



Appendix A

RF Test Data for BT (Conducted Measurement)

Product Name: WI-FI HUMIDITY AND TEMPERATURE SENSOR

Test Model: Shelly Plus H&T

Environmental Conditions

Temperature:	23.8 °C
Relative Humidity:	52.2%
ATM Pressure:	100.0 kPa
Test Engineer:	<i>Nick Peng</i> Nick Peng
Supervised by:	<i>Li Huan</i> Li Huan





A.1 -20dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-20 dB Bandwidth (MHz)	Limit -20 dB Bandwidth (MHz)	Verdict
NVNT	1-DH5	2402	Ant1	0.935	N/A	Pass
NVNT	1-DH5	2441	Ant1	0.935	N/A	Pass
NVNT	1-DH5	2480	Ant1	0.941	N/A	Pass
NVNT	2-DH5	2402	Ant1	1.329	N/A	Pass
NVNT	2-DH5	2441	Ant1	1.326	N/A	Pass
NVNT	2-DH5	2480	Ant1	1.315	N/A	Pass
NVNT	3-DH5	2402	Ant1	1.307	N/A	Pass
NVNT	3-DH5	2441	Ant1	1.303	N/A	Pass
NVNT	3-DH5	2480	Ant1	1.316	N/A	Pass



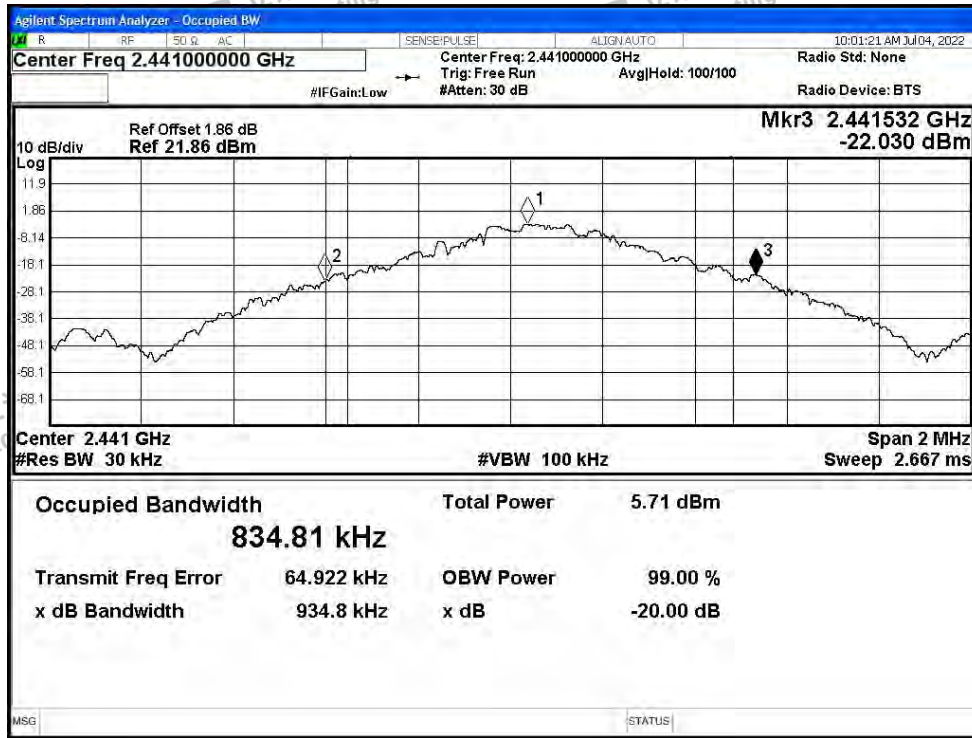


Test Graphs

-20dB Bandwidth NVNT 1-DH5 2402MHz Ant1



-20dB Bandwidth NVNT 1-DH5 2441MHz Ant1

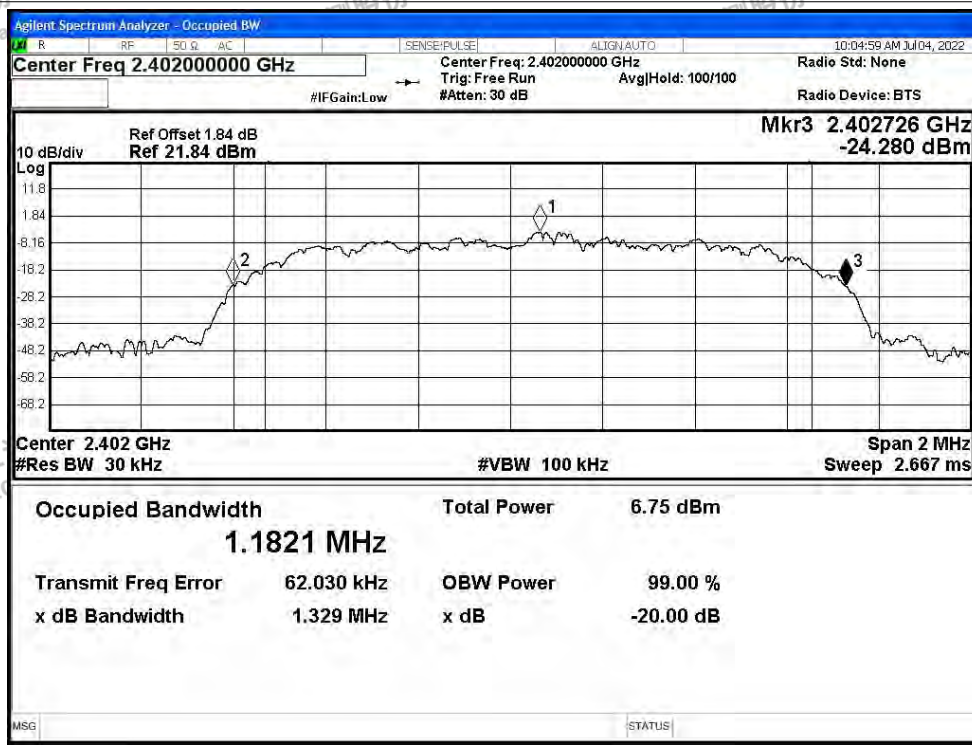




-20dB Bandwidth NVNT 1-DH5 2480MHz Ant1

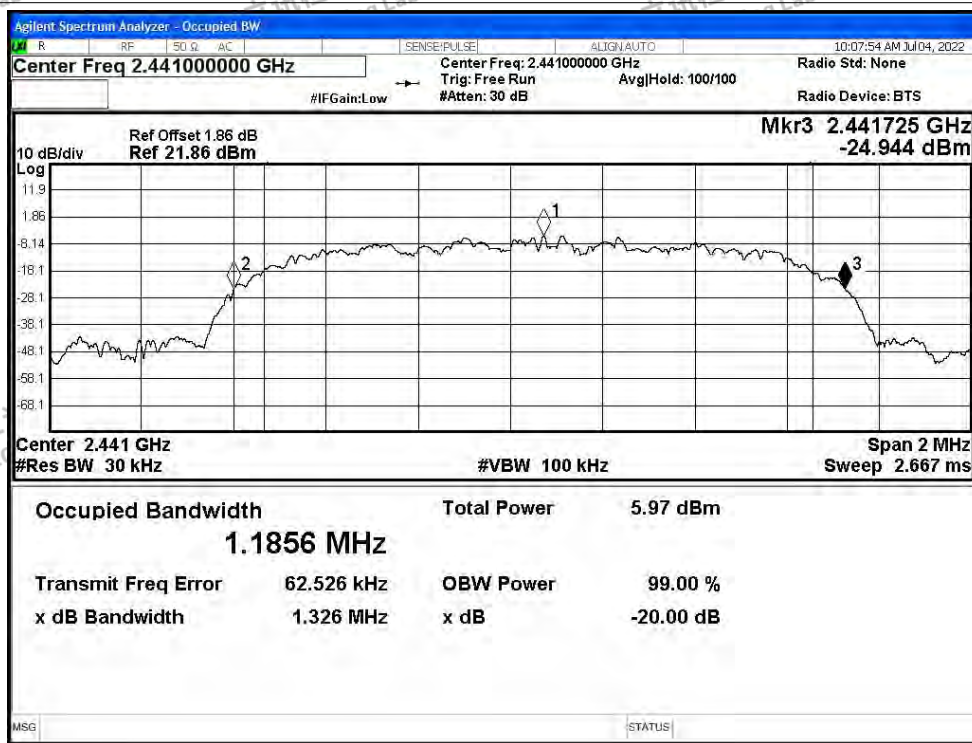


-20dB Bandwidth NVNT 2-DH5 2402MHz Ant1





-20dB Bandwidth NVNT 2-DH5 2441MHz Ant1

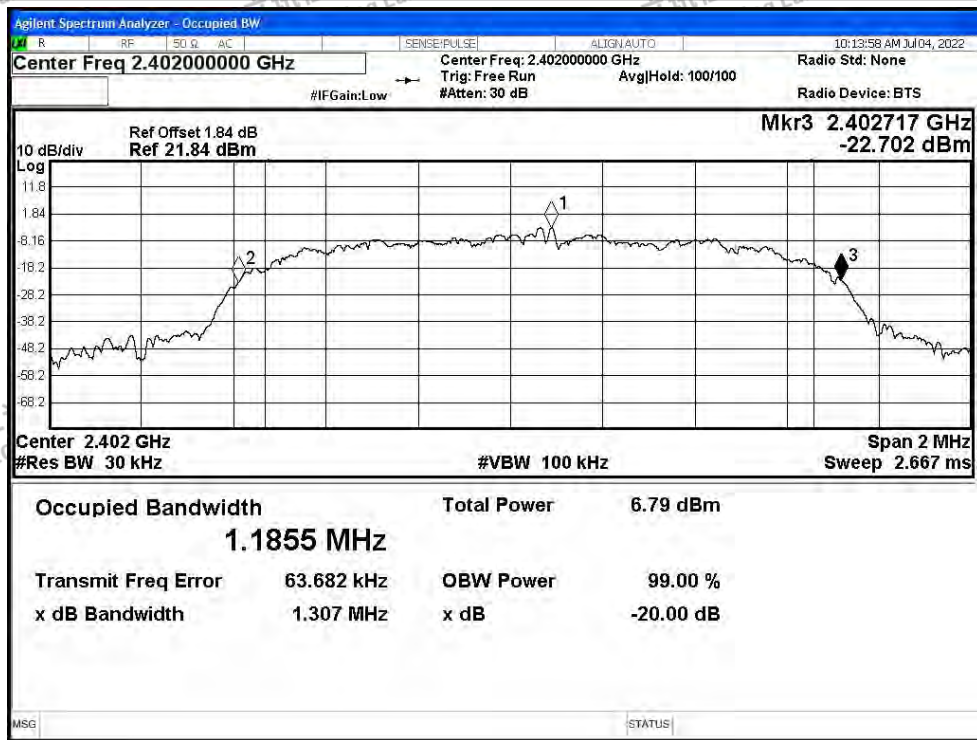


-20dB Bandwidth NVNT 2-DH5 2480MHz Ant1

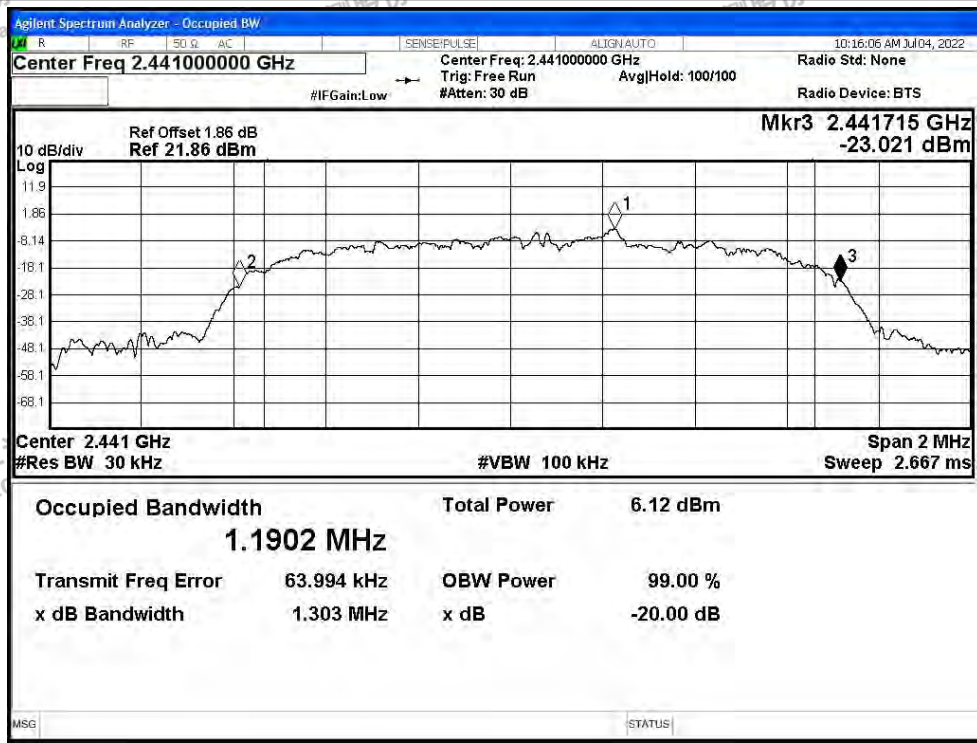


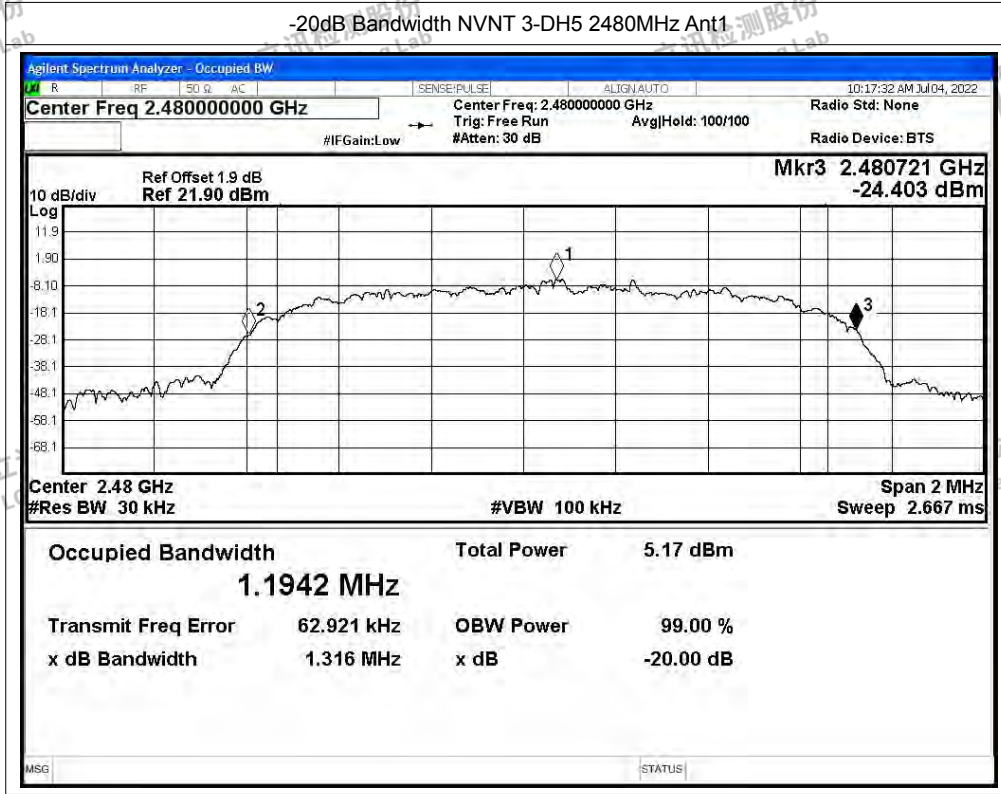


-20dB Bandwidth NVNT 3-DH5 2402MHz Ant1



-20dB Bandwidth NVNT 3-DH5 2441MHz Ant1





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A.2 Maximum Peak Conducted Output Power

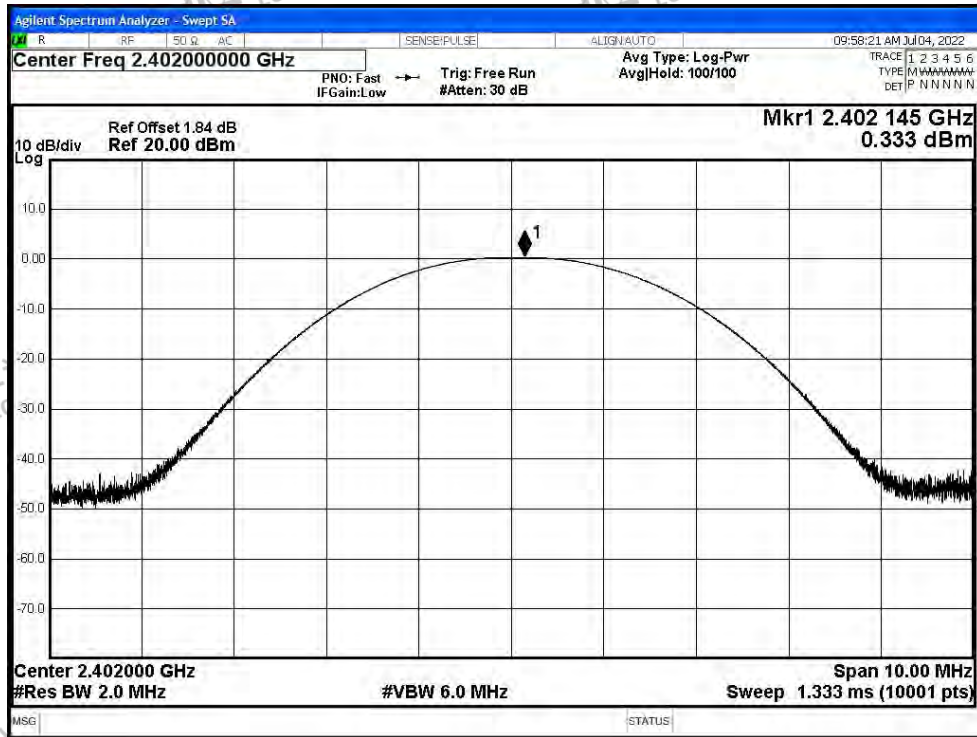
Condition	Mode	Frequency (MHz)	Antenna	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	1-DH5	2402	Ant1	0.33	21	Pass
NVNT	1-DH5	2441	Ant1	-0.18	21	Pass
NVNT	1-DH5	2480	Ant1	-1.11	21	Pass
NVNT	2-DH5	2402	Ant1	2.8	21	Pass
NVNT	2-DH5	2441	Ant1	2.11	21	Pass
NVNT	2-DH5	2480	Ant1	1.26	21	Pass
NVNT	3-DH5	2402	Ant1	3.28	21	Pass
NVNT	3-DH5	2441	Ant1	2.6	21	Pass
NVNT	3-DH5	2480	Ant1	1.55	21	Pass



