An Amateur Radio publication for the Microwave Enthusiast

scatterpoint

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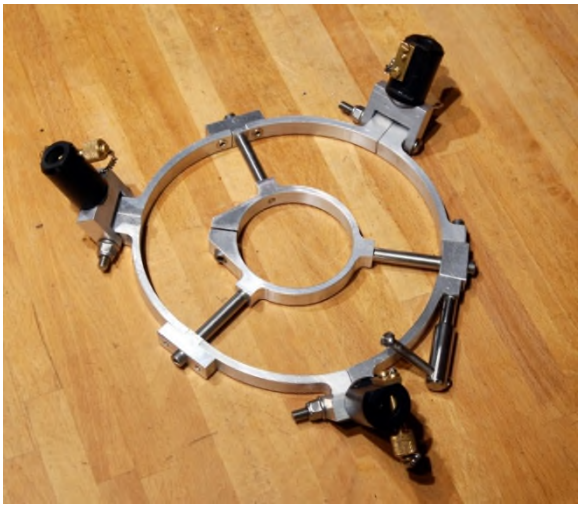
GW1EHF/P looking towards England on 122GHz

G4DBN 3.4GHz Clamping Ring



UK Microwave Group

Subscription Information

The following subscription rates apply.

UK £6.00 US $12.00 Europe €10.00

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**

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

ukug@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@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)

I can extract text and pictures from pdf files but tables can be a bit of a problem so please send these as separate files in one of the above formats.

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 email john@g4bao.com

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 John G4BAO for more information**

5.7GHz 10GHz 24GHz 47GHz 76GHz

UK Microwave Group AGM Calling Notice

Notice is hereby given that the 2020 Annual General Meeting of the UK Microwave Group will be held at 10:00am on Sunday, 25th October 2020, by Zoom. 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.
John Worsnop, the UKuG Treasurer wishes to stand down after completing the 2020 annual accounts in December.
Mike Scott, the UKuG Chipbank manager, wishes to stand down, a volunteer to look after the chip bank would be greatly appreciated.
Mike and Ann Stevens, the Trophy Managers, also wish to stand down.
Other existing committee members are prepared to stand again, however new members would be very welcome.
Any UKuG member wishing to stand should notify the UKµG Secretary, John Quarmby G3XDY, by 25th September 2020.
If you have any agenda or AOB items for the AGM then please contact the UKµG Secretary, John Quarmby G3XDY by 25th September 2020, email: secretary@microwavers.org

UK Microwave-Group is inviting you to a scheduled Zoom meeting.
Topic: UK Microwave Group AGM
Time: Oct 25, 2020 10:00 AM London
Join Zoom Meeting
https://zoom.us/j/93646054540?pwd=K25paWpDejRtanBJNGw1NldPTWJOZz09
Meeting ID: 936 4605 4540
Passcode: 233976
One tap mobile
+442080806591,,93646054540#,,,,,,0#,,233976# United Kingdom
+442080806592,,93646054540#,,,,,,0#,,233976# United Kingdom
Dial by your location
+44 208 080 6591 United Kingdom
+44 208 080 6592 United Kingdom
+44 330 088 5830 United Kingdom
+44 131 460 1196 United Kingdom
+44 203 481 5237 United Kingdom
+44 203 481 5240 United Kingdom
+44 203 901 7895 United Kingdom
Meeting ID: 936 4605 4540
Passcode: 233976
Find your local number: https://zoom.us/u/aczx4fxGqg

The following reports are those normally given at the AGM, and published prior to the event in Scatterpoint

Chairman's Report

When I took over the role of Chairman from Sam G4DDK in April 2019, none of us could have known what 2020 was to bring and the impact COVID-19 would have on some aspects of our hobby. In many respects the effects of lockdown were minor; we could still operate on the amateur bands from home, in other respects lockdown has had a significant effect particularly for microwave operators. Portable operation could not take place with contest rules being amended accordingly. No microwave round tables could be held, meaning no access to test equipment or the opportunity to purchase that item or component that members have been looking for from the various individuals and organisations that support our roundtables. Of course there has been no opportunity to meet up in person to show off equipment, get advice or plan new projects. Even this AGM has had to be delayed from April to October and is being conducted on-line as there is no prospect of holding a physical meeting during 2020.
Despite the lockdown the work of the committee has continued and I would like to thanks all our officers, committee members and our representatives for their hard work and dedication in performing their roles.

This year we have several vacancies that we need to fill. John, G4BAO is stepping down from the role of Treasurer which he has held for a number of years. John is unusual as he is the only treasurer I have ever known who wants to spend money! I would like to thank John for all he has done for the group both as treasurer and as a previous Chairman.
We will need to find a volunteer to take over the Trophies manager role. This has recently been undertaken by Mike G8CUL/F4+++ and Ann G8NVI. Mike has decided he can no longer continue as he lives for part of the year in France. The main work of the trophy manager tends to be concentrated around the time of the AGM when our trophies are awarded. I wish to thank Mike for all his efforts over the last few years in ensuring our trophies are collected in and made ready for the AGM.
We also need a volunteer to take over our chipbank. This has been run my Mike G3LYP for many years. He has taken the chipbank to many roundtables in the south of England as well as providing a very fast response for requests for components through Royal Mail. The chipbank holds large numbers of useful and sometimes hard to find items. Its main advantage is there is no minimum order charge, in fact it is a completely free service (including postage) to our members. Mike is now into his 80's and it is finding it difficult to get to roundtables and feels it is time to hand over to a younger member. So thank you Mike from the committee and all the members who have used the Chipbank, you have provided a top class service.
The committee would also like to appoint a publicity officer. Details of the role were published in the May 2020 edition of Scatterpoint.
All of our officer and committee posts are important to the running of the UKuG so please offer to fill these vacancies, you will be given help and advice in taking up a position.
Scatterpoint has been edited by Roger G8CUB this year with John G4BAO collating the activity news. There has been a good spread of technical articles as well as interesting reports on activity and propagation. Thank you both for your efforts.
During 2019/2020 contests have generally been well supported, although bad weather for some contests have seen fewer portable stations operational. The Tuesday evening RSGB UKAC microwave contests have seen a continued increase in numbers entering with high levels of activity particularly on 23 and 13cm. Even on 9 and 3cm numbers have increased, only on 6cm have the numbers entering remained relatively stable year on year.
During 2019 I was able to attend all six round tables held in Great Britain; Cardiff, Martlesham, RAL, Finningley, Crawley, Burnt-Island Scotland and Shropshire. Each one is unique with their own mix of formal lectures, test equipment, surplus sales and opportunities to interact with other microwavers. The qualifying rounds of the UKuG construction competition has been held at most of the round tables. All of the Round Tables are organised by local clubs and groups; I would like to thank all those involved.
The UKuG has loan equipment available to members to try out different bands before deciding to build or purchase their own equipment. Currently the group has equipment for 5.7, 10, 24 and 76GHz. A system for 47GHz is being constructed by Roger G8CUB. The group has also purchased boards that will be used to build a pair 122GHz transverters.
There has been an upsurge in interest in the 122GHz band following the publication in the Dubus magazine in 2019 of a system based on the 'Silicon Radar' radar chip. Crowd funding by amateurs around the world has enabled a large number of systems to be manufactured. About sixty ready-made boards and dish feeds and horns were purchased by UK amateurs. COVID-19 delayed delivery but 122GHz activity using the system is starting to be reported by UK amateurs.
The microwave amateur has access to large segments of the electromagnetic spectrum, especially compared to HF operators. Commercial exploitation of the microwave bands continues at a pace. Many of our bands are under threat especially the 23cm band to make way for the Galileo GPS system. Studies are being conducted on behalf of the European Union to determine whether amateur radio operation is compatible with Galileo. The studies are due to report to the World Radio Conference 2020 (WRC23). In an increasing number of countries amateur allocations have already been lost especially 13 and 9cm. To ensure continued access it is vital we make good use of our allocations. The saying, 'use it or loss it' has never been truer.
The RSGB Spectrum Forum currently has four UKuG members representing the interests of microwaves (and amateur television). They are Murray G6JYB, Barry G4SJH, Noel G8GTZ (BATC) and Neil G4LDR. The Forum meets once per year but with most work being carried out on-line. The UKuG has been tasked with updating the RSGB website.
Barry G8SJH and Murray G6JYB have represented the RSGB at the European Conference of Postal and Telecommunication Administrations (*CEPT*) meetings particularly preparing for WRC19. Murray used three weeks of his annual leave to represent the interests of the amateur microwave community at WRC19, helping to defend our continued access to the microwave bands, particularly 23cm. I would like to thank all

our members who have and who continue to represent the interests of the microwave amateur at national and international level.
Neil Underwood, G4LDR, Chairman.

