An Amateur Radio publication for the Microwave Enthusiast

scatterpoint

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G4RFR the FRARS EME system

Dave G4GLT working F4CKV/P on 10GHz

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 DropboxAlso, **free access to the Chip Bank**

Please make sure that you pay the stated amounts when you renew your subs next time If the amount is not correct your subs will be allocated on a pro-rata basis and you could miss out on a newsletter or two!

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

payukug@microwavers.org

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@microwaversorg

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

UK Microwave Group AGM Calling Notice

Notice is hereby given that the 2023 Annual General Meeting of the UK Microwave Group will be held at 14:00pm on Sunday, 16th April 2023, at Adastral Park, Martlesham Heath, Ipswich IP5 3RE.

Meeting details are given below.

This will include the election of the officers of the committee and the presentation of the Chairman's, Secretary's and Treasurer's Annual Reports.

There are vacancies for committee roles. New committee members will be very welcome.

Any UKuG member wishing to stand should notify the UKµG Secretary, John Quarmby G3XDY, by 9th April 2023.

If you have any agenda or AOB items for the AGM then please contact the UKµG Secretary, John Quarmby G3XDY by 9th April 2023, email: secretary@microwavers.org

For those not able to make the meeting in person, a Zoom facility will be available, please follow this link:

UK Microwave-Group is inviting you to a scheduled Zoom meeting.

Topic: UKuG AGM

Time: Apr 16, 2023 02:00 PM London

Join Zoom Meeting

https://us06web.zoom.us/j/87808052693?pwd=eHEvOFhWRUIvcUtodE5Nd1Z1eGtzZz09

Meeting ID: 878 0805 2693

Passcode: 787327

The History of The Flight Refuelling ARS Microwave EME system, G4RFR

March 2023

This is a brief summary of the FRARS EME system. FRARS had some experience of EME with Yagis on 432MHz and 1296MHz in the early 80s. This is the story of a project that began in 1985 when RSGB was offered a 12ft (3.65m) prime focus dish that had been removed from the 2GHz links on the Post Office Tower, London. It was gratefully received by G3YGF on behalf of FRARS, and was initially taken to G3OUR (Oxford University Radio Society) on G3WDG's road trailer for some unsuccessful tests, Figure 1. In 1989 the 4 quadrants were taken down to Wimborne, Dorset, on a boat trailer.

Figure 1 The Dish being taken to Oxford in 1985

The Mount

Figures 2 and 3 show the dish.

Figure 2 Front View of The Dish

Figure 3 Rear View of the Dish

It is rather heavy at 250kg. This, and a further 250kg of mild steel fabricated mounting, all sit on top of a 6" round steel pipe which is mounted on a large side-and-end thrust race, giving 360 degree Azimuth rotation. It is clamped to the original square section base post on a Strumech Versatower trailer.

The Elevation axis is a shaft on a pair of 50mm pillow block bearings. Originally, the Azimuth axis was driven by two right-angle gearboxes and a DC motor, and the Elevation axis used a satellite telescopic jack which only covered about 20 degrees. The dish had protractor readouts on the Azimuth and Elevation axes, and we had a team of operators to manually steer the dish and read Az/El from the protractors, but it worked.

At 10GHz, the dish has a gain of 50dBi, and a 0.6 degree 3dB beamwidth, which is almost equal to the size of the sun or moon (0.52 degrees).

We were using G0API's 20W TWT and two single stage preamps, and could hear CW echoes. In 1994, we had the first inter-G 10GHz EME contact with G3WDG, then heard SSB from WA7CJO, and worked a few other stations. We were seeing 0.5dB of Moon noise.

1994 - 2011
There was then a short break of 12 years or so when we were building the Bell Hill beacon complex. Around 2006, with help from M0EYT, we managed to receive signals from the Mars Reconnaissance Orbiter on 8.4GHz, at some 120million miles. In 2007, we worked G4NNS on 10GHz, and in 2008, G4NNS and G3LTF on 3.4GHz.

2011 - 2016
Around 2011, enthusiasm regrew again, and M0GJR and G3YGF began upgrading the mount into the 21st Century, with machining help from G0NZO. With a view to developing our own control software, Selsyns were fitted to provide position Azimuth and Elevation readouts. Stepper motors were used to drive the two axes - Azimuth via the two gearboxes, and Elevation via a homemade jack, consisting of a 3m long piece of 25mm stainless steel studding and a bronze nut, which could take the dish through 90 degrees.

There was about 6 degrees of backlash in the right-angled gearbox on the Azimuth axis, and this was effectively reduced to zero by using heavy weights attached to steel cables which went round the mast to apply a torque to ensure the backlash was always taken up one way.

2017-2019
In 2017 we worked G4NNS on 3.4GHz who was at Goonhilly. By 2019, we had a fully working system, complete with 200W TWT which can be seen as the white object on the lower back of the dish in Figure 3. Since then, we have had many QSOs on 10GHz.

Software Control
Around 2016, John, M5AHQ volunteered to automate the tracking system. The custom dish control software, called Medii after the Moon crater "Sinus Medii", now runs on a Raspberry Pi with suitable driving/interface elements, and allows the dish to be positioned with our custom closed loop software. On-screen displays show all dish control options, and a listing of principal objects to track.

When the Selsyn decoder unit became unreliable, the replacement homebrew decoder showed up some issues around the cardinal points, so, recently, we replaced the Selsyns with two Sick 18 bit, 360 degree, Ethernet absolute position encoders on the axes, which improved the pointing accuracy of the dish to better than 0.1 degrees. The axis of the dish was also set to true vertical using a spirit level and theodolite.
This allowed us to track any object stored in its JPL derived memory.

It is now fully click and track, and can be controlled via a mobile phone for operations around the dish, such as bolting it down or mounting the TWT. Having a calibrated dish and autonomous tracking has reduced the demands on the operating team to the point where single-handed operation is now normal.

The Current System

Figure 4 shows the Block Diagram of the current EME System.

