



Appendix A

RF Test Data for BT (Conducted Measurement)

Product Name: Bluetooth 4" Ceiling Speaker

Test Model: LBT4

Environmental Conditions

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





A.1 20dB Emission Bandwidth

Test Result

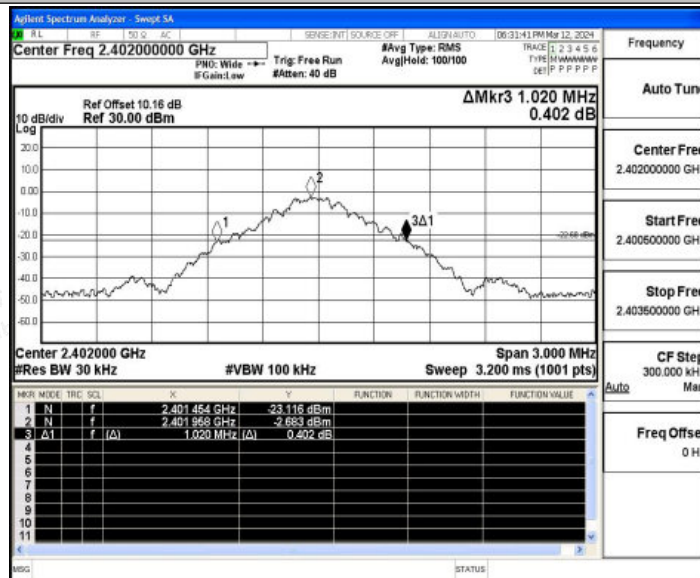
TestMode	Antenna	Frequency[MHz]	20db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	1.020	2401.454	2402.474	---	---
		2480	1.017	2479.463	2480.480	---	---
2DH5	Ant1	2402	1.293	2401.352	2402.645	---	---
		2441	1.320	2440.328	2441.648	---	---
		2480	1.281	2479.352	2480.633	---	---
3DH5	Ant1	2402	1.296	2401.346	2402.642	---	---
		2441	1.305	2440.337	2441.642	---	---
		2480	1.302	2479.337	2480.639	---	---



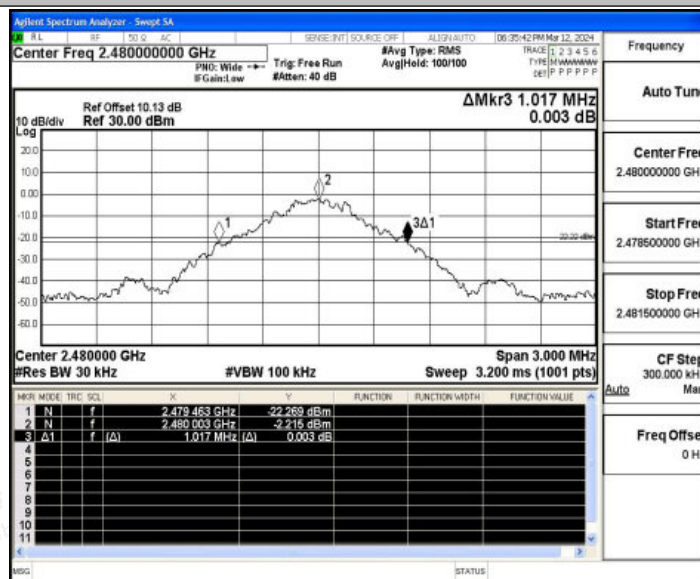


Test Graphs

DH5_Ant1_2402

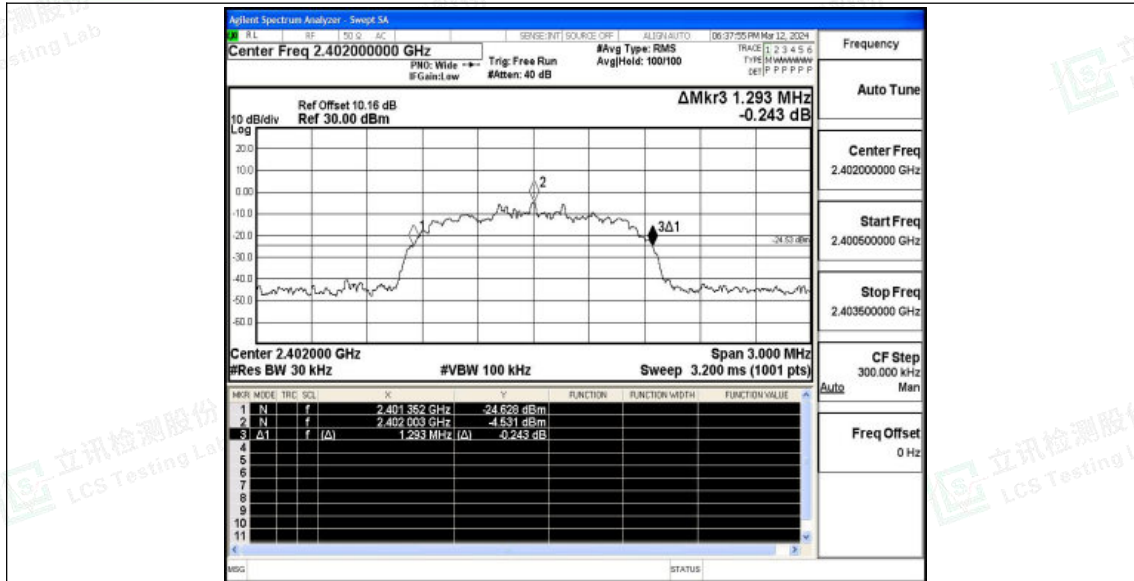


DH5_Ant1_2480

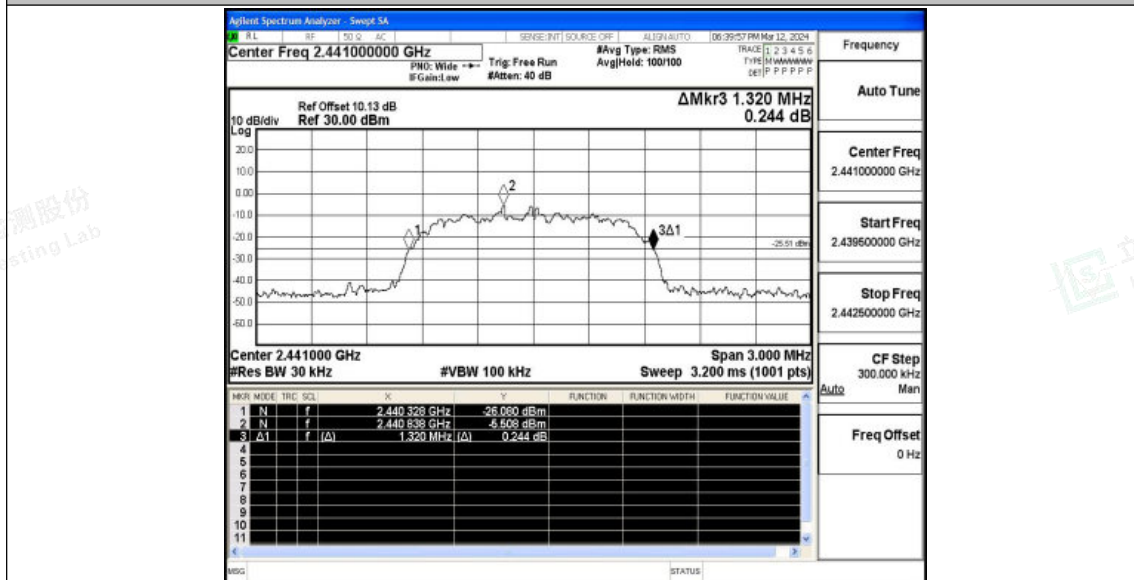


2DH5_Ant1_2402



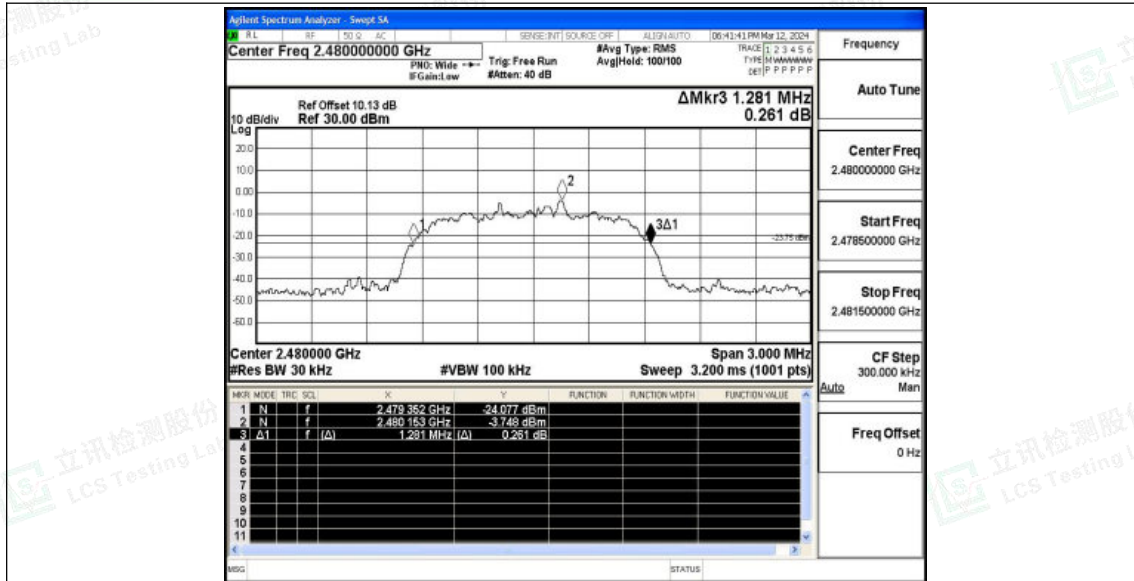


2DH5_Ant1_2441

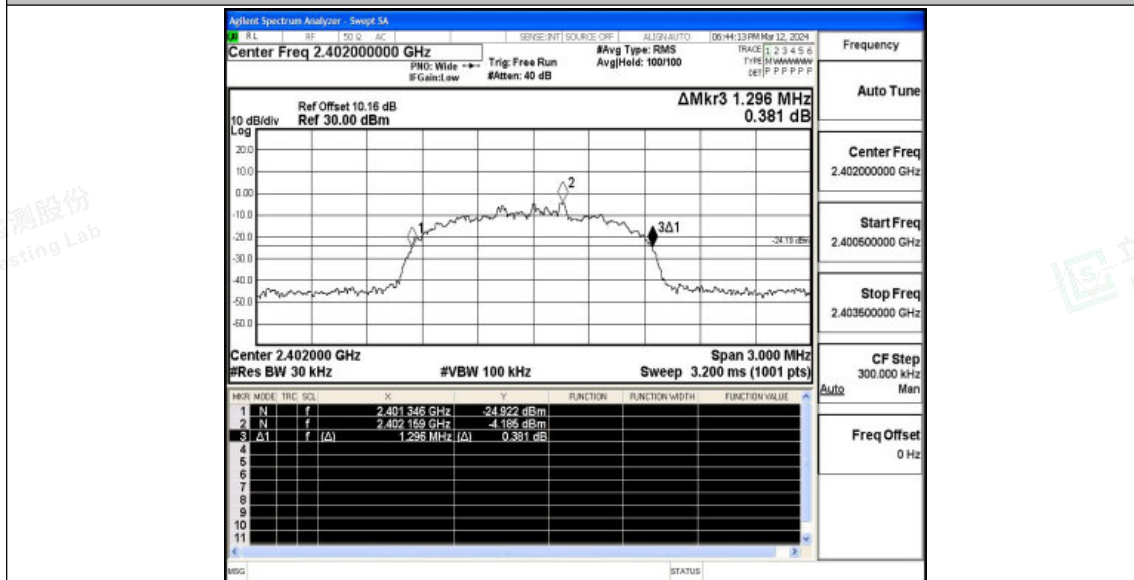


2DH5_Ant1_2480



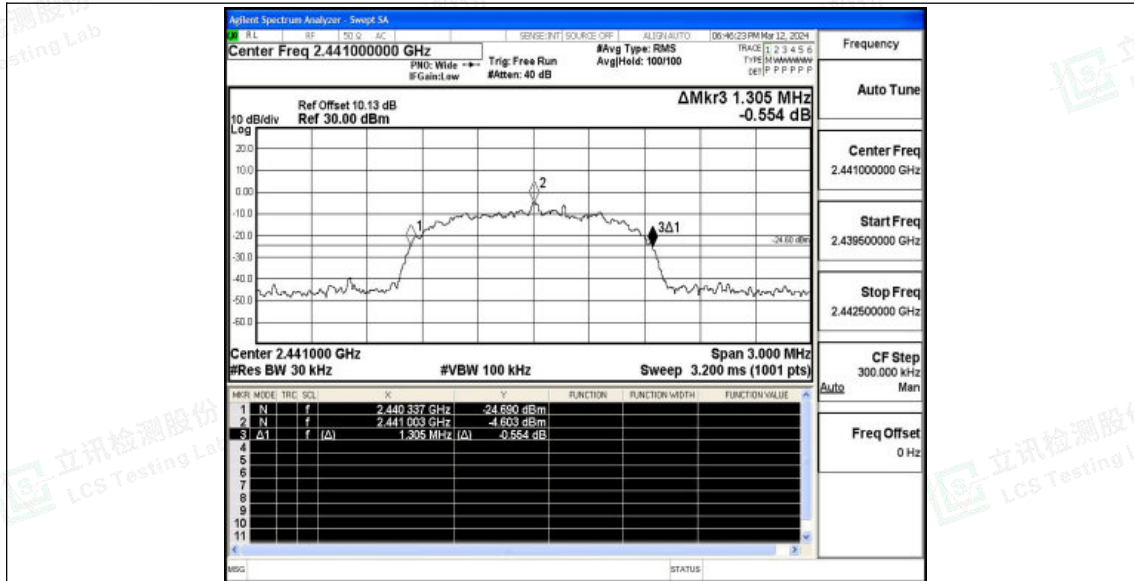


3DH5_Ant1_2402

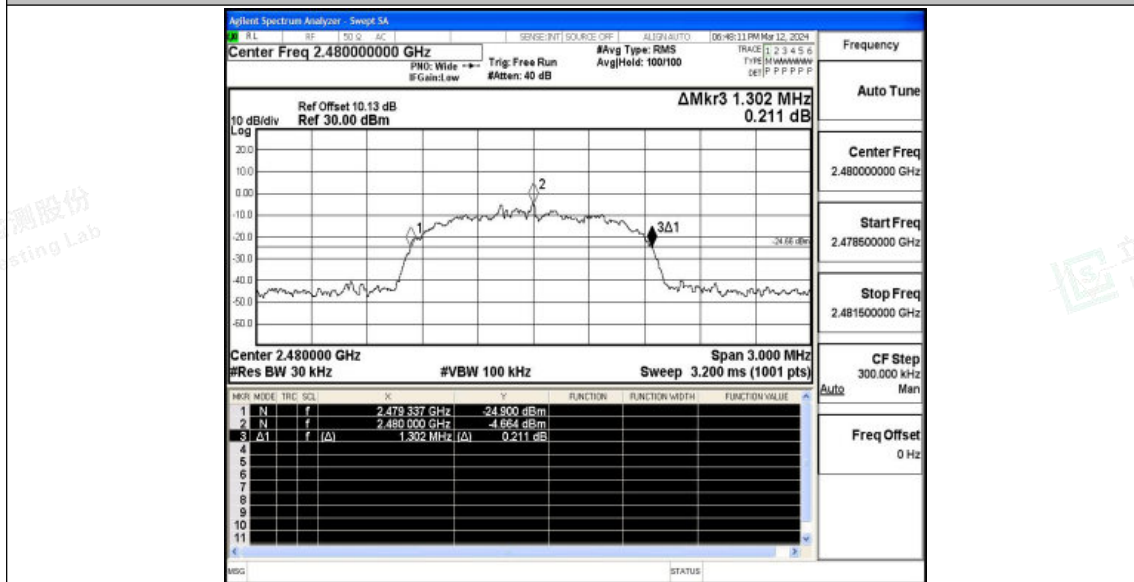


3DH5_Ant1_2441





3DH5_Ant1_2480





A.2 Maximum conducted output power

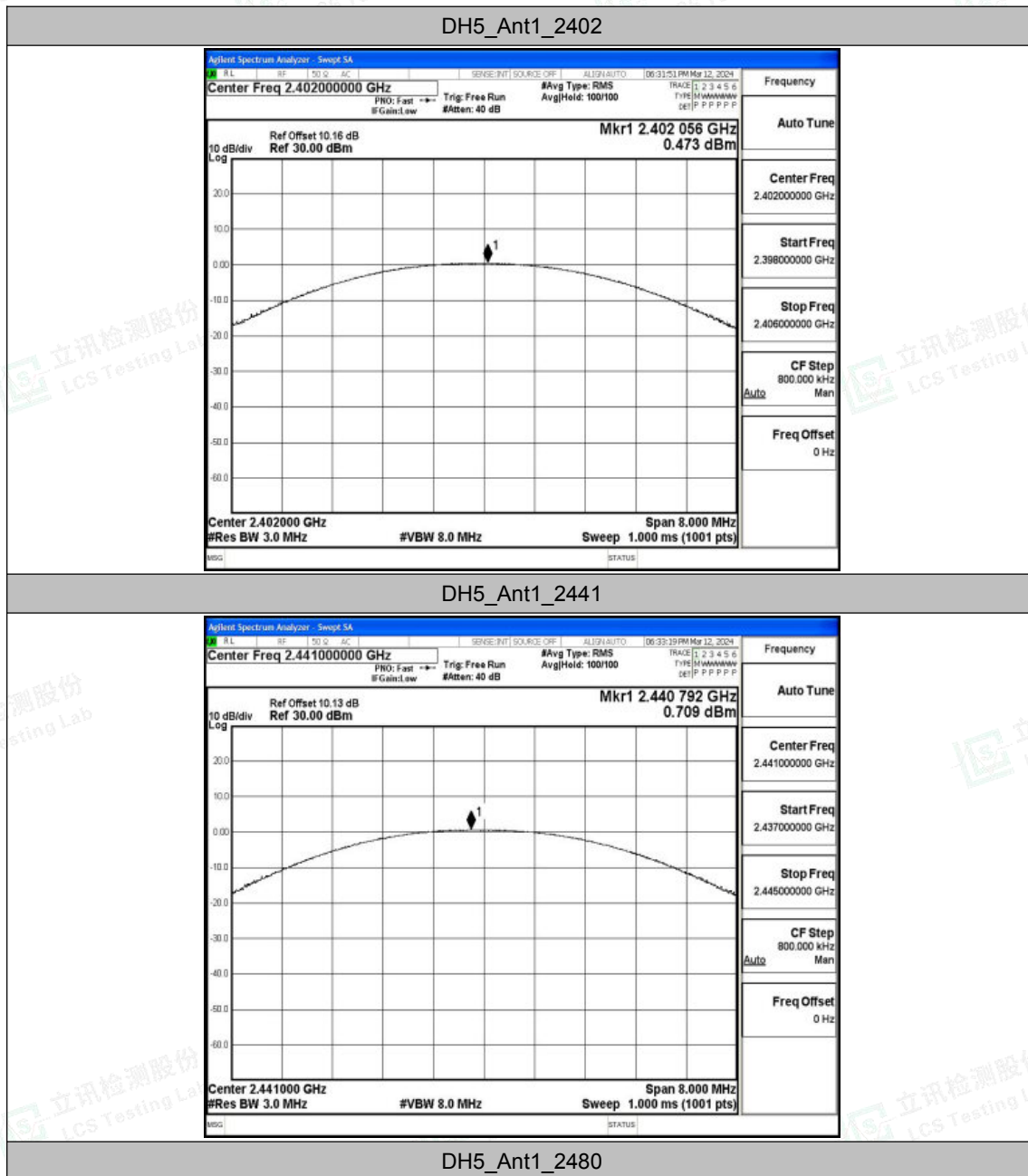
Test Result Peak

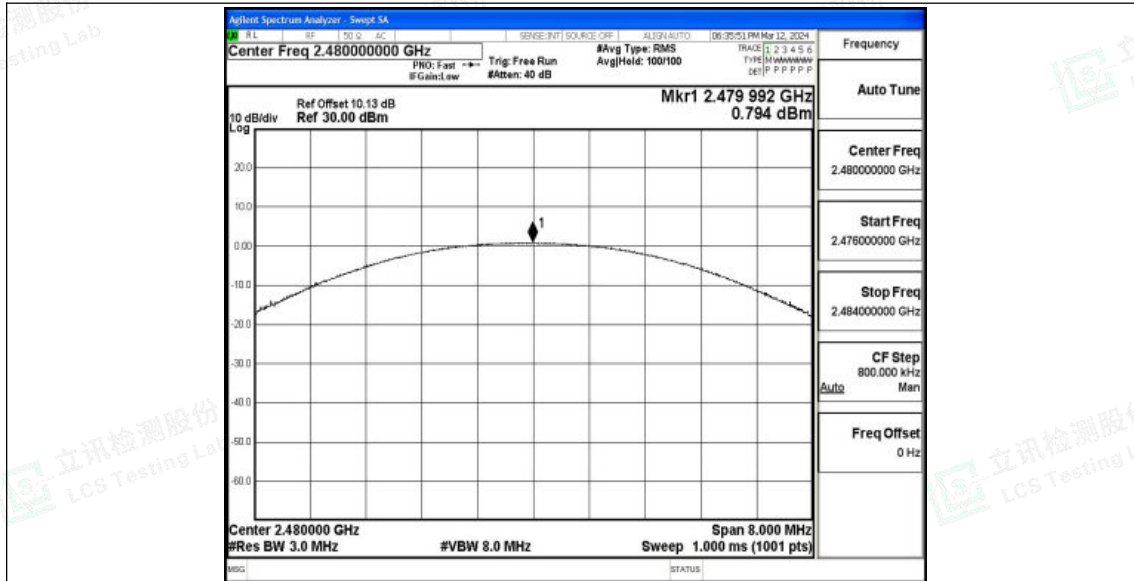
Test Mode	Antenna	Frequency[MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Verdict
DH5	Ant1	2402	0.47	≤21	PASS
		2441	0.71	≤21	PASS
		2480	0.79	≤21	PASS
2DH5	Ant1	2402	0.20	≤21	PASS
		2441	0.46	≤21	PASS
		2480	0.73	≤21	PASS
3DH5	Ant1	2402	0.36	≤21	PASS
		2441	0.60	≤21	PASS
		2480	0.74	≤21	PASS



