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24 and 47 GHz Beacon Project and other things

W5LUA

May 18, 2024

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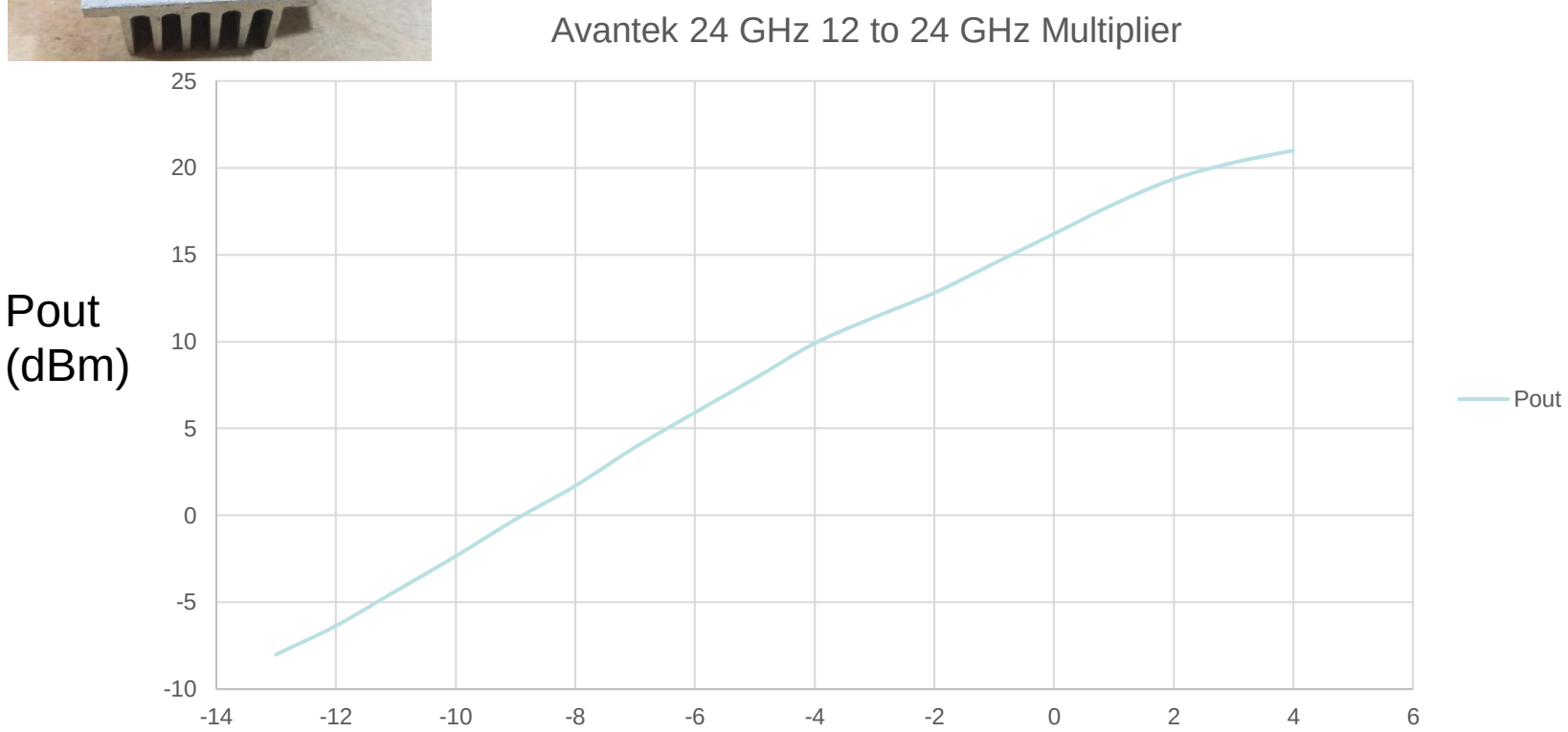
Avantek AMT-261X2

12V @ 555 mA



WA1MBA X4 47 GHz Multiplier

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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				

