Appendix C

RF Test Data for 2.4GWIFI(Conducted Measurement)

Product Name: Legends Pinball

Test Model: HA9920

Environmental Conditions

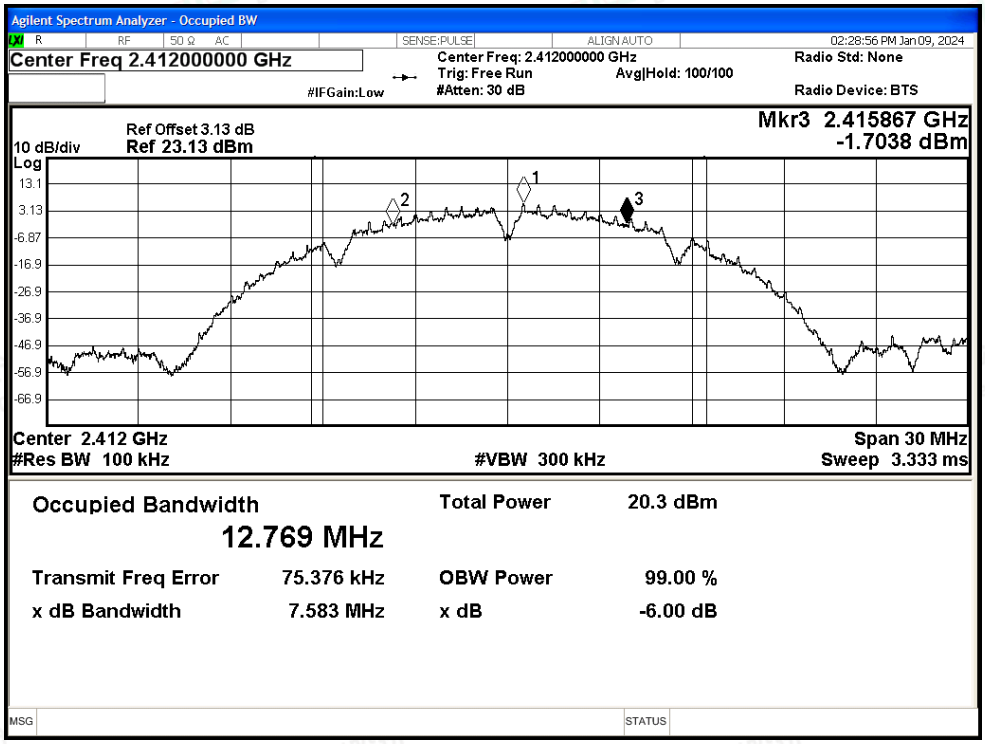
Temperature:	23.8° C
Relative Humidity:	52.1%
ATM Pressure:	100.0 kPa
Test Engineer:	Eason Zhou
Supervised by:	Nick Peng

C.1 -6dB Bandwidth

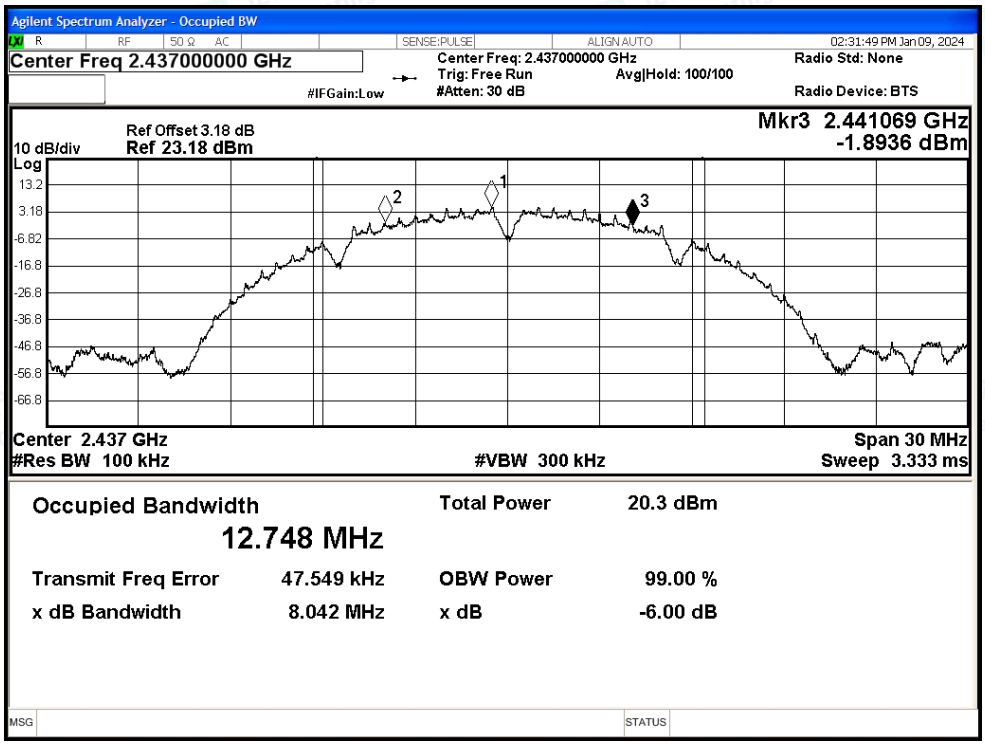
Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	b	2412	Ant1	7.583	>=0.5	Pass
NVNT	b	2437	Ant1	8.042	>=0.5	Pass
NVNT	b	2462	Ant1	7.553	>=0.5	Pass
NVNT	g	2412	Ant1	13.427	>=0.5	Pass
NVNT	g	2437	Ant1	15.288	>=0.5	Pass
NVNT	g	2462	Ant1	15.223	>=0.5	Pass
NVNT	n20	2412	Ant1	16.057	>=0.5	Pass
NVNT	n20	2437	Ant1	15.133	>=0.5	Pass
NVNT	n20	2462	Ant1	14.417	>=0.5	Pass
NVNT	n40	2422	Ant1	35.042	>=0.5	Pass
NVNT	n40	2437	Ant1	33.791	>=0.5	Pass
NVNT	n40	2452	Ant1	35.119	>=0.5	Pass

Test Graphs

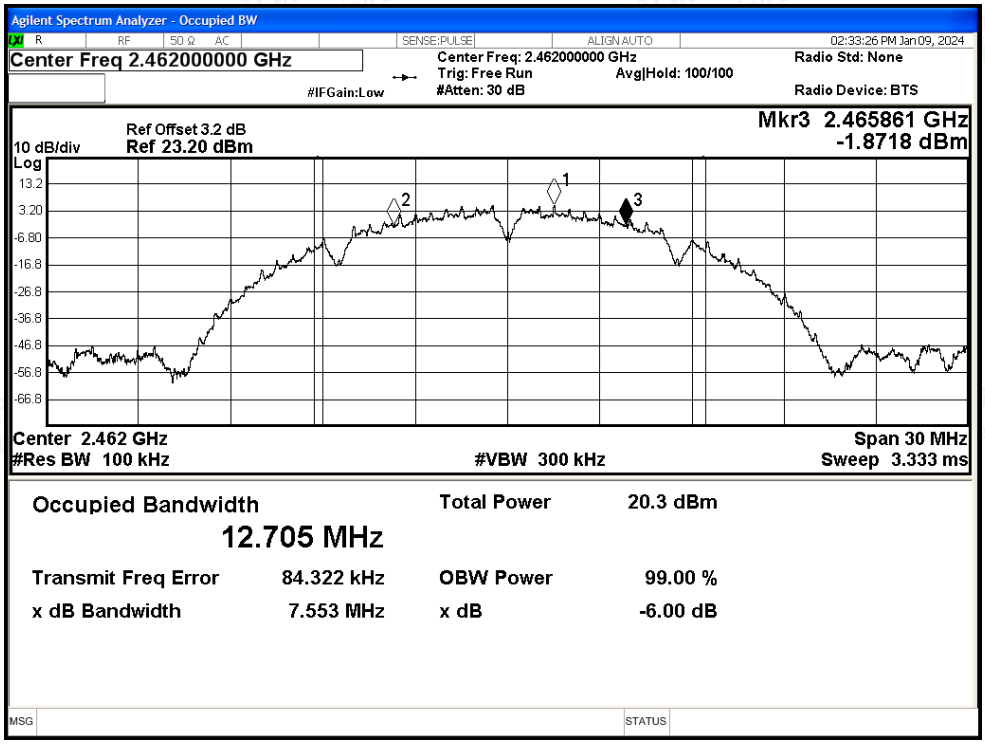
-6dB Bandwidth NVNT b 2412MHz Ant1



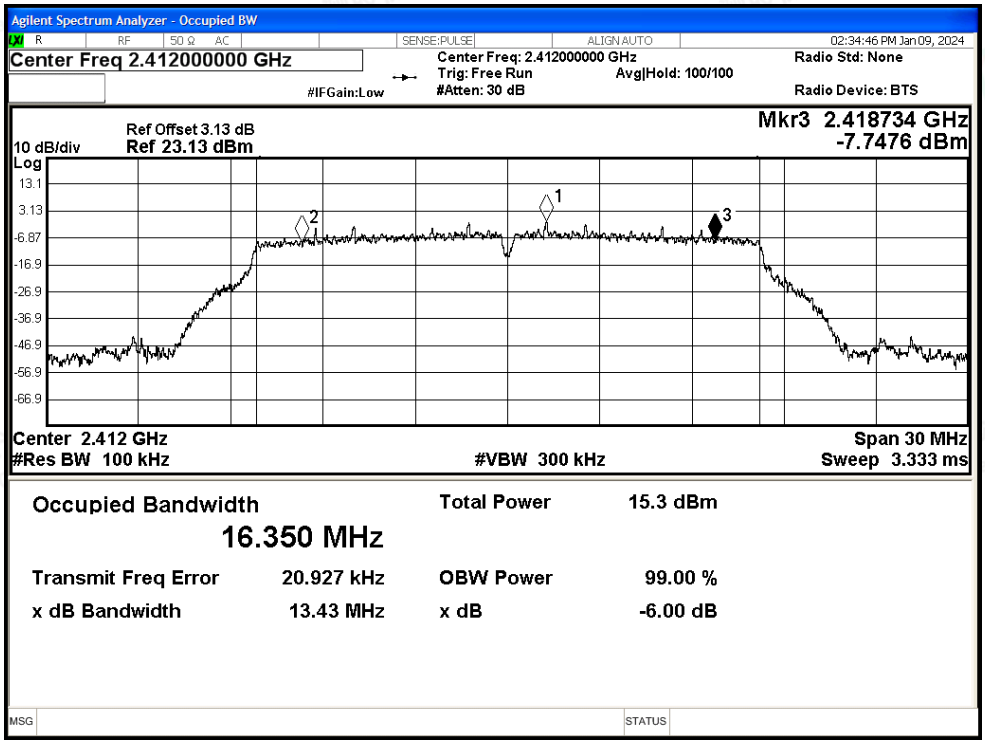
-6dB Bandwidth NVNT b 2437MHz Ant1



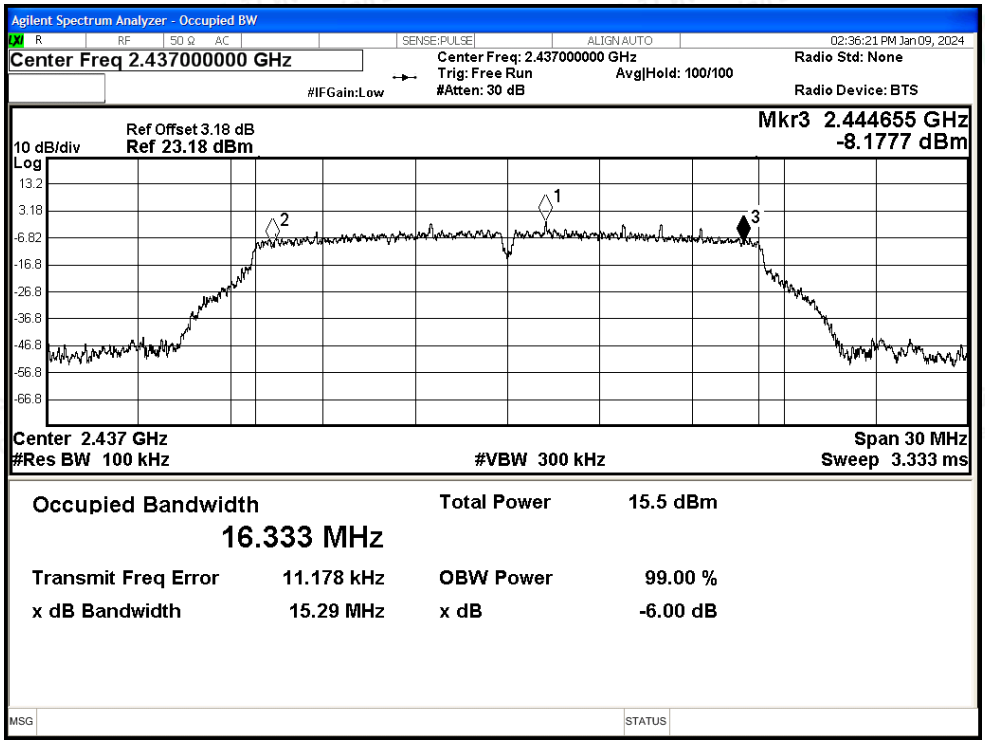
-6dB Bandwidth NVNT b 2462MHz Ant1



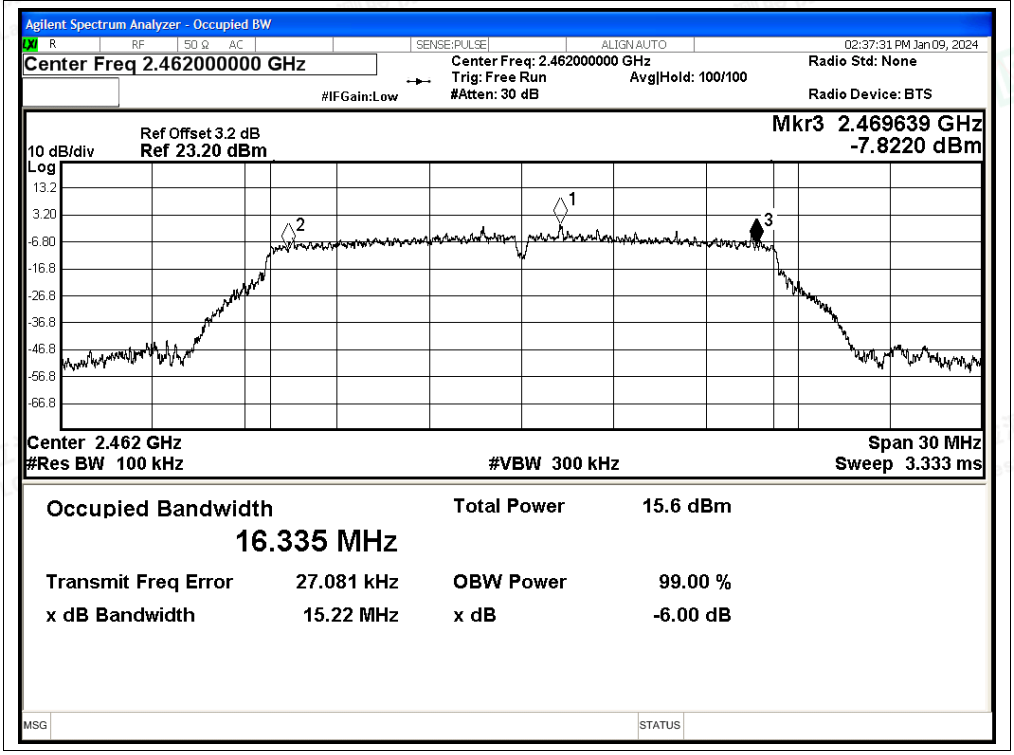
-6dB Bandwidth NVNT g 2412MHz Ant1



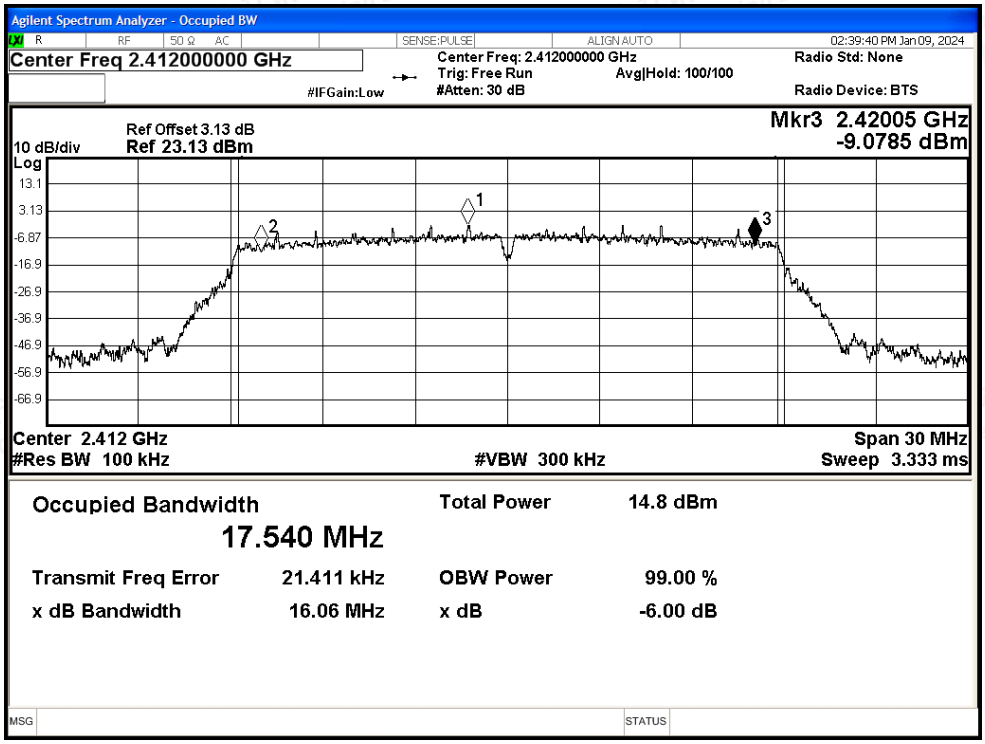
-6dB Bandwidth NVNT g 2437MHz Ant1



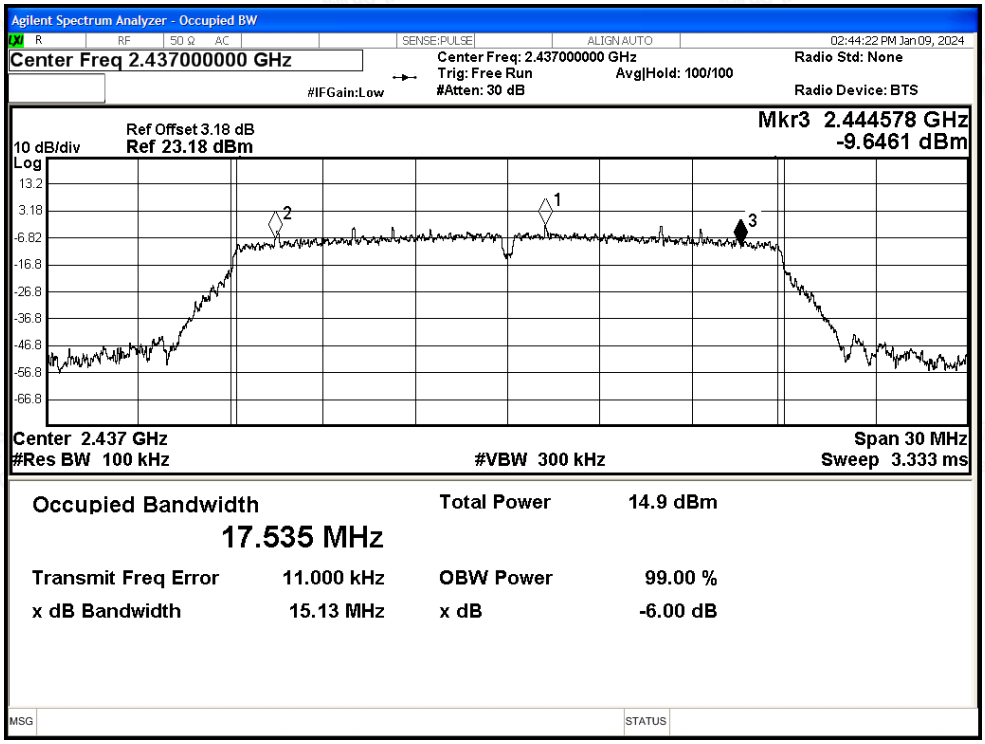
-6dB Bandwidth NVNT g 2462MHz Ant1



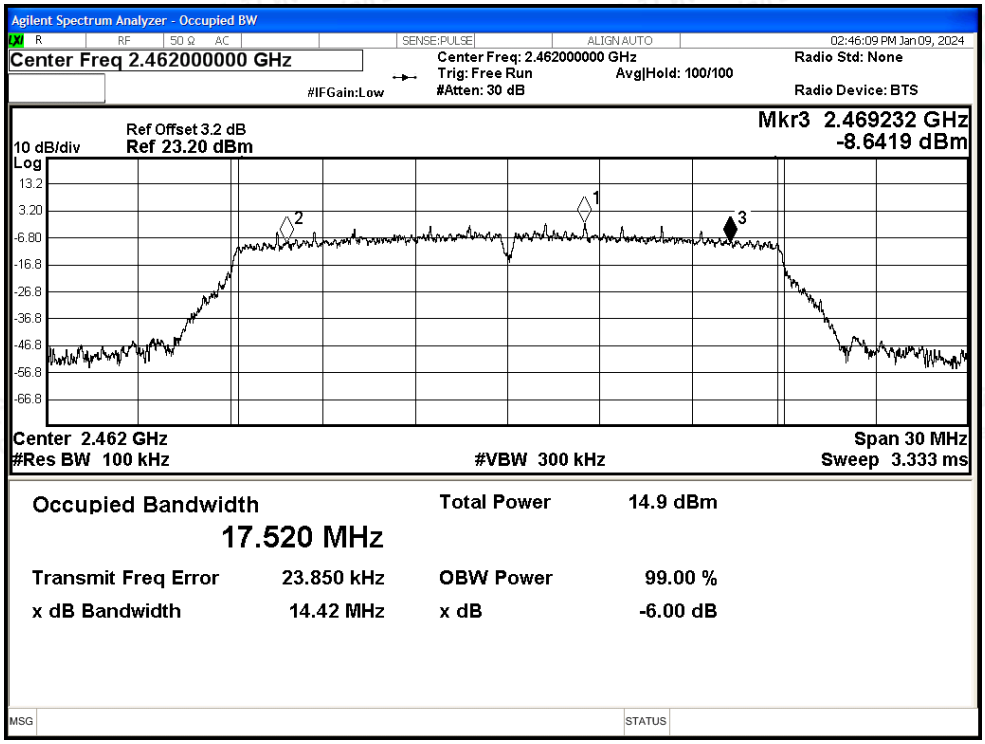
-6dB Bandwidth NVNT n20 2412MHz Ant1



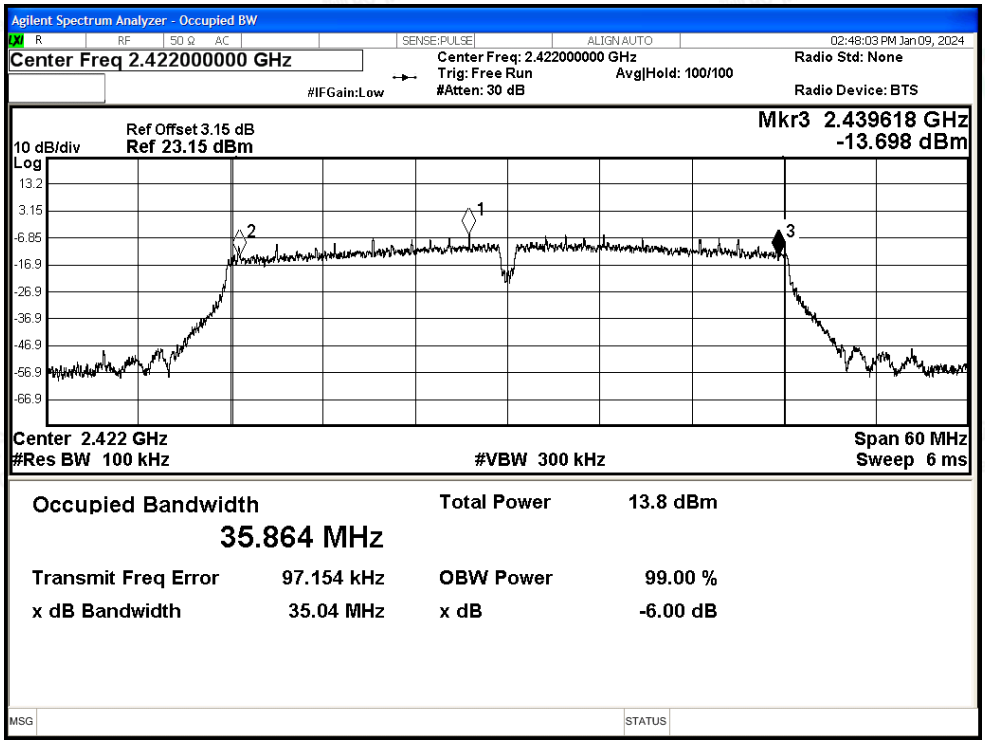
-6dB Bandwidth NVNT n20 2437MHz Ant1



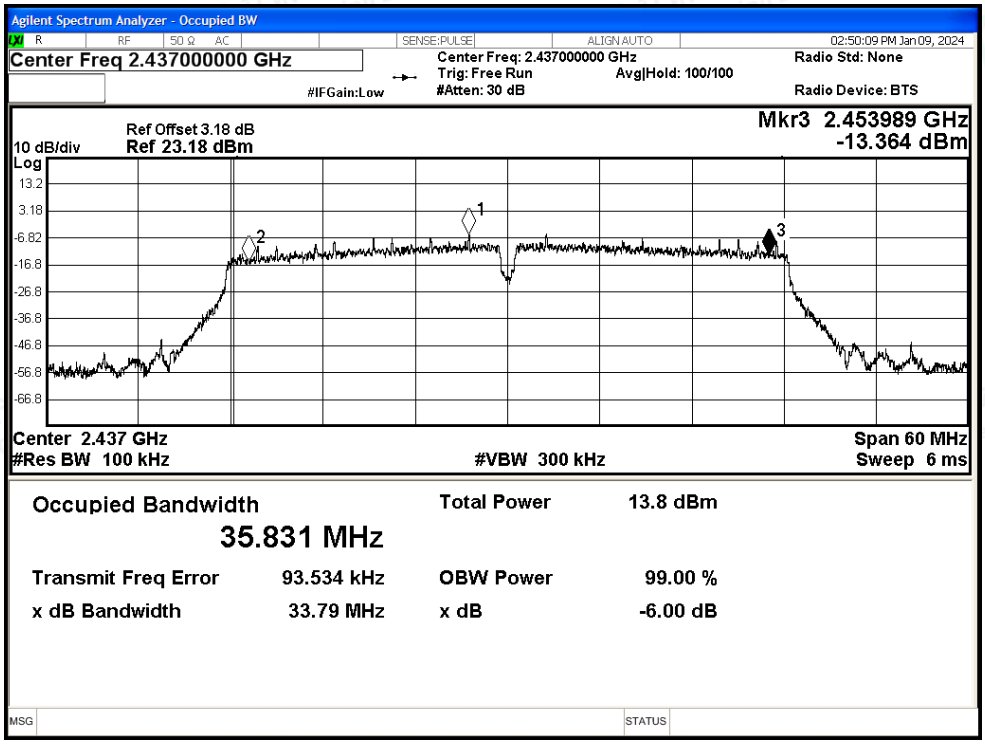
-6dB Bandwidth NVNT n20 2462MHz Ant1



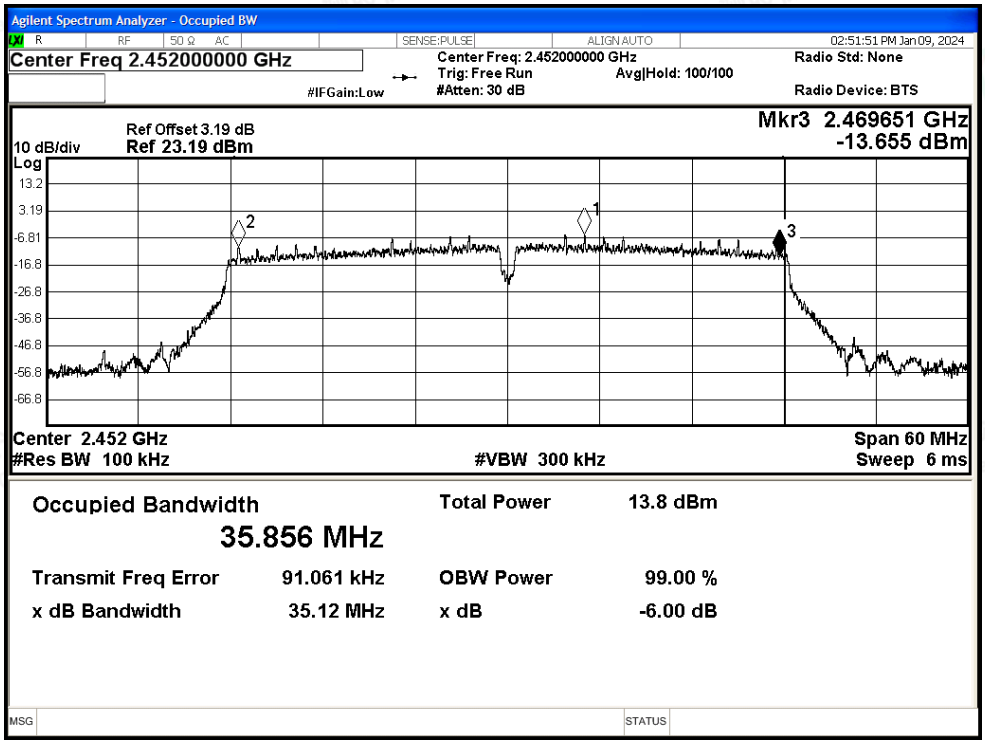
-6dB Bandwidth NVNT n40 2422MHz Ant1



-6dB Bandwidth NVNT n40 2437MHz Ant1



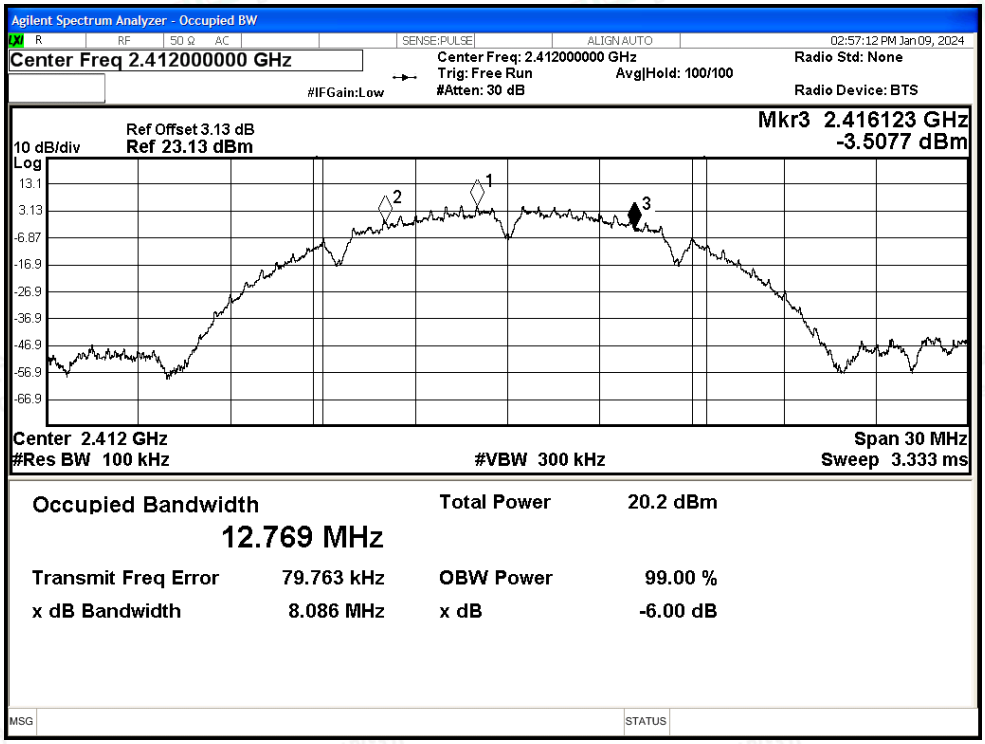
-6dB Bandwidth NVNT n40 2452MHz Ant1



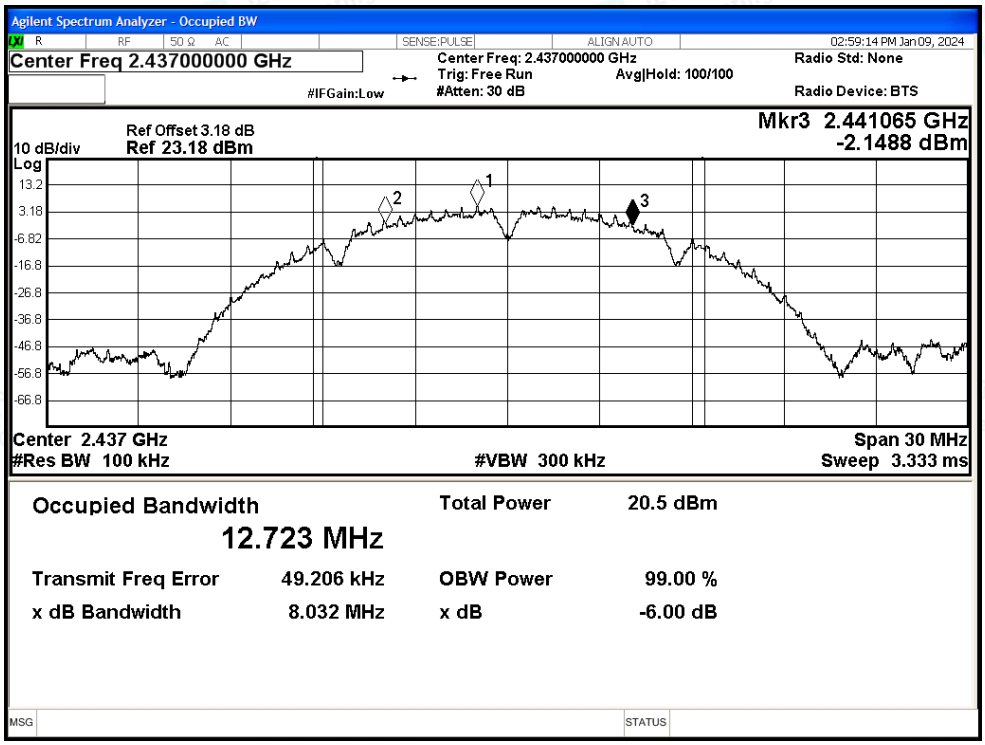
Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	b	2412	Ant2	8.086	>=0.5	Pass
NVNT	b	2437	Ant2	8.032	>=0.5	Pass
NVNT	b	2462	Ant2	7.579	>=0.5	Pass
NVNT	g	2412	Ant2	14.29	>=0.5	Pass
NVNT	g	2437	Ant2	15.038	>=0.5	Pass
NVNT	g	2462	Ant2	16.023	>=0.5	Pass
NVNT	n20	2412	Ant2	15.639	>=0.5	Pass
NVNT	n20	2437	Ant2	13.833	>=0.5	Pass
NVNT	n20	2462	Ant2	12.584	>=0.5	Pass
NVNT	n40	2422	Ant2	34.956	>=0.5	Pass
NVNT	n40	2437	Ant2	32.808	>=0.5	Pass
NVNT	n40	2452	Ant2	35.097	>=0.5	Pass

