

RF Test Data for BT(BDR/EDR) (Conducted Measurement)

Product Name: True Wireless Earbuds

Trade Mark: Tranya

Test Model: F4

FCC ID: 2A4AX-F4

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

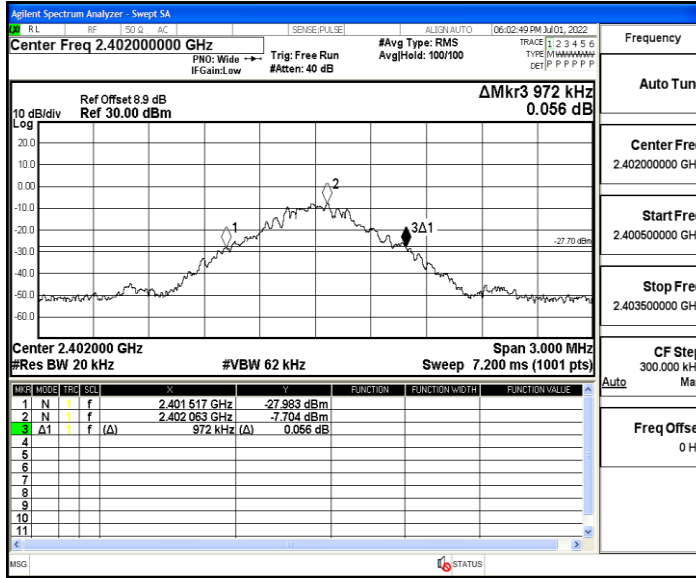
Appendix A: 20dB Emission Bandwidth

Test Result

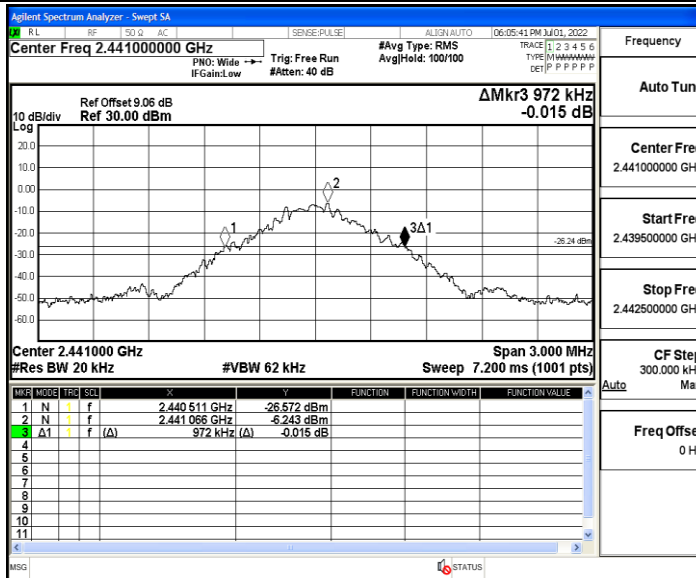
TestMode	Antenna	Channel	20db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.972	2401.517	2402.489	---	---
		2441	0.972	2440.511	2441.483	---	---
		2480	0.999	2479.511	2480.510	---	---
2DH5	Ant1	2402	1.332	2401.343	2402.675	---	---
		2441	1.281	2440.358	2441.639	---	---
		2480	1.347	2479.337	2480.684	---	---

Test Graphs

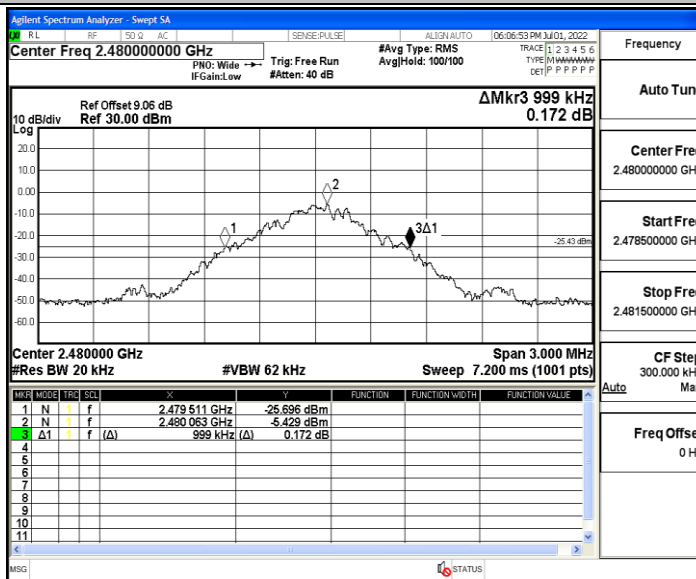
DH5_Ant1_2402



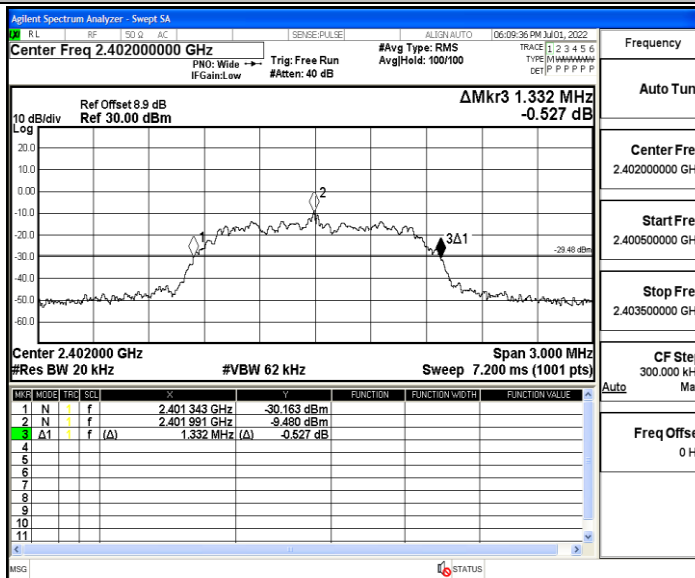
DH5_Ant1_2441



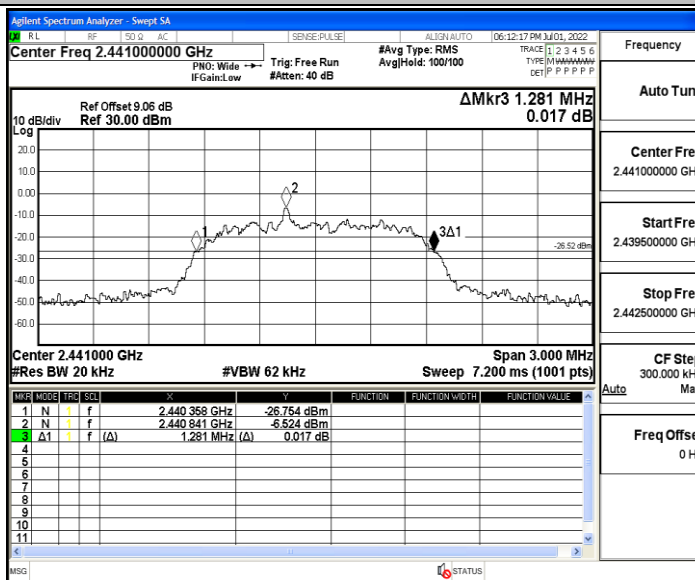
DH5_Ant1_2480



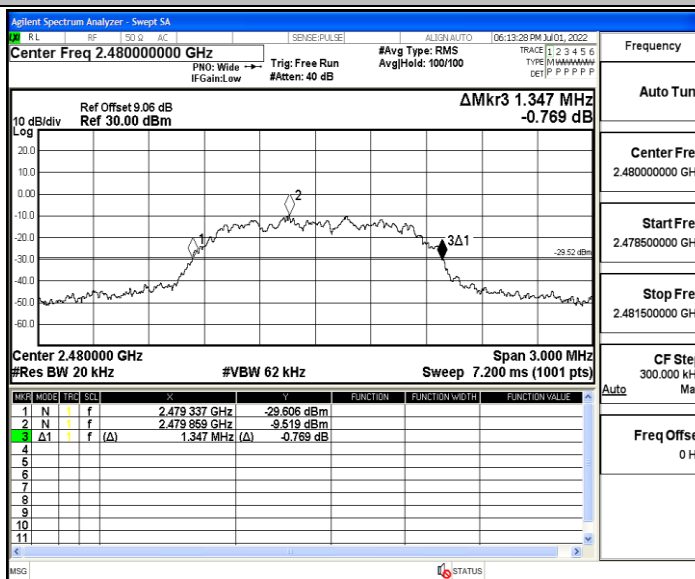
2DH5_Ant1_2402



2DH5_Ant1_2441



2DH5_Ant1_2480



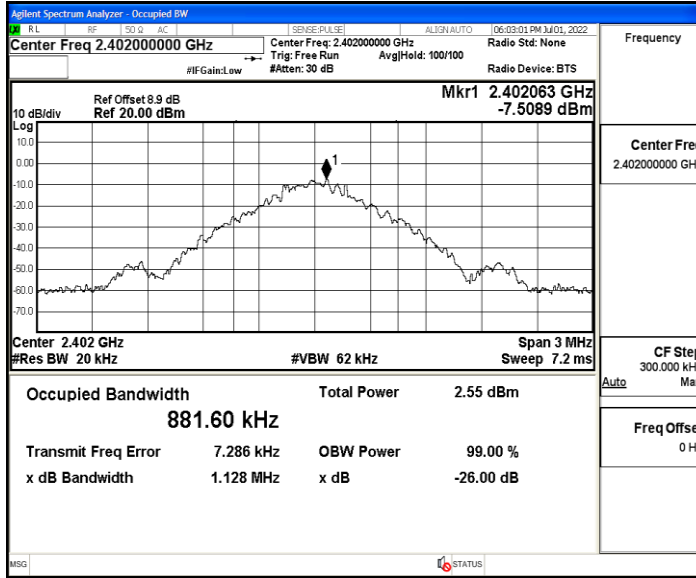
Appendix B: Occupied Channel Bandwidth

Test Result

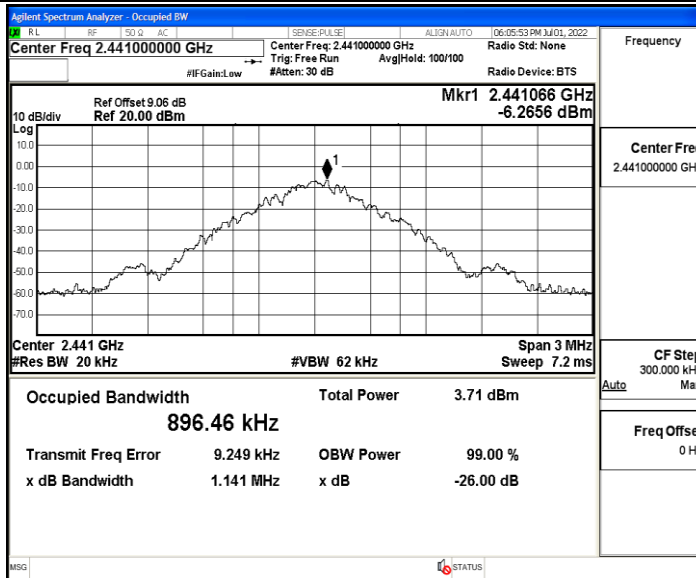
TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.88160	2401.566	2402.448	---	---
		2441	0.89646	2440.561	2441.457	---	---
		2480	0.90502	2479.553	2480.458	---	---
2DH5	Ant1	2402	1.2060	2401.407	2402.613	---	---
		2441	1.1971	2440.408	2441.605	---	---
		2480	1.2084	2479.403	2480.611	---	---

