An Amateur Radio publication for the Microwave Enthusiast

scatterpoint

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In This Issue

Bob G4APV working Barry G8AGN on 30THz 450m

Dave G4GLT working Rudi OE5VRL on 10GHz 1326km

UK Microwave Group

Subscription Information

The following subscription rates apply

UK £6.00 US $9.00 Europe €9.00

This basic sum is for **UKuG membership** For this you receive Scatterpoint for **FREE** by electronic means (now internet only) via

https://groups.io/g/Scatterpoint and/or Dropbox Also, **free access to the Chip Bank**

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You will have to make a quick check with the membership secretary if you have forgotten the renewal date Please try to renew in good time so that continuity of newsletter issues is maintained Put a **renewal date reminder** somewhere prominent in your shack

Please also note the payment methods and be meticulous with PayPal and cheque details

PLEASE QUOTE YOUR CALLSIGN!

Payment can be made by: PayPal to

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or a cheque (drawn on a UK bank) payable to 'UK Microwave Group' and sent to the membership secretary (or, as a last resort, by cash sent to the Treasurer!)

Articles for Scatterpoint

News, views and articles for this newsletter are always welcome

Please send them to

editor@microwavers.org

The CLOSING date is

the FIRST day of the month

if you want your material to be published in the next issue

Please submit your articles in any of the following formats:

Text: txt, rtf, rtfd, doc, docx, odt, Pages

Spreadsheets: Excel, OpenOffice, Numbers

Images: tiff, png, jpg

Schematics: sch (Eagle preferred)

Please send pictures and tables separately, as they can be a bit of a problem.

Thank you for you co-operation

Roger G8CUB

Reproducing articles from Scatterpoint

If you plan to reproduce an article exactly as in Scatterpoint then please contact the Editor – otherwise you need to seek permission from the original source/author.

UKµG Project support

The UK Microwave Group is pleased to encourage and support microwave projects such as Beacons, Synthesiser development, etc. Collectively UKuG has a considerable pool of knowledge and experience available, and now we can financially support worthy projects to a modest degree.

Note that this is essentially a small-scale grant scheme, based on 'cash-on-results'. We are unable to provide ongoing financial support for running costs – it is important that such issues are understood at the early stages along with site clearances/licensing, etc.

The application form has a number of guidance tips on it – or just ask us if in doubt! In summary:-

- Please apply in advance of your project
- We effectively reimburse costs - cash on results (e.g. Beacon on air)
- We regret we are unable to support running costs

Application forms below should be submitted to the UKuG Secretary, after which they are reviewed/ agreed by the committee

www.microwavers.org/proj-support.htm

UKµG Technical support

One of the great things about our hobby is the idea that we give our time freely to help and encourage others, and within the UKuG there are a number of people who are prepared to (within sensible limits!) share their knowledge and, what is more important, test equipment. Our friends in America refer to such amateurs as “Elmers” but that term tends to remind me too much of that rather bumbling nemesis of Bugs Bunny, Elmer Fudd, so let’s call them Tech Support volunteers.

While this is described as a “service to members” it is not a “right of membership!”

Please understand that you, as a user of this service, must expect to fit in with the timetable and lives of the volunteers. Without a doubt, the best way to make people withdraw the service is to hassle them and complain if they cannot fit in with YOUR timetable!

Please remember that a service like our support people can provide would cost lots of money per hour professionally and it’s costing you nothing and will probably include tea and biscuits!

If anyone would like to step forward and volunteer, especially in the regions where we have no representative, please contact the committee.

The current list is available at

www.microwavers.org/tech-support.htm

UKµG Chip Bank – A free service for members

By Mike Scott, G3LYP

Non-members can join the UKµG by following the non-members link on the same page and members will be able to email Mike with requests for components. All will be subject to availability, and a listing of components on the site will not be a guarantee of availability of that component.

The service is run as a free benefit to all members of the UK Microwave Group. The service may be withdrawn at the discretion of the committee if abused. Such as reselling of components.

There is an order form on the website with an address label which will make processing the orders slightly easier.

Minimum quantity of small components is 10.

These will be sent out in a small jiffy back using a second class large letter stamp. The group is currently covering this cost.

As many components are from unknown sources. It is suggested values are checked before they are used in construction. The UKµG can have no responsibility in this respect.

The catalogue is on the UKµG web site at www. microwavers.org/chipbank.htm

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Loan Equipment

Don't forget, UKuG has loan kit in the form of portable transceivers available to members for use on the following bands: **Contact Neil G4DBN for more information**

5.7GHz 10GHz 24GHz 76GHz 122GHz

Phase Noise Measurements of Some Synthesizers

Paul Wade W1GHZ ©2018, updated ©2019 &2023
w1ghz@arrl.net

At Microwave Update 2023 & the 46th Eastern VHF/UHF/Microwave Conference in April 2023, I got a chance to measure phase noise of a new microwave synthesizer, the MAX2870, at both 1152 MHz, for comparison with many other synthesizers, and at 5760 MHz. (results near end)

At the 44th Eastern VHF/UHF/Microwave Conference in April 2018, I got a chance to measure phase noise of some of the newer microwave synthesizers. Few hams have test equipment capable of making phase noise measurements of good oscillators, so we must rely on test equipment at various VHF and Microwave conferences. The excellent equipment at this conference was provided by Greg Bonaguide, WA1VUG, of Rohde & Schwarz.

More recently, at the VHF Super Conference in April 2019, I tested a new synthesizer, as well as one of the best previous ones for comparison. Since Greg provided different Rohde & Schwarz test equipment, the results are presented separately.

A frequency synthesizer is an attractive way of generating a signal at a desired frequency, particularly since it has become very difficult to find quality crystals. A modern synthesizer may operate at a high enough frequency to provide the Local Oscillator for a microwave system, and the frequency may be locked to an accurate reference to provide frequency accuracy and stability.

Phase Noise

However, the phase noise generated by almost all synthesizers is significantly worse than a good crystal oscillator. For very weak signals, my experiments[1] in 2009 suggest that the difference in Minimum Detectable Signal is about 2 dB, between a multiplied crystal oscillator LO and a synthesizer LO. On the other hand, 10 GHz MDS tests at the NEWS (North East Weak Signal group – www.newsvhf.com) picnic over several years suggest that knowing the frequency of a very weak signal can improve the MDS by up to 5 dB, when listening by ear. The addition of an SDR waterfall display eliminates the unknown frequency problem – all signals appear on the screen – so minimizing phase noise can help to hear very weak signals.

In 2012, I developed a locked VCXO[2] which can provide the source for a microwave LO with phase noise very nearly as good as a crystal oscillator and also be locked to a reference source to provide frequency accuracy and stability. This might be an ideal solution, but there are few choices for available VCXO frequency. As part of the development, phase noise comparisons were made with the synthesizers available at that time, shown in Figure 1. The bottom three curves clearly show how phase noise increase with frequency multiplication, whether done by a classic frequency multiplier or in a phase-locked loop. Since all the synthesizers are operating at 1152 MHz and are referenced from the same 10 MHz TCXO, any phase noise greater than the multiplied VCXO is additional noise generated by the synthesizer.

