

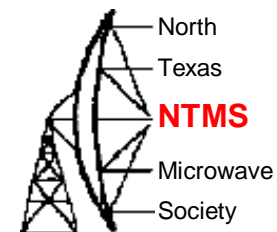
24 and 47 GHz Beacon Project and other things

W5LUA

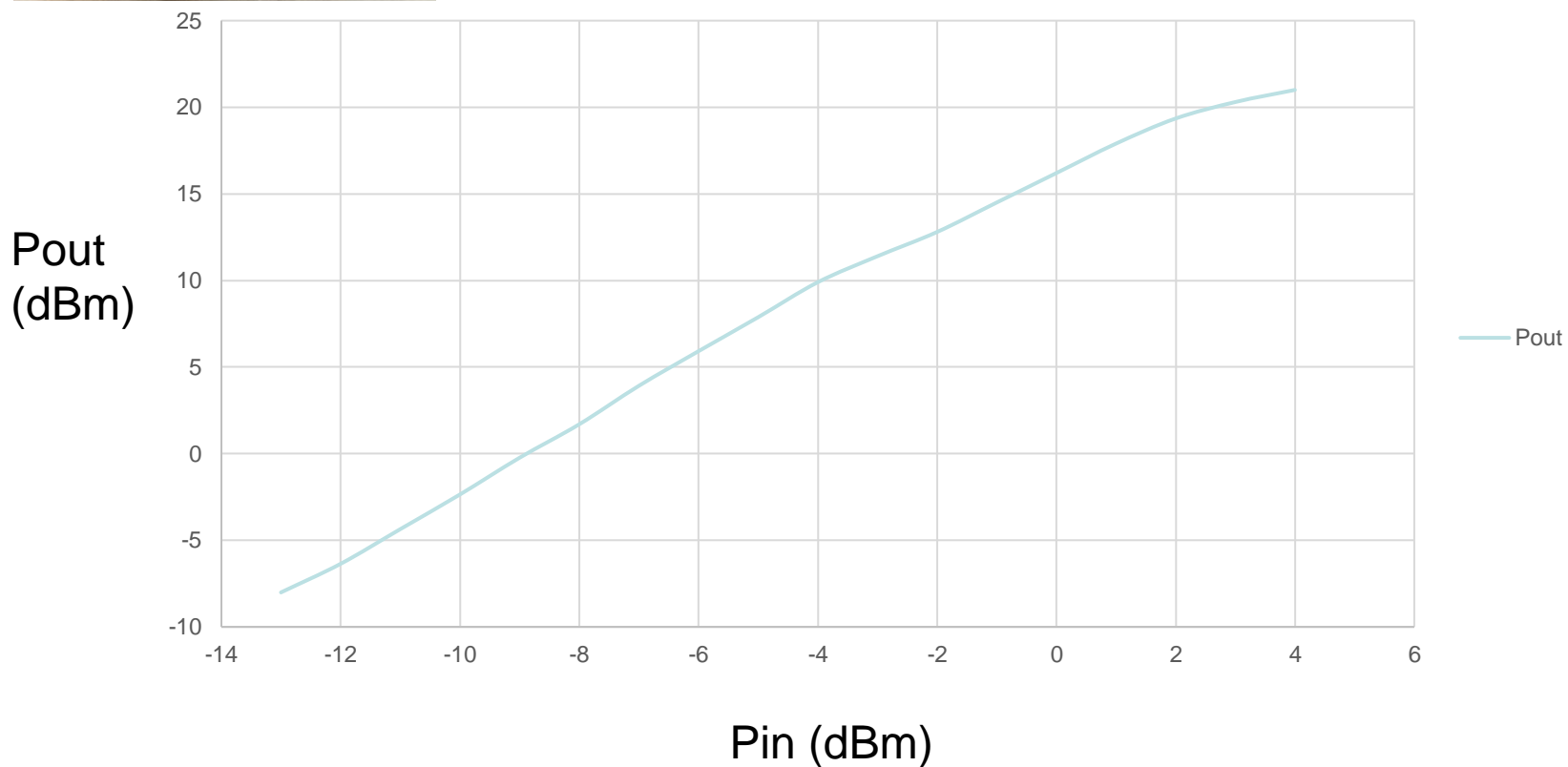
May 18, 2024

Avantek AMT-261X2

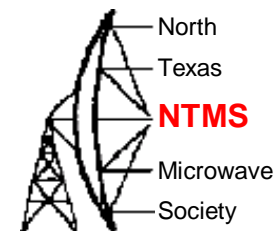
12V @ 555 mA



Avantek 24 GHz 12 to 24 GHz Multiplier



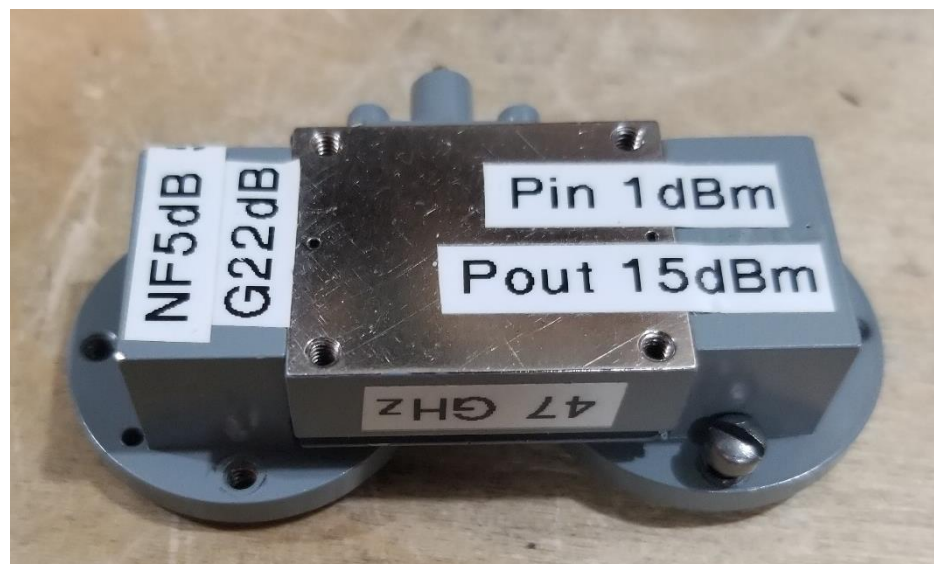
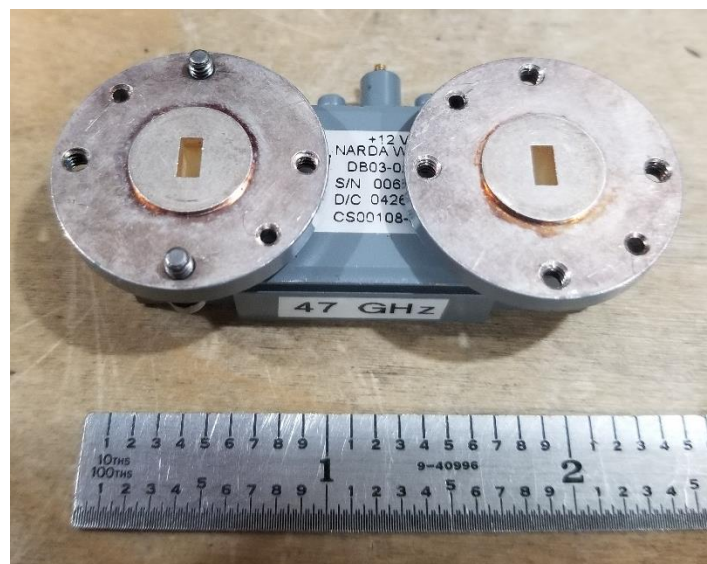
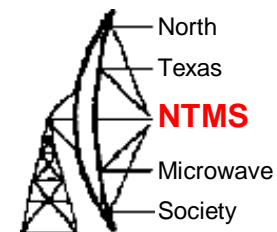
WA1MBA X4 47 GHz Multiplier



WA1MBA X4 47 GHz Multiplier (11776 MHz X4 = 47088 MHz) W5LUA AJWard 3/18/2024

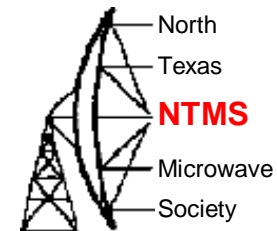
Vdd	Idd	Pin	Pout					
6V	165 mA	2.2 dBm	-10.8 dBm					
		3.2 dBm	9.57 dBm					
		4.2 dBm	12.52 dBm					
		5.2 dBm	12.54 dBm					
5V	162 mA	4.2 dBm	12.24 dBm					
4V	158 mA*	4.2 dBm	10.65 dBm	* 151 mA with RF drive				

