Appendix A

RF Test Data for BT(Conducted Measurement)

Product Name: Legends Pinball

Test Model: HA9920

Environmental Conditions

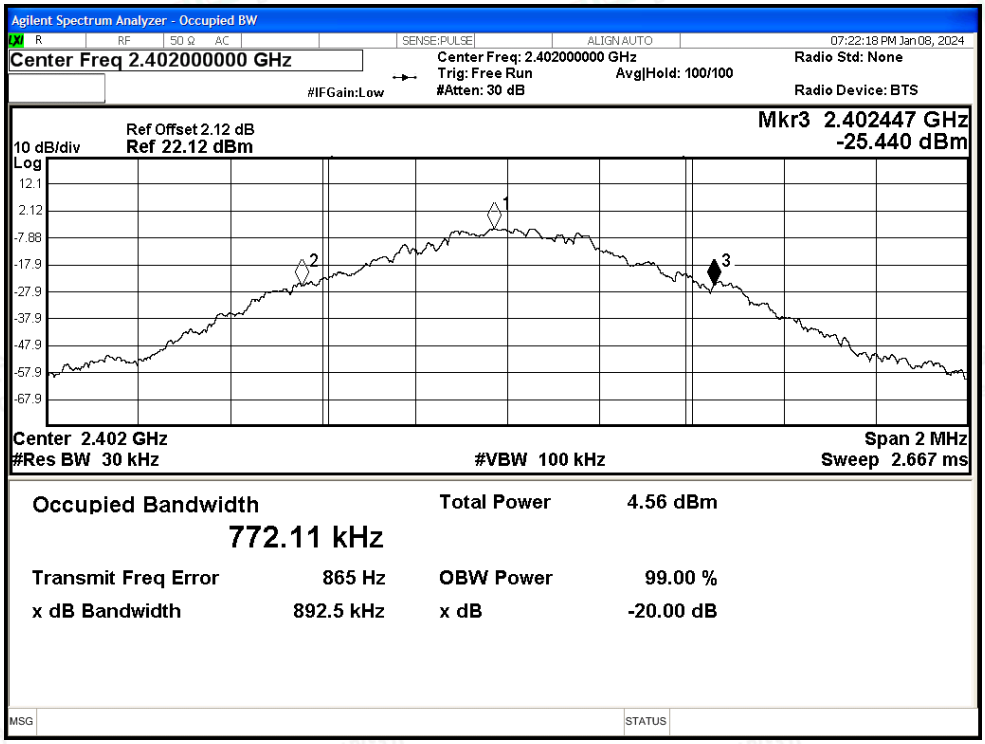
Temperature:	23.8° C
Relative Humidity:	52.1%
ATM Pressure:	100.0 kPa
Test Engineer:	Eason Zhou
Supervised by:	Nick Peng

A.1 -20dB Bandwidth

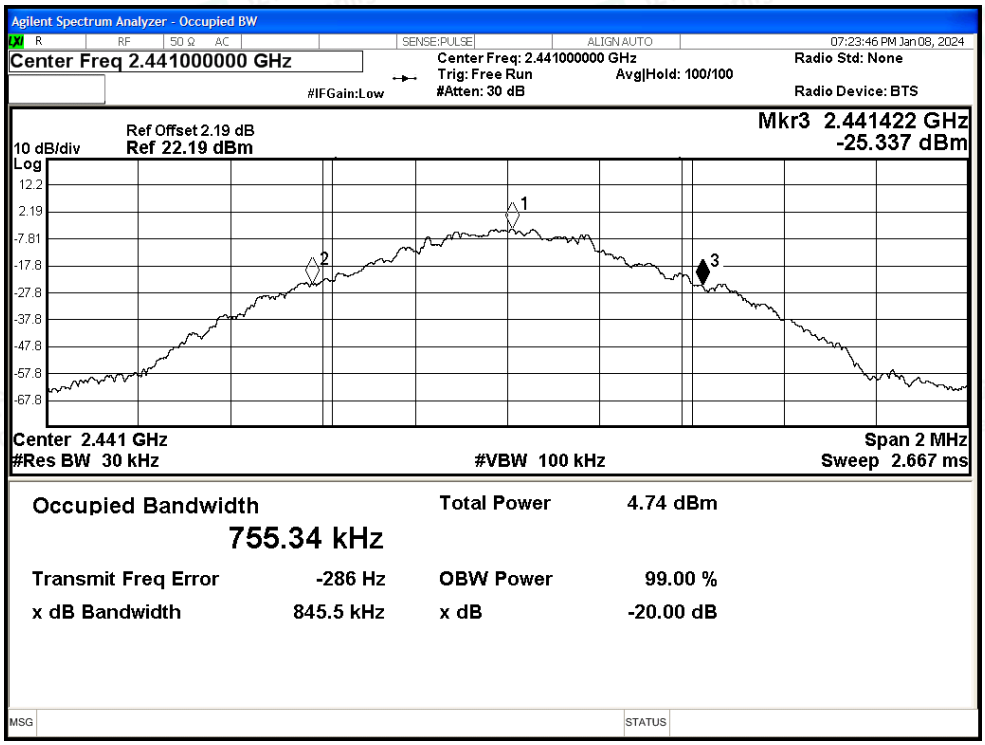
Condition	Mode	Frequency (MHz)	Antenna	-20 dB Bandwidth (MHz)	Limit -20 dB Bandwidth (MHz)	Verdict
NVNT	1-DH5	2402	Ant	0.892	N/A	Pass
NVNT	1-DH5	2441	Ant	0.845	N/A	Pass
NVNT	1-DH5	2480	Ant	0.839	N/A	Pass
NVNT	2-DH5	2402	Ant	1.281	N/A	Pass
NVNT	2-DH5	2441	Ant	1.261	N/A	Pass
NVNT	2-DH5	2480	Ant	1.274	N/A	Pass
NVNT	3-DH5	2402	Ant	1.296	N/A	Pass
NVNT	3-DH5	2441	Ant	1.297	N/A	Pass
NVNT	3-DH5	2480	Ant	1.291	N/A	Pass

Test Graphs

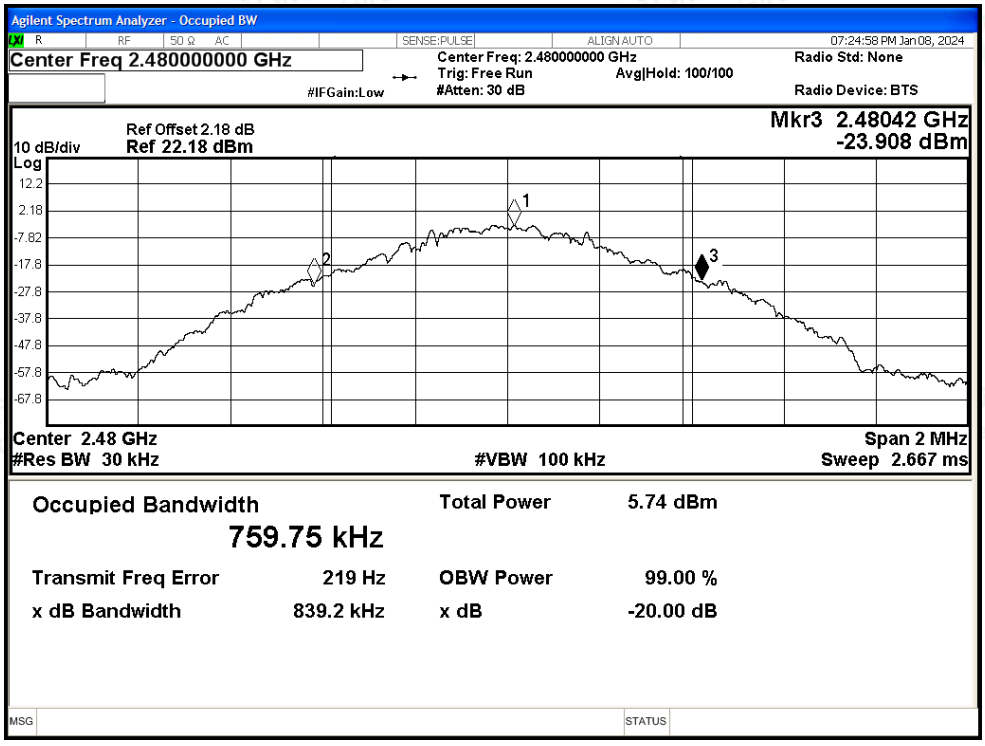
-20dB Bandwidth NVNT 1-DH5 2402MHz Ant



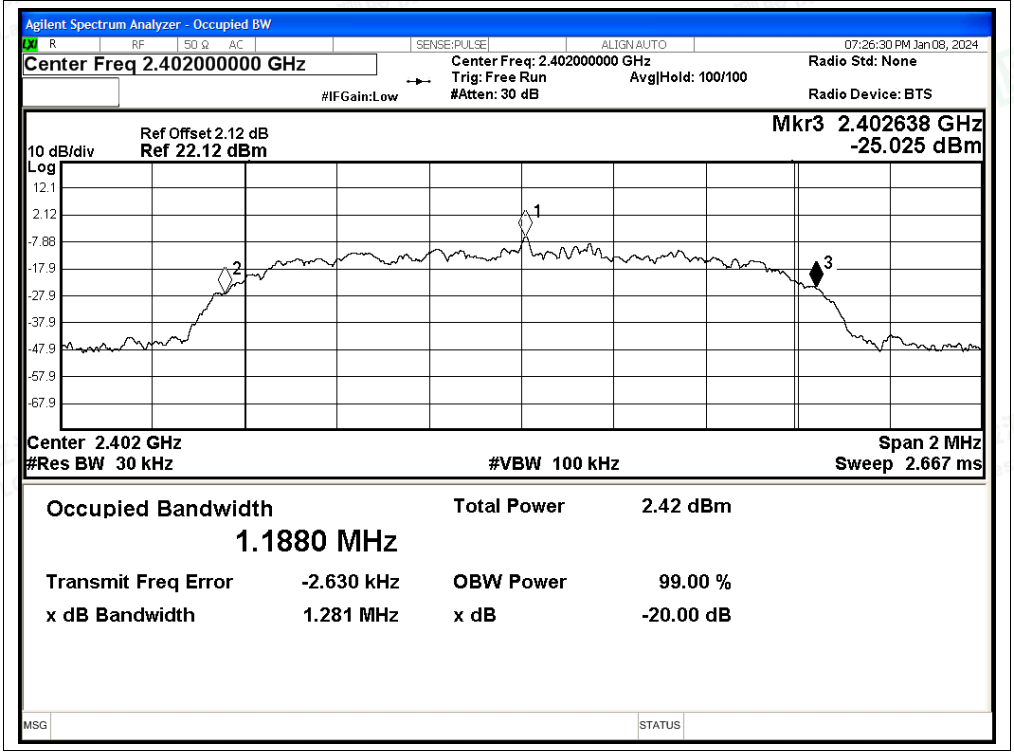
-20dB Bandwidth NVNT 1-DH5 2441MHz Ant



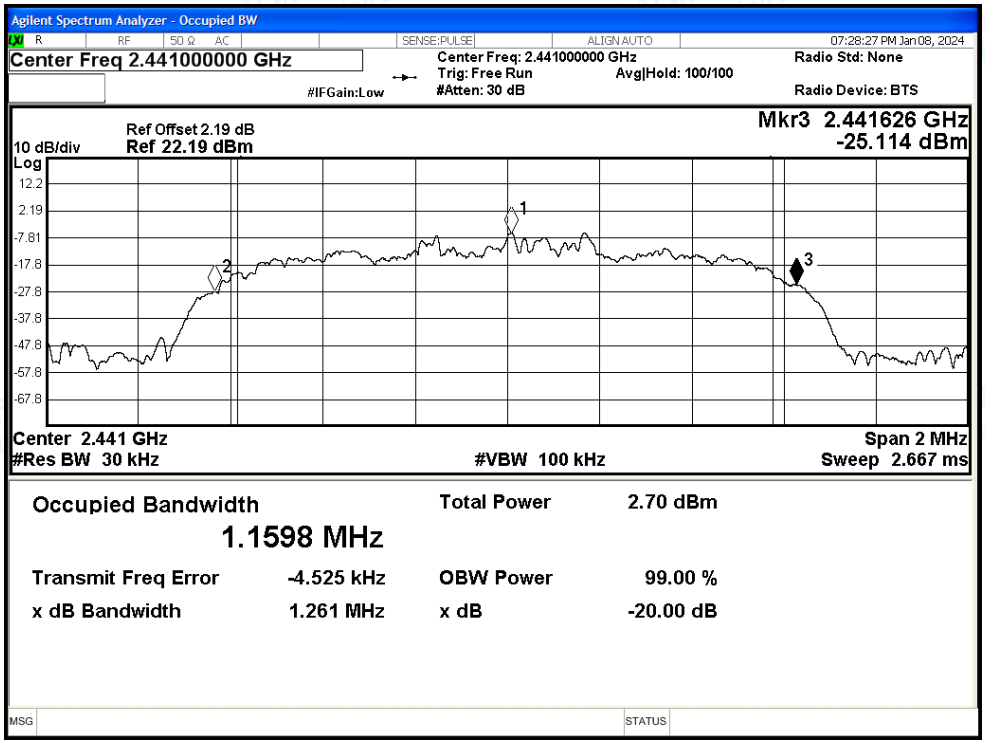
-20dB Bandwidth NVNT 1-DH5 2480MHz Ant



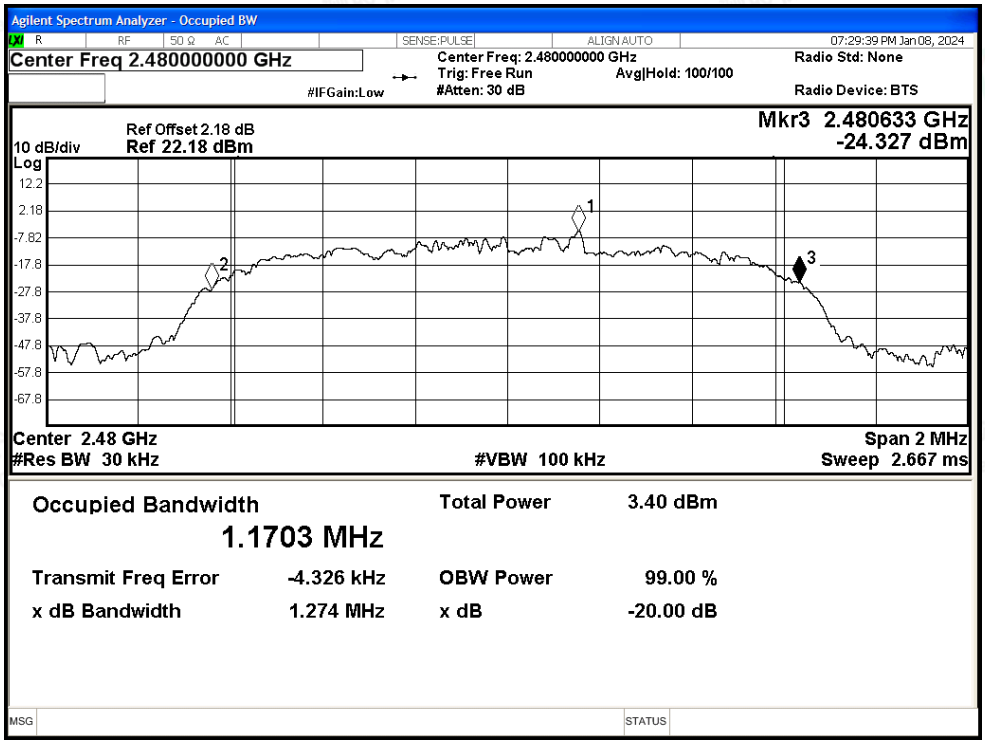
-20dB Bandwidth NVNT 2-DH5 2402MHz Ant



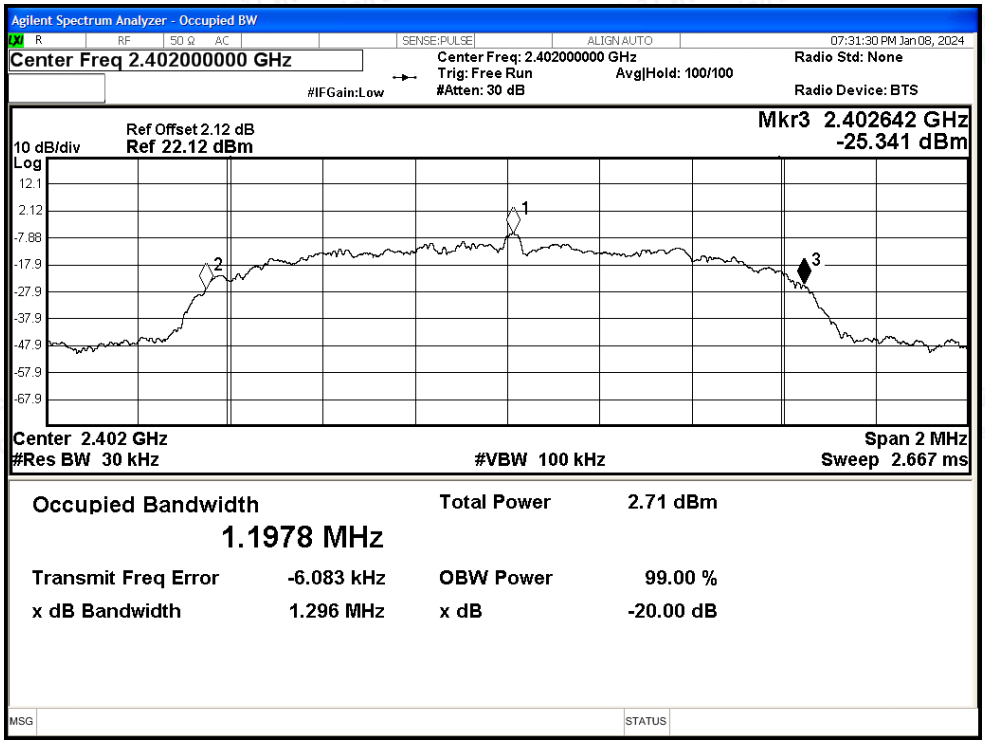
-20dB Bandwidth NVNT 2-DH5 2441MHz Ant



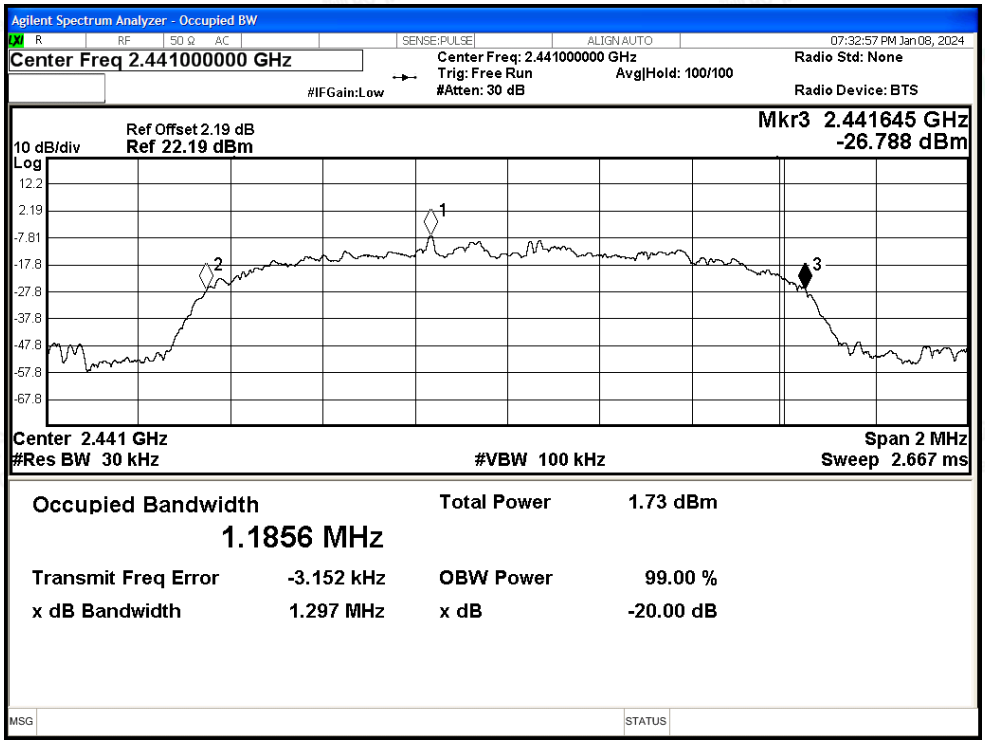
-20dB Bandwidth NVNT 2-DH5 2480MHz Ant



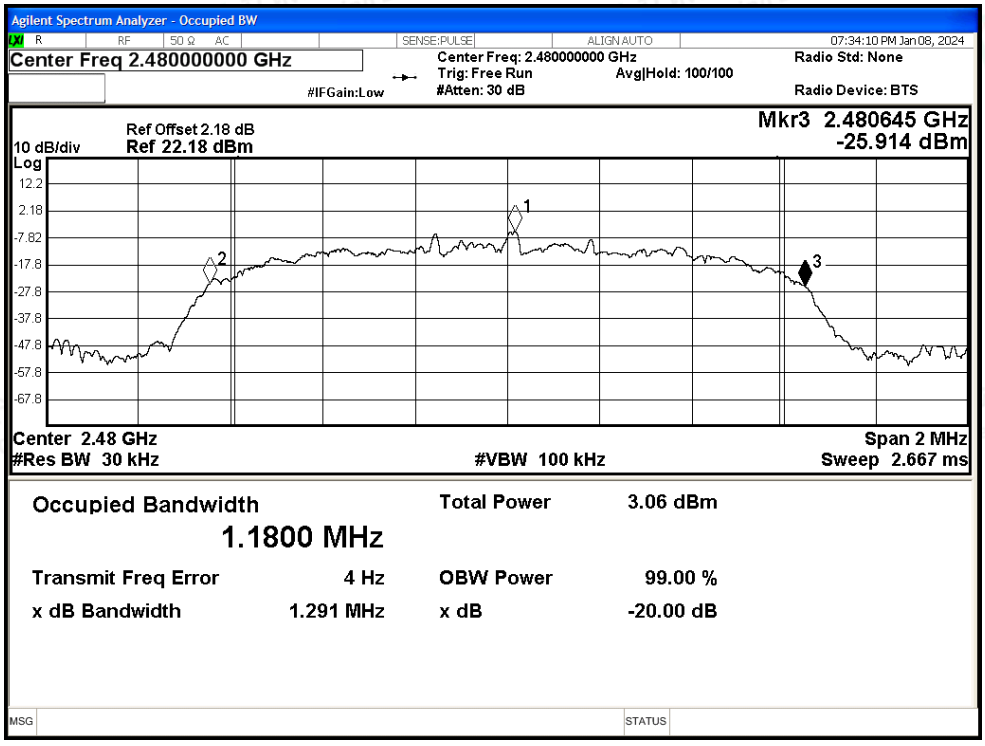
-20dB Bandwidth NVNT 3-DH5 2402MHz Ant



-20dB Bandwidth NVNT 3-DH5 2441MHz Ant



-20dB Bandwidth NVNT 3-DH5 2480MHz Ant

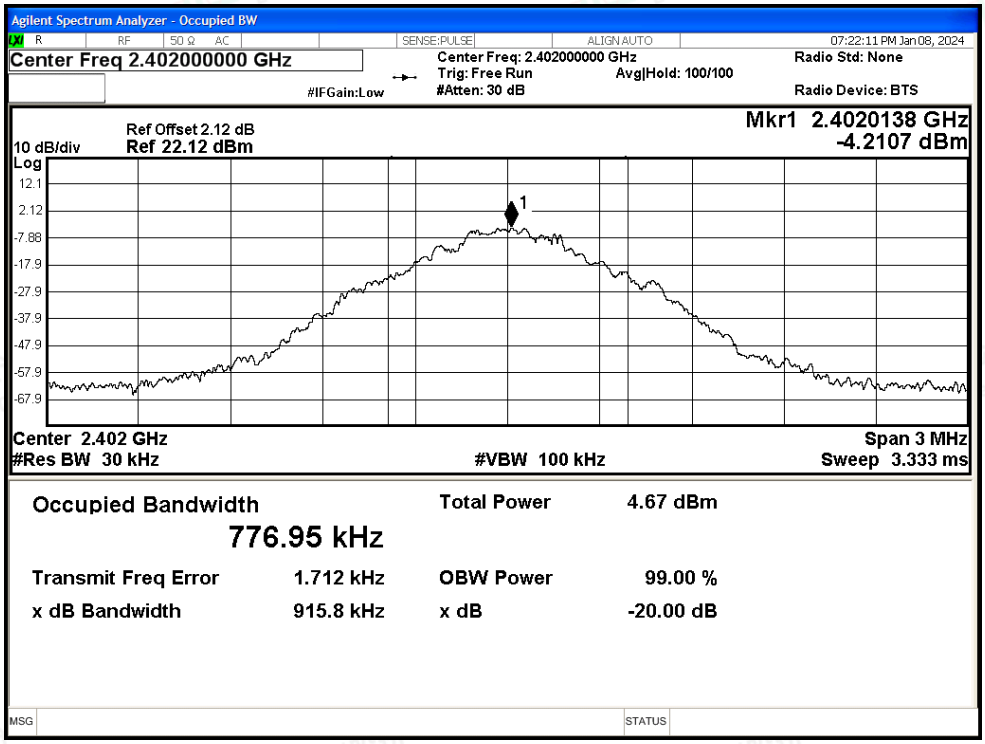


A.2 Occupied Channel Bandwidth

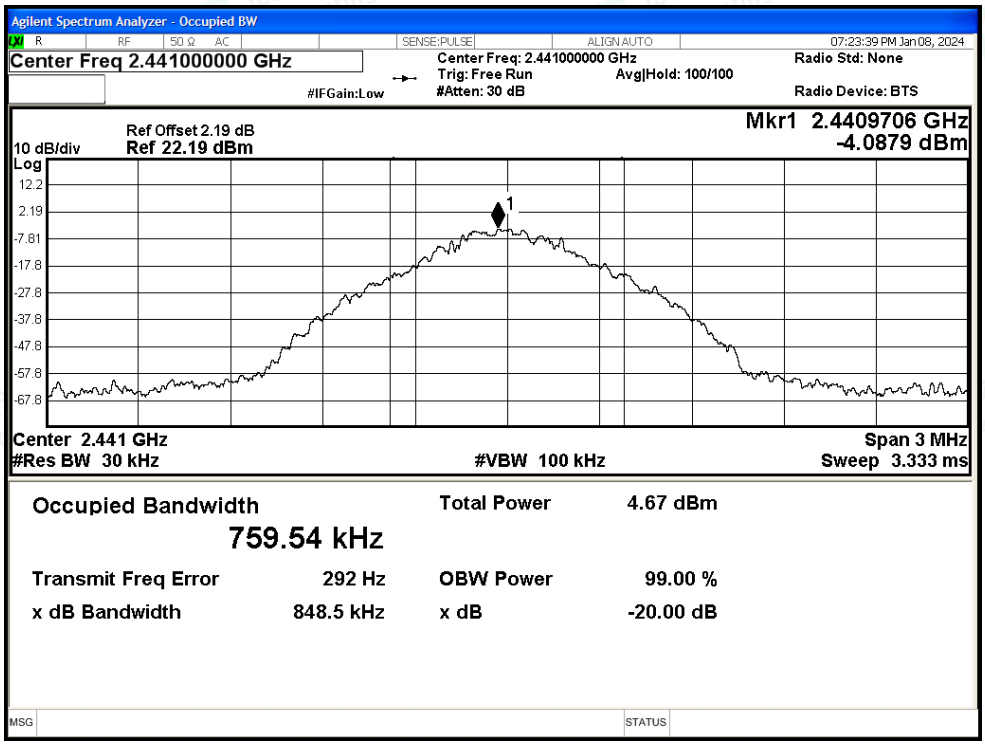
Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	1-DH5	2402	Ant	0.777
NVNT	1-DH5	2441	Ant	0.76
NVNT	1-DH5	2480	Ant	0.75
NVNT	2-DH5	2402	Ant	1.181
NVNT	2-DH5	2441	Ant	1.171
NVNT	2-DH5	2480	Ant	1.17
NVNT	3-DH5	2402	Ant	1.181
NVNT	3-DH5	2441	Ant	1.17
NVNT	3-DH5	2480	Ant	1.178

