



Appendix A

RF Test Data for 2.4G BT (Conducted Measurement)

Product Name: Professional audio speaker

Test Model: TPS15

Environmental Conditions

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





A.1 20dB Emission Bandwidth

Test Result

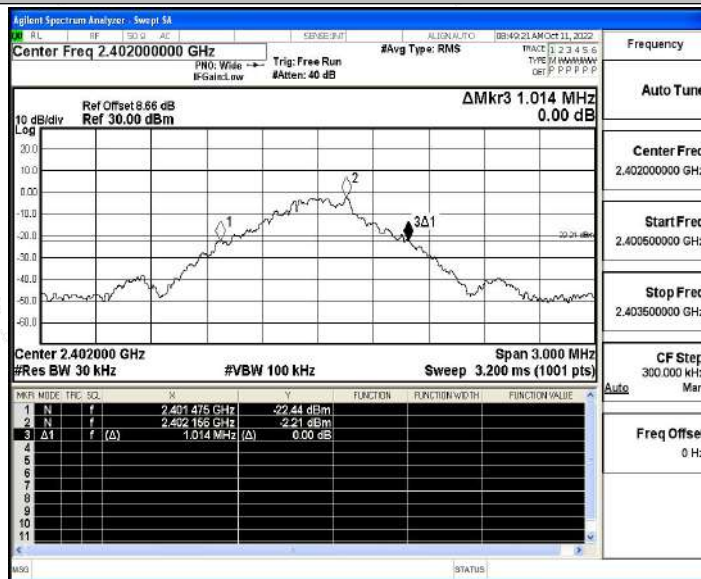
TestMode	Antenna	Channel	20db EBW[MHz]	FL[MHz]	FH[MHz]	Verdict
DH5	Ant1	2402	1.014	2401.475	2402.489	---
		2441	1.044	2440.454	2441.498	---
		2480	1.020	2479.457	2480.477	---
2DH5	Ant1	2402	1.299	2401.349	2402.648	---
		2441	1.284	2440.352	2441.636	---
		2480	1.317	2479.328	2480.645	---
3DH5	Ant1	2402	1.305	2401.334	2402.639	---
		2441	1.290	2440.334	2441.624	---
		2480	1.293	2479.337	2480.630	---



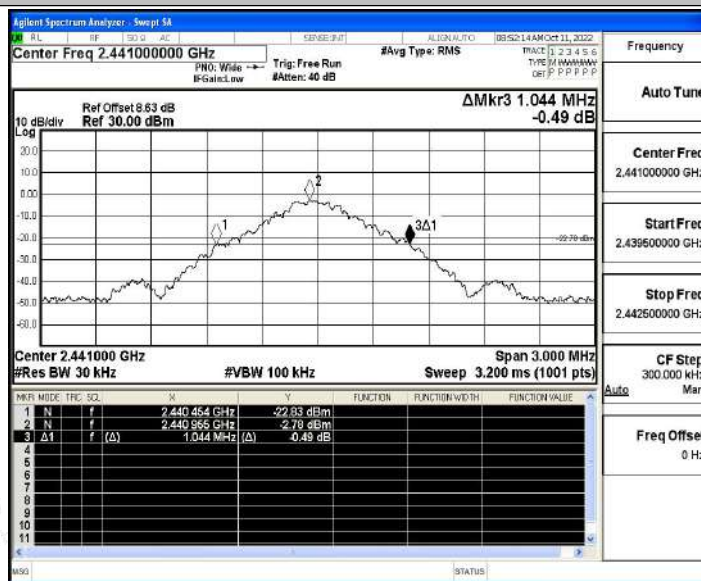


Test Graphs

DH5_Ant1_2402



DH5_Ant1_2441



DH5_Ant1_2480

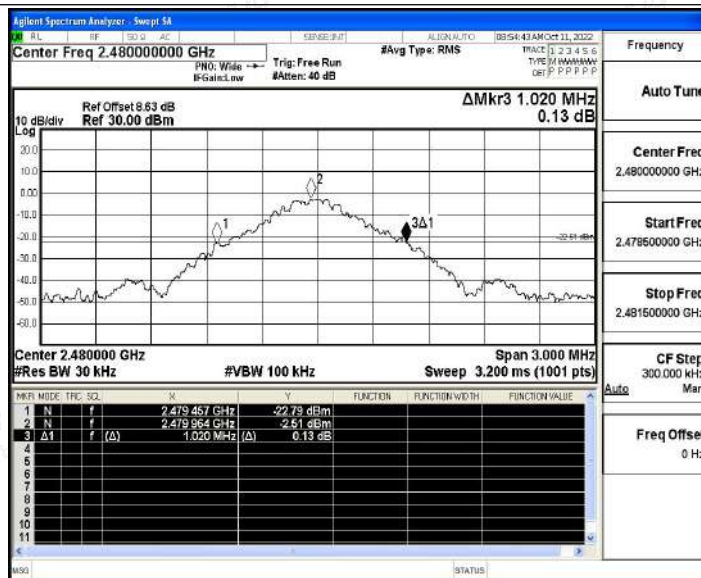


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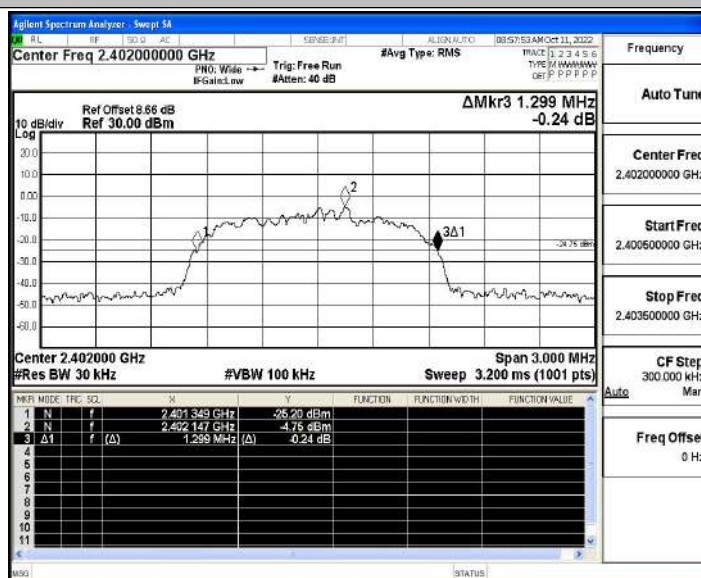
Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

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2DH5_Ant1_2402



2DH5_Ant1_2441

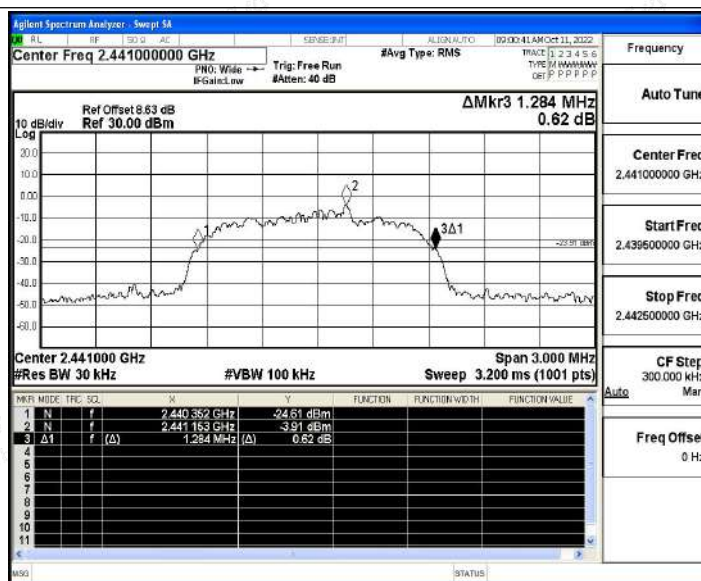


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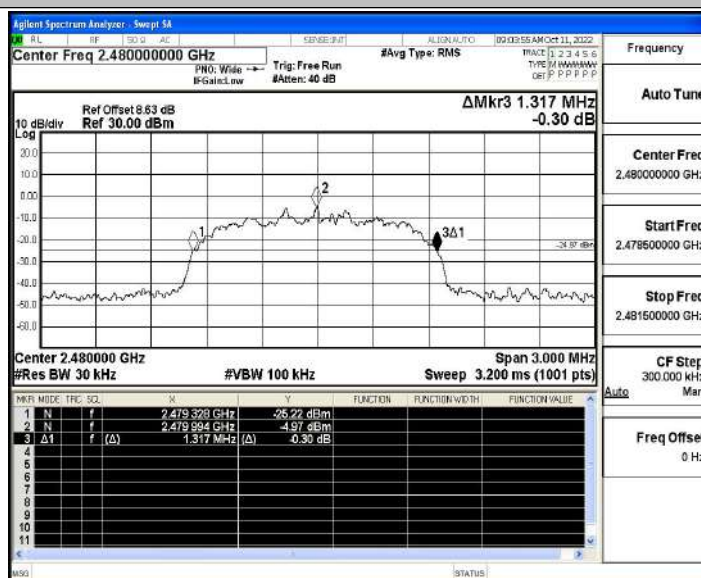
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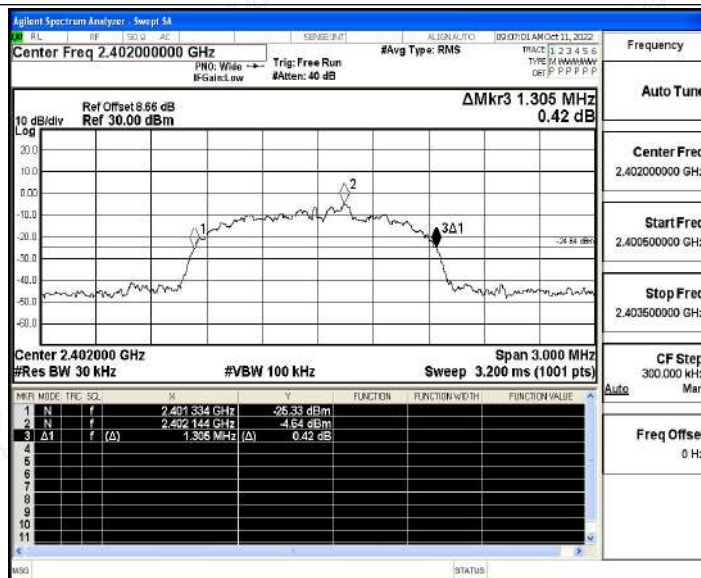


2DH5_Ant1_2480

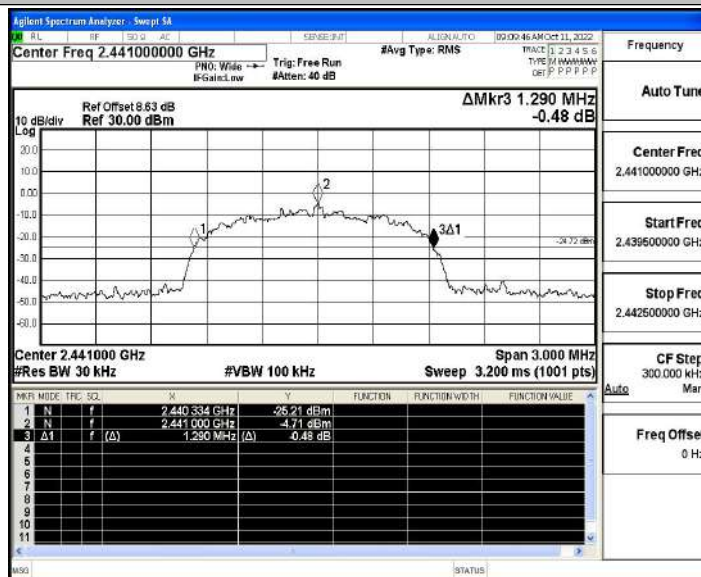


3DH5_Ant1_2402





3DH5_Ant1_2441



3DH5_Ant1_2480

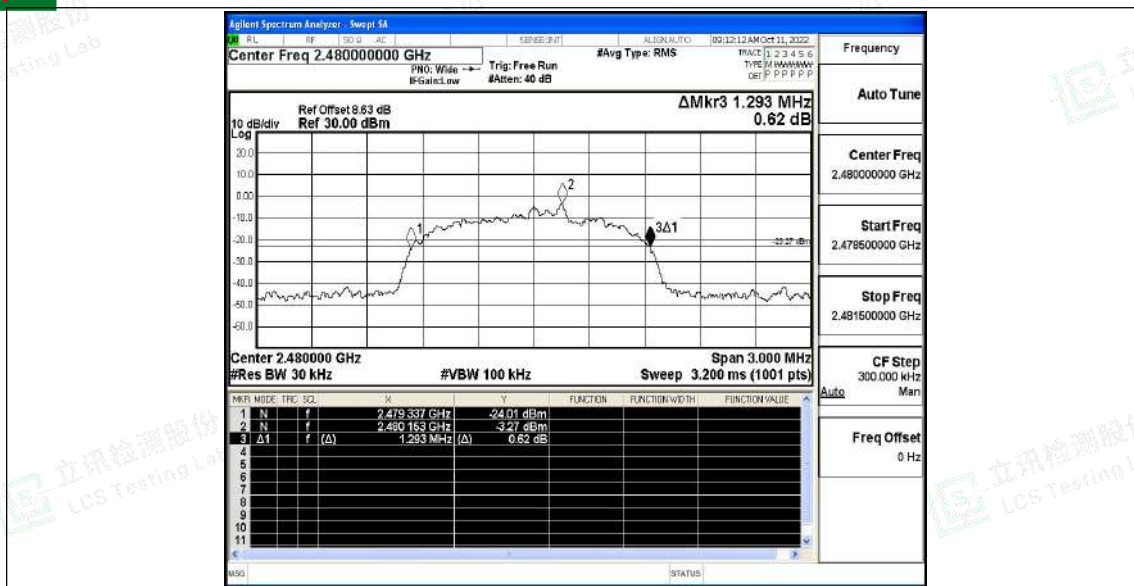


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A.2 Maximum conducted output power