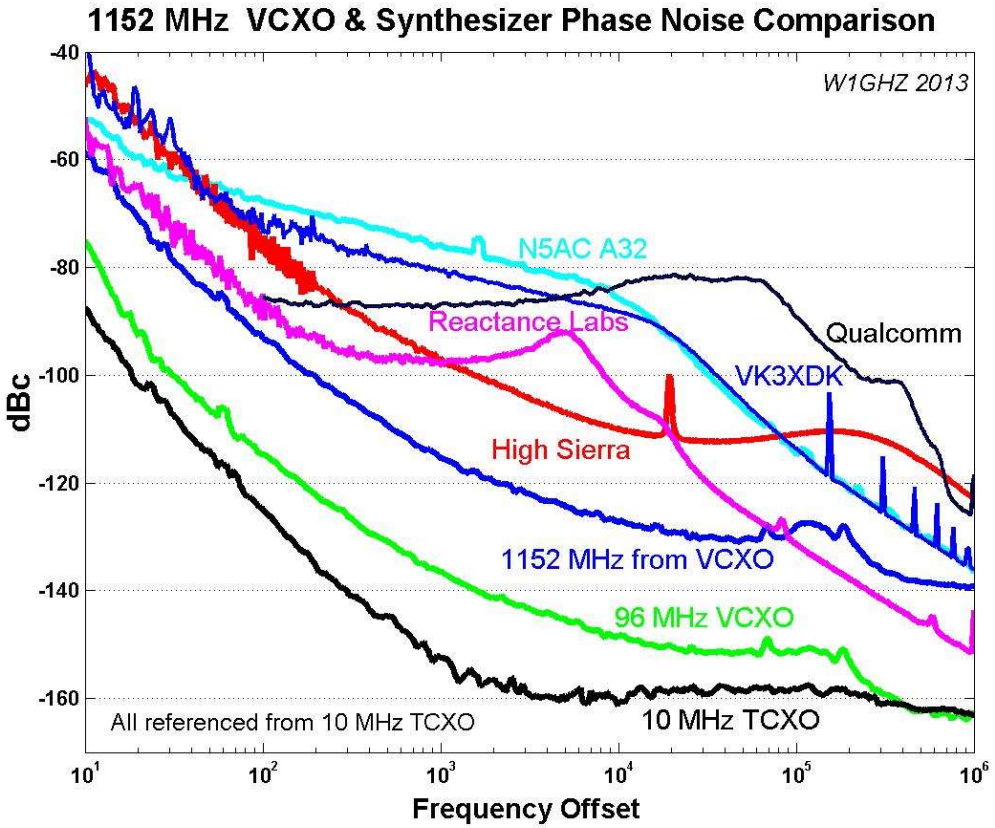


Figure 1 - Synthesizer Phase Noise measurements from 2012 and 2013

More recent synthesizers may have better phase noise characteristics than the N5AC A32 used for my 2009 experiments. Many of the synthesizers in Figure 1 are better, at least over part of the range of frequency offsets. The measurements at the 44th Eastern VHF/UHF/Microwave Conference in April 2018 are shown in Figure 2. These were made with a Rohde & Schwarz FSW-43 analyser. Where possible, synthesizers were referenced to a 10 MHz TCXO, the same unit as Figure 1. The VCXO system and several other synthesizers from Figure 1 are also included for comparison, including the N5AC A32. Some of the units were provided by conference attendees for a wider range of comparisons. Figure 3 includes a picture of each unit, and the Appendix provides more details.
Note that these are not definitive measurements, just what we able to accomplish during the lunch break at the conference. The measurements were made with 10X averaging, so they should be reasonably accurate. Better results might possibly be found with different programming of the synthesizer chips – for instance, for some New England beacons, W1EX found that an ADF4153 programmed for multiplication by four to 10368.320 or 10368.400 had fewer spurious outputs than at other nearby frequencies.

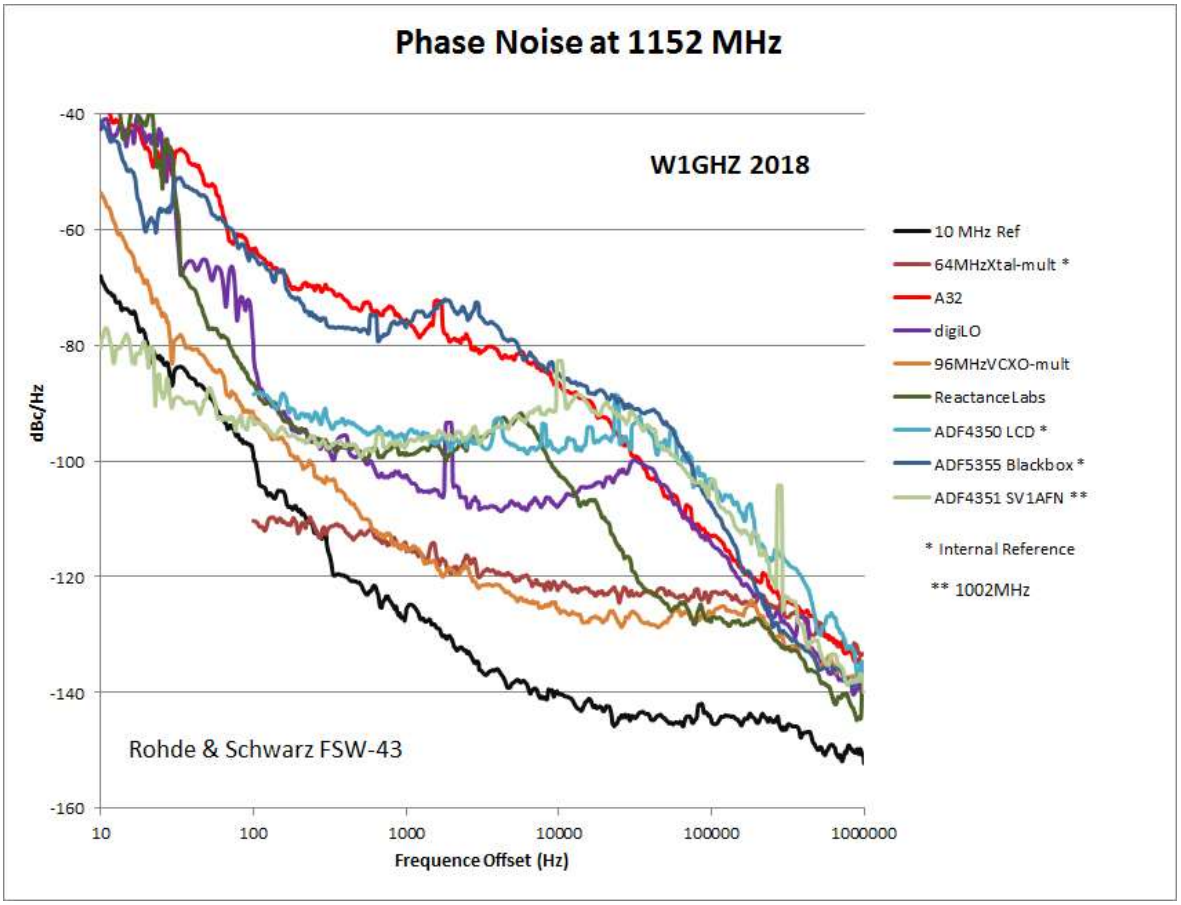


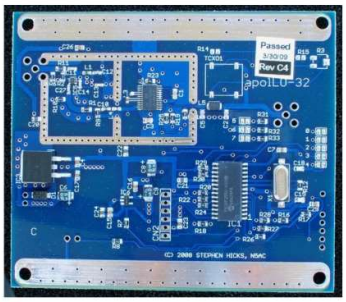
Figure 2 – 1152 MHz Phase Noise measurements at 2018 Eastern VHF Conference

Several of the newer synthesizers have pretty good performance. The digiLO from Q5 Signal (q5signal.com) has the best phase noise at 1152 MHz except for a spike at 2 kHz; it can be easily programmed with jumpers to popular ham frequencies from 23.5 MHz to 6 GHz.

A surprisingly good one is the ADF4350 with the LCD display and programming buttons[3], available from China on eBay, which goes up to 4 GHz. The buttons make it able to run standalone – with a USB battery, it makes a handy signal source.

And a good cost-effective one is the SV1AFN ADF4351 (www.sv1afn.com/adf4351m.html), which requires something like an Arduino for programming, to frequencies anywhere between 35 and 4400 MHz.

The ADF5355, available complete as shown or as a programmable board, operates up to 13.6 GHz. This one arrived just before the conference, so I didn't get a chance to check it out thoroughly.



A32 - N5AC

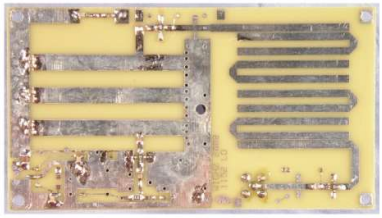
digiLO
q5signal.com

ADF4350

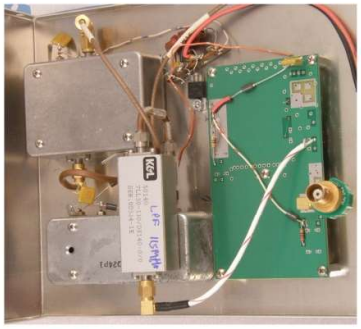
OLED digital ADF5355 54M-13.6...

ADF5355

1152 MHz Sources



64 MHZ Oscillator & Multiplier



96 MHz VCXO & Multiplier

Reactance Labs

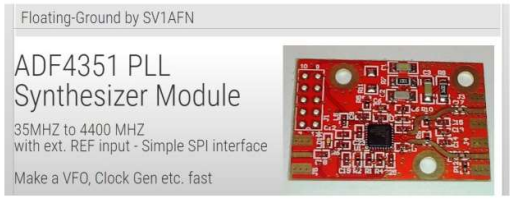


Figure 3 – 1152 MHz sources measured in Figure 2

MAX2870

The MAX2870 synthesizer board came from eBay for about $40, not bad for a 6 GHz synthesizer. This version, shown in the Figure below, is programmable with on-board pushbuttons, and retains the frequency setting. The ad says serial control, “no control software provided.” If anyone has located working software, please let me know.

