Appendix A

RF Test Data for BT (Conducted Measurement)

Product Name: Home Automation Controller

Test Model: OliverIQ Home Automation Controller (Gen 1)

Environmental Conditions

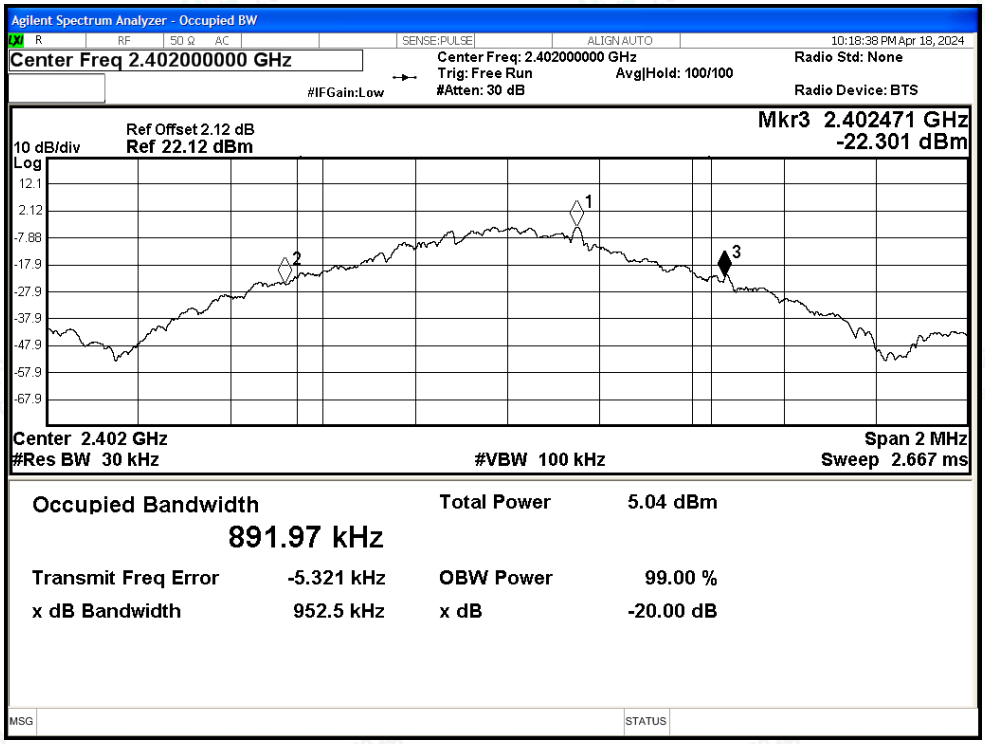
Temperature:	23.8°C
Relative Humidity:	52.1%
ATM Pressure:	100.0 kPa
Test Engineer:	Paddi Chen
Supervised by:	Nick Peng

A.1 -20dB Bandwidth

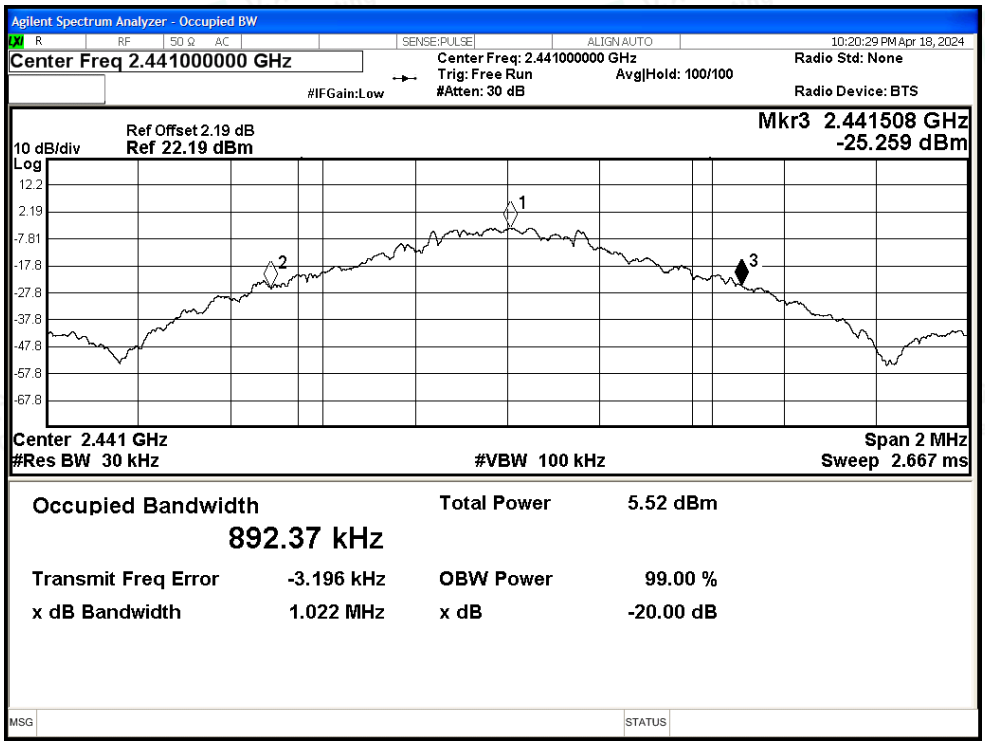
Condition	Mode	Frequency (MHz)	Antenna	-20 dB Bandwidth (MHz)	Limit -20 dB Bandwidth (MHz)	Verdict
NVNT	1-DH5	2402	Ant1	0.953	N/A	Pass
NVNT	1-DH5	2441	Ant1	1.022	N/A	Pass
NVNT	1-DH5	2480	Ant1	1.023	N/A	Pass
NVNT	2-DH5	2402	Ant1	1.317	N/A	Pass
NVNT	2-DH5	2441	Ant1	1.279	N/A	Pass
NVNT	2-DH5	2480	Ant1	1.304	N/A	Pass
NVNT	3-DH5	2402	Ant1	1.288	N/A	Pass
NVNT	3-DH5	2441	Ant1	1.301	N/A	Pass
NVNT	3-DH5	2480	Ant1	1.288	N/A	Pass

Test Graphs

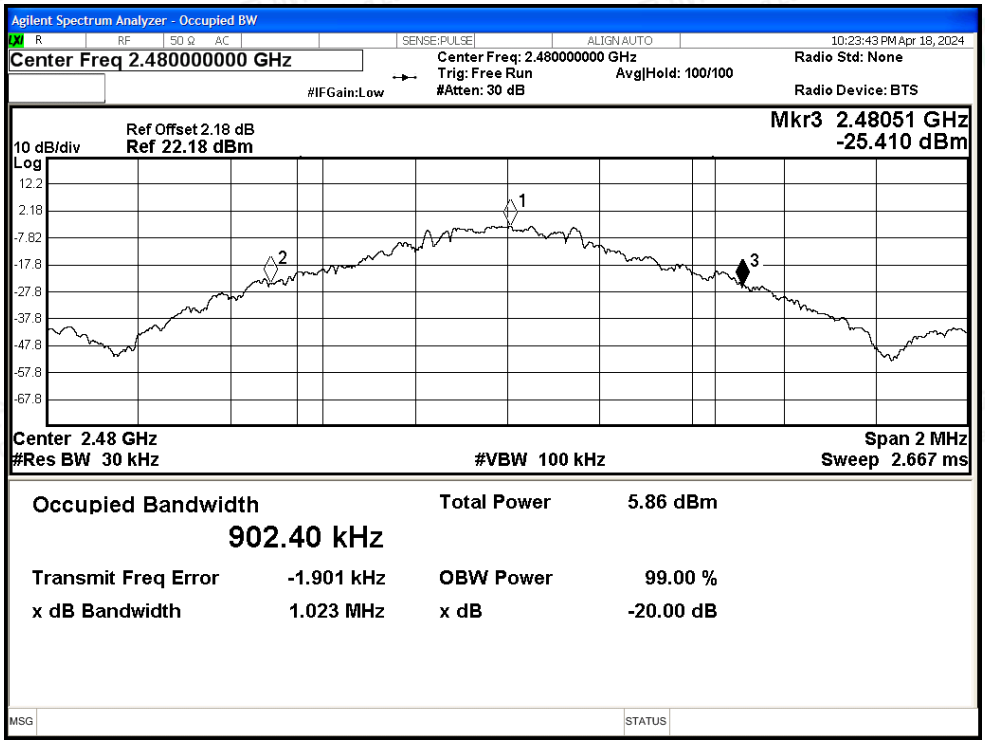
-20dB Bandwidth NVNT 1-DH5 2402MHz Ant1



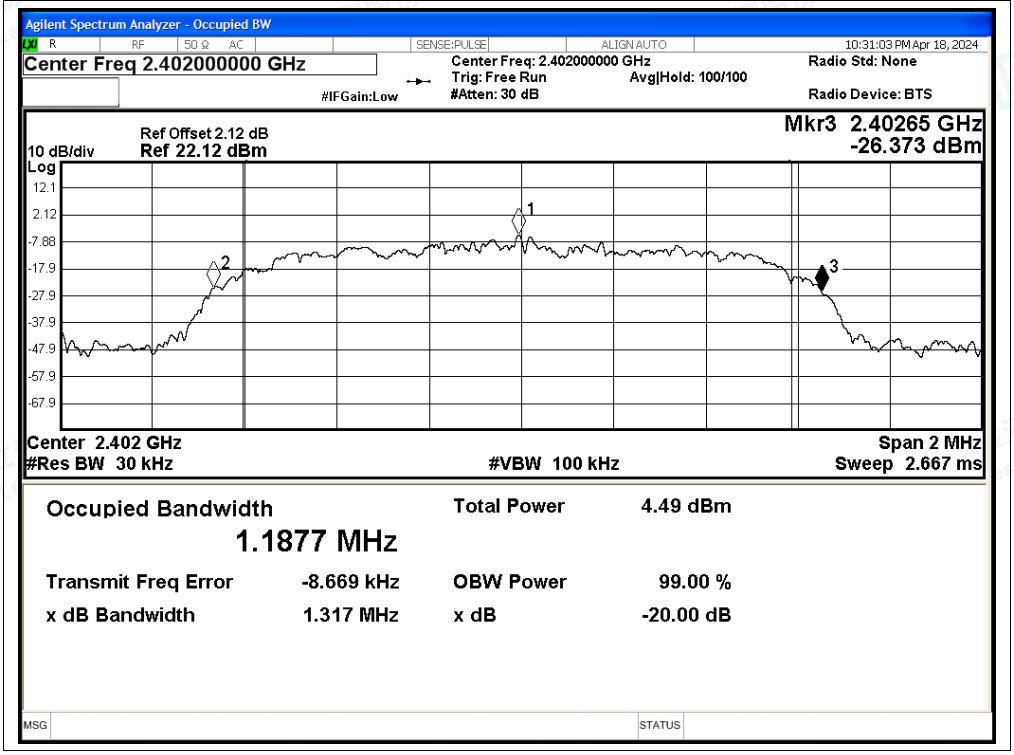
-20dB Bandwidth NVNT 1-DH5 2441MHz Ant1



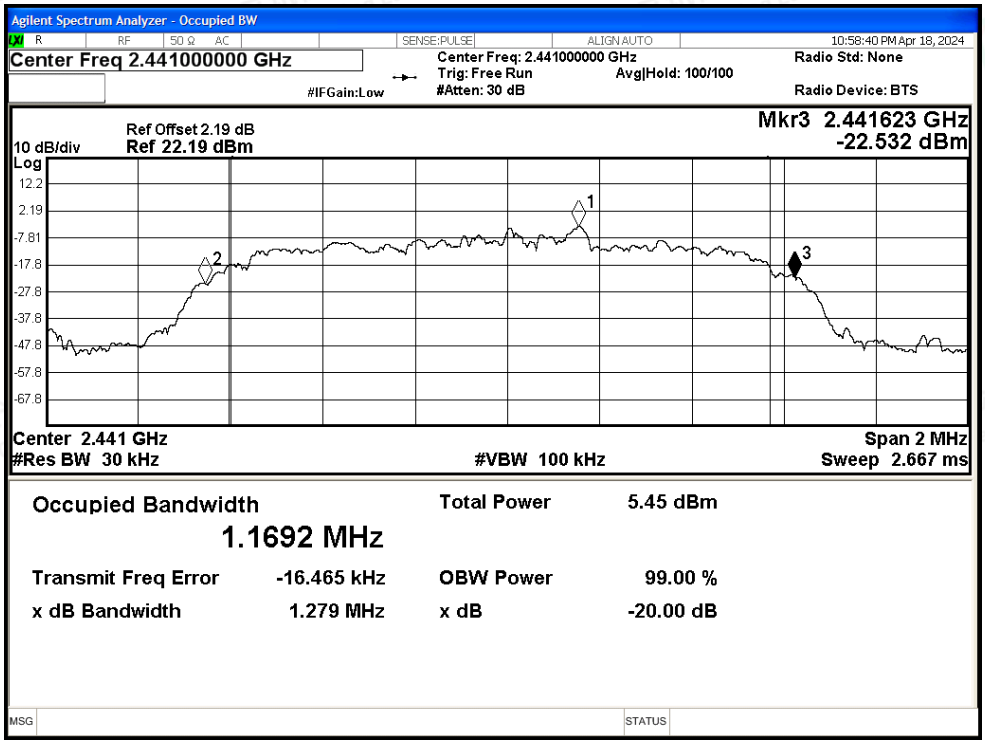
-20dB Bandwidth NVNT 1-DH5 2480MHz Ant1



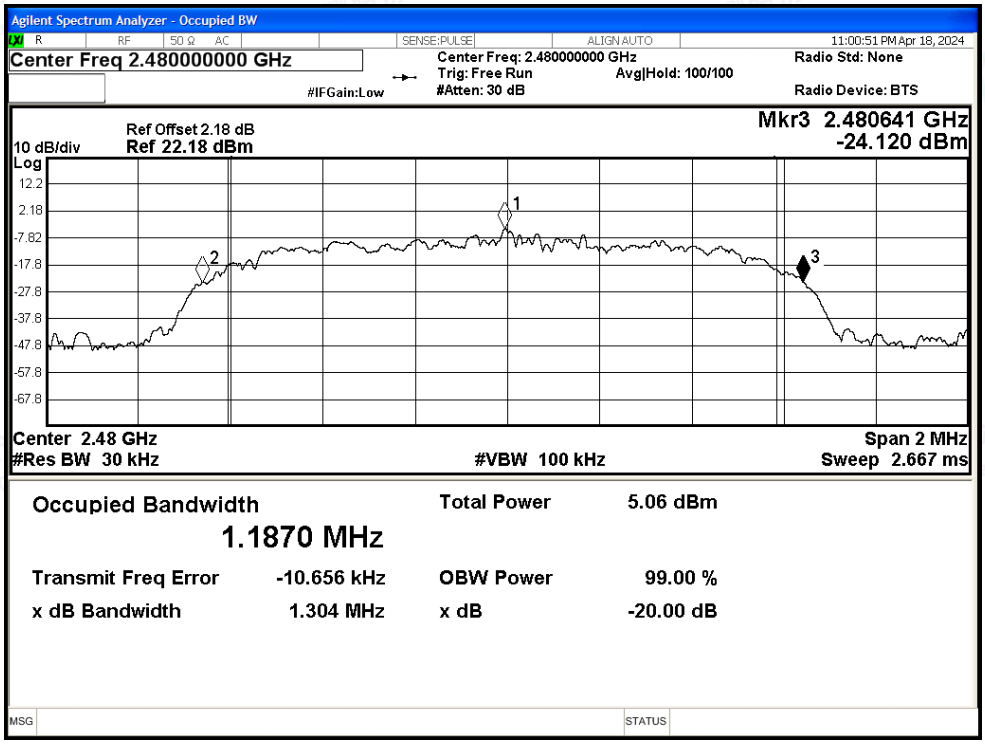
-20dB Bandwidth NVNT 2-DH5 2402MHz Ant1



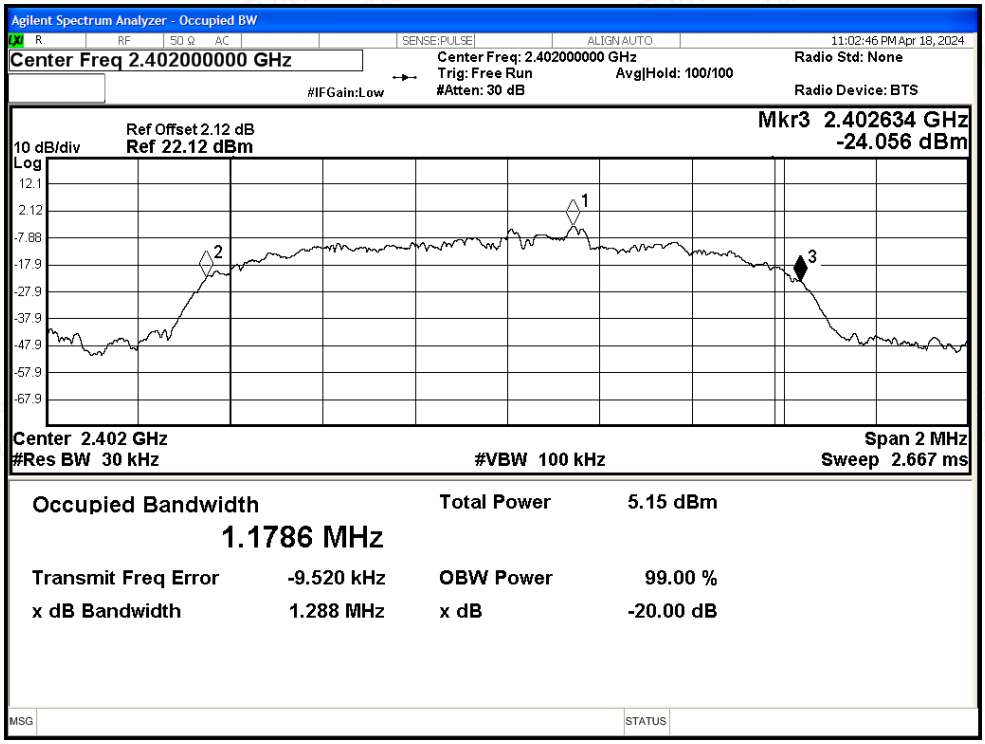
-20dB Bandwidth NVNT 2-DH5 2441MHz Ant1



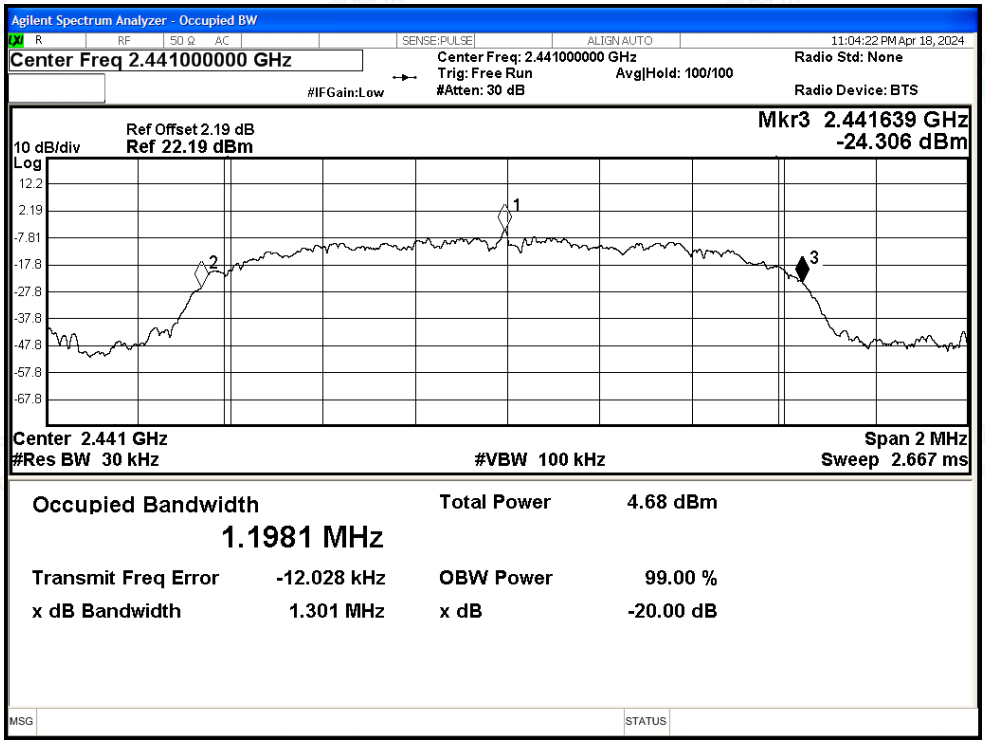
-20dB Bandwidth NVNT 2-DH5 2480MHz Ant1



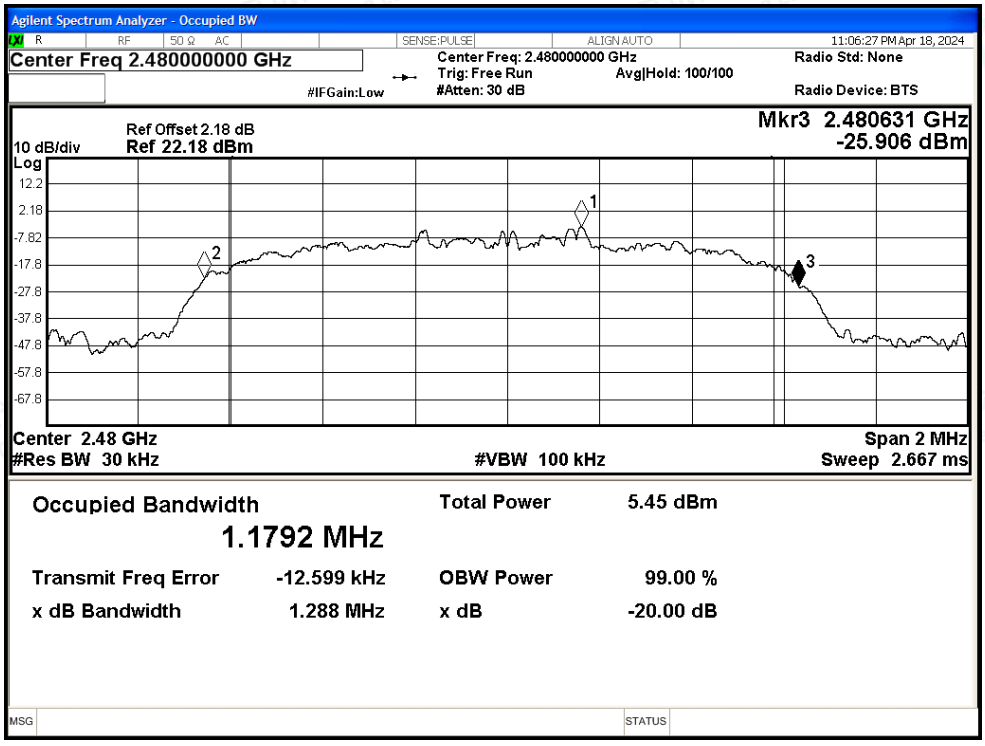
-20dB Bandwidth NVNT 3-DH5 2402MHz Ant1



-20dB Bandwidth NVNT 3-DH5 2441MHz Ant1



-20dB Bandwidth NVNT 3-DH5 2480MHz Ant1

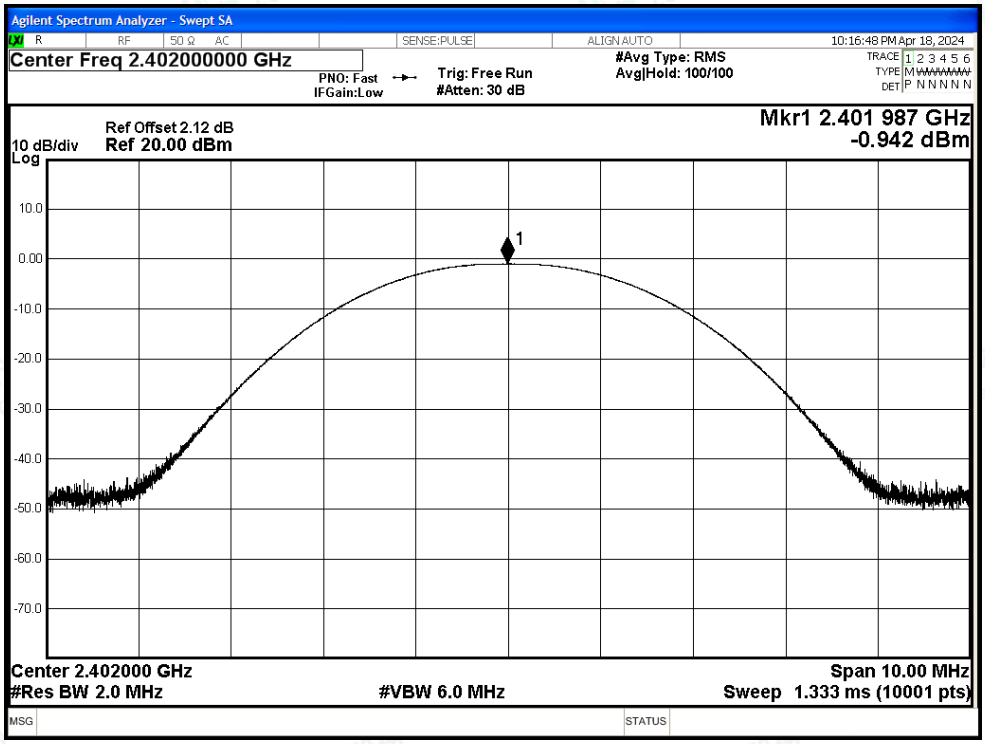


A.3 Maximum Peak Conducted Output Power

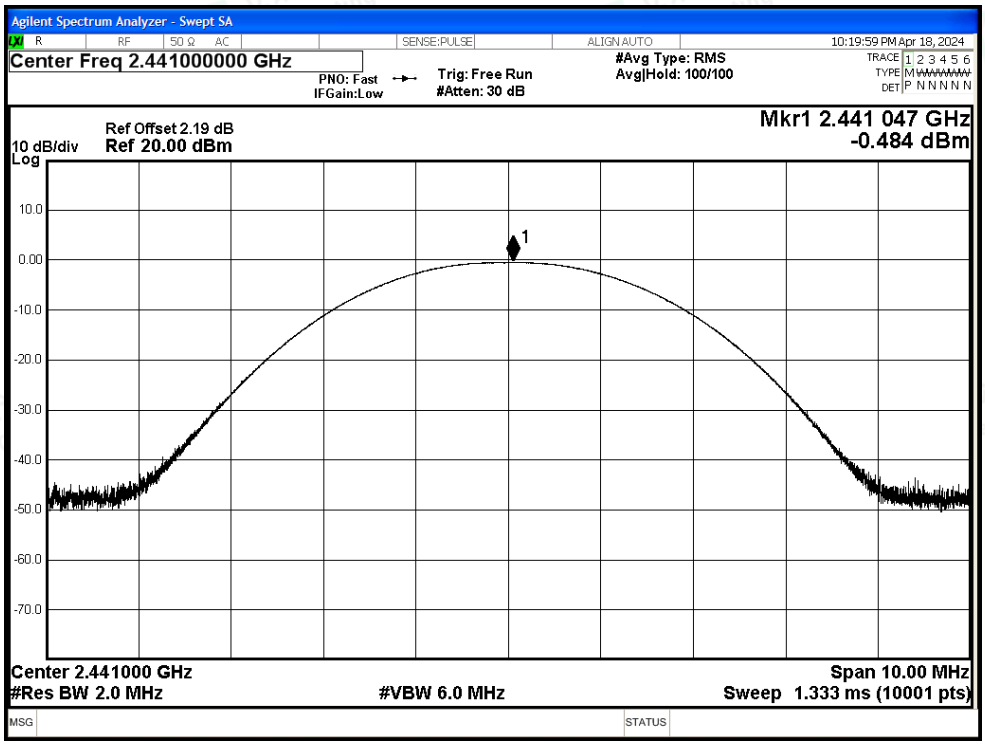
Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	1-DH5	2402	Ant1	-0.94	21	Pass
NVNT	1-DH5	2441	Ant1	-0.48	21	Pass
NVNT	1-DH5	2480	Ant1	-0.45	21	Pass
NVNT	2-DH5	2402	Ant1	0.37	21	Pass
NVNT	2-DH5	2441	Ant1	0.65	21	Pass
NVNT	2-DH5	2480	Ant1	0.76	21	Pass
NVNT	3-DH5	2402	Ant1	0.3	21	Pass
NVNT	3-DH5	2441	Ant1	0.74	21	Pass
NVNT	3-DH5	2480	Ant1	0.85	21	Pass

