North Texas NTMS Microwave Society

W5HN/B EM13kf Denton Report
&
Update on the W5HN/B in EM12il

W5LUA, WA5TKU & KM5PO

November 13, 2026

NTMS Beacons

North Texas Microwave Society area Beacon Status updated January 12, 2026 by Al Ward W5LUA

Freq (MHz)	Call	Grid	Power	Antenna	Height above Ground	Status	Beacon	Frequency Stabilization	Freq Reference	Keying
50.073	W5HN/B	EM13sj	.5 W	Halo	180 ft	OFF THE AIR (1)	Home Brew	Crystal	12.51825 MHz	on/off
144.280.2	W5HN/B	EM13sj	1.5 W	Halo	180 ft	ON THE AIR	Home Brew	Crystal	12.0233 MHz	on/off
222.060	AA5C/B	EM13se	5 W	Folded Dipole	50 ft	ON THE AIR	Home Brew	PLL	16 MHz	on/off
432.370	N5PYK/B	DM93bm	50 W	Yagi towards DFW	70 ft	ON THE AIR		XCVR		on/off
432.380	W5HN/B	EM13kf	.8 W	Halo	280 ft	ON THE AIR	Home Brew	ADF4351	10 MHz OCXO	on/off
903.050	W5HN/B	EM13kf	9 W	Alford Slot	280 ft	ON THE AIR	Home Brew	N5AC PLL	10 MHz OCXO	on/off
1296.375	W5HN/B	EM13kf	3 W	Alford Slot	280 ft	ON THE AIR	Home Brew	N5AC PLL	10 MHz OCXO	on/off
2304.366	W5HN/B	EM13kf	4 W	Alford Slot	280 ft	OFF THE AIR	Home Brew	Crystal		FSK
3456.380	W5HN/B	EM13kf	250 mW	Alford Slot	280 ft	OFF THE AIR	Kuhne	Crystal X 27	128.014 MHz	FSK
3400.380	W5HN/B	EM13kf	250 mW	Alford Slot	280 ft	to be installed	Kuhne	ADF4351	125.94 MHz	on/off
5760.364	W5HN/B	EM13kf	158 mW	Alford Slot	280 ft	ON THE AIR	Kuhne	Crystal X 48	120.0079 MHz	FSK
10368.368	W5HN/B	EM13kf	2.5 W	Alford Slot	280 ft	ON THE AIR	Kuhne	Crystal X 96	108.00395 MHz	FSK
24192.380	AA5C/B	EM13sf	500 mW	16-slot WR42	75 ft	ON THE AIR	Home Brew	Kuhne PLL	10 MHz	on/off
24192.359	W5HN/B	EM13kf	1 W	10 slot Alford	280 ft	Ready to install	Wavelab Module	Kuhne PLL	10 MHz	RF Zero (2)
47088.359	W5HN/B	EM13kf	10 mW	W1GHZ Sector ant	280 ft	Ready to install	WA1MBA X4 mult	Kuhne PLL	10 MHz	RF Zero (2)

Actual 10 digit grid squares
EN13sj = EM13sj91mr
EM13se = EM13se55vi
DM93bm = DM93bm46su
EM13kf = EM13kf45pb
EM13sf= EM13sf89tb

Notes
(1) Waiting for a tower climb to put antenna back up at 60ft
(2) CW ID plus Q65-60C

Beacons highlighted in Yellow are in Denton

Special Thanks

- Special thanks to the (DCARA) Denton County Amateur Radio Association for access to the top of Stark Hall at TWU for maintaining our NTMS Beacons
- The Denton location houses beacons from 432 MHz through 10 GHz
- Our liaisons have been both Gerald WB5NZV and Andrew KE5GDB
- Thank you both!

Our Goals for this Visit

- Swap out the non GPS locked 10 MHz reference for the Spectracom GPS locked 10 MHz reference
- Verify power output of the 432/903,1296 MHz Beacons
- Pull the 2,3,5,10 GHz beacon box and bring home for repair
- Assess the layout for a potential new beacon box for 10/24 GHz and above

Al & Wes

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Where do we start!

It had been a while since we have been up in the penthouse

Al & Wes & Our Beacon Rack

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432 MHz Beacon
built by AA5C

Close up



1296 & 903 MHz beacon built in 2000 by WW2R
Modified in 2017 by W5LUA for 903 MHz

Datum 10 MHz Reference and 24V PS

Beacon Power Supply

Microwave Beacon Power Supply

Our patch panel in the “shack”

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Power Output

- Measured Power Output
- 432 MHz +29.6dBm = 900 mW
- 903 MHz +23.4 dBm = 219 mW
- 1296 MHz +33.3 dBm = 2.4W
- From 10 years ago
- 432 was 800 mW, 903 was 9W, 1296 was 3W
- Need to consider pulling the 903 MHz.