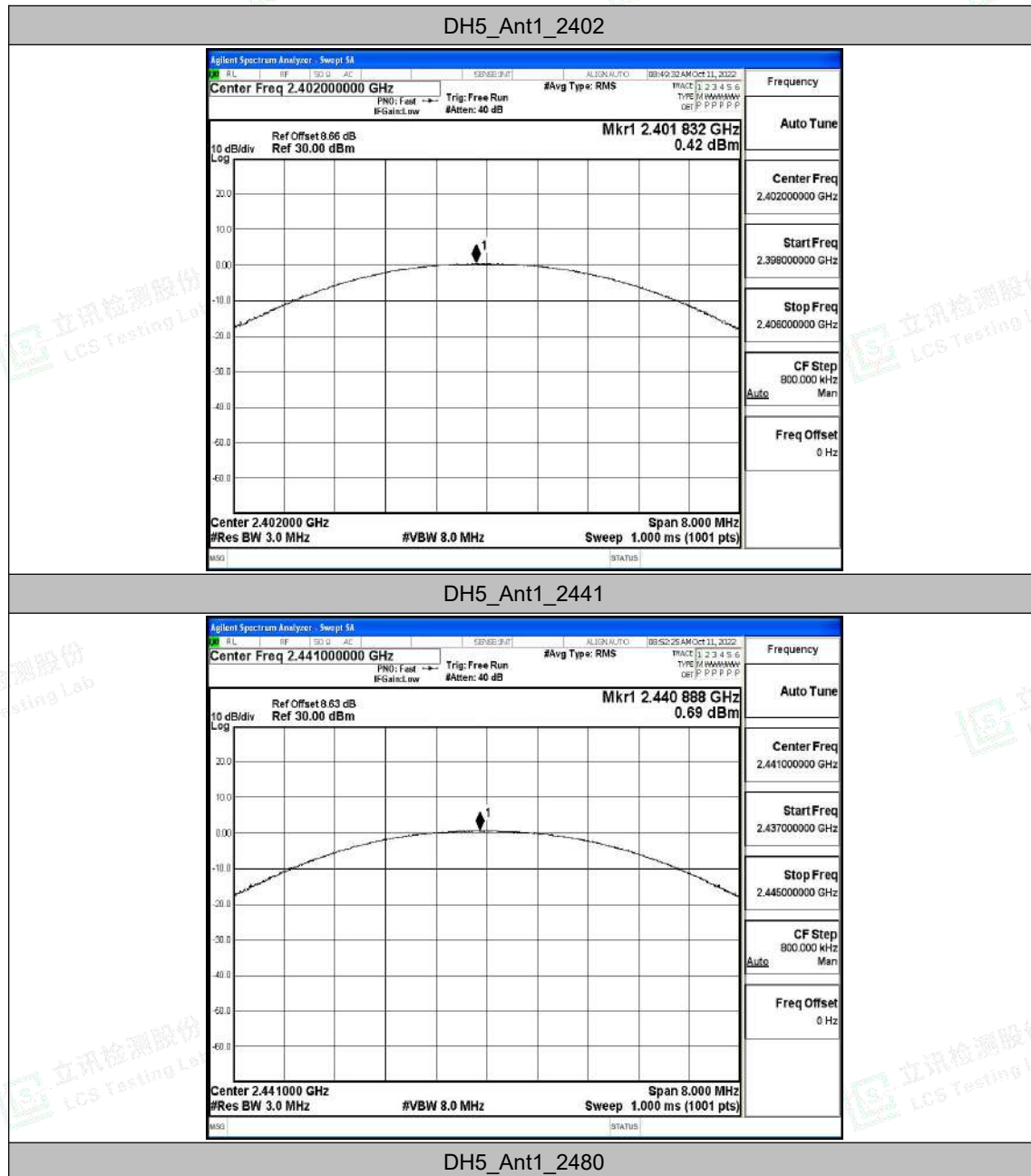
Test Result

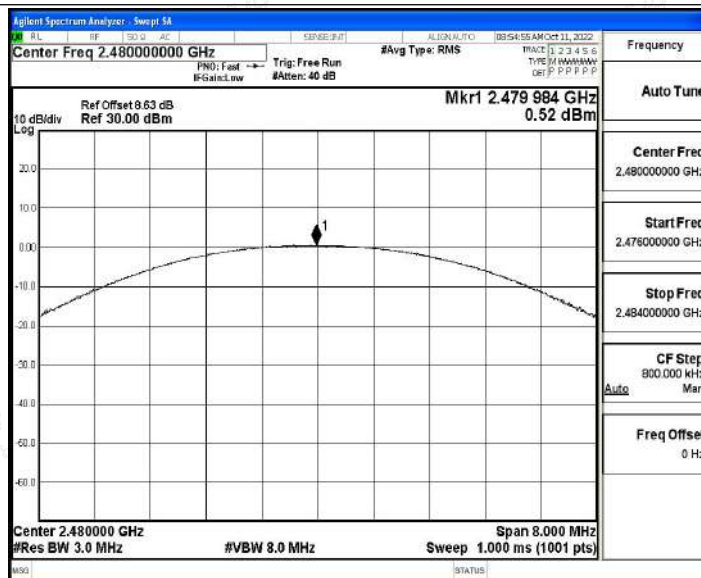
TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
DH5	Ant1	2402	0.42	≤20.97	PASS
		2441	0.69	≤20.97	PASS
		2480	0.52	≤20.97	PASS
2DH5	Ant1	2402	0.4	≤20.97	PASS
		2441	0.4	≤20.97	PASS
		2480	0.26	≤20.97	PASS
3DH5	Ant1	2402	0.51	≤20.97	PASS
		2441	0.38	≤20.97	PASS
		2480	0.31	≤20.97	PASS



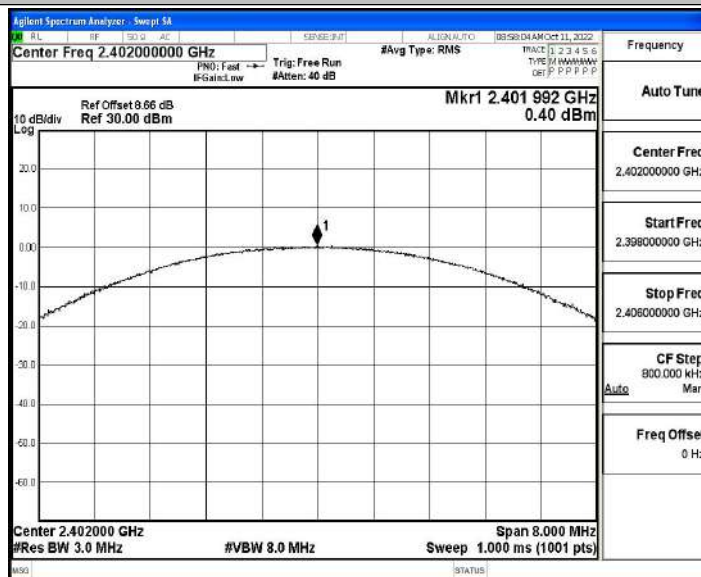


Test Graphs



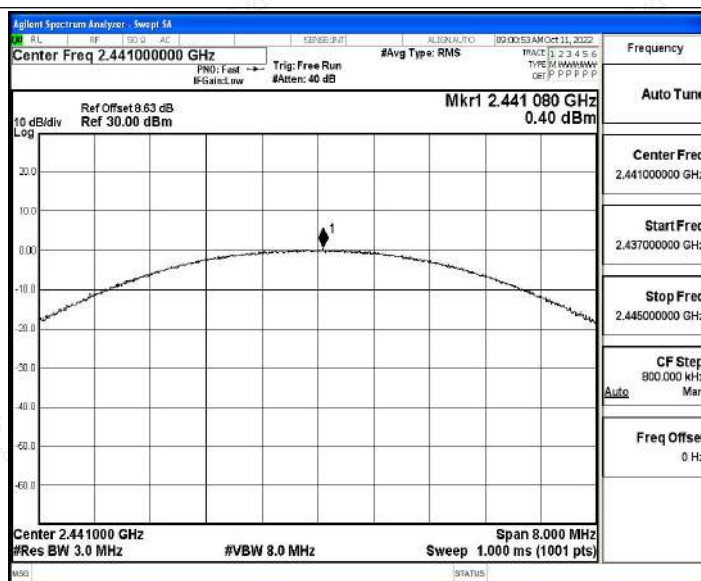


2DH5_Ant1_2402

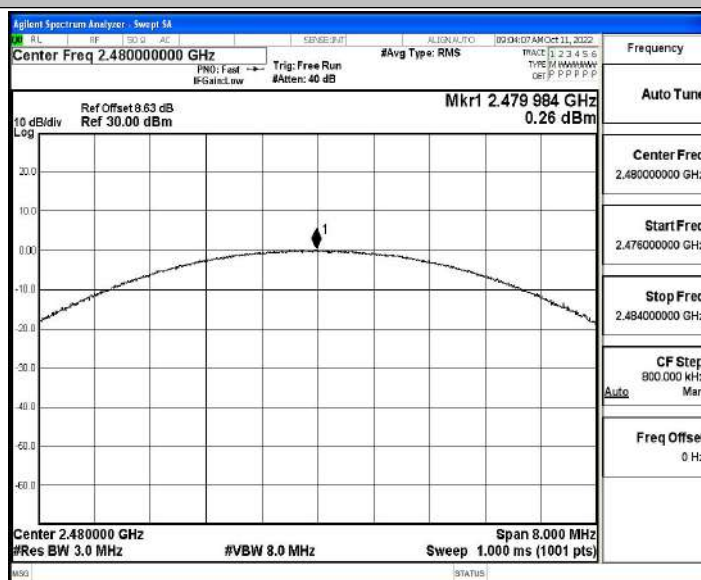


2DH5_Ant1_2441



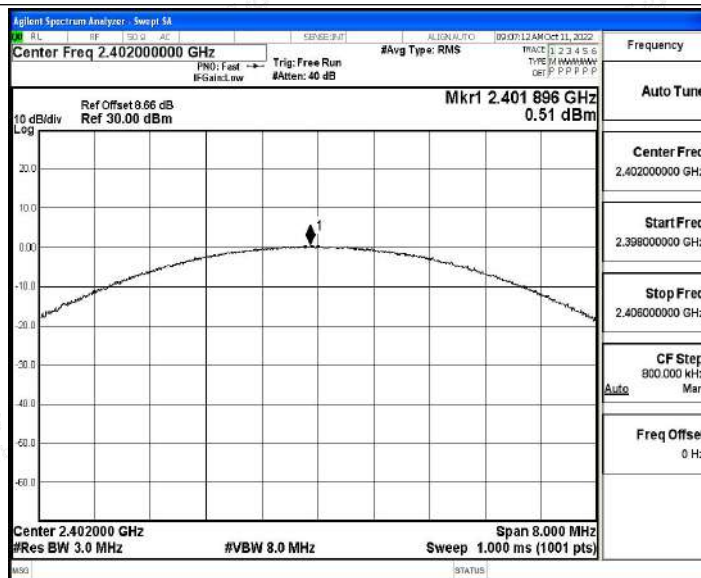


2DH5_Ant1_2480

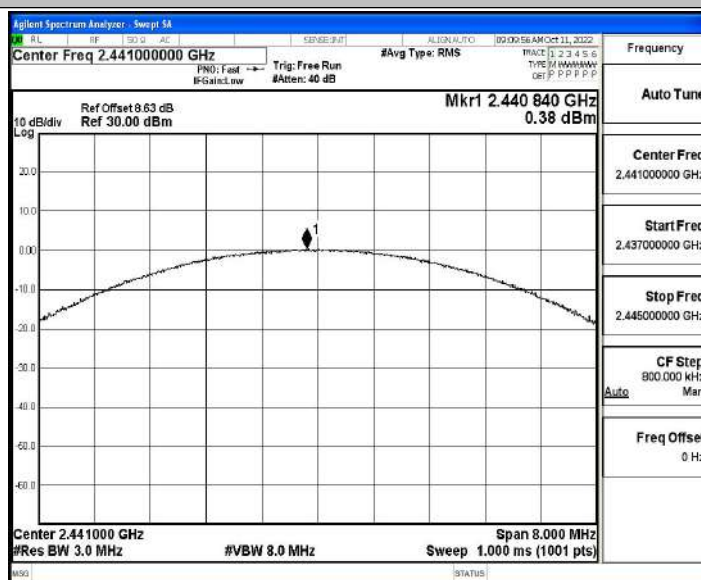


3DH5_Ant1_2402



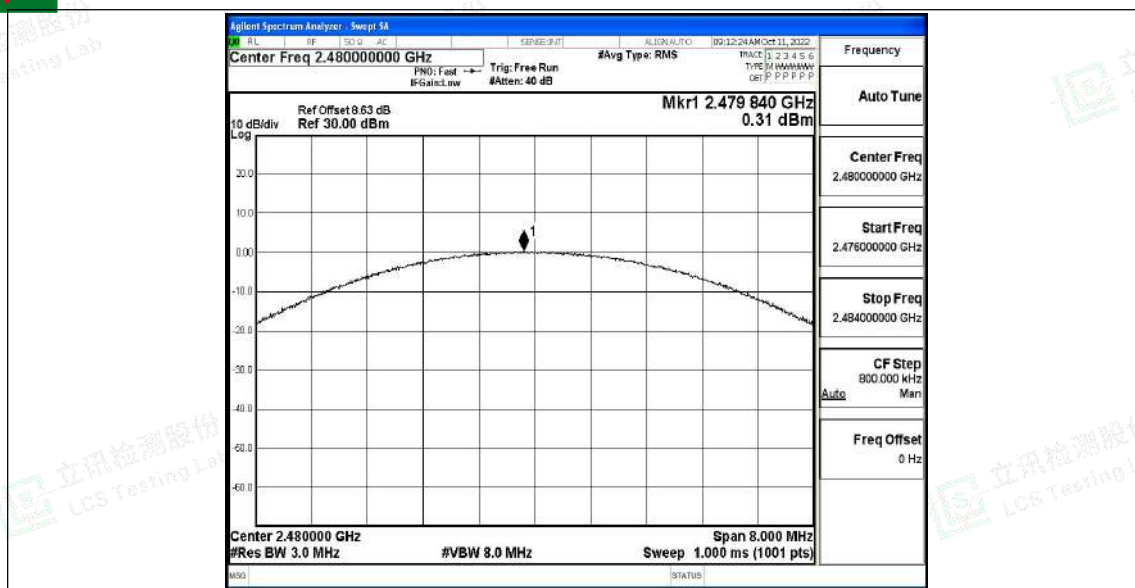


3DH5_Ant1_2441



3DH5_Ant1_2480







A.3 Carrier frequency separation

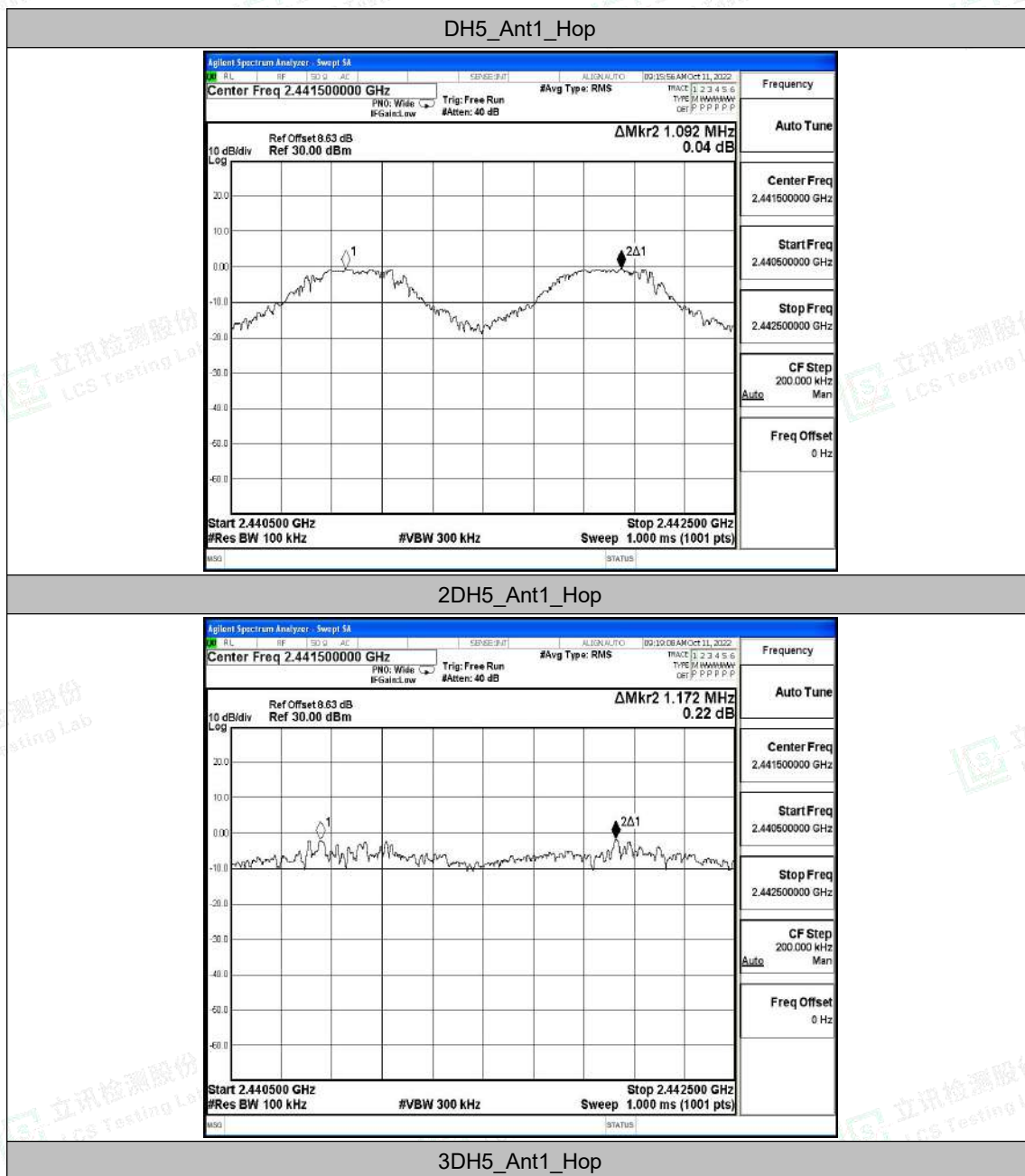
Test Result

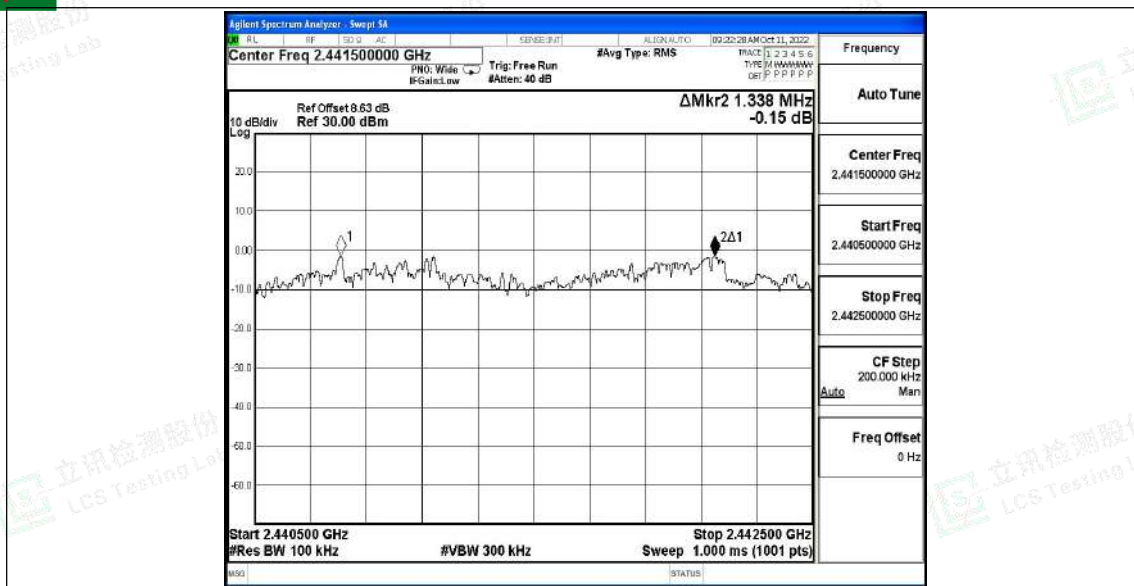
TestMode	Antenna	Channel	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Hop	1.092	≥ 0.696	PASS
2DH5	Ant1	Hop	1.172	≥ 0.878	PASS
3DH5	Ant1	Hop	1.338	≥ 0.870	PASS