WR22 Narda Amplifier



Potential use as an LNA or low power amplifier for 47 GHz

Bench testing 47GHz Components



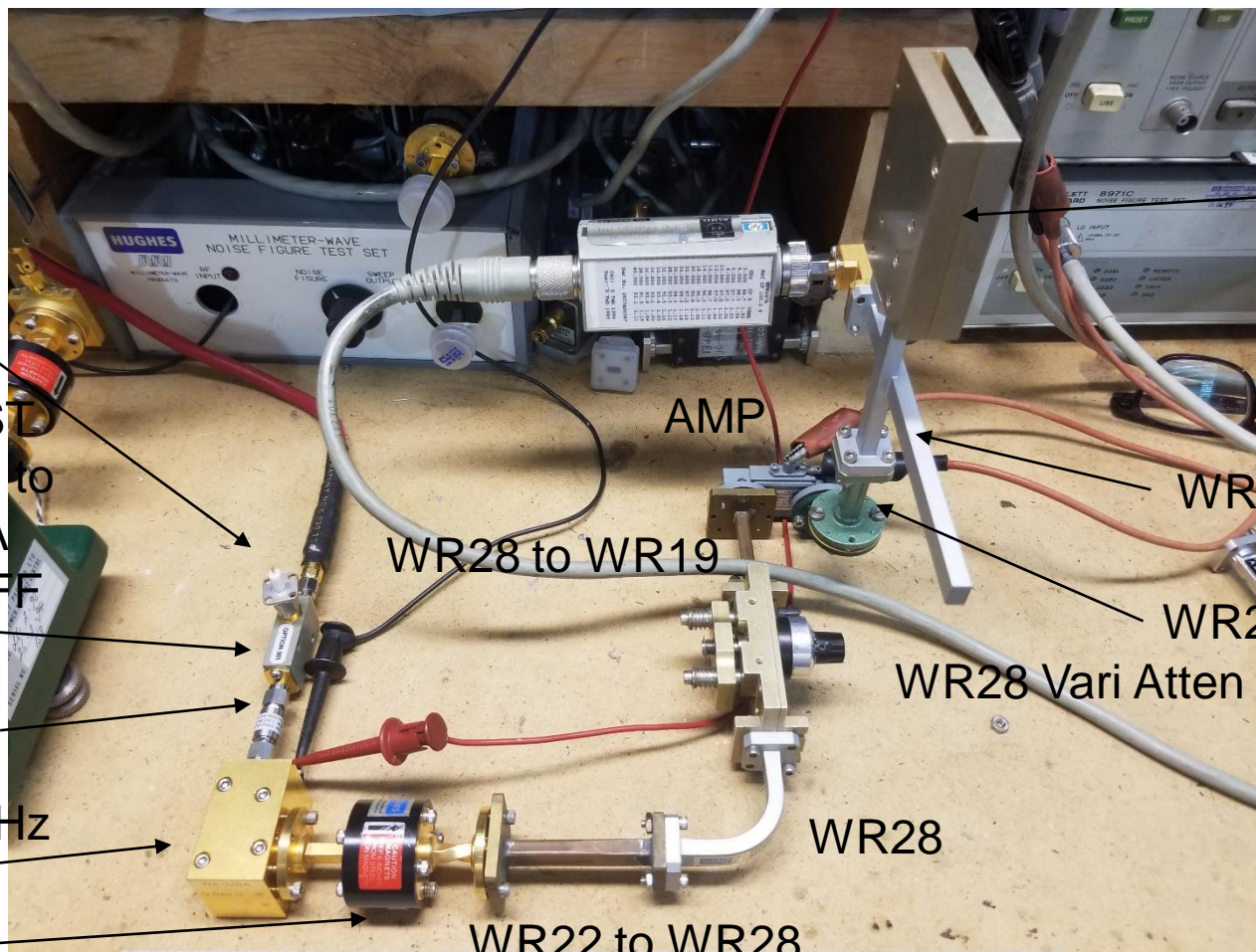
11772 MHz@
+8 dBm

HP 33122A SPST
Switch 100 MHz to
15 GHz – 10 mA
for 30 dB ON/OFF

3 dB Attenuator

WA1MBA 47 GHz
Multiplier

WR22 Isolator



AMP

WR28 to WR19

WR28 Vari Atten

WR28

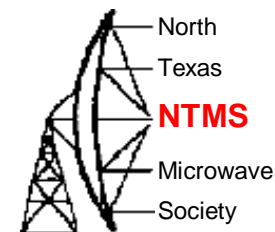
WR22 to WR28

Beacon
Antenna

WR28 Coupler

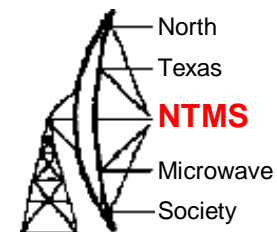
WR28 to WR19

Operating Conditions



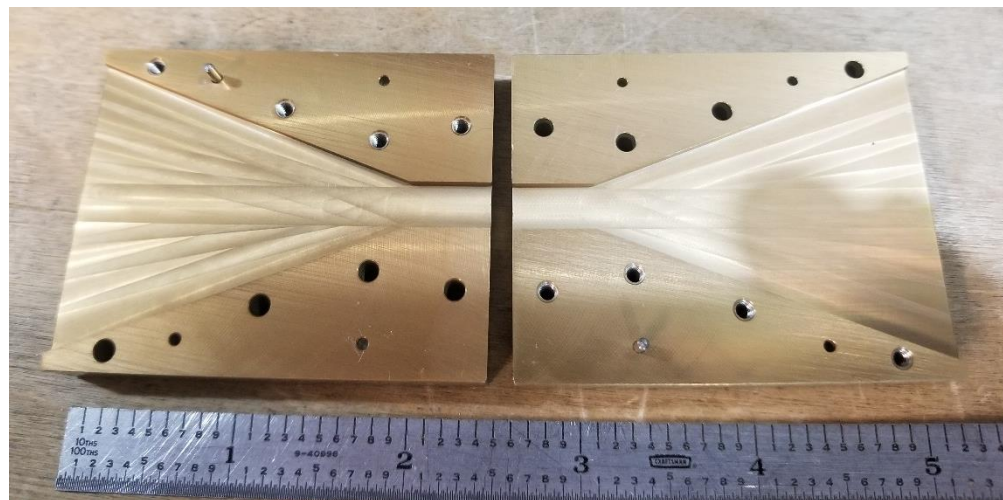
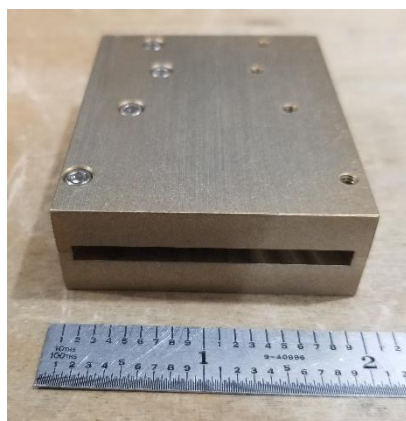
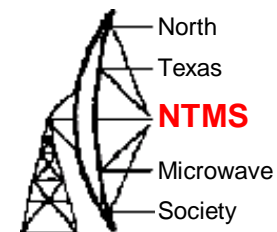
