Appendix A

RF Test Data for BT (Conducted Measurement)

Product Name: Wireless Speaker

Test Model: MA131

Environmental Conditions

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

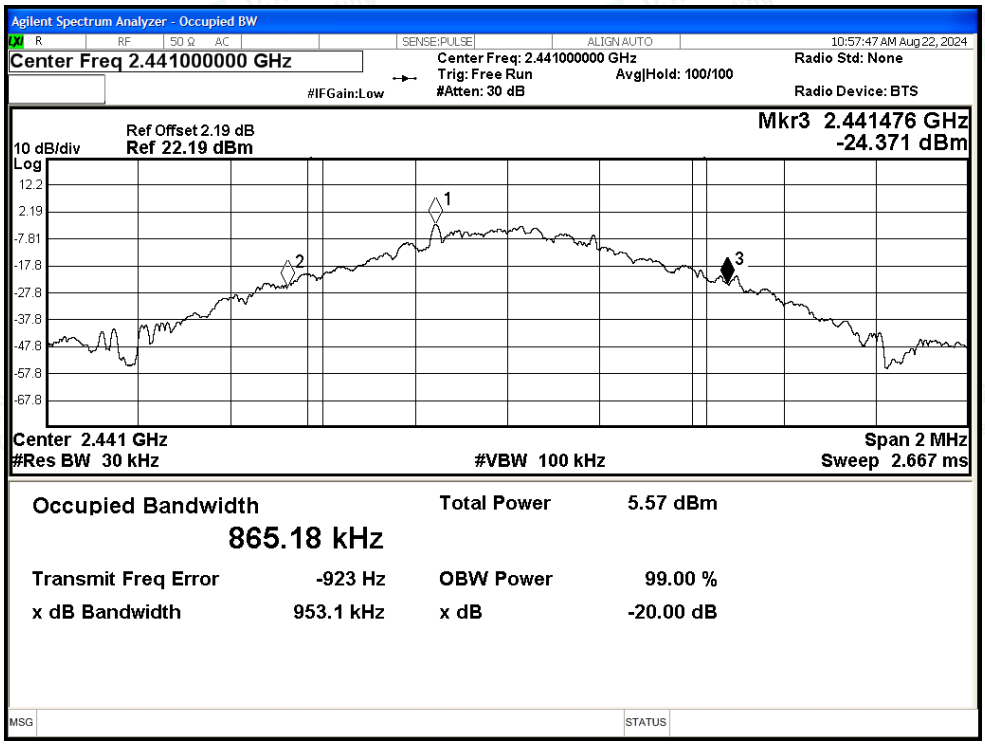
A.1 -20dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-20 dB Bandwidth (MHz)	Limit -20 dB Bandwidth (MHz)	Verdict
NVNT	1-DH5	2402	Ant1	0.944	N/A	Pass
NVNT	1-DH5	2441	Ant1	0.953	N/A	Pass
NVNT	1-DH5	2480	Ant1	0.968	N/A	Pass
NVNT	2-DH5	2402	Ant1	1.306	N/A	Pass
NVNT	2-DH5	2441	Ant1	1.283	N/A	Pass
NVNT	2-DH5	2480	Ant1	1.285	N/A	Pass
NVNT	3-DH5	2402	Ant1	1.299	N/A	Pass
NVNT	3-DH5	2441	Ant1	1.293	N/A	Pass
NVNT	3-DH5	2480	Ant1	1.287	N/A	Pass

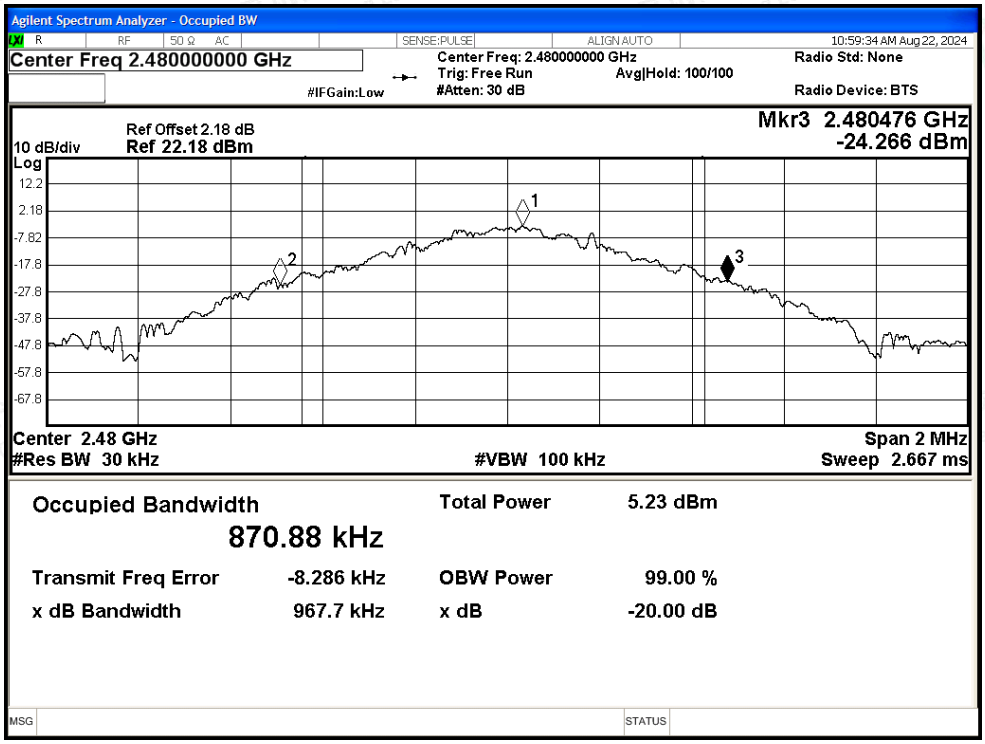
Test Graphs

-20dB Bandwidth NVNT 1-DH5 2402MHz Ant1

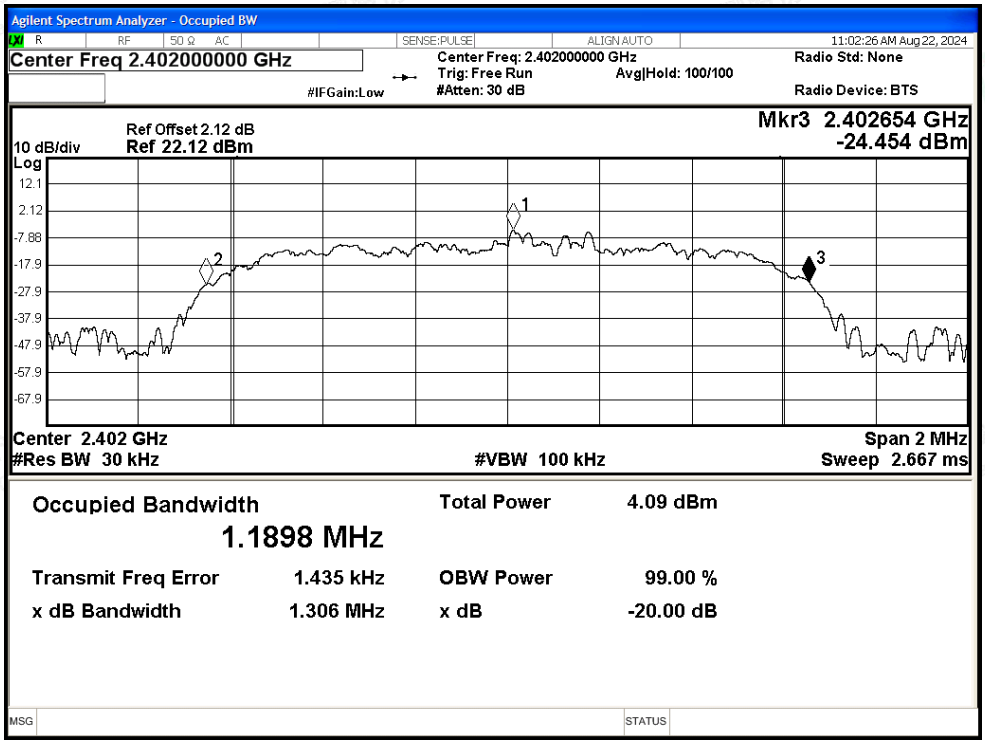
-20dB Bandwidth NVNT 1-DH5 2441MHz Ant1



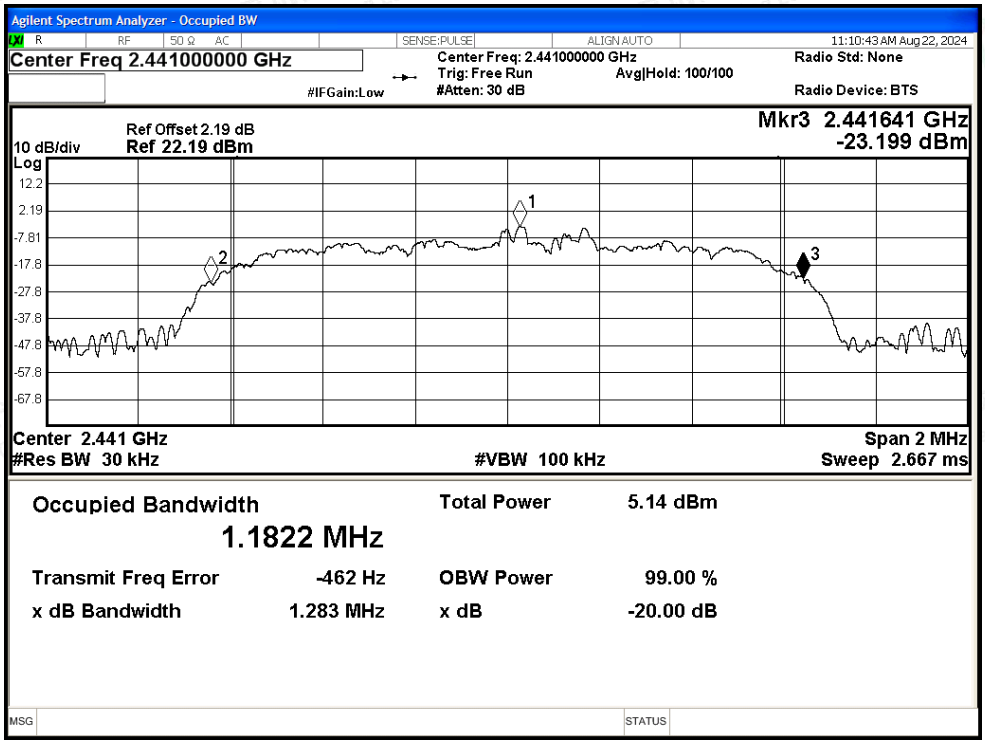
-20dB Bandwidth NVNT 1-DH5 2480MHz Ant1



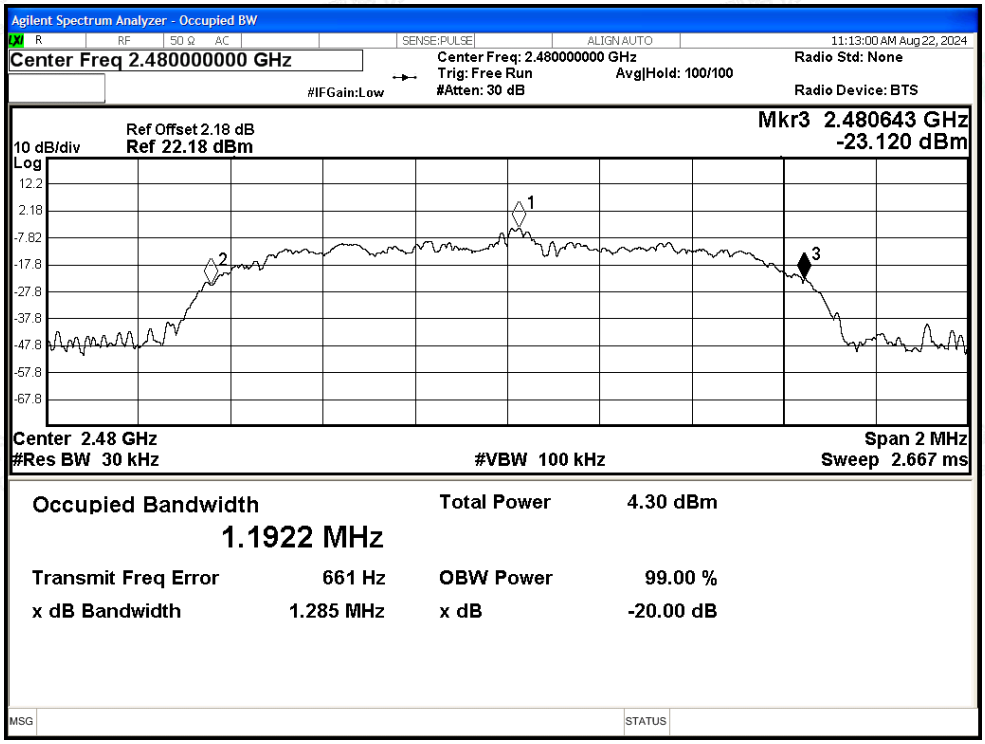
-20dB Bandwidth NVNT 2-DH5 2402MHz Ant1



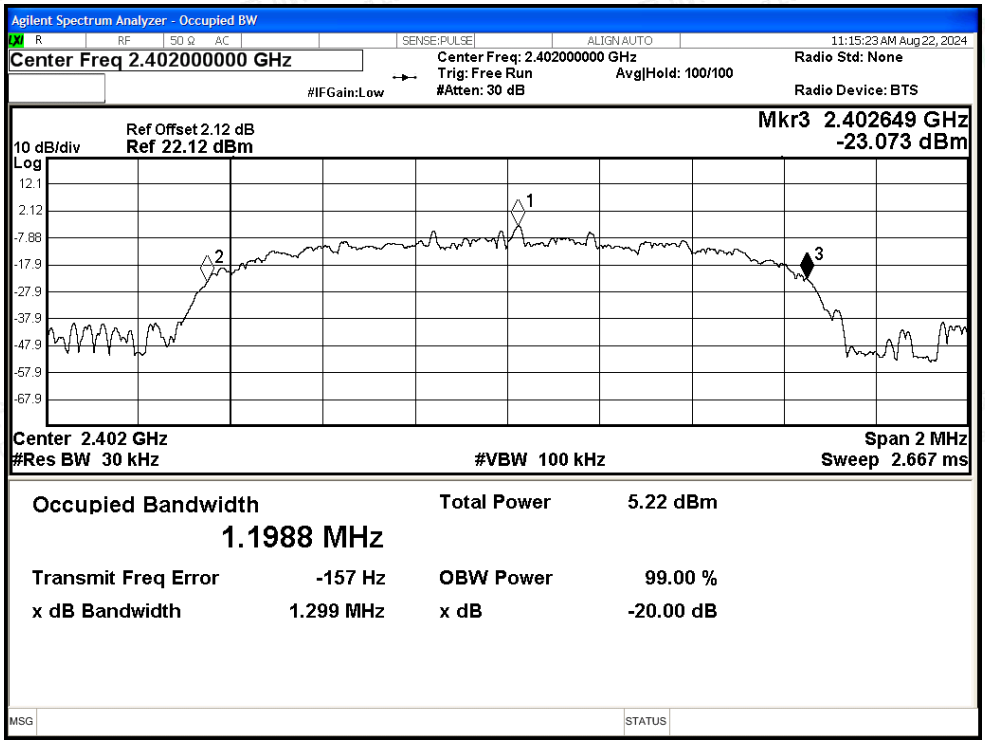
-20dB Bandwidth NVNT 2-DH5 2441MHz Ant1



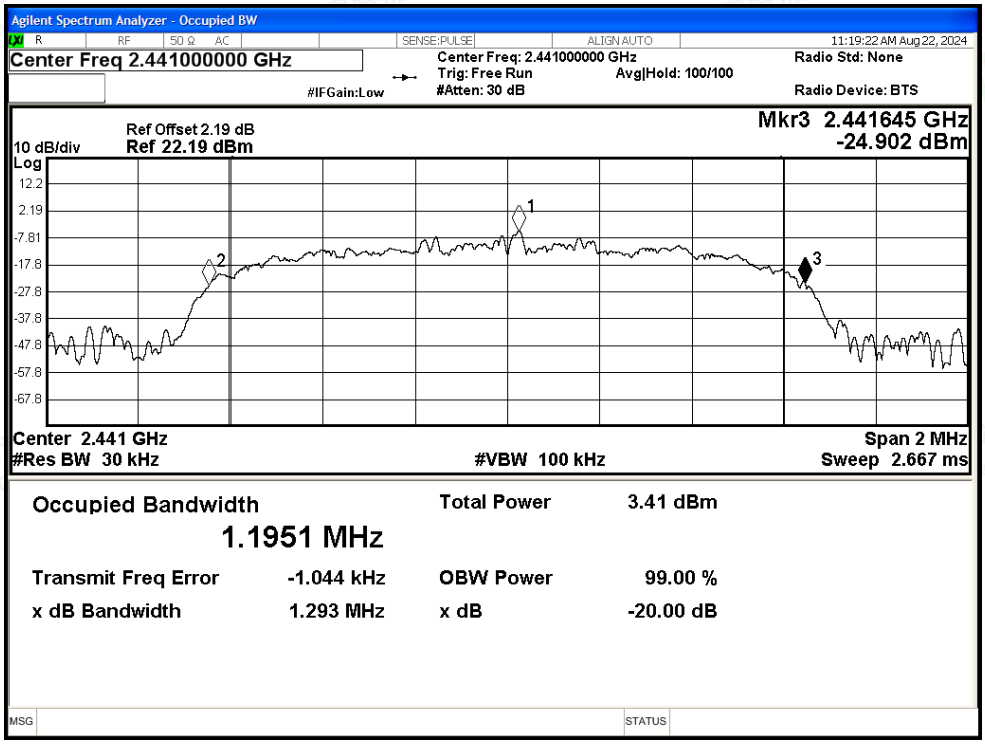
-20dB Bandwidth NVNT 2-DH5 2480MHz Ant1



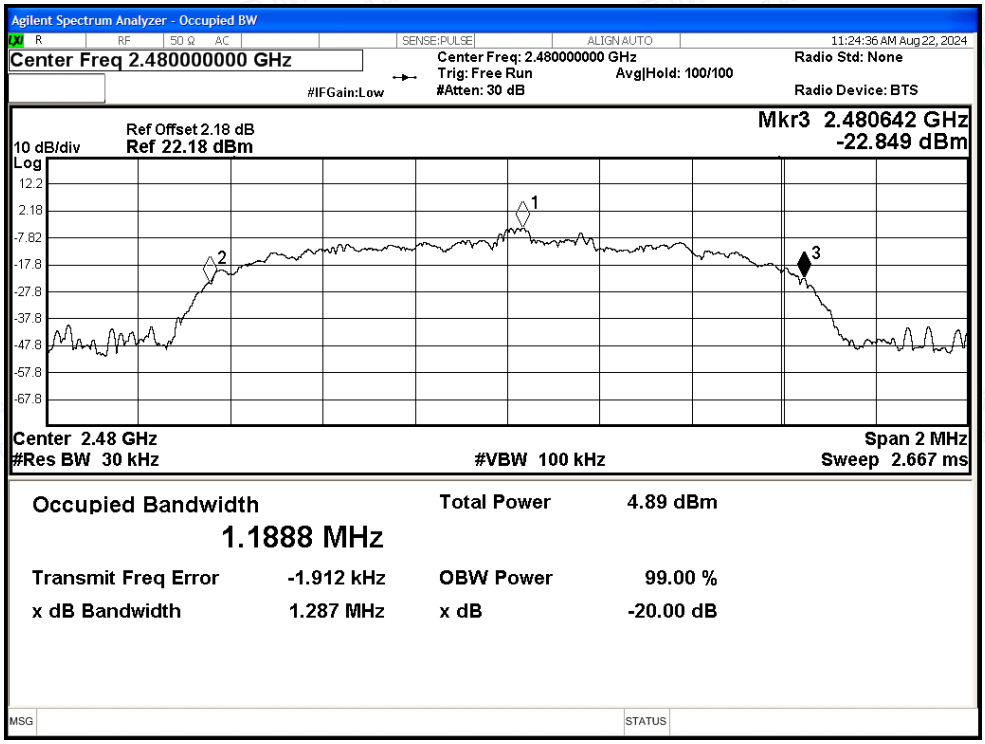
-20dB Bandwidth NVNT 3-DH5 2402MHz Ant1



-20dB Bandwidth NVNT 3-DH5 2441MHz Ant1



-20dB Bandwidth NVNT 3-DH5 2480MHz Ant1

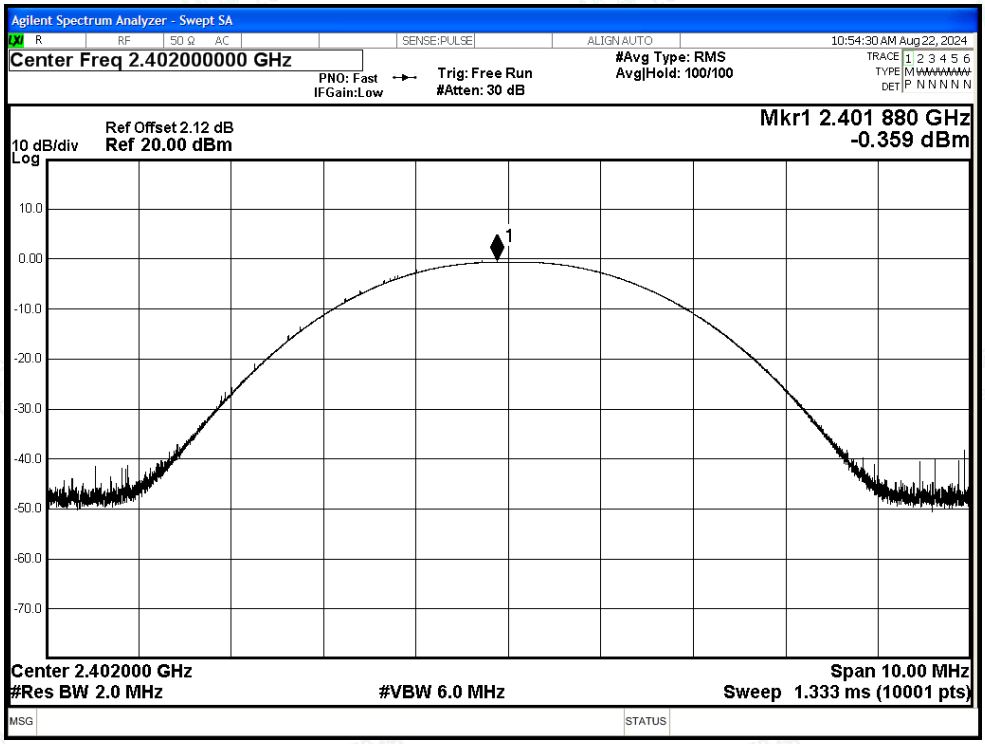


A.2 Maximum Peak Conducted Output Power

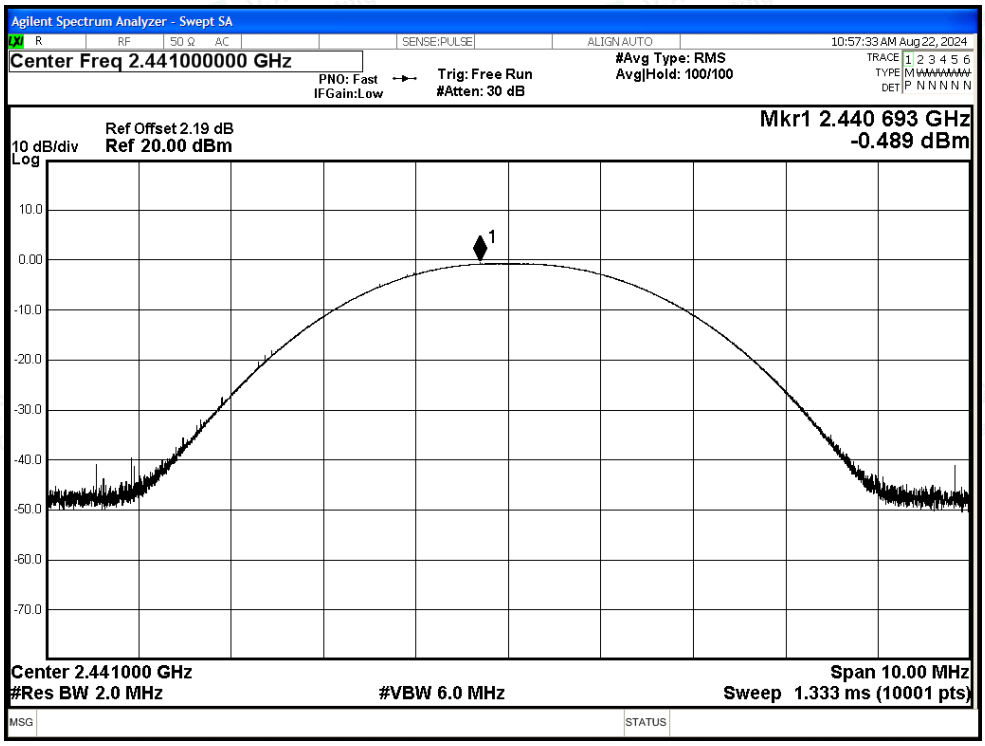
Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	1-DH5	2402	Ant1	-0.36	21	Pass
NVNT	1-DH5	2441	Ant1	-0.49	21	Pass
NVNT	1-DH5	2480	Ant1	-0.86	21	Pass
NVNT	2-DH5	2402	Ant1	-0.44	21	Pass
NVNT	2-DH5	2441	Ant1	-0.29	21	Pass
NVNT	2-DH5	2480	Ant1	0.25	21	Pass
NVNT	3-DH5	2402	Ant1	0.93	21	Pass
NVNT	3-DH5	2441	Ant1	-0.74	21	Pass
NVNT	3-DH5	2480	Ant1	-0.23	21	Pass

