North Texas NTMS Microwave Society

Welcome to The North Texas Microwave Society Cowtown Jan 19, 2019

- W5LUA – Introduction & Equipment/Antennas/Activity
- N5BRG – Software Defined Radios & GNU Radio
- Question and Answer

The North Texas Microwave Society was formed in 1986

North Texas NTMS Microwave Society

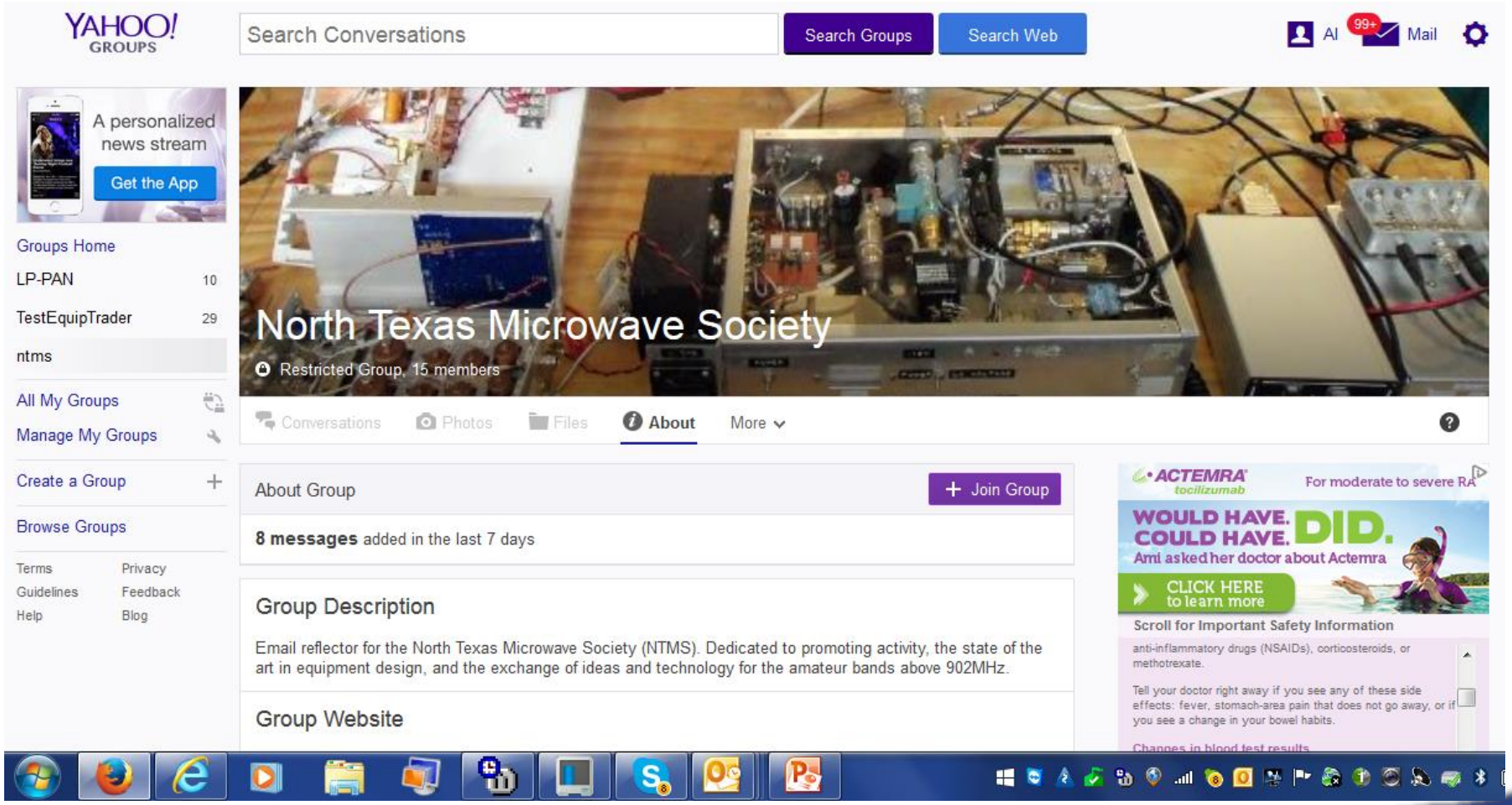
Dedicated to Promoting Activity, the State of the Art in Equipment Design, and the Exchange of Ideas and Technology for the Amateur Bands Above 902 MHz

President – Al Ward W5LUA
Vice President – Kent Britain WA5VJB
Secretary – Eric Haskell KC4YOE
Treasurer - Wes Atchison WA5TKU
Web – Dave McCoy N5RIJ

NTMS web page www.ntms.org

NTMS Yahoo Group

North Texas NTMS Microwave Society



Calling Frequencies for Weak Signal Work on CW and SSB and EME

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Band	Weak Signal Calling Frequency
902-928 MHz	902.1 MHz
1240-1300 MHz	1296.1 MHz
2300-2310 MHz	2304.1 MHz
2390-2450 MHz	2400.1 MHz (used only for EME)
3300-3500 MHz	3456.1 MHz (3400.1 MHz used for EME
5650-5925 MHz	5760.1 MHz
10.0-10.5 GHz	10368.1 MHz (10450.1 MHz also used for EME)
24.0-24.25 GHz	24192.1 MHz (24048.1 MHz used for EME)
47.0-47.2 GHz	47088.1 MHz
76 - 81.0 GHz	78192.1 MHz and 76032.1 MHz
122.25 - 123 GHz	
134 - 141 GHz	
241-250 GHz	
All above 275 GHz	

