



Appendix A

RF Test Data for BT LE (Conducted Measurement)

Product Name: LED Controller

Test Model: SP701E

Environmental Conditions

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



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A.1 DTS Bandwidth

Test Result

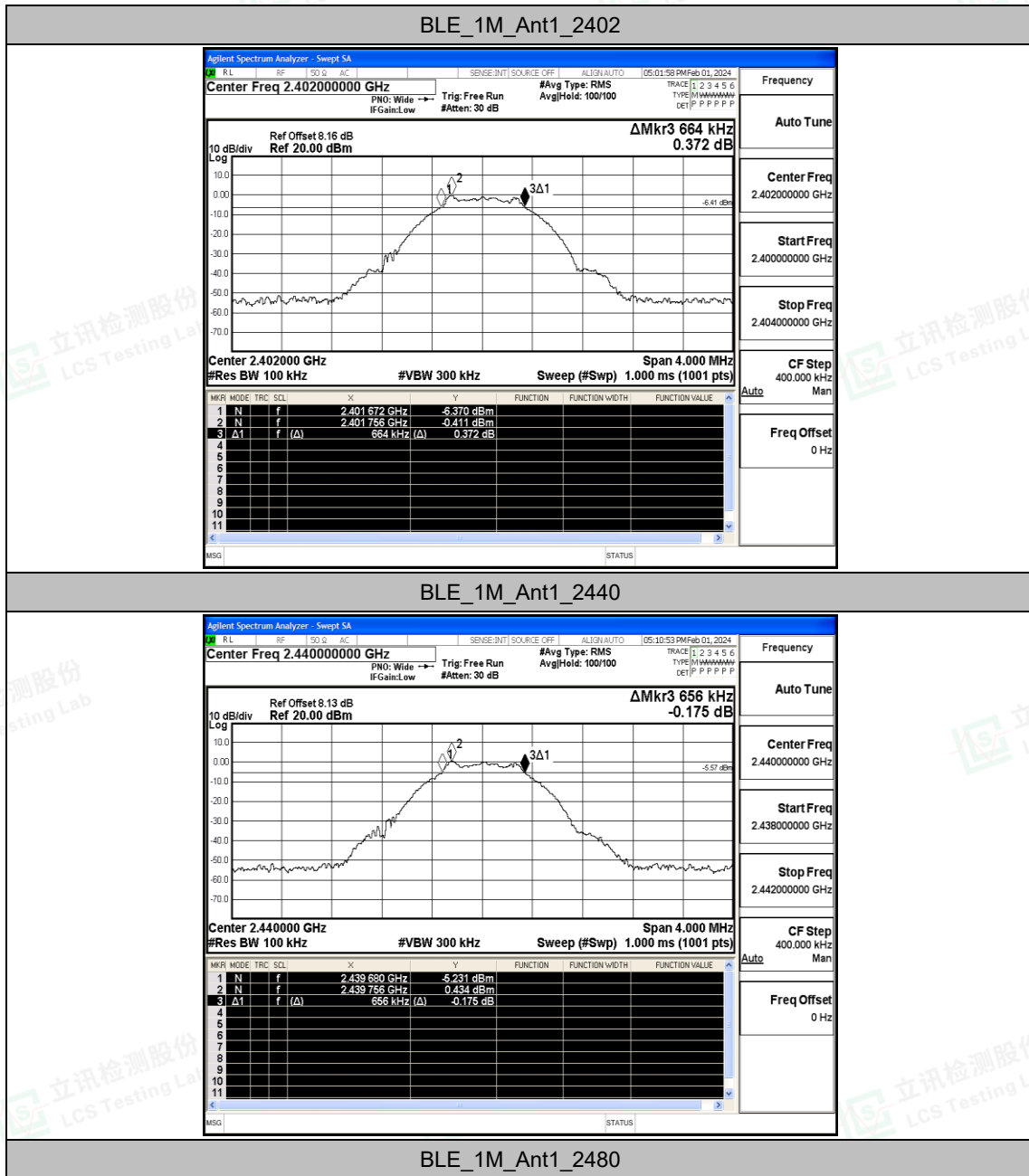
TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.664	2401.672	2402.336	0.5	PASS
		2440	0.656	2439.680	2440.336	0.5	PASS
		2480	0.684	2479.664	2480.348	0.5	PASS
BLE_2M	Ant1	2402	1.204	2401.360	2402.564	0.5	PASS
		2440	1.132	2439.440	2440.572	0.5	PASS
		2480	1.352	2479.328	2480.680	0.5	PASS



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Test Graphs

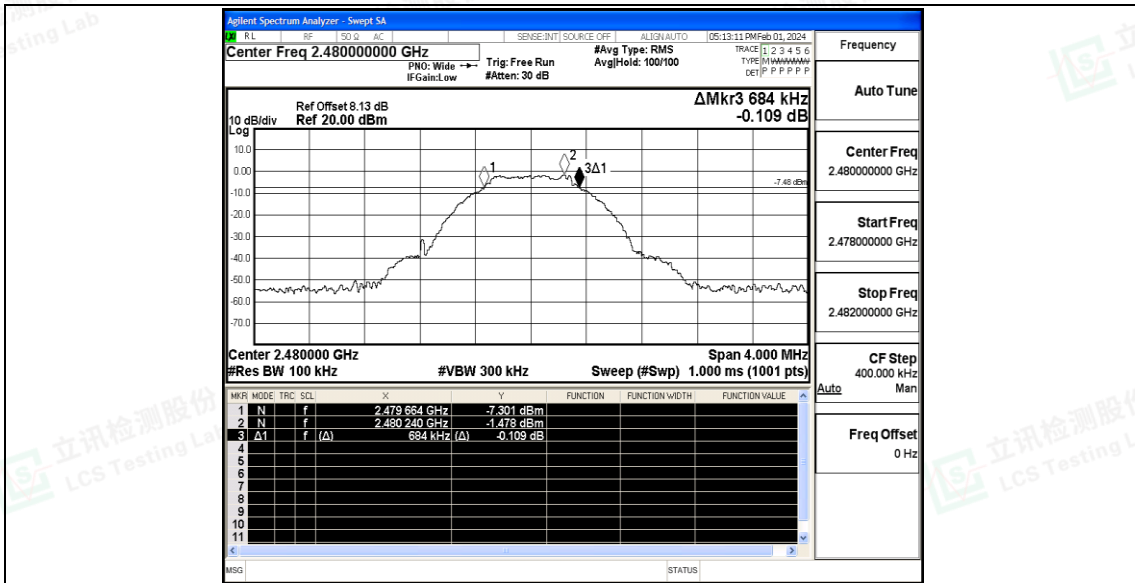


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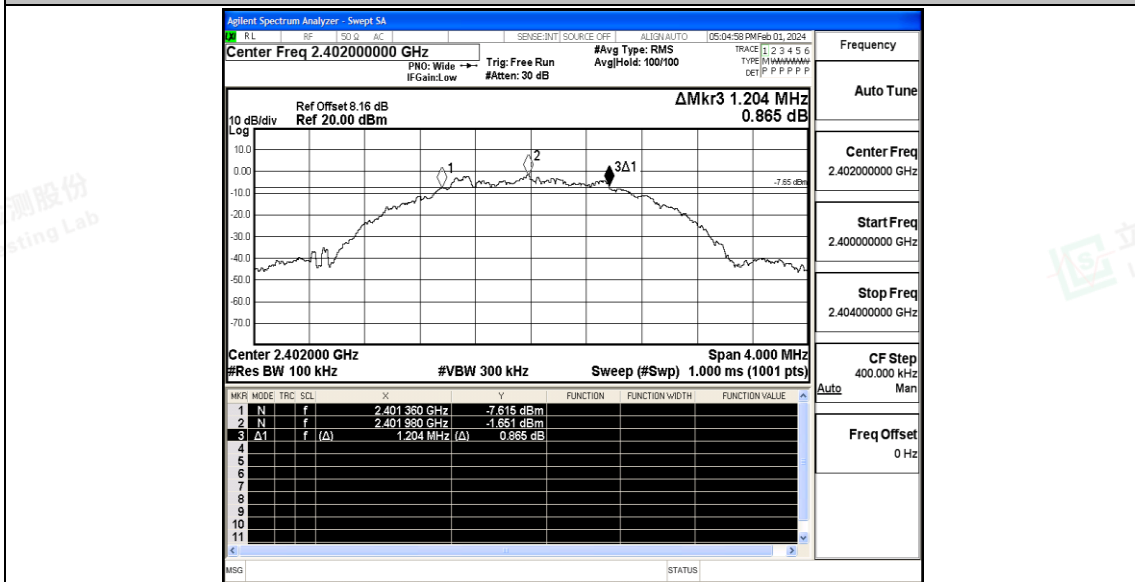
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BLE_2M_Ant1_2402



BLE_2M_Ant1_2440

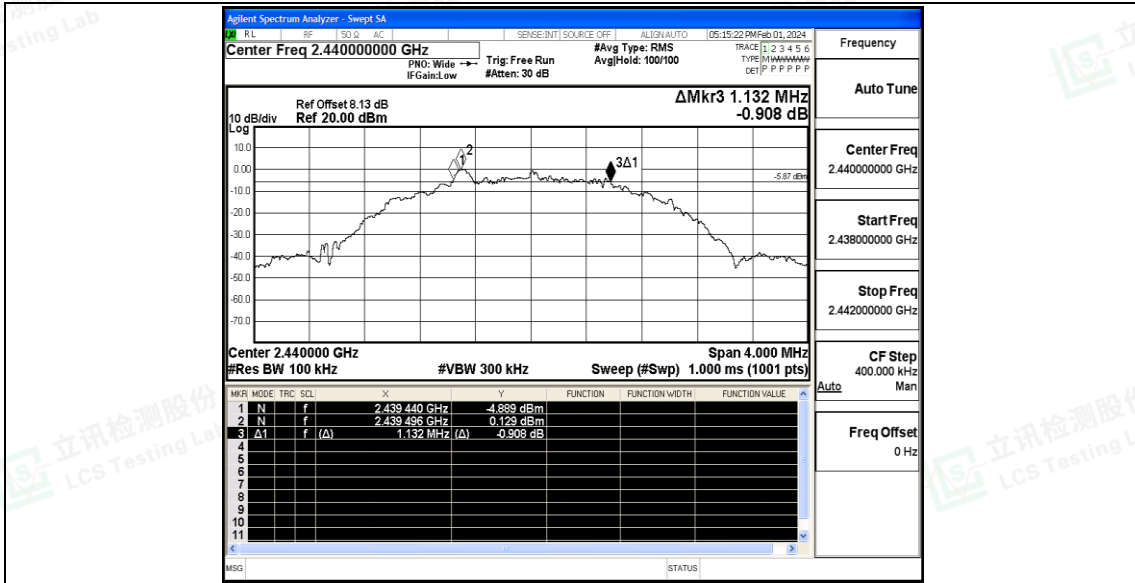


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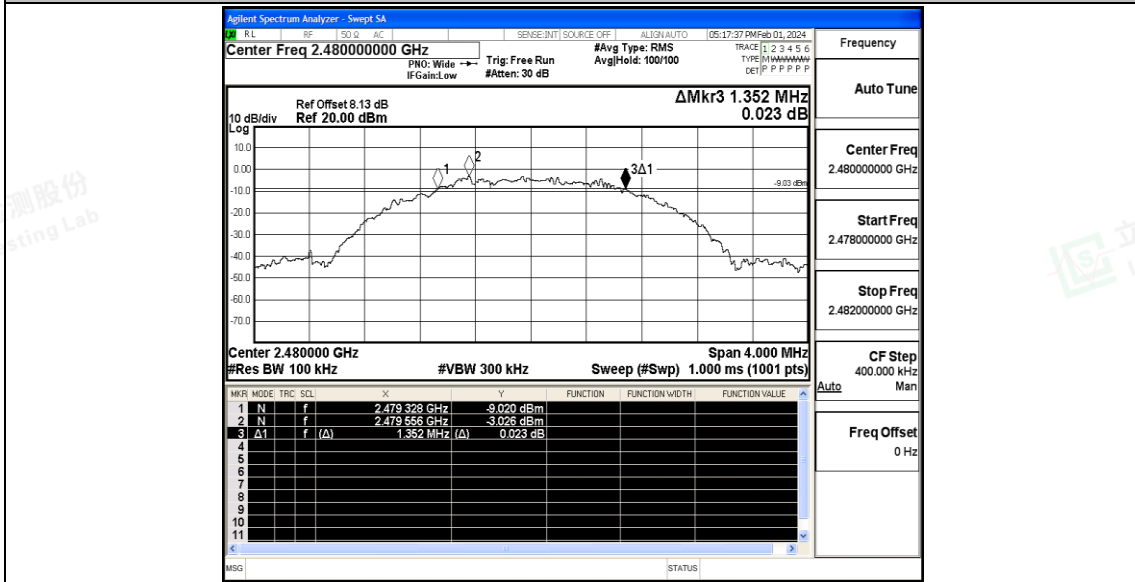
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BLE_2M_Ant1_2480



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A.2 Maximum conducted output power

