



## Appendix A

### RF Test Data for BT LE (Conducted Measurement)

Product Name: LED Controller

Test Model: SP548E

#### 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

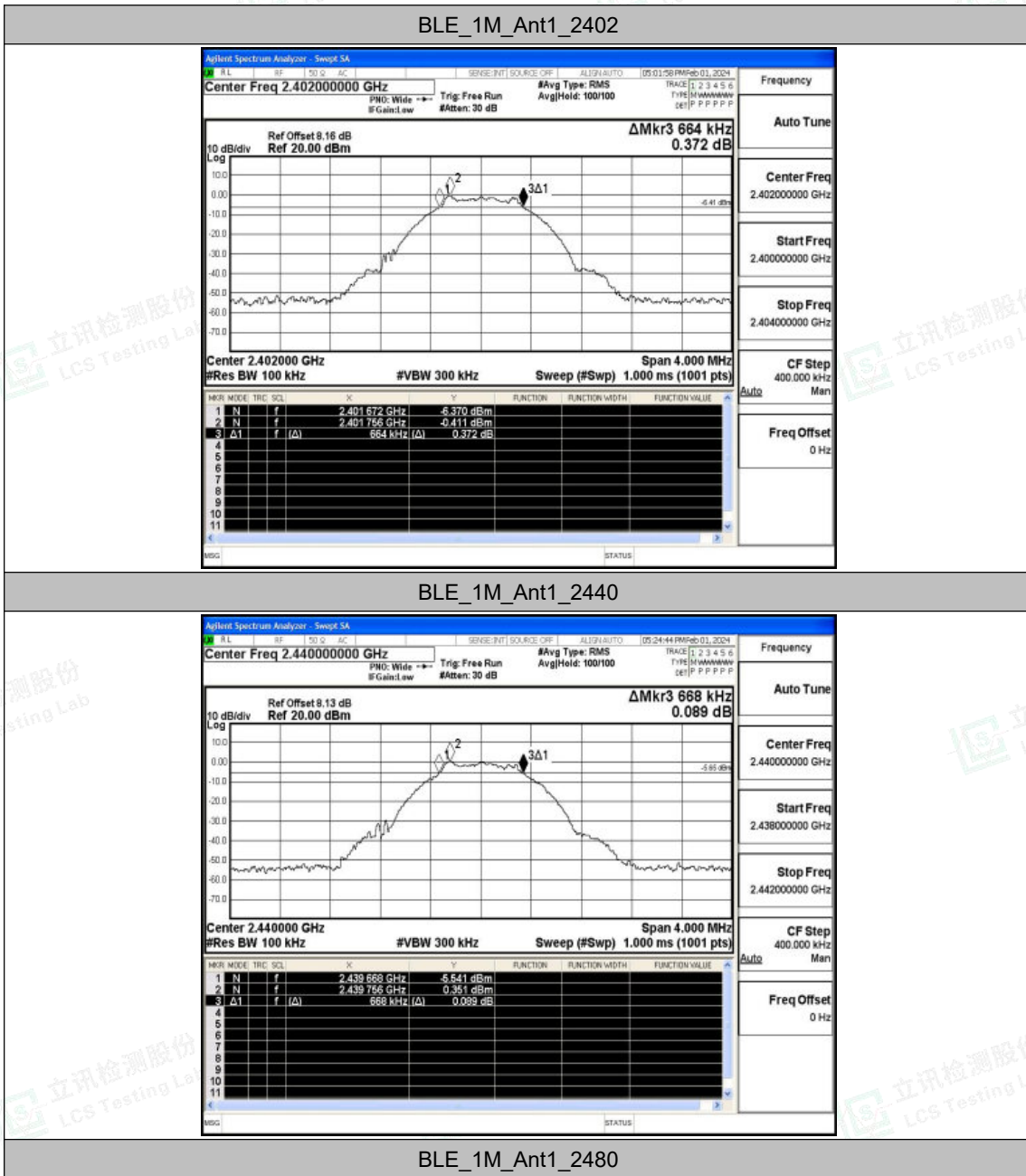
TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.664	2401.672	2402.336	0.5	PASS
		2440	0.668	2439.668	2440.336	0.5	PASS
		2480	0.660	2479.680	2480.340	0.5	PASS
BLE_2M	Ant1	2402	1.204	2401.360	2402.564	0.5	PASS
		2440	1.104	2439.448	2440.552	0.5	PASS
		2480	1.100	2479.456	2480.556	0.5	PASS



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### Test Graphs

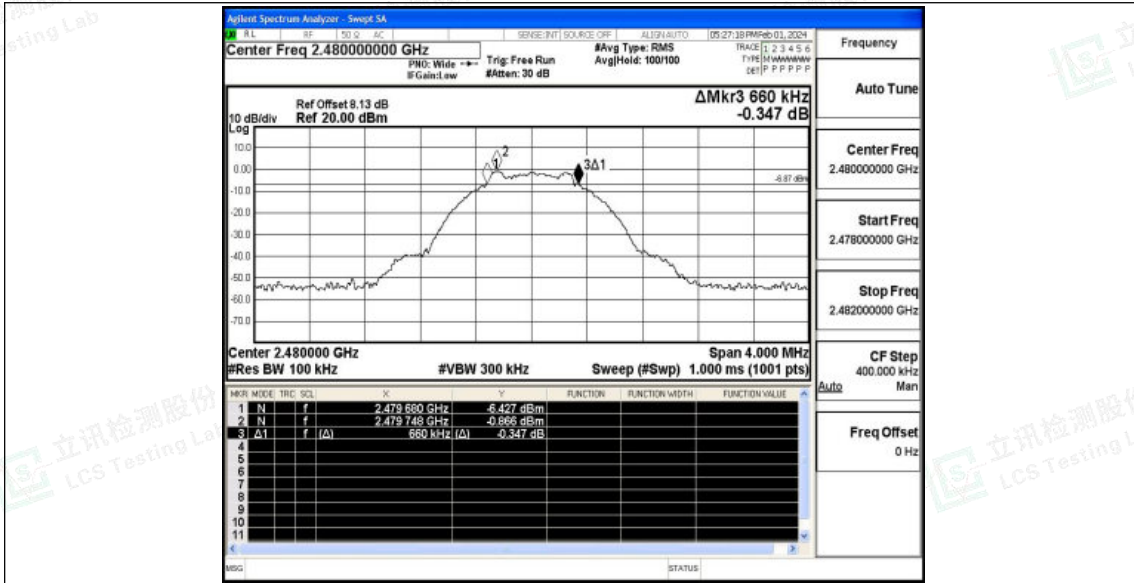


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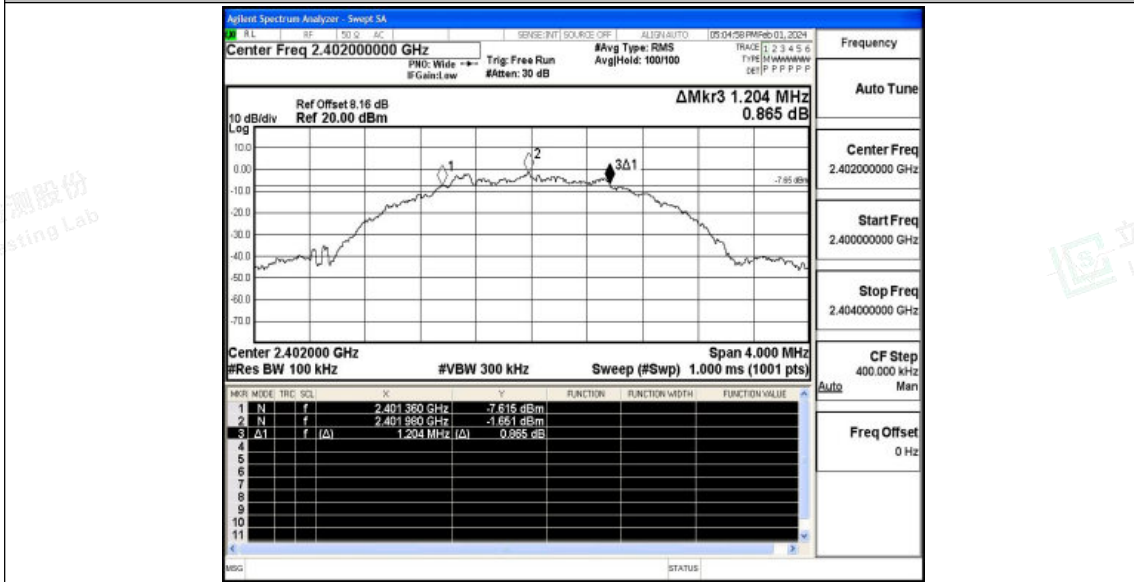
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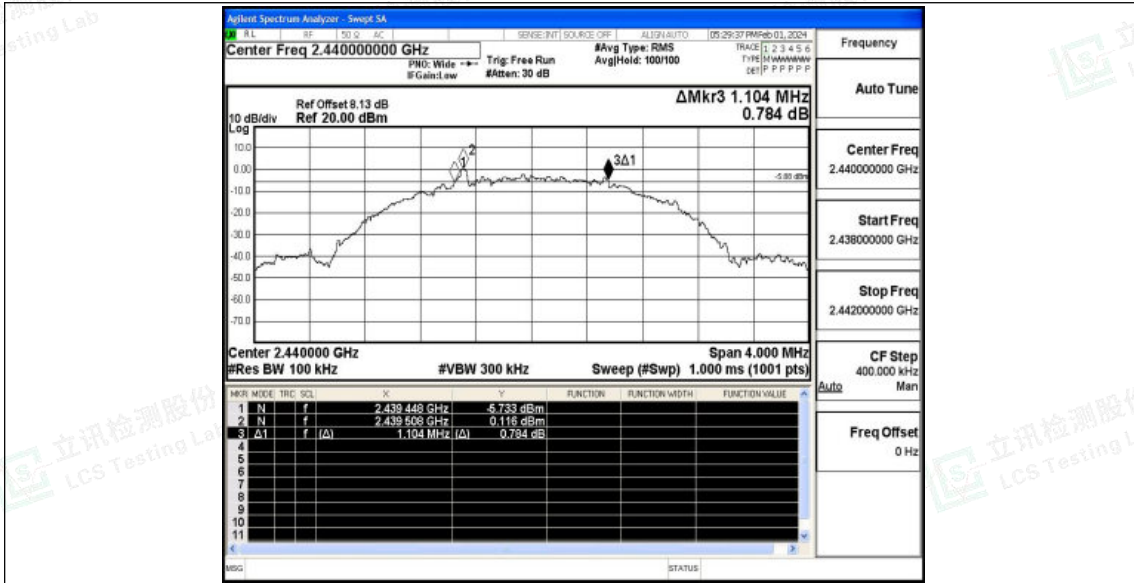
BLE\_2M\_Ant1\_2402



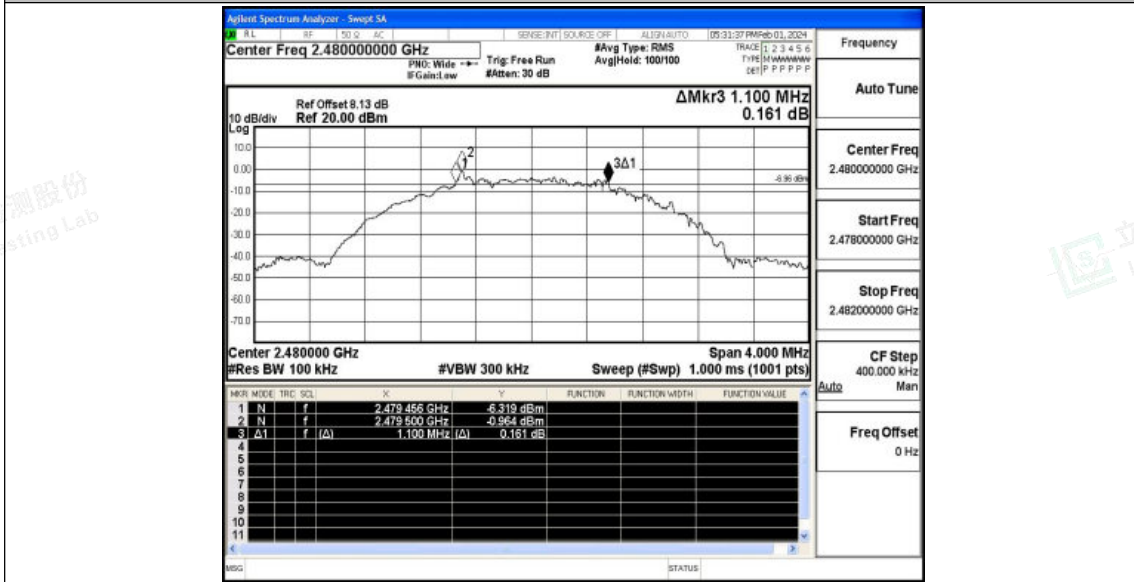
BLE\_2M\_Ant1\_2440



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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	0.80	≤30	PASS
		2480	-0.23	≤30	PASS
BLE_2M	Ant1	2402	0.00	≤30	PASS
		2440	0.59	≤30	PASS
		2480	-0.40	≤30	PASS