VNA

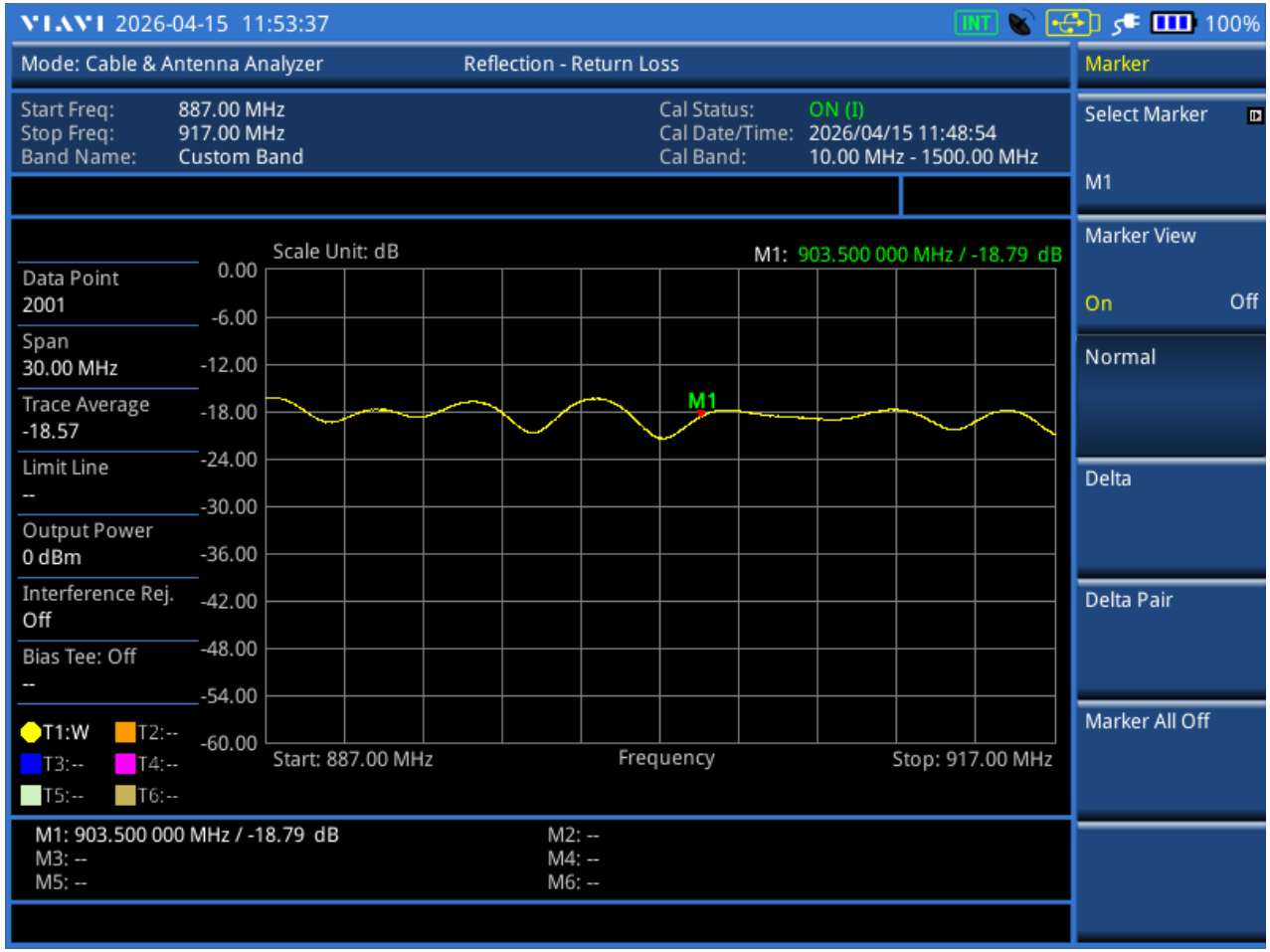


Andrew KE5GDB brought along his portable VNA which allowed us to measure the return loss of the 432, 903, 1296 MHz beacon antennas

Results in the following slides

902/903 MHz Slot Antenna

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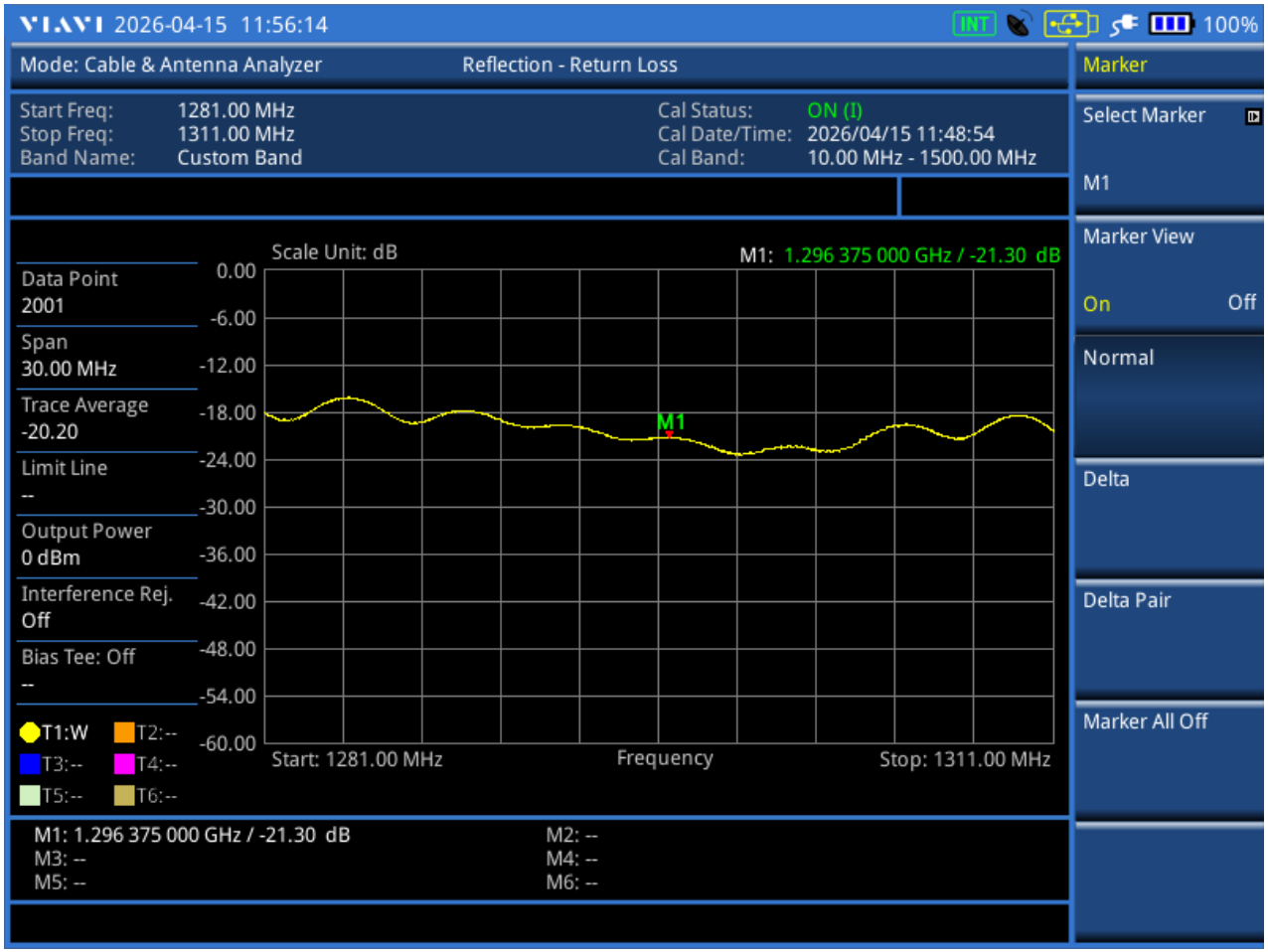