Test Graphs

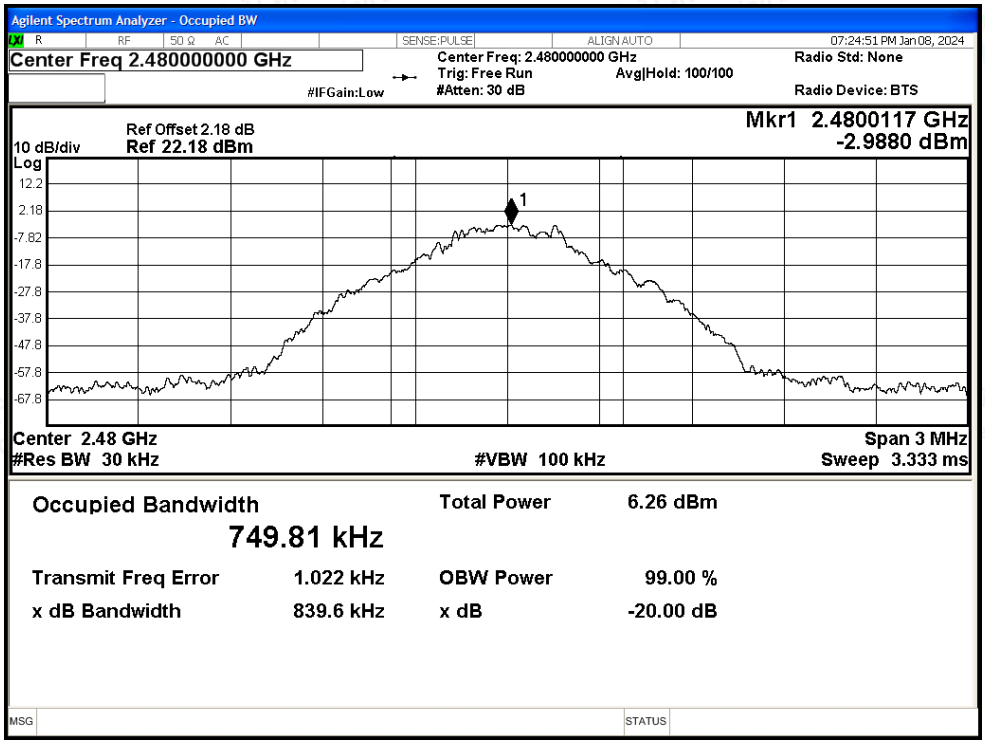
OBW NVNT 1-DH5 2402MHz Ant



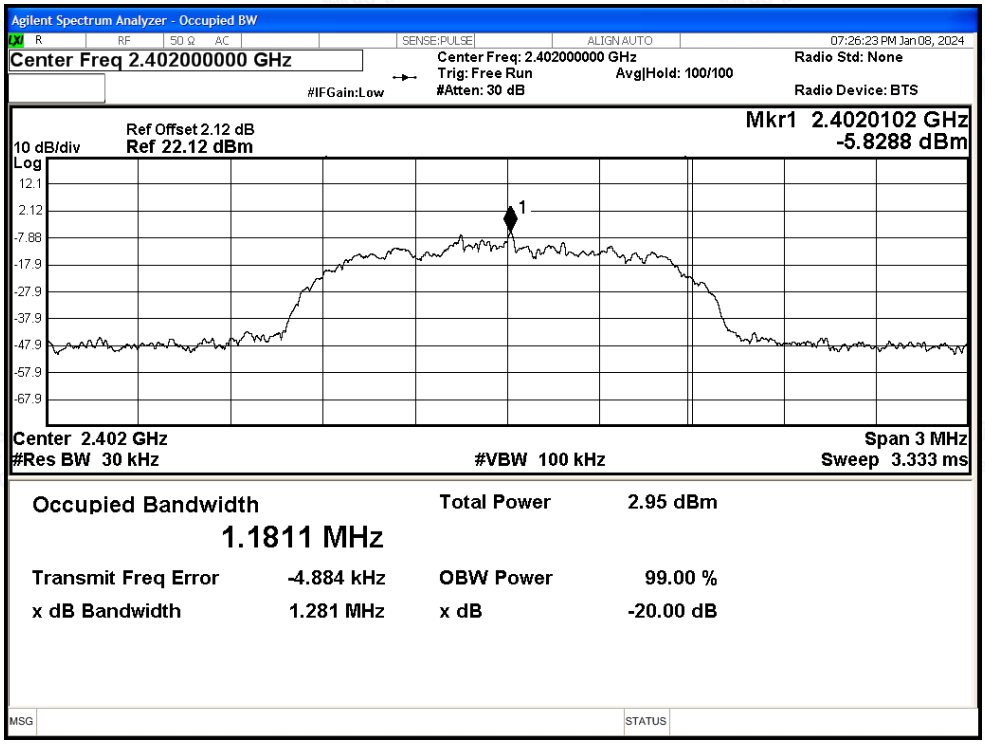
OBW NVNT 1-DH5 2441MHz Ant



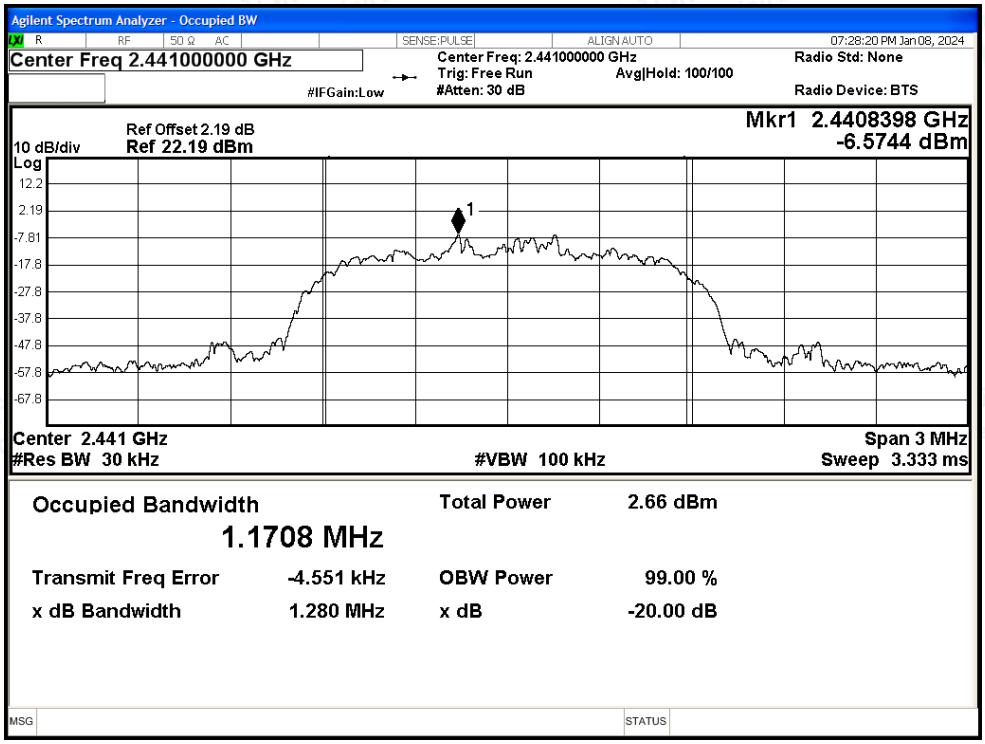
OBW NVNT 1-DH5 2480MHz Ant



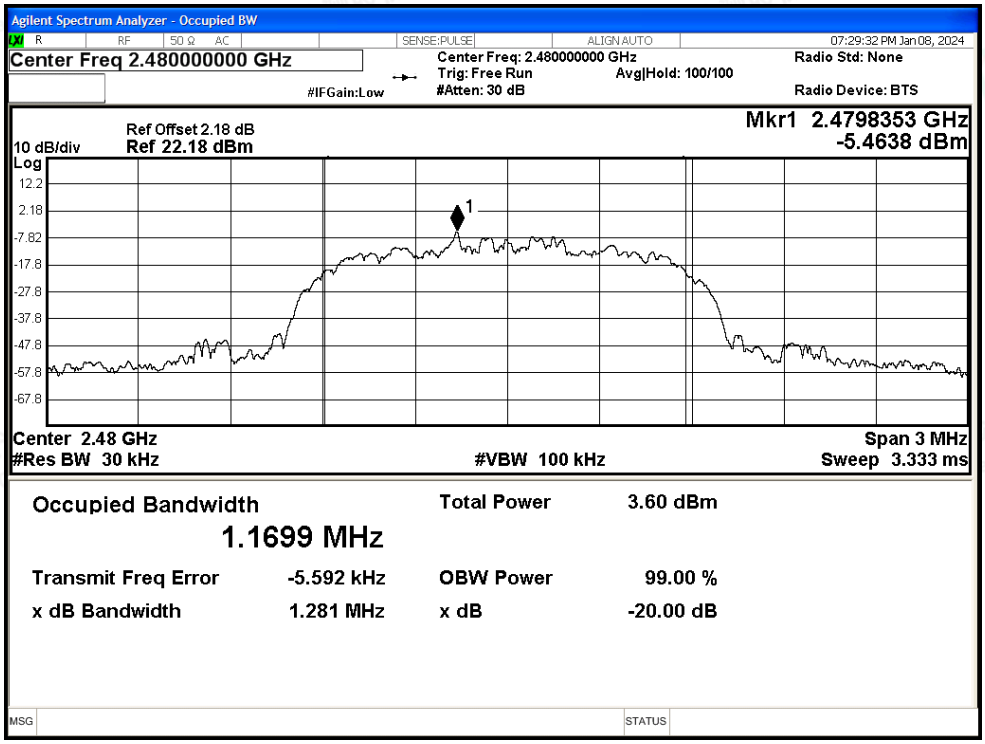
OBW NVNT 2-DH5 2402MHz Ant



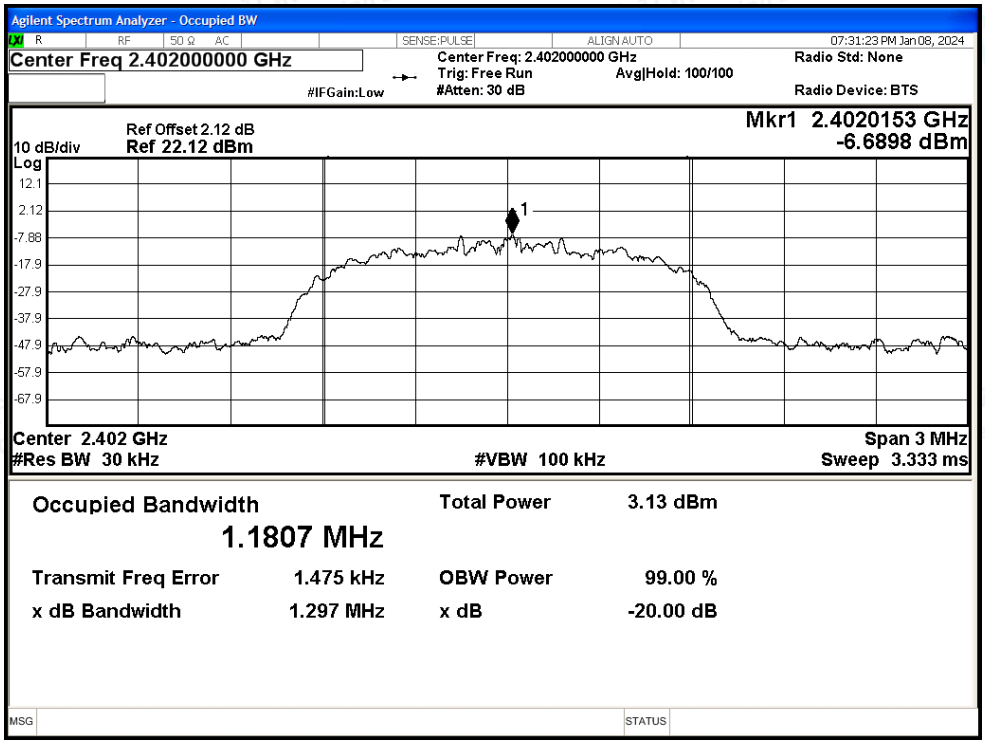
OBW NVNT 2-DH5 2441MHz Ant



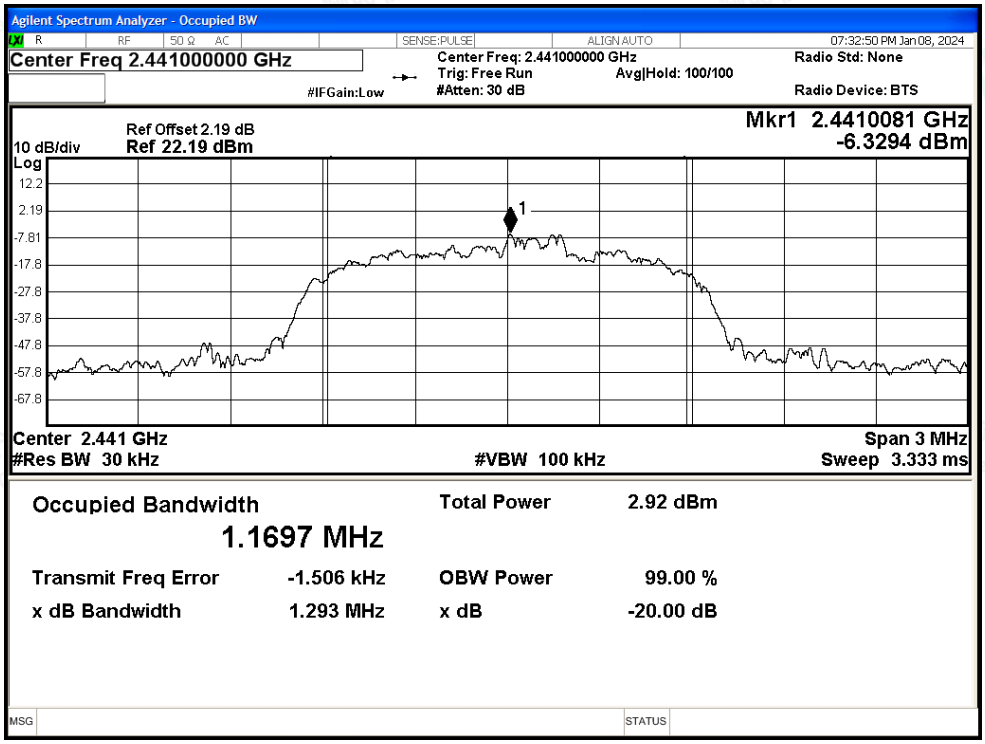
OBW NVNT 2-DH5 2480MHz Ant



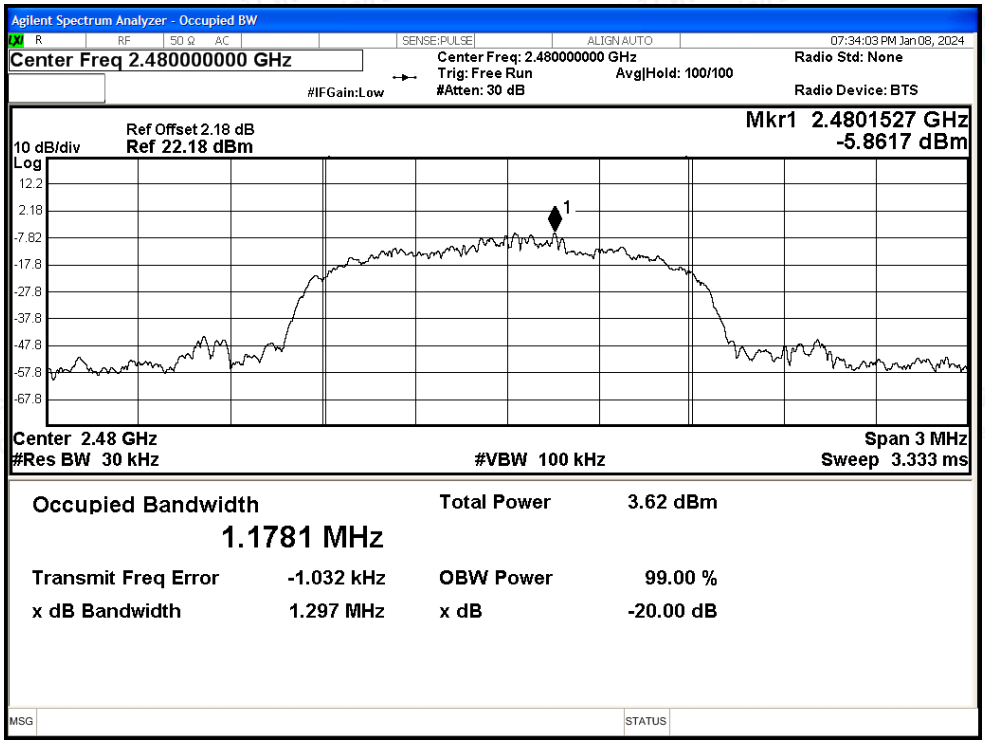
OBW NVNT 3-DH5 2402MHz Ant



OBW NVNT 3-DH5 2441MHz Ant



OBW NVNT 3-DH5 2480MHz Ant

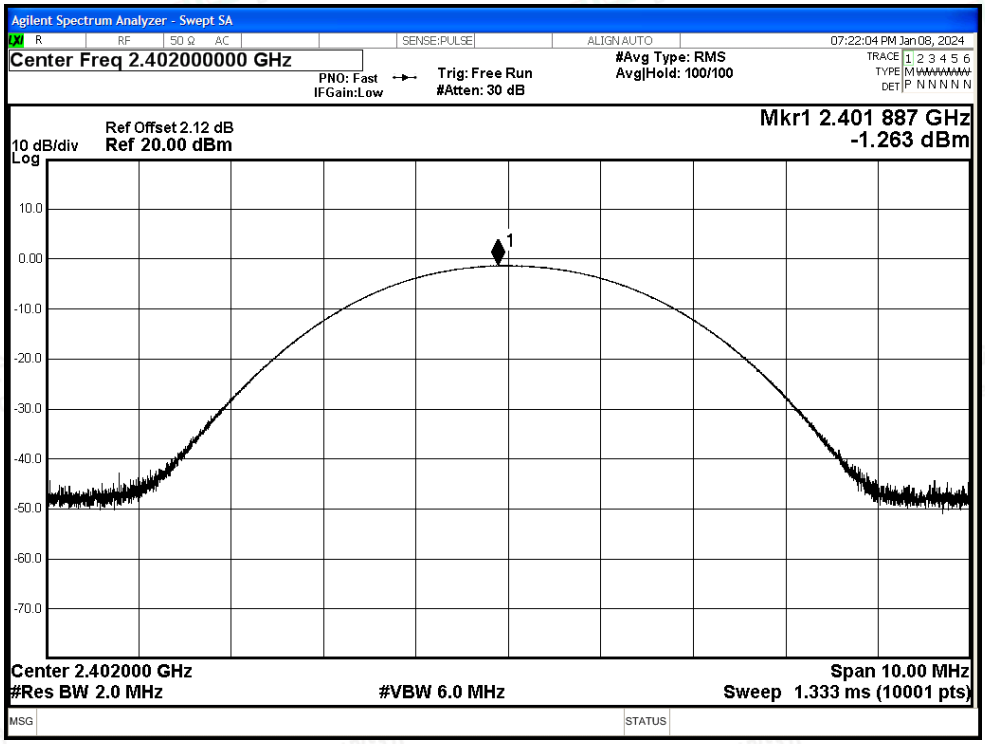


A.3 Maximum Peak Conducted Output Power

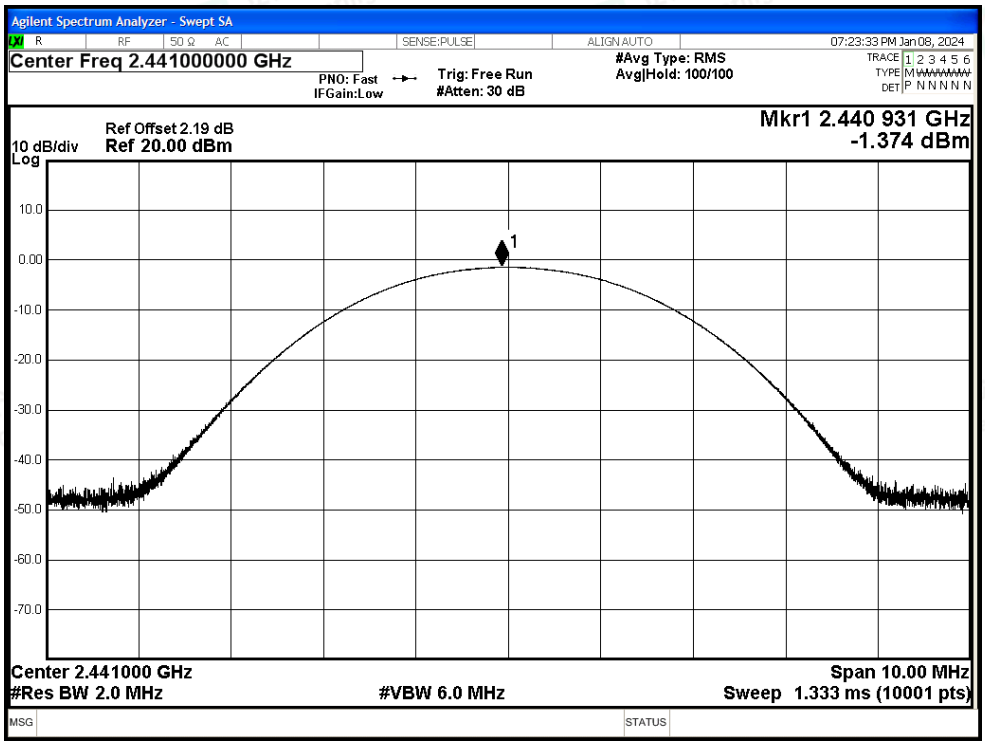
Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	1-DH5	2402	Ant	-1.26	21	Pass
NVNT	1-DH5	2441	Ant	-1.37	21	Pass
NVNT	1-DH5	2480	Ant	-0.36	21	Pass
NVNT	2-DH5	2402	Ant	-1.6	21	Pass
NVNT	2-DH5	2441	Ant	-2.17	21	Pass
NVNT	2-DH5	2480	Ant	-1.14	21	Pass
NVNT	3-DH5	2402	Ant	-1.67	21	Pass
NVNT	3-DH5	2441	Ant	-2.22	21	Pass
NVNT	3-DH5	2480	Ant	-1.16	21	Pass