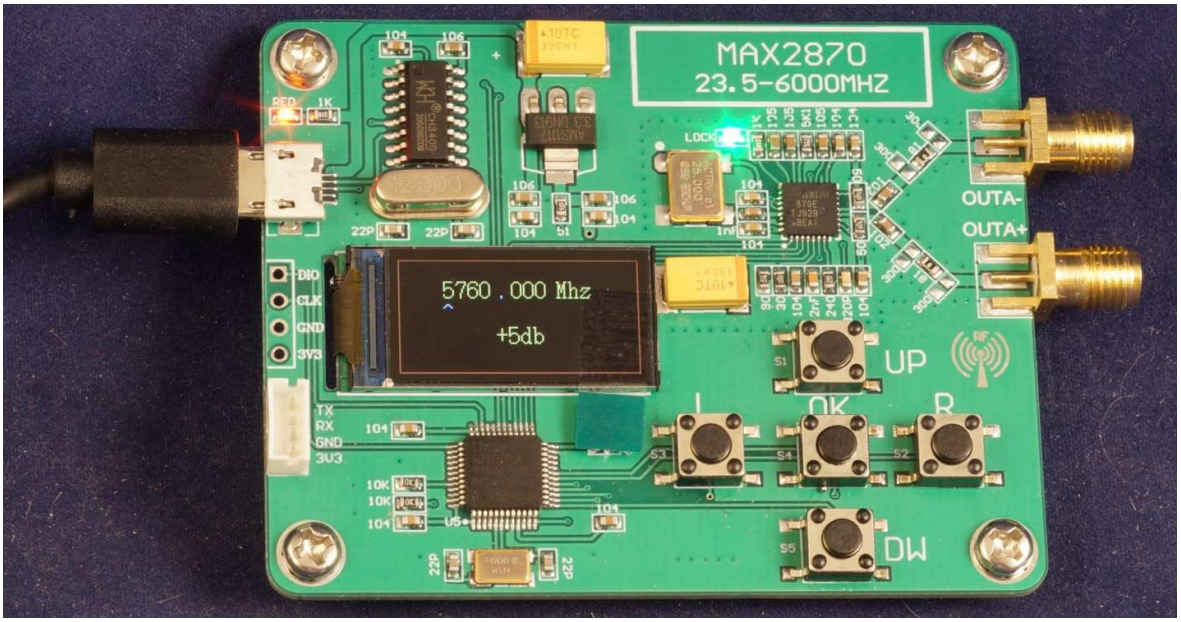


Figure new 2023 – MAX2870 Synthesizer

Power is through a USB-C; I powered it with a USB power pack battery to minimize USB noise.
Indicated power output is optimistic. At the +5dB setting shown, output was +1.5 dBm at 1152 MHz, -1 dBm at 3408 MHz, and -2 dBm at 5882 MHz. The frequency was about 100 kHz low at 5882 MHz.
Phase noise comparison is added to Figures 4 and 5. At 1152 MHz, the MAX2870 is a few dB worse than the DigiLO but significantly better than the VHF Design which uses the similar MAX2871. At 5760 MHz, phase noise is roughly comparable to the X-band units at higher frequencies, but it should be about 6 dB better since it is running a half the frequency.

X-Band Synthesizers

Conference attendees also brought several synthesizers that work directly at X-band, good for 10 GHz or higher bands. The phase noise of these units is comparable to what we would expect from the other synthesizers after frequency multiplication. The 120 Hz spike on the ZL-PLL curves are hum from a crappy power supply – a clean power supply makes a difference.

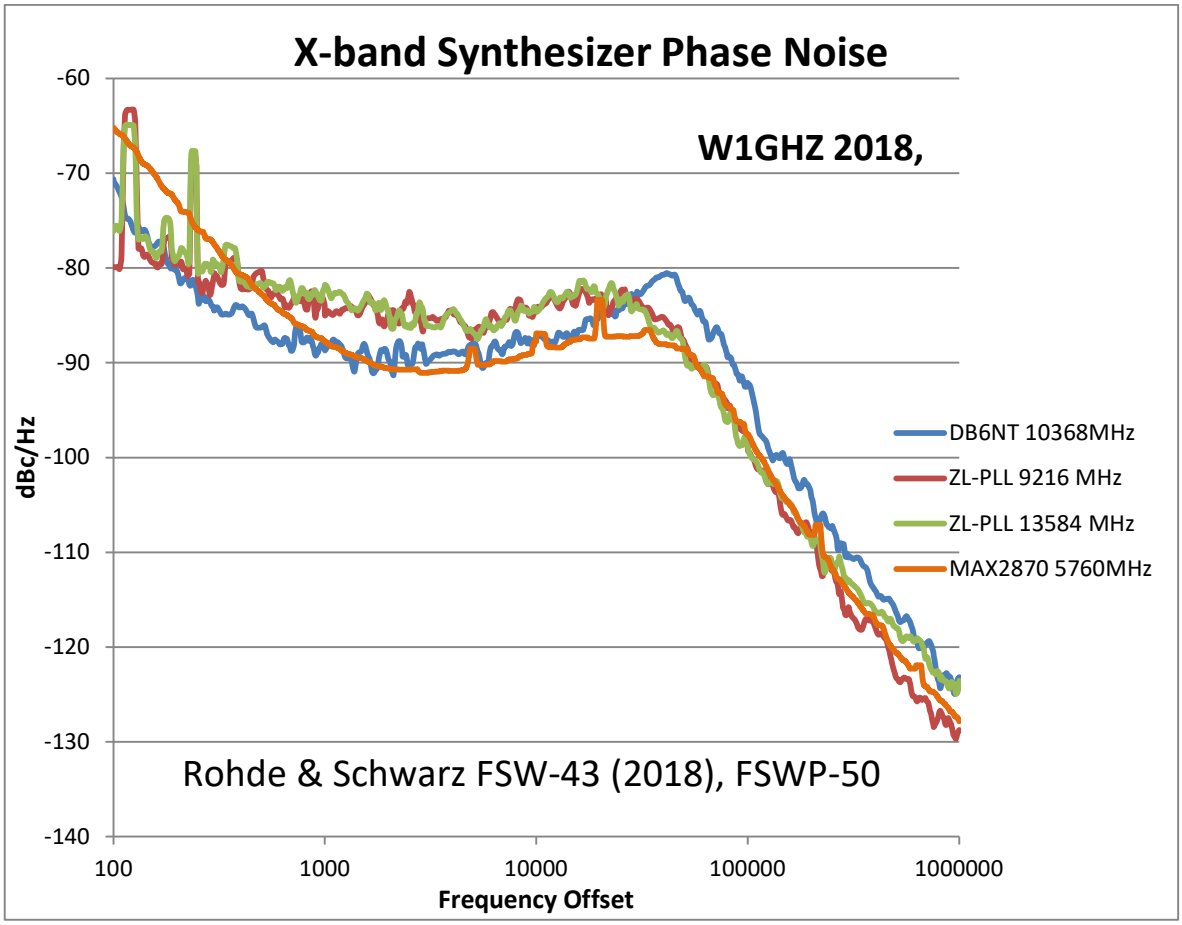


Figure 4 – X-band Phase Noise measurements at 2018 Eastern VHF Conference MAX2870 added - MUD2023

DB6NT = MKU LO 8-13 (kuhne-electronic.de)
ZL-PLL = ZL-PLL 14G (zl2bkc.com)

2019 Measurements + 2023

Since the previous measurements, a new synthesizer has become available from VHFDesign.com, the **LO-PLL-USB-MAX2871-SHF-PCB**. This unit has attractive features: it is programmable from 1 to 6000 MHz, and includes a programmable beacon mode. The phase noise results at 1152 MHz are shown in Figure 5. Compared to the **DigiLO**, the best synthesizer measured so far, this unit is almost 20 dB worse, or comparable to some of the inexpensive synthesizers in Figures 2 and 3.

