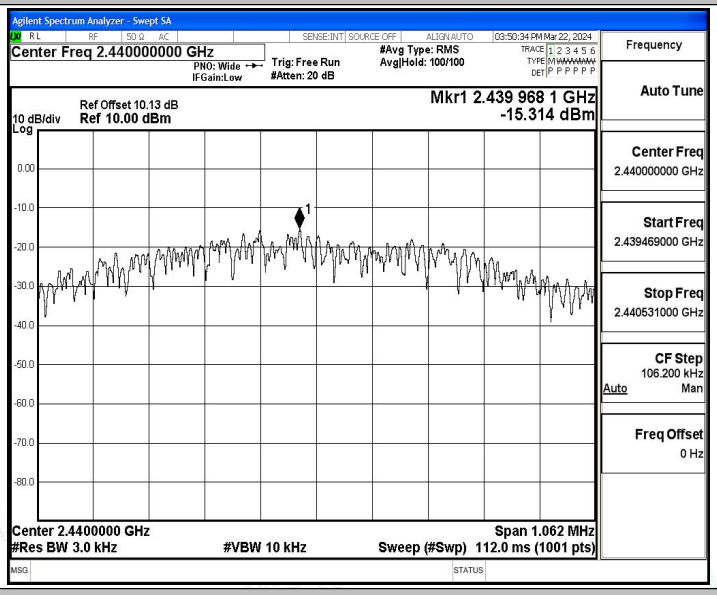
TestMode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-15.55	≤8.00	PASS
		2440	-15.31	≤8.00	PASS
		2480	-15.22	≤8.00	PASS

Test Graphs

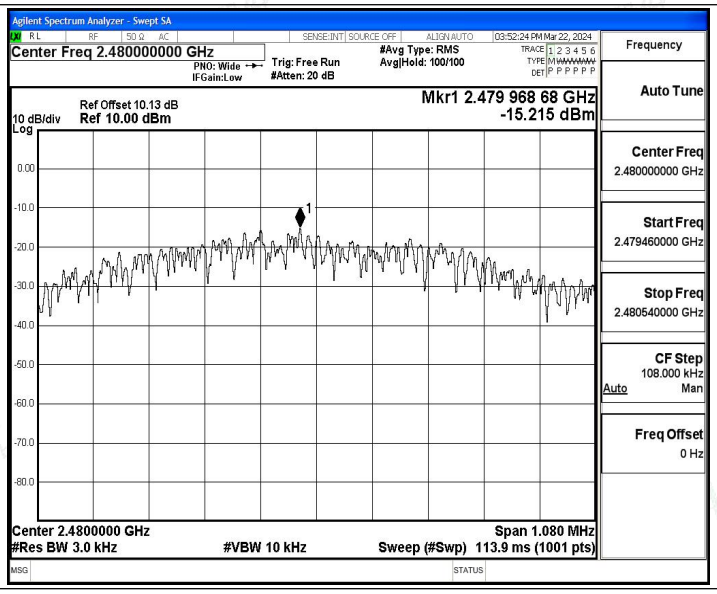
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
Avg|Hold: 100/100
03:52:24 PM Mar 22, 2024
Ref Offset 10.13 dB
10 dB/div Ref 10.00 dBm
Log
Mkr1 2.479 968 68 GHz
-15.215 dBm
Center 2.4800000 GHz
#Res BW 3.0 kHz
#VBW 10 kHz
Span 1.080 MHz
Sweep (#Swp) 113.9 ms (1001 pts)
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.479460000 GHz
Stop Freq
2.480540000 GHz
CF Step
108.000 kHz
Auto Man
Freq Offset
0 Hz

