



Appendix A

RF Test Data for BT (Conducted Measurement)

Product Name: Shower Head Speaker

Test Model: AT1490B

Environmental Conditions

Temperature:	23.8° C
Relative Humidity:	52.2%
ATM Pressure:	100.0 kPa
Test Engineer:	Nick Peng
Supervised by:	Li Huan





A.1 20dB Emission Bandwidth

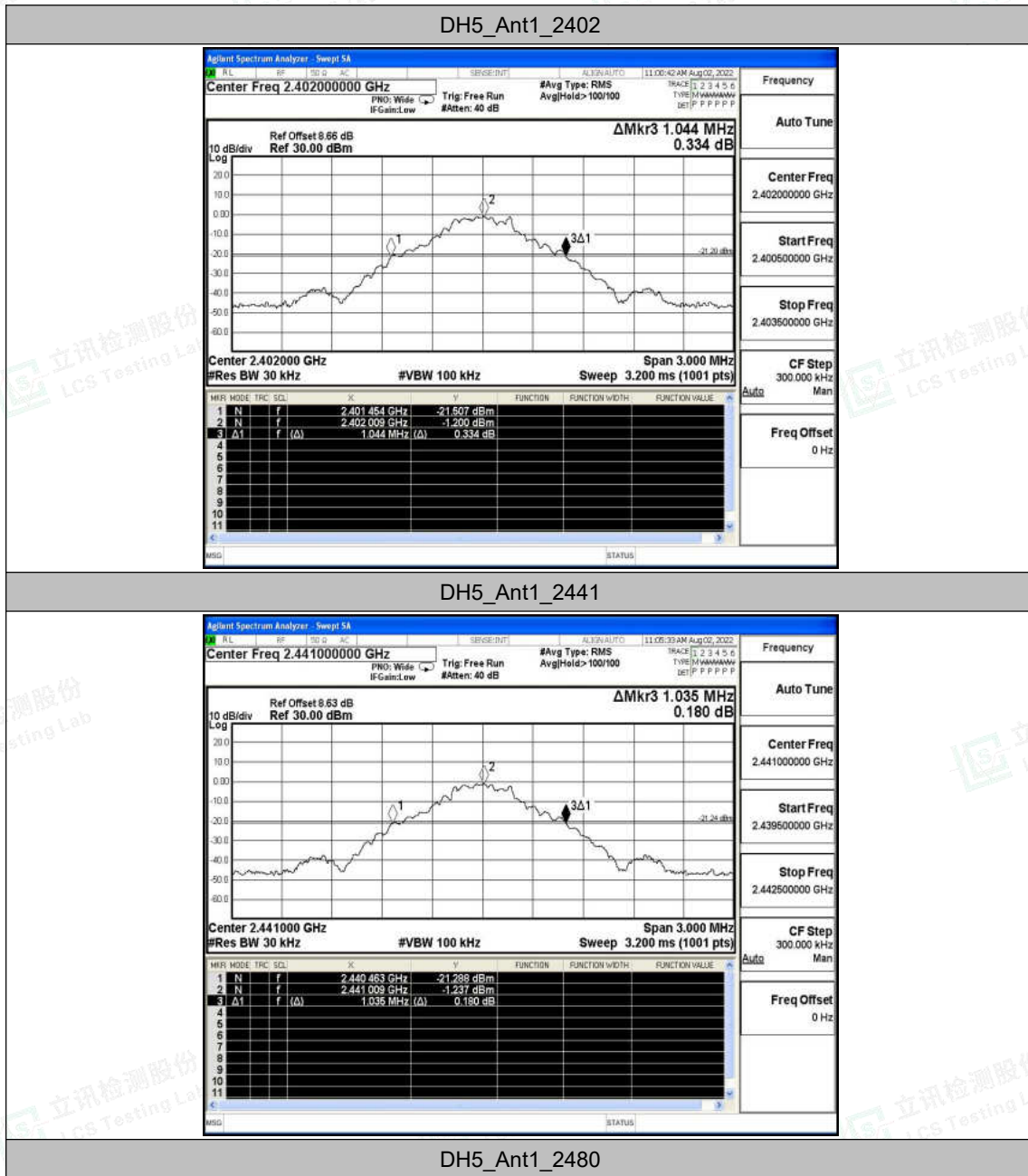
Test Result

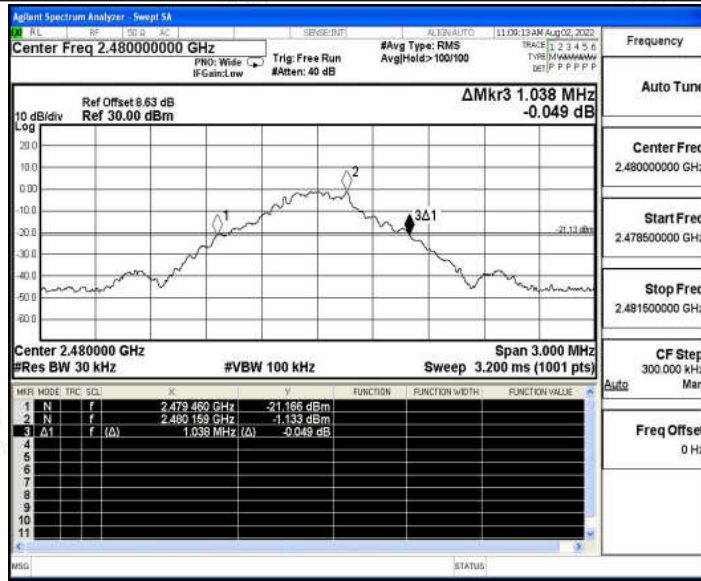
TestMode	Antenna	Channel	20db EBW[MHz]	FL[MHz]	FH[MHz]	Verdict
DH5	Ant1	2402	1.044	2401.454	2402.498	---
		2441	1.035	2440.463	2441.498	---
		2480	1.038	2479.460	2480.498	---
2DH5	Ant1	2402	1.314	2401.334	2402.648	---
		2441	1.299	2440.352	2441.651	---
		2480	1.287	2479.358	2480.645	---
3DH5	Ant1	2402	1.311	2401.337	2402.648	---
		2441	1.305	2440.340	2441.645	---
		2480	1.308	2479.340	2480.648	---