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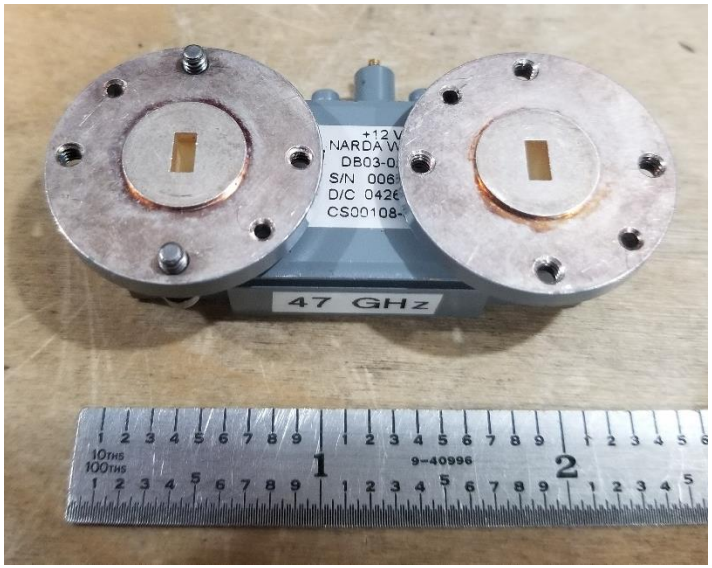
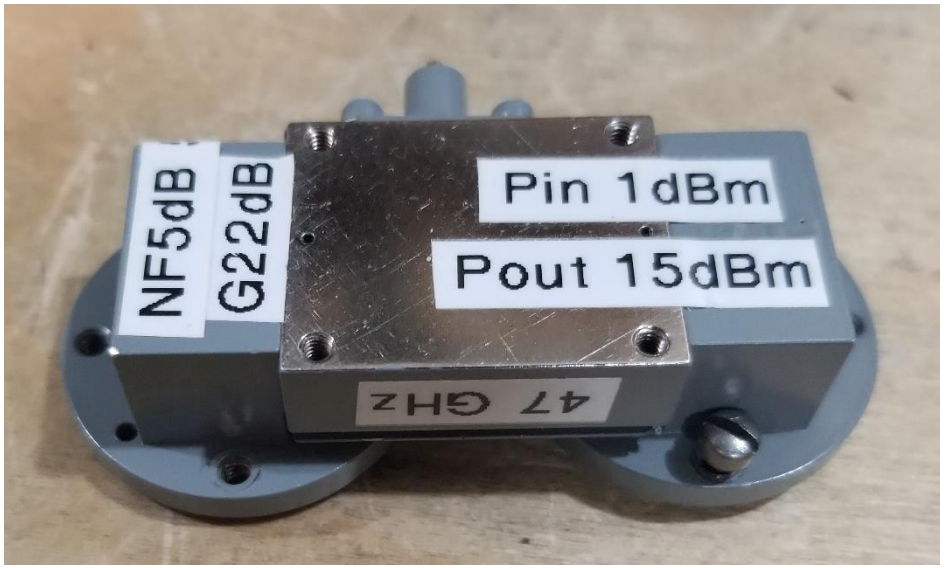
WR22 Narda Amplifier





