Appendix A

RF Test Data for BT LE (Conducted Measurement)

Product Name: Aroma Diffuser

Test Model: Scentify plug-in diffuser

Environmental Conditions

Temperature:	23.5℃
Relative Humidity:	52.2%
ATM Pressure:	100.0 kPa
Test Engineer:	Nick Peng
Supervised by:	Ling Zhu

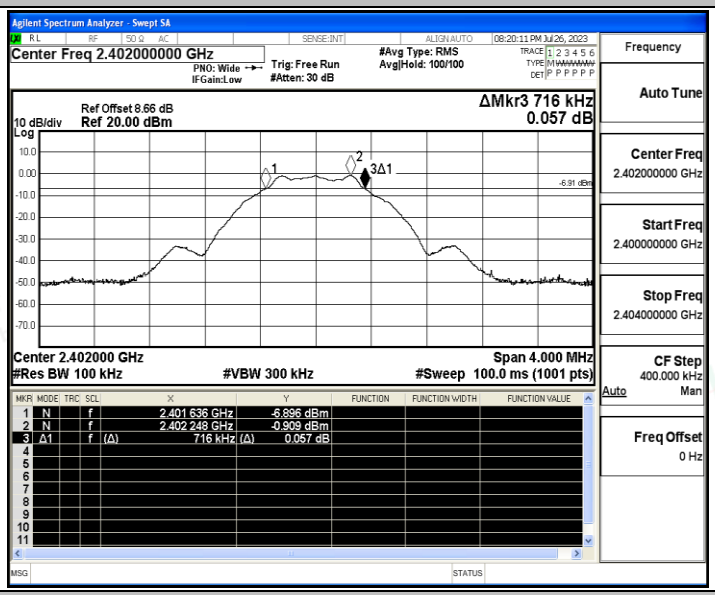
A.1 DTS Bandwidth

Test Result

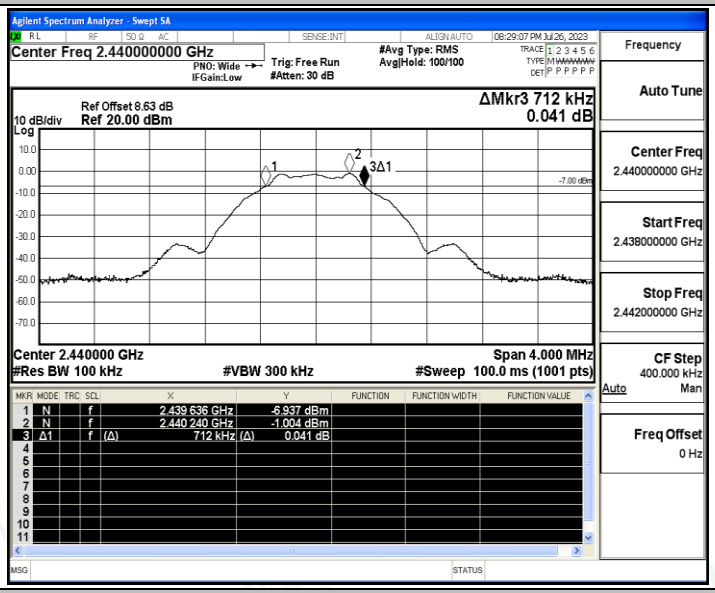
TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.716	2401.636	2402.352	0.5	PASS
		2440	0.712	2439.636	2440.348	0.5	PASS
		2480	0.712	2479.636	2480.348	0.5	PASS

Test Graphs

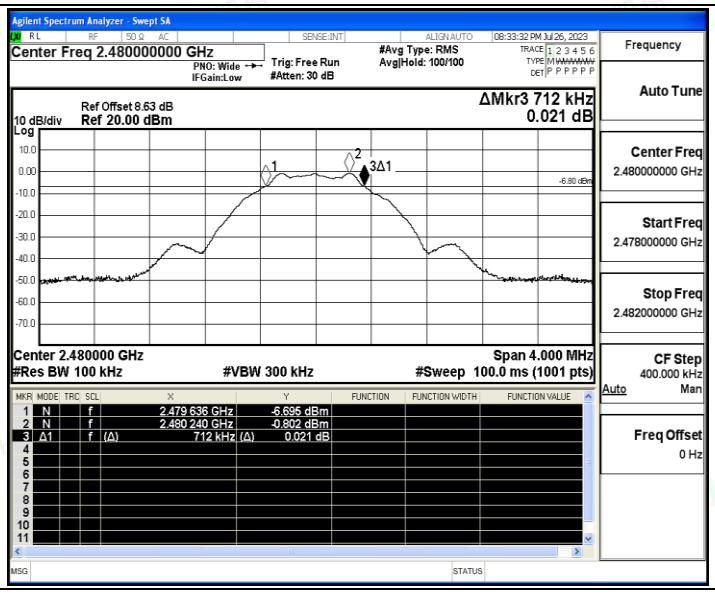
BLE_1M_Ant1_2402



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
08:33:32 PM Jul 26, 2023
Frequency
Auto Tune
Ref Offset 8.63 dB
10 dB/div Ref 20.00 dBm
Log
ΔMkr3 712 kHz
0.021 dB
-6.80 dBm
Center Freq
2.480000000 GHz
Start Freq
2.478000000 GHz
Stop Freq
2.482000000 GHz
Center 2.480000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 4.000 MHz
#Sweep 100.0 ms (1001 pts)
CF Step
400.000 kHz
Auto Man
Freq Offset
0 Hz
1 N f 2.479 636 GHz -8.695 dBm
2 N f 2.480 240 GHz -0.802 dBm
3 Δ1 f (Δ) 712 kHz (Δ) 0.021 dB
MSG
STATUS

