Appendix A

RF Test Data for BT (Conducted Measurement)

Product Name: TWS Bluetooth Earphones

Test Model: OpenListen NC09

Environmental Conditions

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

A.1 -20dB Bandwidth

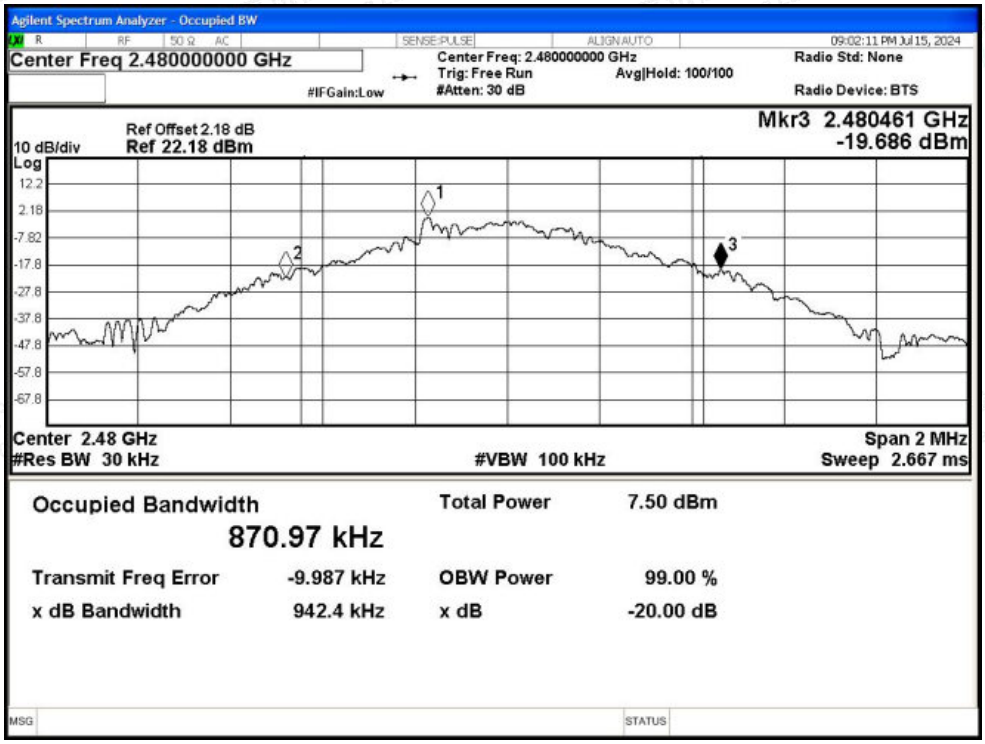
Condition	Mode	Frequency (MHz)	Antenna	-20 dB Bandwidth (MHz)	Limit -20 dB Bandwidth (MHz)	Verdict
NVNT	1-DH5	2402	Ant1	0.938	N/A	Pass
NVNT	1-DH5	2441	Ant1	0.948	N/A	Pass
NVNT	1-DH5	2480	Ant1	0.942	N/A	Pass
NVNT	2-DH5	2402	Ant1	1.283	N/A	Pass
NVNT	2-DH5	2441	Ant1	1.307	N/A	Pass
NVNT	2-DH5	2480	Ant1	1.285	N/A	Pass

Test Graphs

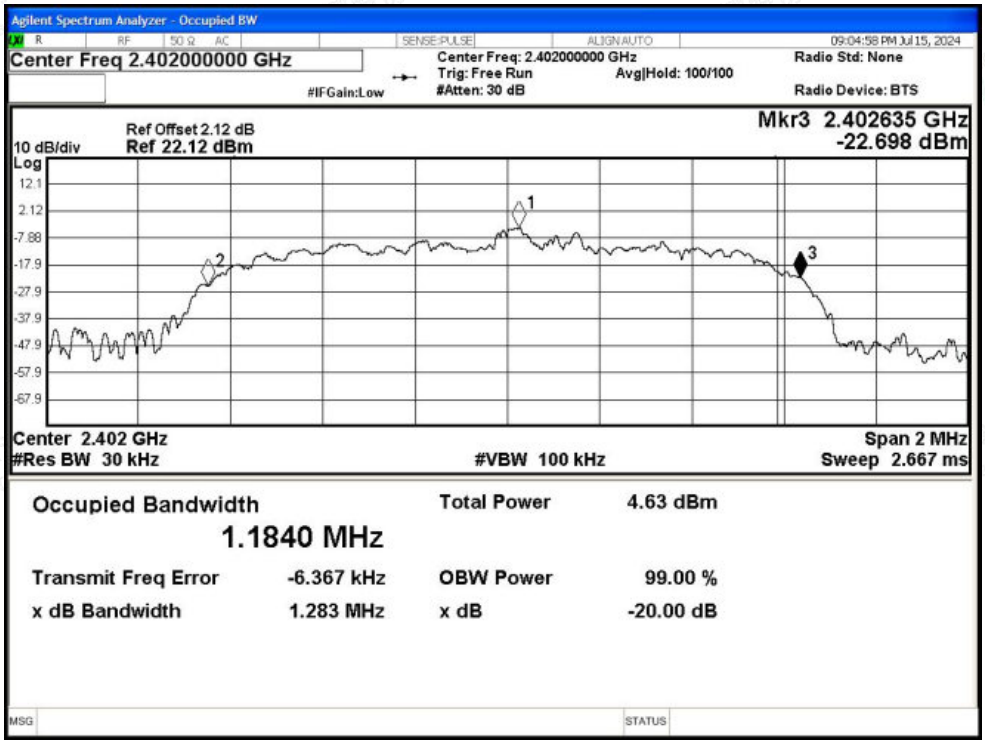
-20dB Bandwidth NVNT 1-DH5 2402MHz Ant1

-20dB Bandwidth NVNT 1-DH5 2441MHz Ant1

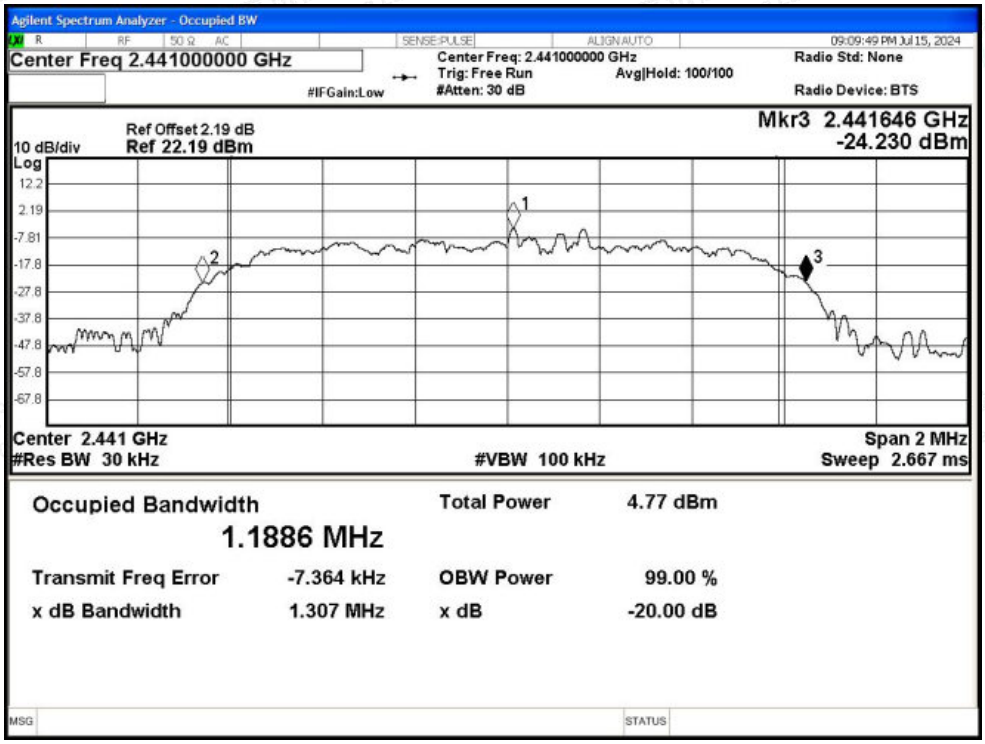
-20dB Bandwidth NVNT 1-DH5 2480MHz Ant1



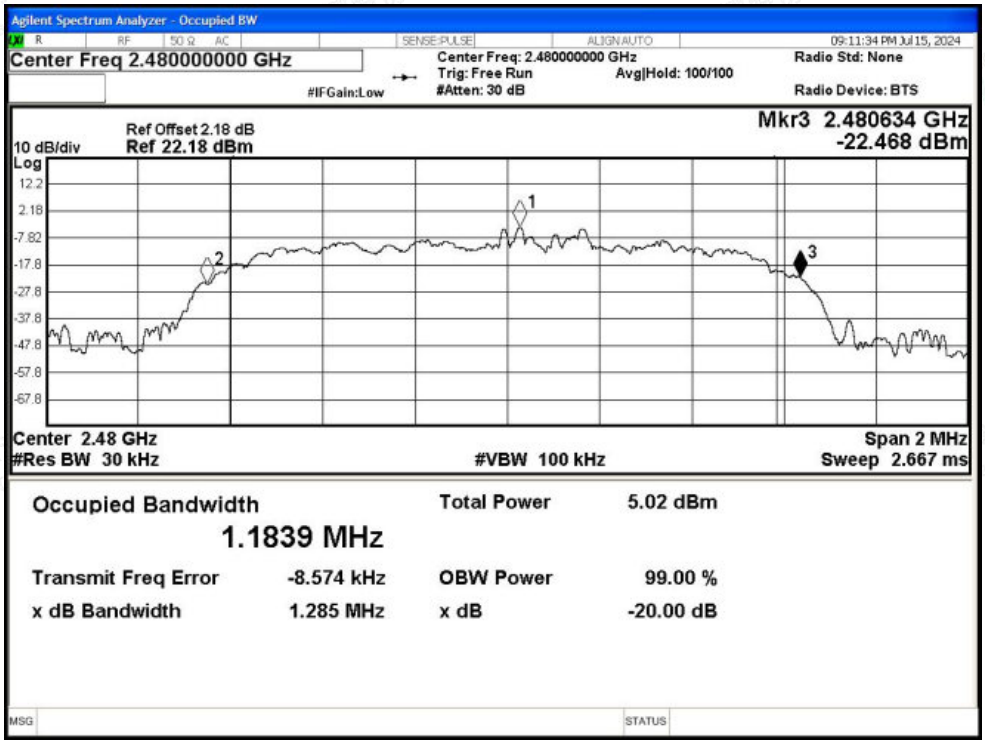
-20dB Bandwidth NVNT 2-DH5 2402MHz Ant1



-20dB Bandwidth NVNT 2-DH5 2441MHz Ant1



-20dB Bandwidth NVNT 2-DH5 2480MHz Ant1

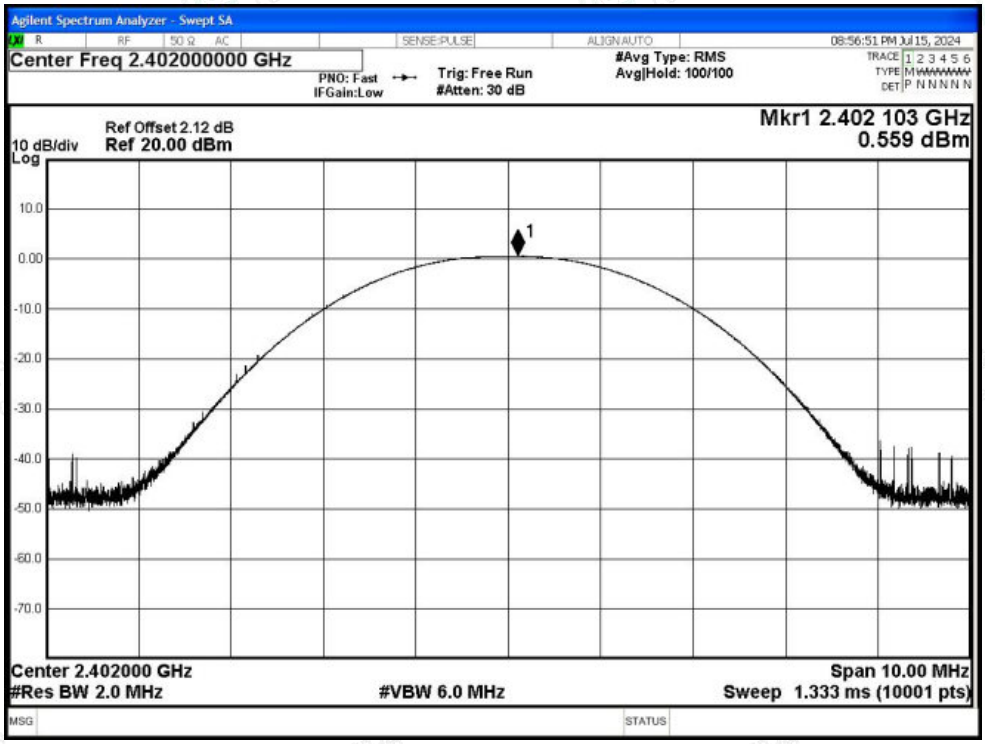


A.2 Maximum Peak Conducted Output Power

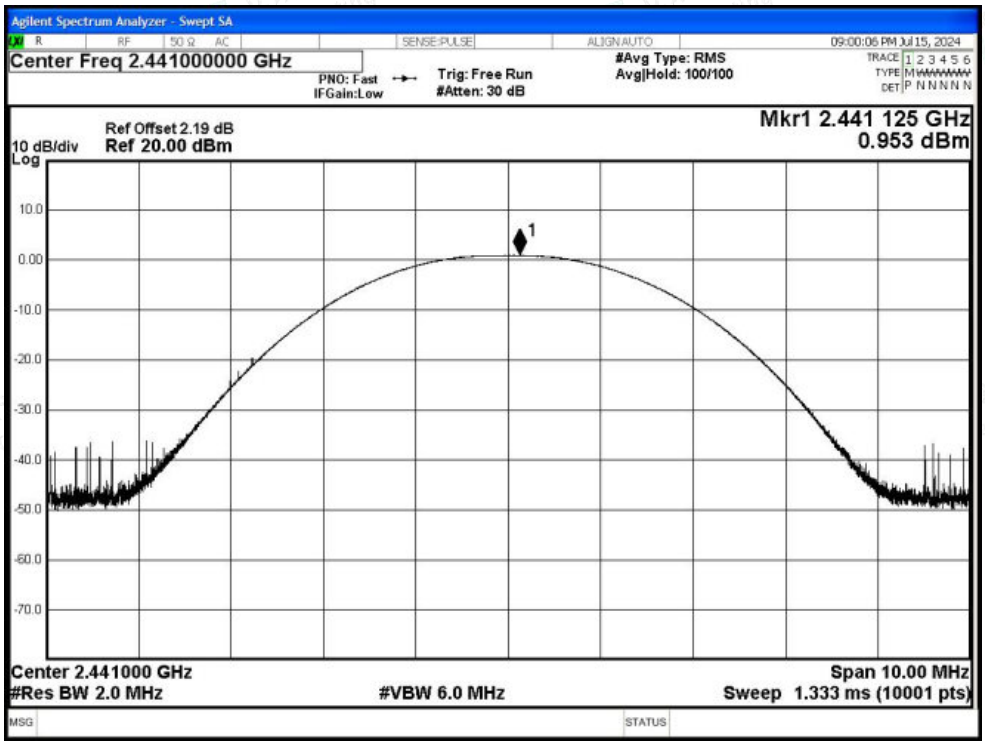
Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	1-DH5	2402	Ant1	0.56	21	Pass
NVNT	1-DH5	2441	Ant1	0.95	21	Pass
NVNT	1-DH5	2480	Ant1	1.11	21	Pass
NVNT	2-DH5	2402	Ant1	0.08	21	Pass
NVNT	2-DH5	2441	Ant1	0.56	21	Pass
NVNT	2-DH5	2480	Ant1	0.52	21	Pass

