Appendix B

RF Test Data for BT LE (Conducted Measurement)

Product Name: Single Hearing PSA

Test Model: PSA5033

Environmental Conditions

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

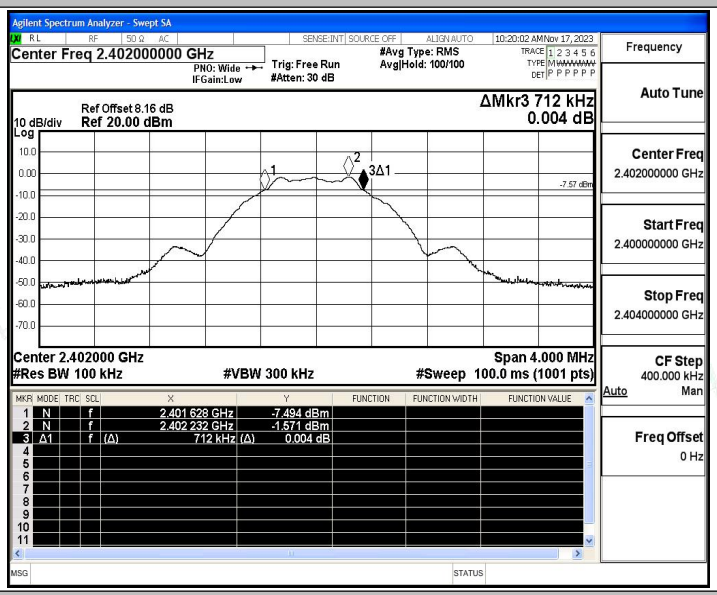
B.1 DTS Bandwidth

Test Result

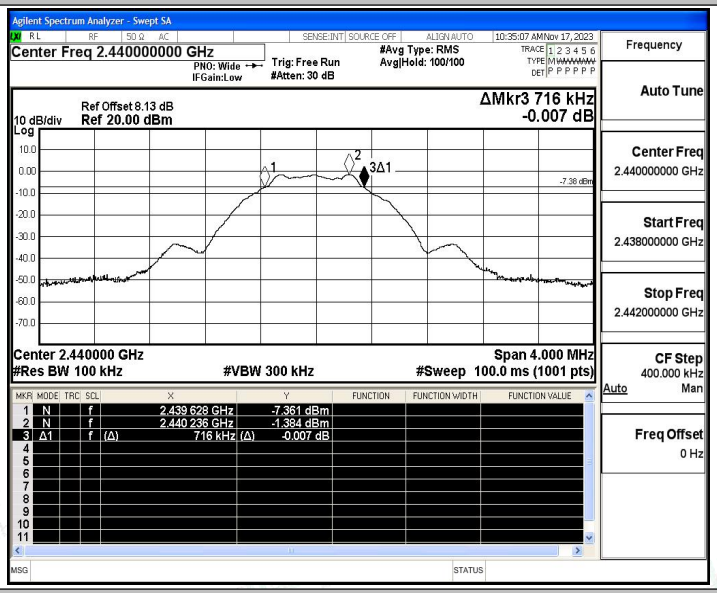
TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.712	2401.628	2402.340	0.5	PASS
		2440	0.716	2439.628	2440.344	0.5	PASS
		2480	0.716	2479.628	2480.344	0.5	PASS

Test Graphs

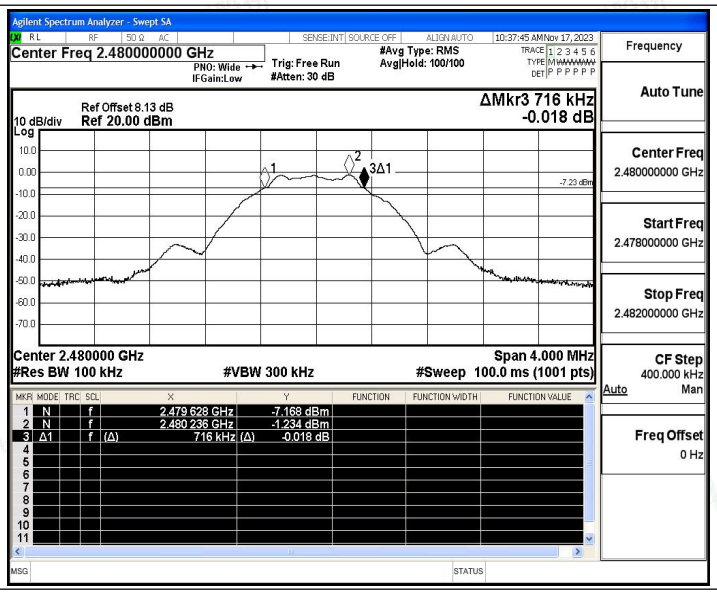
BLE_1M_Ant1_2402



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
10:37:45 AM Nov 17, 2023
Ref Offset 8.13 dB
10 dB/div Ref 20.00 dBm
Log
ΔMkr3 716 kHz
-0.018 dB
-7.23 dBm
Center 2.480000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 4.000 MHz
#Sweep 100.0 ms (1001 pts)
1 N f 2.479 628 GHz -7.168 dBm
2 N f 2.480 236 GHz -1.234 dBm
3 Δ1 f (Δ) 716 kHz (Δ) -0.018 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