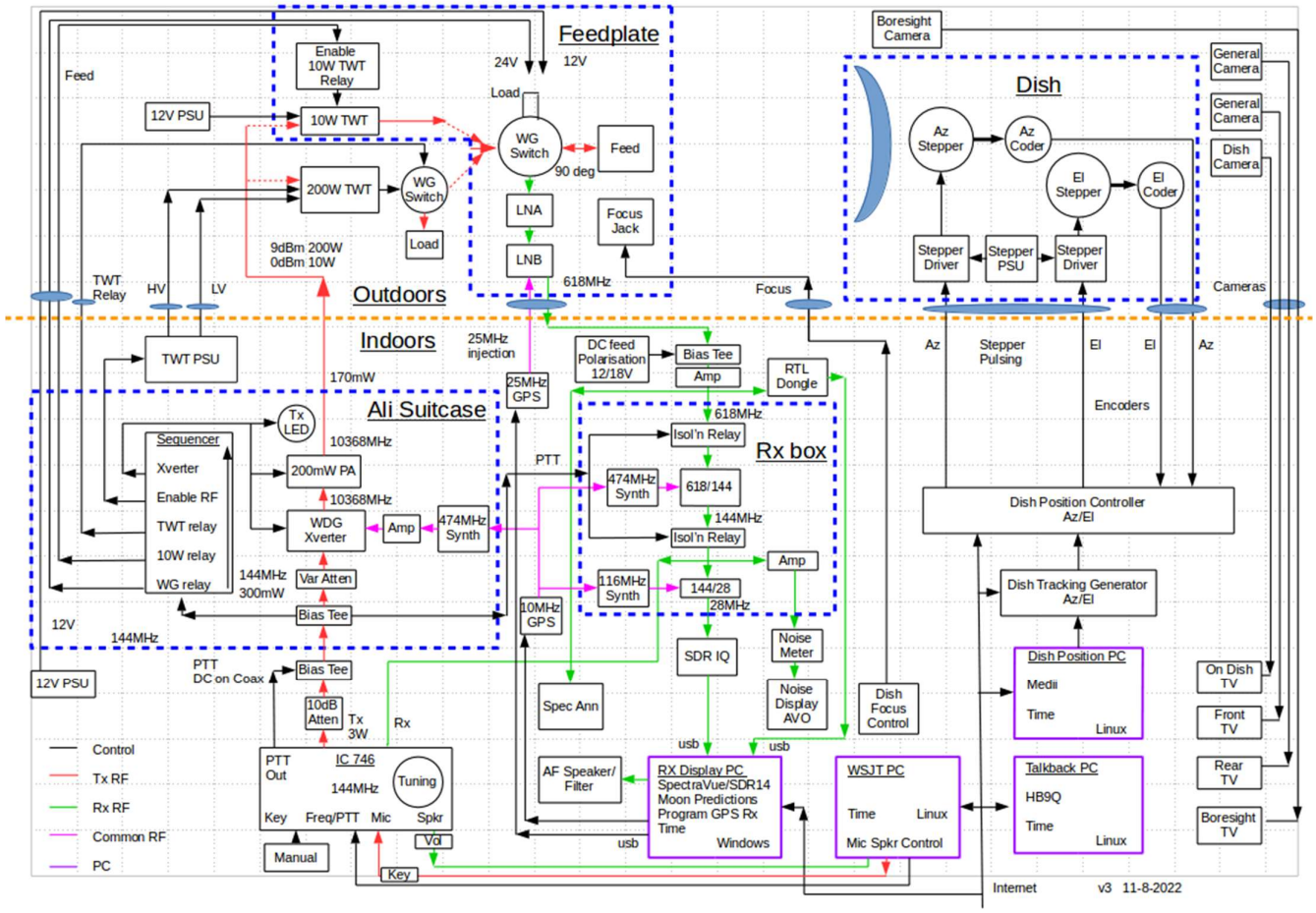


Figure 4 Block Diagram of the Current EME System

Transmitter

The transmitter is largely homebrew, apart from an IC746 on 144MHz with a separate receive port. On transmit, the 0dBm 144MHz signal drives an up-converter fed with a 2556MHz LO derived from a 10MHz GPS referenced synthesiser, into a G3WDG Tx module. The +10dBm 10GHz output feeds a solid state PA to produce +23dBm, which passes via 12m of LDF450 and some Superflex out to the input of a Thompson TH3759A 300 W, 14GHz TWT. This is mounted on the back of the dish and powered by a shack mounted PSU which monitors its operation and is connected with a 16m x 32 way umbilical cable and a 5 way EHT cable carrying 8.5kV. We have re-matched the TWT to operate at 10,368MHz, and it also has a waffle plate harmonic filter in the output, together with a 3 stub waveguide tuner and a waveguide relay which is used to dump any noise from the TWT output during receive into a load. The beam current in the TWT is always "on" to avoid thermally stressing the tube, and to allow rapid TX/RX switching for echo testing. The TWT output to the dish feed goes via 3m of Andrew EW90 flexible elliptical waveguide (0.4dB insertion loss). The TWT is run at 200W during normal operation - this gives an EIRP of up to 20MW. It can be adjusted down to less than 1W should the need arise.

The Feed Plate

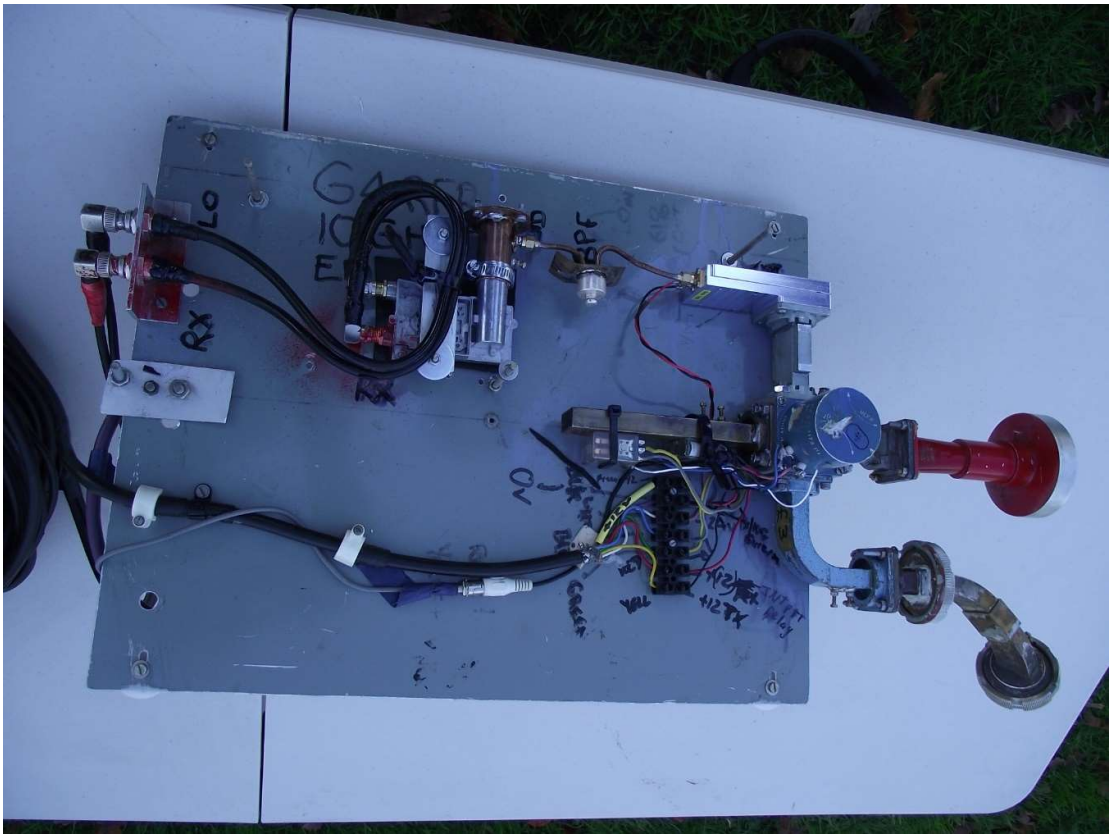


Figure 5 The Feed Plate

The feed is shown in Figure 5, and is mounted on a 4 wheeled trolley inside a cylindrical housing, so can be moved a small amount using a satellite jack to optimise the focus position. On this trolley is the main 4 port waveguide switch which gives 80 dB of isolation between ports. (Note that this isolation drops to about 35dB when the switch is changing state, so a sequencer is essential.) The Tx feeder connects to the waveguide switch, then the RF passes out through a 90 degree waveguide twist to give vertical polarisation (the norm), but which can be substituted by plain guide for horizontal polarisation. Several feeds have been evaluated, including the Super VE4MA and a Scalar Ring.

The changeover system is fully interlocked, with additional contacts on each relay to ensure operation in the correct sequence, and has LED indicators for fault diagnosis. Transmit is initiated by the IC746 - a manual Morse Key is used on CW, Mic pressel on SSB, and is under full CAT control from WSJT for digital modes. On CW, we can key the Tune tone from WSJT, so all modes can be used with all the benefits of Constant-Frequency-On-Moon (CFOM) operation. The system is fully linear to cope with any future modes.

Receiver

Also on the feed plate are a 0.7dB NF DU3T preamp and a modified 1.2dB NF LNB. A dummy load is mounted on the waveguide switch, which allows the receiver to be switched to the dummy load as a room temperature noise reference.

The LNA/modified LNB converts to an intermediate frequency of 618MHz, which feeds an RTL USB SDR dongle, a spectrum analyser and then further down-converters to 144MHz to feed the IC746 and 2MHz wide noise meter, and to 28MHz (all GPS locked) to feed an SDR-IQ running SpectraView, which provides a panoramic display of signals and an audio output, and another noise meter (Continuum mode). Audio from the IC746 feeds a PC running WSJT.