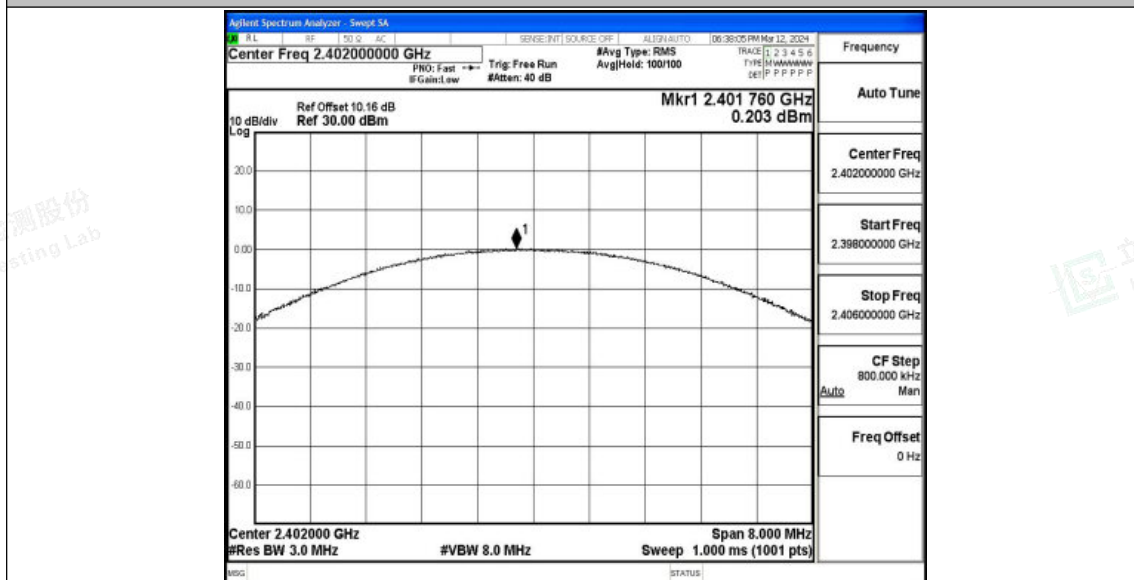


Test Graphs



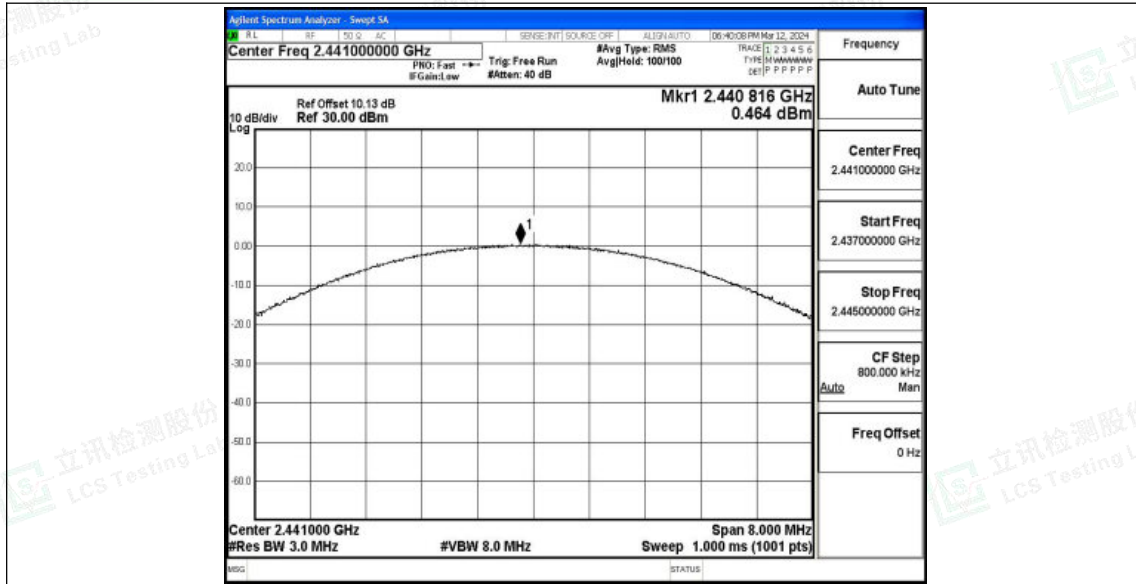


2DH5_Ant1_2402

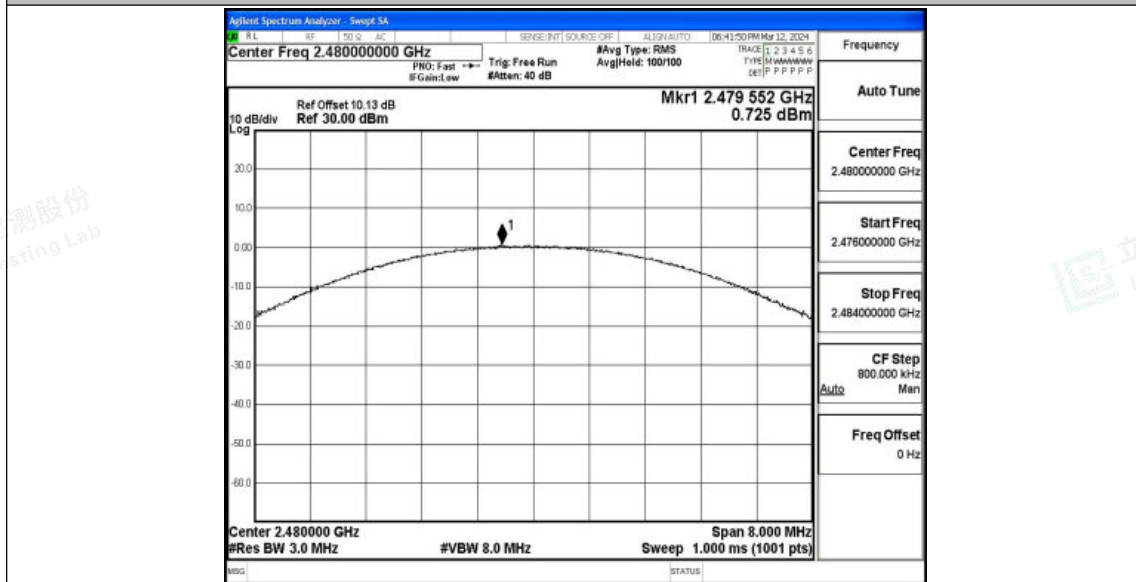


2DH5_Ant1_2441



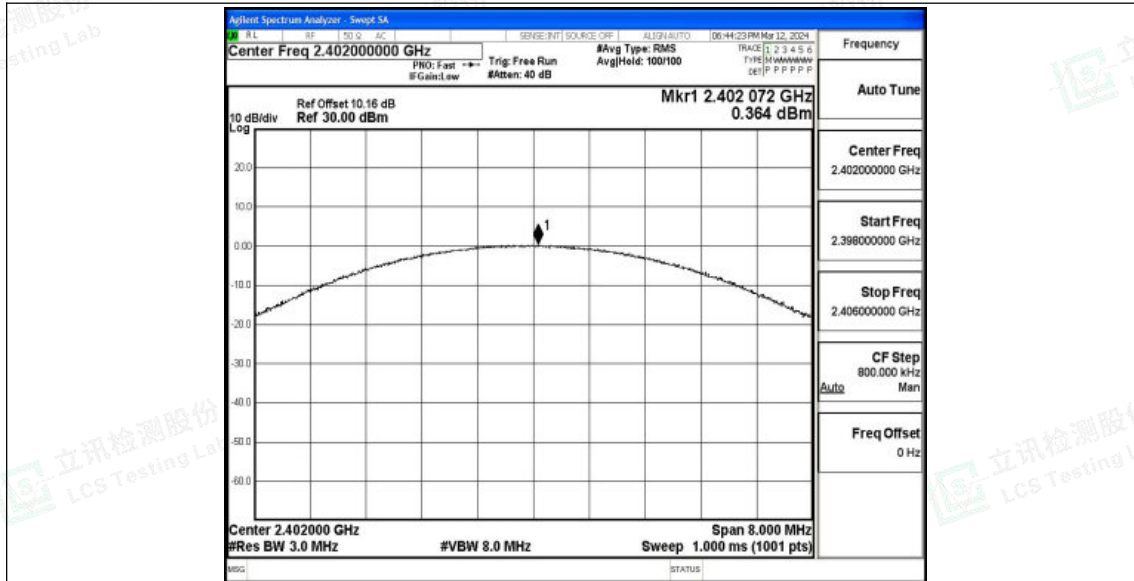


2DH5_Ant1_2480

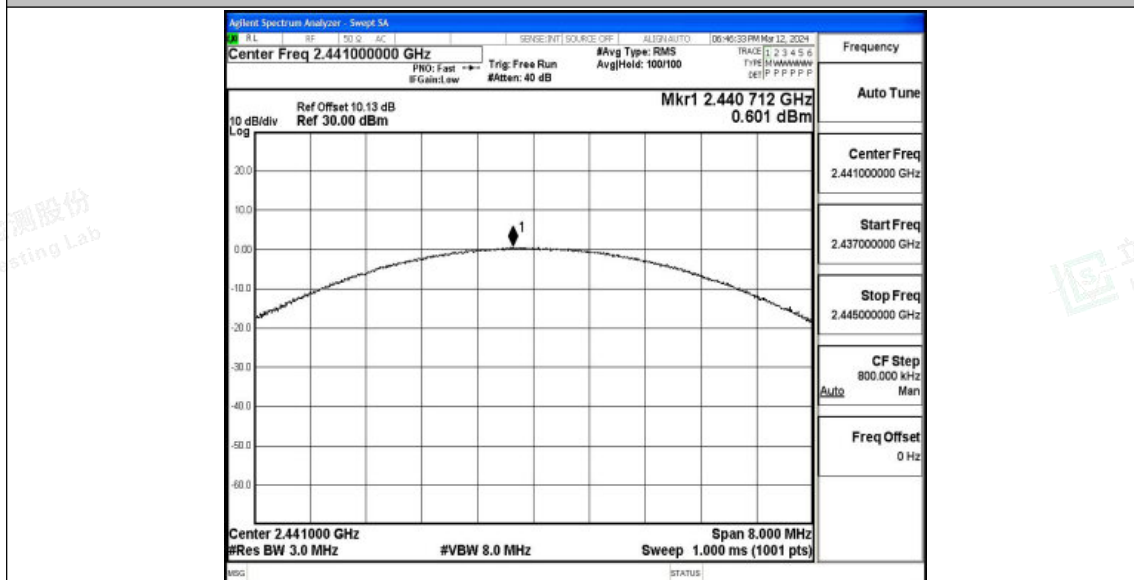


3DH5_Ant1_2402



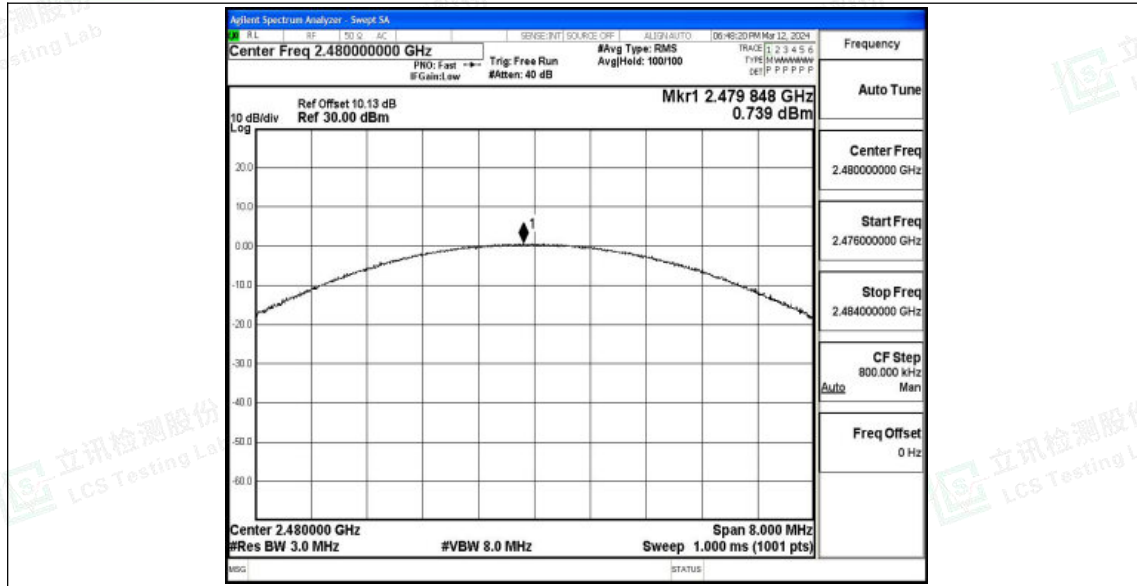


3DH5_Ant1_2441



3DH5_Ant1_2480







A.3 Carrier frequency separation

Test Result

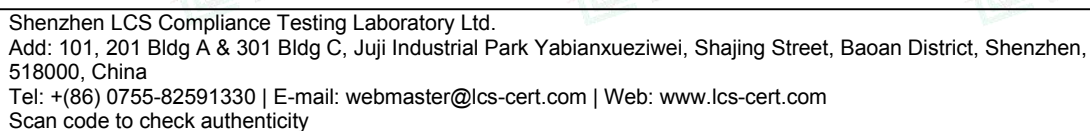
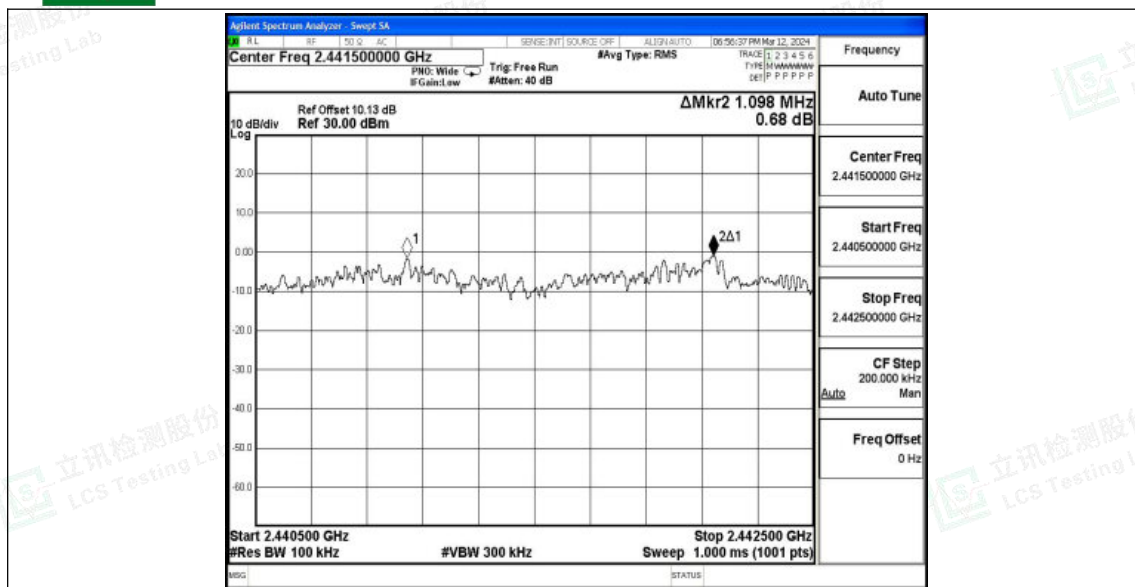
TestMode	Antenna	Frequency[MHz]	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Hop	0.96	≥0.680	PASS
2DH5	Ant1	Hop	1.282	≥0.880	PASS
3DH5	Ant1	Hop	1.098	≥0.870	PASS





Test Graphs







A.4 Time of occupancy

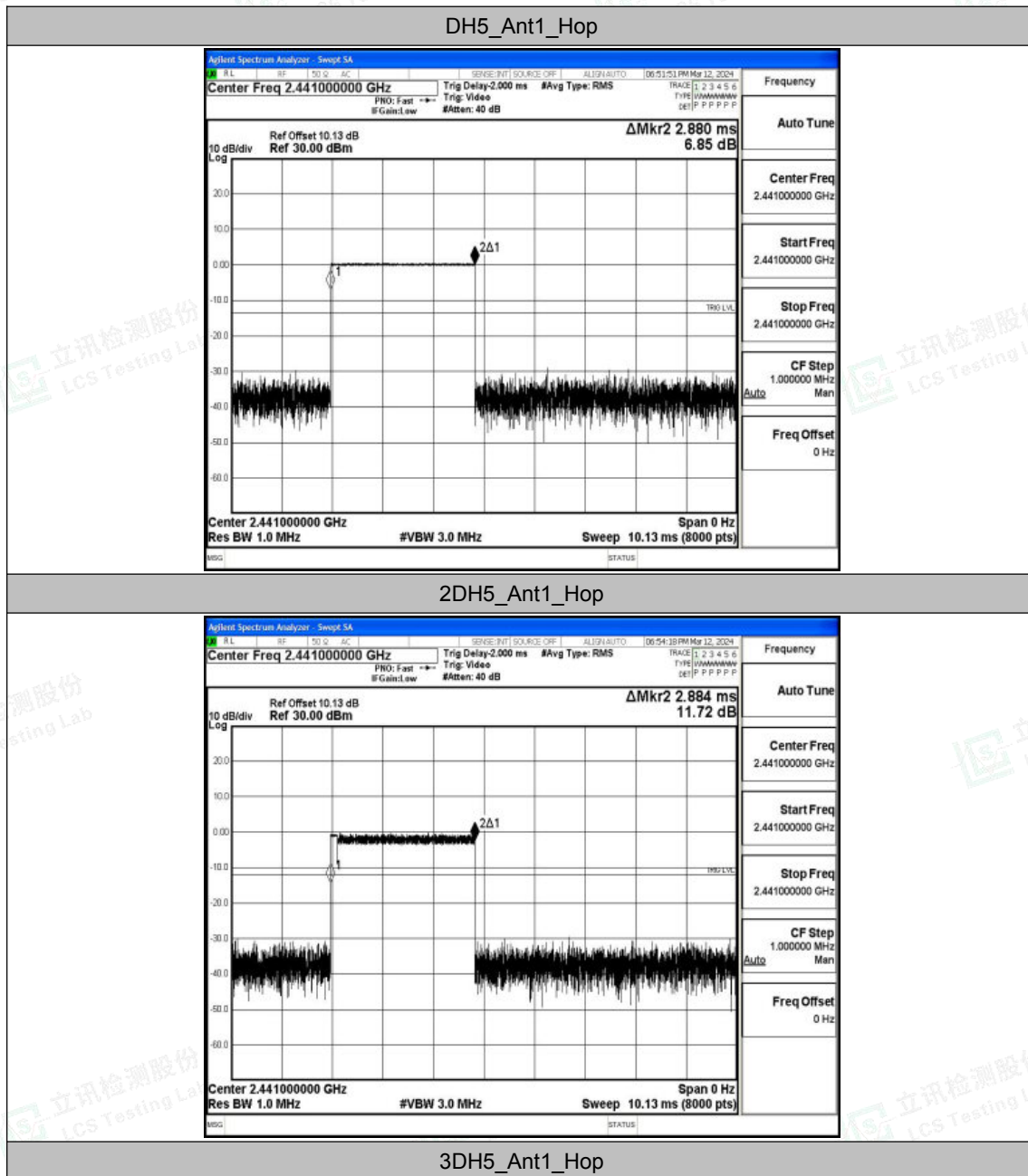
Test Result

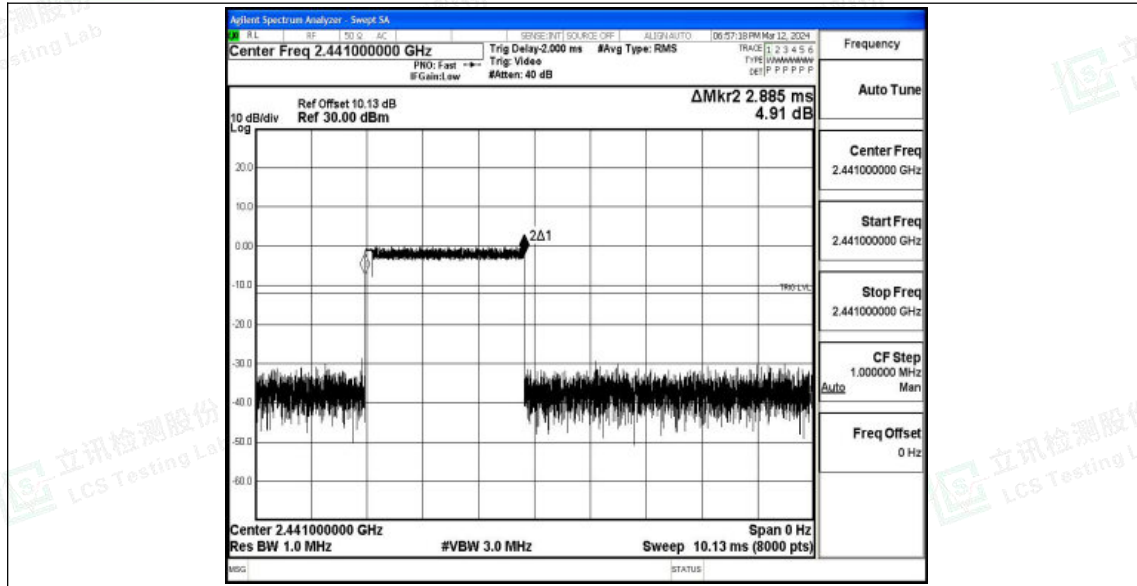
TestMode	Antenna	Frequency[MHz]	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH5	Ant1	Hop	2.880	106.67	0.307	≤0.4	PASS
2DH5	Ant1	Hop	2.884	106.67	0.308	≤0.4	PASS
3DH5	Ant1	Hop	2.885	106.67	0.308	≤0.4	PASS





Test Graphs







A.5 Number of hopping channels

Test Result

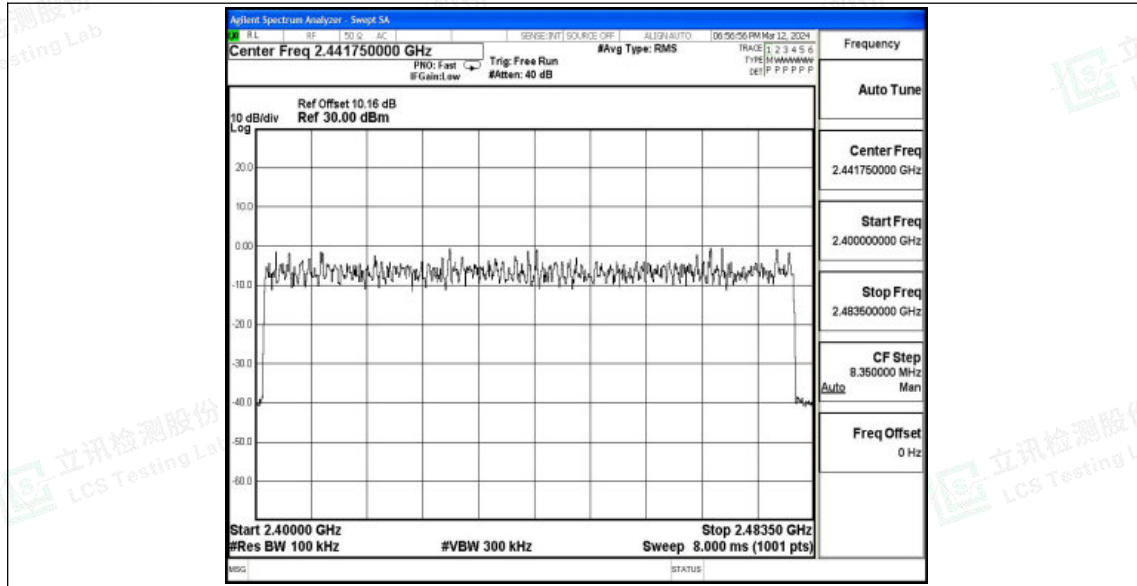
TestMode	Antenna	Frequency[MHz]	Result[Num]	Limit[Num]	Verdict
DH5	Ant1	Hop	79	≥15	PASS
2DH5	Ant1	Hop	79	≥15	PASS
3DH5	Ant1	Hop	79	≥15	PASS