Test Graphs

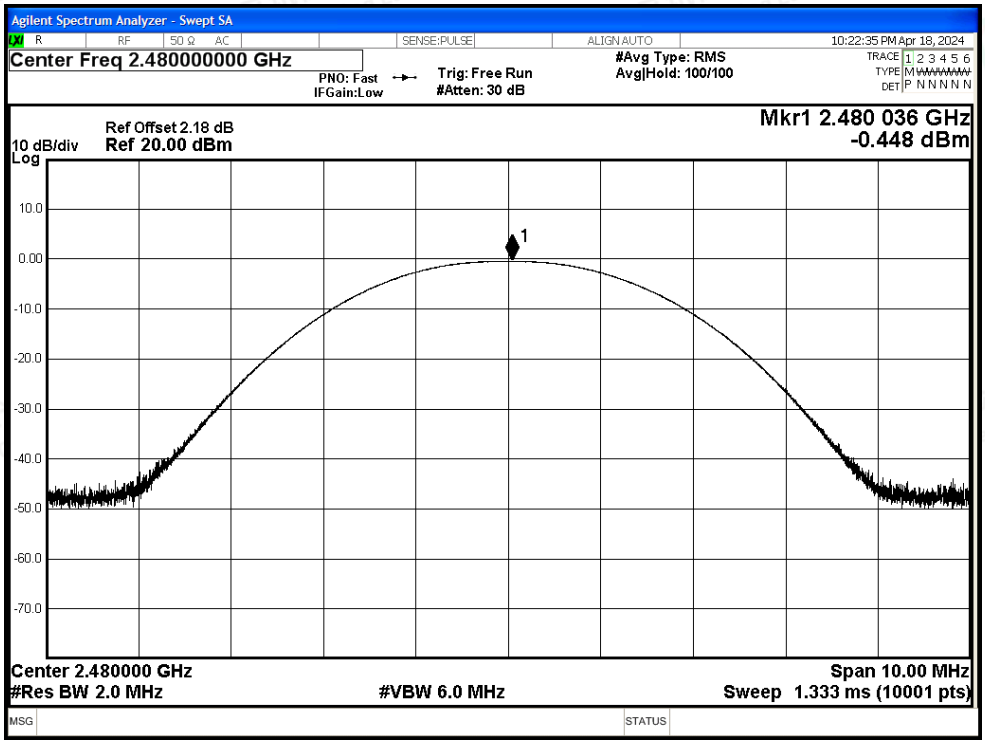
Power NVNT 1-DH5 2402MHz Ant1



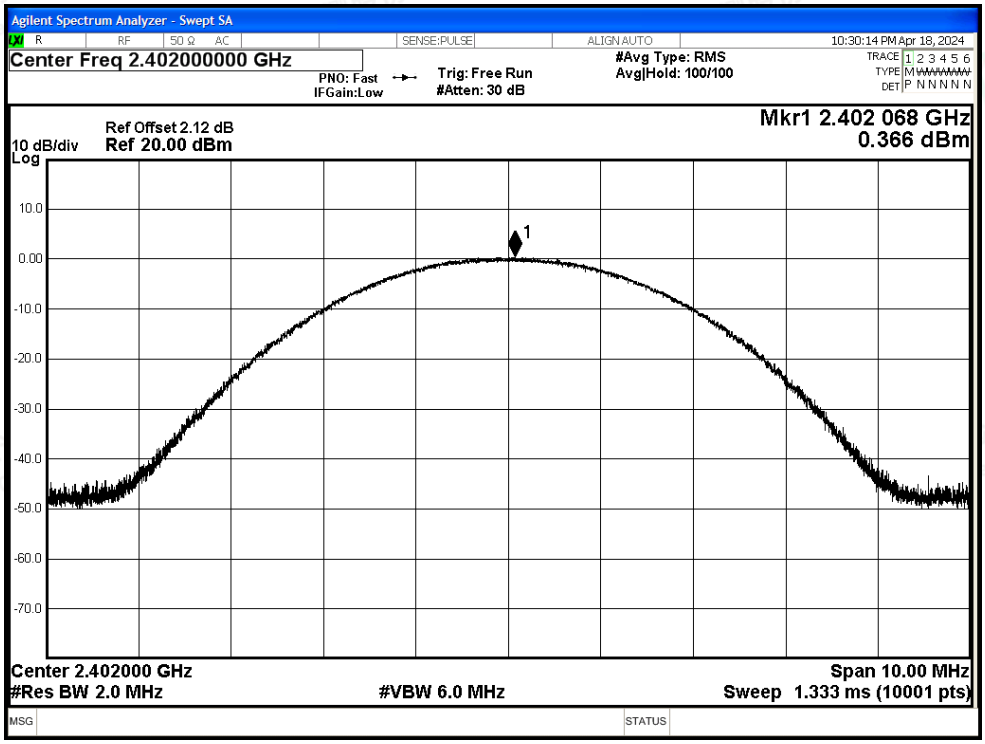
Power NVNT 1-DH5 2441MHz Ant1



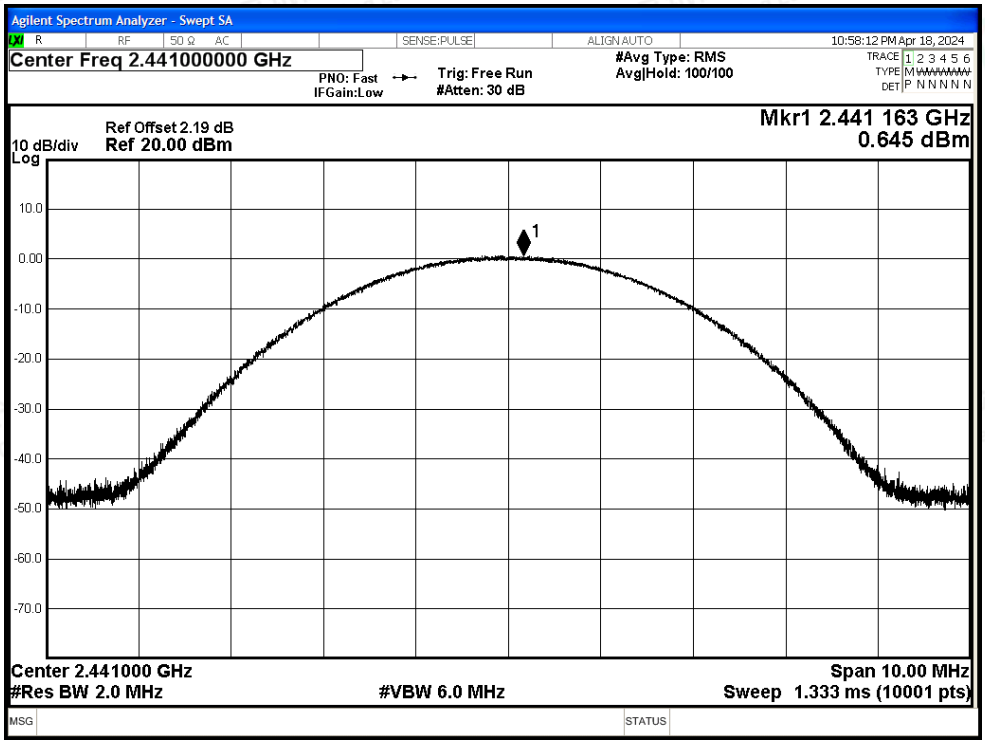
Power NVNT 1-DH5 2480MHz Ant1



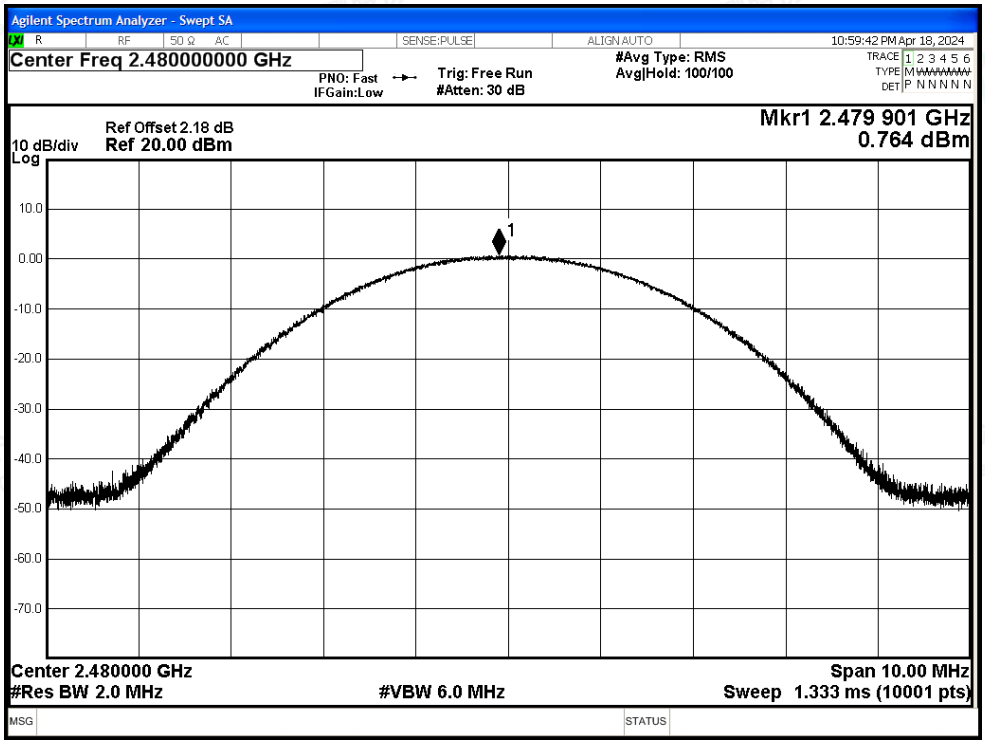
Power NVNT 2-DH5 2402MHz Ant1



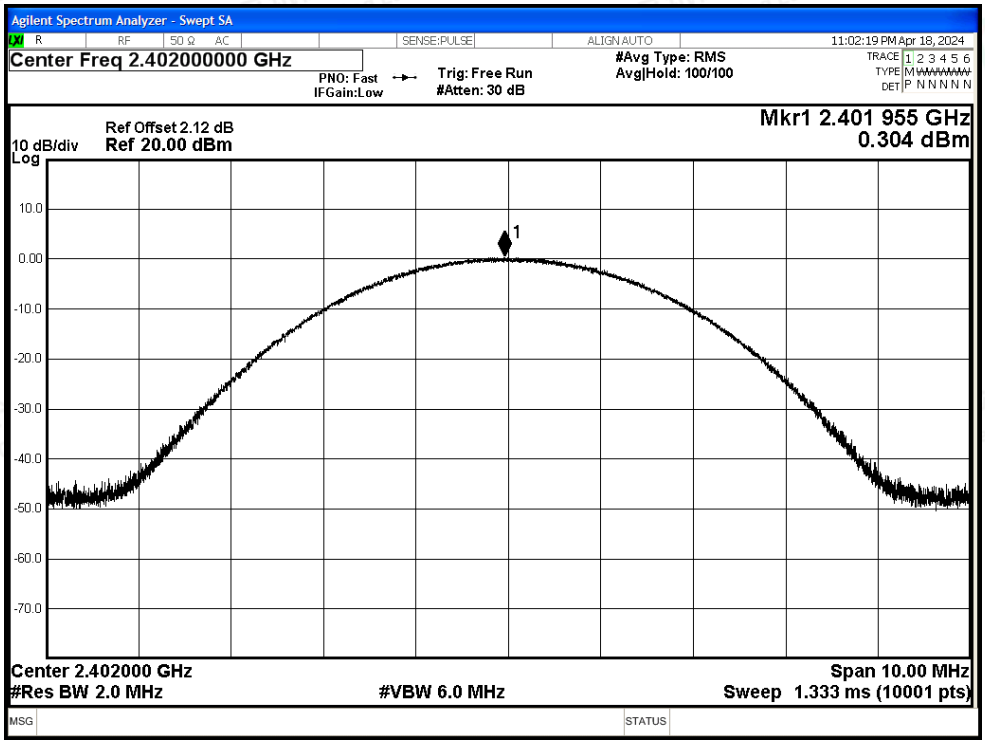
Power NVNT 2-DH5 2441MHz Ant1



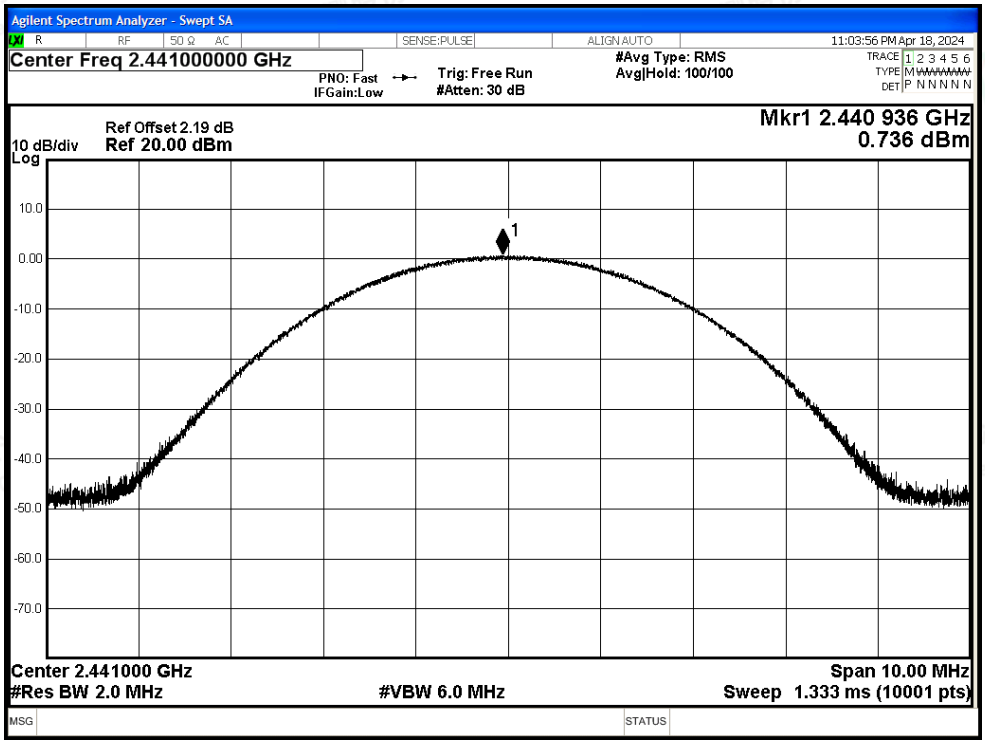
Power NVNT 2-DH5 2480MHz Ant1



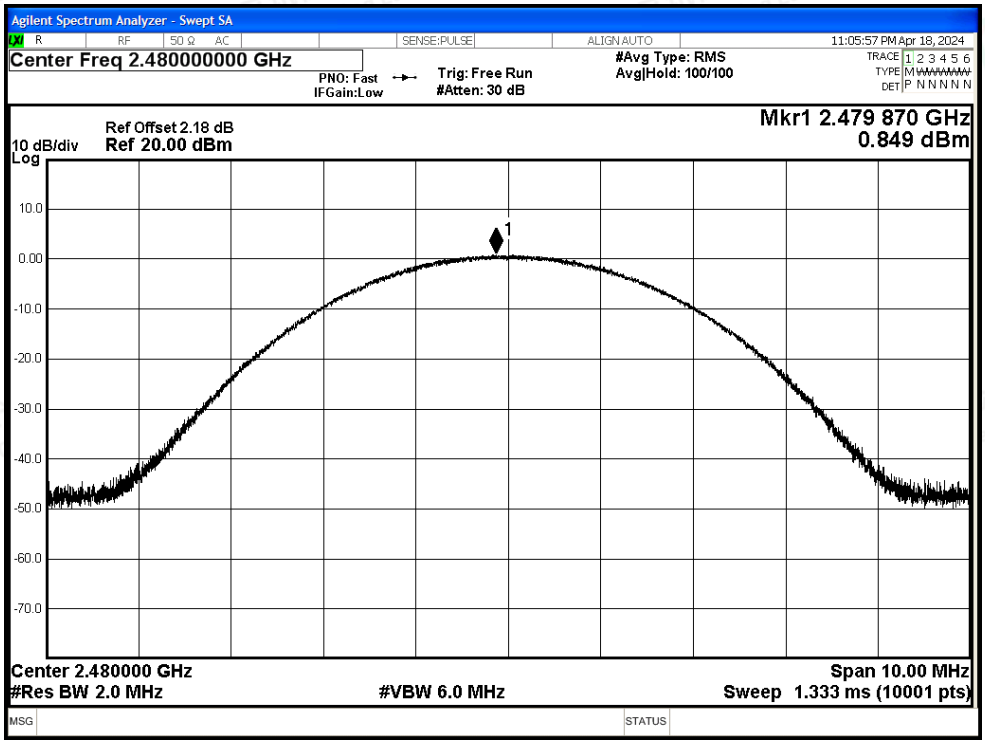
Power NVNT 3-DH5 2402MHz Ant1



Power NVNT 3-DH5 2441MHz Ant1



Power NVNT 3-DH5 2480MHz Ant1

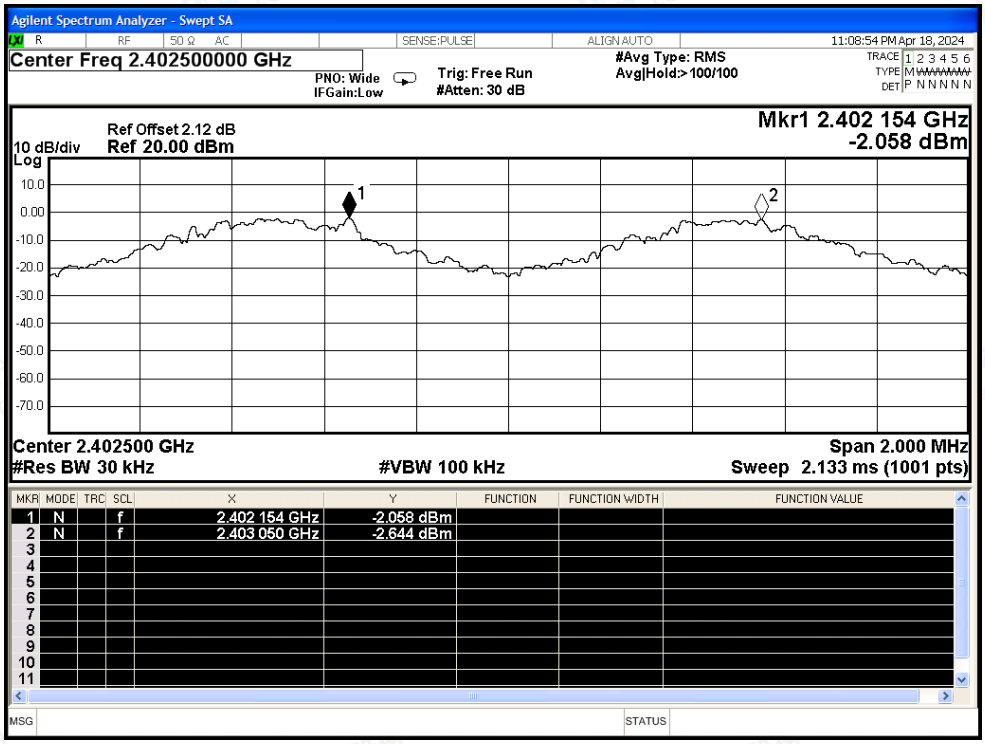


A.4 Carrier Frequencies Separation

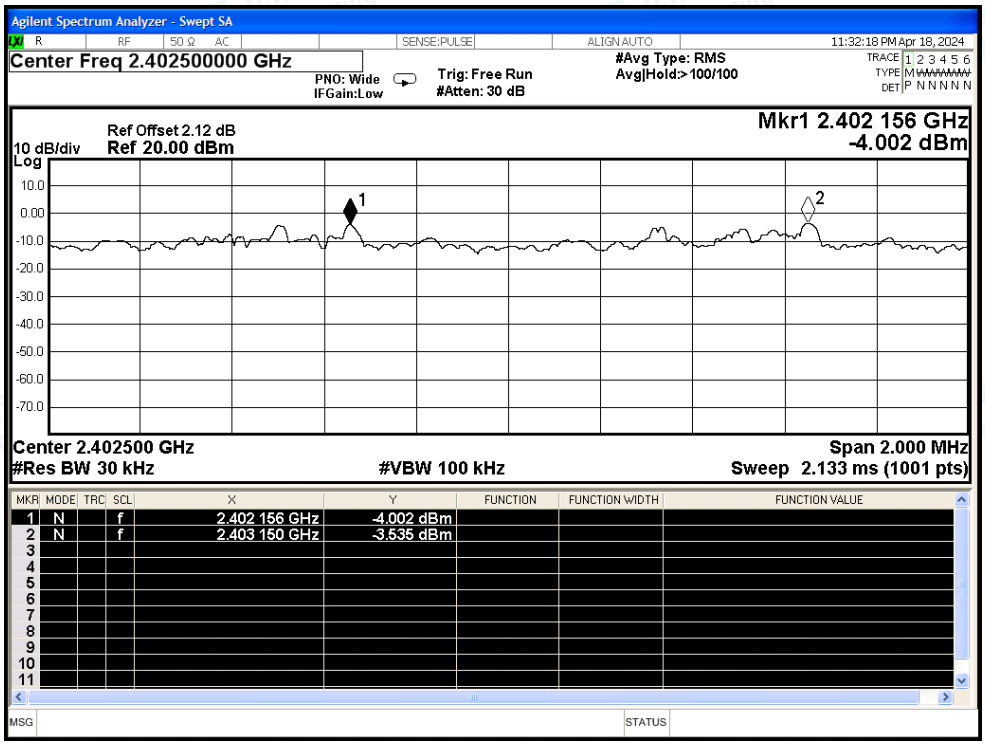
Condition	Mode	Antenna	Hopping Freq1 (MHz)	Hopping Freq2 (MHz)	HFS (MHz)	Limit (MHz)	Verdict
NVNT	1-DH5	Ant1	2402.154	2403.05	0.896	0.682	Pass
NVNT	2-DH5	Ant1	2402.156	2403.15	0.994	0.878	Pass
NVNT	3-DH5	Ant1	2401.838	2403.008	1.17	0.867	Pass

Test Graphs

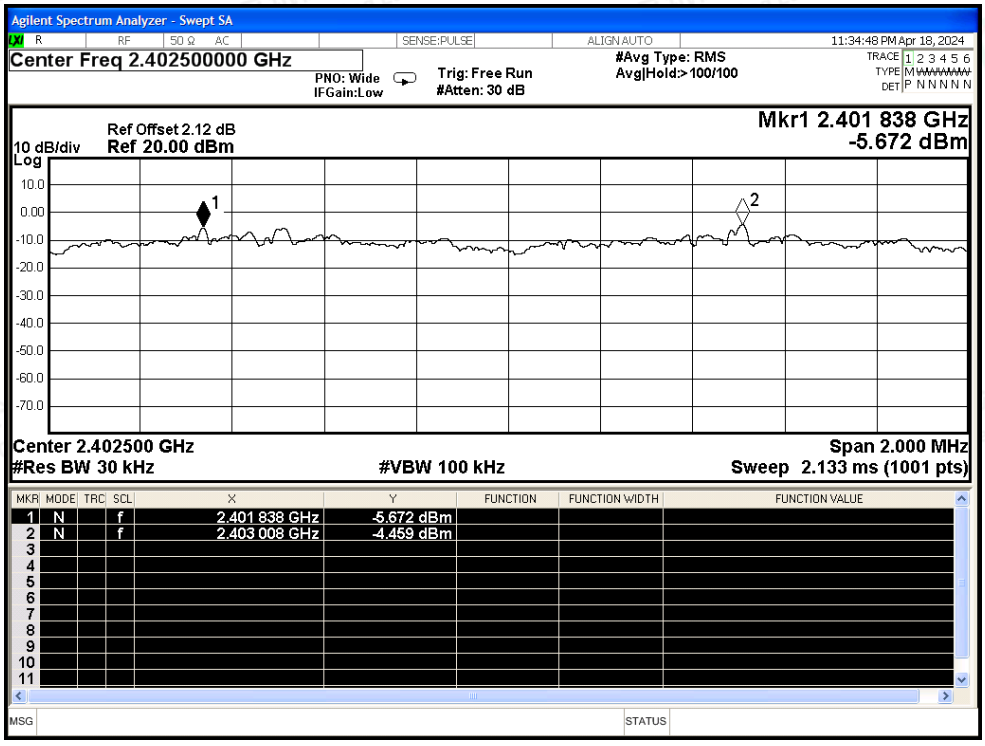
CFS NVNT 1-DH5 2402MHz Ant1



CFS NVNT 2-DH5 2402MHz Ant1



CFS NVNT 3-DH5 2402MHz Ant1

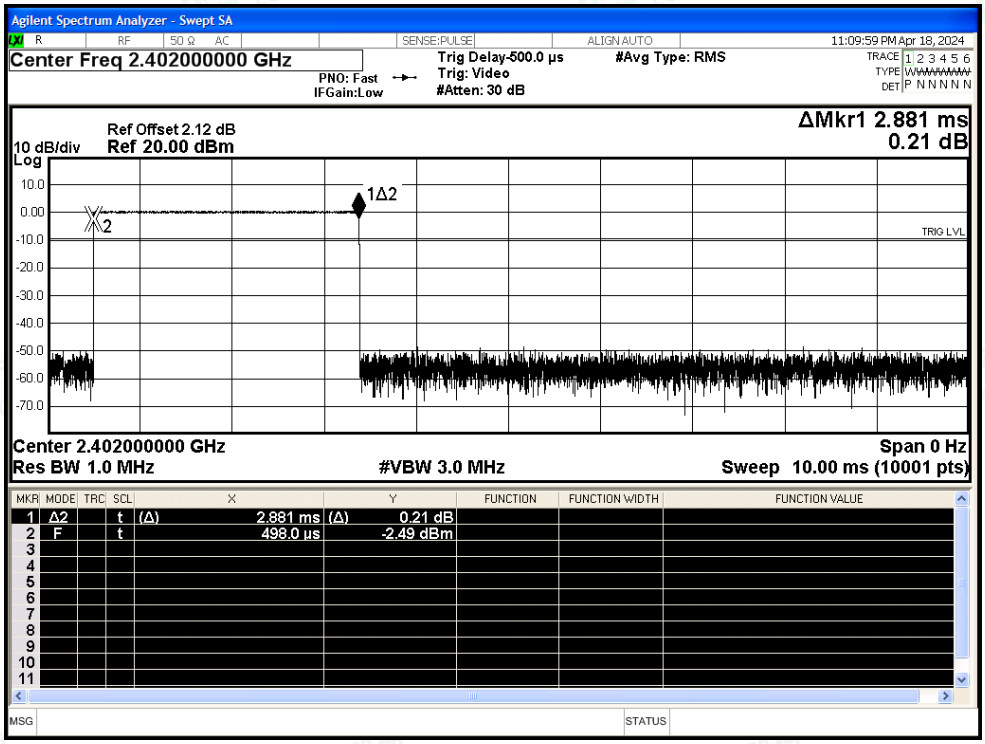


A.5 Dwell Time

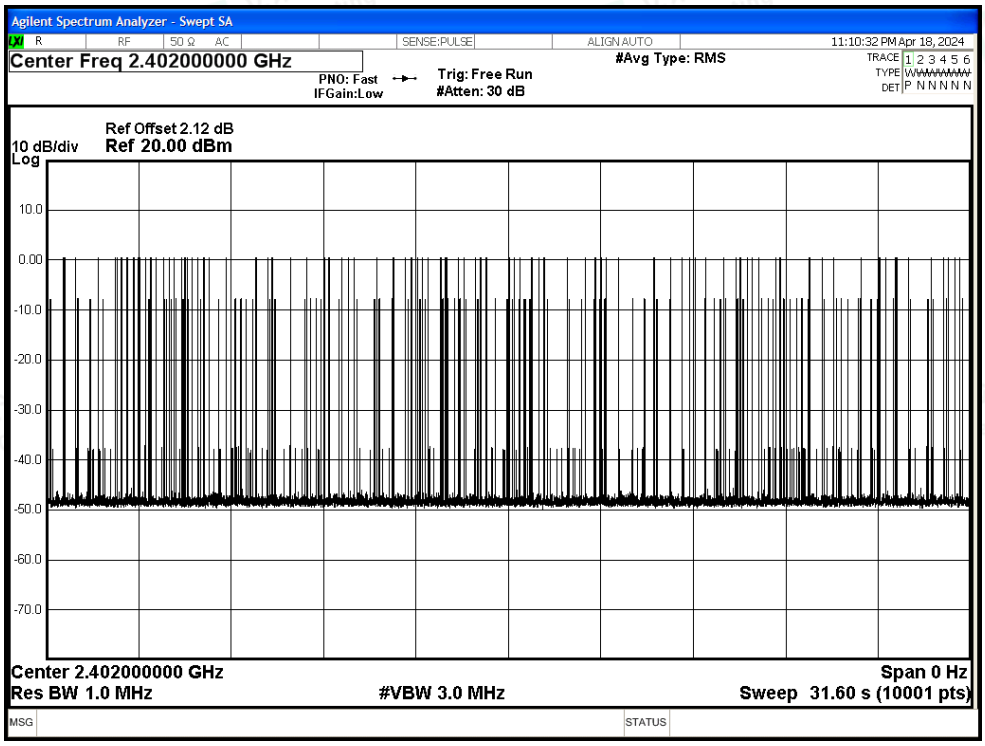
Condition	Mode	Frequency (MHz)	Antenna	Pulse Time (ms)	Total Dwell Time (ms)	Burst Count	Period Time (ms)	Limit (ms)	Verdict
NVNT	1-DH5	2402	Ant1	2.881	296.743	103	31600	400	Pass
NVNT	2-DH5	2402	Ant1	2.88	288	100	31600	400	Pass
NVNT	3-DH5	2402	Ant1	2.887	294.474	102	31600	400	Pass