UKuG AGM 2020 Treasurer's report

It's been another stable year for the Group's finances, with net funds increasing by around 10% to over £26,000. Due to this there is no requirement to increase subscriptions from current rates for 2020-21.
Full accounts are available to view on request to the Treasurer, but the summary is below.

UK Microwave Group Accounts

Item	Income	Expenditure	Balance
Opening C/A+PayPal +Deposit + petty cash balance 01/Jan/19			**£23,884.74**
Subscriptions	**£3,400.99**		
Chipbank donations	**£9.96**		
Interest	**£10.00**		
Round table sales	**£102.00**		
Misc	**£3.51**		
PayPal fees/other		**£174.02**	
RSGB Afilliation		**£47.00**	
Websites (inc beaconspot)		**£23.98**	
Beacon Support		**£386.75**	
Trophies		**£108.00**	
Chipbank Expenses		**£107.84**	
Trifold leaflet		**£26.95**	
Loan equipment insurance		**£184.40**	
Sub-totals excluding transfers	**£3,526.46**	**£1,058.94**	
Closing C/A+PayPal +Deposit + petty cash balance 31st Dec 2019			**£26,352.26**

J C Worsnop G4BAO
Treasurer

Funding and Support

The group's only major external funding project this year, aside from the support it gives annually to Beaconspot.uk, has been to provide financial support towards the rebuild of the GB3FNM 13cm beacon.
Funding for 2019-20 will include new loan equipment for the 47 and 24GHz bands

Treasurer's parting thoughts

After quite a few years as ordinary member, Chairman and Treasurer, I will be standing down from the Committee at this AGM.
Over my tenure as Treasurer, I hope I've run the finances to your satisfaction. We've introduced the loan equipment scheme and built and maintained a number of new and existing beacons with group funds.
As Treasurer I was, more and more, finding myself in a state of frustration with members, at not being able to spend much of the £26k that the group holds. Sadly, with a few notable exceptions, most of our members seem uninterested in using their funds for Microwave projects for themselves or to help others.
I was most disappointed this year about the failure of the Group's proposed Hayling SDR Microwave transceiver to take off as a group project, but heartened to see others outside the group's influence taking up the challenge with the successful of the Langstone Project.
The group has badly missed an opportunity and needs to learn that ideas and money are not enough. It needs passionate leaders to make projects work.
I'm not giving up microwaves, or the GHz Column, and am happy to continue (post-covid) to be the Eastern Area, area tech support guy. I just feel I need a bit of a break after quite a long time serving as a committee member and holding two offices.

A final thanks to our professional accountant, Graham G0KRB who's audited the accounts every year for no charge.

If you'd like to take over as Treasurer, I've summarised the role below

1. To maintain a current account on behalf of the group.
2. To maintain a savings account on behalf of the group. `
3. To maintain a PayPal account on behalf of the group.
4. To maintain accounts detailing all income and expenditure of the group
5. To present audited accounts at the AGM
6. To present a Treasurer's report at the AGM
7. To be a cheque signatory for the group's current account
8. To appoint a second cheque signatory for the group's current account
9. To inform the membership secretary of all renewal payments received
10. To inform the membership secretary of all new member's payments
11. To pay all the group's regular bills promptly, these include equipment insurance, website-related fees, trophy fees and expenses incurred by the Chipbank.
12. To make any other payments approved by the committee.
13. To advise the committee of the general and detailed financial situation of the group.
14. To consider the financial consequences of suggested expenditure and make recommendations to the committee.

Membership Statistics for UKuG on-line AGM 25th October 2020

UKuG membership continues to grow slowly from 533 members at the 2019 AGM to 558 members in September 2020.
The end of year comparison shows there were 59 new members during 2018 and 82 new members during 2019.

Comparing numbers for April 2019 with April 2020 there were 25 new members by April 2019 and 22 members by April 2020 but this number is non-linear over the year with some months regularly contributing more new members than others.
Each year we do lose members by: non-payment of subs, individual email requests often due to "no time for radio" and silent keys.

Up to mid-September 2020 there have been 48 new members added to UKuG membership.

Most new and existing members are subscribed to groups.io/Scatterpoint and are able to download their Scatterpoint newsletter.
Last year (2019) 522 members were subscribed to Scatterpoint, the number so far in 2020 is 547.

Members' subscription payments are predominantly by PayPal, 88% this year compared with 85% in 2019.

Bryan, G8DKK
Membership secretary, UKuG

Contests and Awards Report for 2019

The high bands championship (5.7 and 10GHz) remained at the same levels as 2018.
The Low Band events (1.3/2.3/3.4GHz) continued to grow, with a 14% increase in overall entries.
The mmwave events grew a little on 24GHz and remained the same on the other bands.
No major rule changes have been made for 2020.
Three squares awards were been issued in 2019, 25 squares on 1.3GHz and 5 squares on 2.3GHz to G4FSG, and 60 squares on 1.3GHz to G4DDK. No Firsts certificates were issued.
Downloadable contest certificates are still work in progress – assistance from a graphic designer is being sought.

Operating Awards 2019

G4EAT Trophy (1.3GHz) Combe Gibberlets Group M0HNA/P
G3KEU Trophy (5.7GHz) Dave Austen G1EHF/P
G3JMB Trophy (10GHz Restricted) Barry Lewis, G4SJH/P
G3RPE Trophy (10GHz Open) Telford & District Amateur Radio Society G3ZME/P
G0RRJ Trophy (24GHz Championship) Telford & District Amateur Radio Society G3ZME/P
24GHz Trophy Barry Lewis, G4SJH/P
47GHz Trophy Roger Ray G8CUB/P

SMA Torque Wrench

Paul Nickalls G8AQA

Not being able to justify well over £100 for a quality wrench, I recently purchased a cheap SMA torque wrench. They are available on Ebay under the name Mxita for about £14 which seemed a good price. Firstly I had to carefully smooth off the burrs etc. on the jaw before they would fit an SMA. It cleaned up nicely. As delivered the torque is not set so I carefully set it up on my Britool torque wrench tester. Fairly tricky as it was at the bottom of its range. (See below)

I discovered that it did not break at the same torque in each direction but it was possible to set it so that it was correct for brass connectors in one direction and stainless steel in the other. It is now suitably labelled. Some expensive torque wrenches are pre-set for 1N.m which is too high for brass connectors

Be careful. Many SMAs are affixed to flimsy material so it is necessary to hold both sides to prevent damage.

When do you need to use a torque wrench?

1. For high frequencies - say over 1 GHz
2. For high power to stop them getting too warm.
3. And when you are making measurements at any frequency.
4. Even more so for precision / metrology measurements.

What torque to use?

3–5 in·lbf (0.3 to 0.6 N·m) for brass, and 7–10 in·lbf (0.8 to 1.1 N·m) for stainless steel connectors. Don't blame me if your connectors are rubbish and fall apart.

Don't forget to inspect thoroughly and clean them frequently with some lint free tissue and maybe some IPA (isopropyl alcohol).

Kent Britain adds:-

“going to Imperial, I have seen 6 in-lbs and 8 in-lbs listed as the
recommended torque value. Mine are set to 8 in-lbs”

Mike G3LYP adds:-

“Interested in your comments, I have a SMA Torque wrench I bought for next to nothing at a domestic boot sale in a box of mixed spanners. Unfortunately I have no means of measuring the torque. I have had problems with cheap SMA adapters and on several occasions have wrung the nut off the connector as the split ring holding it in place seems too weak.
I also hadn't realised that steel and brass SMAs needed different torque, but I suppose it makes sense!”

Ian adds:-

“You'll need a vice, a 5/16 (8mm) nut, a weight, a ruler and some sting or wire.
Choose your weight for convenience - a 1 litre plastic bottle out of the fridge would be perfect (I say plastic because the weight of the contents is known and the packaging is negligible).
Clamp the nut in the vice jaws so the axis of the nut is inline with the axis of the vice.
Put the Torque Wrench on the nut and adjust the nut so the Torque Wrench handle is horizontal (Torque Wrench will be parallel to the gap between the jaws, but out in free space).
Now hang the 'known weight from the handle and slide in and out to find the "set point"
Measure from the nut to to the Set Point and multiply by your "known weight" and you'll have a very accurate torque figure.”

Alwyn G8DOH adds:-

“And while we’re at it note that the torque settings for brass SMA’s are 40% less than for the stainless steel ones.

Also, the setting for metrology is less than that used on assemble and forget applications.

I see the main use of SMA torque wrenches to be preventing over-tightening by the inexperienced/over enthusiastic.

