

Appendix A

RF Test Data for 2.4GWIFI(Conducted Measurement)

Product Name: Wireless Diagnostics Module / Vehicle Communication Interface

Test Model: V114

Environmental Conditions

Temperature:	24.2°C
Relative Humidity:	53.5%
ATM Pressure:	100.0 kPa
Test Engineer:	Jone Lee
Supervised by:	Fengliu Tang



A.1 -6dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	b	2412	Ant1	8.701	≥ 0.5	Pass
NVNT	b	2437	Ant1	9.167	≥ 0.5	Pass
NVNT	b	2462	Ant1	9.141	≥ 0.5	Pass
NVNT	g	2412	Ant1	16.193	≥ 0.5	Pass
NVNT	g	2437	Ant1	16.396	≥ 0.5	Pass
NVNT	g	2462	Ant1	16.359	≥ 0.5	Pass
NVNT	n20	2412	Ant1	17.078	≥ 0.5	Pass
NVNT	n20	2437	Ant1	17.421	≥ 0.5	Pass
NVNT	n20	2462	Ant1	17.346	≥ 0.5	Pass
NVNT	n40	2422	Ant1	35.827	≥ 0.5	Pass
NVNT	n40	2437	Ant1	35.822	≥ 0.5	Pass
NVNT	n40	2452	Ant1	35.847	≥ 0.5	Pass



Test Graphs

-6dB Bandwidth NVNT b 2412MHz Ant1



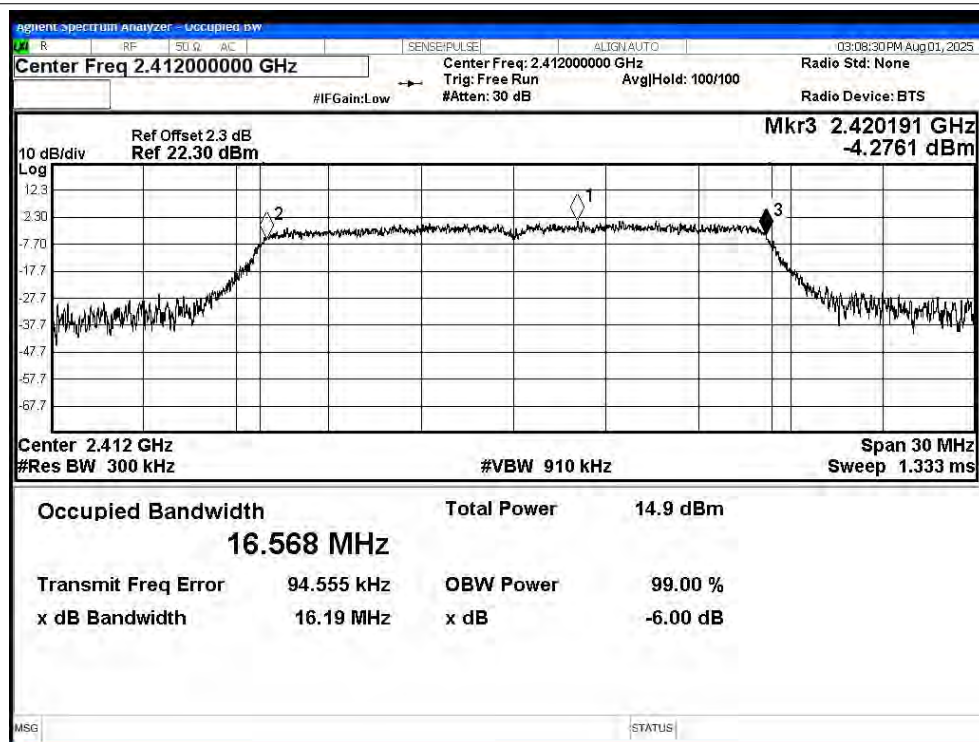
-6dB Bandwidth NVNT b 2437MHz Ant1



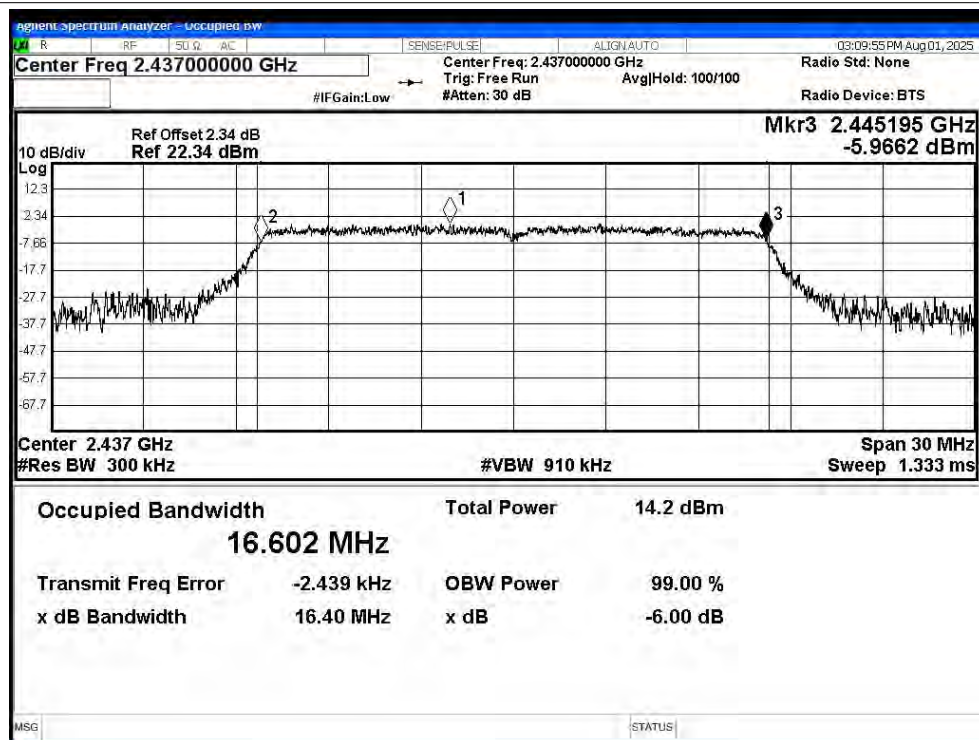
-6dB Bandwidth NVNT b 2462MHz Ant1



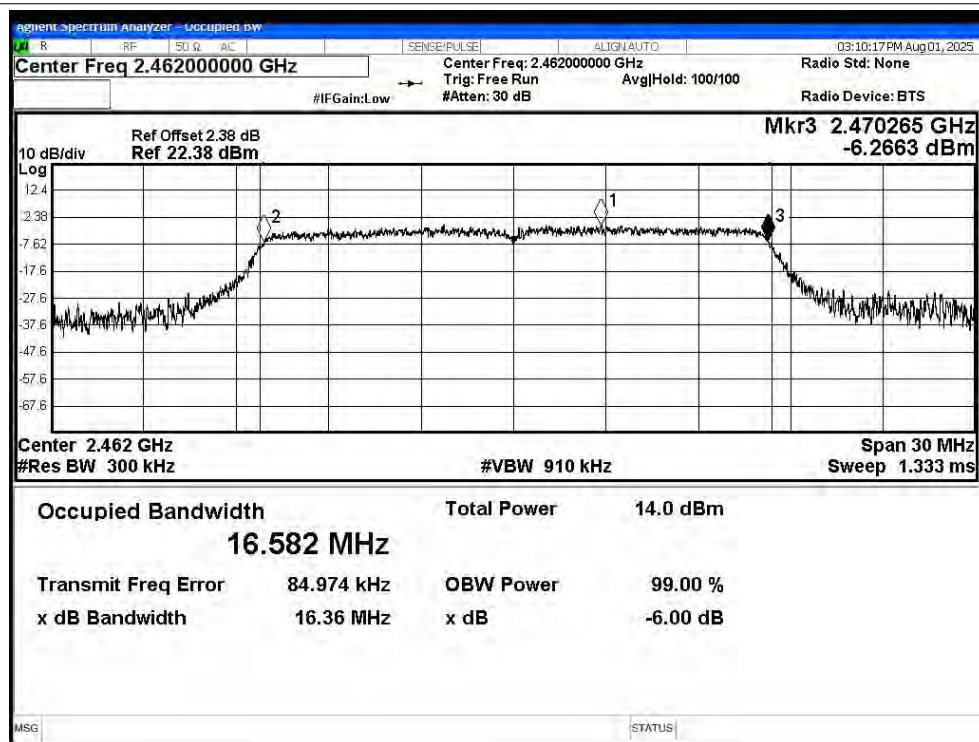
-6dB Bandwidth NVNT g 2412MHz Ant1



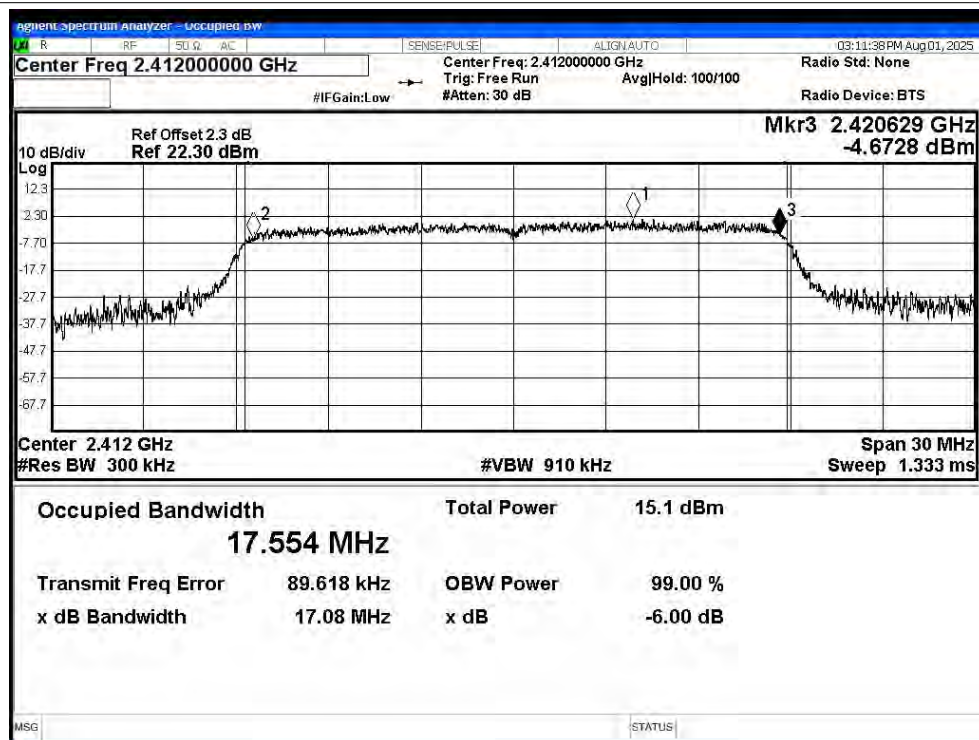
-6dB Bandwidth NVNT g 2437MHz Ant1



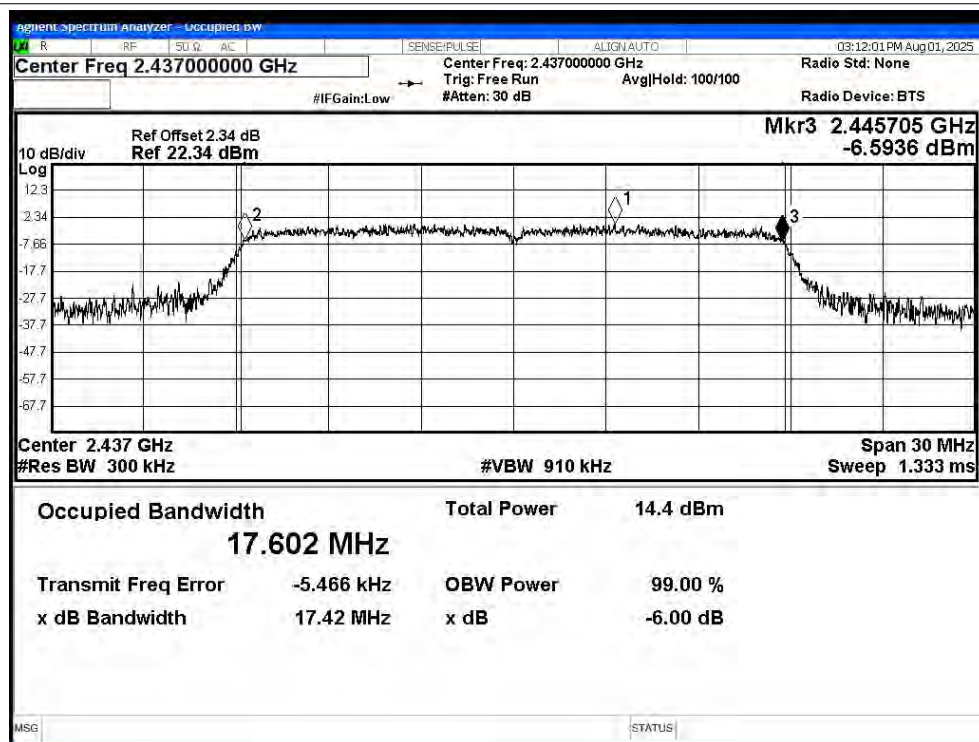
-6dB Bandwidth NVNT g 2462MHz Ant1



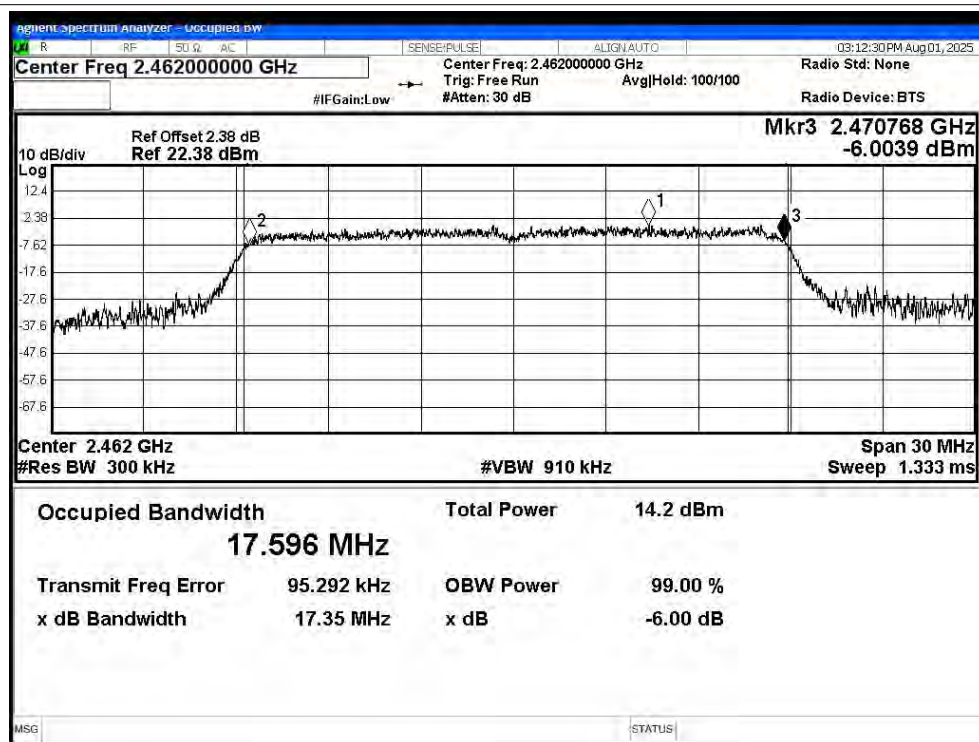
-6dB Bandwidth NVNT n20 2412MHz Ant1



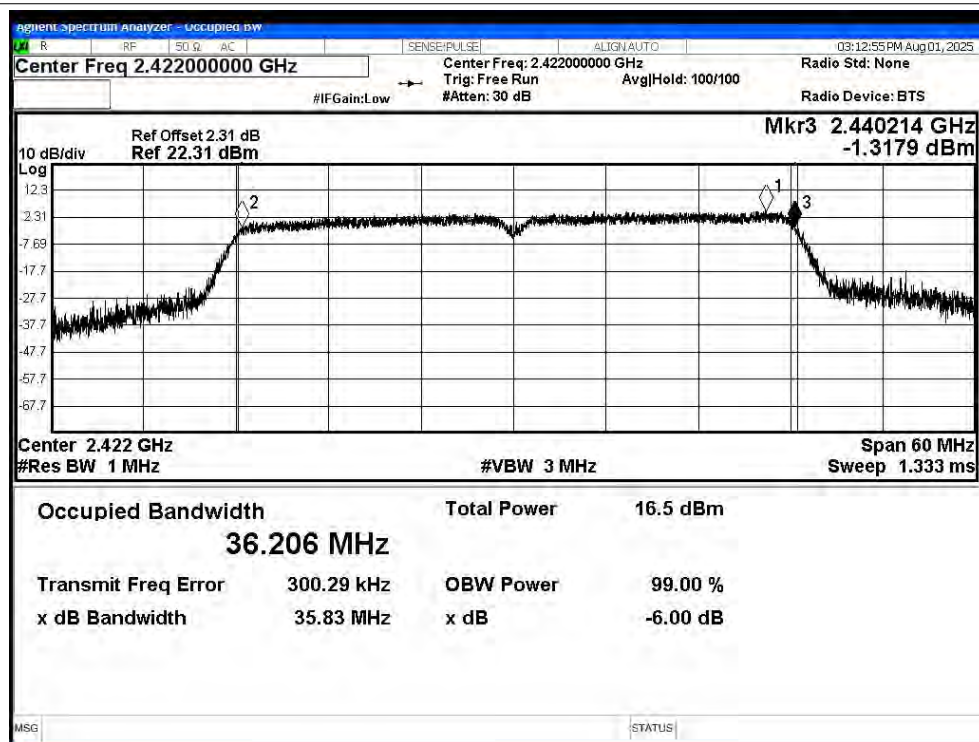
-6dB Bandwidth NVNT n20 2437MHz Ant1



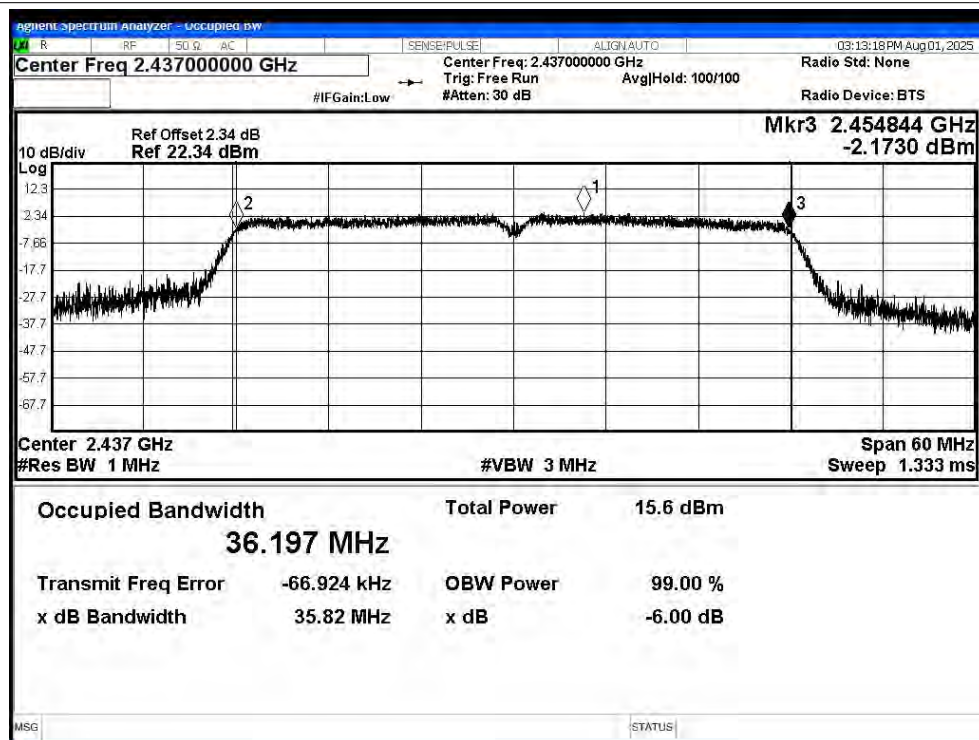
-6dB Bandwidth NVNT n20 2462MHz Ant1



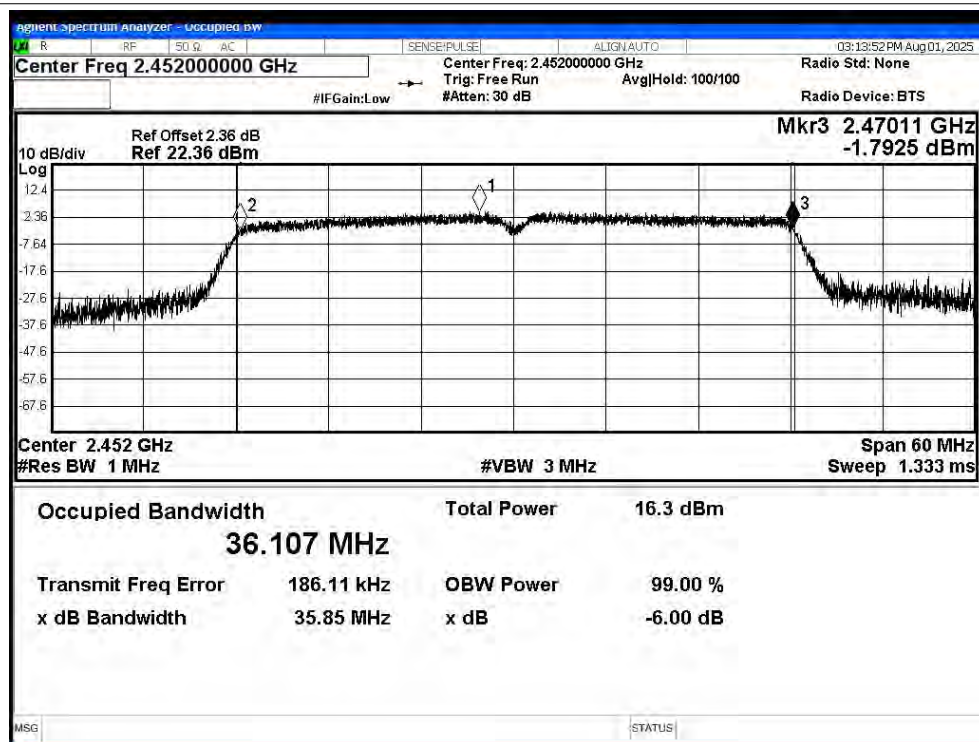
-6dB Bandwidth NVNT n40 2422MHz Ant1



-6dB Bandwidth NVNT n40 2437MHz Ant1



-6dB Bandwidth NVNT n40 2452MHz Ant1



A.2 Maximum Peak Conducted Output Power

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	b	2412	Ant1	13.8	30	Pass
NVNT	b	2437	Ant1	14.15	30	Pass
NVNT	b	2462	Ant1	14.4	30	Pass
NVNT	g	2412	Ant1	14.78	30	Pass
NVNT	g	2437	Ant1	15.43	30	Pass
NVNT	g	2462	Ant1	15.38	30	Pass
NVNT	n20	2412	Ant1	14.65	30	Pass
NVNT	n20	2437	Ant1	15.35	30	Pass
NVNT	n20	2462	Ant1	15.31	30	Pass
NVNT	n40	2422	Ant1	14.27	30	Pass
NVNT	n40	2437	Ant1	14.31	30	Pass
NVNT	n40	2452	Ant1	14.4	30	Pass



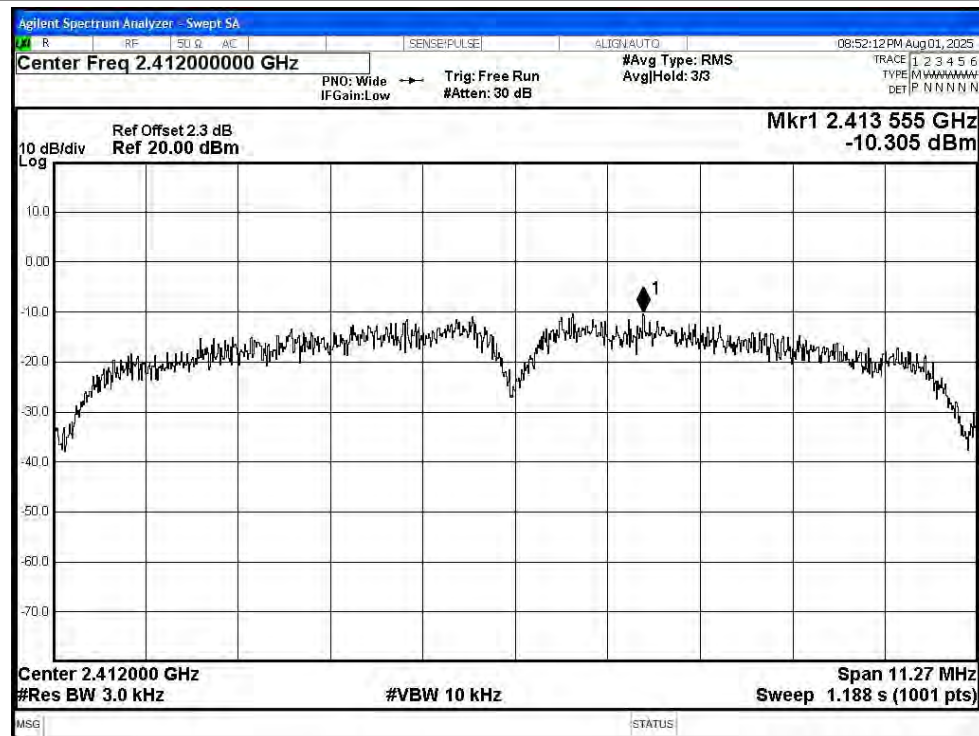
A.3 Maximum Power Spectral Density Level