Test Graphs

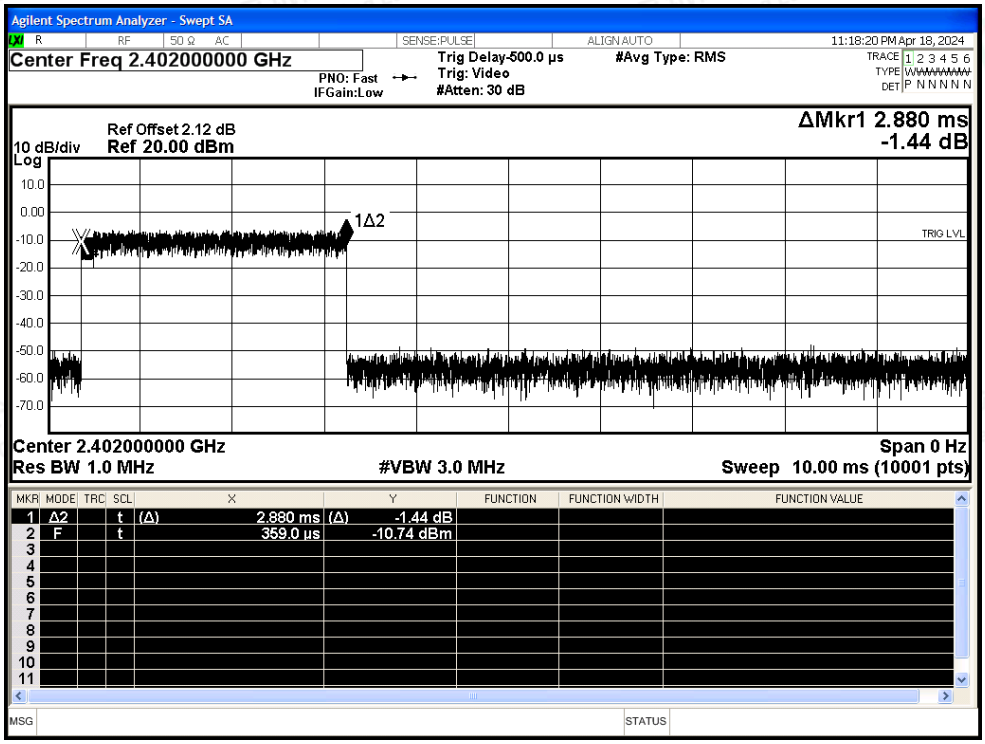
Dwell NVNT 1-DH5 2402MHz Ant1 One Burst



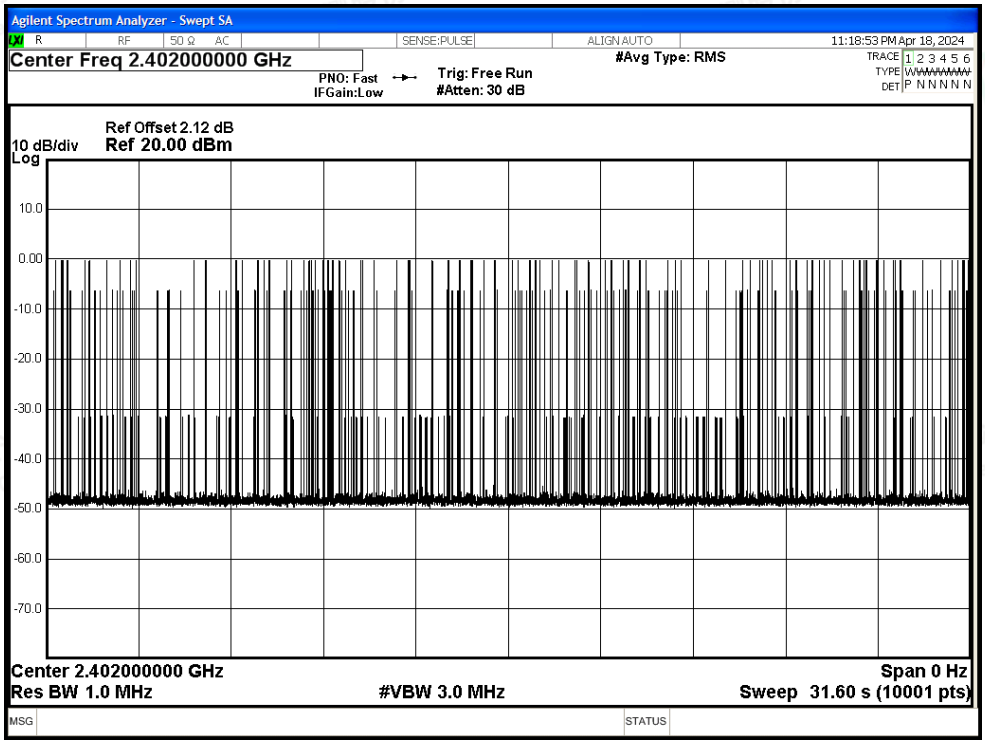
Dwell NVNT 1-DH5 2402MHz Ant1 Accumulated



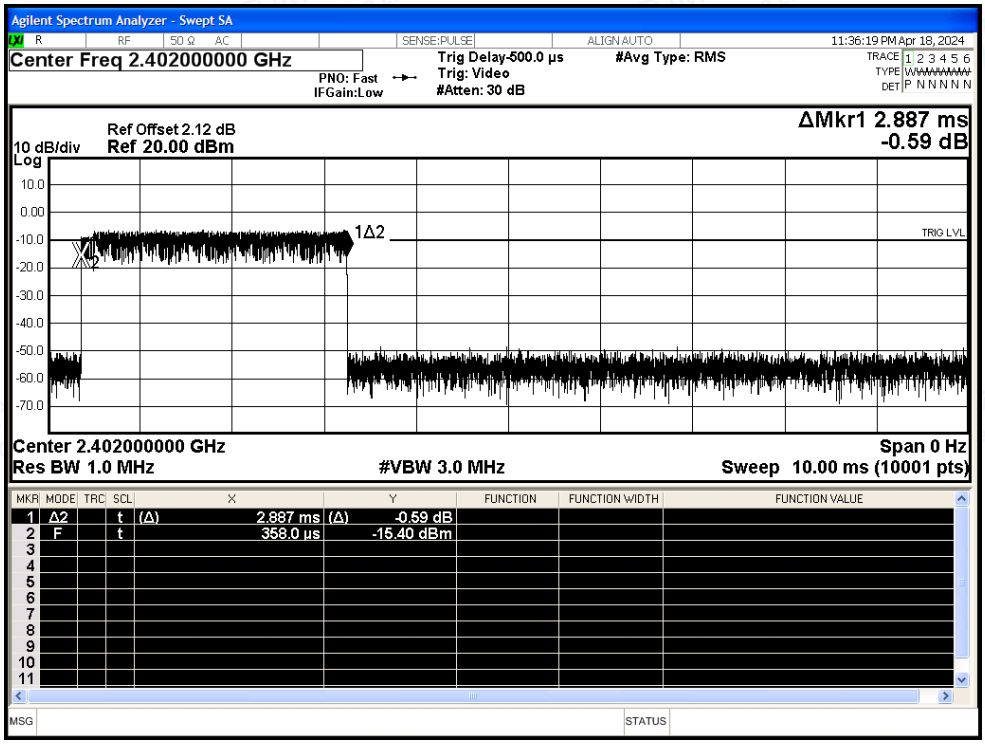
Dwell NVNT 2-DH5 2402MHz Ant1 One Burst



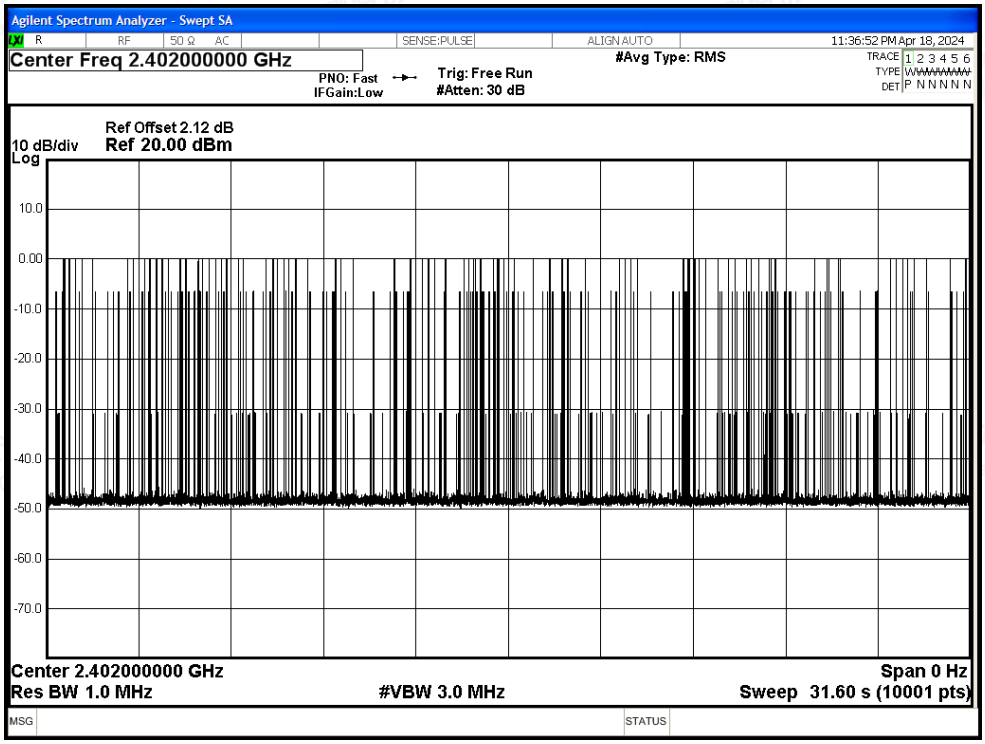
Dwell NVNT 2-DH5 2402MHz Ant1 Accumulated



Dwell NVNT 3-DH5 2402MHz Ant1 One Burst



Dwell NVNT 3-DH5 2402MHz Ant1 Accumulated

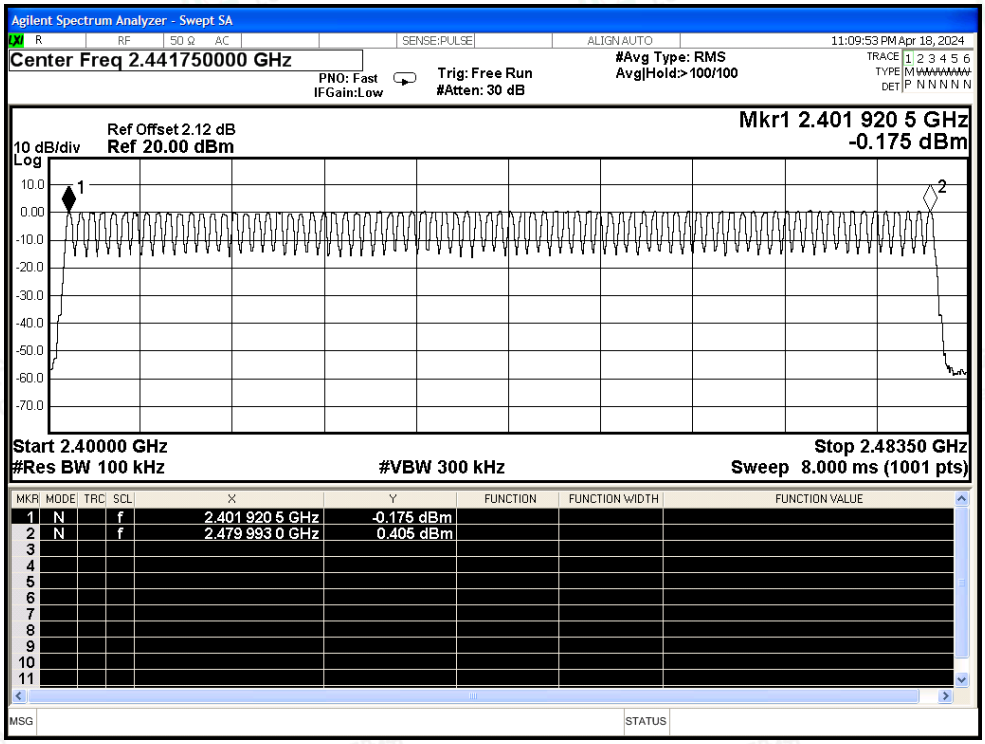


A.6 Number of Hopping Channel

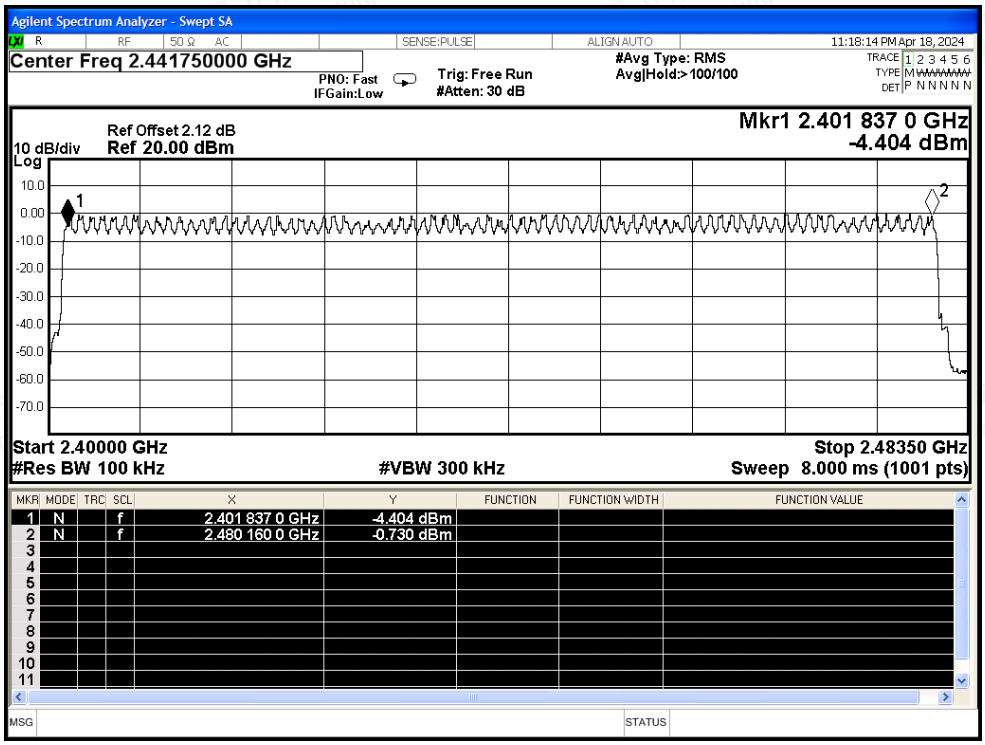
Condition	Mode	Antenna	Hopping Number	Limit	Verdict
NVNT	1-DH5	Ant1	79	15	Pass
NVNT	2-DH5	Ant1	79	15	Pass
NVNT	3-DH5	Ant1	79	15	Pass

Test Graphs

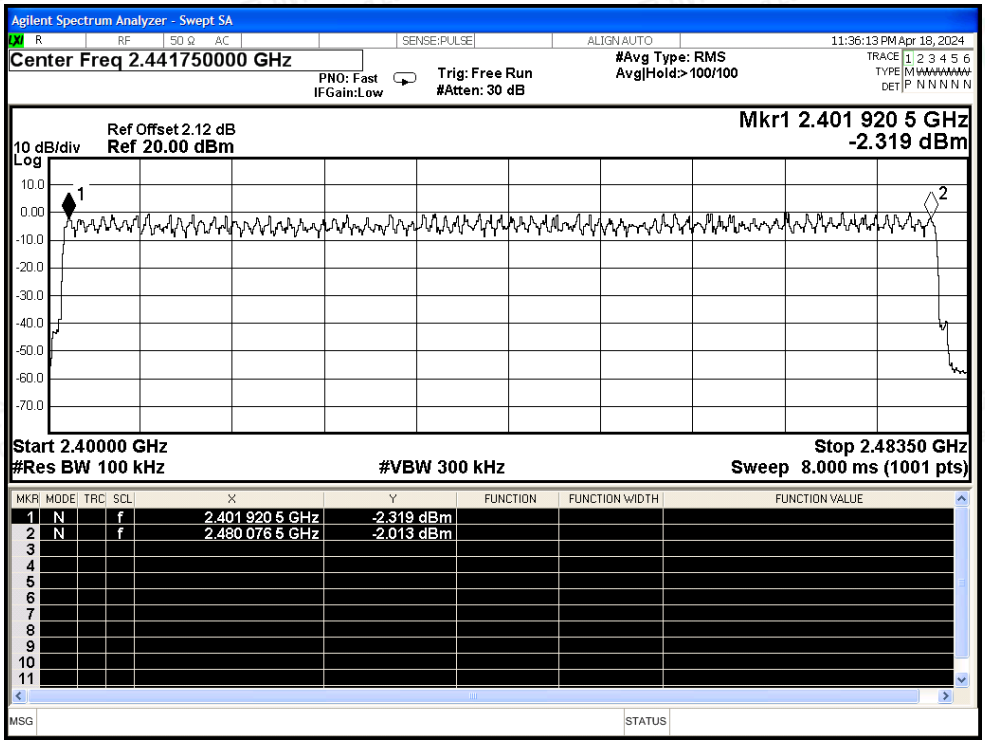
Hopping No. NVNT 1-DH5 2402MHz Ant1



Hopping No. NVNT 2-DH5 2402MHz Ant1



Hopping No. NVNT 3-DH5 2402MHz Ant1

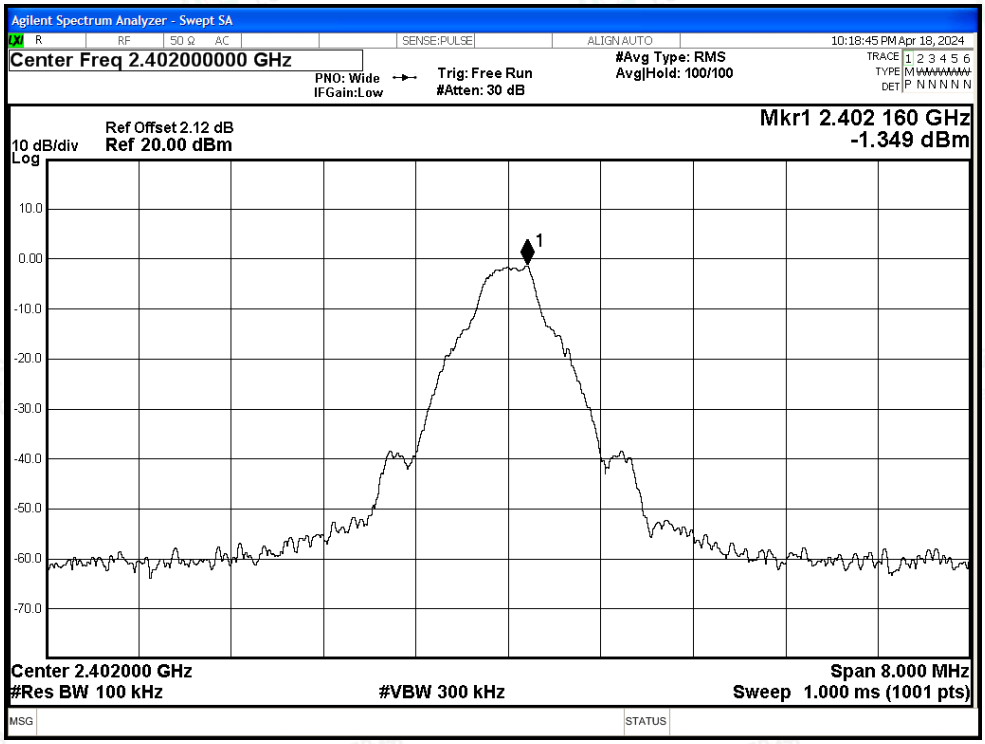


A.7 Band Edge

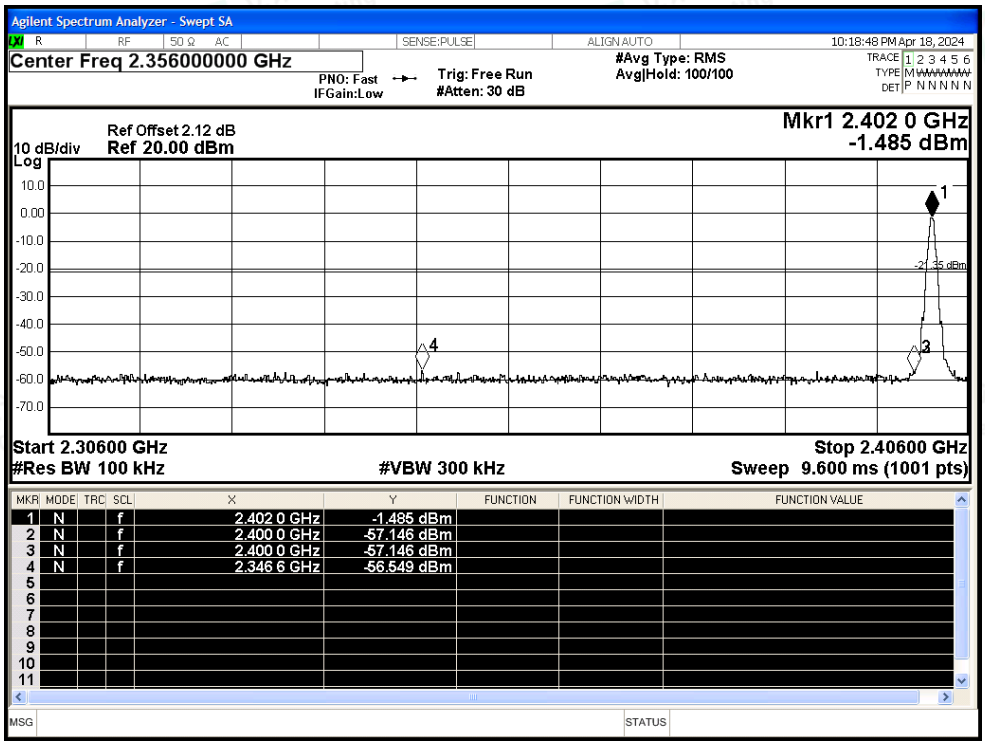
Condition	Mode	Frequency (MHz)	Antenna	Hopping Mode	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	1-DH5	2402	Ant1	No-Hopping	-55.2	-20	Pass
NVNT	1-DH5	2480	Ant1	No-Hopping	-54.97	-20	Pass
NVNT	2-DH5	2402	Ant1	No-Hopping	-54.4	-20	Pass
NVNT	2-DH5	2480	Ant1	No-Hopping	-56.6	-20	Pass
NVNT	3-DH5	2402	Ant1	No-Hopping	-53.77	-20	Pass
NVNT	3-DH5	2480	Ant1	No-Hopping	-56.46	-20	Pass

Test Graphs

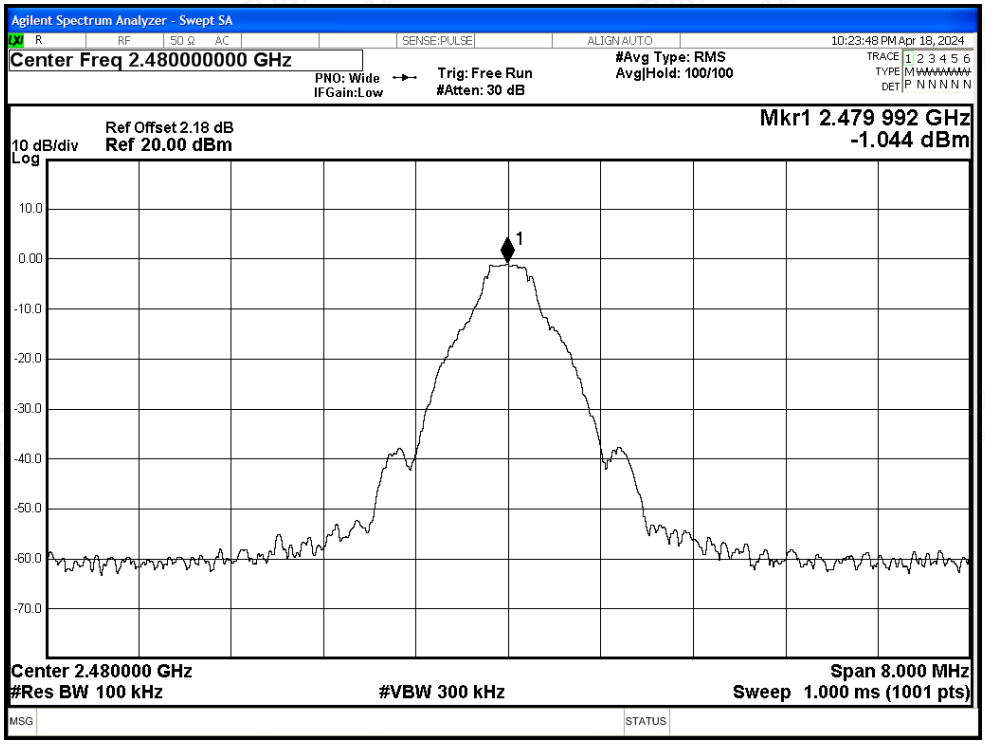
Band Edge NVNT 1-DH5 2402MHz Ant1 No-Hopping Ref



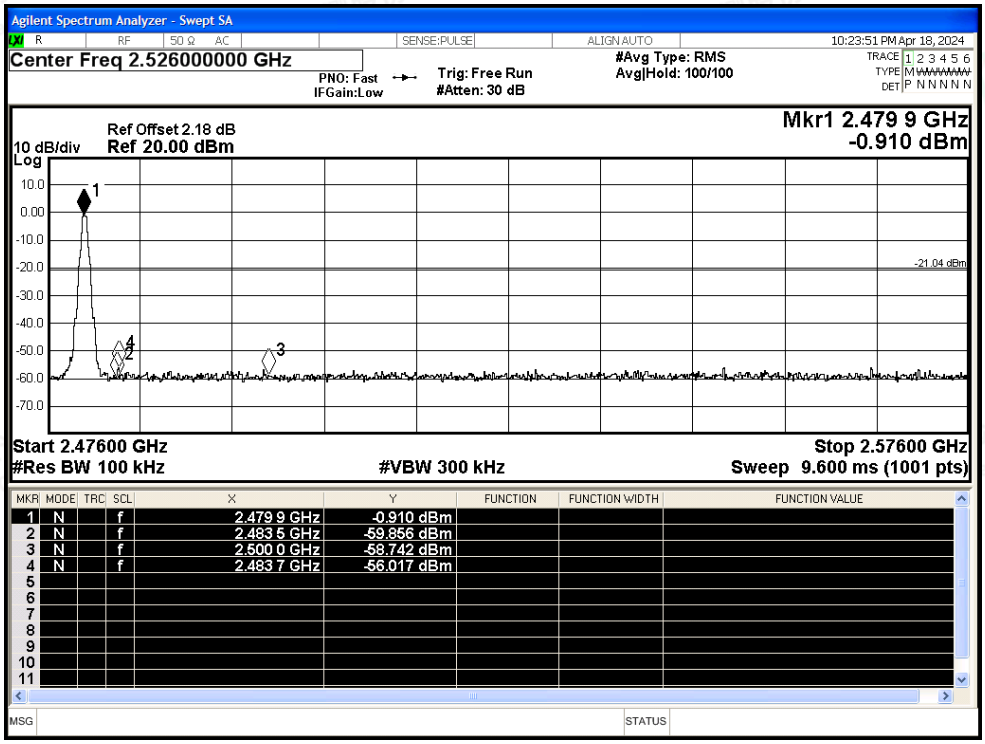
Band Edge NVNT 1-DH5 2402MHz Ant1 No-Hopping Emission



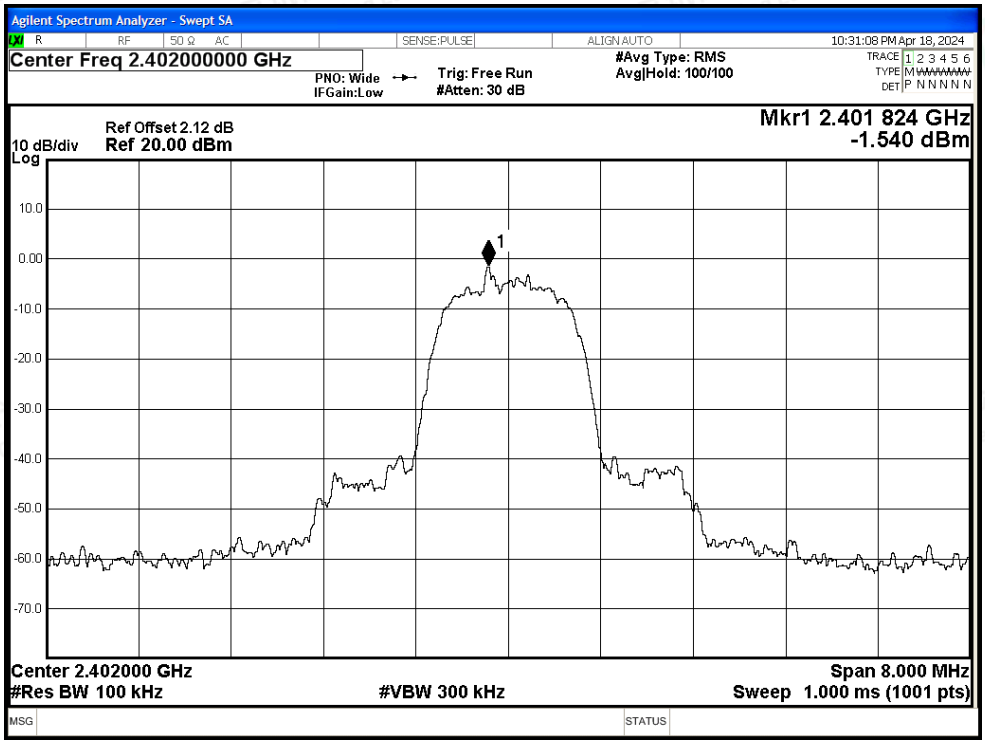
Band Edge NVNT 1-DH5 2480MHz Ant1 No-Hopping Ref