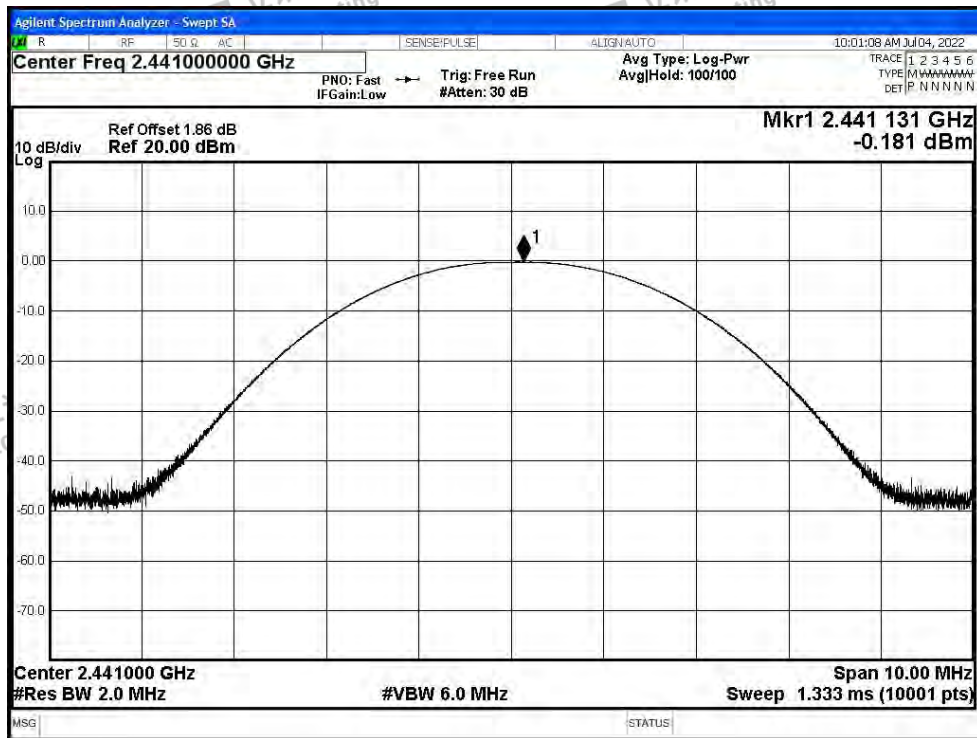


Test Graphs

Power NVNT 1-DH5 2402MHz Ant1

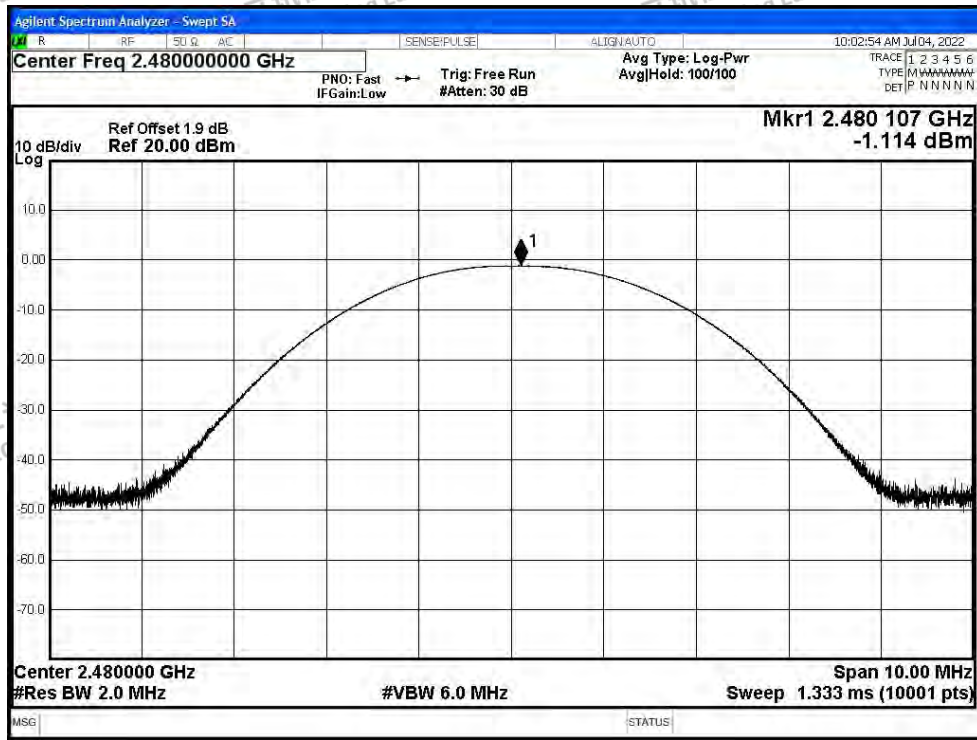


Power NVNT 1-DH5 2441MHz Ant1

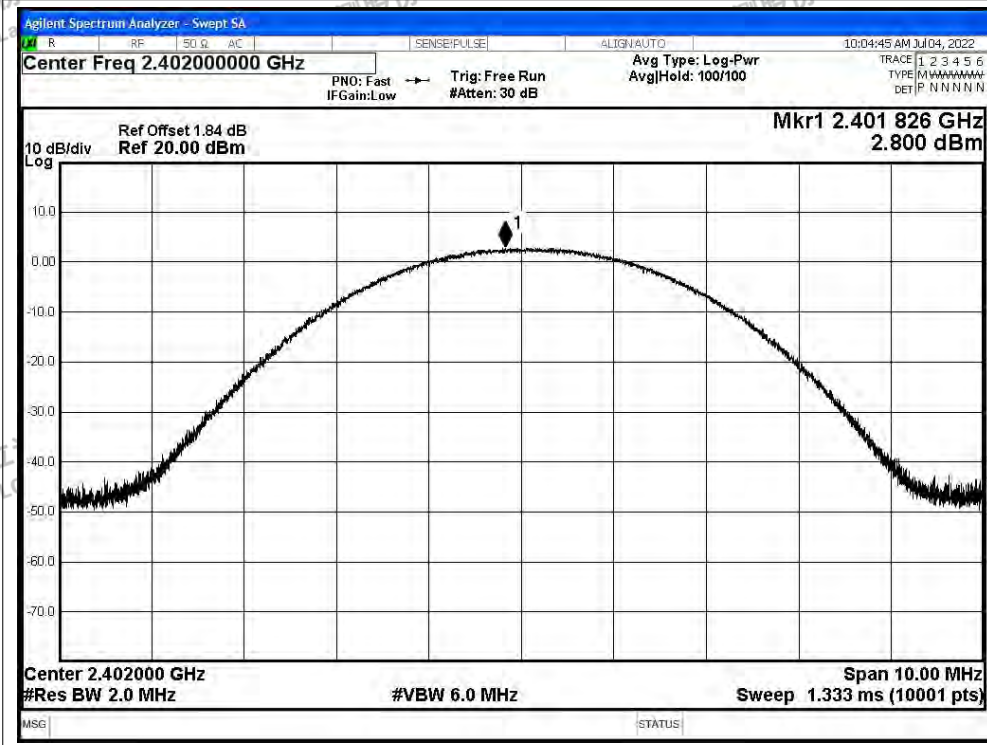




Power NVNT 1-DH5 2480MHz Ant1

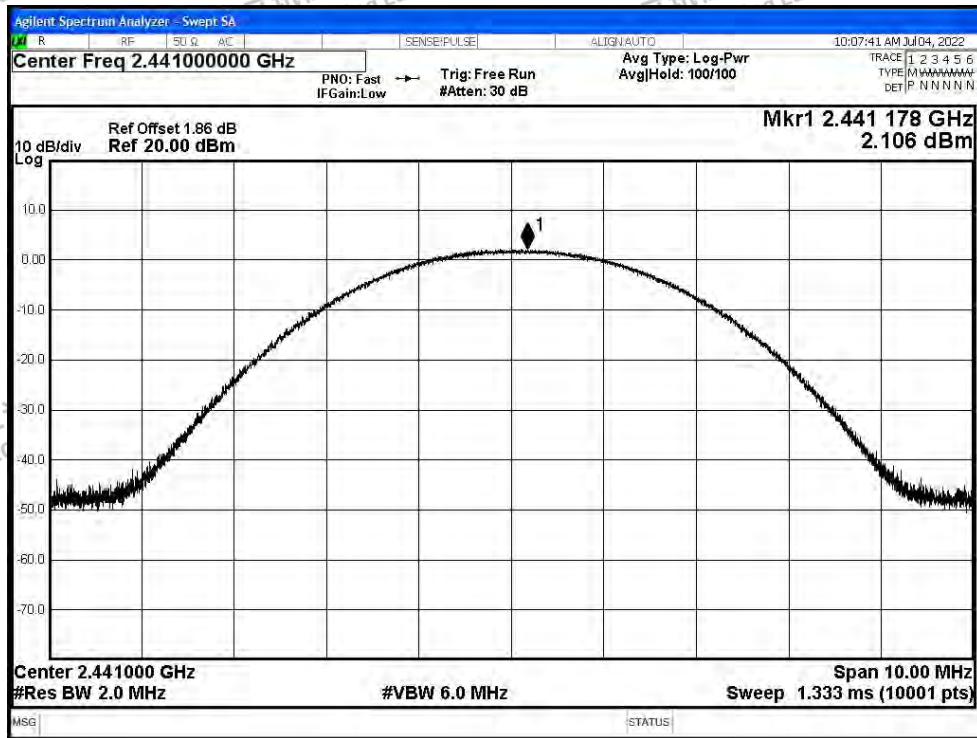


Power NVNT 2-DH5 2402MHz Ant1

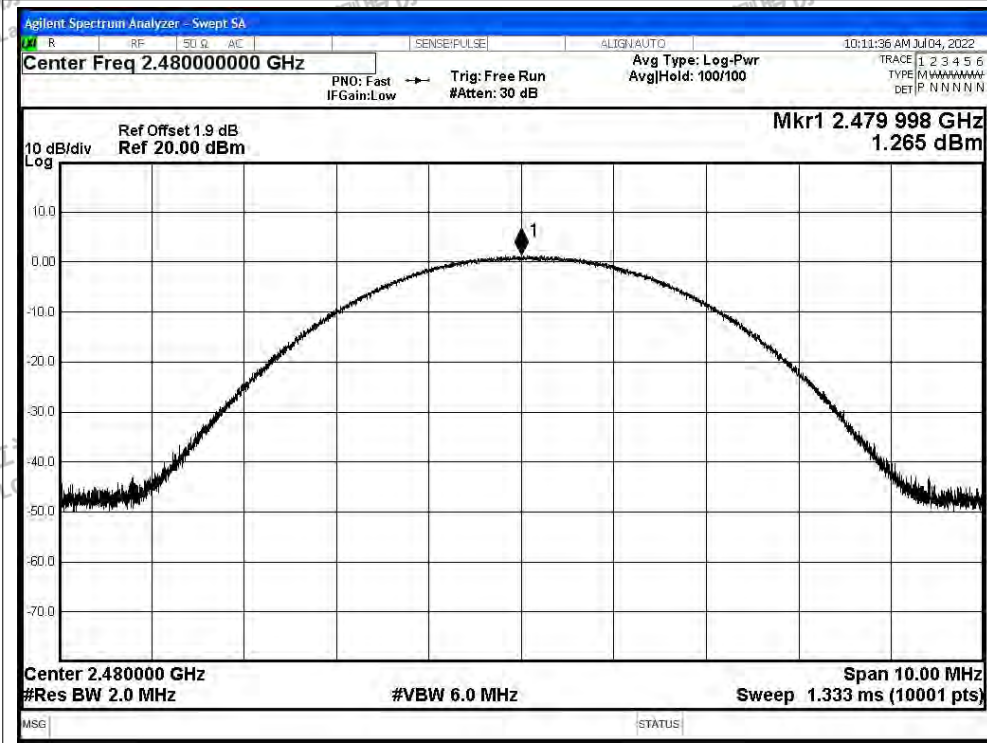




Power NVNT 2-DH5 2441MHz Ant1

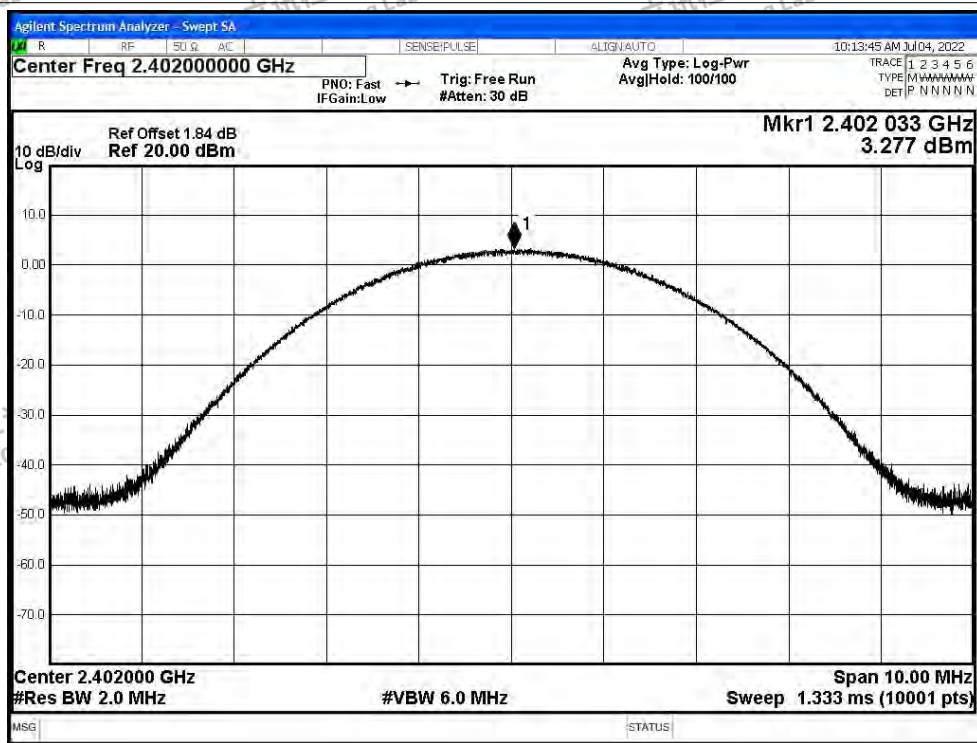


Power NVNT 2-DH5 2480MHz Ant1

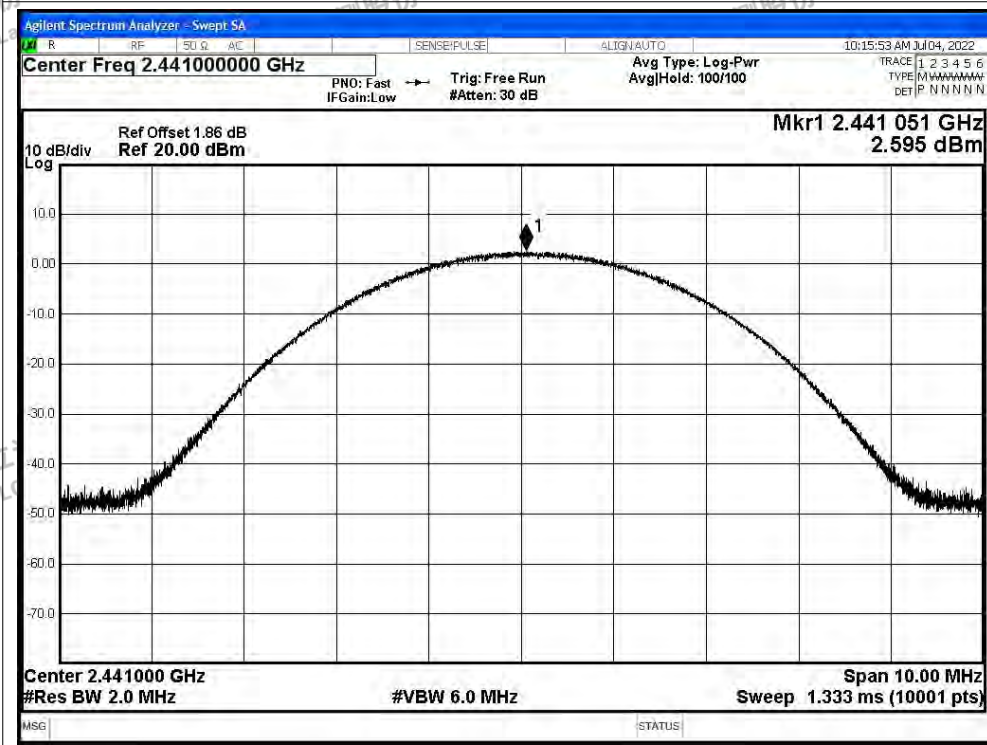




Power NVNT 3-DH5 2402MHz Ant1

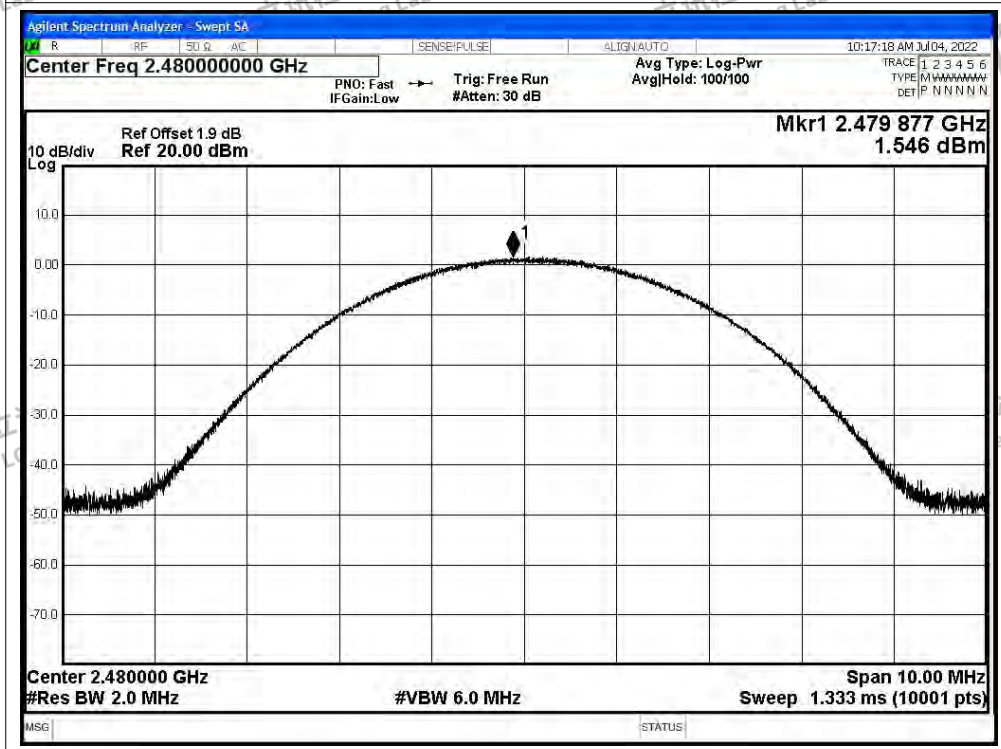


Power NVNT 3-DH5 2441MHz Ant1





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	2402.058	2403.084	1.026	0.623	Pass
NVNT	2-DH5	Ant1	2401.886	2403.064	1.178	0.886	Pass
NVNT	3-DH5	Ant1	2402.08	2403.056	0.976	0.871	Pass



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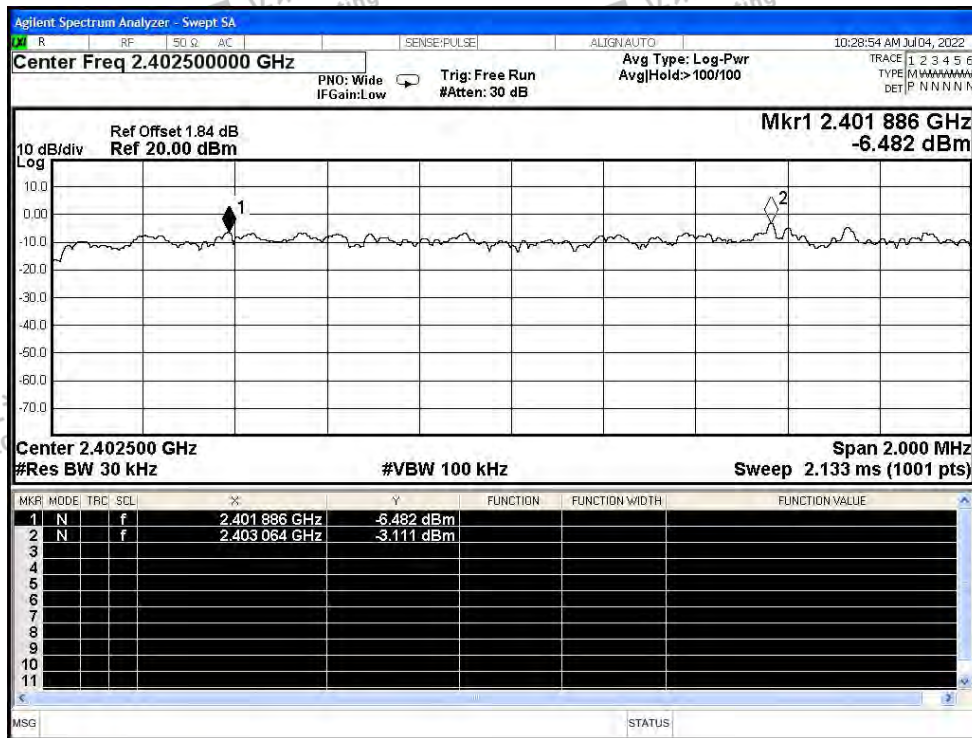


Test Graphs

CFS NVNT 1-DH5 2402MHz Ant1

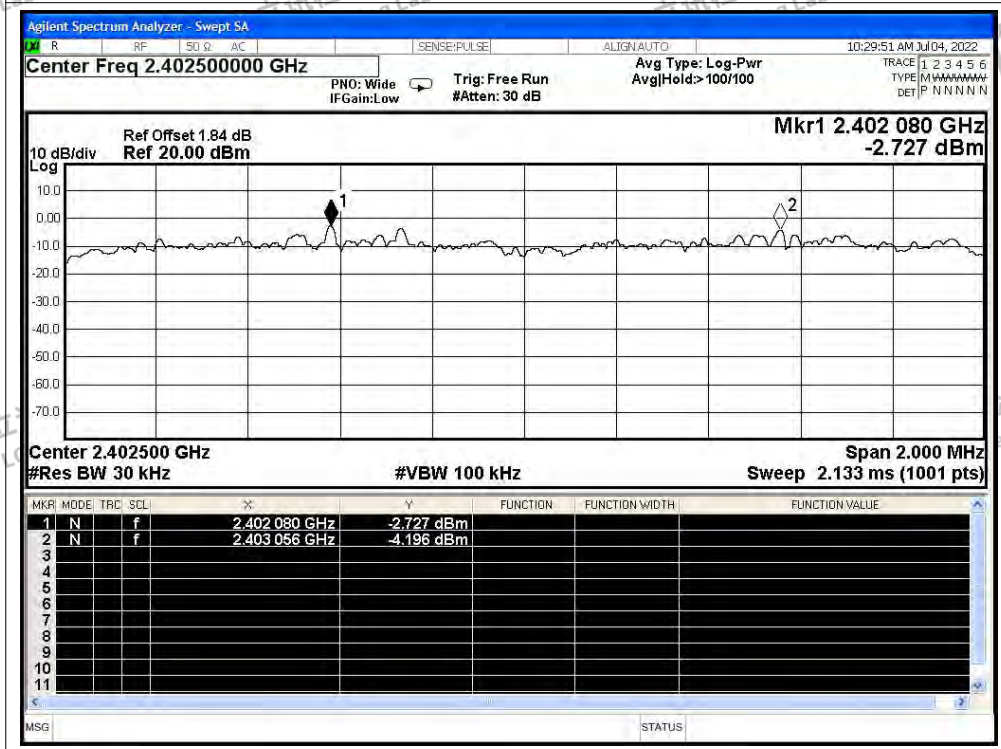


CFS NVNT 2-DH5 2402MHz Ant1





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	2.882	293.964	102	31600	400	Pass
NVNT	2-DH5	2402	Ant1	2.888	311.904	108	31600	400	Pass
NVNT	3-DH5	2402	Ant1	2.891	329.574	114	31600	400	Pass

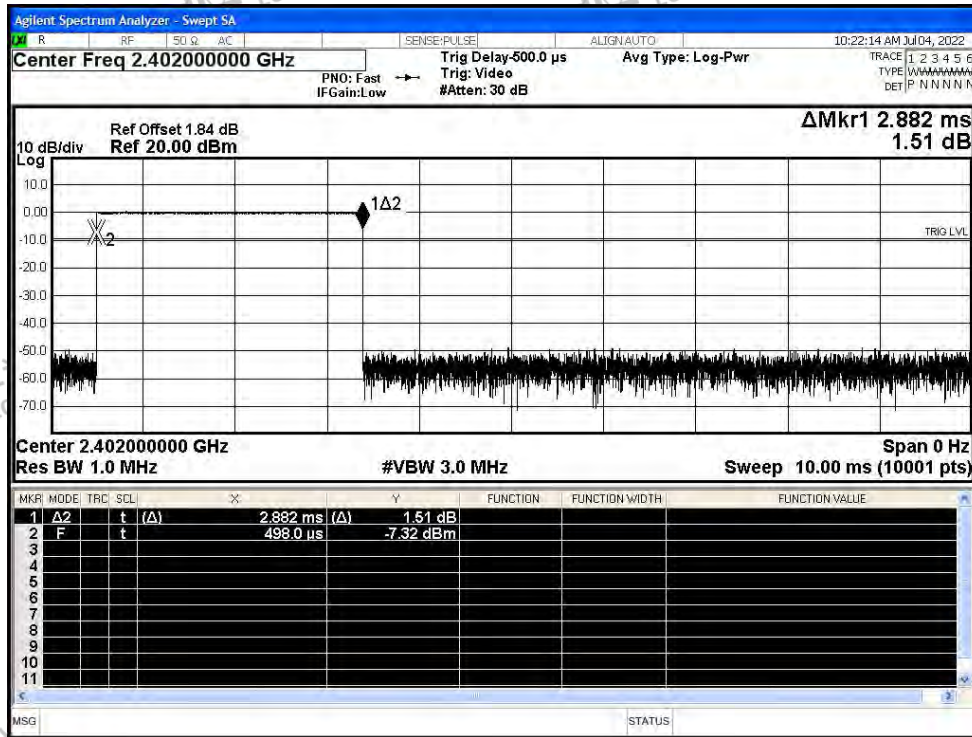


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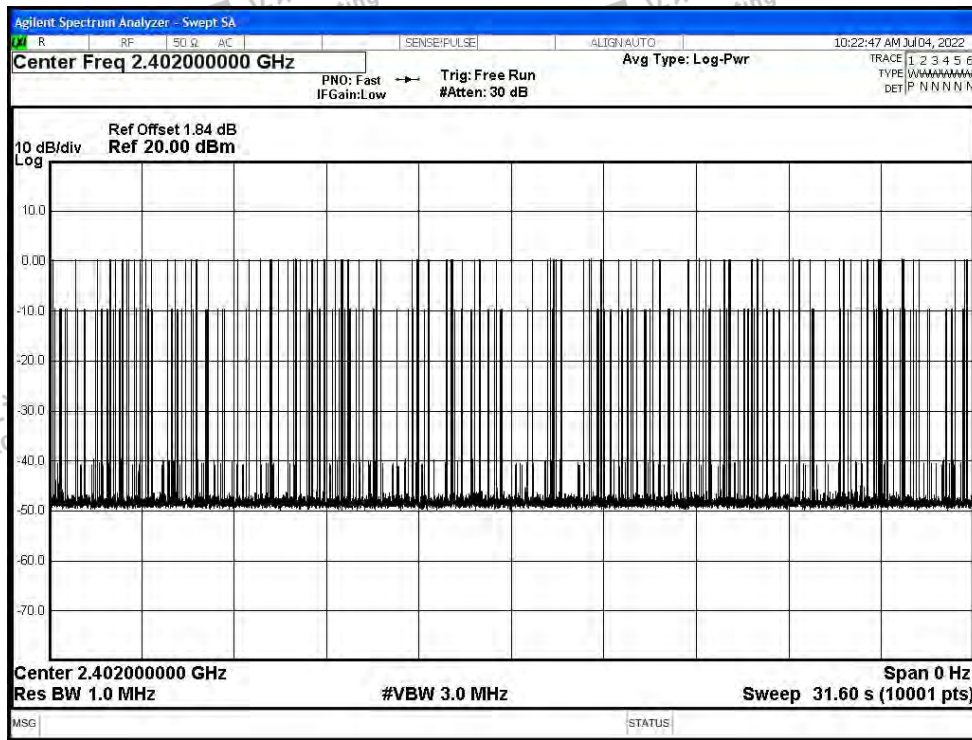