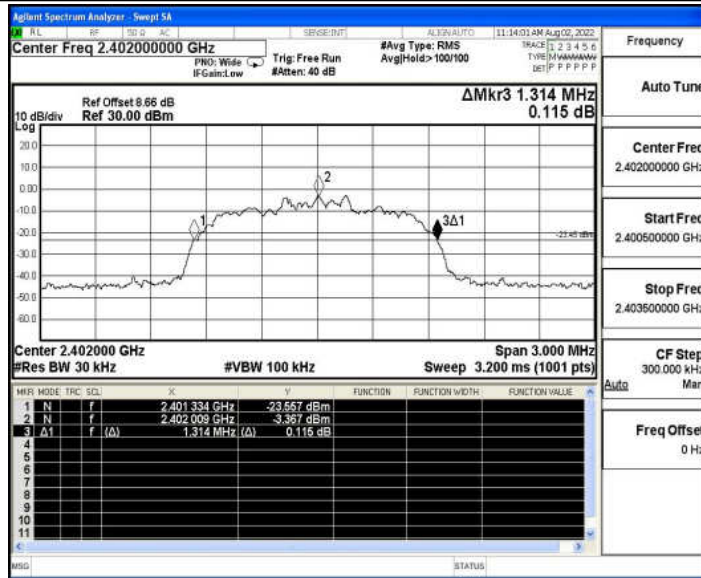


Test Graphs



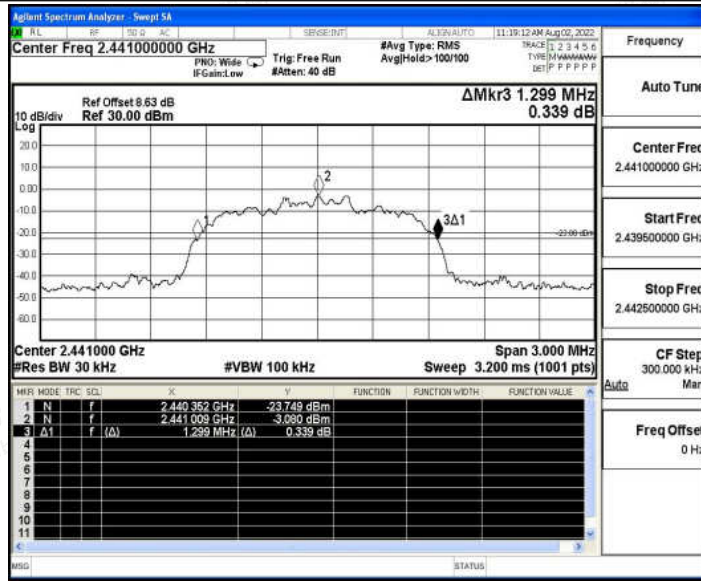


2DHS_Ant1_2402

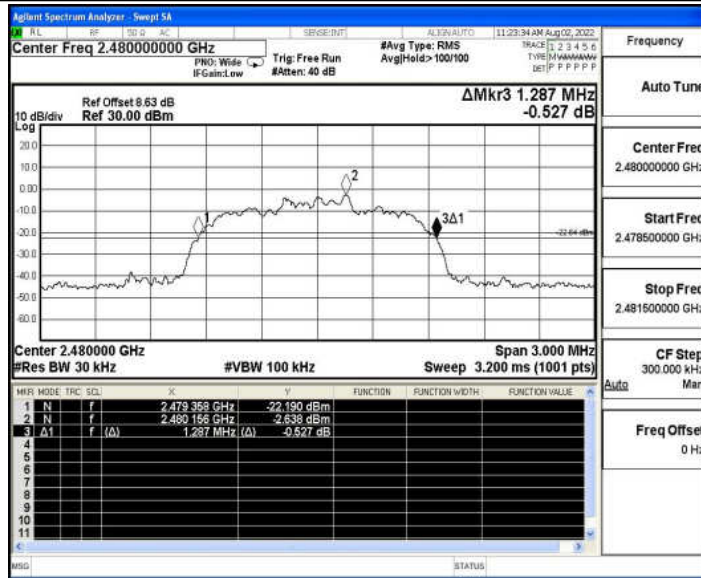


2DHS_Ant1_2441



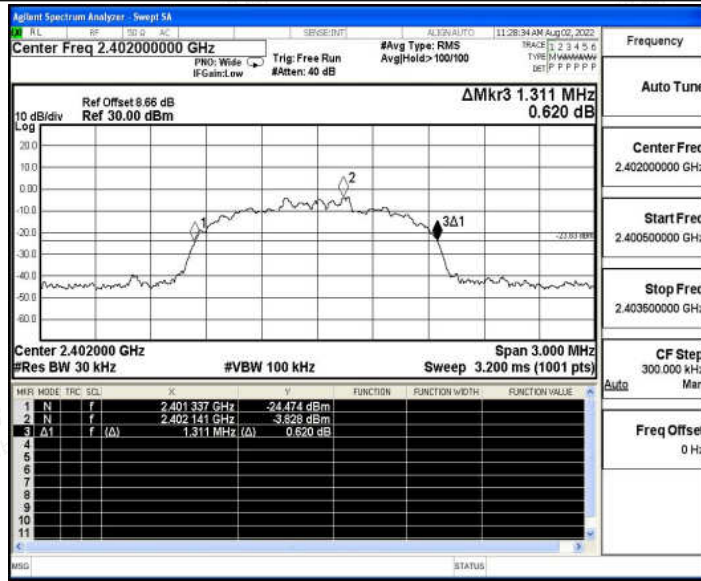


2Dh5_Ant1_2480

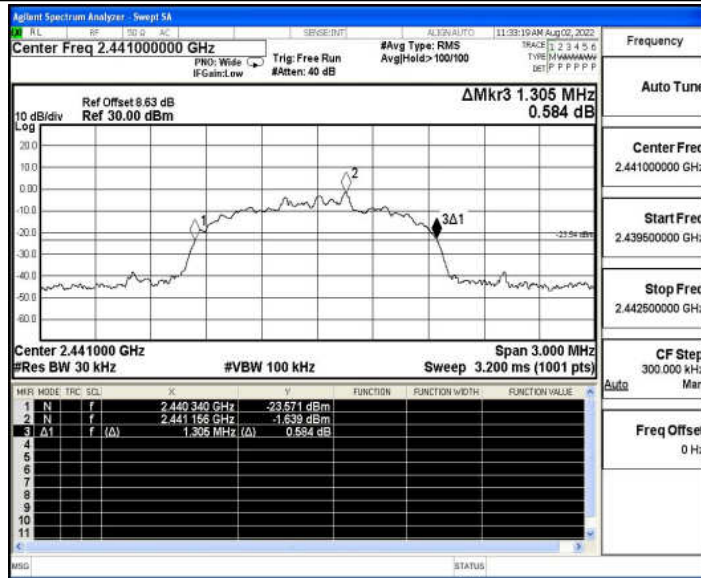


3Dh5_Ant1_2402



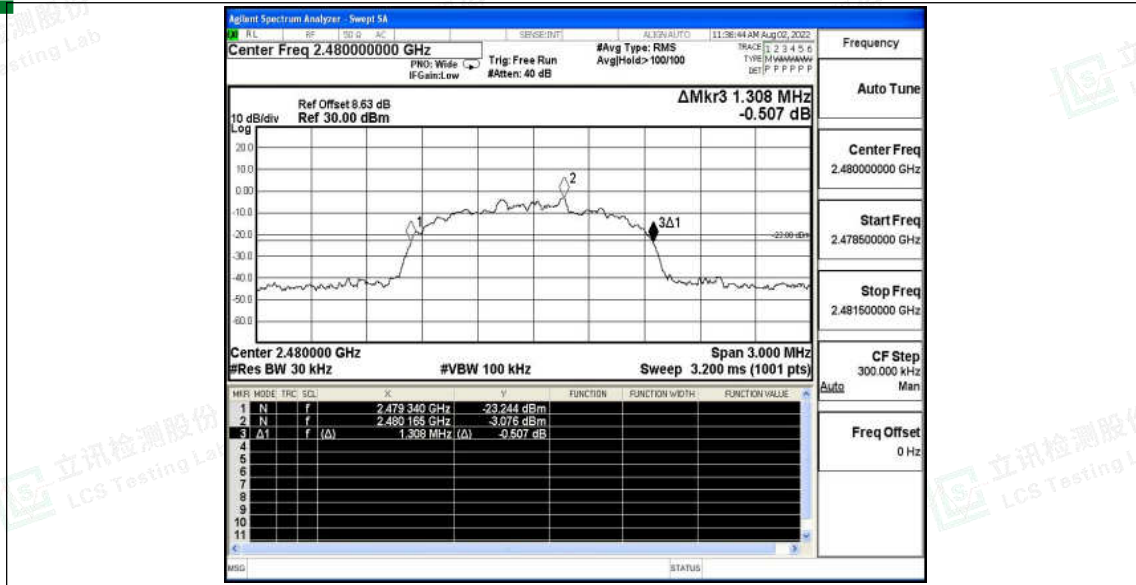


3DH5_Ant1_2441



3DH5_Ant1_2480







A.2 Maximum conducted output power

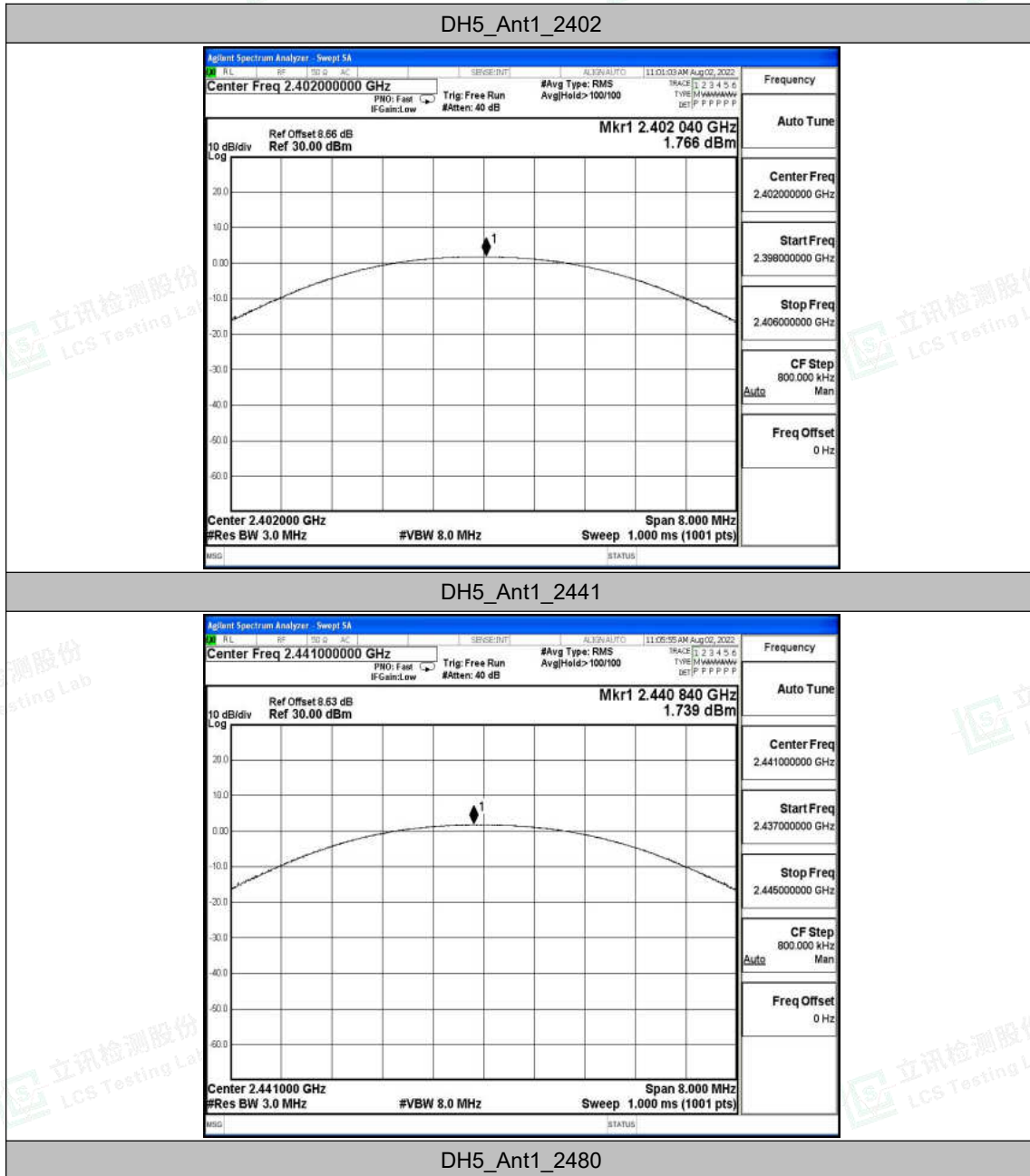
Test Result

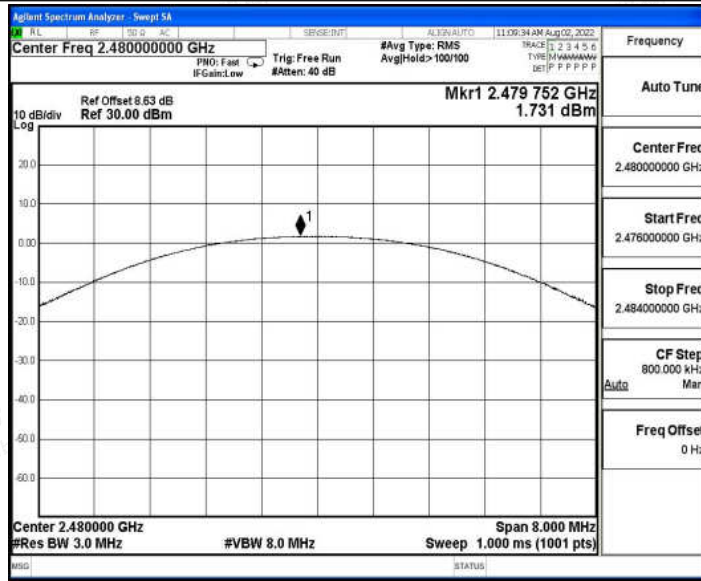
TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
DH5	Ant1	2402	1.77	≤20.97	PASS
		2441	1.74	≤20.97	PASS
		2480	1.73	≤20.97	PASS
2DH5	Ant1	2402	1.47	≤20.97	PASS
		2441	1.49	≤20.97	PASS
		2480	1.45	≤20.97	PASS