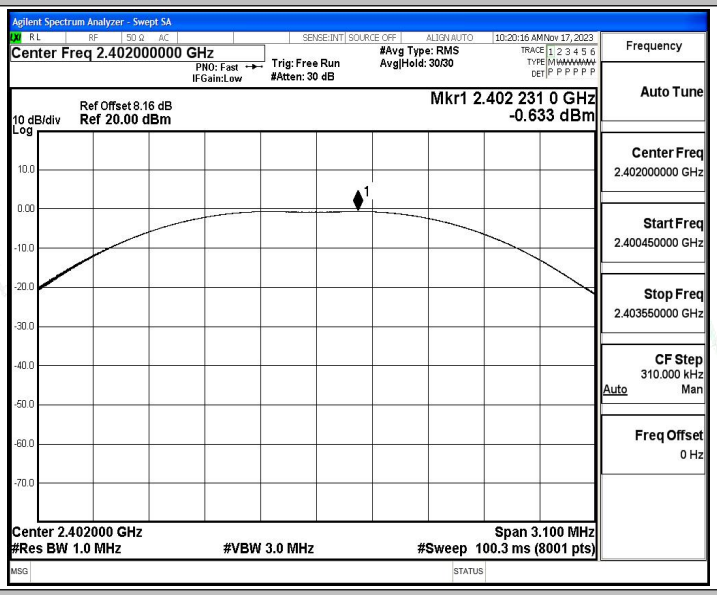
B.2 Maximum conducted output power

Test Result

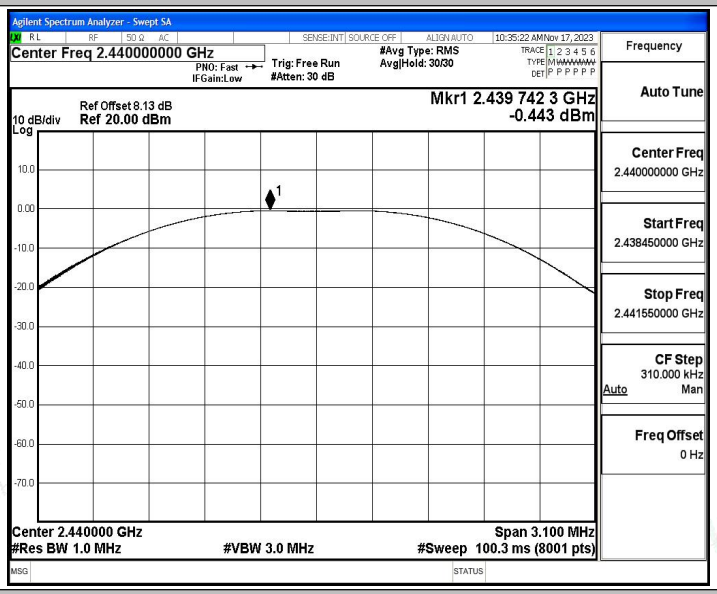
TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	-0.63	≤30	PASS
		2440	-0.44	≤30	PASS
		2480	-0.29	≤30	PASS

Test Graphs

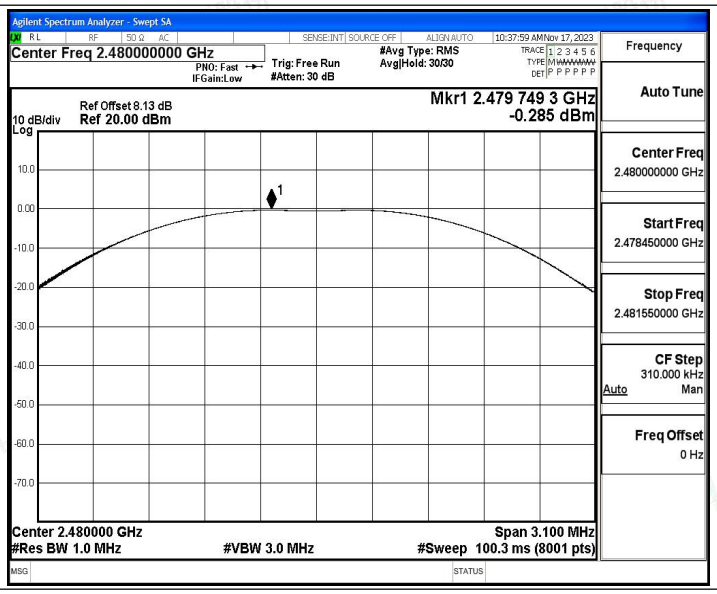
BLE_1M_Ant1_2402



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
10:37:59 AM Nov 17, 2023
Ref Offset 8.13 dB
10 dB/div Ref 20.00 dBm
Log
Mkr1 2.479 749 3 GHz
-0.285 dBm
Center 2.480000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Span 3.100 MHz
#Sweep 100.3 ms (8001 pts)
Frequency
Auto Tune
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