Condition	Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
NVNT	b	2412	Ant1	-10.31	8	Pass
NVNT	b	2437	Ant1	-9.96	8	Pass
NVNT	b	2462	Ant1	-9.52	8	Pass
NVNT	g	2412	Ant1	-13.33	8	Pass
NVNT	g	2437	Ant1	-13.7	8	Pass
NVNT	g	2462	Ant1	-13.65	8	Pass
NVNT	n20	2412	Ant1	-13.43	8	Pass
NVNT	n20	2437	Ant1	-14.18	8	Pass
NVNT	n20	2462	Ant1	-13.45	8	Pass
NVNT	n40	2422	Ant1	-17.11	8	Pass
NVNT	n40	2437	Ant1	-17.89	8	Pass
NVNT	n40	2452	Ant1	-17.63	8	Pass

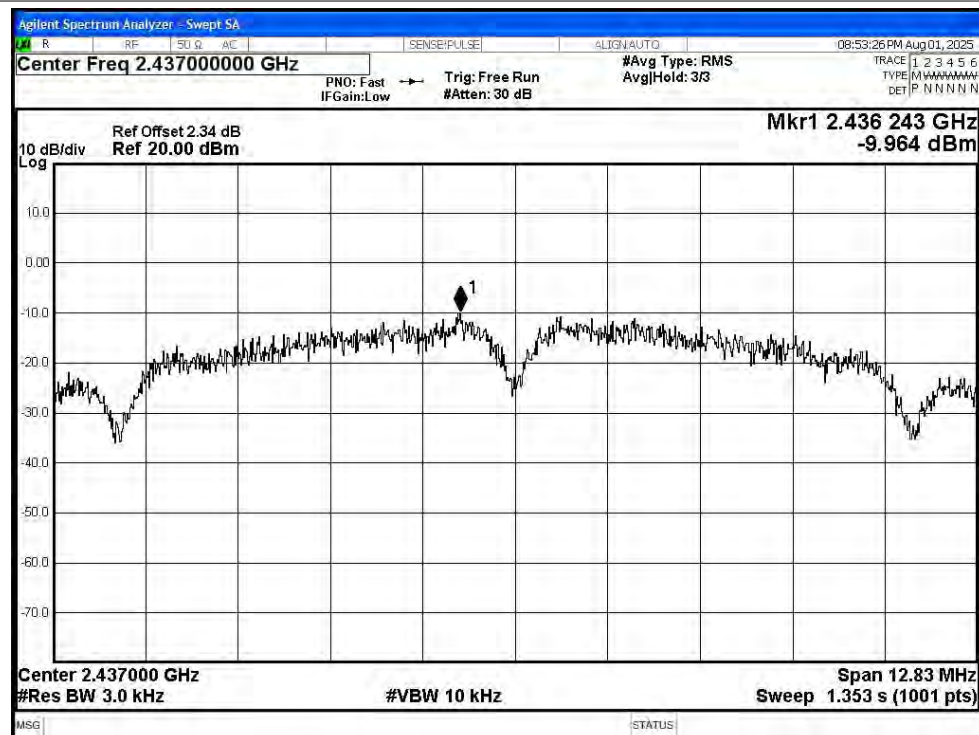


Test Graphs

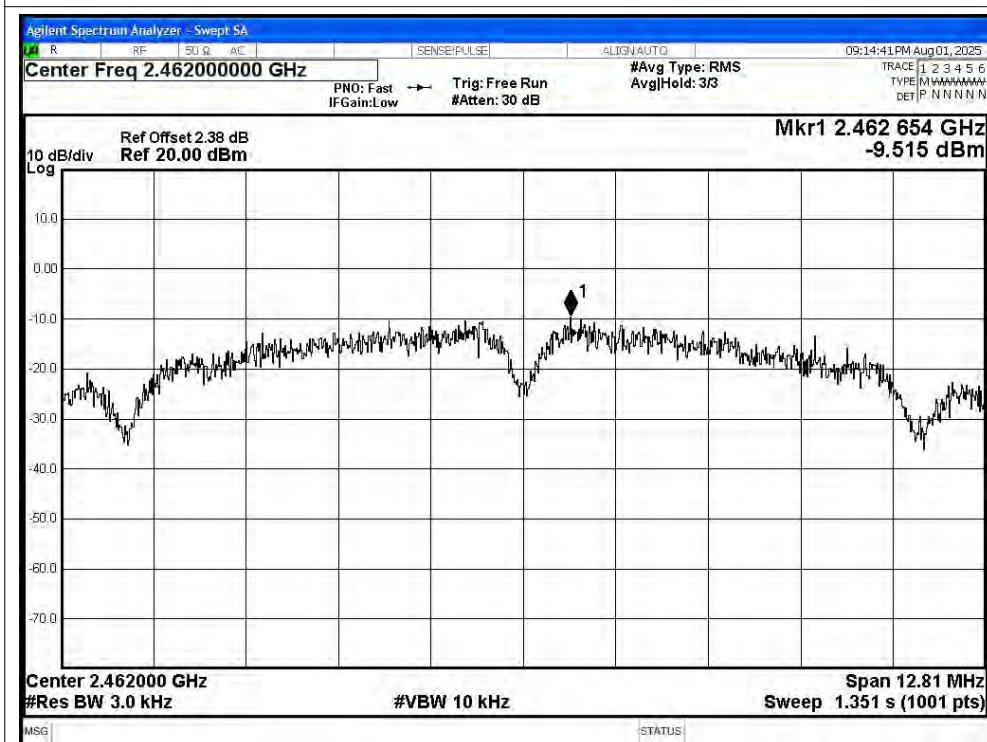
PSD NVNT b 2412MHz Ant1



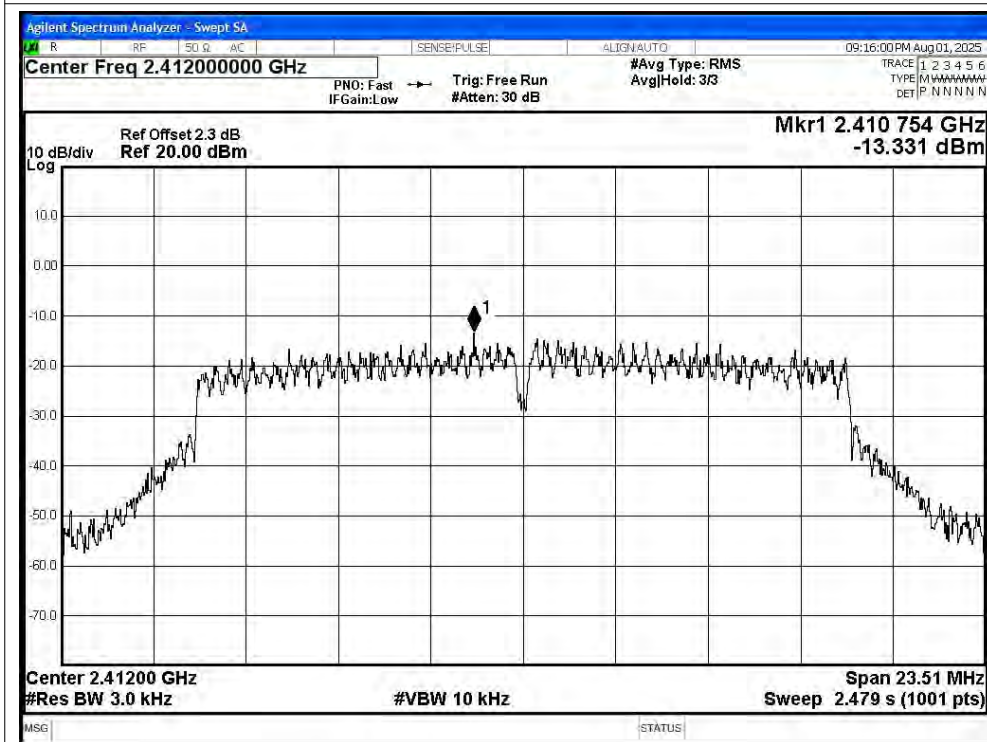
PSD NVNT b 2437MHz Ant1



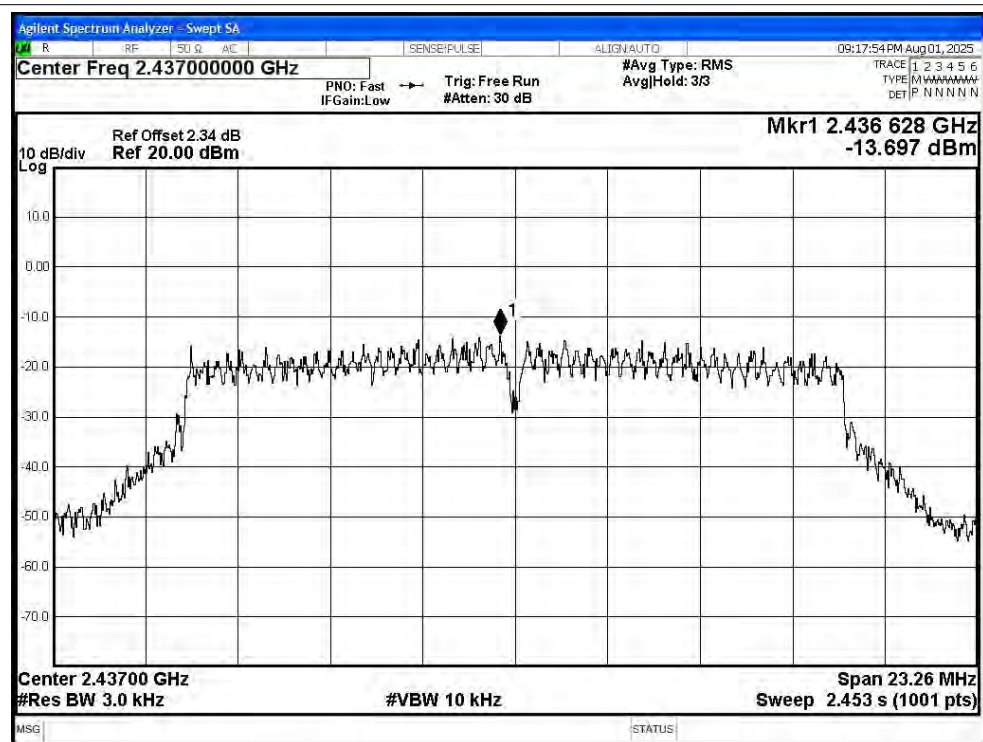
PSD NVNT b 2462MHz Ant1



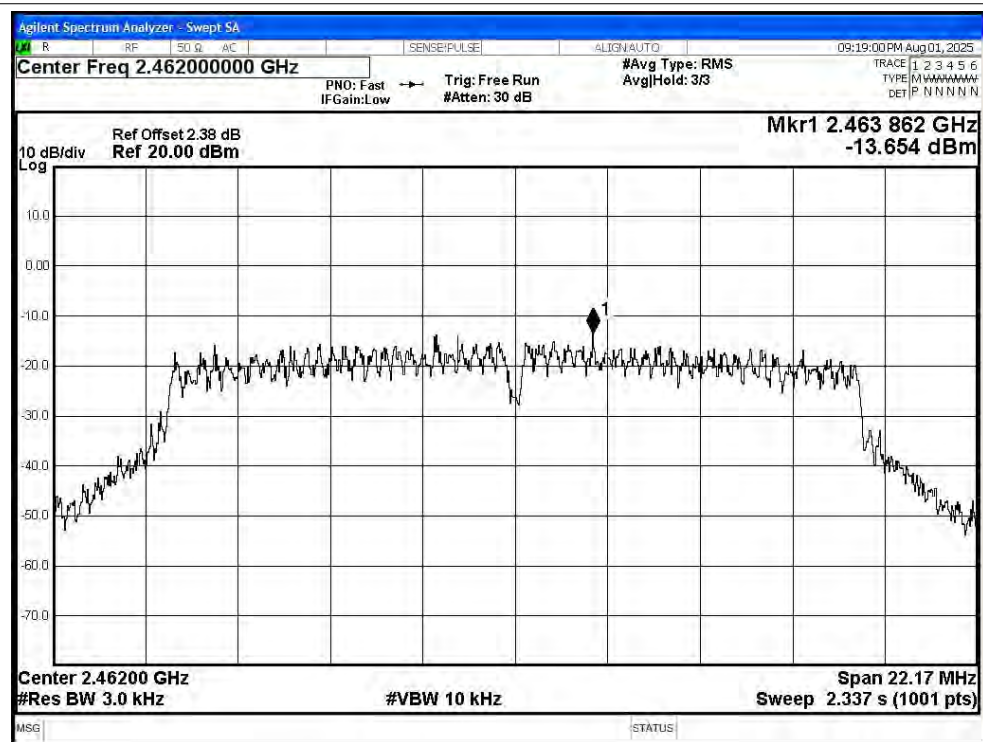
PSD NVNT g 2412MHz Ant1



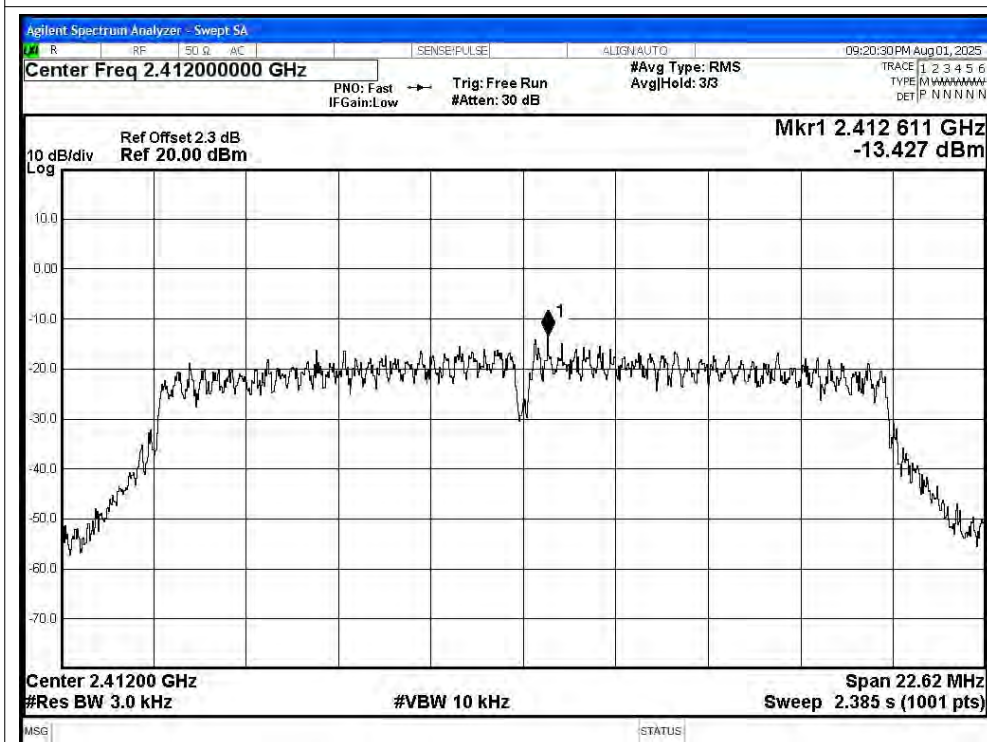
PSD NVNT g 2437MHz Ant1



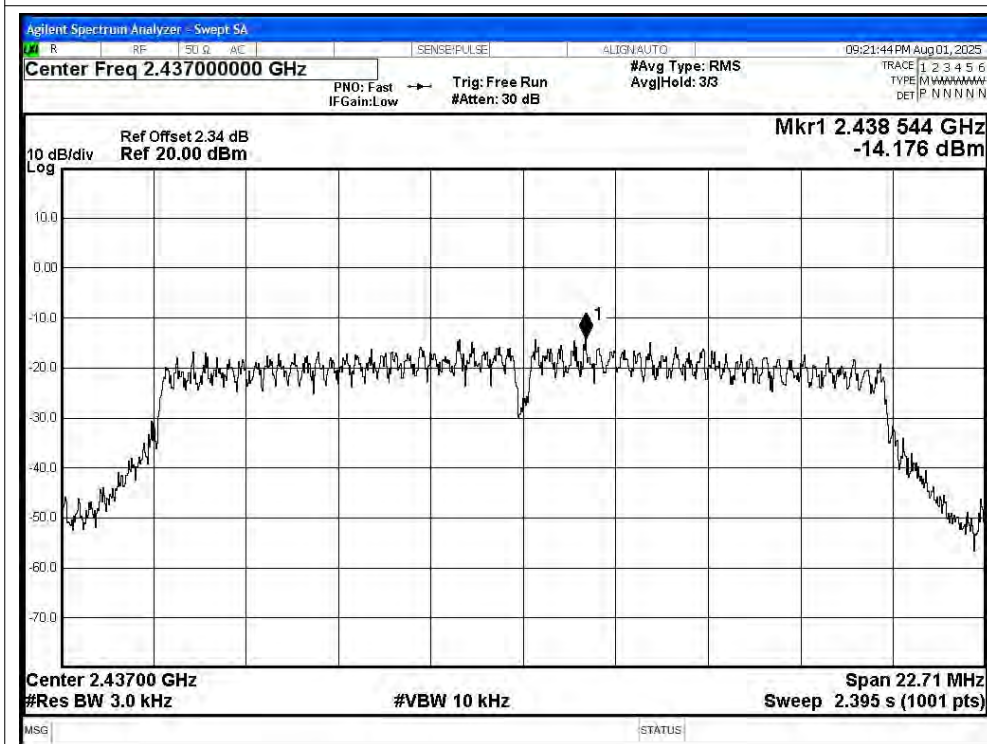
PSD NVNT g 2462MHz Ant1



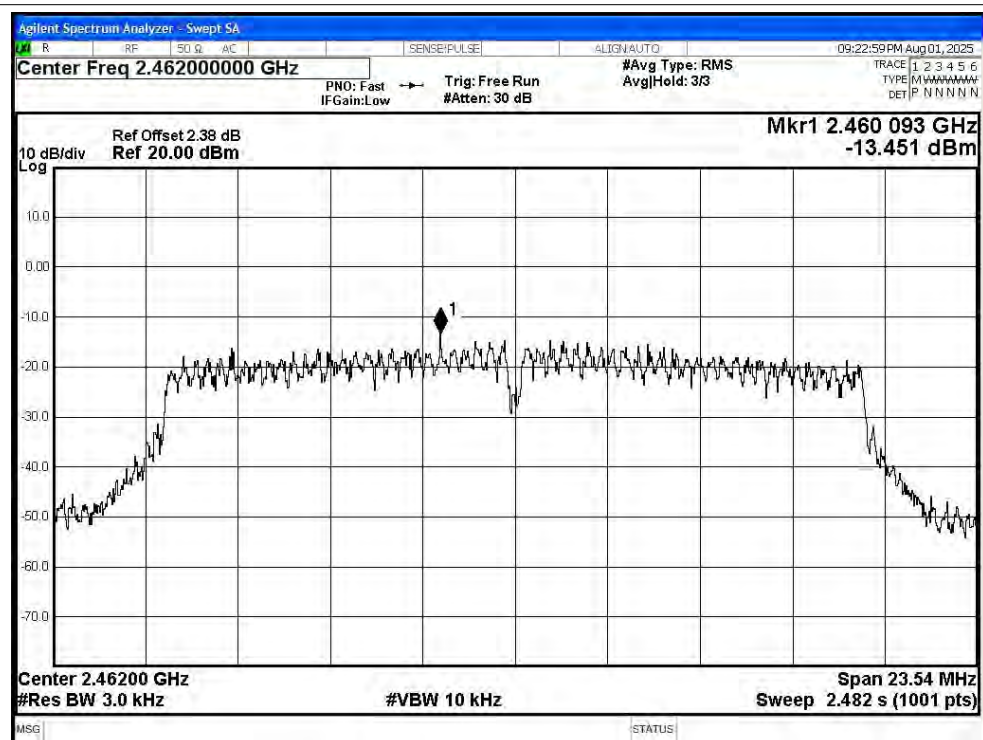
PSD NVNT n20 2412MHz Ant1



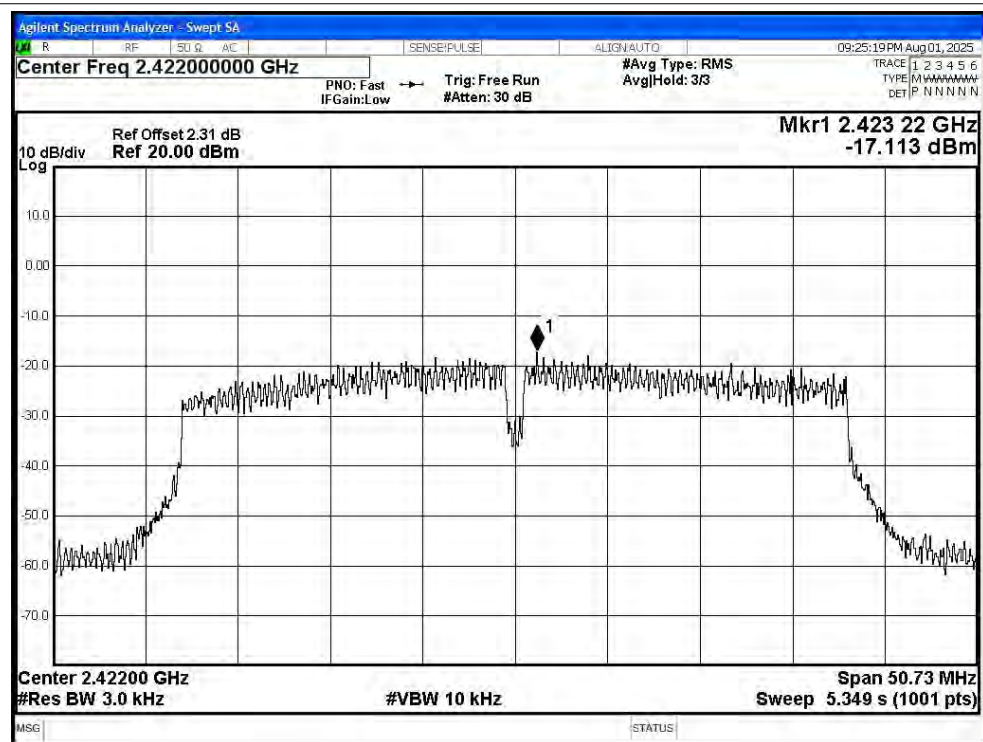
PSD NVNT n20 2437MHz Ant1

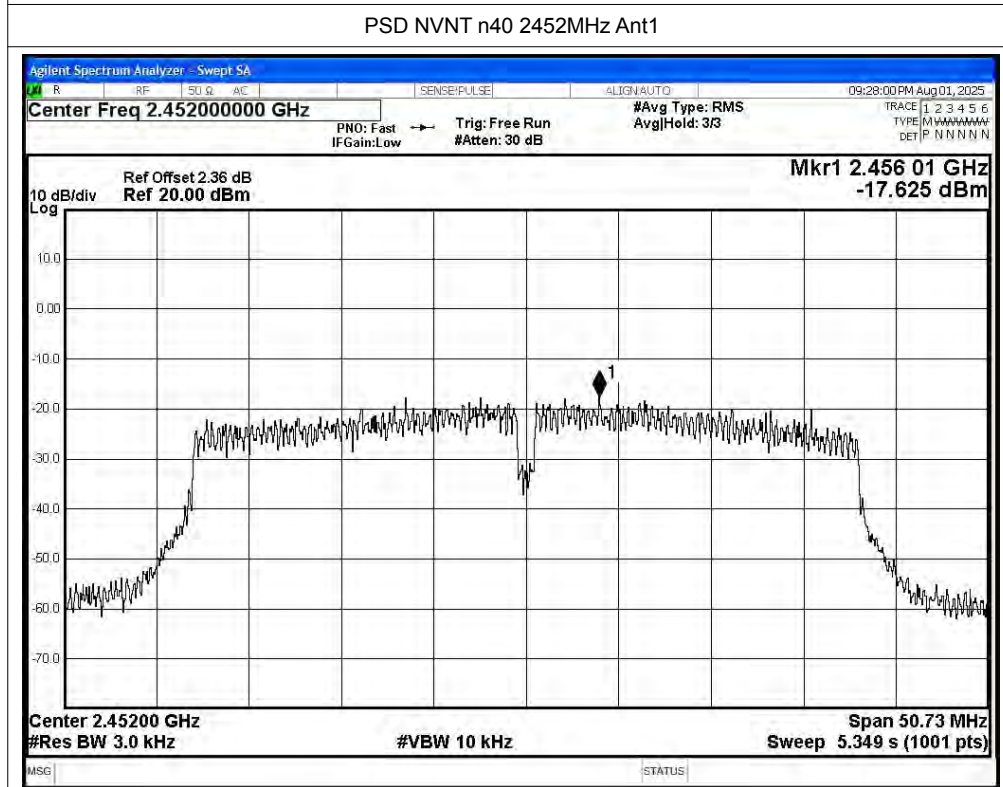
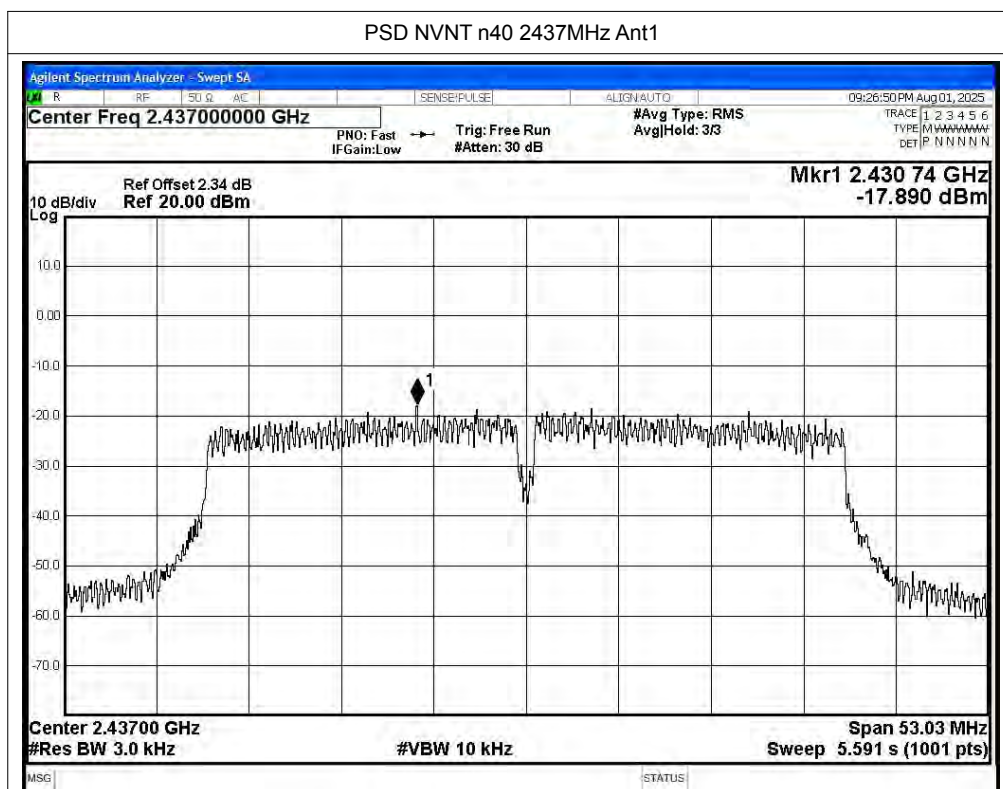