S11 ~ -19 dB
VSWR ~1.25:1

This antenna was originally designed for operation at 902.380 MHz and is now in use at 903.050 MHz

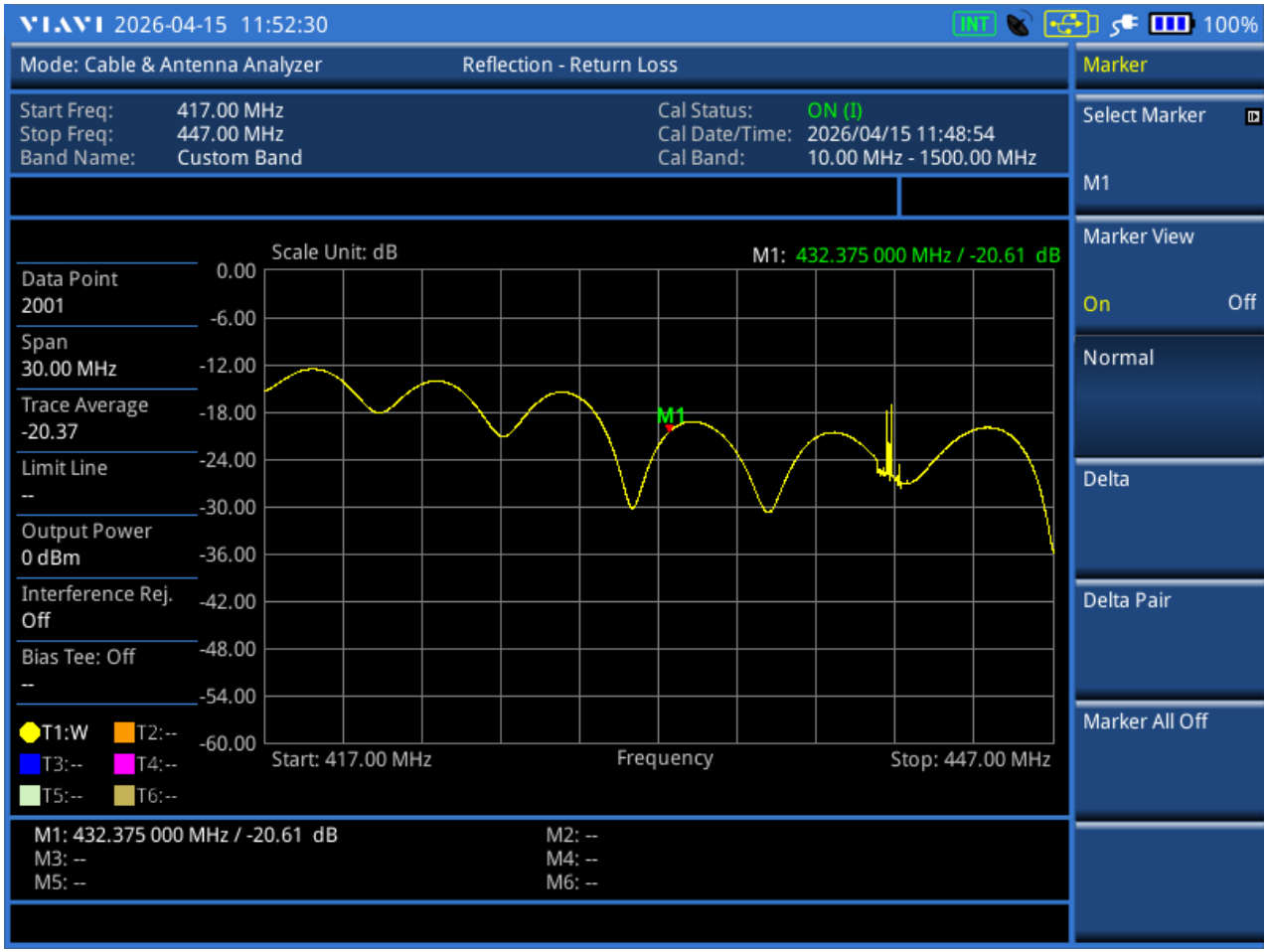
1296 MHz

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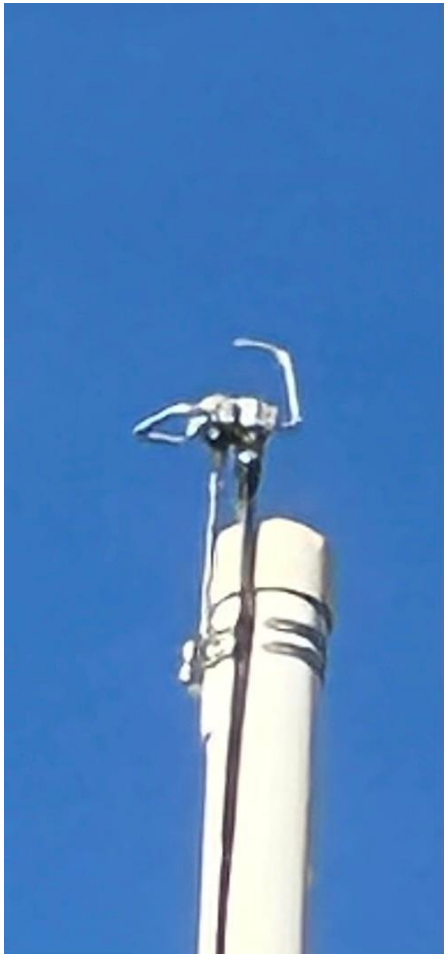
S11 = -21.3 dB
VSWR ~1.19:1

432 MHz M2 Halo

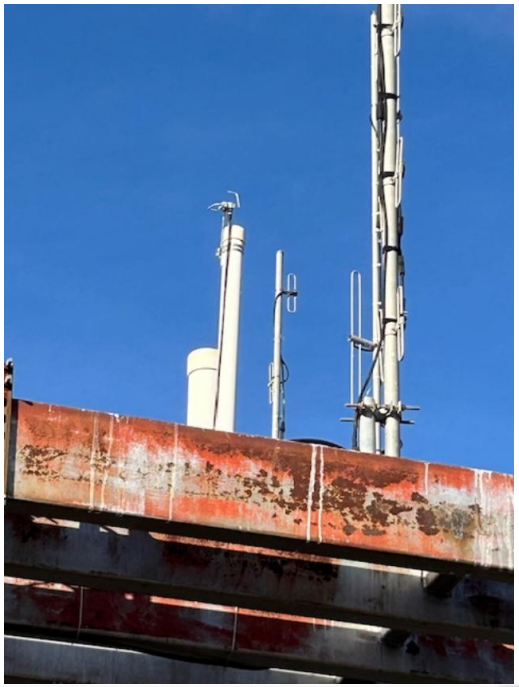