3DH5	Ant1	2402	1.66	≤20.97	PASS
		2441	1.61	≤20.97	PASS
		2480	1.58	≤20.97	PASS



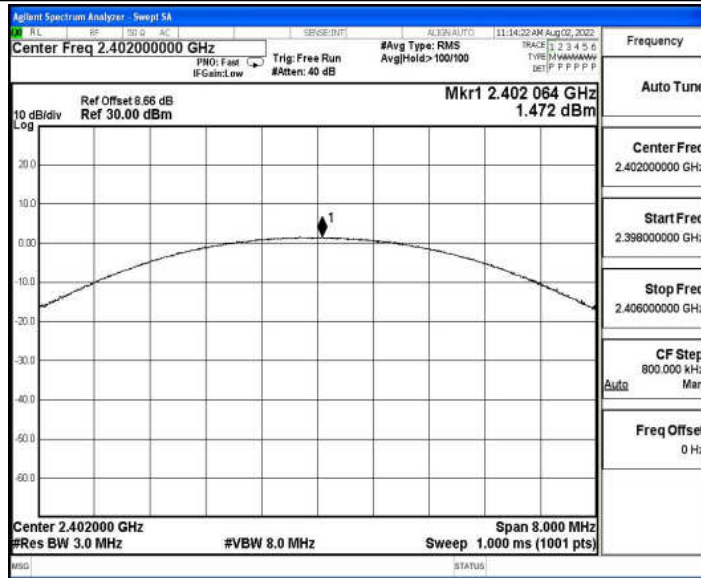


Test Graphs



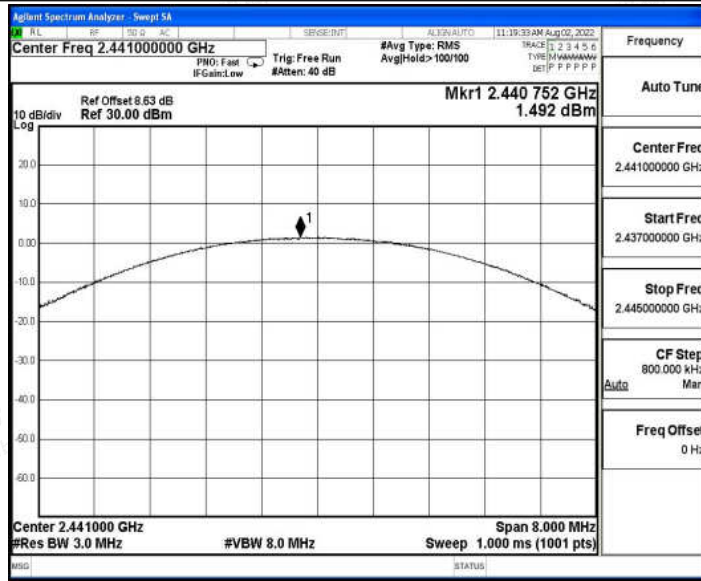


2DH5_Ant1_2402

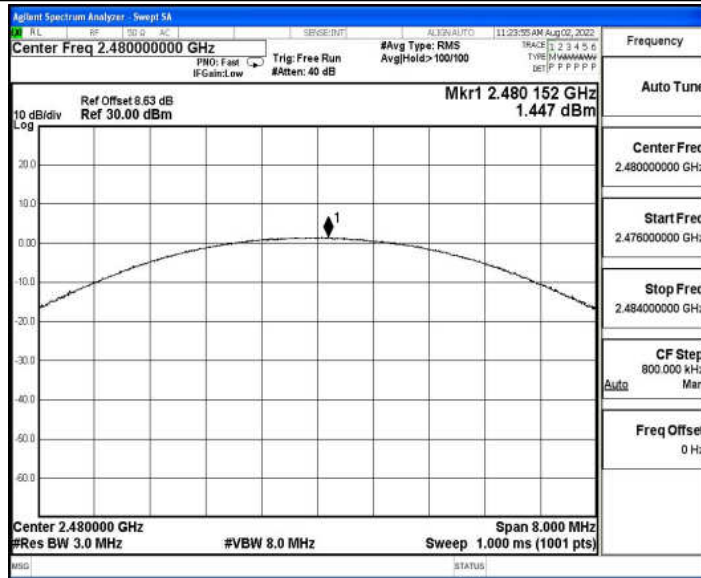


2DH5_Ant1_2441



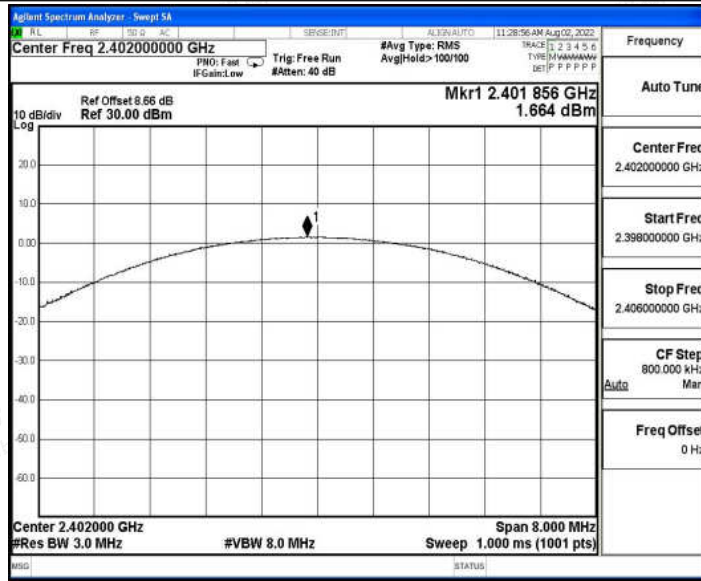


2DH5_Ant1_2480

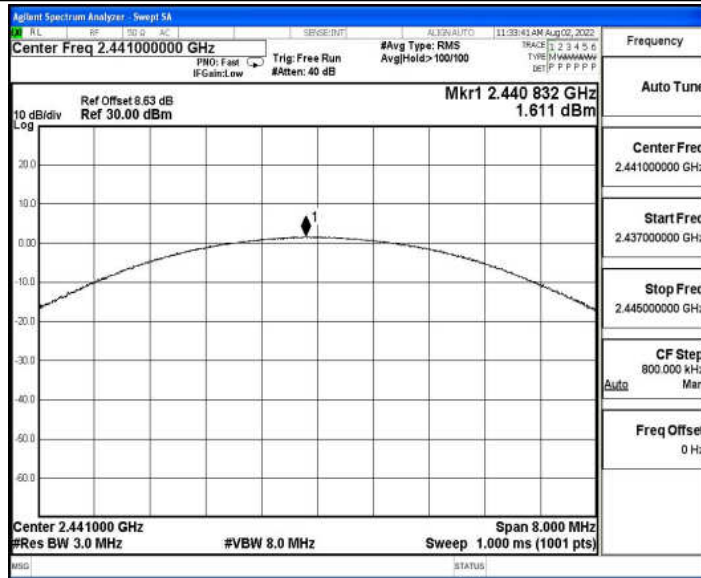


3DH5_Ant1_2402



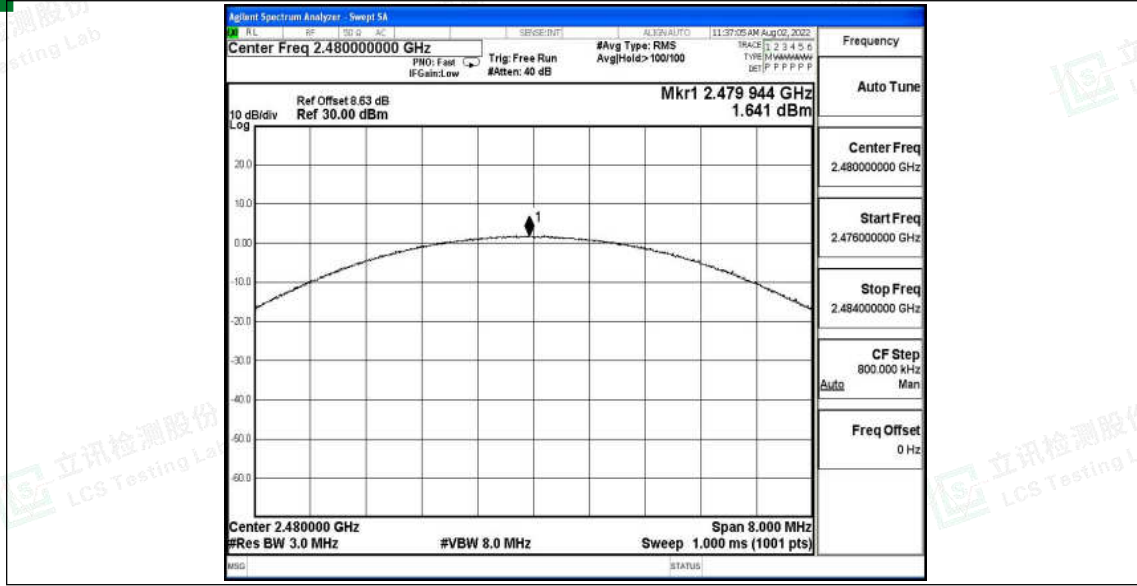


3DH5_Ant1_2441



3DH5_Ant1_2480







A.3 Carrier frequency separation

Test Result

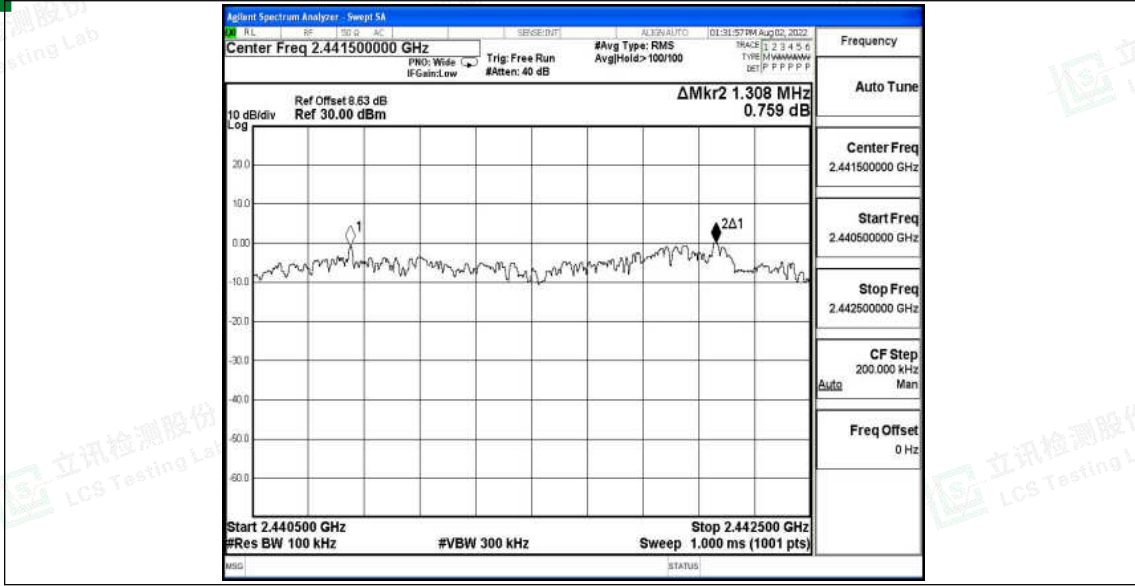
TestMode	Antenna	Channel	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Hop	1.158	≥1.044	PASS
2DH5	Ant1	Hop	1.178	≥0.876	PASS
3DH5	Ant1	Hop	1.308	≥0.874	PASS