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

Bench testing 47GHz Components

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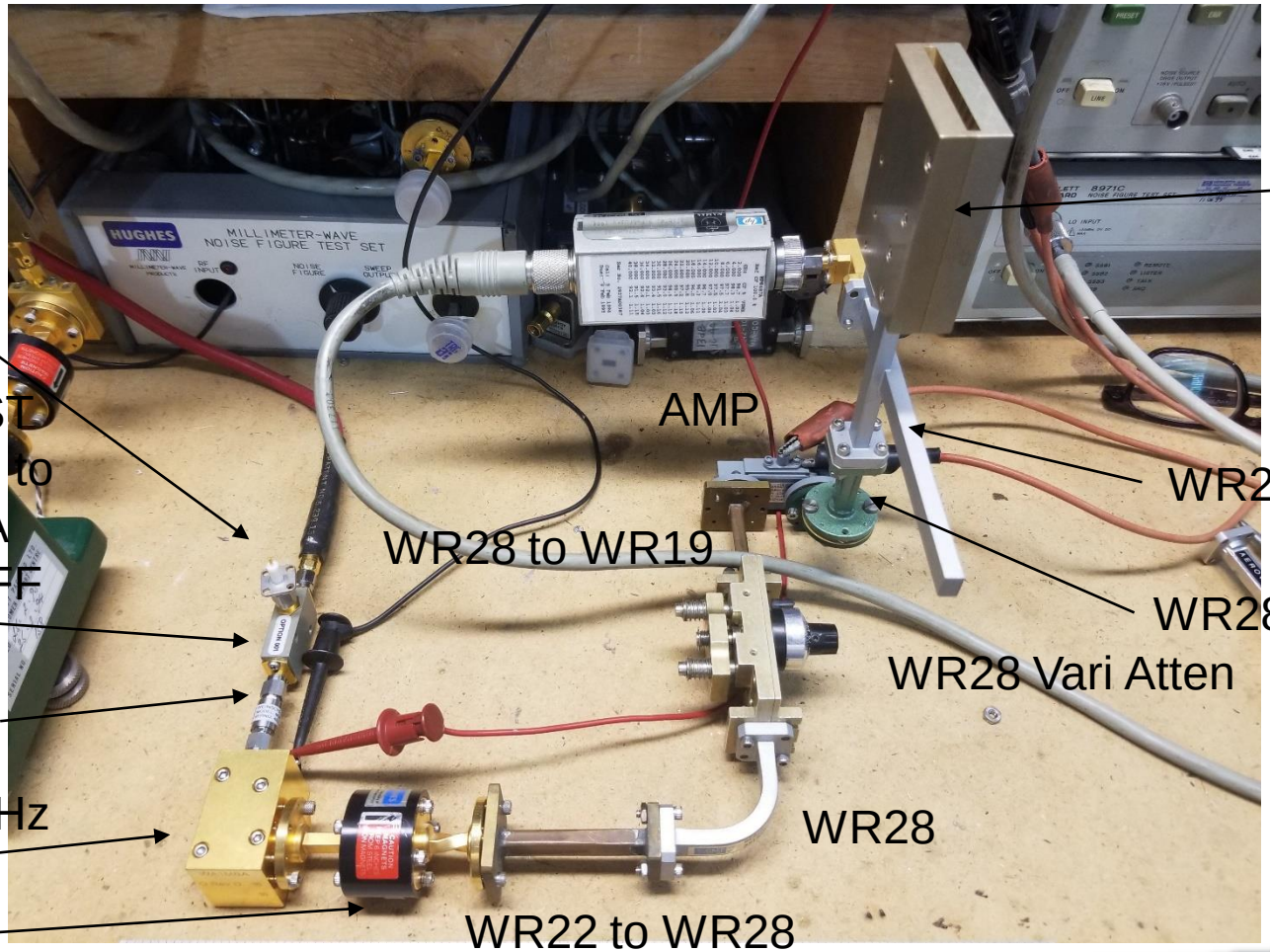

11772 MHz@ +8 dBm

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

Beacon Antenna

AMP

WR28 Coupler

WR28 to WR19

WR28 to WR19

WR28 Vari Atten

WR28

WR22 to WR28

Operating Conditions

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- Although the WA1MBA multiplier can supply +12.5 dBm at a Vcc of 6v, I decided to run it at lower power, i.e. +10 dBm at a Vcc 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

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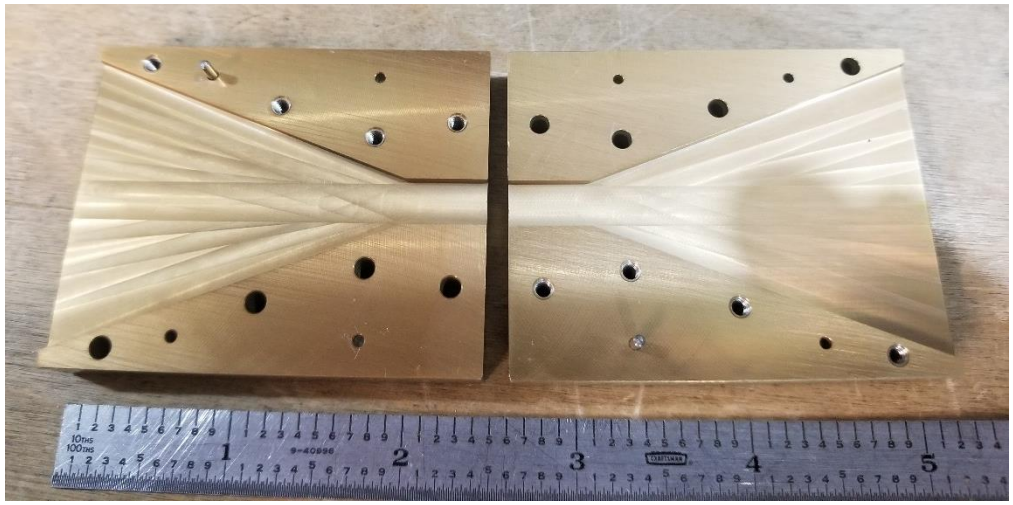

- Described in MUD Proceedings 2023, pp 105 – 110.
- Paul simulated the horn with a 3 dB beamwidth of 82 deg and a -10 dB beamwidth of 170 degrees in the azimuth plane (E-Plane)
- Vertical (H-Plane) 3 dB beamwidth is approximately 10 degrees
- Results in a simulated gain of 14.5 dBi