Test Graphs







A.6 Band edge measurements

Test Result

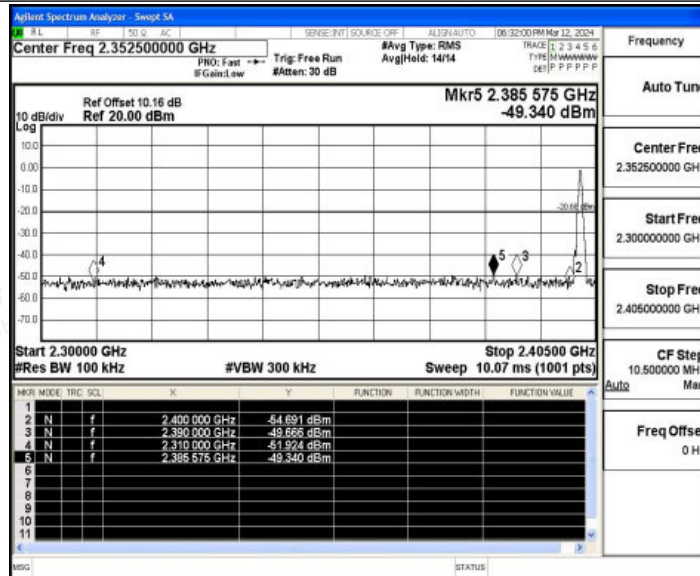
TestMode	Antenna	ChName	Frequency[MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	-0.68	-49.34	≤-20.68	PASS
		High	2480	-0.22	-48.46	≤-20.22	PASS
		Low	Hop_2402	-0.53	-47.66	≤-20.53	PASS
		High	Hop_2480	0.02	-47.42	≤-19.98	PASS
2DH5	Ant1	Low	2402	-1.92	-49.8	≤-21.92	PASS
		High	2480	-1.75	-48.71	≤-21.75	PASS
		Low	Hop_2402	-5.25	-47.59	≤-25.25	PASS
		High	Hop_2480	-0.86	-46.41	≤-20.86	PASS
3DH5	Ant1	Low	2402	-1.19	-48.49	≤-21.19	PASS
		High	2480	-1.41	-48.02	≤-21.41	PASS
		Low	Hop_2402	-4.89	-47.55	≤-24.89	PASS
		High	Hop_2480	-1.19	-47.41	≤-21.19	PASS



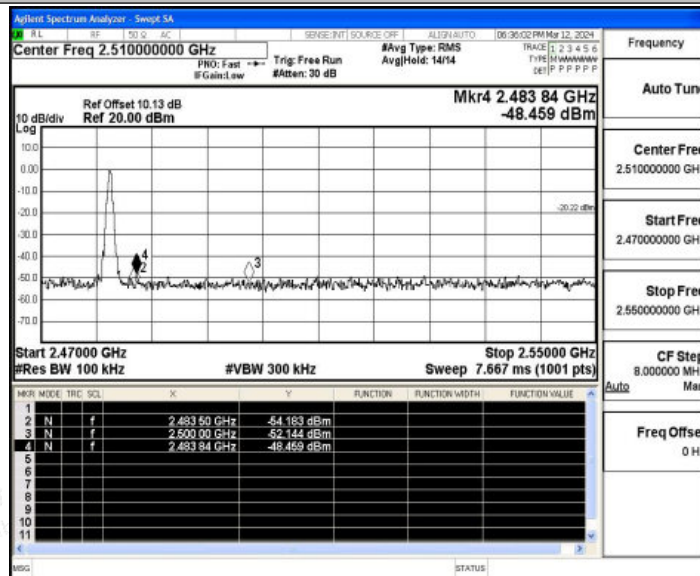


Test Graphs

DH5_Ant1_Low_2402

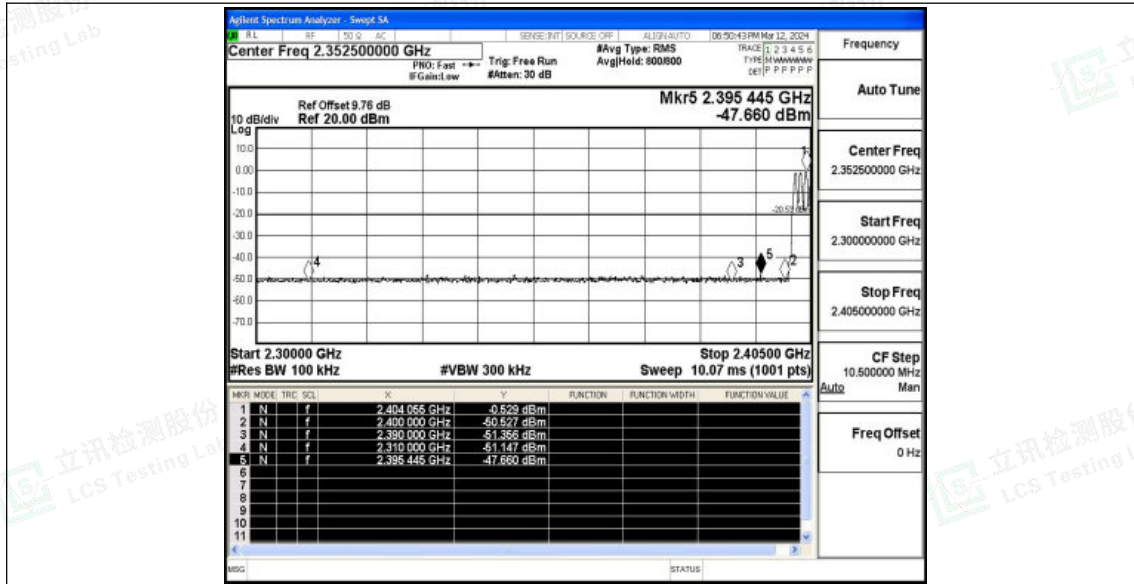


DH5_Ant1_High_2480

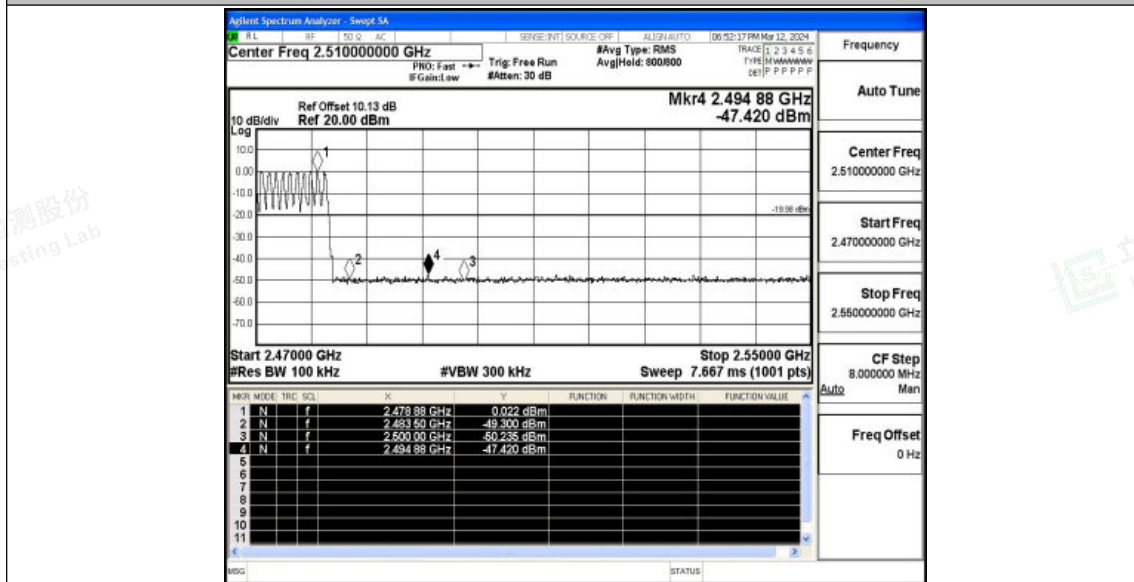


DH5_Ant1_Low_Hop_2402



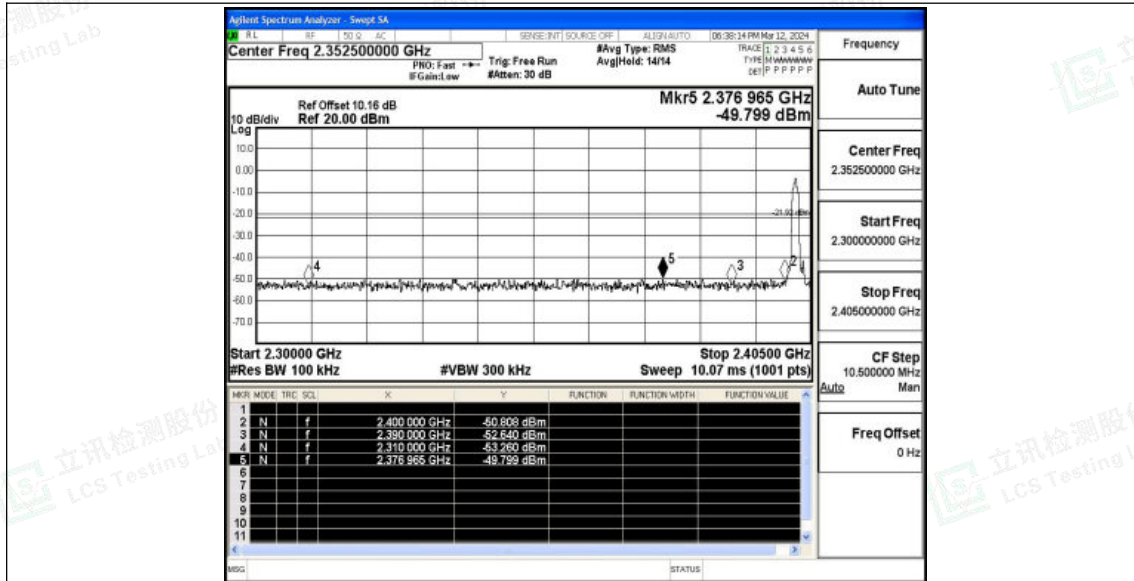


DH5_Ant1_High_Hop_2480

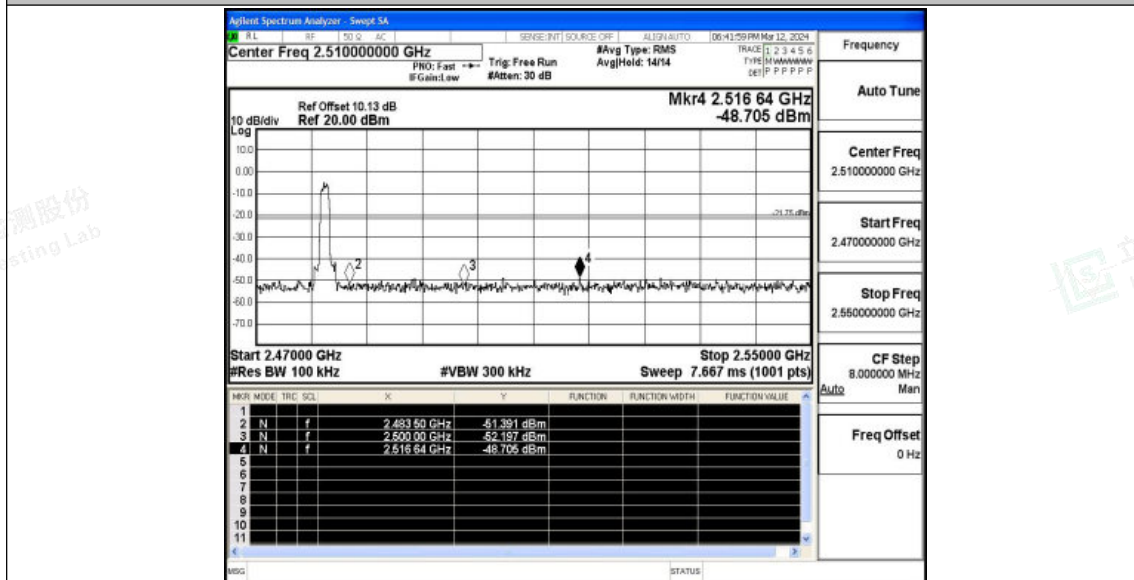


2DH5_Ant1_Low_2402



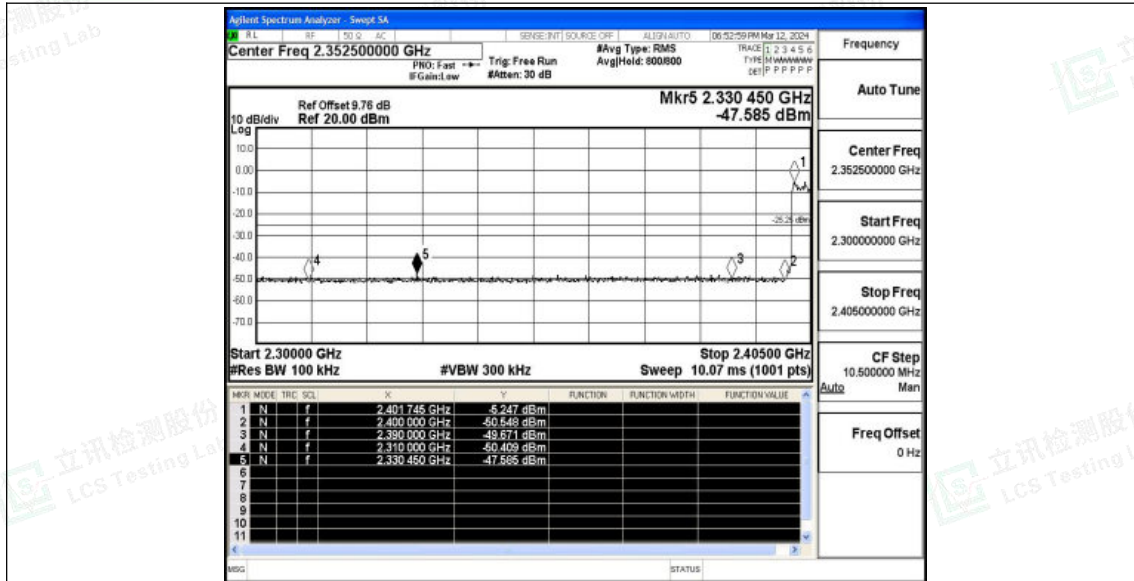


2DH5_Ant1_High_2480

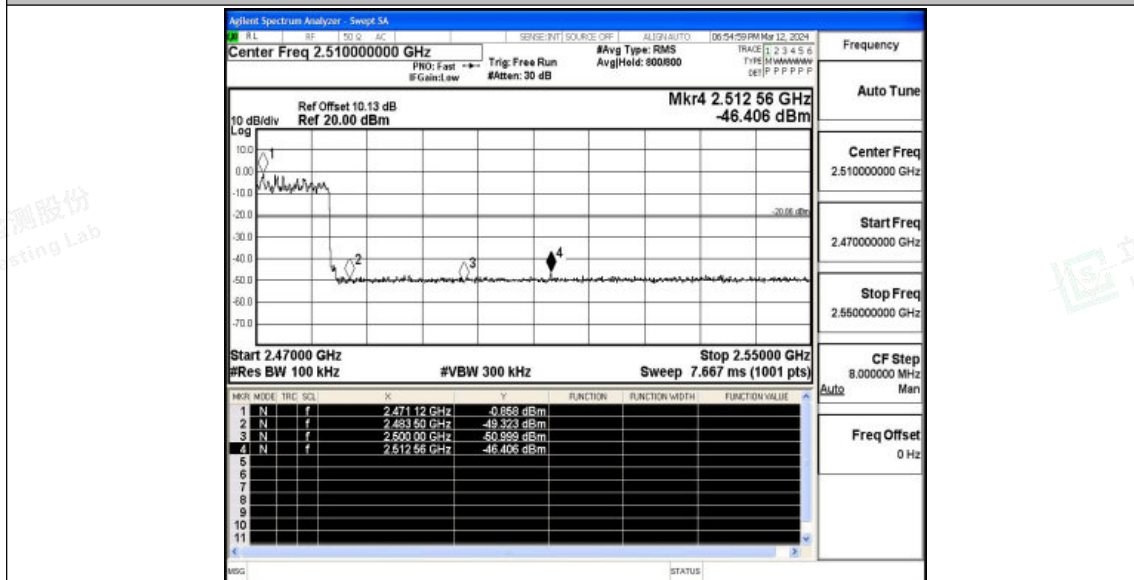


2DH5_Ant1_Low_Hop_2402



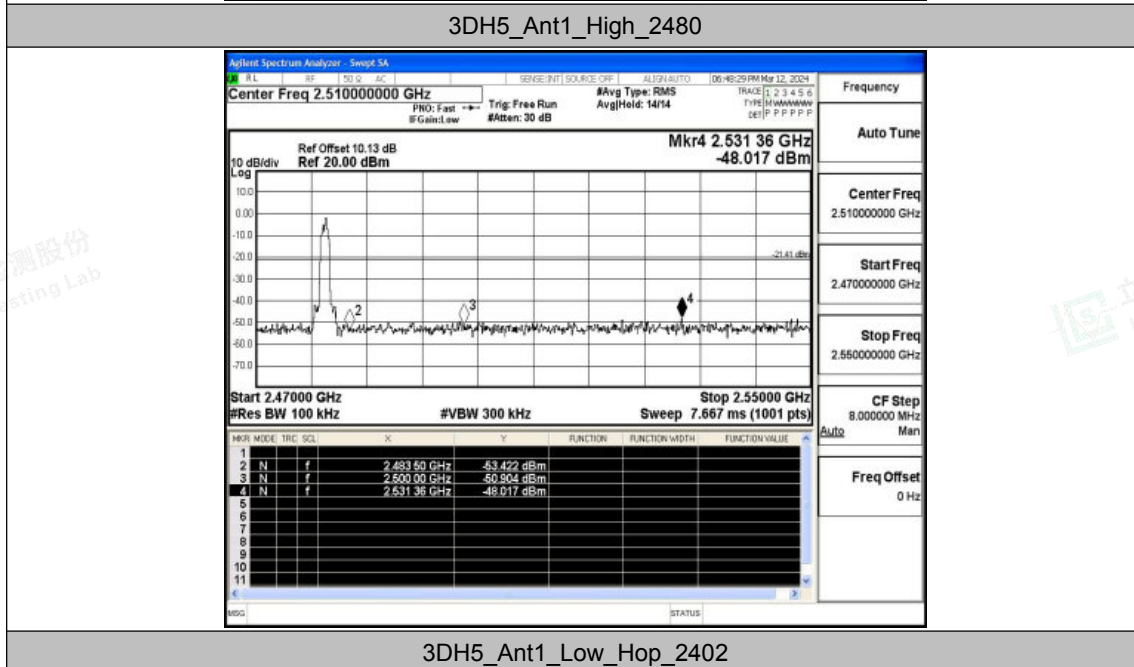
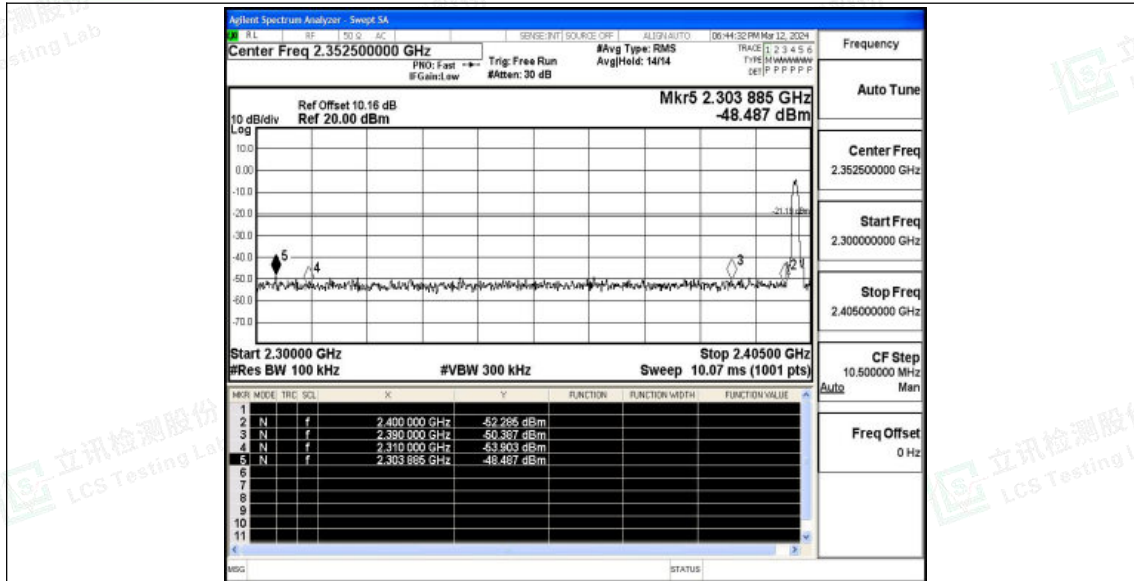