Test Graphs

Dwell NVNT 1-DH5 2402MHz Ant1 One Burst

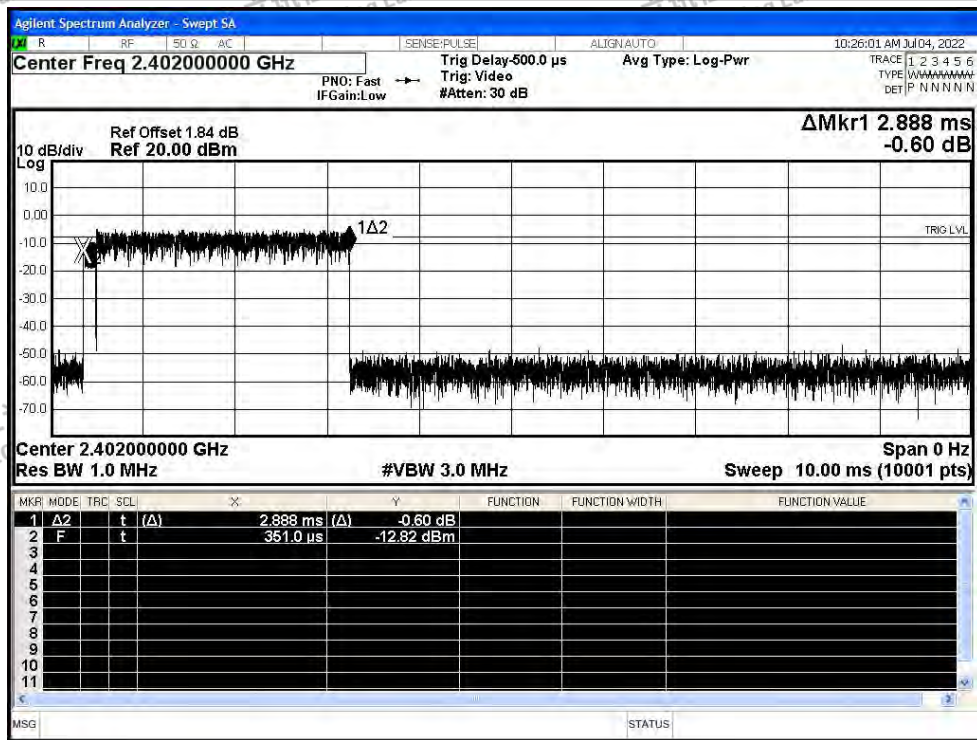


Dwell NVNT 1-DH5 2402MHz Ant1 Accumulated

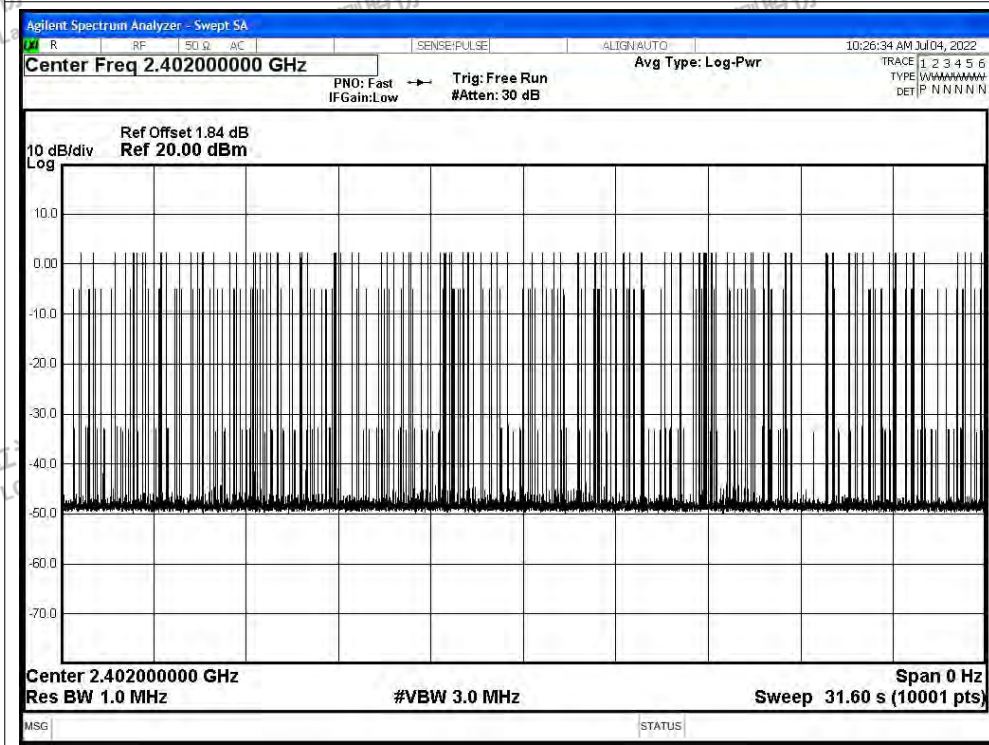




Dwell NVNT 2-DH5 2402MHz Ant1 One Burst

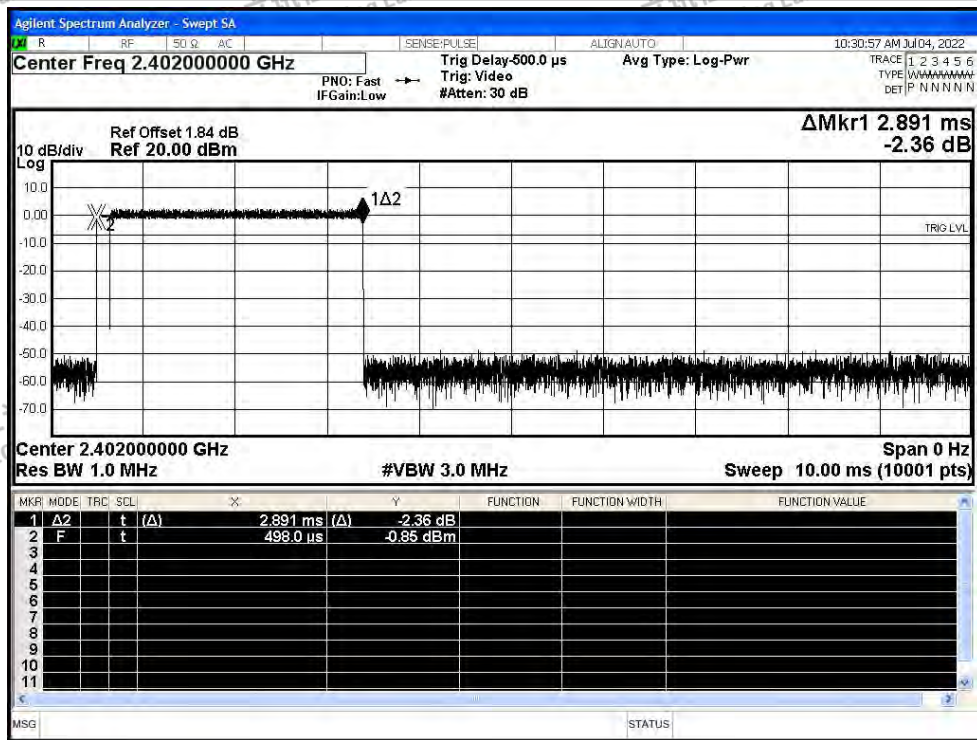


Dwell NVNT 2-DH5 2402MHz Ant1 Accumulated

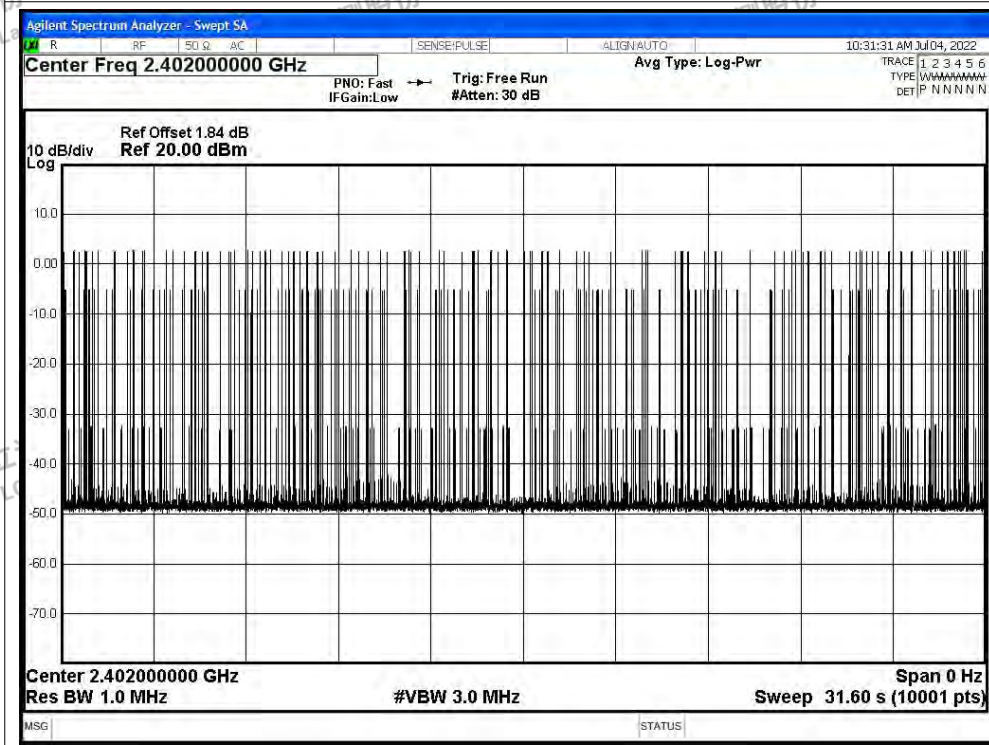




Dwell NVNT 3-DH5 2402MHz Ant1 One Burst



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

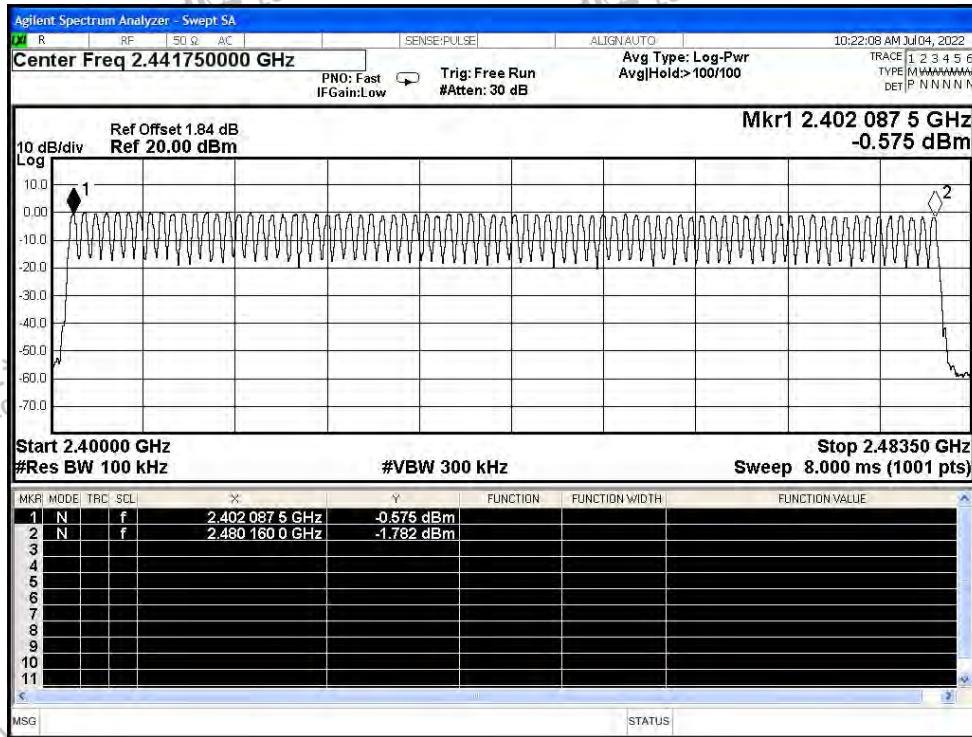


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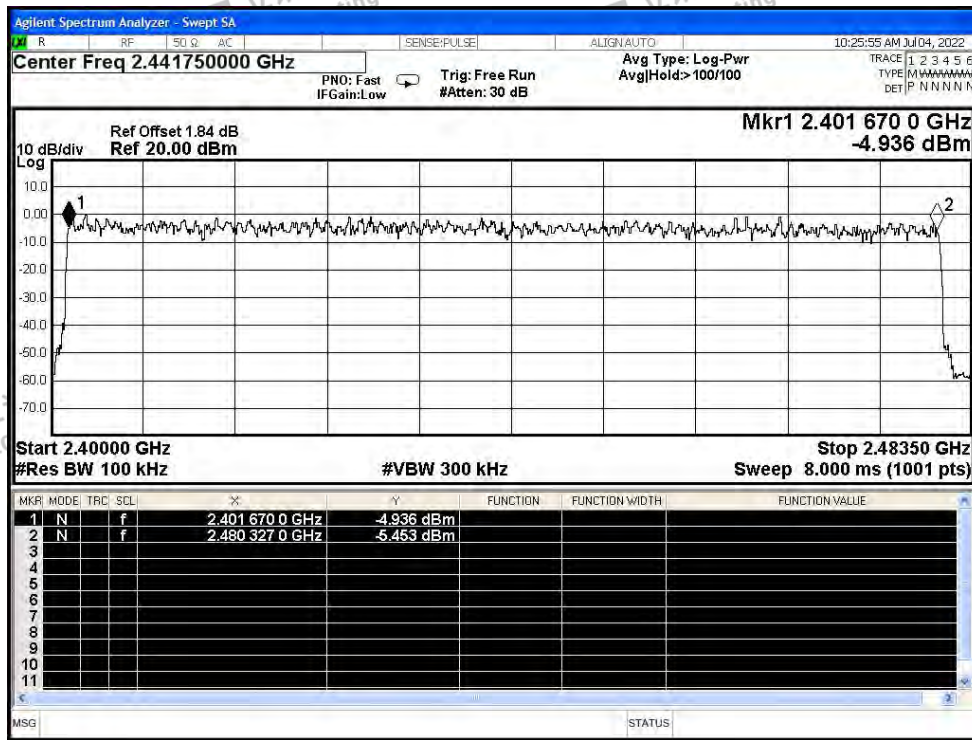


Test Graphs

Hopping No. NVNT 1-DH5 2402MHz Ant1

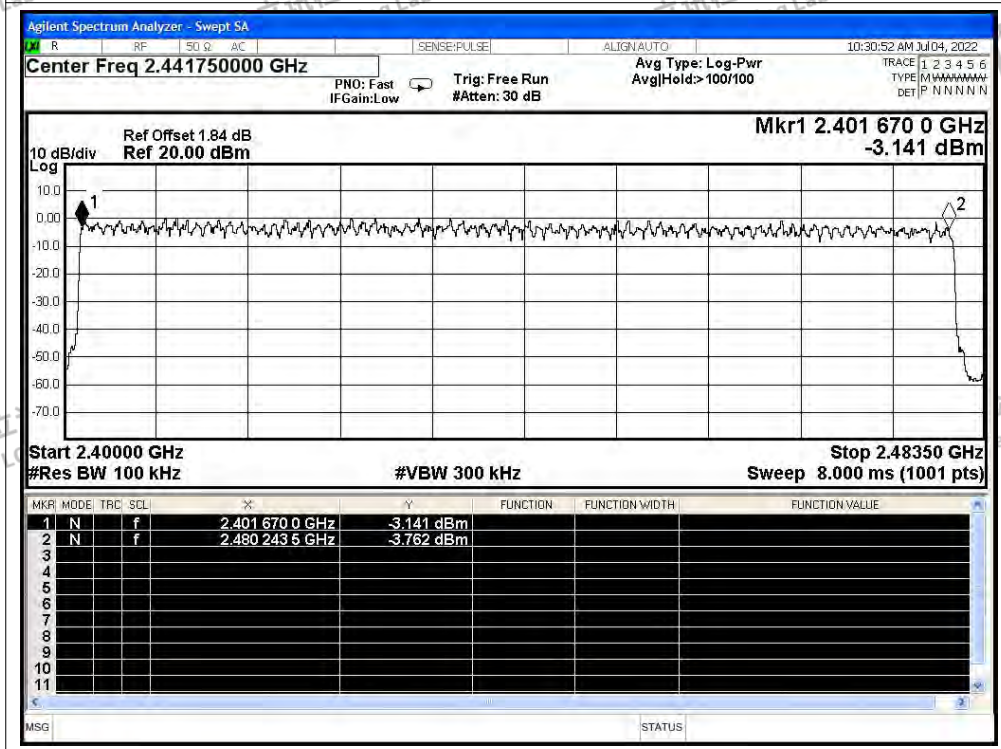


Hopping No. NVNT 2-DH5 2402MHz Ant1





Hopping No. NVNT 3-DH5 2402MHz Ant1





A.6 Band Edge

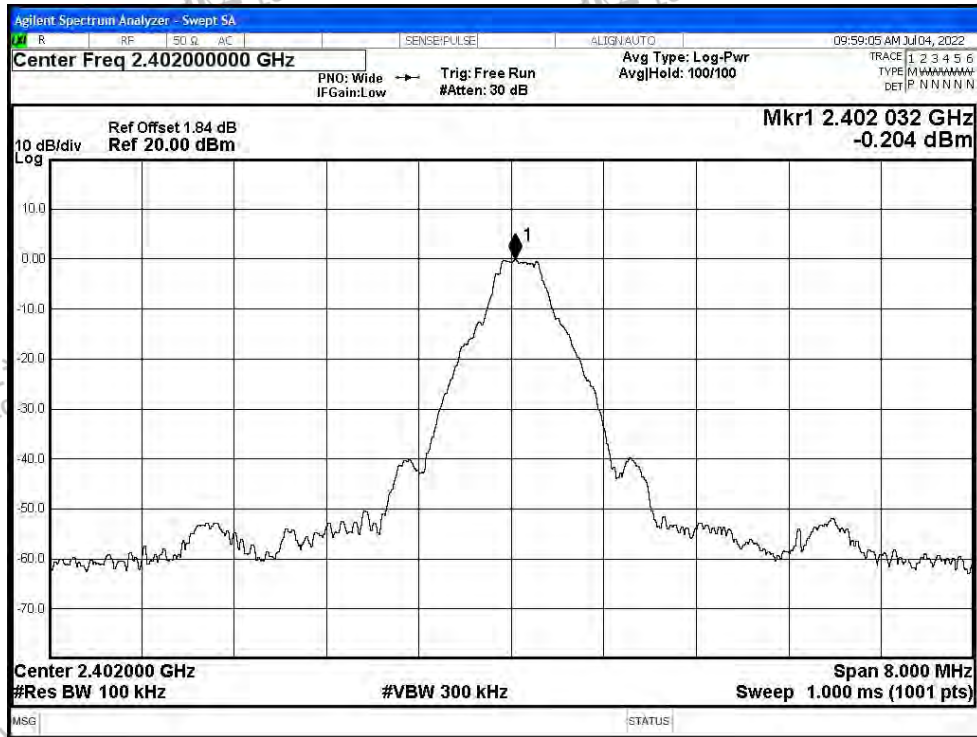
Condition	Mode	Frequency (MHz)	Antenna	Hopping Mode	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	1-DH5	2402	Ant1	No-Hopping	-52.53	-20	Pass
NVNT	1-DH5	2480	Ant1	No-Hopping	-55.16	-20	Pass
NVNT	2-DH5	2402	Ant1	No-Hopping	-52	-20	Pass
NVNT	2-DH5	2480	Ant1	No-Hopping	-55.54	-20	Pass
NVNT	3-DH5	2402	Ant1	No-Hopping	-53.81	-20	Pass
NVNT	3-DH5	2480	Ant1	No-Hopping	-54.66	-20	Pass