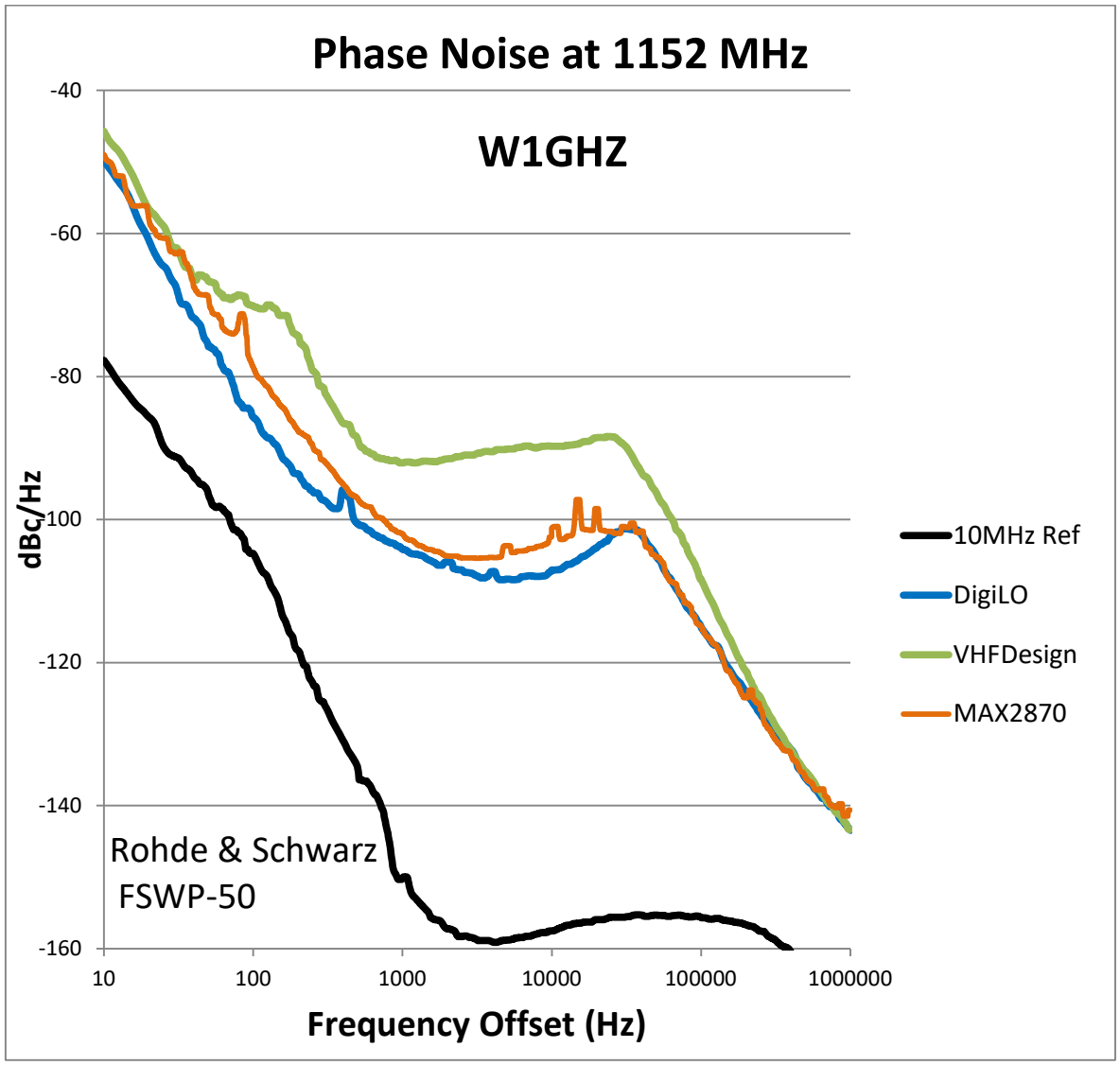


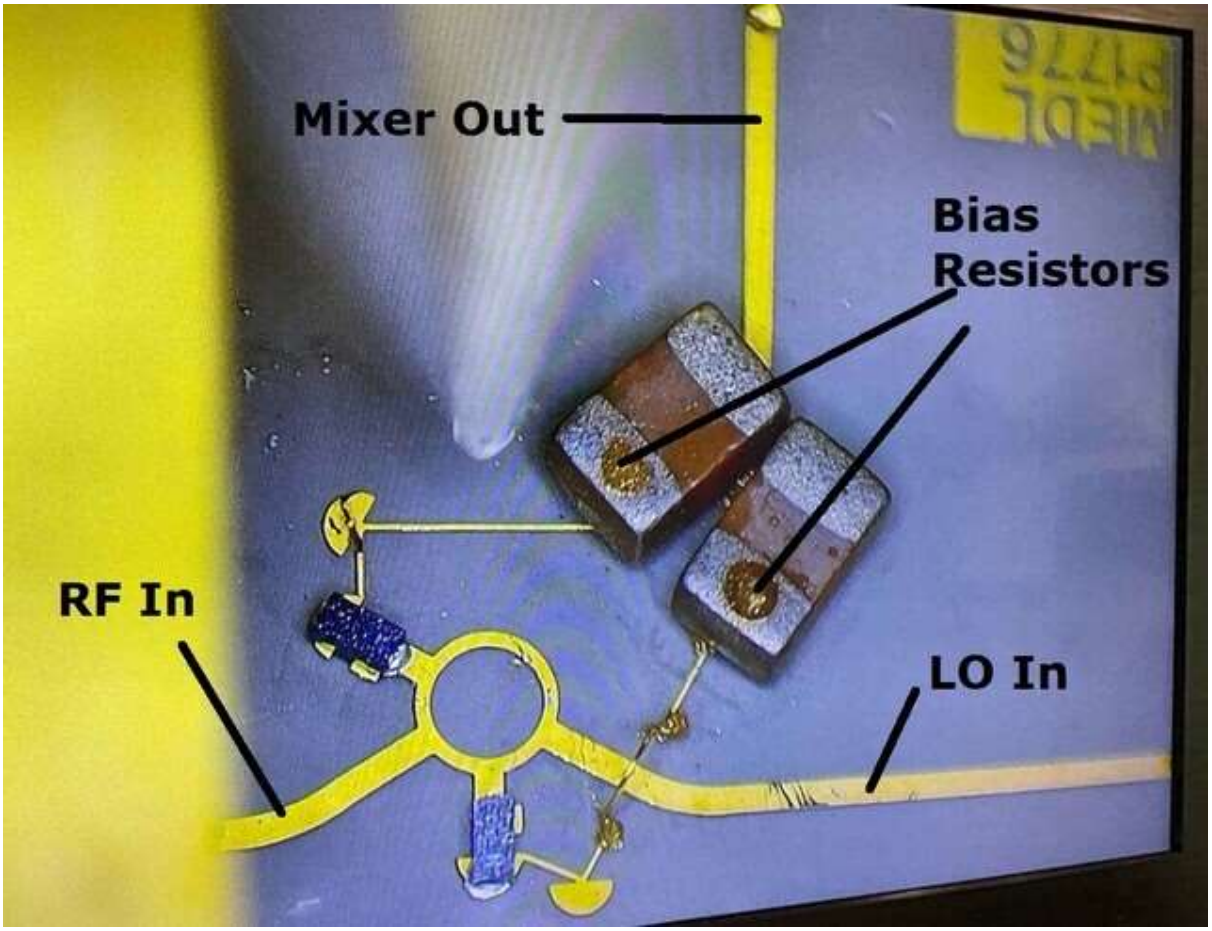
Figure 5 - 1152 MHz Phase Noise measurements at 2019 VHF Super Conference MAX2870 added - MUD2023

Notes:

1. Paul Wade, W1GHZ, "Phase Noise and MDS," *Proceedings of Microwave Update 2009*, ARRL, 2009, pp. 193-196.
2. Paul Wade, W1GHZ, "A Flexible VCXO Locking Board," *Proceedings of Microwave Update 2012*, ARRL, 2012, pp. 101-113.
3. Paul Wade, W1GHZ, "Synthesized Signal Source From China," *44th Eastern VHF/UHF/Microwave Conference*, 2018.

76GHz Loan System Mixer Repair

Following the repair by Iban EB3FRN, and pictures in last month's Scatterpoint.
This explanation of the mixer from Iain Crawford VK5ZD was posted on the reflector
I have included it here, as it makes things very clear. Adding bias to the hybrid ring mixer, improves sensitivity, and means a lower level LO is required.



CAT Display for FT817/818/857/897

From Iban EB3FRN.
I have this info from Luis EA5DOM, who has designed a console for the Yaesu radios. It will be sold in the future as a kit.

"Just some news about the presentation of a CAT display + tools for FT817/818/857/897. Thought for portable microwave operations including audio waterfall, roger beep, beacon, GPS for locator calculation, Sun Az/El and memories per band to easily calculate beams and set frequencies for beacons and contacts. The name was chosen as a tribute to Maxi EA5CV/EC5V recently SK."

Contact with OE5VRL on 10GHz.

Dave Newman G4GLT

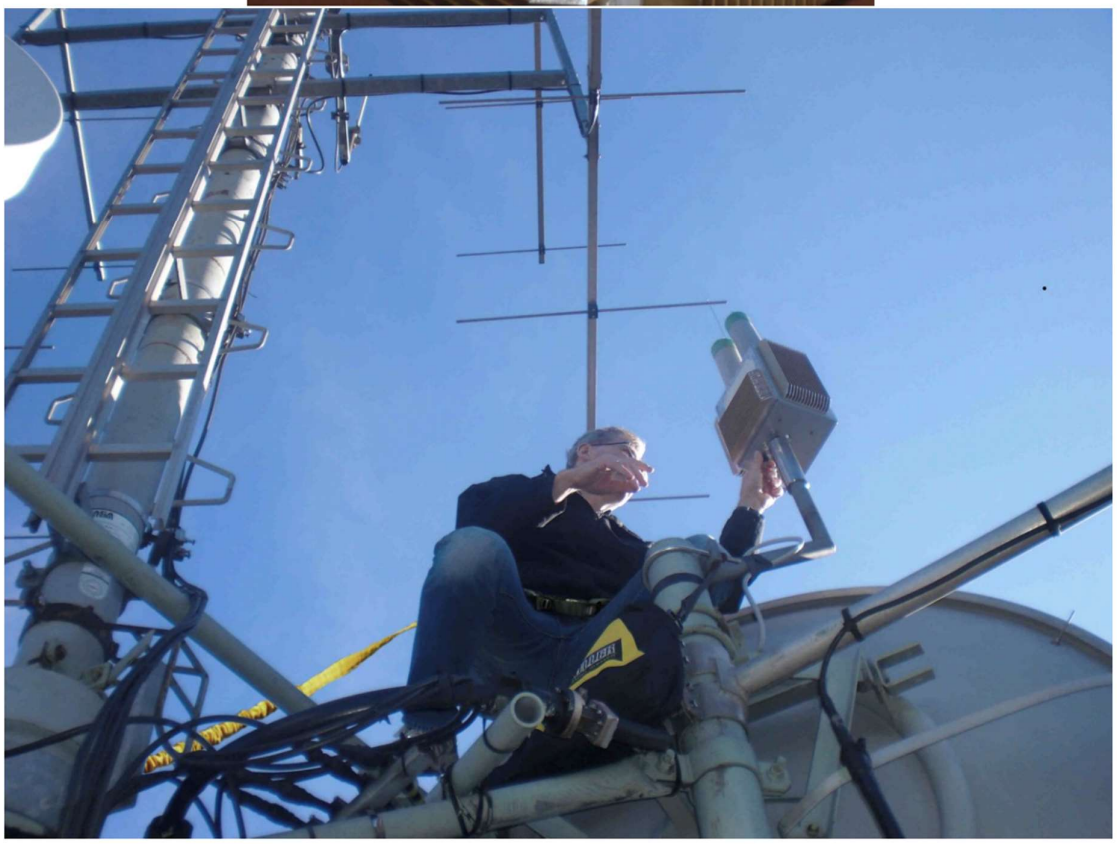
On Thursday 7th September I was out very early at a slightly different portable spot at IO80CN at 392 metres ASL. The prediction looked very promising to the east south east direction. No significant near beacons were heard at any great strength, and HB9BBD was heard briefly at 0712GMT. At 0747GMT I started hearing DB0ANU beacon on 10368.810 at 579 at 1032km for the first time ever.
On turning the dish while on this frequency I was also hearing DB0GHZ 34 degrees more northerly. I was aware that Rudi OE5VRL was hearing F9ZG beacon at 0756GMT. Soon after this he worked Maurice, F6DKW near Paris, who first started hearing DB0ANU at 0653GMT. I looked for the OE5XBM Beacon and found it slightly off frequency on 10368.872MHz at 559 at 0817GMT.
We had a QSO at 0817GMT and Rudi (OE5VRL) was 579 and my first report was 529 which he changed to 559. Rudi's locator was JN78DK and he runs 25 watts to a 3 metre dish. The distance worked using 10 digit/letter locators was 1326km using the F5LEN calculator. This is the furthest either of us has worked on 10GHz.
Rudi has been running his DX QTH for 40 years (see photo), and it's on a farm on a hill, and only one kilometre from his apartment.
The DX QTH has a 17 metre mast, with a homemade rotator and a commercial 3 metre dish. In front of this dish are his transverters and PA's for 47GHz, 24GHz, 10GHz, 6cm and 9cm, and all the antennas for the bands from 70cm to 47GHz. On the back of the antenna there are transverters and PA's for 13 and 23cm. The feedpoints can be turned sideways to the focal point. The location is 866 metres ASL.