- Although the WA1MBA multiplier can supply +12.5 dBm at a V_{cc} of 6v, I decided to run it at lower power, i.e. +10 dBm at a V_{cc} of 4.5v to minimize heat dissipation.
- After attenuating the multiplier output to +2.5 dBm to drive the Narda amplifier drive, the power out of the Narda amplifier was +14 dBm.
- After directional coupler and some waveguide, power output was +13.3 dBm....Does not seem worth it??
- Need an amplifier. Checked Kuhne and they no longer sell the 1W or 300 mW amplifier.
- Does anyone have a spare or any ideas?

Other Option



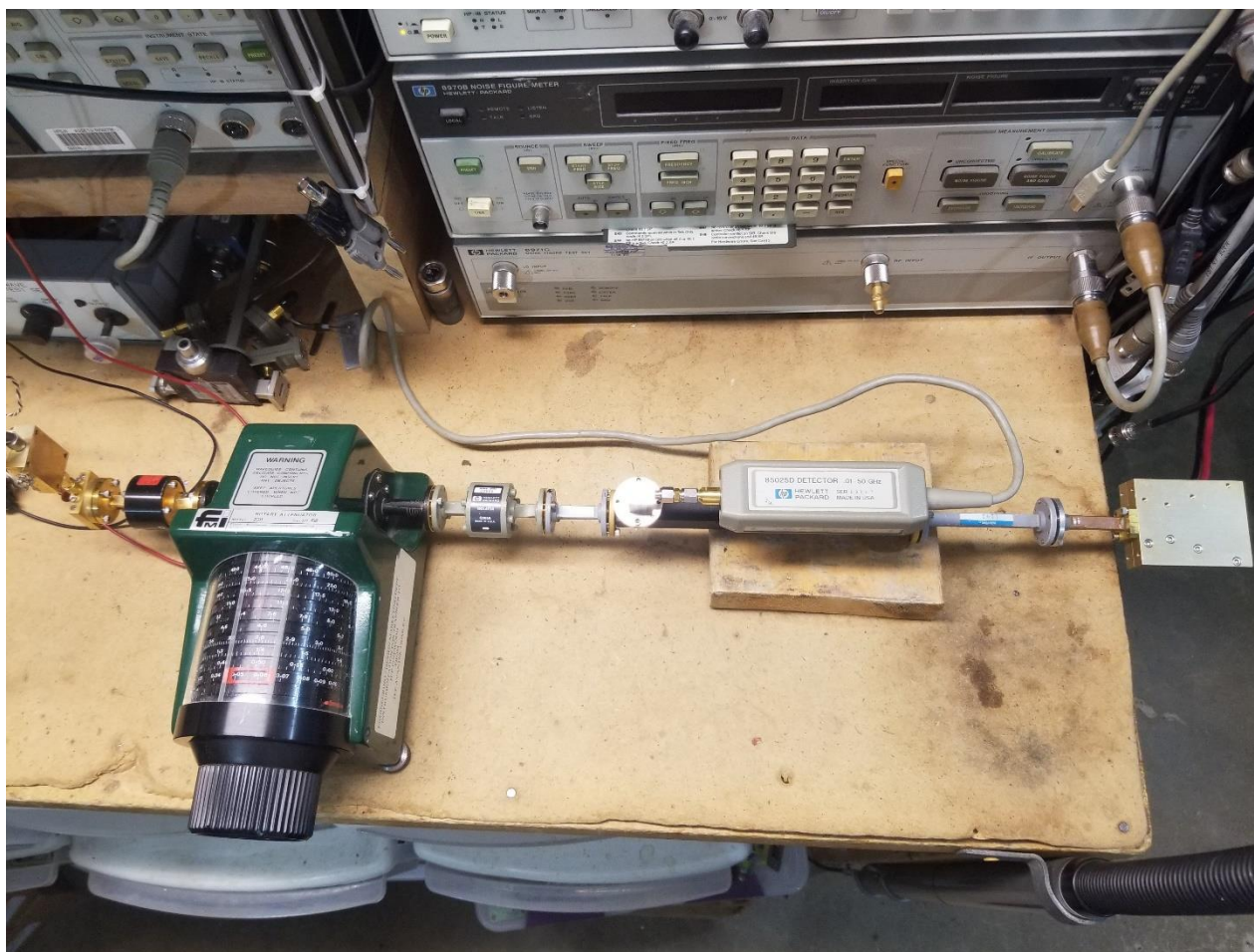
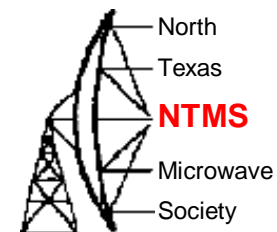
- Run the 47 GHz multiplier at 6V for an output power of +12 dBm only on demand remotely and keep an eye on thermals.
- Other thoughts?