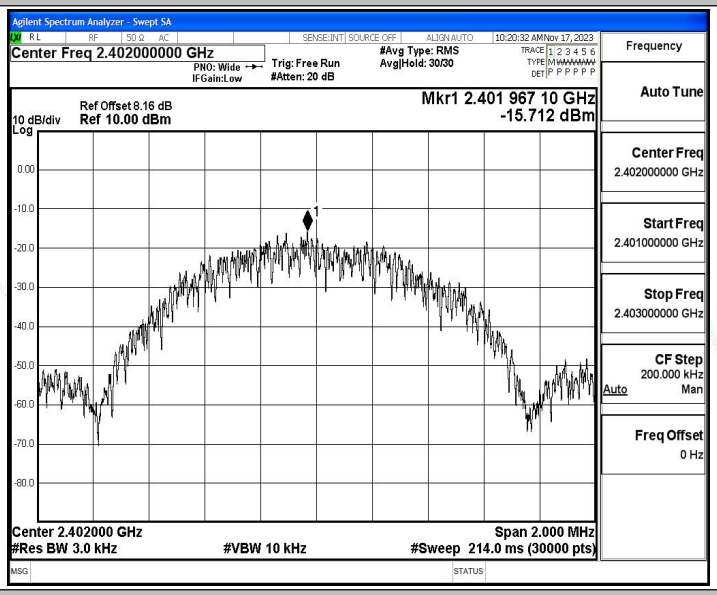
B.3 Maximum power spectral density

Test Result

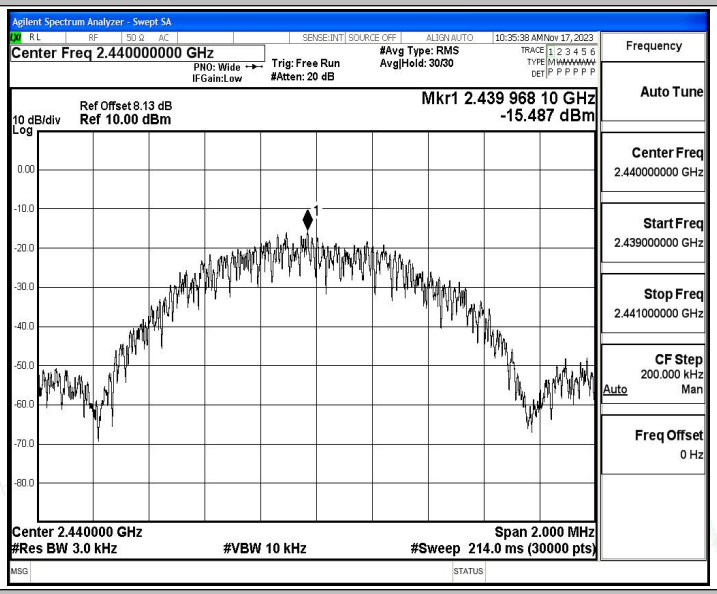
TestMode	Antenna	Channel	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-15.71	≤8.00	PASS
		2440	-15.49	≤8.00	PASS
		2480	-15.35	≤8.00	PASS

Test Graphs

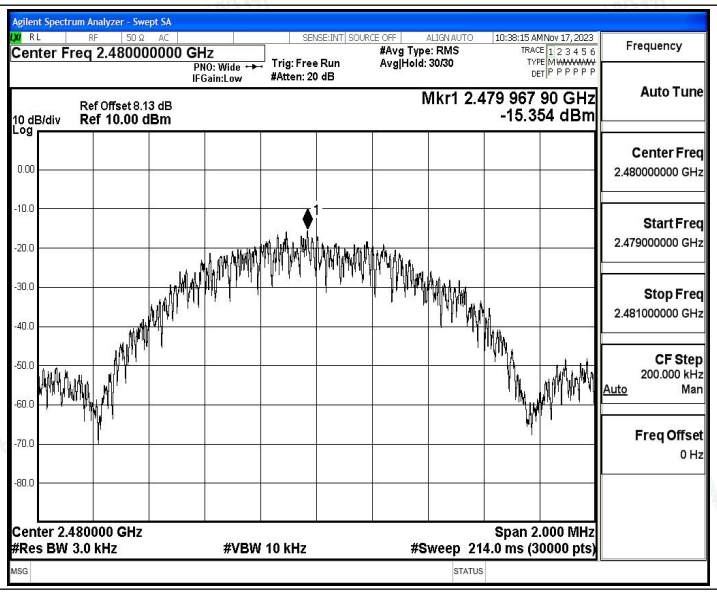
BLE_1M_Ant1_2402



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
10:38:15 AM Nov 17, 2023
Ref Offset 8.13 dB
10 dB/div Ref 10.00 dBm
Log
Mkr1 2.479 967 90 GHz
-15.354 dBm
Center 2.480000 GHz
#Res BW 3.0 kHz
#VBW 10 kHz
Span 2.000 MHz
#Sweep 214.0 ms (30000 pts)
Frequency
Auto Tune
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