PSD NVNT n20 2462MHz Ant1



PSD NVNT n40 2422MHz Ant1





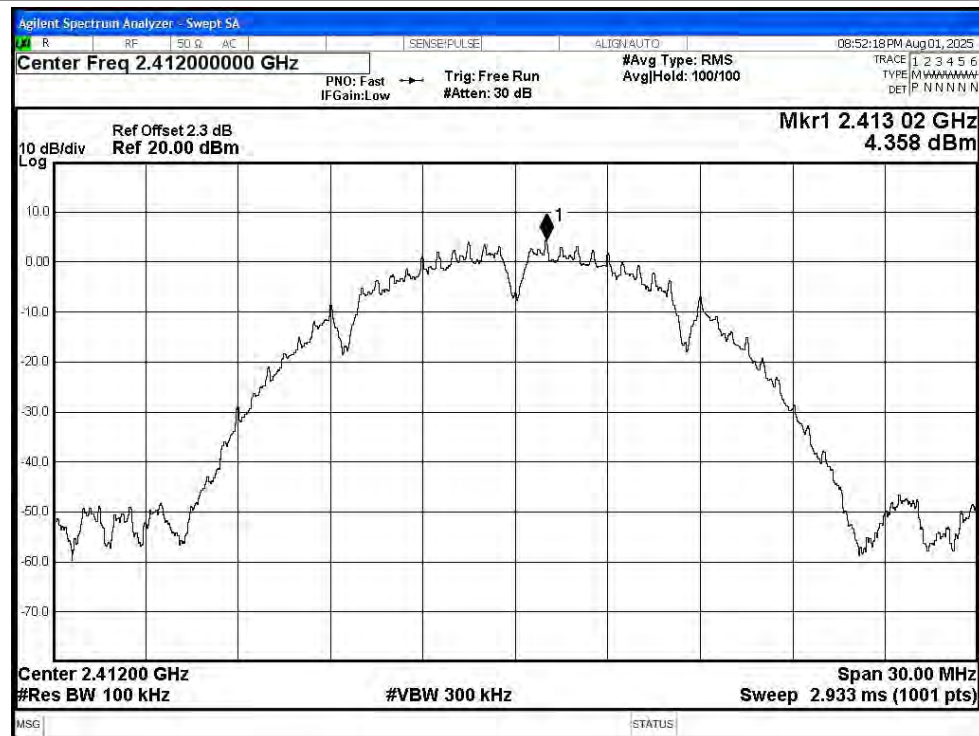
A.4 Band Edge

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	b	2412	Ant1	-53.3	-20	Pass
NVNT	b	2462	Ant1	-57.86	-20	Pass
NVNT	g	2412	Ant1	-35.37	-20	Pass
NVNT	g	2462	Ant1	-45.38	-20	Pass
NVNT	n20	2412	Ant1	-34.81	-20	Pass
NVNT	n20	2462	Ant1	-44.46	-20	Pass
NVNT	n40	2422	Ant1	-35.85	-20	Pass
NVNT	n40	2452	Ant1	-34.65	-20	Pass

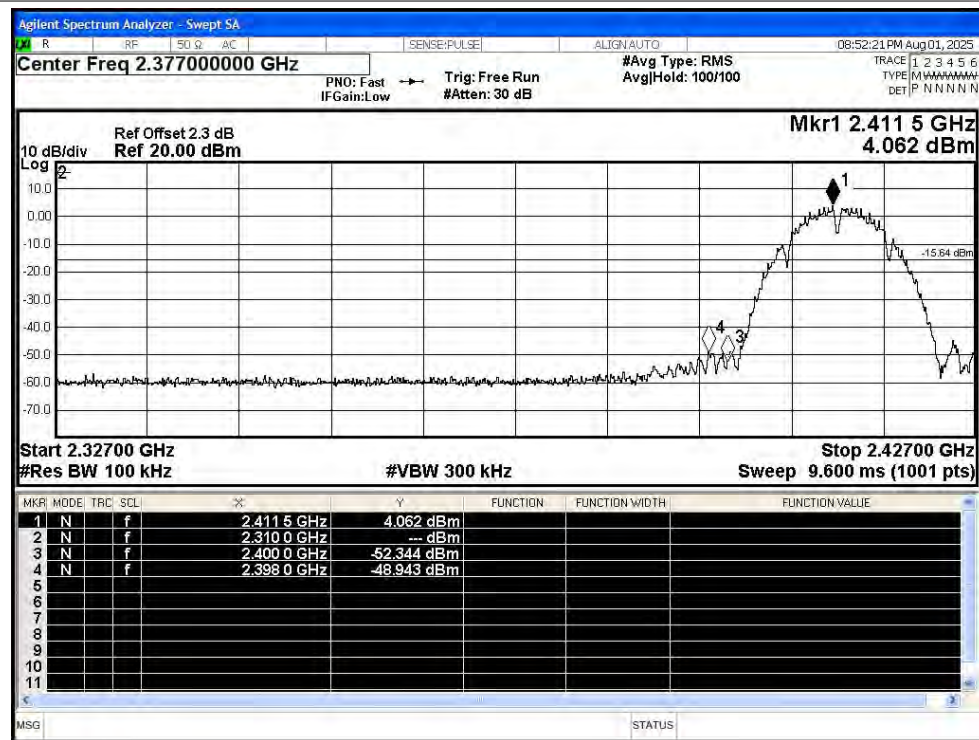


Test Graphs

Band Edge NVNT b 2412MHz Ant1 Ref



Band Edge NVNT b 2412MHz Ant1 Emission



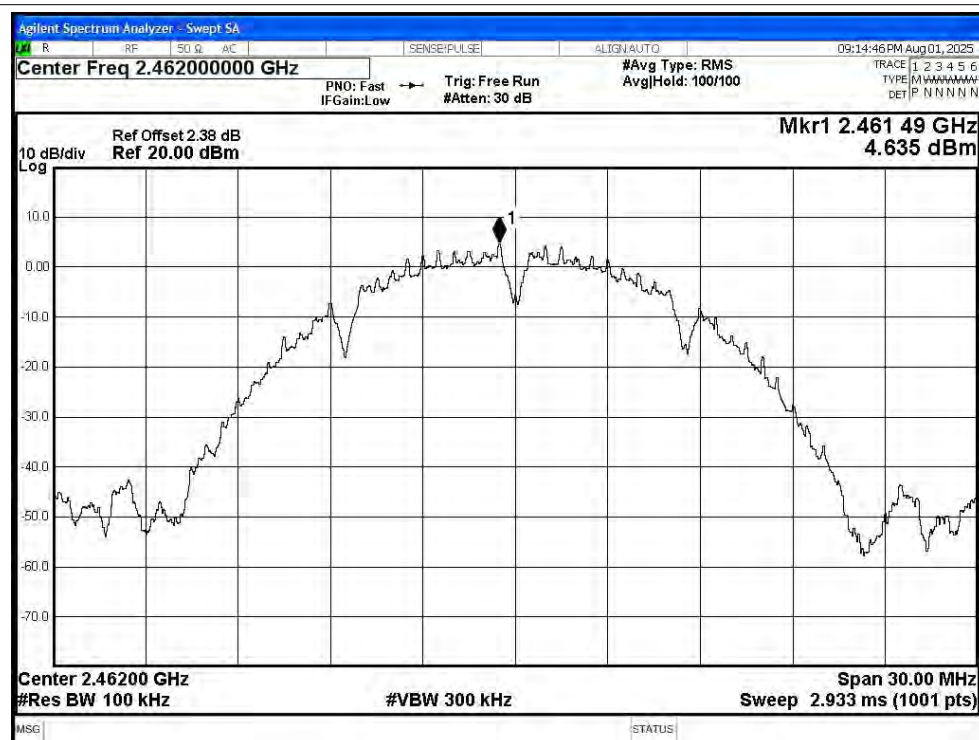
Shenzhen LCS Compliance Testing Laboratory Ltd.

Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

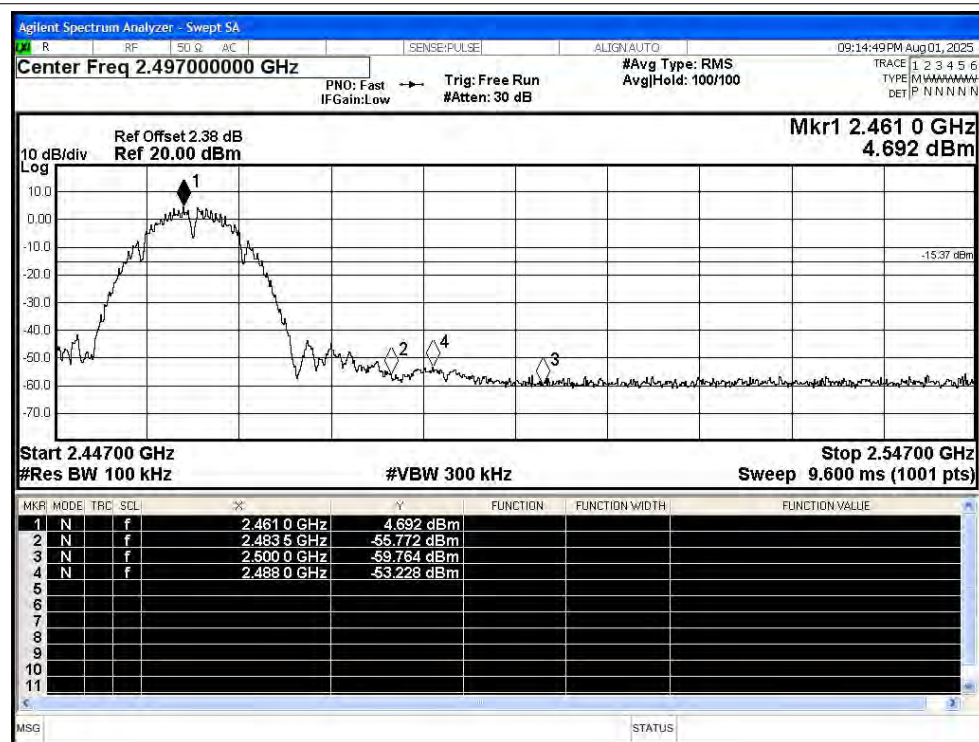
Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

