

Appendix Test Data for BT(BDR/EDR) (Conducted Measurement)**Product Name: True Wireless Earbuds****Trade Mark: Tranya****Test Model: X5****FCC ID: 2A4AX-X5****Environmental Conditions**

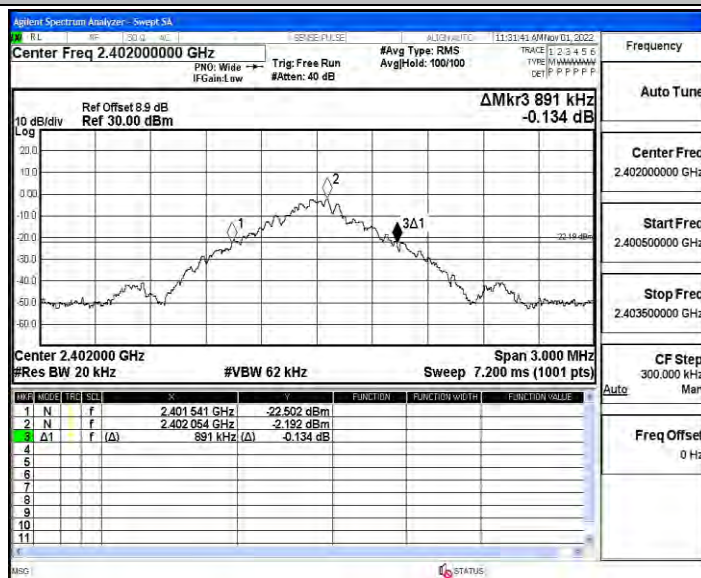
Temperature:	25.5°C
Relative Humidity:	55%
ATM Pressure:	100.0 kPa
Test Engineer:	Anna Hu
Supervised by:	Hugo Chen
NOTE	N/A

Appendix A: 20dB Emission Bandwidth**Test Result**

TestMode	Antenna	Channel	20db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.891	2401.541	2402.432	---	---
		2441	0.855	2440.544	2441.399	---	---
		2480	0.888	2479.541	2480.429	---	---
2DH5	Ant1	2402	1.188	2401.397	2402.585	---	---
		2441	1.185	2440.400	2441.585	---	---
		2480	1.320	2479.334	2480.654	---	---
3DH5	Ant1	2402	1.242	2401.364	2402.606	---	---
		2441	1.236	2440.364	2441.600	---	---
		2480	1.239	2479.364	2480.603	---	---

Test Graphs

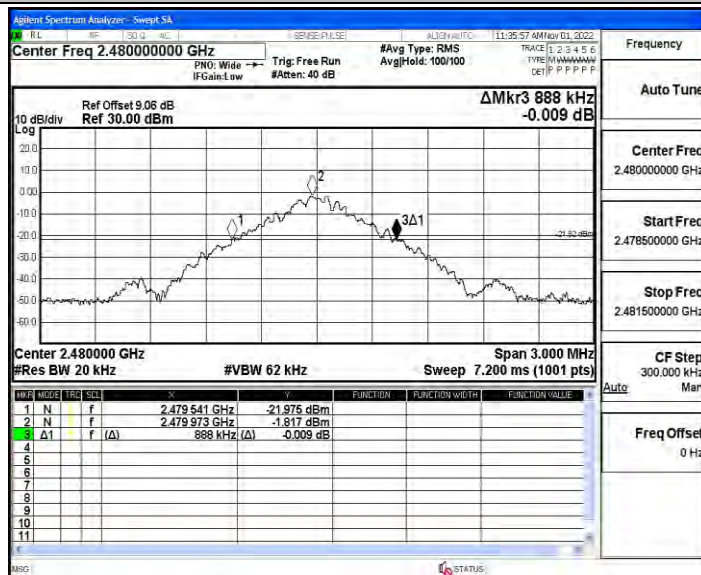
DH5_Ant1_2402



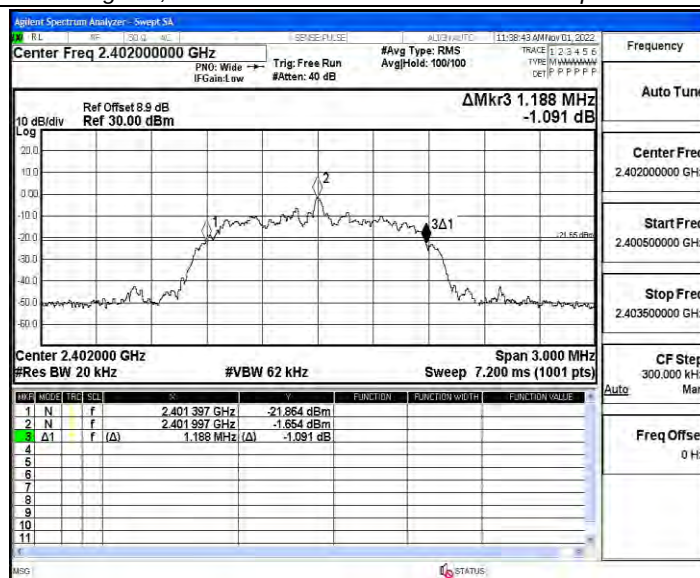
DH5_Ant1_2441



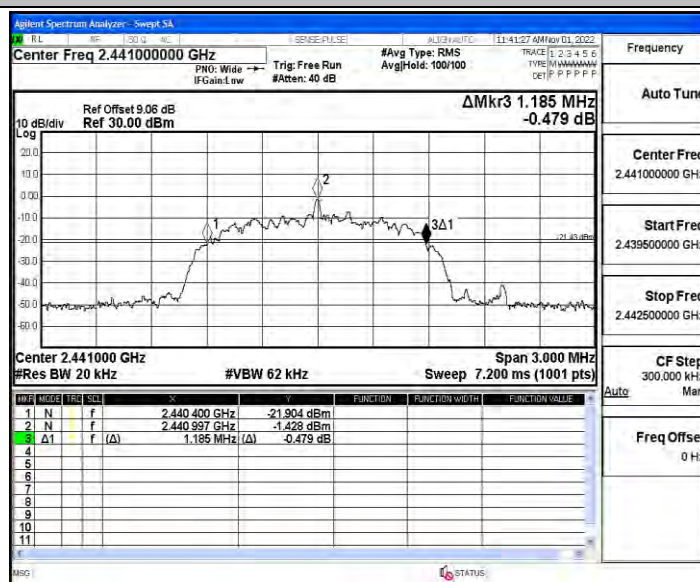
DH5_Ant1_2480



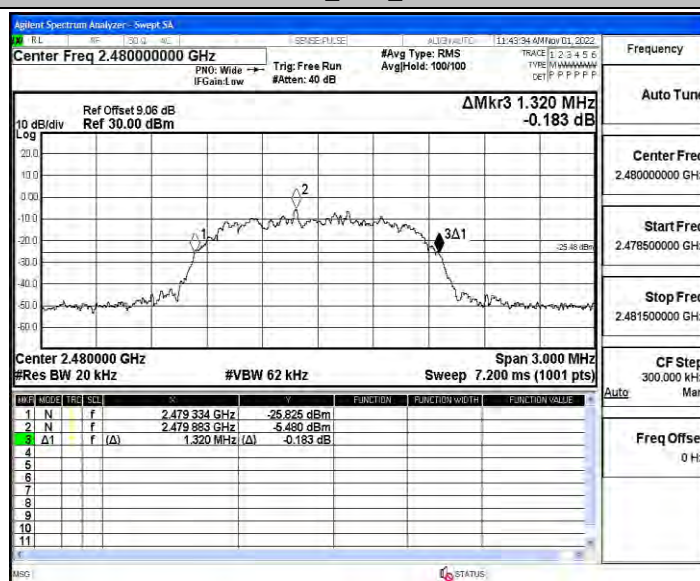
2DH5_Ant1_2402



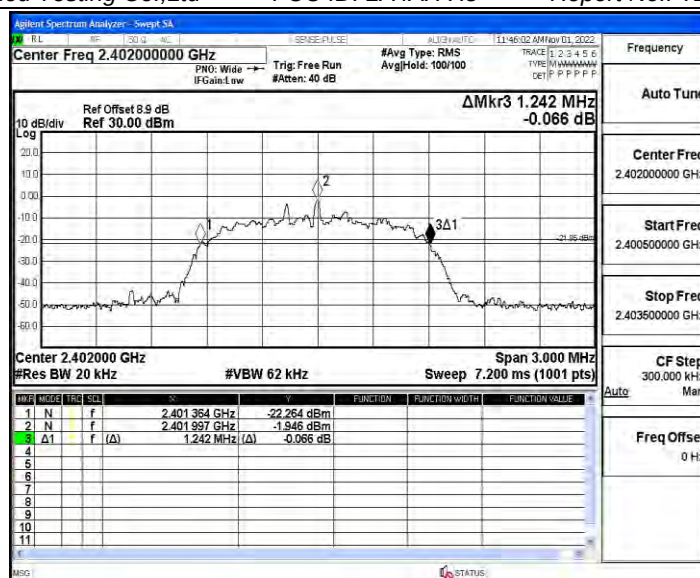
2DH5_Ant1_2441



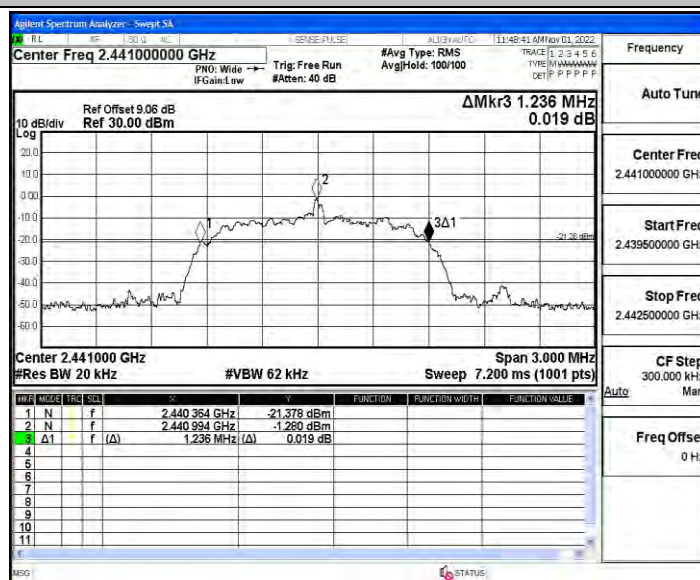
2DH5_Ant1_2480



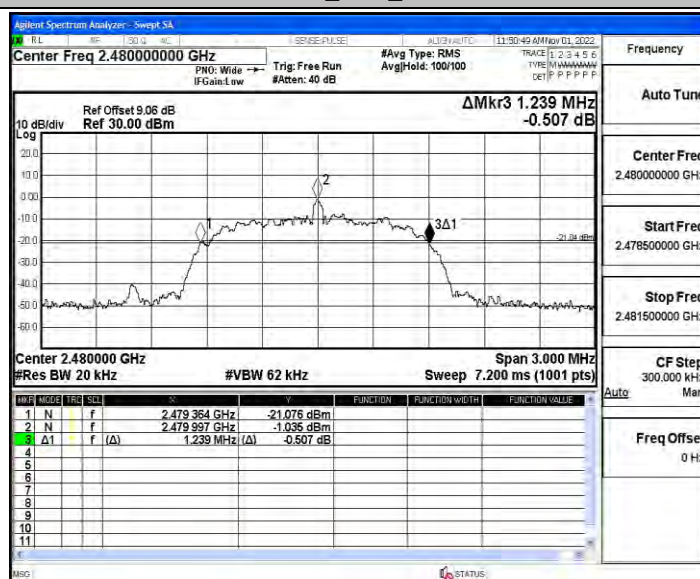
3DH5_Ant1_2402



3DH5_Ant1_2441



3DH5_Ant1_2480



Appendix B: Occupied Channel Bandwidth

Test Result

TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.84651	2401.5740	2402.4205	---	---
		2441	0.82198	2440.5841	2441.4061	---	---
		2480	0.82645	2479.5814	2480.4079	---	---
2DH5	Ant1	2402	1.1717	2401.4088	2402.5805	---	---
		2441	1.1614	2440.4114	2441.5728	---	---
		2480	1.1589	2479.4111	2480.5700	---	---
3DH5	Ant1	2402	1.1477	2401.4226	2402.5703	---	---
		2441	1.1470	2440.4217	2441.5687	---	---
		2480	1.1519	2479.4170	2480.5689	---	---