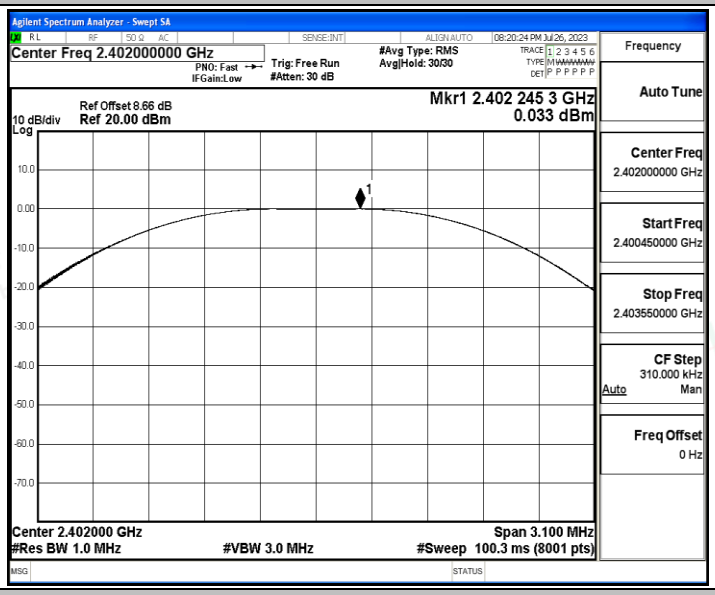
A.2 Maximum conducted output power

Test Result

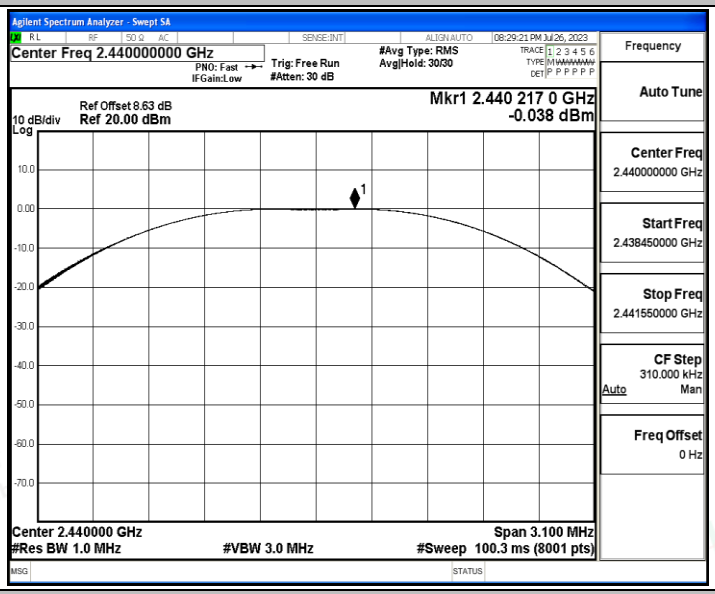
TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	0.03	≤30	PASS
		2440	-0.04	≤30	PASS
		2480	0.16	≤30	PASS

Test Graphs

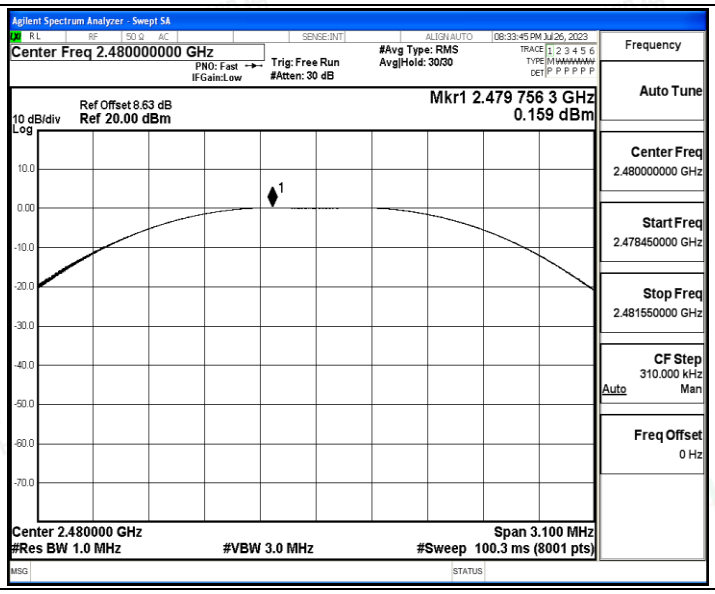
BLE_1M_Ant1_2402



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: 30/30
08:33:45 PM Jul 26, 2023
Frequency
Auto Tune
Ref Offset 8.63 dB
10 dB/div Ref 20.00 dBm
Log
Mkr1 2.479 756 3 GHz
0.159 dBm
Center Freq
2.480000000 GHz
Start Freq
2.478450000 GHz
Stop Freq
2.481550000 GHz
CF Step
310.000 kHz
Auto Man
Freq Offset
0 Hz
Center 2.480000 GHz
Span 3.100 MHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
#Sweep 100.3 ms (8001 pts)

