

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

Product Name: Wireless Earbuds

Trade Mark: LOGIC, UNONU, ISWAG

Test Model: LOGIC TWS31

FCC ID: O55T312324

Environmental Conditions

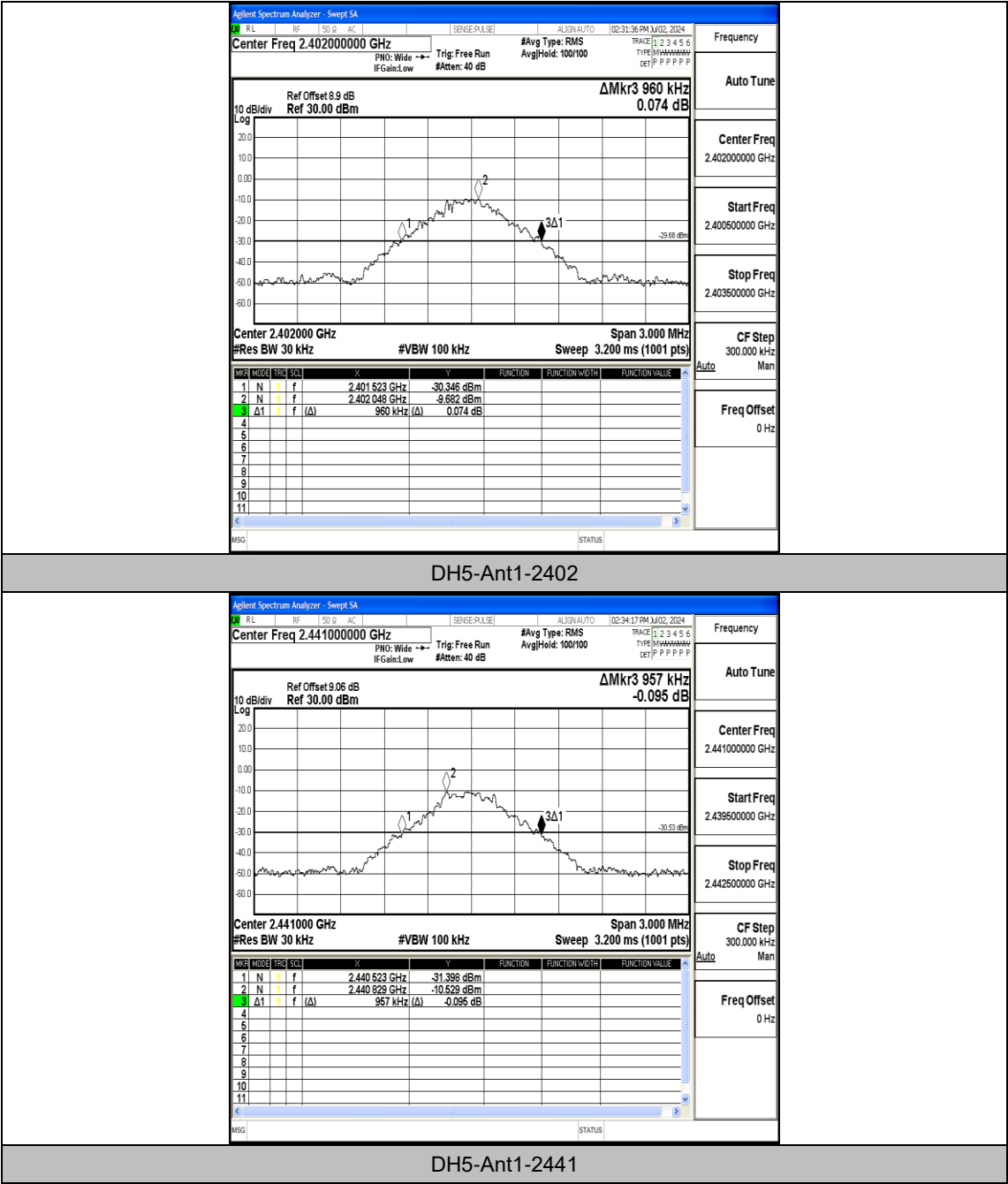
Temperature:	23.5℃
Relative Humidity:	58%
ATM Pressure:	100.0 kPa
Test Engineer:	Allen Lai
Supervised by:	Hugo Chen
NOTE	N/A

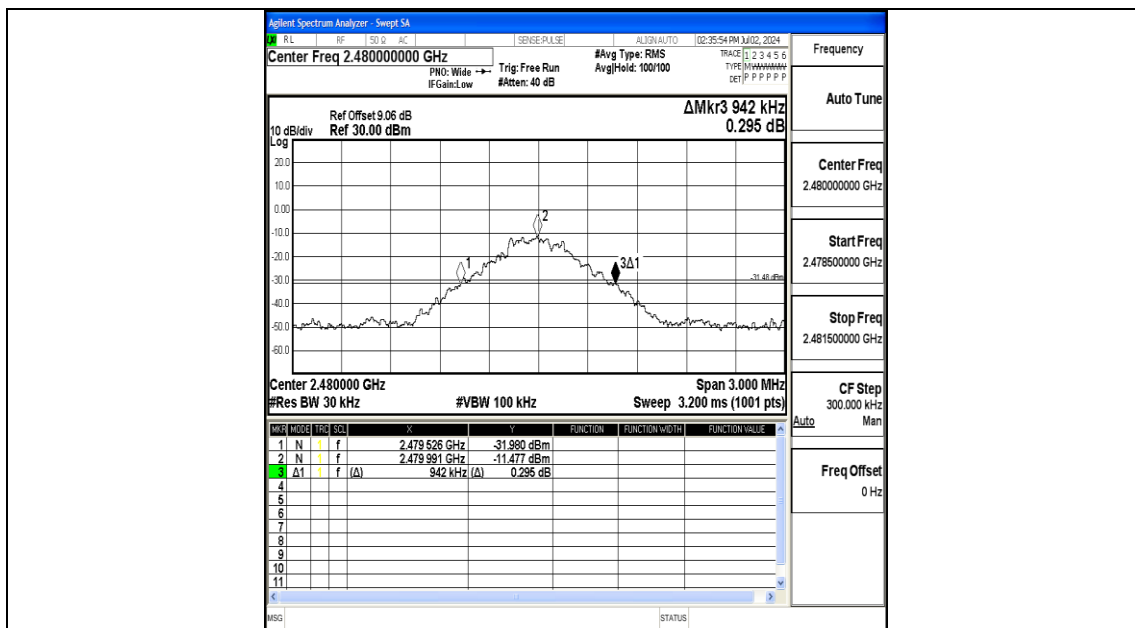
Appendix A: 20dB Emission Bandwidth

Test Result

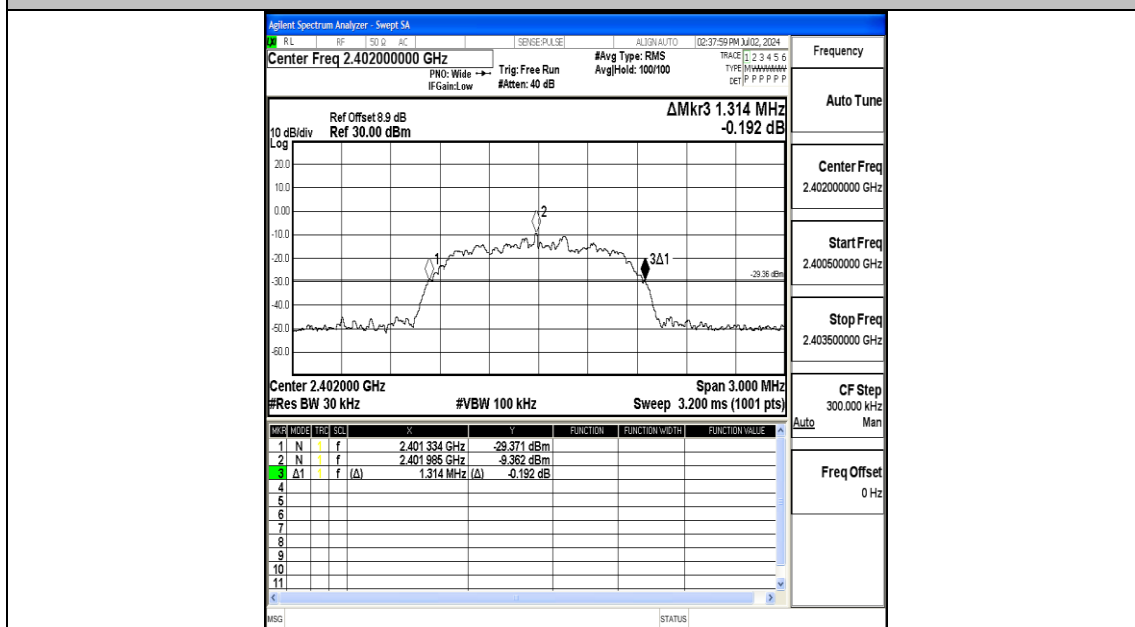
Test Mode	Antenna	Frequency [MHz]	20db EBW [MHz]	FL [MHz]	FH [MHz]	Limit [MHz]	Verdict
DH5	Ant1	2402	0.960	2401.523	2402.483	---	---
DH5	Ant1	2441	0.957	2440.523	2441.480	---	---
DH5	Ant1	2480	0.942	2479.526	2480.468	---	---
2DH5	Ant1	2402	1.314	2401.334	2402.648	---	---
2DH5	Ant1	2441	1.326	2440.322	2441.648	---	---
2DH5	Ant1	2480	1.320	2479.328	2480.648	---	---
3DH5	Ant1	2402	1.317	2401.334	2402.651	---	---
3DH5	Ant1	2441	1.323	2440.334	2441.657	---	---
3DH5	Ant1	2480	1.299	2479.334	2480.633	---	---