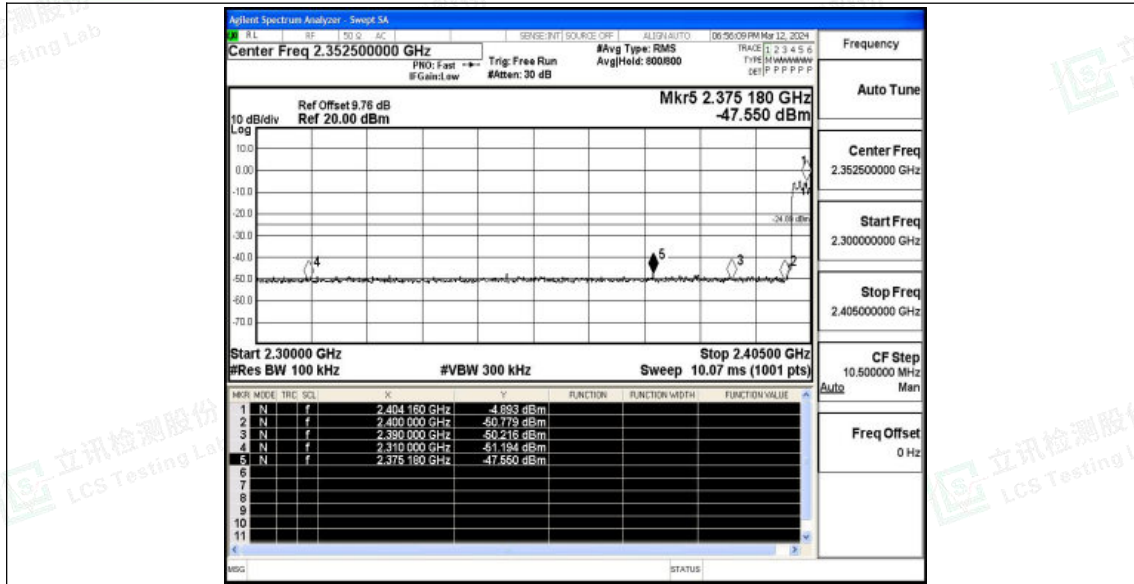
2DH5_Ant1_High_Hop_2480



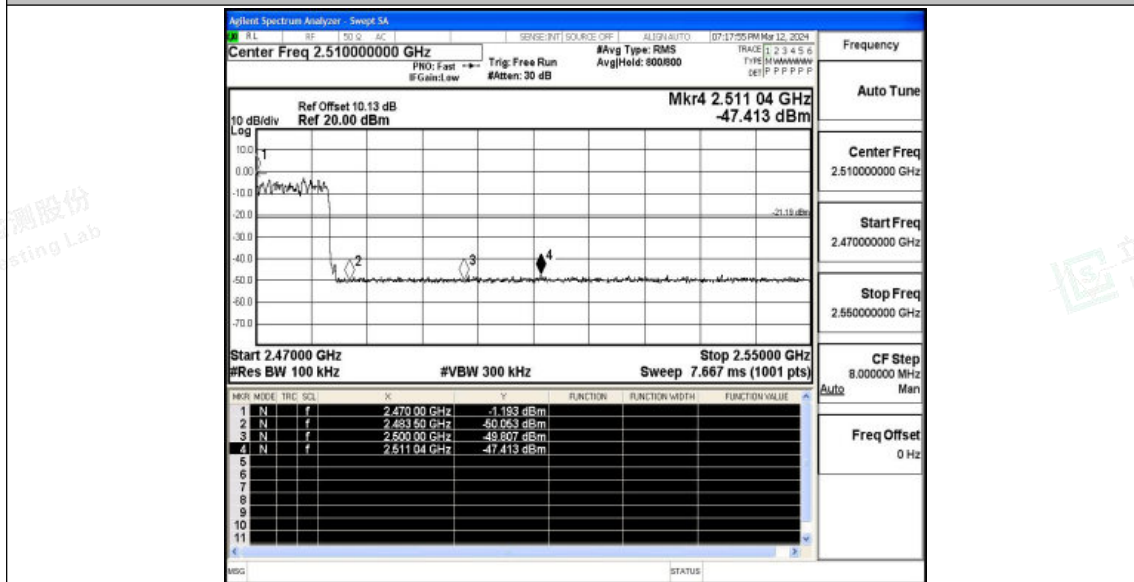
3DH5_Ant1_Low_2402







3DH5_Ant1_High_Hop_2480





A.7 Conducted Spurious Emission

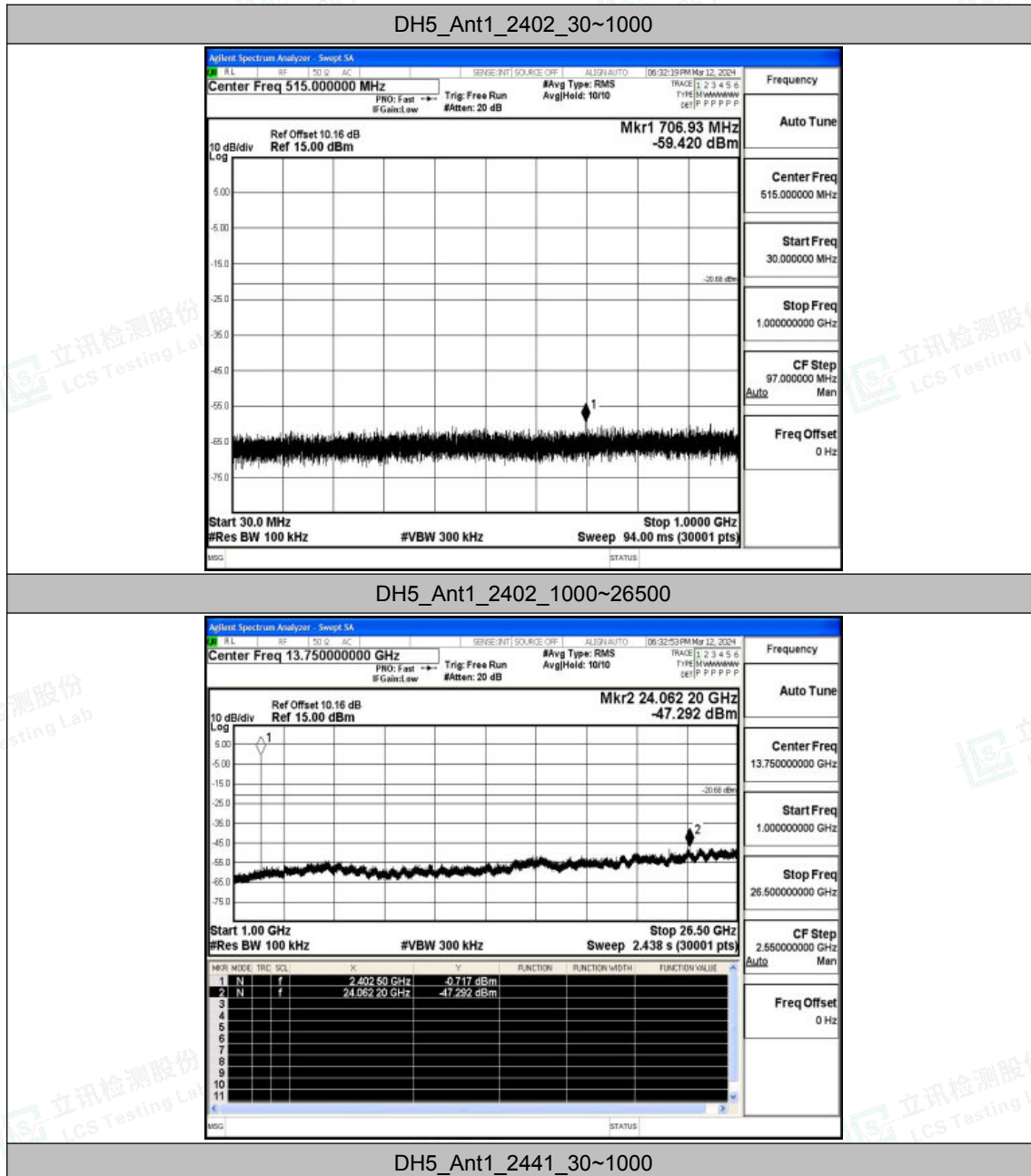
Test Result

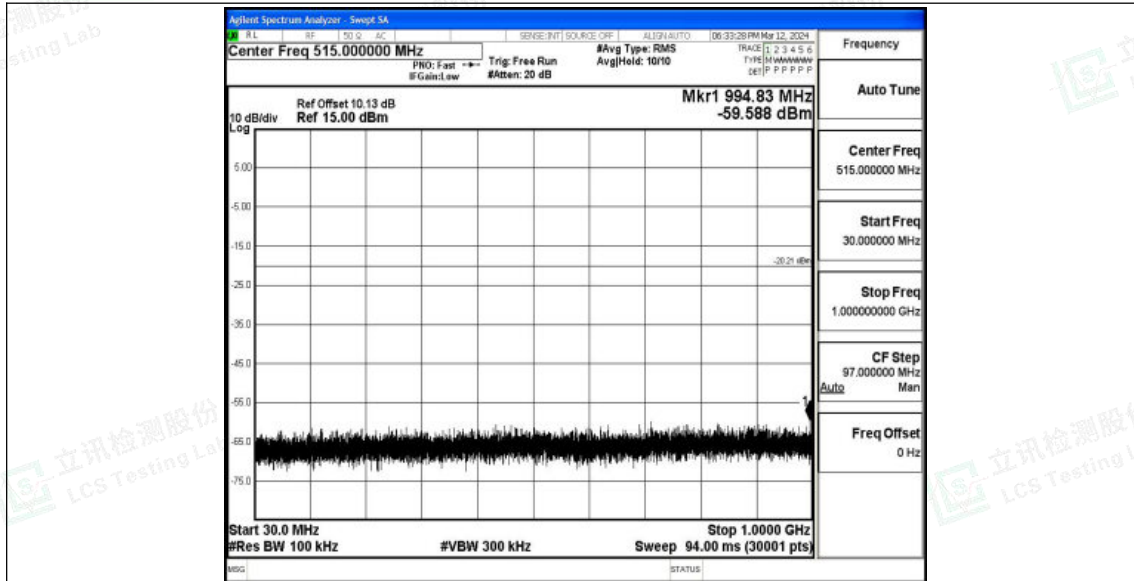
TestMode	Antenna	Frequency[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	2402	30~1000	-0.68	-59.42	≤-20.68	PASS
			1000~26500	-0.68	-47.29	≤-20.68	PASS
		2441	30~1000	-0.21	-59.59	≤-20.21	PASS
			1000~26500	-0.21	-46.96	≤-20.21	PASS
		2480	30~1000	-0.22	-59.46	≤-20.22	PASS
			1000~26500	-0.22	-47.56	≤-20.22	PASS
2DH5	Ant1	2402	30~1000	-1.92	-59.75	≤-21.92	PASS
			1000~26500	-1.92	-46.74	≤-21.92	PASS
		2441	30~1000	-1.63	-59.45	≤-21.63	PASS
			1000~26500	-1.63	-47.39	≤-21.63	PASS
		2480	30~1000	-1.75	-59.8	≤-21.75	PASS
			1000~26500	-1.75	-47.01	≤-21.75	PASS
3DH5	Ant1	2402	30~1000	-1.19	-59.26	≤-21.19	PASS
			1000~26500	-1.19	-47.85	≤-21.19	PASS
		2441	30~1000	-1.20	-60.2	≤-21.2	PASS
			1000~26500	-1.20	-46.59	≤-21.2	PASS
		2480	30~1000	-1.41	-59.33	≤-21.41	PASS
			1000~26500	-1.41	-46.69	≤-21.41	PASS