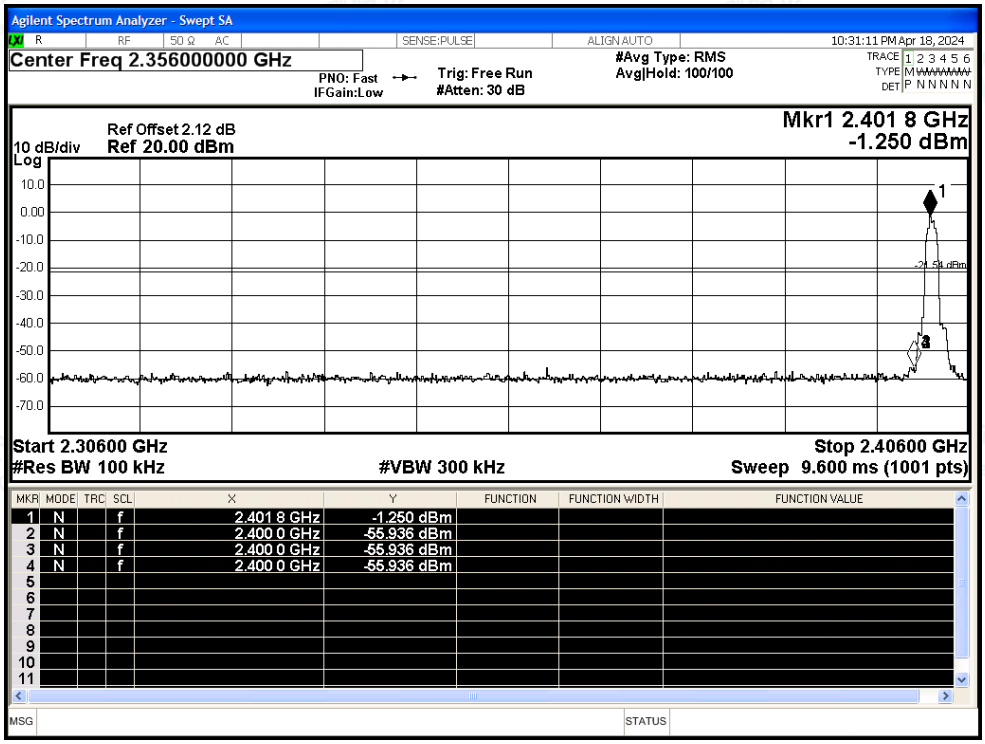
Band Edge NVNT 1-DH5 2480MHz Ant1 No-Hopping Emission



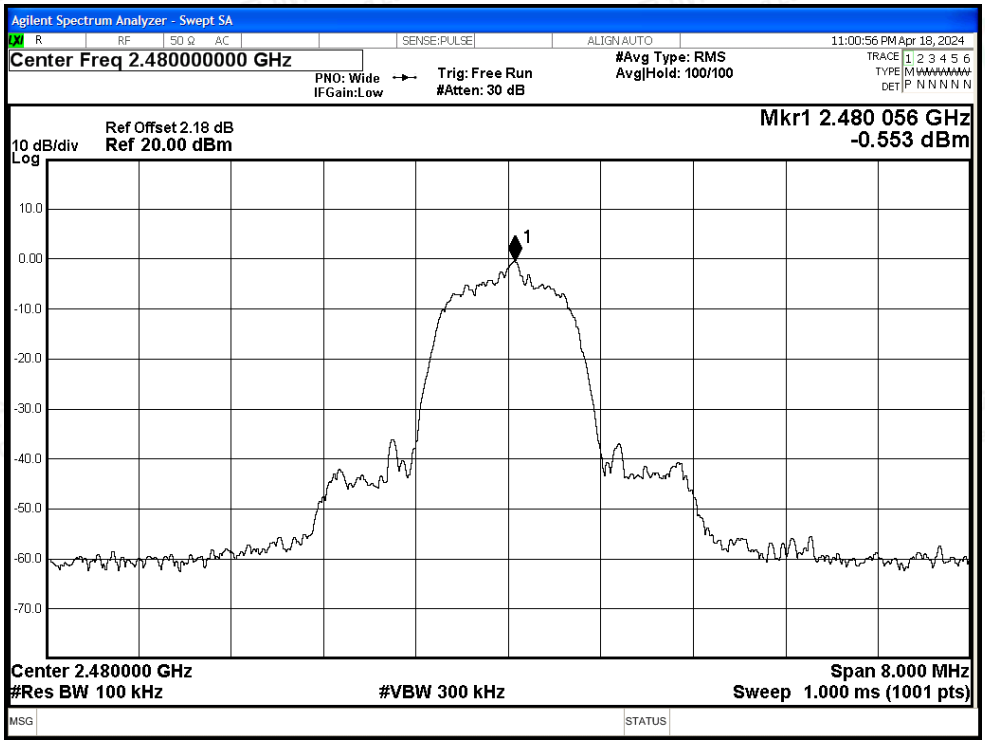
Band Edge NVNT 2-DH5 2402MHz Ant1 No-Hopping Ref



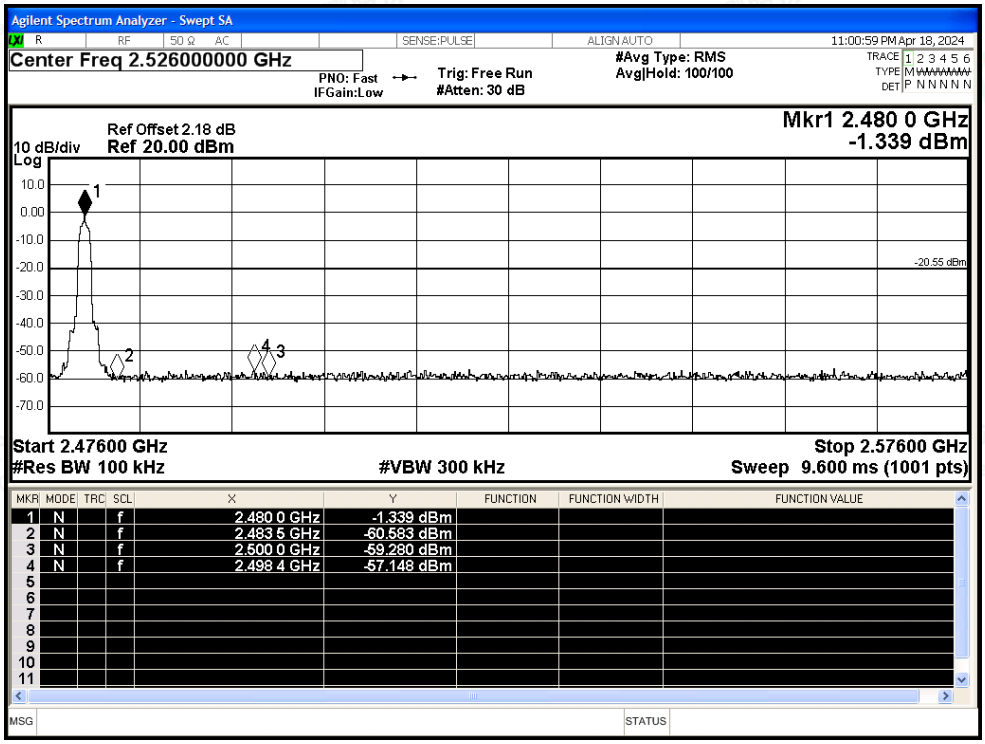
Band Edge NVNT 2-DH5 2402MHz Ant1 No-Hopping Emission



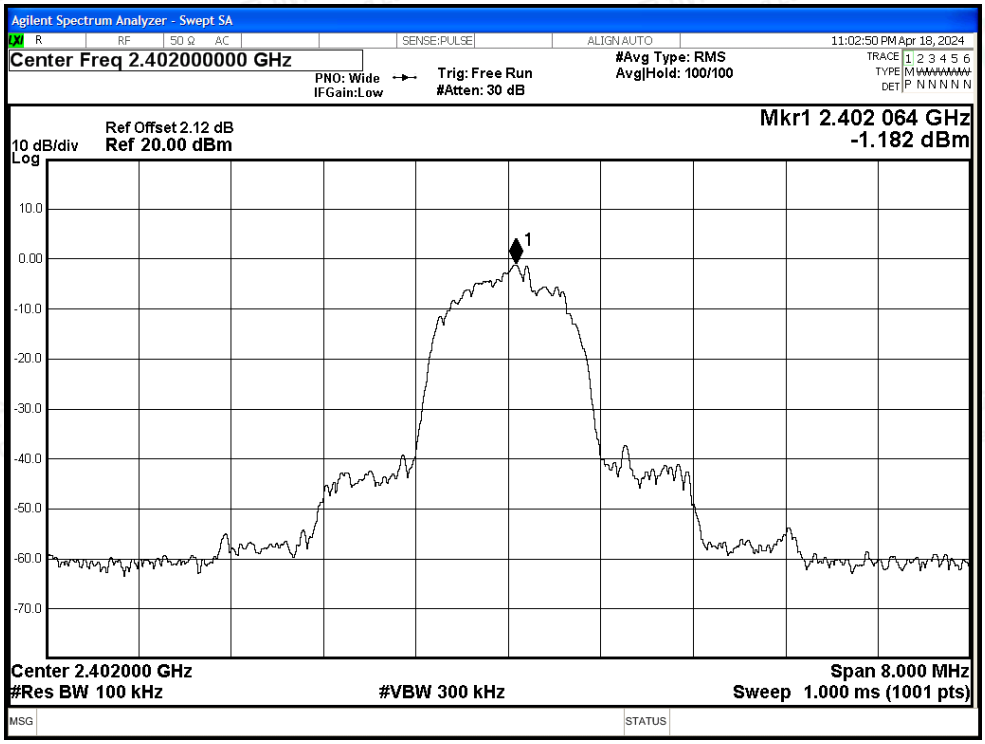
Band Edge NVNT 2-DH5 2480MHz Ant1 No-Hopping Ref



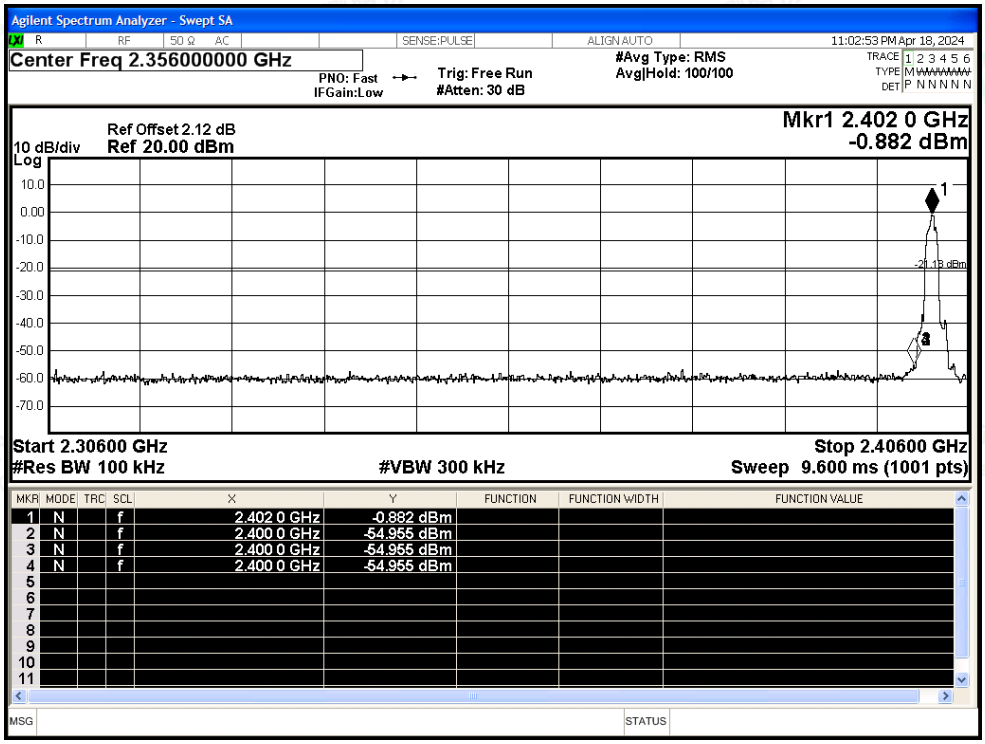
Band Edge NVNT 2-DH5 2480MHz Ant1 No-Hopping Emission



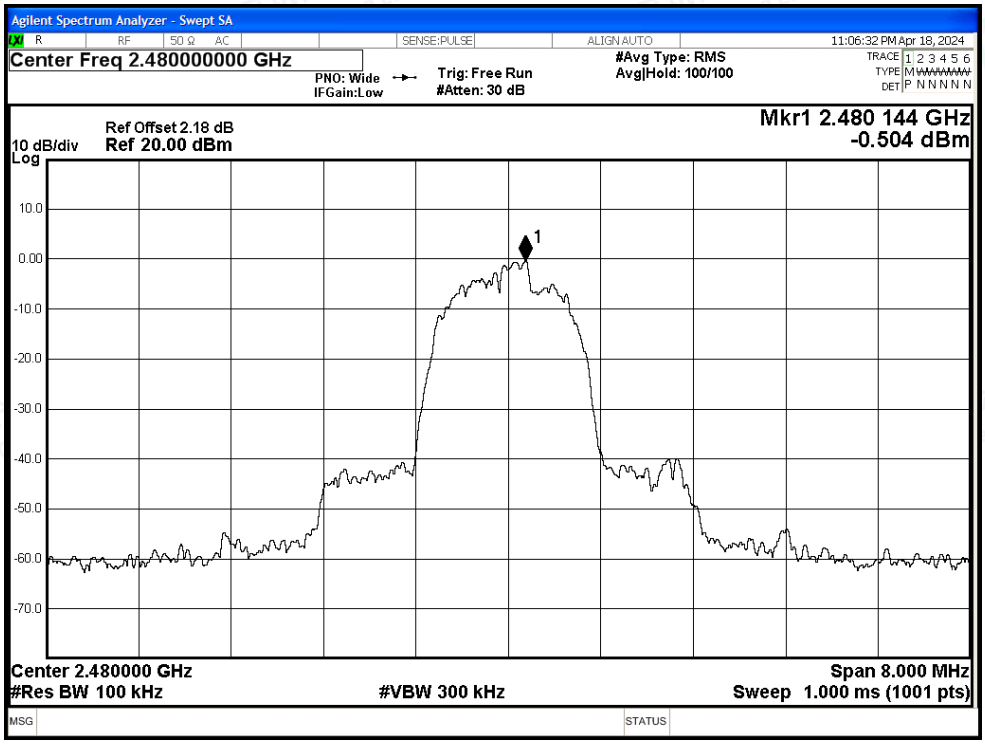
Band Edge NVNT 3-DH5 2402MHz Ant1 No-Hopping Ref



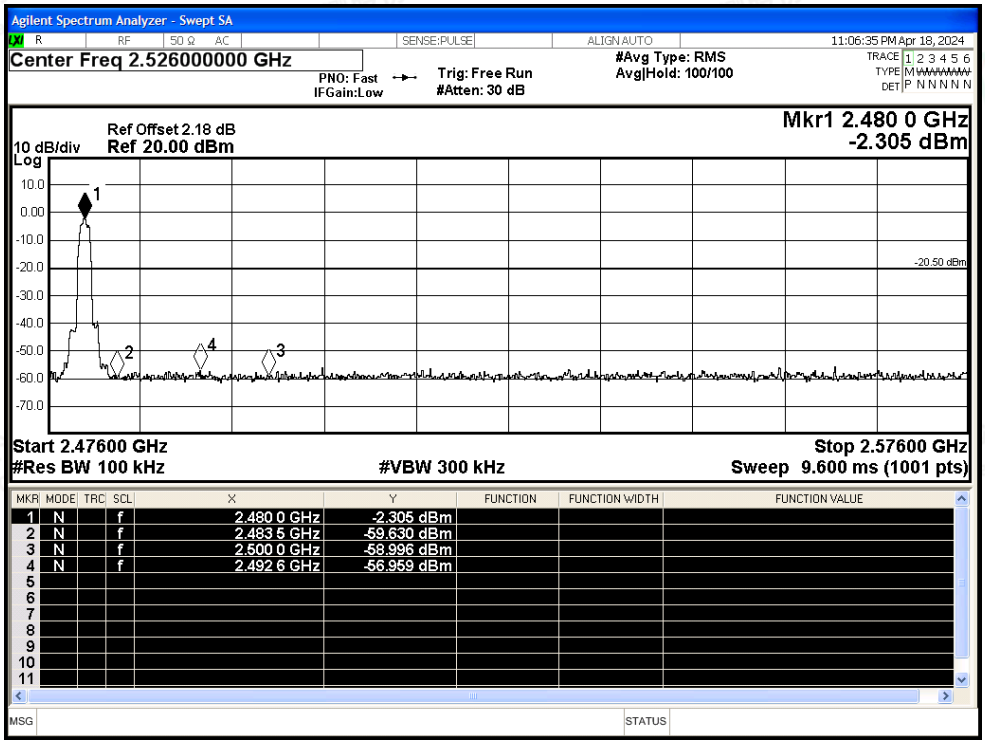
Band Edge NVNT 3-DH5 2402MHz Ant1 No-Hopping Emission



Band Edge NVNT 3-DH5 2480MHz Ant1 No-Hopping Ref



Band Edge NVNT 3-DH5 2480MHz Ant1 No-Hopping Emission

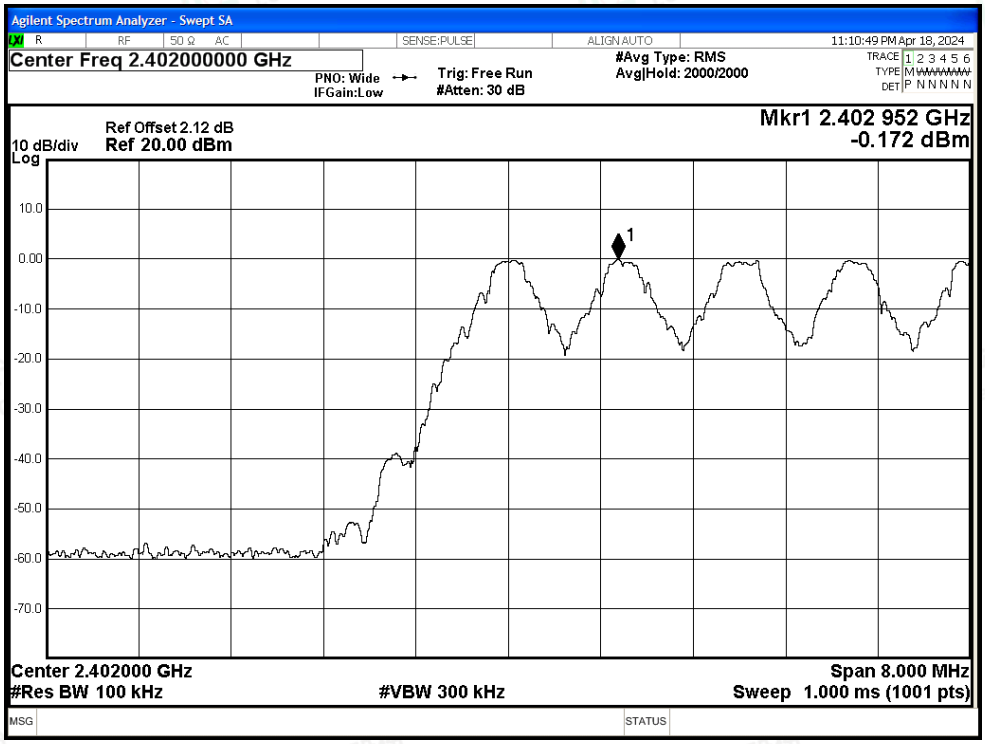


(Hopping)

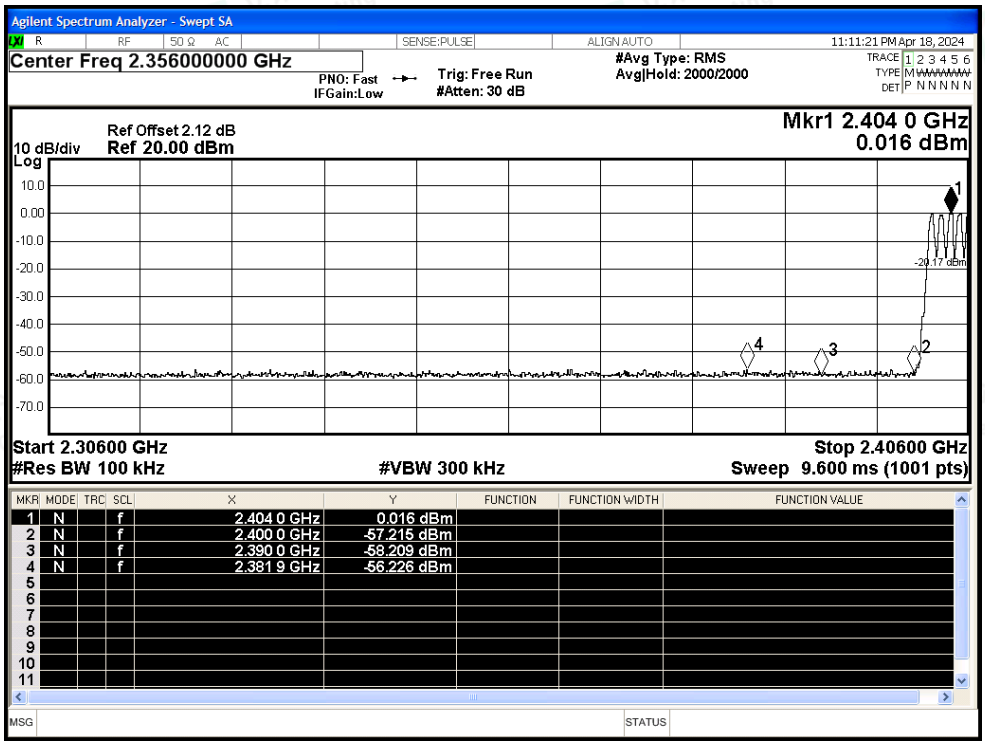
Condition	Mode	Frequency (MHz)	Antenna	Hopping Mode	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	1-DH5	2402	Ant1	Hopping	-56.05	-20	Pass
NVNT	1-DH5	2480	Ant1	Hopping	-56.15	-20	Pass
NVNT	2-DH5	2402	Ant1	Hopping	-54.01	-20	Pass
NVNT	2-DH5	2480	Ant1	Hopping	-54.8	-20	Pass
NVNT	3-DH5	2402	Ant1	Hopping	-55.19	-20	Pass
NVNT	3-DH5	2480	Ant1	Hopping	-53.69	-20	Pass

Test Graphs

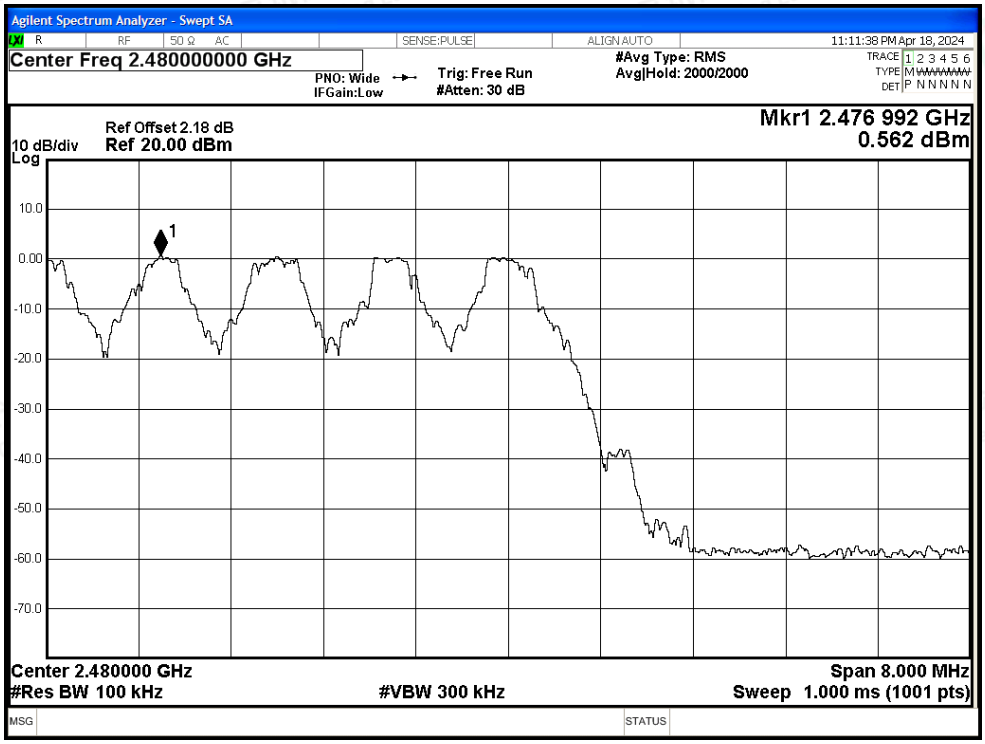
Band Edge(Hopping) NVNT 1-DH5 2402MHz Ant1 Hopping Ref



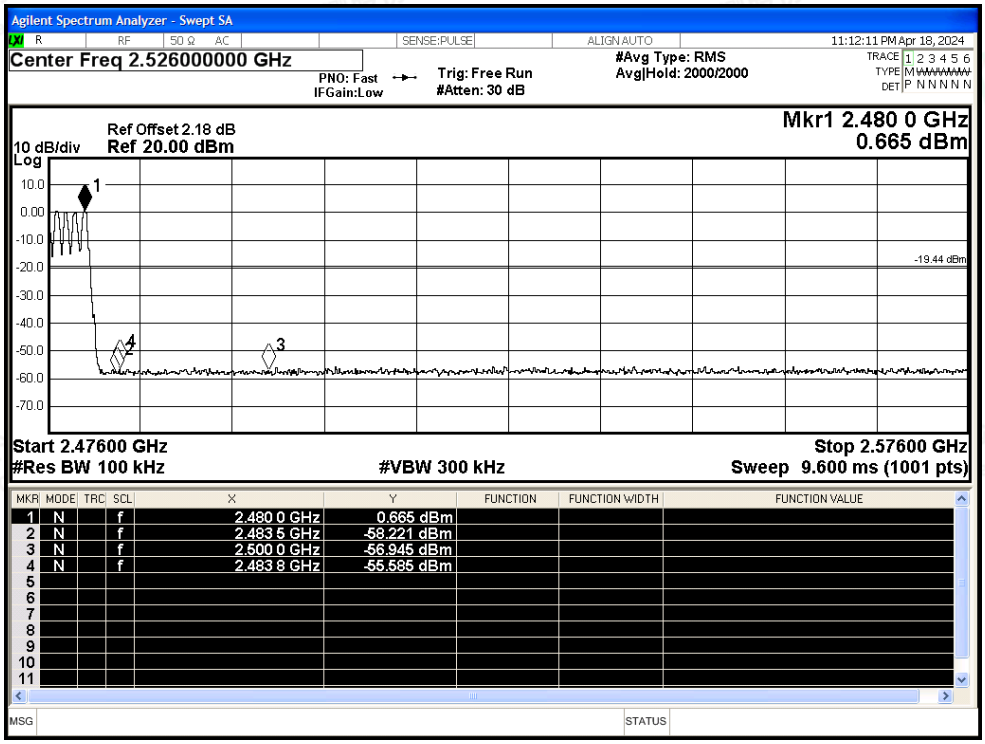
Band Edge(Hopping) NVNT 1-DH5 2402MHz Ant1 Hopping Emission



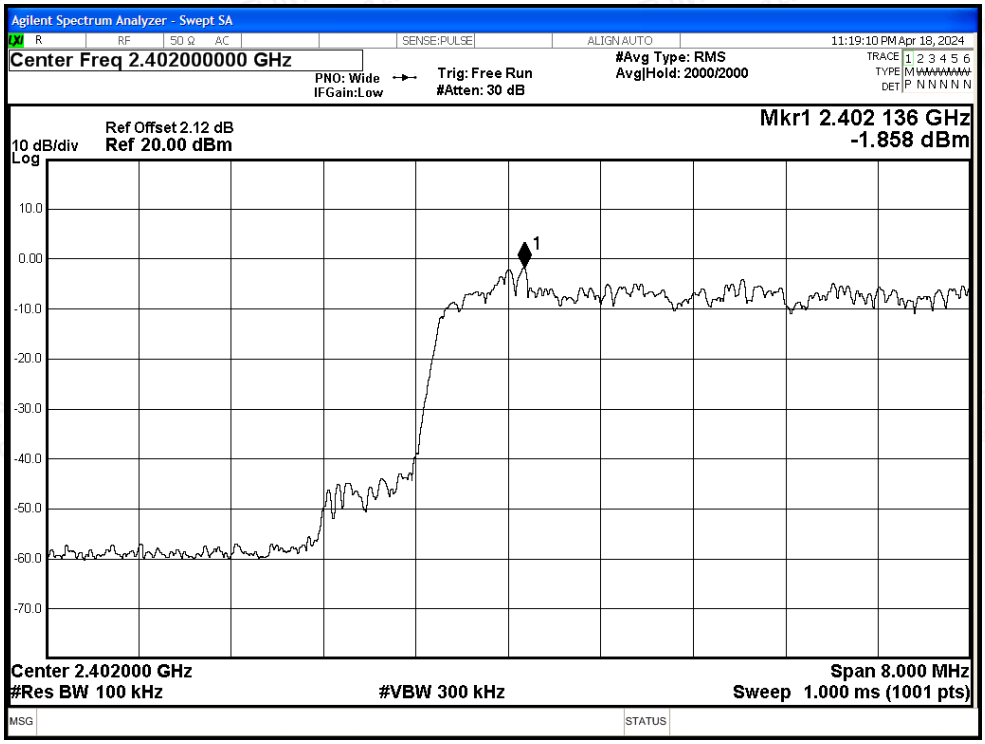
Band Edge(Hopping) NVNT 1-DH5 2480MHz Ant1 Hopping Ref