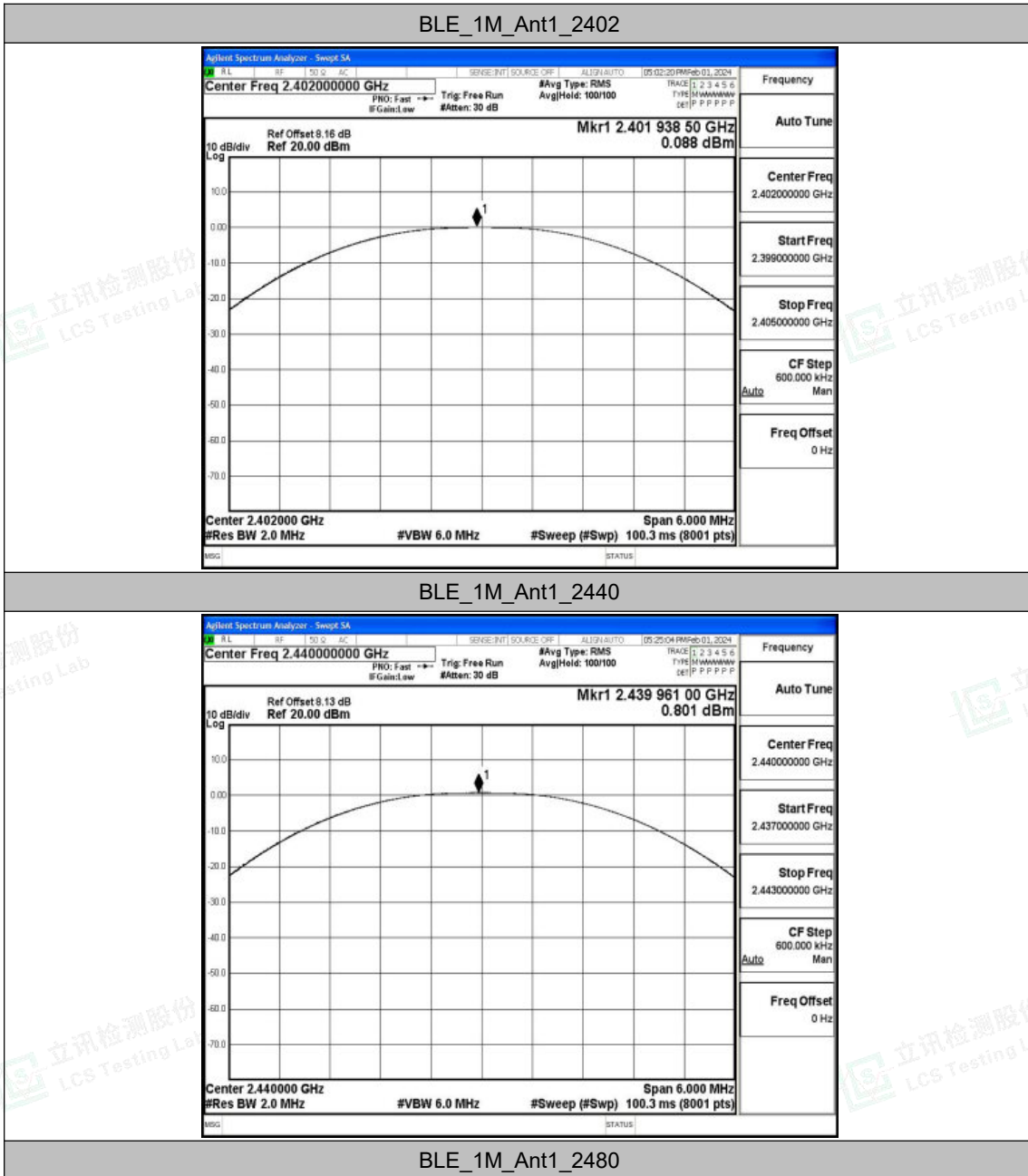


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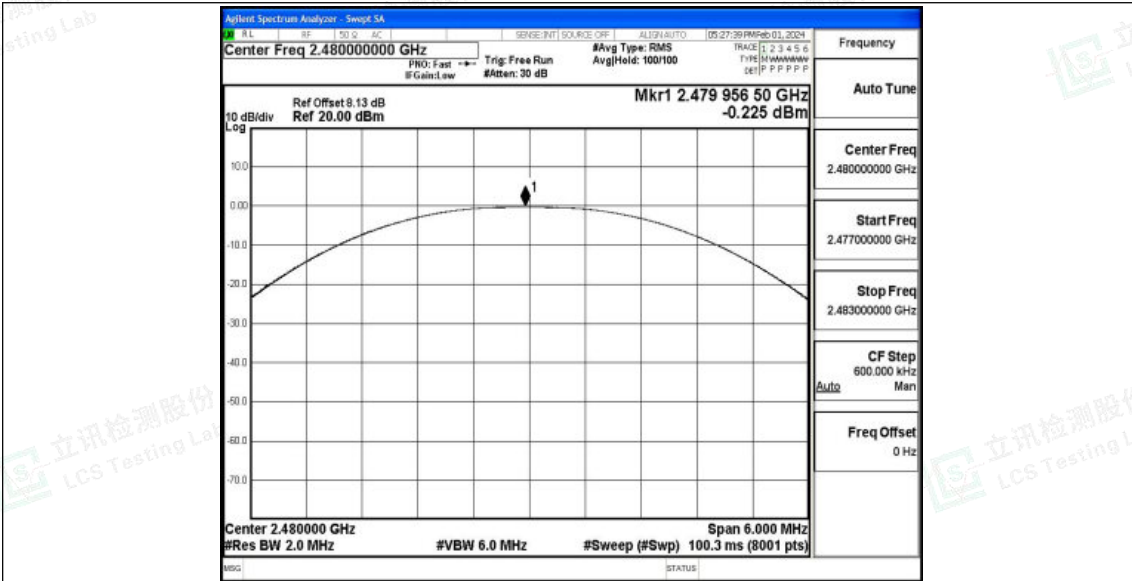




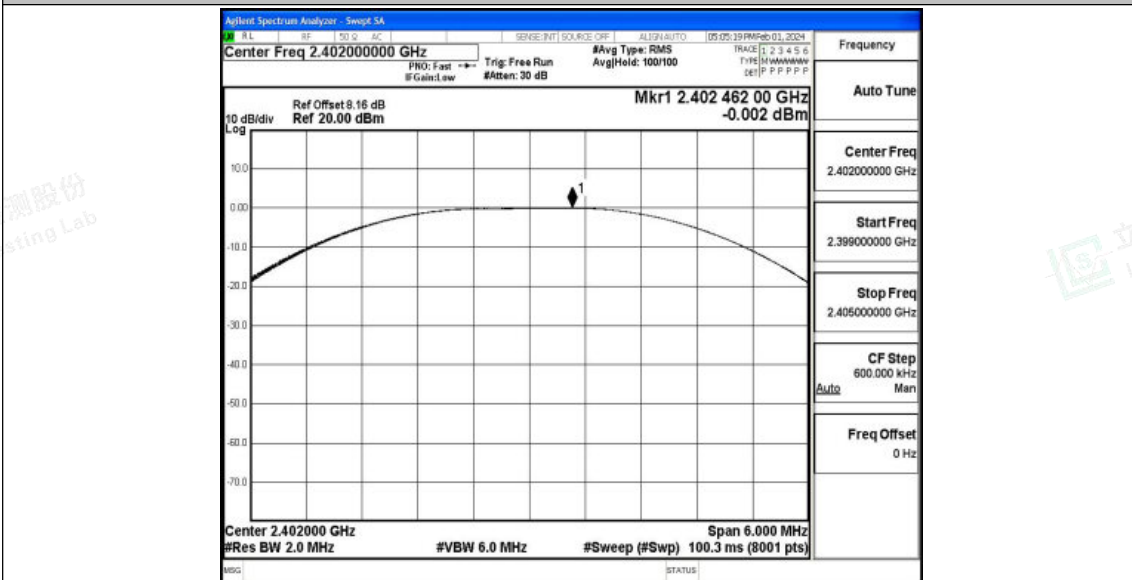
### Test Graphs



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BLE\_2M\_Ant1\_2402



BLE\_2M\_Ant1\_2440



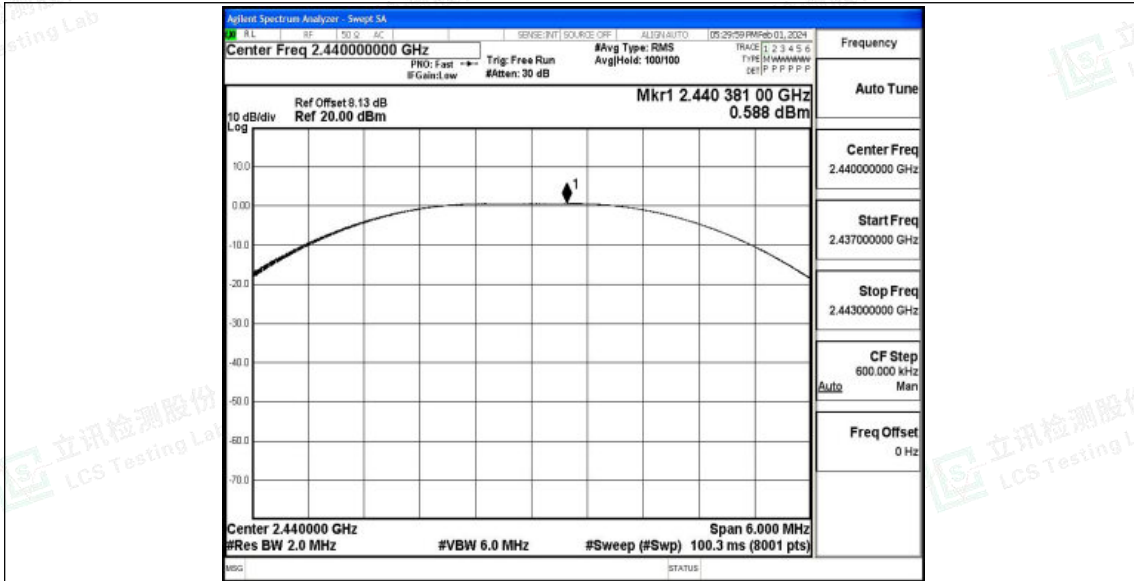
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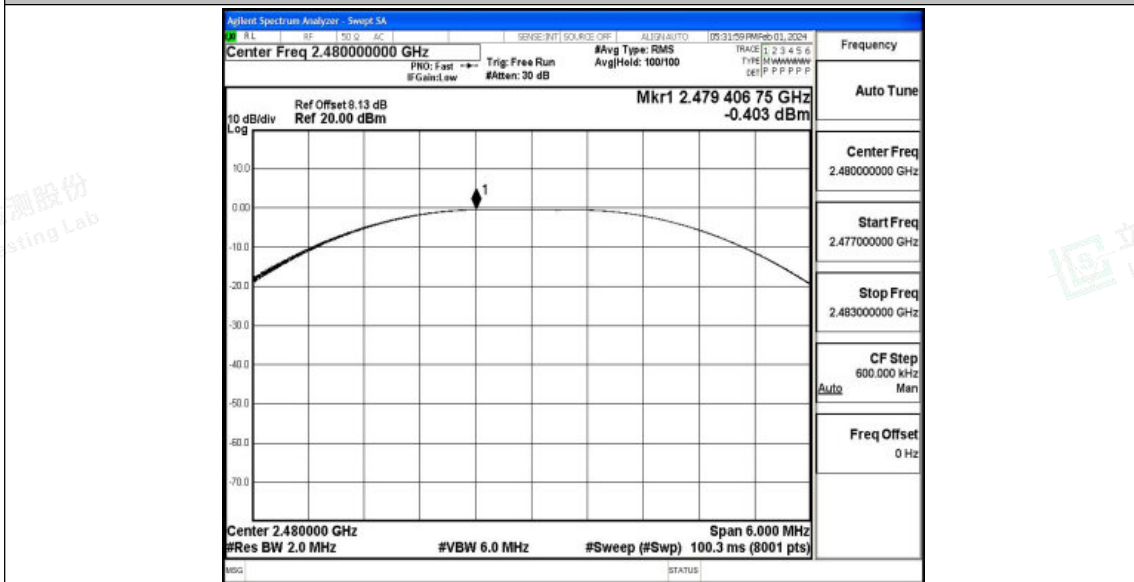
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BLE\_2M\_Ant1\_2480



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### A.3 Maximum power spectral density

#### Test Result

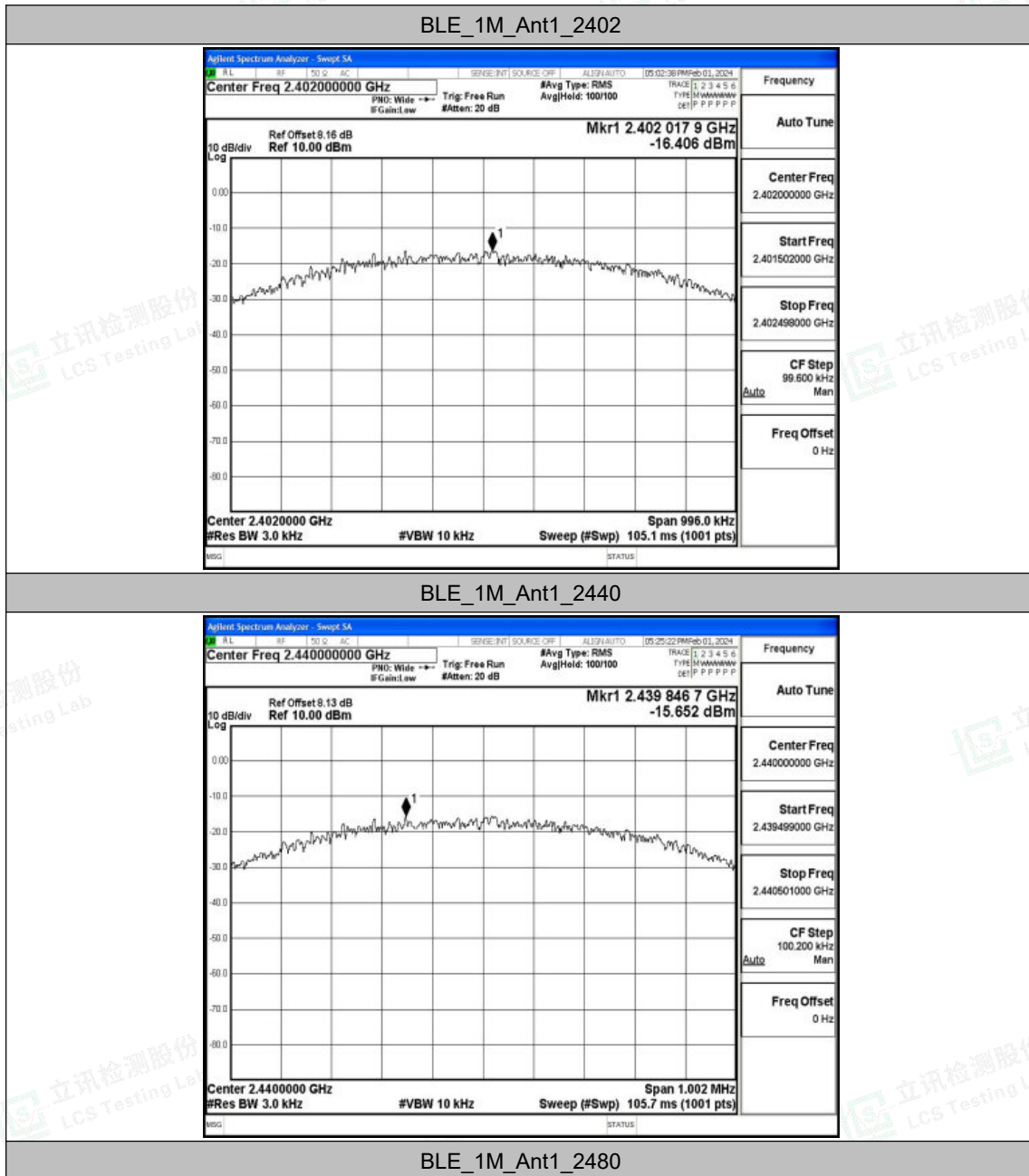
TestMode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-16.41	≤8.00	PASS
		2440	-15.65	≤8.00	PASS
		2480	-16.84	≤8.00	PASS
BLE_2M	Ant1	2402	-19.56	≤8.00	PASS
		2440	-18.91	≤8.00	PASS
		2480	-19.88	≤8.00	PASS