Test Graphs

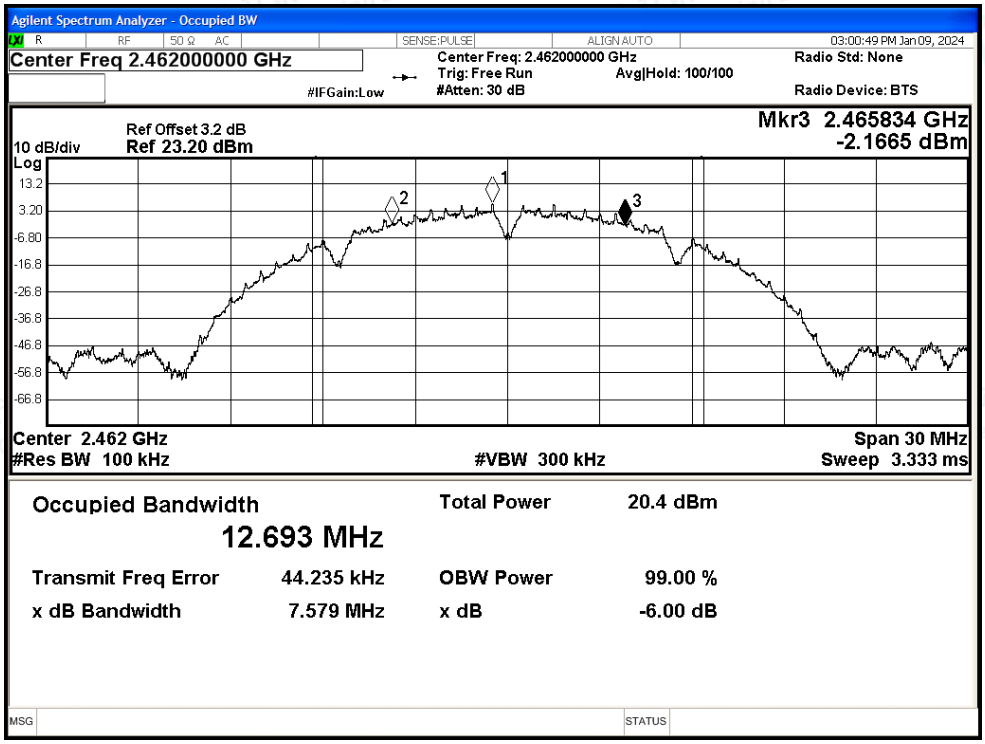
-6dB Bandwidth NVNT b 2412MHz Ant2



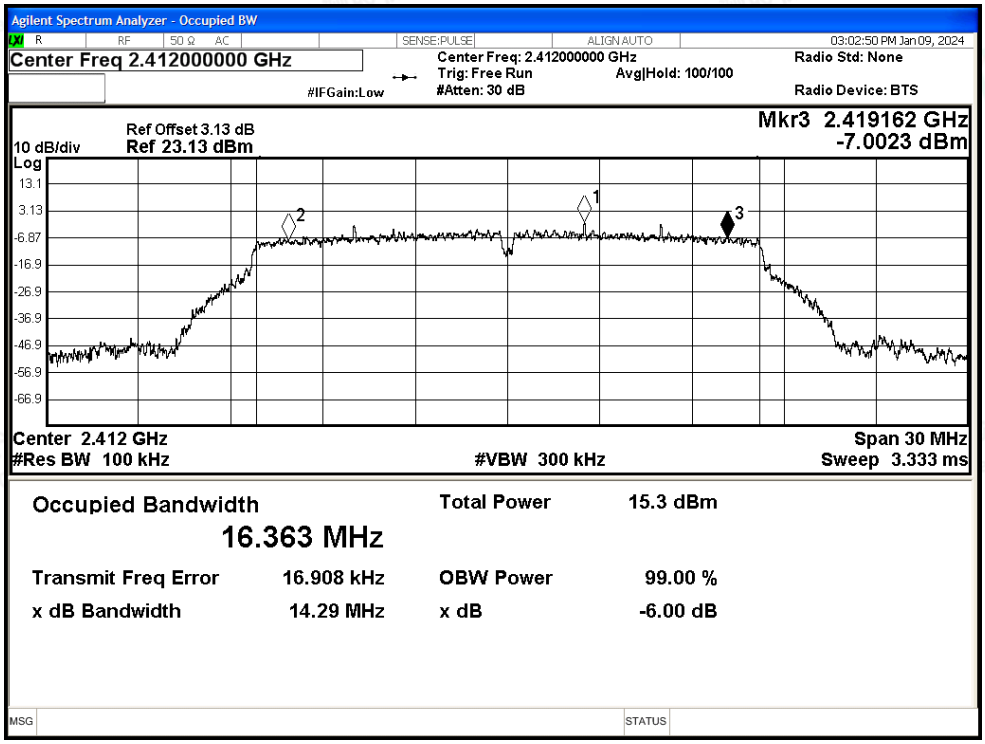
-6dB Bandwidth NVNT b 2437MHz Ant2



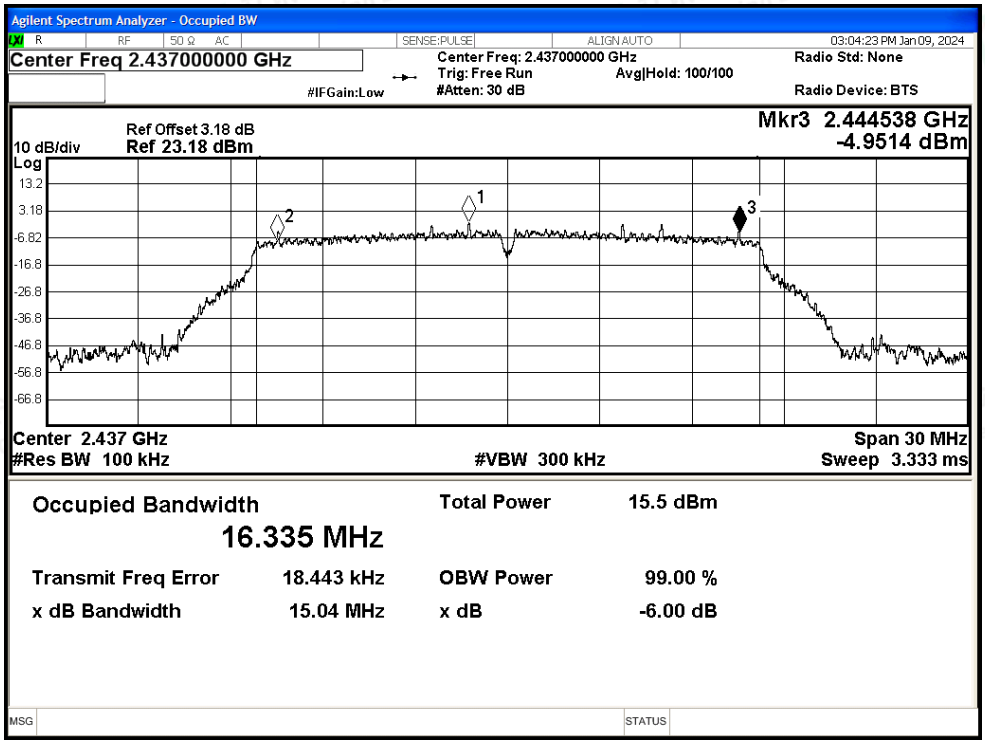
-6dB Bandwidth NVNT b 2462MHz Ant2



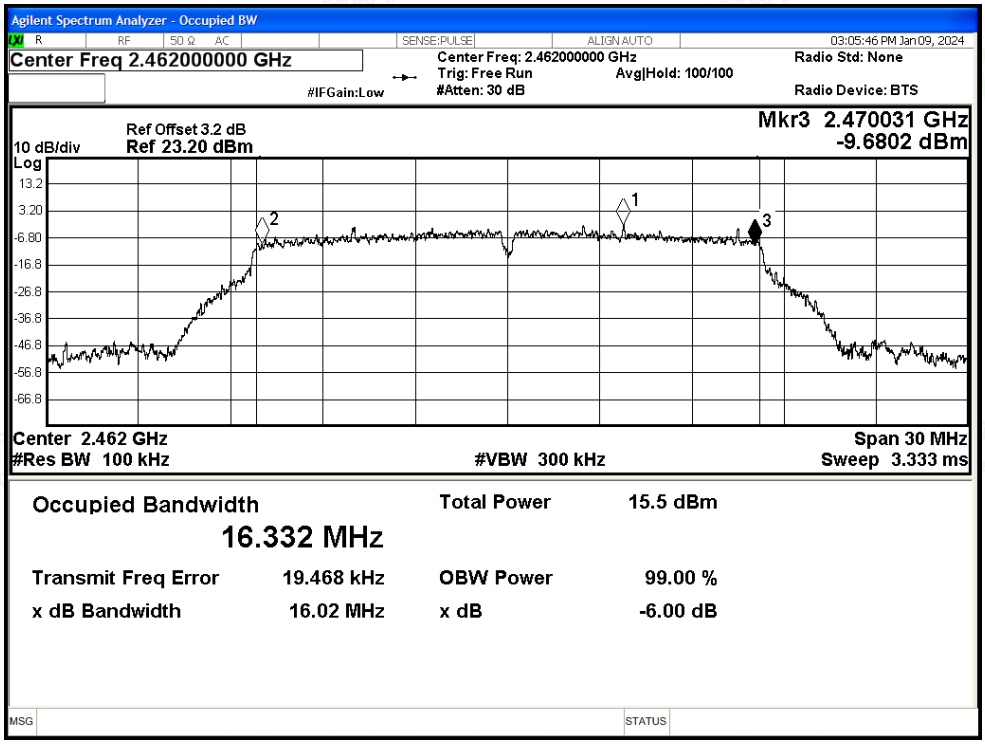
-6dB Bandwidth NVNT g 2412MHz Ant2



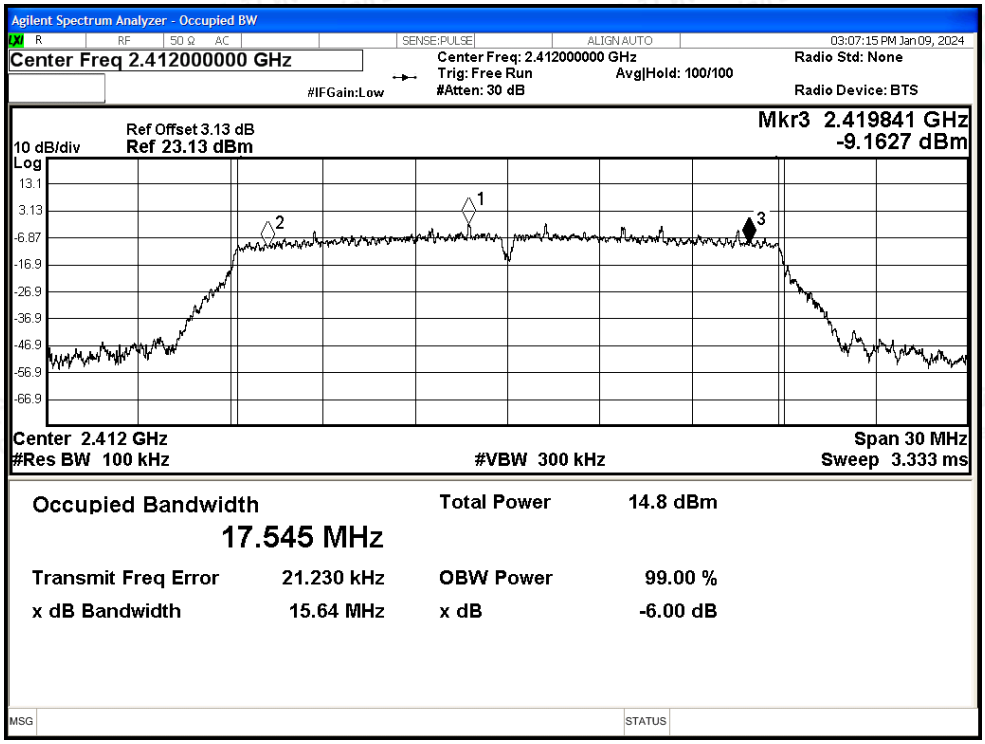
-6dB Bandwidth NVNT g 2437MHz Ant2



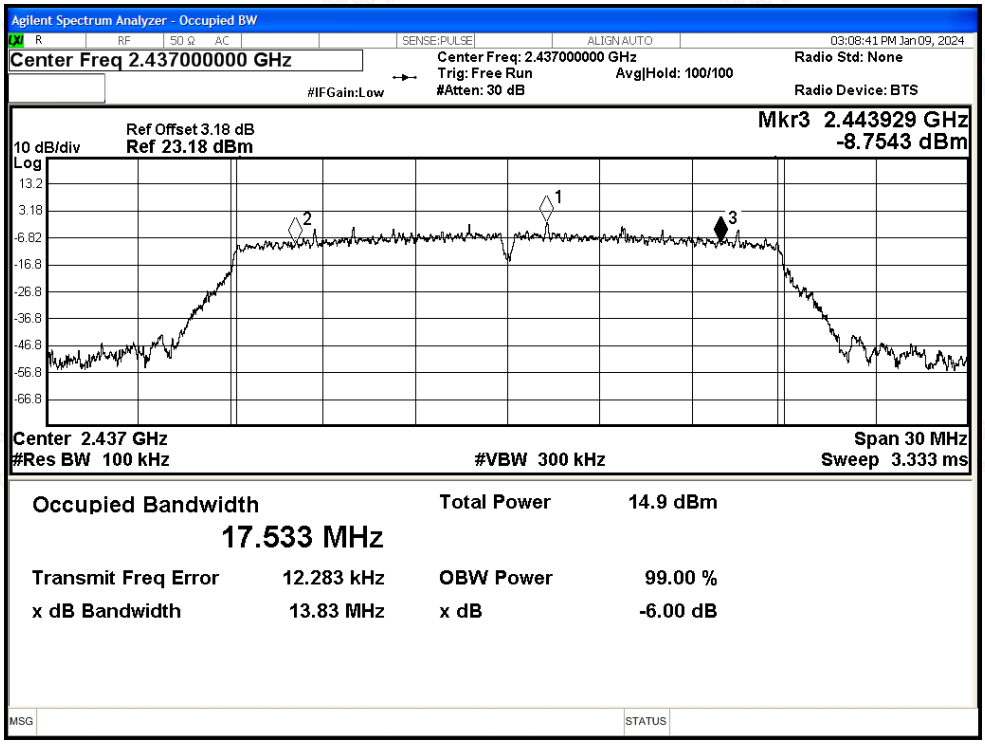
-6dB Bandwidth NVNT g 2462MHz Ant2



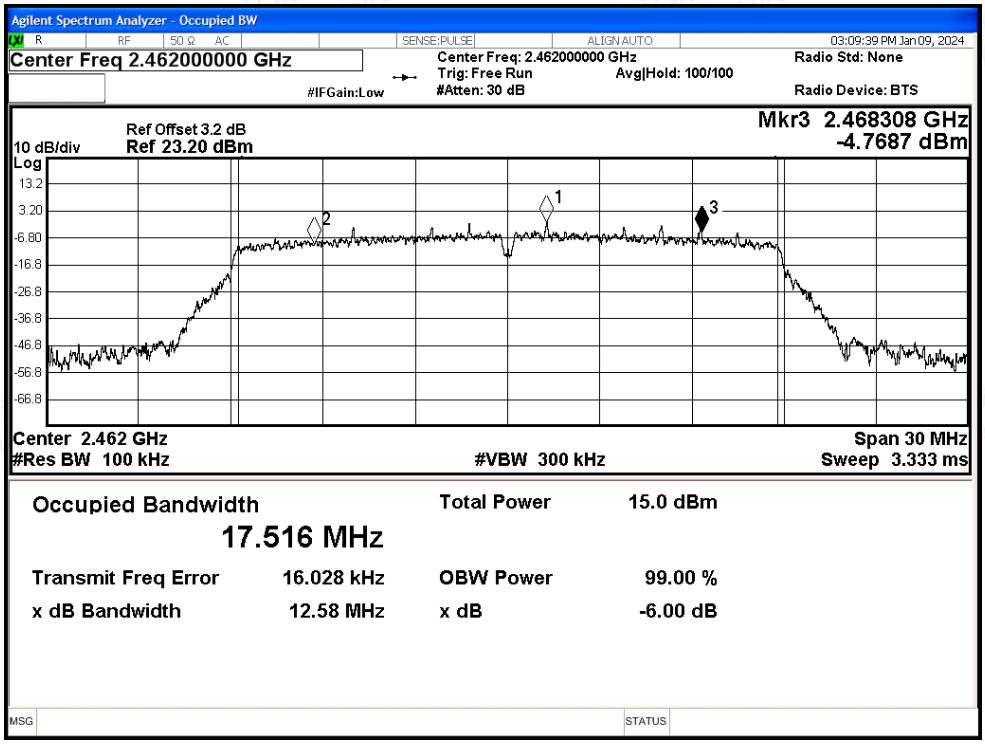
-6dB Bandwidth NVNT n20 2412MHz Ant2



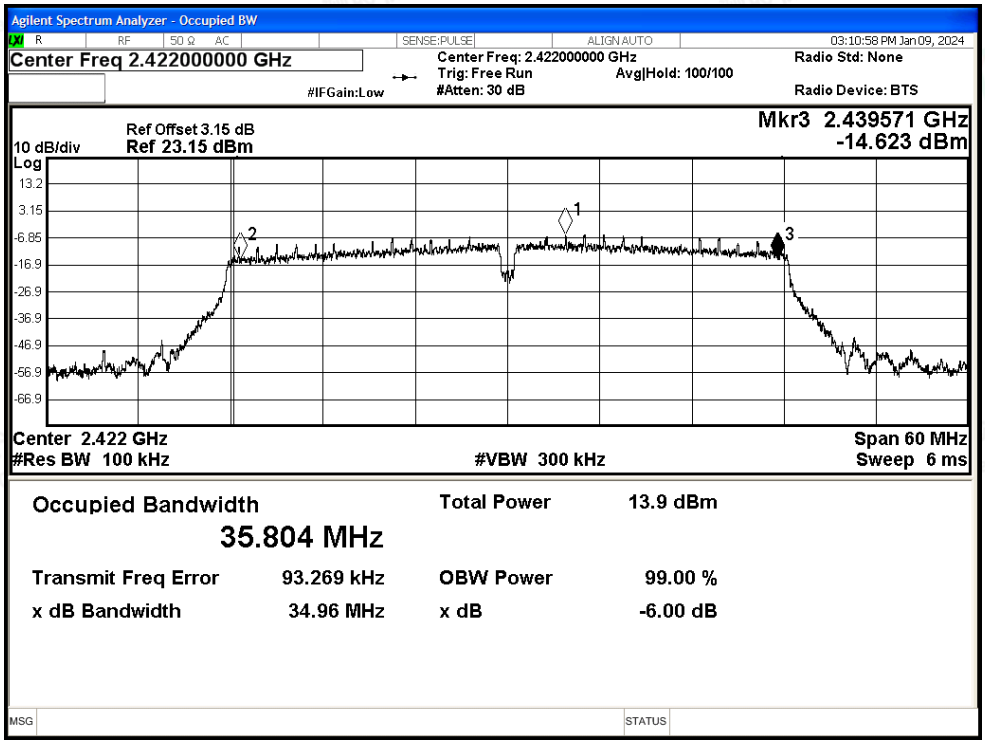
-6dB Bandwidth NVNT n20 2437MHz Ant2



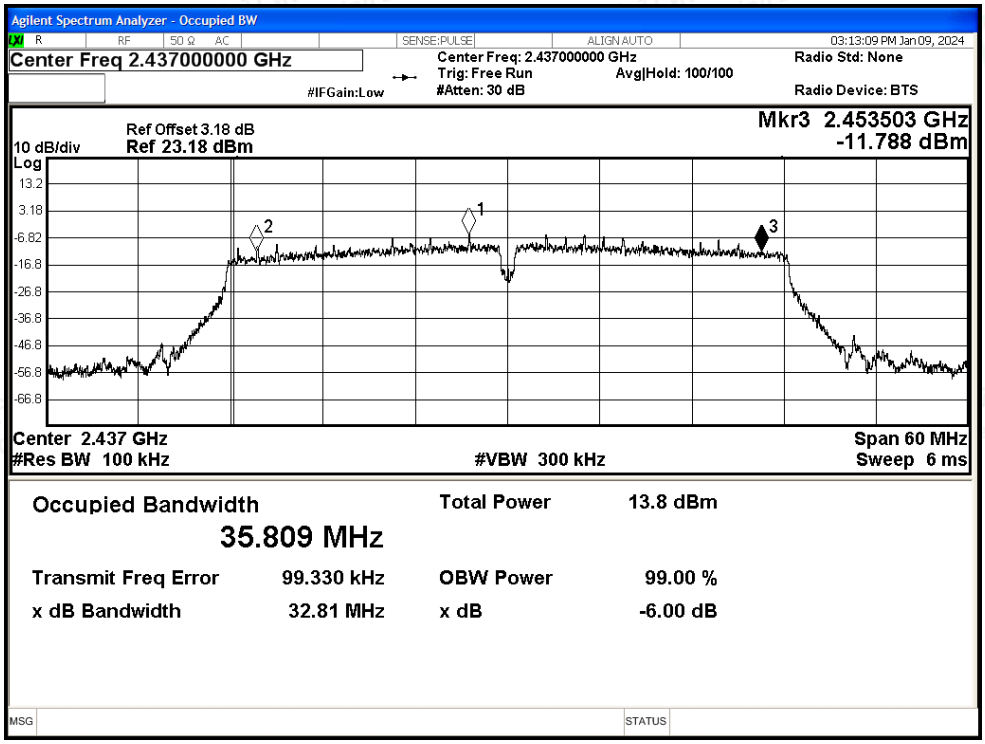
-6dB Bandwidth NVNT n20 2462MHz Ant2



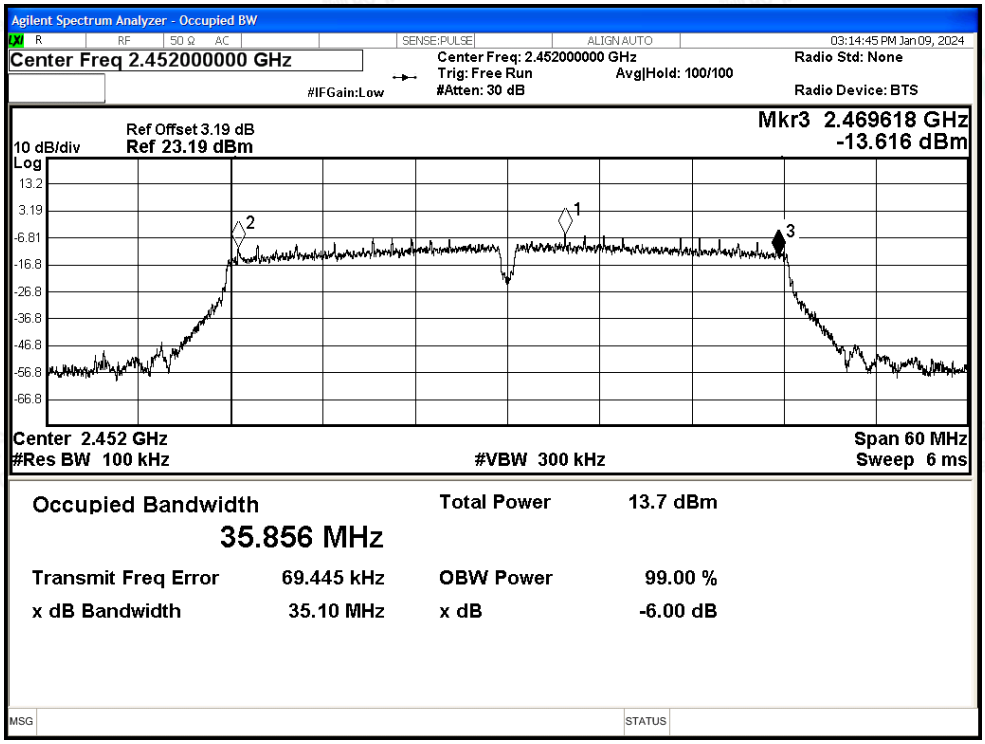
-6dB Bandwidth NVNT n40 2422MHz Ant2



-6dB Bandwidth NVNT n40 2437MHz Ant2



-6dB Bandwidth NVNT n40 2452MHz Ant2

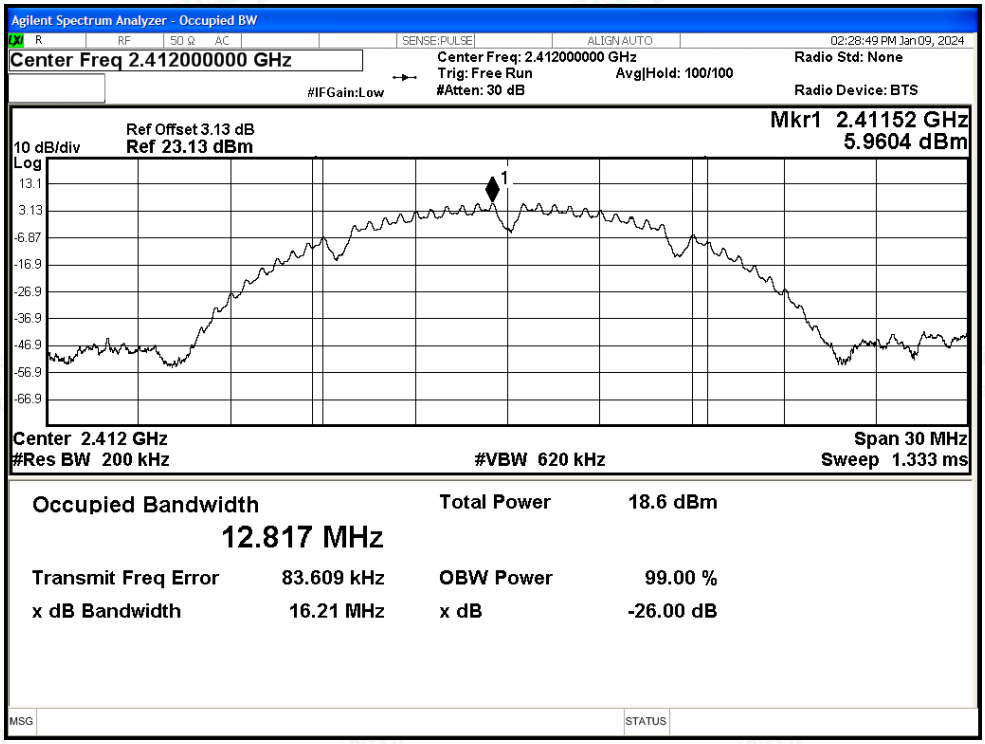


C.2 Occupied Channel Bandwidth

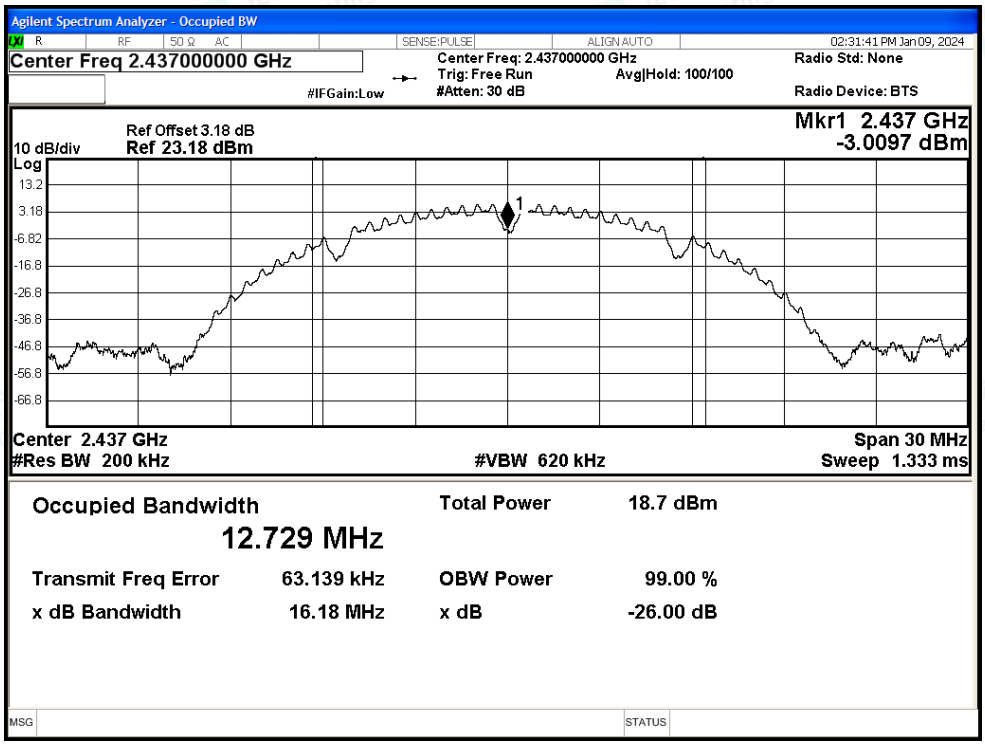
Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	b	2412	Ant1	12.817
NVNT	b	2437	Ant1	12.729
NVNT	b	2462	Ant1	12.695
NVNT	g	2412	Ant1	16.436
NVNT	g	2437	Ant1	16.393
NVNT	g	2462	Ant1	16.371
NVNT	n20	2412	Ant1	17.567
NVNT	n20	2437	Ant1	17.57
NVNT	n20	2462	Ant1	17.529
NVNT	n40	2422	Ant1	35.946
NVNT	n40	2437	Ant1	35.953
NVNT	n40	2452	Ant1	36.036