By contrast, you need to be quite muscular to tighten a 7/16 connector to recommended torque- I hate the way this connector gives nasty suck-outs unless fully tightened.”

Paul G8AQA

More modes on 122GHz using the VK3CV boards

Barry Chambers, G8AGN v1.0 29 Aug 2020

Introduction

When the VK3CV 122GHz transceiver board was designed, it was envisaged that it would be used with either FM voice or FSK CW. In fact, many other forms of modulation may also be used, and in an earlier article I showed how Hellschreiber could be implemented since this a CW-like modulation which makes use of a ticker-tape format display at the receiver and the eye-brain combination for interpreting signals which are weak or corrupted by QSB or QRM. In this article I will discuss how both analogue and digital modes can be "piggy-backed" onto the VK3CV board's FM voice mode. This technique was first proposed by Mike K6ML, who demonstrated the transmission of FT4 using it [1].

Before showing some off-air results, it is useful to consider how the FM voice mode "piggy backing" technique works. Starting with AM, if a R.F. carrier is modulated by a single audio sine wave, then the resulting frequency spectrum shows three "spikes", the central one corresponding to the carrier frequency and the other two, which are symmetrically placed about it, are the lower and upper sideband frequencies. As the modulating frequency is changed, then so is the spacing between the two sideband frequencies and the carrier frequency. Furthermore, as the modulation index is changed, by altering the amplitude of the modulating tone, the amplitude of the sideband signals also changes but the amplitude of the carrier signal is unchanged. Hence the total power carried by the AM signal changes with the value of the modulation index but the signal bandwidth remains constant. It should be noted that it is the sidebands which carry information, not the carrier and this is the type of modulation (but usually in the form of SSB with suppressed carrier) which is normally required to transmit modes such as JT4 and JT65.

The corresponding FM case is much more complex since, in theory, modulating the carrier by a single audio sine wave gives rise to a frequency spectrum containing an infinite number of pairs of sidebands which are again placed symmetrically about the carrier frequency. Altering the modulation index now affects the spectrum in two ways. Firstly, the relative amplitude of individual pairs of sidebands changes and secondly the amplitude of the carrier also changes since unlike the AM case, the total transmitted power (power associated with the carrier and all the sidebands) is constant. Hence, as the amplitude of individual pairs of sidebands change with changing modulation index, they either steal power from the carrier or give it back. Ideally, we would like the FM signal spectrum to approximate to an AM spectrum and this can be achieved by using a low value of modulation index such that the power carried by the first pair of sidebands predominates over that carried by the others. This case is often referred to as narrow band FM. In practice this is achieved by adjusting the level of the audio signal which is fed into the MIC socket on the VK3CV board on transmit. Now, like the AM case considered above, the amplitude of the first pair of FM sidebands varies with modulation index which is what is required for transmitting an analogue signal such as SSTV or digital signals such as JT4, JT65 or FT8.

FM "piggy backing" in practice

SSTV

The easiest way to send and receive SSTV with the VK3CV board is by using the MMSSTV software package running on a PC [2]. Two audio connections are required. To transmit SSTV, an audio connection must be made between the headphone socket on the PC and the MIC input on the VK3CV board. To receive, another audio connection is required, this time between the headphone socket on the 144MHz IF receiver (e.g. FT817 etc.) and the MIC input on the PC. Many modern laptop computers do not seem to have an external microphone socket and so I used an inexpensive USB soundcard from eBay [3]. I have found that the 144MHz receiver tuning is less critical when the receive mode is set to AM. To aid initial receiver tuning, the MMSSTV software at the transmitting end can transmit a 1750Hz tone and this should be positioned accordingly on the receiving end MMSSTV spectrum display. The MMSSTV software can send and receive SSTV signals in a number of formats. I have not tried them all but the ScottieDX format seems to work well. Figures 1 and 2 show a SSTV picture which has been transmitted over a 10m path at 122GHz using a pair of VK3CV boards which have been fitted with external 10MHz double oven OCXO references. Figure 1 shows the picture as seen at the TX end and Figure 2 shows the picture as received at the Rx end of the link.

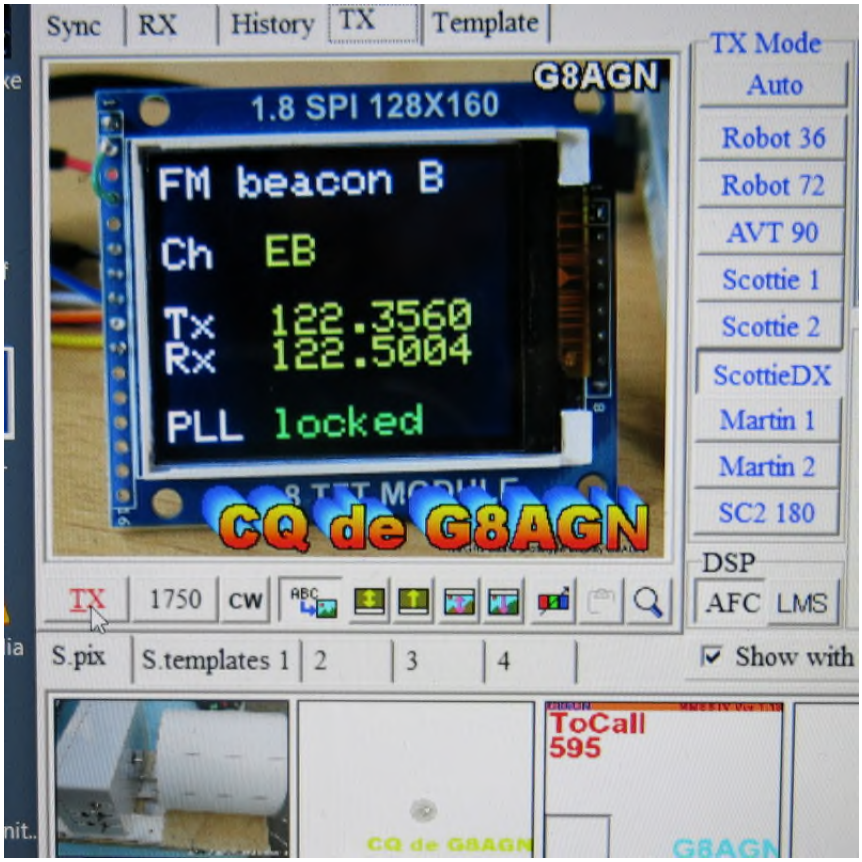


Figure 1 Original SSTV picture as seen at transmitting end

Figure 2 SSTV picture as received after transmission at 122GHz

The received picture, which is of a prototype display for the VK3CV board, shows some slight evidence of timing errors. This is thought to be due to differences in the soundcard sampling rates in the two PCs rather than frequency instability in the VK3CV boards.

JT modes

Transmission and reception of digital modes using the VK3CV boards is achieved using the same audio connections as for SSTV but using the WSJT-X software package instead [4]. Since the pair of VK3CV boards comprising a link are operating in duplex mode (i.e. the two transmit frequencies are spaced apart by 144MHz and are "on" all the time), there is no need for any CAT control and provided that the two PC clocks are synchronised then the transmitting and reporting process across the link should be the same as when such digital modes are used on the lower amateur bands. Following K6ML's suggestion, I set the Tx and Rx base audio frequencies in WSJT-X to 450Hz. This value must be high enough to ensure that the spacing between the first and second sidebands in the VK3CV board's transmitted FM spectrum can accommodate the bandwidth of the JT signal without overlap. To aid in initial tuning of the 144MHz receiver(s), WSJT-X has a Tune facility for transmitting just a single tone, which in our case would be 450Hz. This is then positioned correctly on the receiving WSJT-X spectrum display.
I started my JT4 tests using JT4C which comprises 4 tones, spaced apart by 17.5Hz and giving a signal bandwidth of about 57Hz. Decodes were reliably obtained and so I then moved to JT4A which has a signal bandwidth of 17.5Hz and again decodes were reliably obtained. Finally, I tried sending JT65A signals and again decodes were reliably obtained. Some results from these tests are shown in Figure 3, 4 and 5.