Test Graphs

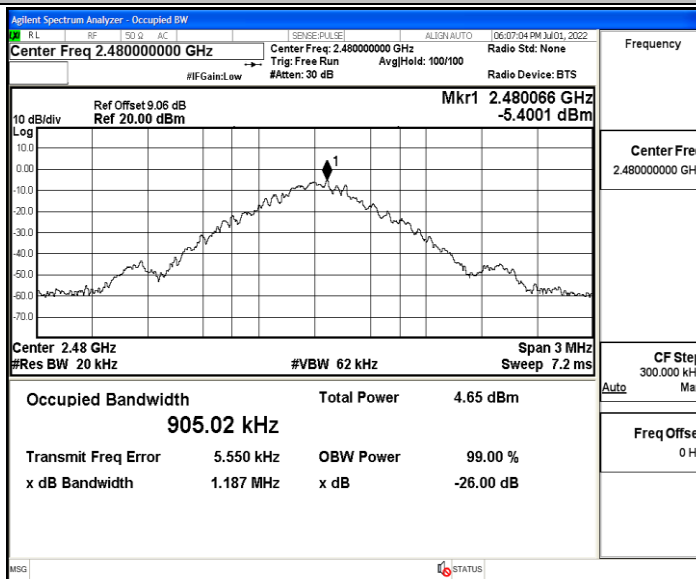
DH5_Ant1_2402



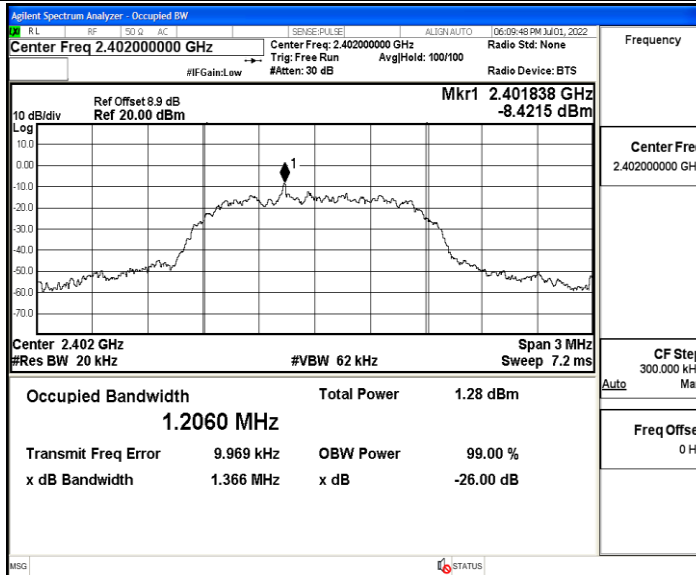
DH5_Ant1_2441



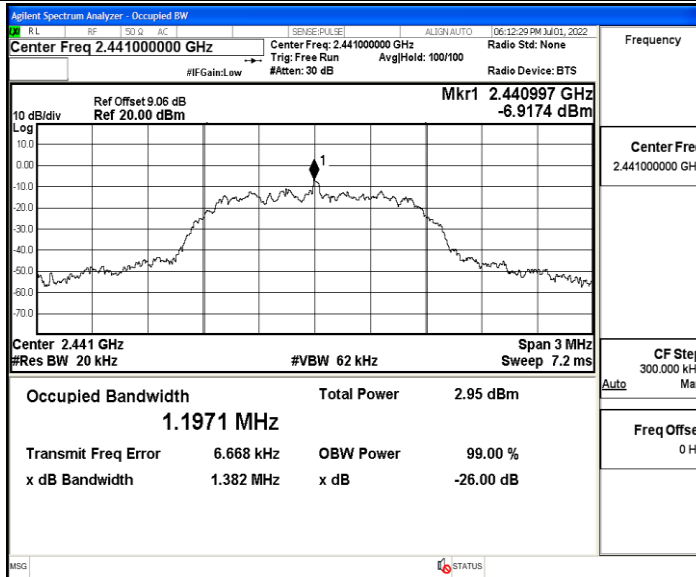
DH5_Ant1_2480



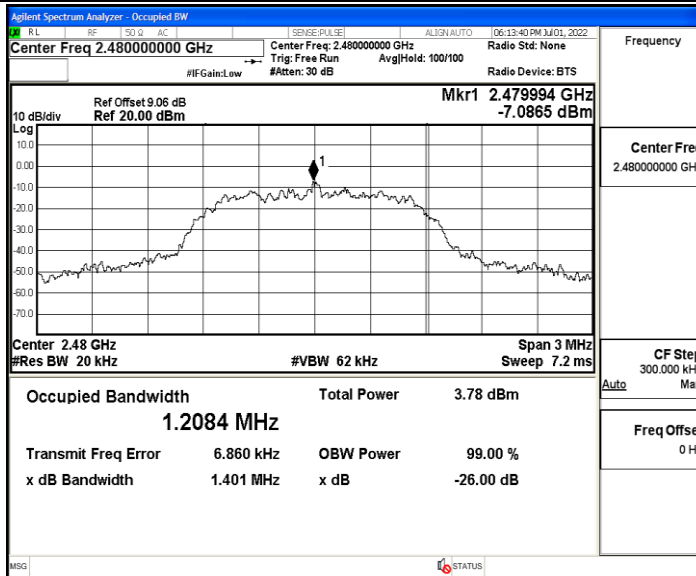
2DH5_Ant1_2402



2DH5_Ant1_2441



2DH5_Ant1_2480



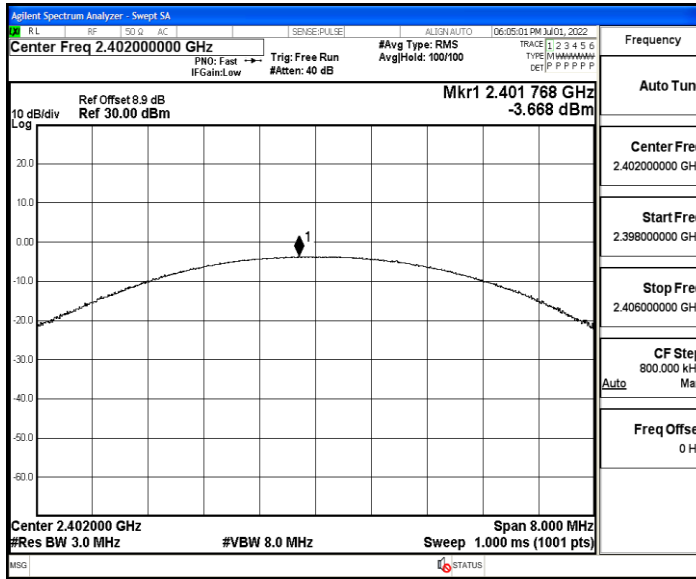
Appendix C: Maximum Peak conducted output power

Test Result

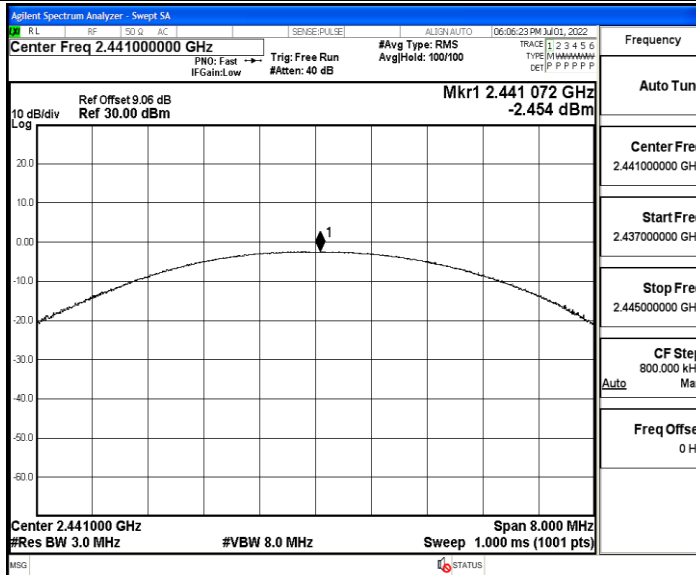
TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
DH5	Ant1	2402	-3.67	≤30	PASS
		2441	-2.45	≤30	PASS
		2480	-1.6	≤30	PASS
2DH5	Ant1	2402	-3	≤20.97	PASS
		2441	-1.7	≤20.97	PASS
		2480	-1	≤20.97	PASS