W1GHZ Sectoral Horn Beacon Antenna used on 47 GHz

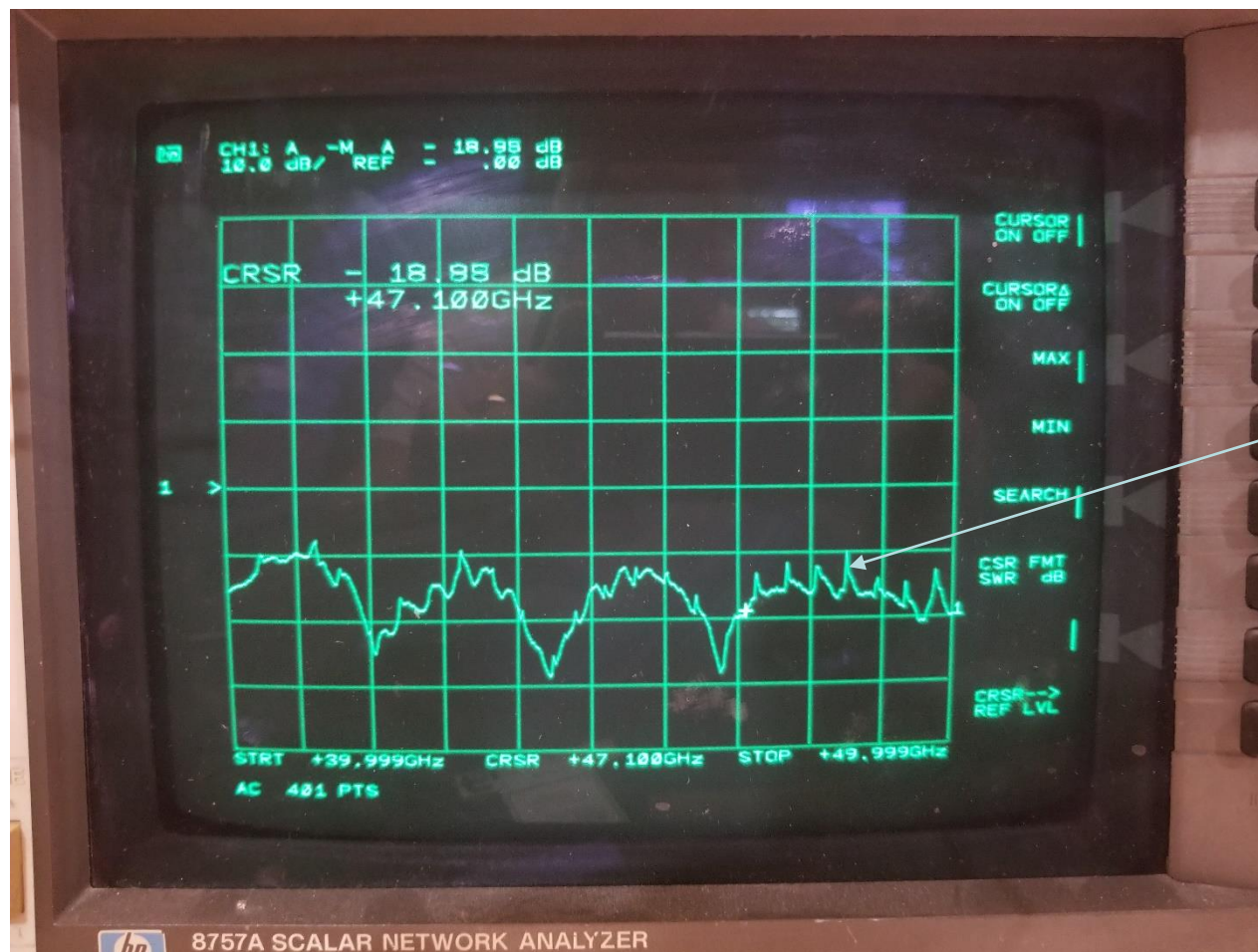
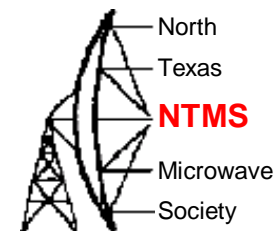