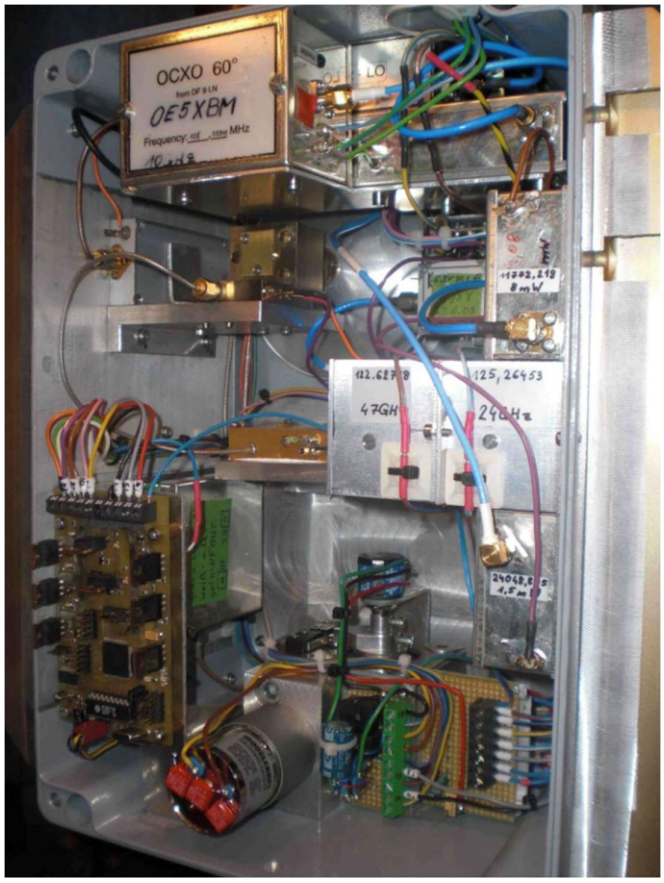
In a previous article I mentioned that one should look out for very strong beacons in the near range when searching for long distance tropo. This sometimes happens if you are lucky, but I am now coming to the conclusion that more often than not there may be no near indicator, and that you have to search for all the long-distance beacons in the area of interest. In this instance the QSO path went between two near beacons: F5ZTR (AZ=86.3 deg) and ON0VHF (AZ=101.5 deg), and both were very weak/absent. The QSO azimuth for me was 93 degrees and the azimuth of DB0ANU was 92.7 degrees.

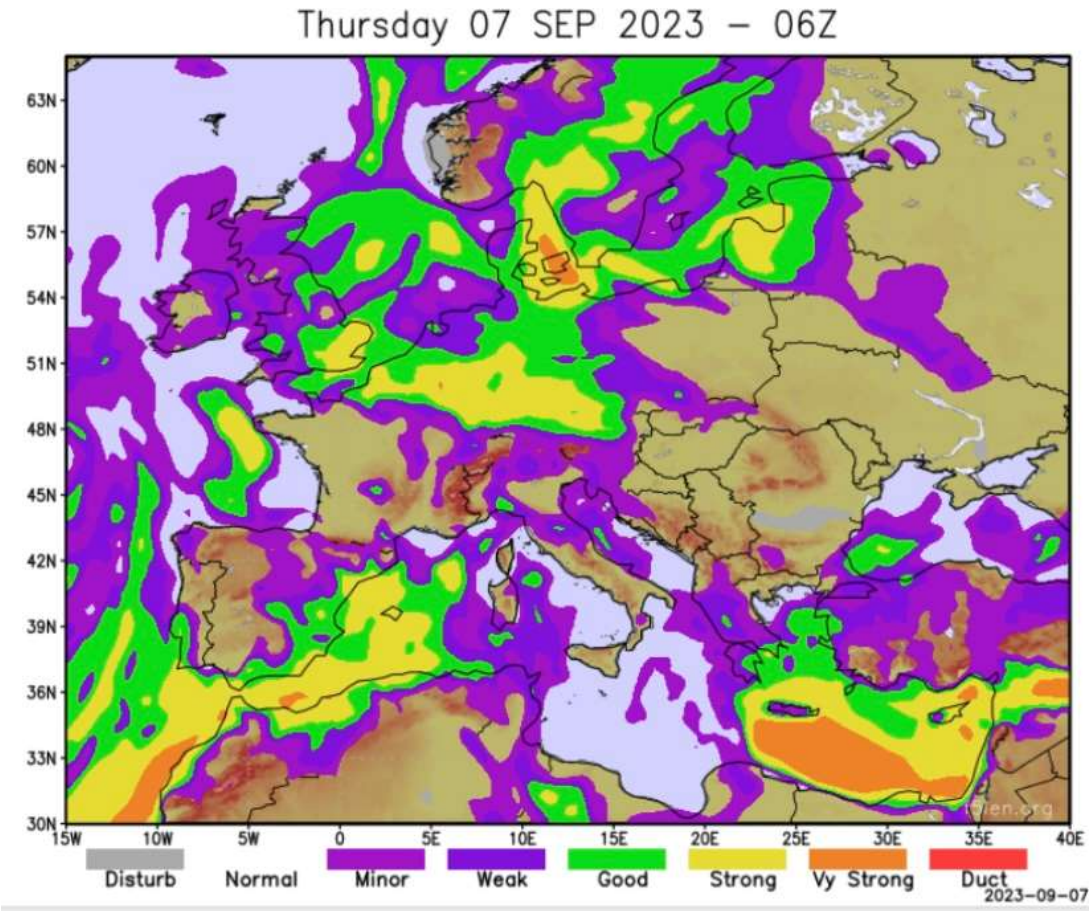
The OE5XBM beacons have gone through various phases of development since their inception around 1998. The beacon is on a mountain (Breitenstein) (JN78DK), 855m ASL and on a telecommunications mast at a height of 24metres above ground. At the start the 10GHz section had 1 watt and a 10dB omni directional antenna and the 24GHz unit had 100mW and a 13dB omni directional antenna. Three years later 47GHz was added with 25mW to a 20dB horn, which was permanently beaming SW. This meant that it could only be heard in a limited arc. In 2003 it was also decided to control the beacon remotely with a DTMF controller using a 2 metre frequency.
In 2010 Rudi dismantled the old beacon, and some parts were reused. The 24GHz power was increased to 1 watt. The 76Ghz beacon was completely new and the output power is 15mW.
The 10 and 24GHz slot radiators were reused , a sector horn with 20dbi gain was used on 47GHz and a precision mirror with 34dbi gain on 76GHz (see photo). The sector horn is right next to the mirror in the photo. However, this parabolic mirror has an opening angle of 3 degrees. This was not a problem as the beacon can be rotated using remote control and a rotator, with directional feedback on 10GHz.
The remote control antenna can be seen between the two waveguide antennas in the photograph. Inside the enclosure the DTMF unit is in the lower left and to the lower right is worm gear rotator. Above it are the oven oscillators and multiplier stages for 10,24, 47 and 76GHz, and also the power stages for 10 and 24GHz.
Rudi invites anyone interested to play with the beacon, especially on 47 and 76GHz. The DTMF can turn the beacons on and off separately, controls the rotor, and deactivates the CW temporarily to make measurements. The mast photo shows Rudi installing the beacon. The 10GHz beacon currently runs 900mW.
The beacon photo with the view towards the south west shows the Innviertel, which is more than 40km away.
It has been a real pleasure to exchange several emails with Rudi.
He told me that he started amateur radio 49 years ago and has been fascinated by it ever since. In October 1976 he experienced his first tropo opening to G. With only 10 watts and a 9 element yagi he contacted one station after another on 2 metres over 2 days. He was 18 years old at the time and this experience shaped the rest of his life. He reflects that his wife and his entire family endure this very patiently, and in that sense he is very lucky. I can also echo that, as I am actually encouraged to get out there and enjoy the microwaves.