Test Graphs

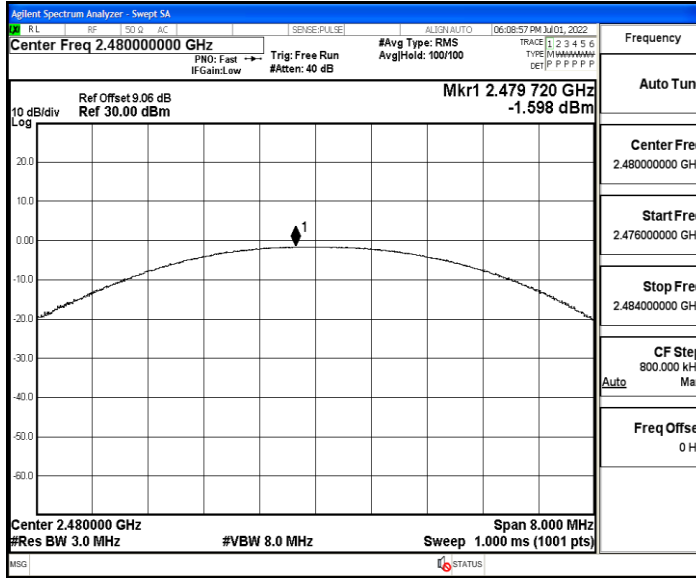
DH5_Ant1_2402



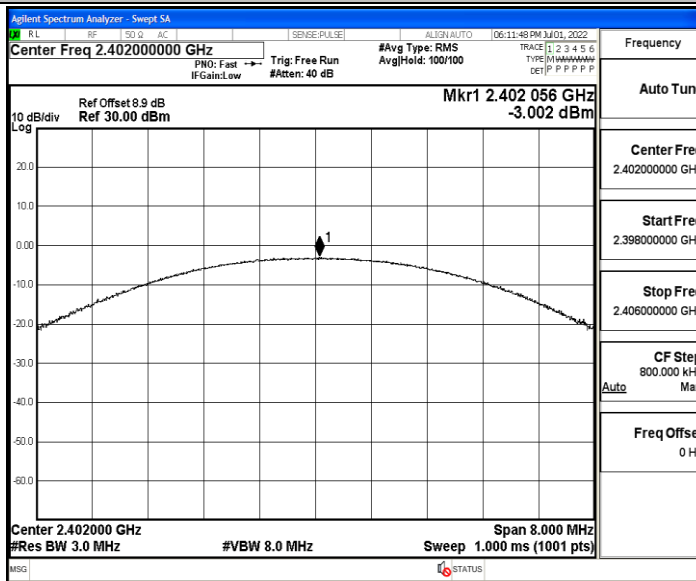
DH5_Ant1_2441



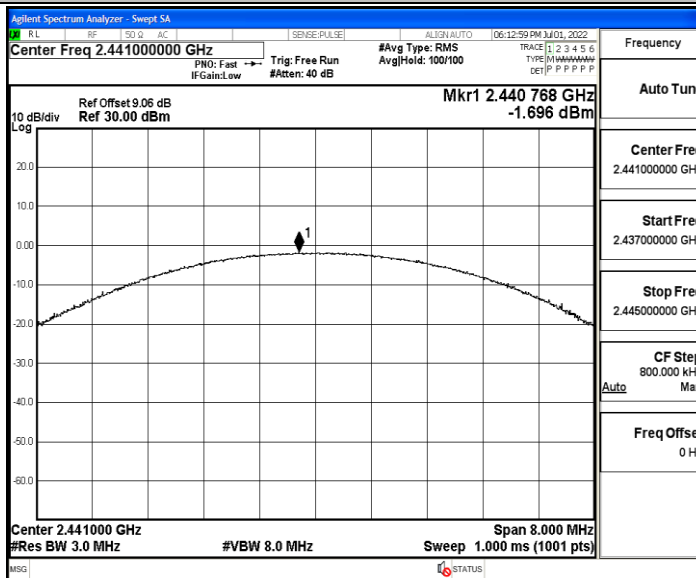
DH5_Ant1_2480



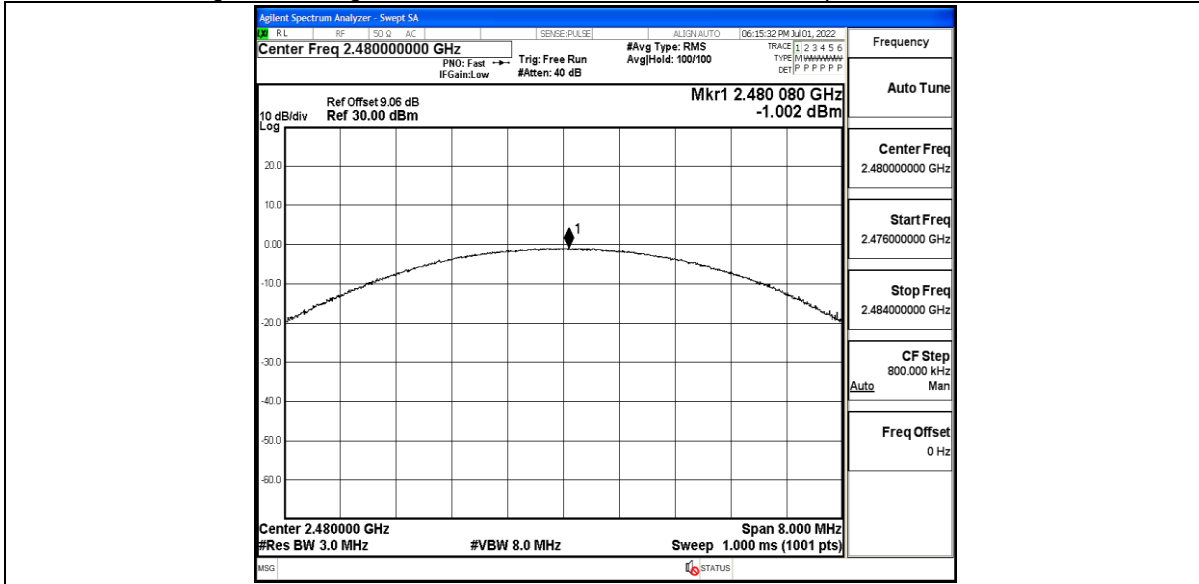
2DH5_Ant1_2402



2DH5_Ant1_2441



2DH5_Ant1_2480



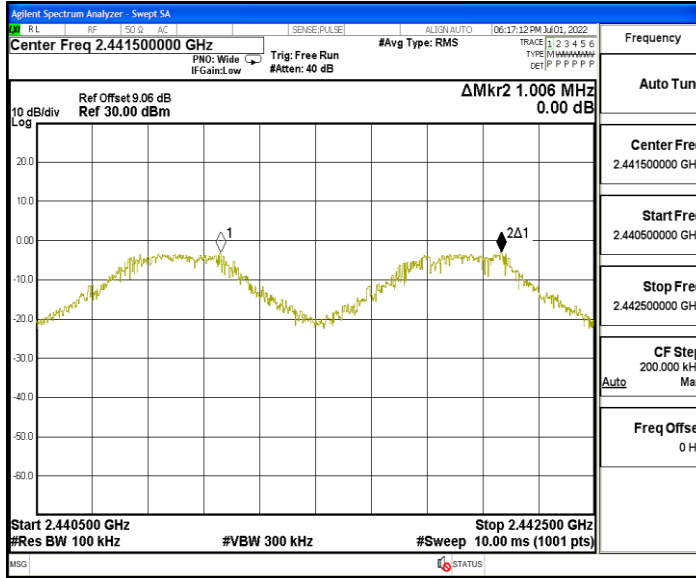
Appendix D: Carrier frequency separation

Test Result

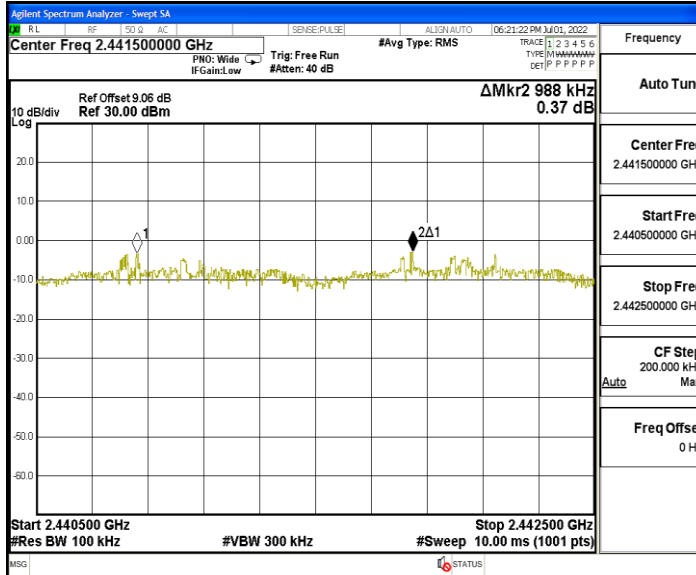
TestMode	Antenna	Channel	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Hop	1.006	≥0.999	PASS
2DH5	Ant1	Hop	0.988	≥0.898	PASS

Test Graphs

DH5_Ant1_Hop



2DH5_Ant1_Hop



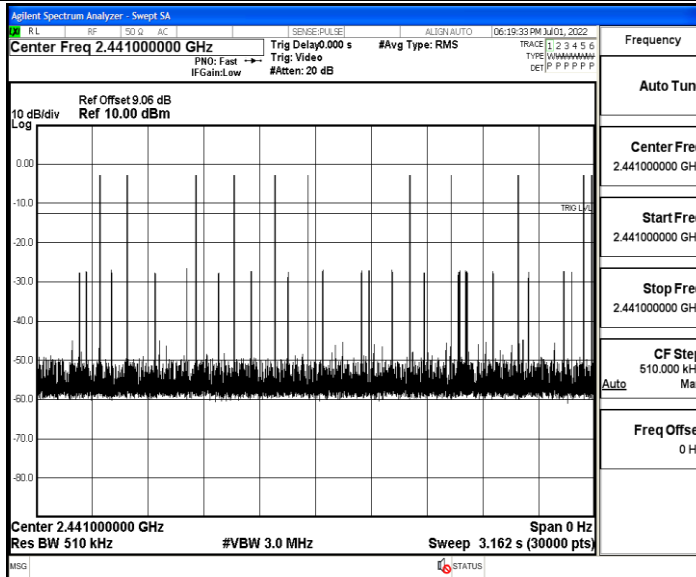
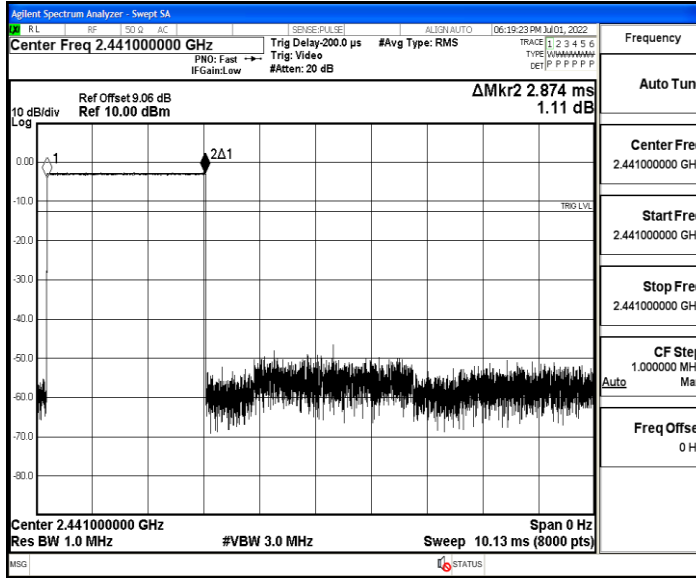
Appendix E: Time of occupancy

Test Result

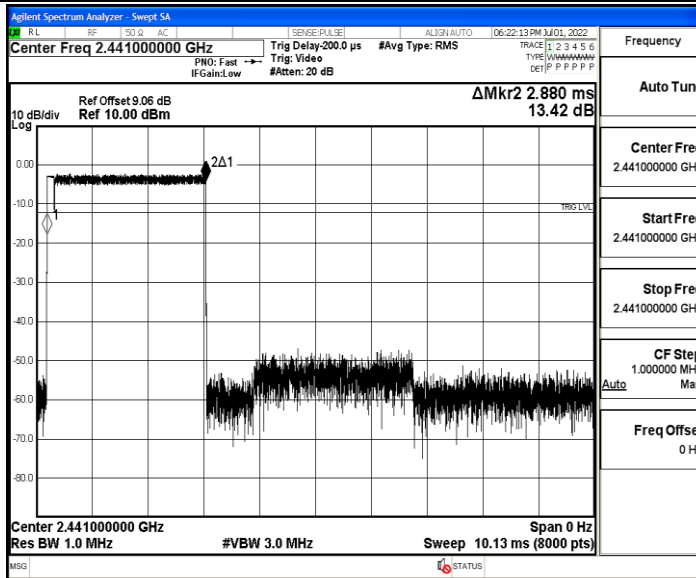
TestMode	Antenna	Channel	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH5	Ant1	Hop	2.87	120	0.345	≤0.4	PASS
2DH5	Ant1	Hop	2.88	120	0.346	≤0.4	PASS