- Described in MUD Proceedings 2023, pp 105 – 110.
- Paul simulated the horn with a 3 dB beamwidth of 82 deg and a -10 dB beamwidth of 170 degrees in the azimuth plane (E-Plane)
- Vertical (H-Plane) 3 dB beamwidth is approximately 10 degrees
- Results in a simulated gain of 14.5 dBi

Testing Beacon Antenna



W1GHZ 24/47 GHz Beacon Antenna

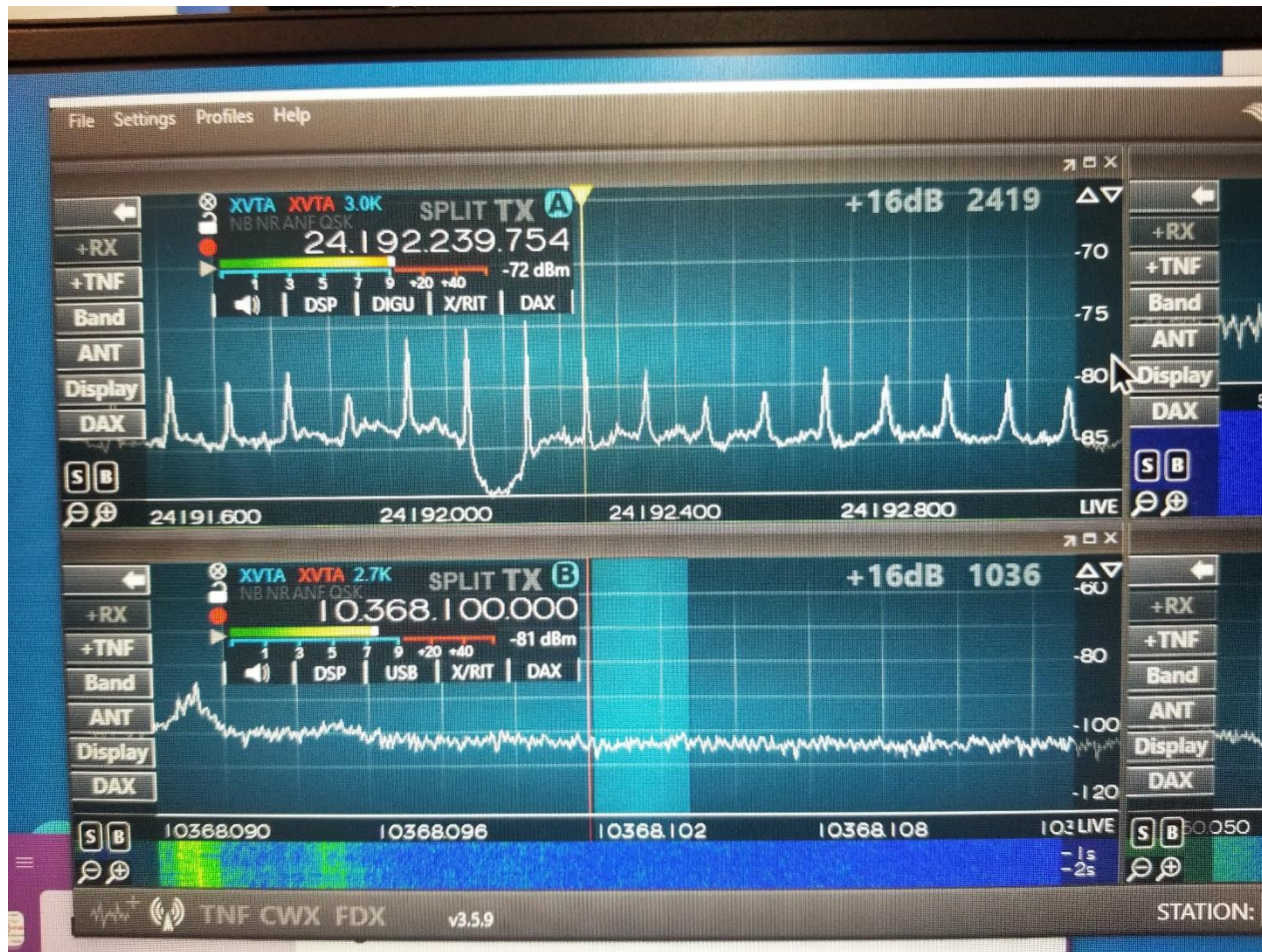
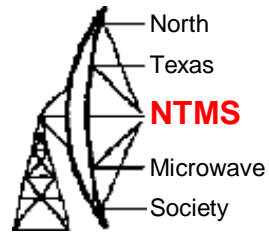


