



Appendix B

RF Test Data for 2.4GWIFI (Conducted Measurement)

Product Name: WiFi Retrofit Smart Lock

Test Model: WR

Environmental Conditions

Temperature:	23.8 ° C
Relative Humidity:	52.1%
ATM Pressure:	100.0 kPa
Test Engineer:	Taylor Hu
Supervised by:	Ling Zhu





B.1 -6dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	b	2412	Ant	8.946	≥ 0.5	Pass
NVNT	b	2437	Ant	8.588	≥ 0.5	Pass
NVNT	b	2462	Ant	8.067	≥ 0.5	Pass
NVNT	g	2412	Ant	15.04	≥ 0.5	Pass
NVNT	g	2437	Ant	16.271	≥ 0.5	Pass
NVNT	g	2462	Ant	15.304	≥ 0.5	Pass
NVNT	n20	2412	Ant	13.748	≥ 0.5	Pass
NVNT	n20	2437	Ant	17.528	≥ 0.5	Pass
NVNT	n20	2462	Ant	17.526	≥ 0.5	Pass
NVNT	n40	2422	Ant	33.773	≥ 0.5	Pass
NVNT	n40	2437	Ant	35.067	≥ 0.5	Pass
NVNT	n40	2452	Ant	35.03	≥ 0.5	Pass

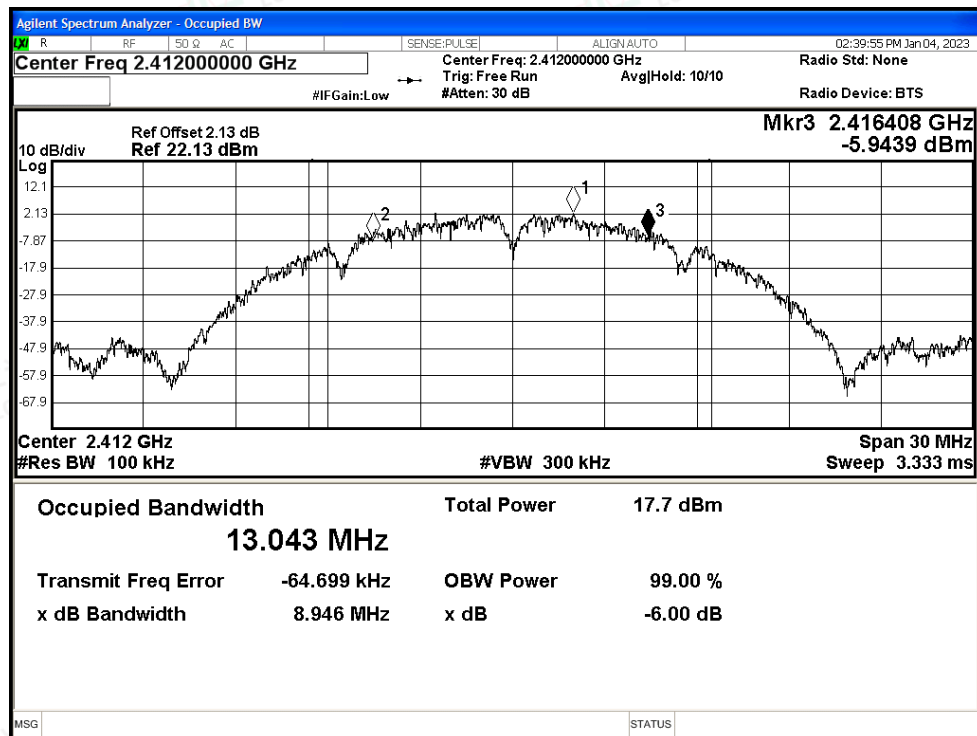


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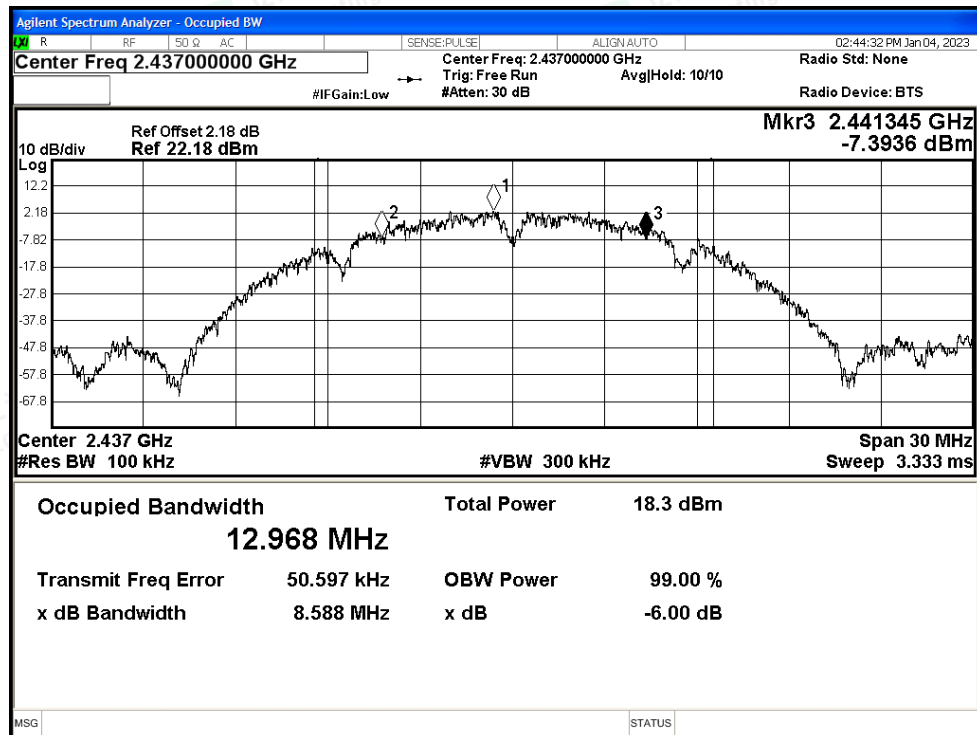


Test Graphs

-6dB Bandwidth NVNT b 2412MHz Ant

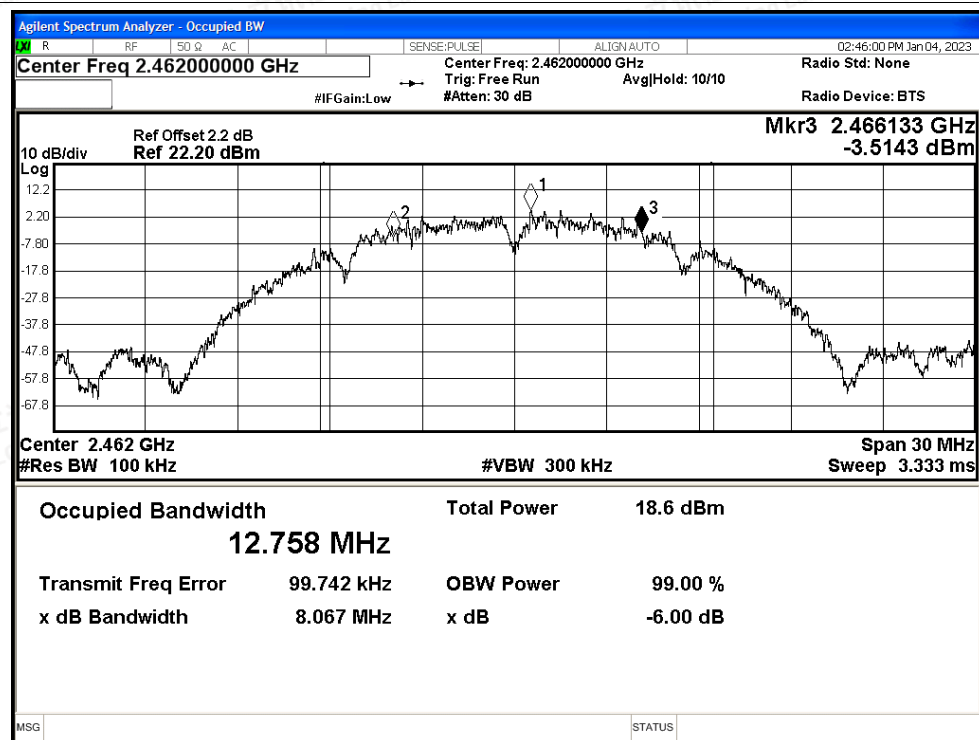


-6dB Bandwidth NVNT b 2437MHz Ant

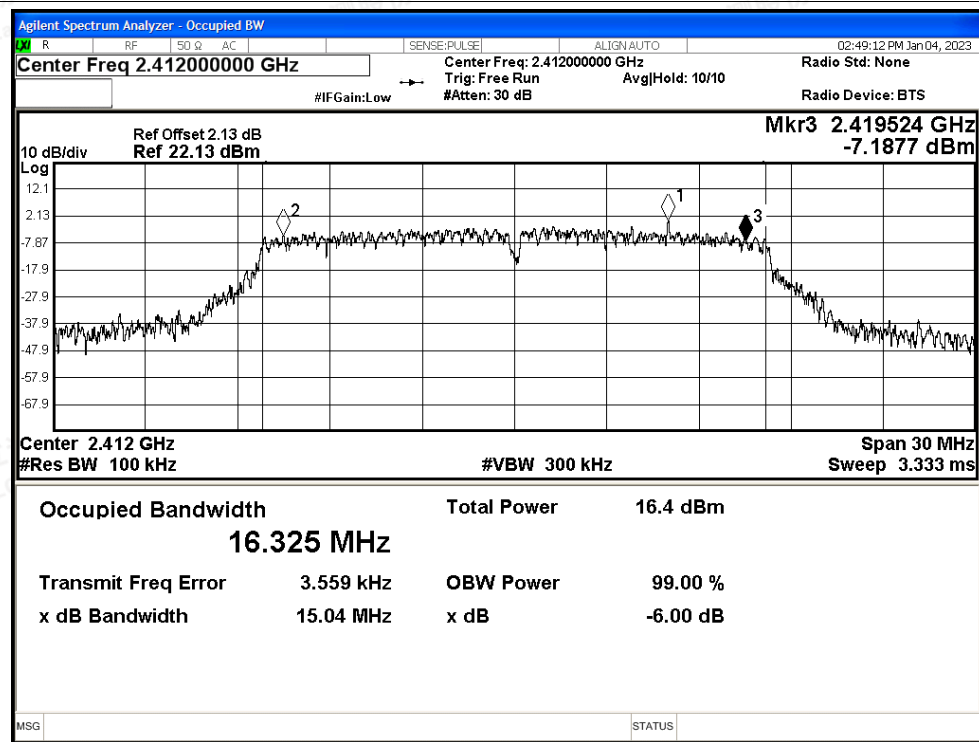




-6dB Bandwidth NVNT b 2462MHz Ant

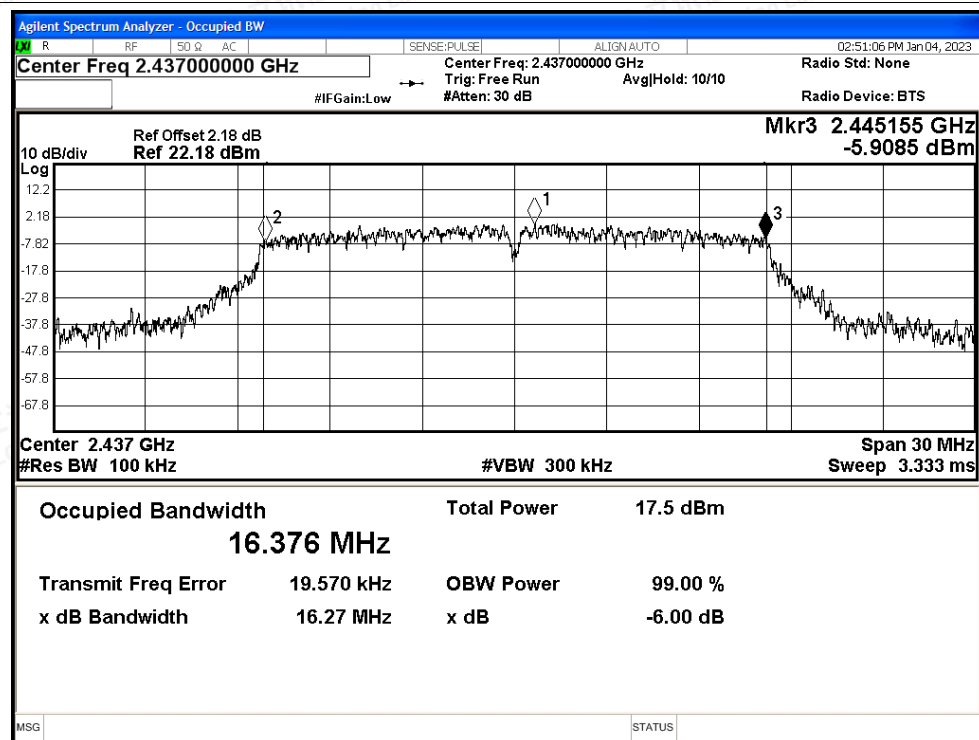


-6dB Bandwidth NVNT g 2412MHz Ant

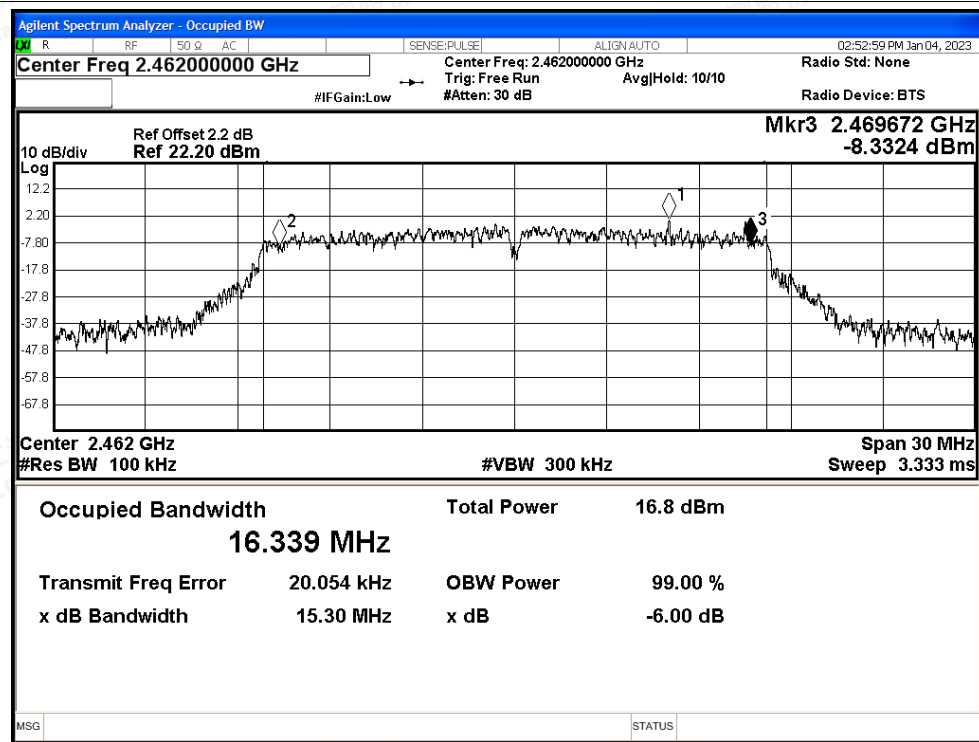




-6dB Bandwidth NVNT g 2437MHz Ant

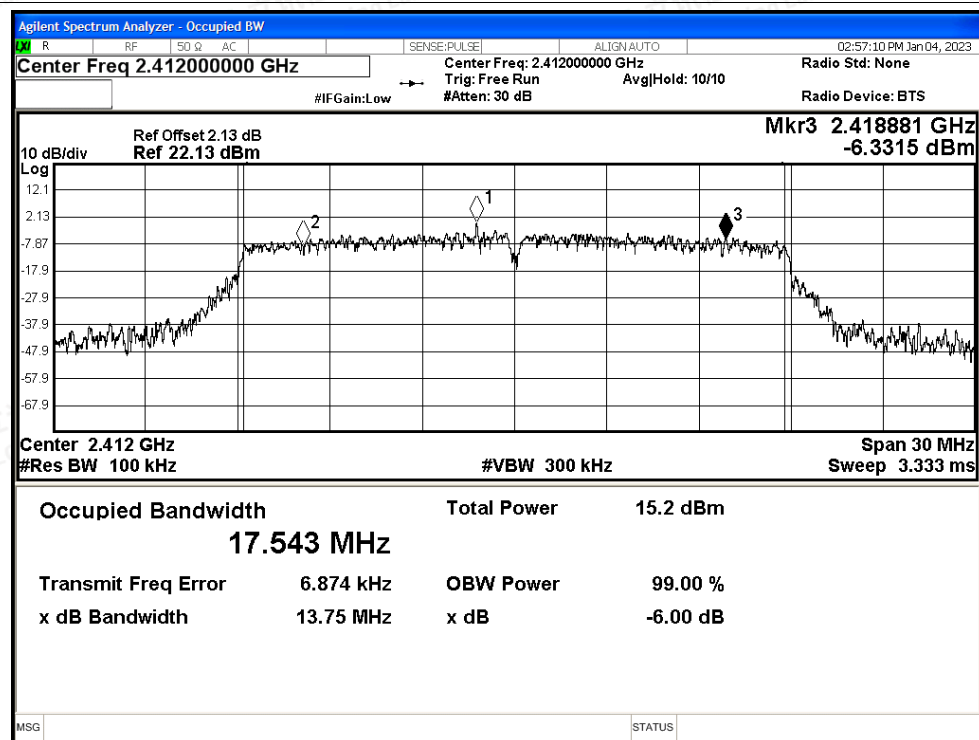


-6dB Bandwidth NVNT g 2462MHz Ant

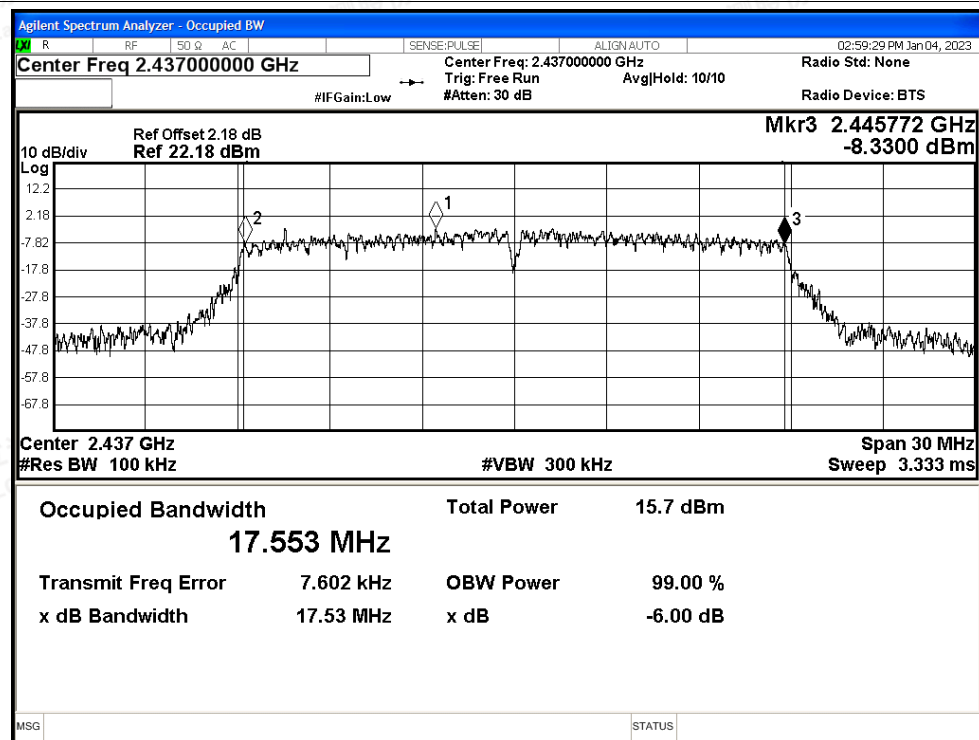


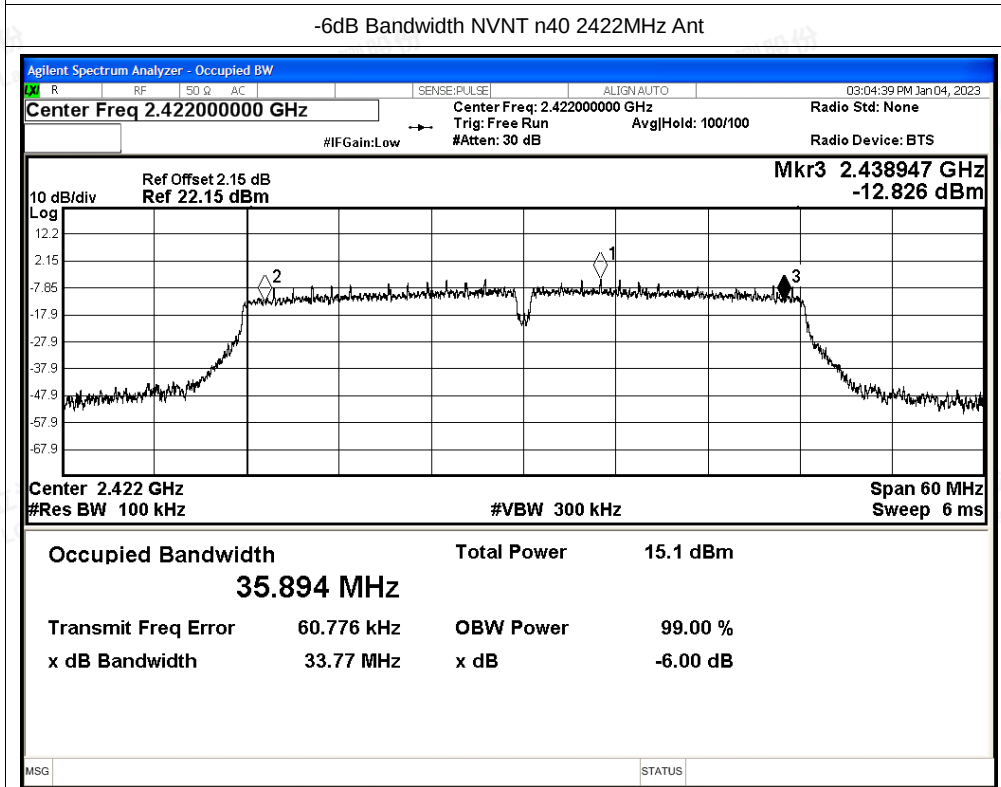
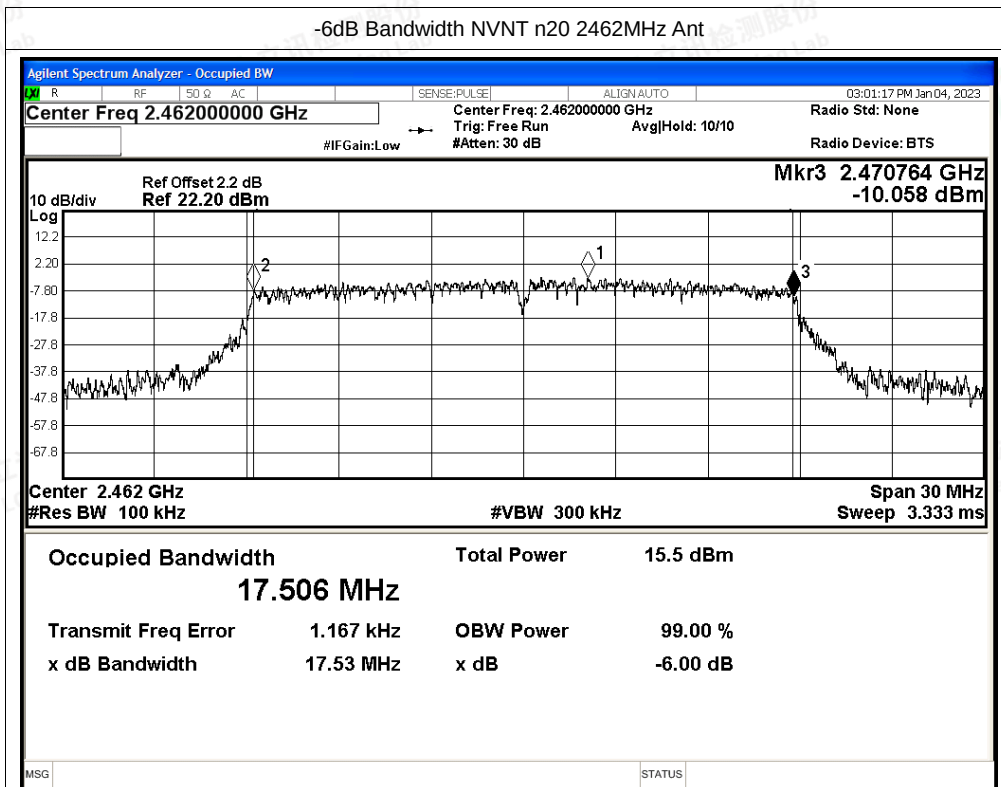


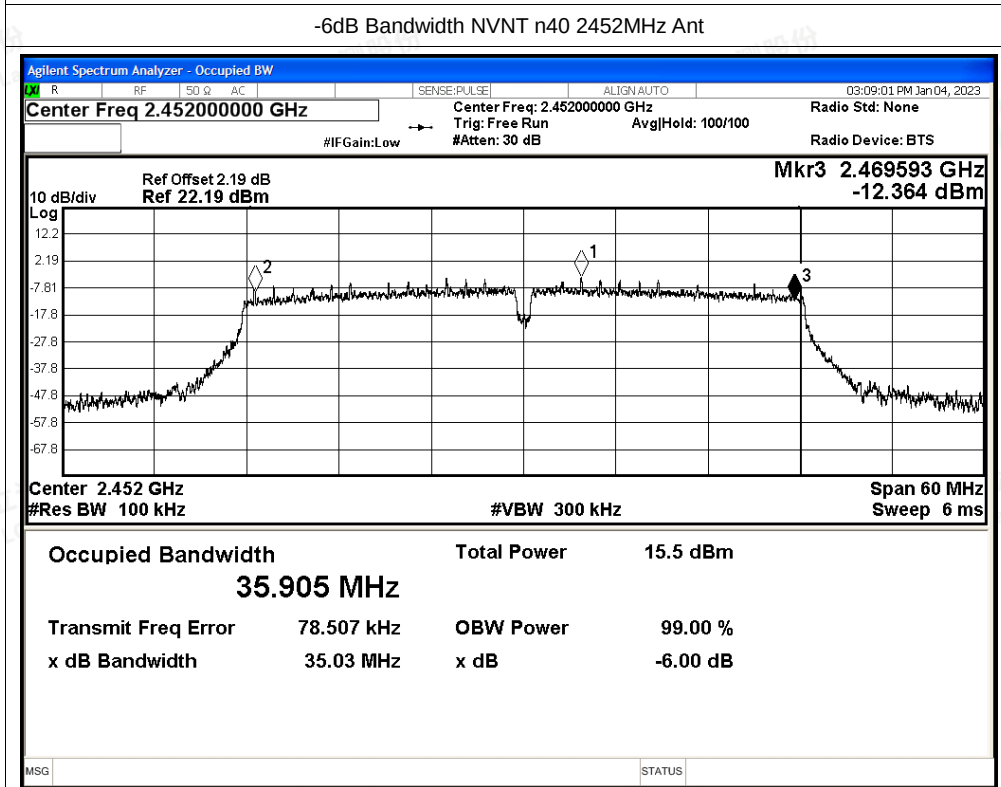
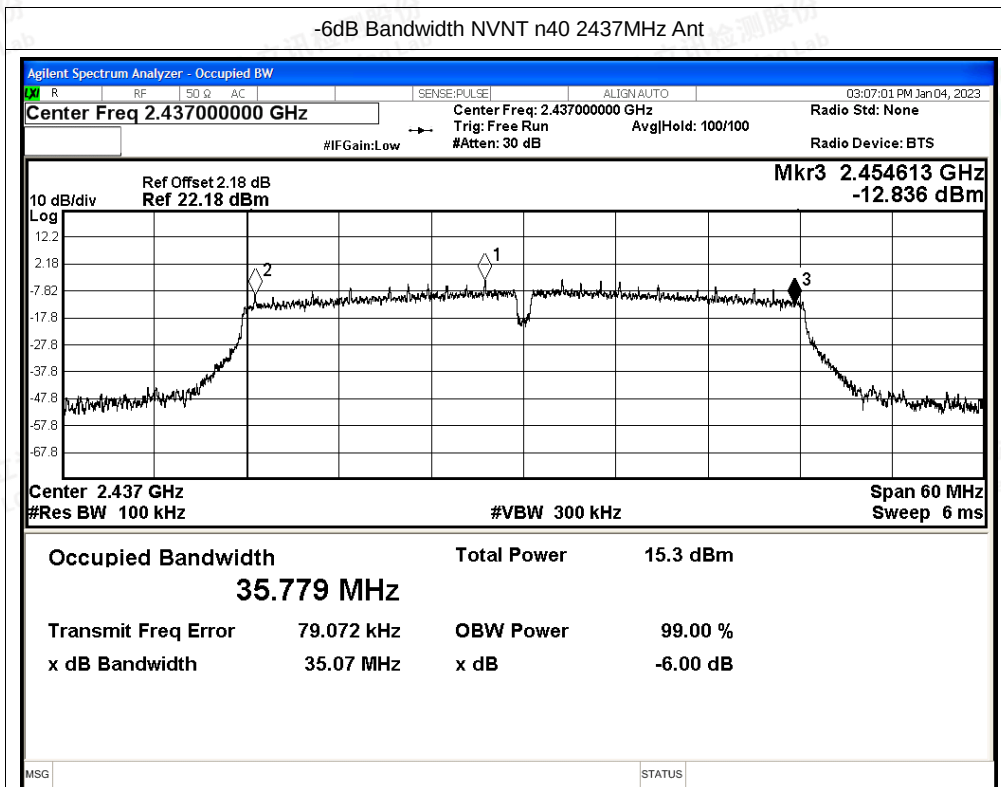
-6dB Bandwidth NVNT n20 2412MHz Ant



-6dB Bandwidth NVNT n20 2437MHz Ant









B.3 Maximum Conducted Output Power

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	b	2412	Ant	14.39	30	Pass
NVNT	b	2437	Ant	14.93	30	Pass
NVNT	b	2462	Ant	14.92	30	Pass
NVNT	g	2412	Ant	15.04	30	Pass
NVNT	g	2437	Ant	15.30	30	Pass
NVNT	g	2462	Ant	15.49	30	Pass
NVNT	n20	2412	Ant	14.00	30	Pass
NVNT	n20	2437	Ant	14.26	30	Pass
NVNT	n20	2462	Ant	14.18	30	Pass
NVNT	n40	2422	Ant	13.59	30	Pass
NVNT	n40	2437	Ant	13.71	30	Pass
NVNT	n40	2452	Ant	13.82	30	Pass