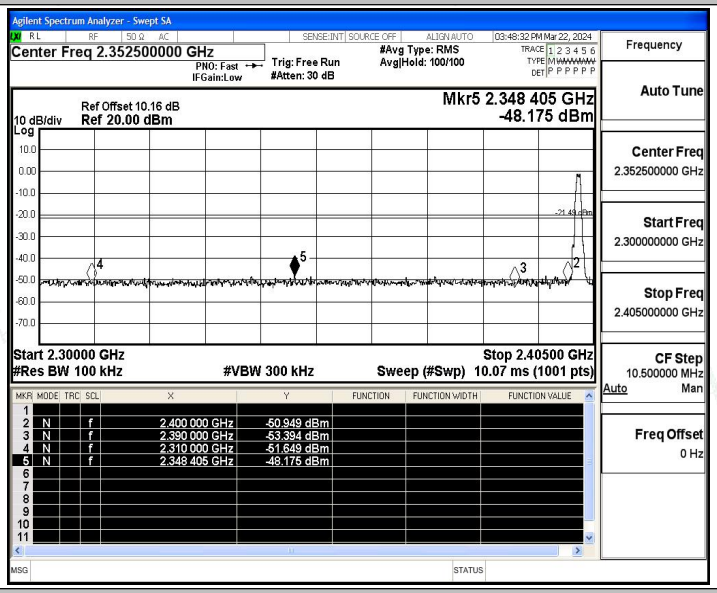
A.4 Band edge measurements

Test Result

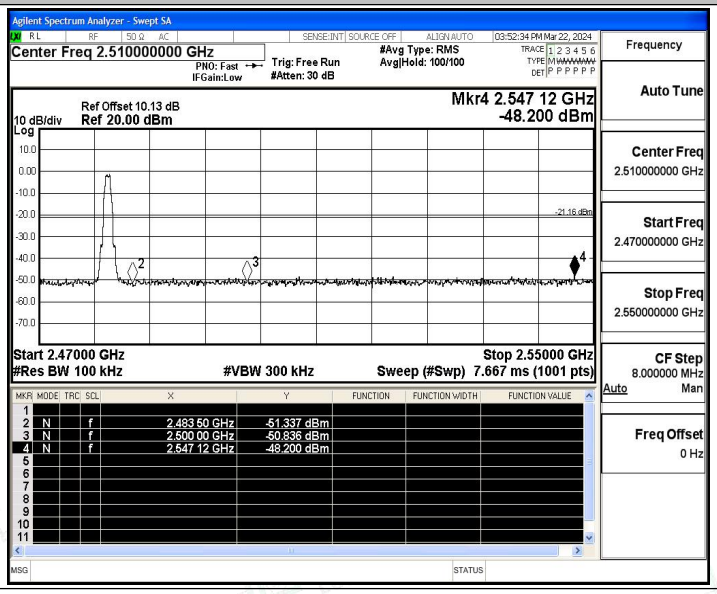
TestMode	Antenna	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	-1.49	-48.18	≤-21.49	PASS
		High	2480	-1.16	-48.2	≤-21.16	PASS