Test Graphs

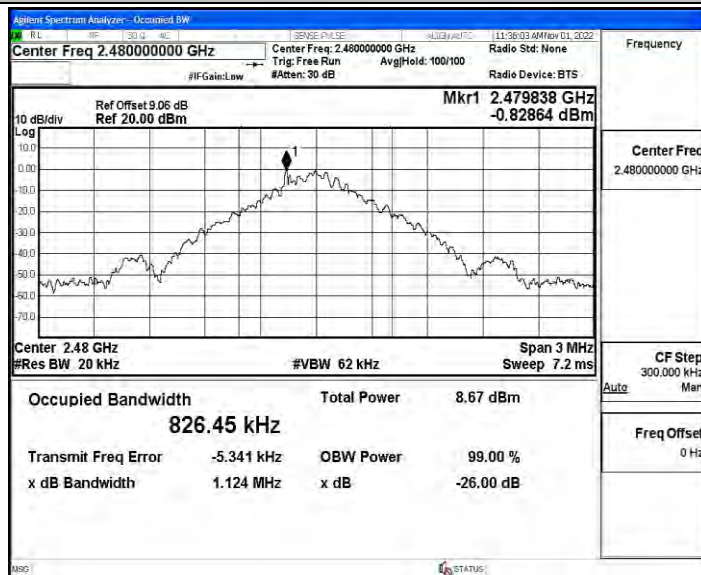
DH5_Ant1_2402



DH5_Ant1_2441



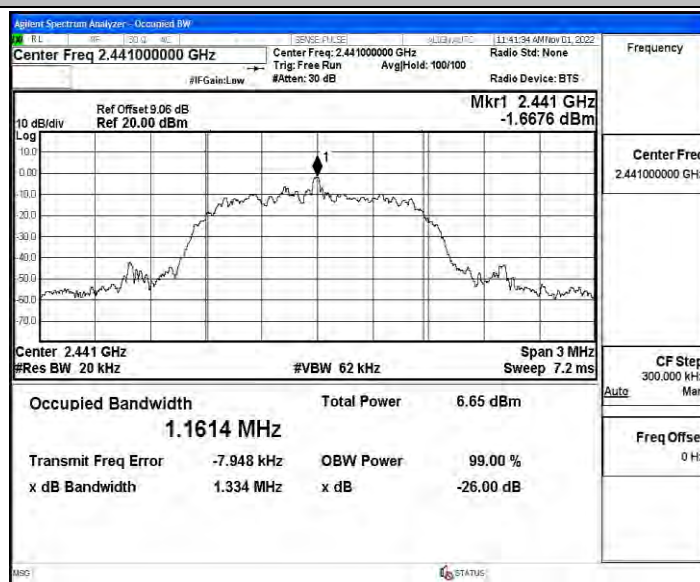
DH5_Ant1_2480



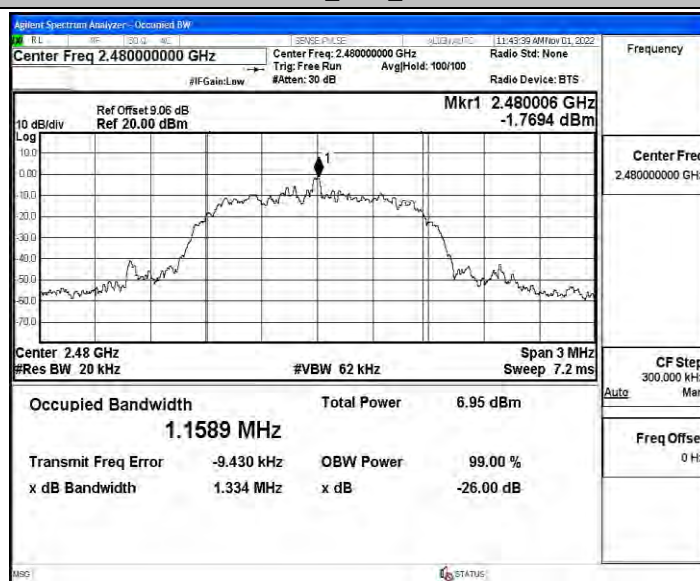
2DH5_Ant1_2402



2DH5_Ant1_2441



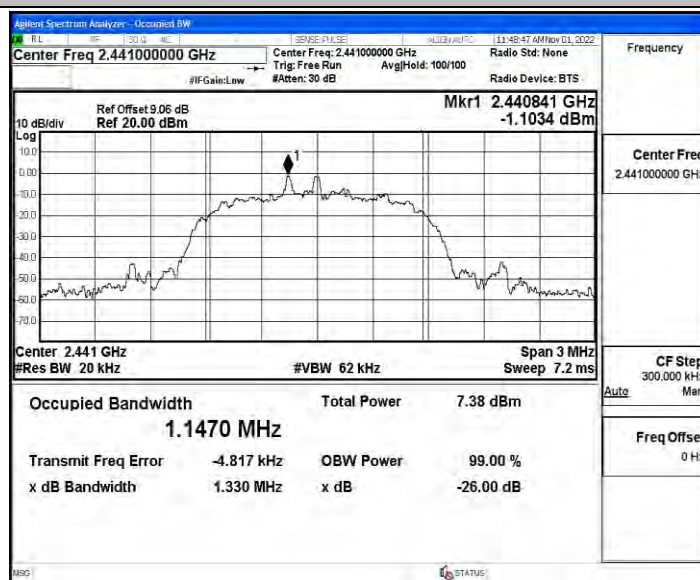
2DH5_Ant1_2480



3DH5_Ant1_2402



3DH5_Ant1_2441



3DH5_Ant1_2480



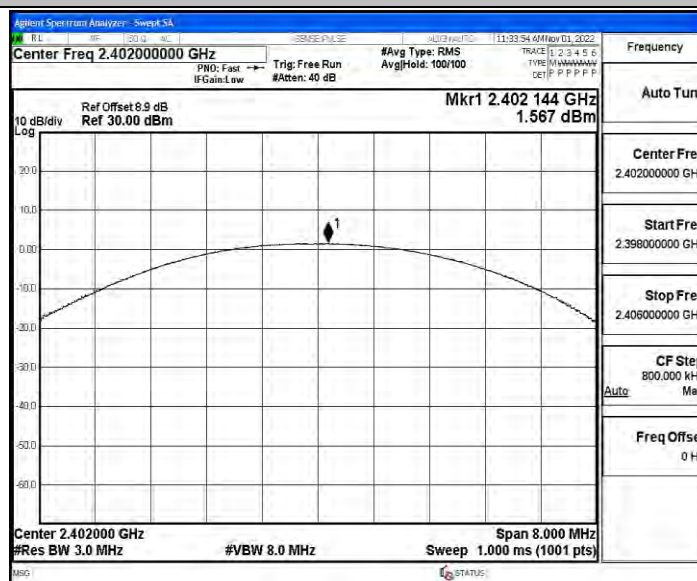
Appendix C: Maximum Peak conducted output power

Test Result

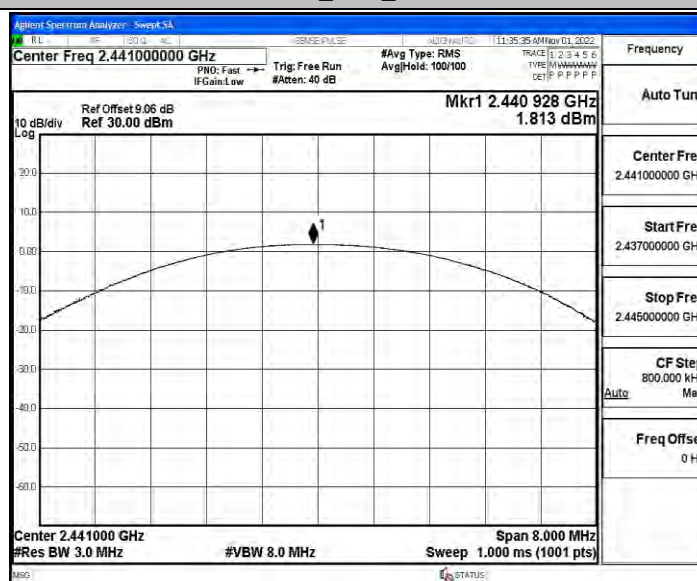
TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
DH5	Ant1	2402	1.57	≤30	PASS
		2441	1.81	≤30	PASS
		2480	2.14	≤30	PASS
2DH5	Ant1	2402	1.51	≤20.97	PASS
		2441	1.72	≤20.97	PASS
		2480	2.03	≤20.97	PASS
3DH5	Ant1	2402	1.72	≤20.97	PASS
		2441	2.06	≤20.97	PASS
		2480	2.3	≤20.97	PASS

Test Graphs

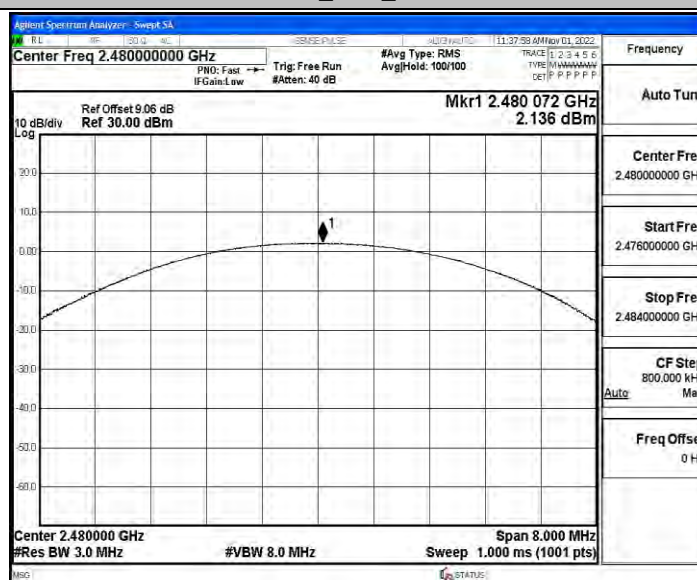
DH5_Ant1_2402



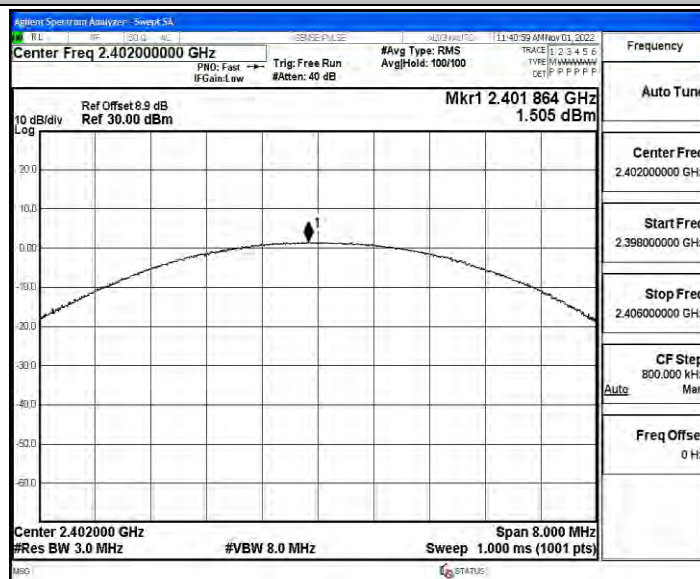
DH5_Ant1_2441



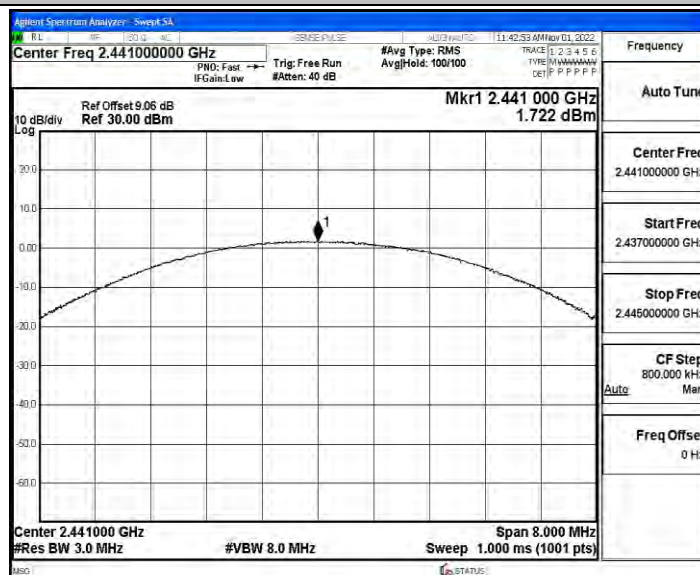
DH5_Ant1_2480



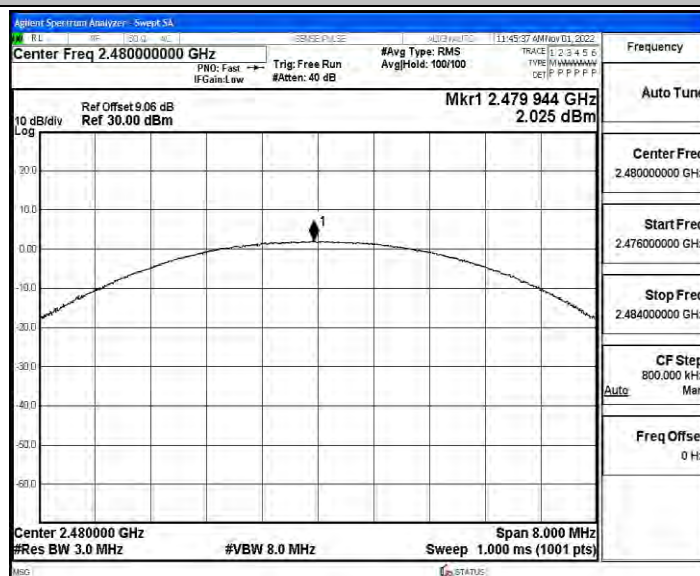
2DH5_Ant1_2402



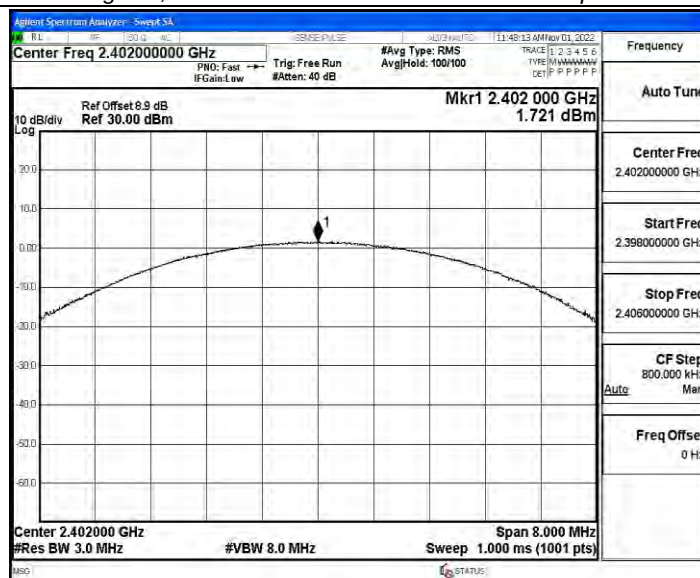
2DH5_Ant1_2441



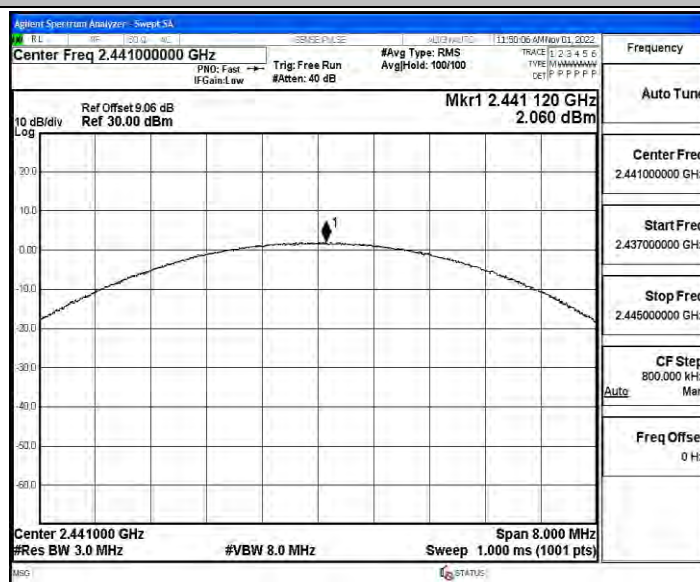
2DH5_Ant1_2480



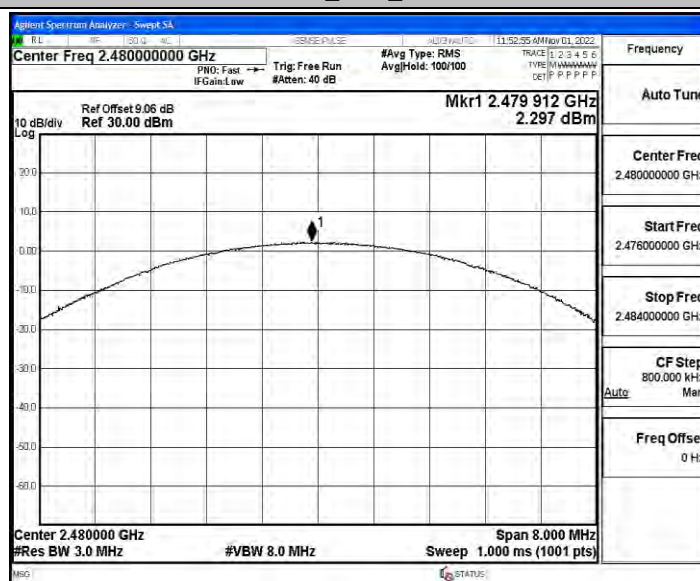
3DH5_Ant1_2402



3DH5_Ant1_2441



3DH5_Ant1_2480



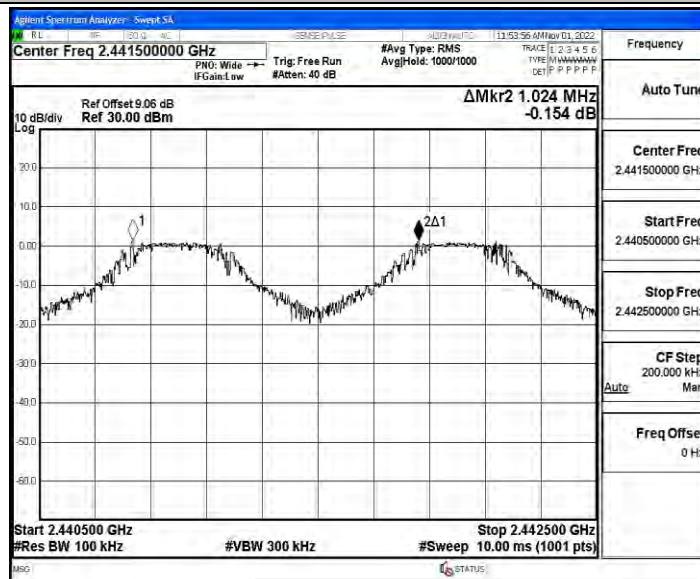
Appendix D: Carrier frequency separation

Test Result

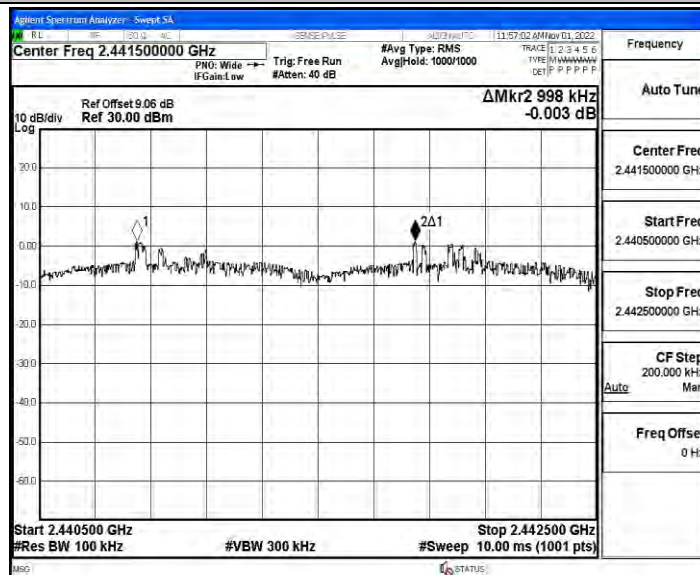
TestMode	Antenna	Channel	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Hop	1.024	≥ 0.891	PASS
2DH5	Ant1	Hop	0.998	≥ 0.880	PASS
3DH5	Ant1	Hop	1.018	≥ 0.828	PASS

