Mt Allison Beacons

10 GHz + Linear Translator
24 GHz

Gary K6MG
Brian WA6QDP
Joel KD6W
Pete K6TJ
Oliver KB6BA

10 GHz Beacon

10,369.000 MHz

CW IDer at 10 wpm alternating 20 wpm

K6MG CM97BL

114 mW

10 dB gain omni slot antenna

Linear Translator

Output is a range 11-55 kHz above the beacon

> 10,369.011 to 10, 369.055 MHz

Input is 600 kHz below the output:
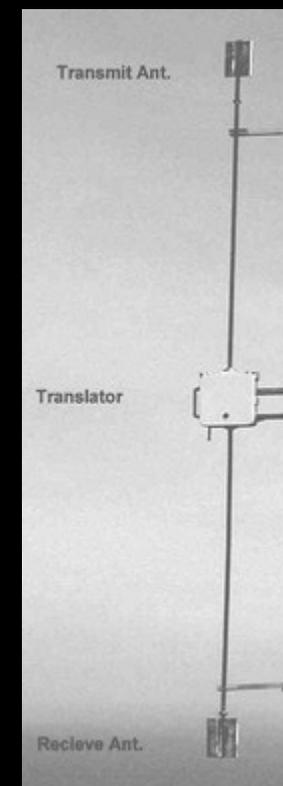
> 10,368.411 to 10, 368.455 MHz