Test Graphs

BLE_1M_Ant1_Low_2402



BLE_1M_Ant1_High_2480



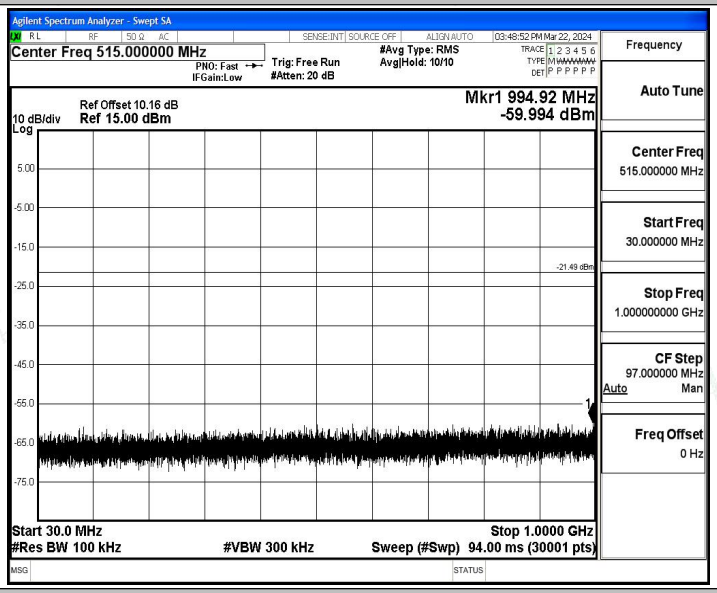
A.5 Conducted Spurious Emission

Test Result

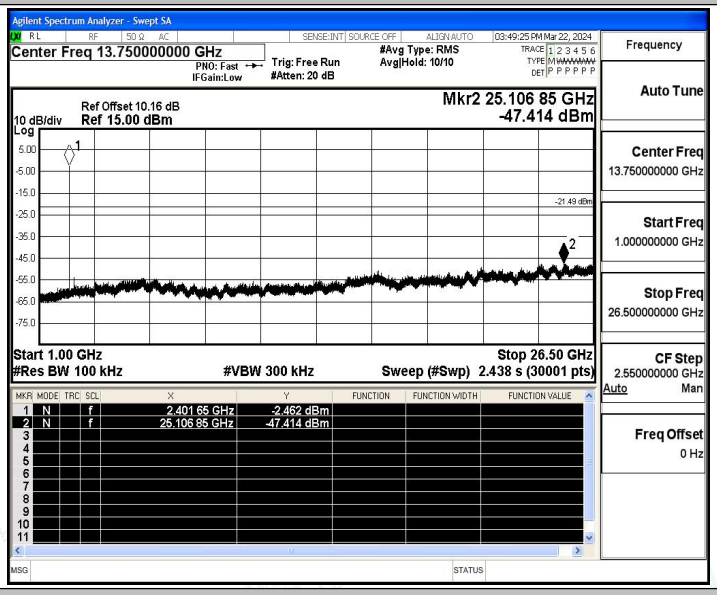
TestMode	Antenna	Frequency[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	30~1000	-1.49	-59.99	≤-21.49	PASS
			1000~26500	-1.49	-47.41	≤-21.49	PASS
		2440	30~1000	-1.24	-60.09	≤-21.24	PASS
			1000~26500	-1.24	-47.5	≤-21.24	PASS
		2480	30~1000	-1.16	-59.85	≤-21.16	PASS
			1000~26500	-1.16	-46.27	≤-21.16	PASS