The Operating Position

The operating position is shown in Figure 6. There are currently 4 PCs and 6 monitors at the operating desk, running WSJT, the HB9Q chat facility/the internet, SpectraVue. the dish tracking software, and a split screen display for cameras monitoring the dish.

Figure 6 The Operating Position

Performance

The current system performance is: Moon noise 2.6dB (quite an improvement over the initial 0.5dB), Sun noise 15.7dB, Ground noise 5.5dB, and room temperature waveguide load 5.7dB, giving CW echoes of 16dB in a 200Hz noise bandwidth, after the 2.6 second round trip delay. (Libration is about 100Hz, so this contains all the energy). SSB echoes are quite normal, even with the 100Hz or so of Libration spreading.

We have now had some 200 contacts on 10GHz EME, including world firsts of G-China and G-Uruguay and have worked quite a few small stations, including GI7UGV at -21dB S/N/-13dB S/N (1.2m dish and 10W), G0OLX -19dB S/N/-3dB S/N (1.2m dish and 15W), and been received by KA1GT at -8dB S/N (0.85m dish), N1BUG at -9dB S/N (0.75m dish), G4HSK at -13dB S/N (0.65m dish), and GW3TKH (1.2m dish) at +4dB S/N. (WSJT S/Ns are given in dB relative to 2,500Hz). Obviously the figures from WSJT vary a bit, depending on the type of decoding and whether the receiving station's dish is exactly on the Moon, but they give an idea of what can be done with a small dish, and it illustrates the power of WSJT in digging out weak signals. We recently worked W7CJO again, who has a 4.8m dish and 300W, and had good 2-way SSB with him.

It has been an excellent learning experience for all to get to this stage, requiring attention to detail in all aspects of mechanical, electrical, radio and software design, and the dish has more than proven its worth. In the future, we intend to use other bands, and to use a chirp waveform to measure the distance to the moon more accurately.

Thanks

This project has been a team effort over the last 35 years, including (in order of involvement) G3JVL, G3YGF, G0API, G4JNT, G6NLC, G0NZO, M0EYT, M0GJR, M5AHQ, M5RAO, has had input from G3WDG, G3LTF, G4NNS, many other past and present members of FRARS, the company that helped us with the surplus 200W TWT, the RSGB and the Post Office who gave us the dish in the first place. To all these, we give our sincere thanks.

Lithium-ion Batteries for Portable use

Dave G4GLT

Many people who go portable will already be taking advantage of the excellent lithium-ion batteries available, that are light and easy to charge. They are however considerably more expensive than Leisure batteries particularly if you are running higher power and need a 100Ah battery.

I just wanted to add my own experience so that others can avoid problems. I have been using a Victron 40Ah lithium-ion battery for about 5 years with no problems up till recently.

I had left the battery in my van during all the below freezing weather just after Xmas. Just after that I took the battery out to listen to the 10GHz GB3RPE beacon from a high point and it was also very cold indeed. The battery did not work and the 'button' indicator flashed an error message.

After warming the battery up, it eventually started to work normally. I now keep both my lithium-ion batteries indoors and in the winter will be taking them outside in a polystyrene box.

I gather that there are some lithium-ion batteries now available which will cope better with low temperatures.

The stated parameters for my lithium Peak Power Pack are as follows: Battery charging 0 to 40 deg. C
Battery discharge -20 to +40 deg. C
Storage -20 to +40 deg. C.

So despite what is claimed above, I think I will be looking after mine a lot more carefully.

Picture of example battery only

Getting started with Waveguide on the Millimetre Bands-part 3

Roger G8CUB

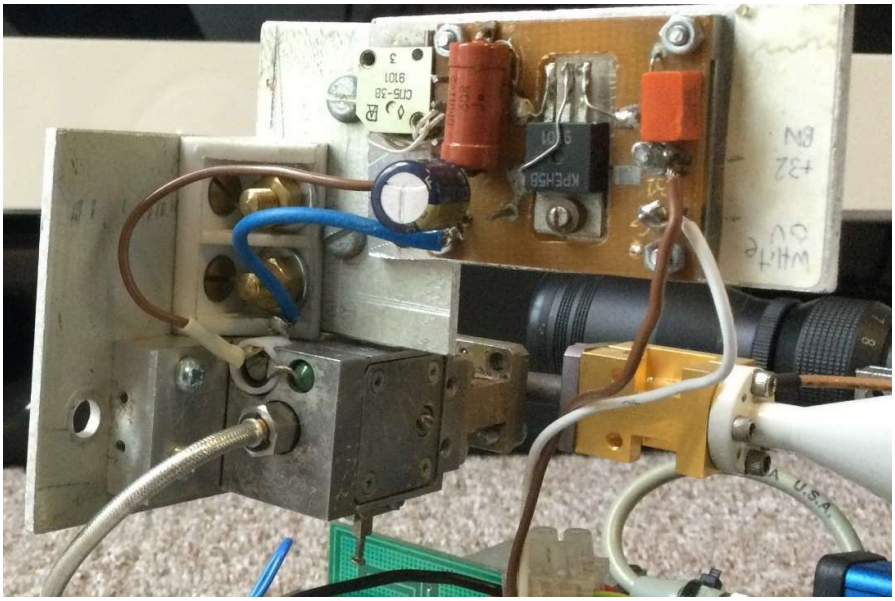
Continuing from Part 2 in November 2022, on the subject of frequency multipliers.

A multiplier of some form, is the only way of getting to the millimetre bands. You could though have a Gunn or Impatt source, at the frequency of interest. Even then you would want to 'lock' it with the harmonic of a lower frequency source. Even a harmonic mixer is a form of multiplier. Because a mixed signal is a low level, usually the multiplied LO is used as the TX output.

Below is shown a range of commercial multipliers. Is it a lot easier if someone else has done the packaging, especially at the higher frequencies

The Honeywell mixers are X3 for the top one, X3/X4 for the lower WR-19 one. This last one was broken as received. I rightly suspected an input capacitor. Fixed by brute force, knocking in the sma centre pin with a hammer. I just have to remember not to put anything on the input that would short the internal bias, like an attenuator.
The top one, on the right is a tuneable 50-75GHz doubler. While the other one, is a Faran varactor tripler. There are three tuning strips, input, idle, and output. As usual with varactor multipliers, the bias resistor is a high value, 100k in this case. As shown, it is tuned for 61.2GHz (122.4/2), with 10mW output