Question...

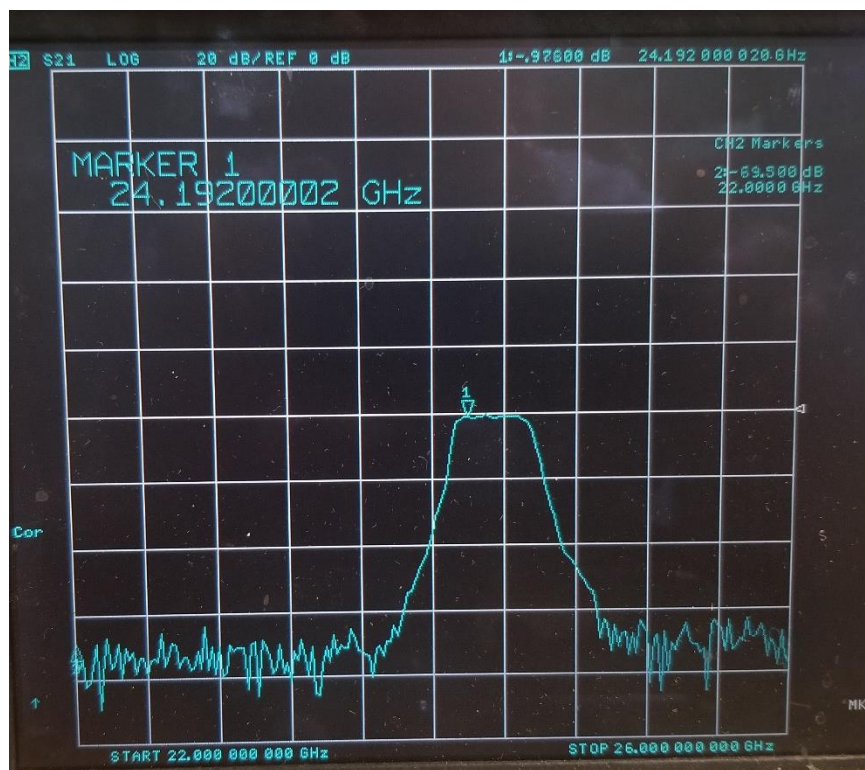
Does anyone know what causes these little spikes in the passband? I use an HP 8340A sweeper along with my HP8757A scalar analyzer

- Other items

My Neighbor's Doorbell !



Pyro-Joe 24 GHz Bandpass Filter

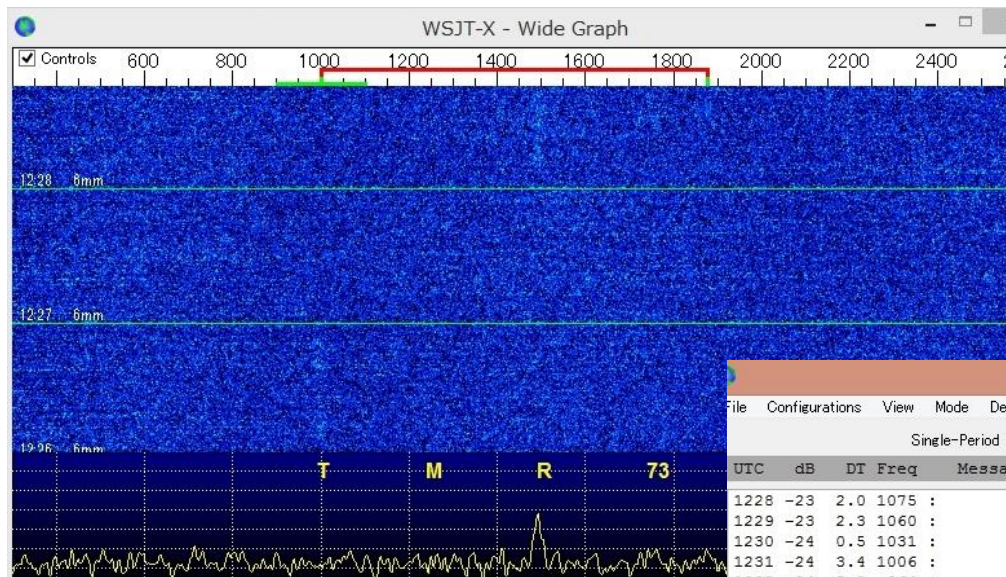
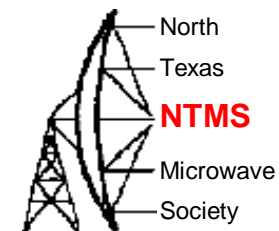


The filter can reject the 21828 MHz LO of the Wavelab unit by over 65 dB
Insertion loss at 24192 MHz <1dB.