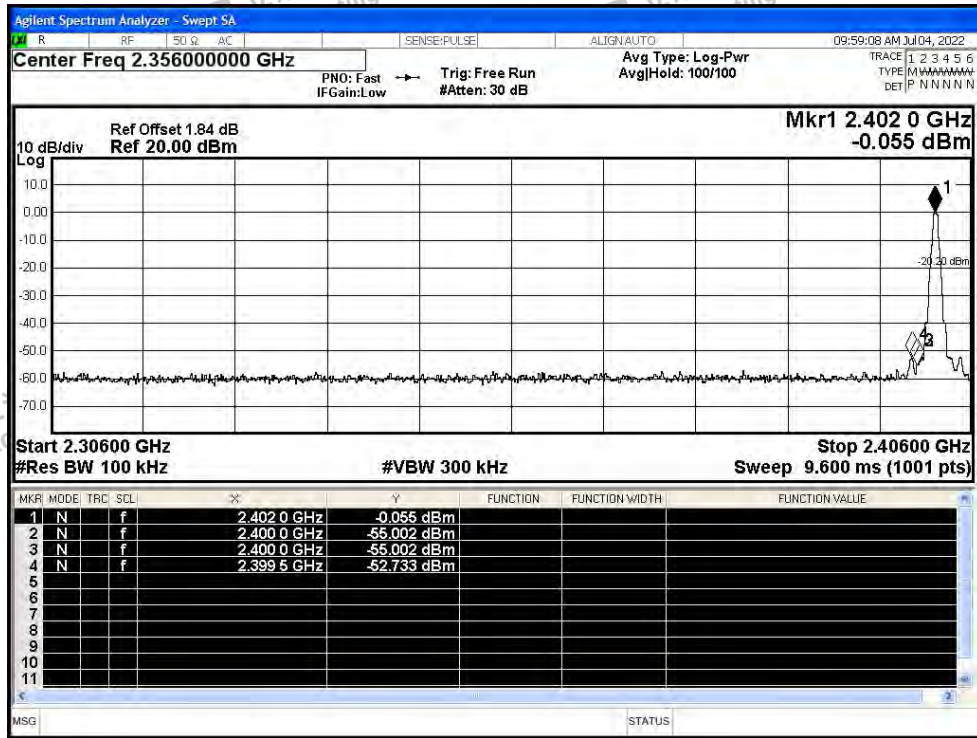


Test Graphs

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

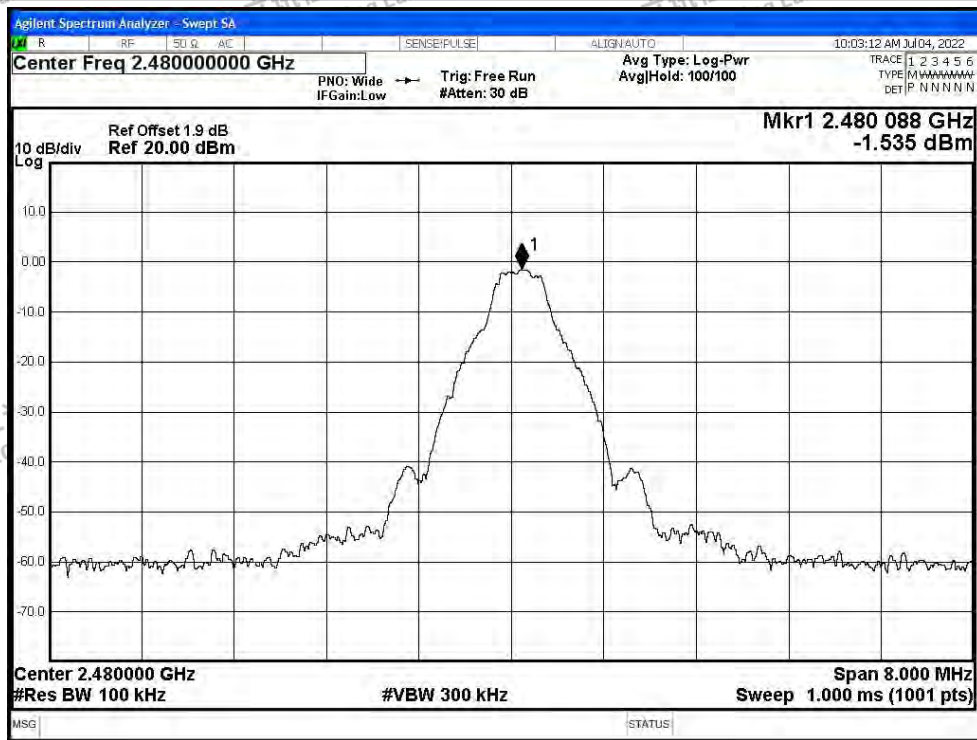


Band Edge NVNT 1-DH5 2402MHz Ant1 No-Hopping Emission

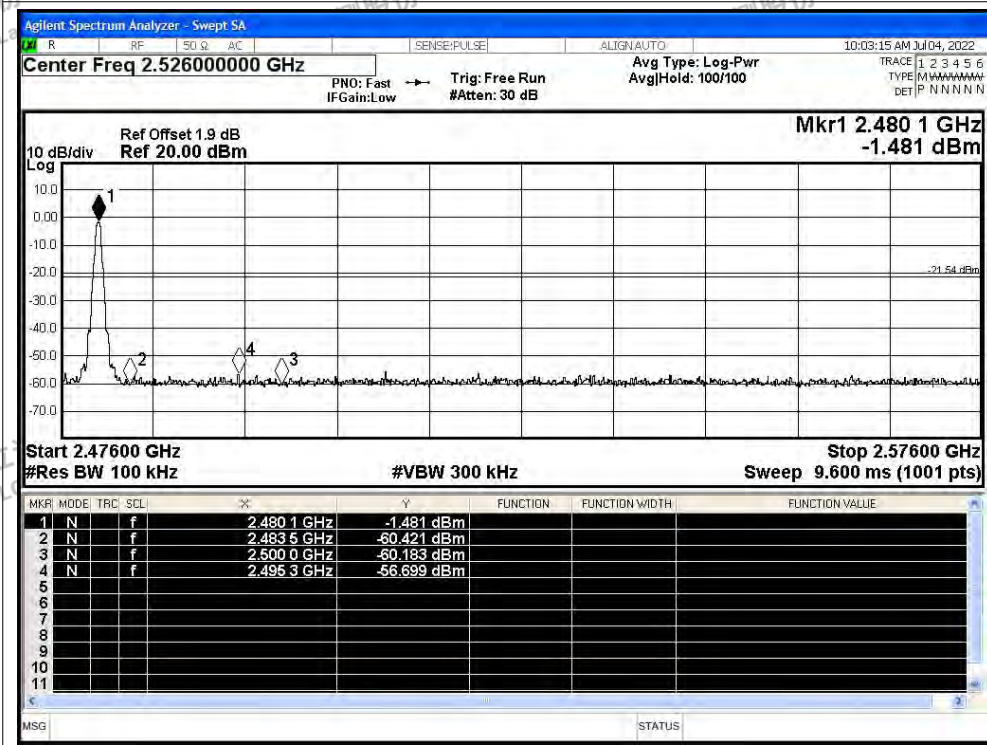




Band Edge NVNT 1-DH5 2480MHz Ant1 No-Hopping Ref

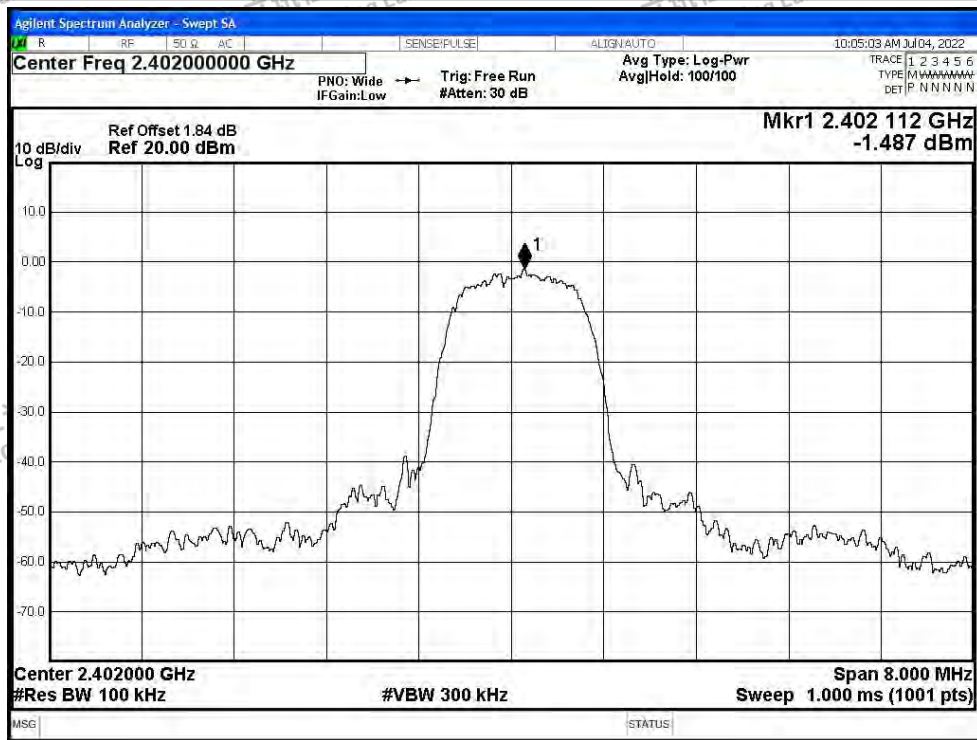


Band Edge NVNT 1-DH5 2480MHz Ant1 No-Hopping Emission

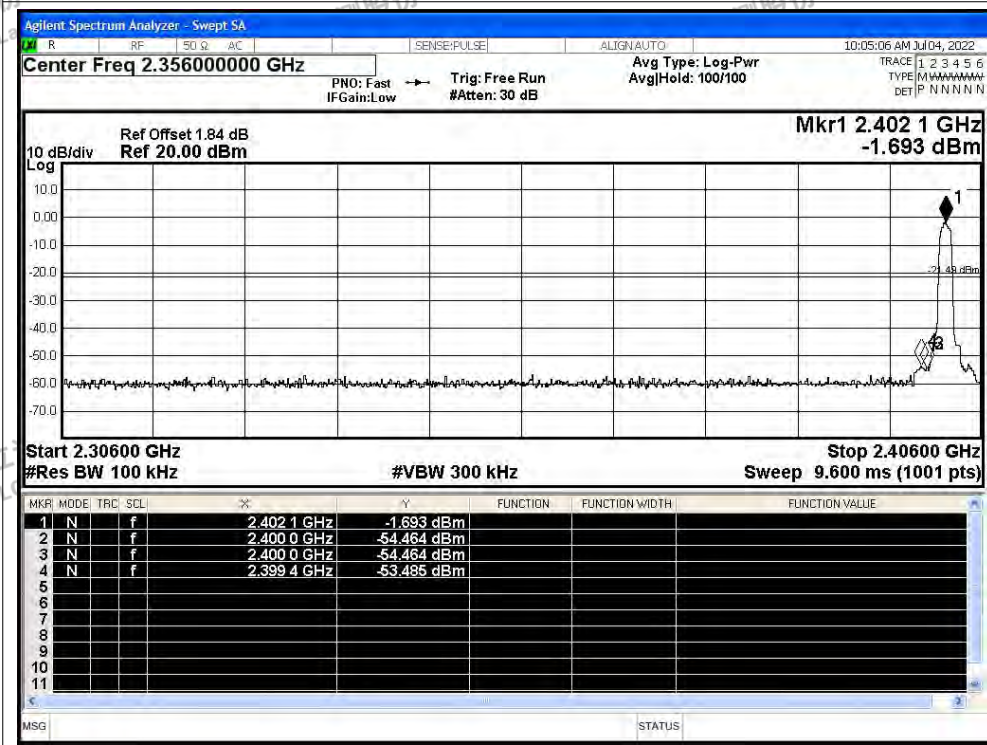




Band Edge NVNT 2-DH5 2402MHz Ant1 No-Hopping Ref

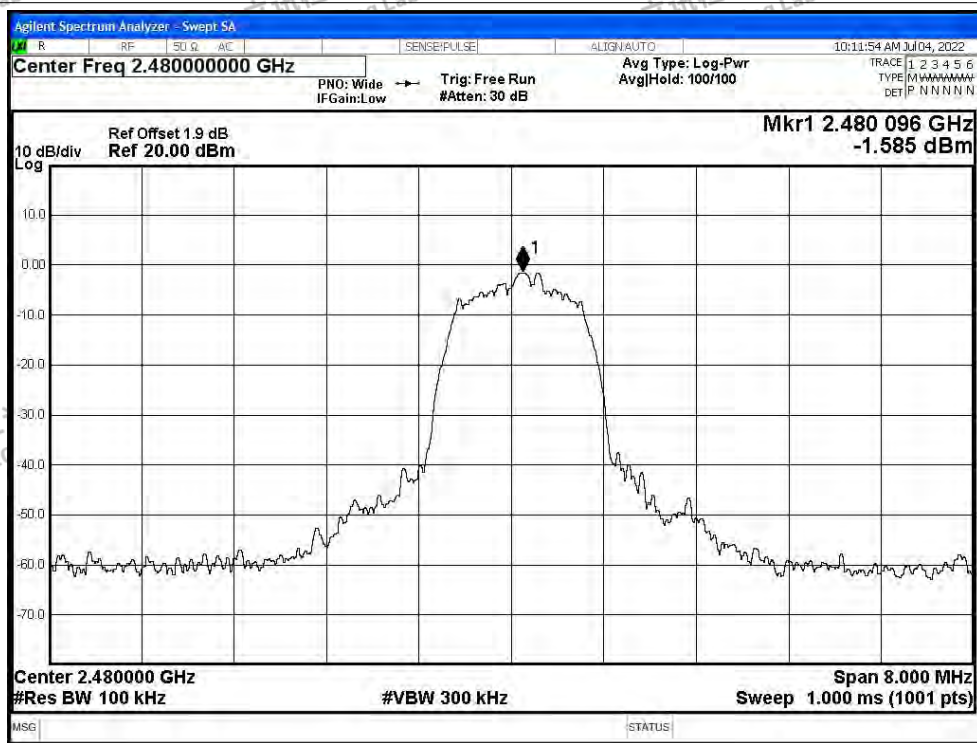


Band Edge NVNT 2-DH5 2402MHz Ant1 No-Hopping Emission

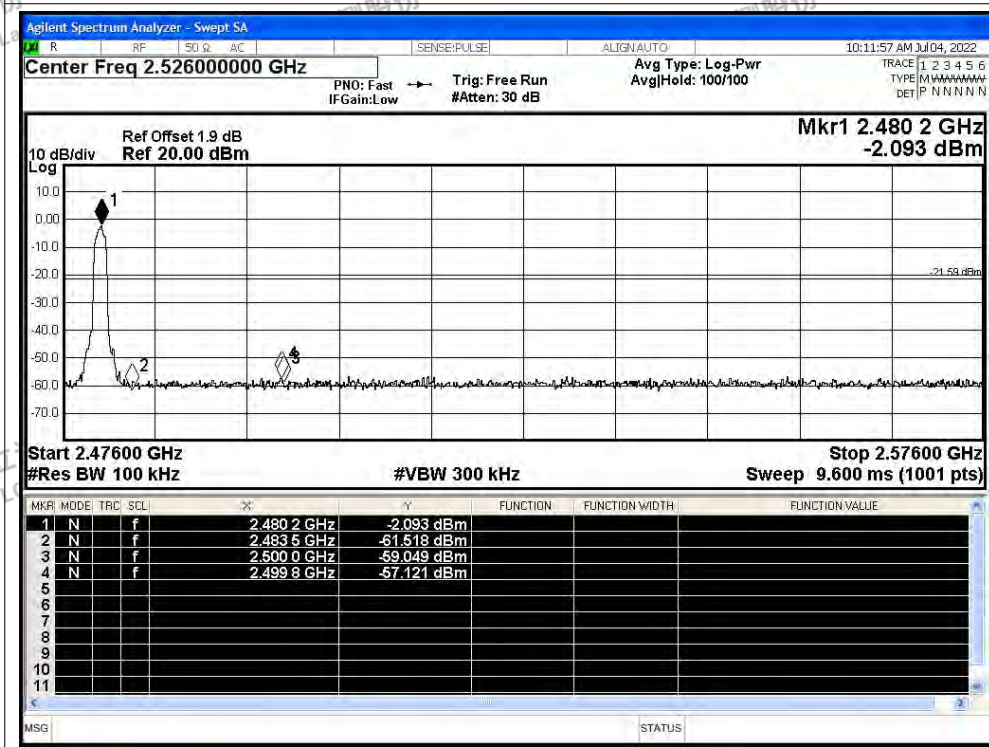




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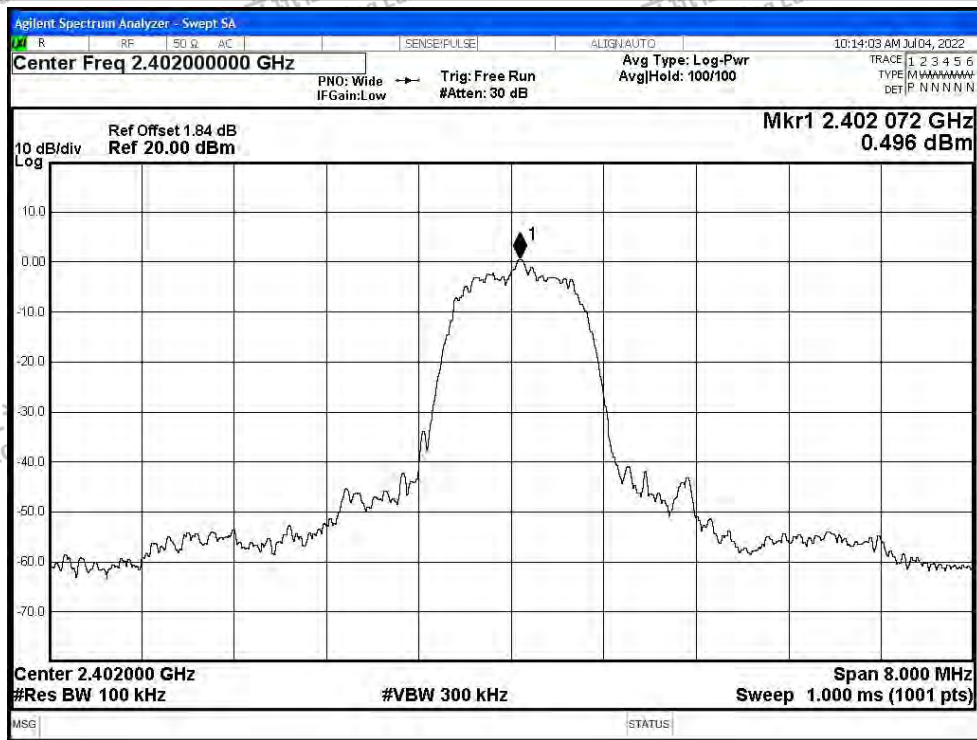


Band Edge NVNT 2-DH5 2480MHz Ant1 No-Hopping Emission

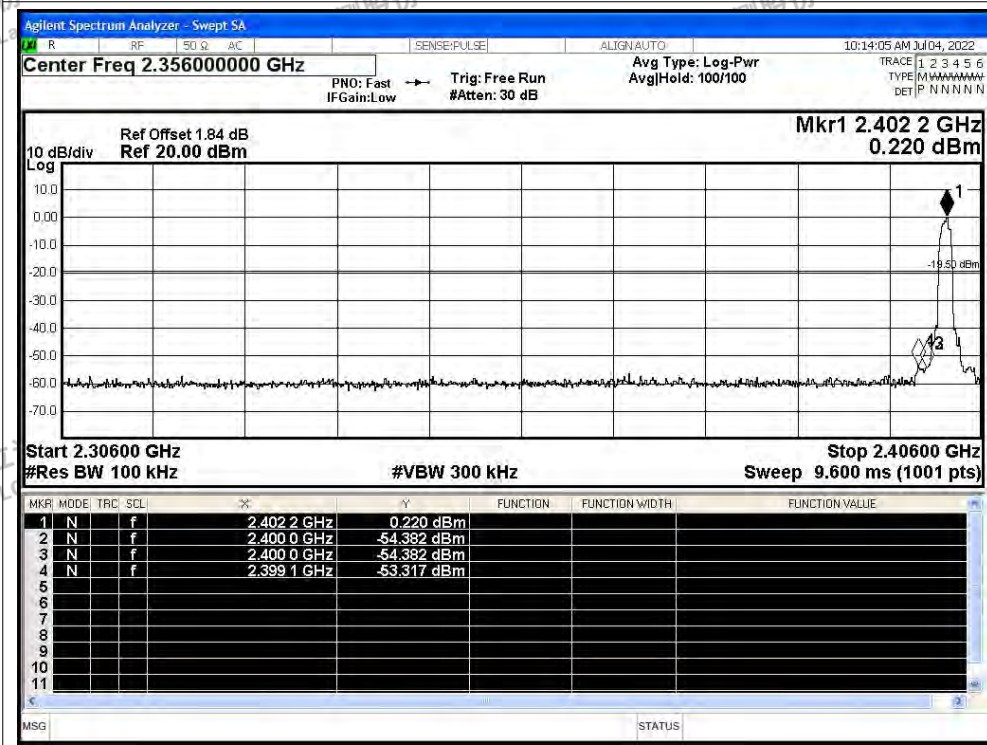




Band Edge NVNT 3-DH5 2402MHz Ant1 No-Hopping Ref

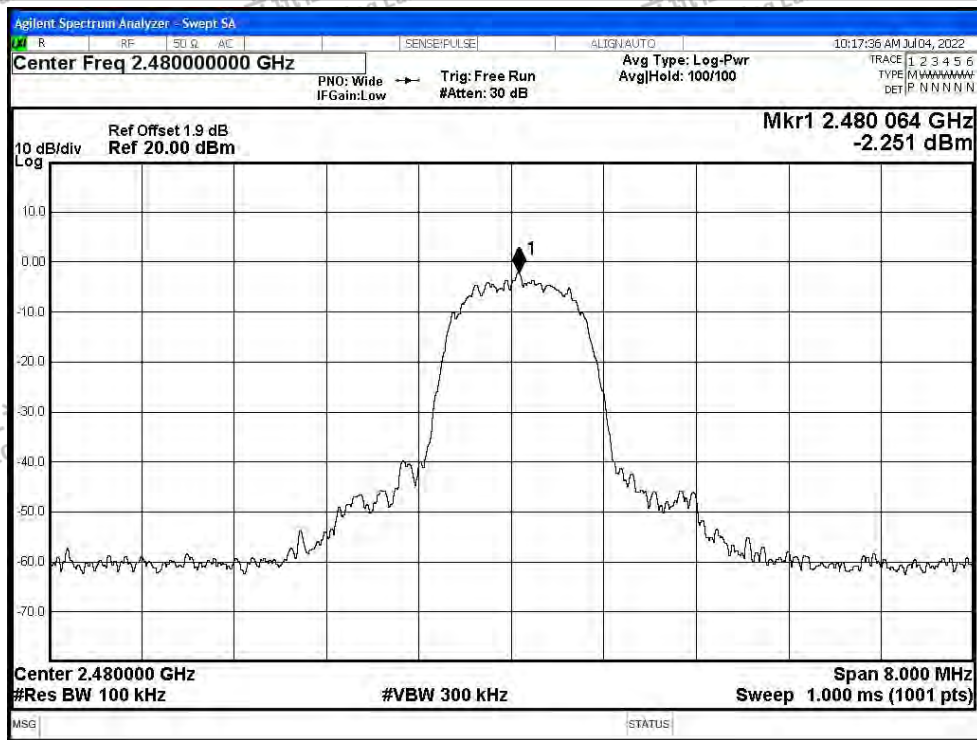


Band Edge NVNT 3-DH5 2402MHz Ant1 No-Hopping Emission

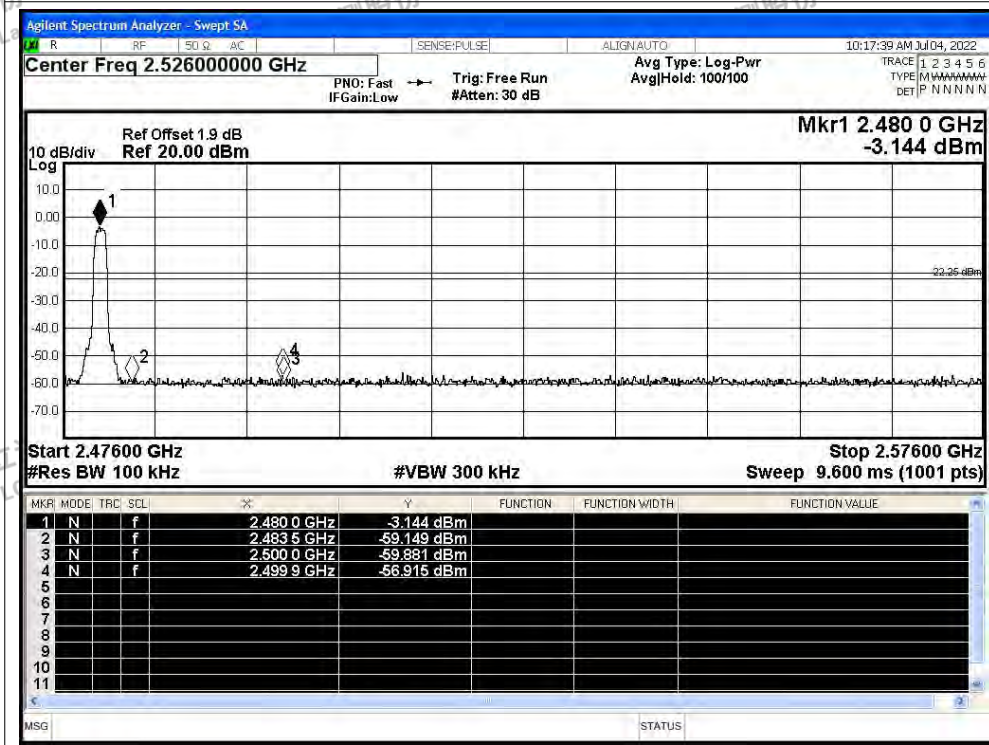




Band Edge NVNT 3-DH5 2480MHz Ant1 No-Hopping Ref



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





(Hopping)