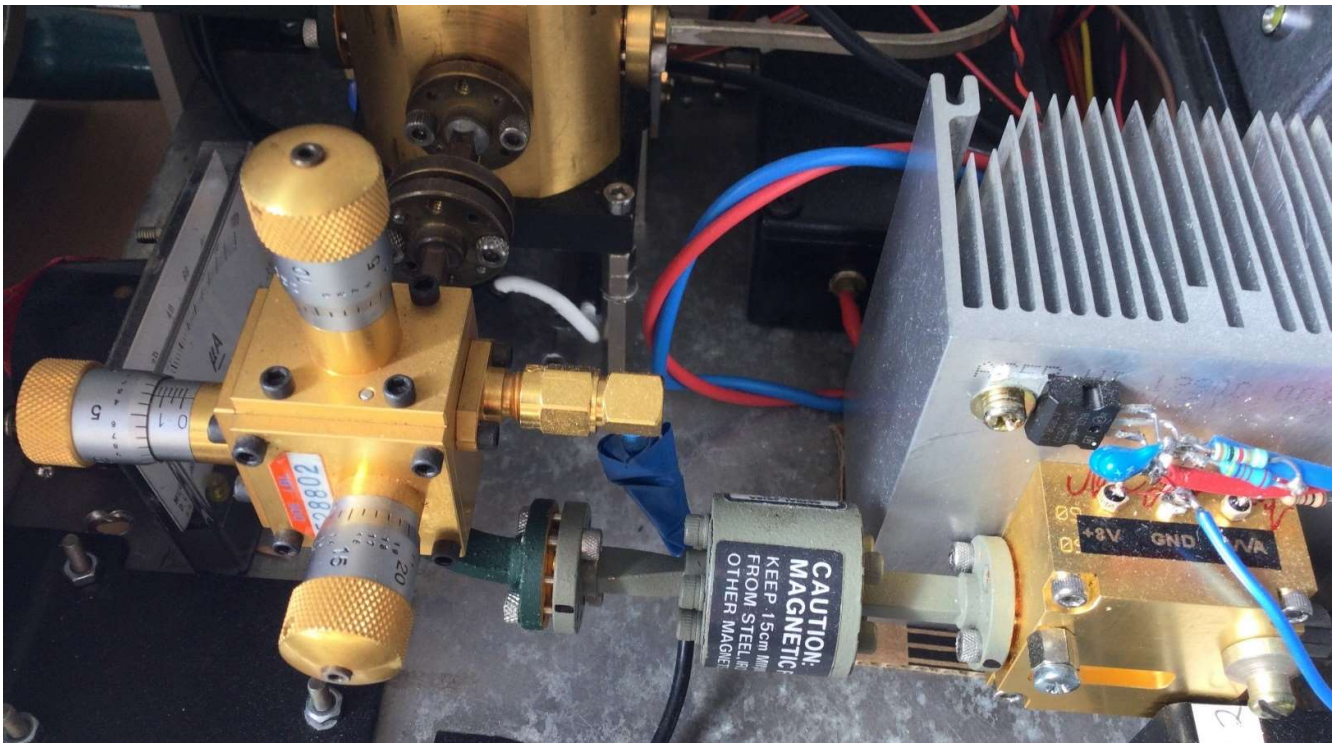
The gold block units are from a system working around 58GHz. They are diode multipliers or harmonic mixers. They work in the same way to produce a multiplied signal. Some require a bias resistor on the sma input. Some work better as even multipliers, others as odd harmonic multipliers. It is a matter of try and see what works best. The one shown was not very efficient at X7, but gave a useful test signal at 76GHz.



Another type of multiplier. It is in the grey box with sma input. This uses an Impatt diode, to multiply X9. A bias voltage is required of around 30V. Not obvious from the picture, the gold block, is a biased doubler to 134GHz, giving around 3mW.
Getting a multiplier to work efficiently always needs some optimisation. The input impedance of the multiplier is usually pretty poor. What's worse, is that it will change with drive level. Ideally every multiplier would have an isolator, or attenuator on the input, to improve the match. Often, we need all the drive, that we can get. So, it is necessary to play with matching. Practically this is achieved in coax, by changing the length of the input cable. I have seen 15dB difference in output, just by changing cable length. One way to fine tune this is with a phase trimmer, as shown below.

The adjustable phase trimmer is on the right. The m/f adaptors on the right allow the trimmer range to be extended. As already stated, the input match can change with drive level, giving a hysteresis effect. So when 'tuned up', turn the drive off, and back on again, and check that there is still output!

With waveguide, it is a lot more difficult to change the phase length. Without getting into the use of tuning screws. Try a couple of different waveguide lengths, or ideally use a waveguide isolator. Of course, these are not easy to find, and expensive. So, it is usually bolt it up and hope for the best!



In this case I have used a waveguide isolator. The investment prudent, to protect my expensive variable gain amplifier, and tuneable WR-08 output doubler. This is part of my 122/134GHz transverter.

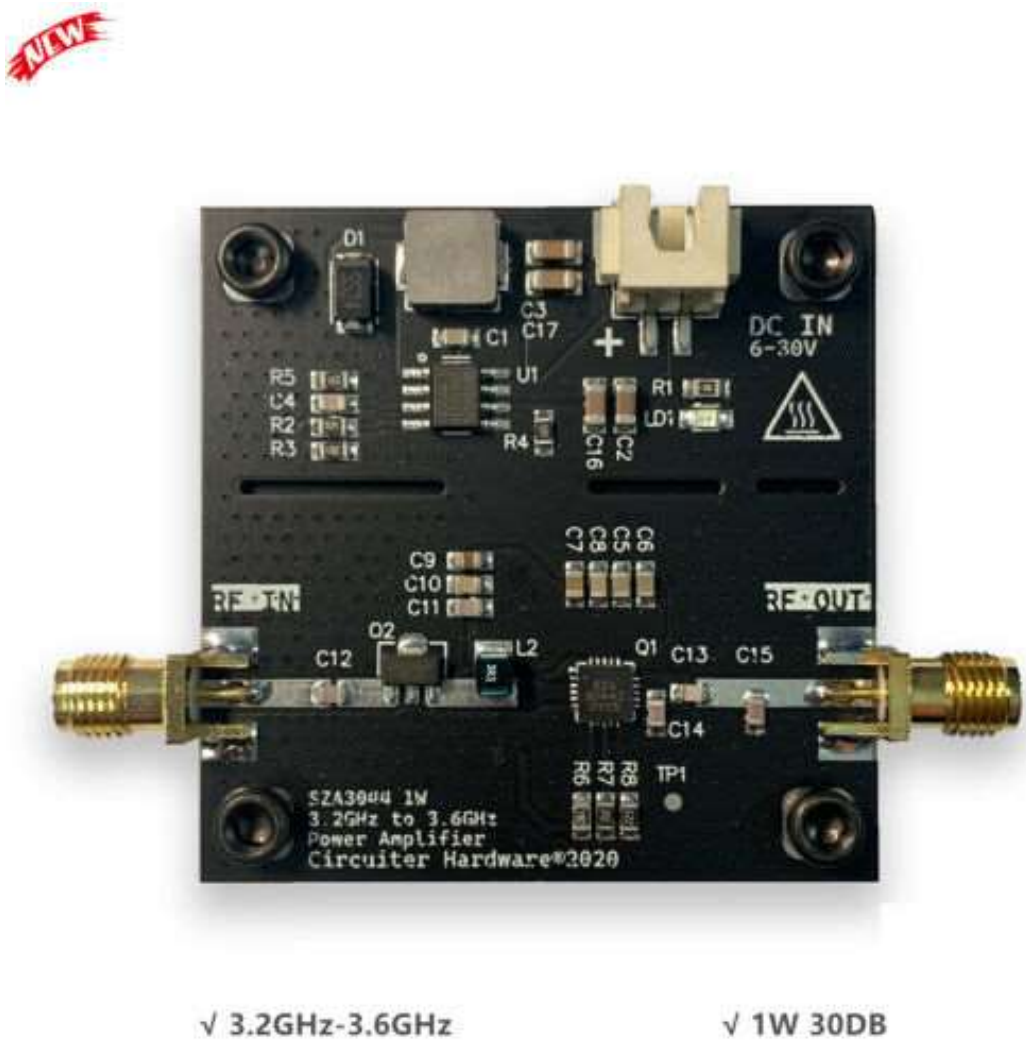
A Word of Warning

Dave G1EHF

A short while ago I needed some gain and low power on 3.4 GHz and spotted this amplifier https://www.ebay.co.uk/itm/114568839536 (see picture). Advertised as an SBB5089 + SZA3044, 3.2GHz - 3.6GHz Microwave Power Amplifier RF Power Amp 1W 30dB" it looked ideal and included a small heatsink on the rear of the PCB. I ordered one and it arrived quite quickly from the Far East.