Test Graphs

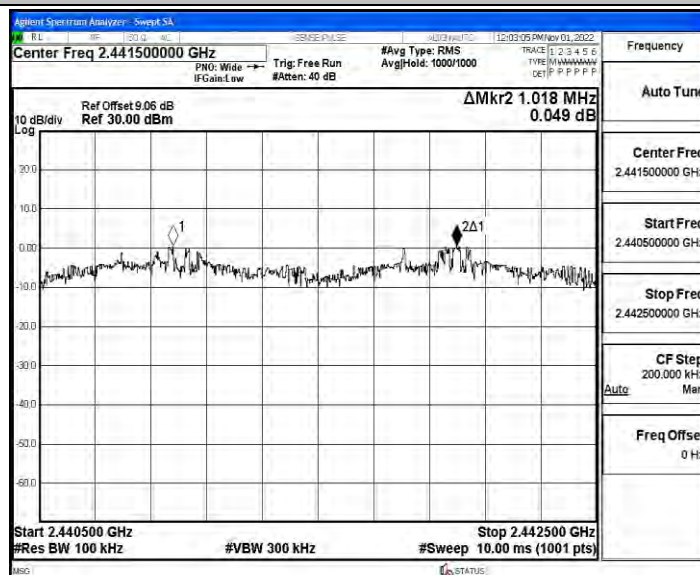
DH5_Ant1_Hop



2DH5_Ant1_Hop



3DH5_Ant1_Hop



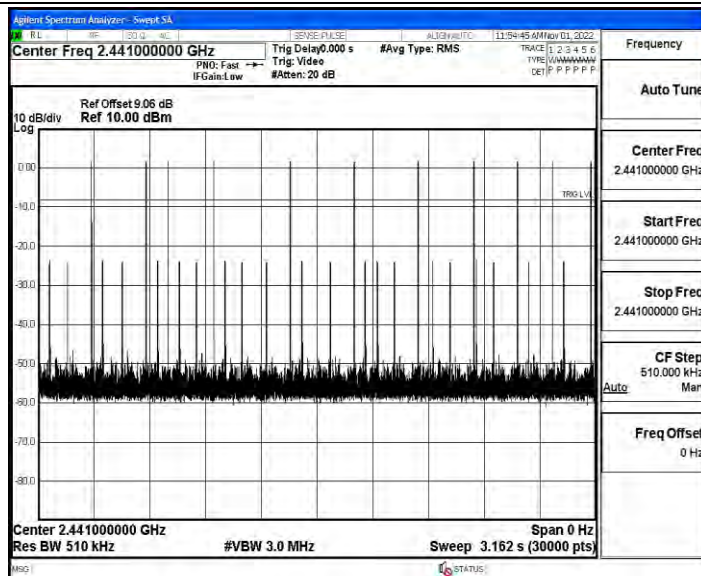
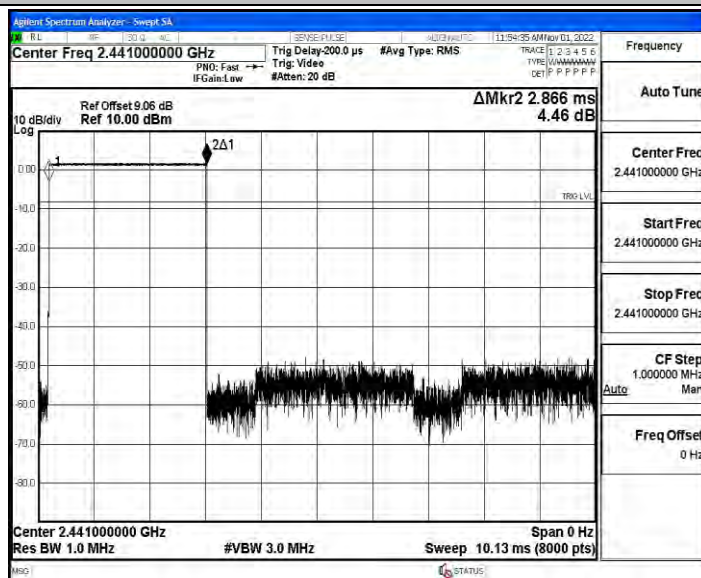
Appendix E: Time of occupancy

Test Result

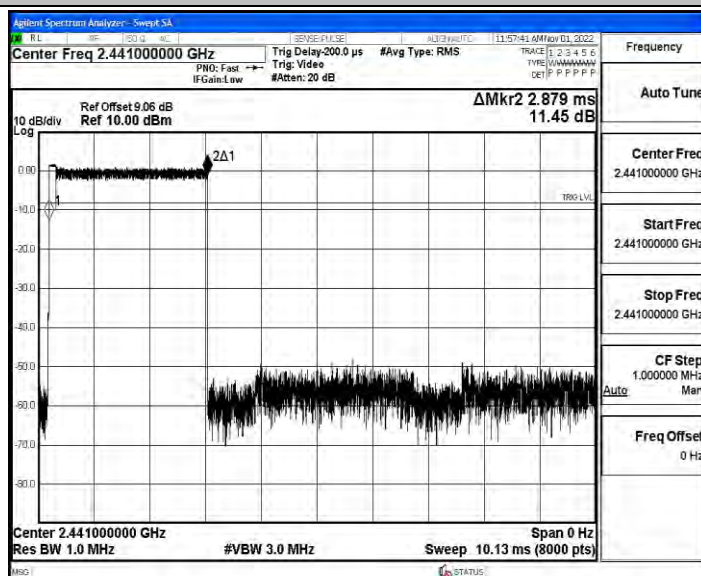
TestMode	Antenna	Channel	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH5	Ant1	Hop	2.866	120	0.344	≤0.4	PASS
2DH5	Ant1	Hop	2.879	110	0.317	≤0.4	PASS
3DH5	Ant1	Hop	2.880	110	0.317	≤0.4	PASS

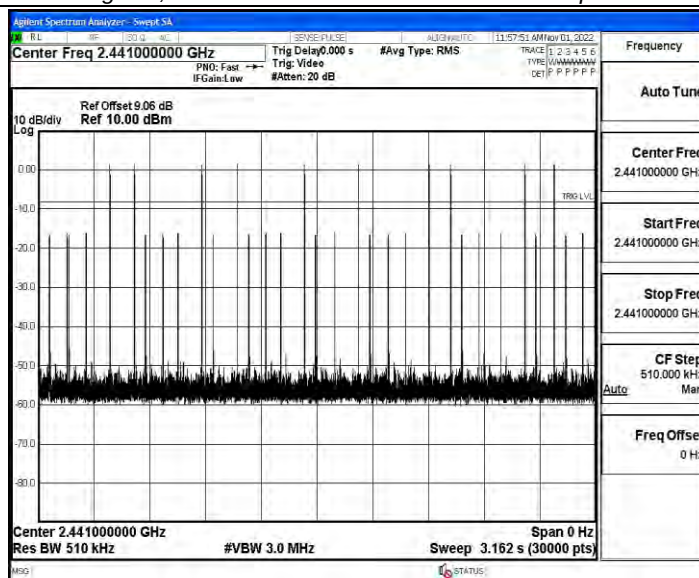
Test Graphs

DH5_Ant1_Hop

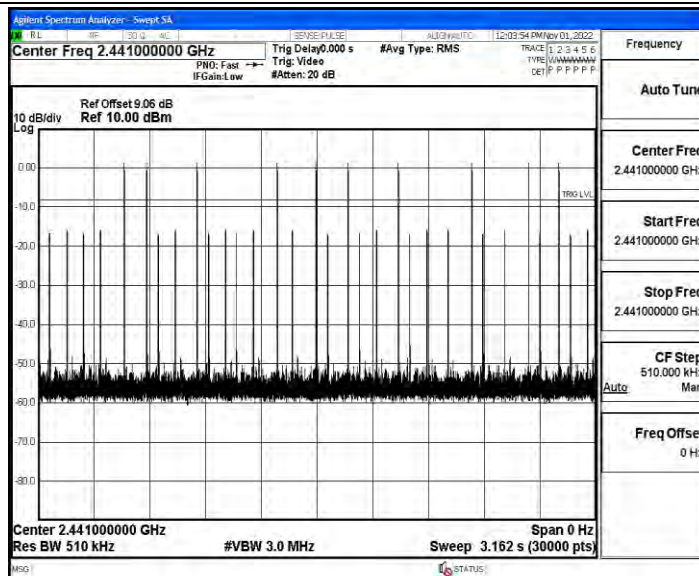
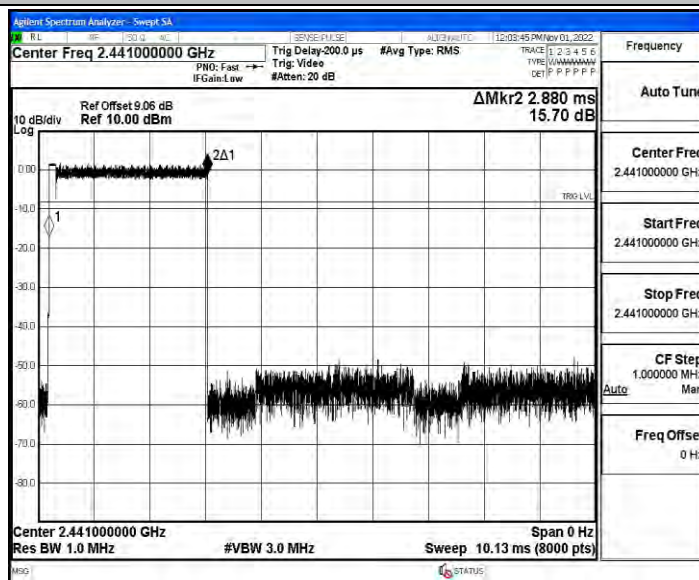


2DH5_Ant1_Hop





3DH5_Ant1_Hop

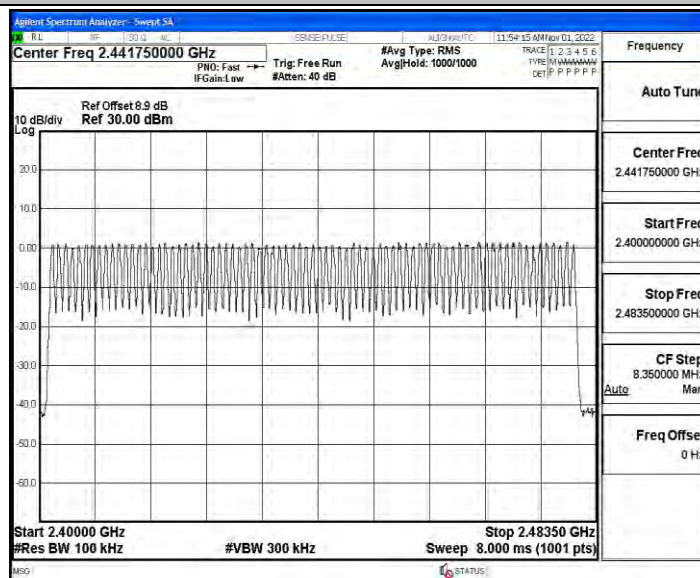


Appendix F: Number of hopping channels

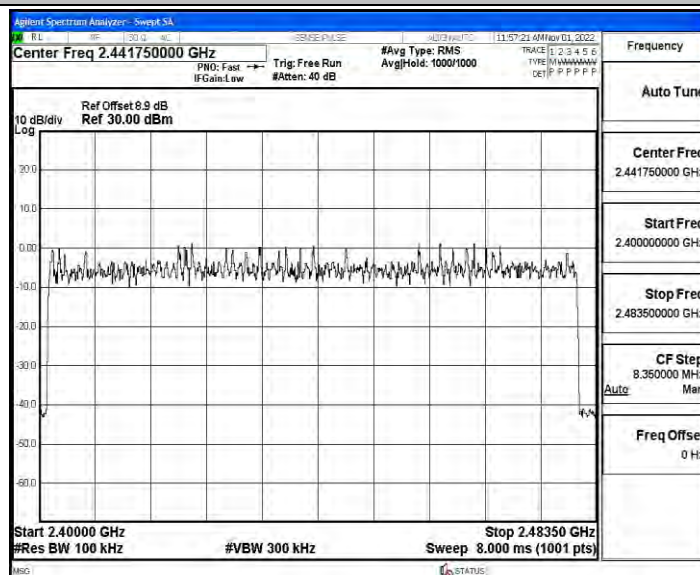
Test Result

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

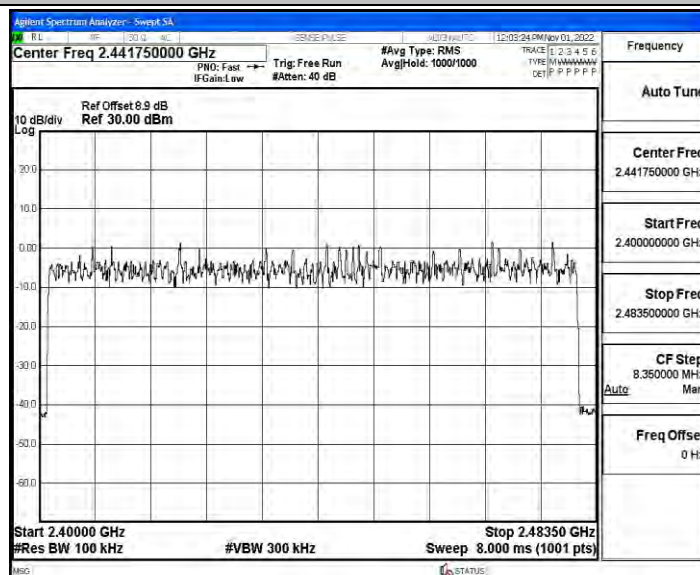
DH5 Ant1 Hop



2DH5 Ant1 Hop



3DH5_Ant1_Hop



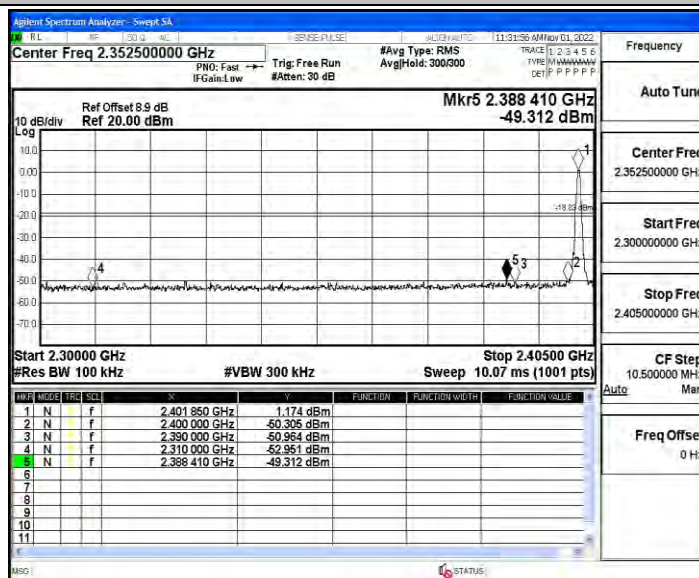
Appendix G: Band edge measurements

Test Result

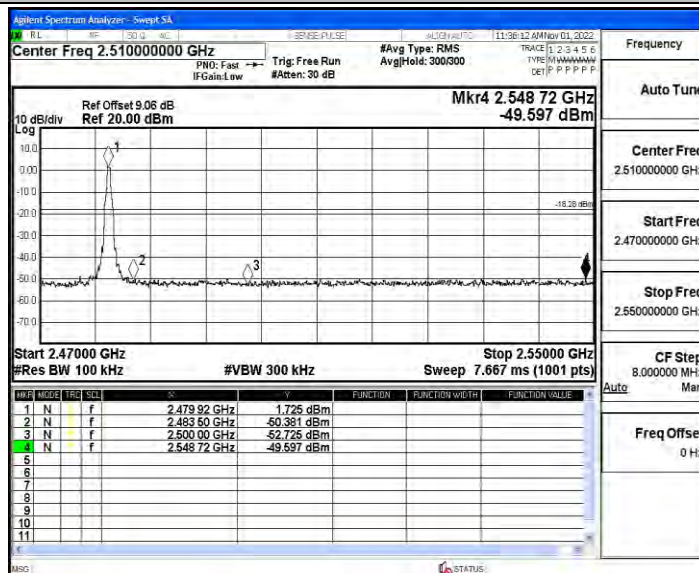
TestMode	Antenna	ChName	Channel	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	1.17	-49.31	≤-18.83	PASS
		High	2480	1.73	-49.6	≤-18.28	PASS
		Low	Hop_2402	0.85	-50.82	≤-19.15	PASS
		High	Hop_2480	1.63	-49.41	≤-18.37	PASS
2DH5	Ant1	Low	2402	0.63	-50.06	≤-19.37	PASS
		High	2480	1.40	-49.38	≤-18.6	PASS
		Low	Hop_2402	-4.27	-50.42	≤-24.27	PASS
		High	Hop_2480	-2.44	-49.53	≤-22.44	PASS
3DH5	Ant1	Low	2402	1.15	-50.22	≤-18.85	PASS
		High	2480	1.74	-48.91	≤-18.26	PASS
		Low	Hop_2402	0.98	-50.26	≤-19.02	PASS
		High	Hop_2480	0.31	-49.1	≤-19.69	PASS