NTMS Activities

- Monthly meetings with informal “bull and swap” session followed by technical presentations
- Noise figure and network analyzer test sessions at meetings or at members houses
- Antenna range for measuring antenna gain
- Equipment Construction
- Contesting
- Social events
- Sponsor Microwave Update conference

2019 NTMS Meeting Schedule

North Texas NTMS Microwave Society

- Church February 2nd
- Church March 2nd
- Belton April 6th
- Church April 13th
- Church May 4th
- Hamcom June 8th
- Church July 6th
- Church August 3rd
- Church September 7th
- MUD October 4th & 5th
- Church November 2nd
- Church December 7th

We meet at the St Barnabas Presbyterian Church
1220 W. Beltline Rd, Richardson, TX 75080
From Noon to 4 PM

Weekly Lunches

- East Side - Tuesday 11:30AM
  Texas SmokeHouse BBQ
  800 E. Arapaho Rd, Suite #101
  Richardson, TX 75081
- West Side – Wednesday 11:30AM
  Riscky's BBQ
  Ft. Worth

North Texas Beacons

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North Texas Microwave Society area Beacon Status updated January 16, 2019								
Outside temp = 55F								
Please send updates to w5lua@sbcglobal.net								
Freq (MHz)	Call	Grid	Power Output	Antenna	Height above Ground	Status	GPS Locked ?	Keying
50.072.7	W5HN/B	EM13sj	.5 W	Halo	180 ft	ON THE AIR	NO	on/off
144.280.2	W5HN/B	EM13sj	1.5 W	Halo	180 ft	ON THE AIR	NO	on/off
222.060	AA5C/B	EM13se	8 W	Folded Dipole	53 ft	ON THE AIR	NO	on/off
432.370	N5PYK/B	DM93bm	50 W	Yagi towards DFW	70 ft	ON THE AIR	NO	on/off
432.380	W5HN/B	EM13kf	.8 W	Halo	280 ft	ON THE AIR	NO	on/off
903.050	W5HN/B	EM13kf	9 W	Alford Slot	280 ft	ON THE AIR	NO	on/off
1296.375	W5HN/B	EM13kf	3 W	Alford Slot	280 ft	ON THE AIR	NO	on/off
2304.366	W5HN/B	EM13kf	4 W	Alford Slot	280 ft	ON THE AIR	NO	FSK
3456.382.5	W5HN/B	EM13kf	250 mW	Alford Slot	280 ft	ON THE AIR	NO	FSK
5760.364	W5HN/B	EM13kf	158 mW	Alford Slot	280 ft	ON THE AIR	NO	FSK
10368.368	W5HN/B	EM13kf	2.5 W	Alford Slot	280 ft	ON THE AIR	NO	FSK
24192.308	AA5C/B	EM13sf	500 mW	16-slot WR42	75 ft	ON THE AIR	NO	on/off
47088.300	Under construction							

NTMS Sunday Night NET

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- Local to DFW gathering on 144.260 MHz USB starting at 8PM
- Generally run by Ross K5ZSJ from the Carrollton area
- Very informal

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Meeting and Tune-up Party at N5BRG's QTH

November 17 Gathering Testing - Show and Tell - Build

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10 GHz Antenna Range

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St. Barnabas Church
parking lot antenna range.

Kent, WA5VJB and Jim, WA5JAT

Jim, K0MHC and Jim, WA5JAT

November 17 Gathering
Testing - Show and Tell - Build

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Microwave Propagation

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- Terrestrial weak signal CW/SSB/WSJT modes – work up to 1000 miles plus under the right tropospheric conditions
- Rain & Snow Scatter CW/FM – work hundreds of miles
- EME (Earth – Moon - Earth) CW/SSB/WSJT Modes

Getting on Microwave

- Conventional method is to use your favorite VHF Multiband SSB-CW Transceiver and connect to a Transverter.
- A transverter uses a local oscillator and mixers to upconvert from an IF like 2m to an RF frequency like 10368 MHz on transmit and the reciprocal on receive.
- As an example an LO of 10224 MHz can be used to mix with 144 MHz to achieve 10368 MHz
- Now to build or buy?

