An Amateur Radio publication for the Microwave Enthusiast

scatterpoint

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Barry G8AGN's dish illuminated with red LED


Gavin Taylor GM4GAV's talk at GMRT

UK Microwave Group

Subscription Information

The following subscription rates apply

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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

A 30THz transmitter using a directly modulated 2-PSK QRSS-CW source

Barry Chambers, G8AGN

Over the summer of 2023, Bob G4APV and I carried out a number of tests at 30THz using the chopper wheel transmitter and SDR receiver described previously in [1] - [3]. The longest DX achieved was 450m; this was carried out over a reservoir near Sheffield and indicated evidence of possible interesting propagation effects. A later test over a longer path at the same location was unsuccessful and this has led to consideration of how to improve the transmitter's electrical efficiency and radiating characteristics.
The chopper wheel transmitter has the advantage that it gives good control of the effective switching on and off of the 30THz radiation but it is inefficient in that it requires about 60W of continuous power at 12V. The two MCH (metal ceramic heater) sources take the form of flat plates and these radiate energy almost hemi-spherically which means that little is directed towards the distant receiver. Hence, an attempt was made to locate a single smaller MCH source and its associated chopper wheel at the focus of a standard microwave dish antenna with a f/D of 0.25. The resulting assembly is shown in Figure 1.

Figure 1: MCH heater and chopper wheel placed at dish focus

To facilitate alignment of the transmitter dish in the direction of the distant receiver, the MCH source could be replaced by a 3W red LED and the resulting visible beam used to "brighten up" the receiver telescope tube end cap which had been coated with 3M prismatic retro-reflective tape. The disadvantage of this approach can be seen in Figure 2, where the excessive dish aperture blockage is obvious and this changes as the chopper wheel rotates.

Figure 2: Here the MCH heater has been swapped with a 3W red LED for dish alignment

At present, the only obvious alternative approach appears to be trying to use a directly modulated 30THz source. Remi M0LRH tried this in early 2023 using a custom-made helical filament made from very thin resistance wire which operated at about 0.8W power dissipation. The filament was mounted on a mica substrate which was then placed in a plastic 3D-printed telescope eyepiece adapter for use with a 76mm Celestron™ reflecting telescope. The current through the filament was switched on and off using an Arduino-controlled FET to achieve 2-PSK QRSS6-CW with a carrier frequency of 2Hz. A DX of about 190m was achieved using this approach [4]. Because of heat dissipation limitations and the fragility of the heater helix, it appeared that this approach could not be scaled up and so was rejected initially by this author.
Recently, however, a more durable source of “filament” has been found on eBay in the guise of a flameless electrically heated cigarette lighter, as shown in Figure 3. The lighter contains a small double spiral heater element, about 1cm in diameter, which appears to have been etched or stamped out of very thin stainless-steel sheet, as shown in Figure 4. Originally, the heater element was made to glow red hot using a short burst of current supplied by a two-cell LiPo battery via a custom IC. The element resistance was found to be about 1.5R which implies that it requires about 2A of current and dissipates about 6W, most of which will be in the form of thermal radiation. Furthermore, the filament thermal time constant appeared to be extremely short which implied the possibility of obtaining a reasonably fast 2-PSK carrier frequency when used as a directly modulated 30THz source.

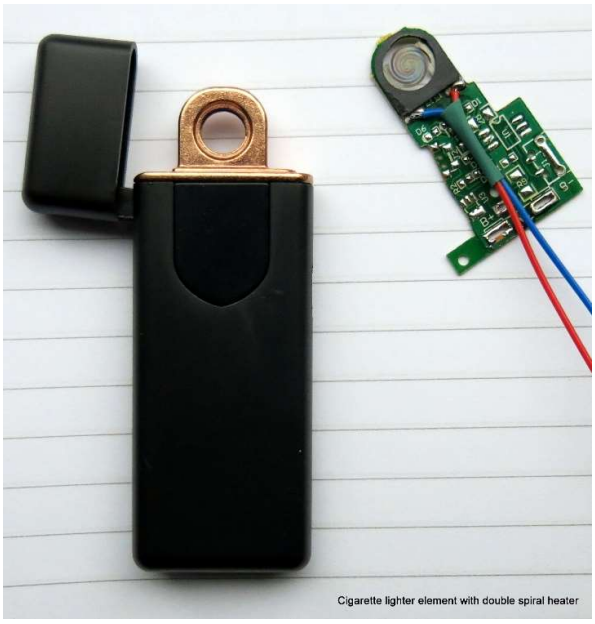


Figure 3: Flameless electrical cigarette lighter

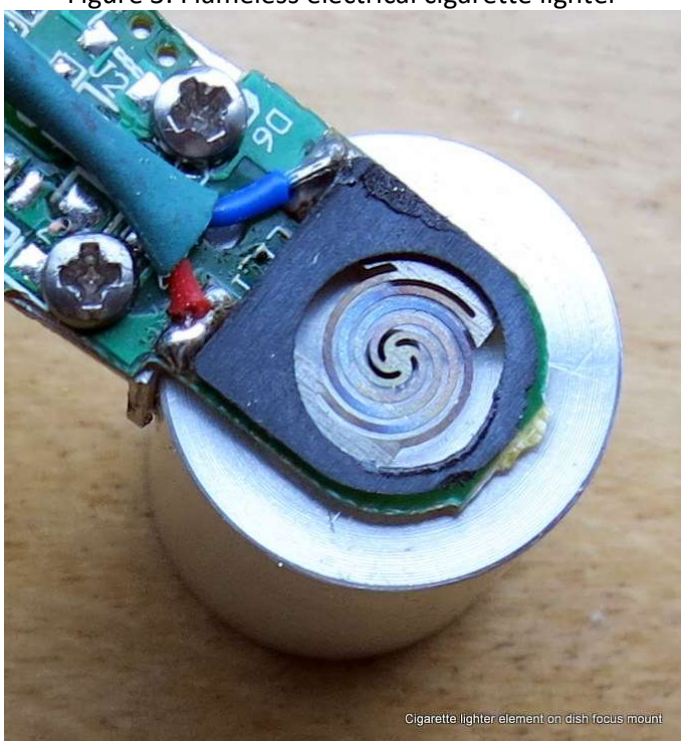


Figure 4: Double spiral heater element

To utilise the spiral heater in my new 30THz transmitter, all the electronic components on the original lighter PCB were removed and wires were soldered directly to the spiral contacts. The modified PCB was then mounted on a metal adapter which could be positioned at the focus of my 25cm 0.4 f/D ex-signalling lamp silvered parabolic reflector which had been used in my original 30THz Rx. The arrangement is shown in Figure 5.