Test Graphs







A.4 Time of occupancy

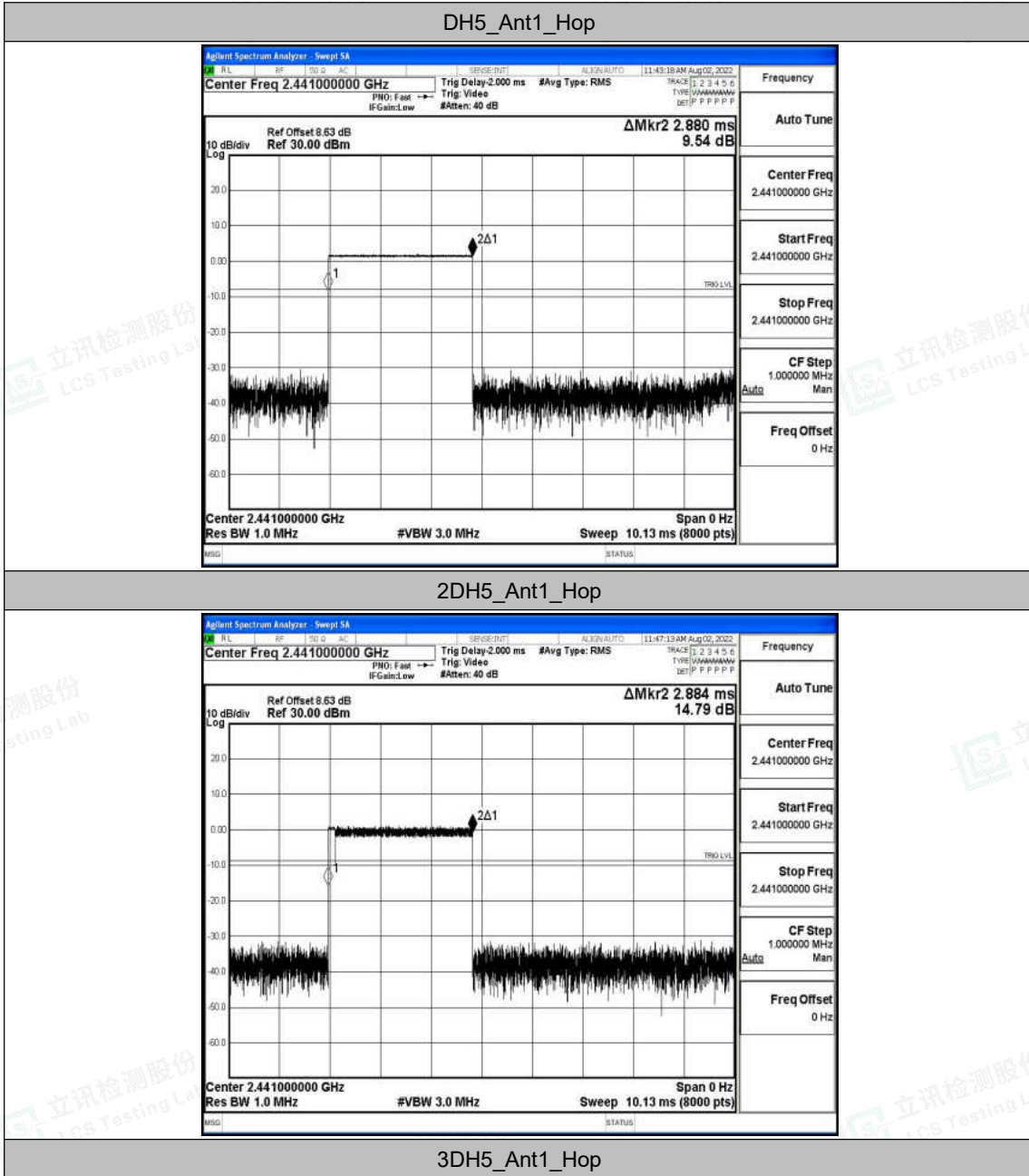
Test Result

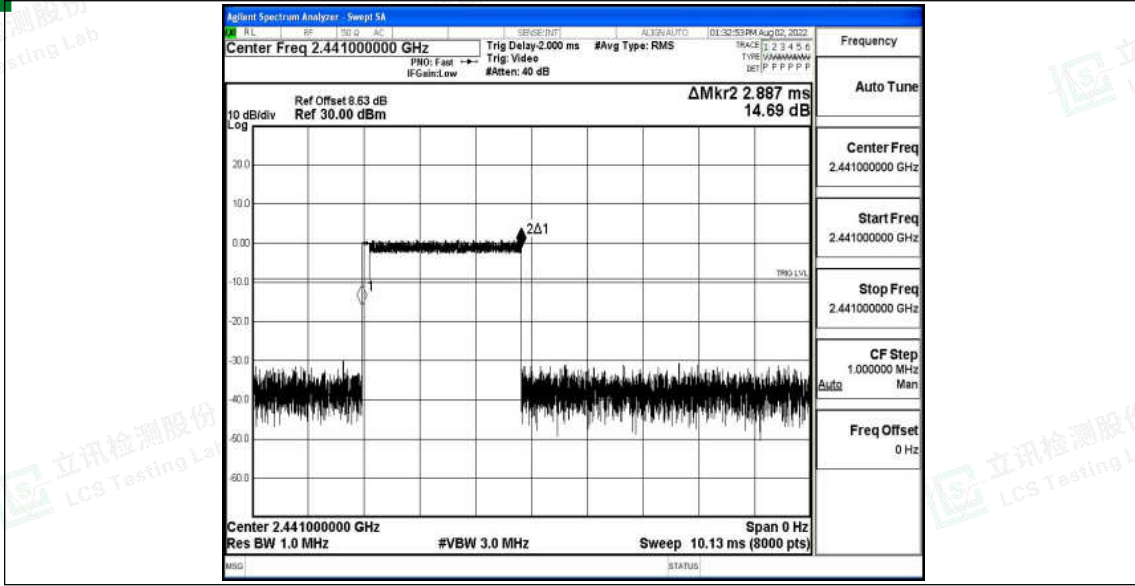
TestMode	Antenna	Channel	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH5	Ant1	Hop	2.88	106.67	0.307	≤0.4	PASS
2DH5	Ant1	Hop	2.88	106.67	0.308	≤0.4	PASS
3DH5	Ant1	Hop	2.89	106.67	0.308	≤0.4	PASS





Test Graphs







A.5 Number of hopping channels

Test Result

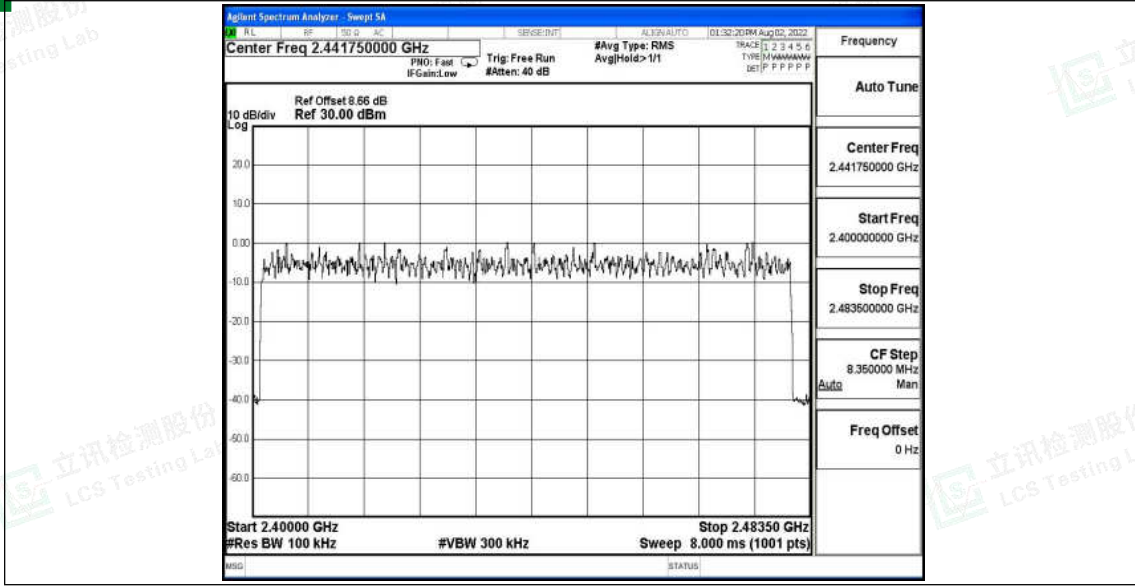
TestMode	Antenna	Channel	Result[Num]	Limit[Num]	Verdict
DH5	Ant1	Hop	79	≥15	PASS
2DH5	Ant1	Hop	79	≥15	PASS
3DH5	Ant1	Hop	79	≥15	PASS





Test Graphs







A.6 Band edge measurements

Test Result

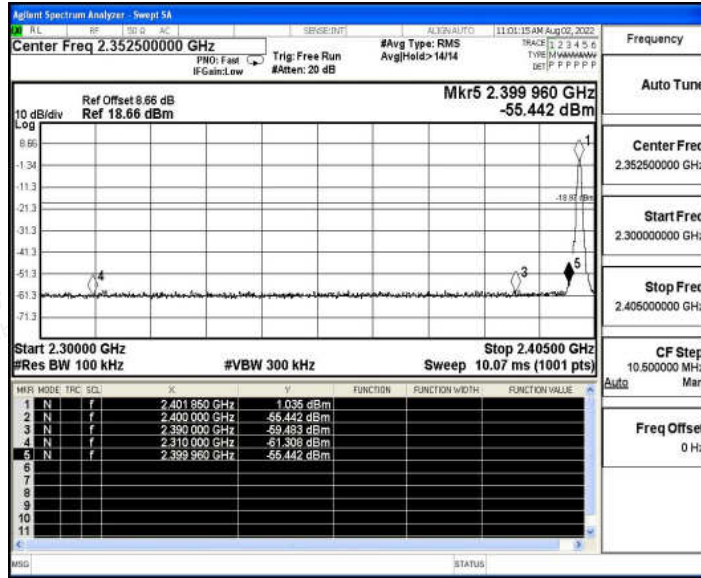
TestMode	Antenna	ChName	Channel	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	1.04	-55.44	≤-18.97	PASS
		High	2480	1.08	-58.05	≤-18.92	PASS
		Low	Hop_2402	0.89	-59	≤-19.11	PASS
		High	Hop_2480	1.48	-57.31	≤-18.52	PASS
2DH5	Ant1	Low	2402	-0.30	-56.19	≤-20.3	PASS
		High	2480	0.14	-57.55	≤-19.86	PASS
		Low	Hop_2402	-3.68	-58.73	≤-23.68	PASS
		High	Hop_2480	-1.38	-57.27	≤-21.38	PASS
3DH5	Ant1	Low	2402	0.16	-55.99	≤-19.84	PASS
		High	2480	0.14	-57.02	≤-19.86	PASS
		Low	Hop_2402	-0.55	-58.55	≤-20.55	PASS
		High	Hop_2480	-0.11	-57.02	≤-20.11	PASS