Various 10 GHz surplus items that could be used to build a transverter

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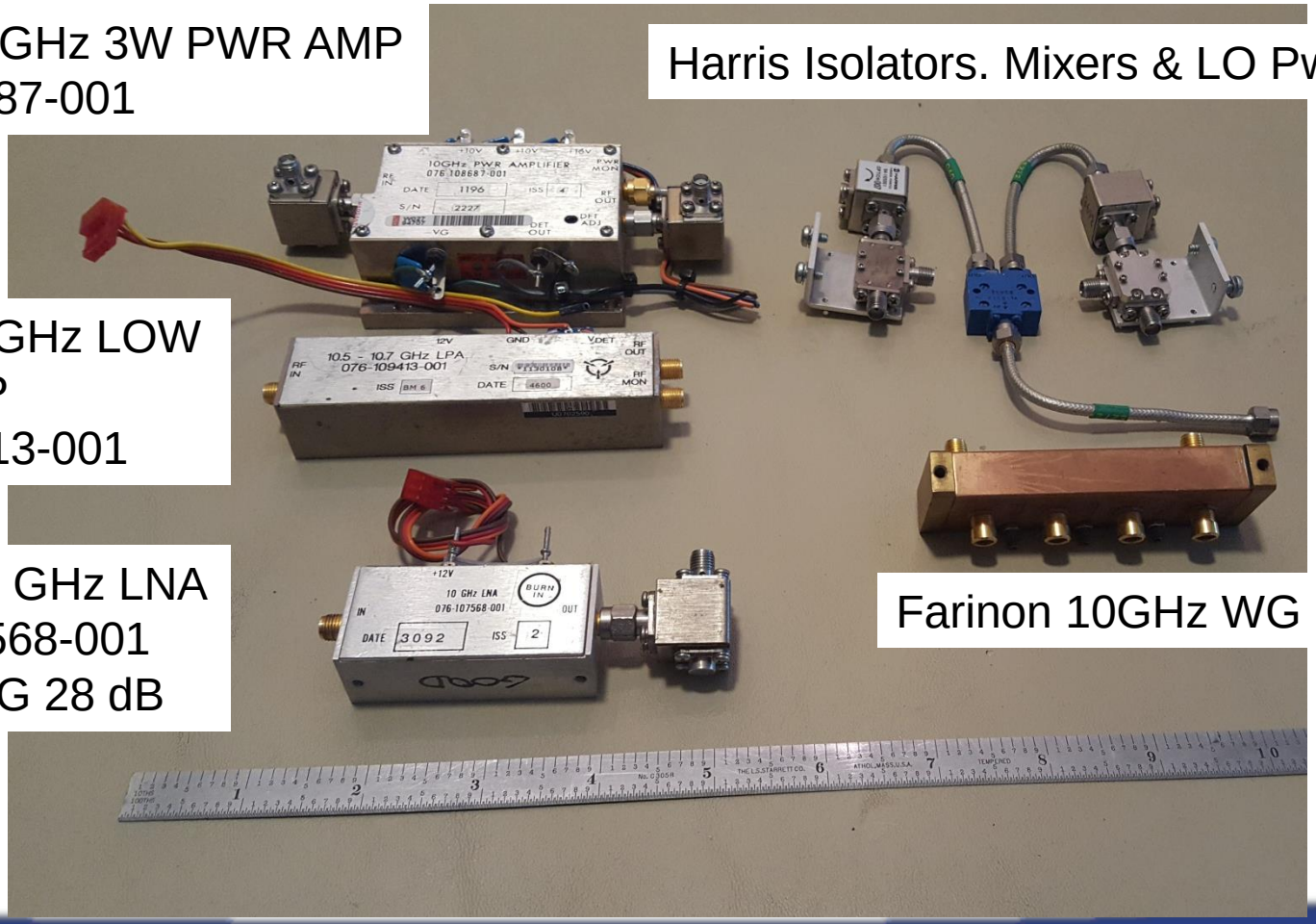
Harris 10 GHz 3W PWR AMP
076-108687-001