Test Result

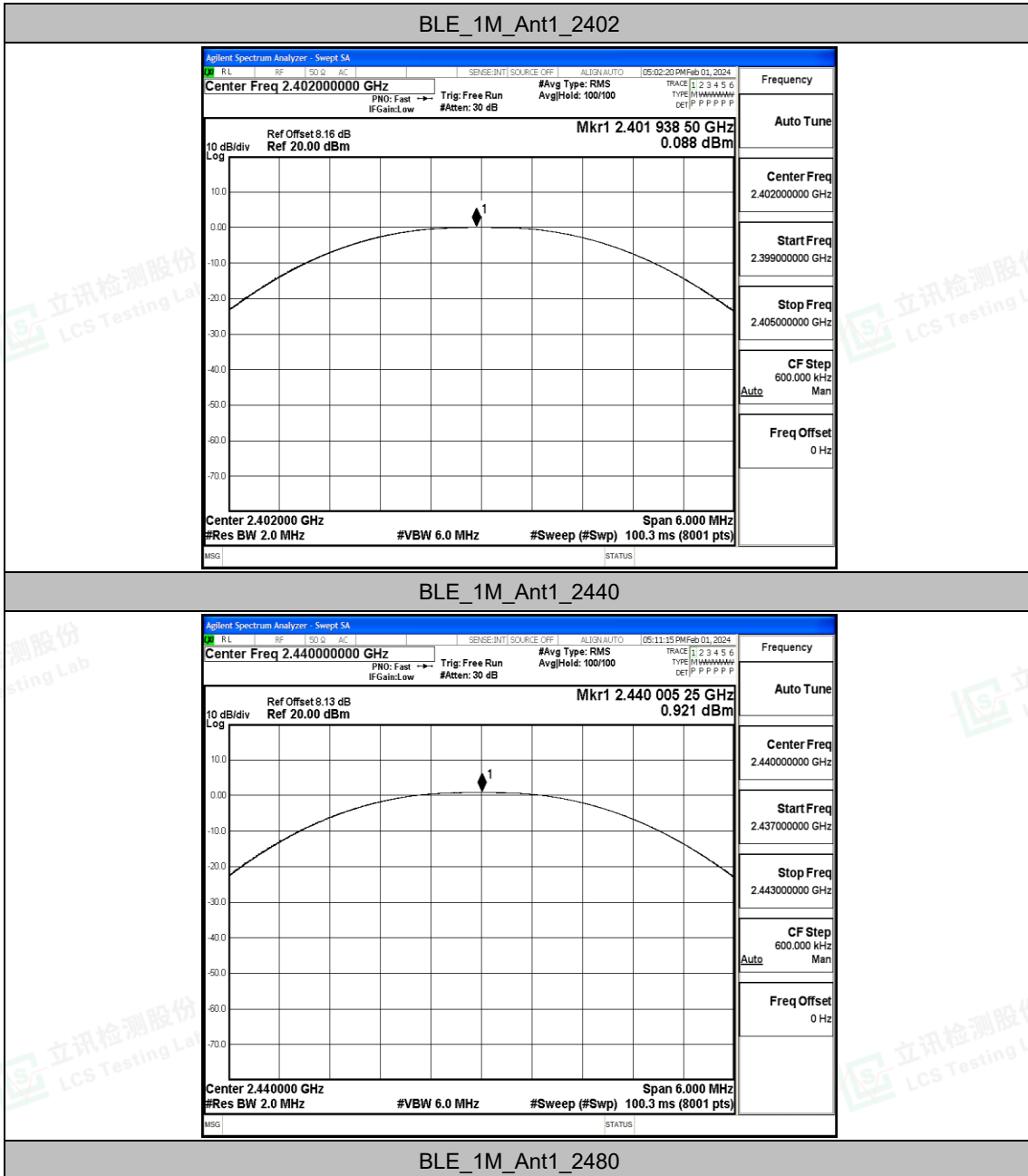
TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	0.09	≤30	PASS
		2440	0.92	≤30	PASS
		2480	-0.11	≤30	PASS
BLE_2M	Ant1	2402	0.00	≤30	PASS
		2440	0.70	≤30	PASS
		2480	-0.33	≤30	PASS



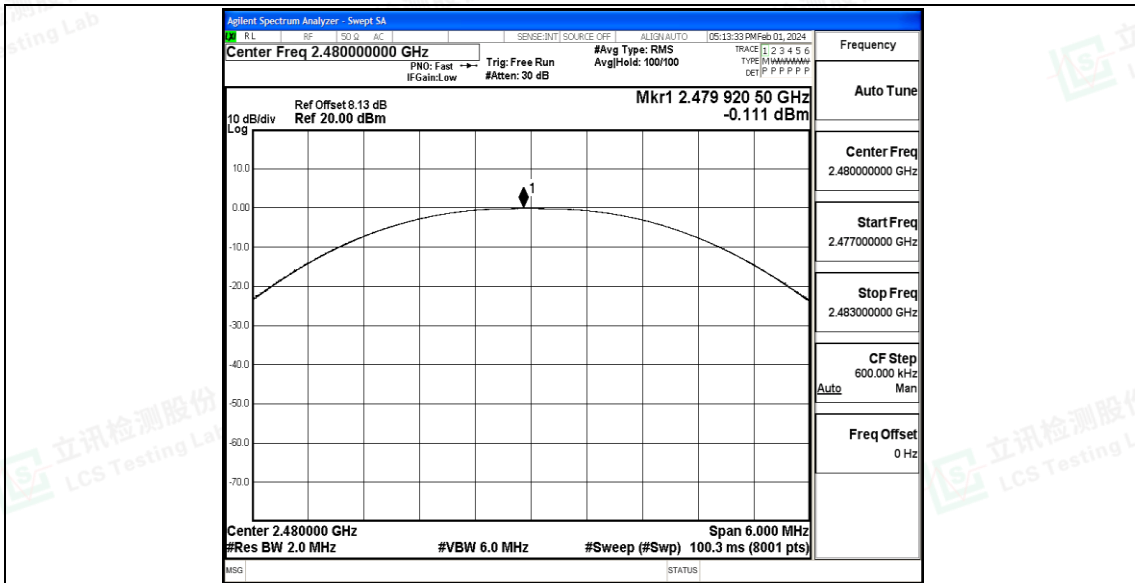
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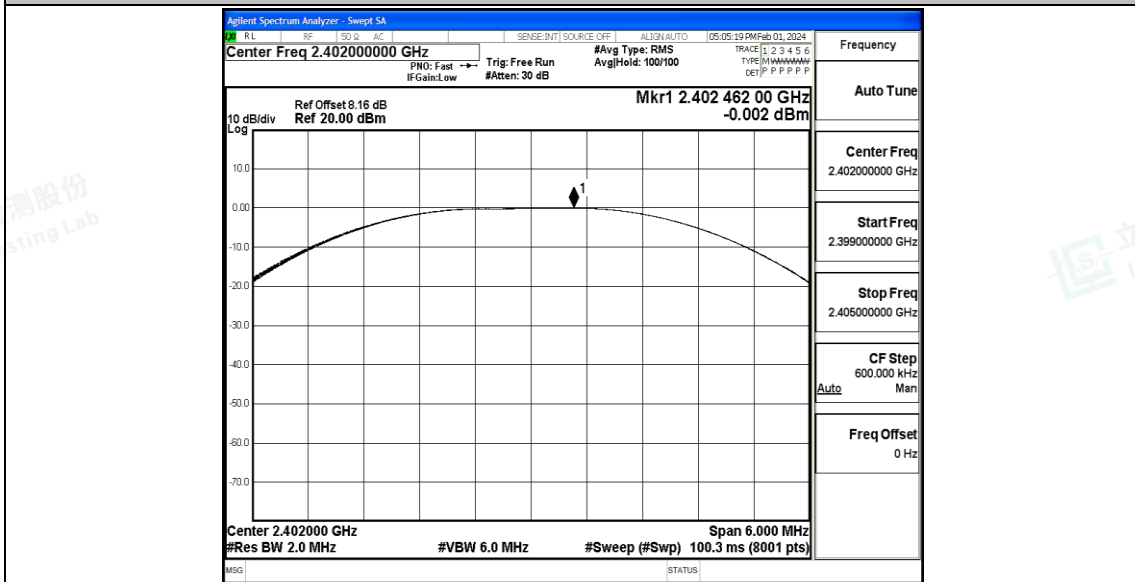
Test Graphs



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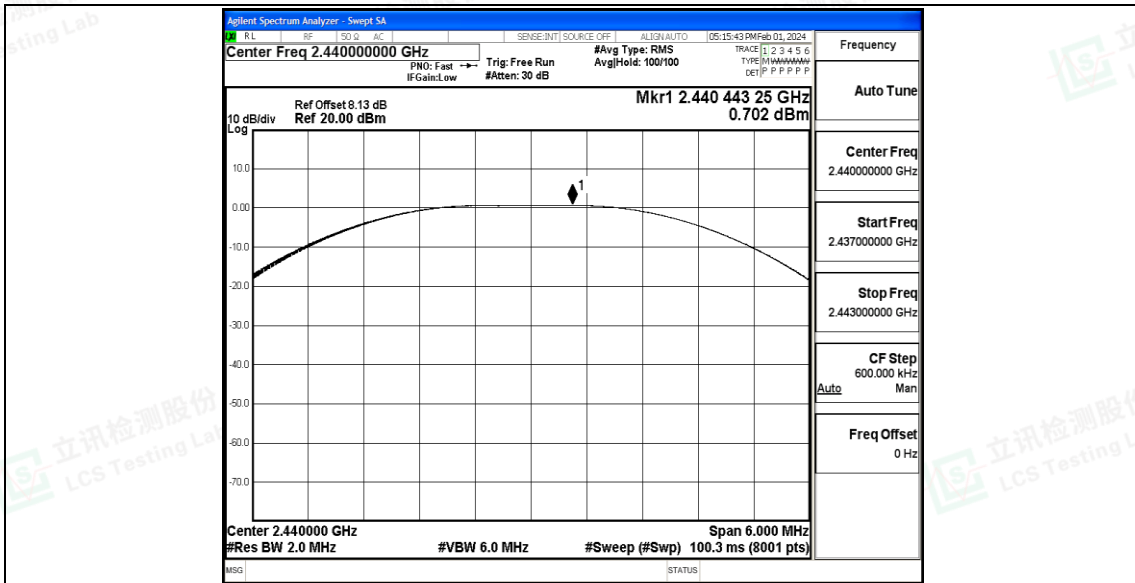
BLE_2M_Ant1_2402



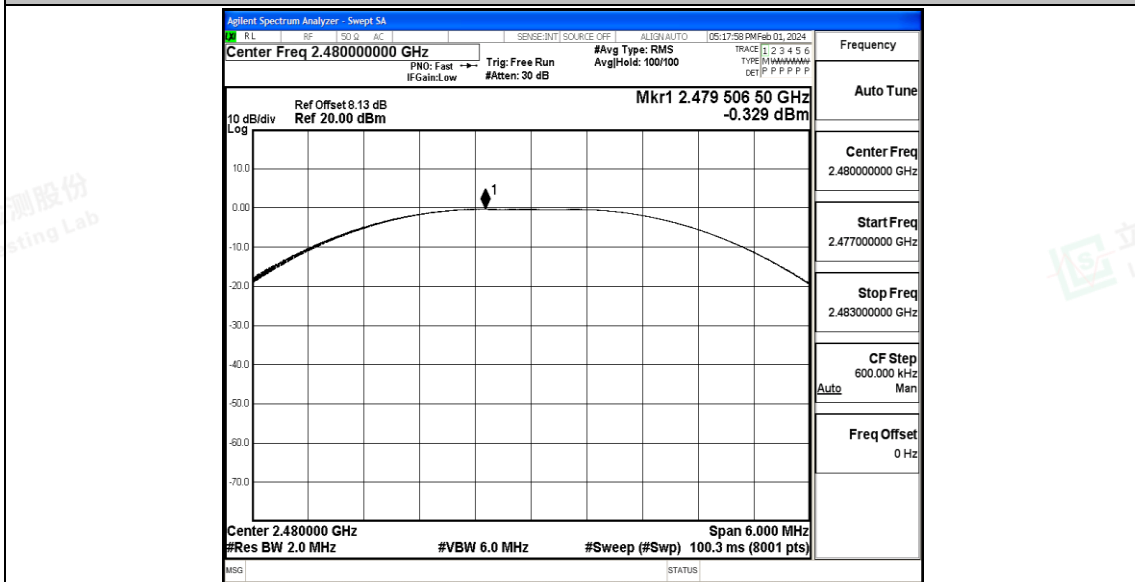
BLE_2M_Ant1_2440



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BLE_2M_Ant1_2480



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A.3 Maximum power spectral density

Test Result

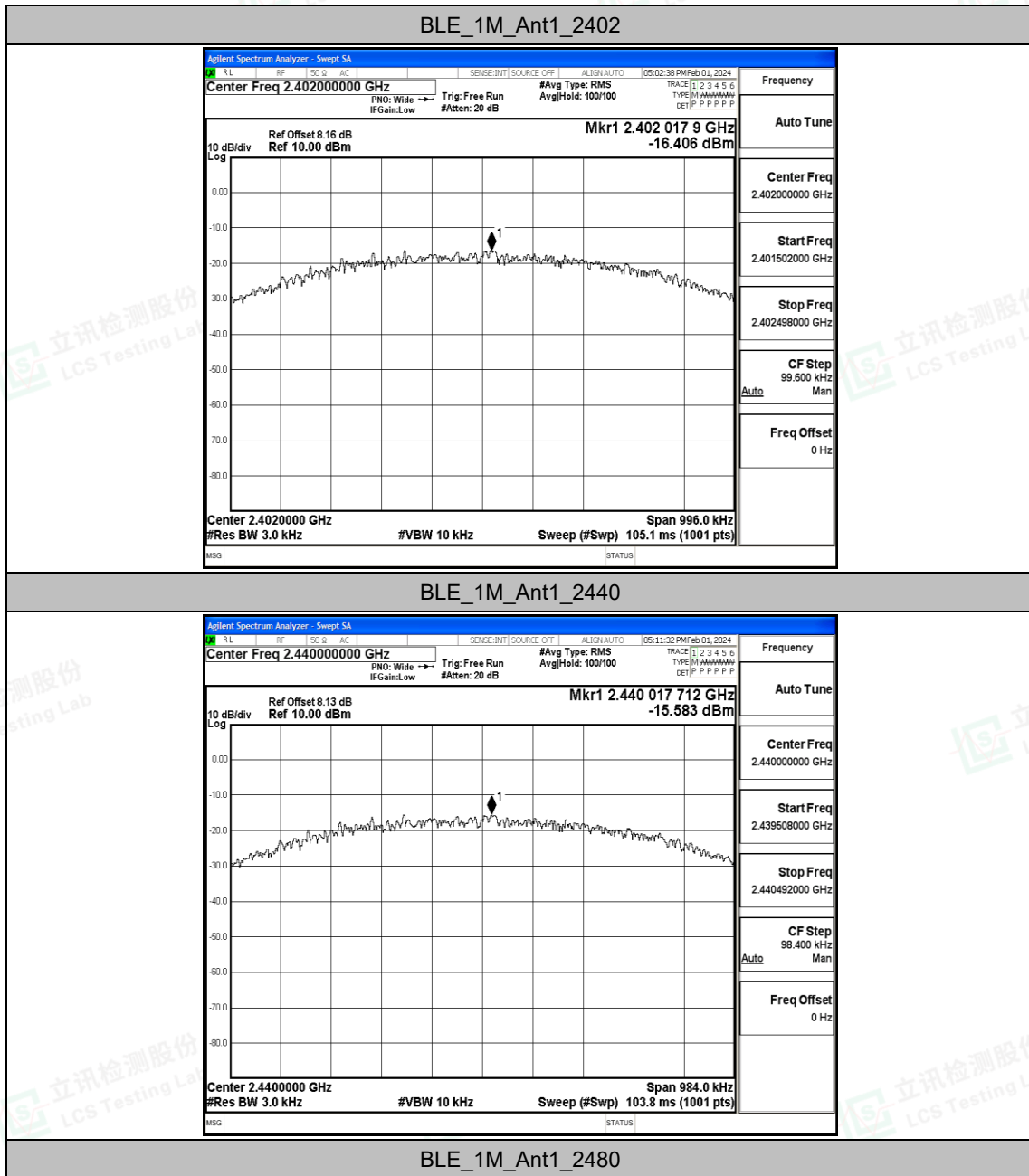
TestMode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-16.41	≤8.00	PASS
		2440	-15.58	≤8.00	PASS
		2480	-16.68	≤8.00	PASS
BLE_2M	Ant1	2402	-19.56	≤8.00	PASS
		2440	-18.66	≤8.00	PASS
		2480	-19.68	≤8.00	PASS