Test Graphs

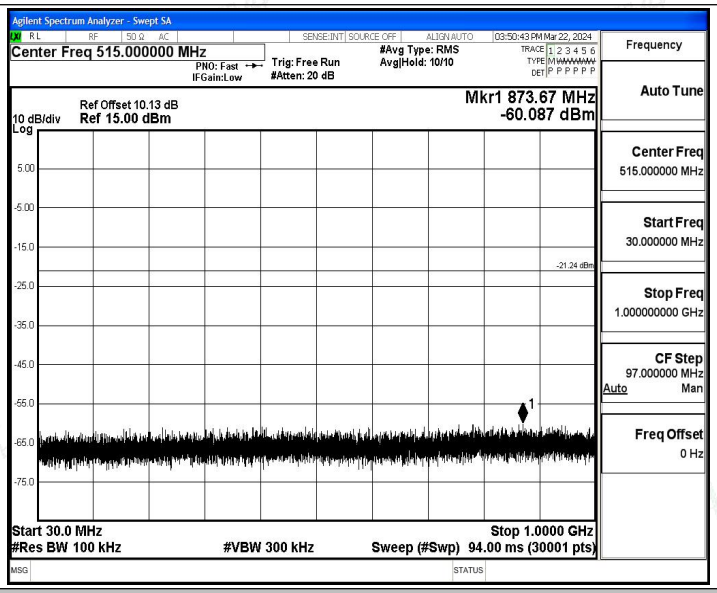
BLE_1M_Ant1_2402_30~1000



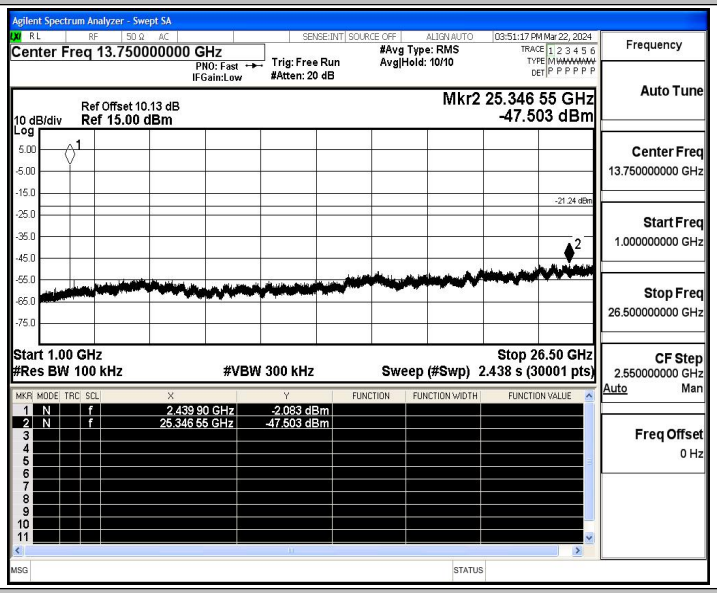
BLE_1M_Ant1_2402_1000~26500



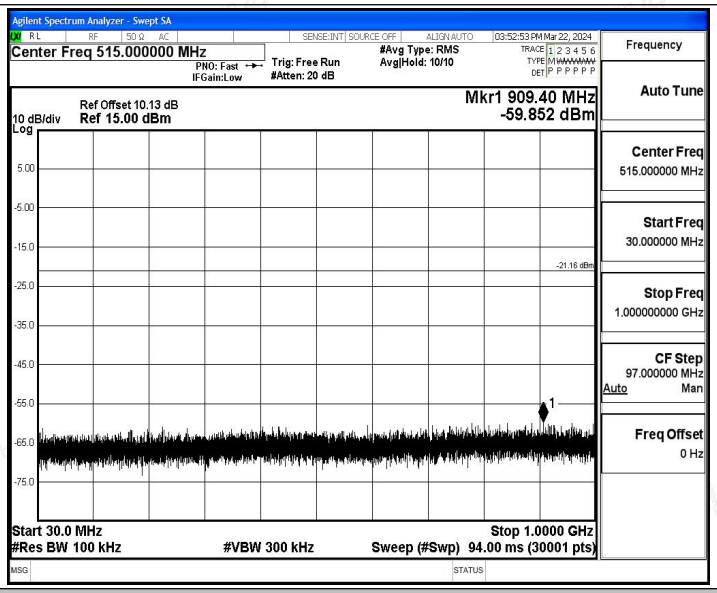
BLE_1M_Ant1_2440_30~1000



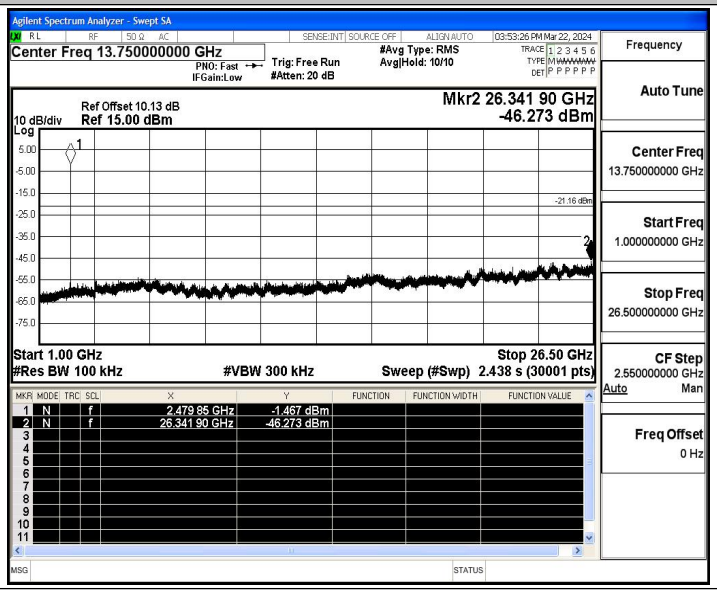
BLE_1M_Ant1_2440_1000~26500



BLE_1M_Ant1_2480_30~1000



BLE_1M_Ant1_2480_1000~26500



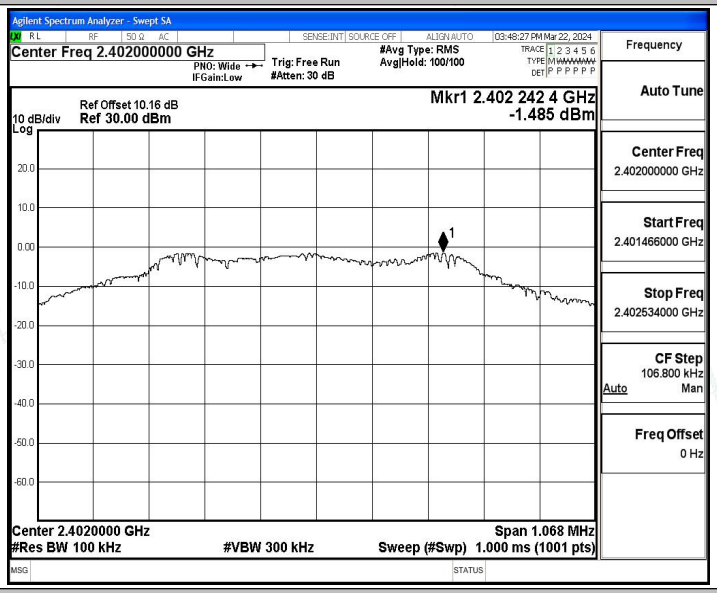
Reference level measurement

Test Result

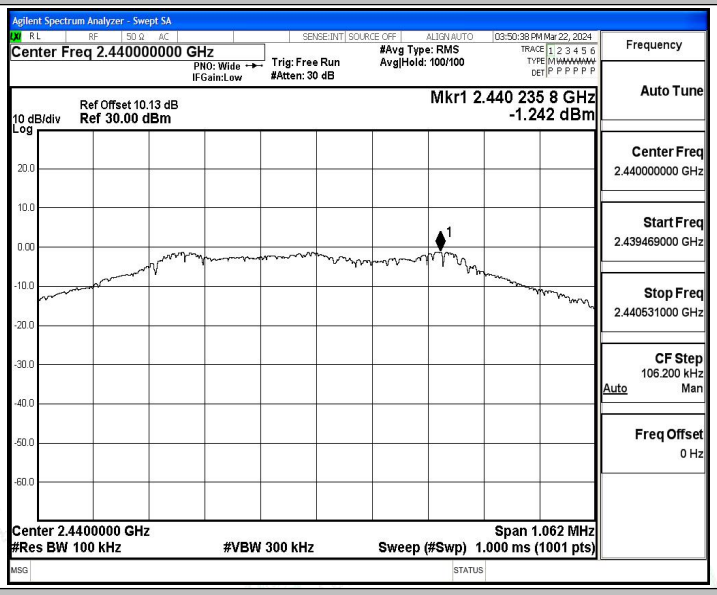
TestMode	Antenna	Freq(MHz)	Max.Point[MHz]	Result[dBm]
BLE_1M	Ant1	2402	2402.24	-1.49