USB comes out as USB, FM as FM, CW as CW

No-signal bandwidth power = 42 mW
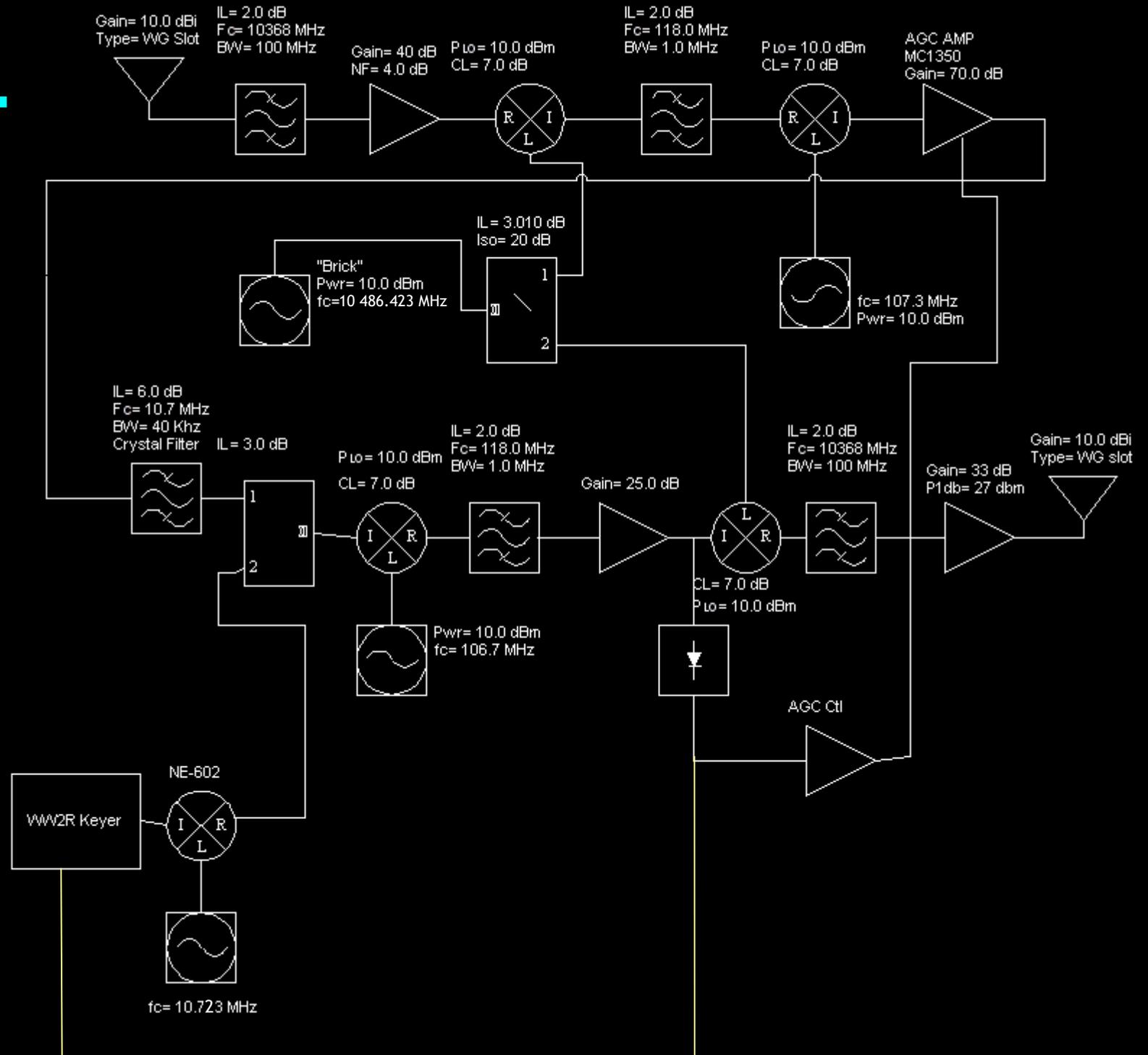