Test Graphs

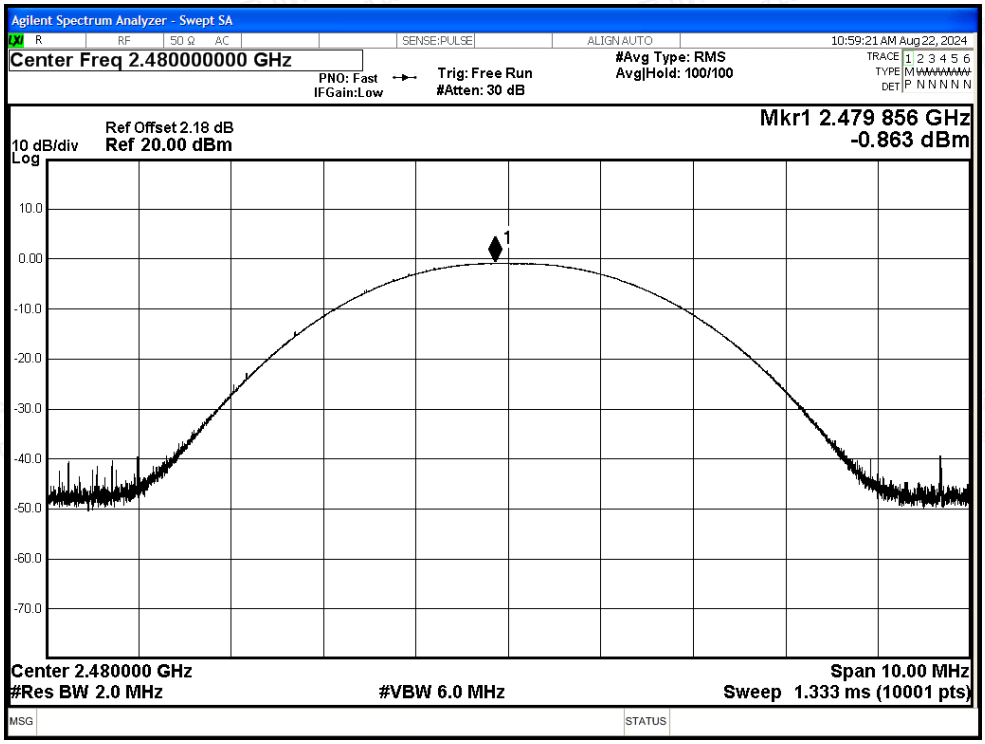
Power NVNT 1-DH5 2402MHz Ant1



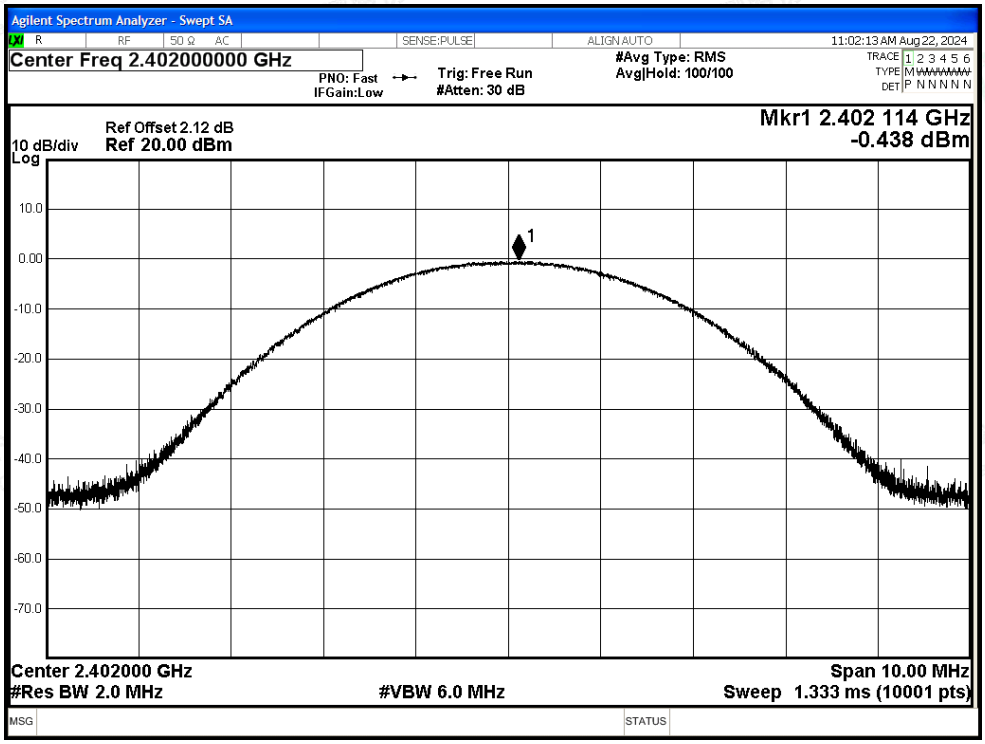
Power NVNT 1-DH5 2441MHz Ant1



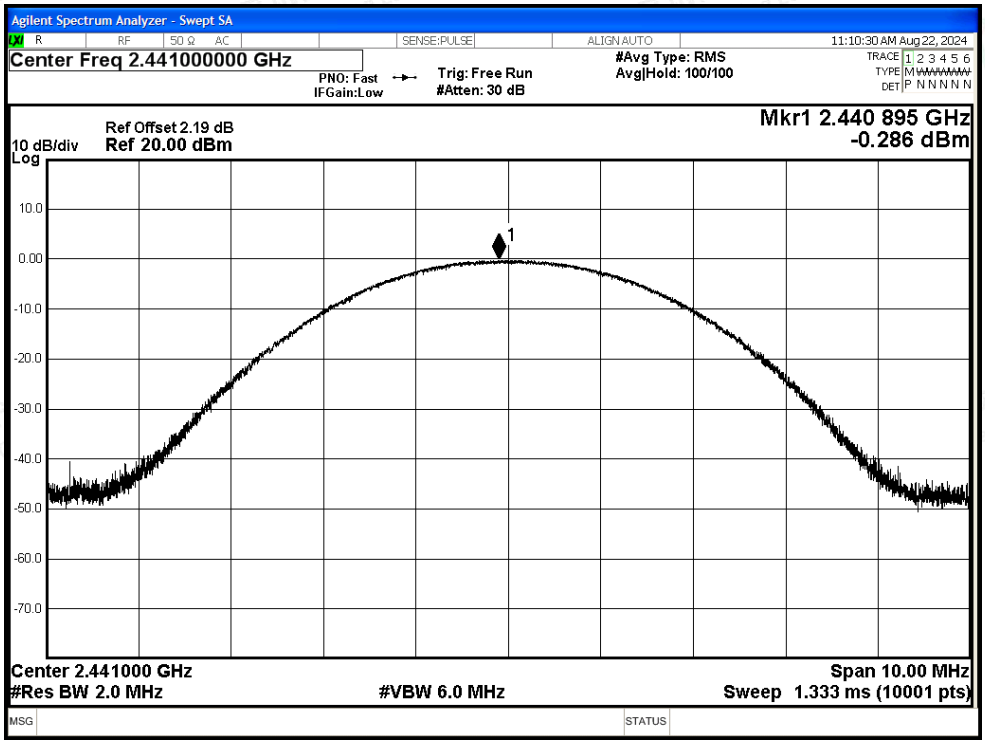
Power NVNT 1-DH5 2480MHz Ant1



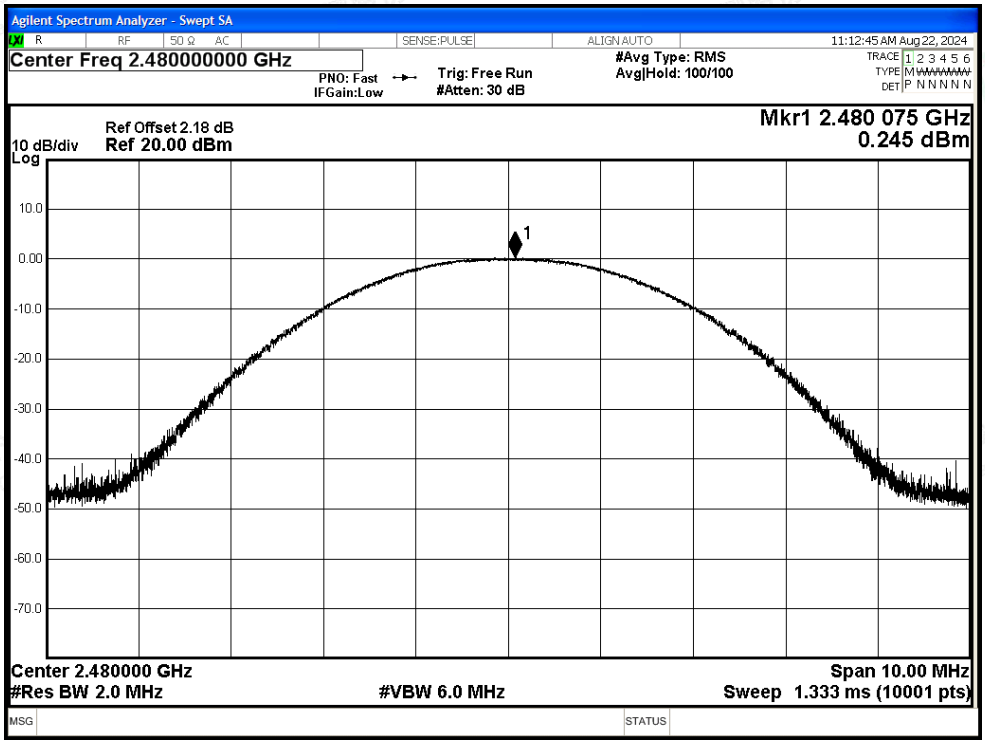
Power NVNT 2-DH5 2402MHz Ant1



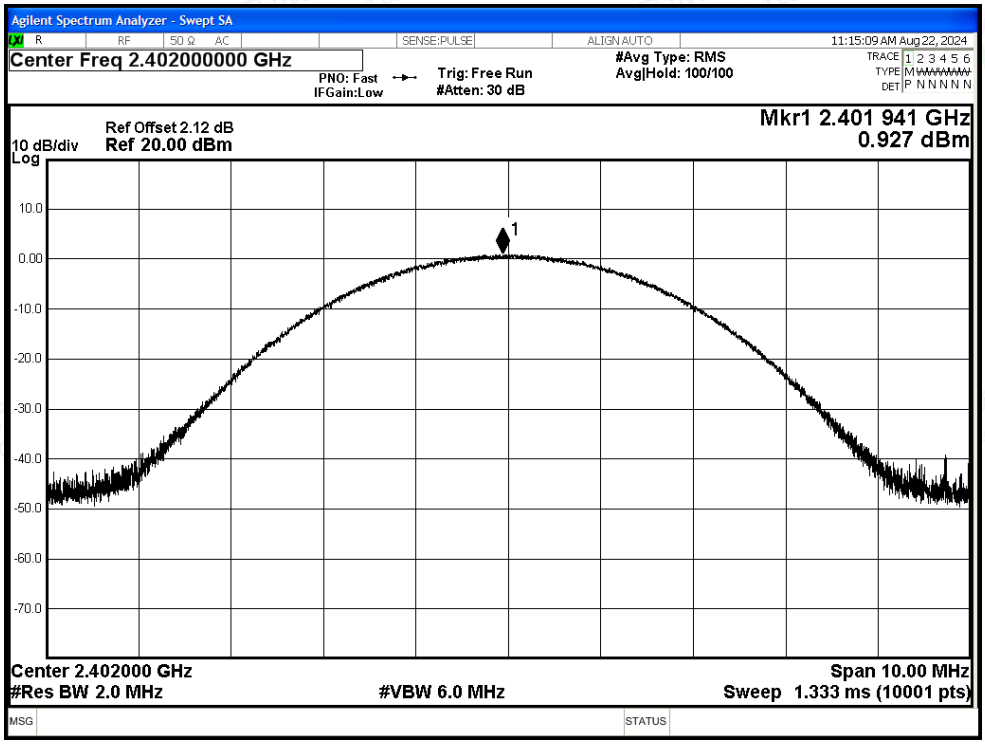
Power NVNT 2-DH5 2441MHz Ant1



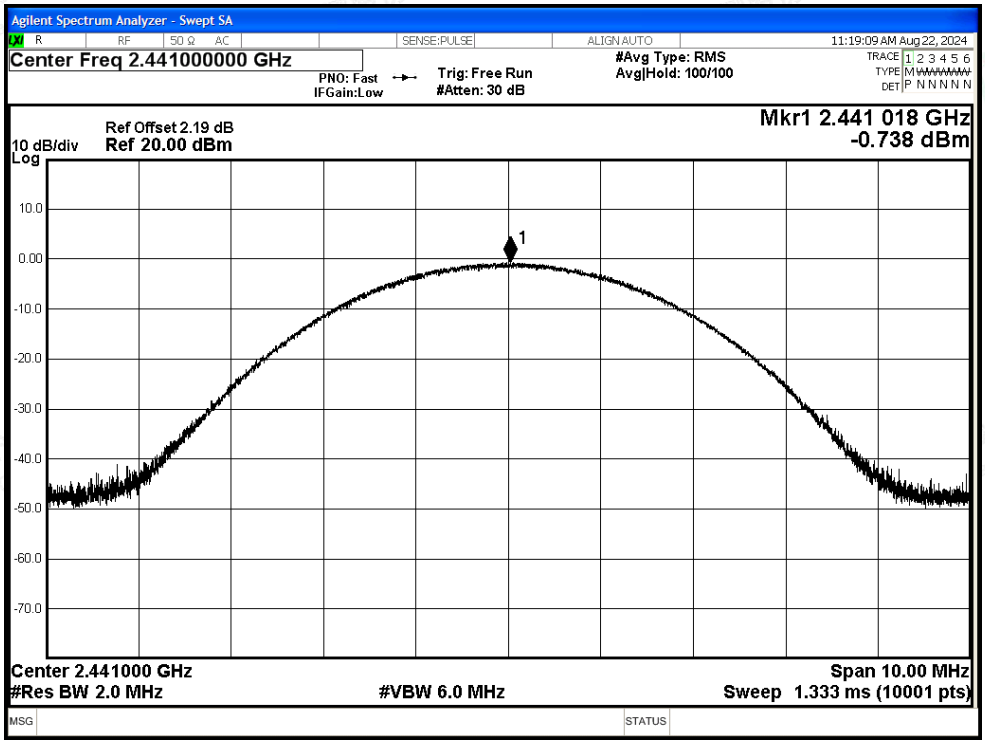
Power NVNT 2-DH5 2480MHz Ant1



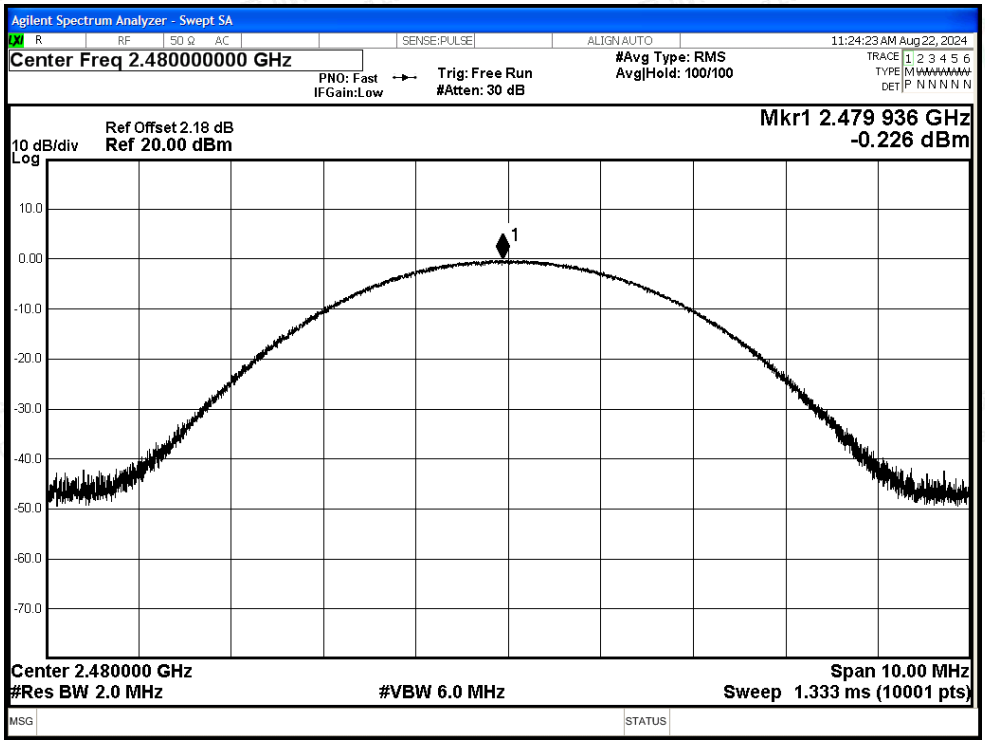
Power NVNT 3-DH5 2402MHz Ant1



Power NVNT 3-DH5 2441MHz Ant1



Power NVNT 3-DH5 2480MHz Ant1

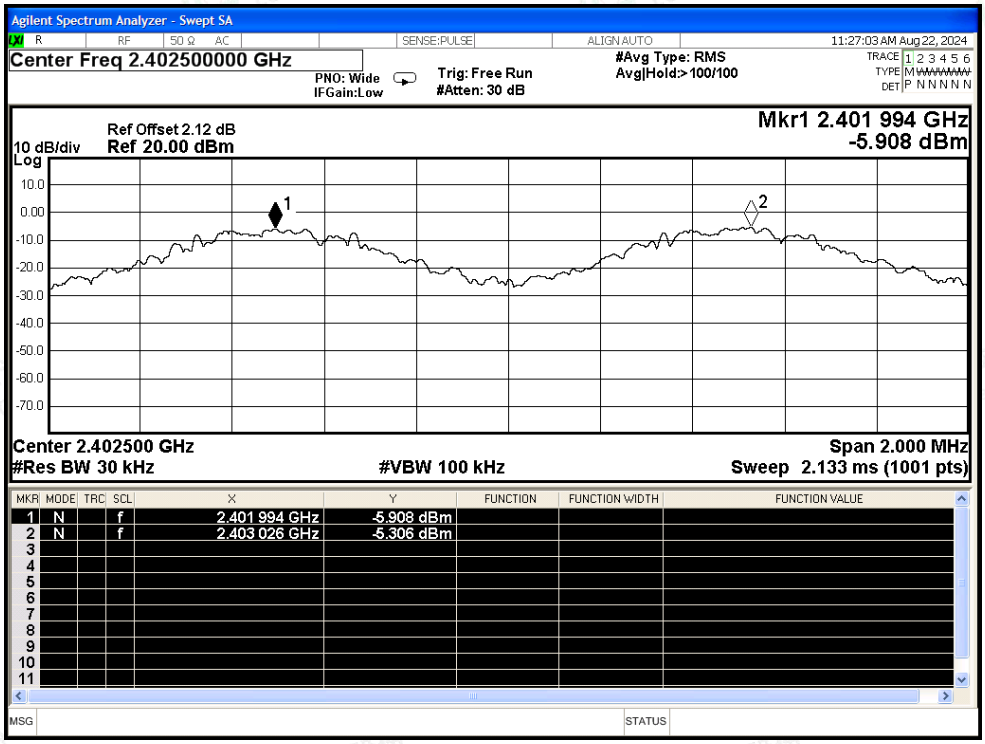


A.3 Carrier Frequencies Separation

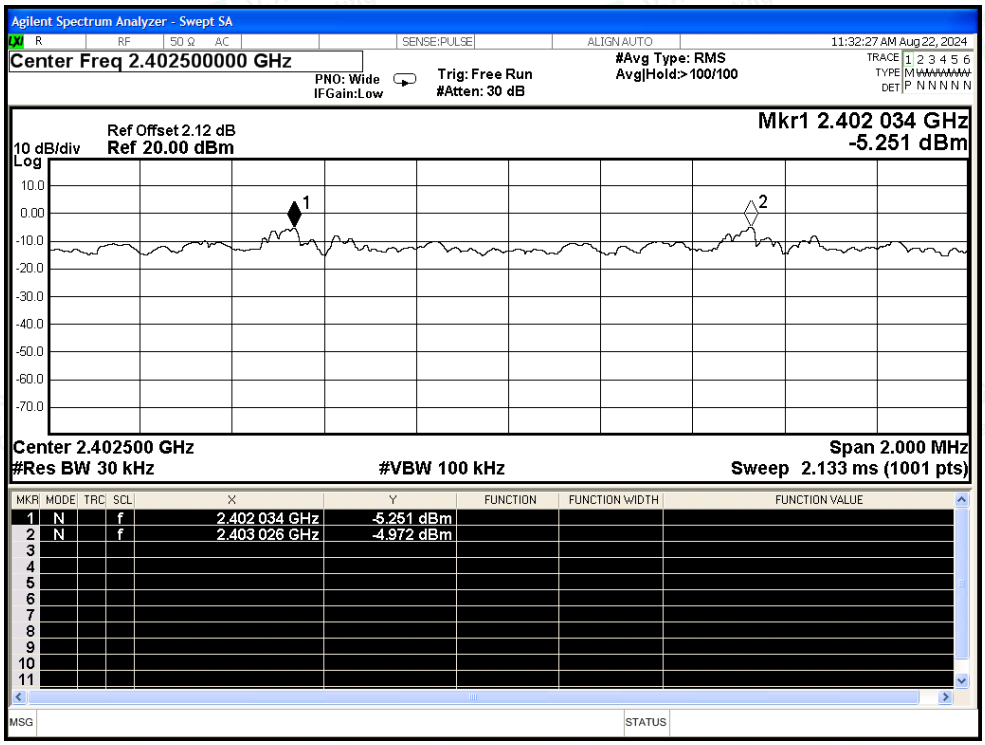
Condition	Mode	Antenna	Hopping Freq1 (MHz)	Hopping Freq2 (MHz)	HFS (MHz)	Limit (MHz)	Verdict
NVNT	1-DH5	Ant1	2401.994	2403.026	1.032	0.645	Pass
NVNT	2-DH5	Ant1	2402.034	2403.026	0.992	0.871	Pass
NVNT	3-DH5	Ant1	2402.006	2403.168	1.162	0.866	Pass

Test Graphs

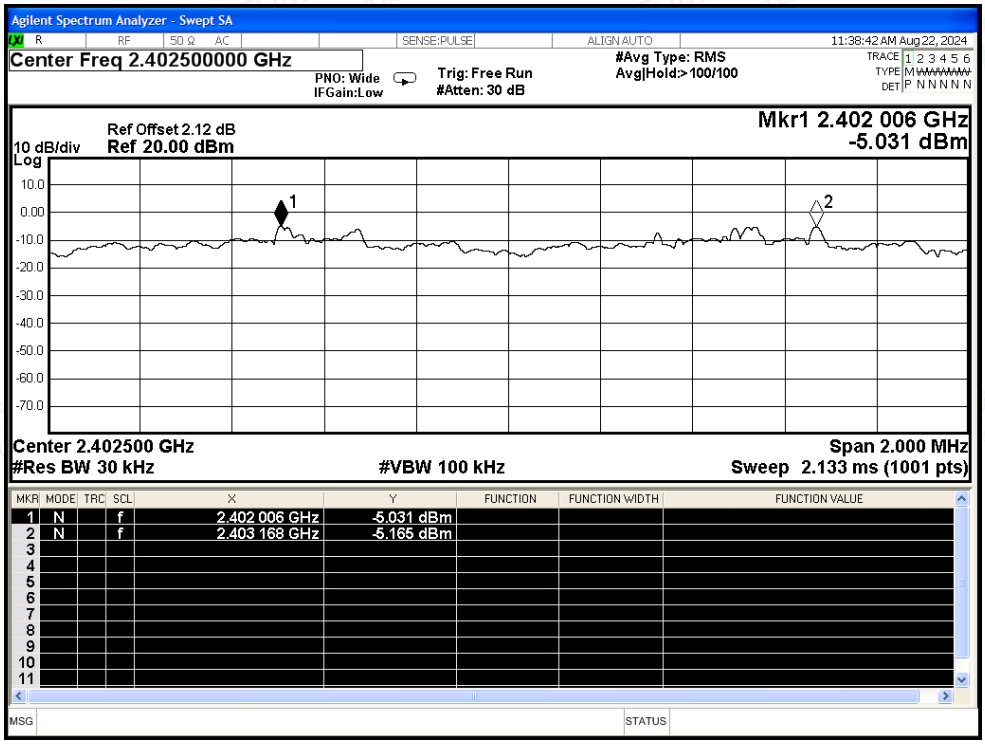
CFS NVNT 1-DH5 2402MHz Ant1



CFS NVNT 2-DH5 2402MHz Ant1



CFS NVNT 3-DH5 2402MHz Ant1

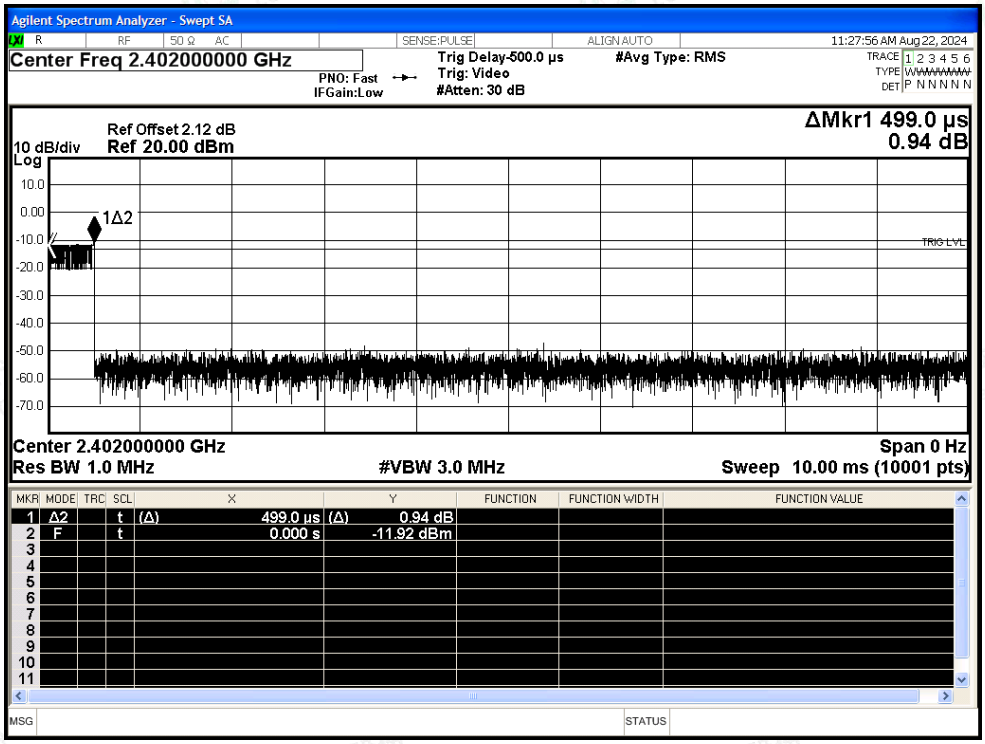


A.4 Dwell Time

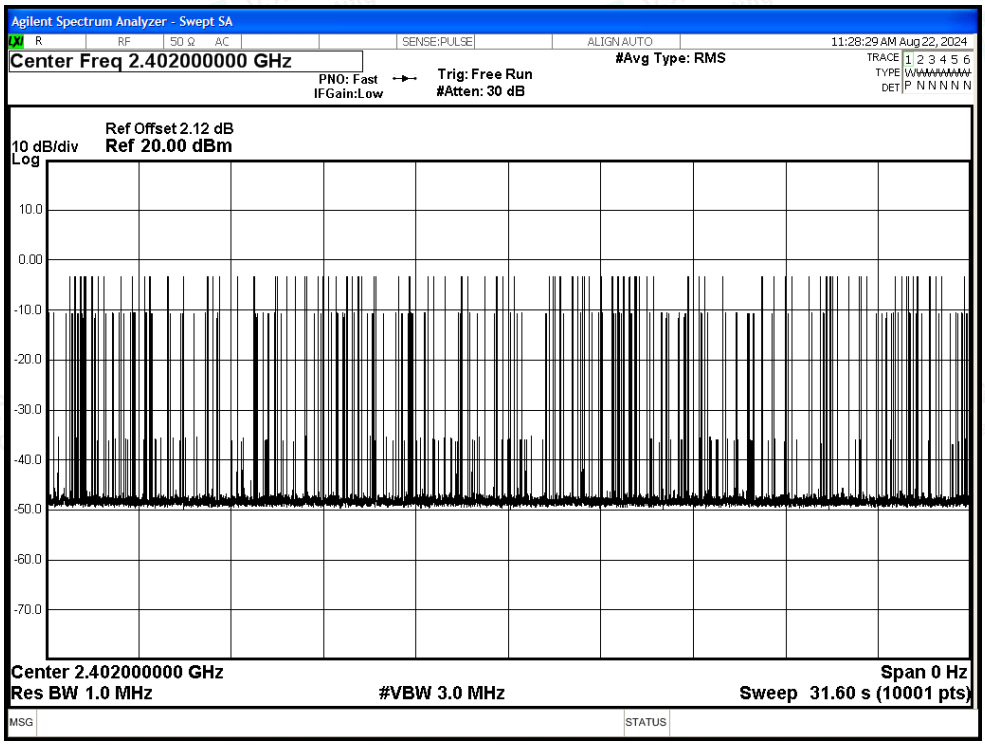
Condition	Mode	Frequency (MHz)	Antenna	Pulse Time (ms)	Total Dwell Time (ms)	Burst Count	Period Time (ms)	Limit (ms)	Verdict
NVNT	1-DH5	2402	Ant1	0.499	55.389	111	31600	400	Pass
NVNT	2-DH5	2402	Ant1	2.898	327.474	113	31600	400	Pass
NVNT	3-DH5	2402	Ant1	2.897	312.876	108	31600	400	Pass

Test Graphs

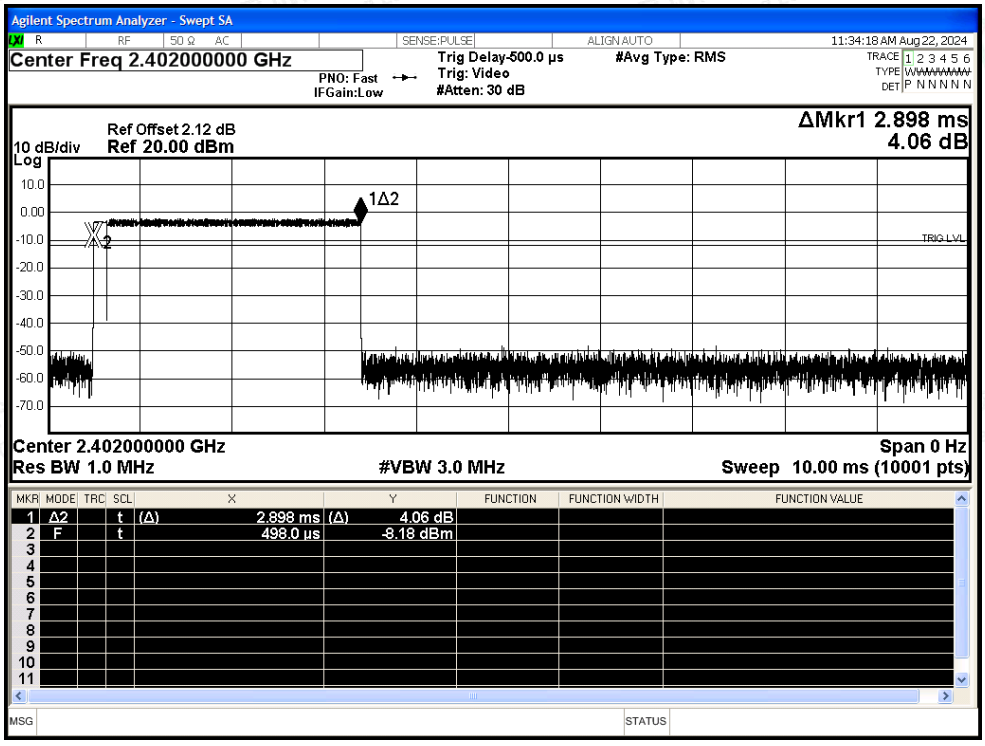
Dwell NVNT 1-DH5 2402MHz Ant1 One Burst



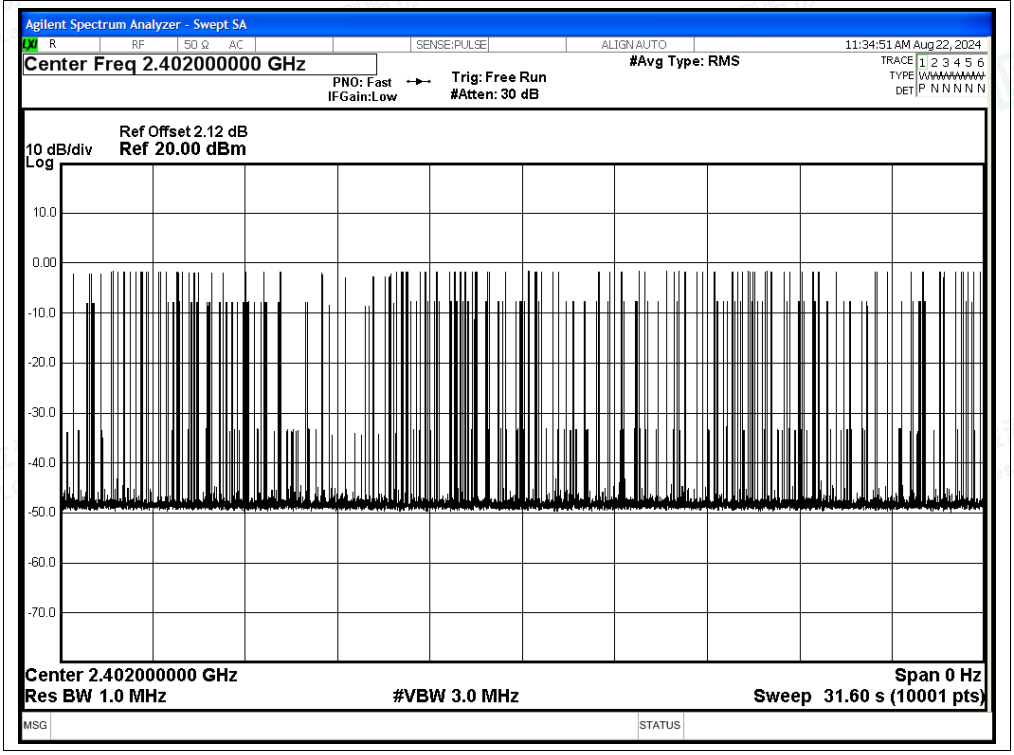
Dwell NVNT 1-DH5 2402MHz Ant1 Accumulated