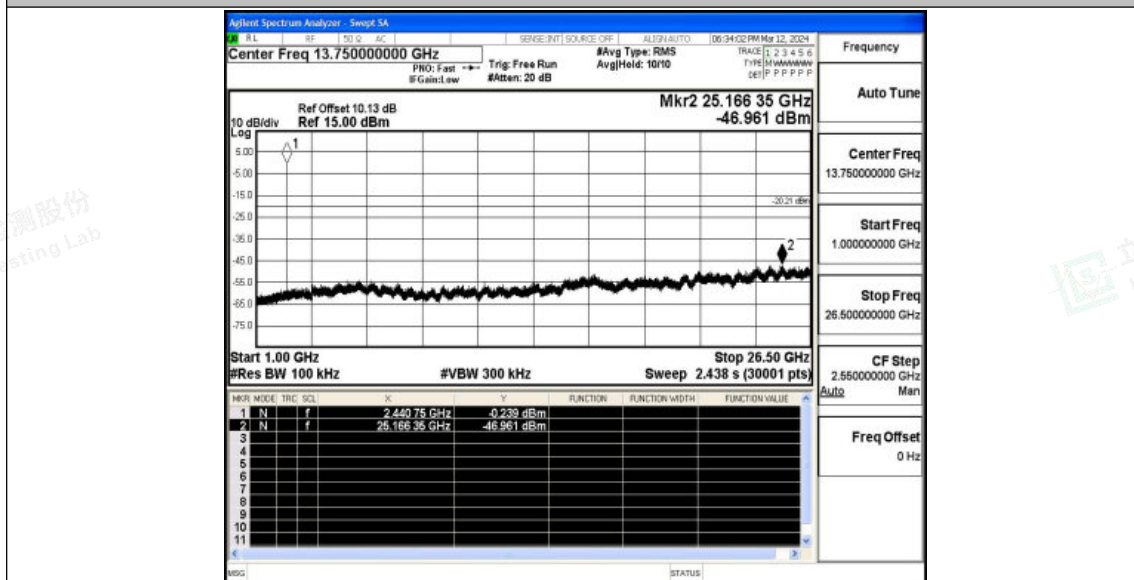


Test Graphs



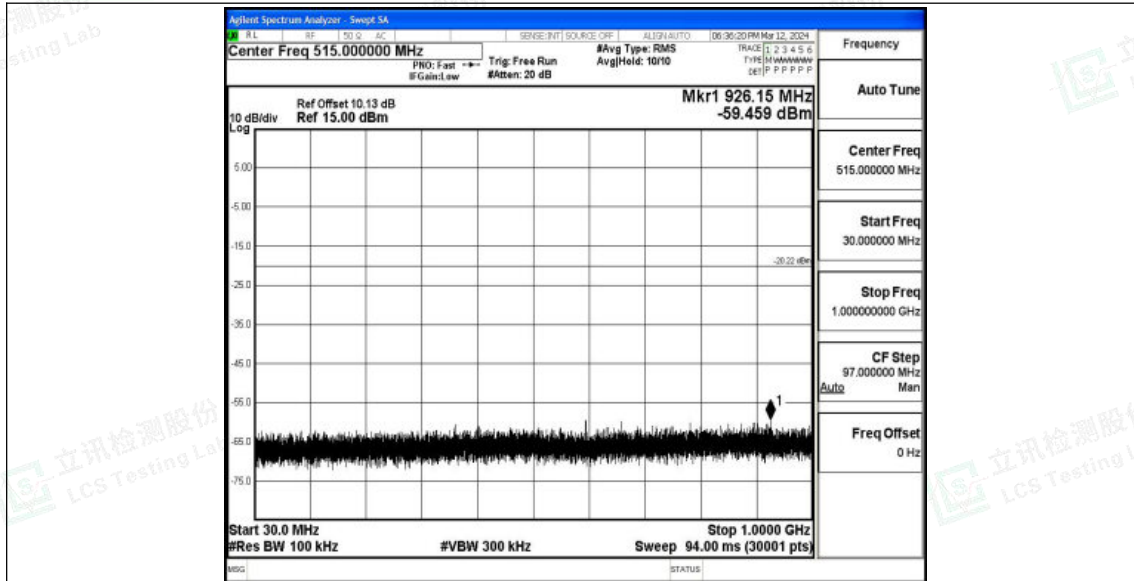


DH5_Ant1_2441_1000~26500

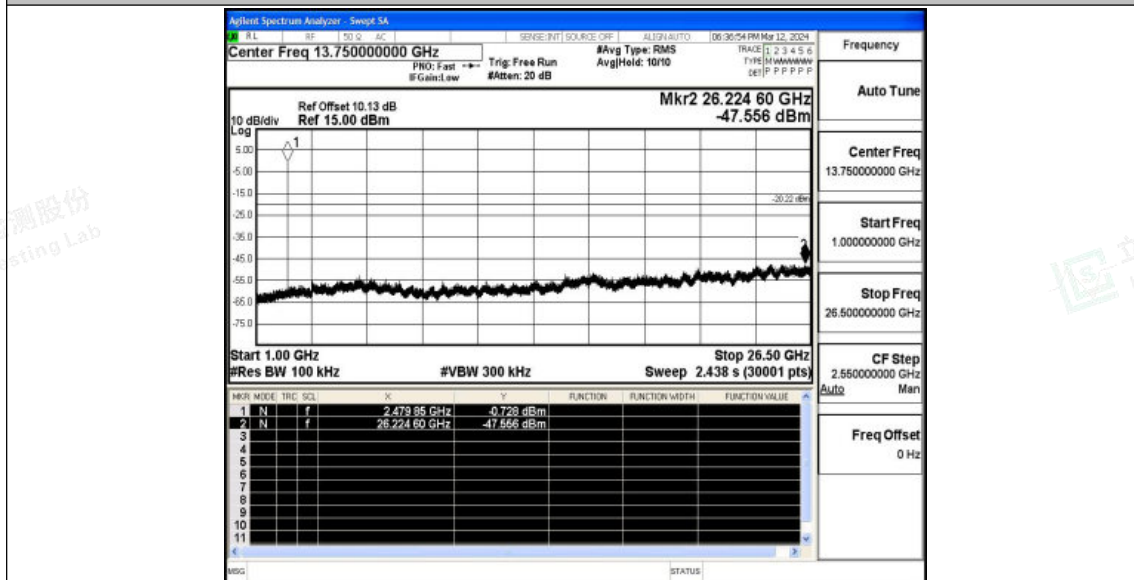


DH5_Ant1_2480_30~1000



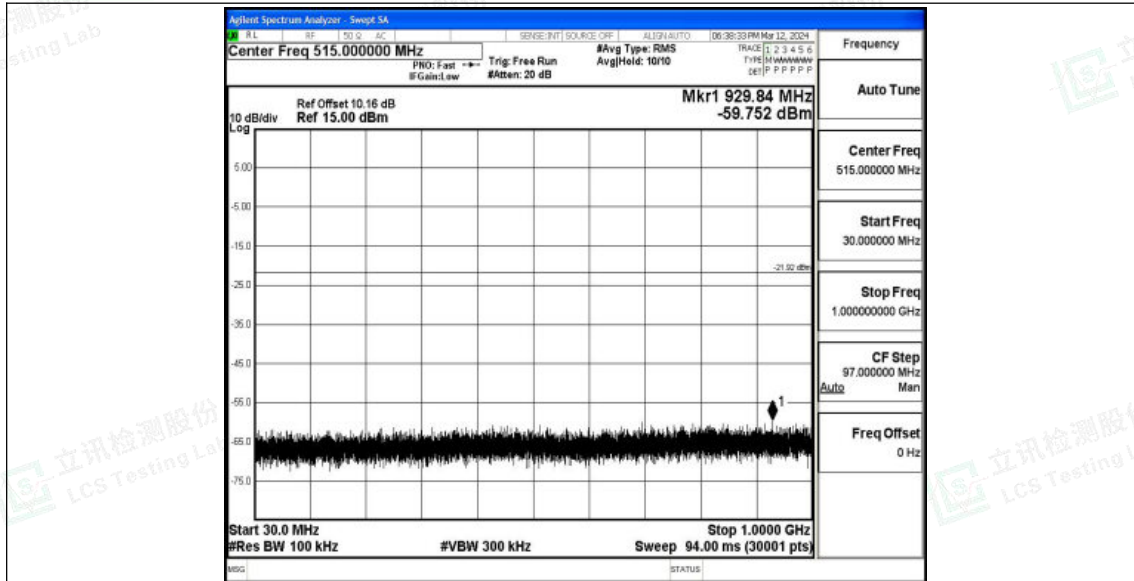


DH5_Ant1_2480_1000~26500

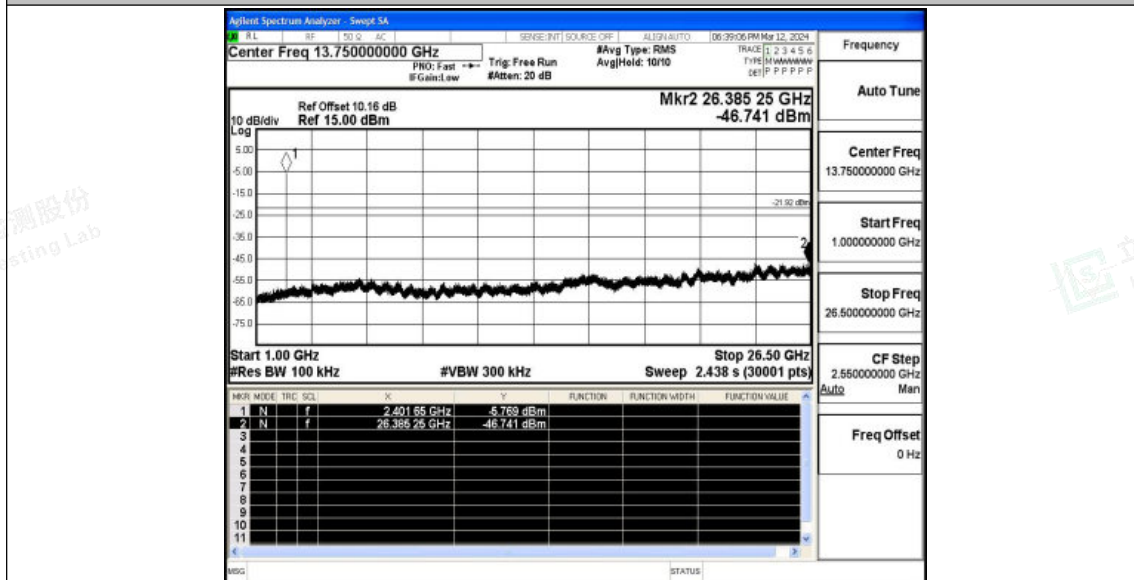


2DH5_Ant1_2402_30~1000



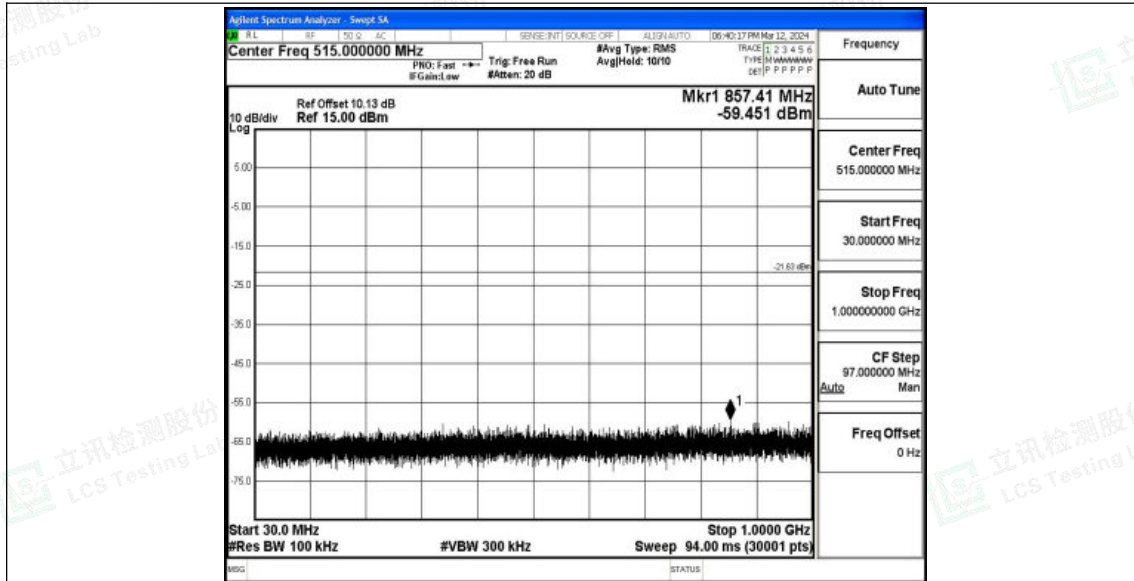


2DH5_Ant1_2402_1000~26500

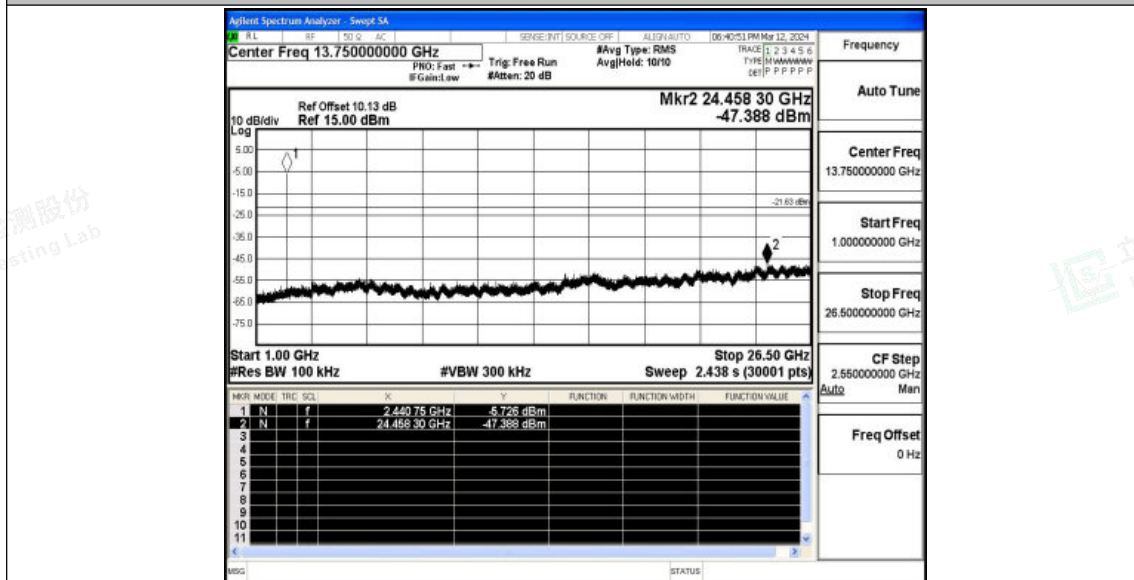


2DH5_Ant1_2441_30~1000



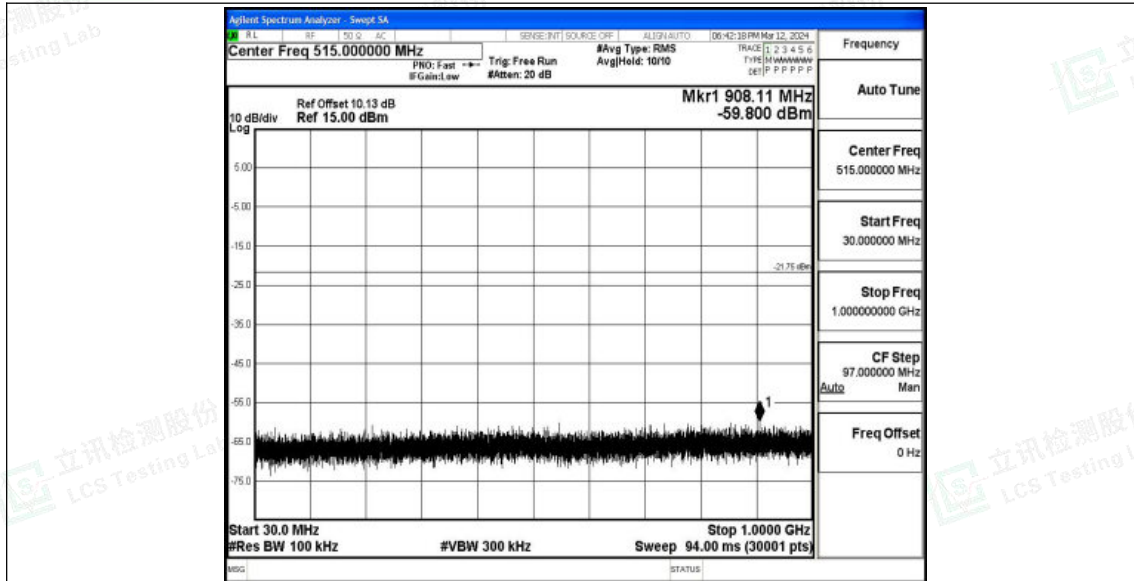


2DH5_Ant1_2441_1000~26500

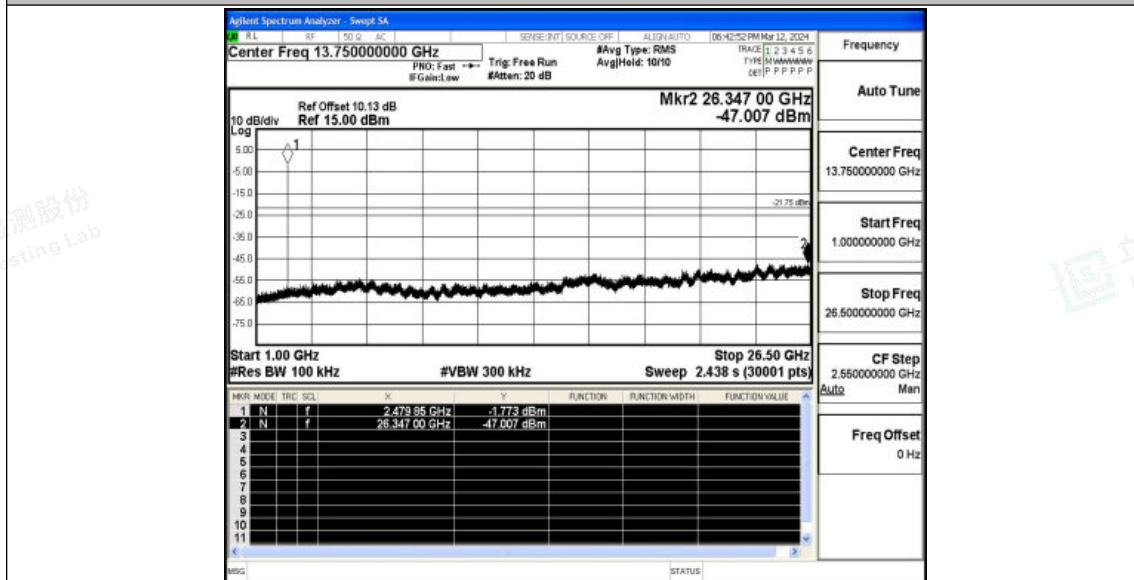


2DH5_Ant1_2480_30~1000



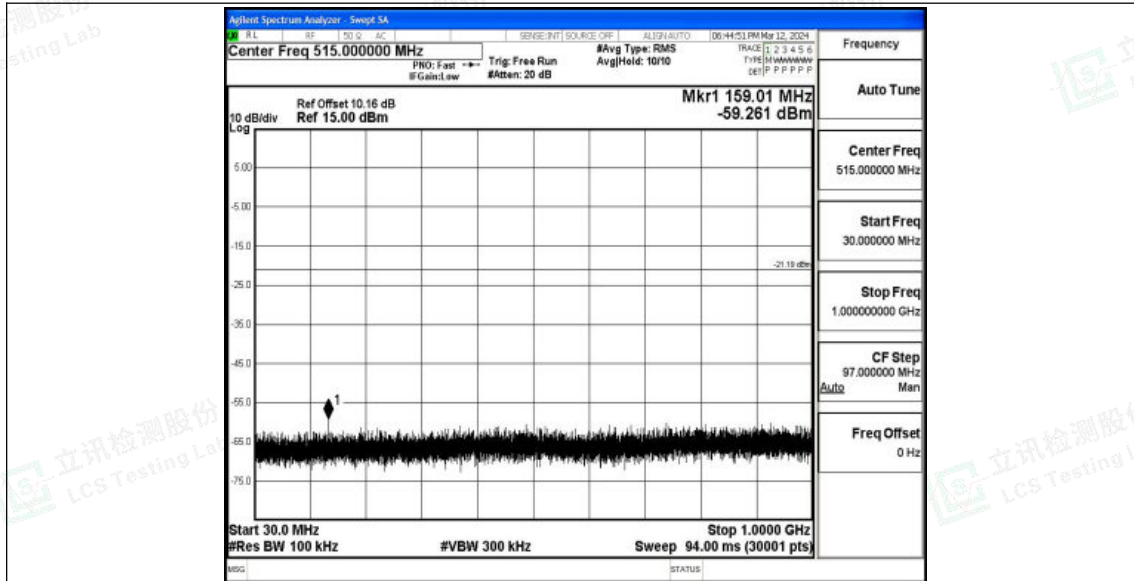


2DH5_Ant1_2480_1000~26500

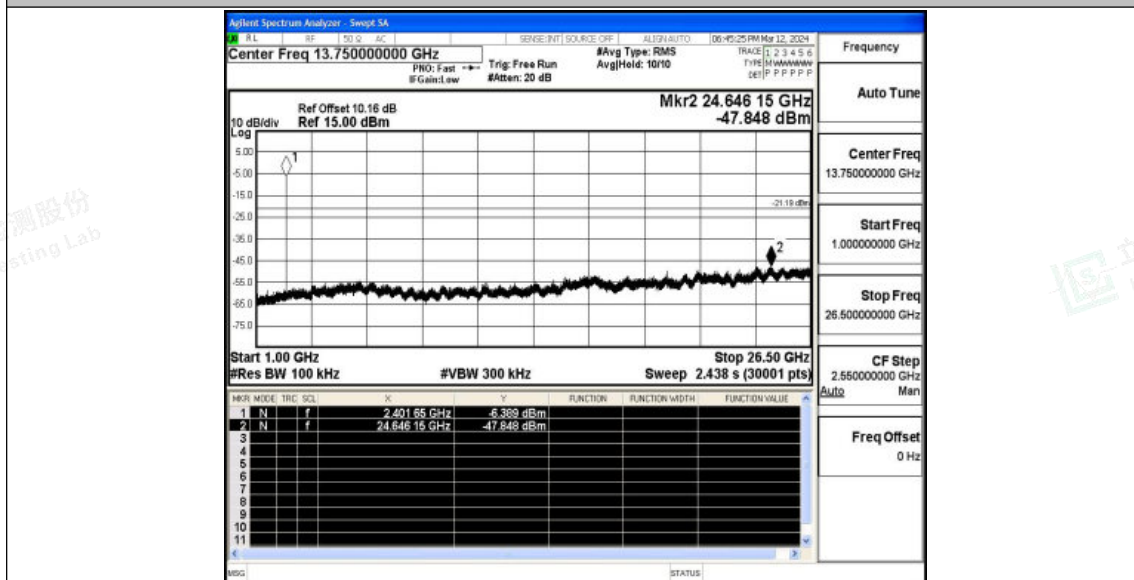


3DH5_Ant1_2402_30~1000



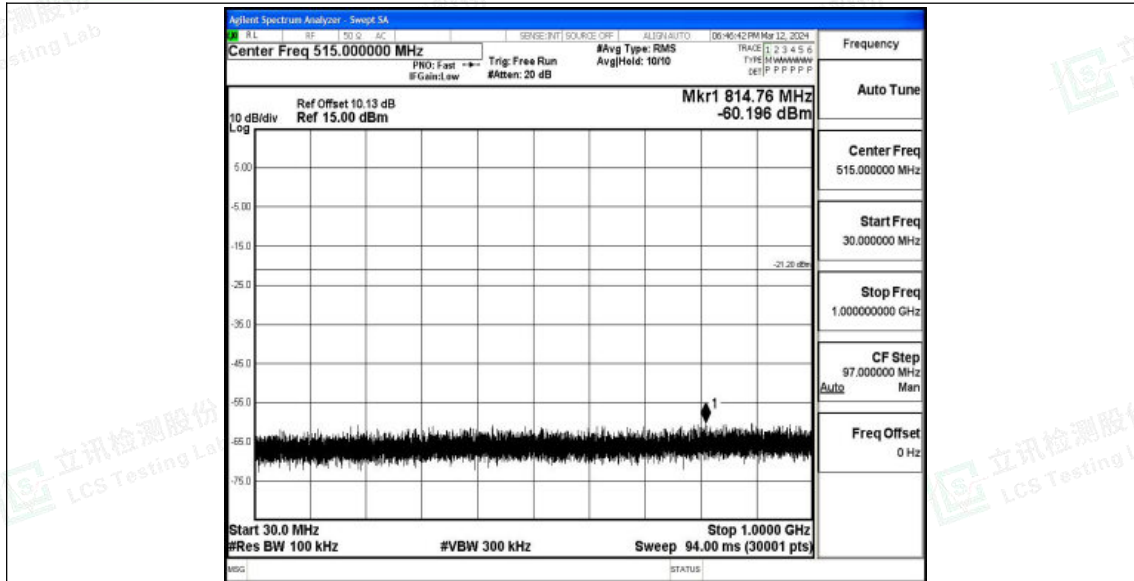


3DH5_Ant1_2402_1000~26500

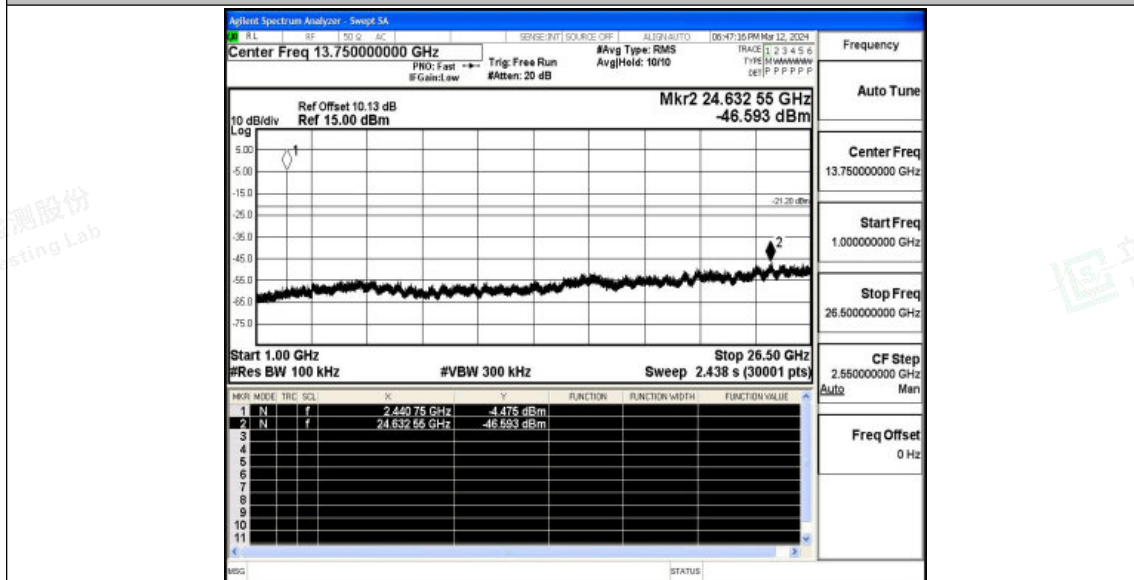


3DH5_Ant1_2441_30~1000



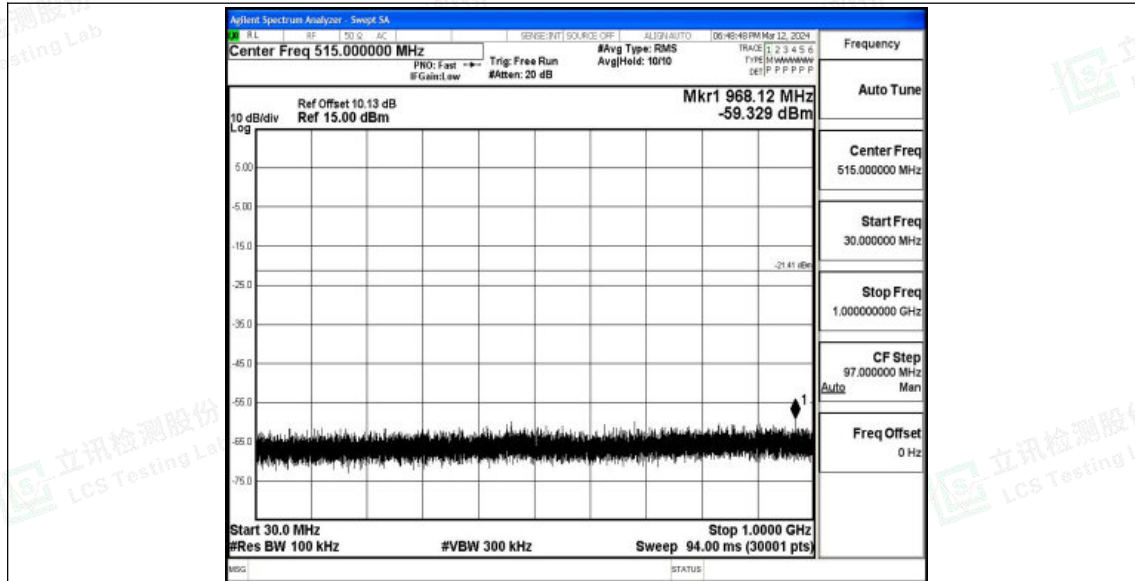


3DH5_Ant1_2441_1000~26500

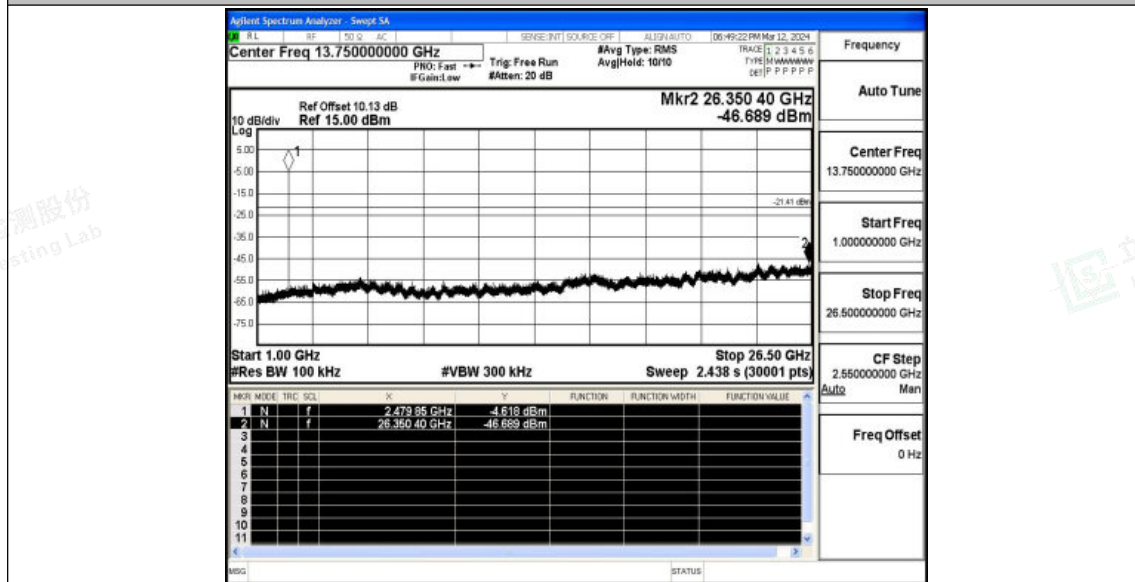


3DH5_Ant1_2480_30~1000





3DH5_Ant1_2480_1000~26500





Reference Level

Test Result

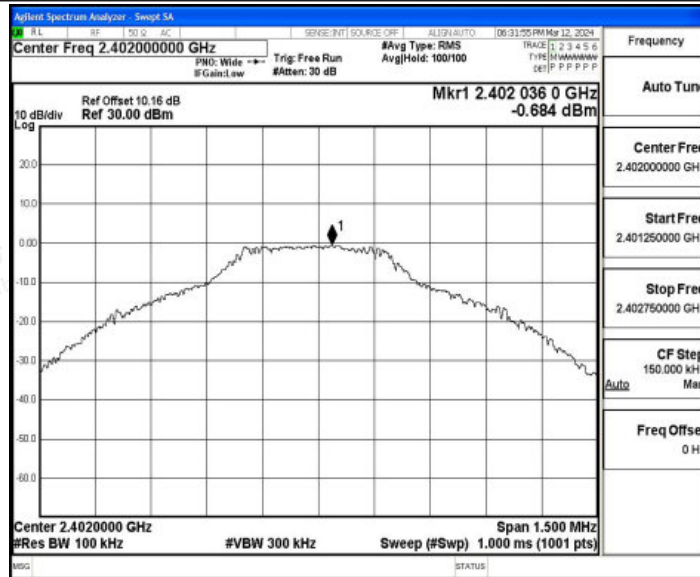
TestMode	Antenna	ChName	Frequency[MHz]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	2402	2402.04	-0.68	---	PASS
		2441	2441.13	-0.21	---	PASS
		2480	2479.85	-0.22	---	PASS
2DH5	Ant1	2402	2402.13	-1.92	---	PASS
		2441	2440.81	-1.63	---	PASS
		2480	2480.12	-1.75	---	PASS
3DH5	Ant1	2402	2401.82	-1.19	---	PASS
		2441	2440.84	-1.20	---	PASS
		2480	2480.14	-1.41	---	PASS



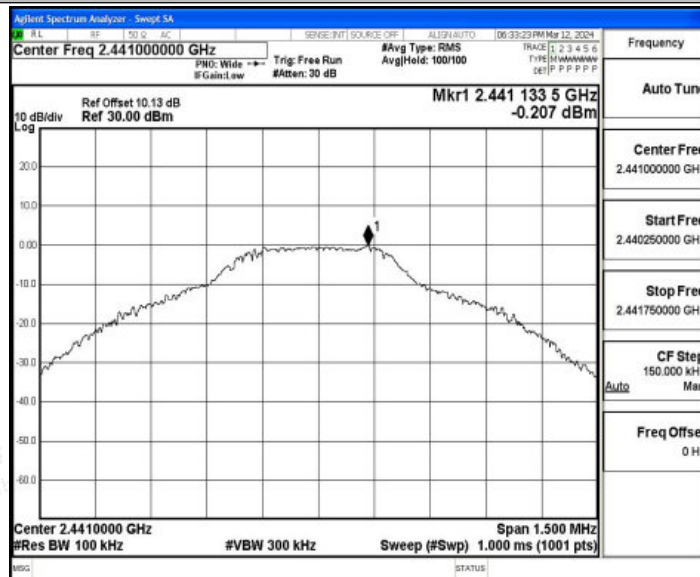


Test Graphs

DH5_Ant1_2402

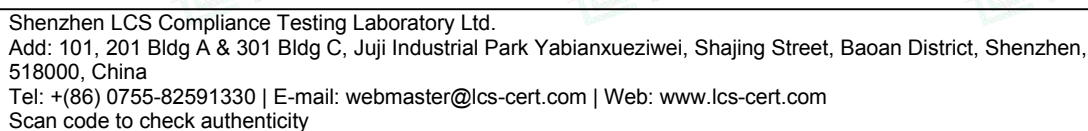
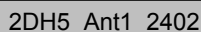


