



Appendix B

RF Test Data for BLE (Conducted Measurement)

Product Name: LEGENDS PINBALL MICRO

Test Model: HA8818

Environmental Conditions

Temperature:	23.5° C
Relative Humidity:	52.2%
ATM Pressure:	100.0 kPa
Test Engineer:	<i>Taylor Hu</i> Taylor Hu
Supervised by:	<i>Li huan</i> Li huan



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B.1 DTS Bandwidth

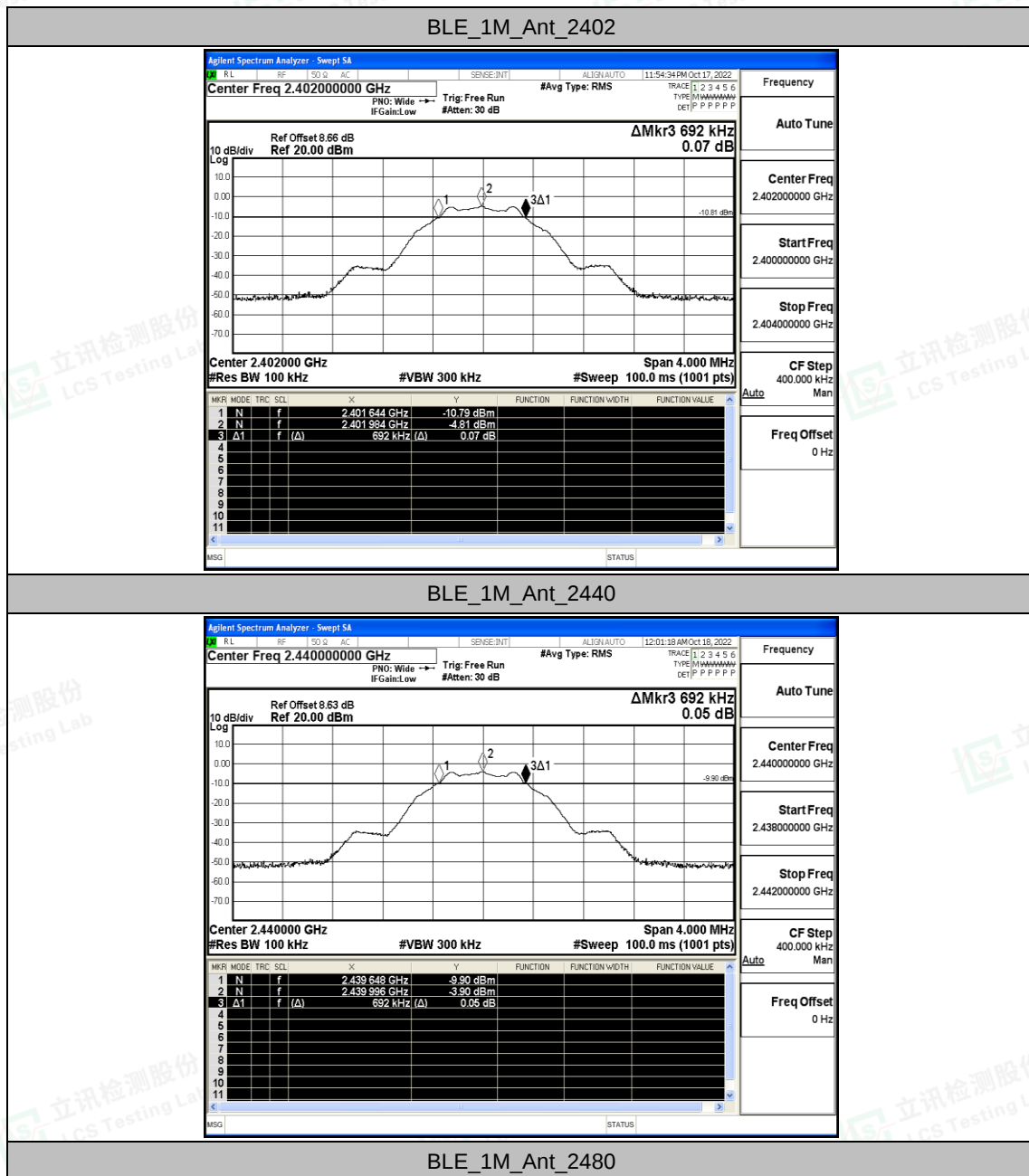
Test Result

TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant	2402	0.692	2401.644	2402.336	0.5	PASS
		2440	0.692	2439.648	2440.340	0.5	PASS
		2480	0.696	2479.644	2480.340	0.5	PASS
BLE_2M	Ant	2402	1.144	2401.428	2402.572	0.5	PASS
		2440	1.144	2439.428	2440.572	0.5	PASS
		2480	1.144	2479.428	2480.572	0.5	PASS





Test Graphs

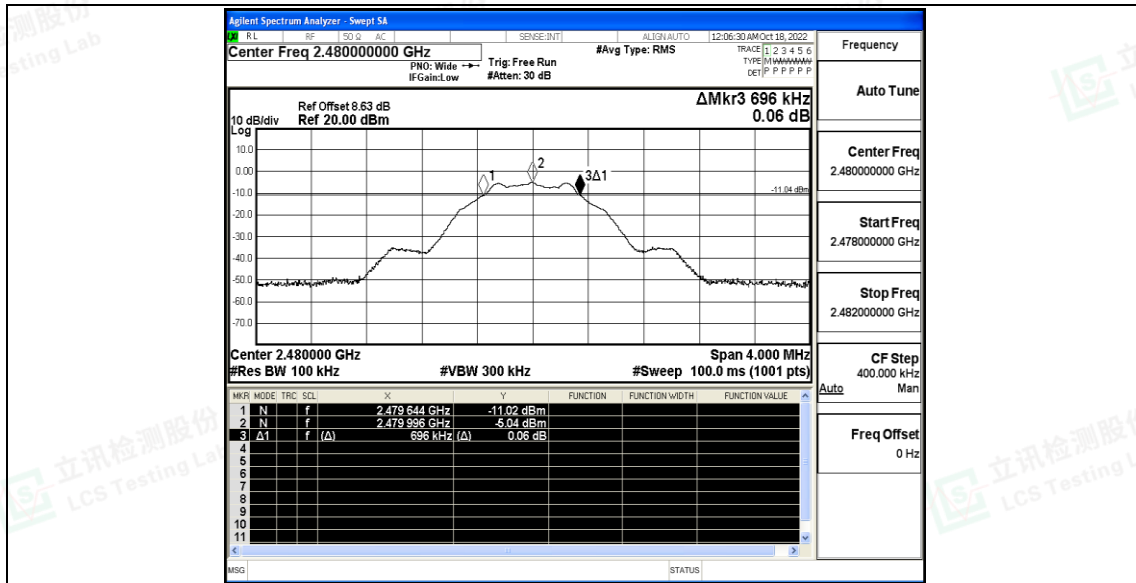


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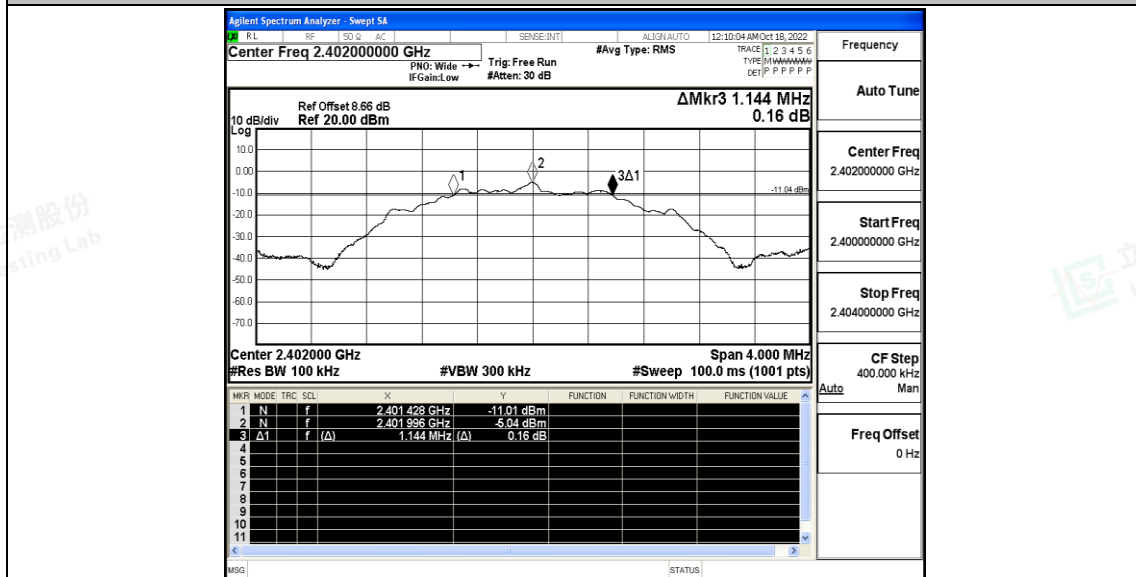
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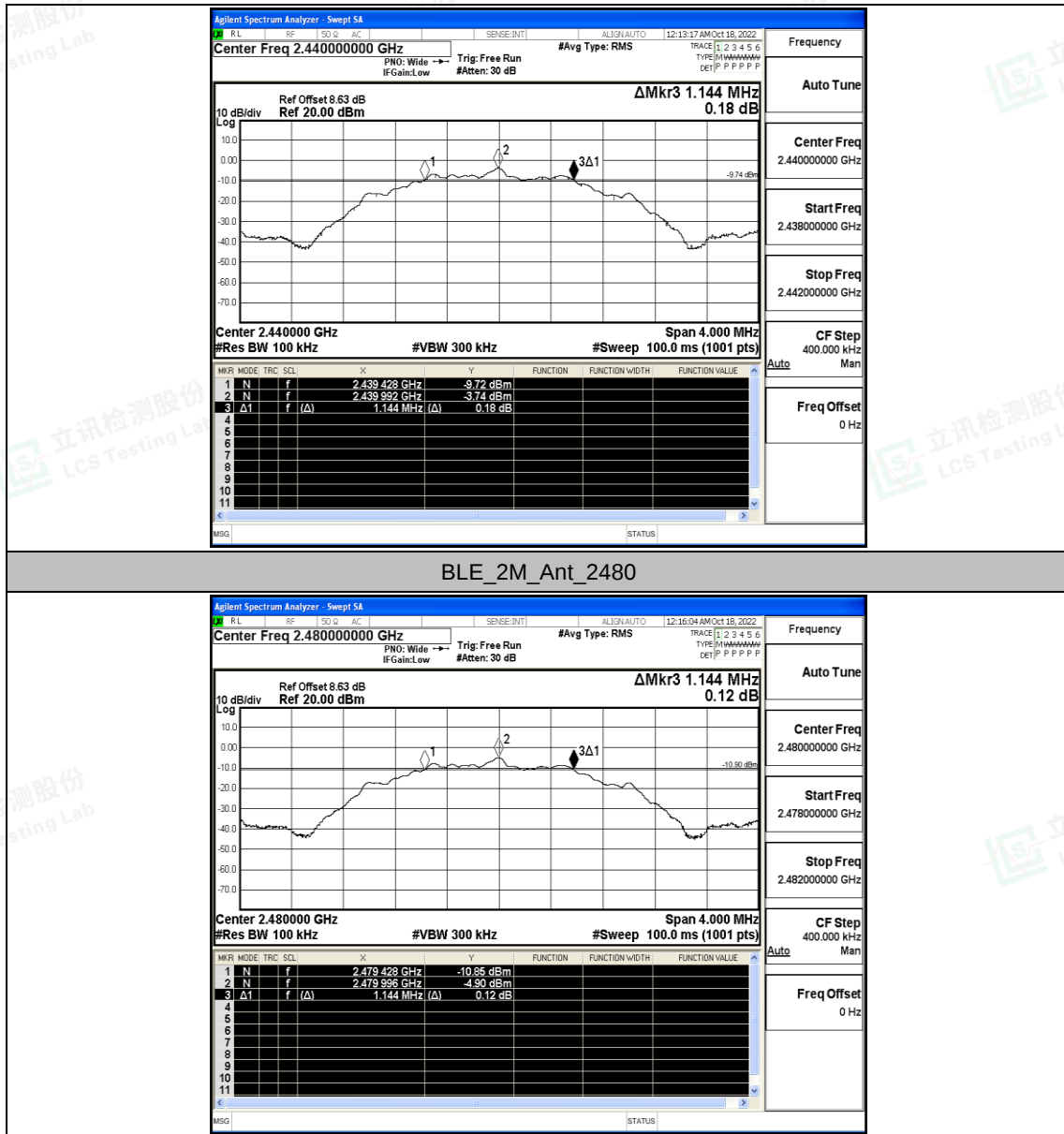


BLE_2M_Ant_2402



BLE_2M_Ant_2440





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B.2 Maximum conducted output power