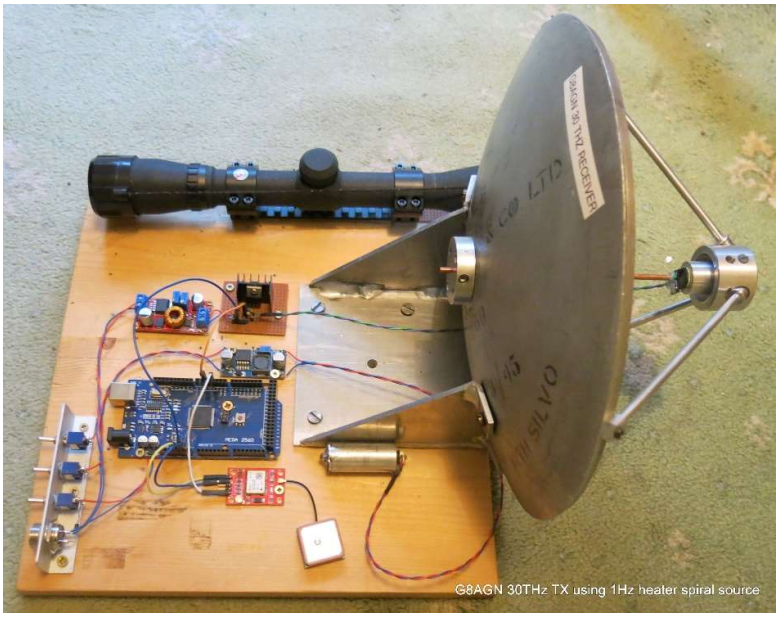


Figure 5: Directly modulated 30THz transmitter

It is possible to swap the spiral heater element for a 3W red LED (shown in Figure 5 near to the GPS antenna) and the visible beam from this can be used for aligning the transmitter onto the distant receiver telescope aperture. This is facilitated by covering the telescope tube end cap with 3M prismatic retro-reflecting tape. Such an approach is very effective even at long ranges when viewed through the transmitter telescopic sight.

The basic circuit of the new 30THz transmitter is shown in Figure 6. Not shown are the two SMPSs which are required to power the spiral heater and the 3W red LED. (Two are required because of the different supply voltage requirements).

The spiral heater is switched on and off via a IRF540 power FET whose gate voltage is controlled by an Arduino. If only very short 2-PSK QRSS-CW messages are to be transmitted, then an Arduino Nano or Uno could be used, but for longer messages more memory is required and a Mega2560 is suggested. I did try using the new Uno R4 but was unsuccessful because of an obscure compilation/compatibility issue.

A number of short-range tests have been carried out so far to examine the new transmitter's performance when using different 2-PSK carrier frequencies in the range 1 to 4Hz. As an example of the received data at a DX of 20m (the length of my garden) when using 2-PSK QRSS1-CW at a carrier frequency of 4Hz (which is the same frequency as used in my chopper wheel transmitter), Figure 7 shows a screen shot of typical raw (unprocessed) received data and Figure 8 shows data after bandpass filtering (4Hz CF, 1Hz BW) which essentially removes the raw signal's varying DC shift.

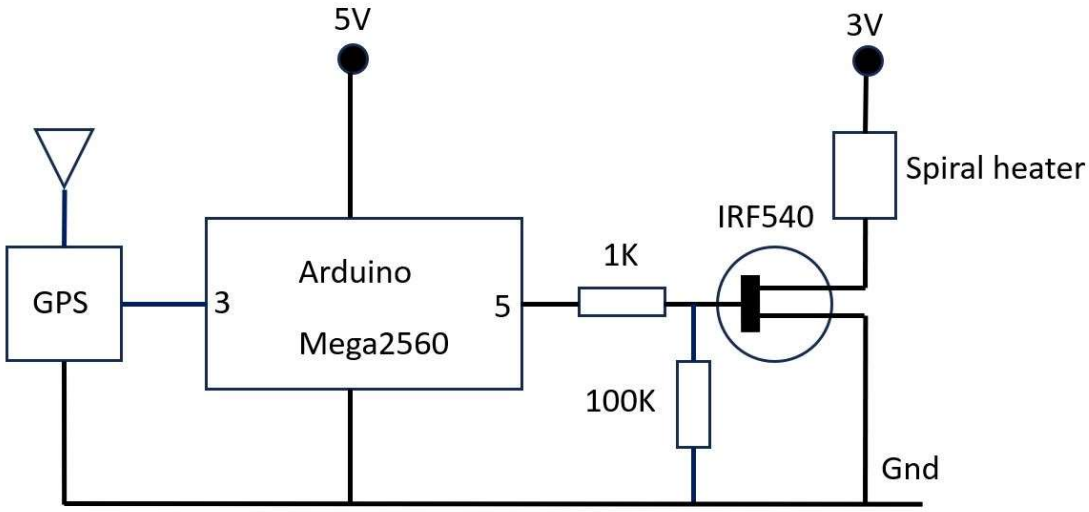


Figure 6: Basic circuit schematic of spiral heater transmitter.

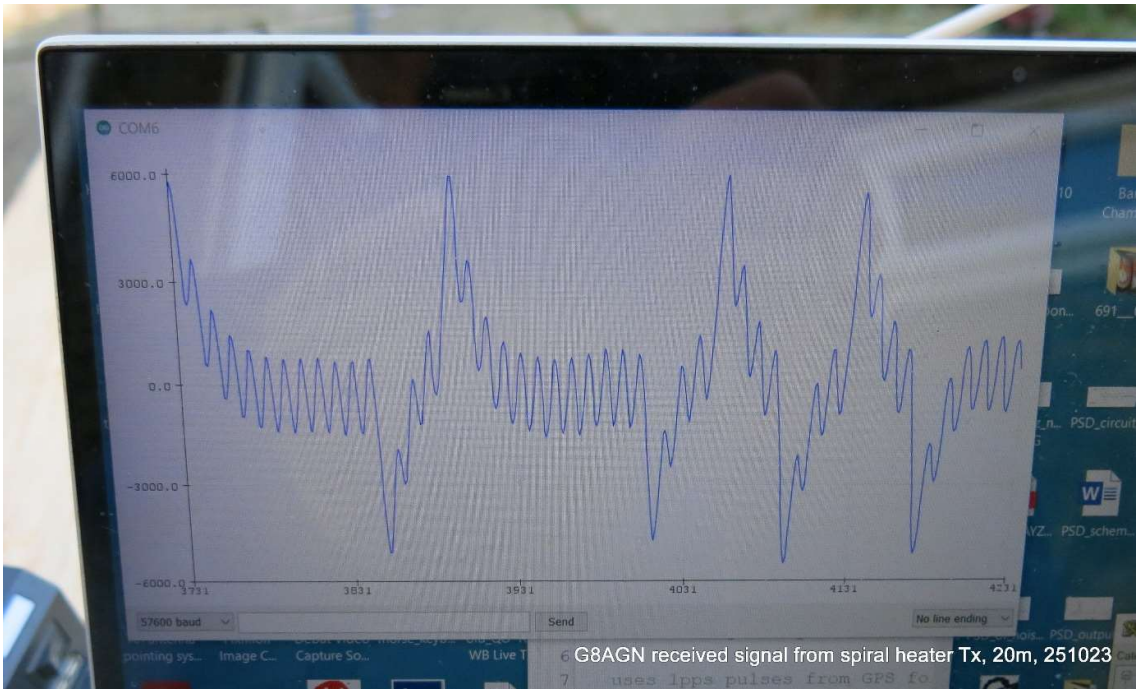


Figure 7: Typical raw data received at 20m DX when transmitting 4Hz 2-PSK QRSS1-CW