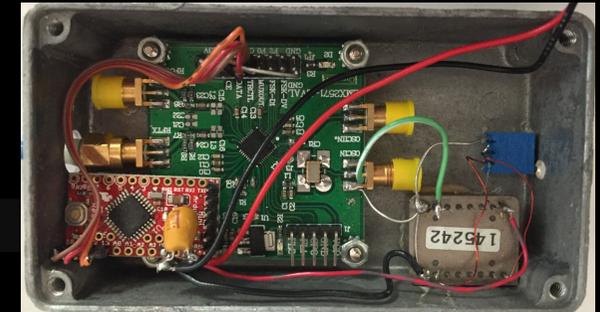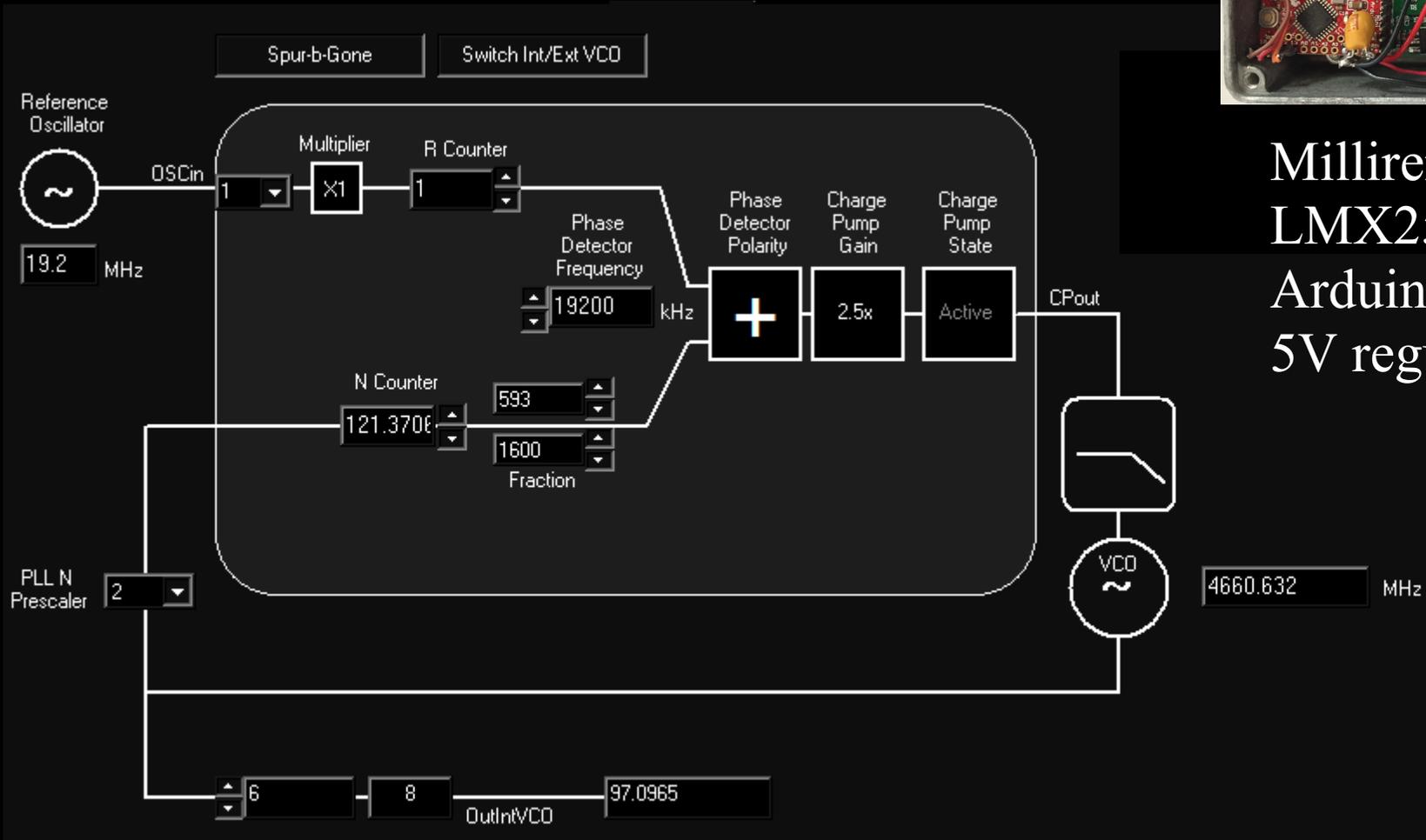Large input signal bandwidth power = 825 mW