Test Graphs

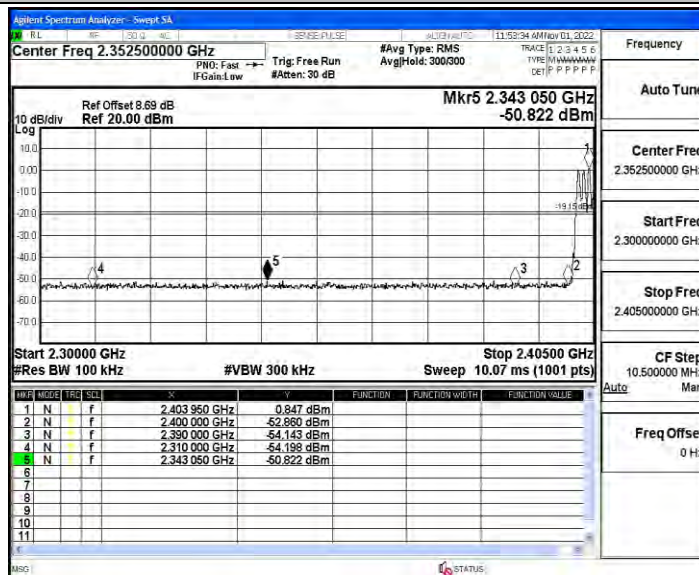
DH5_Ant1_Low_2402



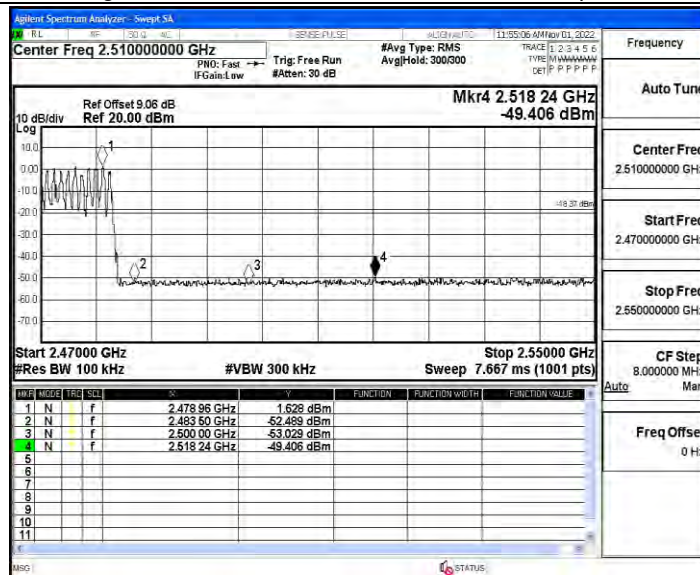
DH5_Ant1_High_2480



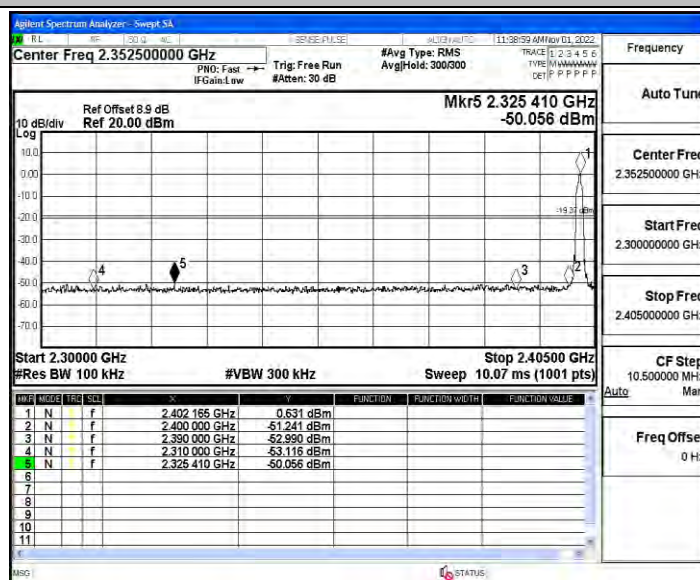
DH5_Ant1_Low_Hop_2402



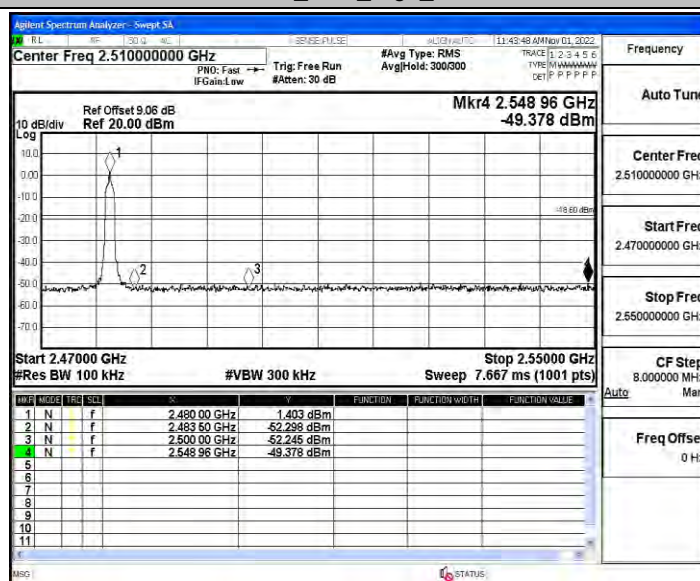
DH5_Ant1_High_Hop_2480



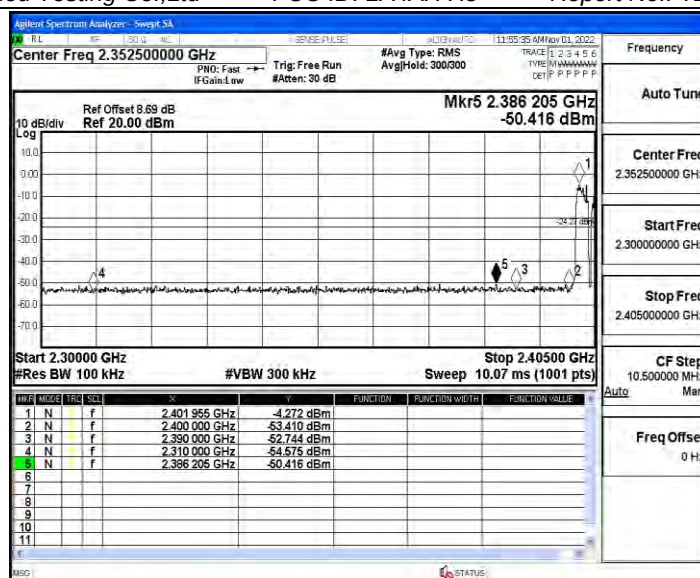
2DH5_Ant1_Low_2402



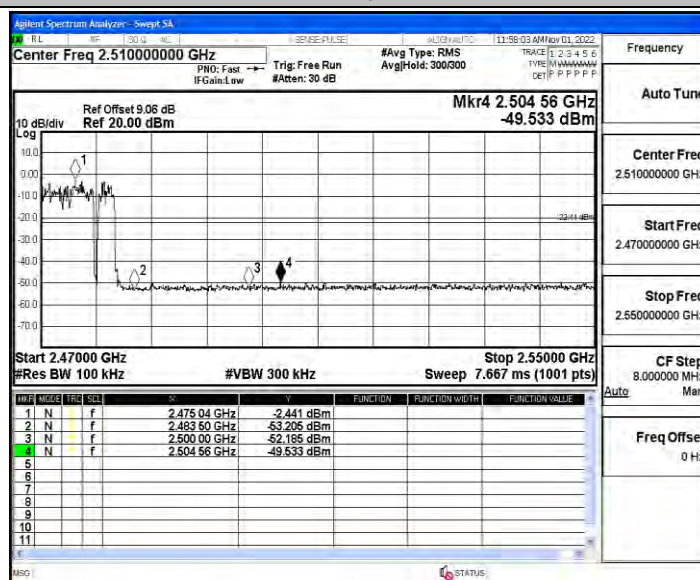
2DH5_Ant1_High_2480



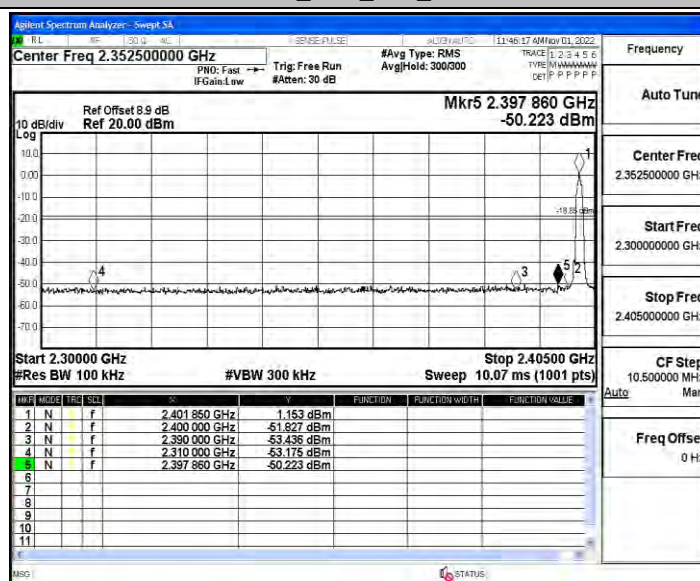
2DH5_Ant1_Low_Hop_2402



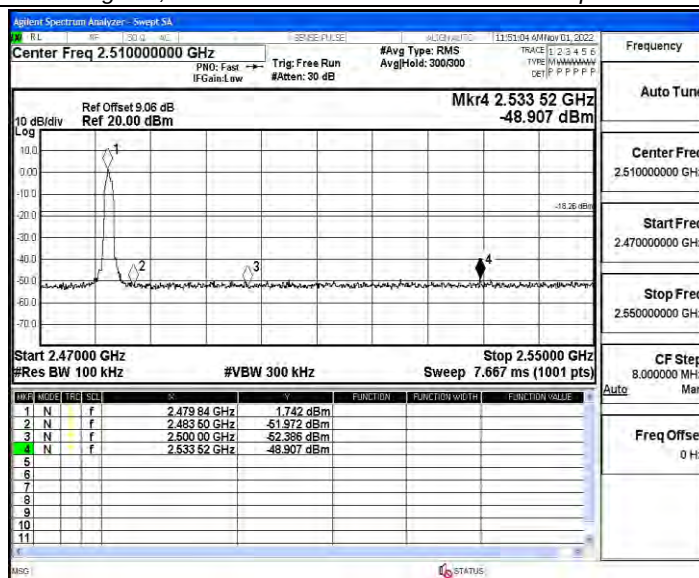
2DH5_Ant1_High_Hop_2480



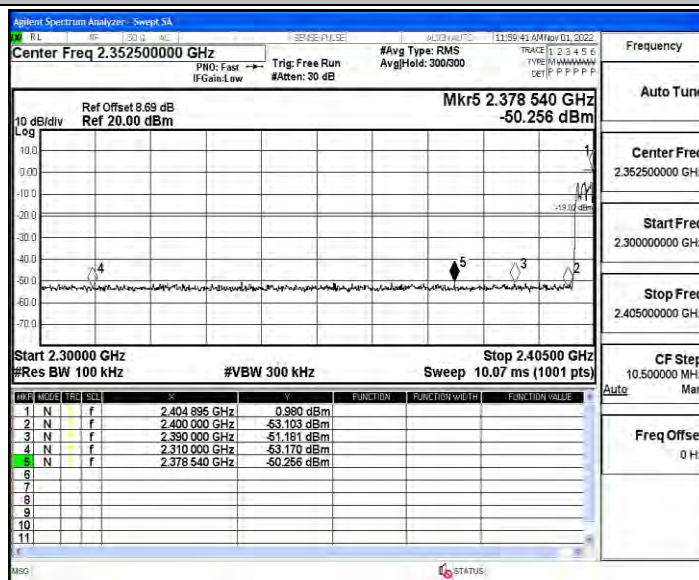
3DH5_Ant1_Low_2402



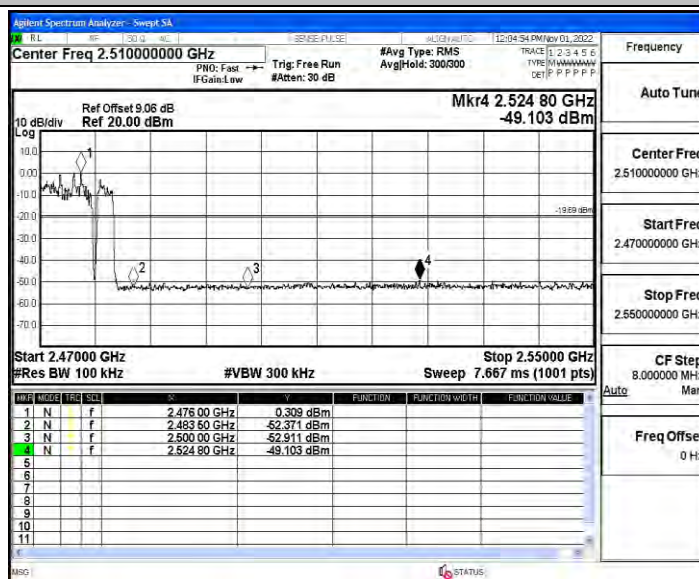
3DH5_Ant1_High_2480



3DH5_Ant1_Low_Hop_2402



3DH5_Ant1_High_Hop_2480



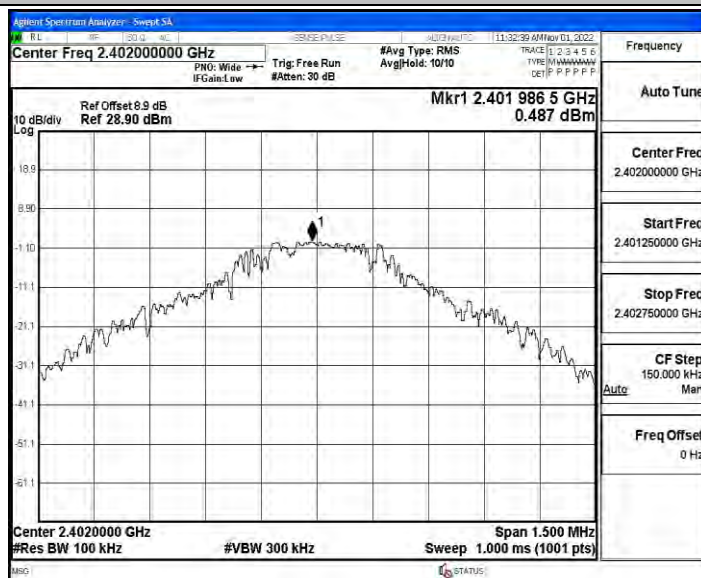
Appendix H: Conducted Spurious Emission

Test Result

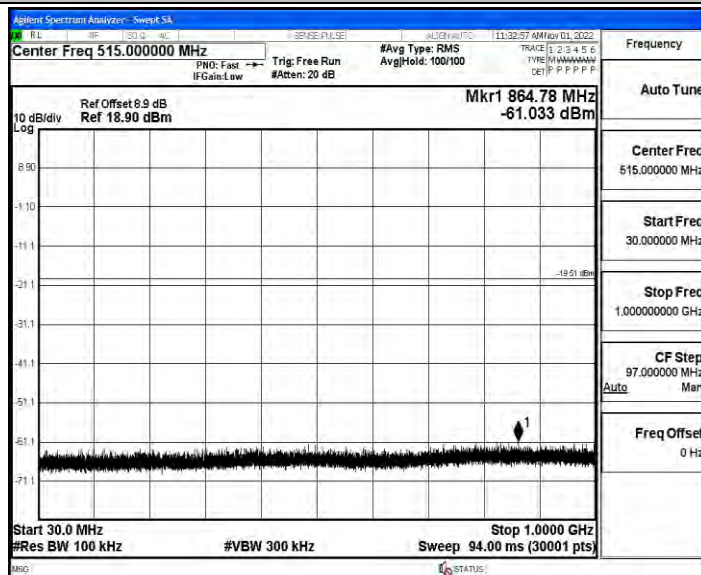
TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	2402	Reference	0.49	0.49	---	PASS
			30~1000	0.49	-61.03	≤-19.51	PASS
			1000~26500	0.49	-40.28	≤-19.51	PASS
		2441	Reference	1.01	1.01	---	PASS
			30~1000	1.01	-61.15	≤-18.99	PASS
			1000~26500	1.01	-41.33	≤-18.99	PASS
		2480	Reference	1.00	1.00	---	PASS
			30~1000	1.00	-61.01	≤-19	PASS
			1000~26500	1.00	-43.42	≤-19	PASS
2DH5	Ant1	2402	Reference	-1.19	-1.19	---	PASS
			30~1000	-1.19	-60.01	≤-21.19	PASS
			1000~26500	-1.19	-41.59	≤-21.19	PASS
		2441	Reference	-2.82	-2.82	---	PASS
			30~1000	-2.82	-60.73	≤-22.82	PASS
			1000~26500	-2.82	-43.73	≤-22.82	PASS
		2480	Reference	-1.90	-1.90	---	PASS
			30~1000	-1.90	-60.27	≤-21.9	PASS
			1000~26500	-1.90	-45.6	≤-21.9	PASS
3DH5	Ant1	2402	Reference	-3.62	-3.62	---	PASS
			30~1000	-3.62	-60.92	≤-23.62	PASS
			1000~26500	-3.62	-41.37	≤-23.62	PASS
		2441	Reference	0.10	0.10	---	PASS
			30~1000	0.10	-60.95	≤-19.9	PASS
			1000~26500	0.10	-44.74	≤-19.9	PASS
		2480	Reference	-2.84	-2.84	---	PASS
			30~1000	-2.84	-60.27	≤-22.84	PASS
			1000~26500	-2.84	-45.41	≤-22.84	PASS