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Test Graphs

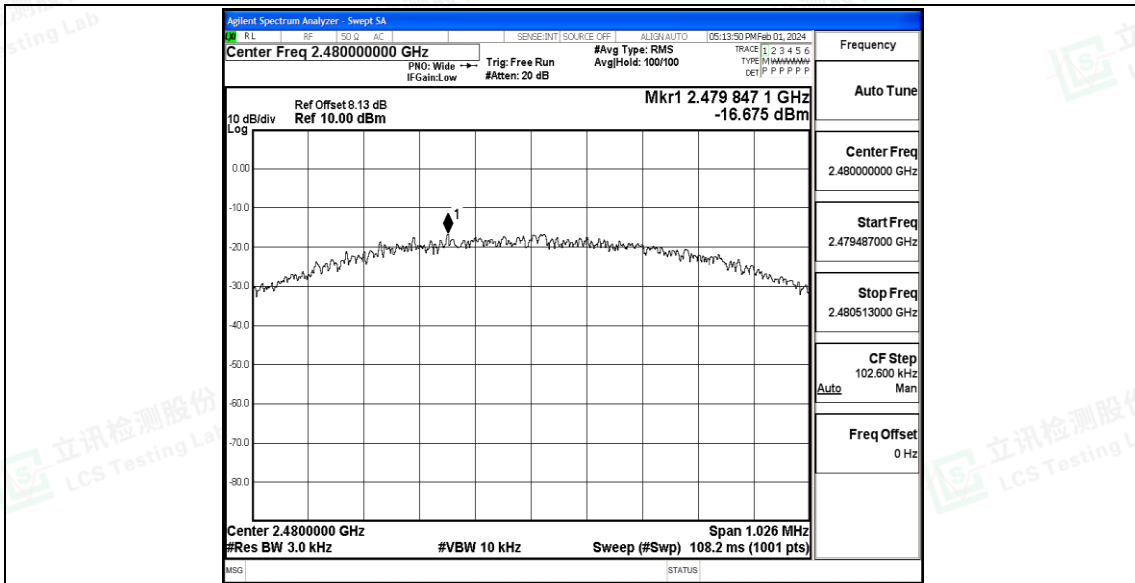


Shenzhen LCS Compliance Testing Laboratory Ltd.

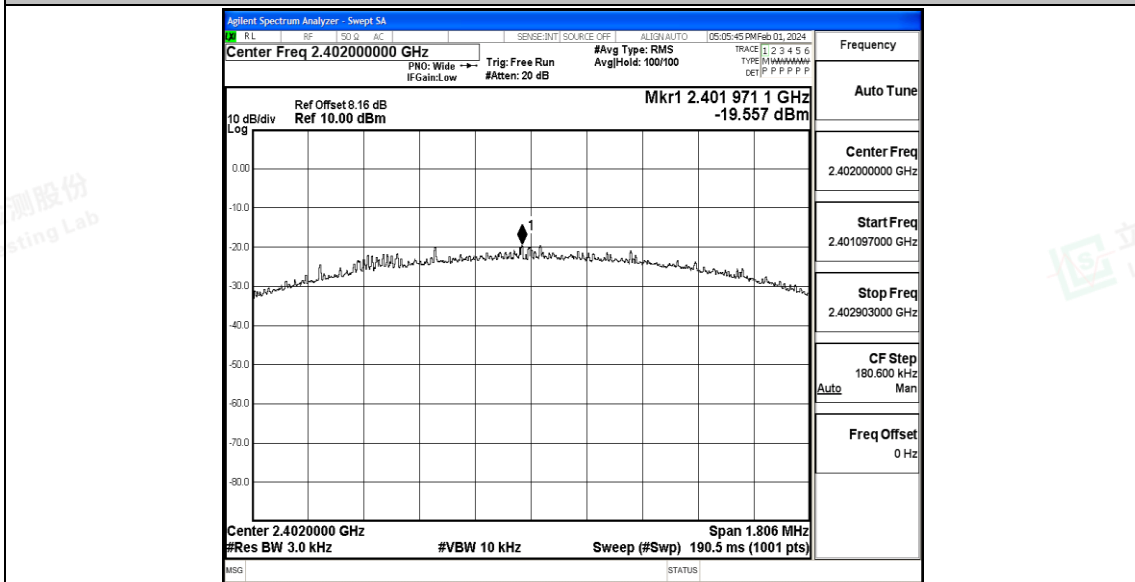
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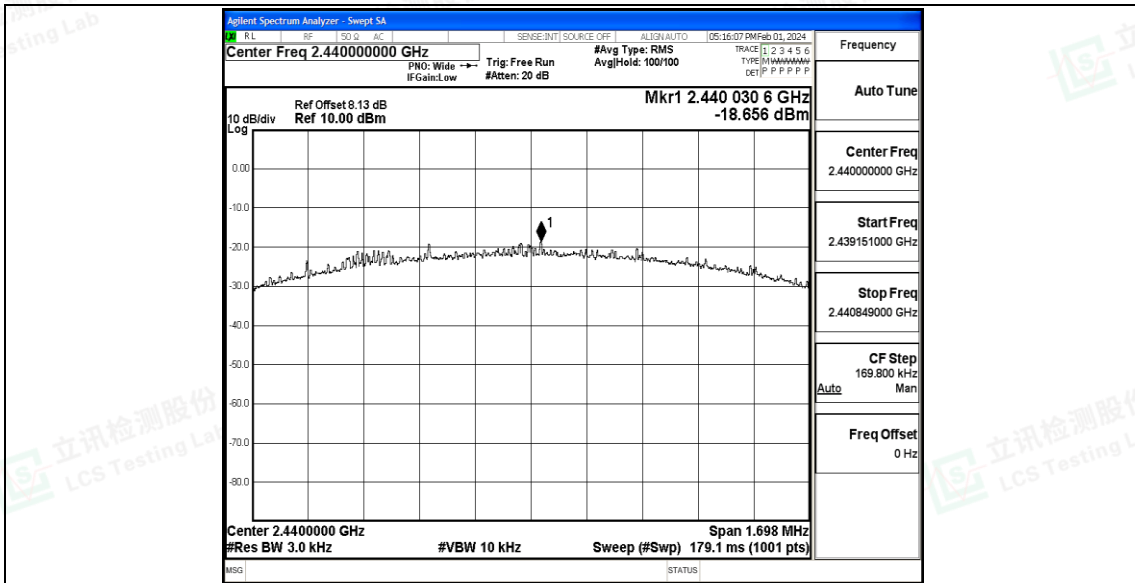
BLE_2M_Ant1_2402



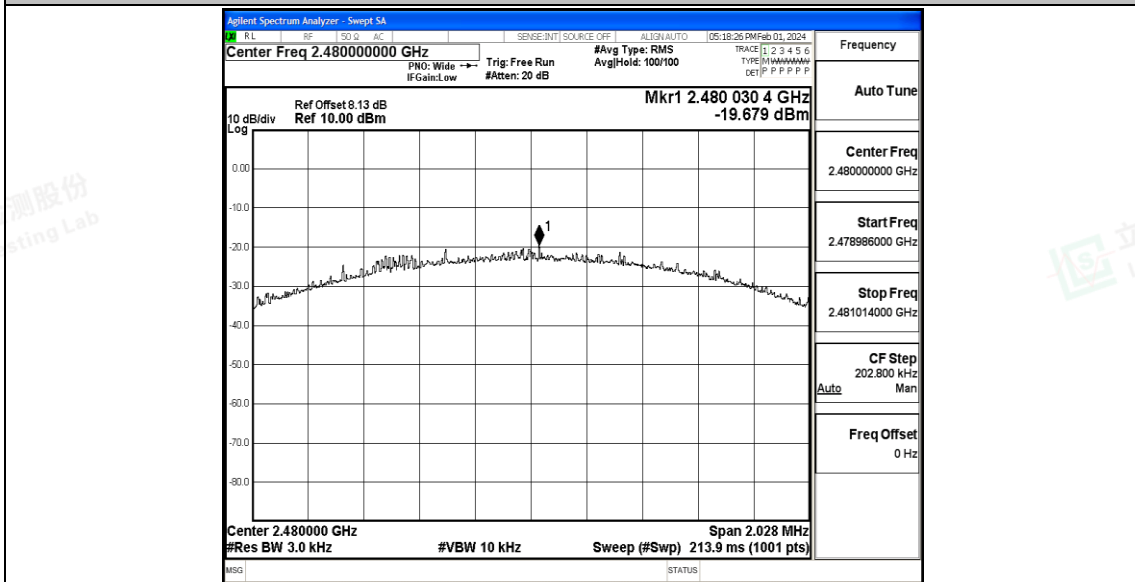
BLE_2M_Ant1_2440



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BLE_2M_Ant1_2480



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Reference level measurement

Test Result

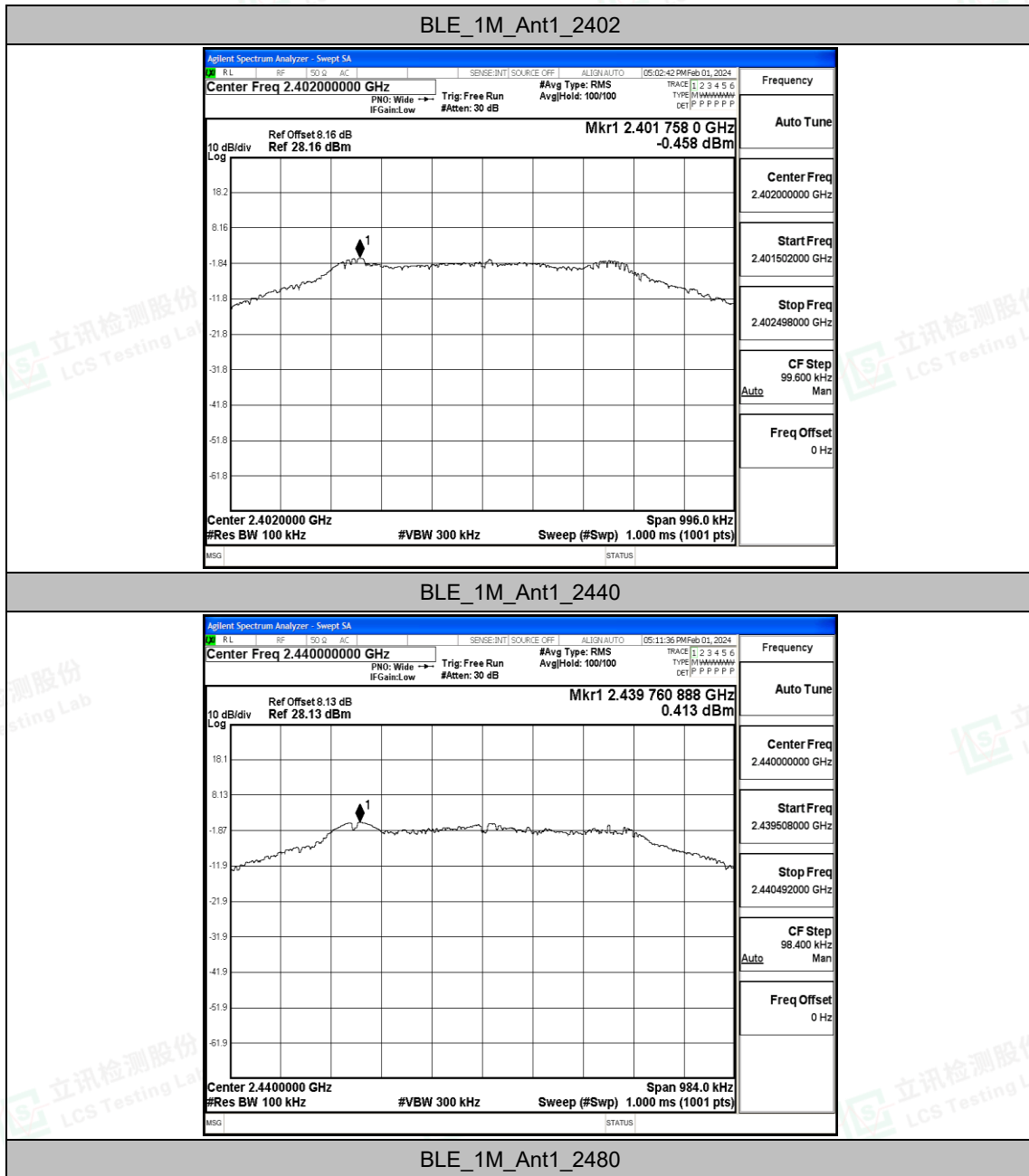
TestMode	Antenna	Freq(MHz)	Max.Point[MHz]	Result[dBm]
BLE_1M	Ant1	2402	2401.76	-0.46
		2440	2439.76	0.41
		2480	2479.75	-0.70
BLE_2M	Ant1	2402	2401.49	-0.87
		2440	2439.51	0.16
		2480	2479.47	-2.29