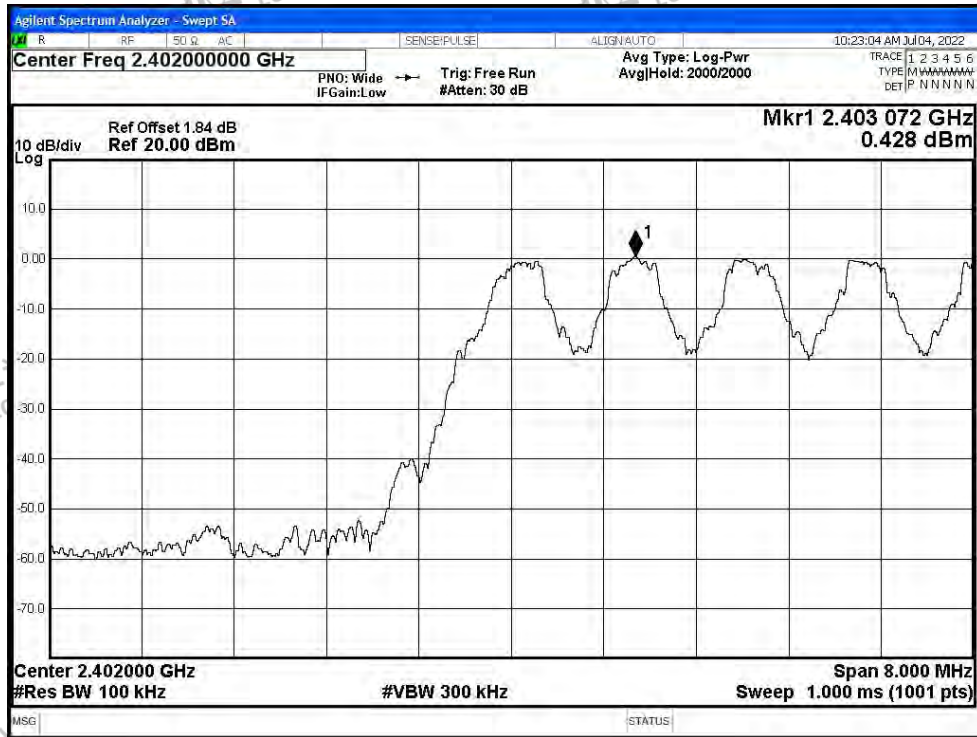
Condition	Mode	Frequency (MHz)	Antenna	Hopping Mode	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	1-DH5	2402	Ant1	Hopping	-56.93	-20	Pass
NVNT	1-DH5	2480	Ant1	Hopping	-54.34	-20	Pass
NVNT	2-DH5	2402	Ant1	Hopping	-56.49	-20	Pass
NVNT	2-DH5	2480	Ant1	Hopping	-53.49	-20	Pass
NVNT	3-DH5	2402	Ant1	Hopping	-55.11	-20	Pass
NVNT	3-DH5	2480	Ant1	Hopping	-53.89	-20	Pass



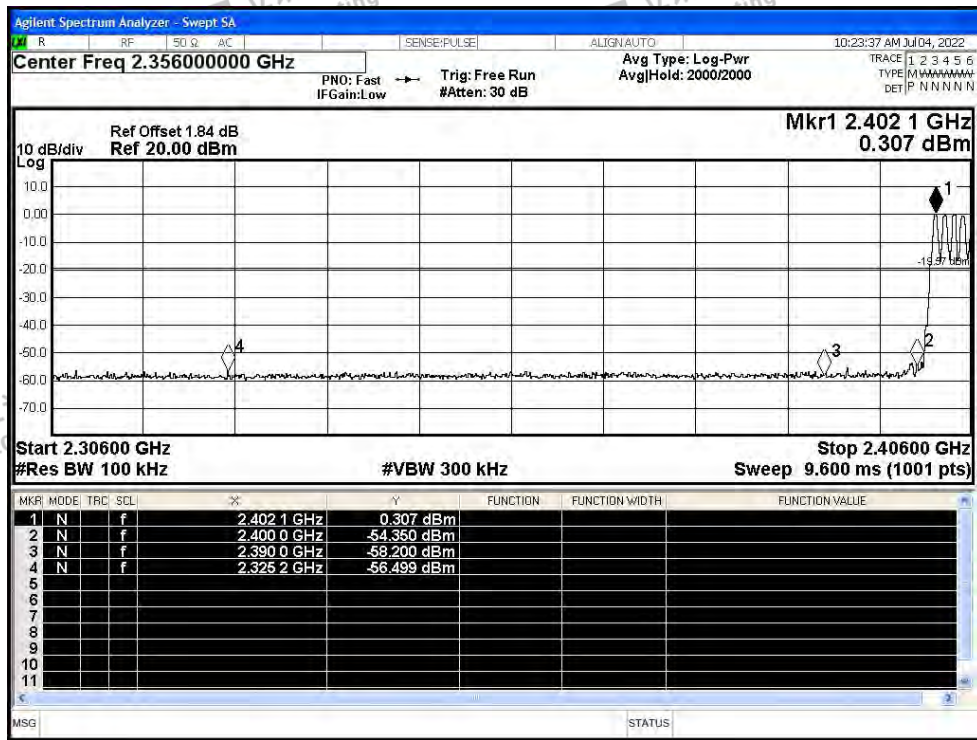


Test Graphs

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

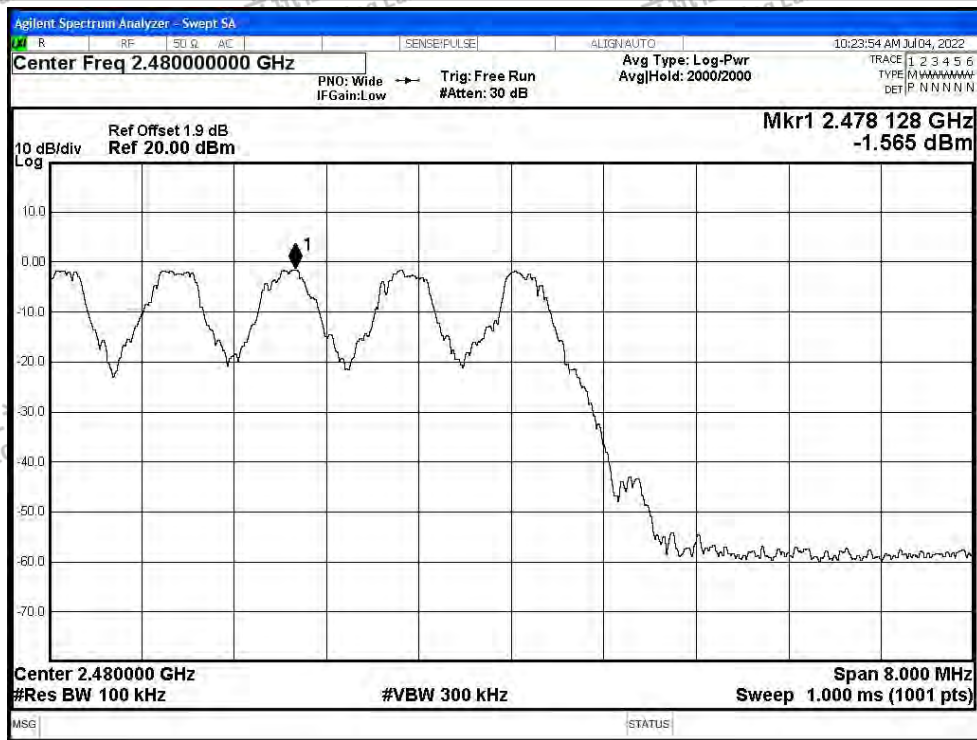


Band Edge(Hopping) NVNT 1-DH5 2402MHz Ant1 Hopping Emission

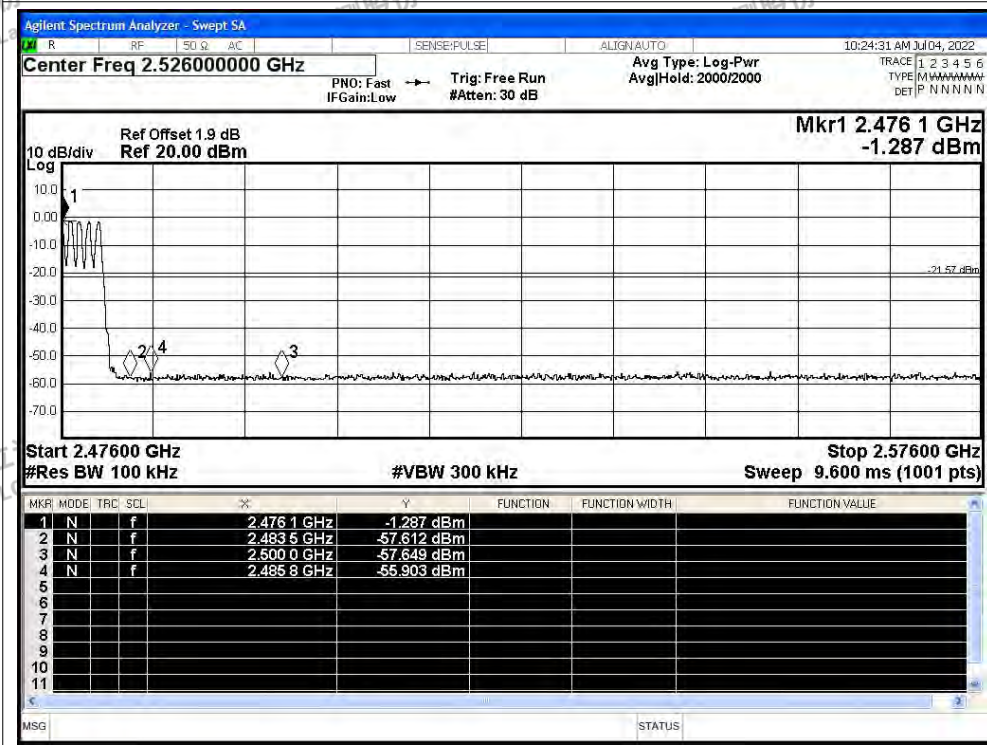




Band Edge(Hopping) NVNT 1-DH5 2480MHz Ant1 Hopping Ref



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

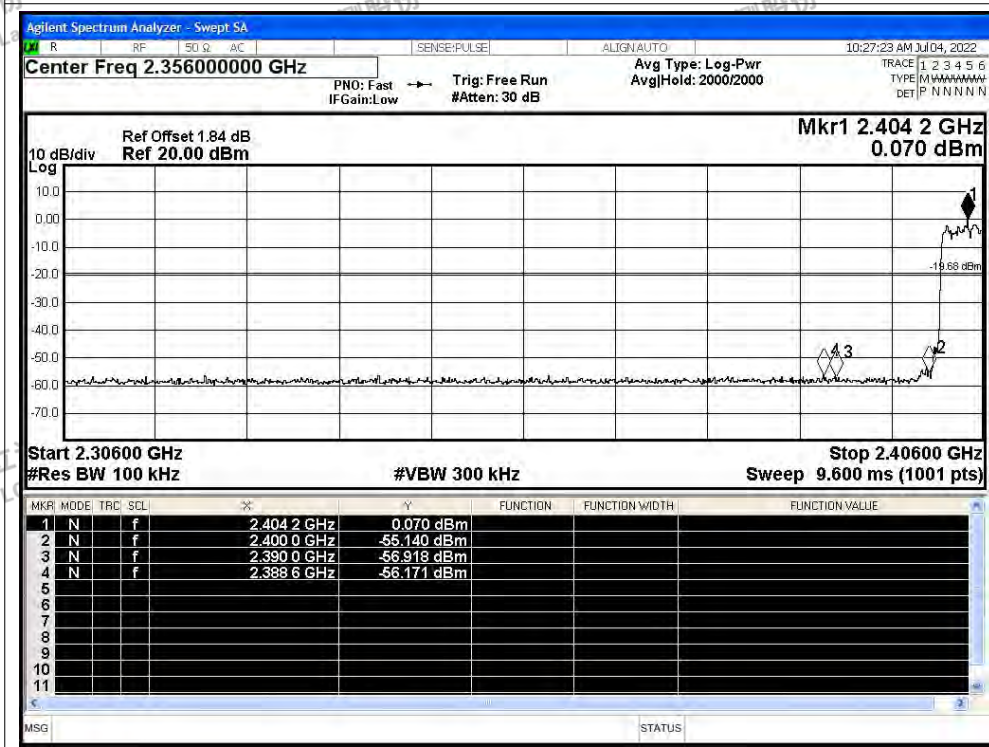




Band Edge(Hopping) NVNT 2-DH5 2402MHz Ant1 Hopping Ref

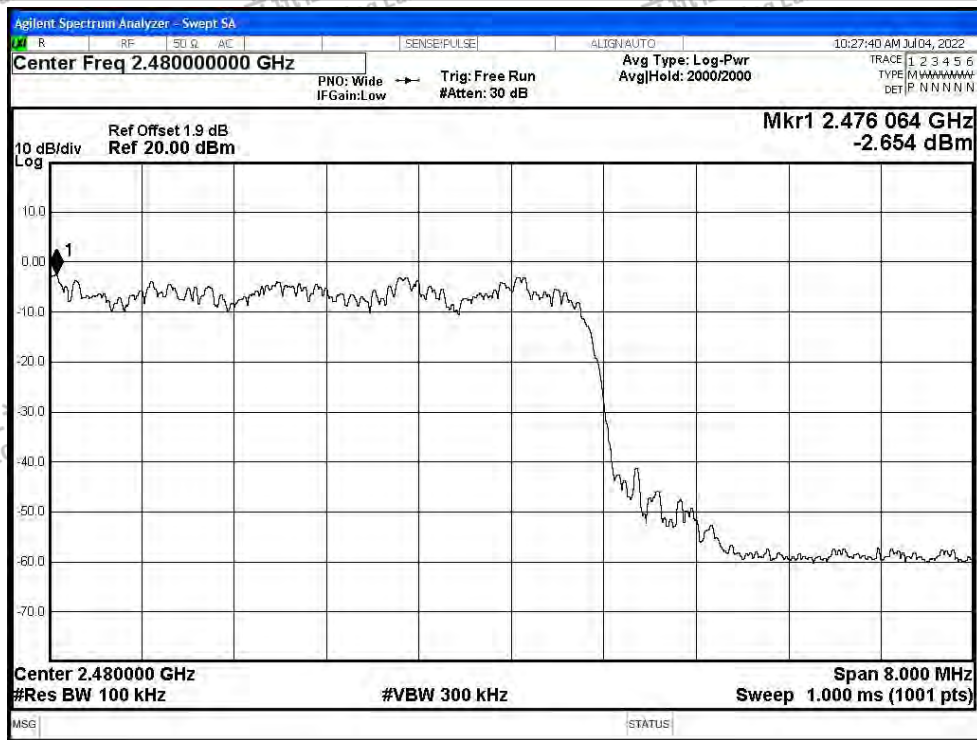


Band Edge(Hopping) NVNT 2-DH5 2402MHz Ant1 Hopping Emission

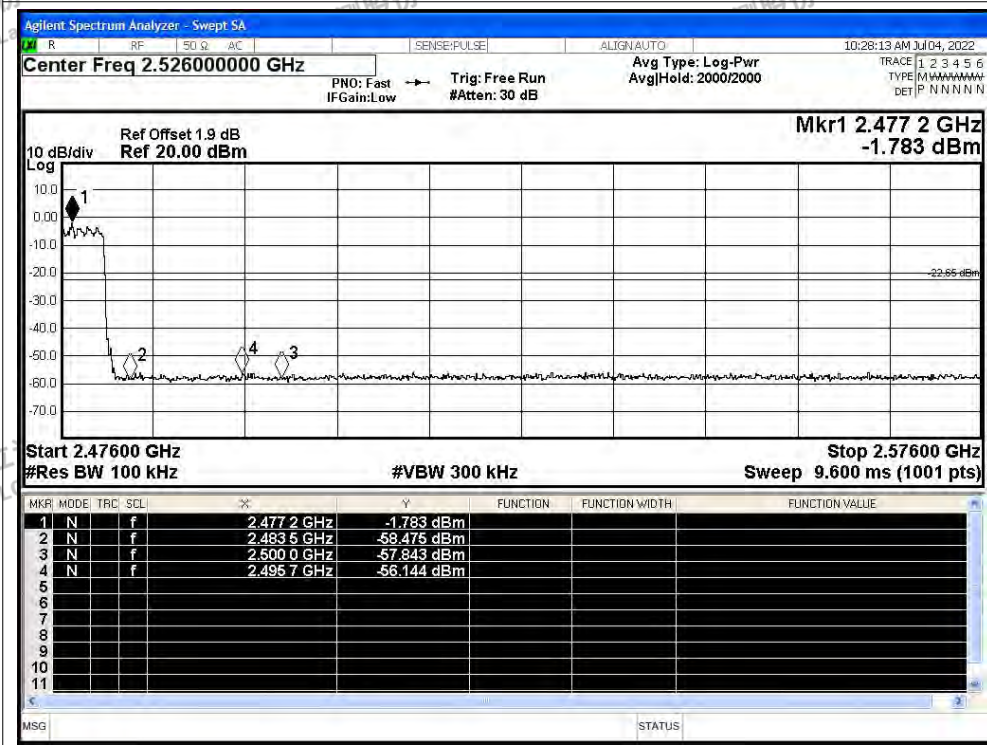




Band Edge(Hopping) NVNT 2-DH5 2480MHz Ant1 Hopping Ref



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

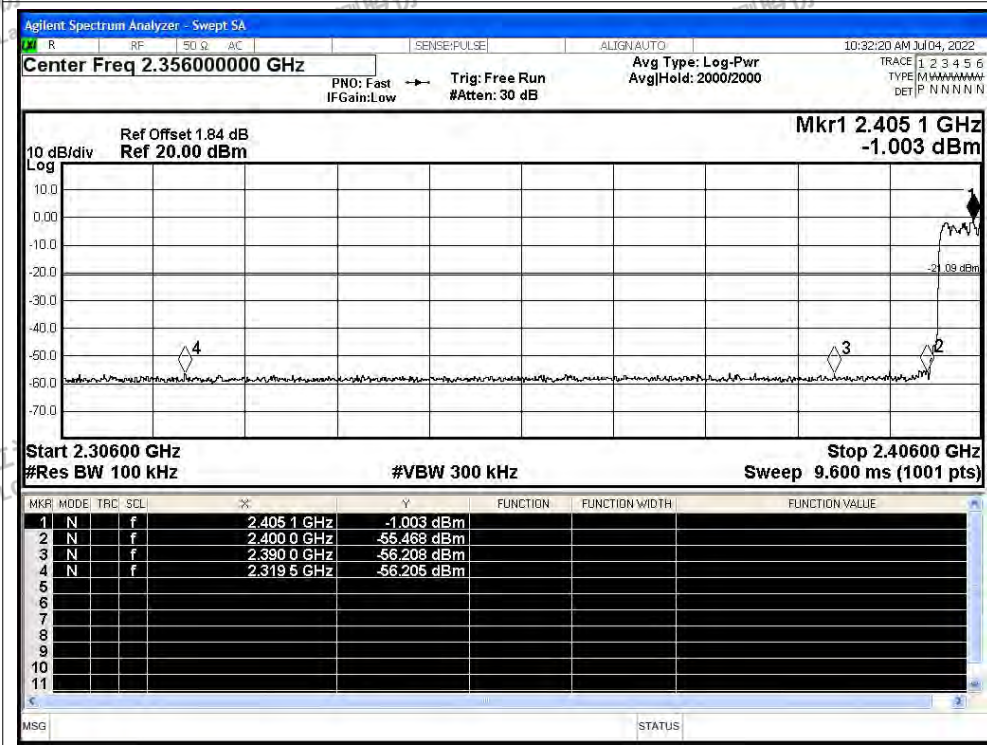




Band Edge(Hopping) NVNT 3-DH5 2402MHz Ant1 Hopping Ref

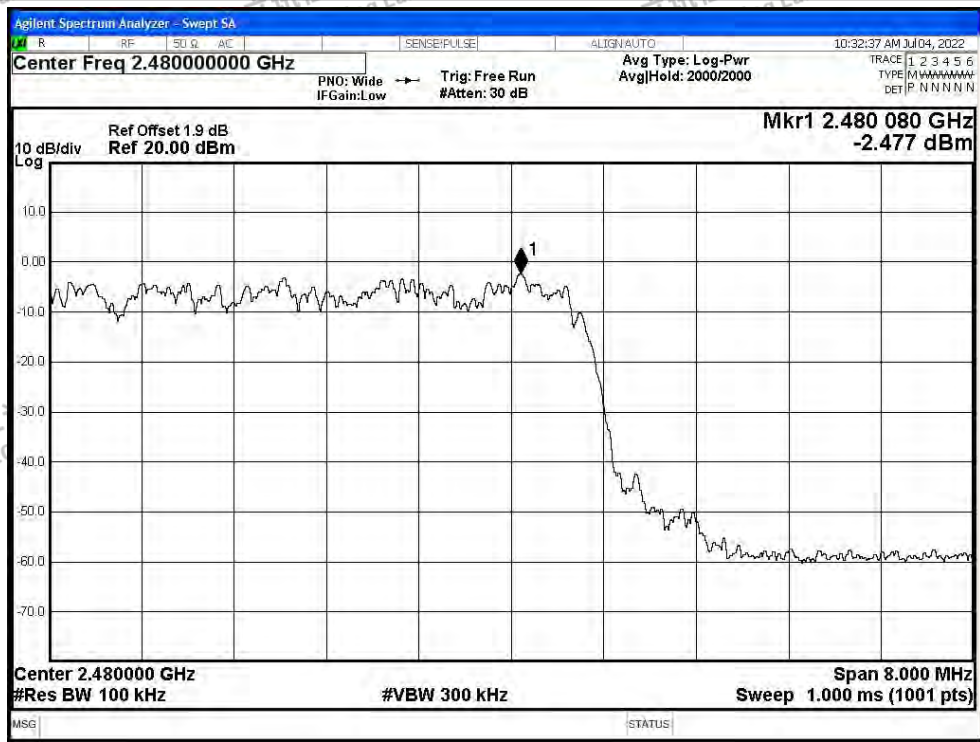


Band Edge(Hopping) NVNT 3-DH5 2402MHz Ant1 Hopping Emission

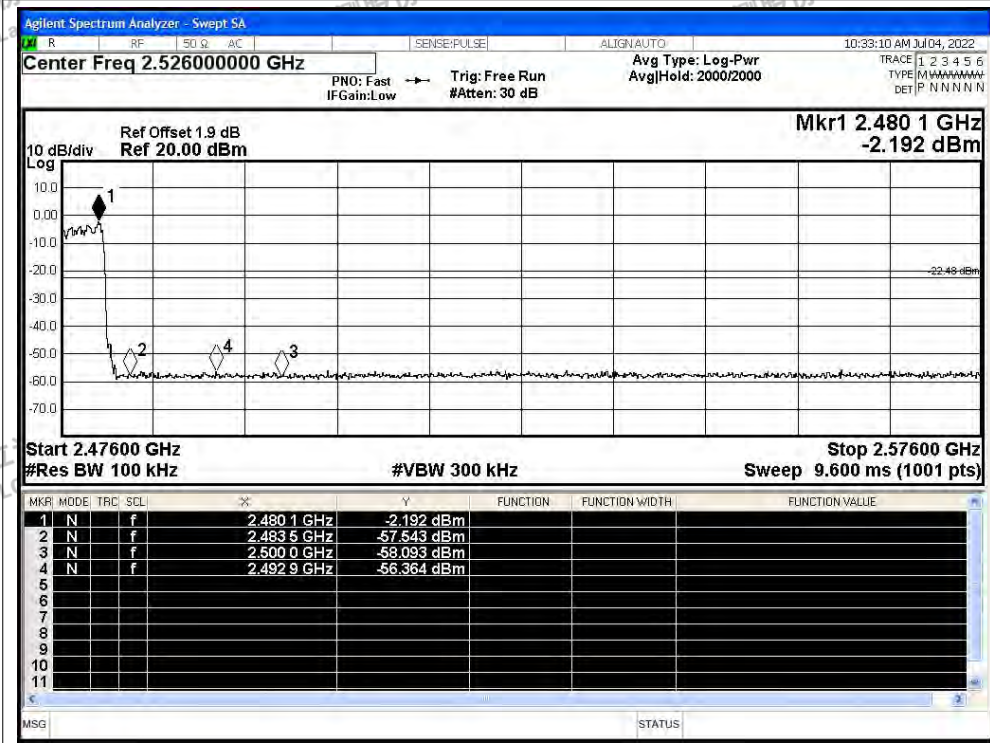




Band Edge(Hopping) NVNT 3-DH5 2480MHz Ant1 Hopping Ref



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	-45.89	-20	Pass
NVNT	1-DH5	2441	Ant1	-49.43	-20	Pass
NVNT	1-DH5	2480	Ant1	-51.19	-20	Pass
NVNT	2-DH5	2402	Ant1	-46.15	-20	Pass
NVNT	2-DH5	2441	Ant1	-50.13	-20	Pass
NVNT	2-DH5	2480	Ant1	-51.29	-20	Pass
NVNT	3-DH5	2402	Ant1	-45.9	-20	Pass
NVNT	3-DH5	2441	Ant1	-45.47	-20	Pass
NVNT	3-DH5	2480	Ant1	-45.18	-20	Pass