AD6FP 2002
http://www.ceitron.com/mvus/translator.html

50 MHz and up
July, 2019

Gain= 10.0 dBi
Type= WG Slot

IL= 2.0 dB
Fc= 10368 MHz
BW= 100 MHz

Gain= 40 dB
NF= 4.0 dB

P LO= 10.0 dBm
CL= 7.0 dB

IL= 2.0 dB
Fc= 118.0 MHz
BW= 1.0 MHz

P LO= 10.0 dBm
CL= 7.0 dB

AGC AMP
MC1350
Gain= 70.0 dB

IL= 3.010 dB
Iso= 20 dB

"Brick"
Pwr= 10.0 dBm
fc=10 486.423 MHz

fc= 107.3 MHz
Pwr= 10.0 dBm

IL= 6.0 dB
Fc= 10.7 MHz
BW= 40 Khz
Crystal Filter

IL= 3.0 dB

P LO= 10.0 dBm
CL= 7.0 dB

IL= 2.0 dB
Fc= 118.0 MHz
BW= 1.0 MHz

Gain= 25.0 dB

IL= 2.0 dB
Fc= 10368 MHz
BW= 100 MHz

Gain= 10.0 dBi
Type= WG slot

Gain= 33 dB
P1db= 27 dbm

CL= 7.0 dB
P LO= 10.0 dBm

Pwr= 10.0 dBm
fc= 106.7 MHz

AGC Ctl

NE-602

WW2R Keyer

fc= 10.723 MHz

Brick Locker

Milliren OCXO
LMX2571
Arduino Mini
5V regulator

Spur-b-Gone   Switch Int/Ext VCO

Reference Oscillator

OSCin   Multiplier X1   R Counter 1

19.2 MHz

Phase Detector Frequency   19200 kHz

Phase Detector Polarity   +

Charge Pump Gain   2.5x

Charge Pump State   Active

CPout

N Counter   121.3706   593   1600   Fraction

VCO   4660.632 MHz

PLL N Prescaler   2

6   8   OutIntVCO   97.0965

Passband
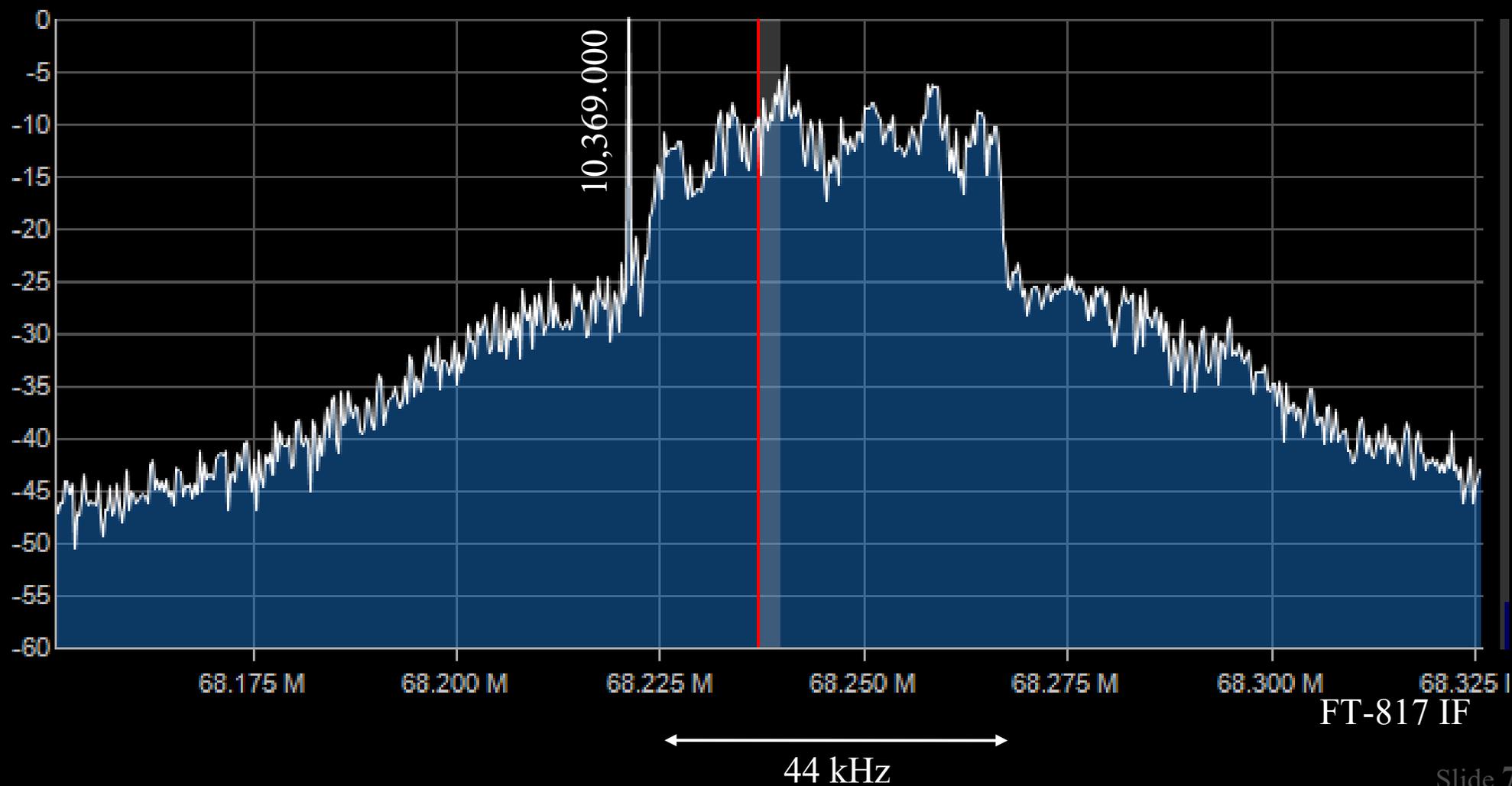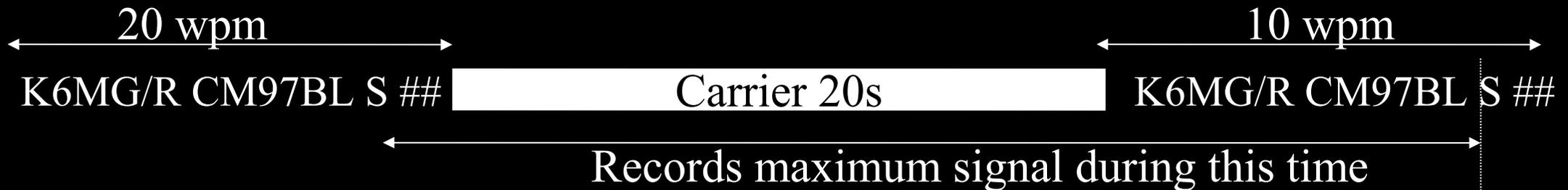
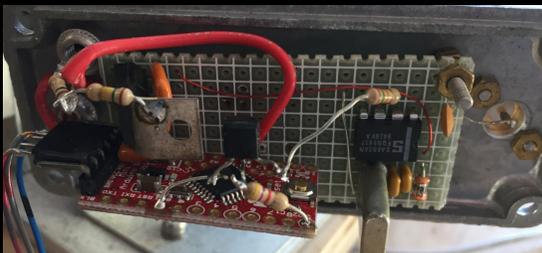# No Spurious Transmission > -40 dBc