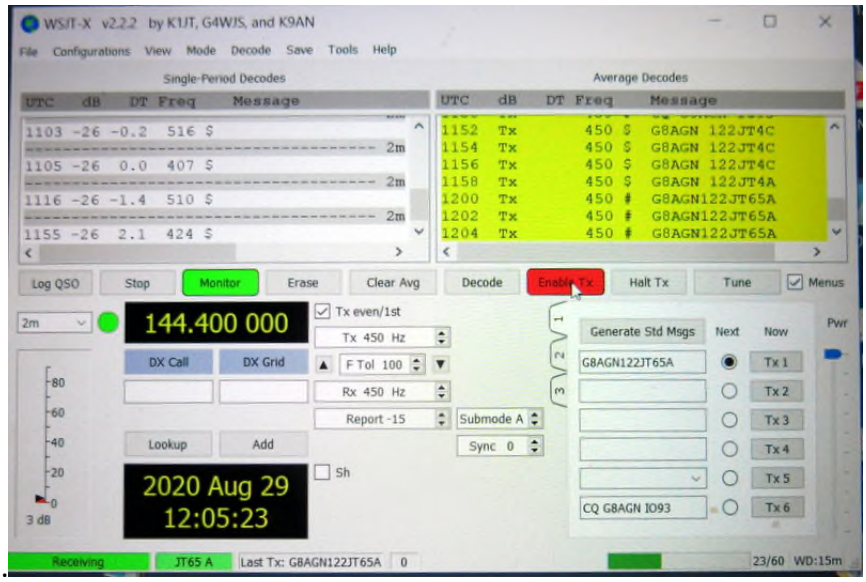


Figure 3 JT Signals sent from VK3CV board

Figure 4 Spectrum of received JT4C signal from VK3CV board

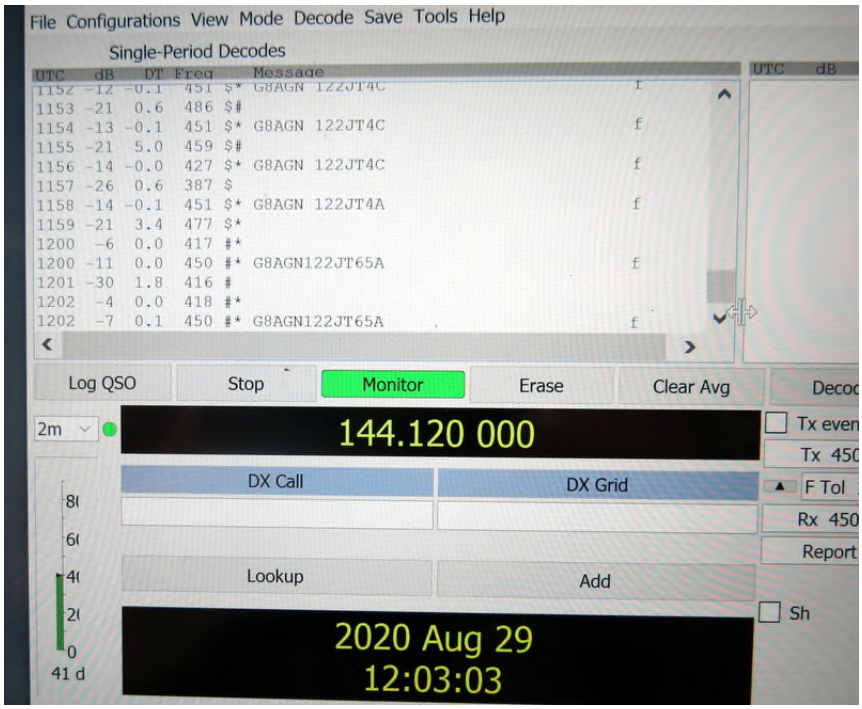


Figure 5 Decodes of JT4C, JT4A and JT65A signals from VK3CV Tx and Rx boards

It will be noted that the 2m frequencies shown in Figures 3 and 5 are different. Since the VK3CV boards and the 144MHz IF (FT817) were not being operated under CAT control, the numbers shown were irrelevant.

Discussion

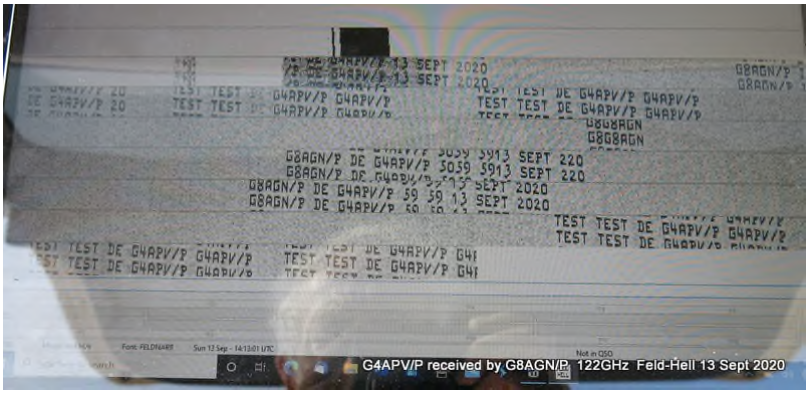
It should be emphasised that both VK3CV boards used in these tests were fitted with double oven 10MHz OCXO external references. I have not tried decoding JT modes using unmodified VK3CV boards but it may be possible if the GPS locking is turned off and use is made of JT modes which have a larger tone spacing. Care must be taken, however, and if modes such as JT4F and G are contemplated, it is suggested that the transmitter base frequency should be increased from the 450Hz value that I used. This will then increase the spacing between the first and second sidebands in the FM spectrum which the VK3CV board generates on transmit and this will then leave more space between the sidebands to accommodate the four tones which represent the JT4 signal.

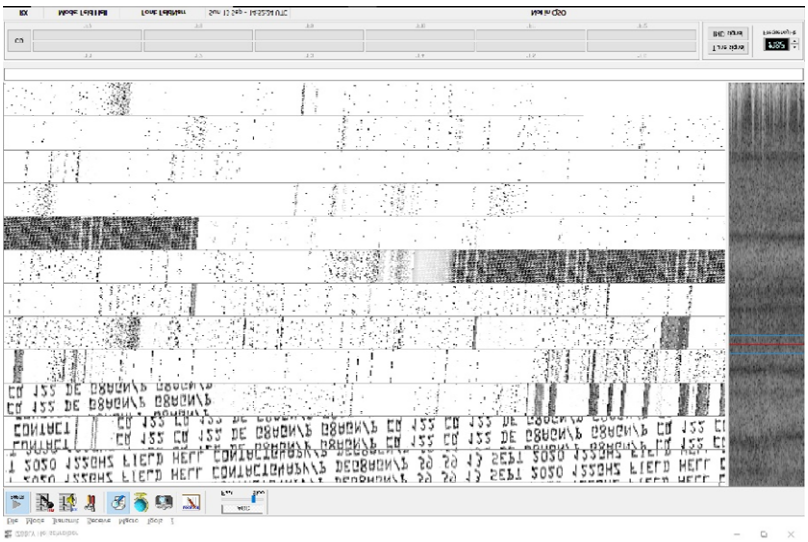
It is well known that when using WSJT-X, it is important to ensure that the PCs at both ends of the link are using clocks which are closely synchronised. Since my testing was done within range of my wireless router, I was able to ensure synchronisation of my Windows 10 PCs using the Dimension4 software [5]. For operation "in the field", where Wi-Fi coverage is not available, synchronisation should be possible using GPS [6] but this has yet to be tried.

For two-way working using JT modes, i.e. you need to set the 122 boards for duplex working. So one board is set as CH/B to A and the other to CHA/B to B.

References

[1] http://www.50mhzandup.org/vk3cv_zoom_workshop_070720.pdf
[2} https://hamsoft.ca/pages/mmsstv.php
[3] https://www.ebay.co.uk/itm/External-Virtual-USB-3D-7-1-Channels-Sound-Audio-Card-Adaptor-for-Raspberry-Pi/173262756574?ssPageName=STRK%3AMEBIDX%3AIT&_trksid=p2057872.m2749.l2649
[4] https://physics.princeton.edu/pulsar/K1JT/wsjtx.html
[5] http://www.thinkman.com/dimension4/
[6] https://www.coaa.co.uk/gpstime.htm





Bob G4APV/P and Barry G8AGN/P yesterday (13 Sept 2020) made what is believed to be the first Hellscriber contact on 122GHz (certainly in the UK and probably in the world). Both stations used VK3CV transceiver boards. Bob used a 20cm horn and Barry used a 30cm offset dish. Dx was only about 2.5km but 59 reports were given both ways - see attached screenshots. Hellscriber keyboards, as described recently in Scatterpoint, were used on transmit and IZ8BLY software. 73 Barry, G8AGN

Power control of the FT817

D Robinson G4FRE

Since posting on the reflector about how I limit the power output of my FT817 I have had a number of enquiries of how I do it, so more details:-

The need

1. My DB6NT Transverters are now all set for around 100mW of drive at both 144MHz and 432MHz IF. This allows me to deploy smaller components in the IF/10MHz diplexers and saves power when portable
2. Having blown up pin diodes in DB6NT Transverters by applying too much drive by accidentally choosing the wrong power level from the front panel of the FT817, I needed to set the output power to be the same, irrespective of power chosen through the front panel

The solution

The FT817 has a hidden soft menu as detailed at http://www.ka7oei.com/ft817_calibrate.html . It is accessed by holding down the A and B and C buttons then powering up the radio. Menu items 40 through 43 set the output power for 144MHz ("VHF") menu items 44 through 47 set the output power for 432MHz ("UHF")

Firstly record the existing settings of menu items 40 through 47 in case I wanted to return it to a 5 Watt radio on VHF/UHF.