		2440	2440.24	-1.24
		2480	2480.23	-1.16

Test Graphs

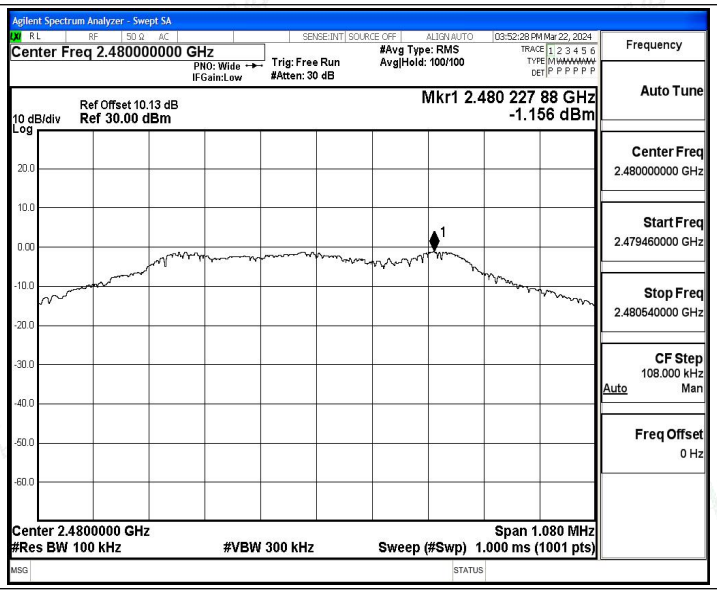
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480


Agilent 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
03:52:28 PM Mar 22, 2024
Ref Offset 10.13 dB
10 dB/div Ref 30.00 dBm
Log
Mkr1 2.480 227 88 GHz
-1.156 dBm
Center 2.4800000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 1.080 MHz
Sweep (#Swp) 1.000 ms (1001 pts)
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.479460000 GHz
Stop Freq
2.480540000 GHz
CF Step
108.000 kHz
Auto Man
Freq Offset
0 Hz