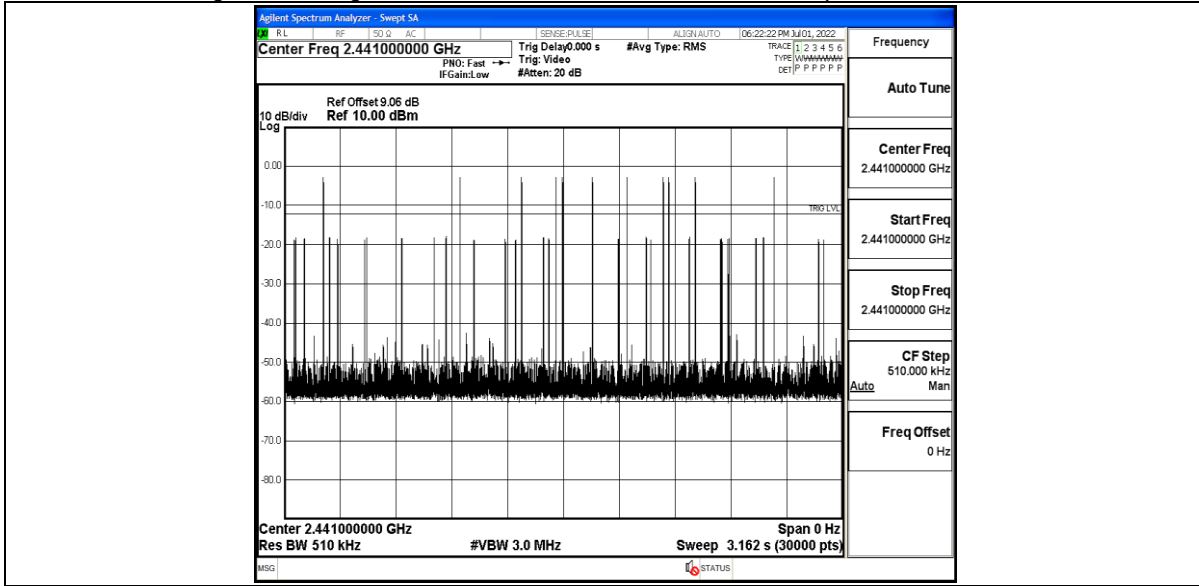
Test Graphs

DH5_Ant1_Hop



2DH5_Ant1_Hop





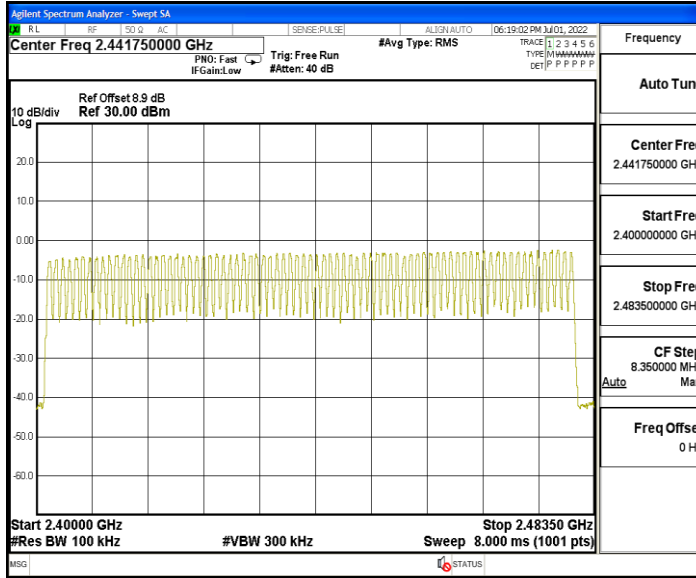
Appendix F: Number of hopping channels

Test Result

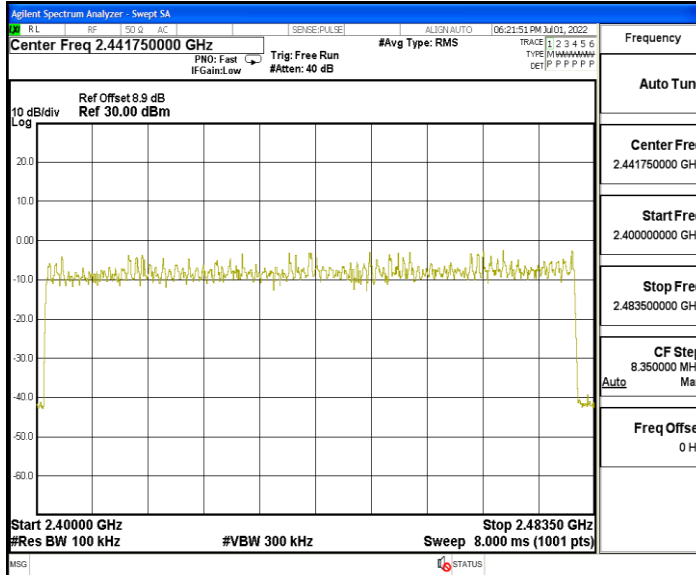
TestMode	Antenna	Channel	Result[Num]	Limit[Num]	Verdict
DH5	Ant1	Hop	79	≥15	PASS
2DH5	Ant1	Hop	79	≥15	PASS

Test Graphs

DH5_Ant1_Hop



2DH5_Ant1_Hop



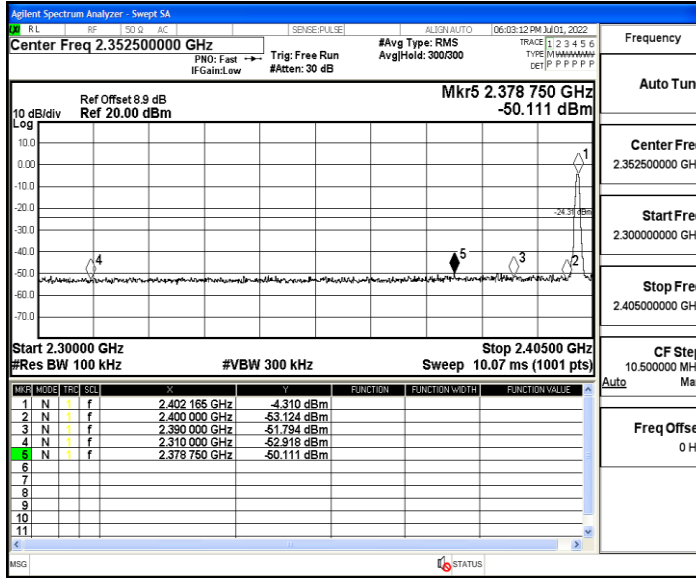
Appendix G: Band edge measurements

Test Result

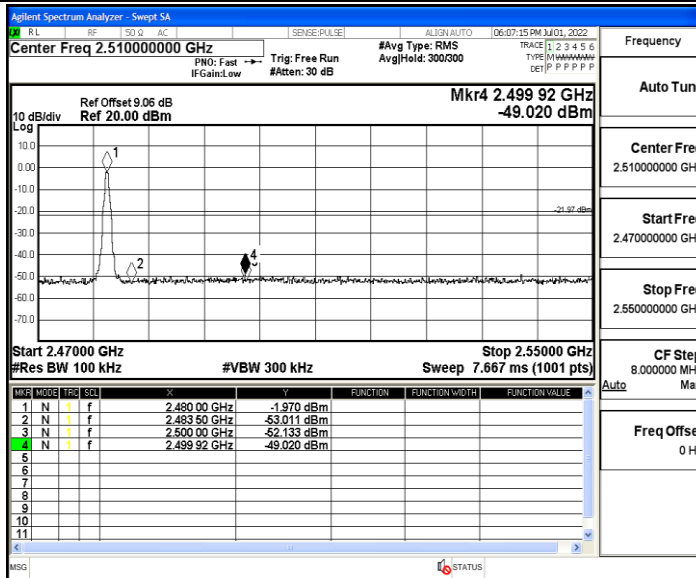
TestMode	Antenna	ChName	Channel	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	-4.31	-50.11	≤ -24.31	PASS
		High	2480	-1.97	-49.02	≤ -21.97	PASS
		Low	Hop_2402	-5.27	-50.03	≤ -25.27	PASS
		High	Hop_2480	-2.18	-49.78	≤ -22.18	PASS
2DH5	Ant1	Low	2402	-4.34	-49.7	≤ -24.34	PASS
		High	2480	-2.07	-49.63	≤ -22.07	PASS
		Low	Hop_2402	-5.96	-50.79	≤ -25.96	PASS
		High	Hop_2480	-2.03	-49.2	≤ -22.03	PASS