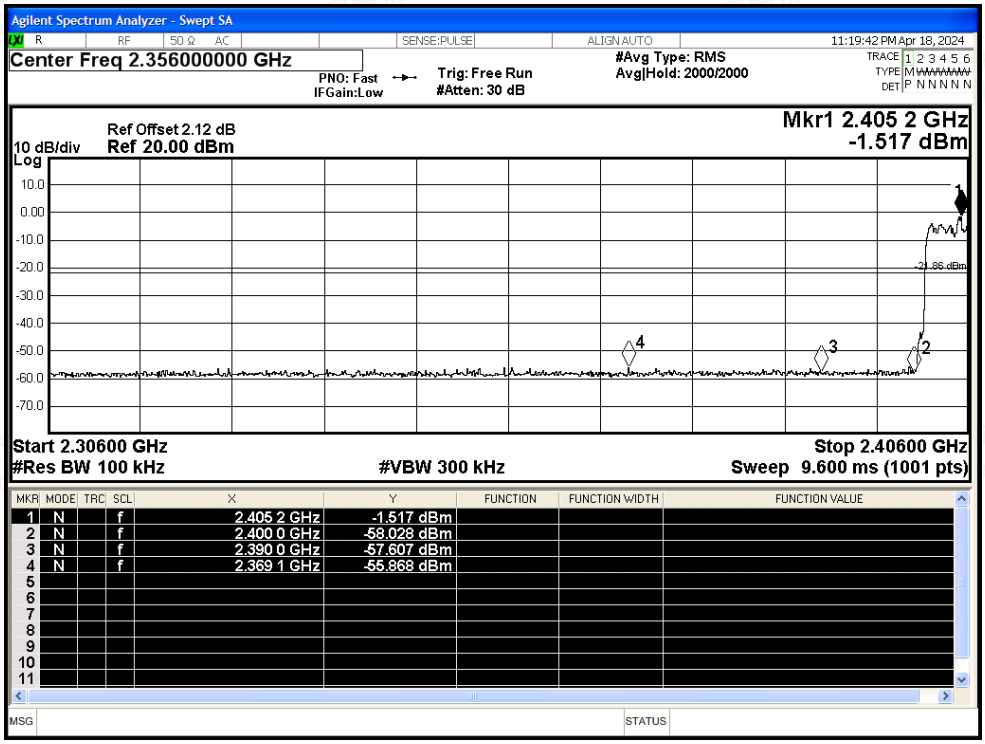
Band Edge(Hopping) NVNT 1-DH5 2480MHz Ant1 Hopping Emission



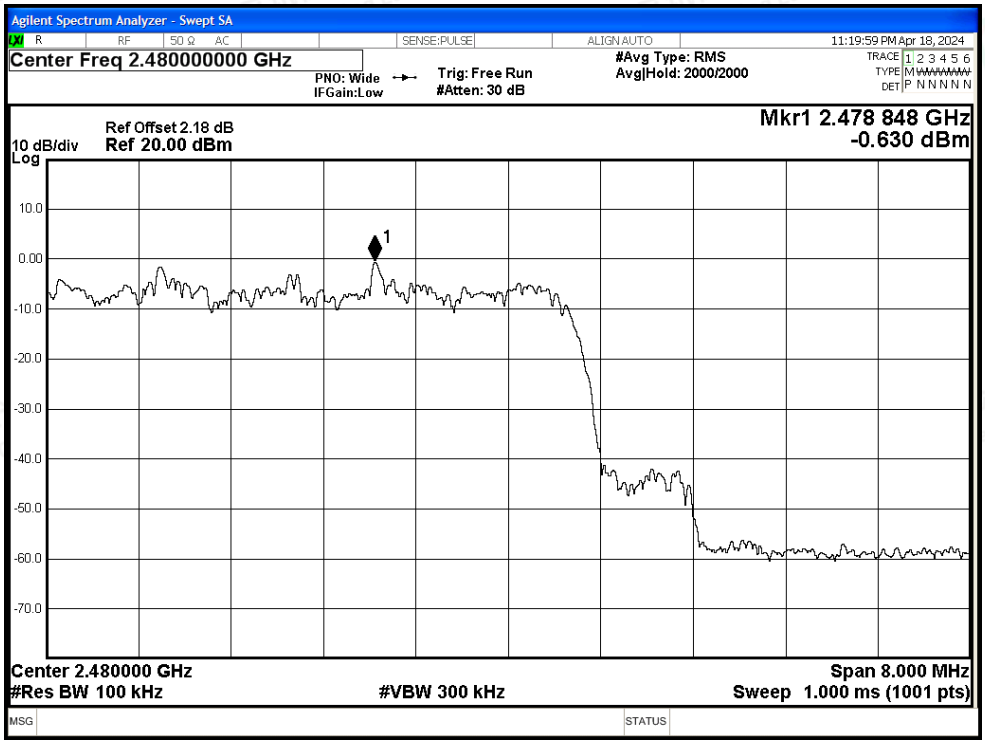
Band Edge(Hopping) NVNT 2-DH5 2402MHz Ant1 Hopping Ref



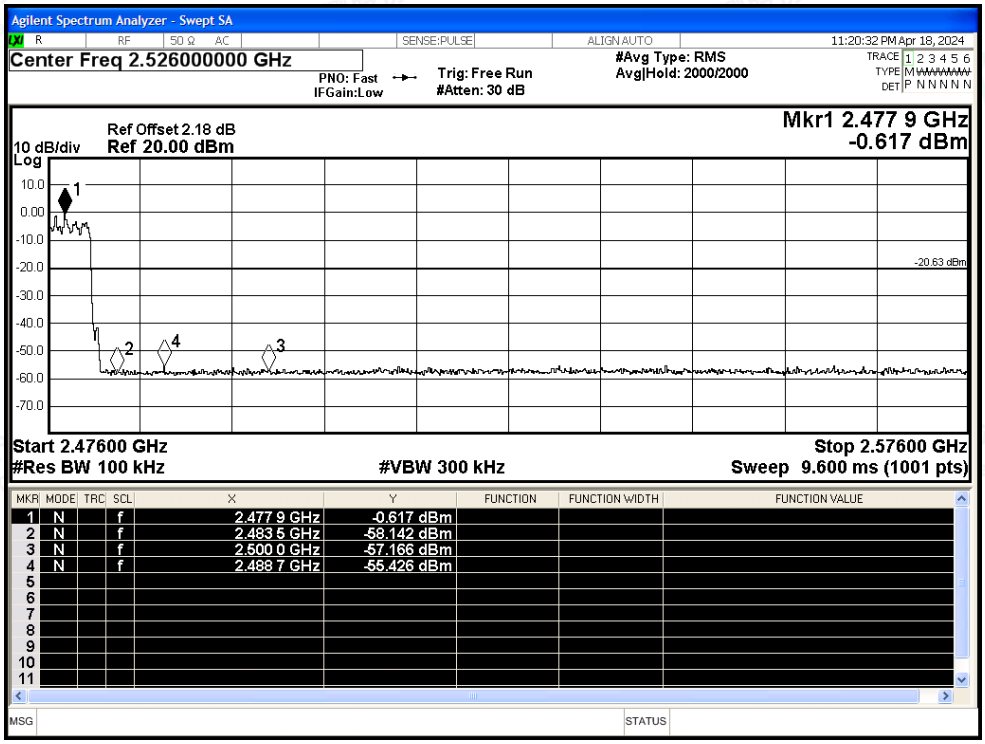
Band Edge(Hopping) NVNT 2-DH5 2402MHz Ant1 Hopping Emission



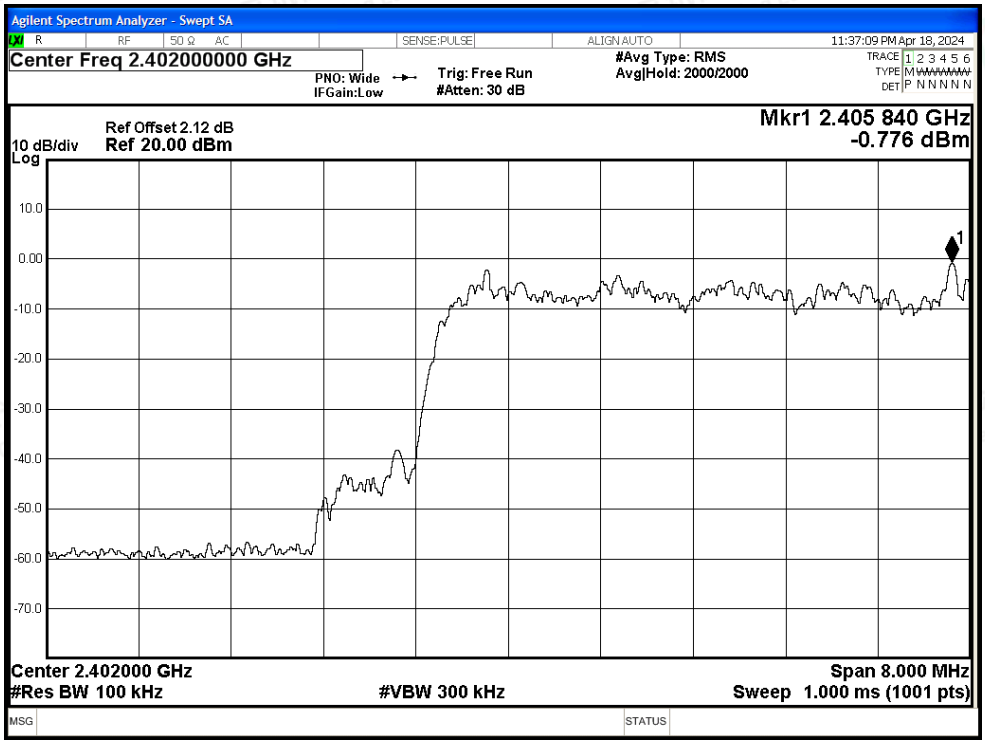
Band Edge(Hopping) NVNT 2-DH5 2480MHz Ant1 Hopping Ref



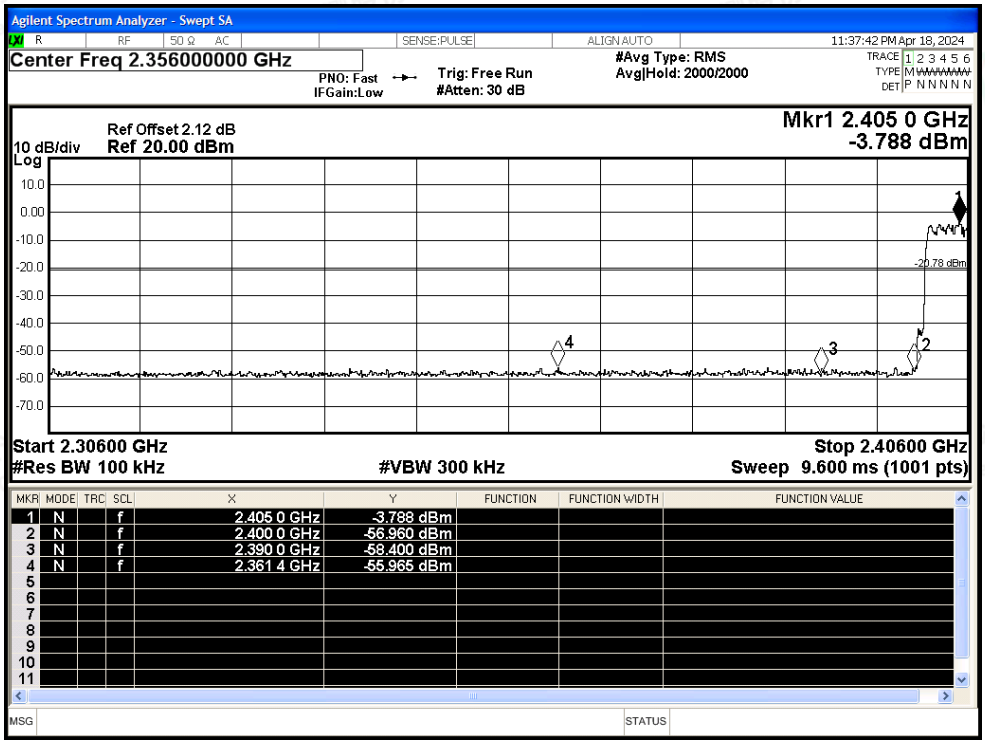
Band Edge(Hopping) NVNT 2-DH5 2480MHz Ant1 Hopping Emission



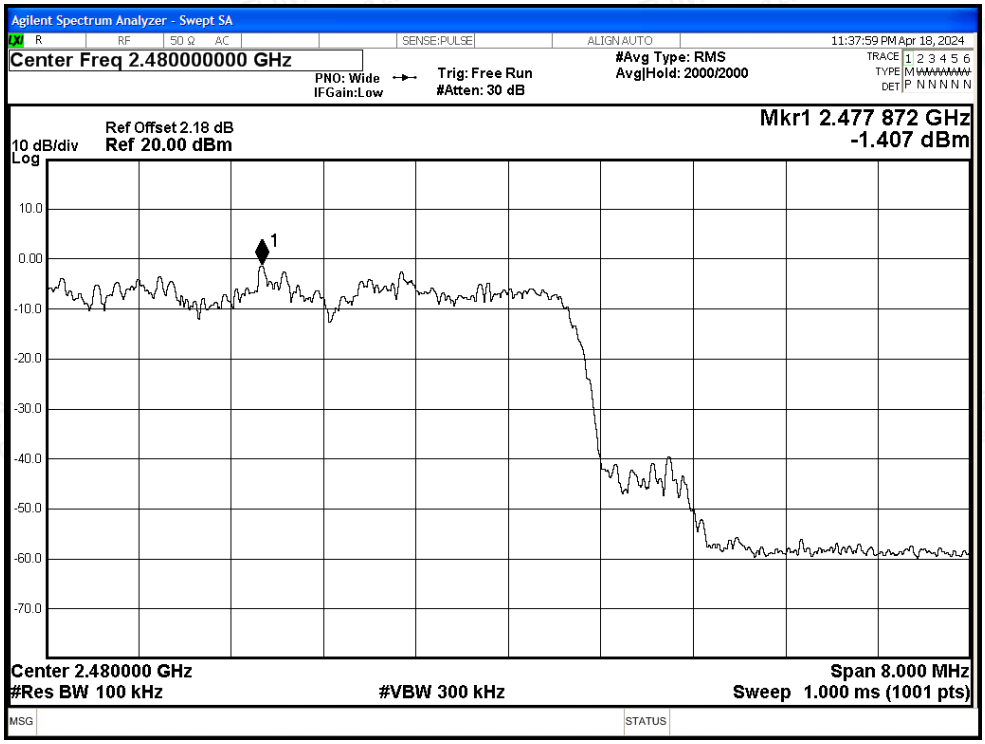
Band Edge(Hopping) NVNT 3-DH5 2402MHz Ant1 Hopping Ref



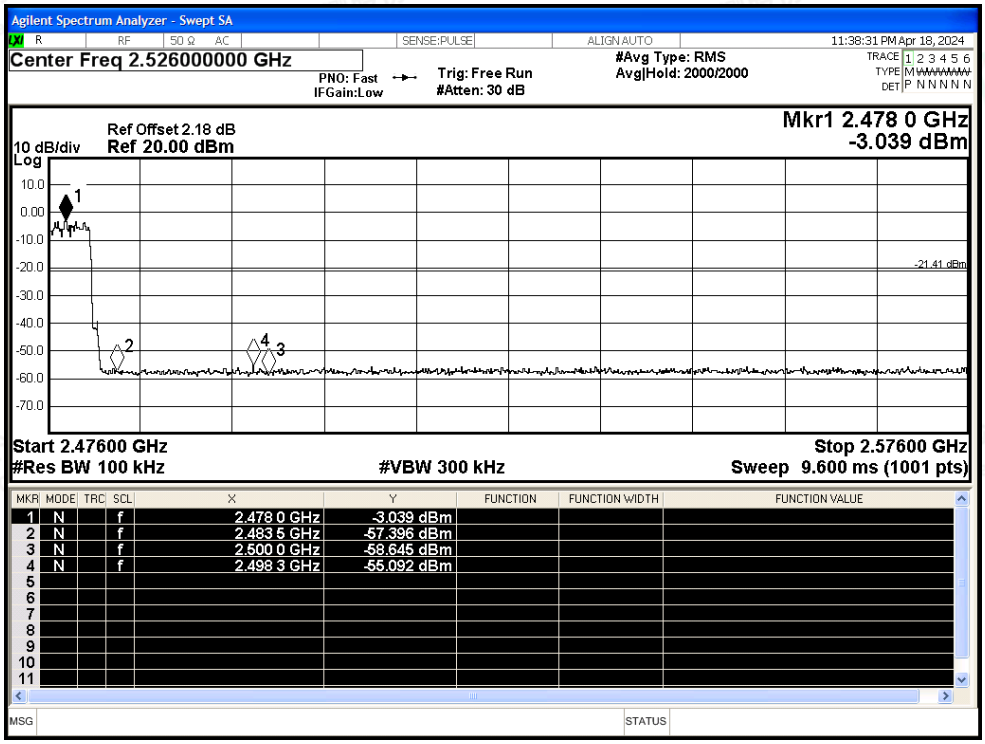
Band Edge(Hopping) NVNT 3-DH5 2402MHz Ant1 Hopping Emission



Band Edge(Hopping) NVNT 3-DH5 2480MHz Ant1 Hopping Ref



Band Edge(Hopping) NVNT 3-DH5 2480MHz Ant1 Hopping Emission

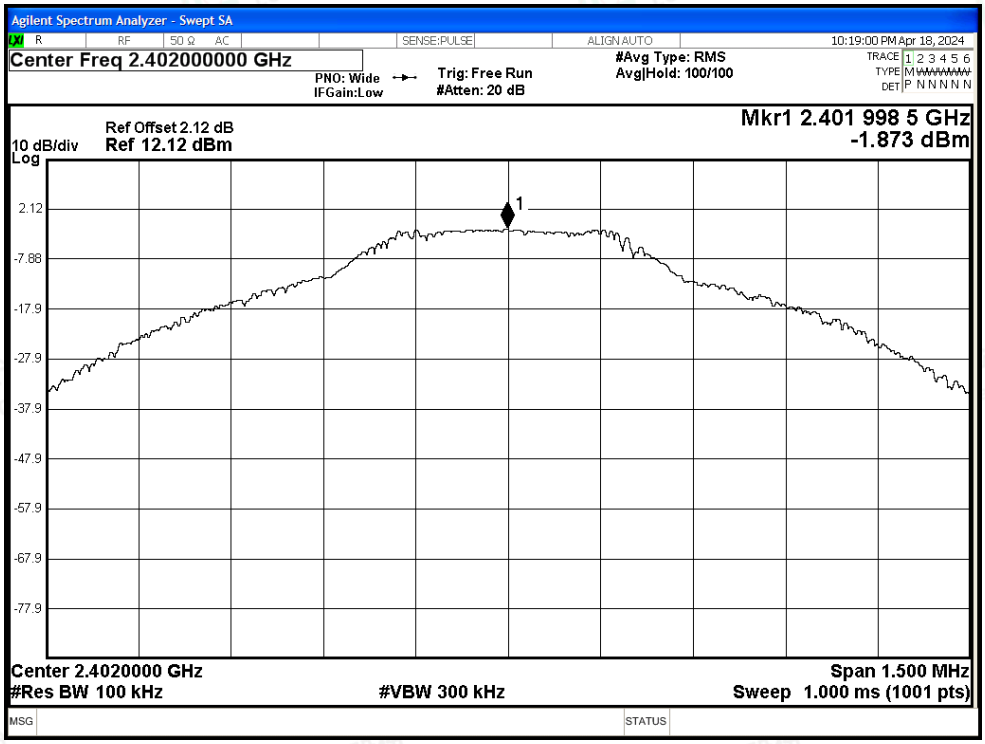


A.8 Conducted RF Spurious Emission

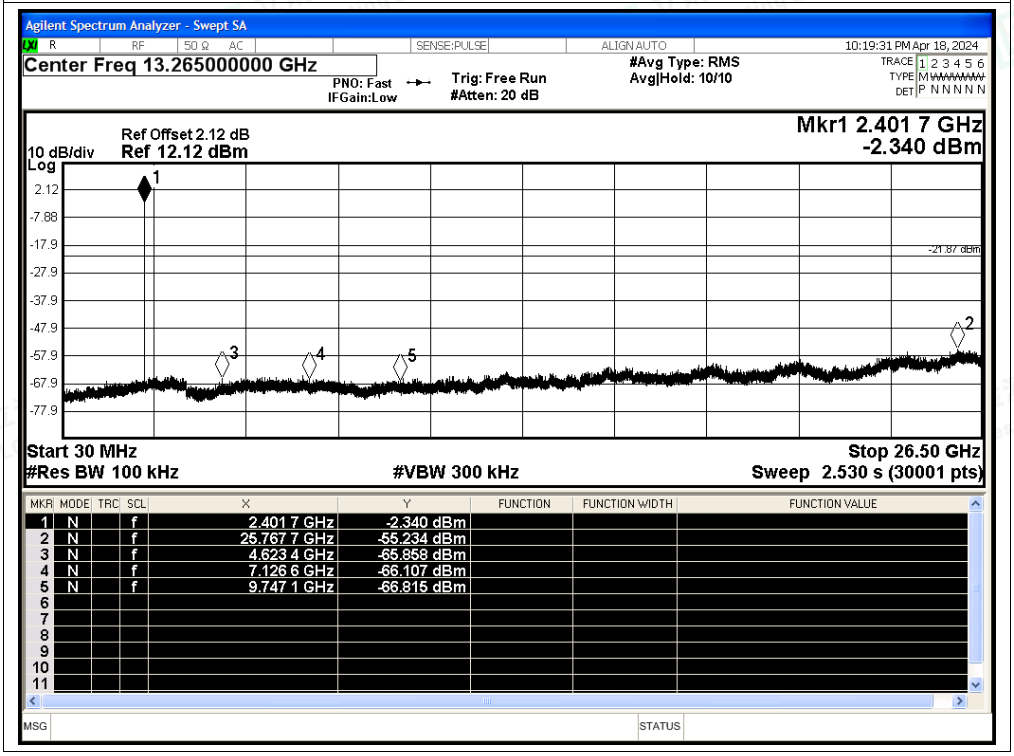
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	1-DH5	2402	Ant1	-53.36	-20	Pass
NVNT	1-DH5	2441	Ant1	-54.05	-20	Pass
NVNT	1-DH5	2480	Ant1	-53.66	-20	Pass
NVNT	2-DH5	2402	Ant1	-54.42	-20	Pass
NVNT	2-DH5	2441	Ant1	-54.18	-20	Pass
NVNT	2-DH5	2480	Ant1	-55.11	-20	Pass
NVNT	3-DH5	2402	Ant1	-48.6	-20	Pass
NVNT	3-DH5	2441	Ant1	-54.95	-20	Pass
NVNT	3-DH5	2480	Ant1	-50.1	-20	Pass

Test Graphs

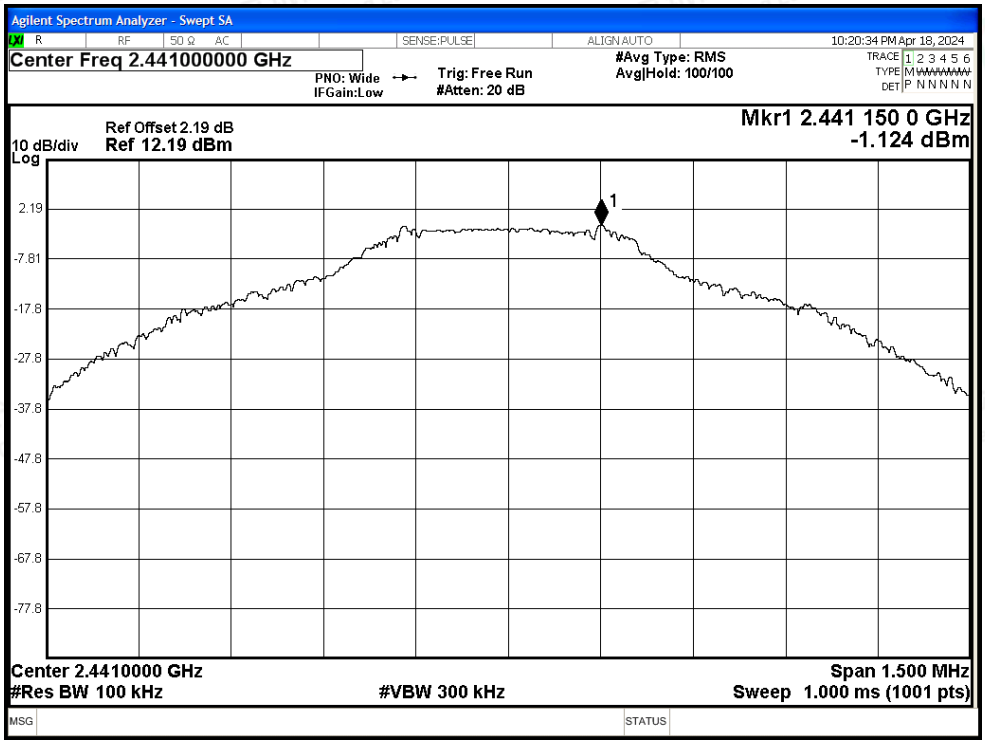
Tx. Spurious NVNT 1-DH5 2402MHz Ant1 Ref



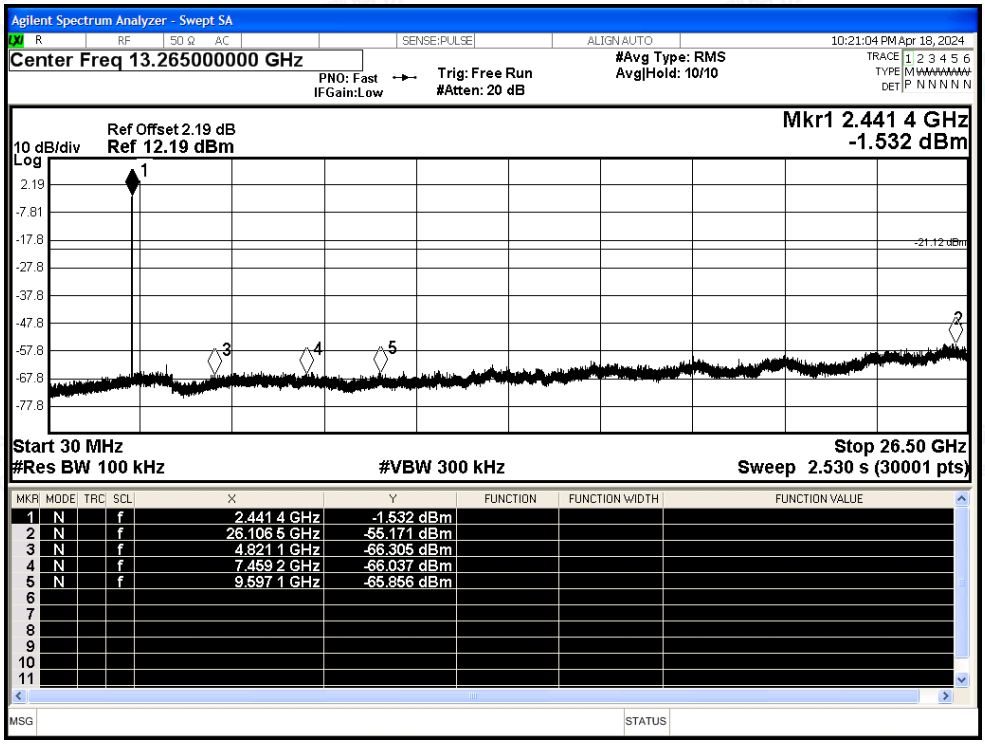
Tx. Spurious NVNT 1-DH5 2402MHz Ant1 Emission



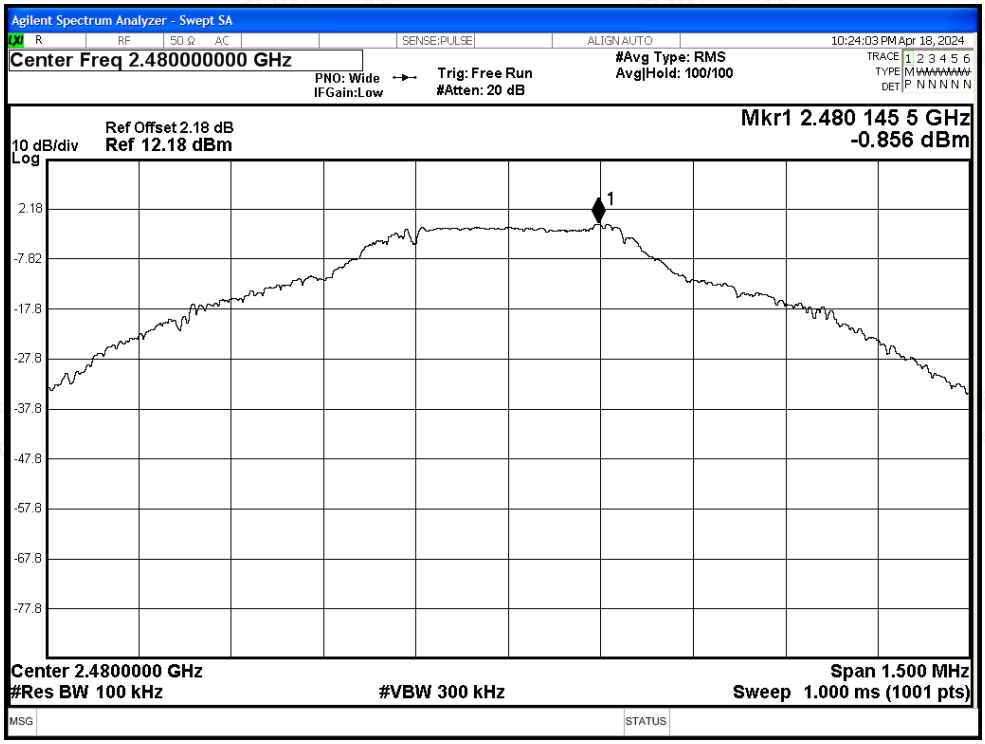
Tx. Spurious NVNT 1-DH5 2441MHz Ant1 Ref