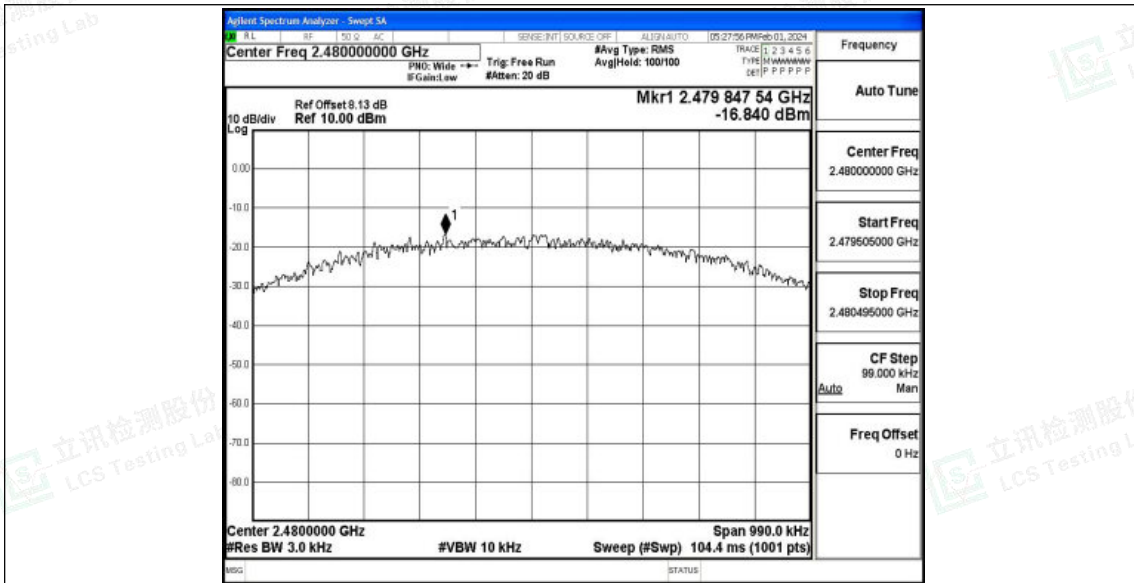
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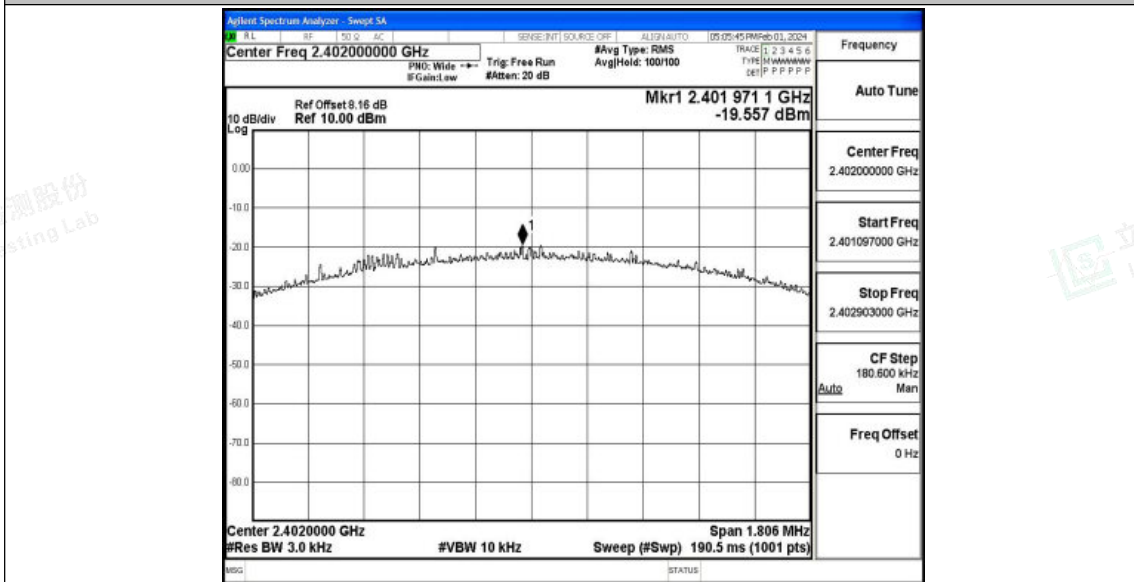
### Test Graphs



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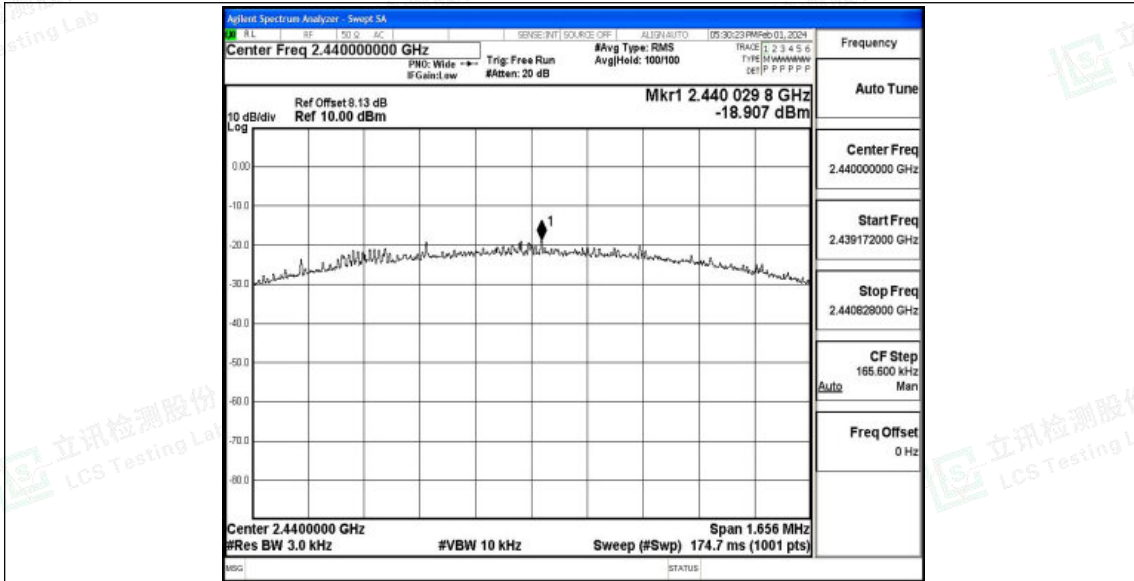


BLE\_2M\_Ant1\_2402

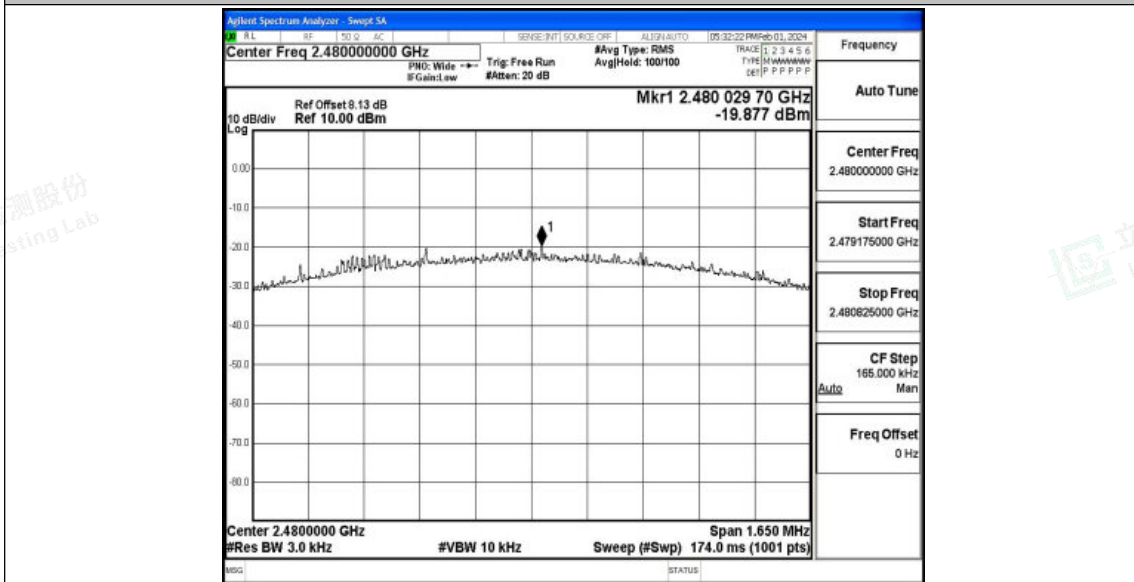


BLE\_2M\_Ant1\_2440





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	-0.69	-50.05	≤-20.69	PASS
BLE_2M	Ant1	Low	2402	-0.87	-44.84	≤-20.87	PASS
		High	2480	-0.93	-49.95	≤-20.93	PASS

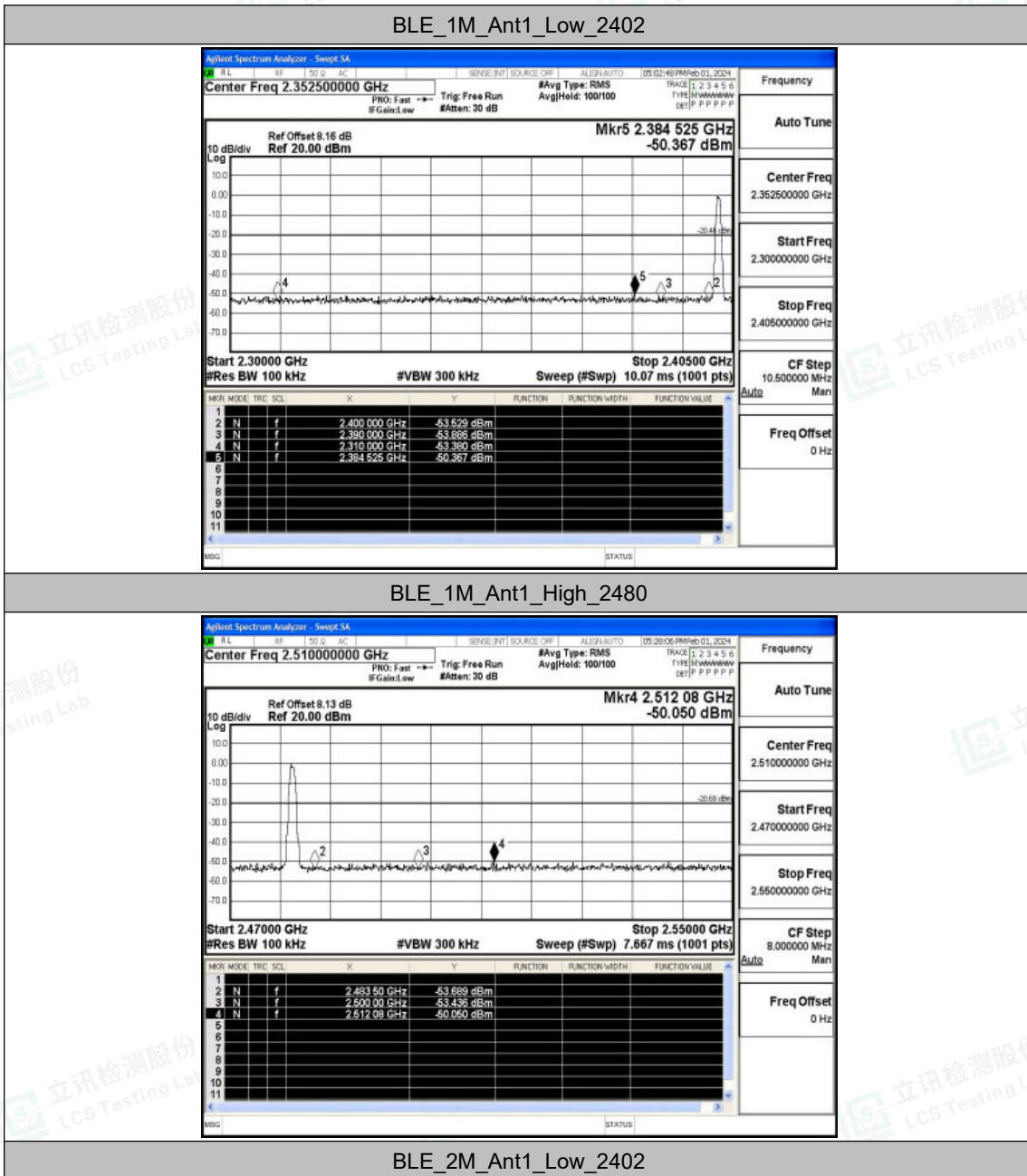


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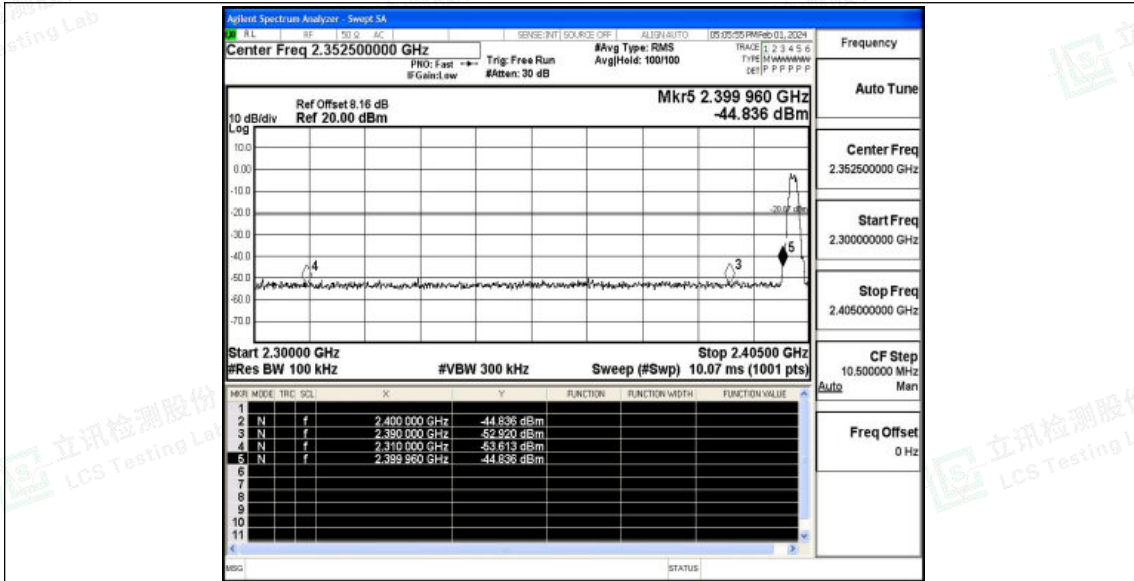