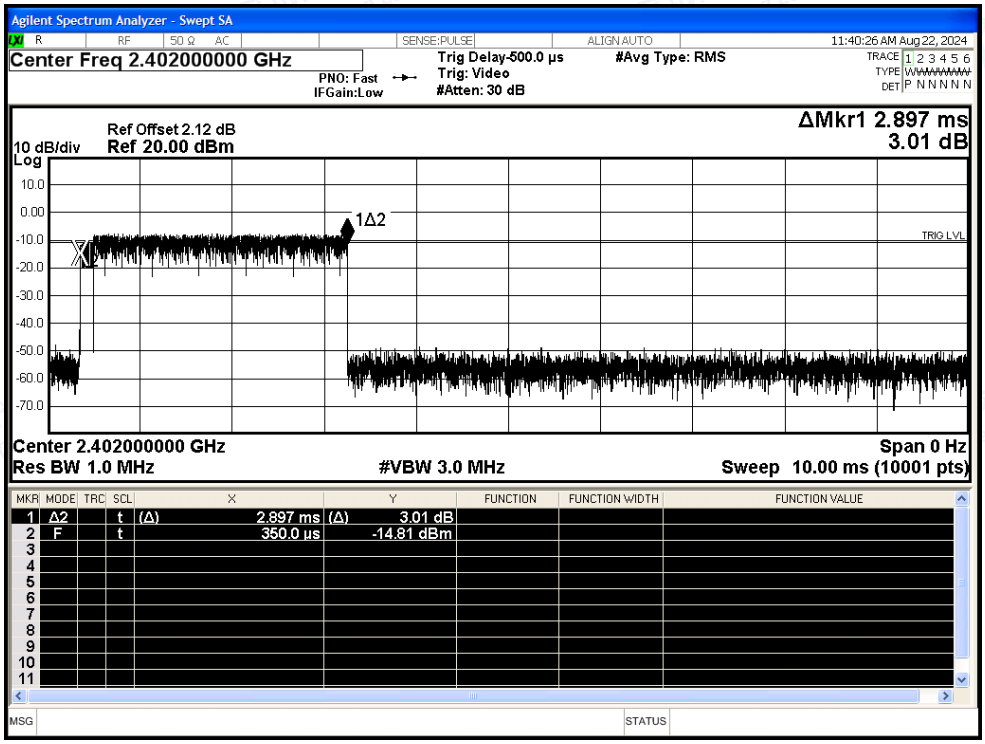
Dwell NVNT 2-DH5 2402MHz Ant1 One Burst



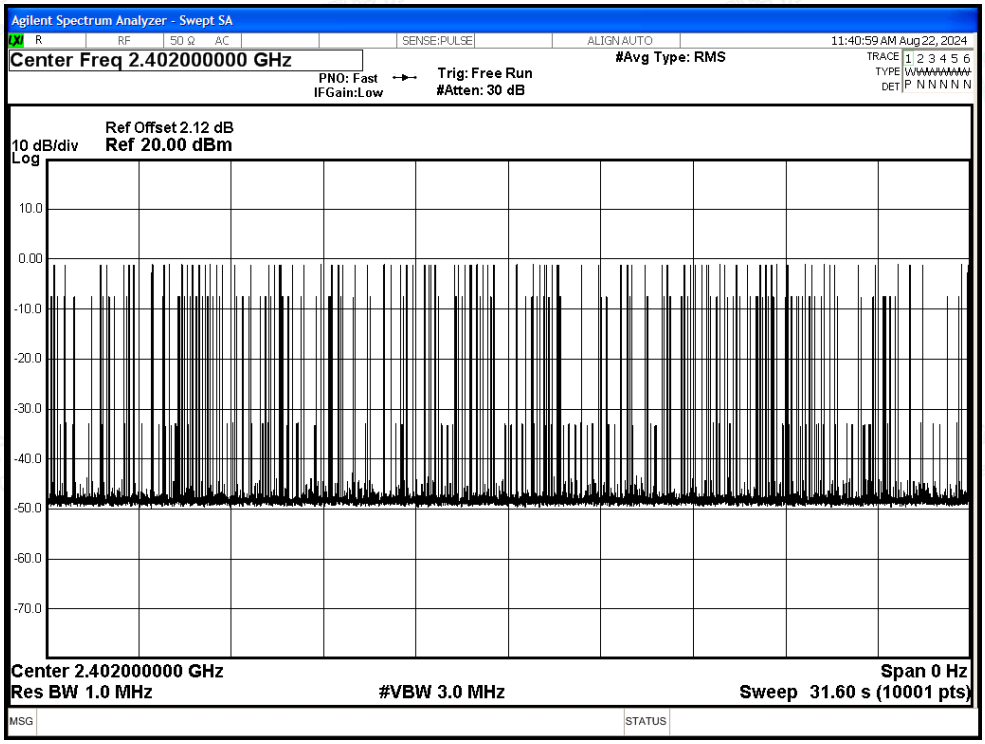
Dwell NVNT 2-DH5 2402MHz Ant1 Accumulated



Dwell NVNT 3-DH5 2402MHz Ant1 One Burst



Dwell NVNT 3-DH5 2402MHz Ant1 Accumulated

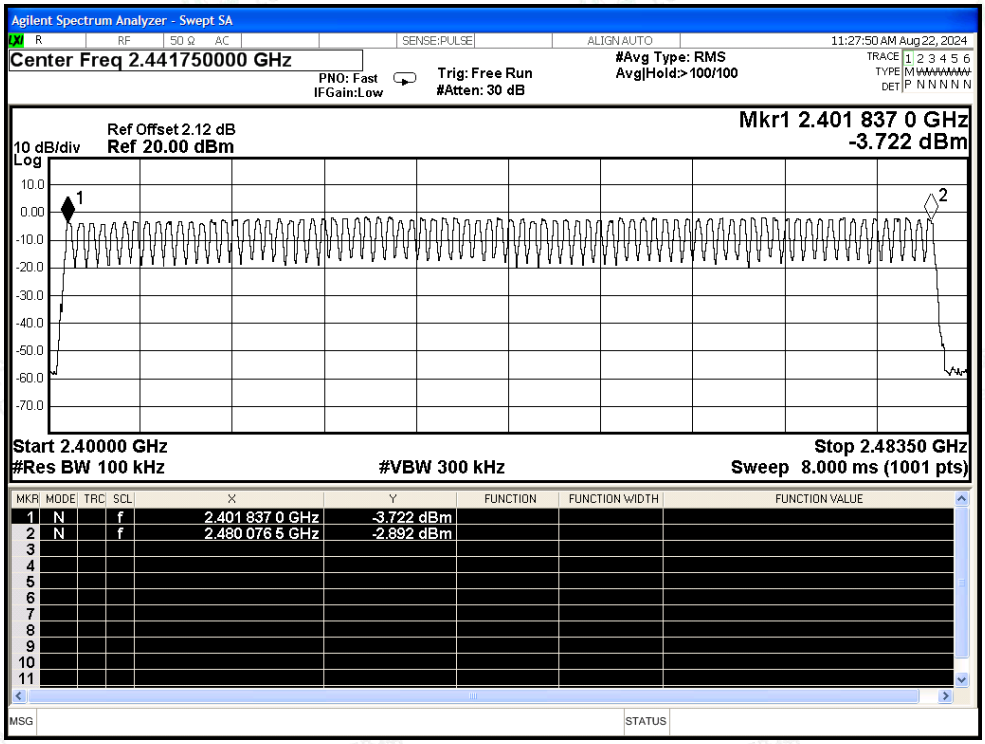


A.5 Number of Hopping Channel

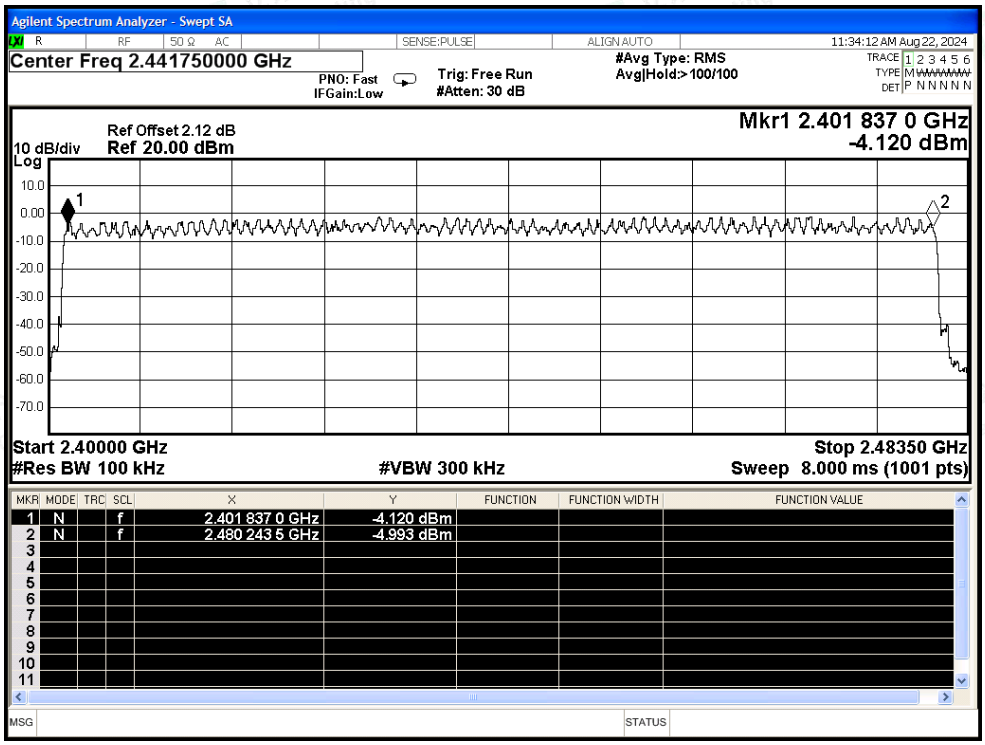
Condition	Mode	Antenna	Hopping Number	Limit	Verdict
NVNT	1-DH5	Ant1	79	15	Pass
NVNT	2-DH5	Ant1	79	15	Pass
NVNT	3-DH5	Ant1	79	15	Pass

Test Graphs

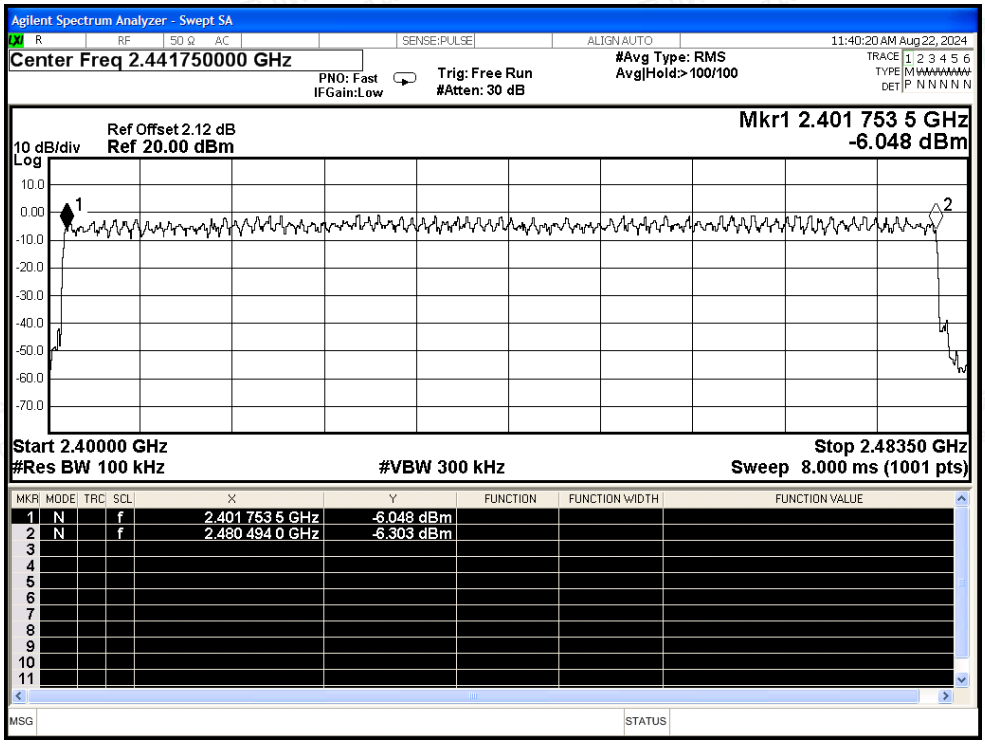
Hopping No. NVNT 1-DH5 2402MHz Ant1



Hopping No. NVNT 2-DH5 2402MHz Ant1



Hopping No. NVNT 3-DH5 2402MHz Ant1

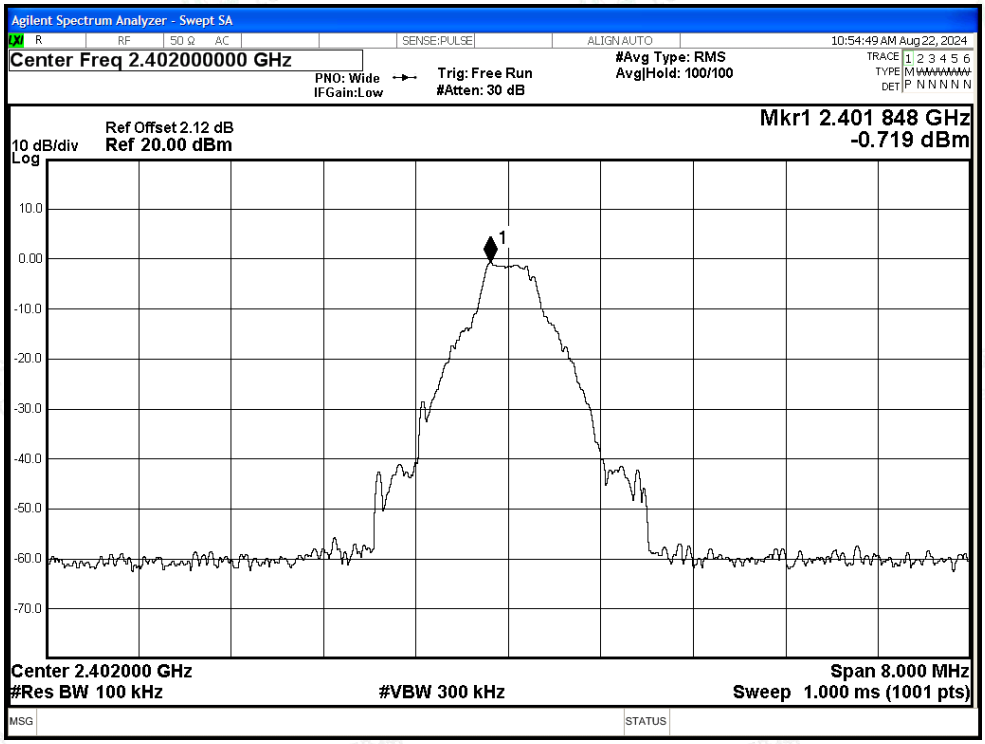


A.6 Band Edge

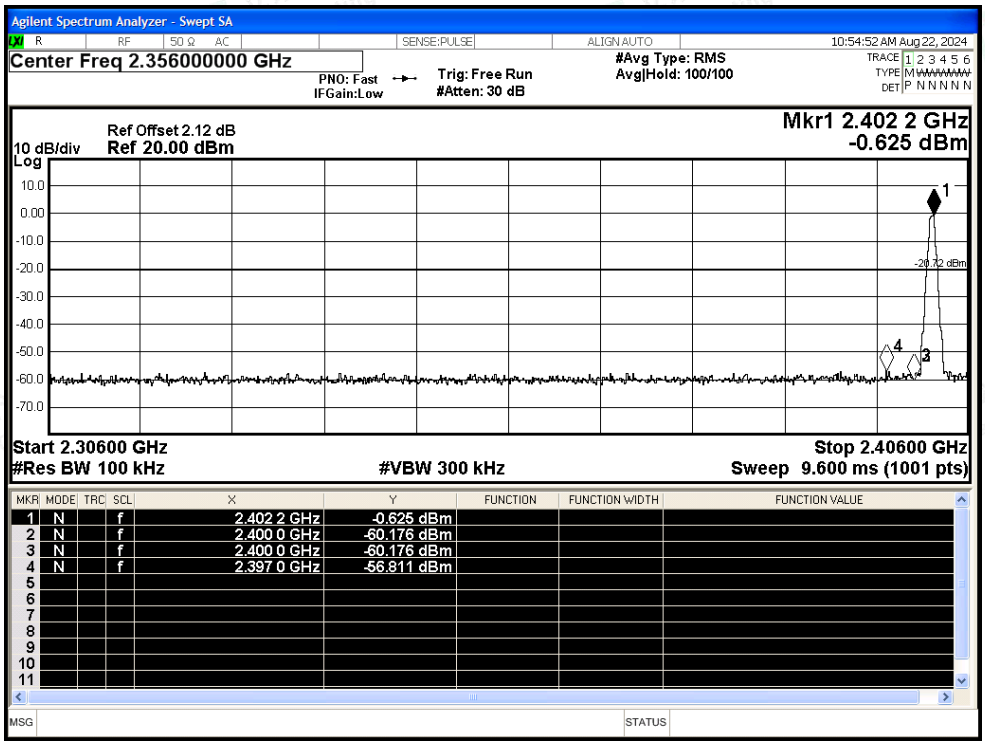
Condition	Mode	Frequency (MHz)	Antenna	Hopping Mode	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	1-DH5	2402	Ant1	No-Hopping	-56.09	-20	Pass
NVNT	1-DH5	2480	Ant1	No-Hopping	-55.89	-20	Pass
NVNT	2-DH5	2402	Ant1	No-Hopping	-53.91	-20	Pass
NVNT	2-DH5	2480	Ant1	No-Hopping	-52.95	-20	Pass
NVNT	3-DH5	2402	Ant1	No-Hopping	-53.01	-20	Pass
NVNT	3-DH5	2480	Ant1	No-Hopping	-52.1	-20	Pass

Test Graphs

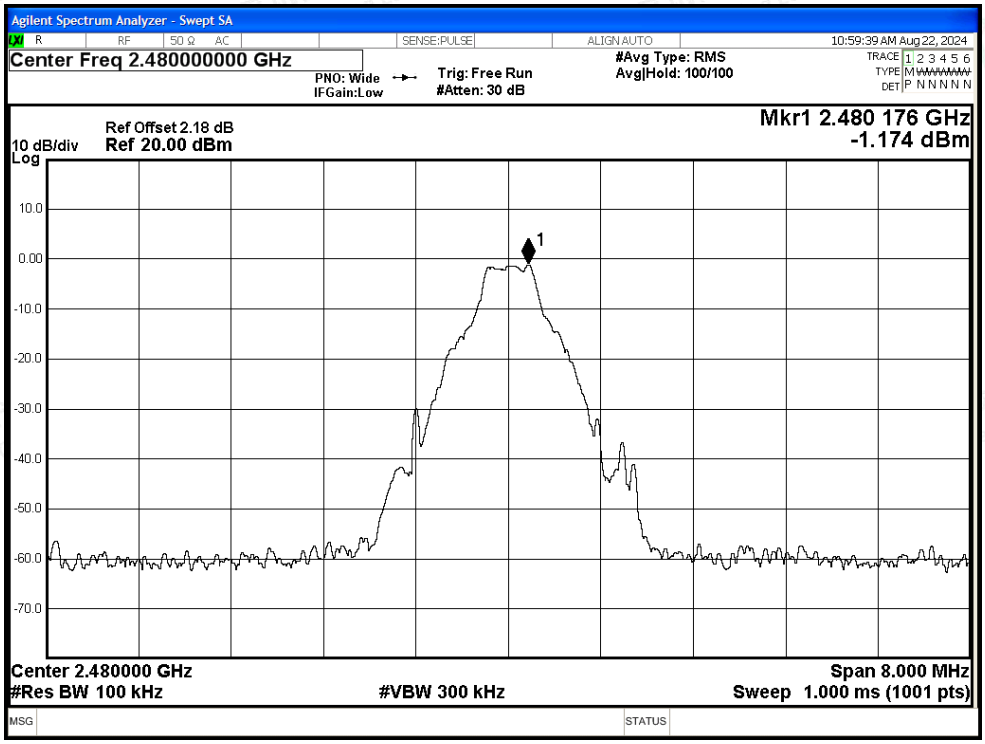
Band Edge NVNT 1-DH5 2402MHz Ant1 No-Hopping Ref



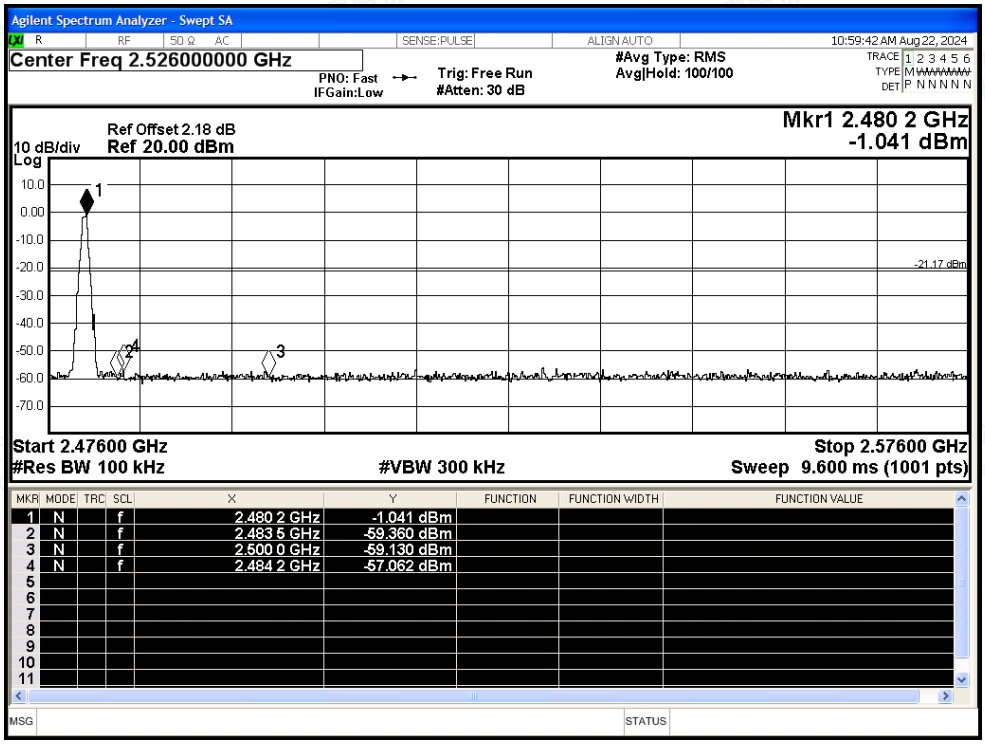
Band Edge NVNT 1-DH5 2402MHz Ant1 No-Hopping Emission



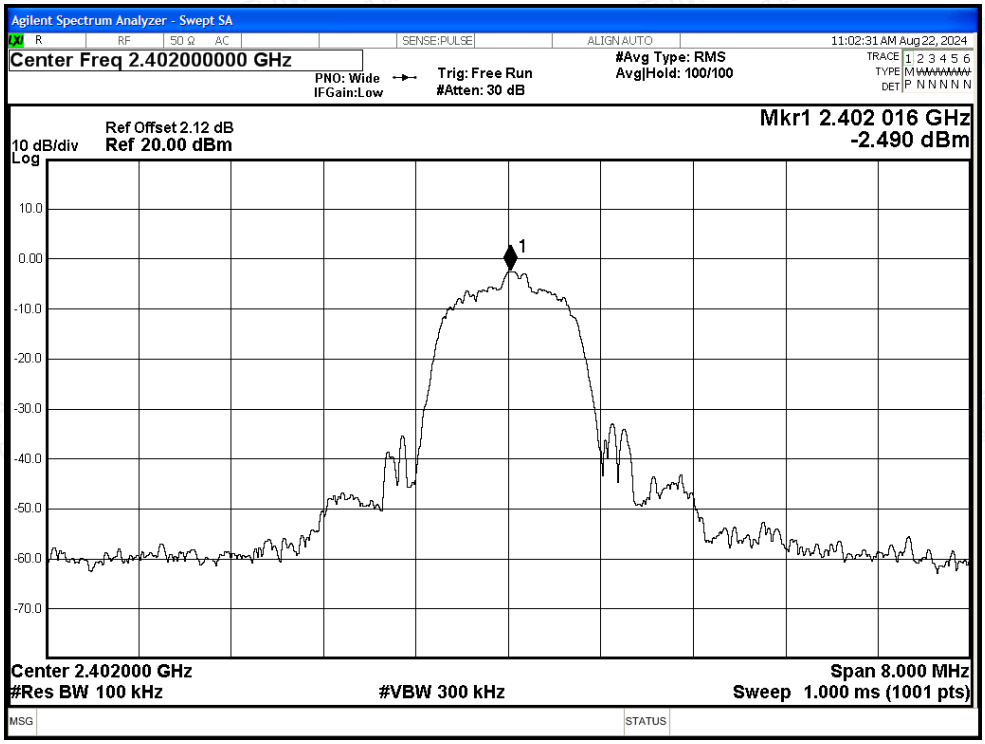
Band Edge NVNT 1-DH5 2480MHz Ant1 No-Hopping Ref



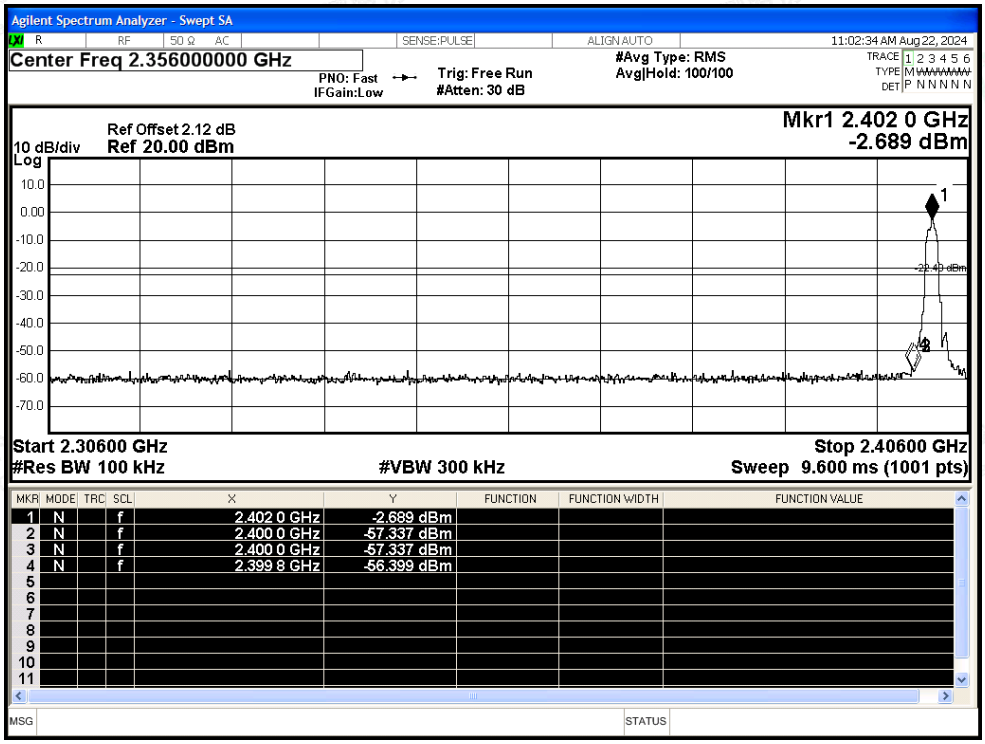
Band Edge NVNT 1-DH5 2480MHz Ant1 No-Hopping Emission