Test Graphs

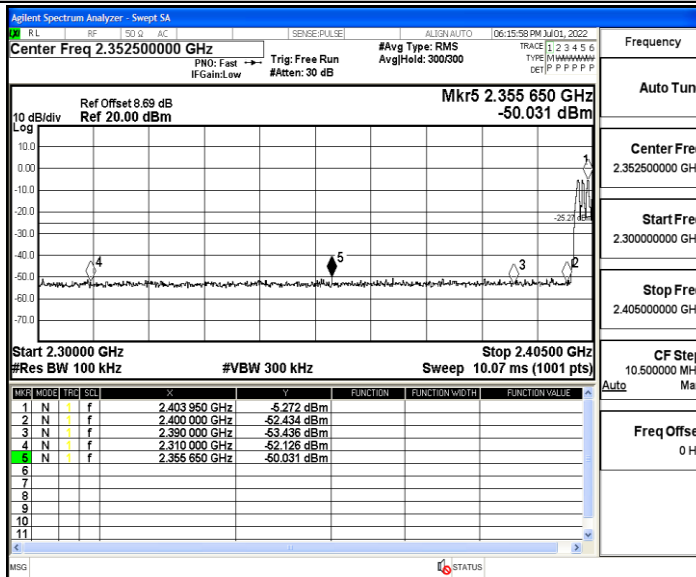
DH5_Ant1_Low_2402



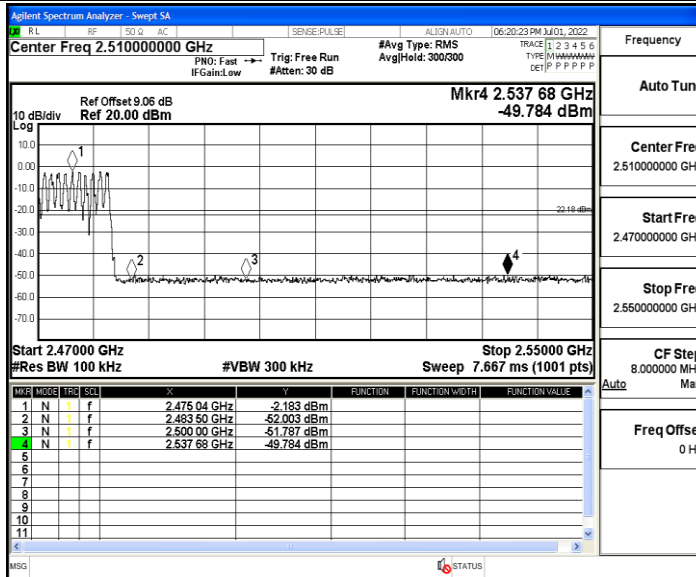
DH5_Ant1_High_2480



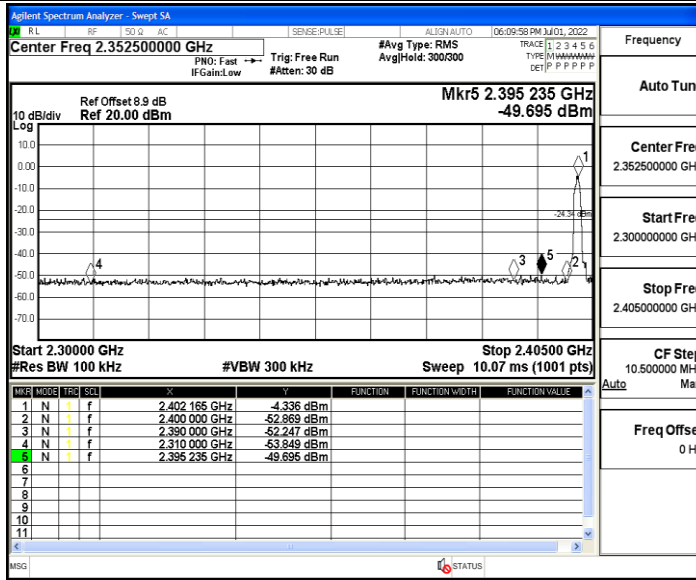
DH5_Ant1_Low_Hop_2402



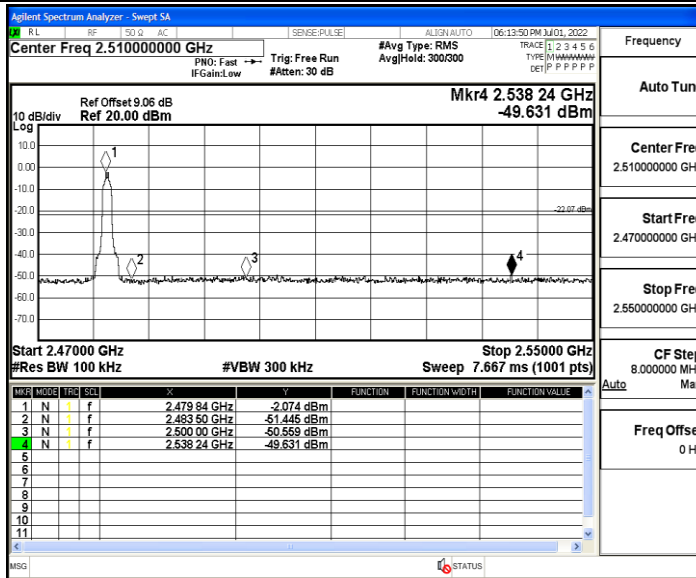
DH5_Ant1_High_Hop_2480



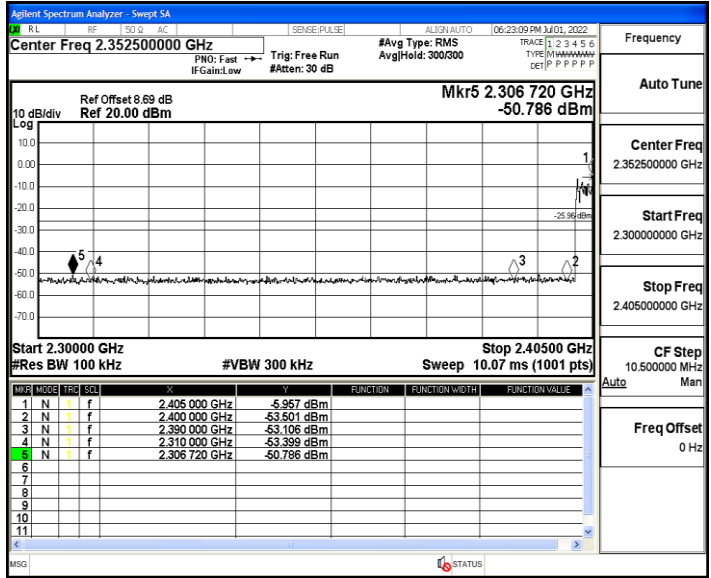
2DH5_Ant1_Low_2402



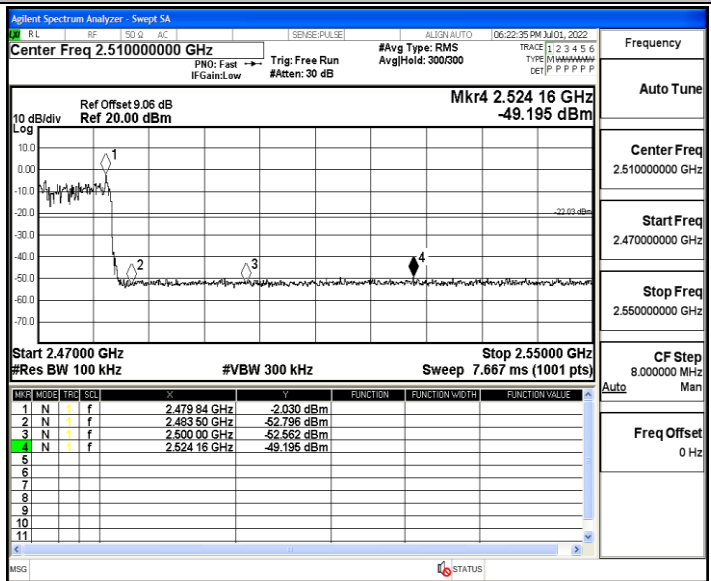
2DH5_Ant1_High_2480



2DH5_Ant1_Low_Hop_2402



2DH5_Ant1_High_Hop_2480



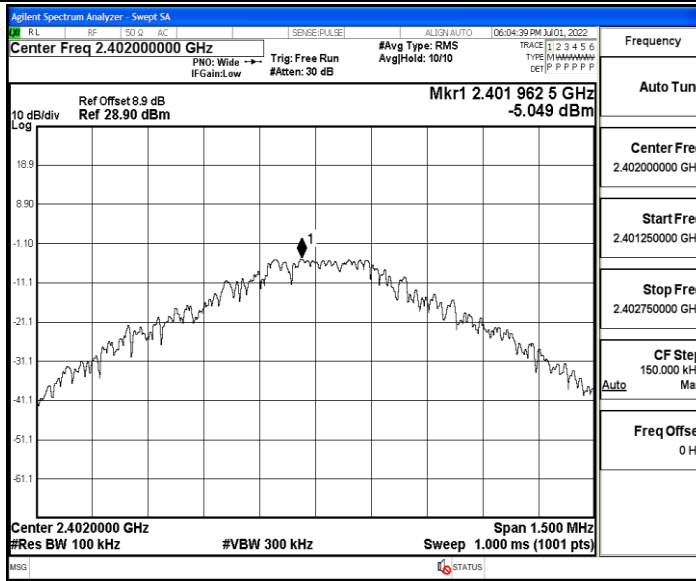
Appendix H: Conducted Spurious Emission

Test Result

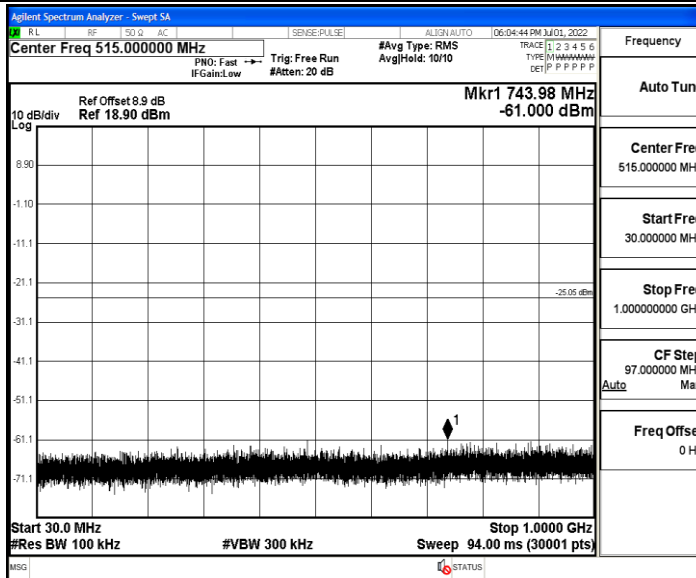
TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	2402	Reference	-5.05	-5.05	---	PASS
			30~1000	-5.05	-61	≤-25.05	PASS
			1000~26500	-5.05	-49.98	≤-25.05	PASS
		2441	Reference	-3.66	-3.66	---	PASS
			30~1000	-3.66	-61.3	≤-23.66	PASS
			1000~26500	-3.66	-49.36	≤-23.66	PASS
		2480	Reference	-2.76	-2.76	---	PASS
			30~1000	-2.76	-61.39	≤-22.76	PASS
			1000~26500	-2.76	-49.8	≤-22.76	PASS
2DH5	Ant1	2402	Reference	-6.95	-6.95	---	PASS
			30~1000	-6.95	-61.54	≤-26.95	PASS
			1000~26500	-6.95	-52.1	≤-26.95	PASS
		2441	Reference	-3.14	-3.14	---	PASS
			30~1000	-3.14	-61.27	≤-23.14	PASS
			1000~26500	-3.14	-51.26	≤-23.14	PASS
		2480	Reference	-5.33	-5.33	---	PASS
			30~1000	-5.33	-61.6	≤-25.33	PASS
			1000~26500	-5.33	-51.94	≤-25.33	PASS