S11 = -20.6 dB
VSWR ~1.2:1

Modified 432 Antenna



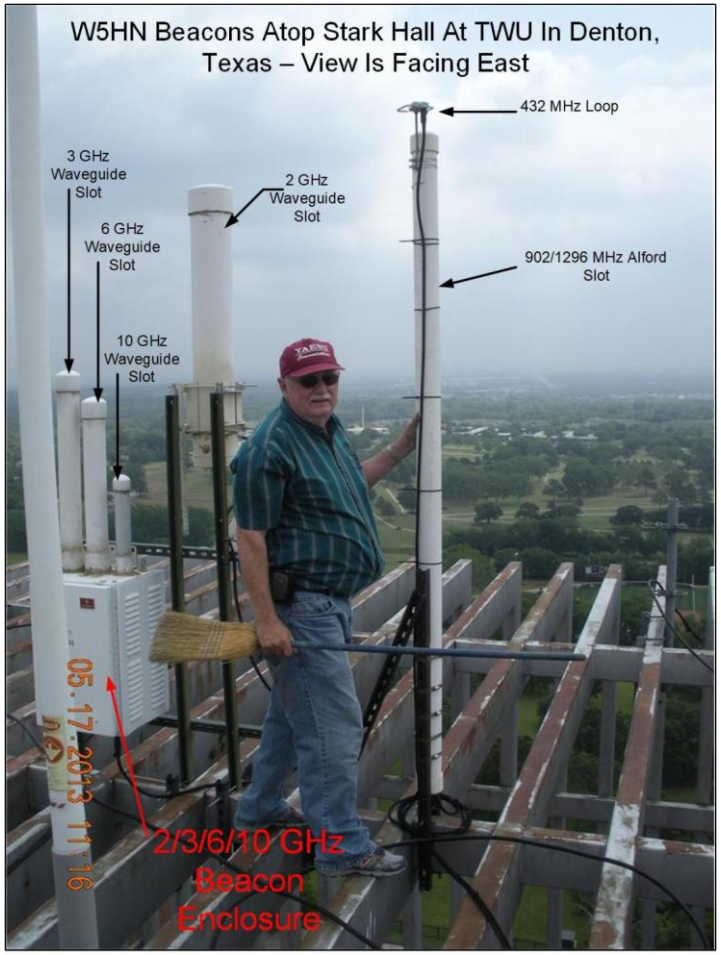
Despite the modification, the 432 MHz antenna still had a decent return loss! The M2 432 MHz Halo is attached to the PVC tubing that houses the 903/1296 MHz slot antennas



We do sit among other VHF and UHF repeater systems!