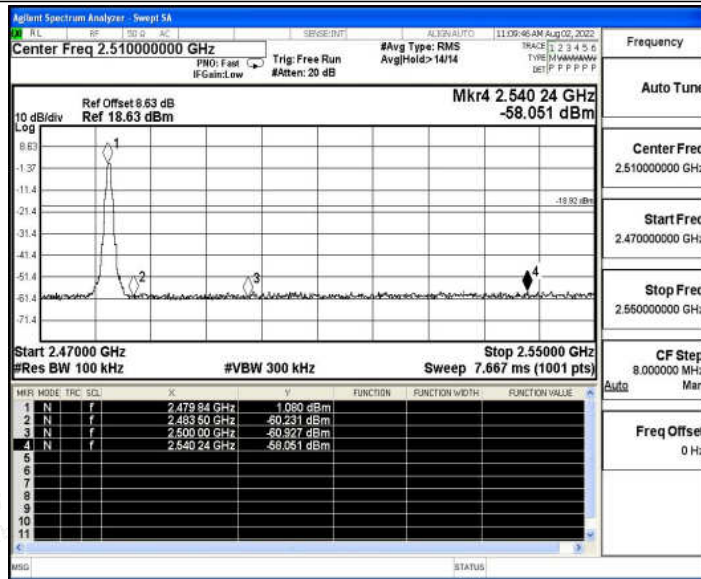


Test Graphs

DH5_Ant1_Low_2402

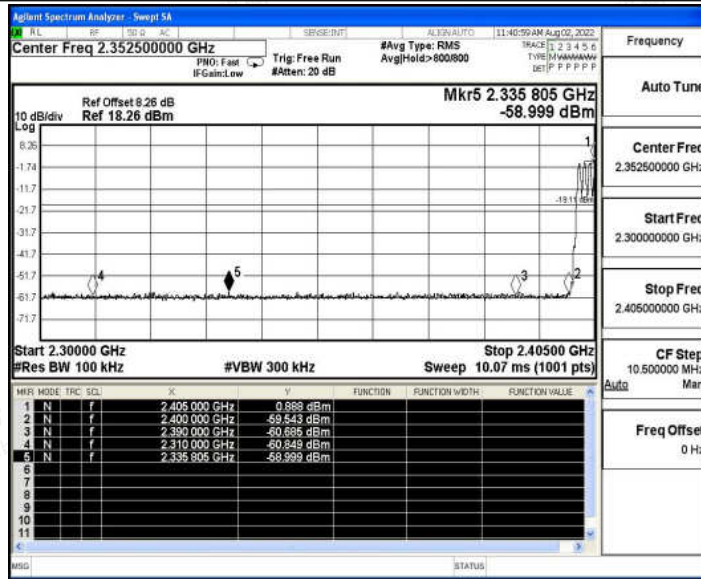


DH5_Ant1_High_2480

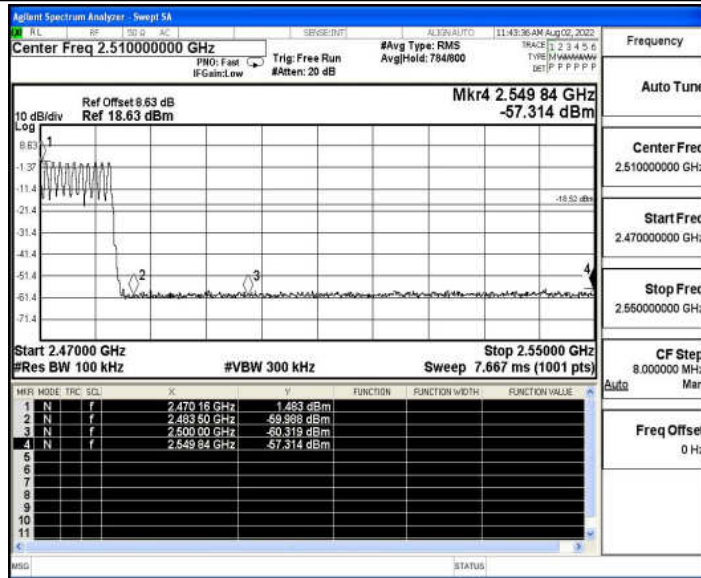


DH5_Ant1_Low_Hop_2402



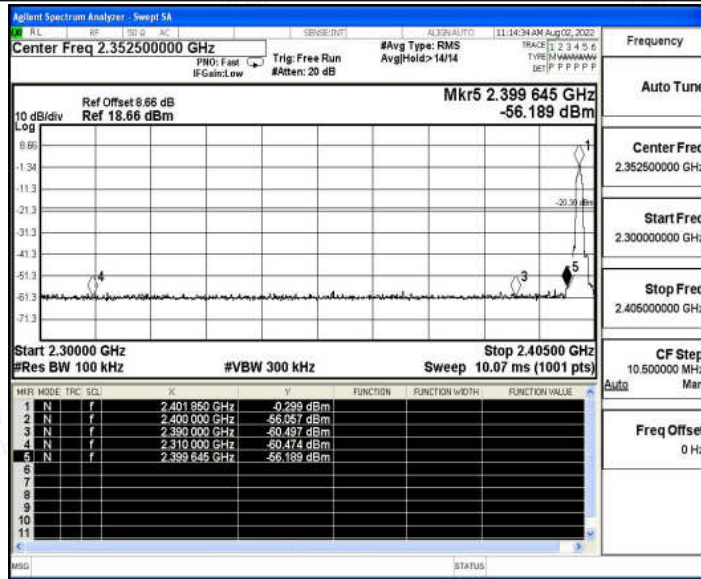


DH5_Ant1_High_Hop_2480

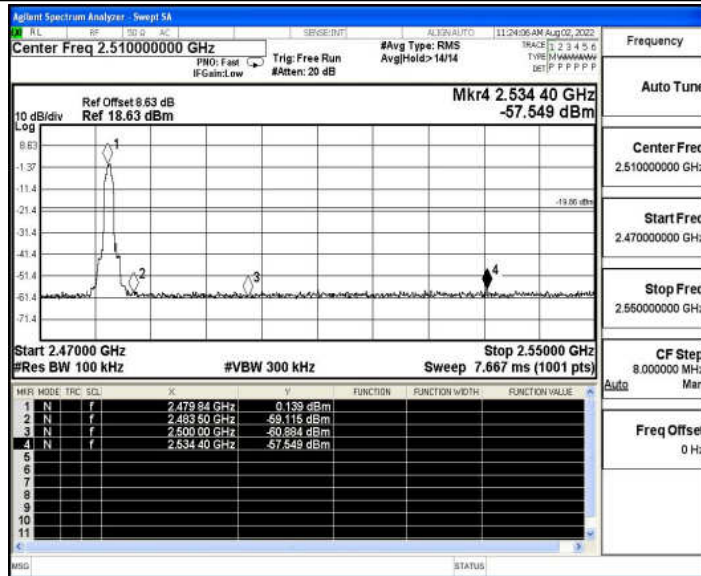


2DH5_Ant1_Low_2402



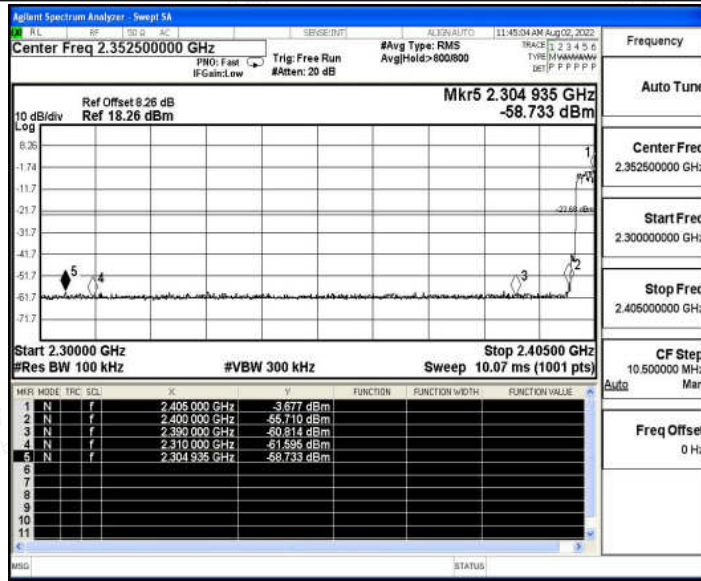


2DH5_Ant1_High_2480

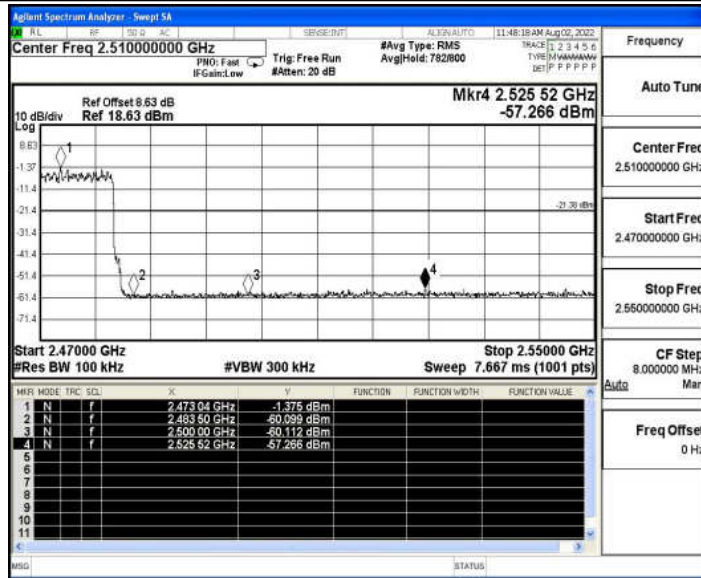


2DH5_Ant1_Low_Hop_2402



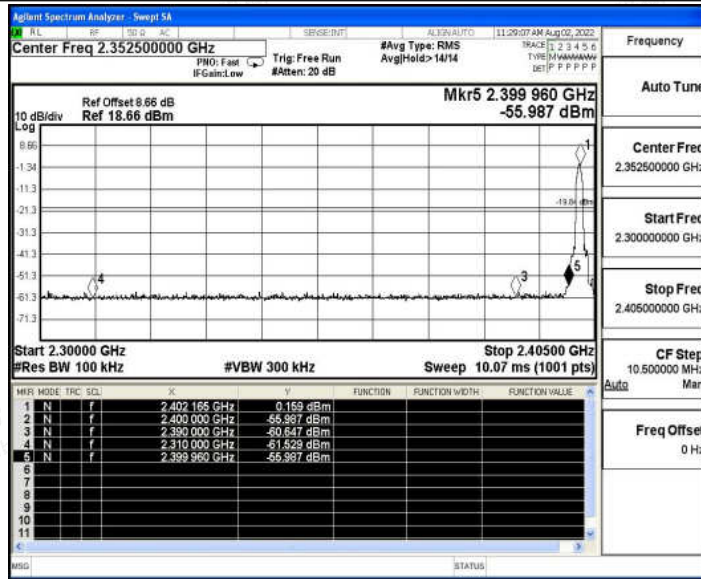


2DH5_Ant1_High_Hop_2480

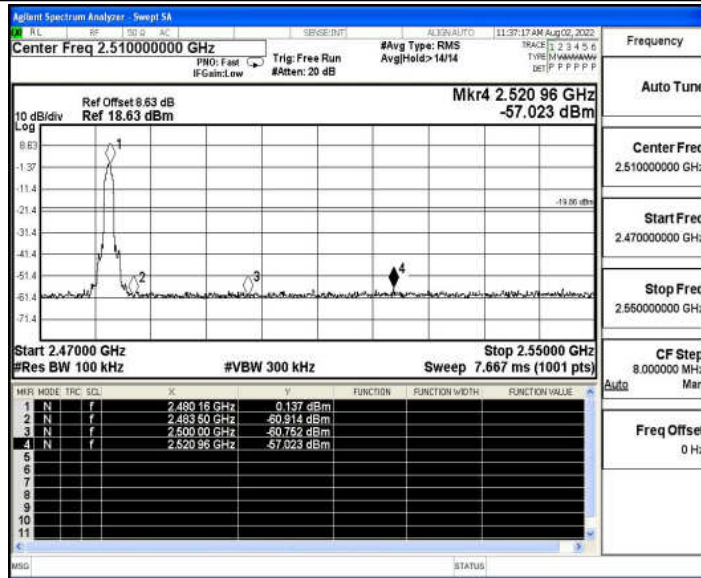


3DH5_Ant1_Low_2402



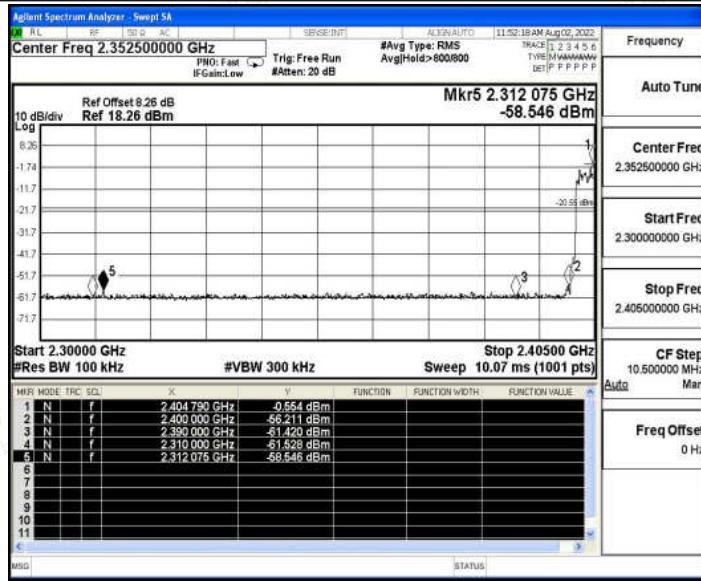


3DH5_Ant1_High_2480

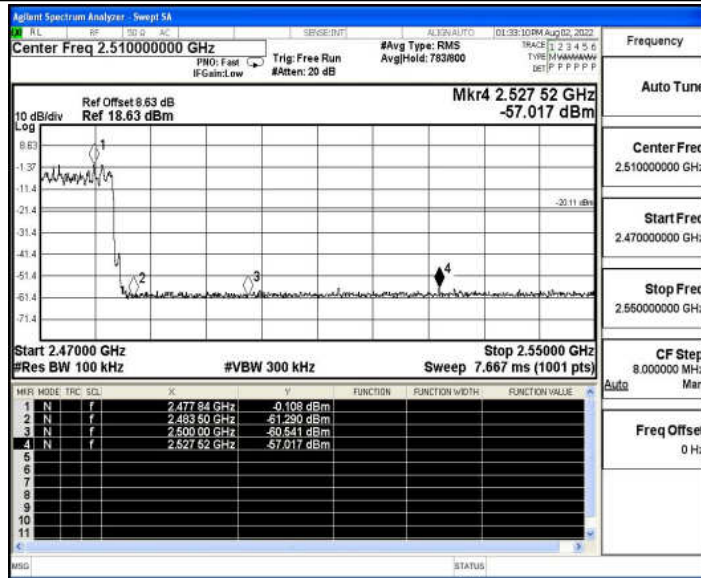


3DH5_Ant1_Low_Hop_2402





3DH5_Ant1_High_Hop_2480





A.7 Conducted Spurious Emission

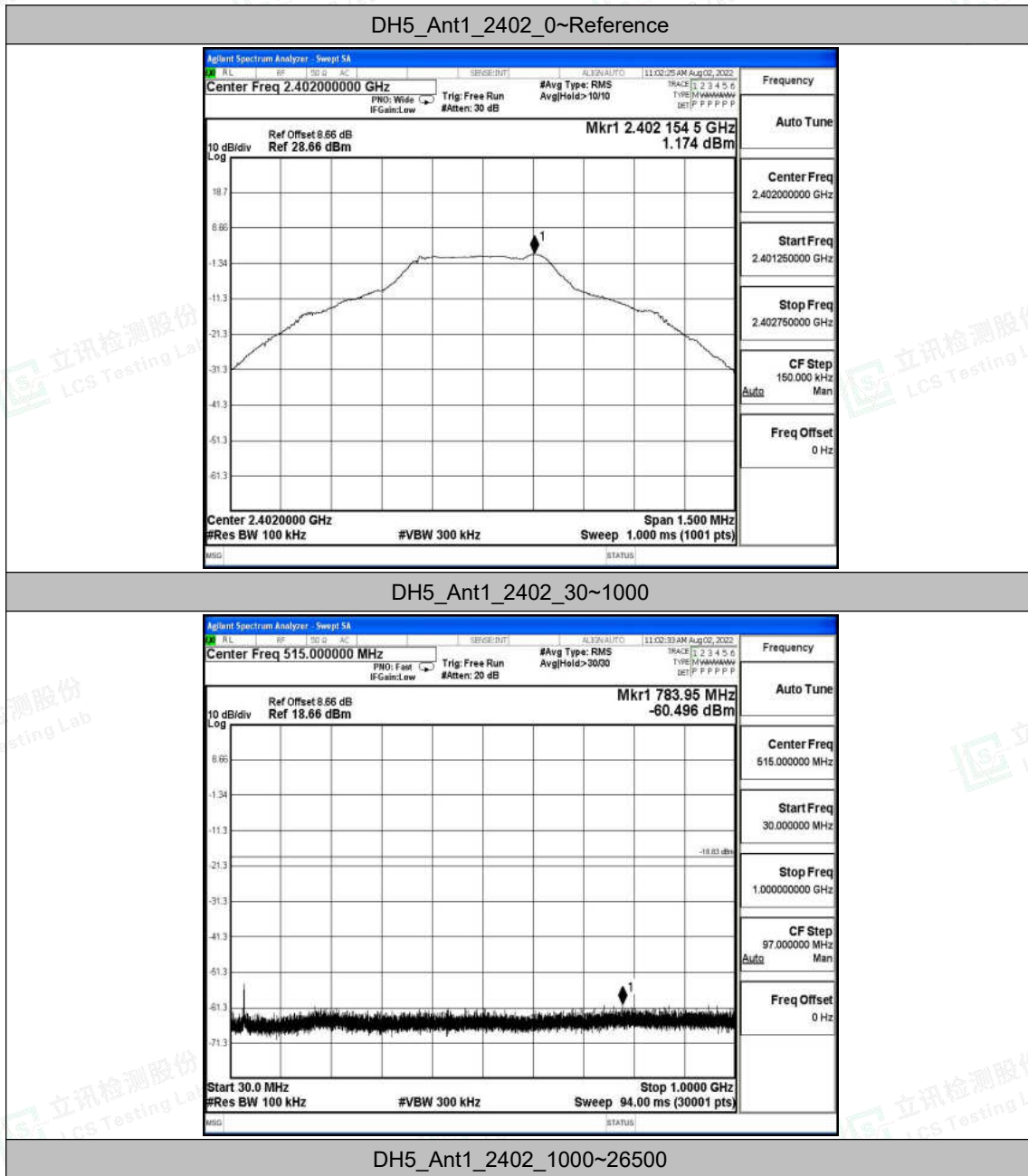
Test Result

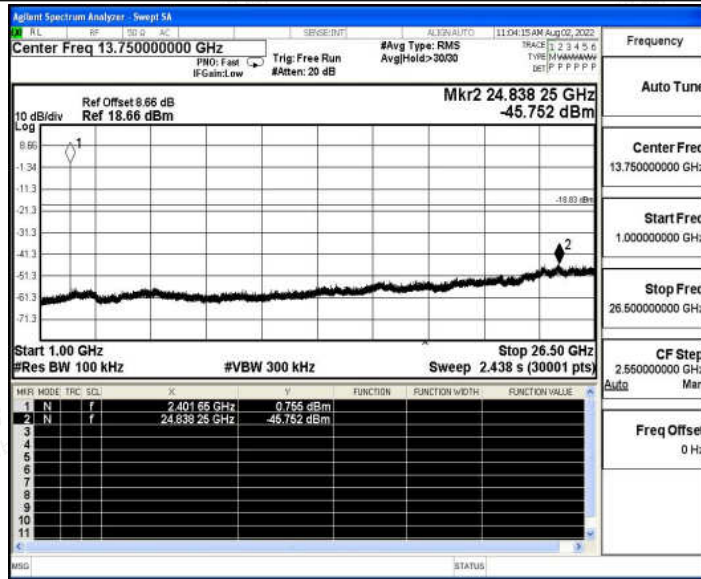
TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	2402	Reference	1.17	1.17	---	PASS
			30~1000	1.17	-60.5	≤-18.83	PASS
			1000~26500	1.17	-45.75	≤-18.83	PASS
		2441	Reference	1.08	1.08	---	PASS
			30~1000	1.08	-59.96	≤-18.92	PASS
			1000~26500	1.08	-45.94	≤-18.92	PASS
		2480	Reference	0.99	0.99	---	PASS
			30~1000	0.99	-60.34	≤-19.01	PASS
			1000~26500	0.99	-45.99	≤-19.01	PASS
2DH5	Ant1	2402	Reference	0.04	0.04	---	PASS
			30~1000	0.04	-60	≤-19.96	PASS
			1000~26500	0.04	-45.79	≤-19.96	PASS
		2441	Reference	0.06	0.06	---	PASS
			30~1000	0.06	-59.89	≤-19.94	PASS
			1000~26500	0.06	-45.66	≤-19.94	PASS
		2480	Reference	-0.04	-0.04	---	PASS
			30~1000	-0.04	-52.49	≤-20.04	PASS
			1000~26500	-0.04	-45.69	≤-20.04	PASS
3DH5	Ant1	2402	Reference	0.16	0.16	---	PASS
			30~1000	0.16	-60.49	≤-19.84	PASS
			1000~26500	0.16	-45.48	≤-19.84	PASS
		2441	Reference	0.04	0.04	---	PASS
			30~1000	0.04	-60.35	≤-19.96	PASS
			1000~26500	0.04	-45.4	≤-19.96	PASS
		2480	Reference	-0.05	-0.05	---	PASS
			30~1000	-0.05	-59.63	≤-20.05	PASS
			1000~26500	-0.05	-45.86	≤-20.05	PASS