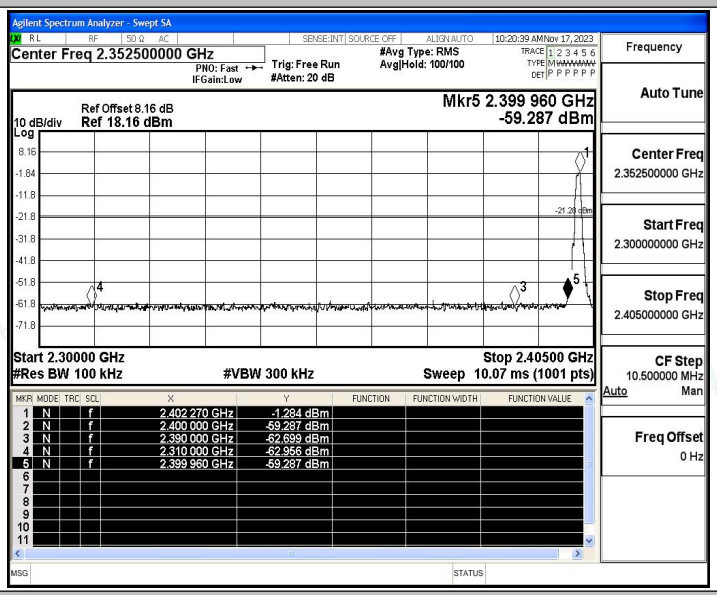
B.4 Band edge measurements

Test Result

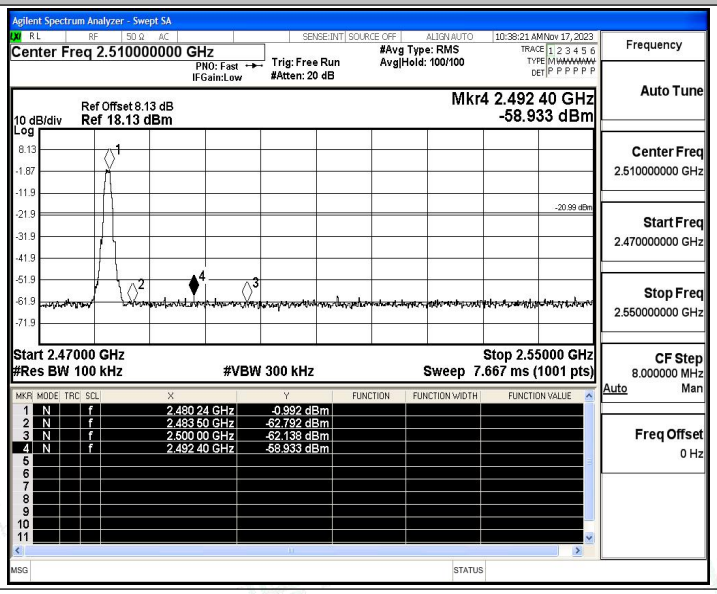
TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	-1.28	-59.29	≤-21.28	PASS
		High	2480	-0.99	-58.93	≤-20.99	PASS

Test Graphs

BLE_1M_Ant1_Low_2402



BLE_1M_Ant1_High_2480



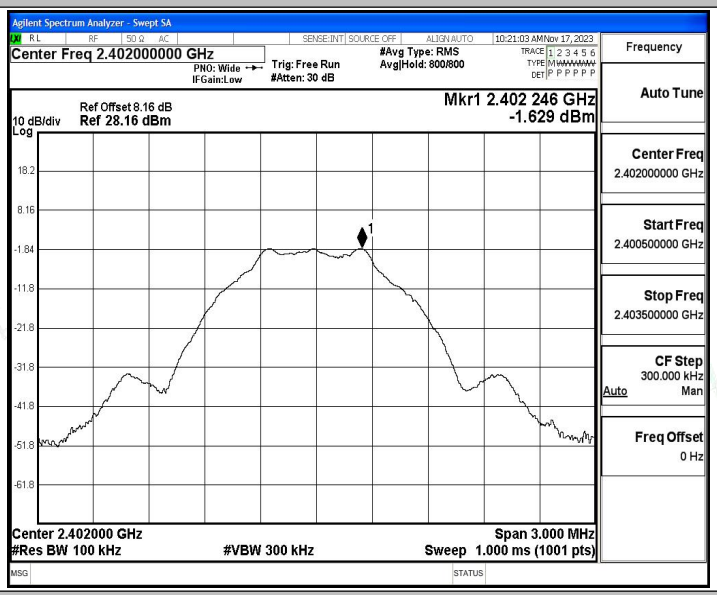
B.5 Conducted Spurious Emission

Test Result

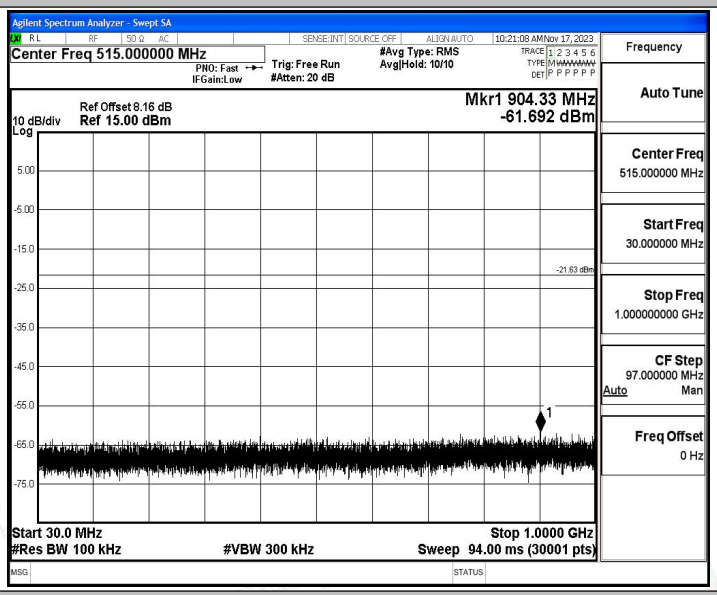
TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	-1.63	-1.63	---	PASS
			30~1000	-1.63	-61.69	≤-21.63	PASS
			1000~26500	-1.63	-48.72	≤-21.63	PASS
		2440	Reference	-1.36	-1.36	---	PASS
			30~1000	-1.36	-61.61	≤-21.36	PASS
			1000~26500	-1.36	-49.29	≤-21.36	PASS
		2480	Reference	-1.25	-1.25	---	PASS
			30~1000	-1.25	-61.92	≤-21.25	PASS
			1000~26500	-1.25	-48.39	≤-21.25	PASS