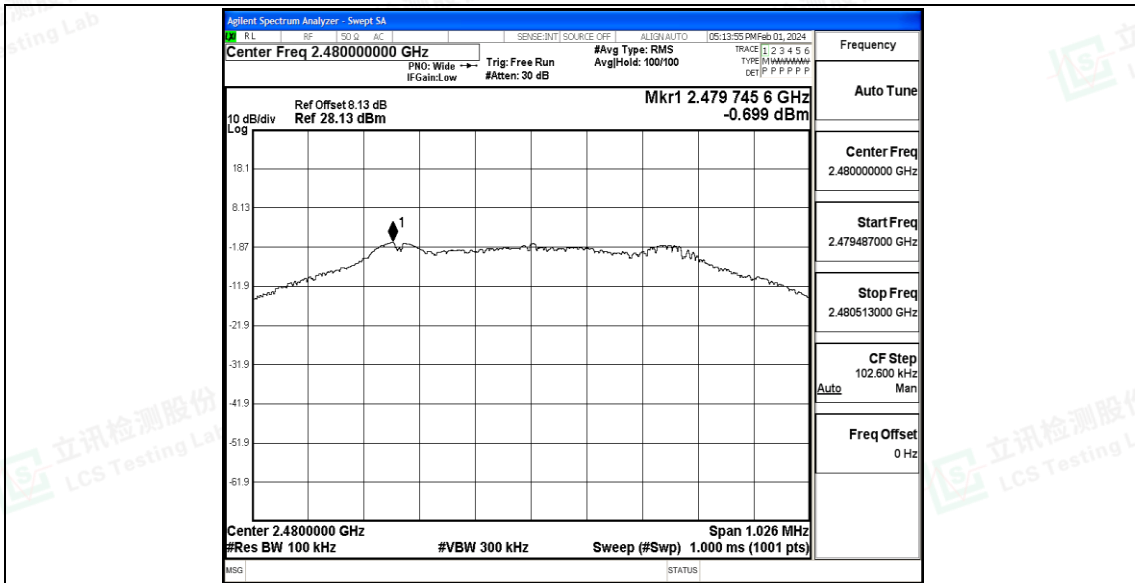
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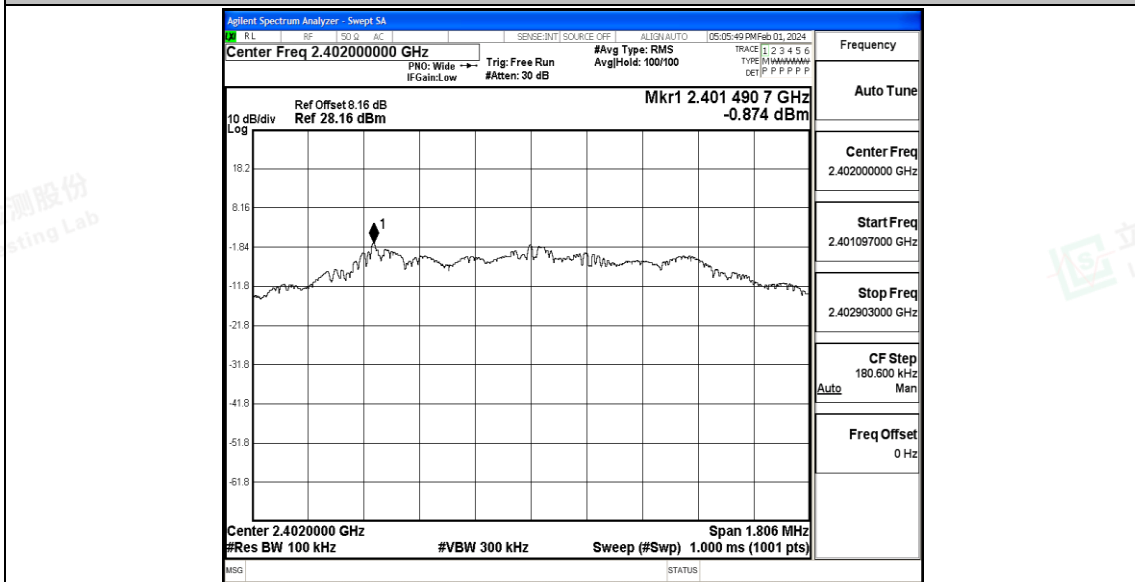
Test Graphs



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BLE_2M_Ant1_2402



BLE_2M_Ant1_2440

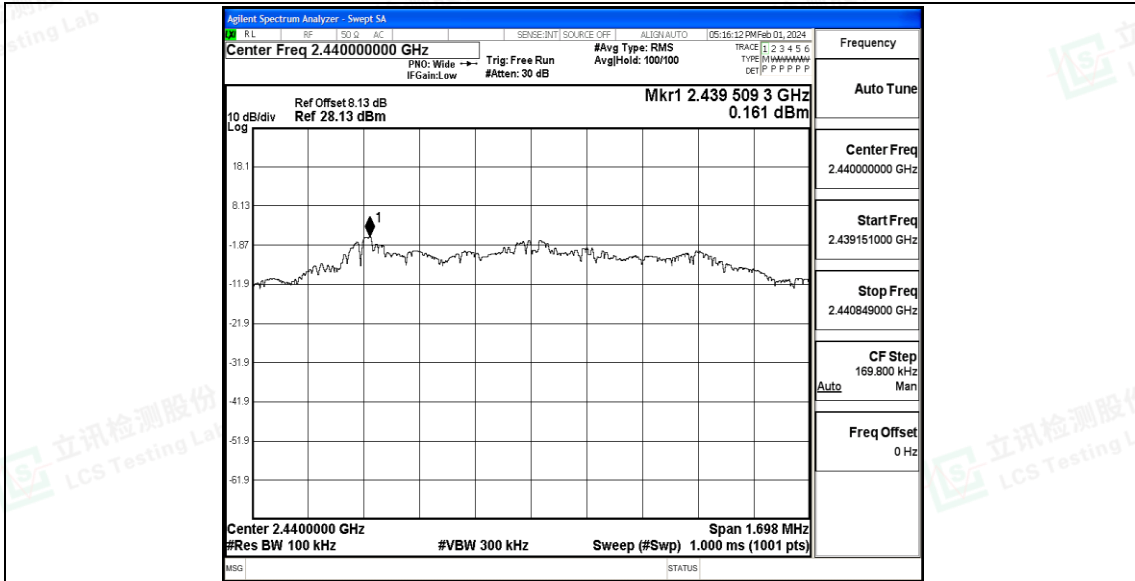


Shenzhen LCS Compliance Testing Laboratory Ltd.

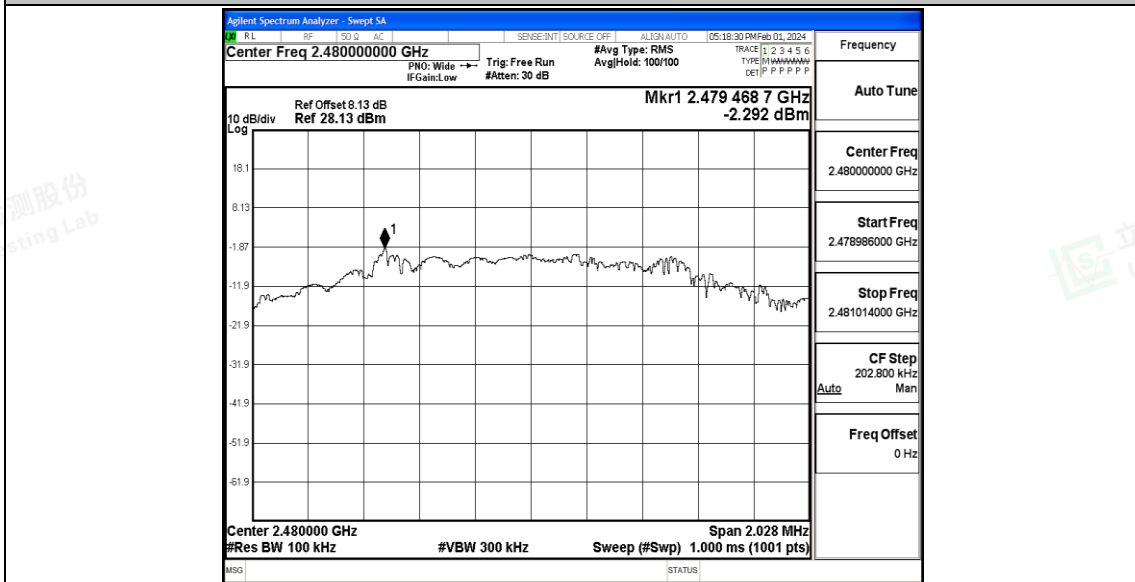
Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

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BLE_2M_Ant1_2480



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A.4 Band edge measurements

Test Result

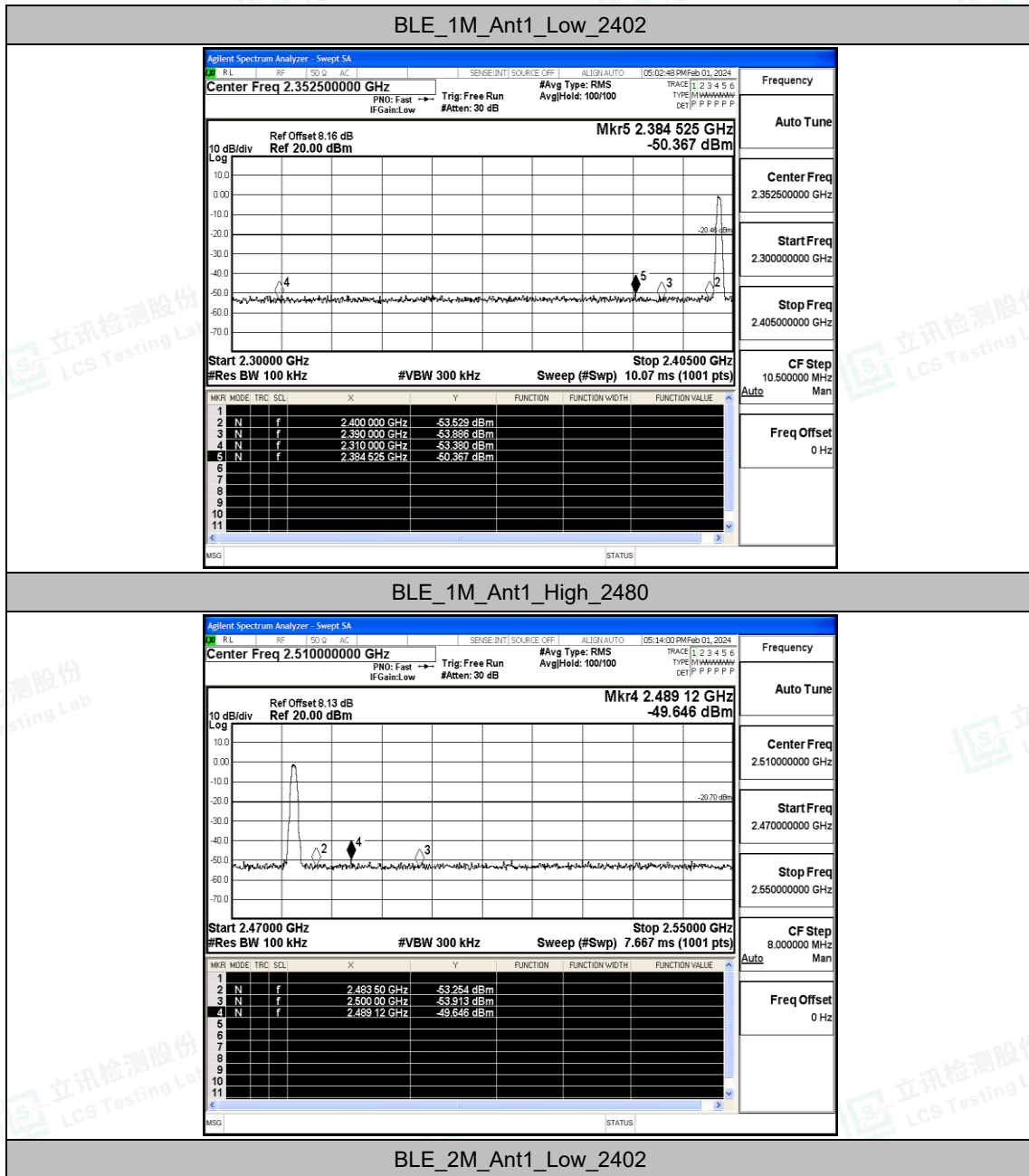
TestMode	Antenna	Channel	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	-0.46	-50.37	≤-20.46	PASS
		High	2480	-0.70	-49.65	≤-20.7	PASS
BLE_2M	Ant1	Low	2402	-0.87	-44.84	≤-20.87	PASS
		High	2480	-2.29	-49.77	≤-22.29	PASS



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Test Graphs

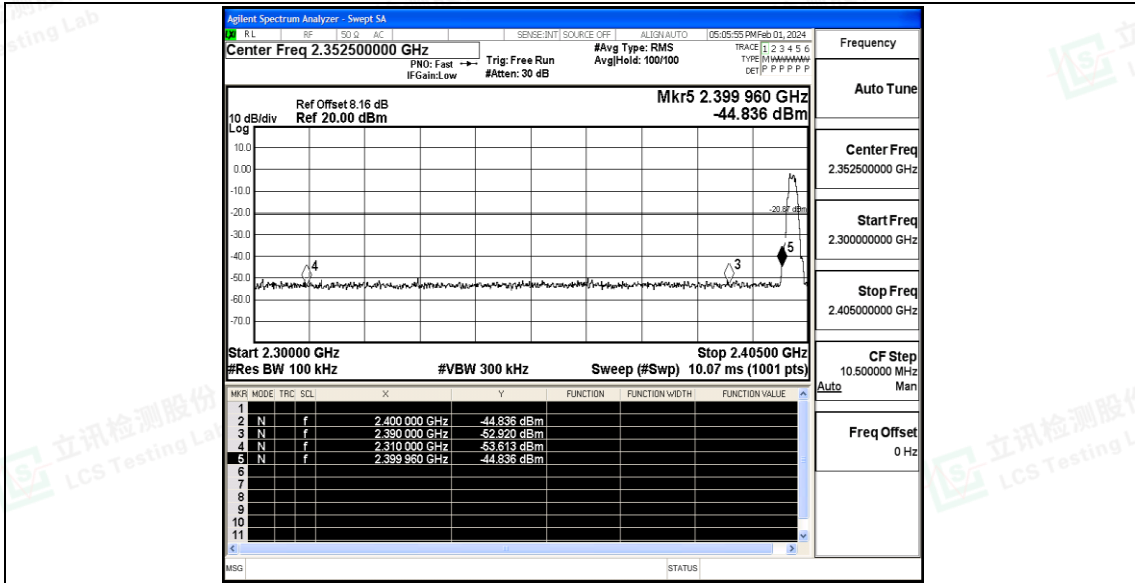


Shenzhen LCS Compliance Testing Laboratory Ltd.