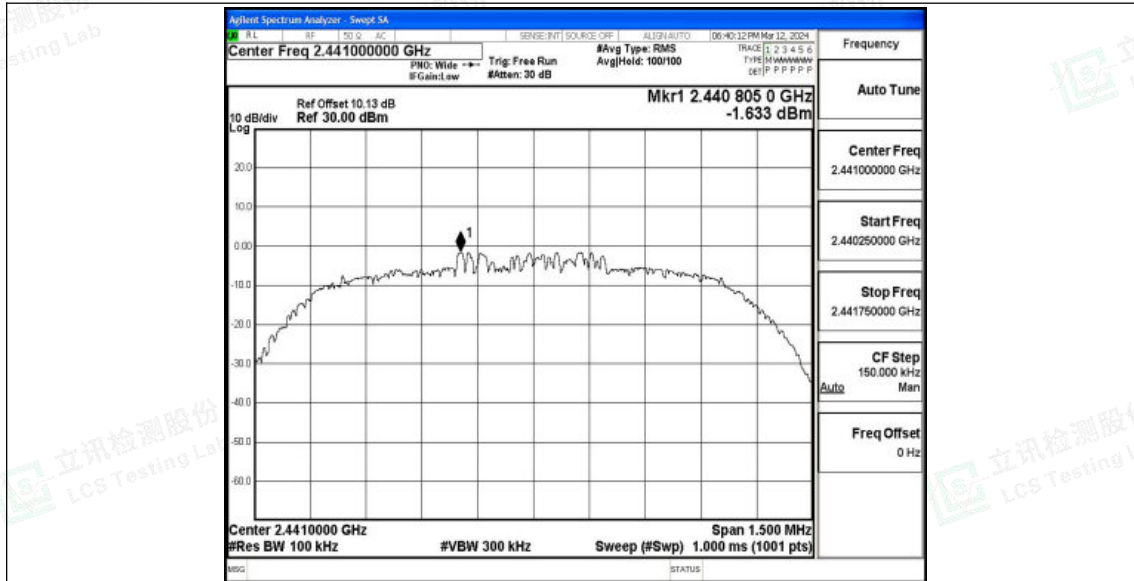
DH5_Ant1_2441



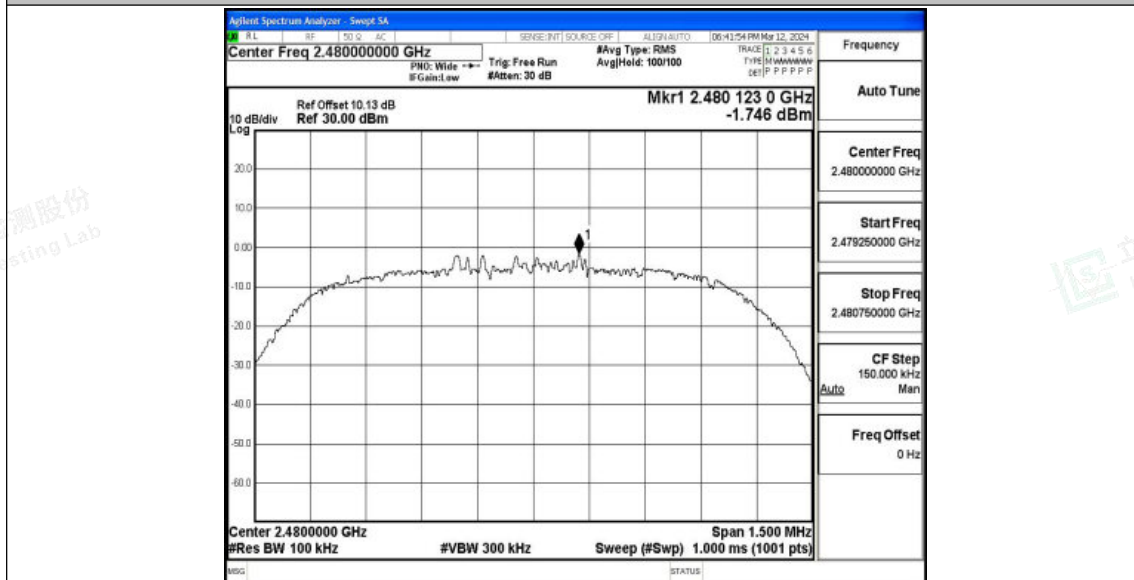
DH5_Ant1_2480





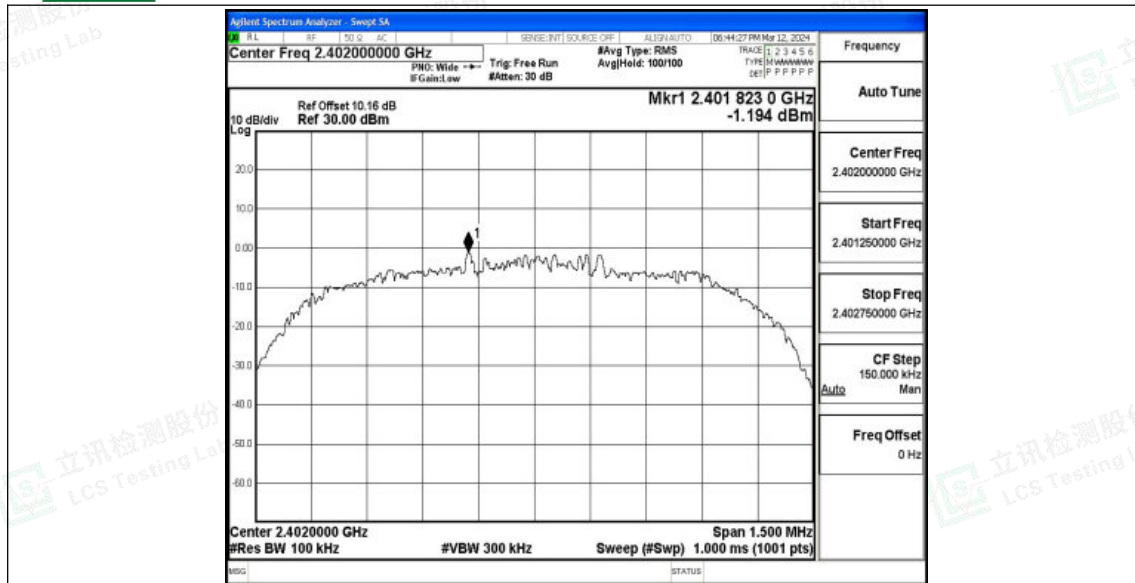


2DH5_Ant1_2480

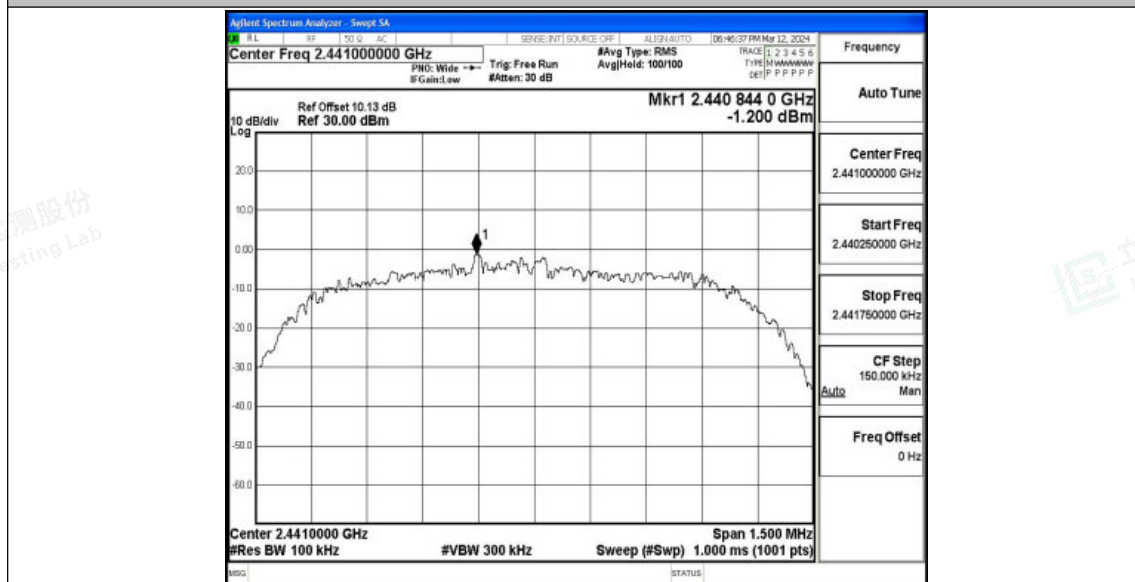


3DH5_Ant1_2402



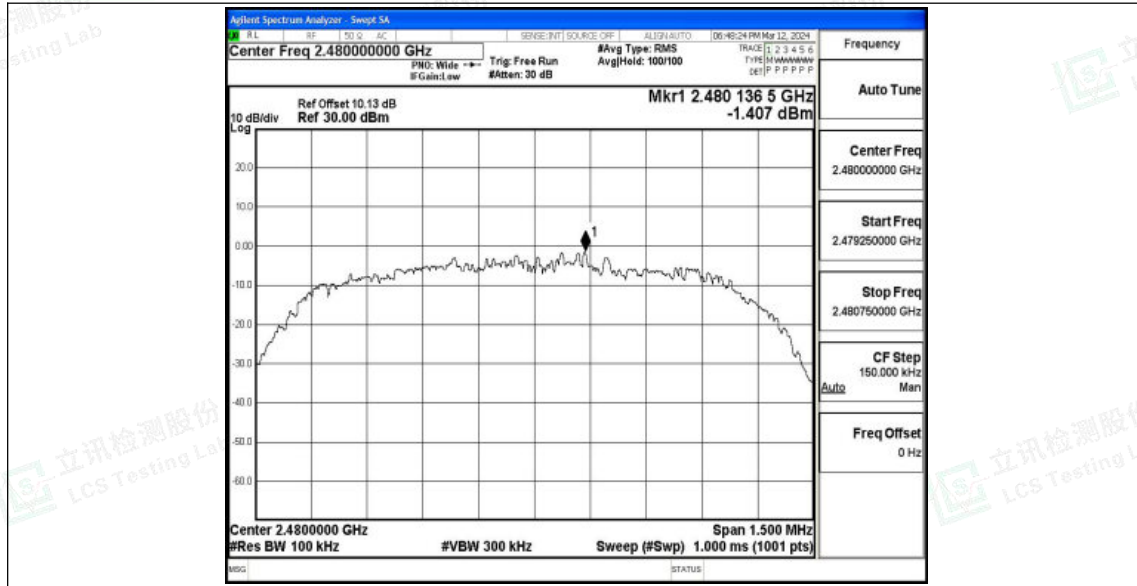


3DH5_Ant1_2441



3DH5_Ant1_2480







A.8 Duty Cycle

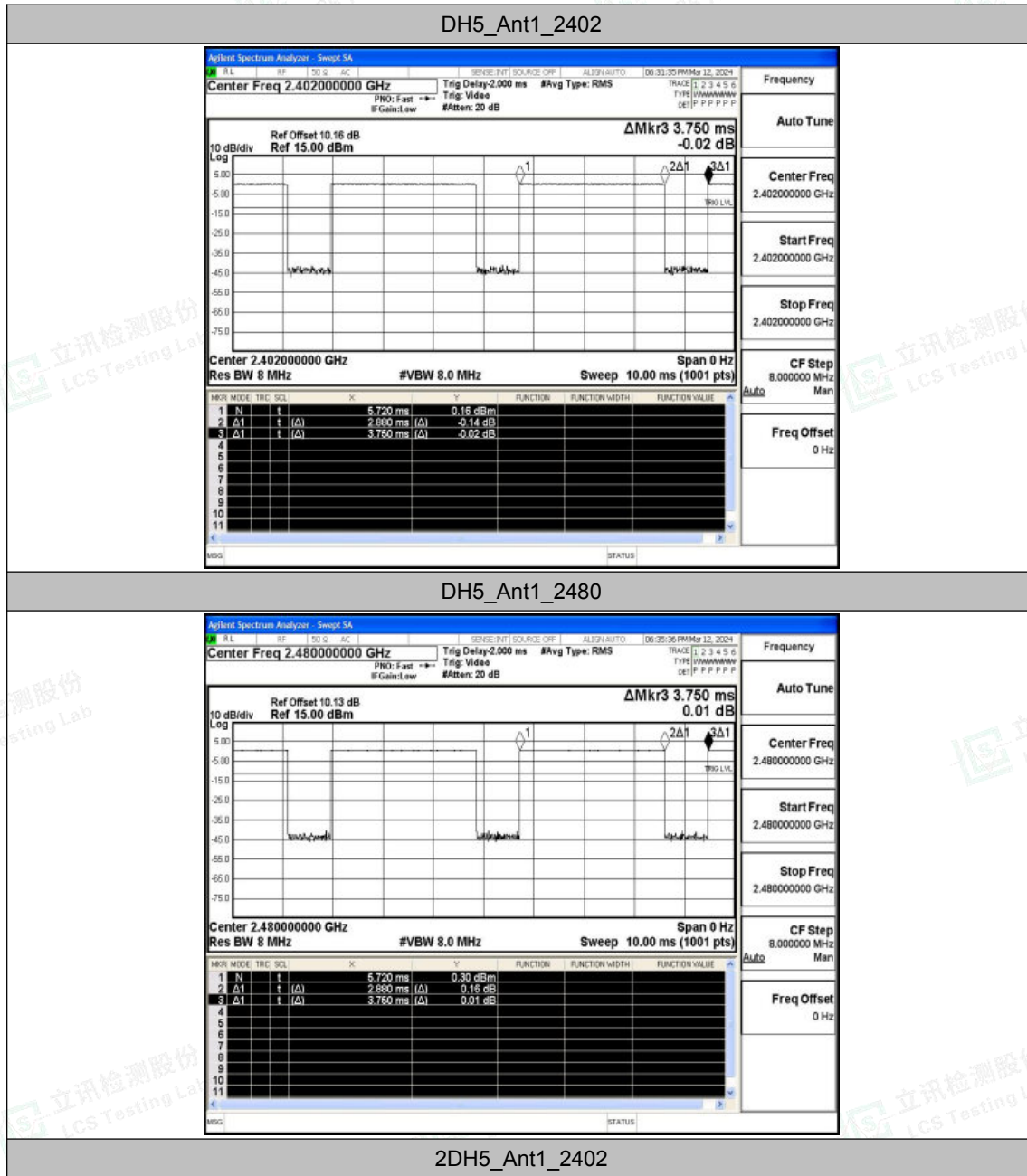
Test Result

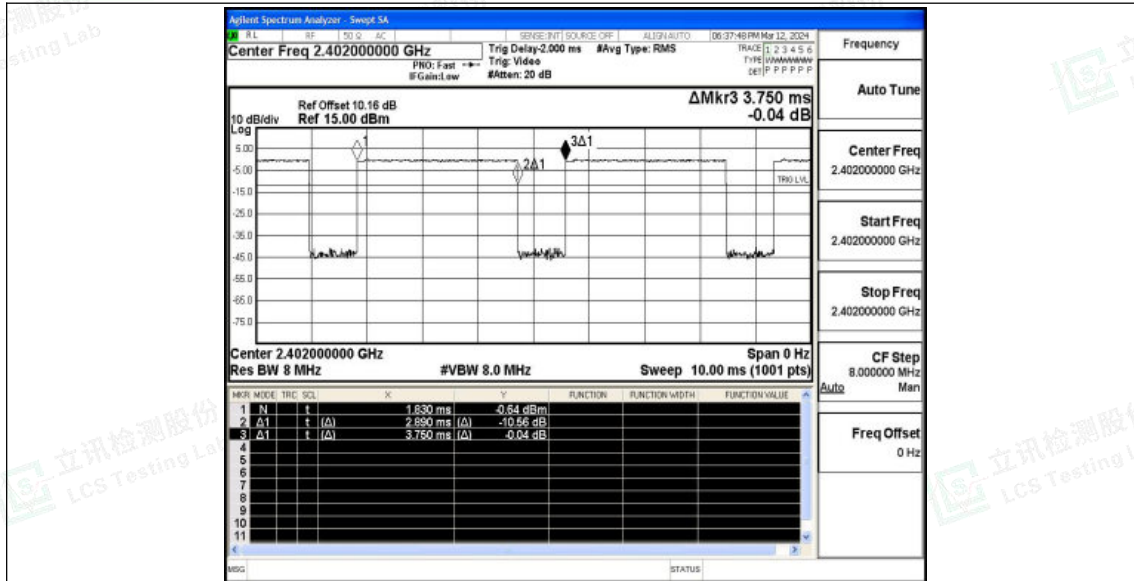
TestMode	Antenna	Frequency[MHz]	ON Time[ms]	Period[ms]	Duty Cycle[%]	Duty Cycle Factor[dB]	1/T Factor[kHz]
DH5	Ant1	2402	2.88	3.75	76.80	1.15	0.35
		2480	2.88	3.75	76.80	1.15	0.35
2DH5	Ant1	2402	2.89	3.75	77.07	1.13	0.35
		2441	2.89	3.75	77.07	1.13	0.35
		2480	2.89	3.75	77.07	1.13	0.35
3DH5	Ant1	2402	2.89	3.75	77.07	1.13	0.35
		2441	2.88	3.75	76.80	1.15	0.35
		2480	2.89	3.75	77.07	1.13	0.35