Test Graphs

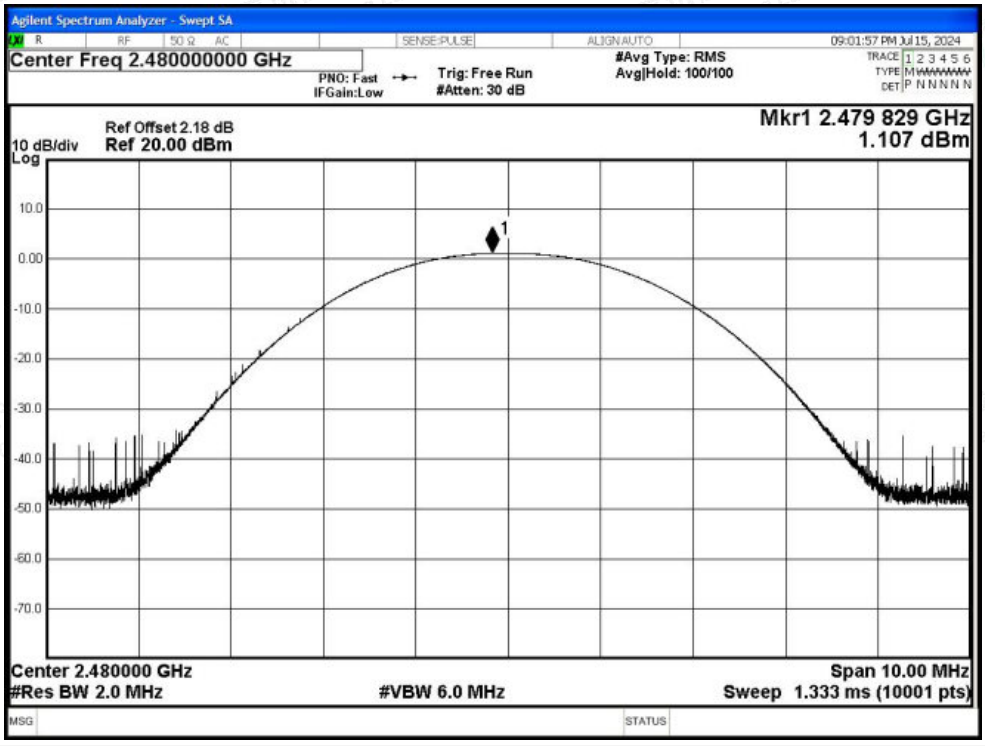
Power NVNT 1-DH5 2402MHz Ant1



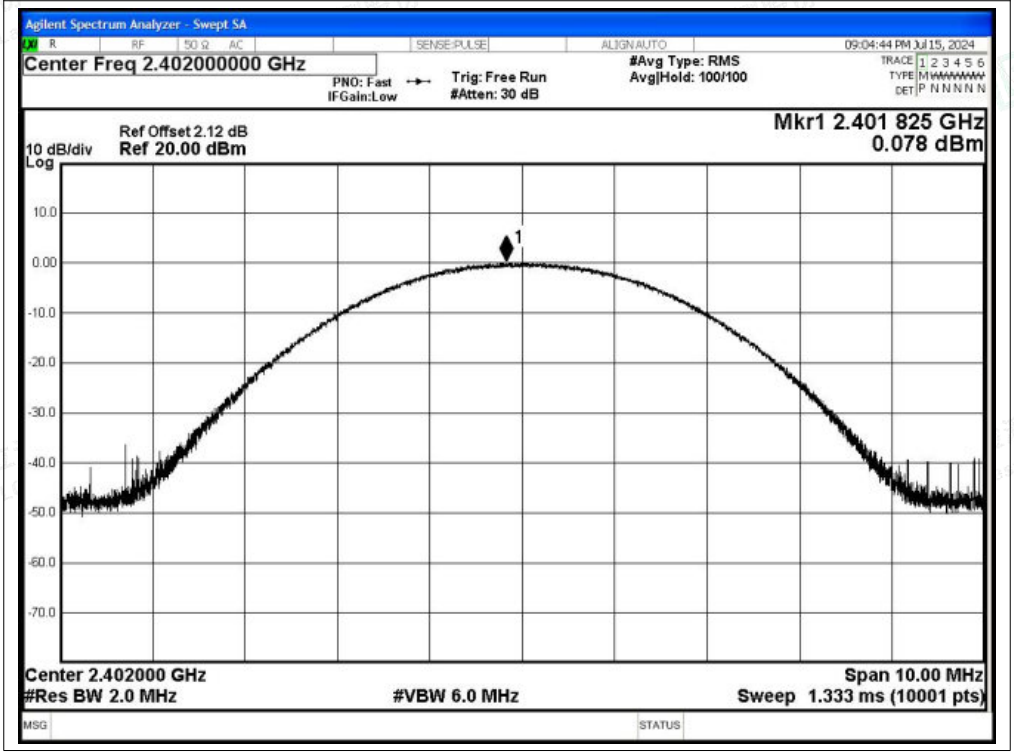
Power NVNT 1-DH5 2441MHz Ant1



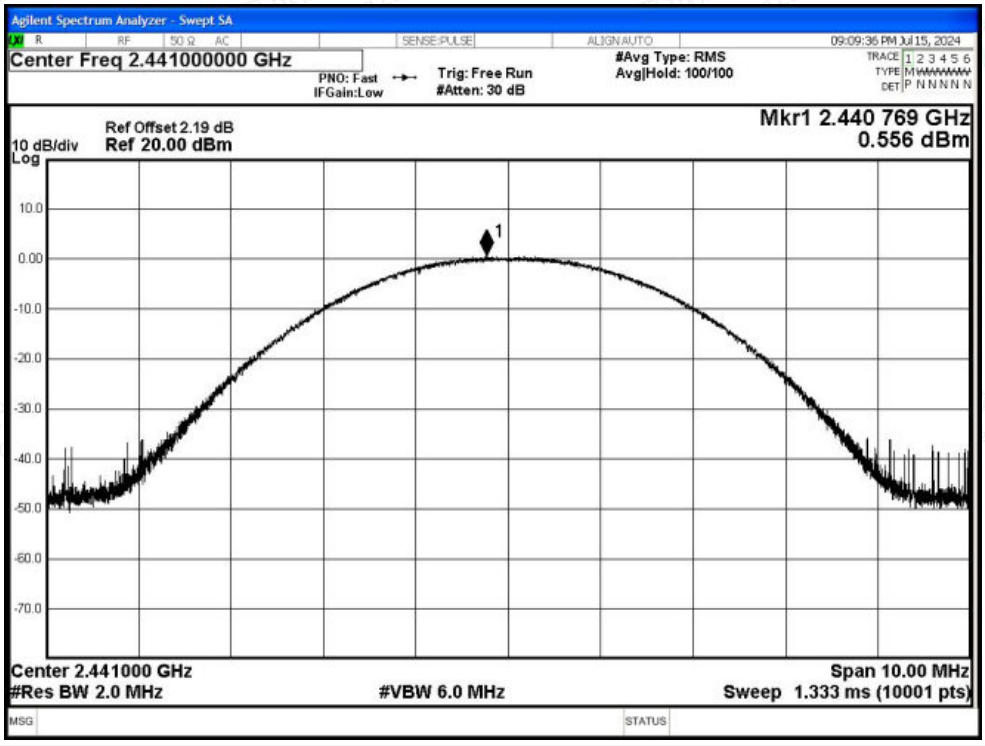
Power NVNT 1-DH5 2480MHz Ant1



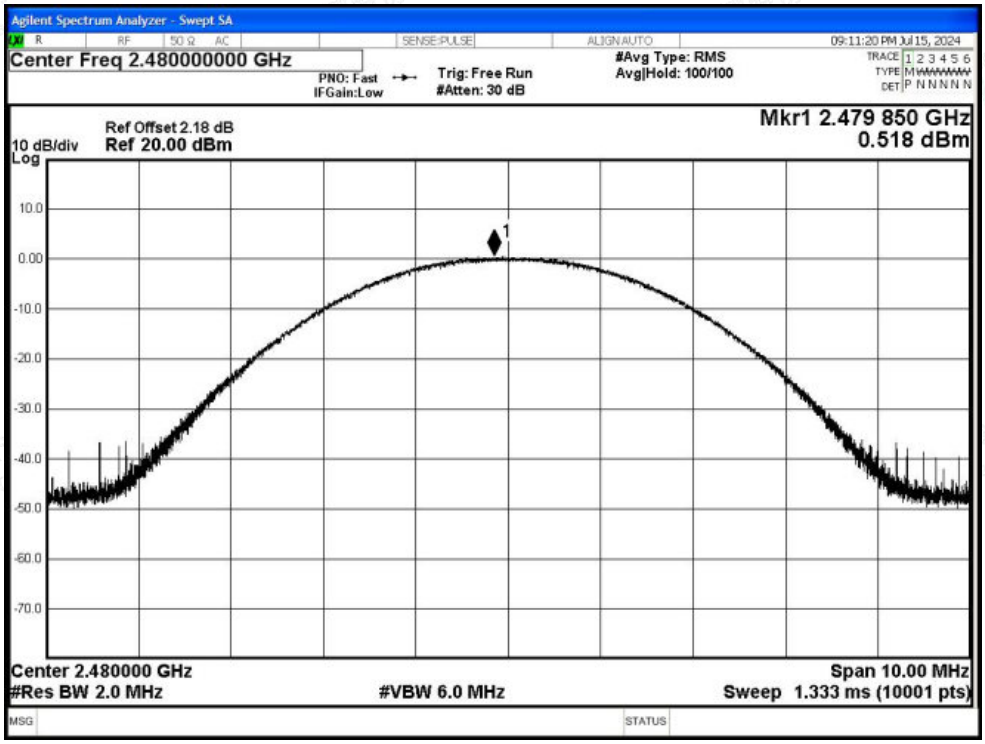
Power NVNT 2-DH5 2402MHz Ant1



Power NVNT 2-DH5 2441MHz Ant1



Power NVNT 2-DH5 2480MHz Ant1

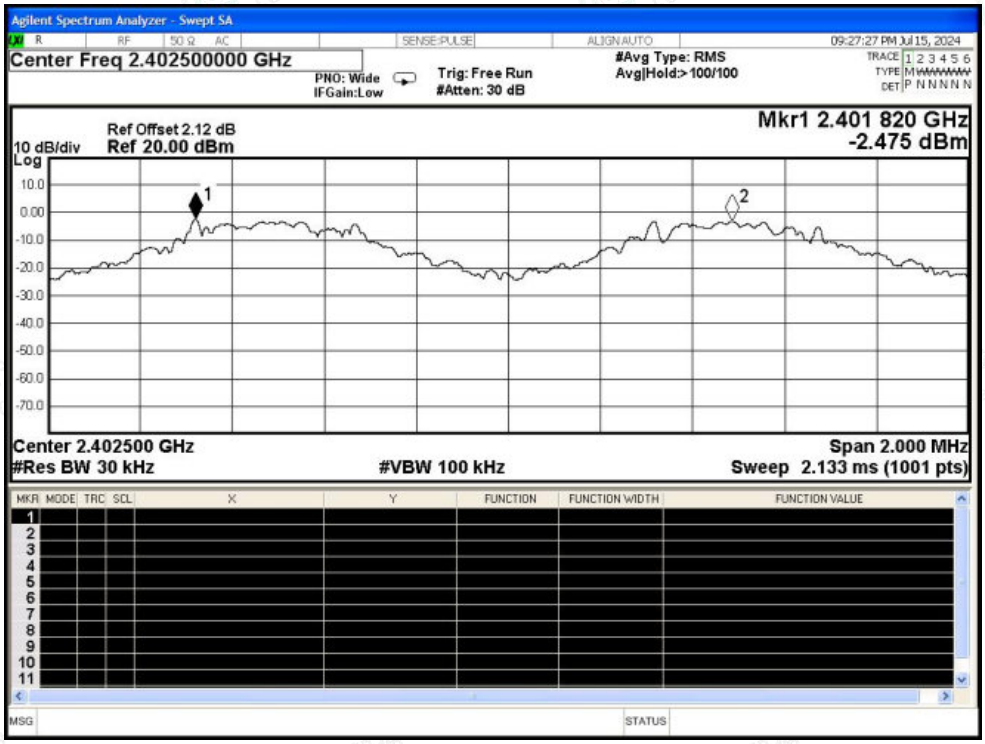


A.3 Carrier Frequencies Separation

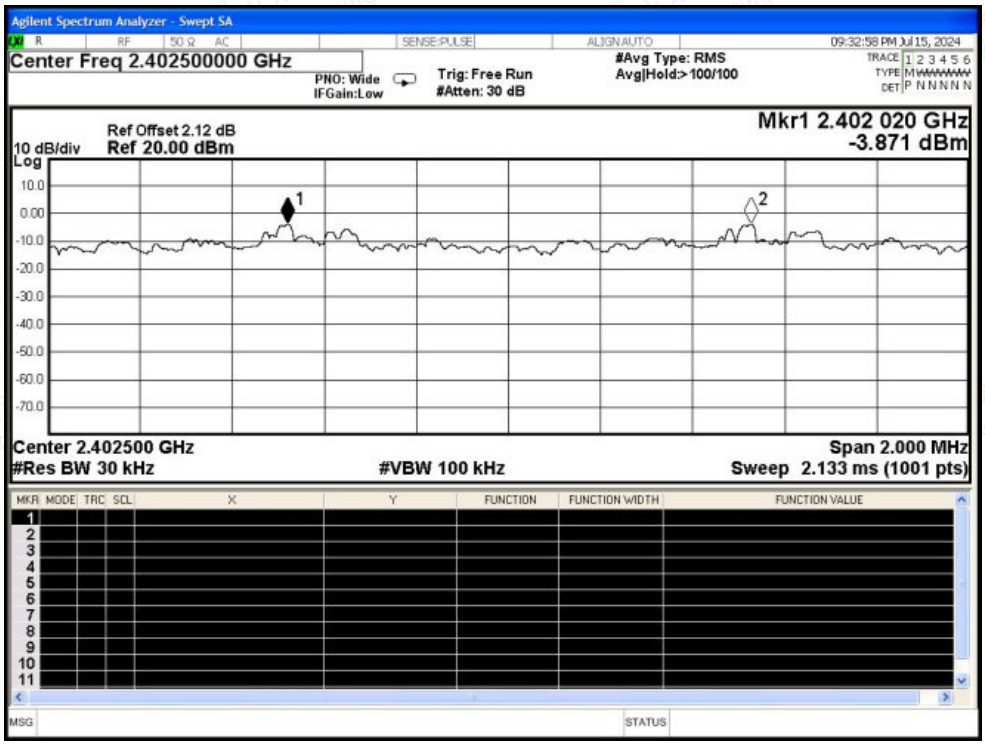
Condition	Mode	Antenna	Hopping Freq1 (MHz)	Hopping Freq2 (MHz)	HFS (MHz)	Limit (MHz)	Verdict
NVNT	1-DH5	Ant1	2401.82	2402.986	1.166	0.632	Pass
NVNT	2-DH5	Ant1	2402.02	2403.026	1.006	0.871	Pass

Test Graphs

CFS NVNT 1-DH5 2402MHz Ant1



CFS NVNT 2-DH5 2402MHz Ant1

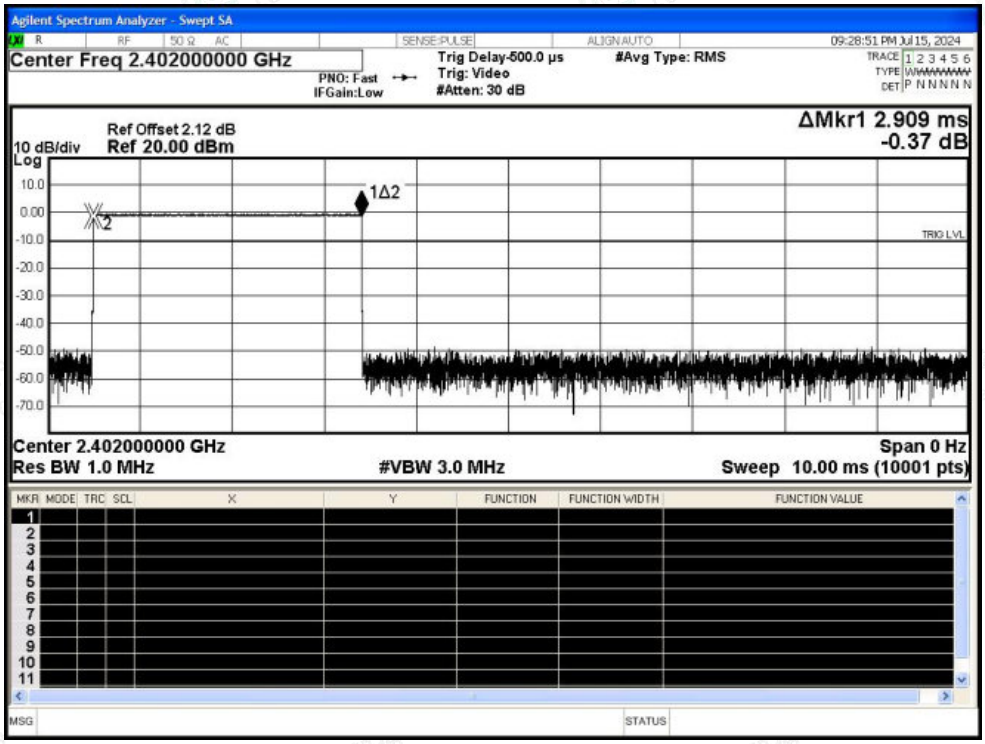


A.4 Dwell Time

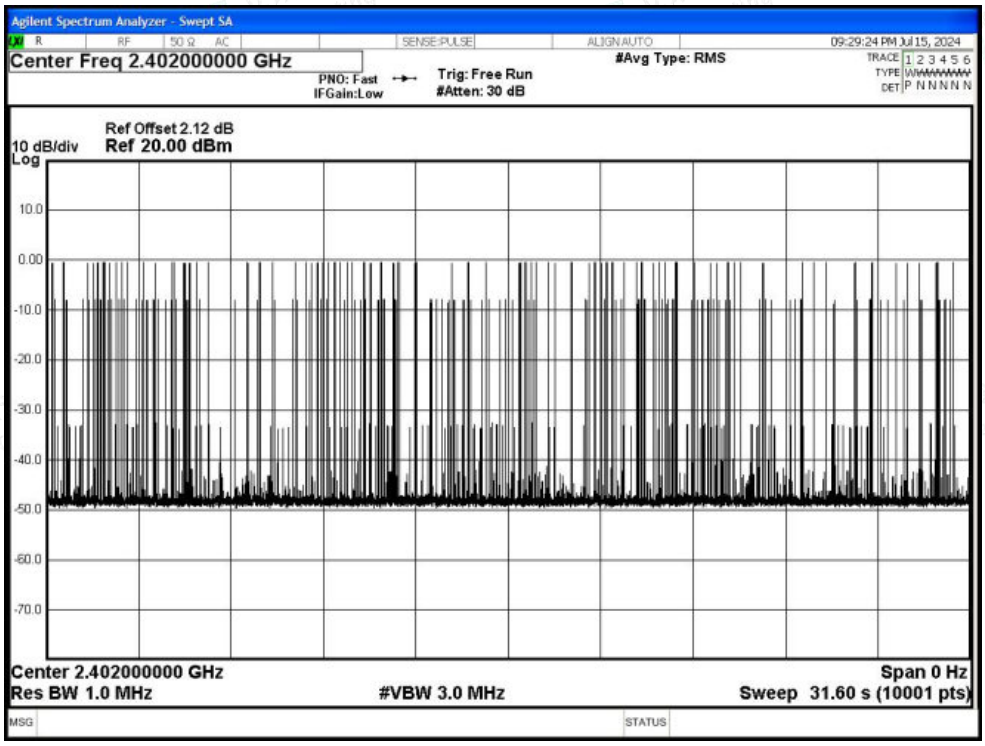
Condition	Mode	Frequency (MHz)	Antenna	Pulse Time (ms)	Total Dwell Time (ms)	Burst Count	Period Time (ms)	Limit (ms)	Verdict
NVNT	1-DH5	2402	Ant1	2.909	282.173	97	31600	400	Pass
NVNT	2-DH5	2402	Ant1	2.899	313.092	108	31600	400	Pass