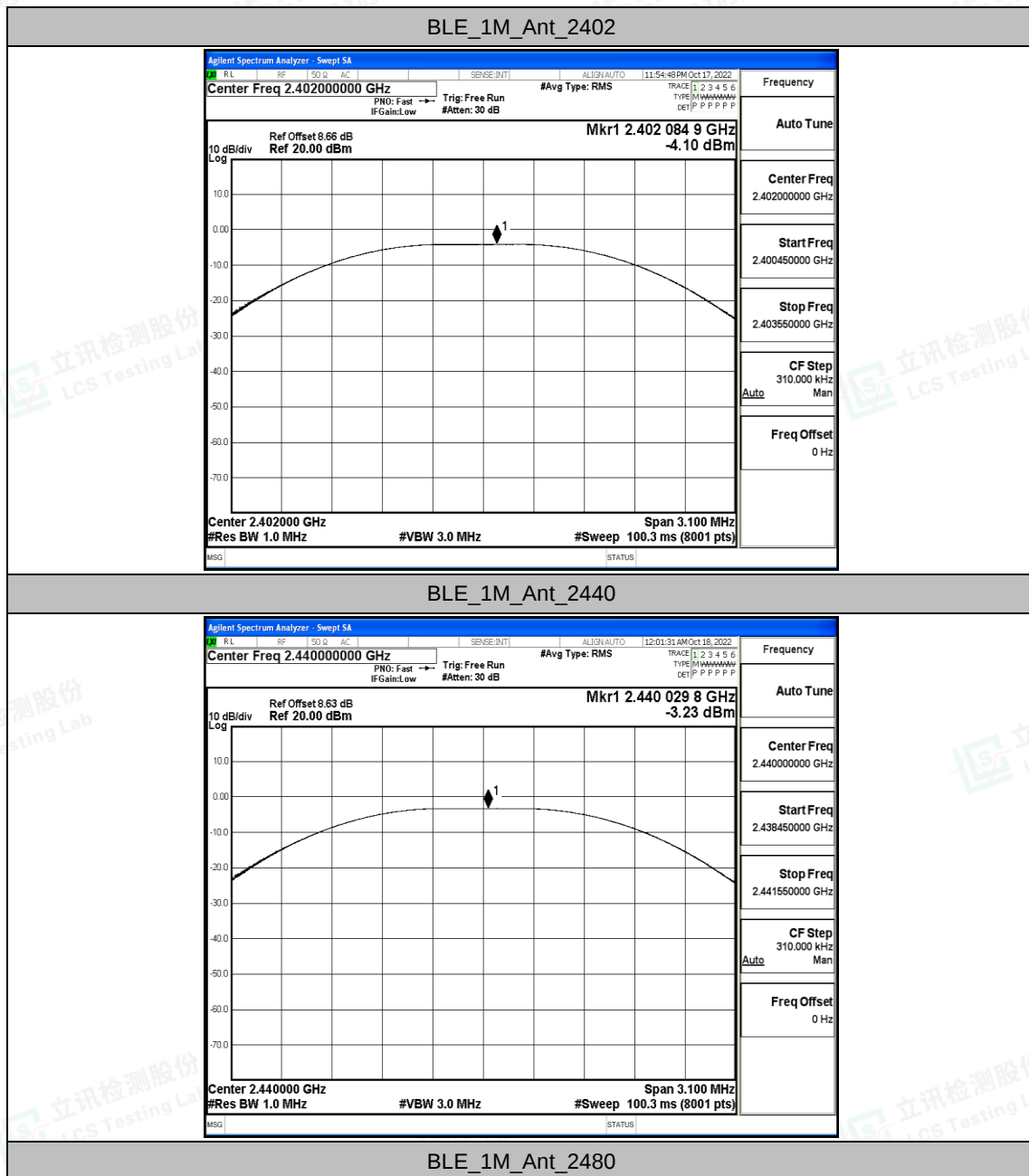
Test Result

TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant	2402	-4.10	≤30	PASS
		2440	-3.24	≤30	PASS
		2480	-4.37	≤30	PASS
BLE_2M	Ant	2402	-4.24	≤30	PASS
		2440	-2.99	≤30	PASS
		2480	-4.10	≤30	PASS





Test Graphs

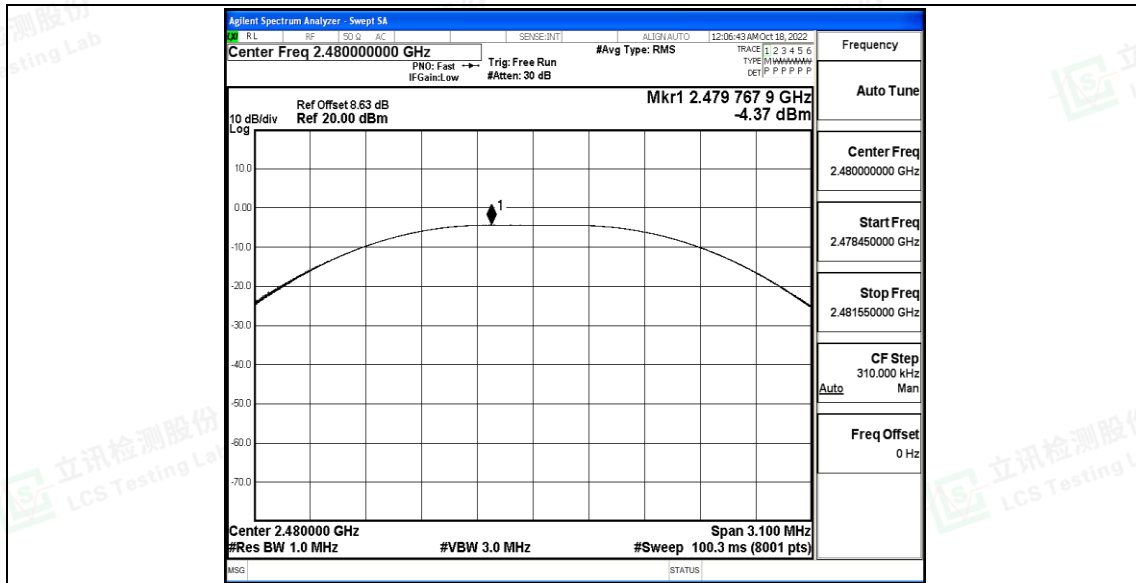


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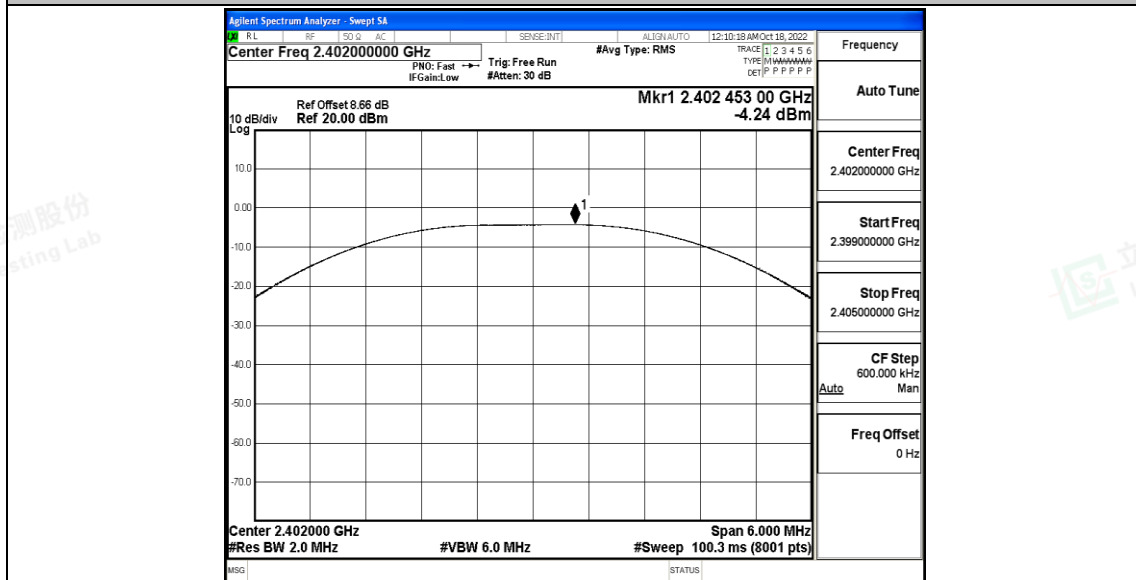
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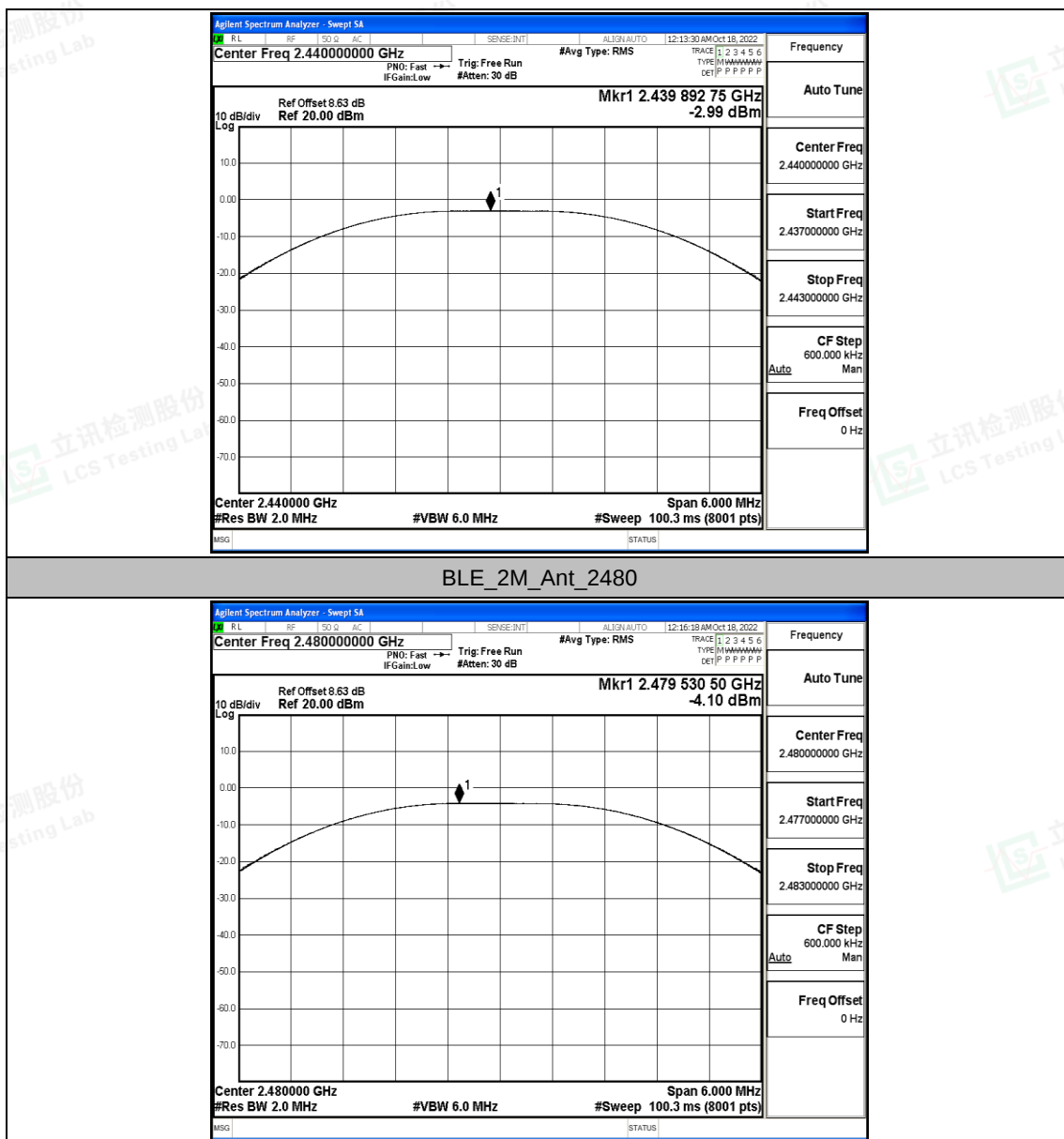