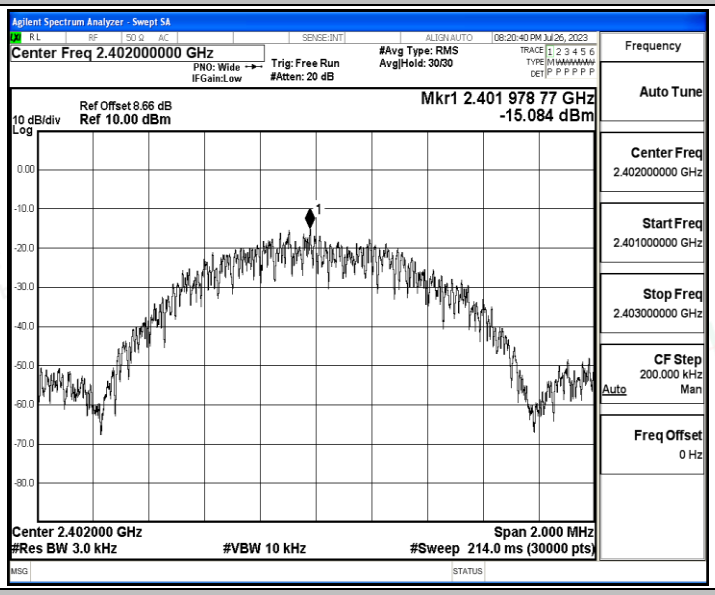
A.3 Maximum power spectral density

Test Result

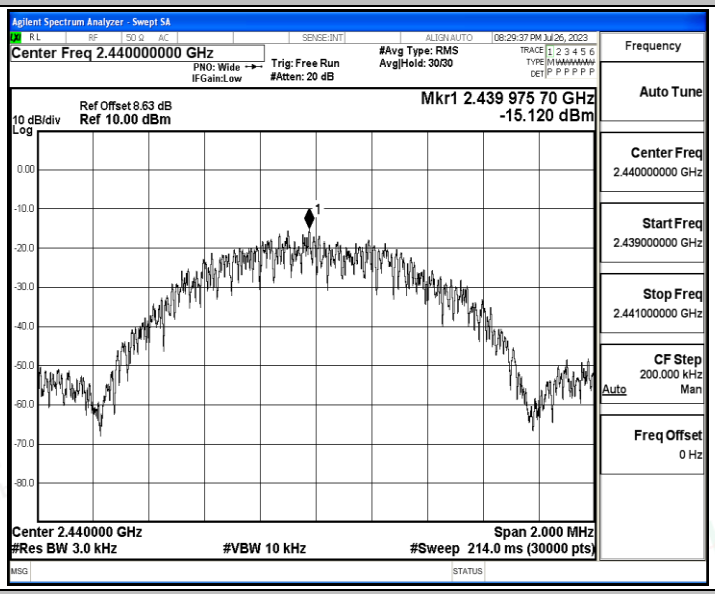
TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-15.08	≤8.00	PASS
		2440	-15.12	≤8.00	PASS
		2480	-14.95	≤8.00	PASS

Test Graphs

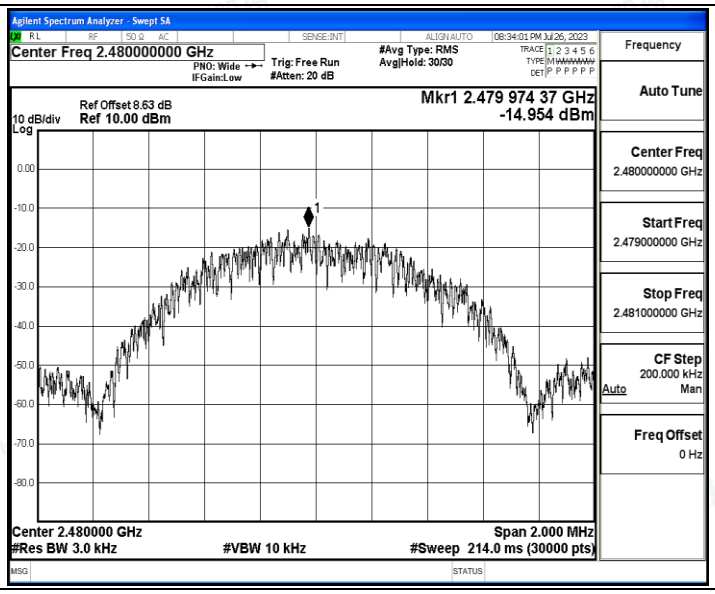
BLE_1M_Ant1_2402



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: 30/30
08:34:01 PM Jul 26, 2023
Frequency
Auto Tune
Ref Offset 8.63 dB
10 dB/div Ref 10.00 dBm
Log
Mkr1 2.479 974 37 GHz
-14.954 dBm
Center Freq
2.480000000 GHz
Start Freq
2.479000000 GHz
Stop Freq
2.481000000 GHz
CF Step
200.000 kHz
Auto Man
Freq Offset
0 Hz
Center 2.480000 GHz
#Res BW 3.0 kHz
#VBW 10 kHz
Span 2.000 MHz
#Sweep 214.0 ms (30000 pts)