Test Graphs

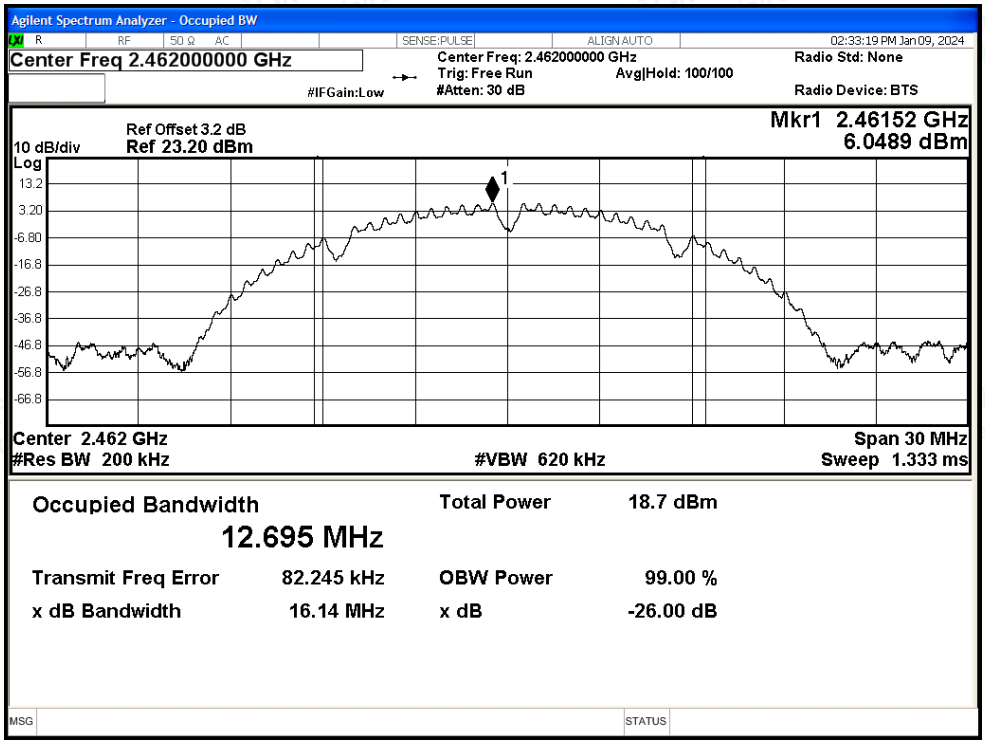
OBW NVNT b 2412MHz Ant1



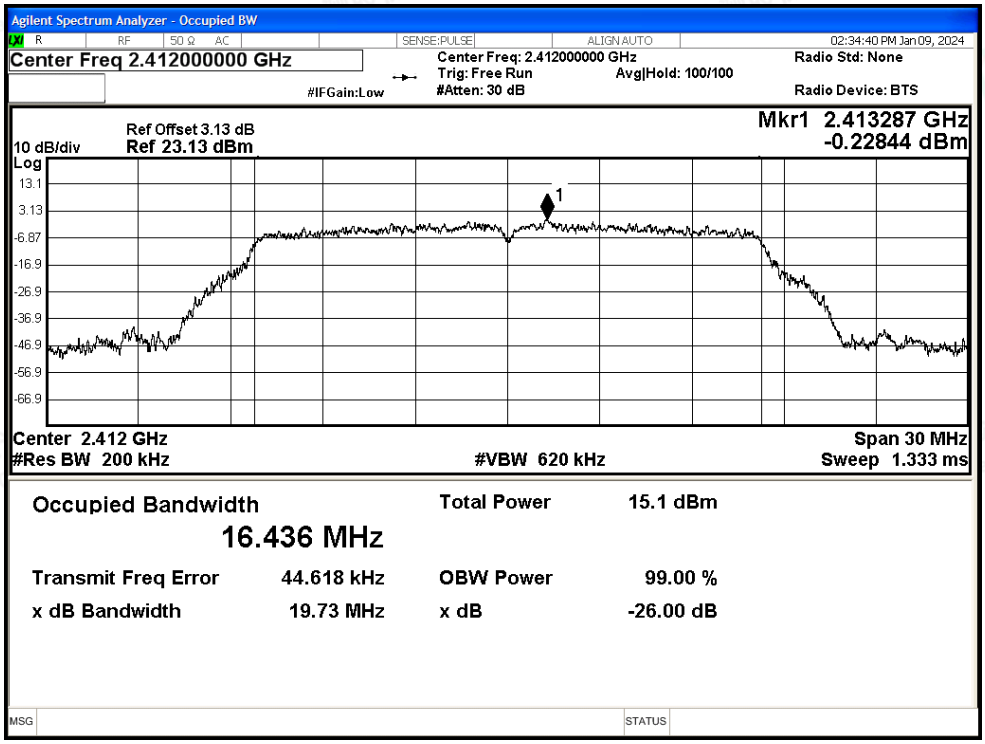
OBW NVNT b 2437MHz Ant1



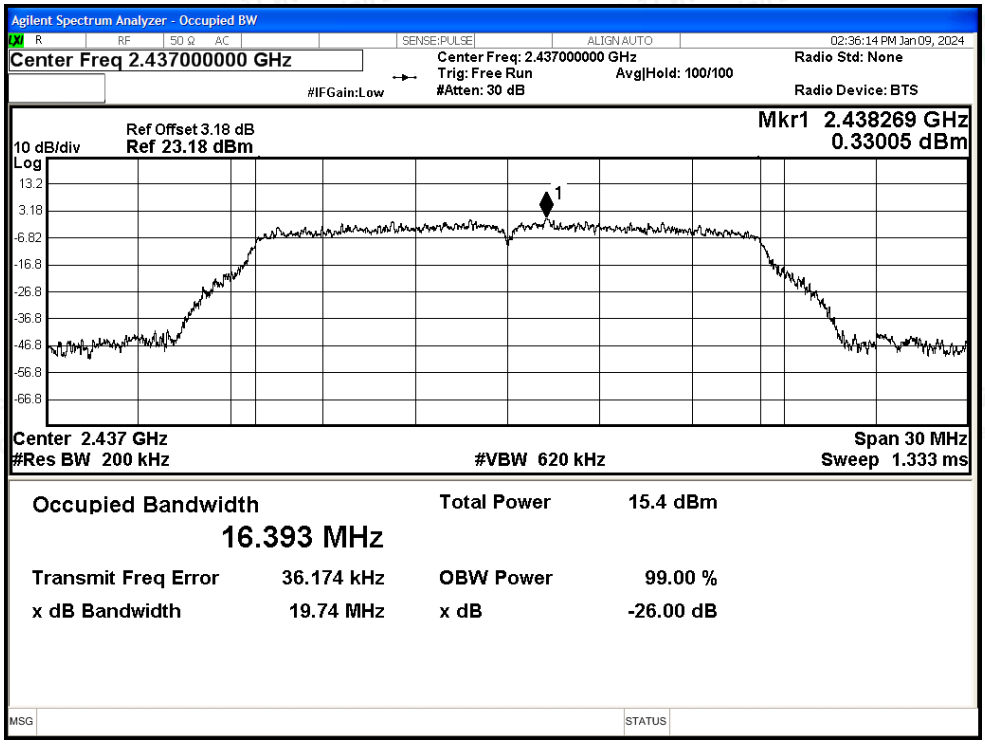
OBW NVNT b 2462MHz Ant1



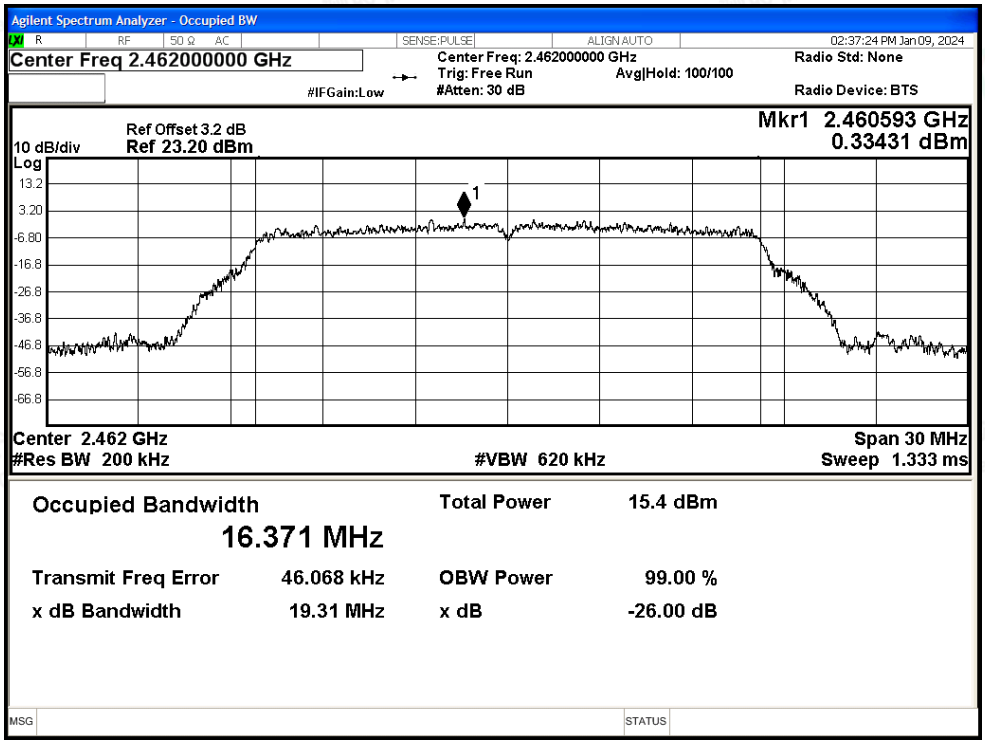
OBW NVNT g 2412MHz Ant1



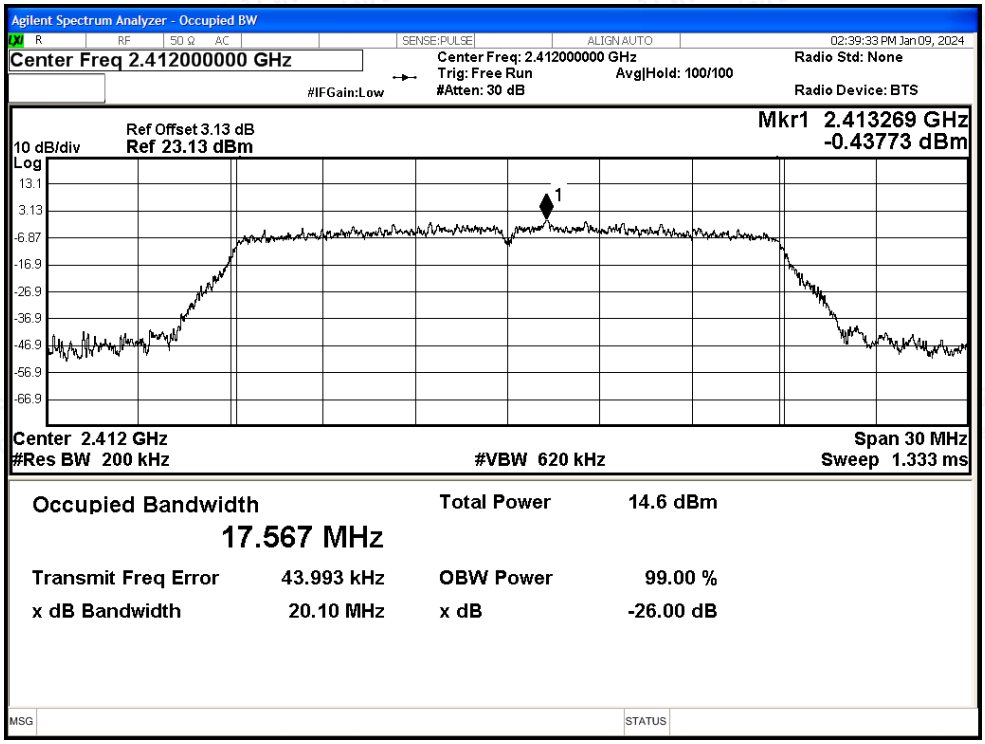
OBW NVNT g 2437MHz Ant1



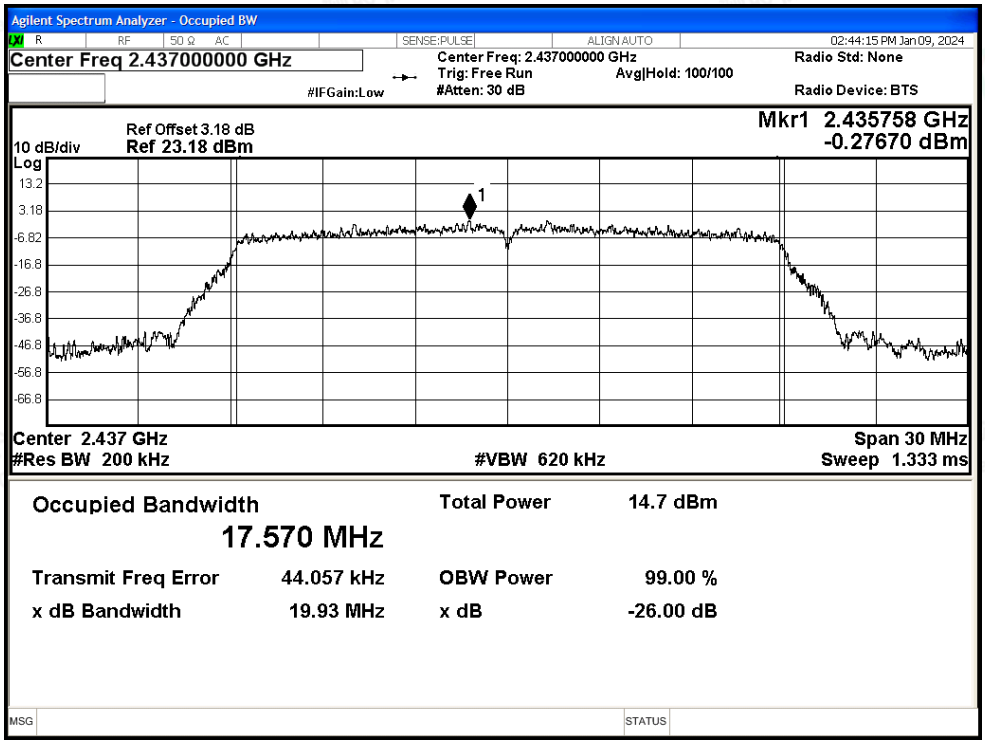
OBW NVNT g 2462MHz Ant1



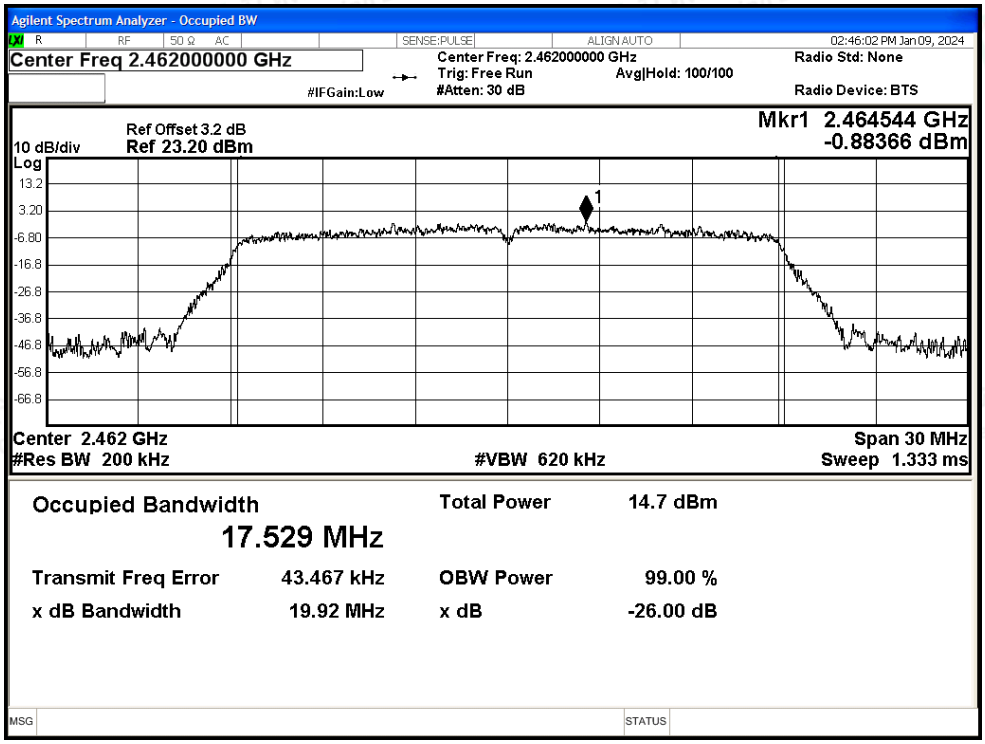
OBW NVNT n20 2412MHz Ant1



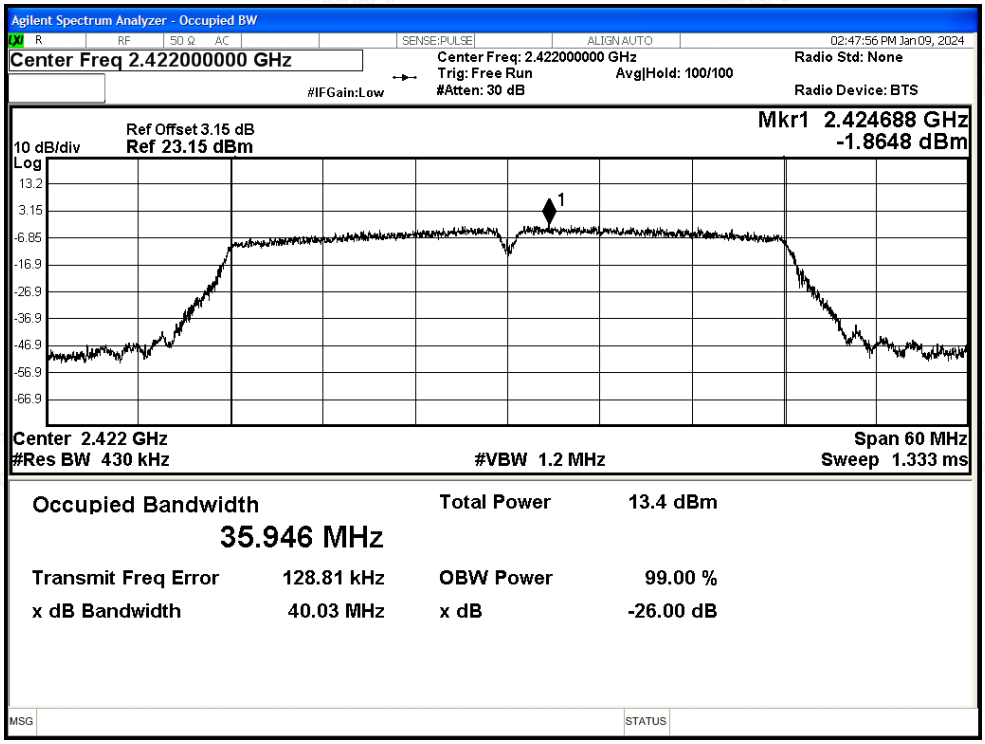
OBW NVNT n20 2437MHz Ant1



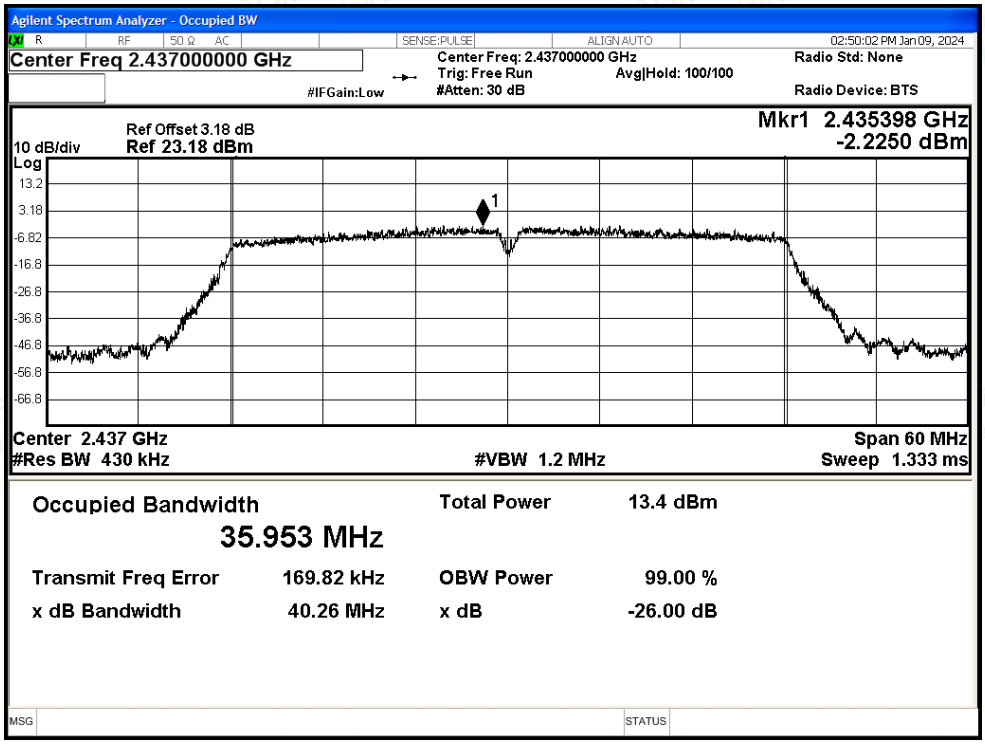
OBW NVNT n20 2462MHz Ant1



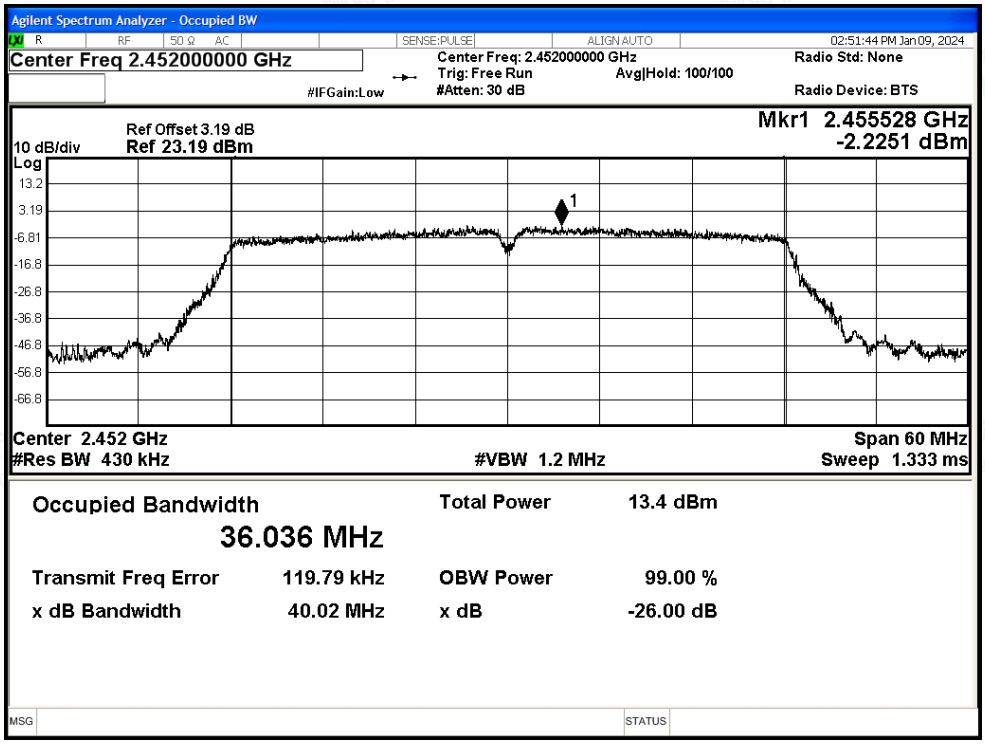
OBW NVNT n40 2422MHz Ant1



OBW NVNT n40 2437MHz Ant1



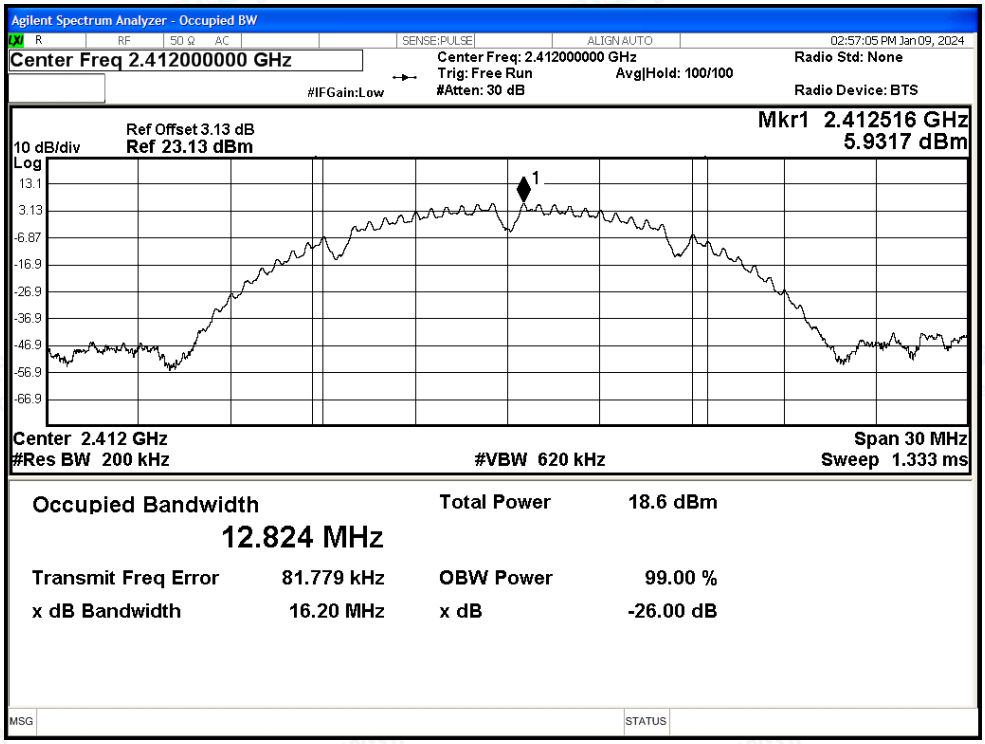
OBW NVNT n40 2452MHz Ant1



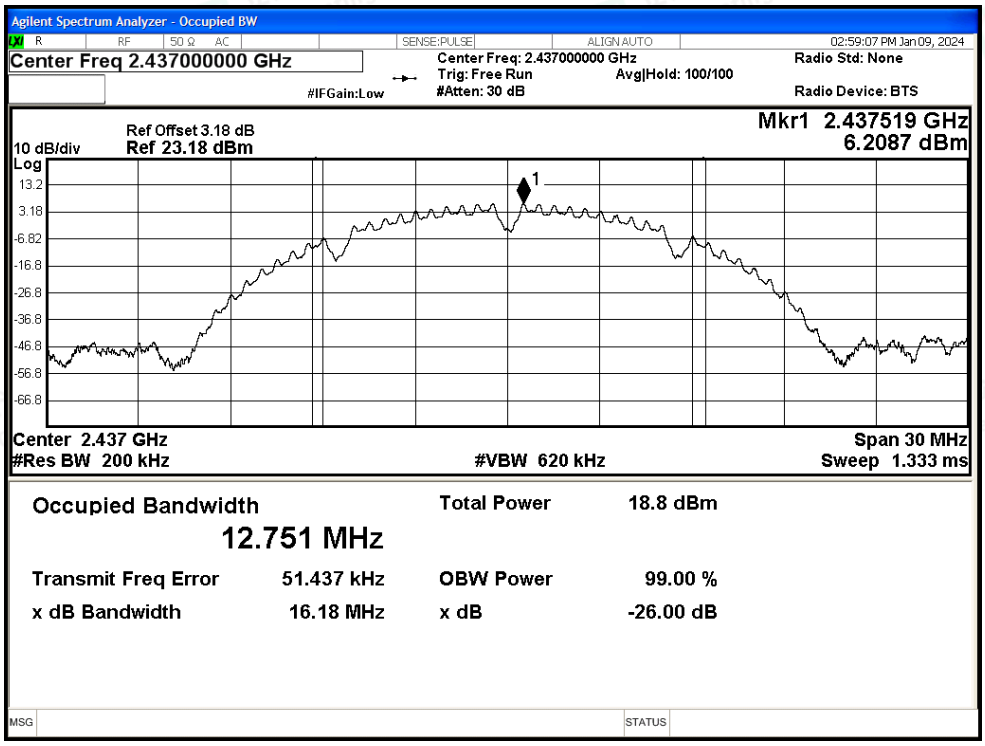
Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	b	2412	Ant2	12.824
NVNT	b	2437	Ant2	12.751
NVNT	b	2462	Ant2	12.704
NVNT	g	2412	Ant2	16.433
NVNT	g	2437	Ant2	16.368
NVNT	g	2462	Ant2	16.415
NVNT	n20	2412	Ant2	17.562
NVNT	n20	2437	Ant2	17.548
NVNT	n20	2462	Ant2	17.542
NVNT	n40	2422	Ant2	35.949
NVNT	n40	2437	Ant2	35.925
NVNT	n40	2452	Ant2	35.976

Test Graphs

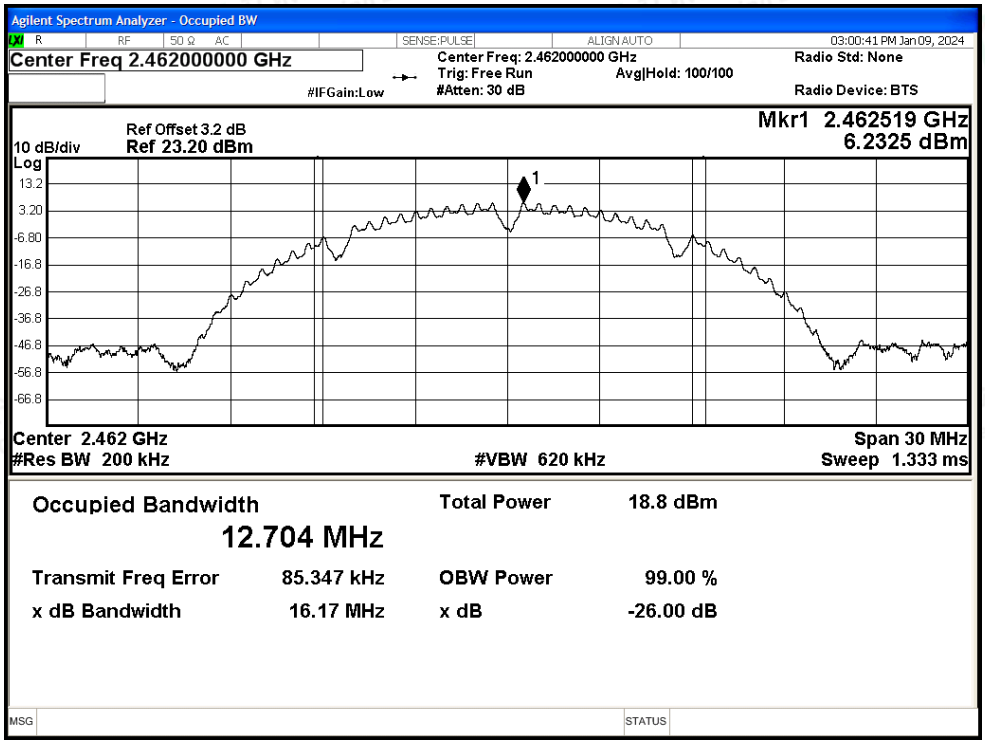
OBW NVNT b 2412MHz Ant2



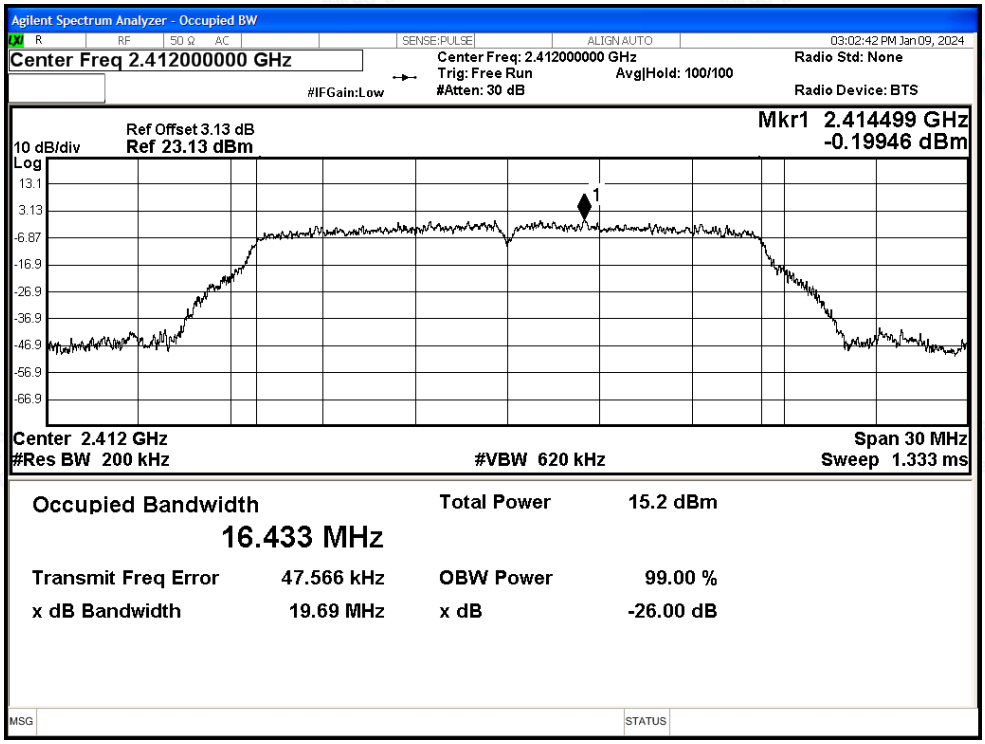
OBW NVNT b 2437MHz Ant2



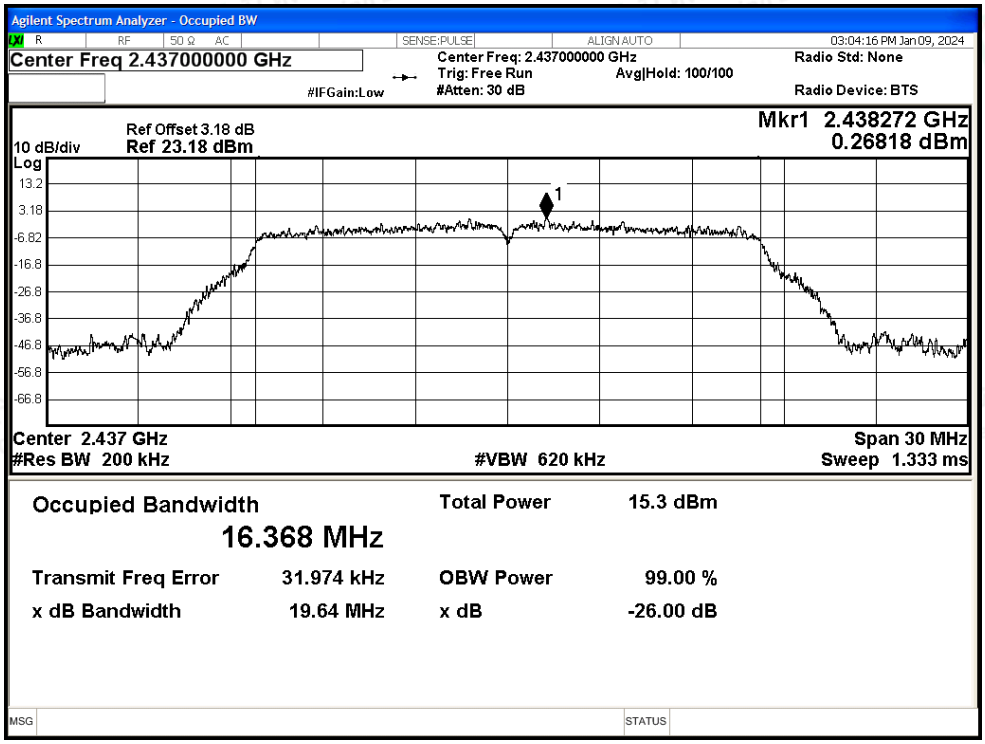
OBW NVNT b 2462MHz Ant2



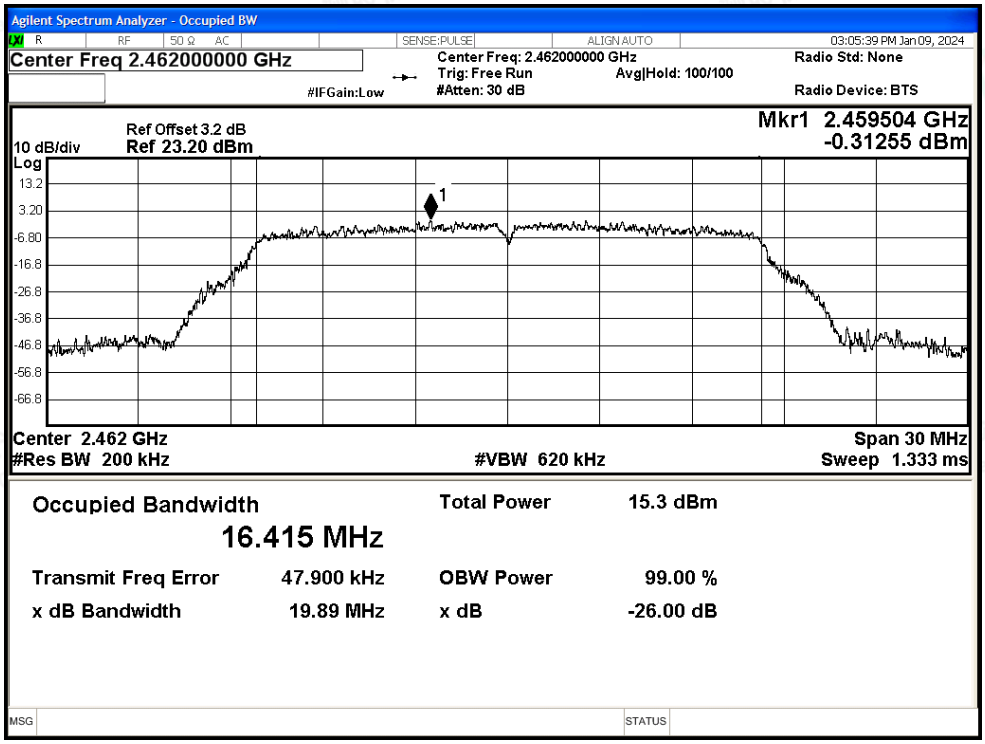
OBW NVNT g 2412MHz Ant2



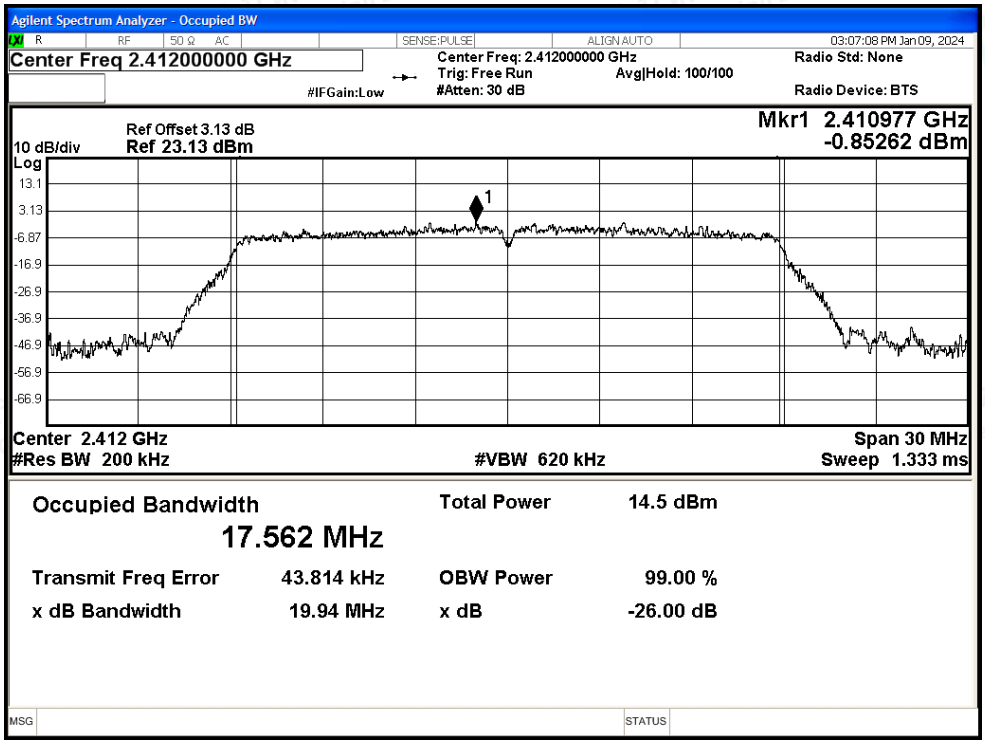
OBW NVNT g 2437MHz Ant2



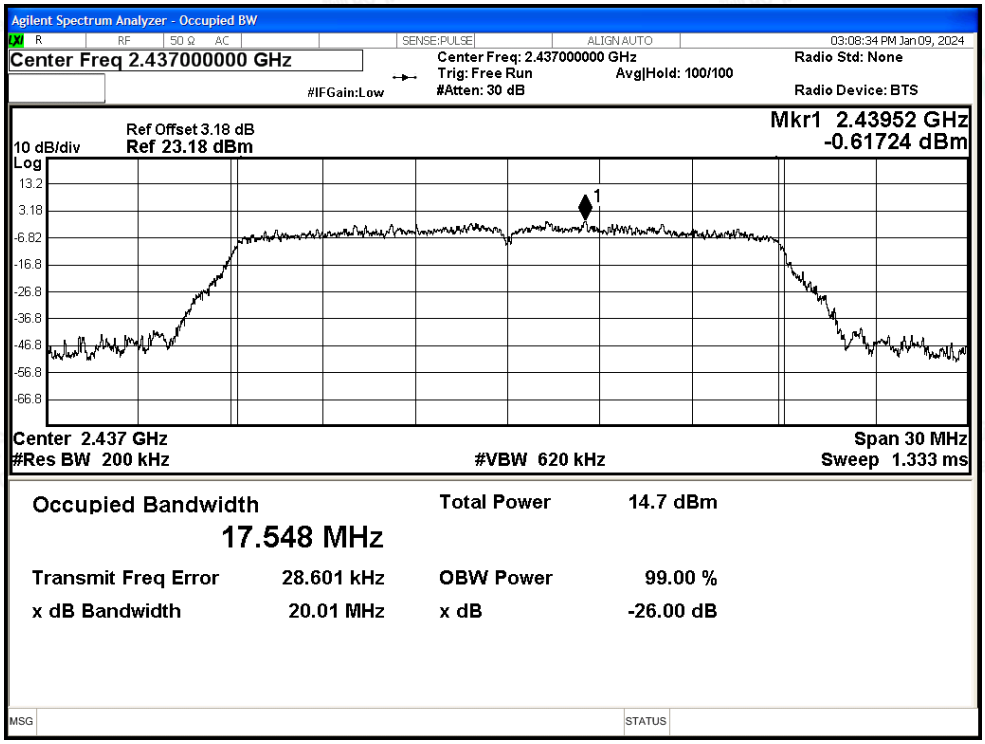
OBW NVNT g 2462MHz Ant2



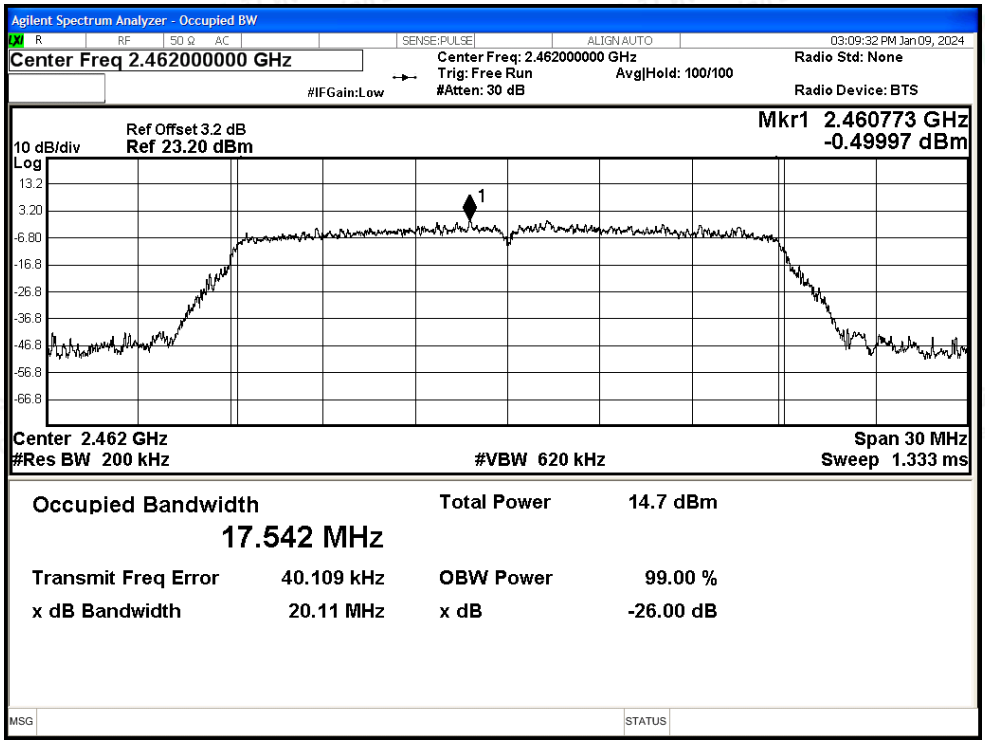
OBW NVNT n20 2412MHz Ant2



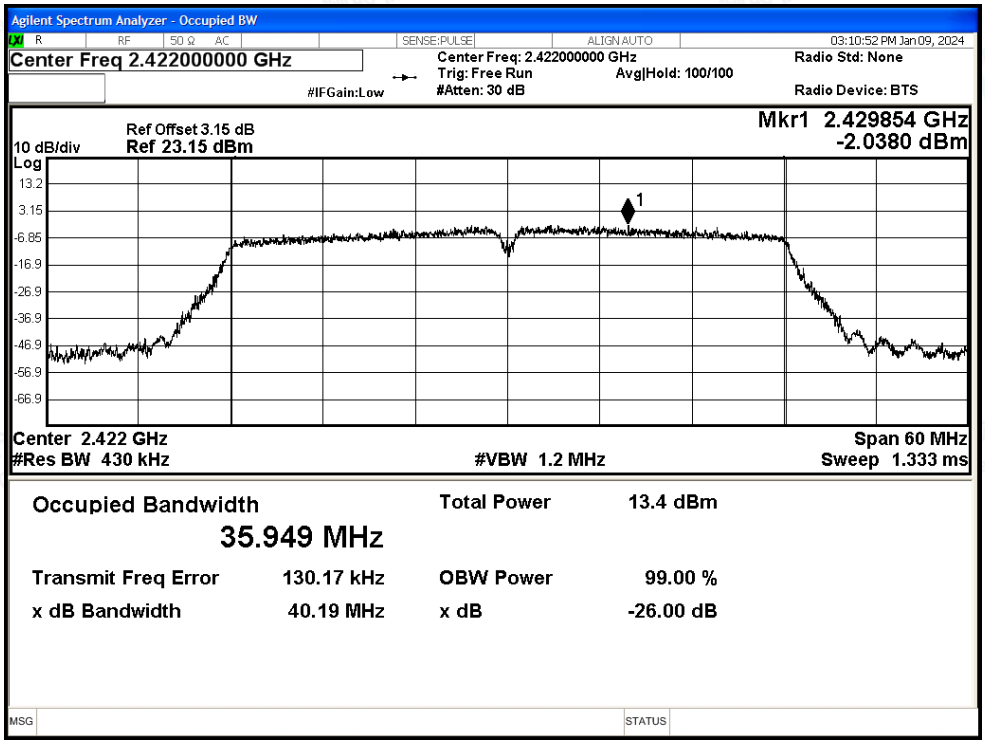
OBW NVNT n20 2437MHz Ant2



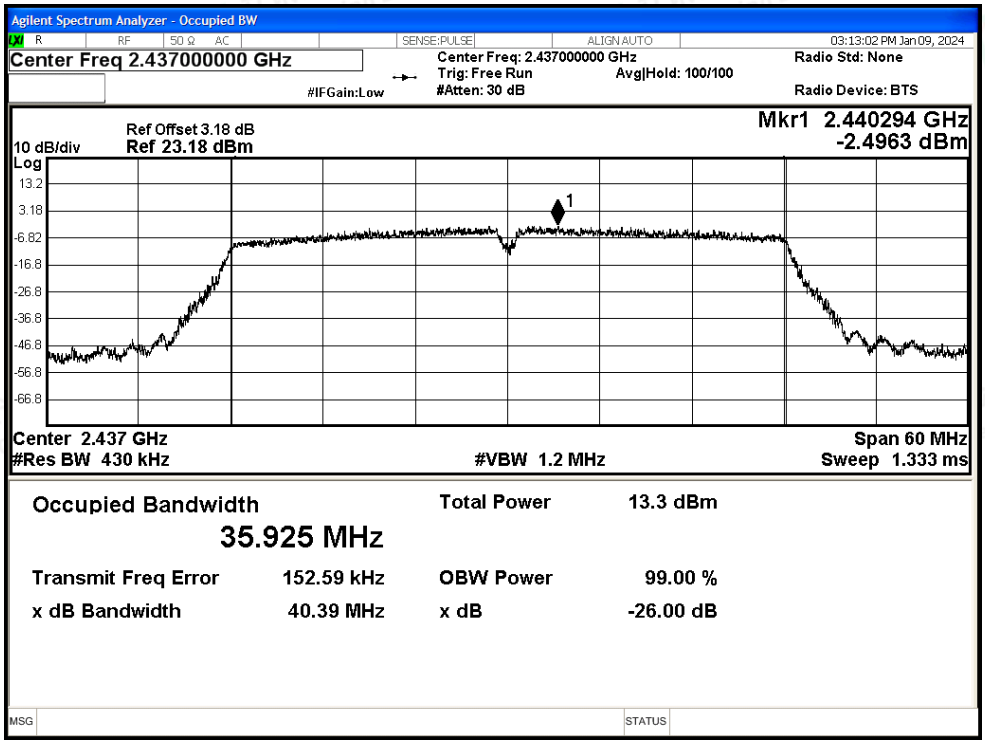
OBW NVNT n20 2462MHz Ant2



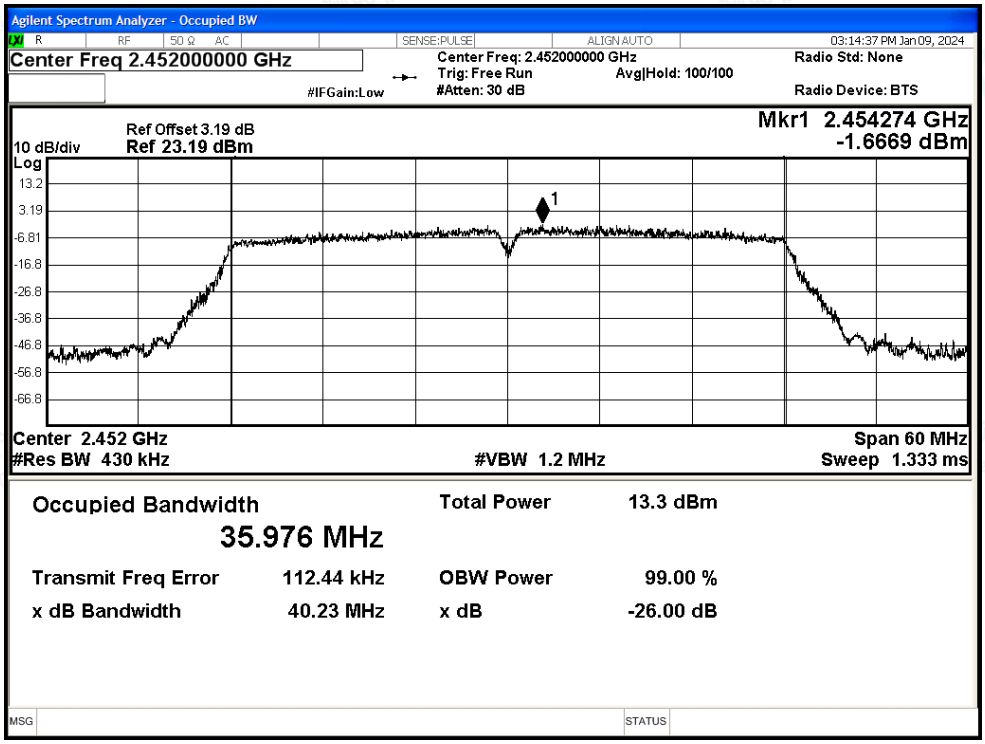
OBW NVNT n40 2422MHz Ant2



OBW NVNT n40 2437MHz Ant2



OBW NVNT n40 2452MHz Ant2



C.3 Maximum Peak Conducted Output Power

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	b	2412	Ant1	15.25	30	Pass
NVNT	b	2437	Ant1	15.29	30	Pass
NVNT	b	2462	Ant1	15.27	30	Pass
NVNT	g	2412	Ant1	14.06	30	Pass
NVNT	g	2437	Ant1	14.25	30	Pass
NVNT	g	2462	Ant1	14.37	30	Pass
NVNT	n20	2412	Ant1	13.5	30	Pass
NVNT	n20	2437	Ant1	13.6	30	Pass
NVNT	n20	2462	Ant1	13.58	30	Pass
NVNT	n40	2422	Ant1	12.31	30	Pass
NVNT	n40	2437	Ant1	12.36	30	Pass
NVNT	n40	2452	Ant1	12.26	30	Pass

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	b	2412	Ant2	15.18	30	Pass
NVNT	b	2437	Ant2	15.44	30	Pass
NVNT	b	2462	Ant2	15.42	30	Pass
NVNT	g	2412	Ant2	14.13	30	Pass
NVNT	g	2437	Ant2	14.24	30	Pass
NVNT	g	2462	Ant2	14.22	30	Pass
NVNT	n20	2412	Ant2	13.44	30	Pass
NVNT	n20	2437	Ant2	13.56	30	Pass
NVNT	n20	2462	Ant2	13.58	30	Pass
NVNT	n40	2422	Ant2	12.36	30	Pass
NVNT	n40	2437	Ant2	12.29	30	Pass
NVNT	n40	2452	Ant2	12.2	30	Pass

MIMO

Condition	Mode	Frequency (MHz)	Total Power (dBm)			Limit (dBm)	Verdict
			Ant1	Ant2	Ant1+Ant2		
NVNT	n20	2412	13.5	13.44	16.48	30	Pass
NVNT	n20	2437	13.6	13.56	16.59	30	Pass
NVNT	n20	2462	13.58	13.58	16.59	30	Pass
NVNT	n40	2422	12.31	12.36	15.35	30	Pass
NVNT	n40	2437	12.36	12.29	15.34	30	Pass
NVNT	n40	2452	12.26	12.2	15.24	30	Pass

C.4 Maximum Power Spectral Density Level

Condition	Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
NVNT	b	2412	Ant1	-8.45	8	Pass
NVNT	b	2437	Ant1	-8.74	8	Pass
NVNT	b	2462	Ant1	-9.13	8	Pass
NVNT	g	2412	Ant1	-15.13	8	Pass
NVNT	g	2437	Ant1	-15.12	8	Pass
NVNT	g	2462	Ant1	-14.35	8	Pass
NVNT	n20	2412	Ant1	-15.98	8	Pass
NVNT	n20	2437	Ant1	-16.34	8	Pass
NVNT	n20	2462	Ant1	-15.82	8	Pass
NVNT	n40	2422	Ant1	-18.58	8	Pass
NVNT	n40	2437	Ant1	-20.23	8	Pass
NVNT	n40	2452	Ant1	-19.26	8	Pass

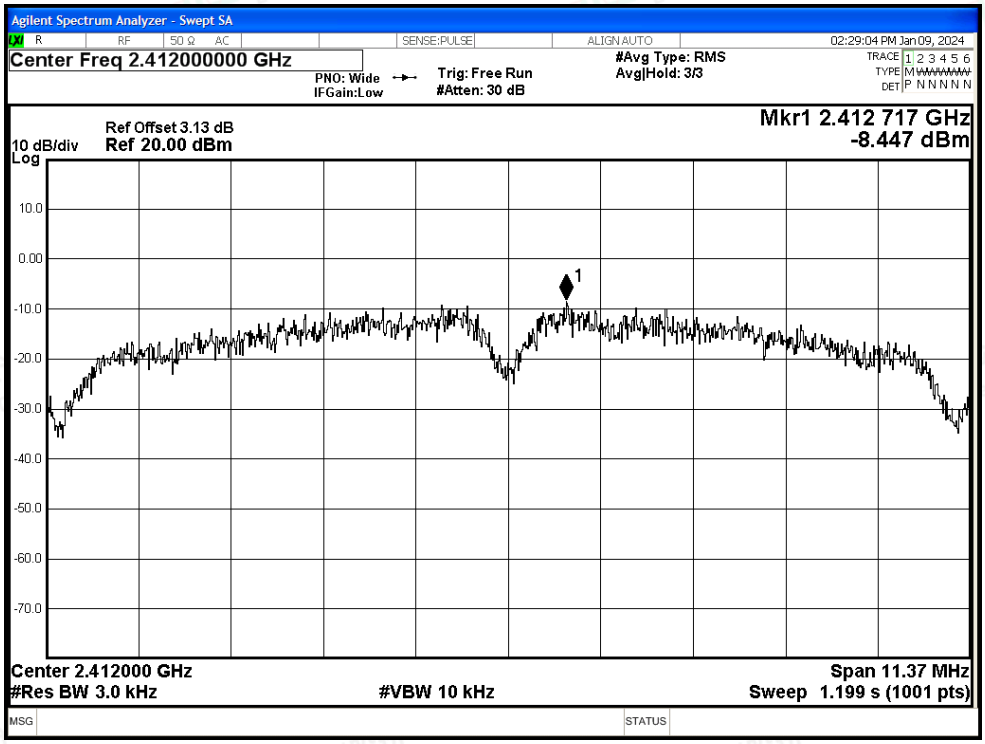
Condition	Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
NVNT	b	2412	Ant2	-9.02	8	Pass
NVNT	b	2437	Ant2	-8.35	8	Pass
NVNT	b	2462	Ant2	-7.58	8	Pass
NVNT	g	2412	Ant2	-15.52	8	Pass
NVNT	g	2437	Ant2	-14.8	8	Pass
NVNT	g	2462	Ant2	-15.55	8	Pass
NVNT	n20	2412	Ant2	-15.39	8	Pass
NVNT	n20	2437	Ant2	-16.22	8	Pass
NVNT	n20	2462	Ant2	-15.27	8	Pass
NVNT	n40	2422	Ant2	-18.19	8	Pass
NVNT	n40	2437	Ant2	-19.68	8	Pass
NVNT	n40	2452	Ant2	-20.03	8	Pass