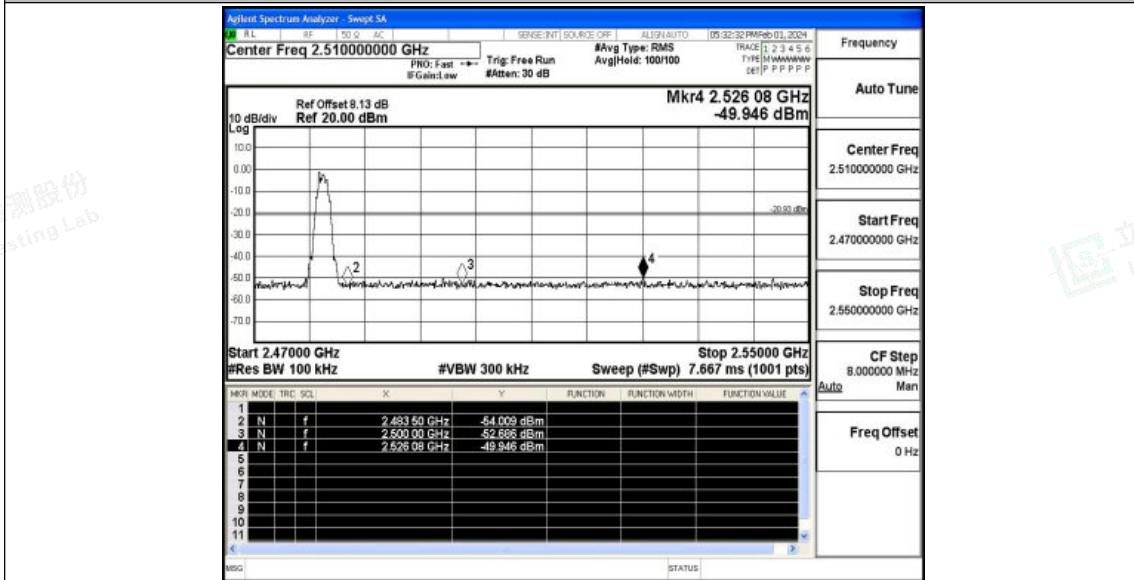
### Test Graphs



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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	0.33	-61.78	≤-19.67	PASS
			1000~26500	0.33	-49.44	≤-19.67	PASS
		2480	30~1000	-0.69	-61.93	≤-20.69	PASS
			1000~26500	-0.69	-47.35	≤-20.69	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	-0.54	-61.59	≤-20.54	PASS
			1000~26500	-0.54	-49.47	≤-20.54	PASS
		2480	30~1000	-0.93	-61.34	≤-20.93	PASS
			1000~26500	-0.93	-49.48	≤-20.93	PASS



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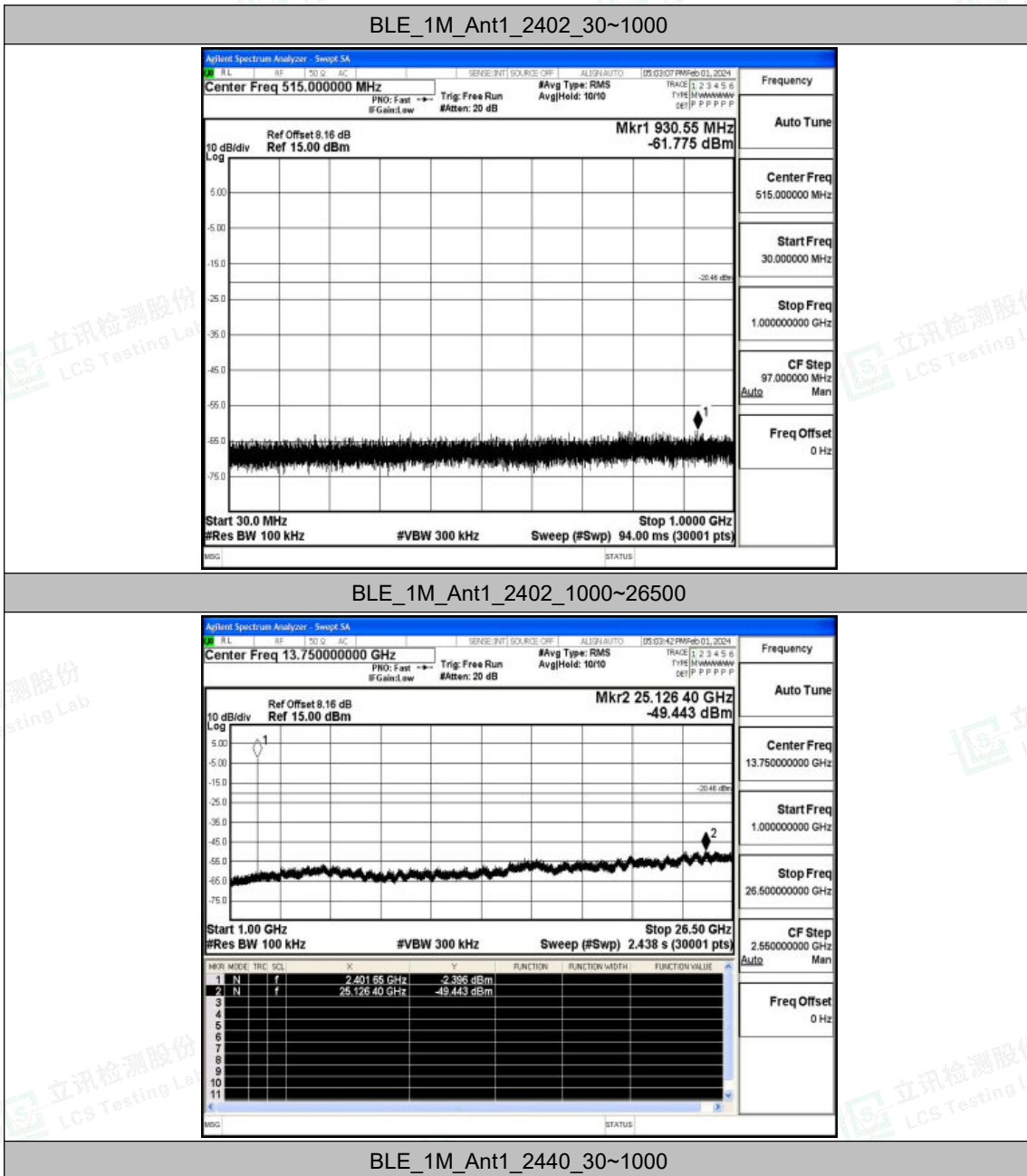
Add: 101, 201 Bldg A &amp; 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

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### Test Graphs

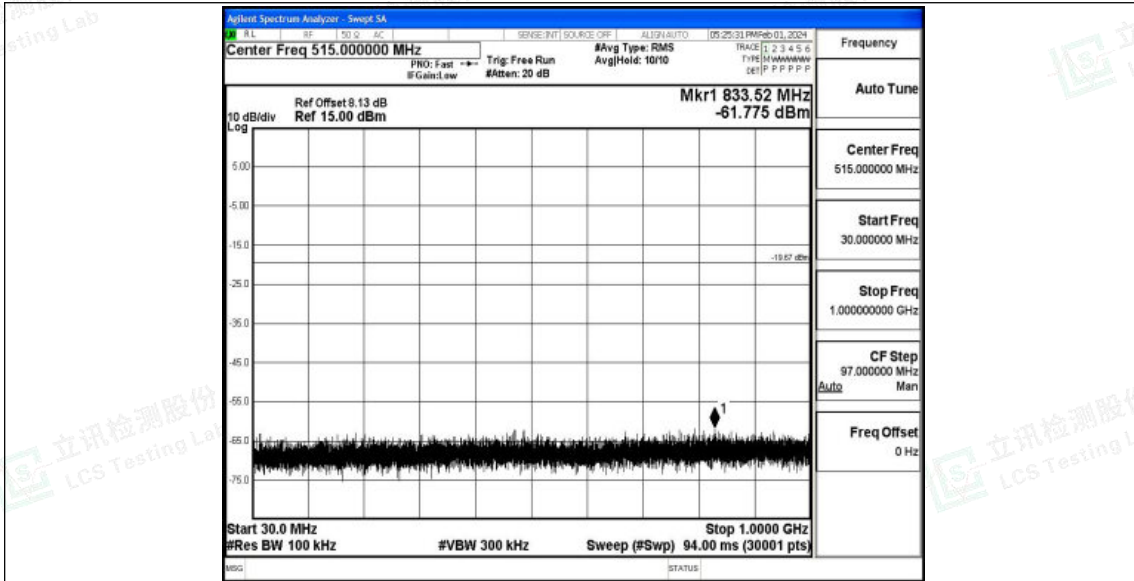


Shenzhen LCS Compliance Testing Laboratory Ltd.

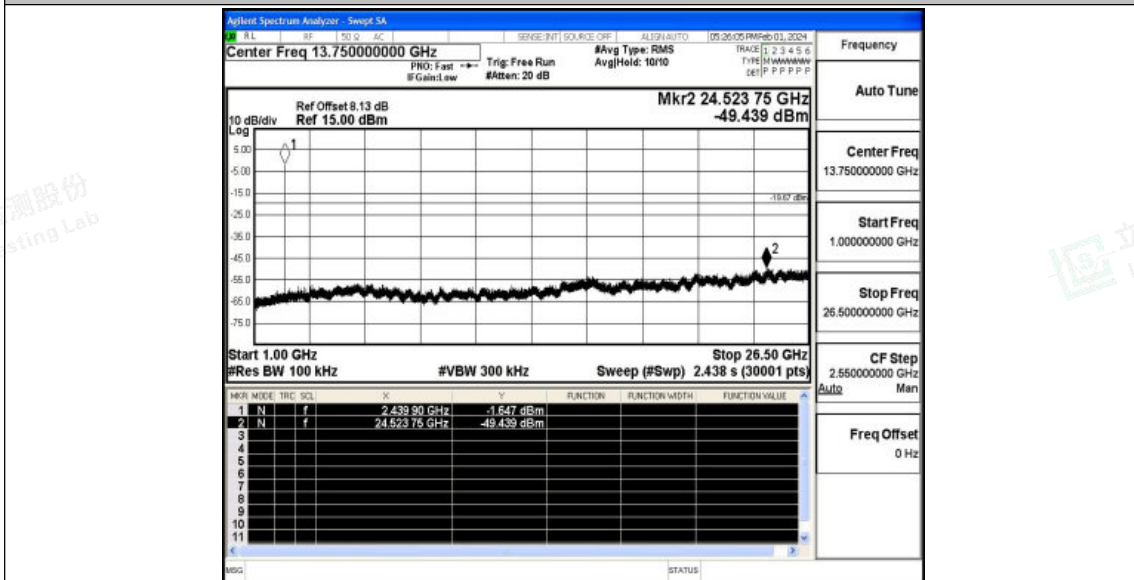
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BLE\_1M\_Ant1\_2440\_1000~26500

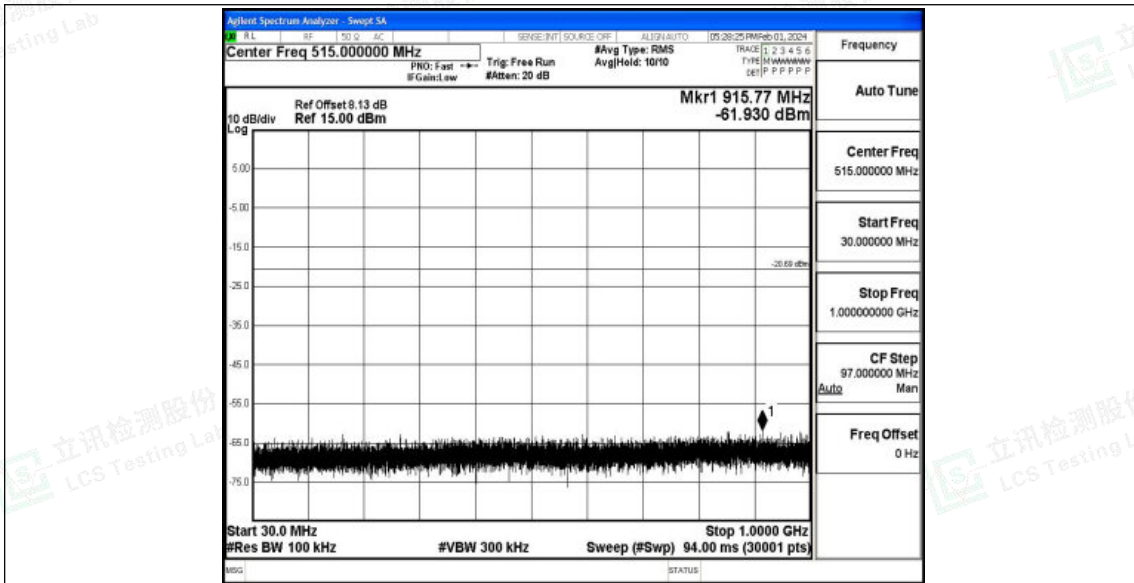


BLE\_1M\_Ant1\_2480\_30~1000

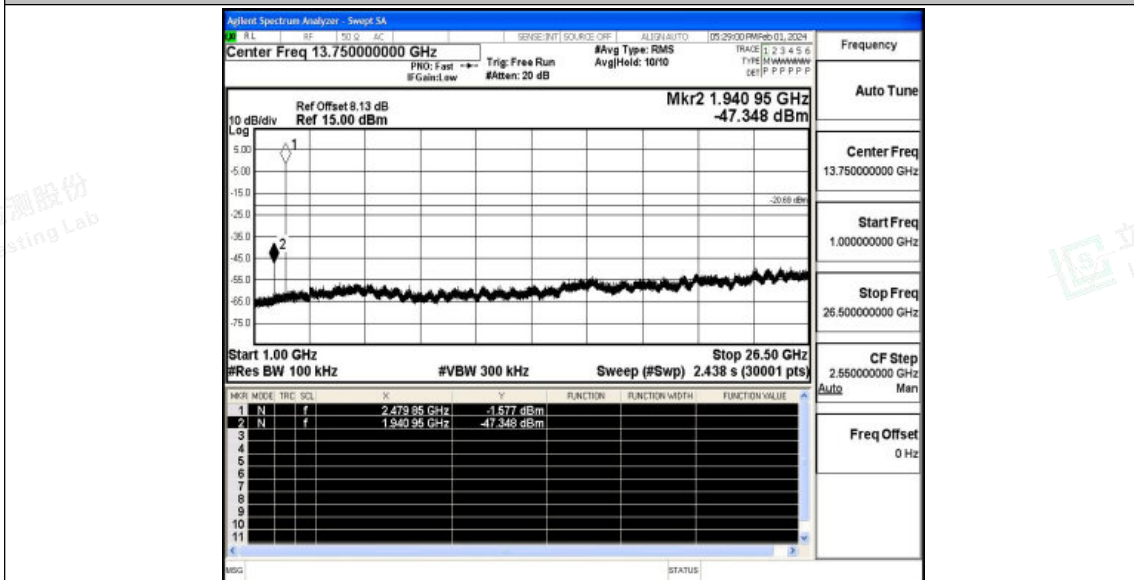


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BLE\_1M\_Ant1\_2480\_1000~26500