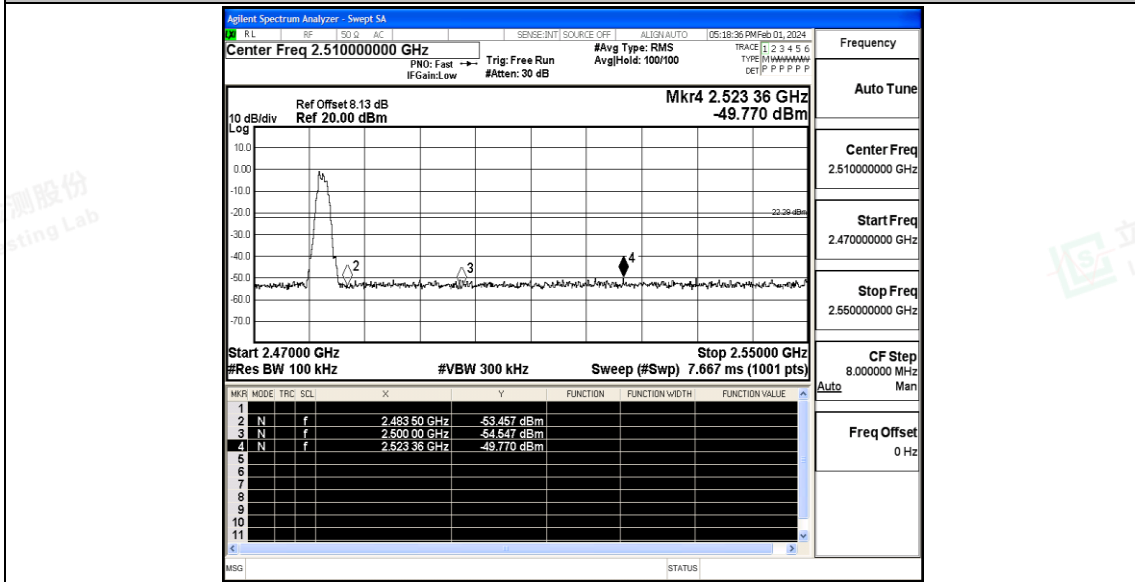
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BLE_2M_Ant1_High_2480



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A.5 Conducted Spurious Emission

Test Result

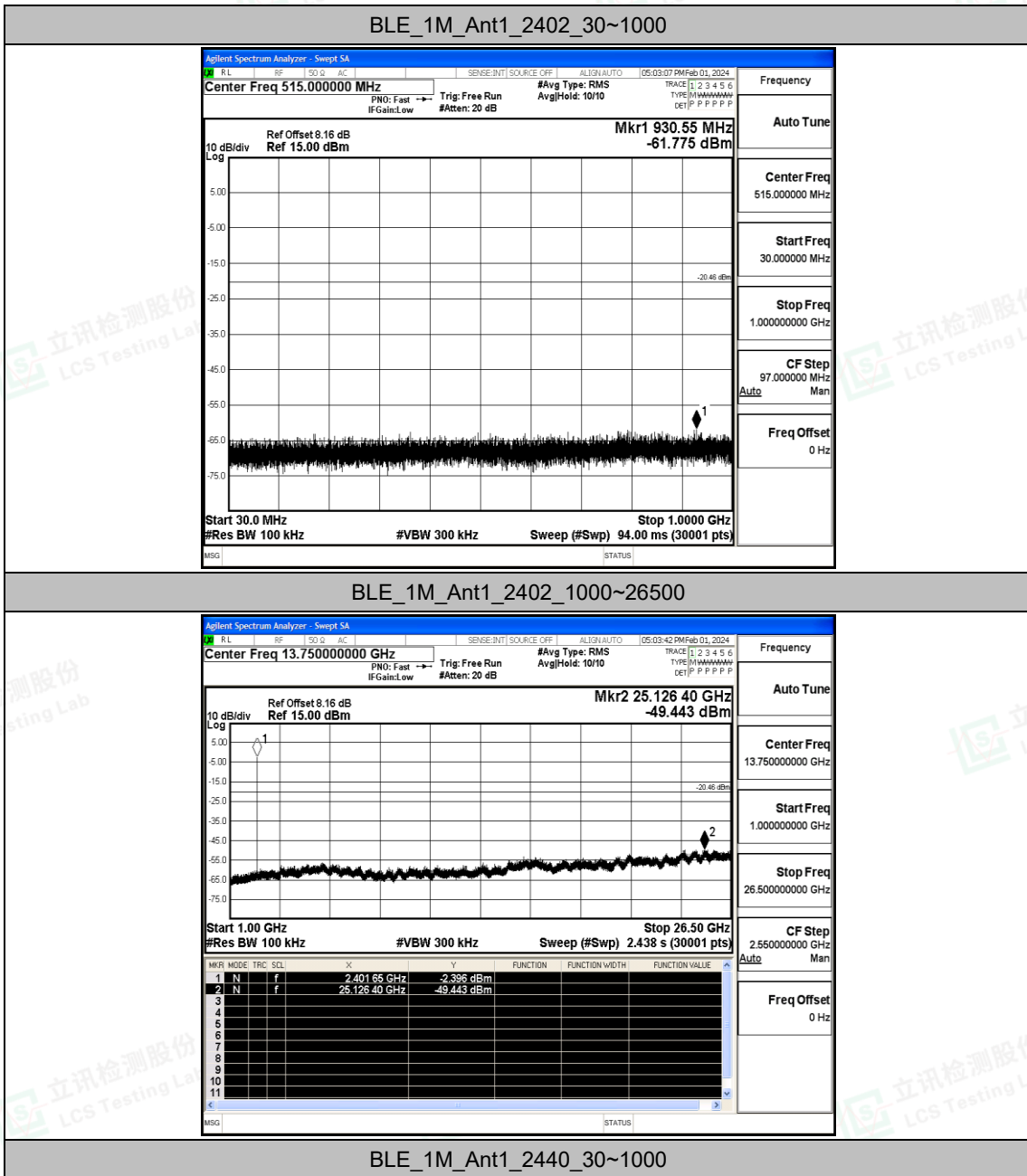
TestMode	Antenna	Frequency[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	30~1000	-0.46	-61.78	≤-20.46	PASS
			1000~26500	-0.46	-49.44	≤-20.46	PASS
		2440	30~1000	0.41	-61.67	≤-19.59	PASS
			1000~26500	0.41	-49.37	≤-19.59	PASS
		2480	30~1000	-0.70	-62.2	≤-20.7	PASS
			1000~26500	-0.70	-48.77	≤-20.7	PASS
BLE_2M	Ant1	2402	30~1000	-0.87	-61.07	≤-20.87	PASS
			1000~26500	-0.87	-48.8	≤-20.87	PASS
		2440	30~1000	0.16	-61.97	≤-19.84	PASS
			1000~26500	0.16	-49.45	≤-19.84	PASS
		2480	30~1000	-2.29	-62.24	≤-22.29	PASS
			1000~26500	-2.29	-48.6	≤-22.29	PASS



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Test Graphs

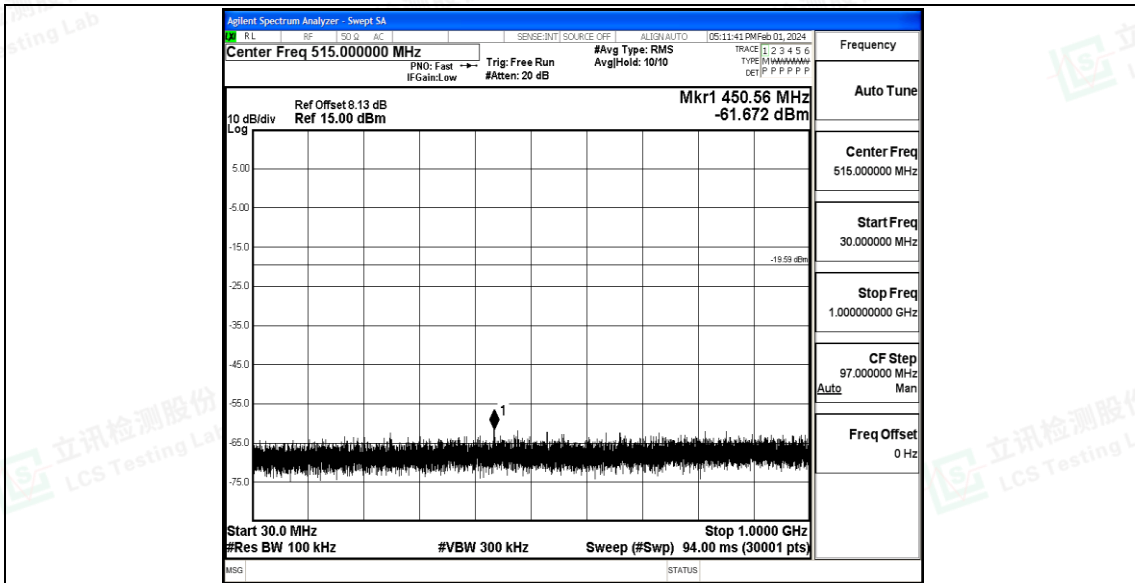


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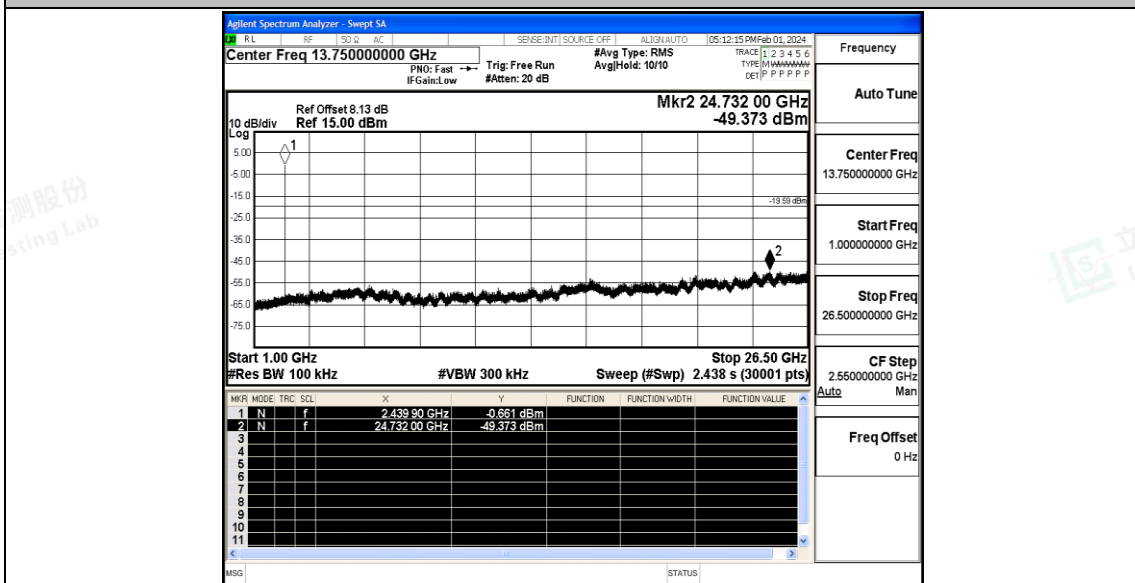
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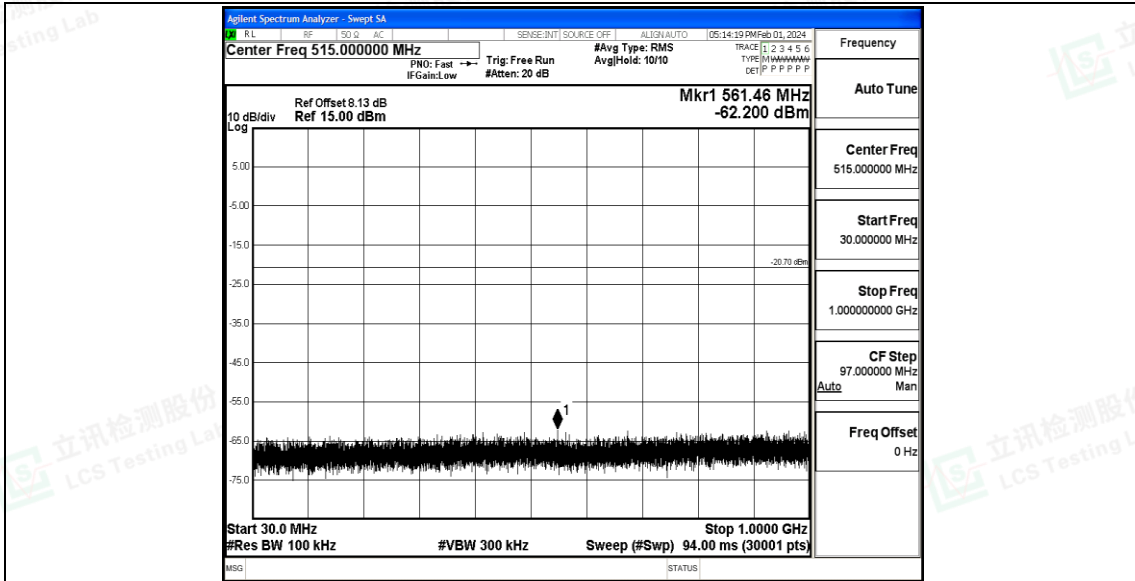
BLE_1M_Ant1_2440_1000~26500