Test Graphs

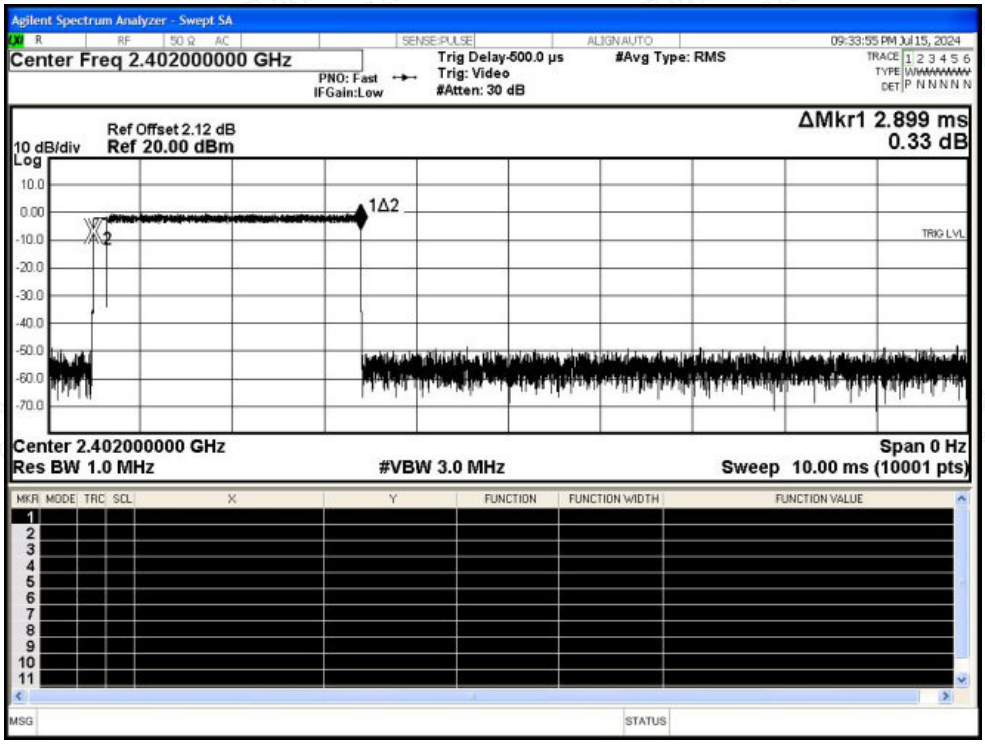
Dwell NVNT 1-DH5 2402MHz Ant1 One Burst



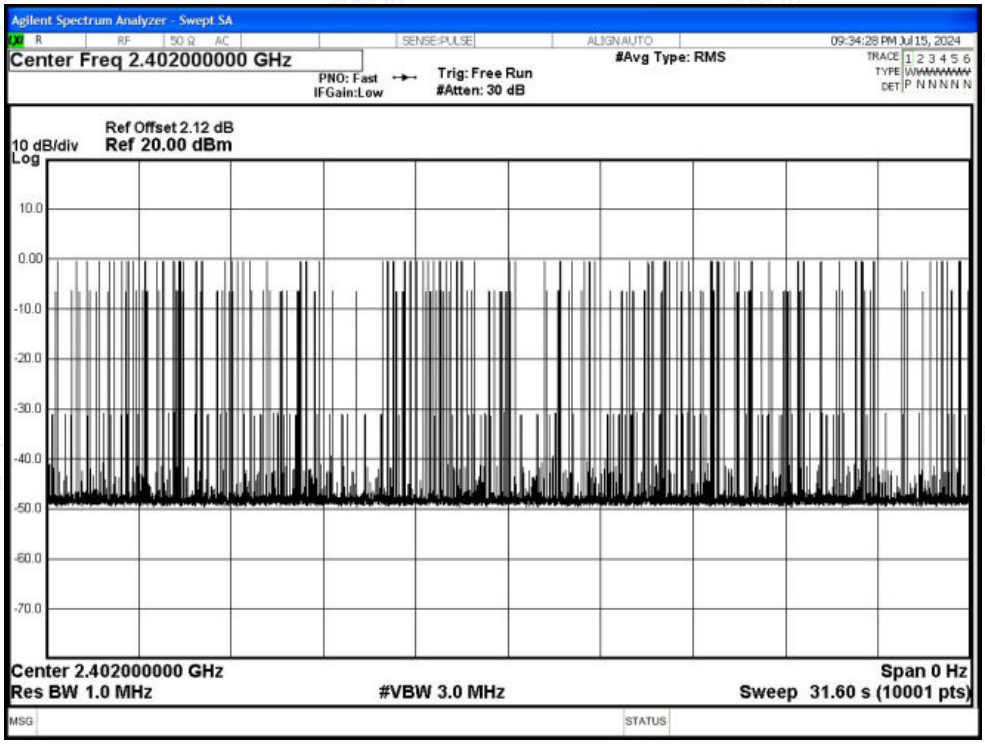
Dwell NVNT 1-DH5 2402MHz Ant1 Accumulated



Dwell NVNT 2-DH5 2402MHz Ant1 One Burst



Dwell NVNT 2-DH5 2402MHz Ant1 Accumulated

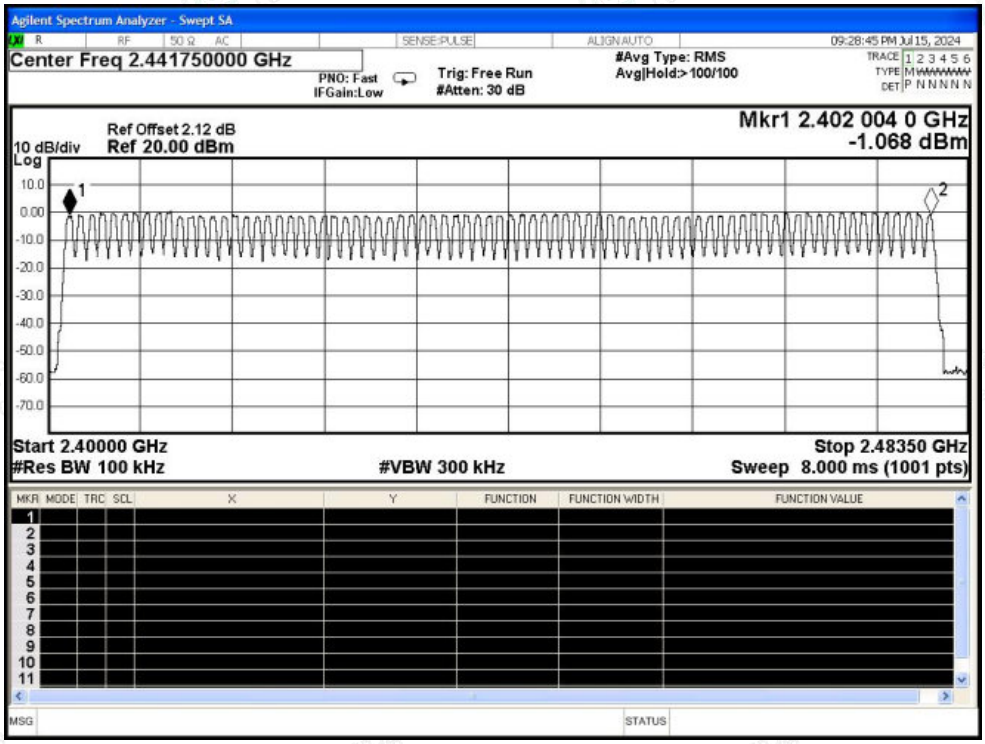


A.5 Number of Hopping Channel

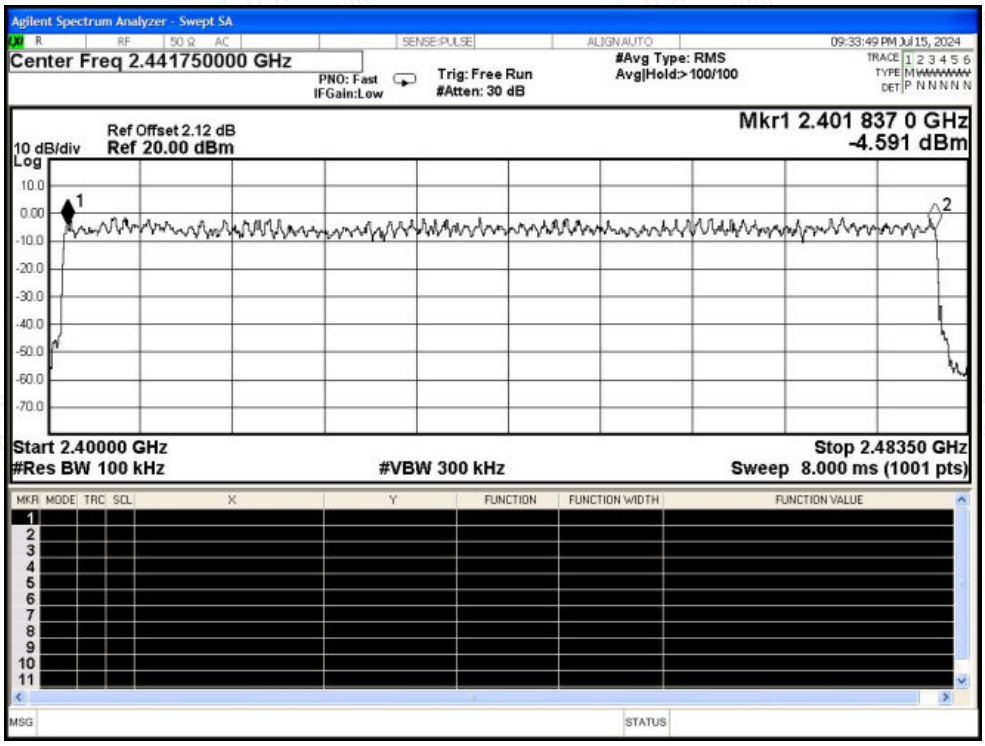
Condition	Mode	Antenna	Hopping Number	Limit	Verdict
NVNT	1-DH5	Ant1	79	15	Pass
NVNT	2-DH5	Ant1	79	15	Pass

Test Graphs

Hopping No. NVNT 1-DH5 2402MHz Ant1



Hopping No. NVNT 2-DH5 2402MHz Ant1

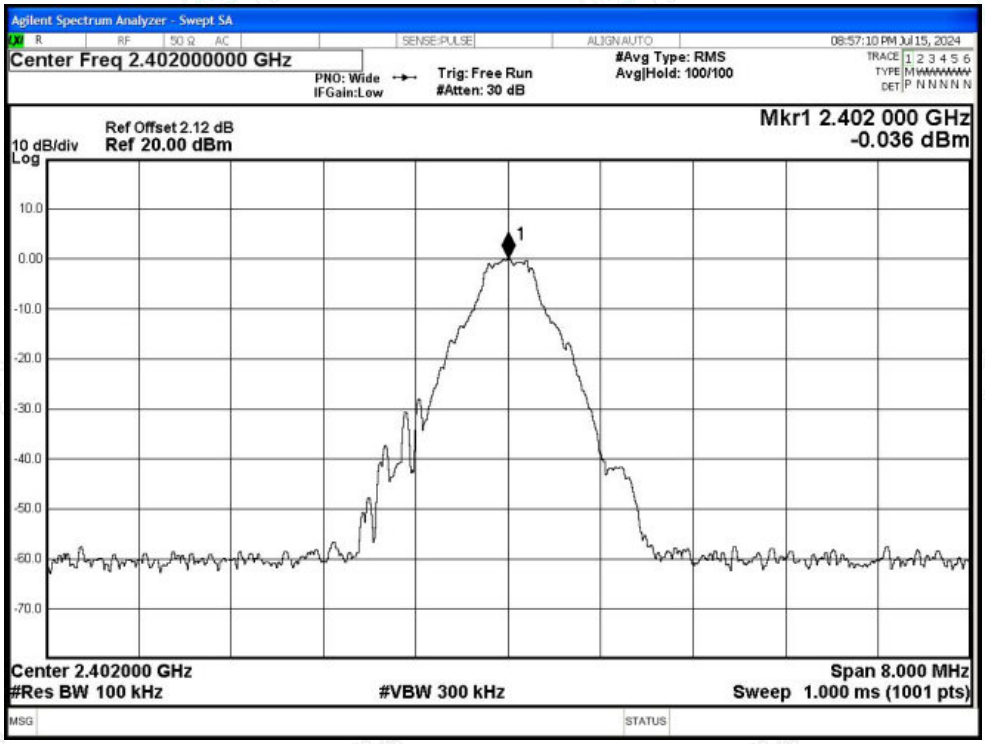


A.6 Band Edge

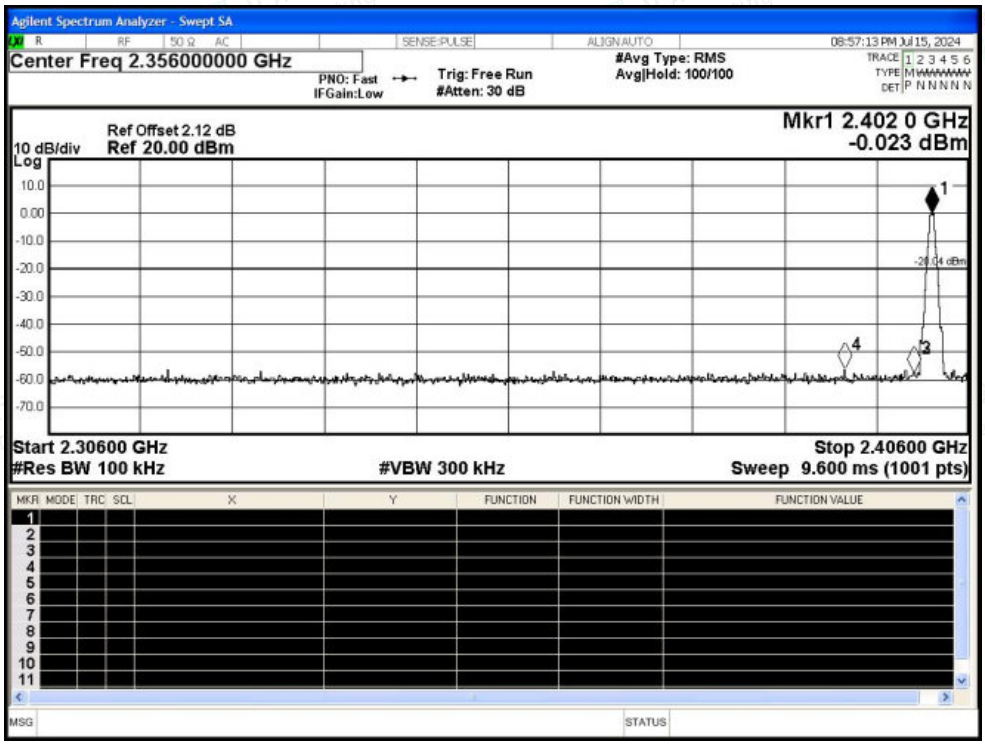
Condition	Mode	Frequency (MHz)	Antenna	Hopping Mode	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	1-DH5	2402	Ant1	No-Hopping	-56.19	-20	Pass
NVNT	1-DH5	2480	Ant1	No-Hopping	-57.6	-20	Pass
NVNT	2-DH5	2402	Ant1	No-Hopping	-52.92	-20	Pass
NVNT	2-DH5	2480	Ant1	No-Hopping	-54.44	-20	Pass

Test Graphs

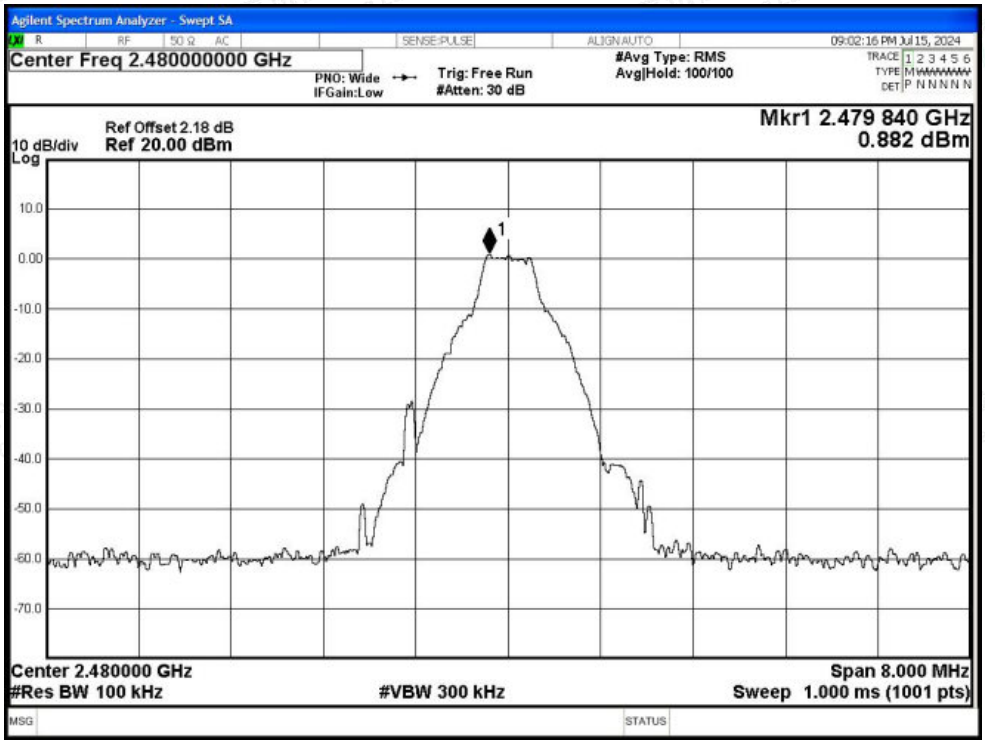
Band Edge NVNT 1-DH5 2402MHz Ant1 No-Hopping Ref



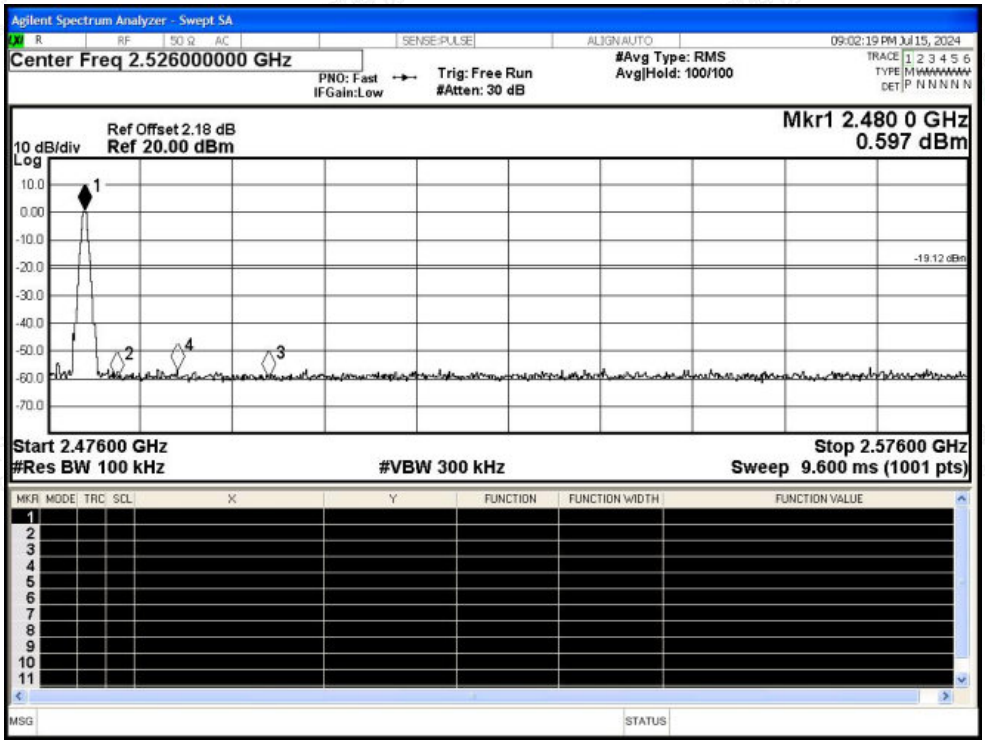
Band Edge NVNT 1-DH5 2402MHz Ant1 No-Hopping Emission



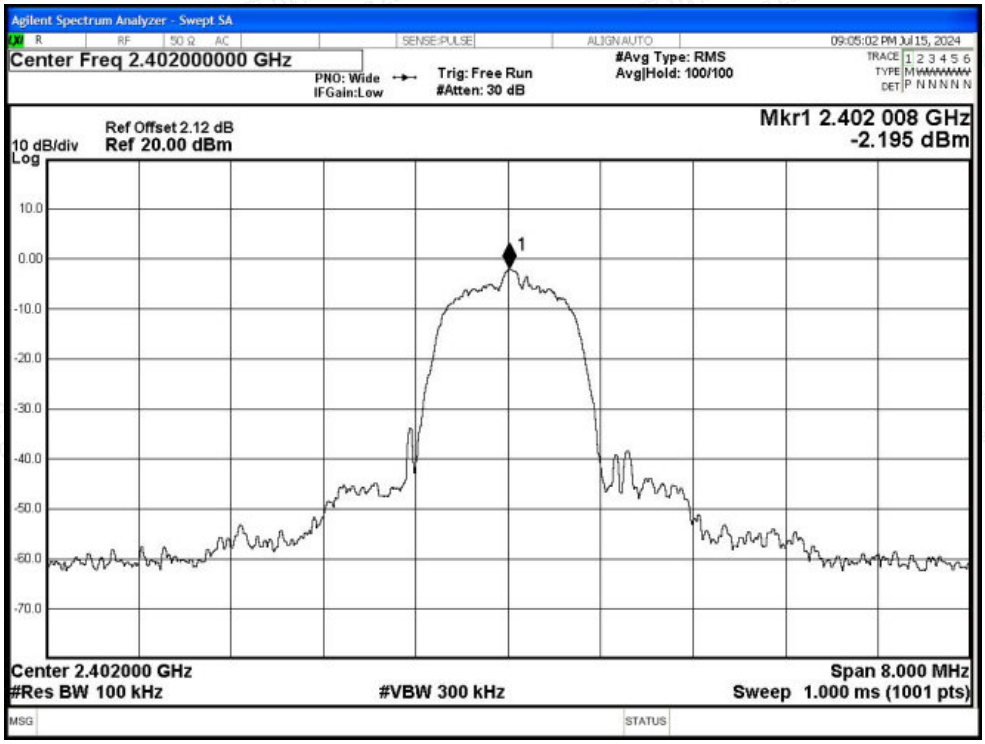
Band Edge NVNT 1-DH5 2480MHz Ant1 No-Hopping Ref