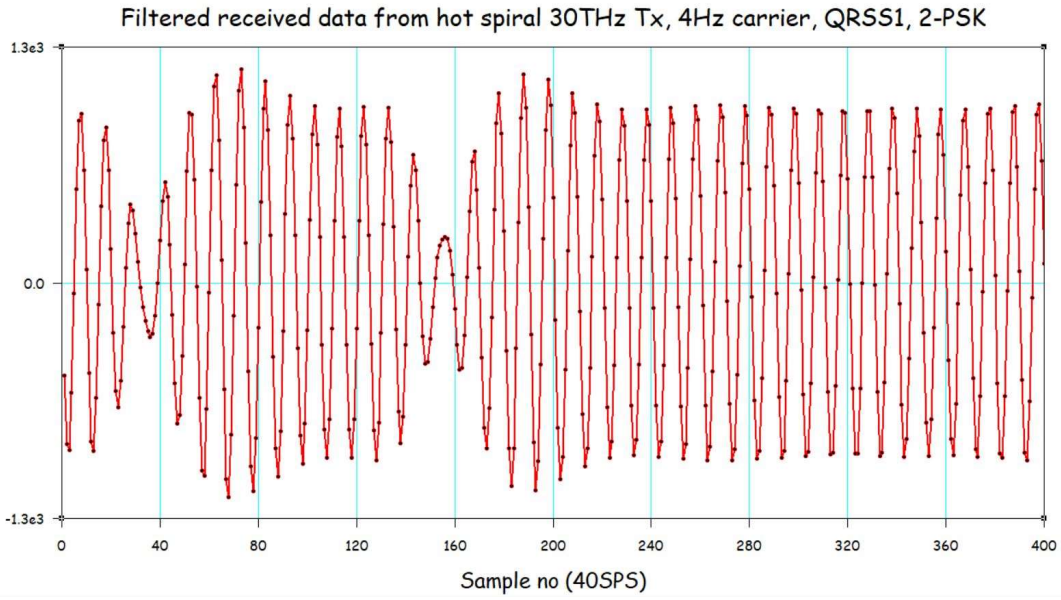


Figure 8: Typical filtered data received at 20m DX when transmitting 4Hz 2-PSK QRSS1-CW

The waveforms shown in Figures 7 and 8 have very clearly defined 180°phase transitions which the receiver phase sensitive detector needs to demodulate the CW dots and spaces forming the transmitted message. Figure 9 shows a partial decode of the message transmitted during this test. The relevant data is in the right-hand column.

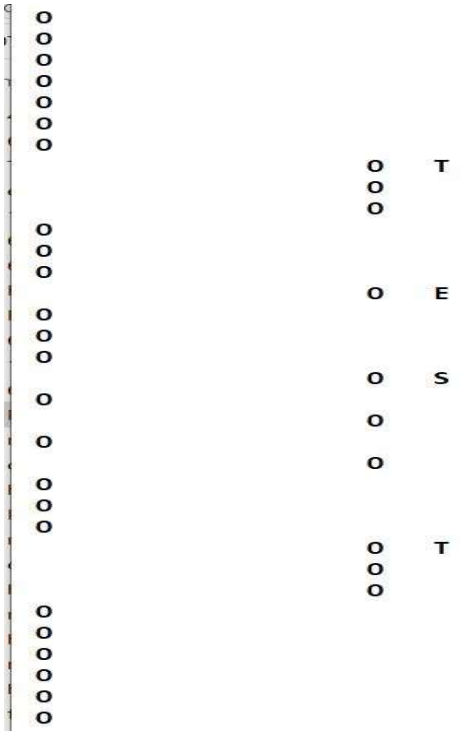


Figure 9: Snip of decoded message sent during 20m test of new transmitter with 4Hz carrier frequency

In conclusion, the new directly modulated 30THz transmitter is showing promise and further testing over longer DX is anticipated in the near future.

References

1. B. Chambers, “Operating on the 30THz band, Part 3”, RadCom Plus, Vol 8, No 1, July 2023.
2. B. Chambers, “A binary-phase modulated transmitter for the 30THz infrared band”, DUBUS, 2/2023
3. B. Chambers, “ A software defined receiver for the 30THz infrared band”, DUBUS, 3/2023.
4. R. Lecybyl, “30THz at Wasdale Head (16 February 2023)”, 30THz at Wasdale Head (16th February 2023) - YouTube

WB-SG2-8G Signal Generator as Test Signal Source

Roger G8CUB

The range of BG7TBL Signal Generators, include an 8GHz version. This is relatively low cost around £150. Although some suppliers are adding silly postage costs. The only obvious difference between the SG1 & SG2 is the LCD and box size. This signal generator is fixed output level 35MHz – 8GHz (mine worked to 9GHz+). Output level around 5dBm dropping down to 0dBm at the highest frequency. Like the more expensive versions, it has the following features:
1Hz – 200MHz output on Ch.1
10MHz reference in/out.
Sweep
100% AM modulation (i.e. full on/off) 1Hz – 1MHz

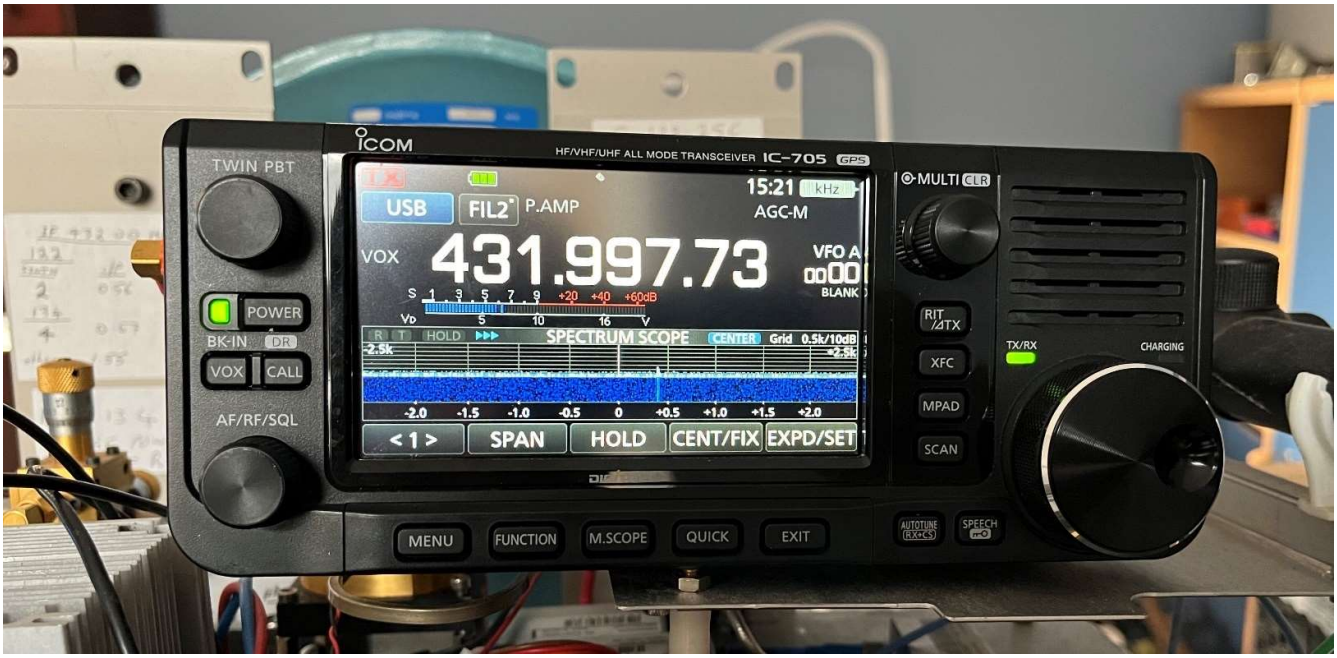
What it does not have is amplitude control, or last frequency memory (unfortunately).
The output spectrum / phase noise is pretty good. Frequency accuracy well within 1kHz at the highest frequency.
I assume it uses a 4.4GHz synth doubled. Though it is very much better than cheap synth boards.
With one of my Elcom synths dying, I needed at test source for 24 & 47GHz. So I was thinking of adding an amplifier and diode to get harmonics. In practice they were not required!