Test Graphs

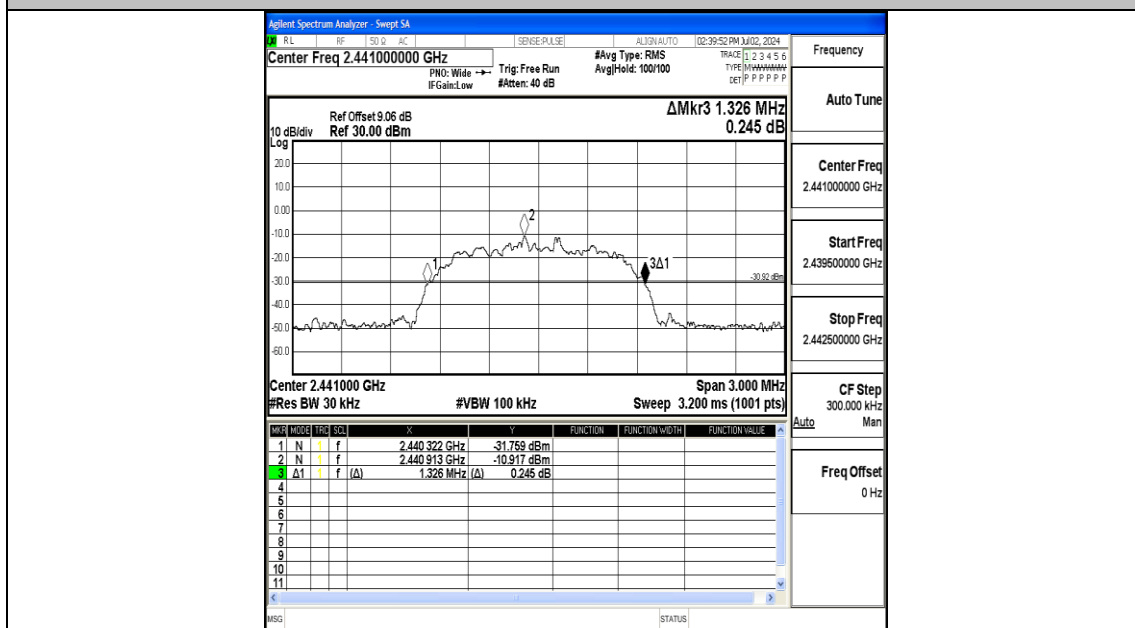




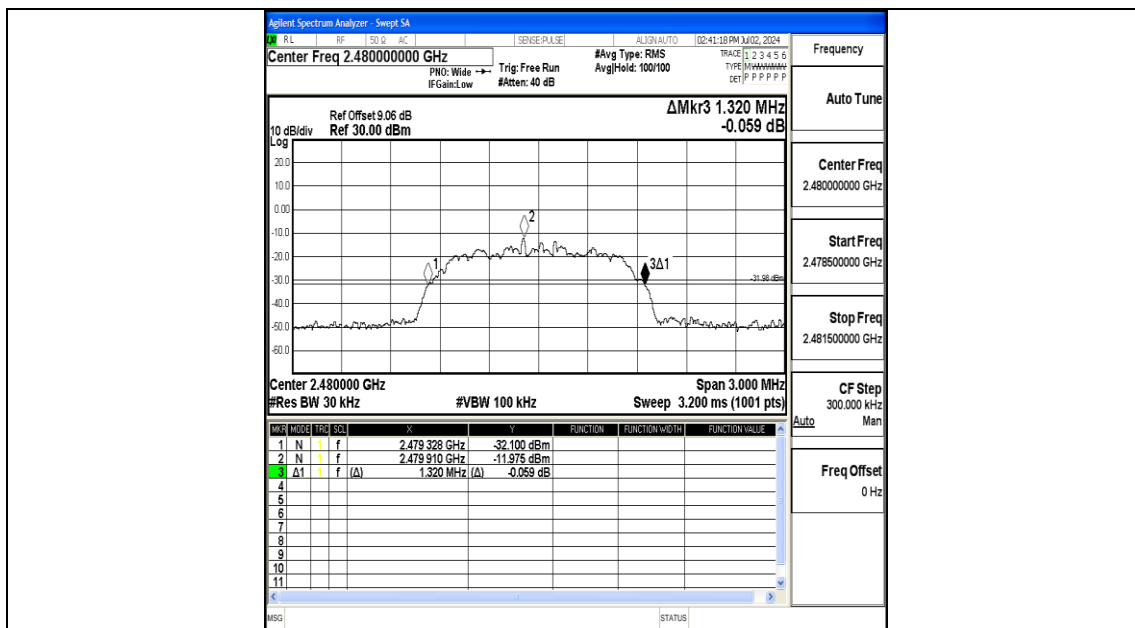
DH5-Ant1-2480



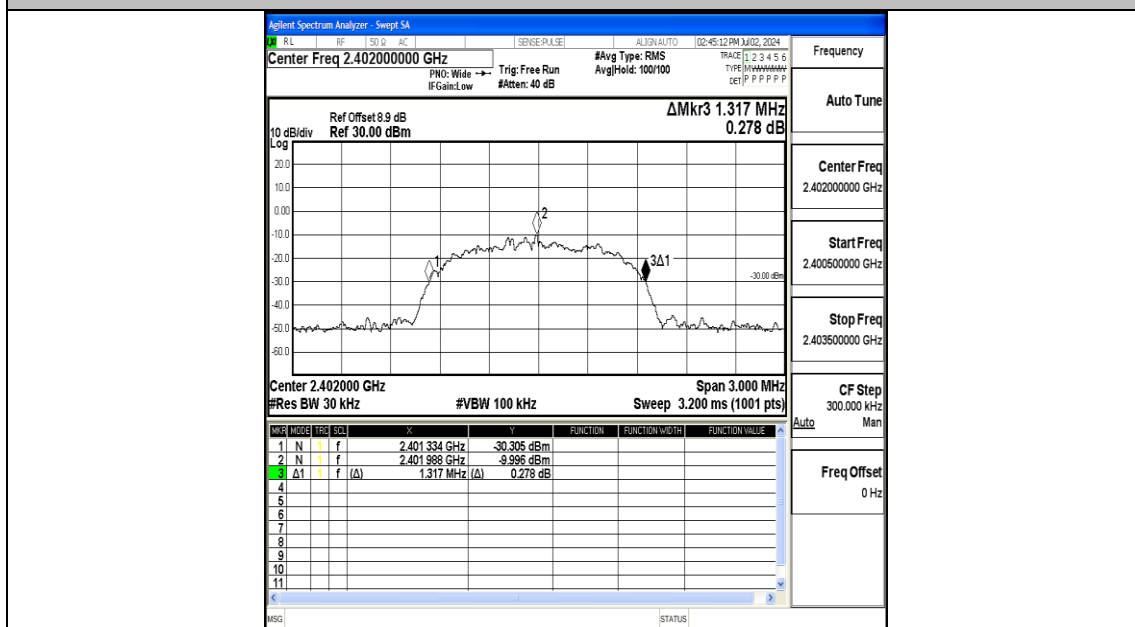
2DH5-Ant1-2402



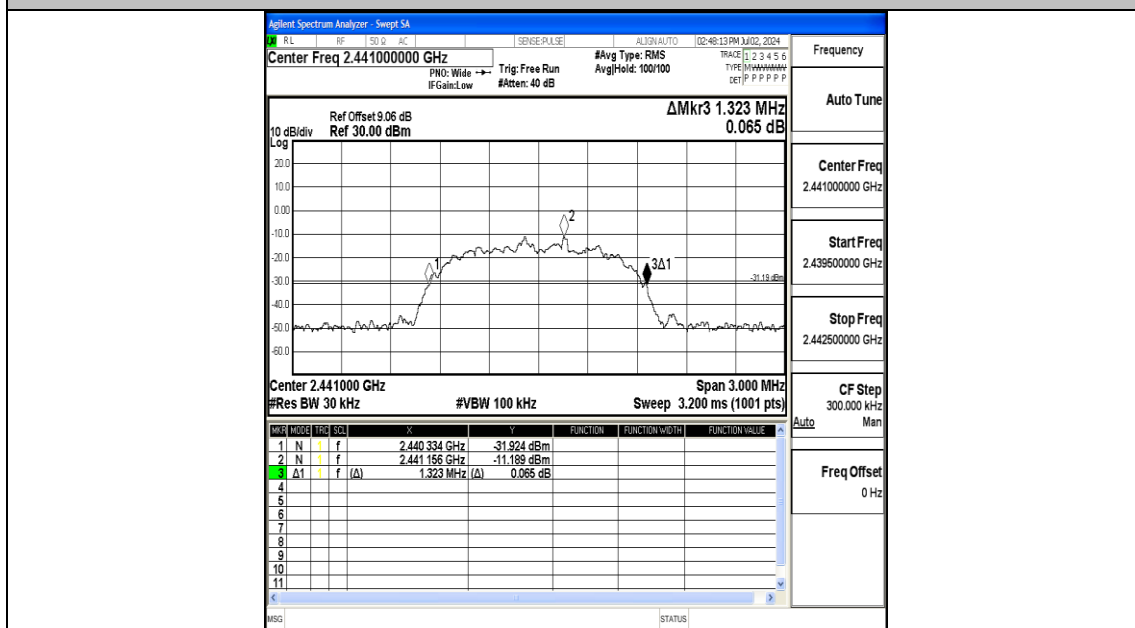
2DH5-Ant1-2441



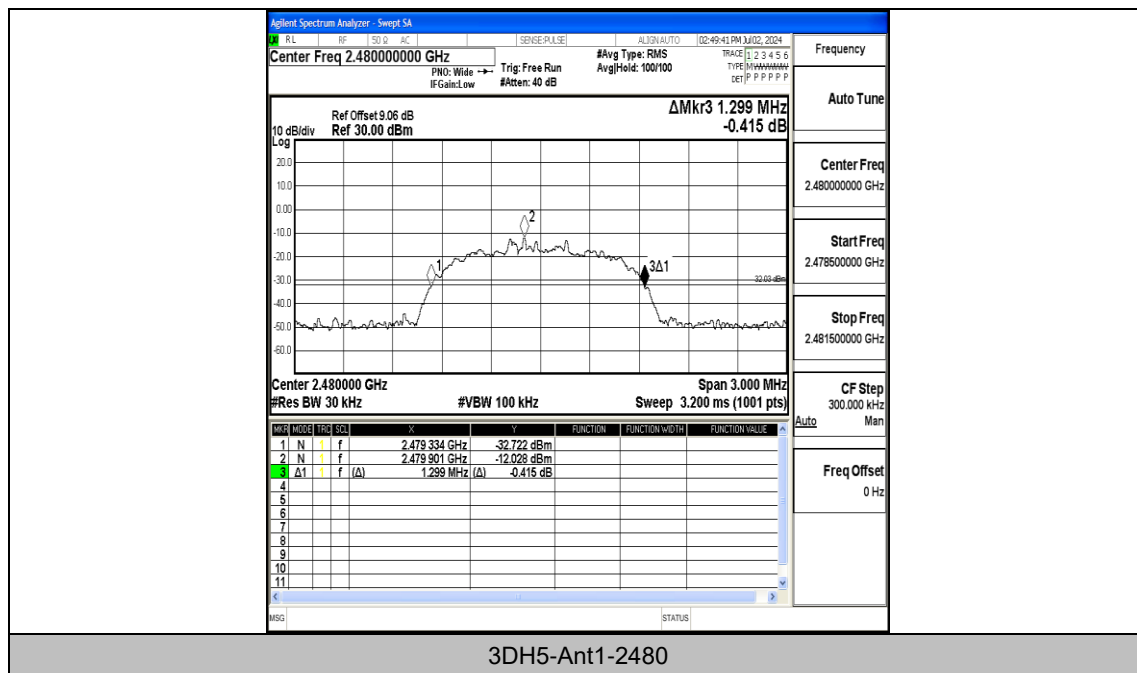
2DH5-Ant1-2480



3DH5-Ant1-2402



3DH5-Ant1-2441

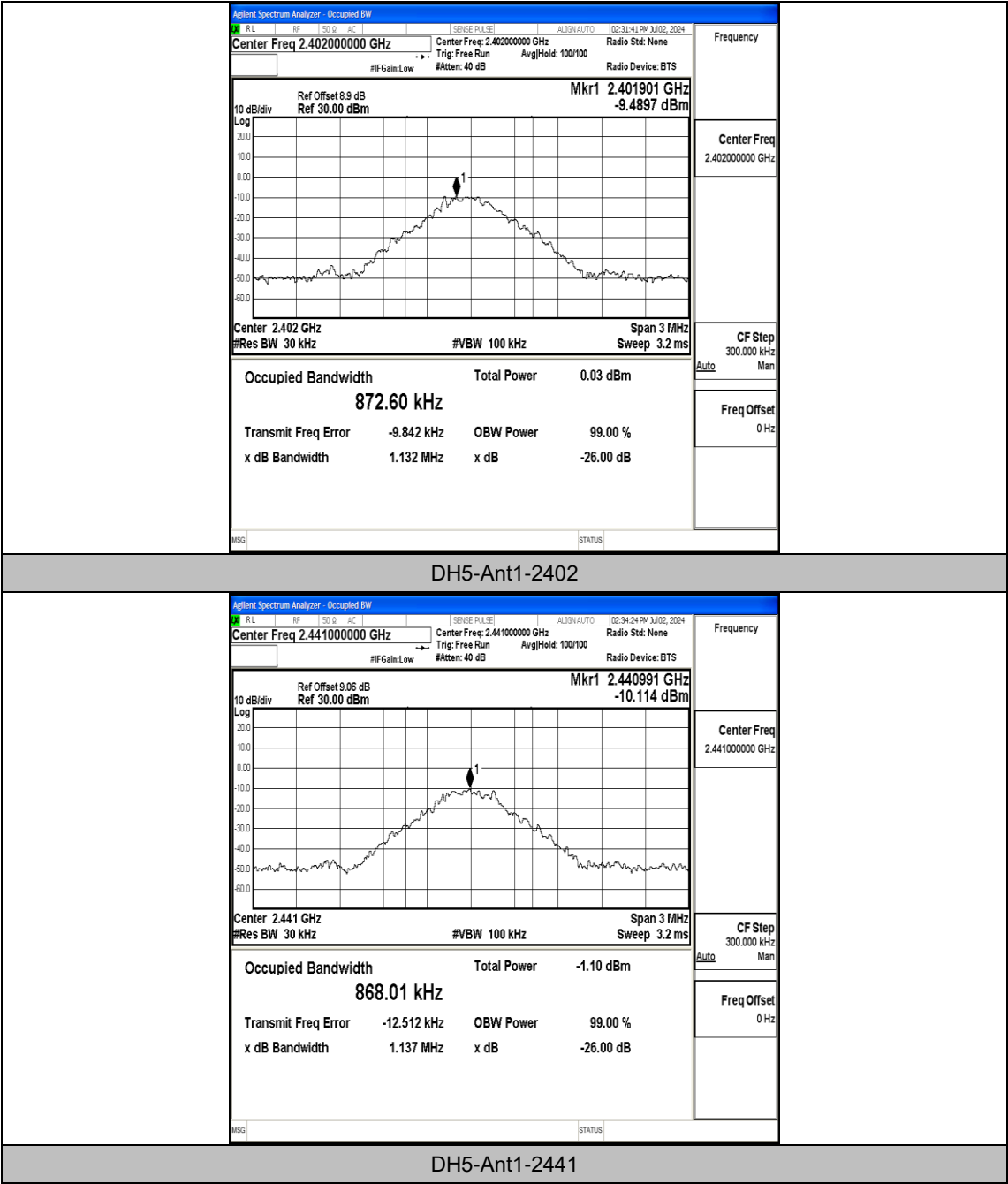


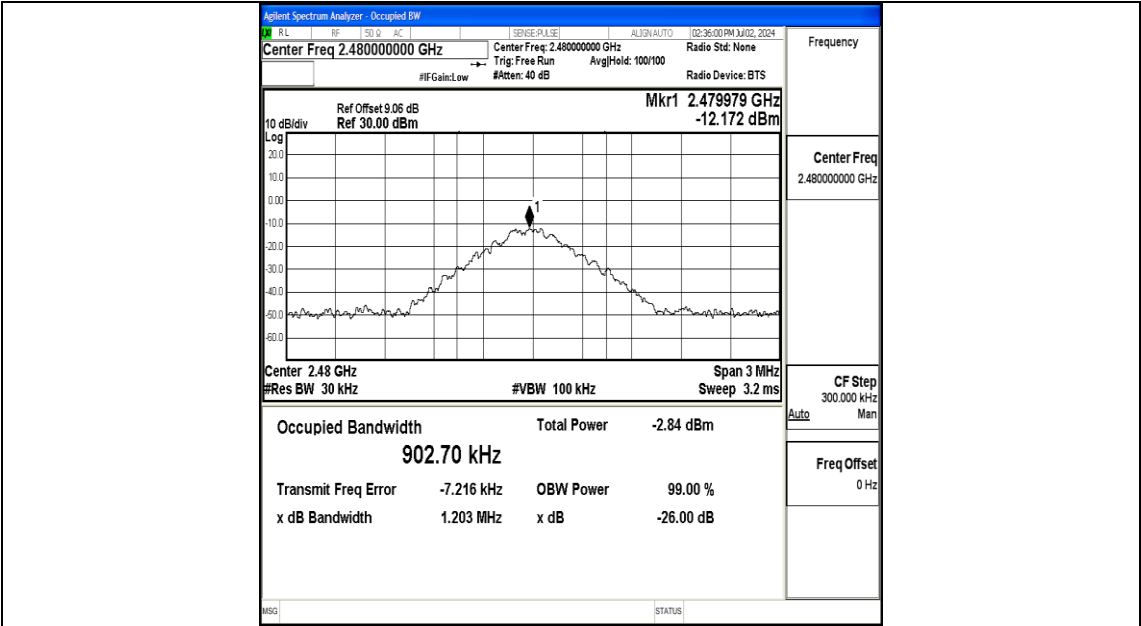
Appendix B: Occupied Channel Bandwidth

Test Result

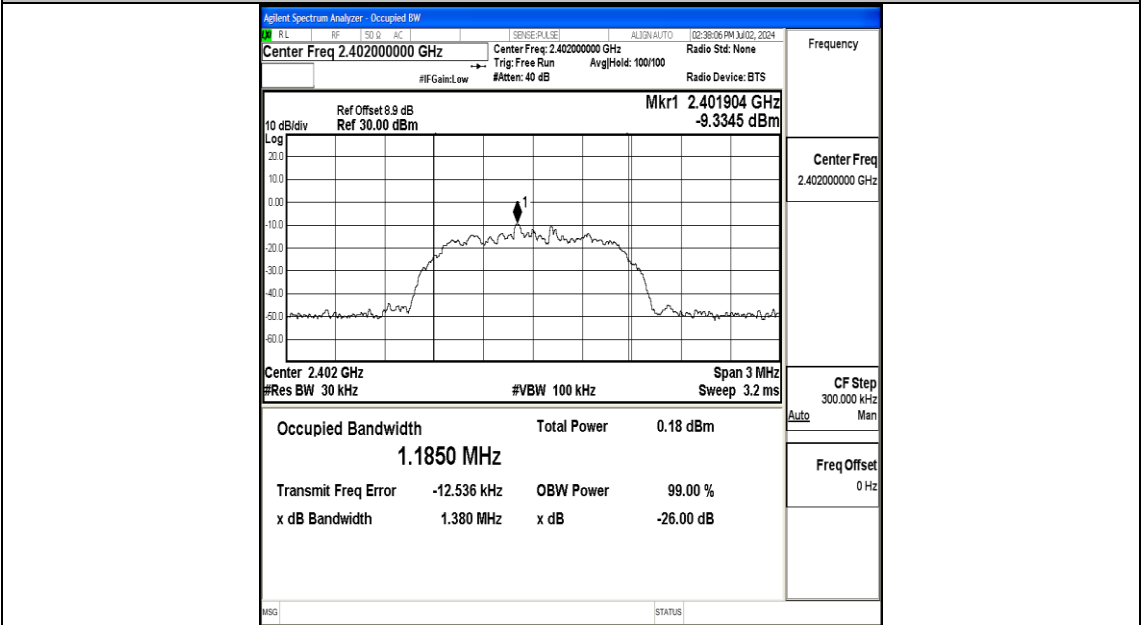
Test Mode	Antenna	Frequency [MHz]	OCB [MHz]	FL [MHz]	FH [MHz]	Limit [MHz]	Verdict
DH5	Ant1	2402	0.87260	2401.5539	2402.4265	---	---
DH5	Ant1	2441	0.86801	2440.5535	2441.4215	---	---
DH5	Ant1	2480	0.90270	2479.5414	2480.4441	---	---
2DH5	Ant1	2402	1.1850	2401.3950	2402.5800	---	---
2DH5	Ant1	2441	1.1914	2440.3927	2441.5841	---	---
2DH5	Ant1	2480	1.1805	2479.3976	2480.5781	---	---
3DH5	Ant1	2402	1.1854	2401.4004	2402.5858	---	---
3DH5	Ant1	2441	1.1994	2440.3895	2441.5889	---	---
3DH5	Ant1	2480	1.1994	2479.3883	2480.5877	---	---

Test Graphs

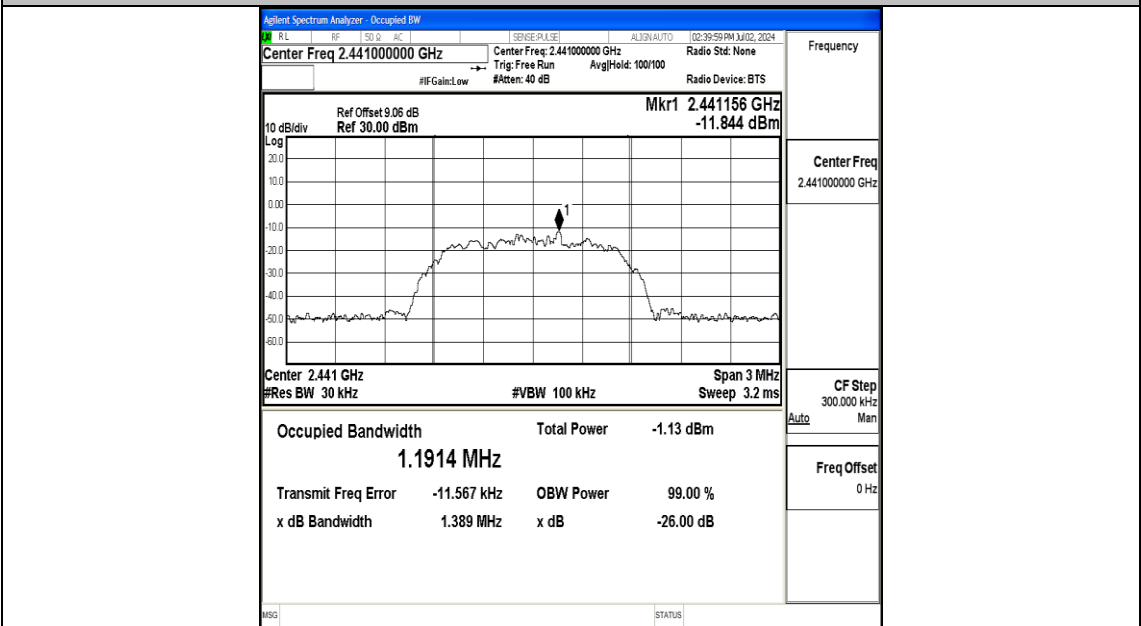




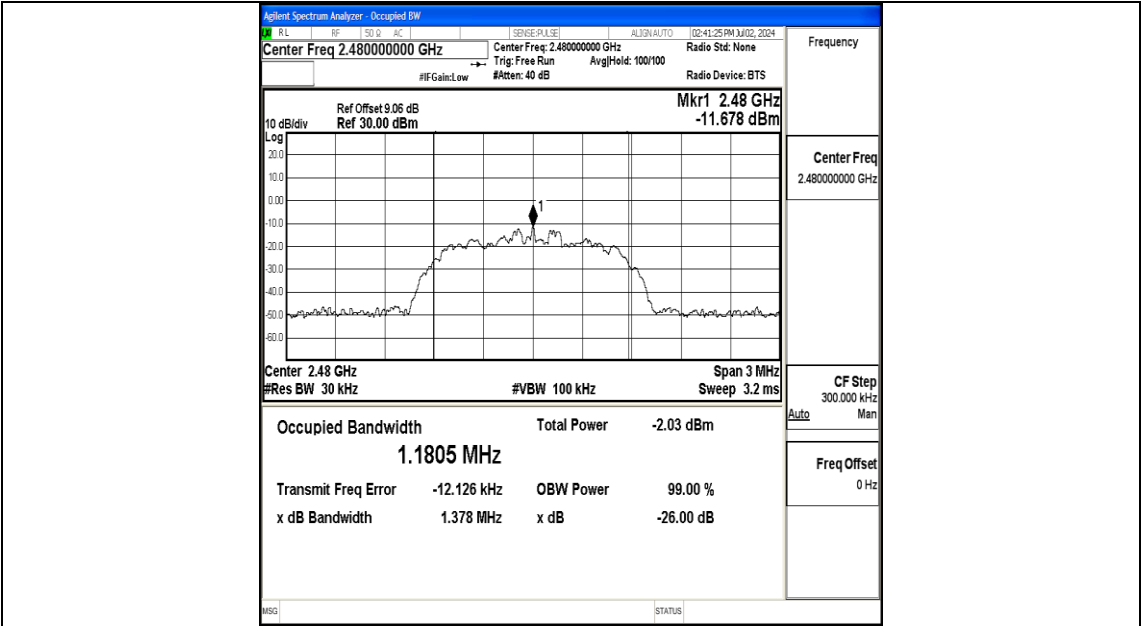
DH5-Ant1-2480



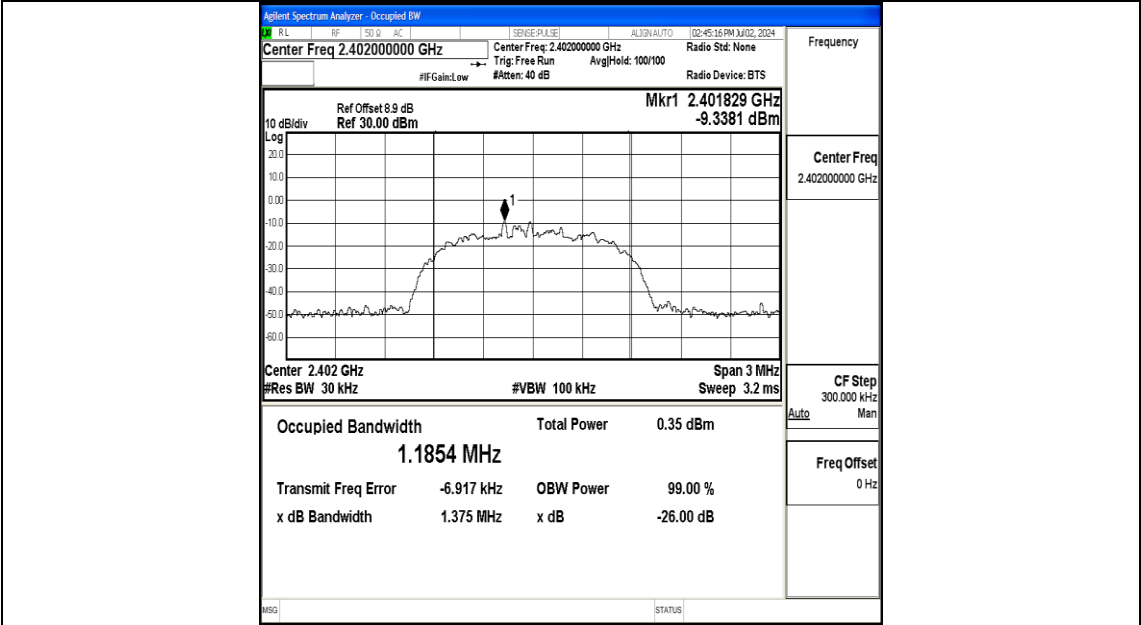
2DH5-Ant1-2402



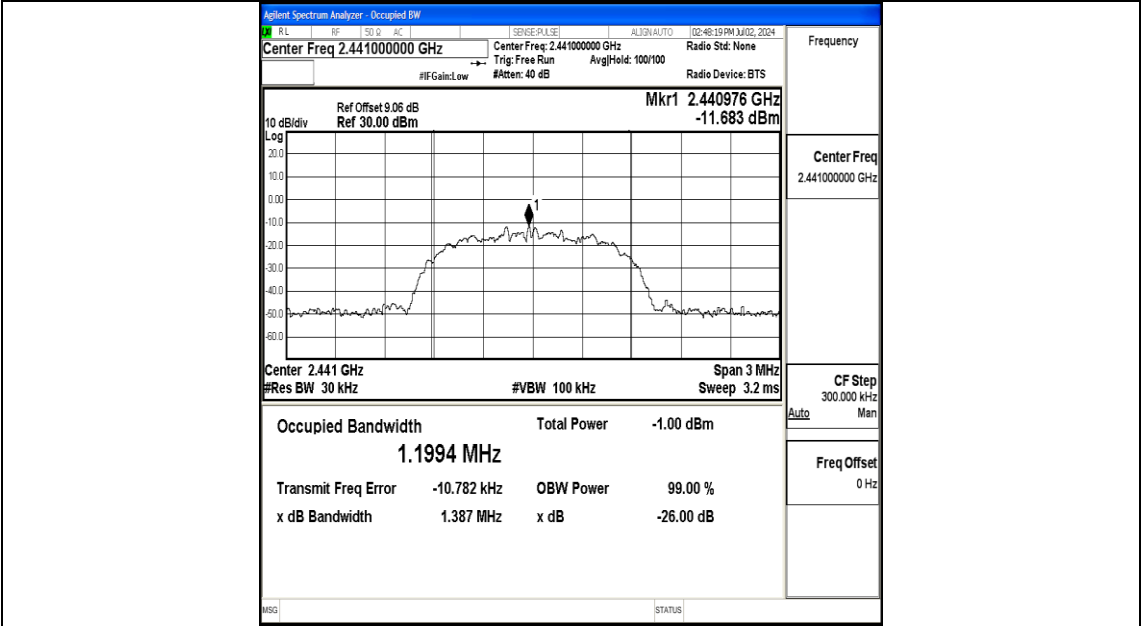
2DH5-Ant1-2441



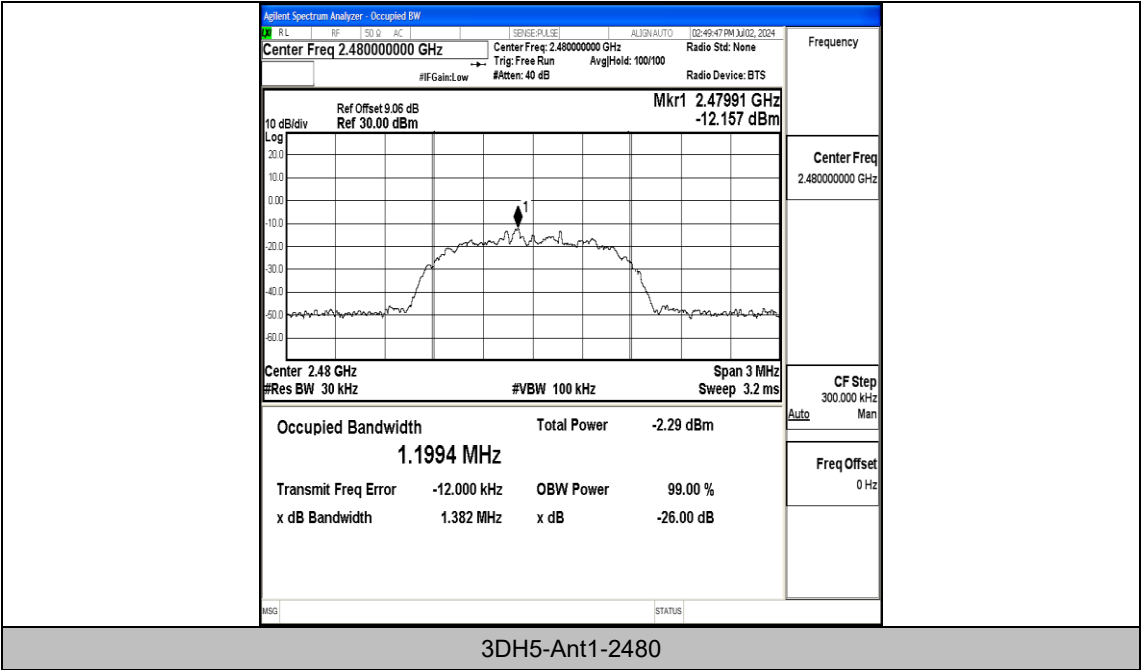
2DH5-Ant1-2480



3DH5-Ant1-2402



3DH5-Ant1-2441

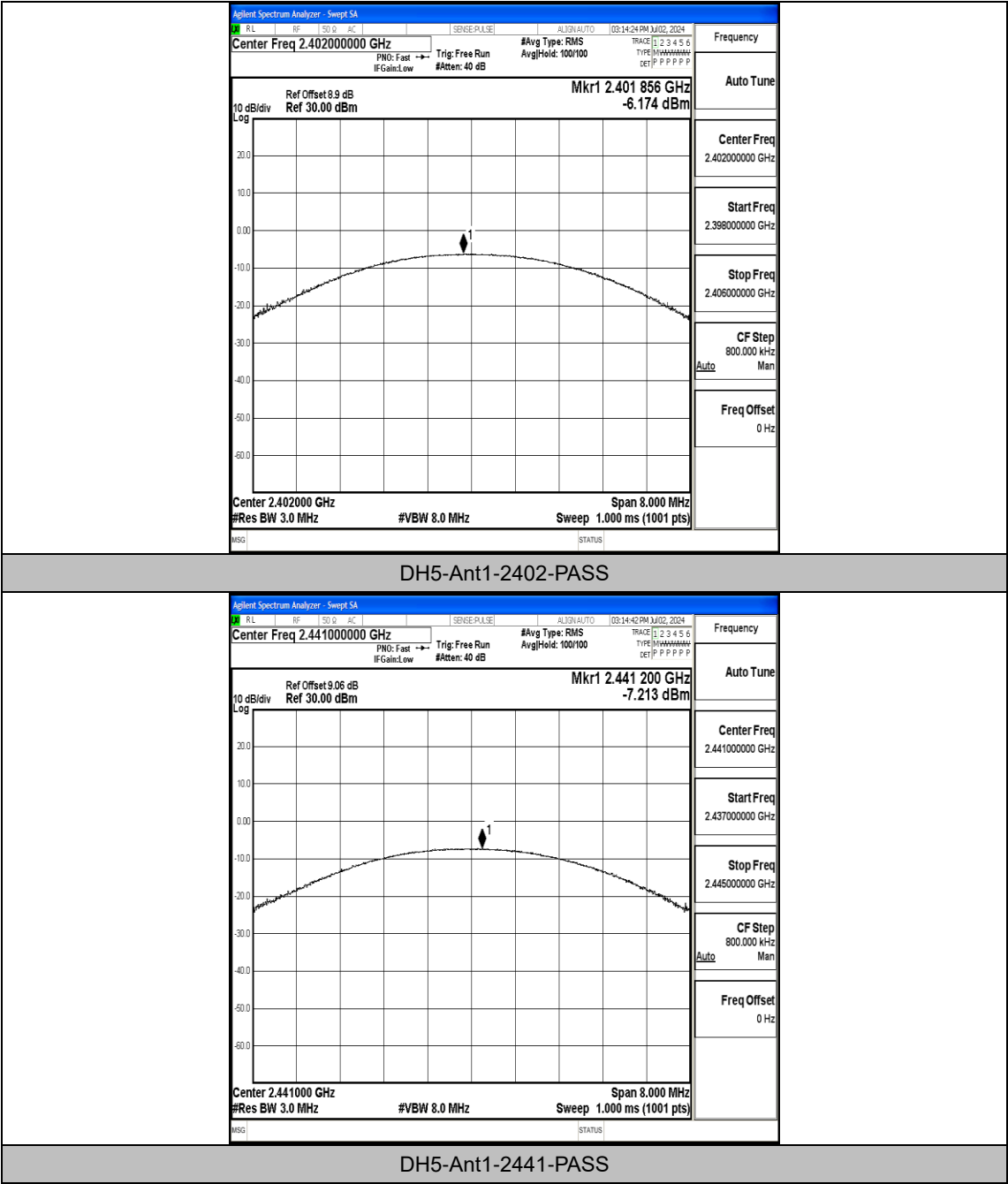


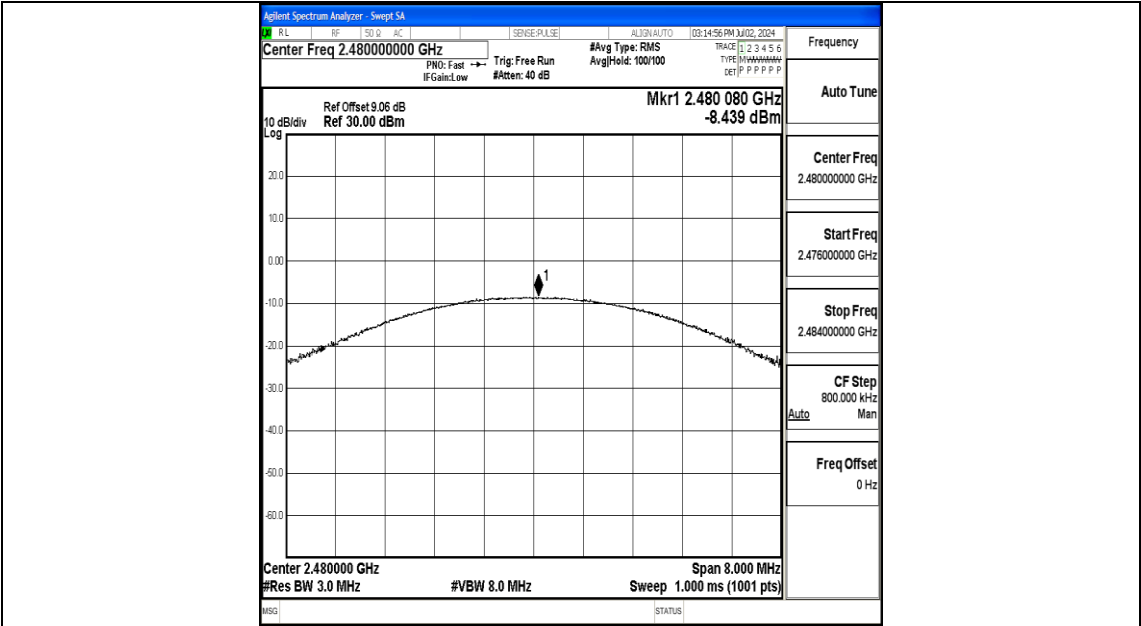
Appendix C: Maximum peak conducted output power