Test Graphs

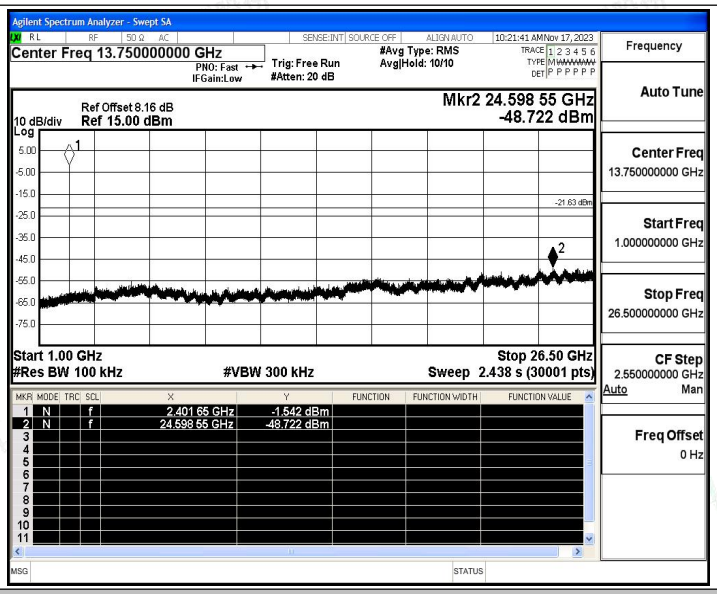
BLE_1M_Ant1_2402_0~Reference



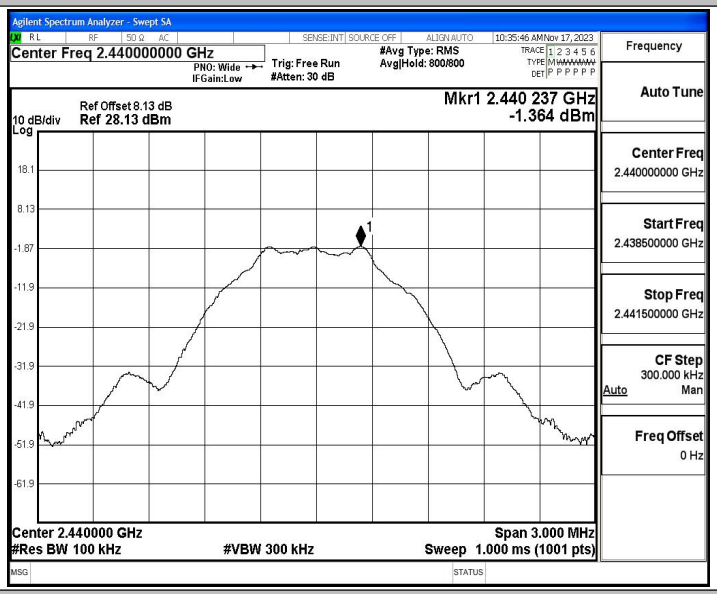
BLE_1M_Ant1_2402_30~1000



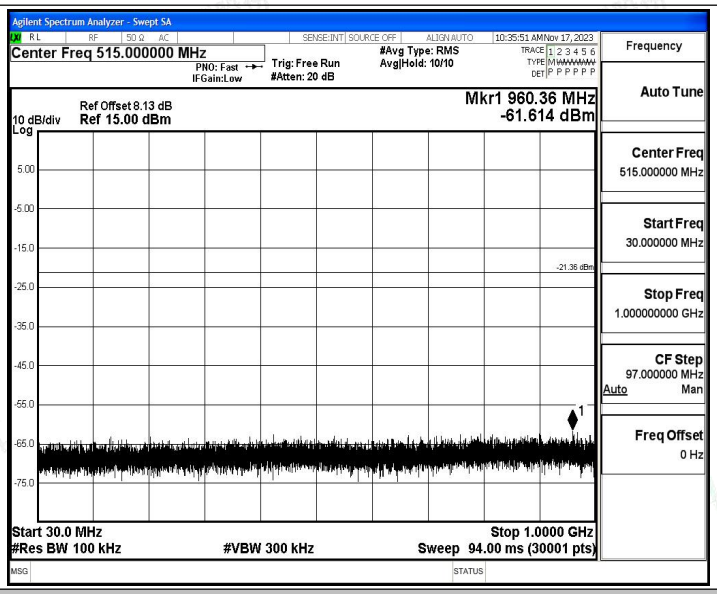
BLE_1M_Ant1_2402_1000~26500



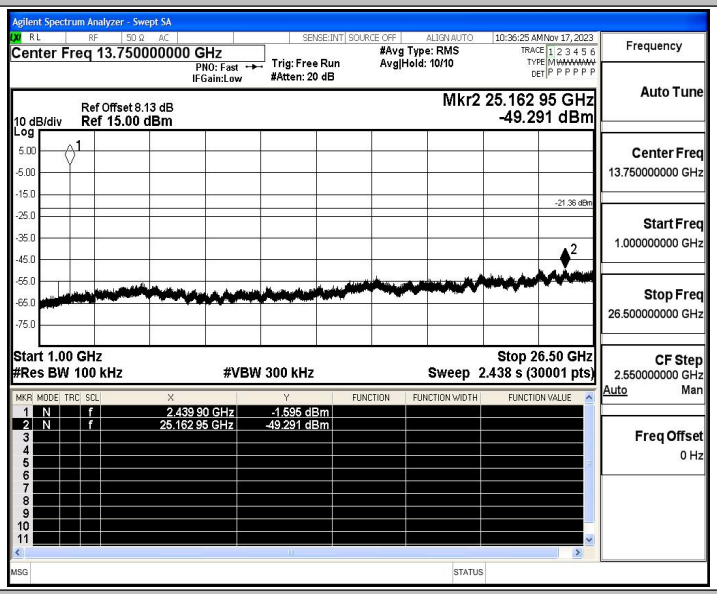
BLE_1M_Ant1_2440_0~Reference



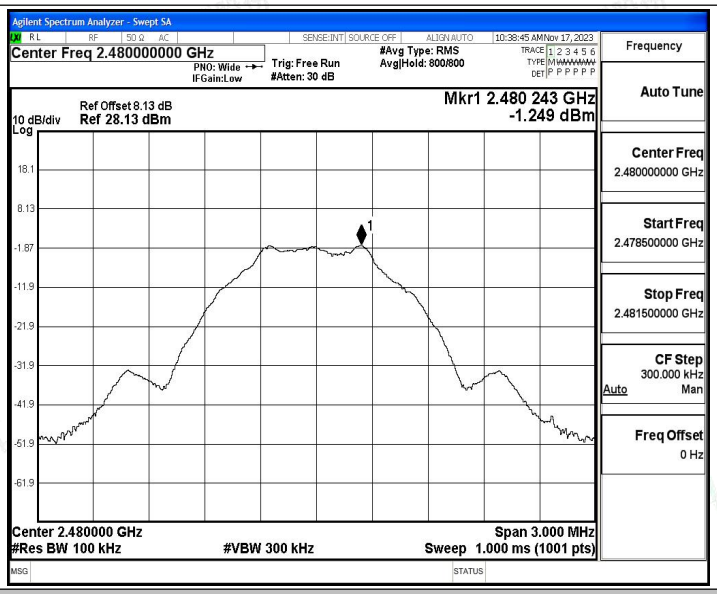
BLE_1M_Ant1_2440_30~1000



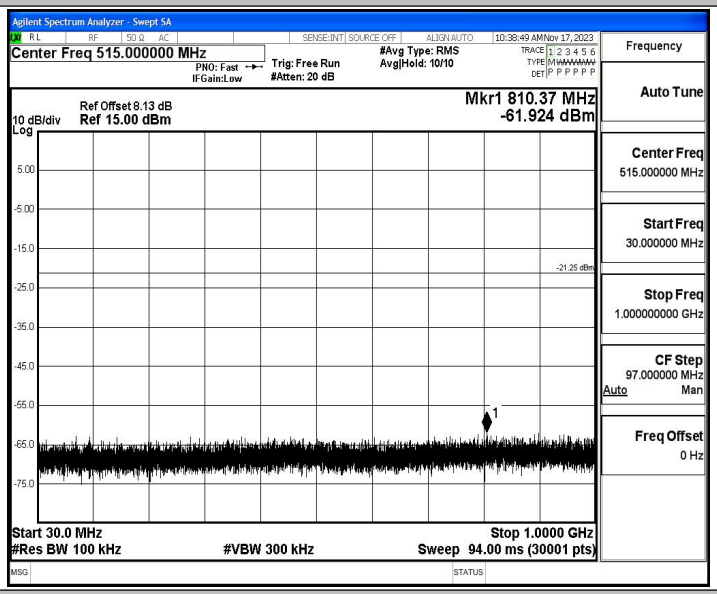