View at 280 ft Looking East Towards McKinney

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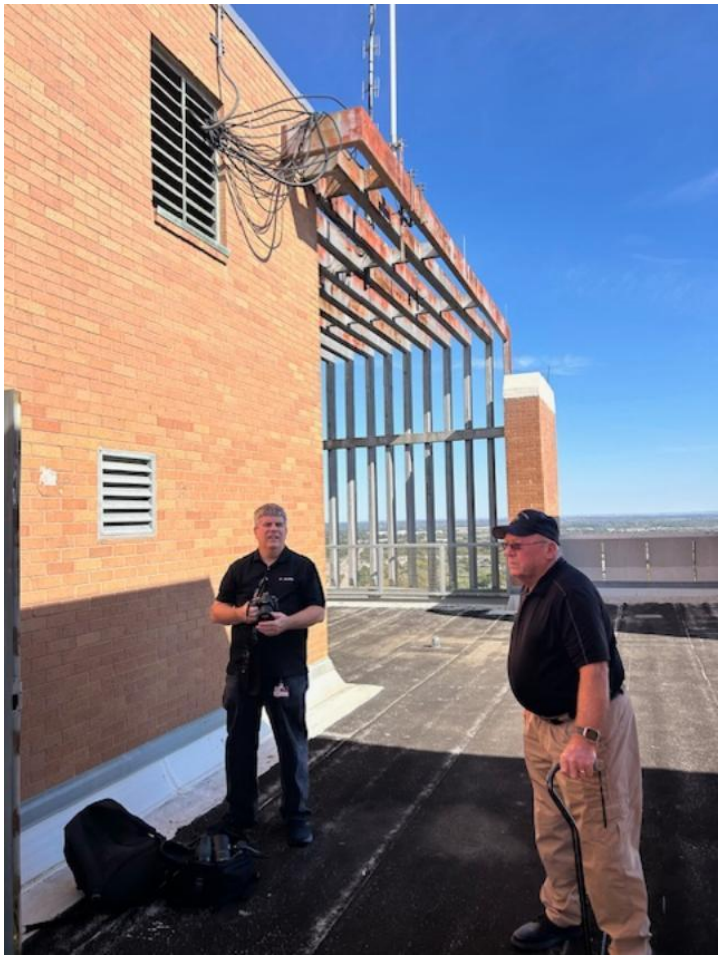


Note the broom!

It has been used in the past to “adjust” the 432 antenna

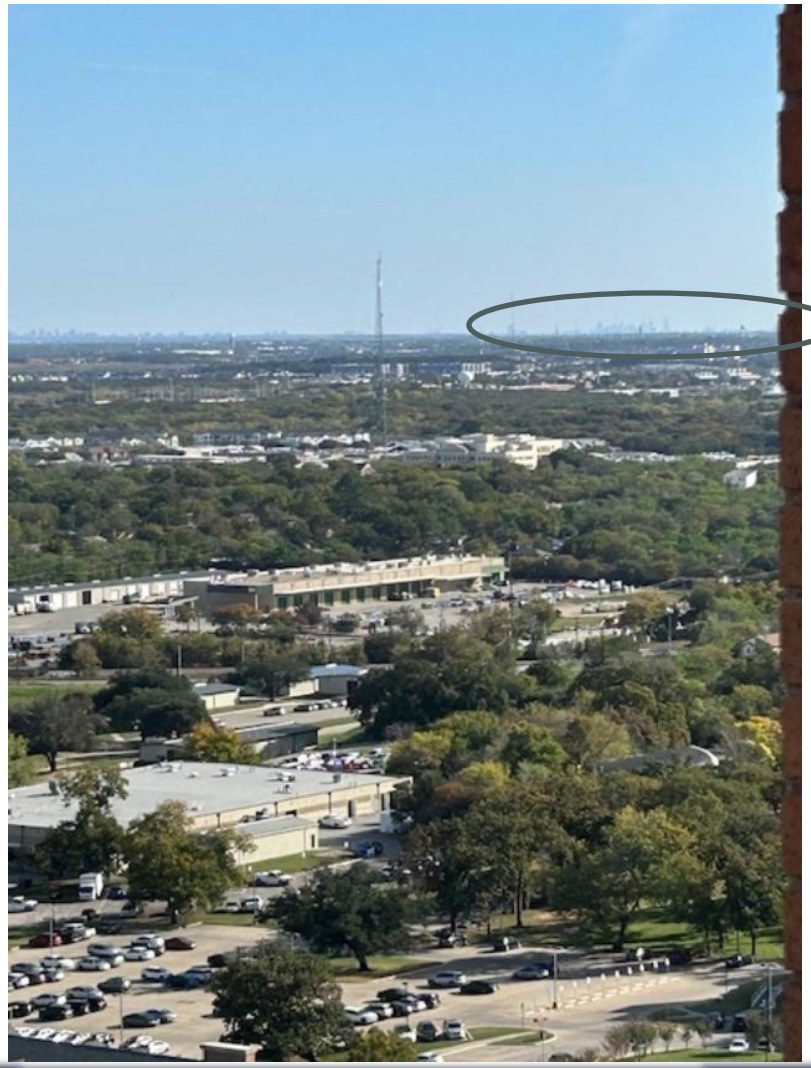
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Our IT Escort Andrew