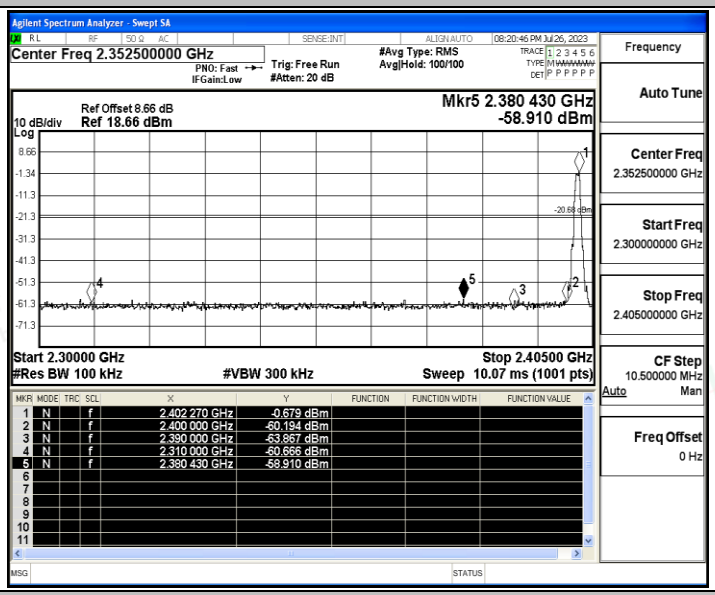
A.4 Band edge measurements

Test Result

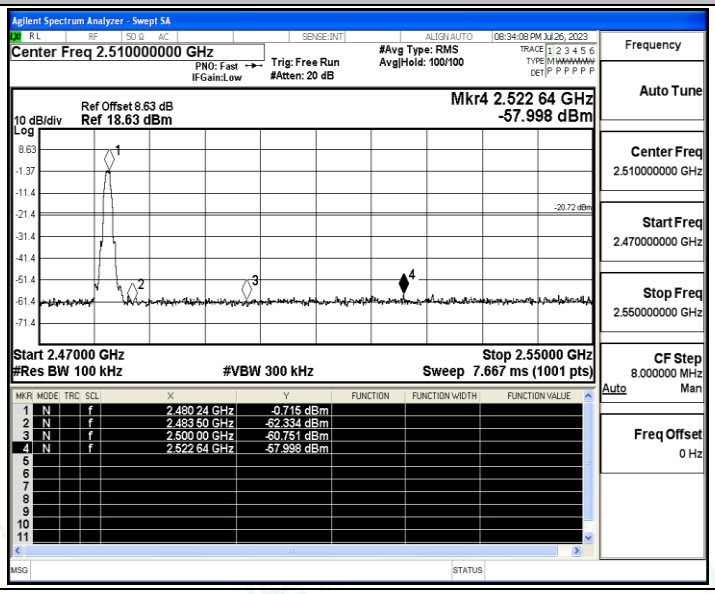
TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	-0.68	-58.91	≤-20.68	PASS
		High	2480	-0.72	-58	≤-20.72	PASS

Test Graphs

BLE_1M_Ant1_Low_2402



BLE_1M_Ant1_High_2480



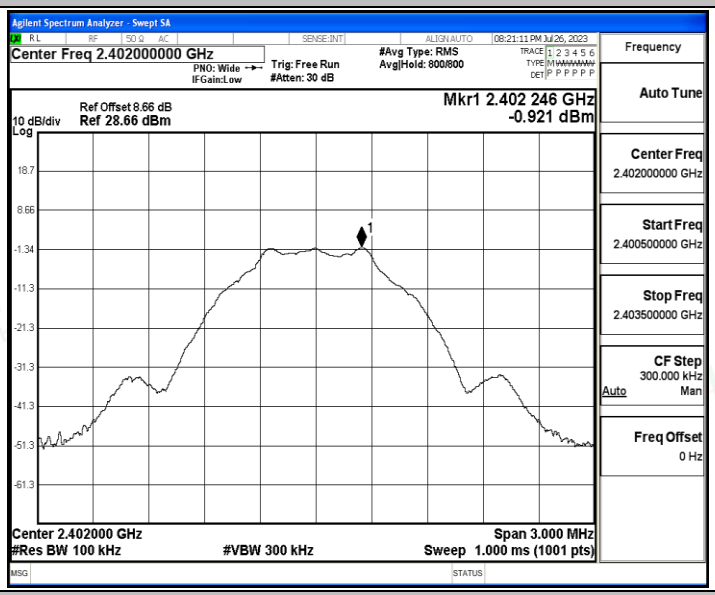
A.5 Conducted Spurious Emission

Test Result

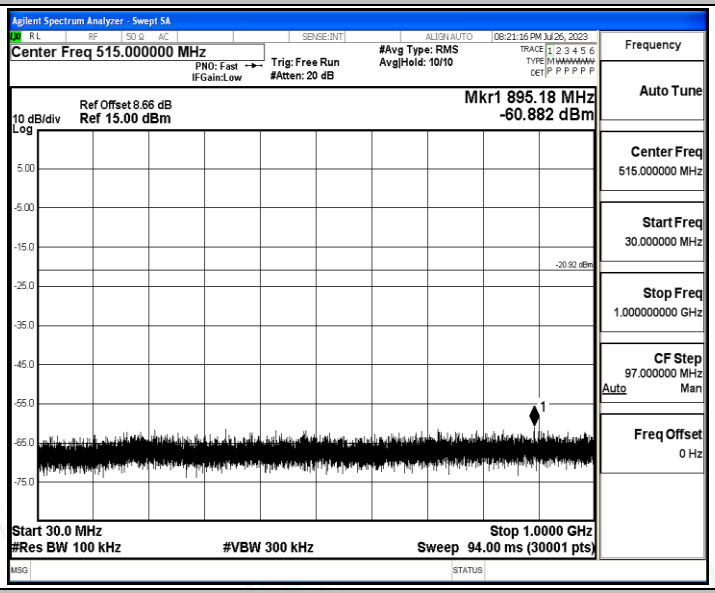
TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	-0.92	-0.92	---	PASS
			30~1000	-0.92	-60.88	≤-20.92	PASS
			1000~26500	-0.92	-46.83	≤-20.92	PASS
		2440	Reference	-1.01	-1.01	---	PASS
			30~1000	-1.01	-61.04	≤-21.01	PASS
			1000~26500	-1.01	-46.39	≤-21.01	PASS
		2480	Reference	-0.81	-0.81	---	PASS
			30~1000	-0.81	-61.2	≤-20.81	PASS
			1000~26500	-0.81	-46.72	≤-20.81	PASS