So using the frequencies set on the generator, this is the output received at 5 metres. With **nothing** connected to the generator.

	Frequency	harmonic	
24,048.3	8016.1	3	S9 + 20dB
47,088.3	6726.9	7	S9
75,976.2	8441.8	9	easily detectable signal (S2/3 in front of the dish).

Of course it would not work at 122GHz. Oh yes it did….
Not a big signal but easily seen at 3 metres. In all cases the signal appeared to emanate from the LCD display. At 122GHz, I had to turn the generator to around a 30 degree angle.

122.4GHz	7200	17	detectable @ 3 metres



122.4GHz harmonic received at 3 metres. Line on the spectrum can be seen between 0 and 0.5 (kHz)

The 8GHz signal generator is on table sat vertically @ 30 degrees for best output at this frequency.

Generator Review
https://reeve.com/Documents/Articles%20Papers/Reeve_WB-SG1_SigGen.pdf

24GHz my Journey so far

Adrian G4UVZ

At the end of the summer I completed my Wavelab transceiver and received GB3AMU in Cardiff and GB3SCK Bell Hill ...just before it was taken off air. I also worked G8IKP and GW3TKH both at S9 over line of sight 40-50 K distances, all from Coome Beacon near Chard about 25 minutes from home.

Over the last couple of months I have been re-boxing the transceiver to be fully weatherproof and also weather proofing the feed with a table tennis ball which thus far has been successful .

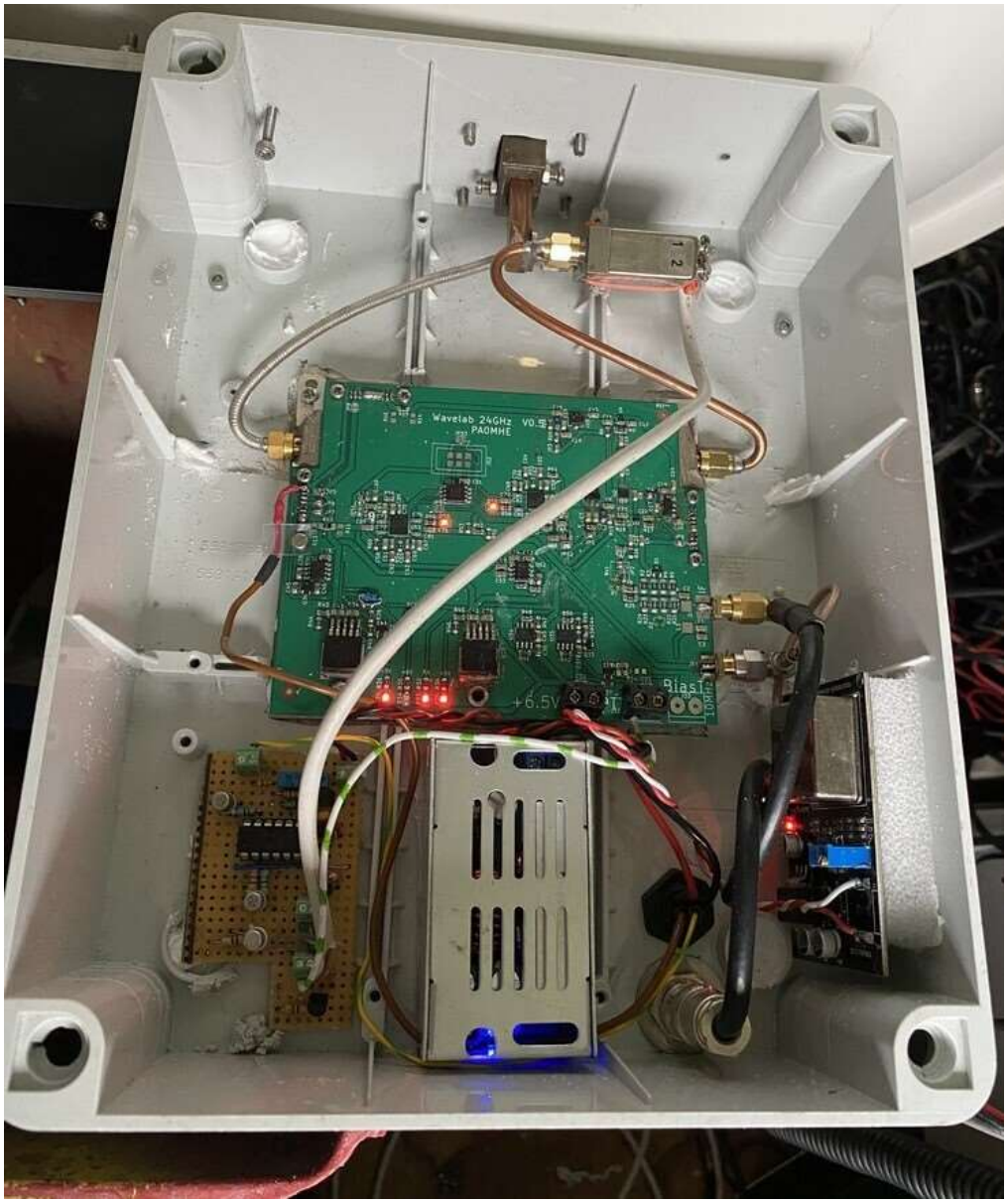
In the absence of any beacons which I could receive in the shack, I have been experimenting initially with the Explorer sig gen on 4 GHz and latterly with the 'Russian' synthesised beacon transmitted tuned to 8.016 GHz feeding into a scalar 10GHz launcher. This system only produces -10 dBm on 8 GHz but the third harmonic was S9 ++ at the bottom of the garden ....about 40 M distant.

Yesterday the whole transceiver system was mounted on the end of the bungalow. In the afternoon I worked Keith GW3TKH over a non optical path on SSB ...not strong but Q5 ! The heading to the Cardiff beacon is only a degree away from Keith's heading and it was with great joy that I found a very weak signal popping in and out of the QSB...I am not sure how much power AMU transmits ...but it does beam SE which is way off my heading in IO80 KX

Todays interesting reception has been from my beacon transmitted as above but 9 K away....over a line of sight path it is peaking S3 ! Quite amazing.

So I am now hoping that there will be other 24 GHz stations who might consider A setting up from home or B going out /P somewhere in the South West I have a clear take of line of site for approx. 50 K from north through to 70 degrees. Finally I have a couple of friends who are interested in building Wavelab systems...if you have bought a module and it is sitting on a shelf ...please get in touch

More details on the elevation construction to follow.....



Adrian's 24GHz Wavelab transverter

Satellite Proposal for discussion

At the recent RSGB Convention / AMSAT-UK Colloquium at Milton Keynes, Frank Zeppenfeldt, PD0AP, from the European Space Agency Satellite Communications Group, made a presentation on the subject of a future ESA backed amateur satellite mission to GEO. Frank has obtained funding of 250,000 Euro to investigate the possibility of an Amateur satellite or payload to be placed in GEO orbit. The presentation emphasises innovation and microwave communications.

Frank's full presentation is available on YouTube
https://www.youtube.com/watch?v=_FTvlEyDa1Y&t=37s&pp=ygUYYW1zYXQgVUsgY29sbG9xdWl1bSAyMDIz

As a member of the UK microwave / Satellite community, we would like to invite you to contribute to the design concept of this mission.
We would welcome any thoughts you may have via e-mail etc. and we will add those to the overall discussion.