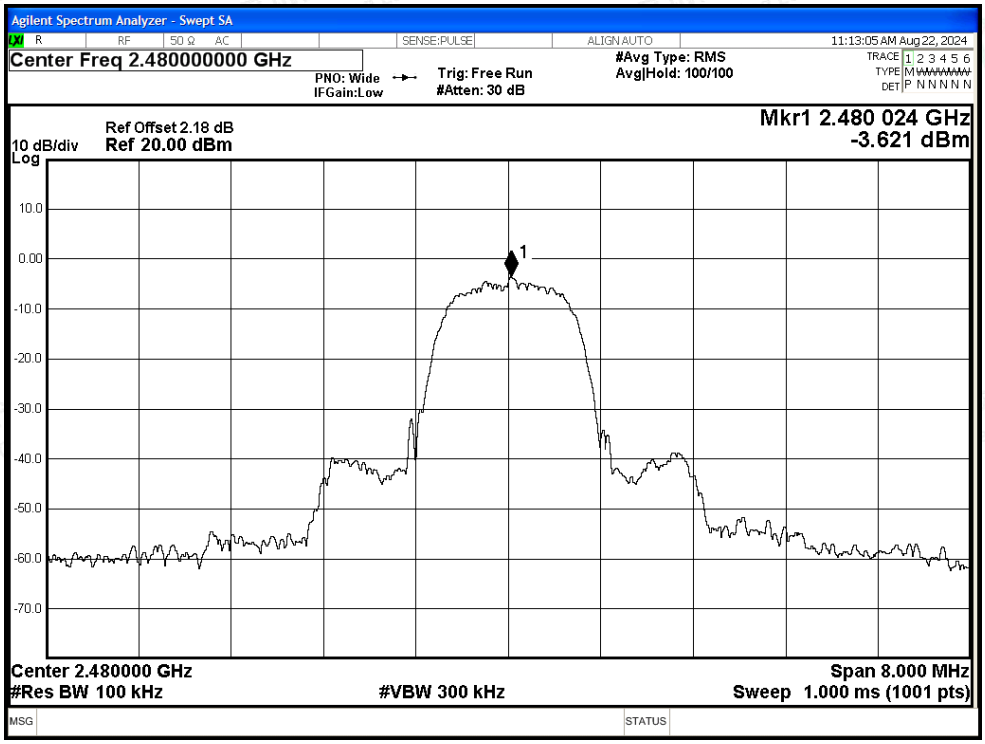
Band Edge NVNT 2-DH5 2402MHz Ant1 No-Hopping Ref



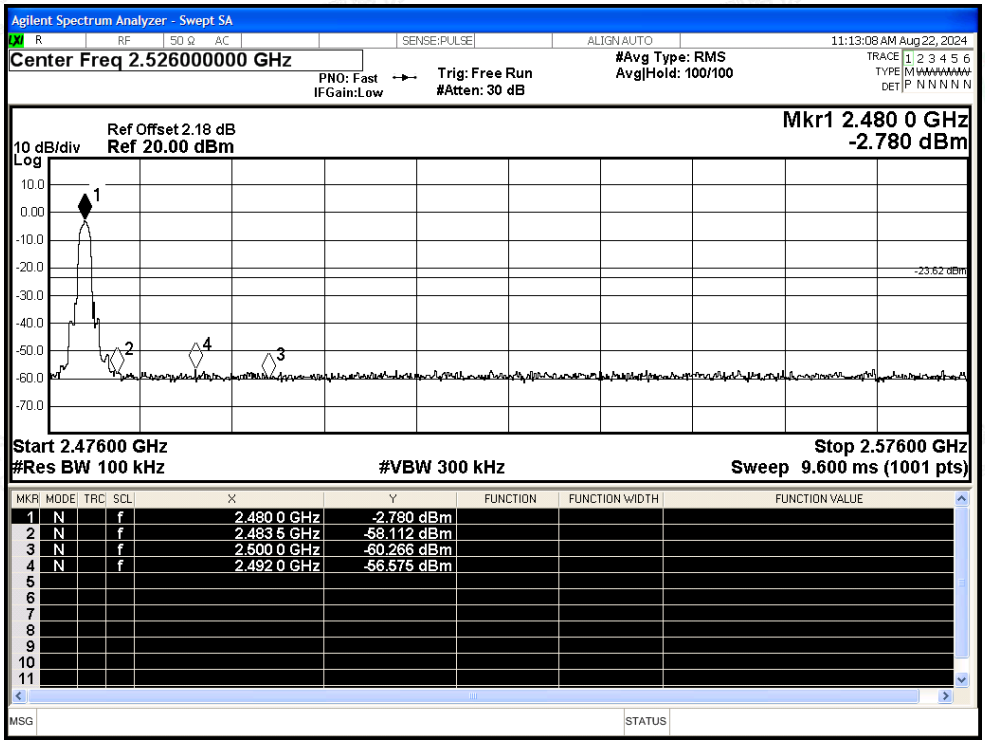
Band Edge NVNT 2-DH5 2402MHz Ant1 No-Hopping Emission



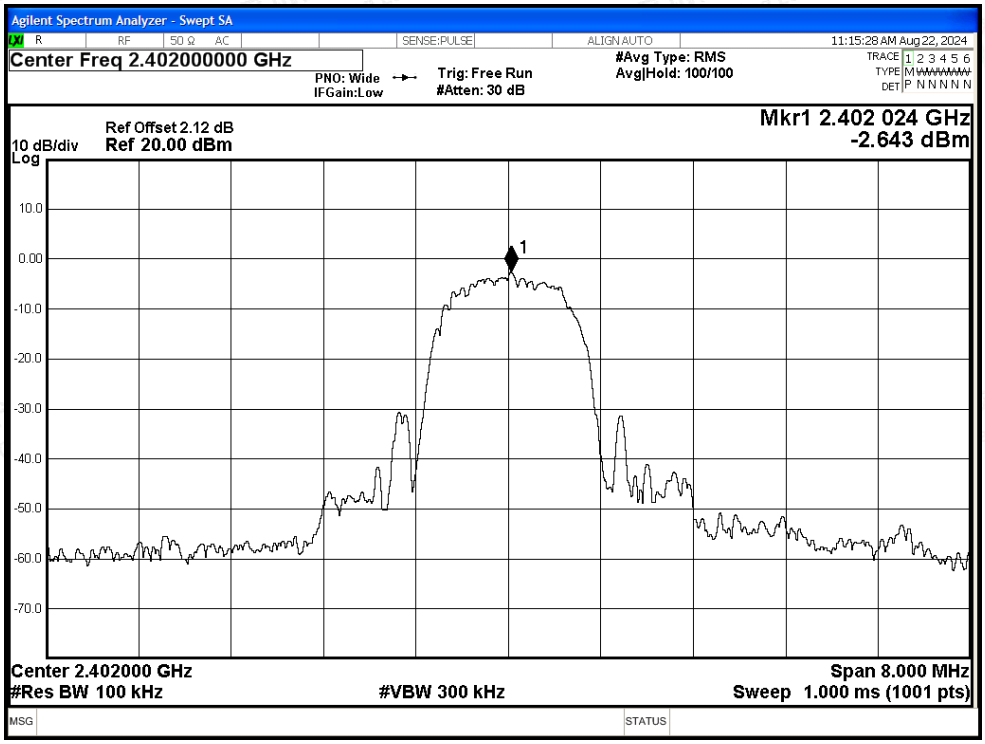
Band Edge NVNT 2-DH5 2480MHz Ant1 No-Hopping Ref



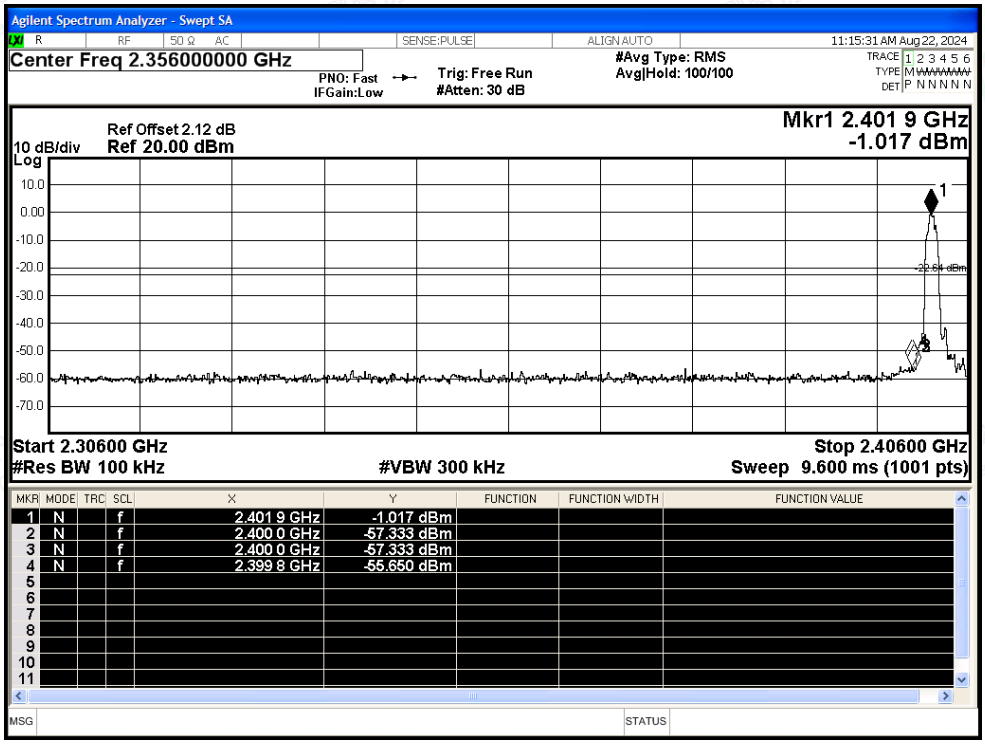
Band Edge NVNT 2-DH5 2480MHz Ant1 No-Hopping Emission



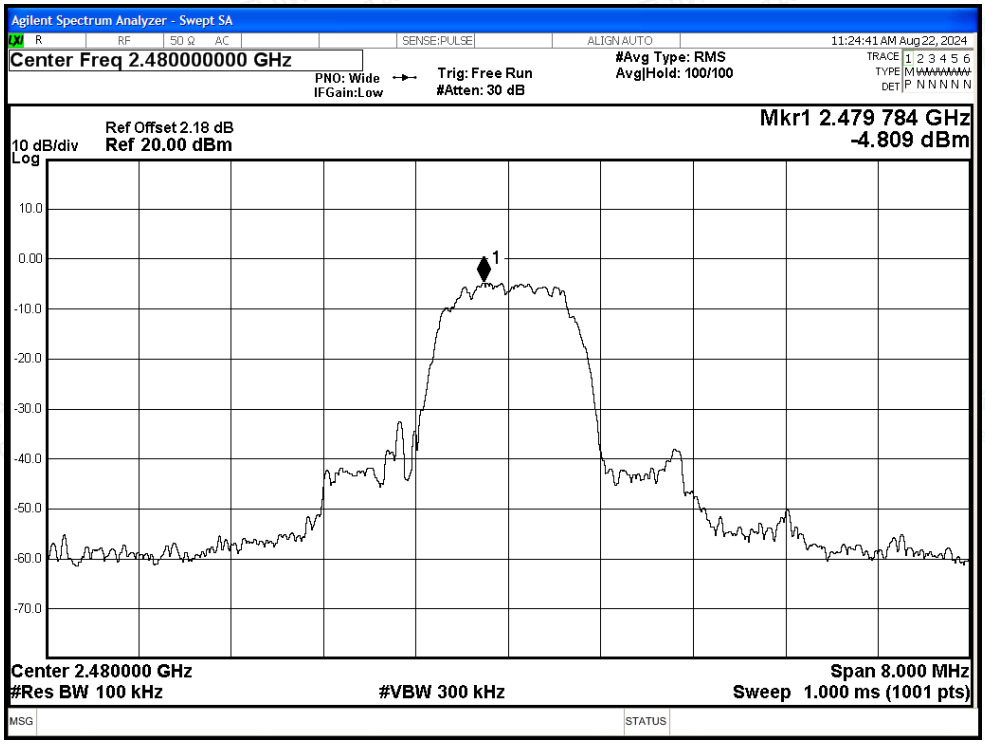
Band Edge NVNT 3-DH5 2402MHz Ant1 No-Hopping Ref



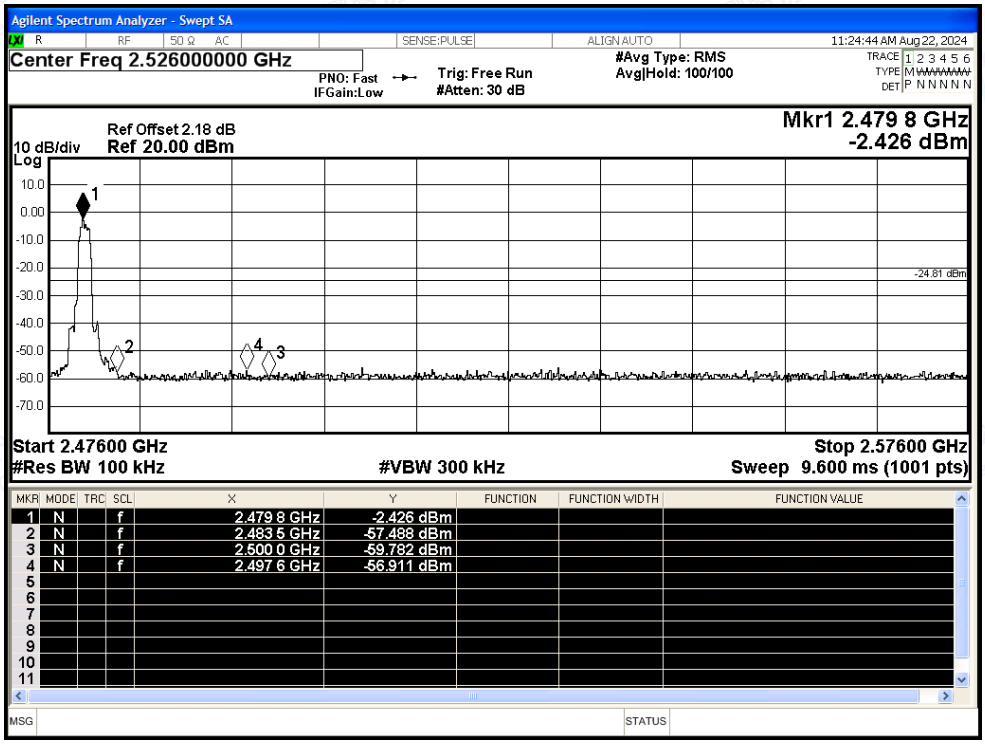
Band Edge NVNT 3-DH5 2402MHz Ant1 No-Hopping Emission



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



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

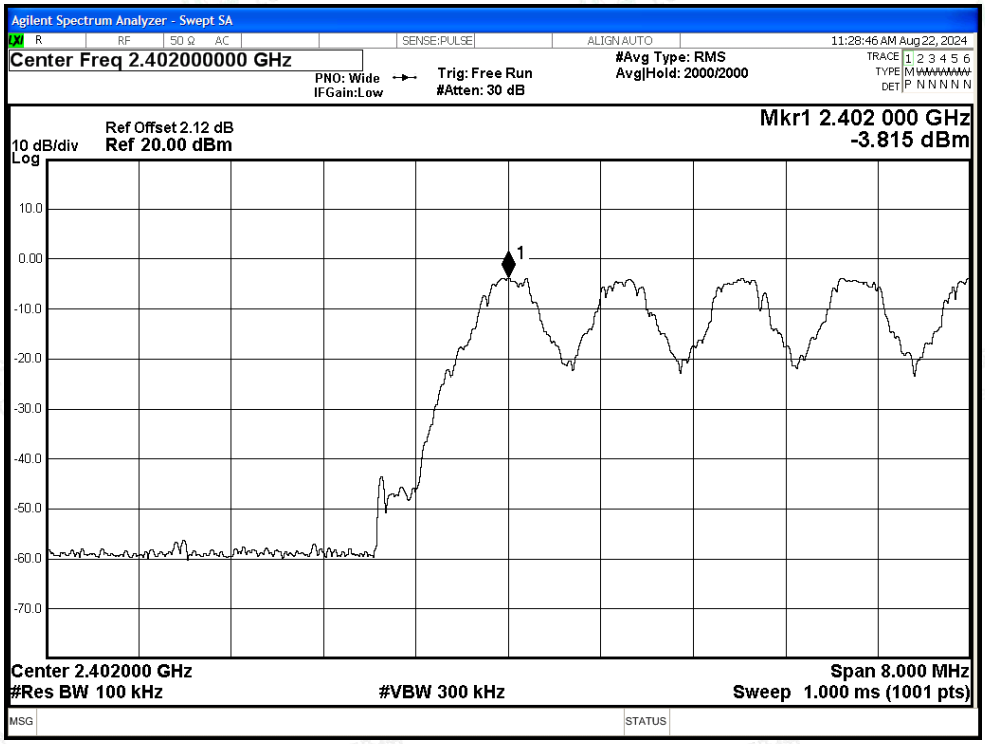


(Hopping)

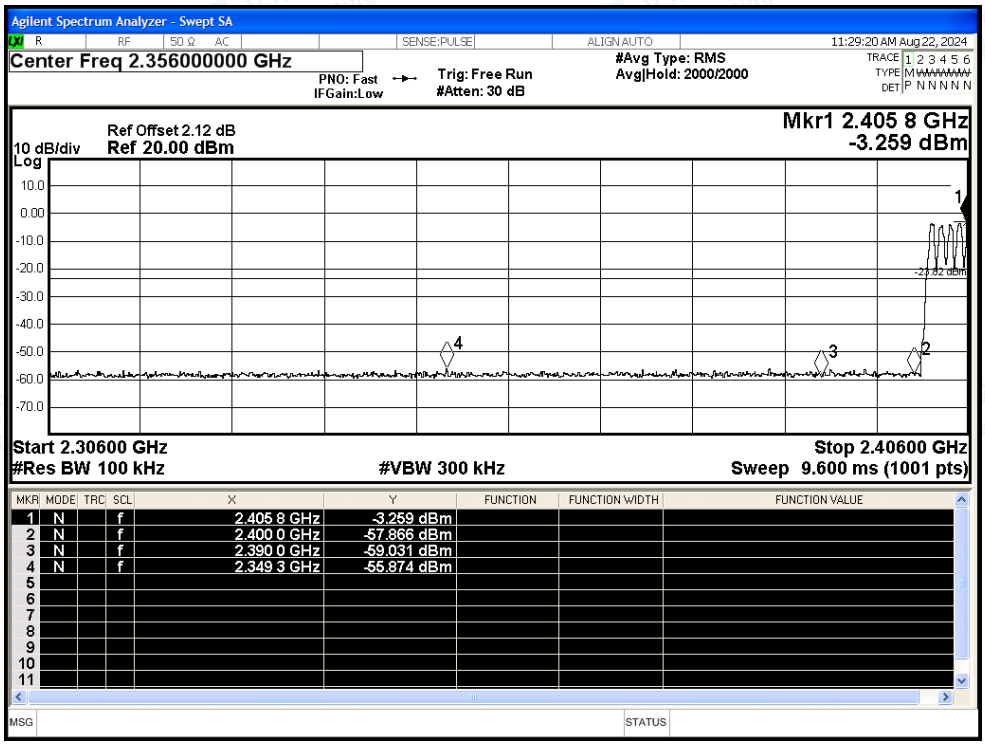
Condition	Mode	Frequency (MHz)	Antenna	Hopping Mode	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	1-DH5	2402	Ant1	Hopping	-52.06	-20	Pass
NVNT	1-DH5	2480	Ant1	Hopping	-54.04	-20	Pass
NVNT	2-DH5	2402	Ant1	Hopping	-52.76	-20	Pass
NVNT	2-DH5	2480	Ant1	Hopping	-53.19	-20	Pass
NVNT	3-DH5	2402	Ant1	Hopping	-53.49	-20	Pass
NVNT	3-DH5	2480	Ant1	Hopping	-54.88	-20	Pass

Test Graphs

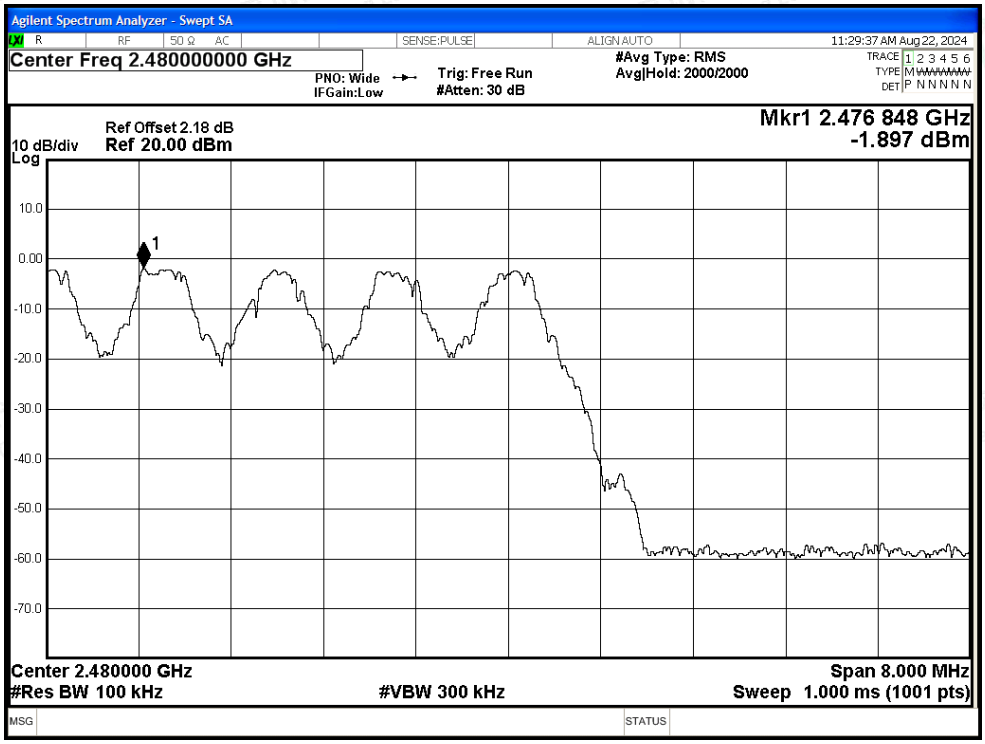
Band Edge(Hopping) NVNT 1-DH5 2402MHz Ant1 Hopping Ref



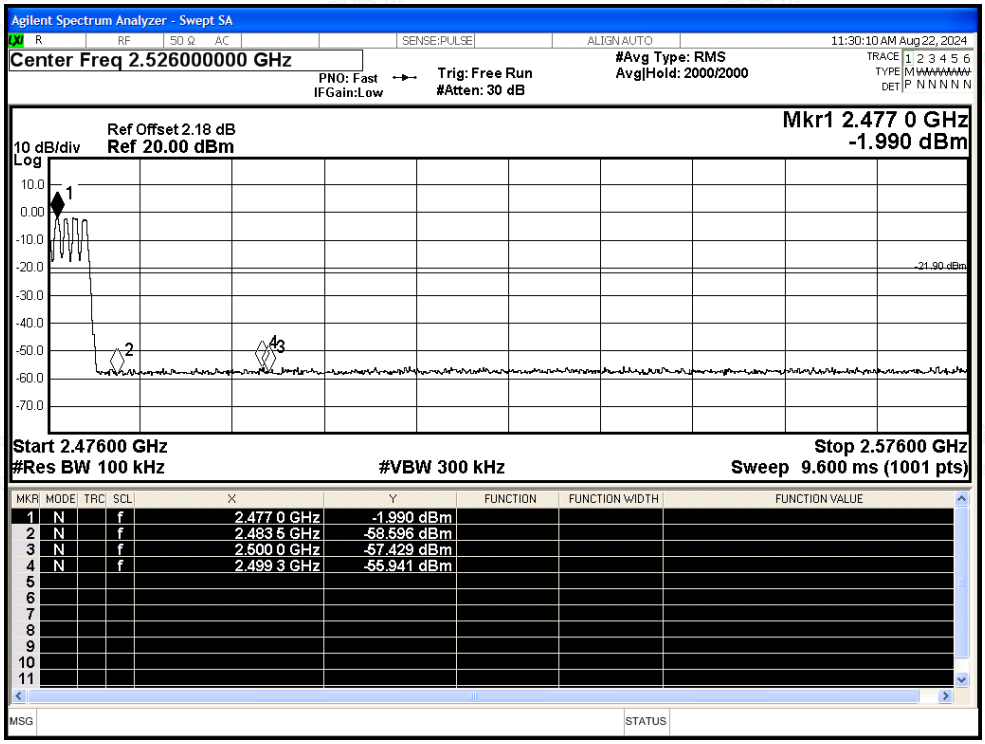
Band Edge(Hopping) NVNT 1-DH5 2402MHz Ant1 Hopping Emission



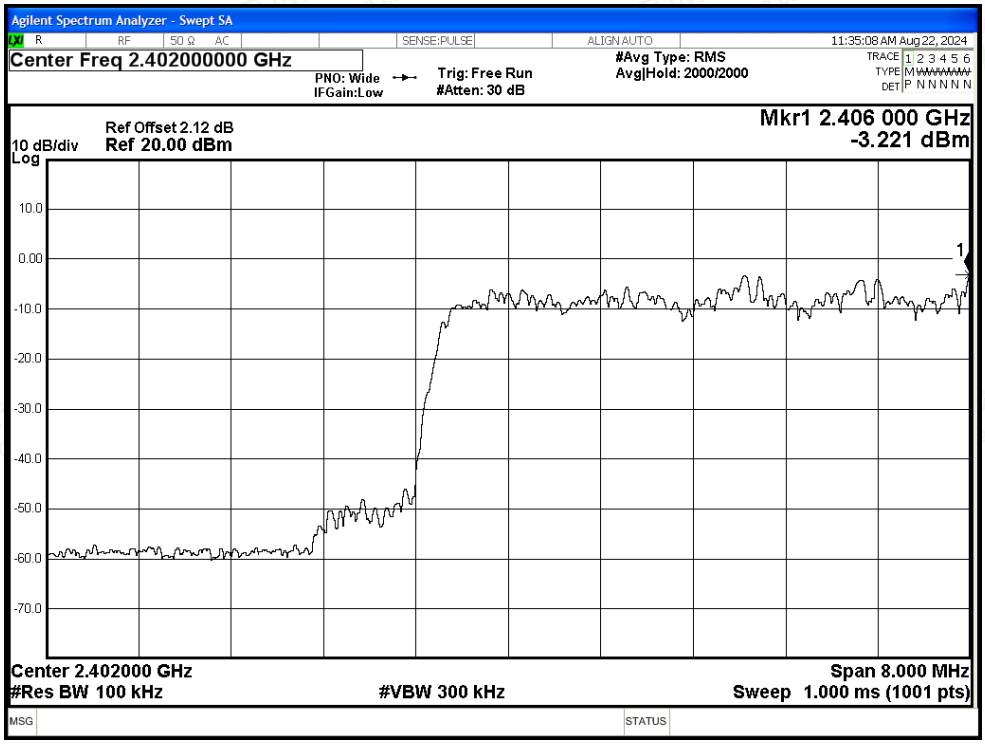
Band Edge(Hopping) NVNT 1-DH5 2480MHz Ant1 Hopping Ref



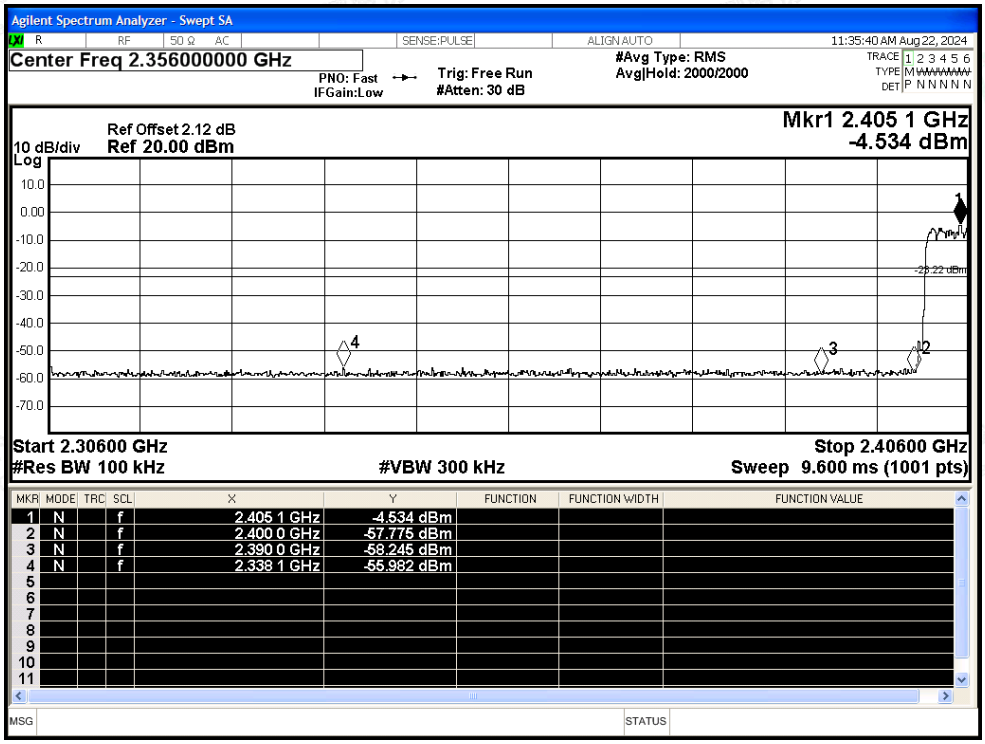
Band Edge(Hopping) NVNT 1-DH5 2480MHz Ant1 Hopping Emission