Test Graphs

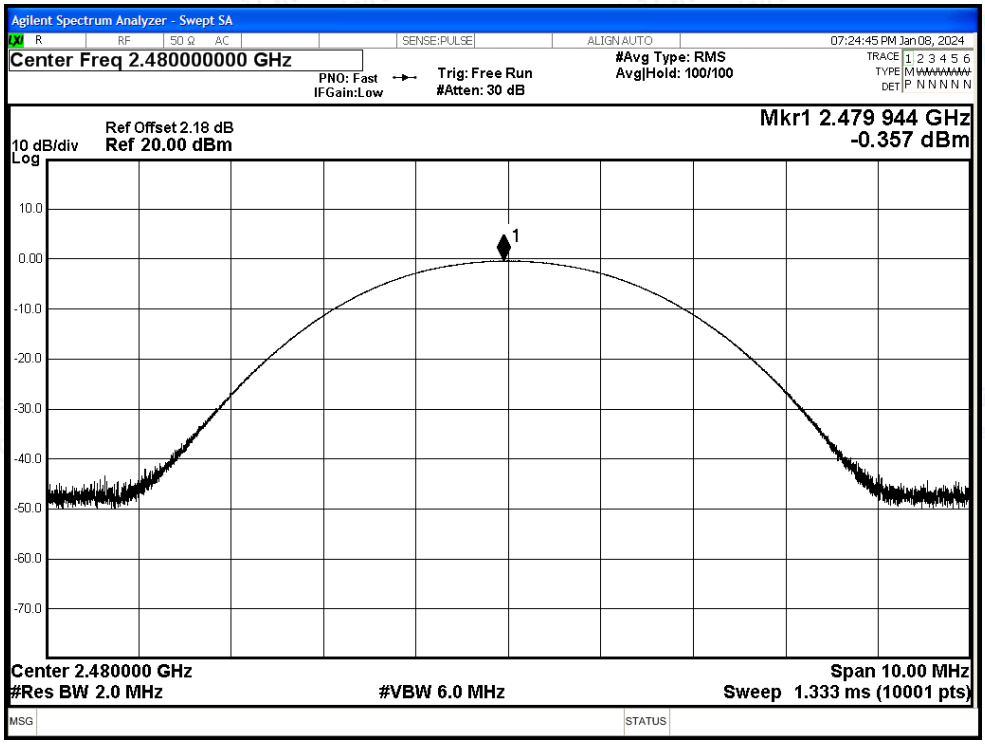
Power NVNT 1-DH5 2402MHz Ant



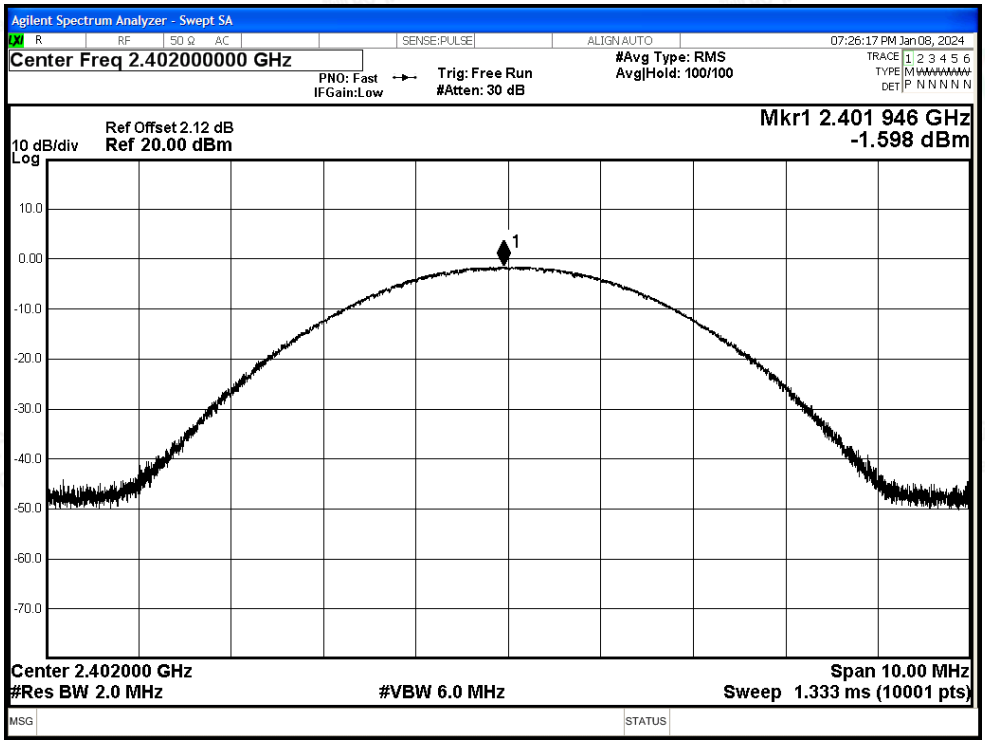
Power NVNT 1-DH5 2441MHz Ant



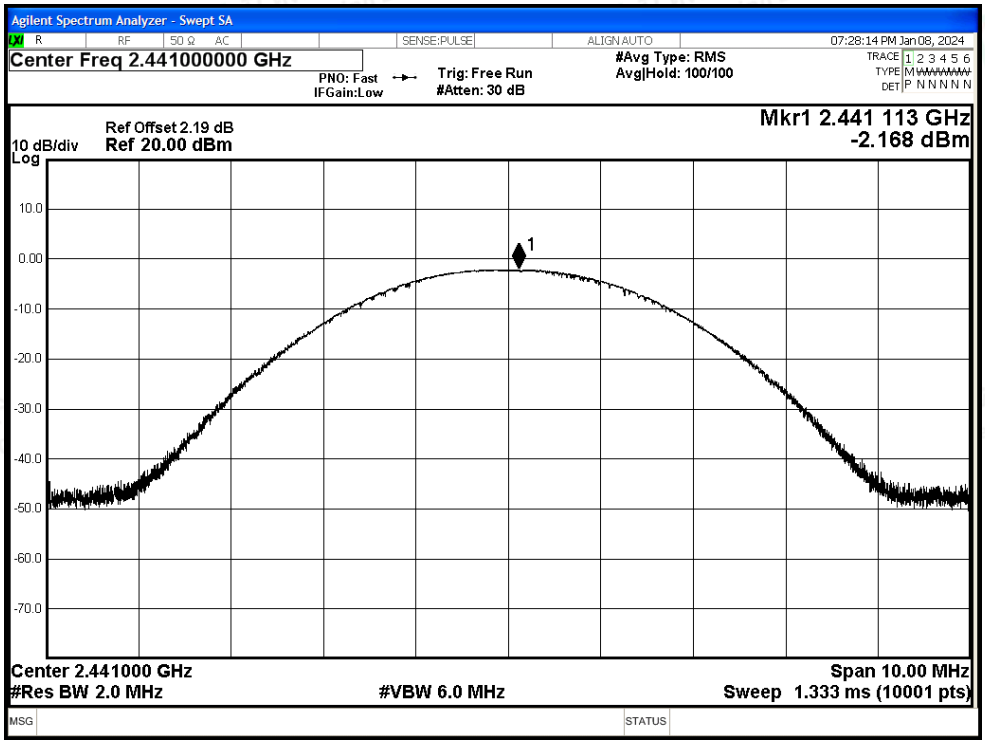
Power NVNT 1-DH5 2480MHz Ant



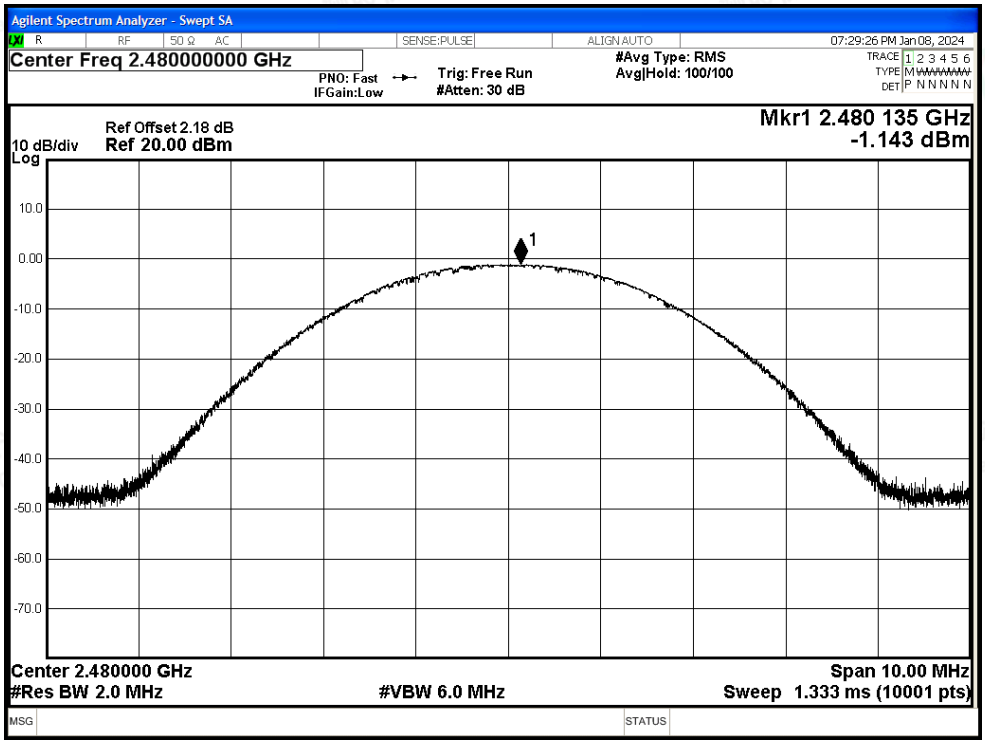
Power NVNT 2-DH5 2402MHz Ant



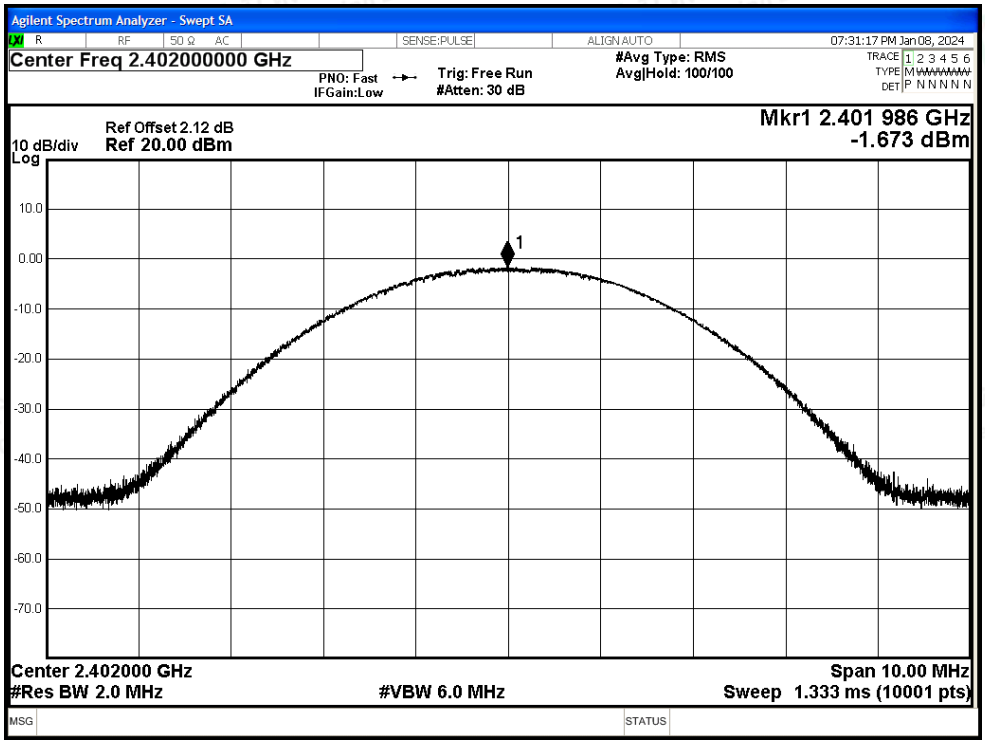
Power NVNT 2-DH5 2441MHz Ant



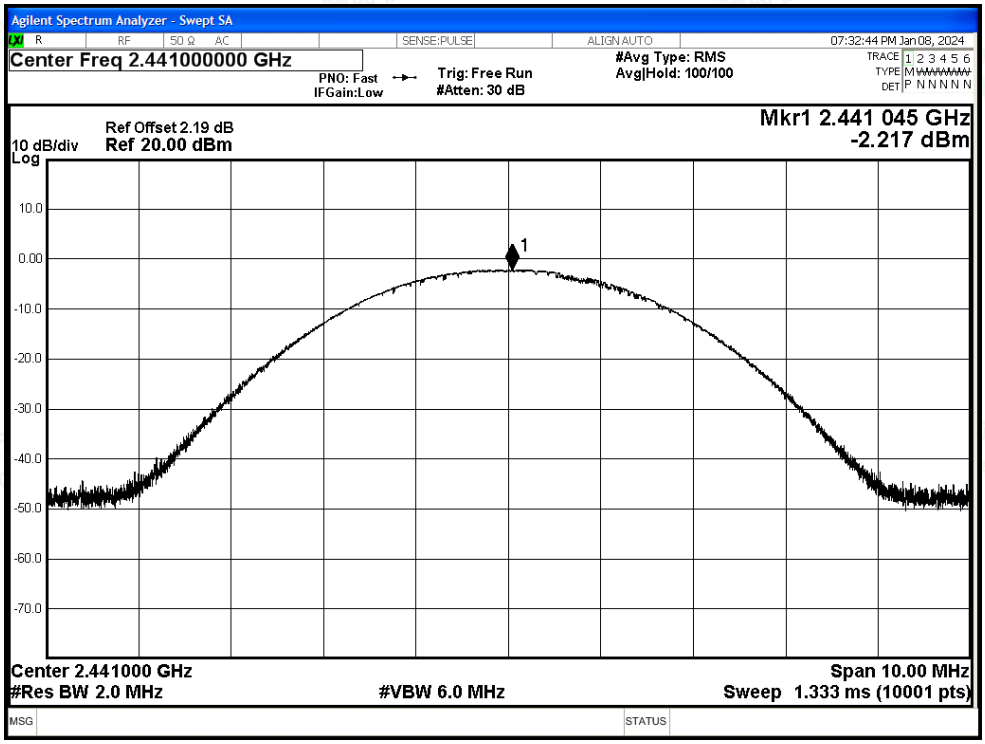
Power NVNT 2-DH5 2480MHz Ant



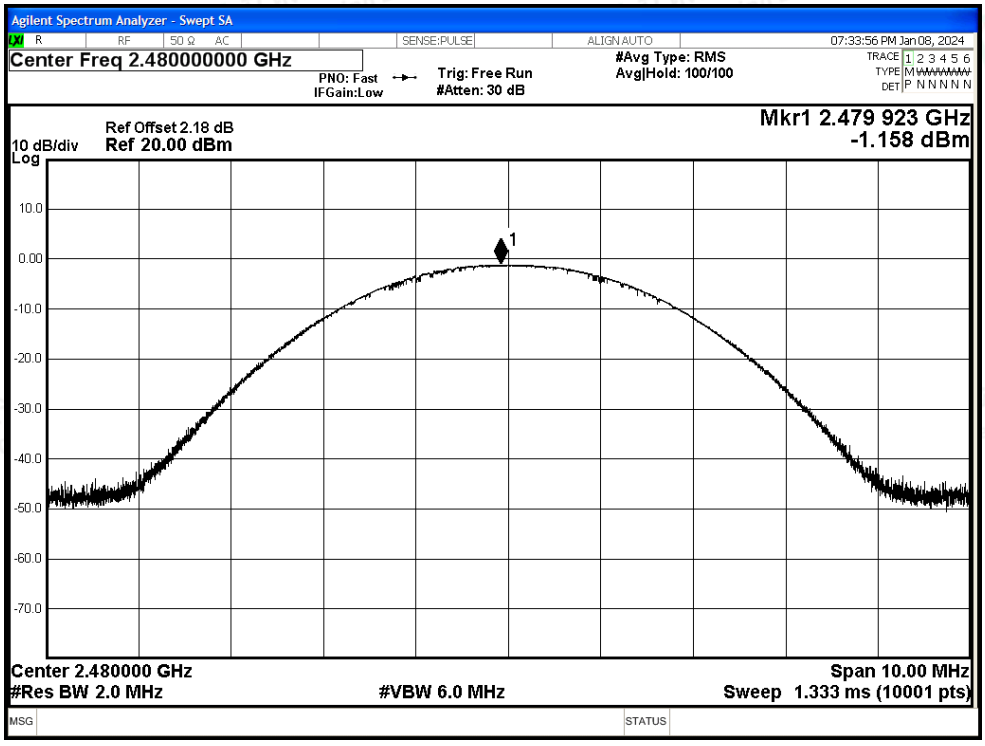
Power NVNT 3-DH5 2402MHz Ant



Power NVNT 3-DH5 2441MHz Ant



Power NVNT 3-DH5 2480MHz Ant

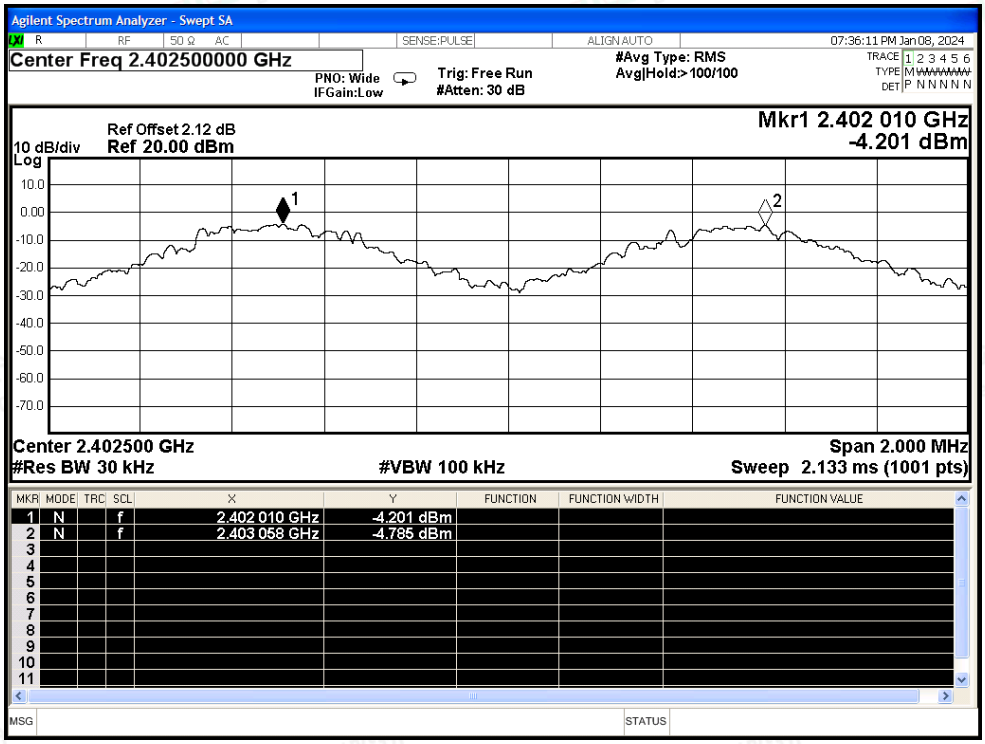


A.4 Carrier Frequencies Separation

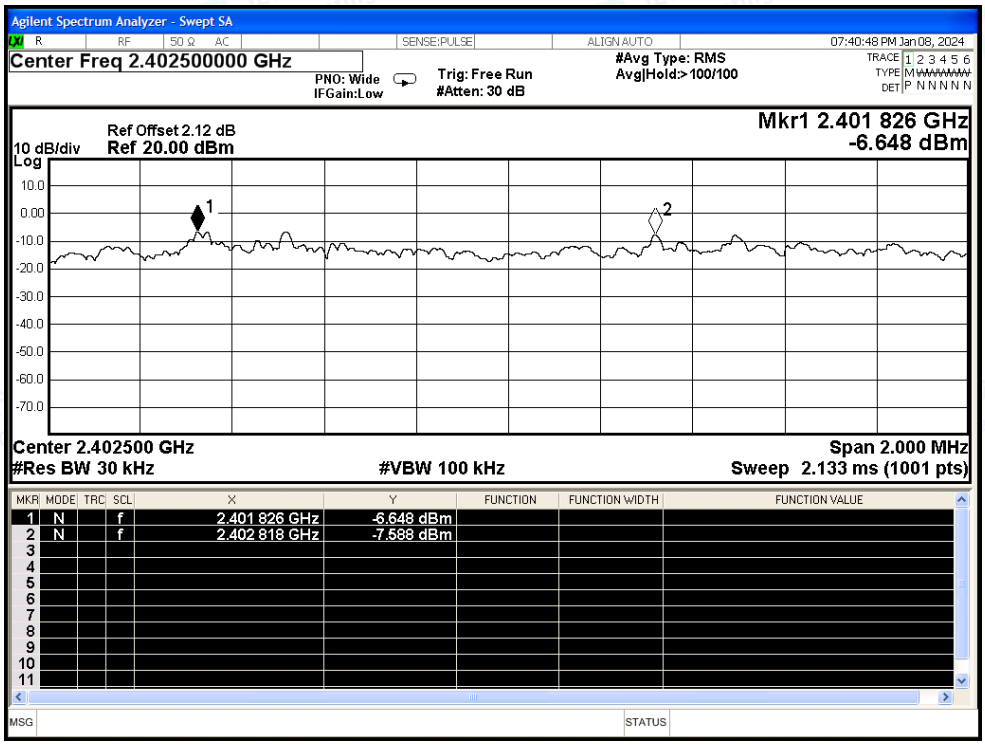
Condition	Mode	Antenna	Hopping Freq1 (MHz)	Hopping Freq2 (MHz)	HFS (MHz)	Limit (MHz)	Verdict
NVNT	1-DH5	Ant	2402.01	2403.058	1.048	0.595	Pass
NVNT	2-DH5	Ant	2401.826	2402.818	0.992	0.854	Pass
NVNT	3-DH5	Ant	2402.018	2403.014	0.996	0.865	Pass

Test Graphs

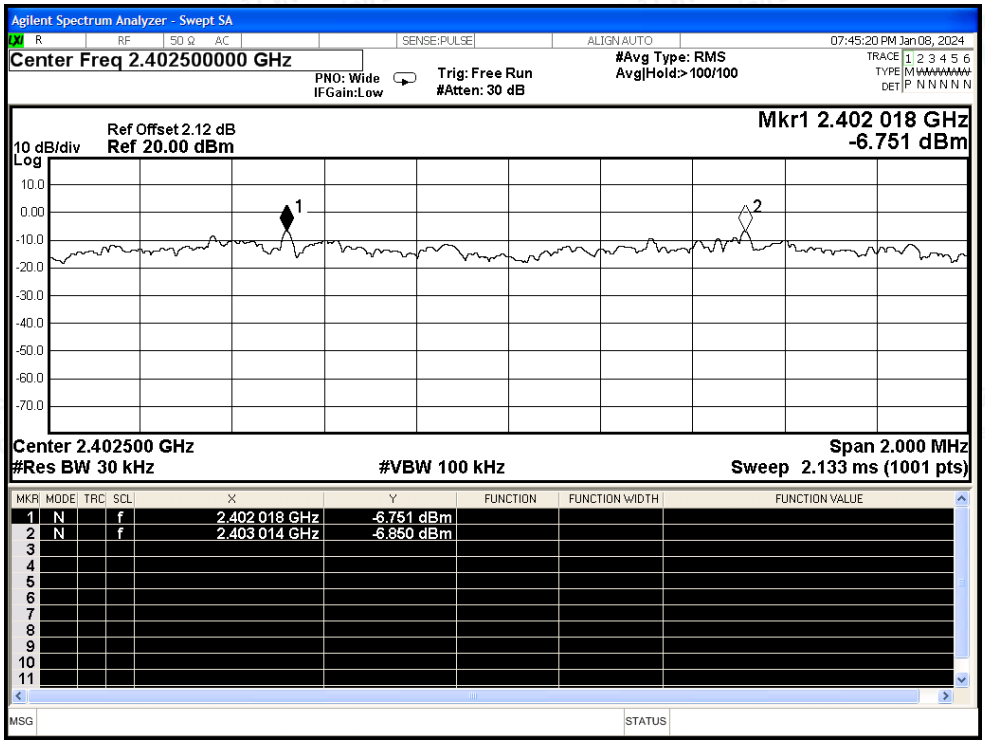
CFS NVNT 1-DH5 2402MHz Ant



CFS NVNT 2-DH5 2402MHz Ant



CFS NVNT 3-DH5 2402MHz Ant

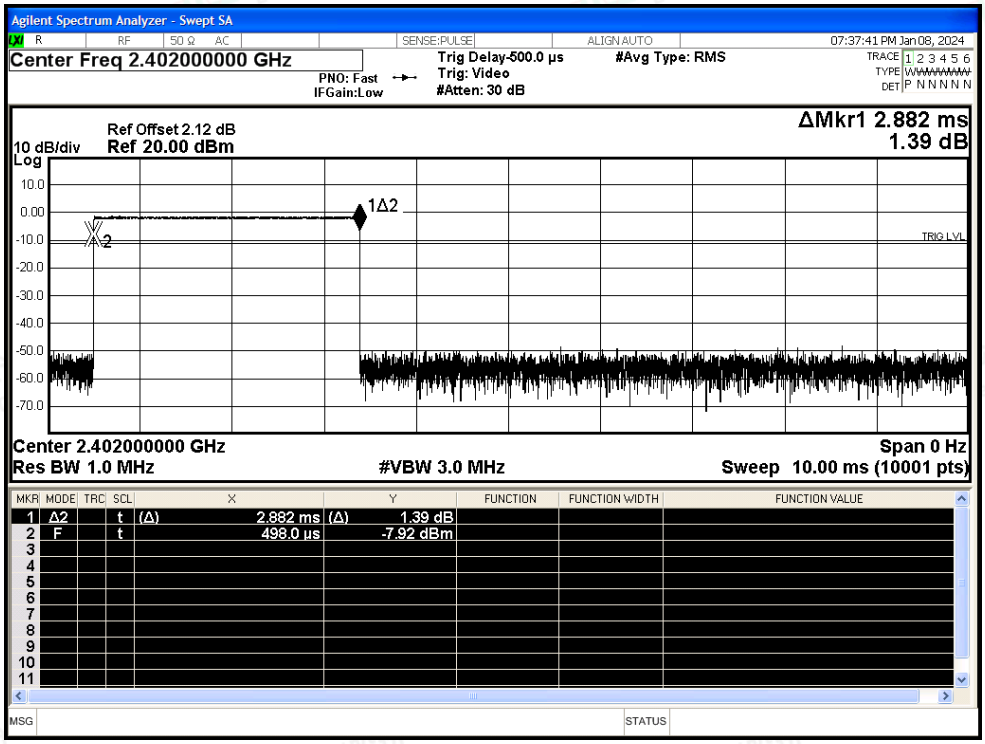


A.5 Dwell Time

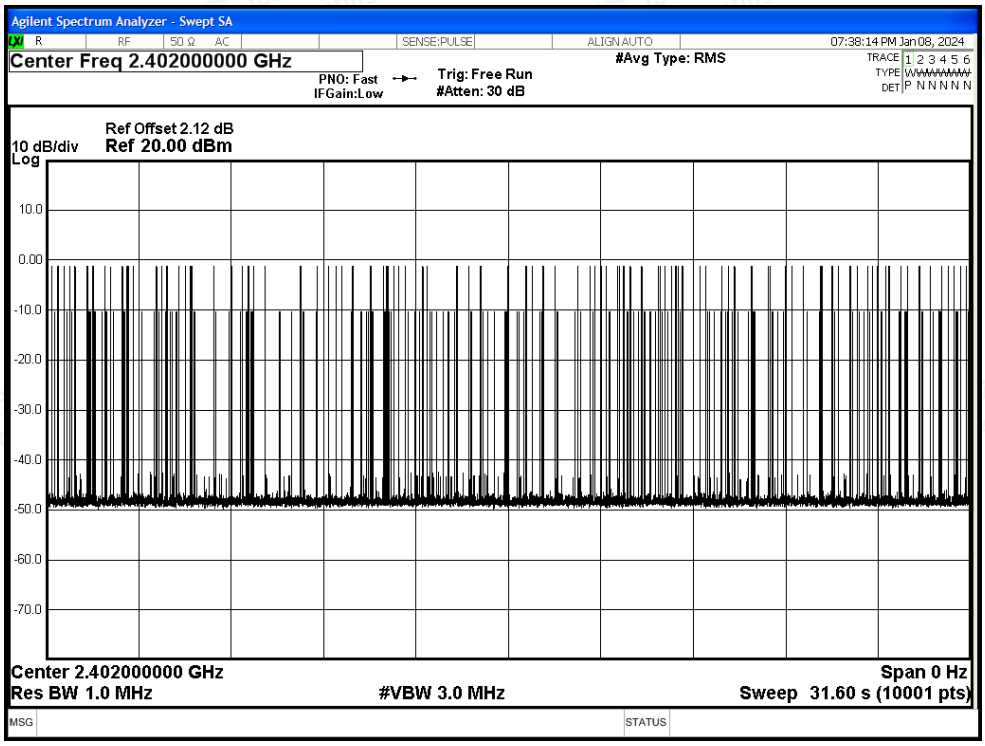
Condition	Mode	Frequency (MHz)	Antenna	Pulse Time (ms)	Total Dwell Time (ms)	Burst Count	Period Time (ms)	Limit (ms)	Verdict
NVNT	1-DH5	2402	Ant	2.882	314.138	109	31600	400	Pass
NVNT	2-DH5	2402	Ant	2.885	314.465	109	31600	400	Pass
NVNT	3-DH5	2402	Ant	2.886	291.486	101	31600	400	Pass

Test Graphs

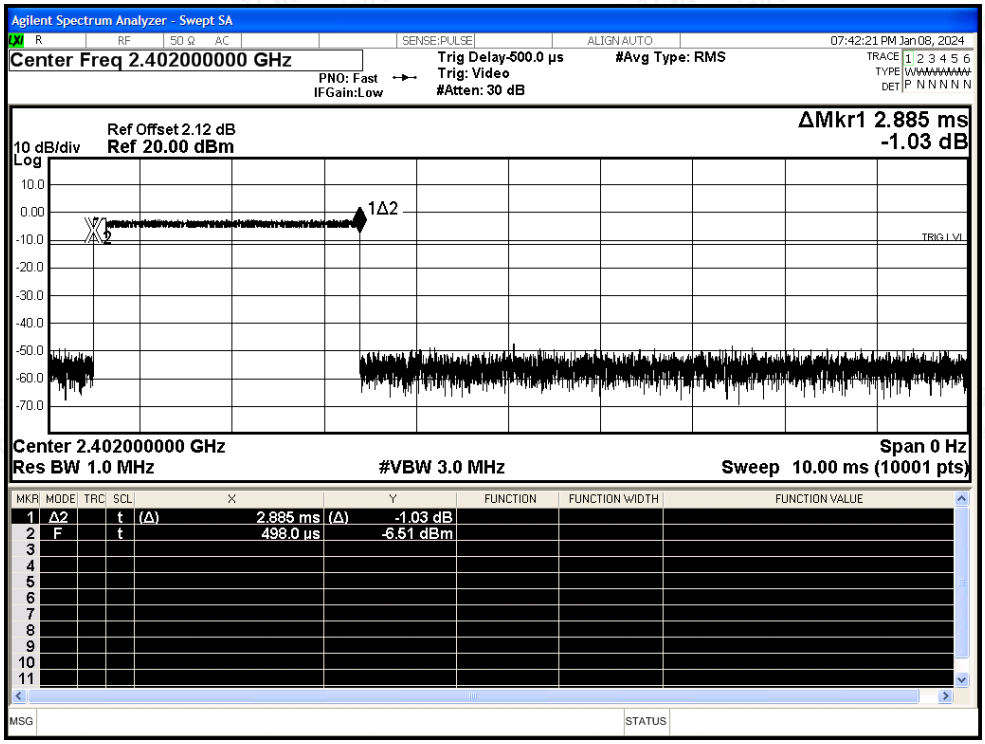
Dwell NVNT 1-DH5 2402MHz Ant One Burst



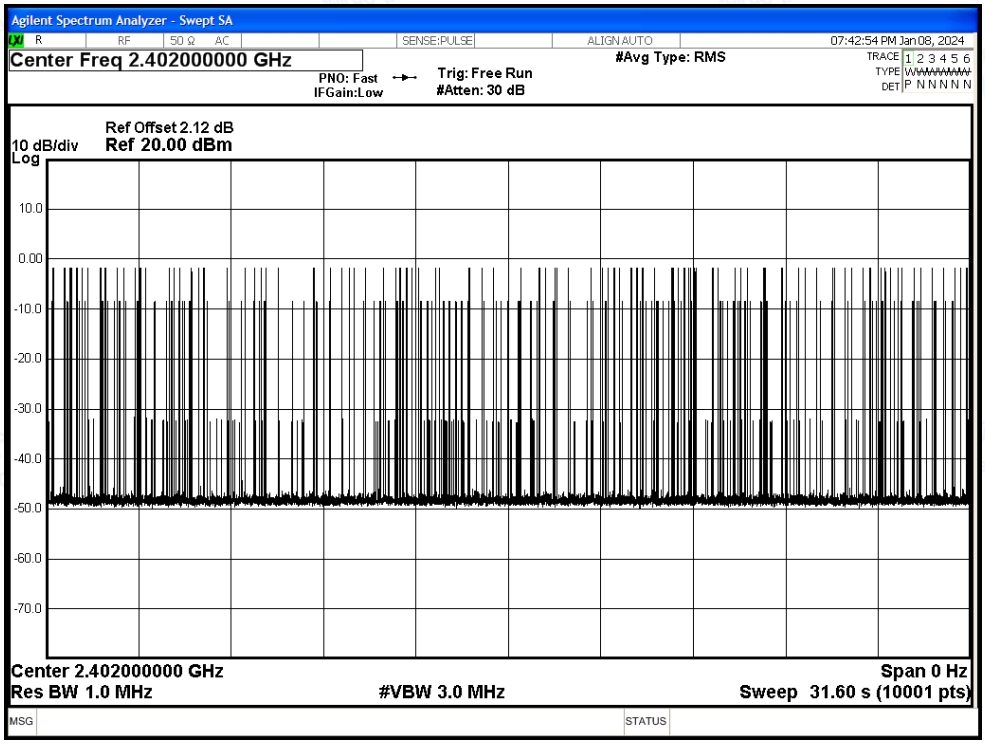
Dwell NVNT 1-DH5 2402MHz Ant Accumulated



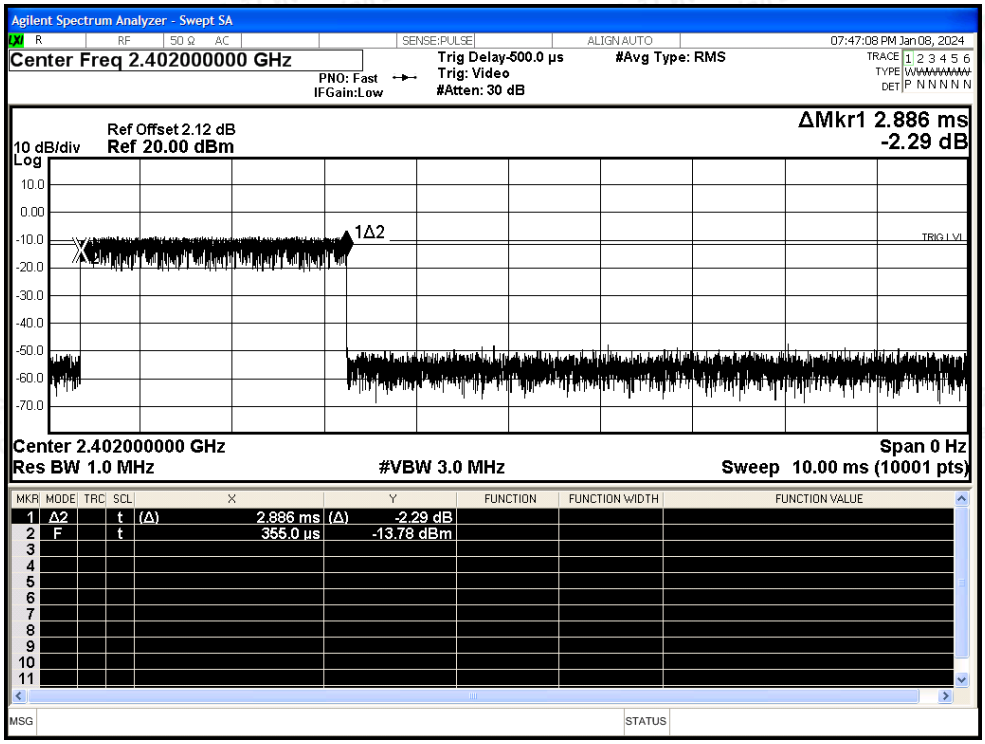
Dwell NVNT 2-DH5 2402MHz Ant One Burst



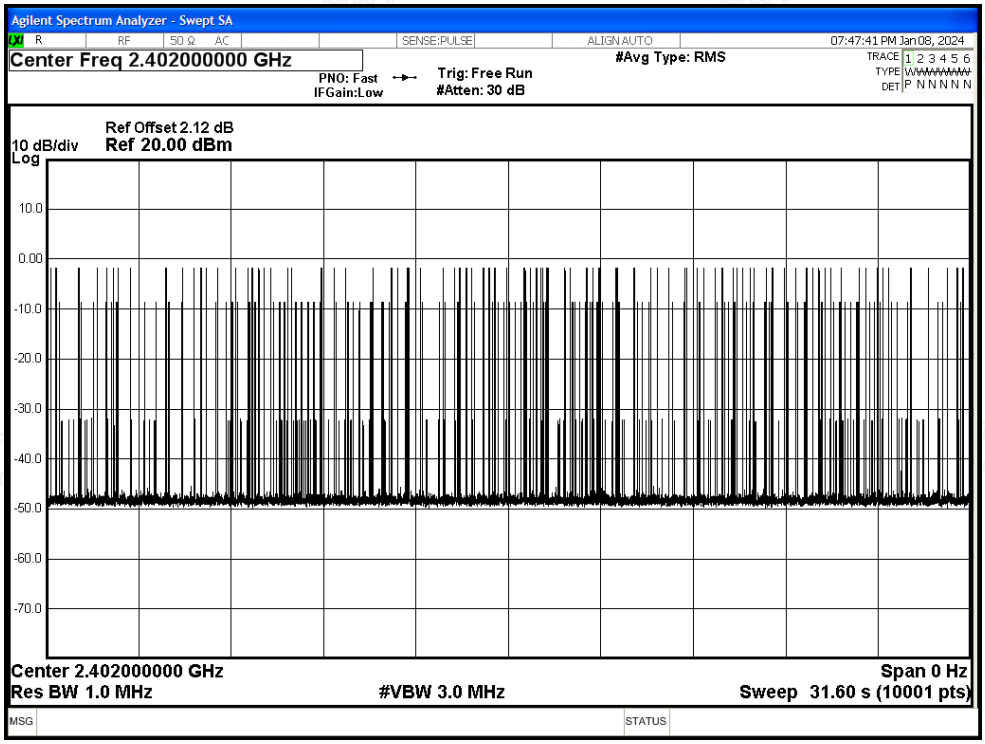
Dwell NVNT 2-DH5 2402MHz Ant Accumulated



Dwell NVNT 3-DH5 2402MHz Ant One Burst



Dwell NVNT 3-DH5 2402MHz Ant Accumulated

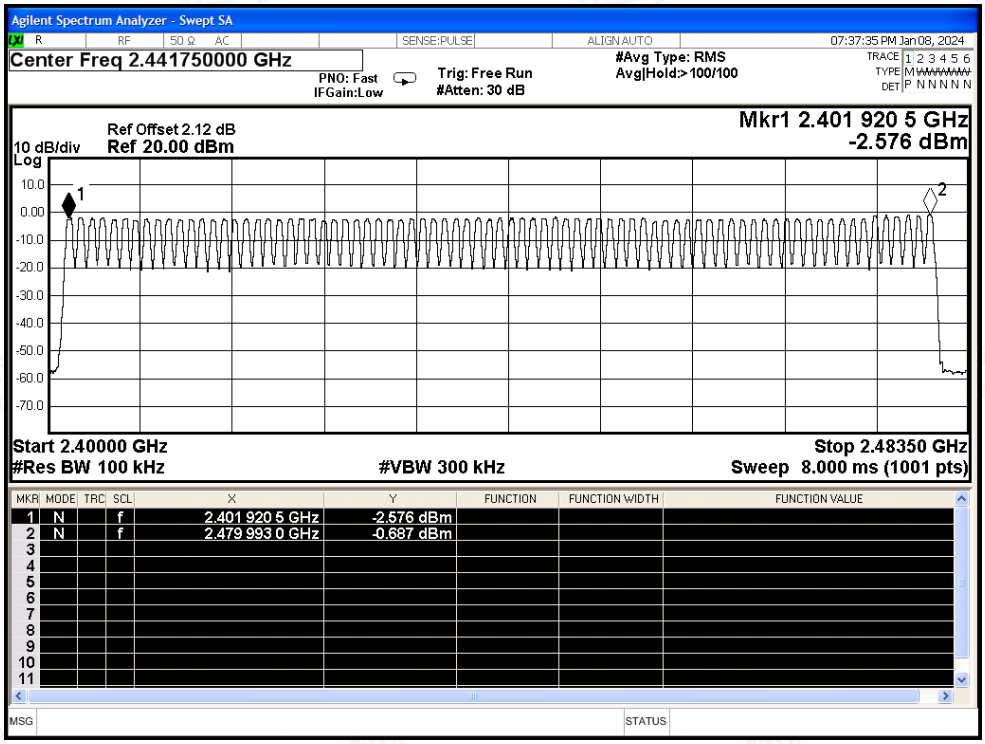


A.6 Number of Hopping Channel

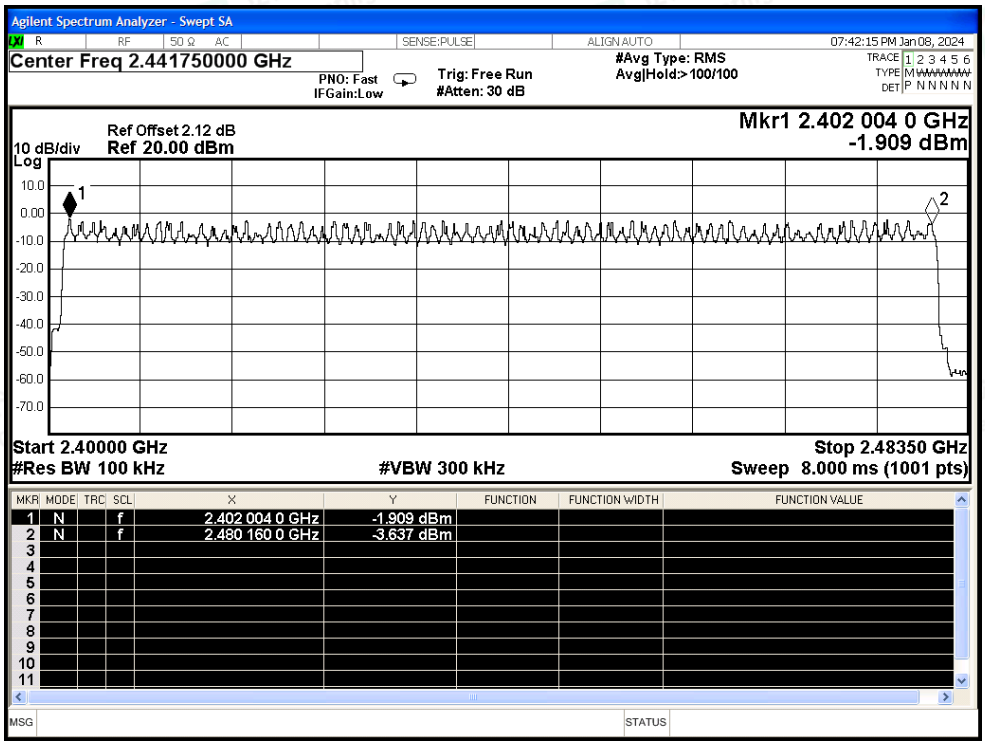
Condition	Mode	Antenna	Hopping Number	Limit	Verdict
NVNT	1-DH5	Ant	79	15	Pass
NVNT	2-DH5	Ant	79	15	Pass
NVNT	3-DH5	Ant	79	15	Pass