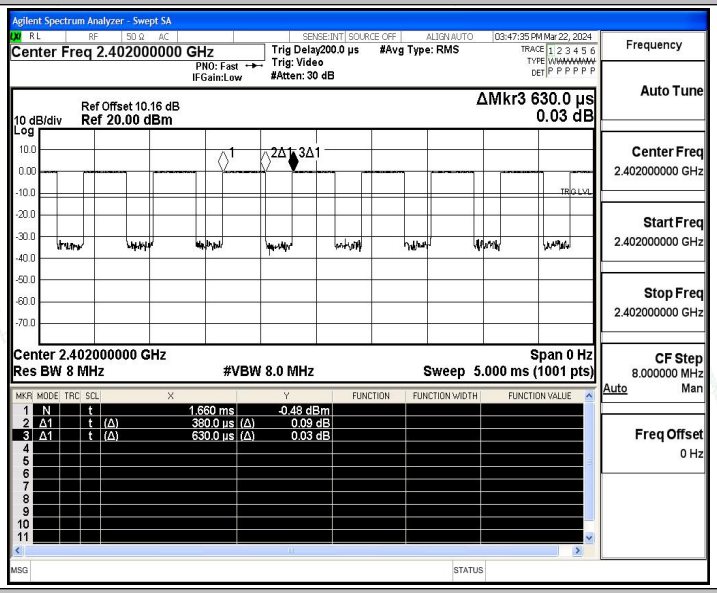
A.6 Duty Cycle

Test Result

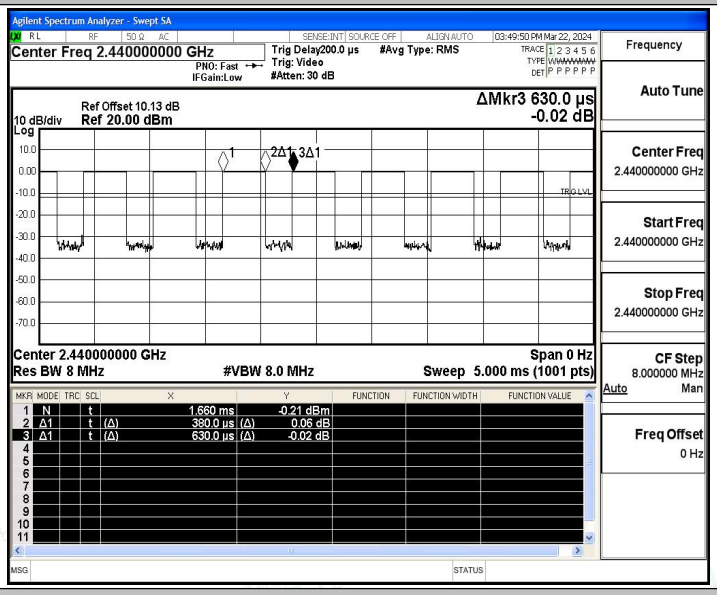
TestMode	Antenna	Frequency[MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor[dB]	1/T Factor[dB]
BLE_1M	Ant1	2402	0.38	0.63	60.32	2.20	2.63
		2440	0.38	0.63	60.32	2.20	2.63
		2480	0.38	0.63	60.32	2.20	2.63