FT-817 IF
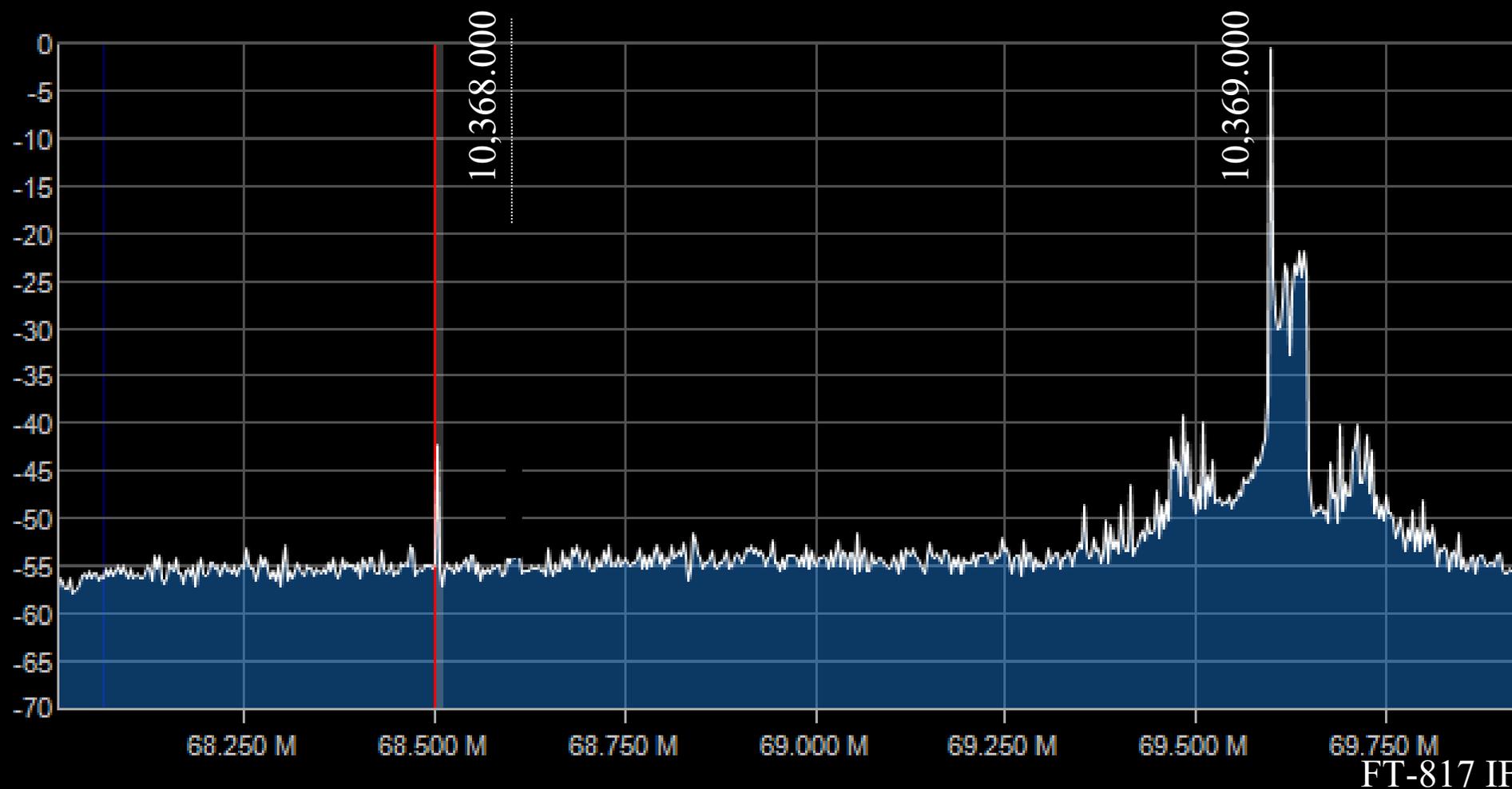
S-meter

S value is largest receive signal since last "S"

~20s listening periods, sampled every 10 ms

Measures total power in linear translator bandwidth

20 wpm		10 wpm
K6MG/R CM97BL S ##	Carrier 20s	K6MG/R CM97BL S ##

Records maximum signal during this time

Reset
Max

Benefits of Linear Translator