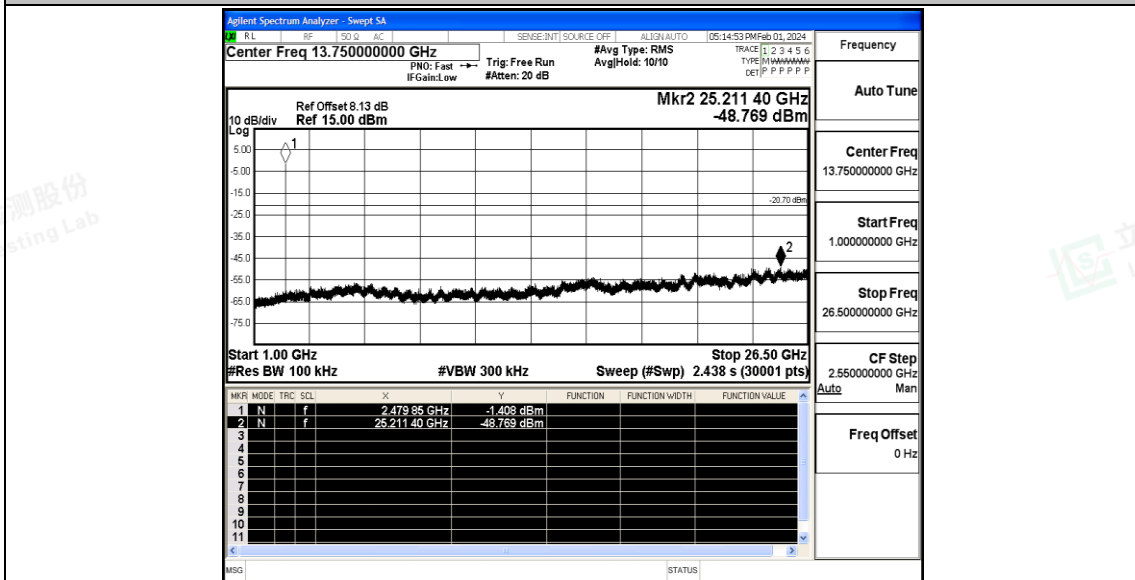
BLE_1M_Ant1_2480_30~1000



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BLE_1M_Ant1_2480_1000~26500



BLE_2M_Ant1_2402_30~1000

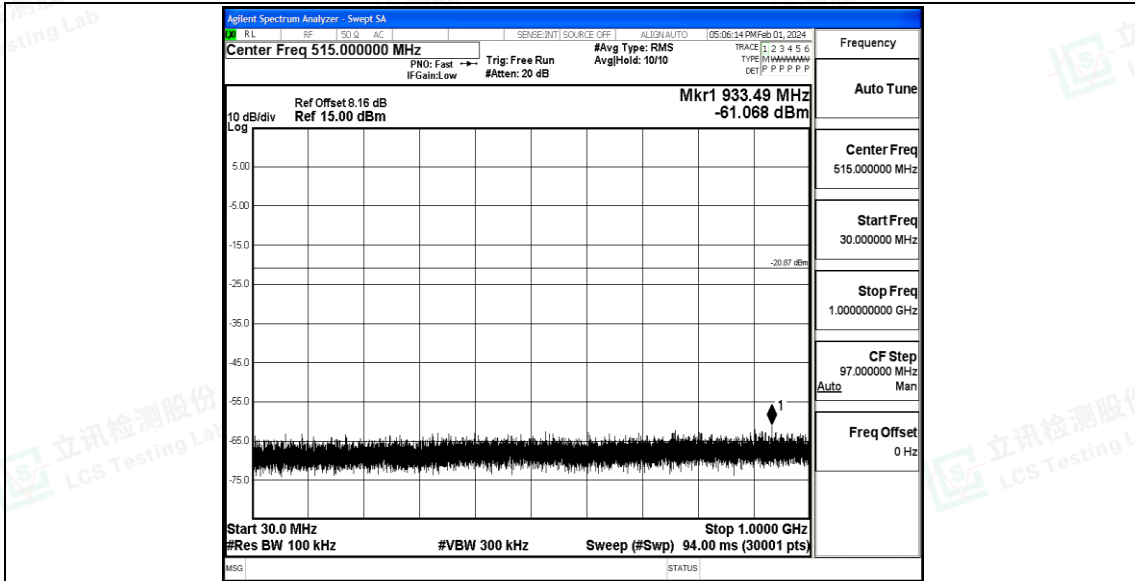


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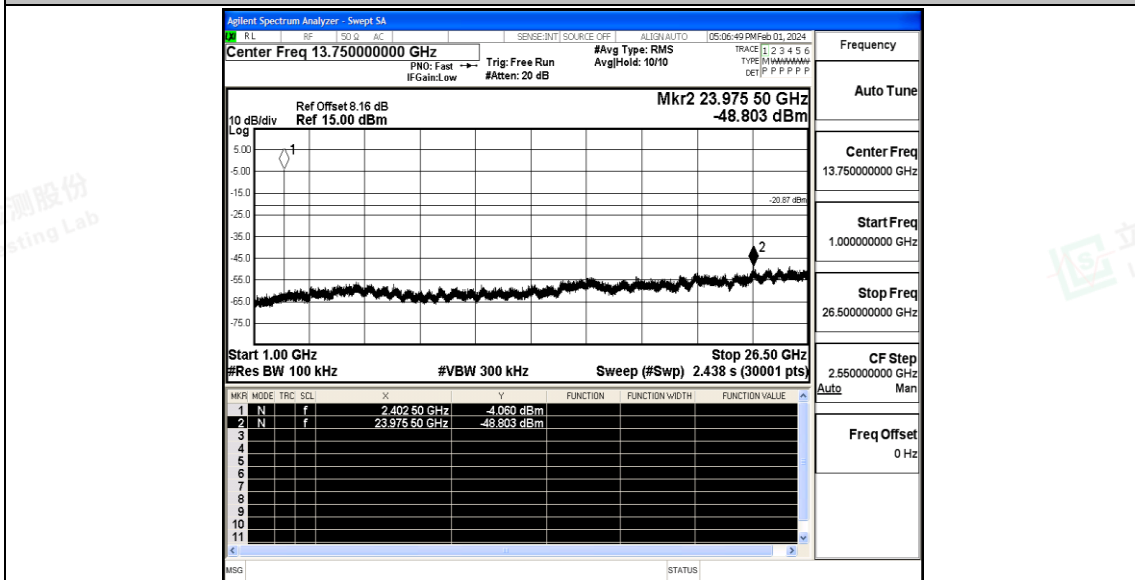
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BLE_2M_Ant1_2402_1000~26500



BLE_2M_Ant1_2440_30~1000

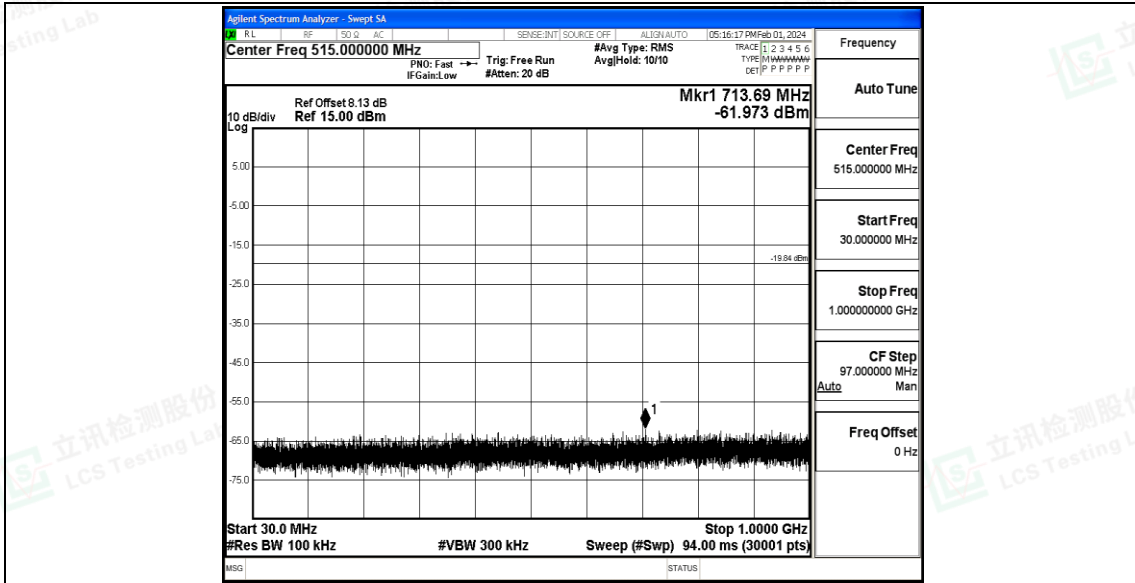


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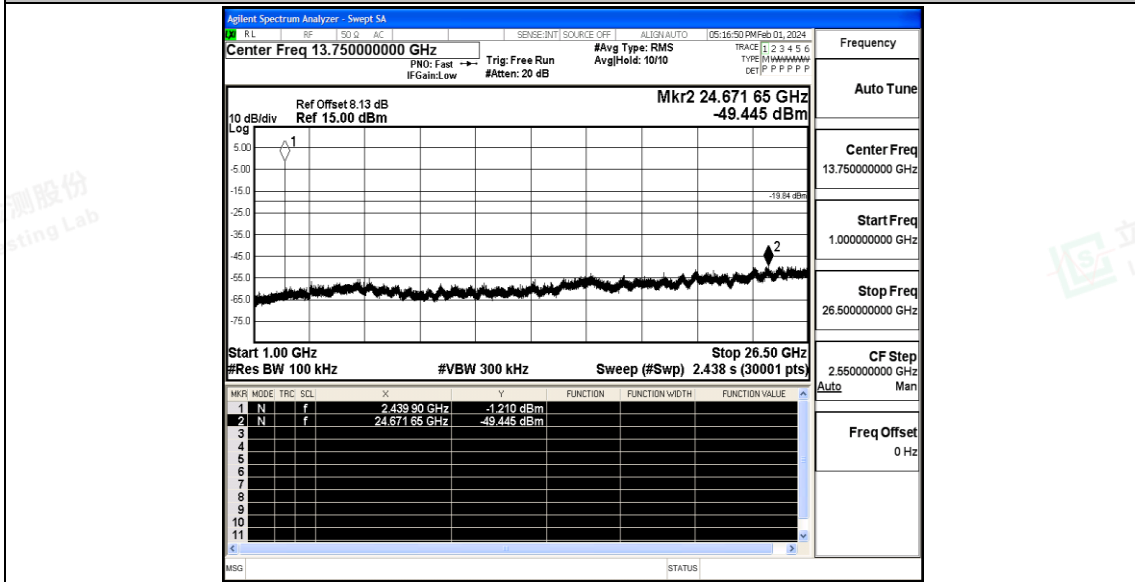
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BLE_2M_Ant1_2440_1000~26500



BLE_2M_Ant1_2480_30~1000

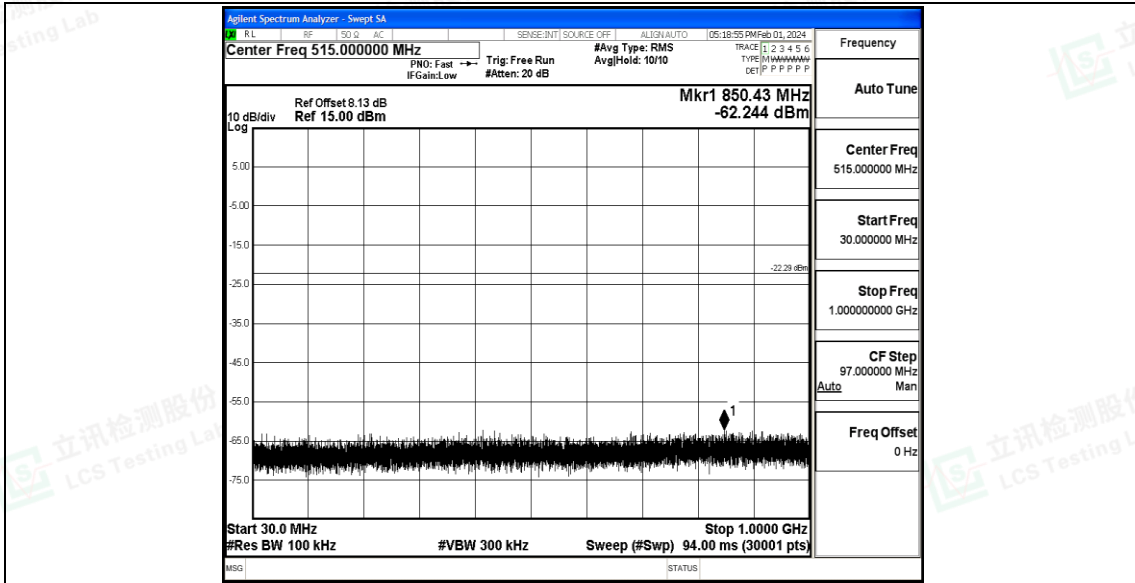


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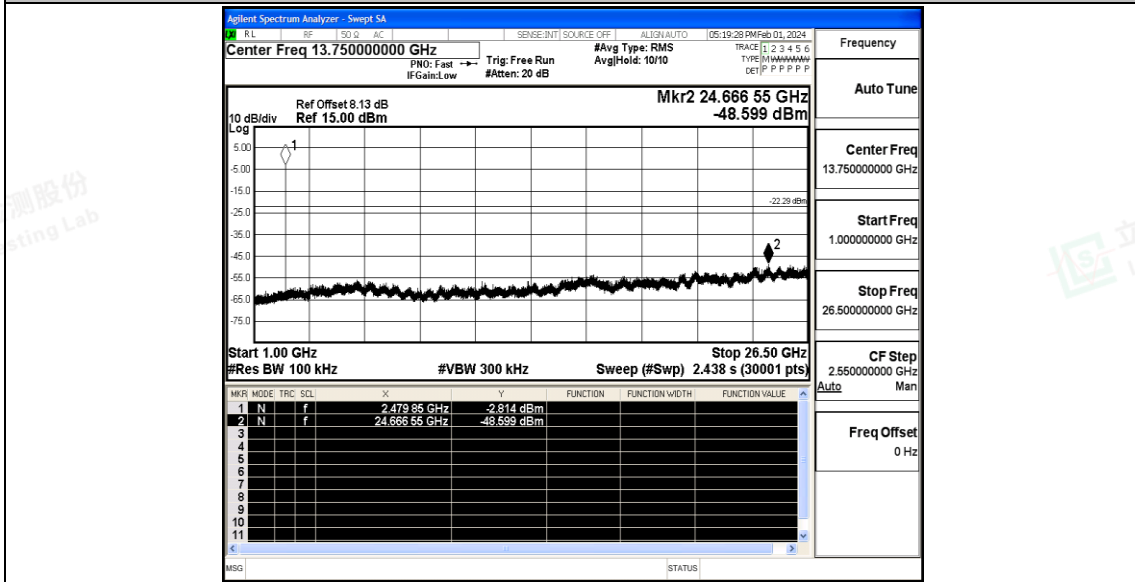
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BLE_2M_Ant1_2480_1000~26500



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A.6 Duty Cycle

Test Result

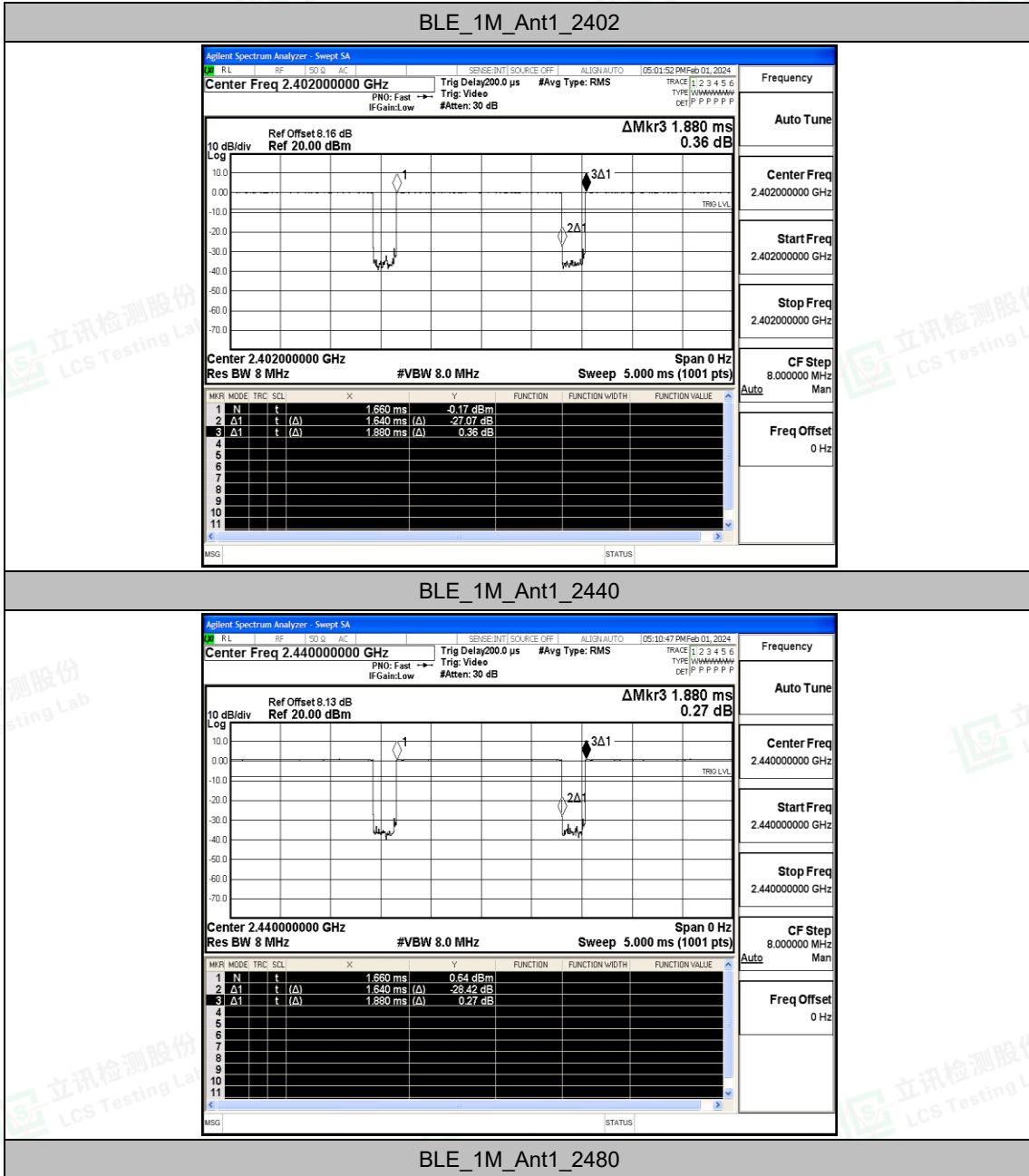
TestMode	Antenna	Frequency[MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor[dB]	1/T Factor[dB]
BLE_1M	Ant1	2402	1.64	1.88	87.23	0.59	0.61
		2440	1.64	1.88	87.23	0.59	0.61
		2480	1.64	1.88	87.23	0.59	0.61
BLE_2M	Ant1	2402	0.83	1.25	66.40	1.78	1.20
		2440	0.83	1.25	66.40	1.78	1.20
		2480	0.83	1.25	66.40	1.78	1.20