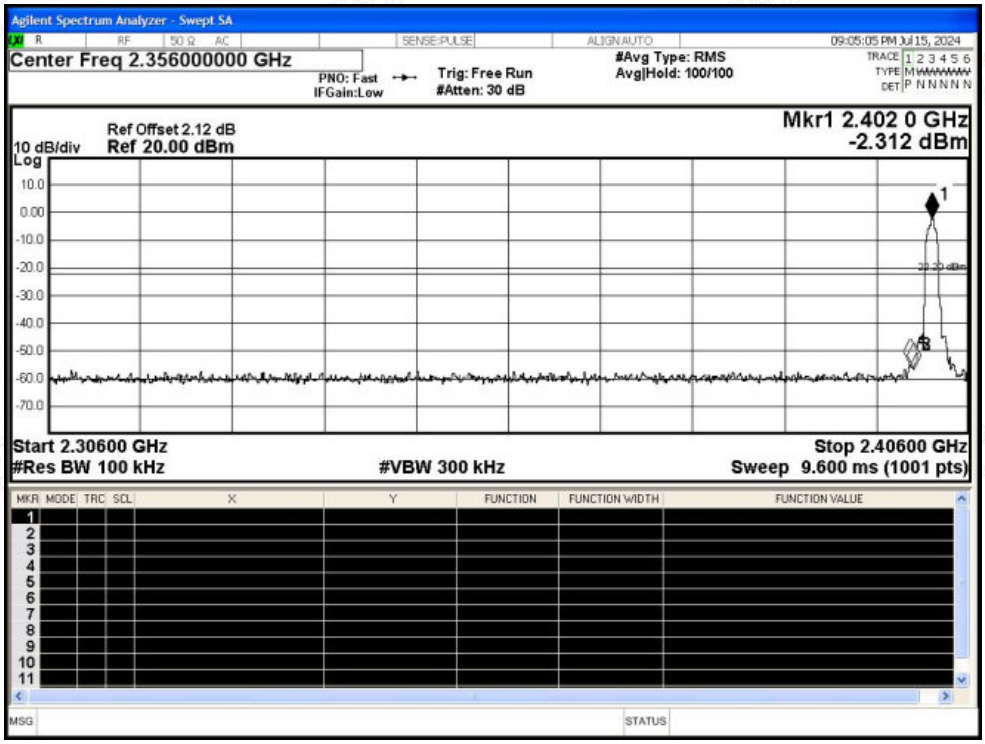
Band Edge NVNT 1-DH5 2480MHz Ant1 No-Hopping Emission



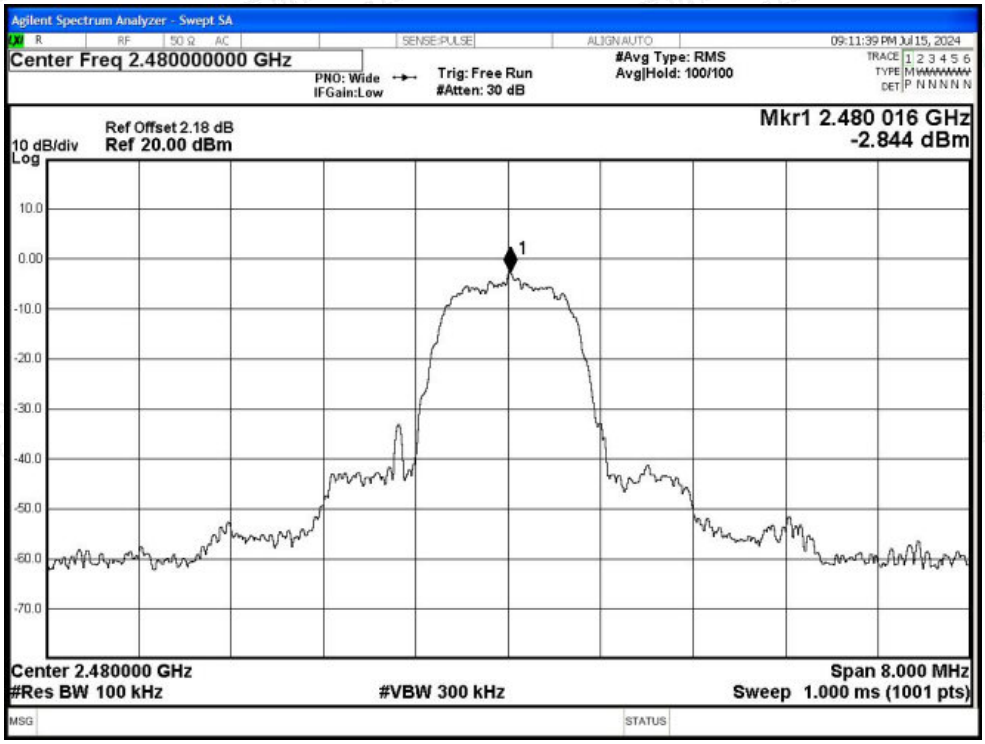
Band Edge NVNT 2-DH5 2402MHz Ant1 No-Hopping Ref



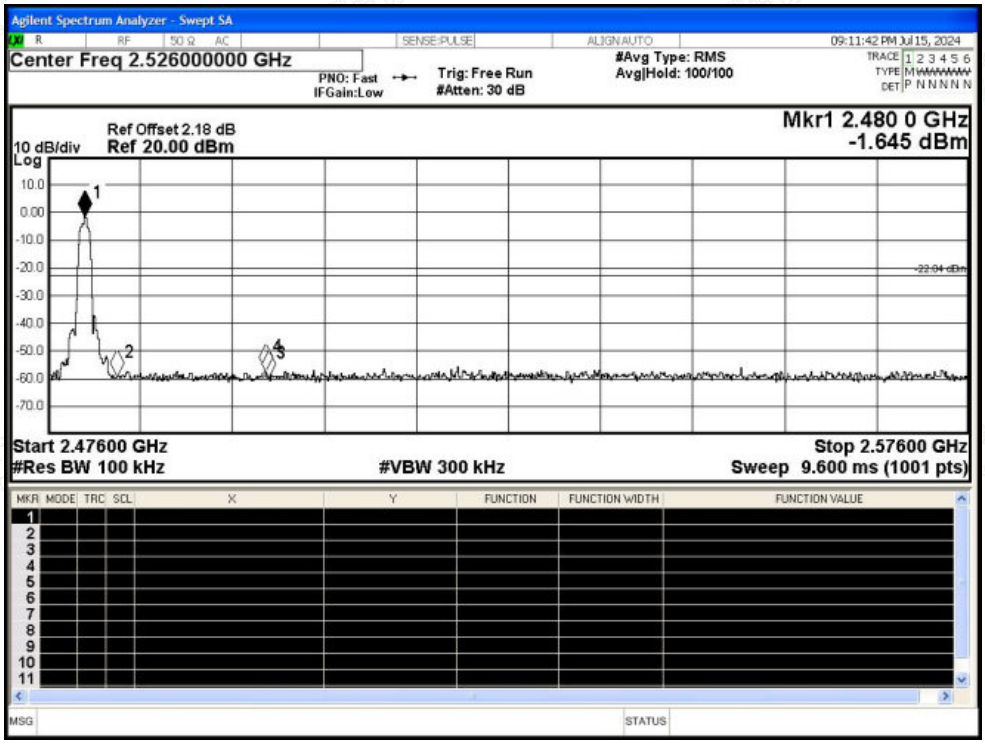
Band Edge NVNT 2-DH5 2402MHz Ant1 No-Hopping Emission



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



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

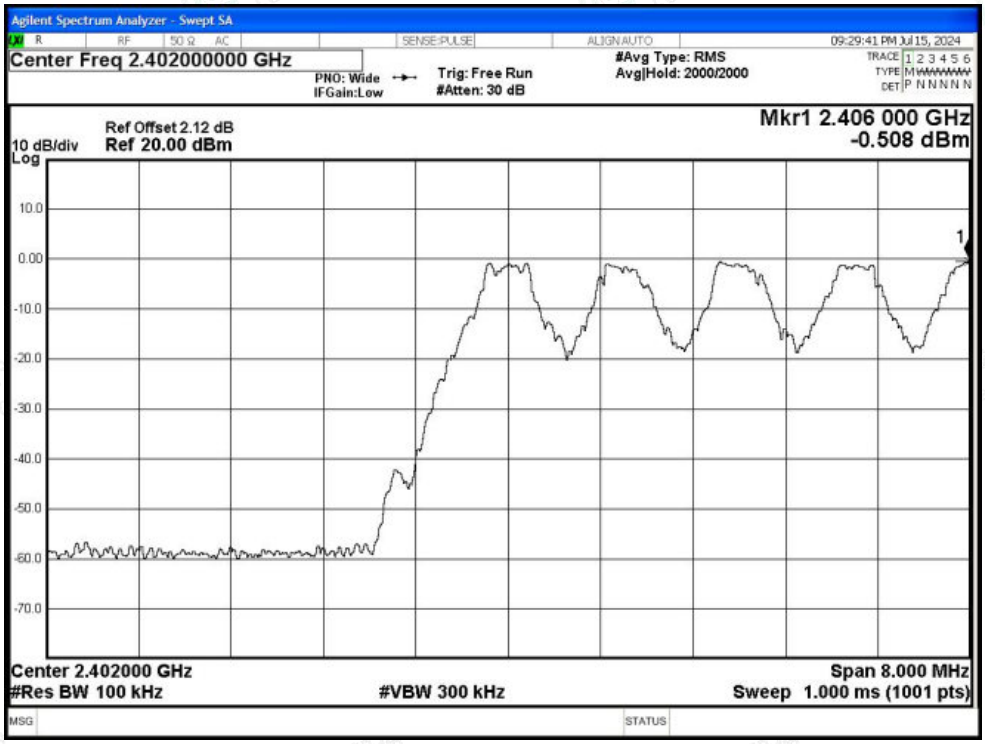


(Hopping)

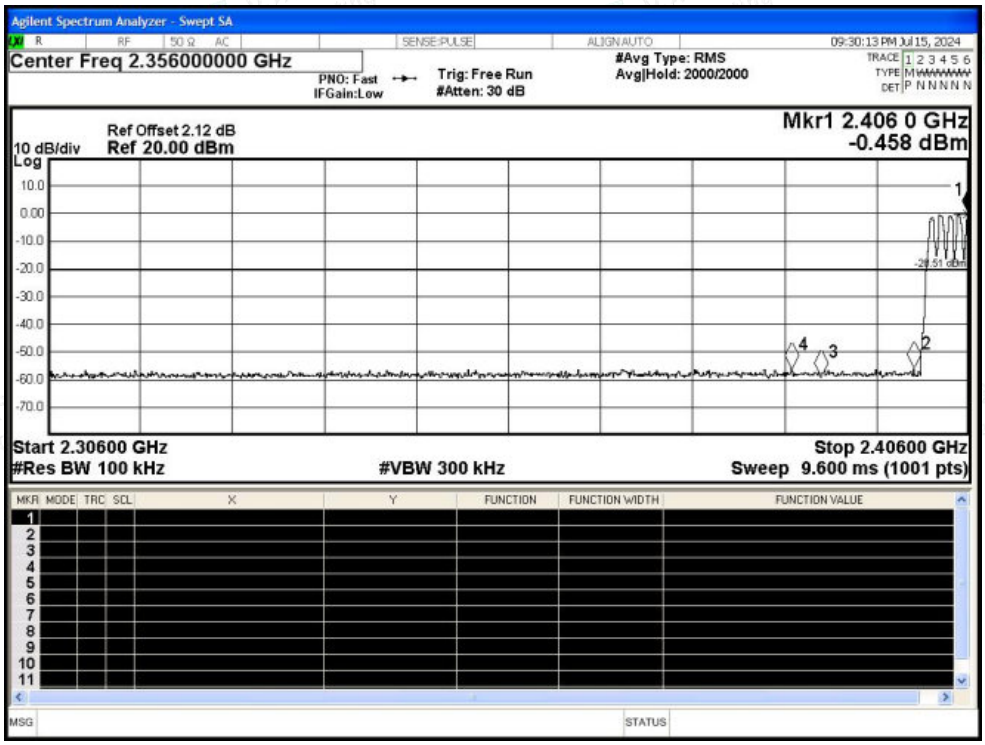
Condition	Mode	Frequency (MHz)	Antenna	Hopping Mode	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	1-DH5	2402	Ant1	Hopping	-55.62	-20	Pass
NVNT	1-DH5	2480	Ant1	Hopping	-55.57	-20	Pass
NVNT	2-DH5	2402	Ant1	Hopping	-52.92	-20	Pass
NVNT	2-DH5	2480	Ant1	Hopping	-41.86	-20	Pass

Test Graphs

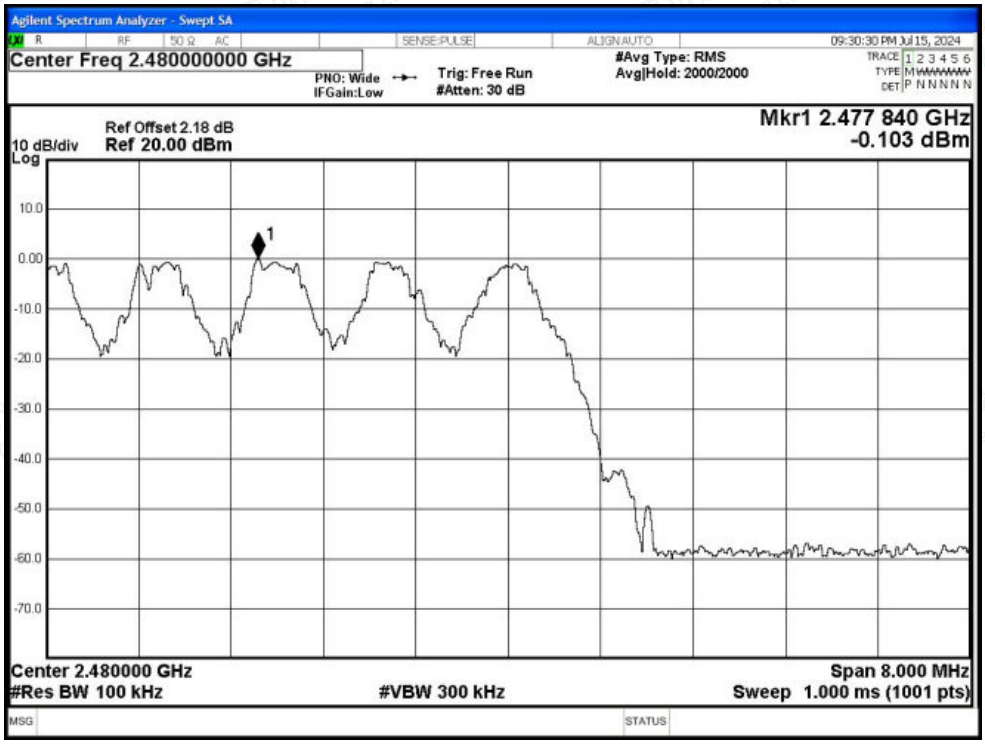
Band Edge(Hopping) NVNT 1-DH5 2402MHz Ant1 Hopping Ref



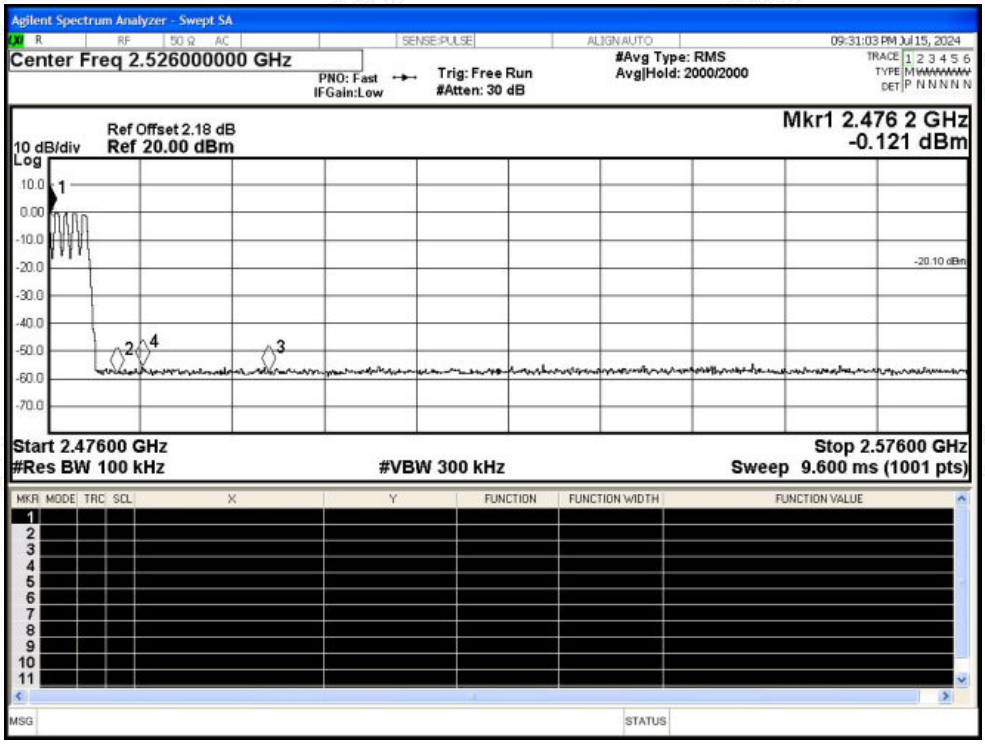
Band Edge(Hopping) NVNT 1-DH5 2402MHz Ant1 Hopping Emission



