



Appendix A

RF Test Data for BLE (Conducted Measurement)

Product Name: X1 Star Projector and Home Planetarium, White

Test Model: LV-X2P-W-US

Environmental Conditions

Temperature:	23.5° C
Relative Humidity:	52.2%
ATM Pressure:	100.0 kPa
Test Engineer:	Nick Peng
	<i>Nick Peng</i>
Supervised by:	Ling Zhu
	<i>Ling Zhu</i>



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A.1 DTS Bandwidth

Test Result

TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.736	2401.592	2402.328	0.5	PASS
		2440	0.732	2439.596	2440.328	0.5	PASS
		2480	0.736	2479.592	2480.328	0.5	PASS



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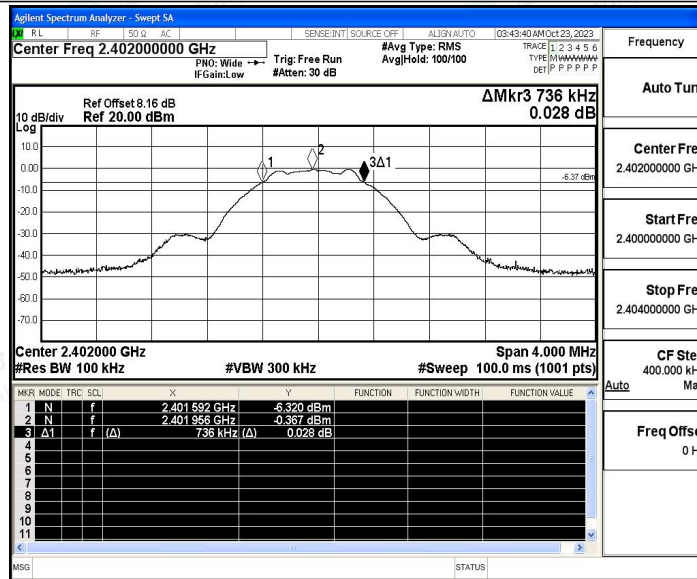
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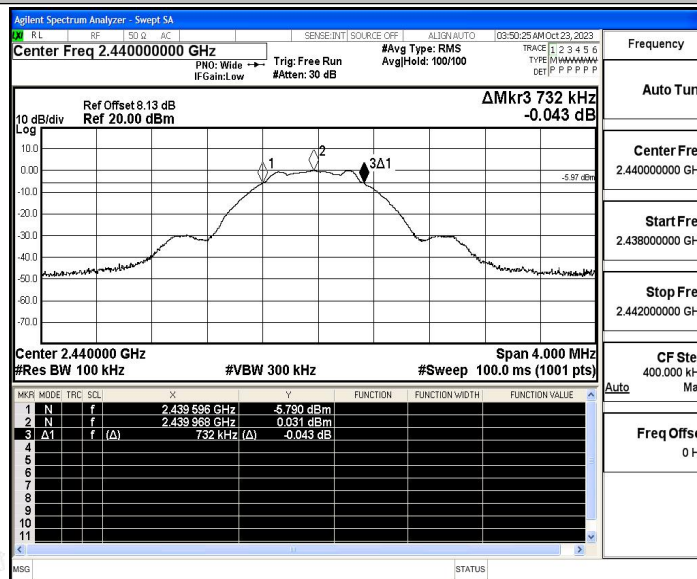


Test Graphs

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480

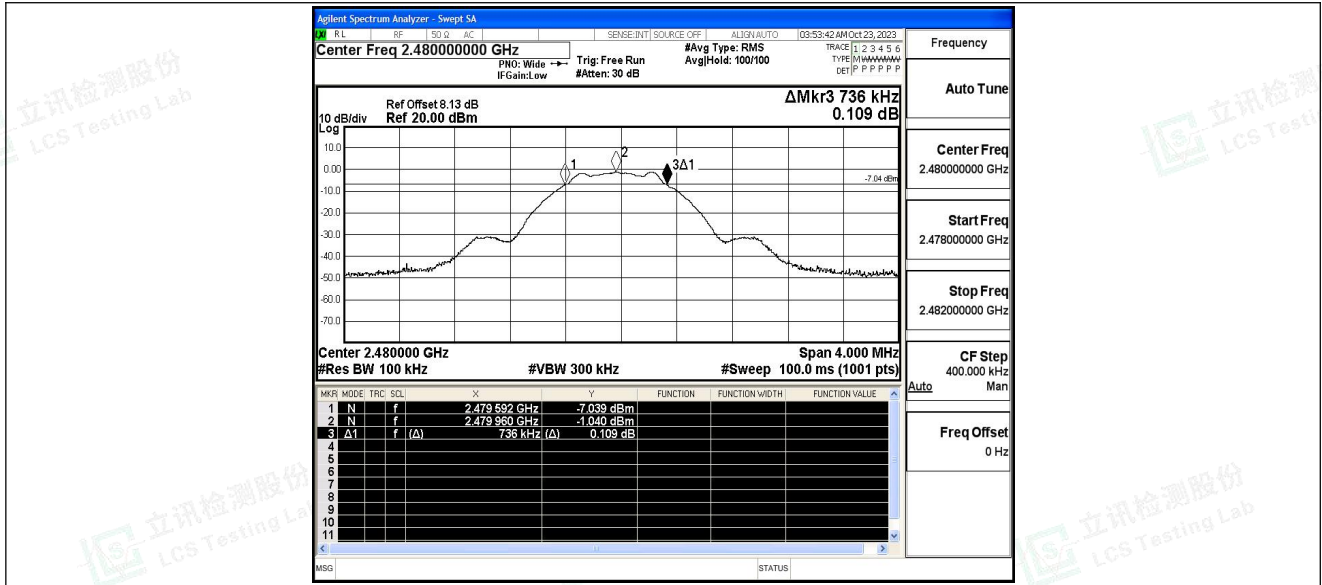


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A.2 Maximum conducted output power