In a follow up Teams meeting on Wed 1st Nov between Frank and AMSAT-UK, it became clear that an ideal solution from an ESA perspective should provide a service to amateurs in Canada as well as Europe. - Canada is an ESA co-operating state. Note that any GEO covering part or all of Canada will also cover a significant proportion of The USA. AMSAT-UK is working to identify a suitable range of GEO slots which meet this requirement.

What is needed, is a proposal for 2 or 3 ideas for what this GEO mission (most likely a hosted payload) should include. See notes / Franks presentation.

AMSAT-UK aims to respond with some proposals by Dec 4th. These do not need great detail, but should justify bands used and other ideas.

For Example.
What bands should be included. - This project is not aimed as a QO-100 replacement.
Is 24G and up practical? Can a ground station generate enough power economically with today's available technology for an uplink on 24/47/76G
Given a resource in space, is there an 'easy' entry level on say 24G - RX or TX so we can attract new microwave operators.
Should the transponder/s be old style bent pipe configurations or contain on board processing to decode RX signals then encode the downlink?
What digital protocols are appropriate for the above?
Is 5.6G viable as an uplink given the WiFi presence? Any observations on 6cm interference would be valuable.
Note: The antennas on the satellite will likely have a min gain of 20dB as this covers the visible portion of the Earth from geostationary orbit.

In recent discussions with BATC etc we have concluded that a 10G downlink should be the baseline to take advantage of the large existing userbase and that a minimum power output onboard needs to be 10W into a 20dB antenna.

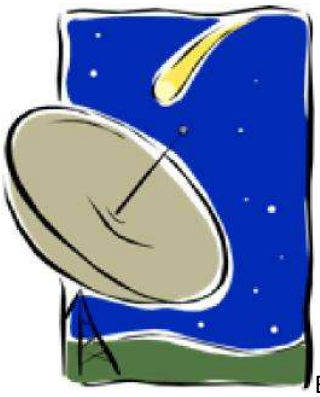
If the proposals are considered substantial enough for further discussion, we have suggested a meeting at the ESA technical centre in The Netherlands around end Feb / March next year. This 2 day (?) event would be funded by ESA probably via A-UK. If this meeting happens, then representatives from A-UK BATC and UK microwave group could attend along with other groups from The EU and USA so we can take the project forward.

Frank anticipates doing some initial prototyping and then present the findings to a meeting of GEO platform operators next year. Hopefully this will find a commercial partner with a platform going to an appropriate GEO slot.

If any of this is of interest, please let us know your thoughts.
This is a rare opportunity. I hope you can give it your support.

David G0MRF / Noel G8GTZ

Activity News October 2023



By John G4BAO

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

From Denis G0OLX

I have been active on 10GHz Moonbounce recently. On Sept 30th I worked, OZ1LPR, and F2CT. On October 7th , OK2AQ, PE1CKK, and on October 22nd UR3VKC and IK0HWJ, the quickest contact so far, taking just 5 minutes to complete. At the time, DL0SHF was decoding -7 with Noise reduction and -12 without NR. I use the built in NR which is in the Icom IC9700 and the IC705. I get a much better decode and the signal shows up on the display on WXJT-X much brighter. The experts say not use it but I find it very beneficial and sure that I would struggle decoding some stations without it! It can add 0.2 seconds on the DT which I take is the time to process the signal It would be interesting if someone with a bigger system could try it to see if they also get the improvements. If you do, (or don't) let me and the editor know. I used it on the IC905 on 2M and saw the same improvement.

From Phil G3TCU

Graham G3TCT and I operated as M0HNA/P from Walbury Hill IO91GI yesterday on 23cm in the last 'Low Microwave Bands' session of the year. Our usual associates who operate the 13 & 9cm bands being unavailable. Barry G4SJH having a particularly good excuse being in Dubai for the WARC. Access to the site was 'challenging' given the immense amounts or rain we've had recently but fortunately, my 4WD Transit got through the mud with no difficulty. It was gruesome setting up; light rain & cold easterly wind. Conditions seemed to be completely flat but we were rewarded with a good bunch of QSOs. We got off to a good start with 2X DL, 2X F, 1X PA & GU in the first 15 minutes. I have 400W from a MRF13750 PA feeding a 67 ele Wimo on top of a 12m SCAM and a DDK masthead pre-amp for my portable system. We ended up with 39 QSOs including 6 X DL, 1 X EI, 2 X F & 4 X PA in the log. Many were weak CW and a few by A/S.
Quite a satisfying outcome for a winter session, we're grateful for everyone who came on.

From Gus G3ZEZ

In the October contest I worked LX/ON4MU/P on 10GHz at S9+ plus on the Sunday morning of the contest. There were also very good 1.3GHz conditions to the SE. ODX was HB9XC plus lots of other stations.
Gus is interested to know if LX has been worked before on 10GHz via Tropo?

From Mike G8CUL

The last UKuG Low Band Contest for 2023 took place on Sunday 12th November. Ann, G8NVI and I were active on 1.3, 2.30, 2.32 and 3.4GHz. Activity on 1.3GHz was good with 29 QSOs completed. That included 1 EI, 1 GD, 1 GU,1 GW, 1 GM, 2 French, 4 Dutch and 3 German stations. DF2VJ called right at the end of the contest but we ran out of time before a QSO could be completed. He would have given us a best DX of 629km. As it was our best DX was with DC1EHG at 'only' 609km! 2.30GHz activity was poor with only John, G3XDY and Neil, G4LDR being worked. 2.32GHz was better with 10 QSOs completed, with the best DX being DL5EBS at 578km, PE1CKK was also worked. 3.4GHz was slow with only 4 QSOs completed, the best DX being John, G3XDY. It was all an interesting and enjoyable contest with the equipment all behaving itself – will I now regret that statement?

From Bob G8HGN

Also in the October contest, I used my IC9700 and a temporary antenna, to make some QSOs on 1.3GHz. The 17 ele antenna is homebrew to a design by G0KSC. ODX was HB9XC in JN37, followed closely by DR9A in JN48. The latter were a tremendous signal for most of the contest.

From M1CRO/P

Another report from the October contest sees M1CRO/P operated from Walton-on-the Naze in Essex, and their QSO Map looked impressive on both 1.3 and 10GHz. QSOs were made on 1.3GHz from Northern Spain to Potsdam in Germany and on 10GHz down to Central France.