Select a frequency in the 144MHz band. Select the highest power setting via the front panel menu. While measuring the output power adjust the VHF menu item 40 setting to achieve 200mW (to allow for cable loss) then make menu items 41 through 43 match this value

If you want controlled power on UHF as well. Select a frequency in the 432MHz band. Select the highest power setting via the front panel menu. While measuring the output power adjust the UHF menu item 44 setting to achieve 200mW then make menu items 45 through 47 match this value

The following table shows the values I ended up with:-

Menu setting	Parameter	Original Value	200mW value
40	VHF-HI	87	1
41	VHF-L3	48	1
42	VHF-L2	14	1
43	VHF-L1	5	1
44	UHF-HI	98	7
45	UHF-L3	56	7
46	UHF-L2	21	7
47	UHF-L1	7	7

When you are done adjusting values, the F key must be pressed to save these parameters to the radio's EEPROM. If this is not done, any changes made will simply be lost.

From Martin G8BHC

Radio Ham's Code

WIP	Work In Progress
UFO	Unfinished Object
PHD	Project Half Done
PIB	Projects In Boxes
WOMCAT	Waste Of Money Components And Time
NESTY	Note Even Started Yet
PJC	Professional Junk Collector
STABLE	Stash Accumulation Beyond Life Expectancy
WITHWIT	What in The Heck Was I Thinking?
AF	Awaiting Fettling
RF	Refused Fettling
UHF	Unable to Hold Frequency
TIH	There is Hope.

Hat Tip to *The Knitter's code* from Australian FB user Terry Mason.

2.4m Dish QD Feed Mount Modifications

Neil G4DBN

Tony G8DMU has a 2.4m mesh dish on a big pneumatic mast on the back of his Transit van. He uses a variety of feeds, and they are all different diameters. I made up a quick-detach support ring to fit an RF Hamdesign multi-band ring feed, as seen in an earlier Scatterpoint.

The ring support was designed to fit the ring feed. Tony's single-band 23cm feed has a rather larger diameter, so the clamp would not fit. I decided to split the two long arcs of the clamp and spread them with extension blocks. The quick-detach adjustable end sockets and carbon fibre tubes are unaltered after the change to the support clamp.

First step was to extend the ring to fit the large feed I machined some tee-section blocks, threaded them and made countersunk holes in the ring so allow the blocks to be inserted. That increased the diameter of the ring, but I had to insert another block between the clamp faces to make it large enough. I drilled the blocks to 5mm clearance so I could fit attachment bolts for various crescents and spiders

I made up a stainless steel internally threaded clamp nut to fit on a stainless threaded stud fixed into the block with Loctite, so I didn't have to worry about threads in the aluminium getting damaged with repeated use

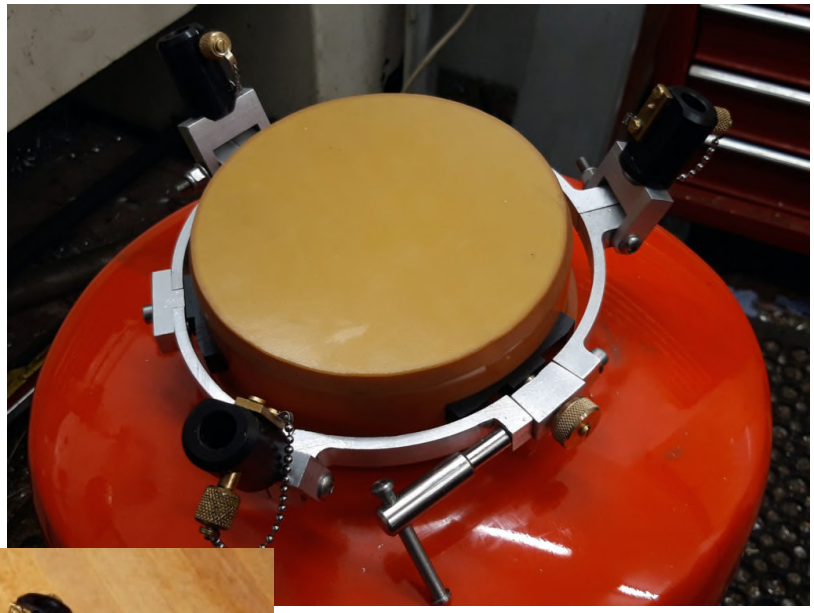
Next step was to make support cheeks/crescents to hold the original multiband ring feed without removing the extension blocks. I decided to make crescent-shaped spacers from Delrin, with the internal diameter to fit the ring feed, and the outside relieved to fit within the ring.

Extension block fitted into clamp ring

Two of the crescents are tapped M5, the other has a brass insert which mates with a stainless steel screw tapped into the third extension block. I make a knurled nut to make it easy to tighten without allowing too much torque, which might distort or damage the ring feed.

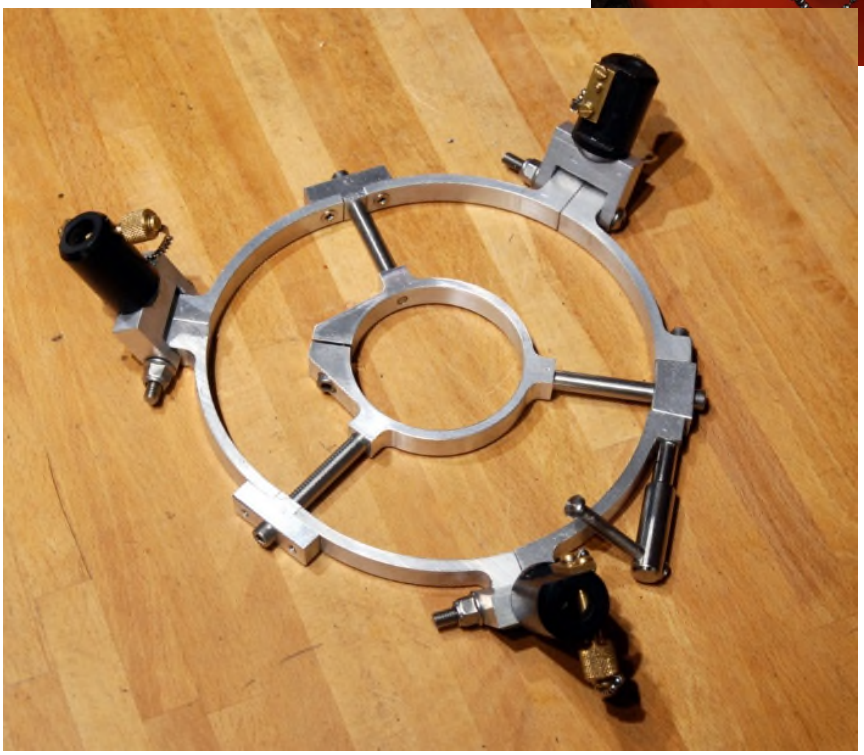
New clamp lock and ring on the big 23cm feed

previously. The spider arms are 8mm stainless steel,



The 3.4 GHz feed is the smallest, so I milled a support ring (left) and fitted support rods with threaded ends to fix to the holes in the outer ring.
The threads were M5 so a bolt would fit easily through the M6 threaded hole in the clamping block.
The locking bolt is designed to be used by gloved hands in the dark.

with an M5 stud one end and M5 internal thread at the other.
The quick-detach sockets mean Tony can fit the chosen feedhorn in the comfort of the van, then clamber up on the roof and fix the feed to the plugs on the carbon fibre arms and fit the captive locking pins (with their bath-plug safety chains).
Once fitted, the spiders can stay attached to the feeds.



The 3.4 GHz clamping ring is made in one piece to fit the feedhorn with detachable scalar choke that I made

Tony's 13cm horn is a little larger, and the clamp had to be made in two pieces to fit over the back plate..
I milled the rings on my ancient Bridgeport mill using a shop-made fixture plate on a rotary table with a sacrificial plate made from acrylic sheet.
The rest of the parts were made on my 1980s Colchester lathe.