Harris Isolators. Mixers & LO Pwr Divider



Harris 10 GHz LOW
PWR AMP
076-109413-001

Harris 10 GHz LNA
076-107568-001
NF 2dB, G 28 dB

Farinon 10GHz WG Filter

www.w1ghz.org

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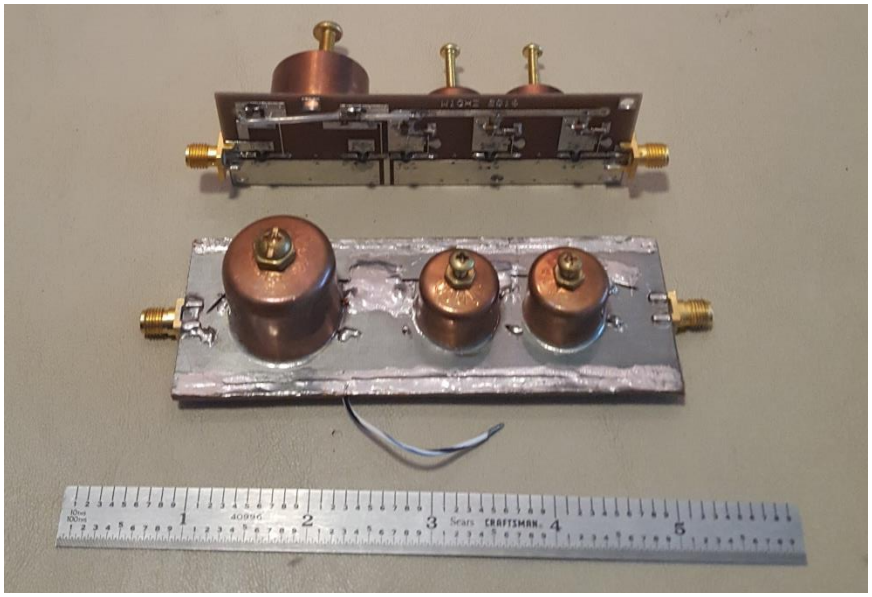
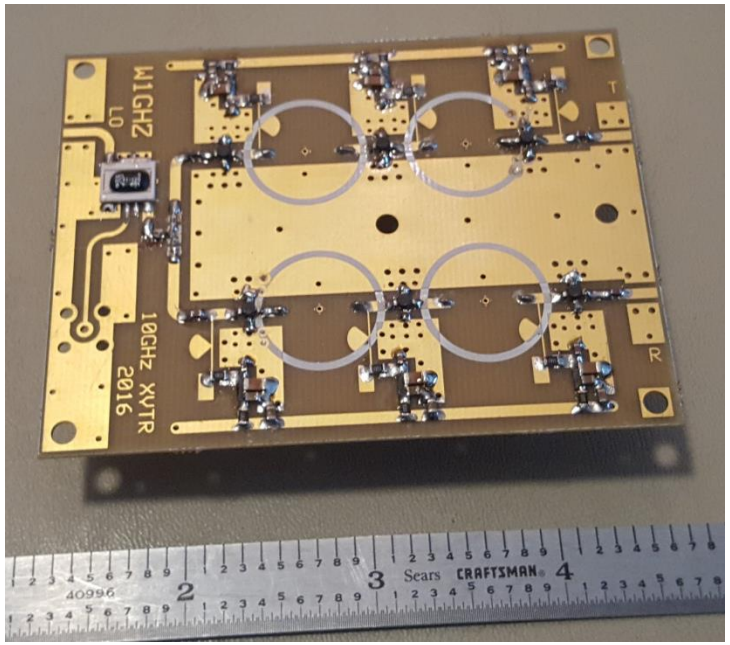
Paul Wade makes numerous circuit boards for many microwave projects.
Here are 2 PCBs for 10 GHz



X9 Multiplier
Fin=1136 MHz Fout=10224 MHz



10 GHz Transverter 10368 MHz to 144 MHz
LO in = 10224 MHz

Local Oscillator Boards

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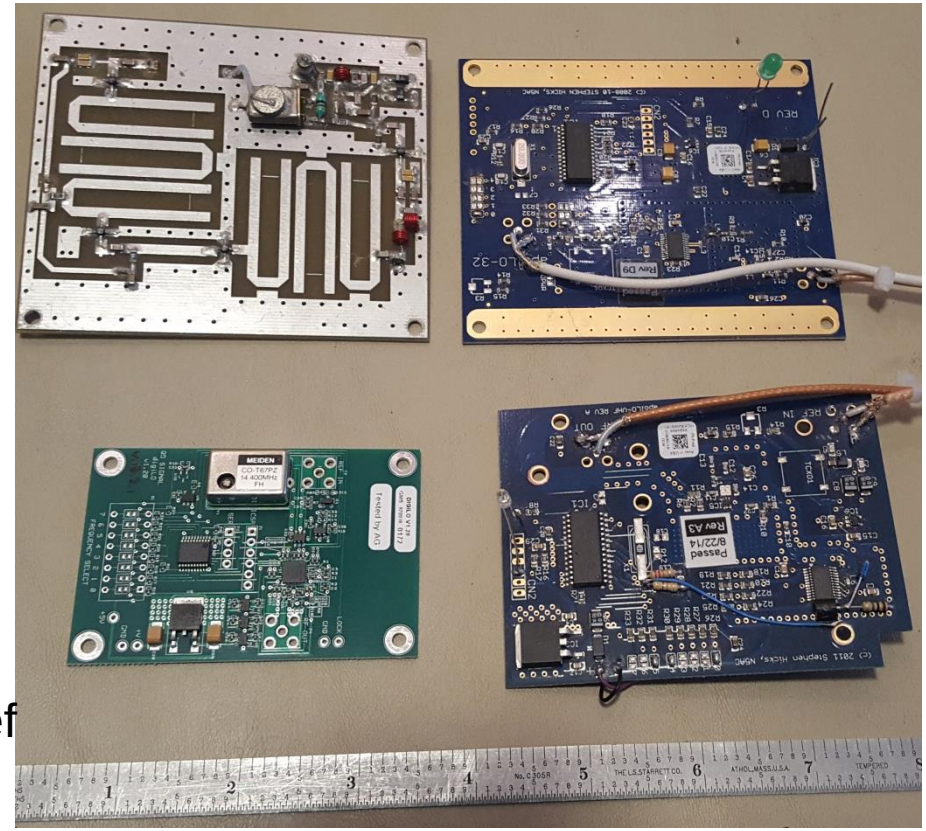
DEMI Micro LO
1080-1136 MHz
Crystal Controlled