Test Graphs

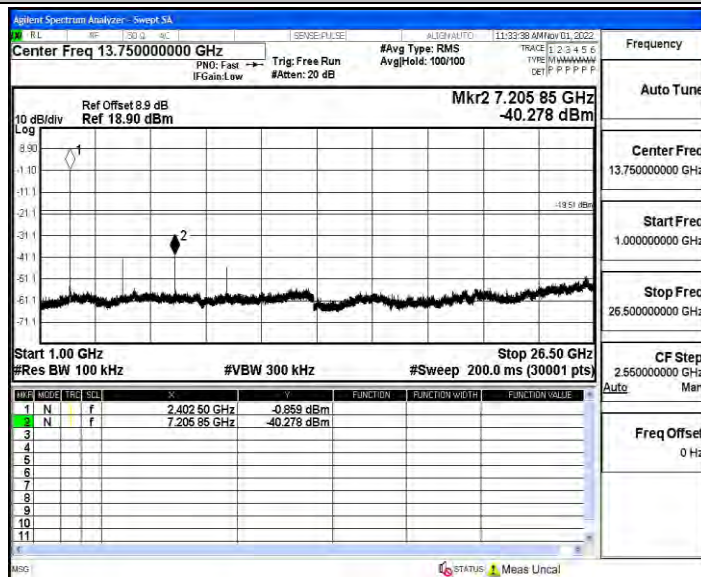
DH5_Ant1_2402_0~Reference



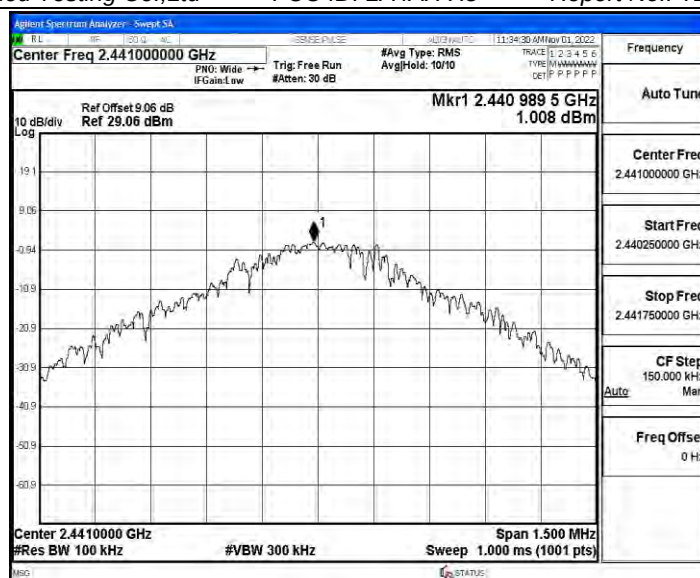
DH5_Ant1_2402_30~1000



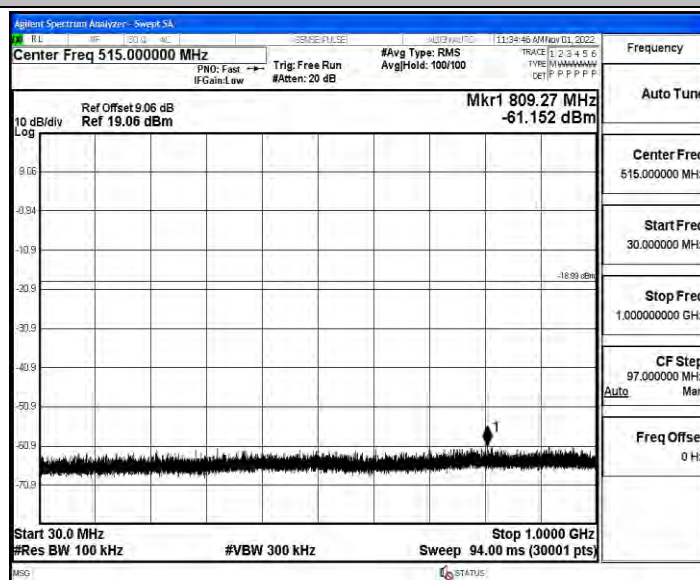
DH5_Ant1_2402_1000~26500



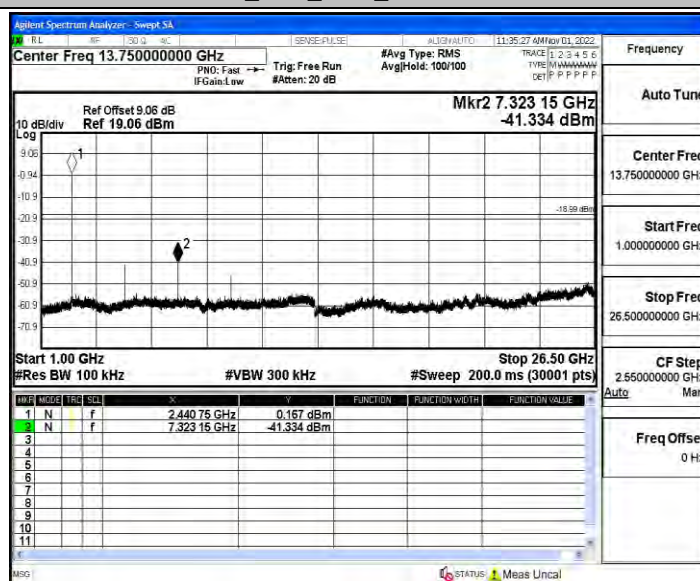
DH5_Ant1_2441_0~Reference



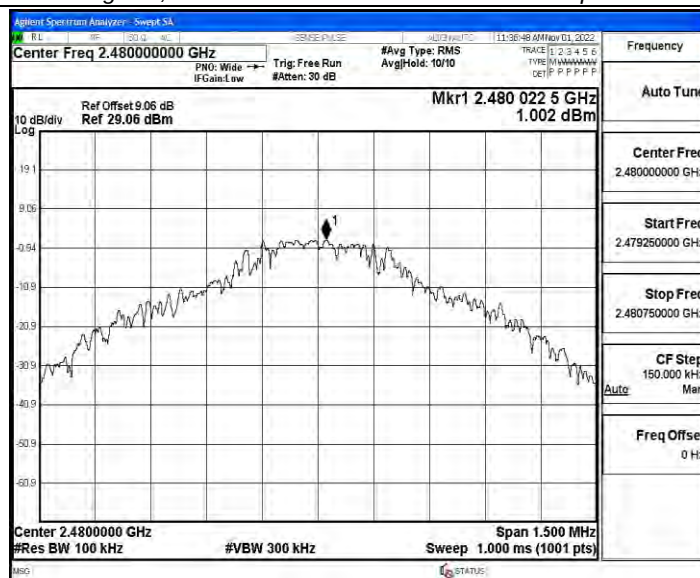
DH5_Ant1_2441_30~1000



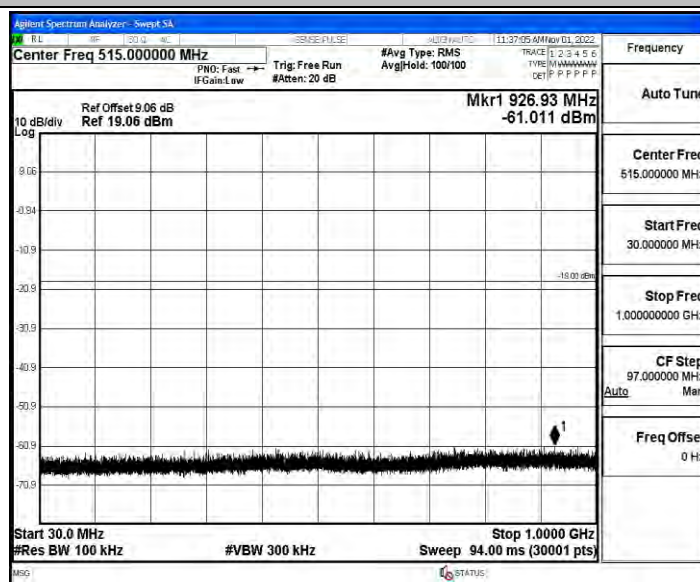
DH5_Ant1_2441_1000~26500



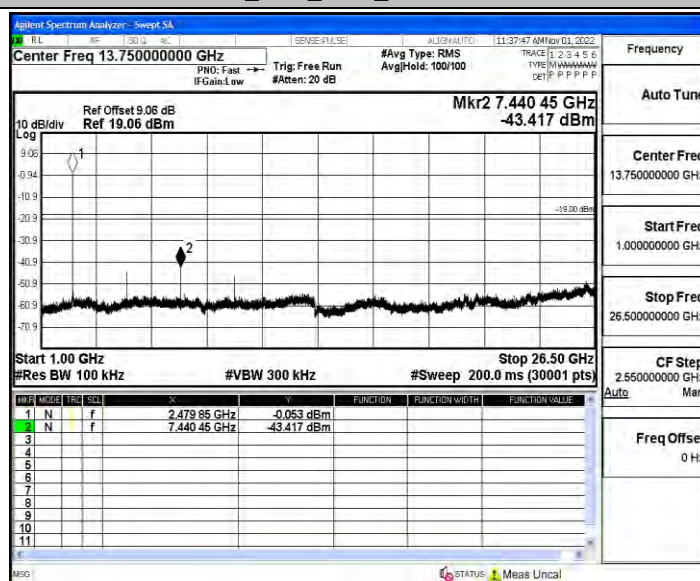
DH5_Ant1_2480_0~Reference



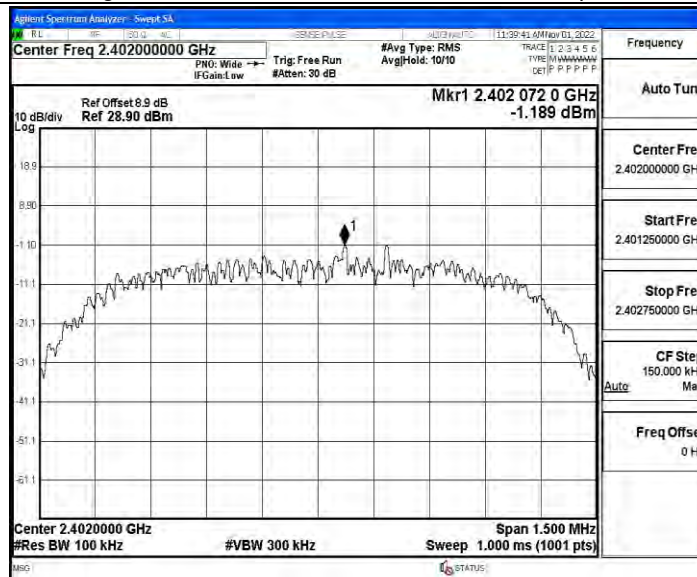
DH5_Ant1_2480_30~1000



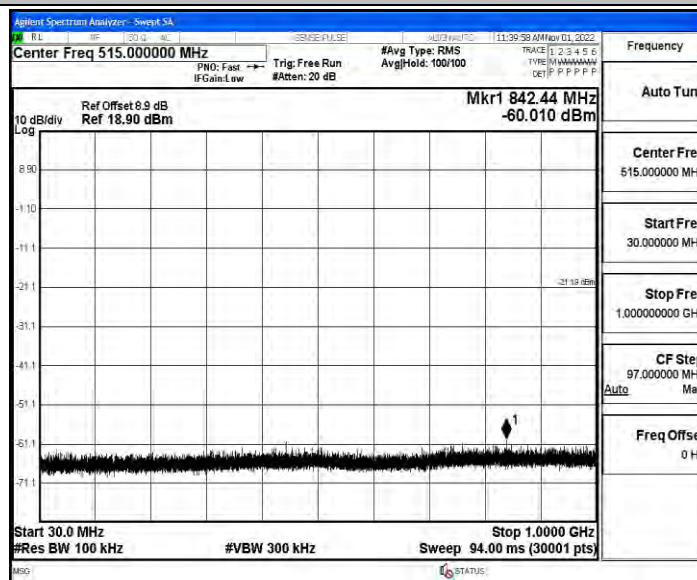
DH5_Ant1_2480_1000~26500



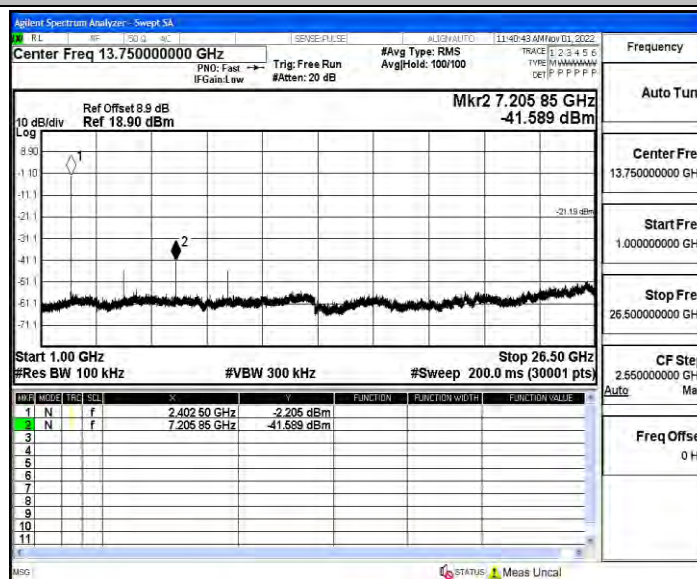
2DH5_Ant1_2402_0~Reference



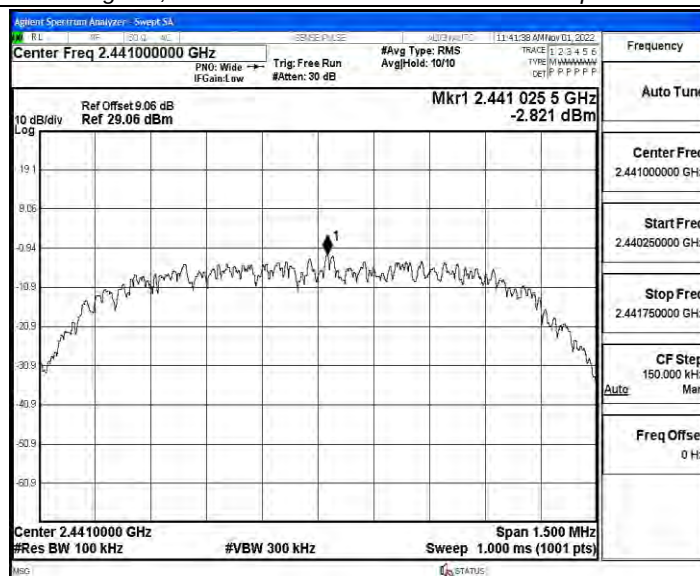
2DH5_Ant1_2402_30~1000



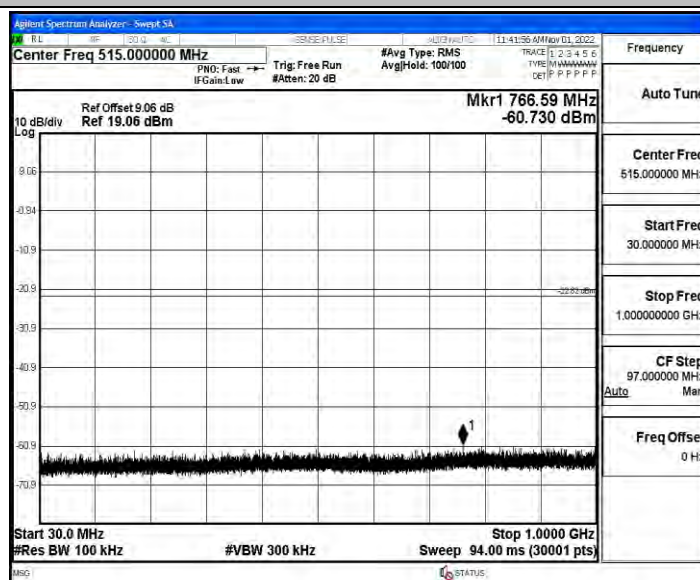
2DH5_Ant1_2402_1000~26500



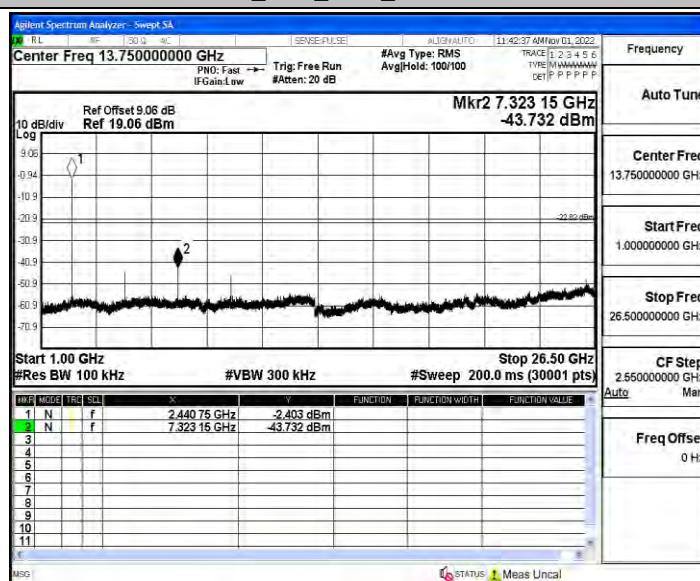
2DH5_Ant1_2441_0~Reference



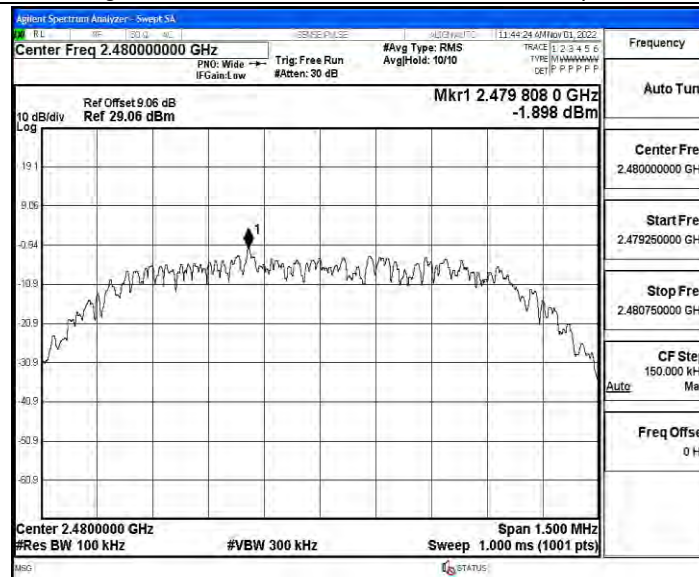
2DH5_Ant1_2441_30~1000



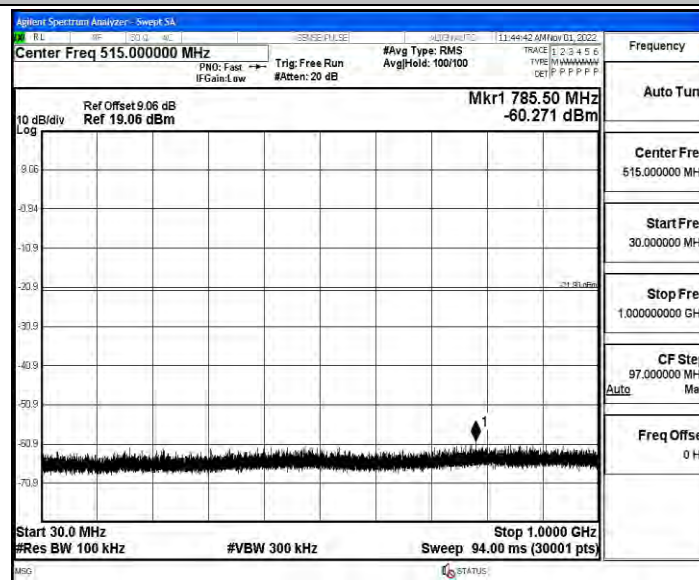
2DH5_Ant1_2441_1000~26500



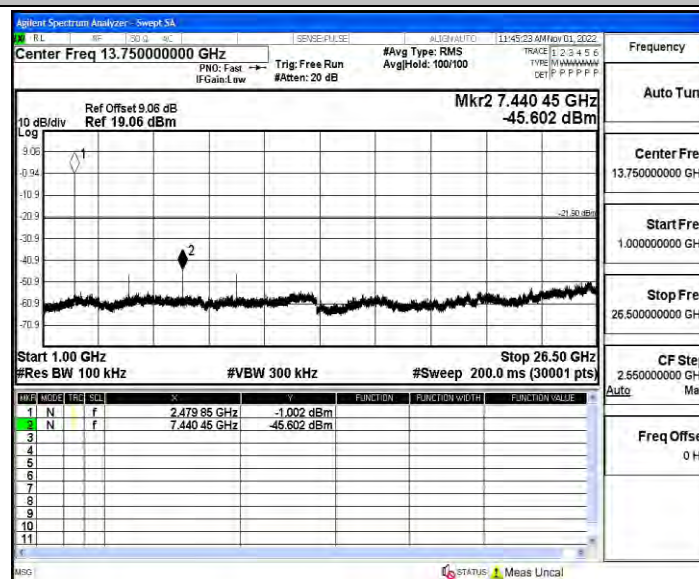
2DH5_Ant1_2480_0~Reference



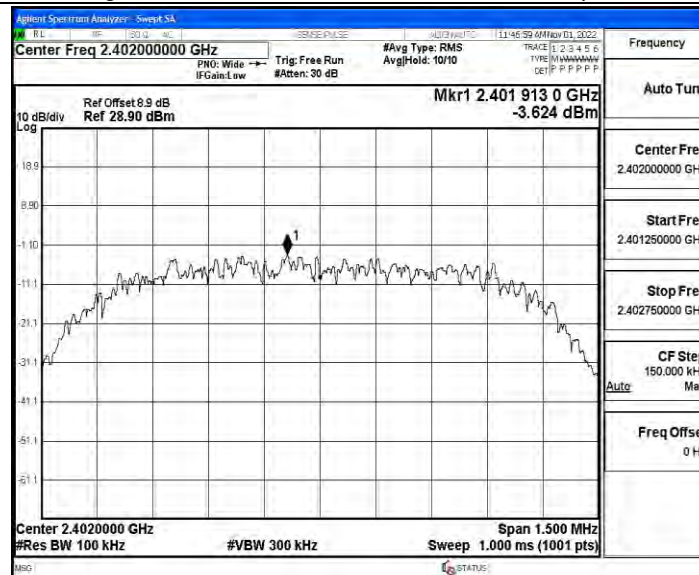