BLE_2M_Ant_2402



BLE_2M_Ant_2440







B.3 Maximum power spectral density

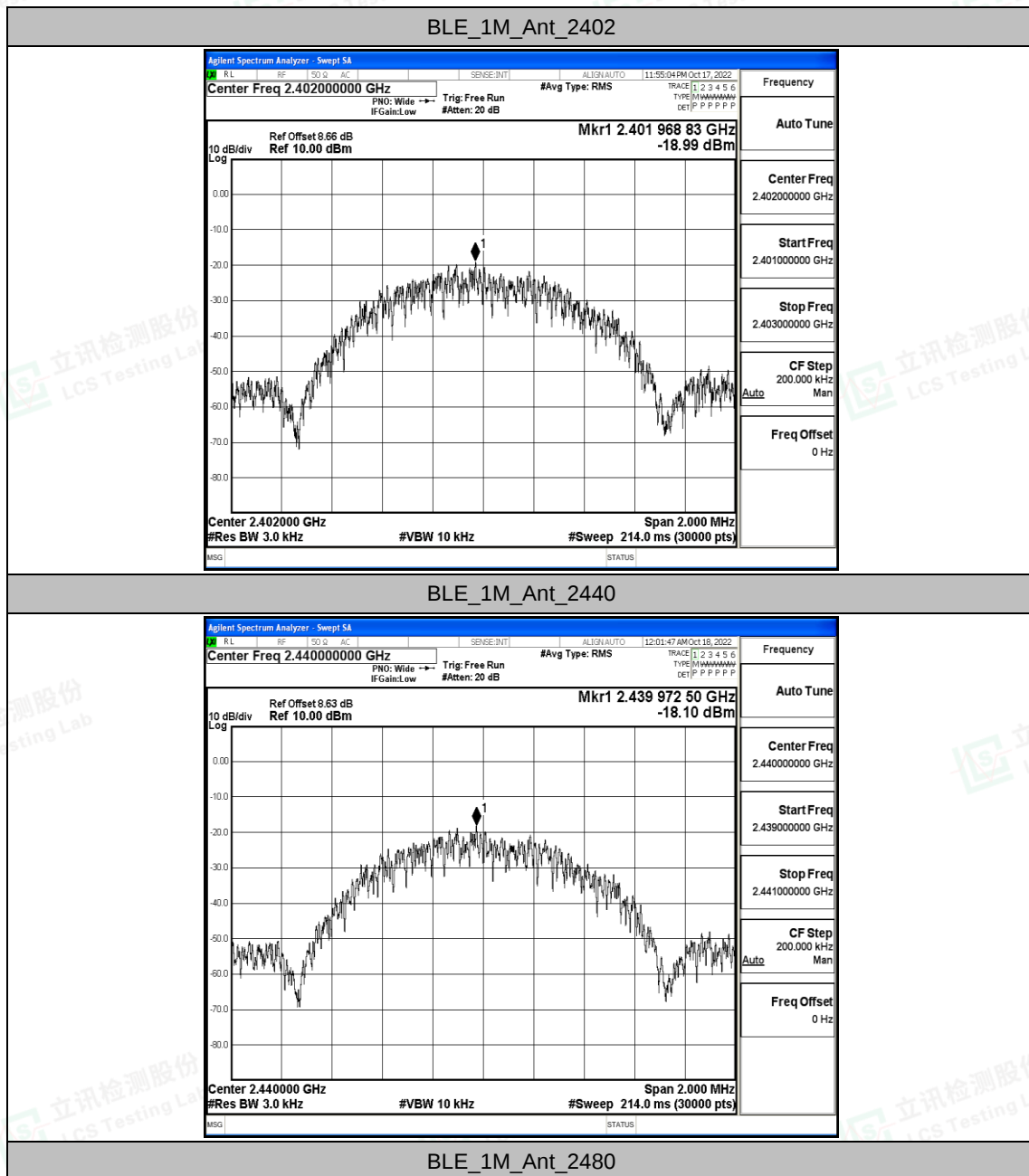
Test Result

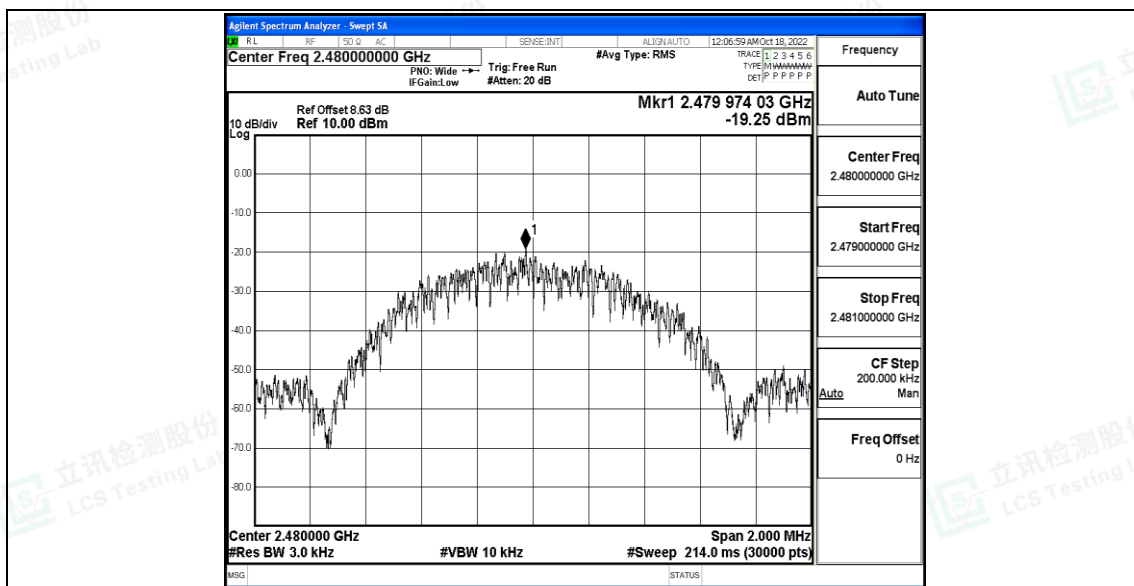
TestMode	Antenna	Channel	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant	2402	-18.99	≤8.00	PASS
		2440	-18.10	≤8.00	PASS
		2480	-19.25	≤8.00	PASS
BLE_2M	Ant	2402	-21.41	≤8.00	PASS
		2440	-20.13	≤8.00	PASS
		2480	-21.35	≤8.00	PASS



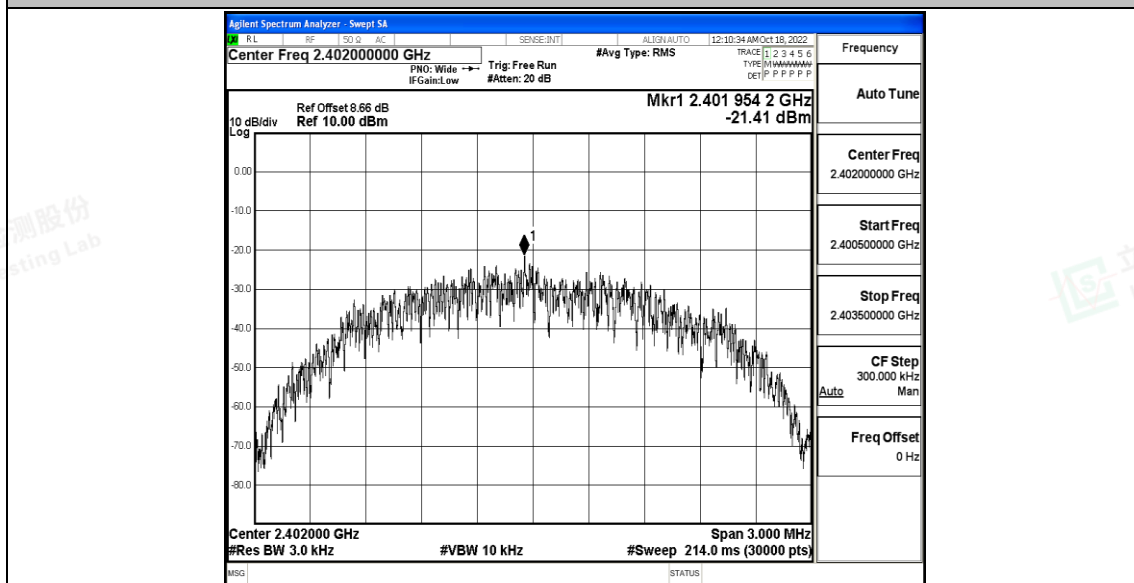


Test Graphs



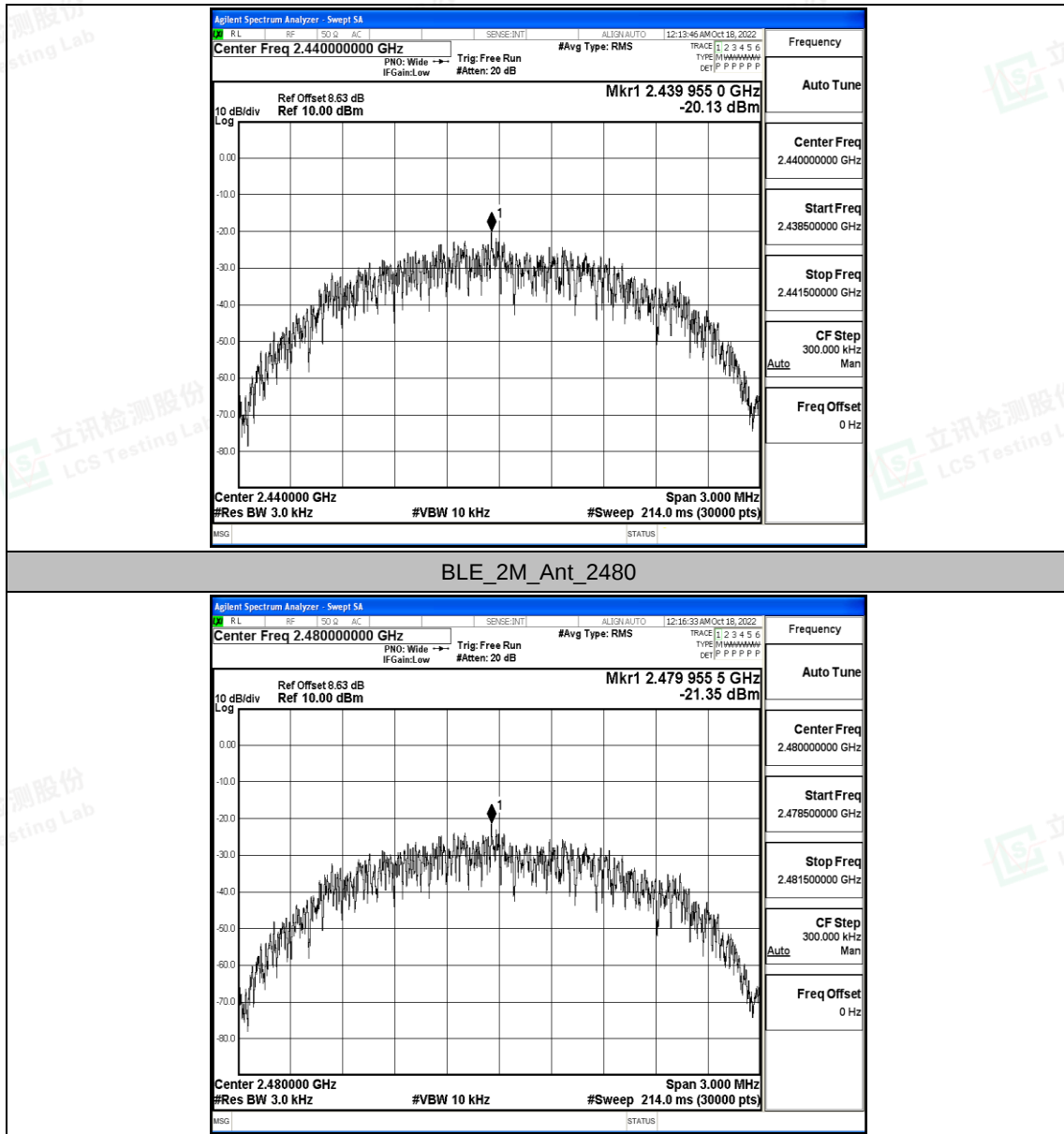


BLE_2M_Ant_2402



BLE_2M_Ant_2440







B.4 Band edge measurements

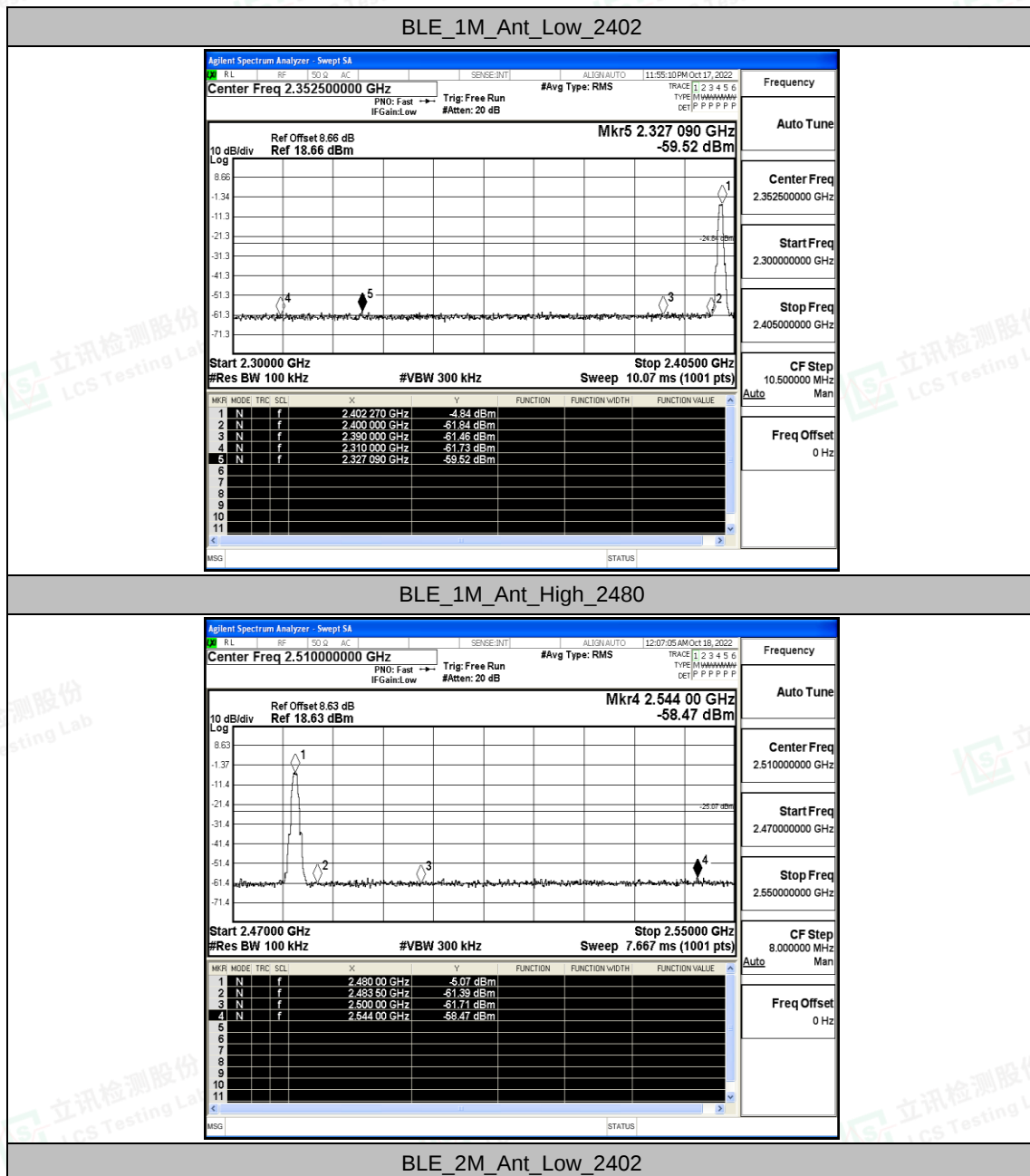
Test Result

TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant	Low	2402	-4.84	-59.52	≤-24.84	PASS
		High	2480	-5.07	-58.47	≤-25.07	PASS
BLE_2M	Ant	Low	2402	-7.82	-41.06	≤-27.82	PASS
		High	2480	-6.27	-58.32	≤-26.27	PASS





Test Graphs



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B.5 Conducted Spurious Emission