Test Graphs

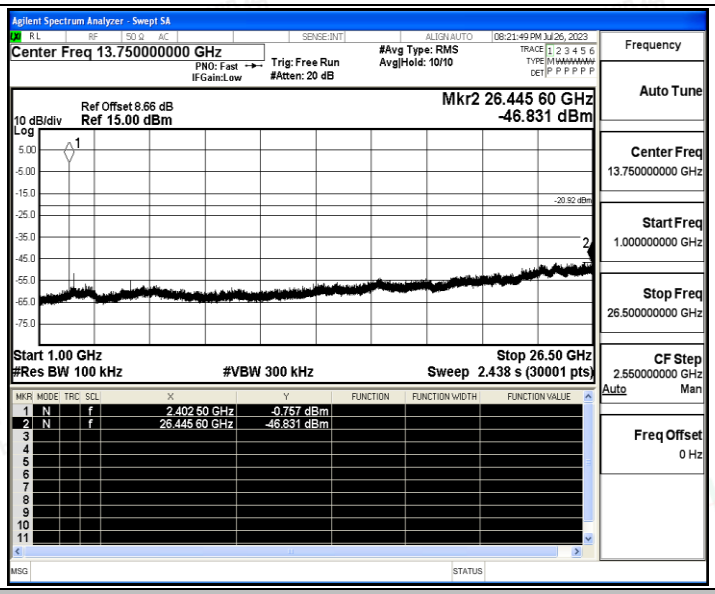
BLE_1M_Ant1_2402_0~Reference



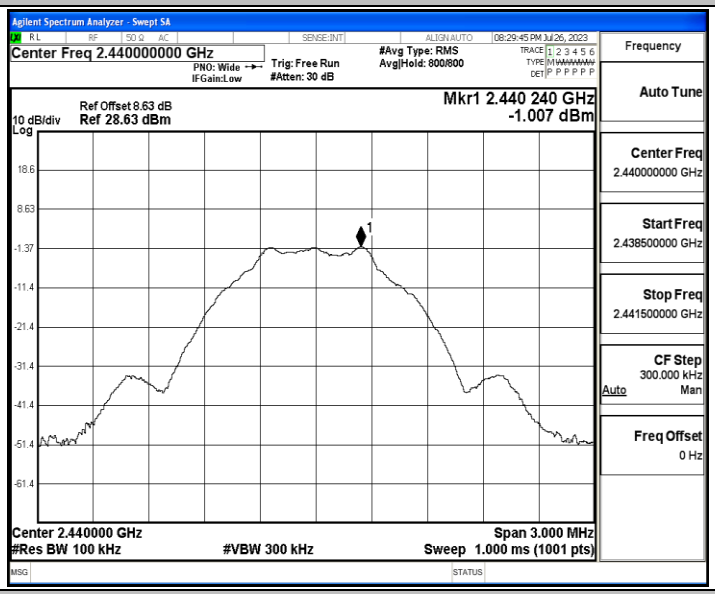
BLE_1M_Ant1_2402_30~1000



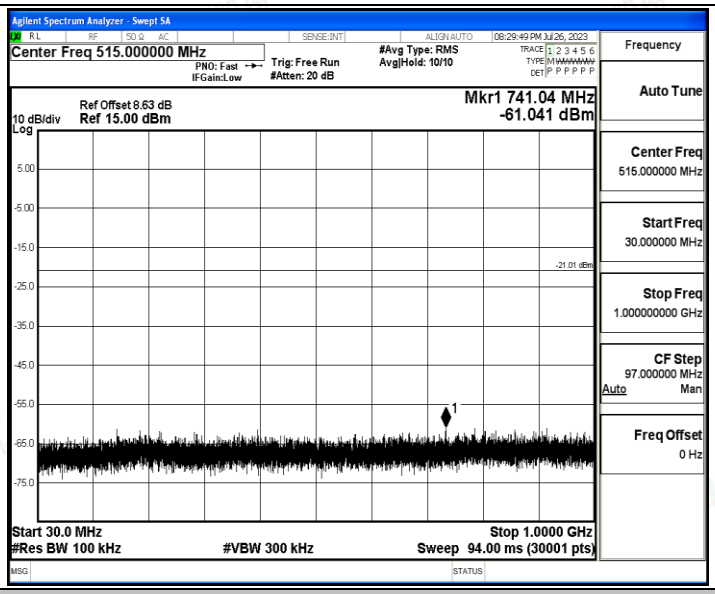
BLE_1M_Ant1_2402_1000~26500



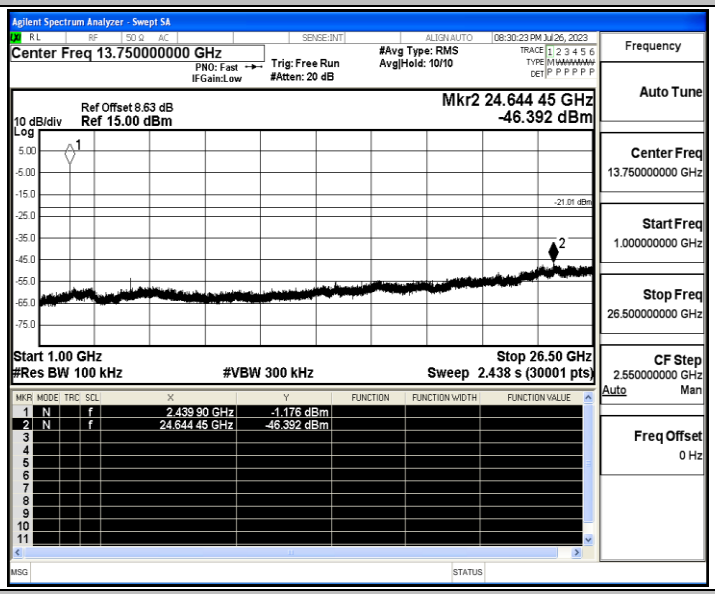
BLE_1M_Ant1_2440_0~Reference



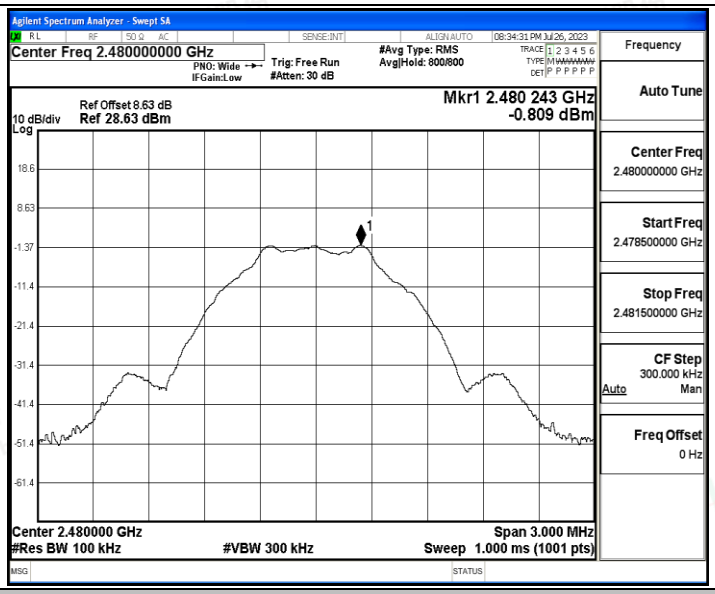
BLE_1M_Ant1_2440_30~1000



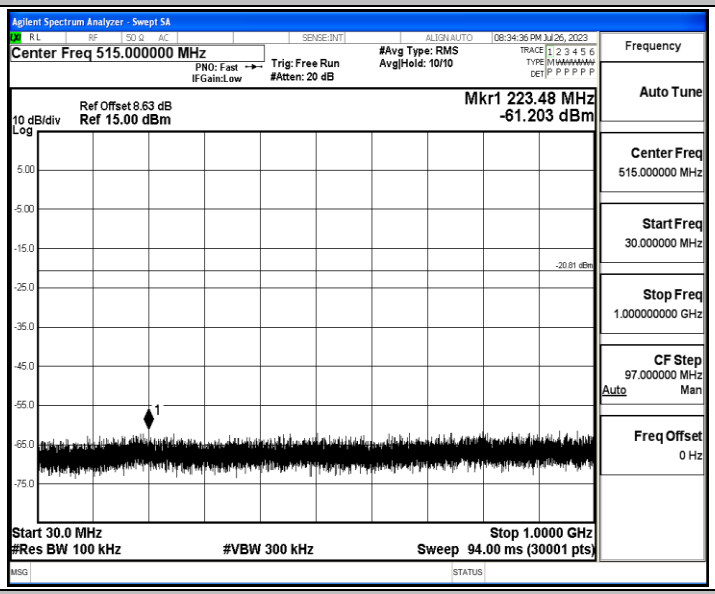
BLE_1M_Ant1_2440_1000~26500



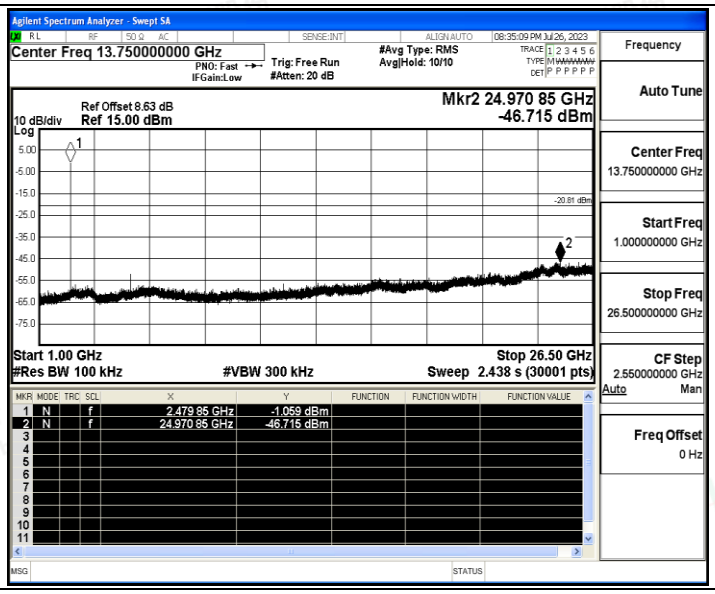
BLE_1M_Ant1_2480_0~Reference



BLE_1M_Ant1_2480_30~1000



BLE_1M_Ant1_2480_1000~26500


Agilent 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
08:35:09 PM Jul 26, 2023
Ref Offset 8.63 dB
10 dB/div Ref 15.00 dBm
Log
Mkr2 24.970 85 GHz
-46.715 dBm
-20.81 dBm
Start 1.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.50 GHz
Sweep 2.438 s (30001 pts)
1 N f 2.479 85 GHz -1.059 dBm
2 N f 24.970 85 GHz -46.715 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