DEMI N5AC ApolLO
900-1300 MHz
PLL 10 MHz Ref

DEMI/Q5Signal
DigiLO PLL
23.5MHz - 6GHz
Internal Ref or
External10 MHz Ref

DEMI N5AC VHF ApolLO
70-410 MHz
PLL 10 MHz Ref

ADF5355 PLL Synthesizer 54 MHz to 13.6 GHz

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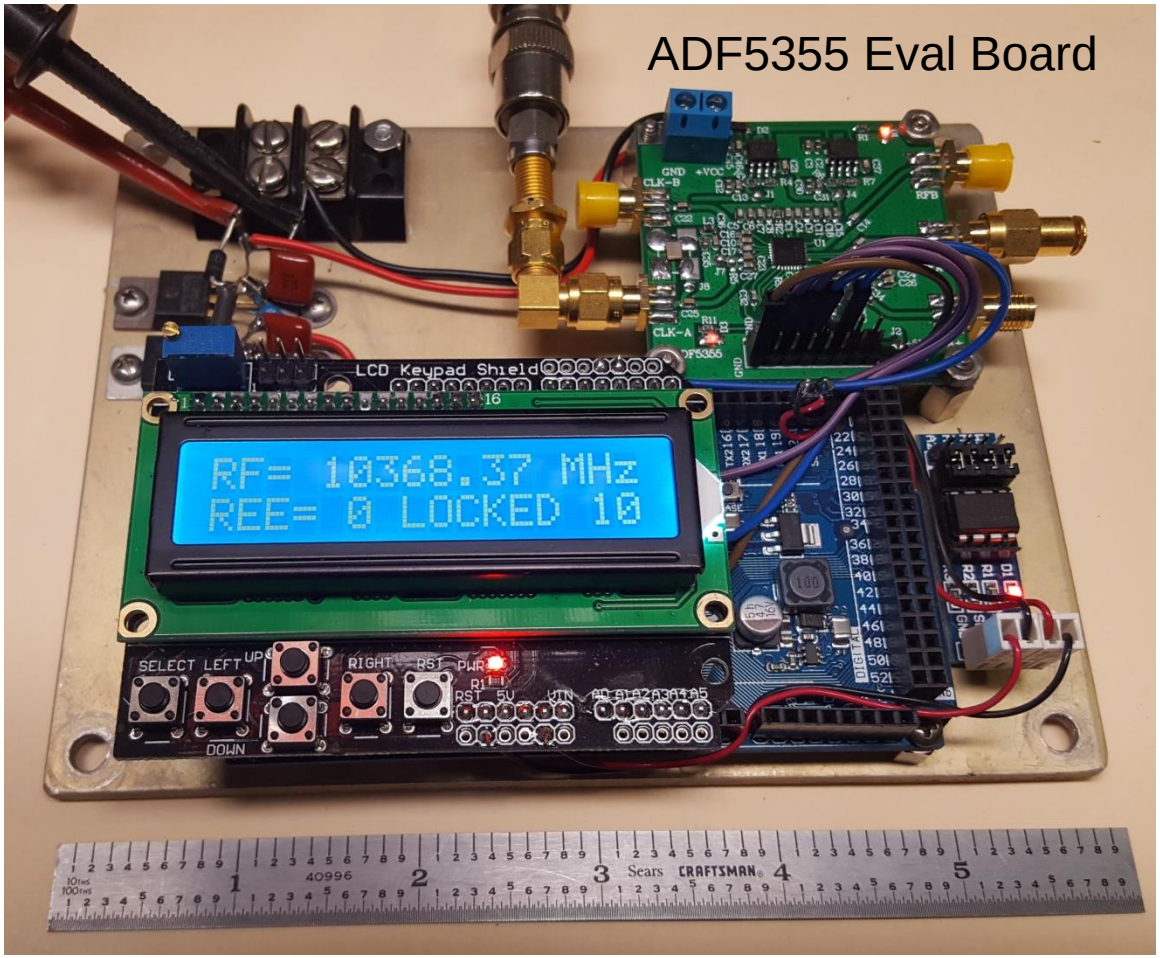

Presentation on
www.ntms.org
-Knowledge Base
-At the meetings
-September 2017
“ADF-4351 and ADF5355 Update by Greg McIntire AA5C