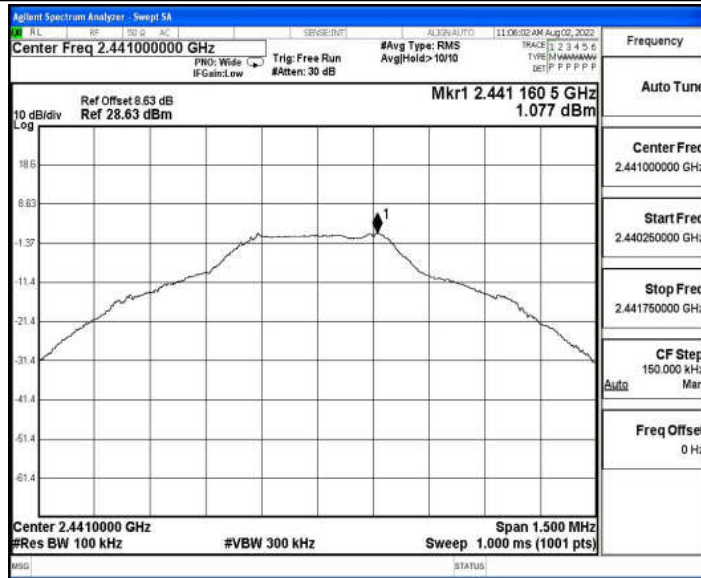


Test Graphs



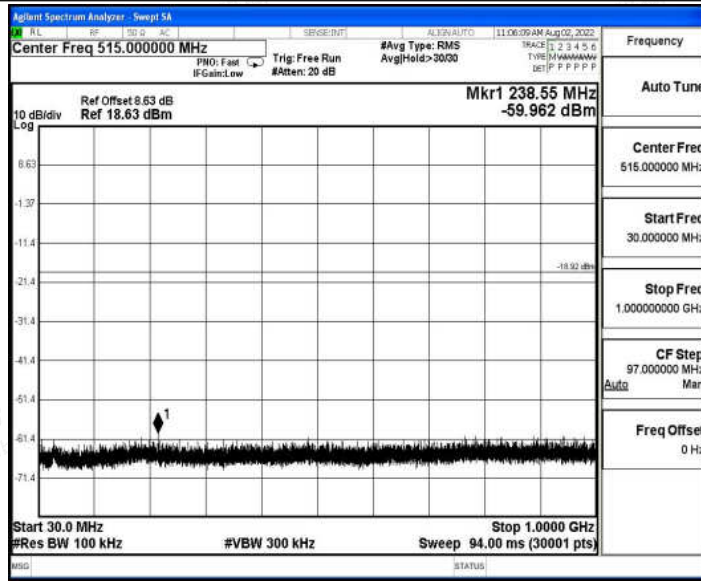


DH5_Ant1_2441_0~Reference

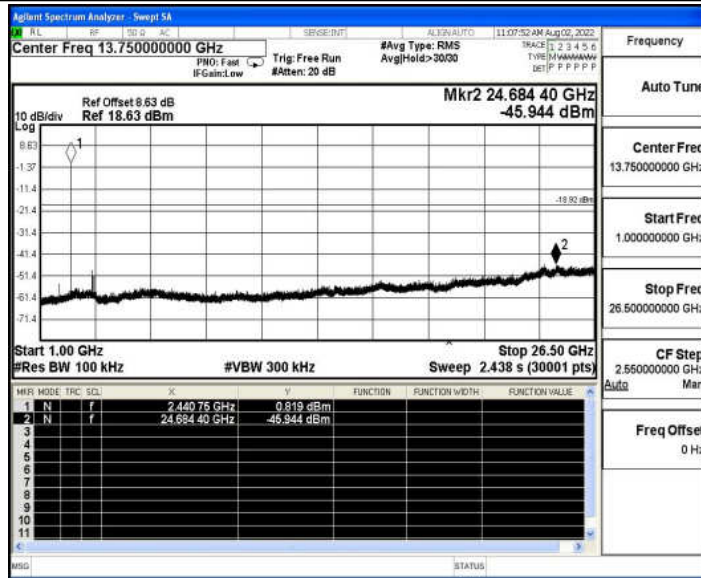


DH5_Ant1_2441_30~1000



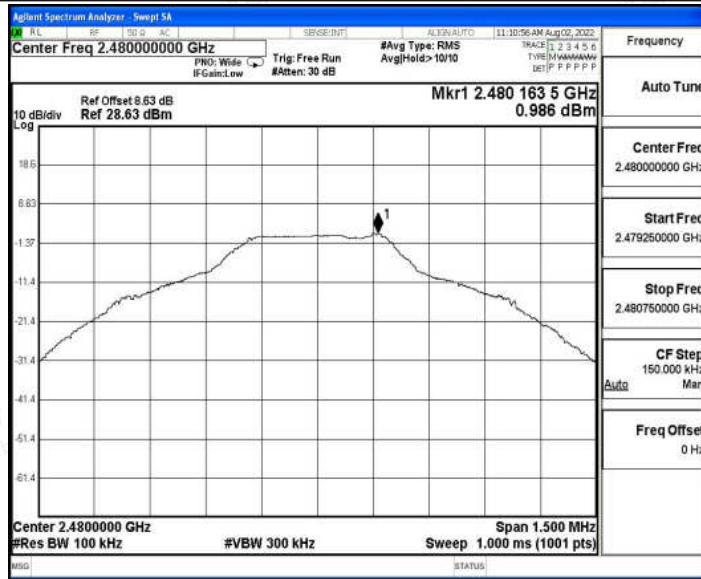


DH5_Ant1_2441_1000~26500

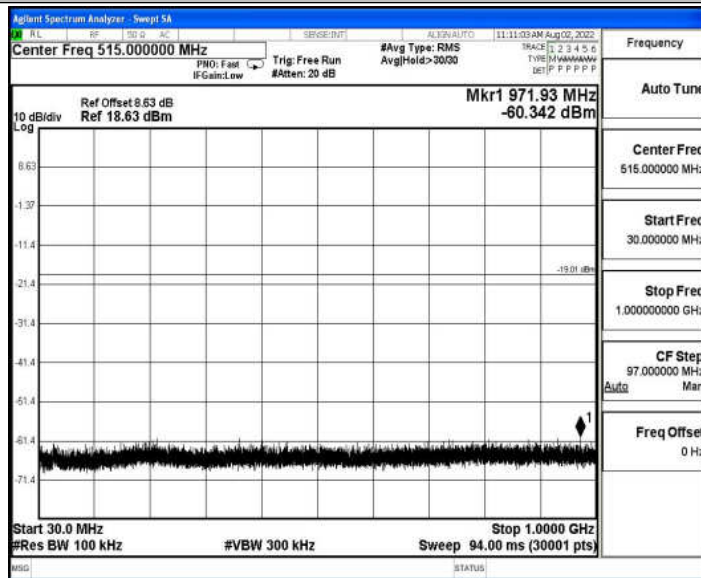


DH5_Ant1_2480_0~Reference



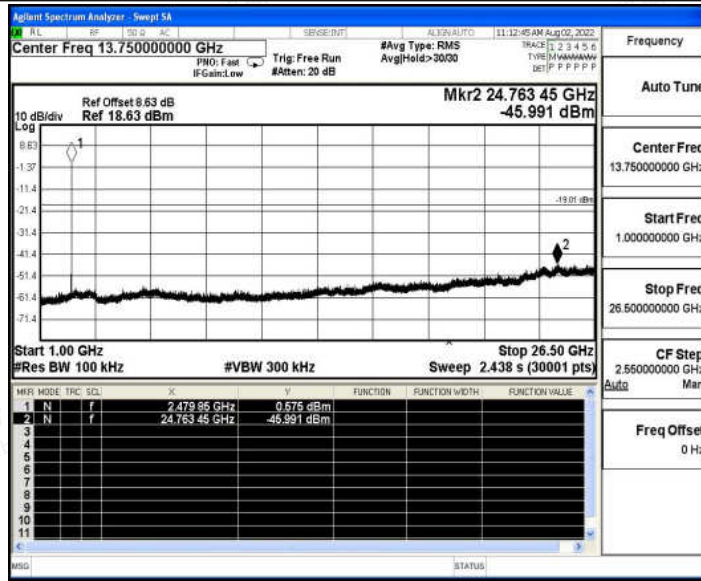


DH5_Ant1_2480_30~1000

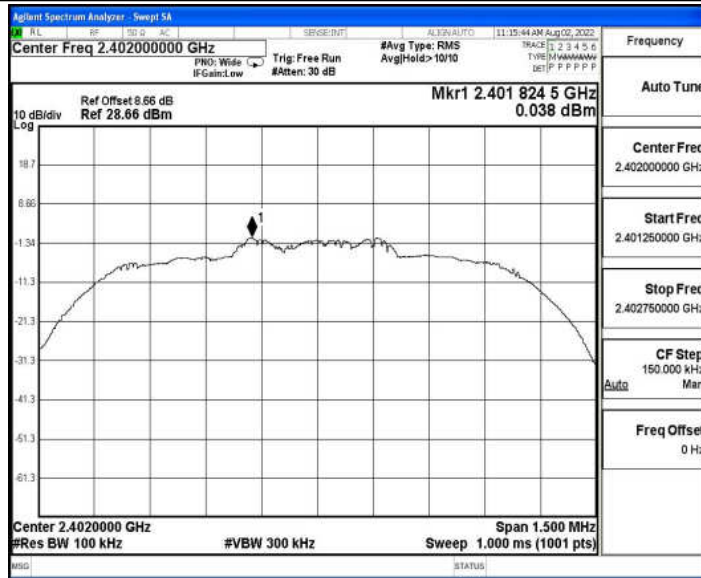


DH5_Ant1_2480_1000~26500



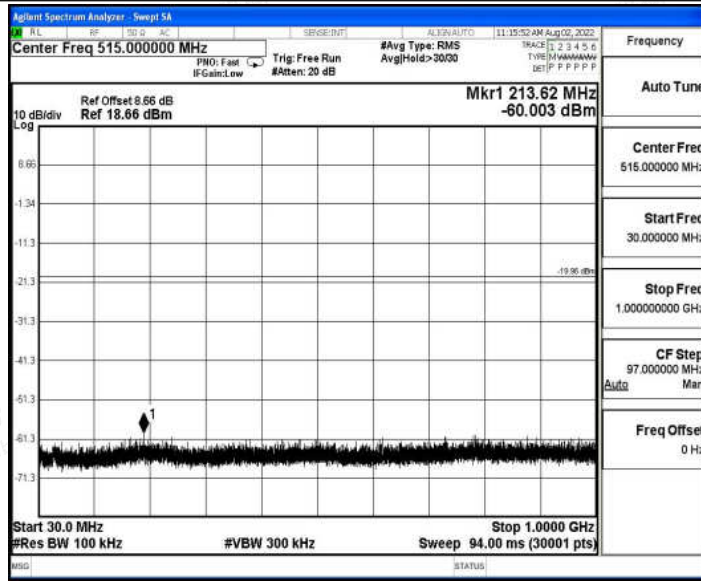


2DH5_Ant1_2402_0~Reference

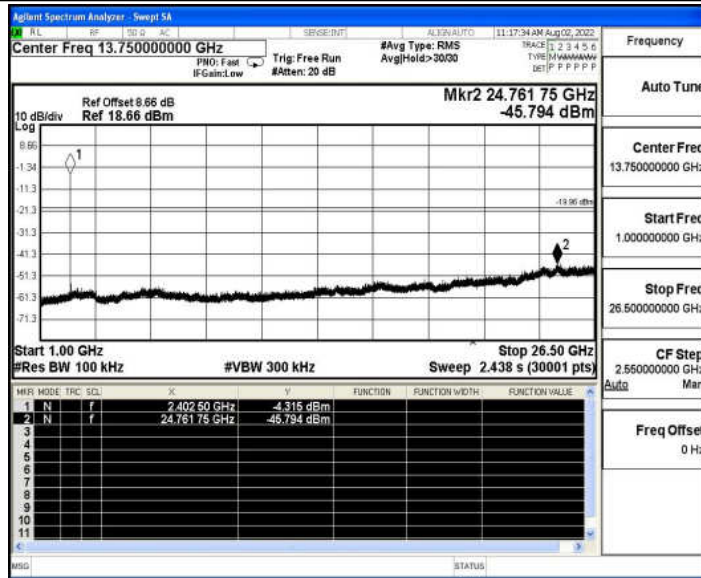


2DH5_Ant1_2402_30~1000



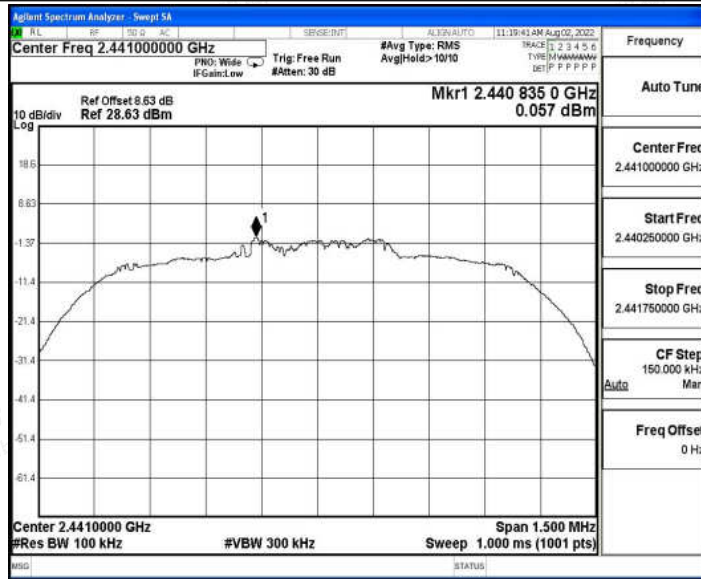


2DH5_Ant1_2402_1000~26500

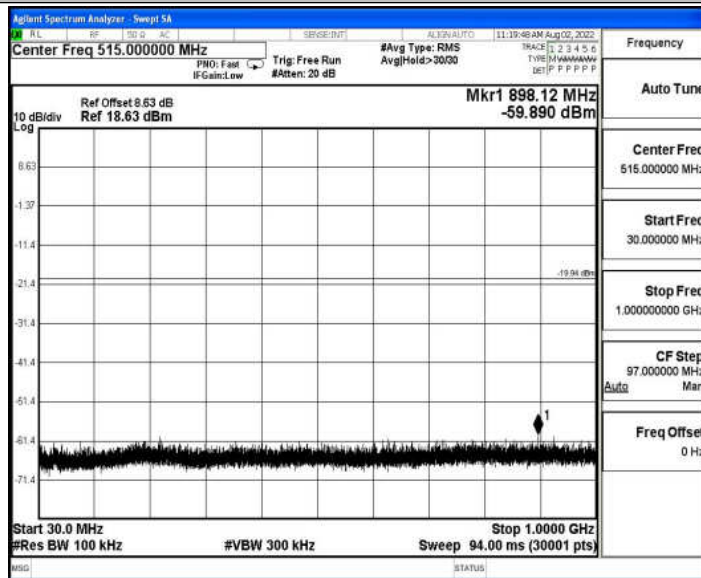


2DH5_Ant1_2441_0~Reference



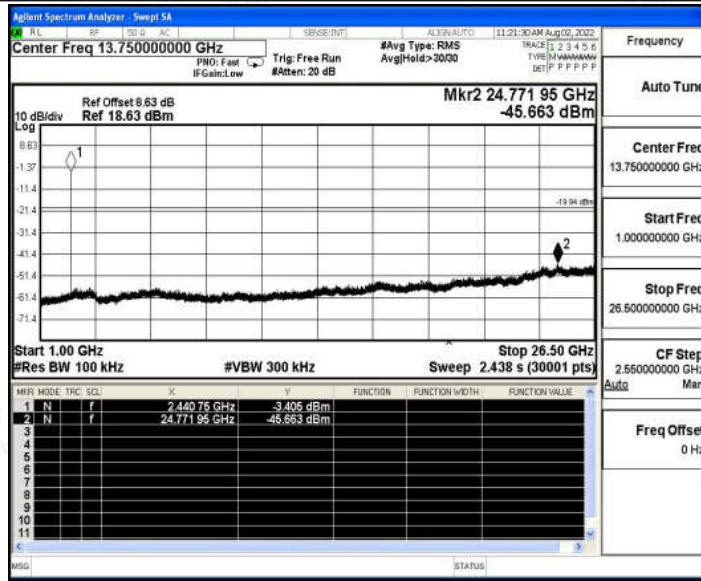


2DH5_Ant1_2441_30~1000

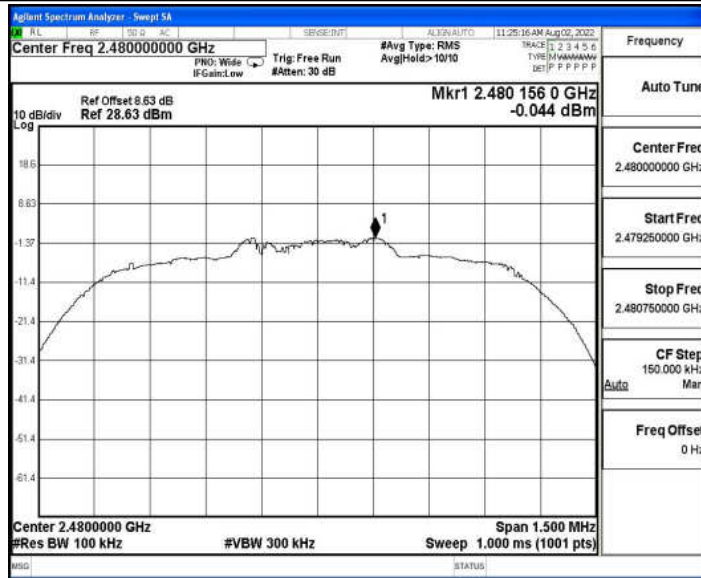


2DH5_Ant1_2441_1000~26500



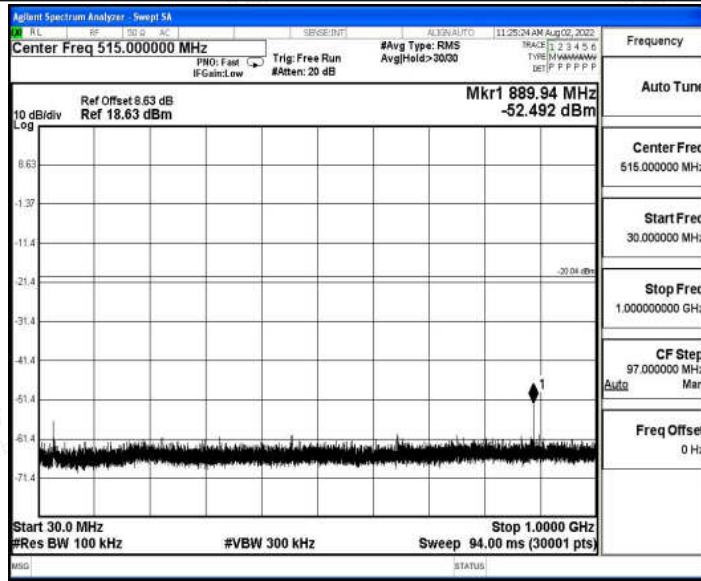


2DH5_Ant1_2480_0~Reference

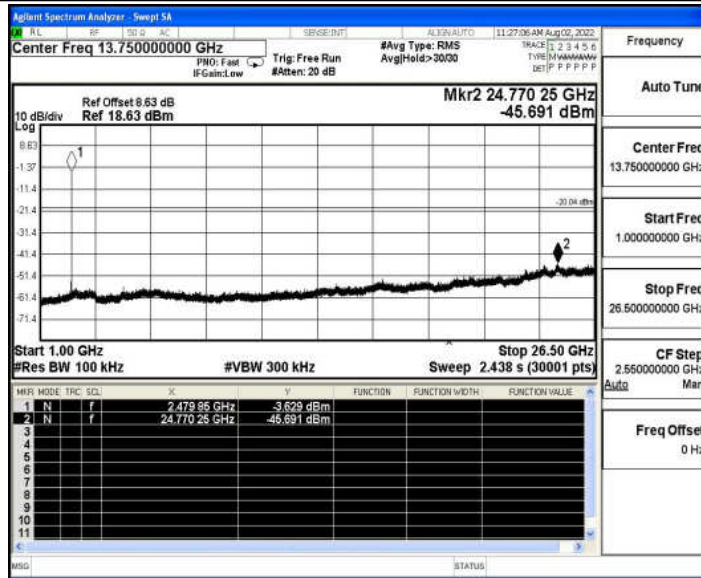


2DH5_Ant1_2480_30~1000



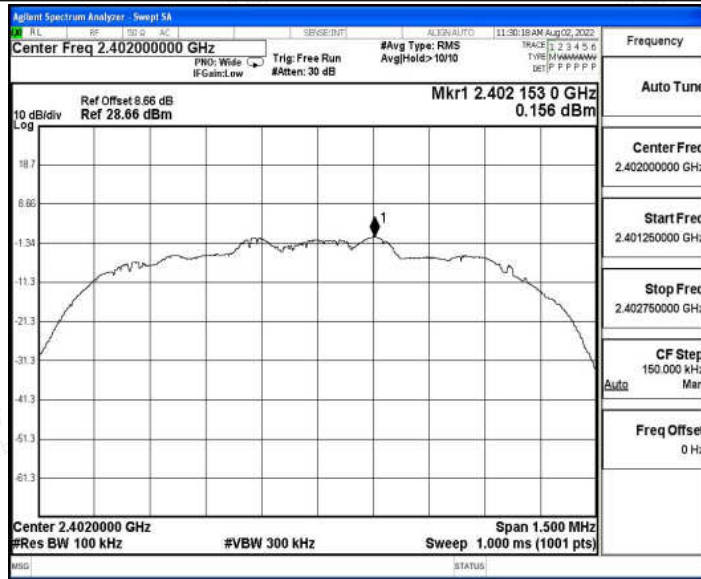


2DH5_Ant1_2480_1000~26500

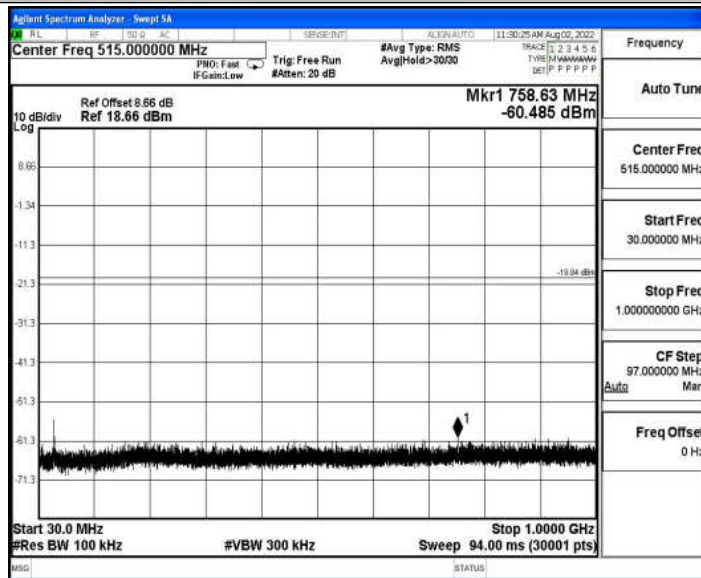


3DH5_Ant1_2402_0~Reference



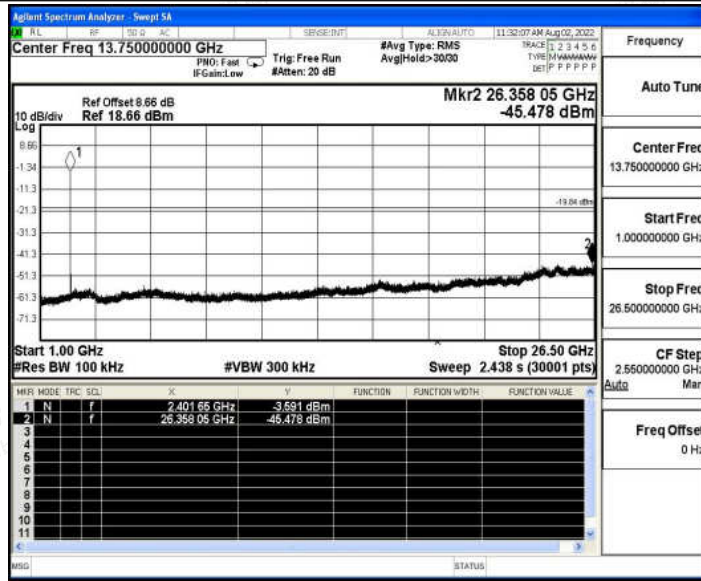


3DH5_Ant1_2402_30~1000

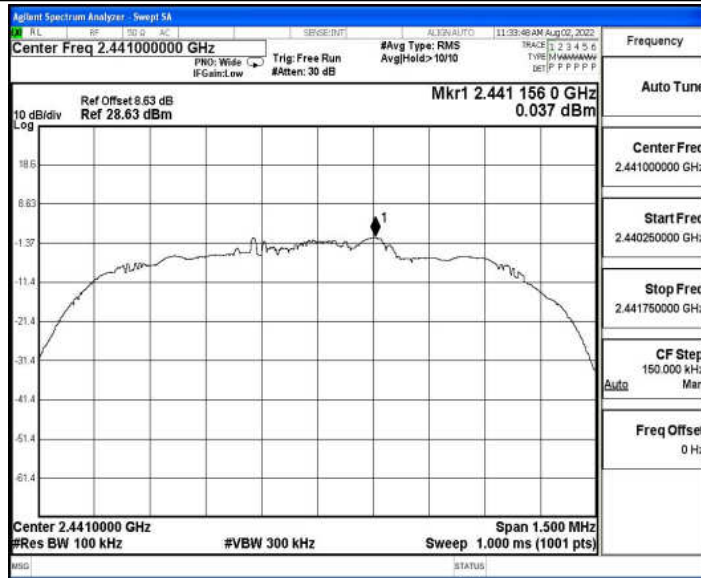


3DH5_Ant1_2402_1000~26500



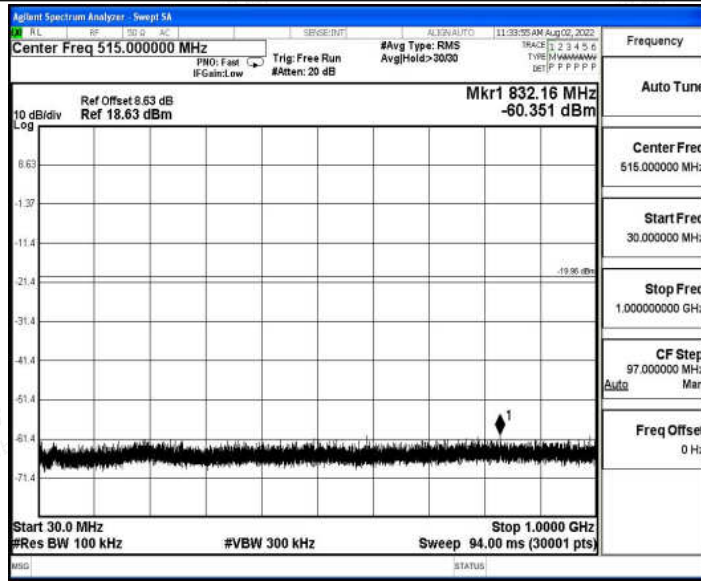


3DH5_Ant1_2441_0~Reference

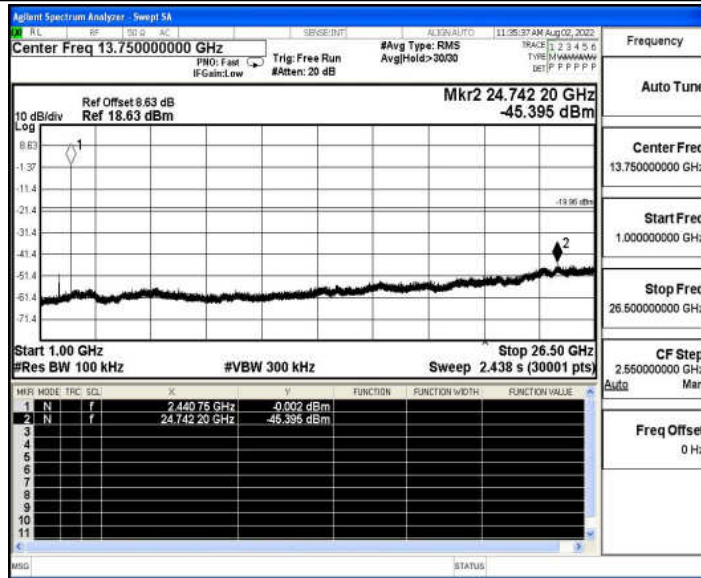


3DH5_Ant1_2441_30~1000



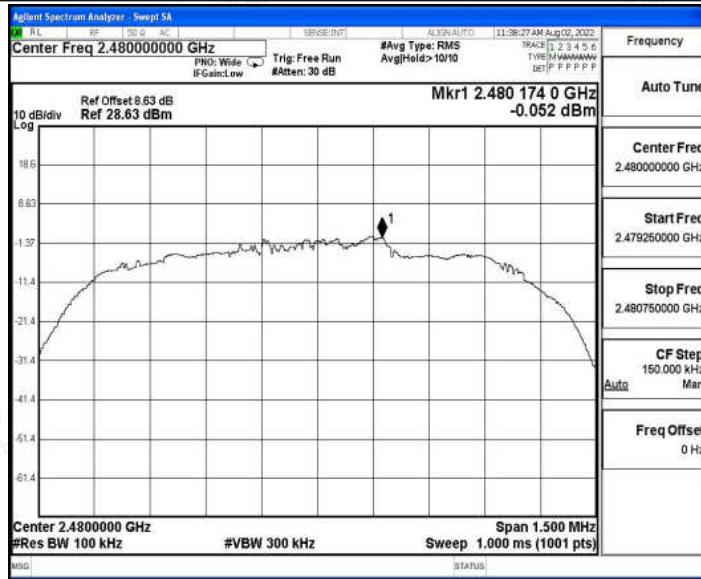


3DH5_Ant1_2441_1000~26500

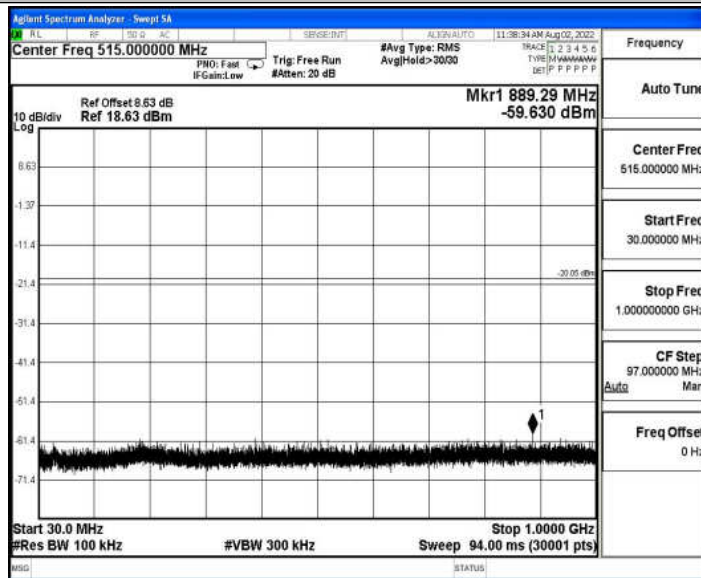


3DH5_Ant1_2480_0~Reference



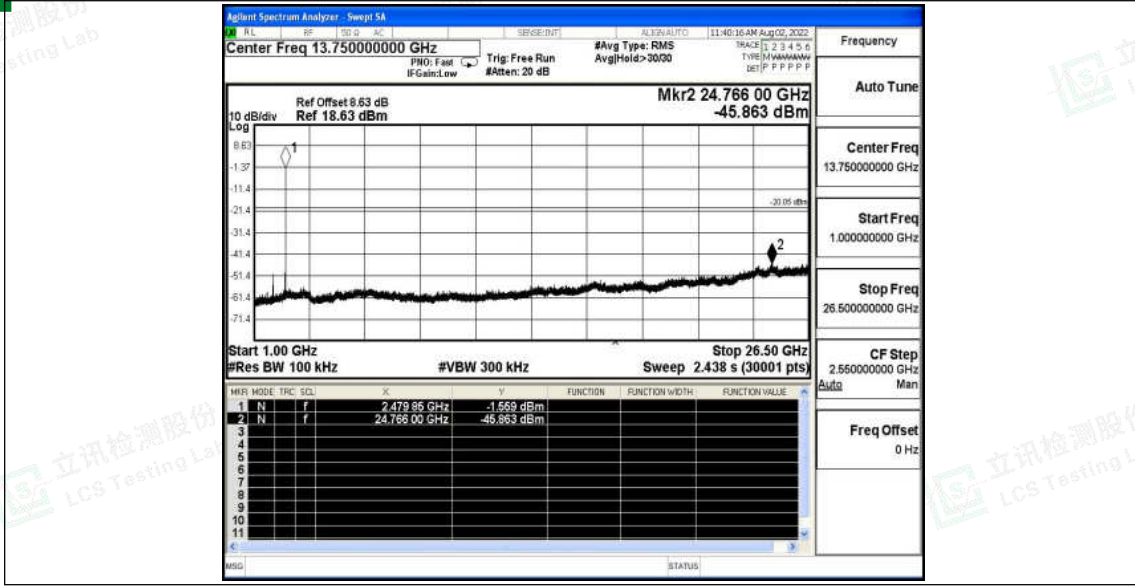


3DH5_Ant1_2480_30~1000



3DH5_Ant1_2480_1000~26500





**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	-58.06	≤-41.20	37.14	≤54	PASS		
				AV	2383.475	-57.42	≤-41.20	37.78	≤54	PASS		
				AV	2390.000	-57.55	≤-41.20	37.65	≤54	PASS		
				Peak	2310.000	-48.88	≤-21.20	46.32	≤74	PASS		
				Peak	2383.370	-46.48	≤-21.20	48.72	≤74	PASS		
				Peak	2390.000	-48.33	≤-21.20	46.87	≤74	PASS		
		High	2480	AV	2483.500	-54.69	≤-41.20	40.51	≤54	PASS		
				AV	2483.520	-54.79	≤-41.20	40.41	≤54	PASS		
				AV	2500.000	-57.05	≤-41.20	38.15	≤54	PASS		
				Peak	2483.500	-47.04	≤-21.20	48.16	≤74	PASS		
				Peak	2491.120	-45.18	≤-21.20	50.02	≤74	PASS		
				Peak	2500.000	-47.43	≤-21.20	47.77	≤74	PASS		