Test Graphs

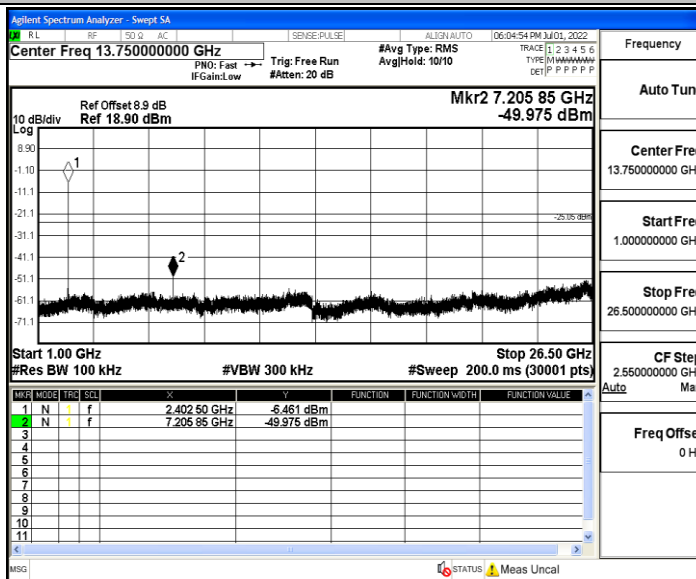
DH5_Ant1_2402_0~Reference



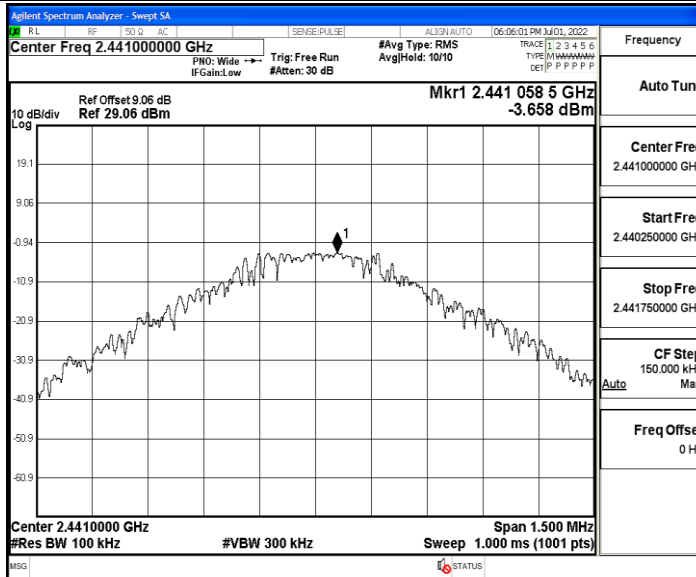
DH5_Ant1_2402_30~1000



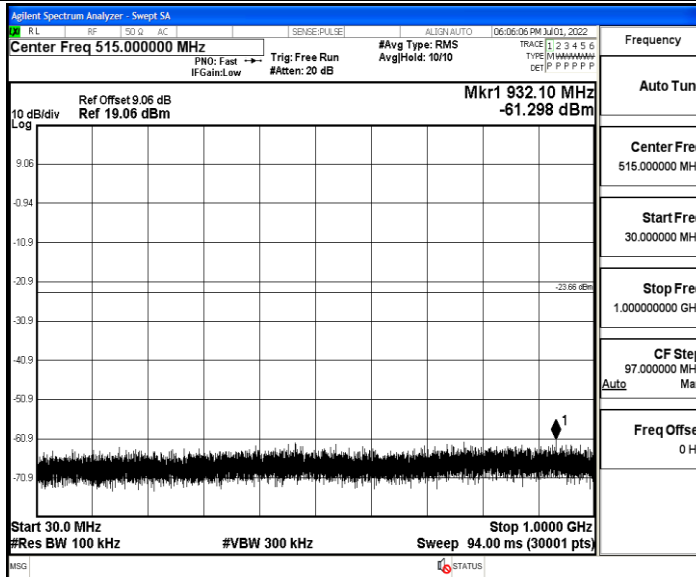
DH5_Ant1_2402_1000~26500



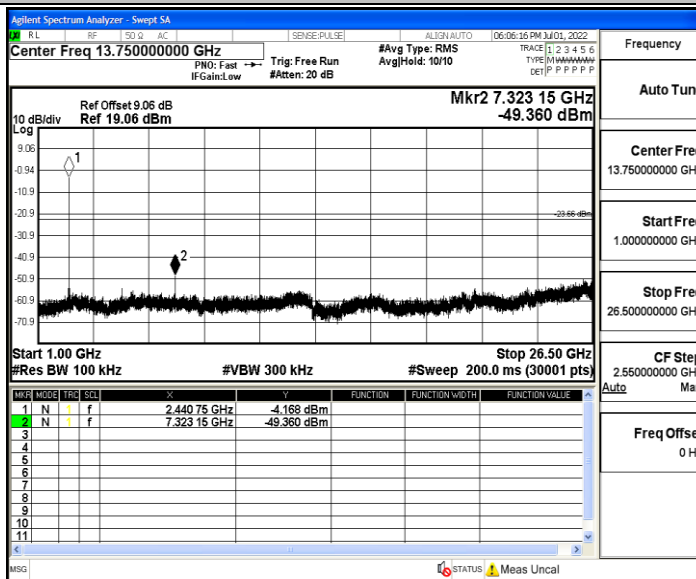
DH5_Ant1_2441_0~Reference



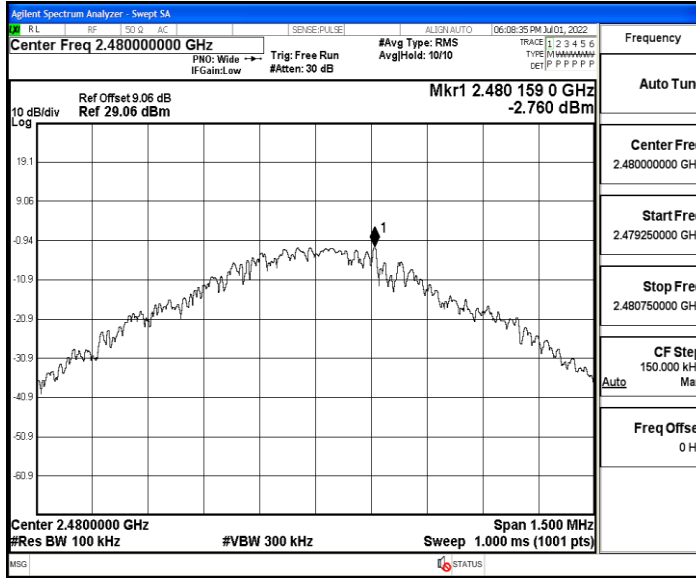
DH5_Ant1_2441_30~1000



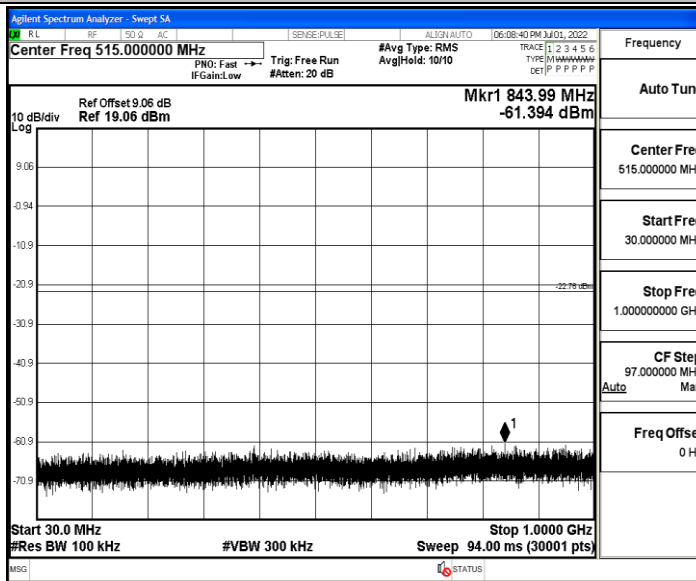
DH5_Ant1_2441_1000~26500



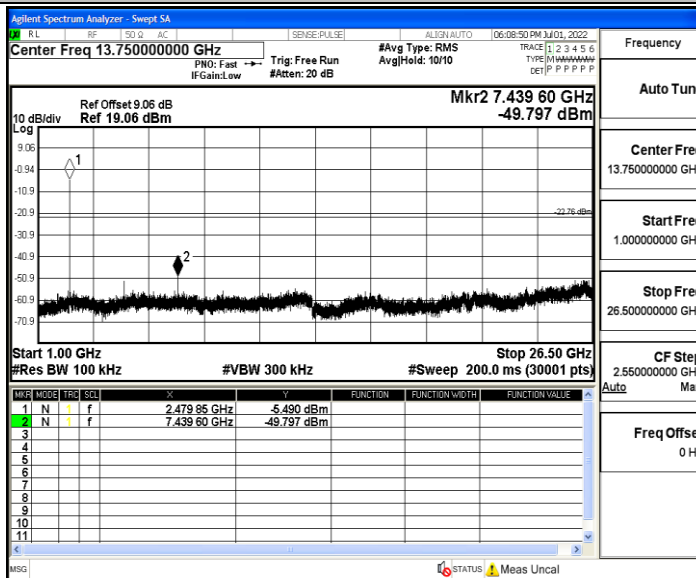
DH5_Ant1_2480_0~Reference



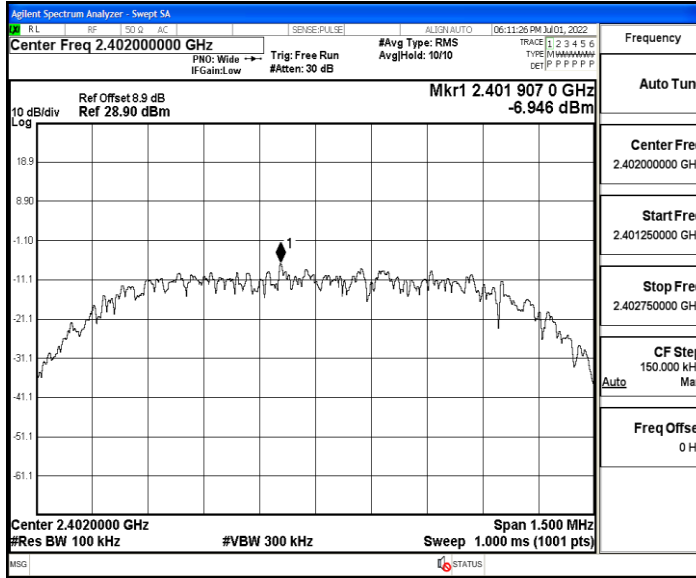
DH5_Ant1_2480_30~1000



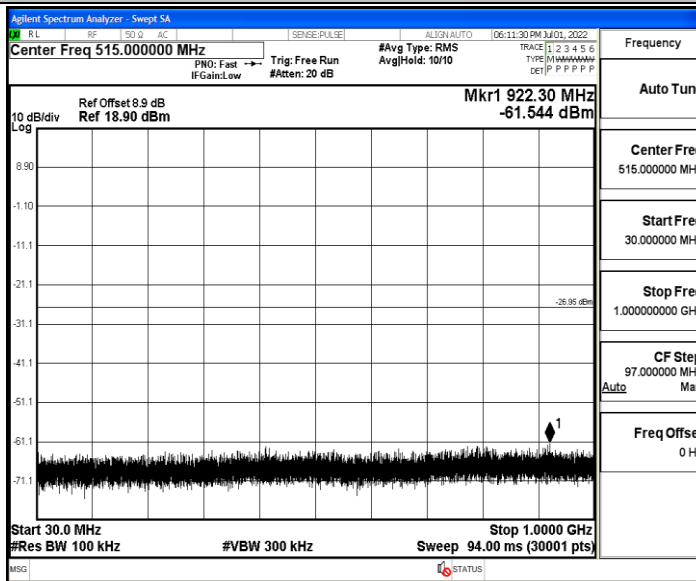
DH5_Ant1_2480_1000~26500



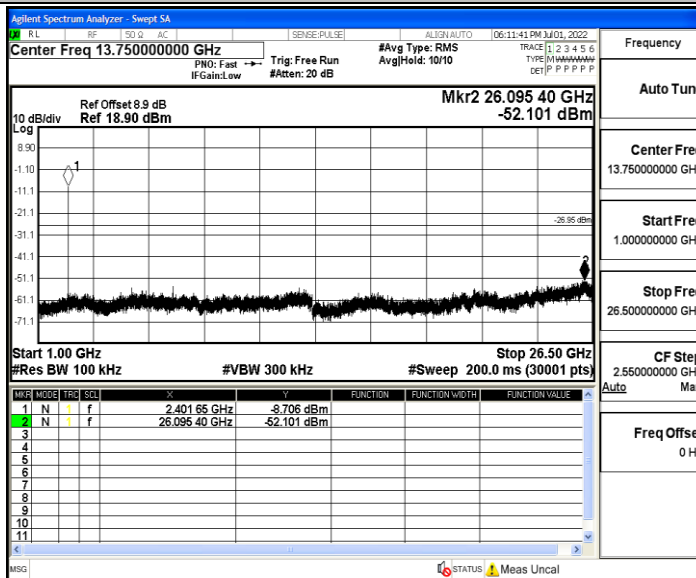
2DH5_Ant1_2402_0~Reference



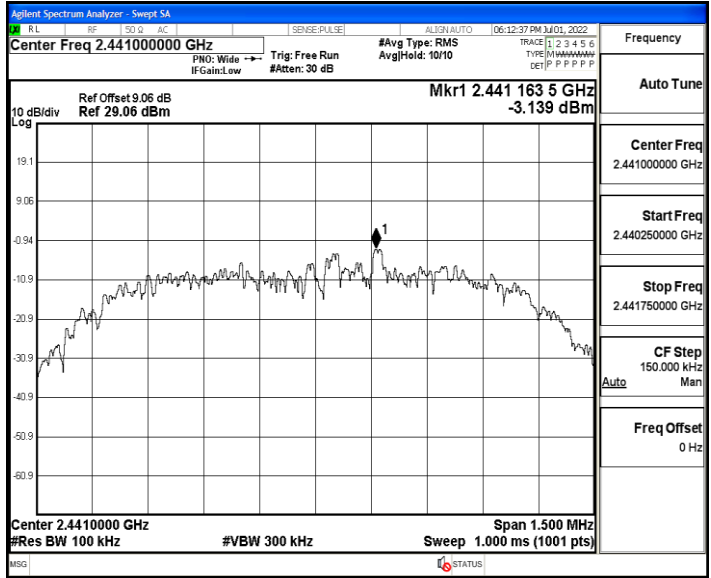
2DH5_Ant1_2402_30~1000