Testing Beacon Antenna

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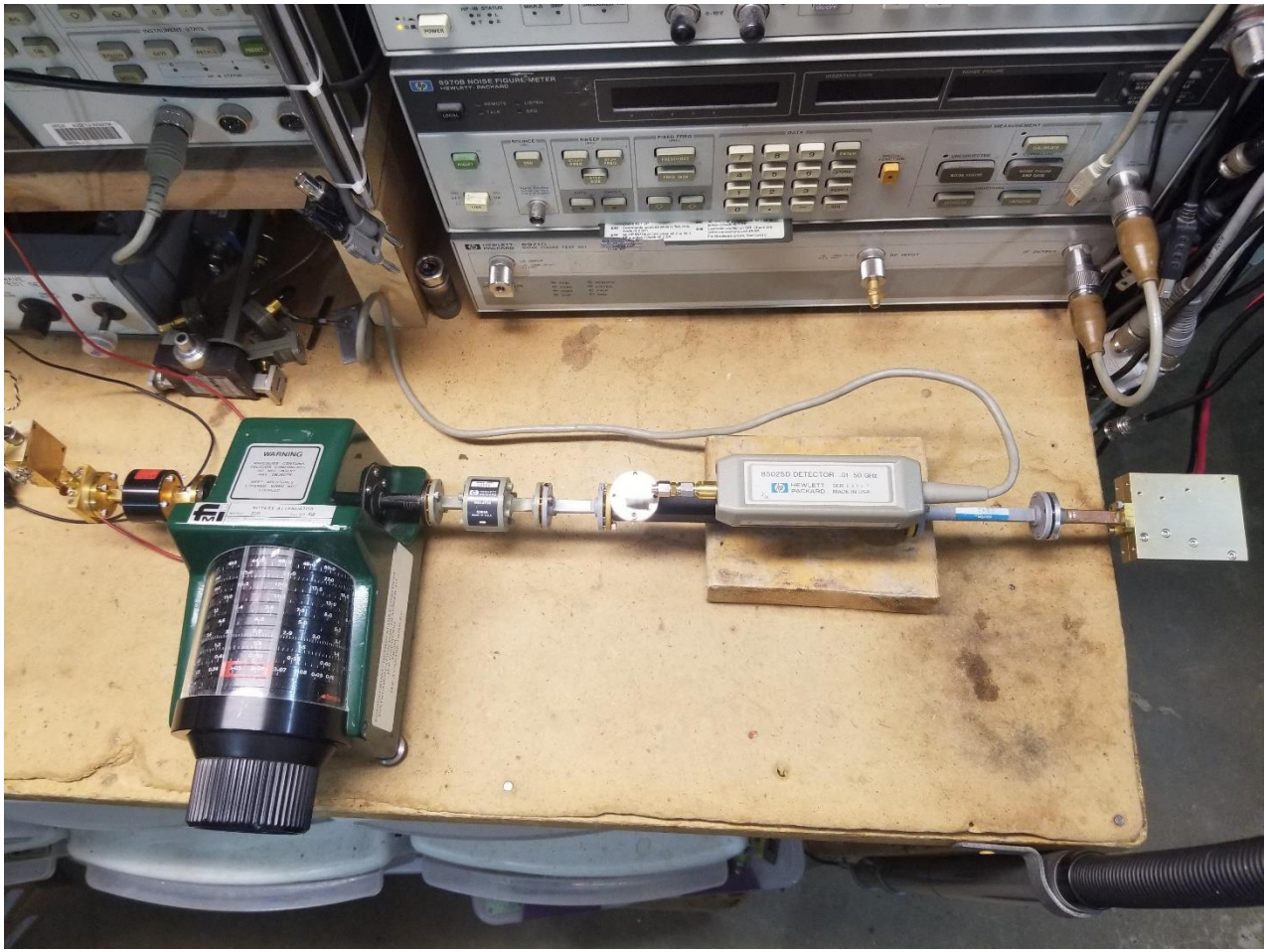