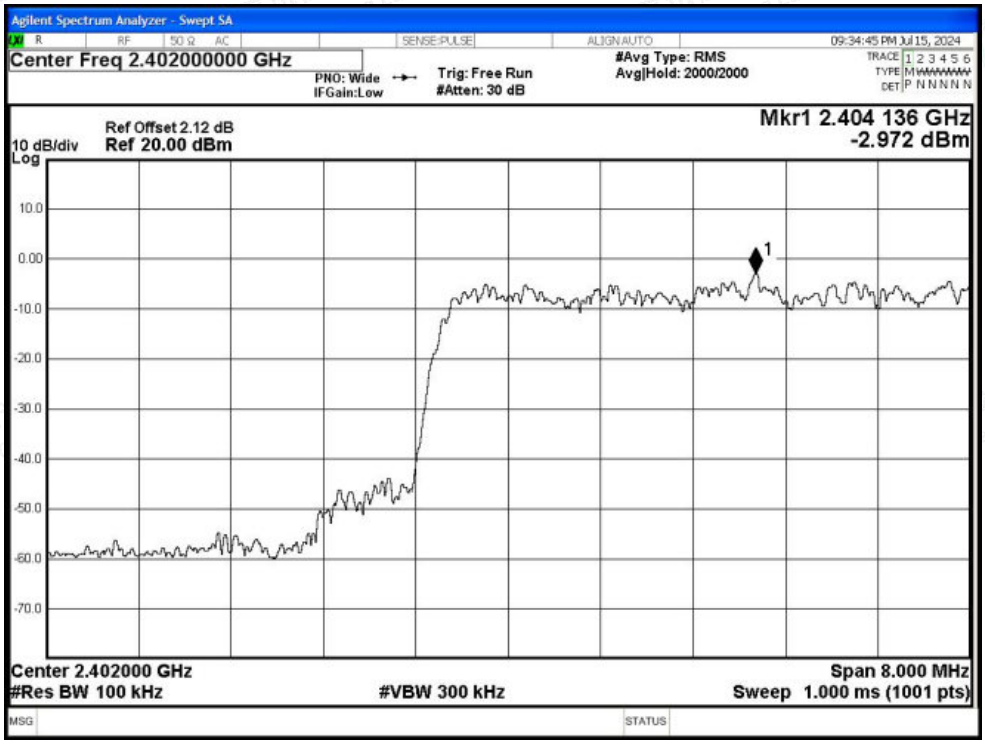
Band Edge(Hopping) NVNT 1-DH5 2480MHz Ant1 Hopping Ref



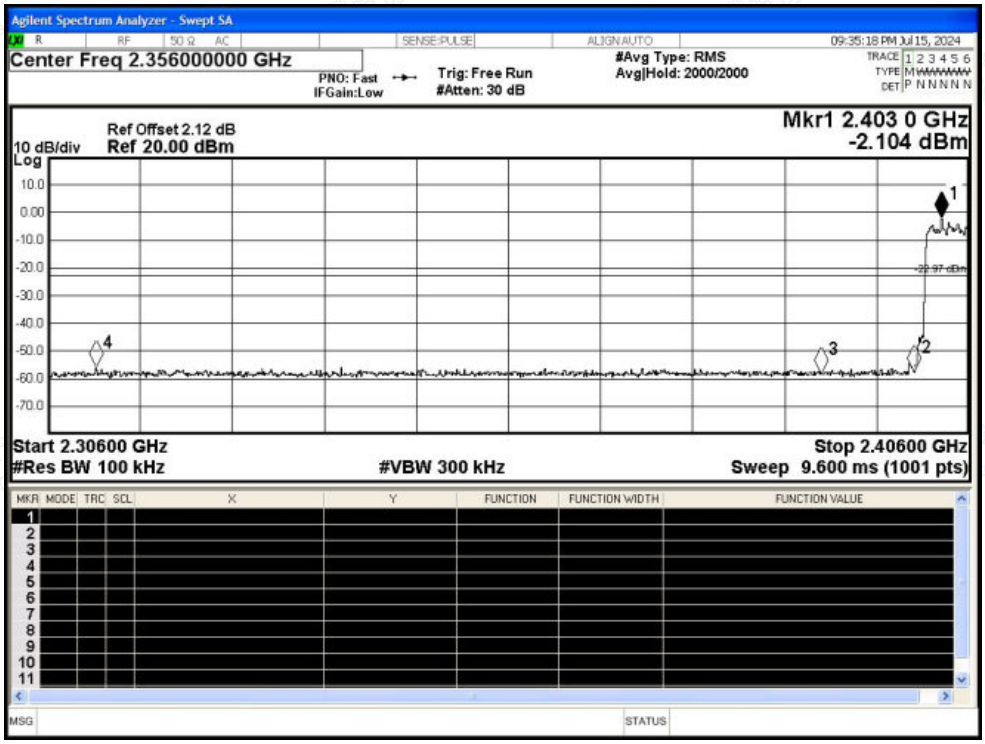
Band Edge(Hopping) NVNT 1-DH5 2480MHz Ant1 Hopping Emission



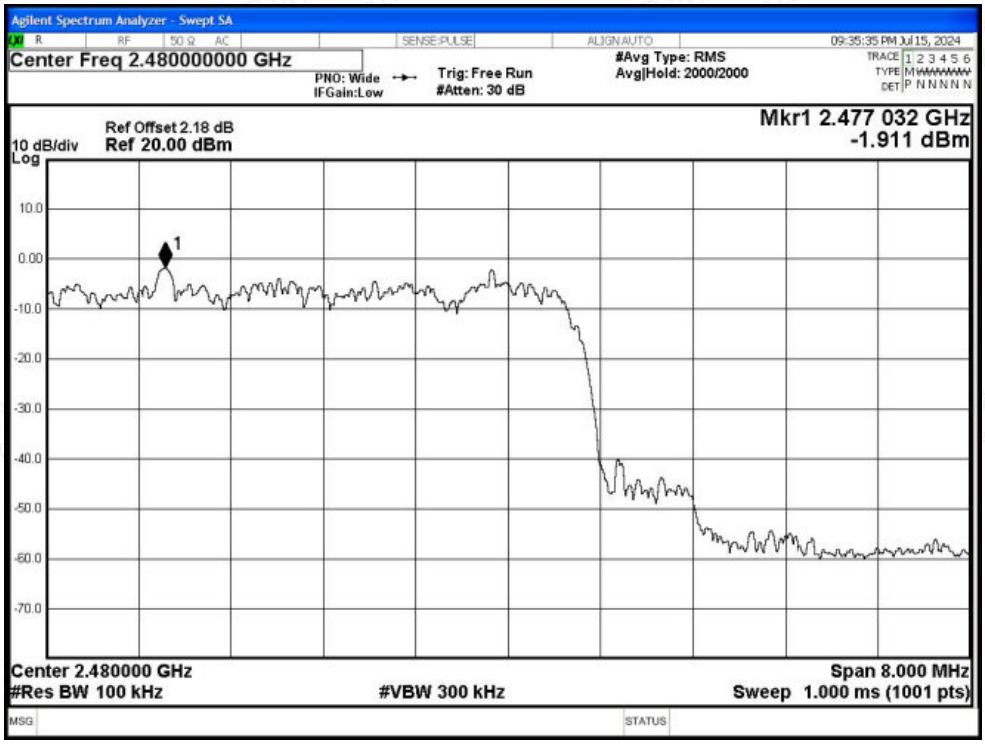
Band Edge(Hopping) NVNT 2-DH5 2402MHz Ant1 Hopping Ref



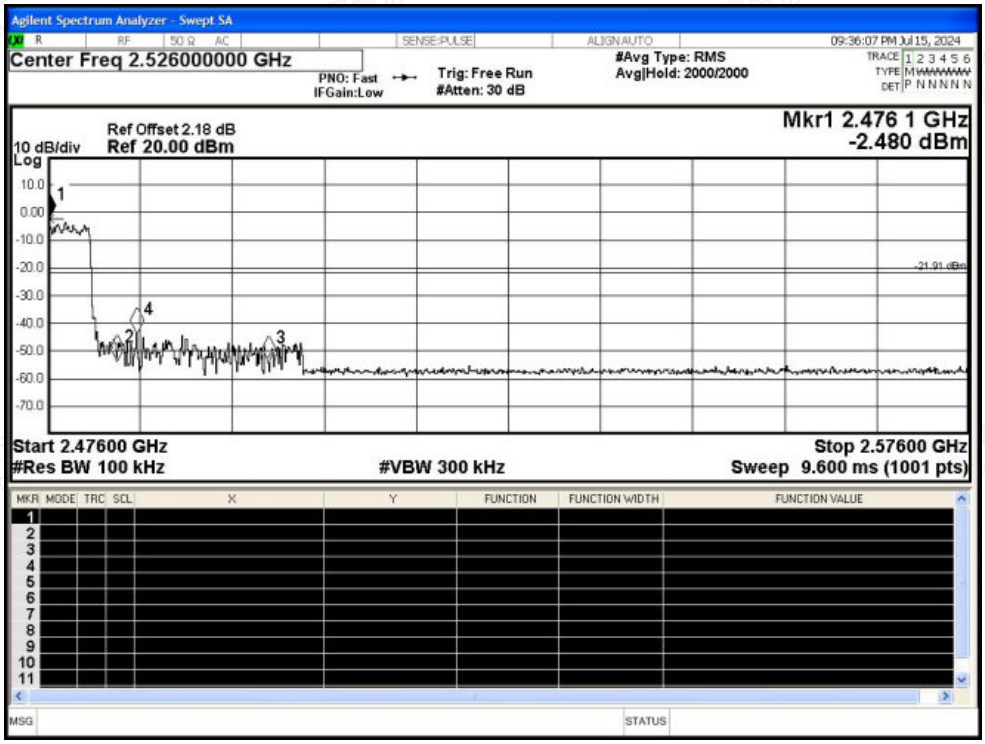
Band Edge(Hopping) NVNT 2-DH5 2402MHz Ant1 Hopping Emission



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



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

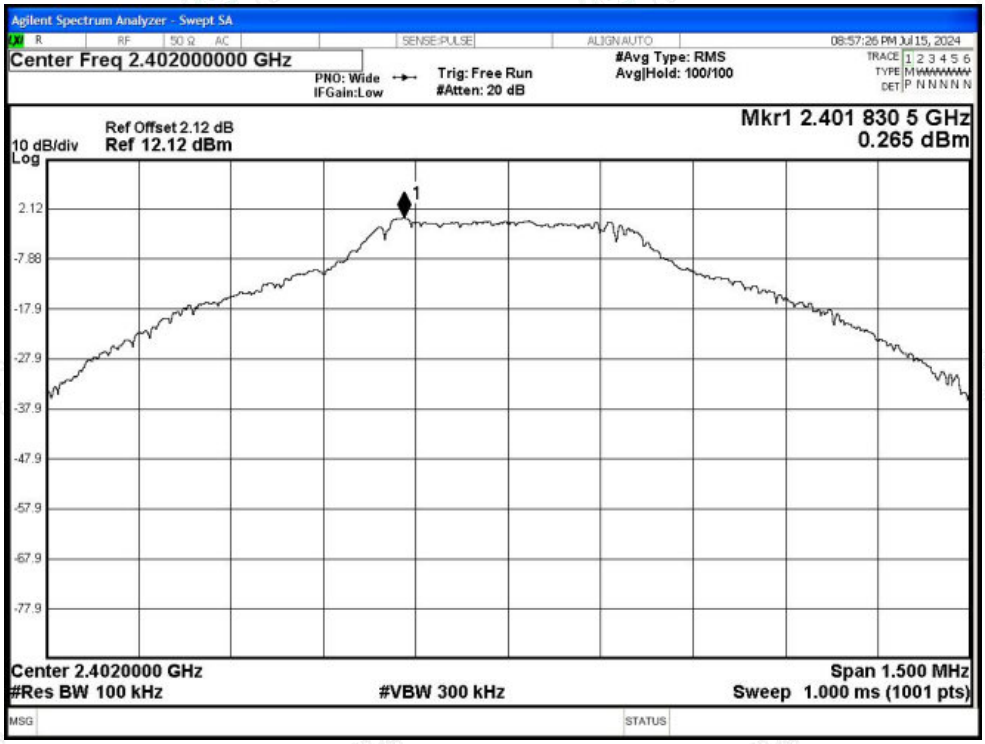


A.7 Conducted RF Spurious Emission

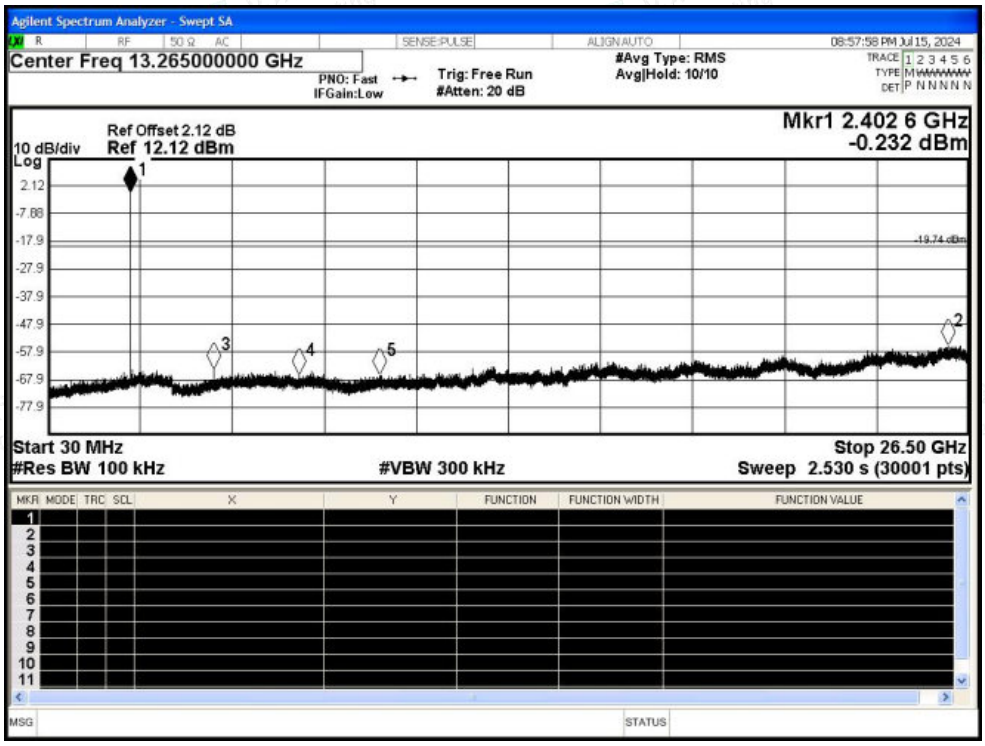
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	1-DH5	2402	Ant1	-55.85	-20	Pass
NVNT	1-DH5	2441	Ant1	-56.11	-20	Pass
NVNT	1-DH5	2480	Ant1	-56.19	-20	Pass
NVNT	2-DH5	2402	Ant1	-52.94	-20	Pass
NVNT	2-DH5	2441	Ant1	-53.67	-20	Pass
NVNT	2-DH5	2480	Ant1	-52.24	-20	Pass

Test Graphs

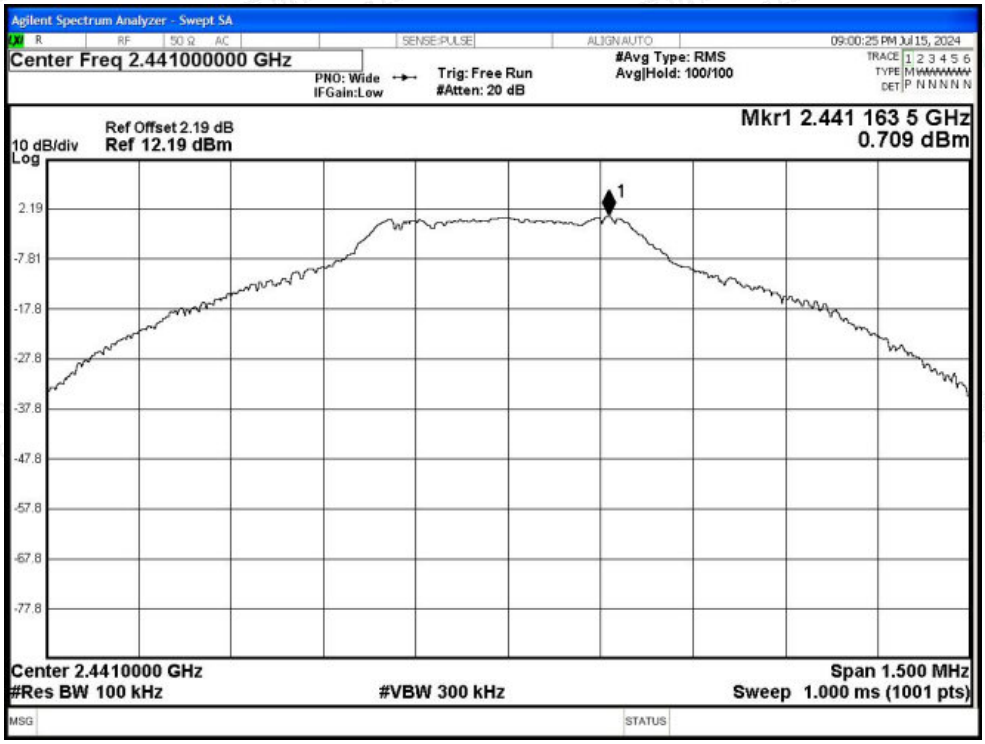
Tx. Spurious NVNT 1-DH5 2402MHz Ant1 Ref



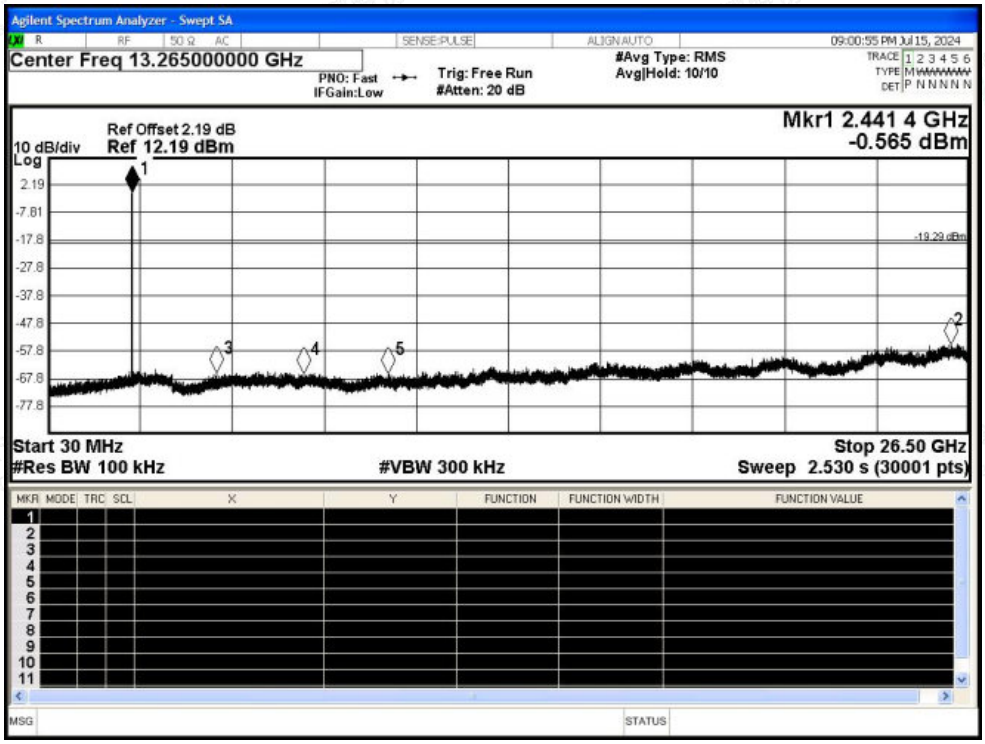
Tx. Spurious NVNT 1-DH5 2402MHz Ant1 Emission