Facilitates home-to-home, allowing everyone to hear the conversation and more distant stations to participate

Check radio prior to contests, develop operating skills

Steadily improve RX and TX performance on your schedule, even for large dishes

Using the Linear Translator

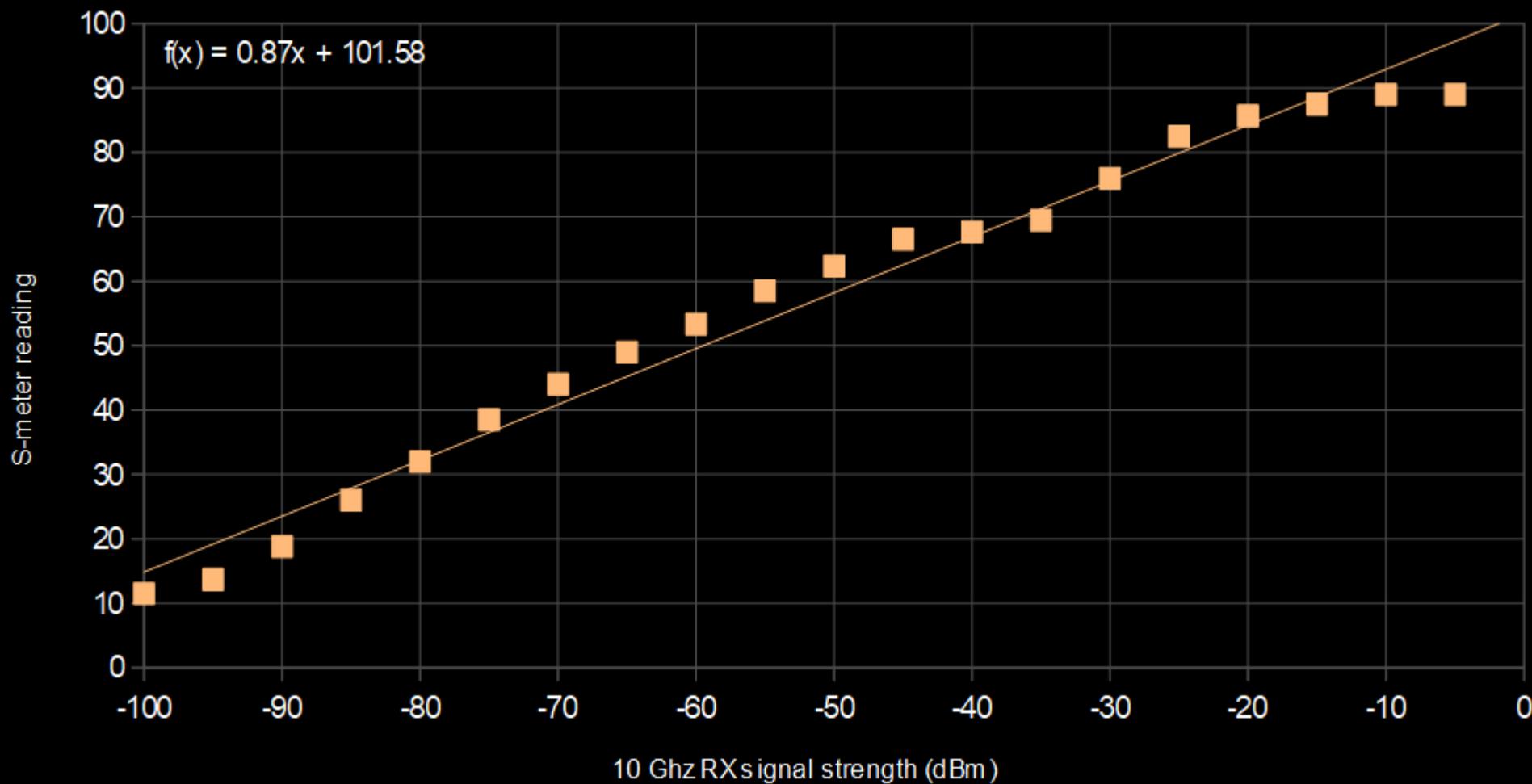Reduce transmit power if you have line of sight