Test Result

TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant	2402	Reference	-5.03	-5.03	---	PASS
			30~1000	-5.03	-60.49	≤-25.03	PASS
			1000~26500	-5.03	-45.8	≤-25.03	PASS
		2440	Reference	-4.57	-4.57	---	PASS
			30~1000	-4.57	-60.62	≤-24.57	PASS
			1000~26500	-4.57	-46.45	≤-24.57	PASS
		2480	Reference	-5.09	-5.09	---	PASS
			30~1000	-5.09	-60	≤-25.09	PASS
			1000~26500	-5.09	-45.76	≤-25.09	PASS
BLE_2M	Ant	2402	Reference	-6.21	-6.21	---	PASS
			30~1000	-6.21	-60.96	≤-26.21	PASS
			1000~26500	-6.21	-46.74	≤-26.21	PASS
		2440	Reference	-7.20	-7.20	---	PASS
			30~1000	-7.20	-60.09	≤-27.2	PASS
			1000~26500	-5.31	-46.09	≤-25.31	PASS
		2480	Reference	-4.90	-4.90	---	PASS
			30~1000	-4.90	-60.91	≤-24.9	PASS
			1000~26500	-4.90	-46.02	≤-24.9	PASS



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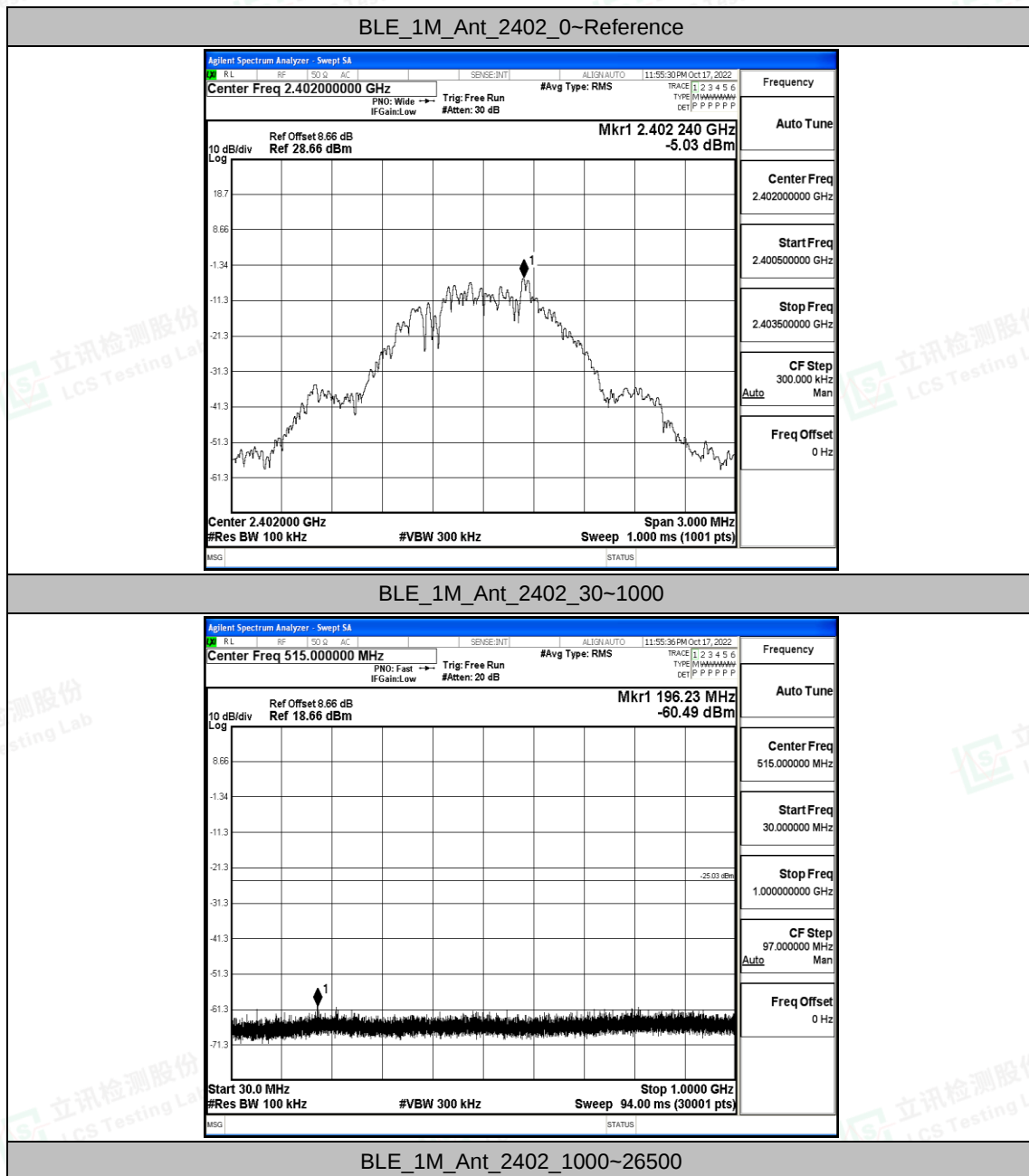
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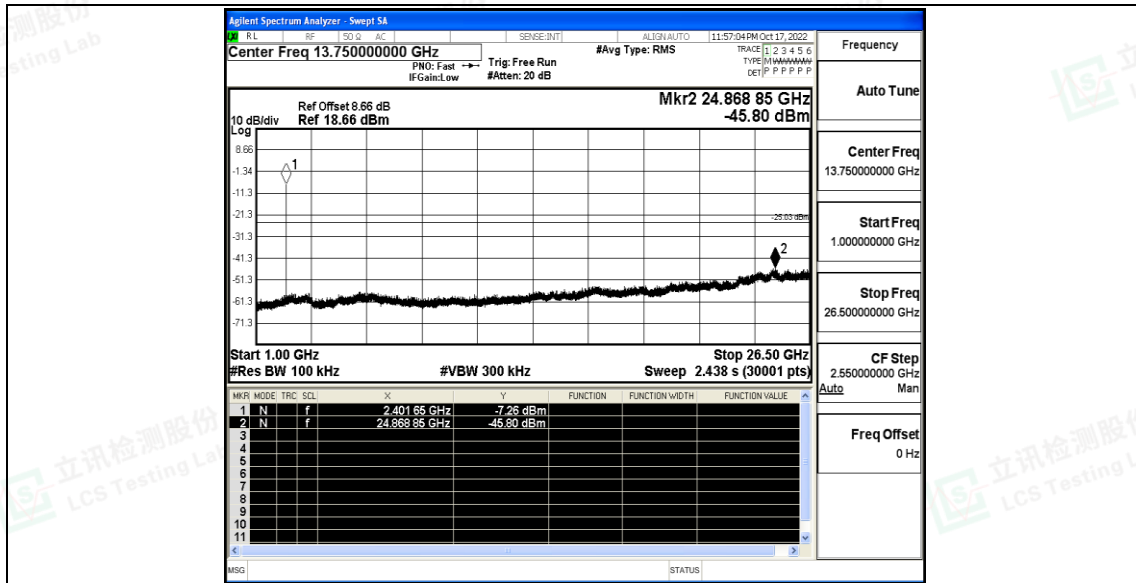
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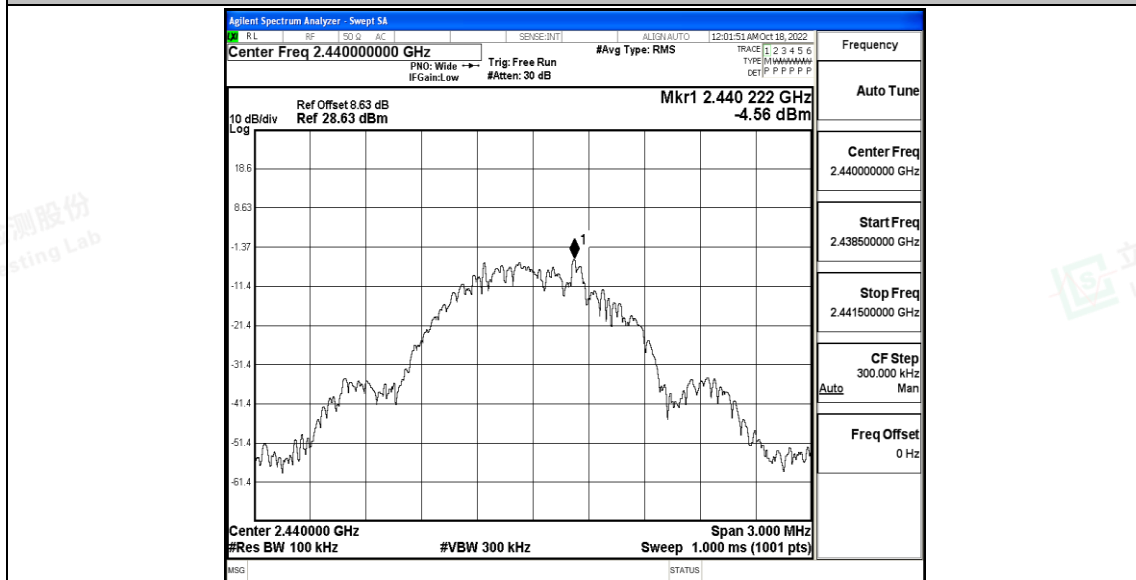