Finally, a photo from Tony of the 2.4m dish in use on his van at a portable contest site up in the North Yorkshire hills. It doesn't look anywhere near as scary in the photo as it does in real life.

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Antenna gain measurement at microwave frequencies using the 3-antenna method

Barry Chambers, G8AGN

Introduction

The subject of antenna gain is one which crops up frequently in conversations between radio amateurs and is of particular interest when operating at frequencies above a few GHz where an increase in antenna gain is often the cheapest way of improving the "potency" of one's transmitting and receiving equipment.

The most well-known method of measuring the gain of an unknown antenna is by comparison with another one whose gain is already known (see Appendix). This can present a problem if such an antenna is not available or has itself been characterised against another antenna of "known" gain. Although only two antennas are actually involved in the gain comparison process, three are actually required to make a measurement since the signal source itself requires an antenna but this is "passive" in the sense that it is only used to provide a convenient signal to enable the actual gain comparison to take place at the receiver. A better method of measuring antenna gain makes "active" use of all three antennas in the measurement process and this then removes the requirement for one of them to have a known gain. Furthermore, at the end of the revised measurement process, the gains of all three antennas have been determined.

The 3-antenna method of measuring gain

Assuming that we have a suitable transmitter and receiver for the band in which the antennas are to be characterised, then the receiving antenna should be spaced far enough away from the transmitting antenna so that it is in a quasi-plane-wave field region. A plane-wave is one in which the wave-front perpendicular to the direction of propagation is flat, i.e. there is ideally no amplitude or phase variation across it. This ideal state of affairs can only be achieved if the antennas are in free-space (i.e. no nearby reflecting objects) and an infinite distance apart. In practice the spacing can be made much smaller provided that the transmitted field wave-front across the aperture of the receiving antenna has only a small phase variation across it, typically λ/16, where λ is the wavelength. This minimum spacing between the transmitting and receiving antennas is called the "far-field distance", FF, and can be calculated from

$$FF = \frac{2D^2}{\lambda} \qquad (1)$$

where D is the maximum transverse dimension (e.g. dish diameter) of the larger antenna. The variation of far-field distance with antenna size on the microwave bands above 10GHz is shown in Figure 1. It may seem paradoxical that the far-field distance for a given dish size increases with frequency but this is due to the factor D/λ in (1), i.e. the size of the dish being expressed in wavelengths. FF must remain fixed during the measurement programme outlined below.

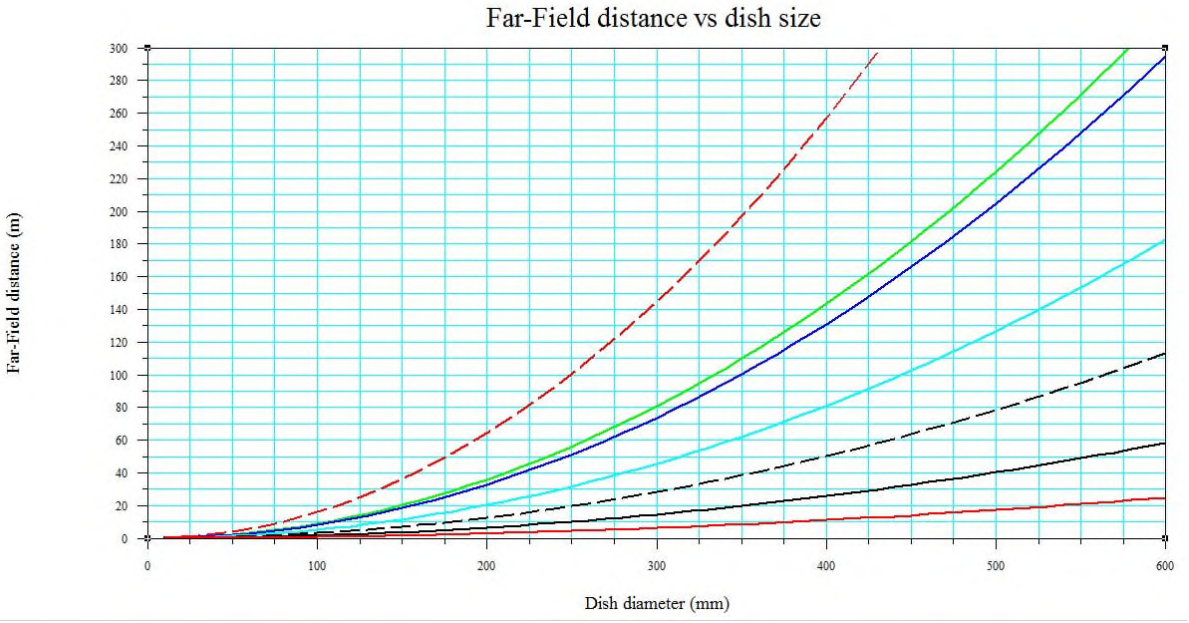

Figure 1

red..10GHz, black...24GHz, black dashed...47GHz, cyan...76GHz, blue...122GHz, green...134GHz, red dashed...241GHz

Let us assume that the three antennas A, B and C have gains (as yet unknown) of G_A, G_B and G_C, respectively. Then, for example, if we were to use A as the transmitting antenna and B as the receiving antenna, the received signal, S_{AB}, will be proportional to $G_A G_B$. Hence

$$S_{AB} \propto G_A G_B = X G_A G_B \qquad (2)$$

All the quantities in (2) are measured in linear units and X is a term which accounts for factors such as the transmitter power, the frequency and the transmitter-receiver separation. In this case, S_{AB} represents the received power. Especially at the higher microwave frequencies, the received power will be very small because of low transmitter power and high free-space path loss. Hence it is better to measure S_{AB} as a received carrier to noise (C/N) ratio; in this case, the quantity X in (2) must also include the receiver noise figure and the receiver bandwidth. These factors are assumed to remain constant throughout the measurement process. Normally it is more convenient to work in terms of dB rather than linear units and so (2) can be re-written as

$$S_{AB} = X + G_A + G_B \qquad (3)$$

Similar equations may be obtained for the other two cases, namely transmitting and receiving antenna pairs of (i) A and C, (ii) B and C

$$S_{AC} = X + G_A + G_C \qquad (4)$$

$$S_{BC} = X + G_B + G_C \qquad (5)$$

Now we have three equations (3), (4) and (5) with three knowns S_{AB}, S_{AC} and S_{BC} and so the three unknowns G_A, G_B and G_C can be found by elimination; in the process, the other unknown quantity X cancels out and so does not need to be determined.

Hence the three antenna gains are

$$G_A = \frac{S_{AB}+S_{AC}-S_{BC}}{2} \qquad (6)$$

$$G_B = \frac{S_{AB}+S_{BC}-S_{AC}}{2} \qquad (7)$$

$$G_C = \frac{S_{AC}+S_{BC}-S_{AB}}{2} \qquad (8)$$

The values of gain obtained from (6), (7) and (8) are in dB and assume that the measured C/N values are reciprocal, i.e. $S_{AB} = S_{BA}$ etc. This should be so if the three antennas are well matched to the transmitter and receiver ports but as a check, the measurements could be repeated but with antenna A interchanged with antenna B to give S_{BA} etc and the results averaged. So, for example, a better measure of G_A might be

$$G_A = \frac{S_{AB}+S_{BA}+S_{AC}+S_{CA}-S_{BC}-S_{CB}}{4} \qquad (9)$$

Implementation

Accurate antenna gain measurements can only be made if the measurement environment – the antenna range - and the transmitter and receiver are suitable. A good introduction to the choice of a suitable measurement environment and how its suitability can be checked is given in [1]. The transmitter power must be high enough to ensure that the received C/N value is not too close to the receiver noise level and the gains of the antennas to be measured should differ by no more than, say, 30dB. In addition, the beamwidth of the lowest gain antenna should not be so broad as to have an excessively wide beamwidth so, for example, a half wave dipole or an open-ended waveguide would not be suitable. Measurements on the higher mm-wave bands will be problematical, especially for antennas with high gain, because of the need for a large far-field separation between transmitting and receiving antennas, the low transmitter power and, probably, high receiver noise figure, the narrow antenna beam-widths and the high free-space path loss and associated propagation irregularities caused by the atmosphere.