BLE_1M_Ant1_2440_1000~26500



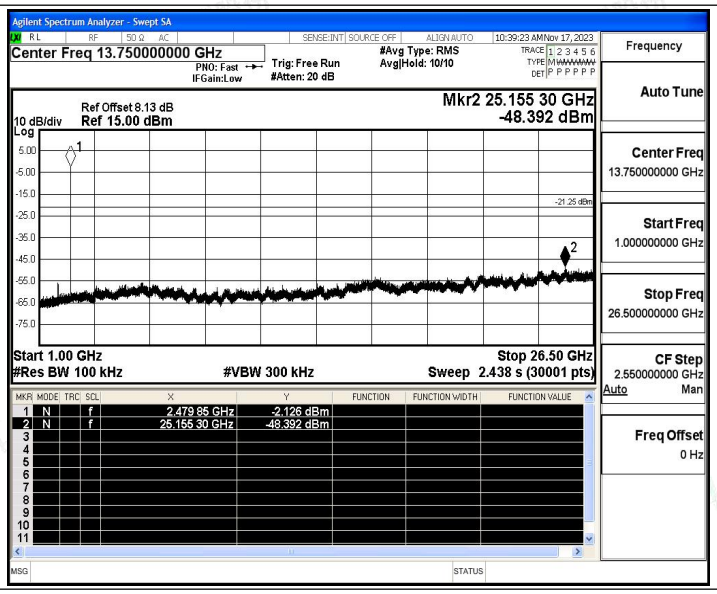
BLE_1M_Ant1_2480_0~Reference



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
10:39:23 AM Nov 17, 2023
Ref Offset 8.13 dB
10 dB/div Ref 15.00 dBm
Log
Mkr2 25.155 30 GHz
-48.392 dBm
-21.25 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 -2.126 dBm
2 N f 25.155 30 GHz -48.392 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