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B.2 Occupied Channel Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	b	2412	Ant	13.021
NVNT	b	2437	Ant	12.85
NVNT	b	2462	Ant	12.836
NVNT	g	2412	Ant	16.415
NVNT	g	2437	Ant	16.408
NVNT	g	2462	Ant	16.408
NVNT	n20	2412	Ant	17.557
NVNT	n20	2437	Ant	17.563
NVNT	n20	2462	Ant	17.563
NVNT	n40	2422	Ant	36.089
NVNT	n40	2437	Ant	35.91
NVNT	n40	2452	Ant	36.06

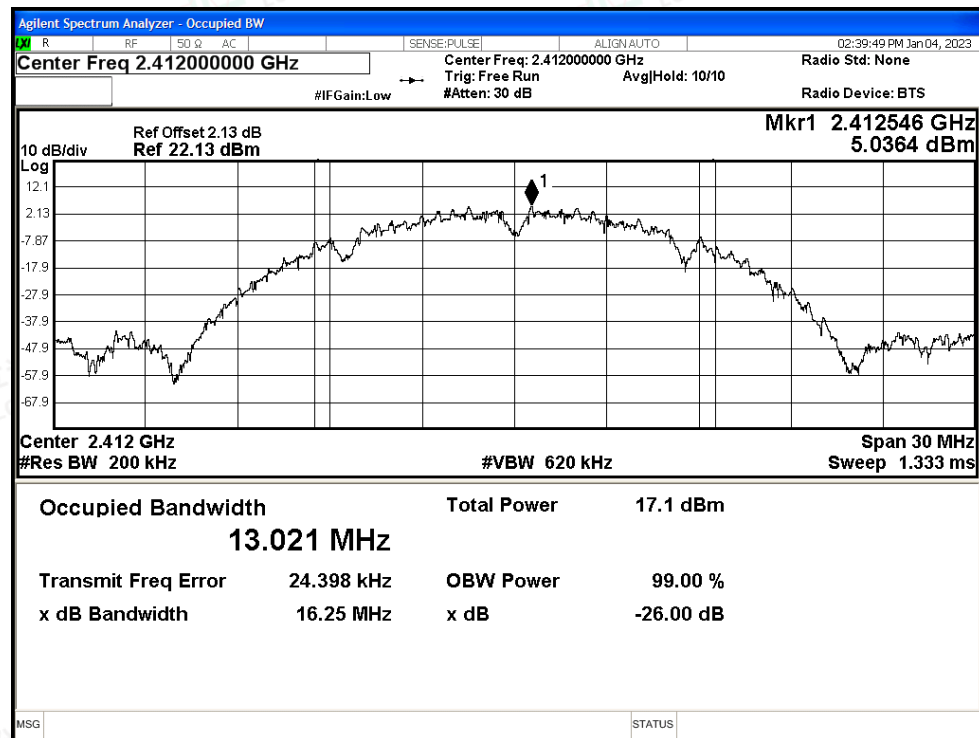


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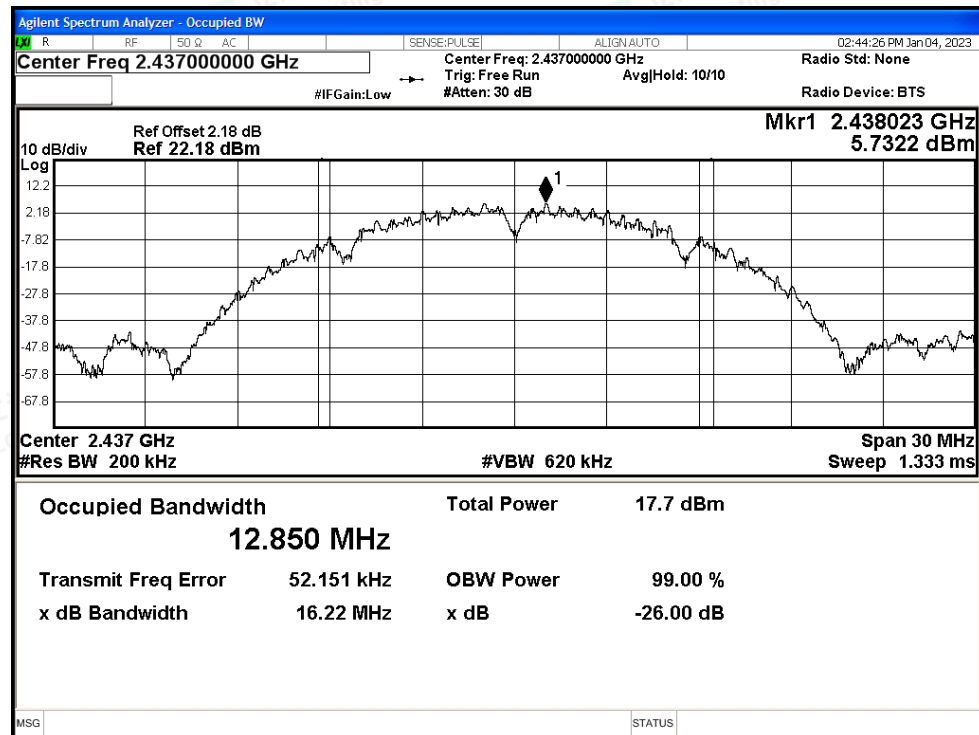


Test Graphs

OBW NVNT b 2412MHz Ant

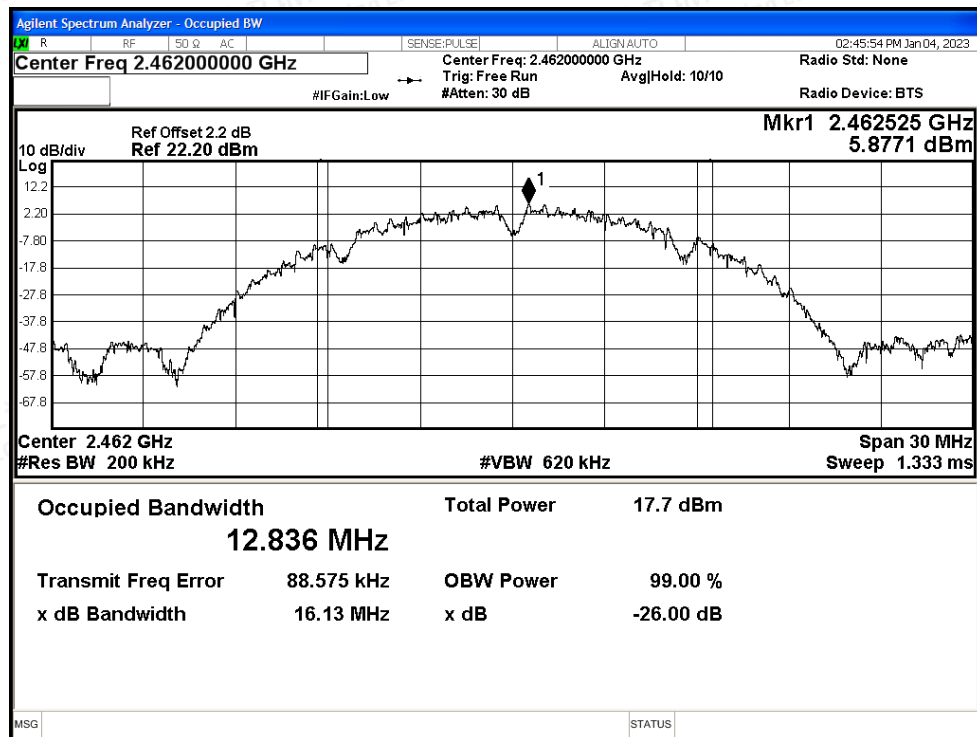


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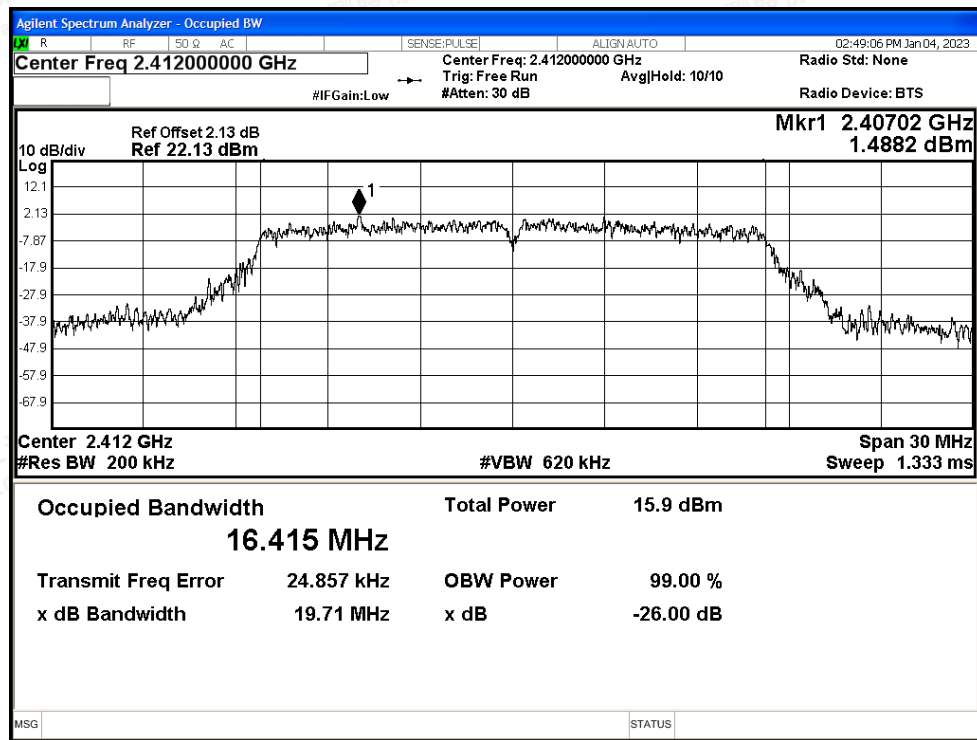




OBW NVNT b 2462MHz Ant

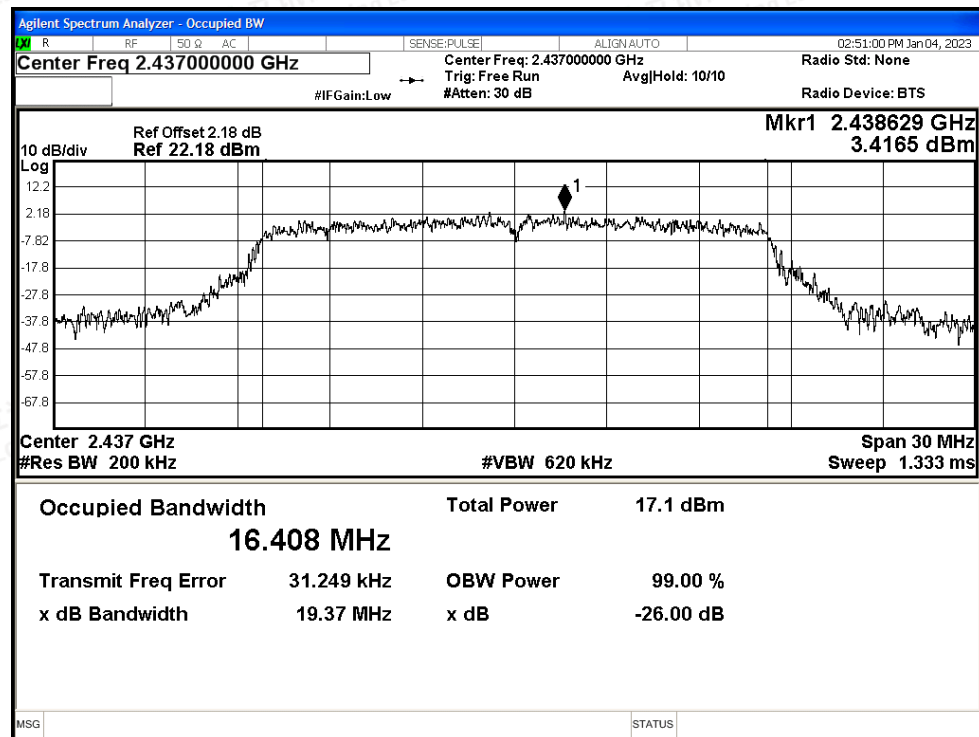


OBW NVNT g 2412MHz Ant

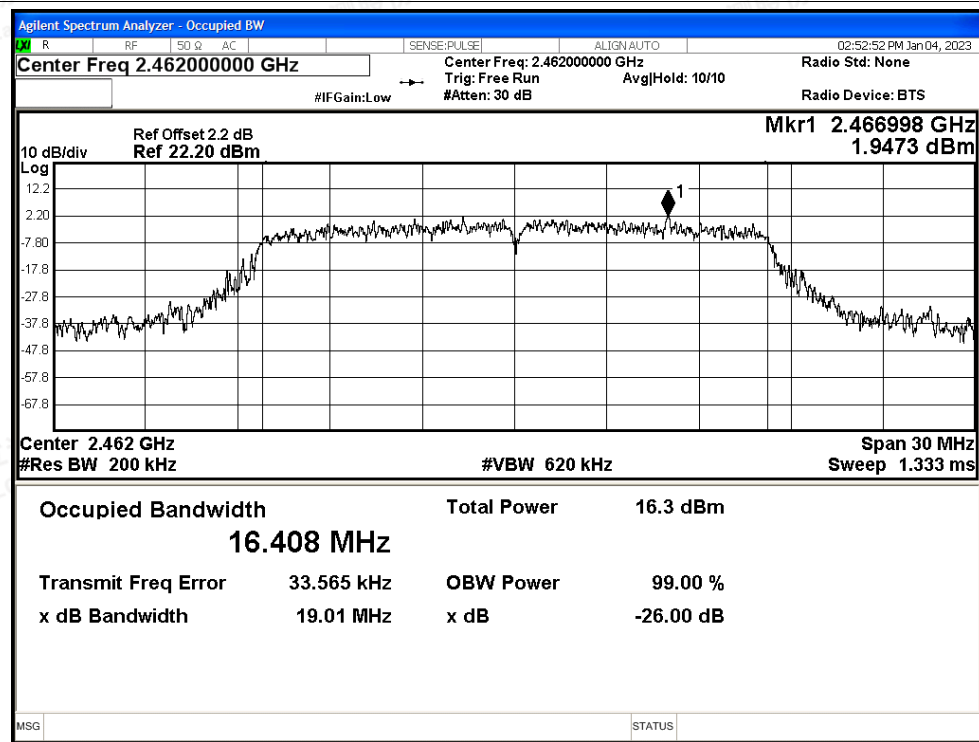




OBW NVNT g 2437MHz Ant

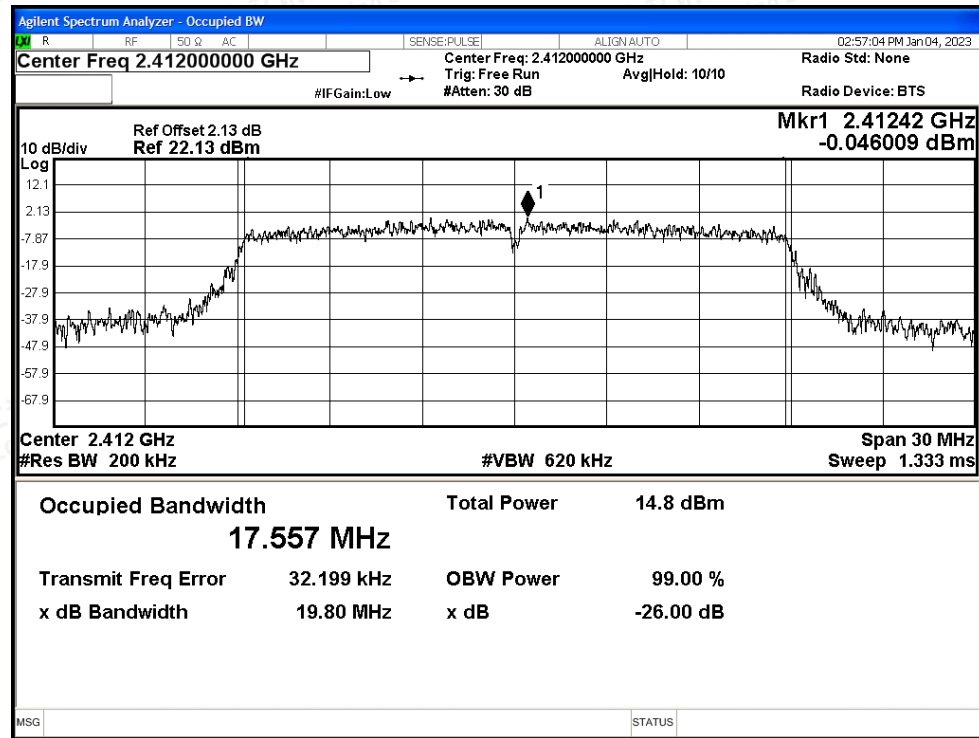


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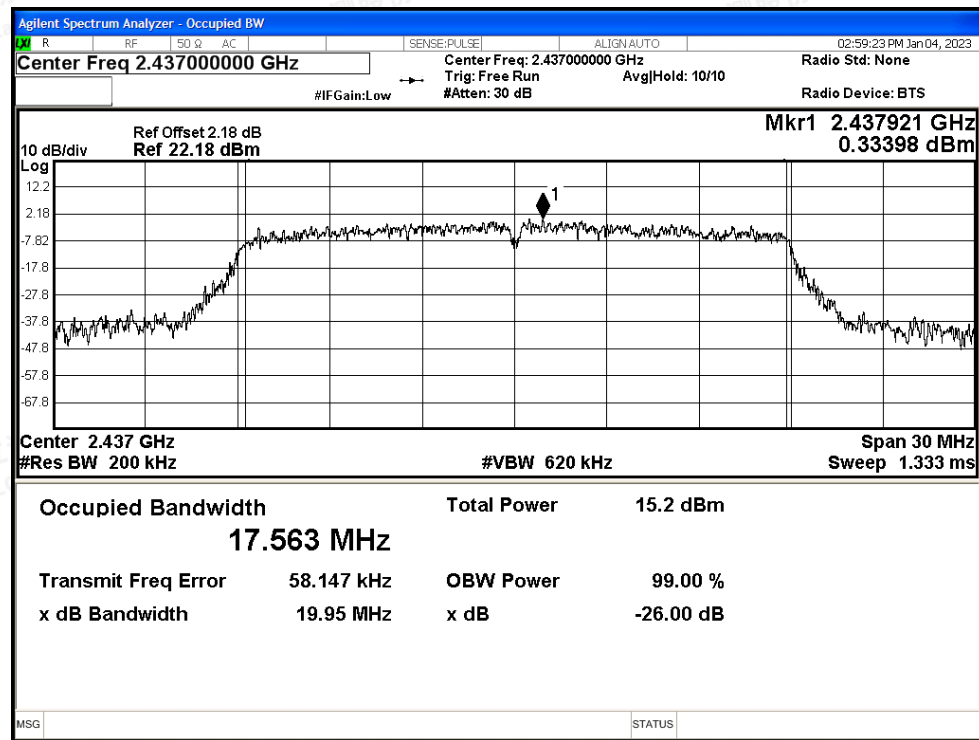




OBW NVNT n20 2412MHz Ant

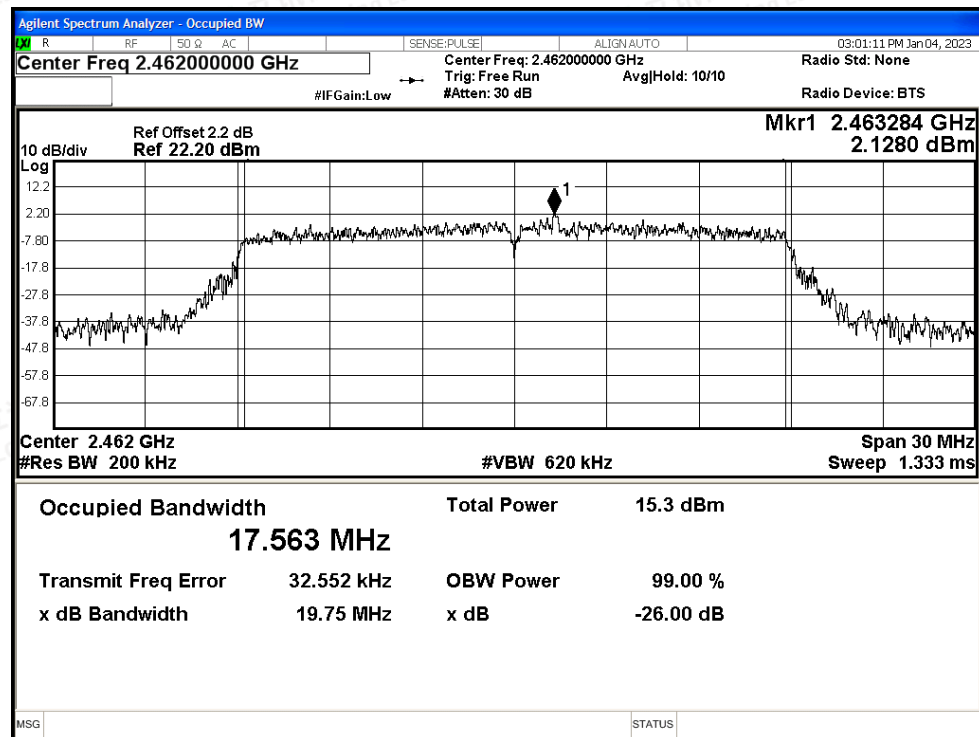


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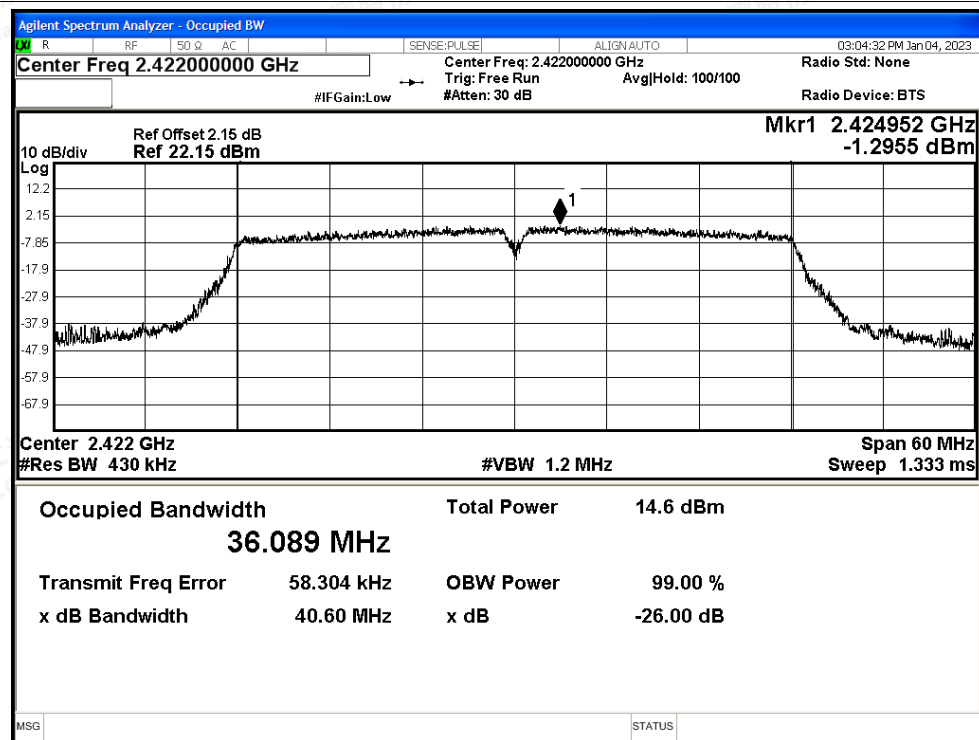




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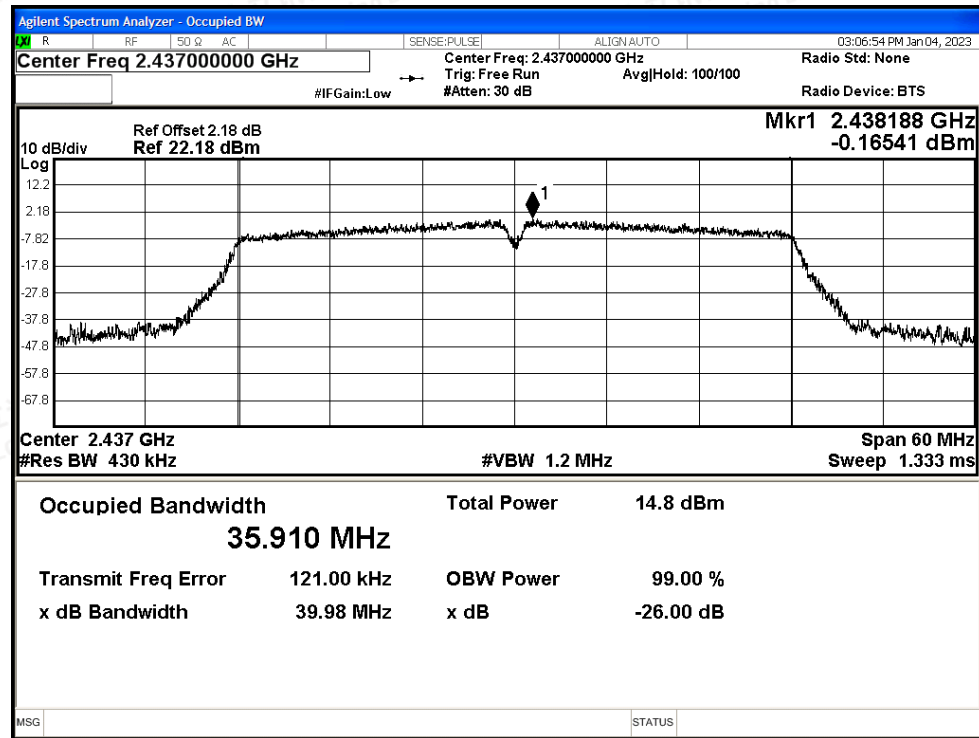


OBW NVNT n40 2422MHz Ant

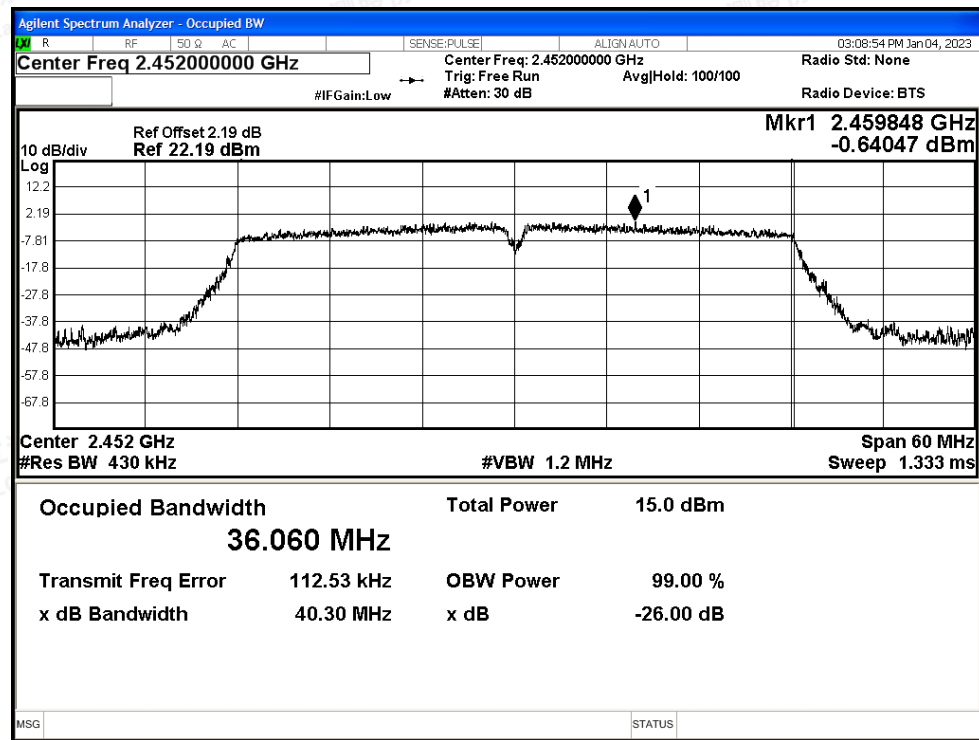




OBW NVNT n40 2437MHz Ant



OBW NVNT n40 2452MHz Ant





B.4 Maximum Power Spectral Density Level

Condition	Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
NVNT	b	2412	Ant	-8.94	8	Pass
NVNT	b	2437	Ant	-7.86	8	Pass
NVNT	b	2462	Ant	-8.87	8	Pass
NVNT	g	2412	Ant	-13.31	8	Pass
NVNT	g	2437	Ant	-11.12	8	Pass
NVNT	g	2462	Ant	-11.91	8	Pass
NVNT	n20	2412	Ant	-14.52	8	Pass
NVNT	n20	2437	Ant	-12.79	8	Pass
NVNT	n20	2462	Ant	-12.31	8	Pass
NVNT	n40	2422	Ant	-17.6	8	Pass
NVNT	n40	2437	Ant	-17.94	8	Pass
NVNT	n40	2452	Ant	-18.39	8	Pass