When using the three-antenna method of measuring gain, because we have no datum or reference received power level in terms of an already known reference antenna gain (as we have in the two-antenna measurement discussed in the Appendix), we have to use an alternative; the receiver noise floor. Now our measurements are expressed in terms of received carrier-to-noise ratios. This would be satisfactory if the oscillators in our transmitter and receiver chains were perfect but in practice the oscillators will exhibit phase noise which will mask the true level of the receiver noise floor in the vicinity of the transmitted carrier frequency. Furthermore, a change of either the transmit or receive antenna will not only change the level of the received carrier signal but also the level of the phase noise as seen on the SDR spectrum display, i.e. the carrier to phase noise ratio is constant. Hence an approximate measurement of the actual receiver noise floor has to be made at a frequency sufficiently far away from the carrier frequency that the phase noise is below that of the true noise floor. The word “approximate” implies that the true level of the noise floor does not change significantly over this frequency offset.

Appendix

The 2-antenna method of measuring gain

The signal power in watts received from a distant transmitter can be calculated using the Friis formula. Its simplest form is given in (A1).

$$S = P_T G_T G_R \left[\frac{\lambda}{4\pi D}\right]^2 \qquad \text{(A1)}$$

P_T is the transmitter power in watts, G_T and G_R are the transmitter and receiver antenna gains, λ is the wavelength and D is the transmitter-receiver separation. D is large enough to ensure that the receiving antenna is immersed in a quasi-plane-wave field. The term in square brackets is essentially the power form of the free-space path loss.
Equation (A1) is in linear units and the only variable quantity is G_R, the receiving antenna gain. Hence (A1) can be written as

$$S = XG_R \qquad \text{(A2)}$$

or in dB form

$$S = X + G_R \qquad \text{(A3)}$$

In the 2-antenna gain comparison measurement, we make two measurements of S, corresponding to either the standard gain antenna or the unknown antenna being used at the receiver, hence

$$S_{SG} = X + G_{SG} \qquad \text{(A4)}$$

$$S_{unknown} = X + G_{unknown} \qquad \text{(A5)}$$

Then subtracting (A5) from (A4), we get

$$S_{SG} - S_{unknown} = G_{SG} - G_{unknown} \qquad \text{(A6)}$$

Hence

$$G_{unknown} = G_{SG} - (S_{SG} - S_{unknown}) \qquad \text{(A7)}$$

The bracketed term on the RHS of (A7) implies that we do not need to measure absolute received power levels, only the difference in levels between the two measurements. This is because our datum or reference level is set by the fact that we already know the gain of the standard antenna.
When making gain measurements on the higher mm-wave bands, however, the transmitter power may be very low and the free-space path loss implied by D having to be large enough to satisfy the far-field criterion may be large; hence using (A7) may not be possible since the received power levels may be too small to measure with a conventional power meter or indicator plus calibrated attenuator. The solution is to use a SDR as the receiver I.F. and to work with indicated carrier powers as shown on the calibrated SDR spectrum display. Again, because we are working with relative powers rather than absolute ones, we do not need to measure the actual carrier-to-noise ratios since the fact that the gain of the standard antenna is known provides our reference datum. Nevertheless, the receiver bandwidth and gain must be kept constant during the measurement procedure and any AGC must be switched off.

Reference

[1] https://groups.io/g/Easy-100/attachment/287/0/Antenna%20Ratiometry%20Measurements.pdf

Scatterpoint activity report

Activity News: August 2020

By John G4BAO

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

From Mike, G8CUL

Microwave activity at G8CUL has been in progress for some time, with a slow movement towards the higher bands. The aerial system is a 1.5m dish with a tri-band feed (1.3, 2.3 and 3.4GHz). The 1.3 and 2.3GHz systems are pretty good with G4DDK preamps at the dish, both bands having filters between the dish and preamp to remove the usual mobile phone interference. The PAs for both these bands reside in the shack with heliax coax on transmit and RG213 or RG58 type coax on receive – after all there is a lot of gain in the preamps! Not so with the 3.4GHz system! All the equipment for this band is in the shack. This means that there is a coax loss of around 5-6dB between the dish and the PA/preamp assembly (the preamp also from G4DDK). Even with this sub-optimal system, QSOs on 3.4GHz are often to John, G3XDY but less often to Dave, G4JLG. With so much coax loss it is difficult to get longer distance QSOs but even in this state the signal has been heard by DK2MN!

The obvious way forward is to put the preamp and the PA at the dish, thus reducing the coax loss by about 5dB, improving both transmit and receive by an appreciable amount. This of course creates some logistical problems, not the least of which is box sealing (while still dissipating the PA heat) and the DC power required for the PA. The current idea is to put some simple embedded processing in the mast-head box to control the PA and preamp with suitable sequencing, measuring the DC current to the PA and forward and reflected RF power. This embedded processor is in continuous communication with a similar system in the shack which presents the results on a simple display for user perusal. Transmit and receive "commands" are also sent via the same telemetry system with the shack end being in overall control.

The telemetry system runs at a relatively slow bit rate (9600bits/second) and uses RS485 via a New beacon shielded twisted-pair cable. At this rate it should be very robust with little or no interfering effect on any of the bands. I have designed and in-use some PA control boards and these, with some simple extra circuitry provide the necessary functionality. All the control and telemetry is currently working 'on the bench' with the next task to put the mast-head box together with suitable heatsinking and sealing together with power control and conditioning. This is perhaps the difficult bit!

From John G4BAO

Been busy fettling 122GHz but got in a few GHz QSOs during August/September

1.3GHz

08/08 SM6VTZ JO58UJ CW TR 994km
13/09 DL3IAE JN49DG CW ACS 658km

3.4GHz

03/08 G4ZTR JOØ1KW TR 59km, G4FSG JOØ2PC SSB TR 76km
12/08 G4BRK IO91HP SSB RS 129km
15/09 G3XDY JOØ2OB SSB TR 72km

10GHz EME (QRA64D digimode with 1.1m dish and 20Watts)
19/08 IW2FZR, 19/08 OZ1FF
20/08 IW2FZR
21/08 F6BKB
12/09 RA3EME, S57RA, OK2AQ, DL4DTU, DF1OI, W3SZ
13/09 IW2FZR, VE4MA, OK1CA, OZ1FF

24GHz
30/07 G3XDY JOØ2OB SSB TR 72km
13/09 G3XDY JOØ2OB CW TR 72km

From John G0API

Reasonably normal flat conditions over last month but this morning (14/09/2020) when the bedroom TV was turned on for the 8am news on Radio 2 , up popped a NO SIGNAL message .
In a half awake state I looked outside to find mist overlaying the local area - thinks LIFT !
10GHz was working with PI7ALK at 45dB above noise (6Hz RBW) on the SDR-IQ .GB3SEE was a similar level , with GB3CAM 569 .
There were probably others that had been available but the Sun was by then at work and all ducting stopped at this 66m asl QTH at 9 am .
I then checked 5.7GHz and found GB3 FNM was still 40dB + .All enhanced signals were to my East , Northerly paths were normal .
I use a 60cm offset dish at 6m agl , with a locked original Octagon LNB on 10GHz and a VE4MA feed offset by 7 degrees for 5.7GHz , directly coupled to a modified Franco (G4DDK mod) preamp , followed by a 2 stage ERA mod amp gain block and 25m of Sat TV coaxial cable to the shack Kune DB6NT TVTR .
It was pleasing to give some 1/2 points away for RX only contacts on both 5.7 and 10GHz during the recent Cumulatives .There must be several stations with similar kit that could participate in the RSGB events ?

From Neil G4DBN

I made good use of the thunderstorms in the West Midlands on the evening of August 11th, enjoying a 10GHz ragchew on FM with Graham G3VKV at 218km. Neil was hearing six UK 10GHz beacons (GB3OSW, KBQ, FNY, CAM, SCX, LEX) on the same heading as Graham. A slight change of beam heading brought in two more (SEE, PKT). Turning north, GM6BIG/b (IO85BU) was just audible, but there was an excellent signal from GM3WOJ/b (IO77WS) at 490km via a scatterpoint near Edinburgh. A quick test with Nick G4KUX (IO94BP) resulted in a CW rainscatter QSO off a storm out in the North Sea (JO15)

From Nick G4OGI

The 14th September tropo event can be attributed to the huge High-pressure area centred over middle-Europe. Looking at the early morning Skew-T charts when propagation on 3cm was at its best. (Contact Nick direct if you want to look at the charts (Ed)

I can see that there was a temperature inverse at about 500 – 700m (a pressure level of between 950 and 975hPa) This inversion seems to have been quite widespread as it was identical from Helgoland (DB0GHZ), Copenhagen (OZ7IGY), Brussels, Luxembourg, Paris (very strong inversion), Brest, London, Essen and Frankfurt. The inversion was slight less defined and a little higher (1000m) for Manchester. Very strong signals from DB0GHZ, DB0VC, PI7ALK, PI7RTD, PE9GHZ. Weaker from OZ5SHF and F5ZTR. Interesting that I still heard no UK beacons. My inland take-off angle of 1.4 degrees is part of the problem.