Test Graphs

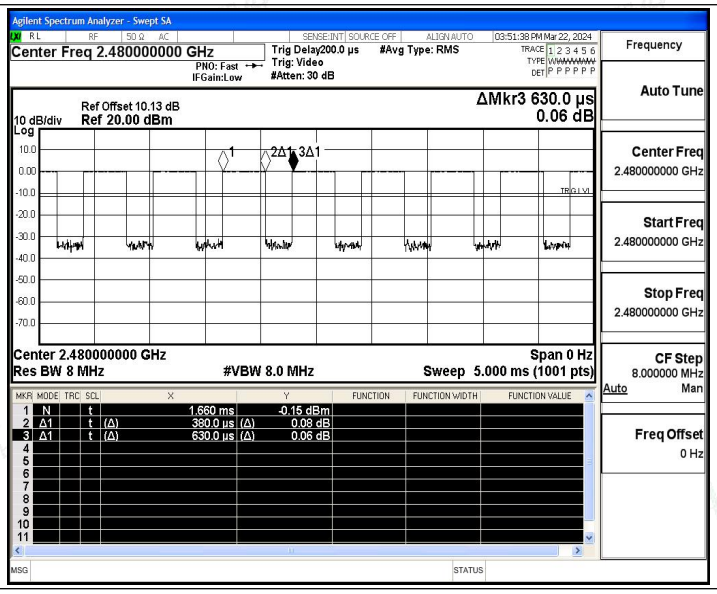
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
Trig Delay200.0 µs
Trig: Video
#Atten: 30 dB
#Avg Type: RMS
03:51:38 PM Mar 22, 2024
Frequency
Auto Tune
Ref Offset 10.13 dB
10 dB/div Ref 20.00 dBm
Log
ΔMkr3 630.0 µs
0.06 dB
Center Freq
2.480000000 GHz
Start Freq
2.480000000 GHz
Stop Freq
2.480000000 GHz
Center 2.480000000 GHz
Res BW 8 MHz
#VBW 8.0 MHz
Span 0 Hz
Sweep 5.000 ms (1001 pts)
CF Step
8.000000 MHz
Auto Man
Freq Offset
0 Hz
1 N t 1.660 ms -0.15 dBm
2 Δ1 t (Δ) 380.0 µs (Δ) 0.08 dB
3 Δ1 t (Δ) 630.0 µs (Δ) 0.06 dB
MSG
STATUS

A.7 Emissions in Restricted Bands

Test Result

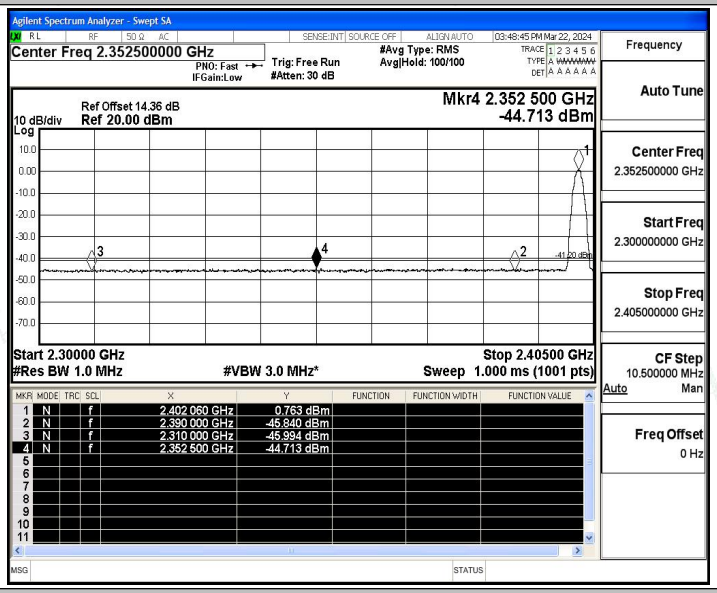
TestMode	Antenna	ChName	Frequency[MHz]	Detector	Freq [MHz]	Result [dBm]	Limit [dBm]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
BLE_1M	Ant1	Low	2402	AV	2310.000	-45.99	≤-41.20	49.21	≤54	PASS
				AV	2352.500	-44.71	≤-41.20	50.49	≤54	PASS
				AV	2390.000	-45.84	≤-41.20	49.36	≤54	PASS
				Peak	2310.000	-39.32	≤-21.20	55.88	≤74	PASS
				Peak	2375.180	-36.72	≤-21.20	58.48	≤74	PASS
				Peak	2390.000	-40.17	≤-21.20	55.03	≤74	PASS
		High	2480	AV	2483.500	-45.59	≤-41.20	49.61	≤54	PASS
				AV	2498.400	-44.73	≤-41.20	50.47	≤54	PASS
				AV	2500.000	-45.17	≤-41.20	50.03	≤54	PASS
				Peak	2483.500	-39.72	≤-21.20	55.48	≤74	PASS
				Peak	2486.000	-37.64	≤-21.20	57.56	≤74	PASS
				Peak	2500.000	-37.98	≤-21.20	57.22	≤74	PASS