Test Result

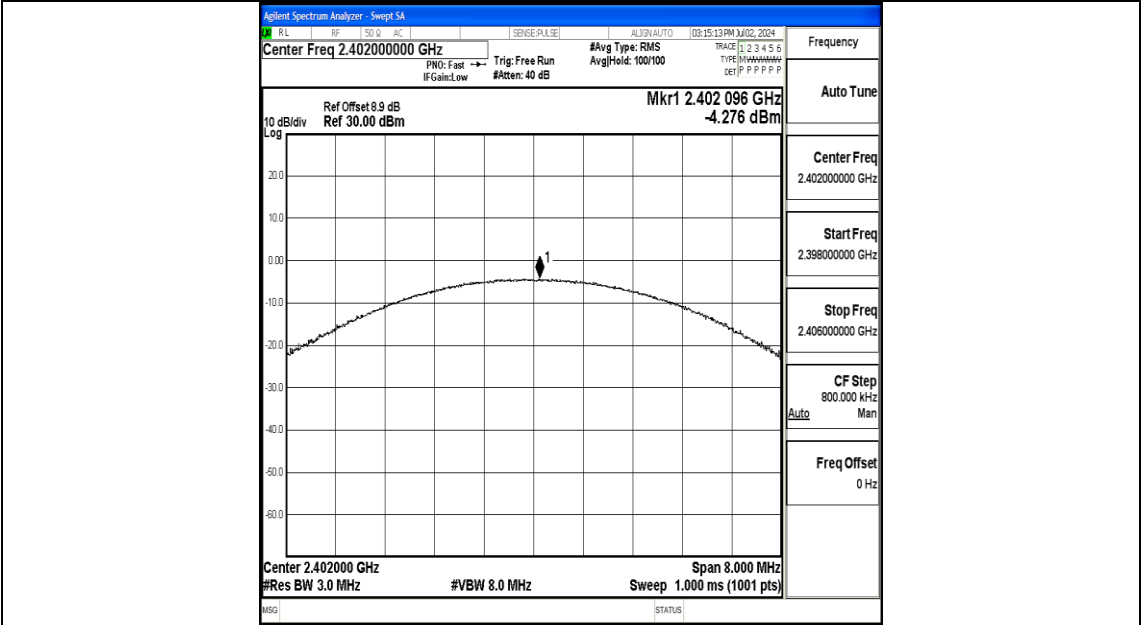
Test Mode	Antenna	Frequency [MHz]	Conducted Peak Power [dBm]	Conducted Limit [dBm]	Verdict
DH5	Ant1	2402	-6.17	≤30	PASS
DH5	Ant1	2441	-7.21	≤30	PASS
DH5	Ant1	2480	-8.44	≤30	PASS
2DH5	Ant1	2402	-4.28	≤20.97	PASS
2DH5	Ant1	2441	-5.47	≤20.97	PASS
2DH5	Ant1	2480	-6.83	≤20.97	PASS
3DH5	Ant1	2402	-3.75	≤20.97	PASS
3DH5	Ant1	2441	-4.75	≤20.97	PASS
3DH5	Ant1	2480	-6.16	≤20.97	PASS

Test Graphs

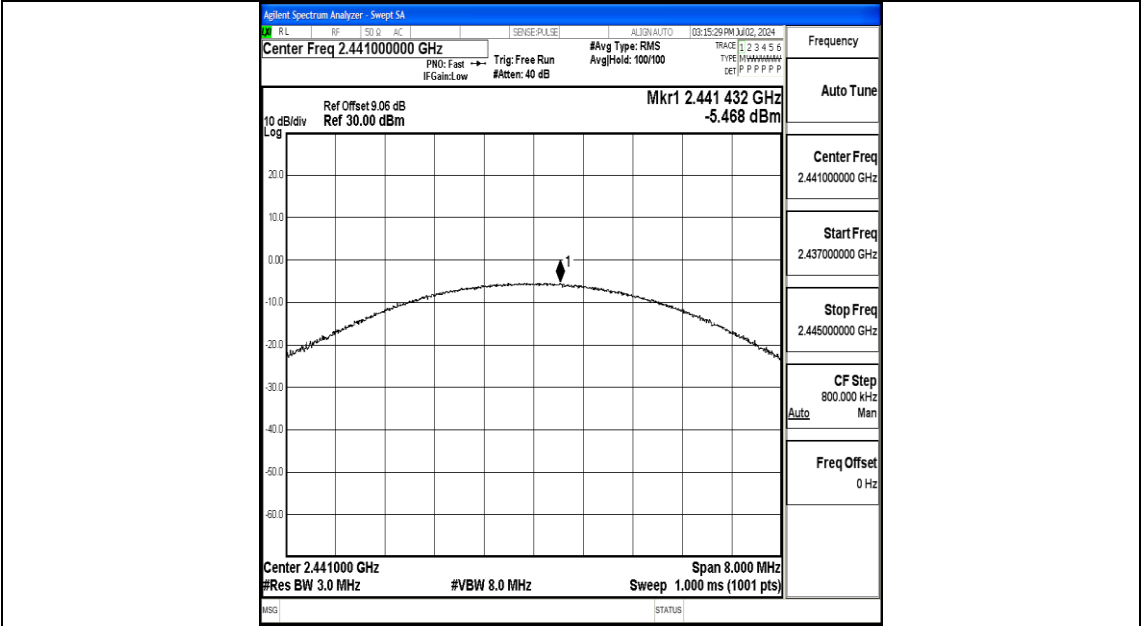




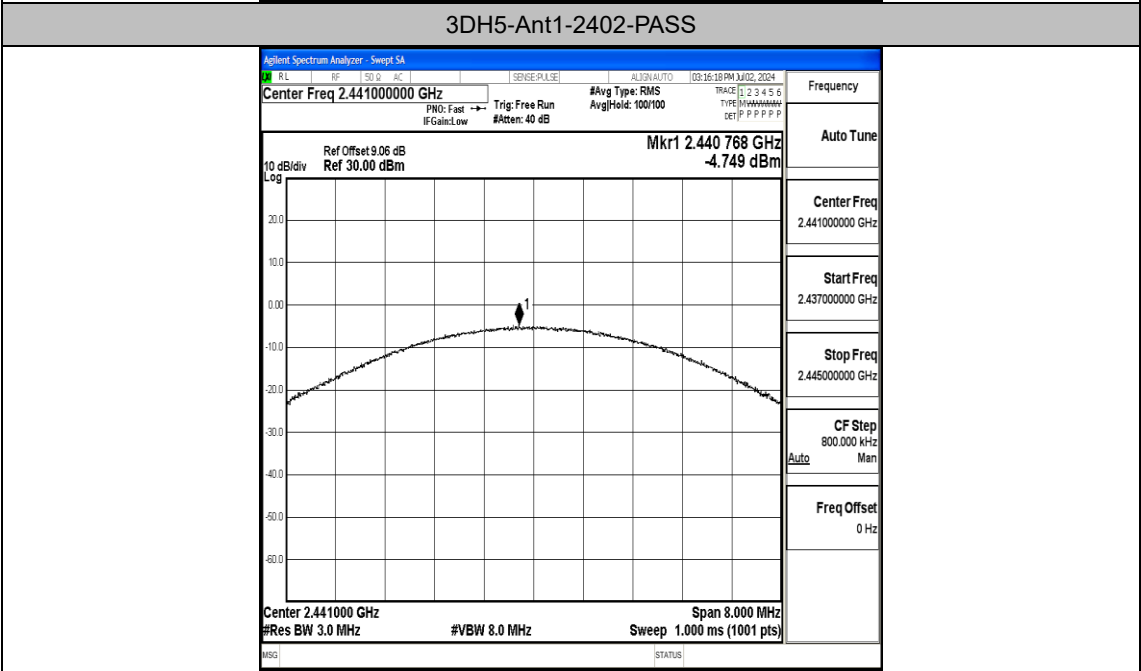
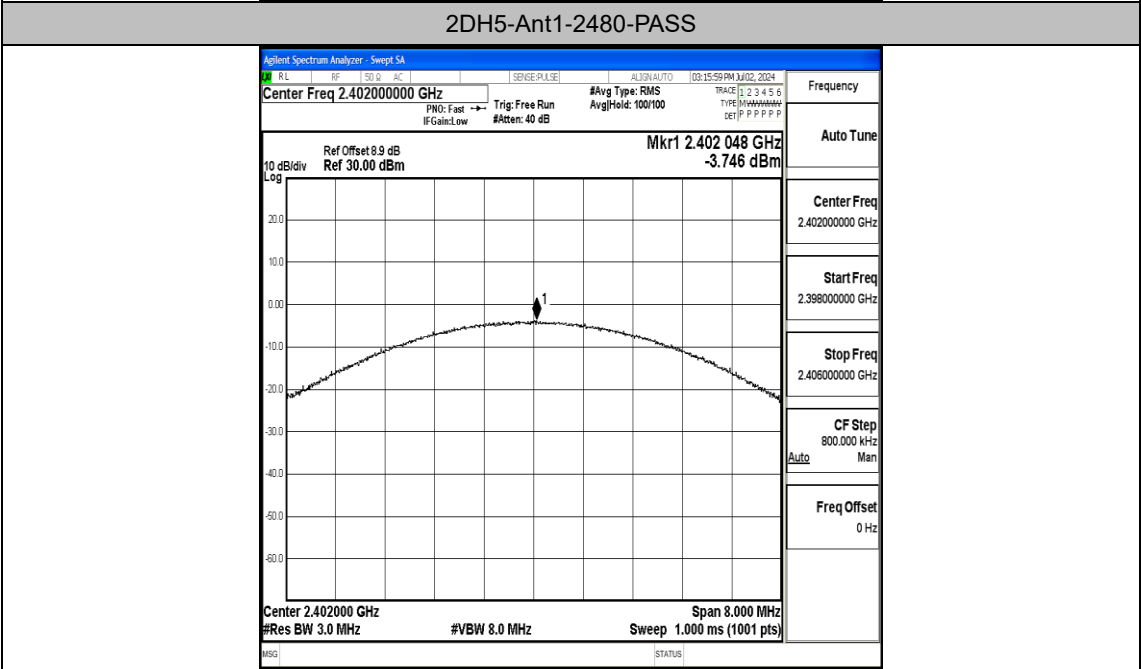
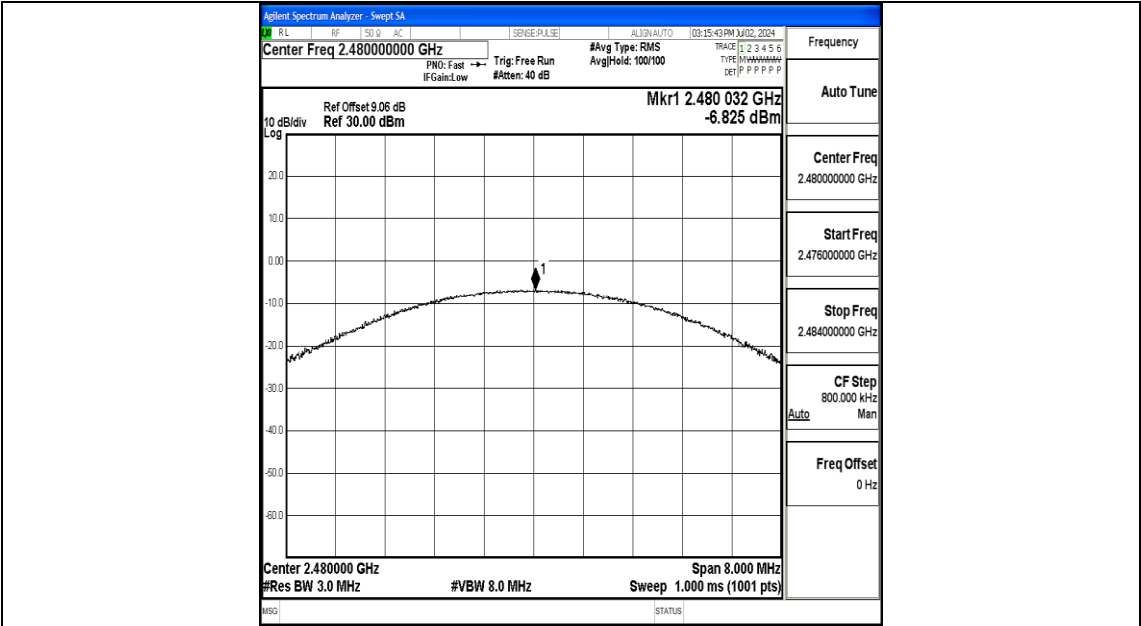
DH5-Ant1-2480-PASS

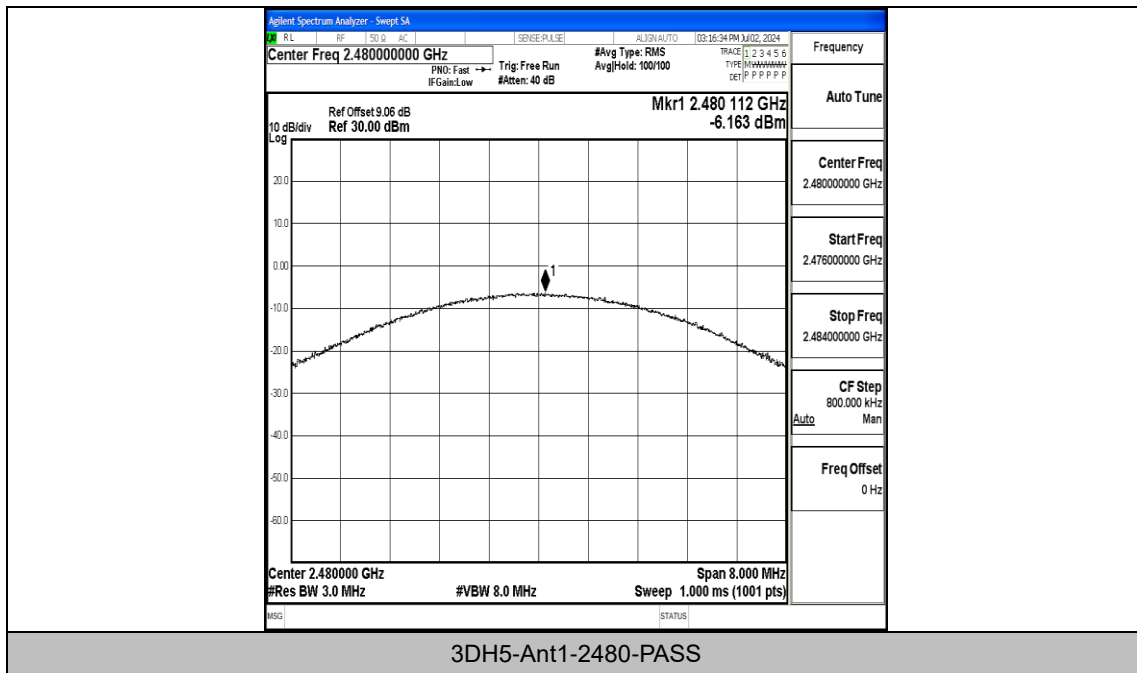


2DH5-Ant1-2402-PASS



2DH5-Ant1-2441-PASS



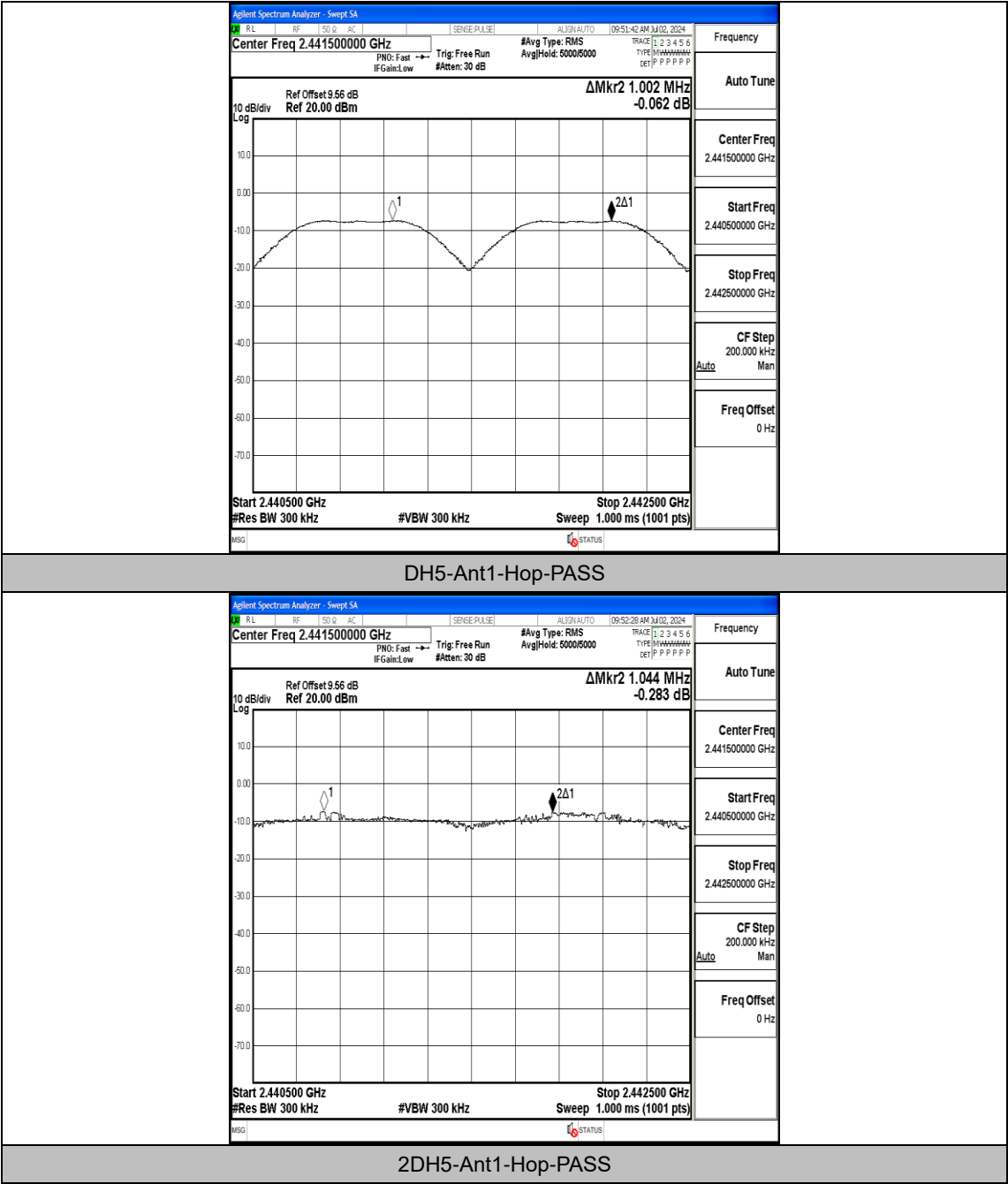


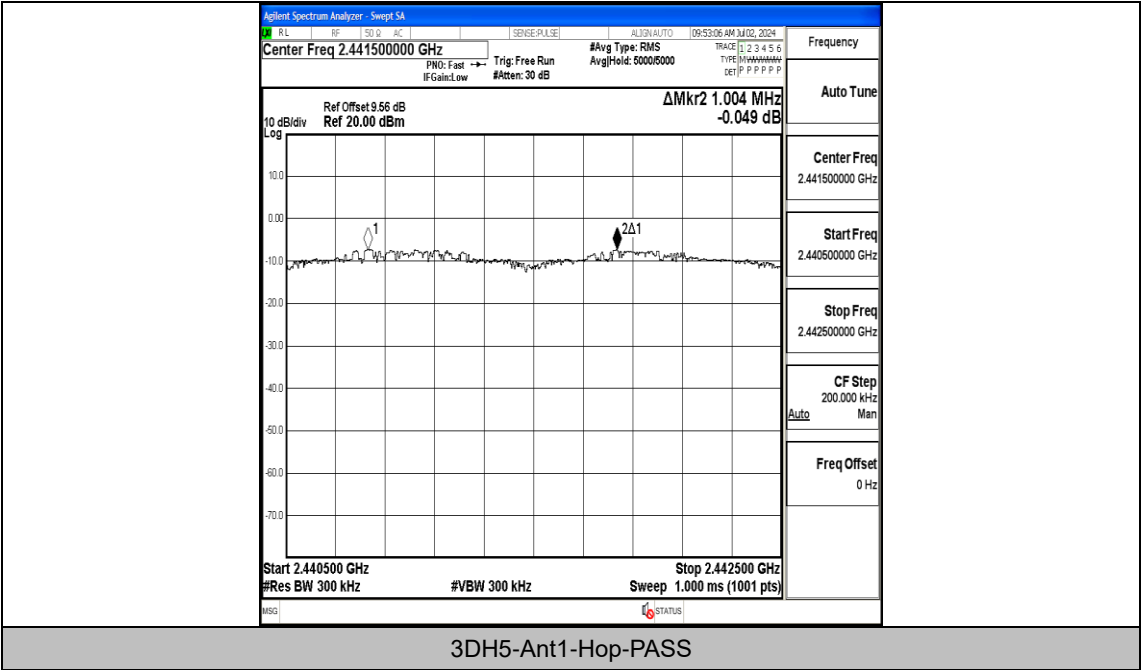
Appendix D: Carrier frequency separation

Test Result

Test Mode	Antenna	Frequency [MHz]	Result [MHz]	Limit [MHz]	Verdict
DH5	Ant1	Hop	1.002	≥0.960	PASS
2DH5	Ant1	Hop	1.044	≥0.884	PASS
3DH5	Ant1	Hop	1.004	≥0.882	PASS