Test Result

TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	0.9	≤30	PASS
		2440	1.21	≤30	PASS
		2480	0.14	≤30	PASS



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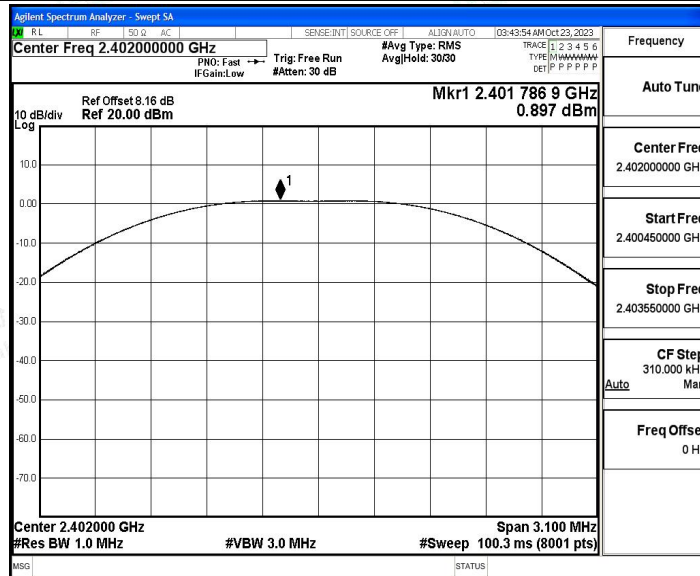
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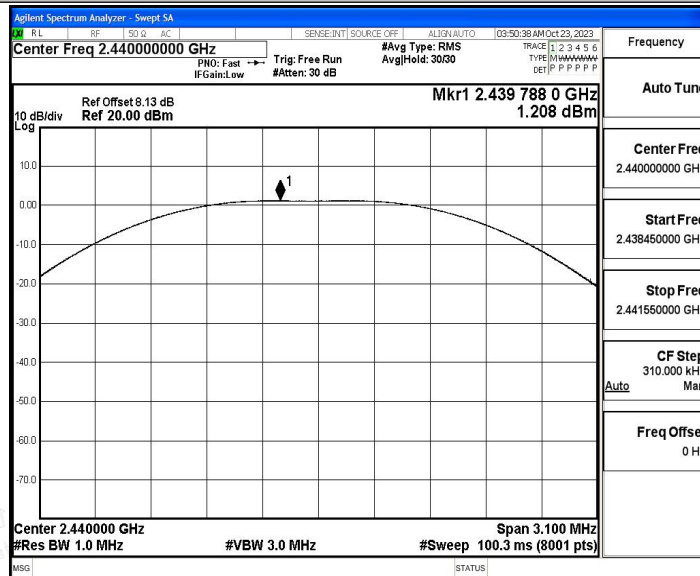


Test Graphs

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480

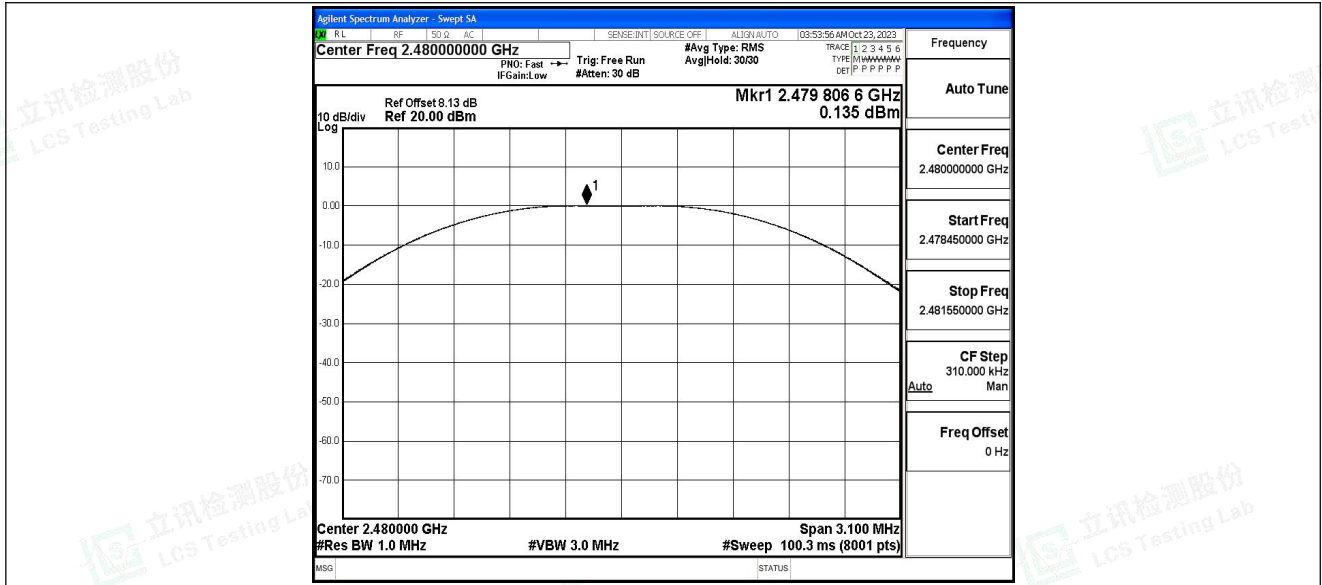


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A.3 Maximum power spectral density