BLE\_2M\_Ant1\_2402\_30~1000



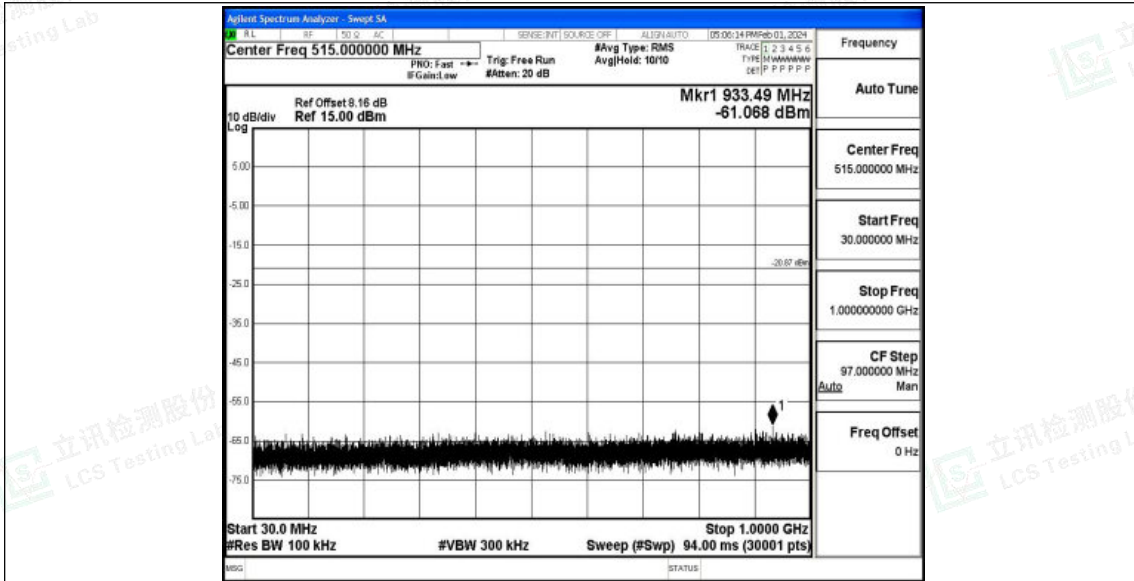
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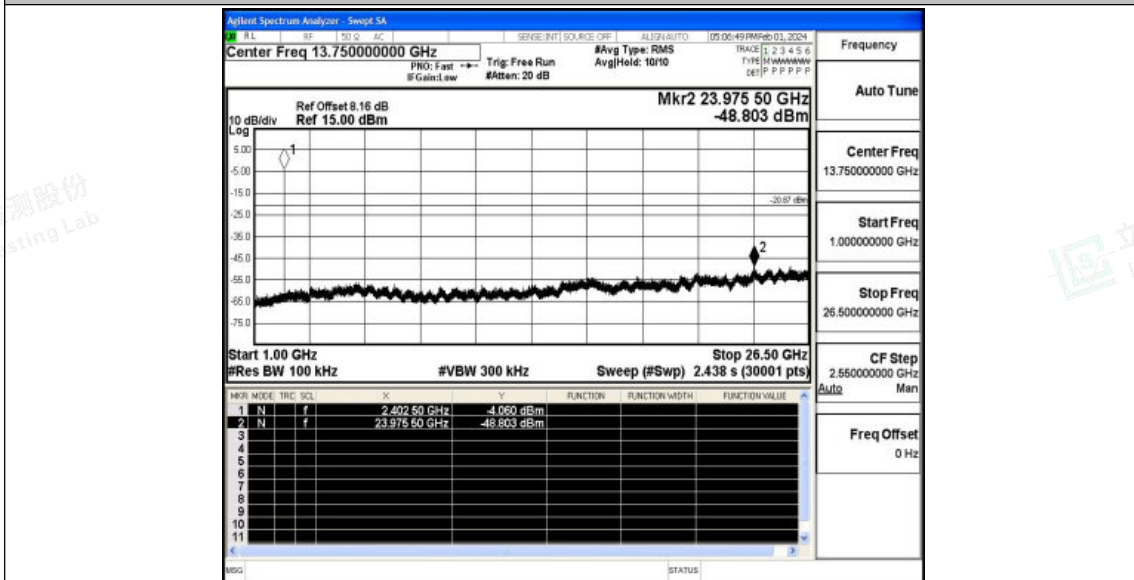
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BLE\_2M\_Ant1\_2402\_1000~26500



BLE\_2M\_Ant1\_2440\_30~1000

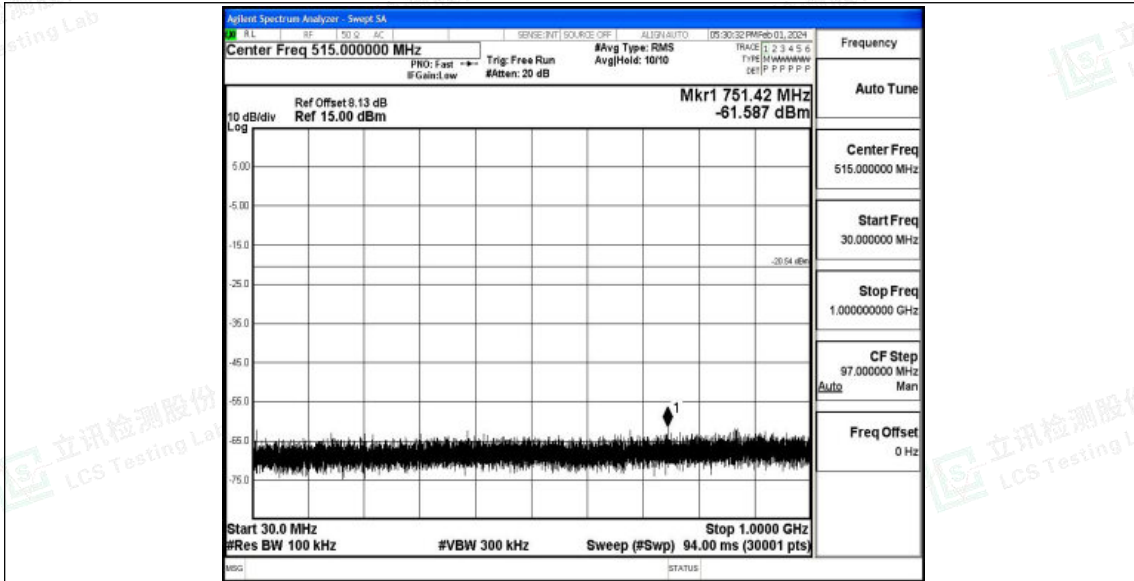


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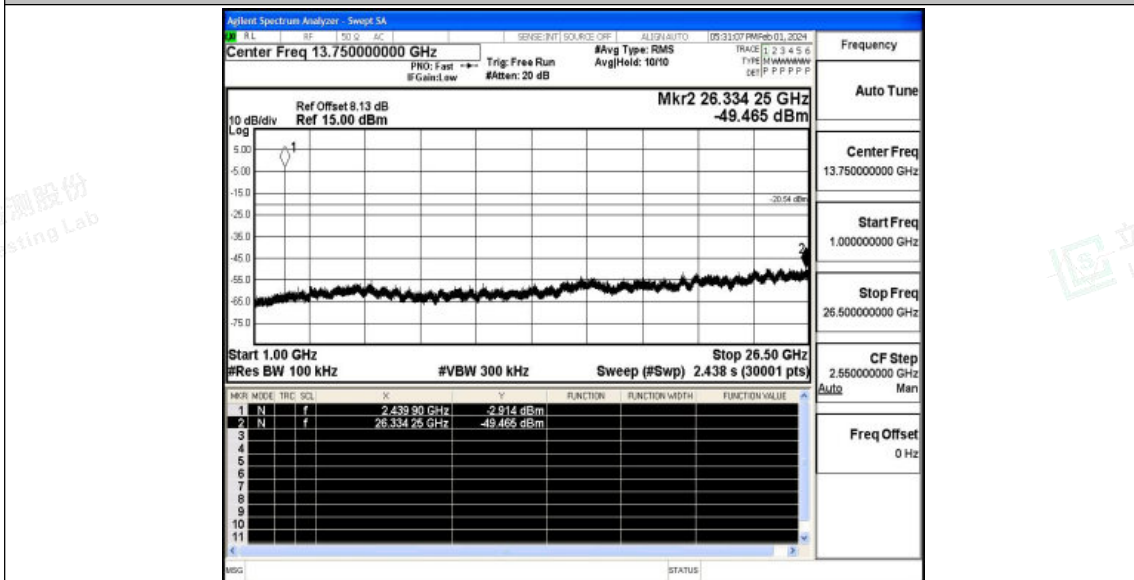
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BLE\_2M\_Ant1\_2440\_1000~26500



BLE\_2M\_Ant1\_2480\_30~1000

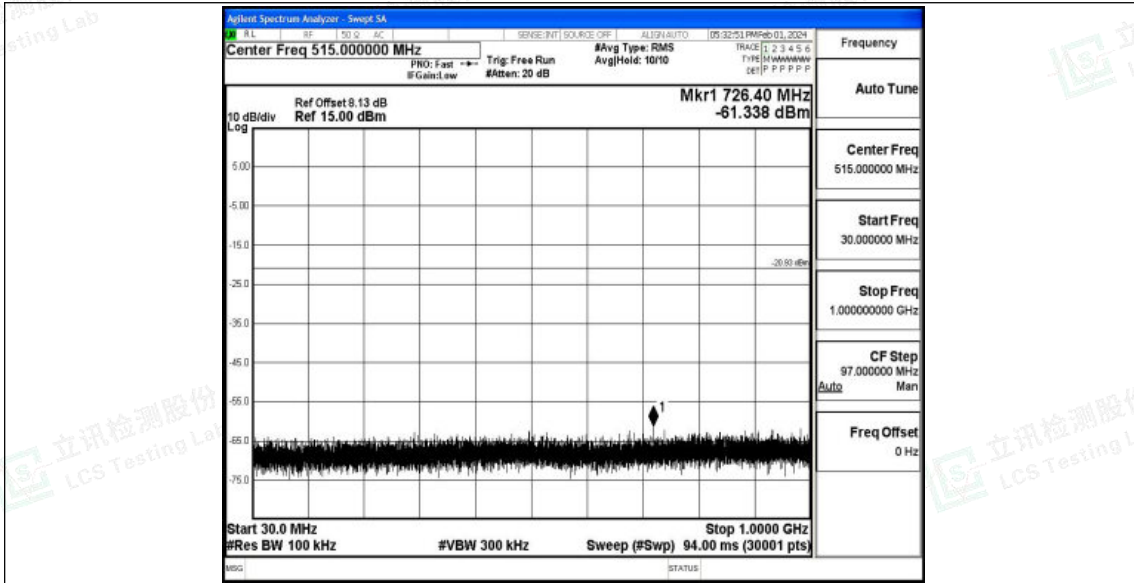


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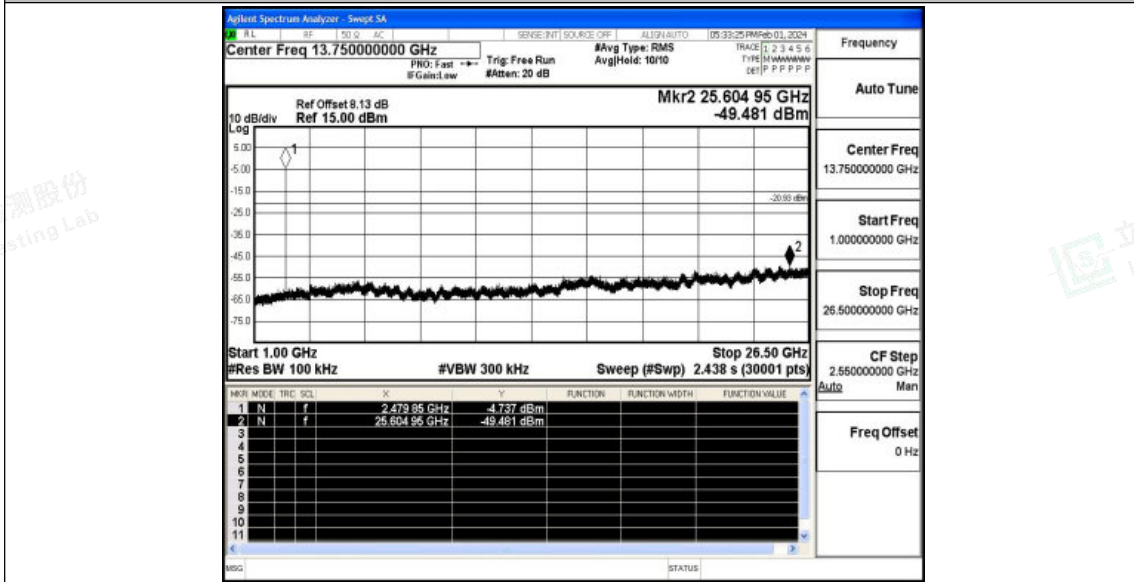
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BLE\_2M\_Ant1\_2480\_1000~26500