Test Graphs

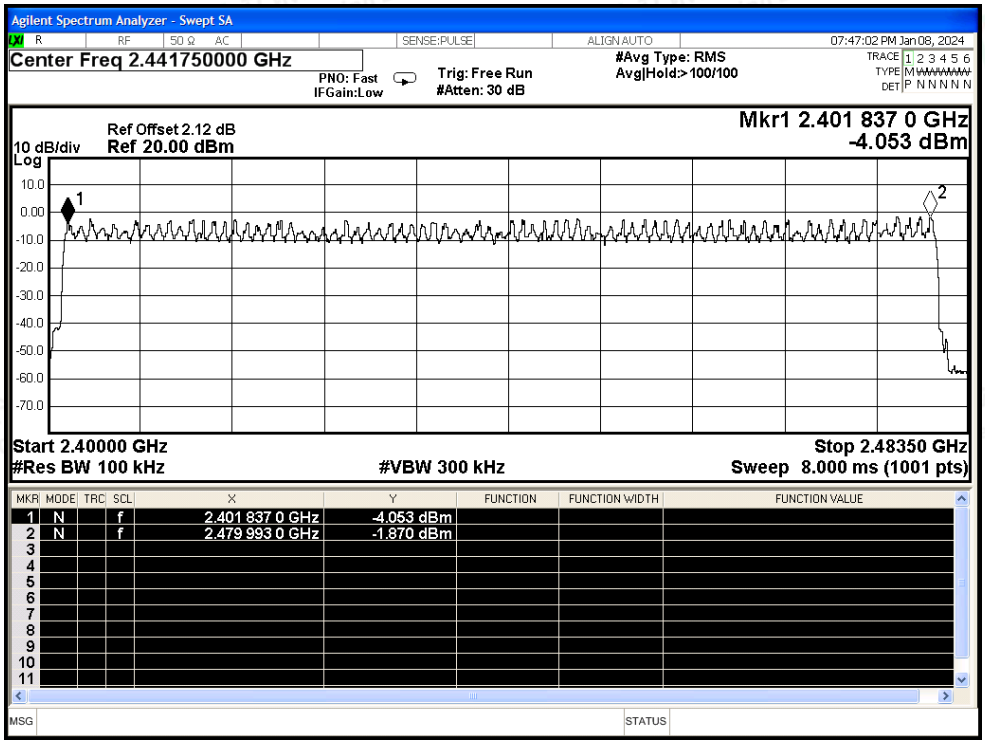
Hopping No. NVNT 1-DH5 2402MHz Ant



Hopping No. NVNT 2-DH5 2402MHz Ant



Hopping No. NVNT 3-DH5 2402MHz Ant

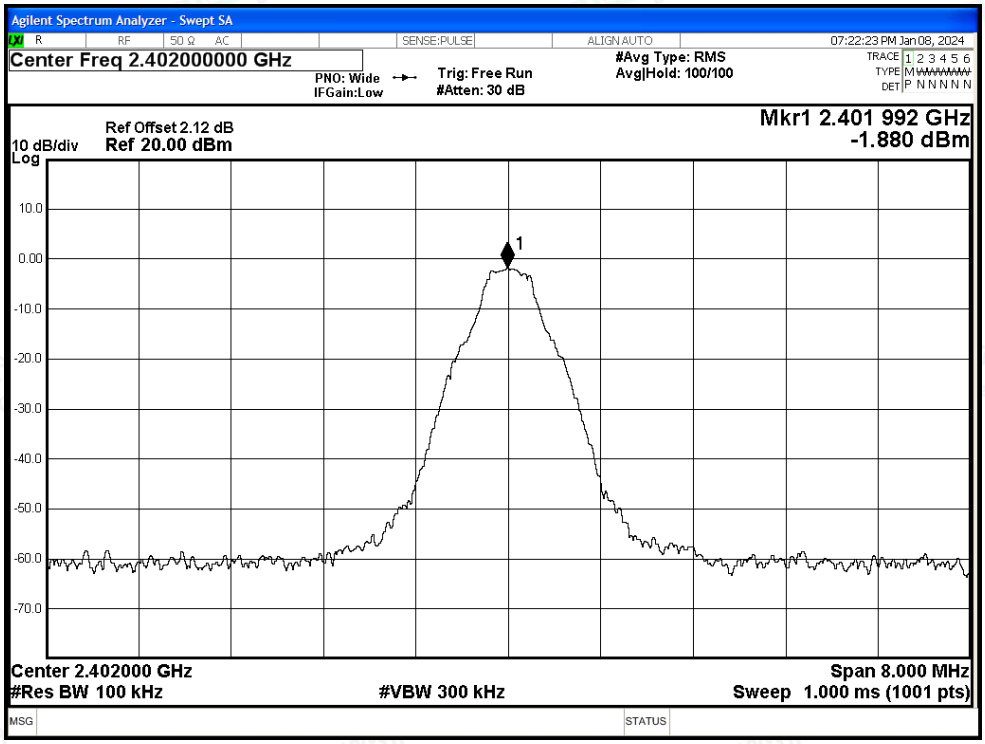


A.7 Band Edge

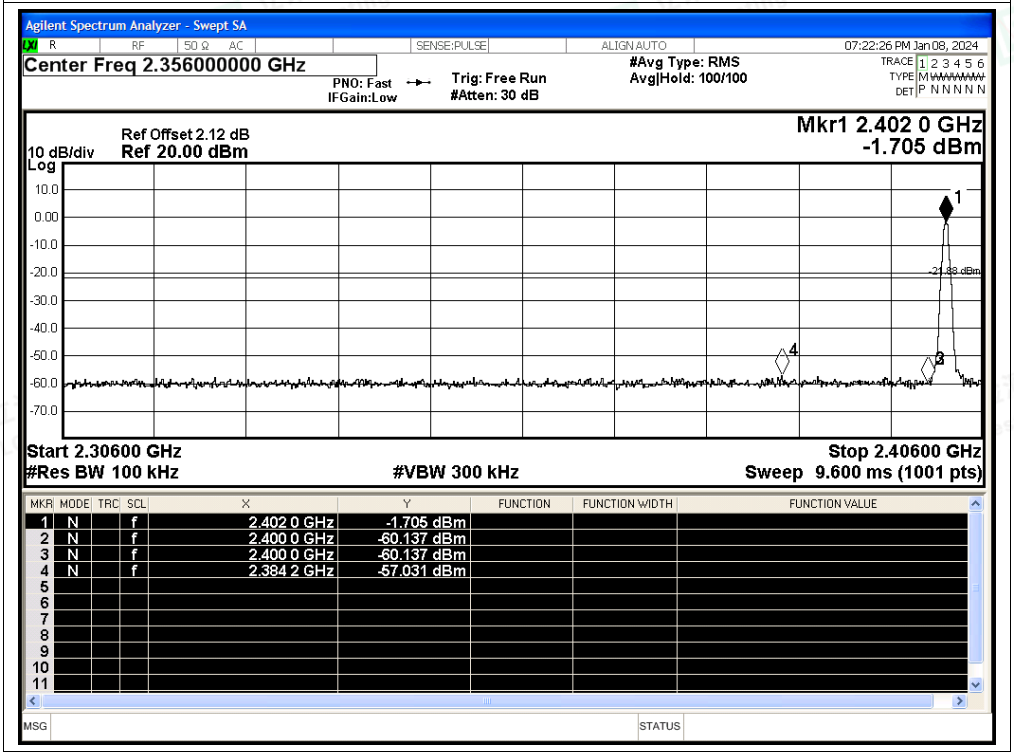
Condition	Mode	Frequency (MHz)	Antenna	Hopping Mode	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	1-DH5	2402	Ant	No-Hopping	-55.15	-20	Pass
NVNT	1-DH5	2480	Ant	No-Hopping	-56.66	-20	Pass
NVNT	2-DH5	2402	Ant	No-Hopping	-52.39	-20	Pass
NVNT	2-DH5	2480	Ant	No-Hopping	-55.14	-20	Pass
NVNT	3-DH5	2402	Ant	No-Hopping	-52.26	-20	Pass
NVNT	3-DH5	2480	Ant	No-Hopping	-56.28	-20	Pass

Test Graphs

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

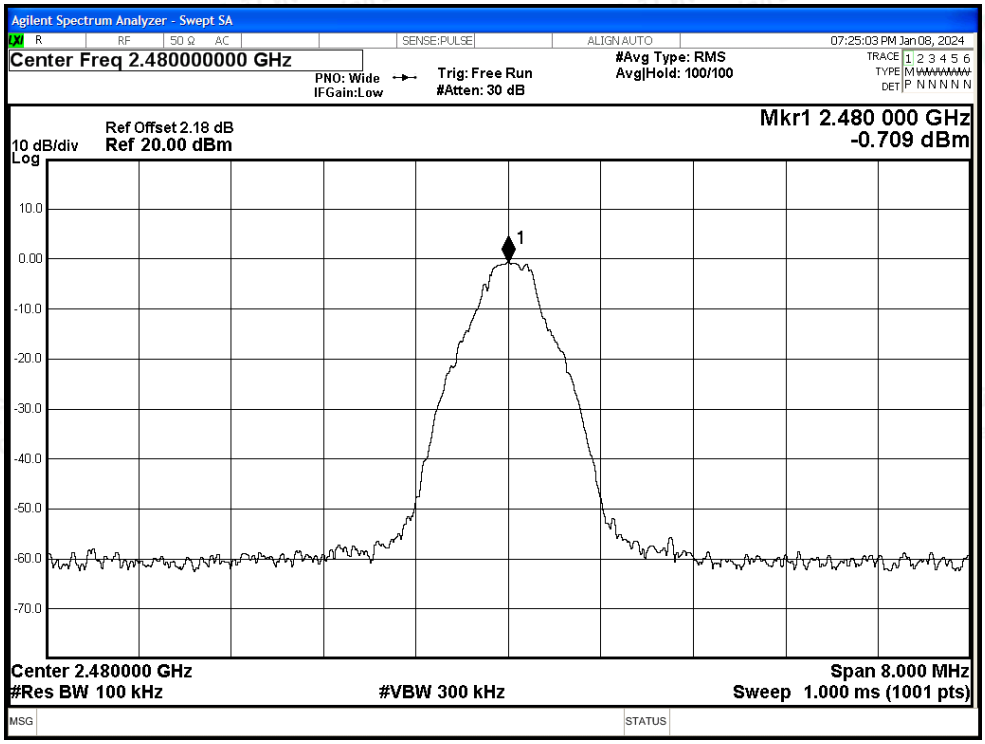


Band Edge NVNT 1-DH5 2402MHz Ant No-Hopping Emission

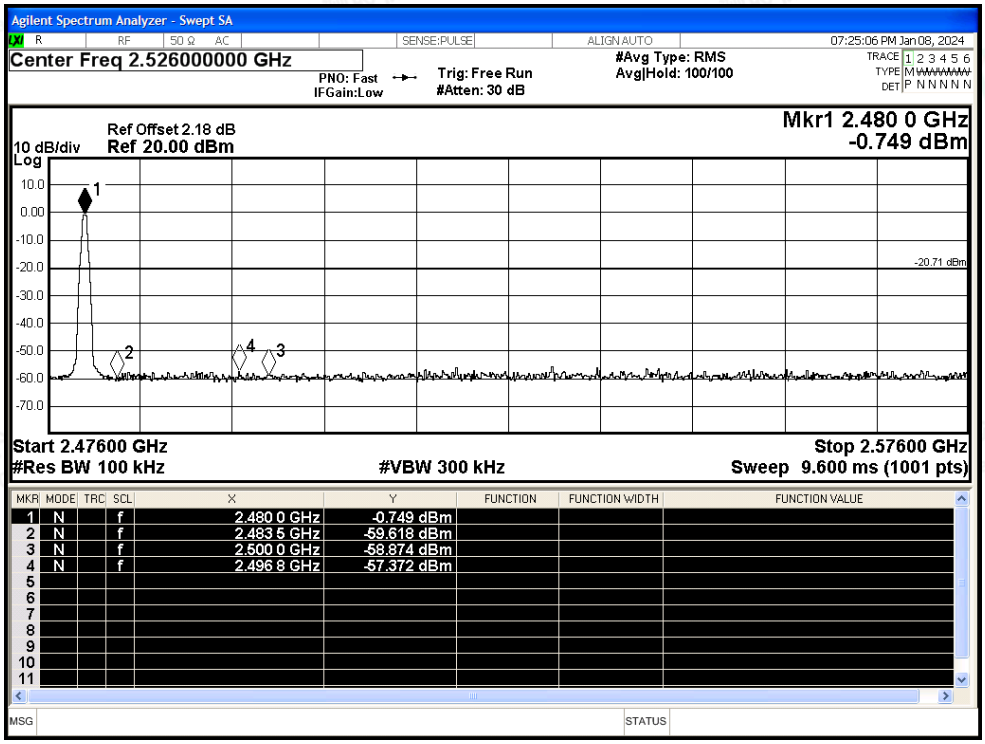


MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N		f	2.402 0 GHz	-1.705 dBm			
2	N		f	2.400 0 GHz	-60.137 dBm			
3	N		f	2.400 0 GHz	-60.137 dBm			
4	N		f	2.384 2 GHz	-57.031 dBm			
5								
6								
7								
8								
9								
10								
11								

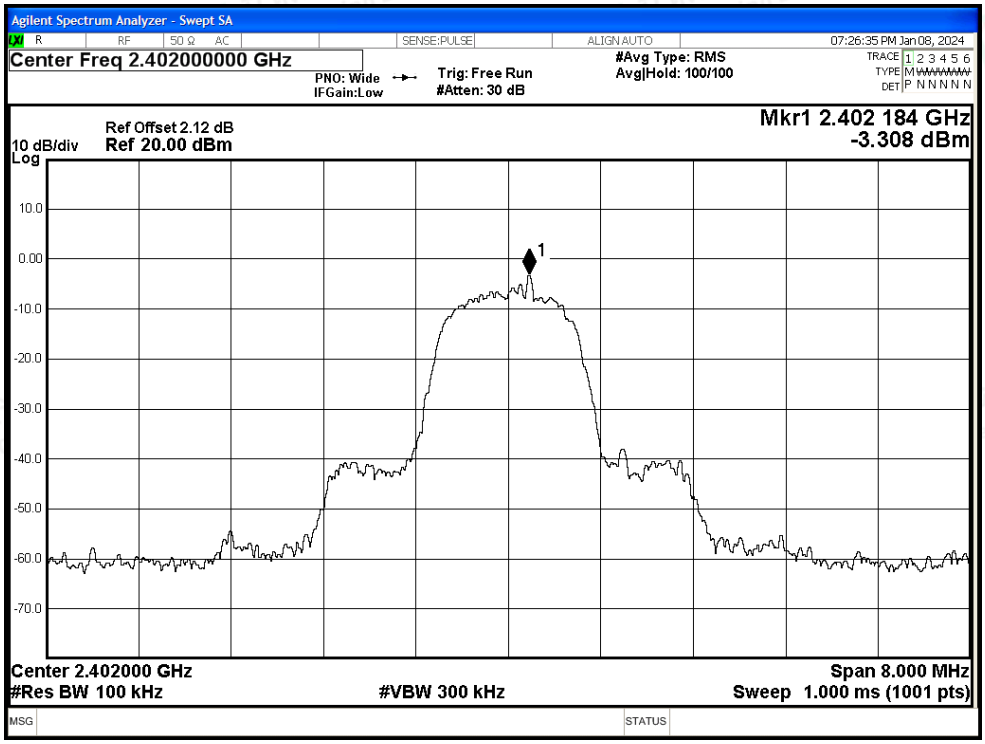
Band Edge NVNT 1-DH5 2480MHz Ant No-Hopping Ref



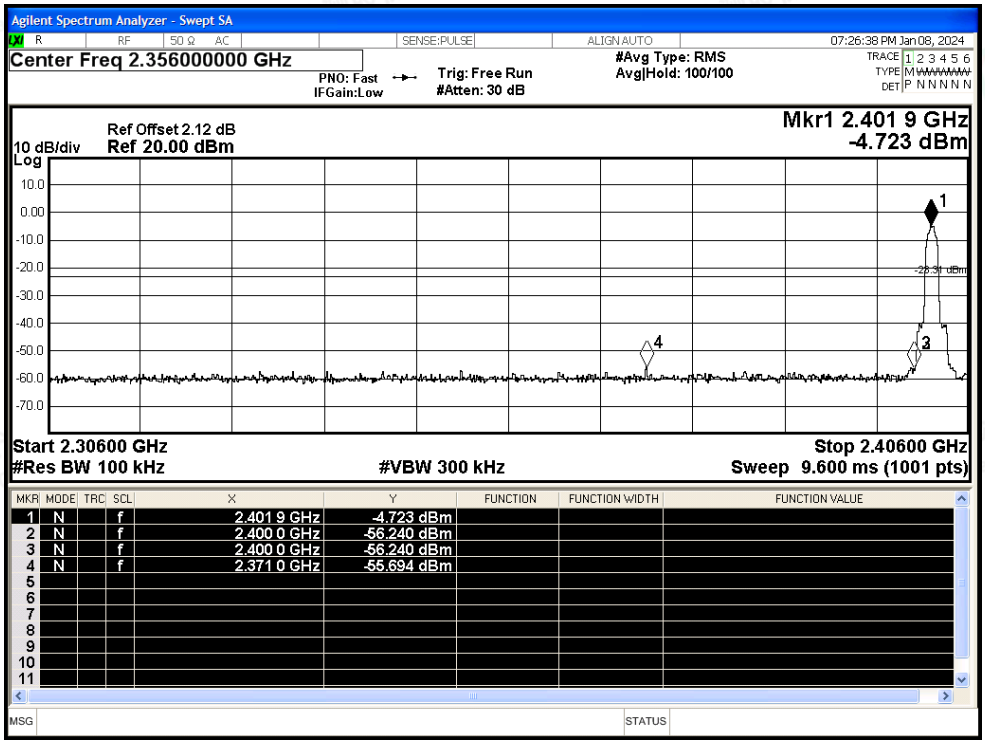
Band Edge NVNT 1-DH5 2480MHz Ant No-Hopping Emission



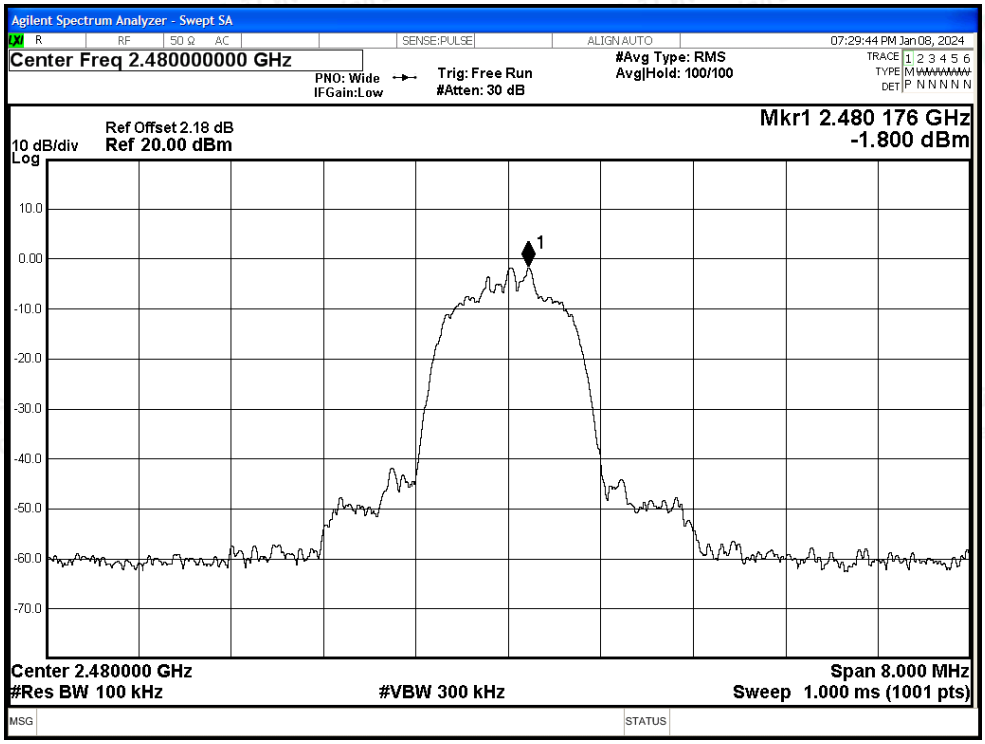
Band Edge NVNT 2-DH5 2402MHz Ant No-Hopping Ref



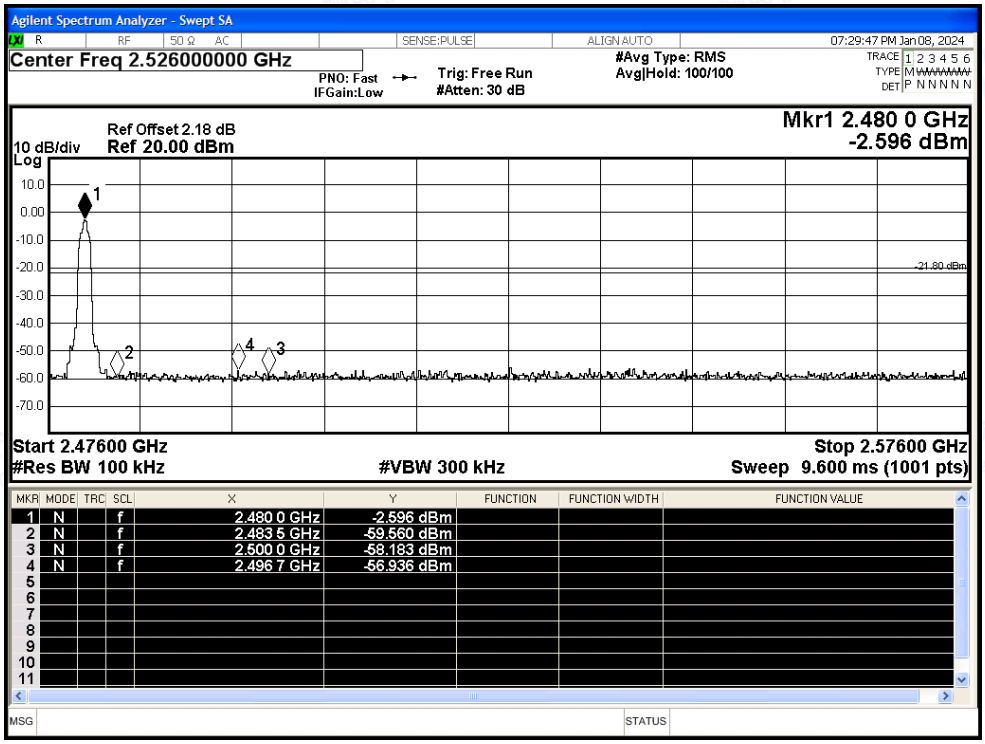
Band Edge NVNT 2-DH5 2402MHz Ant No-Hopping Emission



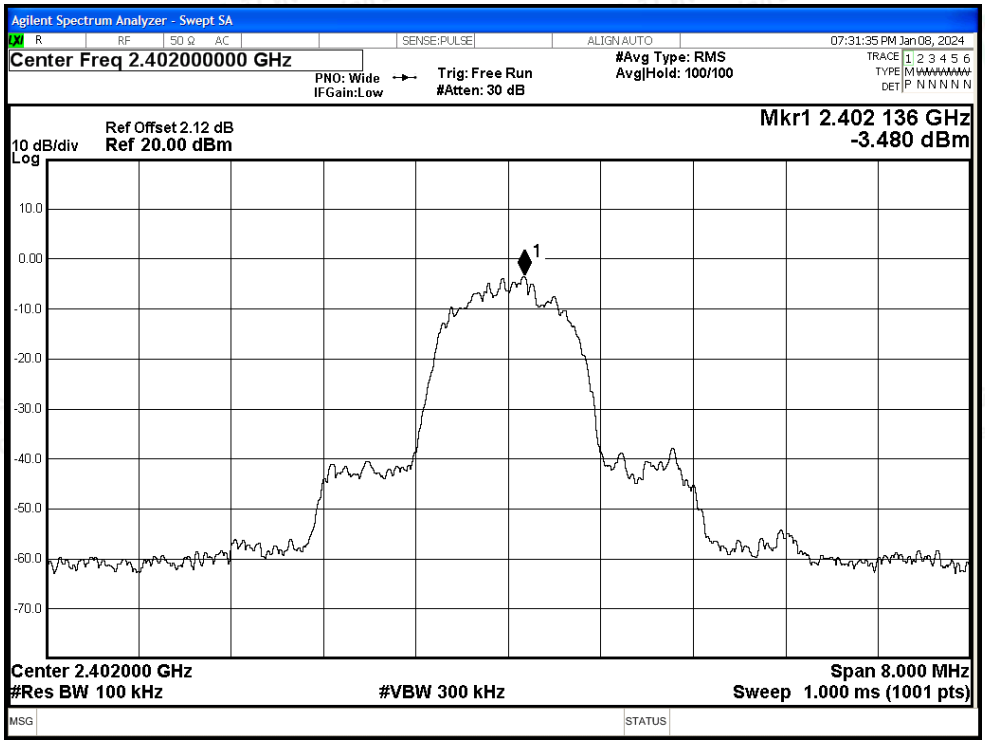
Band Edge NVNT 2-DH5 2480MHz Ant No-Hopping Ref



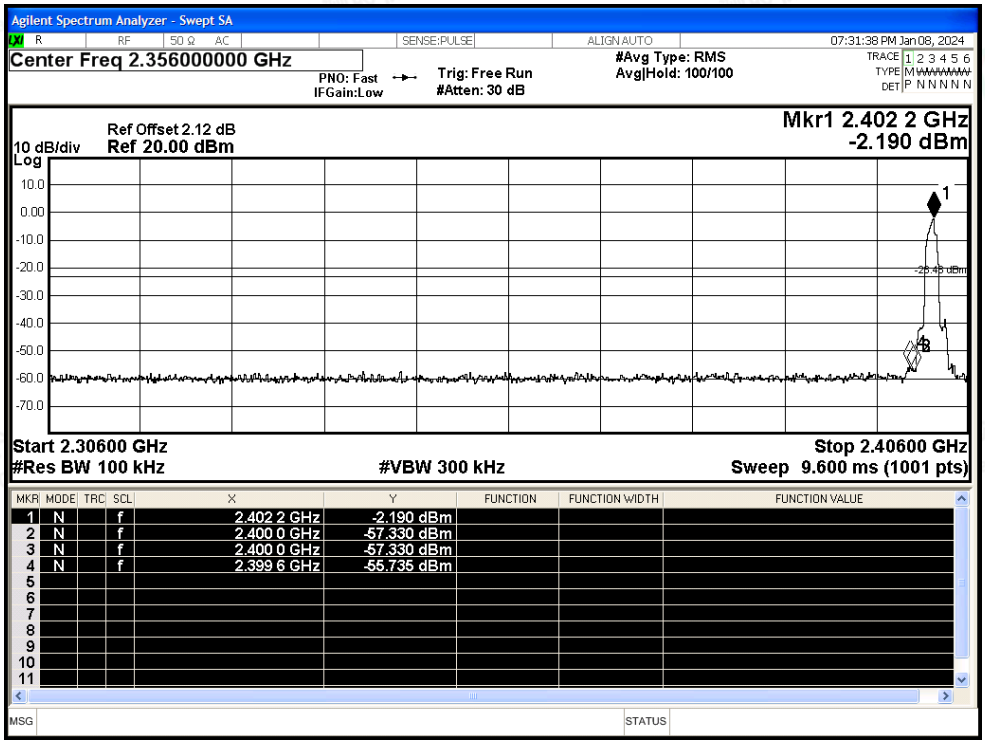
Band Edge NVNT 2-DH5 2480MHz Ant No-Hopping Emission



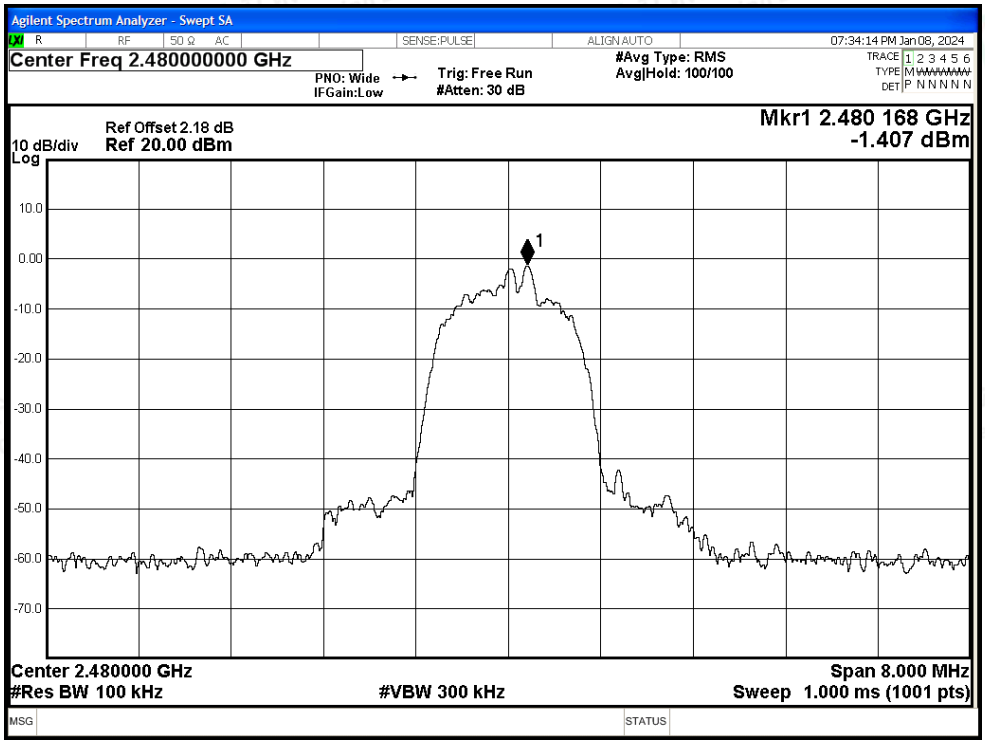
Band Edge NVNT 3-DH5 2402MHz Ant No-Hopping Ref



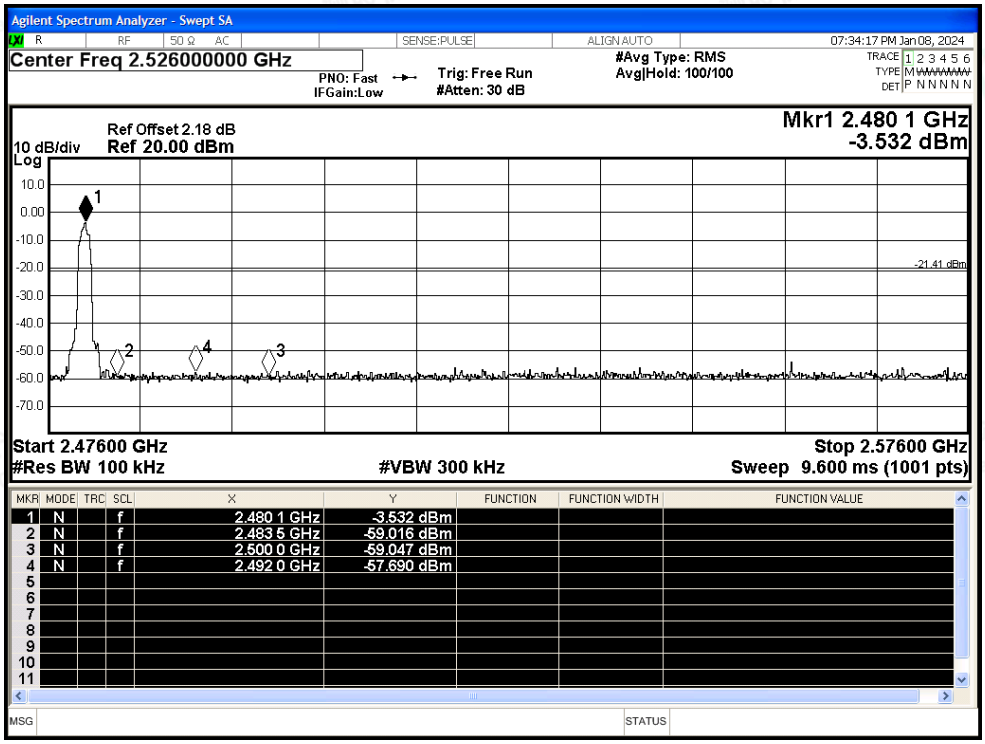
Band Edge NVNT 3-DH5 2402MHz Ant No-Hopping Emission



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



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

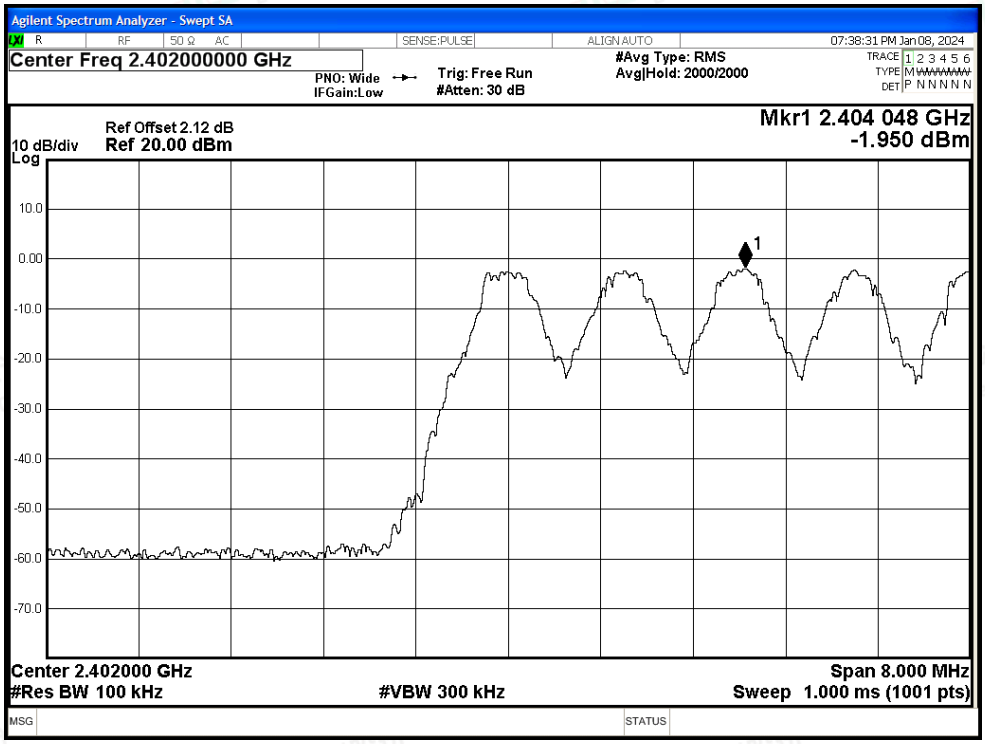


(Hopping)