Gerald WB5NZV from the DCARA

Dallas Skyline @ 280ft



Staircase to the Antennas

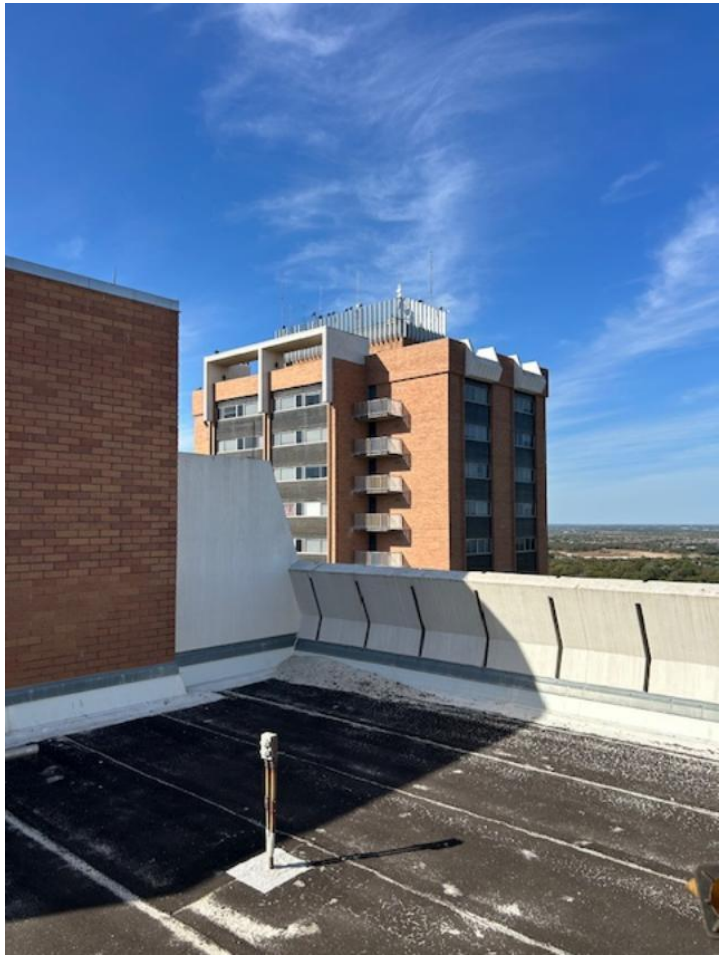
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Our IT Guy

View Towards Guinn Hall

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Guinn Hall is the neighboring dorm that is slightly higher than where our beacons are located

Guinn Hall is home of the 146.32/92 Repeater and other DCARA repeaters

Vultures on Guinn Hall!

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Remote Capability

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- Thanks to Andrew we are able to remotely interrogate our Spectracom 10 MHz unit form several home locations
- This allows us to monitor present conditions including alarm status and satellite status

Spectracom "Stat" Command

- OSCILLATOR STATUS= LOCKED
  GPS SIGNAL= QUALIFIED
  INTERNAL TEMP= +43.0 DEGREES C COOLING FAN= OFF
  ALARM RELAYS: MAJOR= OFF MINOR= OFF
  ACTIVE ALARMS: MINOR
  OUTPUT FAULT

I have seen "Output Fault" on my unit at home and it has to do with which port is being used as an output port and how they are terminated.

Spectracom “GSS”

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- TRACKING 10 SATELLITES
  GPS STATE= POS-HOLD DOP= 00.0
  LATITUDE= N 33 13 45.989 LONGITUDE= W 097 07 39.989 HEIGHT= +00260 METERS
  QUALITY= PASSED

CHAN	VID	MODE	STREN	STAT
01	07	08	041	08A0
02	30	08	051	08A0
03	06	08	046	08A0
04	20	08	045	08A0
05	14	08	050	08A1
06	00	00	000	0000
07	02	08	043	08A0
08	22	08	053	08A0
09	17	08	052	08A0
10	01	08	045	08A0
11	19	08	046	08A1
12	00	00	000	0000