W5LUA received at JA1WQF

47088.1 MHz Feb 10, 2020



2.4m offset fed dishes
at both stations

WSJT-X v2.1.2 by K1JT

File Configurations View Mode Decode Save Tools Help

Single-Period Decodes

UTC	dB	DT	Freq	Message
1228	-23	2.0	1075	:
1229	-23	2.3	1060	:
1230	-24	0.5	1031	:
1231	-24	3.4	1006	:
1232	-24	5.2	964	:
1233	-23	5.0	1056	:
1234	-25	2.8	987	:* JA1WQF W5LUA EM13

Average Decodes

UTC	dB	DT	Freq	Message
1146	-23	2.7	994	:* JA1WQF W5LUA EM13
1210	-24	-1.0	1008	:
1214	-23	3.3	1003	:
1220	-23	0.2	994	:
1221	-24	5.6	1001	:
1231	-24	3.4	1006	:

Log QSO Stop Monitor Erase Decode Enable Tx Halt Tx Tune Menus

6mm 47,088.145 000

TX even/1st Tx 1000 Hz Hold Tx Freq F Tol 100 Rx 1000 Hz Report -15 Submode D Sync 1 Tx6

DX Call DX Grid W5LUA EM13QC Az: 44 10365 km Lookup Add

2020 2 10 12:35:39

Receiving QRA64 D

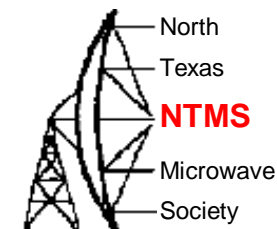
Generate Std Msgs Next Now Pwr

Msg	Next	Now	Pwr
W5LUA JA1WQF QM05	<input type="radio"/>	Tx 1	
W5LUA JA1WQF -15	<input type="radio"/>	Tx 2	
W5LUA JA1WQF R-15	<input type="radio"/>	Tx 3	
W5LUA JA1WQF RR73	<input type="radio"/>	Tx 4	
W5LUA JA1WQF 73	<input type="radio"/>	Tx 5	
CQ JA1WQF QM05	<input checked="" type="radio"/>	Tx 6	

39/60

W5LUA runs a 30 watt TWT

W5LUA reception of DL7YC on 47 GHz



WSJT-X - 6600M v2.6.1 by K1JT et al.

File Configurations View Mode Decode Save Tools Help

Single-Period Decodes

UTC	dB	DT	Freq	Message
1808	-17	2.9	699	: W5LUA DL7YC JO62 q3

Average Decodes

UTC	dB	DT	Freq	Message
1808	-17	2.9	699	: W5LUA DL7YC JO62 q3
1812	-17	2.9	691	: W5LUA DL7YC JO62 q33

Log QSO Stop Monitor Erase Clear Avg Decode Enable Tx Halt Tx Tune ☒ Menu

6mm **S** **47,088.123 622** ☐ Tx even/1st
 Tx 700 Hz
 F Tol 100 Rx 666 Hz Submode E Max Drift 50
 Az: 36 8358 km Report -15 T/R 60 s
☐ Sh ☒ Auto Seq CQ: None ☐ Tx6

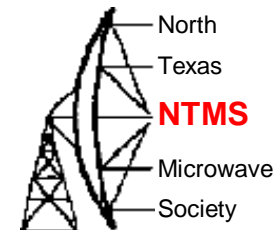
H DX Call DX Grid
 FT8 DL7YC JO62PK
 FT4 Az: 36 8358 km
 MSK Lookup Add
 Q65 **2024 May 13 16:43:36**
 JT65

Generate Std Msgs Next Now
 DL7YC W5LUA EM13 ☐ Tx 1
 DL7YC W5LUA -15 ☐ Tx 2
 DL7YC W5LUA R-15 ☐ Tx 3
 DL7YC W5LUA RR73 ☐ Tx 4
 DL7YC W5LUA 73 ☐ Tx 5
 CQ W5LUA EM13 ☒ Tx 6

240511_1814.wav Q65-60E 2 2 0/60

2.4m offset fed dish and 2.35 dB noise figure, DL7YC was running 2.4m dish and 40 watts

VPW-2931 Needed!



My power supply has arcing issues. Therefore looking for a replacement!

- 73 for now de AI W5LUA