Arduino Due & LCD Shield & EEProm Board

Built by W5LUA

Most Popular Commercial XVTRs

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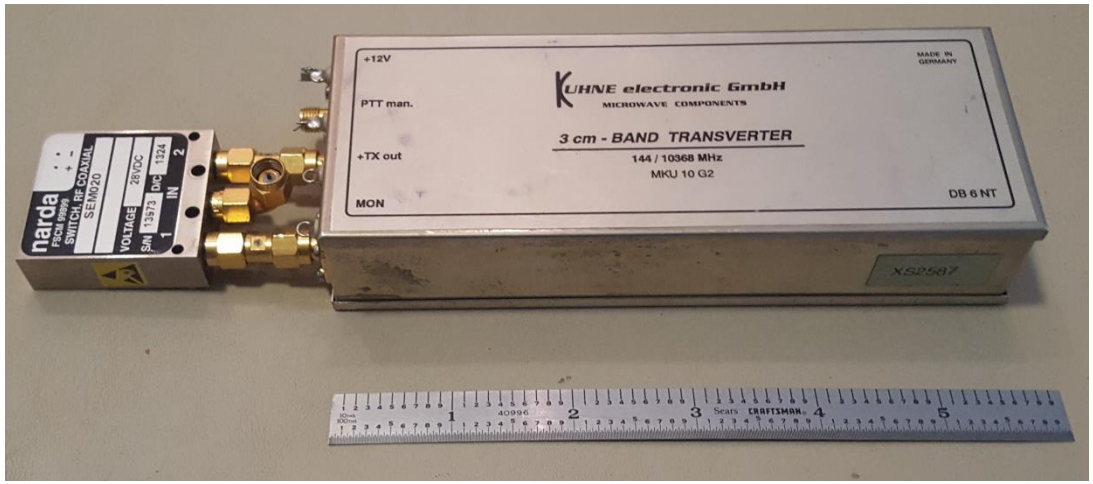
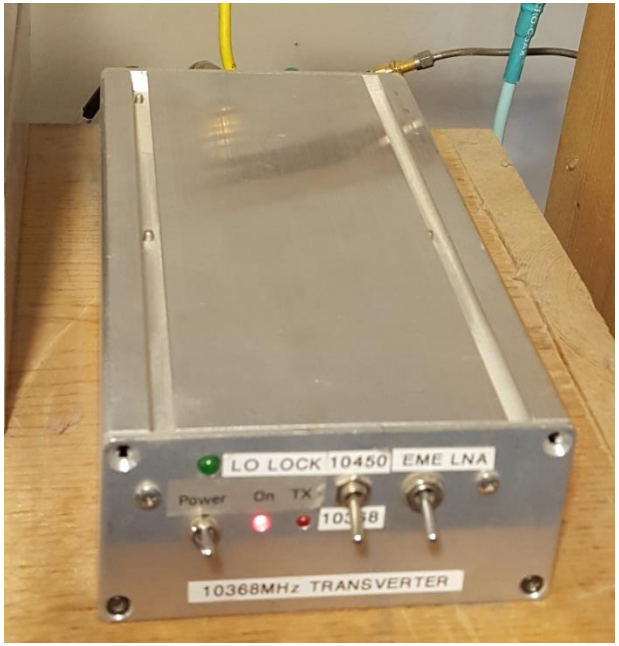
DB6NT



https://shop.kuhne-electronic.com/kuhne/en/shop/

DEMI



https://www.downeastmicrowave.com/

Others as well…

Antenna options for 10 GHz

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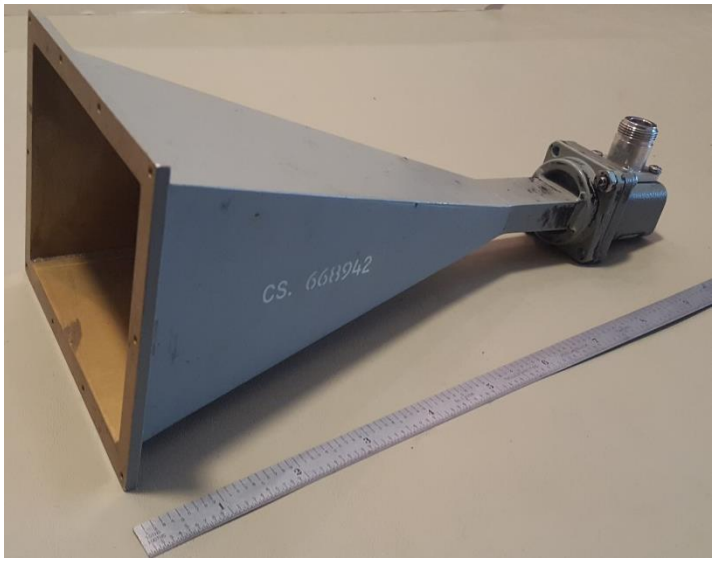

4.3” X 2.3” Horn
G = 20 dBi
3dB Beamwidth ~ 17 deg

8” Offset Fed Dish
G = 25 dBi
3dB Beamwidth ~ 9 deg

18” Offset Fed Dish
G = 32 dBi
3dB Beamwidth ~ 4.3 deg

Roving on 10 GHz

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- The major event for the NTMS is to participate in the ARRL 10 GHz and Up Contest in both August and September
- Some stations operate from home and a number of stations are rovers.
- The object of the contest is to work as many stations in as many 6 digit grid squares as possible. Rovers are required to move at least 16km (10 miles) before a station is reworked. Every contact has a distance multiplier in km. The sum of the distance multiplier plus 100 points for each unique call sign provides the total score.
- See Feb 2019 QST for results. Full report will be at www.arrl.org

WA5YWC (sk) in 2019 ARRL 10GHz Contest

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Operating position in cab of truck