Test Graphs







A.4 Time of occupancy

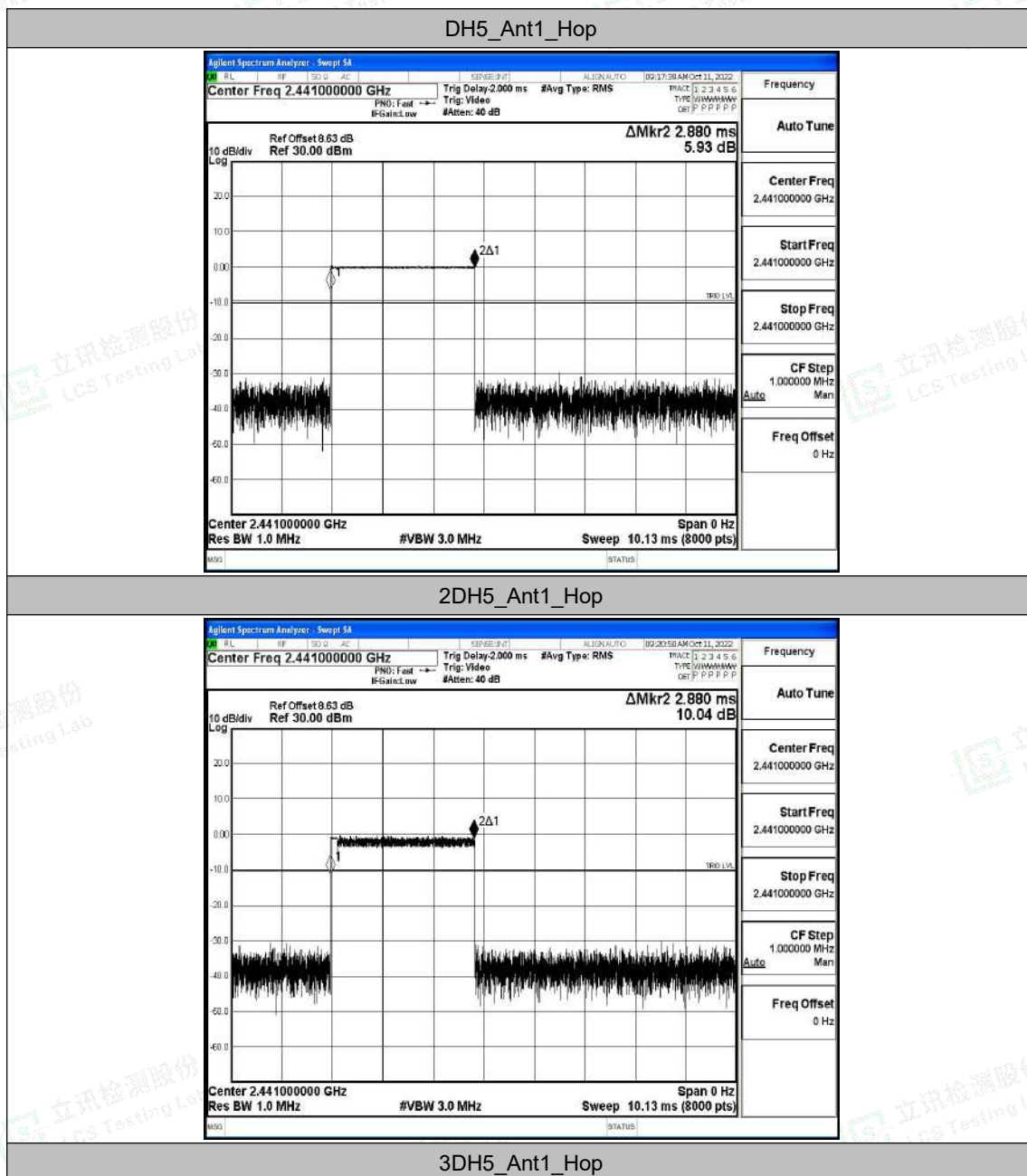
Test Result

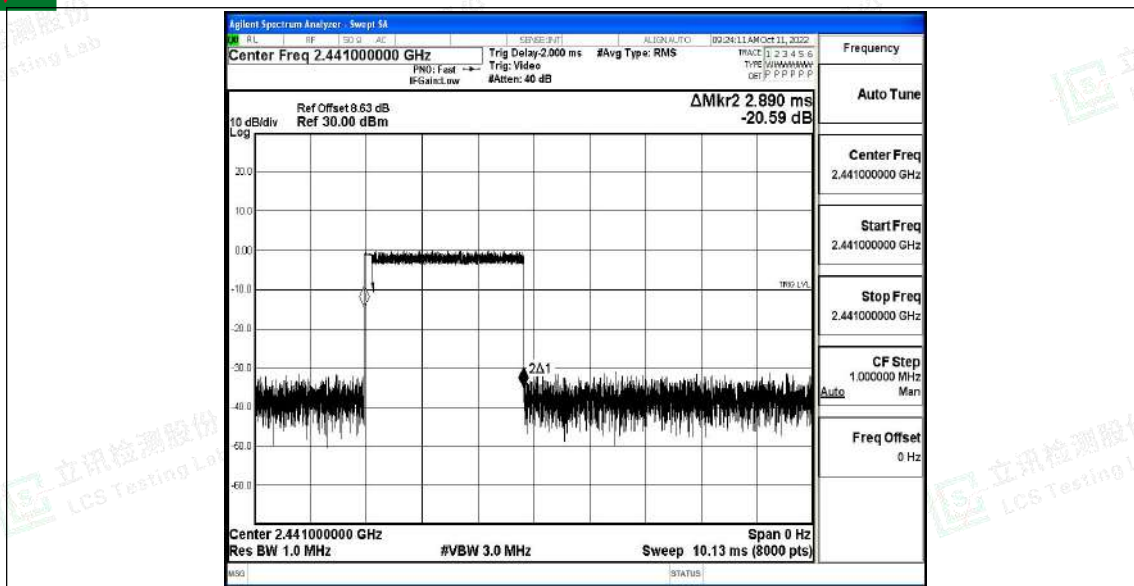
TestMode	Antenna	Channel	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH5	Ant1	Hop	2.88	106.67	0.307	≤0.4	PASS
2DH5	Ant1	Hop	2.88	106.67	0.307	≤0.4	PASS
3DH5	Ant1	Hop	2.89	106.67	0.308	≤0.4	PASS





Test Graphs







A.5 Number of hopping channels

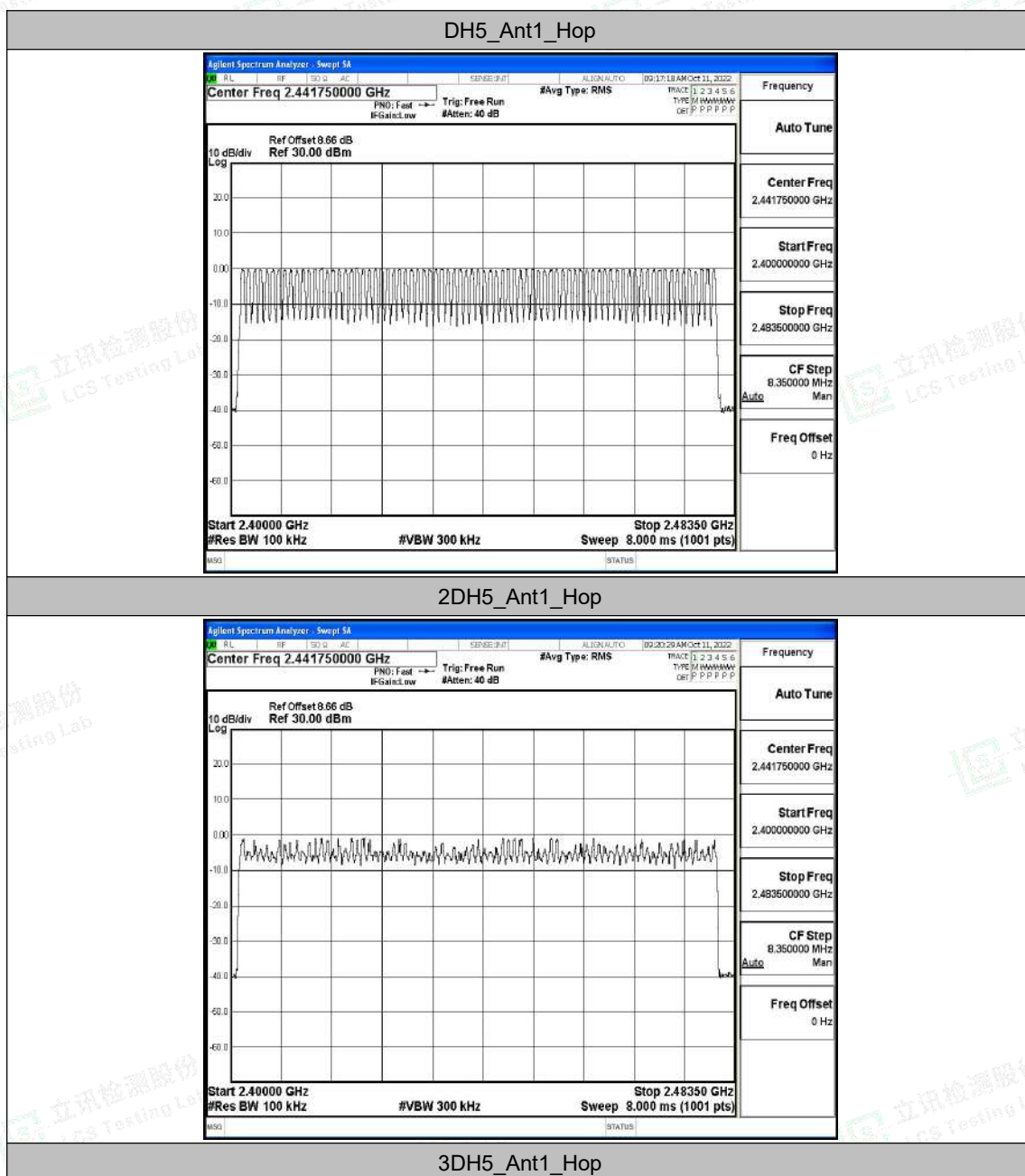
Test Result

TestMode	Antenna	Channel	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

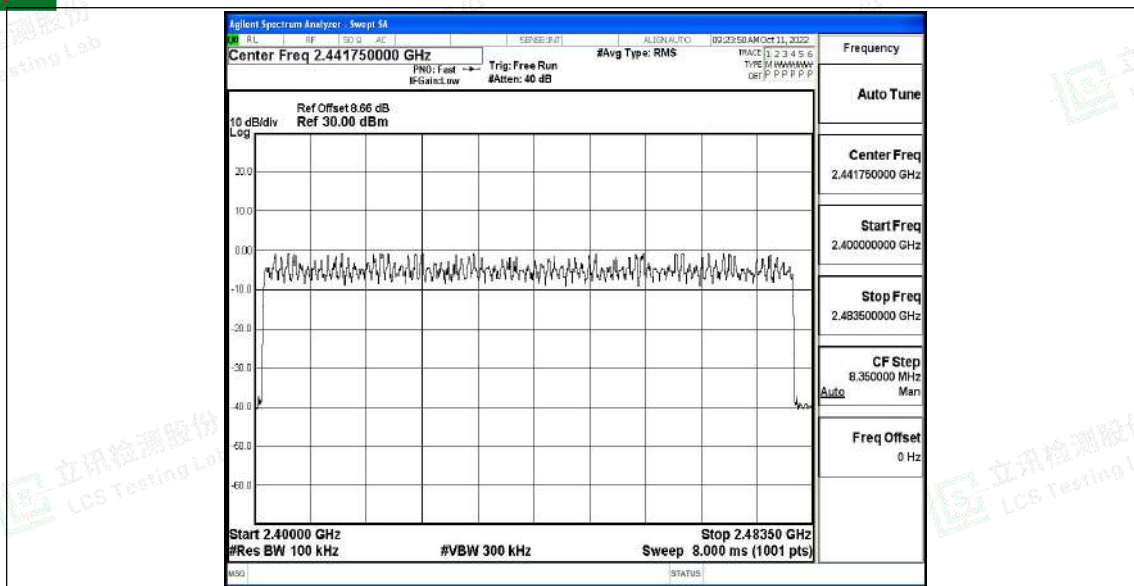


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A.6 Band edge measurements

Test Result

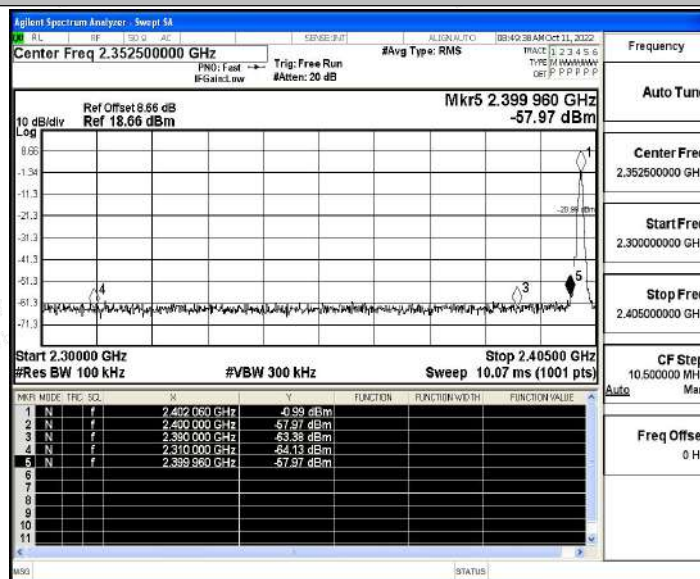
TestMode	Antenna	ChName	Channel	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	-0.99	-57.97	≤ -20.99	PASS
		High	2480	-0.39	-58.25	≤ -20.39	PASS
		Low	Hop_2402	-0.92	-59.2	≤ -20.92	PASS
		High	Hop_2480	-0.14	-57.25	≤ -20.14	PASS
2DH5	Ant1	Low	2402	-3.99	-58.44	≤ -23.99	PASS
		High	2480	-6.26	-59.05	≤ -26.26	PASS
		Low	Hop_2402	-4.95	-59.13	≤ -24.95	PASS
		High	Hop_2480	-3.18	-57.49	≤ -23.18	PASS
3DH5	Ant1	Low	2402	-4.74	-58.86	≤ -24.74	PASS
		High	2480	-4.49	-58.39	≤ -24.49	PASS
		Low	Hop_2402	-1.66	-59.32	≤ -21.66	PASS
		High	Hop_2480	-0.90	-56.86	≤ -20.9	PASS