Test Graphs



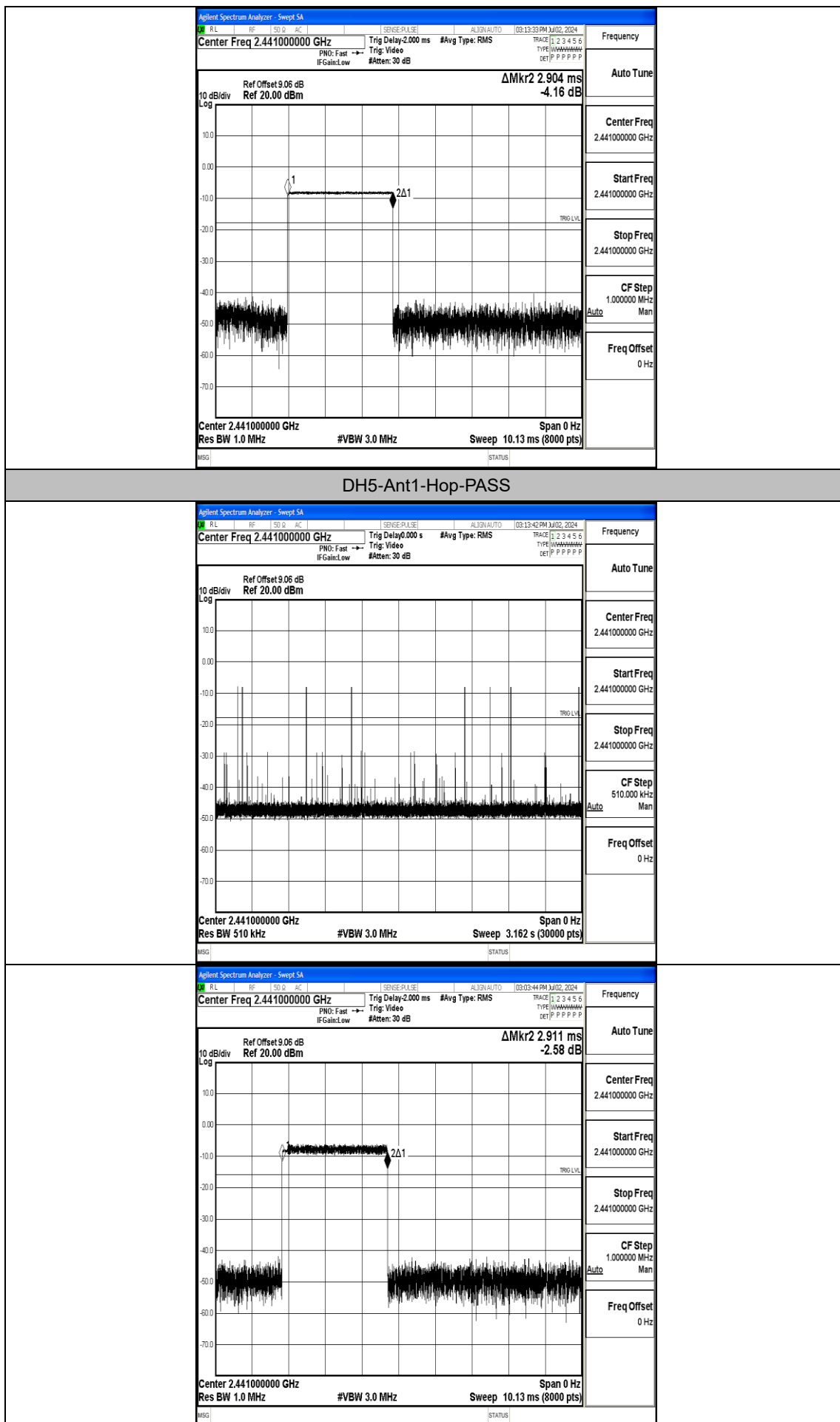


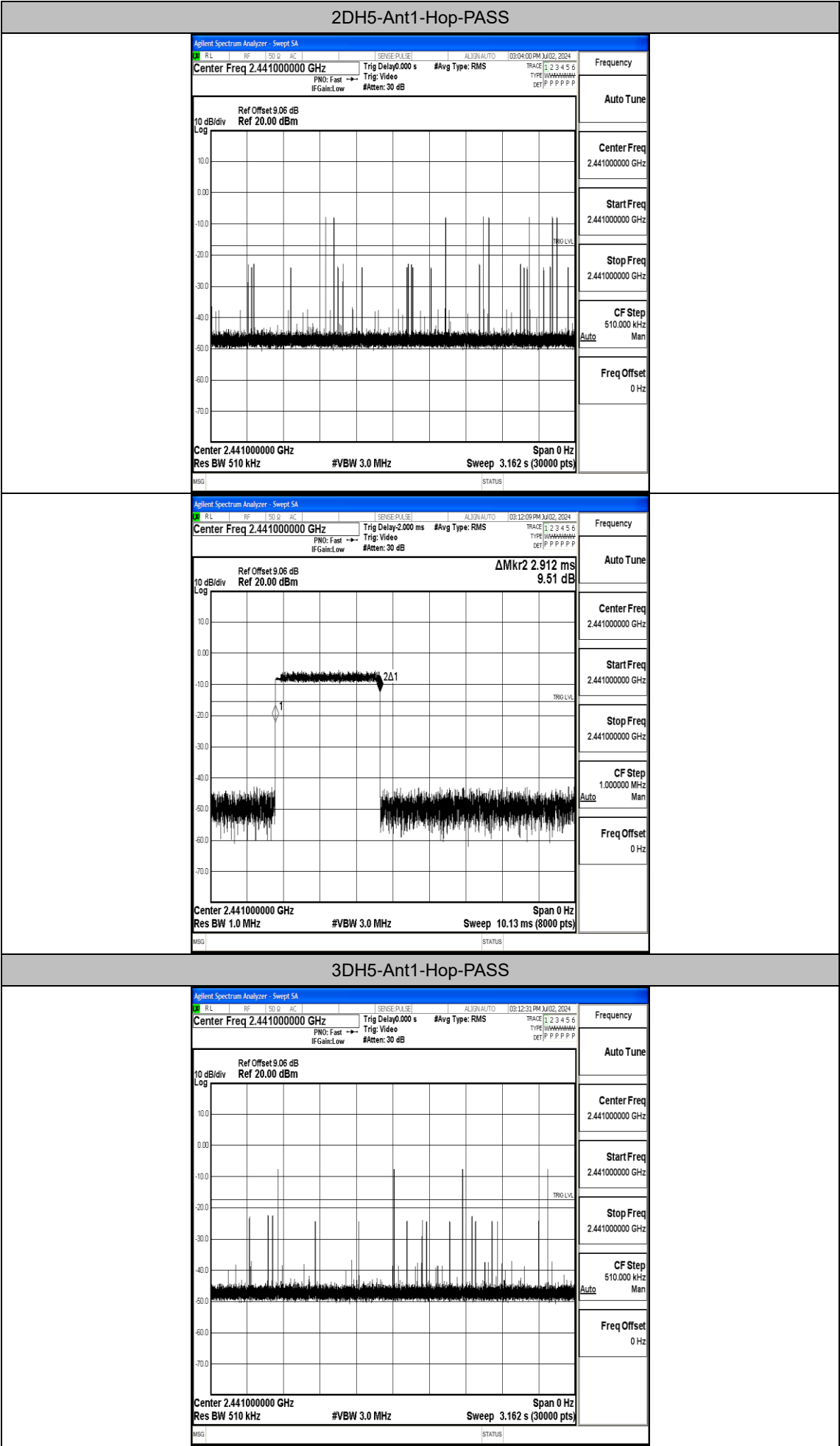
Appendix E: Time of occupancy

Test Result

Test Mode	Antenna	Frequency [MHz]	Burst Width [ms]	TotalHops [Num]	Result [s]	Limit [s]	Verdict
DH5	Ant1	Hop	2.904	90	0.261	≤0.4	PASS
2DH5	Ant1	Hop	2.911	100	0.291	≤0.4	PASS
3DH5	Ant1	Hop	2.912	50	0.146	≤0.4	PASS

Test Graphs



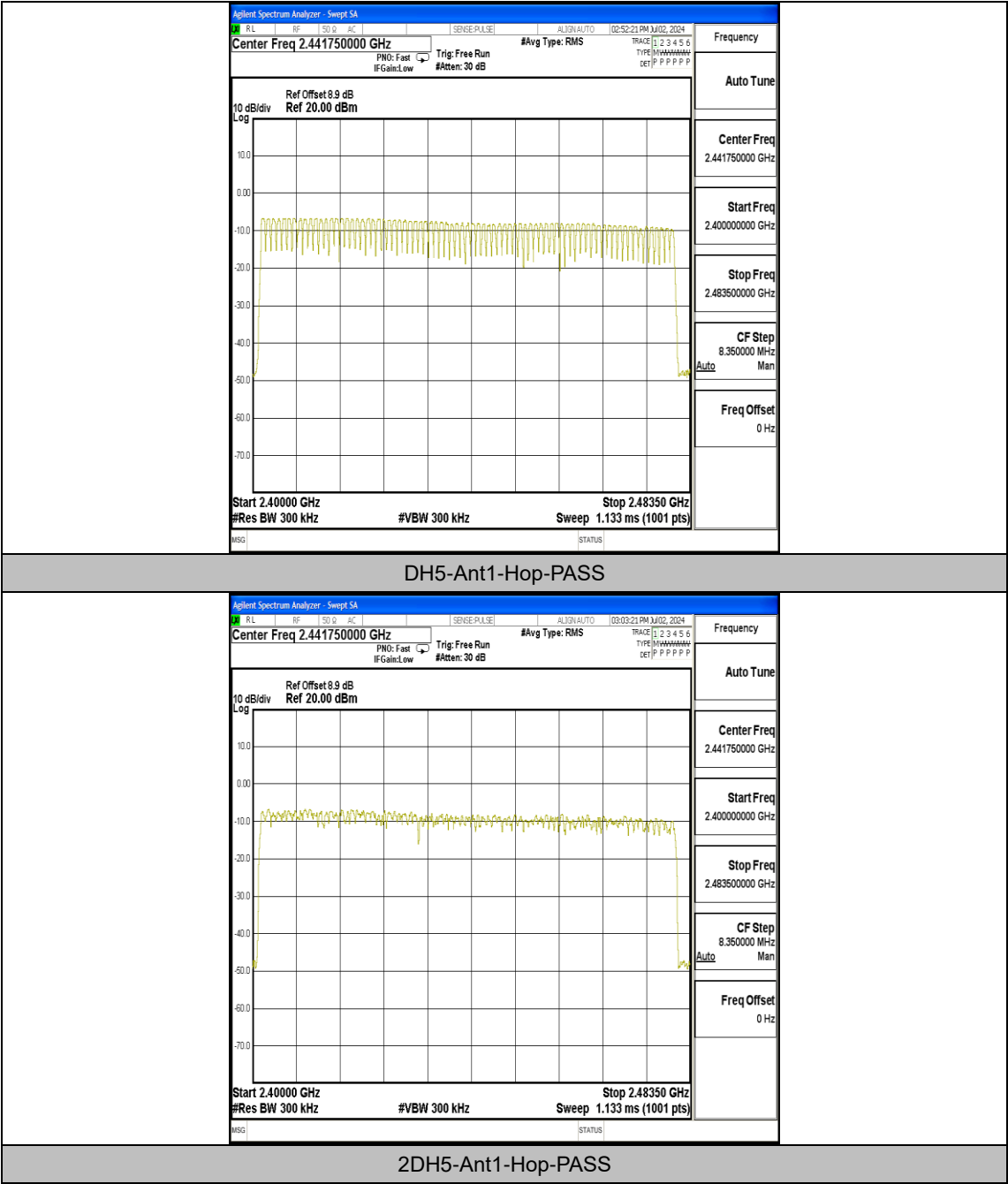


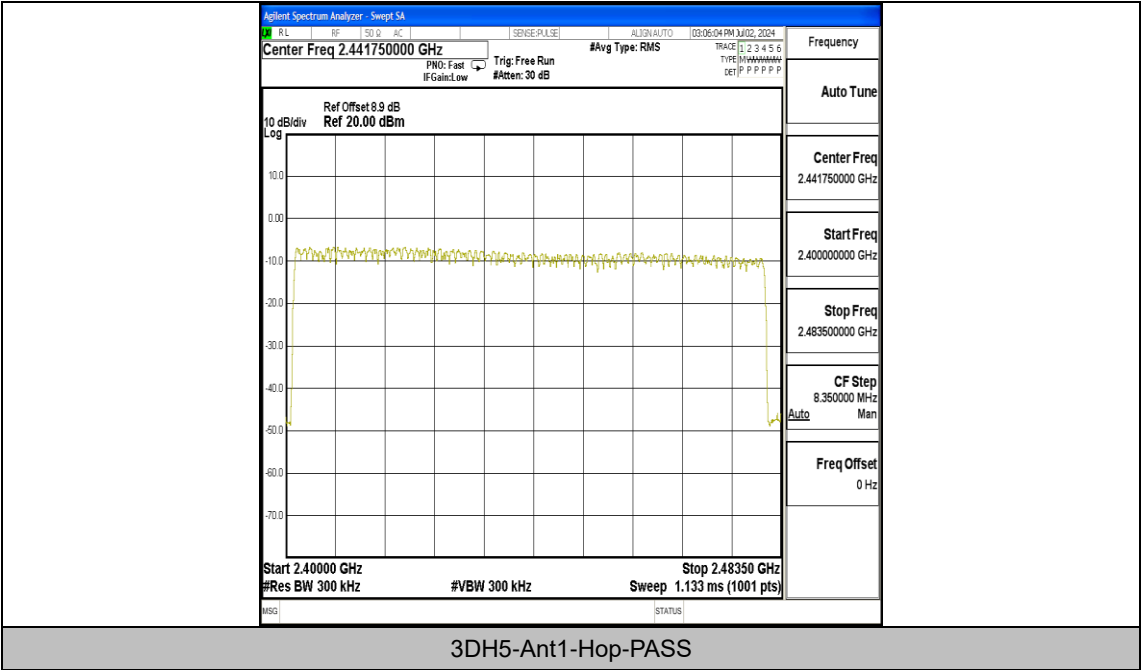
Appendix F: Number of hopping channels

Test Result

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

Test Graphs



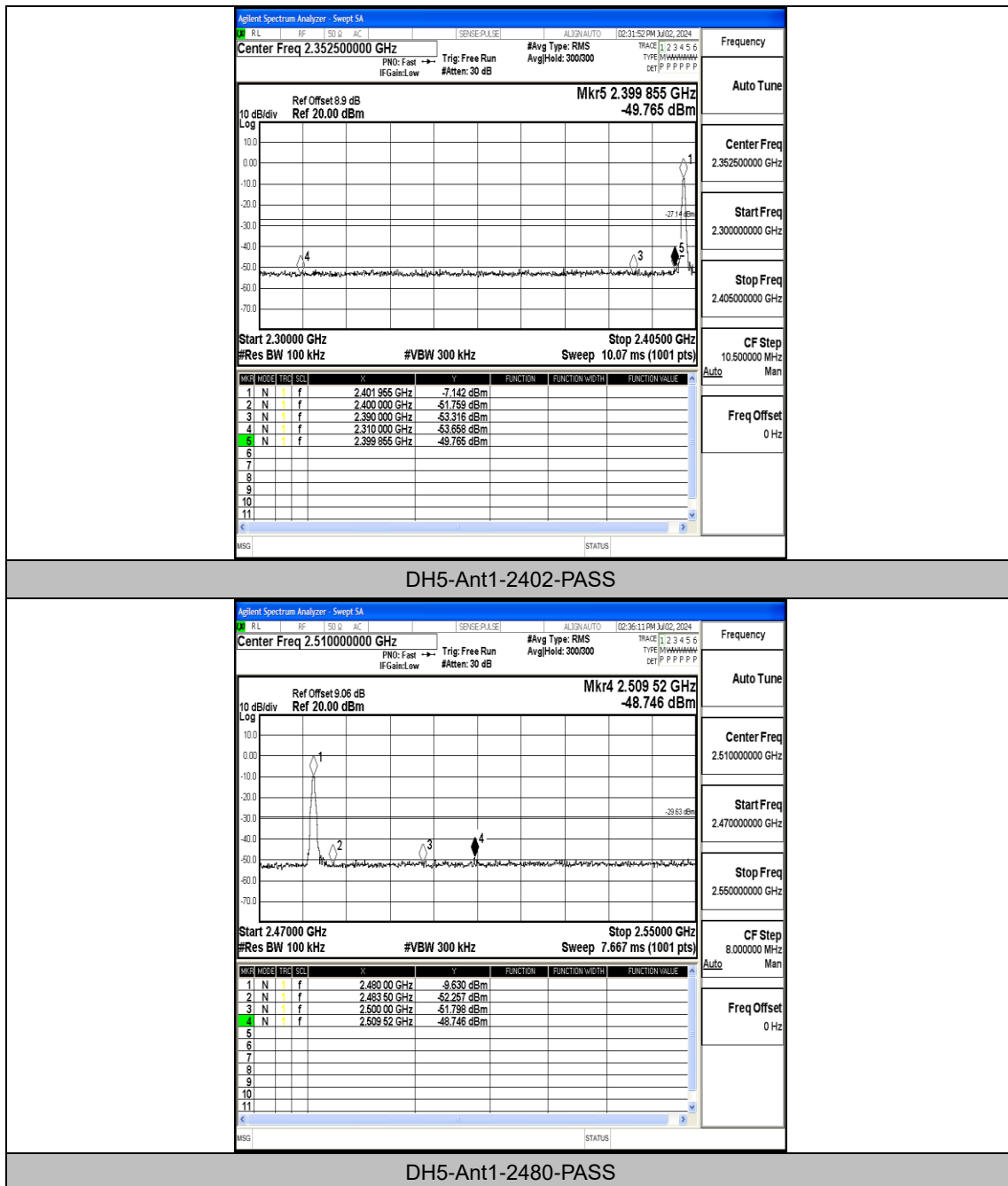


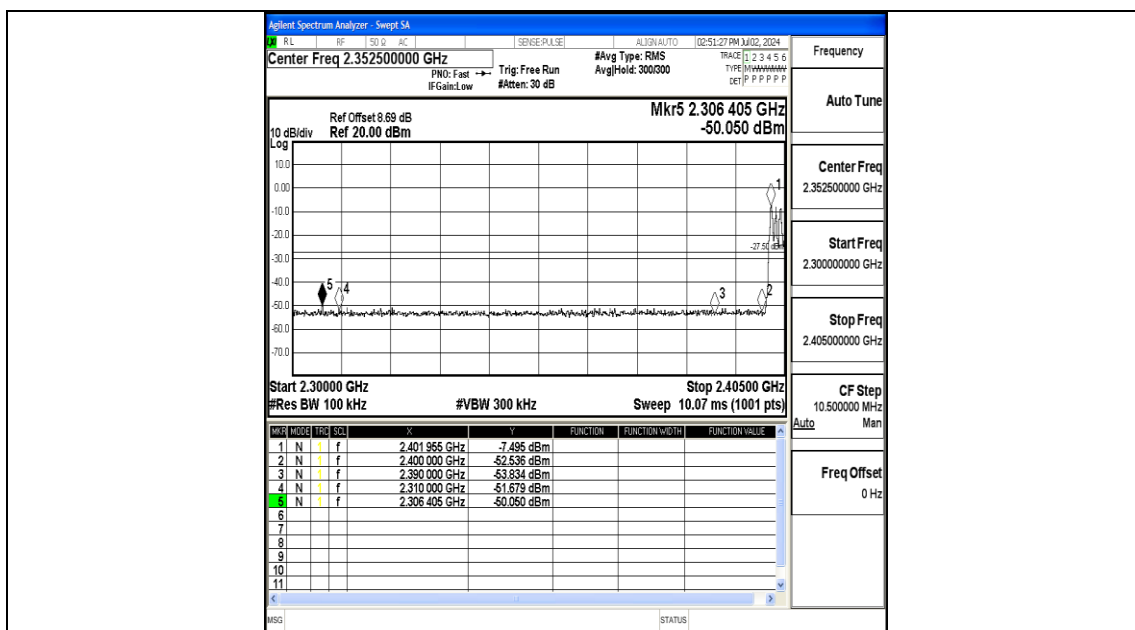
Appendix G: Band edge measurements

Test Result

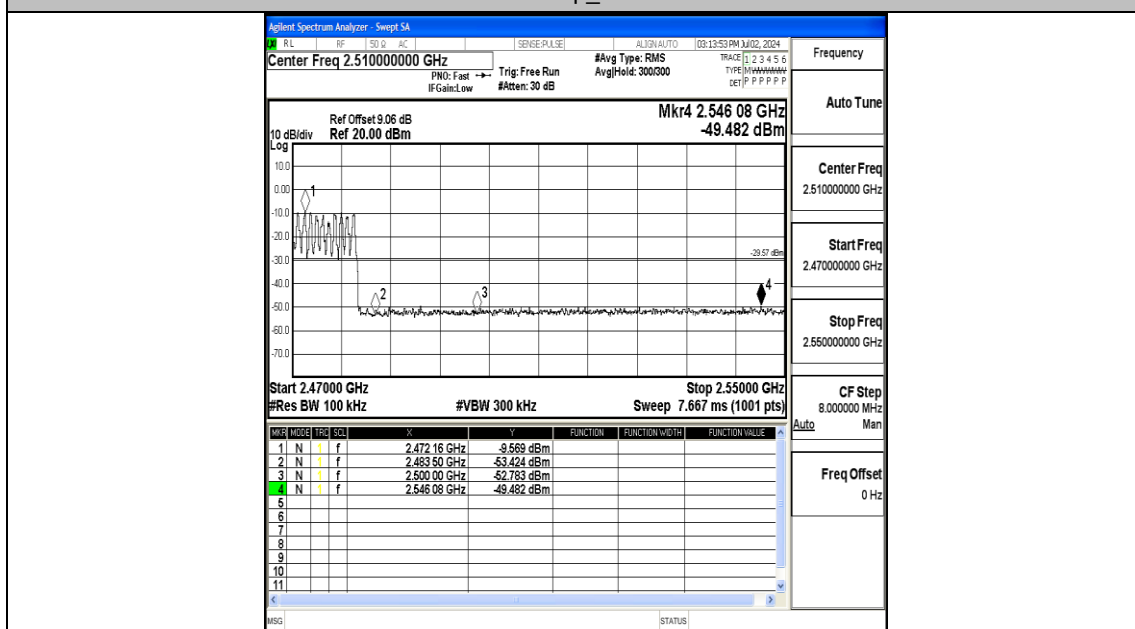
Test Mode	Antenna	Ch.Name	Frequency [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	-7.14	-49.77	≤ -27.14	PASS
DH5	Ant1	High	2480	-9.63	-48.75	≤ -29.63	PASS
DH5	Ant1	Low	Hop_2402	-7.50	-50.05	≤ -27.5	PASS
DH5	Ant1	High	Hop_2480	-9.57	-49.48	≤ -29.57	PASS
2DH5	Ant1	Low	2402	-7.21	-49.98	≤ -27.21	PASS
2DH5	Ant1	High	2480	-9.71	-49.57	≤ -29.71	PASS
2DH5	Ant1	Low	Hop_2402	-10.91	-49.71	≤ -30.91	PASS
2DH5	Ant1	High	Hop_2480	-10.34	-49.84	≤ -30.34	PASS
3DH5	Ant1	Low	2402	-7.35	-49.89	≤ -27.35	PASS
3DH5	Ant1	High	2480	-9.43	-49.32	≤ -29.43	PASS
3DH5	Ant1	Low	Hop_2402	-9.03	-50.47	≤ -29.03	PASS
3DH5	Ant1	High	Hop_2480	-11.43	-48.84	≤ -31.43	PASS