According to manual strength above 40 is good

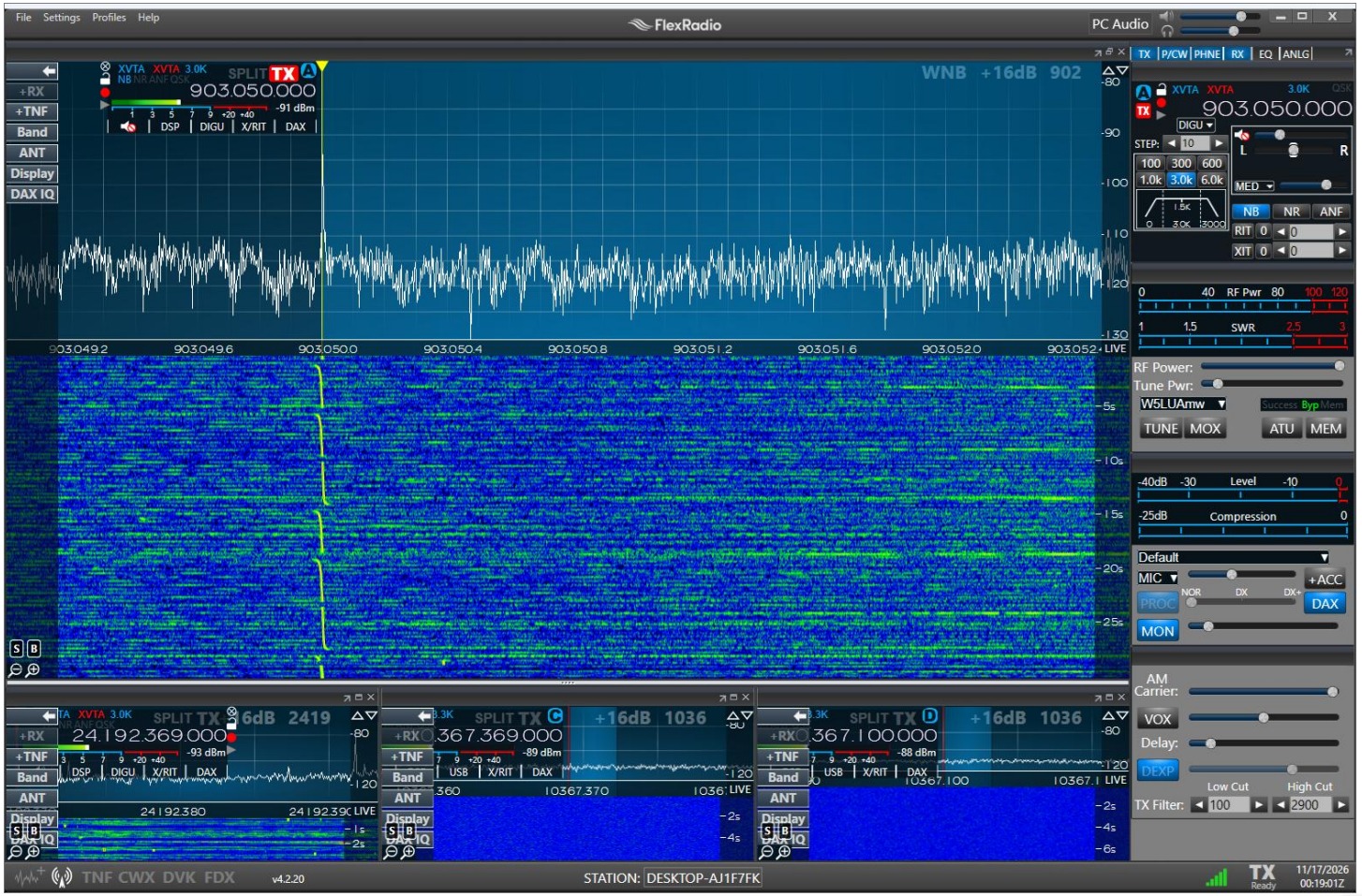
Issues to be solved on 432/903/1296 MHz

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- I forgot to change the 903/1296 MHz beacon from key down CW to Message mode after I was done measuring power output. Andrew will contact his IT guy to throw the little switch.
- The 1296 MHz still has 10 or 20 Hz of shift. Not sure why since the Spectracom is supposedly “locked”
- The 903 MHz has a funny behavior as well
- Verify the exact cause of the “output” error message on the Spectracom.
- Consider pulling the 903/1296 MHz beacon and checking power level on 903 MHz
- Correct the 432 MHz Halo configuration