Scan code to check authenticity

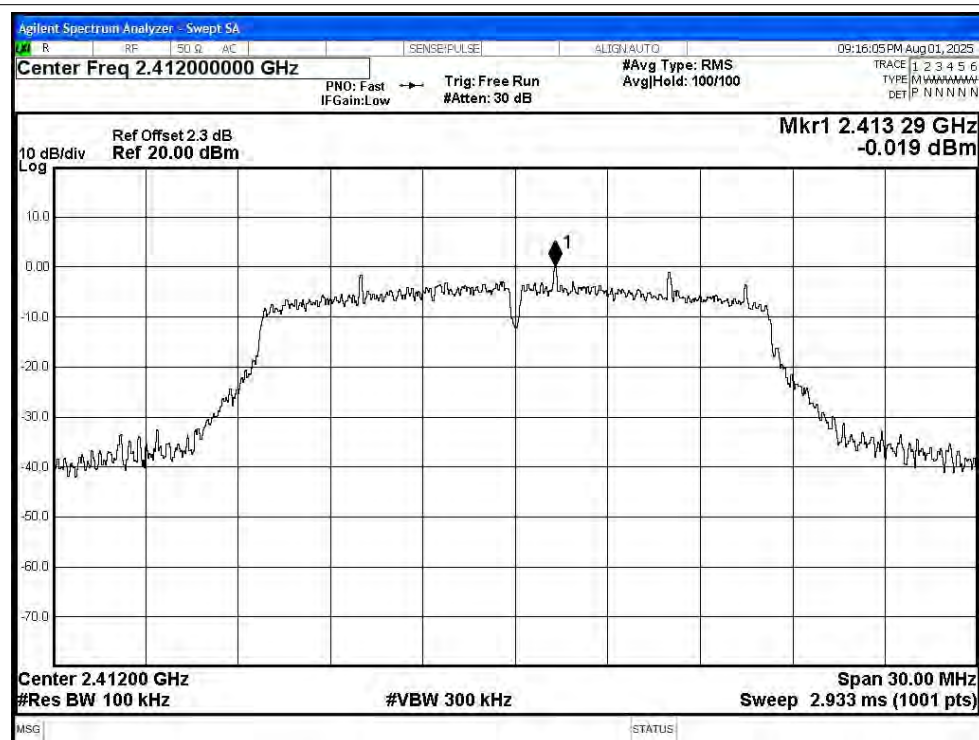
Band Edge NVNT b 2462MHz Ant1 Ref



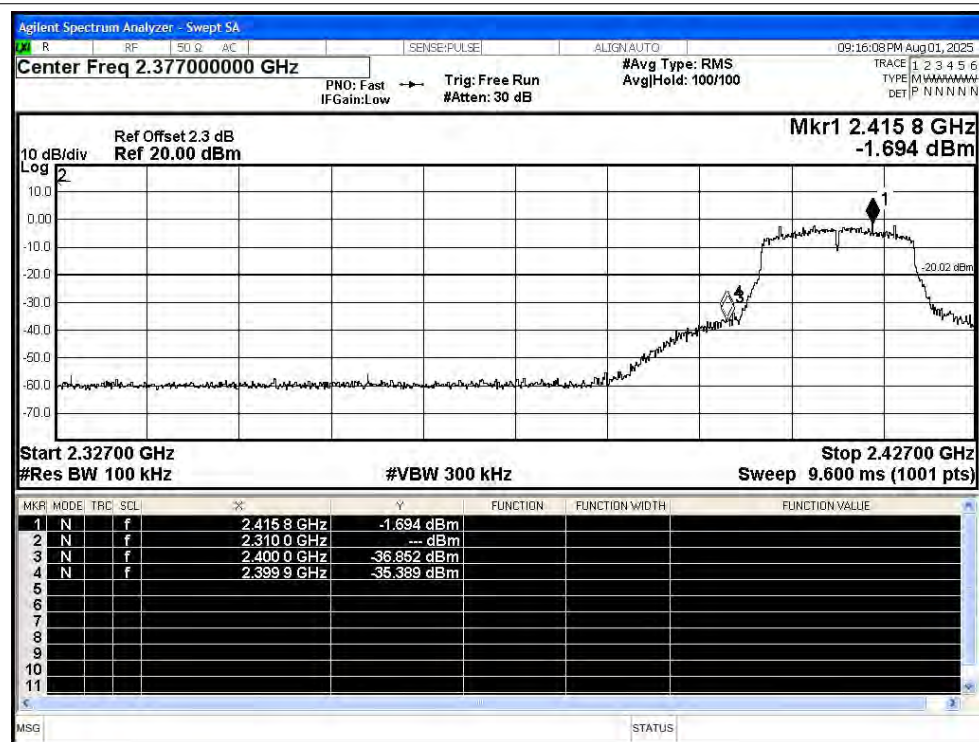
Band Edge NVNT b 2462MHz Ant1 Emission



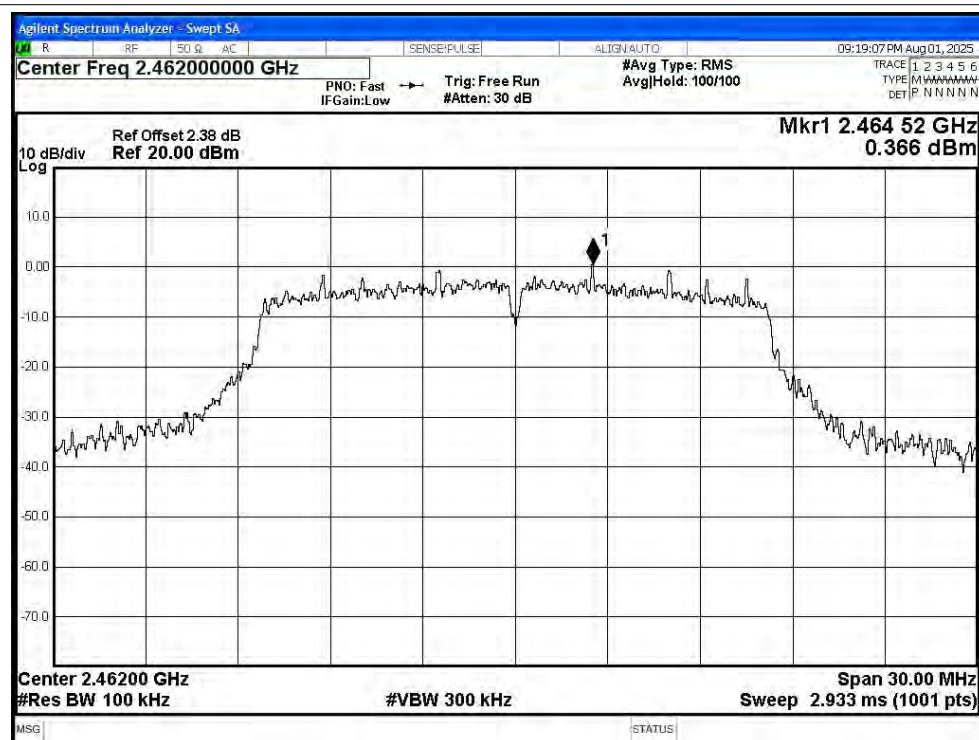
Band Edge NVNT g 2412MHz Ant1 Ref



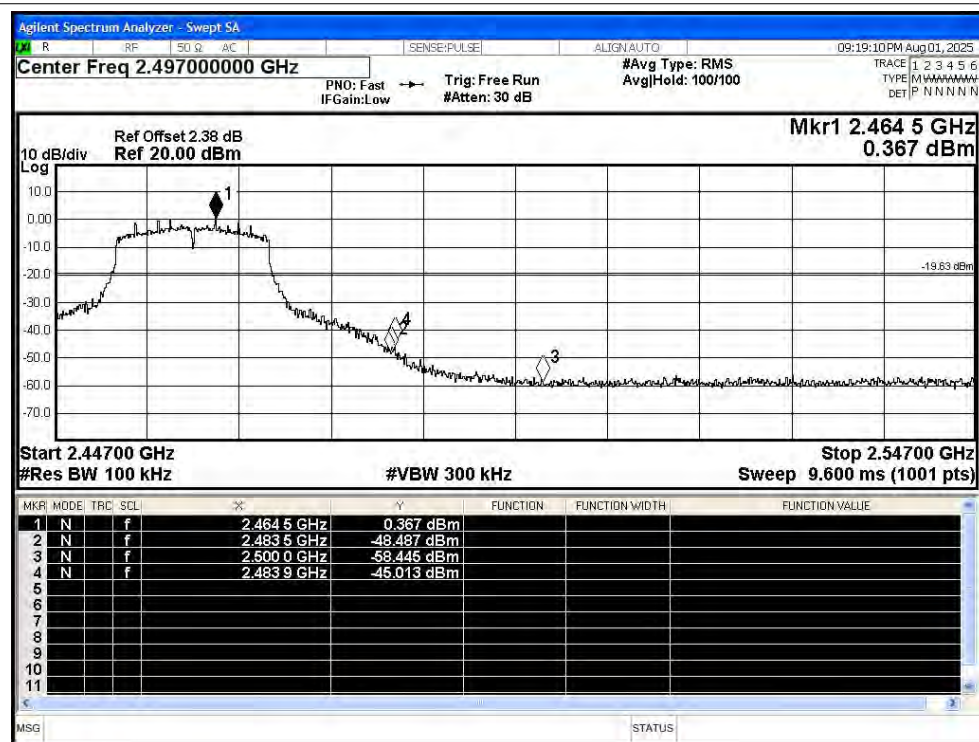
Band Edge NVNT g 2412MHz Ant1 Emission



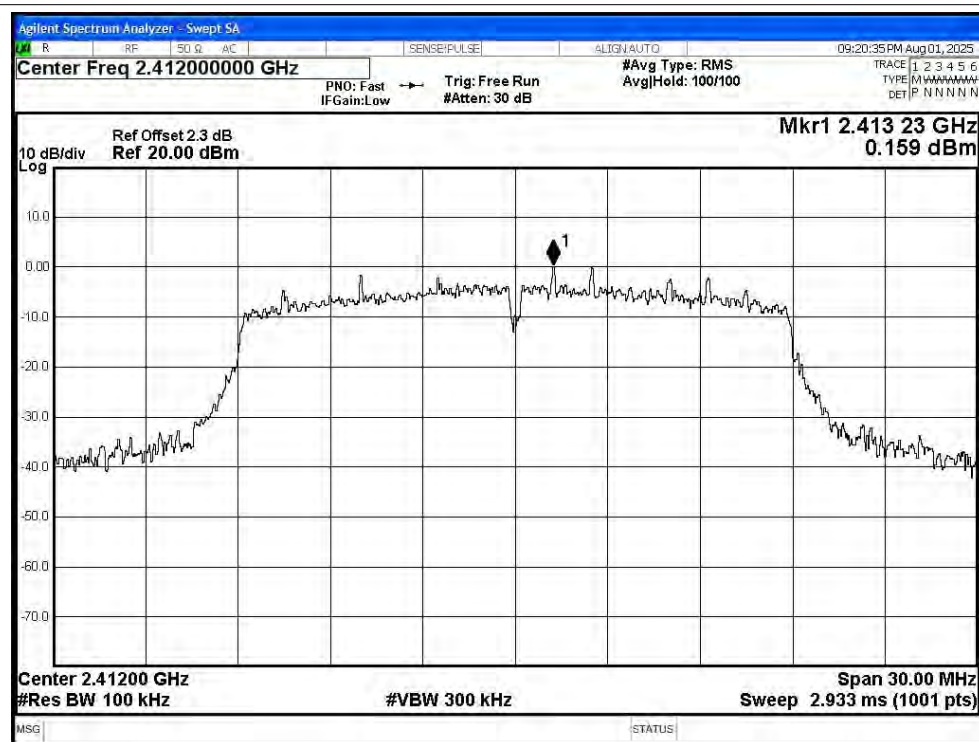
Band Edge NVNT g 2462MHz Ant1 Ref



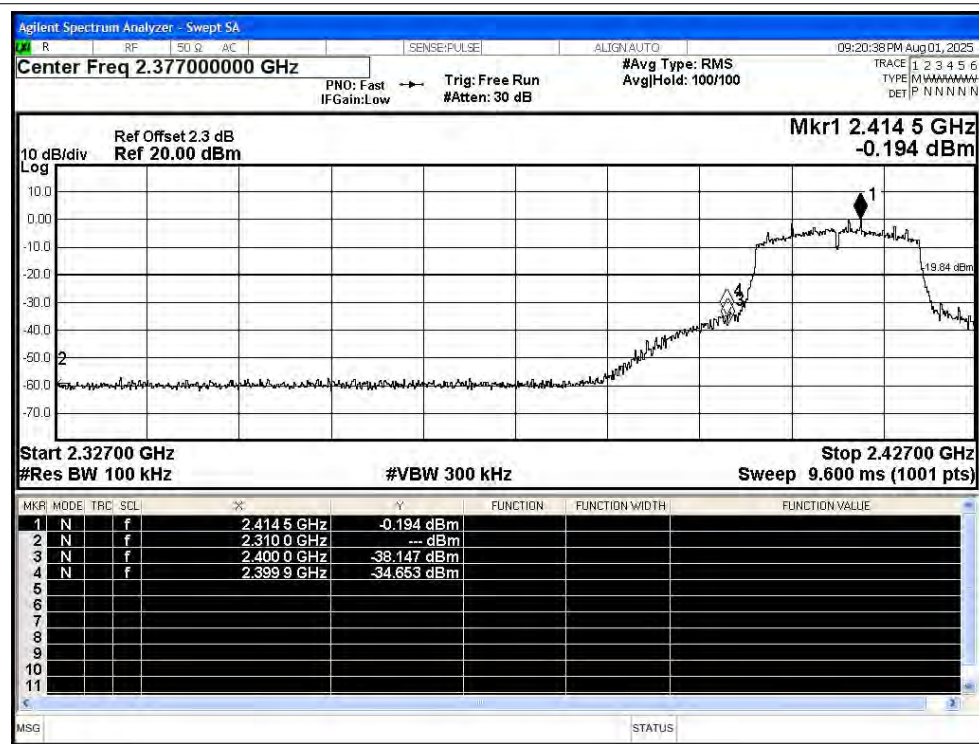
Band Edge NVNT g 2462MHz Ant1 Emission



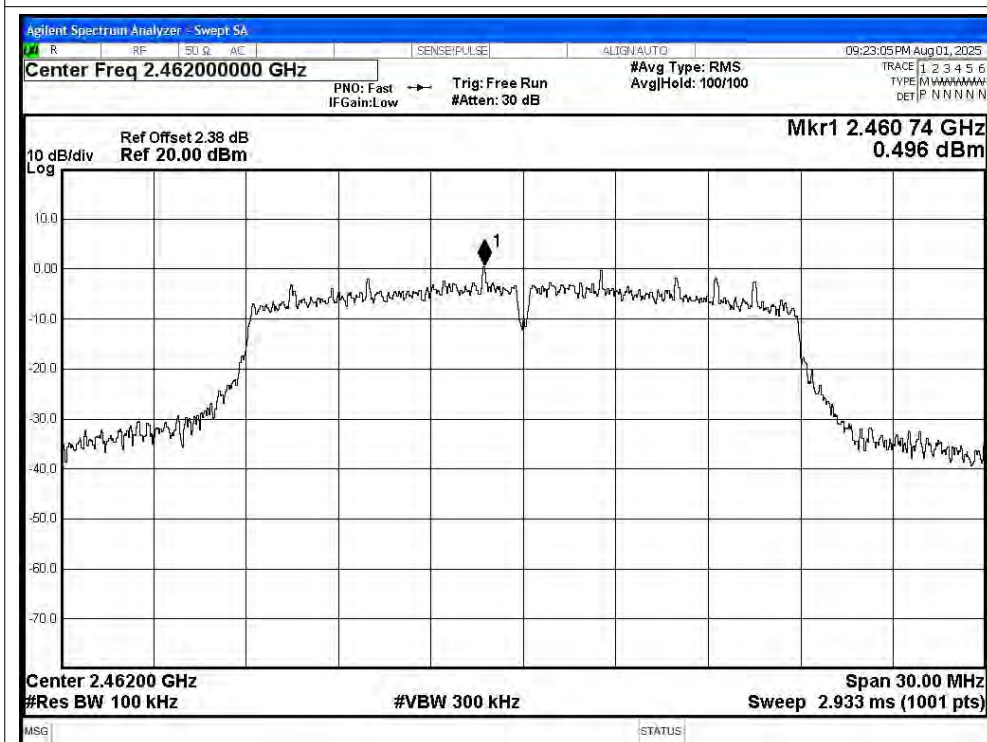
Band Edge NVNT n20 2412MHz Ant1 Ref



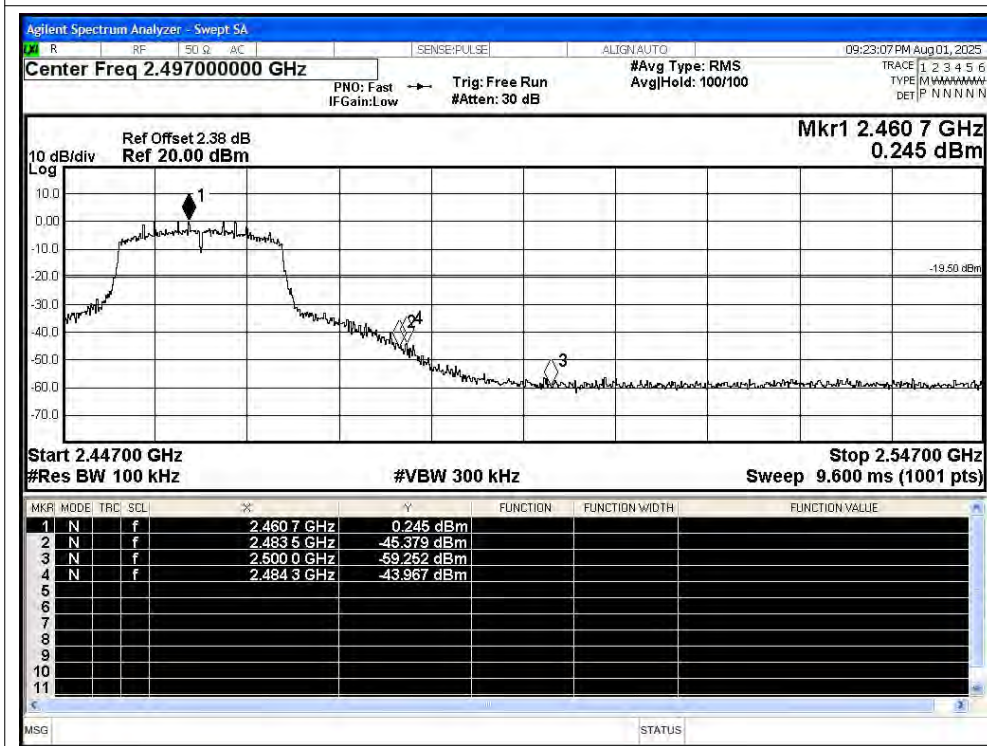
Band Edge NVNT n20 2412MHz Ant1 Emission



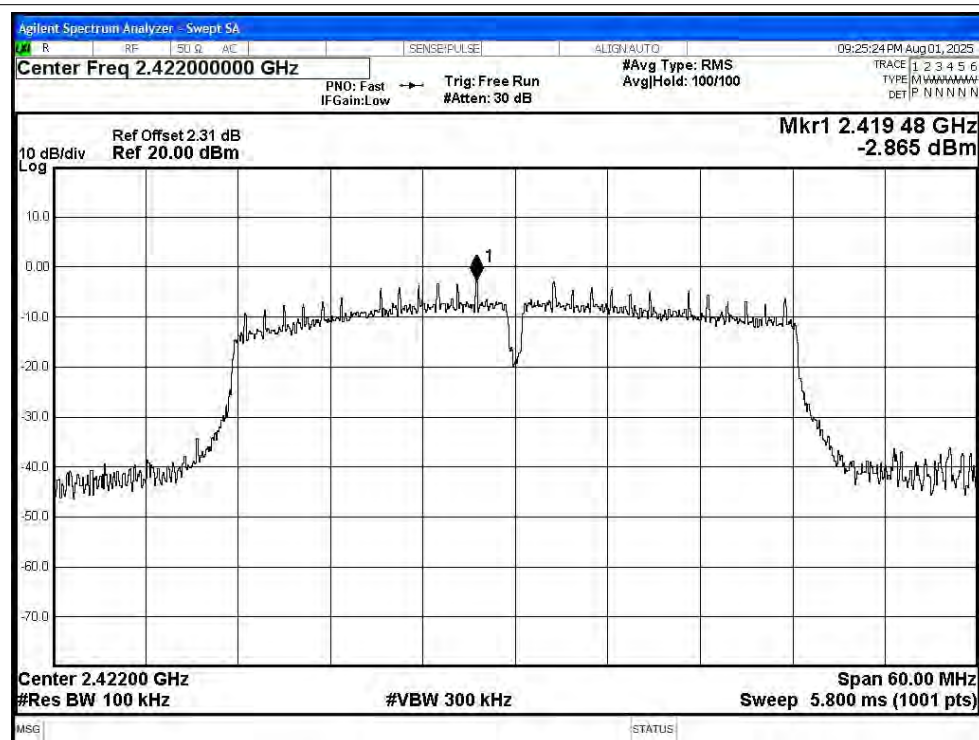
Band Edge NVNT n20 2462MHz Ant1 Ref



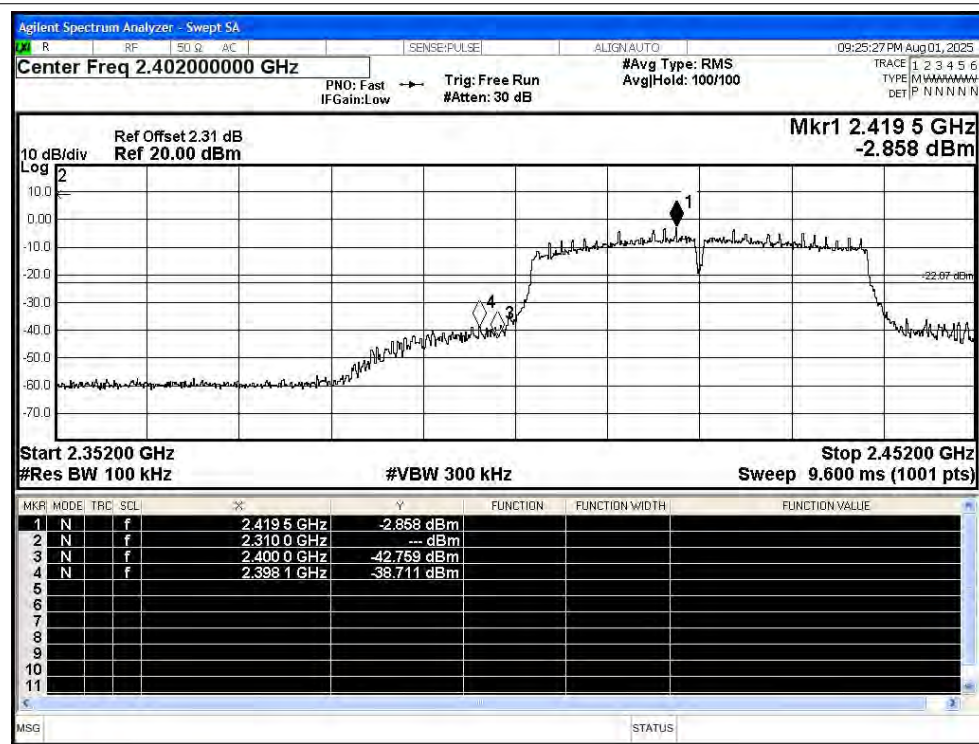
Band Edge NVNT n20 2462MHz Ant1 Emission



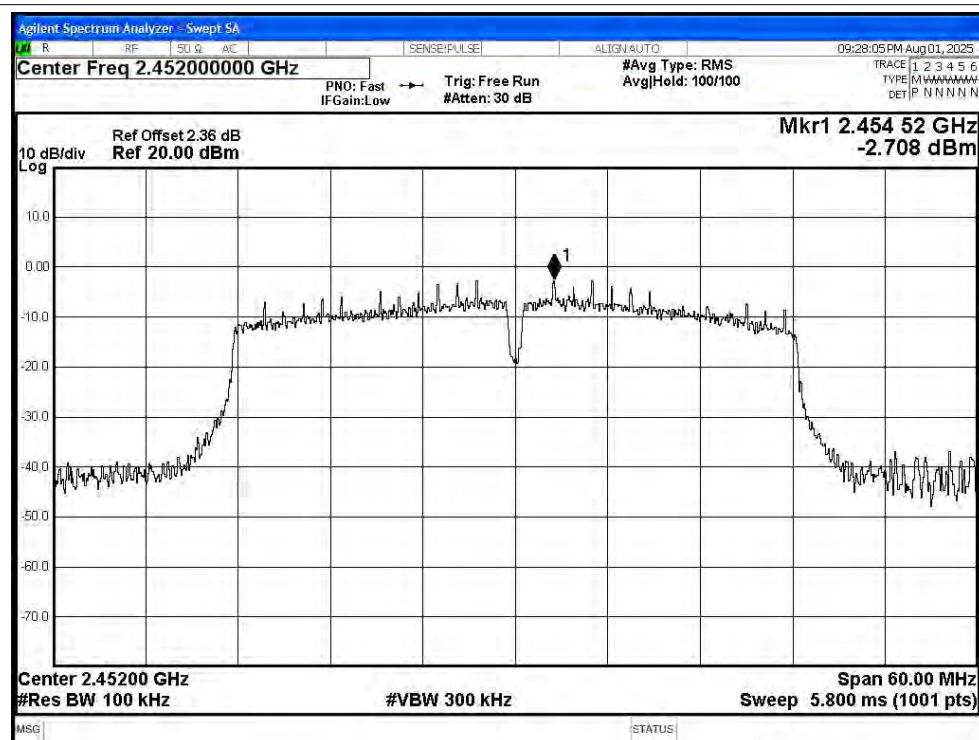
Band Edge NVNT n40 2422MHz Ant1 Ref



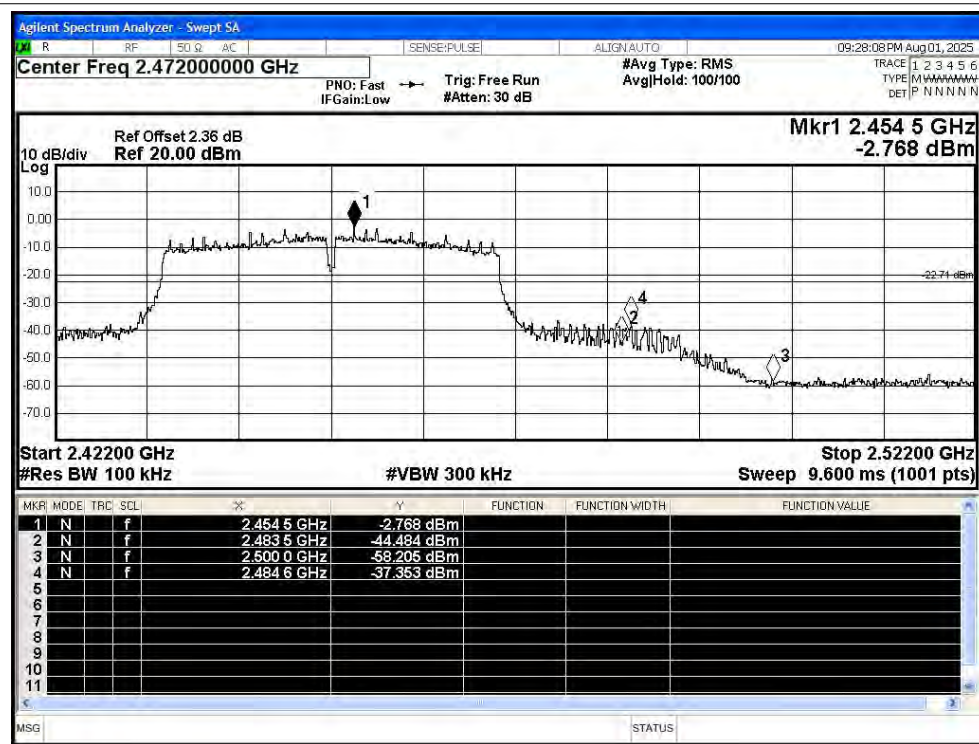
Band Edge NVNT n40 2422MHz Ant1 Emission



Band Edge NVNT n40 2452MHz Ant1 Ref



Band Edge NVNT n40 2452MHz Ant1 Emission



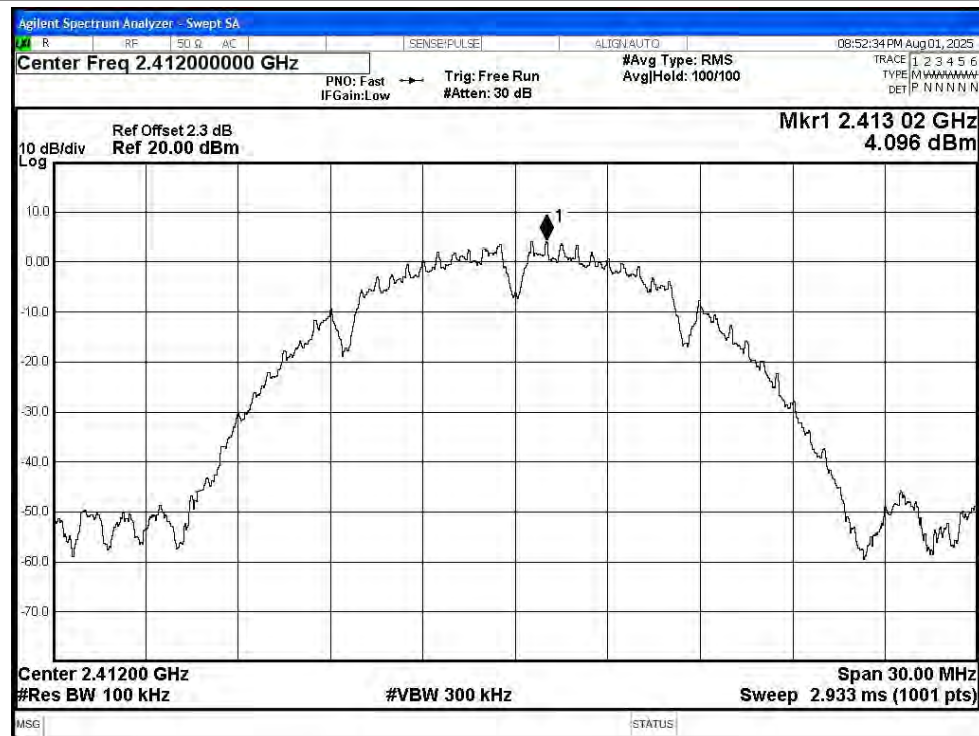
A.5 Conducted RF Spurious Emission

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	b	2412	Ant1	-49.97	-20	Pass
NVNT	b	2437	Ant1	-50.28	-20	Pass
NVNT	b	2462	Ant1	-49.82	-20	Pass
NVNT	g	2412	Ant1	-44.57	-20	Pass
NVNT	g	2437	Ant1	-46.08	-20	Pass
NVNT	g	2462	Ant1	-47.41	-20	Pass
NVNT	n20	2412	Ant1	-45.25	-20	Pass
NVNT	n20	2437	Ant1	-46.74	-20	Pass
NVNT	n20	2462	Ant1	-47.24	-20	Pass
NVNT	n40	2422	Ant1	-42.49	-20	Pass
NVNT	n40	2437	Ant1	-42.24	-20	Pass
NVNT	n40	2452	Ant1	-42.82	-20	Pass

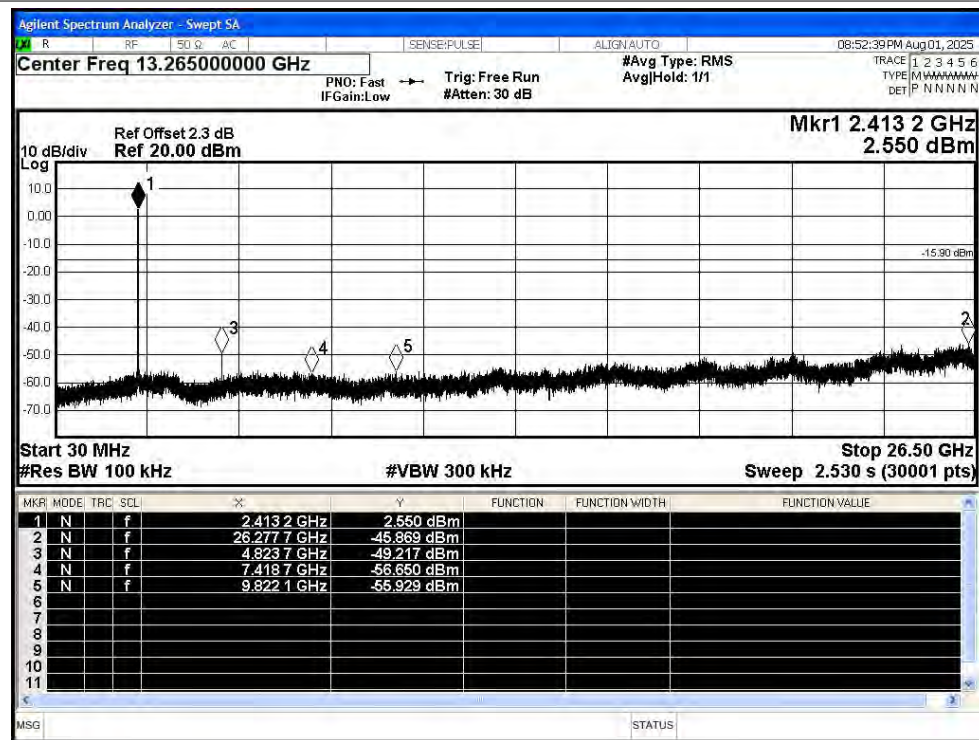


Test Graphs

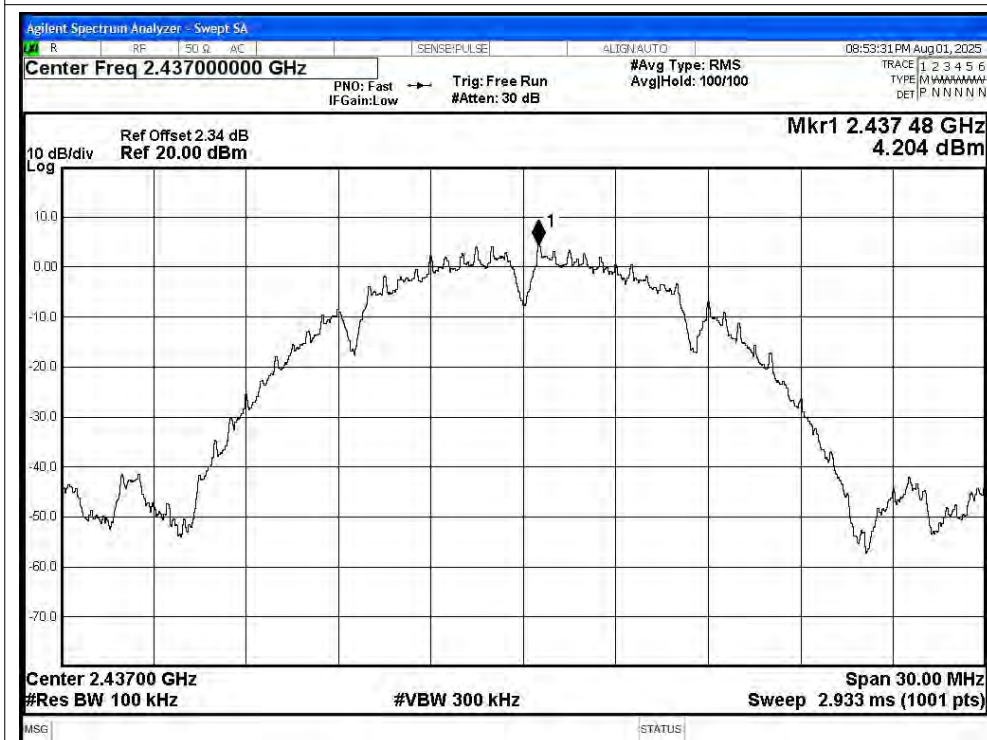
Tx. Spurious NVNT b 2412MHz Ant1 Ref



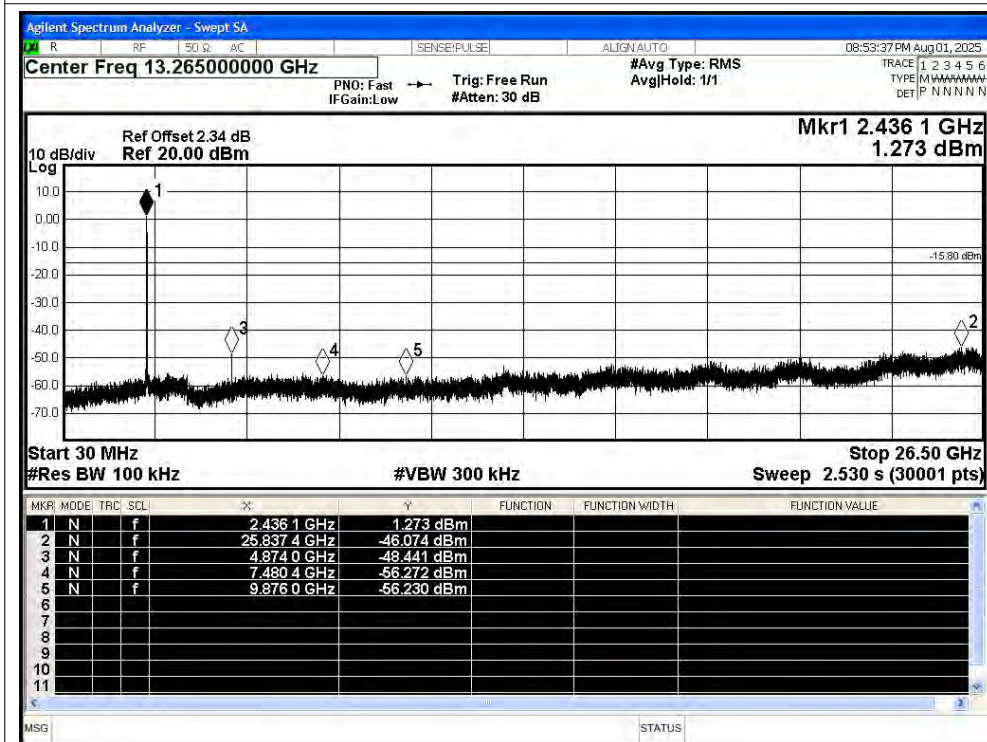
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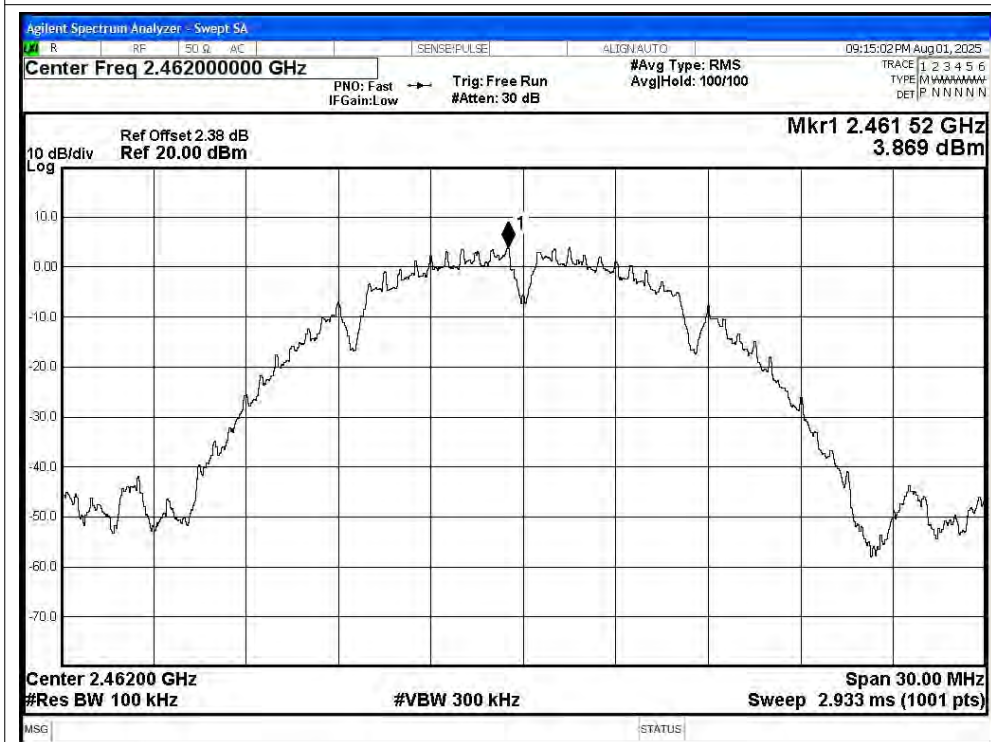
Tx. Spurious NVNT b 2437MHz Ant1 Ref