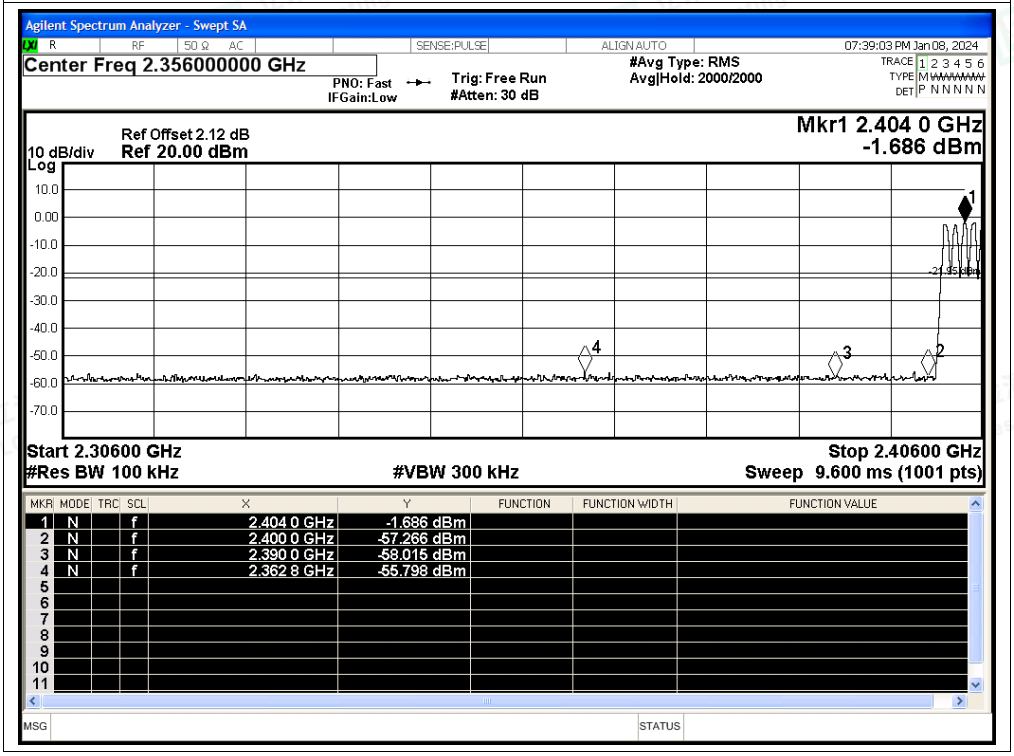
Condition	Mode	Frequency (MHz)	Antenna	Hopping Mode	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	1-DH5	2402	Ant	Hopping	-53.85	-20	Pass
NVNT	1-DH5	2480	Ant	Hopping	-54.51	-20	Pass
NVNT	2-DH5	2402	Ant	Hopping	-53.17	-20	Pass
NVNT	2-DH5	2480	Ant	Hopping	-53.52	-20	Pass
NVNT	3-DH5	2402	Ant	Hopping	-51.51	-20	Pass
NVNT	3-DH5	2480	Ant	Hopping	-54.01	-20	Pass

Test Graphs

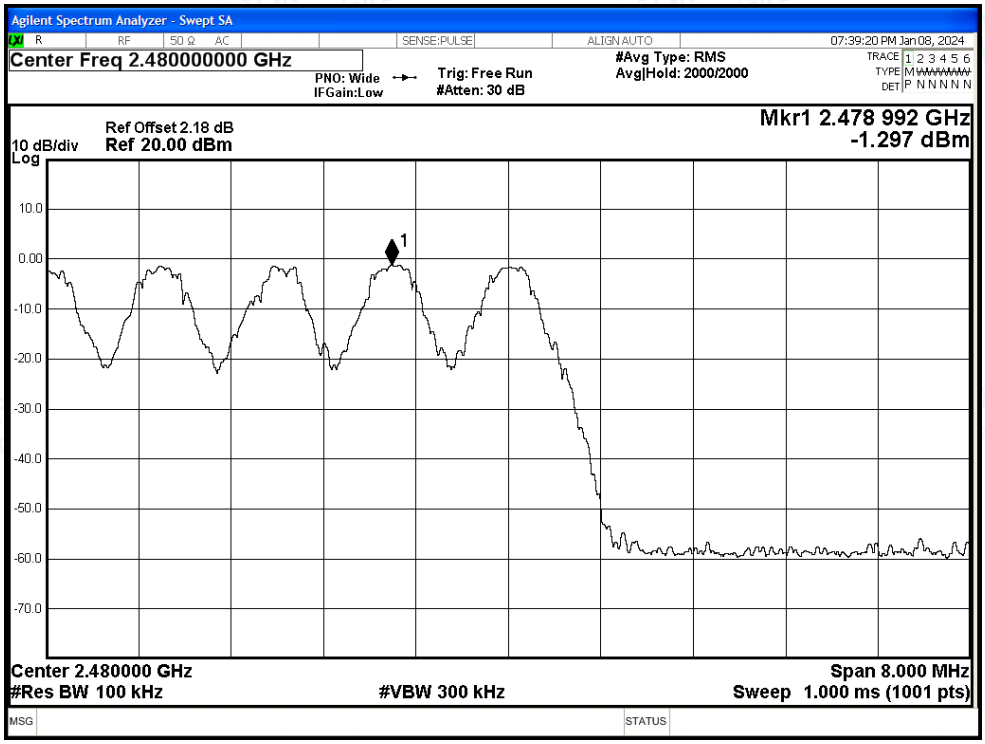
Band Edge(Hopping) NVNT 1-DH5 2402MHz Ant Hopping Ref



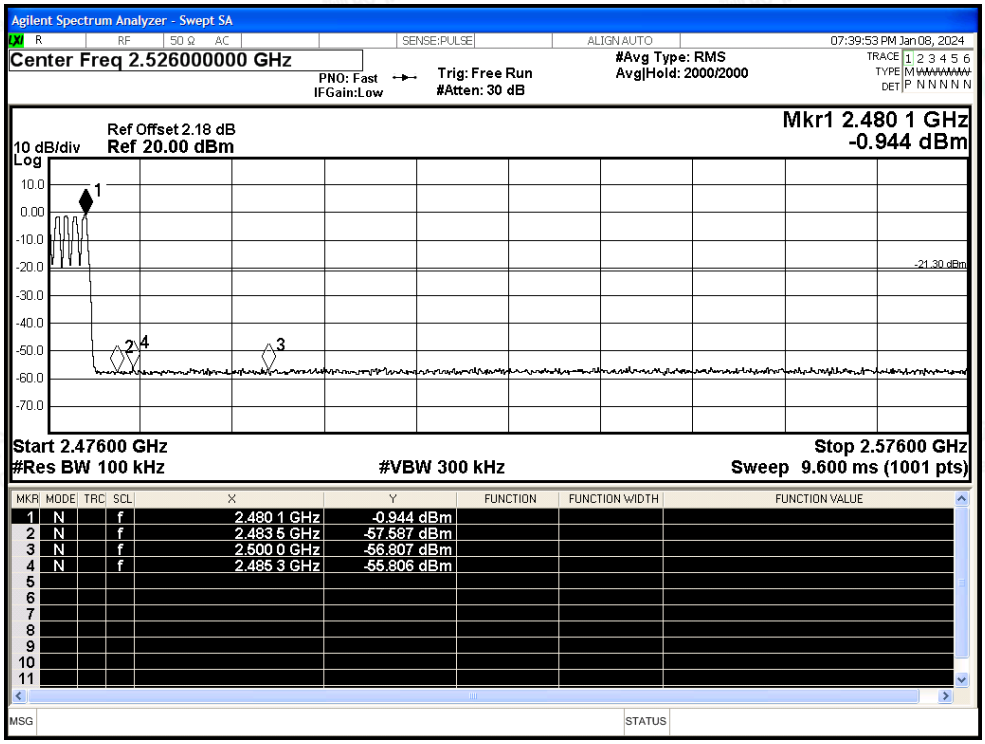
Band Edge(Hopping) NVNT 1-DH5 2402MHz Ant Hopping Emission



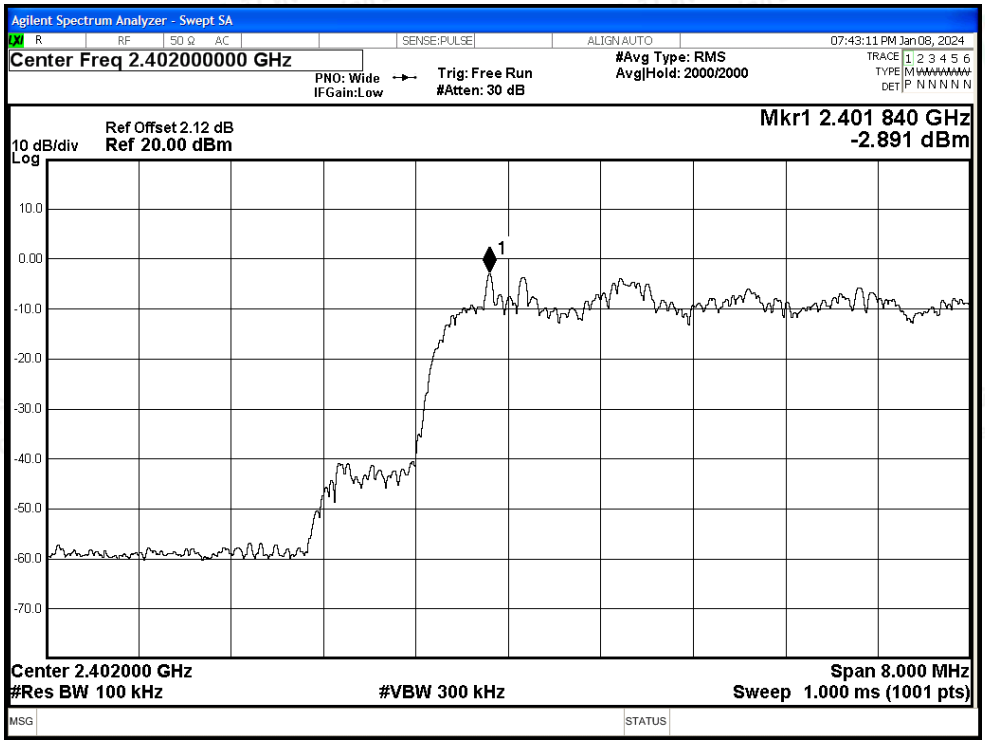
Band Edge(Hopping) NVNT 1-DH5 2480MHz Ant Hopping Ref



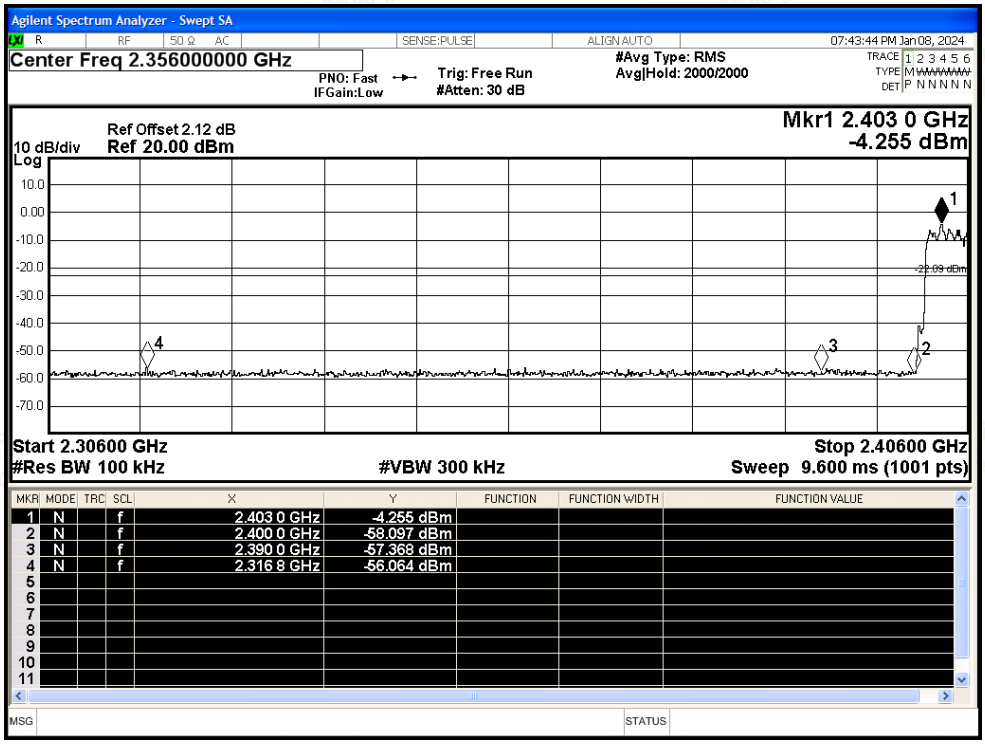
Band Edge(Hopping) NVNT 1-DH5 2480MHz Ant Hopping Emission



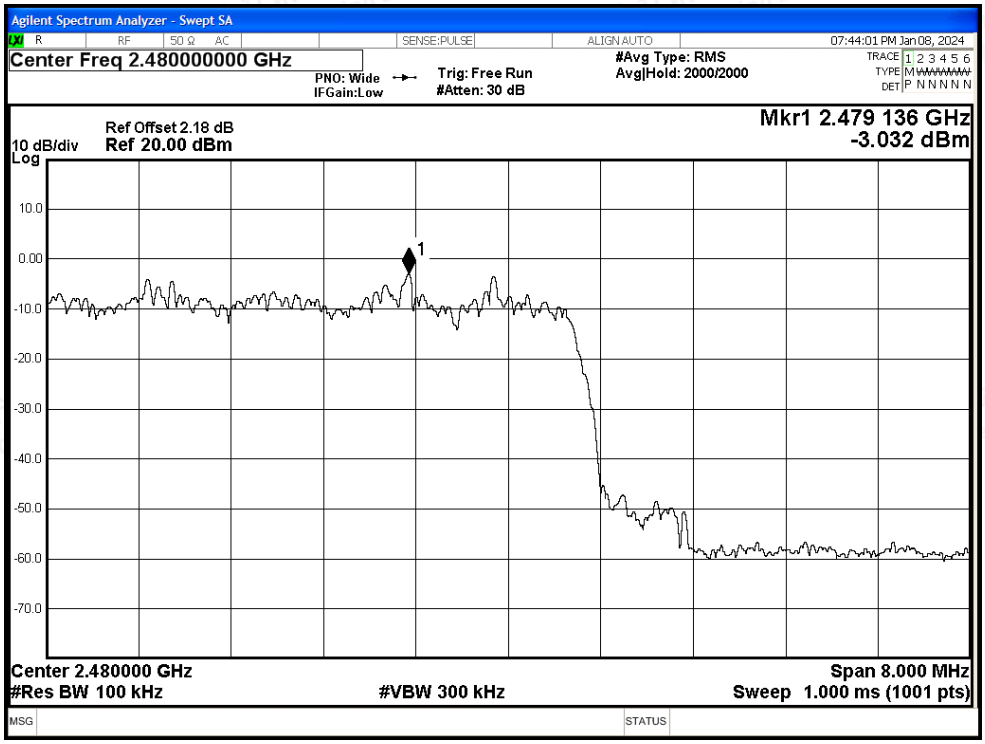
Band Edge(Hopping) NVNT 2-DH5 2402MHz Ant Hopping Ref



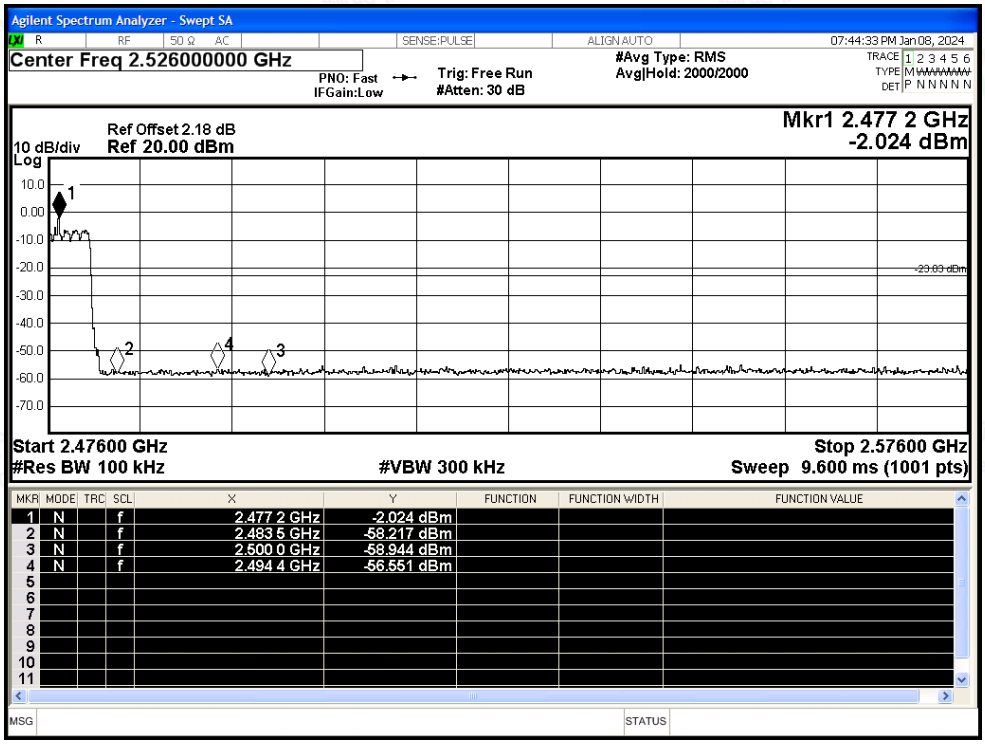
Band Edge(Hopping) NVNT 2-DH5 2402MHz Ant Hopping Emission



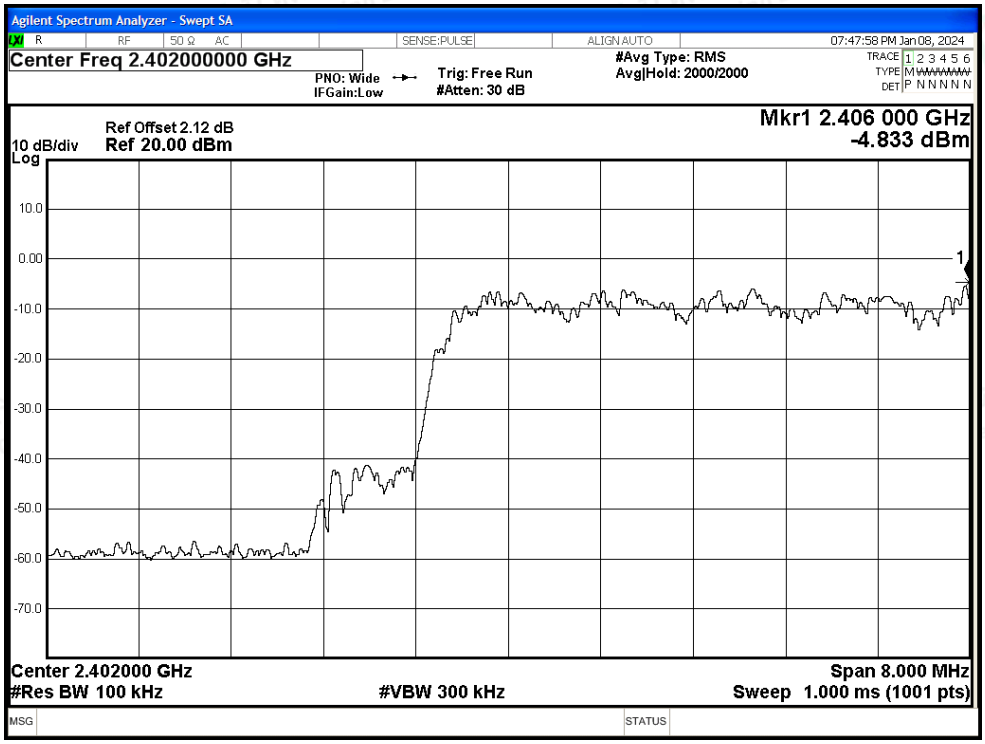
Band Edge(Hopping) NVNT 2-DH5 2480MHz Ant Hopping Ref



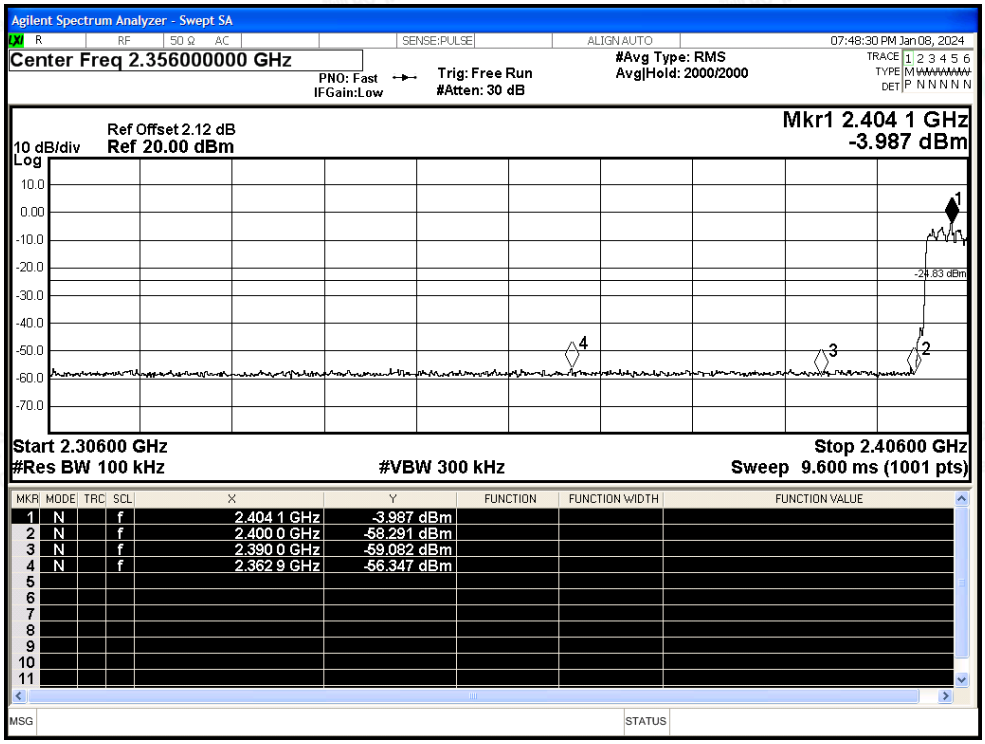
Band Edge(Hopping) NVNT 2-DH5 2480MHz Ant Hopping Emission



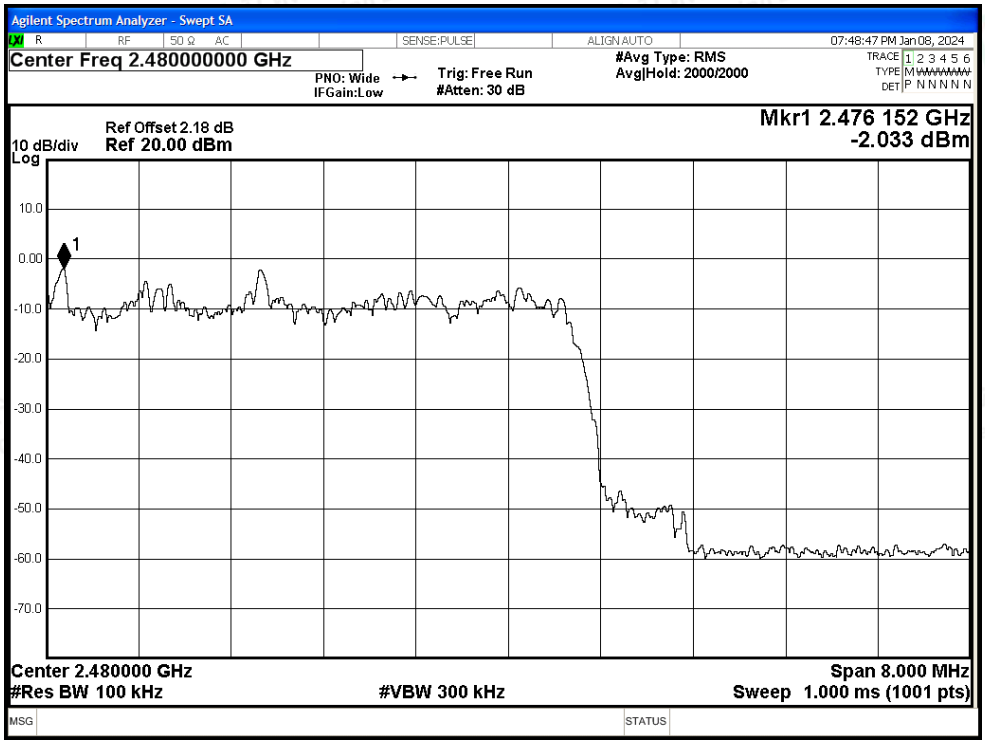
Band Edge(Hopping) NVNT 3-DH5 2402MHz Ant Hopping Ref



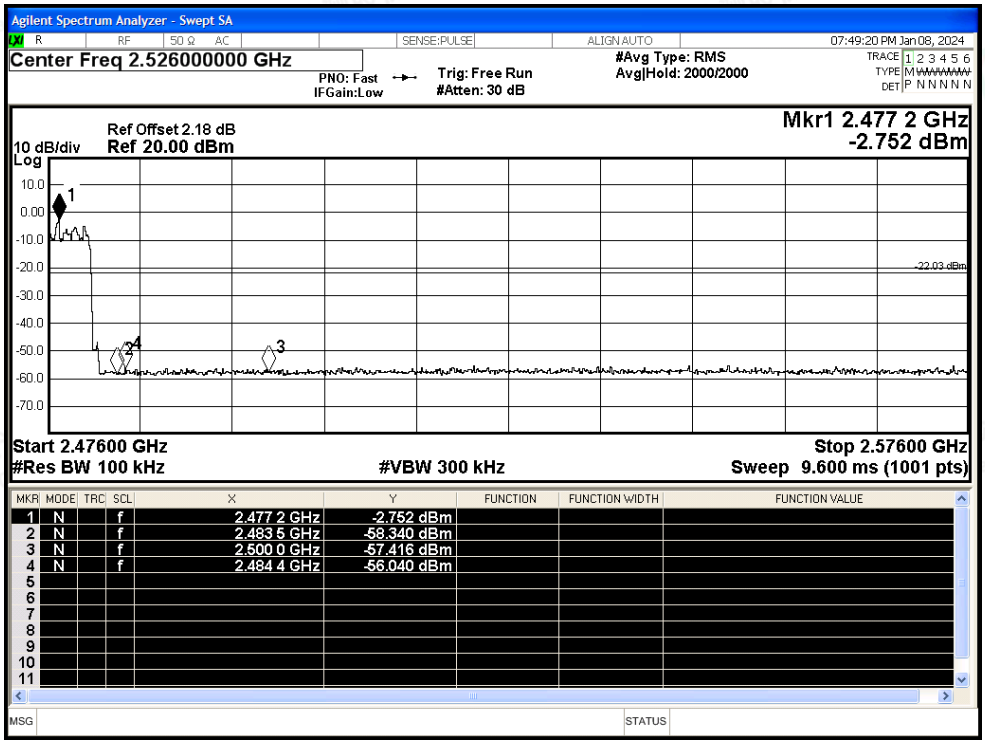
Band Edge(Hopping) NVNT 3-DH5 2402MHz Ant Hopping Emission



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



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

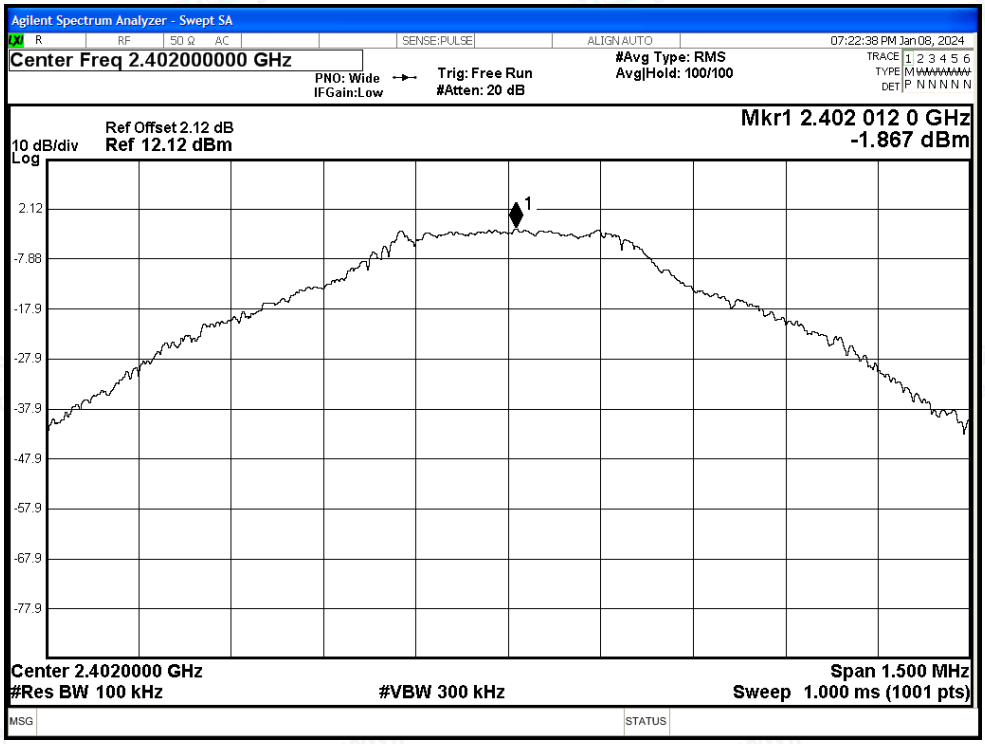


A.8 Conducted RF Spurious Emission

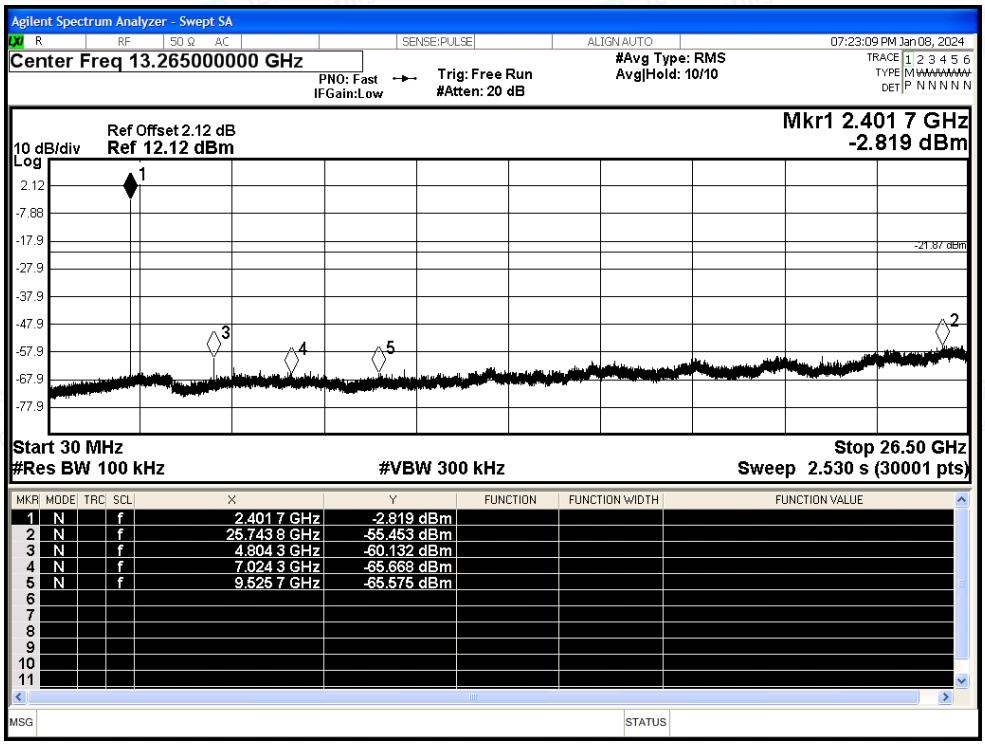
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	1-DH5	2402	Ant	-53.59	-20	Pass
NVNT	1-DH5	2441	Ant	-53.4	-20	Pass
NVNT	1-DH5	2480	Ant	-54.94	-20	Pass
NVNT	2-DH5	2402	Ant	-52.13	-20	Pass
NVNT	2-DH5	2441	Ant	-51.47	-20	Pass
NVNT	2-DH5	2480	Ant	-53.15	-20	Pass
NVNT	3-DH5	2402	Ant	-52.74	-20	Pass
NVNT	3-DH5	2441	Ant	-52.98	-20	Pass
NVNT	3-DH5	2480	Ant	-53.45	-20	Pass