Dave (G4GLT) September 2023.

Portable location for QSO at G4GLT- sea horizon visible normally from Haytor but misty in this shot.

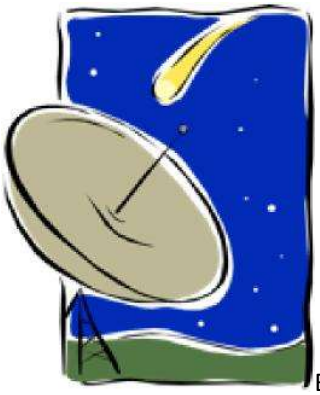






(My thanks to Rudi for all the photos and information and to Pascal F5LEN for the tropospheric chart)

Activity News August 2023



By John G4BAO

Please send your activity news to: **scatterpoint@microwavers.org**

From Stuart G1ZAR

At the beginning of August Stuart – G1ZAR operated on 1.3GHz from IO82JP, SOTA summit GW/MW-032 Upper Park. Running just 2 Watts to a 16 ele Yagi a metre or so above the ground via a long coax feed. See Photo 1 He worked G3VKV IO81XV, G3SMT IO82KV, G7MHF IO82LW, G8DOH IO92FA and just failed to complete with G4YTL in IO92MB.

From Peter G3LTF

On the 12th of August in the ARRL microwave EME contest first leg, on 13cm I worked 15 stations on CW. SP9VFD, OM6AA, OH1LRY, OK1DFC, OK2ULQ, PI9CAM, DL6SH, G4RGK, VE6TA, IK3COJ, HB9Q, KL6M, W5LUA, WA6PY and VE4MA. (USA stations were X-band to 2304) Heard UA5Y and SP3XBO. Weather was difficult with strong winds blowing the dish off the moon heading. Sun noise was 20.9dB with SF 153.
On Sunday 13th on 9cm CW I worked DL6SH, SP3XBO, DF3RU, KL6M and W5LUA. Sun noise was 16.4dB with SF 148 and moon noise 0.6dB and power was about 3dB down (45W). Investigating the sun noise yesterday I found the Rx probe connector was not held down securely. I fixed this and it is now 18.5dB with SF 151 and moon noise is 1.1dB. Power is back to normal, but I did not find the reason. Getting nice SSB echoes at near apogee.

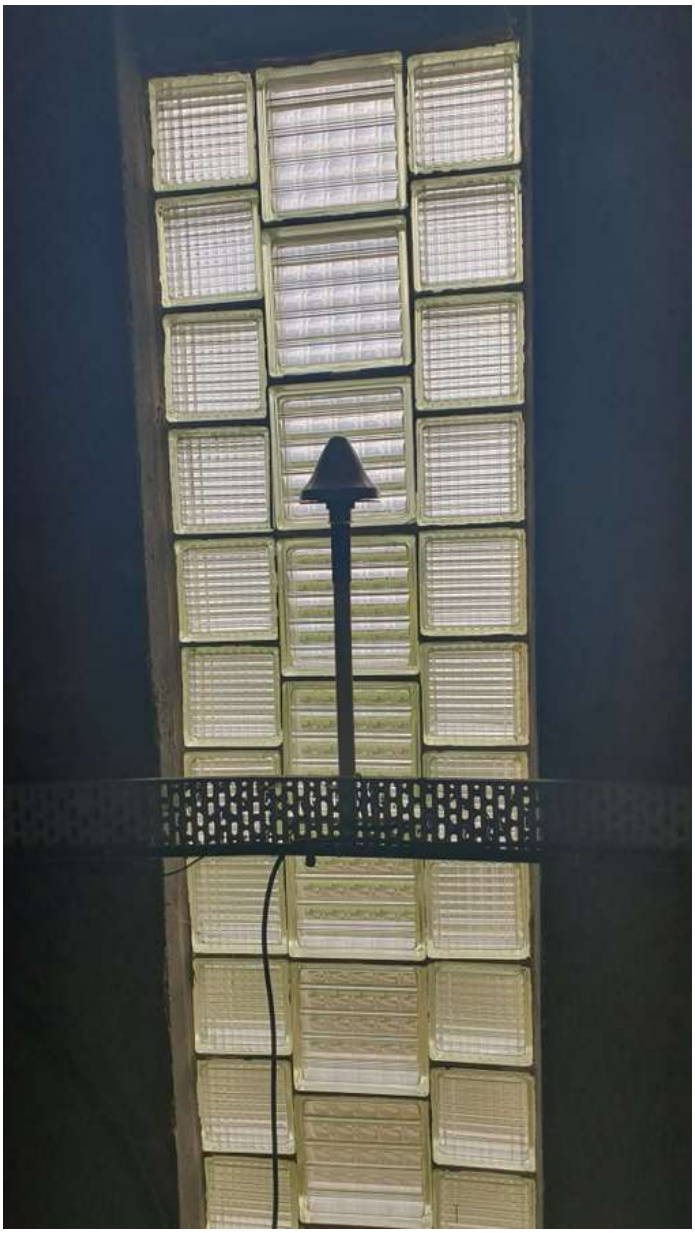
From David G4ASR

Inspired by some recent good rainscatter, I decided to make Wednesday the 2nd of August "a day when I didn't just hear beacons". With an announcement a couple of days before, on the UK microwaves email reflector, I managed to get a few enthusiastic stations on to 10GHz and co-ordinate activity using ON4KST and Zello. I did still hear some beacons, namely GB3KBQ IO80, GB3RPE IO71, GB3LEX IO92, GB3SCX IO80 and GB3GCT (first time heard), but worked G4ZTR (JO01), G4BAO (JO02), G4YTL (IO92), G3VKV (IO81), G0WZV (JO01) and G4DBN (IO93). I was using a masthead mounted Kuhne G4 transverter, DL2AM SSPA, and a 50cm Procom Dish @ 24m agl from my Herefordshire QTH at 215m asl in IO81MX.

From John G4BAO

All my activity in August has been on10GHz. I worked G4ASR on CW rainscatter at 219km and I had a fully quieting NBFN rainscatter chat with G0WZV JO01KV over a 62km path. Not bad for a wet Wednesday on 10GHz and it just shows there is activity if you make the effort and advertise it. I spent one and a half hours on the band during the 10/5.7GHz contest on the 27th, I managed 7 QSOs in 6 squares. ODX was M0EYT/P at 242km and GW3TKH/P at 236km. On EME, running 20W and a 1.2m dish, I managed three new digimode EME initials, CT2GUR, IM59ML (a new DXCC on the band) PE1CKK, JO22 and DL3WDG in JN68. This takes my initials score up to 42 and DXCCs (EME+ terrestrial) to 22. During the EME contest weekend of the 11-12th I worked OK1CA, OK1DFC, OK1KIR, OK2AQ, PA0PLY, and SA6BUN. All on Q65 mode.
It's encouraging to see more and more people doing 10GHz EME. Much can be worked on digimodes with a well set up 1.2m dish and a few tens of watts

Finally, I'm pleased to report that 24GHz GB3CAM beacon was quickly returned to service. The problem was the failure in the recently – repaired outdoor bias tee/ diplexer box, of the 5V regulator that feeds the GPS antenna on the roof of the Water tower. I fixed it quickly without the need to climb outside by adding an indoor GPS antenna close to the rack and a convenient window in the water tower.
All seems good as I write this, with no sign of the elderly G3RUH GPSDO losing lock despite a much-reduced view of the sky compared to the previous antenna location.



The GB3CAM indoor GPS antenna

From Simon G7SOZ

On Sunday August 23rd I finally managed to spend some time working on my 23cm EME project. I finally replace the rotator and controller power supplies and spent some time making sure that the tracking and RX are OK after a period of not being used. The new rotator control cable and changes I made to the rack wiring seem to have solved the rotator issues I was having. I've also been trying to track down all the bits and pieces I've been buying/hoarding for this project :-)

Lots of stations heard (see below). The next steps are to replace the cheapo 2m transverter with my G4DDK Anglian and move the GPSDOs and a couple of other bits into the rack. I then need to get TX sorted!