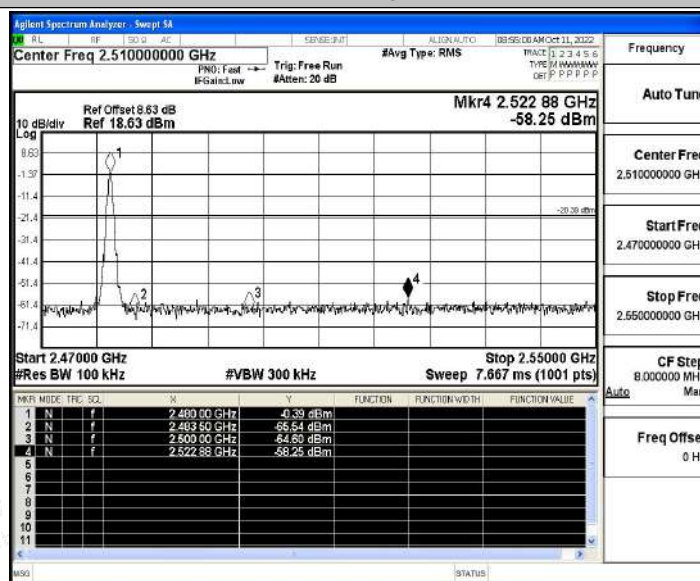


Test Graphs

DH5_Ant1_Low_2402

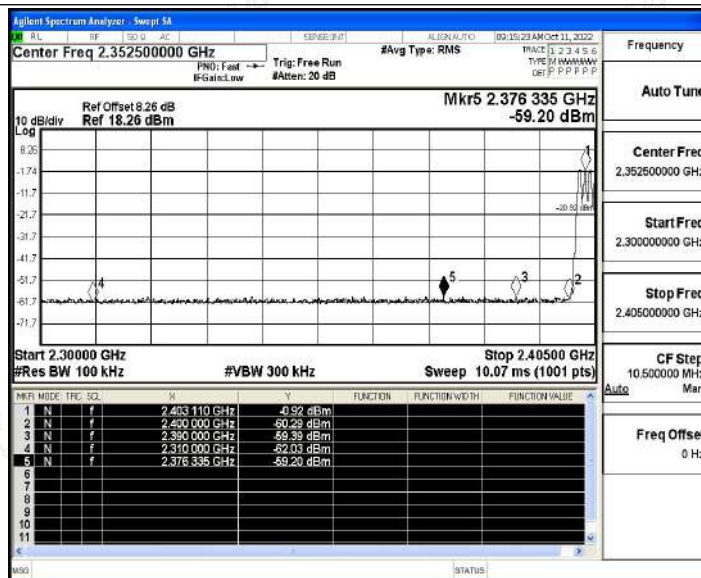


DH5_Ant1_High_2480

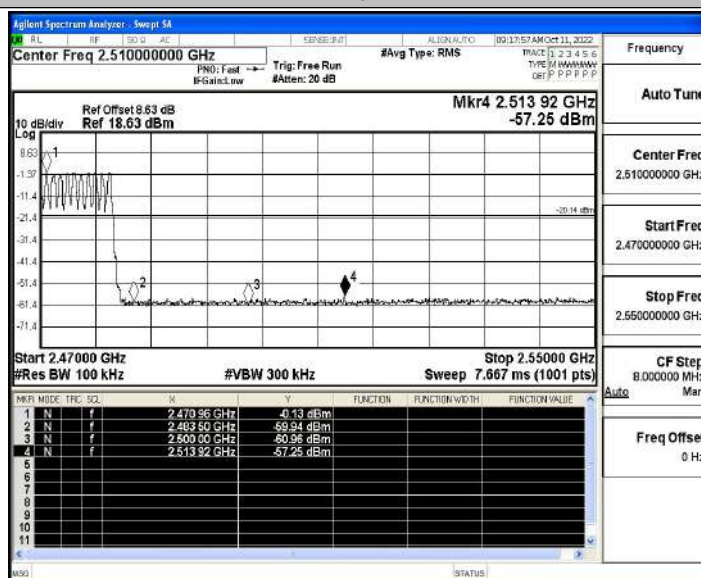


DH5_Ant1_Low_Hop_2402



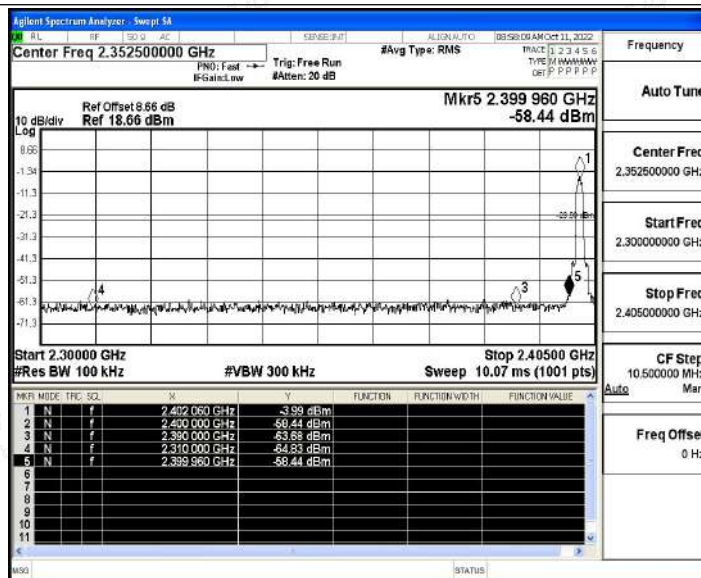


DH5_Ant1_High_Hop_2480

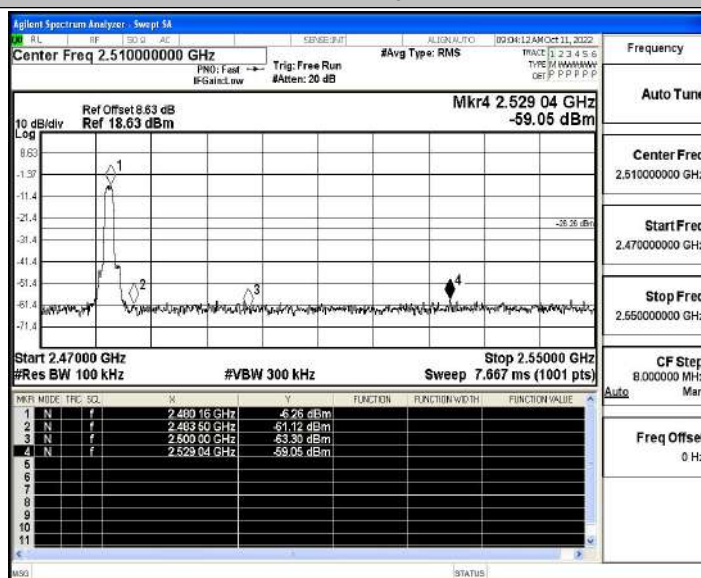


2DH5_Ant1_Low_2402



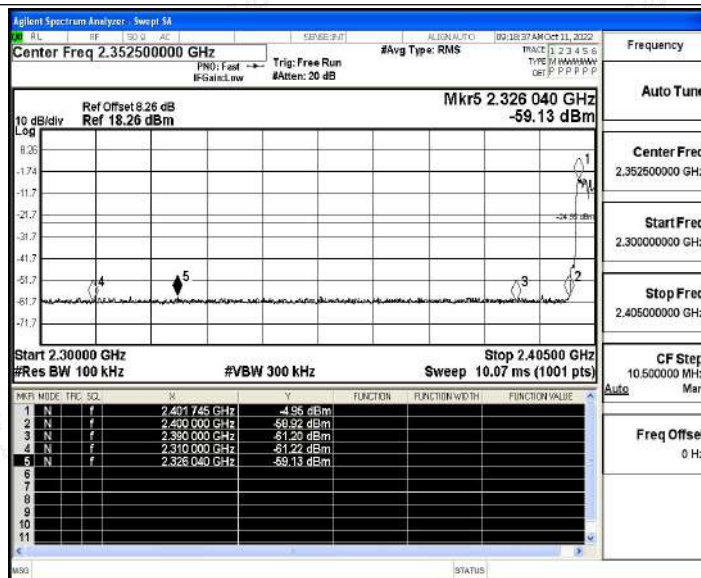


2DH5_Ant1_High_2480

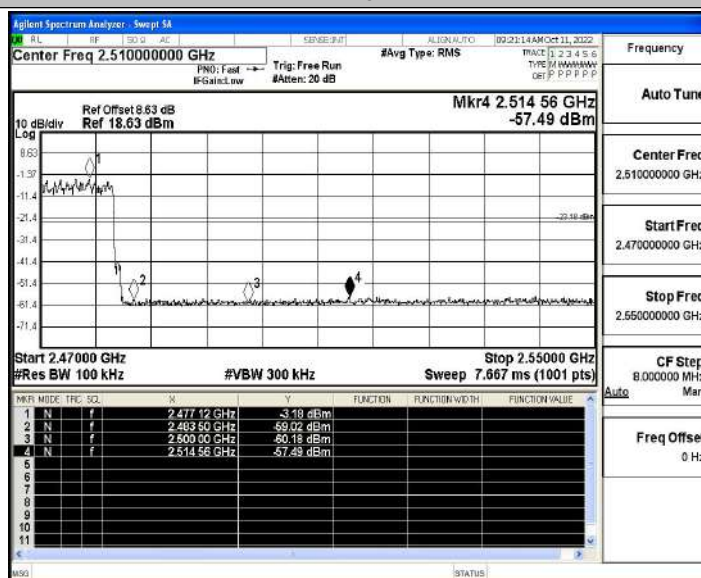


2DH5_Ant1_Low_Hop_2402



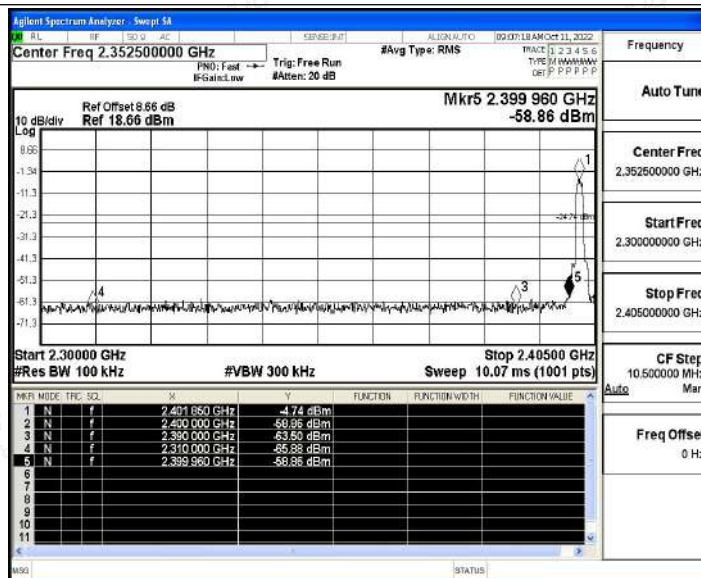


2DH5_Ant1_High_Hop_2480

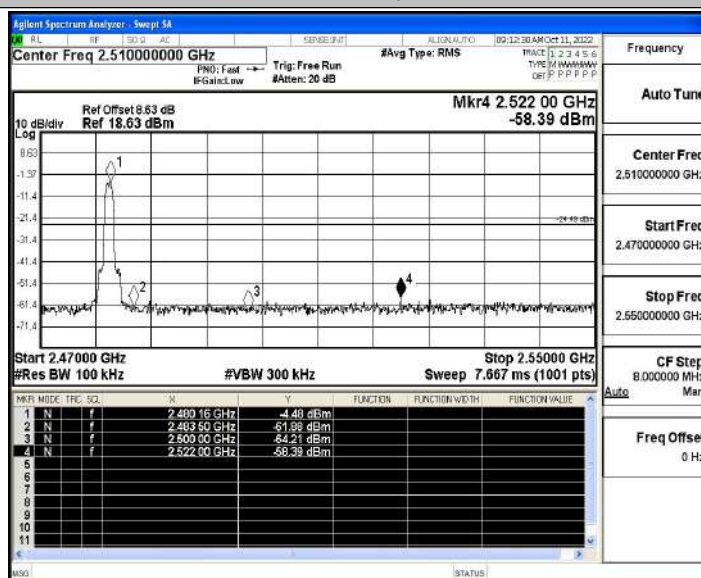


3DH5_Ant1_Low_2402



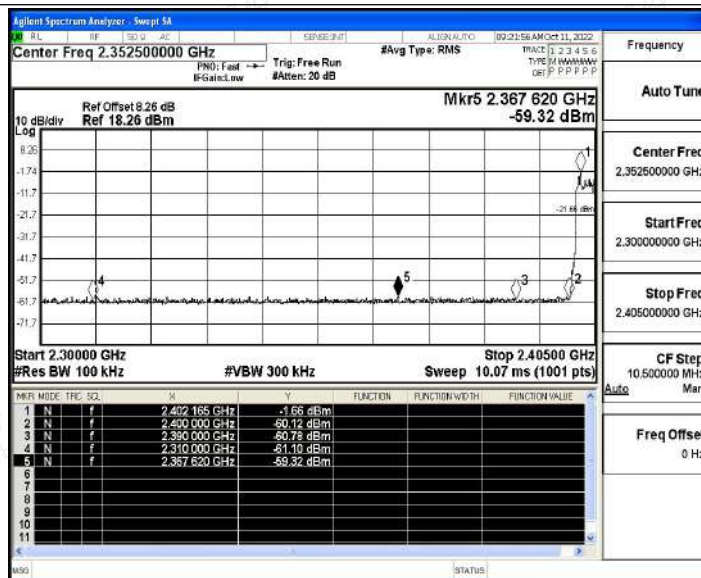


3DH5_Ant1_High_2480

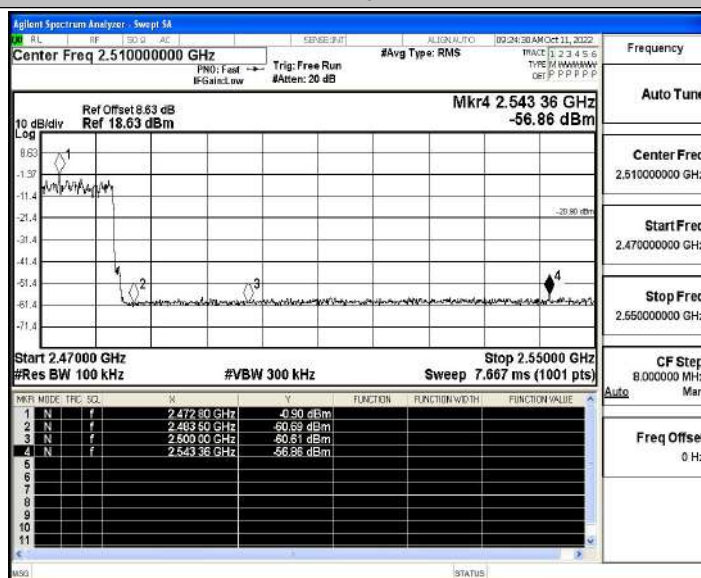


3DH5_Ant1_Low_Hop_2402





3DH5_Ant1_High_Hop_2480





A.7 Conducted Spurious Emission

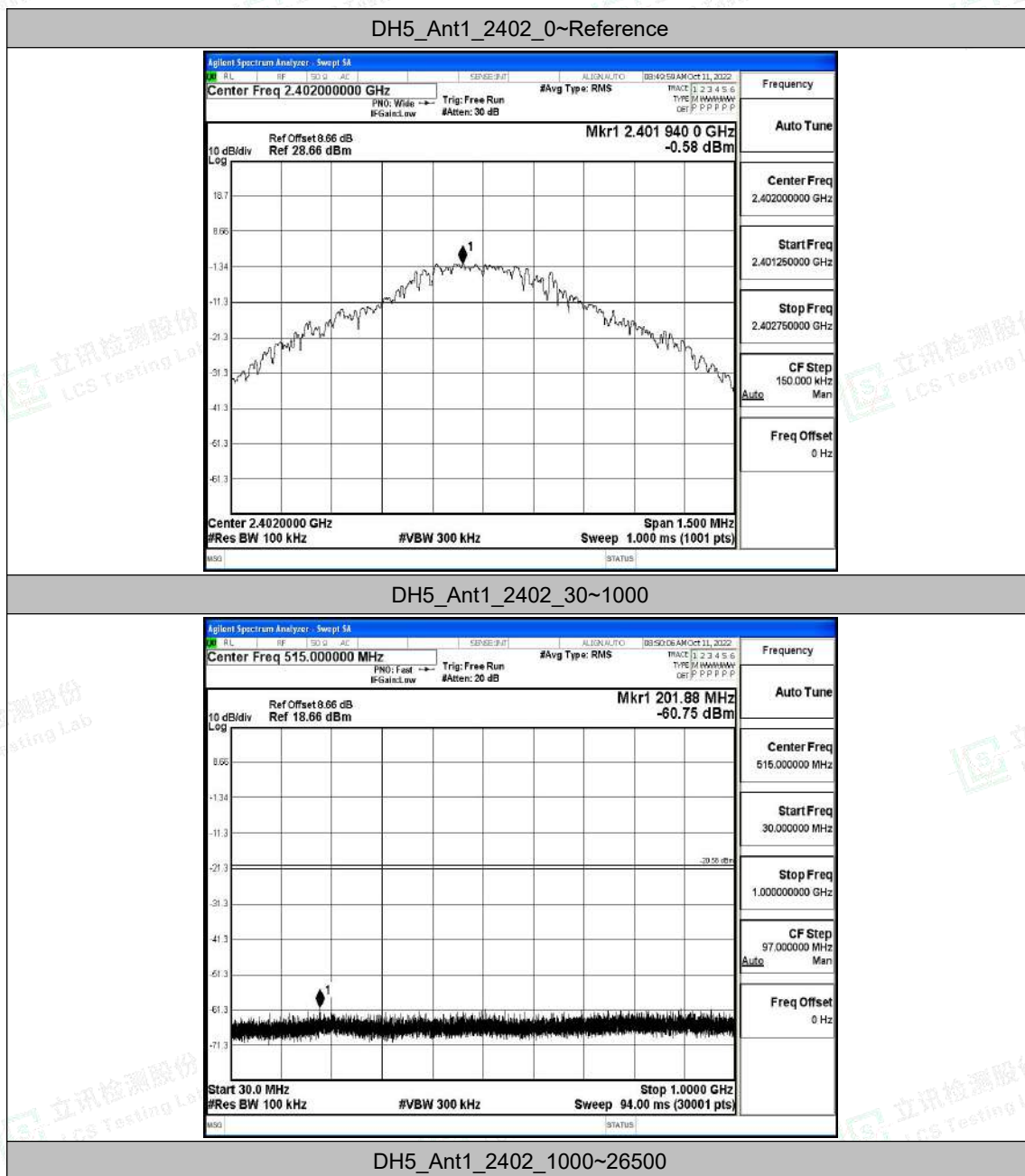
Test Result

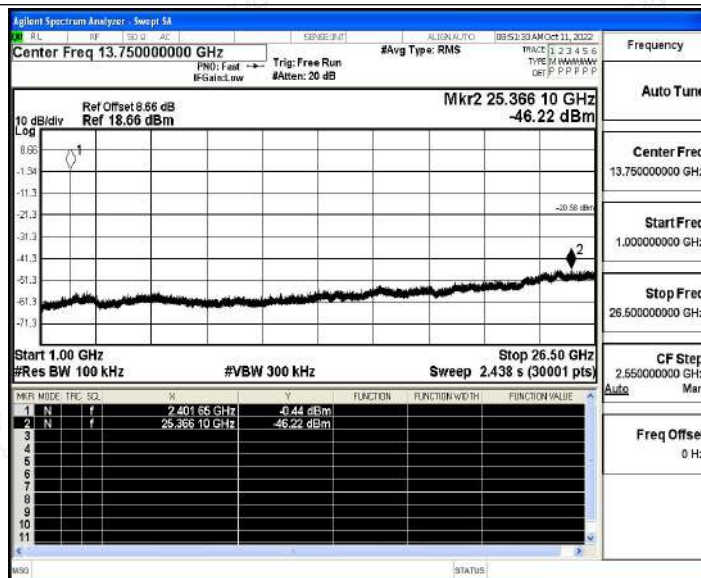
TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	2402	Reference	-0.58	-0.58	---	PASS
			30~1000	-0.58	-60.75	≤-20.58	PASS
			1000~26500	-0.58	-46.22	≤-20.58	PASS
		2441	Reference	-0.70	-0.70	---	PASS
			30~1000	-0.70	-53.96	≤-20.7	PASS
			1000~26500	-0.70	-45.73	≤-20.7	PASS
		2480	Reference	-0.69	-0.69	---	PASS
			30~1000	-0.69	-60.44	≤-20.69	PASS
			1000~26500	-0.69	-45.79	≤-20.69	PASS
2DH5	Ant1	2402	Reference	-4.37	-4.37	---	PASS
			30~1000	-4.37	-60.84	≤-24.37	PASS
			1000~26500	-4.37	-45.76	≤-24.37	PASS