Test Graphs



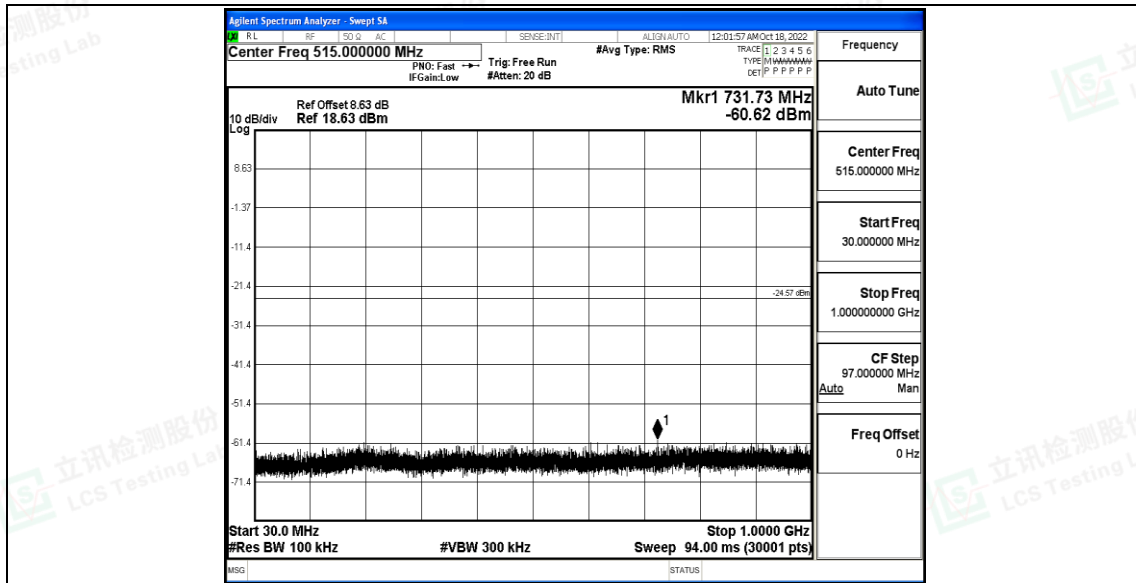


BLE_1M_Ant_2440_0~Reference

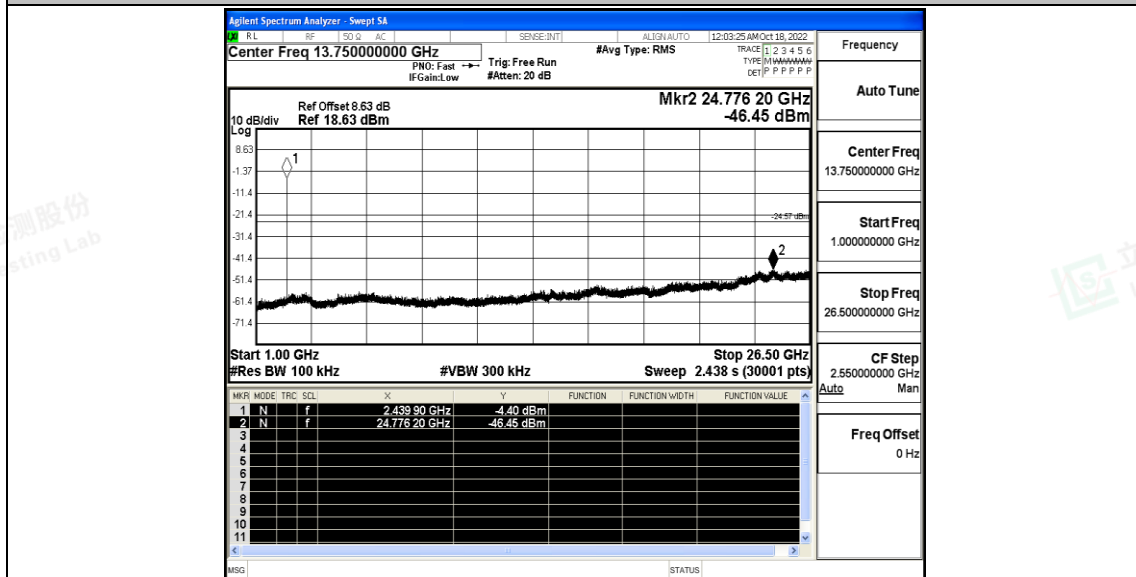


BLE_1M_Ant_2440_30~1000



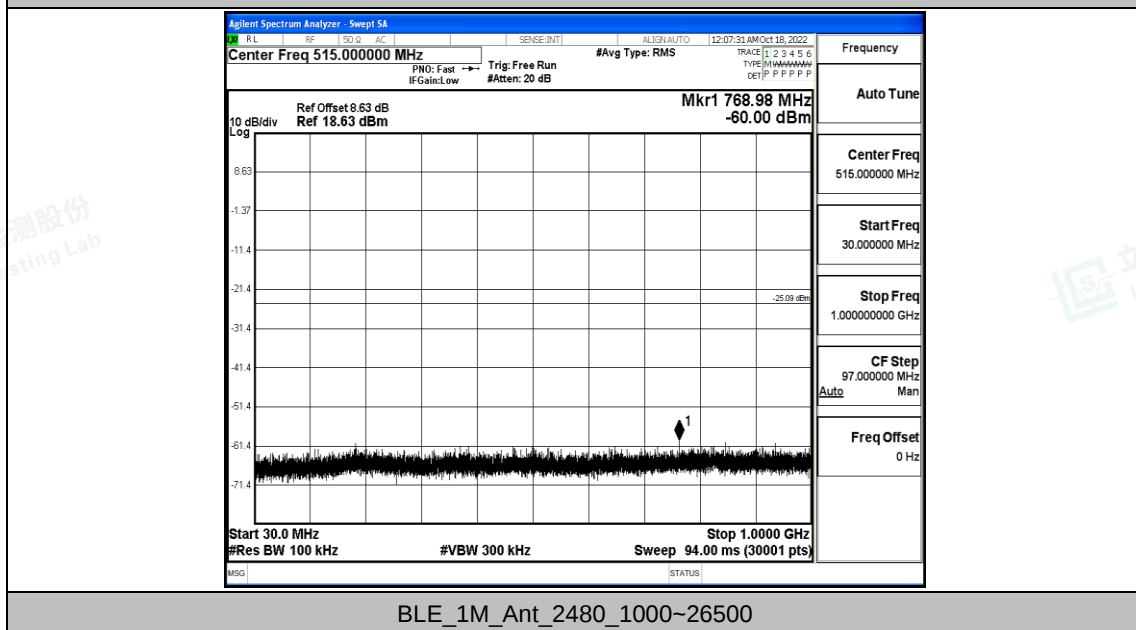
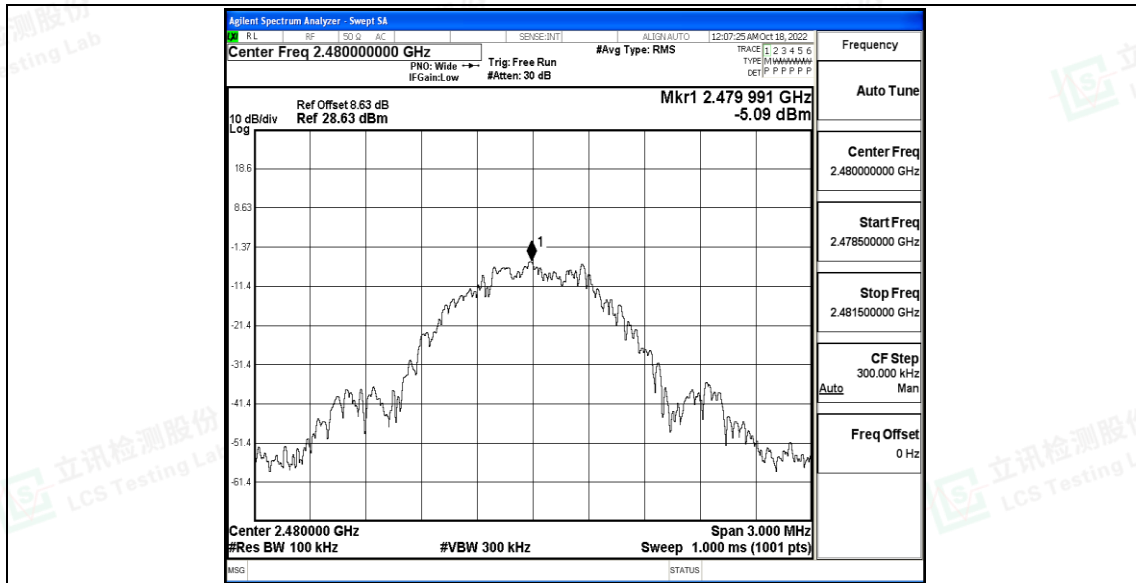


BLE_1M_Ant_2440_1000~26500



BLE_1M_Ant_2480_0~Reference



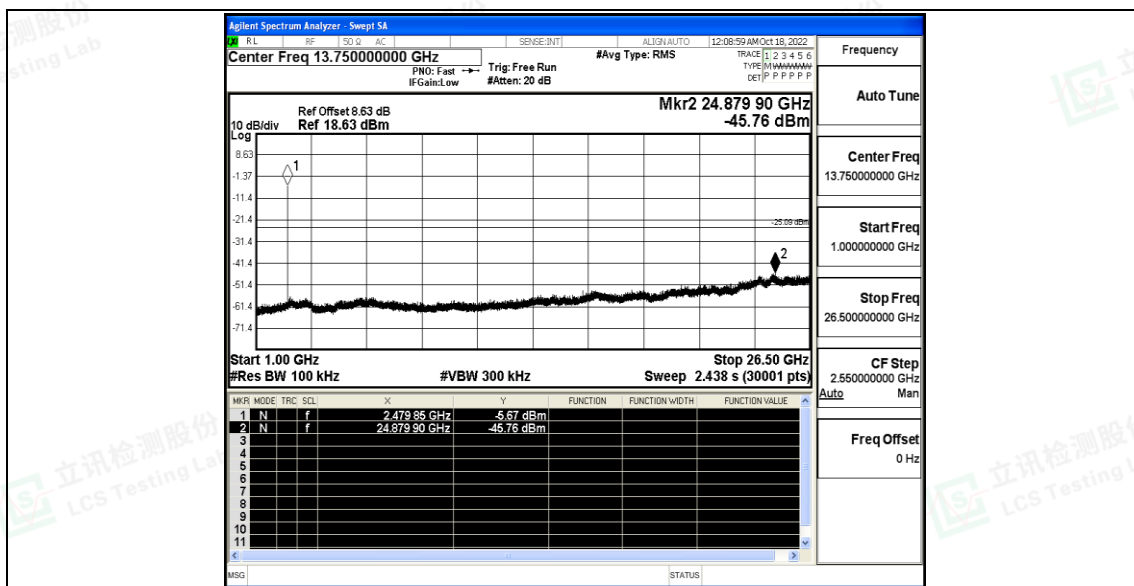


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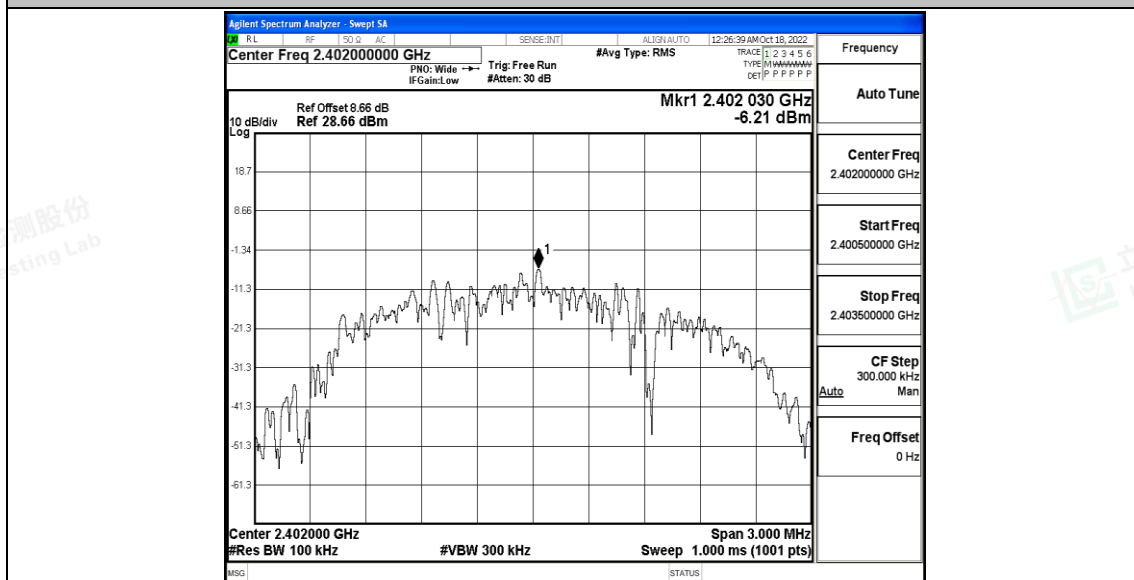
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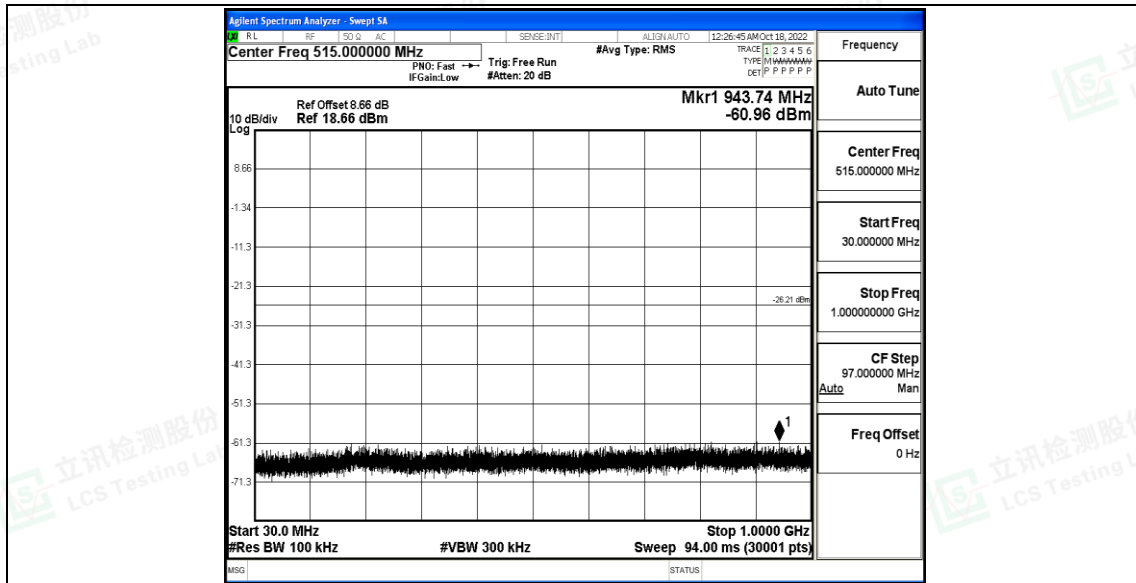