UTC	dB	DT	Freq	Message	
1539	-24	3.1	1984	: UA4LCF PA3HDG 73	q0
1557	-21	3.0	626	: OZ6OL IQ2DB 73	q0
1558	-20	3.0	624	: IQ2DB OZ6OL 73	q0
1600	-20	3.0	606	: CQ OZ6OL JO65	q0
1602	-18	3.3	473	: 9H1BN RA4HL LO43	q0
1604	-14	3.2	459	: 9H1BN RA4HL R-14	q0
1606	-15	3.2	444	: 9H1BN RA4HL 73	q0
1610	-20	3.0	523	: CQ IQ2DB JN45	q0
1612	-23	3.0	514	: CQ IQ2DB JN45	q1
1623	-22	3.0	404	: CQ NC1I FN32	q1
1625	-17	3.0	399	: CQ NC1I FN32	q0
1630	-20	3.1	424	: NC1I IQ2DB JN45	q0
1631	-16	3.0	424	: IQ2DB NC1I -11	q0
1632	-20	3.1	414	: NC1I IQ2DB R-09	q0
1633	-16	3.0	414	: IQ2DB NC1I RR73	q0
1634	-22	3.2	404	: NC1I IQ2DB 73	q0
1635	-16	3.0	404	: CQ NC1I FN32	q0
1639	-17	3.0	469	: G7TZZ NC1I RR73	q0
1641	-17	3.0	459	: CQ NC1I FN32	q0
1643	-17	3.0	451	: CQ NC1I FN32	q0
1644	-22	3.0	516	: NC1I IK2DDR JN55	q0
1645	-17	3.0	443	: IK2DDR NC1I -13	q0
1646	-21	3.0	486	: NC1I IK2DDR R-07	q0
1647	-17	2.9	436	: IK2DDR NC1I RR73	q0
1648	-21	2.9	463	: TU FRANK 73	q0
1649	-20	2.9	416	: LU8ENU NC1I R-16	q0
1651	-17	2.9	413	: LU8ENU NC1I R-16	q0
1653	-17	2.9	406	: LU8ENU NC1I 73	q0
1655	-18	2.9	399	: CQ NC1I FN32	q0
1723	-18	3.1	428	: PA3JRK XE1XA 73	q0
1726	-13	2.9	543	: F4DWB KD5FZX -17	q0
1728	-14	3.0	534	: F4DWB KD5FZX RR73	q0
1729	-21	3.0	581	: IQ2DB XE1XA -10	q0
1730	-23	3.0	598	: XE1XA IQ2DB R-13	q0
1731	-20	3.1	569	: RRR 73	q0
1732	-23	3.0	589	: XE1XA IQ2DB 73	q0

From Barry G8AGN

On the evening of the 10th of Aug 2023, Bob G4APV and I extended our DX on 30THz to a GPS calculated 450metres. The path was over the larger of the three reservoirs at Redmires on the West side of Sheffield. The path was entirely over water, and the line of shoot was only a few metres above the water surface.

The Tx used was the normal 2-PSK-QRSS1 source using a 4 bladed Arduino-controlled chopper wheel (sub-carrier frequency of 4Hz). The Rx had been upgraded and used a 5 inch Zhumell Newtonian reflecting telescope and the SDR Arduino software had been modified to enable software switching of the Rx bandwidth between 2Hz or 1Hz. Received signal data was logged for about 20 minutes. The first period used a Rx bandwidth of 2Hz and this was then changed to 1Hz. Rx signal levels were small and subsequent computer processing of the data using a digital phase sensitive detector (lock-in amplifier) only resulted in message recovery when the Rx bandwidth was set to 1Hz.

It is believed that this was the first 30THz test to have been carried out over a water path. As the evening wore on, the logged signal data seemed to suggest that signal levels were improving as the Sun got lower in the sky and the air temperature started to drop. Whether this had an effect on the humidity of the air just above the water will warrant future investigation.

The 450m path over Redmires reservoir

G4APV's setup

G8AGN with his setup

Editors Comments

I look forward to seeing many of you at Crawley RT. Thank you to all the contributors this month. This August issue has rather become August / September.
The last millimetre (24/47/76) contest was a difficult one for me. My 24/47GHz transverter and tripod blew over in the wind, and bent the dish mount. My umbrella disappeared across the field. The 76GHz unit shorted the battery with an unseen wire whisker. Plus I got very wet. Oh, the joys of microwaving! On the plus side, it was good to see many out using 24G Wavelab transverters. Subsequently a replacement 24GHz mm-tech PA has arrived – thanks Ian…

Roger G8CUB.

Contest News 2023

July 5.7Ghz Contest 2023

Entry levels could still be better! WX was high wind and rain but did create some RS possibilities.
One new callsign to appear on the band was Dave G7WHI/P well done
Well done to winner Neil G4LDR who also worked the best DX at 426km with F8DLS. Runner up Telford and DARS G6ZME/P.
73
Chris G0WUS

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX kms
1	G4LDR	IO91EC	13	1899	F8DLS	426
2	G6ZME/P	IO82QL	11	1654	G3XDY	265
3	M0GHZ	IO81VK	9	1048	G3XDY	246
4	G1EHF/P	IO91GI	7	666	G3XDY	200
5	G1DFL/P	IO91OQ	7	630	G6ZME/P	154
6	G4BRK	IO91HP	6	570	G3XDY	184
7	G7WHI/P	IO92IR	4	425	G3XDY	186

10Ghz Contest July 2023

This event saw not so great WX! High wind and rain making things difficult however many reports of RS qsos being made along with usual "wrong type of rain" comments

However we still managed 15 logs, 3 x Restricted, 10 x Open and 2 Checklogs many thanks Dave G0FEV and Keith G4ODA.

Well done to Open winner John G4ZTR and Telford and DARS G3ZME/P as runner up. Best DX goes to G3ZME/P who worked F6DKW.

Well done to Restricted winner Adrian M0PAI/P

73

Chris G0WUS

Open Section

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX kms	Power
1	G4ZTR	JO01KW	20	4430	F6DKW	365	10
2	G3ZME/P	IO82QL	21	3345	F6DKW	535	8
3	G4LDR	IO91EC	17	3239	F8DLS	426	25
4	G4ASR	IO81MX	19	2694	G3XDY	286	5
5	G4KUX	IO94BP	8	2328	G4LDR	395	8
6	GW4MBS/P	IO71XW	12	2057	G4KUX	334	12
7	M0GHZ	IO81VK	12	1504	G3XDY	246	5
8	G3YJR	IO93FJ	8	1154	G3XDY	238	3
9	GW4JQP	IO71KR	5	836	G4LDR	253	2
10	G7MHF/P	IO82QJ	4	396	G4ODA	174	1.5

Restricted Section

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX kms	Power
1	M0PAI/P	IO93AD	14	2158	G4UVZ	254	1
2	G1DFL/P	IO91OQ	11	1229	M0PAI/P	181	1
3	G4SJH/P	IO91GI	6	655	G4ODA	182	0.8

5.7/10GHz Championship Tables

Positions after three events, best three count to the total

5.7GHz

Pos	Callsign	28/05/2023	25/06/2023	30/07/2023	TOTAL
1	G6ZME/P	1000	1000	871	2871
2	M0GHZ	563	980	552	2095
3	G4CLA	791	952	0	1743
4	G4LDR	474	0	1000	1474
5	G4BRK	295	415	300	1010
6	G1EHF/P	583	0	351	934
7	M0EYT/P	466	0	0	466
8	G1DFL/P	0	0	332	332
9	G7WHI/P	0	0	224	224
10	GW0MDQ/P	44	0	0	44

10GHz Open

Pos	Callsign	28/05/2023	25/06/2023	30/07/2023	TOTAL
1	G4ZTR	1000	1000	1000	3000
2	G4LDR	722	0	874	1596
3	M0GHZ	553	595	406	1554
4	G4CLA	786	657	0	1443
5	G4ASR	0	675	727	1402
6	G(W)4MBS/P	139	573	555	1267
7	G3ZME/P	0	0	903	903
8	G4KUX	0	0	628	628
9	G4DBN	0	569	0	569
10	G0HIK/P	471	0	0	471
11	G8GTZ/P	457	0	0	457
12	M0EYT/P	401	0	0	401
13	GW0MDQ/P	376	0	0	376
14	G3YJR	0	0	311	311
15	GW4JQP	0	0	226	226
16	G7MHF/P	0	0	107	107

10GHz Restricted

Pos	Callsign	28/05/2023	25/06/2023	30/07/2023	TOTAL
1	M0PAI/P	1000	917	1000	2917
2	G7AQA/P	0	1000	0	1000
3	GW0JSB/P	633	0	0	633
4	G1DFL/P	0	0	570	570
5	G4SJH/P	0	0	304	304
6	G4TNX/P	0	170	0	170

Scottish Microwave Round Table

Registration is now open for the Scottish Microwave Round Table which will be held in Burntisland on Saturday 11th November.

Visit https://gmroundtable.org.uk/about/ for more details.

73, Martin
GM8IEM – IO78HF

Midlands Microwave Round Table

Saturday 2nd December Lectures, Antenna Test Range, Test Equipment, Junk Sale and Hot Lunch.
Sunday 3rd December Continuation of some activities and other stuff depending on demand.
Accommodation available 1st, 2nd and 3rd subject to confirmation.

Contact Paul Nickalls G8AQA to book or discuss
paulnickalls@btinternet.com
01694 772 441

Beacon News

From Maurice F5EFD :

Beacons F1ZAO,F1ZAP,F1ZAQ have just restarted after 5 years off…

New frequencies are as follow: 5760,900MHz 10368,900MHz 24048,990MHZ.

Running about 28dBm (24 on 24GHz) in waveguide slots antennas (as before) they are located in IN88HL 300m ASL.

73's Maurice F5EFD

Crawley Microwave Round Table

Sunday 17th September.

Info available https://carc.org.uk/

Talks will commence at 13:30 and will be streamed live on YouTube by following this link:
https://youtube.com/live/8kUBfxbe-_s?feature=share

Crawley Microwave Round Table Program Sunday 17th September 2023

Welcome to the Crawley Roundtable hosted once again at the premises of the Crawley Amateur Radio Club. The morning session will feature the usual 'bring and buy' sale, so if you have surplus radio items then please bring them along. Again this year following we will be holding a heat for the UK Microwave Group annual Project contest. Please do bring along your constructed equipment or project and enter. Entries do not necessarily need to have been finished during the last year. Please note that the contest will also accept software entries as well as hardware. CARC award the G3GRO trophy to the winner of this round. The winner will also go on to be considered, together with entries from all the other round tables over a year both before and after this event for the G3VVB trophy.