MIMO

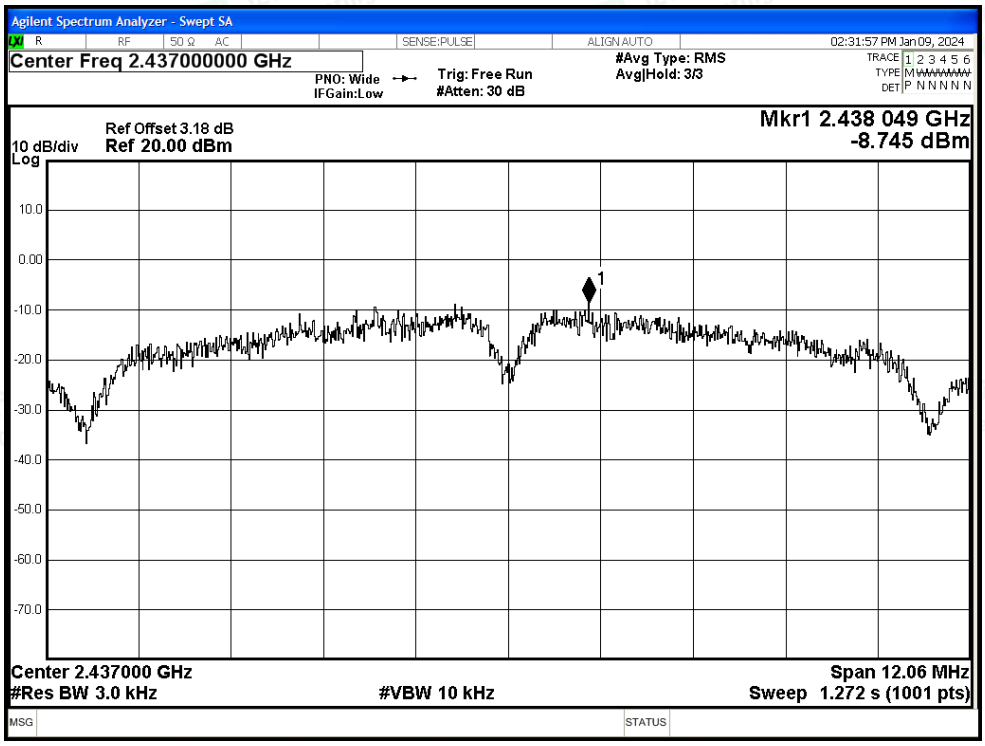
Condition	Mode	Frequency (MHz)	Total PSD (dBm/3kHz)			Limit (dBm)	Verdict
			Ant1	Ant2	Ant1+Ant2		
NVNT	n20	2412	-15.98	-15.39	-12.66	8	Pass
NVNT	n20	2437	-16.34	-16.22	-13.27	8	Pass
NVNT	n20	2462	-15.82	-15.27	-12.53	8	Pass
NVNT	n40	2422	-18.58	-18.19	-15.37	8	Pass
NVNT	n40	2437	-20.23	-19.68	-16.94	8	Pass
NVNT	n40	2452	-19.26	-20.03	-16.62	8	Pass

Test Graphs

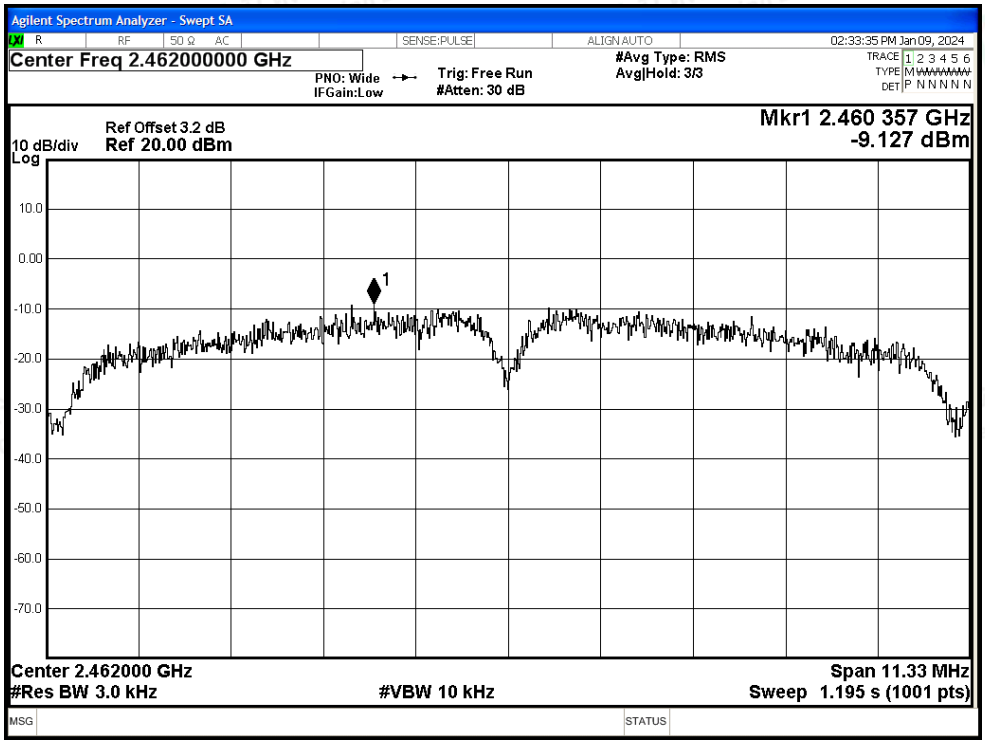
PSD NVNT b 2412MHz Ant1



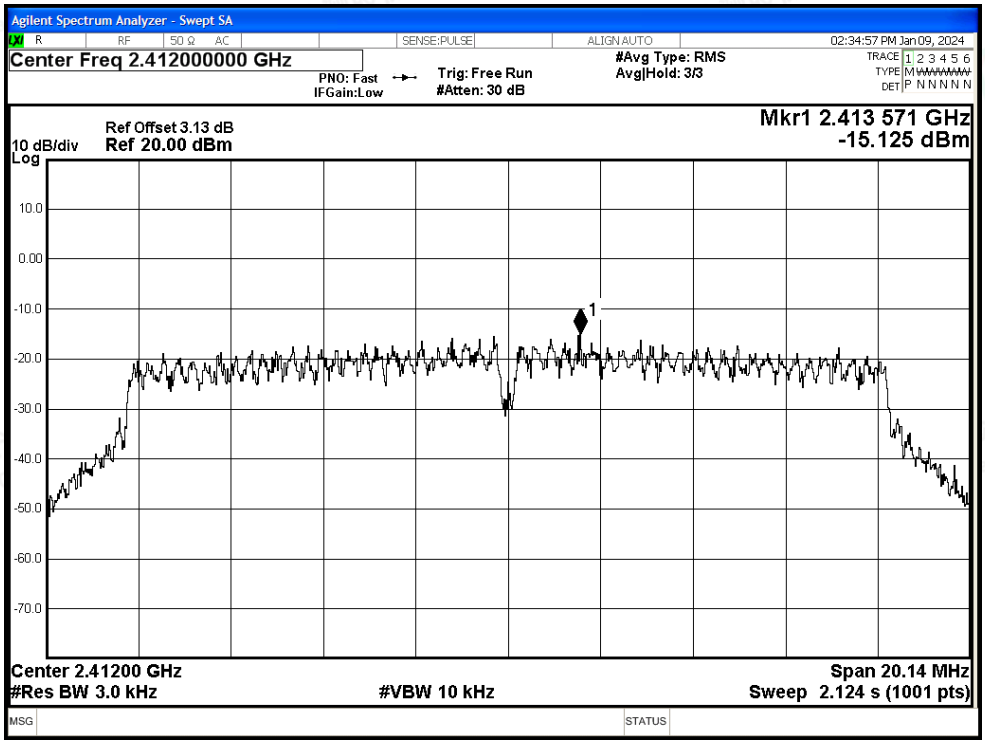
PSD NVNT b 2437MHz Ant1



PSD NVNT b 2462MHz Ant1



PSD NVNT g 2412MHz Ant1



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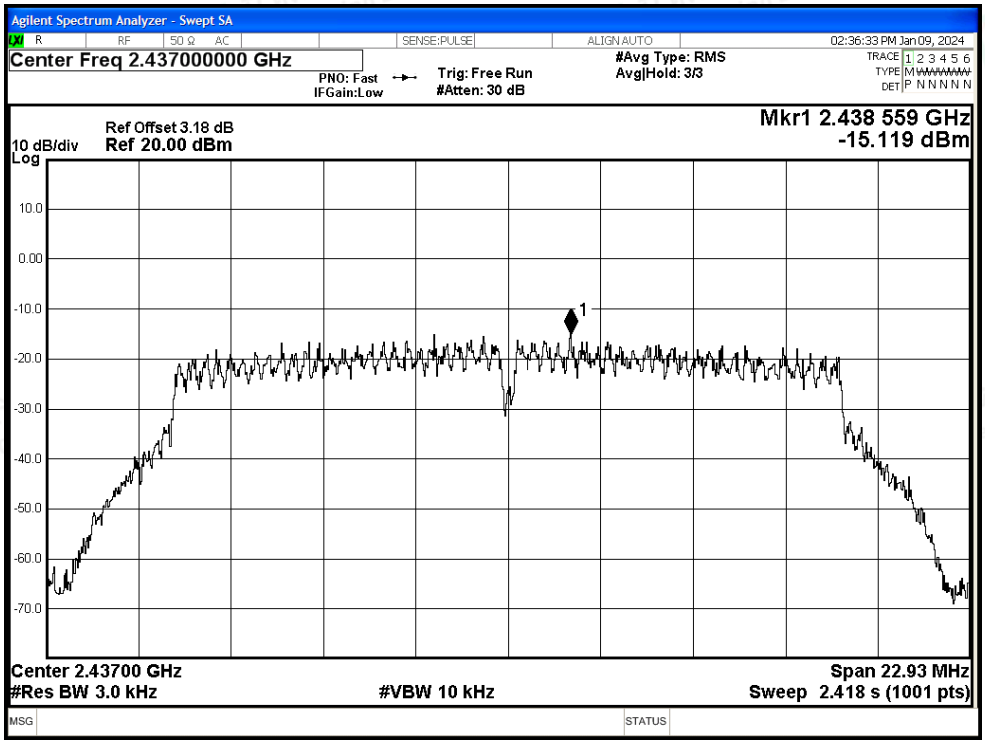

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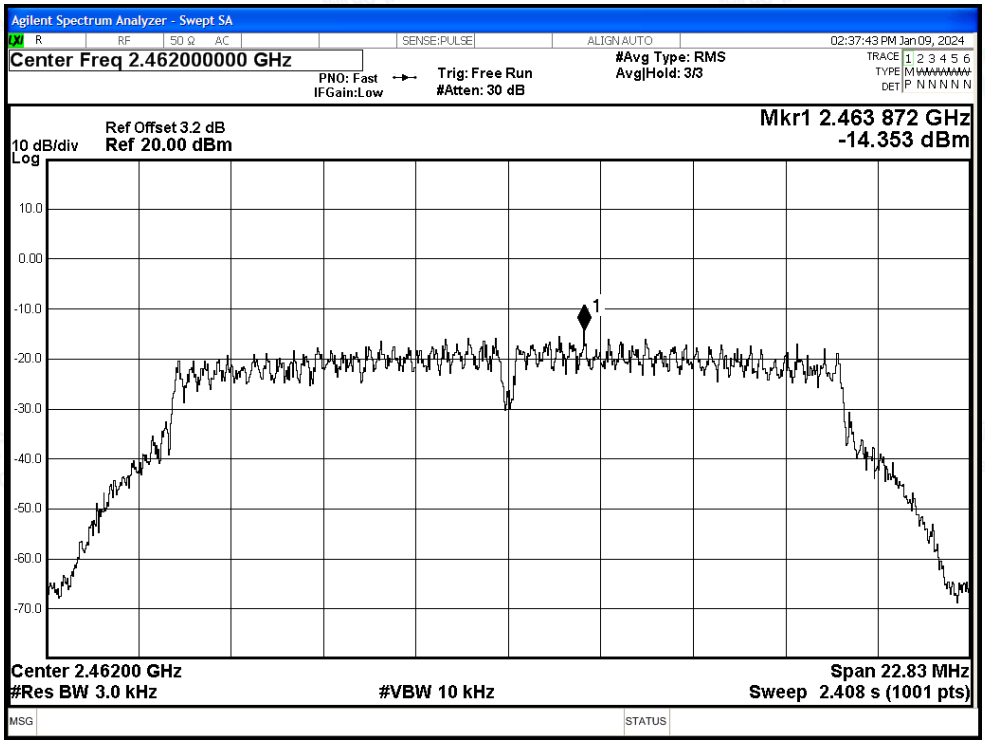

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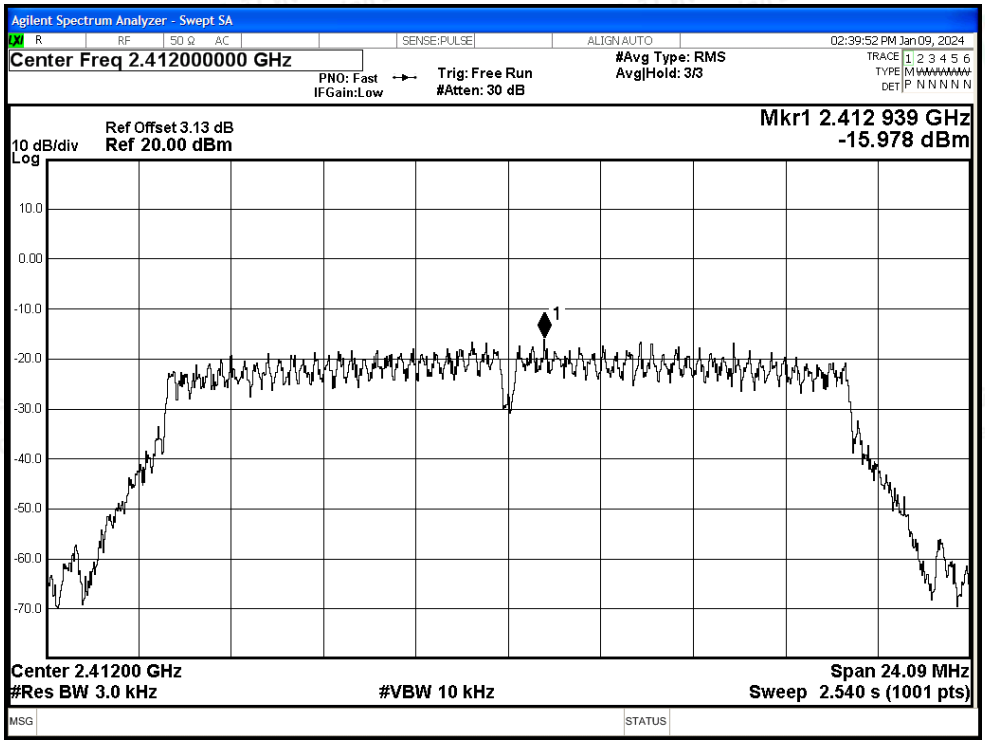
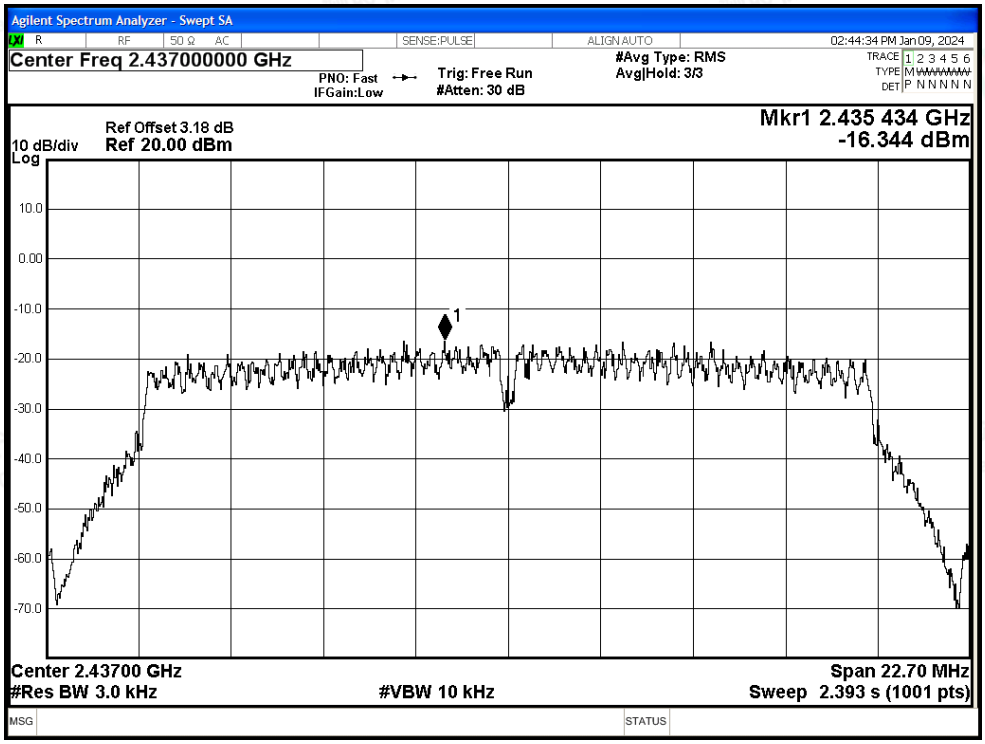
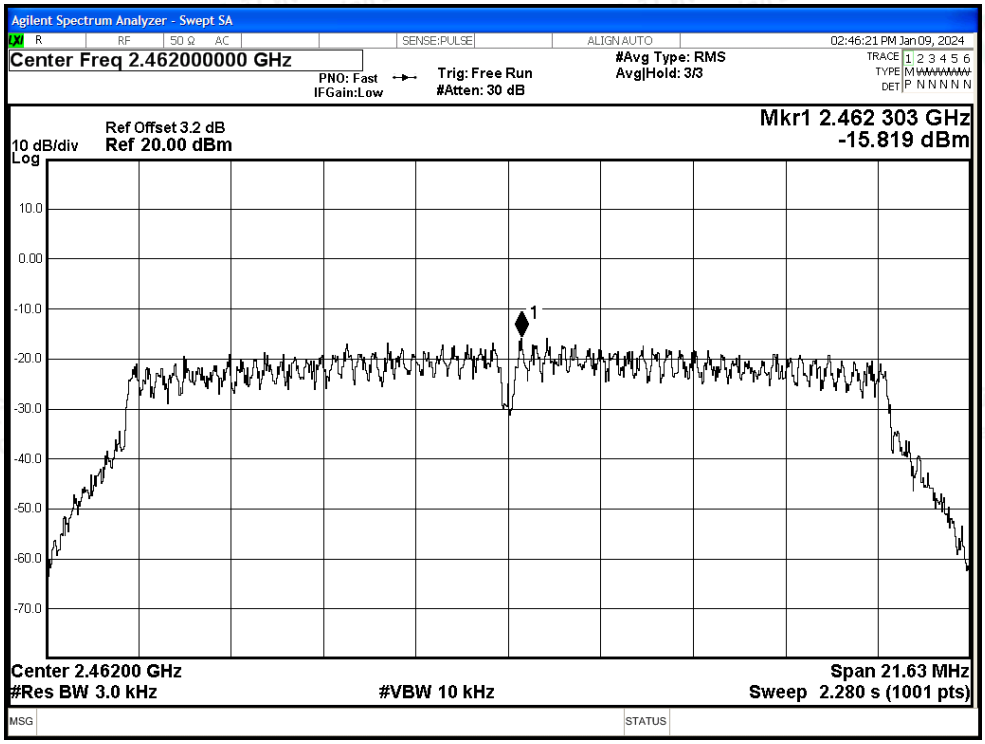


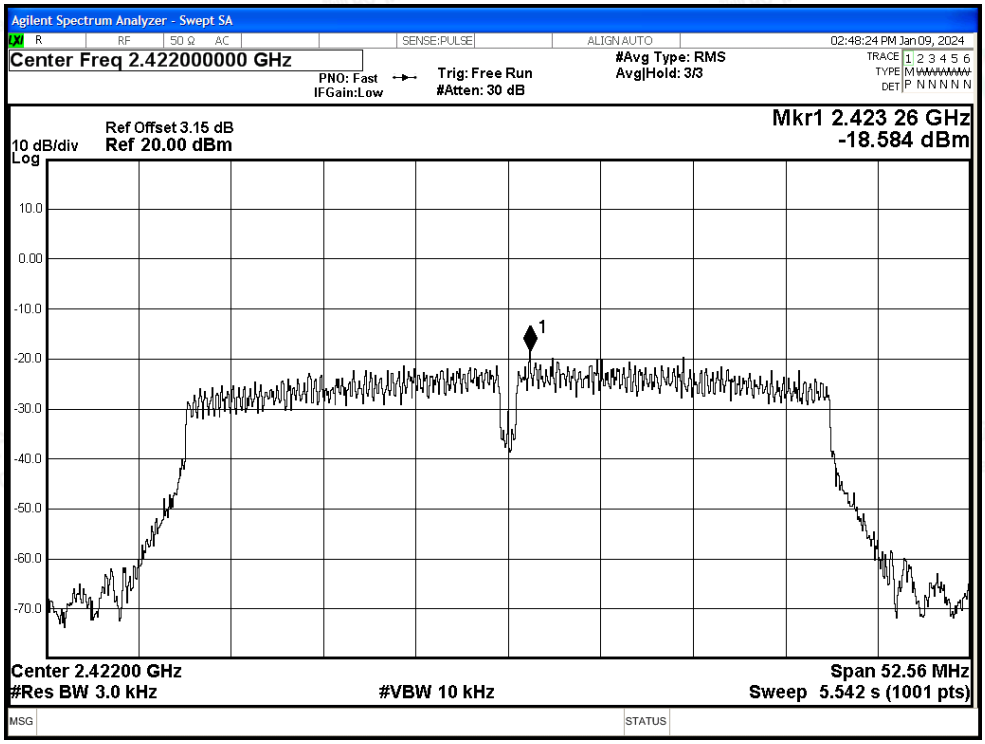
PSD NVNT n20 2437MHz Ant1



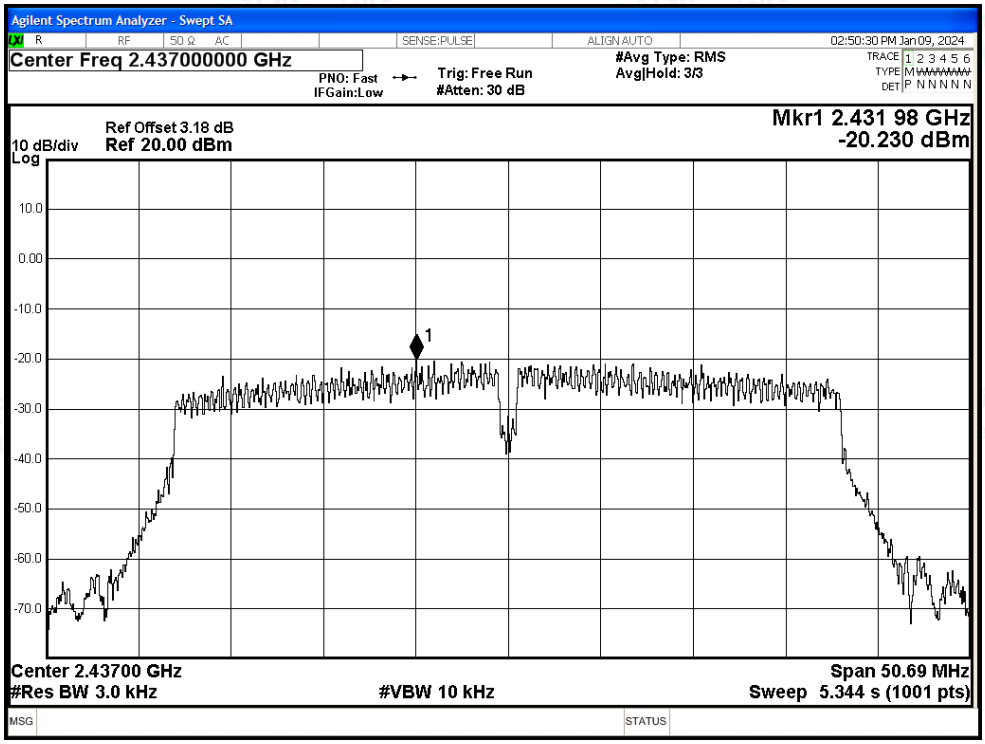
PSD NVNT n20 2462MHz Ant1



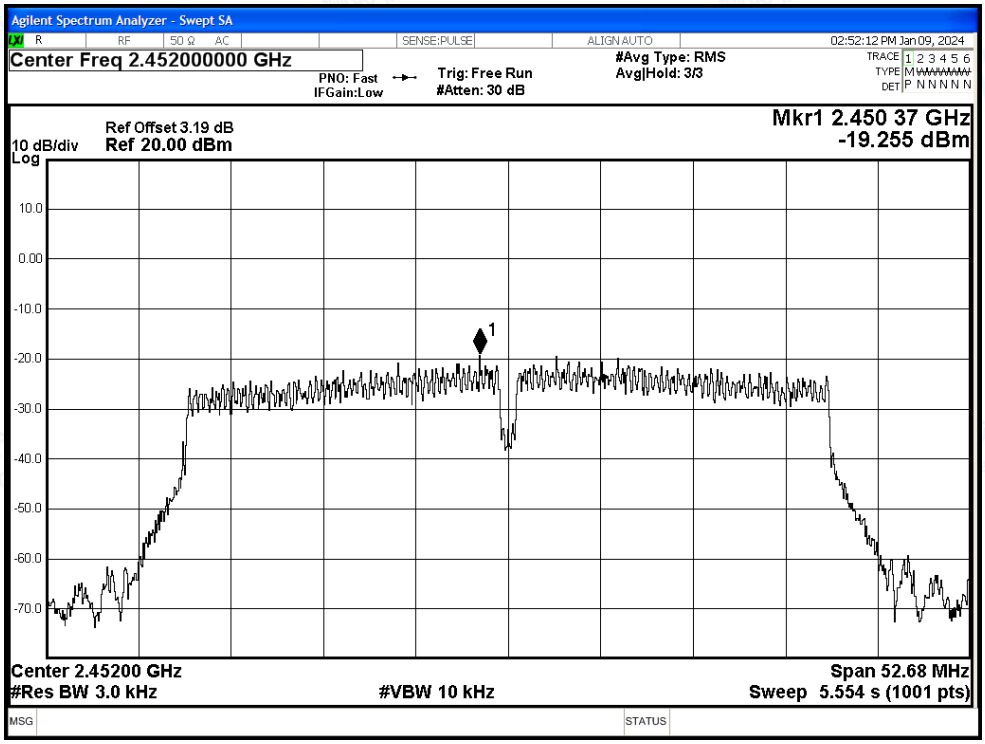
PSD NVNT n40 2422MHz Ant1



PSD NVNT n40 2437MHz Ant1

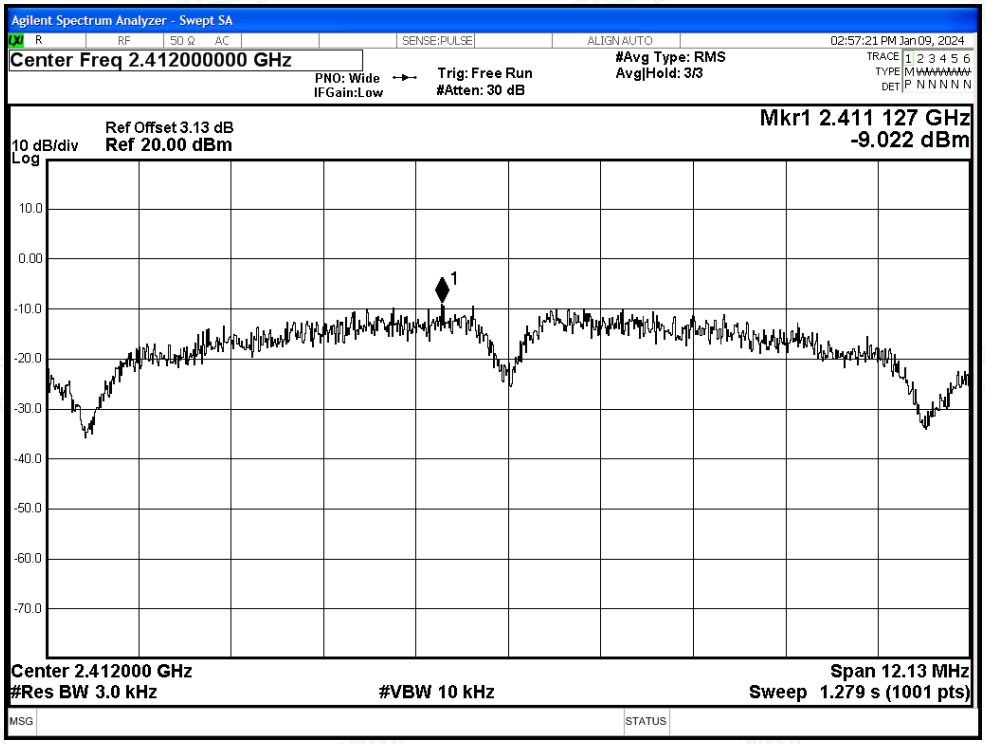


PSD NVNT n40 2452MHz Ant1

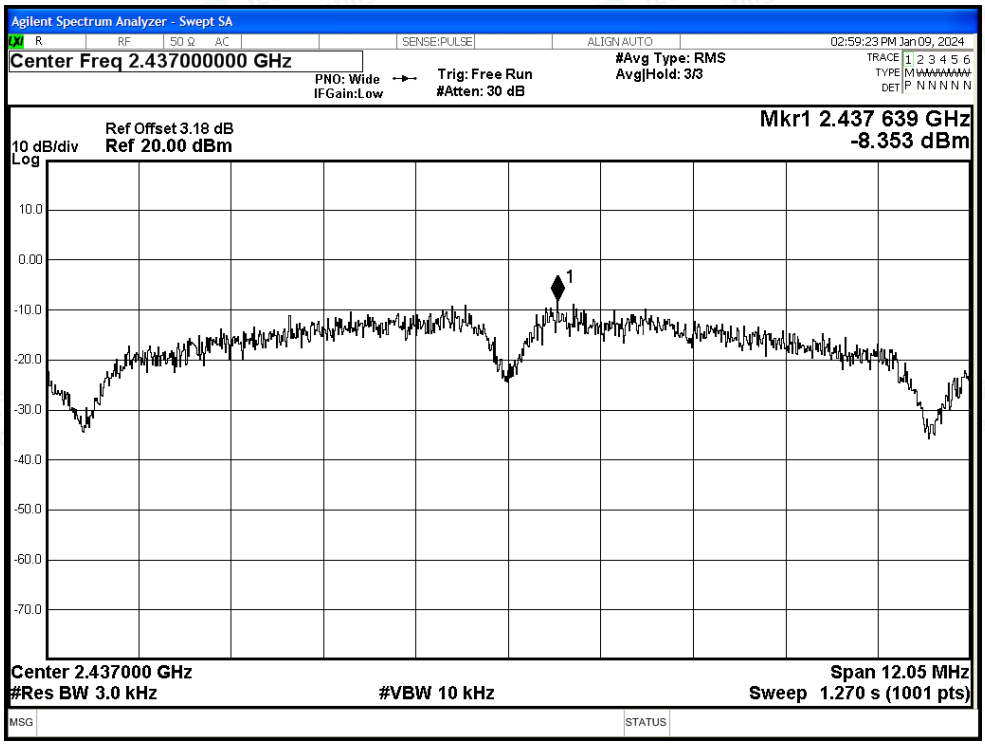


Test Graphs

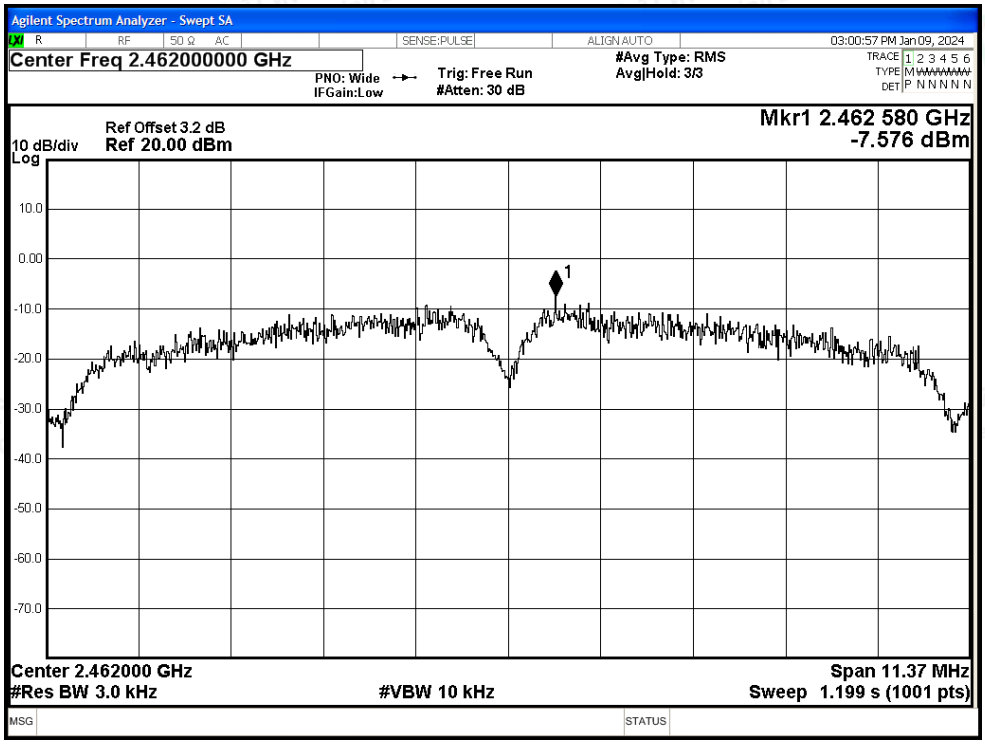
PSD NVNT b 2412MHz Ant2



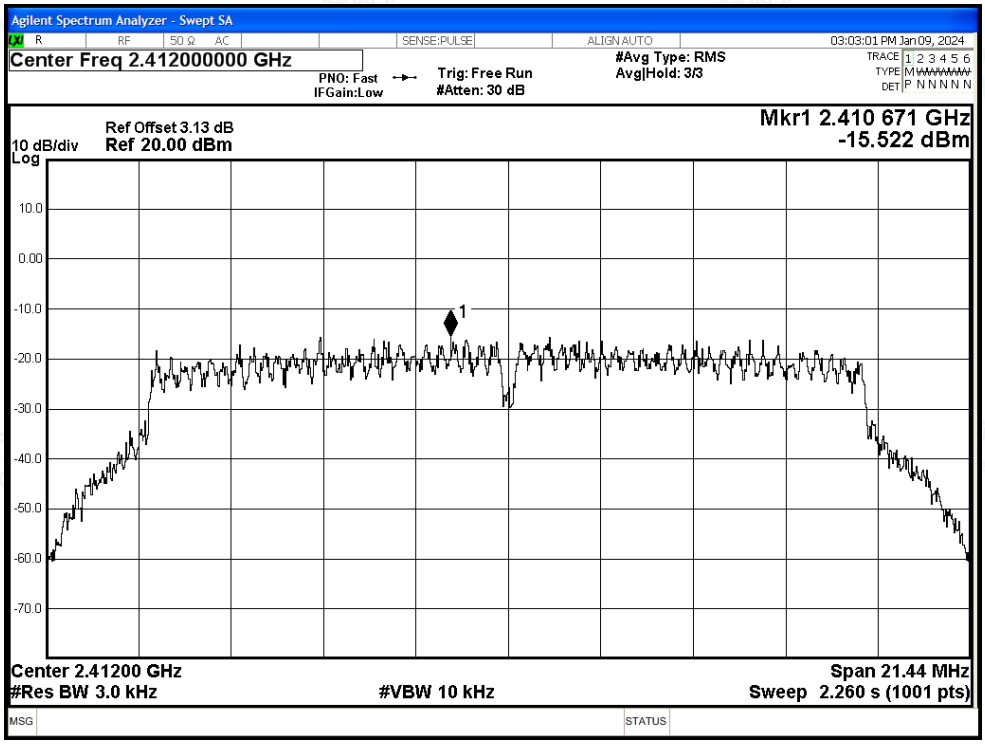
PSD NVNT b 2437MHz Ant2



PSD NVNT b 2462MHz Ant2



PSD NVNT g 2412MHz Ant2



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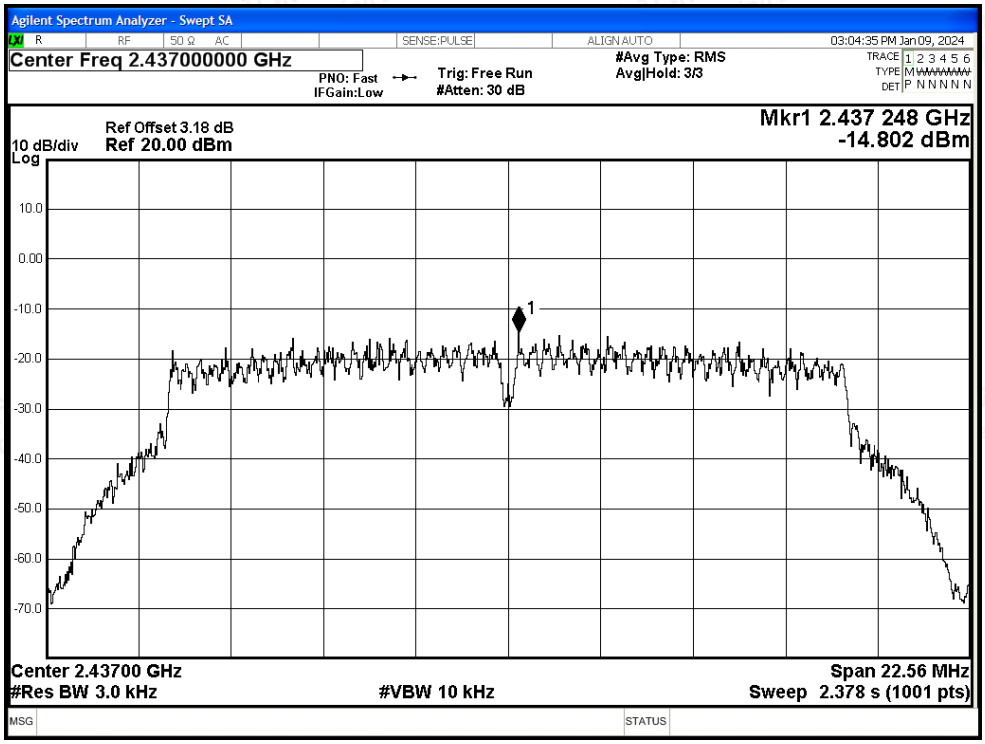