2DH5_Ant1_2480_30~1000



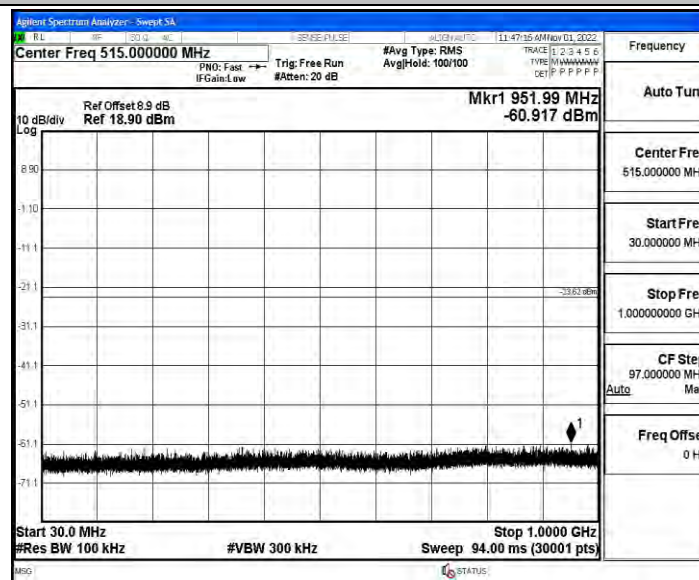
2DH5_Ant1_2480_1000~26500



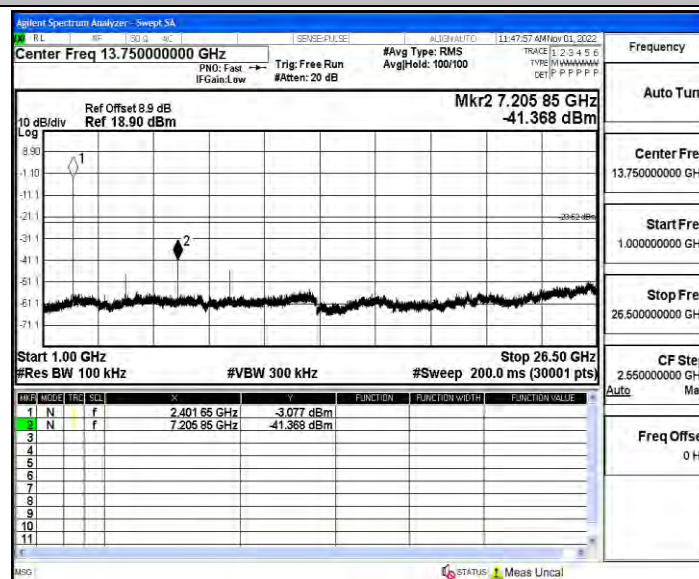
3DH5_Ant1_2402_0~Reference



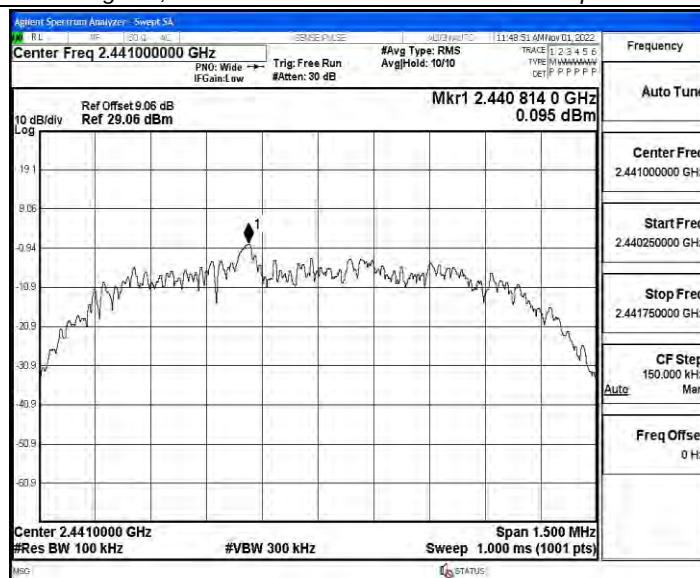
3DH5_Ant1_2402_30~1000



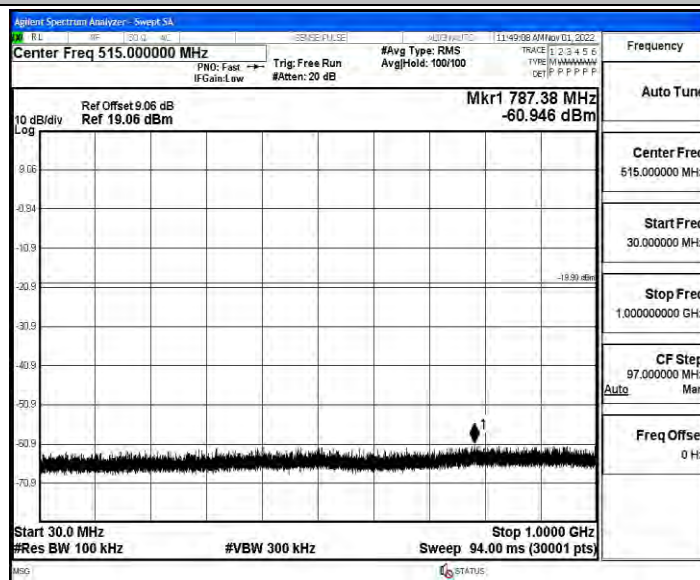
3DH5_Ant1_2402_1000~26500



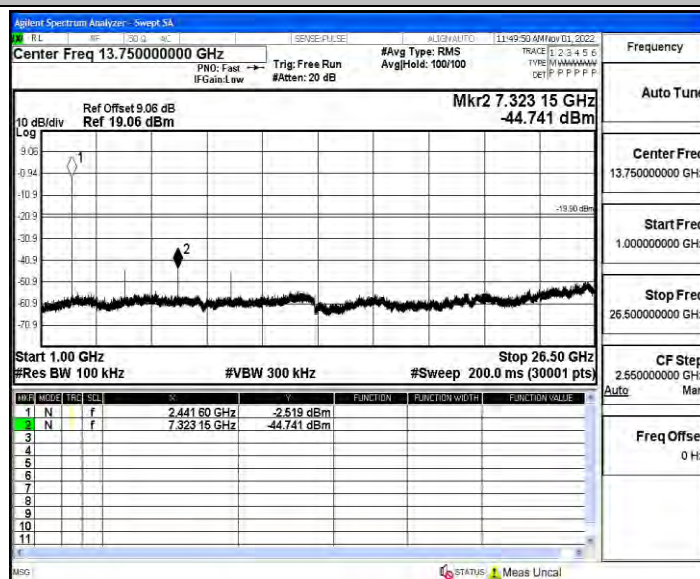
3DH5_Ant1_2441_0~Reference



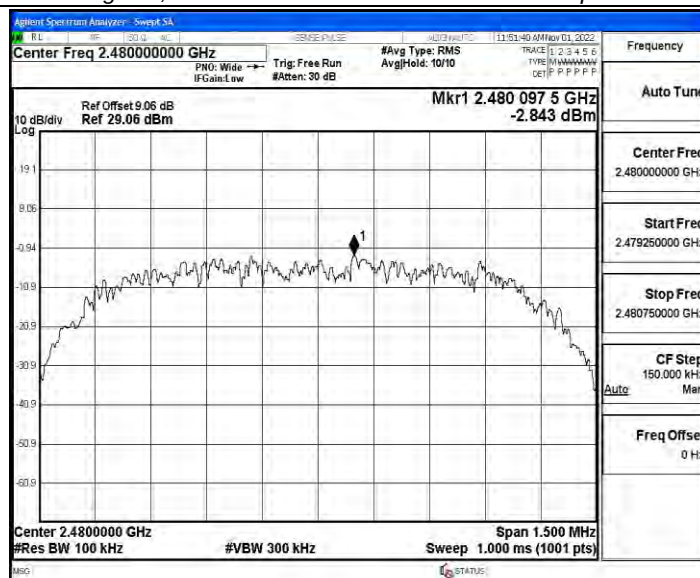
3DH5_Ant1_2441_30~1000



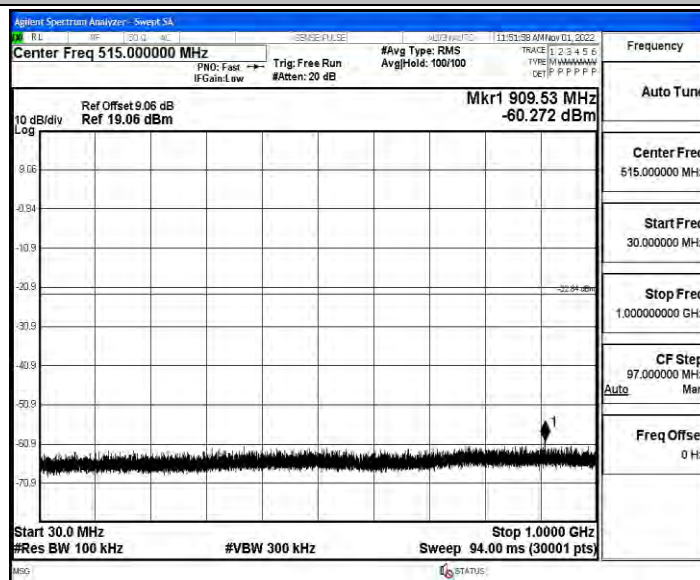
3DH5_Ant1_2441_1000~26500



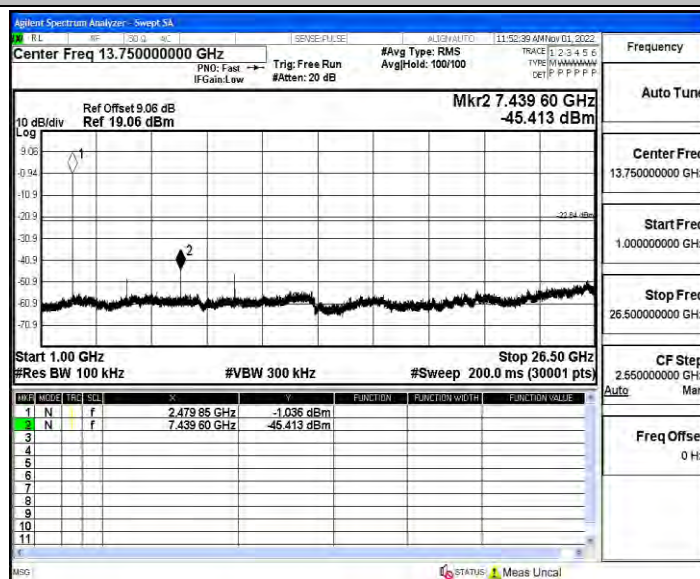
3DH5_Ant1_2480_0~Reference



3DH5_Ant1_2480_30~1000



3DH5_Ant1_2480_1000~26500



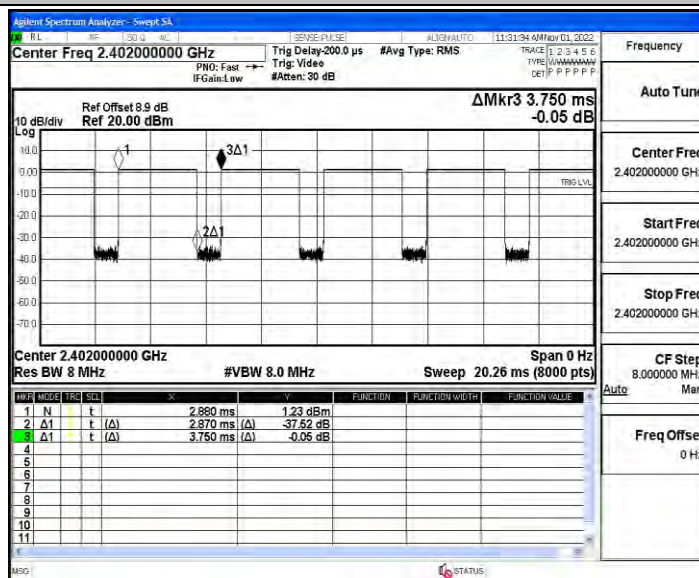
Appendix I: Duty Cycle

Test Result

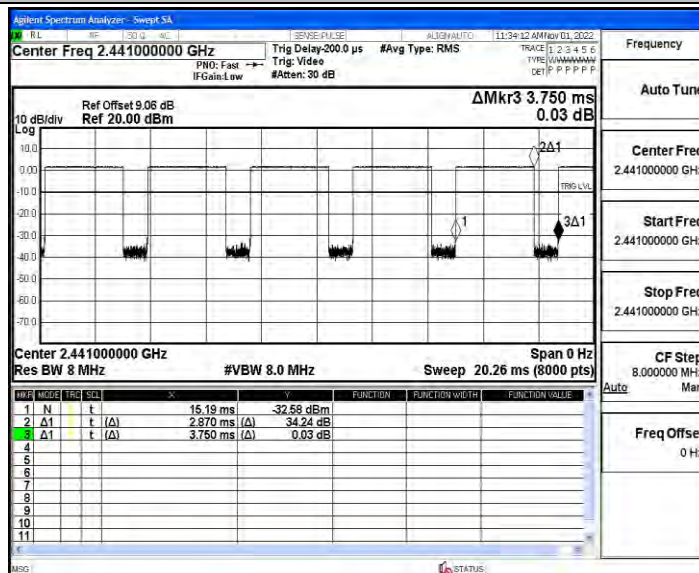
TestMode	Antenna	Channel	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	1/T[kHz]
DH5	Ant1	2402	2.87	3.75	76.53	0.35
		2441	2.87	3.75	76.53	0.35
		2480	2.87	3.75	76.53	0.35
2DH5	Ant1	2402	2.88	3.75	76.80	0.35
		2441	2.88	3.75	76.80	0.35
		2480	2.88	3.75	76.80	0.35
3DH5	Ant1	2402	2.88	3.75	76.80	0.35
		2441	2.88	3.75	76.80	0.35
		2480	2.89	3.76	76.86	0.35