Test Graphs

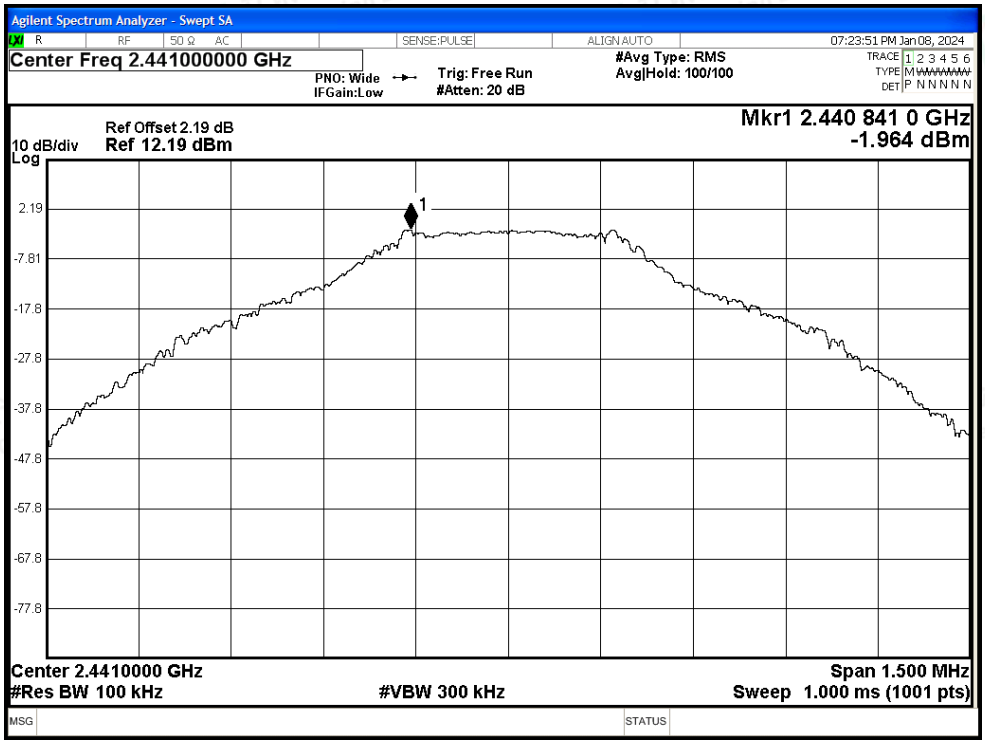
Tx. Spurious NVNT 1-DH5 2402MHz Ant Ref



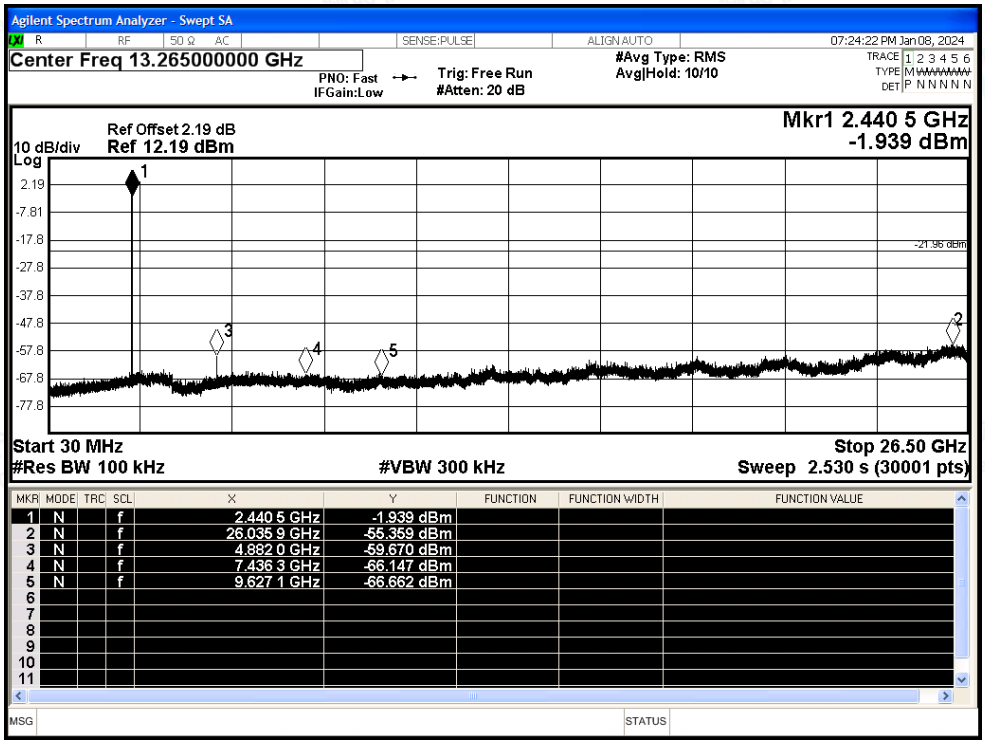
Tx. Spurious NVNT 1-DH5 2402MHz Ant Emission



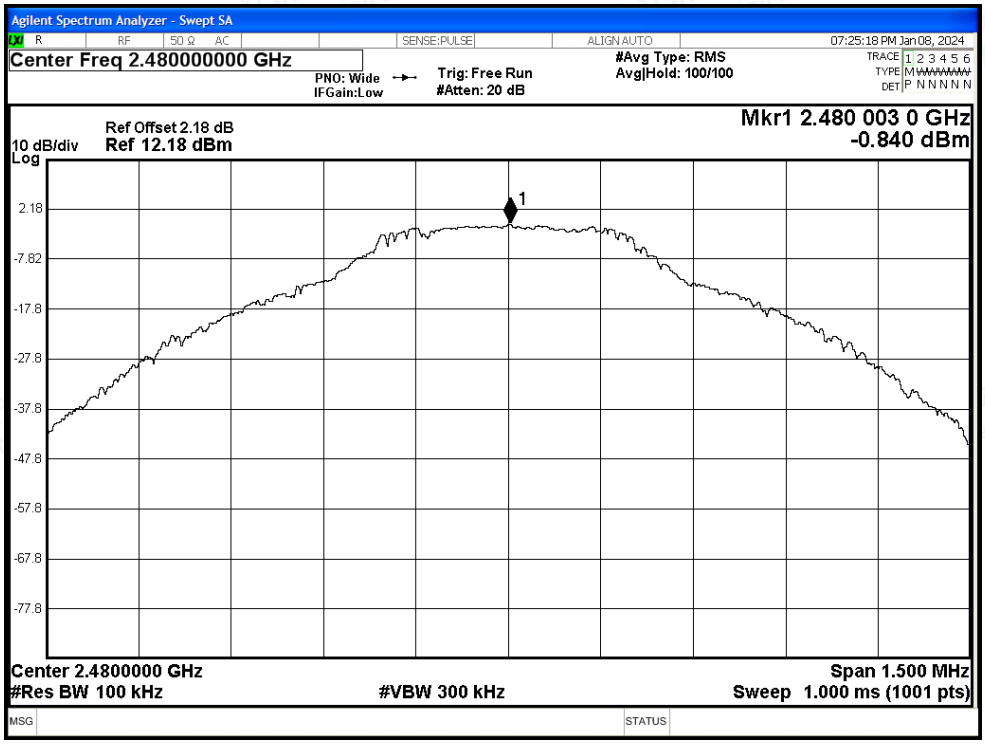
Tx. Spurious NVNT 1-DH5 2441MHz Ant Ref



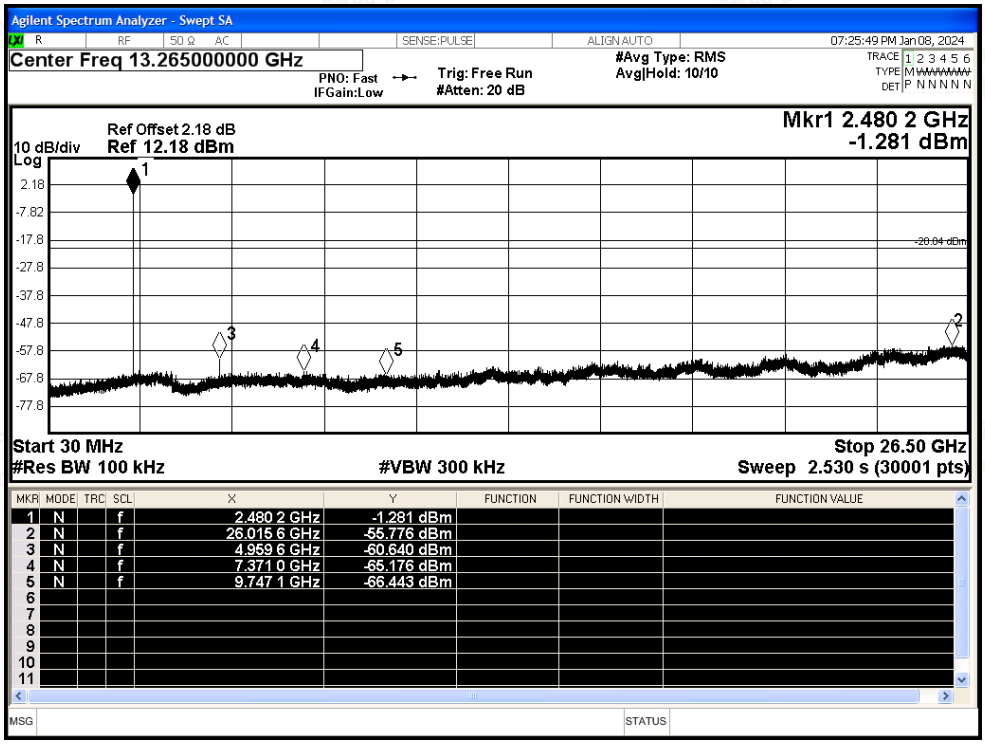
Tx. Spurious NVNT 1-DH5 2441MHz Ant Emission



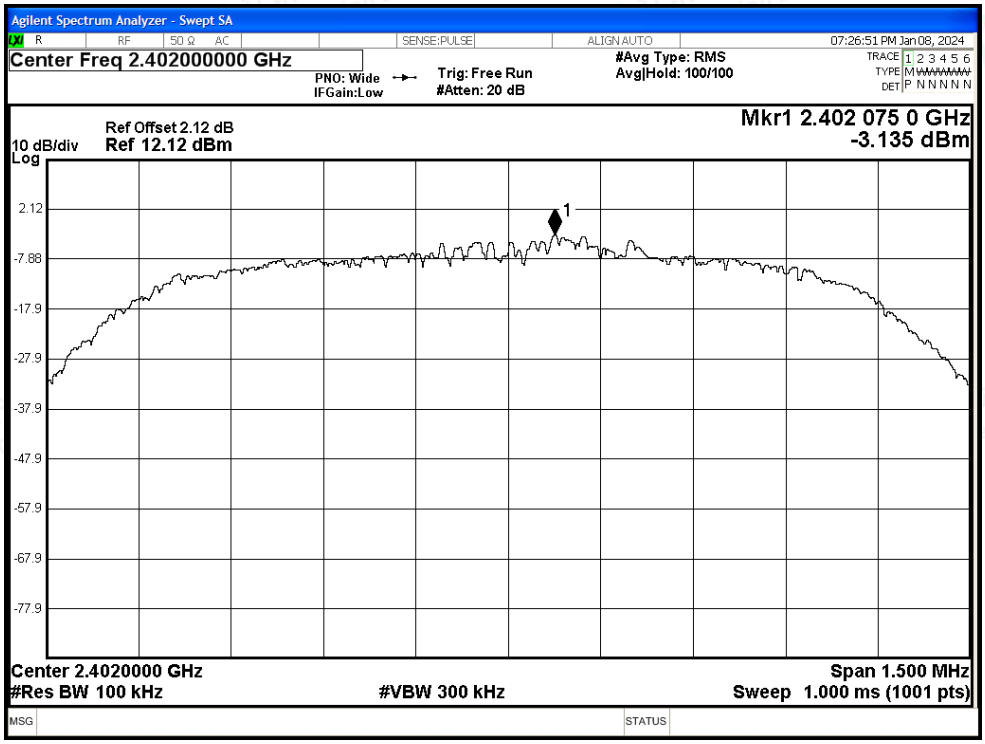
Tx. Spurious NVNT 1-DH5 2480MHz Ant Ref



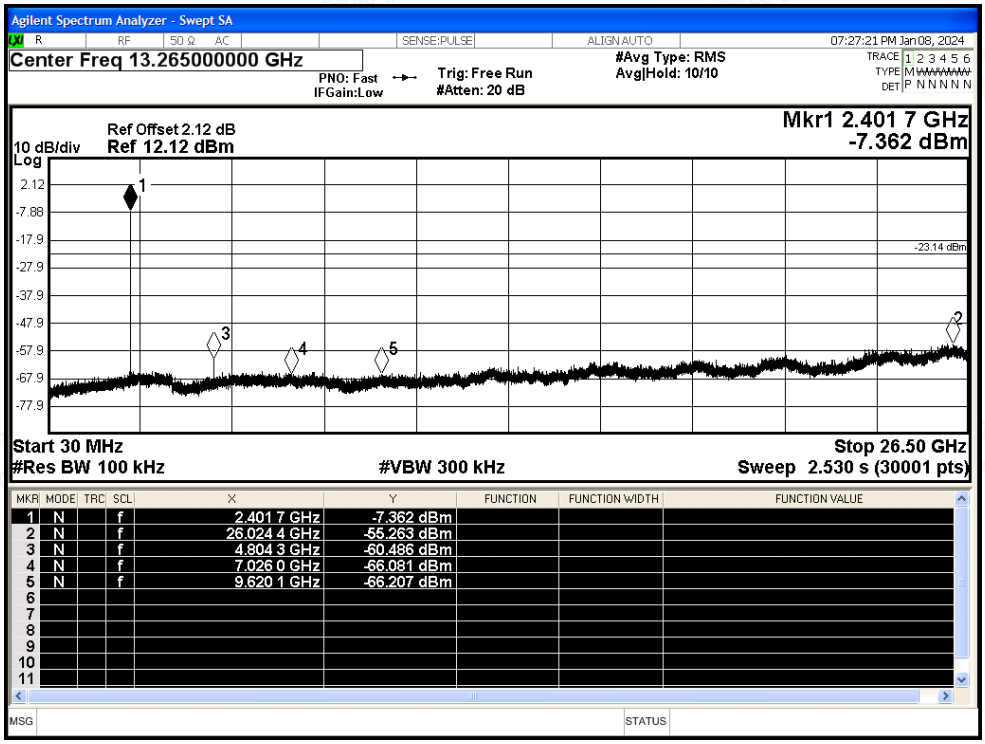
Tx. Spurious NVNT 1-DH5 2480MHz Ant Emission



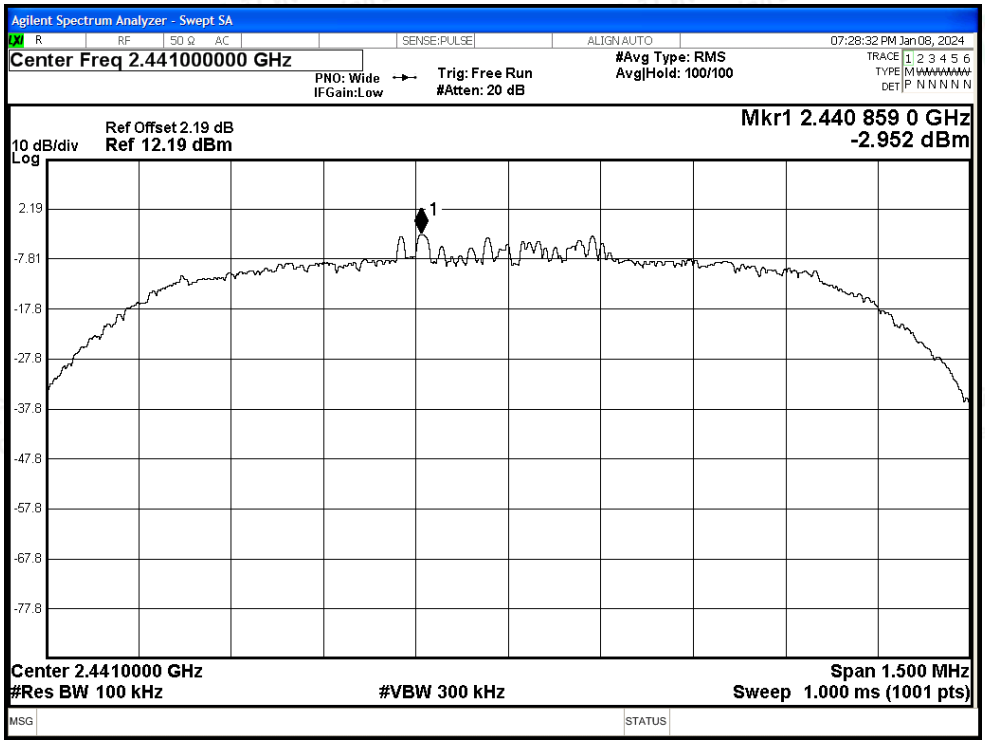
Tx. Spurious NVNT 2-DH5 2402MHz Ant Ref



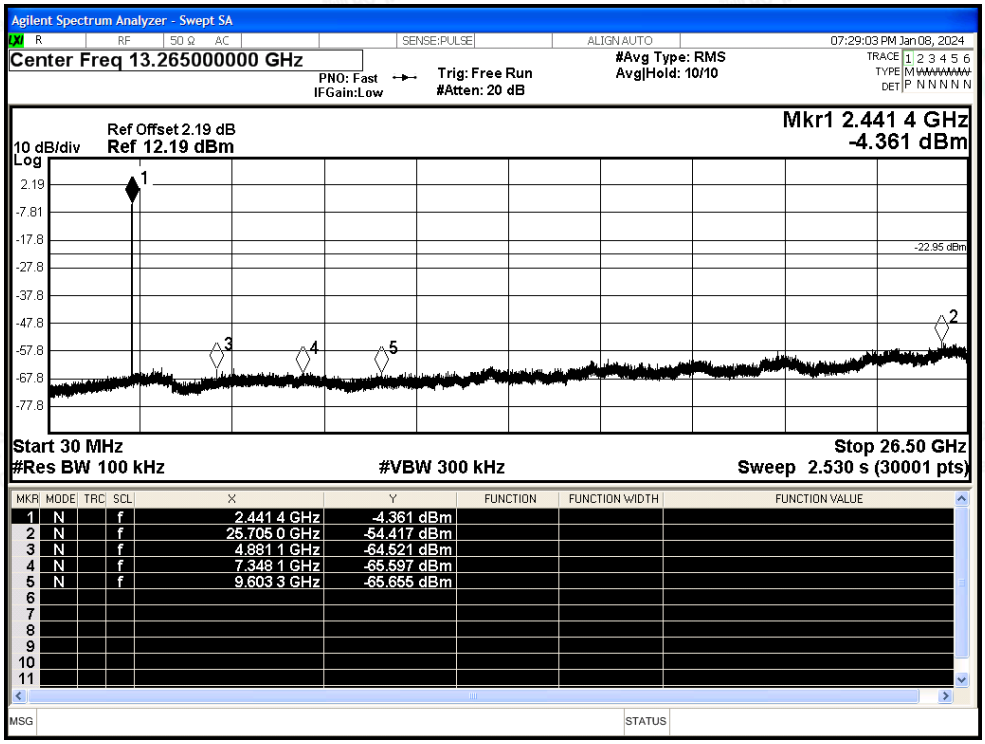
Tx. Spurious NVNT 2-DH5 2402MHz Ant Emission



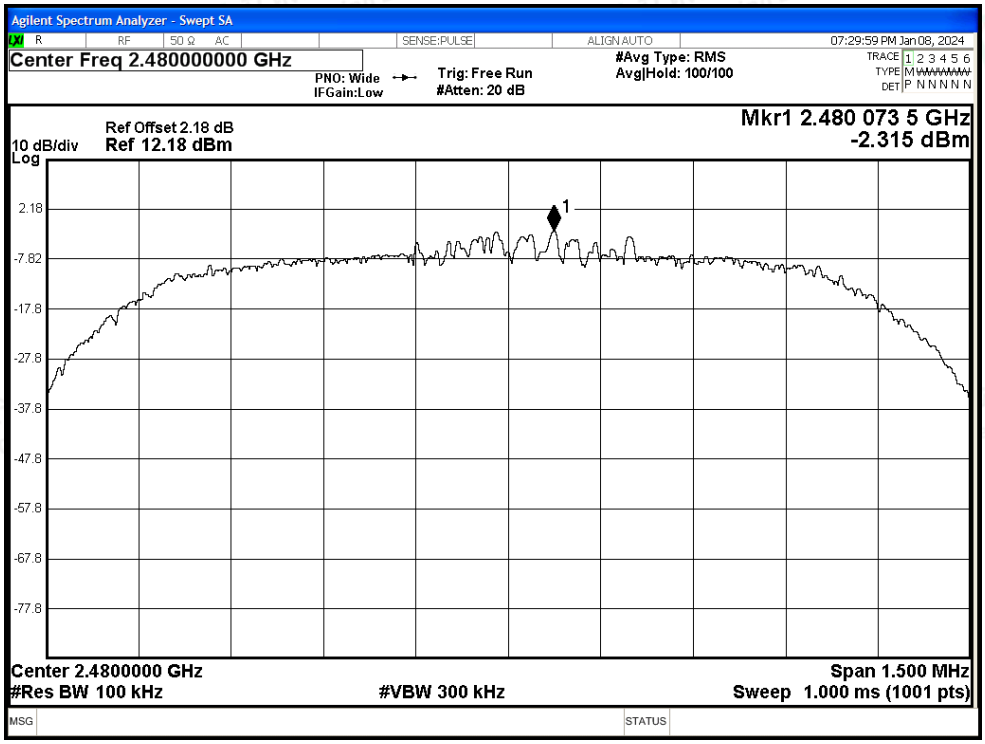
Tx. Spurious NVNT 2-DH5 2441MHz Ant Ref



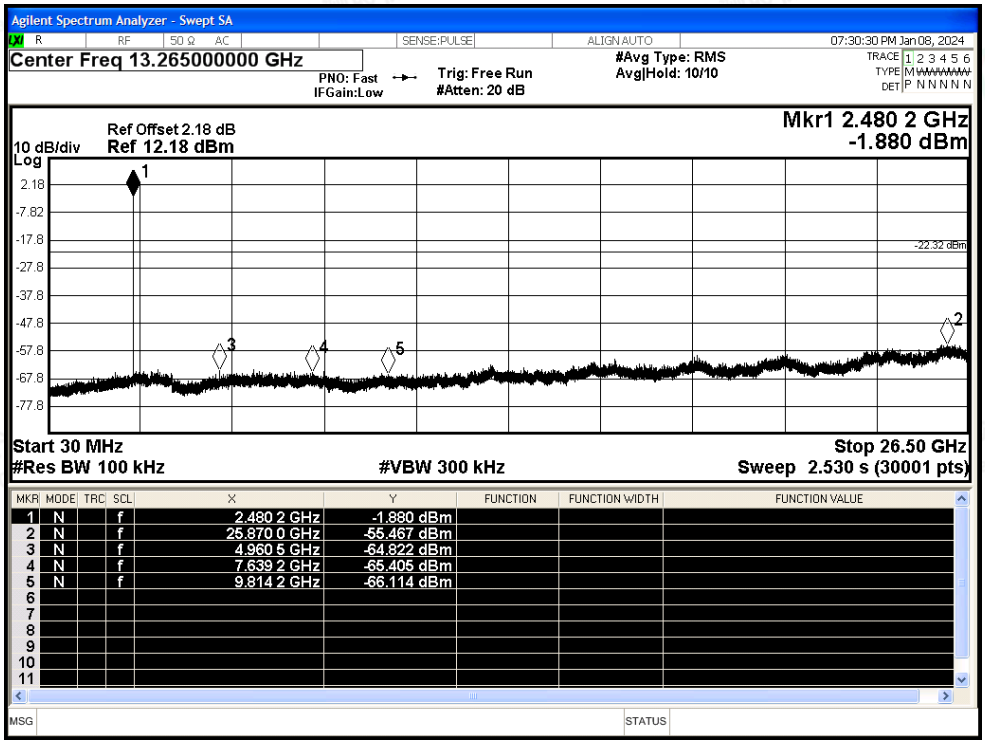
Tx. Spurious NVNT 2-DH5 2441MHz Ant Emission



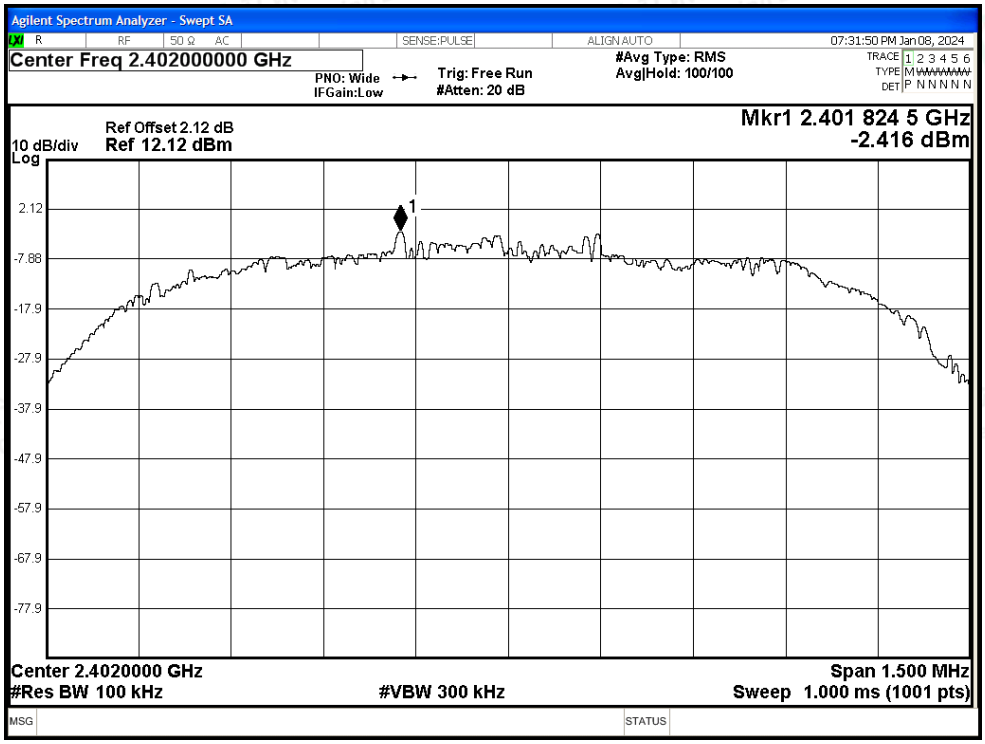
Tx. Spurious NVNT 2-DH5 2480MHz Ant Ref



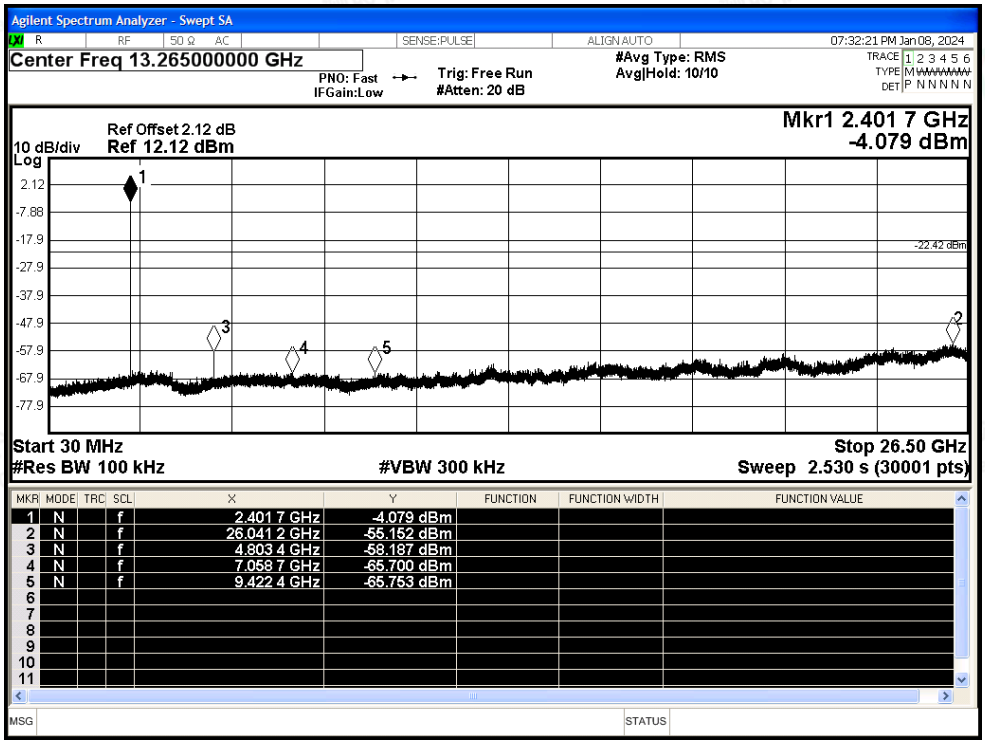
Tx. Spurious NVNT 2-DH5 2480MHz Ant Emission