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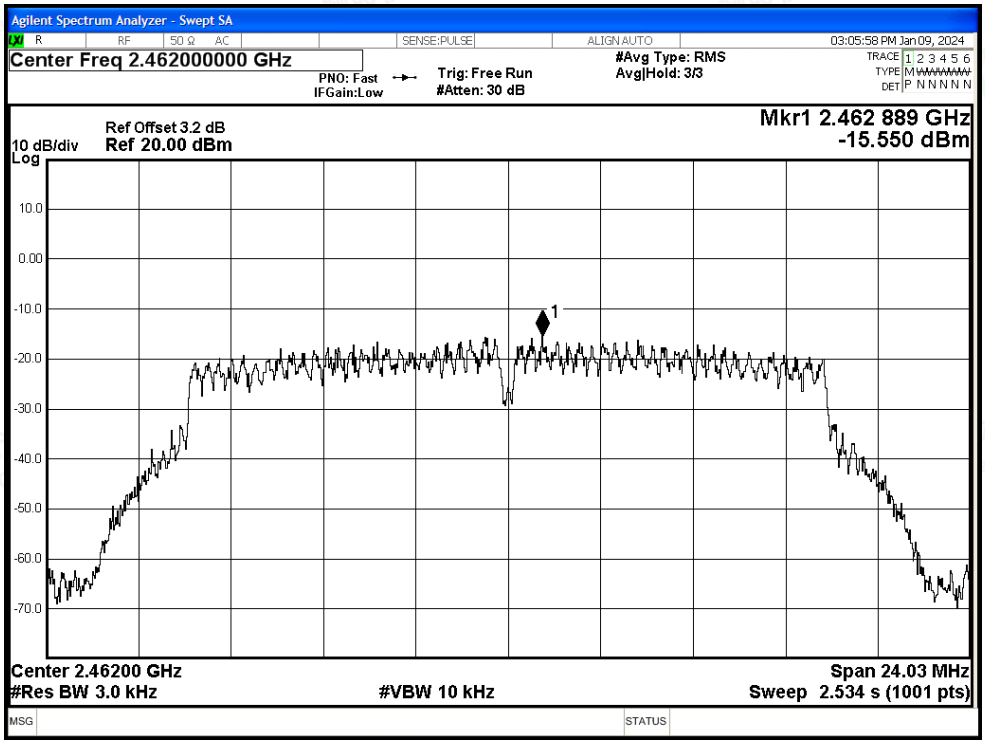
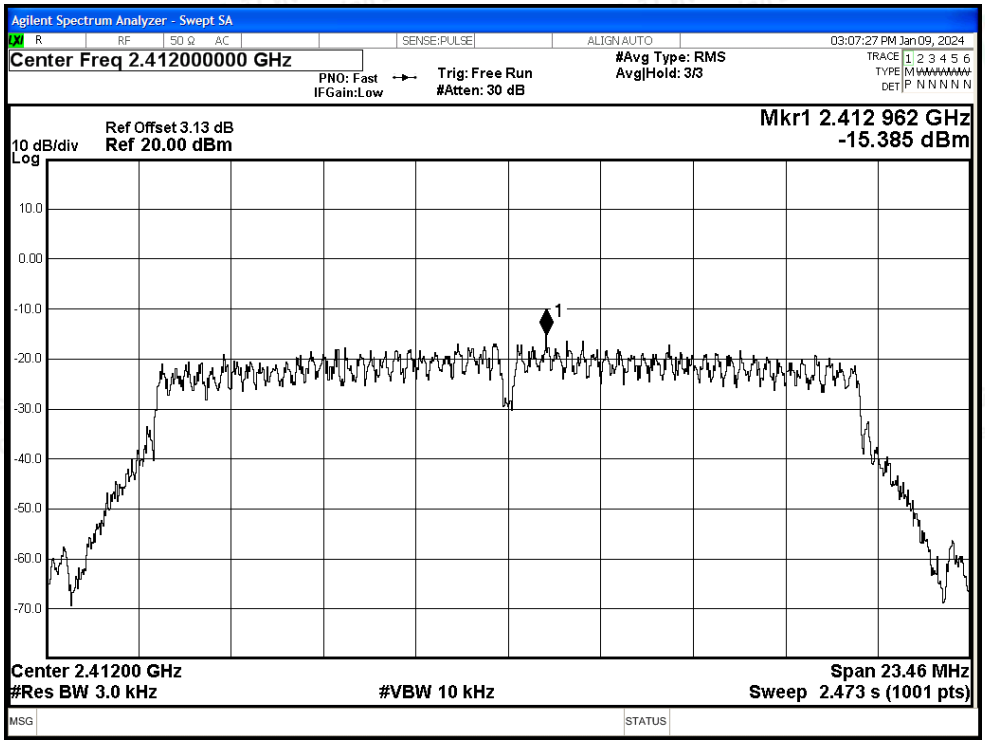
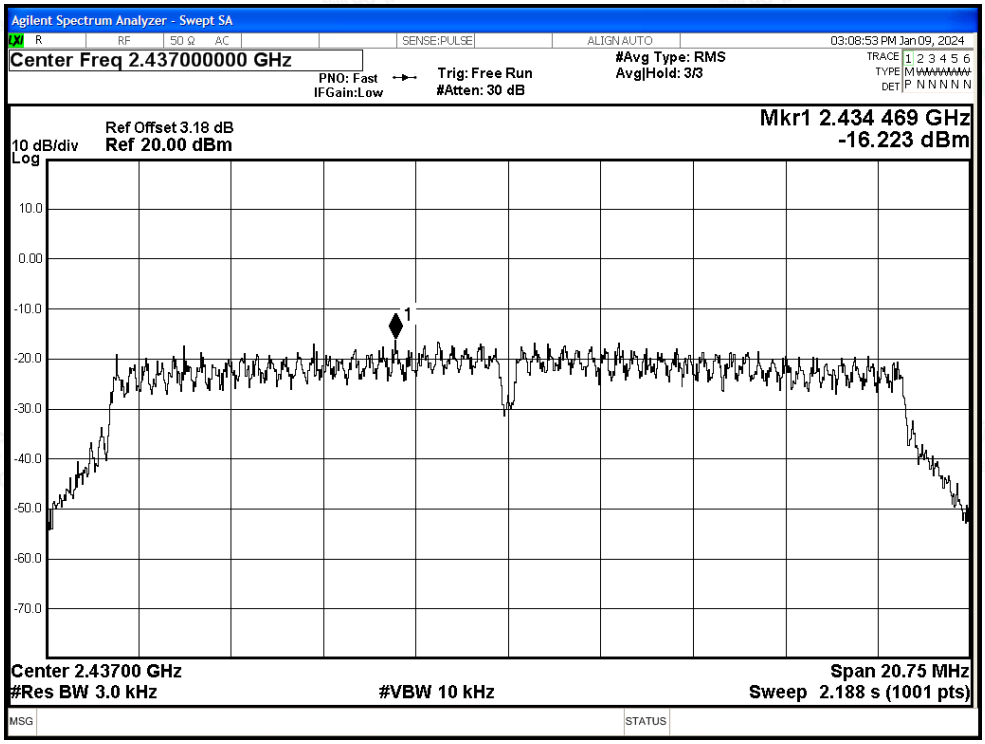


PSD NVNT n20 2412MHz Ant2



PSD NVNT n20 2437MHz Ant2



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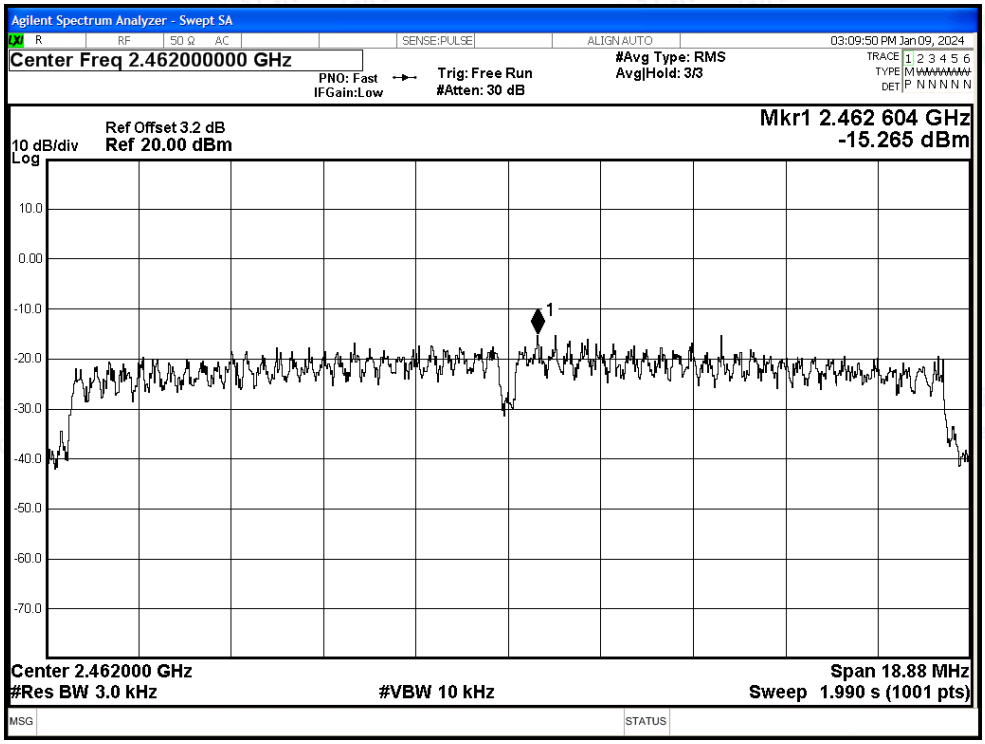
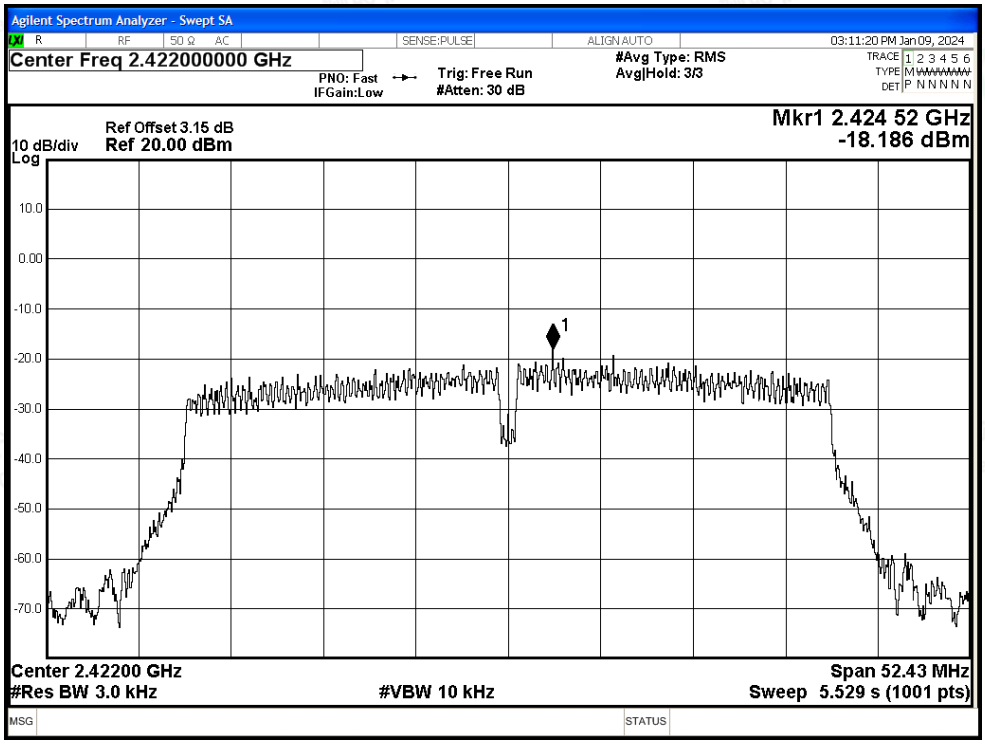


PSD NVNT n40 2422MHz Ant2



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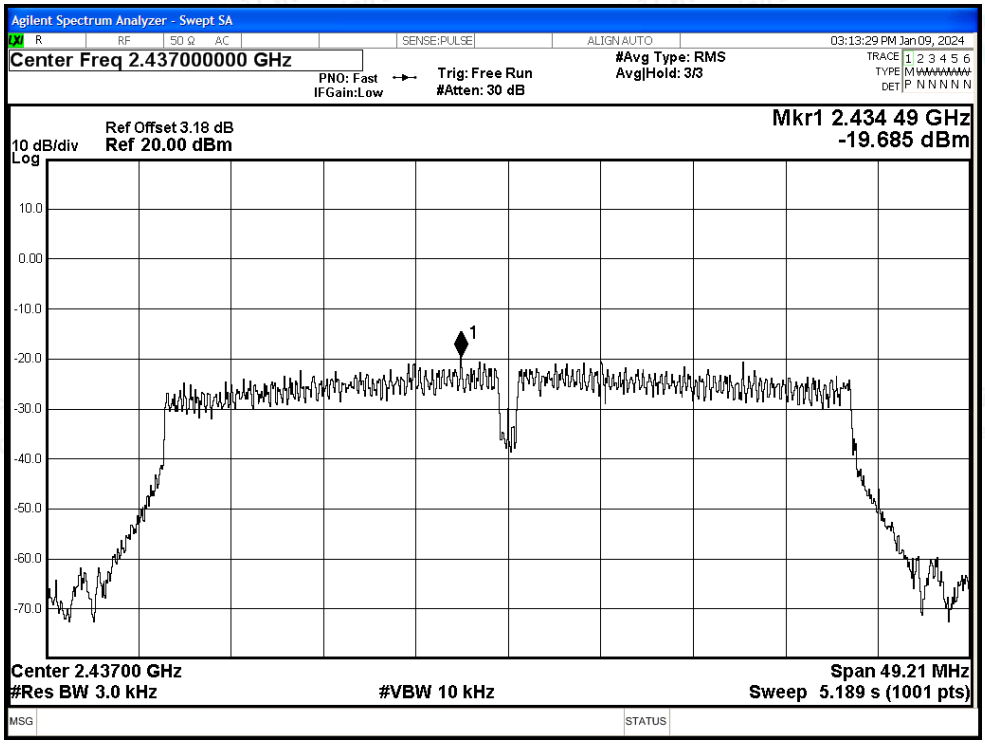
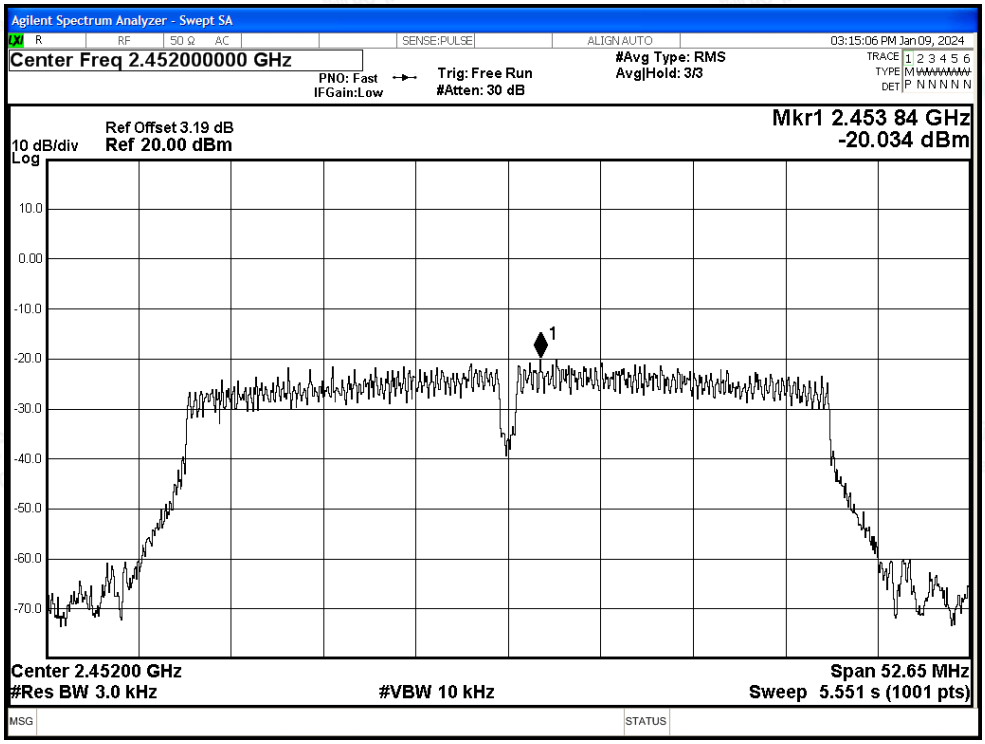


PSD NVNT n40 2452MHz Ant2

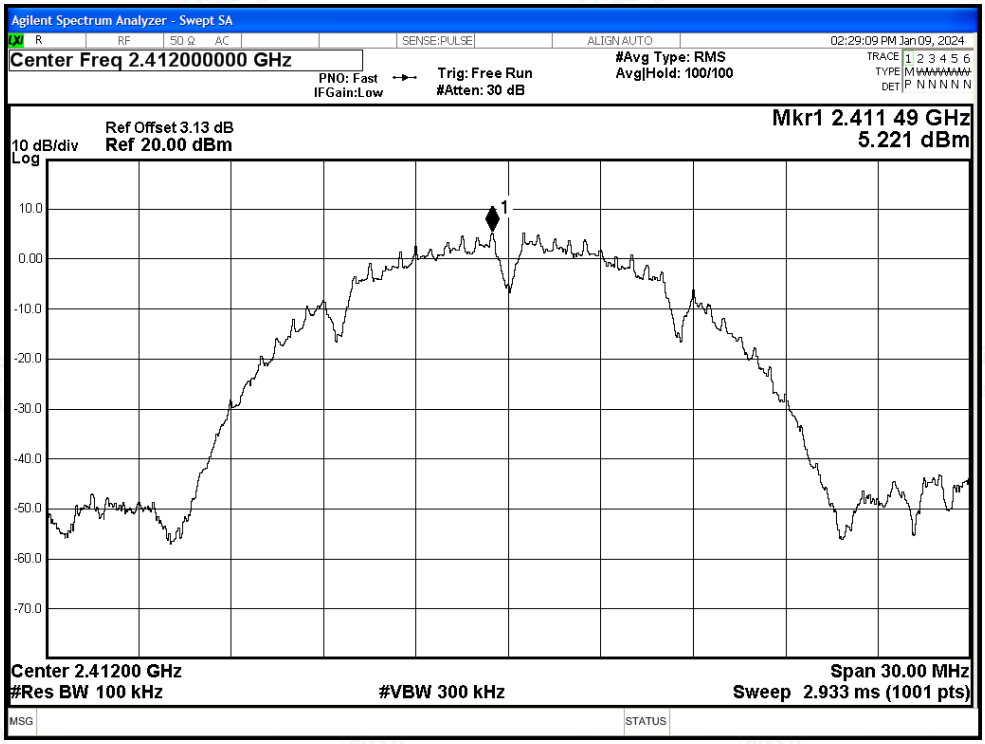


C.5 Band Edge

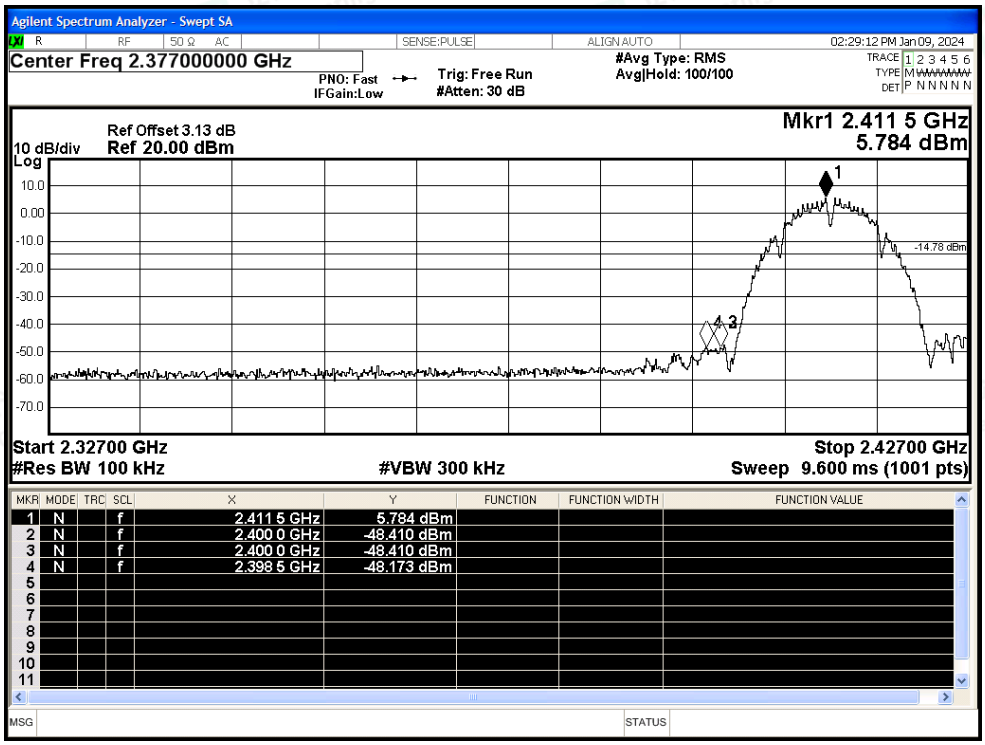
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	b	2412	Ant1	-53.39	-20	Pass
NVNT	b	2462	Ant1	-59.46	-20	Pass
NVNT	g	2412	Ant1	-40.62	-20	Pass
NVNT	g	2462	Ant1	-51.89	-20	Pass
NVNT	n20	2412	Ant1	-43.88	-20	Pass
NVNT	n20	2462	Ant1	-51.2	-20	Pass
NVNT	n40	2422	Ant1	-42.35	-20	Pass
NVNT	n40	2452	Ant1	-46.38	-20	Pass

Test Graphs

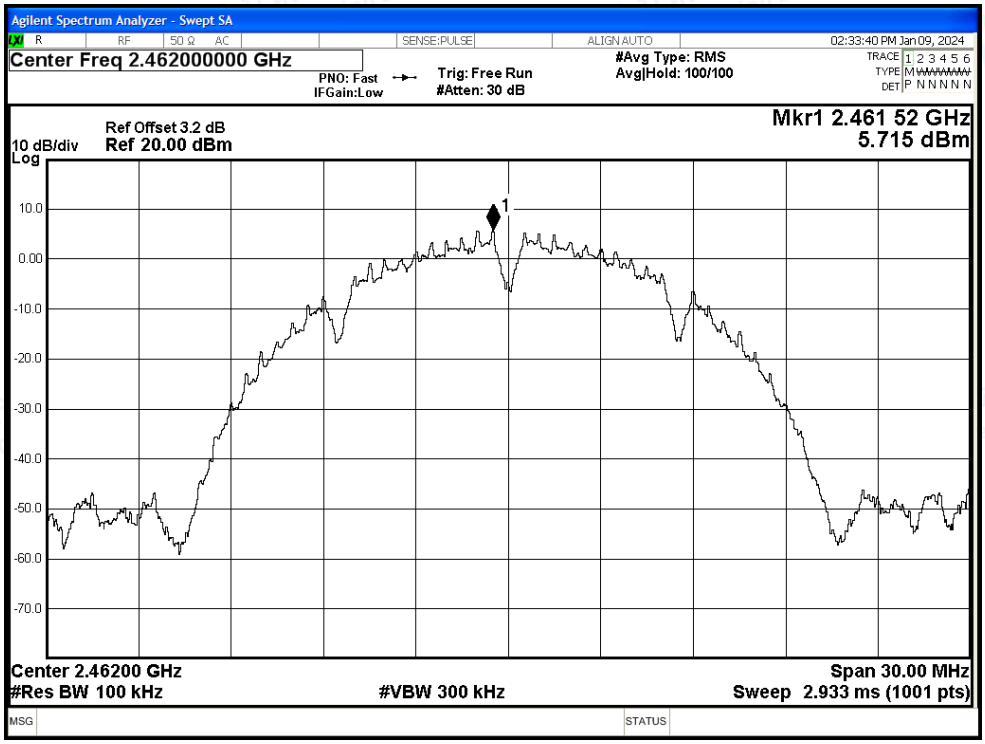
Band Edge NVNT b 2412MHz Ant1 Ref



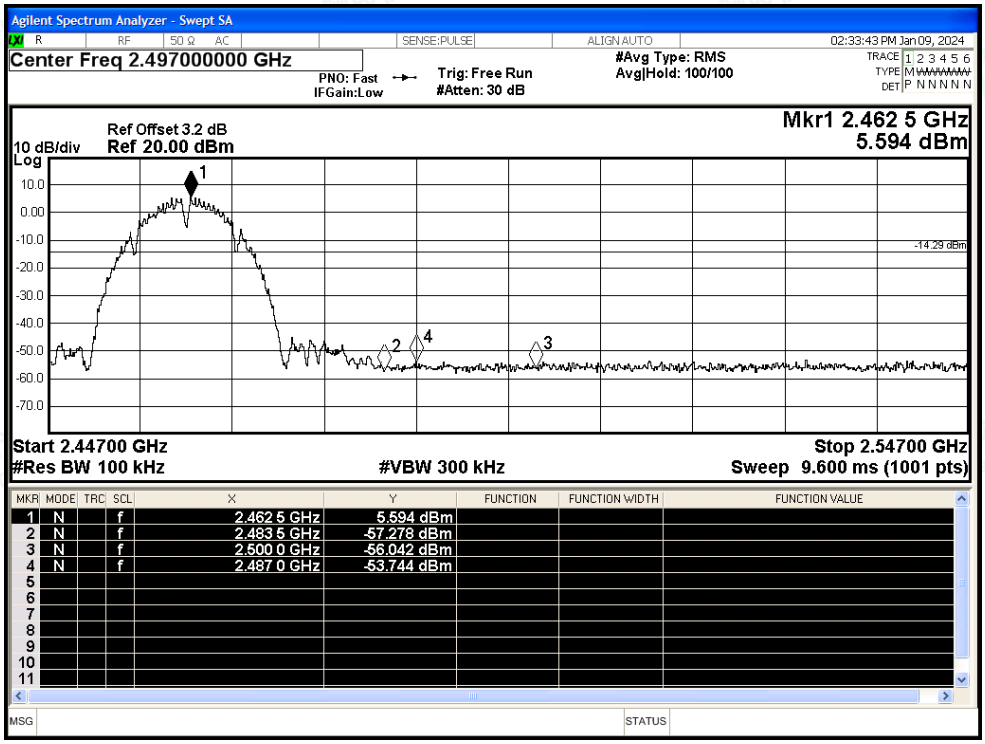
Band Edge NVNT b 2412MHz Ant1 Emission



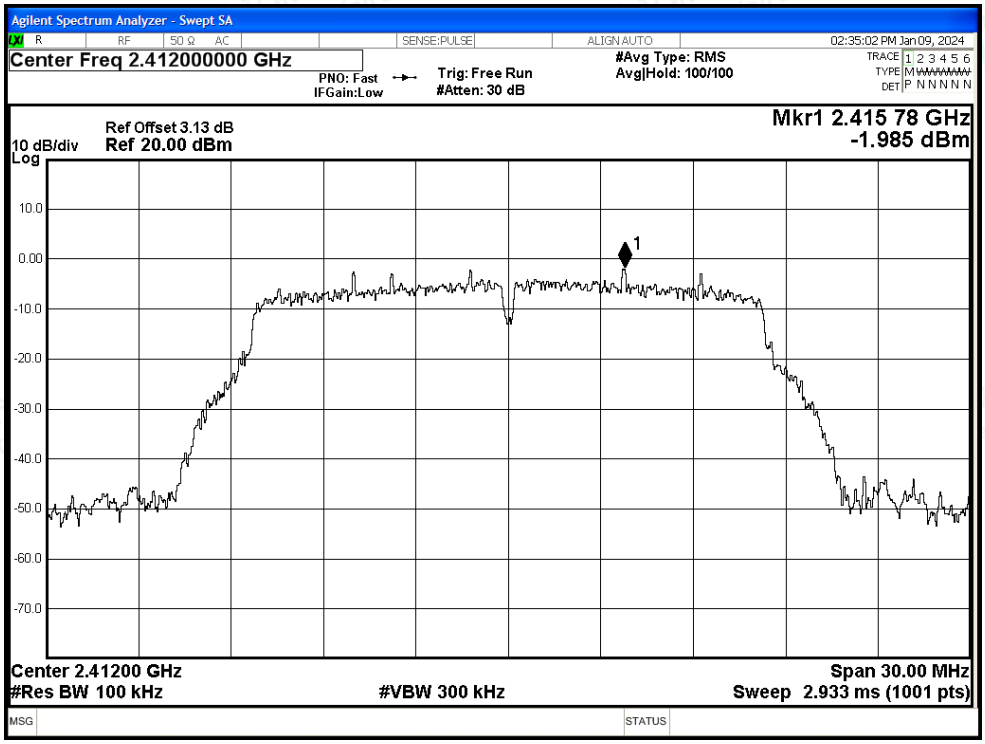
Band Edge NVNT b 2462MHz Ant1 Ref



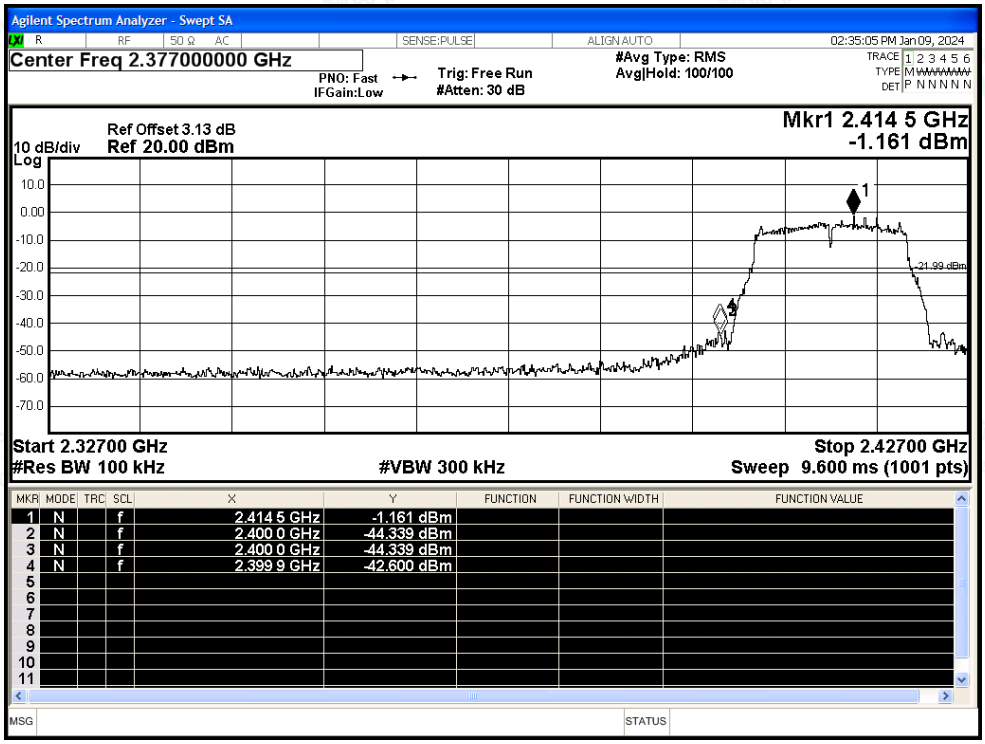
Band Edge NVNT b 2462MHz Ant1 Emission



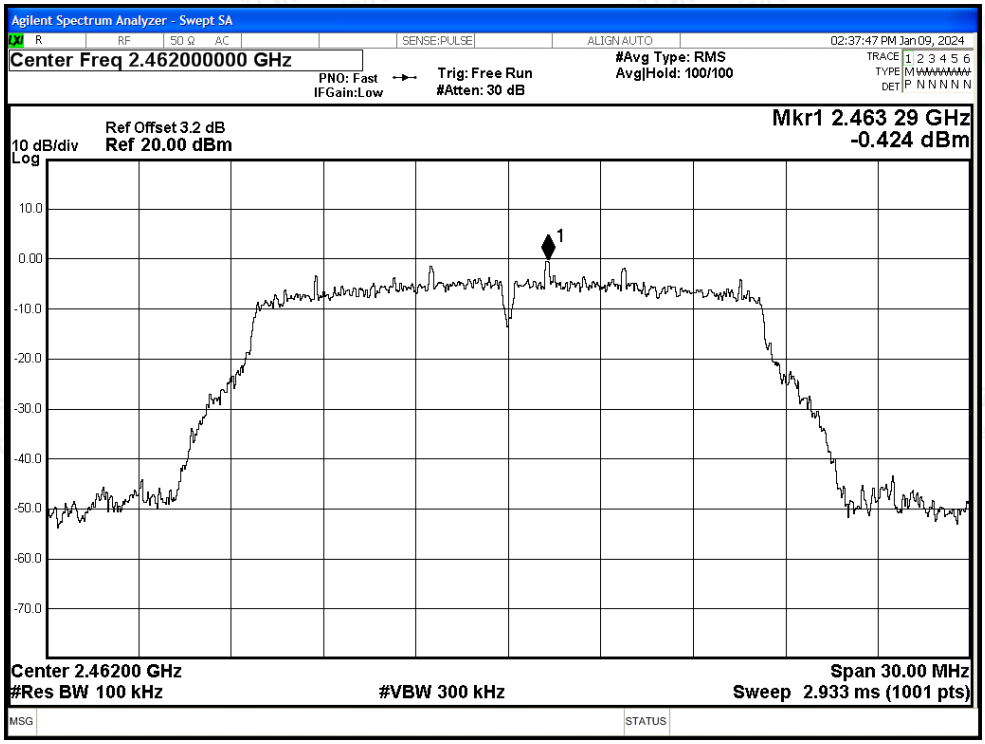
Band Edge NVNT g 2412MHz Ant1 Ref



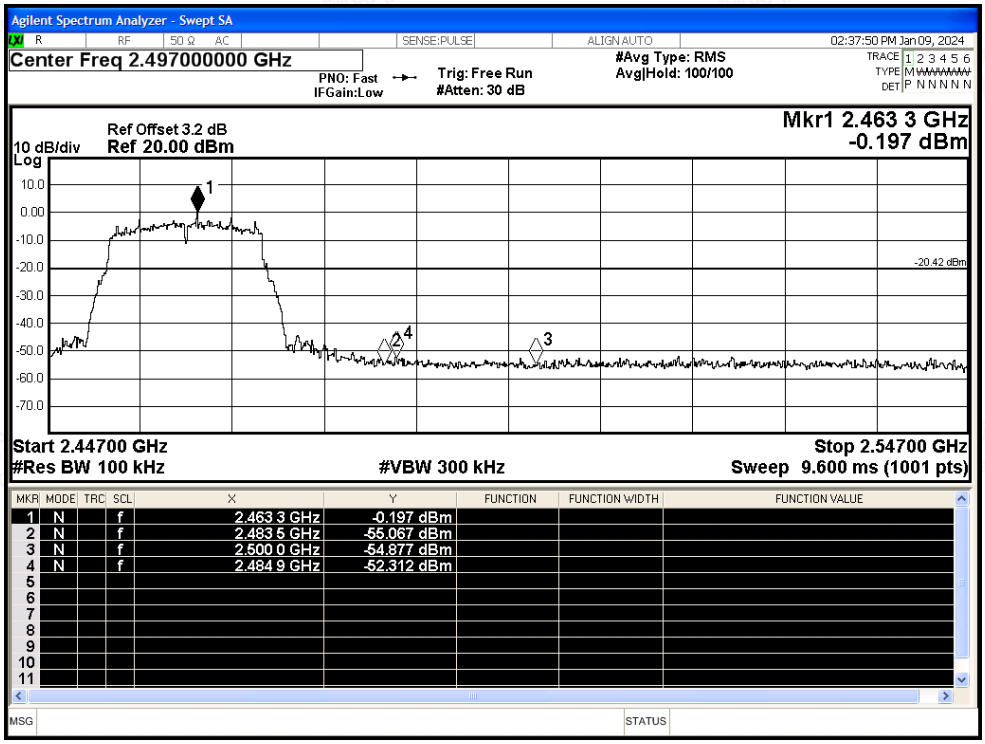
Band Edge NVNT g 2412MHz Ant1 Emission



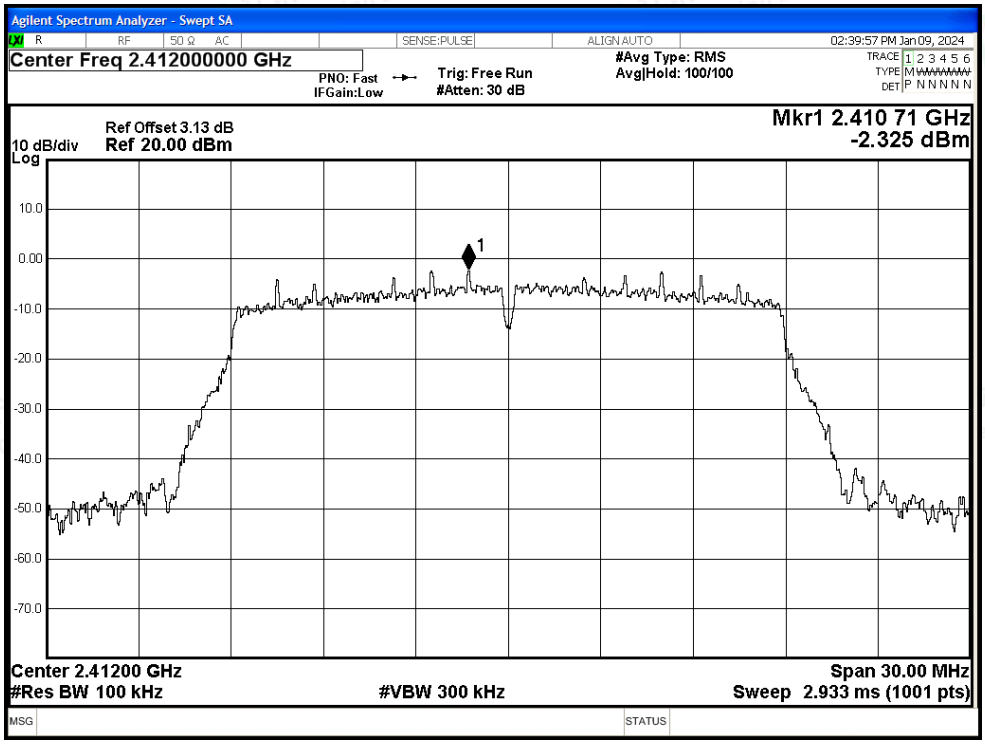
Band Edge NVNT g 2462MHz Ant1 Ref



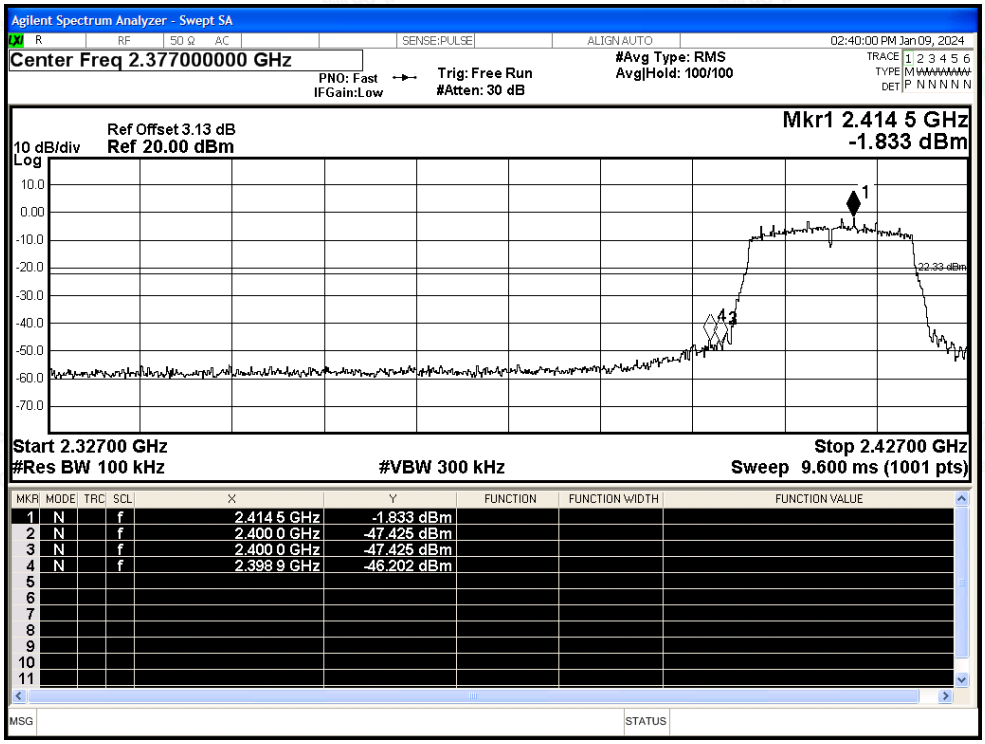
Band Edge NVNT g 2462MHz Ant1 Emission



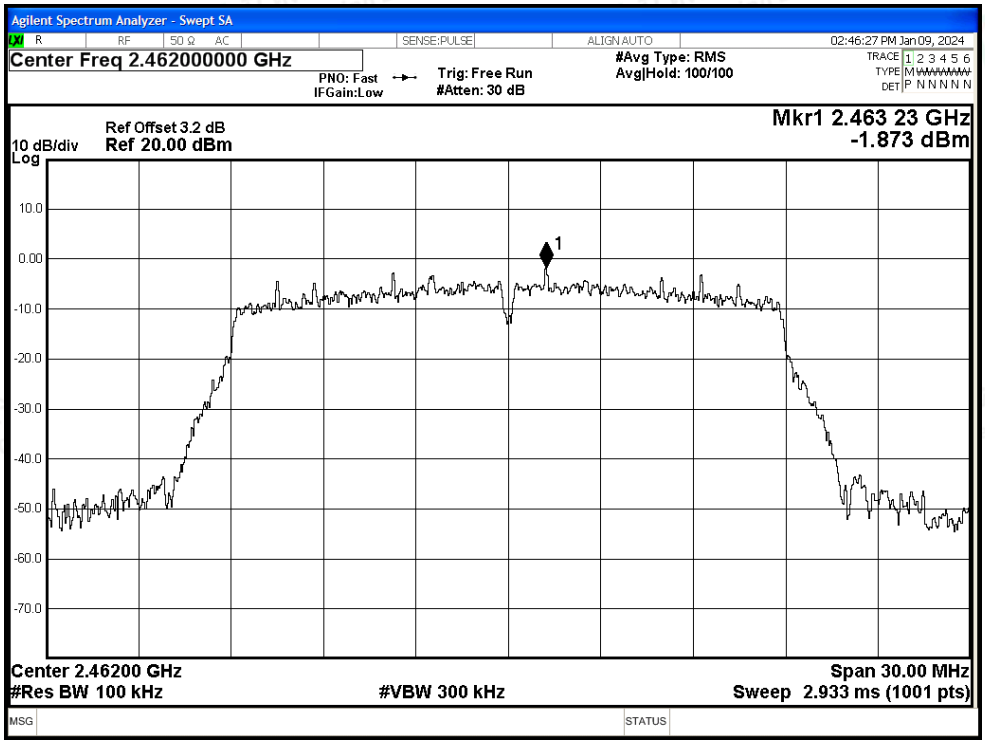
Band Edge NVNT n20 2412MHz Ant1 Ref



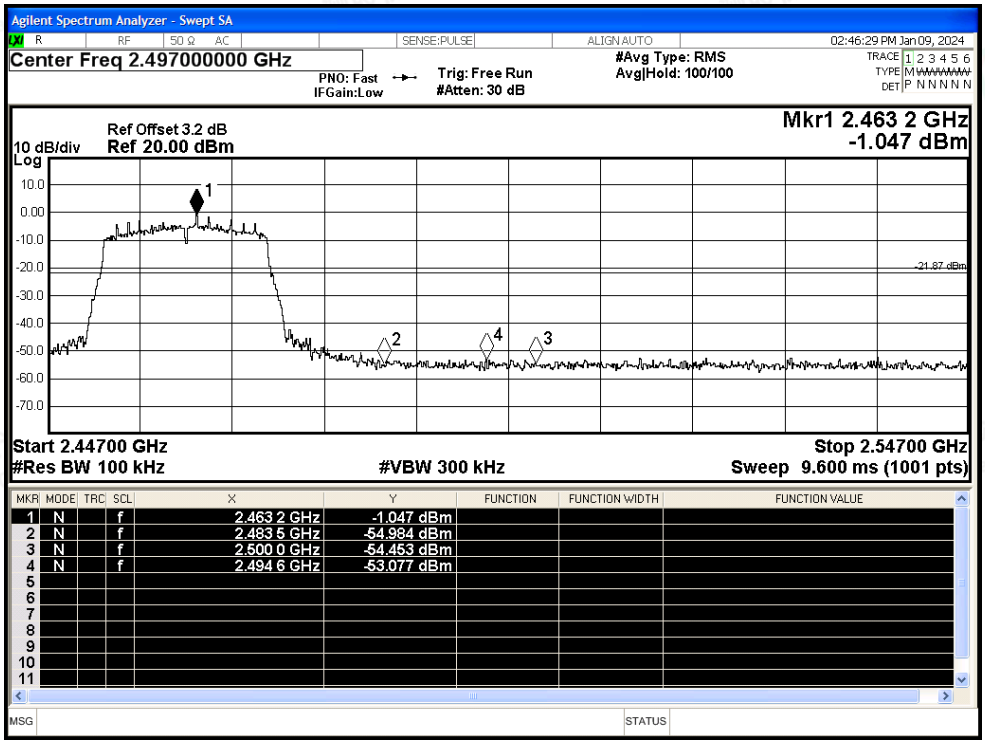
Band Edge NVNT n20 2412MHz Ant1 Emission