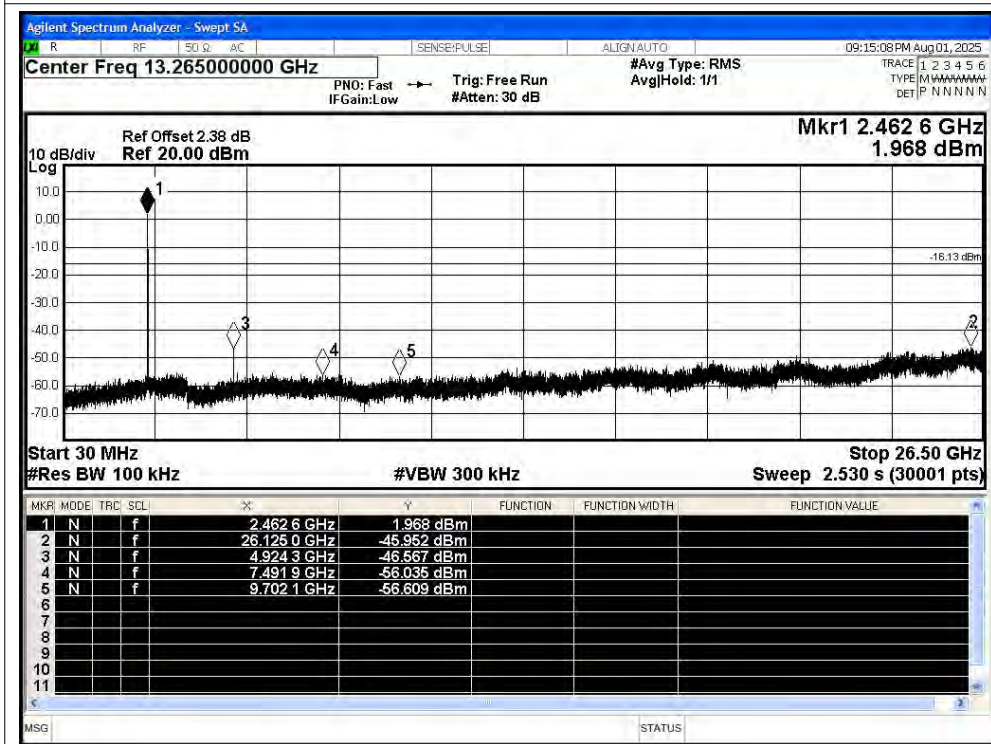
Tx. Spurious NVNT b 2437MHz Ant1 Emission



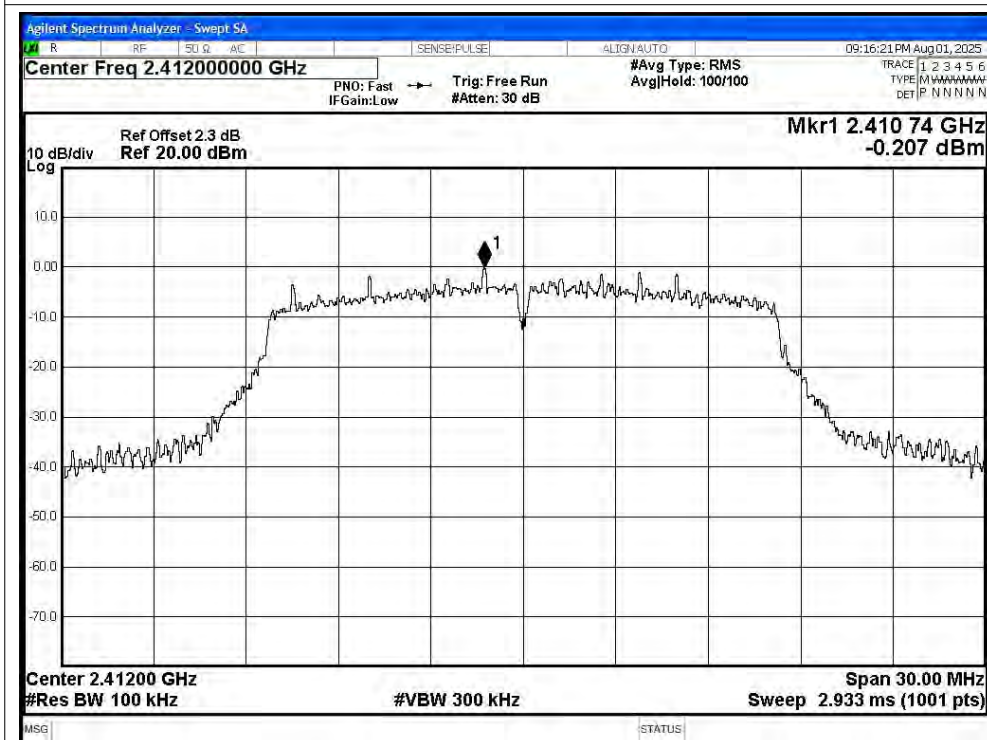
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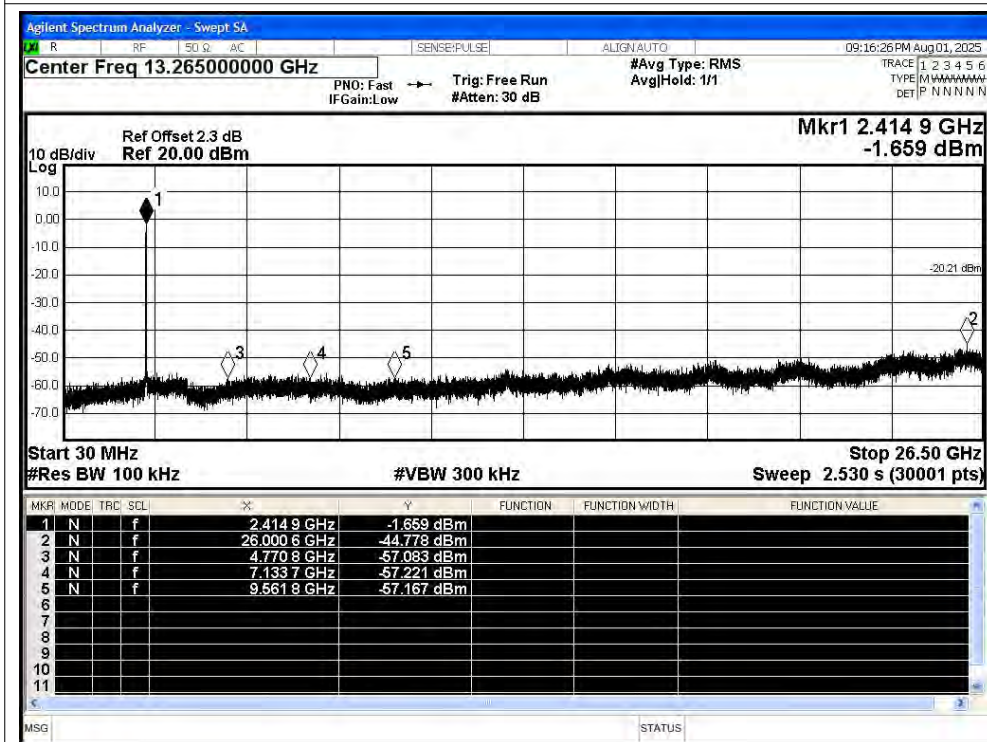
Tx. Spurious NVNT b 2462MHz Ant1 Emission



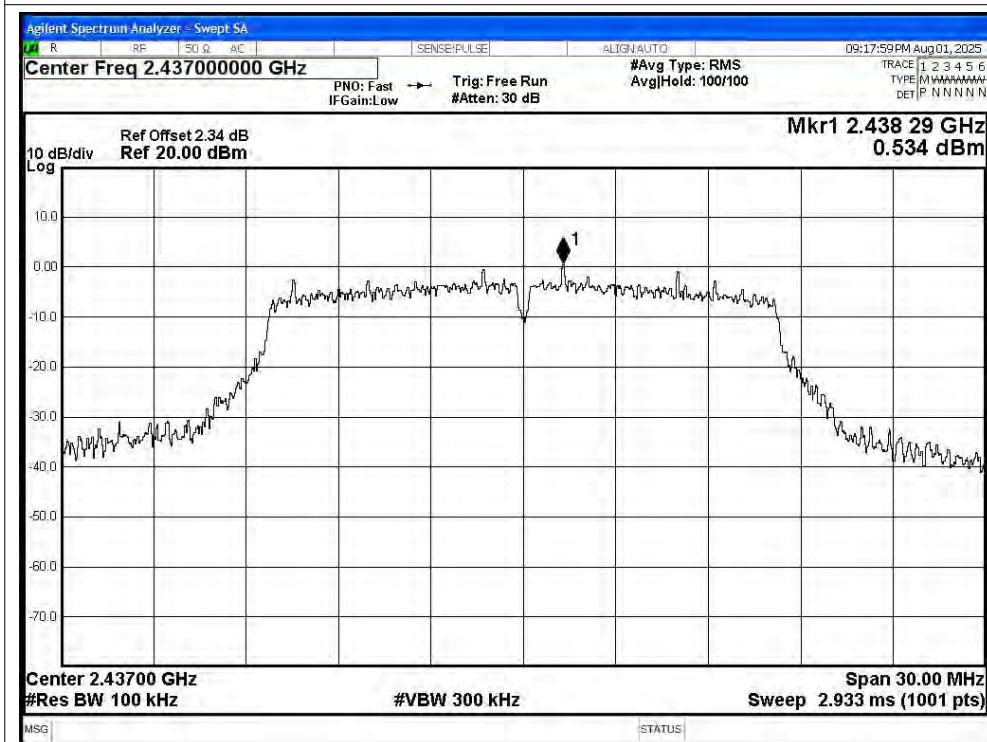
Tx. Spurious NVNT g 2412MHz Ant1 Ref



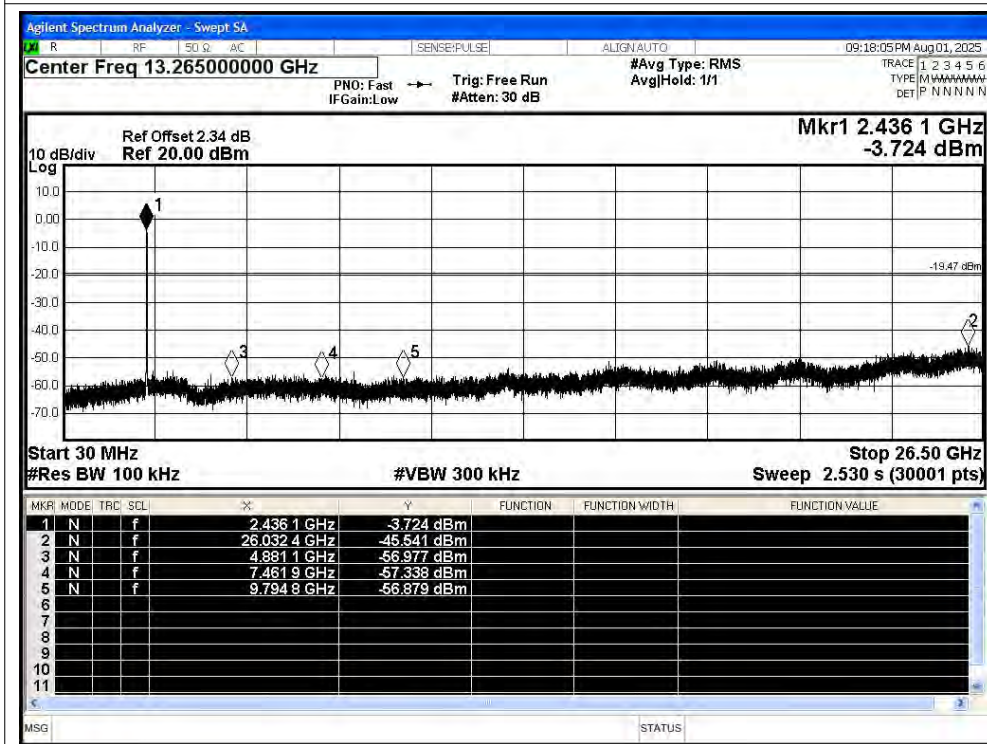
Tx. Spurious NVNT g 2412MHz Ant1 Emission



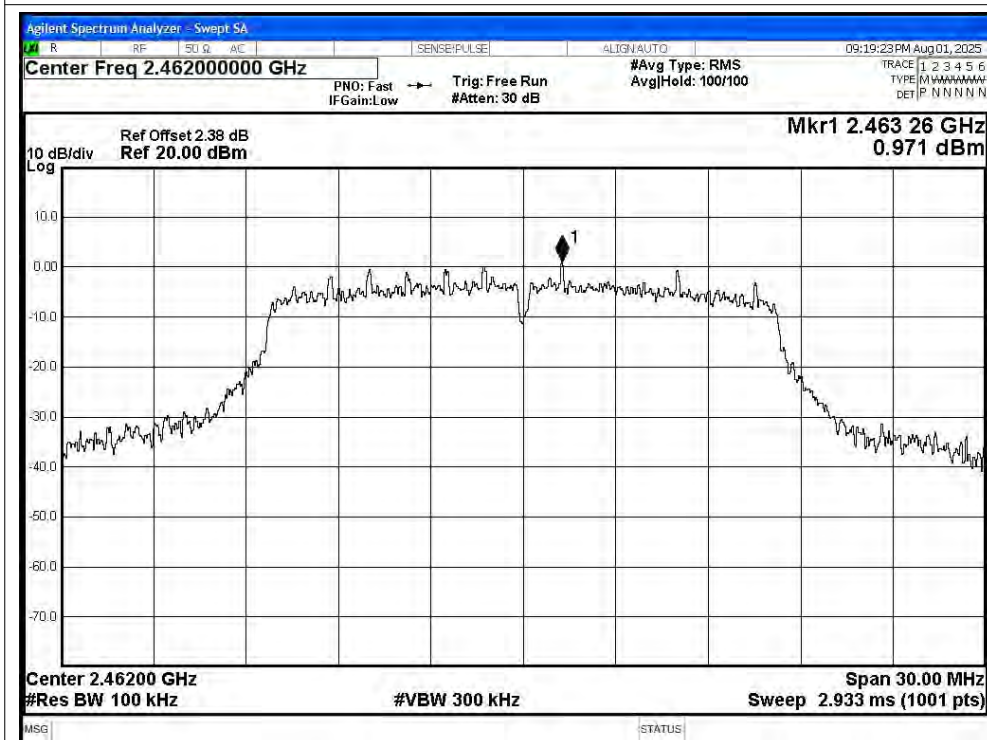
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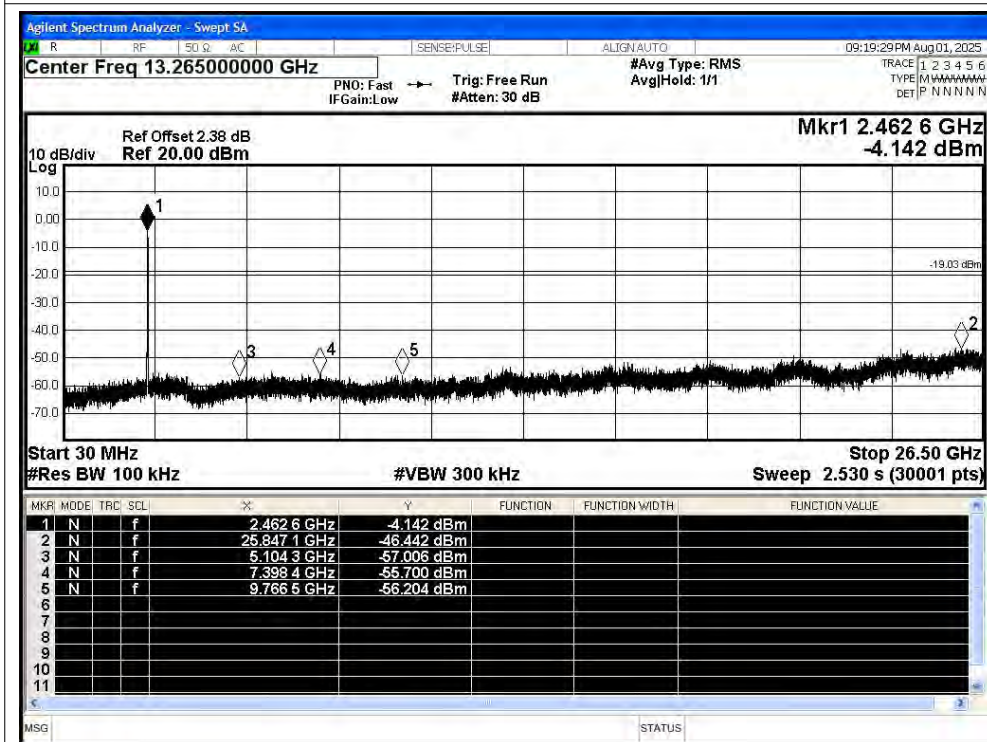
Tx. Spurious NVNT g 2437MHz Ant1 Emission



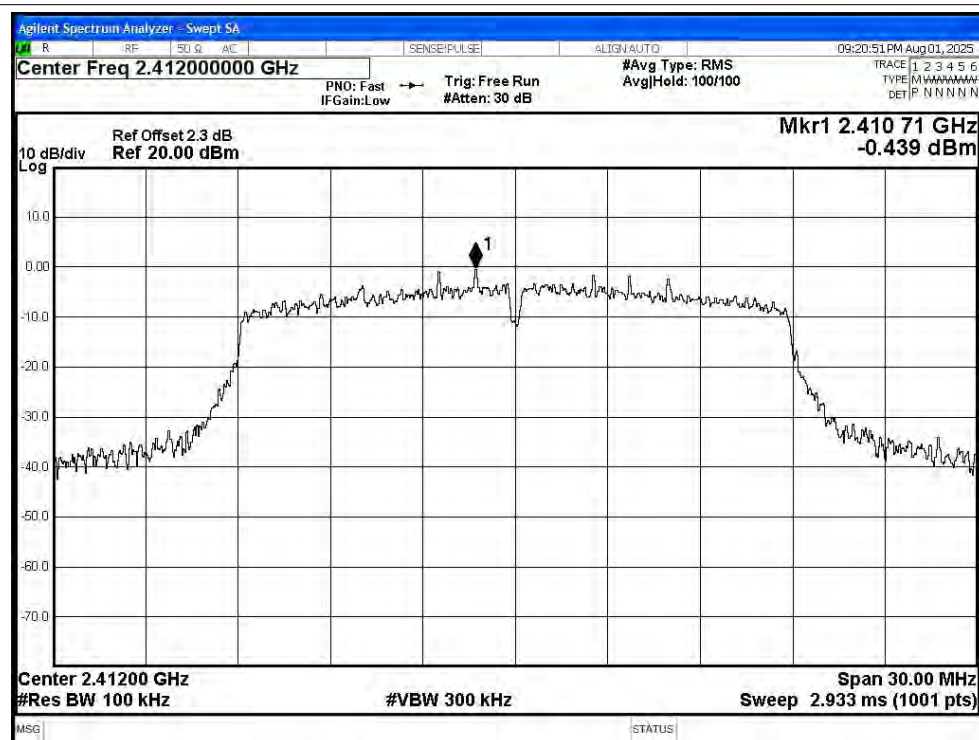
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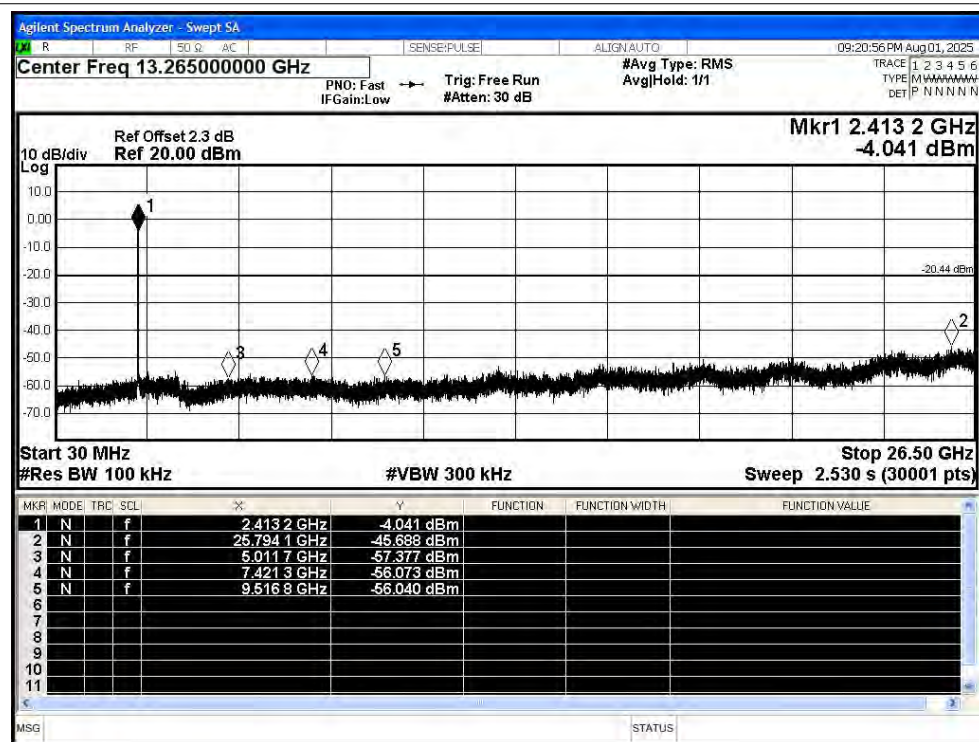
Tx. Spurious NVNT g 2462MHz Ant1 Emission