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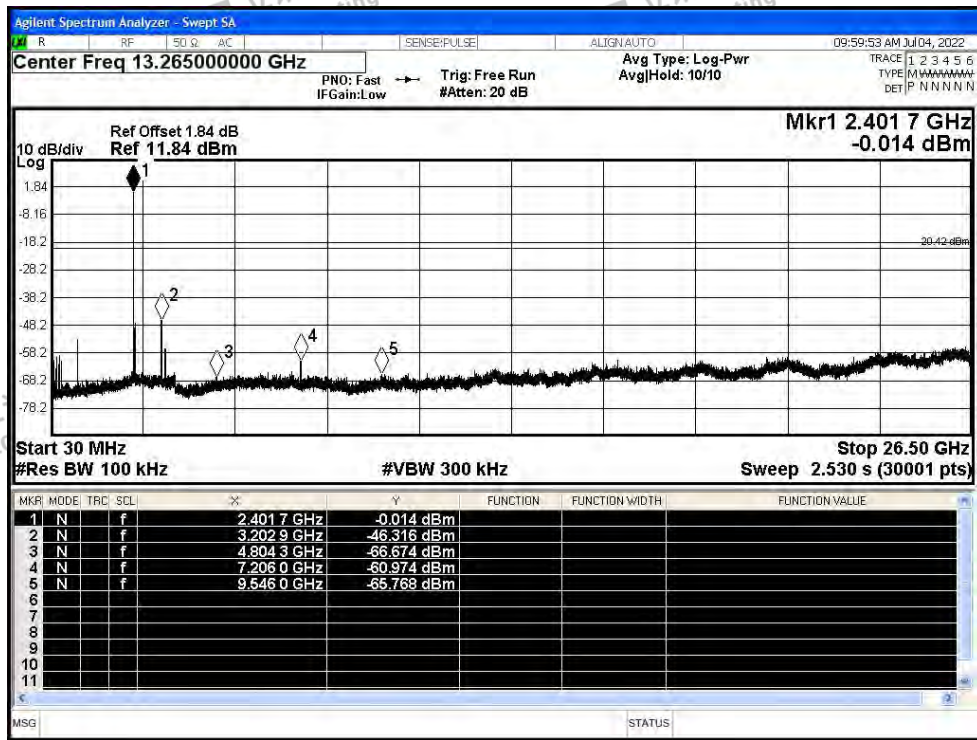