On power-up, I did get RF output but it lasted only a few seconds and then disappeared! Baffled, I looked at the circuit implementation and quickly spotted an error. The output of the first stage (SBB5089) is connected directly to the input of the second stage (SZA3044) and is biased at the supply voltage (5V). However, the data sheet for the SZA3044 includes the following statement "RF input pin. This is DC grounded internal to the IC. Do not apply voltage to this pin 1". Unsurprising that it goes pop quite quickly!

Clearly neither prototype or production examples have been tested. I did inform the supplier and he quickly sent me a replacement. Of course I cut the track between the two devices and inserted a decoupling capacitor and this now works fine. However, it looks like the unmodified amplifiers are still being sold, so if you are tempted to buy one, make the modification before powering up!



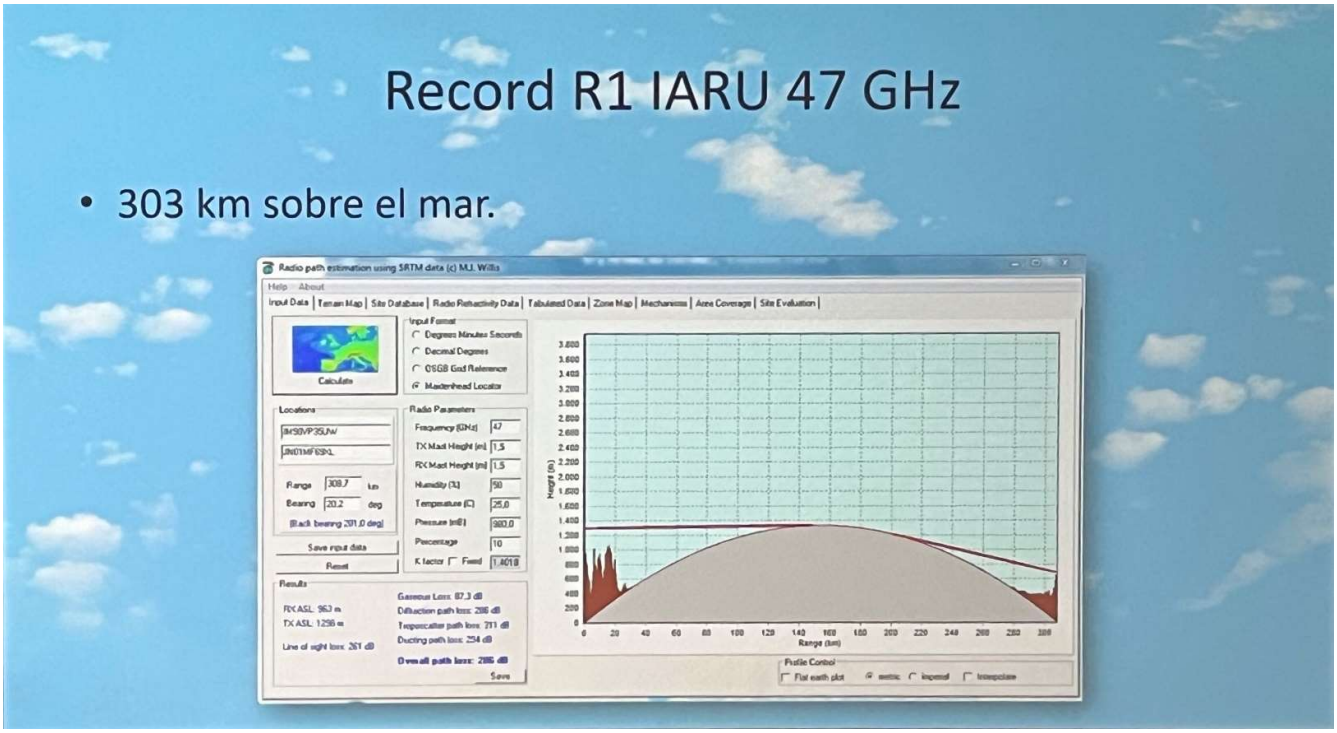
Micromeet 2023 report

Roger G8CUB

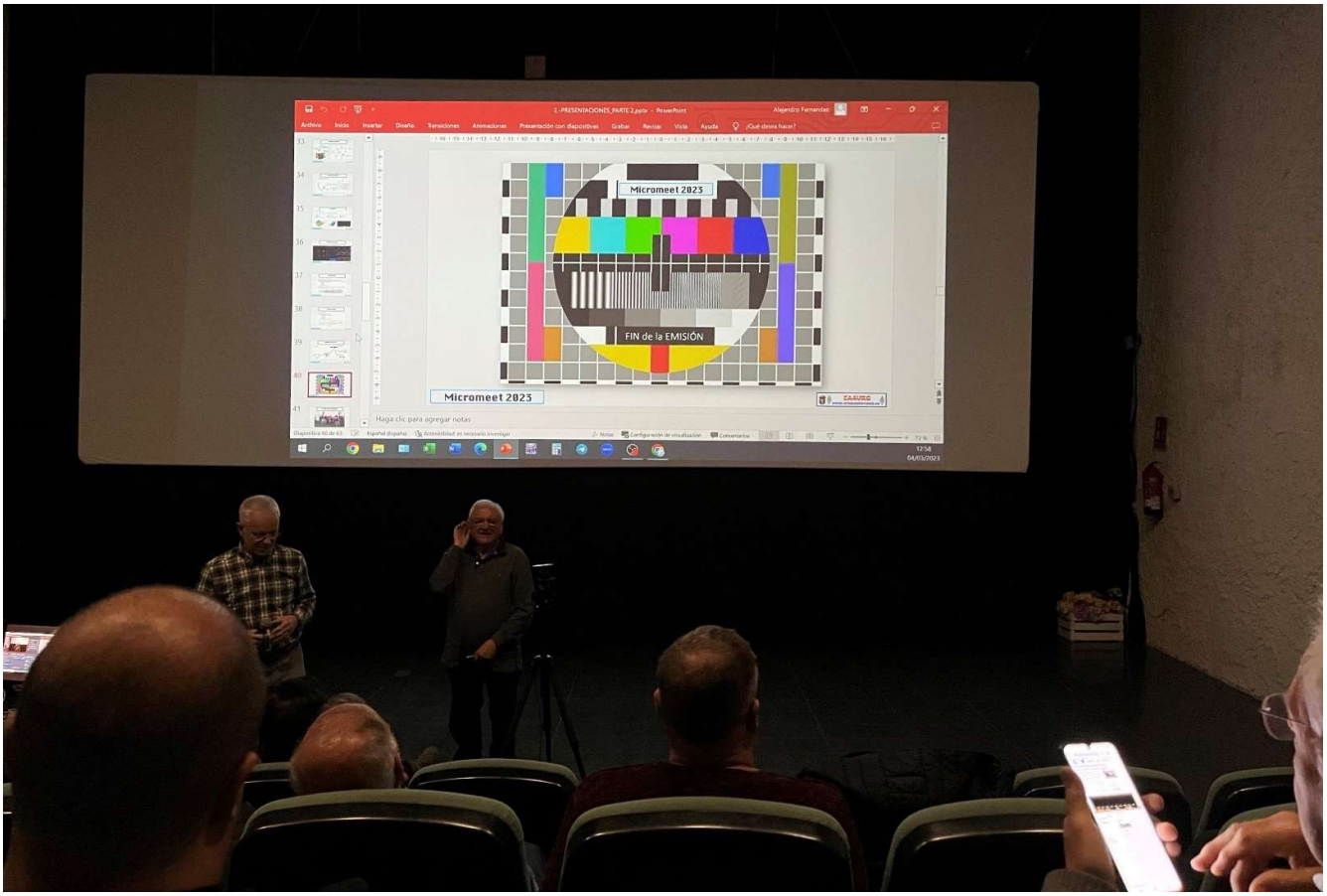
The final decision to visit Micromeet near Madrid, was only made two days before the last suitable ferry from Portsmouth to Bilbao. Fortunately the Bay of Biscay was hind to us, and it was a very smooth crossing. The drive towards Madrid was clear but chilly. We even stopped to throw a couple of snow balls enroute.