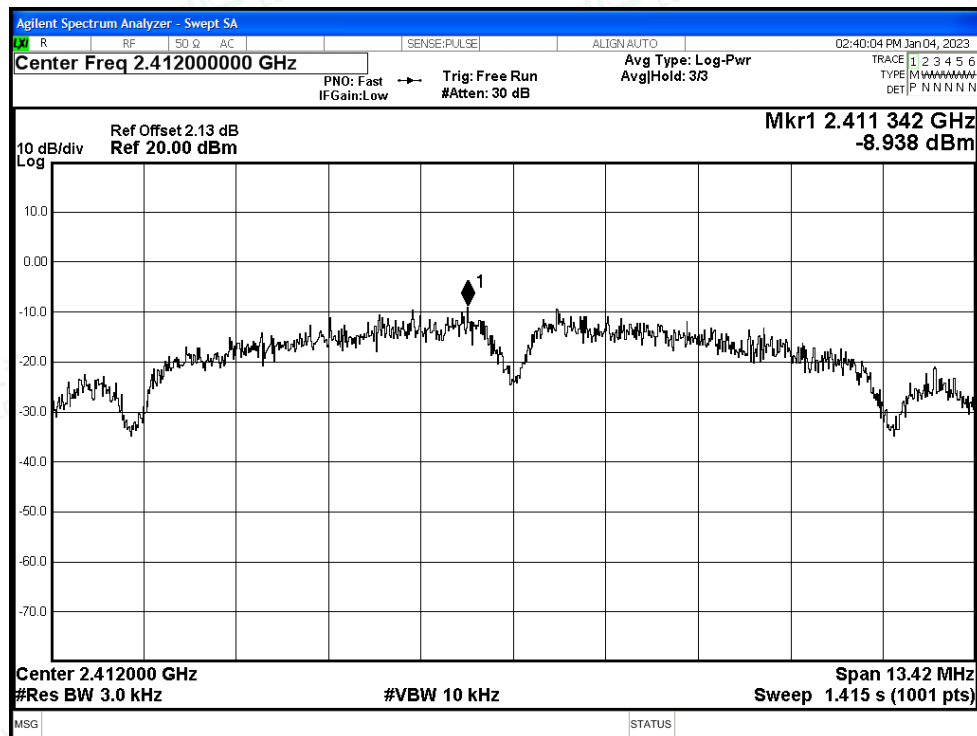


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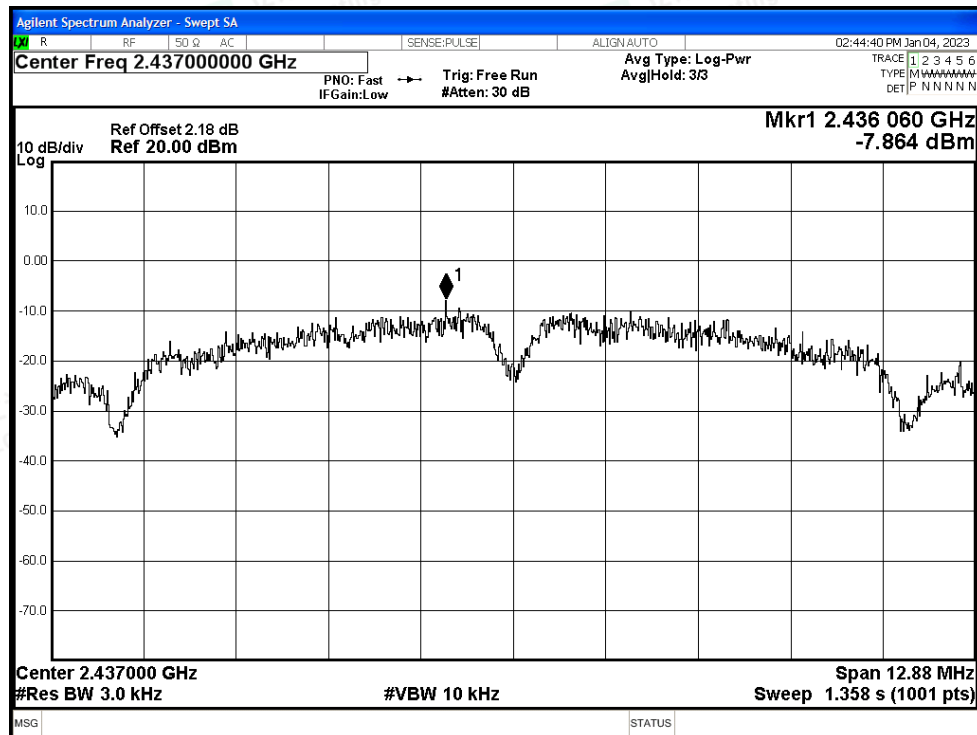


Test Graphs

PSD NVNT b 2412MHz Ant

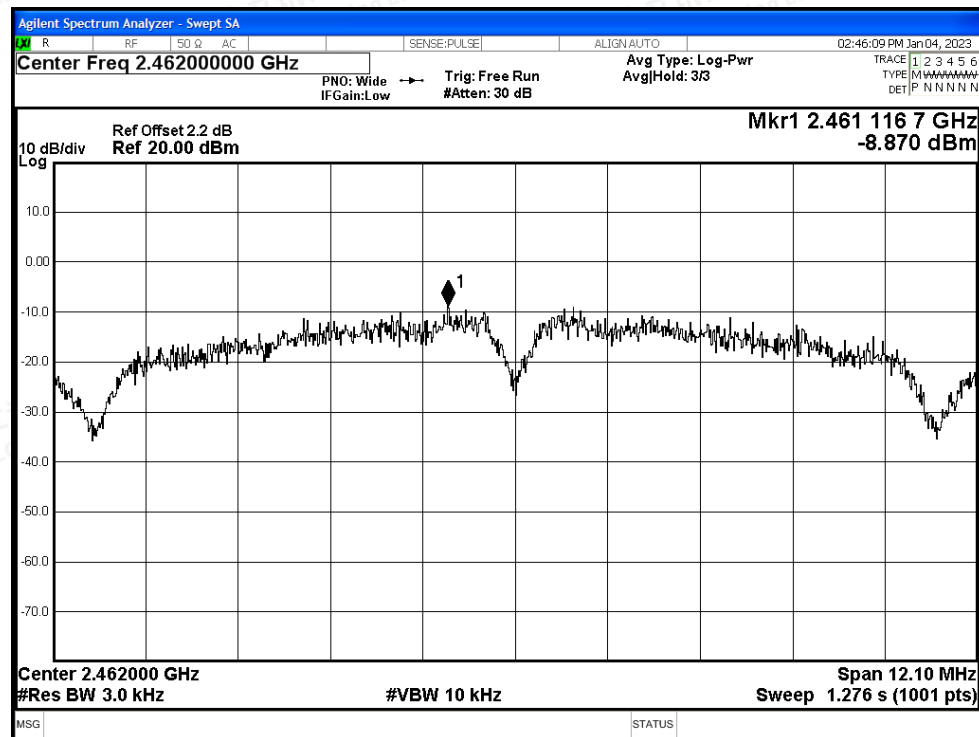


PSD NVNT b 2437MHz Ant

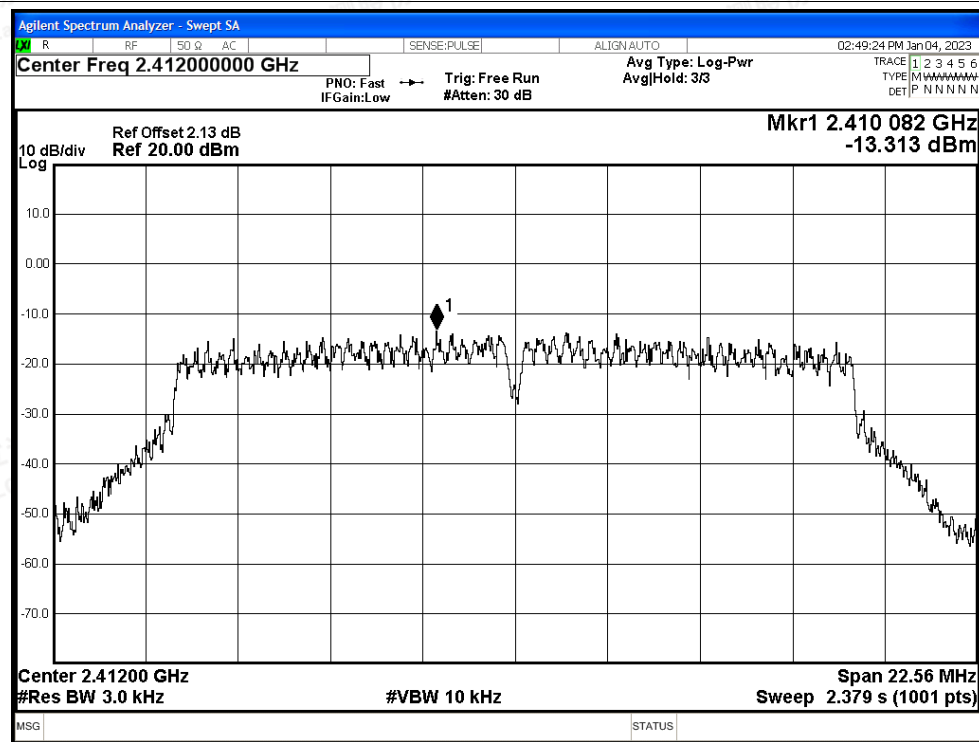




PSD NVNT b 2462MHz Ant

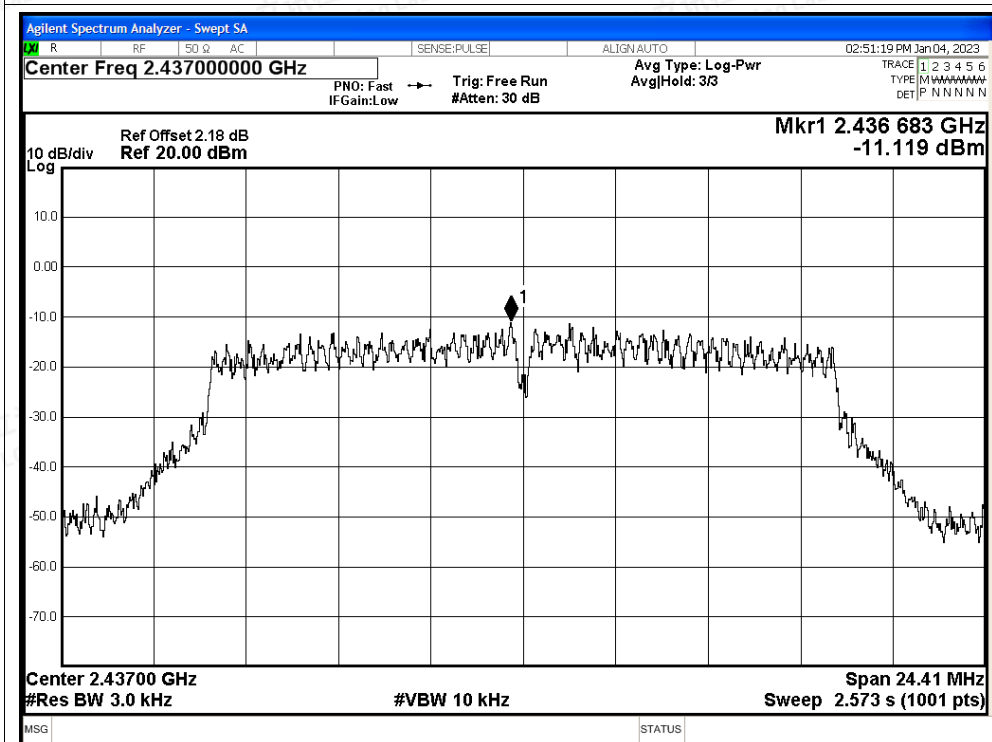


PSD NVNT g 2412MHz Ant

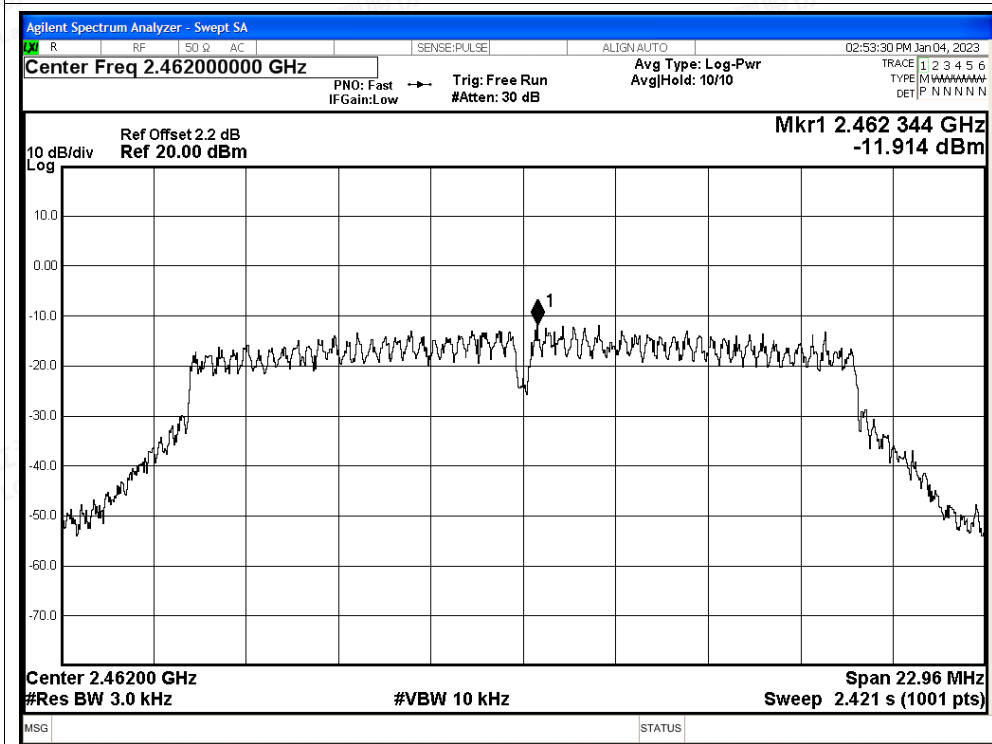




PSD NVNT g 2437MHz Ant

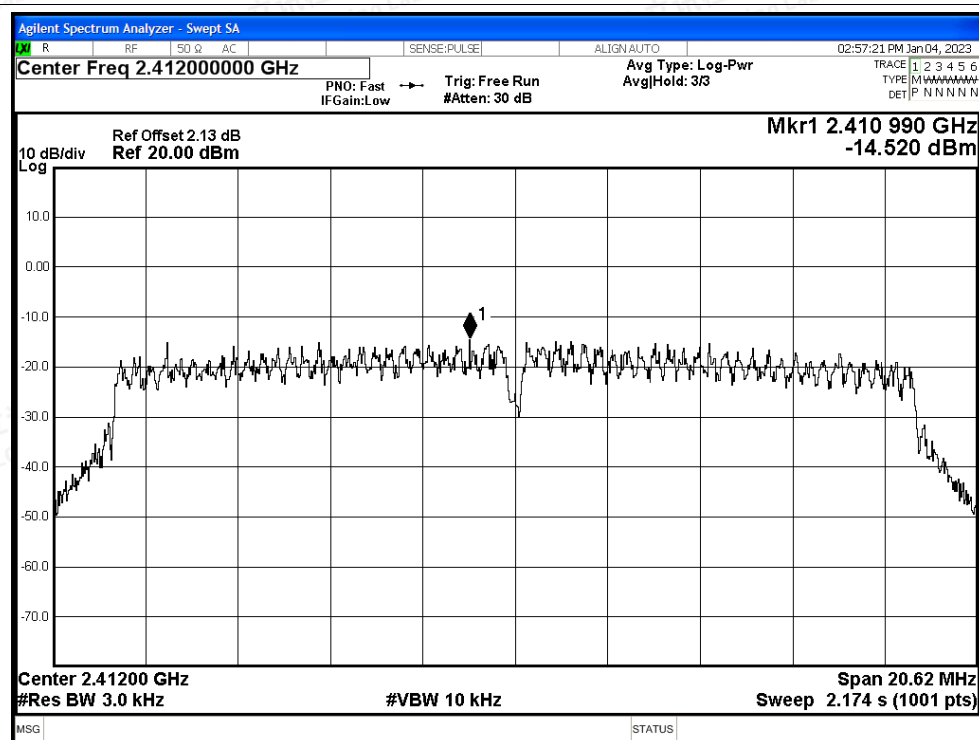


PSD NVNT g 2462MHz Ant

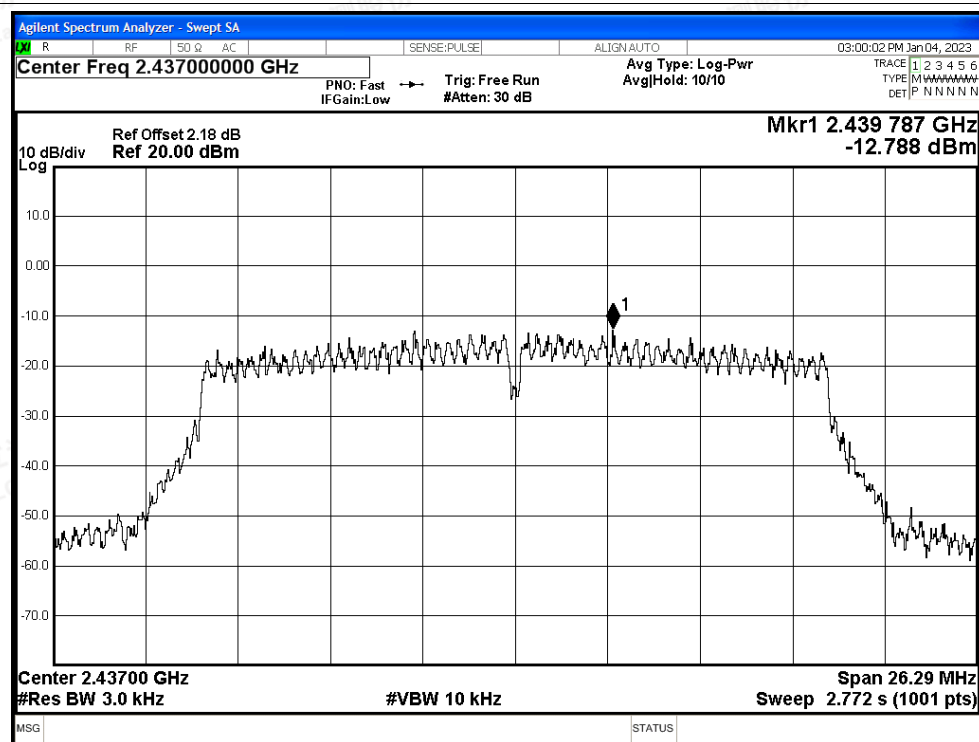




PSD NVNT n20 2412MHz Ant

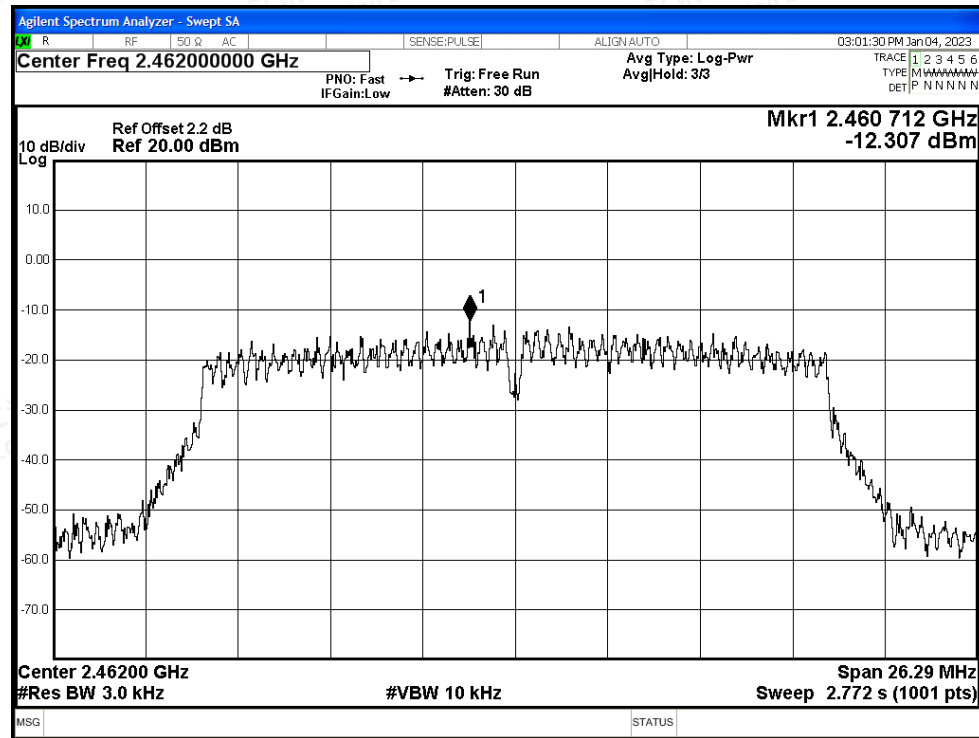


PSD NVNT n20 2437MHz Ant

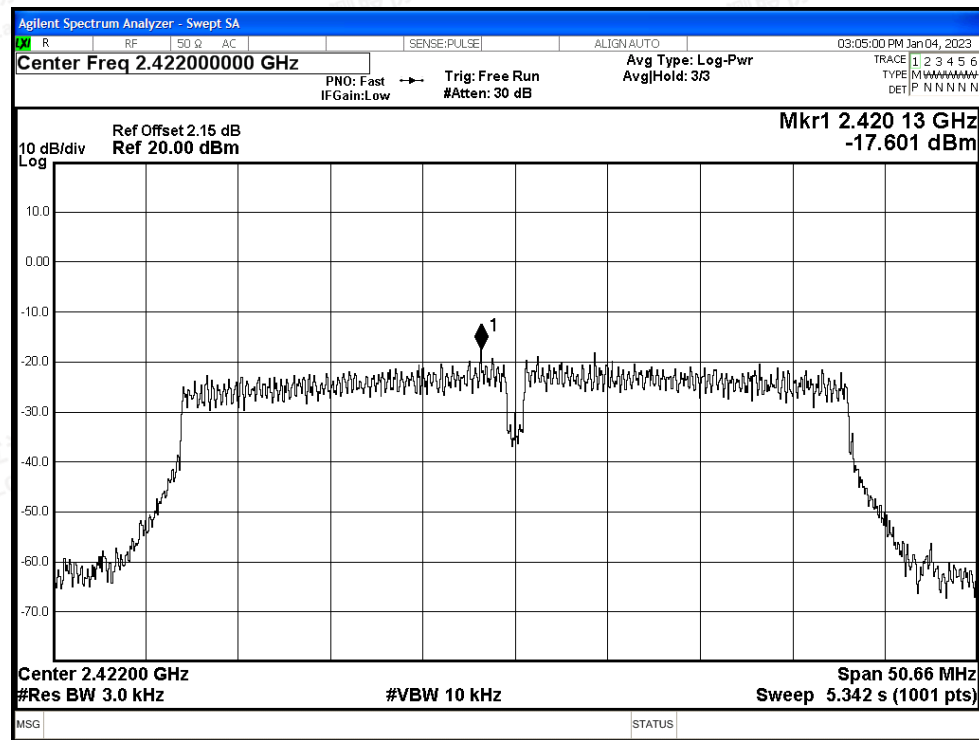




PSD NVNT n20 2462MHz Ant

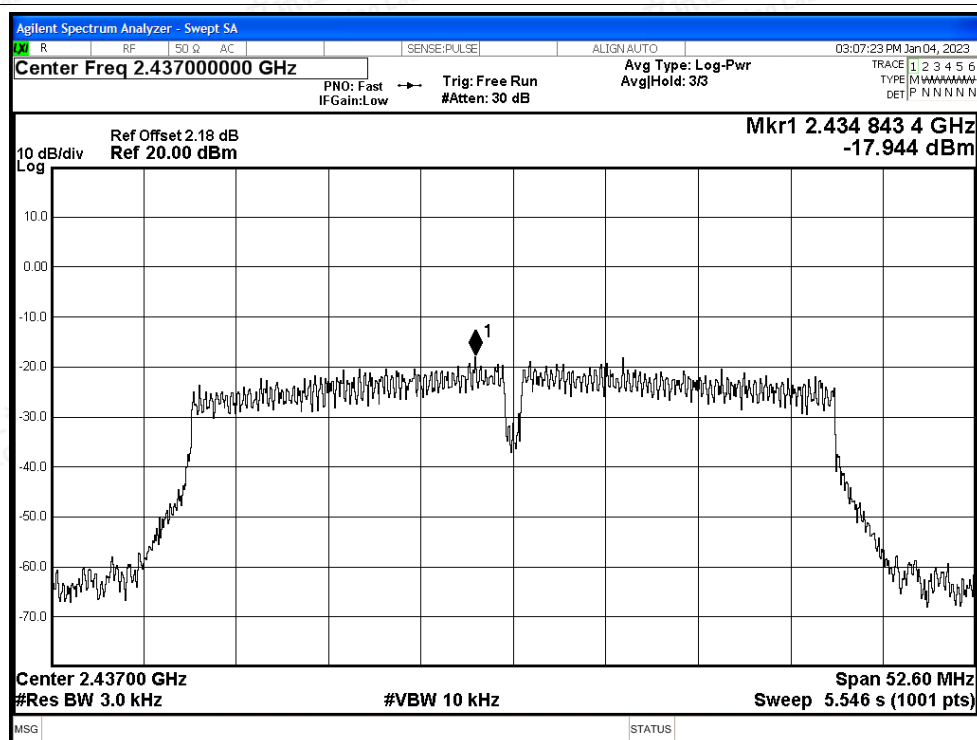


PSD NVNT n40 2422MHz Ant

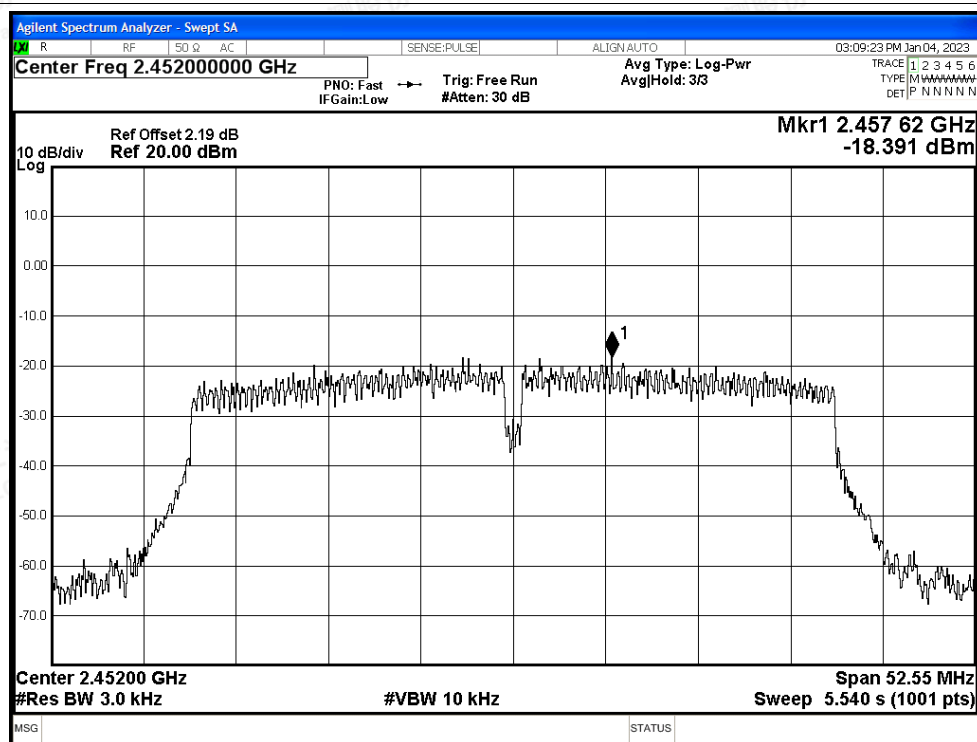




PSD NVNT n40 2437MHz Ant



PSD NVNT n40 2452MHz Ant





B.5 Band Edge

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	b	2412	Ant	-48.28	-20	Pass
NVNT	b	2462	Ant	-59.66	-20	Pass
NVNT	g	2412	Ant	-35.98	-20	Pass
NVNT	g	2462	Ant	-52.47	-20	Pass
NVNT	n20	2412	Ant	-39.08	-20	Pass
NVNT	n20	2462	Ant	-52.17	-20	Pass
NVNT	n40	2422	Ant	-38.42	-20	Pass
NVNT	n40	2452	Ant	-43.44	-20	Pass

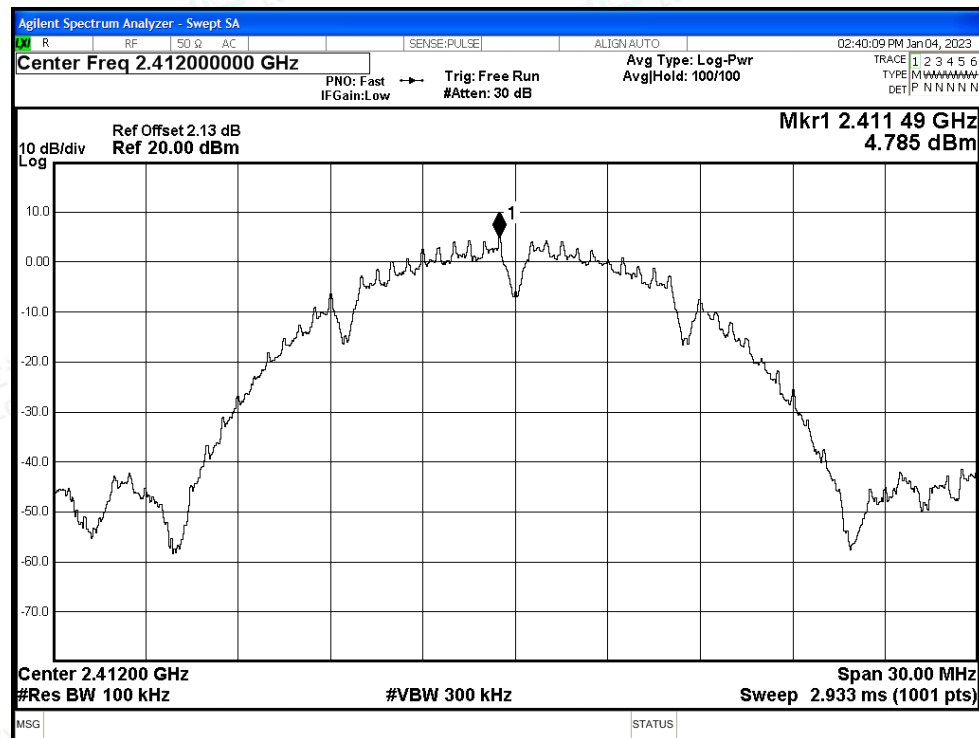


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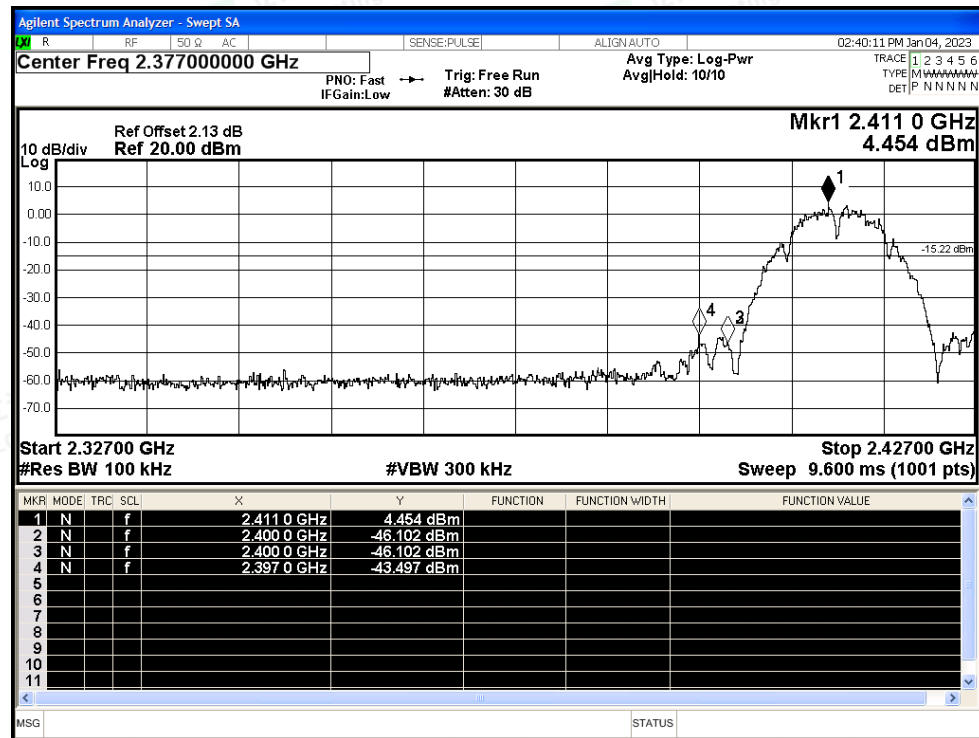