		Low	Hop_24 02	Peak	2310.000	-48.21	≤-21.20	46.99	≤74	PASS		
				Peak	2378.855	-46.58	≤-21.20	48.62	≤74	PASS		
				Peak	2390.000	-48.96	≤-21.20	46.24	≤74	PASS		
		High	Hop_24 80	Peak	2483.500	-47.18	≤-21.20	48.02	≤74	PASS		
				Peak	2486.400	-45.84	≤-21.20	49.36	≤74	PASS		
				Peak	2500.000	-47.27	≤-21.20	47.93	≤74	PASS		
		2DH5	Ant1	Low	2402	AV	2310.000	-57.94	≤-41.20	37.26	≤54	PASS
						AV	2385.260	-57.37	≤-41.20	37.83	≤54	PASS
						AV	2390.000	-57.54	≤-41.20	37.66	≤54	PASS
						Peak	2310.000	-48.4	≤-21.20	46.80	≤74	PASS
						Peak	2388.830	-46.63	≤-21.20	48.57	≤74	PASS
						Peak	2390.000	-48.28	≤-21.20	46.92	≤74	PASS
High	2480			AV	2483.500	-54.46	≤-41.20	40.74	≤54	PASS		
				AV	2483.520	-54.46	≤-41.20	40.74	≤54	PASS		
				AV	2500.000	-57.06	≤-41.20	38.14	≤54	PASS		
				Peak	2483.500	-47.48	≤-21.20	47.72	≤74	PASS		
				Peak	2497.200	-46.04	≤-21.20	49.16	≤74	PASS		
				Peak	2500.000	-48.17	≤-21.20	47.03	≤74	PASS		
Low	Hop_24 02			Peak	2310.000	-49.07	≤-21.20	46.13	≤74	PASS		
				Peak	2346.410	-45.81	≤-21.20	49.39	≤74	PASS		
				Peak	2390.000	-48.44	≤-21.20	46.76	≤74	PASS		
High	Hop_24 80			Peak	2483.500	-47.38	≤-21.20	47.82	≤74	PASS		
				Peak	2495.600	-46.1	≤-21.20	49.10	≤74	PASS		



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Scan code to check authenticity



3DH5	Ant1	Low	2402	Peak	2500.000	-46.35	≤-21.20	48.85	≤74	PASS
				AV	2310.000	-58.07	≤-41.20	37.13	≤54	PASS
				AV	2389.250	-57.42	≤-41.20	37.78	≤54	PASS
				AV	2390.000	-57.62	≤-41.20	37.58	≤54	PASS
				Peak	2310.000	-48.4	≤-21.20	46.80	≤74	PASS
				Peak	2369.825	-46.01	≤-21.20	49.19	≤74	PASS
		High	2480	AV	2483.500	-54.28	≤-41.20	40.92	≤54	PASS
				AV	2483.520	-54.28	≤-41.20	40.92	≤54	PASS
				AV	2500.000	-57.11	≤-41.20	38.09	≤54	PASS
				Peak	2483.500	-47.12	≤-21.20	48.08	≤74	PASS
				Peak	2496.400	-45.91	≤-21.20	49.29	≤74	PASS
				Peak	2500.000	-47.6	≤-21.20	47.60	≤74	PASS
	Low	Hop_24 02	Peak	2310.000	-49.34	≤-21.20	45.86	≤74	PASS	
			Peak	2313.545	-46.82	≤-21.20	48.38	≤74	PASS	
			Peak	2390.000	-47.98	≤-21.20	47.22	≤74	PASS	
	High	Hop_24 80	Peak	2483.500	-48.67	≤-21.20	46.53	≤74	PASS	
			Peak	2498.560	-45.71	≤-21.20	49.49	≤74	PASS	
			Peak	2500.000	-47.18	≤-21.20	48.02	≤74	PASS	

Note:

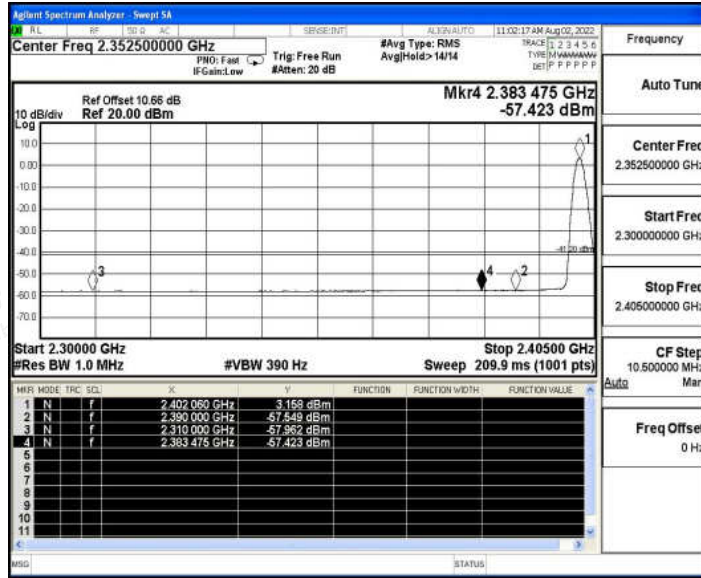
1. The Antenna Gain is compensated in the graph.
2. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.