		2441	Reference	-4.44	-4.44	---	PASS
			30~1000	-4.44	-60.59	≤-24.44	PASS
			1000~26500	-4.44	-46.31	≤-24.44	PASS
		2480	Reference	-4.43	-4.43	---	PASS
			30~1000	-4.43	-60.22	≤-24.43	PASS
			1000~26500	-4.43	-45.27	≤-24.43	PASS
3DH5	Ant1	2402	Reference	-1.70	-1.70	---	PASS
			30~1000	-1.70	-60.88	≤-21.7	PASS
			1000~26500	-1.70	-46.18	≤-21.7	PASS
		2441	Reference	-4.65	-4.65	---	PASS
			30~1000	-4.65	-59.82	≤-24.65	PASS
			1000~26500	-4.65	-45.47	≤-24.65	PASS
		2480	Reference	-4.99	-4.99	---	PASS
			30~1000	-4.99	-60.75	≤-24.99	PASS
			1000~26500	-4.99	-45.82	≤-24.99	PASS



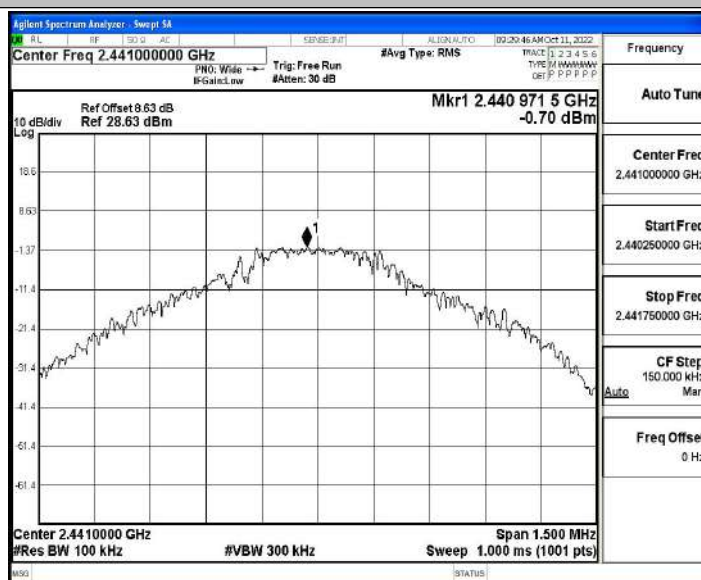


Test Graphs





DH5_Ant1_2441_0~Reference



DH5_Ant1_2441_30~1000

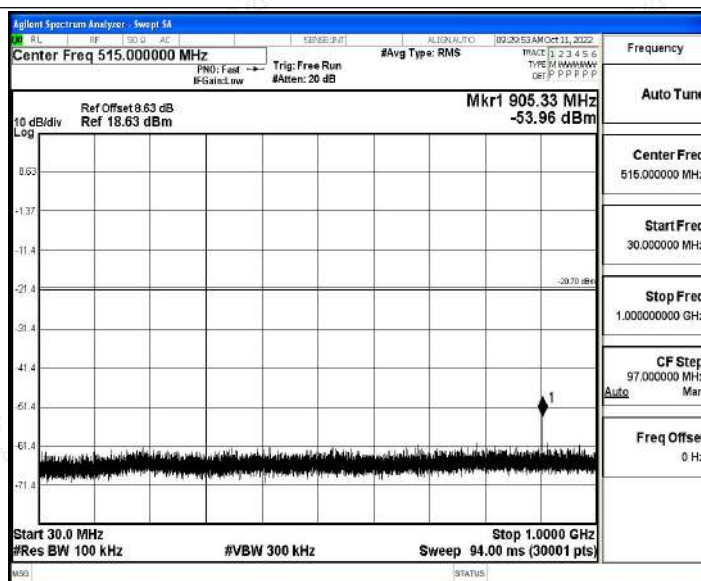


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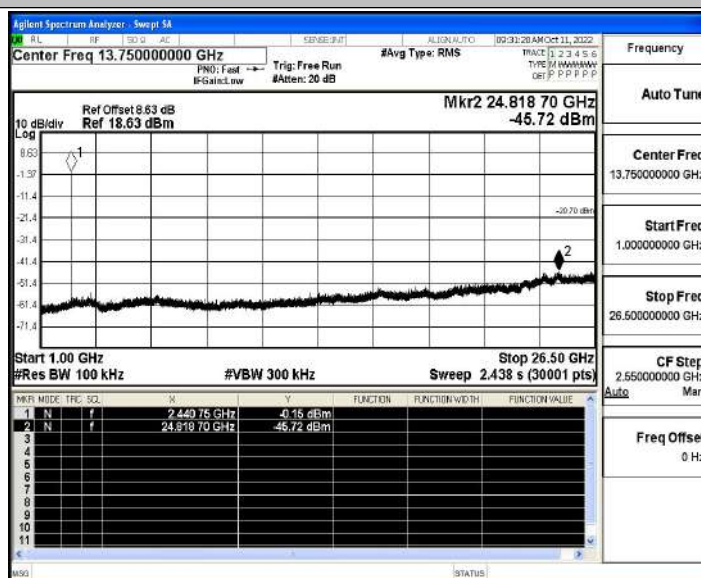
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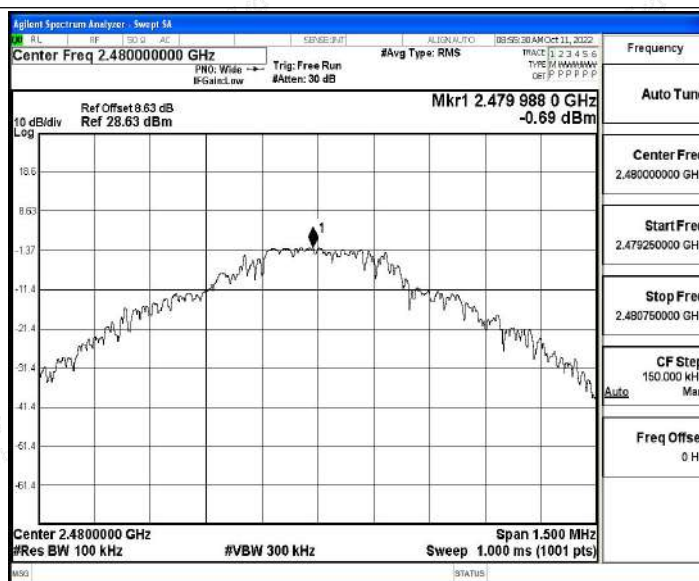


DH5_Ant1_2441_1000~26500

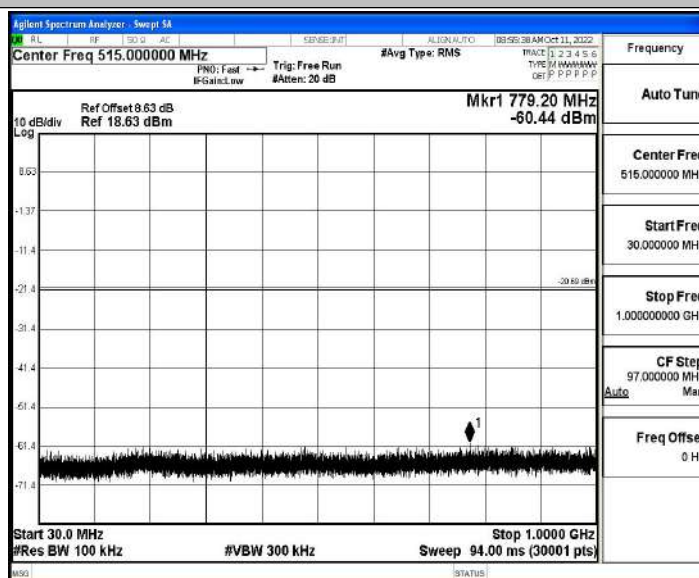


DH5_Ant1_2480_0~Reference



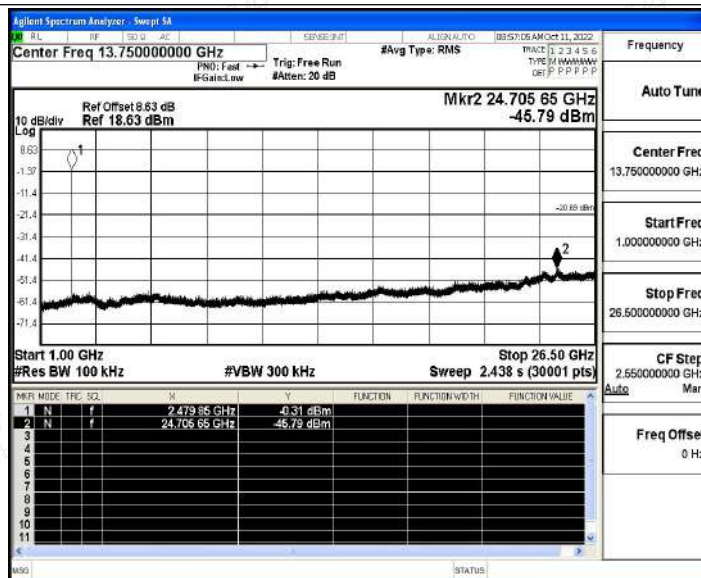


DH5_Ant1_2480_30~1000

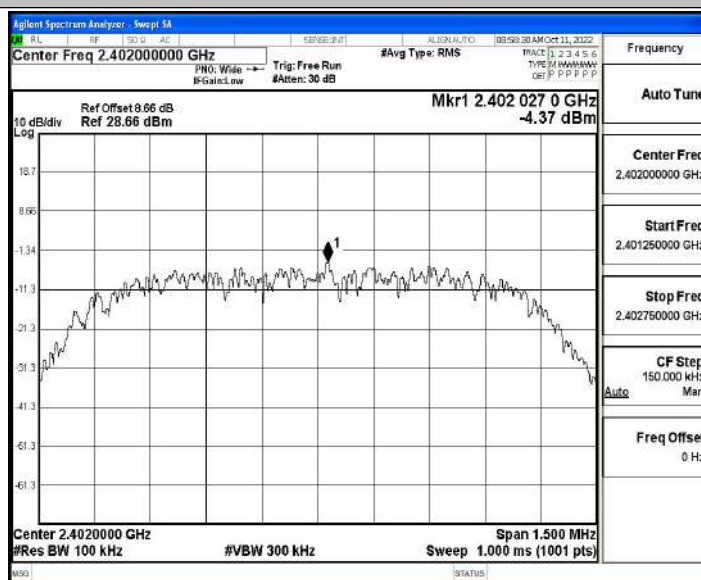


DH5_Ant1_2480_1000~26500





2DH5_Ant1_2402_0~Reference



2DH5_Ant1_2402_30~1000

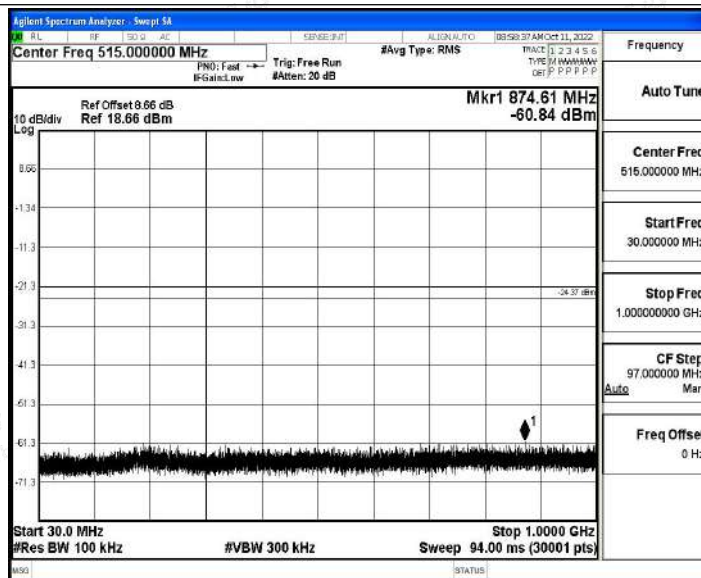


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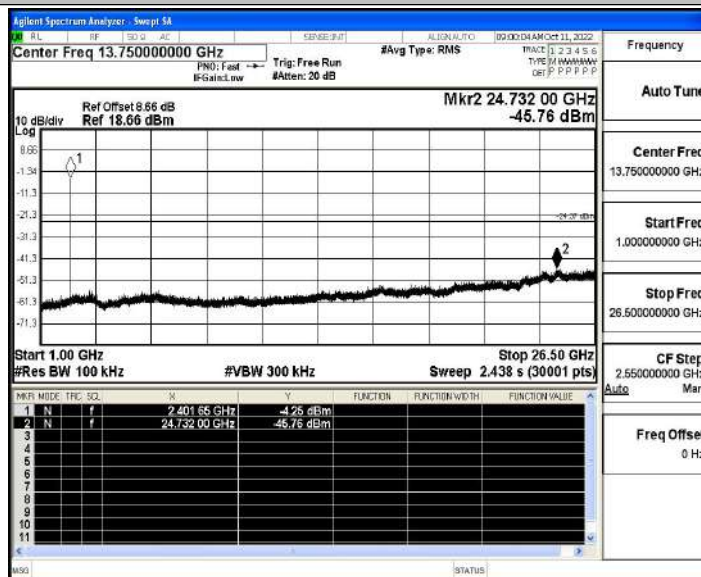
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2DH5_Ant1_2402_1000~26500