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## Reference level measurement

### Test Result

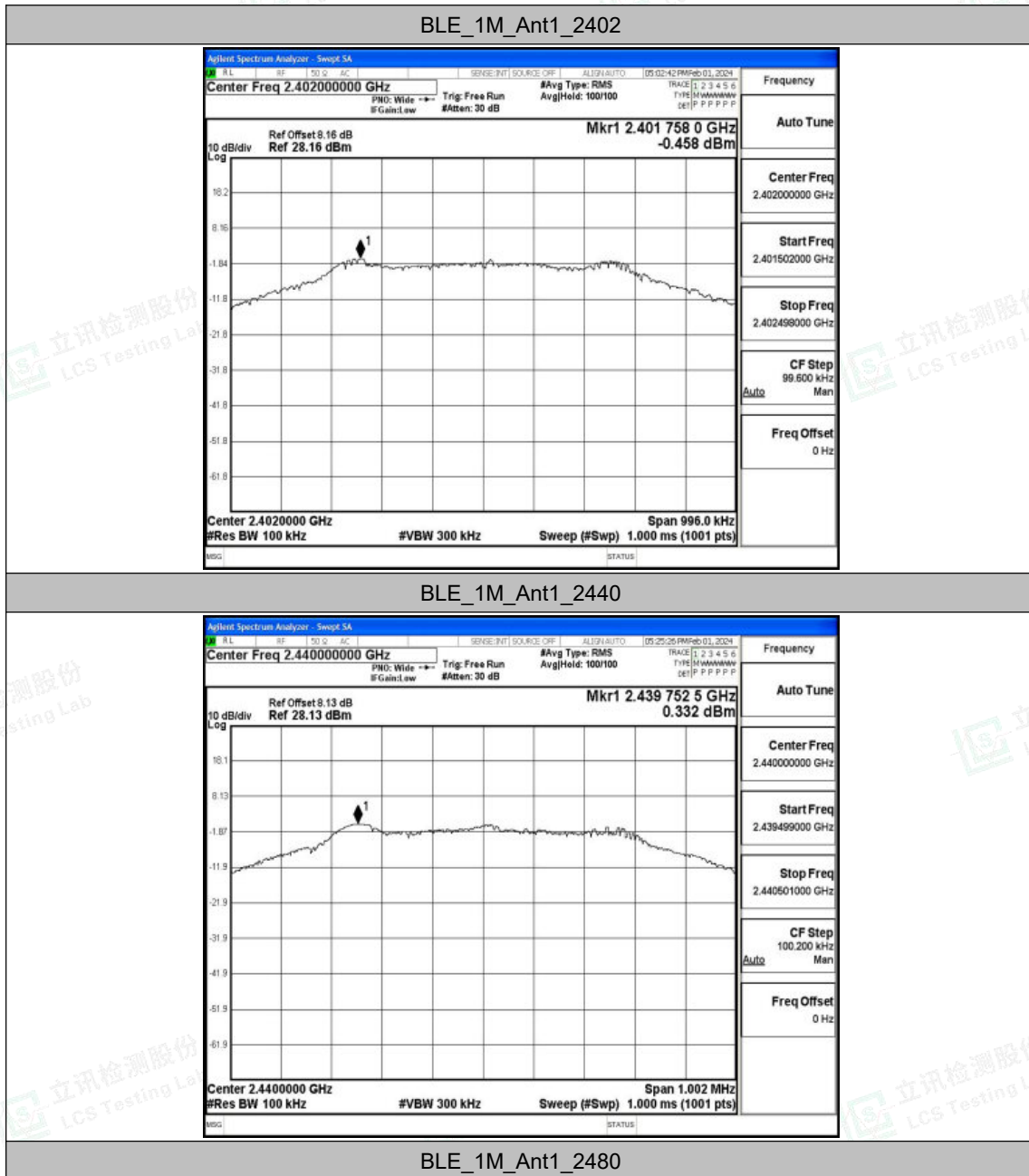
TestMode	Antenna	Freq(MHz)	Max.Point[MHz]	Result[dBm]
BLE_1M	Ant1	2402	2401.76	-0.46
		2440	2439.75	0.33
		2480	2479.75	-0.69
BLE_2M	Ant1	2402	2401.49	-0.87
		2440	2439.99	-0.54
		2480	2479.51	-0.93



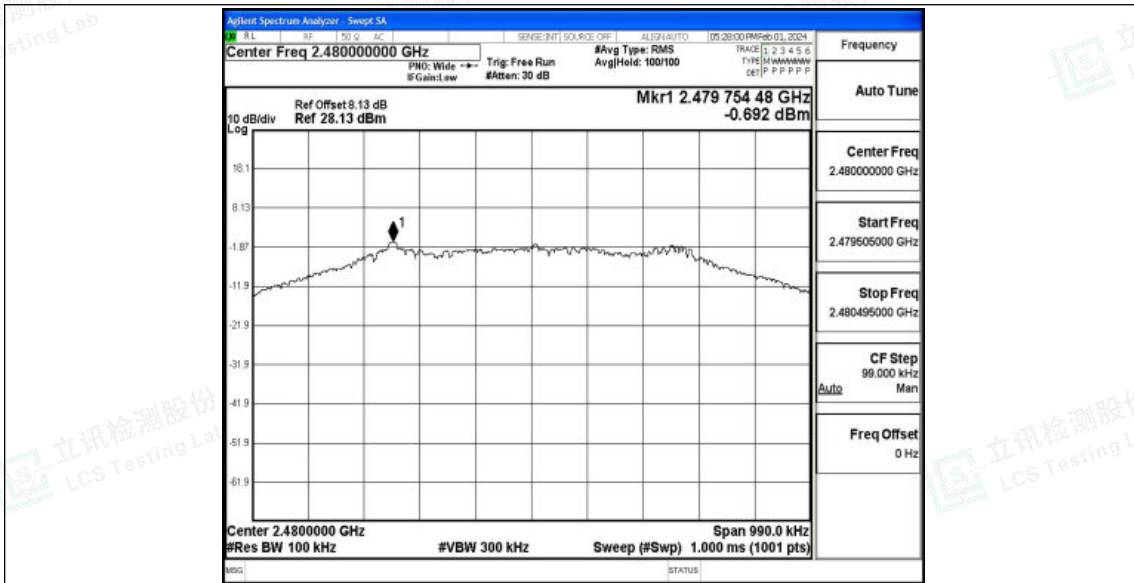
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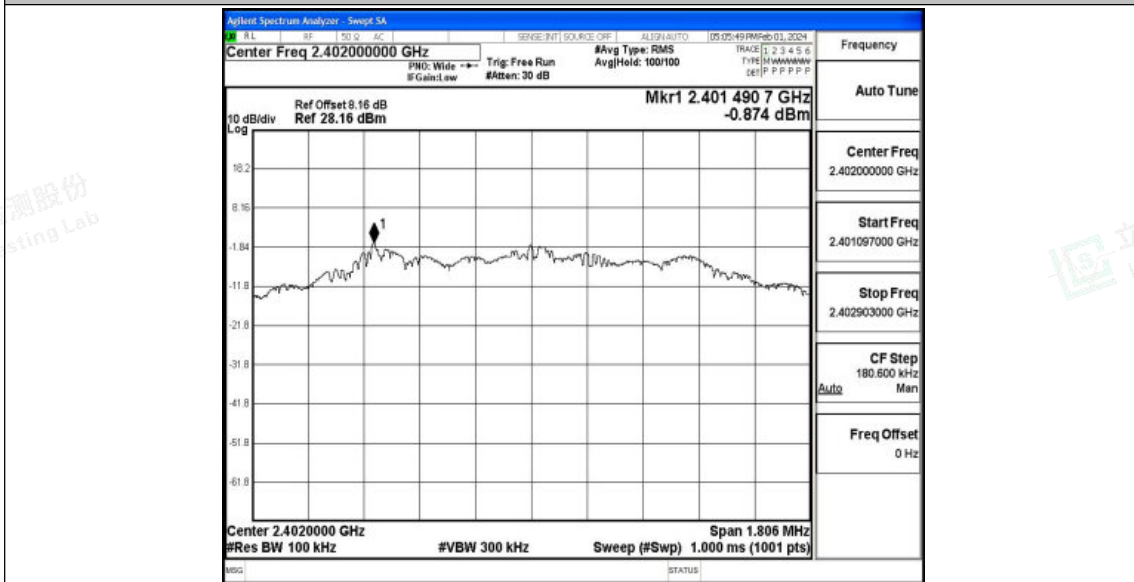
### Test Graphs