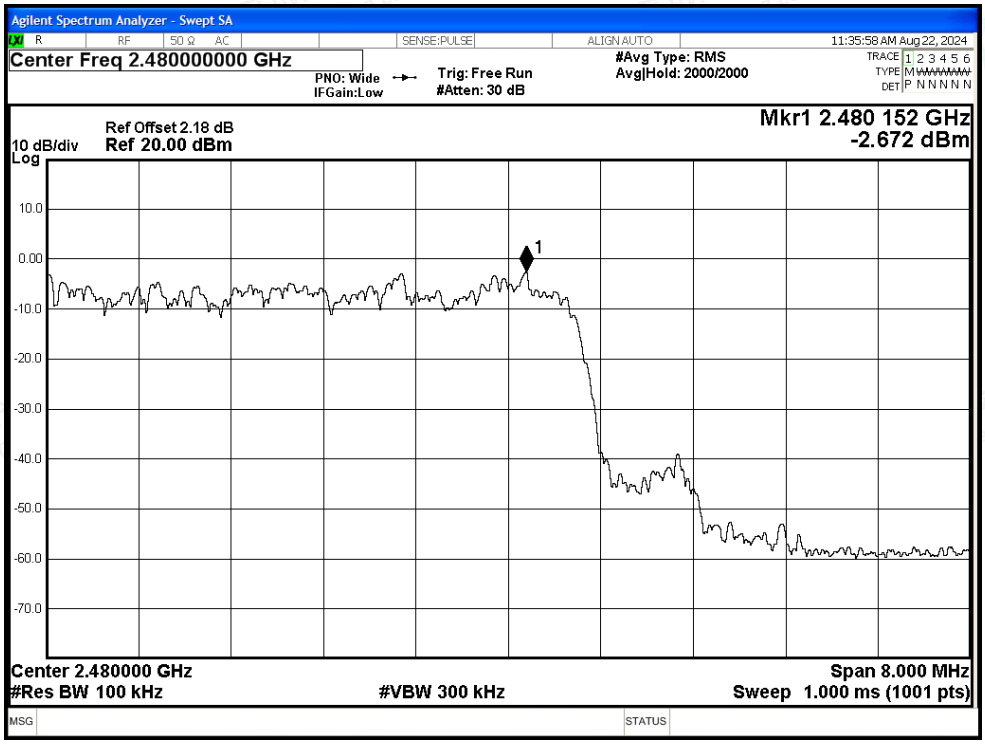
Band Edge(Hopping) NVNT 2-DH5 2402MHz Ant1 Hopping Ref



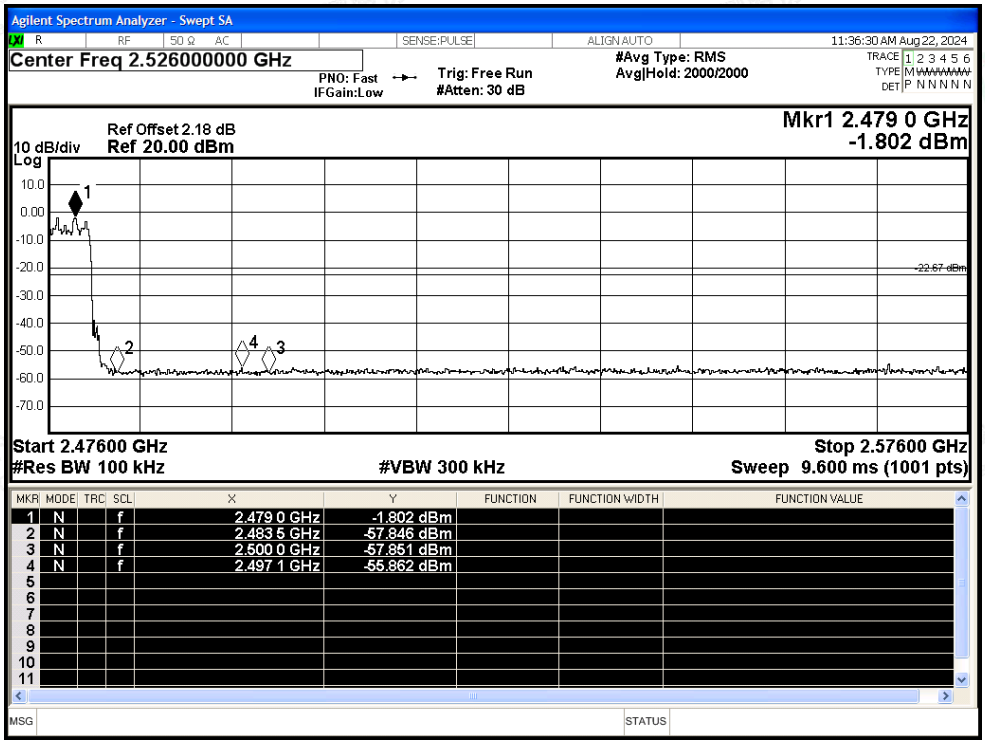
Band Edge(Hopping) NVNT 2-DH5 2402MHz Ant1 Hopping Emission



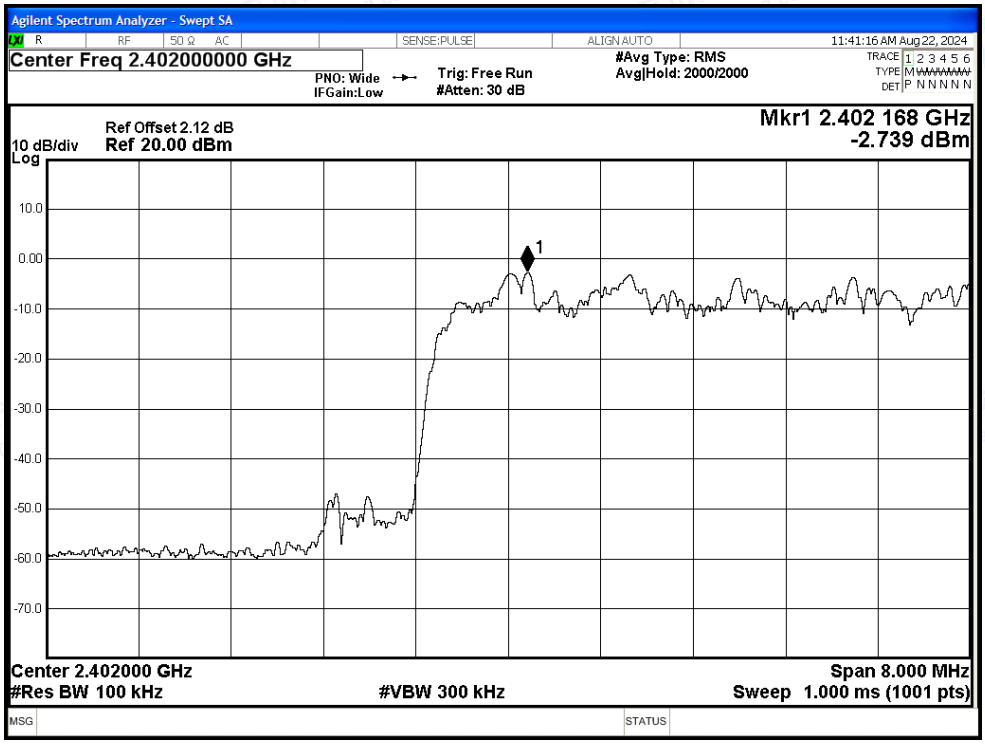
Band Edge(Hopping) NVNT 2-DH5 2480MHz Ant1 Hopping Ref



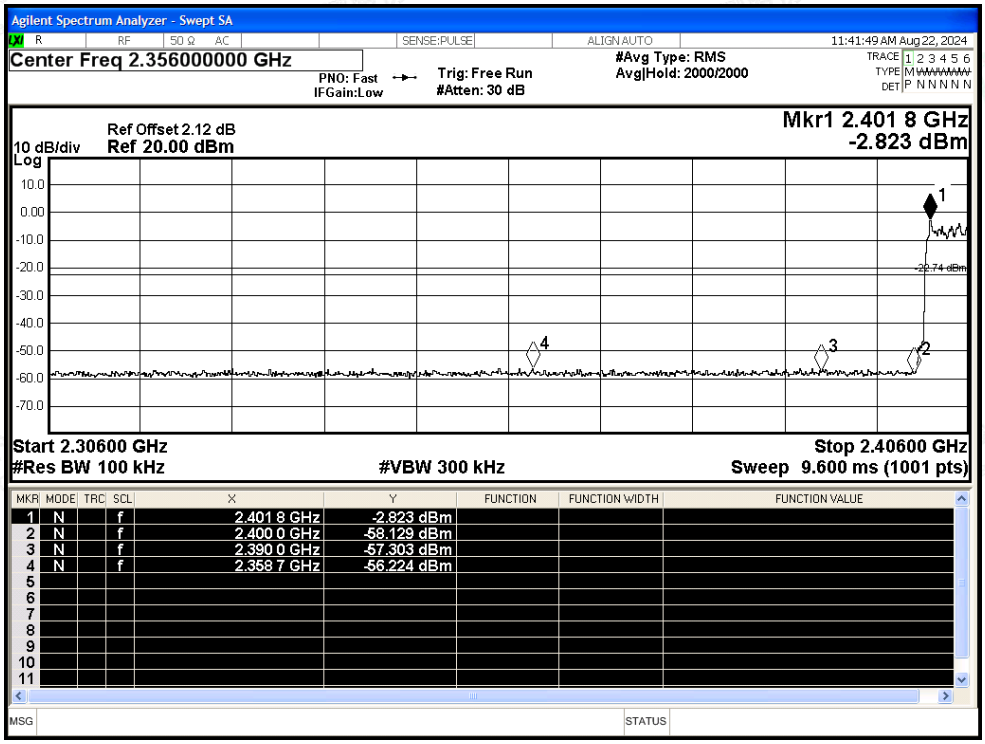
Band Edge(Hopping) NVNT 2-DH5 2480MHz Ant1 Hopping Emission



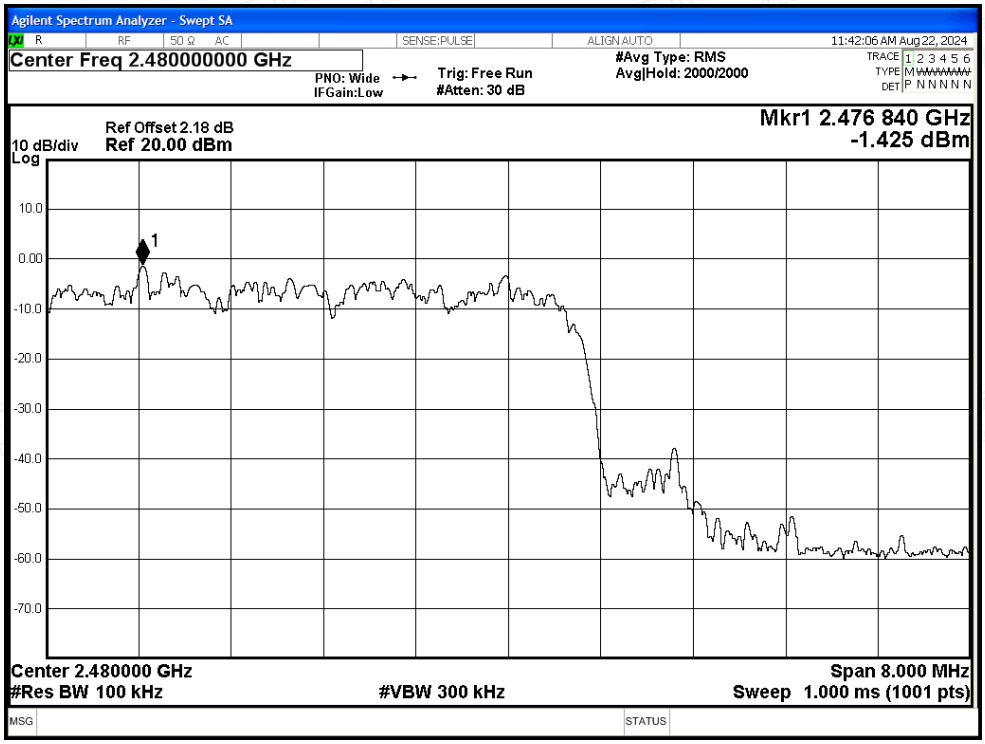
Band Edge(Hopping) NVNT 3-DH5 2402MHz Ant1 Hopping Ref



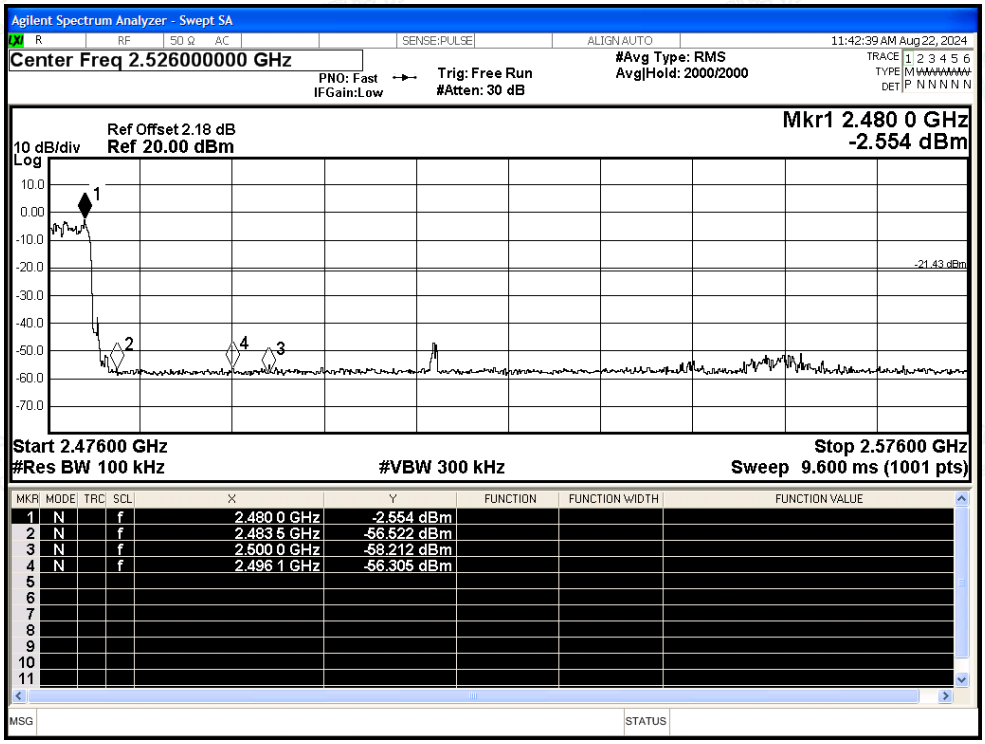
Band Edge(Hopping) NVNT 3-DH5 2402MHz Ant1 Hopping Emission



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



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

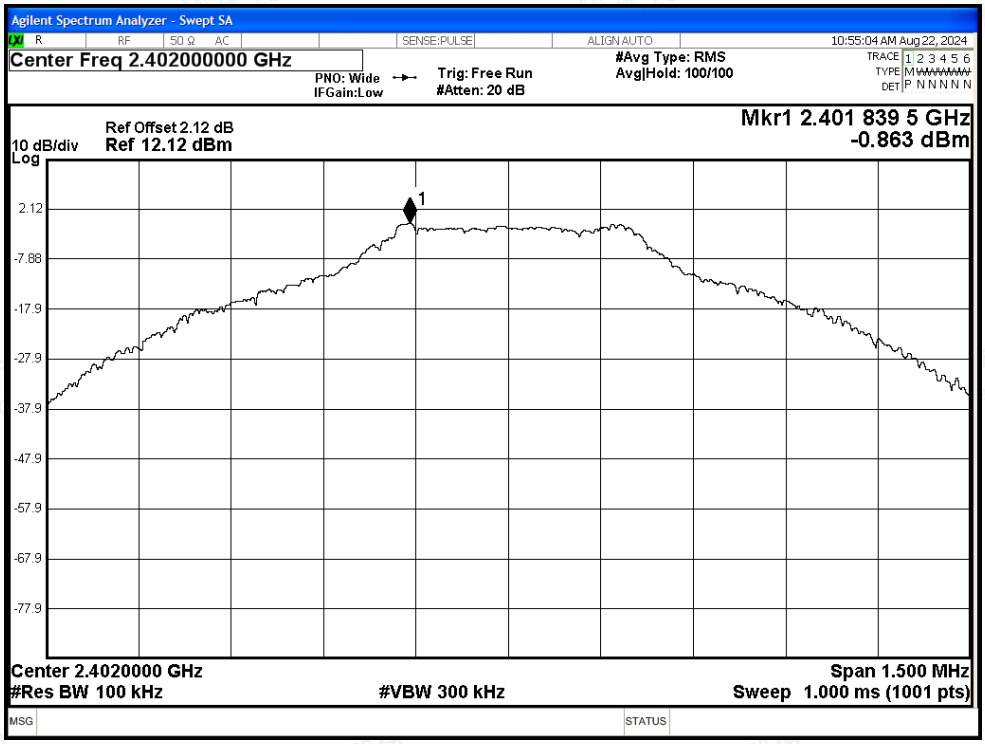


A.7 Conducted RF Spurious Emission

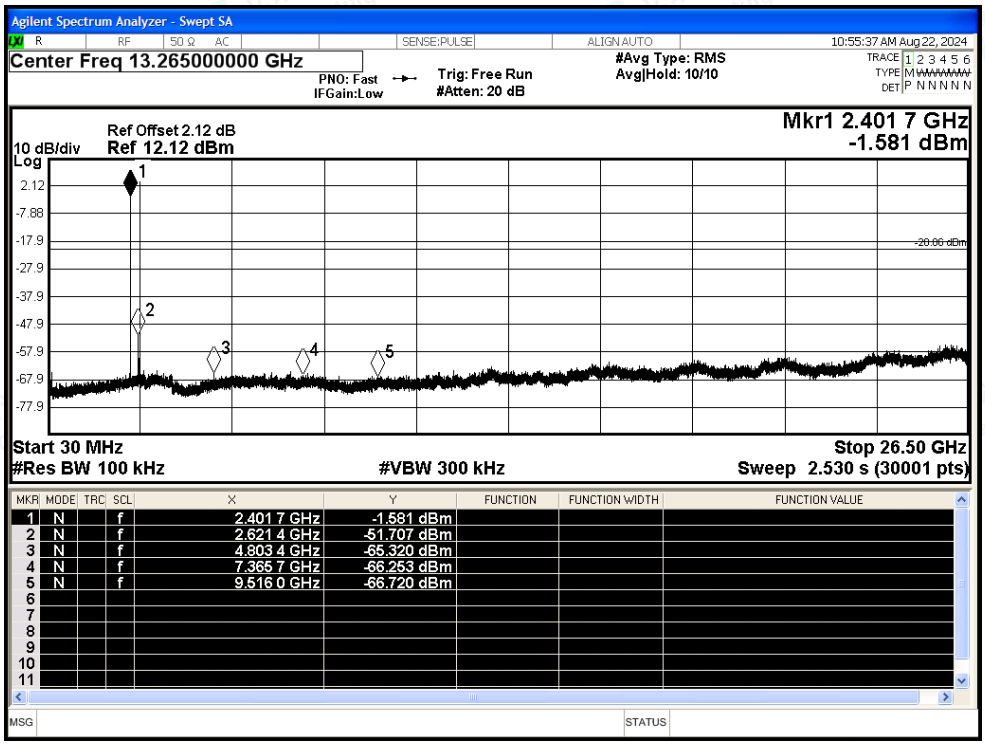
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	1-DH5	2402	Ant1	-50.84	-20	Pass
NVNT	1-DH5	2441	Ant1	-54.32	-20	Pass
NVNT	1-DH5	2480	Ant1	-54.49	-20	Pass
NVNT	2-DH5	2402	Ant1	-52	-20	Pass
NVNT	2-DH5	2441	Ant1	-52.49	-20	Pass
NVNT	2-DH5	2480	Ant1	-54.04	-20	Pass
NVNT	3-DH5	2402	Ant1	-54.52	-20	Pass
NVNT	3-DH5	2441	Ant1	-45.86	-20	Pass
NVNT	3-DH5	2480	Ant1	-52.72	-20	Pass

Test Graphs

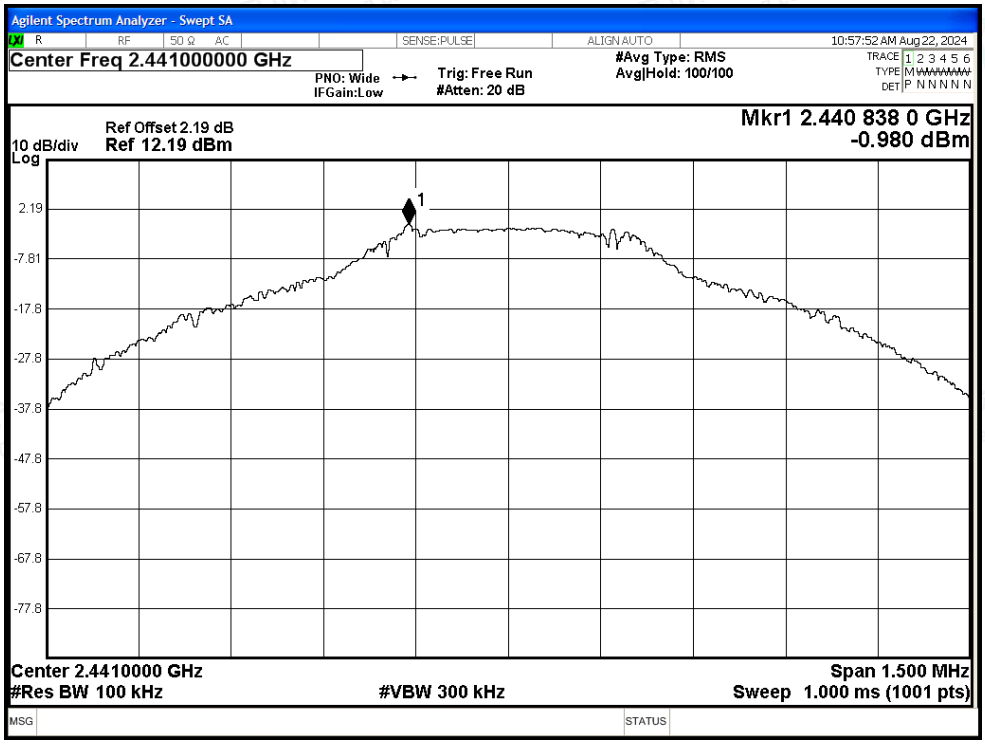
Tx. Spurious NVNT 1-DH5 2402MHz Ant1 Ref



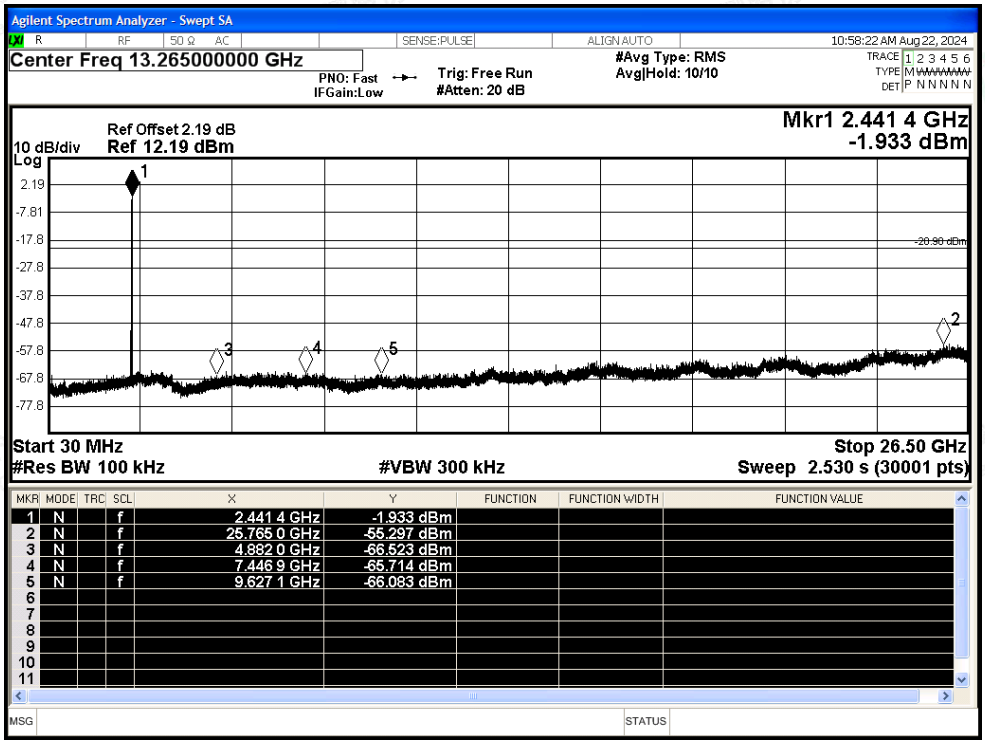
Tx. Spurious NVNT 1-DH5 2402MHz Ant1 Emission



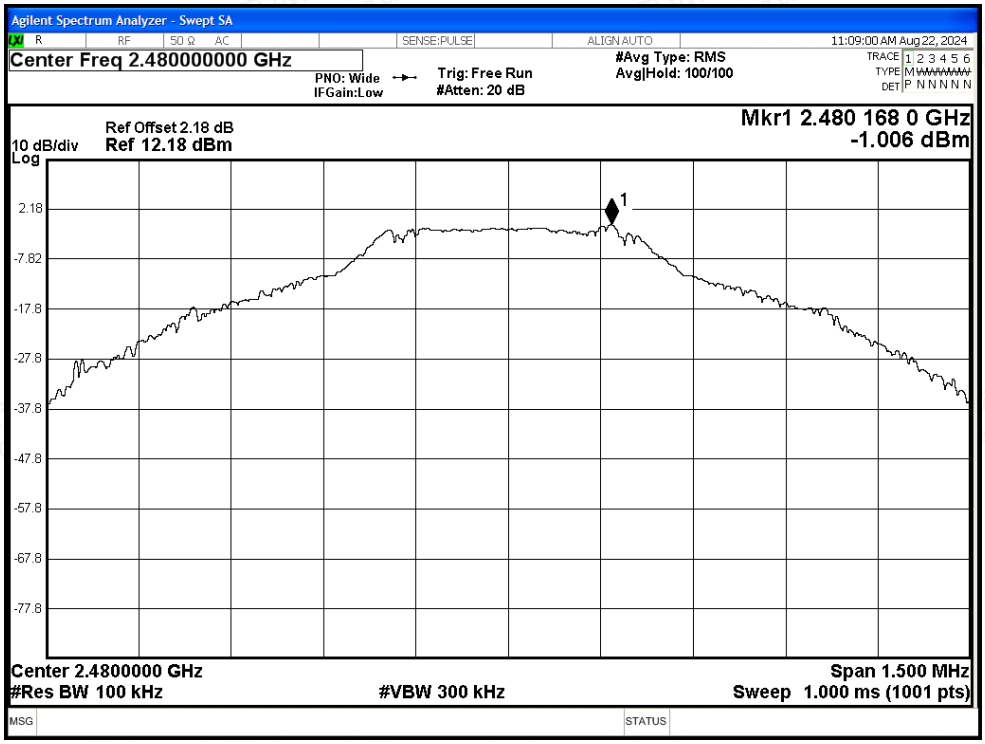
Tx. Spurious NVNT 1-DH5 2441MHz Ant1 Ref