2DH5_Ant1_2441_0~Reference

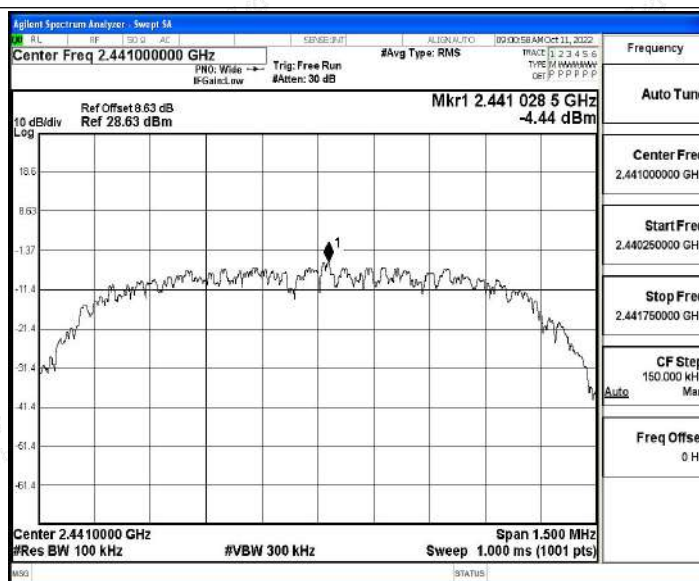


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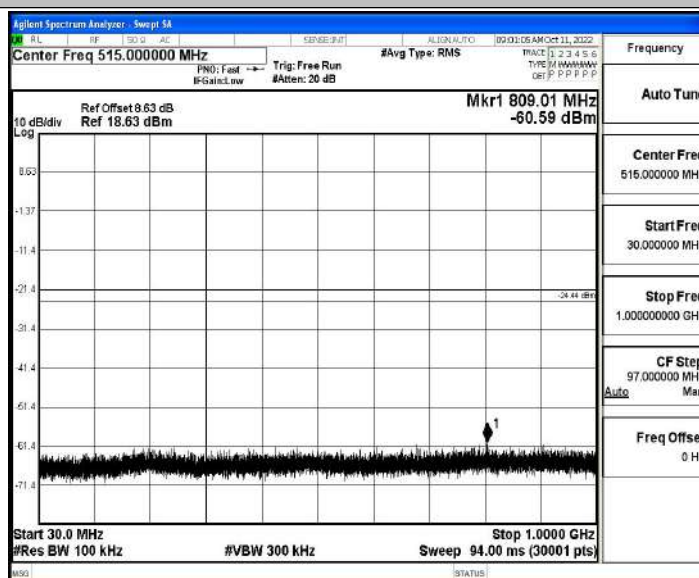
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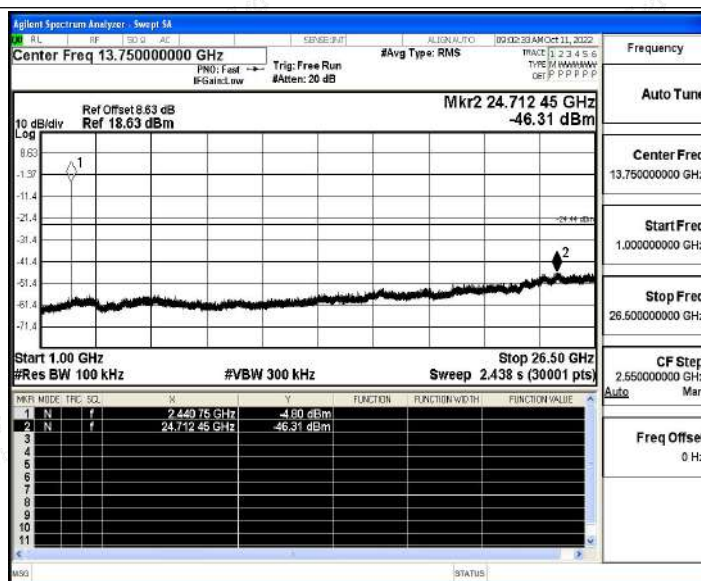


2DH5_Ant1_2441_30~1000

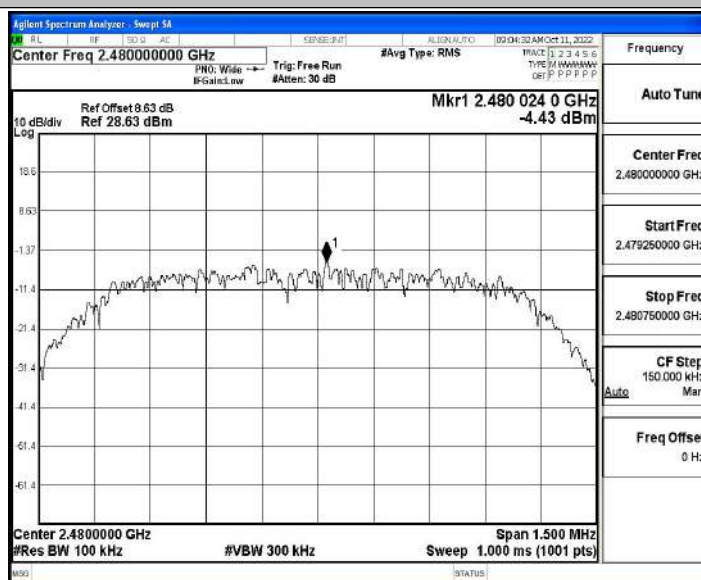


2DH5_Ant1_2441_1000~26500





2DH5_Ant1_2480_0~Reference



2DH5_Ant1_2480_30~1000

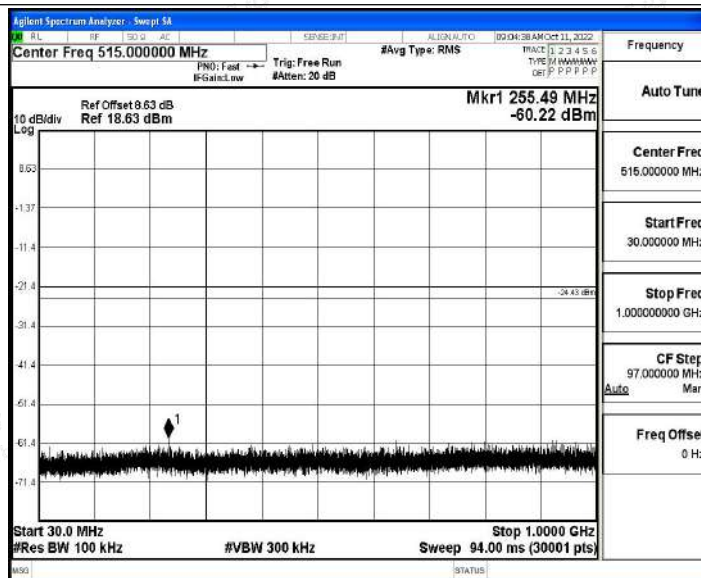


Shenzhen LCS Compliance Testing Laboratory Ltd.

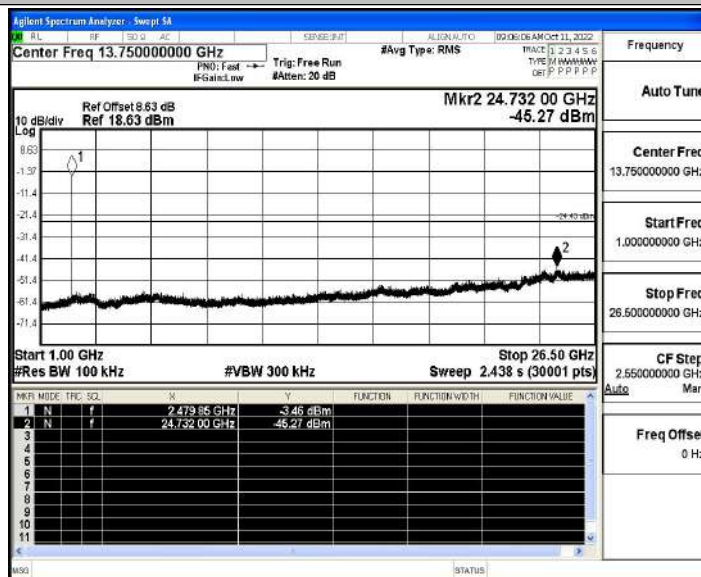
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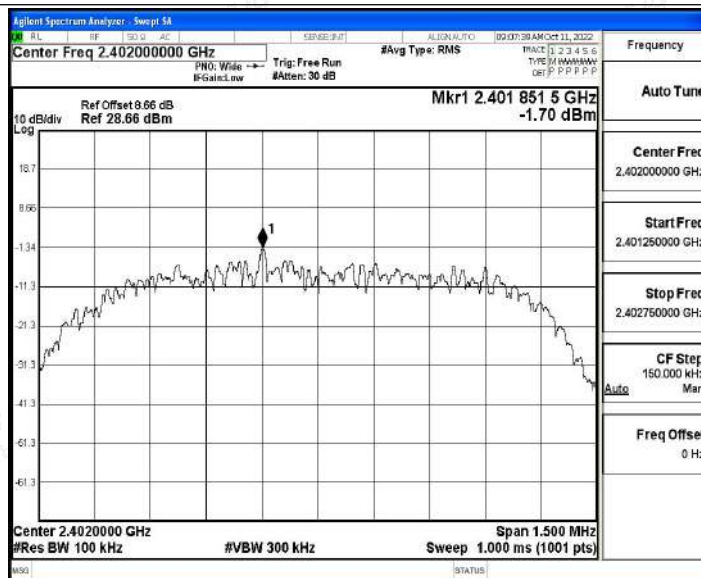


2DH5_Ant1_2480_1000~26500

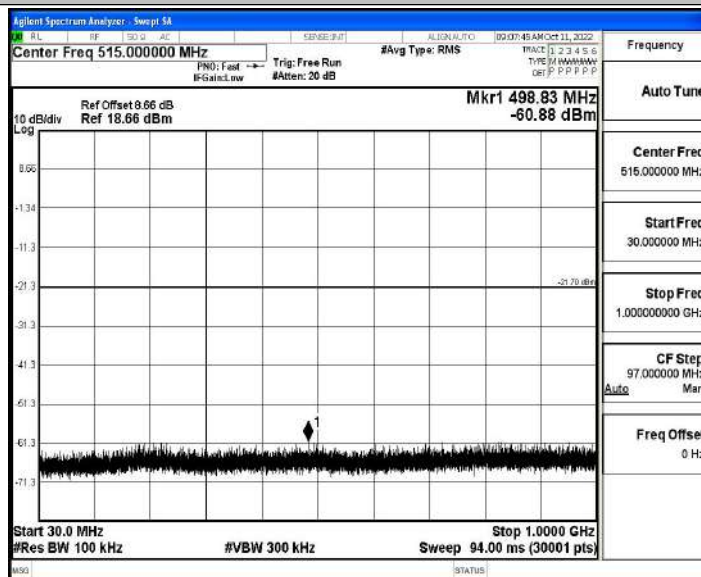


3DH5_Ant1_2402_0~Reference



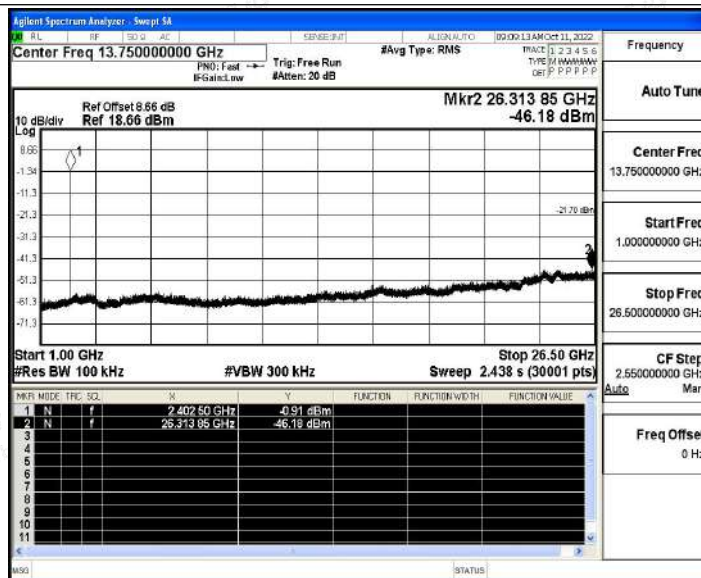


3DH5_Ant1_2402_30~1000

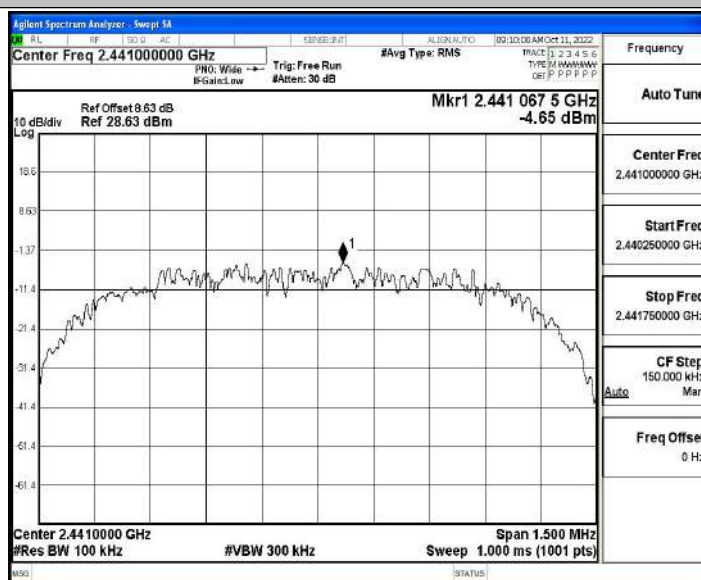


3DH5_Ant1_2402_1000~26500





3DH5_Ant1_2441_0~Reference



3DH5_Ant1_2441_30~1000

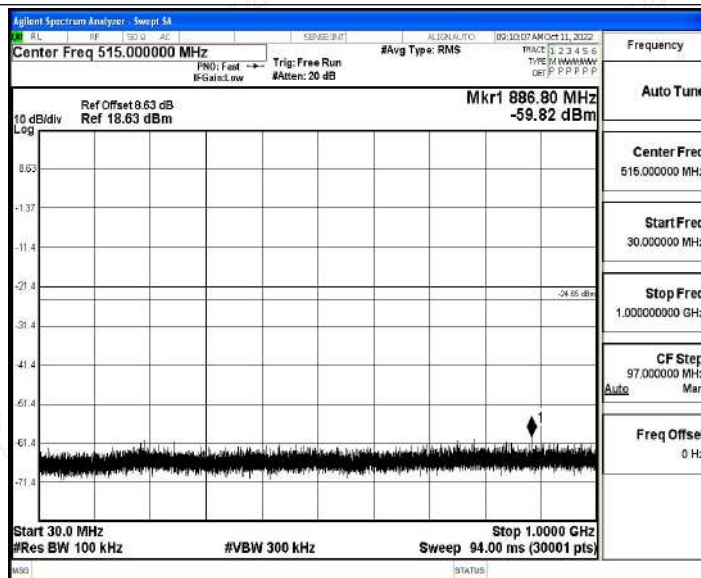


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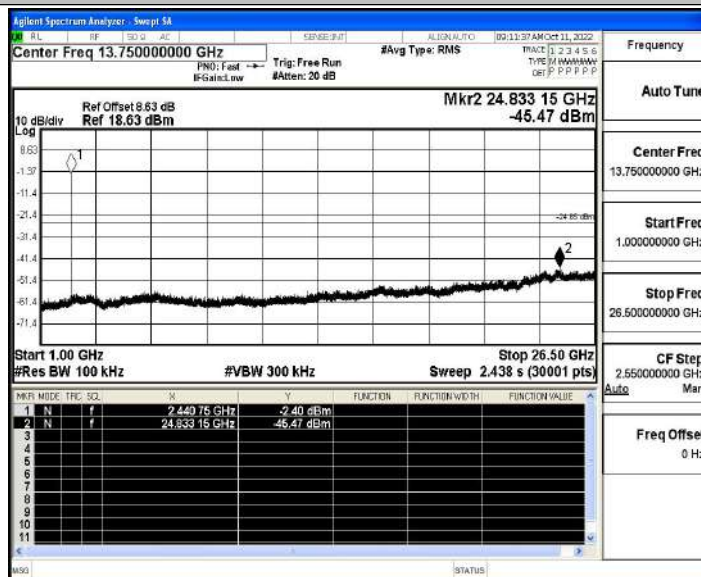
Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