Test Graphs

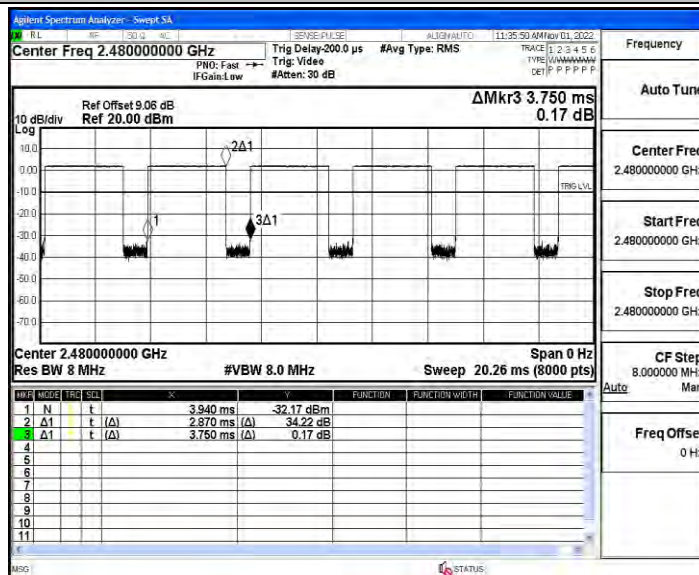
DH5_Ant1_2402



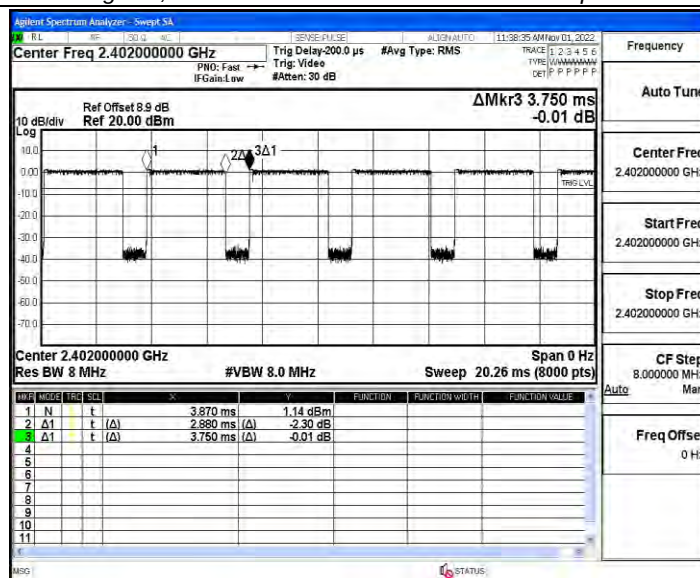
DH5_Ant1_2441



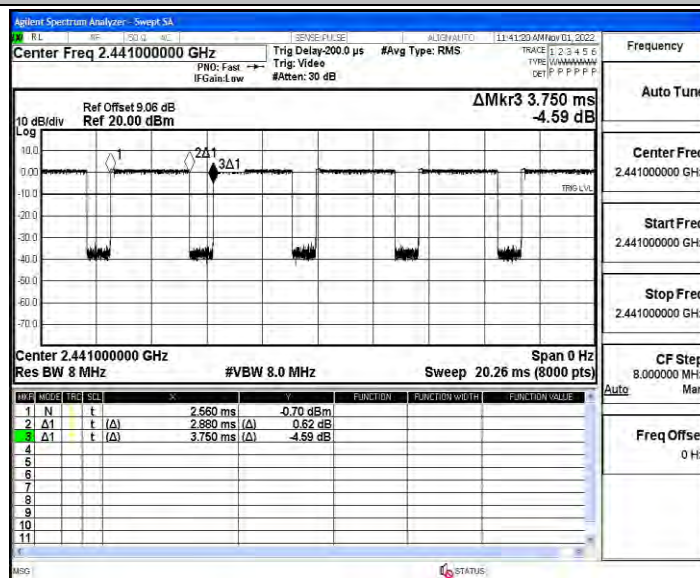
DH5_Ant1_2480



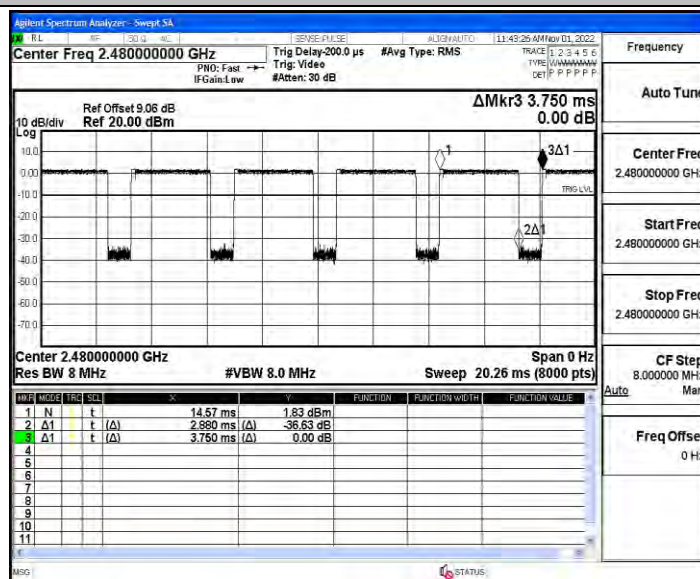
2DH5_Ant1_2402



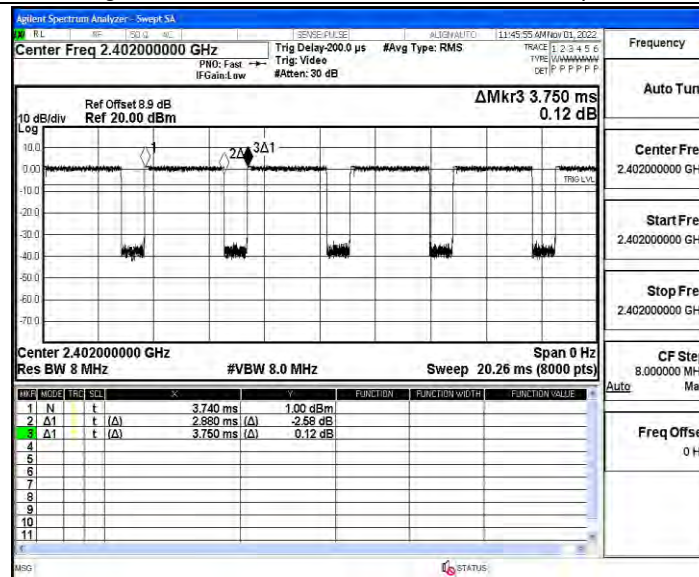
2DH5_Ant1_2441



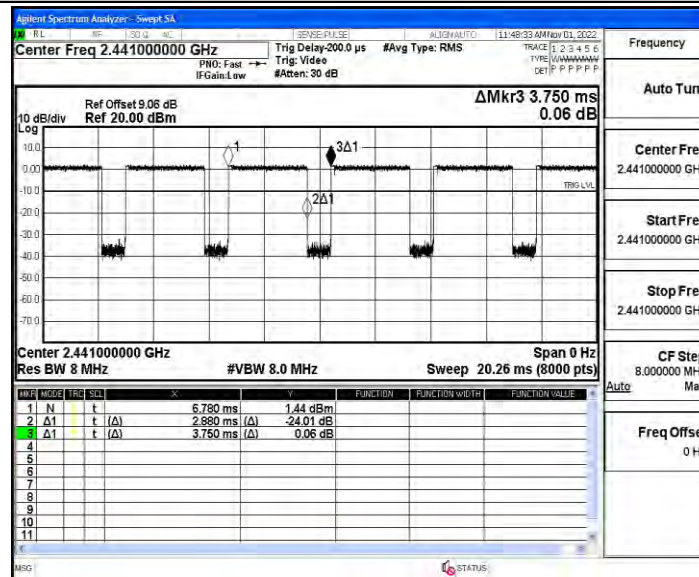
2DH5_Ant1_2480



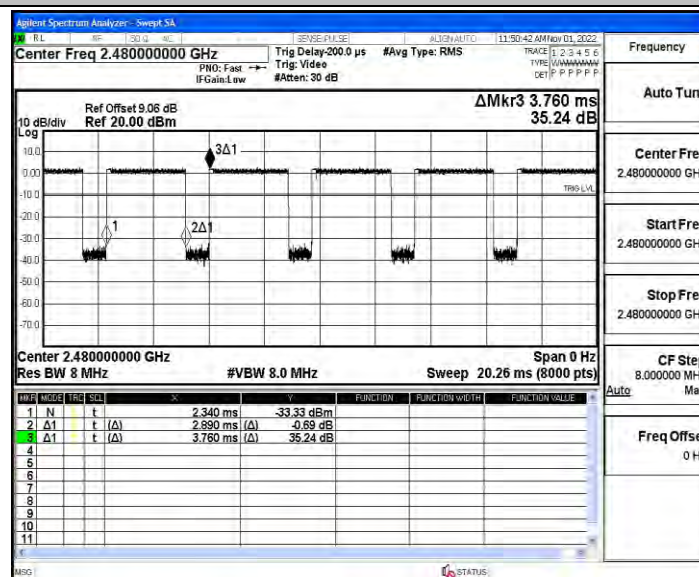
3DH5_Ant1_2402



3DH5_Ant1_2441



3DH5_Ant1_2480



Appendix J: Emissions in Restricted Bands

Test Result

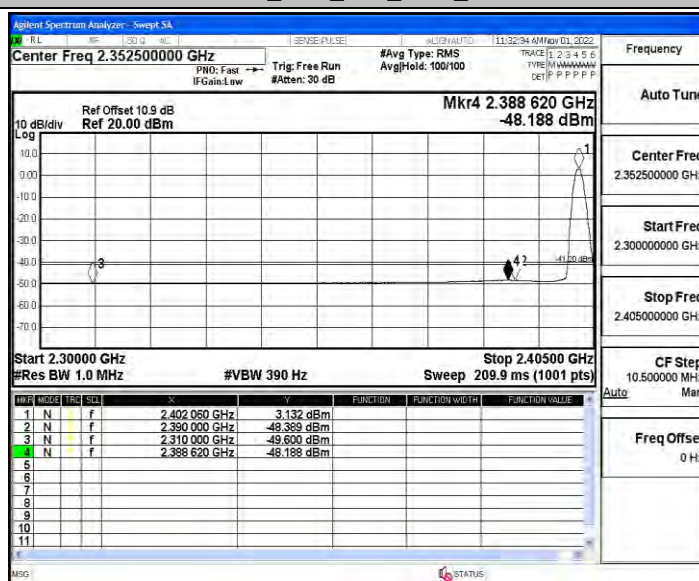
TestMode	Antenna	ChName	Channel	Detector	Freq(MHz)	Result(dBm)	Limit(dBm)	Verdict
DH5	Ant1	Low	2402	AV	2310.000	-49.6	≤-41.20	PASS
				AV	2388.620	-48.19	≤-41.20	PASS
				AV	2390.000	-48.39	≤-41.20	PASS
				Peak	2310.000	-42.05	≤-21.20	PASS
				Peak	2368.460	-38.7	≤-21.20	PASS
				Peak	2390.000	-41.89	≤-21.20	PASS
		High	2480	AV	2483.500	-47.36	≤-41.20	PASS
				AV	2483.520	-47.36	≤-41.20	PASS
				AV	2500.000	-48.16	≤-41.20	PASS
				Peak	2483.500	-39.28	≤-21.20	PASS
				Peak	2493.920	-38.15	≤-21.20	PASS
				Peak	2500.000	-39.69	≤-21.20	PASS
2DH5	Ant1	Low	2402	AV	2310.000	-49.55	≤-41.20	PASS
				AV	2389.250	-48.73	≤-41.20	PASS
				AV	2390.000	-48.87	≤-41.20	PASS
				Peak	2310.000	-42.67	≤-21.20	PASS
				Peak	2387.360	-39.07	≤-21.20	PASS
				Peak	2390.000	-41.09	≤-21.20	PASS
		High	2480	AV	2483.500	-47.8	≤-41.20	PASS
				AV	2483.520	-47.8	≤-41.20	PASS
				AV	2500.000	-48.37	≤-41.20	PASS