Test Result

TestMode	Antenna	Channel	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-14.42	≤8.00	PASS
		2440	-14.49	≤8.00	PASS
		2480	-15.14	≤8.00	PASS



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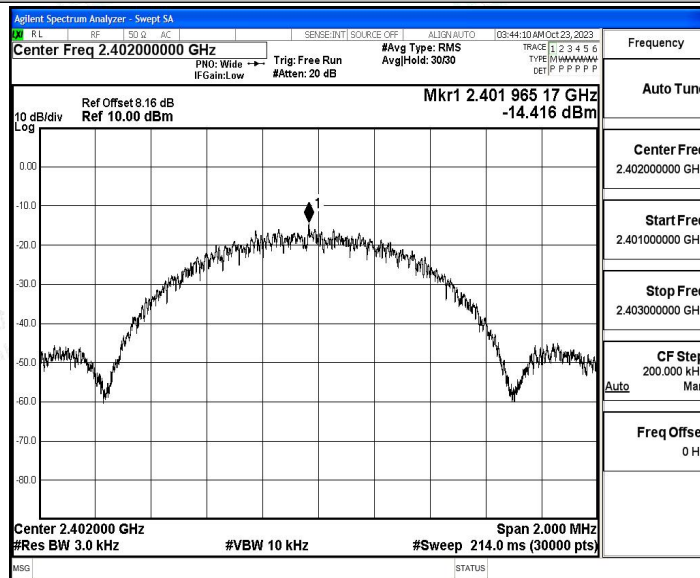
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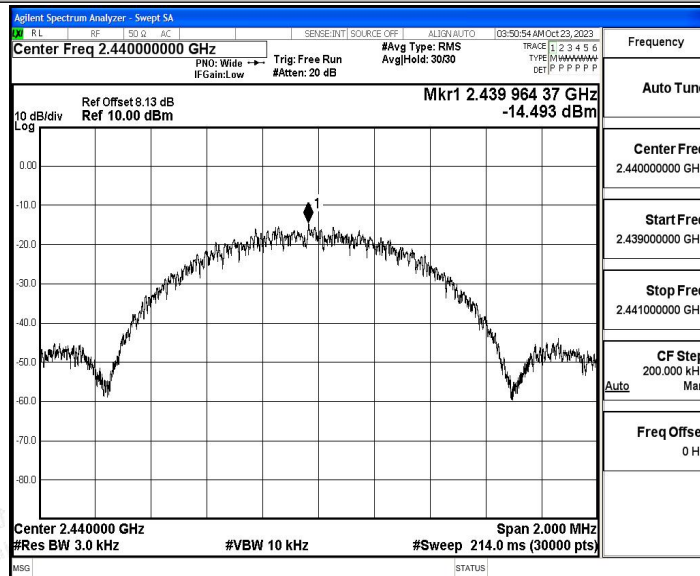