Group photo at 'Overon Teleport'

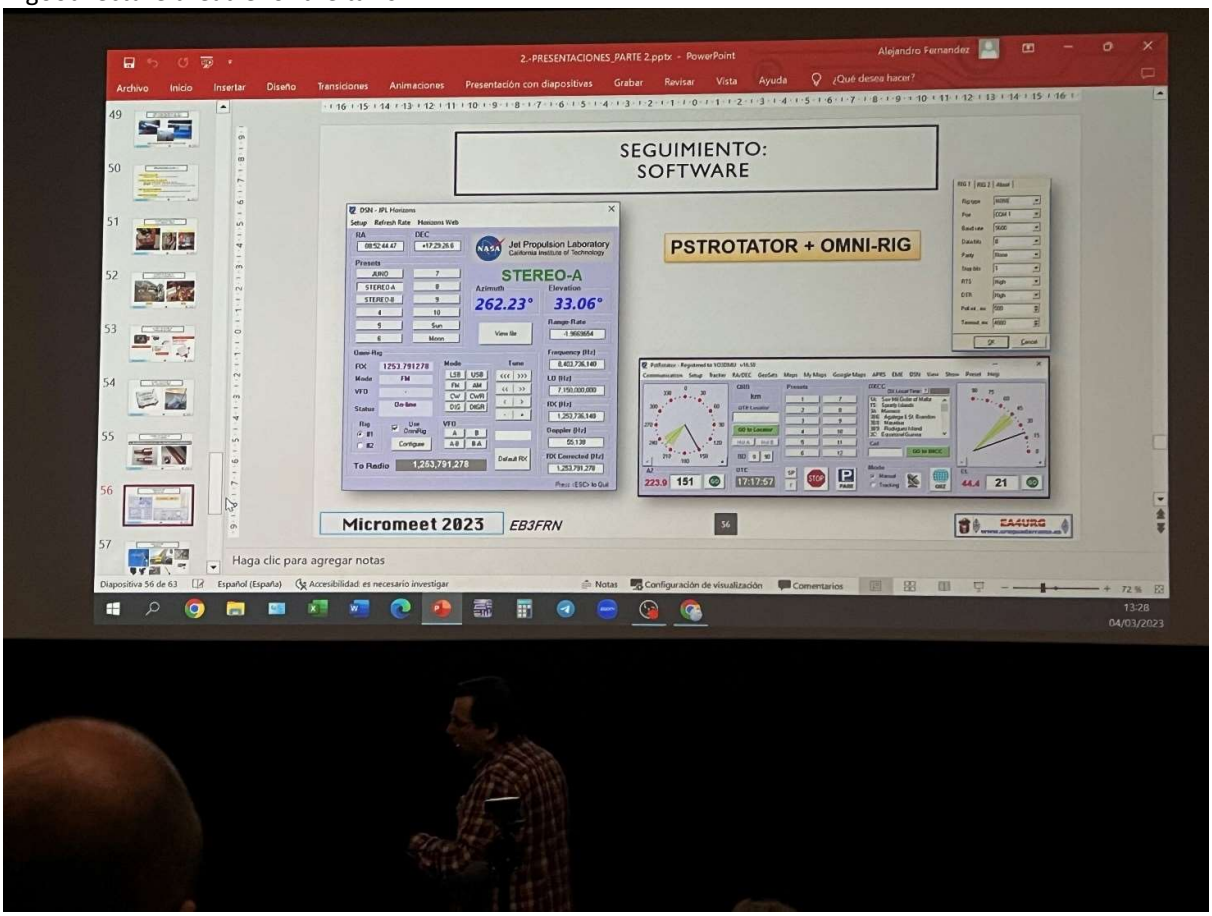
The first talk included excellent information of how to get on the microwave bands.



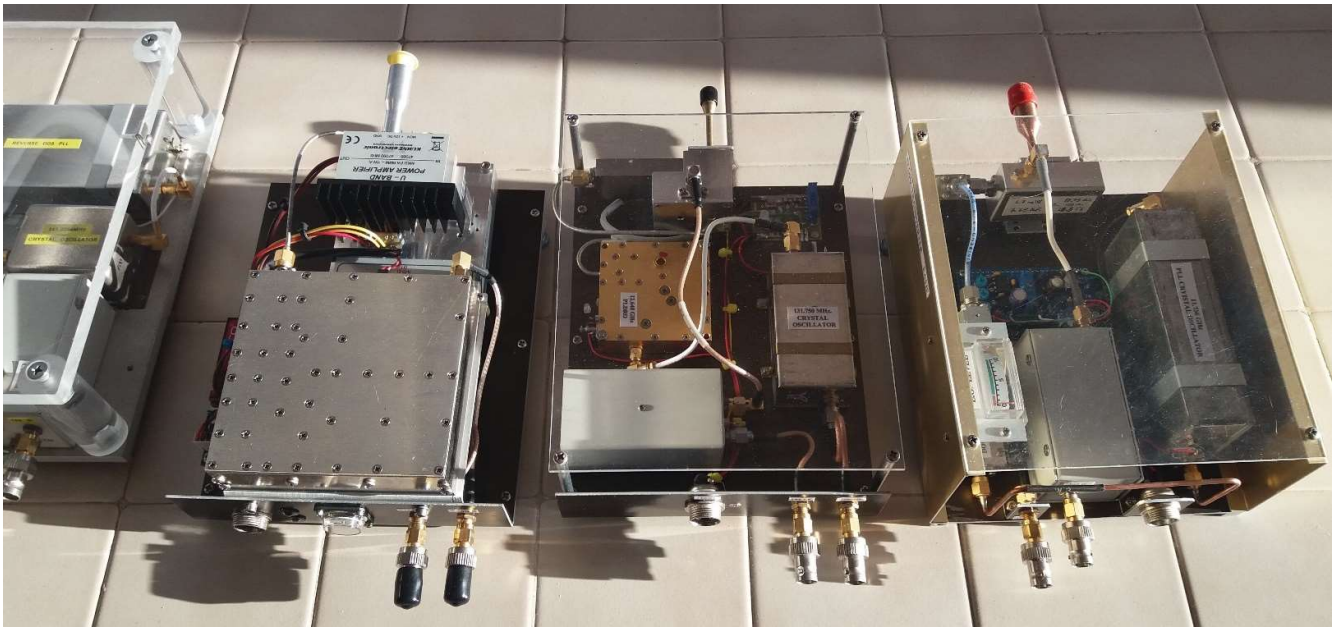
The talk also included detail of this 47GHz 303km contact over the sea. I believe that the path was established on 24GHz, then 47GHz signals appeared on Opera, allowing the qso to be made.



A good lecture theatre for the talks



Iban EB3FRN giving information on what can be received from Space.