Test Graphs

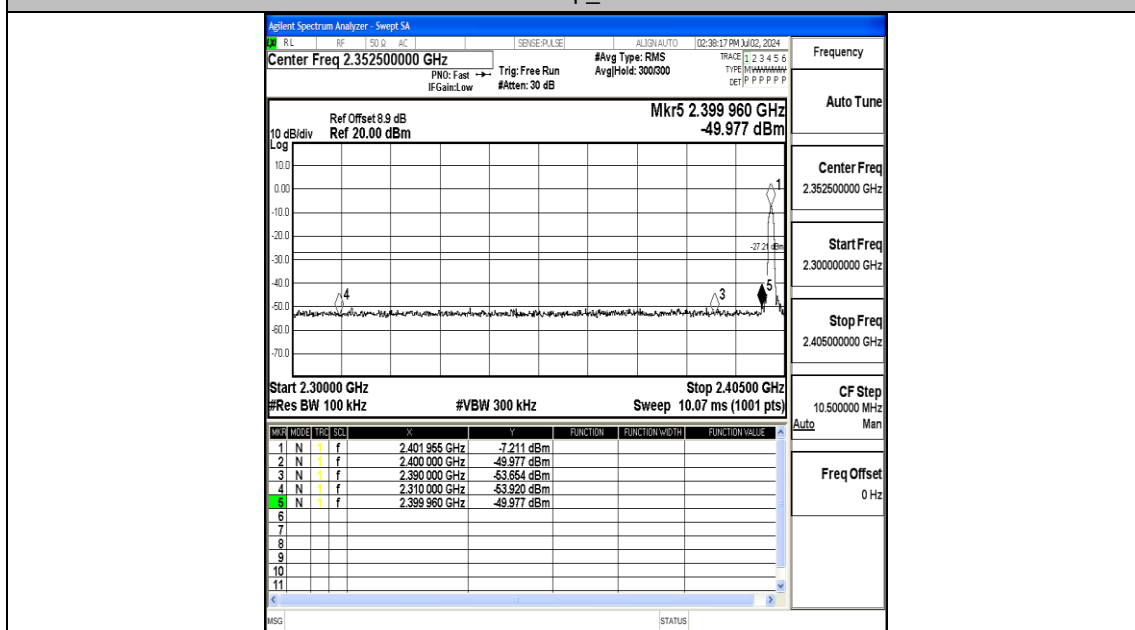




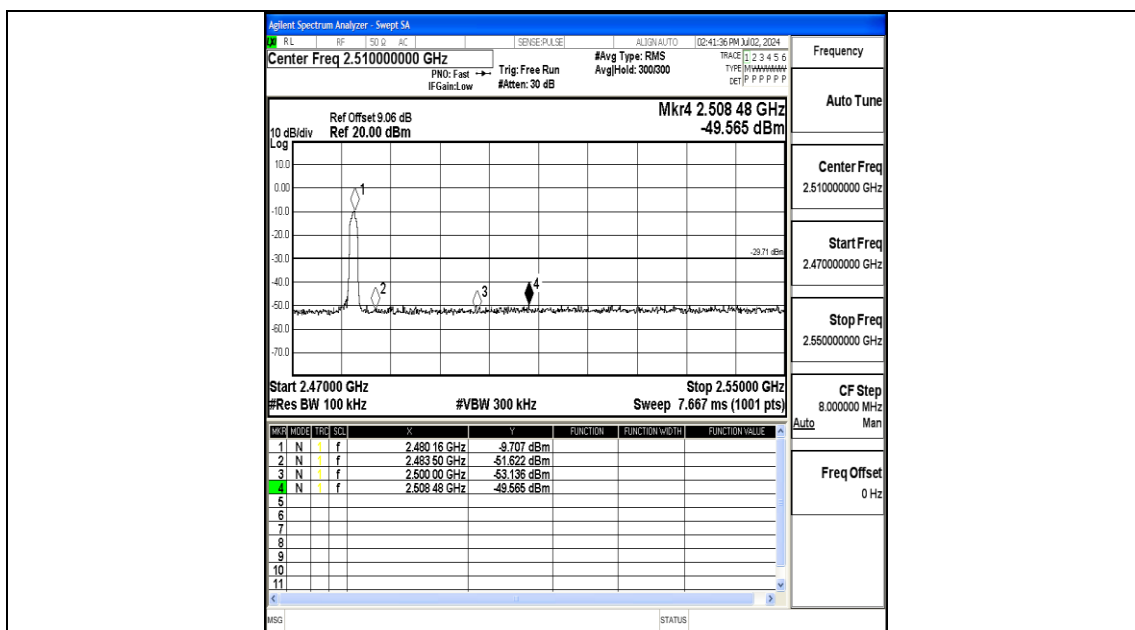
DH5-Ant1-Hop_2402-PASS



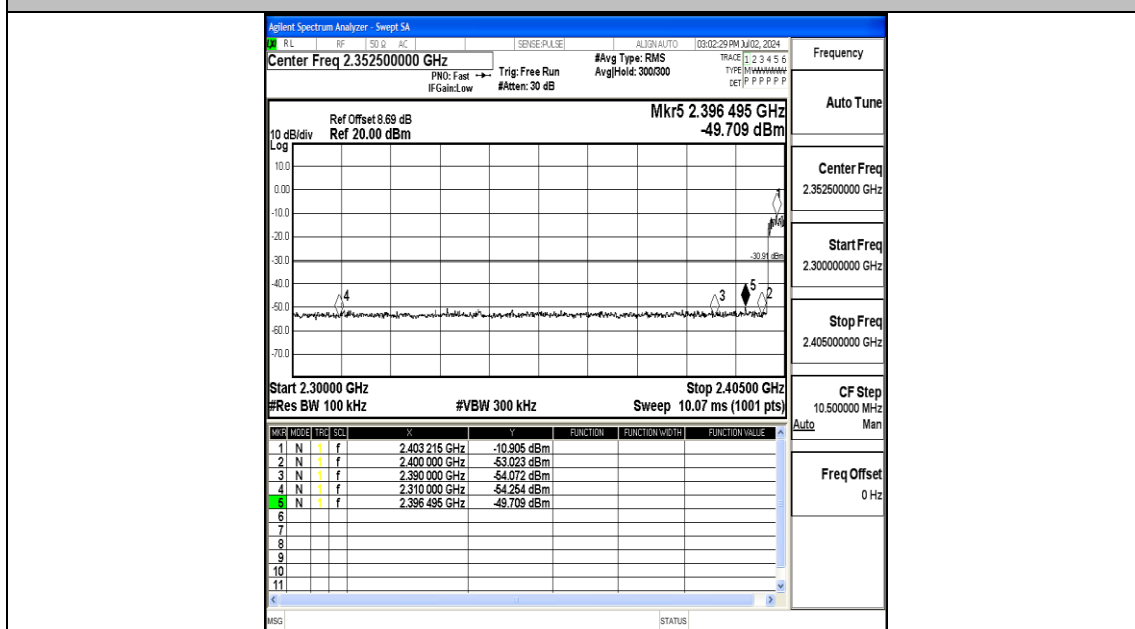
DH5-Ant1-Hop_2480-PASS



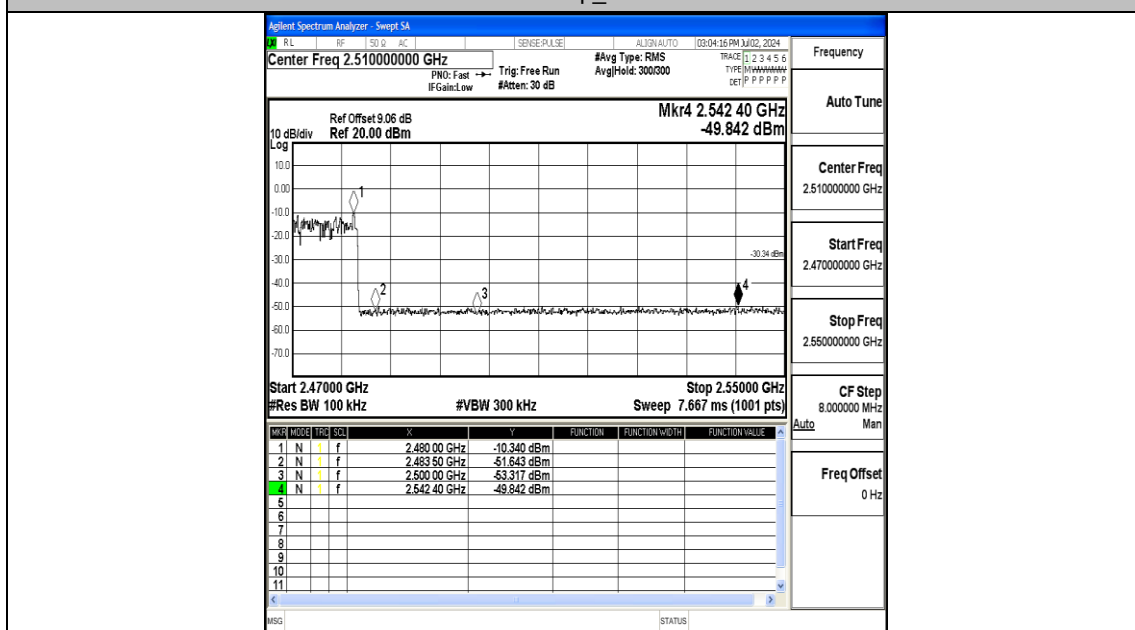
2DH5-Ant1-2402-PASS



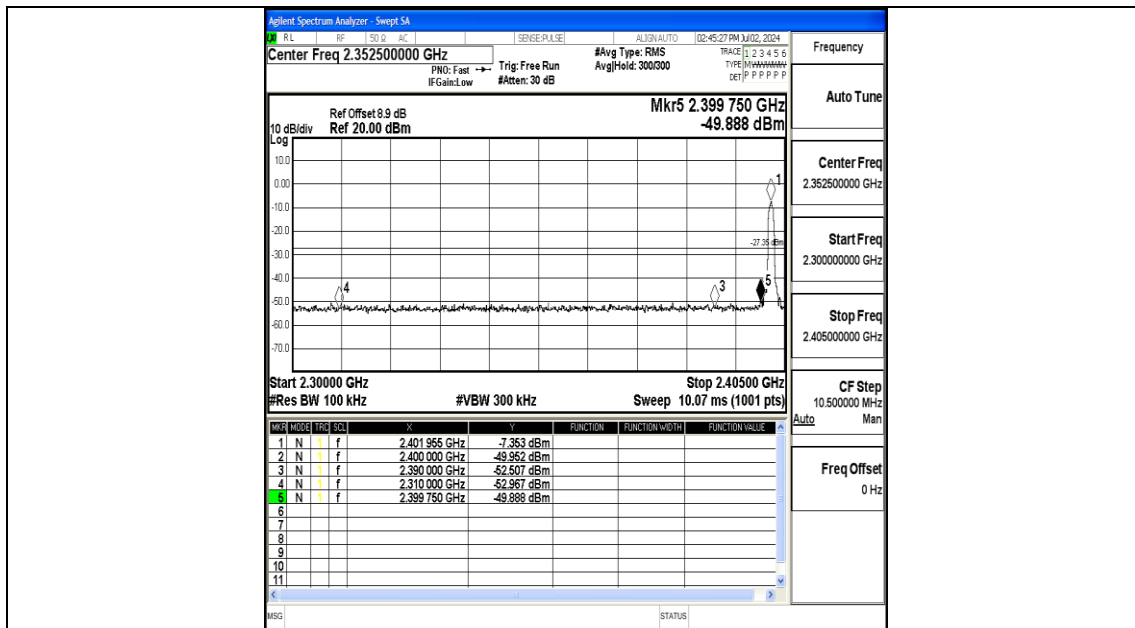
2DH5-Ant1-2480-PASS



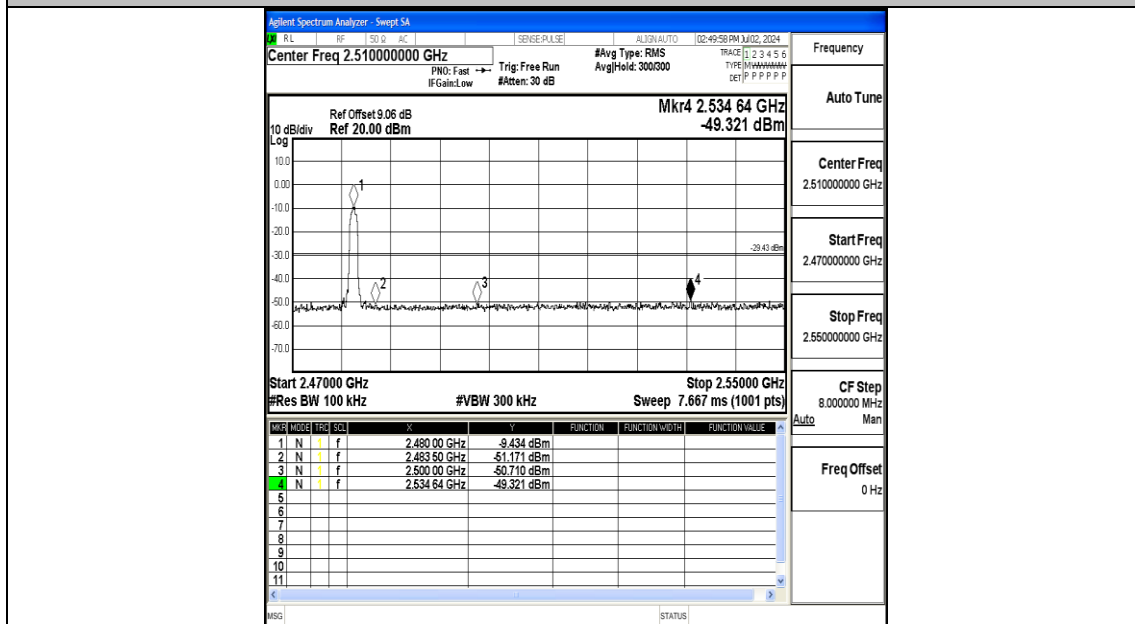
2DH5-Ant1-Hop_2402-PASS



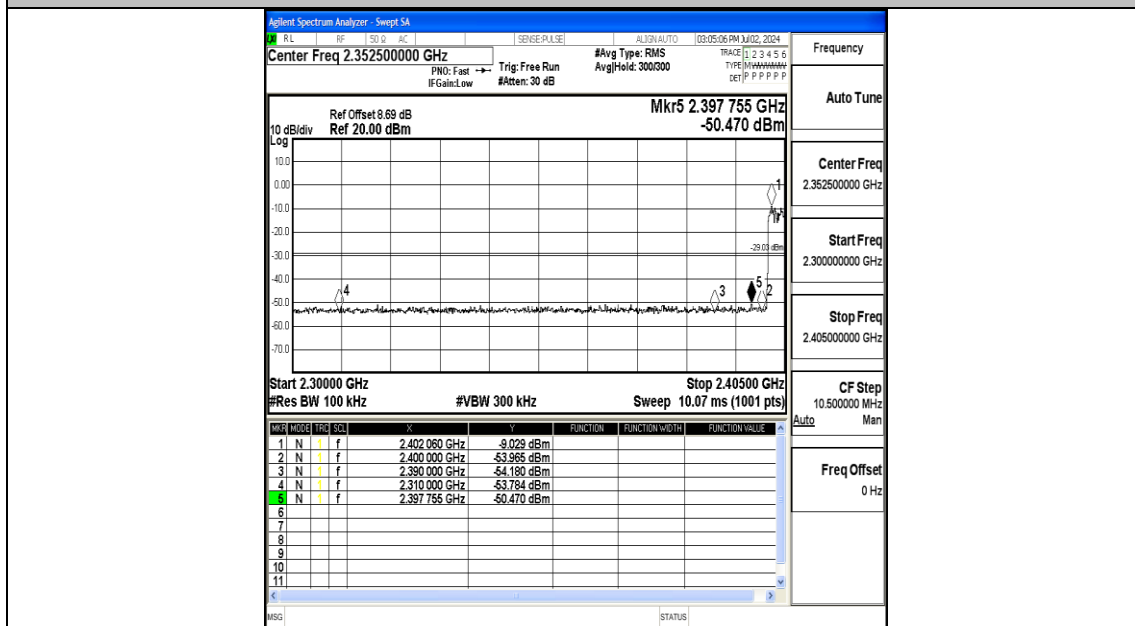
2DH5-Ant1-Hop_2480-PASS



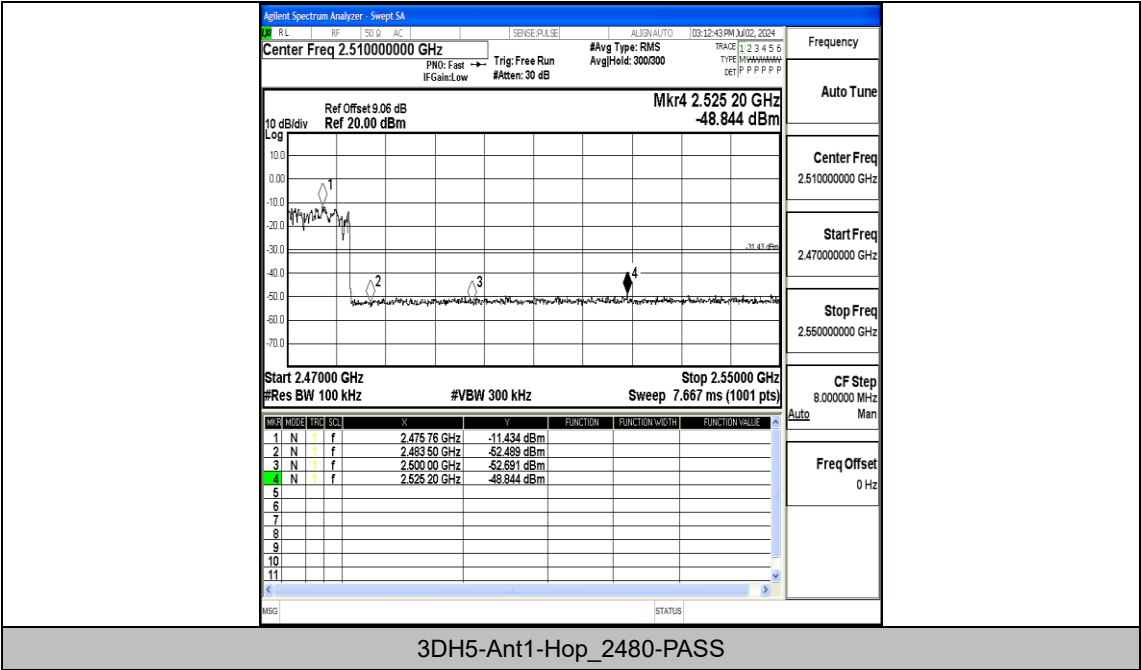
3DH5-Ant1-2402-PASS



3DH5-Ant1-2480-PASS



3DH5-Ant1-Hop_2402-PASS

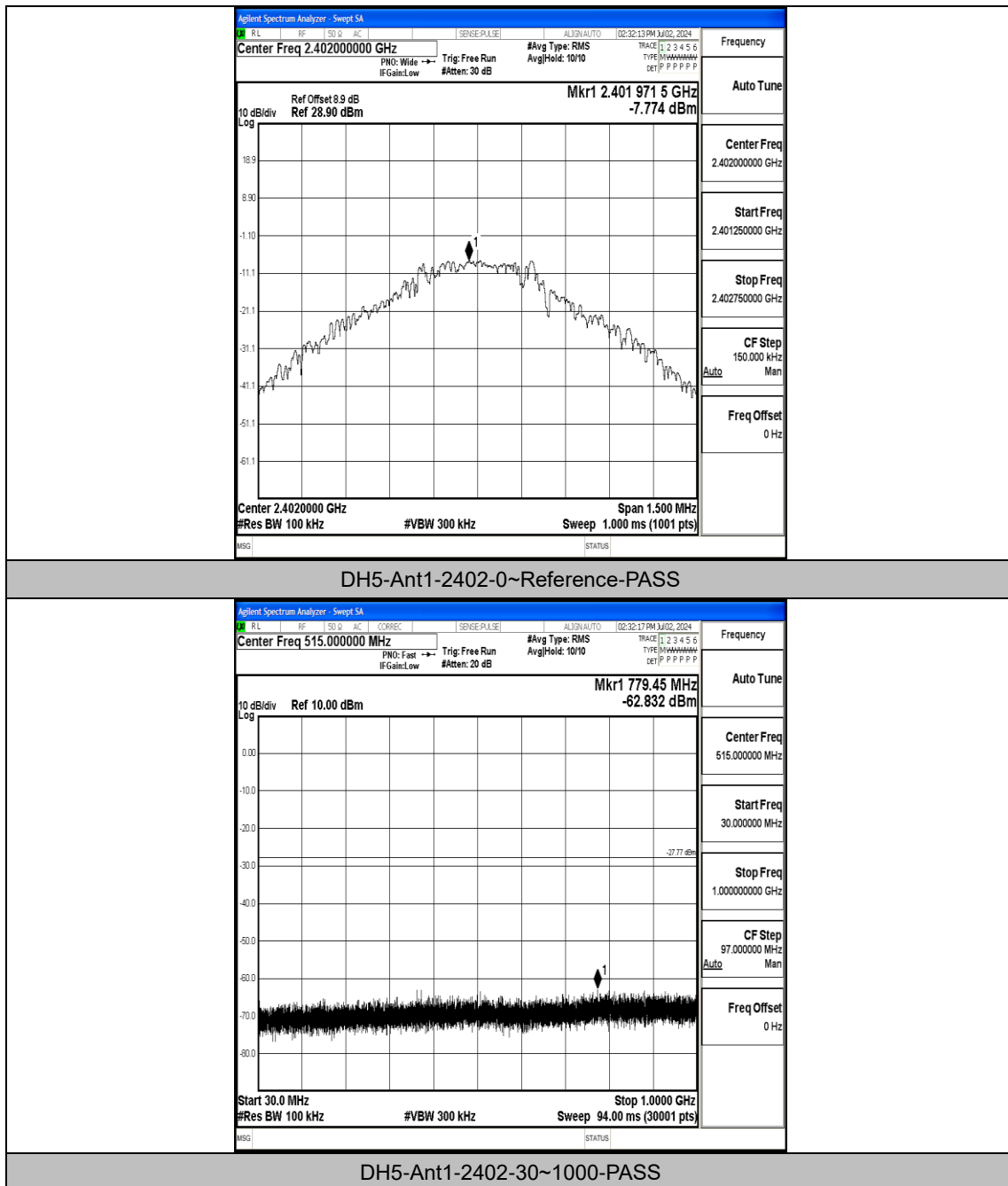


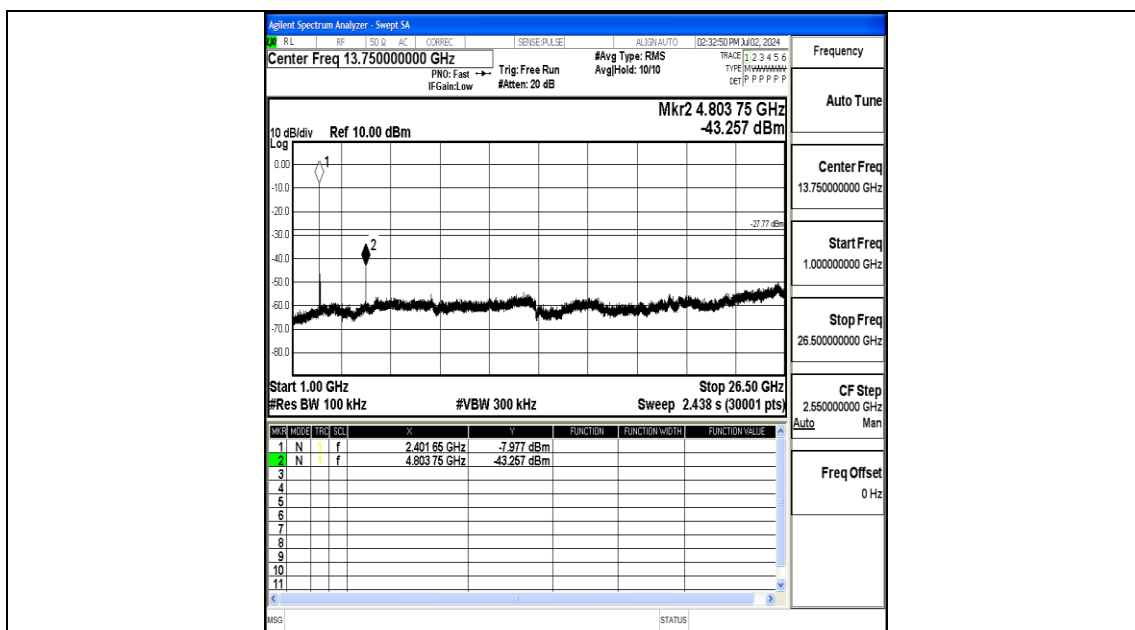
Appendix H: Conducted Spurious Emission

Test Result

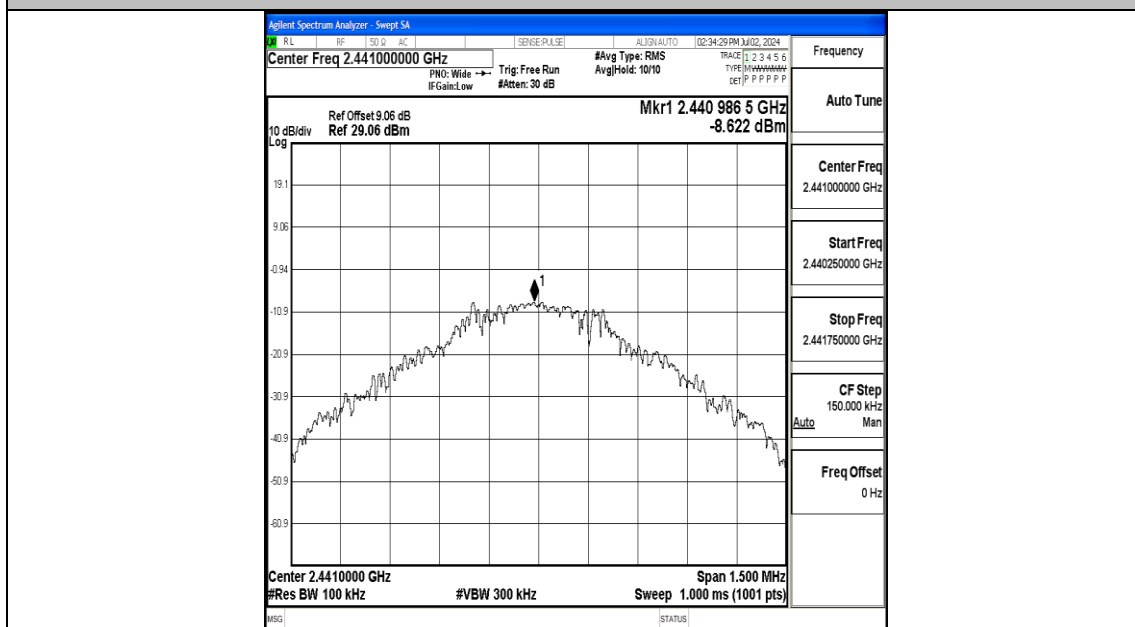
Test Mode	Antenna	Frequency [MHz]	Freq. Range [MHz]	Ref. Level [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	2402	0~Reference	-7.77	-7.77	---	PASS
DH5	Ant1	2402	30~1000	-7.77	-62.83	≤-27.77	PASS
DH5	Ant1	2402	1000~26500	-7.77	-43.26	≤-27.77	PASS
DH5	Ant1	2441	0~Reference	-8.62	-8.62	---	PASS
DH5	Ant1	2441	30~1000	-8.62	-61.94	≤-28.62	PASS
DH5	Ant1	2441	1000~26500	-8.62	-48.43	≤-28.62	PASS
DH5	Ant1	2480	0~Reference	-10.04	-10.04	---	PASS
DH5	Ant1	2480	30~1000	-10.04	-61.81	≤-30.04	PASS
DH5	Ant1	2480	1000~26500	-10.04	-50.01	≤-30.04	PASS
2DH5	Ant1	2402	0~Reference	-8.18	-8.18	---	PASS
2DH5	Ant1	2402	30~1000	-8.18	-62.77	≤-28.18	PASS
2DH5	Ant1	2402	1000~26500	-8.18	-45.93	≤-28.18	PASS
2DH5	Ant1	2441	0~Reference	-9.05	-9.05	---	PASS
2DH5	Ant1	2441	30~1000	-9.05	-62.3	≤-29.05	PASS
2DH5	Ant1	2441	1000~26500	-9.05	-49.4	≤-29.05	PASS
2DH5	Ant1	2480	0~Reference	-12.54	-12.54	---	PASS
2DH5	Ant1	2480	30~1000	-12.54	-62.31	≤-32.54	PASS
2DH5	Ant1	2480	1000~26500	-12.54	-49.55	≤-32.54	PASS
3DH5	Ant1	2402	0~Reference	-7.66	-7.66	---	PASS
3DH5	Ant1	2402	30~1000	-7.66	-62.02	≤-27.66	PASS
3DH5	Ant1	2402	1000~26500	-7.66	-42.81	≤-27.66	PASS
3DH5	Ant1	2441	0~Reference	-10.30	-10.30	---	PASS
3DH5	Ant1	2441	30~1000	-10.30	-62.59	≤-30.3	PASS
3DH5	Ant1	2441	1000~26500	-10.30	-48.96	≤-30.3	PASS
3DH5	Ant1	2480	0~Reference	-10.29	-10.29	---	PASS
3DH5	Ant1	2480	30~1000	-10.29	-62.7	≤-30.29	PASS
3DH5	Ant1	2480	1000~26500	-10.29	-49.38	≤-30.29	PASS