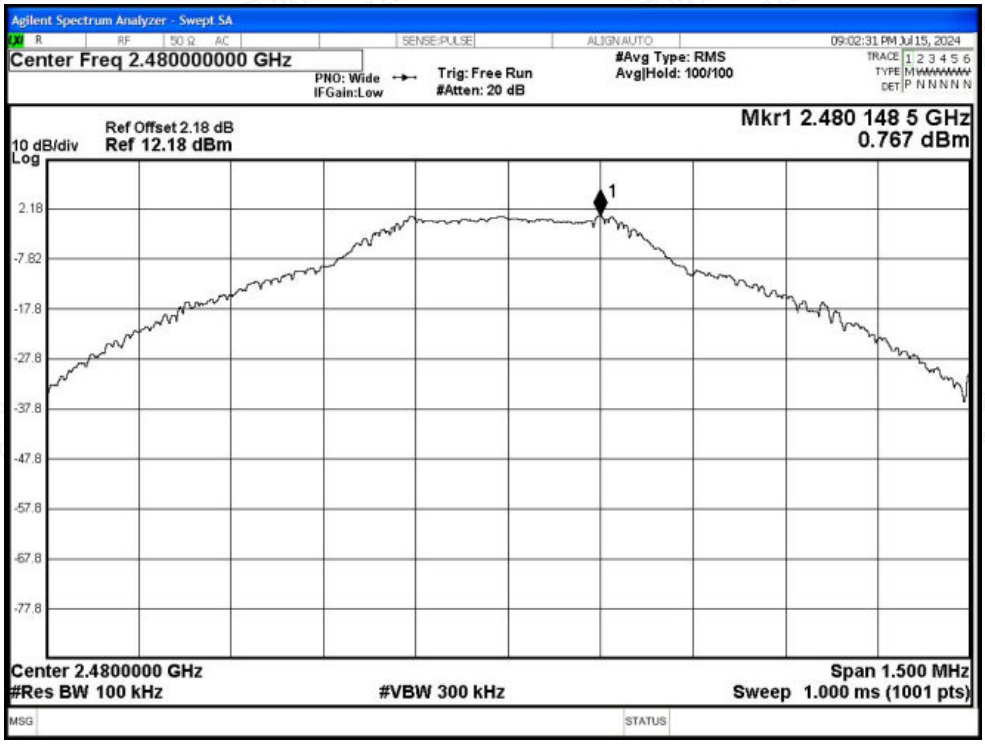
Tx. Spurious NVNT 1-DH5 2441MHz Ant1 Ref



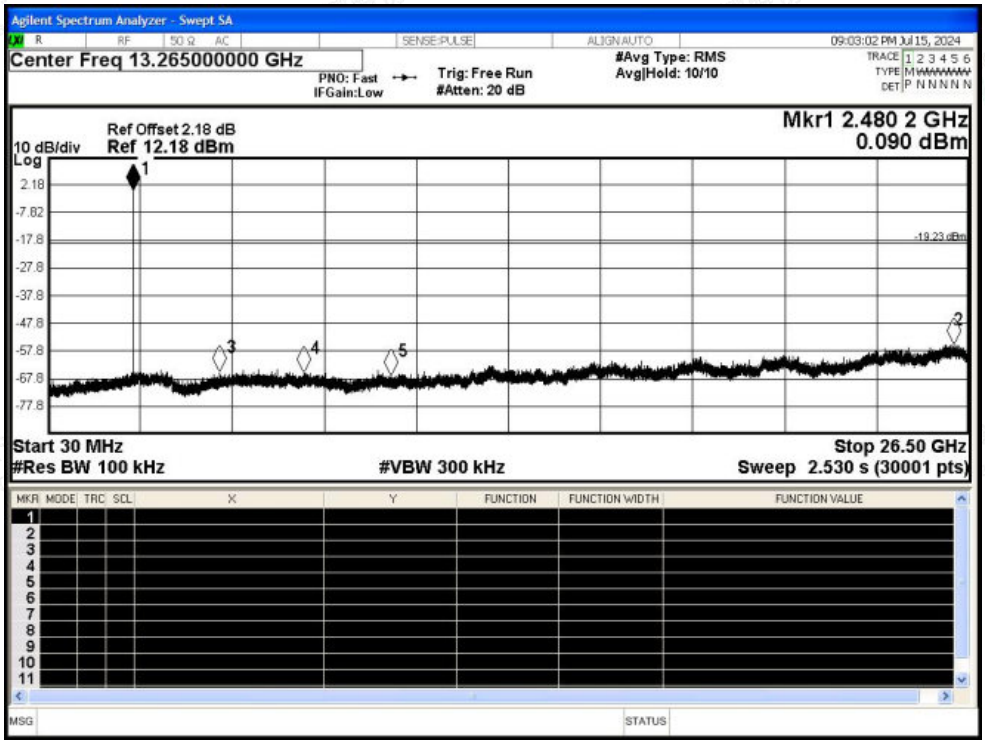
Tx. Spurious NVNT 1-DH5 2441MHz Ant1 Emission



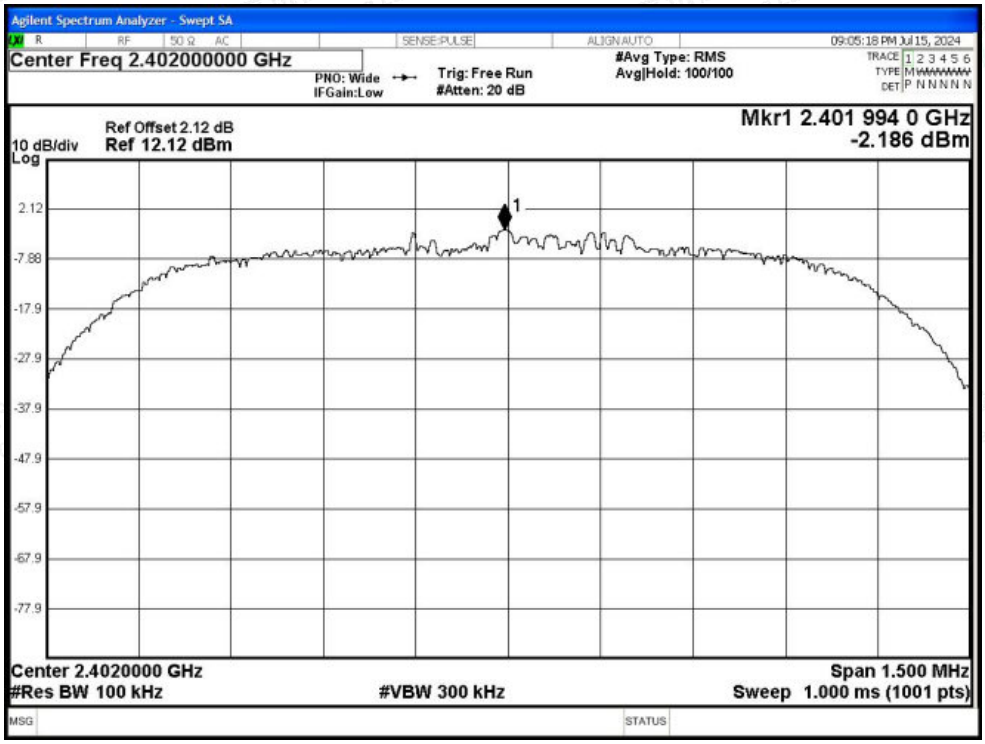
Tx. Spurious NVNT 1-DH5 2480MHz Ant1 Ref



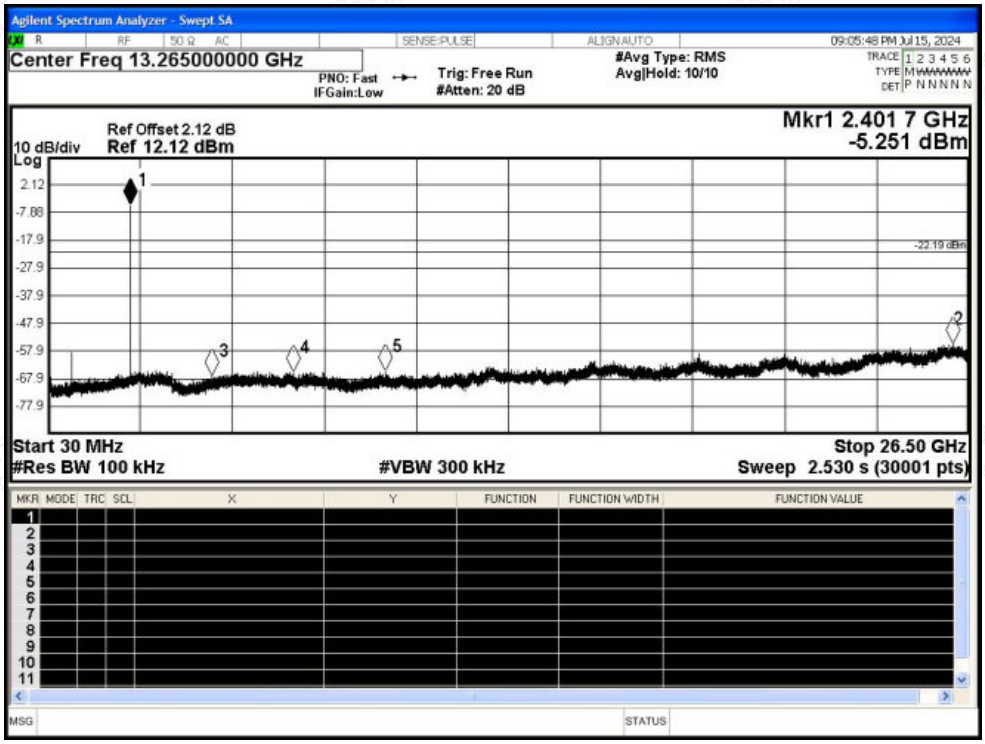
Tx. Spurious NVNT 1-DH5 2480MHz Ant1 Emission



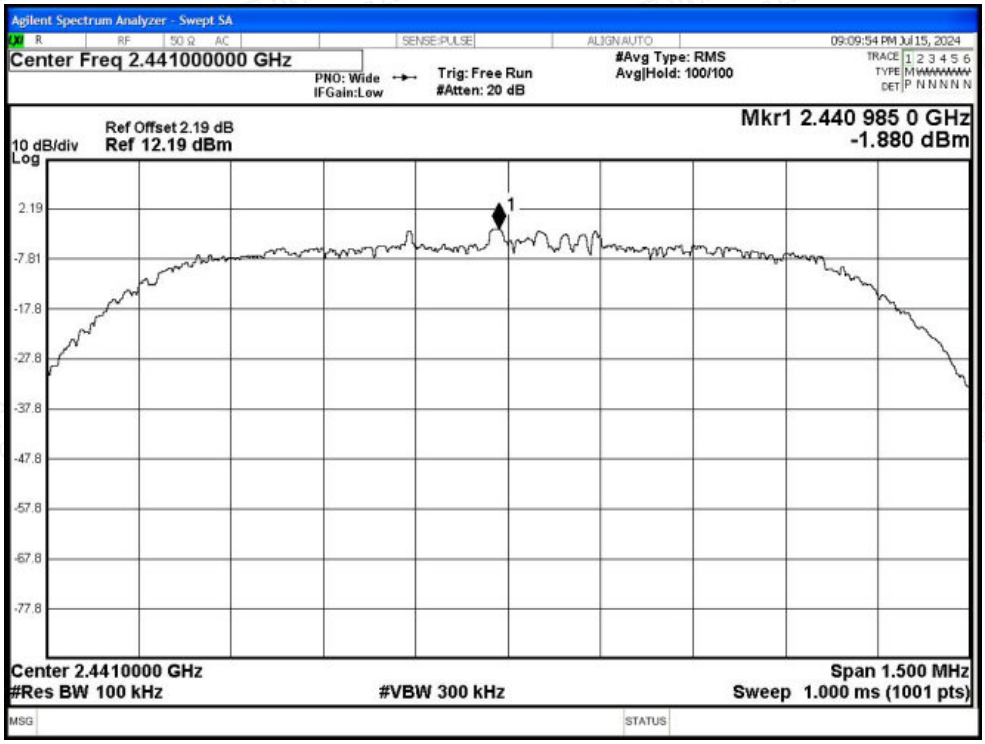
Tx. Spurious NVNT 2-DH5 2402MHz Ant1 Ref



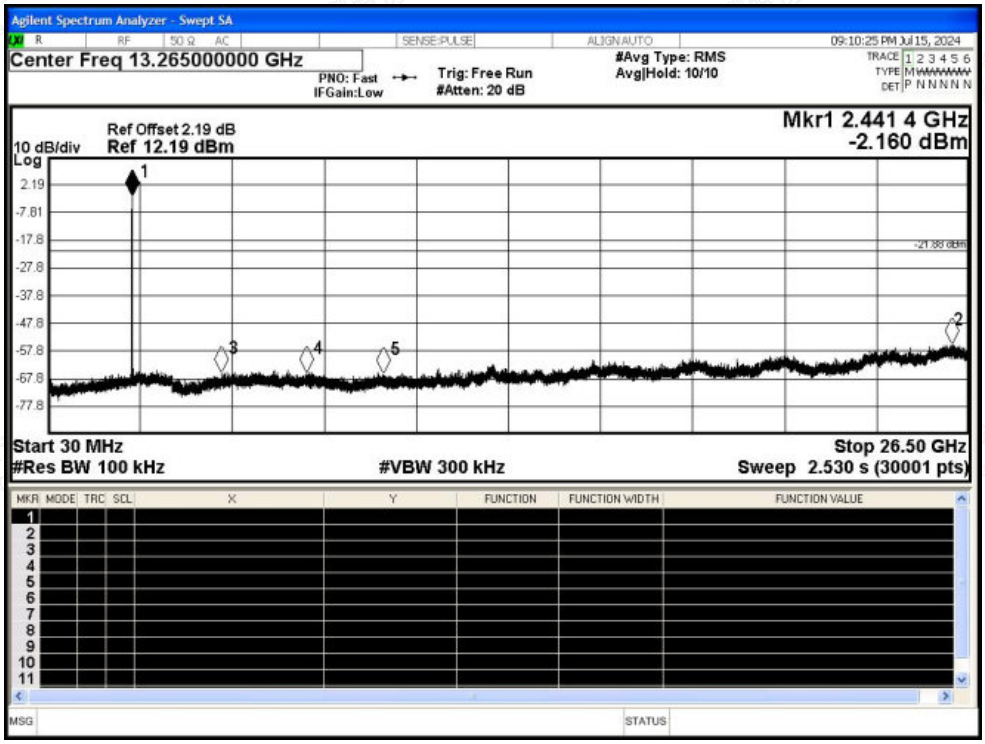
Tx. Spurious NVNT 2-DH5 2402MHz Ant1 Emission



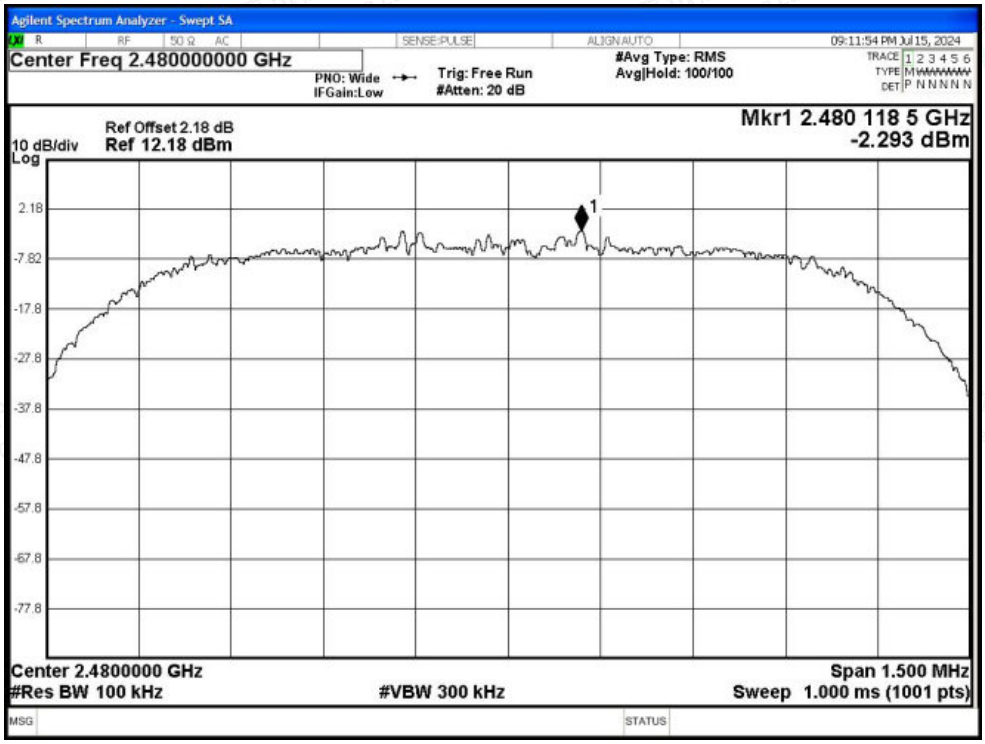
Tx. Spurious NVNT 2-DH5 2441MHz Ant1 Ref



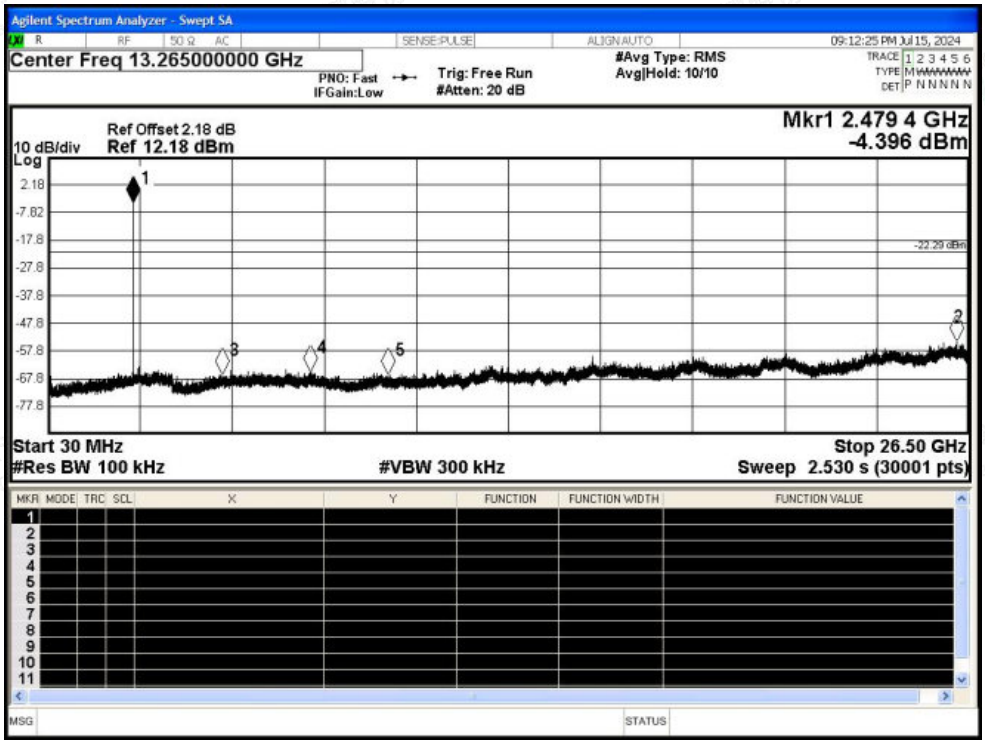
Tx. Spurious NVNT 2-DH5 2441MHz Ant1 Emission