Test Graphs

Band Edge NVNT b 2412MHz Ant Ref

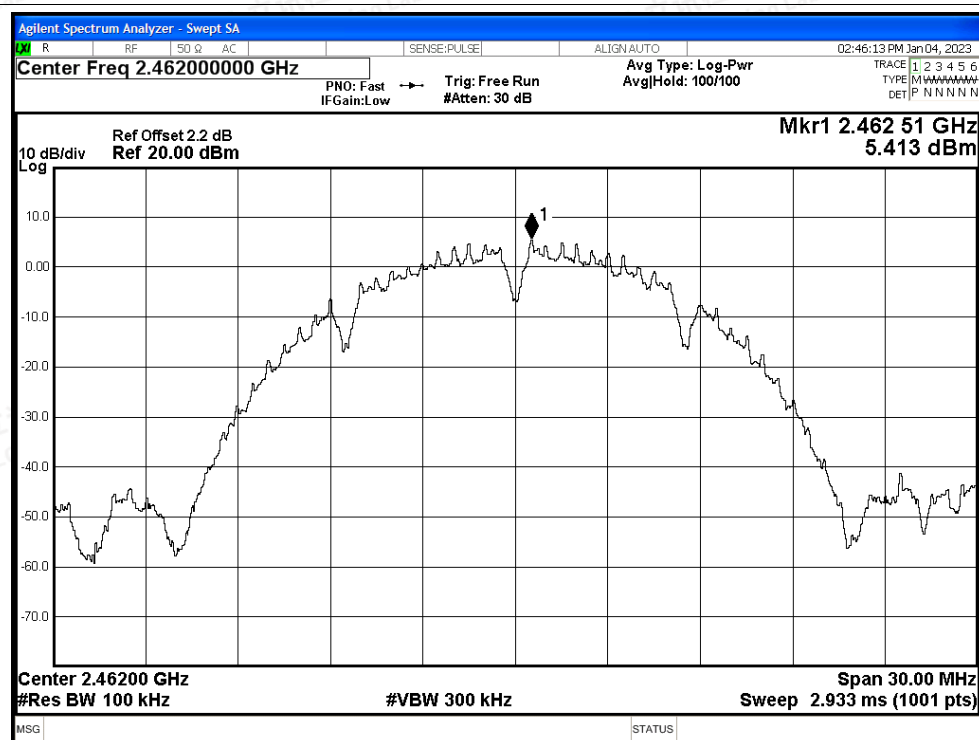


Band Edge NVNT b 2412MHz Ant Emission

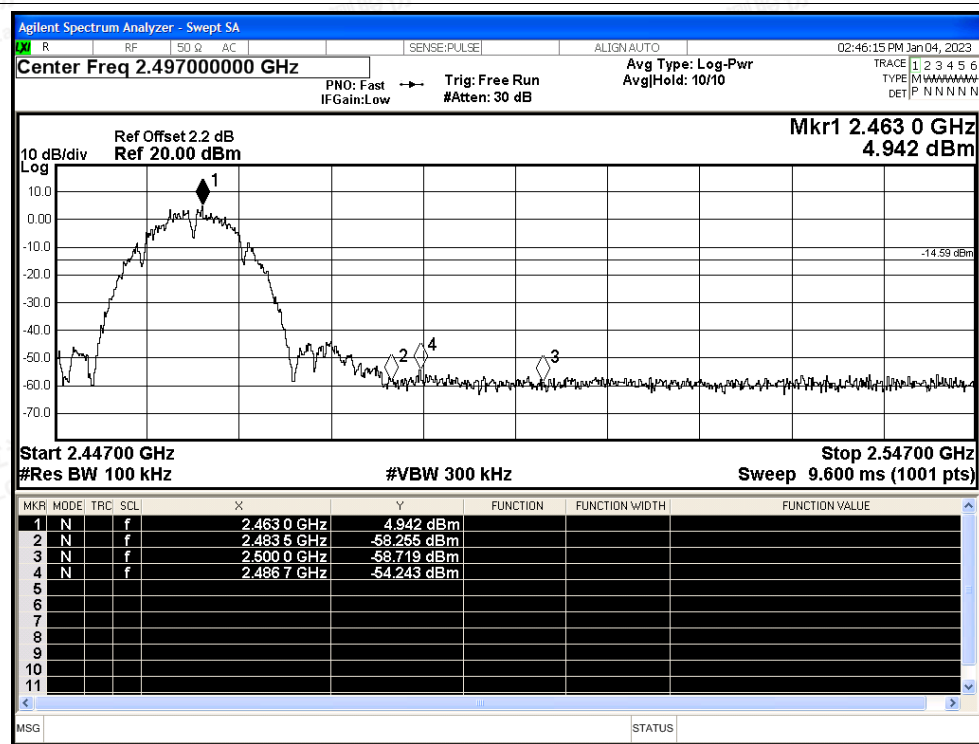




Band Edge NVNT b 2462MHz Ant Ref

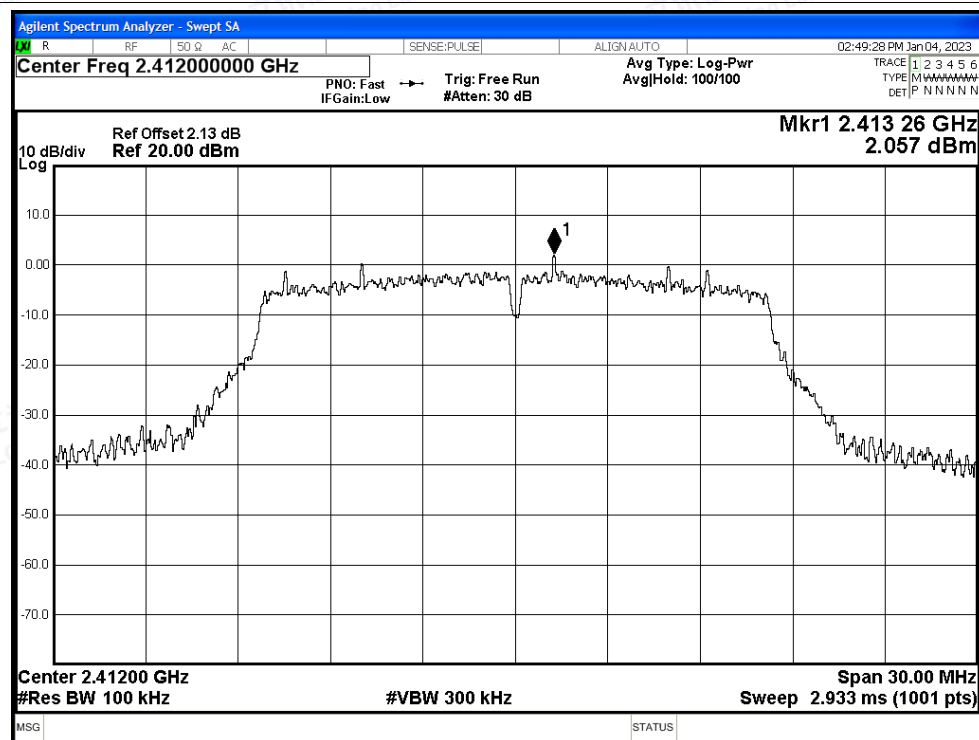


Band Edge NVNT b 2462MHz Ant Emission

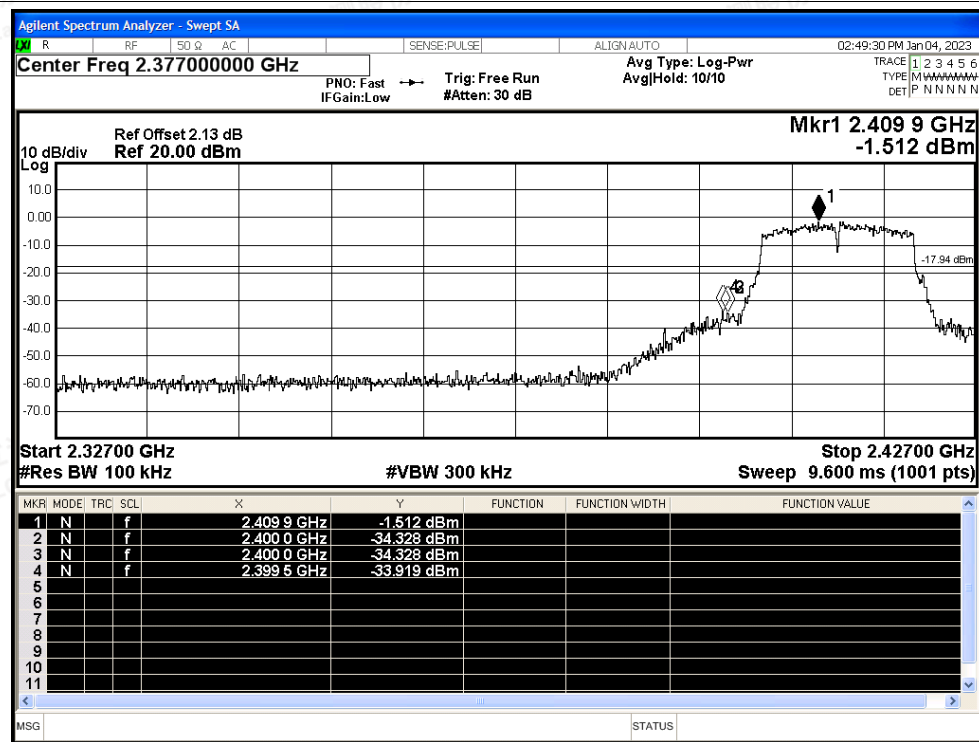


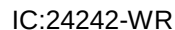


Band Edge NVNT g 2412MHz Ant Ref



Band Edge NVNT g 2412MHz Ant Emission

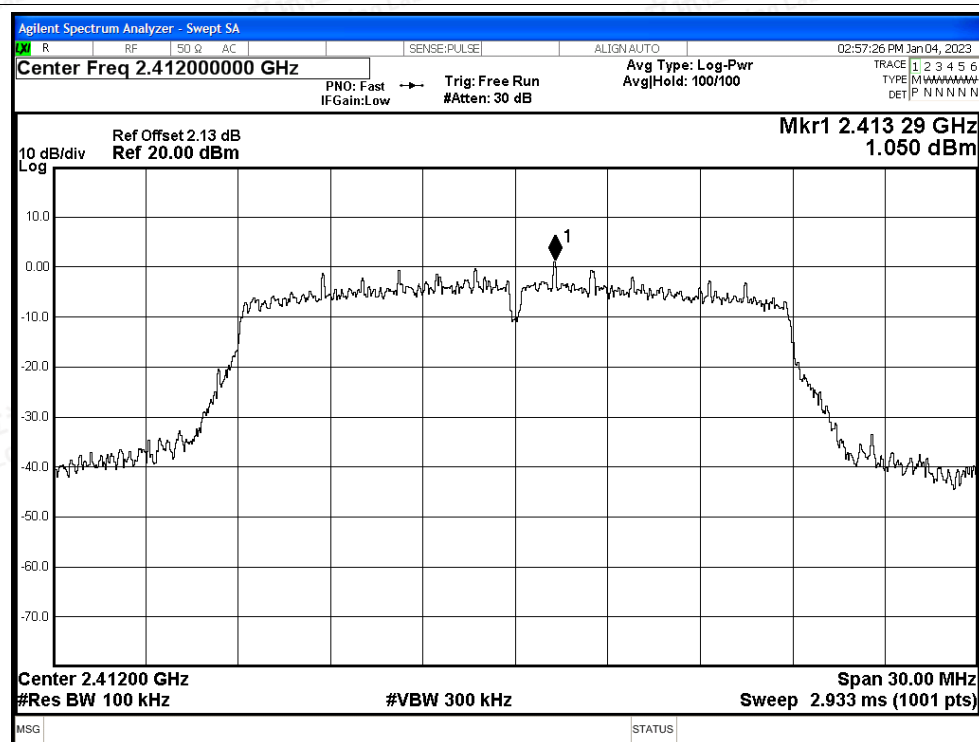




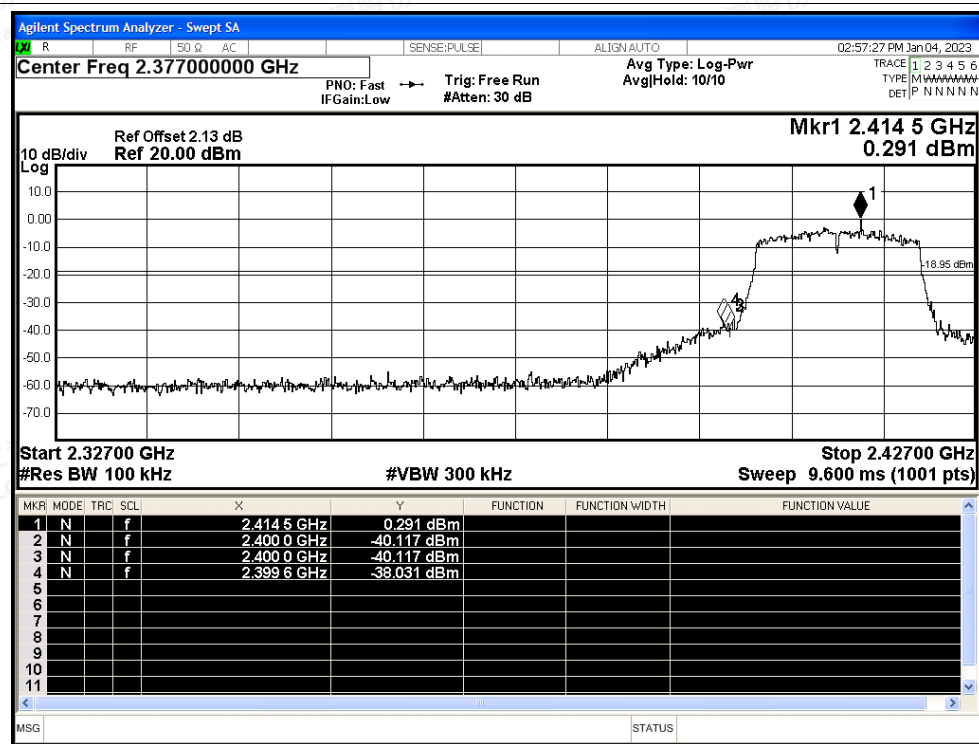
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Band Edge NVNT n20 2412MHz Ant Ref

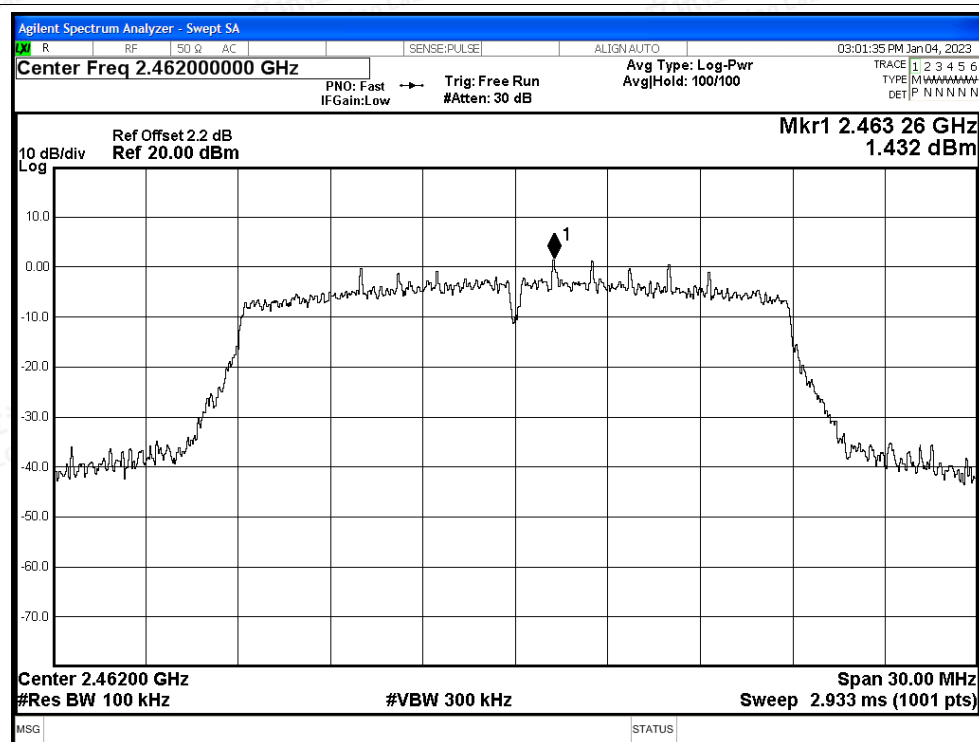


Band Edge NVNT n20 2412MHz Ant Emission

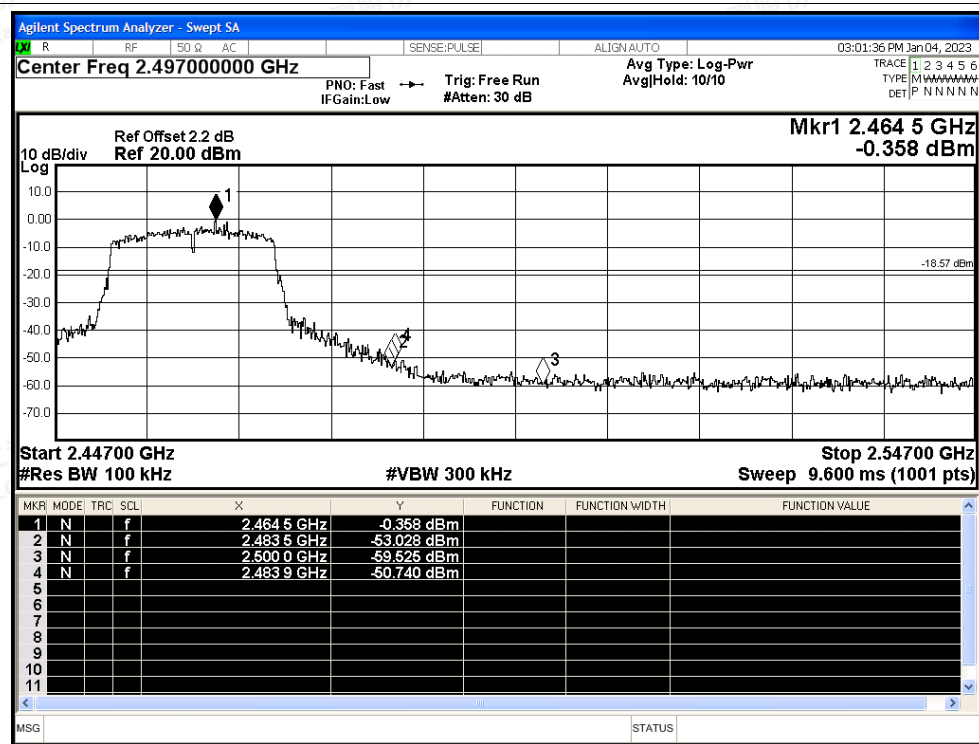




Band Edge NVNT n20 2462MHz Ant Ref

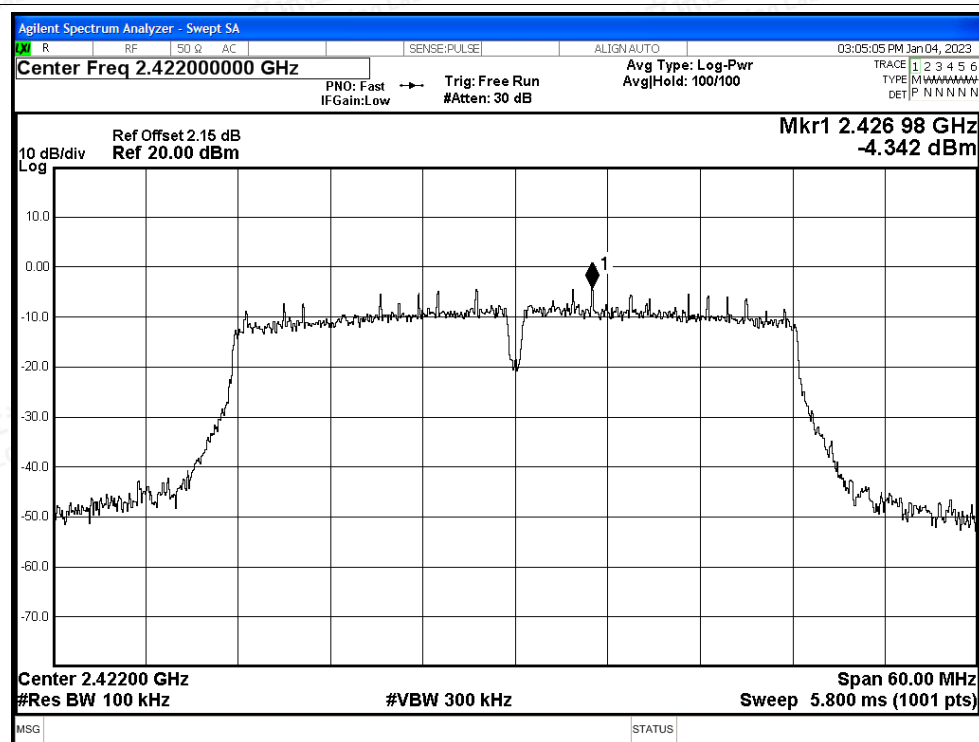


Band Edge NVNT n20 2462MHz Ant Emission

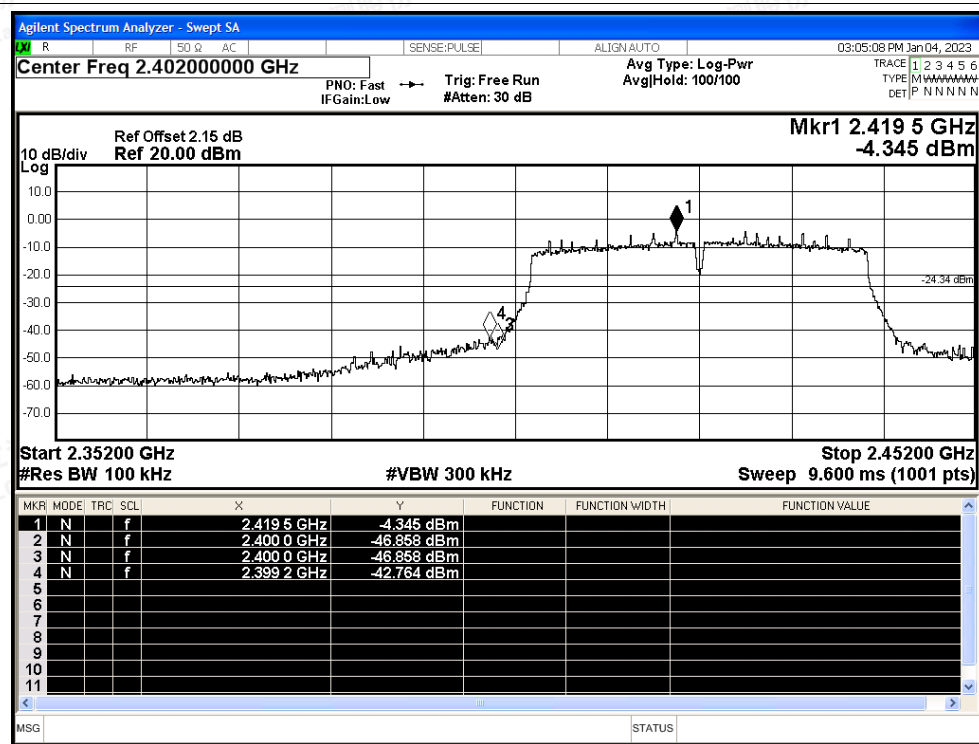




Band Edge NVNT n40 2422MHz Ant Ref

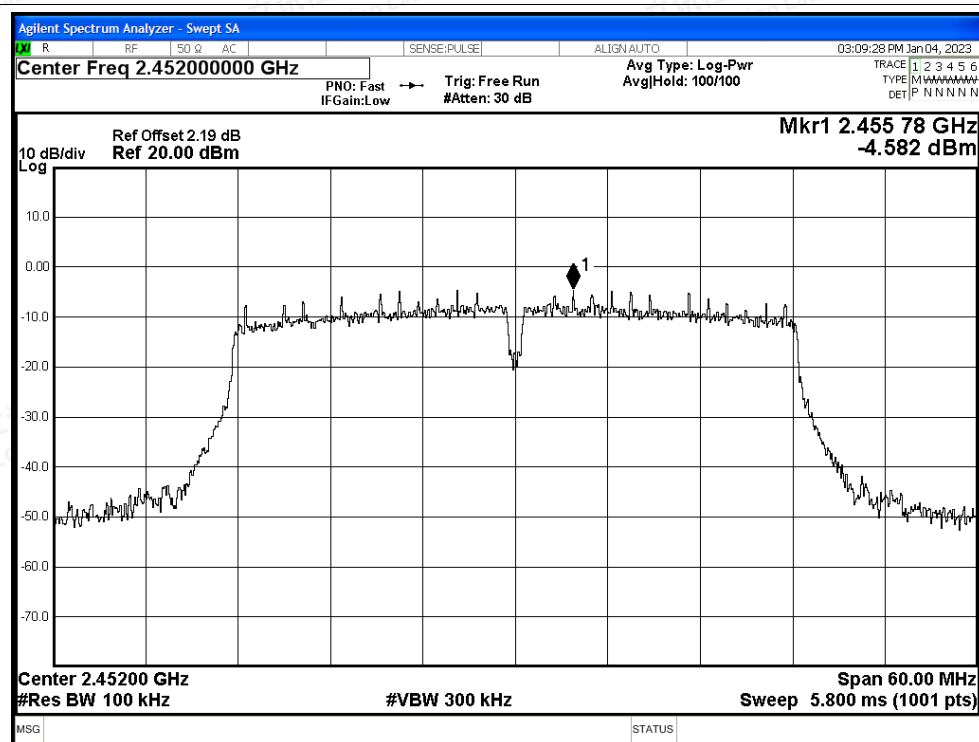


Band Edge NVNT n40 2422MHz Ant Emission

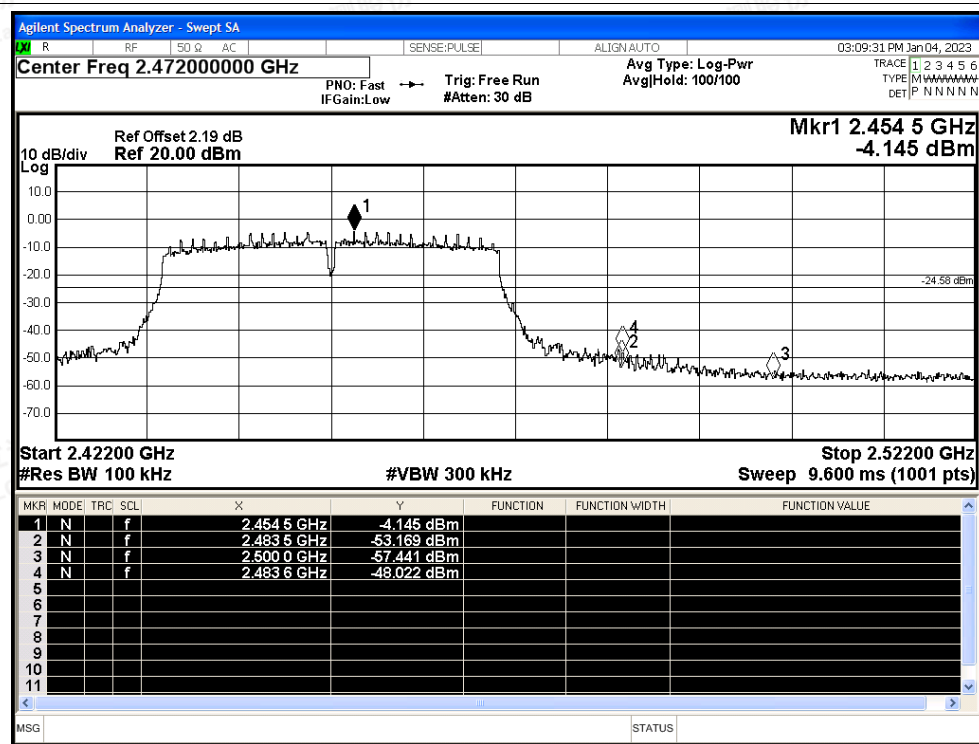




Band Edge NVNT n40 2452MHz Ant Ref



Band Edge NVNT n40 2452MHz Ant Emission





B.6 Conducted RF Spurious Emission

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	b	2412	Ant	-49.91	-20	Pass
NVNT	b	2437	Ant	-51.44	-20	Pass
NVNT	b	2462	Ant	-50.29	-20	Pass
NVNT	g	2412	Ant	-47.77	-20	Pass
NVNT	g	2437	Ant	-48.66	-20	Pass
NVNT	g	2462	Ant	-47.4	-20	Pass
NVNT	n20	2412	Ant	-47.5	-20	Pass
NVNT	n20	2437	Ant	-46.84	-20	Pass
NVNT	n20	2462	Ant	-46.73	-20	Pass
NVNT	n40	2422	Ant	-41.21	-20	Pass
NVNT	n40	2437	Ant	-41.7	-20	Pass
NVNT	n40	2452	Ant	-41.24	-20	Pass