BLE_2M_Ant_2402_0~Reference

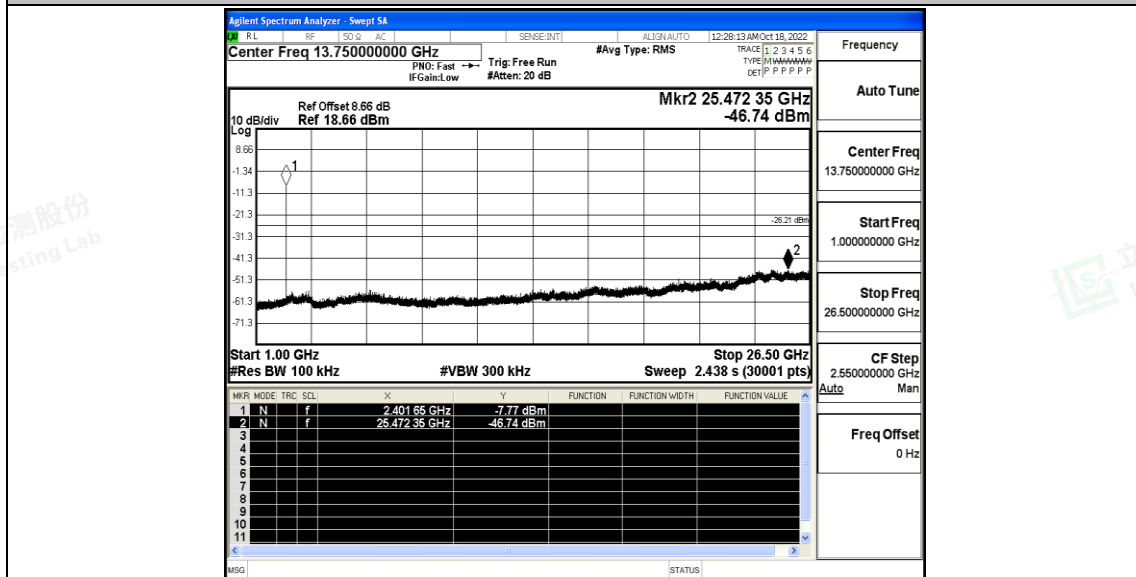


BLE_2M_Ant_2402_30~1000



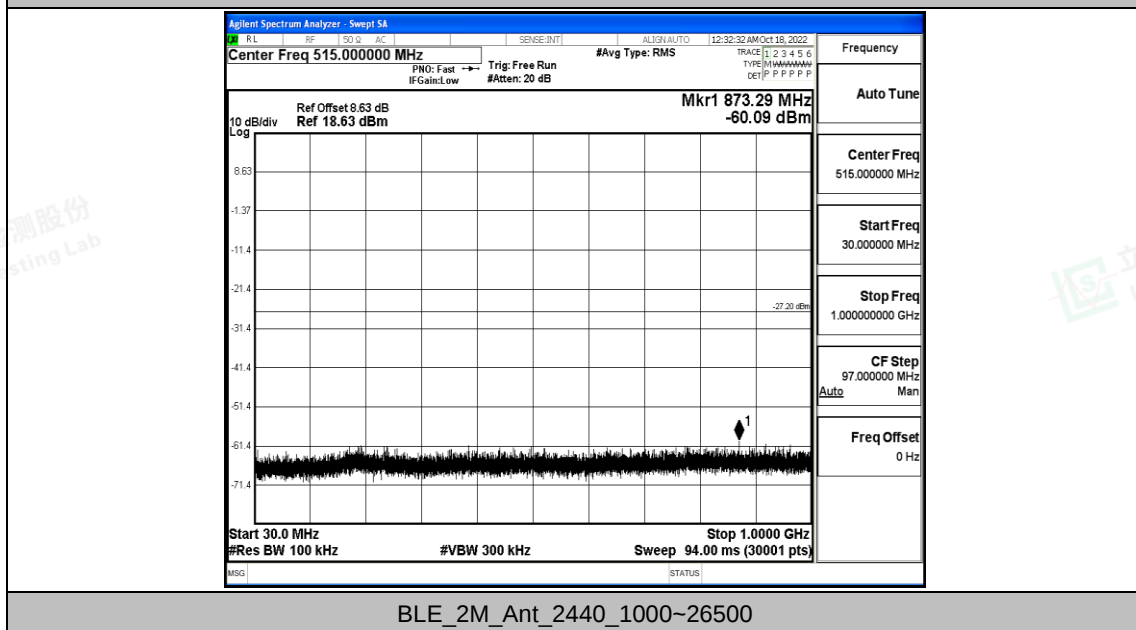
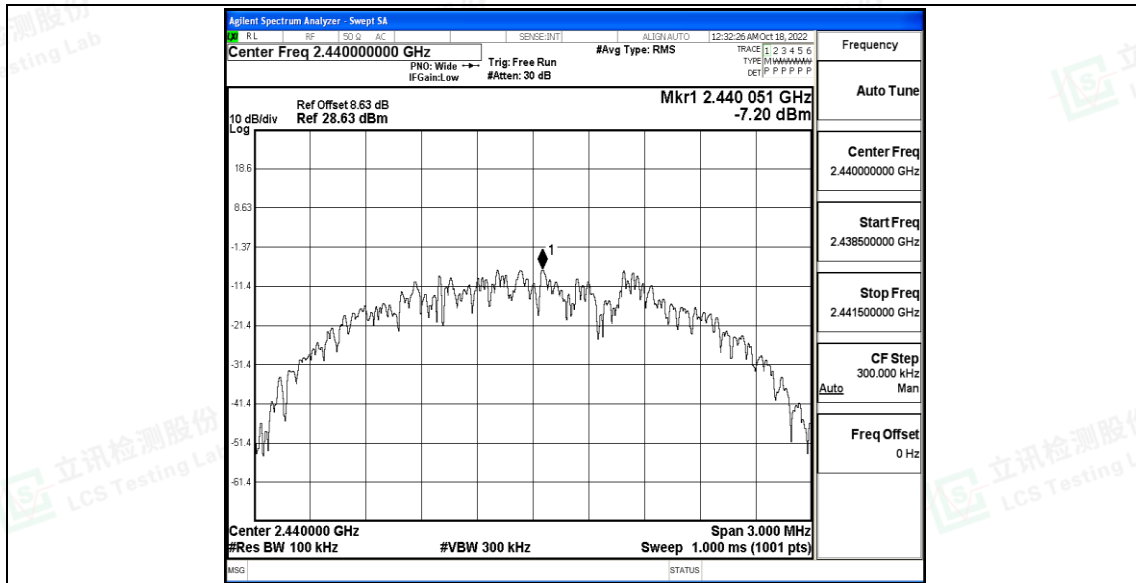


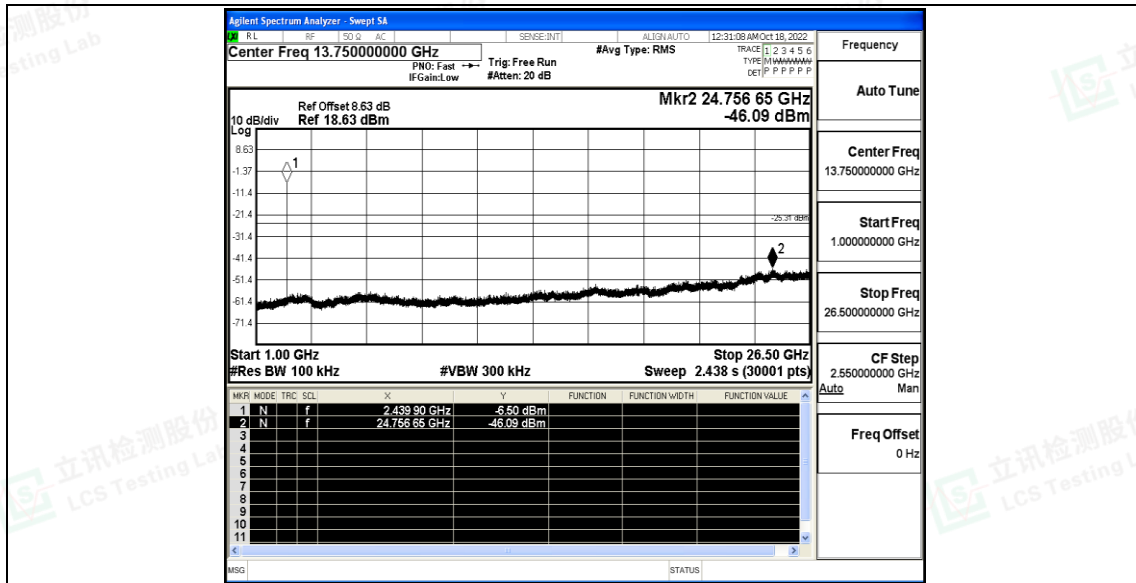
BLE_2M_Ant_2402_1000~26500



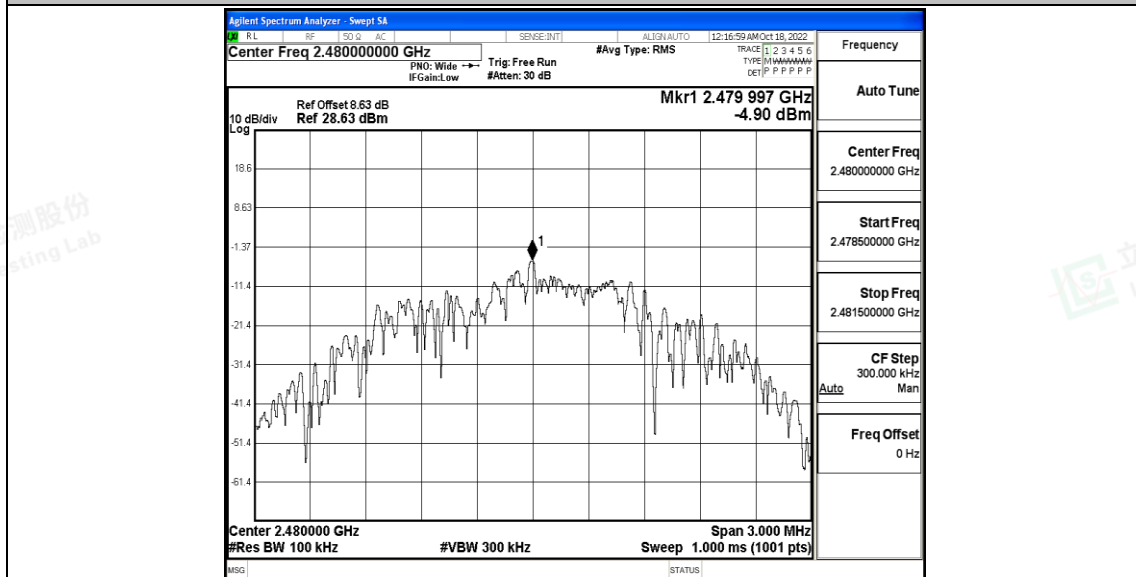
BLE_2M_Ant_2440_0~Reference







BLE_2M_Ant_2480_0~Reference



BLE_2M_Ant_2480_30~1000

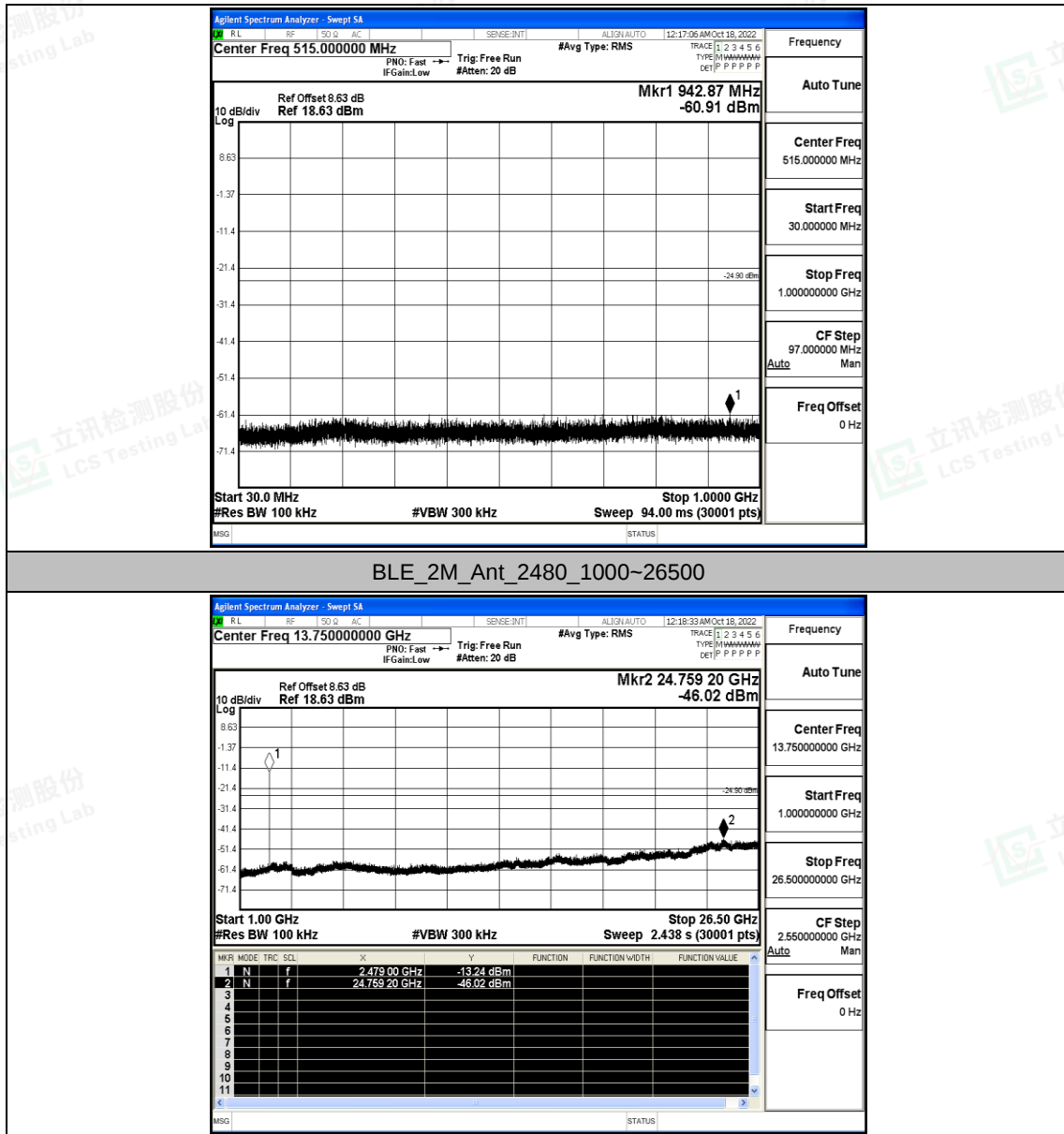


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B.6 Duty Cycle

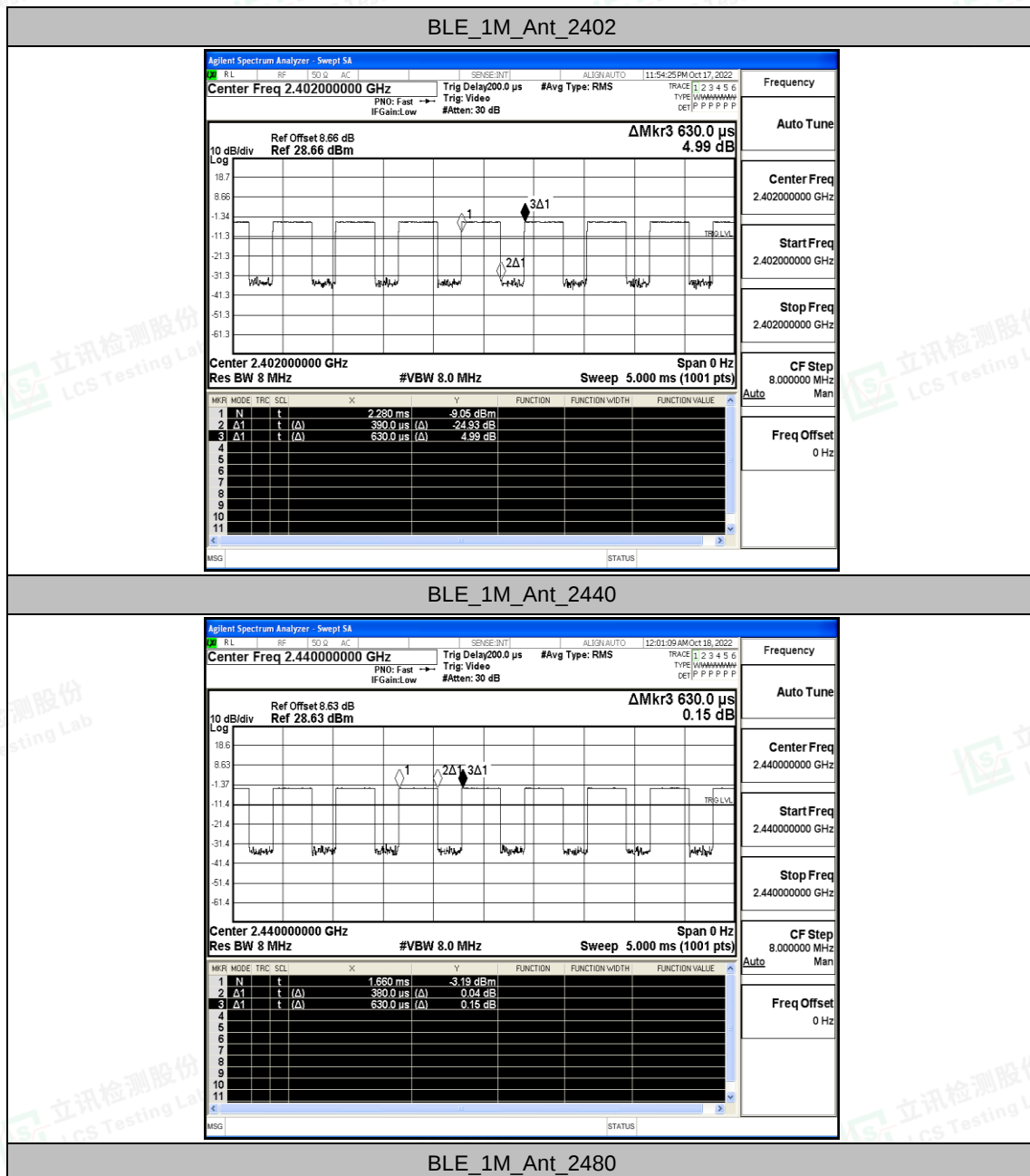
Test Result

TestMode	Antenna	Channel	ON Time [ms]	Period [ms]	X	DC [%]	xFactor	1/T	Limit	Verdict
BLE_1M	Ant	2402	0.39	0.63	0.6190	61.90	2.08	2.56	---	PASS
		2440	0.38	0.63	0.6032	60.32	2.20	2.63	---	PASS
		2480	0.39	0.63	0.6190	61.90	2.08	2.56	---	PASS
BLE_2M	Ant	2402	0.20	0.63	0.3175	31.75	4.98	5.00	---	PASS
		2440	0.20	0.63	0.3175	31.75	4.98	5.00	---	PASS
		2480	0.20	0.63	0.3175	31.75	4.98	5.00	---	PASS