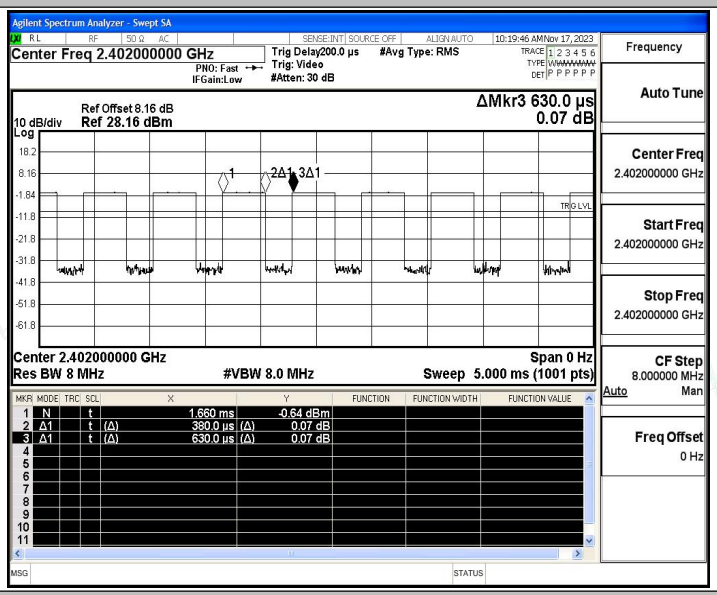
B.6 Duty Cycle

Test Result

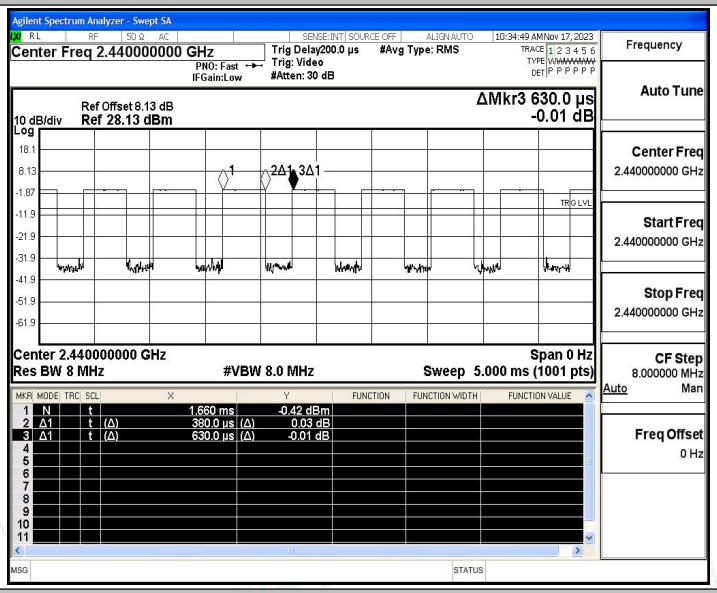
TestMode	Antenna	Channel	ON Time [ms]	Period [ms]	X	DC [%]	xFactor	1/T	Limit	Verdict
BLE_1M	Ant1	2402	0.38	0.63	0.6032	60.32	2.20	2.63	---	---
		2440	0.38	0.63	0.6032	60.32	2.20	2.63	---	---
		2480	0.38	0.63	0.6032	60.32	2.20	2.63	---	---

Test Graphs

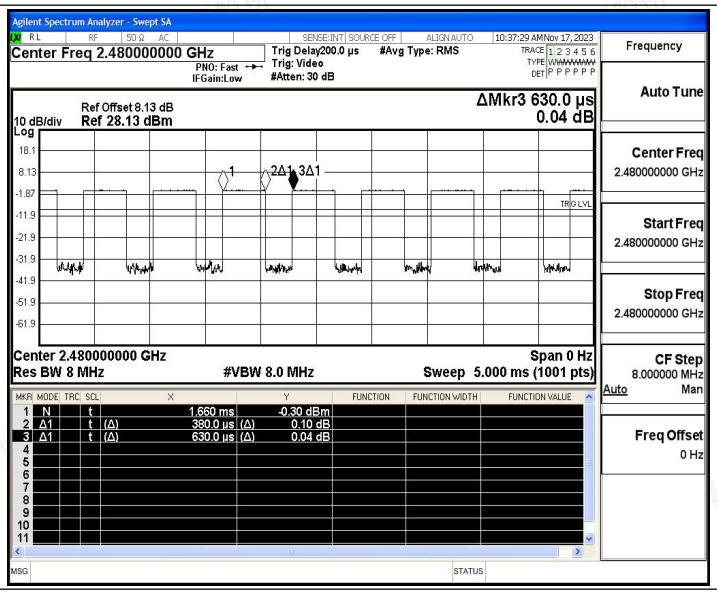
BLE_1M_Ant1_2402



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
10:37:29 AM Nov 17, 2023
Ref Offset 8.13 dB
10 dB/div Ref 28.13 dBm
Log
ΔMkr3 630.0 µs
0.04 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 1.660 ms -0.30 dBm
2 Δ1 t (Δ) 380.0 µs (Δ) 0.10 dB
3 Δ1 t (Δ) 630.0 µs (Δ) 0.04 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

B.7 Emissions in Restricted Bands

Test Result

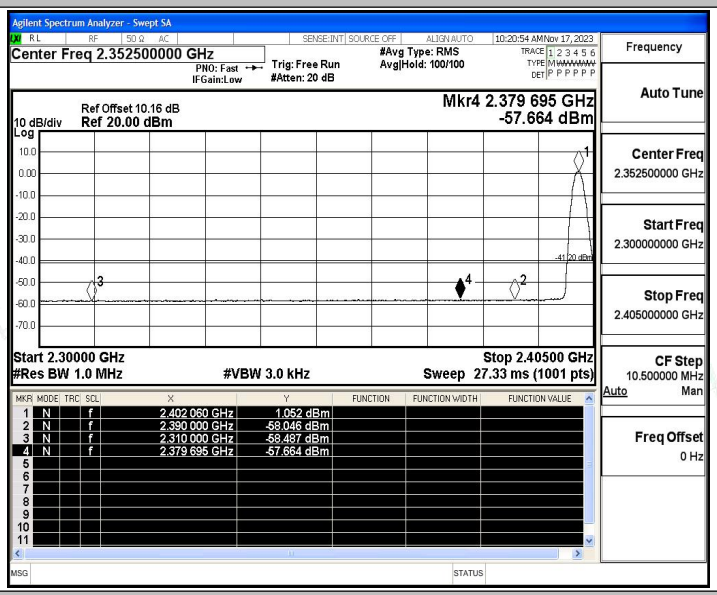
TestMode	Antenna	ChName	Channel	Detector	Freq. [MHz]	Result [dBm]	Limit [dBm]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
BLE_1M	Ant1	Low	2402	AV	2310.000	-58.49	≤-41.20	36.71	≤54	PASS
				AV	2379.695	-57.66	≤-41.20	37.54	≤54	PASS
				AV	2390.000	-58.05	≤-41.20	37.15	≤54	PASS
				Peak	2310.000	-51.37	≤-21.20	43.83	≤74	PASS
				Peak	2365.415	-47.89	≤-21.20	47.31	≤74	PASS
				Peak	2390.000	-50.56	≤-21.20	44.64	≤74	PASS
		High	2480	AV	2483.500	-54.32	≤-41.20	40.88	≤54	PASS
				AV	2483.520	-54.32	≤-41.20	40.88	≤54	PASS
				AV	2500.000	-58.01	≤-41.20	37.19	≤54	PASS
				Peak	2483.500	-52.3	≤-21.20	42.90	≤74	PASS
				Peak	2491.760	-48.4	≤-21.20	46.80	≤74	PASS
				Peak	2500.000	-51.66	≤-21.20	43.54	≤74	PASS