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BLE\_2M\_Ant1\_2402

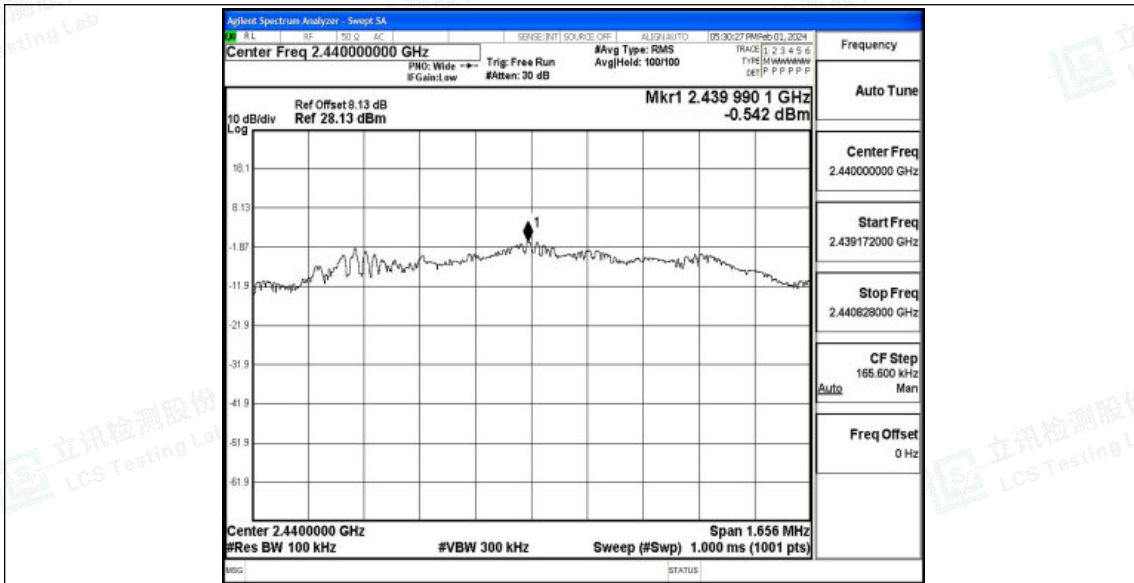


BLE\_2M\_Ant1\_2440

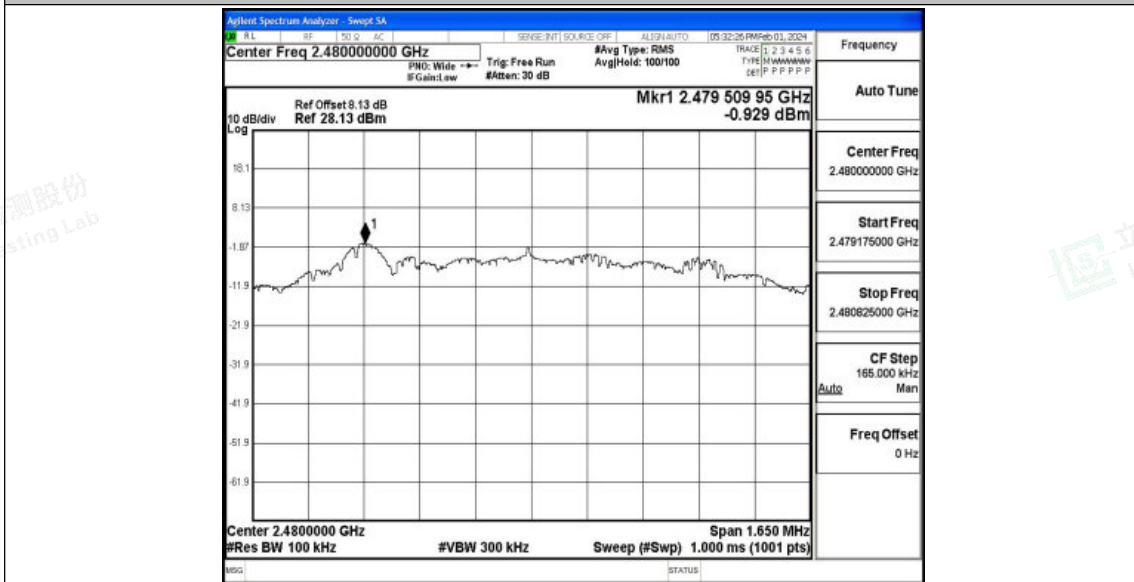


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BLE\_2M\_Ant1\_2480



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## A.6 Duty Cycle

### Test Result

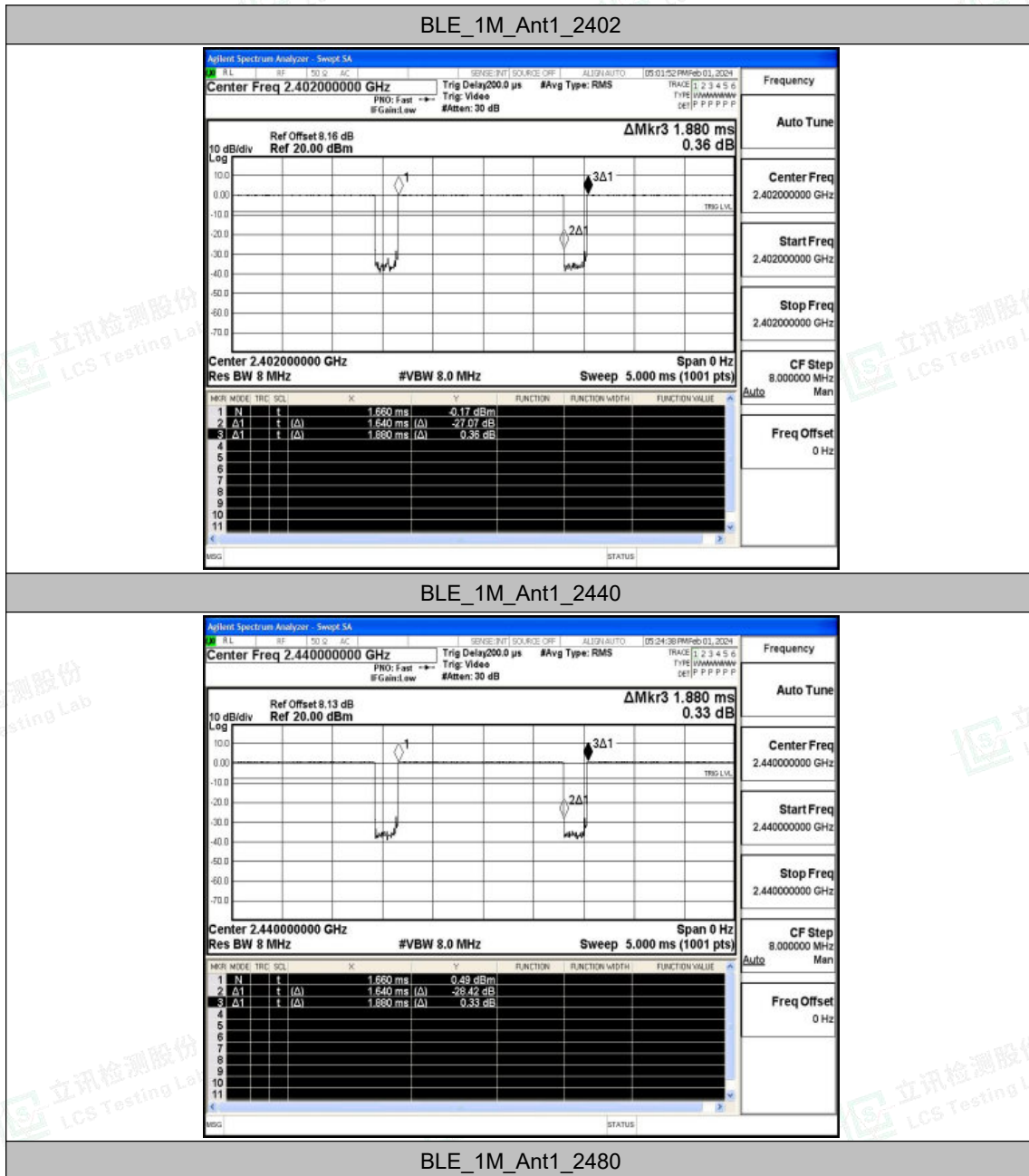
TestMode	Antenna	Frequency[MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor[dB]	1/T Factor[dB]
BLE_1M	Ant1	2402	1.64	1.88	87.23	0.59	0.61
		2440	1.64	1.88	87.23	0.59	0.61
		2480	1.64	1.88	87.23	0.59	0.61
BLE_2M	Ant1	2402	0.83	1.25	66.40	1.78	1.20
		2440	0.83	1.25	66.40	1.78	1.20
		2480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



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### Test Graphs

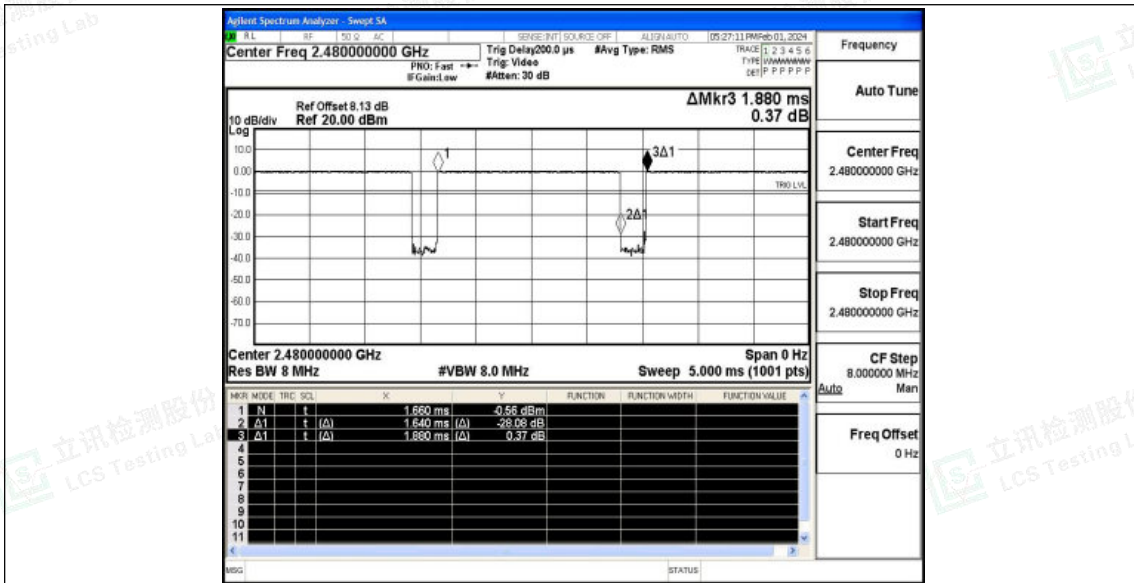


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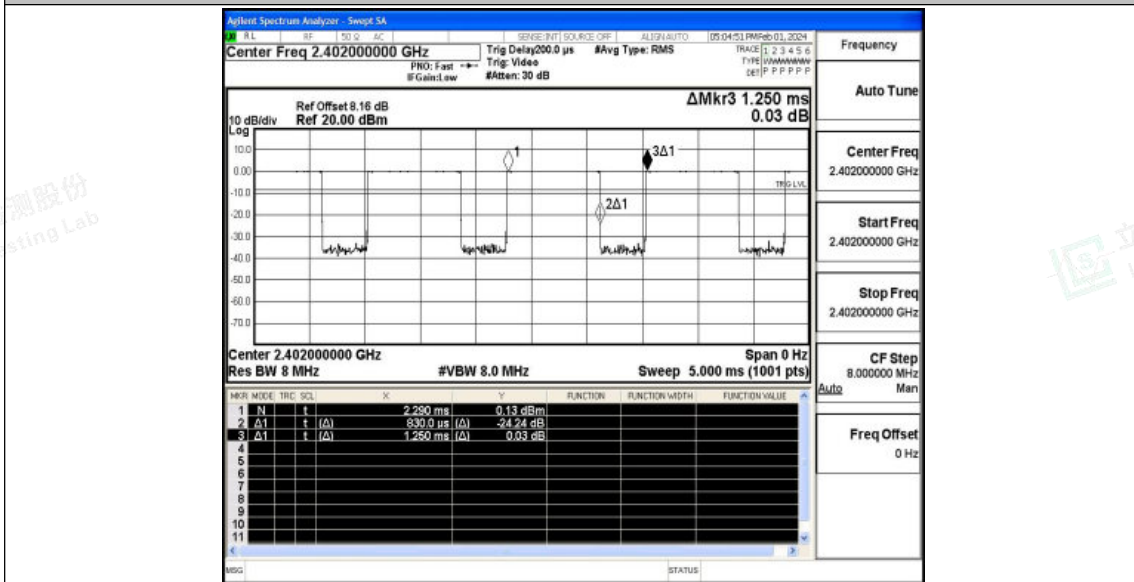
Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

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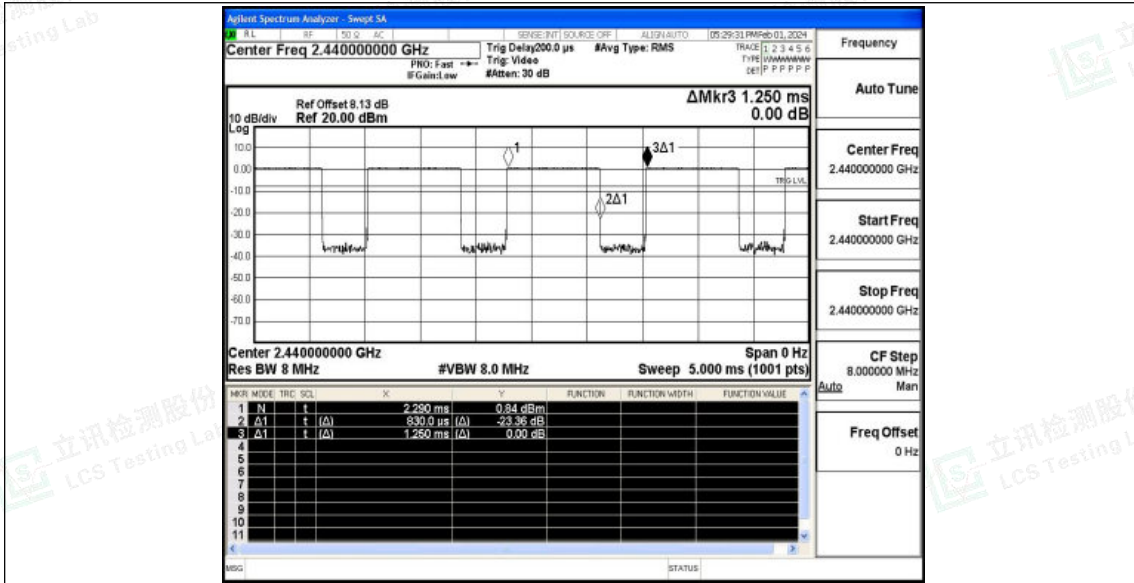