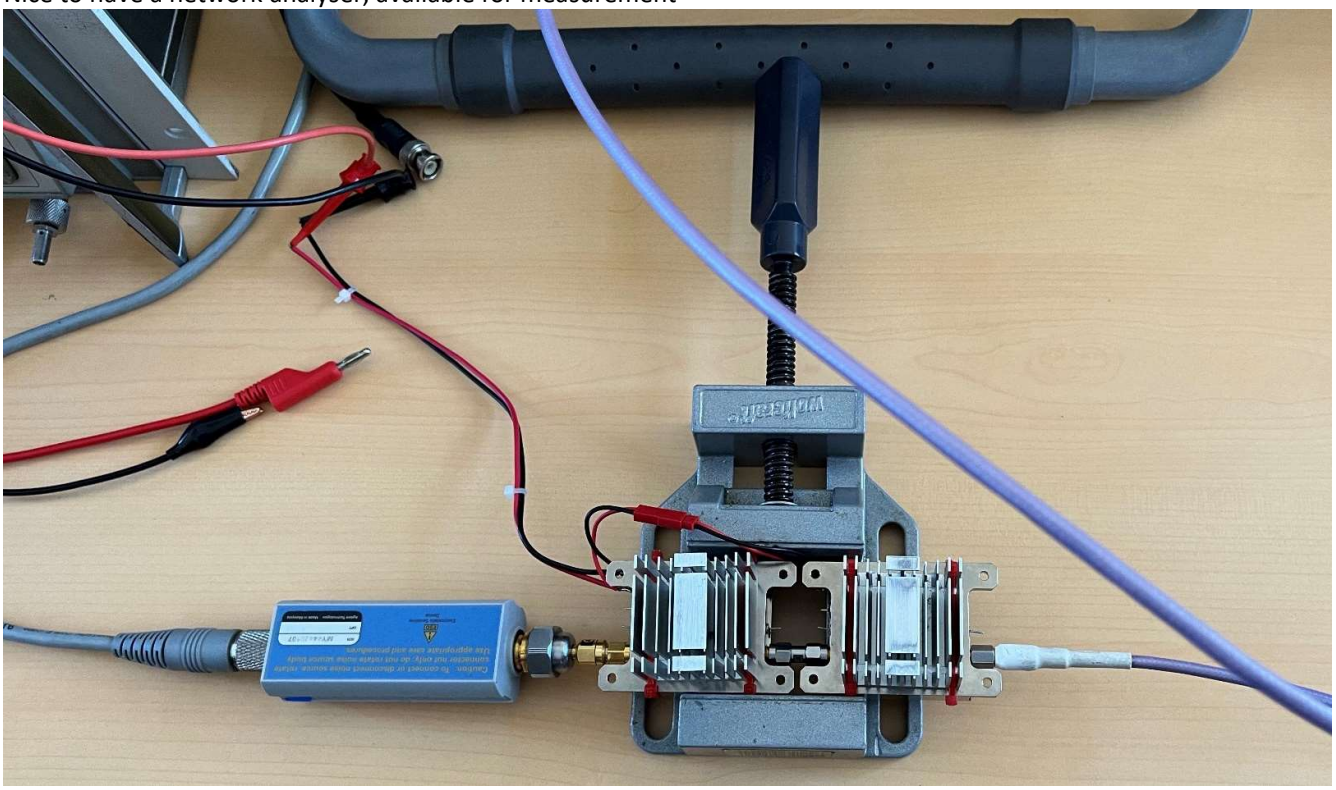


The beautifully made range of transverters made by Pascual Arbona EA5JF. They can be quickly changed and locked in place, to feed a Kathrein offset dish. Thus, allowing alignment at lower frequencies, before moving to millimetre bands.

In the afternoon, measurements and sales.

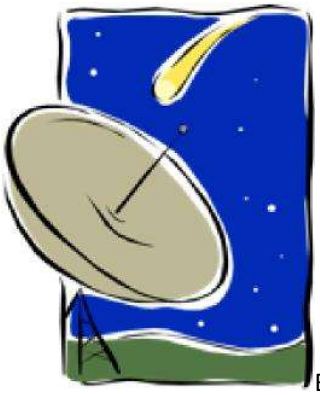
For me it was great to meet up with other like minded microwavers. Especially Eddy ON7UN, Pascual EA5JF and Iban EB3FRN.

Nice to have a network analyser, available for measurement



and proper Noise figure measurement.
Thanks to Maximo for organising this event, now permanently on the calendar!

Activity News February 2023



By John G4BAO

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

From Dave G4GLT

Contact with F4CKV/P on 10ghz.

Regular readers may remember me saying last year that the F5ZLF beacon on 10GHz is a rarity and that I had attempted to have a contact with Pierre (F4CKV) repeatedly last year with no success. When the beacon did come through strongly on Monday 12th September 2022, Pierre was at work.

On Sunday 12th February just after 0700GMT the morning started well with PA3GCO, F5ZBA and ED1ZBE coming through on 10GHz.

I had committed myself to joining a work party at the farm where I live, clearing up and mending broken fences and walls so soon went home.

After 1500GMT, most people wanted to finish for the day, so I was very pleased about this and raced over to my portable spot at IO80DO (363masl). I was delighted to hear F5ZBA and F5ZLF beacons at 559.

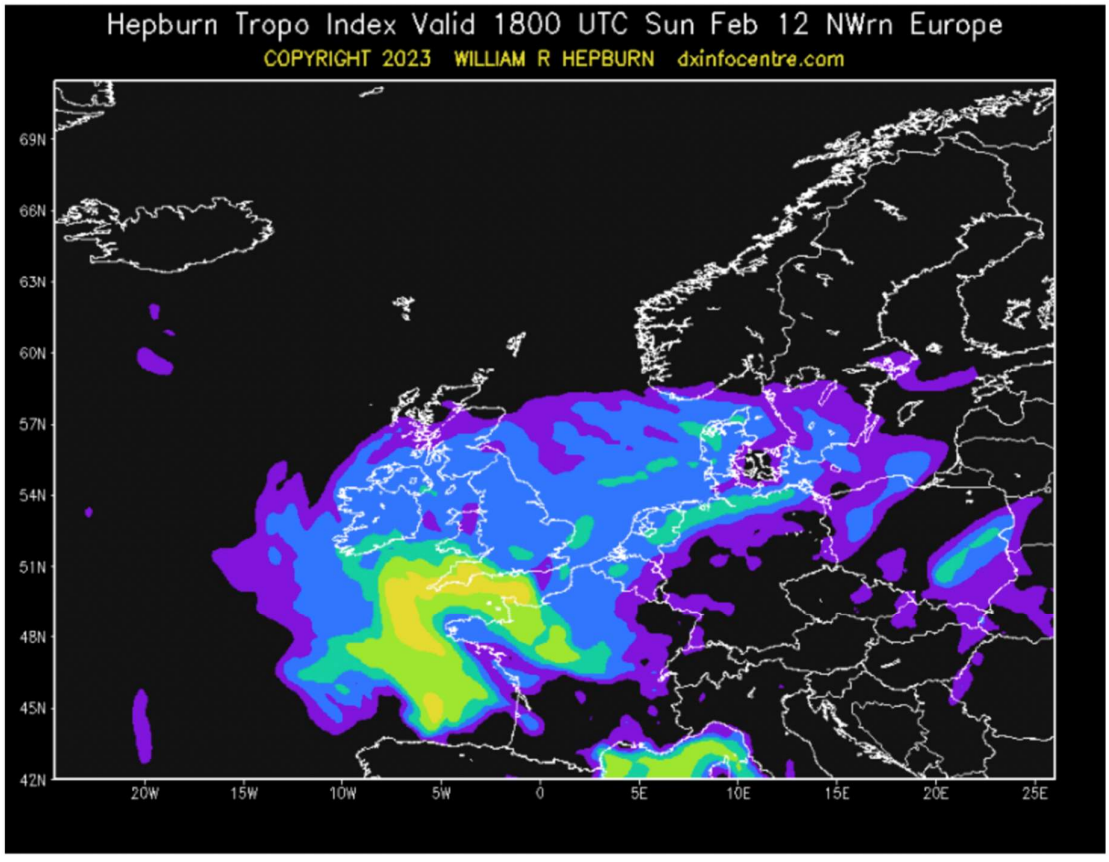
I saw that Pierre was on ON4KST, so contacted him. He was at home and asked me to wait 30 minutes, while he travelled to his portable site. On his arrival I sent him a CW beacon. We had an SSB QSO at 1605 GMT with reports of 55 both ways. (distance 681 km).

What is amazing to me was the fact that Pierre was running 160mW!!! Using this set-up Pierre has in the last year made 200 QSO's, including IQ0SS at 750km. You have to admire his enthusiasm.