Test Graphs

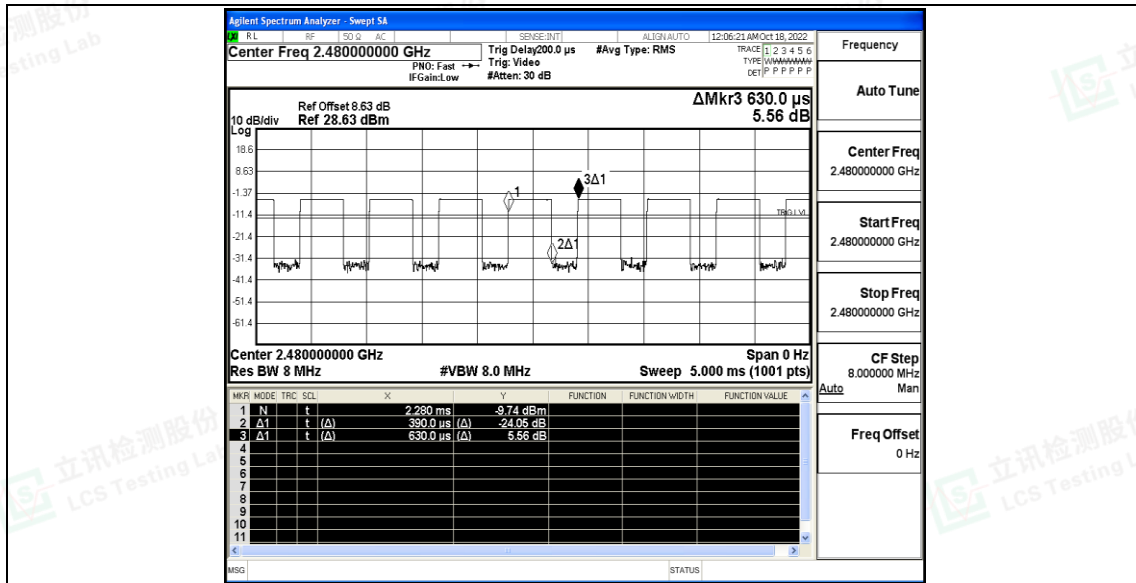


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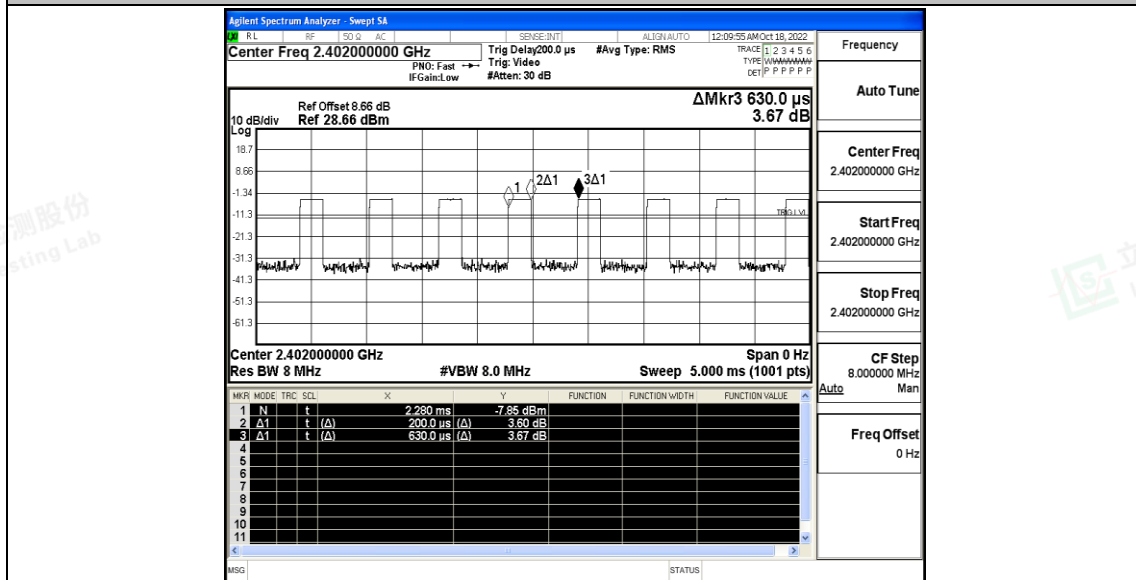
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BLE_2M_Ant_2402



BLE_2M_Ant_2440

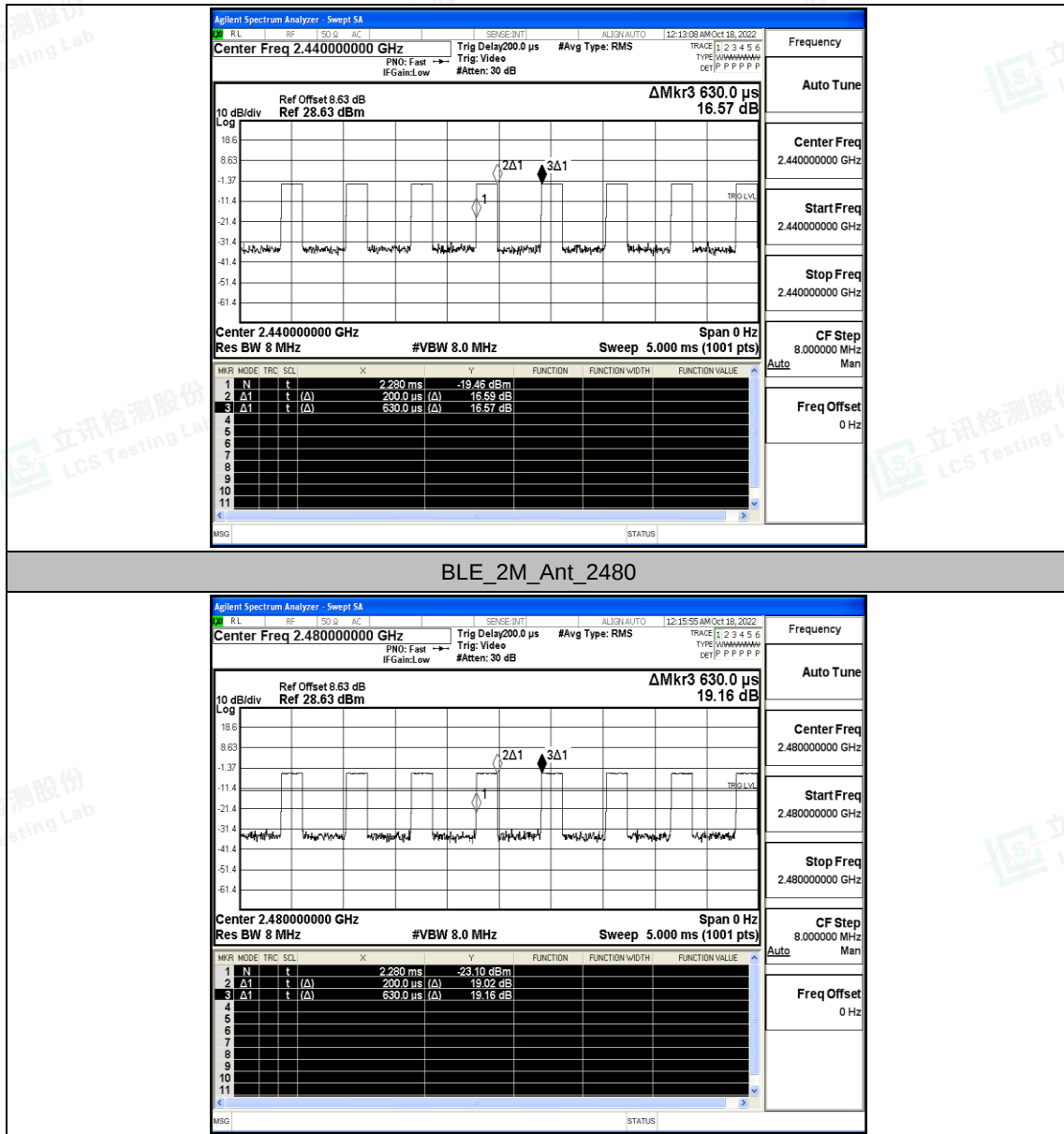


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B.7 Emissions in Restricted Bands

Test Result

TestMode	Antenna	ChName	Channel	Detector	Freq. [MHz]	Result [dBm]	Limit [dBm]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
BLE_1M	Ant	Low	2402	AV	2310.000	-57.52	≤-41.20	37.68	≤54	PASS
				AV	2367.935	-56.75	≤-41.20	38.45	≤54	PASS
				AV	2390.000	-56.9	≤-41.20	38.30	≤54	PASS
				Peak	2310.000	-50.78	≤-21.20	44.42	≤74	PASS
				Peak	2331.920	-48.48	≤-21.20	46.72	≤74	PASS
				Peak	2390.000	-50.7	≤-21.20	44.50	≤74	PASS
		High	2480	AV	2483.500	-55.09	≤-41.20	40.11	≤54	PASS
				AV	2483.520	-55.09	≤-41.20	40.11	≤54	PASS
				AV	2500.000	-56.44	≤-41.20	38.76	≤54	PASS
				Peak	2483.500	-49.98	≤-21.20	45.22	≤74	PASS
				Peak	2490.480	-48.19	≤-21.20	47.01	≤74	PASS
				Peak	2500.000	-50.44	≤-21.20	44.76	≤74	PASS
BLE_2M	Ant	Low	2402	AV	2310.000	-57.13	≤-41.20	38.07	≤54	PASS
				AV	2371.925	-56	≤-41.20	39.20	≤54	PASS
				AV	2390.000	-56.63	≤-41.20	38.57	≤54	PASS
				Peak	2310.000	-50.42	≤-21.20	44.78	≤74	PASS
				Peak	2342.735	-47.53	≤-21.20	47.67	≤74	PASS
				Peak	2390.000	-49.32	≤-21.20	45.88	≤74	PASS
		High	2480	AV	2483.500	-53.5	≤-41.20	41.70	≤54	PASS
				AV	2483.520	-53.5	≤-41.20	41.70	≤54	PASS
				AV	2500.000	-56.03	≤-41.20	39.17	≤54	PASS
				Peak	2483.500	-49.03	≤-21.20	46.17	≤74	PASS
				Peak	2497.680	-46.92	≤-21.20	48.28	≤74	PASS
				Peak	2500.000	-50.41	≤-21.20	44.79	≤74	PASS

Note:

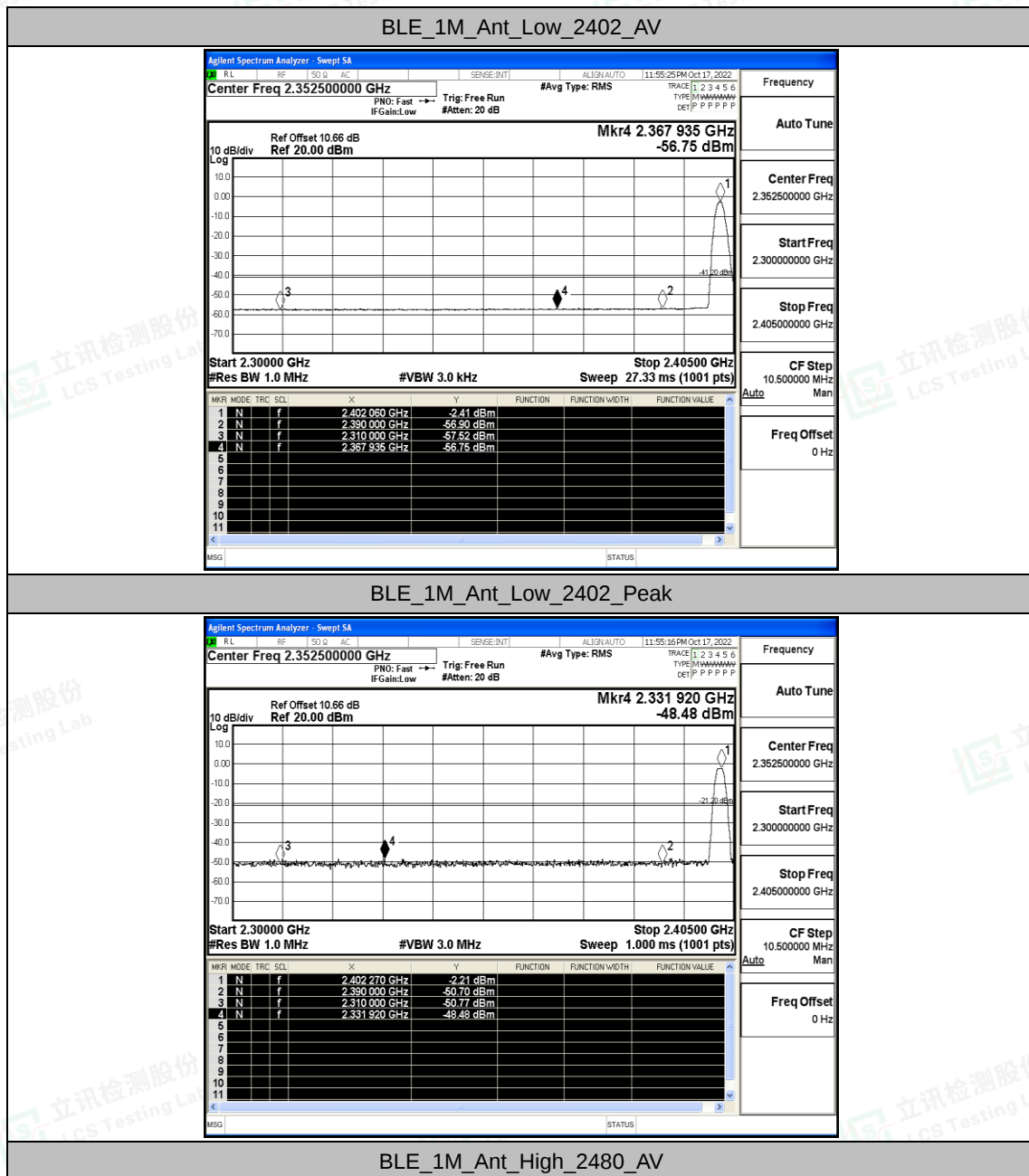
1. The Antenna Gain is compensated in the graph.
2. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.