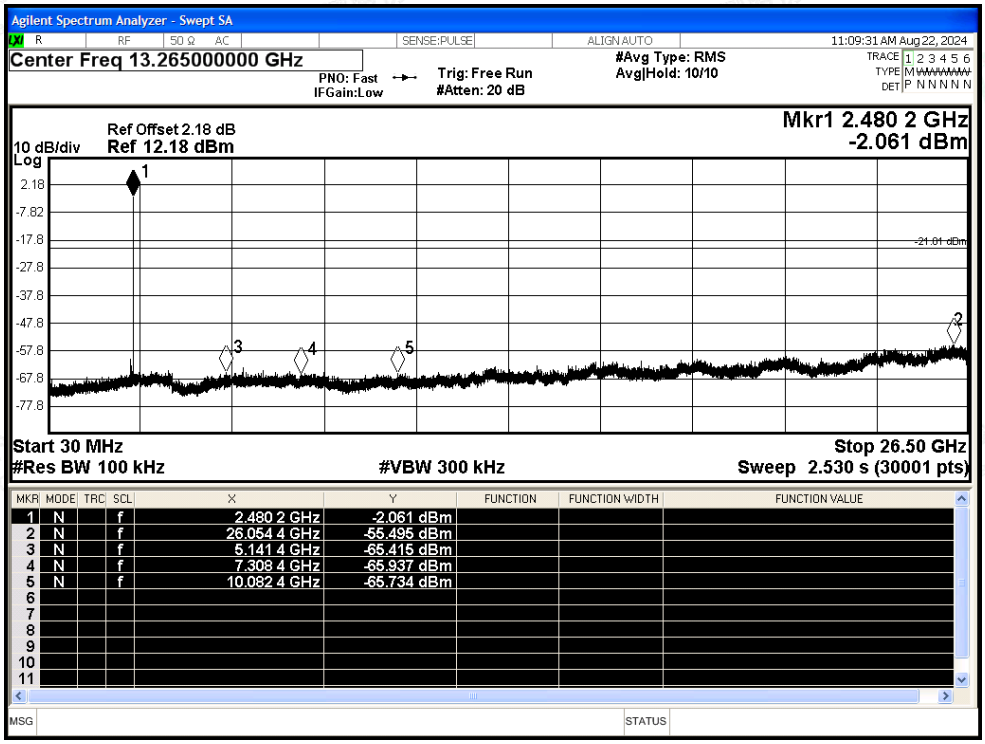
Tx. Spurious NVNT 1-DH5 2441MHz Ant1 Emission



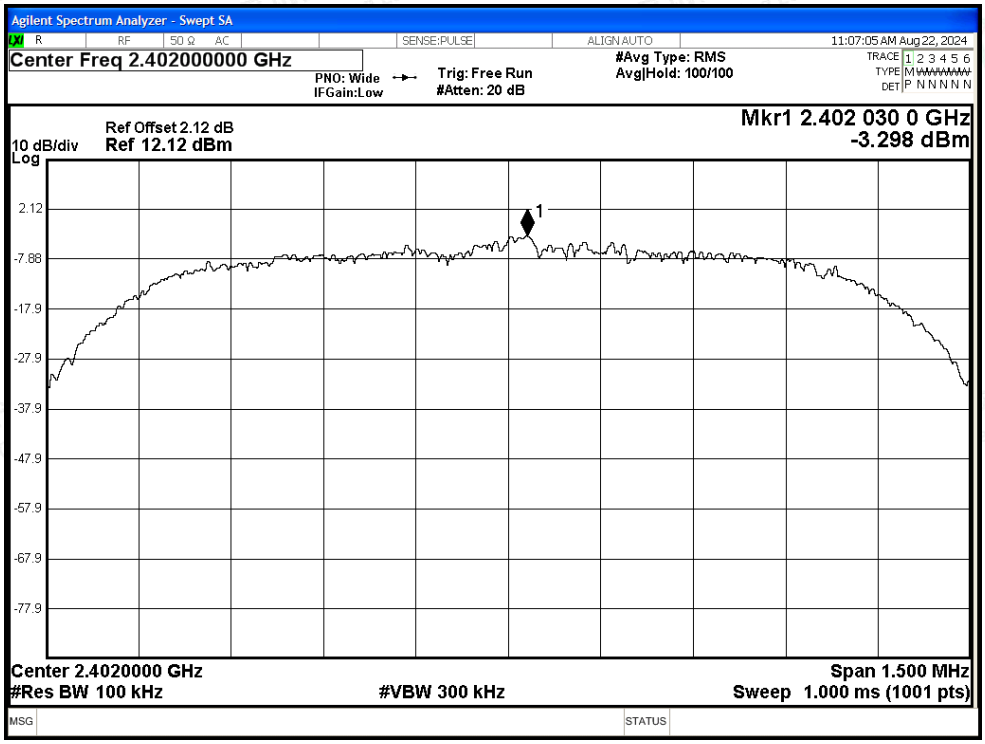
Tx. Spurious NVNT 1-DH5 2480MHz Ant1 Ref



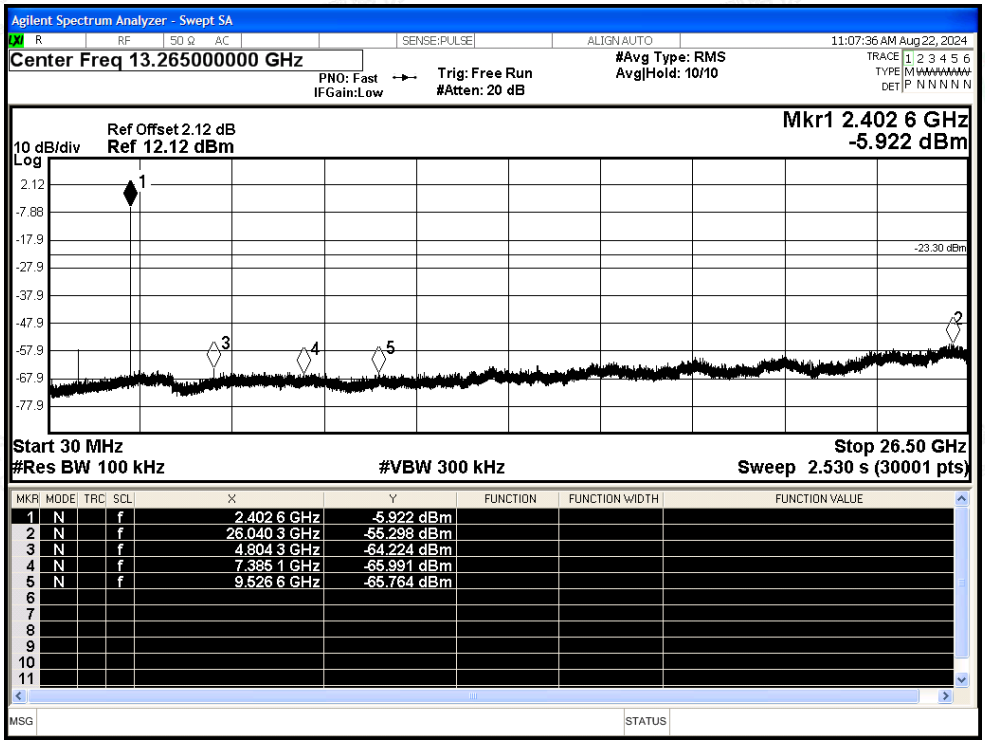
Tx. Spurious NVNT 1-DH5 2480MHz Ant1 Emission



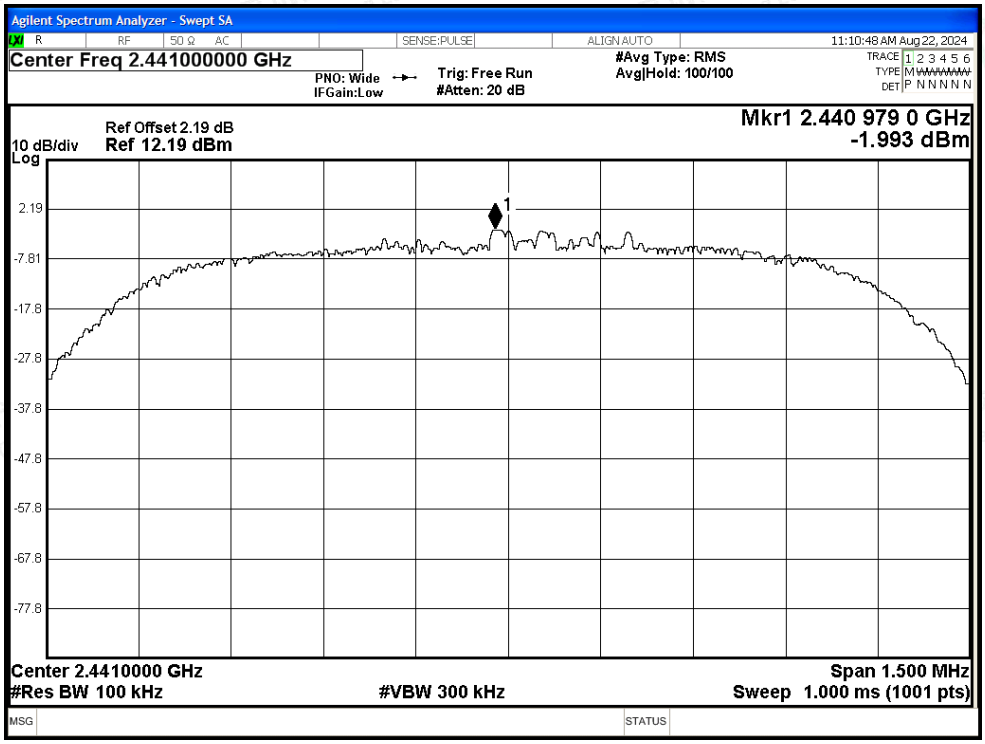
Tx. Spurious NVNT 2-DH5 2402MHz Ant1 Ref



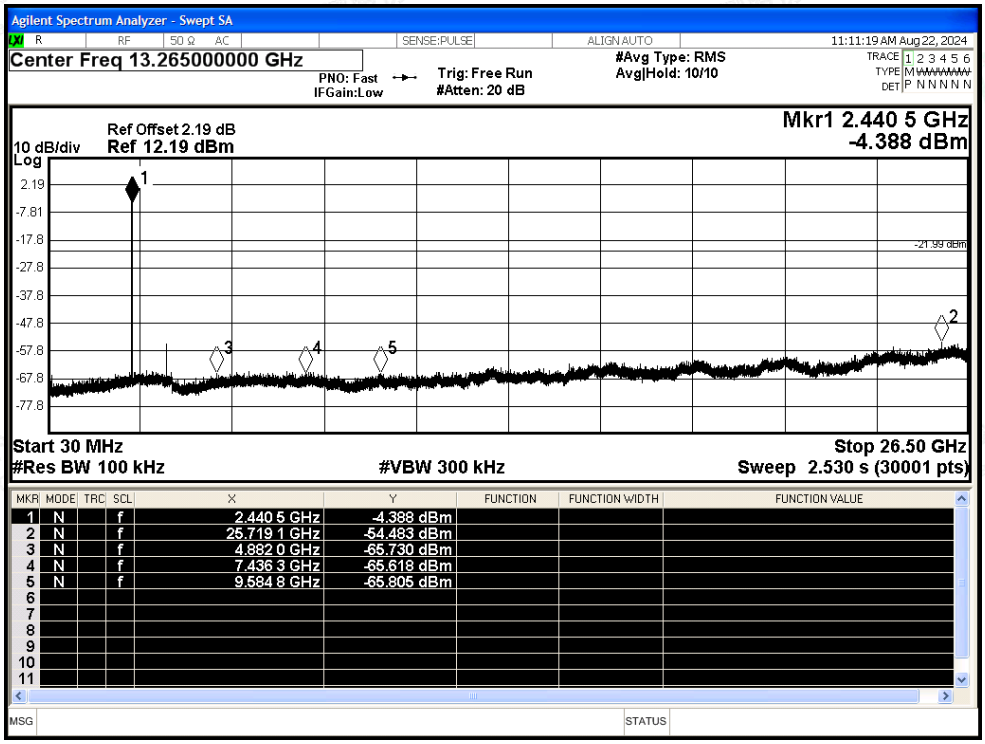
Tx. Spurious NVNT 2-DH5 2402MHz Ant1 Emission



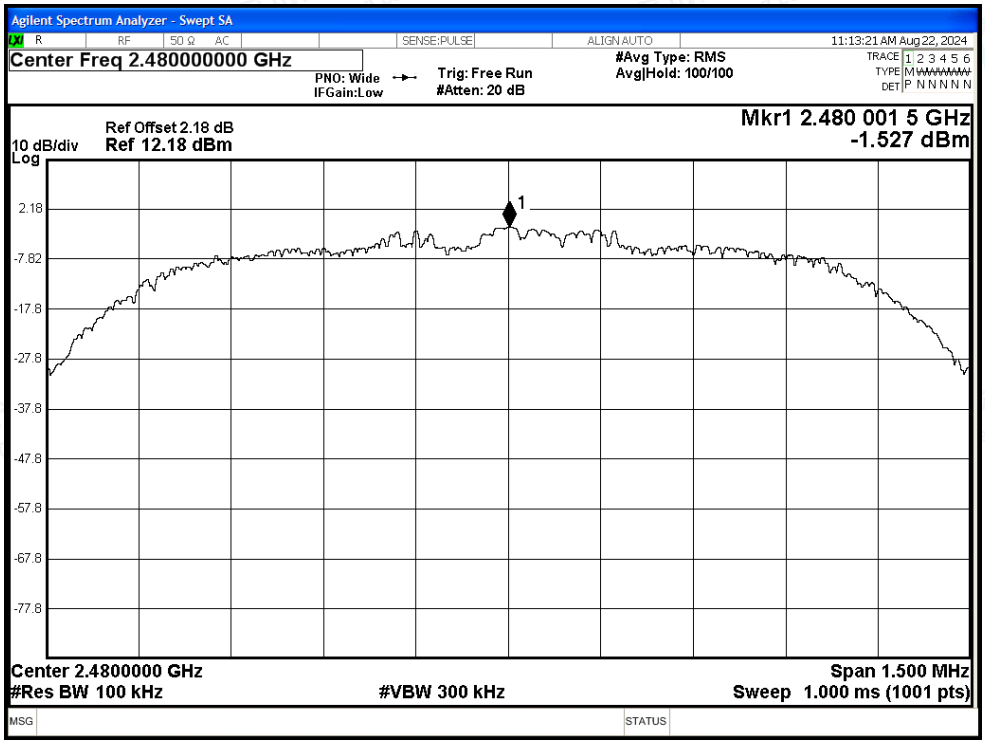
Tx. Spurious NVNT 2-DH5 2441MHz Ant1 Ref



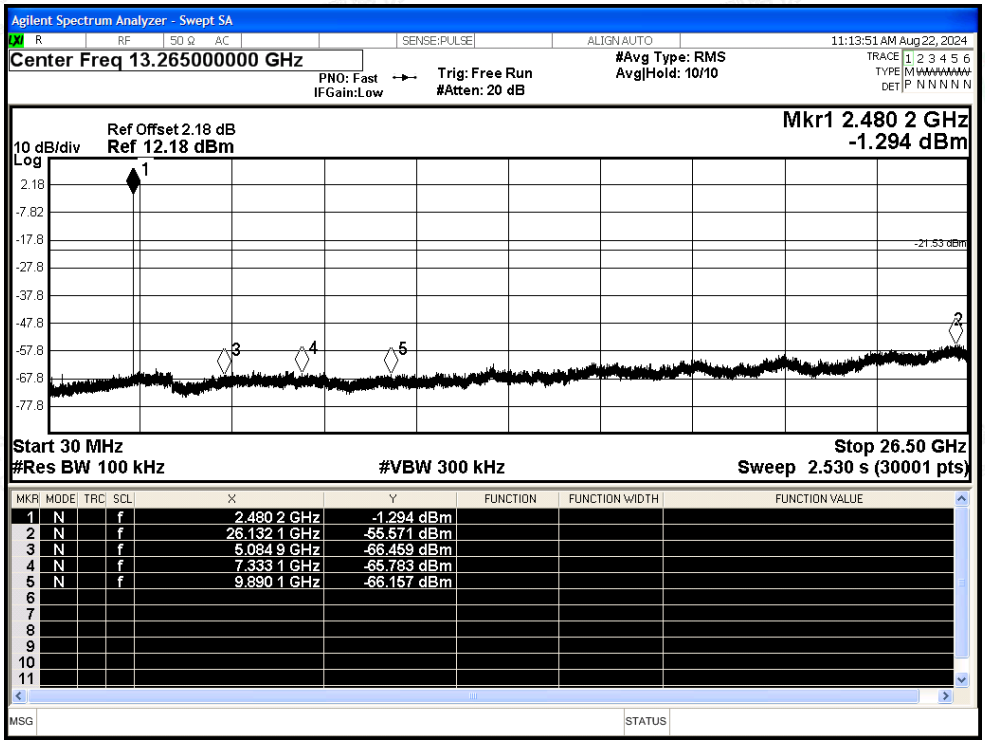
Tx. Spurious NVNT 2-DH5 2441MHz Ant1 Emission



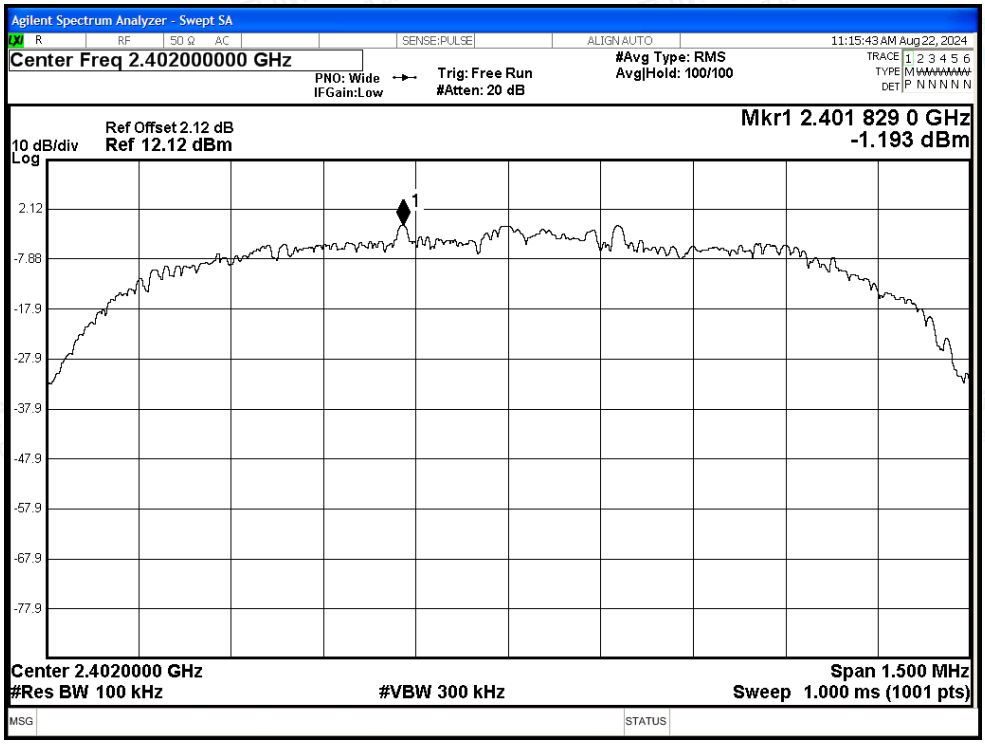
Tx. Spurious NVNT 2-DH5 2480MHz Ant1 Ref



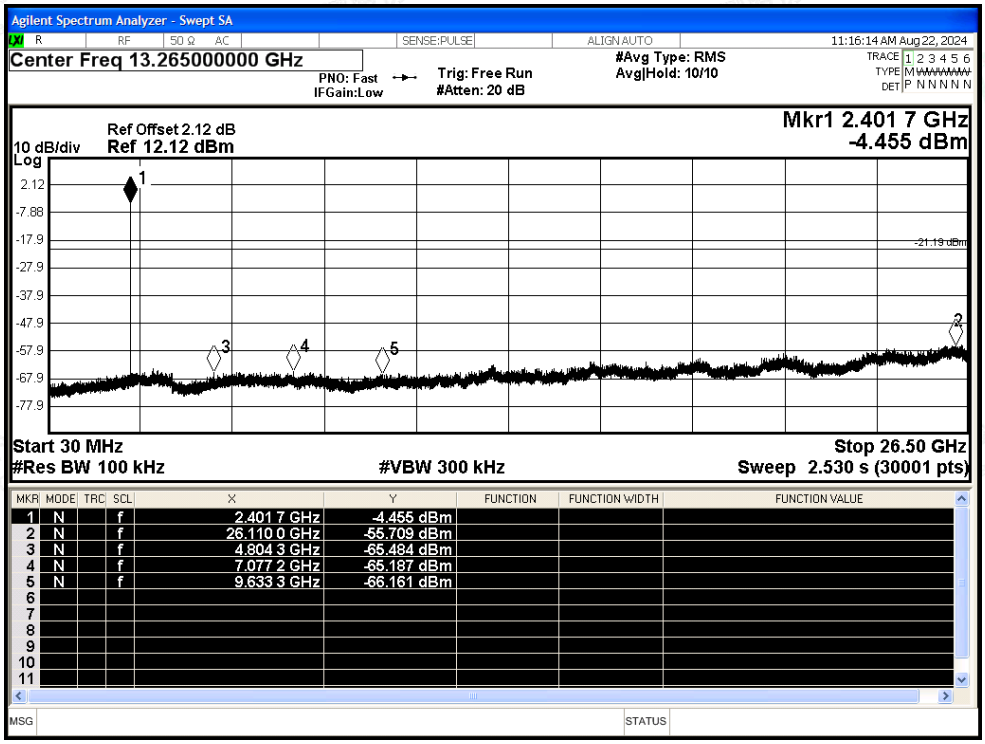
Tx. Spurious NVNT 2-DH5 2480MHz Ant1 Emission



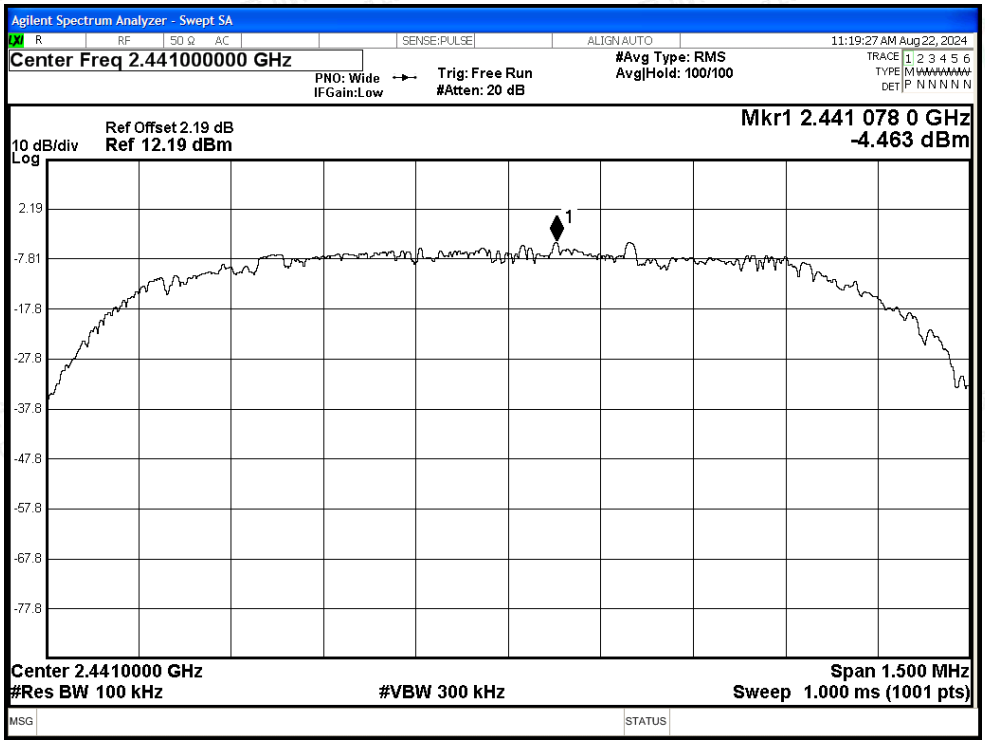
Tx. Spurious NVNT 3-DH5 2402MHz Ant1 Ref



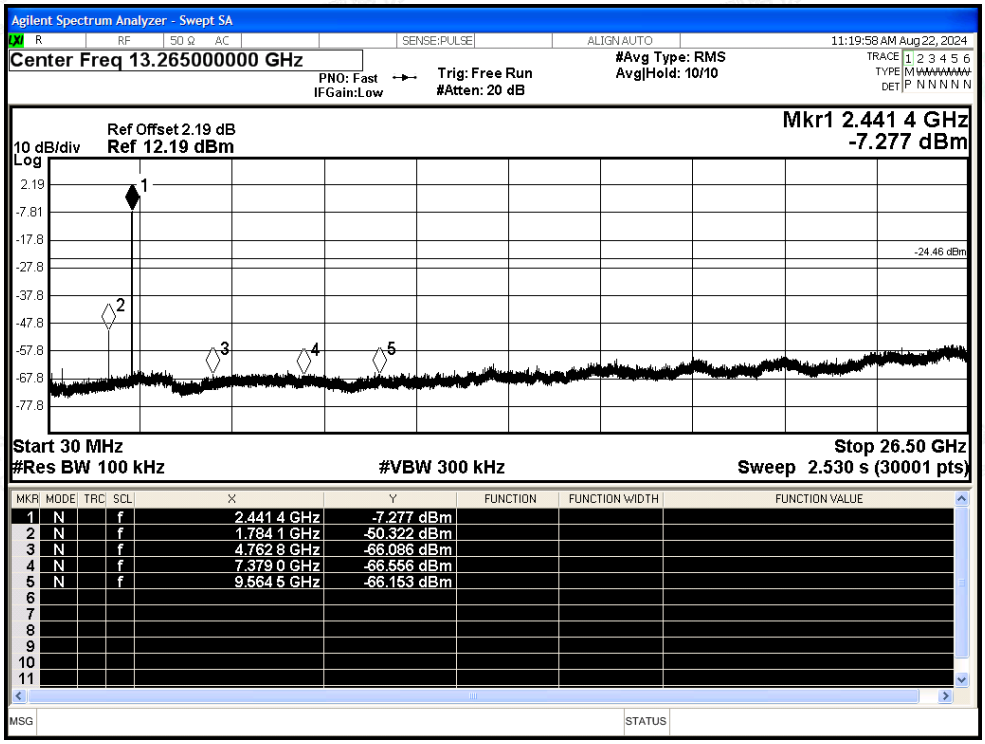
Tx. Spurious NVNT 3-DH5 2402MHz Ant1 Emission



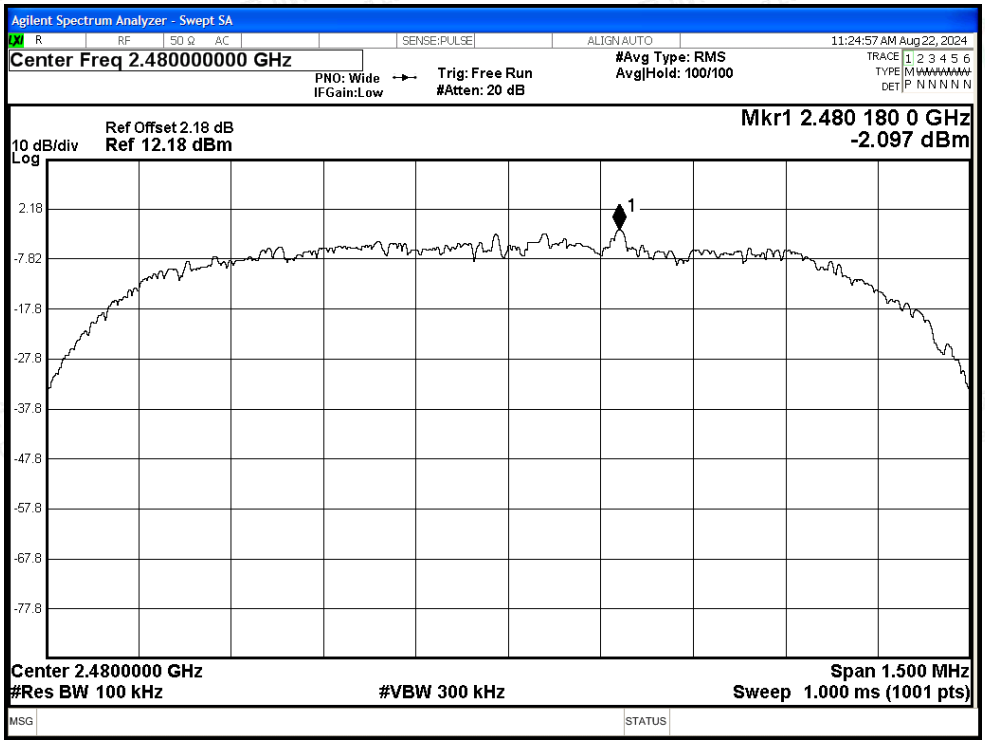
Tx. Spurious NVNT 3-DH5 2441MHz Ant1 Ref