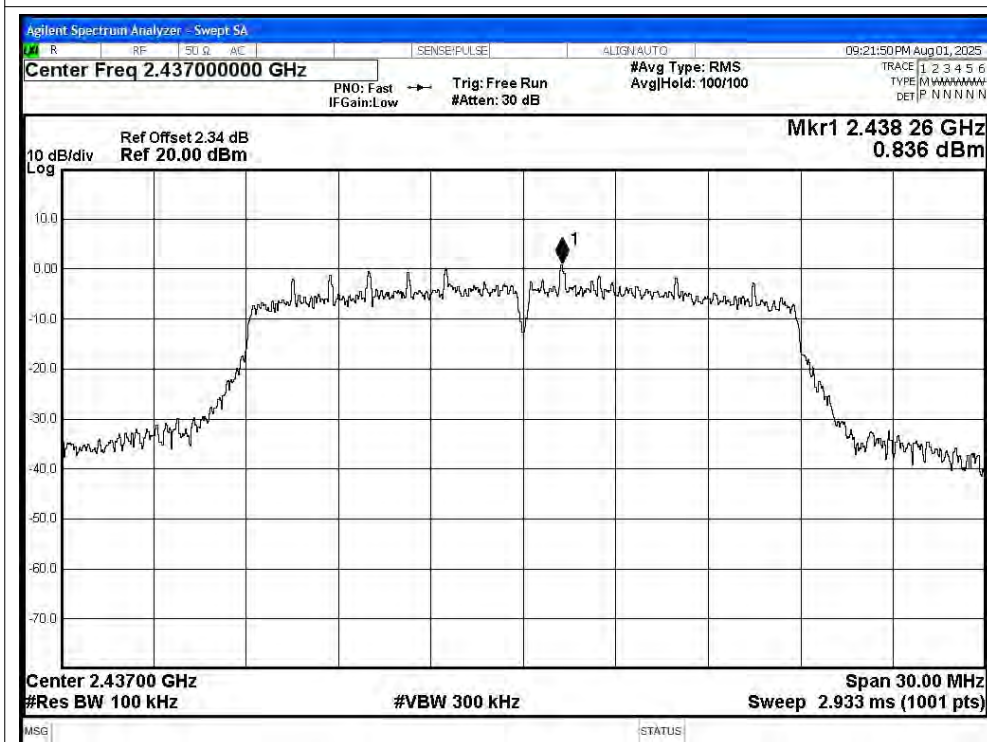
Tx. Spurious NVNT n20 2412MHz Ant1 Ref



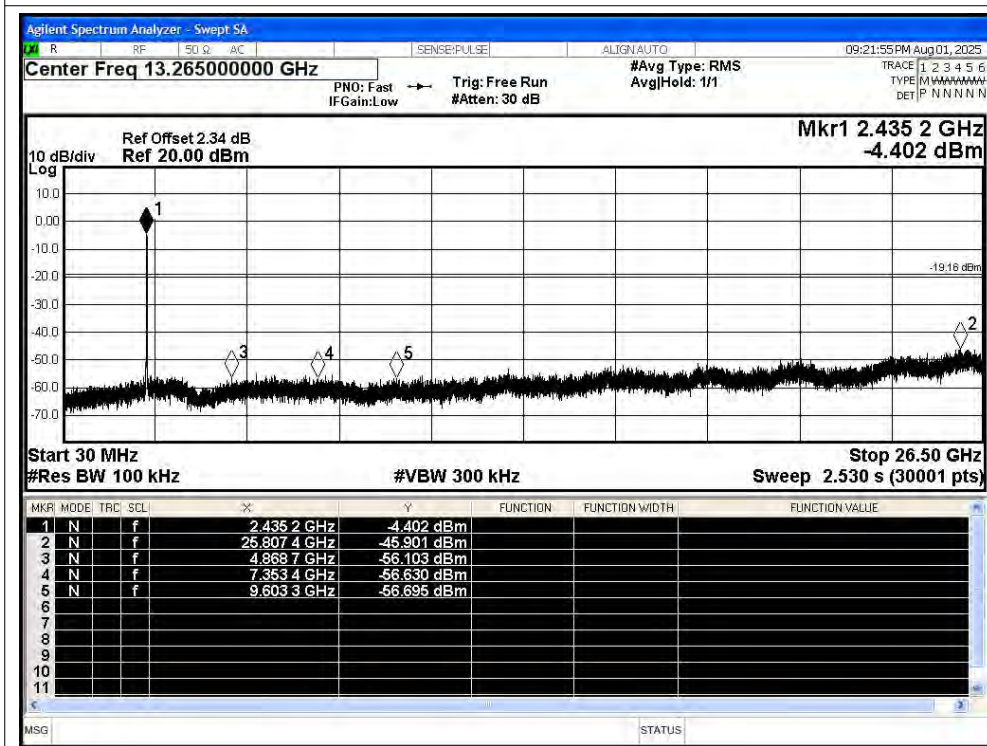
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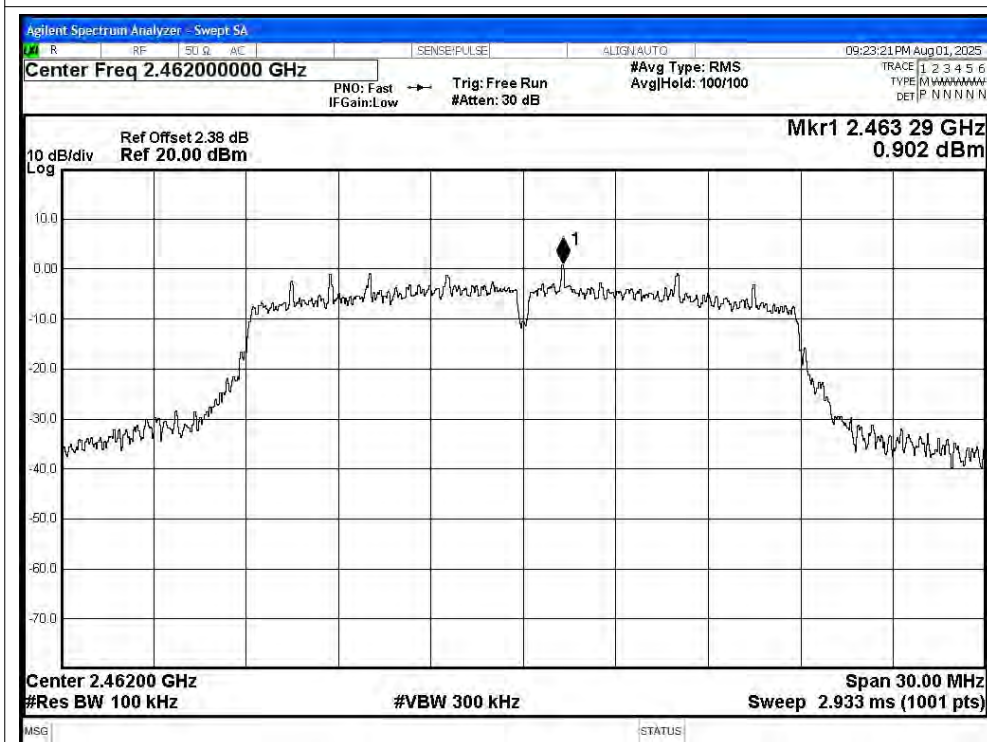
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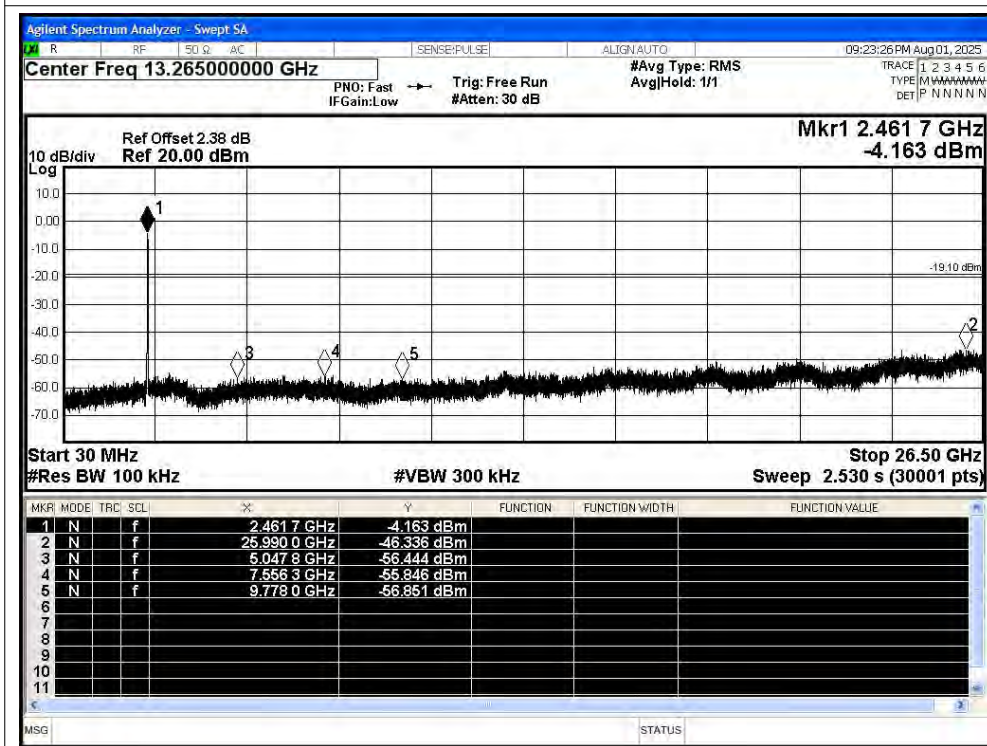
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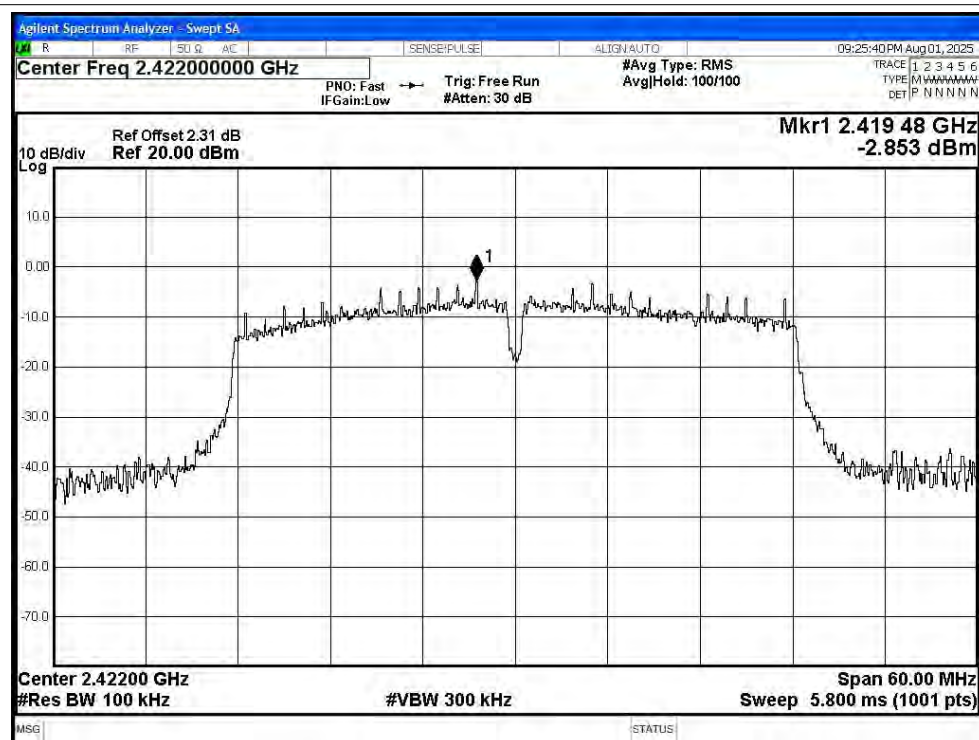
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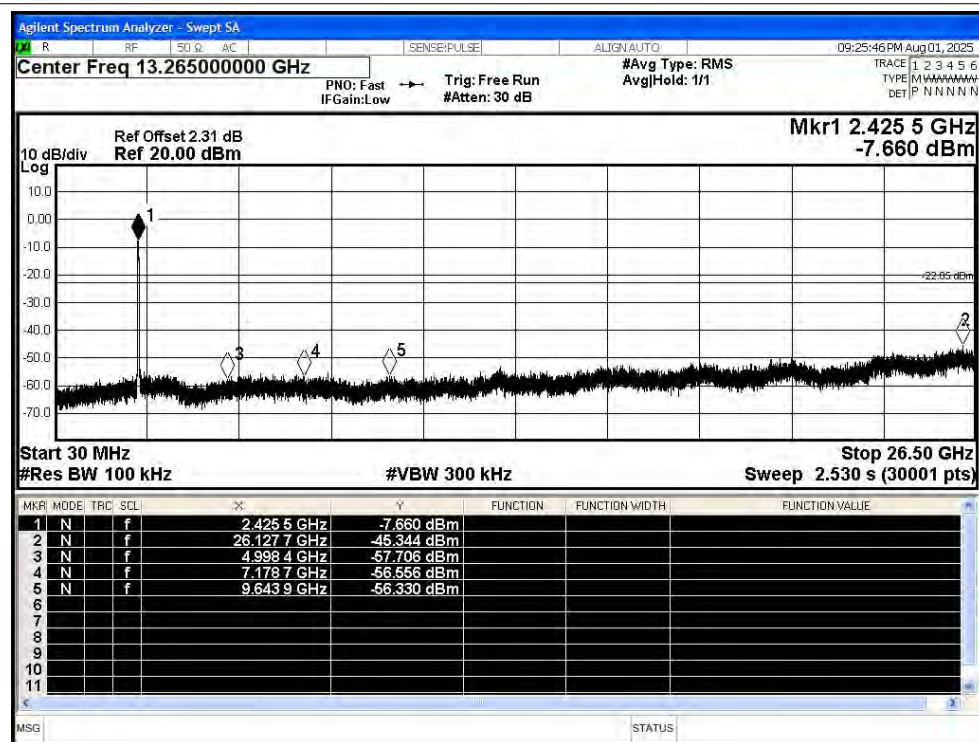
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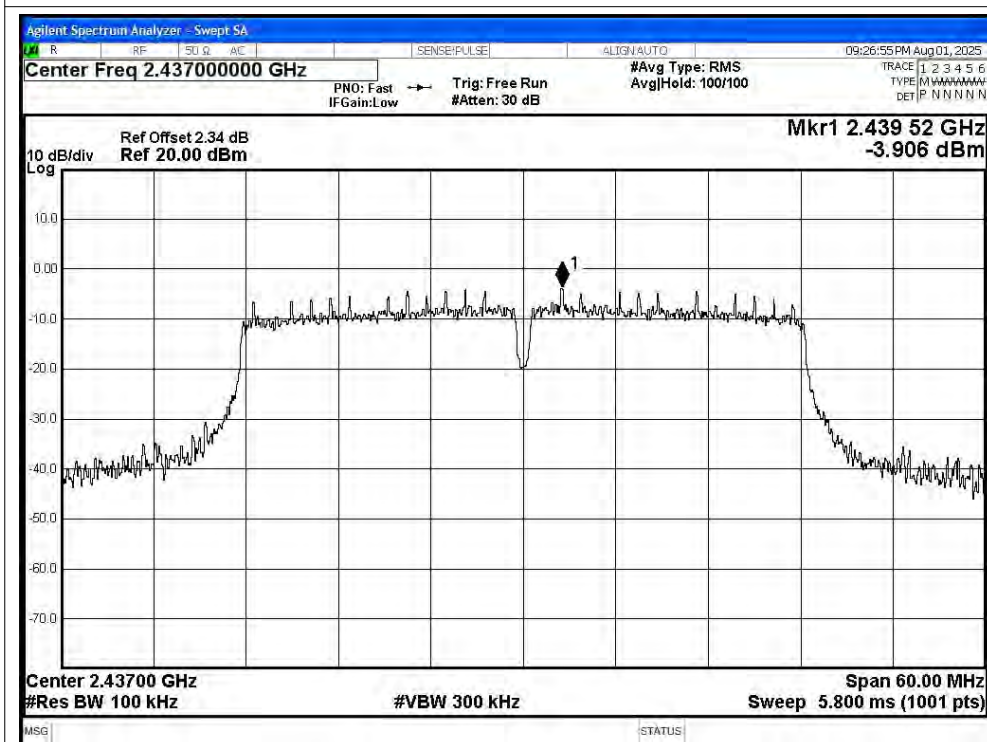
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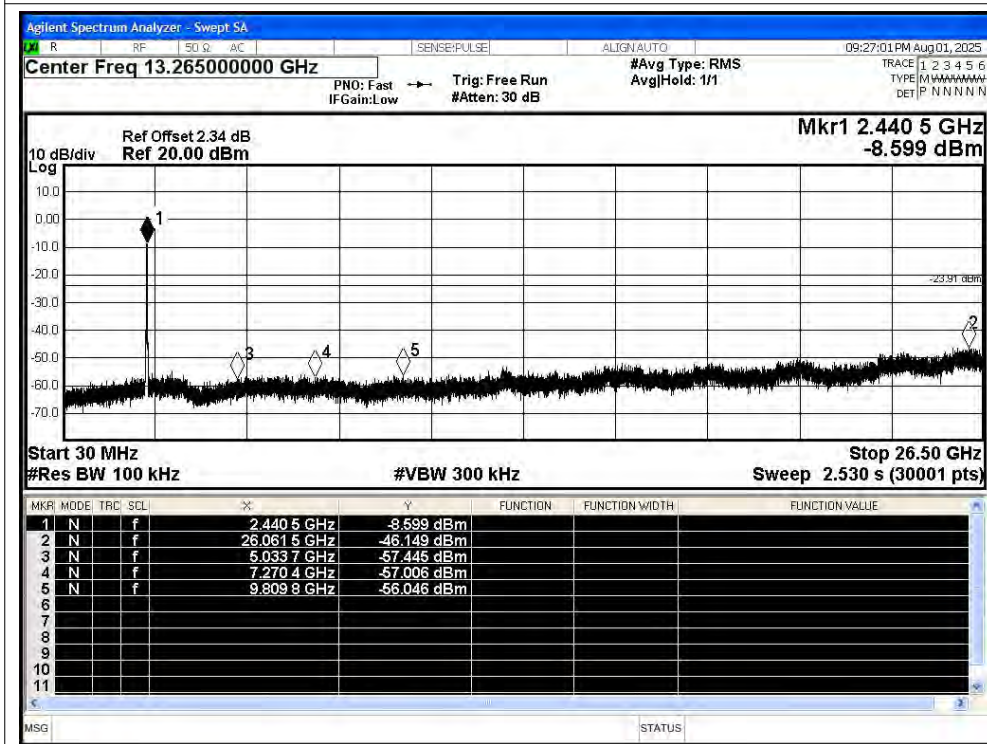
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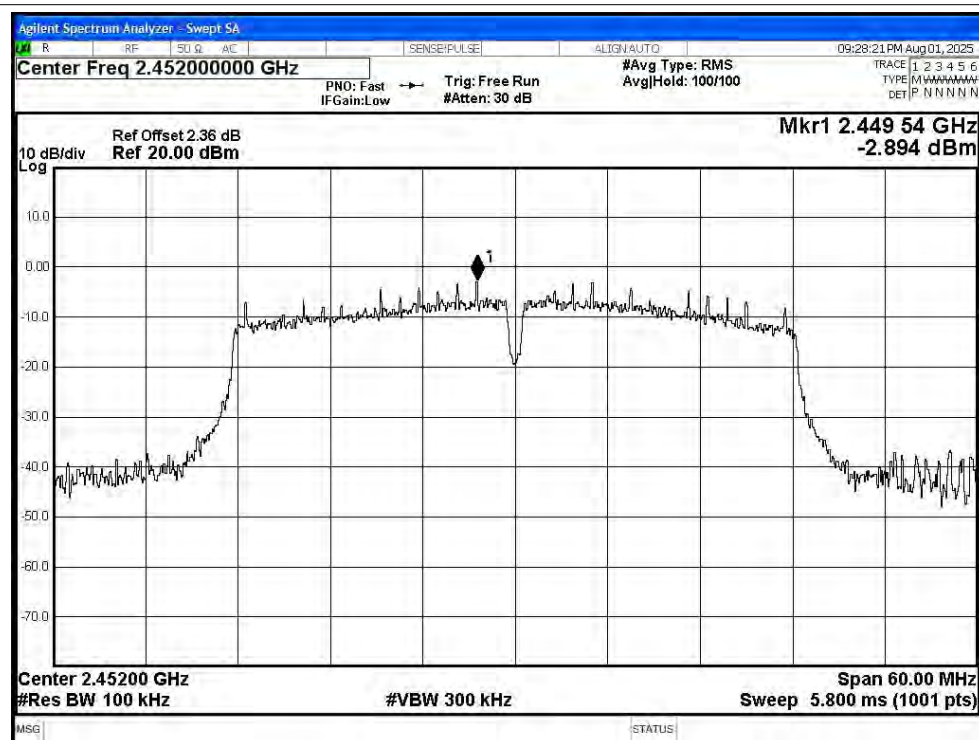
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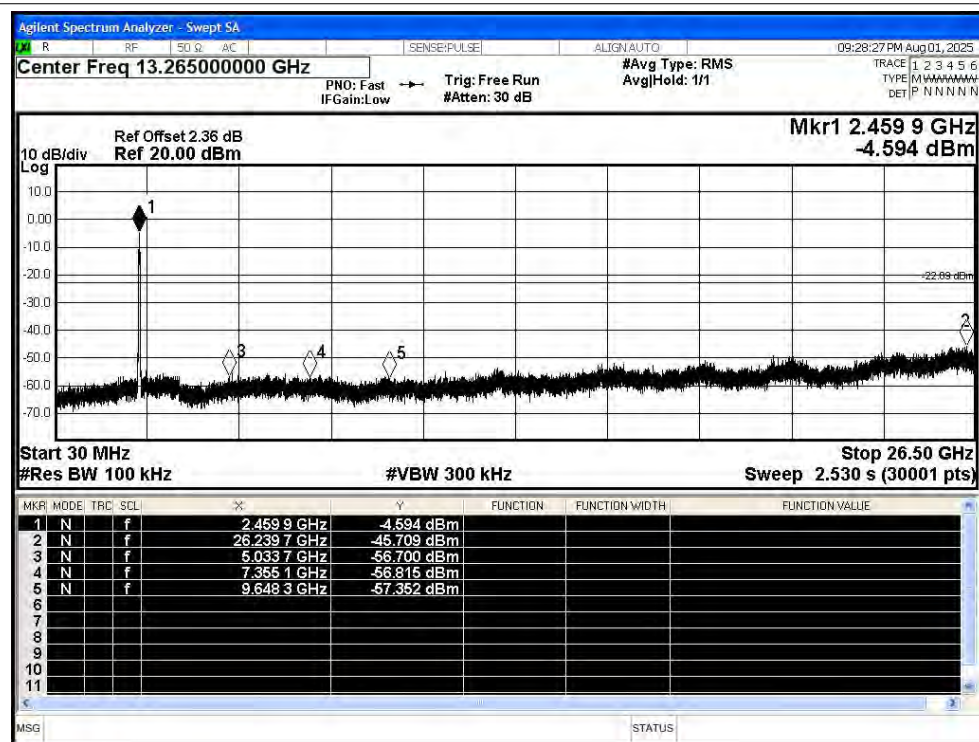
Tx. Spurious NVNT n40 2437MHz Ant1 Emission



Tx. Spurious NVNT n40 2452MHz Ant1 Ref



Tx. Spurious NVNT n40 2452MHz Ant1 Emission



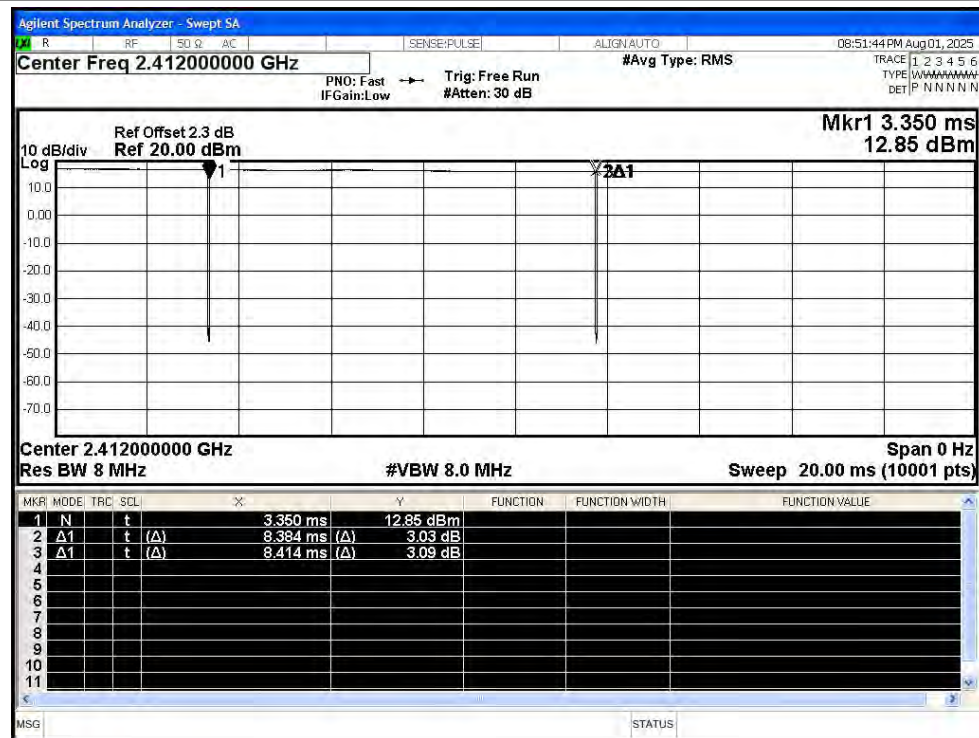
A.6 Duty Cycle

Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	b	2412	Ant1	99.64	0	0.12
NVNT	b	2437	Ant1	99.67	0	0.12
NVNT	b	2462	Ant1	99.67	0	0.12
NVNT	g	2412	Ant1	97.48	0.11	0.72
NVNT	g	2437	Ant1	97.48	0.11	0.72
NVNT	g	2462	Ant1	97.48	0.11	0.72
NVNT	n20	2412	Ant1	97.31	0.12	0.77
NVNT	n20	2437	Ant1	97.31	0.12	0.77
NVNT	n20	2462	Ant1	97.46	0.11	0.77
NVNT	n40	2422	Ant1	94.74	0.23	1.54
NVNT	n40	2437	Ant1	95.01	0.22	1.54
NVNT	n40	2452	Ant1	95.01	0.22	1.54