W1GHZ 24/47 GHz Beacon Antenna

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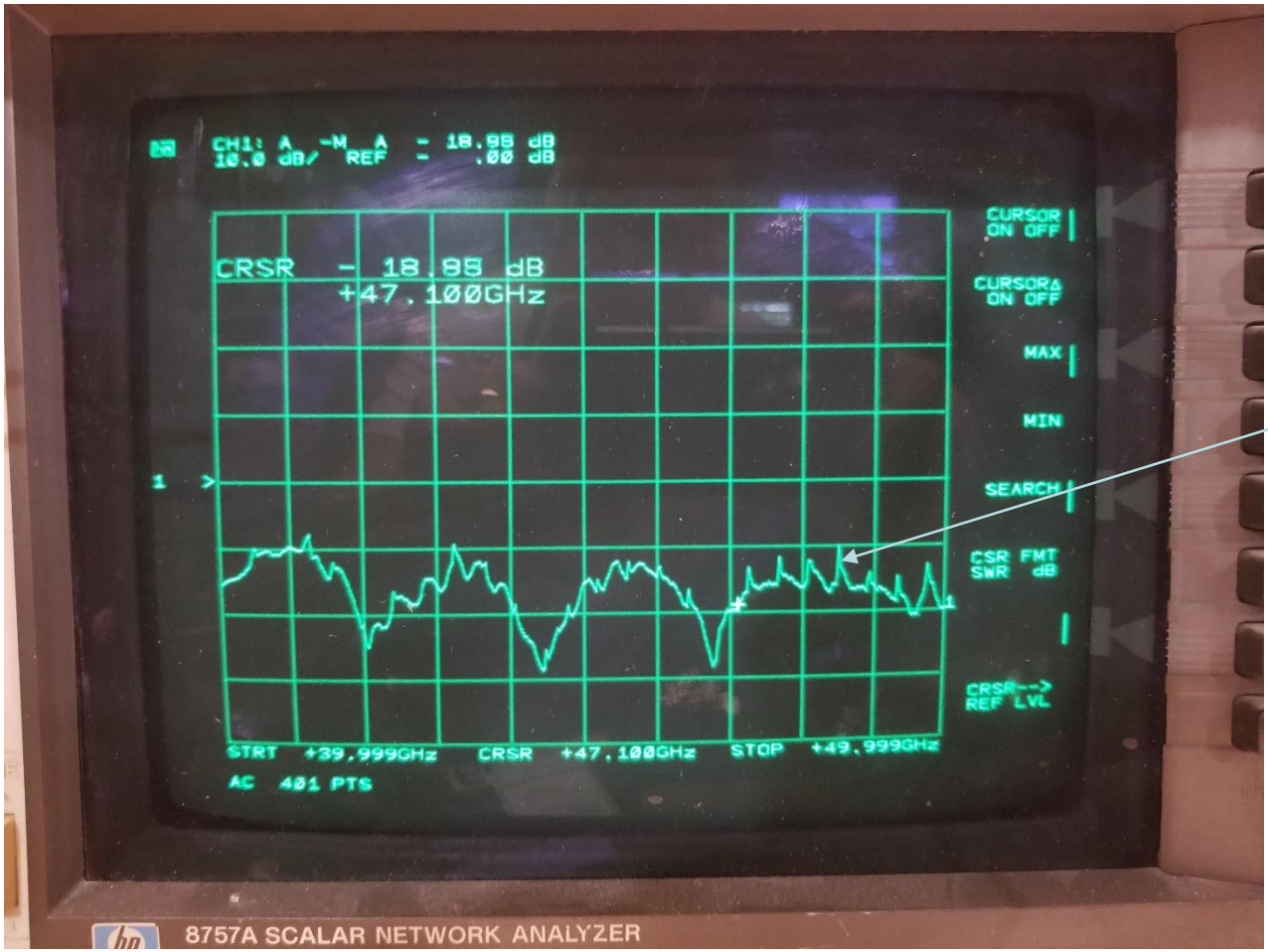

Question…
Does anyone know what causes these little spikes in the passband? I use an HP 8340A sweeper along with my HP8757A scalar analyzer