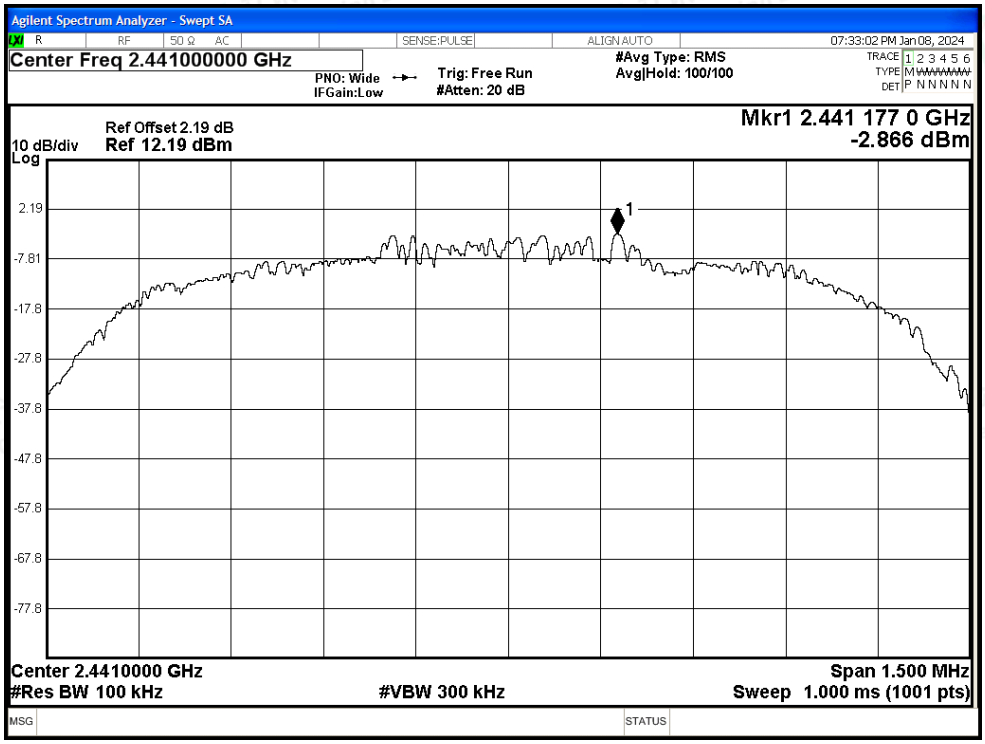
Tx. Spurious NVNT 3-DH5 2402MHz Ant Ref



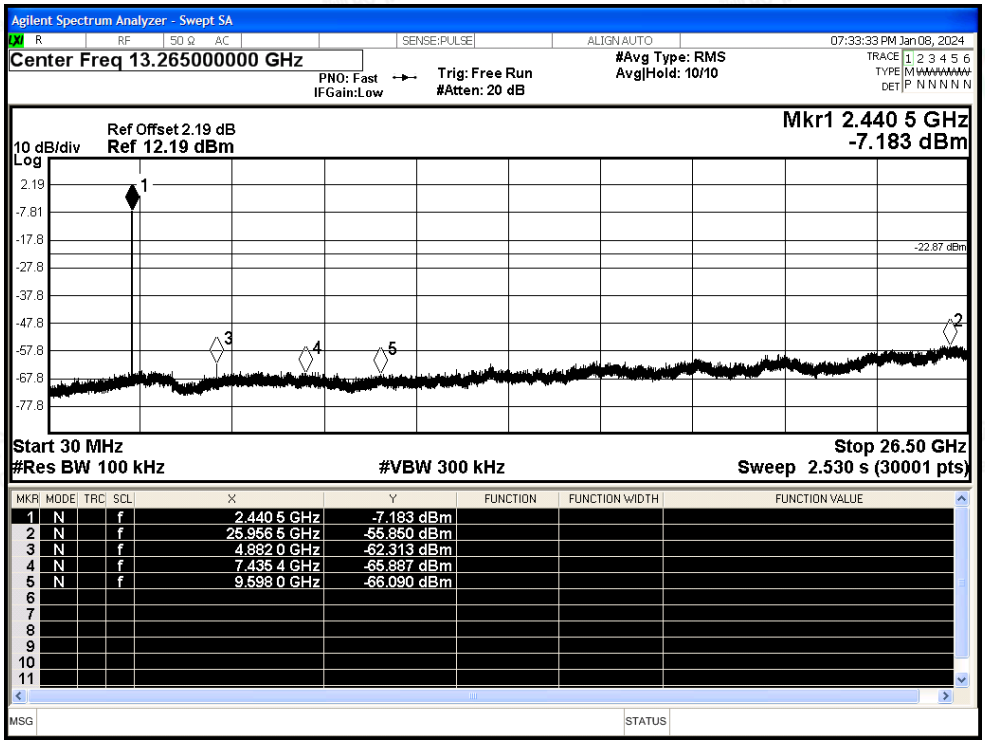
Tx. Spurious NVNT 3-DH5 2402MHz Ant Emission



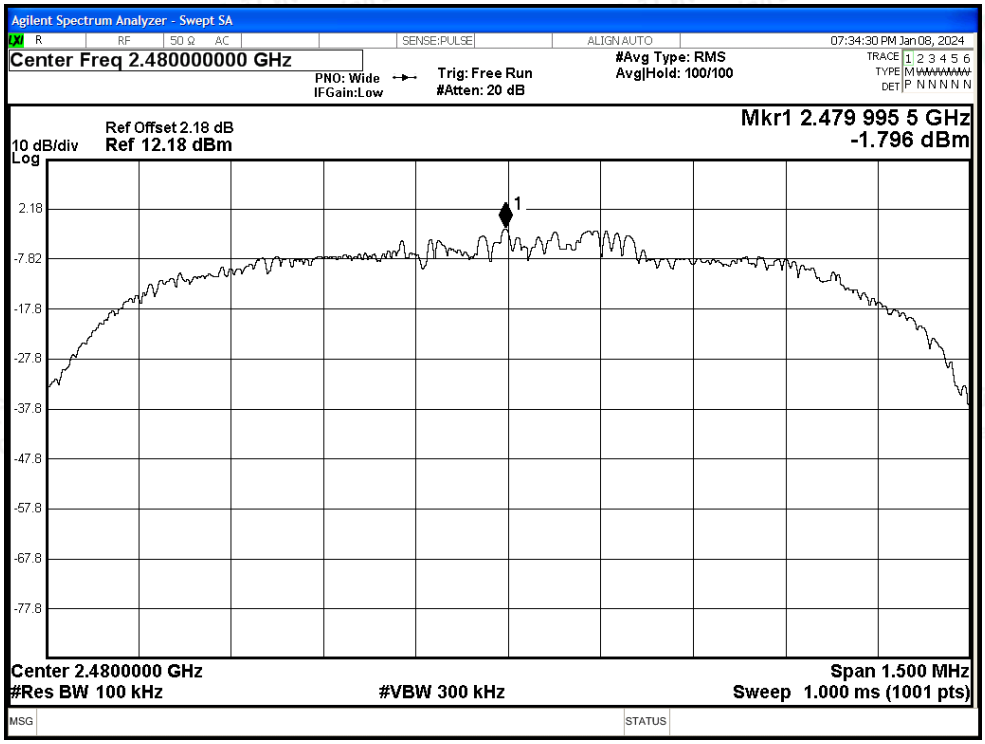
Tx. Spurious NVNT 3-DH5 2441MHz Ant Ref



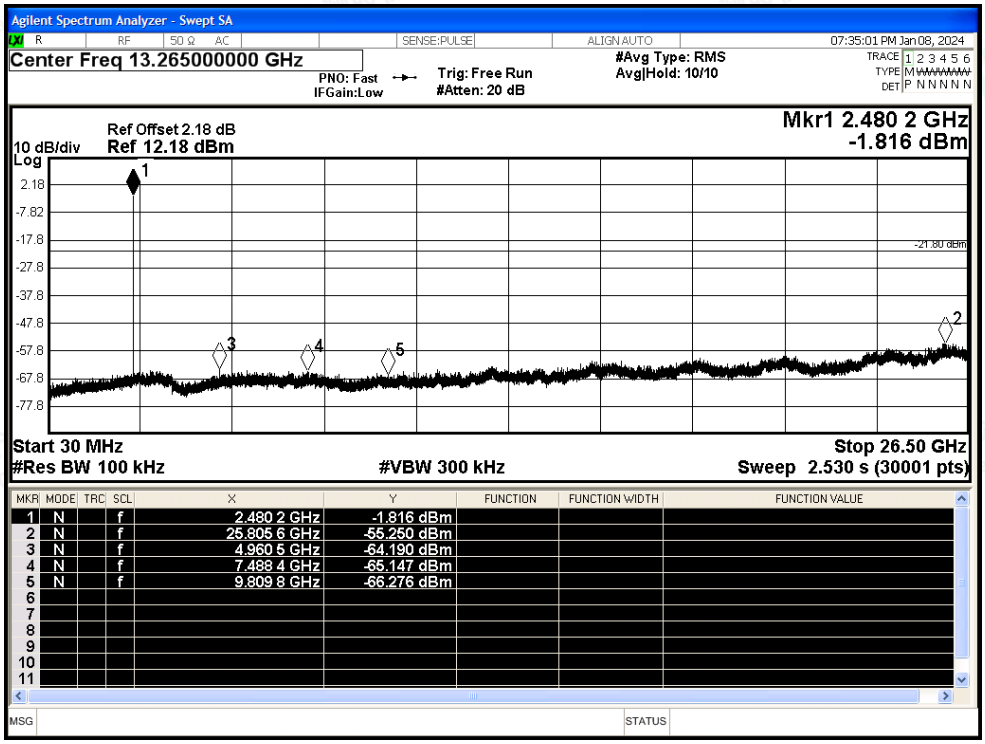
Tx. Spurious NVNT 3-DH5 2441MHz Ant Emission



Tx. Spurious NVNT 3-DH5 2480MHz Ant Ref



Tx. Spurious NVNT 3-DH5 2480MHz Ant Emission

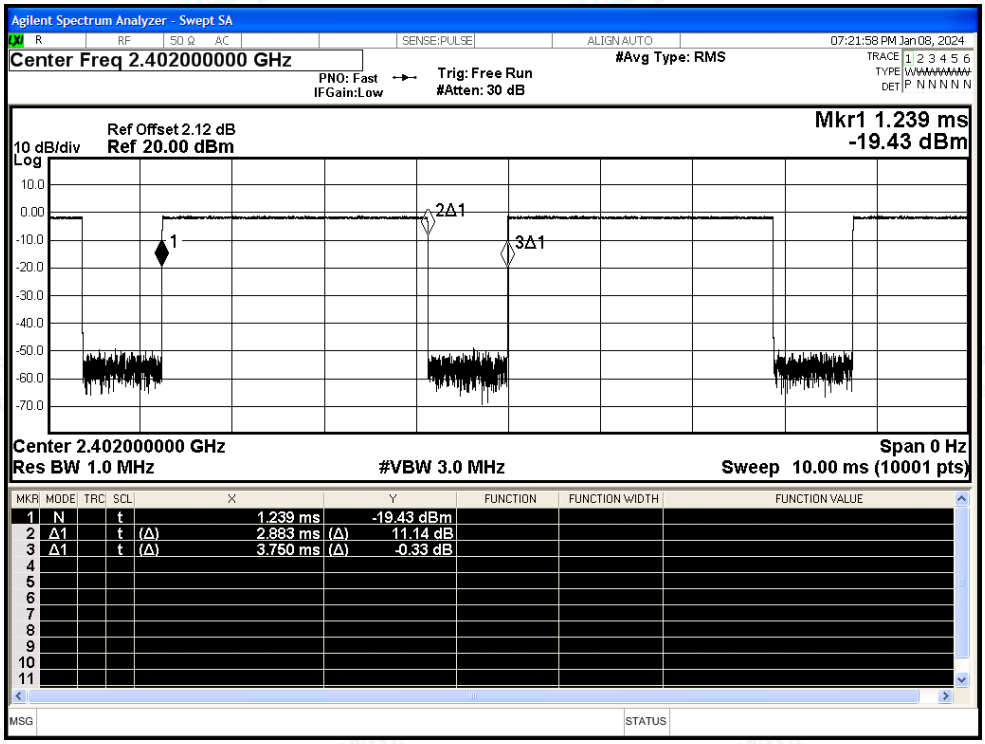


A.9 Duty Cycle

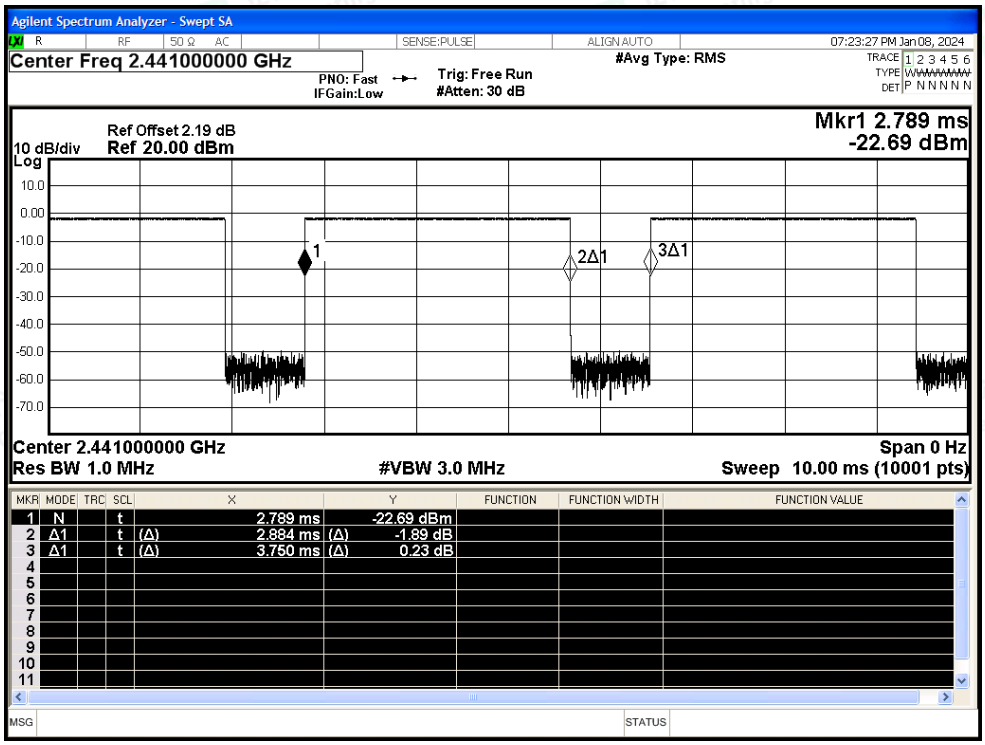
Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	1-DH5	2402	Ant	76.88	1.14	0.35
NVNT	1-DH5	2441	Ant	76.91	1.14	0.35
NVNT	1-DH5	2480	Ant	76.88	1.14	0.35
NVNT	2-DH5	2402	Ant	76.96	1.14	0.35
NVNT	2-DH5	2441	Ant	76.96	1.14	0.35
NVNT	2-DH5	2480	Ant	76.96	1.14	0.35
NVNT	3-DH5	2402	Ant	77.04	1.13	0.35
NVNT	3-DH5	2441	Ant	77.01	1.13	0.35
NVNT	3-DH5	2480	Ant	77.01	1.13	0.35