Test Graphs

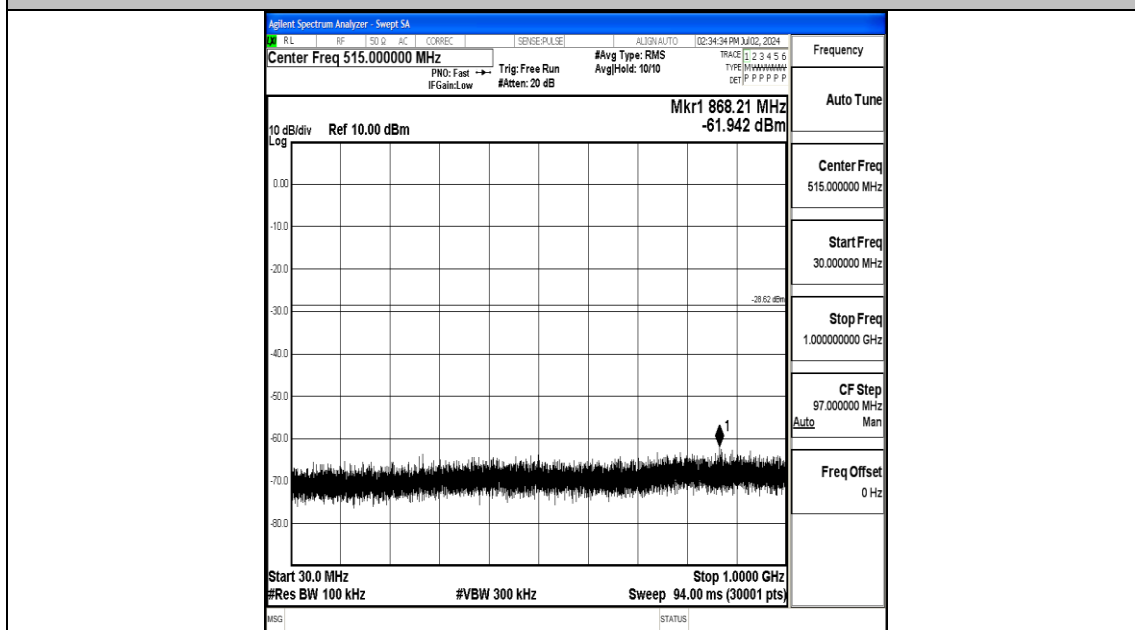




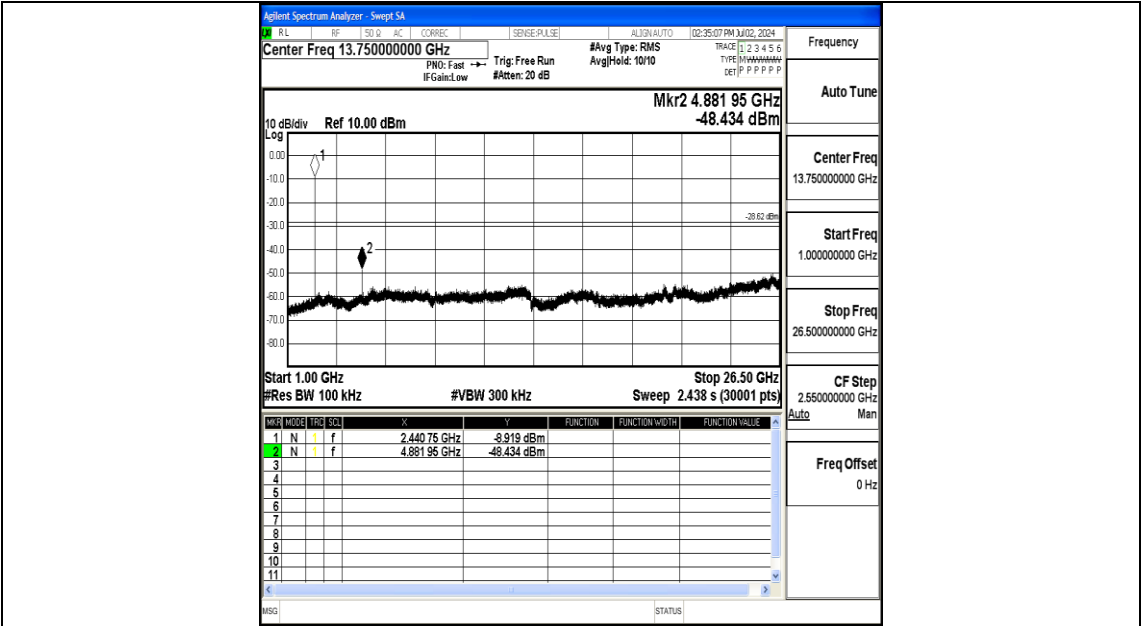
DH5-Ant1-2402-1000~26500-PASS



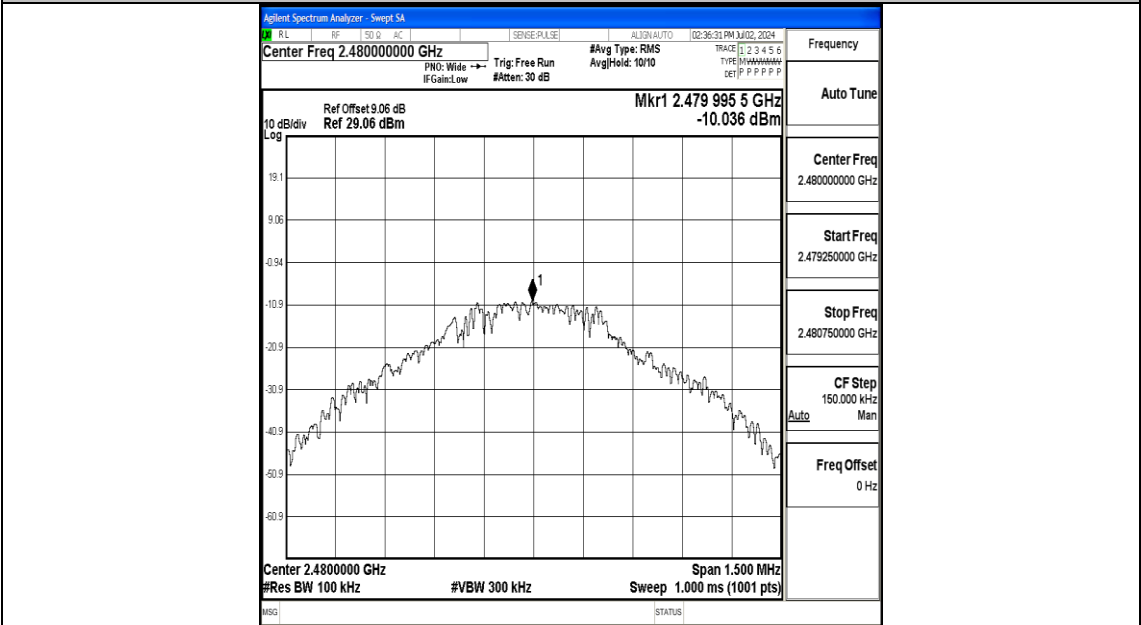
DH5-Ant1-2441-0~Reference-PASS



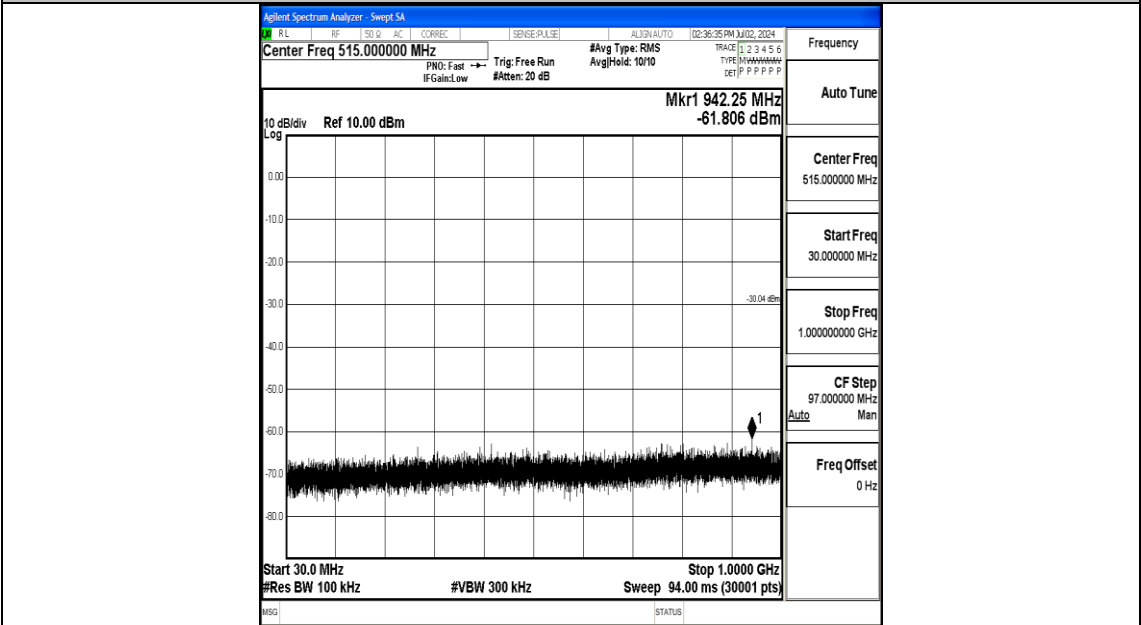
DH5-Ant1-2441-30~1000-PASS



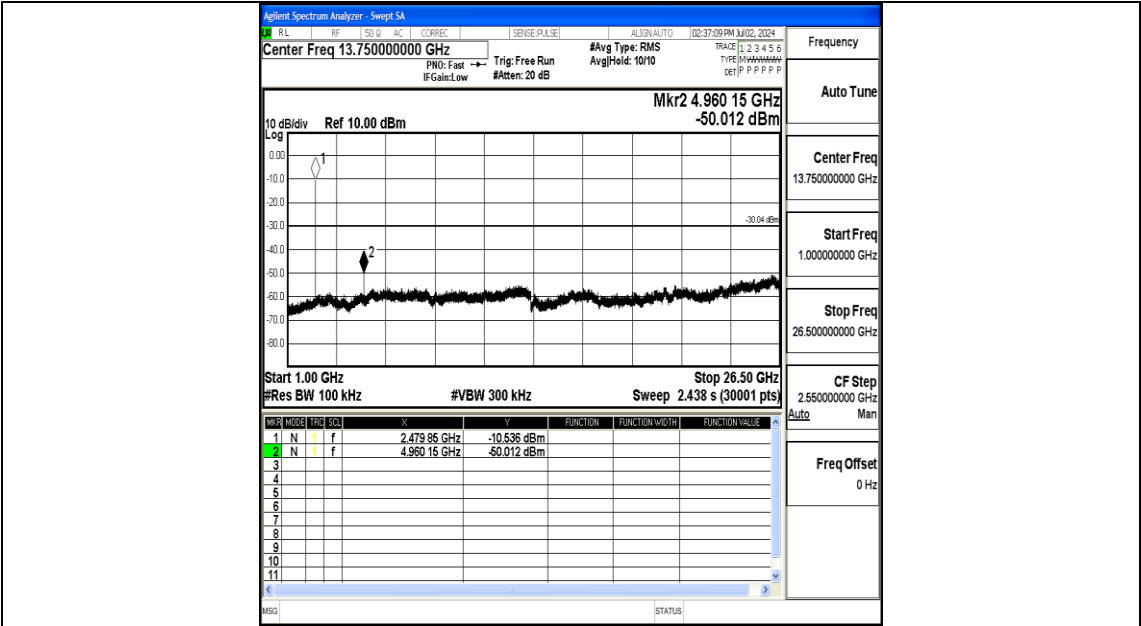
DH5-Ant1-2441-1000~26500-PASS



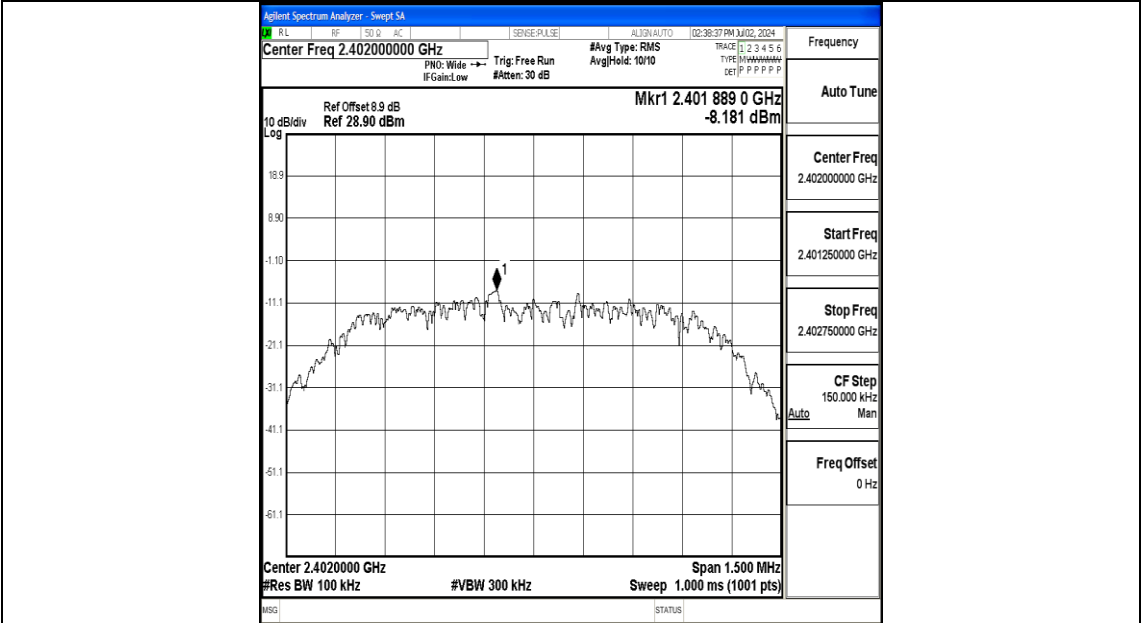
DH5-Ant1-2480-0~Reference-PASS



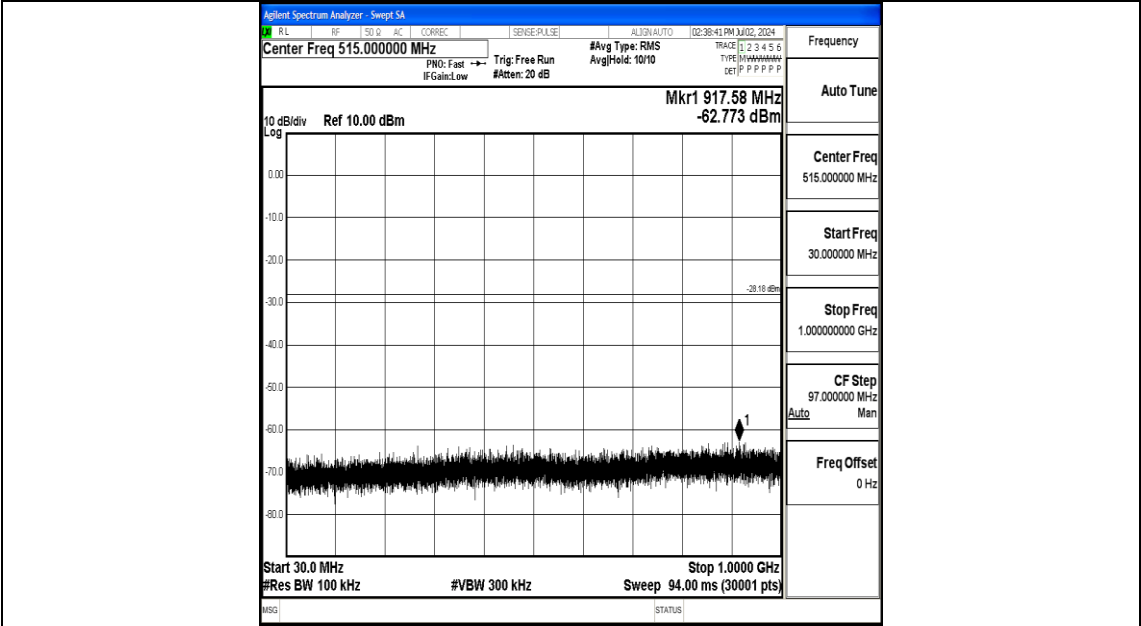
DH5-Ant1-2480-30~1000-PASS



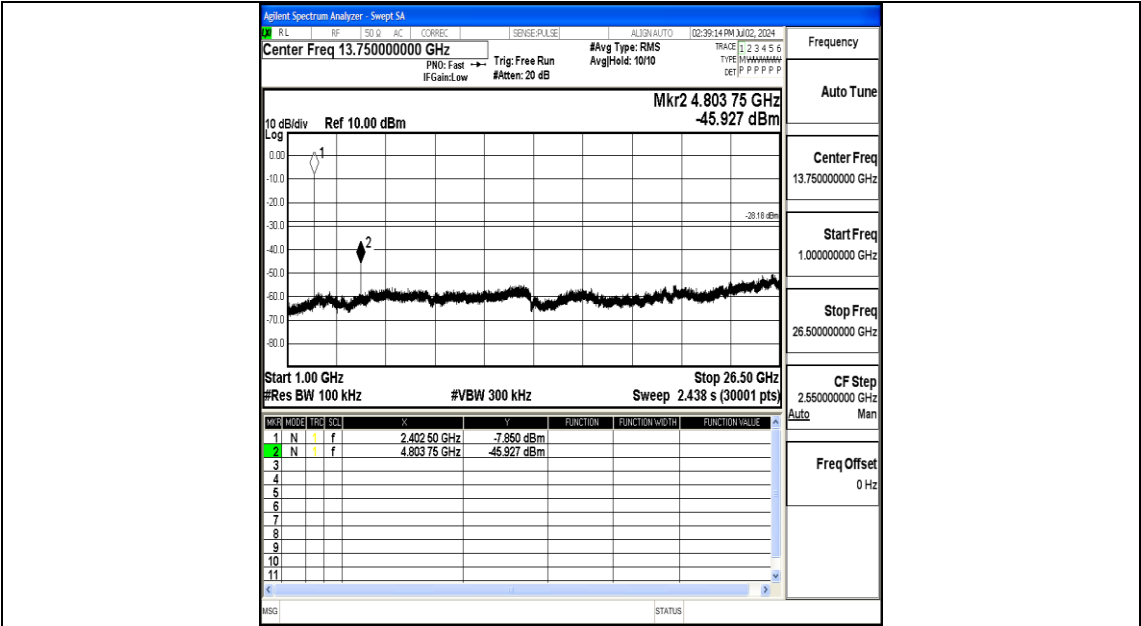
DH5-Ant1-2480-1000~26500-PASS



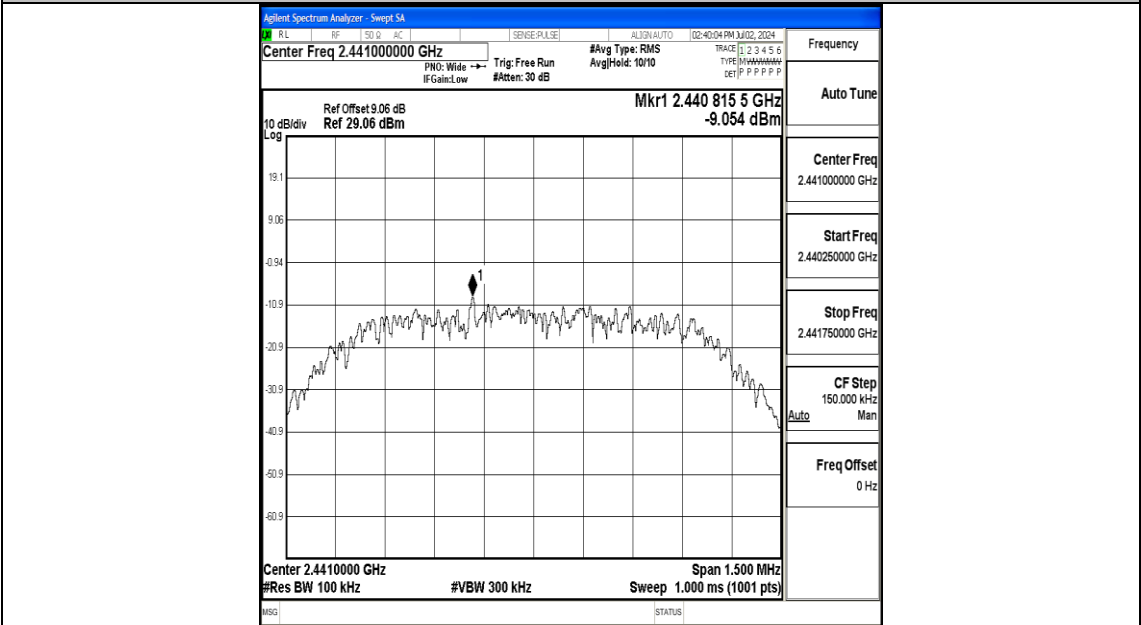
2DH5-Ant1-2402-0~Reference-PASS



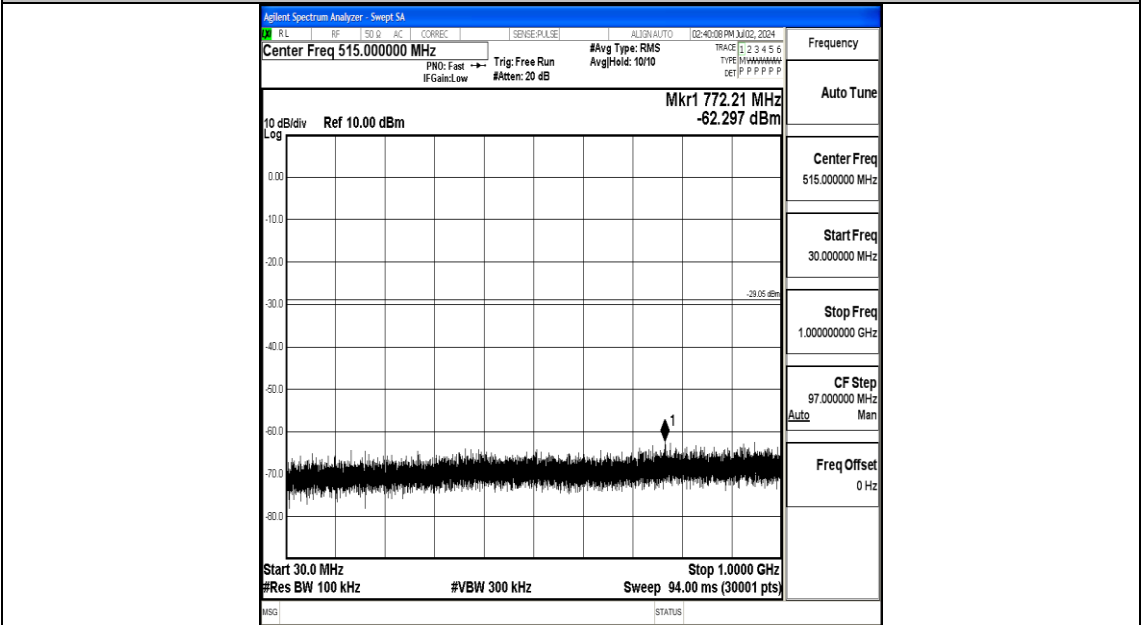
2DH5-Ant1-2402-30~1000-PASS



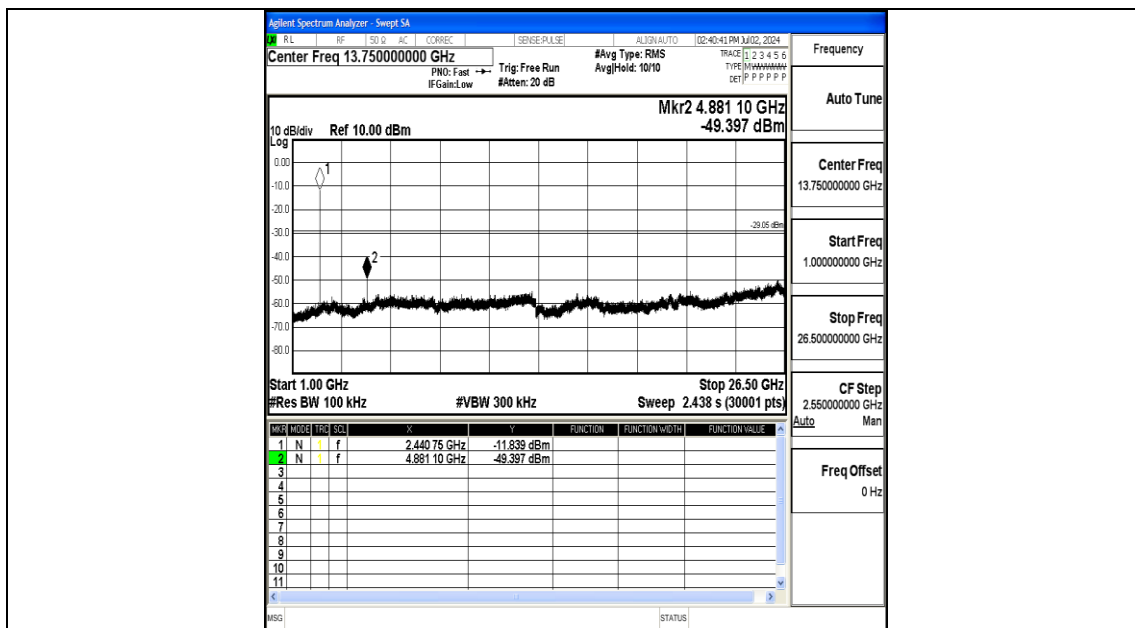
2DH5-Ant1-2402-1000~26500-PASS



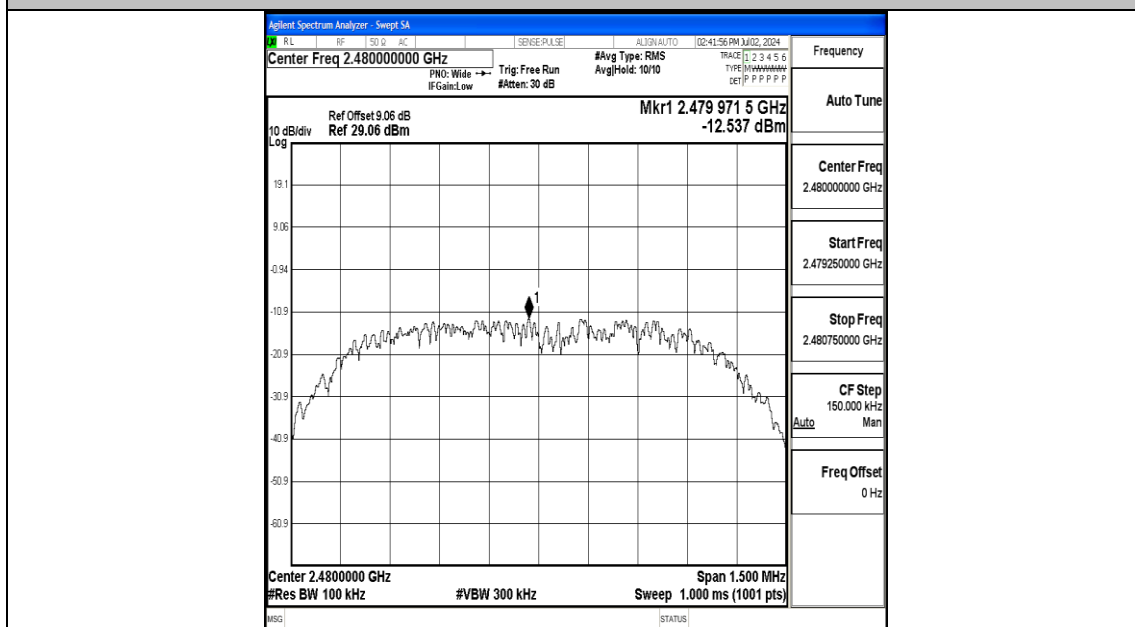
2DH5-Ant1-2441-0~Reference-PASS