BLE\_2M\_Ant1\_2402

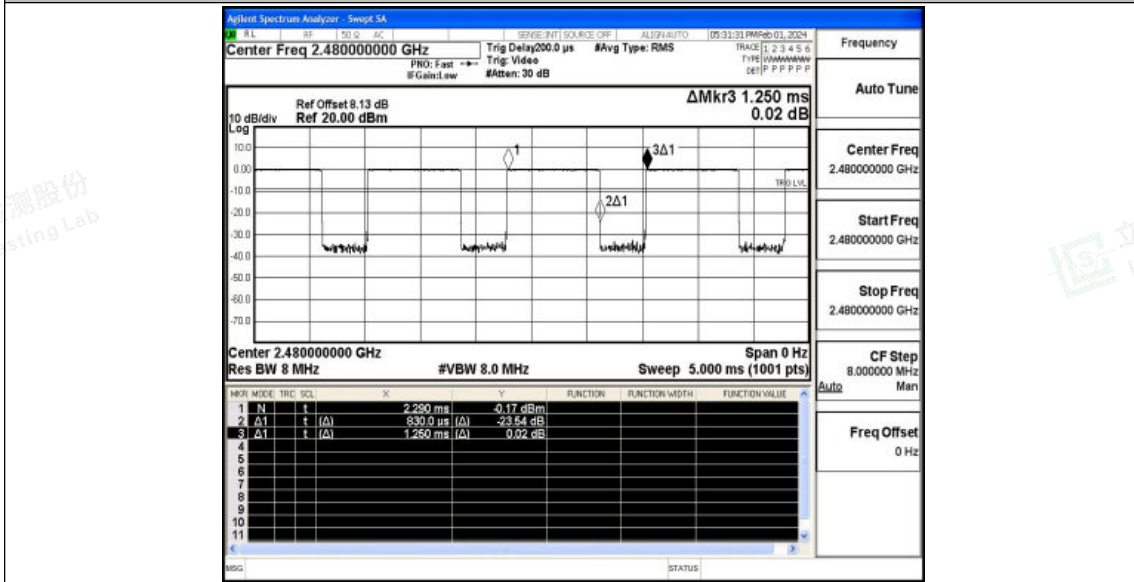


BLE\_2M\_Ant1\_2440





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	-49.1	≤-41.20	46.10	≤54	PASS
				AV	2484.720	-48.33	≤-41.20	46.87	≤54	PASS
				AV	2500.000	-48.83	≤-41.20	46.37	≤54	PASS
				Peak	2483.500	-42.07	≤-21.20	53.13	≤74	PASS
				Peak	2488.000	-39.09	≤-21.20	56.11	≤74	PASS
				Peak	2500.000	-41.08	≤-21.20	54.12	≤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	-47.91	≤-41.20	47.29	≤54	PASS
				AV	2483.680	-47.17	≤-41.20	48.03	≤54	PASS
				AV	2500.000	-47.84	≤-41.20	47.36	≤54	PASS
				Peak	2483.500	-41.25	≤-21.20	53.95	≤74	PASS
				Peak	2485.040	-39.33	≤-21.20	55.87	≤74	PASS
				Peak	2500.000	-41.61	≤-21.20	53.59	≤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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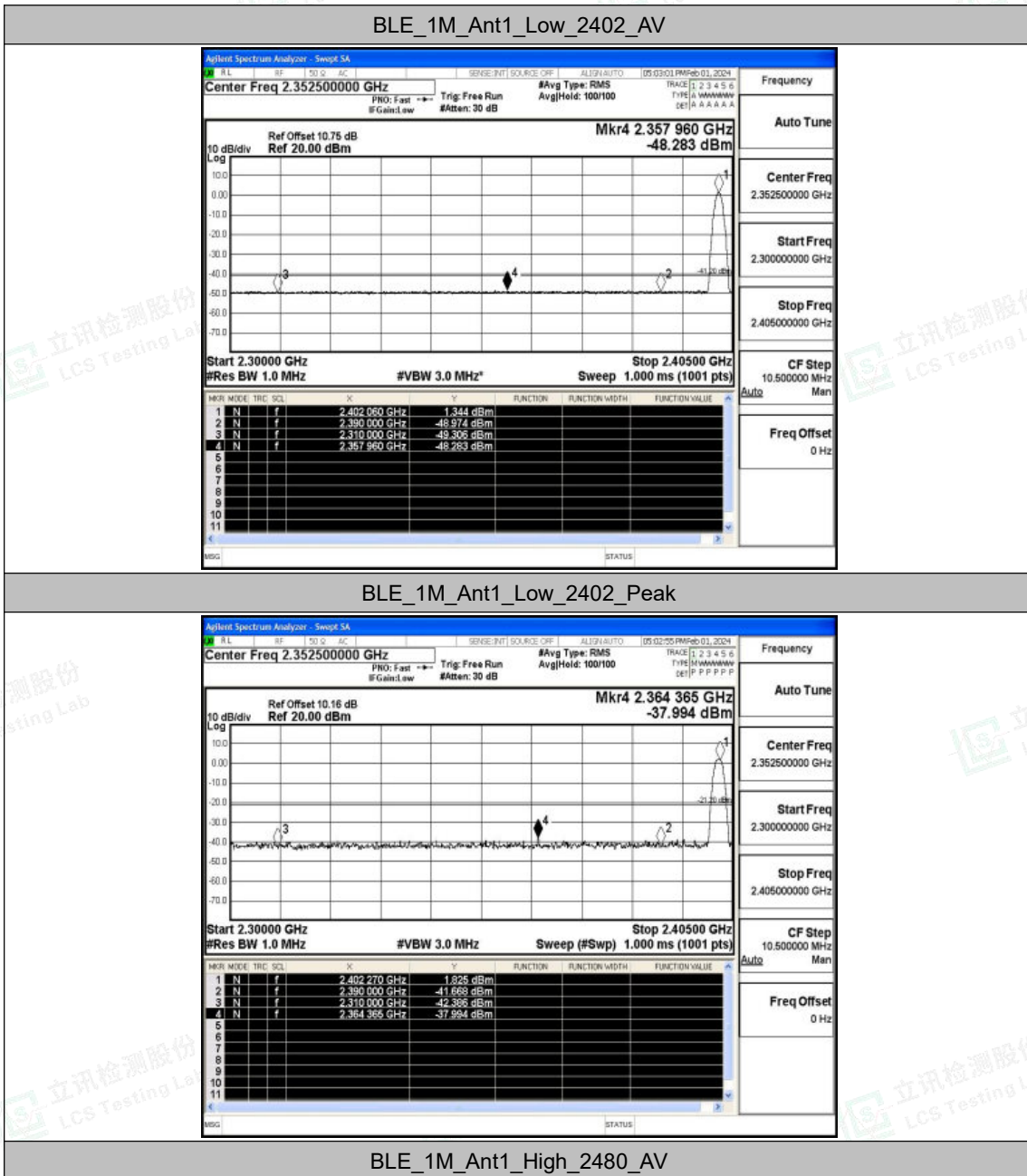
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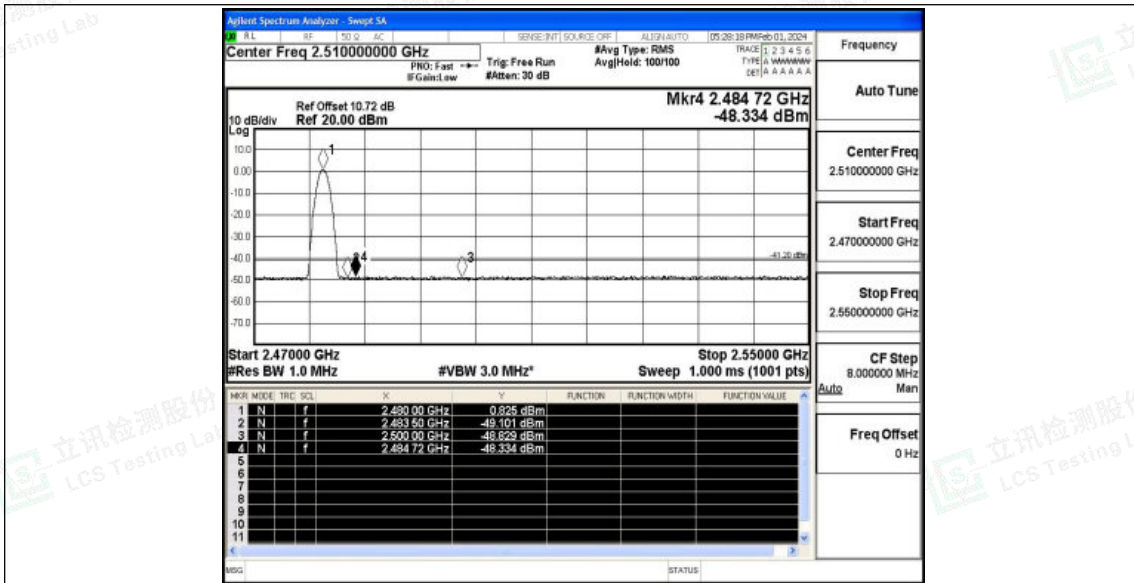




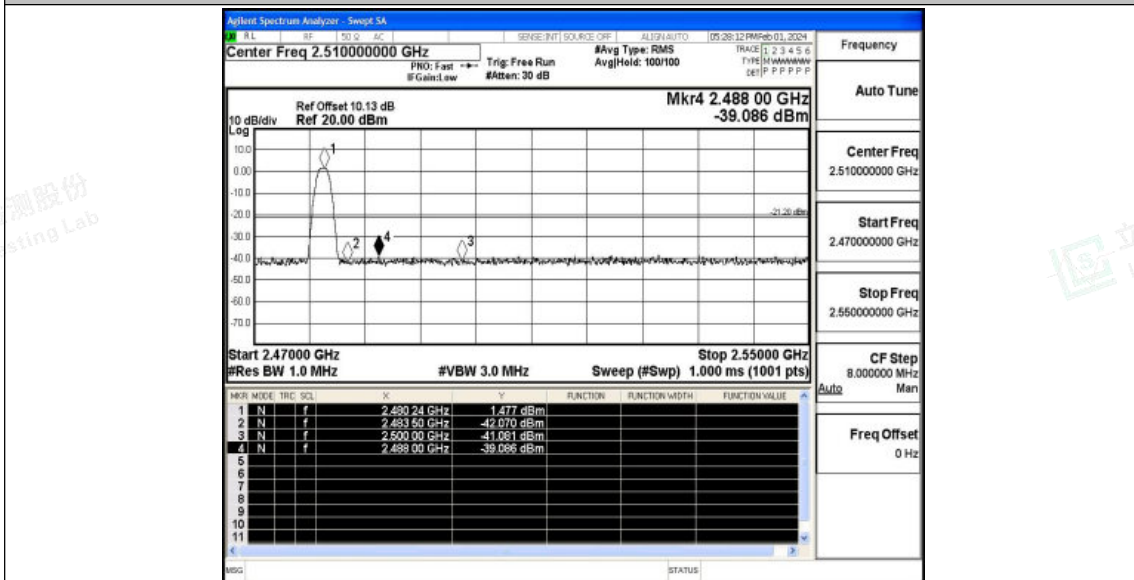
### Test Graphs



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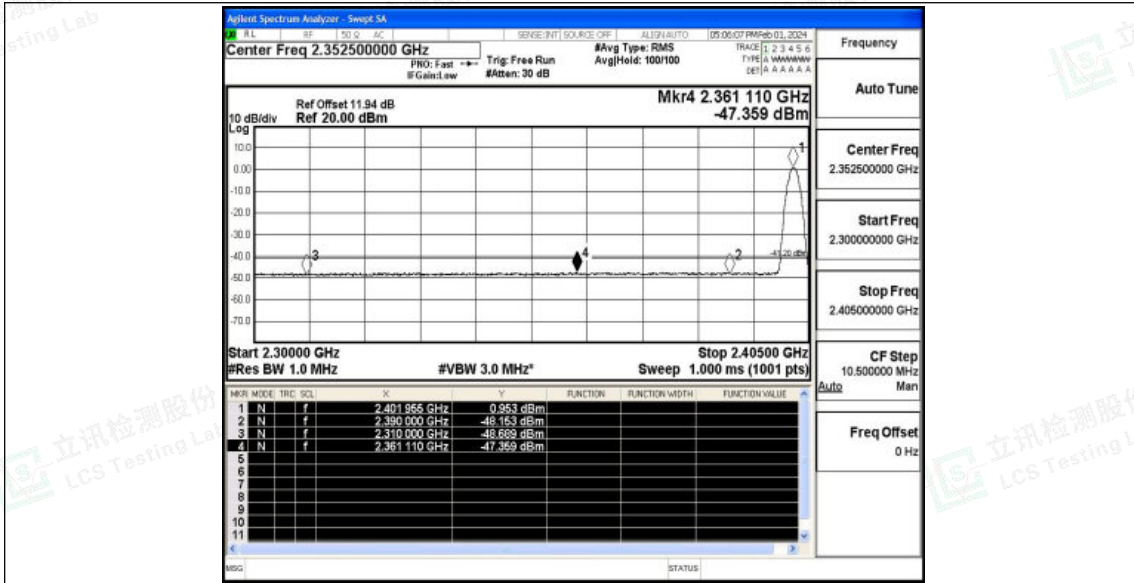
BLE\_1M\_Ant1\_High\_2480\_Peak



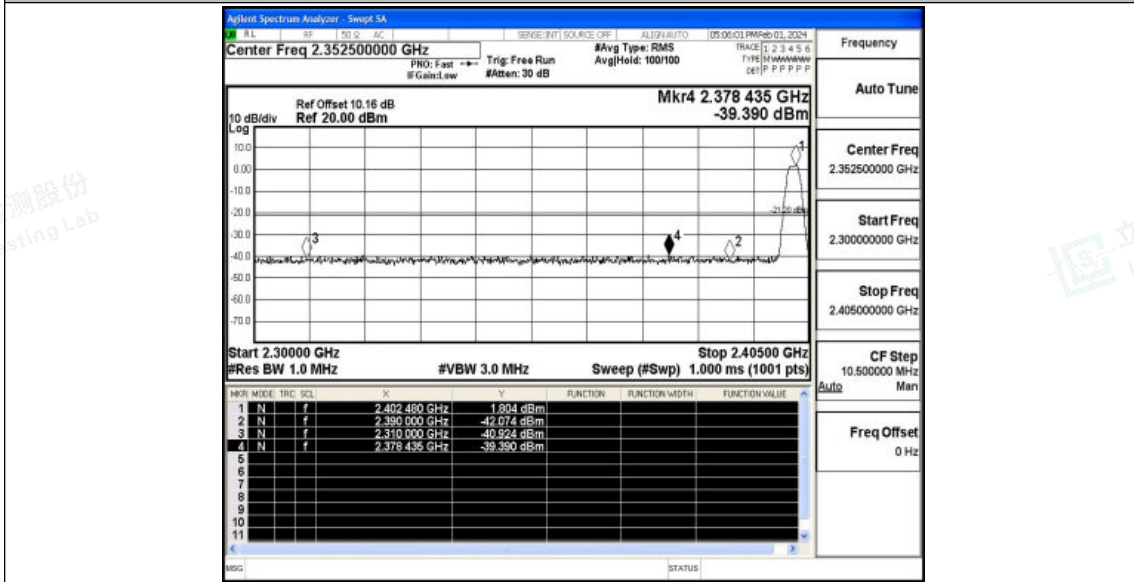
BLE\_2M\_Ant1\_Low\_2402\_AV



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BLE\_2M\_Ant1\_Low\_2402\_Peak



BLE\_2M\_Ant1\_High\_2480\_AV

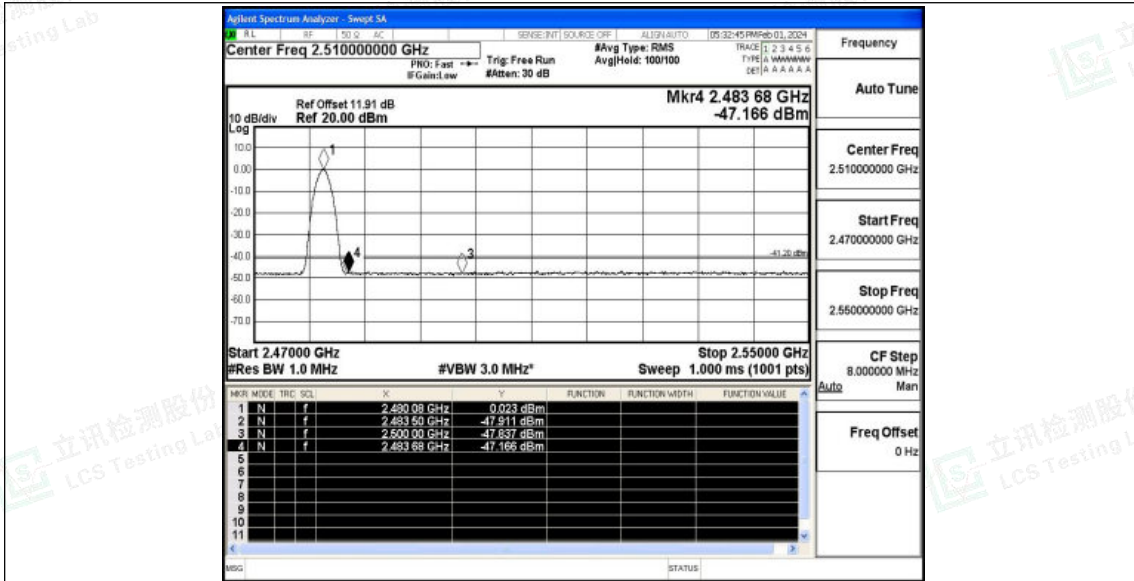


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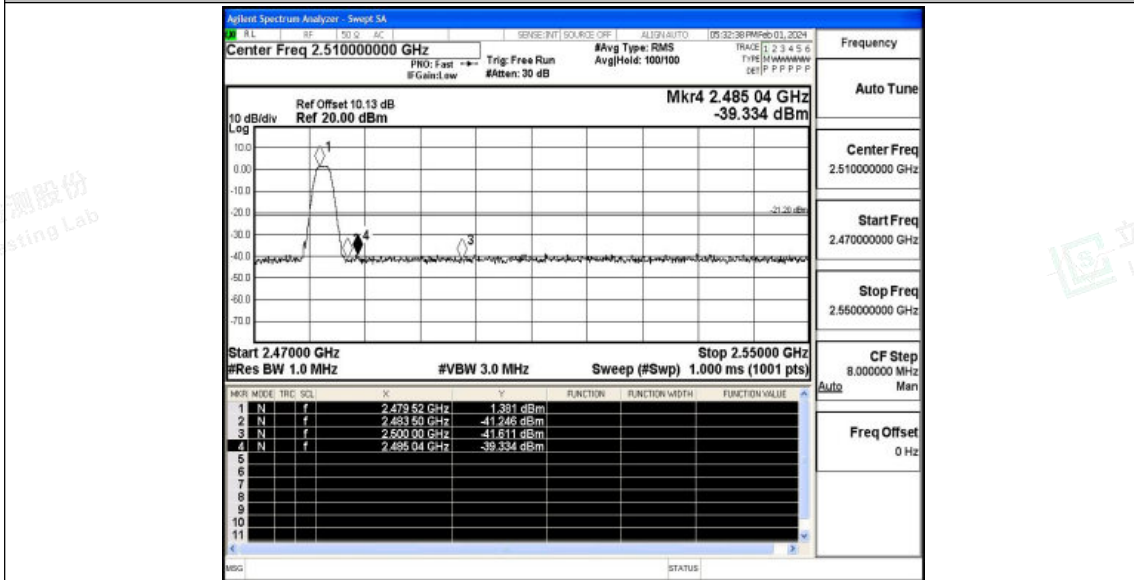
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BLE\_2M\_Ant1\_High\_2480\_Peak



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