Test Graphs

Tx. Spurious NVNT 1-DH5 2402MHz Ant1 Ref



Tx. Spurious NVNT 1-DH5 2402MHz Ant1 Emission

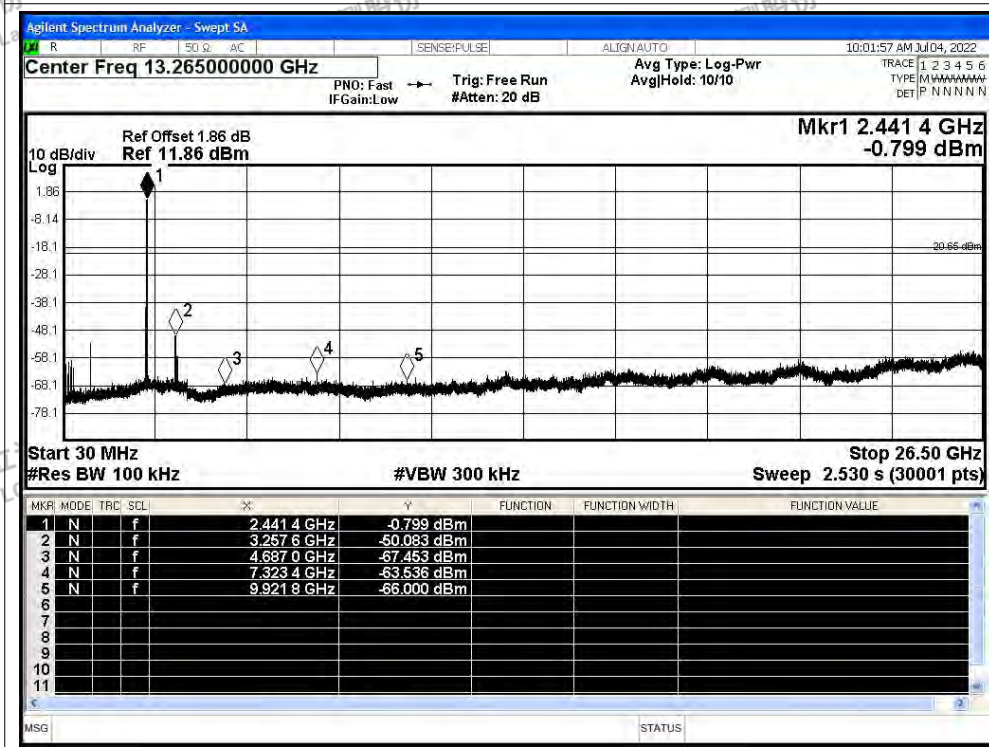




Tx. Spurious NVNT 1-DH5 2441MHz Ant1 Ref

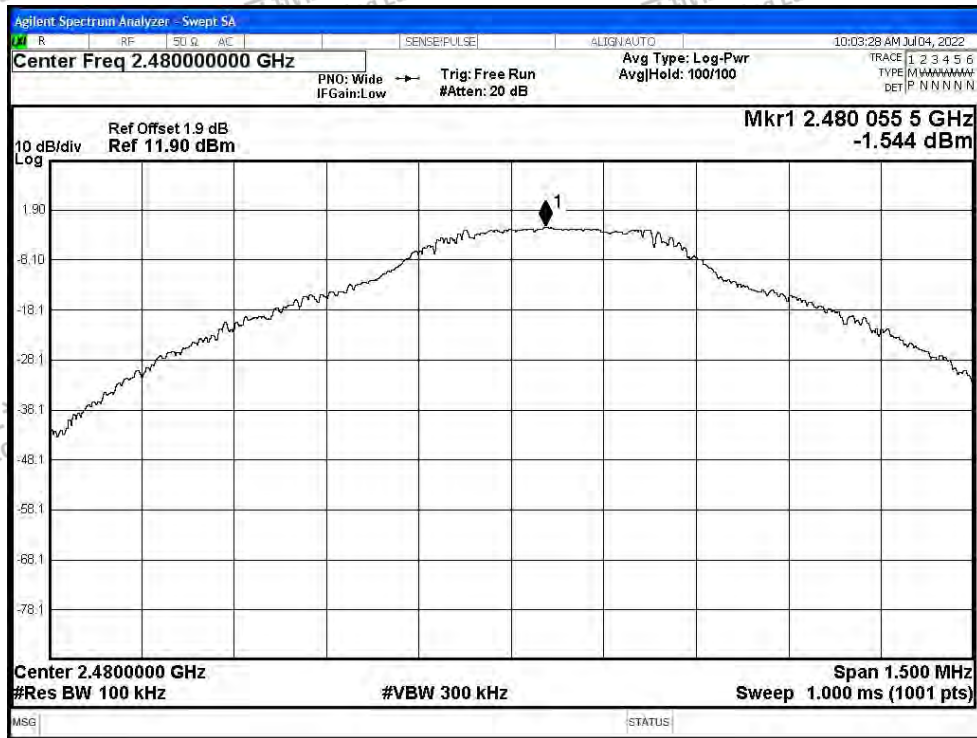


Tx. Spurious NVNT 1-DH5 2441MHz Ant1 Emission

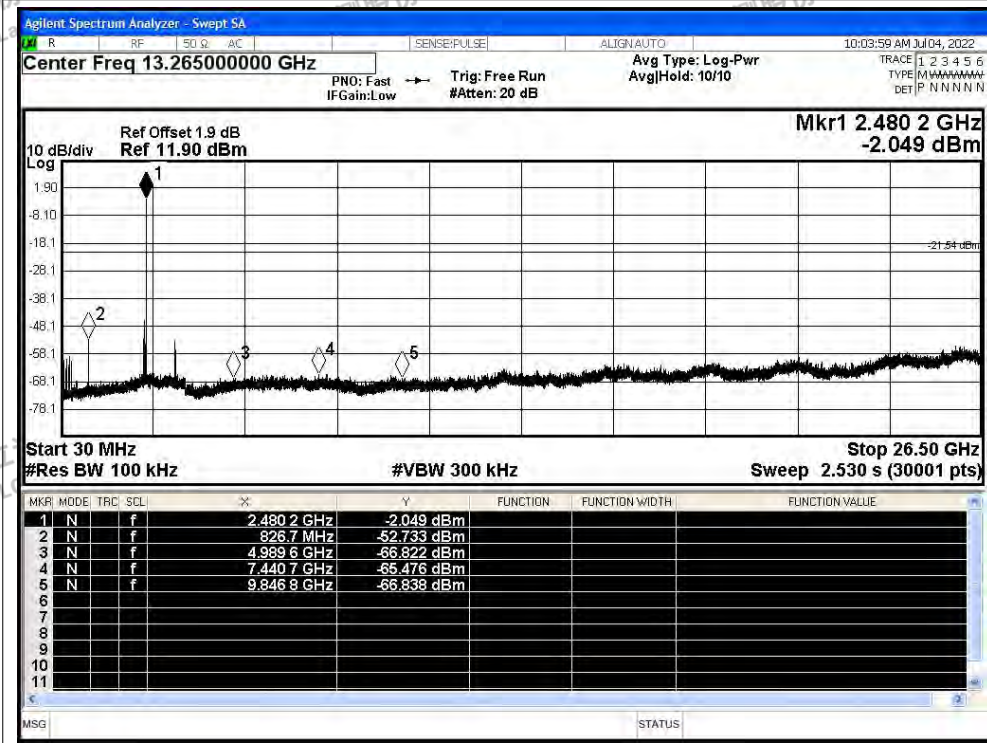




Tx. Spurious NVNT 1-DH5 2480MHz Ant1 Ref

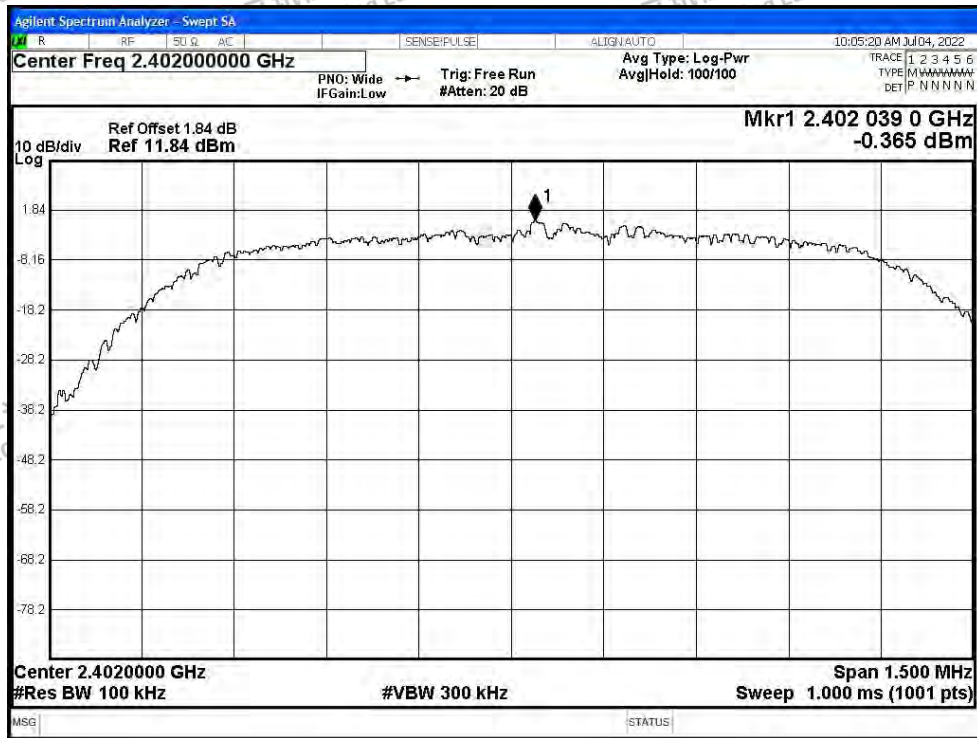


Tx. Spurious NVNT 1-DH5 2480MHz Ant1 Emission

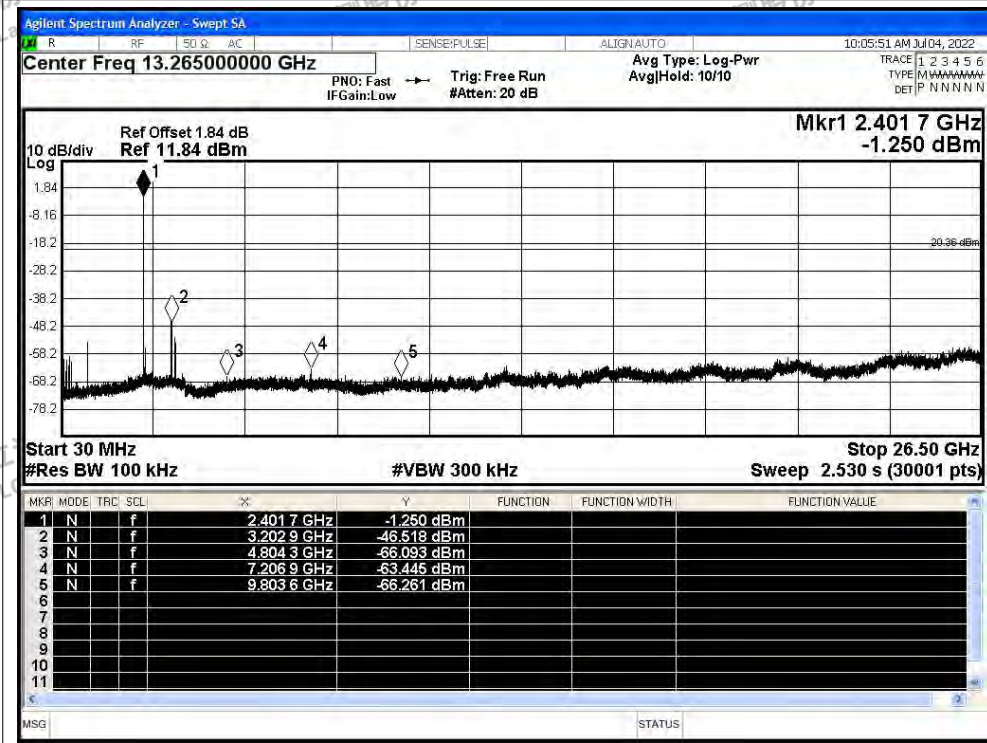




Tx. Spurious NVNT 2-DH5 2402MHz Ant1 Ref

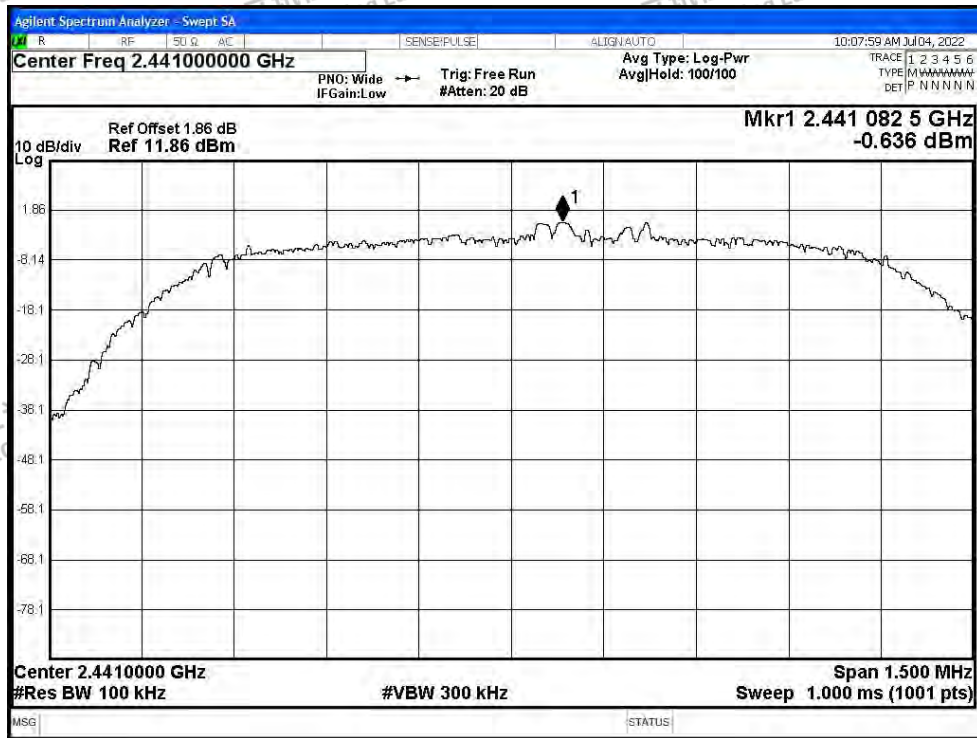


Tx. Spurious NVNT 2-DH5 2402MHz Ant1 Emission

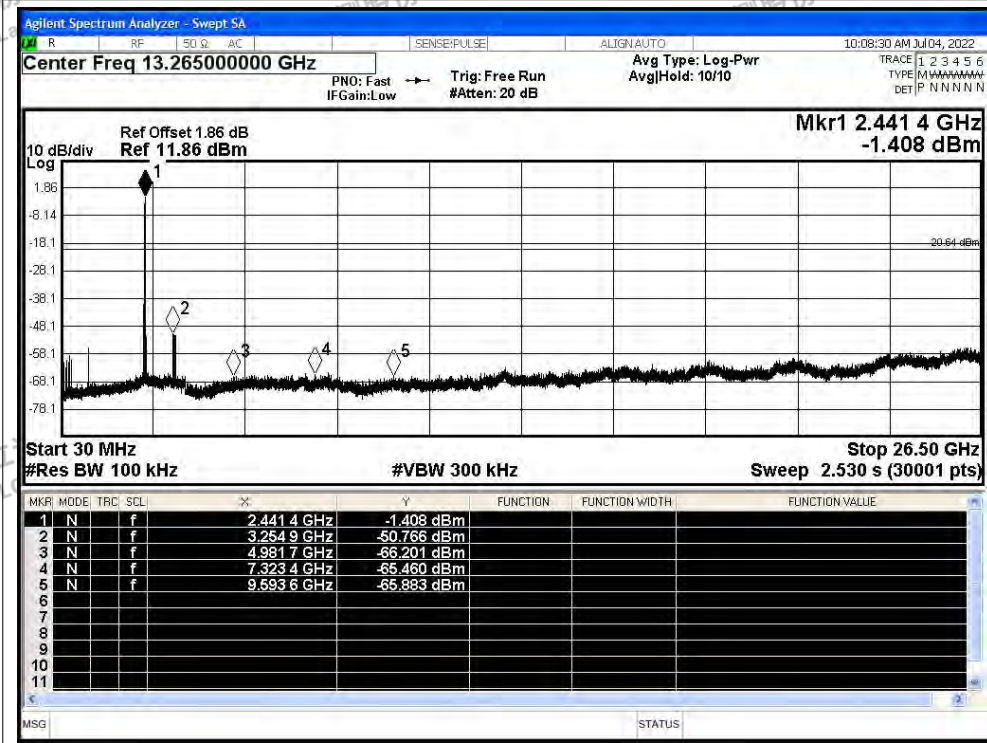




Tx. Spurious NVNT 2-DH5 2441MHz Ant1 Ref

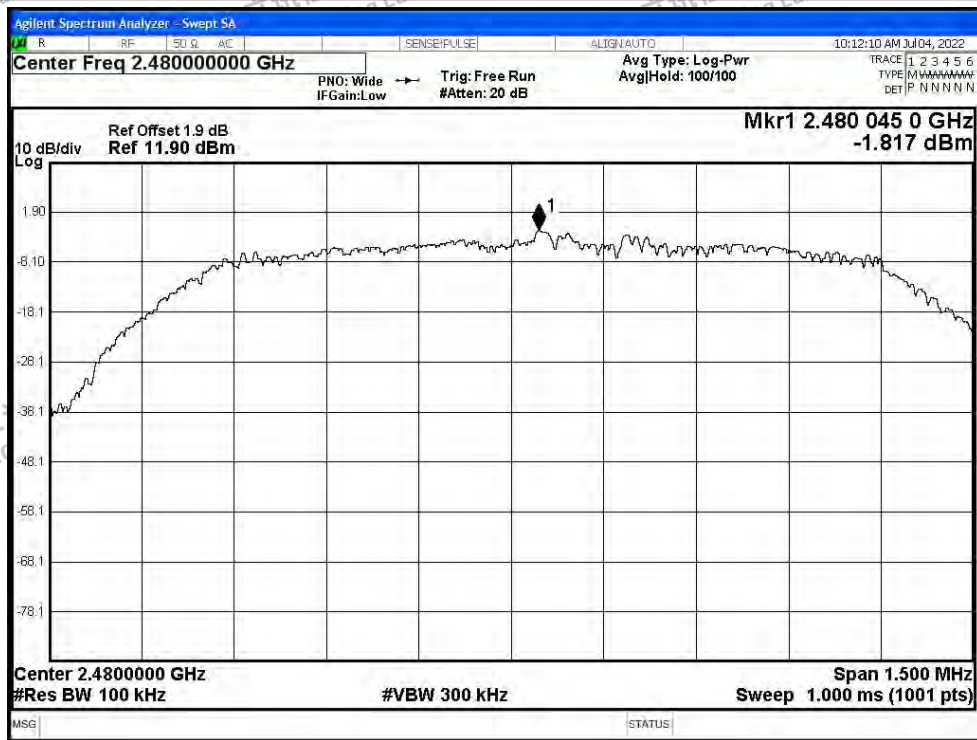


Tx. Spurious NVNT 2-DH5 2441MHz Ant1 Emission

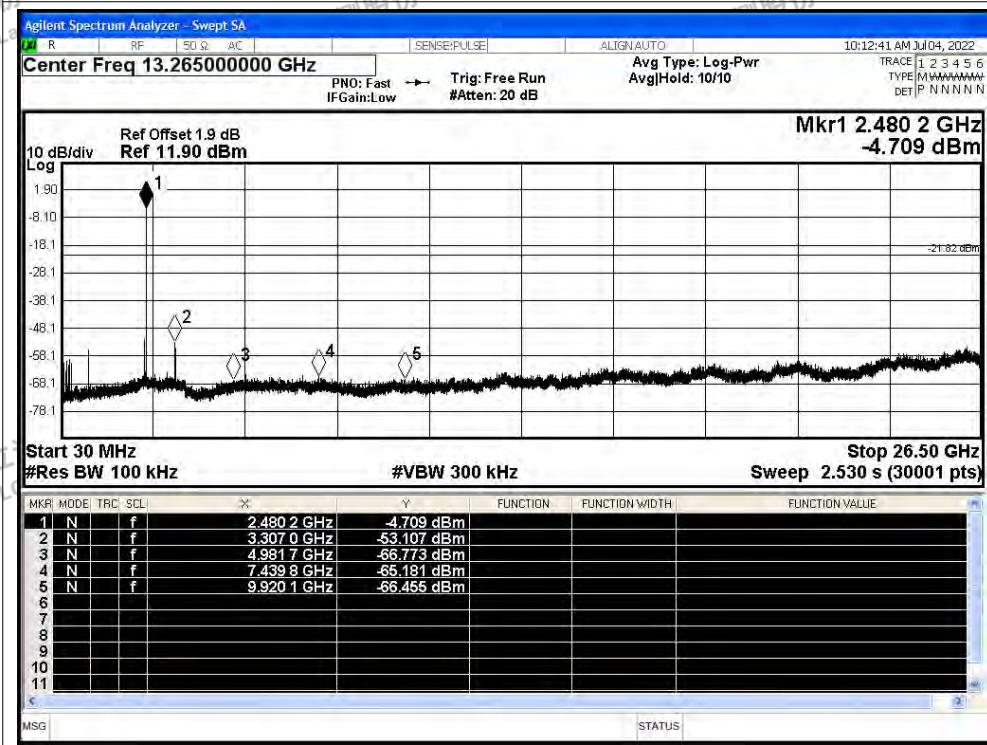




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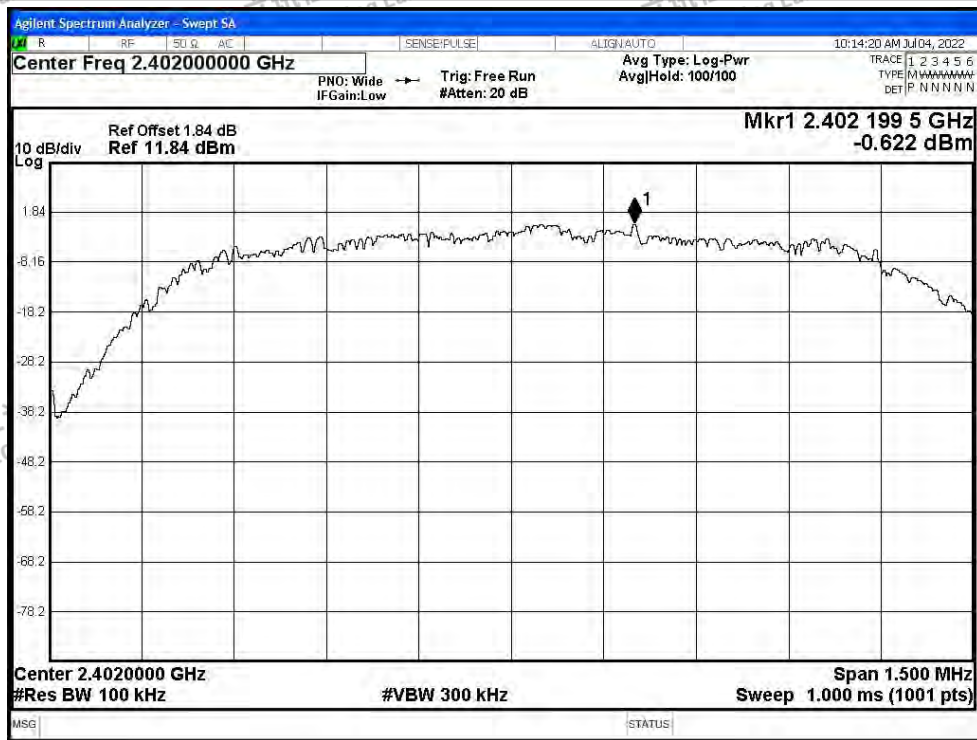


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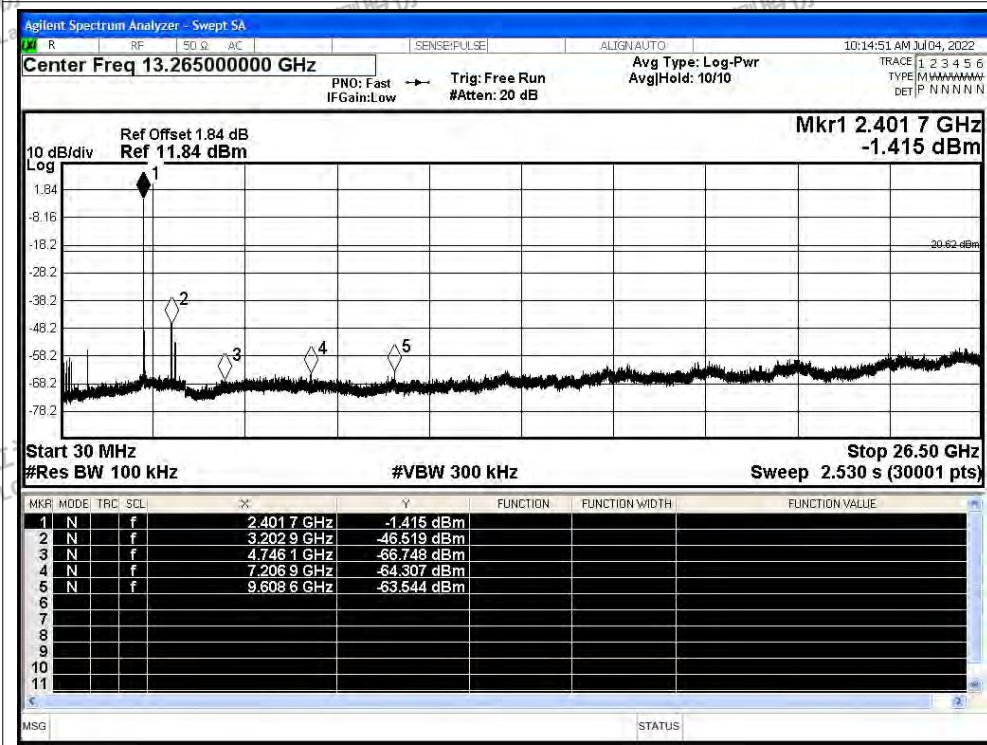




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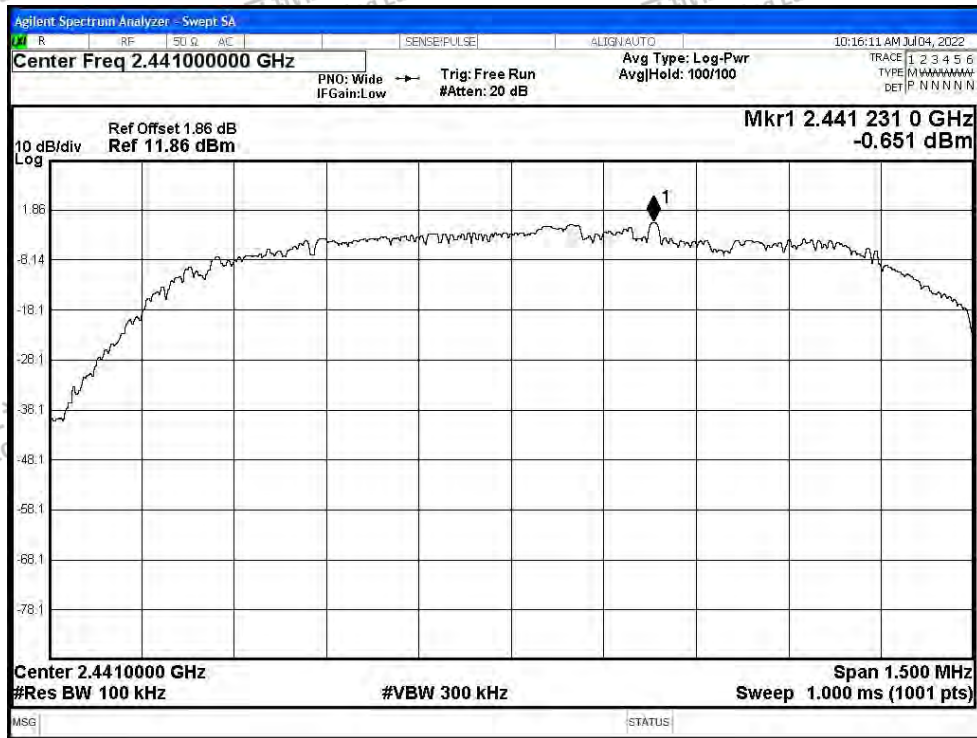


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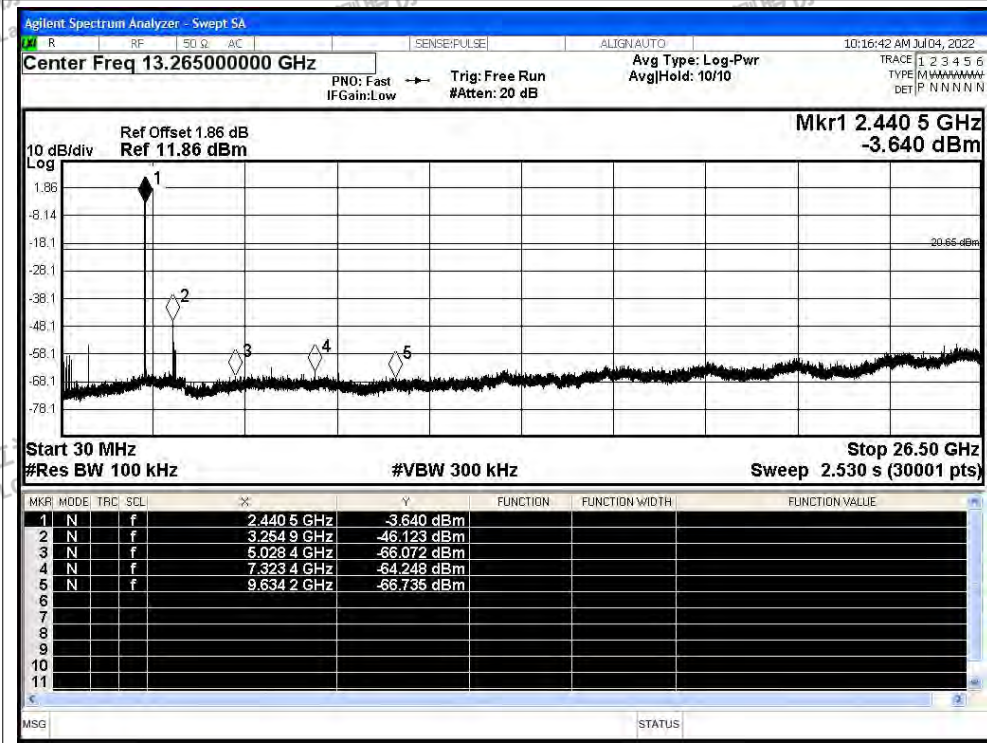




Tx. Spurious NVNT 3-DH5 2441MHz Ant1 Ref

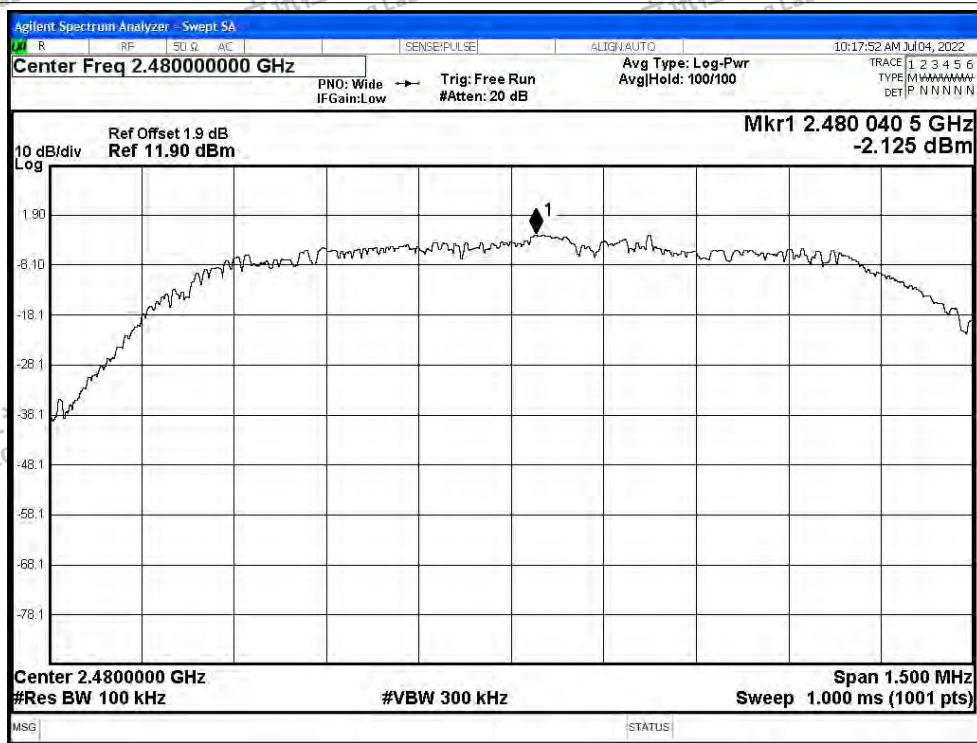


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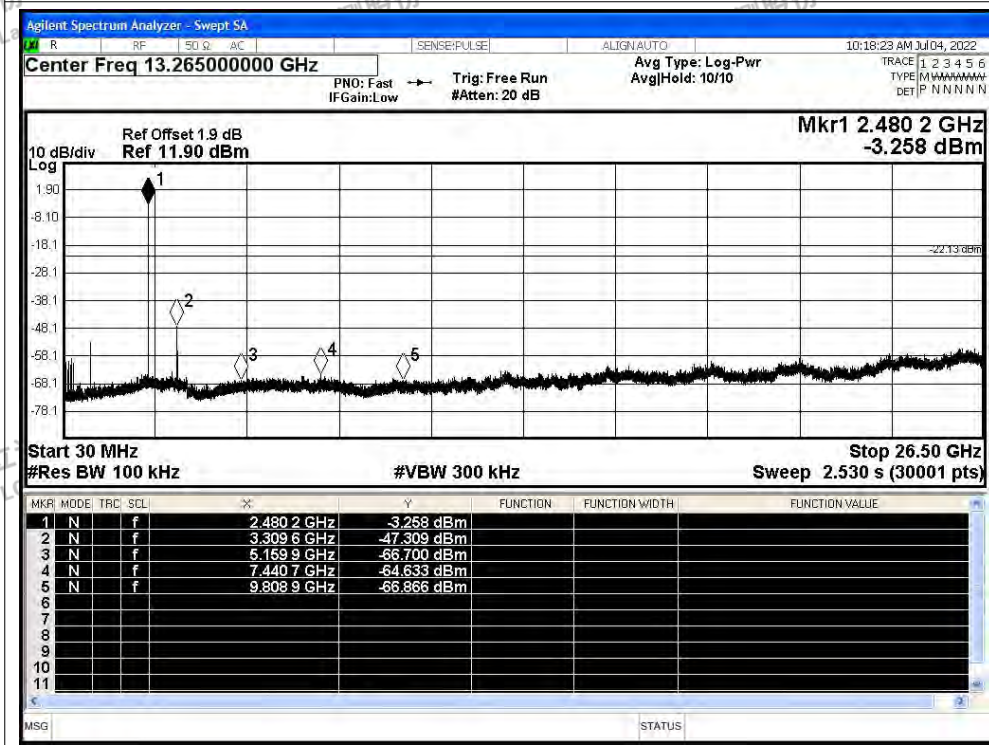




Tx. Spurious NVNT 3-DH5 2480MHz Ant1 Ref



Tx. Spurious NVNT 3-DH5 2480MHz Ant1 Emission





A.8 Restrict Band

Condition	Mode	Frequency (MHz)	Antenna	Hopping Mode	Spur Freq (MHz)	Power (dBm)	Gain (dBi)	E (dBuV/m)	Detector	Limit (dBuV/m)	Verdict
NVNT	1-DH5	2402	Ant1	No-Hopping	2310	-50.16	2	47.1	Peak	74	Pass
NVNT	1-DH5	2402	Ant1	No-Hopping	2310	-60.35	2	36.91	Average	54	Pass
NVNT	1-DH5	2402	Ant1	No-Hopping	2329.392	-47.89	2	49.37	Peak	74	Pass
NVNT	1-DH5	2402	Ant1	No-Hopping	2362.128	-59.82	2	37.44	Average	54	Pass
NVNT	1-DH5	2402	Ant1	No-Hopping	2390	-50.82	2	46.44	Peak	74	Pass
NVNT	1-DH5	2402	Ant1	No-Hopping	2390	-60.11	2	37.15	Average	54	Pass
NVNT	1-DH5	2480	Ant1	No-Hopping	2483.5	-49.13	2	48.13	Peak	74	Pass
NVNT	1-DH5	2480	Ant1	No-Hopping	2483.5	-59.42	2	37.84	Average	54	Pass
NVNT	1-DH5	2480	Ant1	No-Hopping	2490.232	-47.47	2	49.79	Peak	74	Pass
NVNT	1-DH5	2480	Ant1	No-Hopping	2483.536	-59.39	2	37.87	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	-59.73	2	37.53	Average	54	Pass
NVNT	2-DH5	2402	Ant1	No-Hopping	2310	-50.54	2	46.72	Peak	74	Pass
NVNT	2-DH5	2402	Ant1	No-Hopping	2310	-60.51	2	36.75	Average	54	Pass
NVNT	2-DH5	2402	Ant1	No-Hopping	2370.96	-47.33	2	49.93	Peak	74	Pass
NVNT	2-DH5	2402	Ant1	No-Hopping	2362.512	-59.82	2	37.44	Average	54	Pass
NVNT	2-DH5	2402	Ant1	No-Hopping	2390	-50.63	2	46.63	Peak	74	Pass
NVNT	2-DH5	2402	Ant1	No-Hopping	2390	-60.05	2	37.21	Average	54	Pass
NVNT	2-DH5	2480	Ant1	No-Hopping	2483.5	-48.94	2	48.32	Peak	74	Pass
NVNT	2-DH5	2480	Ant1	No-Hopping	2483.5	-59.5	2	37.76	Average	54	Pass
NVNT	2-DH5	2480	Ant1	No-Hopping	2489.656	-47.16	2	50.1	Peak	74	Pass
NVNT	2-DH5	2480	Ant1	No-Hopping	2484.184	-59.45	2	37.81	Average	54	Pass
NVNT	2-DH5	2480	Ant1	No-Hopping	2500	-49.03	2	48.23	Peak	74	Pass
NVNT	2-DH5	2480	Ant1	No-Hopping	2500	-59.88	2	37.38	Average	54	Pass
NVNT	3-DH5	2402	Ant1	No-Hopping	2310	-50.89	2	46.37	Peak	74	Pass
NVNT	3-DH5	2402	Ant1	No-Hopping	2310	-60.45	2	36.81	Average	54	Pass
NVNT	3-DH5	2402	Ant1	No-Hopping	2368.464	-45.89	2	51.37	Peak	74	Pass
NVNT	3-DH5	2402	Ant1	No-Hopping	2362.224	-59.85	2	37.41	Average	54	Pass
NVNT	3-DH5	2402	Ant1	No-Hopping	2390	-50.39	2	46.87	Peak	74	Pass
NVNT	3-DH5	2402	Ant1	No-Hopping	2390	-60.11	2	37.15	Average	54	Pass
NVNT	3-DH5	2480	Ant1	No-Hopping	2483.5	-49.1	2	48.16	Peak	74	Pass
NVNT	3-DH5	2480	Ant1	No-Hopping	2483.5	-59.53	2	37.73	Average	54	Pass
NVNT	3-DH5	2480	Ant1	No-Hopping	2496.04	-46.62	2	50.64	Peak	74	Pass
NVNT	3-DH5	2480	Ant1	No-Hopping	2483.752	-59.49	2	37.77	Average	54	Pass
NVNT	3-DH5	2480	Ant1	No-Hopping	2500	-48.37	2	48.89	Peak	74	Pass
NVNT	3-DH5	2480	Ant1	No-Hopping	2500	-59.86	2	37.4	Average	54	Pass

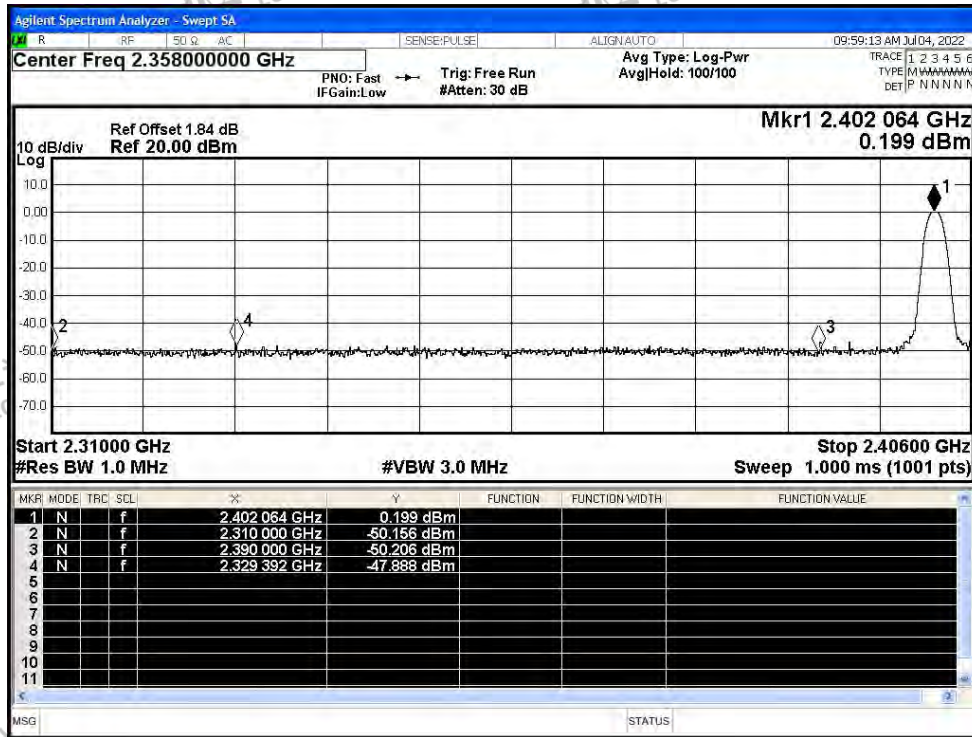


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 Scan code to check authenticity