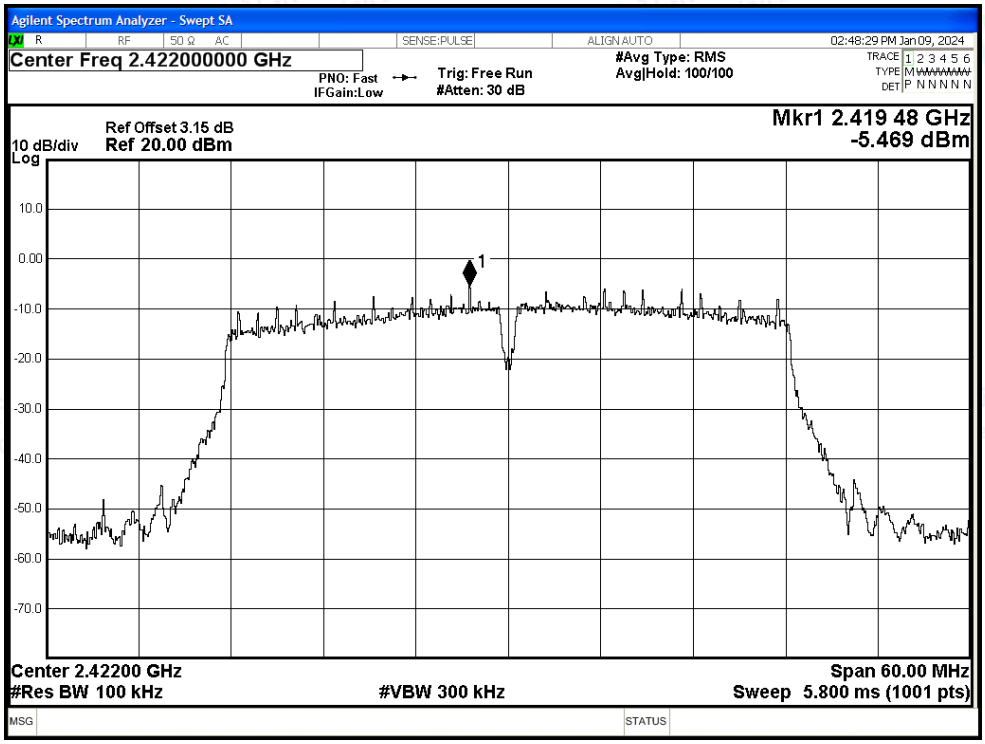
Band Edge NVNT n20 2462MHz Ant1 Ref



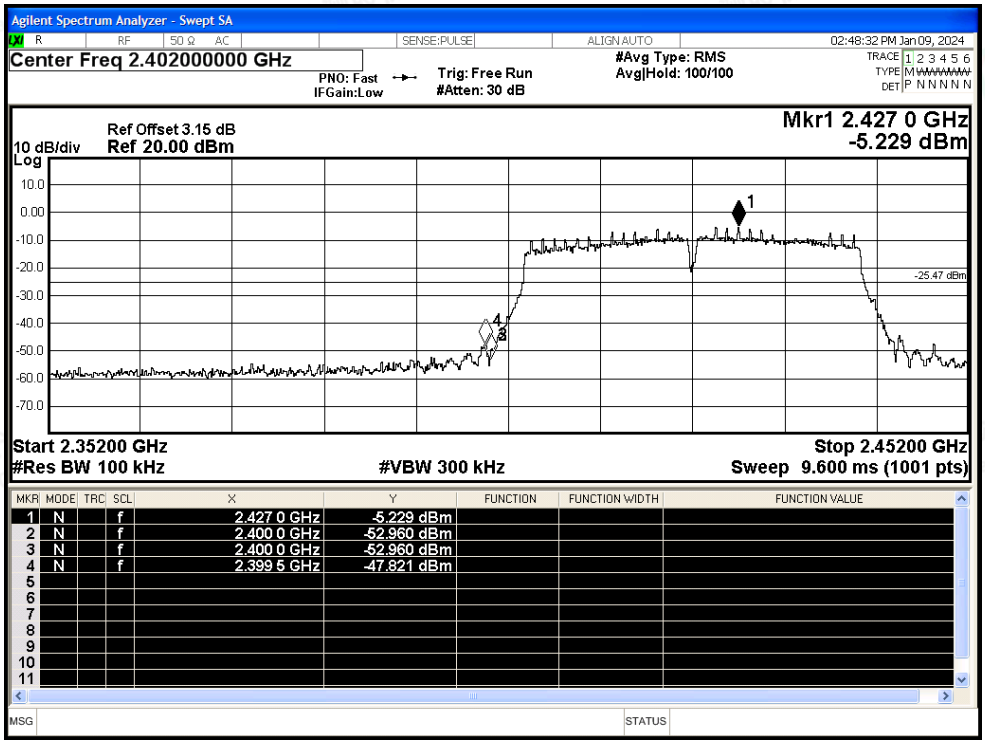
Band Edge NVNT n20 2462MHz Ant1 Emission



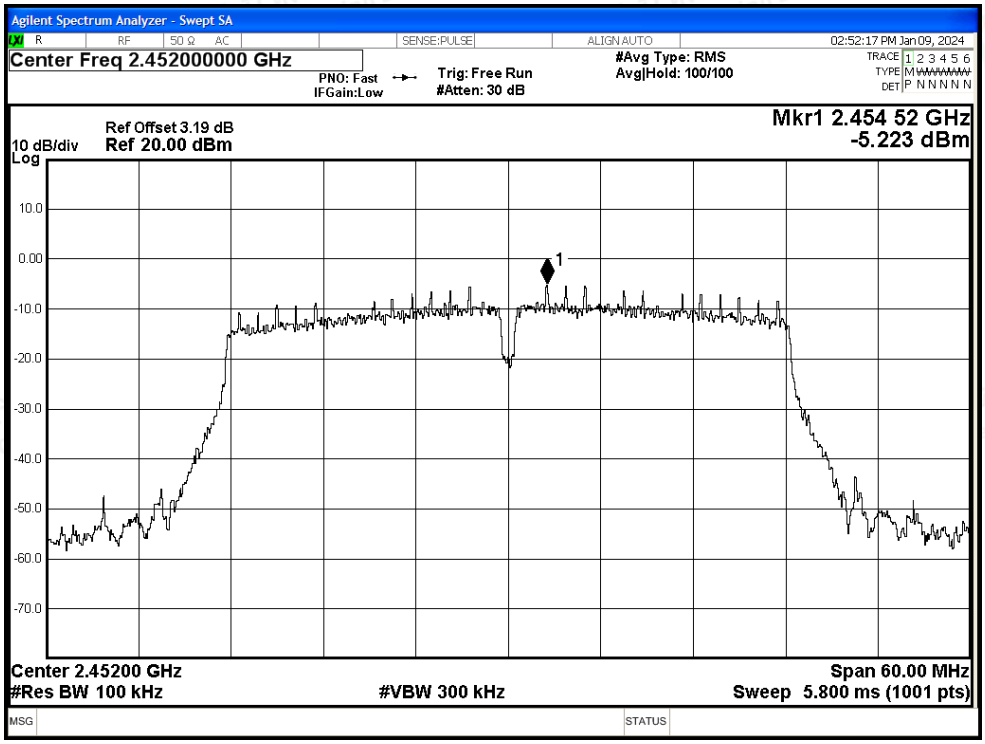
Band Edge NVNT n40 2422MHz Ant1 Ref



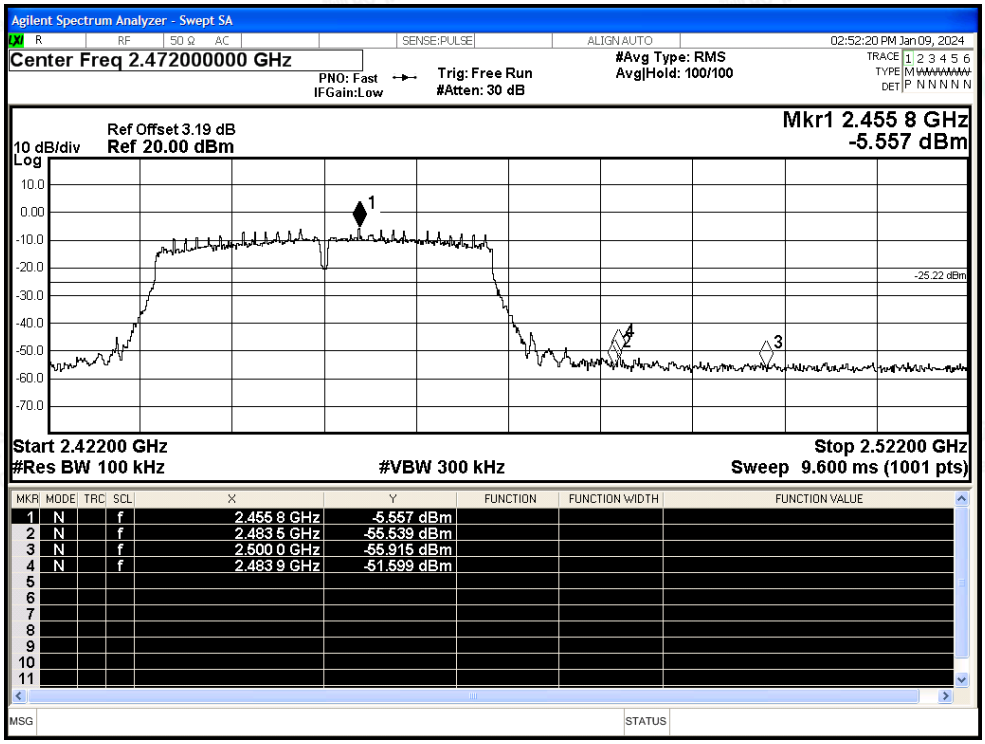
Band Edge NVNT n40 2422MHz Ant1 Emission



Band Edge NVNT n40 2452MHz Ant1 Ref



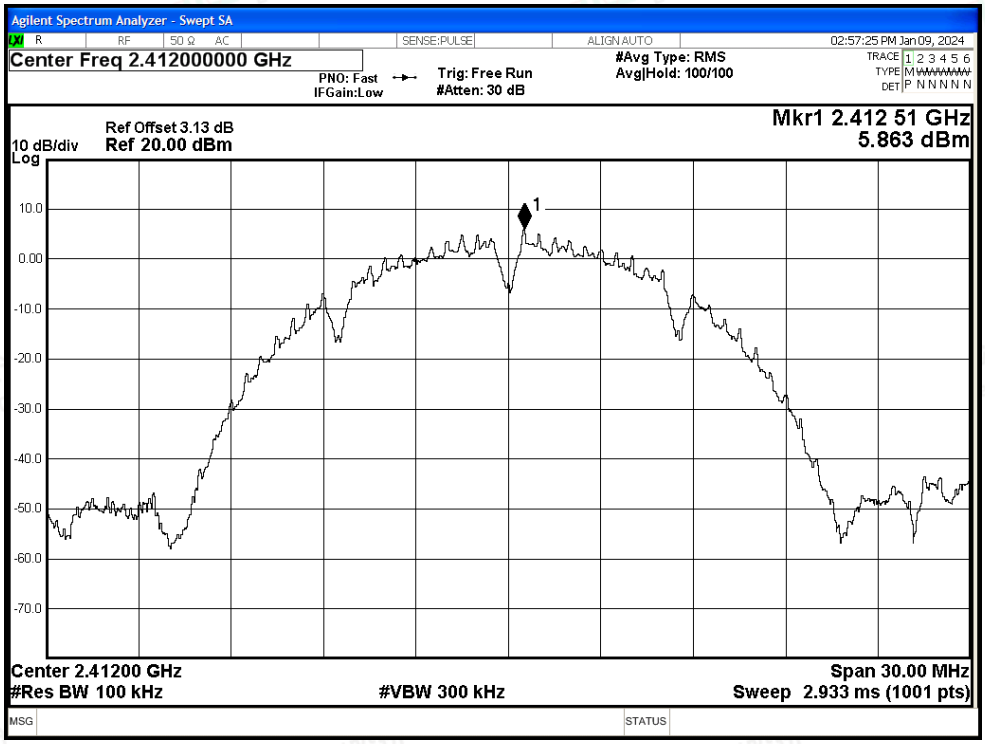
Band Edge NVNT n40 2452MHz Ant1 Emission



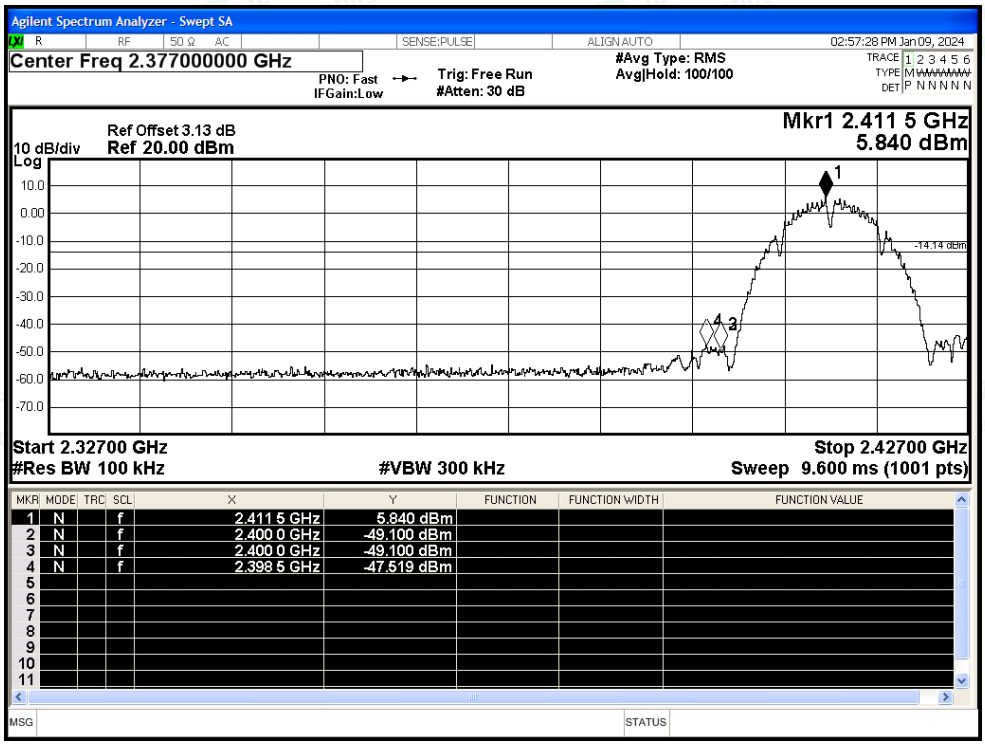
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	b	2412	Ant2	-53.38	-20	Pass
NVNT	b	2462	Ant2	-59.42	-20	Pass
NVNT	g	2412	Ant2	-44.3	-20	Pass
NVNT	g	2462	Ant2	-51.33	-20	Pass
NVNT	n20	2412	Ant2	-44.92	-20	Pass
NVNT	n20	2462	Ant2	-49.61	-20	Pass
NVNT	n40	2422	Ant2	-39.1	-20	Pass
NVNT	n40	2452	Ant2	-45.5	-20	Pass

Test Graphs

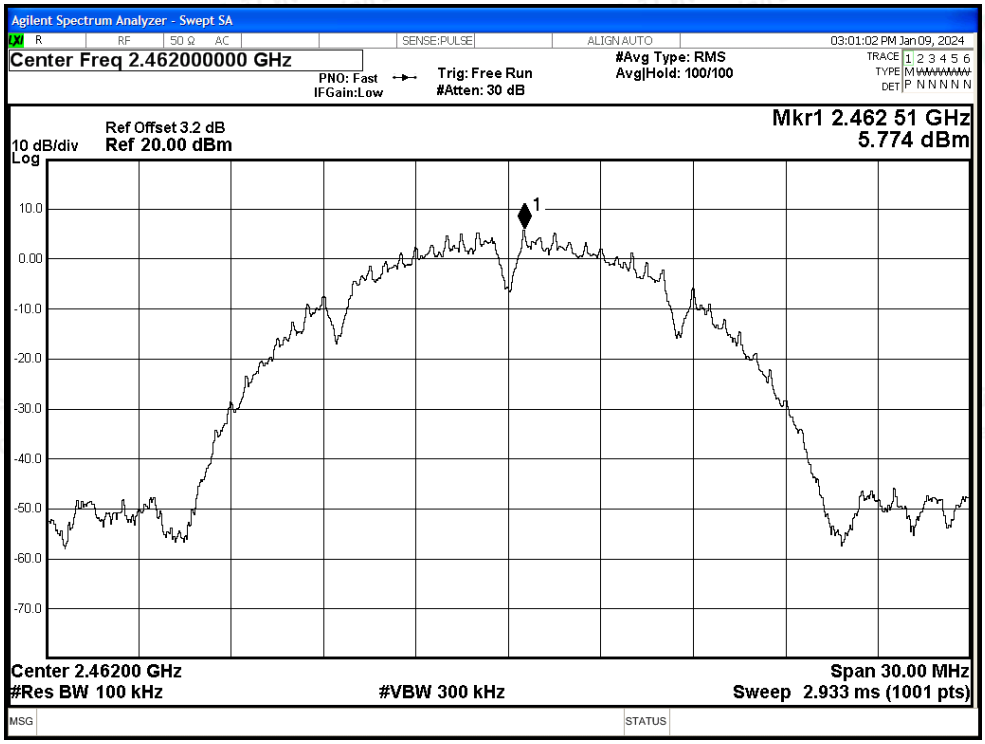
Band Edge NVNT b 2412MHz Ant2 Ref



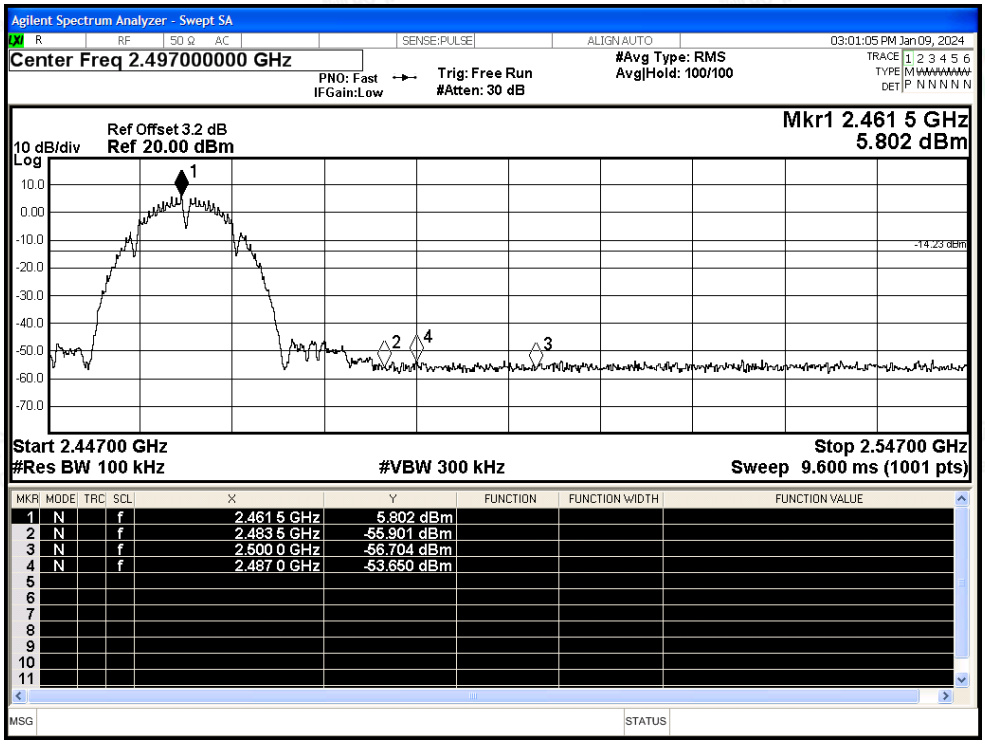
Band Edge NVNT b 2412MHz Ant2 Emission



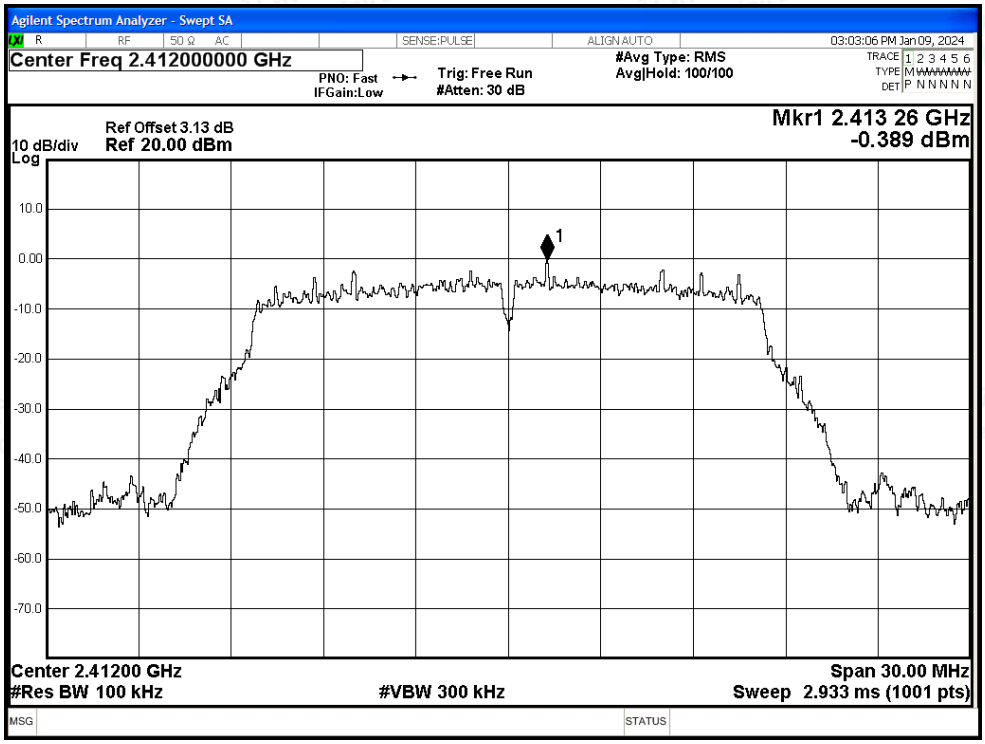
Band Edge NVNT b 2462MHz Ant2 Ref



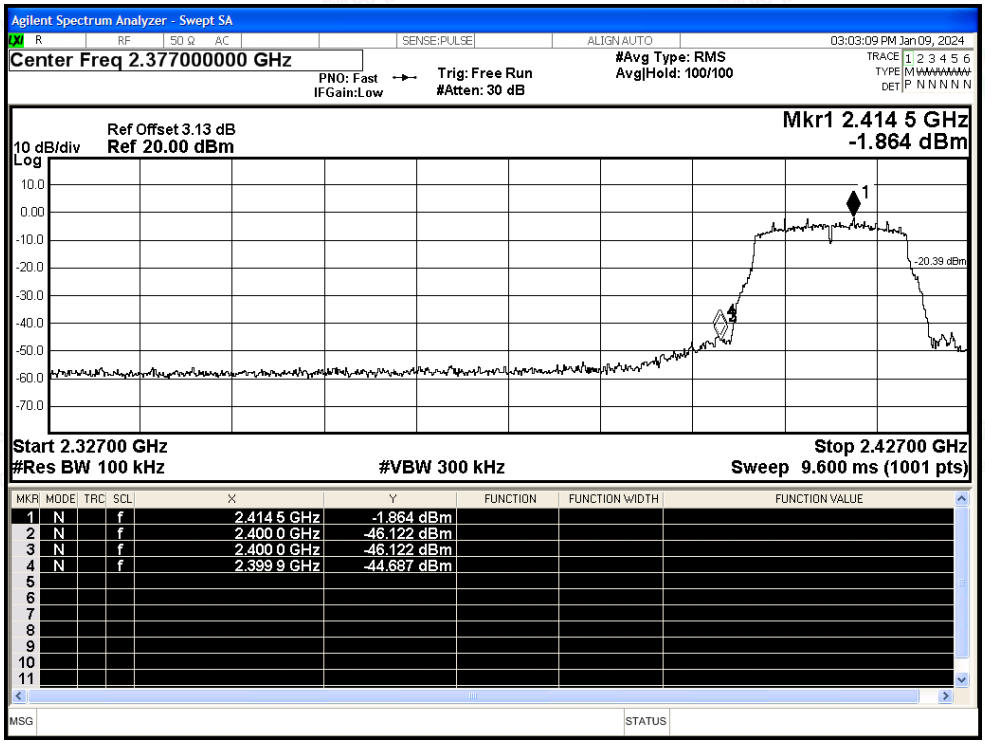
Band Edge NVNT b 2462MHz Ant2 Emission



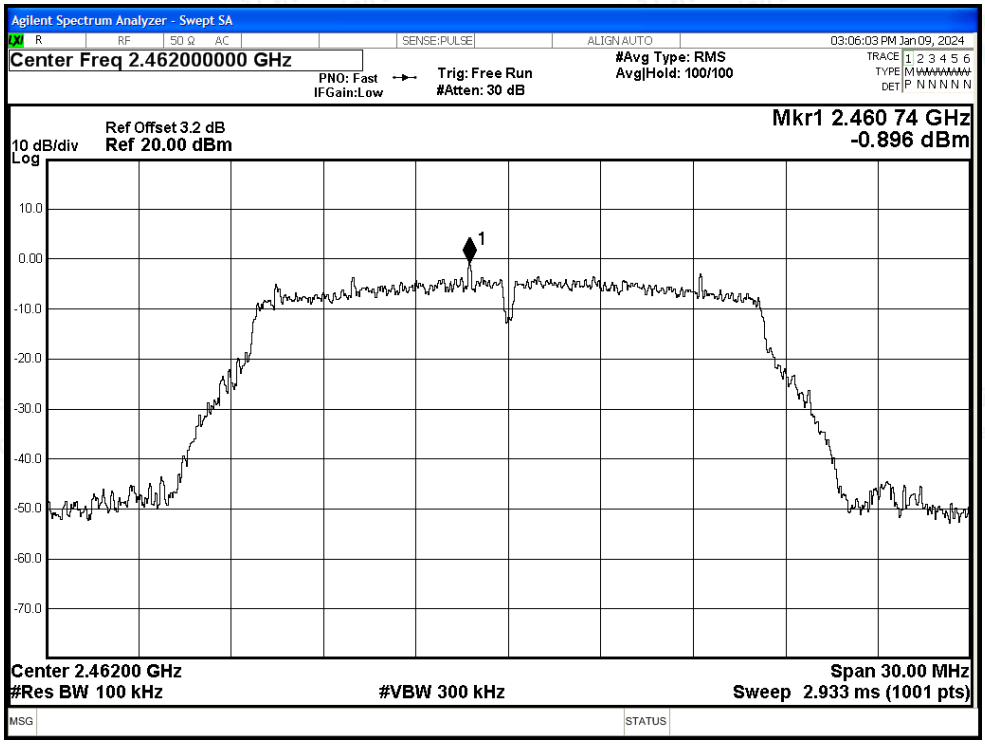
Band Edge NVNT g 2412MHz Ant2 Ref



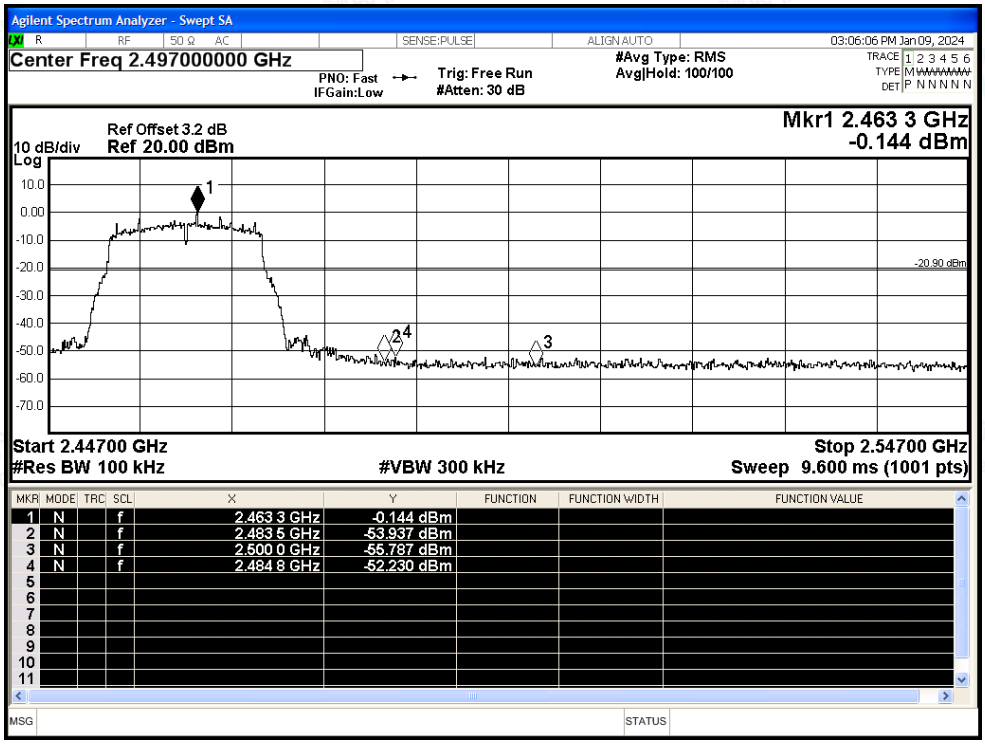
Band Edge NVNT g 2412MHz Ant2 Emission



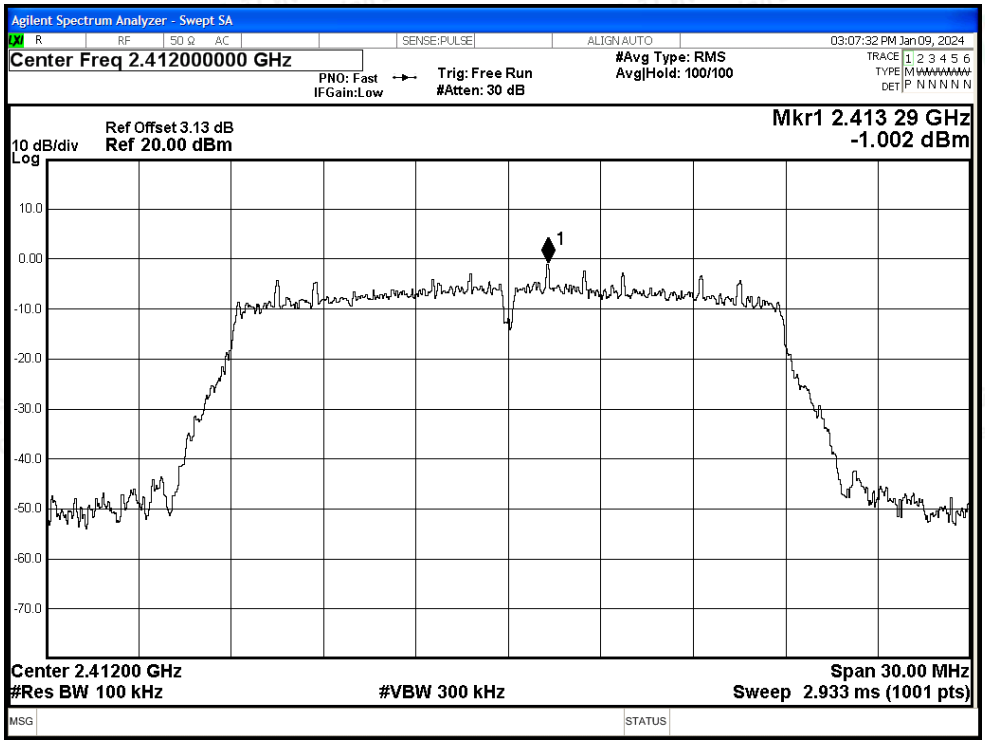
Band Edge NVNT g 2462MHz Ant2 Ref



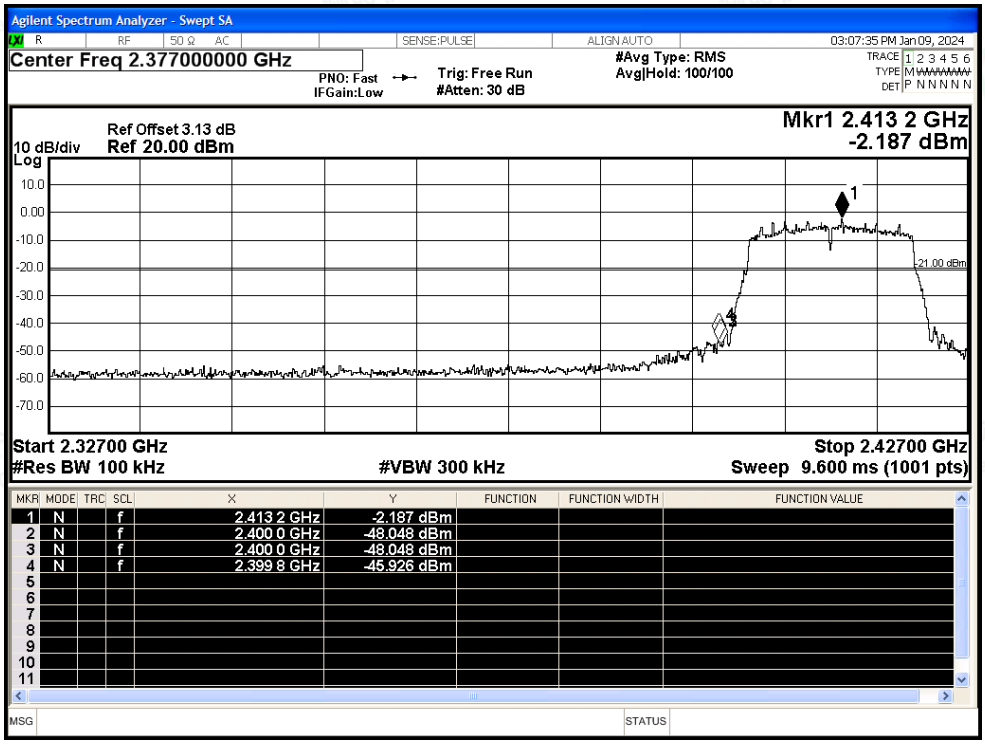
Band Edge NVNT g 2462MHz Ant2 Emission



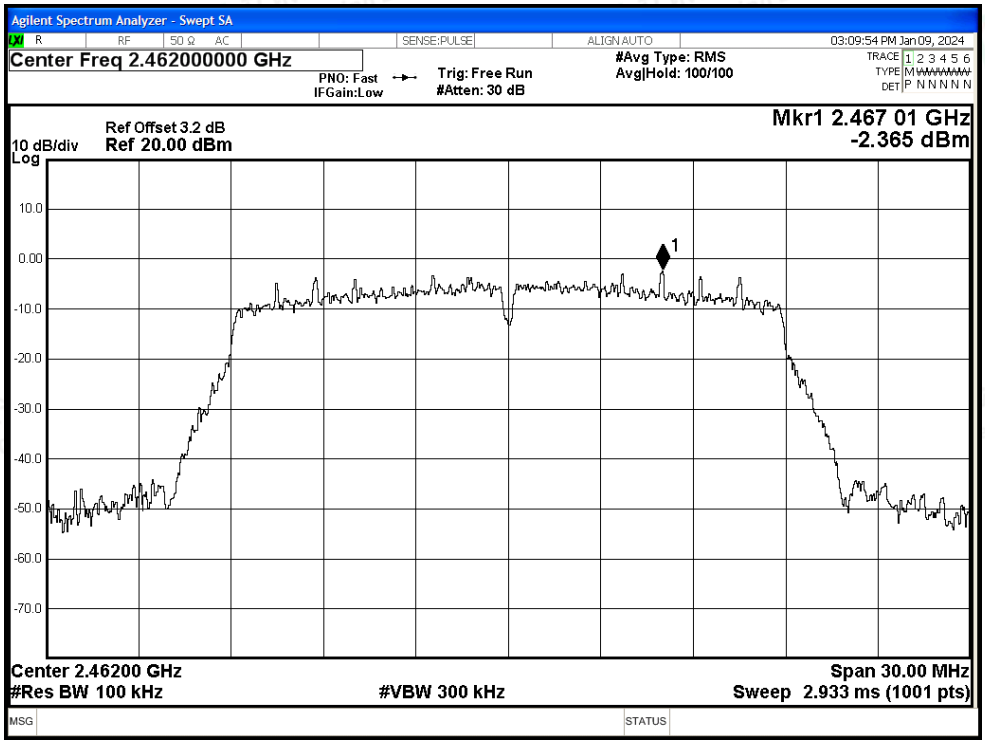
Band Edge NVNT n20 2412MHz Ant2 Ref



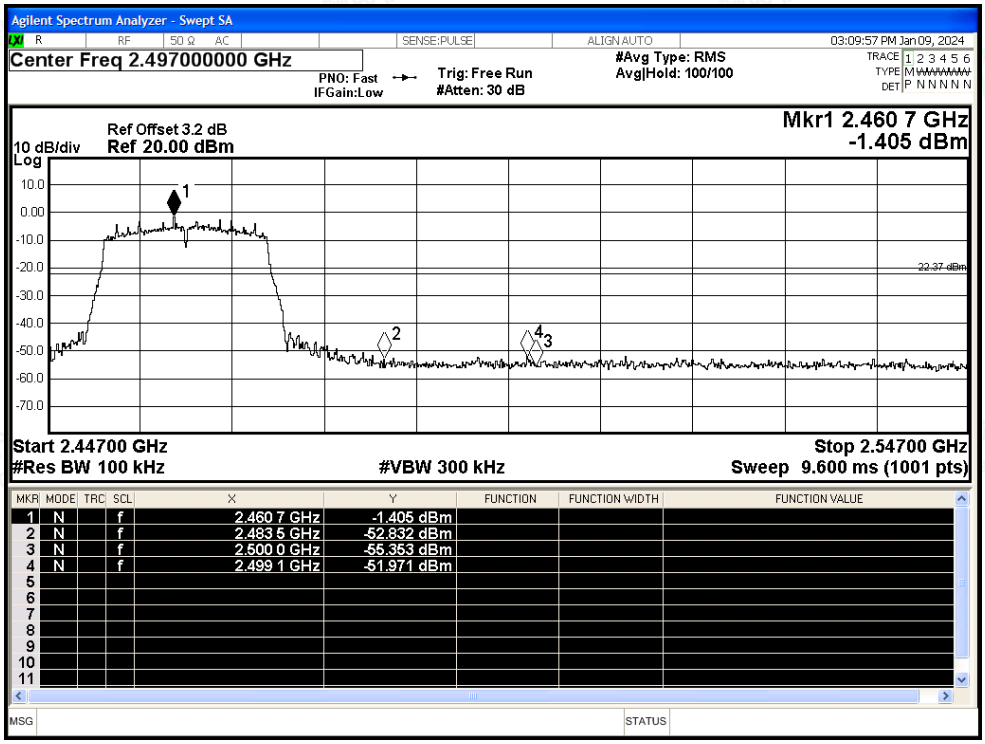
Band Edge NVNT n20 2412MHz Ant2 Emission