Test Graphs

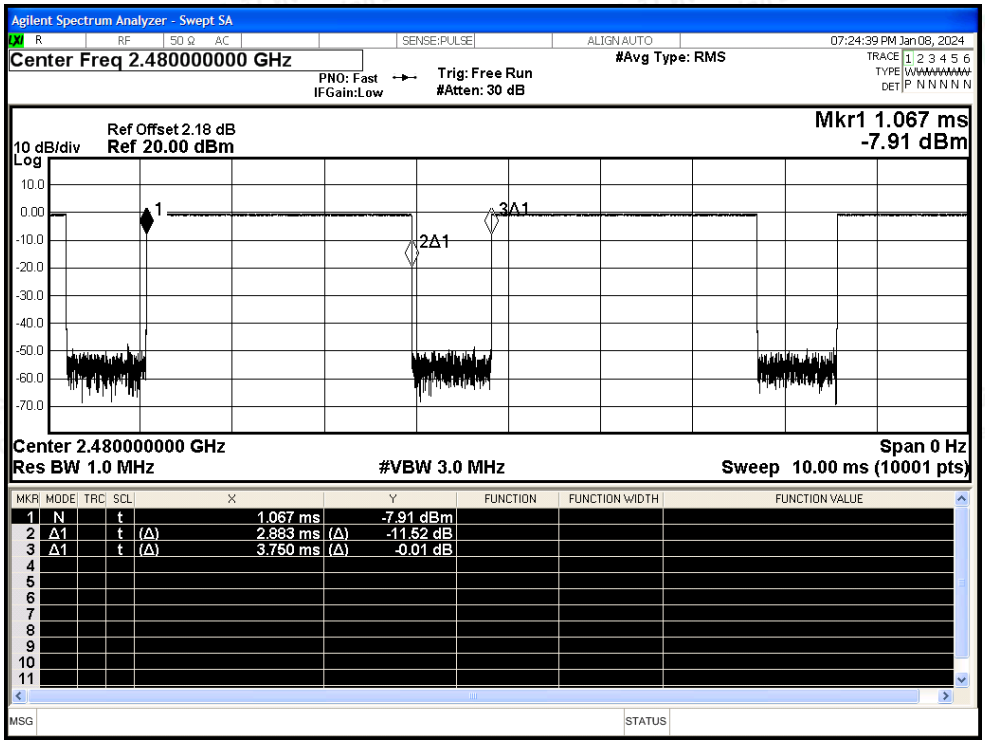
Duty Cycle NVNT 1-DH5 2402MHz Ant



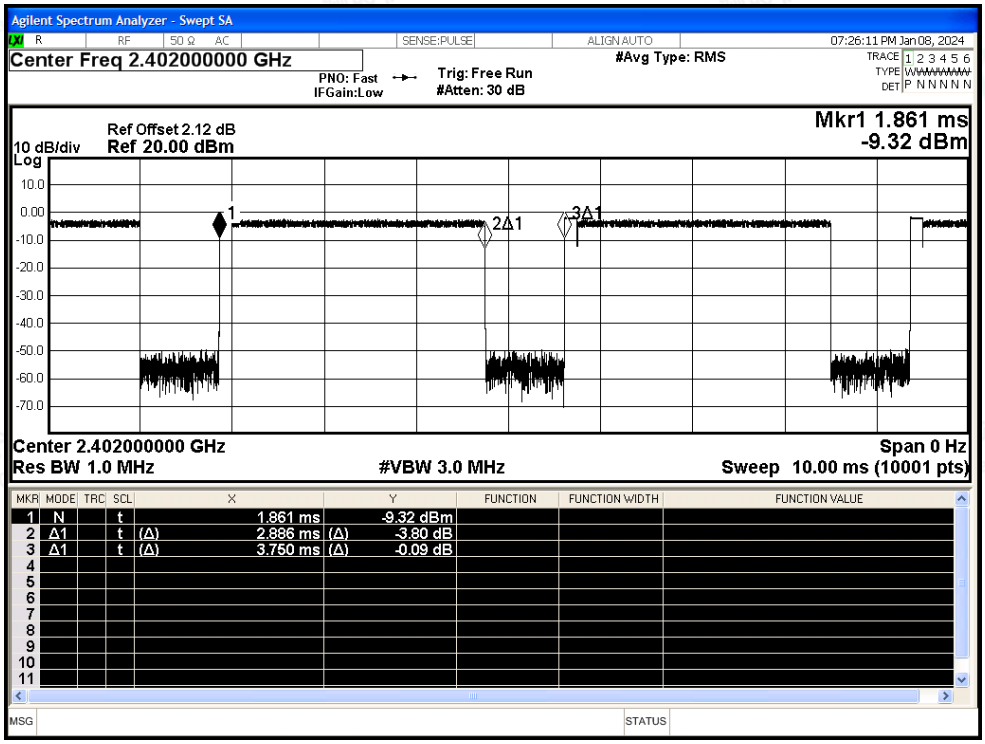
Duty Cycle NVNT 1-DH5 2441MHz Ant



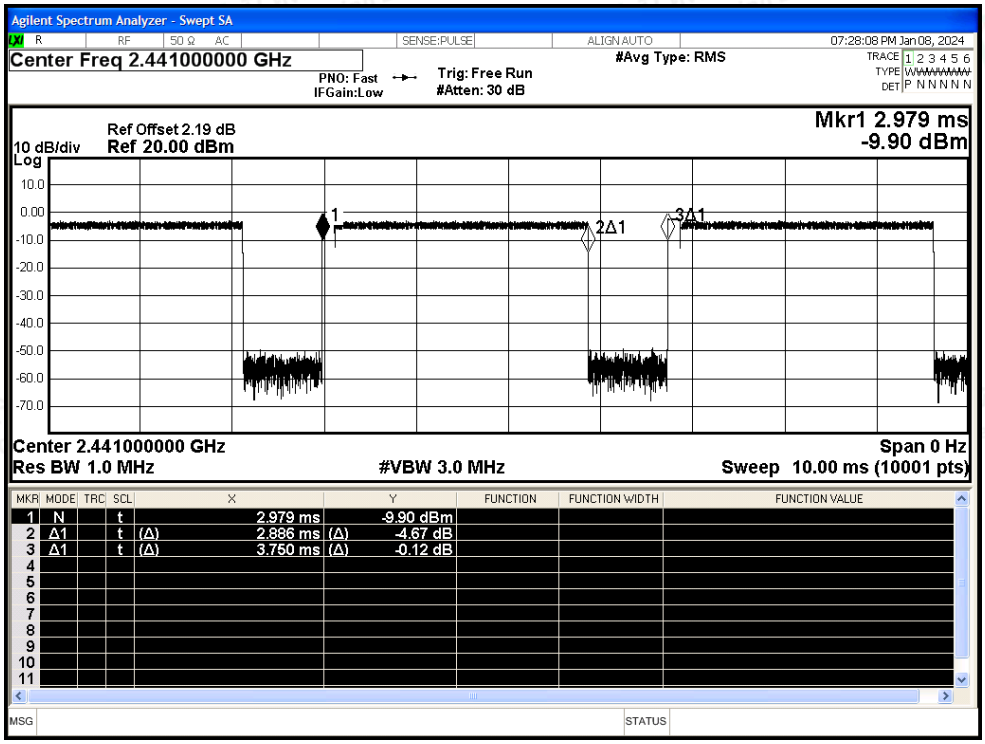
Duty Cycle NVNT 1-DH5 2480MHz Ant



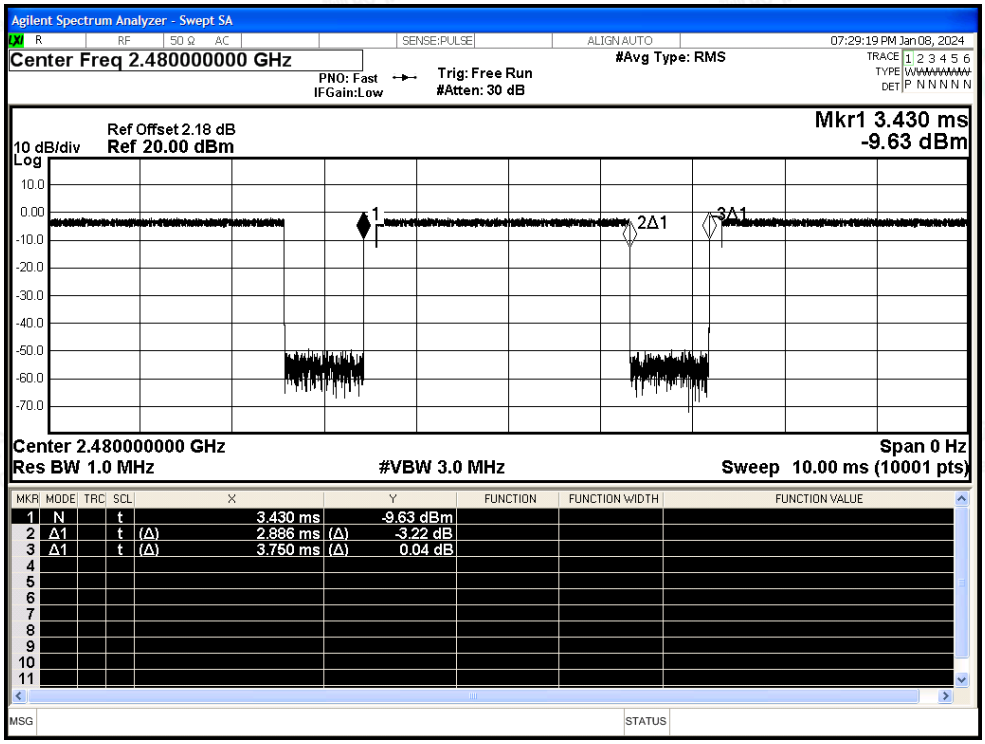
Duty Cycle NVNT 2-DH5 2402MHz Ant



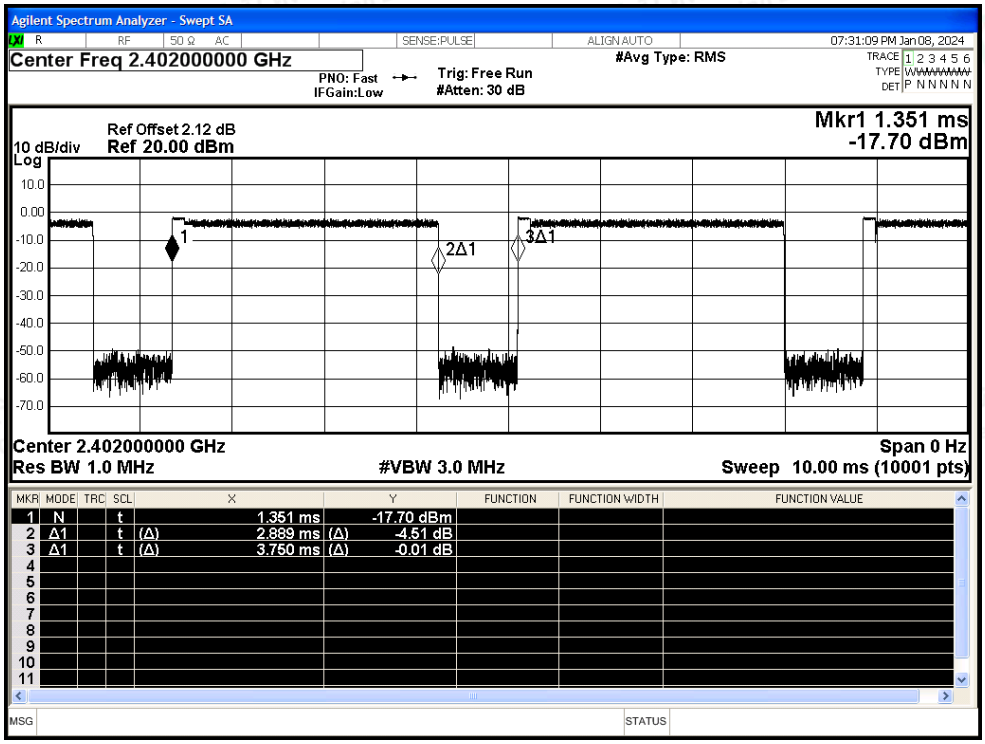
Duty Cycle NVNT 2-DH5 2441MHz Ant



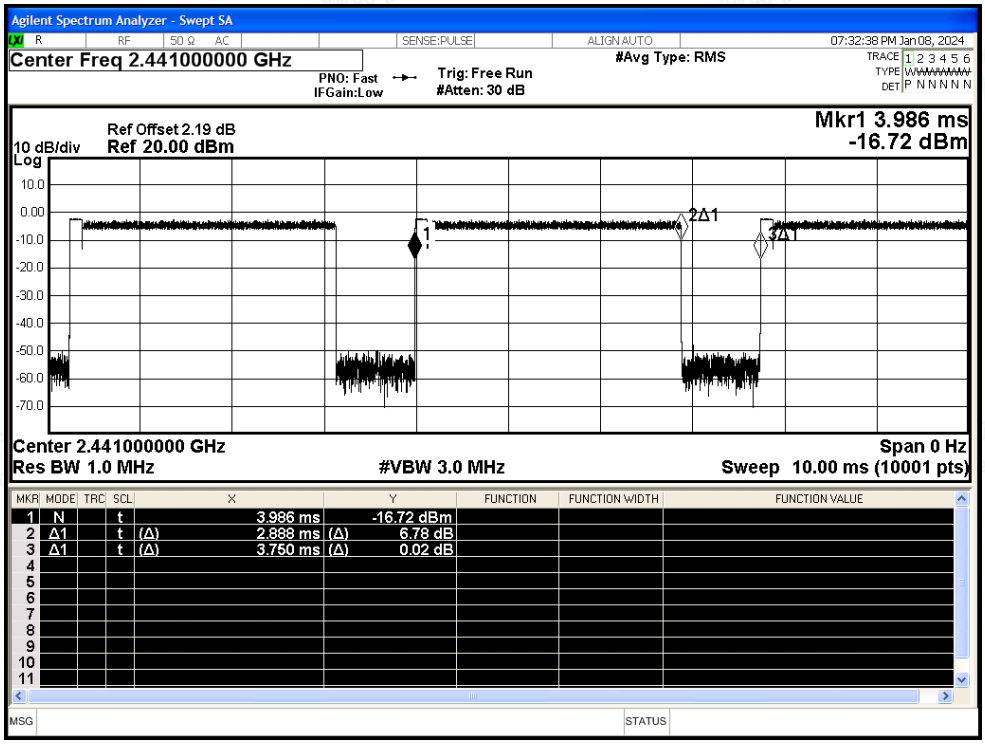
Duty Cycle NVNT 2-DH5 2480MHz Ant



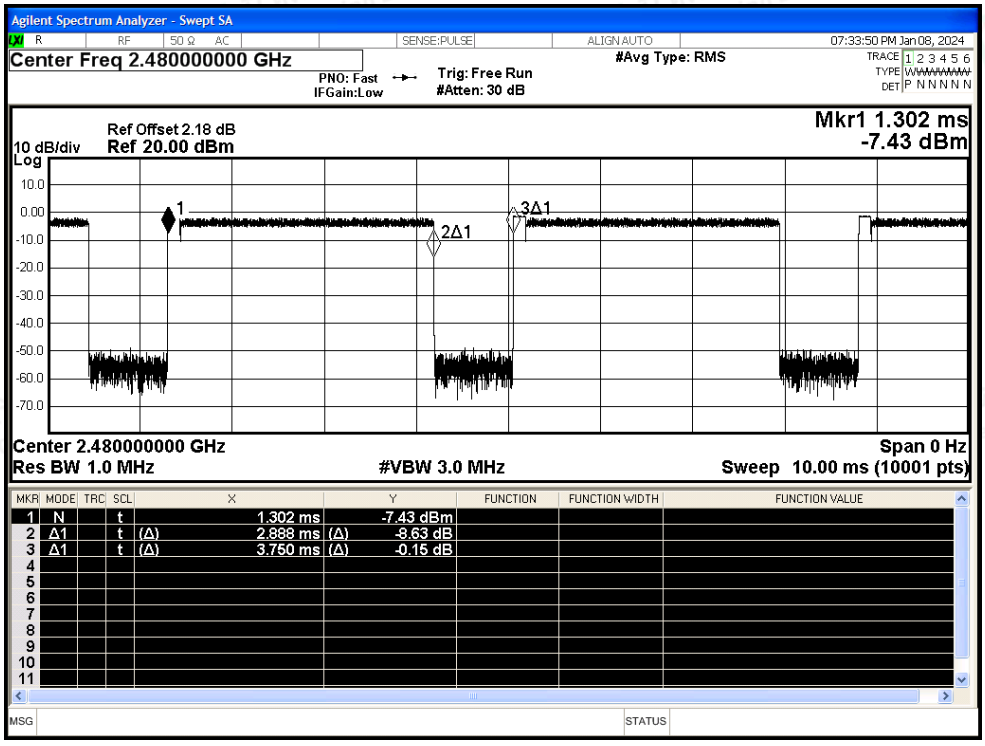
Duty Cycle NVNT 3-DH5 2402MHz Ant



Duty Cycle NVNT 3-DH5 2441MHz Ant



Duty Cycle NVNT 3-DH5 2480MHz Ant

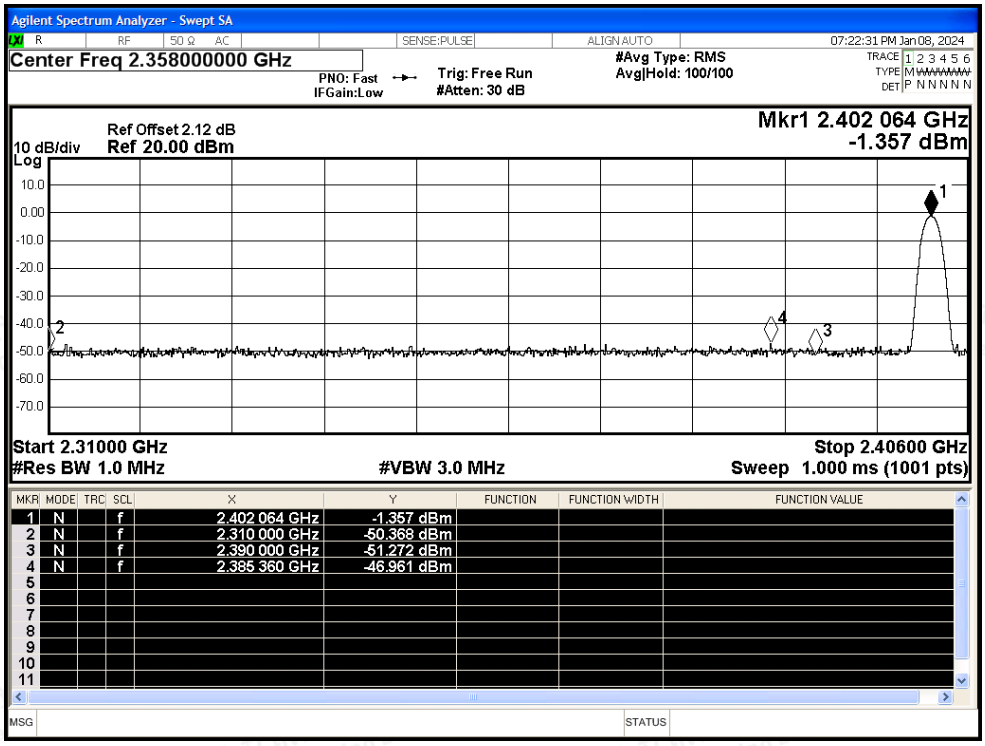


A.10 Restrict Band

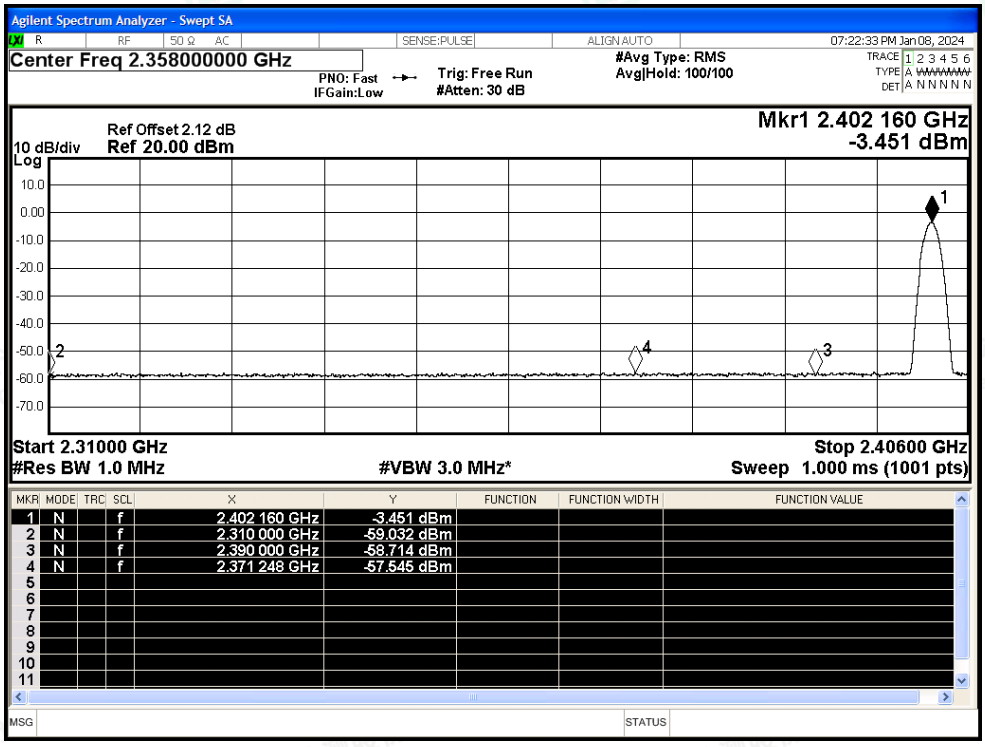
Condition	Mode	Frequency (MHz)	Antenna	Hopping Mode	Spur Freq (MHz)	Power (dBm)	Gain (dBi)	Duty Factor (dB)	E (dBuV/m)	Detector	Limit (dBuV/m)	Verdict
NVNT	1-DH5	2402	Ant	No-Hopping	2310	-50.37	2	-	46.89	Peak	74	Pass
NVNT	1-DH5	2402	Ant	No-Hopping	2310	-59.03	2	1.14	39.37	Average	54	Pass
NVNT	1-DH5	2402	Ant	No-Hopping	2385.36	-46.96	2	-	50.3	Peak	74	Pass
NVNT	1-DH5	2402	Ant	No-Hopping	2371.248	-57.55	2	1.14	40.85	Average	54	Pass
NVNT	1-DH5	2402	Ant	No-Hopping	2390	-51.27	2	-	45.99	Peak	74	Pass
NVNT	1-DH5	2402	Ant	No-Hopping	2390	-58.71	2	1.14	39.69	Average	54	Pass
NVNT	1-DH5	2480	Ant	No-Hopping	2483.5	-48.84	2	-	48.42	Peak	74	Pass
NVNT	1-DH5	2480	Ant	No-Hopping	2483.5	-58	2	1.14	40.4	Average	54	Pass
NVNT	1-DH5	2480	Ant	No-Hopping	2487.736	-46.72	2	-	50.54	Peak	74	Pass
NVNT	1-DH5	2480	Ant	No-Hopping	2494.456	-57.04	2	1.14	41.36	Average	54	Pass
NVNT	1-DH5	2480	Ant	No-Hopping	2500	-51.2	2	-	46.06	Peak	74	Pass
NVNT	1-DH5	2480	Ant	No-Hopping	2500	-57.59	2	1.14	40.81	Average	54	Pass
NVNT	2-DH5	2402	Ant	No-Hopping	2310	-51.73	2	-	45.53	Peak	74	Pass
NVNT	2-DH5	2402	Ant	No-Hopping	2310	-58.46	2	1.14	39.94	Average	54	Pass
NVNT	2-DH5	2402	Ant	No-Hopping	2315.952	-47.18	2	-	50.08	Peak	74	Pass
NVNT	2-DH5	2402	Ant	No-Hopping	2385.744	-57.42	2	1.14	40.98	Average	54	Pass
NVNT	2-DH5	2402	Ant	No-Hopping	2390	-50.74	2	-	46.52	Peak	74	Pass
NVNT	2-DH5	2402	Ant	No-Hopping	2390	-57.65	2	1.14	40.75	Average	54	Pass
NVNT	2-DH5	2480	Ant	No-Hopping	2483.5	-50.47	2	-	46.79	Peak	74	Pass
NVNT	2-DH5	2480	Ant	No-Hopping	2483.5	-57.97	2	1.14	40.43	Average	54	Pass
NVNT	2-DH5	2480	Ant	No-Hopping	2483.752	-46.55	2	-	50.71	Peak	74	Pass
NVNT	2-DH5	2480	Ant	No-Hopping	2489.056	-57.23	2	1.14	41.17	Average	54	Pass
NVNT	2-DH5	2480	Ant	No-Hopping	2500	-49.54	2	-	47.72	Peak	74	Pass
NVNT	2-DH5	2480	Ant	No-Hopping	2500	-57.78	2	1.14	40.62	Average	54	Pass
NVNT	3-DH5	2402	Ant	No-Hopping	2310	-50.74	2	-	46.52	Peak	74	Pass
NVNT	3-DH5	2402	Ant	No-Hopping	2310	-58.31	2	1.13	40.08	Average	54	Pass
NVNT	3-DH5	2402	Ant	No-Hopping	2334.768	-47.69	2	-	49.57	Peak	74	Pass
NVNT	3-DH5	2402	Ant	No-Hopping	2382.672	-57.4	2	1.13	40.99	Average	54	Pass
NVNT	3-DH5	2402	Ant	No-Hopping	2390	-49.76	2	-	47.5	Peak	74	Pass
NVNT	3-DH5	2402	Ant	No-Hopping	2390	-58.51	2	1.13	39.88	Average	54	Pass
NVNT	3-DH5	2480	Ant	No-Hopping	2483.5	-50.82	2	-	46.44	Peak	74	Pass
NVNT	3-DH5	2480	Ant	No-Hopping	2483.5	-57.77	2	1.13	40.62	Average	54	Pass
NVNT	3-DH5	2480	Ant	No-Hopping	2484.976	-46.95	2	-	50.31	Peak	74	Pass
NVNT	3-DH5	2480	Ant	No-Hopping	2497.72	-57.15	2	1.13	41.24	Average	54	Pass
NVNT	3-DH5	2480	Ant	No-Hopping	2500	-48.86	2	-	48.4	Peak	74	Pass
NVNT	3-DH5	2480	Ant	No-Hopping	2500	-57.83	2	1.13	40.56	Average	54	Pass

Test Graphs

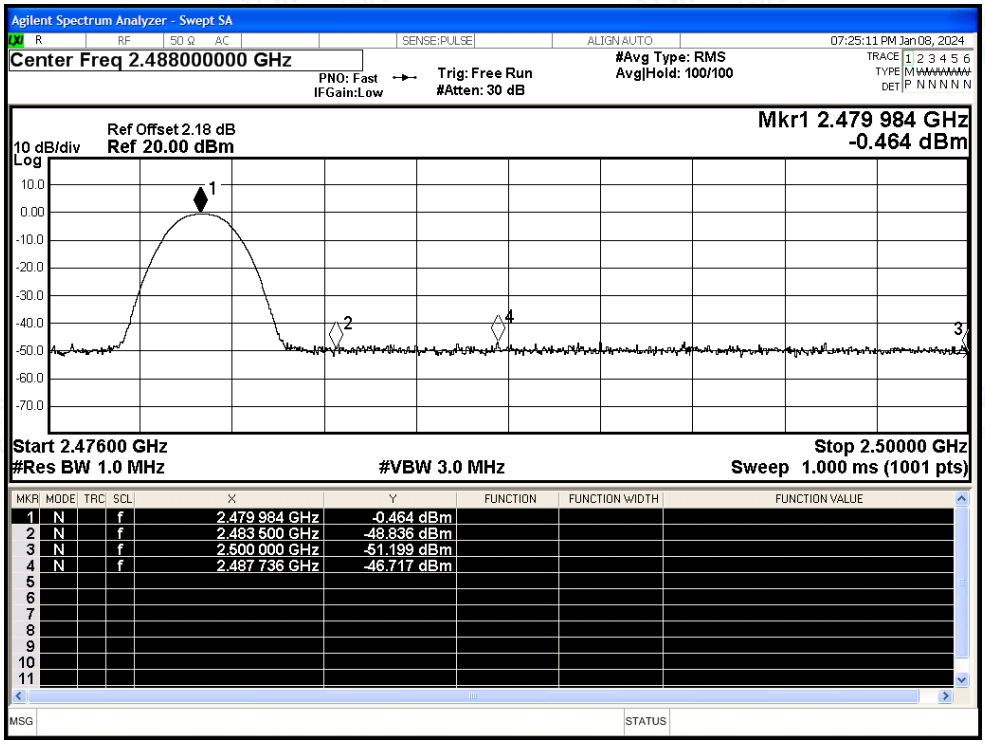
Restrict Band NVNT 1-DH5 2402MHz Ant No-Hopping Peak



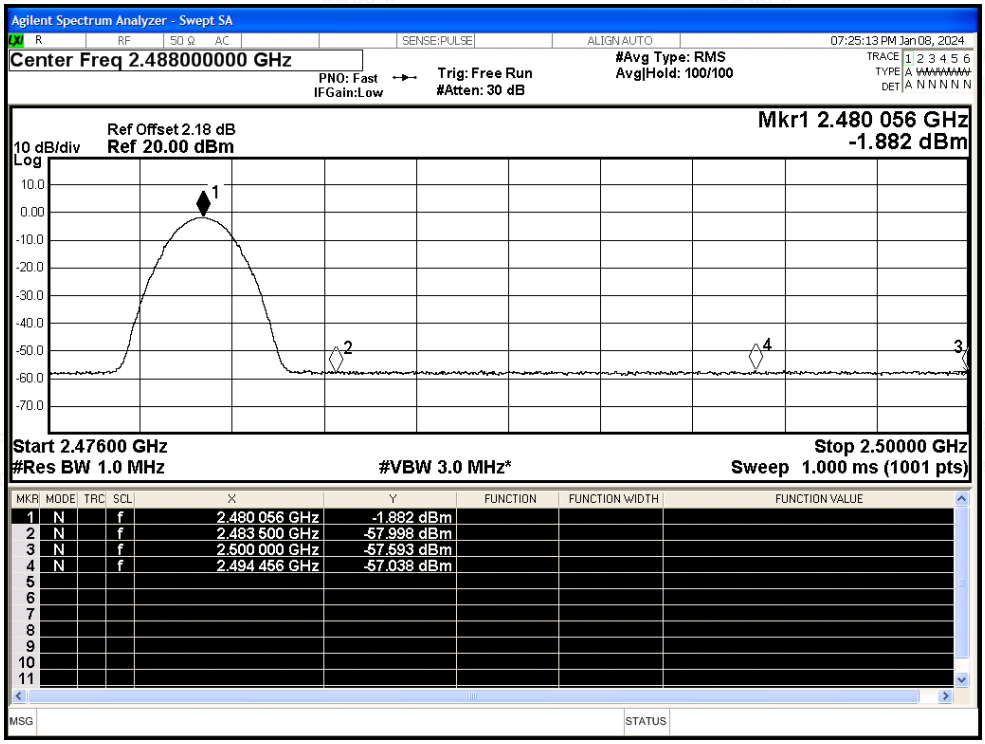
Restrict Band NVNT 1-DH5 2402MHz Ant No-Hopping Average



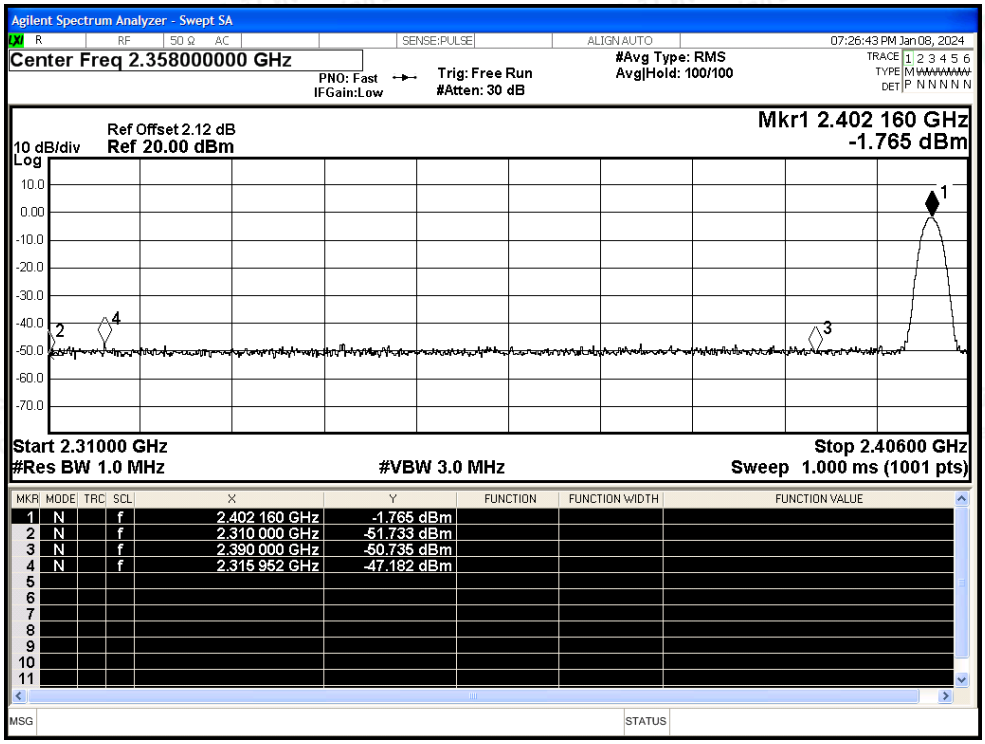
Restrict Band NVNT 1-DH5 2480MHz Ant No-Hopping Peak



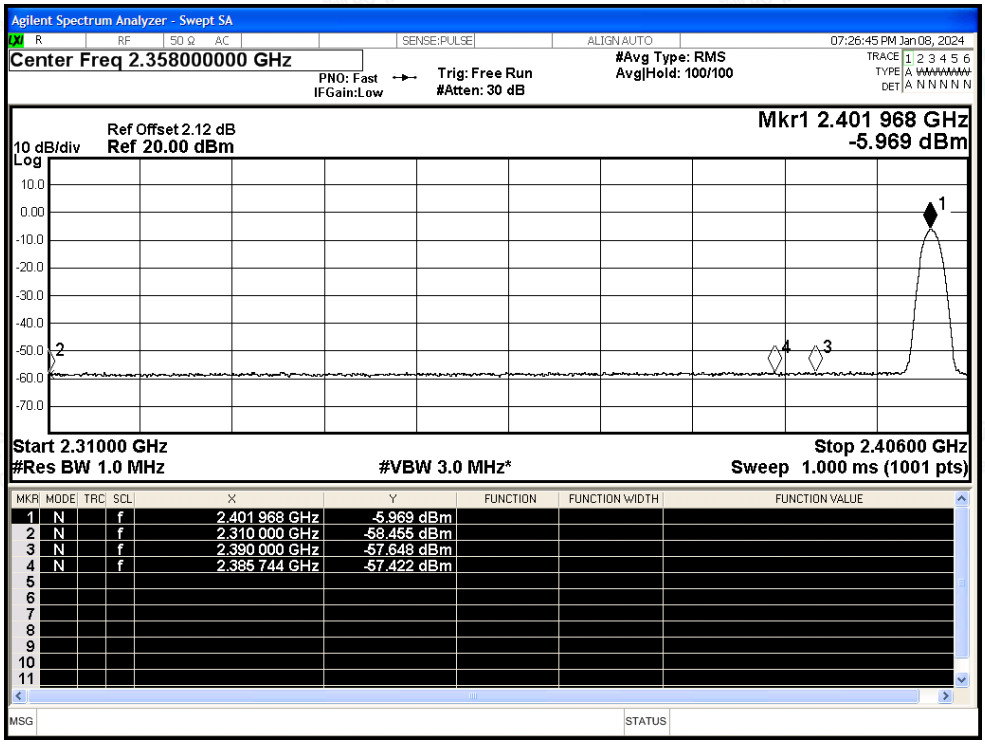
Restrict Band NVNT 1-DH5 2480MHz Ant No-Hopping Average



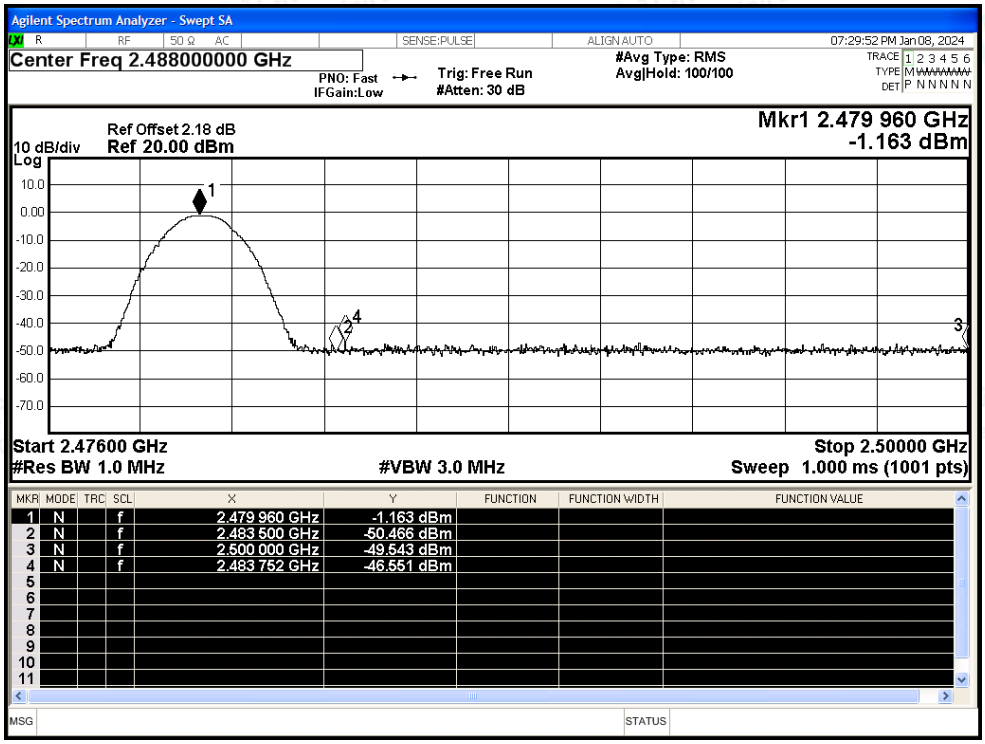
Restrict Band NVNT 2-DH5 2402MHz Ant No-Hopping Peak



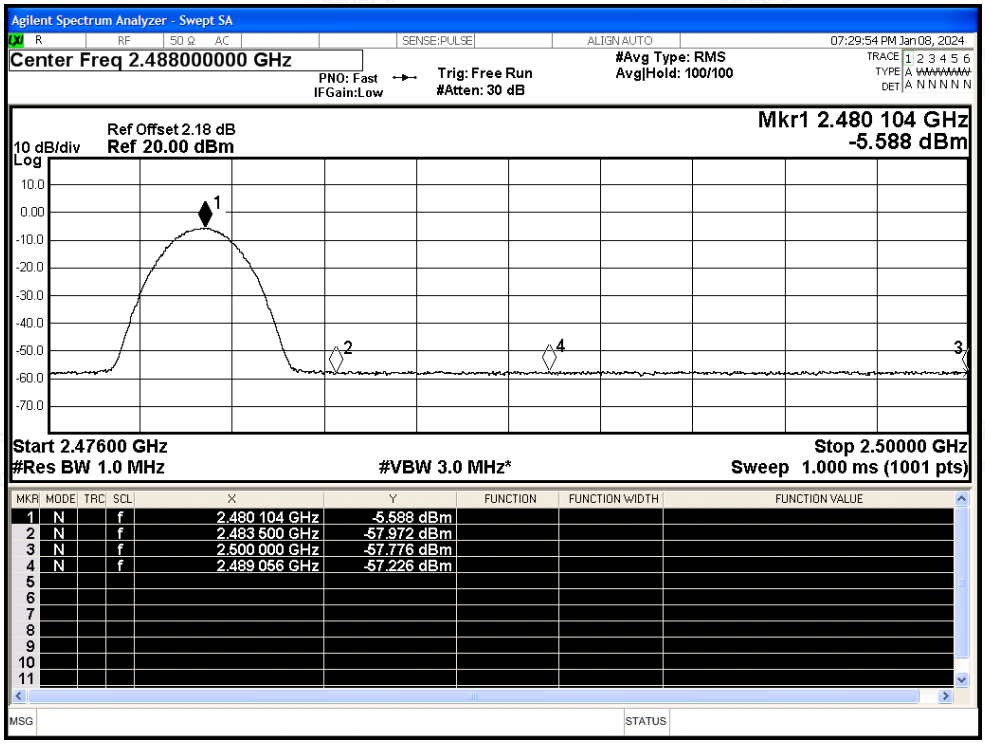
Restrict Band NVNT 2-DH5 2402MHz Ant No-Hopping Average



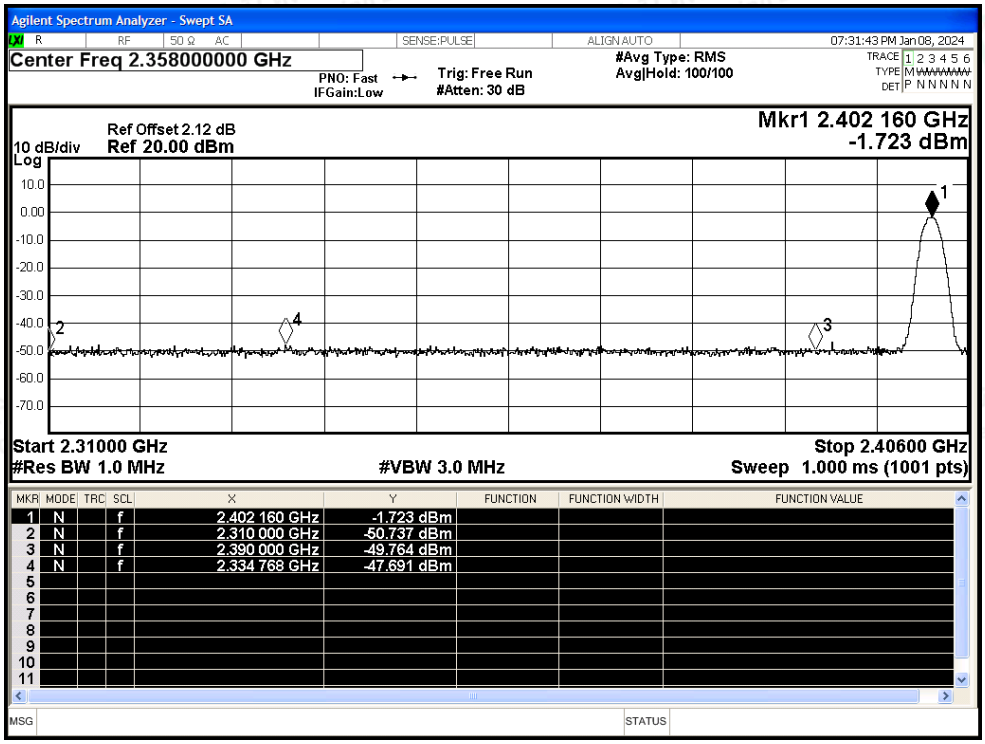
Restrict Band NVNT 2-DH5 2480MHz Ant No-Hopping Peak



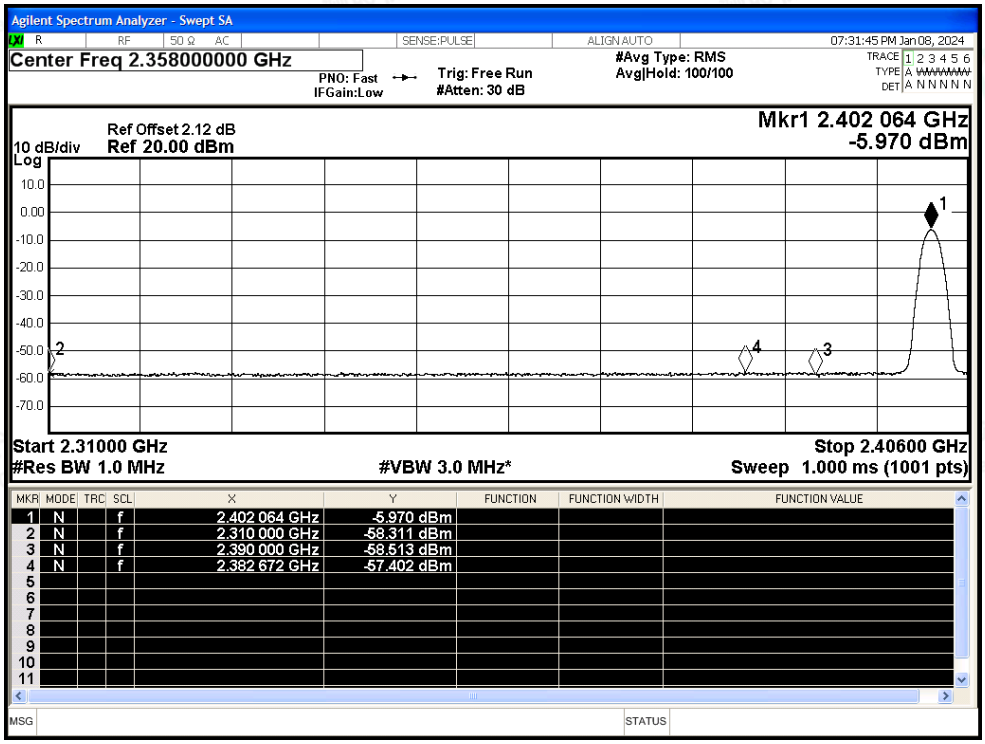
Restrict Band NVNT 2-DH5 2480MHz Ant No-Hopping Average



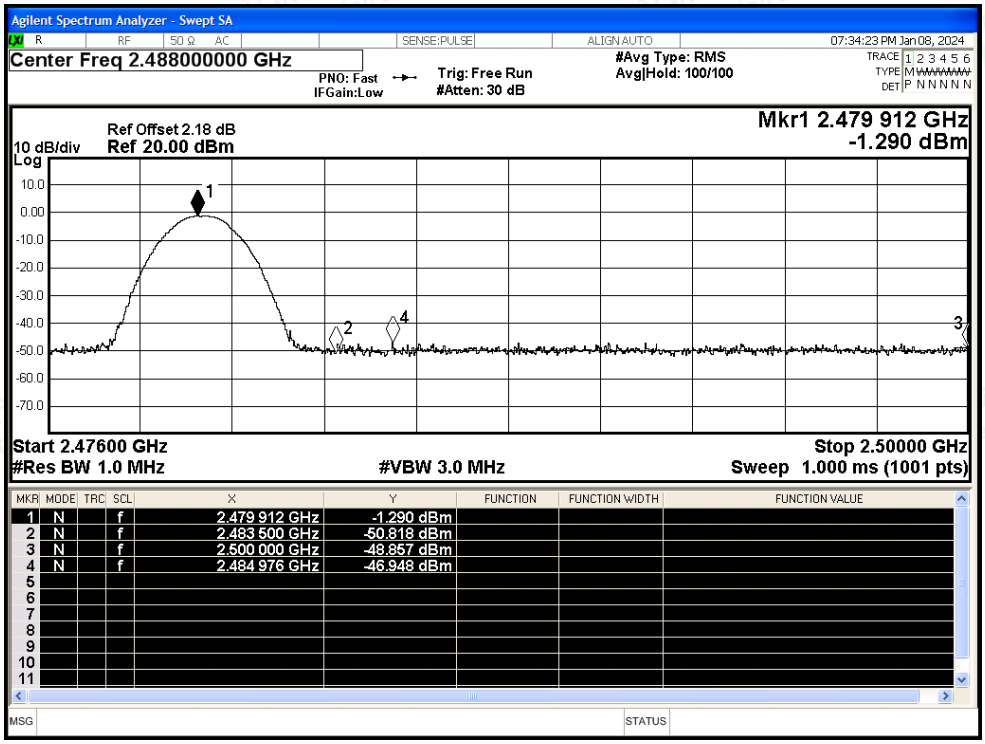
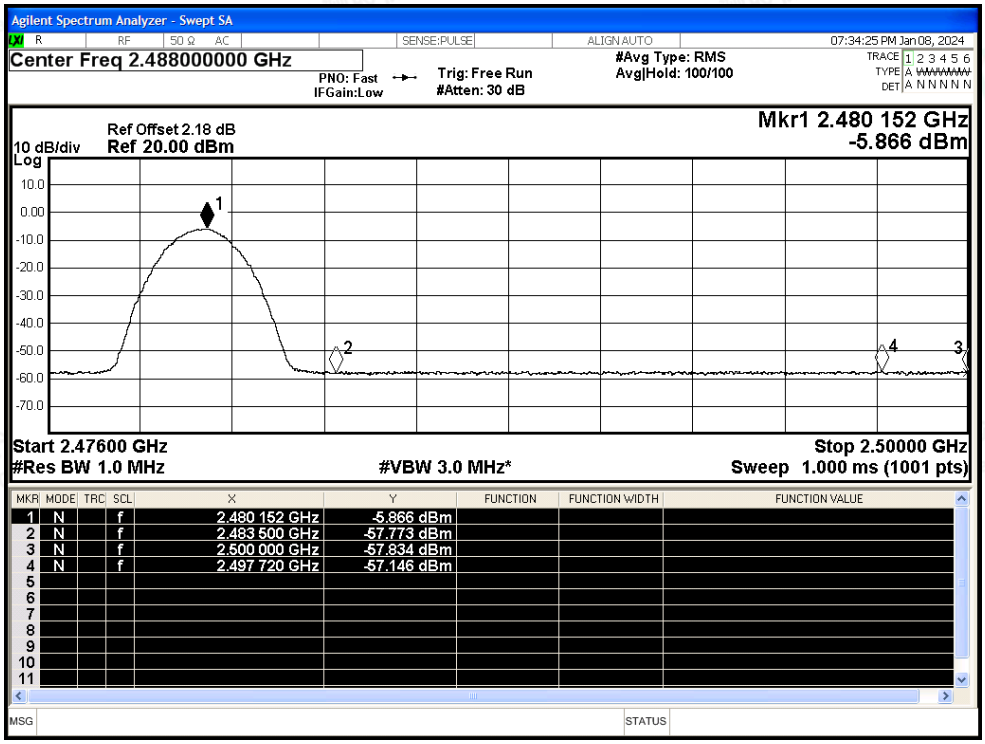
Restrict Band NVNT 3-DH5 2402MHz Ant No-Hopping Peak



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



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



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