UK Microwave Group Committee and Representative Roles

The UKuG committee are looking for additional volunteers to take on roles in running the group. If you would like to help in any way, please get in touch with our Secretary (John G3XDY, gxdy@btinternet.com) or with any of the other committee members or representatives listed in Scatterpoint. We will be very happy to discuss how you can help, and what would be involved.
John G3XDY

UK Microwave Group Contest Ladder

The UKuG Committee is considering running an annual contest ladder which aggregates all the contest scores made by members over a calendar year in any microwave event run by UKuG, RSGB, or BATC.
We are looking for a software/web developer who can help by developing a web site that would aggregate scores from logs submitted as .edi files by members.
Comments on the proposed ladder and offers of help should be addressed to the Secretary in the first instance: secretary@ukmicrowaves.org

UK Microwave Group Draft Contest Ladder Rules:

1. Introduction. The main object of the Microwave Activity Ladder is to promote activity on all bands above 1GHz. Anyone interested in microwaves, whether they are members of the UK Microwave Group or not, are welcome to take part.
2. Eligibility. The contest is open to all licensed radio amateurs who are equipped to transmit on amateur bands above 1GHz. There is no receive only section.
3. Dates and Times. The competition will run from 0000hrs UTC on 1st January 2024 to 2359hrs UTC on the 31st December 2024.
4. Location. Operating locations must be within the terms of your licence. If operating away from your main station, please get the permission of the landowner.
5. Frequencies and Modes. This Ladder is restricted to any amateur band above 1Ghz, using any transmission mode including SSB, CW, FM data and ATV modes.
6. Power. Output power must not exceed that set out in the terms of your licence.
7. Exchange. Both a Call Sign and a 3 digit serial number or 4 digit code number if using ATV modes must be conveyed via RF and received by another station. Reception of the transmitted signal can only be via the RF link.
Note that the code number can either be a standard 3 digit serial number for narrow band or four random chosen digits for ATV modes.
8. Awards The UKmicrowave group will award a certificate to the overall winner and 4 sub band winners at the group AGM.
9. Disputes. The decision of the contest manager and/or the UKMicrowave group Committee is final.
10. Spirit of the Contest. The contest is not adjudicated and relies on the participants being fair and honest – you are only cheating yourself! Contests mean activity and good fun, join in and, even if you only work one or two stations, please use the Ladder to record your activity.

5.7GHz Contest September 2023

Final session of the year. Only two entrants and the WX had turned to winter!

Well done to winner David M0GHZ who also worked the best DX at 340km with M0DTS/P. Runner up Neil G4LDR.

73
Chris G0WUS

5.7GHz Contest September 2023

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX Kms
1	M0GHZ	IO81VK	5	967	M0DTS/P	340
2	G4LDR	IO91EC	1	55	M0GHZ	55

10GHz Contest September 2023

Final event of the year. Winter is here, cold high winds hence lower turn out! Many reporting a flat band and no real DX as such.

Well done to Open winner John G4ZTR and Neil G4LDR as runner up who also had the best DX working F8DLS/P.

No entrants in the restricted section.

73
Chris G0WUS

10GHz Contest September 2023

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX Kms
1	G4ZTR	JO01KW	17	4093	F6DKW	365
2	G4LDR	IO91EC	9	1835	F8DLS	426
3	GW4MBS/P	IO71XW	9	1555	G4ZTR	338
4	M0GHZ	IO81VK	9	1263	G3XDY	246
5	GW4JQP	IO71KR	4	774	G4LDR	253

5.7GHz / 10GHz 2023 overall championship results

The overall results for the 5.7/10GHz Championship for 2023 each entrant's best three scores from a possible five sessions for both bands and both sections on 3cm.

We thank all entrants for their hard work and great effort in getting on air either from a fixed location or being out portable.

Therefore congratulations go to the following:-

5.7GHz Winner G6ZME/P
Runner up David M0GHZ
Third place Neil G4LDR

10GHz Open section
Winner John G4ZTR
Runner up Neil G4LDR
Third place David M0GHZ

10GHz Restricted Section
Winner Adrian M0PAI
Runner up Mike G7AQA
Third place Phil GW0JSB

A Very well done to these and again all whom entered and I look forward to receiving your logs in the championship in 2024

73 GL
Chris G0WUS

5.7/10GHz Championship Tables

Positions after all five events, best three count to the total

5.7GHz

Pos	Callsign	28/05/2023	25/06/2023	30/07/2023	27/08/2023	24/09/2023	TOTAL
1	G6ZME/P	1000	1000	871	1000	0	3000
2	M0GHZ	563	980	552	950	1000	2930
3	G4LDR	474	0	1000	829	55	2303
4	G4CLA	791	952	0	0	0	1743
5	M0EYT/P	466	0	0	967	0	1433
6	G4BRK	295	415	300	660	0	1375
7	G1EHF/P	583	0	351	0	0	934
8	GW4HQX/P	0	0	0	678	0	678
9	G1DFL/P	0	0	332	0	0	332
10	G7WHI/P	0	0	224	0	0	224
11	G8GKQ/P	0	0	0	95	0	95
12	GW3TKH/P	0	0	0	92	0	92
13	GW0MDQ/P	44	0	0	0	0	44

10GHz Open

Pos	Callsign	28/05/2023	25/06/2023	30/07/2023	27/08/2023	24/09/2023	TOTAL
1	G4ZTR	1000	1000	1000	1000	1000	3000
2	G4LDR	722	0	874	563	448	2159
3	M0GHZ	553	595	406	411	309	1559
4	G(W)4MBS/P	139	573	555	428	380	1556
5	G4CLA	786	657	0	0	0	1443
6	G4ASR	0	675	727	0	0	1402
7	G3ZME/P	0	0	903	0	0	903
8	G4DBN	0	569	0	229	0	798
9	M0EYT/P	401	0	0	375	0	776
10	G0HIK/P	471	0	0	269	0	740
11	GW4JQP	0	0	226	223	189	638
12	G4KUX	0	0	628	0	0	628
13	GW0MDQ/P	376	0	0	173	0	549
14	G8GTZ/P	457	0	0	0	0	457
15	G3YJR	0	0	311	100	0	411
16	G4UVZ	0	0	0	395	0	395
17	GW3TKH/P	0	0	0	318	0	318
18	G7MHF/P	0	0	107	44	0	151
19	G4BAO	0	0	0	127	0	127
20	G4RQI	0	0	0	104	0	104
21	G8GKQ/P	0	0	0	40	0	40
22	GW4HQX/P	0	0	0	14	0	14

10GHz Restricted

Pos	Callsign	00/01/1900	25/06/2023	30/07/2023	27/08/2023	24/09/2023	TOTAL
1	M0PAI/P	0	917	1000	0	0	1917
2	G7AQA/P	0	1000	0	0	0	1000
3	GW0JSB/P	633	0	0	0	0	633
4	G1DFL/P	0	0	570	0	0	570
5	G4SJH/P	0	0	304	0	0	304
6	G4TNX/P	0	170	0	0	0	170

24GHz/47GHz/76GHz Contest October 2023 and mm-wave Championship

After a poor showing on the higher bands during the middle of the year, it was pleasing to see more entrants on these bands in the final session. 24GHz benefited from the coincident RSGB UHF Contest with several additional stations active, including several fixed stations.
Martyn G3UKV/P was victorious on 24GHz, also working the best DX in the contest with runner up Dave G1EHF/P at 147km.
On 47GHz Roger G8CUB/P was the winner by a clear margin, with G4FRE/P just pipping G1EHF/P to the runner-up slot. Best DX was the contact from G8CUB/P to GW4HQX/P at 101km.
Roger G8CUB/P also won on 76GHz, with Dave G4FRE/P runner up. The contact between them was the best DX at 53km.
This was the last event in the mm-wave Championship for 2023. Compared with 2022, entries were up this year on 24GHz but lower on the higher two bands.
Martyn G3UKV/P repeated his win as last year on 24GHz, with Dave G1EHF/P taking the runner-up slot. Unusually no-one managed to win more than one session this year.
Roger G8CUB/P won by a large margin on 47GHz, with two wins and one second place. Dave G4FRE/P was runner up with one session win.
76GHz was rather poorly supported this year, but Roger G8CUB/P was the clear leader with two session wins. Dave G4FRE/P was the runner up with two second places.
Congratulations to all the winners and runners up. Martyn G3UKV/P will receive the G0RRJ Memorial Trophy for 24GHz, and the 47GHz Trophy will go to Roger G8CUB/P.