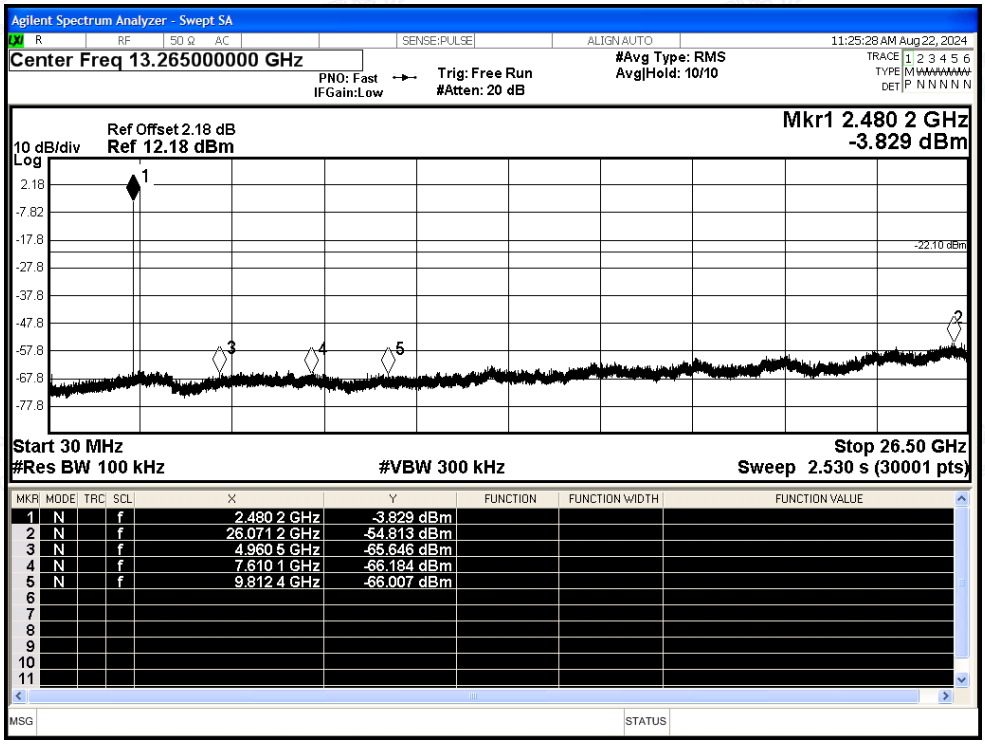
Tx. Spurious NVNT 3-DH5 2441MHz Ant1 Emission



Tx. Spurious NVNT 3-DH5 2480MHz Ant1 Ref



Tx. Spurious NVNT 3-DH5 2480MHz Ant1 Emission



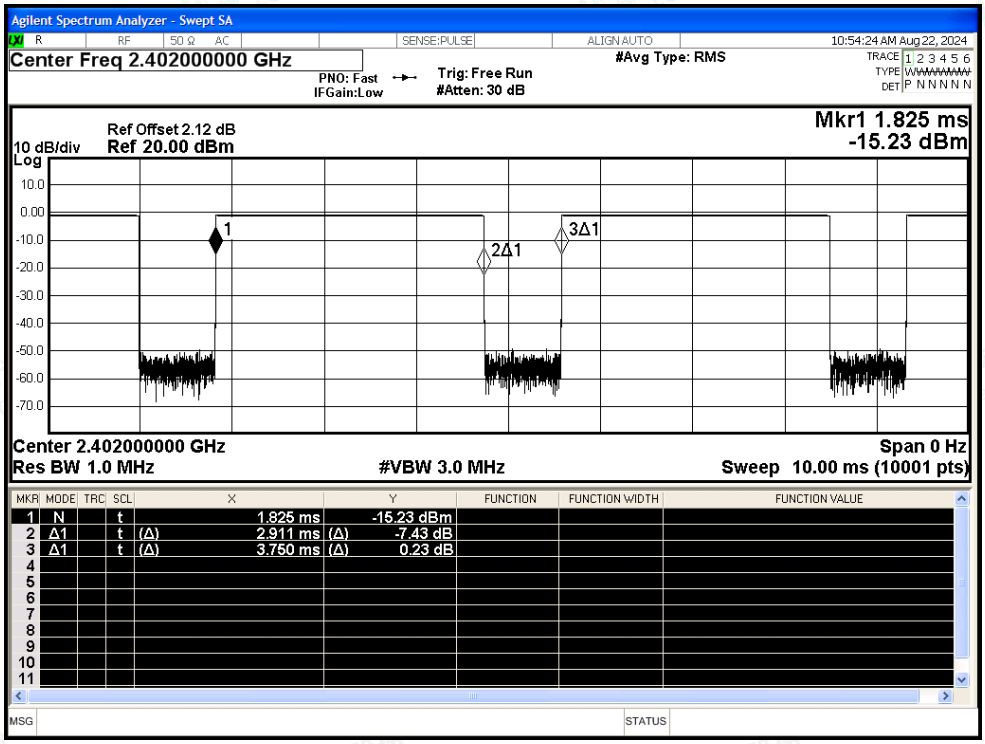
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N		f	2.480 2 GHz	-3.829 dBm			
2	N		f	26.071 2 GHz	-54.813 dBm			
3	N		f	4.960 5 GHz	-65.646 dBm			
4	N		f	7.610 1 GHz	-66.184 dBm			
5	N		f	9.812 4 GHz	-66.007 dBm			
6								
7								
8								
9								
10								
11								

A.8 Duty Cycle

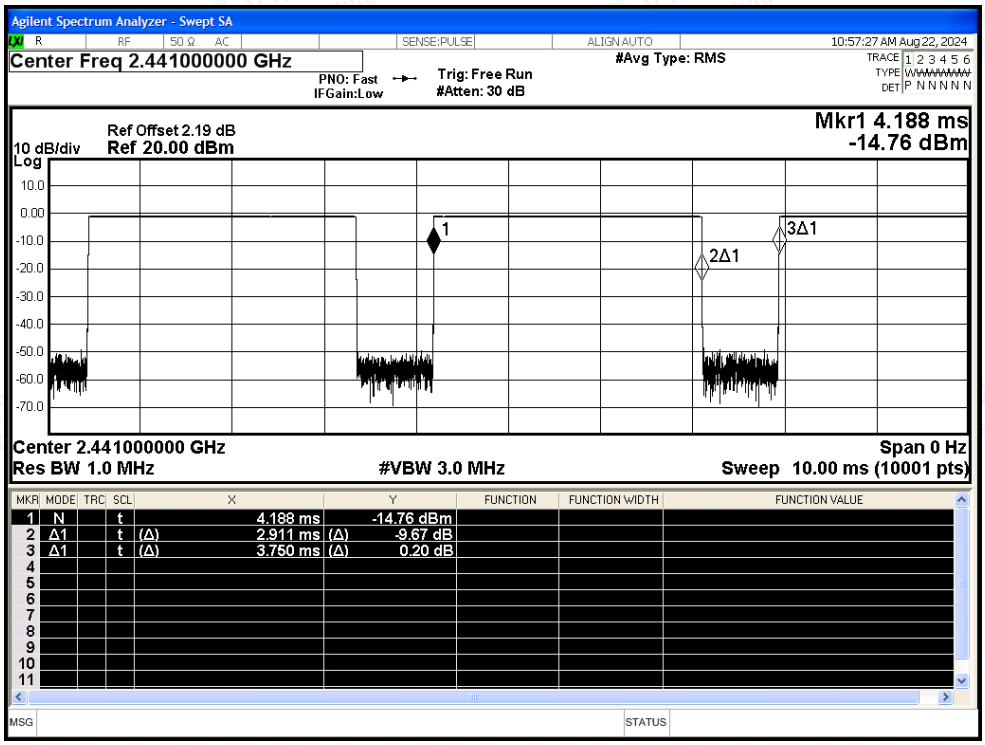
Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	1-DH5	2402	Ant1	77.63	1.1	0.34
NVNT	1-DH5	2441	Ant1	77.63	1.1	0.34
NVNT	1-DH5	2480	Ant1	77.6	1.1	0.34
NVNT	2-DH5	2402	Ant1	77.28	1.12	0.35
NVNT	2-DH5	2441	Ant1	77.33	1.12	0.34
NVNT	2-DH5	2480	Ant1	77.33	1.12	0.34
NVNT	3-DH5	2402	Ant1	77.28	1.12	0.35
NVNT	3-DH5	2441	Ant1	77.28	1.12	0.35
NVNT	3-DH5	2480	Ant1	76.37	1.17	0.36