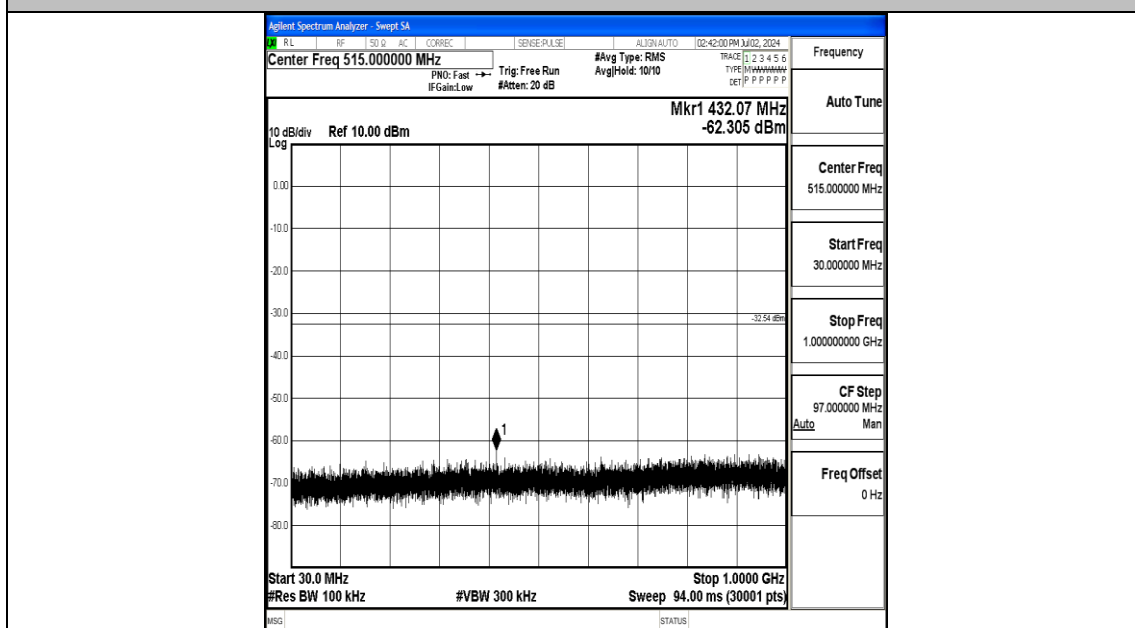
2DH5-Ant1-2441-30~1000-PASS



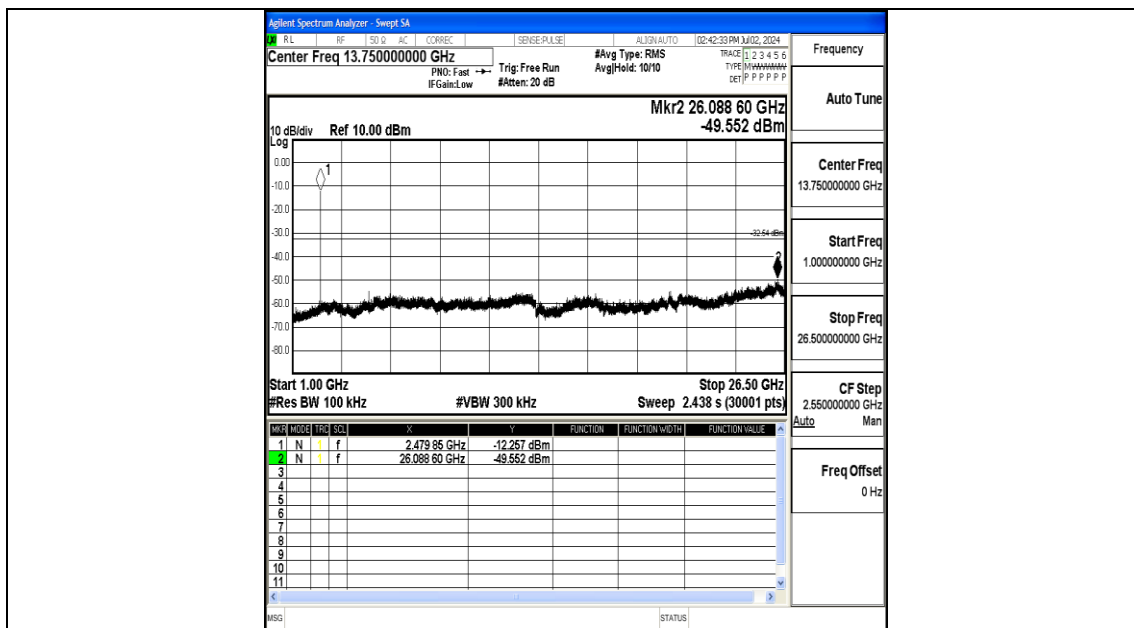
2DH5-Ant1-2441-1000~26500-PASS



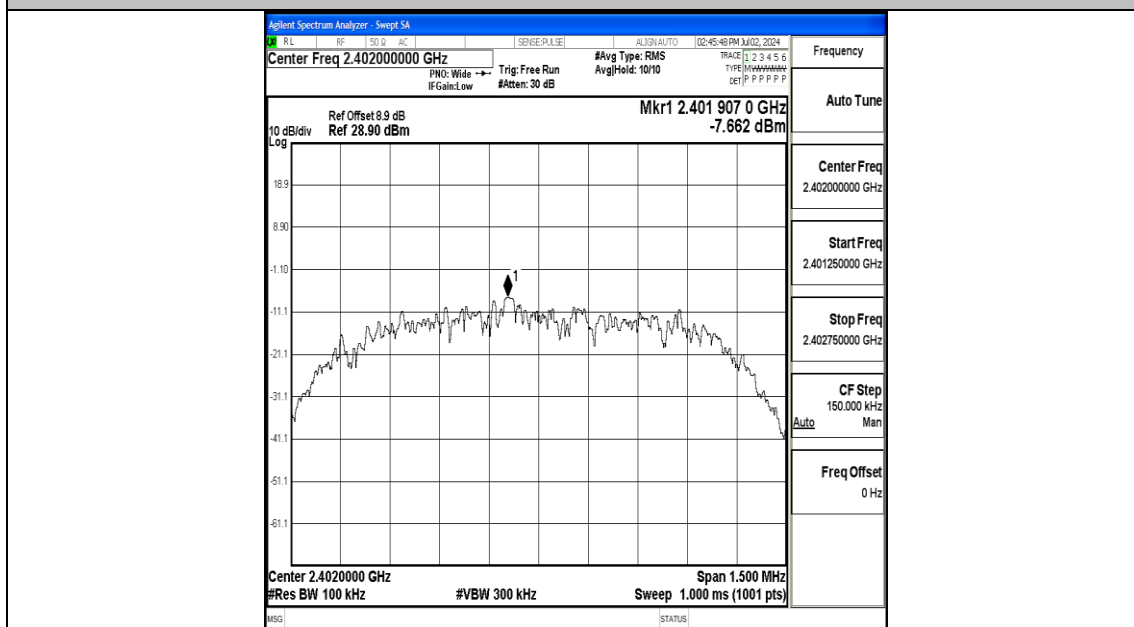
2DH5-Ant1-2480-0~Reference-PASS



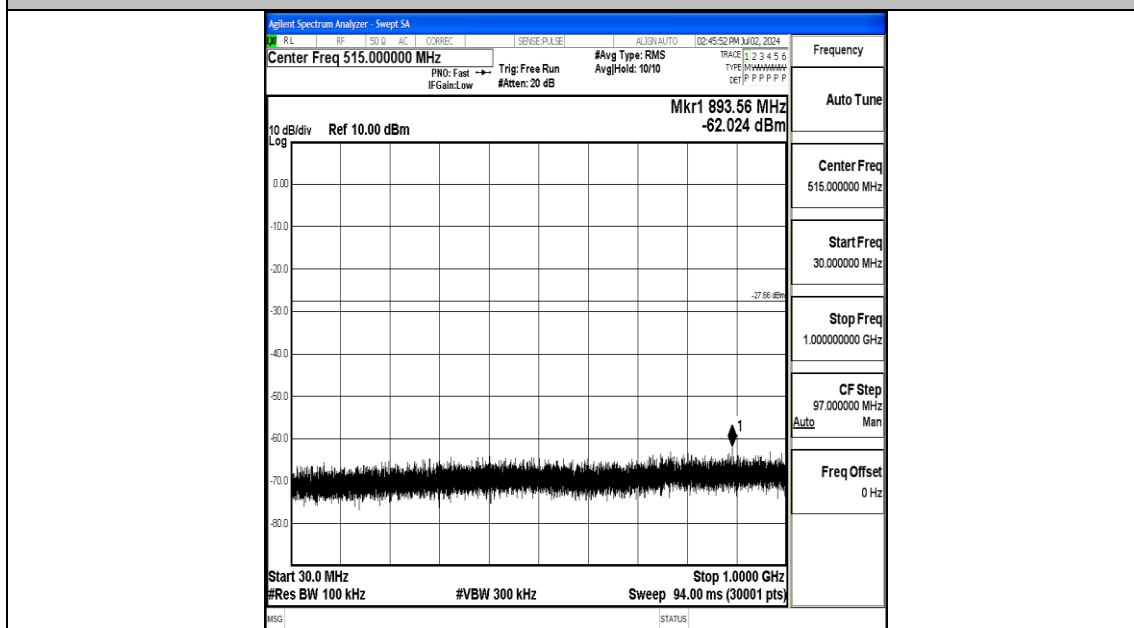
2DH5-Ant1-2480-30~1000-PASS



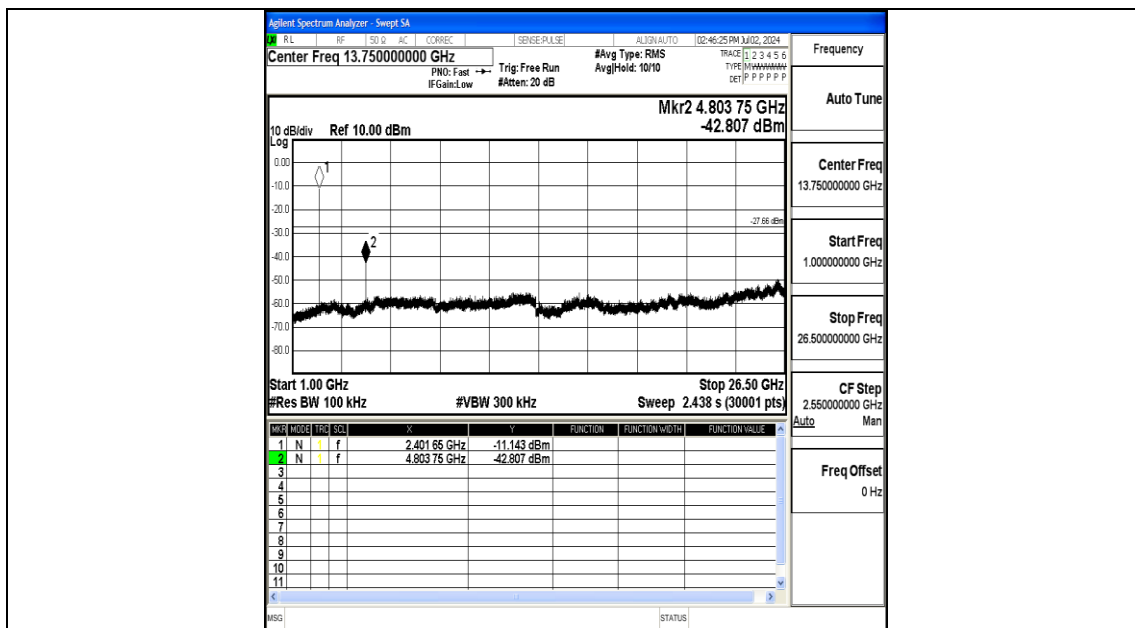
2DH5-Ant1-2480-1000~26500-PASS



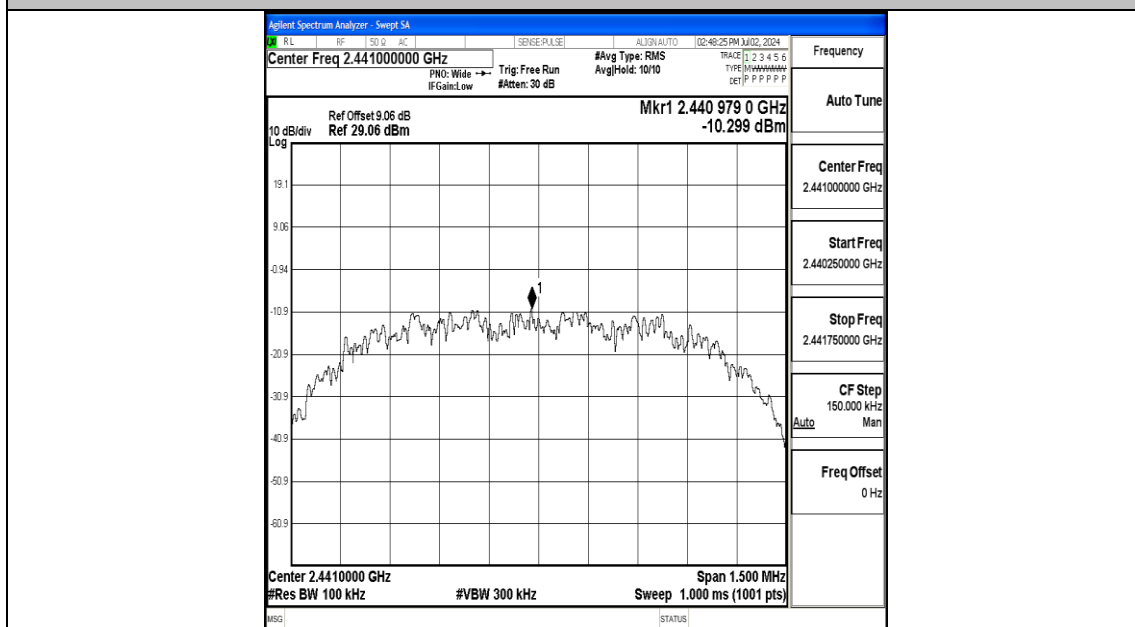
3DH5-Ant1-2402-0~Reference-PASS



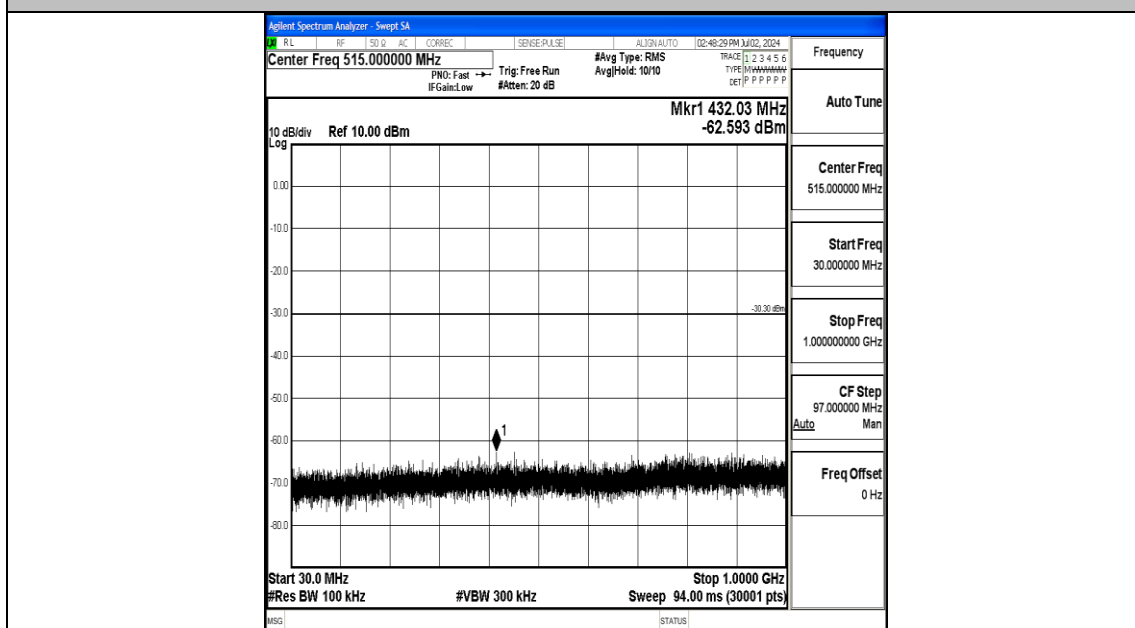
3DH5-Ant1-2402-30~1000-PASS



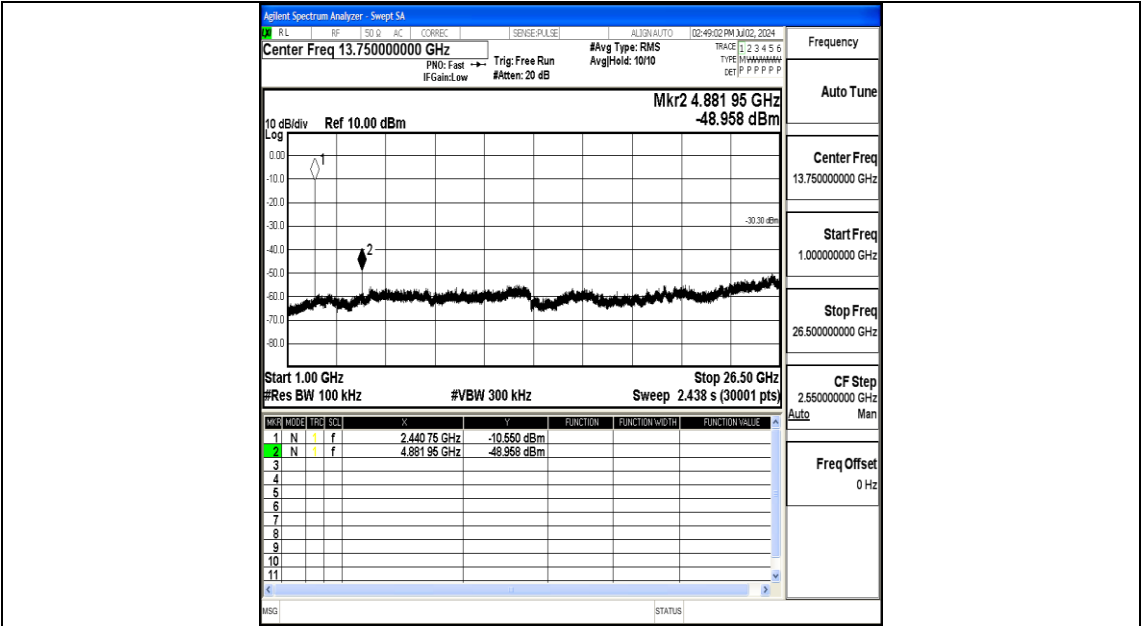
3DH5-Ant1-2402-1000~26500-PASS



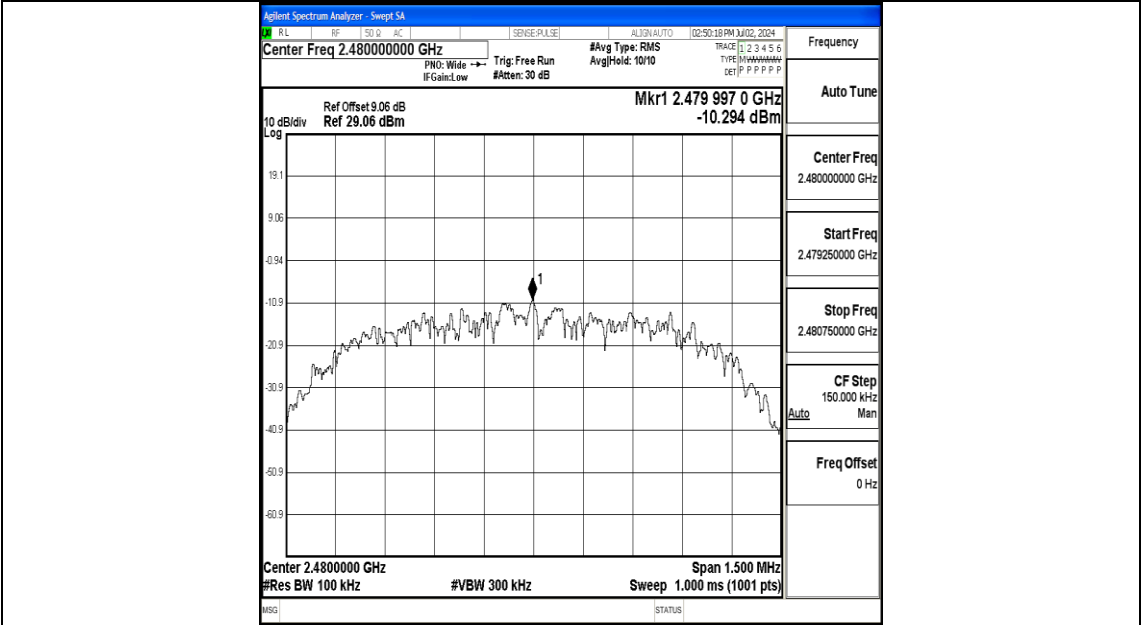
3DH5-Ant1-2441-0~Reference-PASS



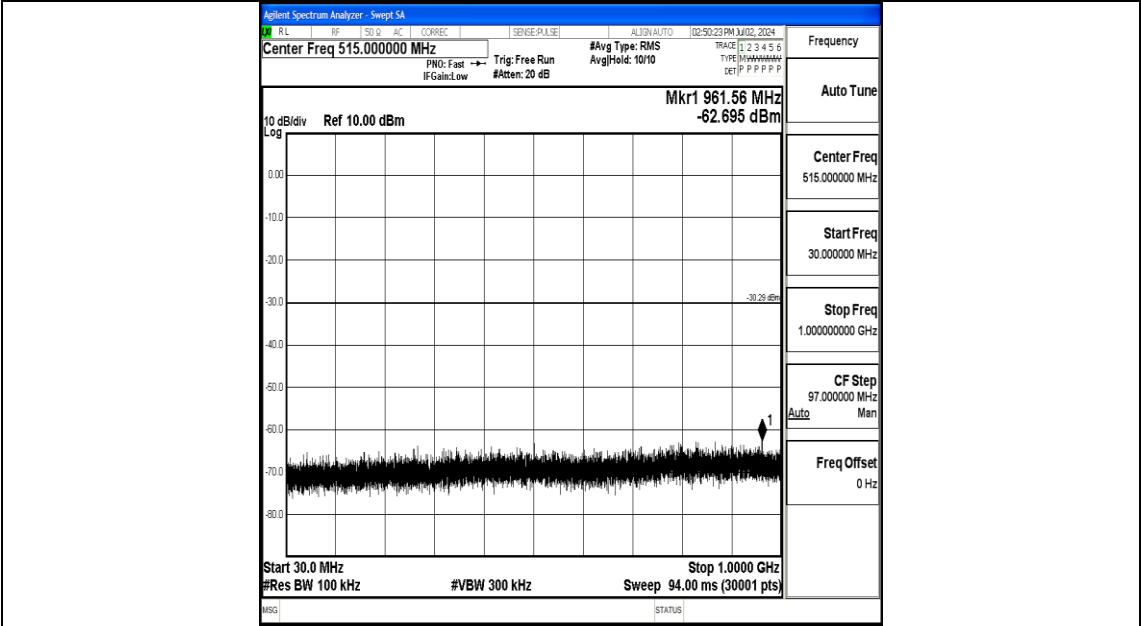
3DH5-Ant1-2441-30~1000-PASS



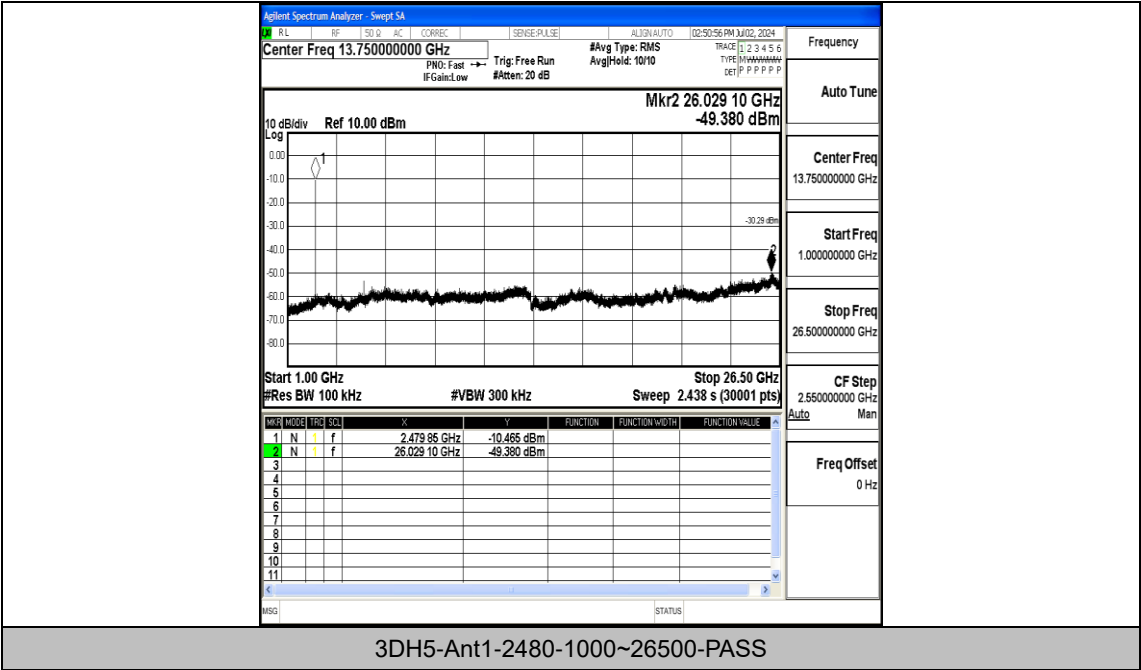
3DH5-Ant1-2441-1000~26500-PASS



3DH5-Ant1-2480-0~Reference-PASS



3DH5-Ant1-2480-30~1000-PASS