2 ft prime focus dish in bed of truck

November 21, 1944 – October 21, 2018

W5HN

WA5YWC & K8ZR Sept 2019

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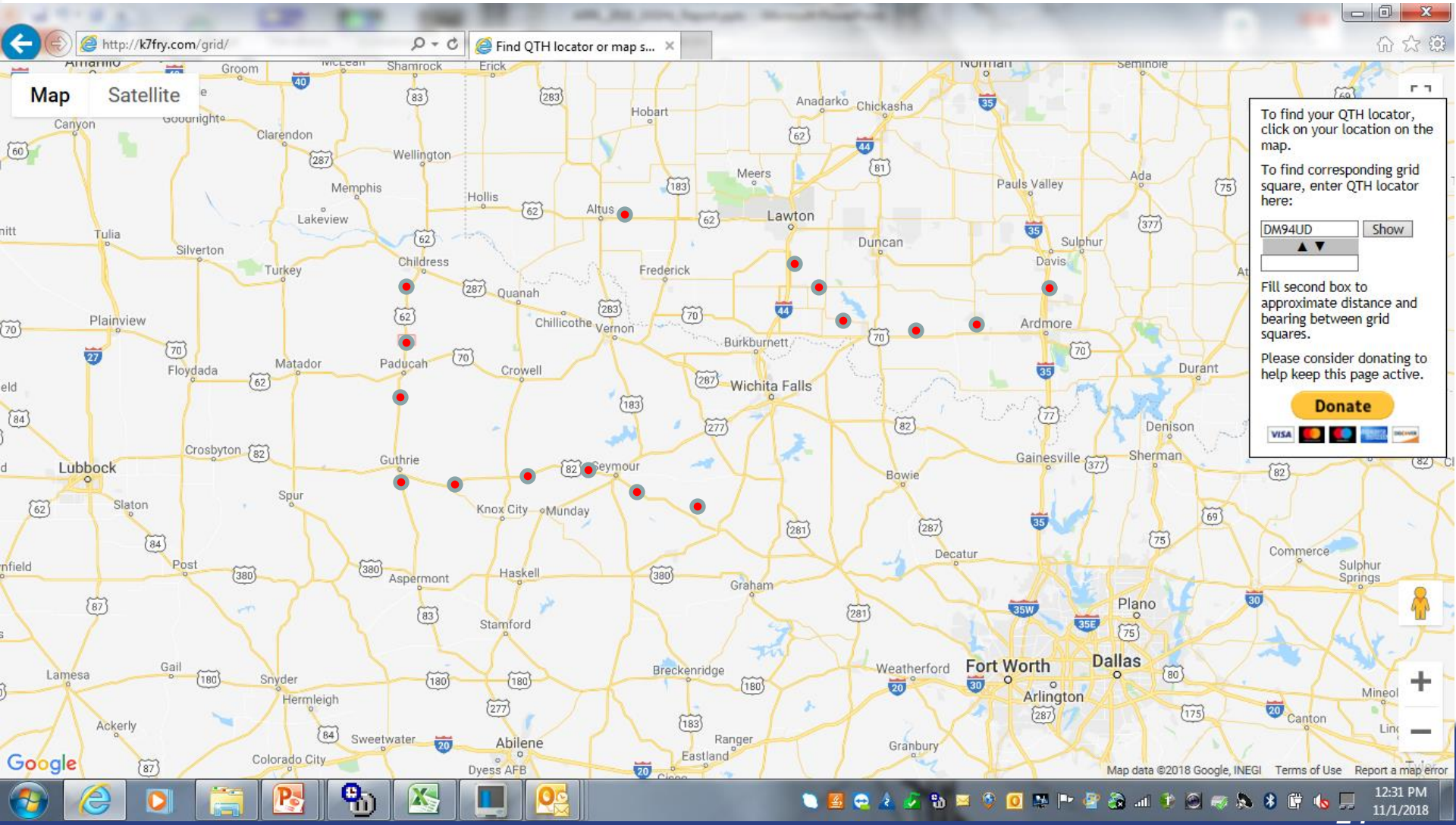

K8ZR/R 24 GHz EM24tq
Sept 16, 2017

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K8ZR/R 10 GHz EM24qq
Sept 16, 2017

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W5LUA Summary for both August and September 2018

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- I worked a total of 13 grids EM14, EM13, EM12, EM11, EM10, EM24, EM23, EM22, EM04, EM03, DM94, DM93, EM17
- I had 83 QSOs with 18 unique call signs on 10 GHz, and 3 QSOs on 24 GHz and 3 QSOs on 47 GHz
- Stations active on 10 GHz included WA5VJB, WA5YWC, K8ZR, WQ5S, WA5TKU, AA5C, AA5AM, K5LLL, W5AFY, N5BRG, K5SOP, W5RLG, AG4V, K5TRA, NM5M, AF5DM, KA5BOU, N0OY
- I worked WA5YWC 27 times, K8ZR 19 times, WQ5S 15 times, WA5TKU 7 times
- My best 10 GHz DX was 523 km or 324 miles to N0OY/R in EM17dr
- Best DX on 24 & 47 GHz was 24 km with AA5C and AA5AM
- Total score was 16937 points, my best ever
- Next year will be tough without Bob…..