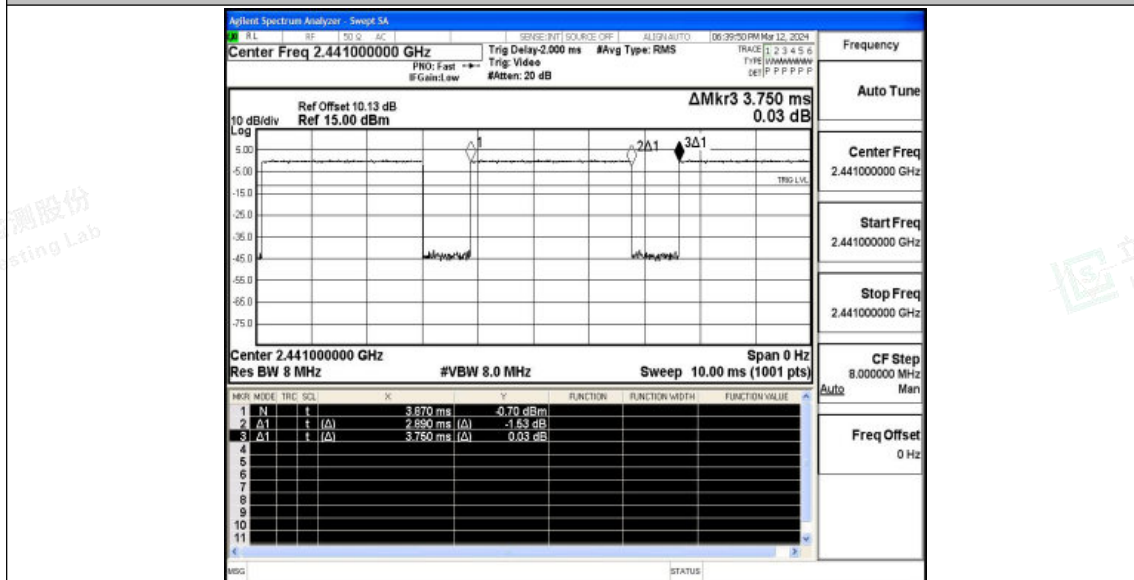


Test Graphs



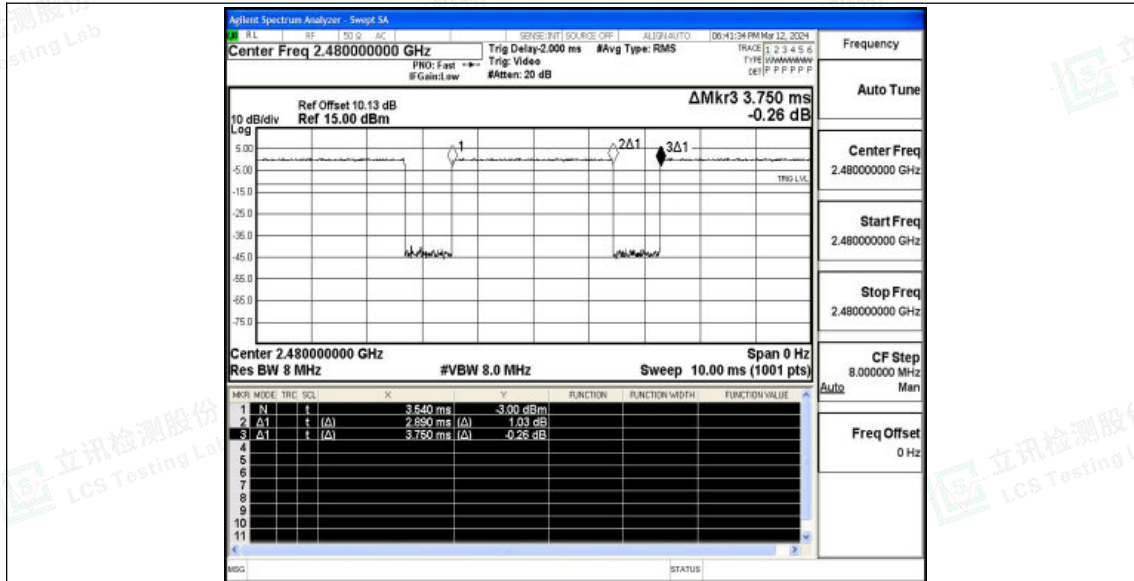


2DH5_Ant1_2441

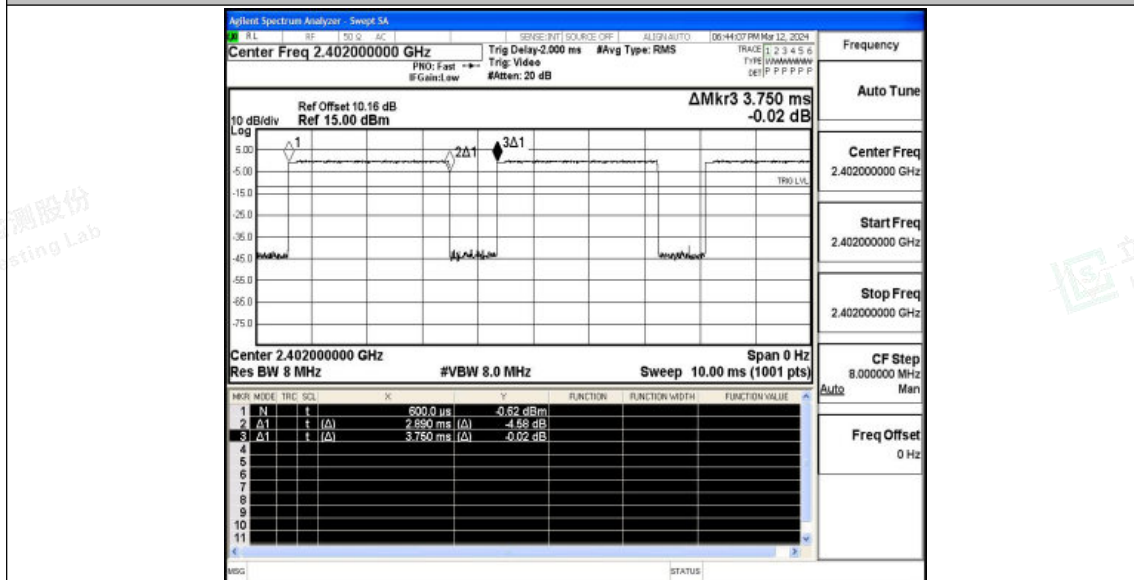


2DH5_Ant1_2480



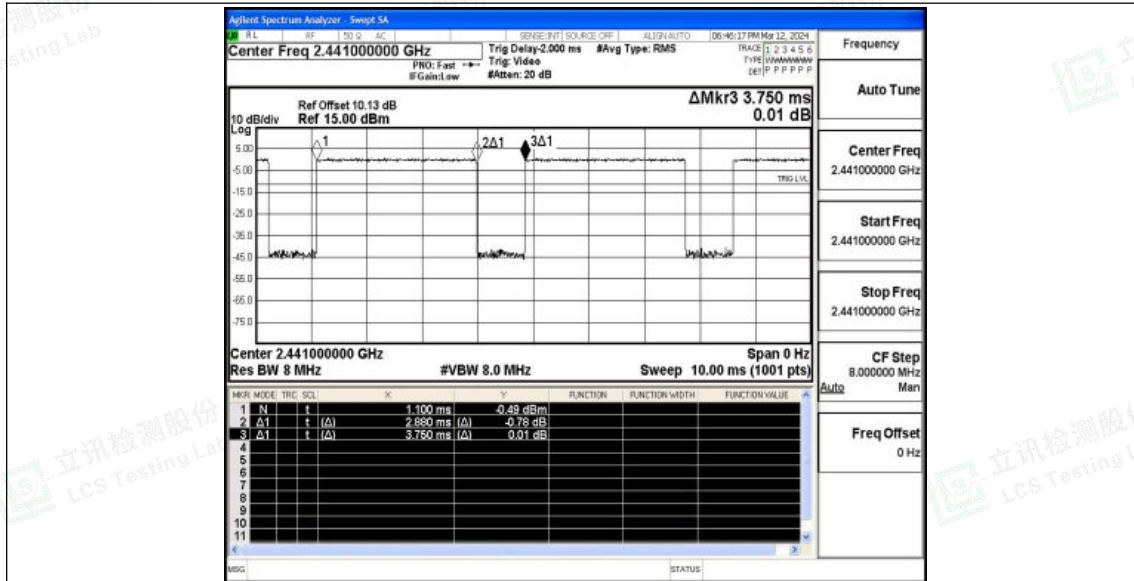


3DH5_Ant1_2402

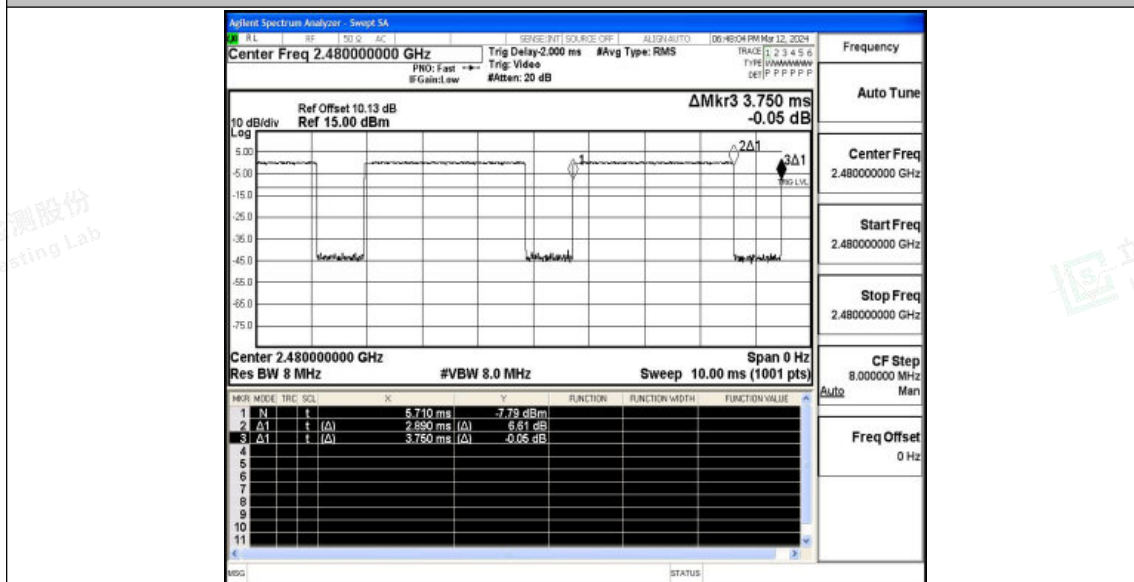


3DH5_Ant1_2441





3DH5_Ant1_2480





A.9 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
DH5	Ant1	Low	2402	AV	2310.000	-46.84	≤-41.20	48.36	≤54	PASS
				AV	2386.730	-45.79	≤-41.20	49.41	≤54	PASS
				AV	2390.000	-46.79	≤-41.20	48.41	≤54	PASS
				Peak	2310.000	-40.67	≤-21.20	54.53	≤74	PASS
				Peak	2342.105	-36.74	≤-21.20	58.46	≤74	PASS
				Peak	2390.000	-40.18	≤-21.20	55.02	≤74	PASS
		High	2480	AV	2483.500	-46.64	≤-41.20	48.56	≤54	PASS
				AV	2498.160	-45.7	≤-41.20	49.50	≤54	PASS
				AV	2500.000	-46.67	≤-41.20	48.53	≤54	PASS
				Peak	2483.500	-39.31	≤-21.20	55.89	≤74	PASS
				Peak	2493.040	-36.81	≤-21.20	58.39	≤74	PASS
				Peak	2500.000	-39.25	≤-21.20	55.95	≤74	PASS
		Low	Hop_240 2	Peak	2310.000	-41.7	≤-21.20	53.50	≤74	PASS
				Peak	2335.280	-37.21	≤-21.20	57.99	≤74	PASS
				Peak	2390.000	-41.15	≤-21.20	54.05	≤74	PASS
		High	Hop_248 0	Peak	2483.500	-39.13	≤-21.20	56.07	≤74	PASS
				Peak	2499.280	-36.83	≤-21.20	58.37	≤74	PASS
				Peak	2500.000	-39.78	≤-21.20	55.42	≤74	PASS
2DH5	Ant1	Low	2402	AV	2310.000	-45.97	≤-41.20	49.23	≤54	PASS
				AV	2385.365	-45.62	≤-41.20	49.58	≤54	PASS
				AV	2390.000	-46.69	≤-41.20	48.51	≤54	PASS
				Peak	2310.000	-40.19	≤-21.20	55.01	≤74	PASS
				Peak	2334.020	-36.49	≤-21.20	58.71	≤74	PASS
				Peak	2390.000	-40.5	≤-21.20	54.70	≤74	PASS
		High	2480	AV	2483.500	-46.46	≤-41.20	48.74	≤54	PASS
				AV	2489.600	-45.81	≤-41.20	49.39	≤54	PASS
				AV	2500.000	-46.65	≤-41.20	48.55	≤54	PASS
				Peak	2483.500	-40.24	≤-21.20	54.96	≤74	PASS
				Peak	2492.320	-36.87	≤-21.20	58.33	≤74	PASS
				Peak	2500.000	-40.76	≤-21.20	54.44	≤74	PASS
		Low	Hop_240 2	Peak	2310.000	-40.65	≤-21.20	54.55	≤74	PASS
				Peak	2367.725	-36.94	≤-21.20	58.26	≤74	PASS
				Peak	2390.000	-39.53	≤-21.20	55.67	≤74	PASS
		High	Hop_248 0	Peak	2483.500	-39.32	≤-21.20	55.88	≤74	PASS
				Peak	2488.080	-37.11	≤-21.20	58.09	≤74	PASS



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Scan code to check authenticity



3DH5	Ant1	Low	2402	Peak	2500.000	-39.69	≤-21.20	55.51	≤74	PASS
				AV	2310.000	-46.58	≤-41.20	48.62	≤54	PASS
				AV	2379.485	-45.87	≤-41.20	49.33	≤54	PASS
				AV	2390.000	-46.84	≤-41.20	48.36	≤54	PASS
				Peak	2310.000	-40.3	≤-21.20	54.90	≤74	PASS
				Peak	2367.095	-36.94	≤-21.20	58.26	≤74	PASS
				Peak	2390.000	-38.26	≤-21.20	56.94	≤74	PASS
		High	2480	AV	2483.500	-46.98	≤-41.20	48.22	≤54	PASS
				AV	2488.080	-45.7	≤-41.20	49.50	≤54	PASS
				AV	2500.000	-46.01	≤-41.20	49.19	≤54	PASS
				Peak	2483.500	-38.58	≤-21.20	56.62	≤74	PASS
				Peak	2498.640	-37.29	≤-21.20	57.91	≤74	PASS
				Peak	2500.000	-39.9	≤-21.20	55.30	≤74	PASS
		Low	Hop_240 2	Peak	2310.000	-41.86	≤-21.20	53.34	≤74	PASS
				Peak	2364.365	-36.62	≤-21.20	58.58	≤74	PASS
				Peak	2390.000	-40.26	≤-21.20	54.94	≤74	PASS
		High	Hop_248 0	Peak	2483.500	-39.37	≤-21.20	55.83	≤74	PASS
				Peak	2490.240	-36.89	≤-21.20	58.31	≤74	PASS
				Peak	2500.000	-40.75	≤-21.20	54.45	≤74	PASS

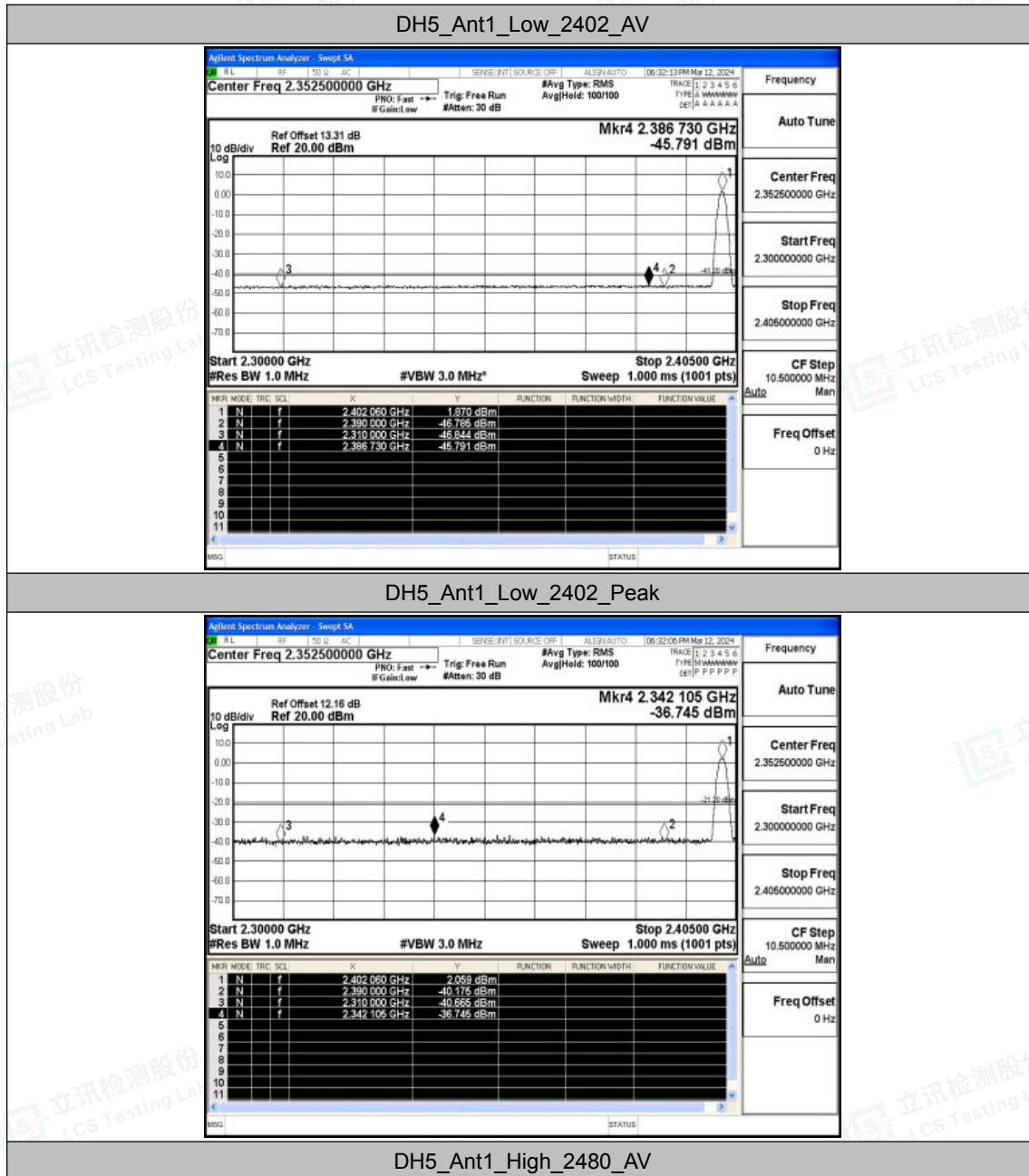
Note:

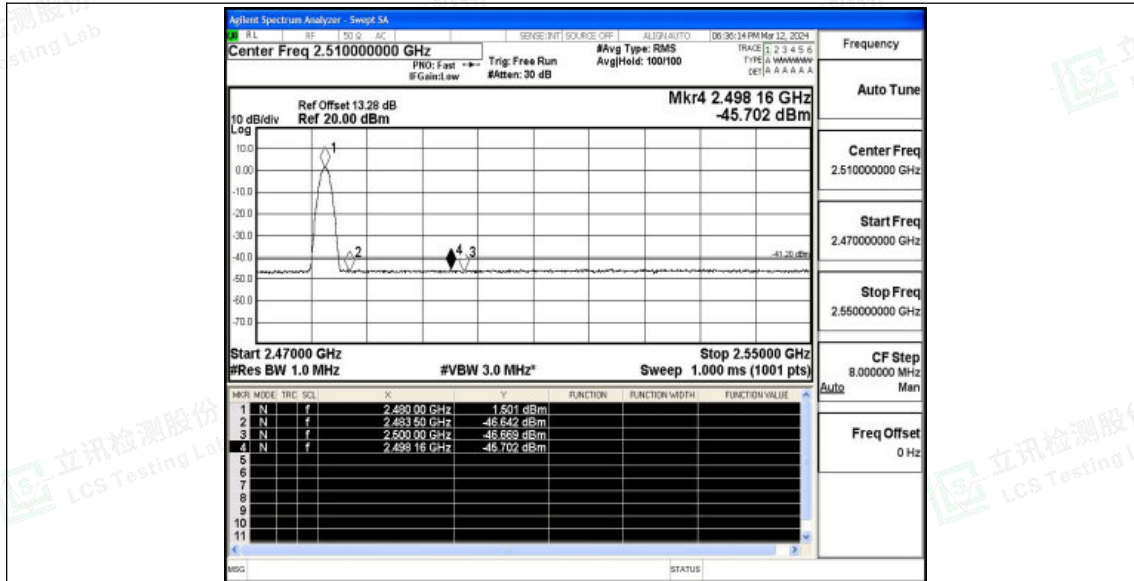
1. The Antenna Gain is compensated in the graph. The Correction Factor is compensated in the graph.
2. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.