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Test Graphs

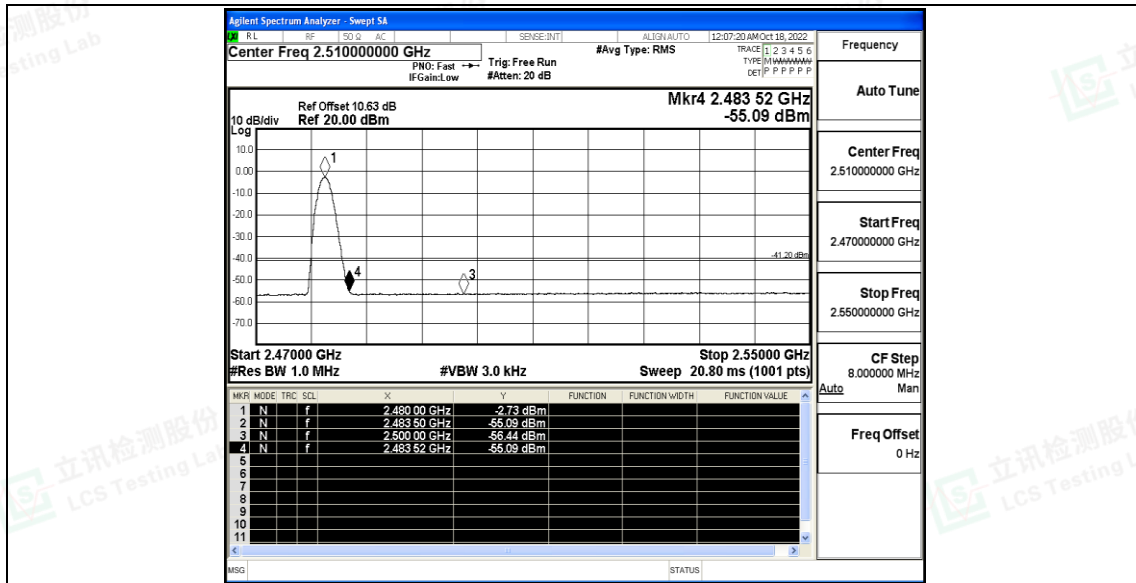


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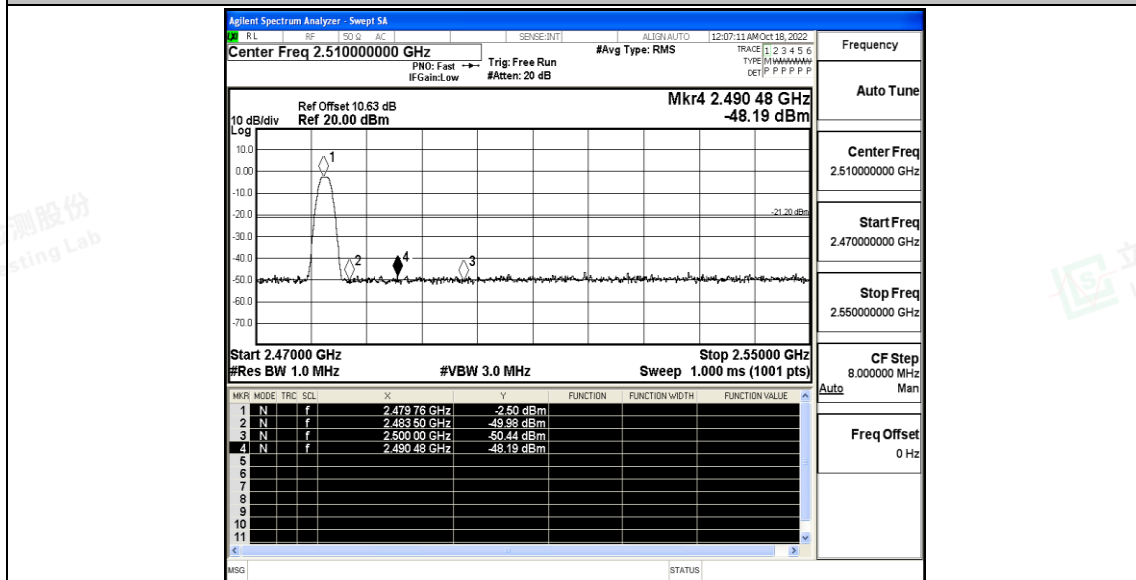
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BLE_1M_Ant_High_2480_Peak



BLE_2M_Ant_Low_2402_AV

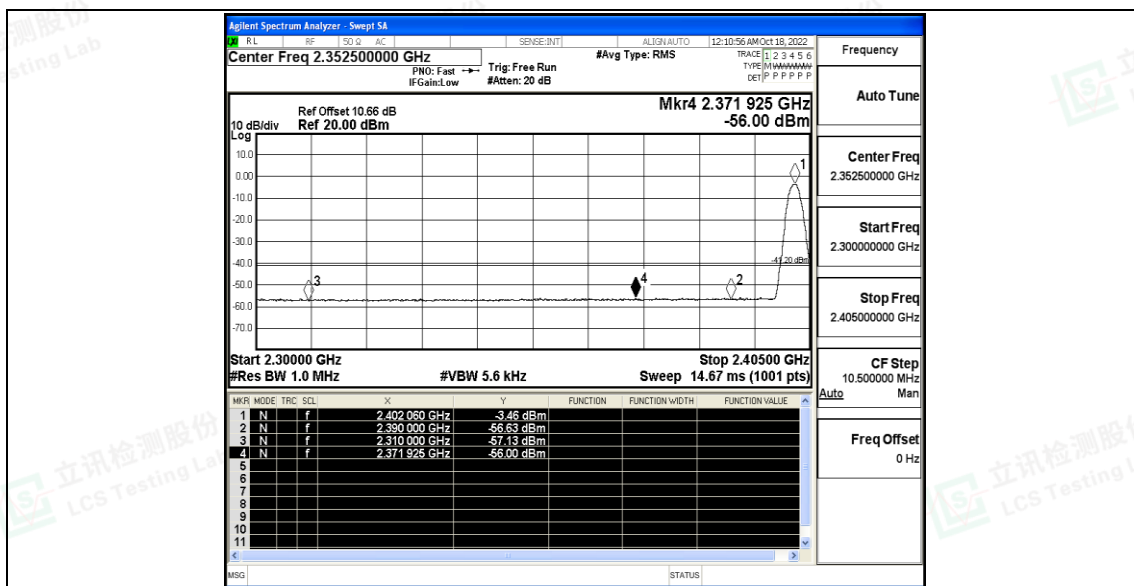


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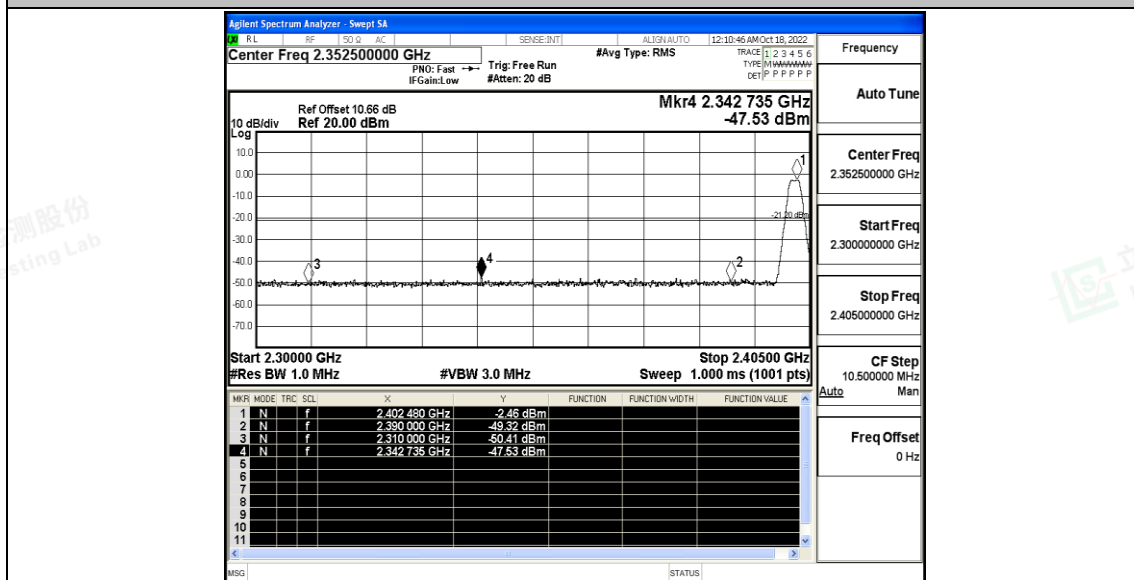
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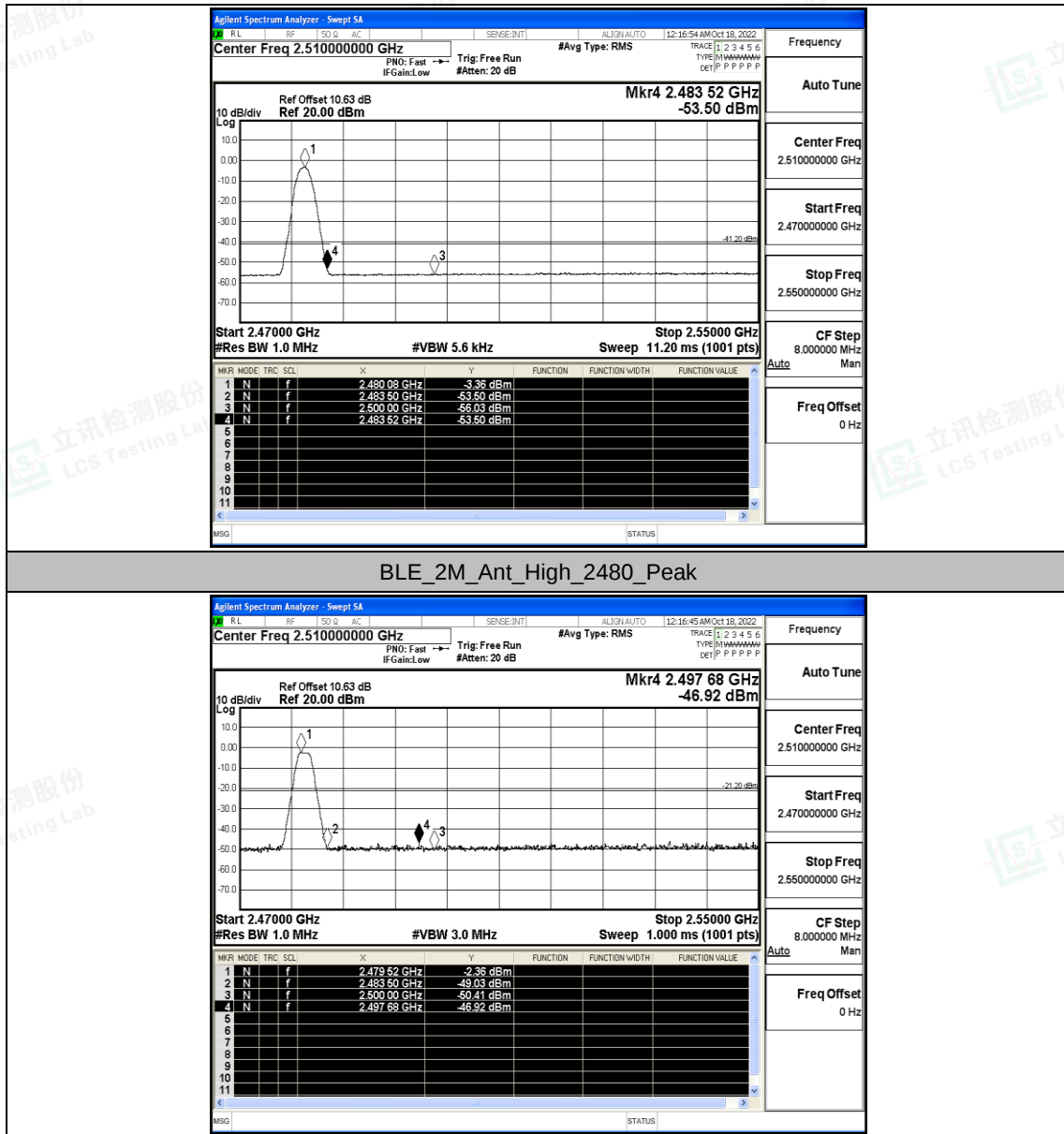


BLE_2M_Ant_Low_2402_Peak



BLE_2M_Ant_High_2480_AV





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