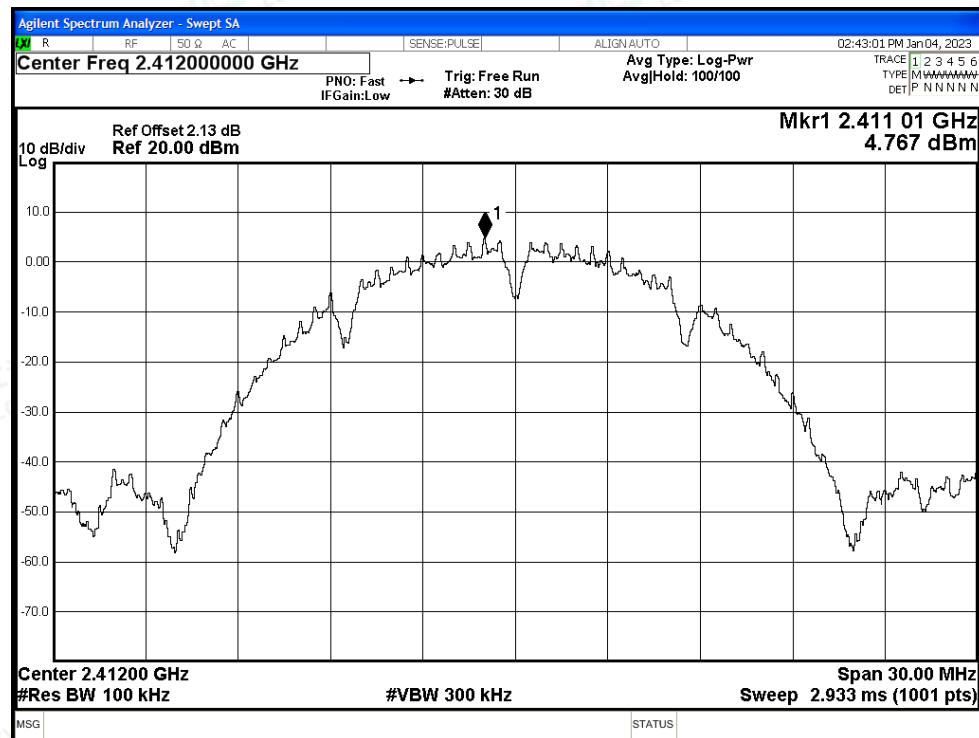


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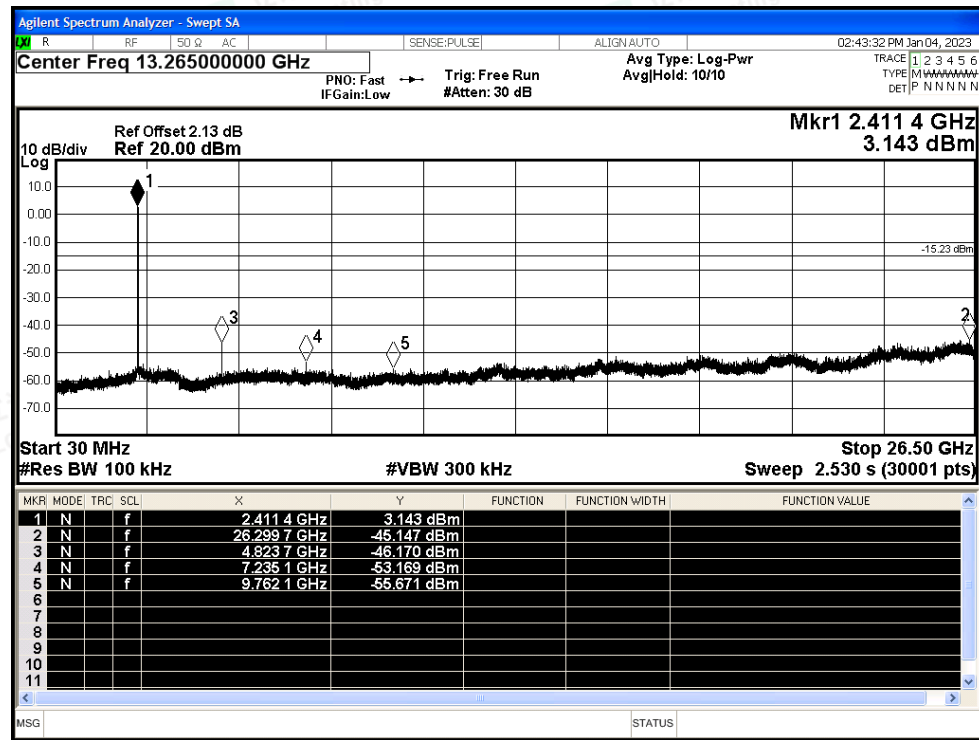


Test Graphs

Tx. Spurious NVNT b 2412MHz Ant Ref

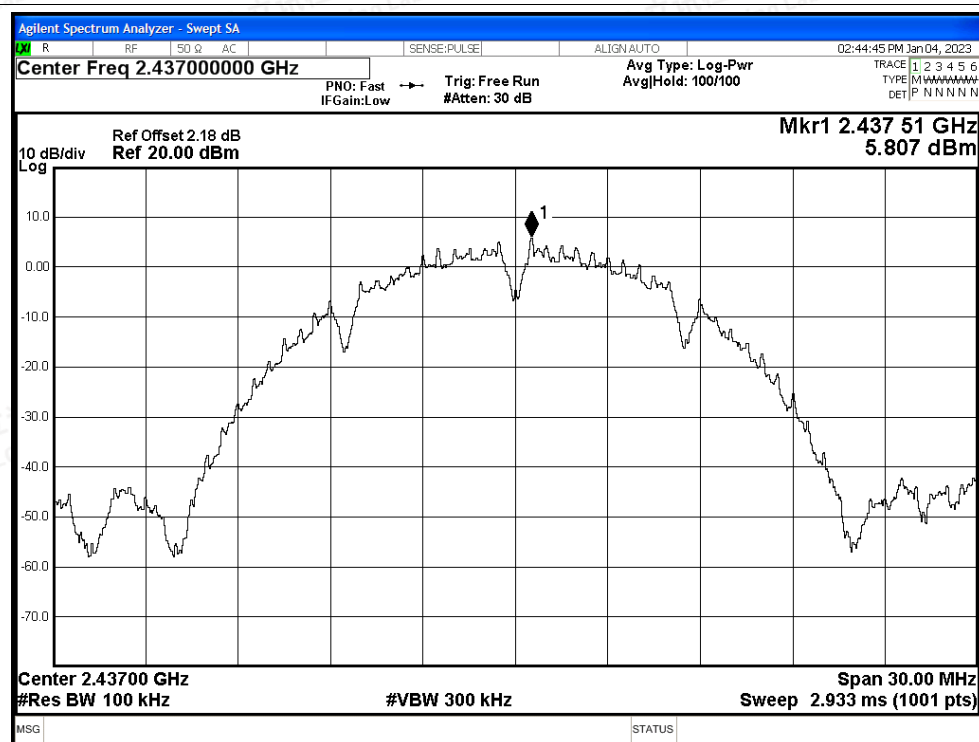


Tx. Spurious NVNT b 2412MHz Ant Emission

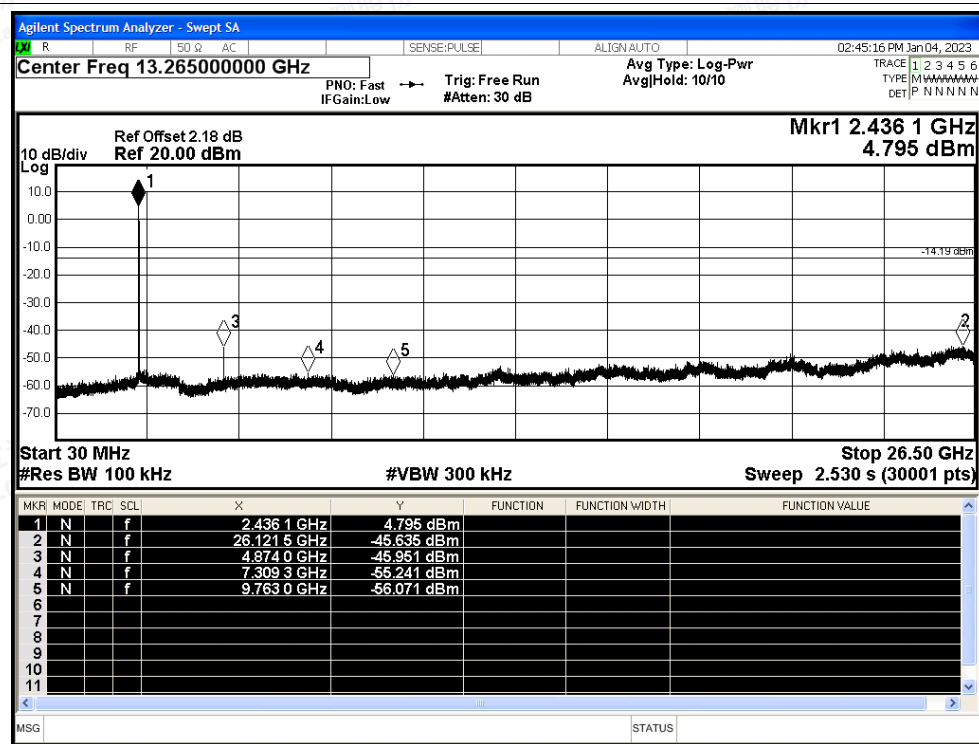




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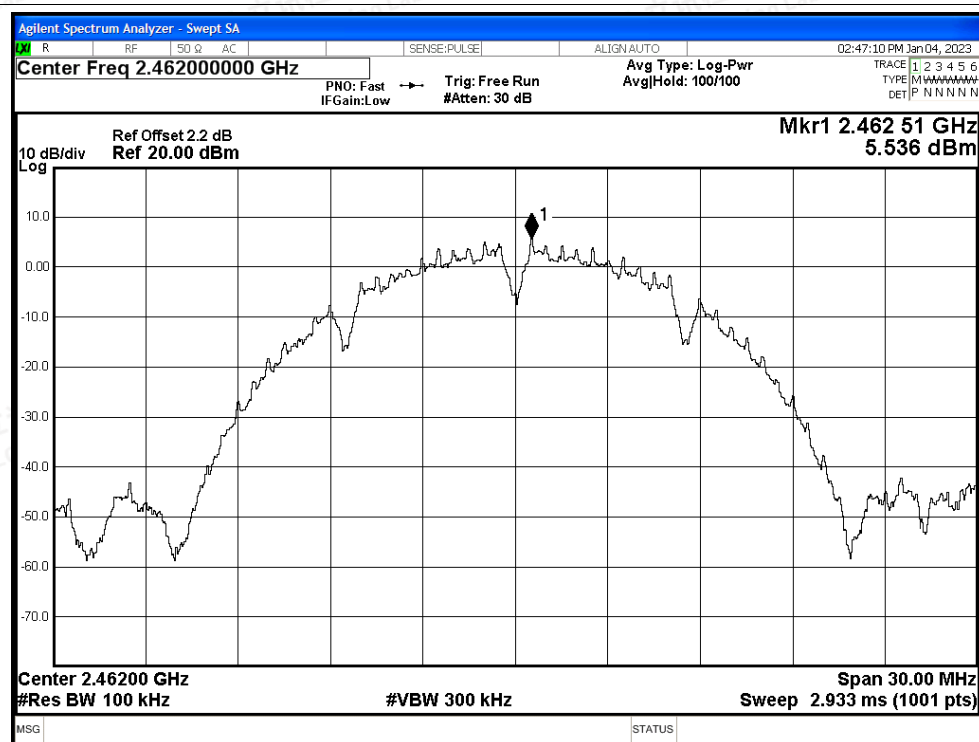


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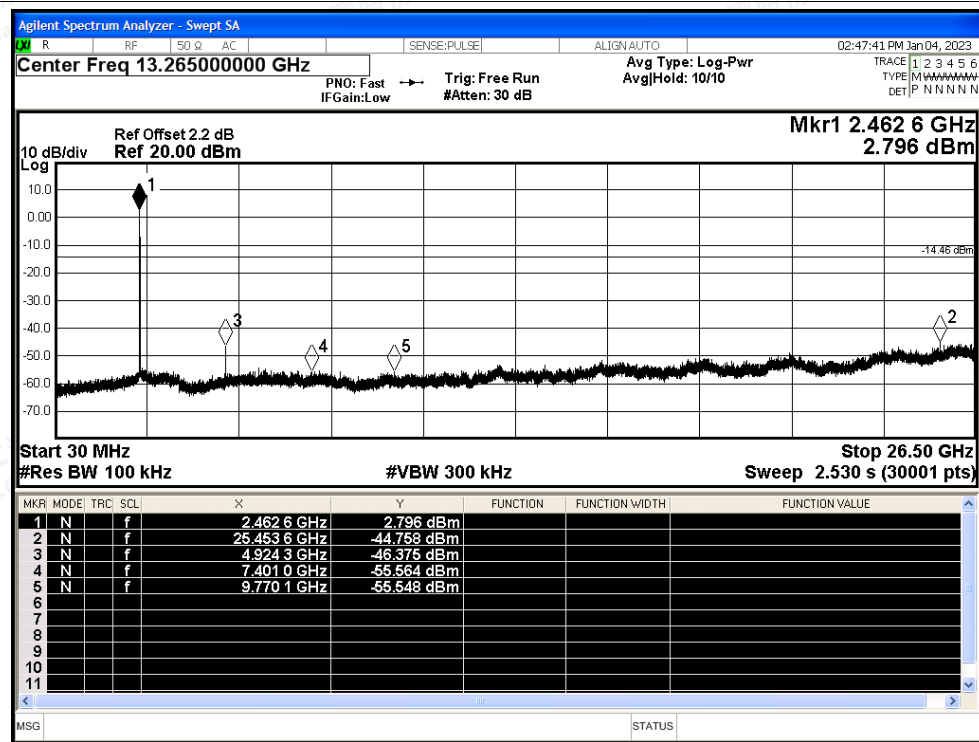




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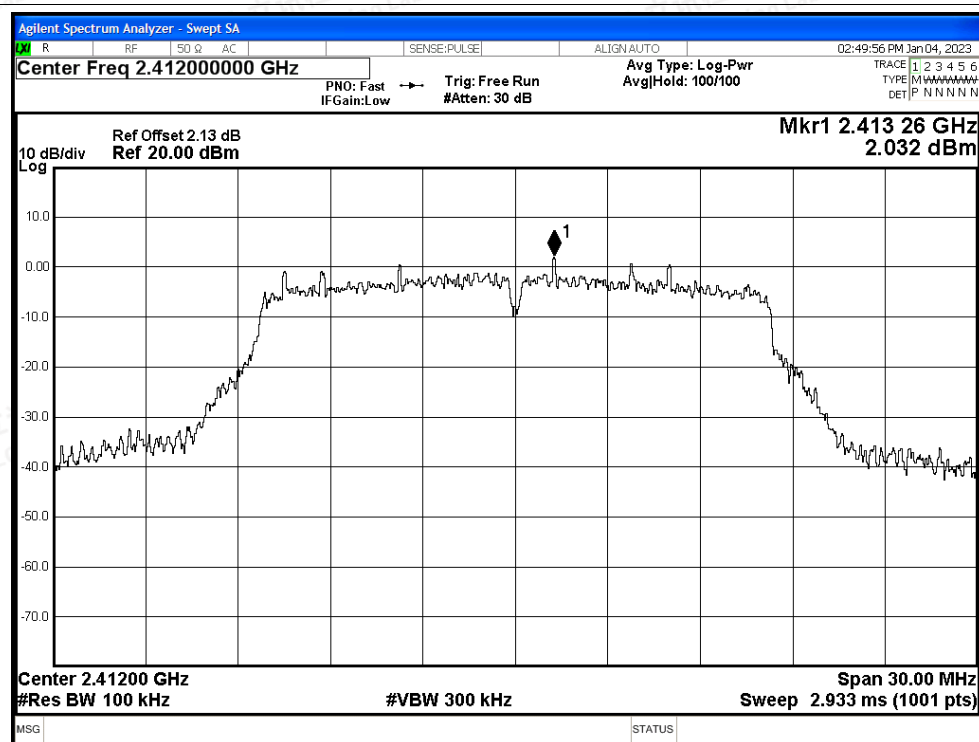


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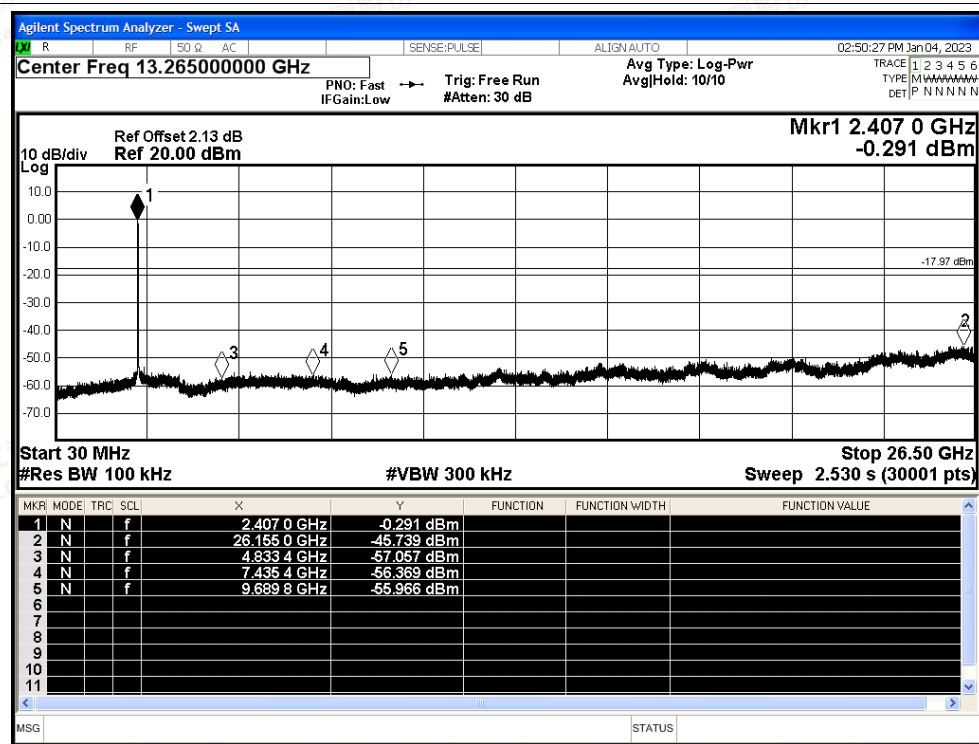




Tx. Spurious NVNT g 2412MHz Ant Ref

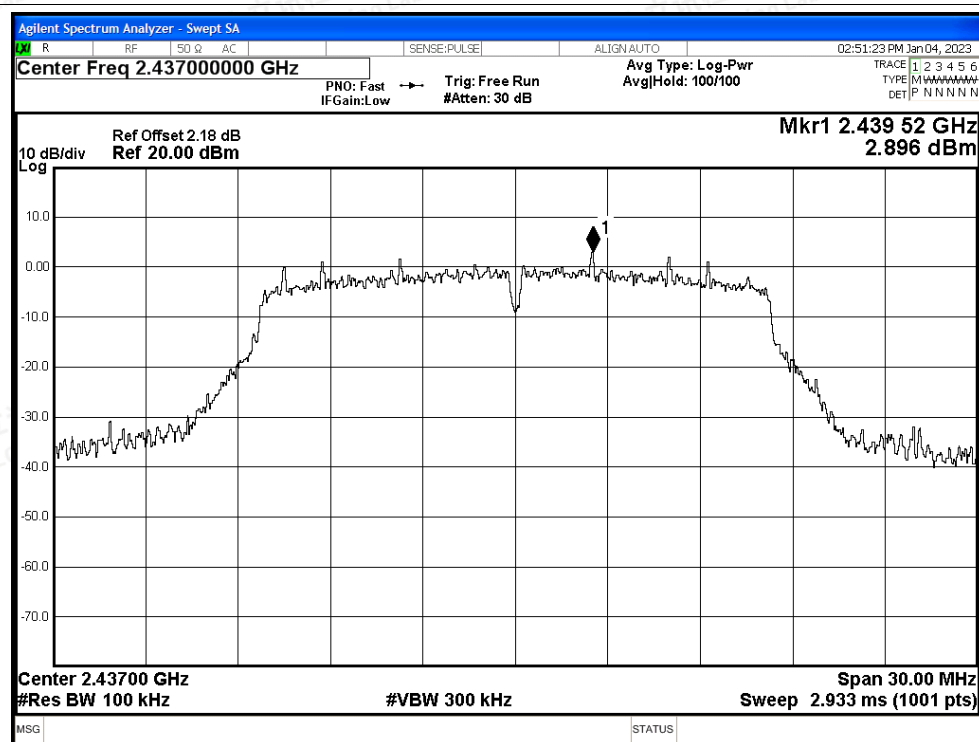


Tx. Spurious NVNT g 2412MHz Ant Emission

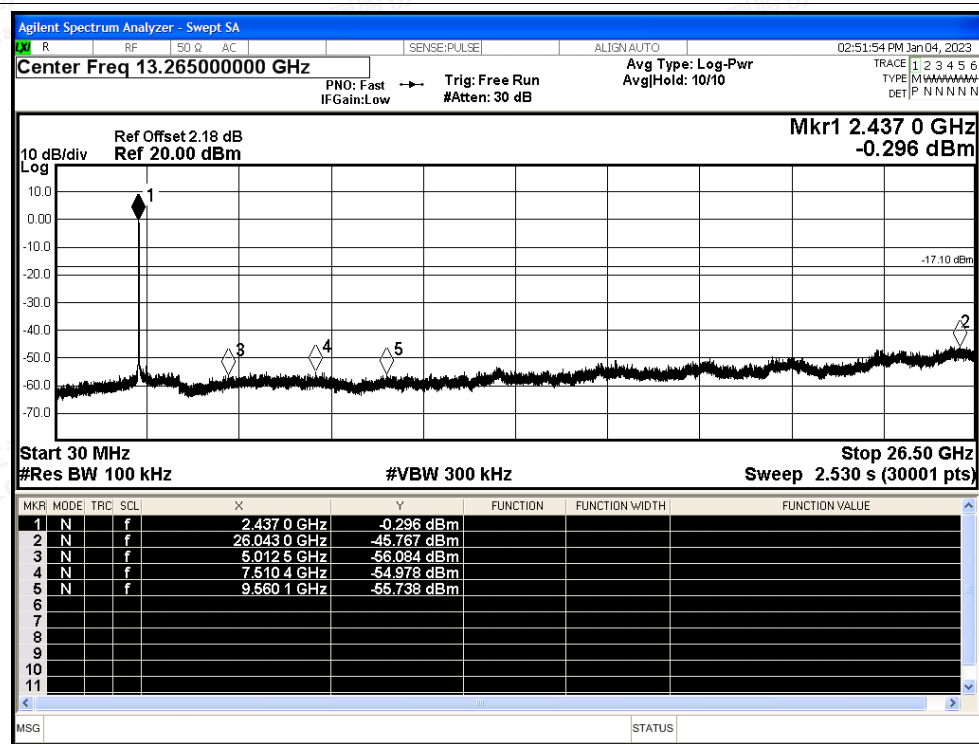




Tx. Spurious NVNT g 2437MHz Ant Ref

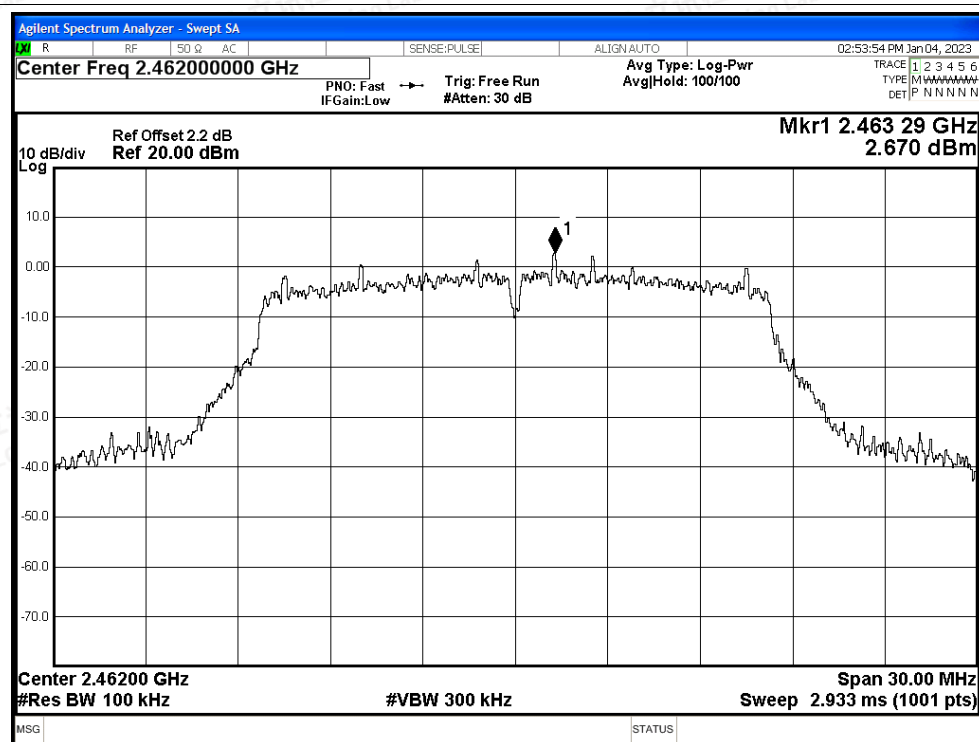


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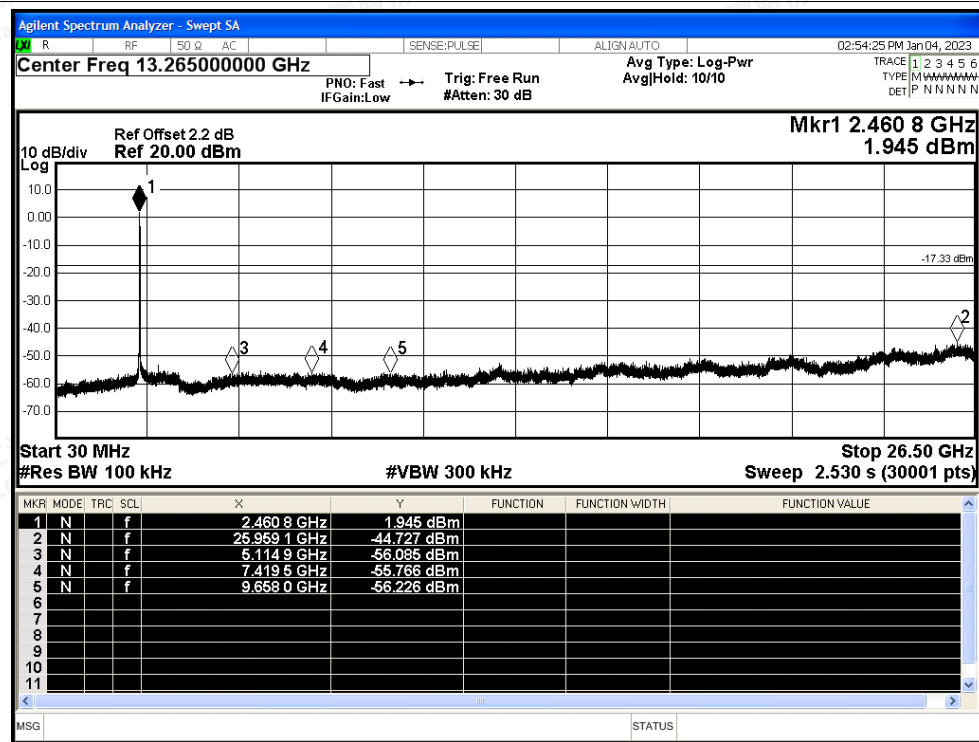




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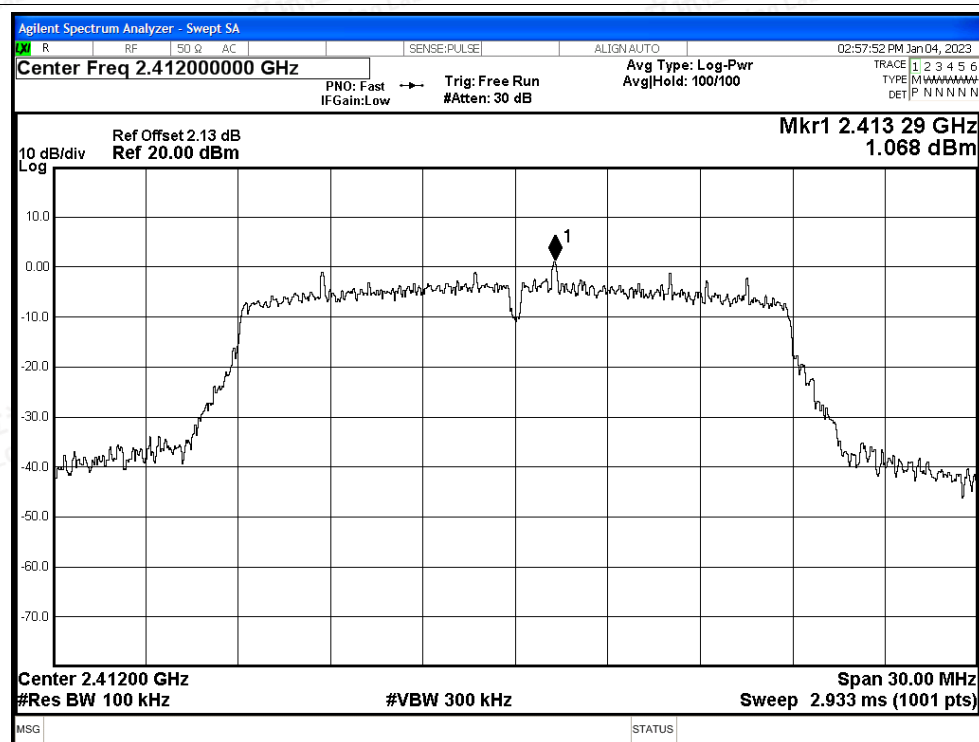