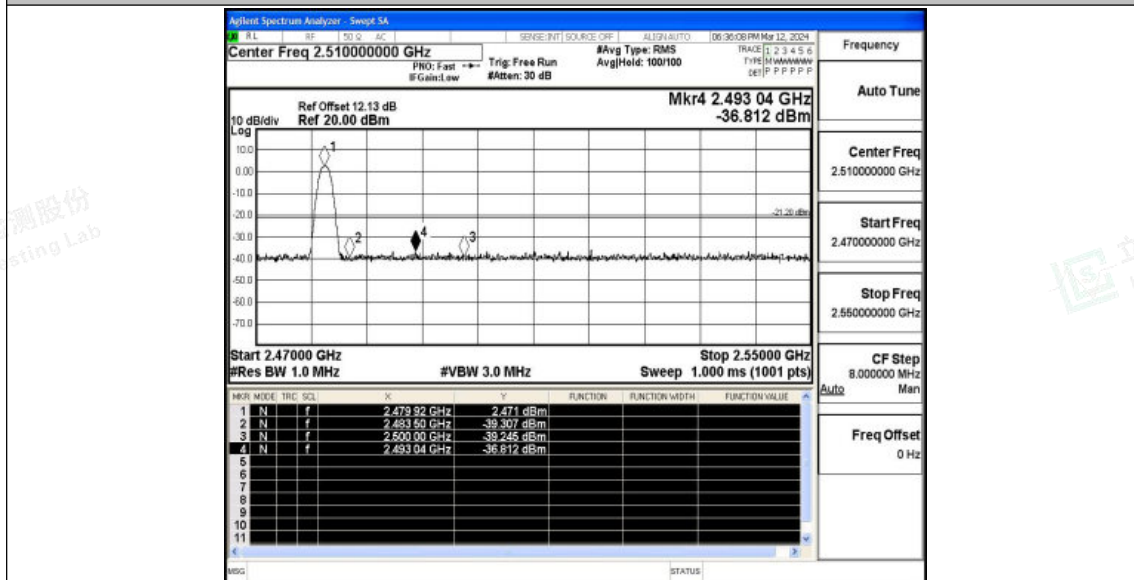


Test Graphs



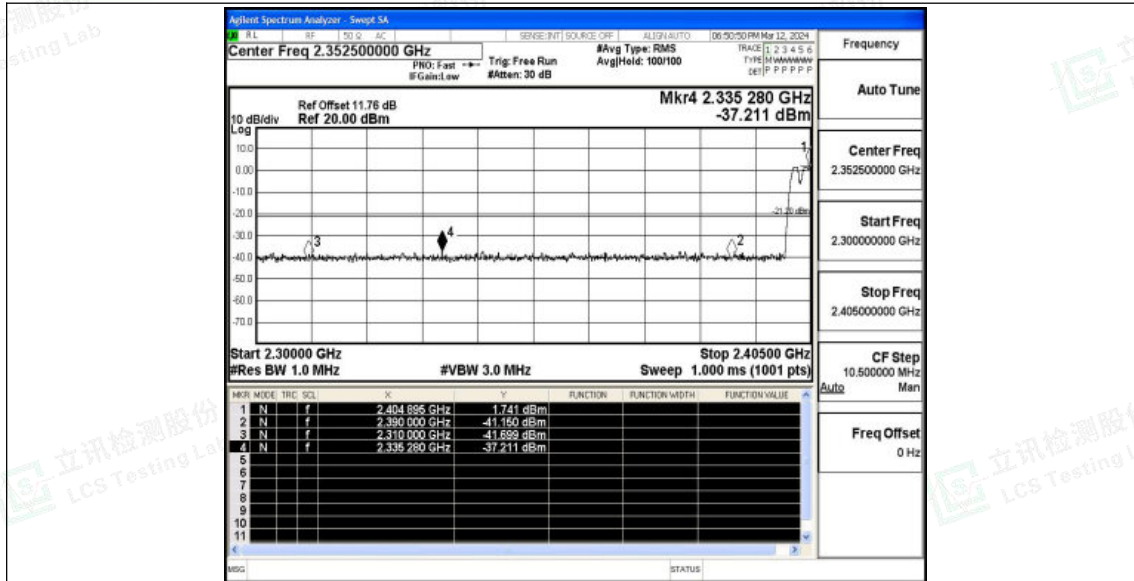


DH5_Ant1_High_2480_Peak

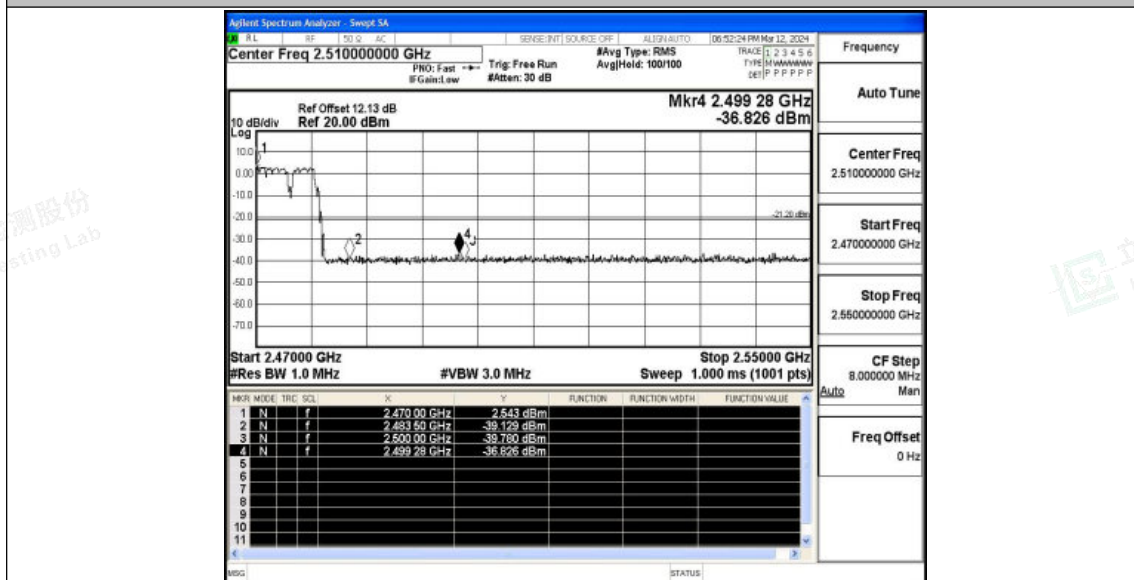


DH5_Ant1_Low_Hop_2402_Peak



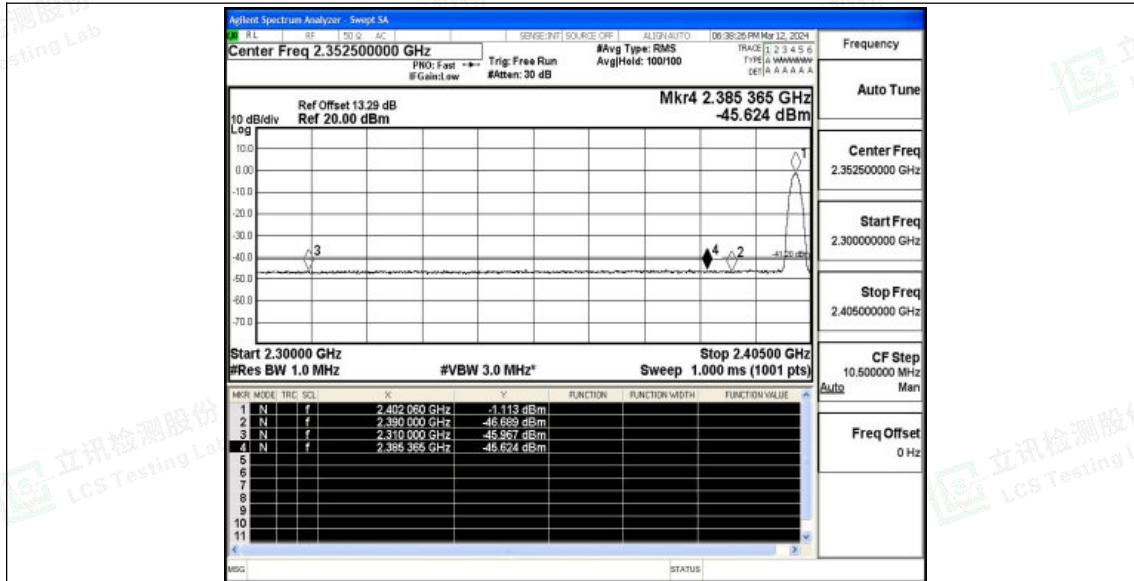


DH5_Ant1_High_Hop_2480_Peak

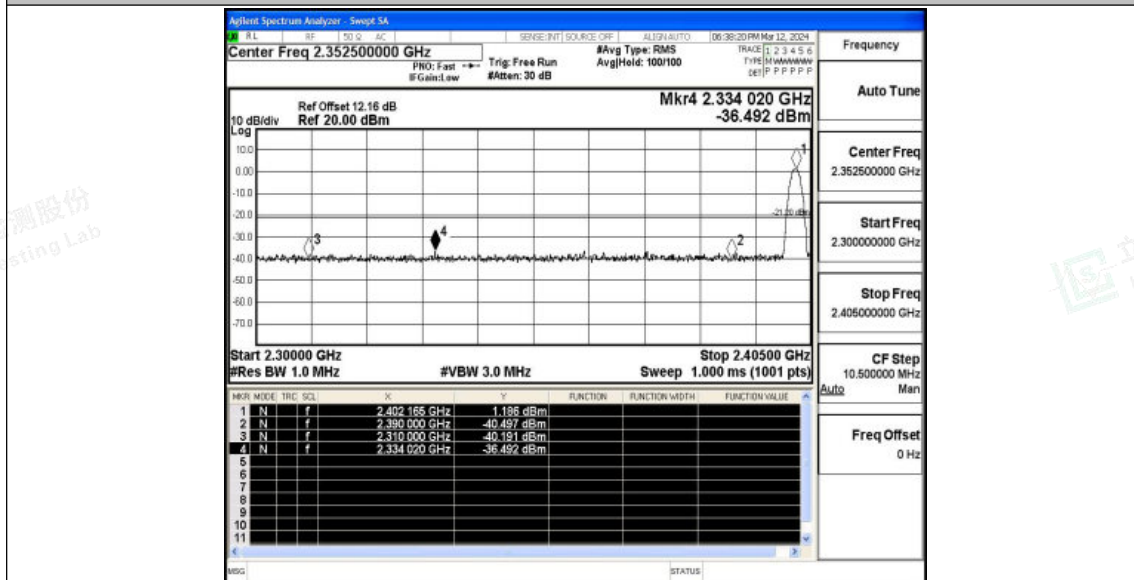


2DH5_Ant1_Low_2402_AV



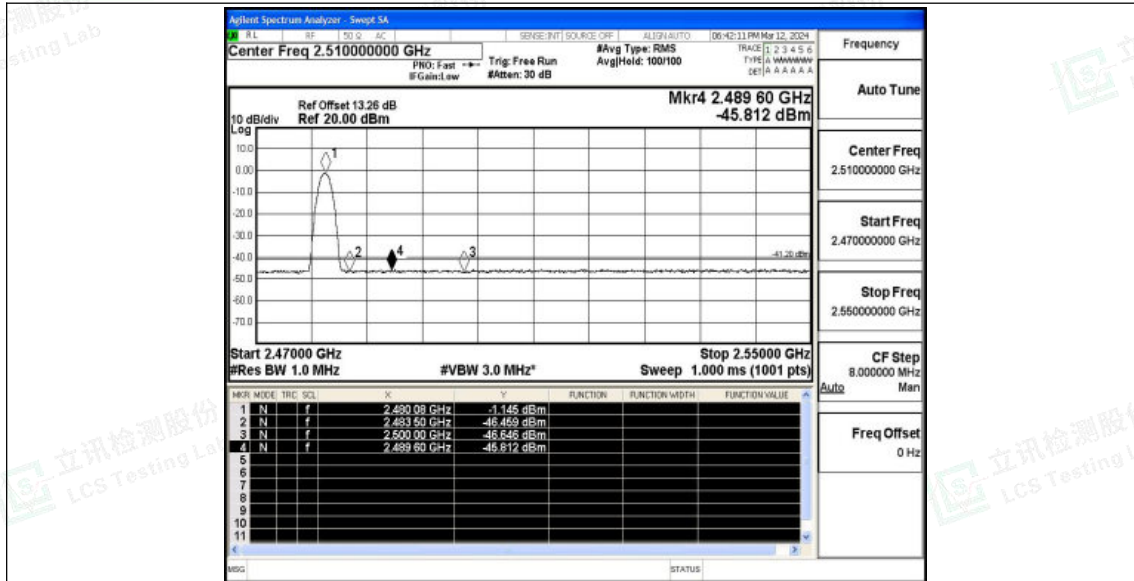


2DH5_Ant1_Low_2402_Peak

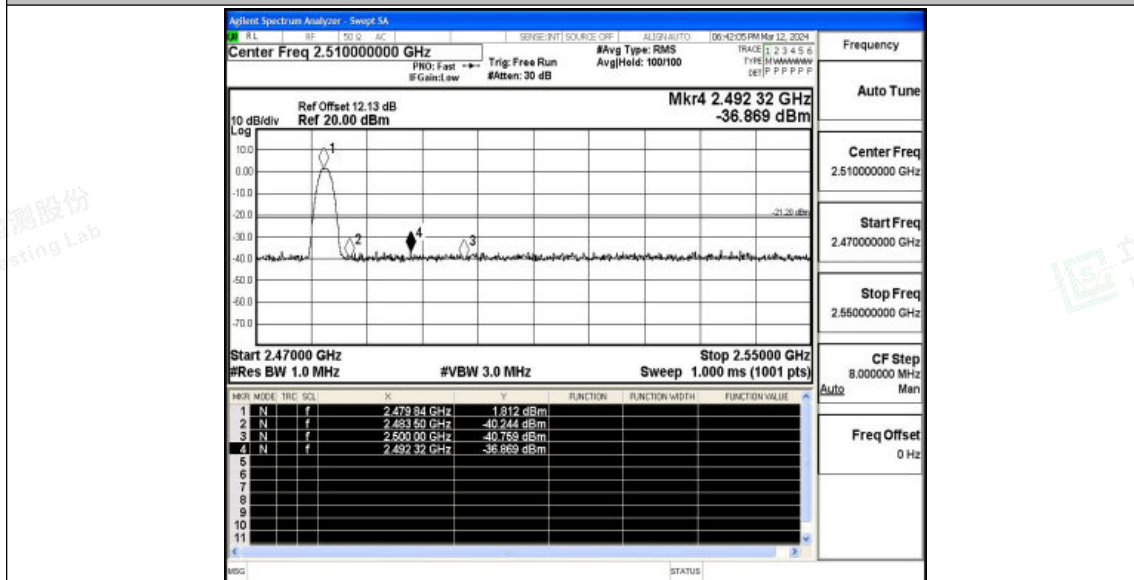


2DH5_Ant1_High_2480_AV



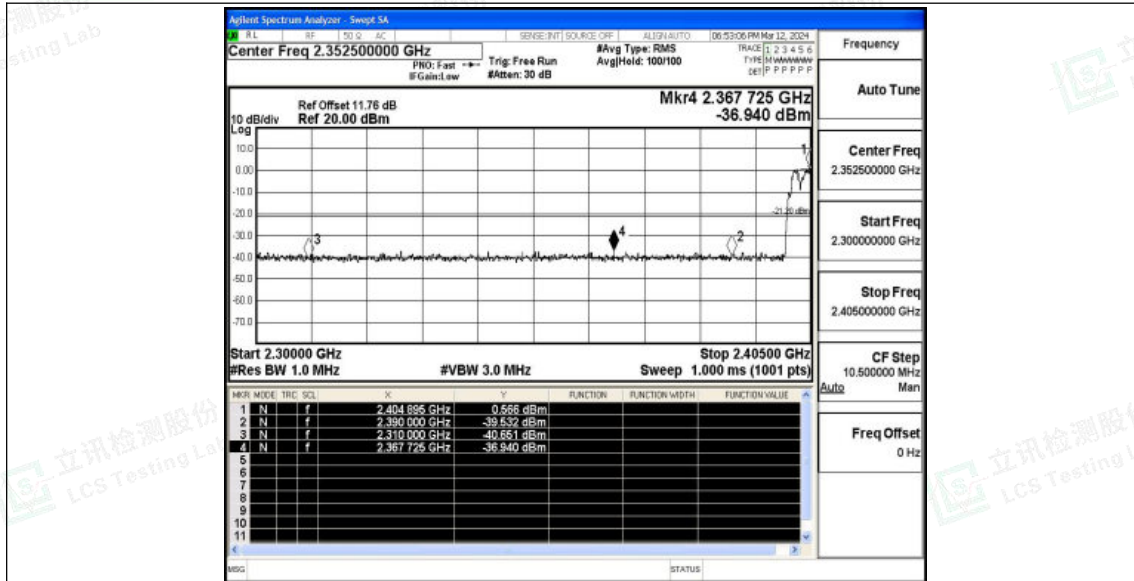


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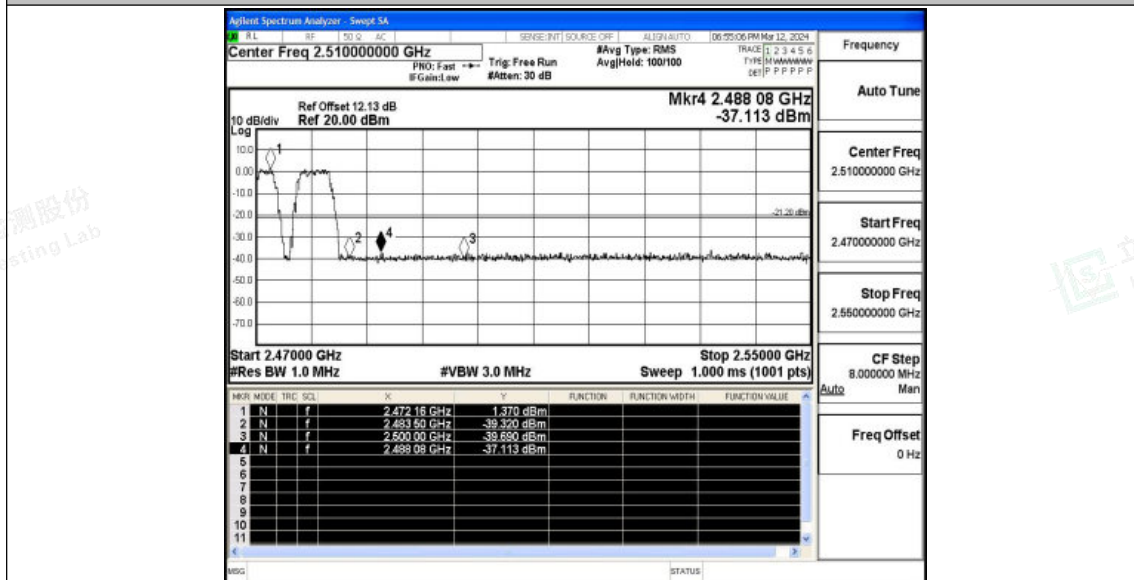


2DH5_Ant1_Low_Hop_2402_Peak



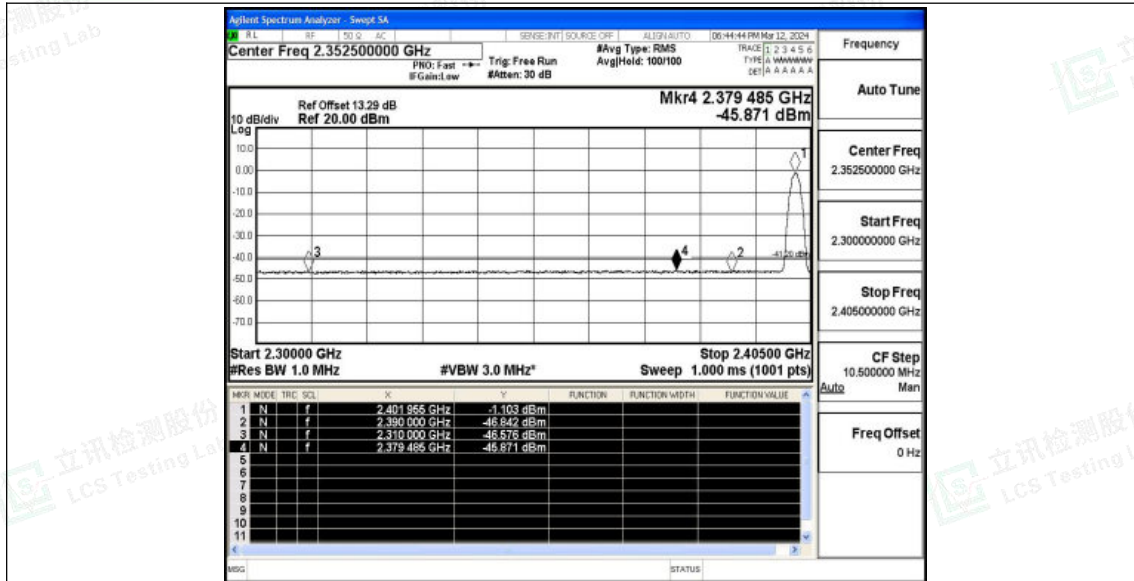


2DH5_Ant1_High_Hop_2480_Peak

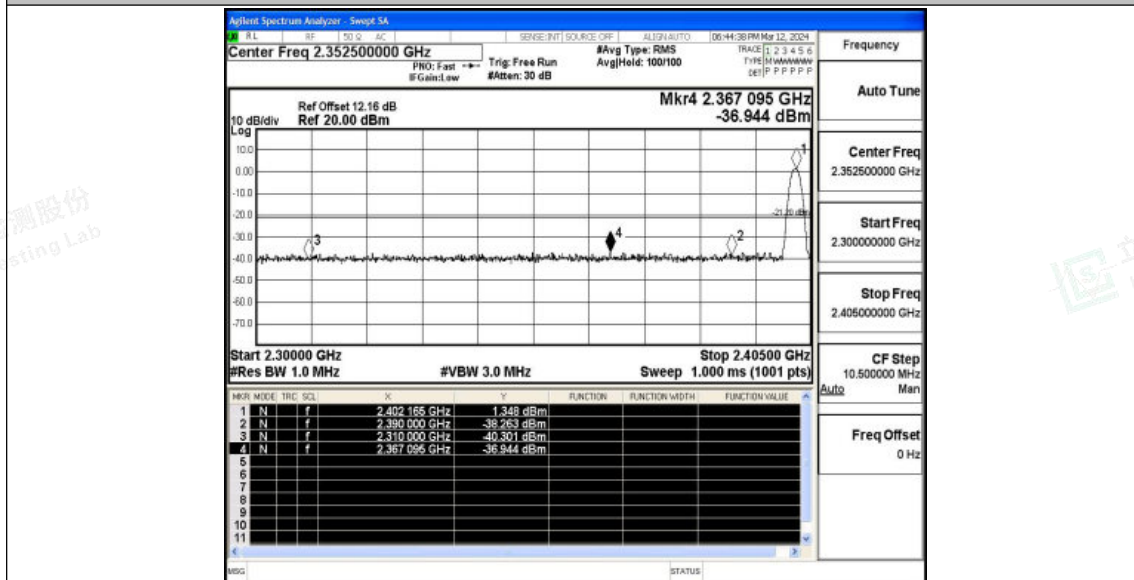


3DH5_Ant1_Low_2402_AV



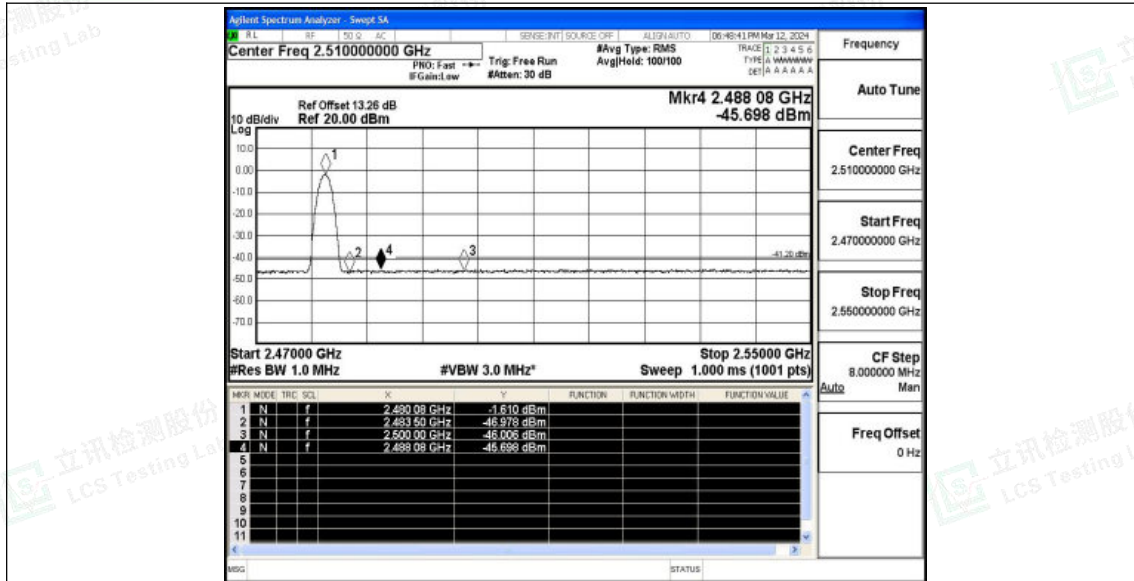


3DH5_Ant1_Low_2402_Peak

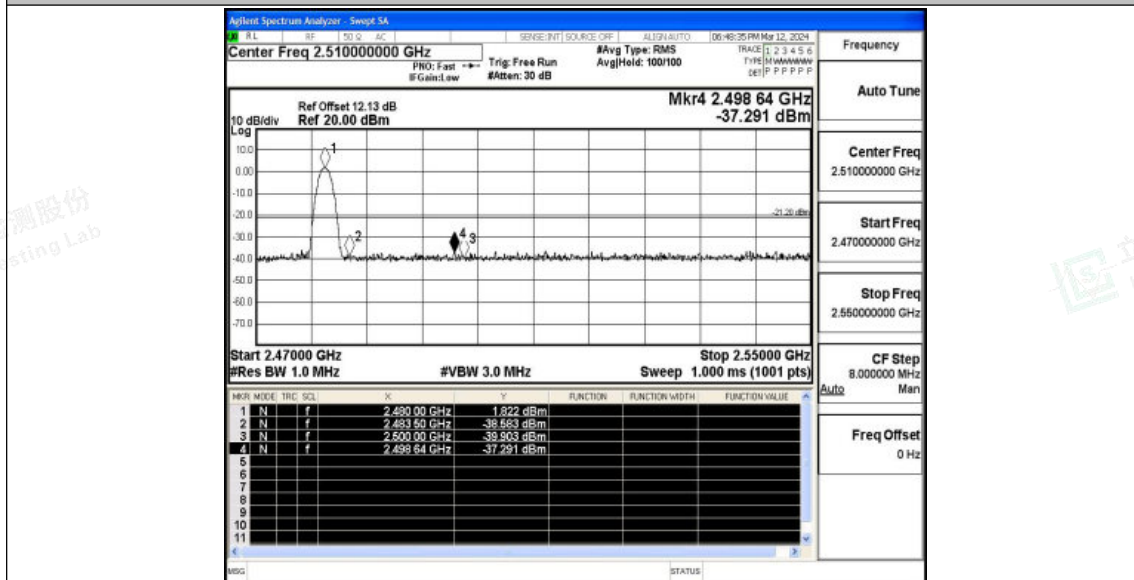


3DH5_Ant1_High_2480_AV



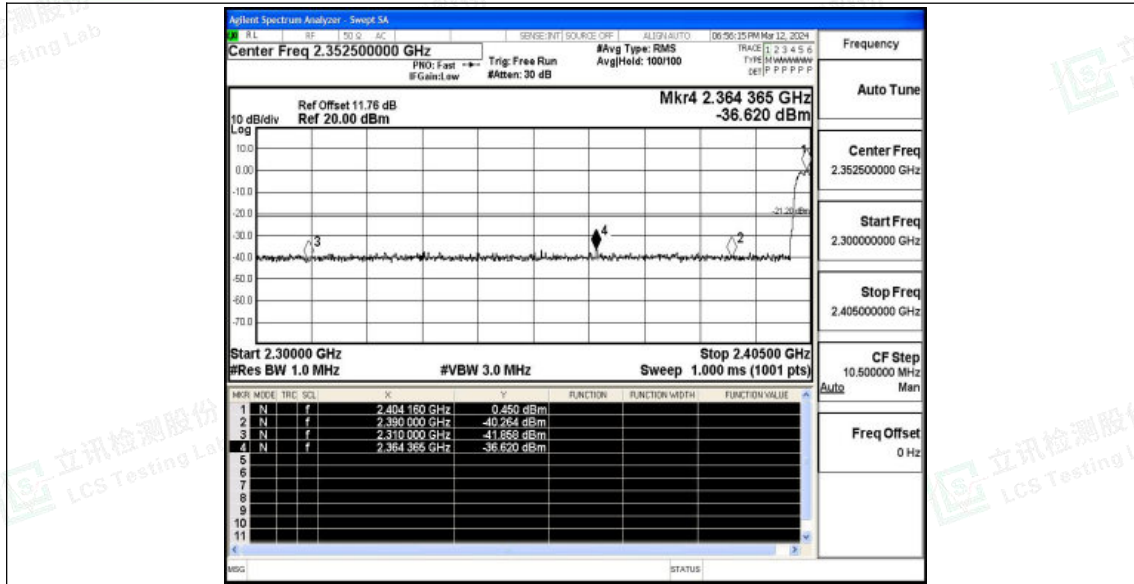


3DH5_Ant1_High_2480_Peak



3DH5_Ant1_Low_Hop_2402_Peak





3DH5_Ant1_High_Hop_2480_Peak