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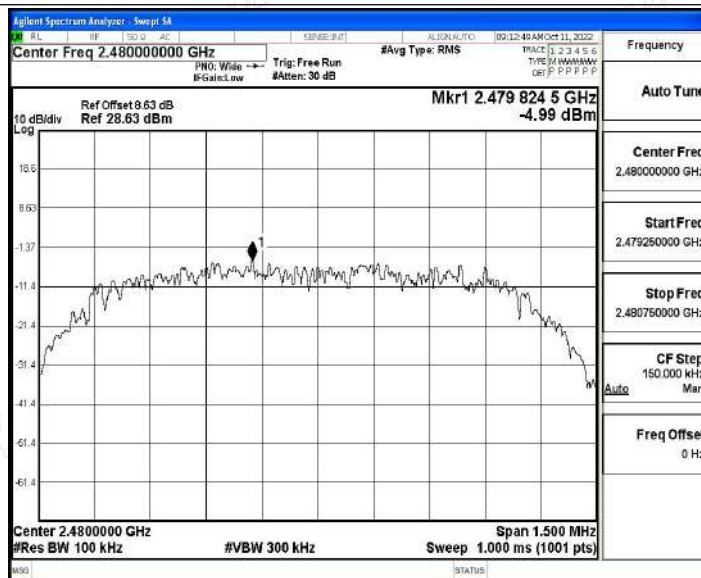


3DH5_Ant1_2441_1000~26500

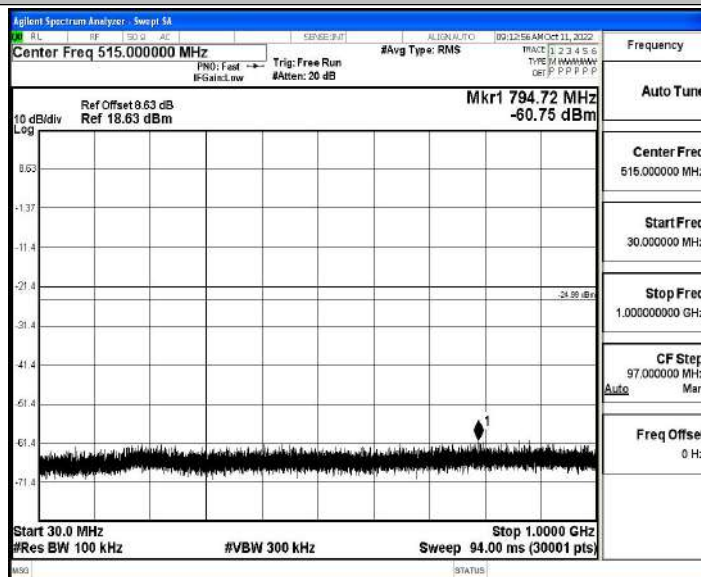


3DH5_Ant1_2480_0~Reference





3DH5_Ant1_2480_30~1000



3DH5_Ant1_2480_1000~26500

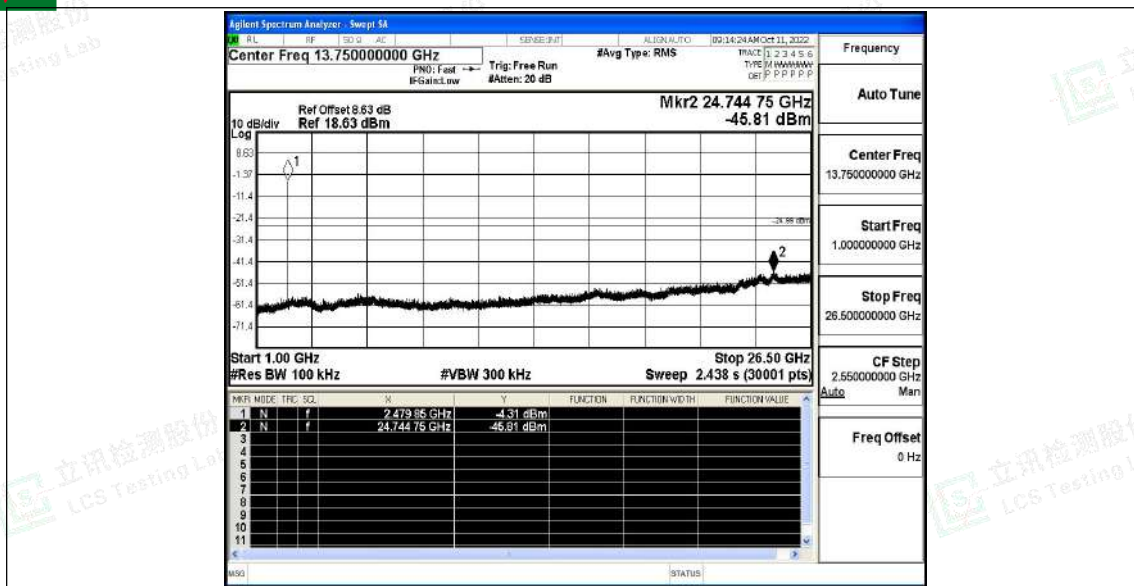


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A.8 Emissions in Restricted Bands

Test Result

TestMode	Antenna	ChName	Channel	Detector	Freq. [MHz]	Result [dBm]	Limit [dBm]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
DH5	Ant1	Low	2402	AV	2310.000	-58.09	≤-41.20	37.11	≤54	PASS
				AV	2382.950	-57.51	≤-41.20	37.69	≤54	PASS
				AV	2390.000	-57.67	≤-41.20	37.53	≤54	PASS
				Peak	2310.000	-52.47	≤-21.20	42.73	≤74	PASS
				Peak	2379.800	-48.07	≤-21.20	47.13	≤74	PASS
				Peak	2390.000	-53.4	≤-21.20	41.80	≤74	PASS
		High	2480	AV	2483.500	-55.39	≤-41.20	39.81	≤54	PASS
				AV	2483.520	-55.39	≤-41.20	39.81	≤54	PASS
				AV	2500.000	-56.94	≤-41.20	38.26	≤54	PASS
				Peak	2483.500	-52.43	≤-21.20	42.77	≤74	PASS
				Peak	2498.160	-47.52	≤-21.20	47.68	≤74	PASS
				Peak	2500.000	-52.44	≤-21.20	42.76	≤74	PASS
		Low	Hop_24 02	Peak	2310.000	-49.26	≤-21.20	45.94	≤74	PASS
				Peak	2350.925	-47.66	≤-21.20	47.54	≤74	PASS
				Peak	2390.000	-50.16	≤-21.20	45.04	≤74	PASS
		High	Hop_24 80	Peak	2483.500	-47.7	≤-21.20	47.50	≤74	PASS
				Peak	2496.560	-46.2	≤-21.20	49.00	≤74	PASS
				Peak	2500.000	-48.44	≤-21.20	46.76	≤74	PASS
2DH5	Ant1	Low	2402	AV	2310.000	-57.98	≤-41.20	37.22	≤54	PASS
				AV	2389.145	-57.48	≤-41.20	37.72	≤54	PASS
				AV	2390.000	-57.74	≤-41.20	37.46	≤54	PASS
				Peak	2310.000	-50.94	≤-21.20	44.26	≤74	PASS
				Peak	2313.755	-48.63	≤-21.20	46.57	≤74	PASS
				Peak	2390.000	-53.21	≤-21.20	41.99	≤74	PASS
		High	2480	AV	2483.500	-55.29	≤-41.20	39.91	≤54	PASS
				AV	2483.520	-55.29	≤-41.20	39.91	≤54	PASS
				AV	2500.000	-57.15	≤-41.20	38.05	≤54	PASS
				Peak	2483.500	-50.9	≤-21.20	44.30	≤74	PASS
				Peak	2490.640	-48.27	≤-21.20	46.93	≤74	PASS
				Peak	2500.000	-52.38	≤-21.20	42.82	≤74	PASS
		Low	Hop_24 02	Peak	2310.000	-49.35	≤-21.20	45.85	≤74	PASS
				Peak	2371.085	-47	≤-21.20	48.20	≤74	PASS
				Peak	2390.000	-49.64	≤-21.20	45.56	≤74	PASS
		High	Hop_24	Peak	2483.500	-47.22	≤-21.20	47.98	≤74	PASS



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3DH5	Ant1		80	Peak	2494.160	-46.75	≤ -21.20	48.45	≤ 74	PASS
				Peak	2500.000	-48.98	≤ -21.20	46.22	≤ 74	PASS
		Low	2402	AV	2310.000	-58.21	≤ -41.20	36.99	≤ 54	PASS
				AV	2388.935	-57.55	≤ -41.20	37.65	≤ 54	PASS
				AV	2390.000	-57.77	≤ -41.20	37.43	≤ 54	PASS
				Peak	2310.000	-51.88	≤ -21.20	43.32	≤ 74	PASS
				Peak	2358.800	-48.59	≤ -21.20	46.61	≤ 74	PASS
				Peak	2390.000	-52.54	≤ -21.20	42.66	≤ 74	PASS
		High	2480	AV	2483.500	-55.39	≤ -41.20	39.81	≤ 54	PASS
				AV	2483.520	-55.39	≤ -41.20	39.81	≤ 54	PASS
				AV	2500.000	-57.16	≤ -41.20	38.04	≤ 54	PASS
				Peak	2483.500	-52.58	≤ -21.20	42.62	≤ 74	PASS
				Peak	2496.800	-48.56	≤ -21.20	46.64	≤ 74	PASS
				Peak	2500.000	-51.5	≤ -21.20	43.70	≤ 74	PASS
		Low	Hop_24 02	Peak	2310.000	-49.69	≤ -21.20	45.51	≤ 74	PASS
				Peak	2322.680	-47.29	≤ -21.20	47.91	≤ 74	PASS
				Peak	2390.000	-50.24	≤ -21.20	44.96	≤ 74	PASS
		High	Hop_24 80	Peak	2483.500	-49.99	≤ -21.20	45.21	≤ 74	PASS
				Peak	2486.320	-46.89	≤ -21.20	48.31	≤ 74	PASS
				Peak	2500.000	-48.97	≤ -21.20	46.23	≤ 74	PASS

Note:

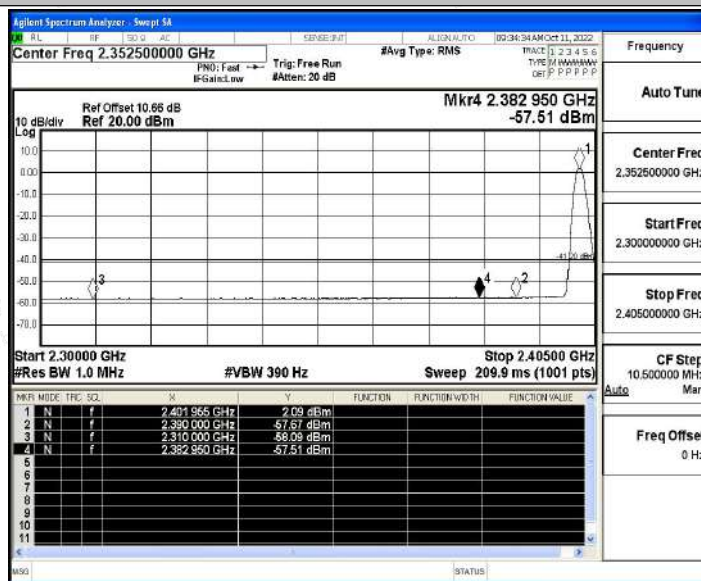
1. The Antenna Gain is compensated in the graph.
2. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.