Initial AA5AM 10 GHz Success

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Double Balanced Mixer and 8 inch offset fed dish
W5LUA worked at 13 miles
Scott also heard W5RLG at 68 miles
And N5WCO at 56 miles
Scott has since improved his station to a larger dish plus 1watt PA and LNA

K5TRA's Attic 10 GHz Antenna

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W5LUA worked K5TRA on 10 GHz at a distance of over 200 miles

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Flyswatter at W5LUA

Lower table with 47 GHz XVTR

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AA5AM/R Beacon Rig at 47088.1 MHz

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EM13td to EM13qc on 47 GHz at 23 km or 14 miles

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W5LUA 76 GHz Transverter using DB6NT MKU 76 G2 Transverter & WA1MBA LNA

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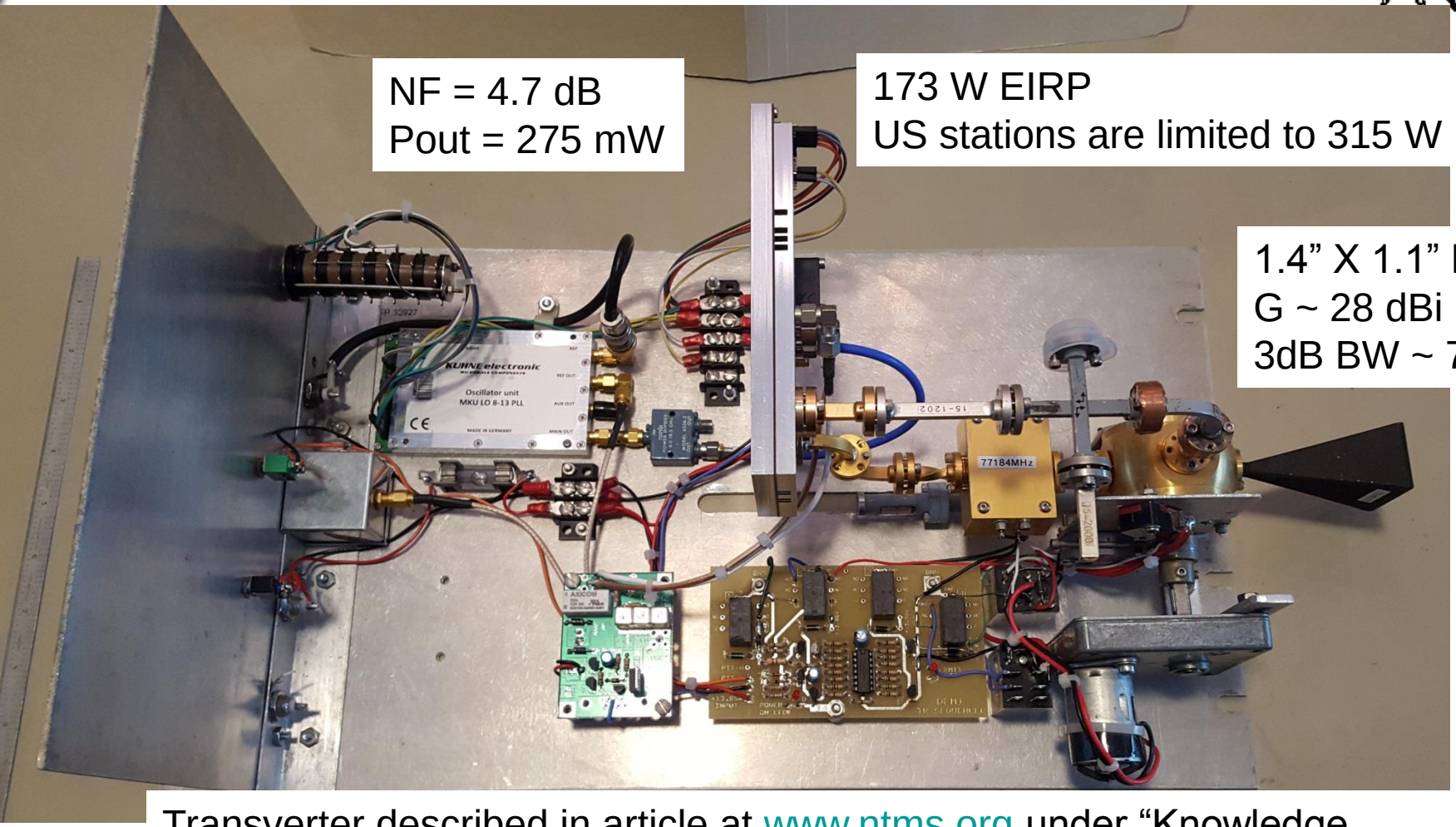

NF = 4.7 dB
Pout = 275 mW

173 W EIRP
US stations are limited to 315 W EIRP

1.4” X 1.1” Horn
G ~ 28 dBi
3dB BW ~ 7 deg

Transverter described in article at www.ntms.org under “Knowledge Base” then under “Tech Library” and then “Millimeter Wave”

Microwave Update 2019

- The North Texas Microwave Society will once again host Microwave Update which will be held at the Hilton Garden Inn in Lewisville (Dallas) on October 4th and 5th.
- Some of the top microwave enthusiasts will be there to present their papers, speakers include VK7MO, K8ZR, WA5TNY, W1GHZ, N5PYK, K6JEY, AA5C, N2CEI, WA5VJB, N5BRG, VE4MA, W5LUA and more.
- We will also have antenna gain measuring, noise figure measurements and phase noise measurements.
- This is also a great social event allowing microwave enthusiasts to compare notes and learn from each other.
- Monitor www.ntms.org and www.microwaveupdate.org as details are available

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- Next up is Bob Stricklin N5BRG