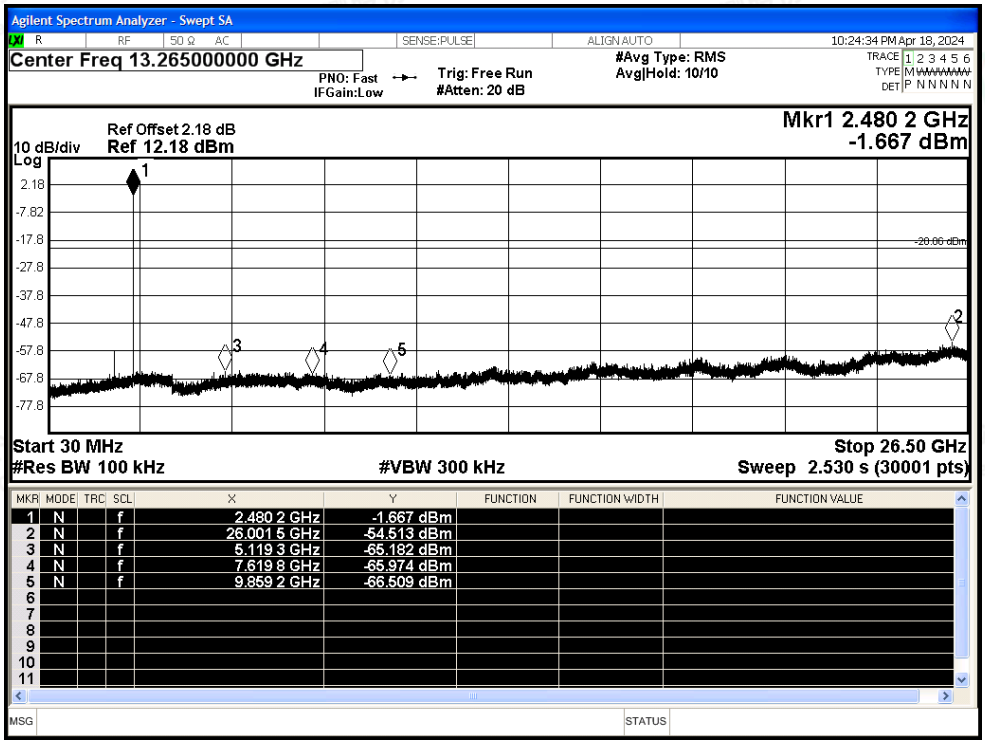
Tx. Spurious NVNT 1-DH5 2441MHz Ant1 Emission



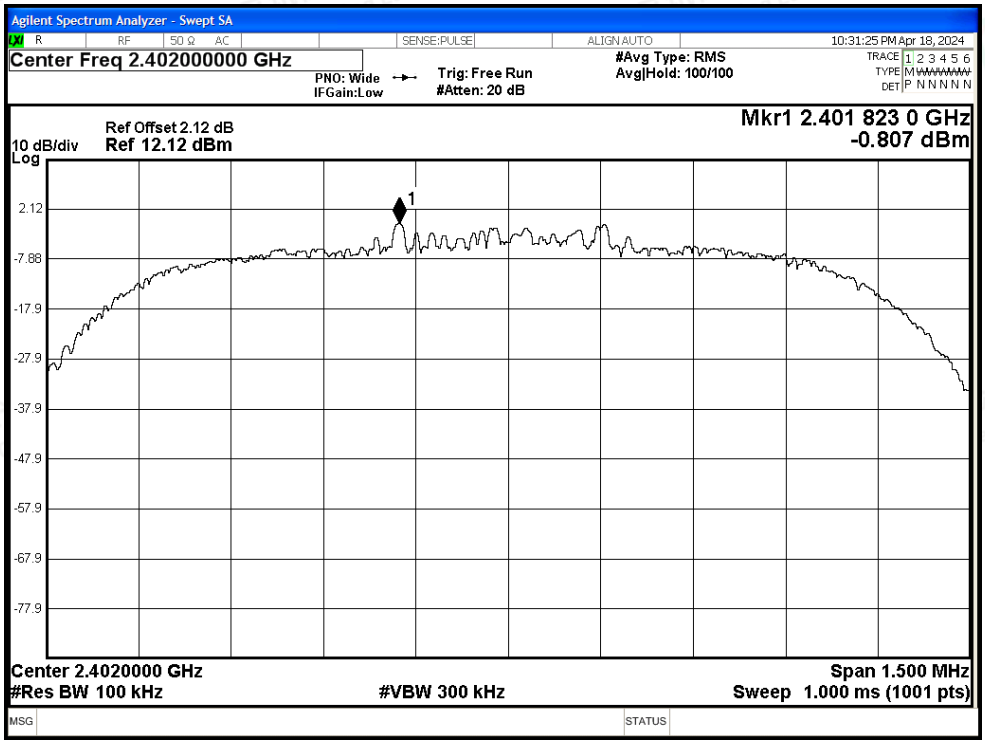
Tx. Spurious NVNT 1-DH5 2480MHz Ant1 Ref



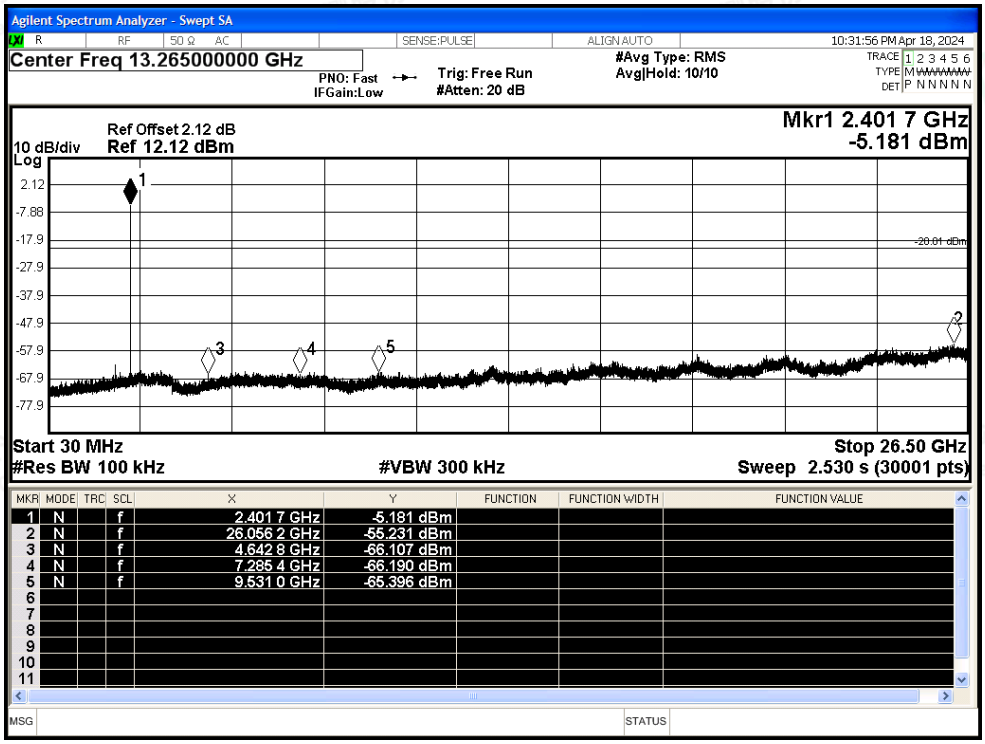
Tx. Spurious NVNT 1-DH5 2480MHz Ant1 Emission



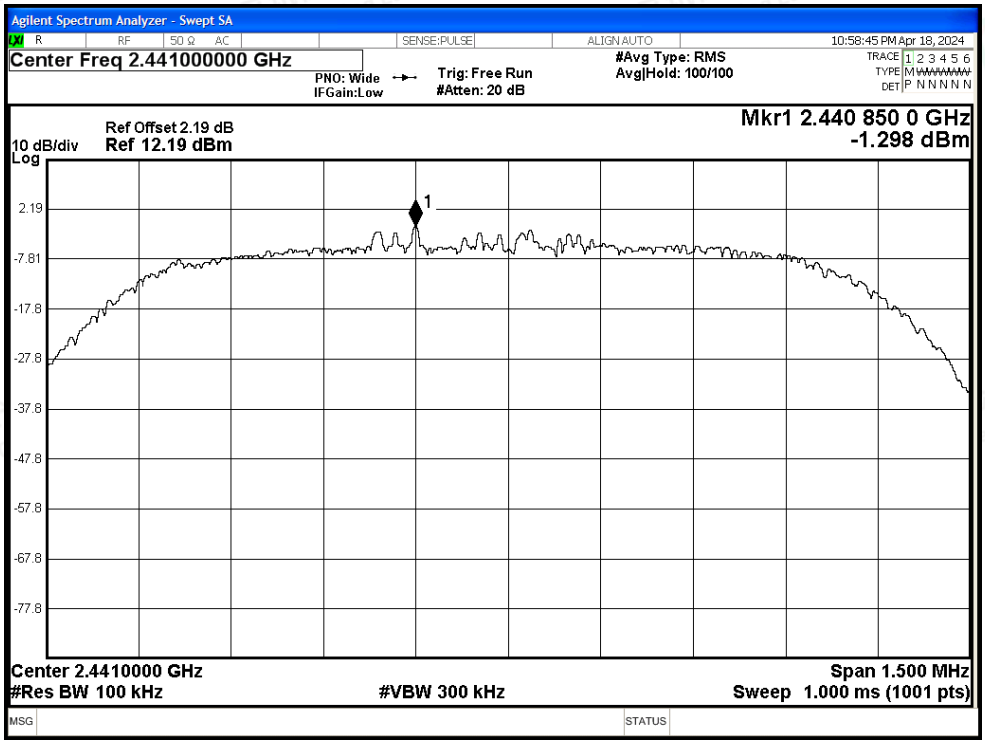
Tx. Spurious NVNT 2-DH5 2402MHz Ant1 Ref



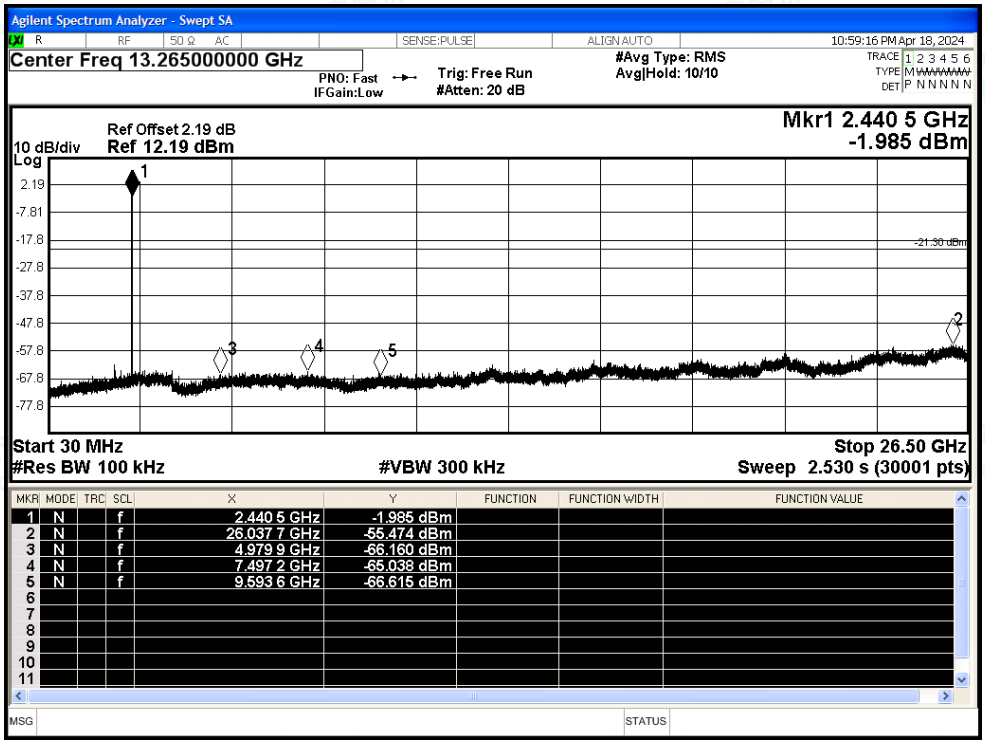
Tx. Spurious NVNT 2-DH5 2402MHz Ant1 Emission



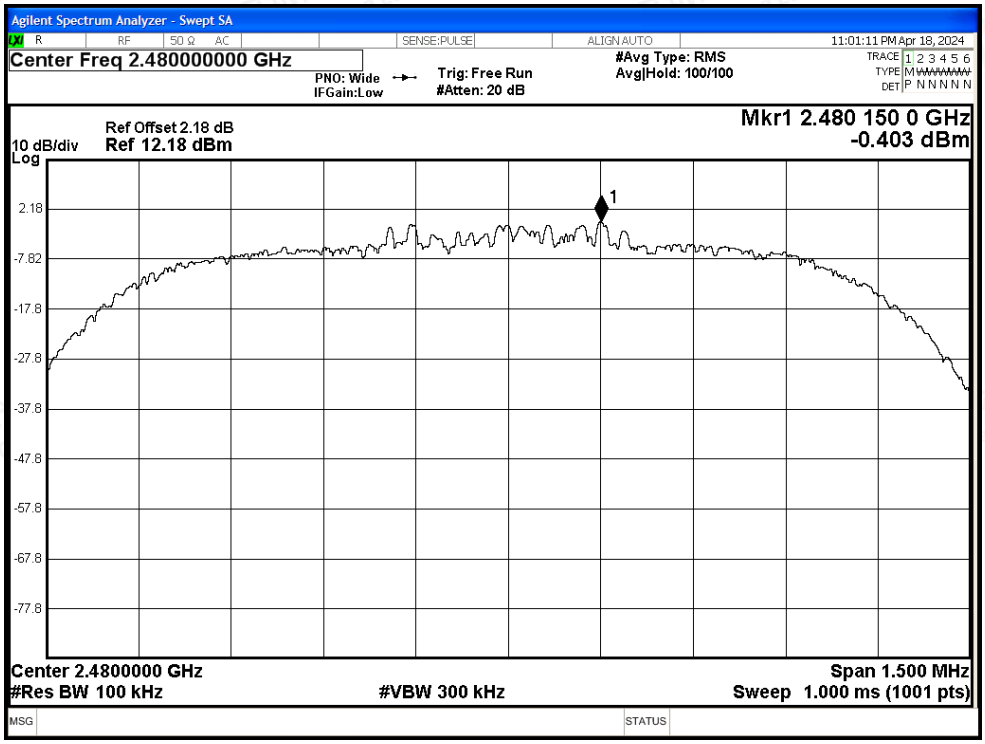
Tx. Spurious NVNT 2-DH5 2441MHz Ant1 Ref



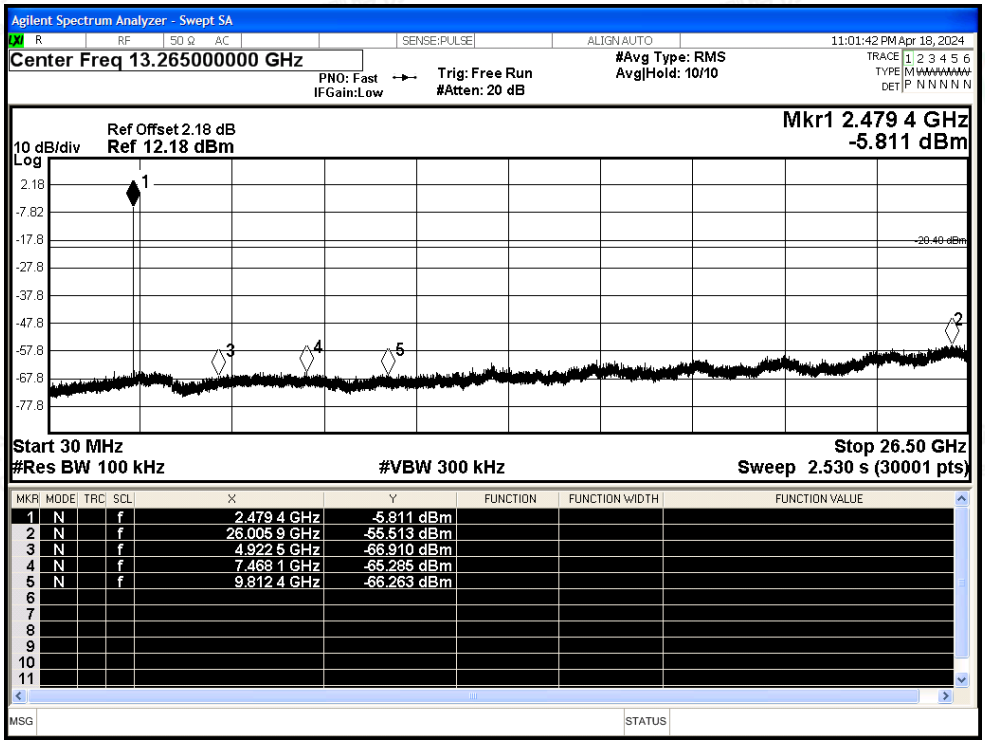
Tx. Spurious NVNT 2-DH5 2441MHz Ant1 Emission



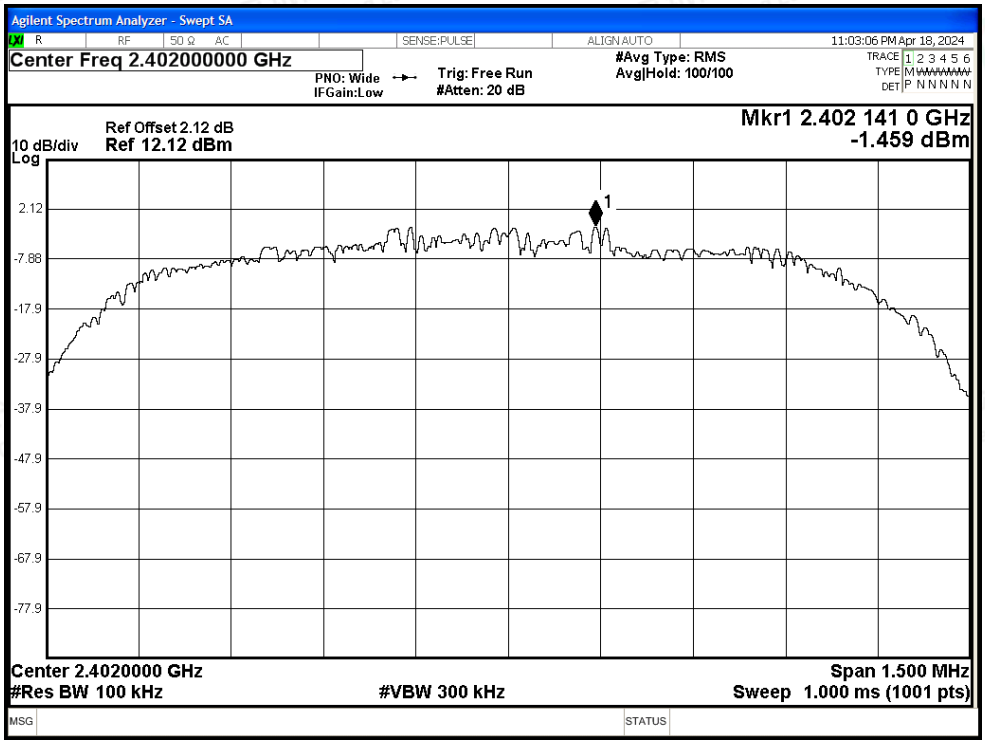
Tx. Spurious NVNT 2-DH5 2480MHz Ant1 Ref



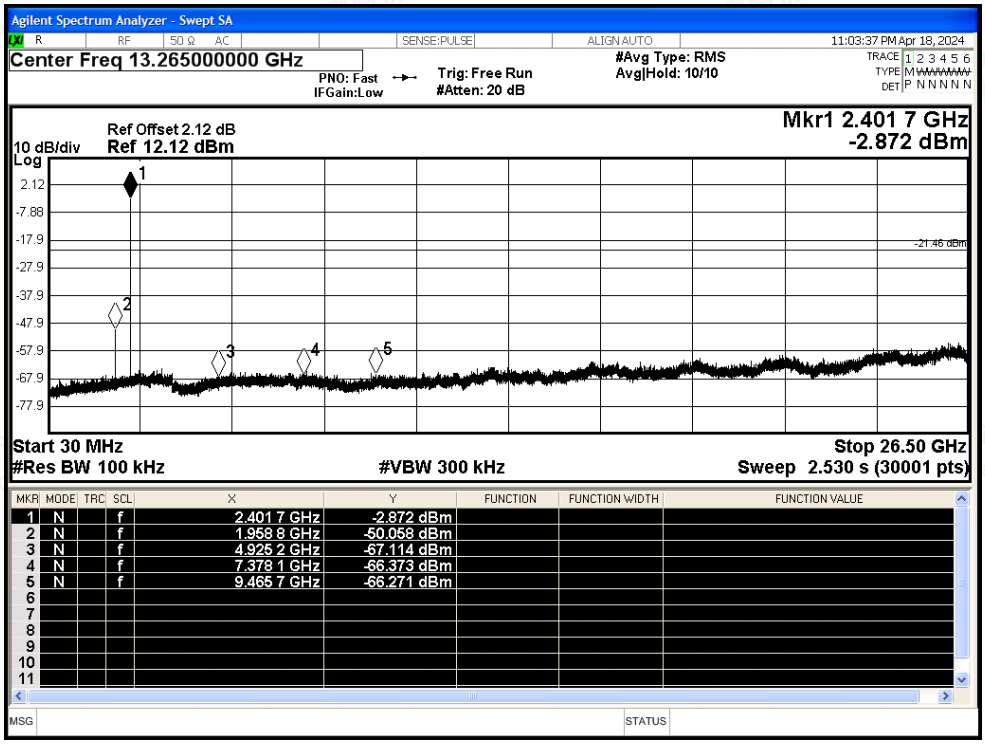
Tx. Spurious NVNT 2-DH5 2480MHz Ant1 Emission



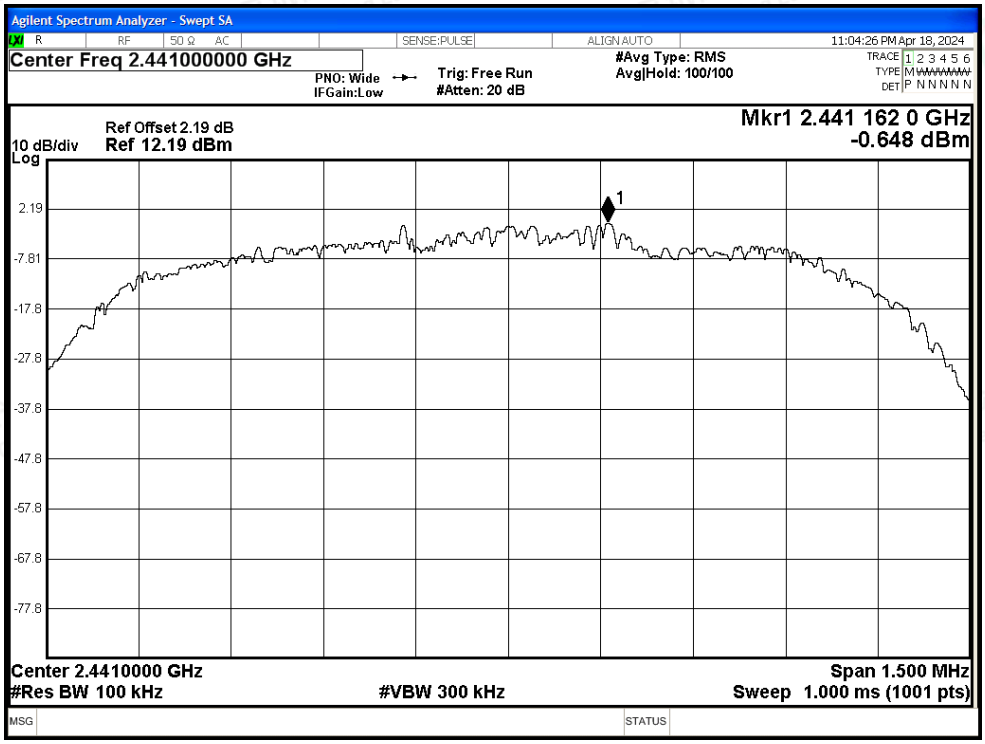
Tx. Spurious NVNT 3-DH5 2402MHz Ant1 Ref



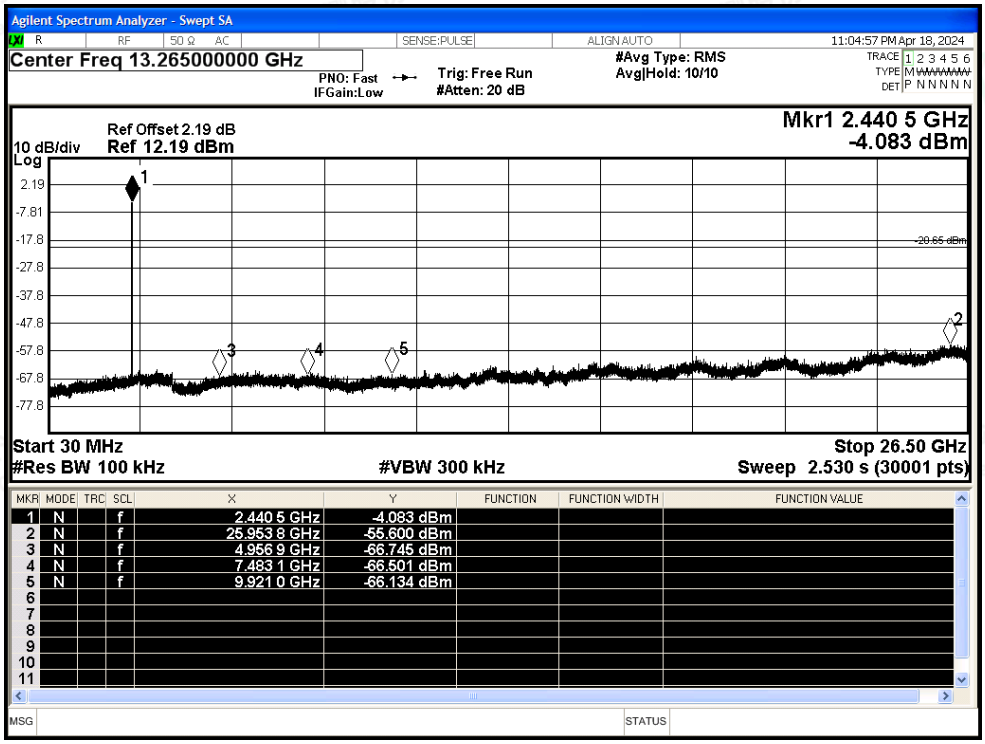
Tx. Spurious NVNT 3-DH5 2402MHz Ant1 Emission



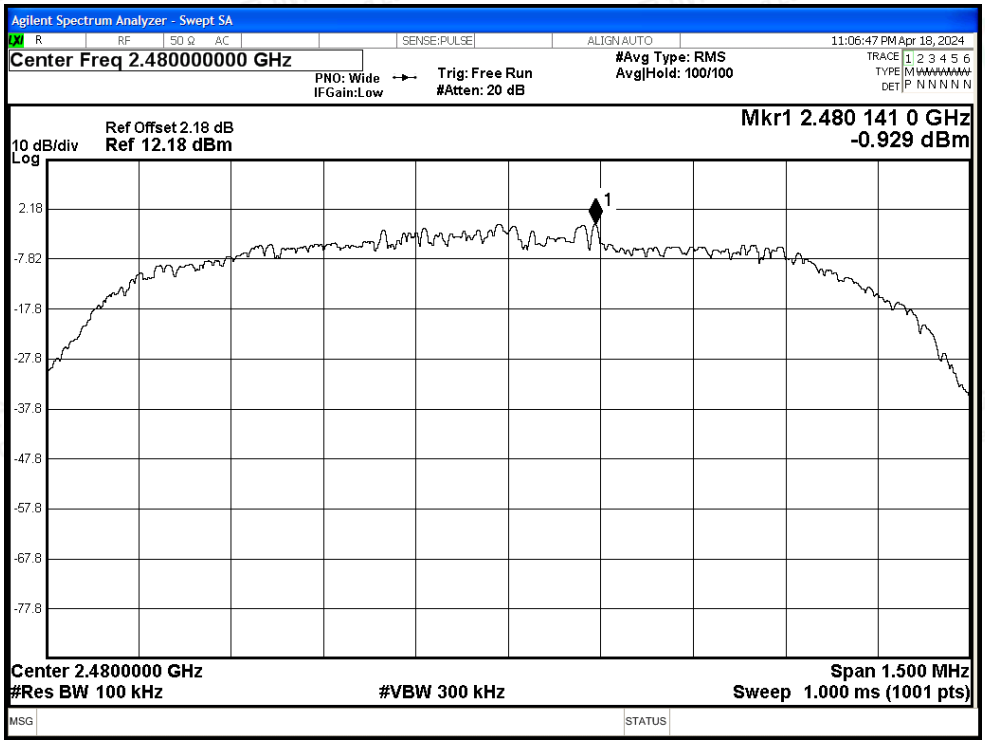
Tx. Spurious NVNT 3-DH5 2441MHz Ant1 Ref