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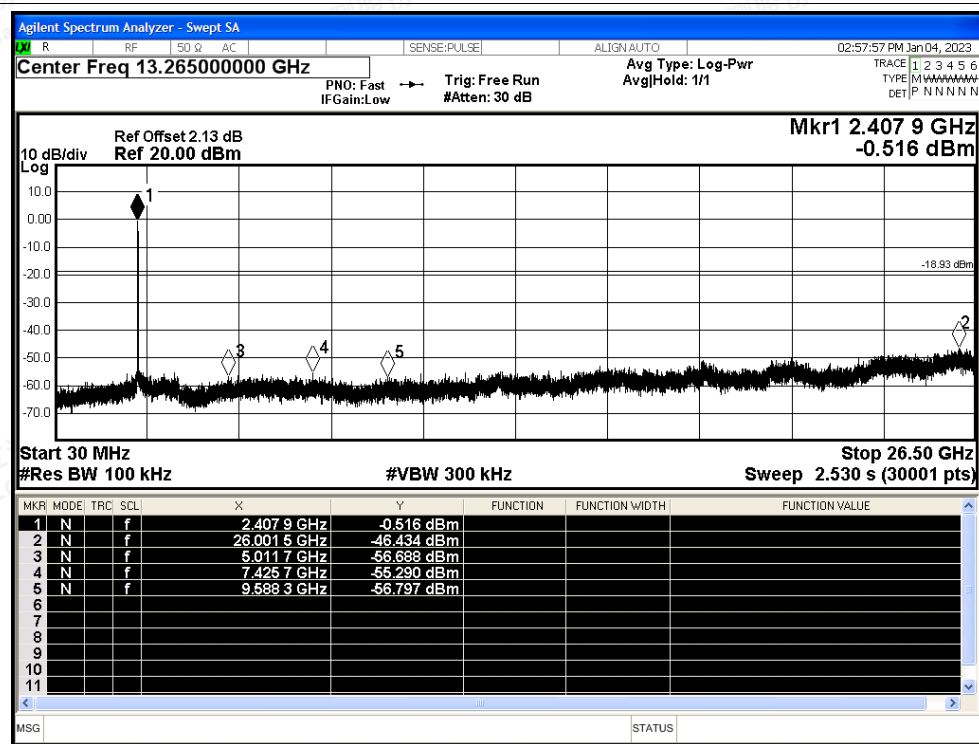




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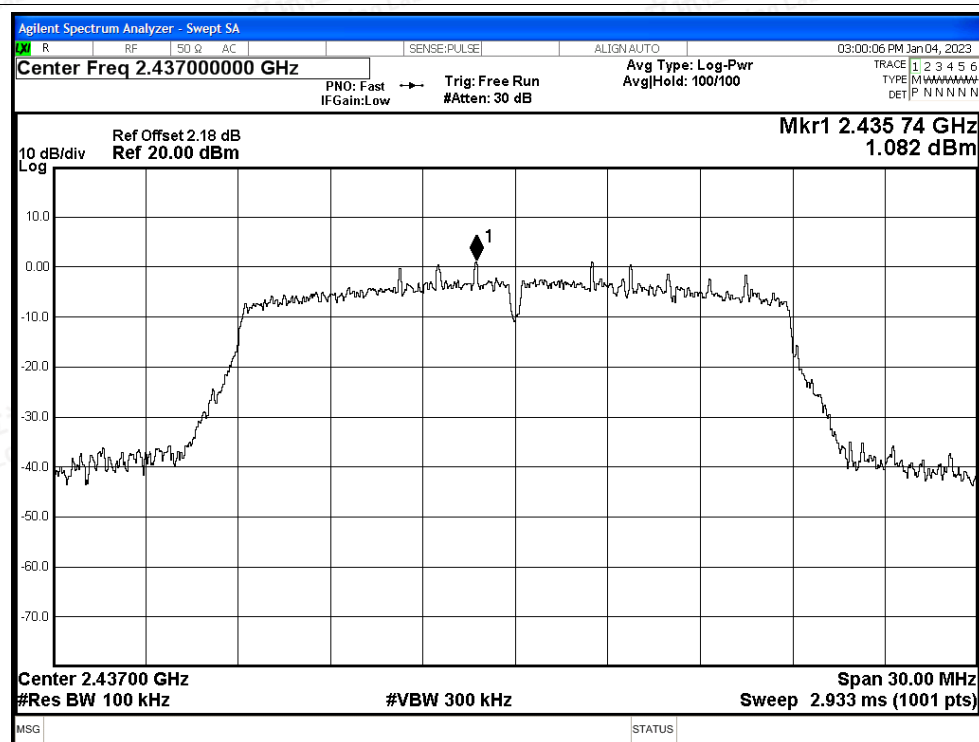


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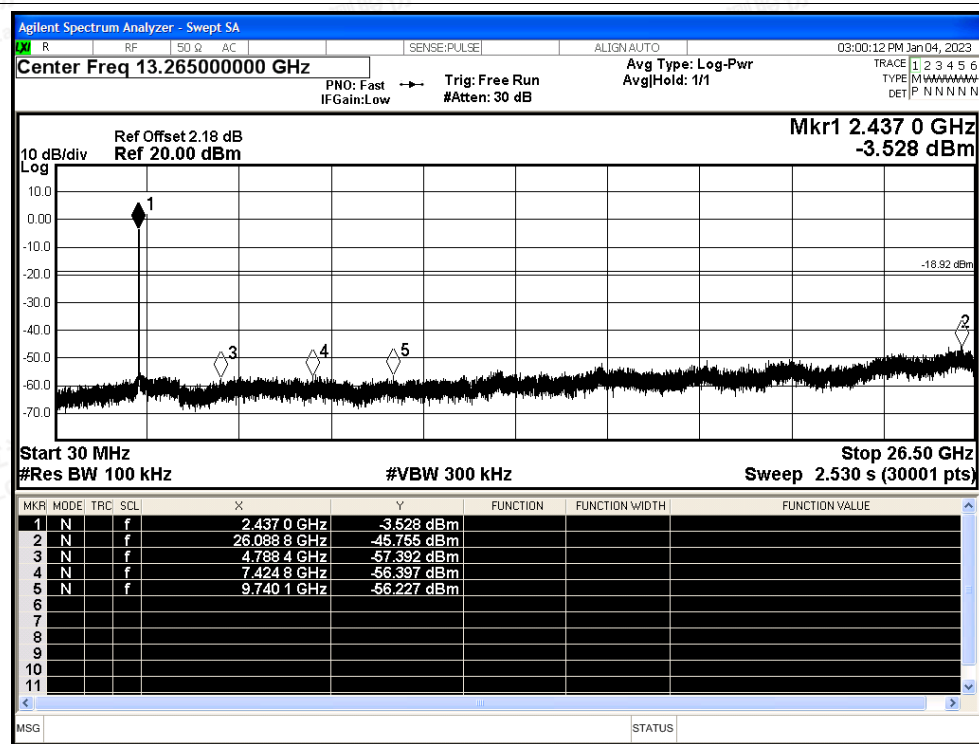




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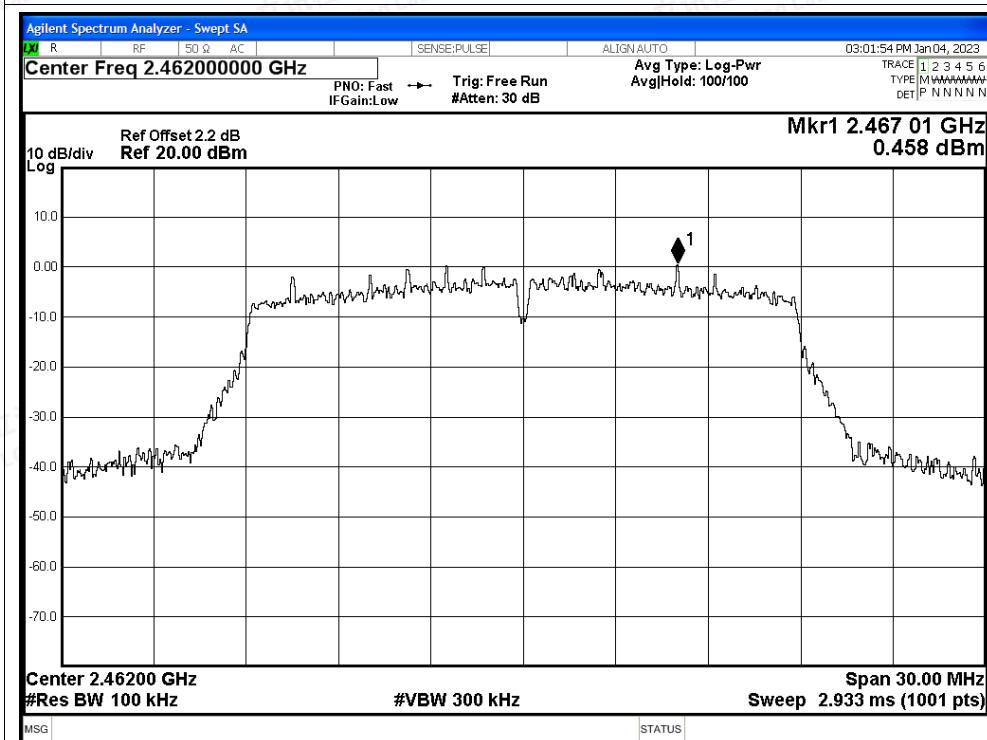


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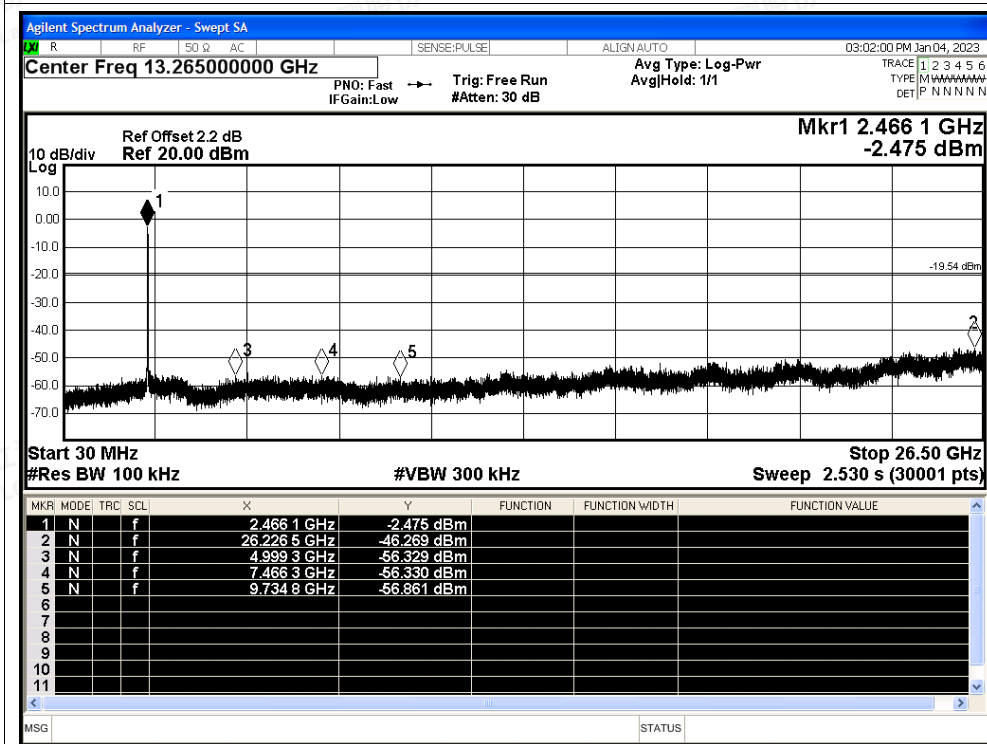




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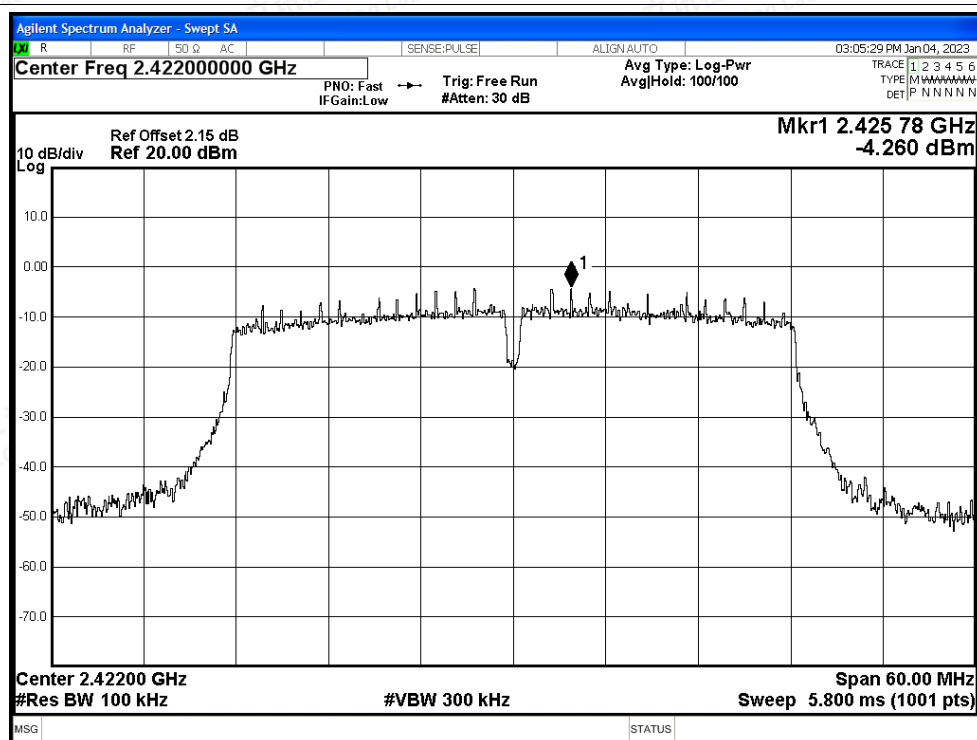


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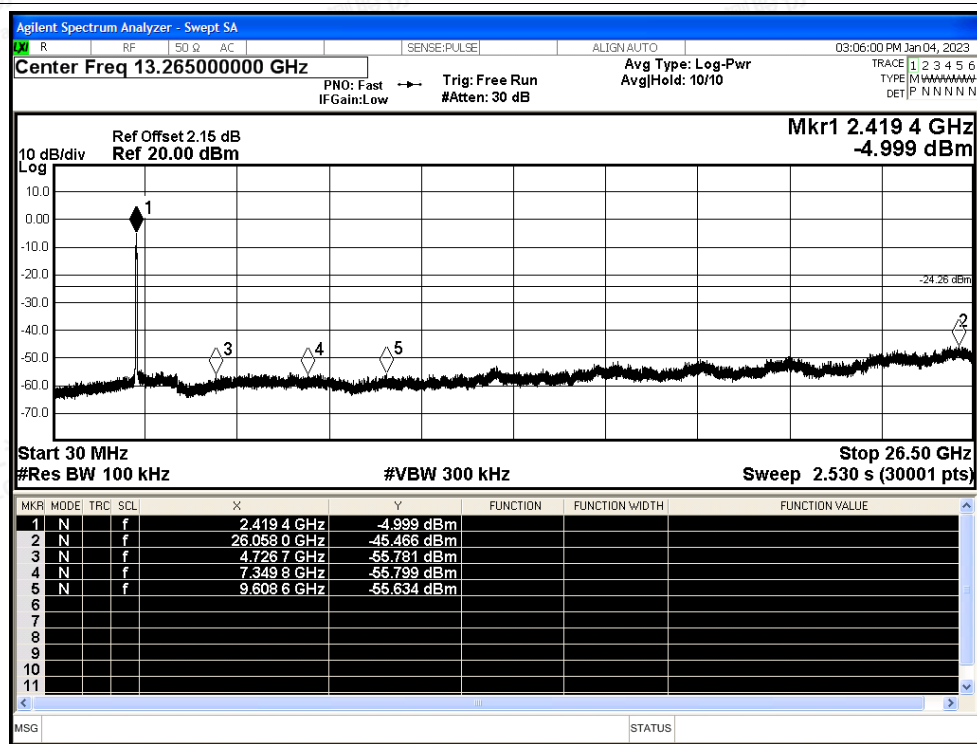




Tx. Spurious NVNT n40 2422MHz Ant Ref

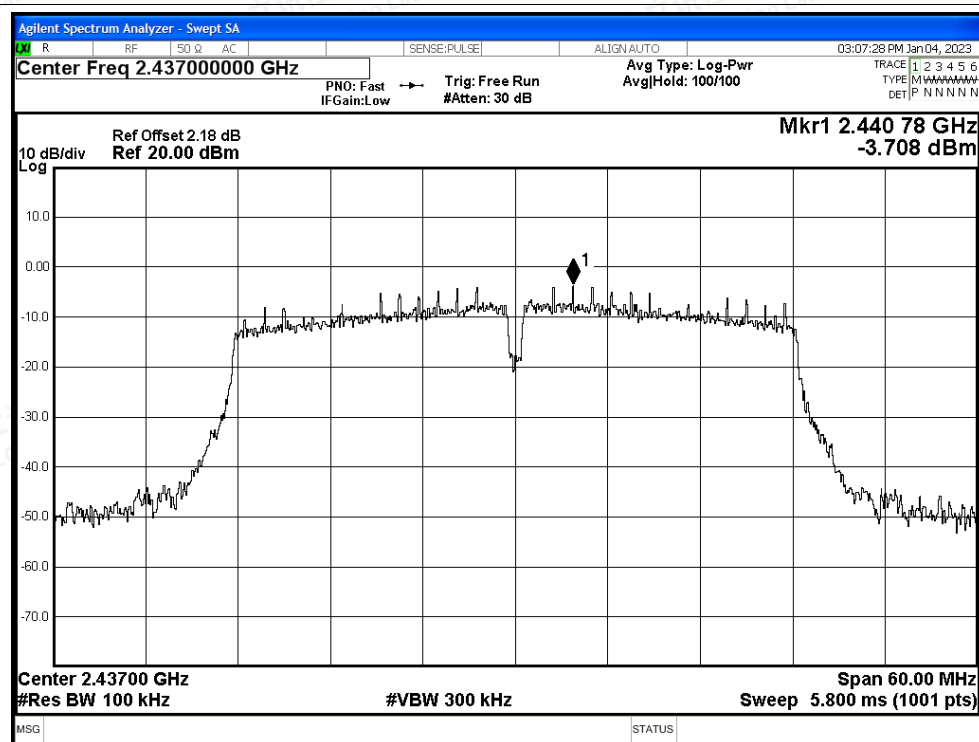


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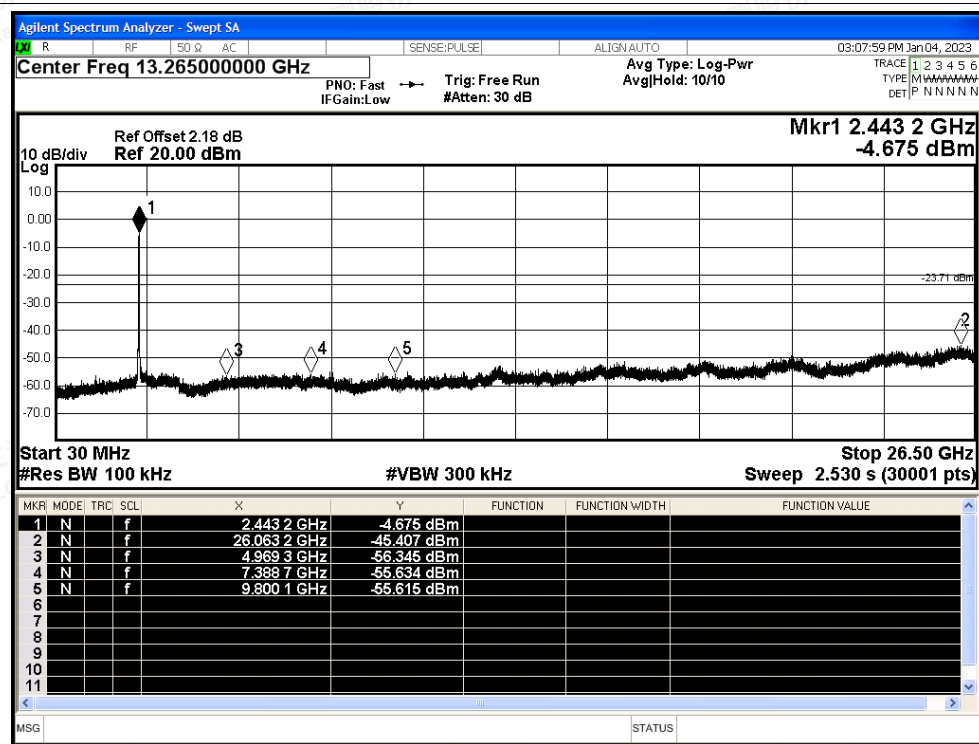




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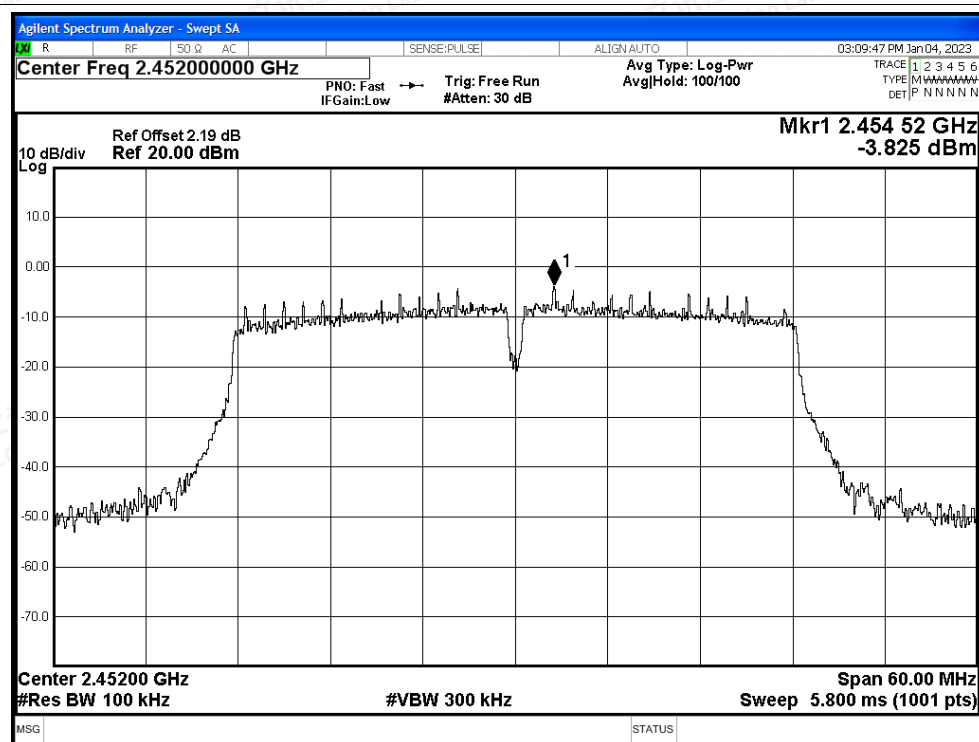


Tx. Spurious NVNT n40 2437MHz Ant Emission

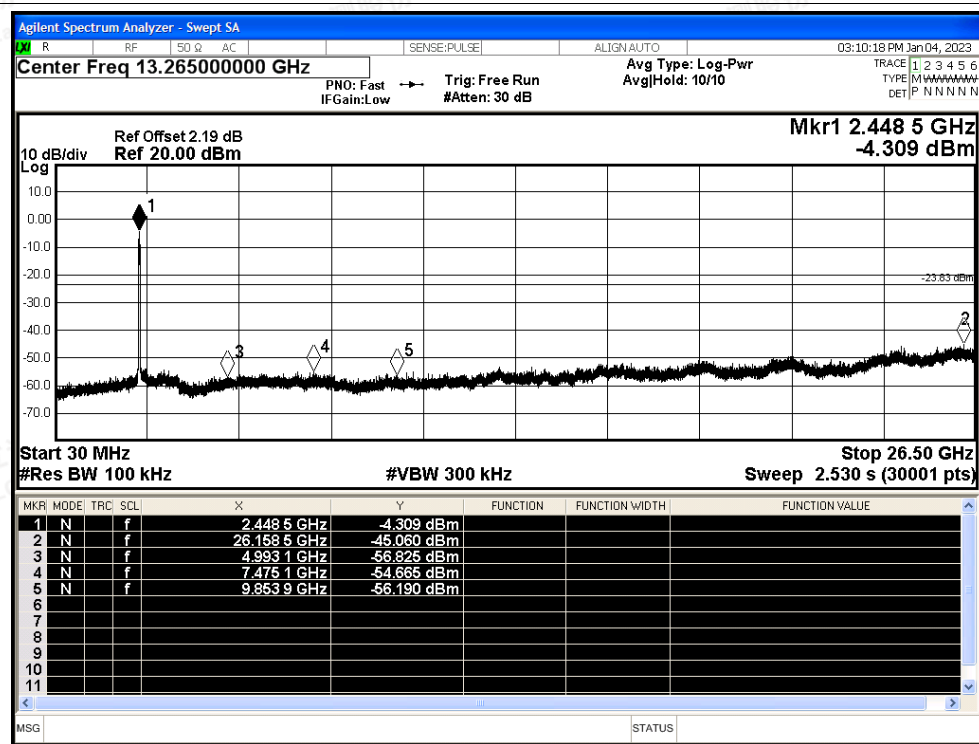




Tx. Spurious NVNT n40 2452MHz Ant Ref



Tx. Spurious NVNT n40 2452MHz Ant Emission





B.7 Duty Cycle

Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	b	2412	Ant	99.55	0	0.12
NVNT	b	2437	Ant	99.57	0	0.12
NVNT	b	2462	Ant	99.55	0	0.12
NVNT	g	2412	Ant	96.94	0.13	0.72
NVNT	g	2437	Ant	96.94	0.13	0.72
NVNT	g	2462	Ant	96.94	0.13	0.72
NVNT	n20	2412	Ant	96.7	0.15	0.78
NVNT	n20	2437	Ant	96.7	0.15	0.78
NVNT	n20	2462	Ant	96.55	0.15	0.78
NVNT	n40	2422	Ant	93.53	0.29	1.57
NVNT	n40	2437	Ant	93.53	0.29	1.57
NVNT	n40	2452	Ant	93.53	0.29	1.57

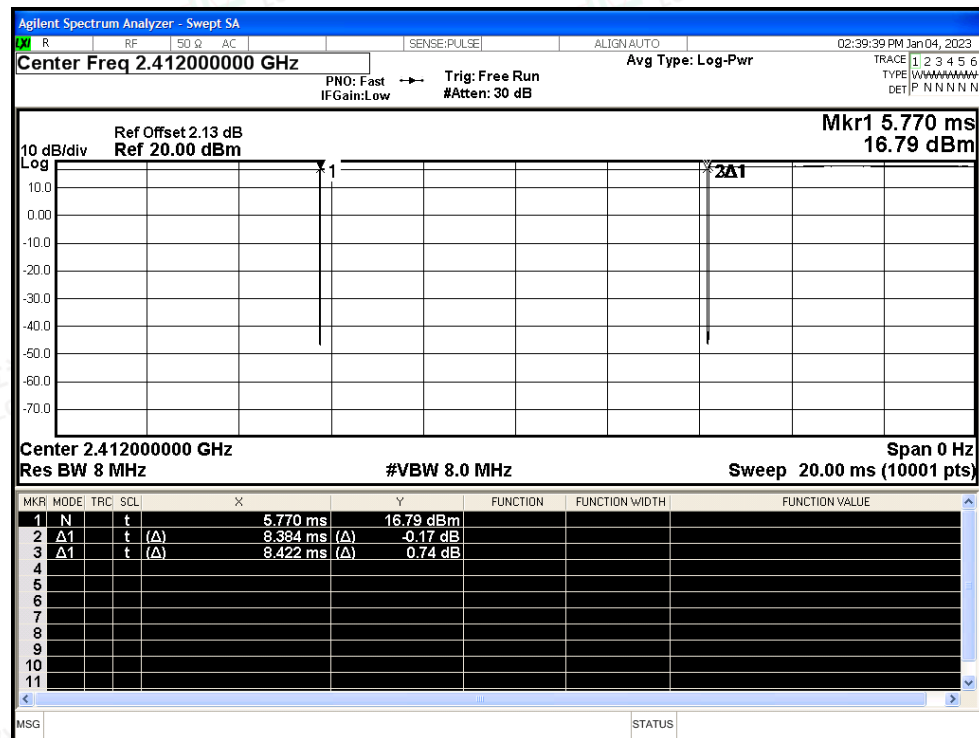


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Scan code to check authenticity