Test Graphs

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480

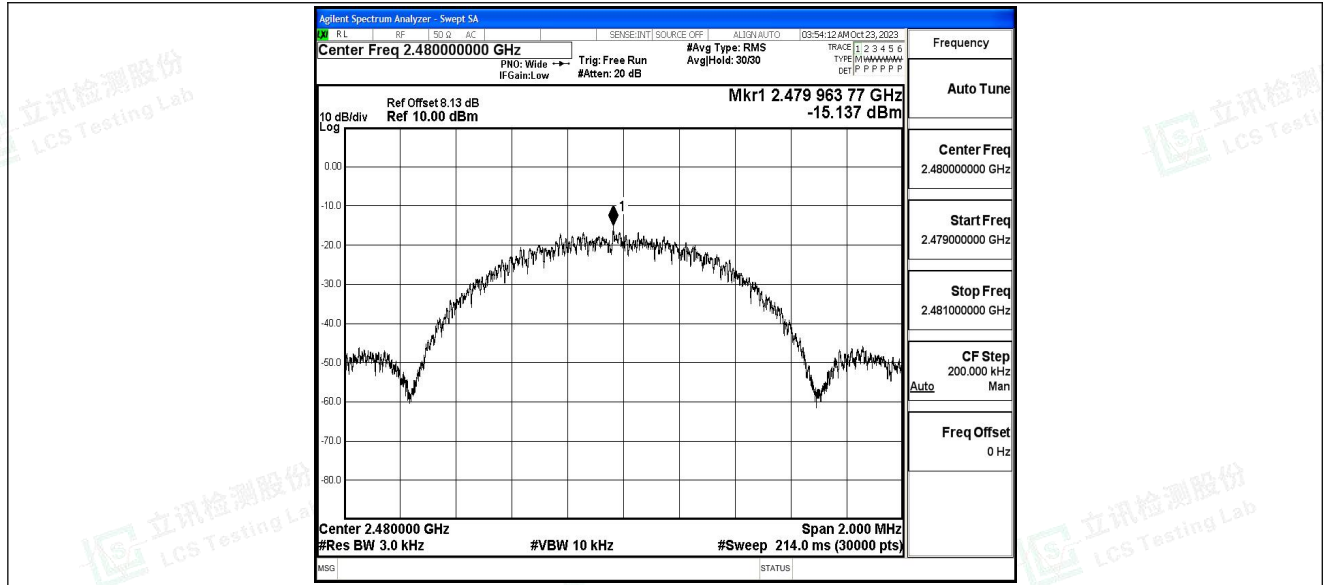


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A.4 Band edge measurements

Test Result

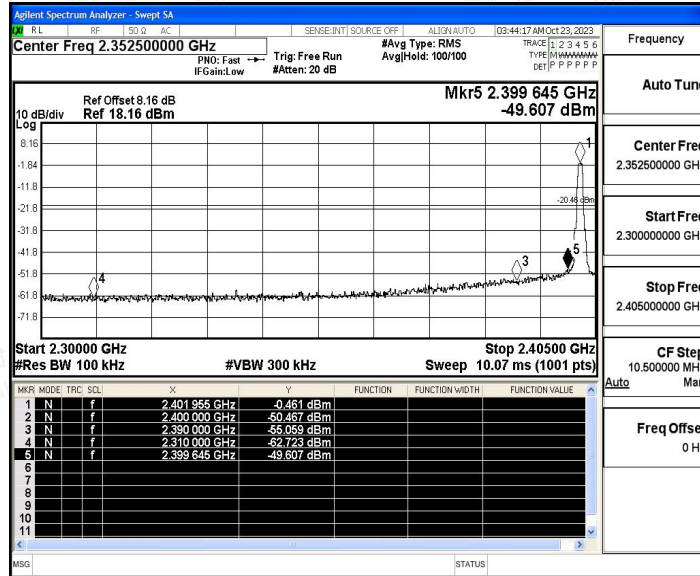
TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	-0.46	-49.61	≤-20.46	PASS
		High	2480	-0.95	-51.43	≤-20.95	PASS



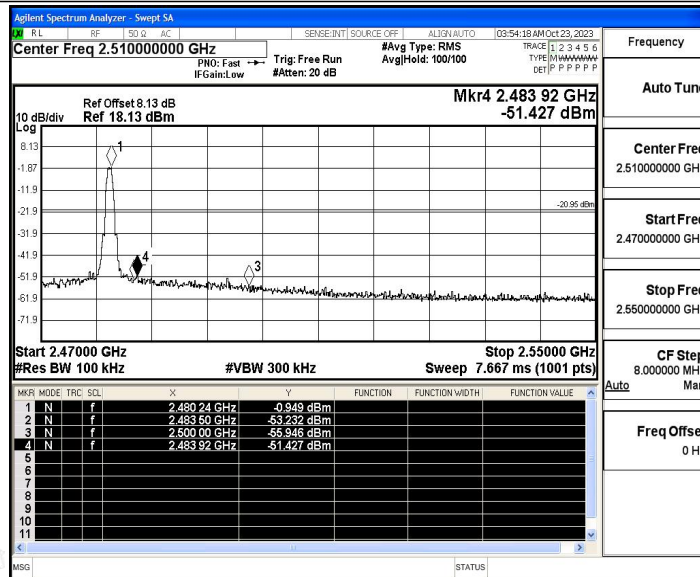


Test Graphs

BLE_1M_Ant1_Low_2402



BLE_1M_Ant1_High_2480



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A.5 Conducted Spurious Emission

Test Result

TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	-0.41	-0.41	---	PASS
			30~1000	-0.41	-61.62	≤-20.41	PASS
			1000~26500	-0.41	-49.6	≤-20.41	PASS
		2440	Reference	-0.08	-0.08	---	PASS
			30~1000	-0.08	-61.93	≤-20.08	PASS
			1000~26500	-0.08	-48.66	≤-20.08	PASS
		2480	Reference	-1.06	-1.06	---	PASS
			30~1000	-1.06	-61.72	≤-21.06	PASS
			1000~26500	-1.06	-48.77	≤-21.06	PASS



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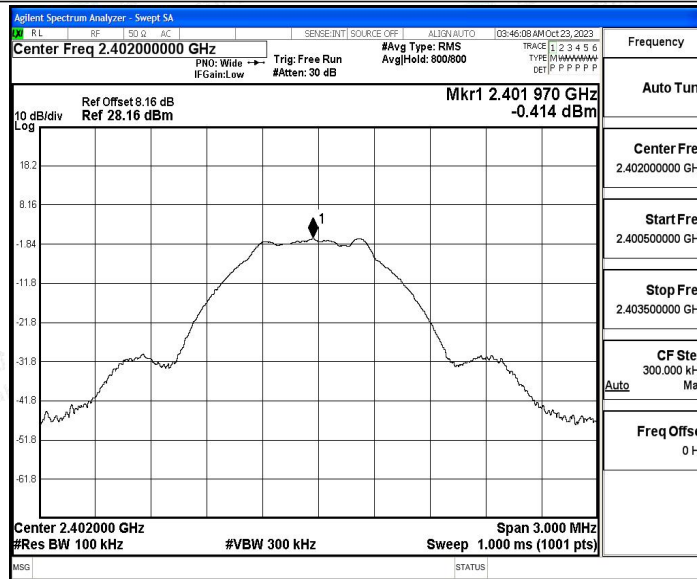
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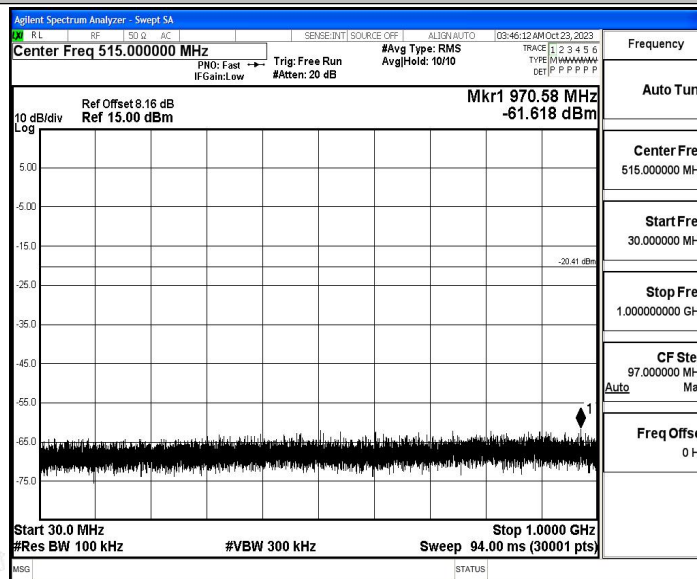