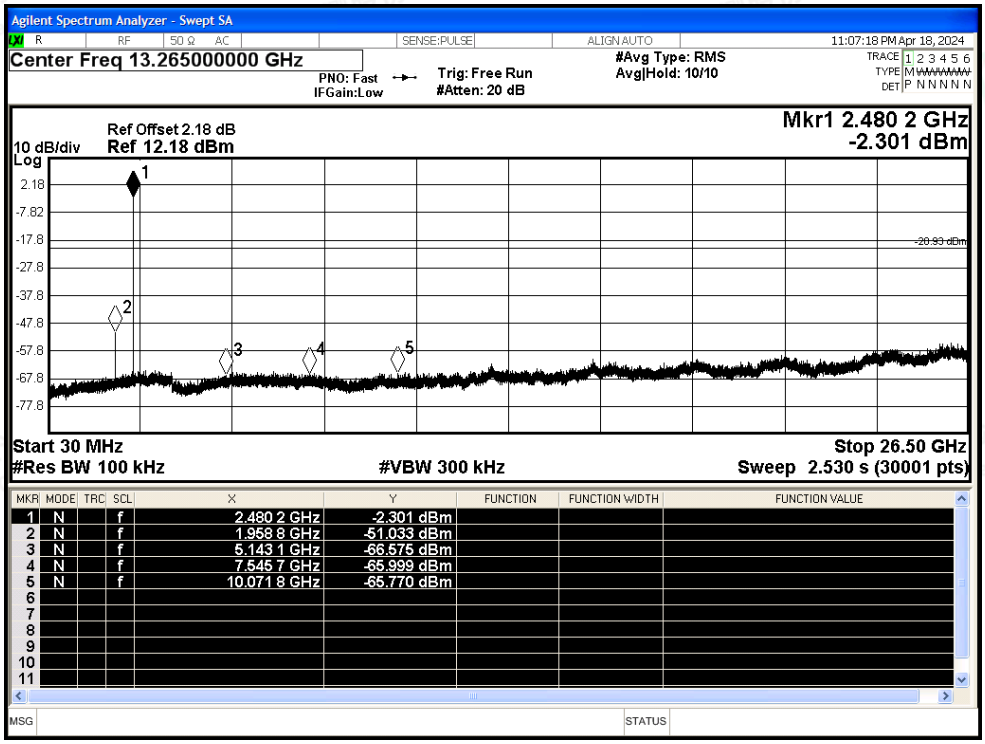
Tx. Spurious NVNT 3-DH5 2441MHz Ant1 Emission



Tx. Spurious NVNT 3-DH5 2480MHz Ant1 Ref



Tx. Spurious NVNT 3-DH5 2480MHz Ant1 Emission

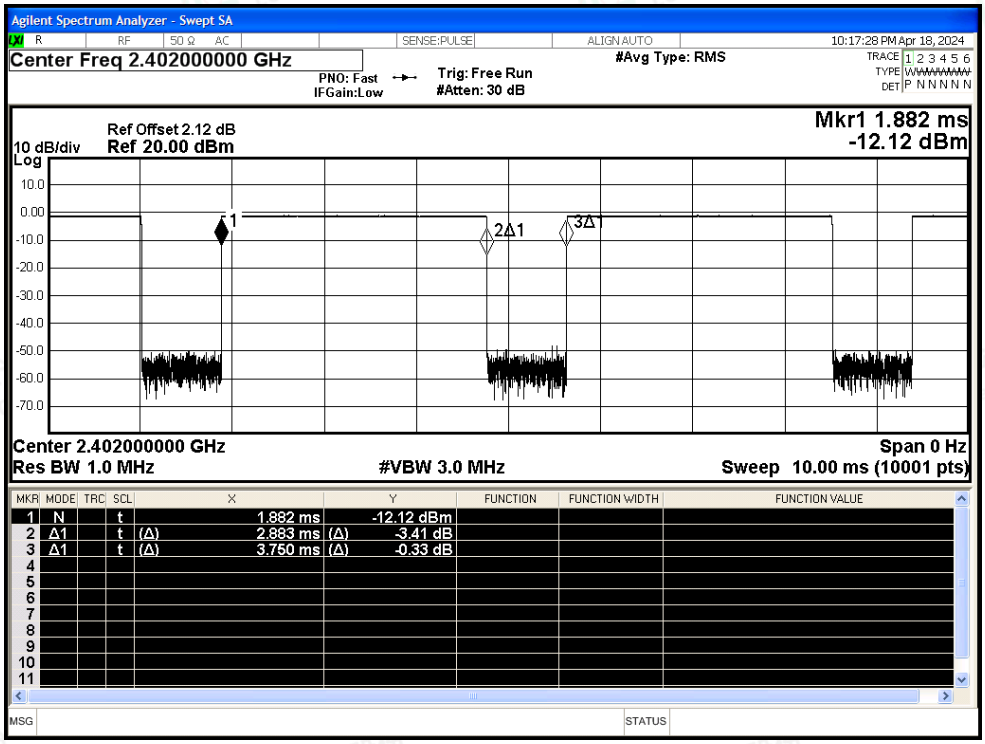


A.9 Duty Cycle

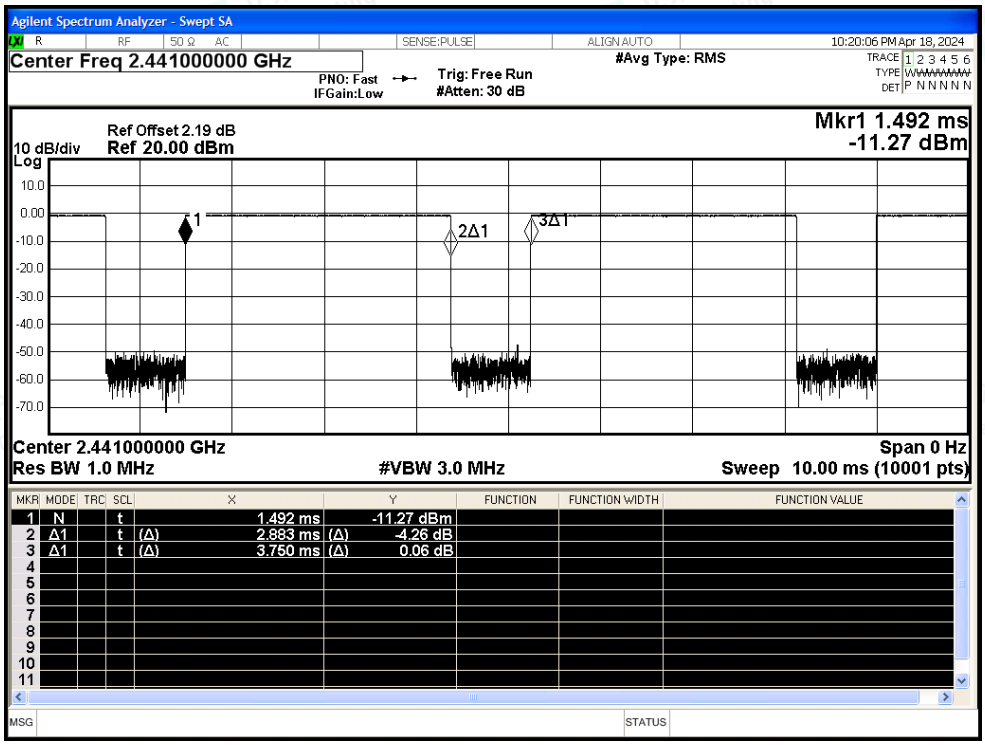
Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	1-DH5	2402	Ant1	76.88	1.14	0.35
NVNT	1-DH5	2441	Ant1	76.88	1.14	0.35
NVNT	1-DH5	2480	Ant1	76.88	1.14	0.35
NVNT	2-DH5	2402	Ant1	76.96	1.14	0.35
NVNT	2-DH5	2441	Ant1	76.99	1.14	0.35
NVNT	2-DH5	2480	Ant1	76.96	1.14	0.35
NVNT	3-DH5	2402	Ant1	77.01	1.13	0.35
NVNT	3-DH5	2441	Ant1	77.01	1.13	0.35
NVNT	3-DH5	2480	Ant1	77.02	1.13	0.35