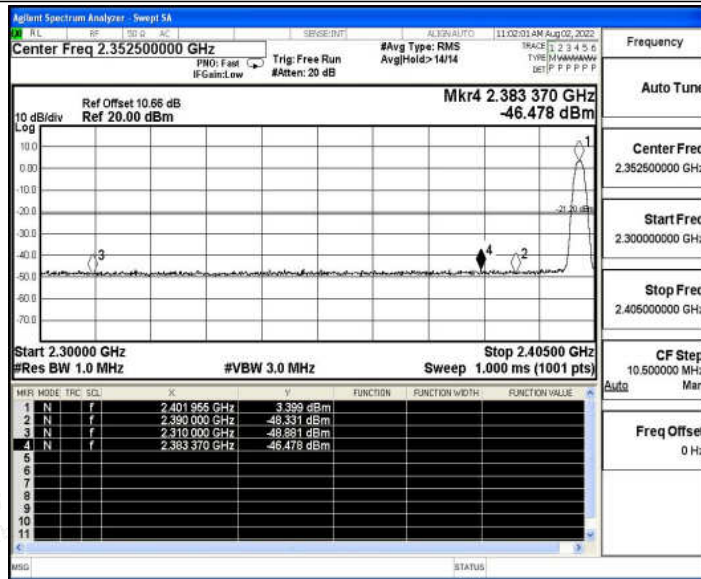


Test Graphs

DH5_Ant1_Low_2402_AV

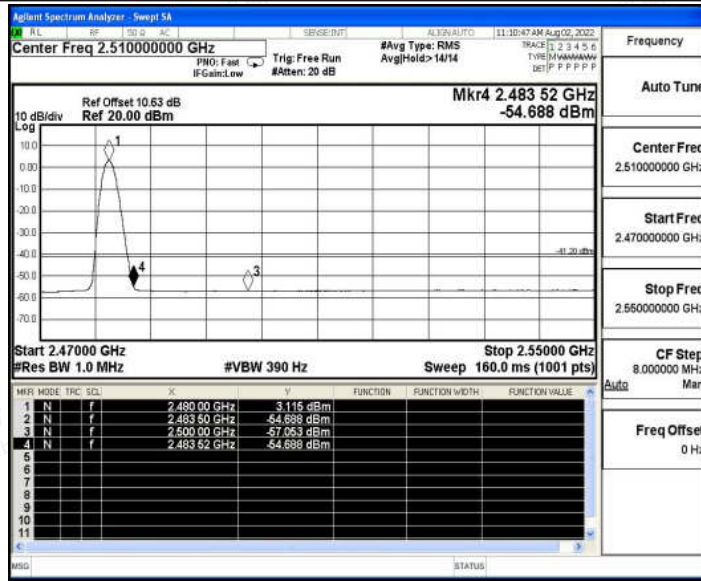


DH5_Ant1_Low_2402_Peak

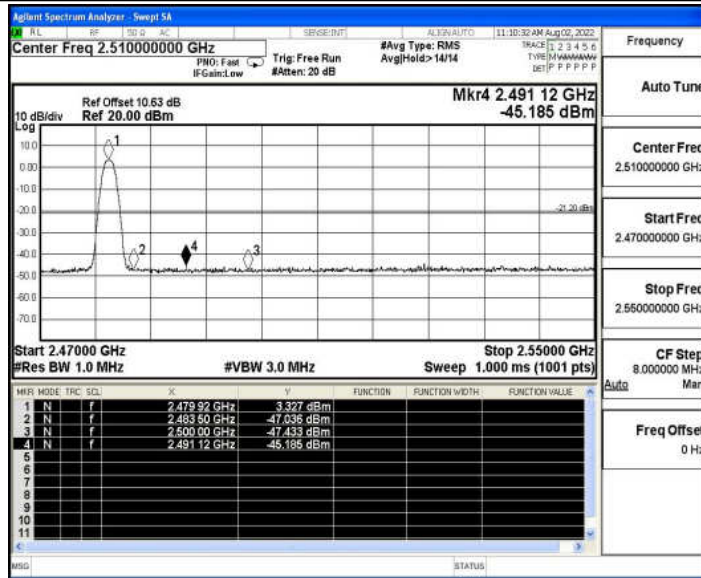


DH5_Ant1_High_2480_AV



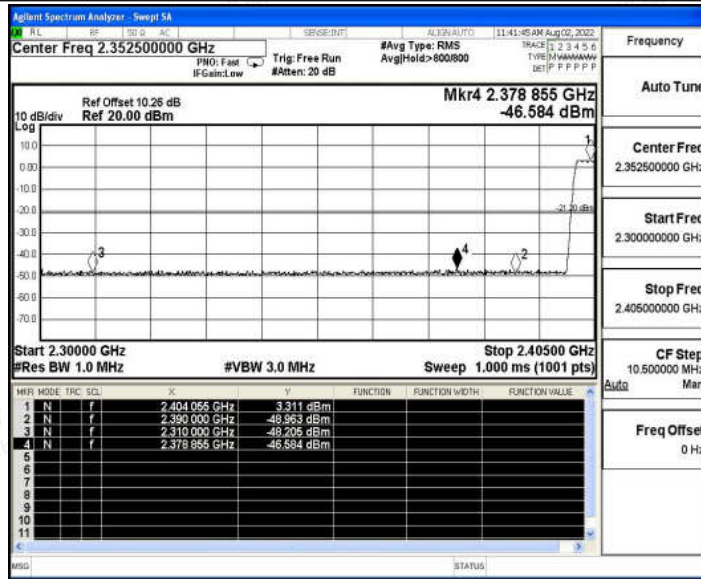


DH5_Ant1_High_2480_Peak

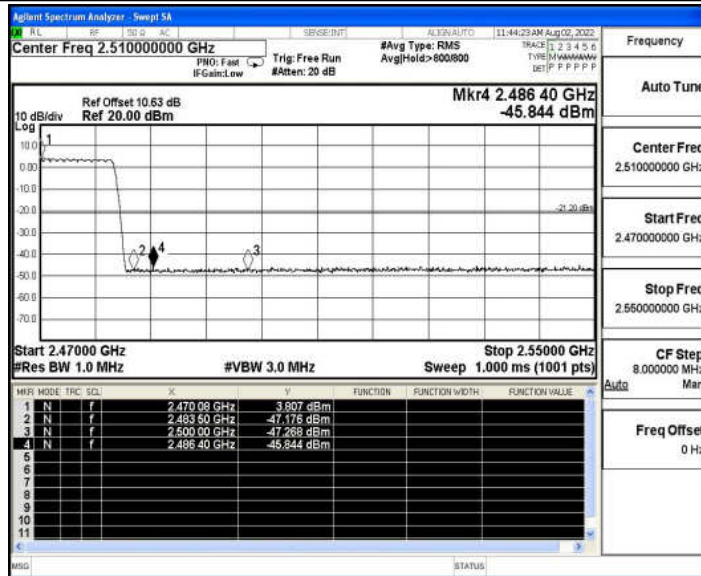


DH5_Ant1_Low_Hop_2402_Peak



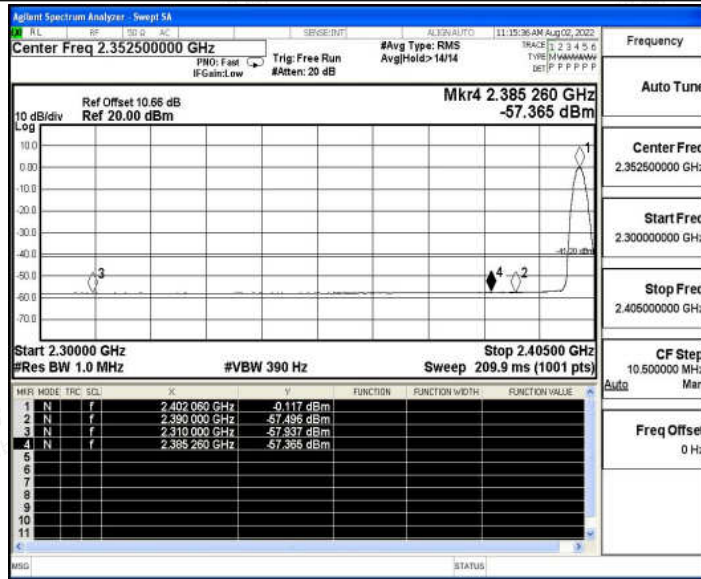


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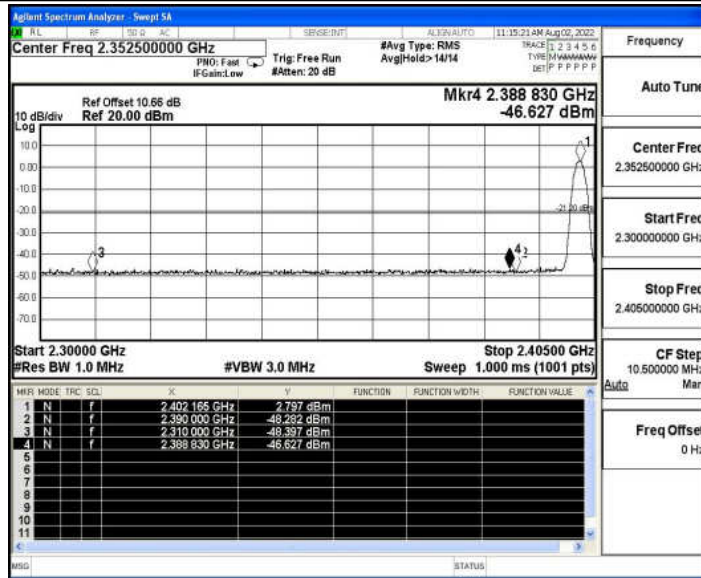


2DH5_Ant1_Low_2402_AV



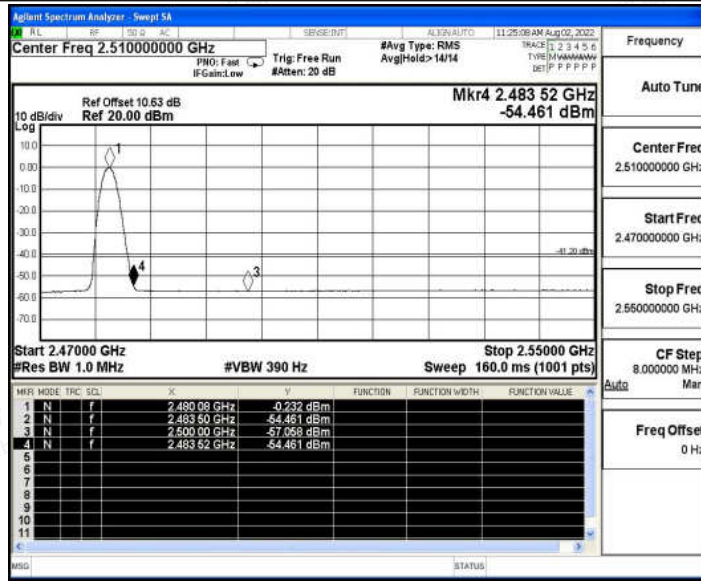


2DH5_Ant1_Low_2402_Peak

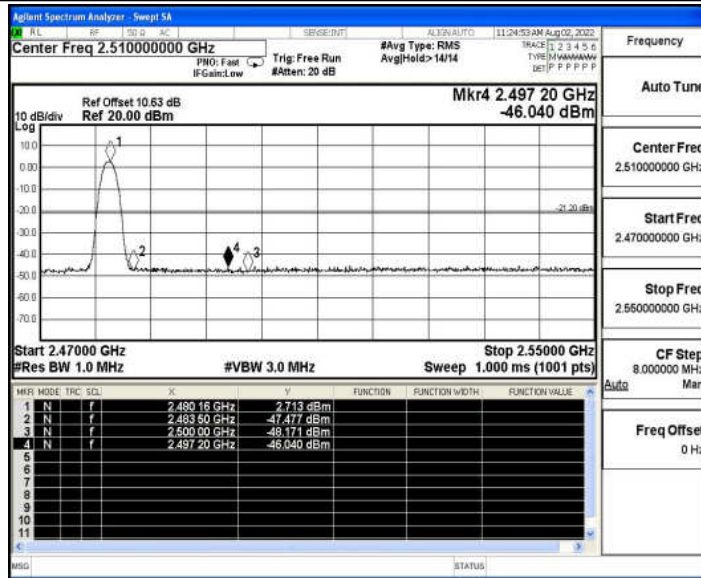


2DH5_Ant1_High_2480_AV



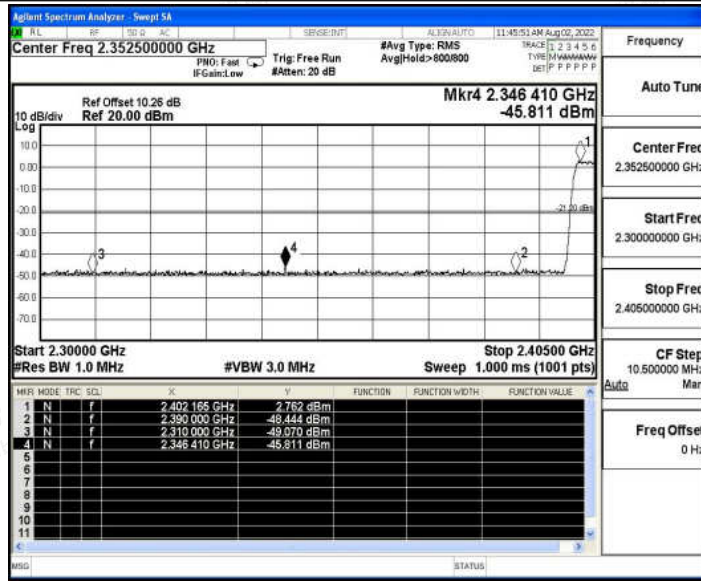


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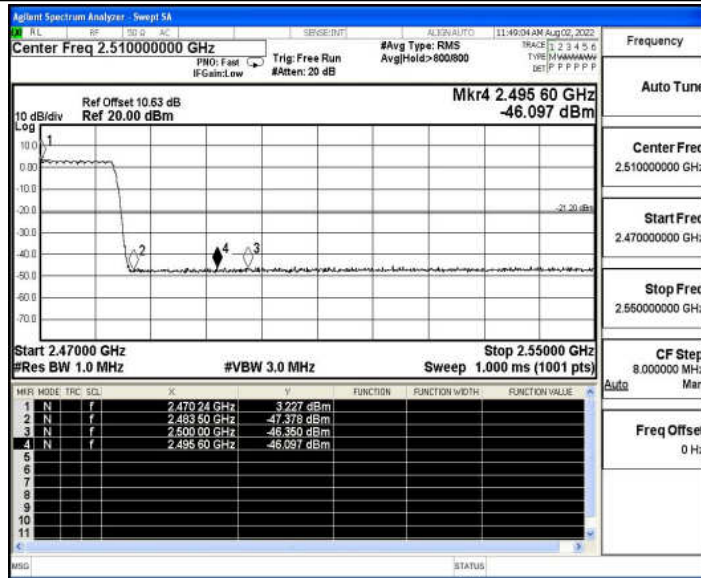


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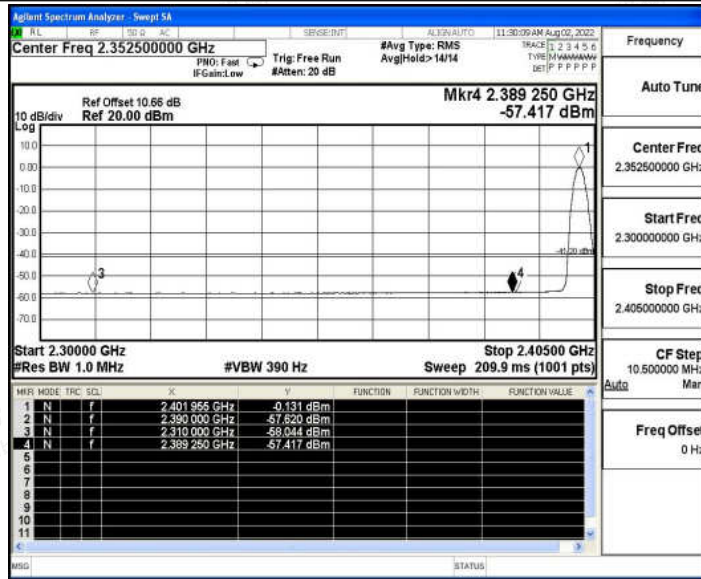


2DH5_Ant1_High_Hop_2480_Peak

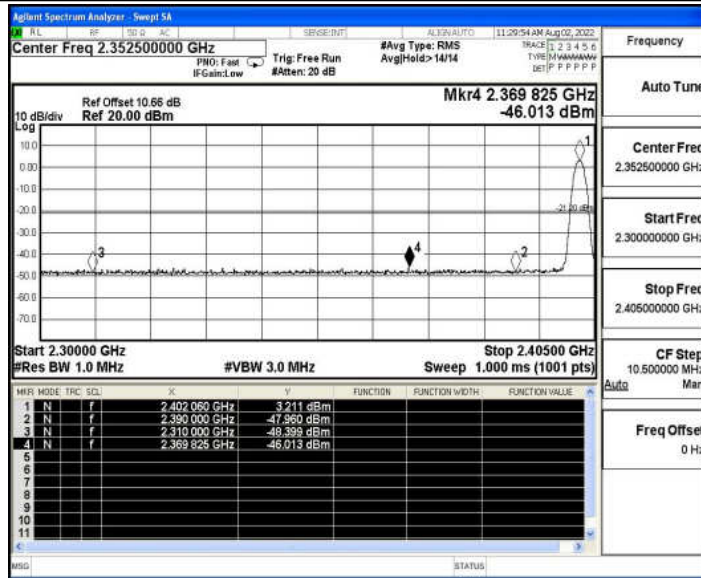


3DH5_Ant1_Low_2402_AV



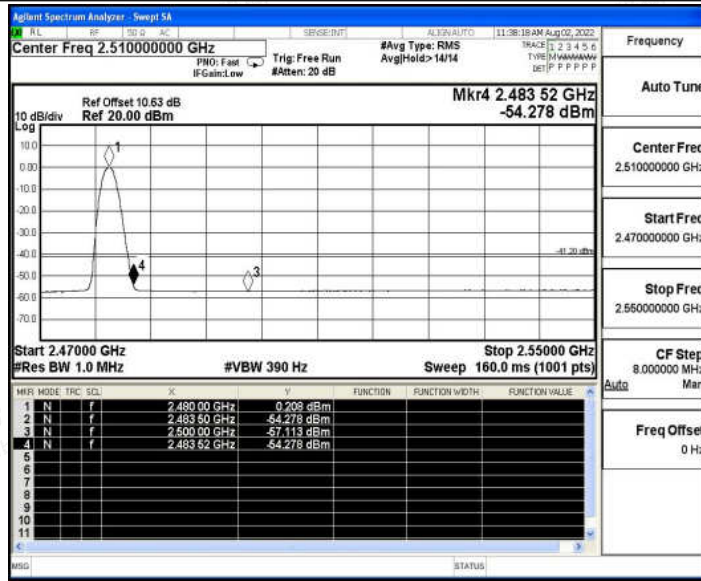


3DH5_Ant1_Low_2402_Peak

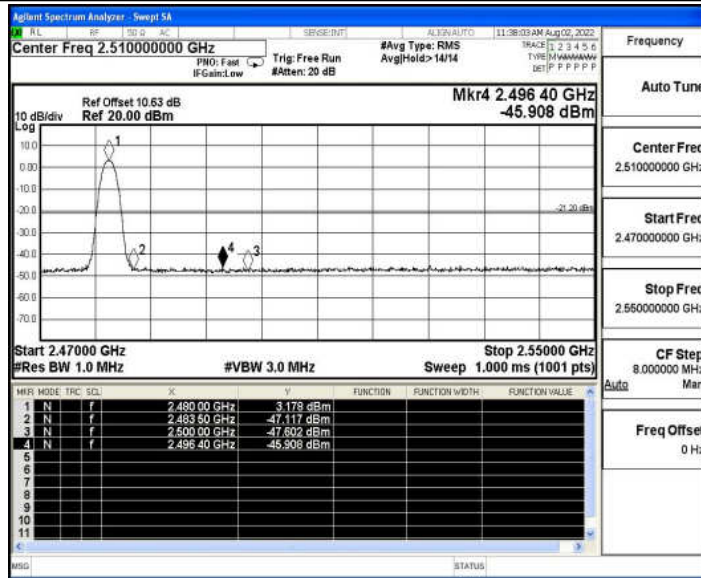


3DH5_Ant1_High_2480_AV



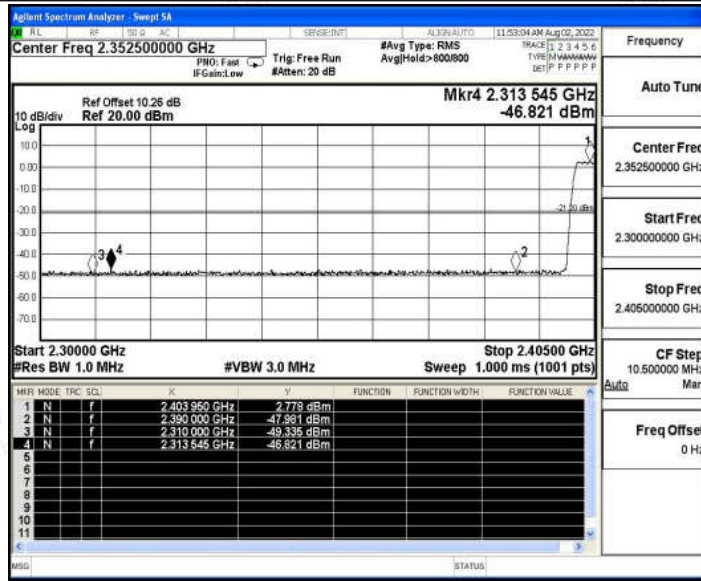


3DH5_Ant1_High_2480_Peak



3DH5_Ant1_Low_Hop_2402_Peak





3DH5_Ant1_High_Hop_2480_Peak