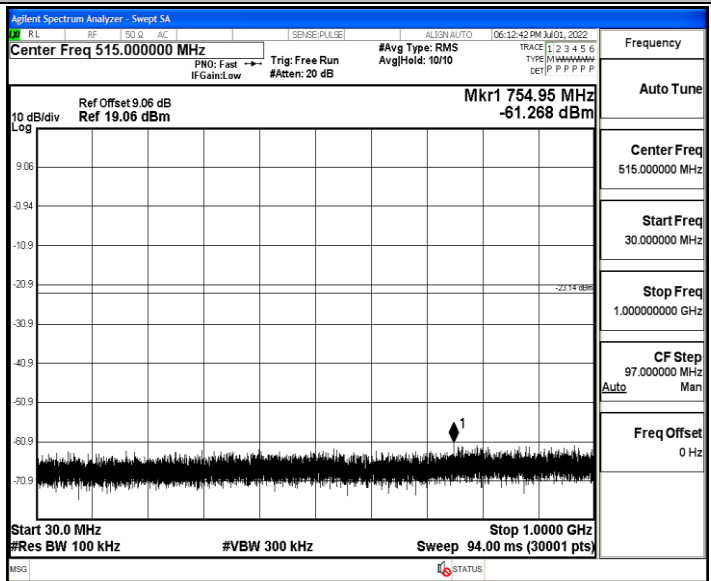
2DH5_Ant1_2402_1000~26500



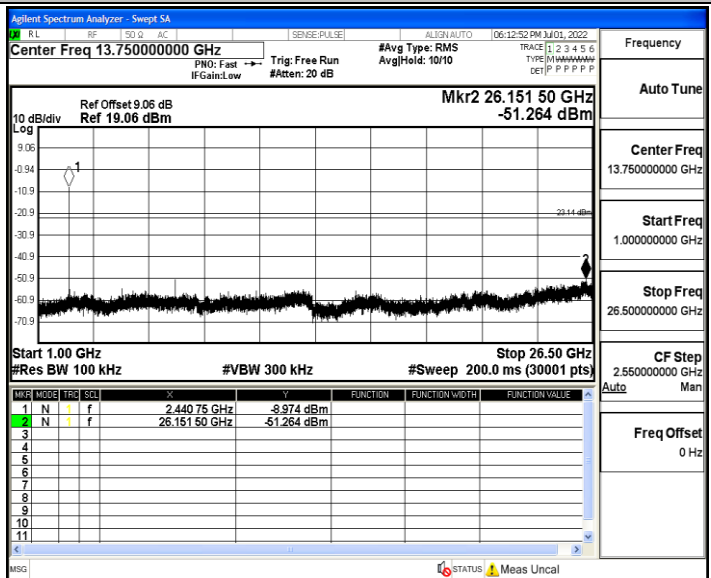
2DH5_Ant1_2441_0~Reference



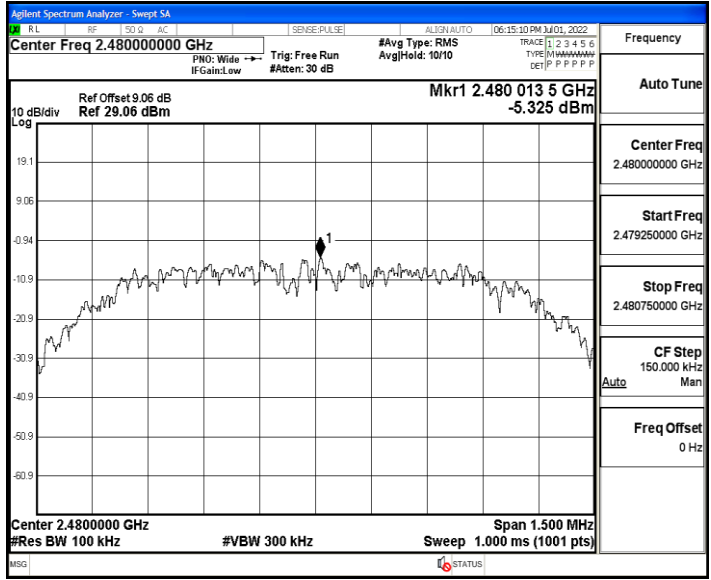
2DH5_Ant1_2441_30~1000



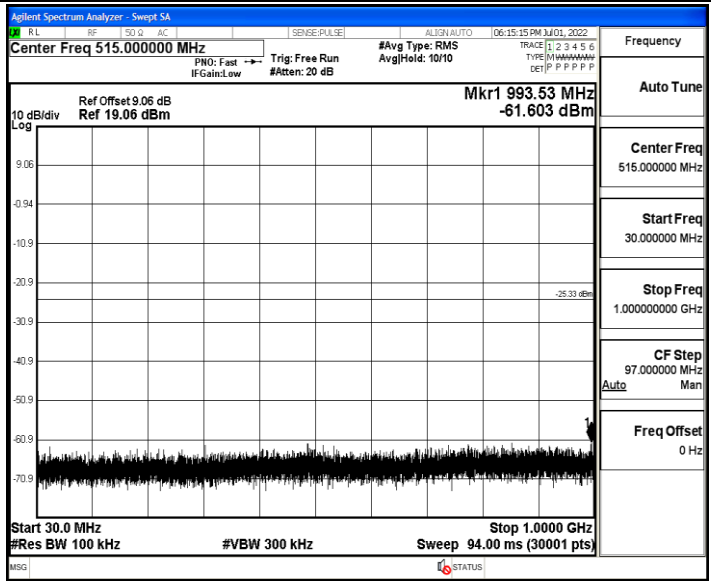
2DH5_Ant1_2441_1000~26500



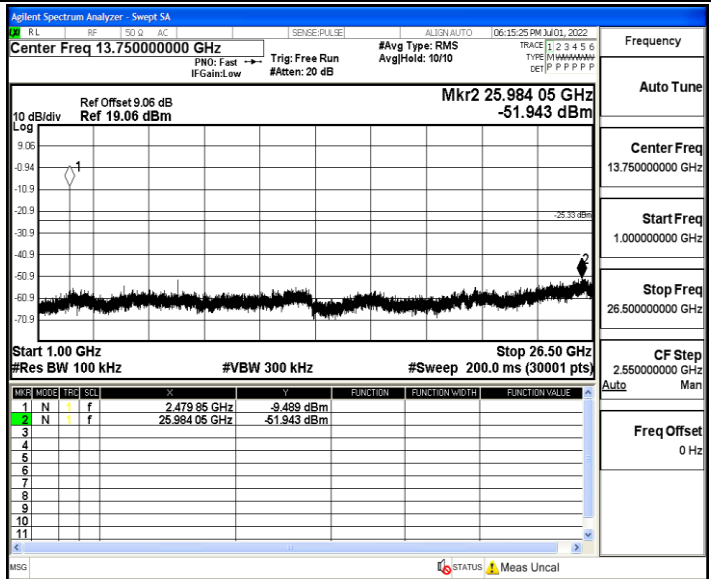
2DH5_Ant1_2480_0~Reference



2DH5_Ant1_2480_30~1000



2DH5_Ant1_2480_1000~26500



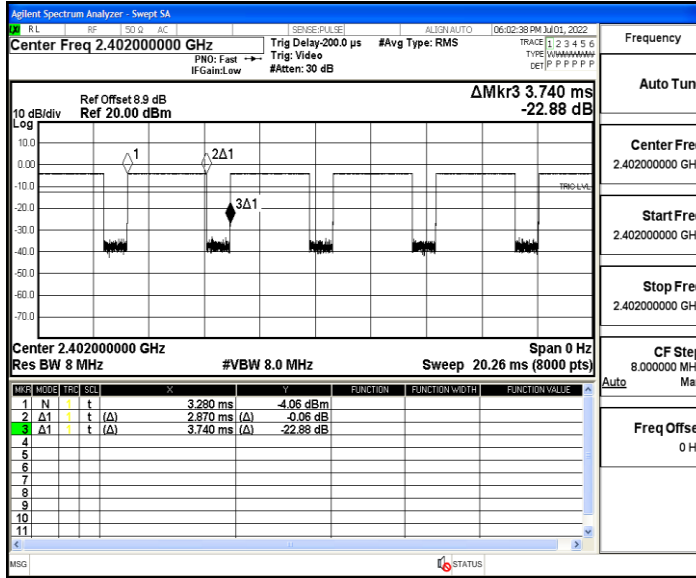
Appendix I: Duty Cycle

Test Result

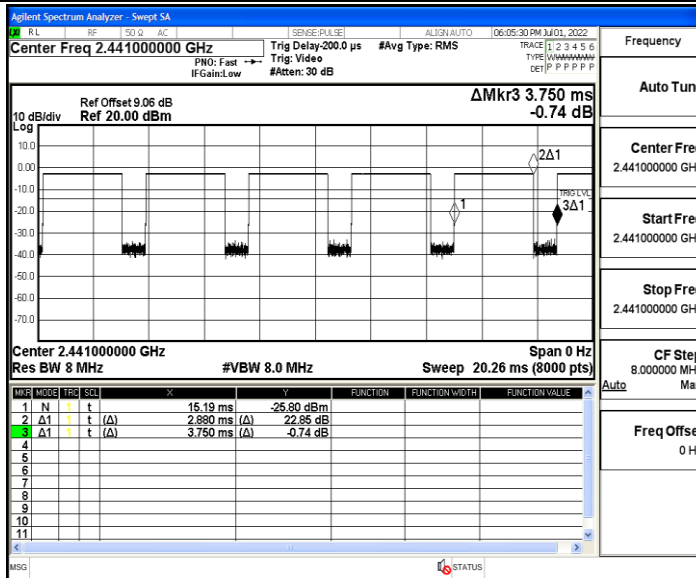
TestMode	Antenna	Channel	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	1/T[kHz]
DH5	Ant1	2402	2.87	3.74	76.74	0.35
		2441	2.88	3.75	76.80	0.35
		2480	2.88	3.75	76.80	0.35
2DH5	Ant1	2402	2.88	3.75	76.80	0.35
		2441	2.88	3.75	76.80	0.35
		2480	2.88	3.75	76.80	0.35