Test Graphs

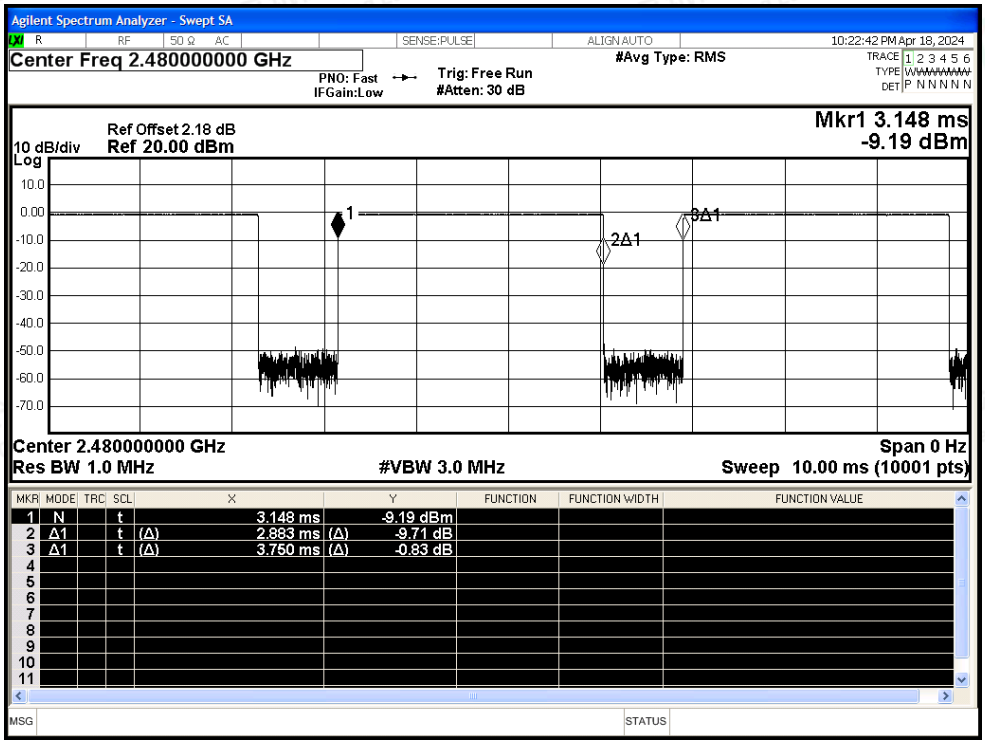
Duty Cycle NVNT 1-DH5 2402MHz Ant1



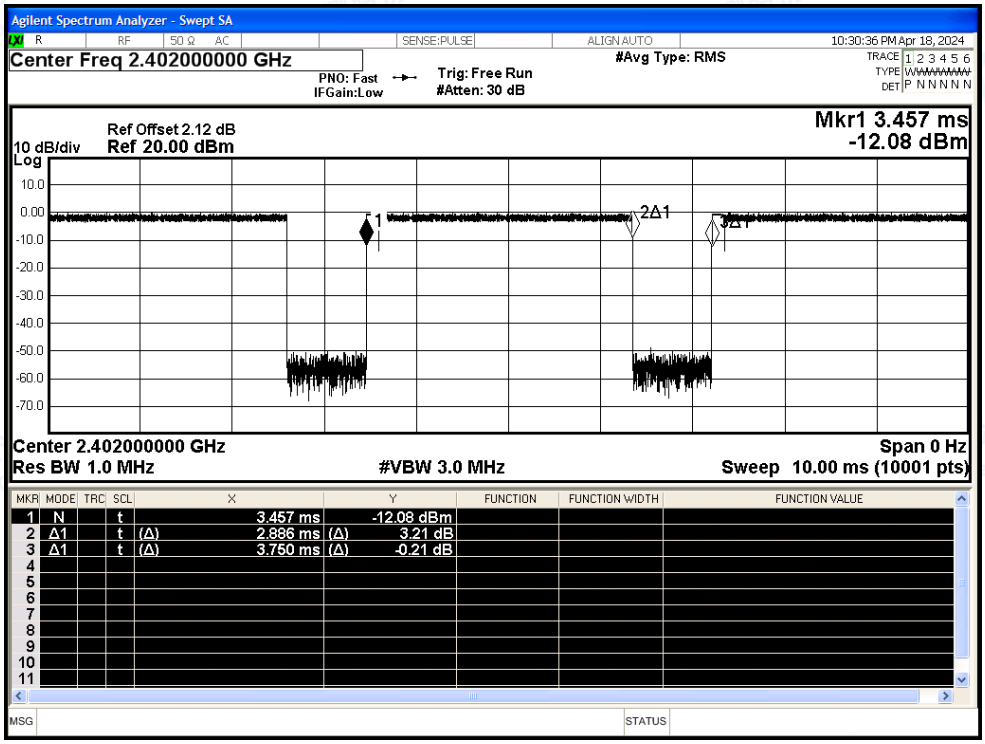
Duty Cycle NVNT 1-DH5 2441MHz Ant1



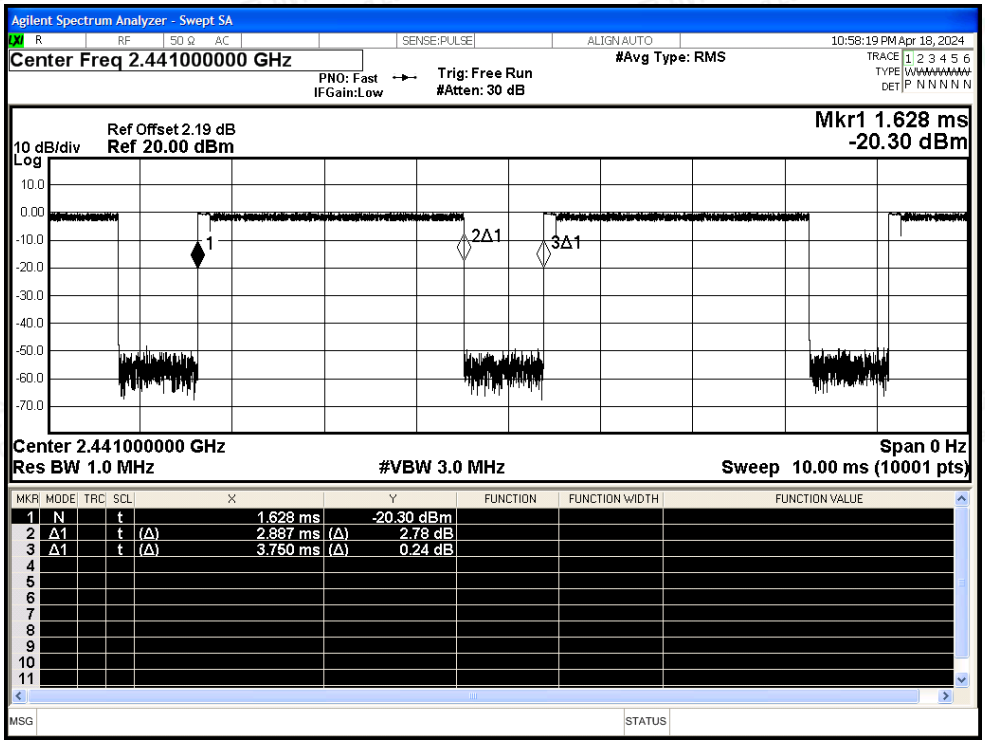
Duty Cycle NVNT 1-DH5 2480MHz Ant1



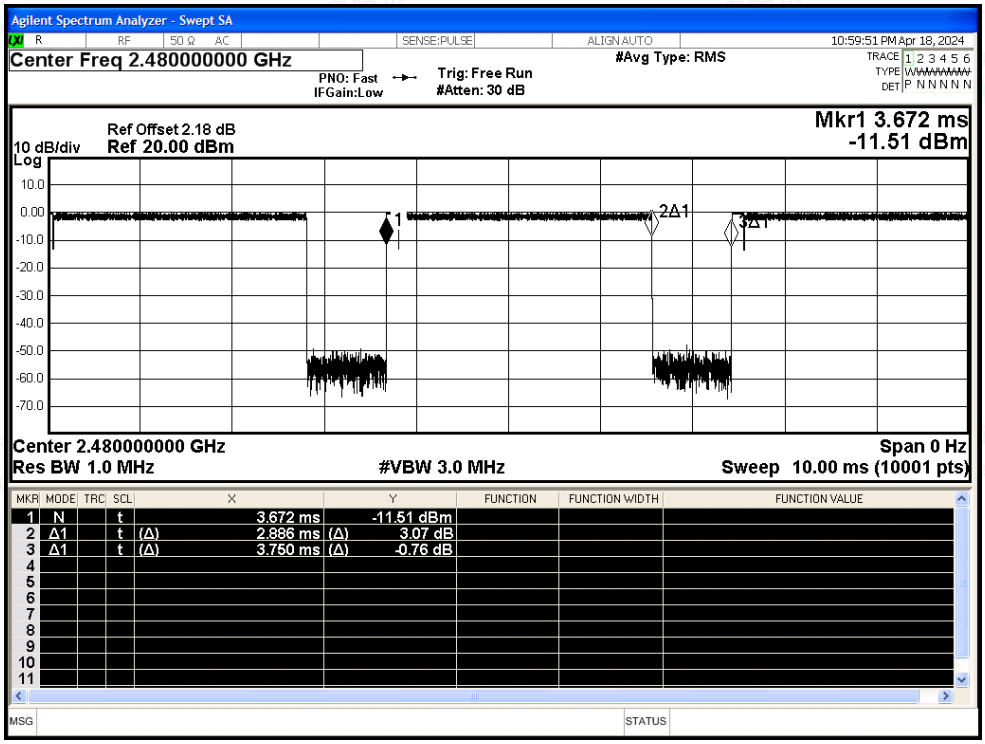
Duty Cycle NVNT 2-DH5 2402MHz Ant1



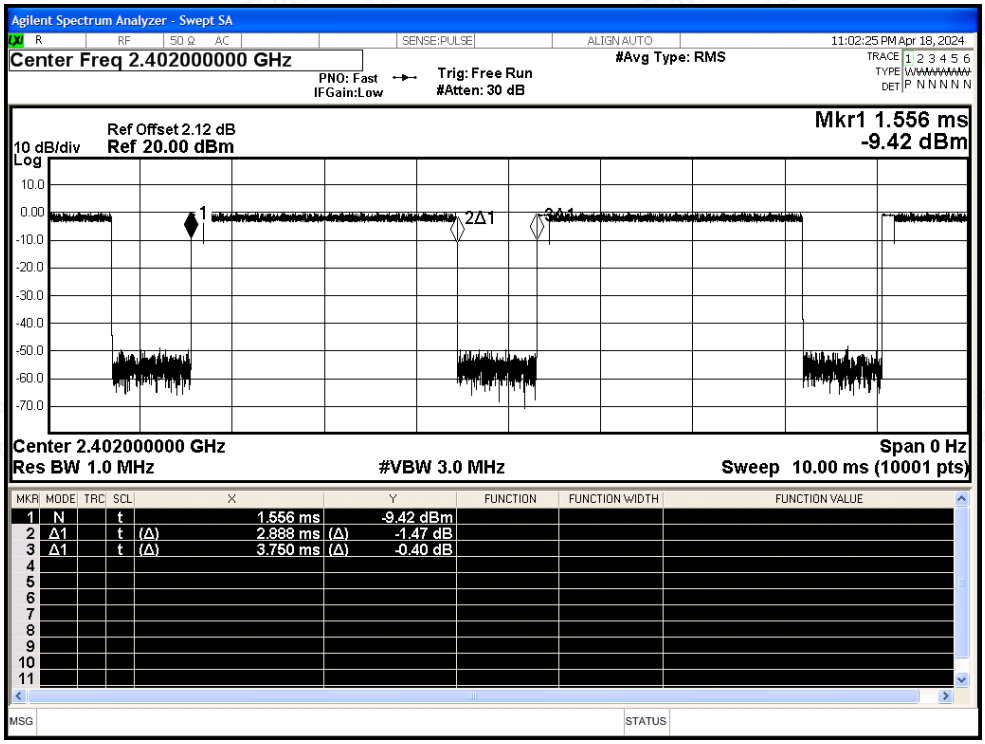
Duty Cycle NVNT 2-DH5 2441MHz Ant1



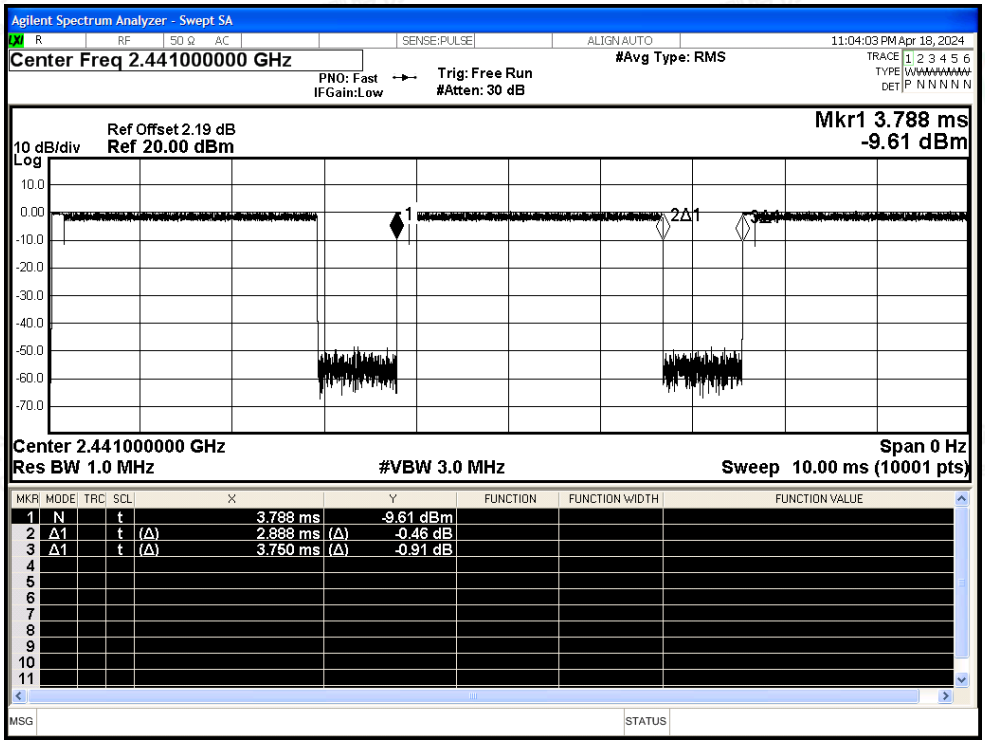
Duty Cycle NVNT 2-DH5 2480MHz Ant1



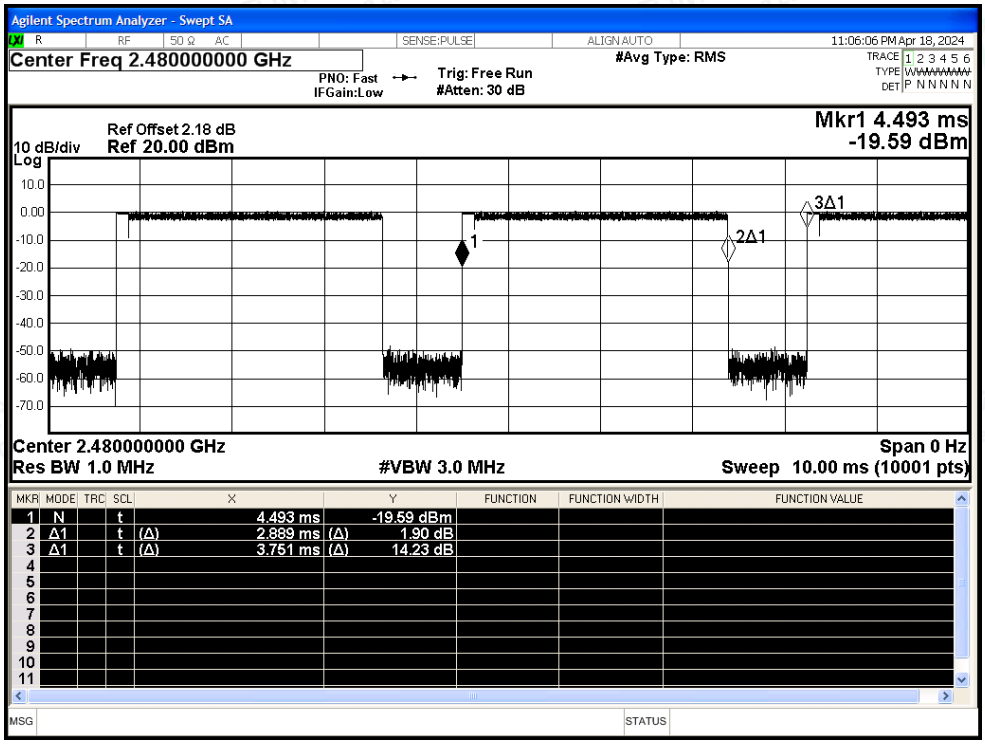
Duty Cycle NVNT 3-DH5 2402MHz Ant1



Duty Cycle NVNT 3-DH5 2441MHz Ant1



Duty Cycle NVNT 3-DH5 2480MHz Ant1

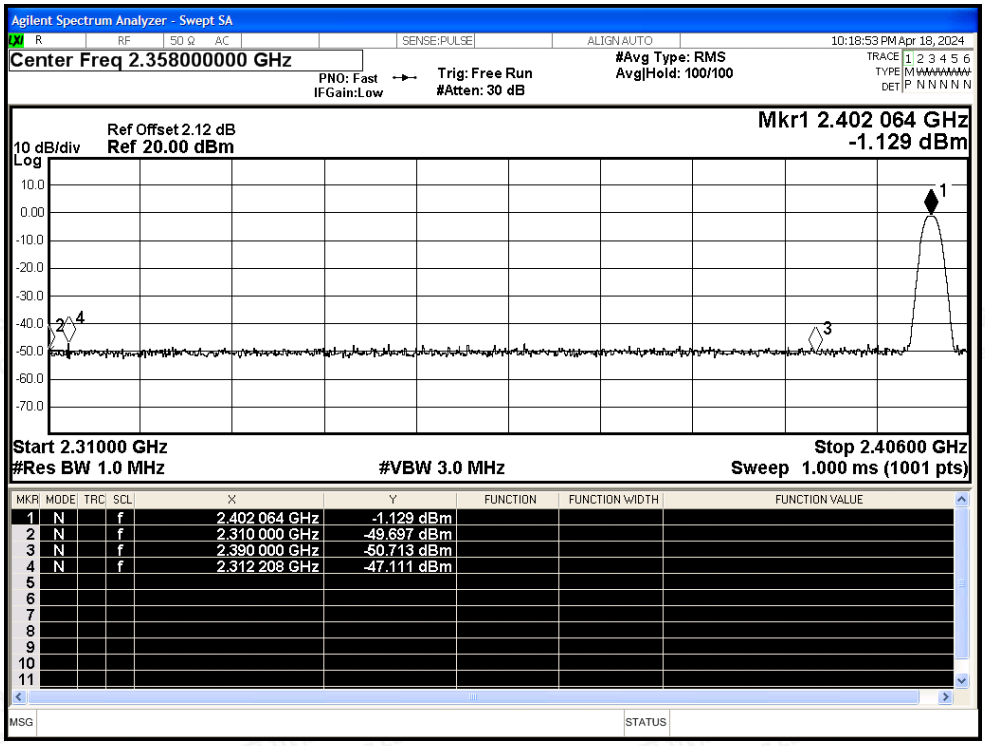


A.10 Restrict Band

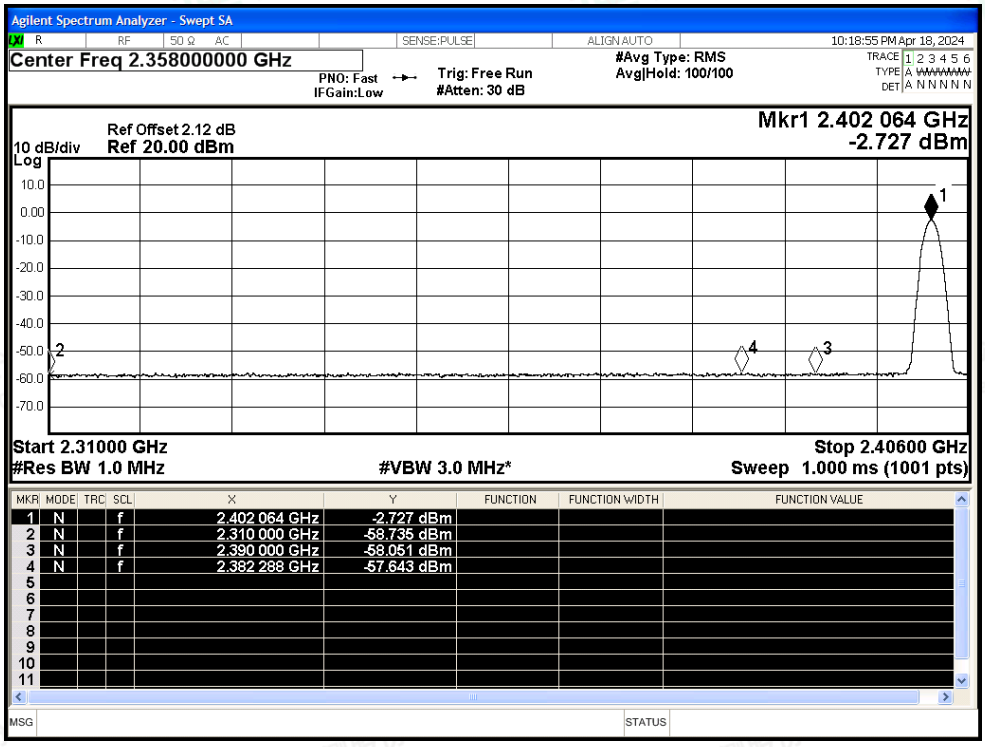
Condition	Mode	Frequency (MHz)	Antenna	Hopping Mode	Spur Freq (MHz)	Power (dBm)	Gain (dBi)	Duty Factor (dB)	E (dBuV/m)	Detector	Limit (dBuV/m)	Verdict
NVNT	1-DH5	2402	Ant1	No-Hopping	2310	-49.7	2.36	-	47.92	Peak	74	Pass
NVNT	1-DH5	2402	Ant1	No-Hopping	2310	-58.74	2.36	1.14	40.02	Average	54	Pass
NVNT	1-DH5	2402	Ant1	No-Hopping	2312.208	-47.11	2.36	-	50.51	Peak	74	Pass
NVNT	1-DH5	2402	Ant1	No-Hopping	2382.288	-57.64	2.36	1.14	41.12	Average	54	Pass
NVNT	1-DH5	2402	Ant1	No-Hopping	2390	-50.71	2.36	-	46.91	Peak	74	Pass
NVNT	1-DH5	2402	Ant1	No-Hopping	2390	-58.05	2.36	1.14	40.71	Average	54	Pass
NVNT	1-DH5	2480	Ant1	No-Hopping	2483.5	-49.41	2.36	-	48.21	Peak	74	Pass
NVNT	1-DH5	2480	Ant1	No-Hopping	2483.5	-57.62	2.36	1.14	41.14	Average	54	Pass
NVNT	1-DH5	2480	Ant1	No-Hopping	2495.224	-46.88	2.36	-	50.74	Peak	74	Pass
NVNT	1-DH5	2480	Ant1	No-Hopping	2490.208	-57.18	2.36	1.14	41.58	Average	54	Pass
NVNT	1-DH5	2480	Ant1	No-Hopping	2500	-48.79	2.36	-	48.83	Peak	74	Pass
NVNT	1-DH5	2480	Ant1	No-Hopping	2500	-58.02	2.36	1.14	40.74	Average	54	Pass
NVNT	2-DH5	2402	Ant1	No-Hopping	2310	-52.68	2.36	-	44.94	Peak	74	Pass
NVNT	2-DH5	2402	Ant1	No-Hopping	2310	-58.36	2.36	1.14	40.4	Average	54	Pass
NVNT	2-DH5	2402	Ant1	No-Hopping	2334.096	-47.82	2.36	-	49.8	Peak	74	Pass
NVNT	2-DH5	2402	Ant1	No-Hopping	2354.16	-57.61	2.36	1.14	41.15	Average	54	Pass
NVNT	2-DH5	2402	Ant1	No-Hopping	2390	-51.4	2.36	-	46.22	Peak	74	Pass
NVNT	2-DH5	2402	Ant1	No-Hopping	2390	-58.55	2.36	1.14	40.21	Average	54	Pass
NVNT	2-DH5	2480	Ant1	No-Hopping	2483.5	-50.03	2.36	-	47.59	Peak	74	Pass
NVNT	2-DH5	2480	Ant1	No-Hopping	2483.5	-57.63	2.36	1.14	41.13	Average	54	Pass
NVNT	2-DH5	2480	Ant1	No-Hopping	2499.592	-46.42	2.36	-	51.2	Peak	74	Pass
NVNT	2-DH5	2480	Ant1	No-Hopping	2485.168	-57.04	2.36	1.14	41.72	Average	54	Pass
NVNT	2-DH5	2480	Ant1	No-Hopping	2500	-50.43	2.36	-	47.19	Peak	74	Pass
NVNT	2-DH5	2480	Ant1	No-Hopping	2500	-57.88	2.36	1.14	40.88	Average	54	Pass
NVNT	3-DH5	2402	Ant1	No-Hopping	2310	-50.52	2.36	-	47.1	Peak	74	Pass
NVNT	3-DH5	2402	Ant1	No-Hopping	2310	-58.08	2.36	1.13	40.67	Average	54	Pass
NVNT	3-DH5	2402	Ant1	No-Hopping	2318.064	-46.67	2.36	-	50.95	Peak	74	Pass
NVNT	3-DH5	2402	Ant1	No-Hopping	2388.336	-57.6	2.36	1.13	41.15	Average	54	Pass
NVNT	3-DH5	2402	Ant1	No-Hopping	2390	-50.48	2.36	-	47.14	Peak	74	Pass
NVNT	3-DH5	2402	Ant1	No-Hopping	2390	-58.37	2.36	1.13	40.38	Average	54	Pass
NVNT	3-DH5	2480	Ant1	No-Hopping	2483.5	-49.78	2.36	-	47.84	Peak	74	Pass
NVNT	3-DH5	2480	Ant1	No-Hopping	2483.5	-57.87	2.36	1.13	40.88	Average	54	Pass
NVNT	3-DH5	2480	Ant1	No-Hopping	2493.88	-46.39	2.36	-	51.23	Peak	74	Pass
NVNT	3-DH5	2480	Ant1	No-Hopping	2496.76	-57.16	2.36	1.13	41.59	Average	54	Pass
NVNT	3-DH5	2480	Ant1	No-Hopping	2500	-50.65	2.36	-	46.97	Peak	74	Pass
NVNT	3-DH5	2480	Ant1	No-Hopping	2500	-58.28	2.36	1.13	40.47	Average	54	Pass

Test Graphs

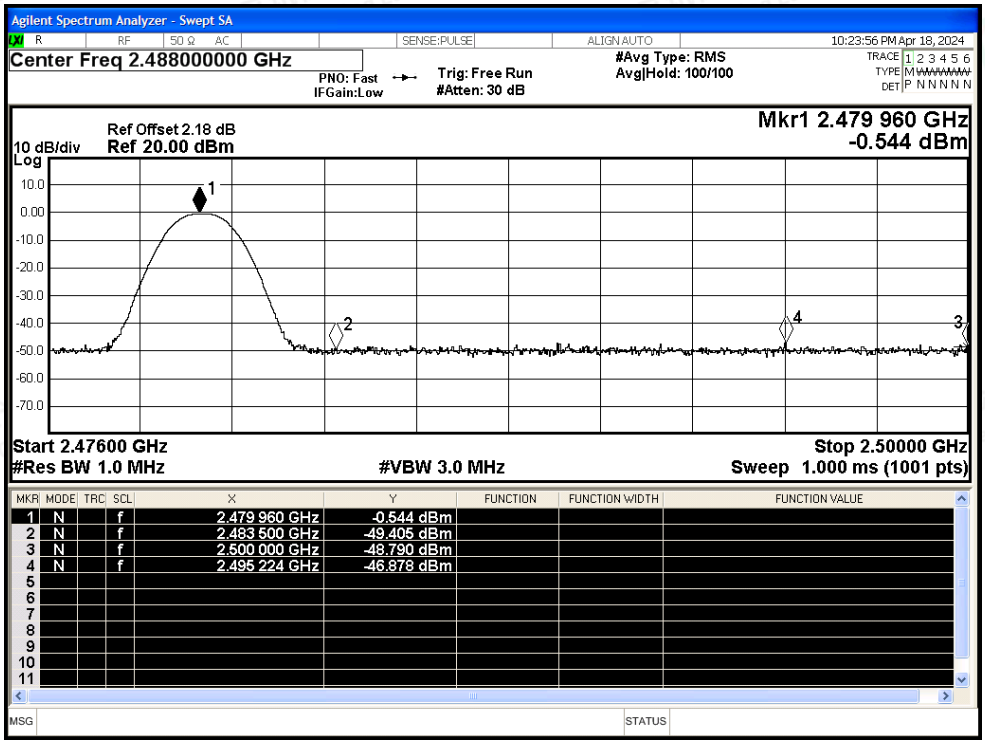
Restrict Band NVNT 1-DH5 2402MHz Ant1 No-Hopping Peak



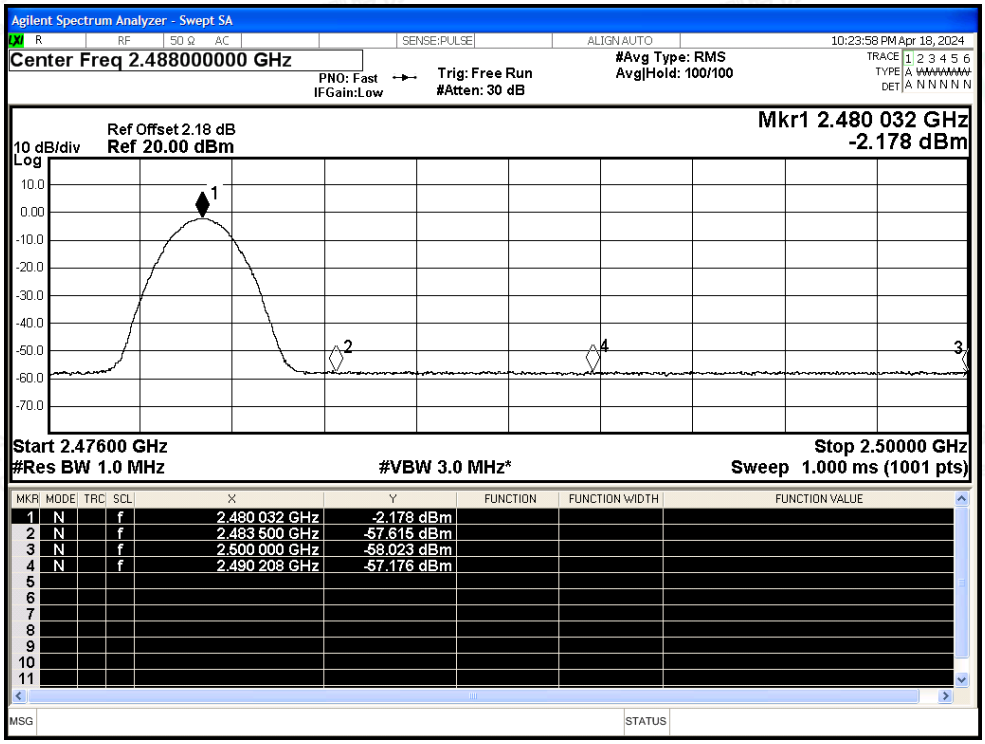
Restrict Band NVNT 1-DH5 2402MHz Ant1 No-Hopping Average



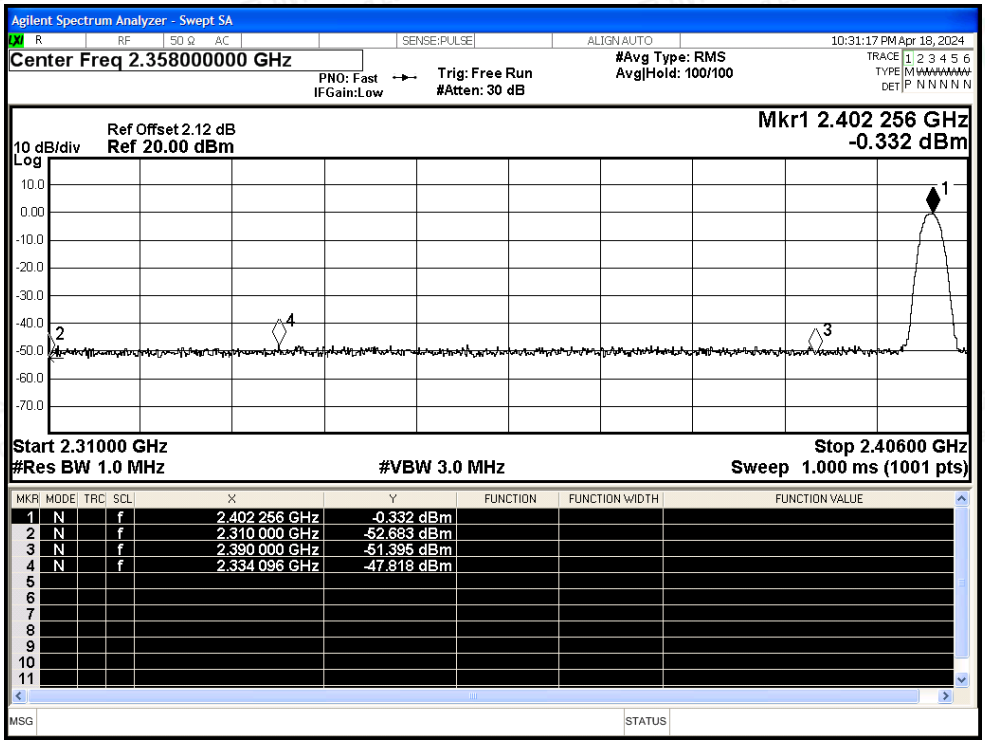
Restrict Band NVNT 1-DH5 2480MHz Ant1 No-Hopping Peak



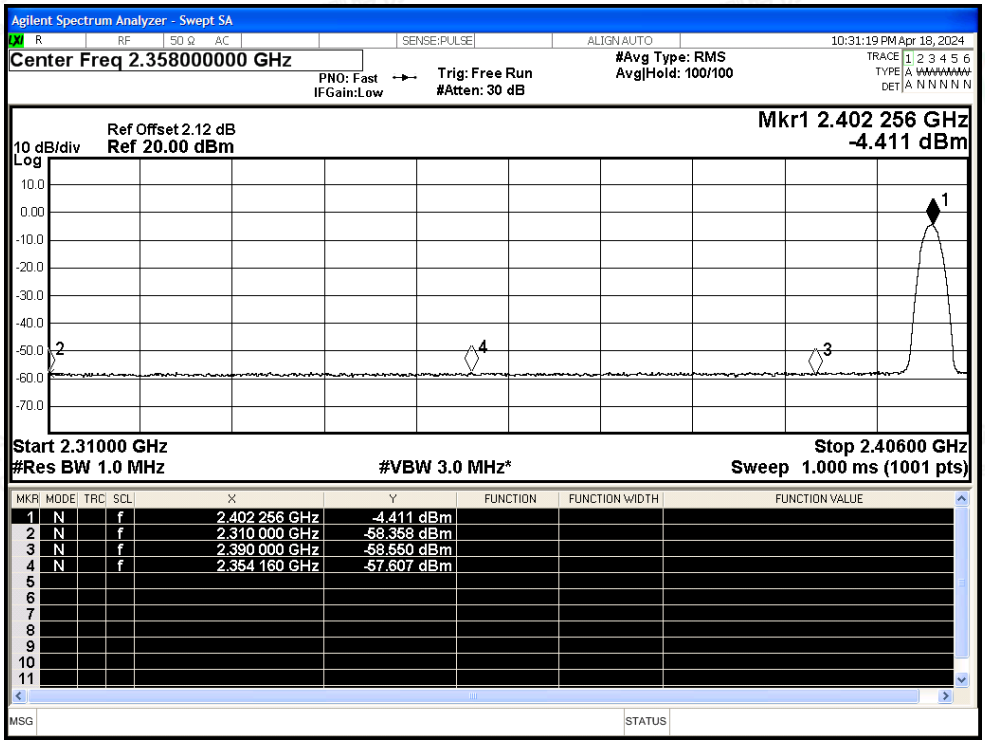
Restrict Band NVNT 1-DH5 2480MHz Ant1 No-Hopping Average



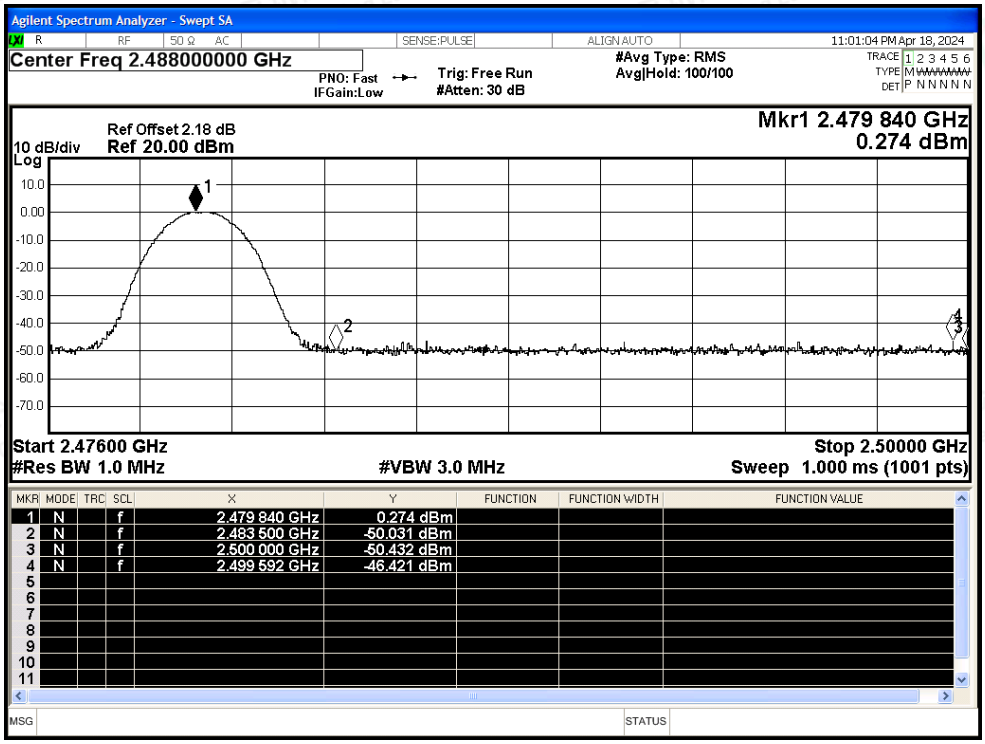
Restrict Band NVNT 2-DH5 2402MHz Ant1 No-Hopping Peak



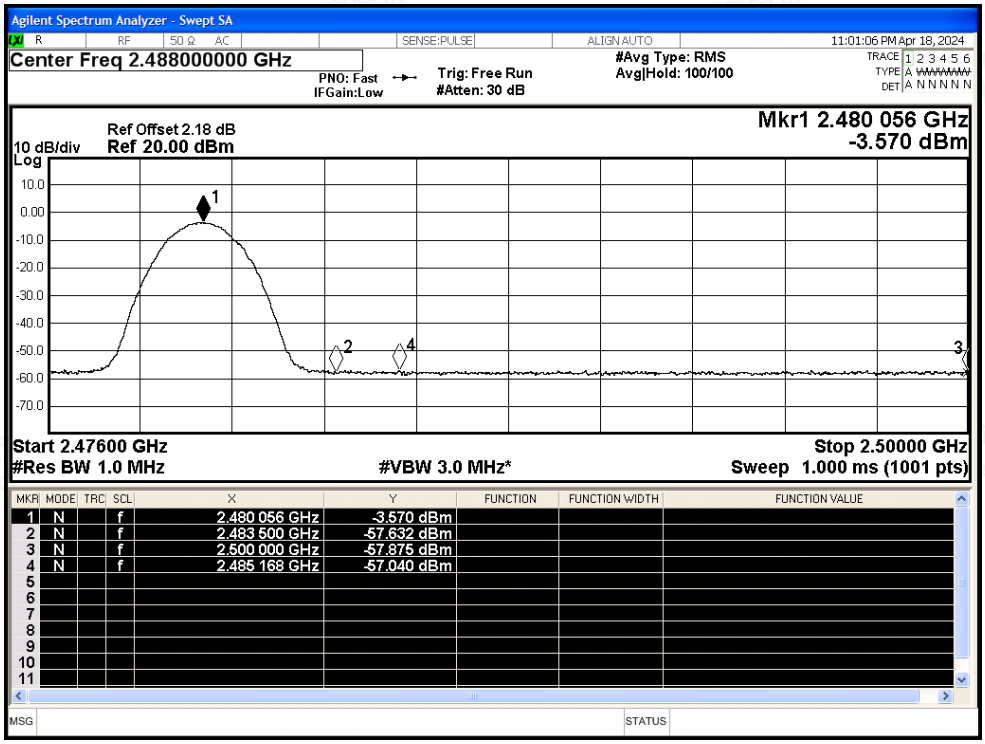
Restrict Band NVNT 2-DH5 2402MHz Ant1 No-Hopping Average



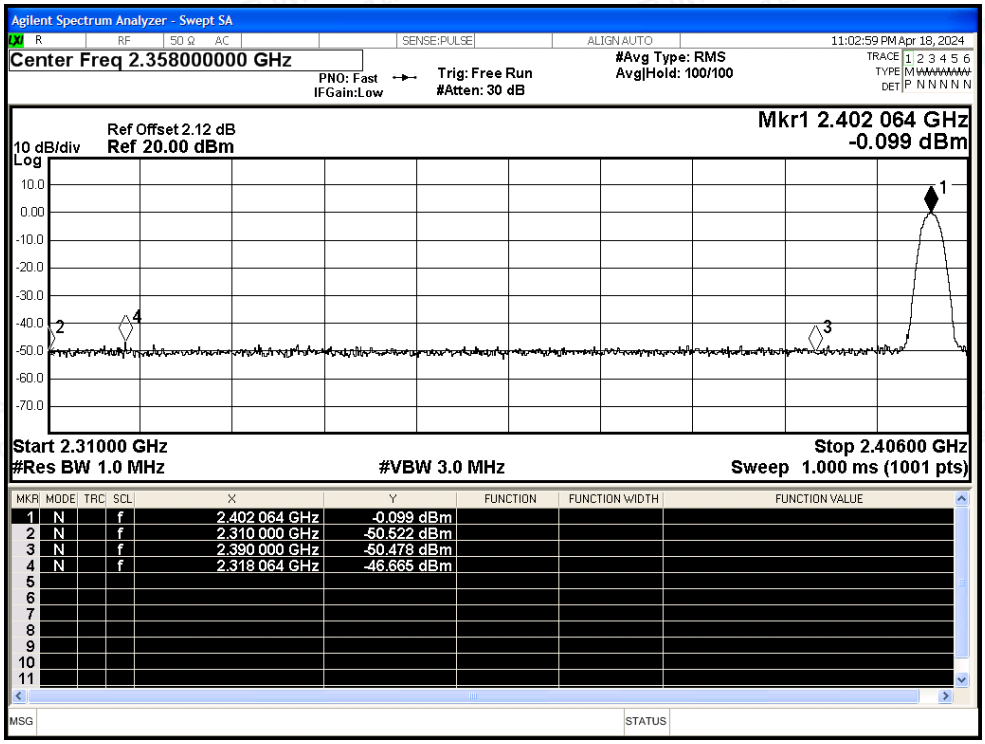
Restrict Band NVNT 2-DH5 2480MHz Ant1 No-Hopping Peak



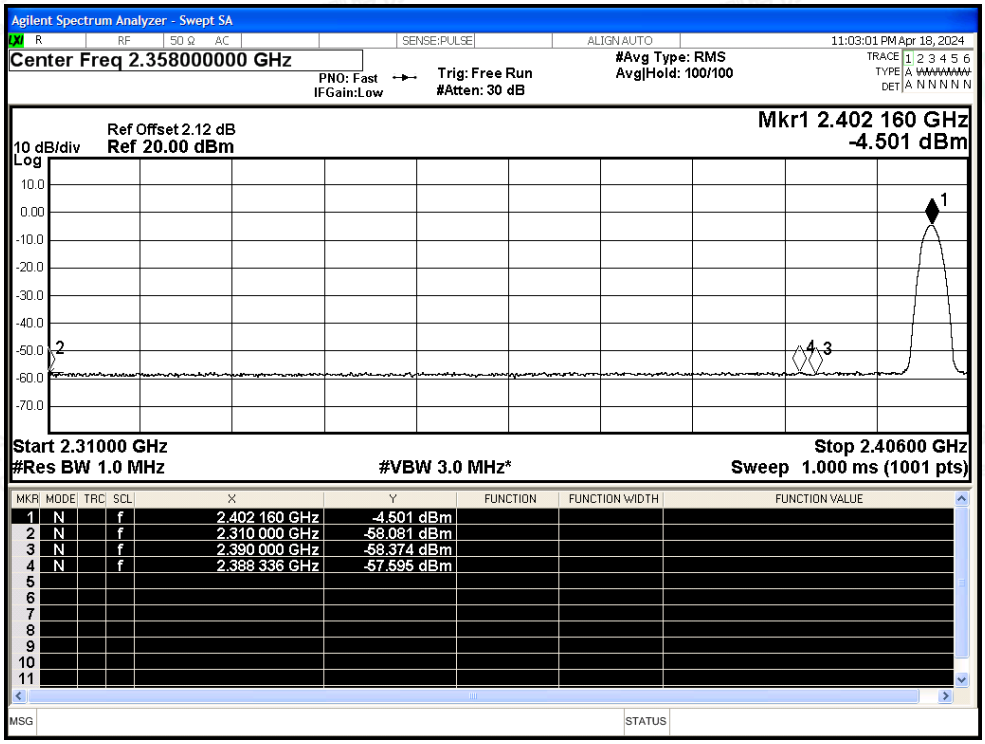
Restrict Band NVNT 2-DH5 2480MHz Ant1 No-Hopping Average



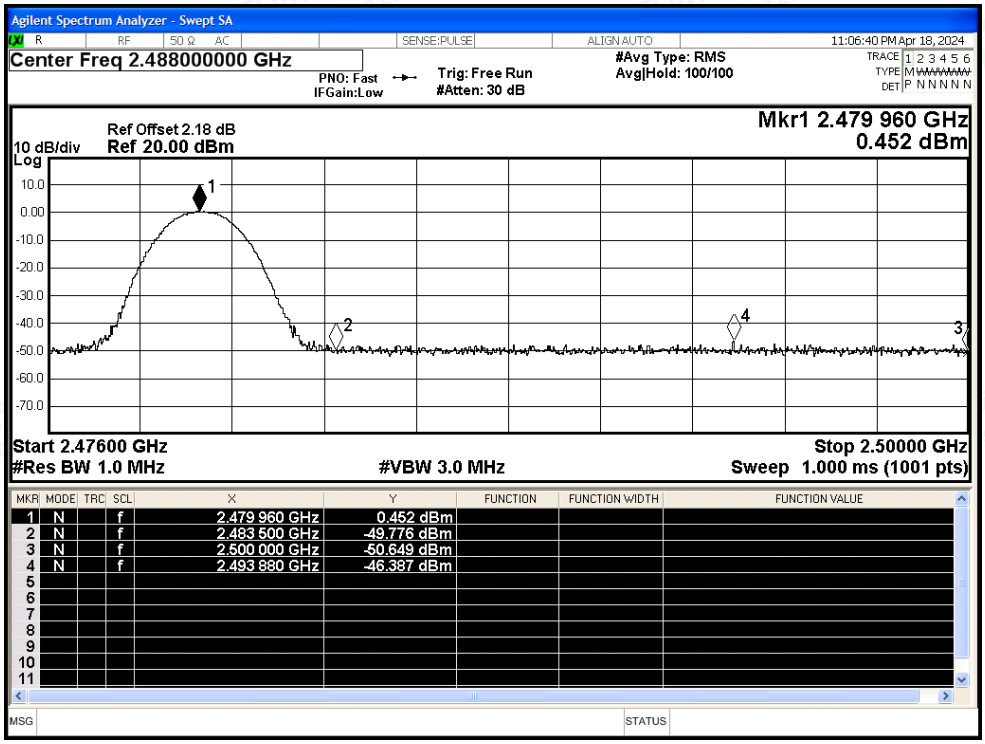
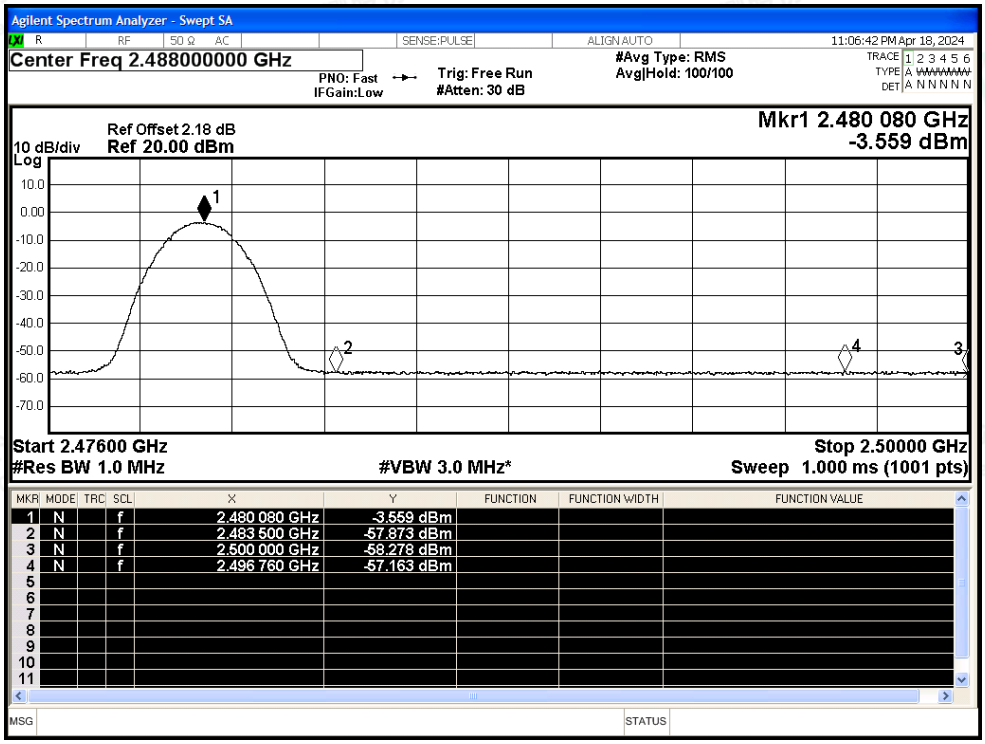
Restrict Band NVNT 3-DH5 2402MHz Ant1 No-Hopping Peak



Restrict Band NVNT 3-DH5 2402MHz Ant1 No-Hopping Average



Restrict Band NVNT 3-DH5 2480MHz Ant1 No-Hopping Peak



Restrict Band NVNT 3-DH5 2480MHz Ant1 No-Hopping Average