Note：

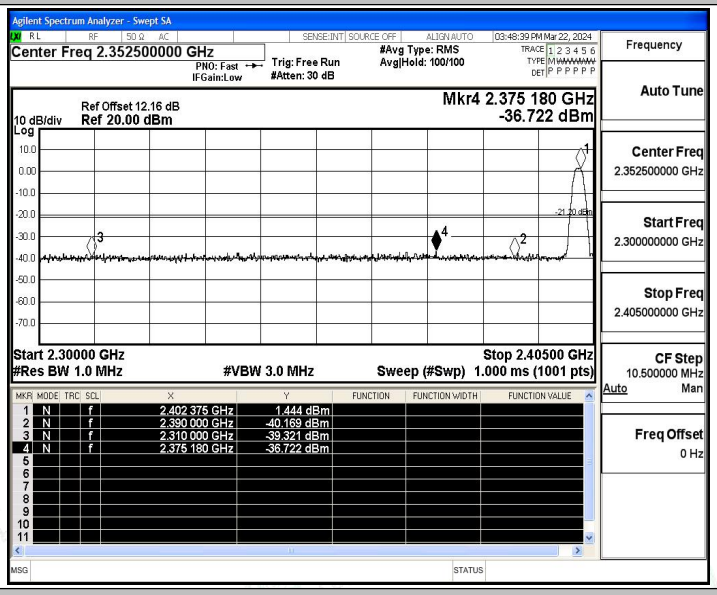
1. The Antenna Gain is compensated in the graph. The Correction Factor is compensated in the graph.
2. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

Test Graphs

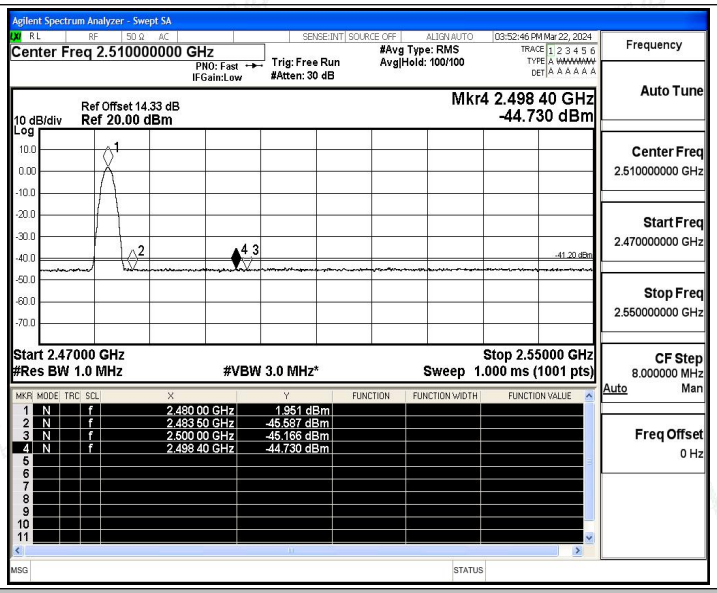
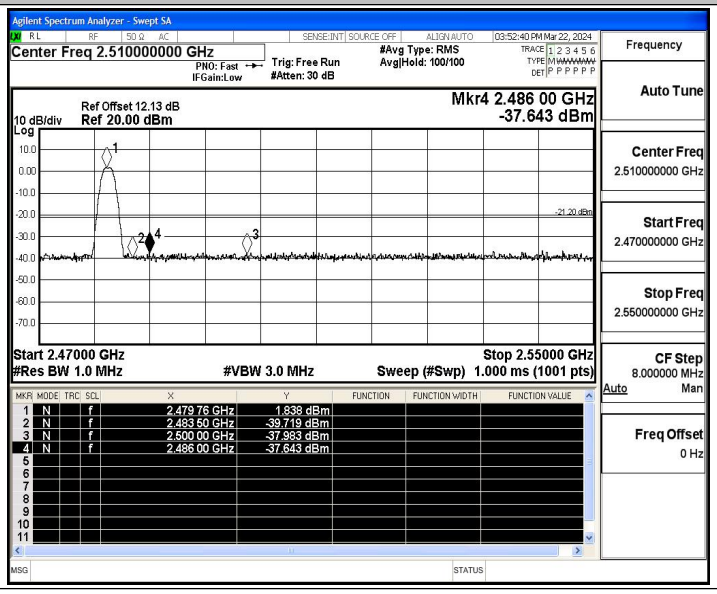
BLE_1M_Ant1_Low_2402_AV



BLE_1M_Ant1_Low_2402_Peak



BLE_1M_Ant1_High_2480_AV



BLE_1M_Ant1_High_2480_Peak