John G3XDY
UKuG Contest Manager

24/47/76GHz Championship Tables 2023

Final positions, best three of four count towards the total

24GHz

Pos	Callsign	14/05/2023	09/07/2023	10/09/2023	08/10/2023	TOTAL
1	G3UKV/P	629	732	235	1000	2361
2	G1EHF/P	819	676	0	712	2207
3	G8CUB/P	427	1000	557	565	2122
4	G4FRE(/P)	52	660	877	528	2065
5	GW3TKH/P	1000	670	0	0	1670
6	G8GTZ/P	443	0	1000	0	1443
7	G(W)0MDQ/P	0	133	833	0	966
8	M0GHZ/P	666	282	0	0	948
9	GW4MBS/P	363	139	0	426	928
10	GW4HQX/P	0	672	0	155	827
11	G1DFL/P	328	181	100	309	818
12	G4LDR(/P)	371	280	150	158	809
13	G8ACE/P	385	155	0	130	670
14	G(W)7MHF/P	0	133	233	152	518
15	G4SJH/P	0	0	360	0	360
16	G4XAT/P	0	0	216	0	216
17	G4BAO	0	0	0	185	185
18	G8GKQ/P	0	0	0	78	78

47GHz

Pos	Callsign	14/05/2023	09/07/2023	10/09/2023	08/10/2023	TOTAL
1	G8CUB/P	1000	919	746	1000	2919
2	G4FRE/P	0	796	746	638	2180
3	G4LDR/P	601	244	1000	0	1845
4	G1EHF/P	189	1000	0	618	1807
5	G8GTZ/P	818	0	690	0	1508
6	GW4HQX/P	0	425	0	508	933
7	G8ACE/P	358	118	0	266	742

76GHz

Pos	Callsign	14/05/2023	09/07/2023	10/09/2023	08/10/2023	TOTAL
1	G8CUB/P	1000	0	0	1000	2000
2	G4FRE/P	0	0	0	707	707
3	G8ACE/P	314	0	0	360	674
4	G4LDR/P	465	0	0	0	465
5	G8GTZ/P	221	0	0	0	221

UK Microwave Group at the RSGB Convention

John G3XDY, Bryan G8DKK, Chris G0FDZ and Denis G0OLX our team at the Convention

‘millimeet’ – Microwavers meet in EA3

Lehane G8KMH

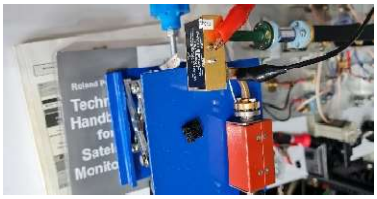
In October Iban, EB3FRN, hosted a small meeting over a weekend at his QTH south of Barcelona and I was fortunate enough to be visiting relatively nearby and had the opportunity to attend.
As well as the ‘local’ EA group there was John, PA7JB, Eddy, ON7UN and myself. Most were EME’ers and looking at pushing towards 47GHz /76 GHz moonbounce.

Iban’s extremely well-equipped lab- multiple 8510C VNA’s, sweep generators, V band waveguide test set, noise figure analyser and a spectrum analyser.
The left hand VNA is configured for the waveguide across 47-90GHz and the right hand for co-axial.

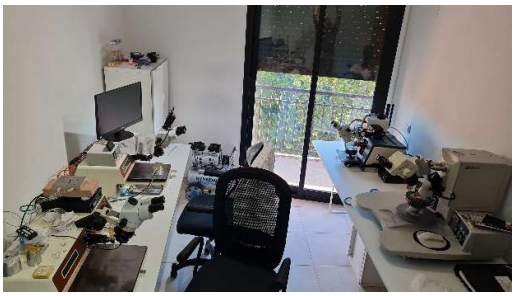
The Sunday group and, being in Catalonia, the lunch on Sunday at a local restaurant. Of course the opportunity was taken to discuss many topics around millimetre activities, as well as sample some local Vino Tinto!

Over the weekend the measurements and tests ranged from 24GHz to 100+GHz as well as some 76GHz mixer repairs.
Pascual. EA5JF, had a number of homebrew 47&76GHz noise sources to compare against commercial noise heads. Eddy found that a ‘rally special’ P band noise source worked very well at 24GHz with good return loss.
Whilst the equipment was set up for 24GHz, I checked one of my junk box SMA loads and was amazed to see it better (with 22dB RL @24GHz) than an expensive branded load. This shows the advantage of having access to good test gear.

Various other attenuators, isolators and an amplifier were tested across 75-96GHz.

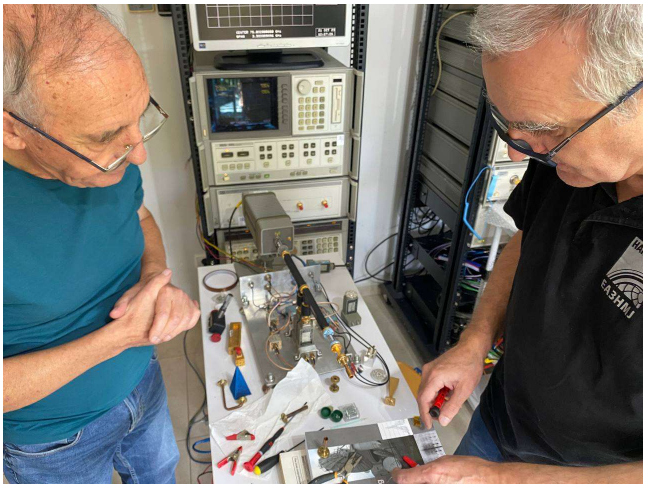


José, EA3HMJ (left), who has provided a lot of machined components for mm-wave activity, was testing out return loss on some new 76GHz dish feeds. It was found that a tuning screw improved the return loss significantly.
One of the items Iban wanted to try was whether the V band (50-75GHz +/-) waveguide test set could work adequately above 100GHz.
I'd brought along some D band waveguide items (right) and a W band mixer, so we configured the test set accordingly. Sadly, it looks like the setup, as is, runs out about 96GHz. It did confirm my 81-86GHz amplifier(above, with the red attenuator) still has 10dB gain at 92(ish) GHz, destined as an LO/mixer driver.



As well as the test equipment, Iban has a range of wire-bonding equipment, used in the production of the local group's 47GHz LNA, and an epoxy dispenser pick and place, this was used to repair two different mixers. Iban previously helped repair one of the UK Microwave Group mixers, and this was described in an earlier Scatterpoint.

It was a great weekend to meet up with others on the millimetre bands and utilise such an amazing range of amateur held test equipment. Thanks to Iban for hosting and looking forward to October 2024!



Scottish Microwave Round Table 2023 Report

Gavin Taylor GM4GAV giving his talk on "Microwave in Mobile Networks".

Attendees making their way to the 11th Scottish Microwave Round Table (GMRT) in Burntisland on Saturday 11th November enjoyed a crisp, clear, sunny winter's morning with superb views over the Firth of Forth towards Edinburgh. What an uplifting way to start what was to be a very enjoyable day!

As usual, the venue was the Museum of Communication (MOC), with a good turn-out of 46 attendees. Peter Dick GM4DTH was on the door again from 9:30 AM to give everyone a friendly welcome and collect the dues. In the background, the sound of familiar voices emanated from within as everyone caught up with friends and acquaintances and made new ones.