Test Graphs

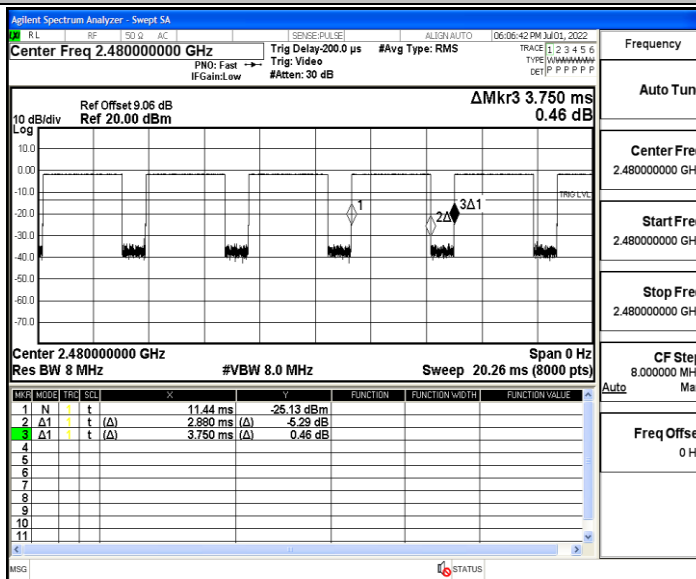
DH5_Ant1_2402



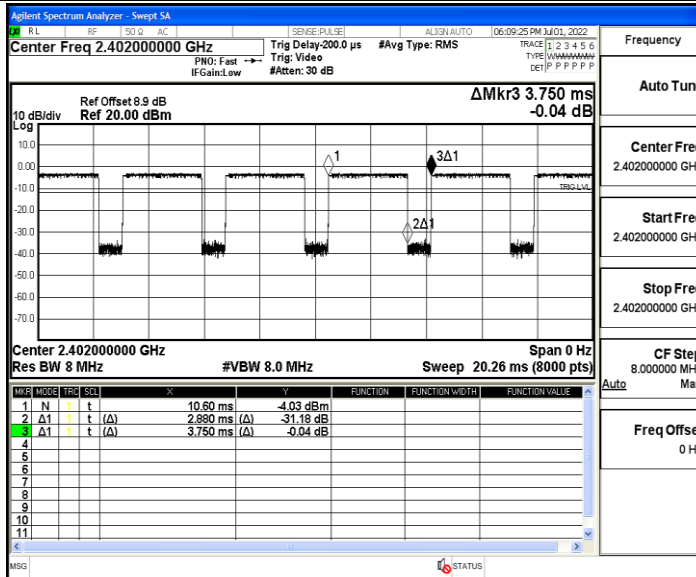
DH5_Ant1_2441



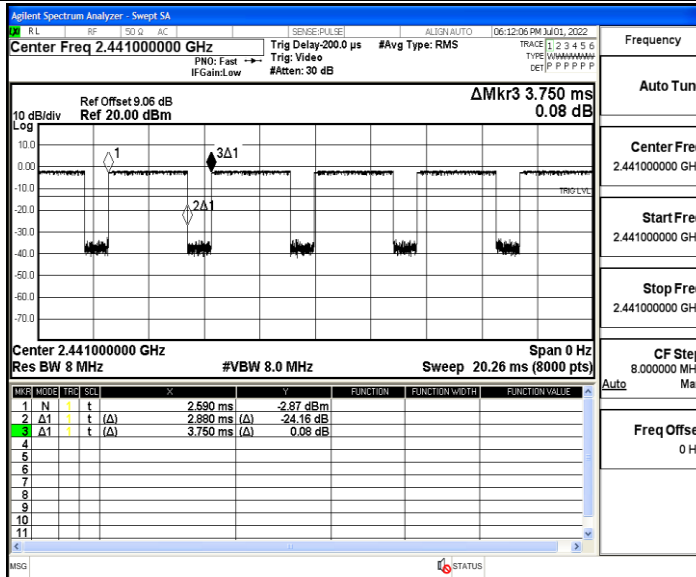
DH5_Ant1_2480



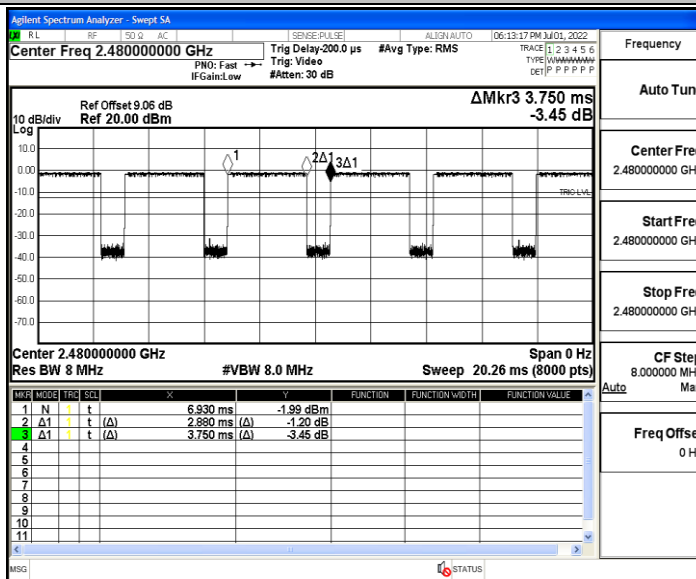
2DH5_Ant1_2402



2DH5_Ant1_2441



2DH5_Ant1_2480



Appendix J: Emissions in Restricted Bands

Test Result

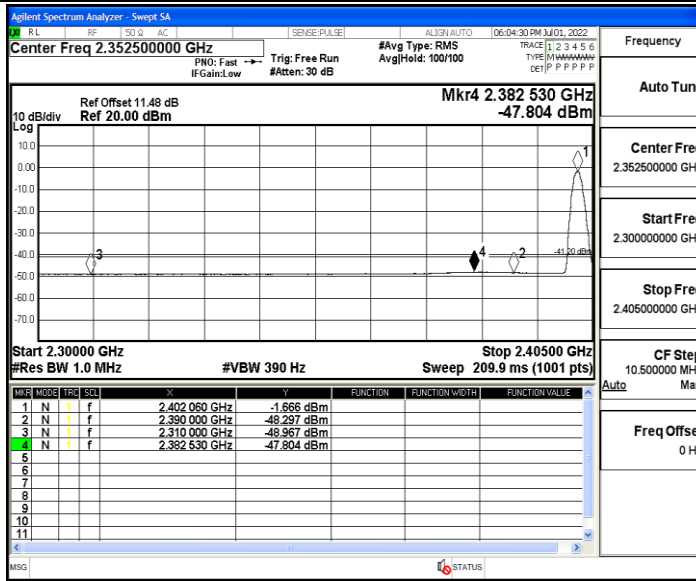
TestMode	Antenna	ChName	Channel	Detector	Freq(MHz)	Result(dBm)	Limit(dBm)	Verdict
DH5	Ant1	Low	2402	AV	2310.000	-48.97	≤-41.20	PASS
				AV	2382.530	-47.8	≤-41.20	PASS
				AV	2390.000	-48.3	≤-41.20	PASS
				Peak	2310.000	-41.79	≤-21.20	PASS
				Peak	2387.465	-39.01	≤-21.20	PASS
				Peak	2390.000	-42.77	≤-21.20	PASS
		High	2480	AV	2483.500	-47.84	≤-41.20	PASS
				AV	2499.760	-46.98	≤-41.20	PASS
				AV	2500.000	-47.05	≤-41.20	PASS
				Peak	2483.500	-41.15	≤-21.20	PASS
				Peak	2497.920	-37.54	≤-21.20	PASS
				Peak	2500.000	-40.05	≤-21.20	PASS
2DH5	Ant1	Low	2402	AV	2310.000	-49.02	≤-41.20	PASS
				AV	2382.005	-47.84	≤-41.20	PASS
				AV	2390.000	-48.17	≤-41.20	PASS
				Peak	2310.000	-41.34	≤-21.20	PASS
				Peak	2373.710	-37.36	≤-21.20	PASS
				Peak	2390.000	-40.35	≤-21.20	PASS
		High	2480	AV	2483.500	-47.73	≤-41.20	PASS
				AV	2498.800	-46.86	≤-41.20	PASS
				AV	2500.000	-47.02	≤-41.20	PASS
				Peak	2483.500	-41.74	≤-21.20	PASS
				Peak	2495.200	-38.04	≤-21.20	PASS
				Peak	2500.000	-39.97	≤-21.20	PASS

Note:

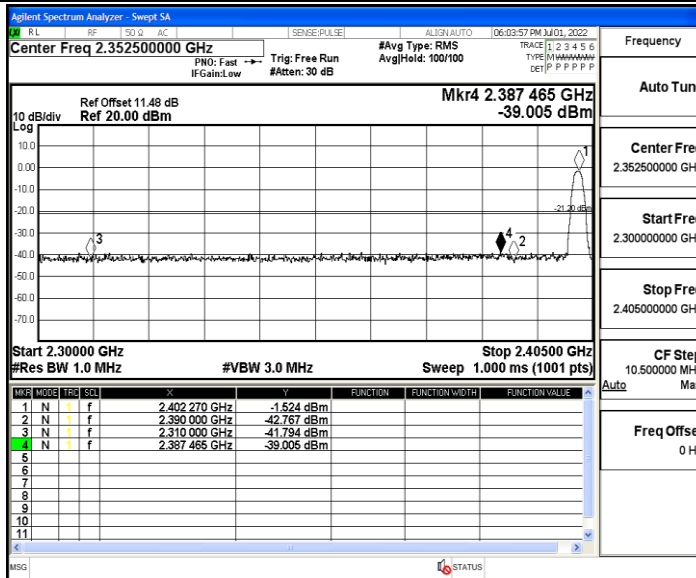
1. The Antenna Gain is compensated in the graph with 2dBi and Antenna Gain which is Higher.
2. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

Test Graphs

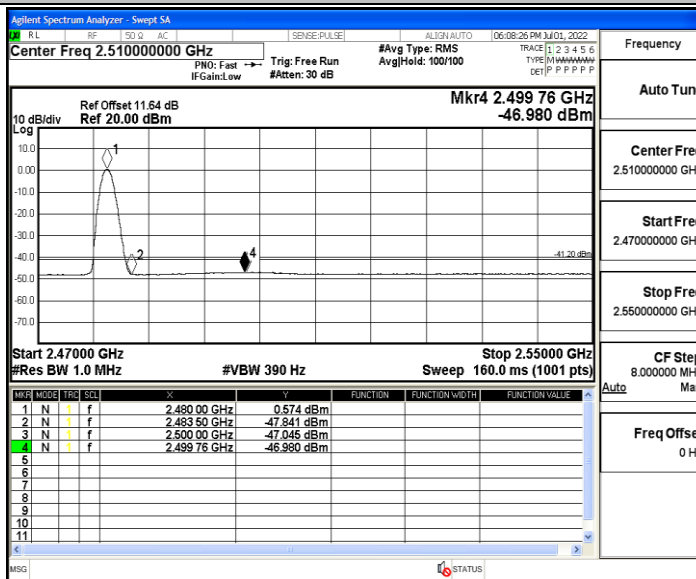
DH5_Ant1_Low_2402_AV



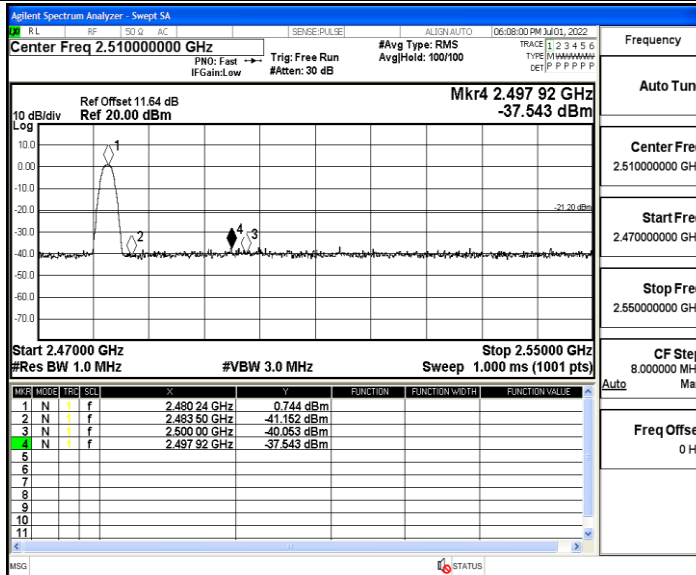
DH5_Ant1_Low_2402_Peak



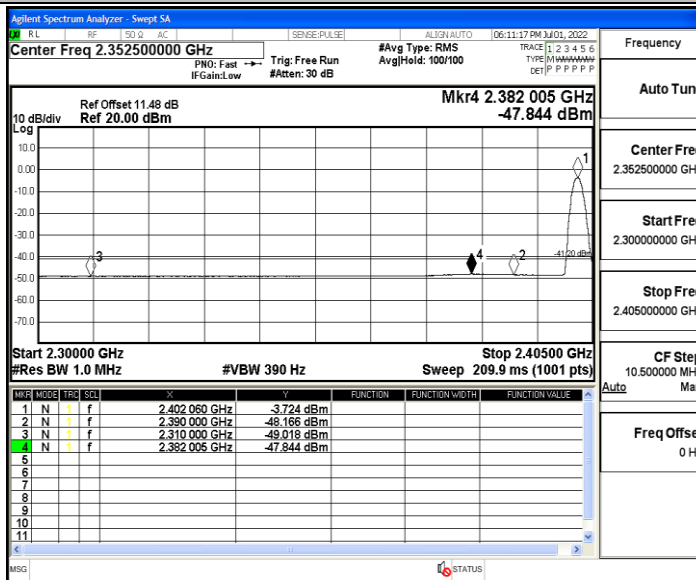
DH5_Ant1_High_2480_AV



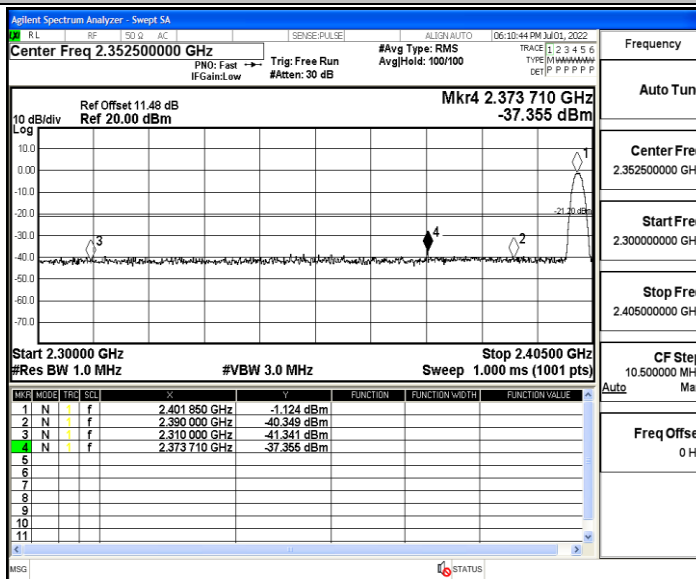
DH5_Ant1_High_2480_Peak



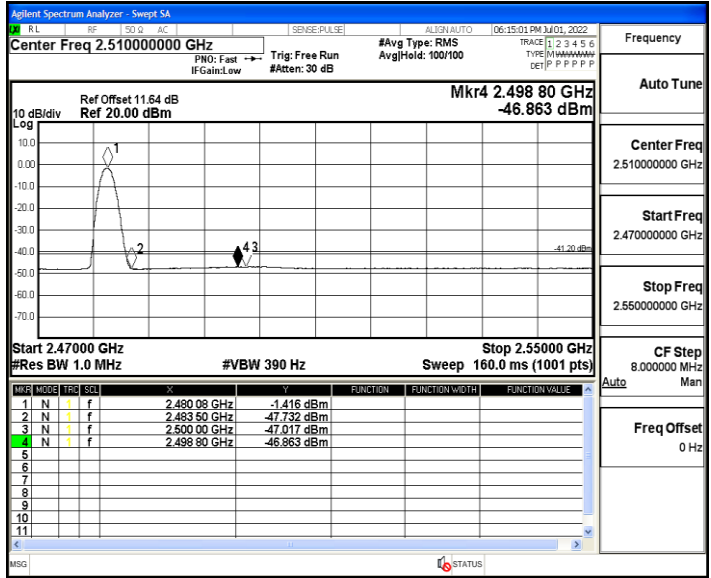
2DH5_Ant1_Low_2402_AV



2DH5_Ant1_Low_2402_Peak



2DH5_Ant1_High_2480_AV



2DH5_Ant1_High_2480_Peak