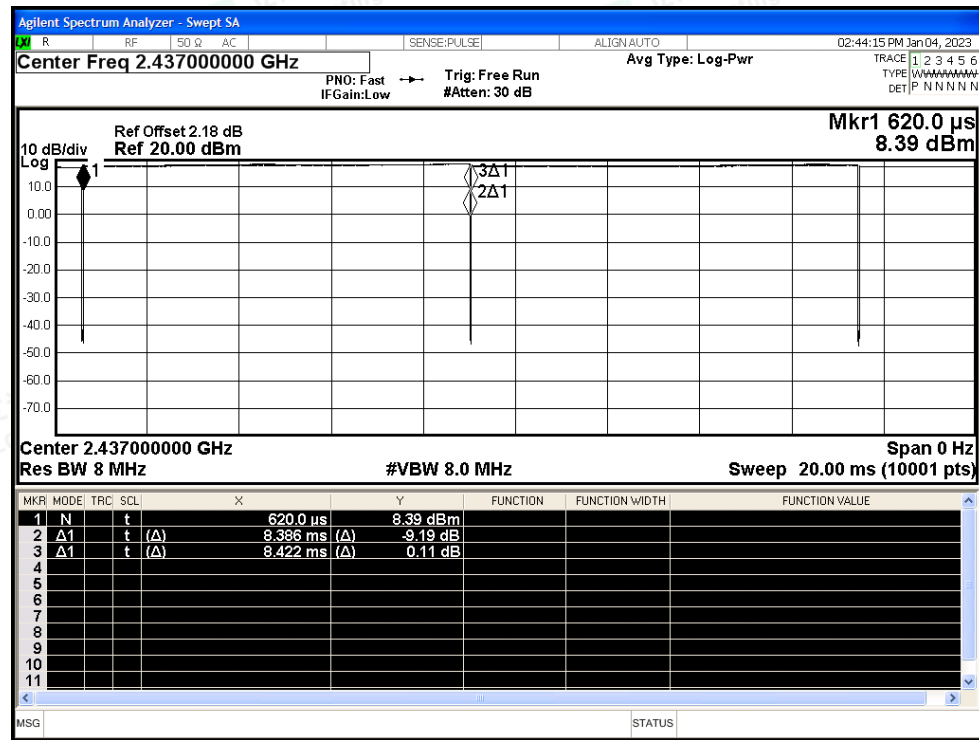


Test Graphs

Duty Cycle NVNT b 2412MHz Ant

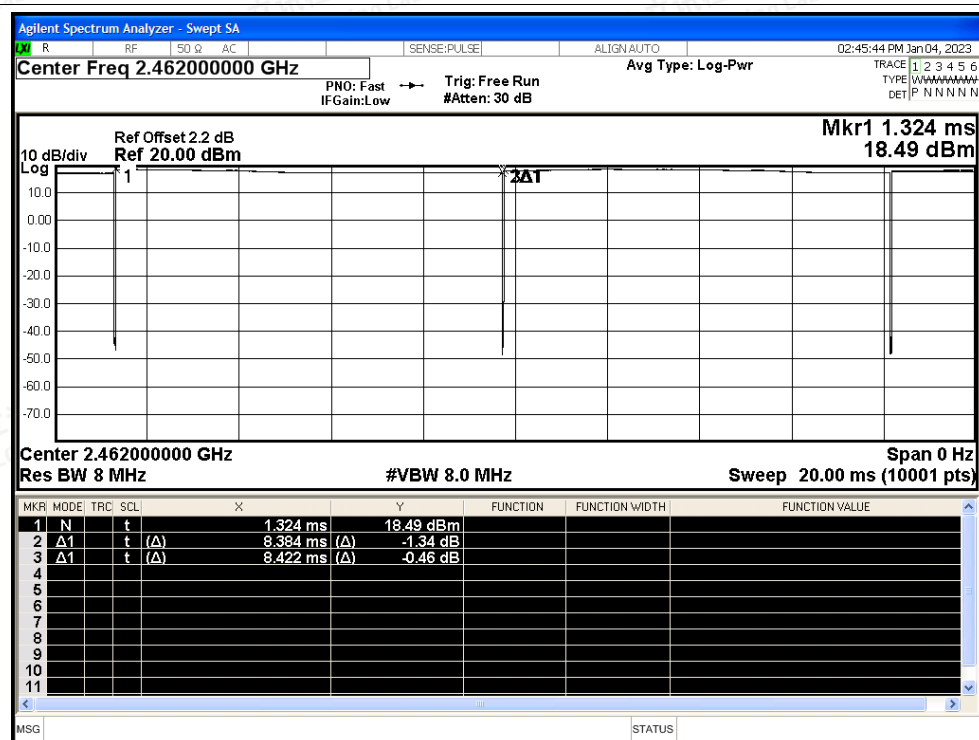


Duty Cycle NVNT b 2437MHz Ant

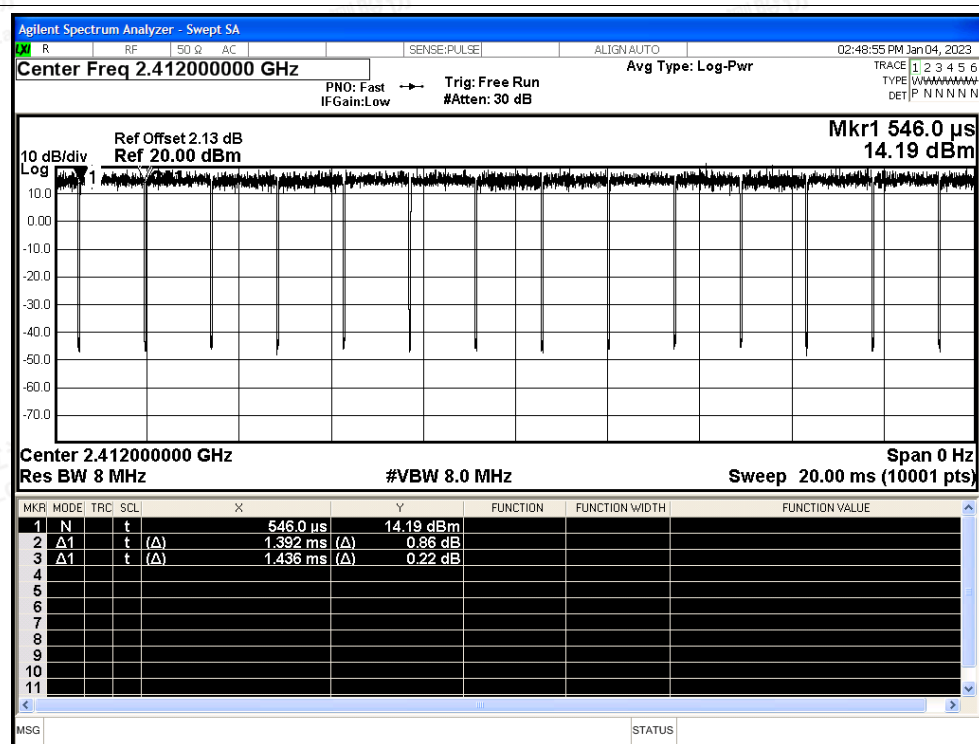




Duty Cycle NVNT b 2462MHz Ant

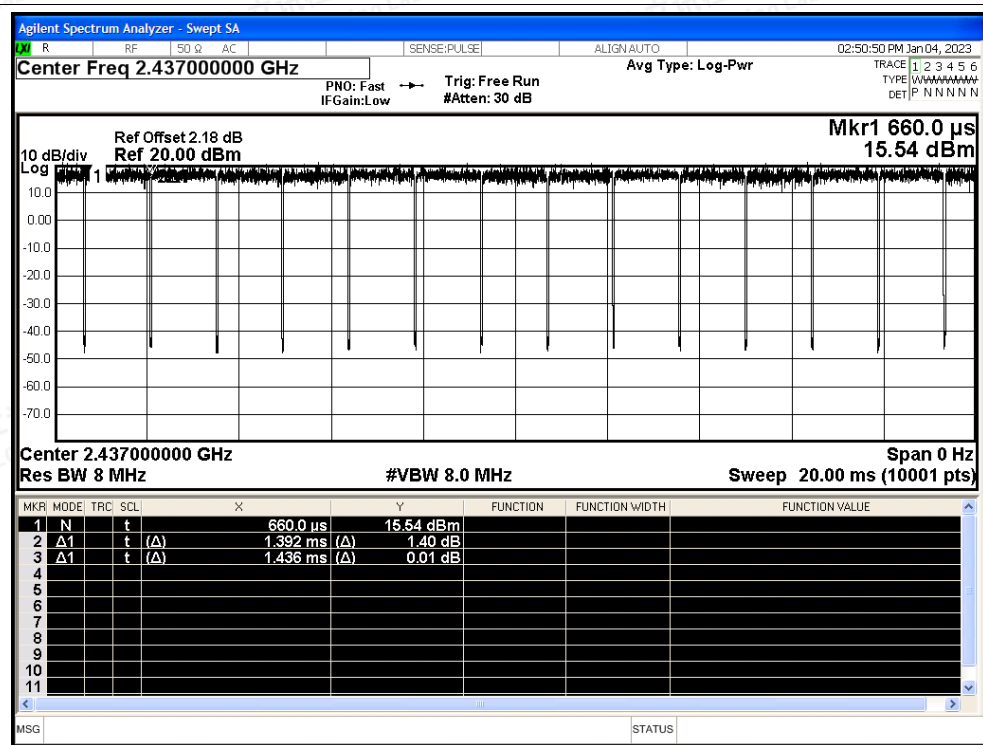


Duty Cycle NVNT g 2412MHz Ant

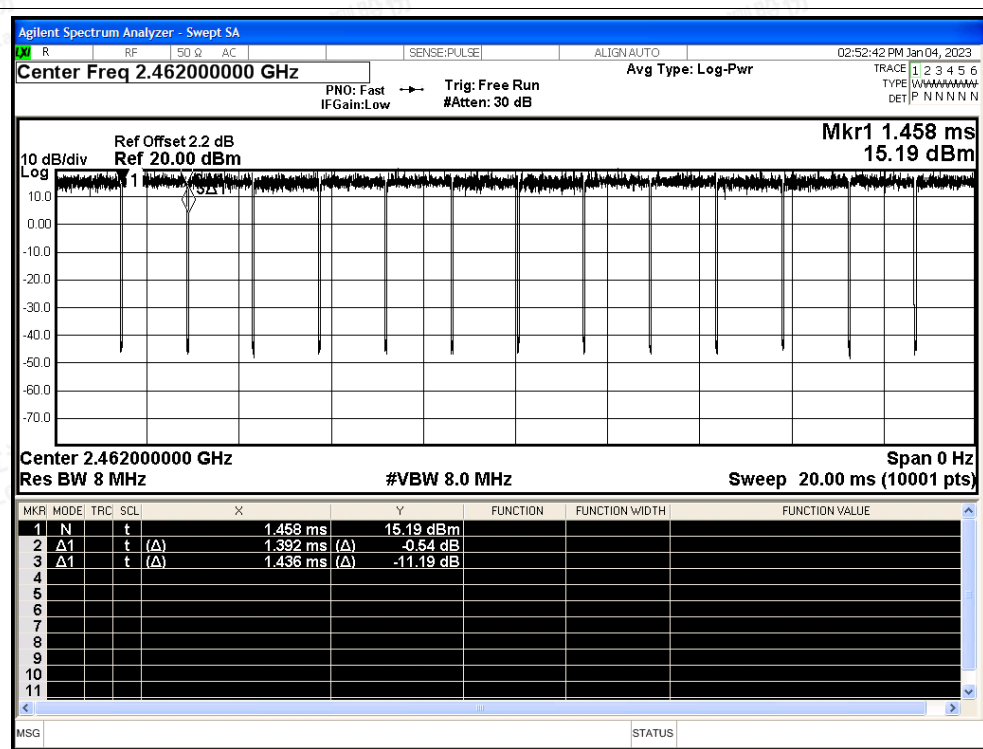




Duty Cycle NVNT g 2437MHz Ant

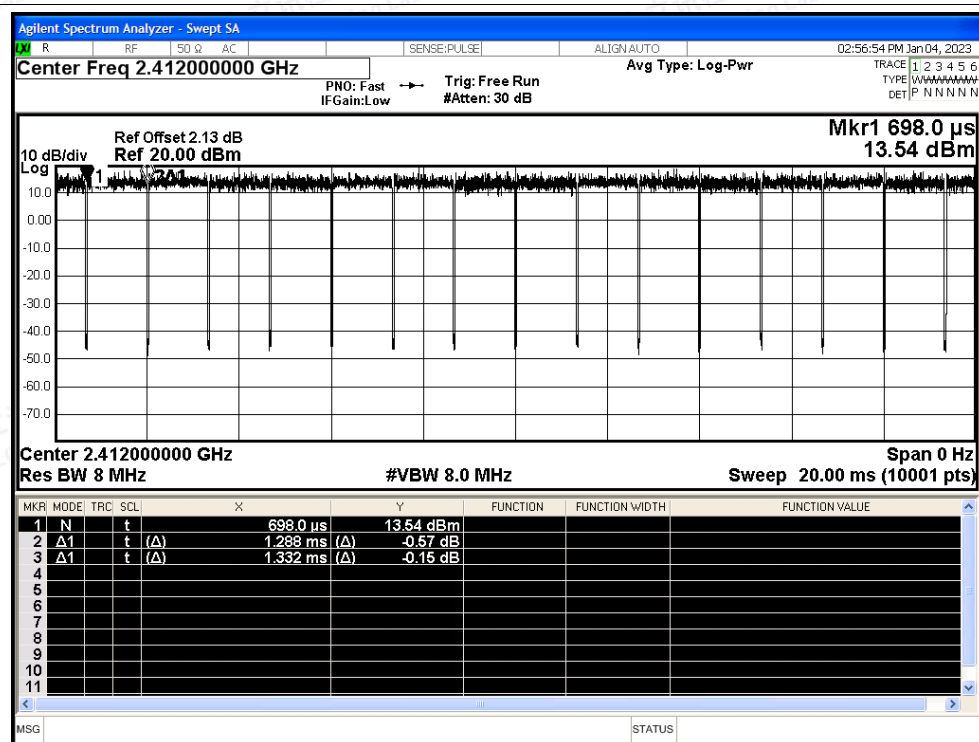


Duty Cycle NVNT g 2462MHz Ant

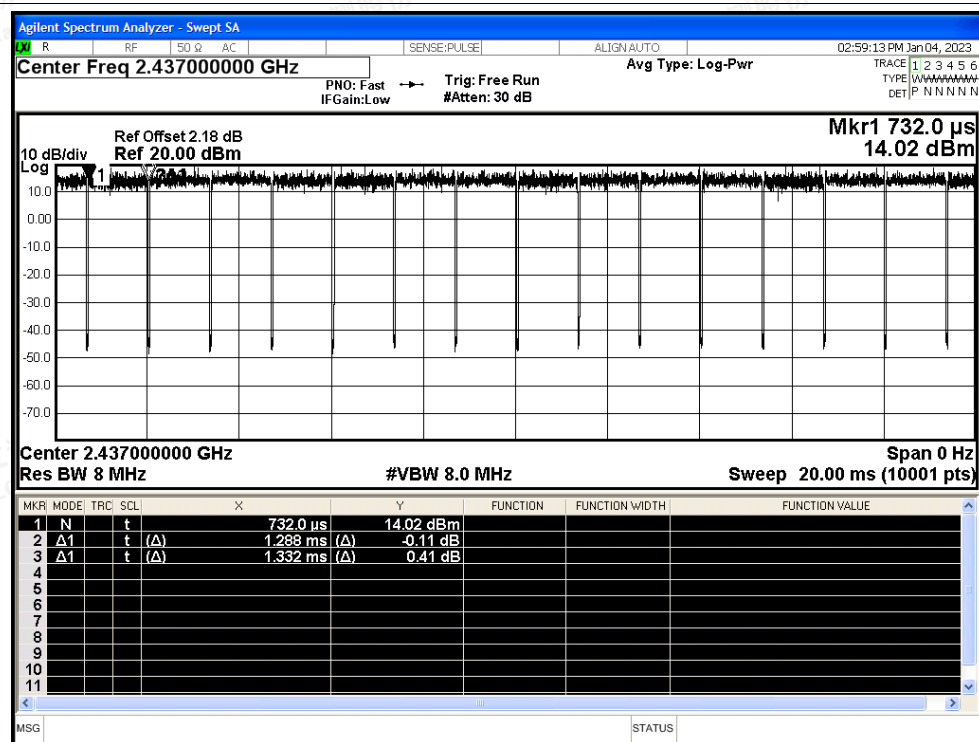




Duty Cycle NVNT n20 2412MHz Ant

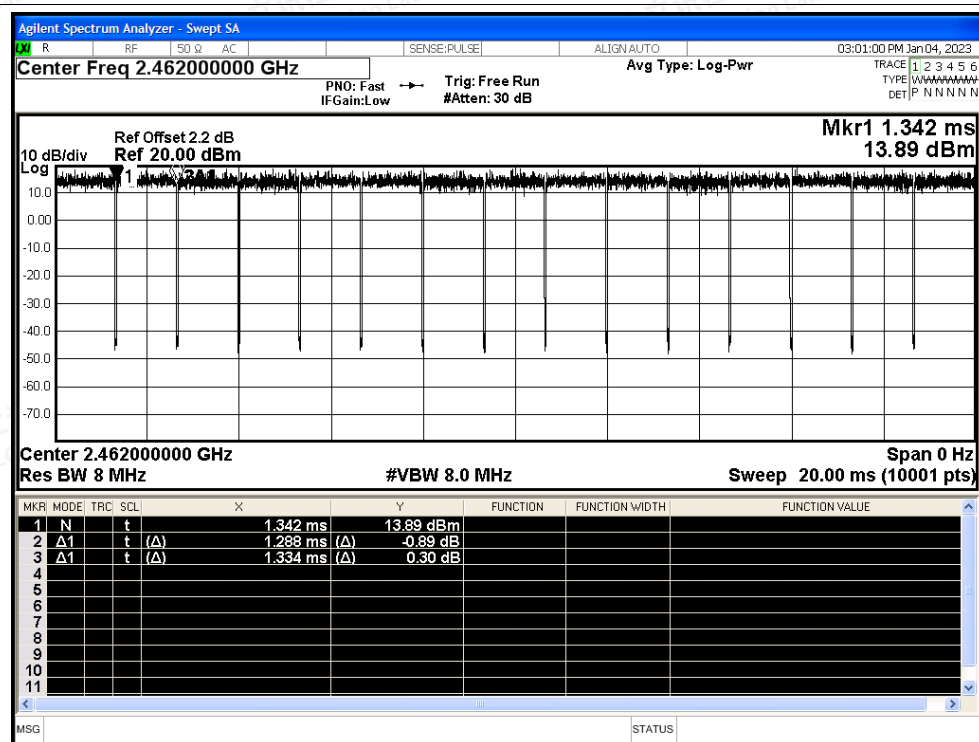


Duty Cycle NVNT n20 2437MHz Ant

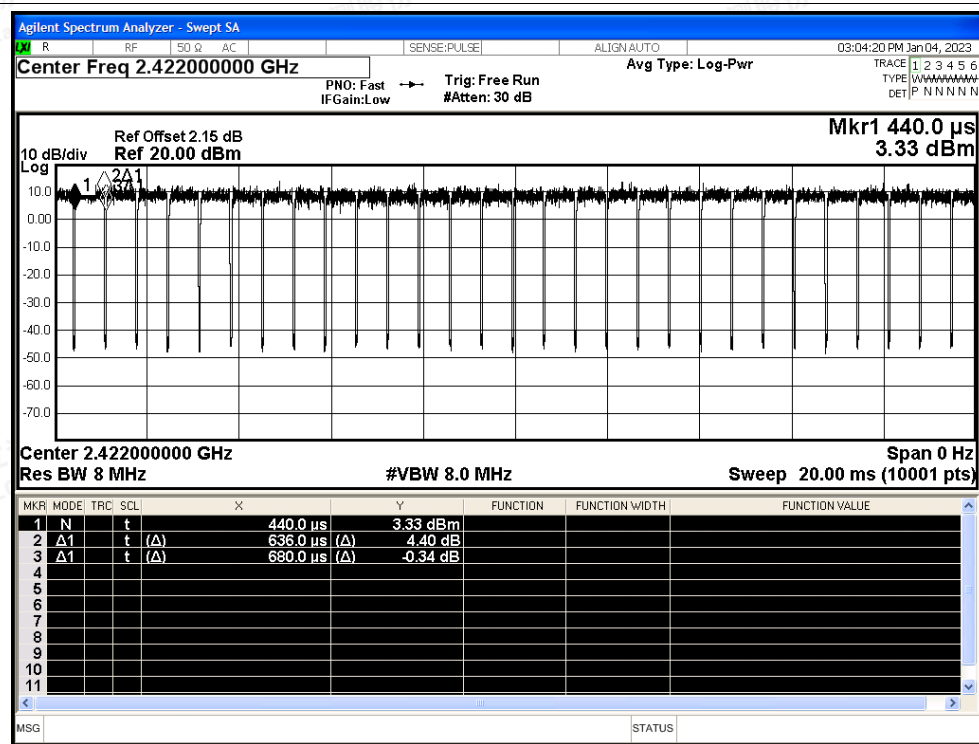




Duty Cycle NVNT n20 2462MHz Ant

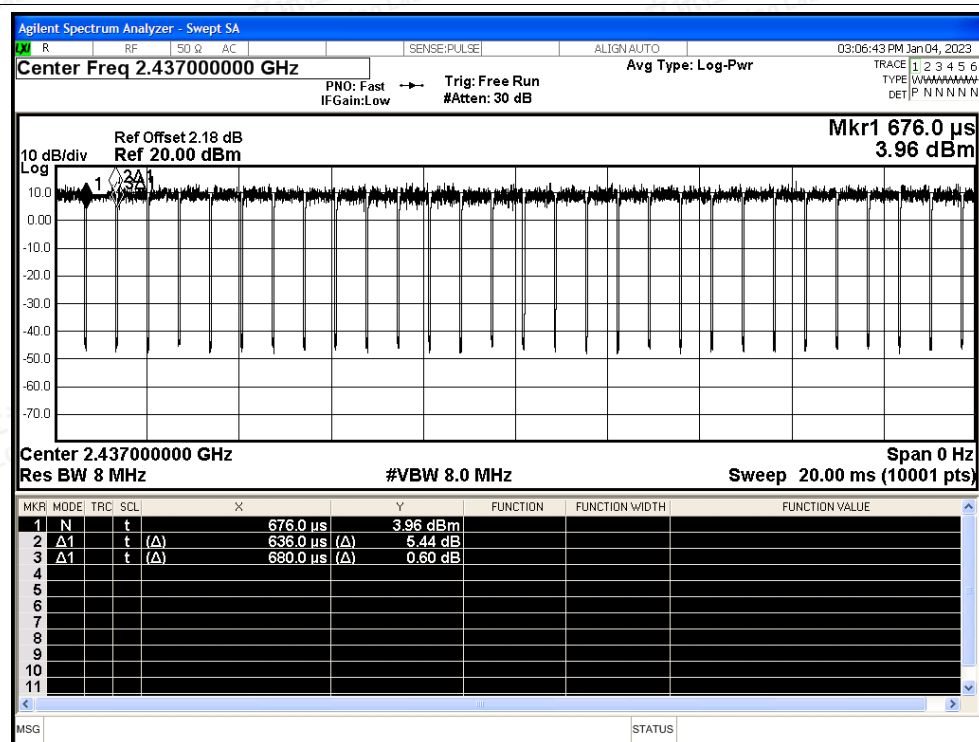


Duty Cycle NVNT n40 2422MHz Ant

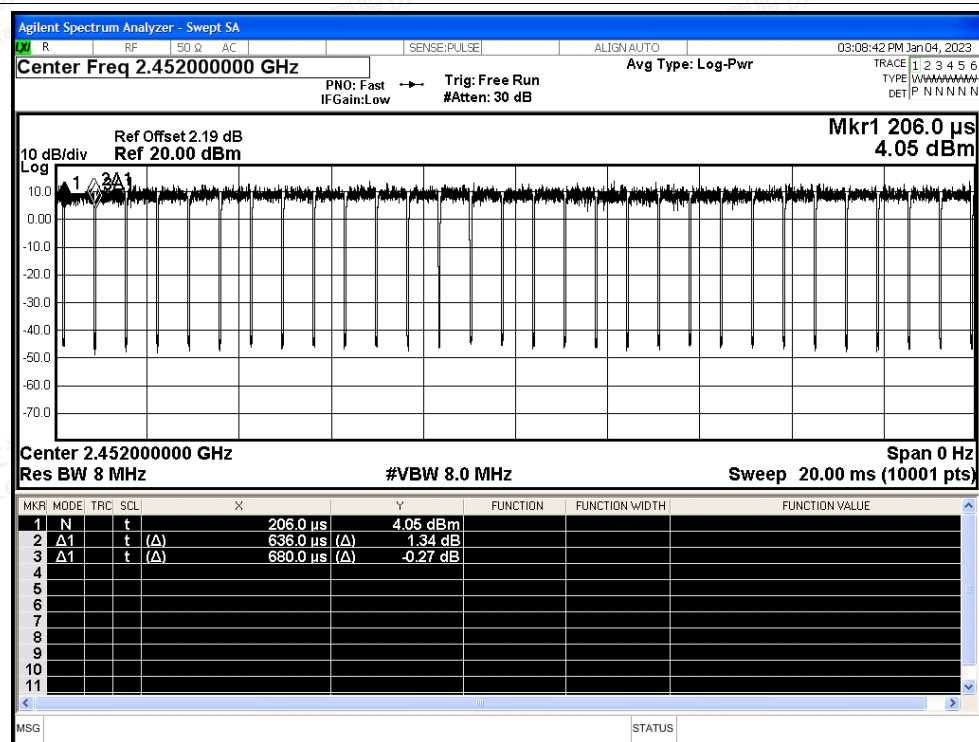




Duty Cycle NVNT n40 2437MHz Ant



Duty Cycle NVNT n40 2452MHz Ant





B.8 Restrict Band

Condition	Mode	Frequency (MHz)	Antenna	Spur Freq (MHz)	Power (dBm)	Gain (dBi)	E (dBuV/m)	Detector	Limit (dBuV/m)	Verdict
NVNT	b	2412	Ant	2310	-49.18	3.05	49.13	Peak	74	Pass
NVNT	b	2412	Ant	2310	-59.86	3.05	38.45	Average	54	Pass
NVNT	b	2412	Ant	2387.103	-44.66	3.05	53.65	Peak	74	Pass
NVNT	b	2412	Ant	2387.454	-56.05	3.05	42.26	Average	54	Pass
NVNT	b	2412	Ant	2390	-47.09	3.05	51.22	Peak	74	Pass
NVNT	b	2412	Ant	2390	-58.09	3.05	40.22	Average	54	Pass
NVNT	b	2462	Ant	2483.5	-46.22	3.05	52.09	Peak	74	Pass
NVNT	b	2462	Ant	2483.5	-57.51	3.05	40.80	Average	54	Pass
NVNT	b	2462	Ant	2487.969	-44.2	3.05	54.11	Peak	74	Pass
NVNT	b	2462	Ant	2487.704	-56.14	3.05	42.17	Average	54	Pass
NVNT	b	2462	Ant	2500	-47.44	3.05	50.87	Peak	74	Pass
NVNT	b	2462	Ant	2500	-57.48	3.05	40.83	Average	54	Pass
NVNT	g	2412	Ant	2310	-48.66	3.05	49.65	Peak	74	Pass
NVNT	g	2412	Ant	2310	-58.99	3.05	39.32	Average	54	Pass
NVNT	g	2412	Ant	2389.56	-36.63	3.05	61.68	Peak	74	Pass
NVNT	g	2412	Ant	2389.911	-51.4	3.05	46.91	Average	54	Pass
NVNT	g	2412	Ant	2390	-38.91	3.05	59.40	Peak	74	Pass
NVNT	g	2412	Ant	2390	-51.27	3.05	47.04	Average	54	Pass
NVNT	g	2462	Ant	2483.5	-39.24	3.05	59.07	Peak	74	Pass
NVNT	g	2462	Ant	2483.5	-50.14	3.05	48.17	Average	54	Pass
NVNT	g	2462	Ant	2484.206	-36.29	3.05	62.02	Peak	74	Pass
NVNT	g	2462	Ant	2483.517	-50.14	3.05	48.17	Average	54	Pass
NVNT	g	2462	Ant	2500	-45.33	3.05	52.98	Peak	74	Pass
NVNT	g	2462	Ant	2500	-55.04	3.05	43.27	Average	54	Pass
NVNT	n20	2412	Ant	2310	-49.15	3.05	49.16	Peak	74	Pass
NVNT	n20	2412	Ant	2310	-59.1	3.05	39.21	Average	54	Pass
NVNT	n20	2412	Ant	2389.794	-36.38	3.05	61.93	Peak	74	Pass
NVNT	n20	2412	Ant	2389.911	-51.19	3.05	47.12	Average	54	Pass
NVNT	n20	2412	Ant	2390	-39.39	3.05	58.92	Peak	74	Pass
NVNT	n20	2412	Ant	2390	-50.95	3.05	47.36	Average	54	Pass
NVNT	n20	2462	Ant	2483.5	-38.03	3.05	60.28	Peak	74	Pass
NVNT	n20	2462	Ant	2483.5	-50.82	3.05	47.49	Average	54	Pass
NVNT	n20	2462	Ant	2483.57	-36.41	3.05	61.90	Peak	74	Pass
NVNT	n20	2462	Ant	2483.623	-50.7	3.05	47.61	Average	54	Pass
NVNT	n20	2462	Ant	2500	-45.94	3.05	52.37	Peak	74	Pass
NVNT	n20	2462	Ant	2500	-56.05	3.05	42.26	Average	54	Pass
NVNT	n40	2422	Ant	2310	-50.53	3.05	47.78	Peak	74	Pass





NVNT	n40	2422	Ant	2310	-58.98	3.05	39.33	Average	54	Pass
NVNT	n40	2422	Ant	2388.952	-34.39	3.05	63.92	Peak	74	Pass
NVNT	n40	2422	Ant	2389.946	-50.78	3.05	47.53	Average	54	Pass
NVNT	n40	2422	Ant	2390	-41.49	3.05	56.82	Peak	74	Pass
NVNT	n40	2422	Ant	2390	-50.78	3.05	47.53	Average	54	Pass
NVNT	n40	2452	Ant	2483.5	-36.5	3.05	61.81	Peak	74	Pass
NVNT	n40	2452	Ant	2483.5	-51.49	3.05	46.82	Average	54	Pass
NVNT	n40	2452	Ant	2483.932	-32.88	3.05	65.43	Peak	74	Pass
NVNT	n40	2452	Ant	2483.698	-51.35	3.05	46.96	Average	54	Pass
NVNT	n40	2452	Ant	2500	-46.59	3.05	51.72	Peak	74	Pass
NVNT	n40	2452	Ant	2500	-56.03	3.05	42.28	Average	54	Pass