Having briefly visited the conference room to pick up refreshments many of the attendees had migrated to the display area on the ground floor to examine and discuss the wide range of microwave equipment, components, and test equipment that were on sale, before the best items were spoken for. Brian Flynn GM8BJF and David Stockton GM4ZNX had set up the test and measurement facility - already in operation, and open for business throughout the day during breaks in the presentations.

The formal event opened at 10:30 AM and Professor Tom Stevenson from the MOC gave the customary welcome to the venue, including domestic arrangements and safety announcement. Martin Hall GM8IEM, the UK Microwave Group (UKuG) Scottish representative, then welcomed the participants, after which Andy Sinclair MM0FMF (secretary of the Lothians Radio Society) took over as chair for the morning session.

Andy showed the gathering the RSGB Jock Kyle trophy, awarded to the GMRT for its contribution to amateur radio last year. He accepted it on behalf of the GMRT at the 2023 GMDX convention in Stirling in April.

The first speaker was Mark Hughes GM4ISM whose talk was entitled "Test Equipment for Amateur Radio", an important issue when trying to establish that your microwave communications system is working as intended. Mark started out by outlining common problems, what we used in the past, and why we need good measurement capability. He described the test gear that was essential, as well as some useful extras, key aspects being to understand the capability, limitations, and measurement accuracy of what you have, and when it might or might not matter. Most importantly, knowing how to use your test equipment to get usable results to a known accuracy is essential!

A short break ensued, after which Paul Dobie GM0PJD started his talk "Getting Started on 23cm EME – the first 200 contacts". This was a fascinating story of how Paul became motivated to reach his goal of 200 Earth-Moon-Earth (EME) contacts from a standing start before the 50th anniversary of the first Apollo moon landing on 20-Jul-19. He covered all aspects of his journey, including the physical attributes of the moon relevant to EME, how the moon reflects signals, the history of EME activity, path loss calculations, station requirements, doppler and libration, and propagation modes. He also gave tips on technical considerations, building a station, mounting the dish, and tracking the moon. Afterwards several attendees were heard discussing how they might get going on 23cm EME!

As usual we were asked to vacate the conference room while lunch was being set out and re-assembled in the museum where the entries for the GM4LBV Projects Trophy were displayed, and where Ian White GM3SEK and David Stockton GM4ZNX examined the entries. The MOC volunteers are renowned for their superb buffet lunches, so the call that it was now ready brought everyone back to the conference room to enjoy the fine food on offer, and to continue chatting.

Brian Flynn GM8BJF, took over as chair for the afternoon session. No chance for a postprandial nap when Neil Smith G4DBN took the floor for his lively and entertaining presentation about "Reconstructing Cold War Spy Bugs". Neil explained how he became involved in this task after the BBC invited him to make a replica of a top-secret listening device found in 1952 in the US Ambassador's residence in Moscow in 1952. He talked us through the political background and the technology involved in developing this bug, which had no batteries or wire connections, and the challenges he faced in producing a working replica. Members of the audience were able to examine some of the replicas Neil had produced. He finished with a brief description of the aftermath to the discovery of the bug.

Another short break followed before the next presentation, which was about "Microwave in Mobile Networks" by Gavin Taylor GM0GAV. In this talk Gavin walked us through the history of the backhaul link for mobile networks operating at 1800 MHz and feeding into leased lines. He illustrated how the capacity of these links within a fixed bandwidth has improved over time to accommodate the increased usage of the mobile networks through the use of ever developing techniques, migrating towards Internet Protocols (IP) since 2015.

Paul Dobie GM0PJD introducing his presentation

Mark Hughes GM4ISM receiving the construction trophy

Immediately following Gavin's talk we had the conclusion of the construction competition and award of the coveted GM4LBV Projects Trophy. The entries were:

- An Arduino controlled microwave step attenuator by Brian Flynn GM8BJF
- 13cm, 9cm and 6m feedhorns for a 1.2m offset dish by Peter Bates GM4BYF
- A fox hunting miniature VHF transmitter by Mark Hughes GM4ISM
- An MAR7 drop-in substitute for the obsolete OM34S used in signal generators by Mark Hughes GM4ISM

The judges Ian White GM3SEK and David Stockton GM4ZNX gave a review of each, pointing out their respective merits and achievements. After some deliberation they decided that the winner was the drop-in replacement for the OM34S, because of its usefulness in bringing dead signal generators back to life.

Brian provided the closing remarks, thanking the museum volunteers for keeping us well supplied with tea, coffee, biscuits, and scones throughout the day, as well as providing the splendid buffet lunch, and they were given gifts in appreciation to a round of applause from the audience. To further applause, Brian also thanked the organising committee, and in particular Brian Howie GM4DIJ who had put together the programme.

The formal closure of the meeting was followed by ongoing chat, which continued right up until the doors closed at 17:00.

Many attendees (and some spouses and partners) moved on to the Kingswood Hotel in the evening for further socialising and an excellent meal – the new owners did us proud. An auction of items was undertaken, and thanks go to those who made the donations. The proceeds from the auction, other donations, and a small surplus from the door takings are donated to the MOC to support their activities. Further discussions continued until late!

Thanks go to the organising committee of Roger Blackwell GM4PMK, John Cooke GM8OTI, Brian Flynn GM8BJF, David Stockton GM4ZNX, Colin Wright GM4HWO, Ian White GM3SEK, Peter Dick GM4DTH, Andy Sinclair MM0FMF, James Gentle GM4WZP, Colin Murray GM4EAU, Peter Bates GM4BYF, and Brian Howie GM4DIJ.

Prepared by Martin Hall GM8IEM, with contributions from the organising team.

21-Nov-23.

Midlands Microwave Round Table

December 2nd Lectures, Antenna Test Range, Test Equipment, Junk Sale and Hot Lunch.
With follow on, the next day the 3rd.

Details can be found at:-

https://www.eatonmanor.co.uk/midlands-round-table-event/

All of the accommodation has been taken but there are still places for the event. The closing date for booking the event is 21st of this month - November. **Note deadline!**

Bookings are made by sending £18 to account - Paul Nickalls 20-53-22 53708810. Otherwise use PayPal as shown on the website.

Please let me know your full name, callsign, email address and any special dietary requirements

Paul G8AQA paulnickalls@btinternet.com 01694 772 441

23cm ITU/IARU News

https://www.iaru-r1.org/2023/itu-r-wp5a-meeting-30-could-not-achieve-consensus-on-the-measures-needed-to-protect-the-rnss-in-the-23cm-band-relating-to-wrc-23-ai-9-1b/

Beacon News

From 14/10/2023 GB3USK is only on from 0700 to 1800UTC every day, subject to enough solar power.

73
Graham G3TCT

UKuG MICROWAVE CONTESTS – 2024

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

November11	Scottish Round Table	www.gmroundtable.org.uk
November 20 -Dec 15	ITU WRC 23, Dubai	rsgb.org/wrc-23
December 2-3	Midlands Roundtable, Eaton Manor, SY6 7DH	eatonmanor.co.uk/midlands-round-table-event/

EVENTS 2024

January 13	Heelweg, Netherlands	www.pamicrowaves.nl
February 16-17	MicroMeet 2024, Spain	www.micromeet.es
March 30	Blomard 2024, France	ref03blog.wordpress.com/blomard-2024-vhf-uhf-shf/
August 9-11	20th EME Conference, Ewing NJ, USA	EME2024Trenton.org
September 22-27	European Microwave Week, Paris	https://www.eumweek.com
October 3-5	Microwave Update, Vancouver, Canada	microwaveupdate.org

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

73 Martyn Vincent G3UKV