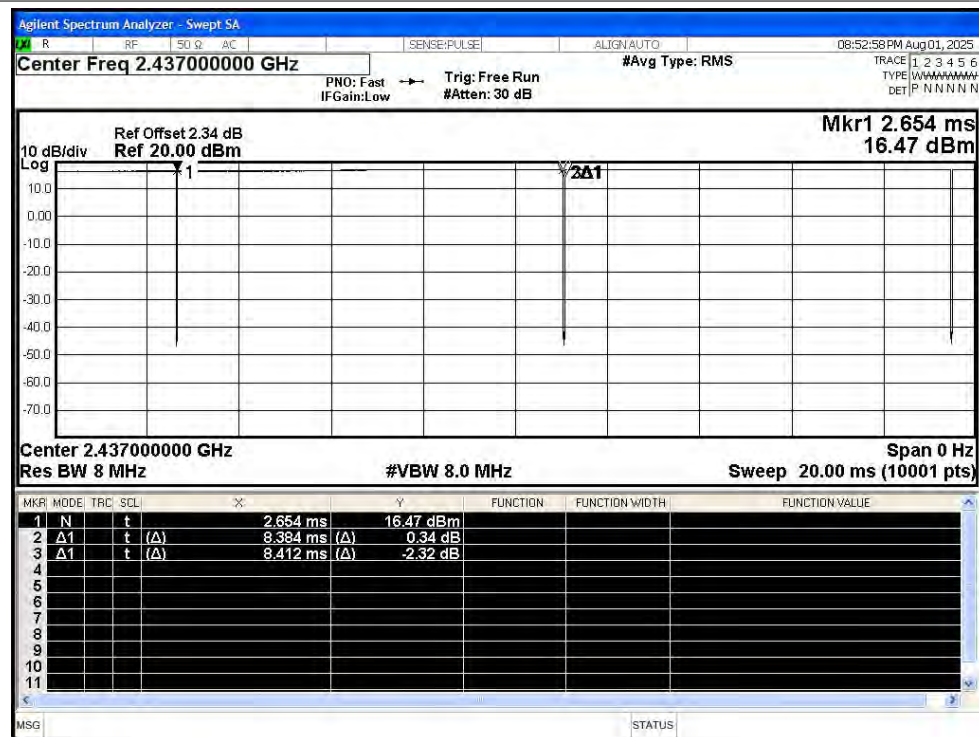


Test Graphs

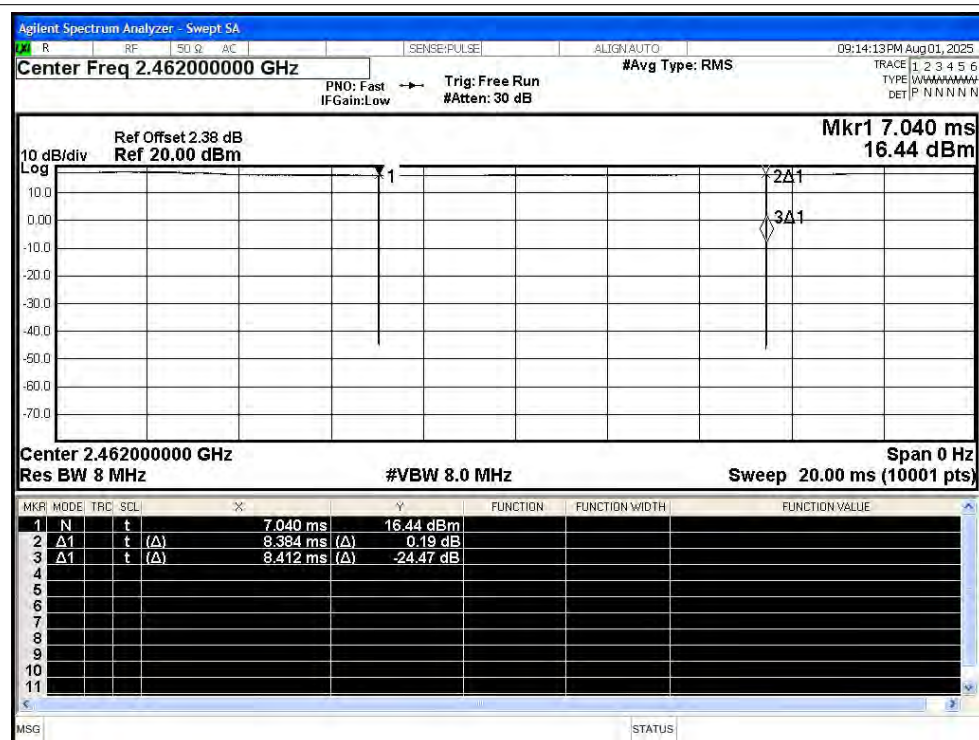
Duty Cycle NVNT b 2412MHz Ant1



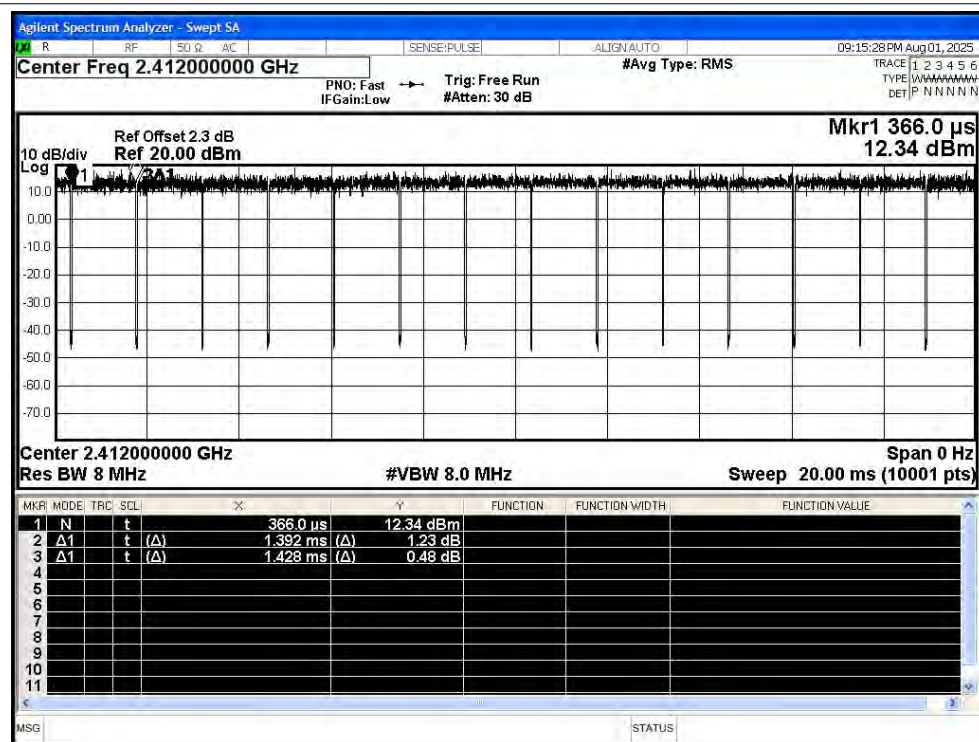
Duty Cycle NVNT b 2437MHz Ant1



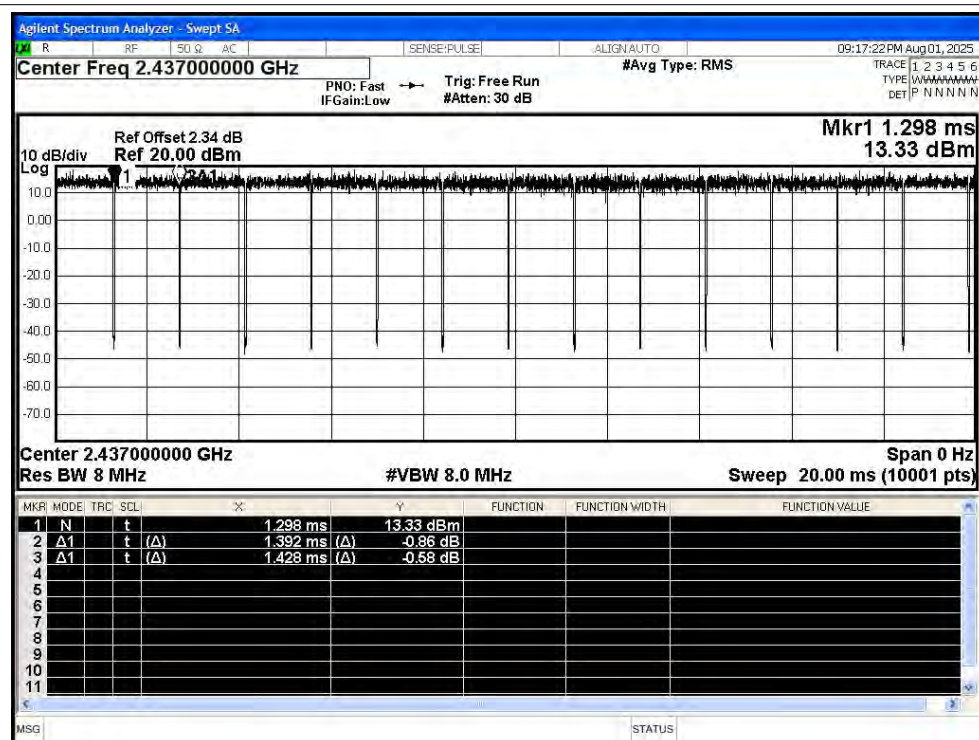
Duty Cycle NVNT b 2462MHz Ant1



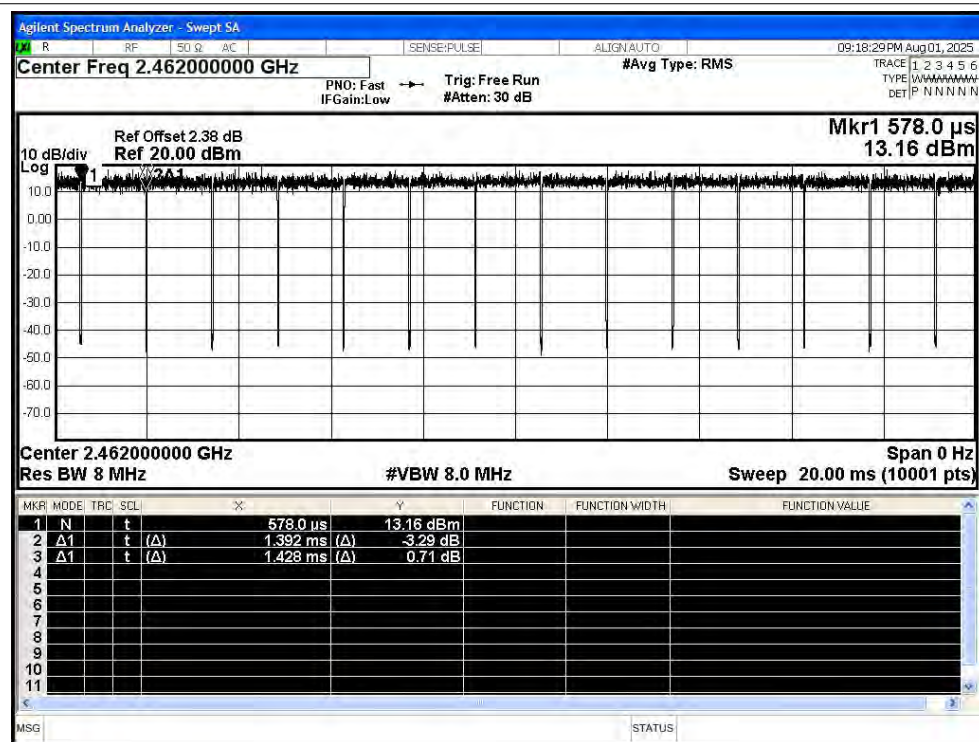
Duty Cycle NVNT g 2412MHz Ant1



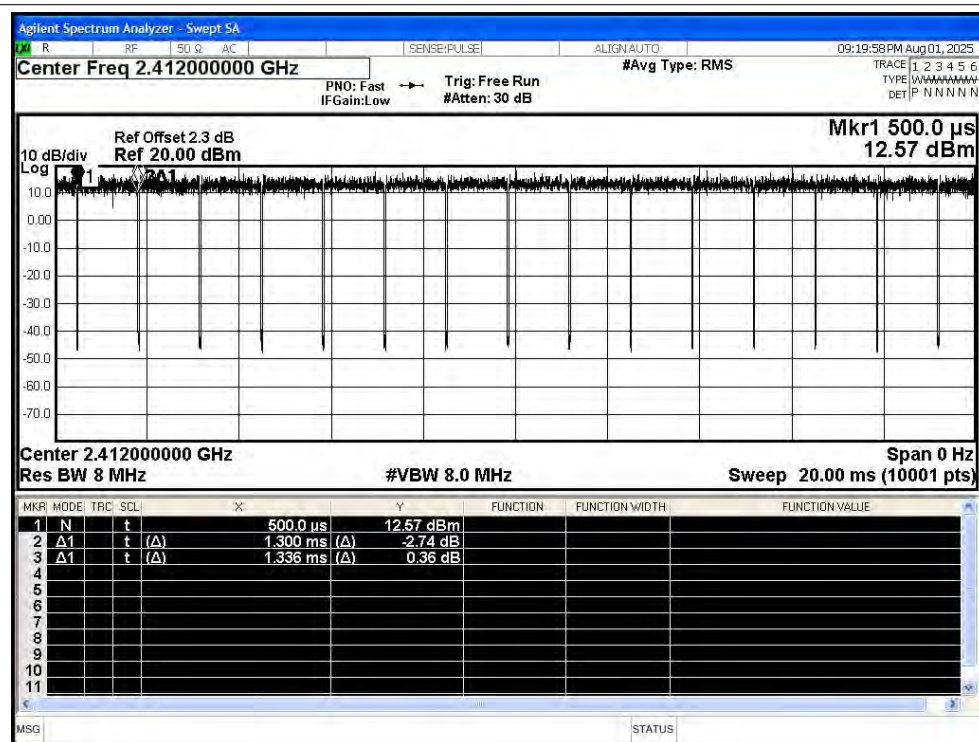
Duty Cycle NVNT g 2437MHz Ant1



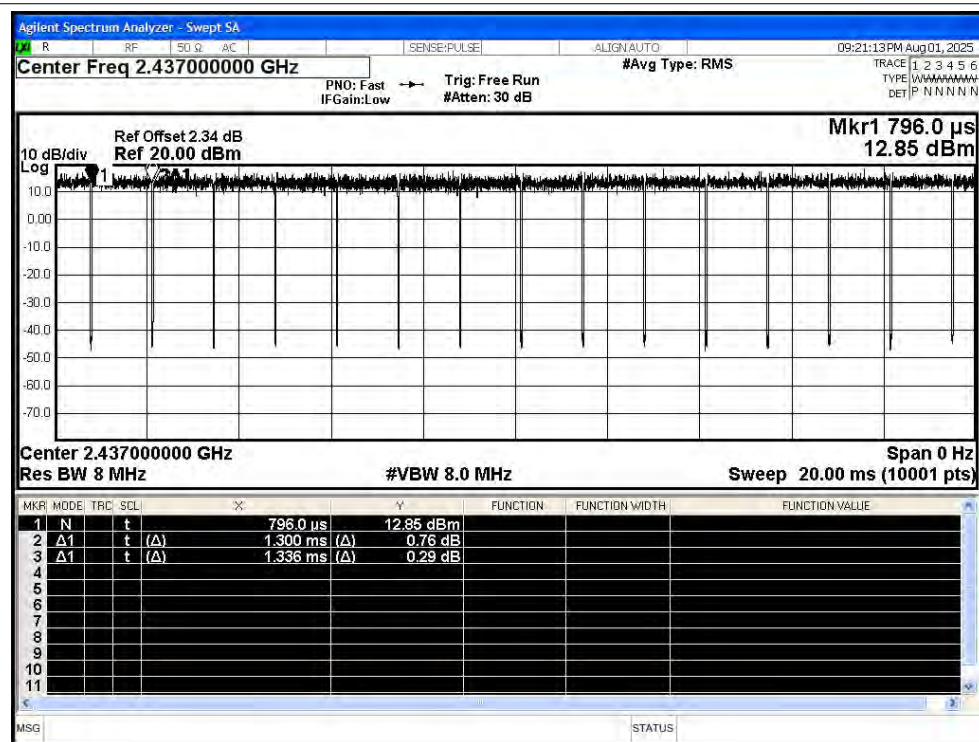
Duty Cycle NVNT g 2462MHz Ant1



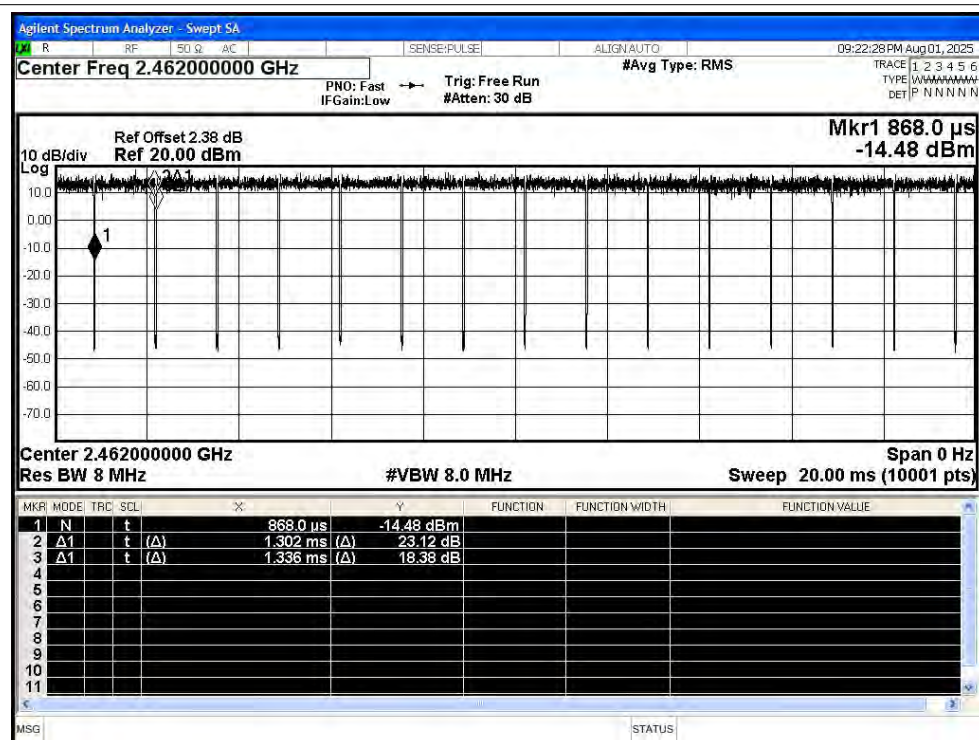
Duty Cycle NVNT n20 2412MHz Ant1



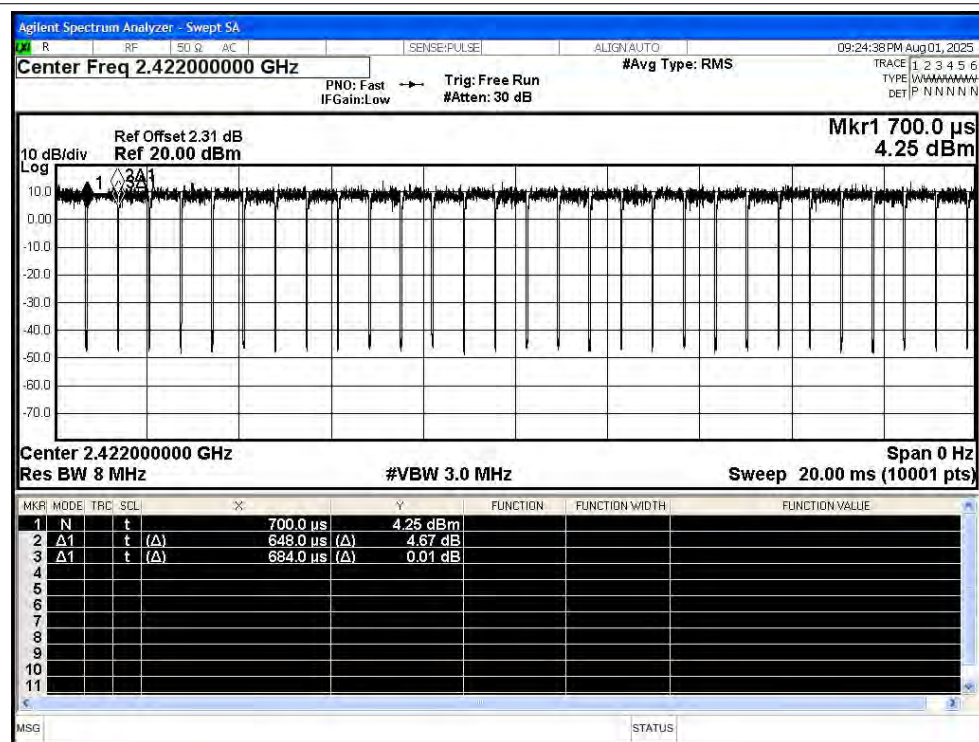
Duty Cycle NVNT n20 2437MHz Ant1



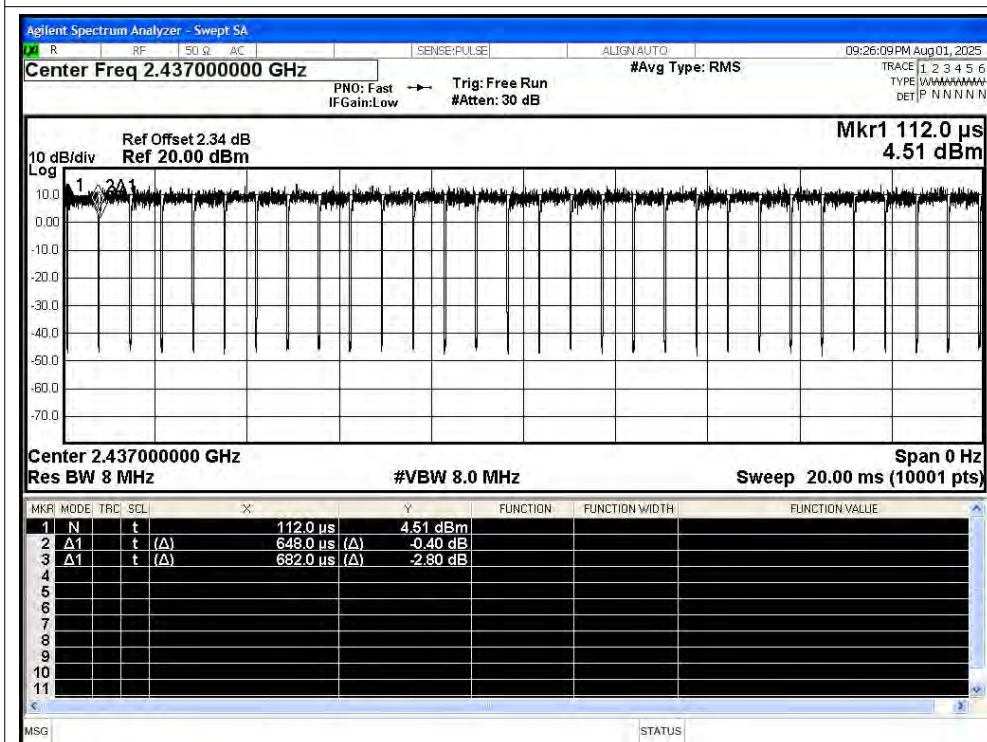
Duty Cycle NVNT n20 2462MHz Ant1



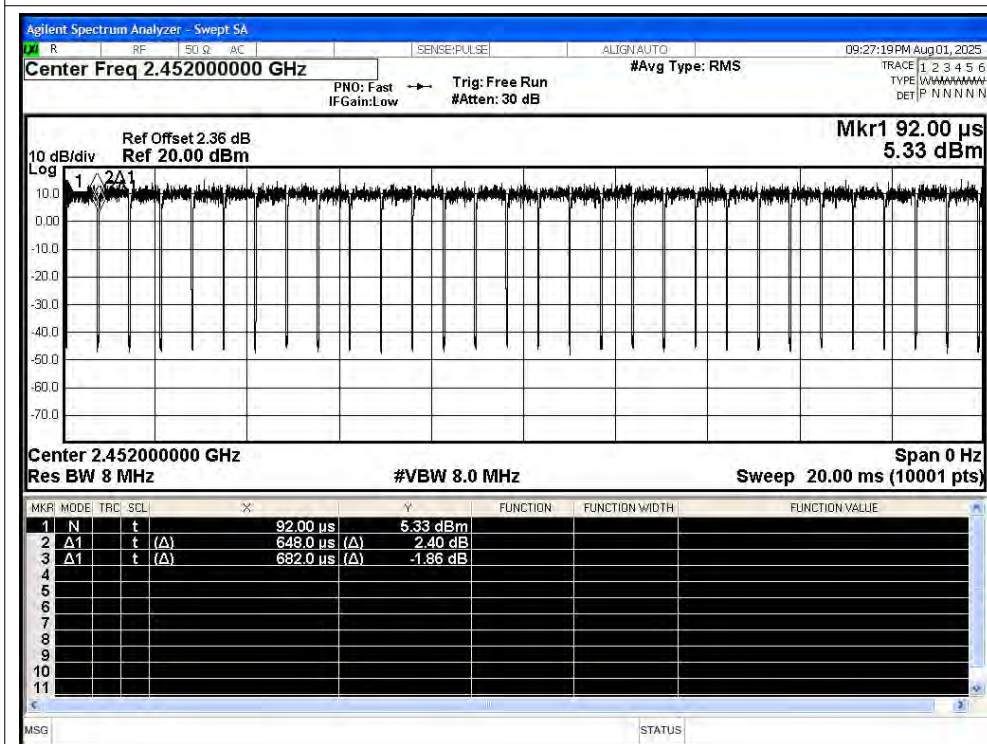
Duty Cycle NVNT n40 2422MHz Ant1



Duty Cycle NVNT n40 2437MHz Ant1



Duty Cycle NVNT n40 2452MHz Ant1



A.7 Restrict Band

Condition	Mode	Frequency (MHz)	Antenna	Spur Freq (MHz)	Power (dBm)	Gain (dBi)	Duty Factor (dB)	E (dBuV/m)	Detector	Limit (dBuV/m)	Verdict
NVNT	b	2412	Ant1	2310	-50.54	4.55	-	49.27	Peak	74	Pass
NVNT	b	2412	Ant1	2310	-58.52	4.55	0	41.29	Average	54	Pass
NVNT	b	2412	Ant1	2375.871	-47.66	4.55	-	52.15	Peak	74	Pass
NVNT	b	2412	Ant1	2388.858	-56.74	4.55	0	43.07	Average	54	Pass
NVNT	b	2412	Ant1	2390	-49.69	4.55	-	50.12	Peak	74	Pass
NVNT	b	2412	Ant1	2390	-57.18	4.55	0	42.63	Average	54	Pass
NVNT	b	2462	Ant1	2483.5	-47.64	4.55	-	52.17	Peak	74	Pass
NVNT	b	2462	Ant1	2483.5	-55.07	4.55	0	44.74	Average	54	Pass
NVNT	b	2462	Ant1	2486.697	-43.95	4.55	-	55.86	Peak	74	Pass
NVNT	b	2462	Ant1	2488.287	-52	4.55	0	47.81	Average	54	Pass
NVNT	b	2462	Ant1	2500	-49.67	4.55	-	50.14	Peak	74	Pass
NVNT	b	2462	Ant1	2500	-57.38	4.55	0	42.43	Average	54	Pass
NVNT	g	2412	Ant1	2310	-49.46	4.55	-	50.35	Peak	74	Pass
NVNT	g	2412	Ant1	2310	-58.44	4.55	0.11	41.48	Average	54	Pass
NVNT	g	2412	Ant1	2389.092	-40.96	4.55	-	58.85	Peak	74	Pass
NVNT	g	2412	Ant1	2389.794	-52.99	4.55	0.11	46.93	Average	54	Pass
NVNT	g	2412	Ant1	2390	-41.32	4.55	-	58.49	Peak	74	Pass
NVNT	g	2412	Ant1	2390	-53.26	4.55	0.11	46.66	Average	54	Pass
NVNT	g	2462	Ant1	2483.5	-36.2	4.55	-	63.61	Peak	74	Pass
NVNT	g	2462	Ant1	2483.5	-47.36	4.55	0.11	52.56	Average	54	Pass
NVNT	g	2462	Ant1	2483.888	-31.02	4.55	-	68.79	Peak	74	Pass
NVNT	g	2462	Ant1	2483.623	-45.93	4.55	0.11	53.99	Average	54	Pass
NVNT	g	2462	Ant1	2500	-48.4	4.55	-	51.41	Peak	74	Pass
NVNT	g	2462	Ant1	2500	-57.89	4.55	0.11	42.03	Average	54	Pass
NVNT	n20	2412	Ant1	2310	-48.74	4.55	-	51.07	Peak	74	Pass
NVNT	n20	2412	Ant1	2310	-58.12	4.55	0.12	41.81	Average	54	Pass
NVNT	n20	2412	Ant1	2387.688	-36.92	4.55	-	62.89	Peak	74	Pass
NVNT	n20	2412	Ant1	2389.794	-50.46	4.55	0.12	49.47	Average	54	Pass
NVNT	n20	2412	Ant1	2390	-41.21	4.55	-	58.60	Peak	74	Pass
NVNT	n20	2412	Ant1	2390	-50.53	4.55	0.12	49.40	Average	54	Pass
NVNT	n20	2462	Ant1	2483.5	-30.46	4.55	-	69.35	Peak	74	Pass
NVNT	n20	2462	Ant1	2483.5	-44.76	4.55	0.11	53.16	Average	54	Pass
NVNT	n20	2462	Ant1	2483.888	-30.25	4.55	-	69.56	Peak	74	Pass
NVNT	n20	2462	Ant1	2483.676	-44.65	4.55	0.11	53.27	Average	54	Pass
NVNT	n20	2462	Ant1	2500	-49.47	4.55	-	50.34	Peak	74	Pass