As the F5ZLF beacon was getting stronger we had a second QSO at 1640GMT, I was S7-9 with him and he was peaking S8 with QSB. Pierre also received F9ZG and GB3MCB. The crucial indicator as far as Pierre is concerned is the F5ZLF beacon, that is behind him hidden behind a peak from my direction. Pierre's locator was JN16NL15JT at 485 metres above sea level, with a low horizon to the UK, and he used a Selectra (IF) transceiver with a DB6NT G1 transverter. The dish was a 73cm prime focus with a shepherd crook feed. The Hepburn shows the ducting between SW England and central France. The temperature at his end was between 5-7 degrees C and the pressure 1034 millibars. At my end the temperature was 7 degrees C and the pressure significantly raised at 1034 millibars.

The path profile shows a significant obstruction mid path, that in this instance did not obstruct the microwave path between us. There is a short video of the contact on

https://youtube.com/shorts/QZqe41xB-tY?feature=share


Hepburn Tropo Index Valid 1800 UTC Sun Feb 12 NWrn Europe
COPYRIGHT 2023 WILLIAM R HEPBURN dxinfocentre.com
69N
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From John G0API

Mainly this Winter I has been working on an upgrade to the G4RFR EME dish system.

We had a request for a QSO back at the end of 2022, from a station down in Hobart, Tasmania and we found we could not reach the needed AZ.

Our 3.65m dish is limited to an arc starting at approx 100 degrees AZ/15 EL, due to the Clubhouse proximity and a 40x8x8 Ft steel container.

On investigation it was found that it would be possible to acquire the rising Moon at approximately 55 degrees AZ and 5 degrees EL - snag was it would involve moving approx 0.5Tonne of dish and trailer into an area we do not have available.

After a week or 2 of investigating further I realised that a solution was to hand - add a second dish, high up on the rear framework of the main dish and 180 degrees offset in AZ. This would "look over " the near ground level obstructions of the large dish.
To my surprise the idea was taken up by the other group members and what G3YGF Christened, Project Janus, was started.

The largest available dish to hand was a 1.8m offset, with no feed point mounting.
This would be approximately 8dB lower gain than the large dish, but by adding a "bit" of fabricated metalwork on top of the main counter balance weights, we could mount the standard large dish feedplate/LNAs and 4 port switch, along with all the associated umbilicals.

John, M5AHQ, modified our Medii tracking control system to work with this new dish without having to do on the fly mental arithmetic. (-180 in AZ and inverted in EL).

It was quite warm in my garage knocking up a 1/4" steel plate mounting for the small dish - about 25kg of bracket that was then bolted to the 2x2x1/4" Alum rear support frame, in January ..

We now have the new dish mounted, suitable feed point support bracket made and performance tested using QO100 and Sun/Moon noise from a locked Mclean dual LNB.
New EW90 elliptical semi-flexible waveguides have been flanged and fitted with 3 stub matching at each end. One run interfaces the dish feed to the headplate 4 port and the other to the rear of the main dish mounted 200W TWA .

And that brings things up to date at the middle of March - dry WX would be appreciated asap for final testing and then the possibility of working the Antipodes!

Update on 13th March
We did some mods to our TX matching at G4RFR yesterday pm and then did a Sun noise RX check. To our surprise we saw 17dB of Solar output ,which exceeds our normal level by approximately 1.5dB .
This was measured on a wideband detector (approx. 2MHz BW) and Continuum on an SDR14 in a 190kHz span and 6Hz RBW.
I notice the high level of DX on 28MHz again today, so speculate Solar output could be the reason.
Does anyone agree or can provide reasons why not?

G4RFR will be operating on 10GHz EME from 1300Hrs next weds , 22nd March and would appreciate any contacts on any mode .

73
John
G0API
FRARS EME Group

MARTLESHAM MICROWAVE ROUND TABLE 2023

BT Adastral Park
Martlesham Heath
Suffolk
IP5 3RE

The Round Table proper will be a one day event on Sunday 16th April, with doors opening at 09:30 for an 09:50 start, and concluding at about 16:00. Location is in the Antares Building Foyer, and Crucible lecture theatre. There will be the usual test lab with measurements including noise figure and power to 10GHz and beyond, refreshments will be available from our usual team of helpers including sandwiches, biscuits and hot/cold drinks.

The talks programme has been assembled by Sam G4DDK, and is shown below.

The UK Microwave Group AGM will take place in the early afternoon, volunteers for committee roles will be very welcome.

The evening before the main event, on the 15th, there will be an informal meal/gathering at the Ipswich Swallow Chef and Brewer, IP3 9SS at 6.45 for 7.00pm. There is an on-site Premier Inn offering accommodation for those staying overnight, please book direct with them. The meal will be on a "pay as you go" basis on the night, but please register if you wish to attend, as space is limited.

The online booking system is open to book your entry to the Martlesham site and to register for the Saturday evening meal.

Contact info: John Quarmby G3XDY. g3xdy@btinternet.com

Saturday 15th April 2023

Informal dinner at the Swallow Brewers Fayre, Augusta Close, Ipswich, IP3 9SS. 6.45pm meet up in the bar area, eat from 7pm. Please reserve your place when registering.

Sunday 16th April 2023

09:30 Doors Open
09:45 Welcome and Opening
10:00 G8CUB – Update on the mm wave activities.
& G8GTZ –122GHz adventures
11:15 Refreshments & Judging of the Project Competition
11:30 G4SJH –23cm band WRC-23 update
12:15 GM3SEK- microwave EMF situation update
13:00 Lunch Break
14:00 UK Microwave Group AGM
15:00 Refreshments
15:15 UKuG Contest Forum
16:00 Close

UKuG MICROWAVE CONTEST CALENDAR 2023

Dates, 2023	Time UTC	Contest name
2-Apr	1000 - 1600	2nd Low band 1.3/2.3/3.4GHz
7-May	0800 - 1400	3rd Low band 1.3/2.3/3.4GHz
14-May	0900 – 1700	1st 24GHz Contest
14-May	0900 – 1700	1st 47GHz Contest
14-May	0900 – 1700	1st 76GHz Contest
28-May	0600 - 1800	1st 5.7GHz Contest
28-May	0600 - 1800	1st 10GHz Contest
4-Jun	1000 - 1600	4th Low band 1.3/2.3/3.4GHz
25-Jun	0600 - 1800	2nd 5.7GHz Contest
25-Jun	0600 - 1800	2nd 10GHz Contest
9-Jul	0900 – 1700	2nd 24GHz Contest
9-Jul	0900 – 1700	2nd 47GHz Contest
9-Jul	0900 – 1700	2nd 76GHz Contest
30 -Jul	0600 - 1800	3rd 5.7GHz Contest
30 -Jul	0600 - 1800	3rd 10GHz Contest
27-Aug	0600 - 1800	4th 5.7GHz Contest
27-Aug	0600 - 1800	4th 10GHz Contest
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

April 1	CJ-2023, Seigy	cj.r-e-f.org
April 14-15	Microwave Update, Windsor CT, USA	microwaveupdate.org
April 16	Martlesham Round Table / AGM	www.microwavers.org
May 19-21	Hamvention, Dayton	www.hamvention.org
June 18	Harwell Microwave Roundtable (RAL)	
June 23-25	Ham Radio, Friedrichshafen	www.hamradio-friedrichshafen.de
July 8/9	Finningley Roundtable	g0ghk.com
August 6	BATC Convention, Midlands Air Museum, Coventry	www.batc.org.uk
September 8-10	68.UKW Tagung Weinheim, Germany	www.ukw-tagung.de
September 17-22	European Microwave week, Berlin	www.eumweek.com
December 2	Midlands Roundtable, Eaton Manor, SY6 7DH	

80m UK Microwavers net

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

73 Martyn Vincent G3UKV