Test Graphs

BLE_1M_Ant1_2402_0~Reference



BLE_1M_Ant1_2402_30~1000



BLE_1M_Ant1_2402_1000~26500

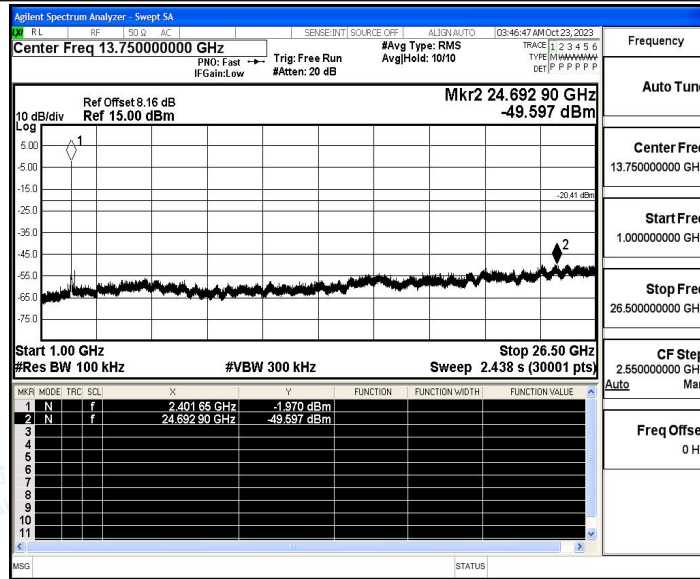


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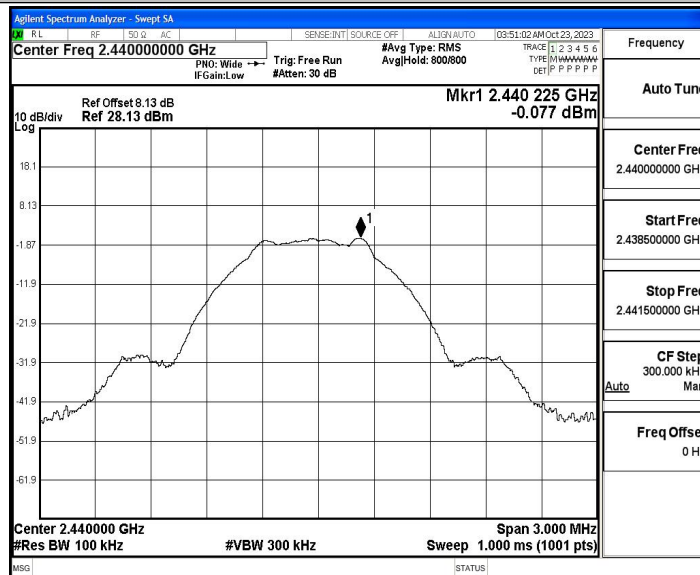
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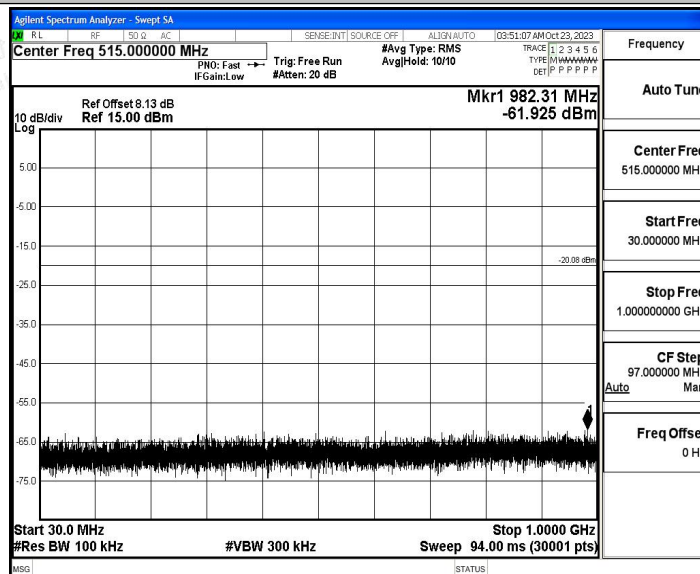
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BLE_1M_Ant1_2440_0~Reference