				Peak	2483.500	-42.23	≤-21.20	PASS
				Peak	2498.800	-38.62	≤-21.20	PASS
				Peak	2500.000	-39.73	≤-21.20	PASS
3DH5	Ant1	Low	2402	AV	2310.000	-49.48	≤-41.20	PASS
				AV	2386.205	-48.66	≤-41.20	PASS
				AV	2390.000	-48.83	≤-41.20	PASS
				Peak	2310.000	-42.03	≤-21.20	PASS
				Peak	2319.845	-39.07	≤-21.20	PASS
				Peak	2390.000	-42.05	≤-21.20	PASS
		High	2480	AV	2483.500	-47.74	≤-41.20	PASS
				AV	2483.520	-47.74	≤-41.20	PASS
				AV	2500.000	-48.3	≤-41.20	PASS
				Peak	2483.500	-39.43	≤-21.20	PASS
				Peak	2486.400	-39.37	≤-21.20	PASS
				Peak	2500.000	-41.97	≤-21.20	PASS

Note:

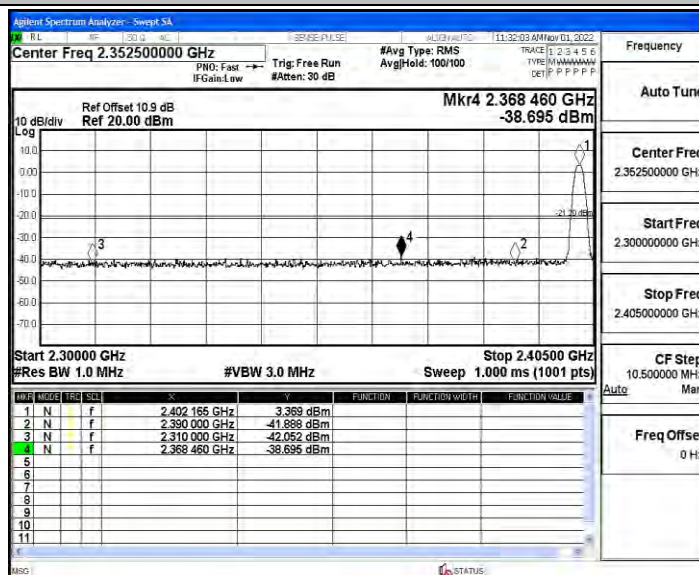
1. The Antenna Gain is compensated in the graph with 2dBi and Antenna Gain which is Higher.
2. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

Test Graphs

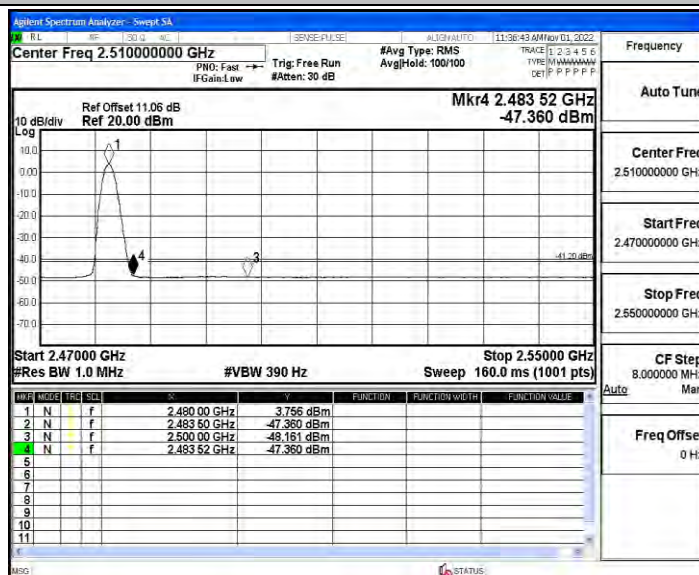
DH5_Ant1_Low_2402_AV



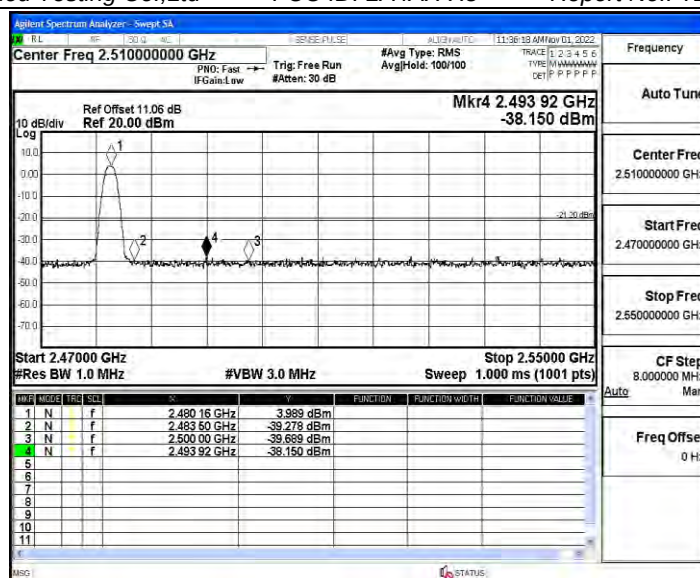
DH5_Ant1_Low_2402_Peak



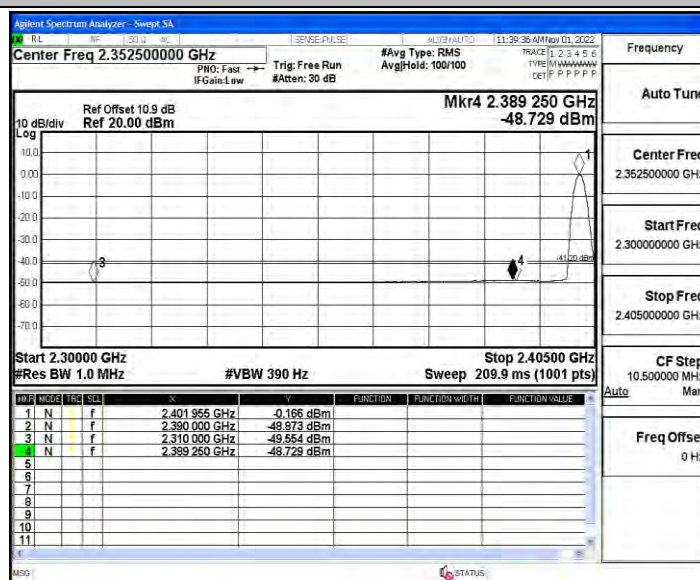
DH5_Ant1_High_2480_AV



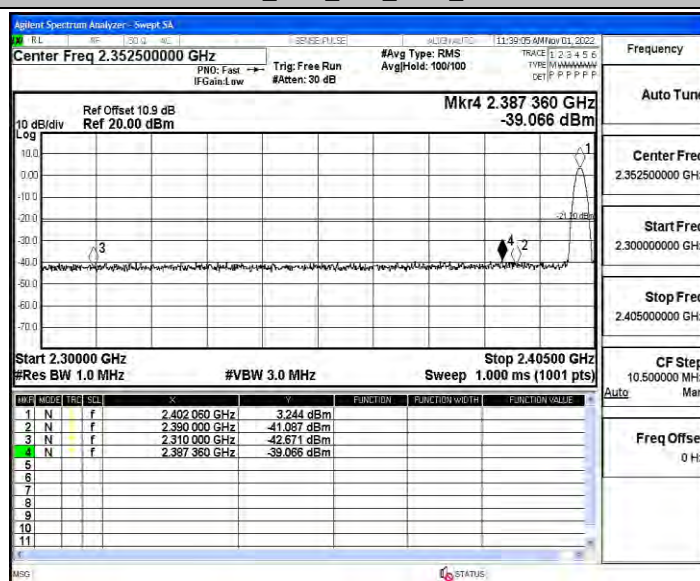
DH5_Ant1_High_2480_Peak



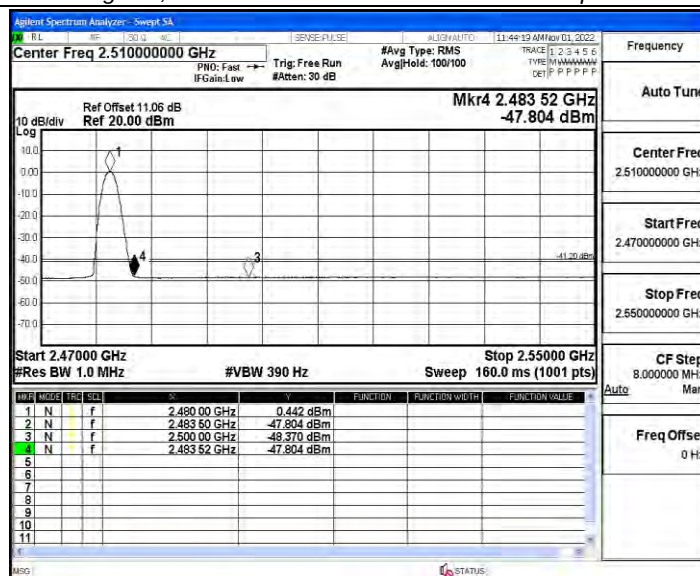
2DH5_Ant1_Low_2402_AV



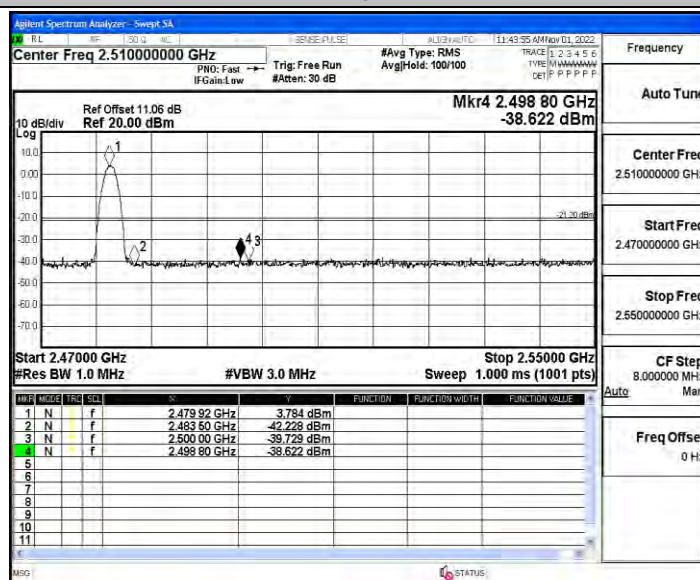
2DH5_Ant1_Low_2402_Peak



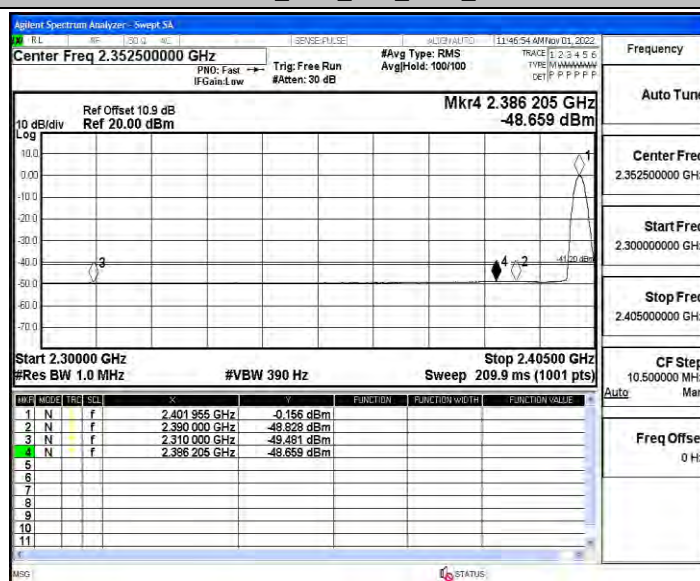
2DH5_Ant1_High_2480_AV



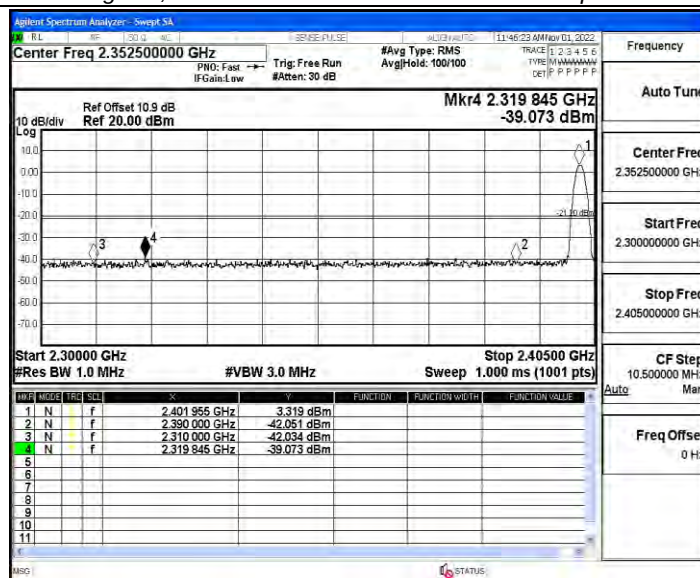
2DH5_Ant1_High_2480_Peak



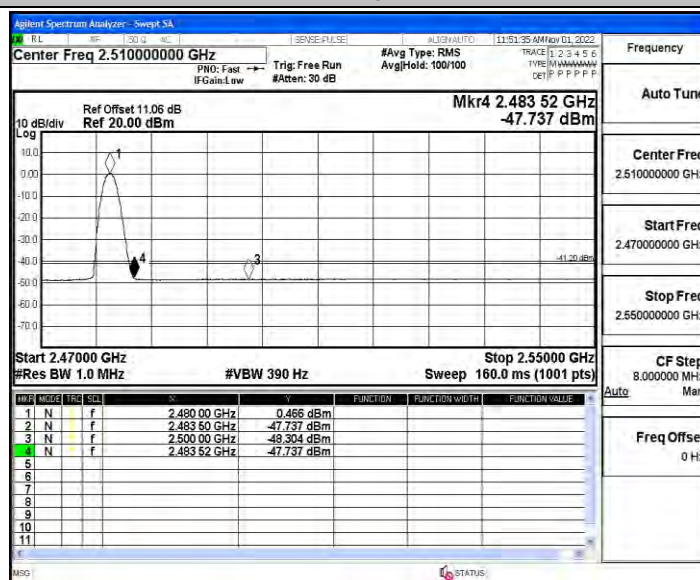
3DH5_Ant1_Low_2402_AV



3DH5_Ant1_Low_2402_Peak



3DH5_Ant1_High_2480_AV



3DH5_Ant1_High_2480_Peak