Tx. Spurious NVNT 2-DH5 2480MHz Ant1 Ref



Tx. Spurious NVNT 2-DH5 2480MHz Ant1 Emission

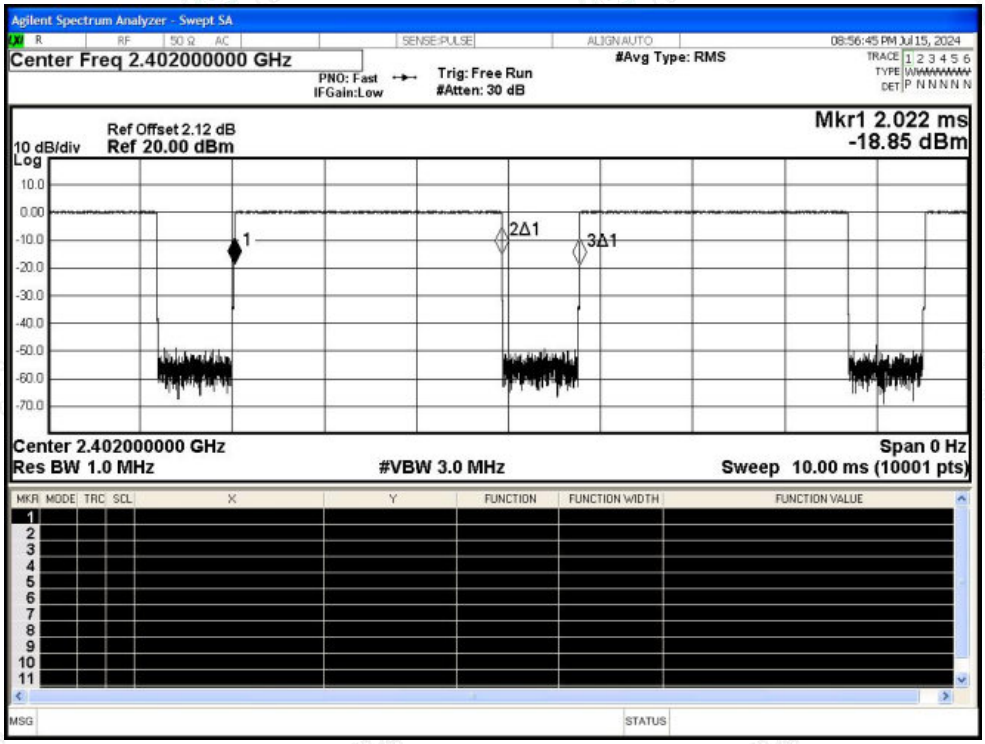


A.8 Duty Cycle

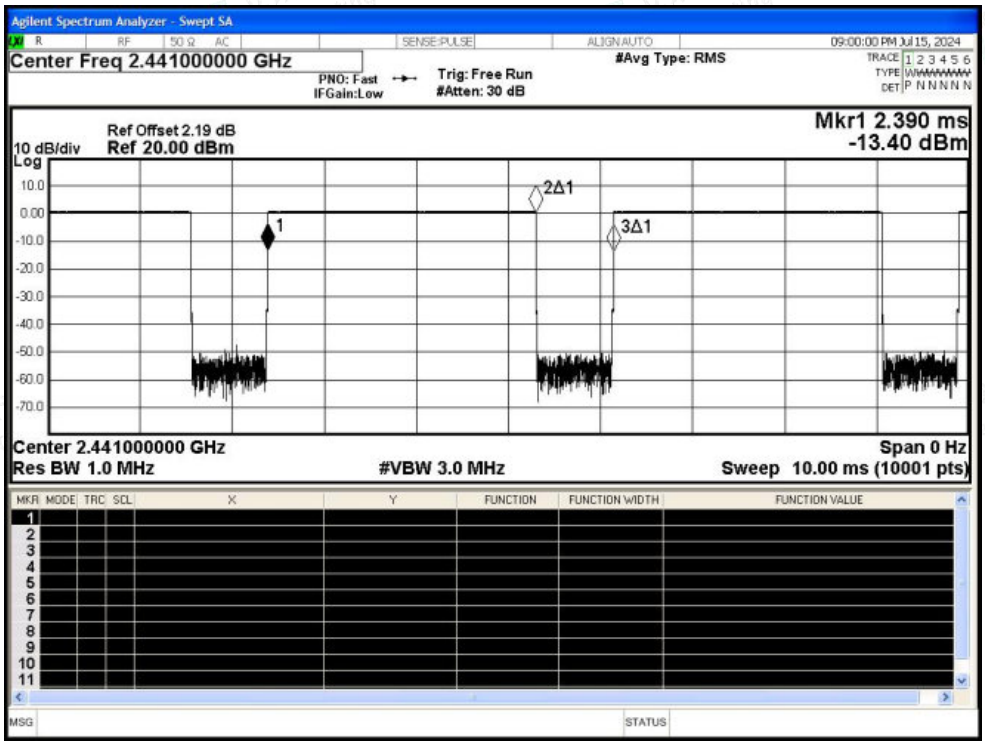
Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	1-DH5	2402	Ant1	77.63	1.1	0.34
NVNT	1-DH5	2441	Ant1	77.6	1.1	0.34
NVNT	1-DH5	2480	Ant1	77.6	1.1	0.34
NVNT	2-DH5	2402	Ant1	76.43	1.17	0.36
NVNT	2-DH5	2441	Ant1	76.41	1.17	0.36
NVNT	2-DH5	2480	Ant1	76.4	1.17	0.36