BLE_1M_Ant1_2440_30~1000

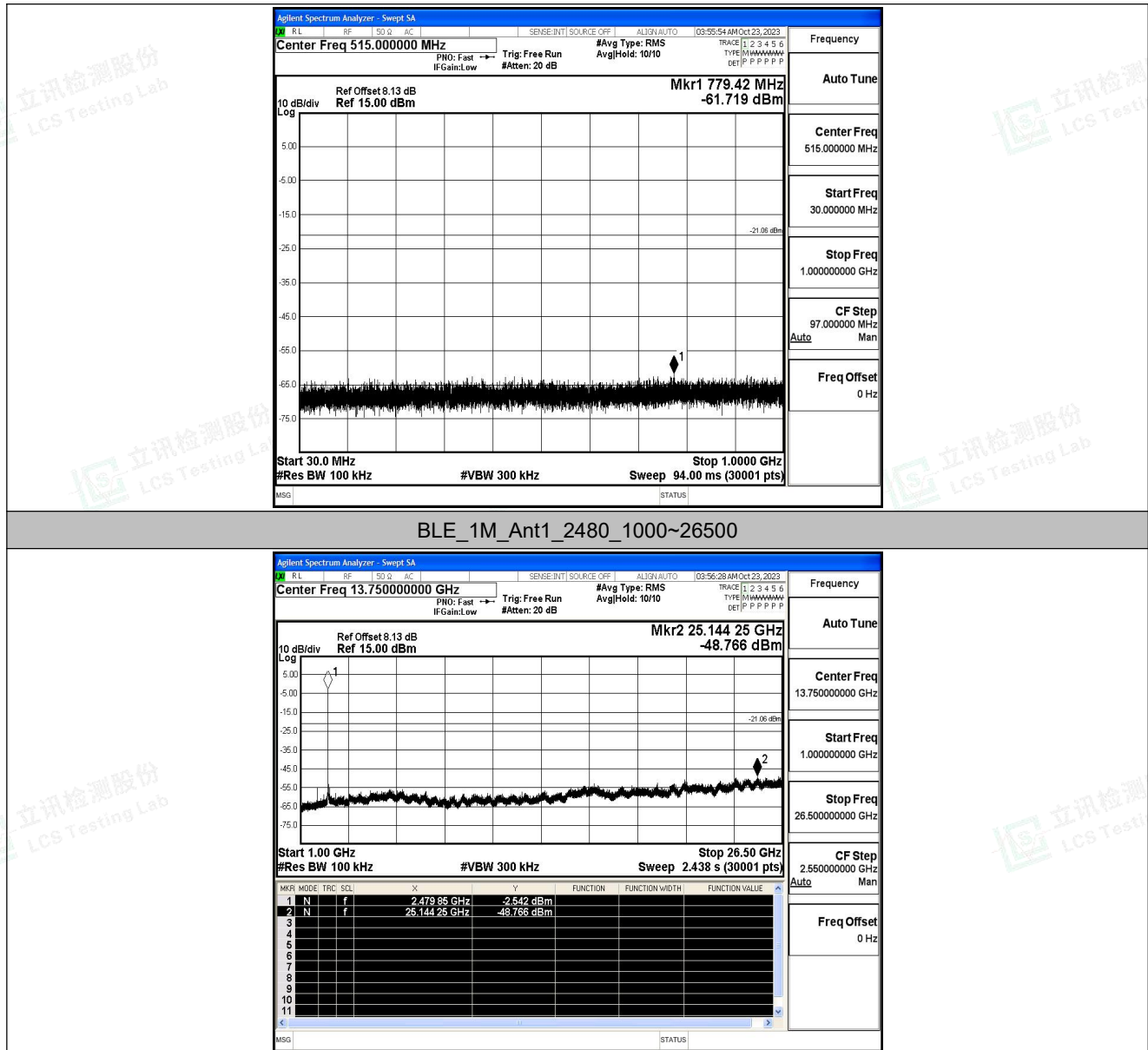


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A.6 Duty Cycle

Test Result

TestMode	Antenna	Channel	ON Time [ms]	Period [ms]	X	DC [%]	xFactor	1/T
BLE_1M	Ant1	2402	20.00	20.00	1.0000	100.00	0.00	0.00
		2440	20.00	20.00	1.0000	100.00	0.00	0.00
		2480	20.00	20.00	1.0000	100.00	0.00	0.00