Note:

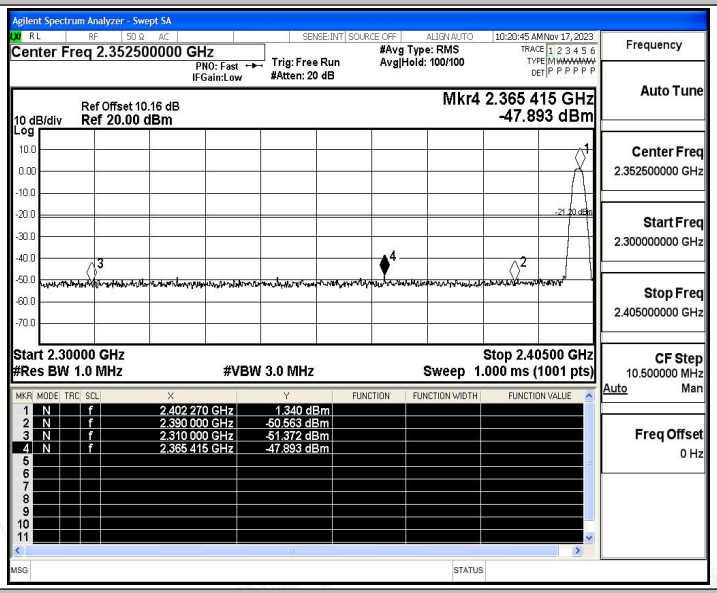
1. The Antenna Gain is compensated in the graph.
2. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

Test Graphs

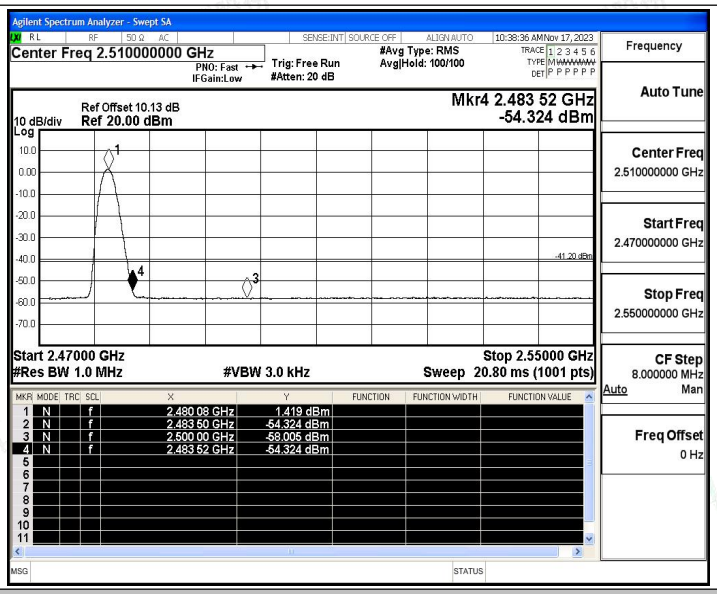
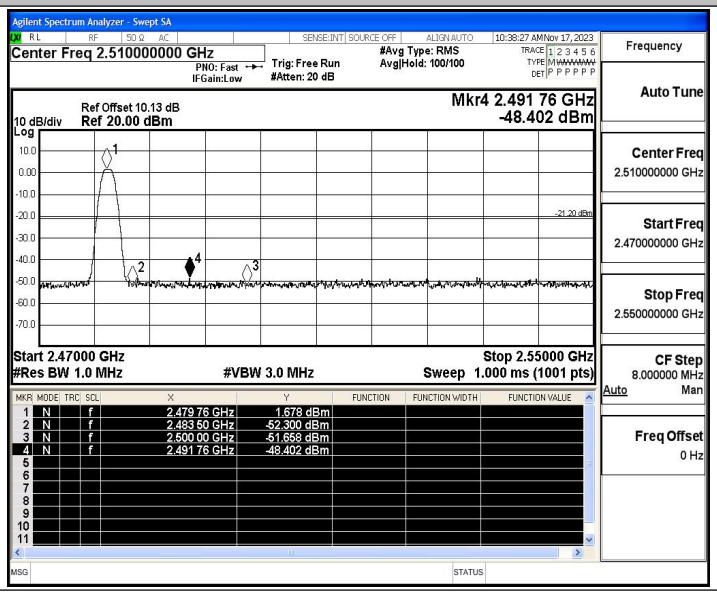
BLE_1M_Ant1_Low_2402_AV



BLE_1M_Ant1_Low_2402_Peak



BLE_1M_Ant1_High_2480_AV



BLE_1M_Ant1_High_2480_Peak