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Test Graphs

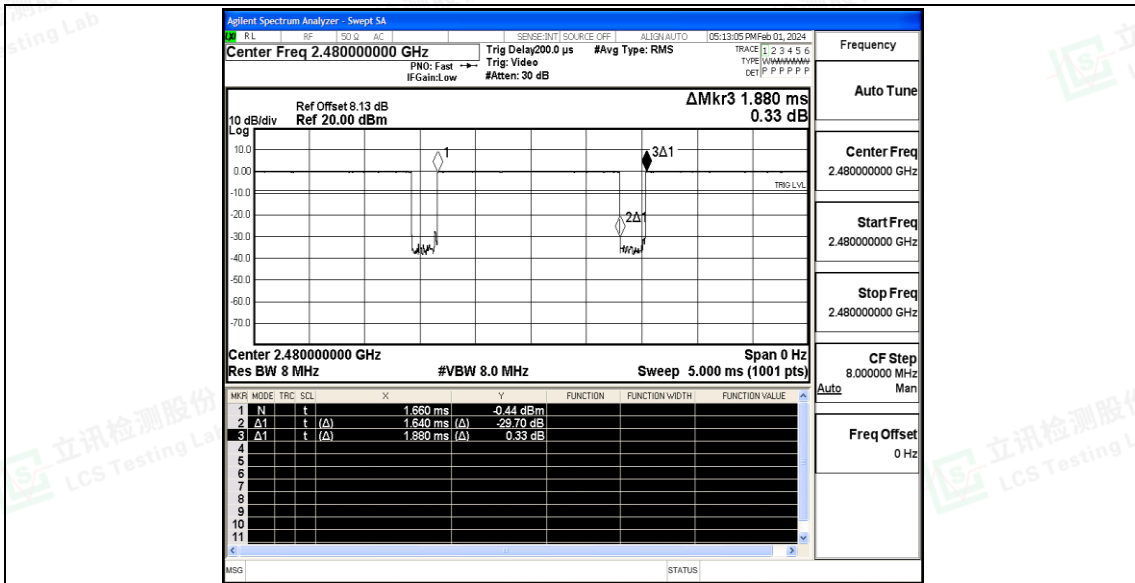


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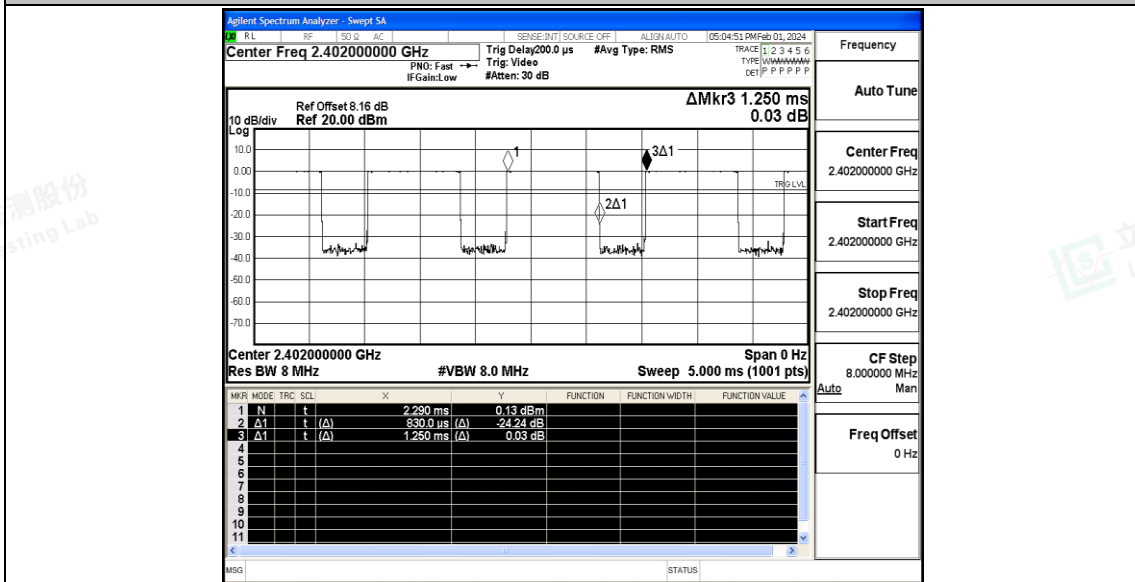
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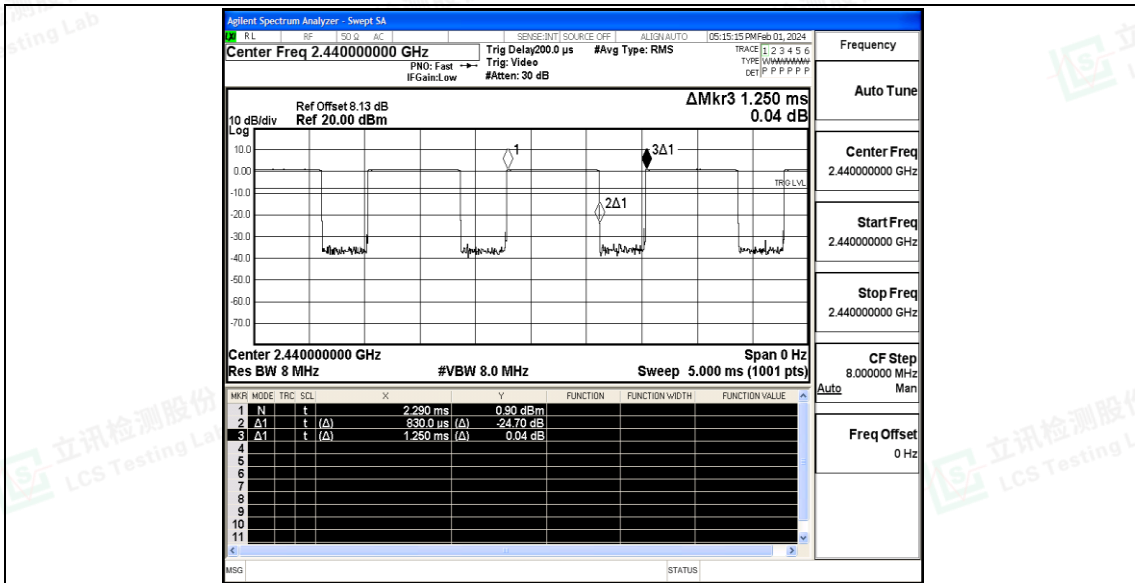


BLE_2M_Ant1_2402

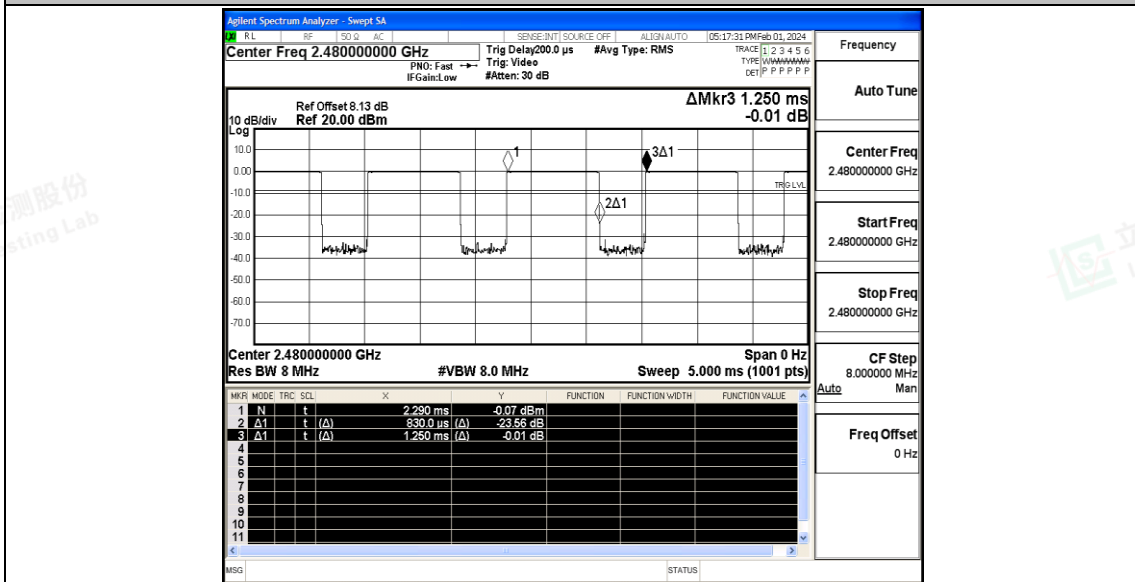


BLE_2M_Ant1_2440





BLE_2M_Ant1_2480



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A.7 Emissions in Restricted Bands

Test Result

TestMode	Antenna	ChName	Frequenc y [MHz]	Detector	Freq [MHz]	Result [dBm]	Limit [dBm]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
BLE_1M	Ant1	Low	2402	AV	2310.000	-49.31	≤-41.20	45.89	≤54	PASS
				AV	2357.960	-48.28	≤-41.20	46.92	≤54	PASS
				AV	2390.000	-48.97	≤-41.20	46.23	≤54	PASS
				Peak	2310.000	-42.39	≤-21.20	52.81	≤74	PASS
				Peak	2364.365	-37.99	≤-21.20	57.21	≤74	PASS
				Peak	2390.000	-41.67	≤-21.20	53.53	≤74	PASS
		High	2480	AV	2483.500	-49.25	≤-41.20	45.95	≤54	PASS
				AV	2494.560	-48.24	≤-41.20	46.96	≤54	PASS
				AV	2500.000	-49.38	≤-41.20	45.82	≤54	PASS
				Peak	2483.500	-42.12	≤-21.20	53.08	≤74	PASS
				Peak	2499.920	-39.8	≤-21.20	55.40	≤74	PASS
				Peak	2500.000	-42.17	≤-21.20	53.03	≤74	PASS
BLE_2M	Ant1	Low	2402	AV	2310.000	-48.69	≤-41.20	46.51	≤54	PASS
				AV	2361.110	-47.36	≤-41.20	47.84	≤54	PASS
				AV	2390.000	-48.15	≤-41.20	47.05	≤54	PASS
				Peak	2310.000	-40.92	≤-21.20	54.28	≤74	PASS
				Peak	2378.435	-39.39	≤-21.20	55.81	≤74	PASS
				Peak	2390.000	-42.07	≤-21.20	53.13	≤74	PASS
		High	2480	AV	2483.500	-48	≤-41.20	47.20	≤54	PASS
				AV	2499.120	-47.18	≤-41.20	48.02	≤54	PASS
				AV	2500.000	-47.94	≤-41.20	47.26	≤54	PASS
				Peak	2483.500	-41.96	≤-21.20	53.24	≤74	PASS
				Peak	2494.480	-38.47	≤-21.20	56.73	≤74	PASS
				Peak	2500.000	-41.28	≤-21.20	53.92	≤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.