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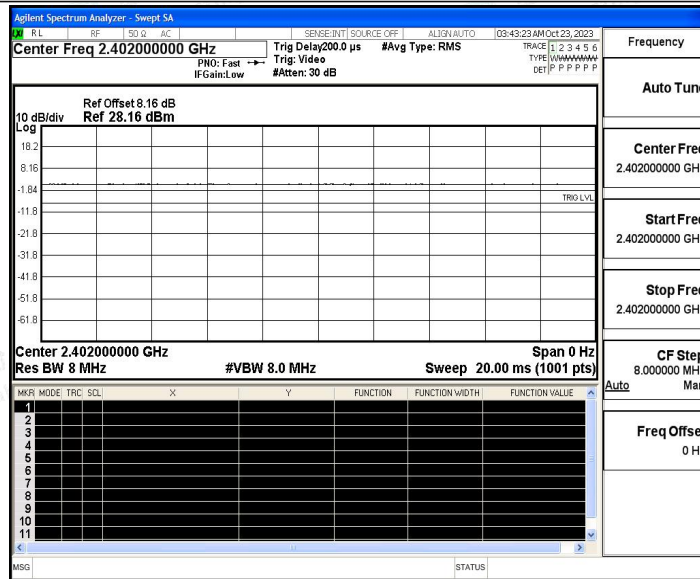
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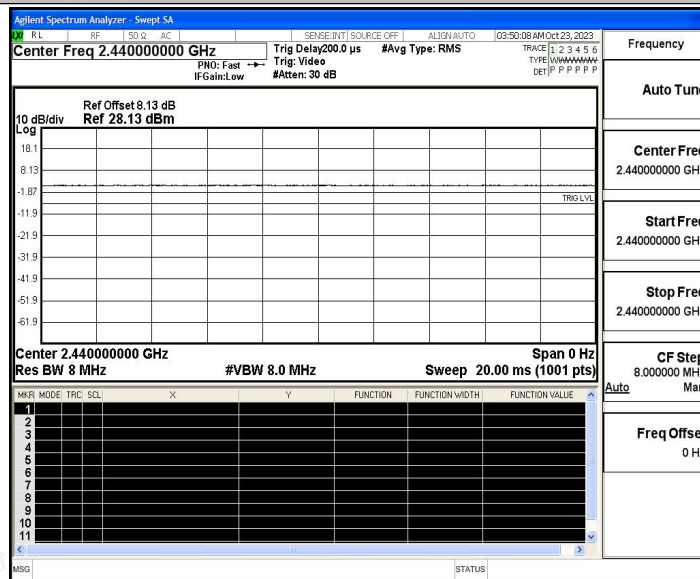


Test Graphs

BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480

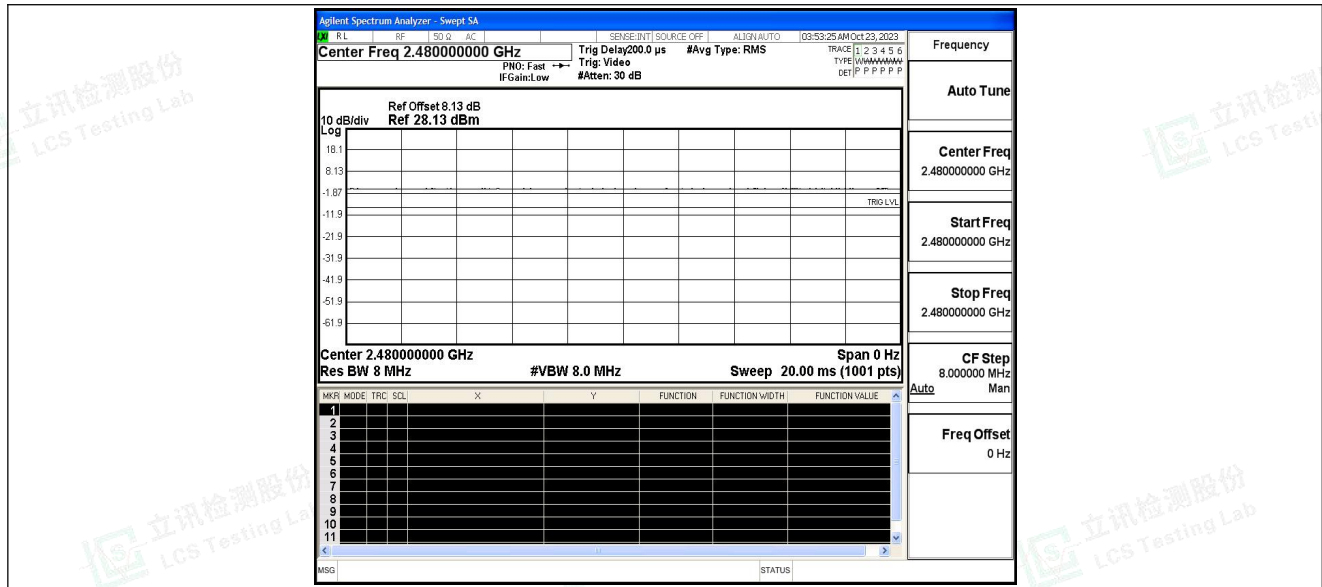


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A.7 Emissions in Restricted Bands

Test Result

TestMode	Antenna	Channel Name	Channel	Detector	Freq. [MHz]	Result [dBm]	Limit [dBm]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
BLE_1M	Ant1	Low	2402	AV	2310.000	-59.23	≤-41.20	35.97	≤54	PASS
				AV	2389.985	-51.31	≤-41.20	43.89	≤54	PASS
				AV	2390.000	-51.32	≤-41.20	43.88	≤54	PASS
				Peak	2310.000	-56.13	≤-21.20	39.07	≤74	PASS
				Peak	2388.620	-43.26	≤-21.20	51.94	≤74	PASS
				Peak	2390.000	-45.53	≤-21.20	49.67	≤74	PASS
		High	2480	AV	2483.500	-48.4	≤-41.20	46.80	≤54	PASS
				AV	2483.520	-48.4	≤-41.20	46.80	≤54	PASS
				AV	2500.000	-52.78	≤-41.20	42.42	≤54	PASS
				Peak	2483.500	-42.34	≤-21.20	52.86	≤74	PASS
				Peak	2486.560	-41.44	≤-21.20	53.76	≤74	PASS
				Peak	2500.000	-46.55	≤-21.20	48.65	≤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.