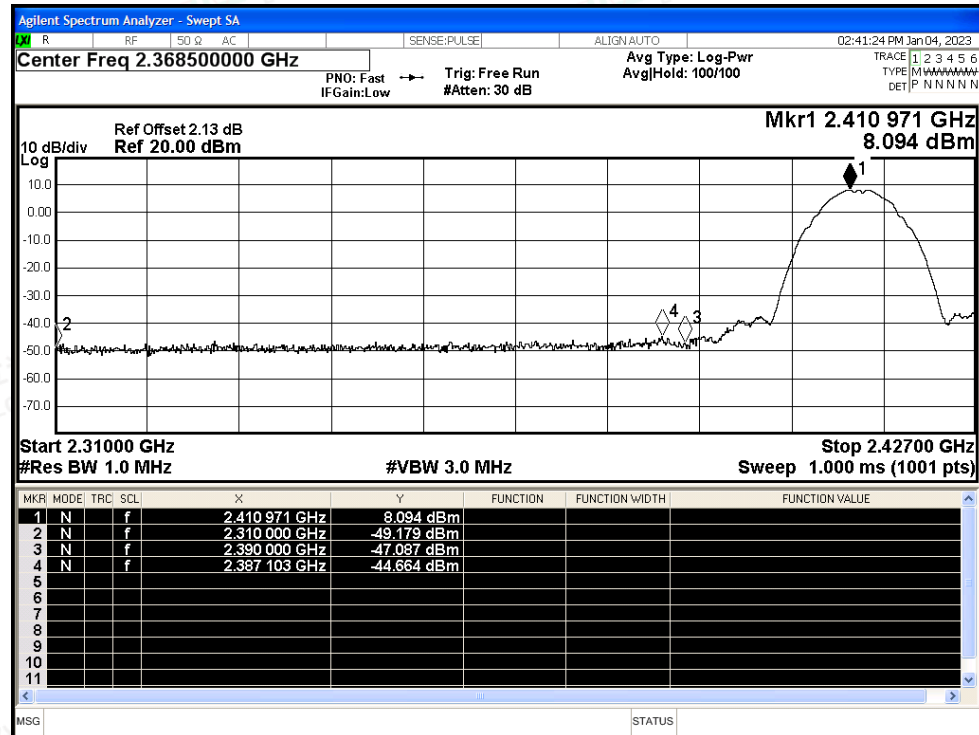


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Test Graphs

Restrict Band NVNT b 2412MHz Ant Peak

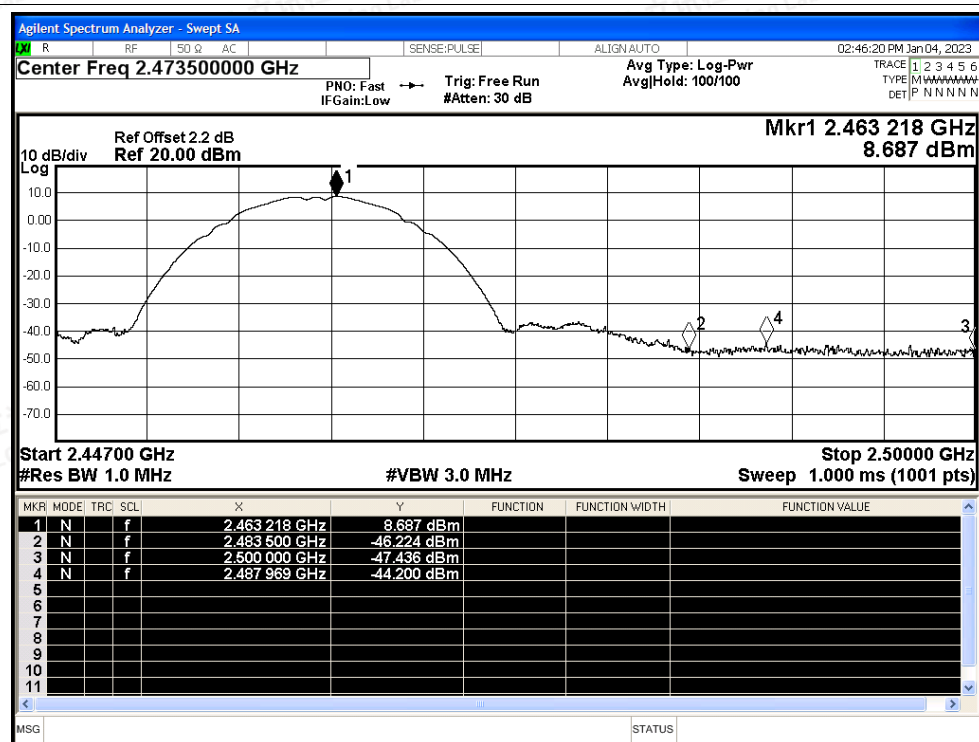


Restrict Band NVNT b 2412MHz Ant Average

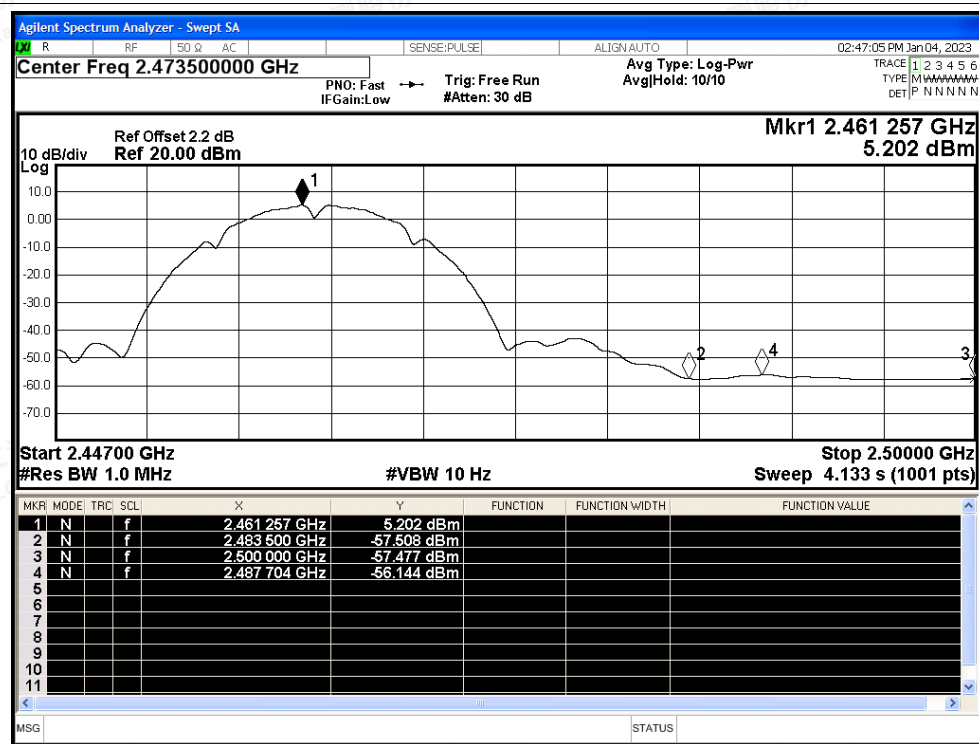


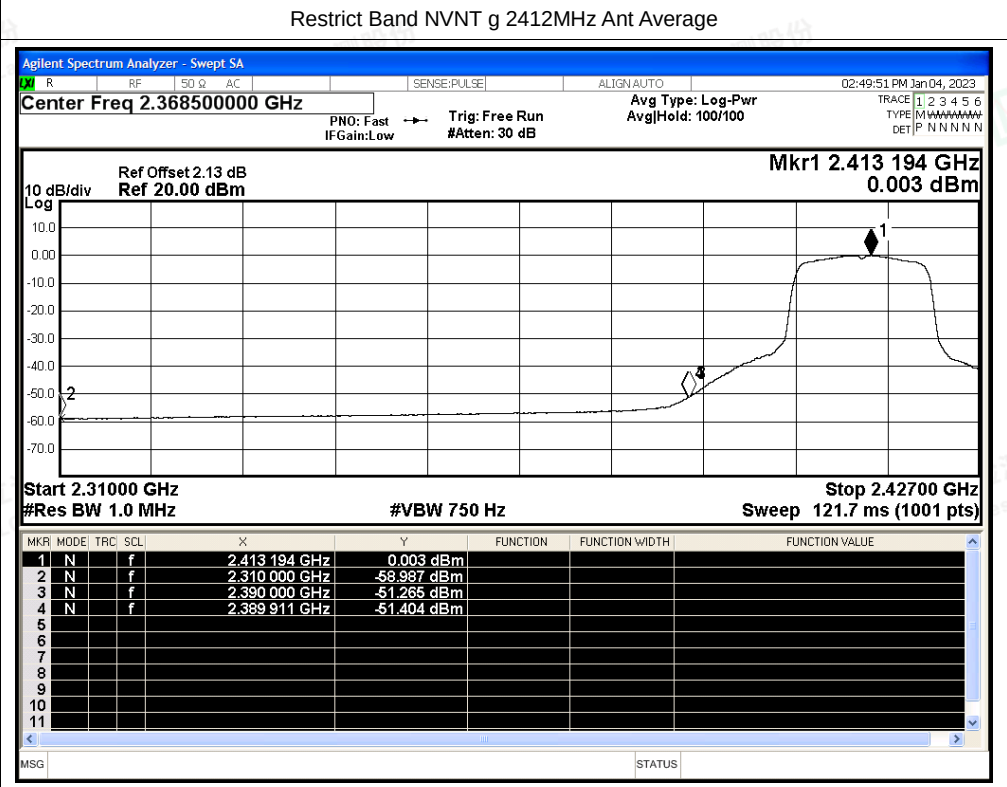
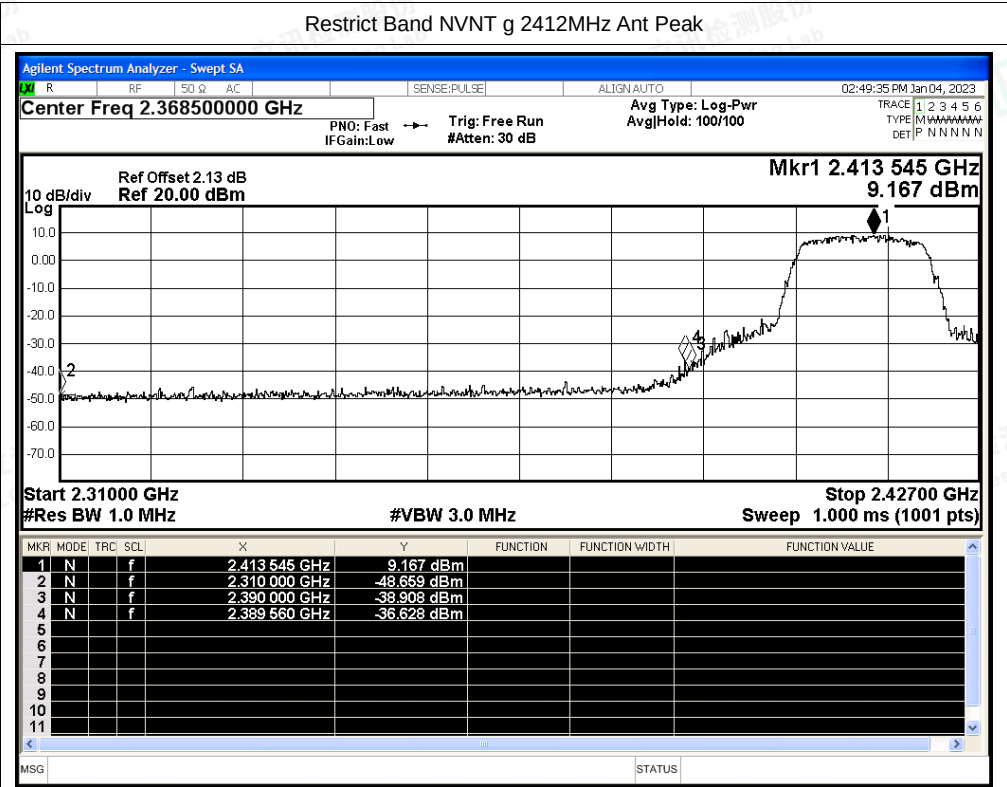


Restrict Band NVNT b 2462MHz Ant Peak



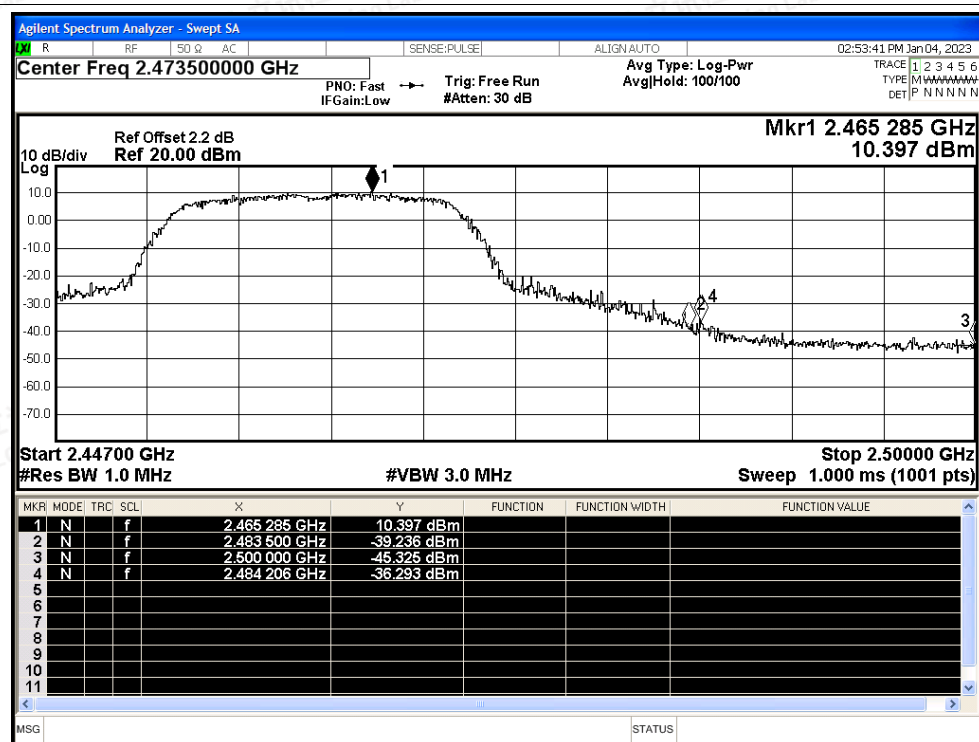
Restrict Band NVNT b 2462MHz Ant Average



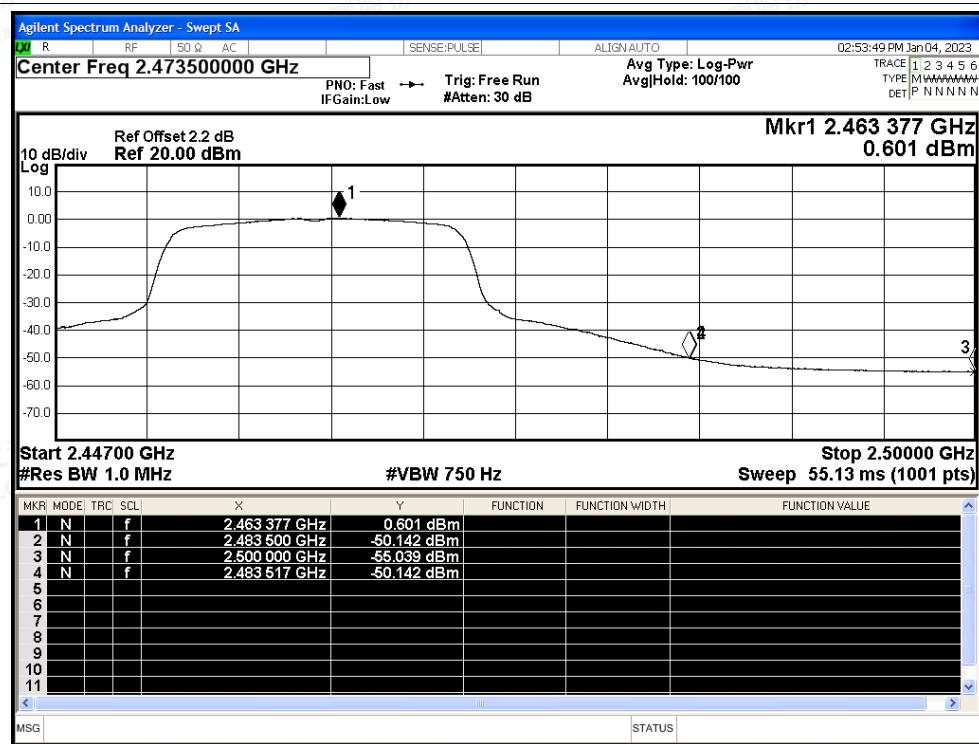




Restrict Band NVNT g 2462MHz Ant Peak

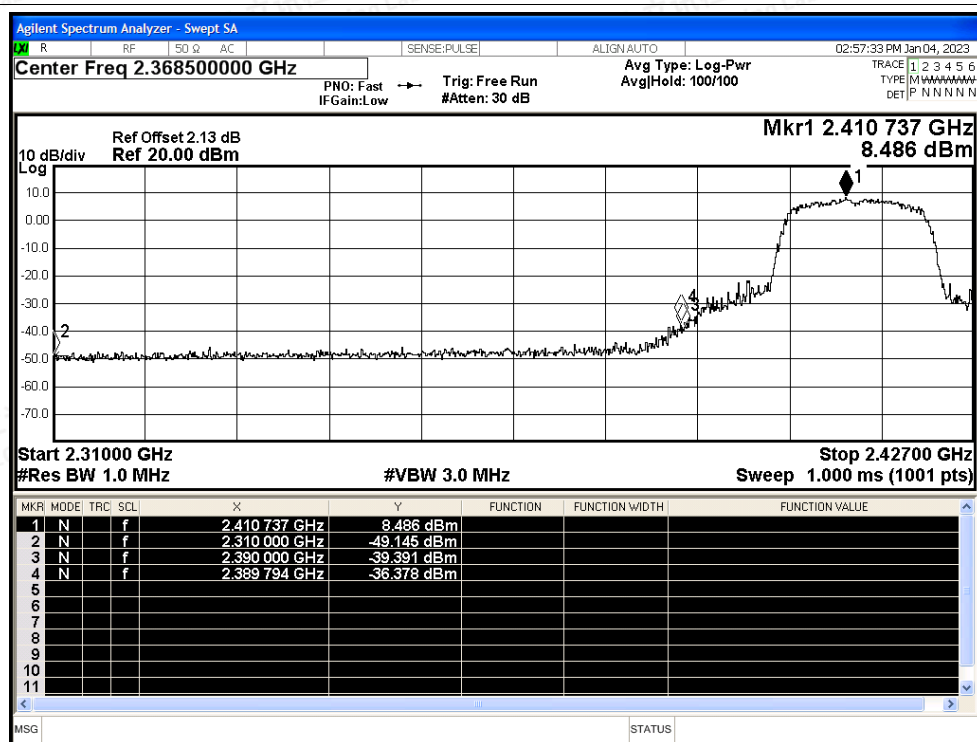


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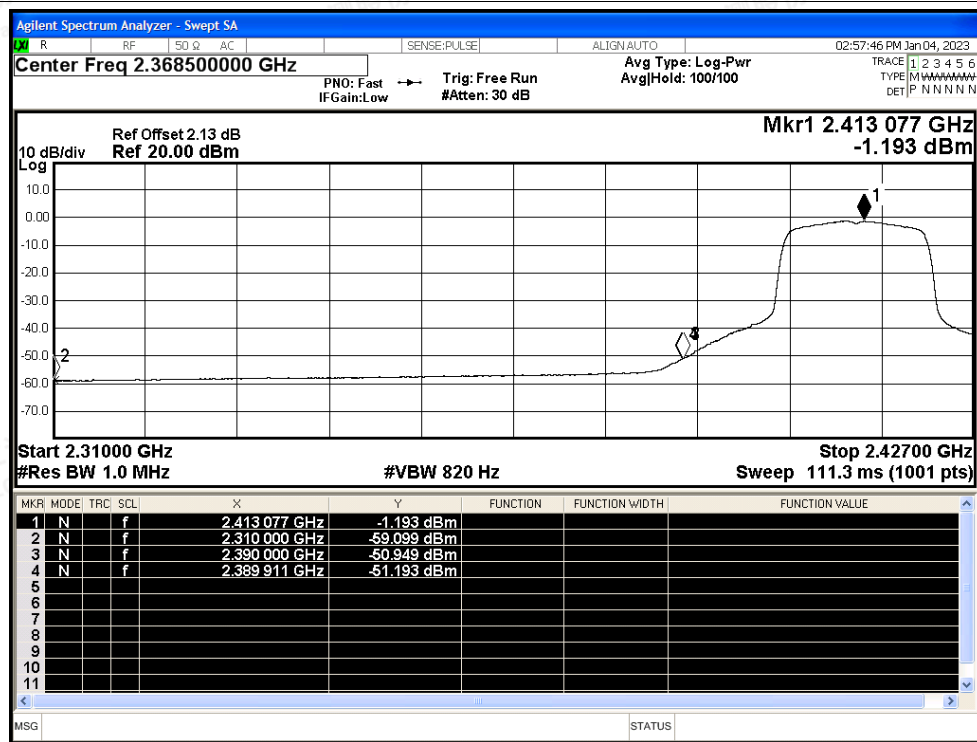




Restrict Band NVNT n20 2412MHz Ant Peak

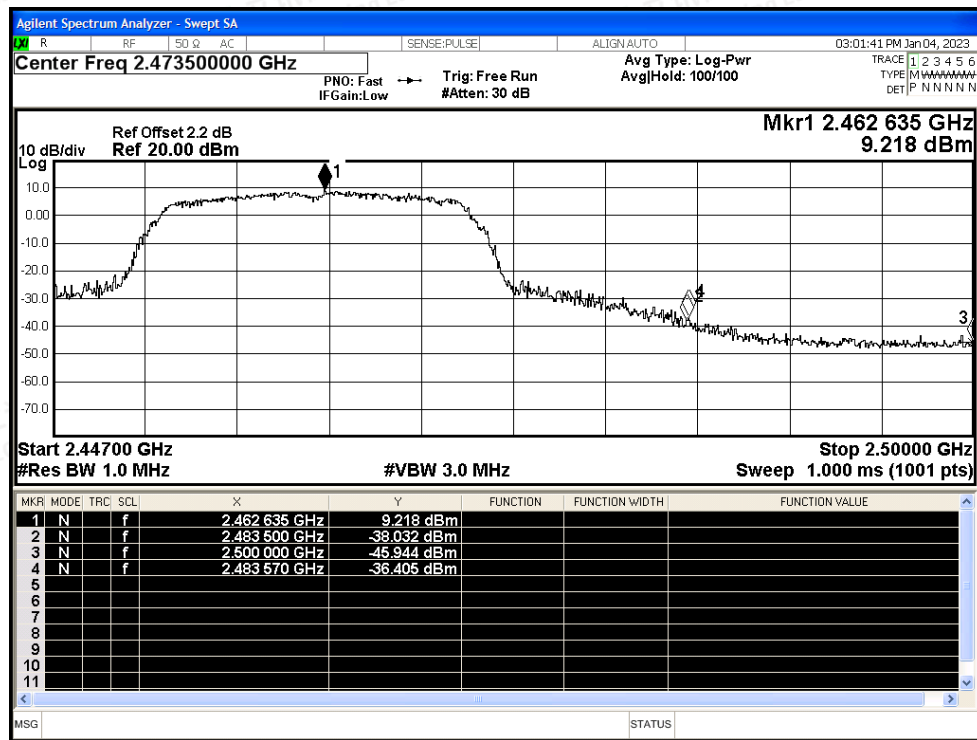


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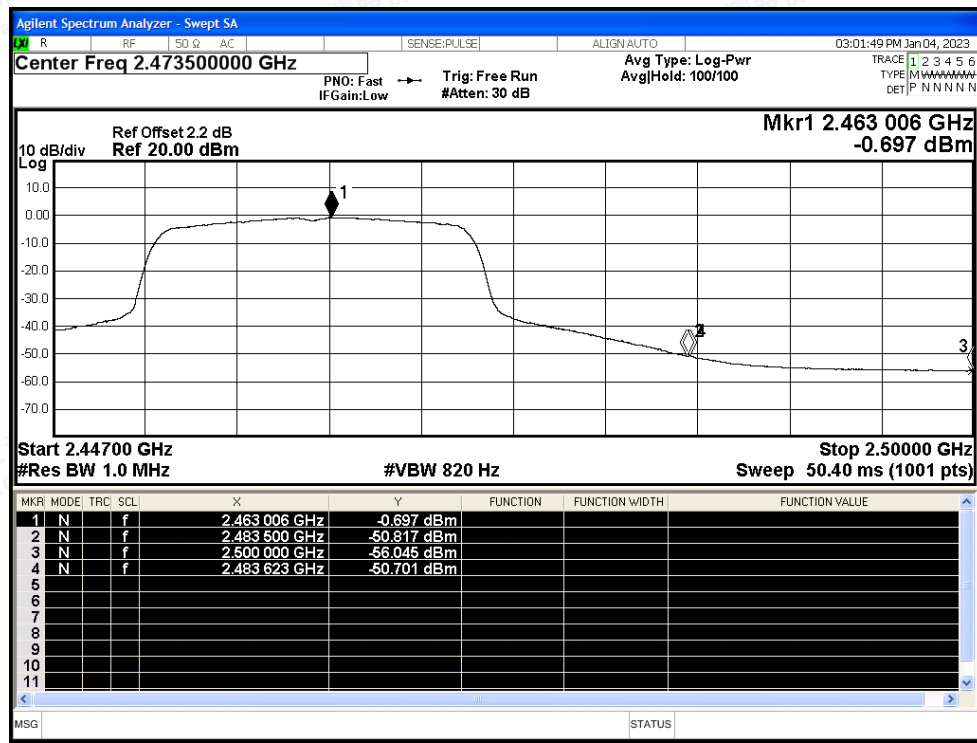




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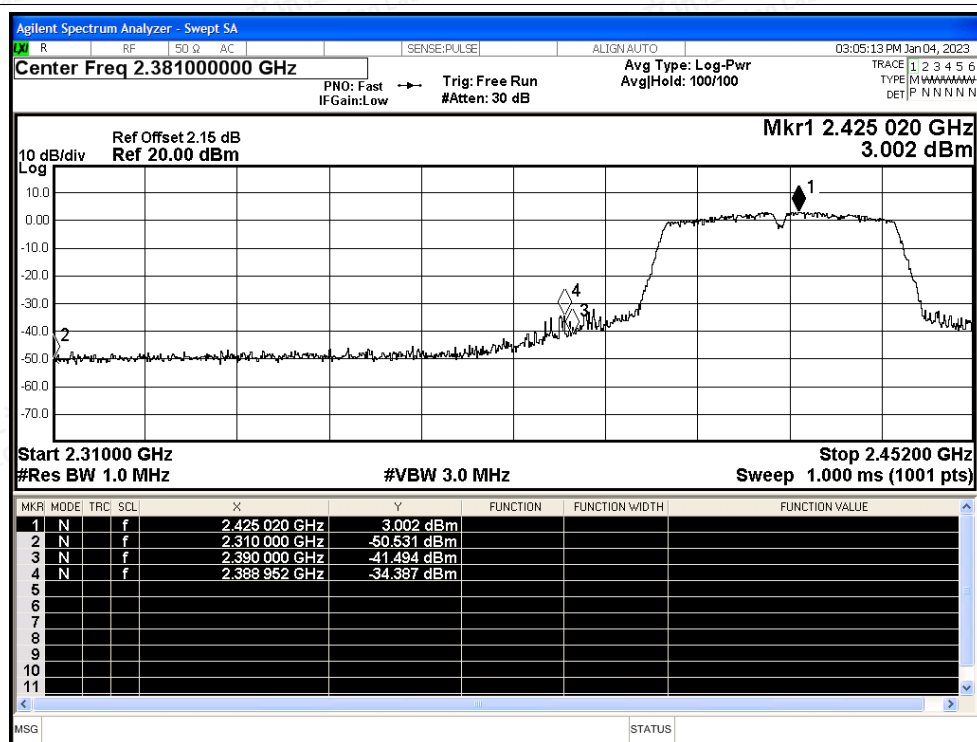


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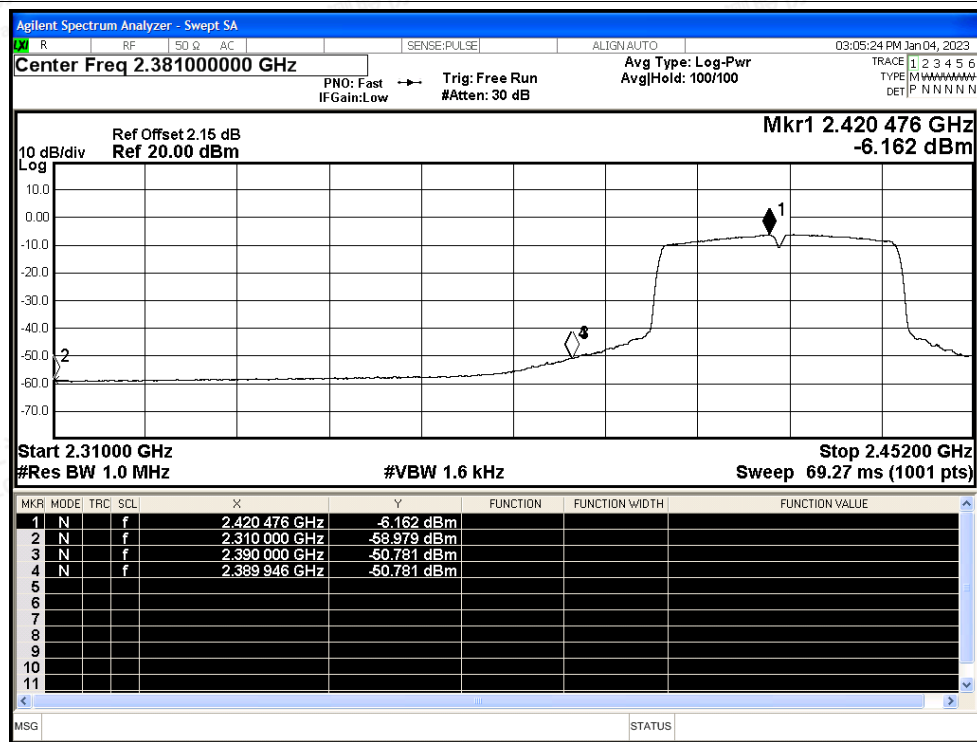




Restrict Band NVNT n40 2422MHz Ant Peak

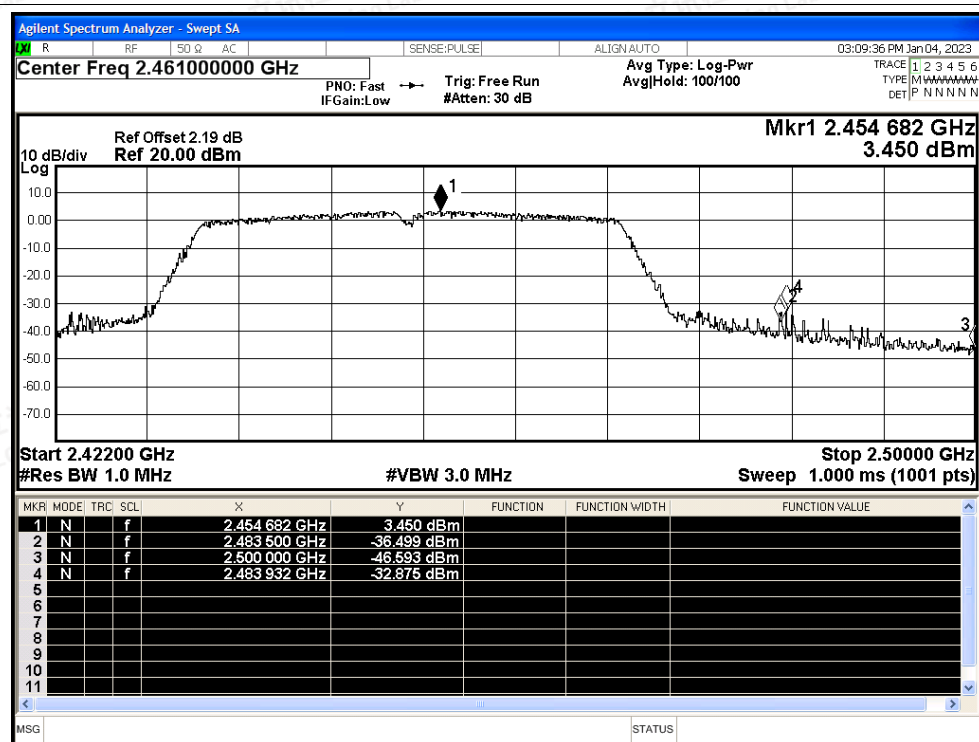


Restrict Band NVNT n40 2422MHz Ant Average





Restrict Band NVNT n40 2452MHz Ant Peak



Restrict Band NVNT n40 2452MHz Ant Average