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- Other items

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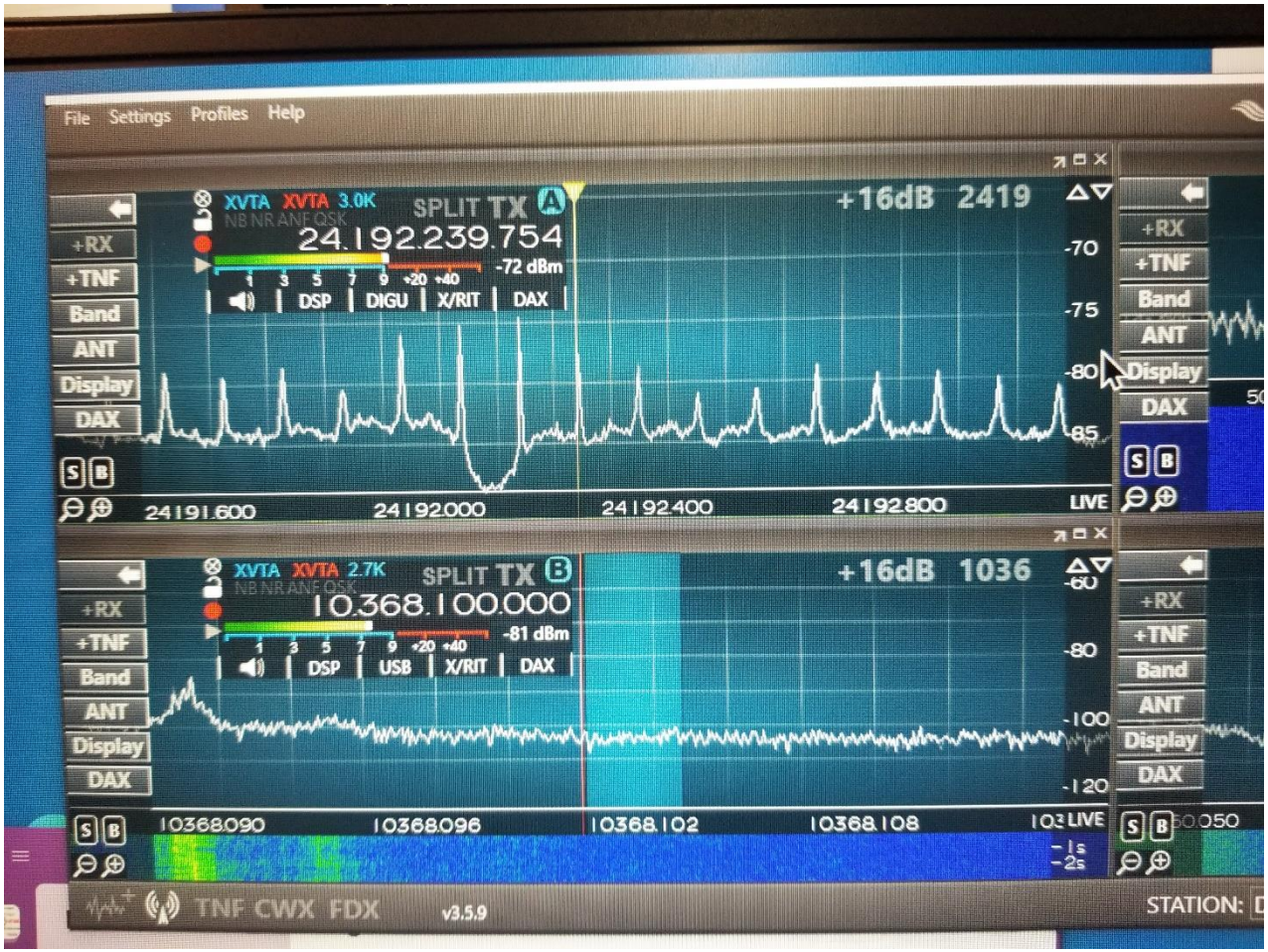
My Neighbor's Doorbell !



Pyro-Joe 24 GHz Bandpass Filter

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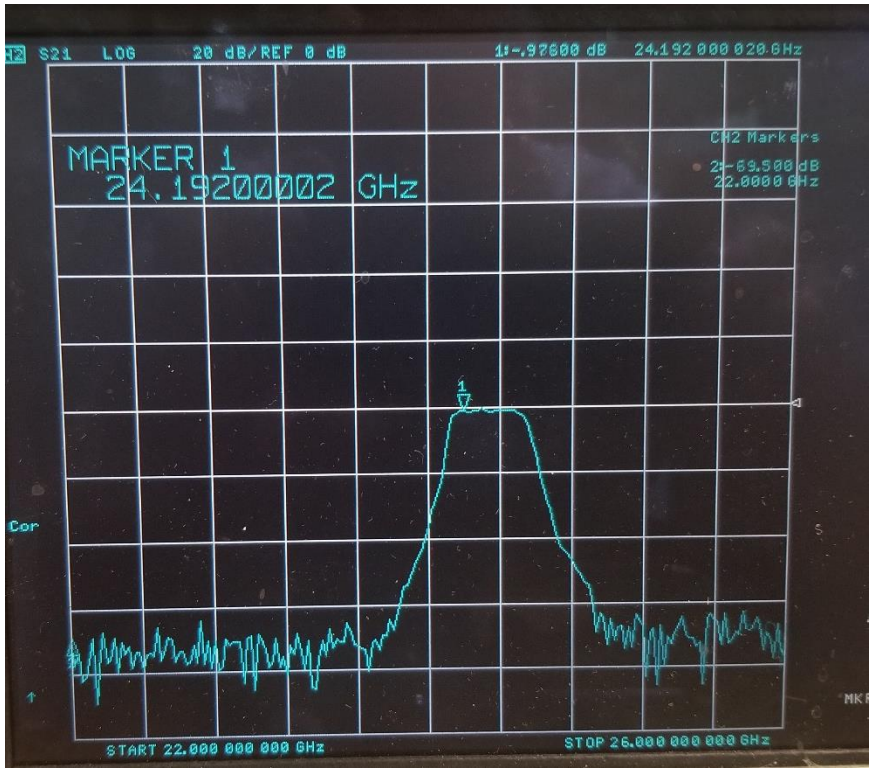

The filter can reject the 21828 MHz LO of the Wavelab unit by over 65 dB
Insertion loss at 24192 MHz <1dB.