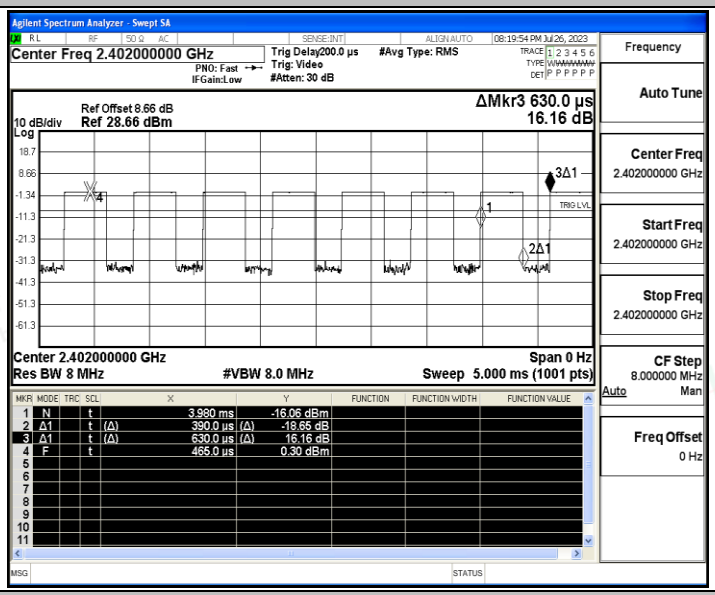
A.6 Duty Cycle

Test Result

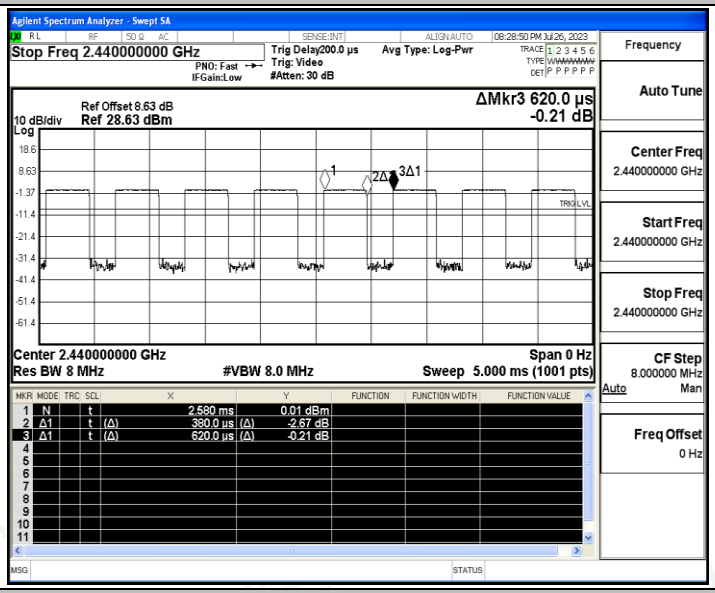
TestMode	Antenna	Channel	ON Time [ms]	Period [ms]	X	DC [%]	xFactor	1/T	Limit	Verdict
BLE_1M	Ant1	2402	0.39	0.63	0.6190	61.90	2.08	2.56	---	---
		2440	0.38	0.62	0.6129	61.29	2.13	2.63	---	---
		2480	0.39	0.63	0.6190	61.90	2.08	2.56	---	---

Test Graphs

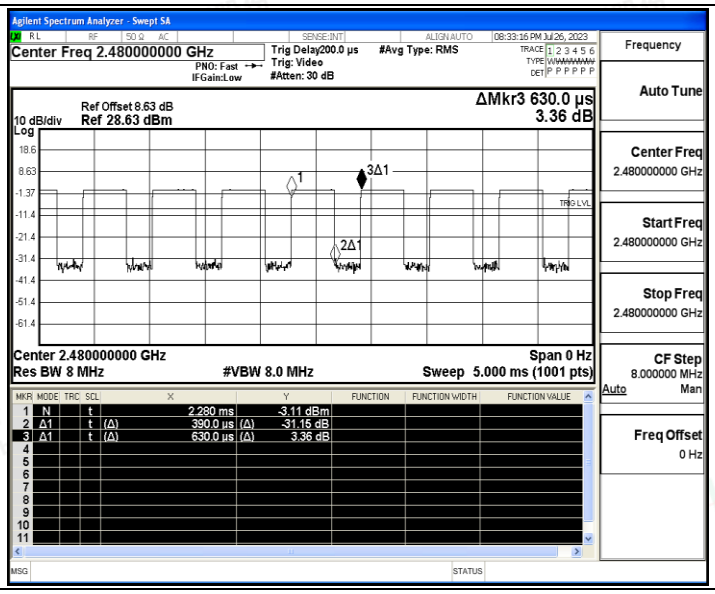
BLE_1M_Ant1_2402



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
08:33:16 PM Jul 26, 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
Ref Offset 8.63 dB
10 dB/div Ref 28.63 dBm
Log
ΔMkr3 630.0 µs
3.36 dB
Center 2.480000000 GHz
Span 0 Hz
Res BW 8 MHz
#VBW 8.0 MHz
Sweep 5.000 ms (1001 pts)
1 N t 2.280 ms -3.11 dBm
2 Δ1 t (Δ) 390.0 µs (Δ) -31.15 dB
3 Δ1 t (Δ) 630.0 µs (Δ) 3.36 dB

A.7 Emissions in Restricted Bands

Test Result

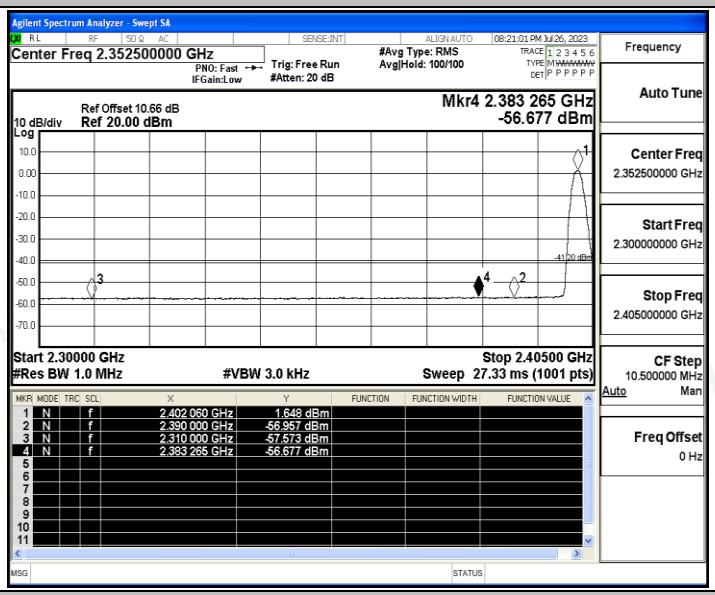
TestMode	Antenna	ChName	Channel	Detector	Freq. [MHz]	Result [dBm]	Limit [dBm]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
BLE_1M	Ant1	Low	2402	AV	2310.000	-57.57	≤-41.20	37.63	≤54	PASS
				AV	2383.265	-56.68	≤-41.20	38.52	≤54	PASS
				AV	2390.000	-56.96	≤-41.20	38.24	≤54	PASS
				Peak	2310.000	-51.98	≤-21.20	43.22	≤74	PASS
				Peak	2388.725	-47.57	≤-21.20	47.63	≤74	PASS
				Peak	2390.000	-50.11	≤-21.20	45.09	≤74	PASS
		High	2480	AV	2483.500	-53.23	≤-41.20	41.97	≤54	PASS
				AV	2483.520	-53.23	≤-41.20	41.97	≤54	PASS
				AV	2500.000	-56.21	≤-41.20	38.99	≤54	PASS
				Peak	2483.500	-50.25	≤-21.20	44.95	≤74	PASS
				Peak	2490.720	-46.21	≤-21.20	48.99	≤74	PASS
				Peak	2500.000	-48.13	≤-21.20	47.07	≤74	PASS