Test Graphs

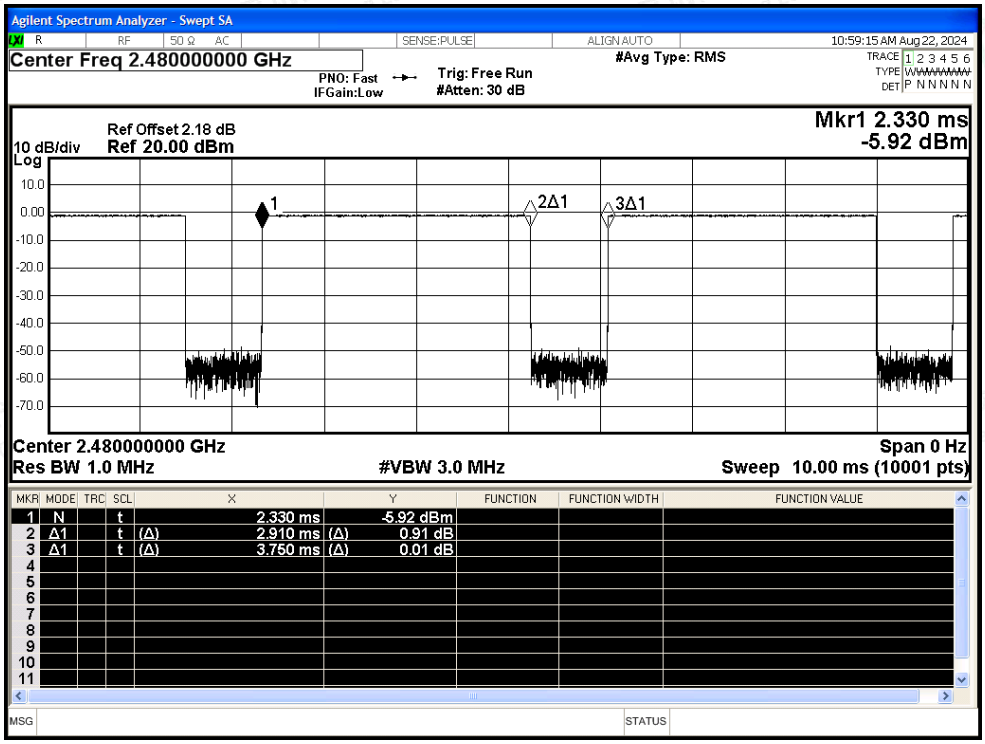
Duty Cycle NVNT 1-DH5 2402MHz Ant1



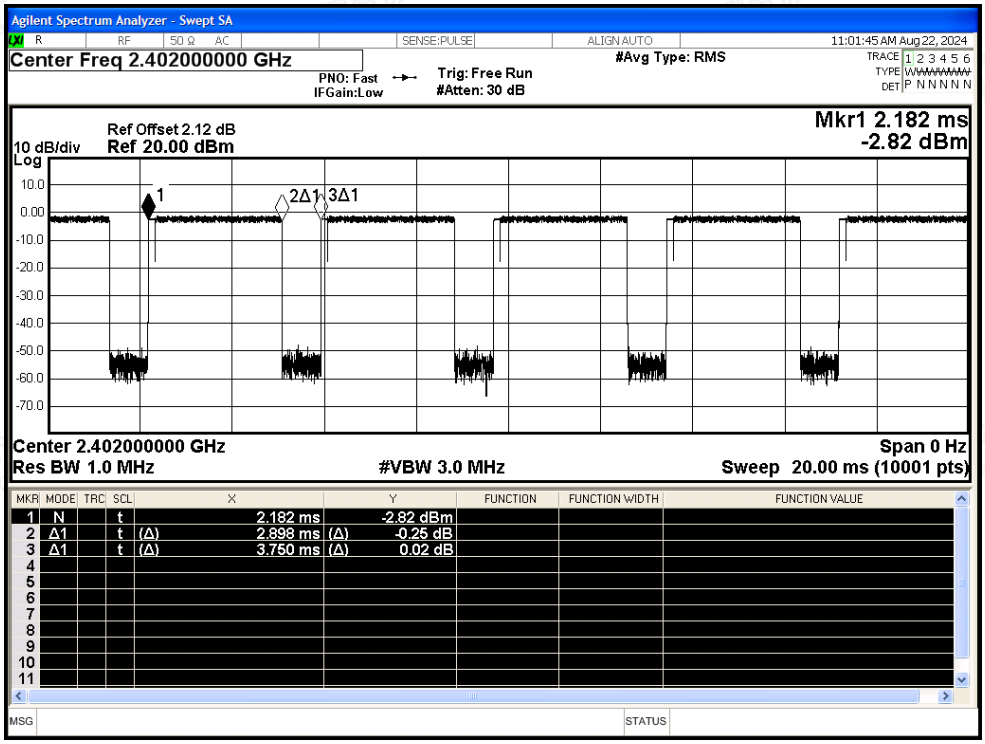
Duty Cycle NVNT 1-DH5 2441MHz Ant1



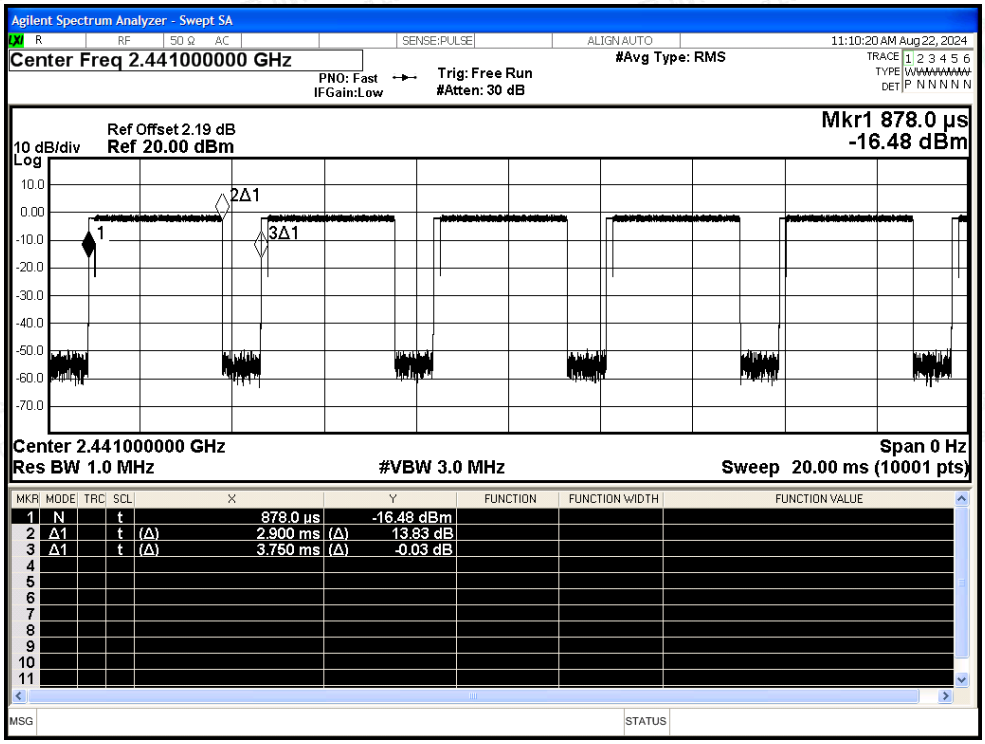
Duty Cycle NVNT 1-DH5 2480MHz Ant1



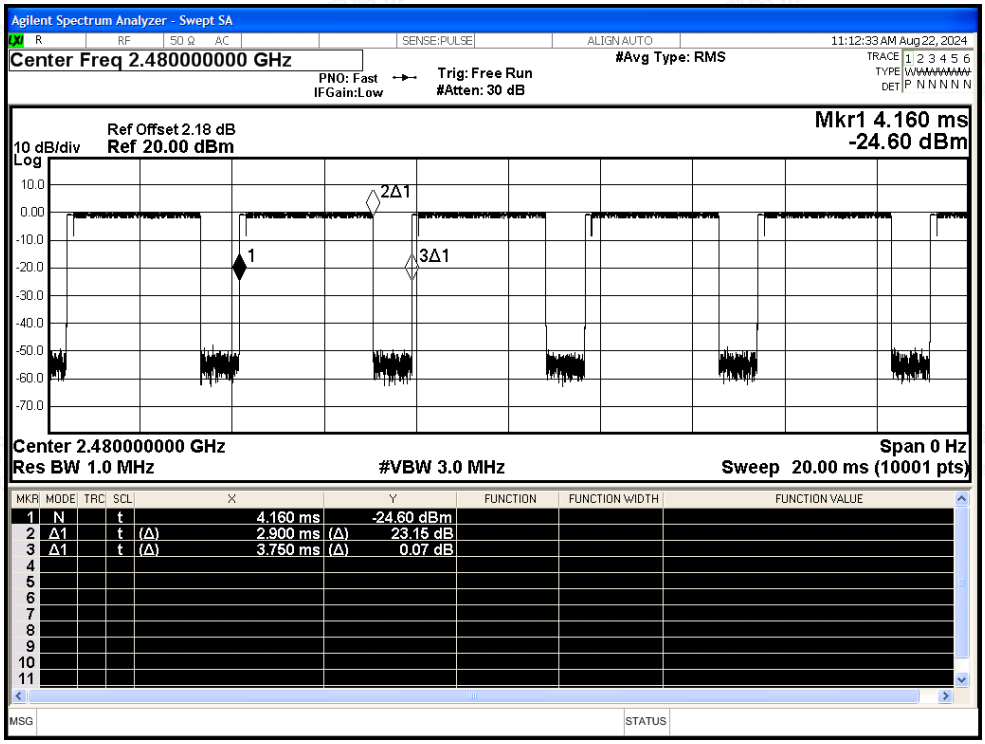
Duty Cycle NVNT 2-DH5 2402MHz Ant1



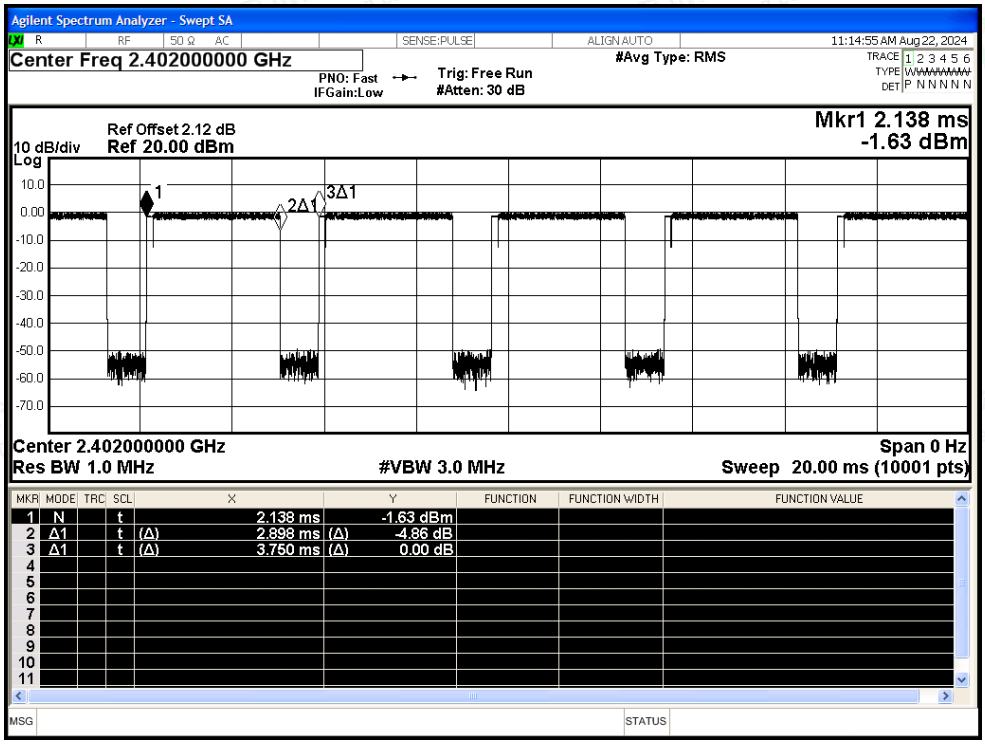
Duty Cycle NVNT 2-DH5 2441MHz Ant1



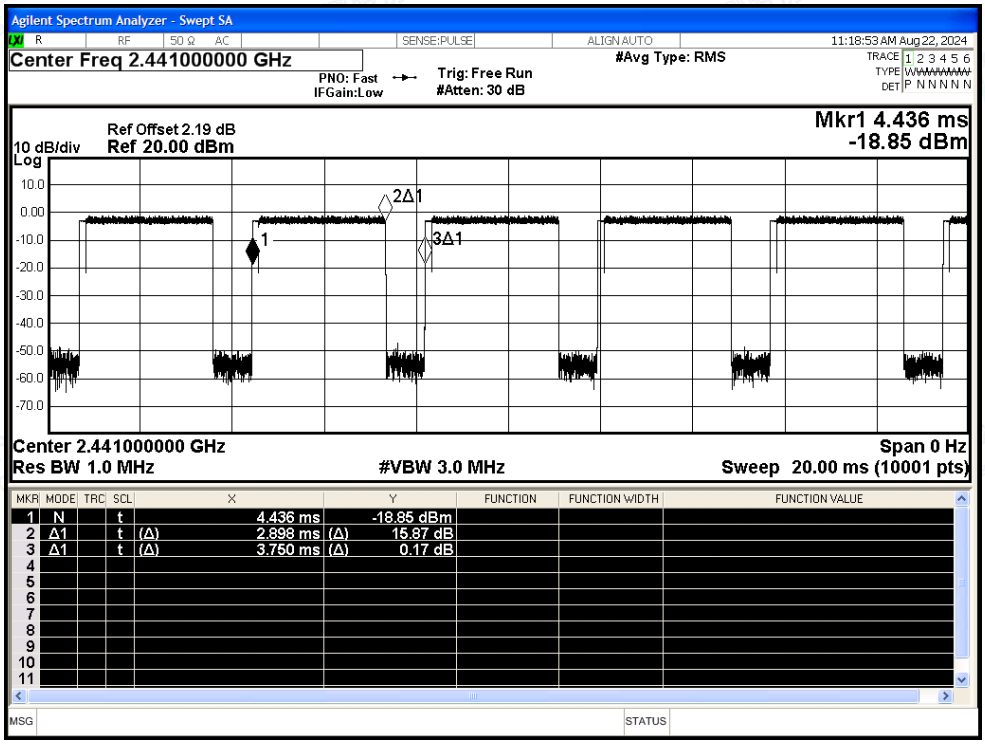
Duty Cycle NVNT 2-DH5 2480MHz Ant1



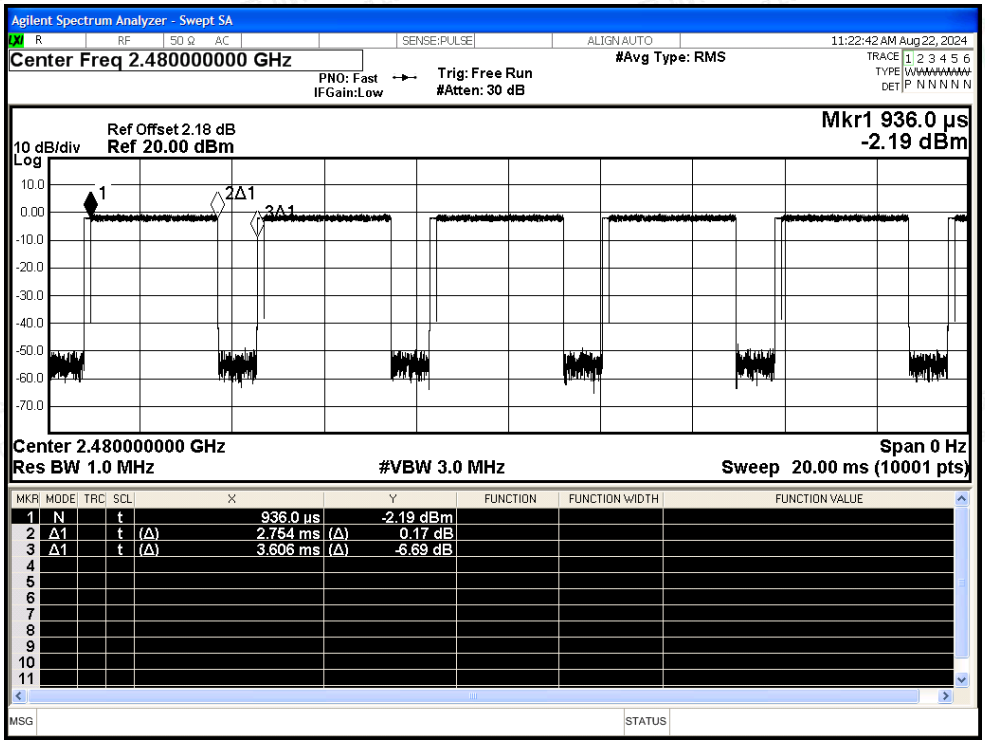
Duty Cycle NVNT 3-DH5 2402MHz Ant1



Duty Cycle NVNT 3-DH5 2441MHz Ant1



Duty Cycle NVNT 3-DH5 2480MHz Ant1

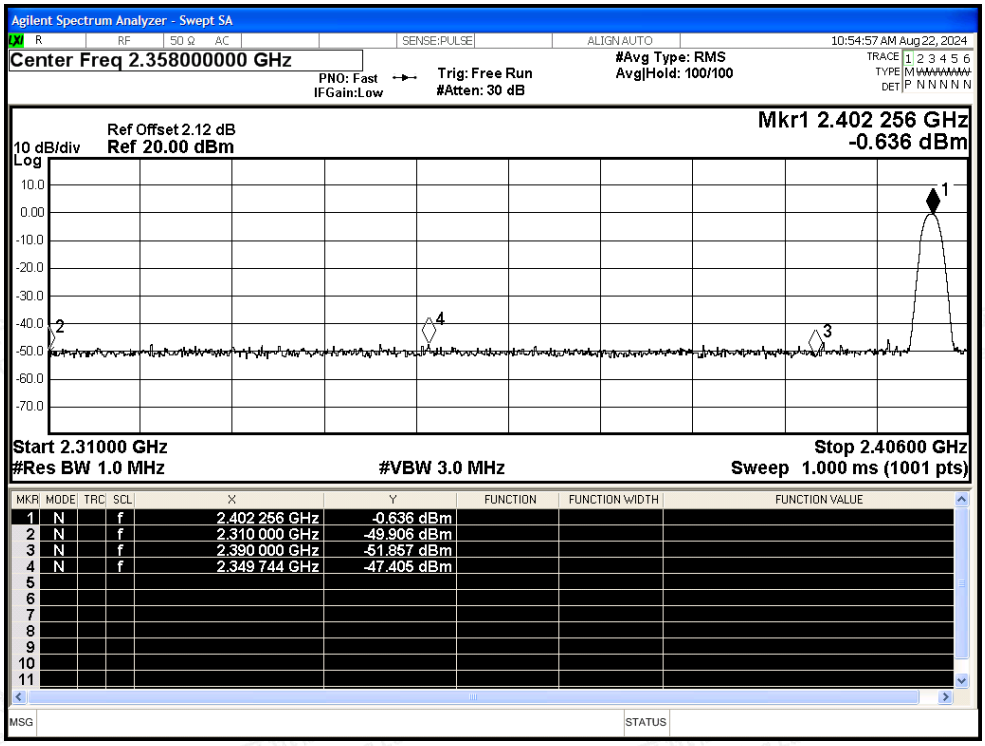


A.9 Restrict Band

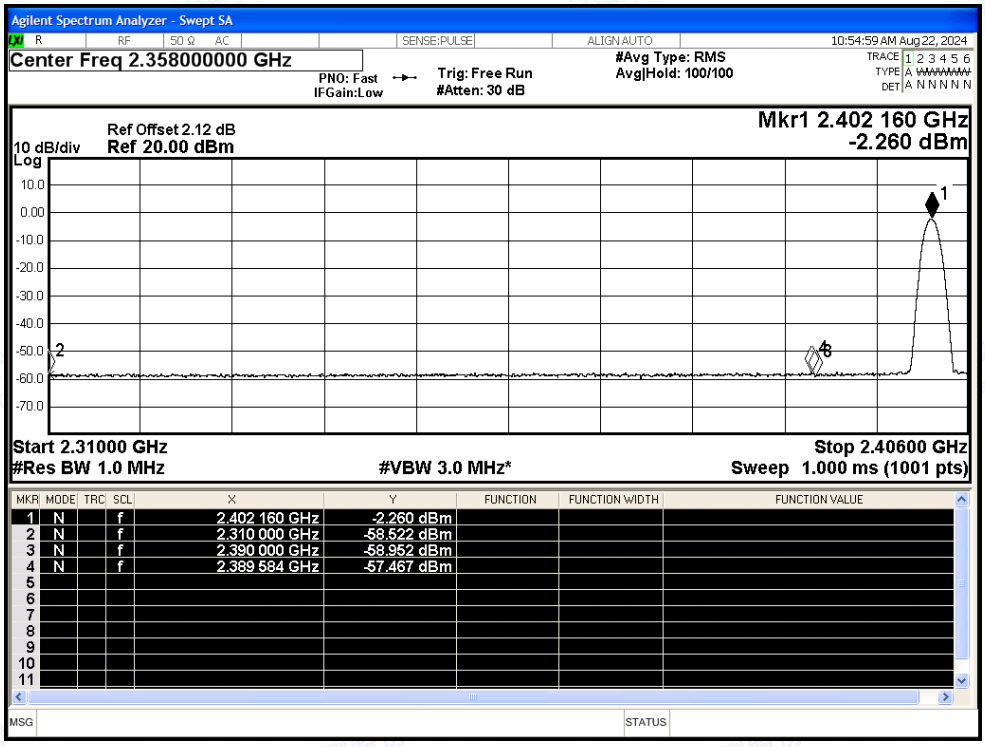
Condition	Mode	Frequency (MHz)	Antenna	Hopping Mode	Spur Freq (MHz)	Power (dBm)	Gain (dBi)	Duty Factor (dB)	E (dBuV/m)	Detector	Limit (dBuV/m)	Verdict
NVNT	1-DH5	2402	Ant1	No-Hopping	2310	-49.91	2	-	47.35	Peak	74	Pass
NVNT	1-DH5	2402	Ant1	No-Hopping	2310	-58.52	2	1.1	39.84	Average	54	Pass
NVNT	1-DH5	2402	Ant1	No-Hopping	2349.744	-47.41	2	-	49.85	Peak	74	Pass
NVNT	1-DH5	2402	Ant1	No-Hopping	2389.584	-57.47	2	1.1	40.89	Average	54	Pass
NVNT	1-DH5	2402	Ant1	No-Hopping	2390	-51.86	2	-	45.4	Peak	74	Pass
NVNT	1-DH5	2402	Ant1	No-Hopping	2390	-58.95	2	1.1	39.41	Average	54	Pass
NVNT	1-DH5	2480	Ant1	No-Hopping	2483.5	-50.12	2	-	47.14	Peak	74	Pass
NVNT	1-DH5	2480	Ant1	No-Hopping	2483.5	-58.02	2	1.1	40.34	Average	54	Pass
NVNT	1-DH5	2480	Ant1	No-Hopping	2487.856	-46.19	2	-	51.07	Peak	74	Pass
NVNT	1-DH5	2480	Ant1	No-Hopping	2485.936	-57.25	2	1.1	41.11	Average	54	Pass
NVNT	1-DH5	2480	Ant1	No-Hopping	2500	-50.06	2	-	47.2	Peak	74	Pass
NVNT	1-DH5	2480	Ant1	No-Hopping	2500	-58.47	2	1.1	39.89	Average	54	Pass
NVNT	2-DH5	2402	Ant1	No-Hopping	2310	-50.09	2	-	47.17	Peak	74	Pass
NVNT	2-DH5	2402	Ant1	No-Hopping	2310	-59.05	2	1.12	39.33	Average	54	Pass
NVNT	2-DH5	2402	Ant1	No-Hopping	2362.8	-47.06	2	-	50.2	Peak	74	Pass
NVNT	2-DH5	2402	Ant1	No-Hopping	2383.728	-57.38	2	1.12	41	Average	54	Pass
NVNT	2-DH5	2402	Ant1	No-Hopping	2390	-50.25	2	-	47.01	Peak	74	Pass
NVNT	2-DH5	2402	Ant1	No-Hopping	2390	-58.48	2	1.12	39.9	Average	54	Pass
NVNT	2-DH5	2480	Ant1	No-Hopping	2483.5	-48.26	2	-	49	Peak	74	Pass
NVNT	2-DH5	2480	Ant1	No-Hopping	2483.5	-56.76	2	1.12	41.62	Average	54	Pass
NVNT	2-DH5	2480	Ant1	No-Hopping	2483.776	-44.85	2	-	52.41	Peak	74	Pass
NVNT	2-DH5	2480	Ant1	No-Hopping	2483.728	-56.38	2	1.12	42	Average	54	Pass
NVNT	2-DH5	2480	Ant1	No-Hopping	2500	-51.07	2	-	46.19	Peak	74	Pass
NVNT	2-DH5	2480	Ant1	No-Hopping	2500	-57.49	2	1.12	40.89	Average	54	Pass
NVNT	3-DH5	2402	Ant1	No-Hopping	2310	-50.56	2	-	46.7	Peak	74	Pass
NVNT	3-DH5	2402	Ant1	No-Hopping	2310	-58.75	2	1.12	39.63	Average	54	Pass
NVNT	3-DH5	2402	Ant1	No-Hopping	2348.304	-47.82	2	-	49.44	Peak	74	Pass
NVNT	3-DH5	2402	Ant1	No-Hopping	2362.224	-57.61	2	1.12	40.77	Average	54	Pass
NVNT	3-DH5	2402	Ant1	No-Hopping	2390	-49.3	2	-	47.96	Peak	74	Pass
NVNT	3-DH5	2402	Ant1	No-Hopping	2390	-58.26	2	1.12	40.12	Average	54	Pass
NVNT	3-DH5	2480	Ant1	No-Hopping	2483.5	-46.82	2	-	50.44	Peak	74	Pass
NVNT	3-DH5	2480	Ant1	No-Hopping	2483.5	-55.77	2	1.17	42.66	Average	54	Pass
NVNT	3-DH5	2480	Ant1	No-Hopping	2483.608	-44.96	2	-	52.3	Peak	74	Pass
NVNT	3-DH5	2480	Ant1	No-Hopping	2483.512	-55.77	2	1.17	42.66	Average	54	Pass
NVNT	3-DH5	2480	Ant1	No-Hopping	2500	-49.93	2	-	47.33	Peak	74	Pass
NVNT	3-DH5	2480	Ant1	No-Hopping	2500	-57.9	2	1.17	40.53	Average	54	Pass

Test Graphs

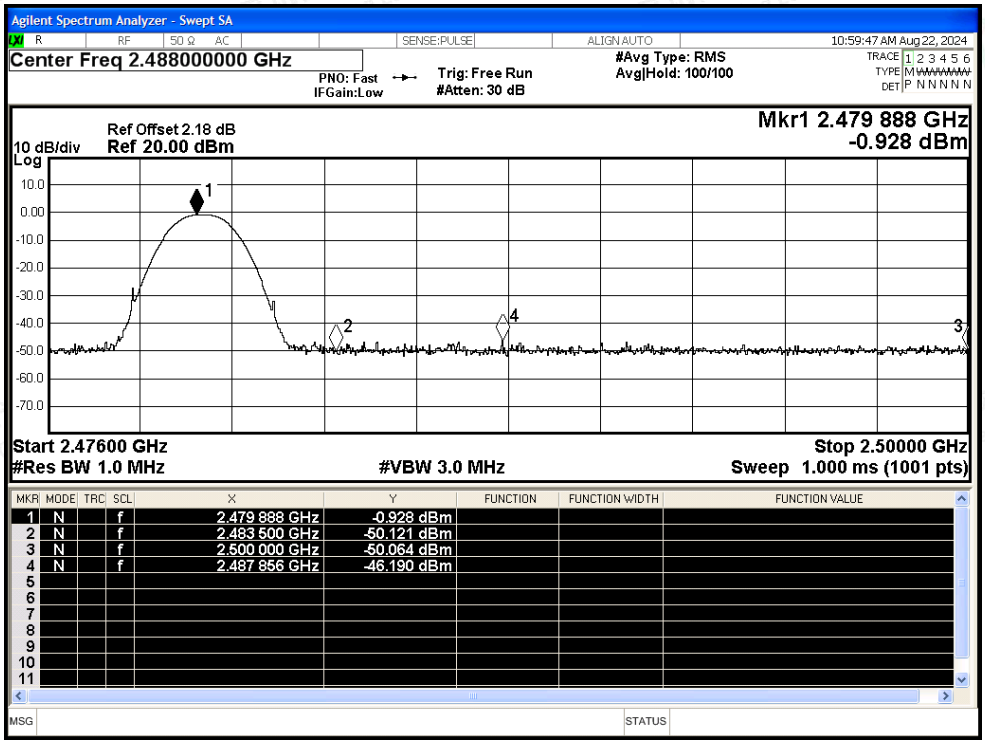
Restrict Band NVNT 1-DH5 2402MHz Ant1 No-Hopping Peak



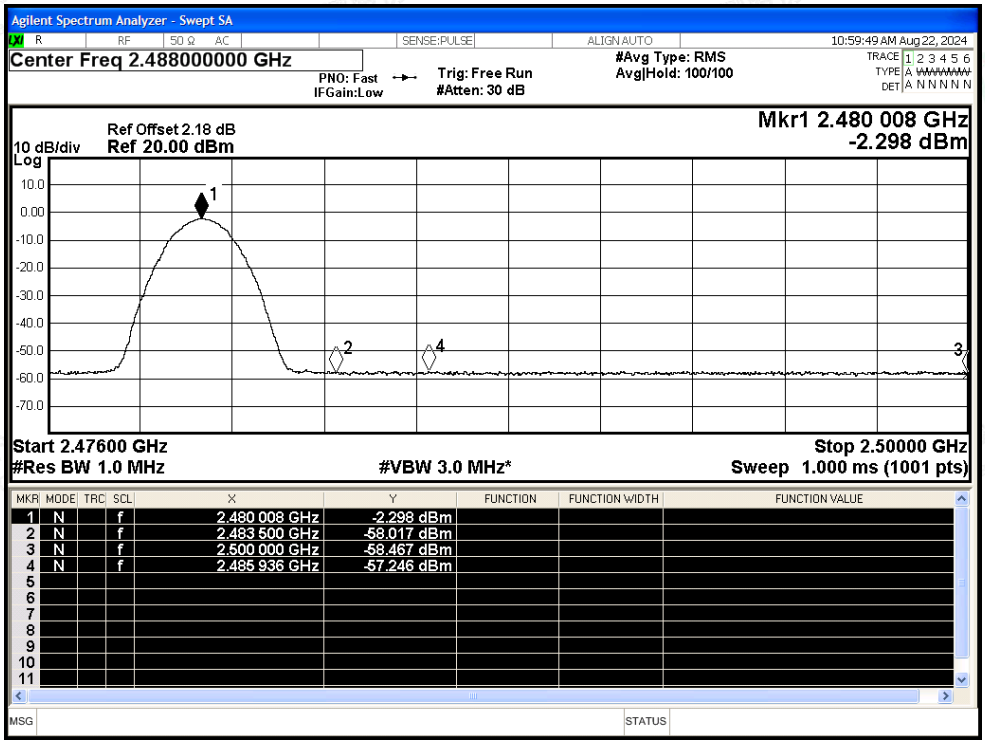
Restrict Band NVNT 1-DH5 2402MHz Ant1 No-Hopping Average



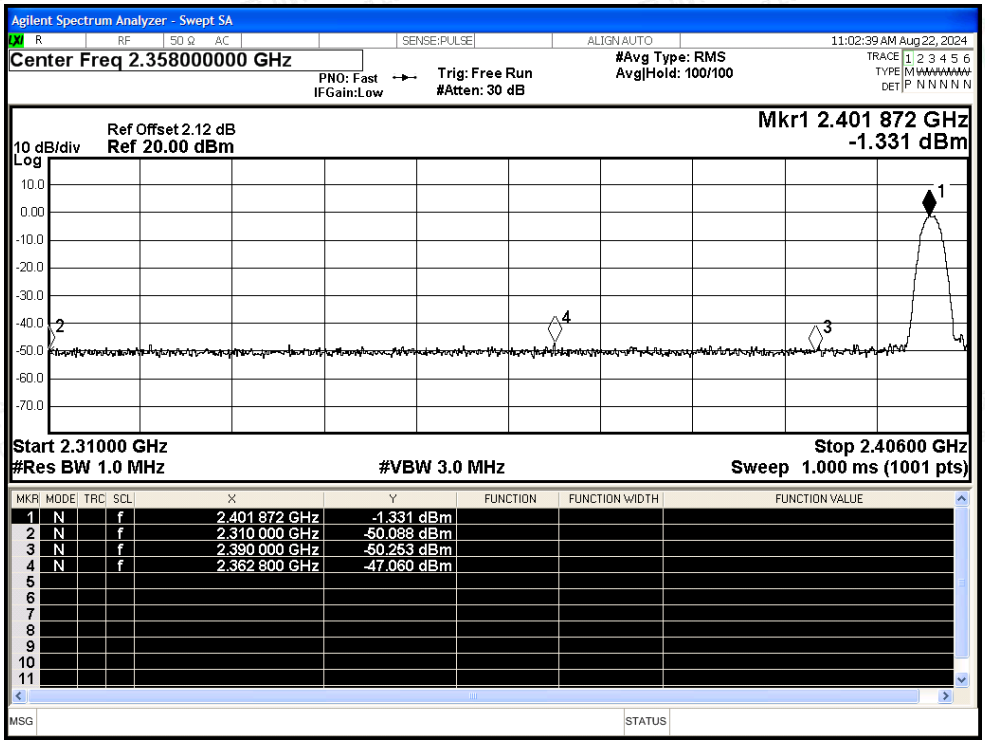
Restrict Band NVNT 1-DH5 2480MHz Ant1 No-Hopping Peak



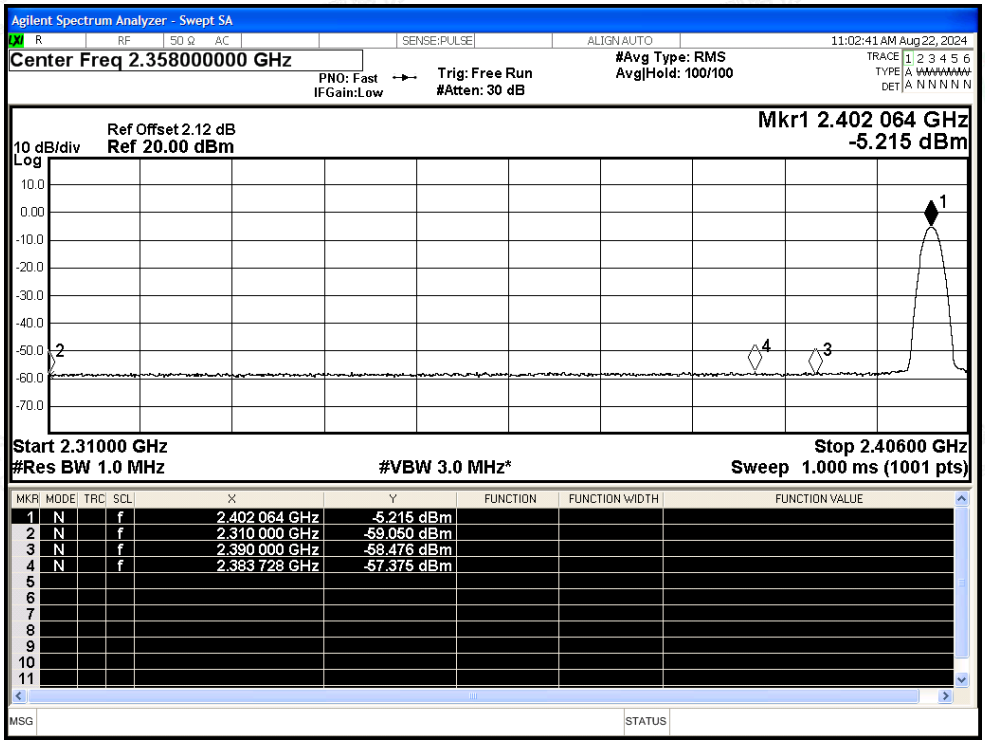
Restrict Band NVNT 1-DH5 2480MHz Ant1 No-Hopping Average



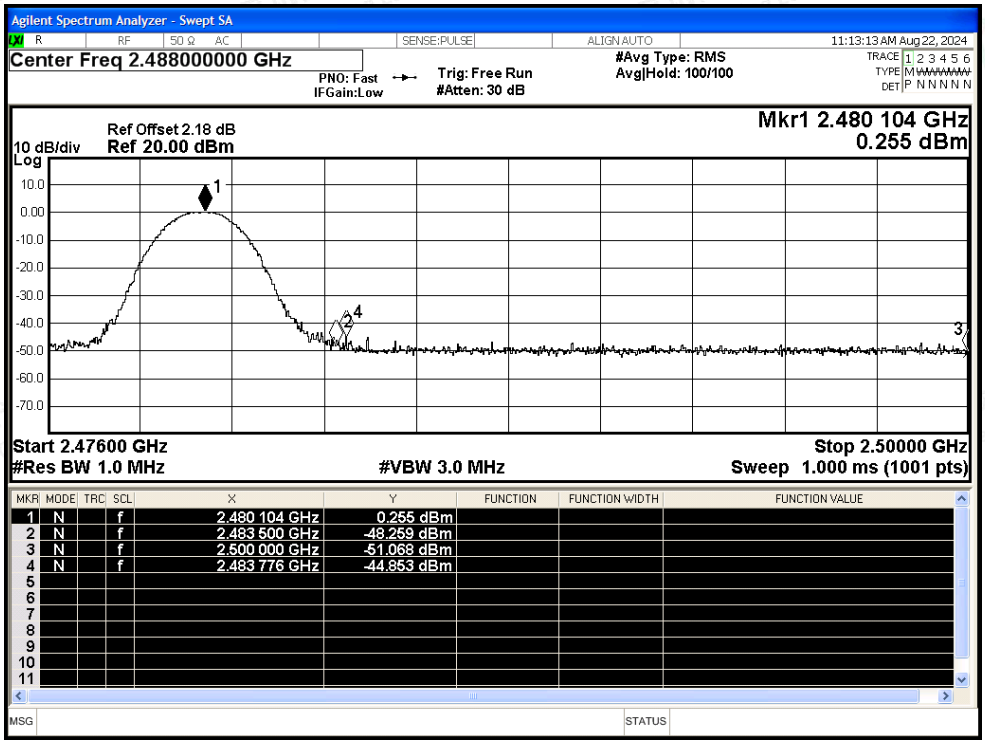
Restrict Band NVNT 2-DH5 2402MHz Ant1 No-Hopping Peak



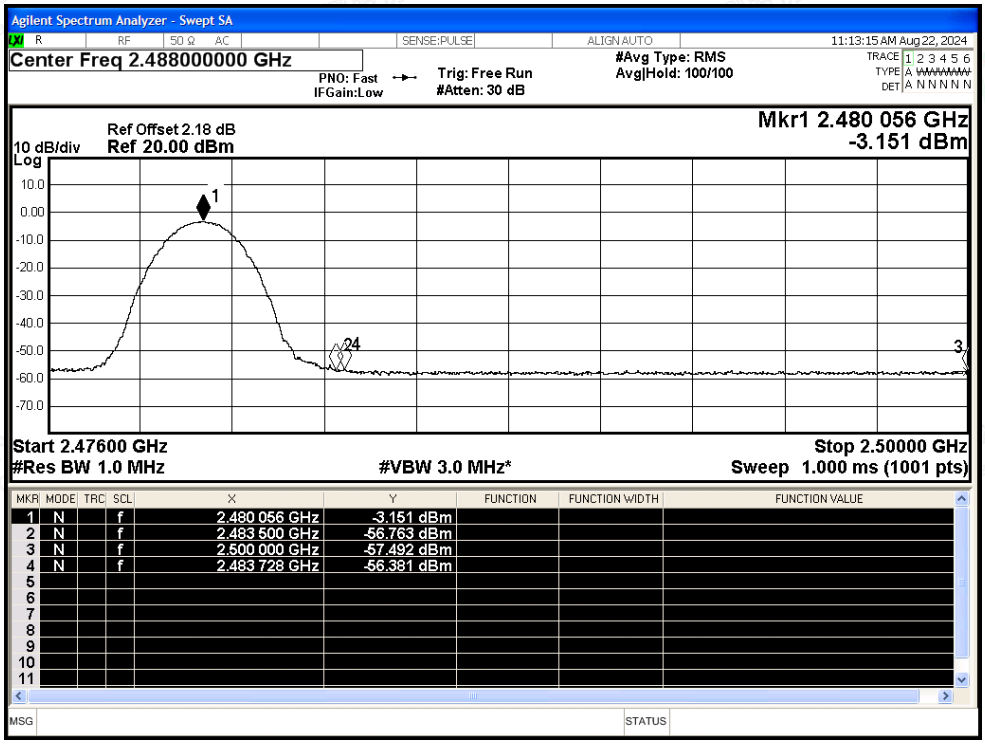
Restrict Band NVNT 2-DH5 2402MHz Ant1 No-Hopping Average



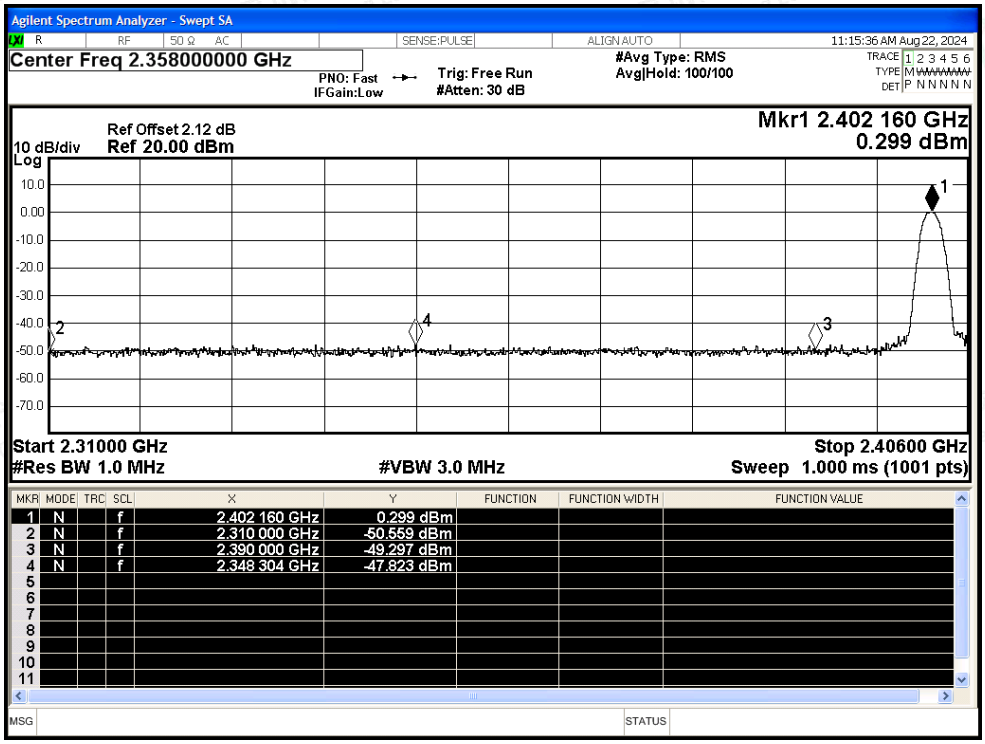
Restrict Band NVNT 2-DH5 2480MHz Ant1 No-Hopping Peak



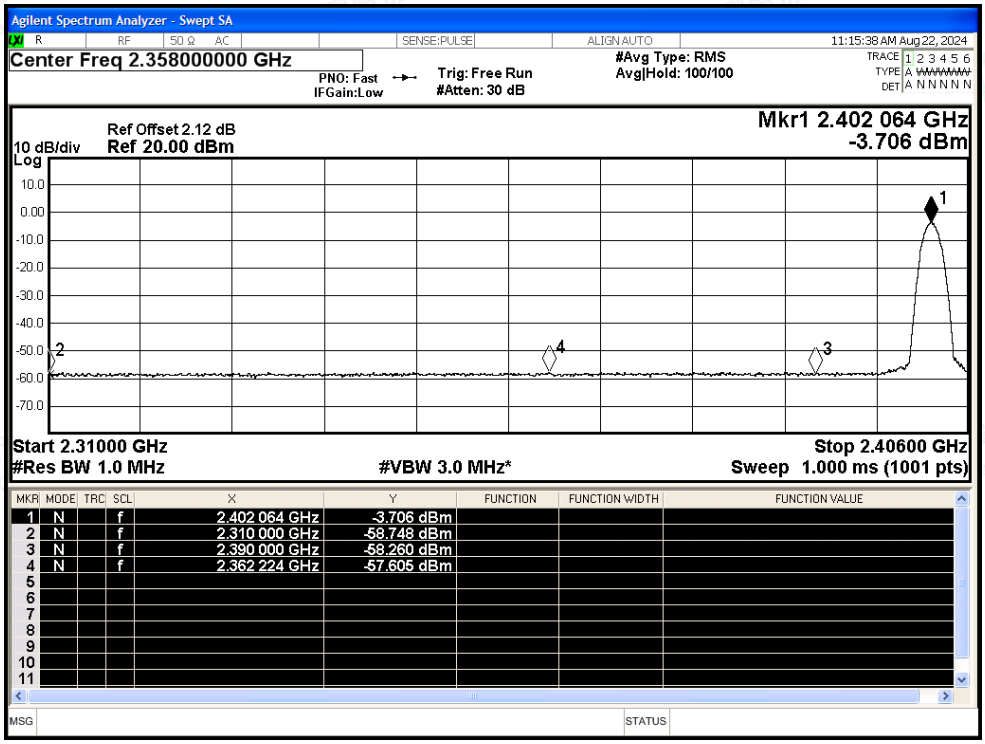
Restrict Band NVNT 2-DH5 2480MHz Ant1 No-Hopping Average



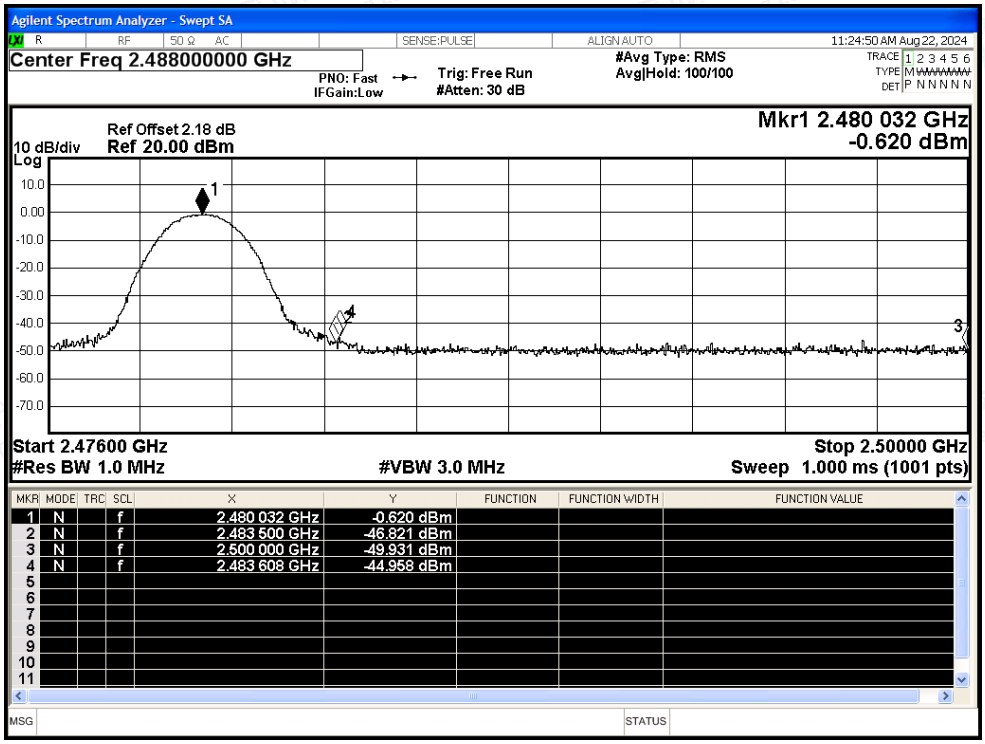
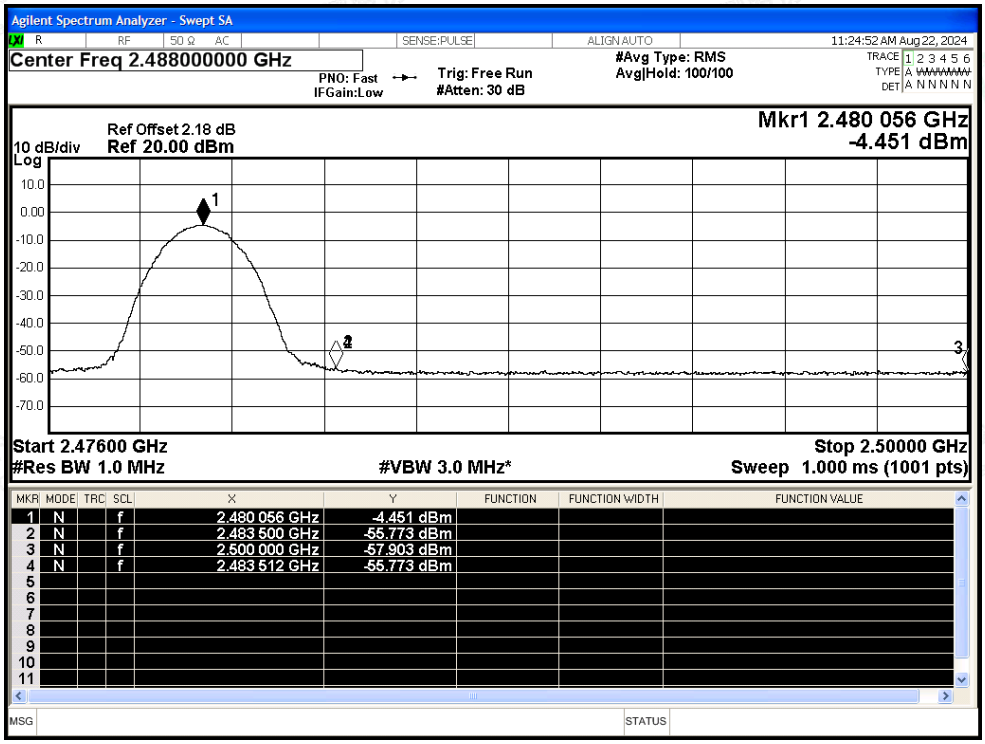
Restrict Band NVNT 3-DH5 2402MHz Ant1 No-Hopping Peak



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