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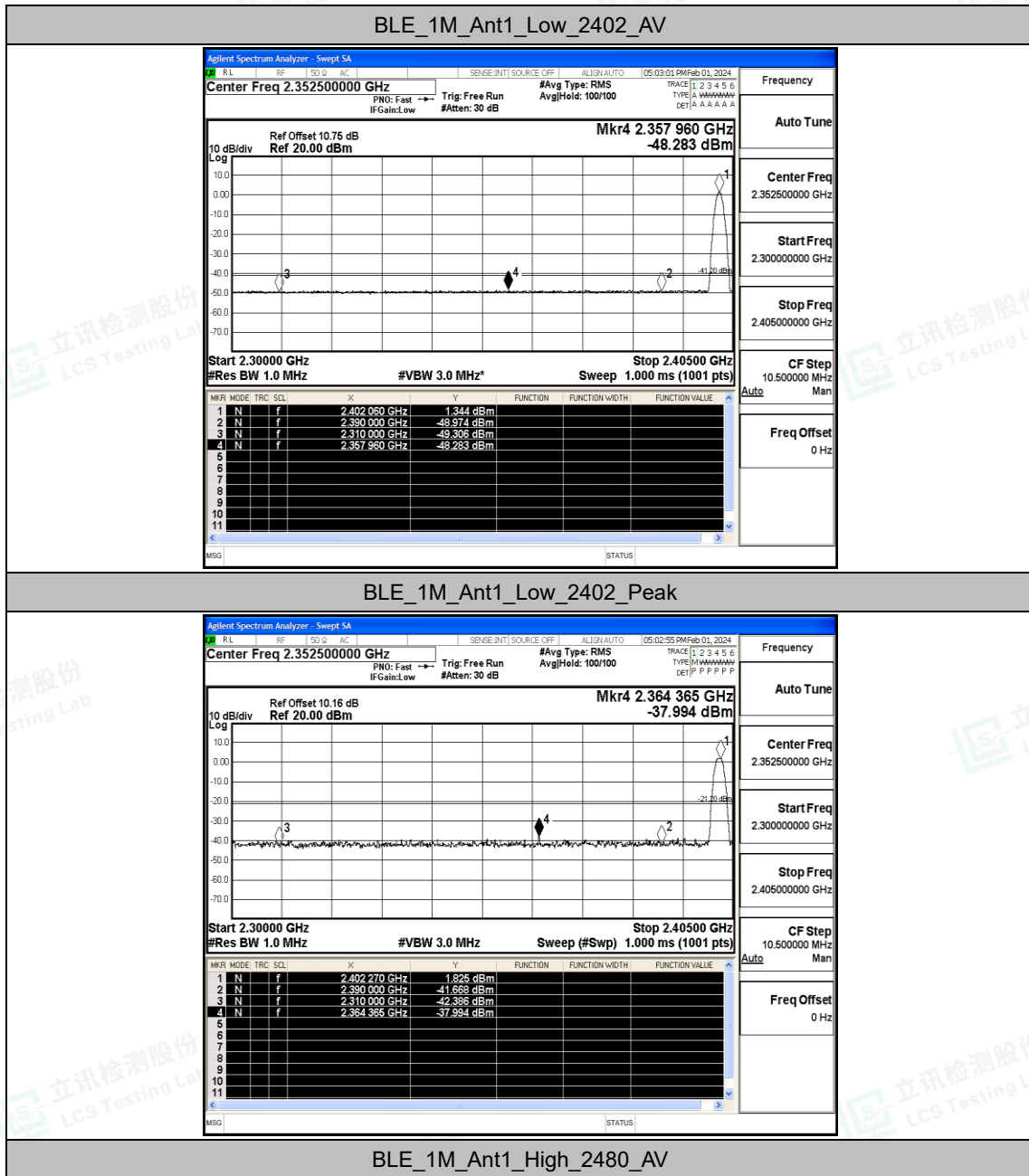
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Test Graphs

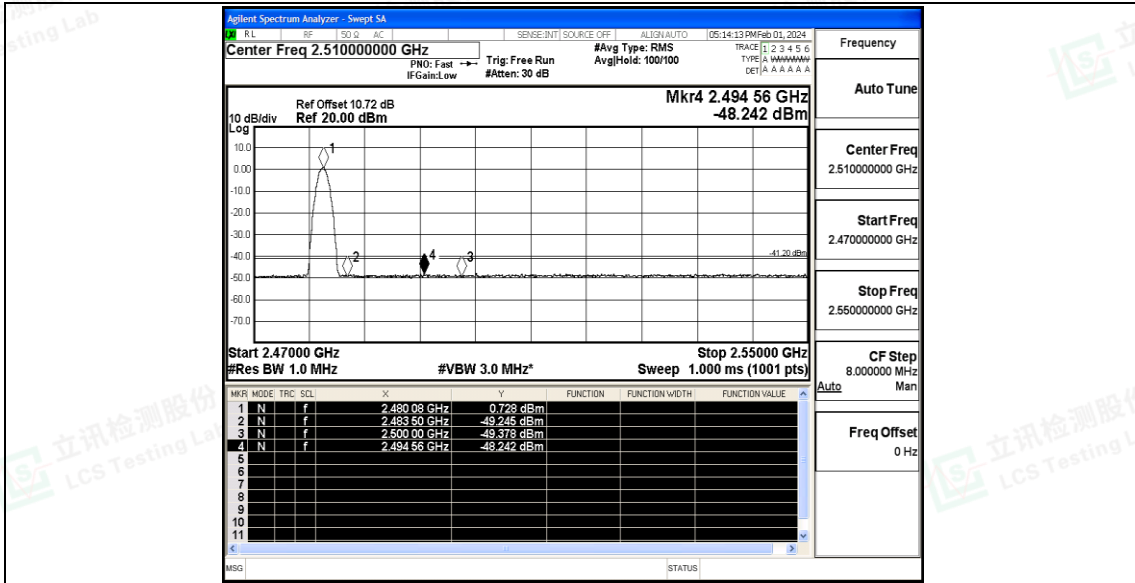


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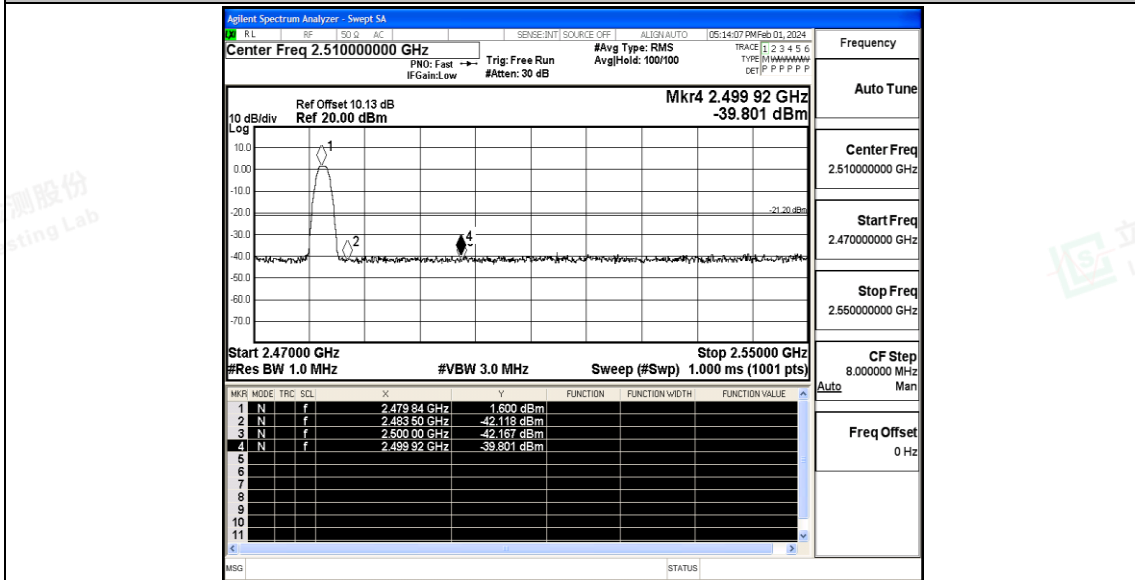
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BLE_1M_Ant1_High_2480_Peak



BLE_2M_Ant1_Low_2402_AV

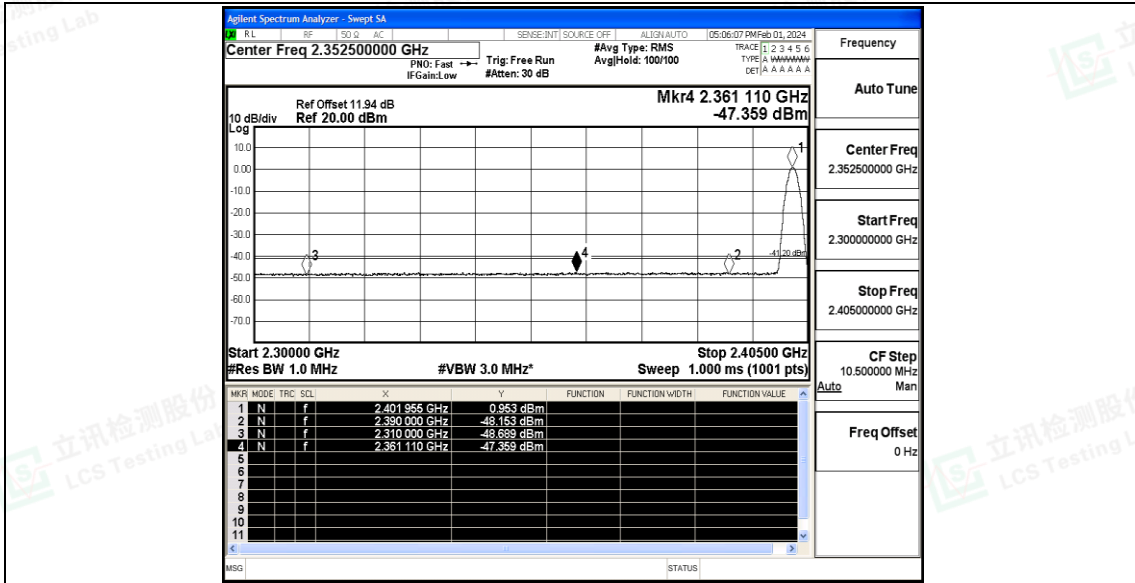


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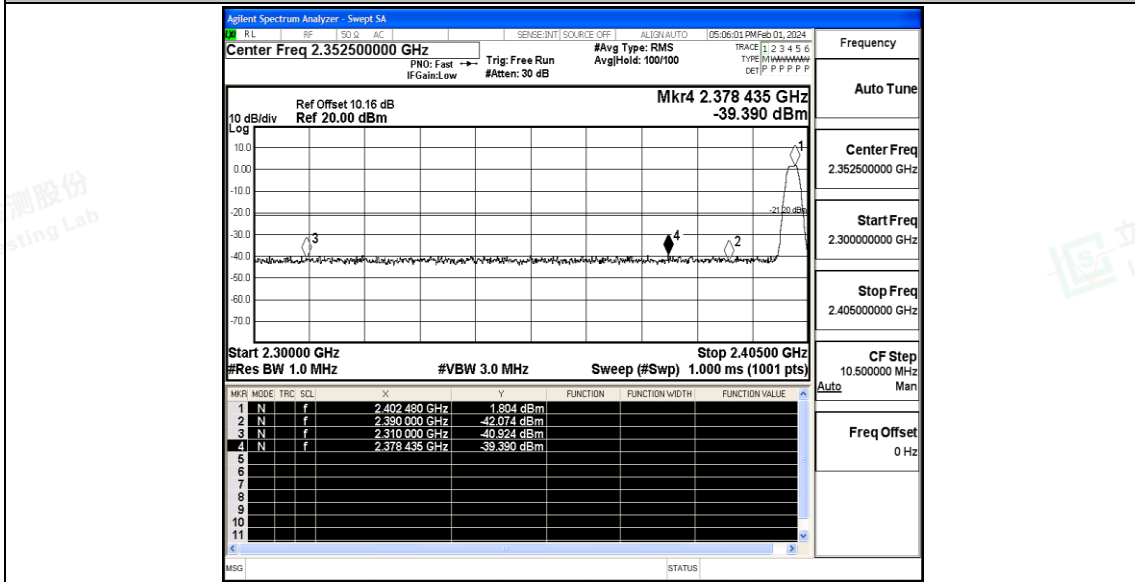
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BLE_2M_Ant1_Low_2402_Peak



BLE_2M_Ant1_High_2480_AV

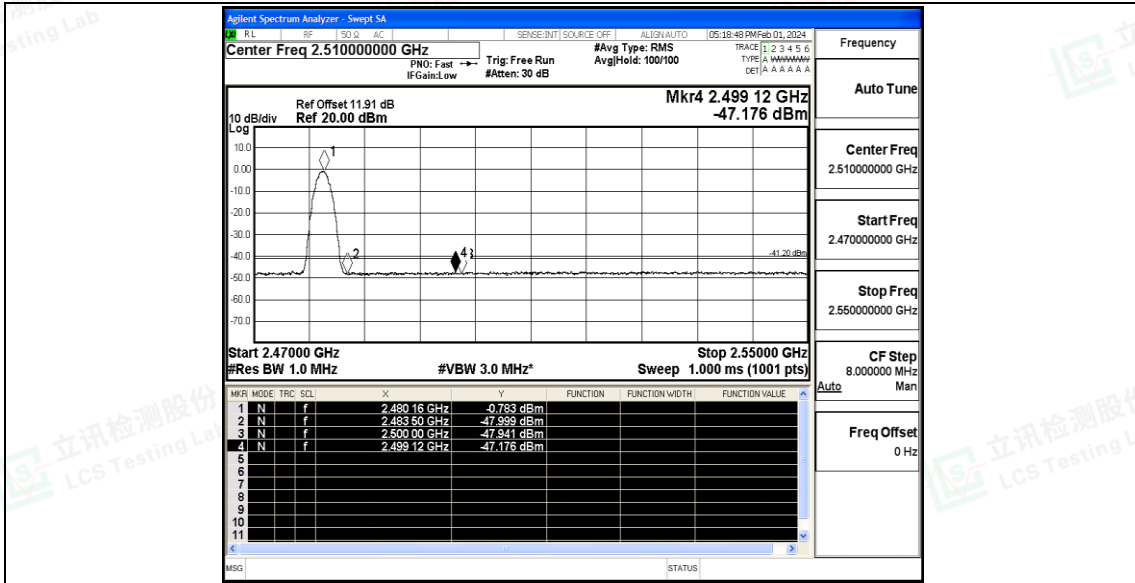


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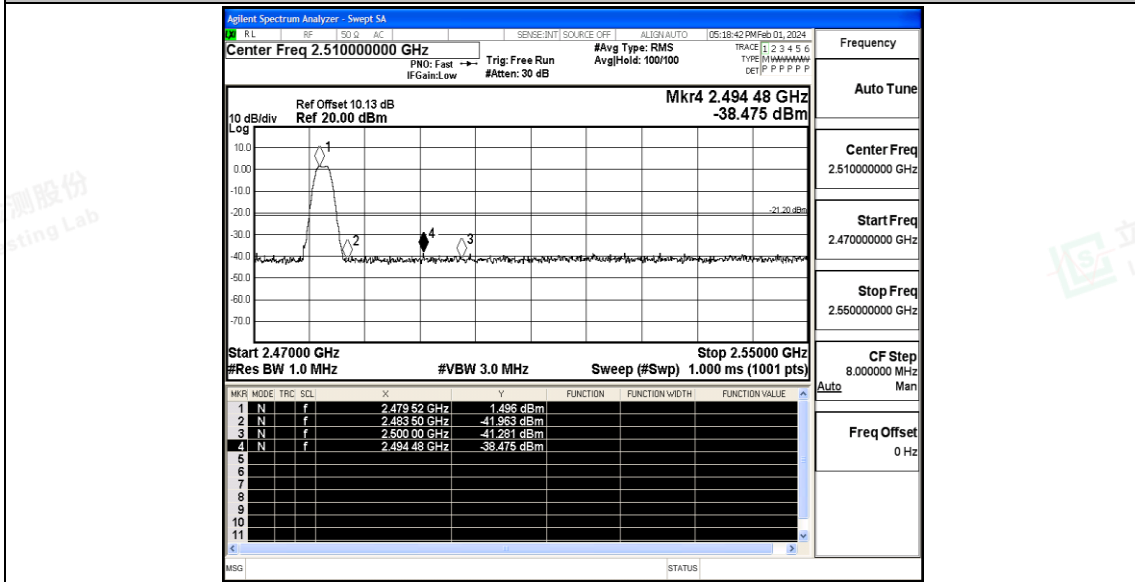
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BLE_2M_Ant1_High_2480_Peak



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