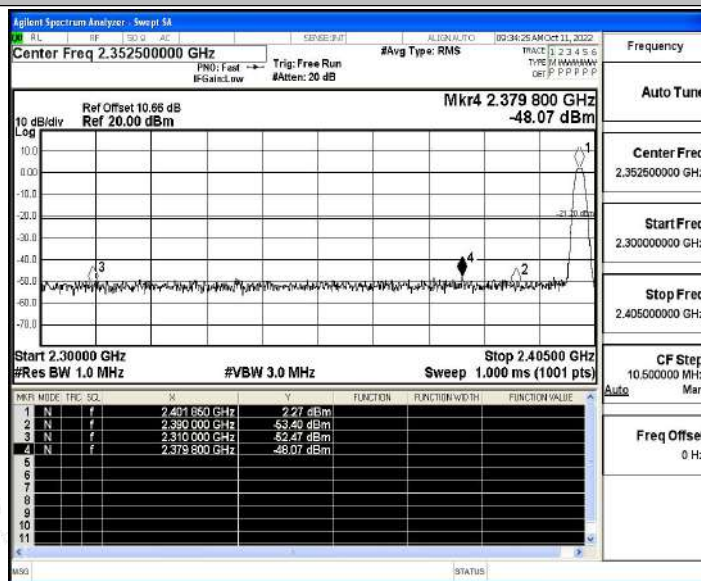


Test Graphs

DH5_Ant1_Low_2402_AV

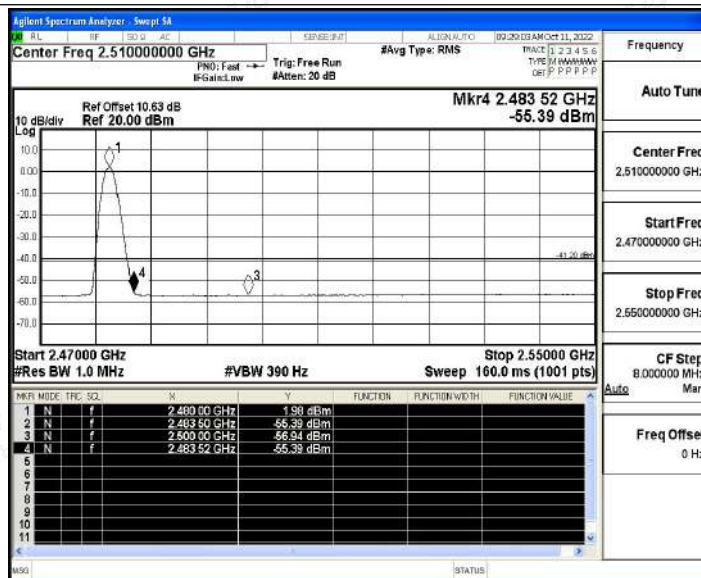


DH5_Ant1_Low_2402_Peak

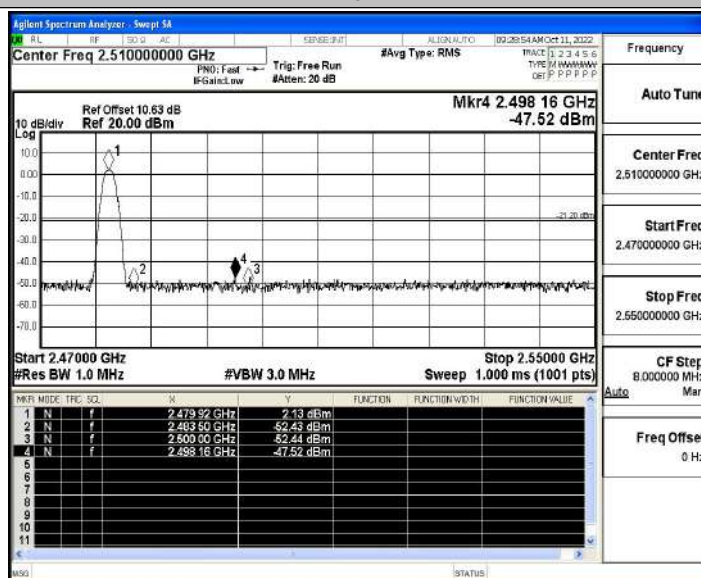


DH5_Ant1_High_2480_AV



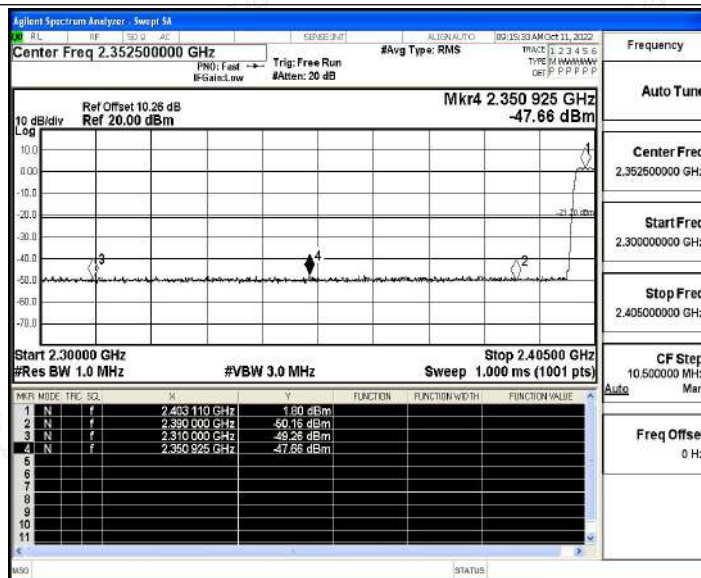


DH5_Ant1_High_2480_Peak

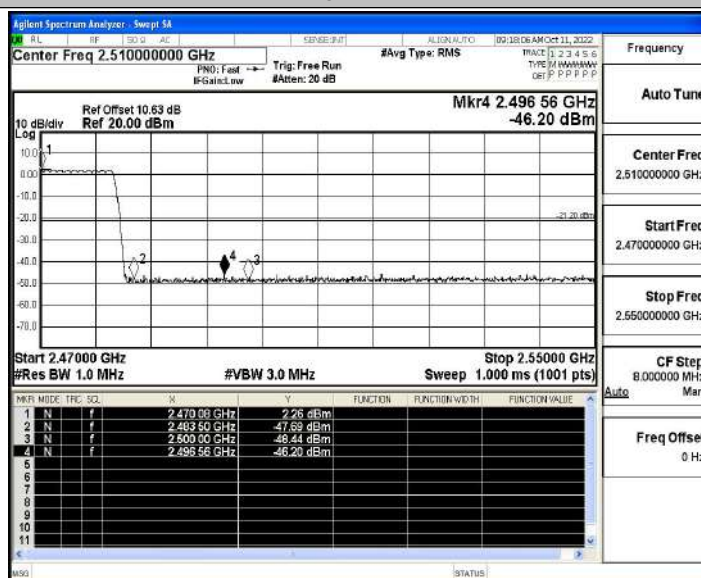


DH5_Ant1_Low_Hop_2402_Peak



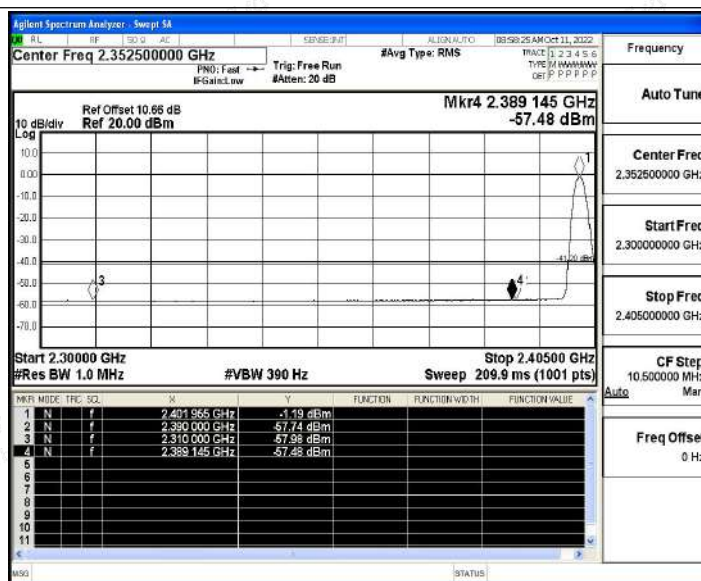


DH5_Ant1_High_Hop_2480_Peak

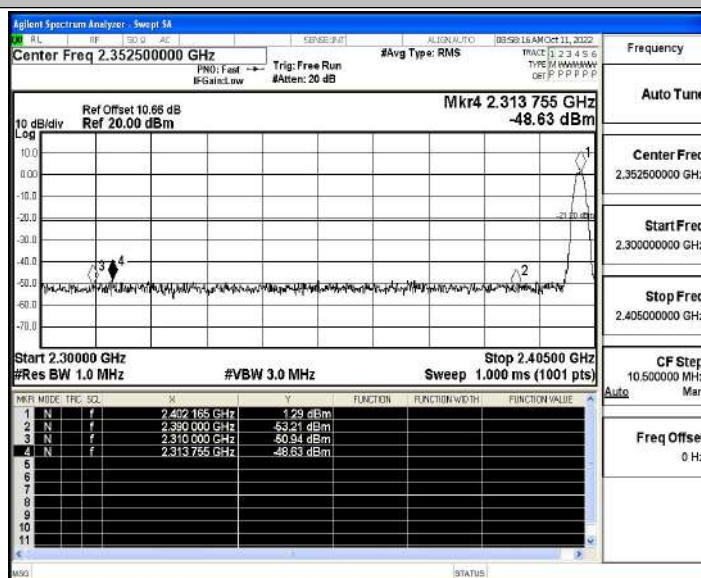


2DH5_Ant1_Low_2402_AV



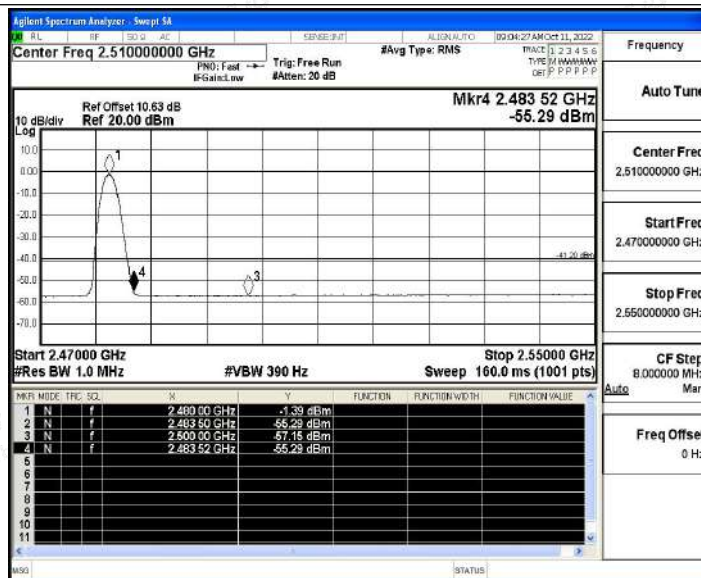


2DH5_Ant1_Low_2402_Peak

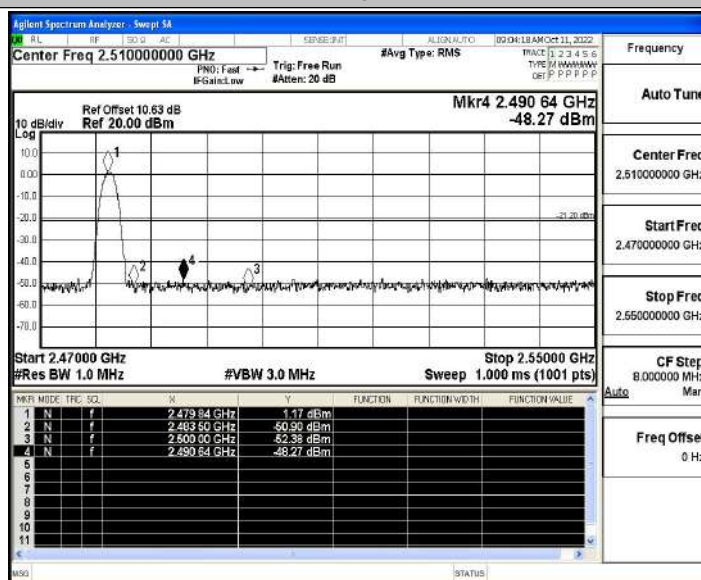


2DH5_Ant1_High_2480_AV



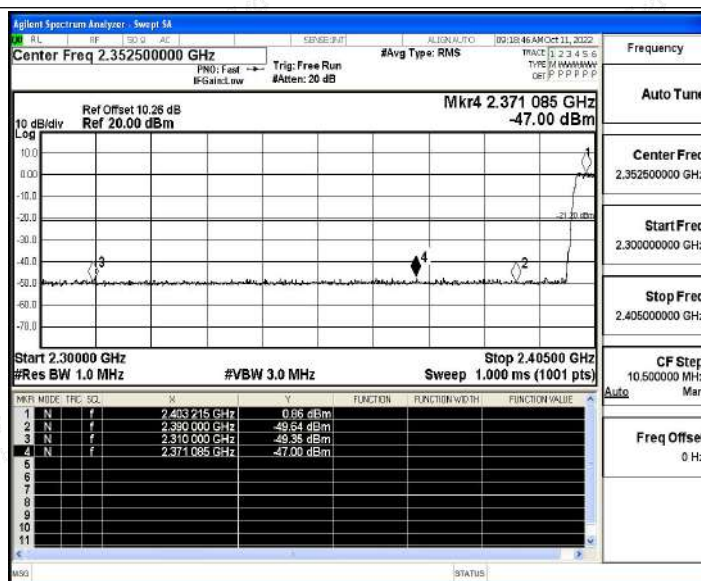


2DH5_Ant1_High_2480_Peak

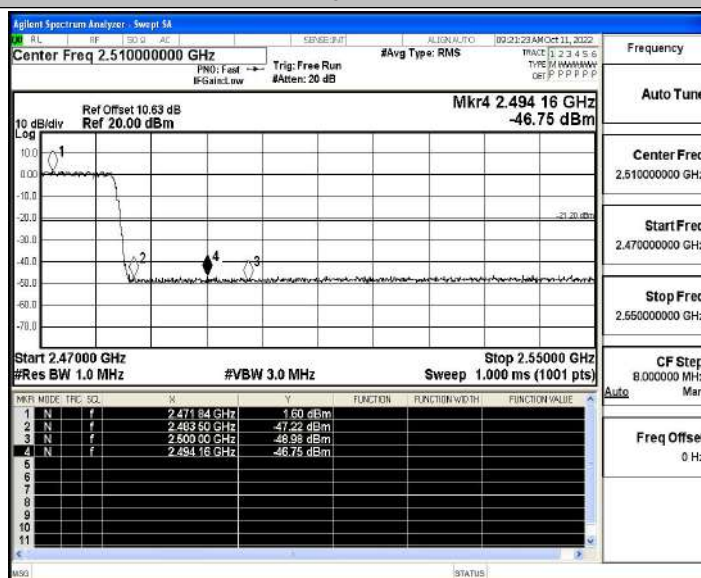


2DH5_Ant1_Low_Hop_2402_Peak



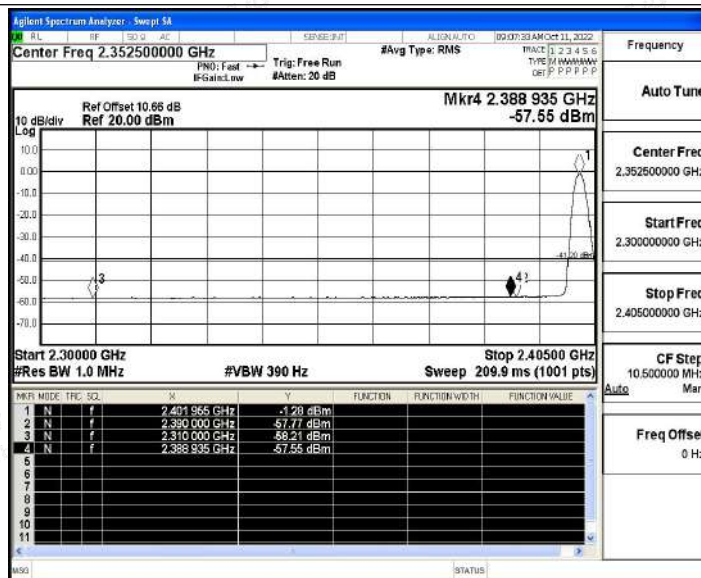


2DH5_Ant1_High_Hop_2480_Peak

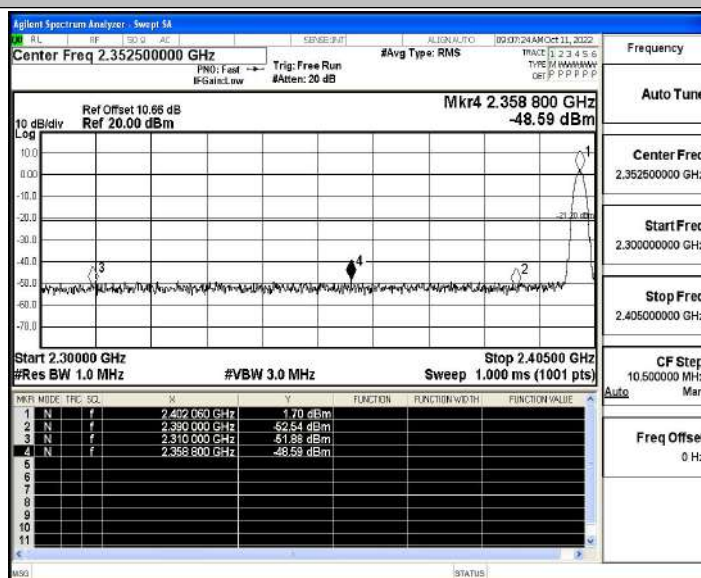


3DH5_Ant1_Low_2402_AV



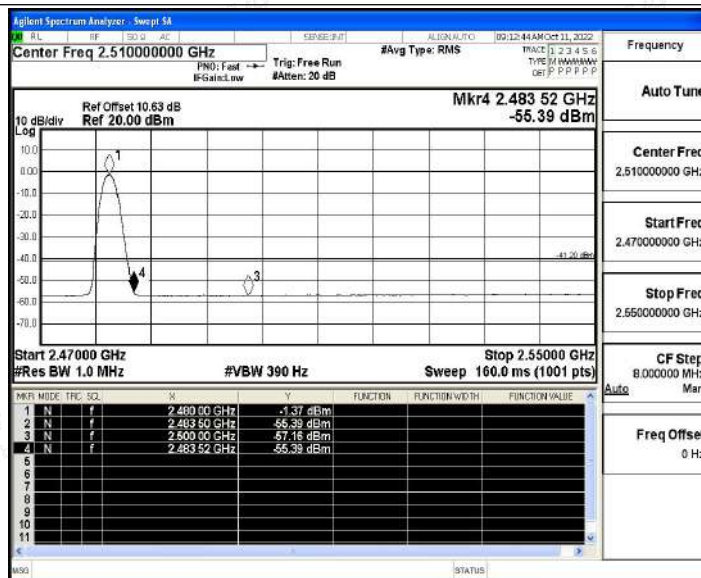


3DH5_Ant1_Low_2402_Peak

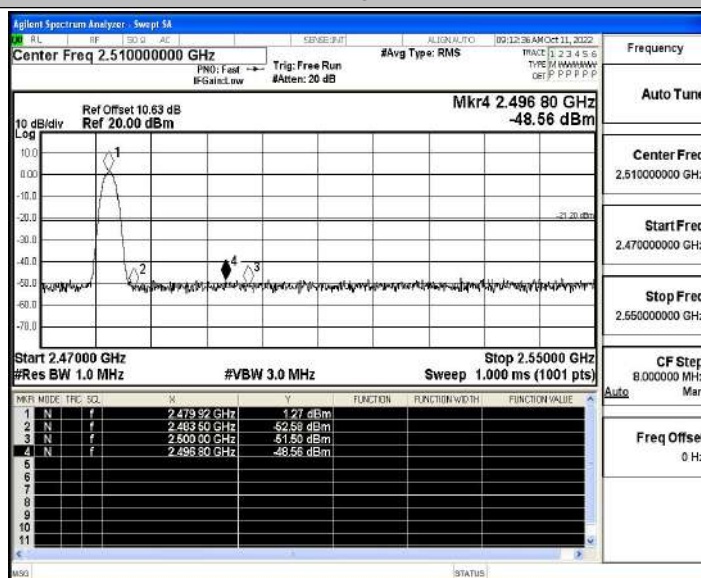


3DH5_Ant1_High_2480_AV



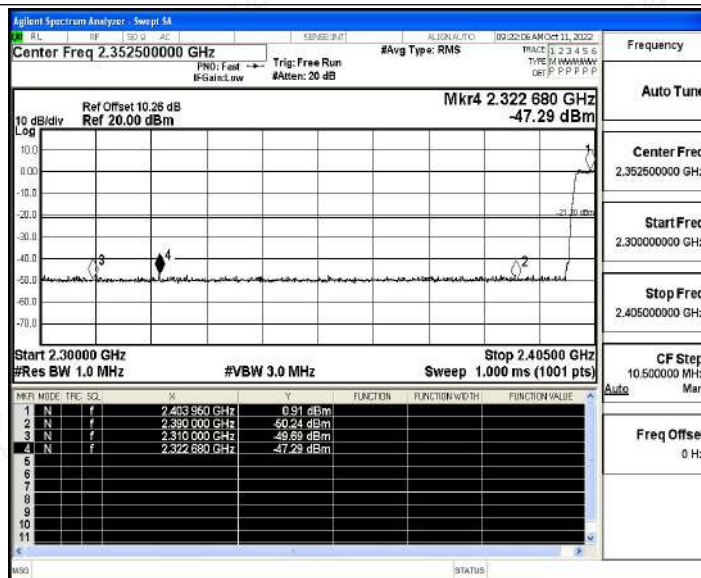


3DH5_Ant1_High_2480_Peak



3DH5_Ant1_Low_Hop_2402_Peak





3DH5_Ant1_High_Hop_2480_Peak