Note：

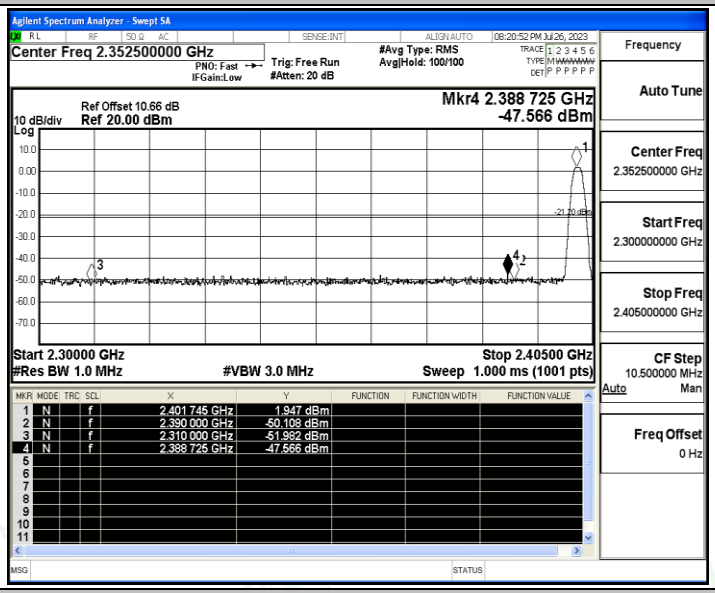
1. The Antenna Gain is compensated in the graph.
2. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

Test Graphs

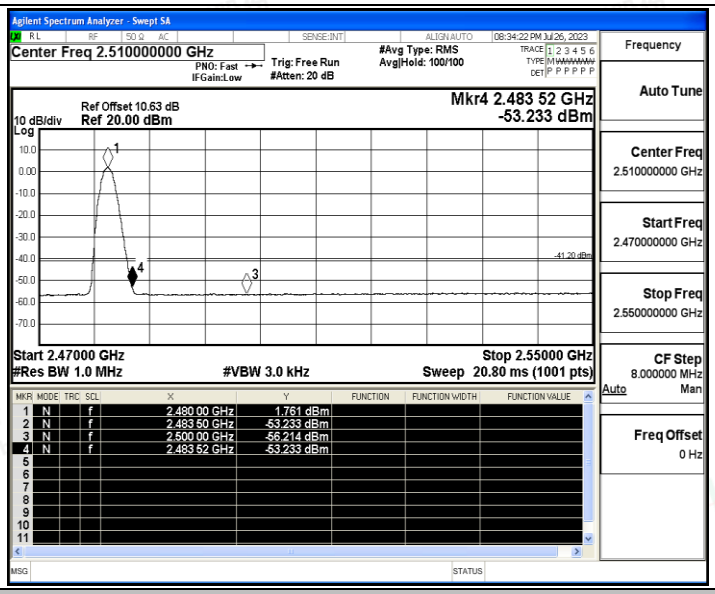
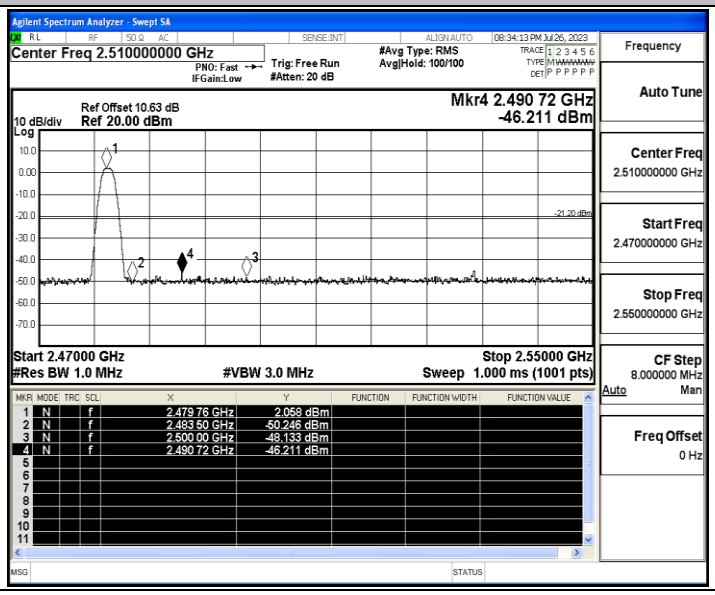
BLE_1M_Ant1_Low_2402_AV



BLE_1M_Ant1_Low_2402_Peak



BLE_1M_Ant1_High_2480_AV



BLE_1M_Ant1_High_2480_Peak