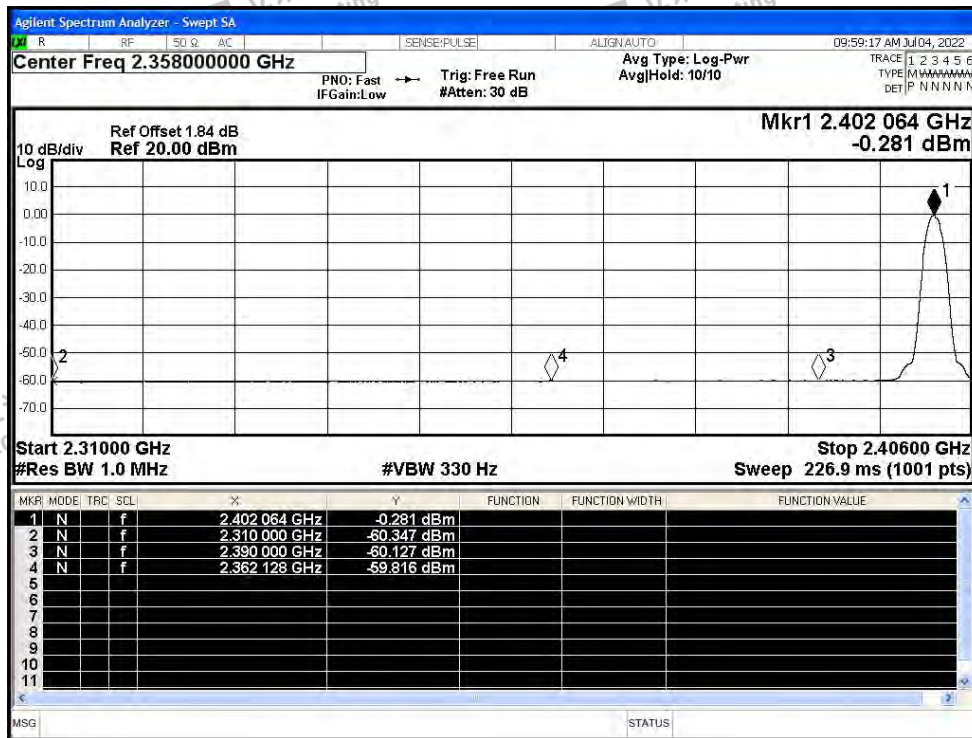


Test Graphs

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

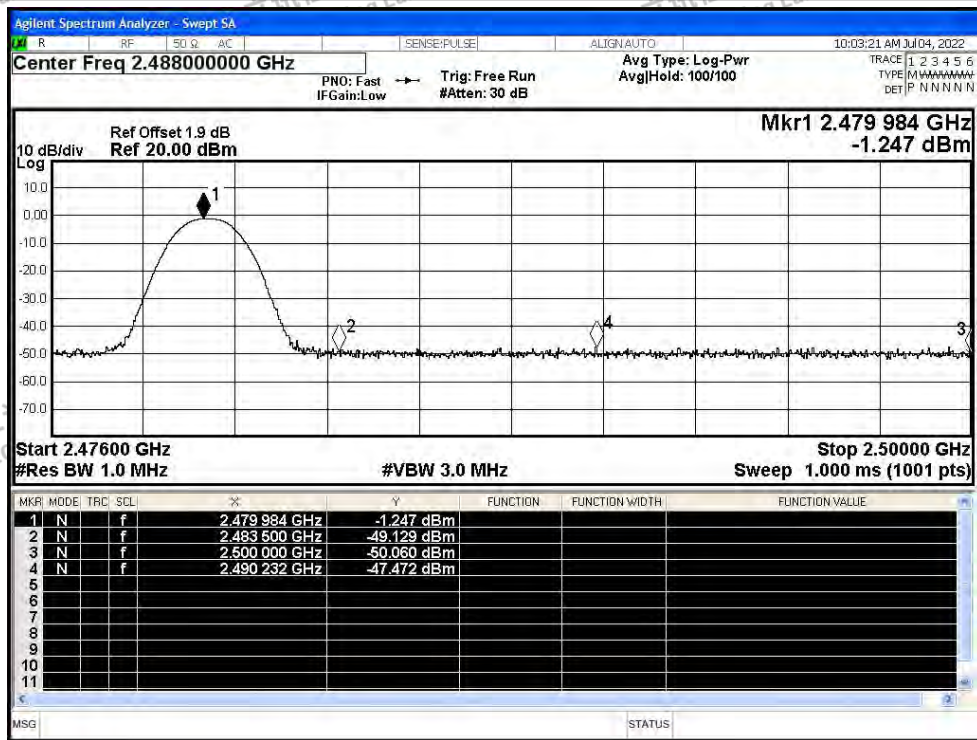


Restrict Band NVNT 1-DH5 2402MHz Ant1 No-Hopping Average

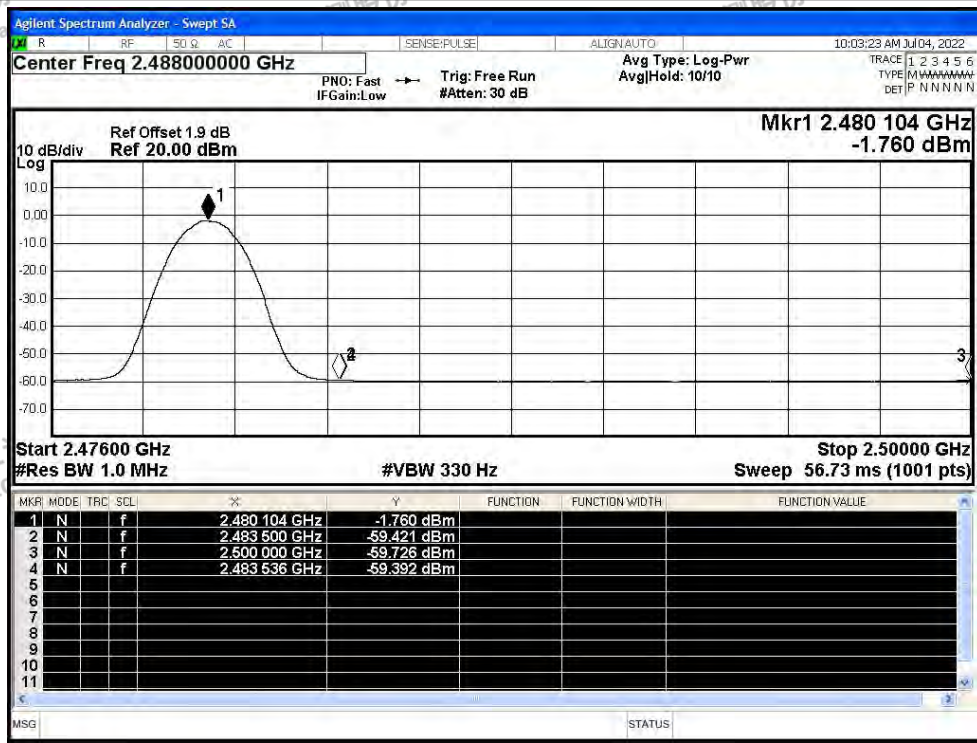




Restrict Band NVNT 1-DH5 2480MHz Ant1 No-Hopping Peak

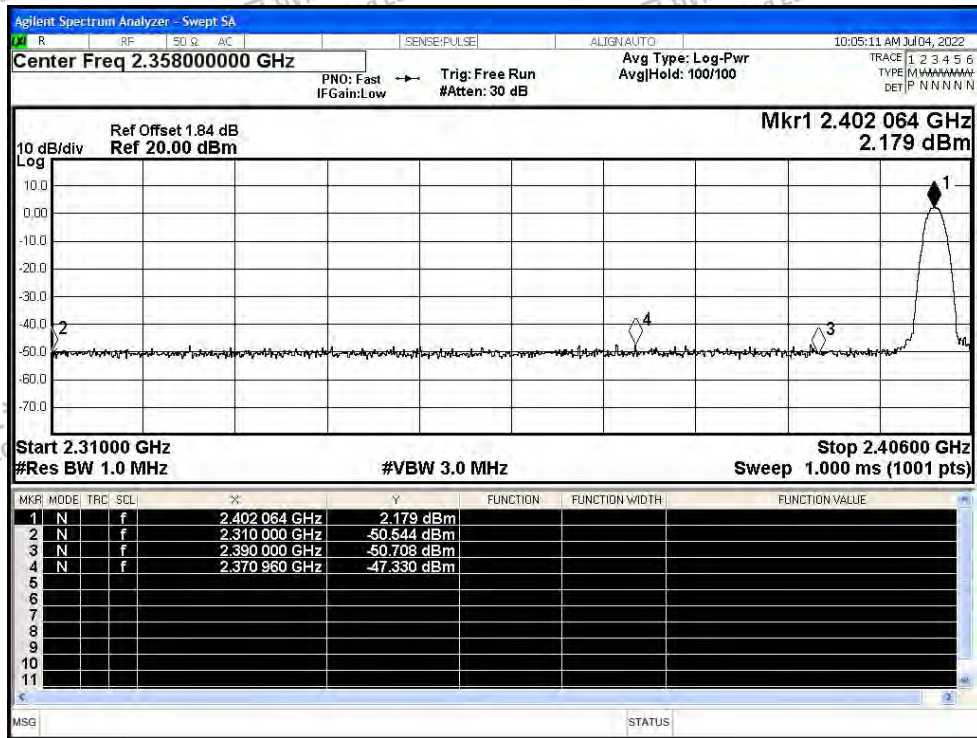


Restrict Band NVNT 1-DH5 2480MHz Ant1 No-Hopping Average

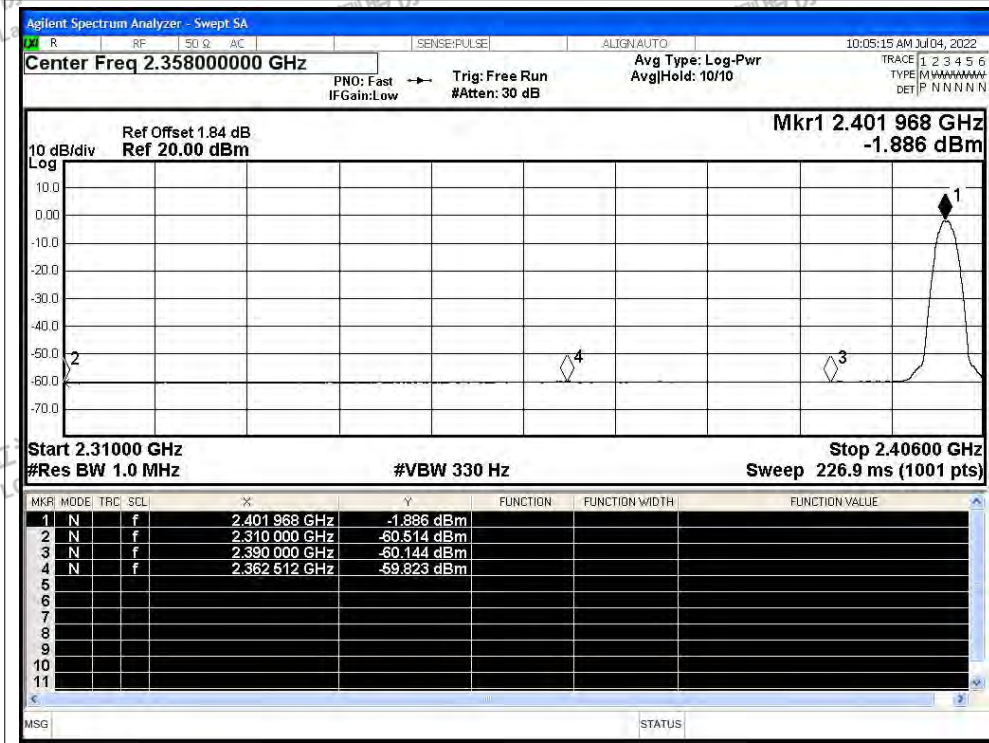




Restrict Band NVNT 2-DH5 2402MHz Ant1 No-Hopping Peak

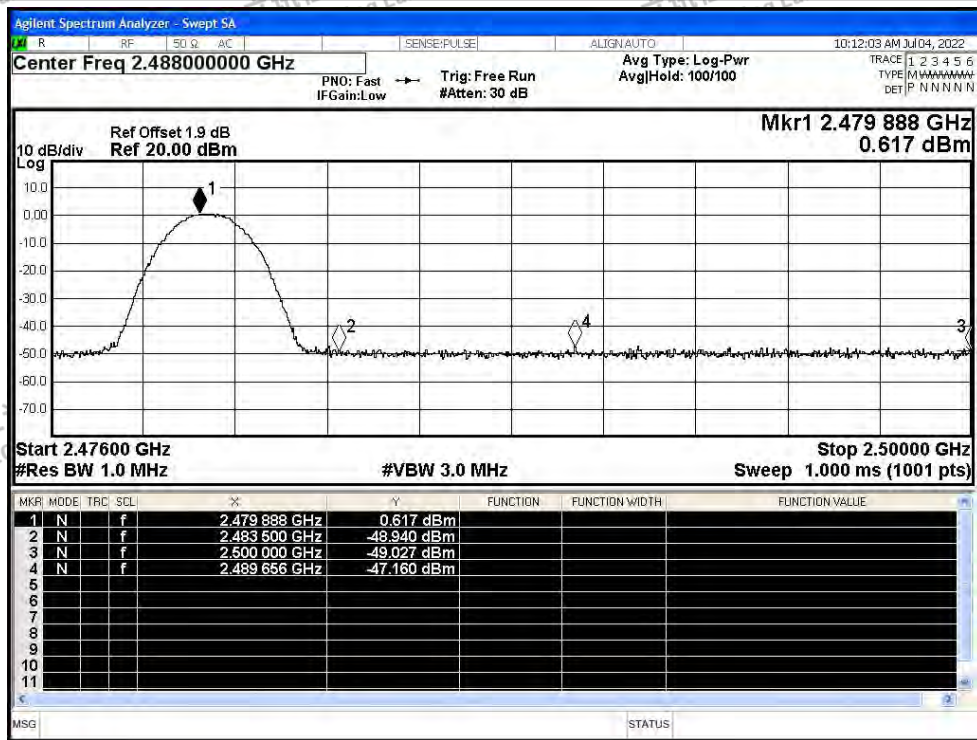


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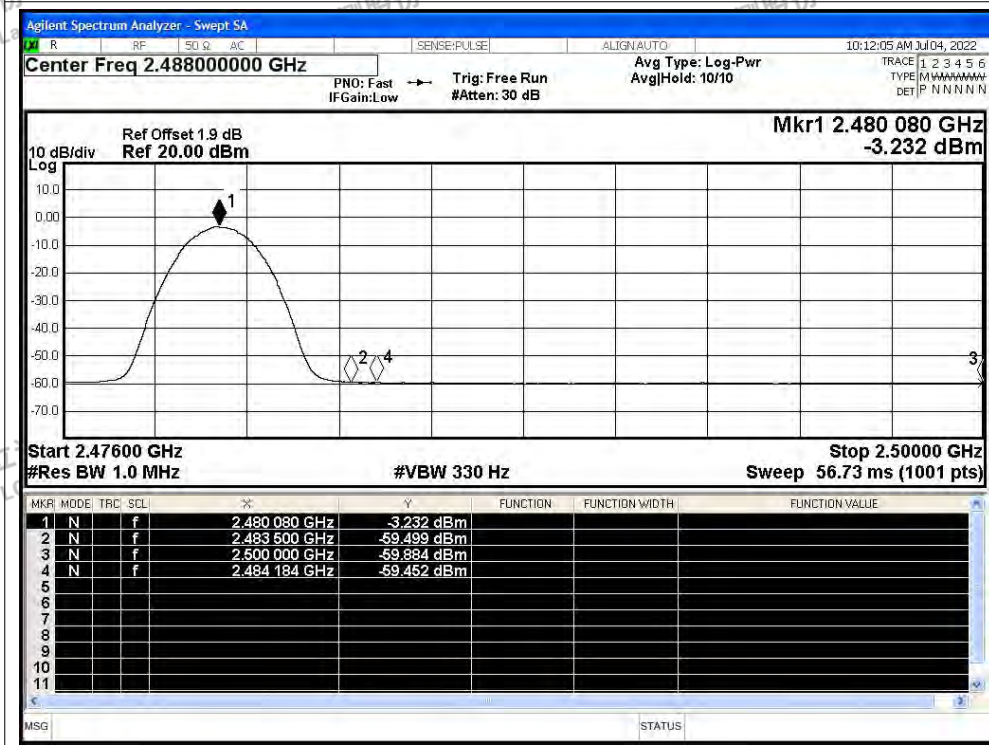




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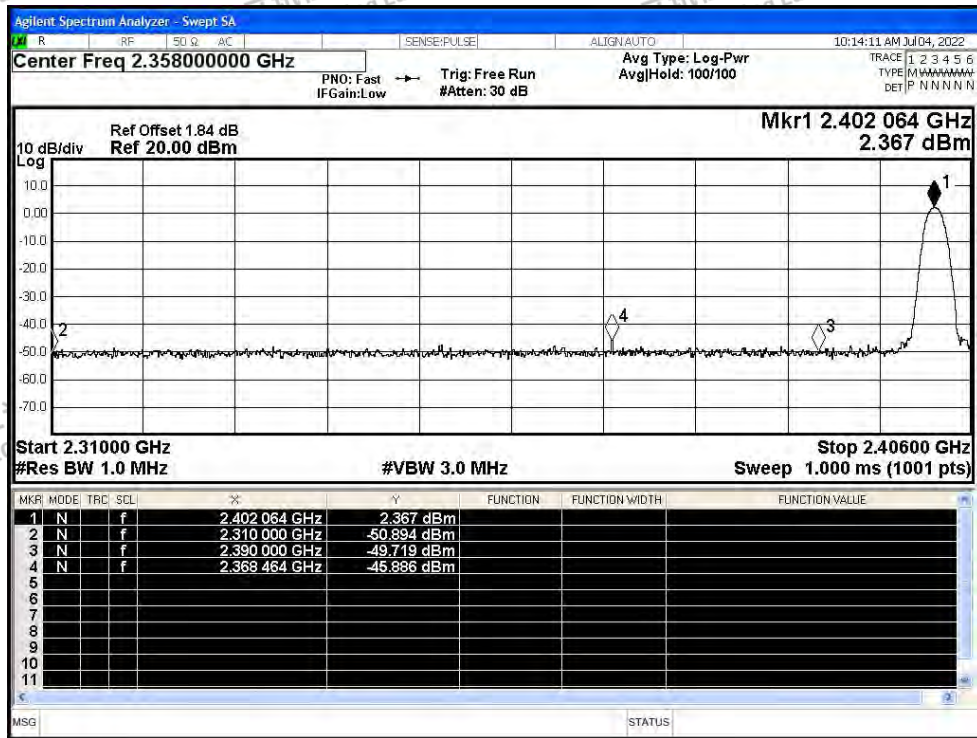


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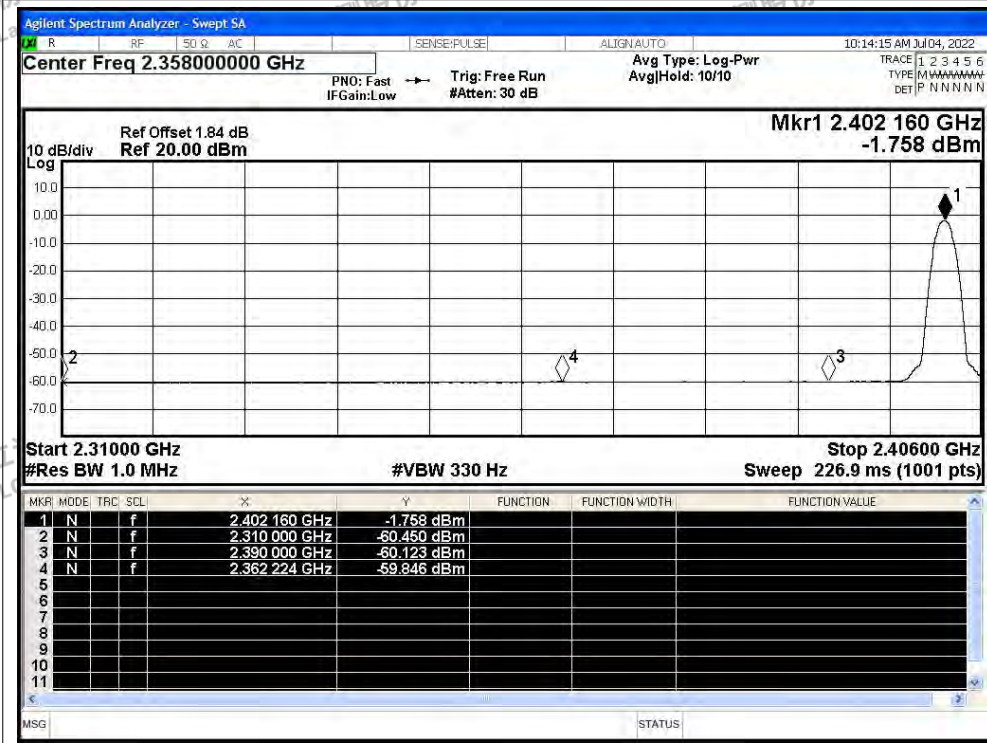




Restrict Band NVNT 3-DH5 2402MHz Ant1 No-Hopping Peak

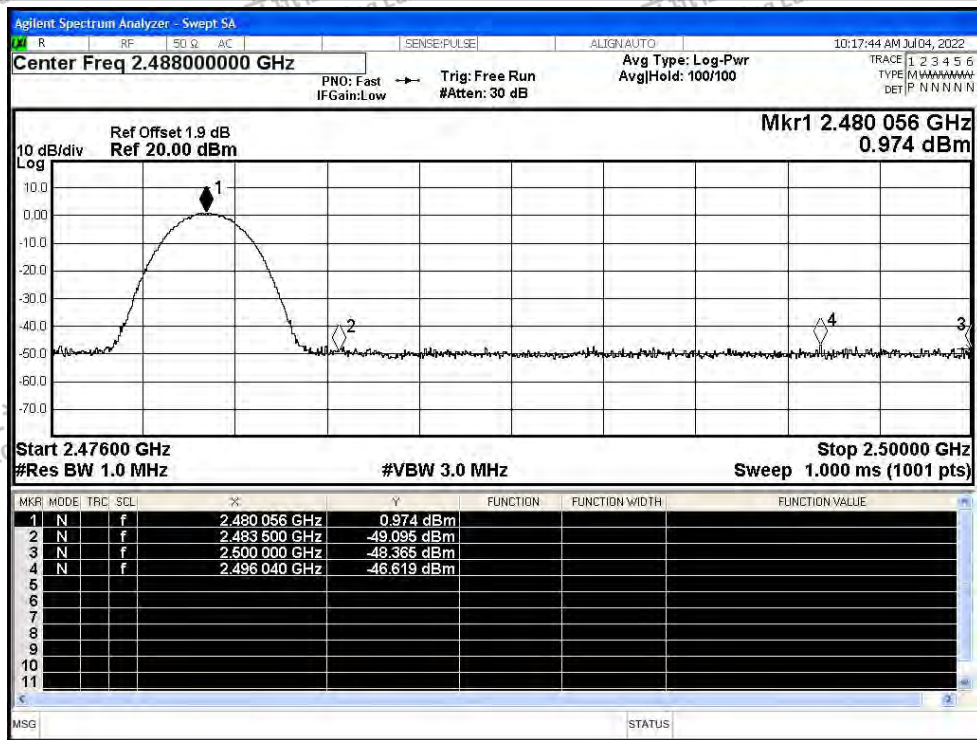


Restrict Band NVNT 3-DH5 2402MHz Ant1 No-Hopping Average





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



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