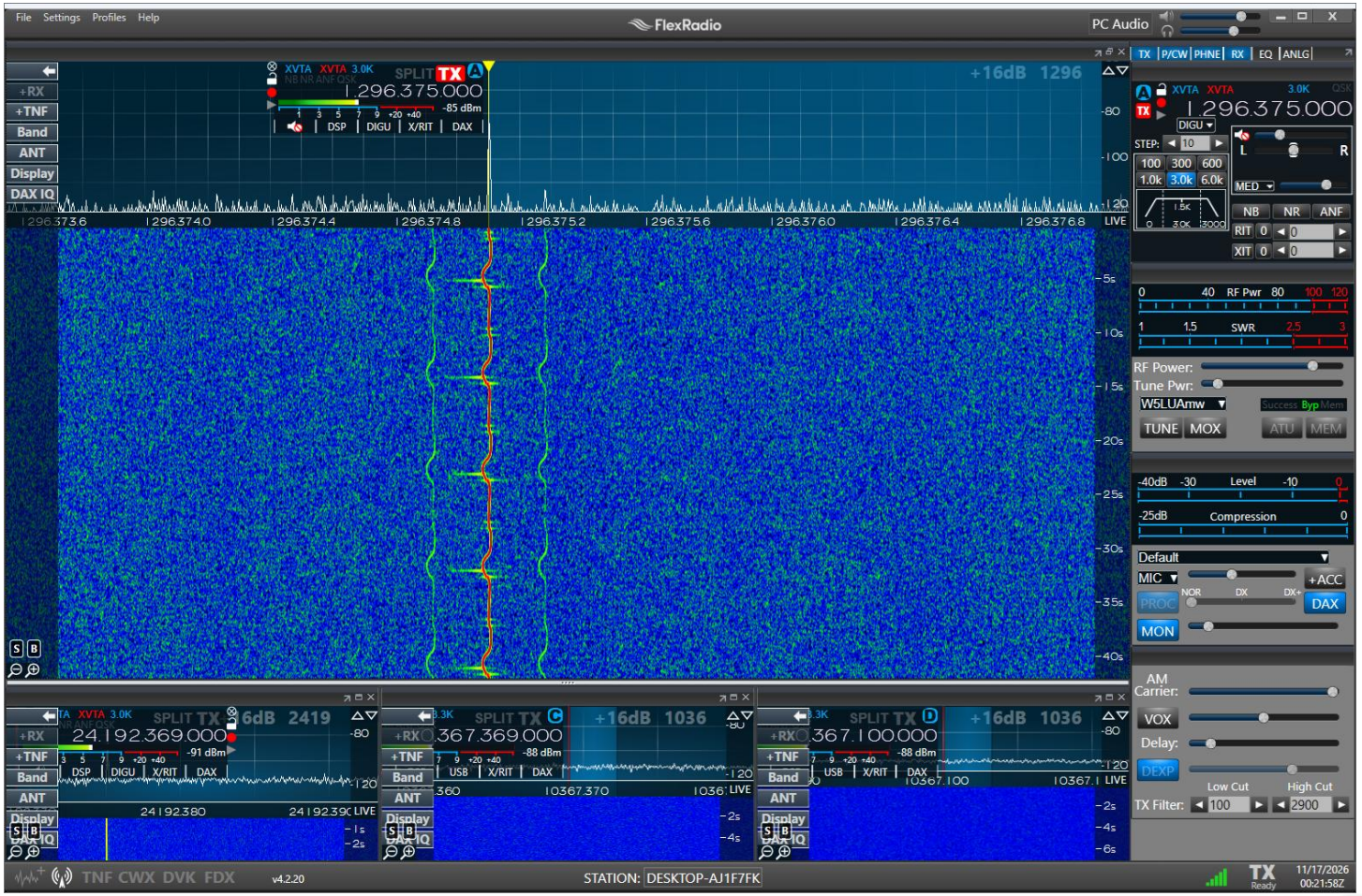
903.050 MHz Beacon

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1296.375 MHz Beacon

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Suggestions?

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- Remove 3 dB attenuator at output of Spectracom 10 MHz unit
- Try a variable attenuator to vary 10 MHz level on 903/1296 MHz beacon box.
- Need to be able to monitor 903/1296 while making changes
- Other thoughts?

2 to 10 GHz W5HN/B Beacon Box

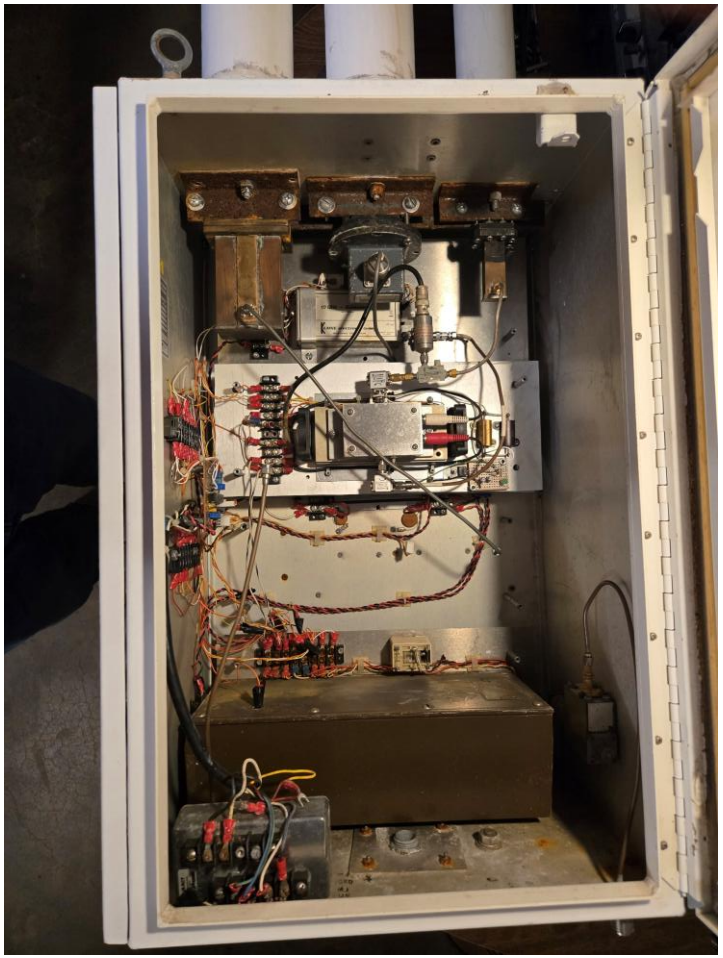
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- 2304 MHz has quit
- 3456 MHz was previously removed
- 3400 MHz has to be installed
- 5760 MHz still working but is stuck in a key down mode. No ID
- 10368 MHz still working but is stuck in a key down mode. No ID
- Beacon box removed and at W5LUA for analysis

Inside Beacon Box

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Keyer common to all beacons



Kuhne 10368 MHz Beacon

Kuhne 5760 MHz Beacon beneath DEMI 3 W PA

Space for 3400 MHz Beacon

2304 MHz Beacon

Beacon Box weighs 80 lbs.

Next Visit in December

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- Verify 903/1296 MHz in Message mode
- Verify Spectracom error concerns
- Install 12V power supply specifically for external devices like the DEMI 10-4 GPS 10 MHz power splitter. Put on separate 110 vac outlet if possible
- Document all wiring

EM12IL W5HN/B

- Currently transmitting on 10368.370, 24192.370, 47088.360
- Odd minute = CW/Carrier Even Minute = Q65-60D
- Recent outage was caused by service provider Hologram experiencing disruption from cyber attack.
- Maintenance over the next few weeks:
  - Remove 47 GHz RF deck, build separate 47 GHz beacon as a mirror of the 47 GHz beacon handed off to Graham W5ISP 5 months ago.
  - Make 24 GHz unit (Wavelab + 5 w PA) a transverter controlled from the ground.
  - Install 12” dish for 24 GHz. Transverter will be used to peak on W5LUA/WB5ZDP.
  - Install power divider and second 3 watt DEMI 10 GHz PA to feed new 60 cm dish which will initially be pointed South.
  - Move beacon from 35-foot tower to 55-foot tower.

Summary

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- Making Progress!
- Questions