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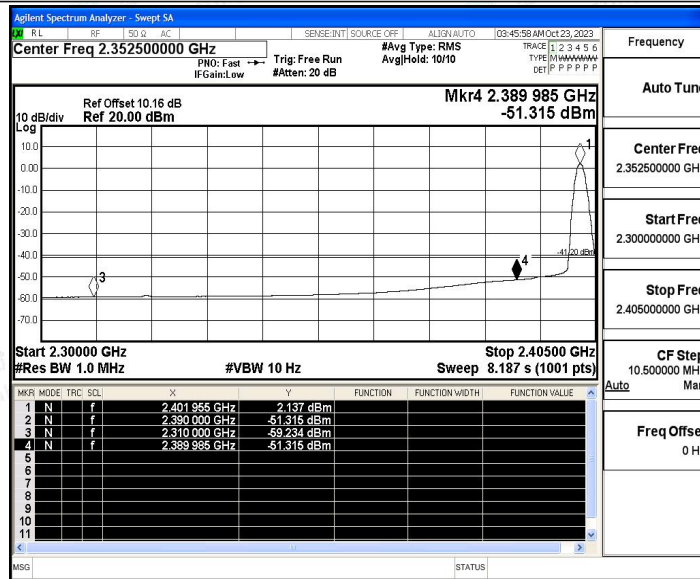
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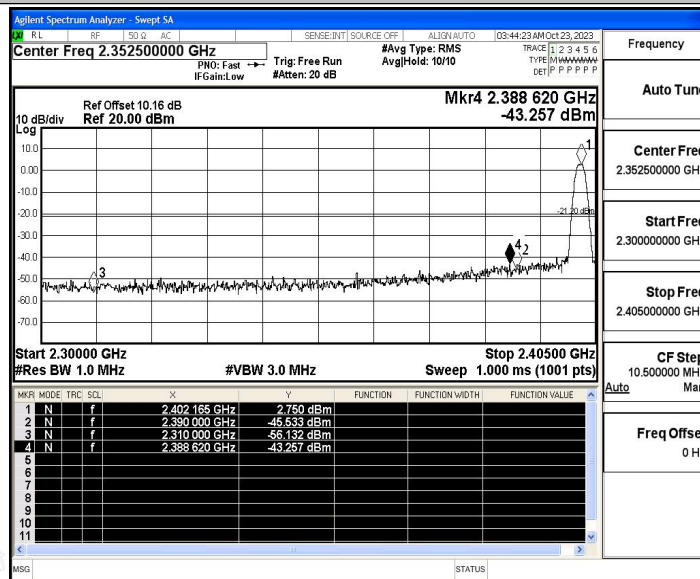


Test Graphs

BLE_1M_Ant1_Low_2402_AV



BLE_1M_Ant1_Low_2402_Peak



BLE_1M_Ant1_High_2480_AV

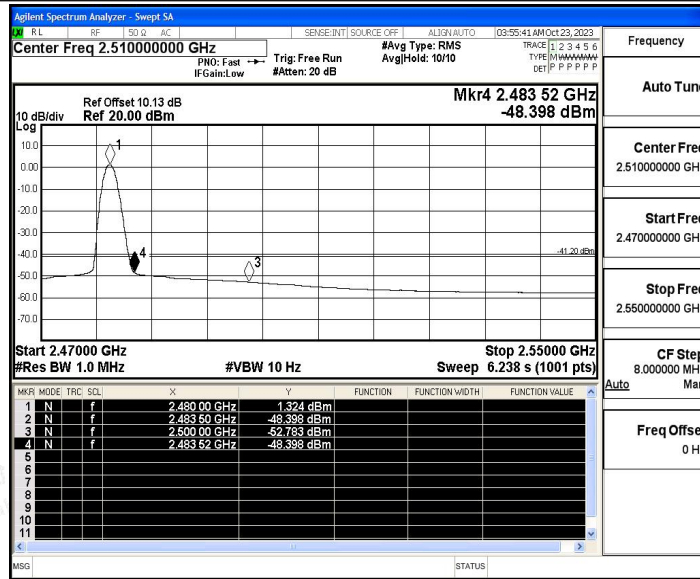


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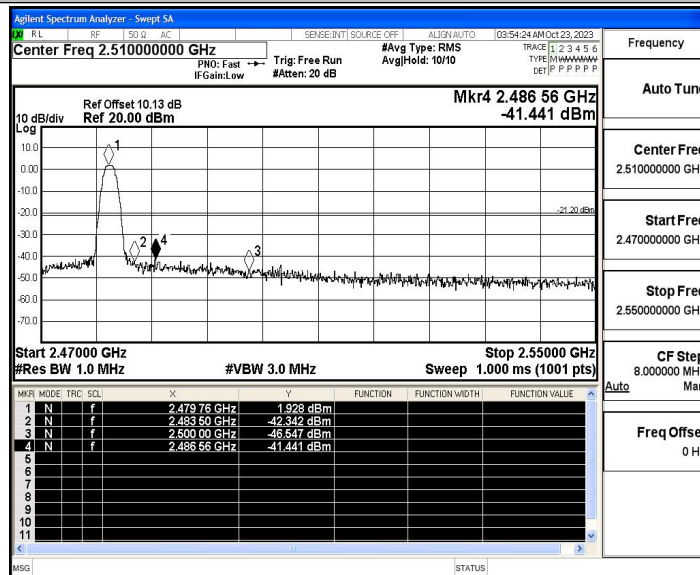
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BLE_1M_Ant1_High_2480_Peak



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