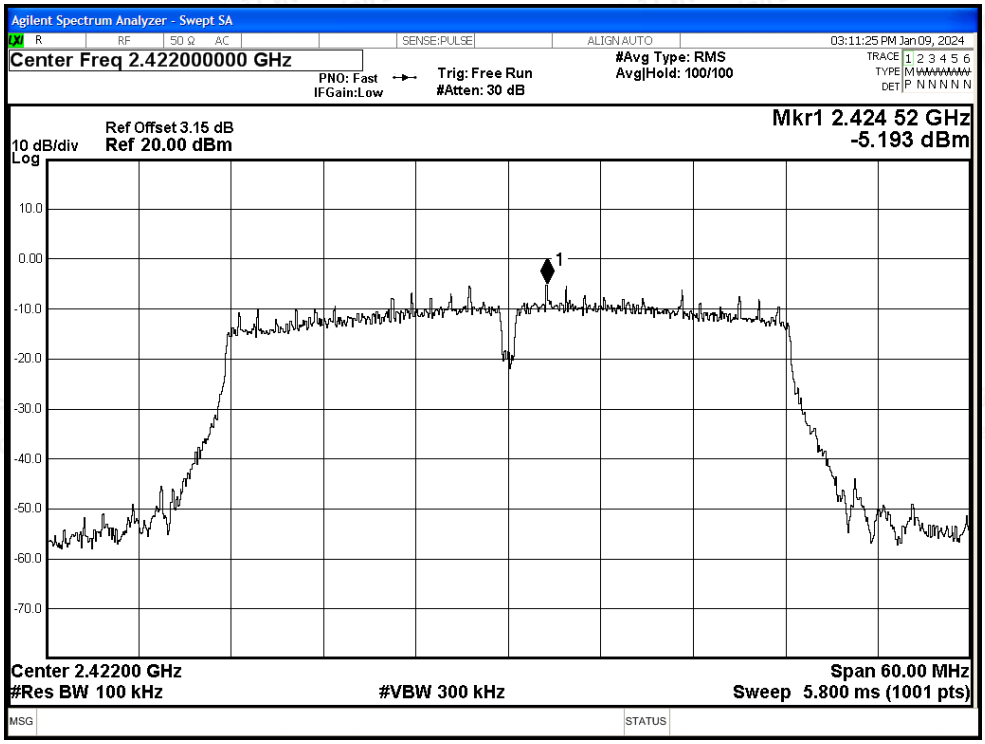
Band Edge NVNT n20 2462MHz Ant2 Ref



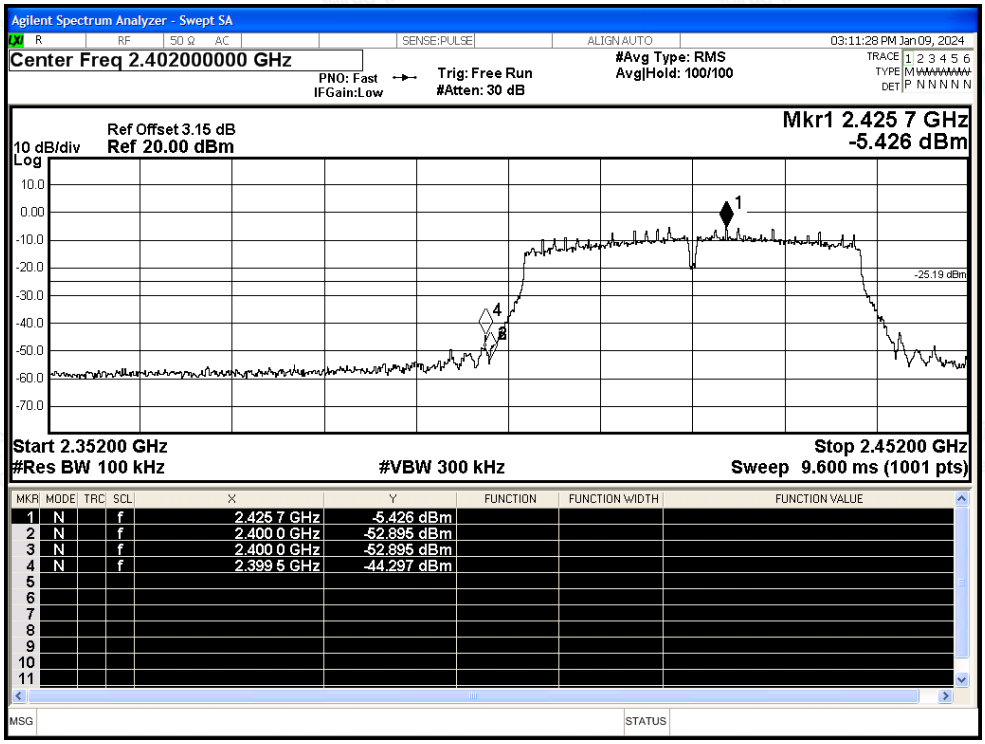
Band Edge NVNT n20 2462MHz Ant2 Emission



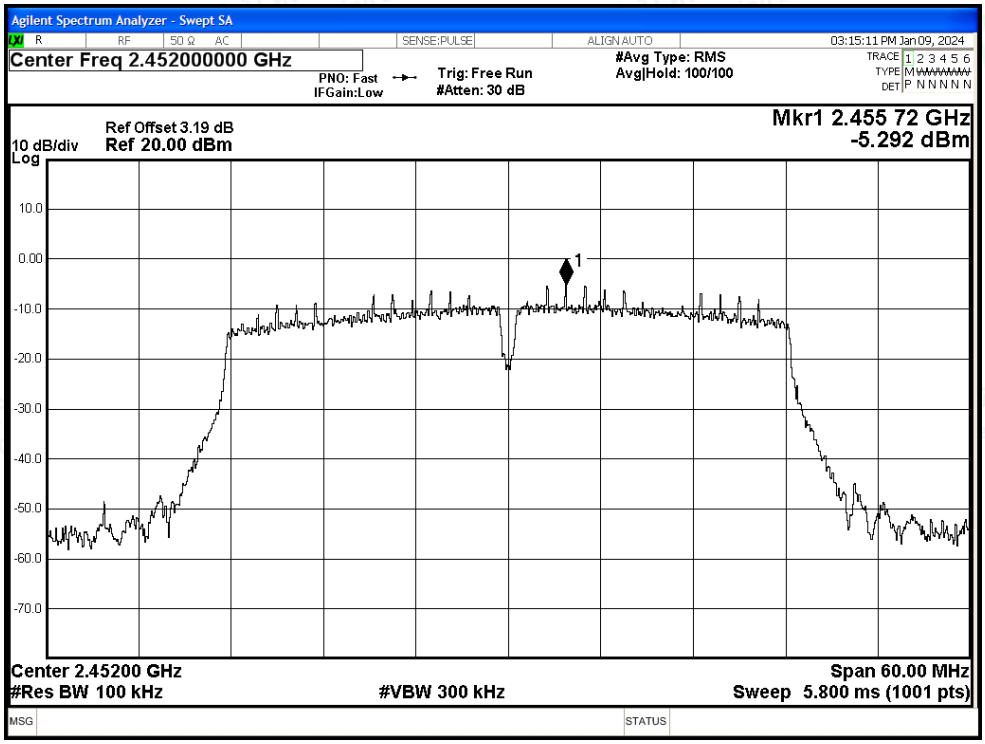
Band Edge NVNT n40 2422MHz Ant2 Ref



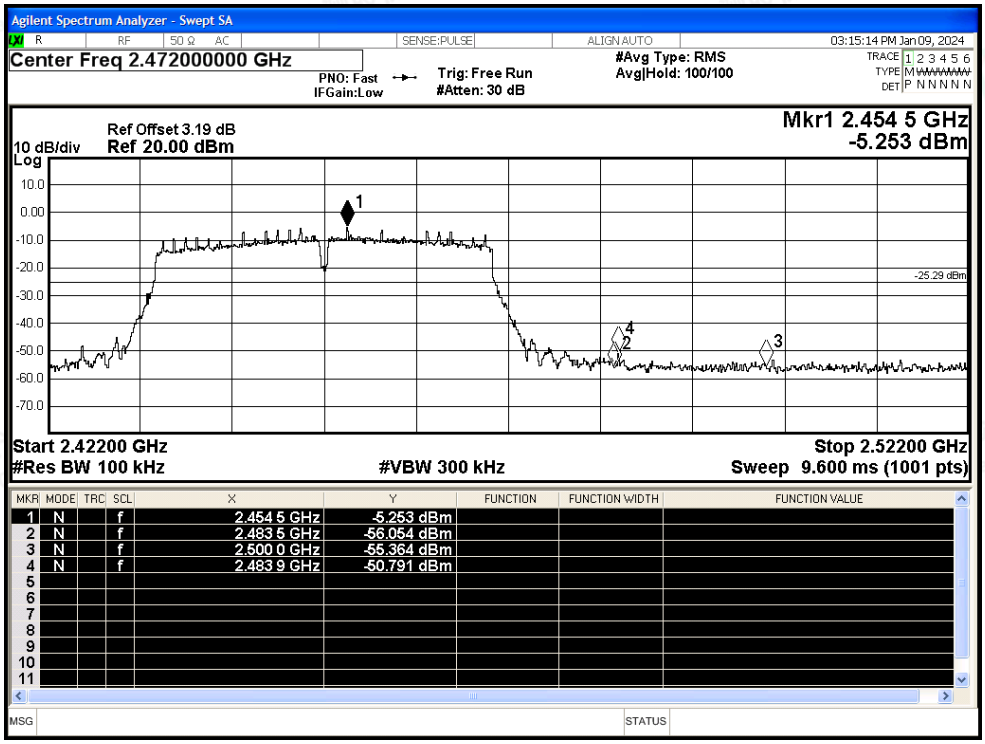
Band Edge NVNT n40 2422MHz Ant2 Emission



Band Edge NVNT n40 2452MHz Ant2 Ref



Band Edge NVNT n40 2452MHz Ant2 Emission

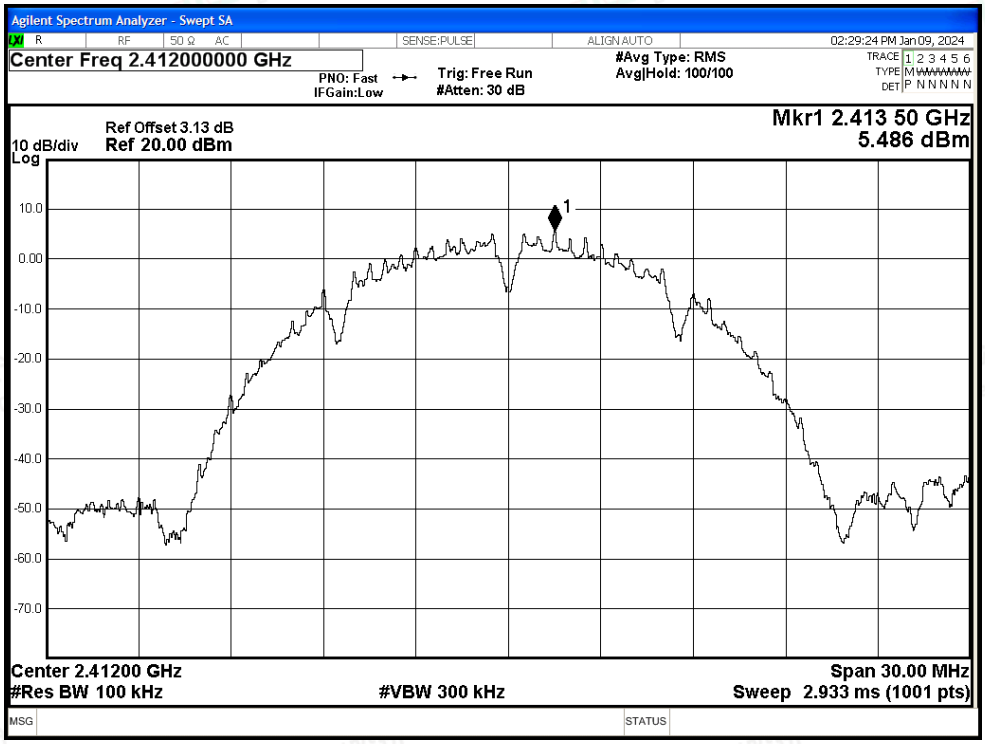


C.6 Conducted RF Spurious Emission

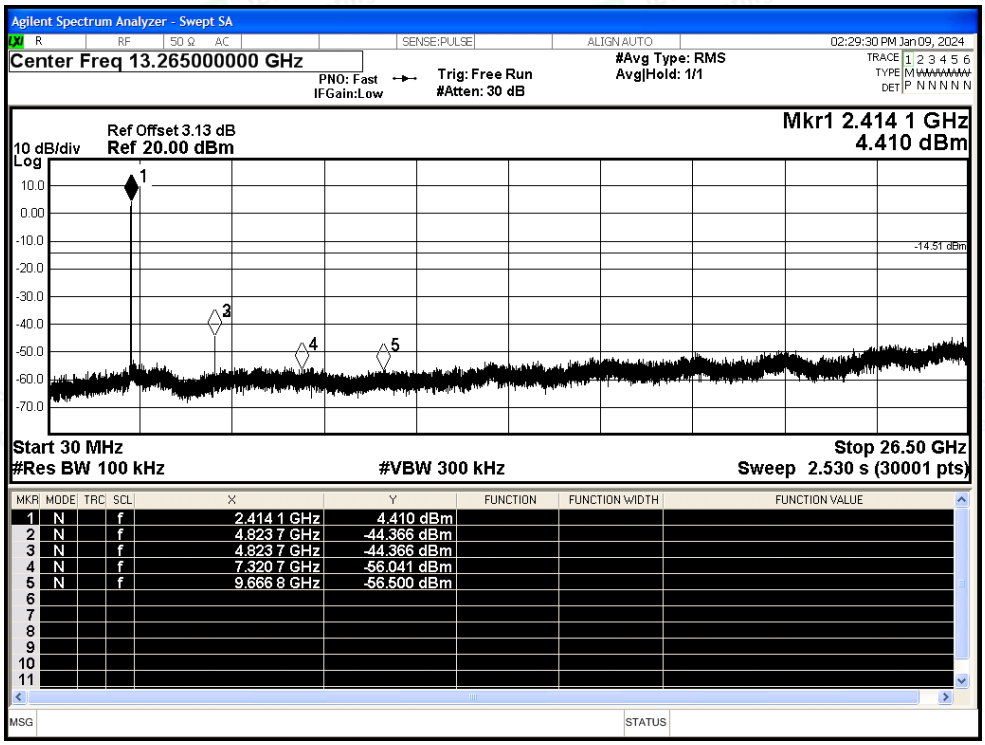
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	b	2412	Ant1	-49.85	-20	Pass
NVNT	b	2437	Ant1	-50.36	-20	Pass
NVNT	b	2462	Ant1	-49.74	-20	Pass
NVNT	g	2412	Ant1	-42.44	-20	Pass
NVNT	g	2437	Ant1	-43.25	-20	Pass
NVNT	g	2462	Ant1	-44.93	-20	Pass
NVNT	n20	2412	Ant1	-42.93	-20	Pass
NVNT	n20	2437	Ant1	-43.55	-20	Pass
NVNT	n20	2462	Ant1	-44.08	-20	Pass
NVNT	n40	2422	Ant1	-39.9	-20	Pass
NVNT	n40	2437	Ant1	-39.99	-20	Pass
NVNT	n40	2452	Ant1	-40.06	-20	Pass

Test Graphs

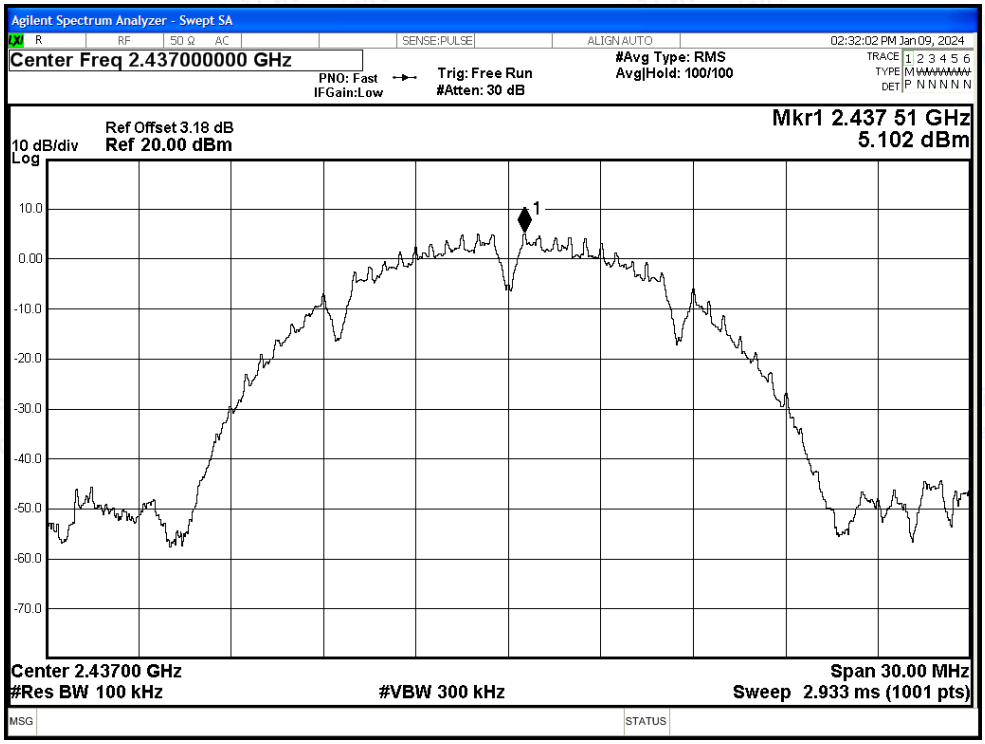
Tx. Spurious NVNT b 2412MHz Ant1 Ref



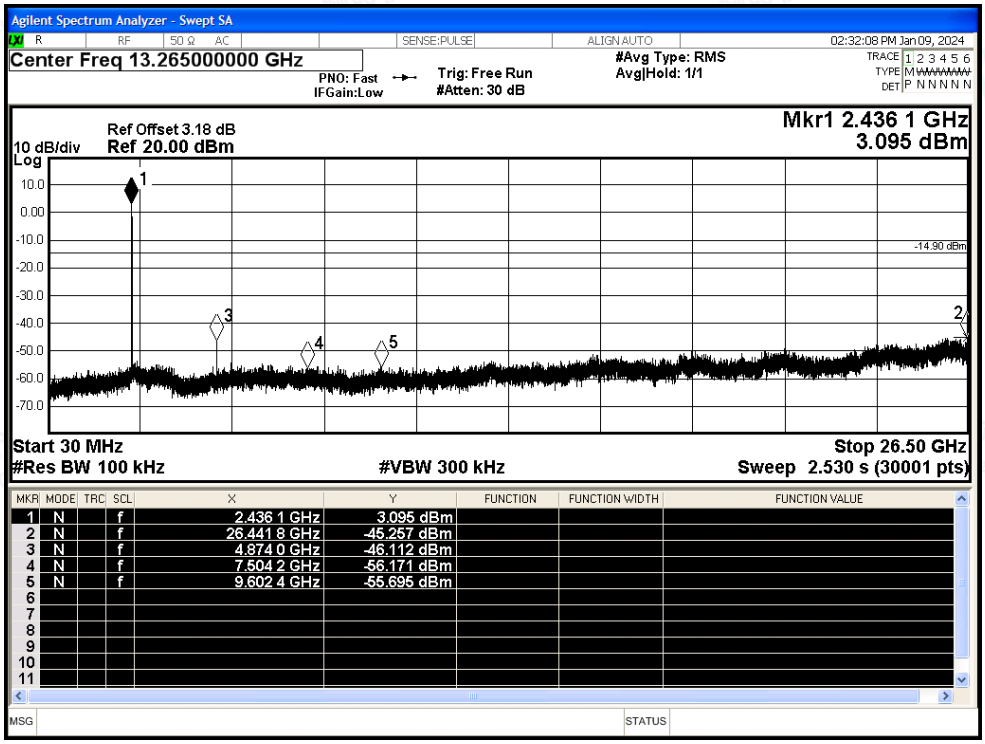
Tx. Spurious NVNT b 2412MHz Ant1 Emission



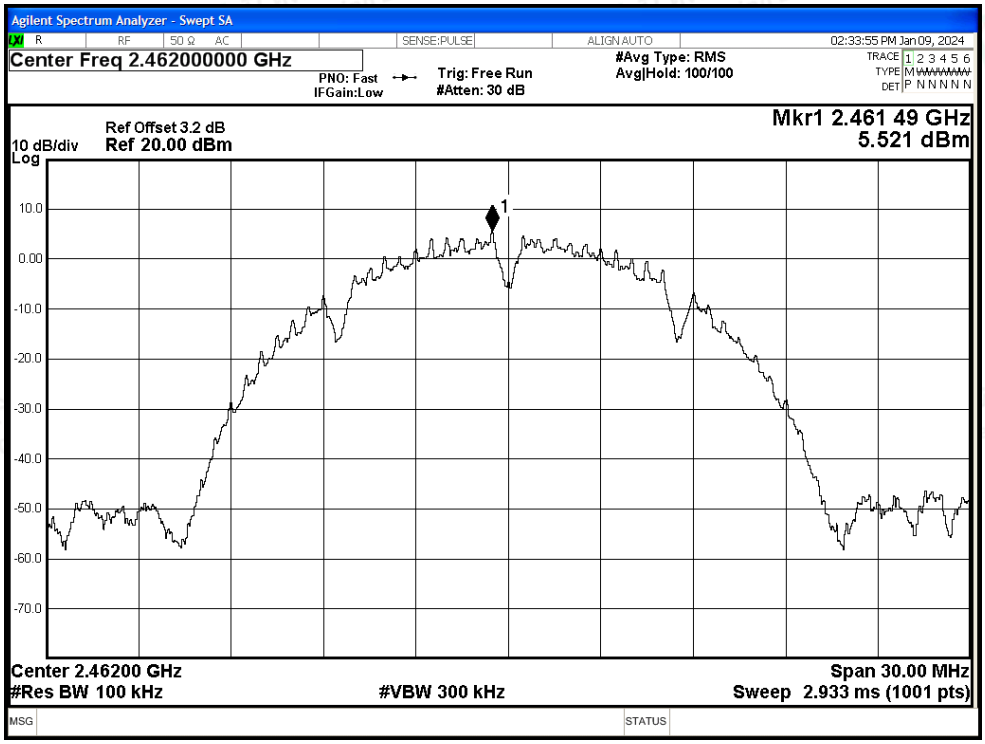
Tx. Spurious NVNT b 2437MHz Ant1 Ref



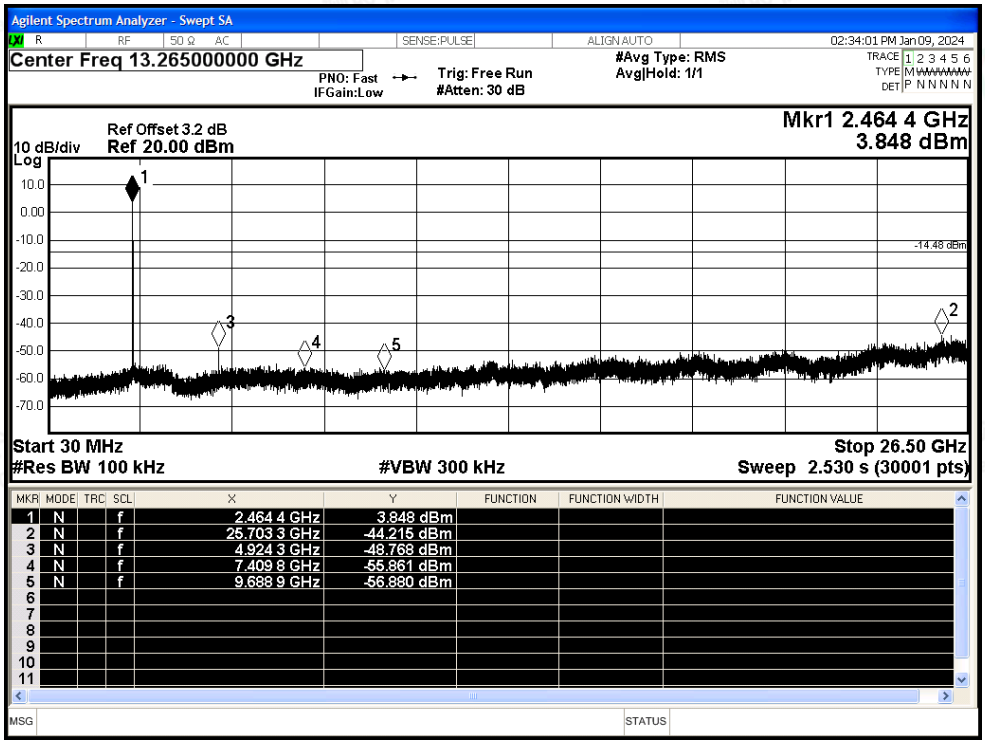
Tx. Spurious NVNT b 2437MHz Ant1 Emission



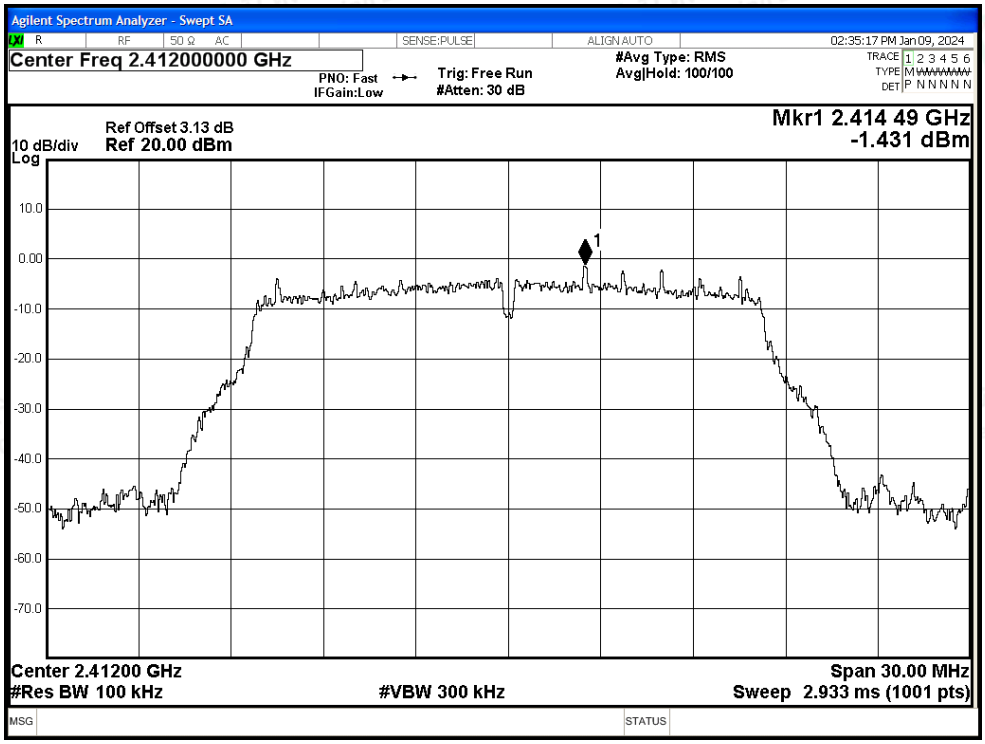
Tx. Spurious NVNT b 2462MHz Ant1 Ref



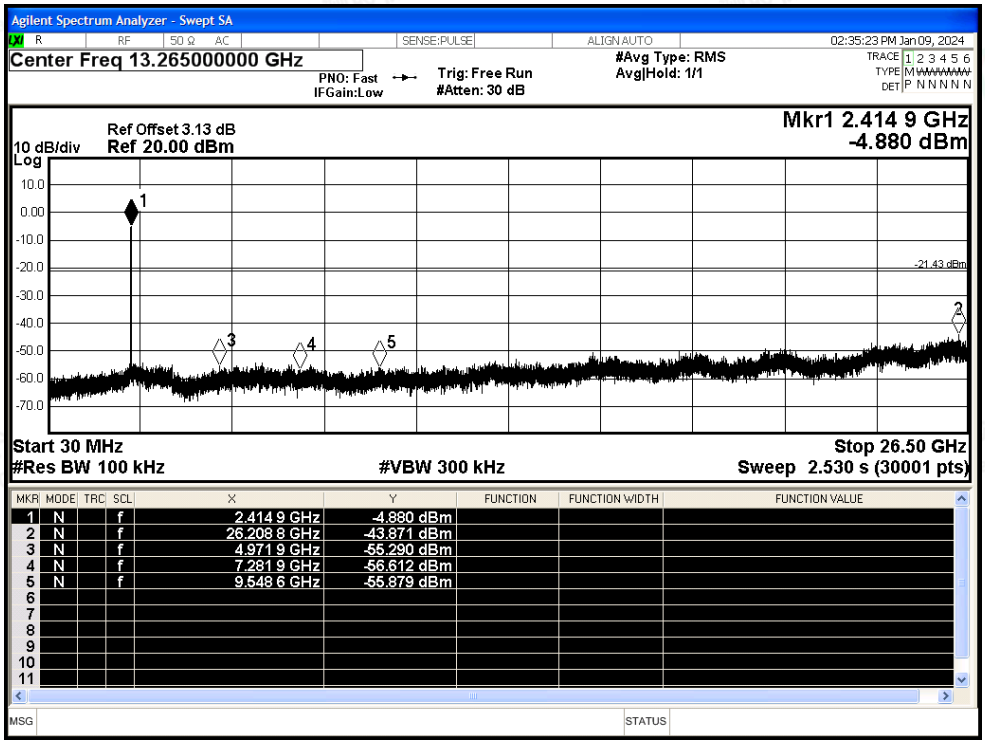
Tx. Spurious NVNT b 2462MHz Ant1 Emission



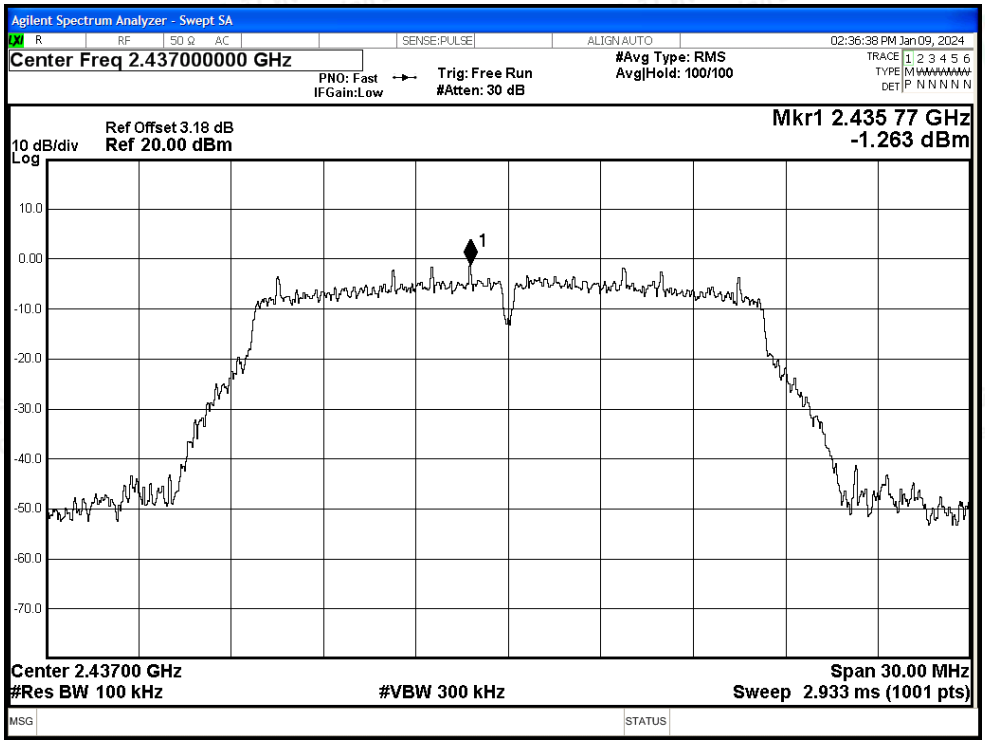
Tx. Spurious NVNT g 2412MHz Ant1 Ref



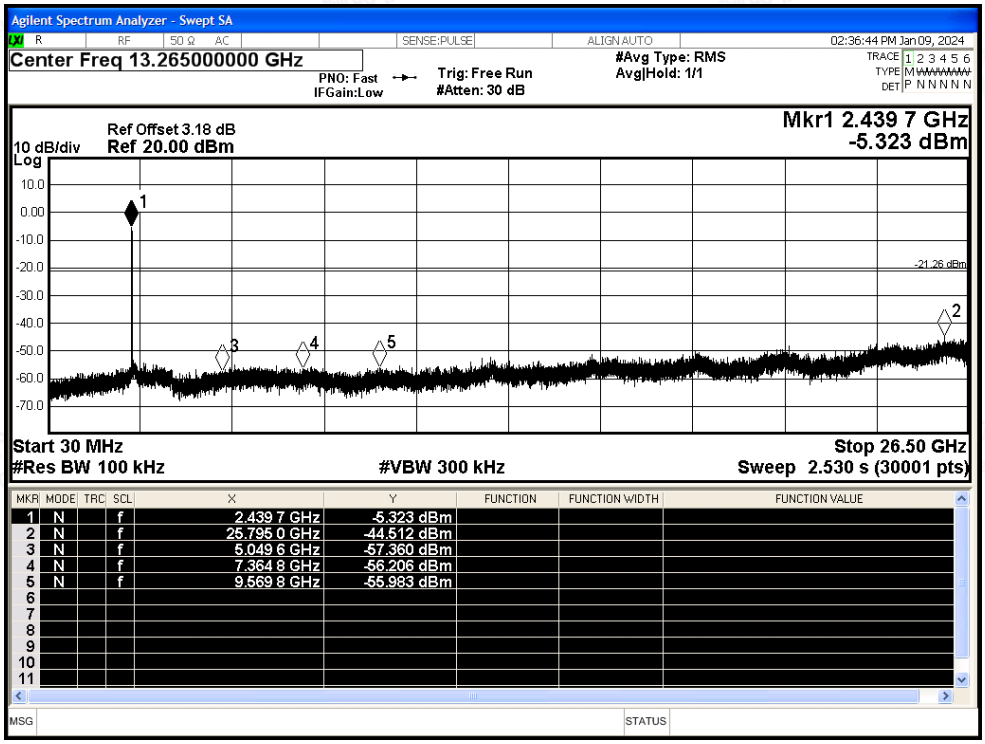
Tx. Spurious NVNT g 2412MHz Ant1 Emission



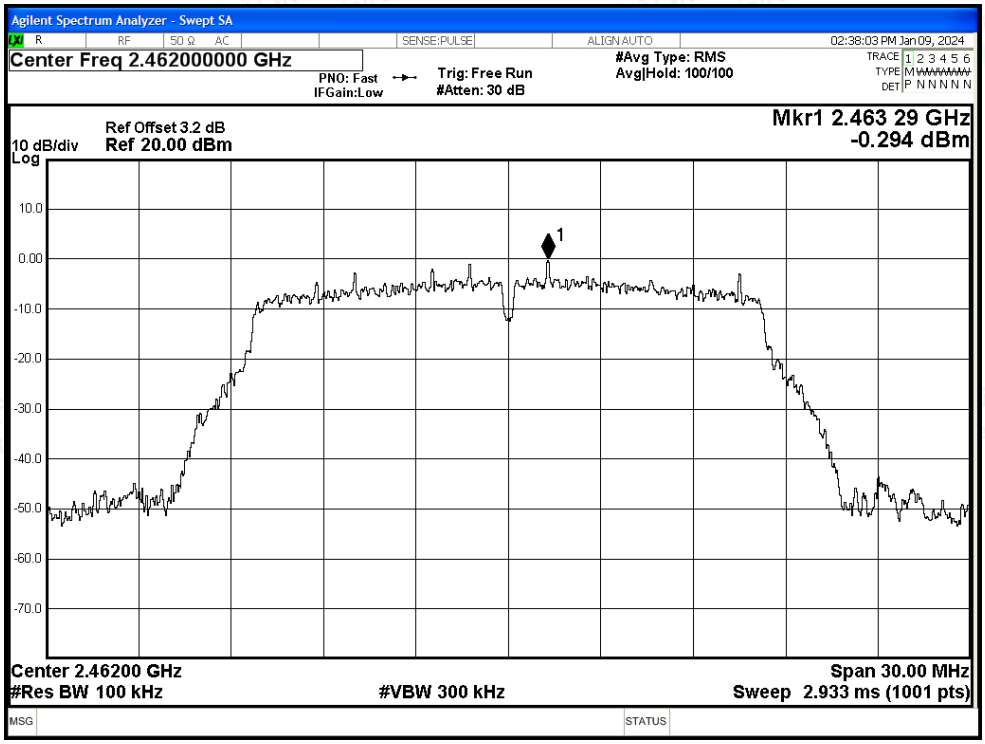
Tx. Spurious NVNT g 2437MHz Ant1 Ref



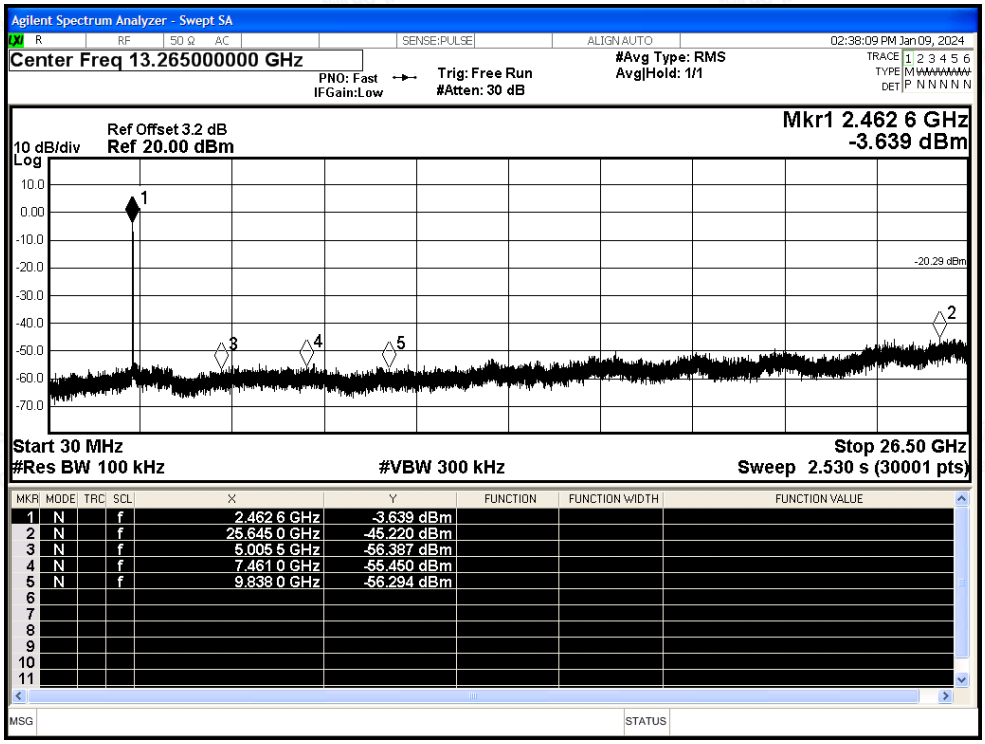
Tx. Spurious NVNT g 2437MHz Ant1 Emission



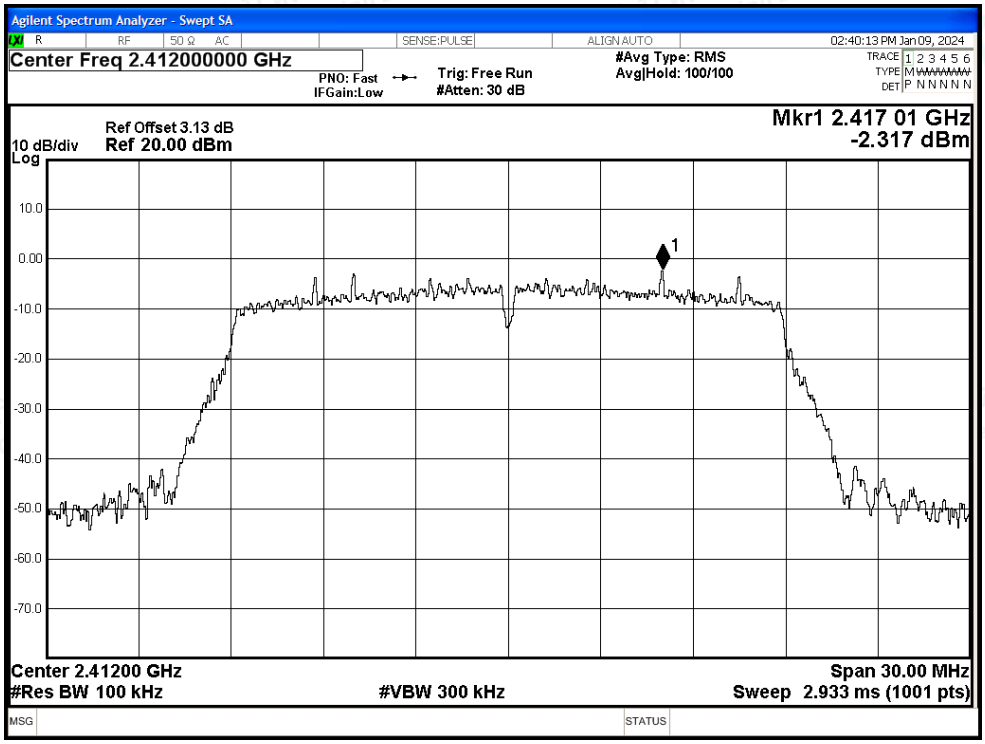
Tx. Spurious NVNT g 2462MHz Ant1 Ref



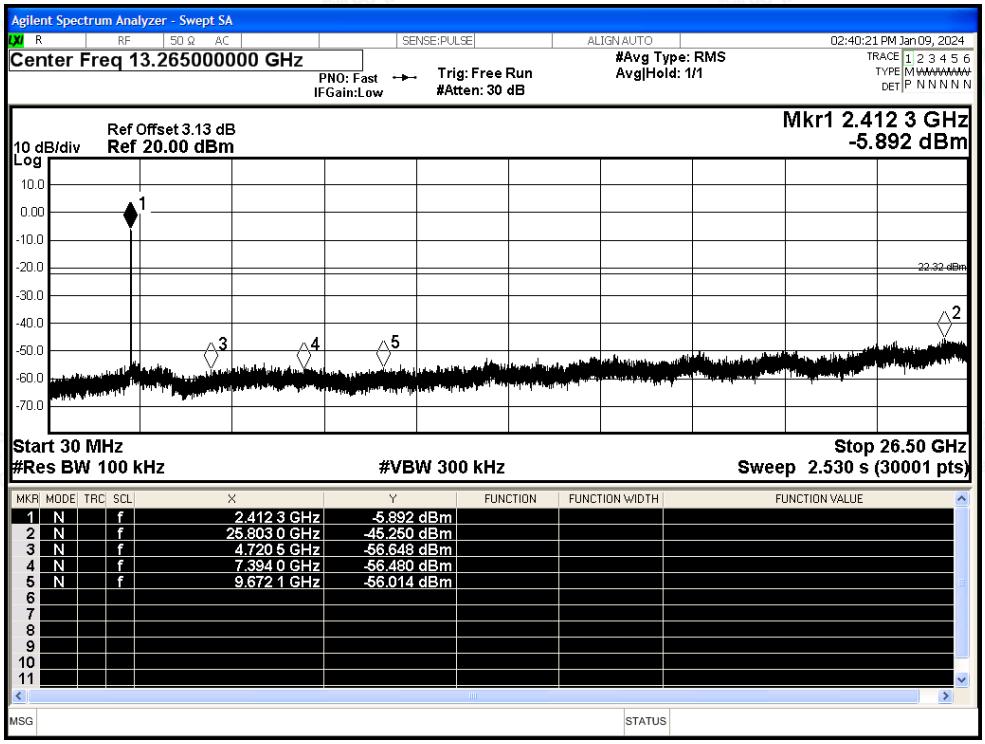
Tx. Spurious NVNT g 2462MHz Ant1 Emission