Below is the timetable:

10:30: Venue opens 10:30: 'Bring and buy', general socialising

12:00 UKuW Group Project contest round/G3GRO trophy judging commences

12:15 Lunch (hot dogs and burger rolls etc and tea/coffee available)

13:15 Welcome and results of the Project contest heat

13:30 Talks: (Live streaming at https://youtube.com/live/8kUBfxbe-_s?feature=share)

TBD

Advances in 122 and 134 GHz, Chris G0FDZ IC-905 transceiver,

Denis Stanton, G0OLX ~16:30 End of meeting

The venue is the Crawley Amateur Radio Club's hut and directions can be found at: http://carc.org.uk/find-us/

All timing are approximate – very approximate!

The venue is the Crawley Amateur Radio Club's hut 18 RH10 5PH Directions can be found at:

http://carc.org.uk/find-us/

UKuG MICROWAVE CONTESTS – 2023

UKuG MICROWAVE CONTEST CALENDAR 2023

Dates, 2023	Time UTC	Contest name
10-Sep	0900 - 1700	3rd 24GHz Contest & 24GHz Trophy
10-Sep	0900 - 1700	3rd 47GHz Contest
10-Sep	0900 - 1700	3rd 76GHz Contest
24 -Sep	0600 - 1800	5th 5.7GHz Contest
24 -Sep	0600 - 1800	5th 10GHz Contest
15 -Oct	0900 - 1700	4th 24GHz Contest
15 -Oct	0900 - 1700	4th 47GHz Contest
15 -Oct	0900 - 1700	4th 76GHz Contest
12 -Nov	1000 - 1400	5th Low band 1.3/2.3/3.4GHz

UKuG MICROWAVE CONTEST CALENDAR 2023

Month	Contest name	Certificates	Date 2023	Time GMT	Notes
Jan	1.3GHz Activity Contest	*Arranged by RSGB*	17-Jan	2000 - 2230	RSGB Contest
Jan	2.3GHz+ Activity Contest	*Arranged by RSGB*	24-Jan	1930 - 2230	RSGB Contest
Feb	1.3GHz Activity Contest	*Arranged by RSGB*	21-Feb	2000 - 2230	RSGB Contest
Feb	2.3GHz+ Activity Contest	*Arranged by RSGB*	28-Feb	1930 - 2230	RSGB Contest
Mar	REF/DUBUS EME 3.4GHz	*Arranged by REF/DUBUS*	4-Mar to 5-Mar	0000 - 2400	REF/DUBUS EME 3.4GHz
Mar	Low Band 1296/2300/2320/3400MHz	F, P,L	5-Mar	1000 - 1600	First 4 hours coincide with IARU
Mar	1.3GHz Activity Contest	*Arranged by RSGB*	21-Mar	2000 - 2230	RSGB Contest
Mar	2.3GHz+ Activity Contest	*Arranged by RSGB*	28-Mar	1930 - 2230	RSGB Contest
Jun	REF/DUBUS EME 2.3GHz	*Arranged by REF/DUBUS*	25-Mar to 26-Mar	0000 - 2400	REF/DUBUS EME 2.3GHz
Apr	Low Band 1296/2300/2320/3400MHz	F, P,L	2-Apr	1000 - 1600	
Apr	1.3GHz Activity Contest	*Arranged by RSGB*	18-Apr	1900 - 2130	RSGB Contest
Apr	REF/DUBUS EME 1.2GHz	*Arranged by REF/DUBUS*	22-Apr to 23-Apr	0000 - 2400	REF/DUBUS EME 1.2GHz
Apr	2.3GHz+ Activity Contest	*Arranged by RSGB*	25-Apr	1830 - 2130	RSGB Contest
May	*432MHz & up*	*Arranged by RSGB*	6-May to 7-May	1400 -1400	RSGB Contest
May	*10GHz Trophy*	*Arranged by RSGB*	7-May	0800 - 1400	Sunday, to coincide with IARU
May	Low Band 1296/2300/2320/3400MHz	F, P,L	7-May	0800 - 1400	Aligned with IARU event
May	24GHz/47/76GHz		14-May	0900-1700	
May	1.3GHz Activity Contest	*Arranged by RSGB*	16-May	1900 - 2130	RSGB Contest
May	REF/DUBUS EME 10GHz & Up	*Arranged by REF/DUBUS*	20-May to 21-May	0000 - 2400	REF/DUBUS EME 10GHz & up
May	2.3GHz+ Activity Contest	*Arranged by RSGB*	23-May	1830 - 2130	RSGB Contest
May	5.7GHz/10GHz	F, P,L	28-May	0600-1800	
Jun	Low Band 1296/2300/2320/3400MHz	F, P,L	4-Jun	1000 - 1600	Aligned with some Eu events
Jun	1.3GHz Activity Contest	*Arranged by RSGB*	20-Jun	1900 - 2130	RSGB Contest
Jun	5.7GHz/10GHz	F, P,L	25-Jun	0600-1800	
Jun	2.3GHz+ Activity Contest	*Arranged by RSGB*	27-Jun	1830 - 2130	RSGB Contest
Jul	VHF NFD (1.3GHz)	*Arranged by RSGB*	1-Jul to 2-Jul	1400 - 1400	RSGB Contest
Jul	24GHz/47/76GHz		9-Jul	0900-1700	
Jul	REF/DUBUS EME 5.7GHz	*Arranged by REF/DUBUS*	15-Jul to 16-Jul	0000 - 2400	REF/DUBUS EME 5.7GHz
Jul	1.3GHz Activity Contest	*Arranged by RSGB*	18-Jul	1900 - 2130	RSGB Contest
Jul	2.3GHz+ Activity Contest	*Arranged by RSGB*	25-Jul	1830 - 2130	RSGB Contest
Jul	5.7GHz/10GHz	F, P,L	30-Jul	0600-1800	
Aug	ARRL Microwave EME	*Arranged by ARRL*	12-Aug to 13-Aug	0000 - 2359	ARRL EME 2.3GHz & Up
Aug	1.3GHz Activity Contest	*Arranged by RSGB*	15-Aug	1900 - 2130	RSGB Contest
Aug	2.3GHz+ Activity Contest	*Arranged by RSGB*	22-Aug	1830 - 2130	RSGB Contest
Aug	5.7GHz/10GHz	F, P,L	27-Aug	0600-1800	
Sep	ARRL Microwave EME	*Arranged by ARRL*	9-Sep to 10-Sep	0000 - 2359	ARRL EME 2.3GHz & Up
Sep	24GHz/47/76GHz		10-Sep	0900-1700	
Sep	1.3GHz Activity Contest	*Arranged by RSGB*	19-Sep	1900 - 2130	RSGB Contest
Sep	5.7GHz/10GHz	F, P,L	24-Sep	0600-1800	
Sep	2.3GHz+ Activity Contest	*Arranged by RSGB*	26-Sep	1830 - 2130	RSGB Contest
Oct	*432MHz & up*	*Arranged by RSGB*	7-Oct to 8-Oct	1400 - 1400	IARU/RSGB Contest
Oct	*1.3 & 2.3GHz Trophies*	*Arranged by RSGB*	7-Oct	1400 - 2200	RSGB Contest
Oct	24GHz/47/76GHz		15-Oct	0900-1700	
Oct	1.3GHz Activity Contest	*Arranged by RSGB*	17-Oct	1900 - 2130	RSGB Contest
Oct	2.3GHz+ Activity Contest	*Arranged by RSGB*	24-Oct	1830 - 2130	RSGB Contest
Oct	ARRL EME 50-1296MHz	*Arranged by ARRL*	28-Oct to 29-Oct	0000 - 2359	ARRL EME Contest
Nov	Low Band 1296/2300/2320/3400MHz	F, P,L	12-Nov	1000 - 1400	
Nov	1.3GHz Activity Contest	*Arranged by RSGB*	21-Nov	2000 - 2230	RSGB Contest
Nov	ARRL EME 50-1296MHz	*Arranged by ARRL*	25-Nov to 26-Nov	0000 - 2359	ARRL EME Contest
Nov	2.3GHz+ Activity Contest	*Arranged by RSGB*	28-Nov	1930 - 2230	RSGB Contest
Dec	1.3GHz Activity Contest	*Arranged by RSGB*	19-Dec	2000 - 2230	RSGB Contest

EVENTS 2023

September 8-10	68.UKW Tagung Weinheim, Germany	www.ukw-tagung.de
September 17	Crawley Round Table	carc.org.uk
September 17-22	European Microwave week, Berlin	www.eumweek.com
October 21	BAT Online Convention (CAT 23 Part 2)	http://batc.org.uk/live
November 2	IET Millimetre Colloquium Glasgow	https://events.theiet.org/events/iet-colloquium-on-mm-wave-and-thz-engineering/
November11	Scottish Round Table	www.gmroundtable.org.uk
November 20 -Dec 15	ITU WRC 23, Dubai	rsgb.org/wrc-23
December 2	Midlands Roundtable, Eaton Manor, SY6 7DH	eatonmanor.co.uk/midlands-round-table-event/

80m UK Microwavers net

Tuesdays 08:30 local on 3626 kHz (+/- QRM)

73 Martyn Vincent G3UKV