W5LUA received at JA1WQF 47088.1 MHz Feb 10, 2020

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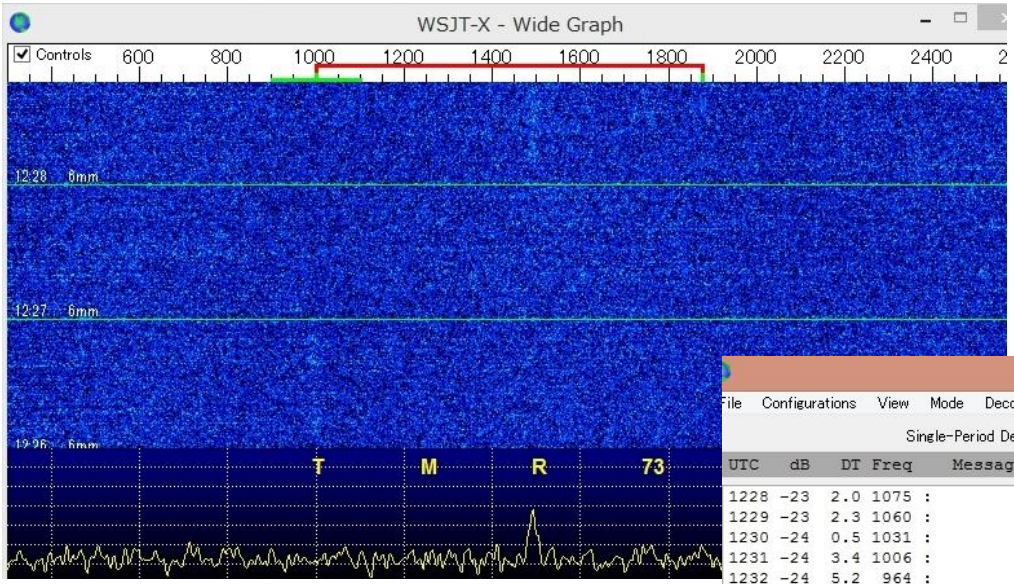
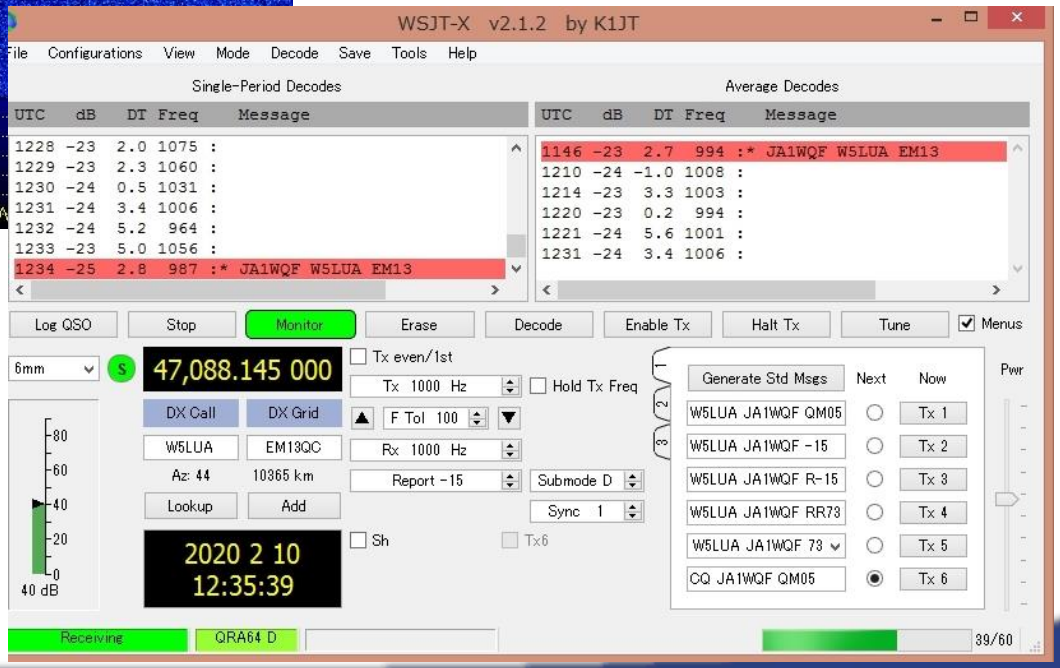