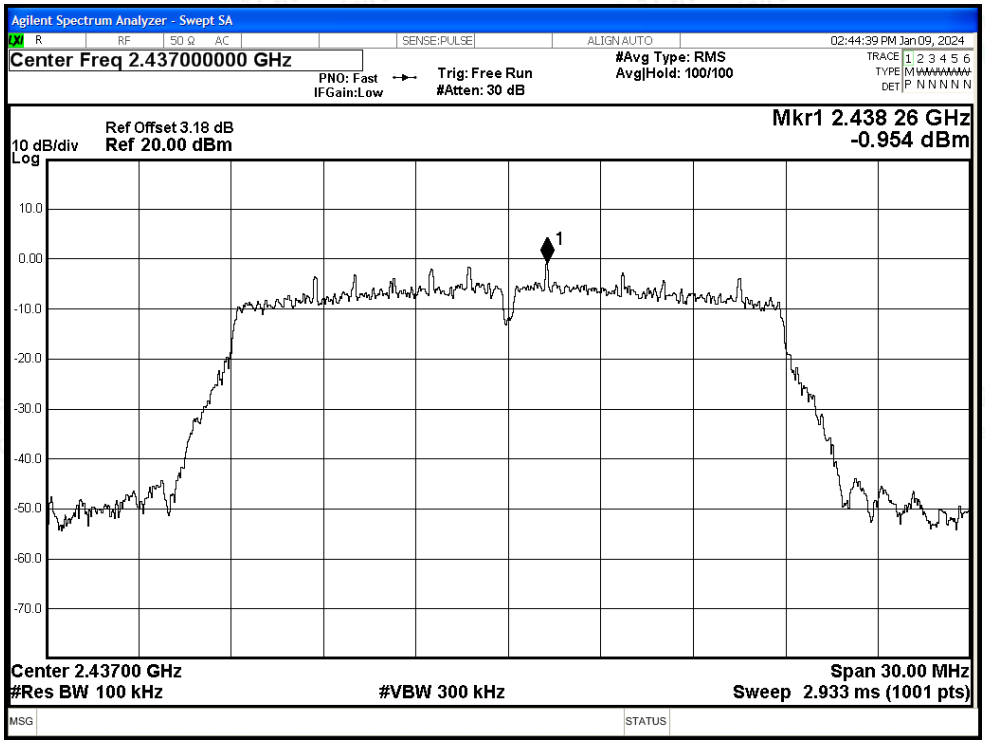
Tx. Spurious NVNT n20 2412MHz Ant1 Ref



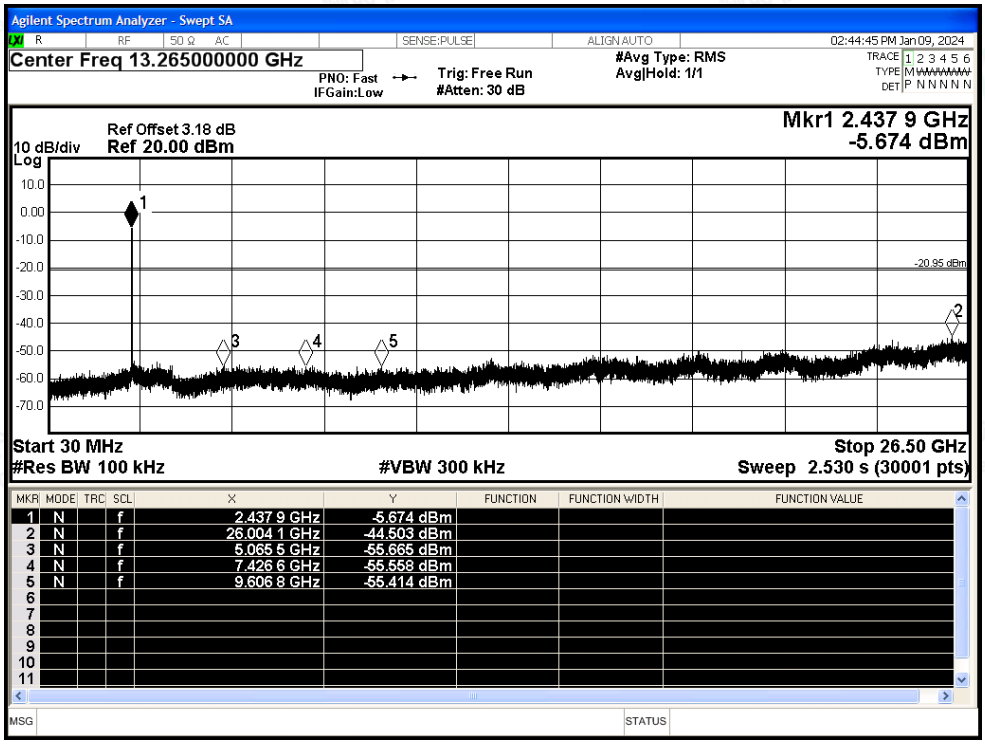
Tx. Spurious NVNT n20 2412MHz Ant1 Emission



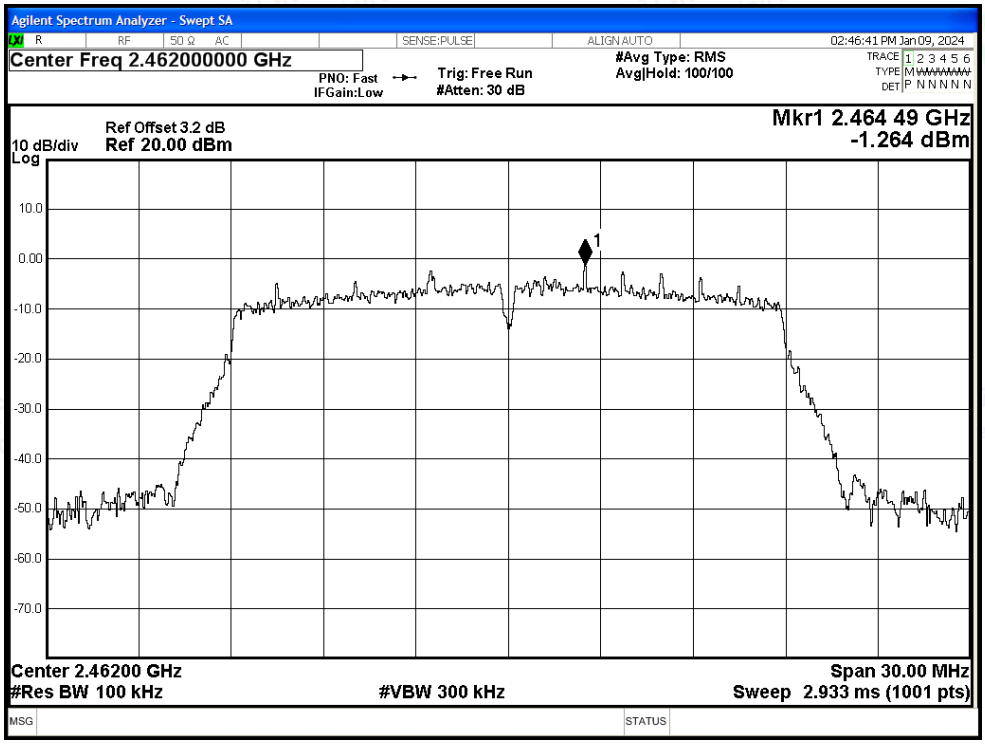
Tx. Spurious NVNT n20 2437MHz Ant1 Ref



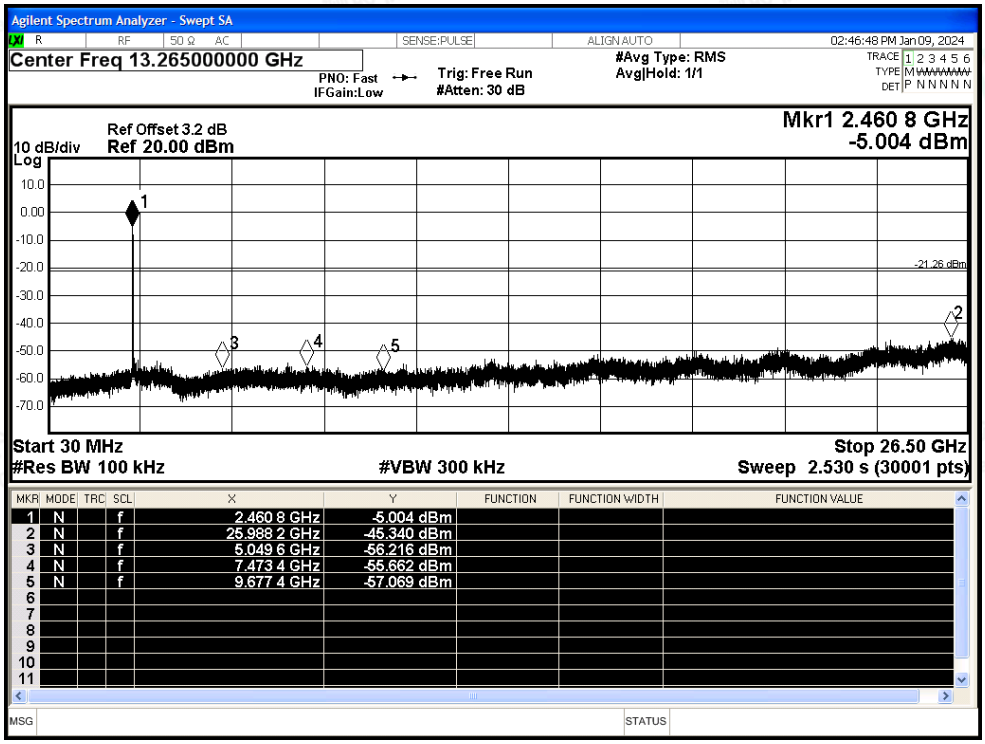
Tx. Spurious NVNT n20 2437MHz Ant1 Emission



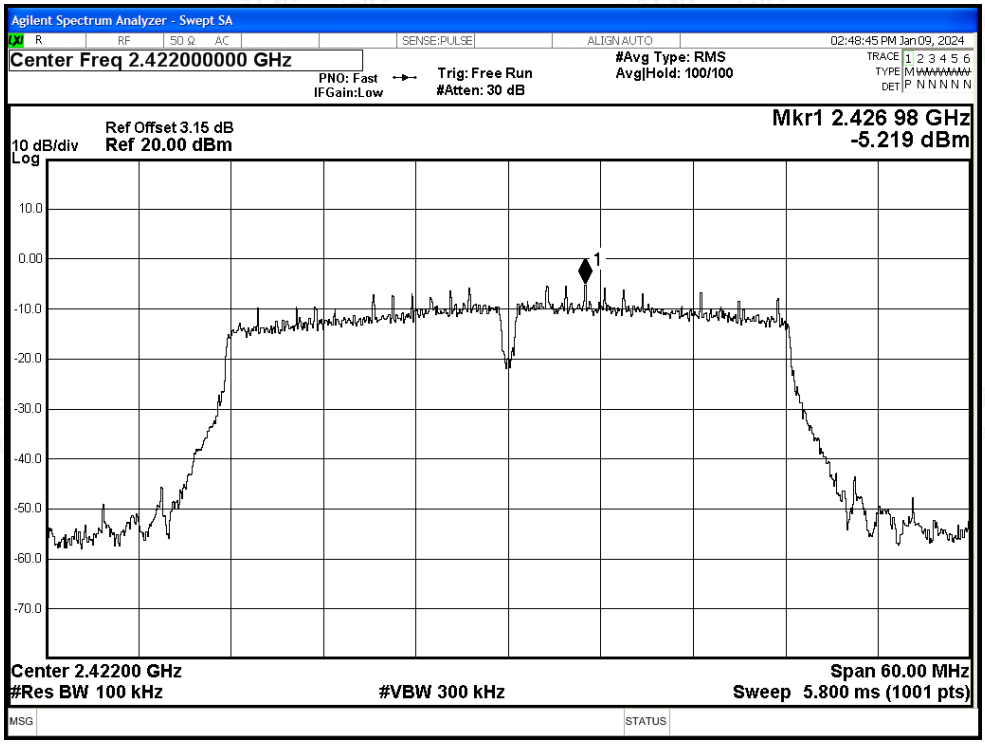
Tx. Spurious NVNT n20 2462MHz Ant1 Ref



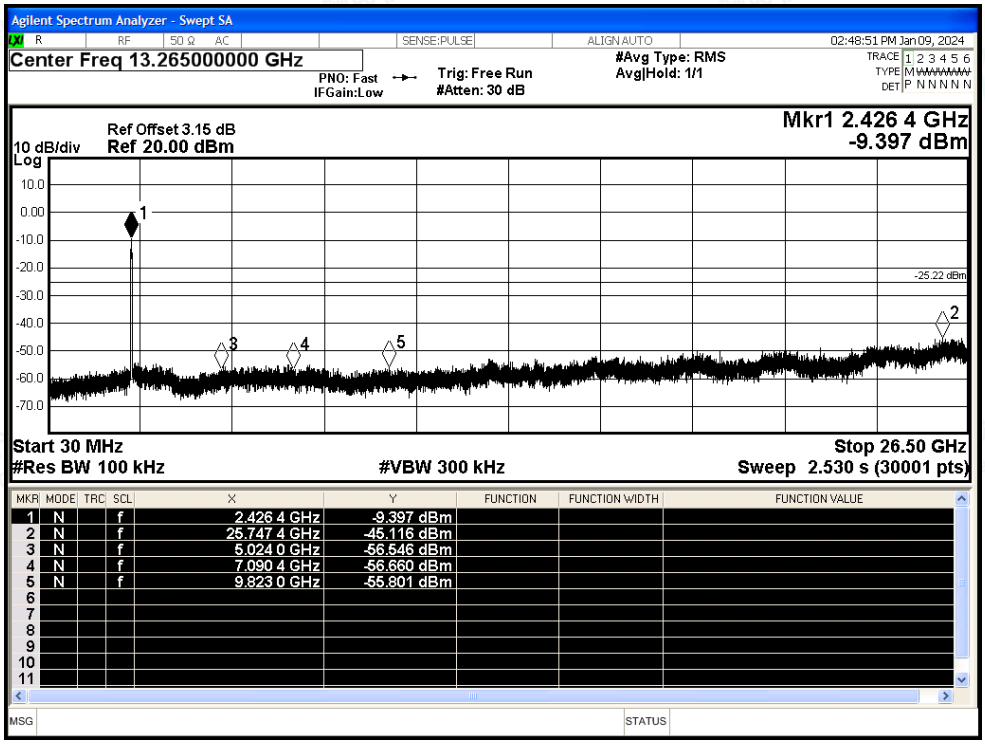
Tx. Spurious NVNT n20 2462MHz Ant1 Emission



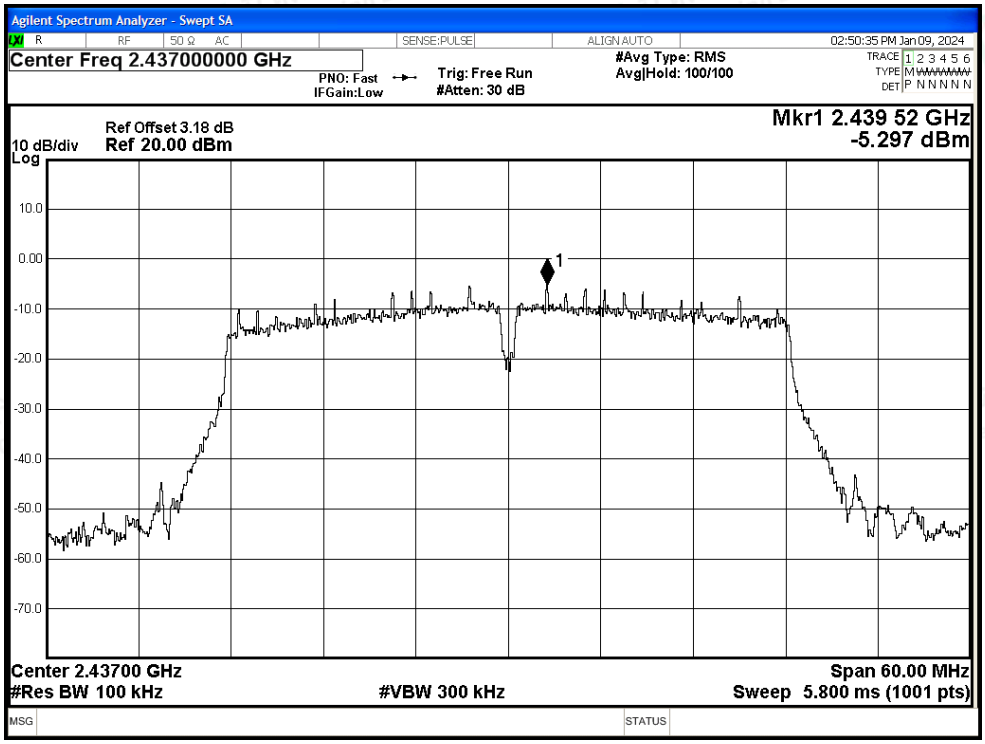
Tx. Spurious NVNT n40 2422MHz Ant1 Ref



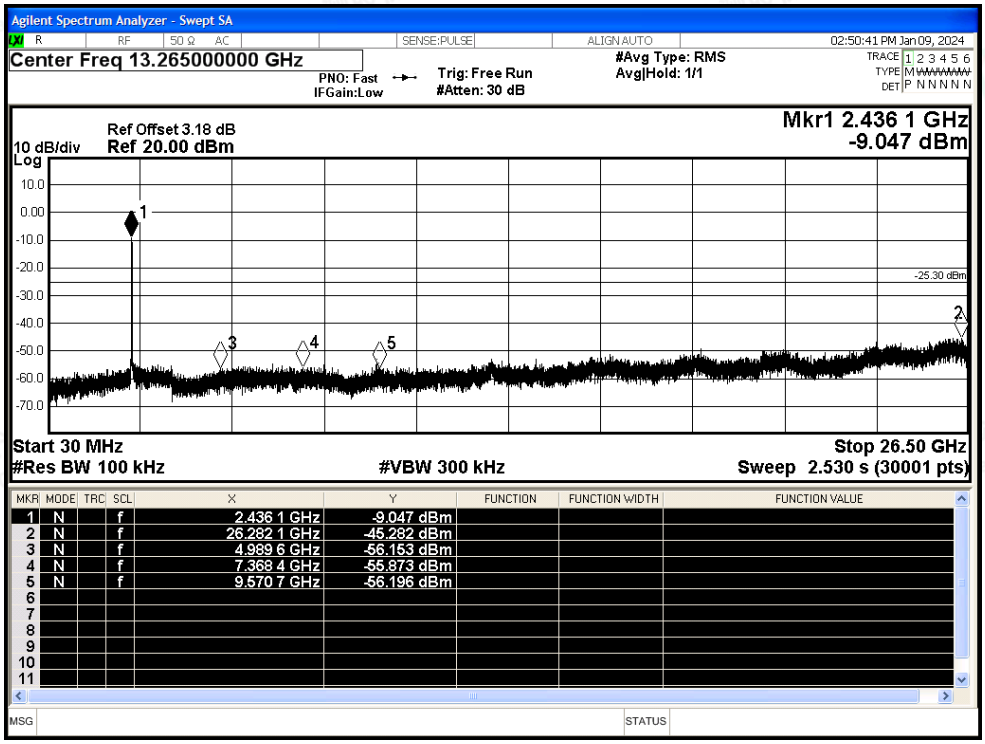
Tx. Spurious NVNT n40 2422MHz Ant1 Emission



Tx. Spurious NVNT n40 2437MHz Ant1 Ref



Tx. Spurious NVNT n40 2437MHz Ant1 Emission



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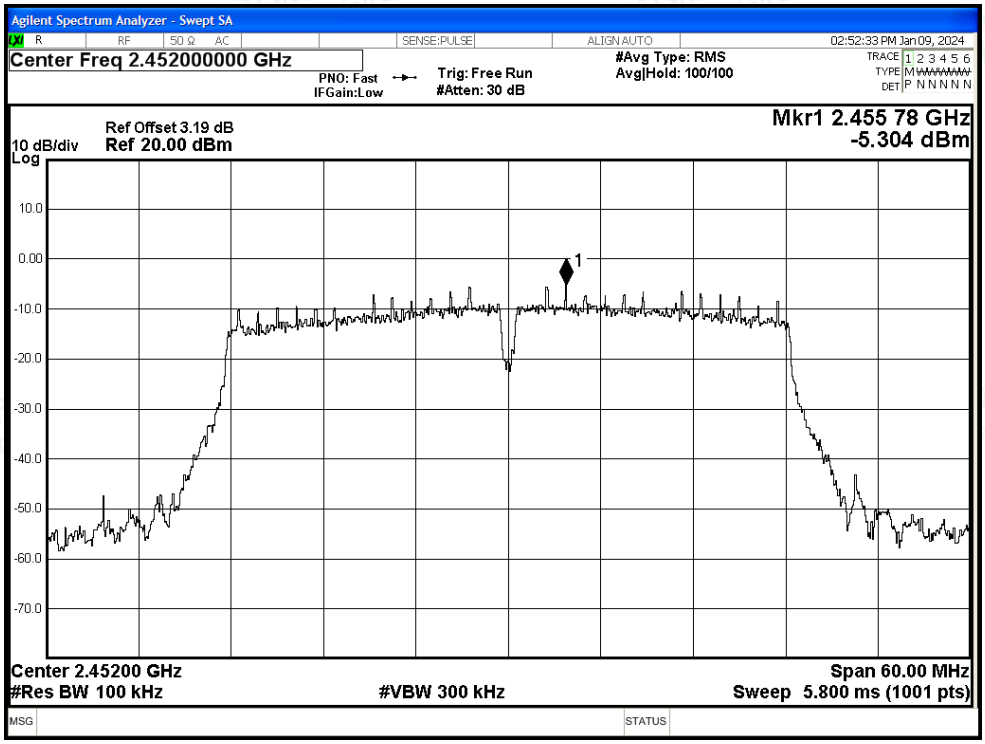
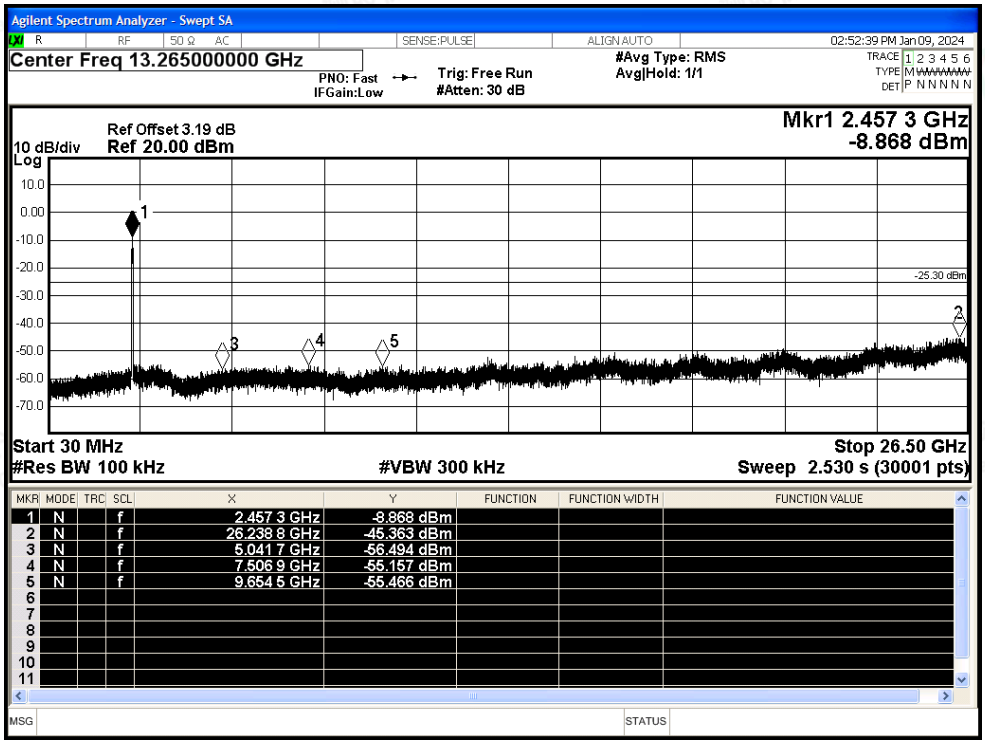


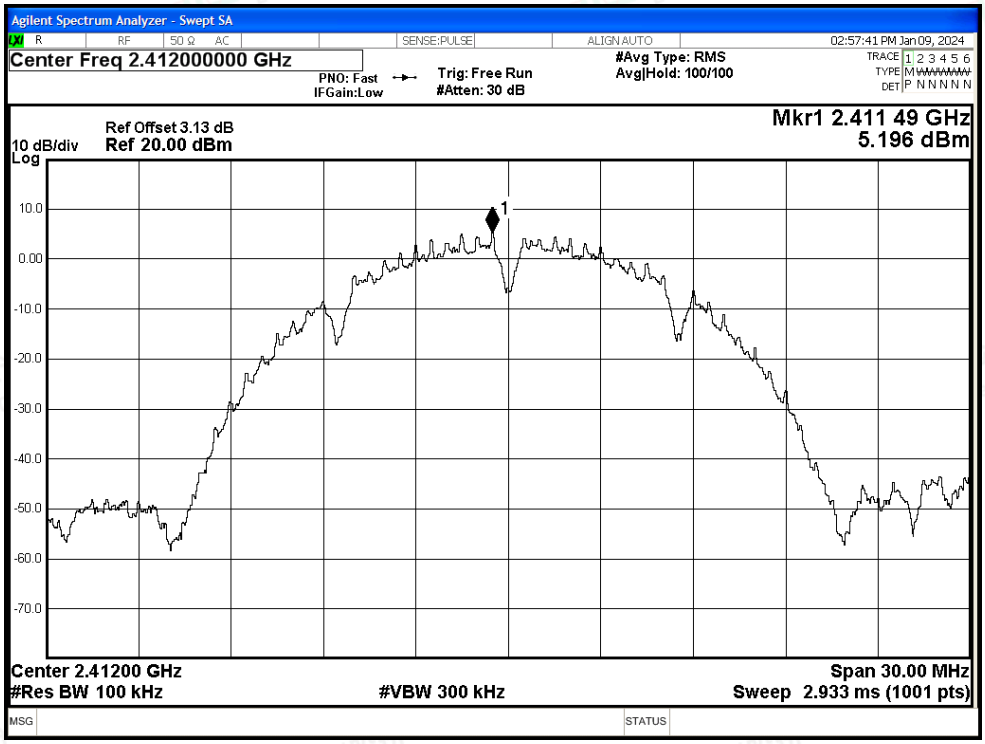
Tx. Spurious NVNT n40 2452MHz Ant1 Emission



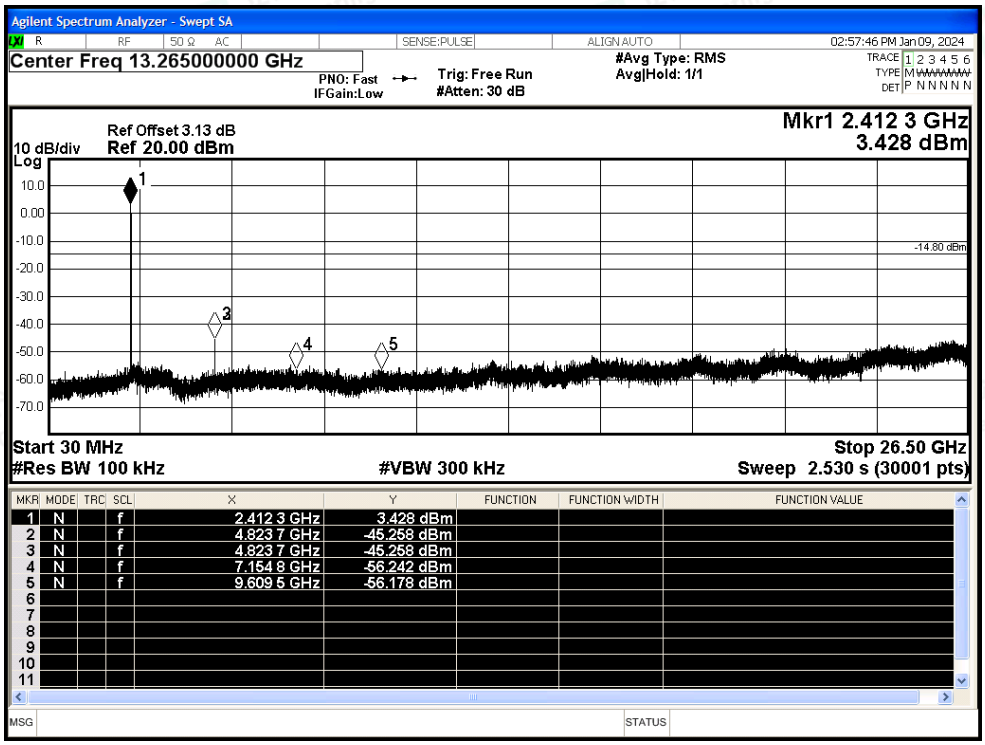
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	b	2412	Ant2	-50.45	-20	Pass
NVNT	b	2437	Ant2	-50.72	-20	Pass
NVNT	b	2462	Ant2	-50.81	-20	Pass
NVNT	g	2412	Ant2	-44.8	-20	Pass
NVNT	g	2437	Ant2	-43.78	-20	Pass
NVNT	g	2462	Ant2	-43.53	-20	Pass
NVNT	n20	2412	Ant2	-43.82	-20	Pass
NVNT	n20	2437	Ant2	-44.44	-20	Pass
NVNT	n20	2462	Ant2	-43.43	-20	Pass
NVNT	n40	2422	Ant2	-39.83	-20	Pass
NVNT	n40	2437	Ant2	-39.96	-20	Pass
NVNT	n40	2452	Ant2	-40.33	-20	Pass

Test Graphs

Tx. Spurious NVNT b 2412MHz Ant2 Ref

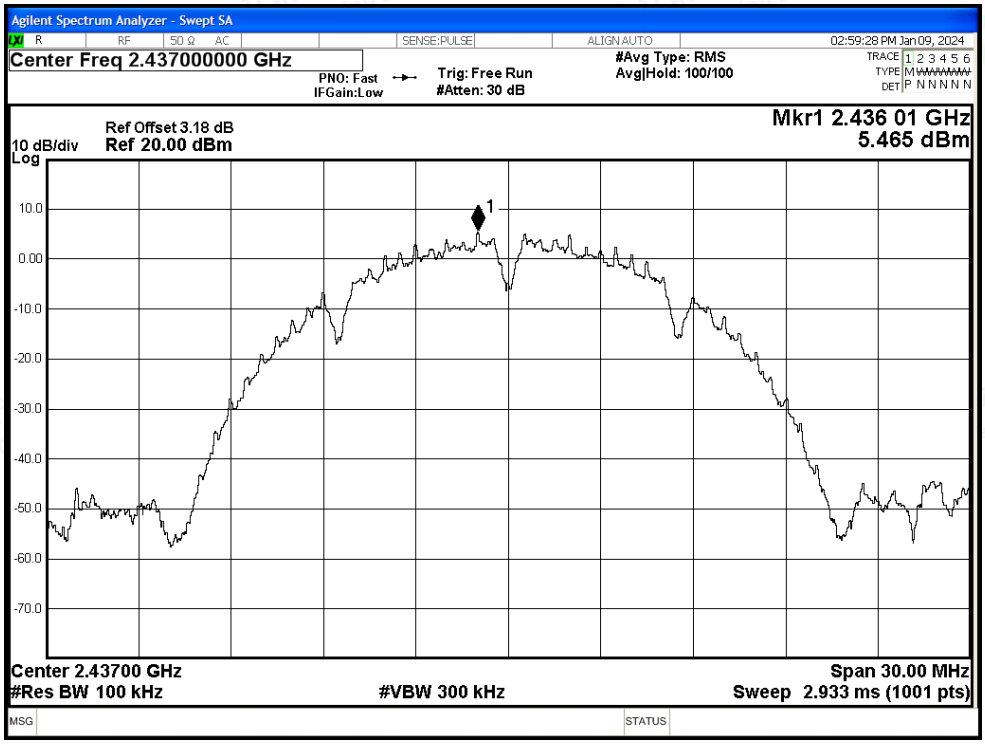


Tx. Spurious NVNT b 2412MHz Ant2 Emission

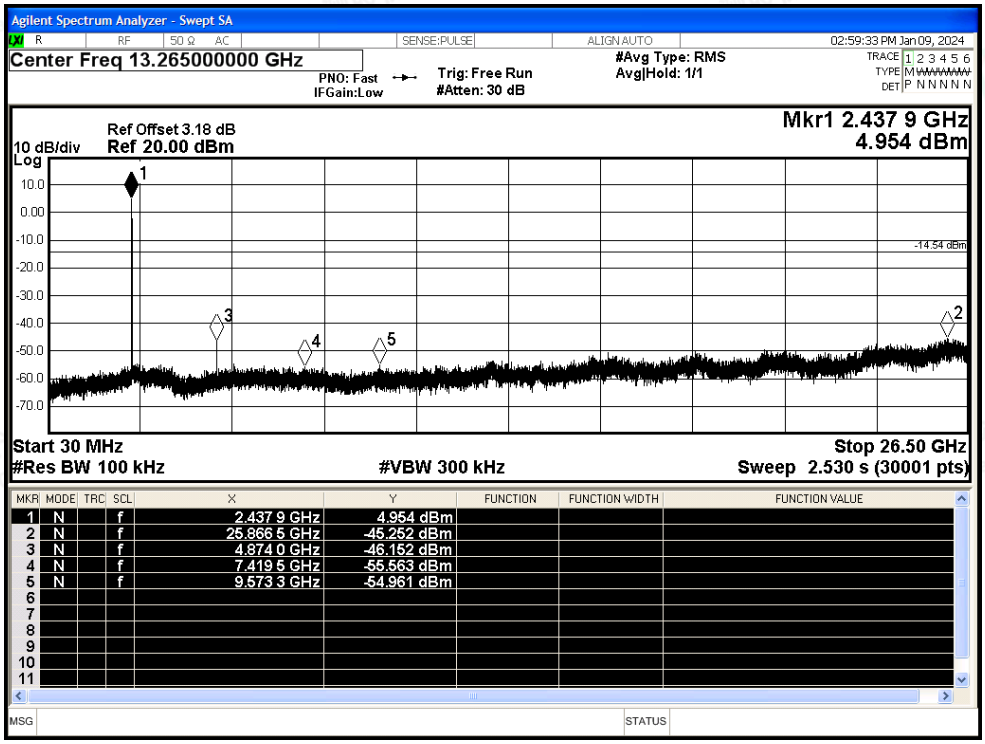


MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N		f	2.412 3 GHz	3.428 dBm			
2	N		f	4.823 7 GHz	-45.258 dBm			
3	N		f	4.823 7 GHz	-45.258 dBm			
4	N		f	7.154 8 GHz	-56.242 dBm			
5	N		f	9.609 5 GHz	-56.178 dBm			
6								
7								
8								
9								
10								
11								

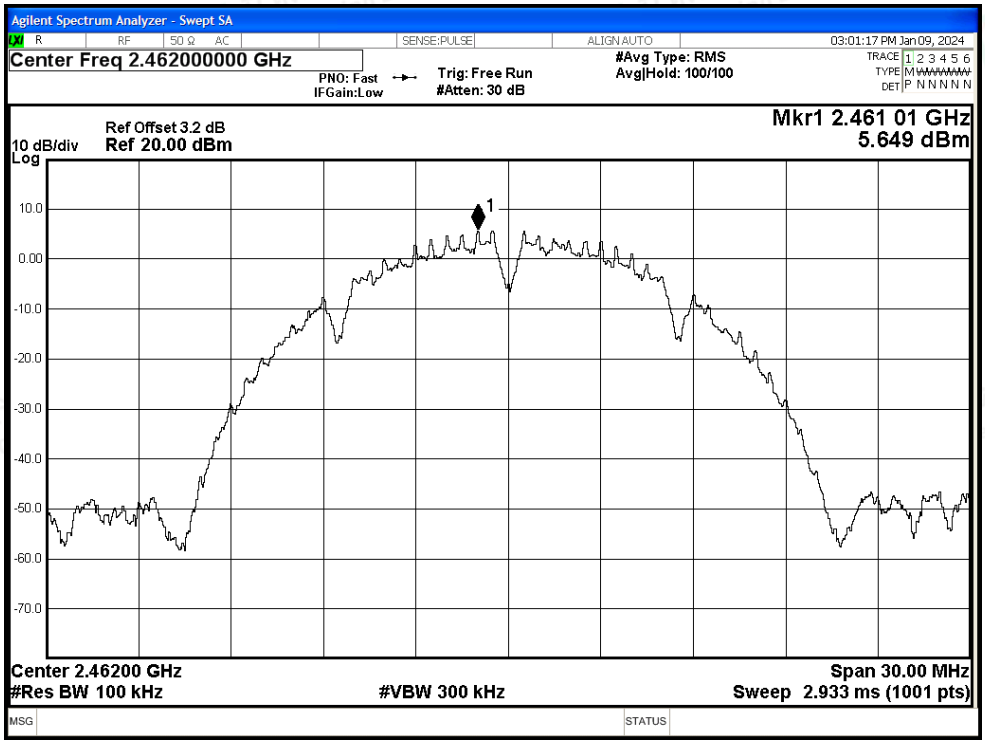
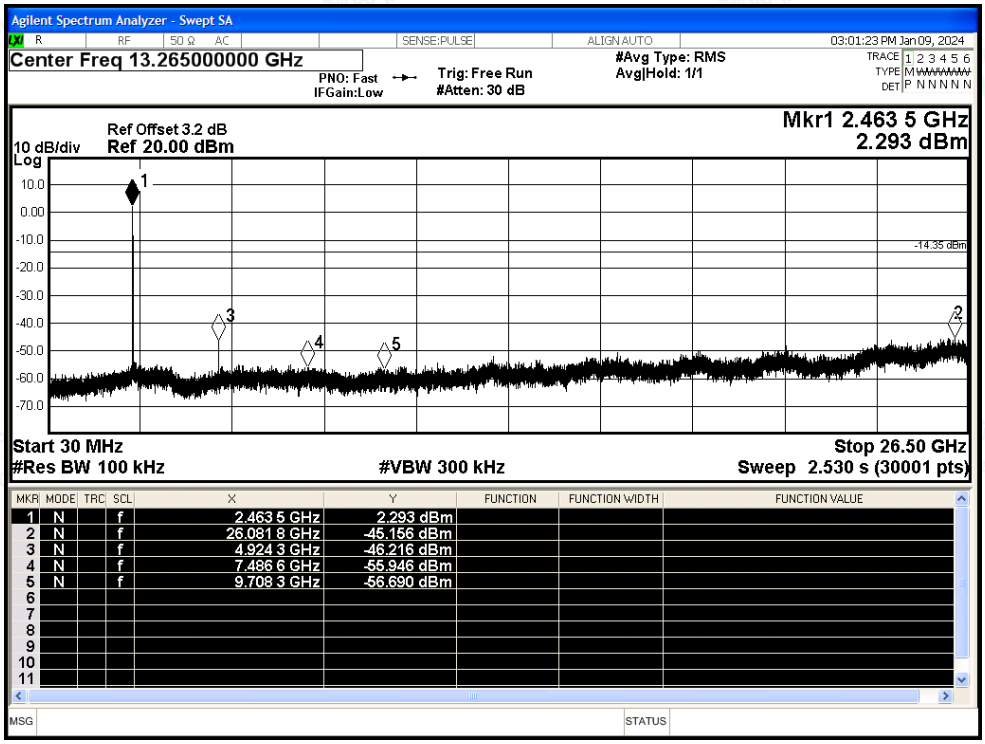
Tx. Spurious NVNT b 2437MHz Ant2 Ref



Tx. Spurious NVNT b 2437MHz Ant2 Emission



Tx. Spurious NVNT b 2462MHz Ant2 Ref



Tx. Spurious NVNT b 2462MHz Ant2 Emission