NVNT	n20	2462	Ant1	2500	-57.69	4.55	0.11	42.23	Average	54	Pass



Shenzhen LCS Compliance Testing Laboratory Ltd.

Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

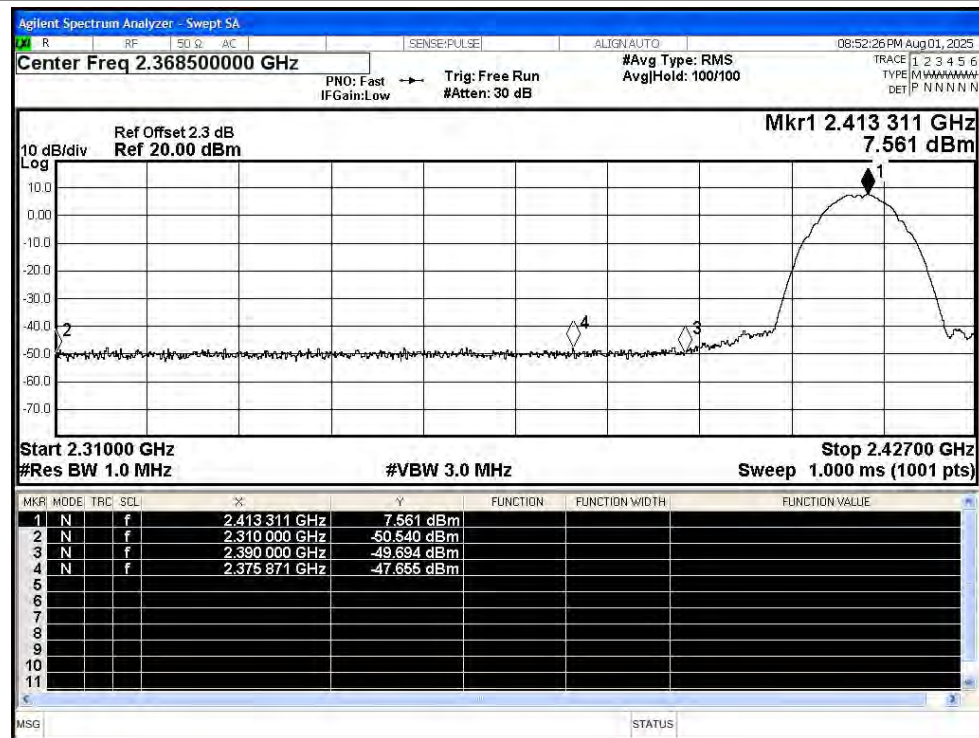
Scan code to check authenticity

NVNT	n40	2422	Ant1	2310	-51.13	4.55	-	48.68	Peak	74	Pass
NVNT	n40	2422	Ant1	2310	-58.2	4.55	0.23	41.84	Average	54	Pass
NVNT	n40	2422	Ant1	2389.378	-28.37	4.55	-	71.44	Peak	74	Pass
NVNT	n40	2422	Ant1	2389.946	-46.64	4.55	0.23	53.40	Average	54	Pass
NVNT	n40	2422	Ant1	2390	-36.9	4.55	-	62.91	Peak	74	Pass
NVNT	n40	2422	Ant1	2390	-46.64	4.55	0.23	53.40	Average	54	Pass
NVNT	n40	2452	Ant1	2483.5	-41.17	4.55	-	58.64	Peak	74	Pass
NVNT	n40	2452	Ant1	2483.5	-52.15	4.55	0.22	47.88	Average	54	Pass
NVNT	n40	2452	Ant1	2485.102	-30.31	4.55	-	69.50	Peak	74	Pass
NVNT	n40	2452	Ant1	2484.322	-49.36	4.55	0.22	50.67	Average	54	Pass
NVNT	n40	2452	Ant1	2500	-48.06	4.55	-	51.75	Peak	74	Pass
NVNT	n40	2452	Ant1	2500	-57.67	4.55	0.22	42.36	Average	54	Pass

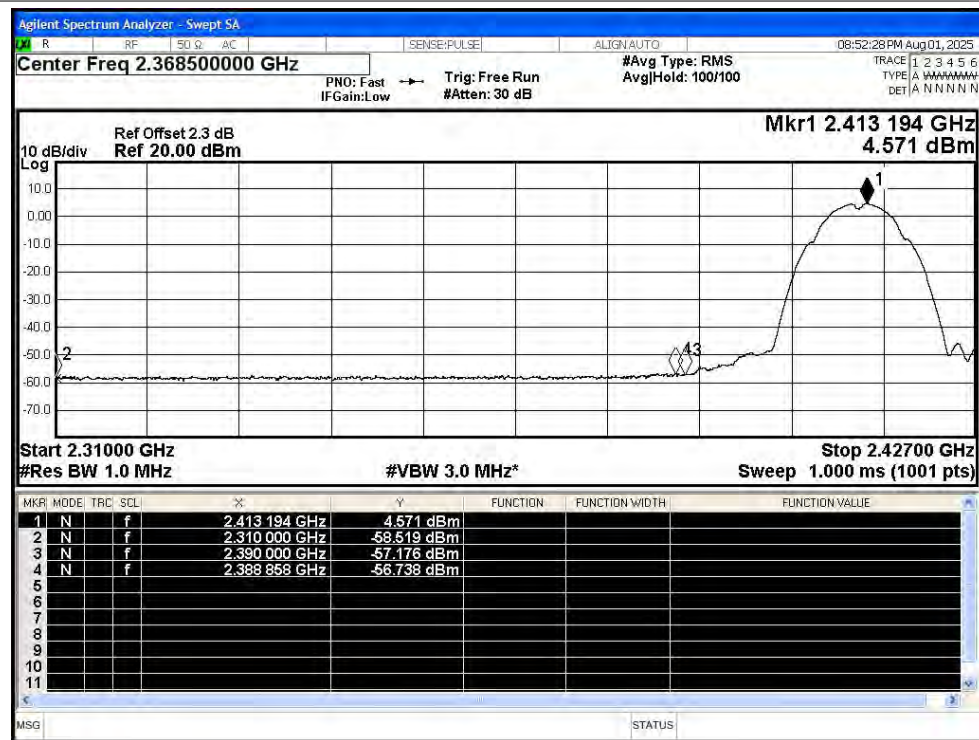


Test Graphs

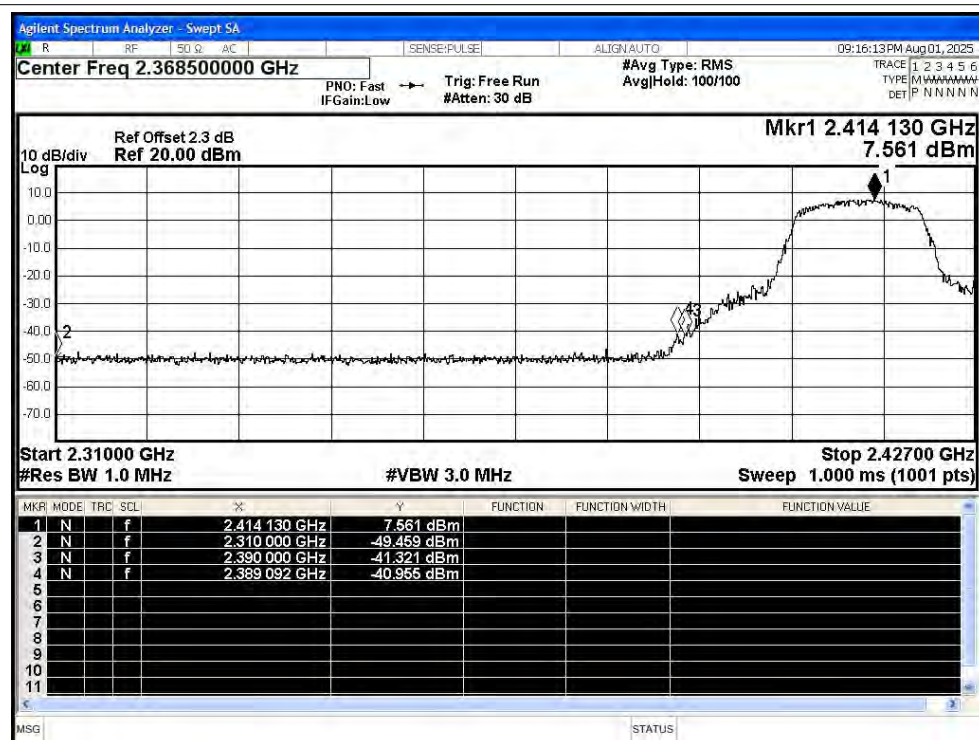
Restrict Band NVNT b 2412MHz Ant1 Peak



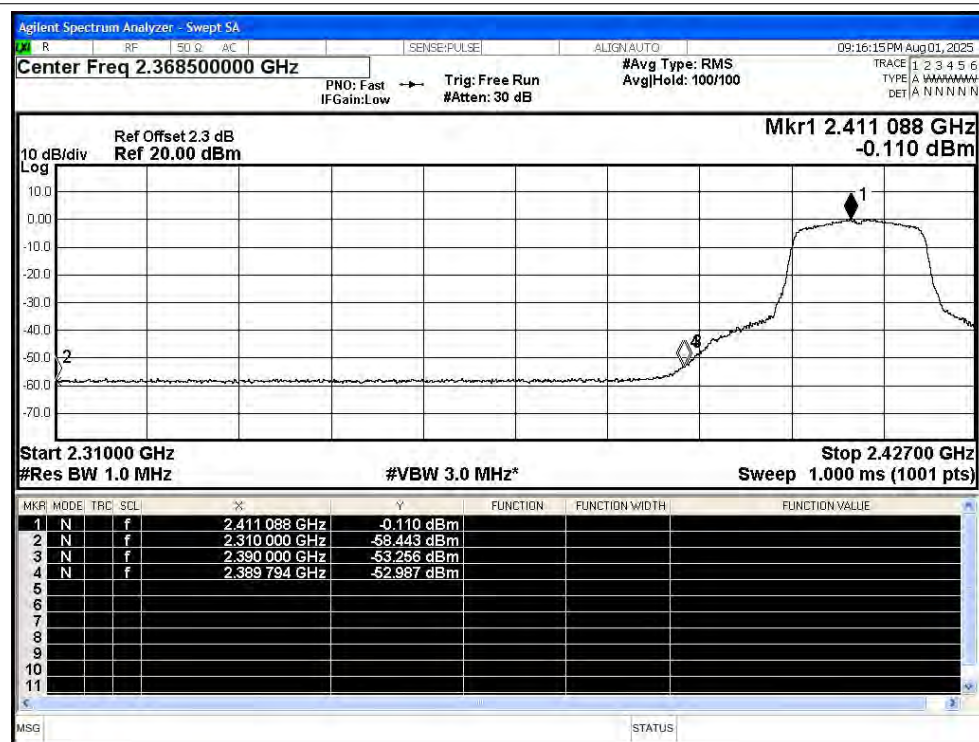
Restrict Band NVNT b 2412MHz Ant1 Average



Restrict Band NVNT g 2412MHz Ant1 Peak



Restrict Band NVNT g 2412MHz Ant1 Average



Agilent Spectrum Analyzer - Swept SA

Center Freq 2.47350000 GHz PNO: Fast IFGain: Low Trig: Free Run #Atten: 30 dB #Avg Type: RMS Avg/Hold: 100/100

Ref Offset 2.38 dB Ref 20.00 dBm Mkr1 2.463 324 GHz 8.067 dBm

10 dB/div Log

Start 2.44700 GHz Stop 2.50000 GHz
#Res BW 1.0 MHz #VBW 3.0 MHz Sweep 1.000 ms (1001 pts)

MKR	MODE	FREQ	LEVEL	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	f	2.463 324 GHz	8.067 dBm		
2	N	f	2.483 500 GHz	-36.202 dBm		
3	N	f	2.500 000 GHz	-48.402 dBm		
4	N	f	2.483 888 GHz	-31.015 dBm		

The spectrum analyzer displays a signal trace with several key parameters at the top:

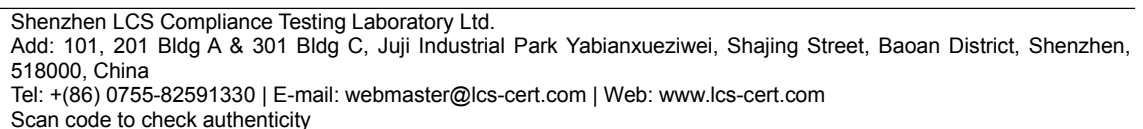
- Agilent Spectrum Analyzer - Swept SA
- R F SQ Q AC SENSE:PULSE ALIGN:AUTO 09:19:17 PM Aug 01, 2025
- Center Freq 2.473500000 GHz PNO: Fast IFGain:Low Trig: Free Run #Avg Type: RMS AvgHold: 100/100

The main plot shows a frequency response from approximately 2.44 GHz to 2.50 GHz. The y-axis represents power level in dBm, ranging from -70.0 to 10.0. A prominent peak is labeled 'Mkr1' with a value of 2.463 165 GHz and 0.635 dBm.

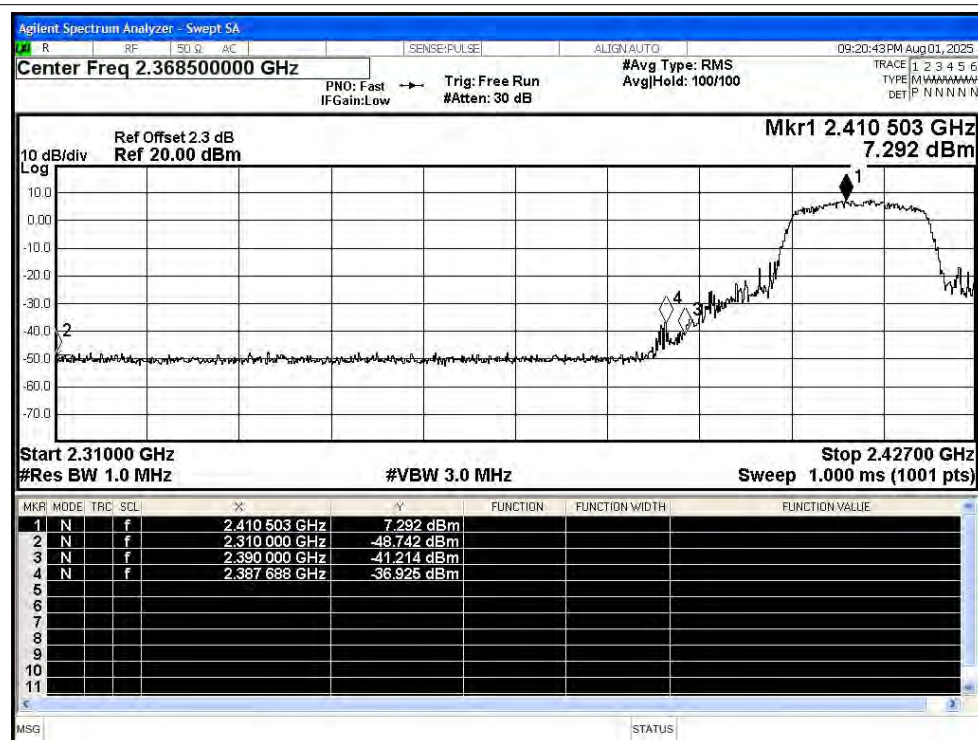
Additional measurement settings displayed below the plot are:

- Ref Offset 2.38 dB
- Ref 20.00 dBm
- Start 2.44700 GHz Stop 2.50000 GHz
- #Res BW 1.0 MHz #VBW 3.0 MHz Sweep 1.000 ms (1001 pts)

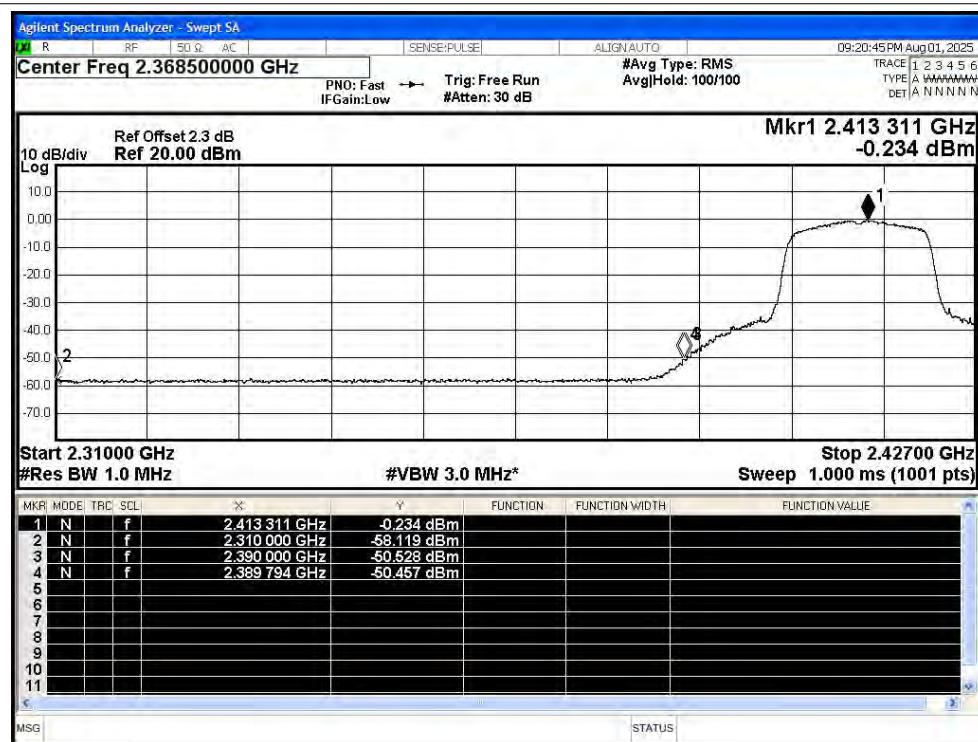
MKR MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	f	2.463 165 GHz	0.635 dBm			
2	N	f	2.483 500 GHz	-47.363 dBm			
3	N	f	2.500 000 GHz	-57.886 dBm			
4	N	f	2.483 623 GHz	-45.930 dBm			
5							
6							
7							
8							
9							
10							
11							



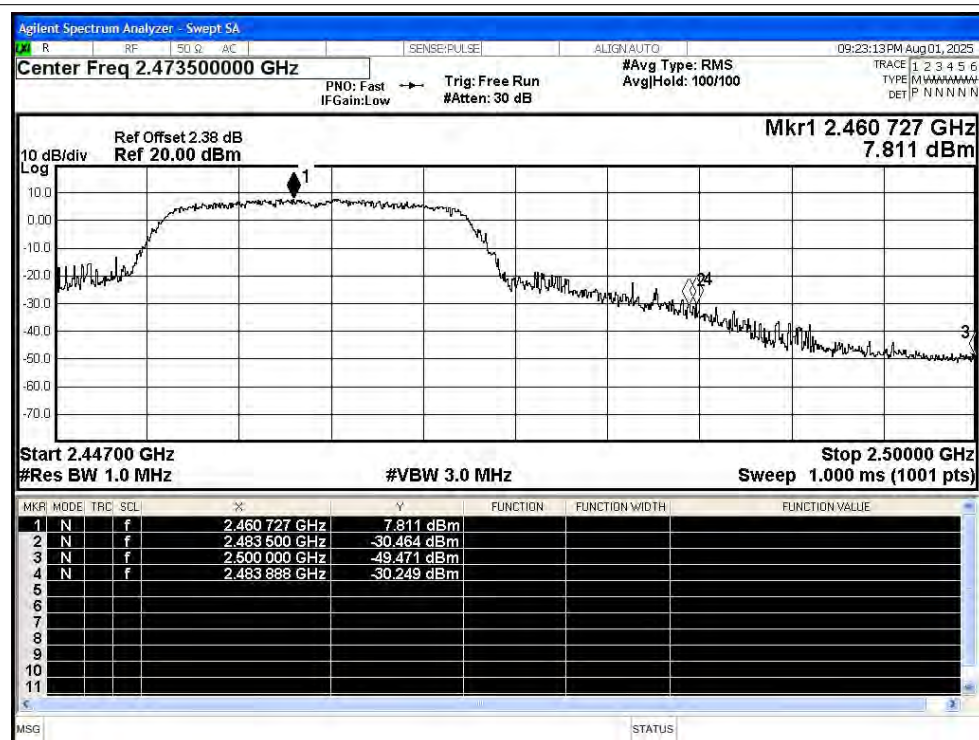
Restrict Band NVNT n20 2412MHz Ant1 Peak



Restrict Band NVNT n20 2412MHz Ant1 Average



Restrict Band NVNT n20 2462MHz Ant1 Peak



Restrict Band NVNT n20 2462MHz Ant1 Average