2.4m offset fed dishes at both stations



W5LUA runs a 30 watt TWT

W5LUA reception of DL7YC on 47 GHz

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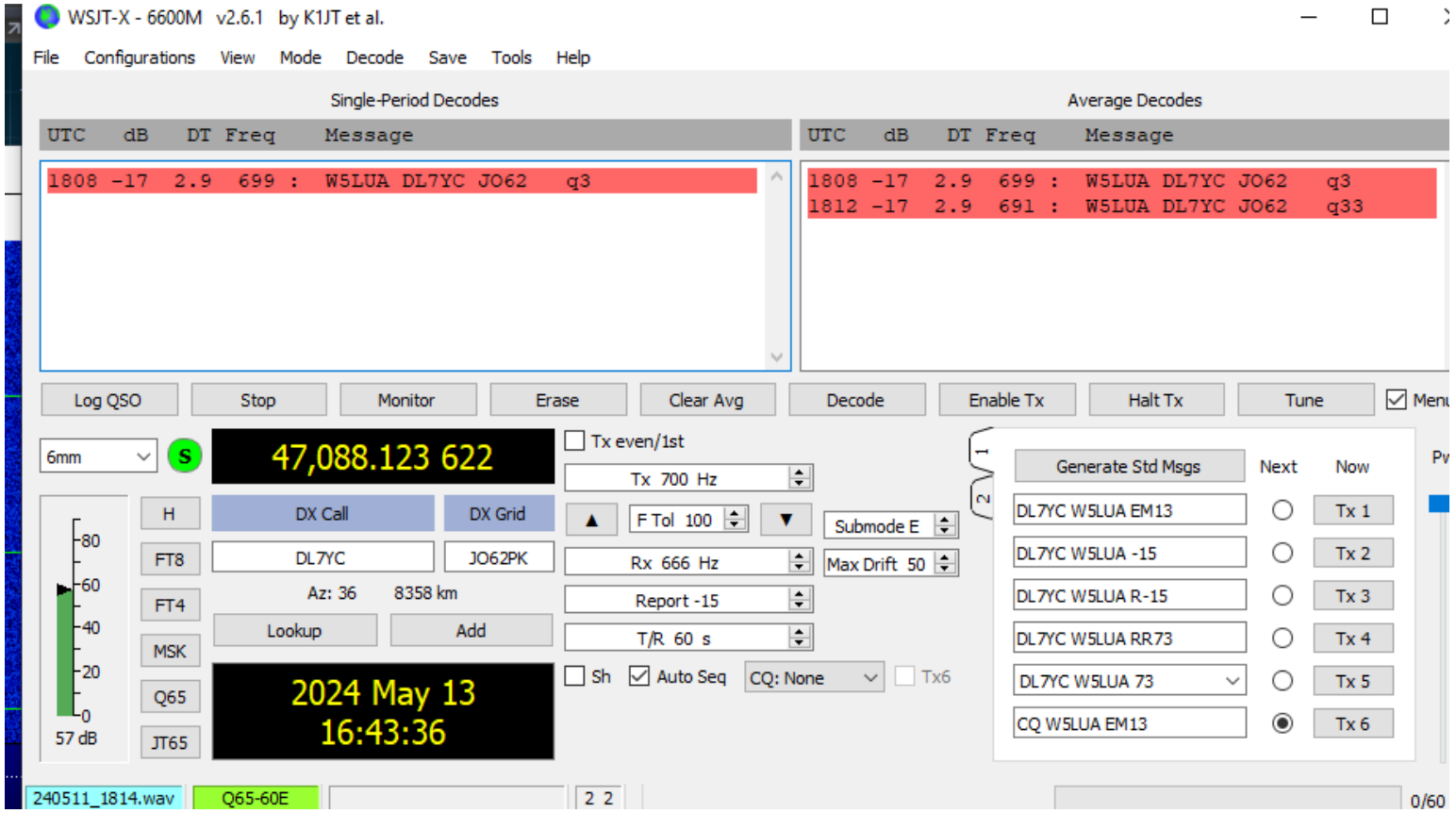

2.4m offset fed dish and 2.35 dB noise figure, DL7YC was running 2.4m dish and 40 watts

VPW-2931 Needed!

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

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- 73 for now de Al W5LUA