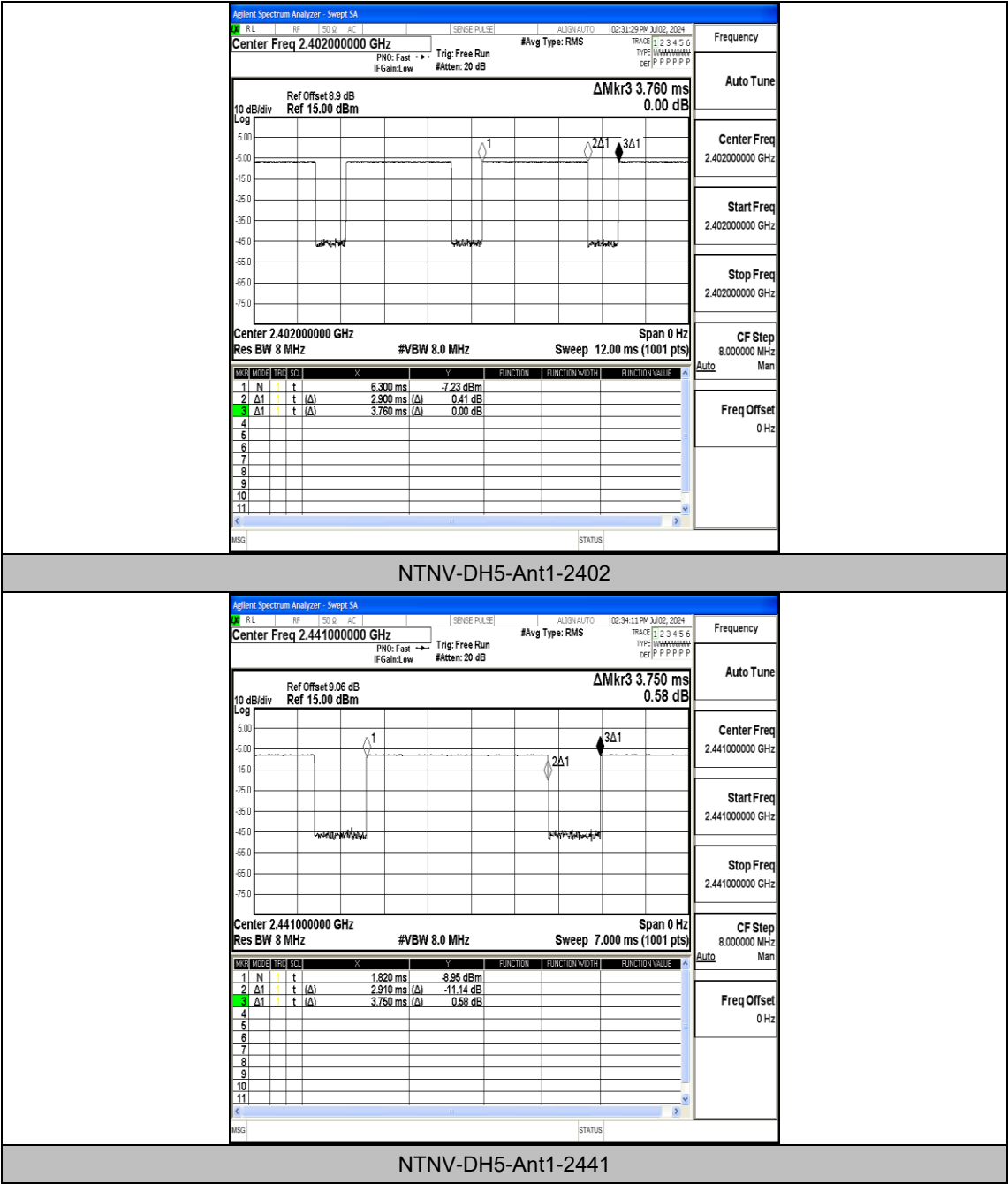


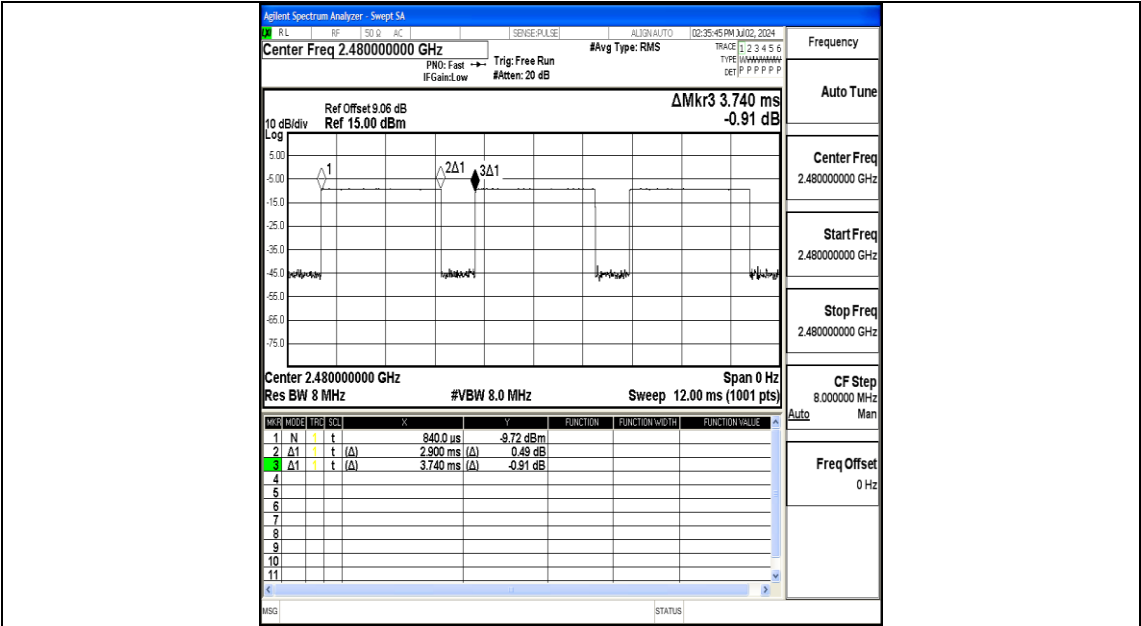
Appendix I: Duty Cycle

Test Result

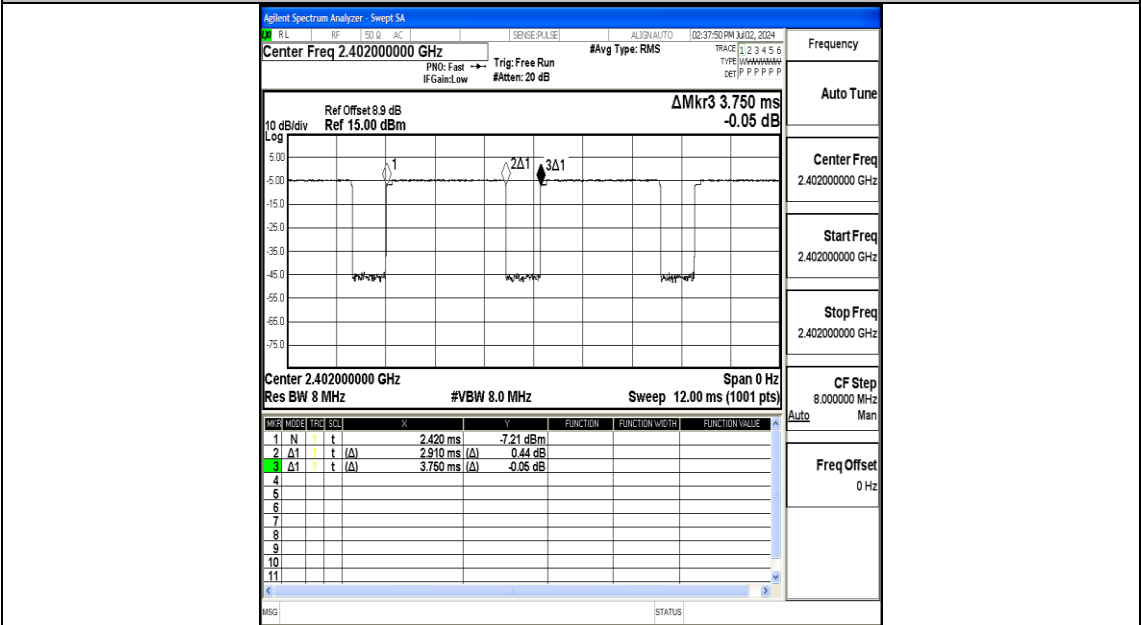
Test Mode	Antenna	Frequency [MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor [dB]
DH5	Ant1	2402	2.90	3.76	77.13	1.13
DH5	Ant1	2441	2.91	3.75	77.60	1.10
DH5	Ant1	2480	2.90	3.74	77.54	1.10
2DH5	Ant1	2402	2.91	3.75	77.60	1.10
2DH5	Ant1	2441	2.91	3.74	77.81	1.09
2DH5	Ant1	2480	2.91	3.74	77.81	1.09
3DH5	Ant1	2402	2.91	3.75	77.60	1.10
3DH5	Ant1	2441	2.92	3.75	77.87	1.09
3DH5	Ant1	2480	2.92	3.75	77.87	1.09

Test Graphs

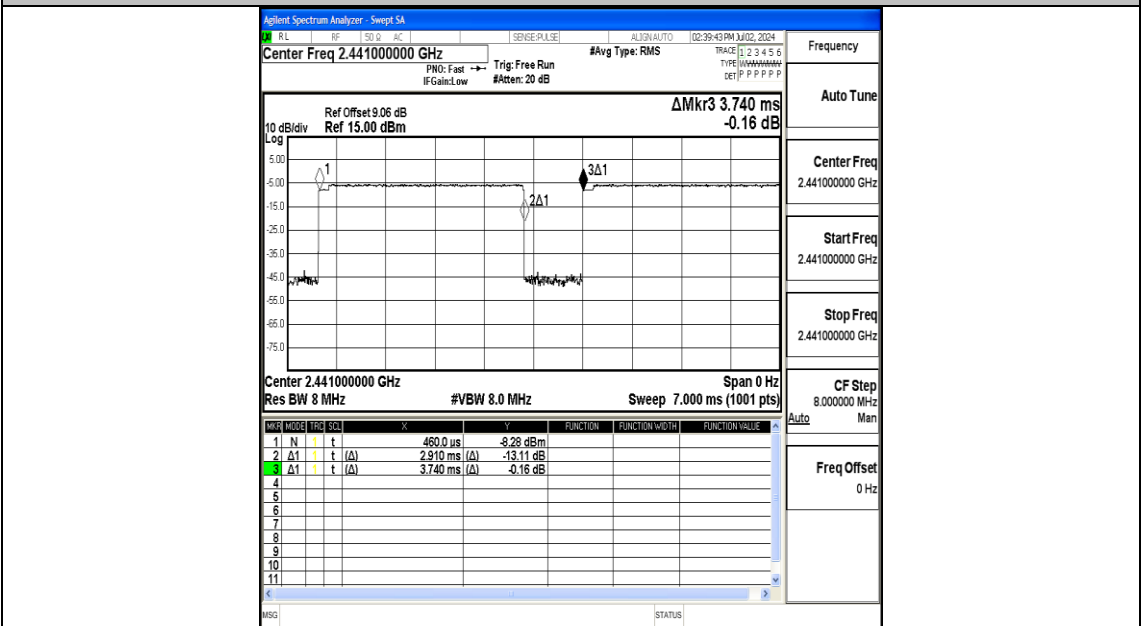




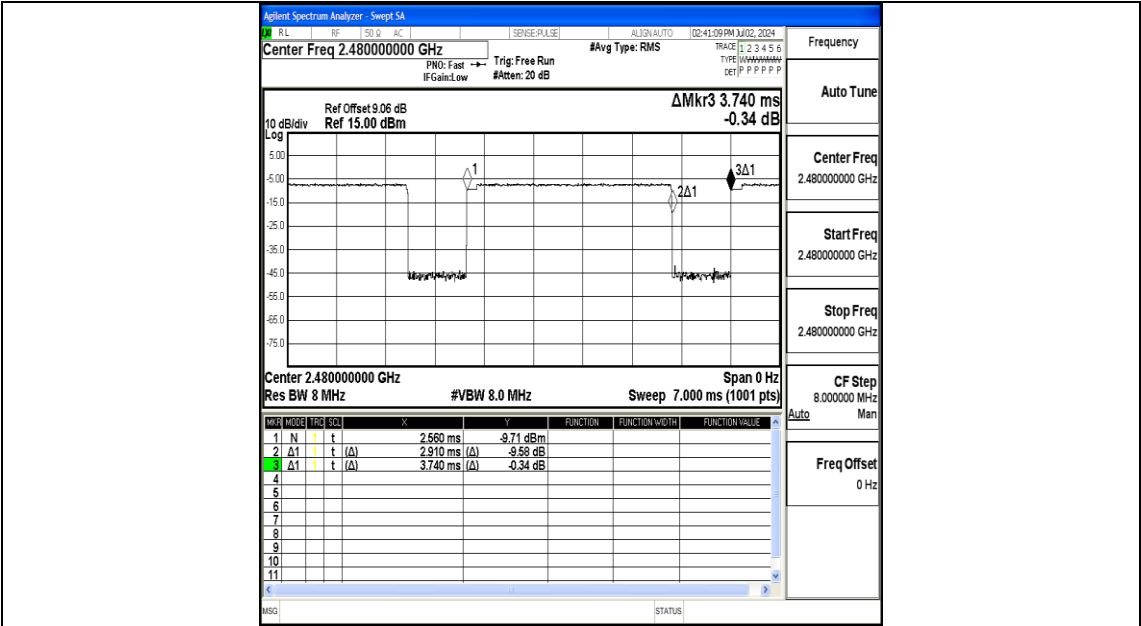
NTNV-DH5-Ant1-2480



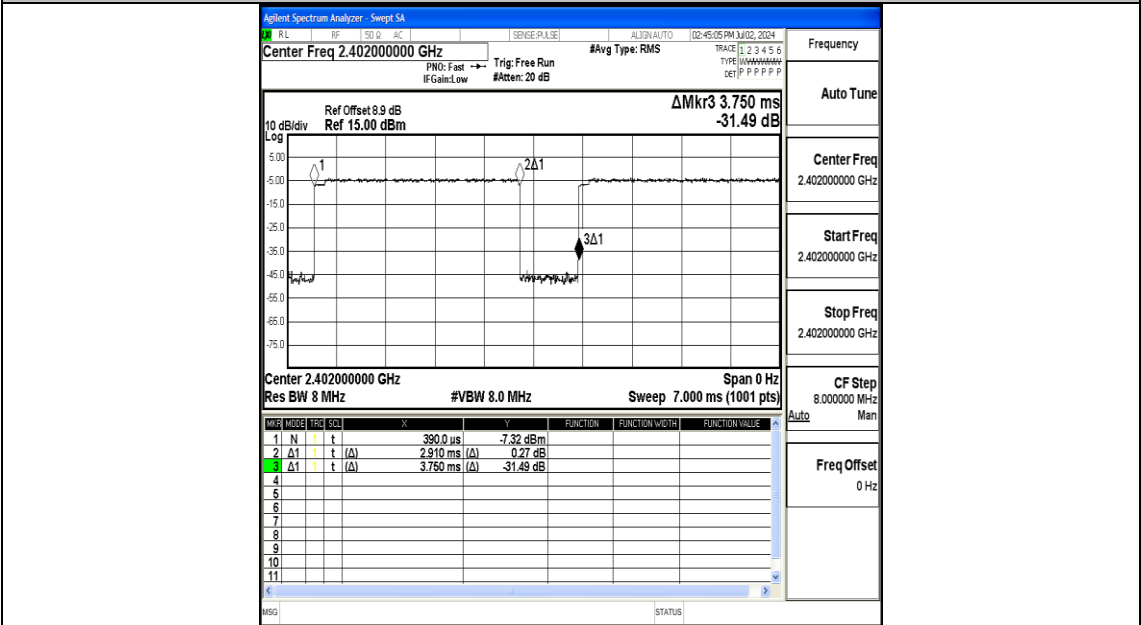
NTNV-2DH5-Ant1-2402



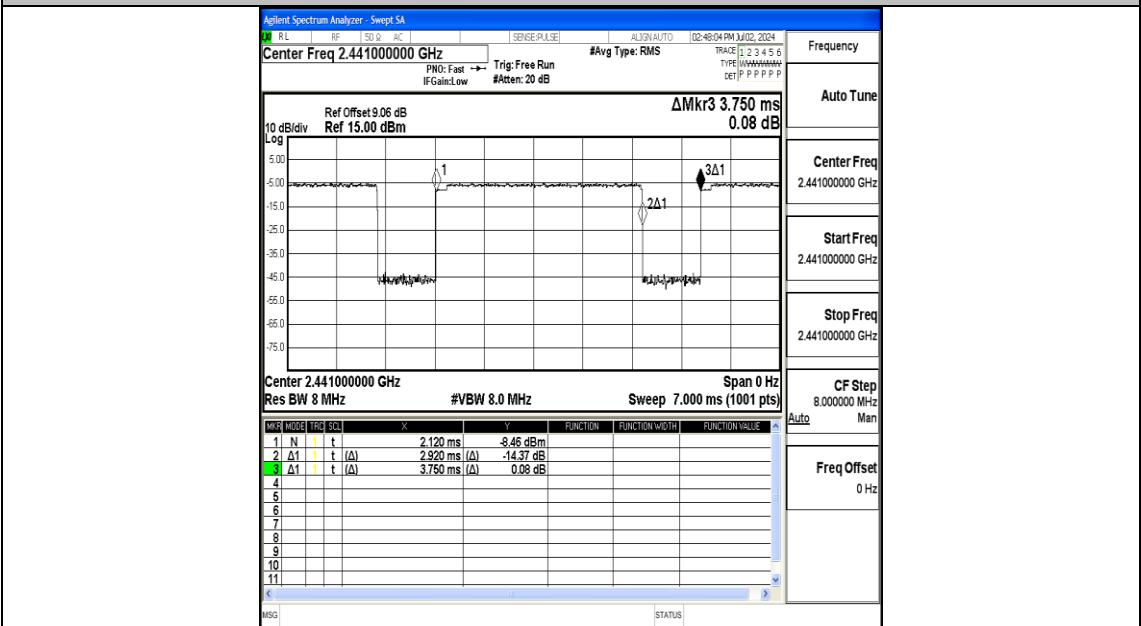
NTNV-2DH5-Ant1-2441



NTNV-2DH5-Ant1-2480



NTNV-3DH5-Ant1-2402



NTNV-3DH5-Ant1-2441