In the FT-817, set up USB 600 kHz split TX/RX

2m IF? FM? use repeater setting

Coordinate on Baynet (145.390; 443.225; 927.8625) or
  NC9RS Sunol

Home-to-home 7pm the week before a meeting

S meter response
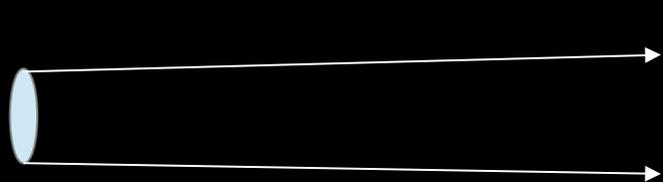
Using the Beacon

Set receiver frequency

Have line-of-sight path? Sets compass rose. CM97BL

Add 50 dB attenuation at feedhorn, don't cross
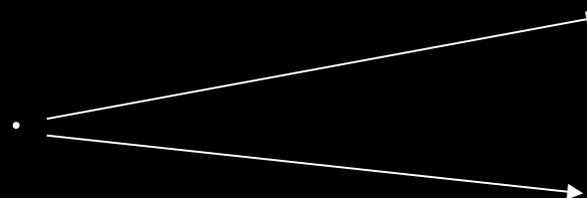   inversion layer, you can measure sensitivity and ERP

   For a 4' dish, test at ~4x Far Field = 384 m!

$$\text{Far Field} \geq \frac{2D^2}{\lambda}$$

Compare to last years' readings or friend's radio nearby

Near Field, gain not realized   Far Field & contest performance

24 GHz beacon

CW IDer N6NU

24,192.010

Power ~20 mW, ERP ~1W

Built by Frank, W6QI

10G Changes

Power-on mode is "active" rather than "standby"

10 GHz beacon now at 10,369.000

The brick is locked to a Milliren series 220 OCXO

10^{-8} stability -54C to 85C

LMX2571 synthesizer

S-meter, & dual morse code speed

Removed these modes: non-translate, low/high power, low/high gain. Now always translates high power.

Beacon control changed from PIC to Arduino; ID changed to K6MG

New Power Harness

Waveguide extensions for easier maintenance

Power amp changed to 0.5W

24G Changes

Beacon control changed from PIC to Arduino

ID changed to N6NU

Next Steps

Burnin 10G complete 8-June

Meet to work out hardware, Kapton, Paint

    June 15, Pete's house

Install on Mt Allison

    June 29 or 30