Test Graphs

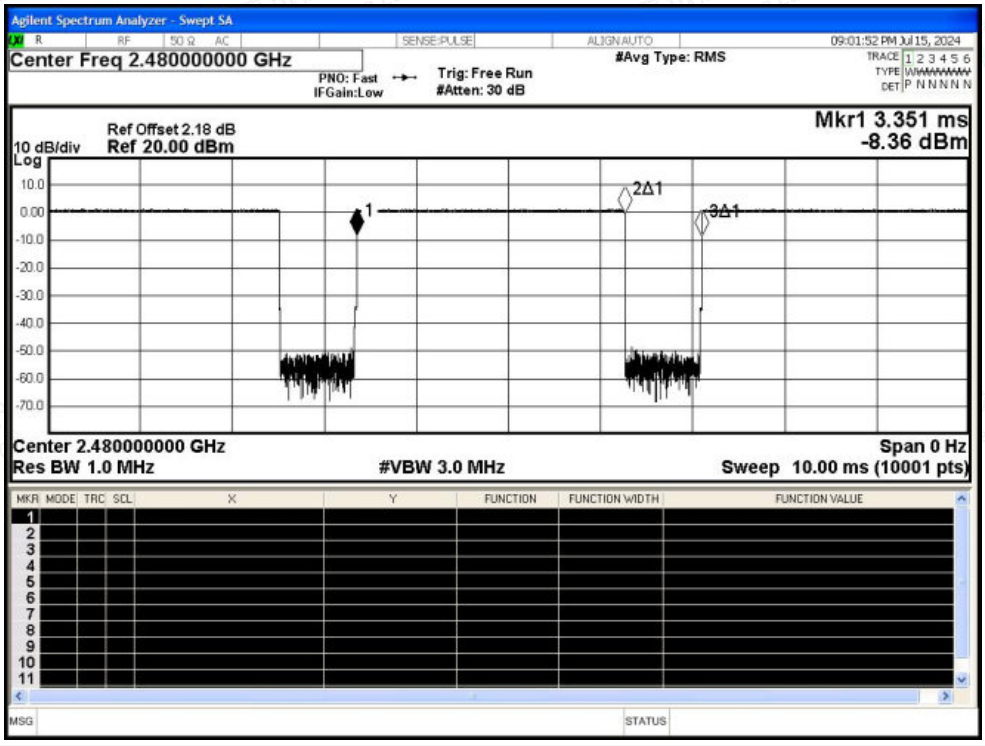
Duty Cycle NVNT 1-DH5 2402MHz Ant1



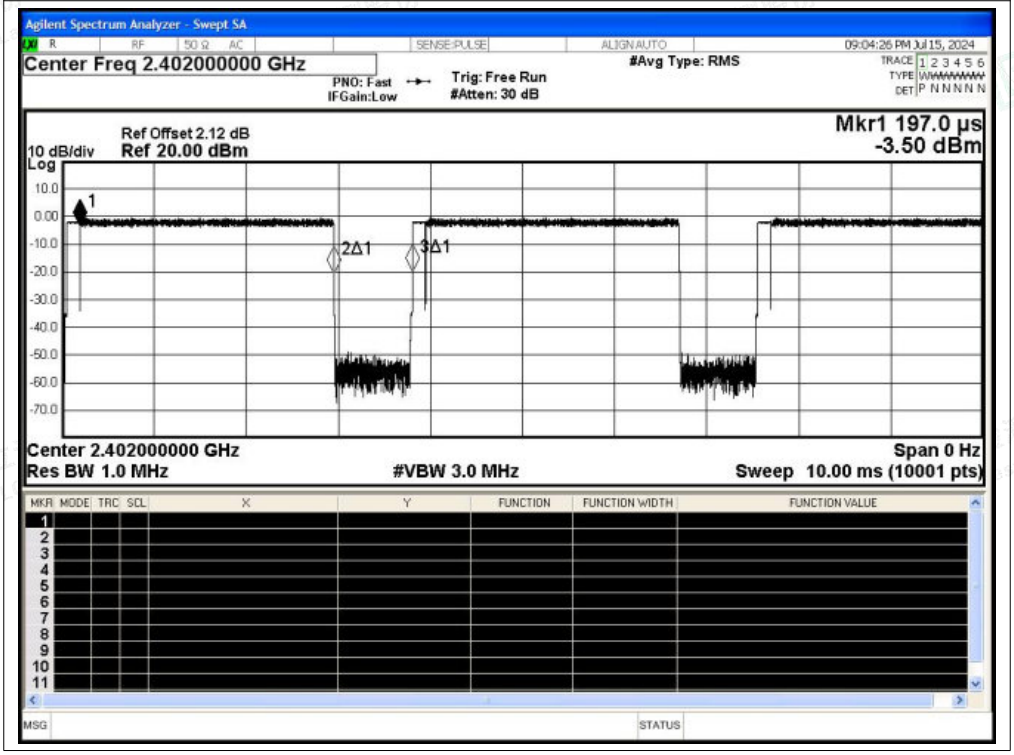
Duty Cycle NVNT 1-DH5 2441MHz Ant1



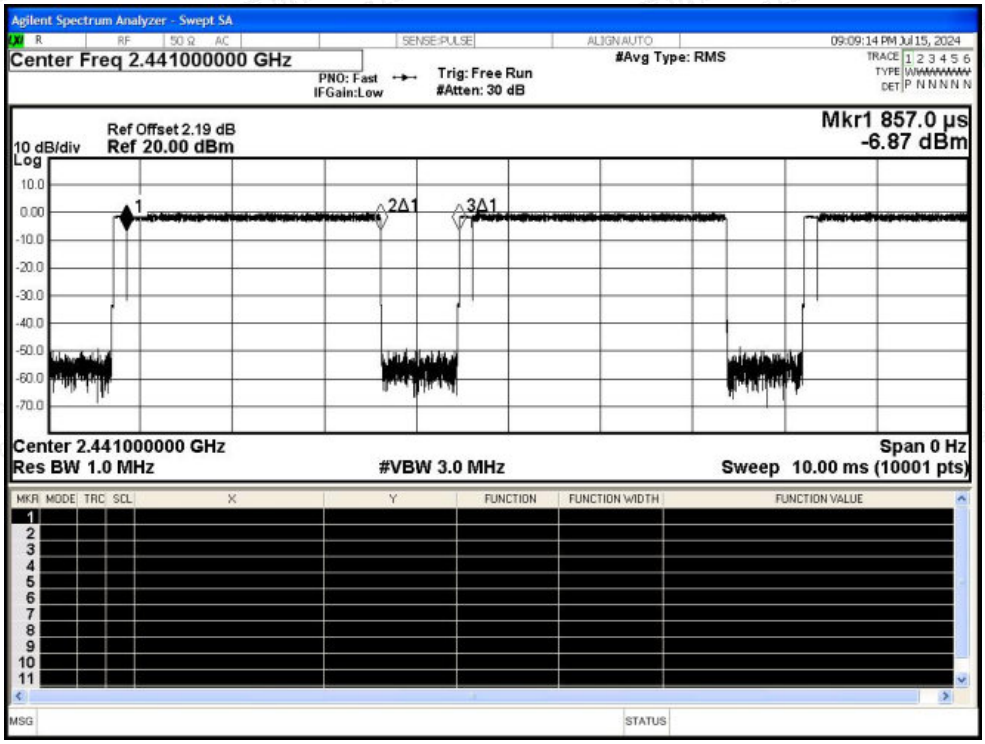
Duty Cycle NVNT 1-DH5 2480MHz Ant1



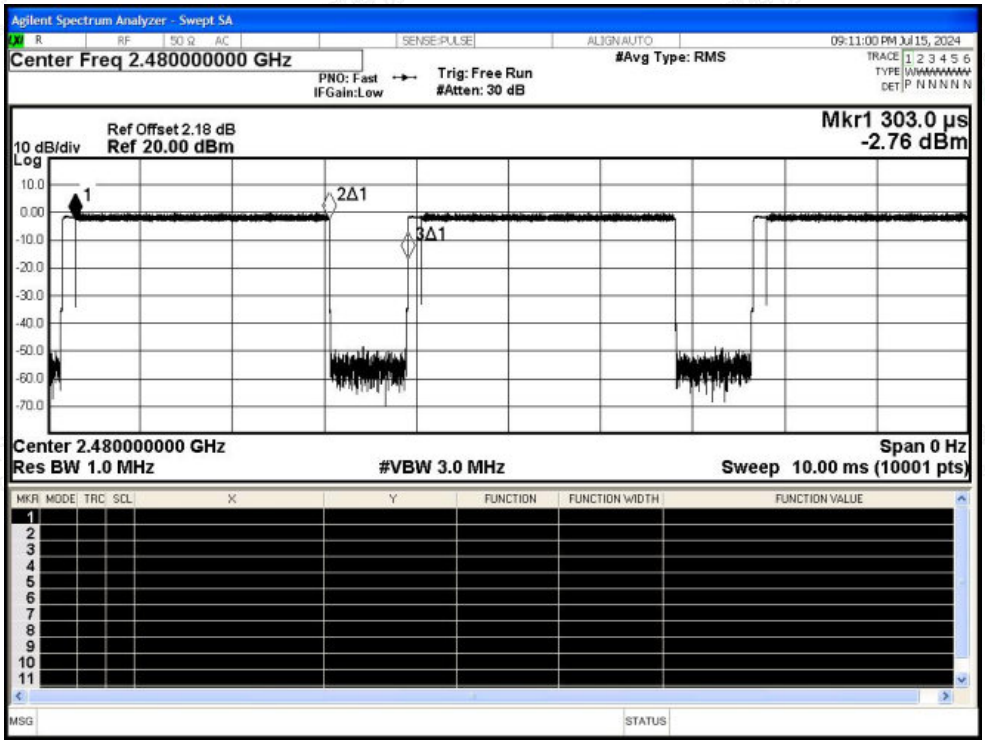
Duty Cycle NVNT 2-DH5 2402MHz Ant1



Duty Cycle NVNT 2-DH5 2441MHz Ant1



Duty Cycle NVNT 2-DH5 2480MHz Ant1

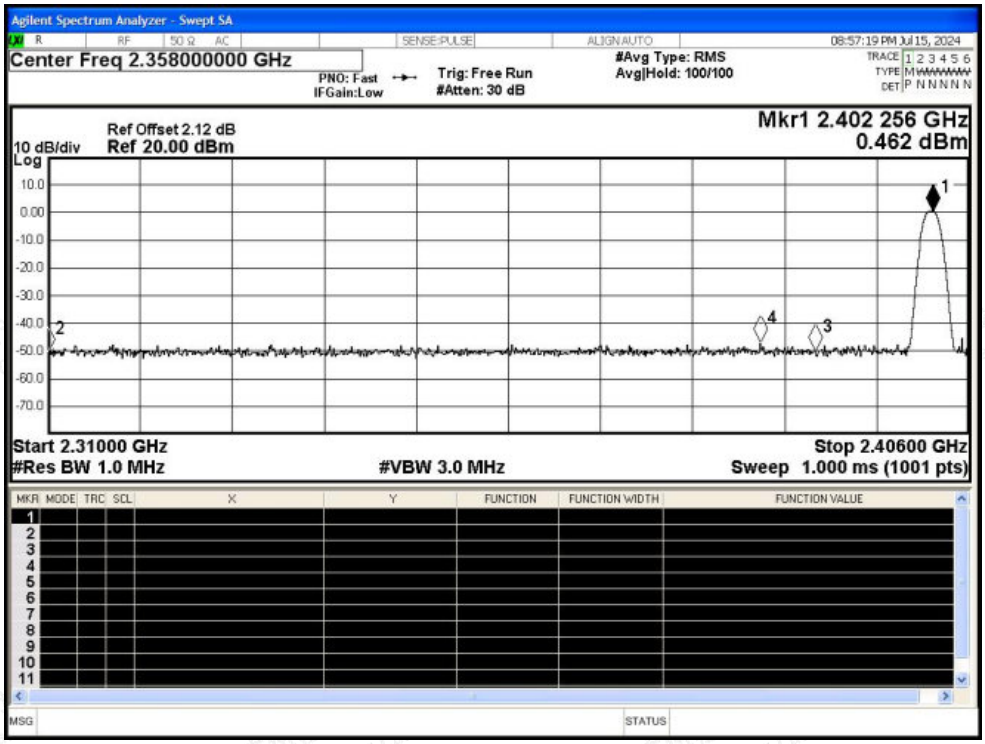


A.9 Restrict Band

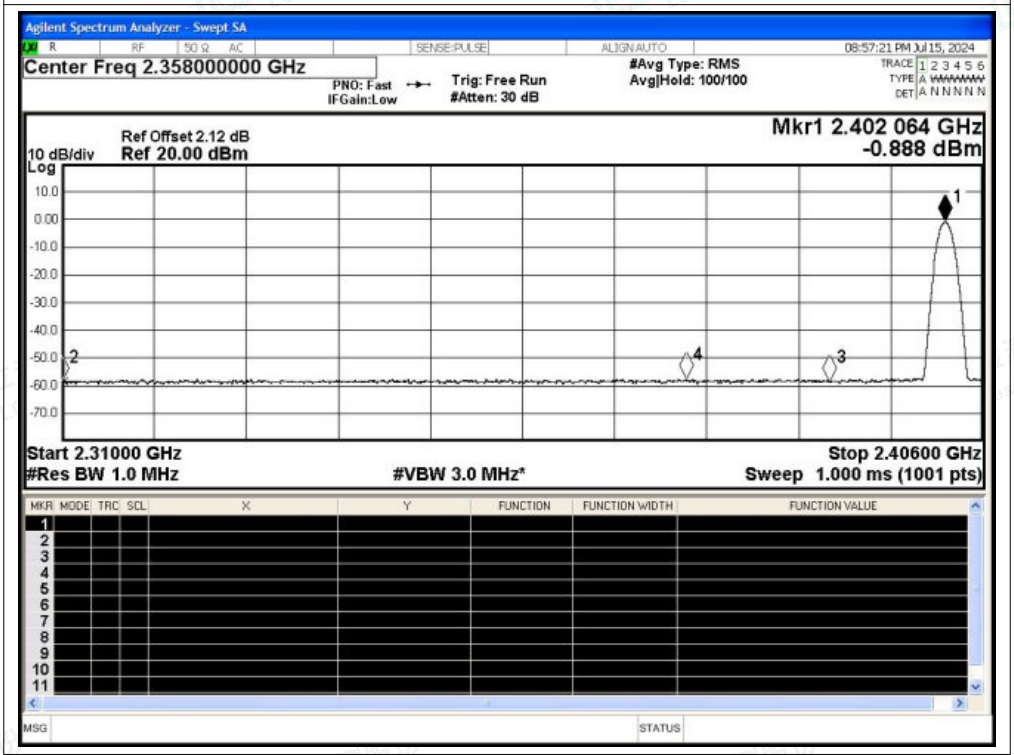
Condition	Mode	Frequency (MHz)	Antenna	Hopping Mode	Spur Freq (MHz)	Power (dBm)	Gain (dBi)	Duty Factor (dB)	E (dBuV/m)	Detector	Limit (dBuV/m)	Verdict
NVNT	1-DH5	2402	Ant1	No-Hopping	2310	-50.7	2.7	-	47.26	Peak	74	Pass
NVNT	1-DH5	2402	Ant1	No-Hopping	2310	-58.65	2.7	1.1	40.41	Average	54	Pass
NVNT	1-DH5	2402	Ant1	No-Hopping	2384.304	-47.08	2.7	-	50.88	Peak	74	Pass
NVNT	1-DH5	2402	Ant1	No-Hopping	2375.088	-57.65	2.7	1.1	41.41	Average	54	Pass
NVNT	1-DH5	2402	Ant1	No-Hopping	2390	-49.89	2.7	-	48.07	Peak	74	Pass
NVNT	1-DH5	2402	Ant1	No-Hopping	2390	-58.69	2.7	1.1	40.37	Average	54	Pass
NVNT	1-DH5	2480	Ant1	No-Hopping	2483.5	-48.68	2.7	-	49.28	Peak	74	Pass
NVNT	1-DH5	2480	Ant1	No-Hopping	2483.5	-57.9	2.7	1.1	41.16	Average	54	Pass
NVNT	1-DH5	2480	Ant1	No-Hopping	2484.16	-41.85	2.7	-	56.11	Peak	74	Pass
NVNT	1-DH5	2480	Ant1	No-Hopping	2499.16	-57.15	2.7	1.1	41.91	Average	54	Pass
NVNT	1-DH5	2480	Ant1	No-Hopping	2500	-49.55	2.7	-	48.41	Peak	74	Pass
NVNT	1-DH5	2480	Ant1	No-Hopping	2500	-57.56	2.7	1.1	41.5	Average	54	Pass
NVNT	2-DH5	2402	Ant1	No-Hopping	2310	-50.23	2.7	-	47.73	Peak	74	Pass
NVNT	2-DH5	2402	Ant1	No-Hopping	2310	-58.84	2.7	1.17	40.29	Average	54	Pass
NVNT	2-DH5	2402	Ant1	No-Hopping	2357.04	-47.55	2.7	-	50.41	Peak	74	Pass
NVNT	2-DH5	2402	Ant1	No-Hopping	2387.088	-57.62	2.7	1.17	41.51	Average	54	Pass
NVNT	2-DH5	2402	Ant1	No-Hopping	2390	-50.34	2.7	-	47.62	Peak	74	Pass
NVNT	2-DH5	2402	Ant1	No-Hopping	2390	-58.28	2.7	1.17	40.85	Average	54	Pass
NVNT	2-DH5	2480	Ant1	No-Hopping	2483.5	-50.25	2.7	-	47.71	Peak	74	Pass
NVNT	2-DH5	2480	Ant1	No-Hopping	2483.5	-57.08	2.7	1.17	42.05	Average	54	Pass
NVNT	2-DH5	2480	Ant1	No-Hopping	2484.136	-41.45	2.7	-	56.51	Peak	74	Pass
NVNT	2-DH5	2480	Ant1	No-Hopping	2483.536	-56.89	2.7	1.17	42.24	Average	54	Pass
NVNT	2-DH5	2480	Ant1	No-Hopping	2500	-49.91	2.7	-	48.05	Peak	74	Pass
NVNT	2-DH5	2480	Ant1	No-Hopping	2500	-58.31	2.7	1.17	40.82	Average	54	Pass

Test Graphs

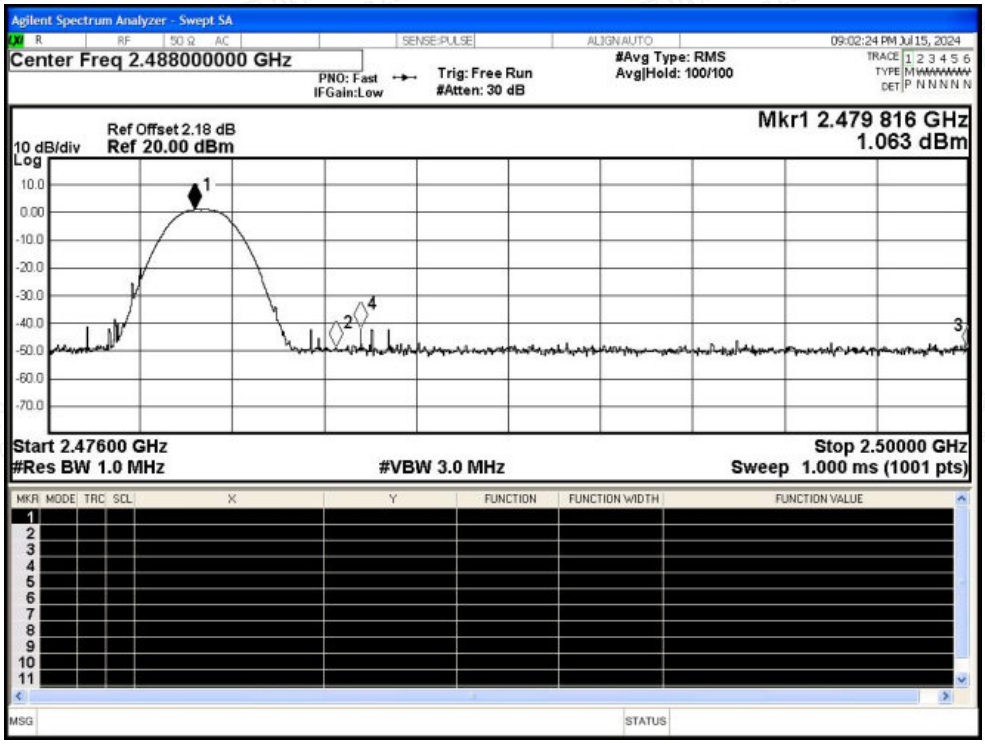
Restrict Band NVNT 1-DH5 2402MHz Ant1 No-Hopping Peak



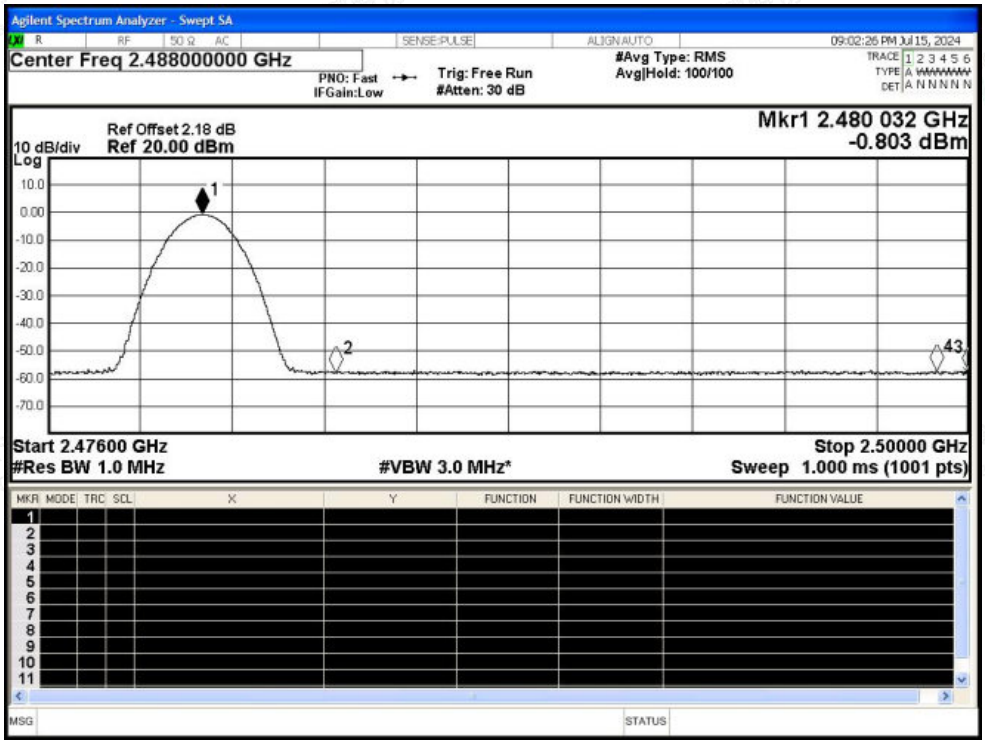
Restrict Band NVNT 1-DH5 2402MHz Ant1 No-Hopping Average



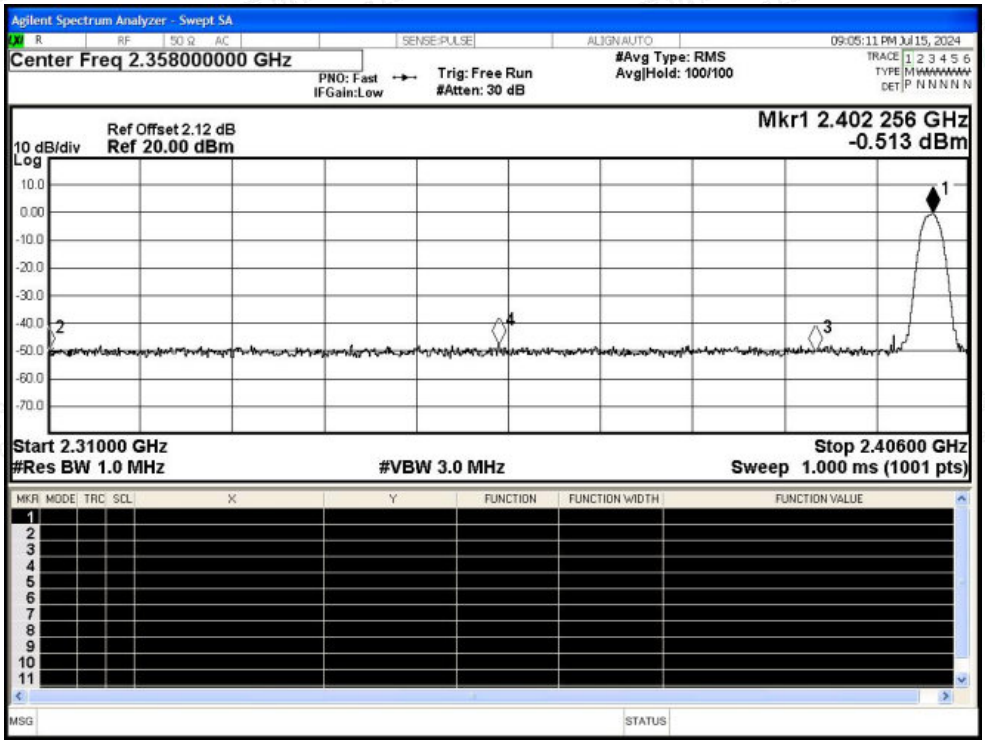
Restrict Band NVNT 1-DH5 2480MHz Ant1 No-Hopping Peak



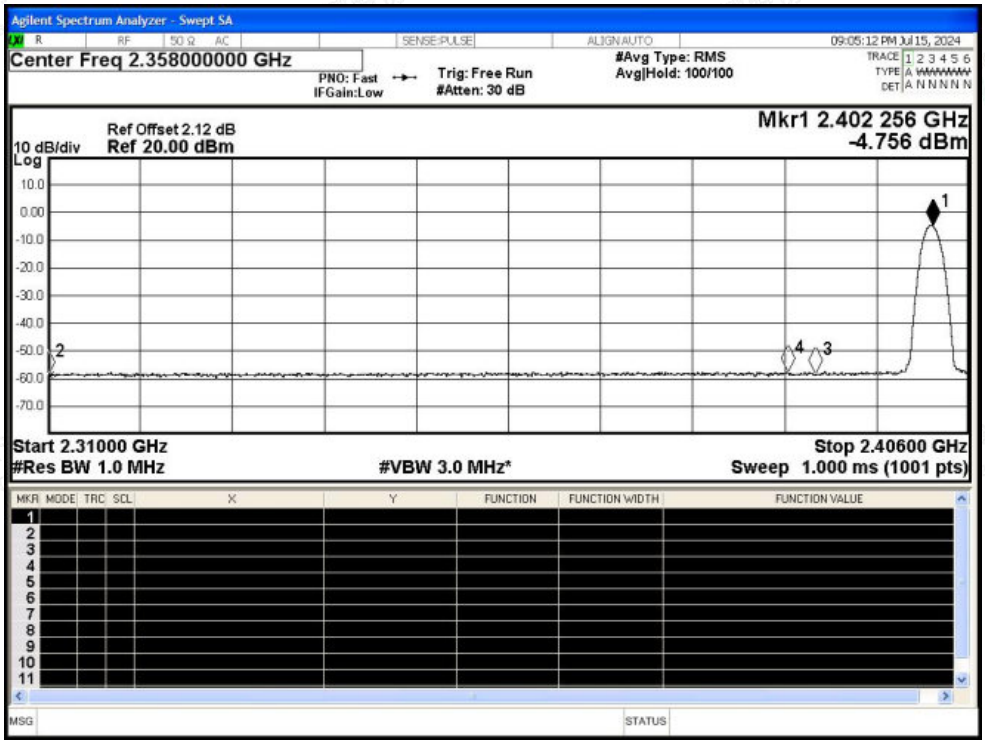
Restrict Band NVNT 1-DH5 2480MHz Ant1 No-Hopping Average



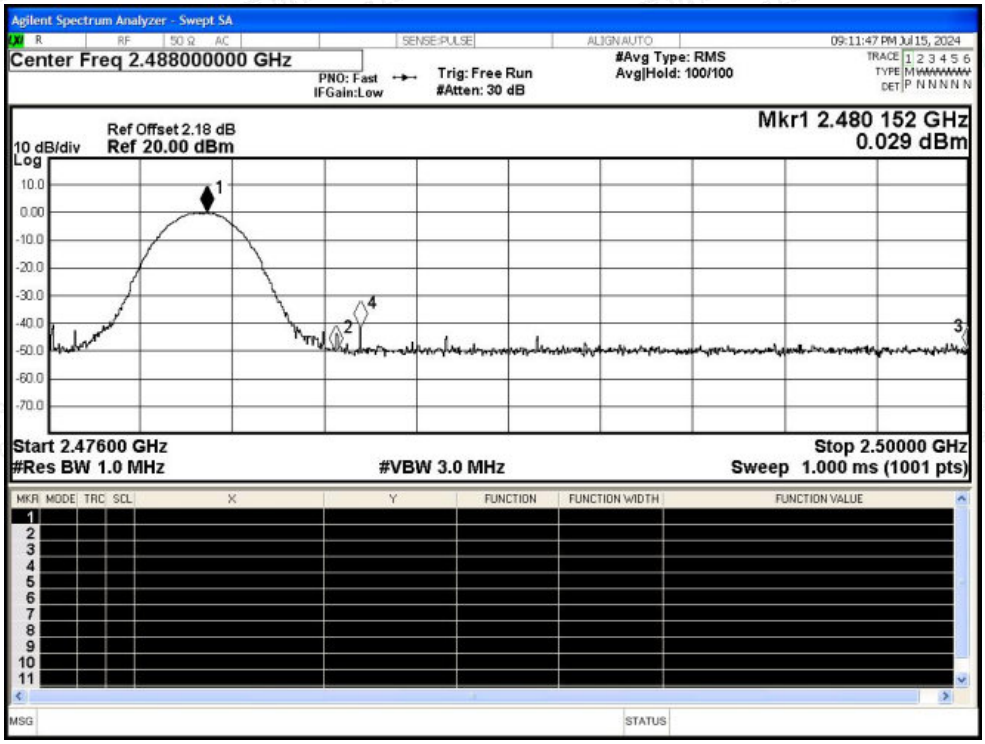
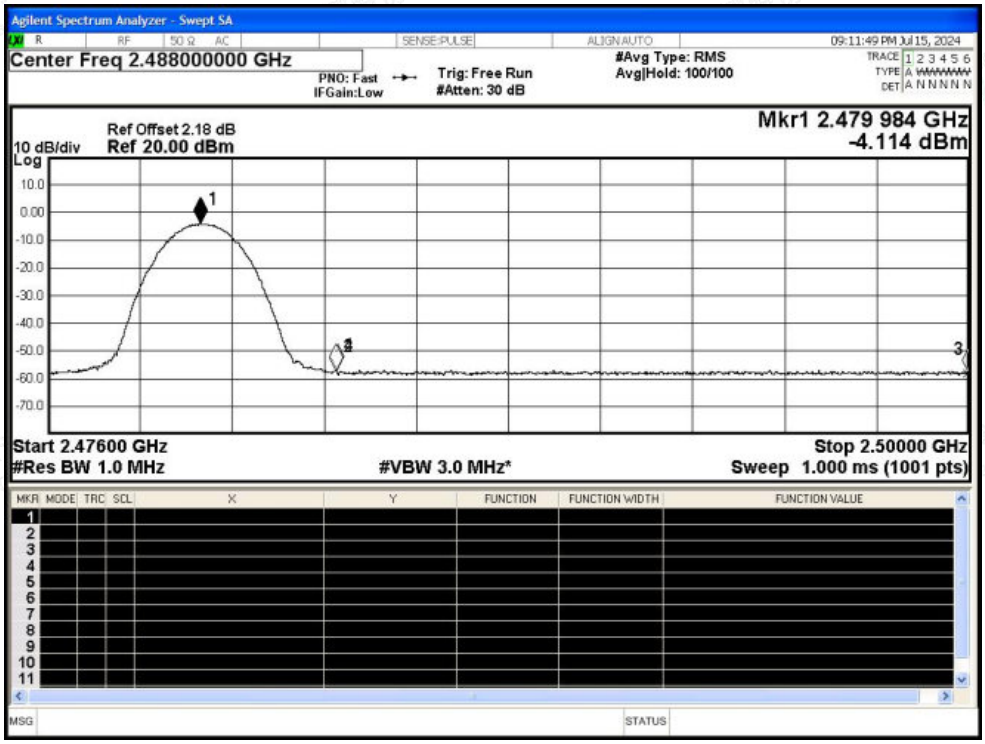
Restrict Band NVNT 2-DH5 2402MHz Ant1 No-Hopping Peak



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