On another observation, I definitely saw a signal from GB3CSB shortly after it returned to air. It was not strong enough to be computer decoded but it was clearly displaying JT4G tones on the SDR Spectrum. No Doppler so was arriving via some tropo-related mode .

Tips from Nick on covering feedhorns

This was provoked by G4BAO posting this picture of his feedhorn on Twitter. The cap, from a “Dole” Fruit salad pot was destroyed by heavy rain and UV over a couple of years!

I found that “Industrial” Cling film (the stuff used in Posh Restaurant and Hotel kitchens) to be ideal as a weather isolator for waveguide feeds. I literally wrap it over the horn and bunch it at the back. Then apply some insulating tape around the flat part of the rim to ensure it stays in place and is weather proof. Most effect at 3cm is a double layer – fold a large piece in two and stretch it across the horn opening.

Quick and effective and lasts. In Germany it lasted about 9 months so used to renew every 6 months. Seemed to behave on 24GHz too.

First G / GW 122GHz Contact

On Tuesday 4th August 2020, Noel G8GTZ/P, Dave G(W)1EHF/P and Neil G(W)4LDR/P set up on opposite sides of the Severn Estuary that separates England and Wales. We had selected sites that were both between the original (1960's) Severn Bridge crossing and the new Severn Bridge crossing. Unfortunately Noel found the road to English site closed so had to search for an alternative location which took some time. A suitable site was eventually found south of the new bridge. This meant the path to GW1EHF/P and GW4LDR/P passed under the new bridge. Neil and Dave had no problem accessing their site at Black Rock picnic site to the south of Chepstow.

At 20200804_1240UTC G8GTZ/P transmitted a CW beacon which was immediately heard by Neil GW4LDR/P. Dave quickly aqcuired Noel's signal with his higher gain dish. Dave and Noel then completed a fully quieting FM duplex contact followed by Neil but at slightly lower signal levels due to the use of a non-optimised 30cm offset dish.

We believe this is the first England (G) to Wales (GW) contact on 122GHz.

G8GHZ/P looking towards the M4 motorway Severn crossing and South Wales. A small offst dish is being used.

GW1EHF/P looking towards England and the new Severn crossing, a small cassegrain dish is being used.

GW4LDR/P working G8GTZ/P using a non-optimised 30cm offset dish. Distance was 4.4km.

The met. conditions at Chepstow at 12:00 were, 18 deg C, 61%r/h, 1015mb and at 15:00 17 deg C, 70%r/h, 1014mb.

News

AMSAT-DL Online Symposium
on September 26th 2020

Unfortunately, the AMSAT-DL Symposium planned for September 26th and 27th, 2020 cannot take place this year in the usual manner.

Since the health of everyone is very close to our hearts and the legal framework currently leaves no other option, we have decided not to hold a meeting on site in Bochum this year. We regret this very much, but the premises only allow an occupancy of less than 20 persons.

A "social" meeting with dinner is unfortunately not possible either, nor is a flea market and other activities, such as the QO-100 User Meeting, which happened for the first time during the HAM Radio Fair in Friedrichshafen in 2019.
Instead, we will broadcast the symposium as an "online" meeting in DATV via the broadband transponder of QO-100 and on the Internet on the YouTube channel of AMSAT-DL (https://www.youtube.com/user/amsatdl).
Enclosed is the preliminary schedule for September 26th 2020 (all times in CEST=UTC+2):

Start	Topic	Who
09:00	Welcome, Introduction, Agenda	Matthias DD1US
09:10	Interview with the AMSAT-DL Board of Directors: Peter DB2OS (Chairman), Michael DD5ER, Thilo DJ5YM	Matthias DD1US
09:45	Introduction to Bochum Observatory and its Ham Radio activities	Thilo DJ5YM
10:10	The AMSAT-DL LunART project proposal to ESA	Peter DB2OS
10:35	The ADALM Pluto as part of the AMSAT-DL QO-100 control station in Bochum	Mario DL5MLO
11:10	Portable station for QO-100 based on the modules of AMSAT-DL	Matthias DD1US
12:00	Lunch break	
12:45	QO-100 DX-pedition to Namibia/South Africa/Botswana	Charly DK3ZL
13:45	Digital Narrowband Operation via QO-100	Florian DF2ET
14:20	School contacts via QO-100 with DP0GVN in Antarctica	Heiner DD0KP
14:55	Update of ARISS and AREx activities	Oliver DG6BCE
15:45	Coffee break	
16:00	Reception of the recently launched probes to Mars	Daniel EA4GPZ, Paul M0EYT, Achim DH2VA
16:50	Final interview with the AMSAT-DL BOD and conclusions: Peter DB2OS (Chairman), Michael DD5ER, Thilo DJ5YM	Matthias DD1US
17:10	Introduction to the virtual QO-100 user meeting	Matthias DD1US
17:20	Virtual QO-100 user meeting via the QO-100 NB transponder	Florian DF2ET
17:50	Closing of the symposium and virtual QO-100 user meeting	Matthias DD1US

Due to the international audience, most of the lectures will be held in English. The current schedule can be found on the AMSAT-DL homepage at https://amsat-dl.org.

We would like to invite you all, also on behalf of the AMSAT-DL board, to this year's AMSAT-DL online conference and the virtual QO-100 user meeting.
Jens DH6BB, Lenz DL8RDL, Florian DF2ET and Matthias DD1US
Please send any queries to dd1us@amsat.org

Contests

July 5.7GHz Contest 2020

With portable entries permitted again, Dave G1EHF/P took full advantage to lead this session, his best DX contact with F8DLS sealing the win. David M0GHZ was the runner up. G3UKV/P noted problems with high levels of Wi-Fi QRM.
73
John G3XDY
UKuG Contest Manager

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX kms
1	G1EHF/P	IO91GI	15	1596	F8DLS	430
2	M0GHZ	IO81VK	13	1435	G3XDY	246
3	G4BRK	IO91HP	12	1057	G3XDY	184
4	G4CLA	IO92JL	9	985	G4JNT	177
5	G3UKV/P	IO82QL	9	916	G4ODA	172
6	G4LDR	IO91EC	8	686	G4ODA	212
7	G4JNT	IO90IV	7	663	G4ODA	224
8	G4FRE/P	IO81XW	8	609	G4ODA	160
9	G8AIM	IO92FH	6	498	M0GHZ	108
10	G1DFL	IO91NL	1	43	G1EHF/P	43

August 5.7GHz Contest 2020

G6ZME/P operated by G3UKV won this session with a 300 point margin over Neil G4LDR as runner up. Best DX was Neil's contact with G4CBW at 296km.
In the overall Championship table the battle for top place is not yet decided. David M0GHZ is in pole position, but it could change after the final session.

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX Kms
1	G6ZME/P	IO82QL	12	1379	G3XDY	265
2	G4LDR	IO91EC	8	1075	G4CBW	296
3	G1EHF/P	IO91GI	8	690	G3XDY	200
4	GW4HQX/P	IO81LS	6	586	G4NNS	121
5	M0GHZ	IO81VK	6	583	G3XDY	246
6	G8AIM	IO92FH	6	531	GW4HQX/P	119
7	G4FRE/P	IO81XW	7	473	G4LDR	98
8	G3PHO	IO93GG	2	332	G1EHF/P	214
9	G3VKV	IO81XV	4	242	G8JVM	89
10	G1DFL	IO91NL	2	73	G1EHF/P	43

July 10GHz Contest 2020

John G4ZTR racked up 20 contacts to win this session by a substantial margin in the Open section, with Paul G8AQA/P operating from Brown Clee as runner up.
In the Restricted Section Barry G4SJH/P takes the honours with Dave G4FRE/P as runner up.
Conditions and DX were rather unexceptional for this session.
73
John G3XDY
UKuG Contest Manager

Open Section

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX Kms
1	G4ZTR	JO01KW	20	3390	G4KUX	353
2	G8AQA/P	IO82QL	18	2259	G4ZTR	246
3	M0GHZ	IO81VK	15	1935	G3XDY	246
4	G4CLA	IO92JL	14	1738	G4KUX	245
5	G4LDR	IO91EC	10	1515	F6DKW	378
6	G4BAO	JO02CG	8	1350	G4KUX	298
7	G4RQI	IO93IR	6	958	G4ZTR	247
8	G1PPA/P	IO93RI	7	918	M0GHZ	242
9	G8AIM	IO92FH	6	593	G4ZTR	171

Restricted Section

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX Kms
1	G4SJH/P	IO91GI	16	1629	G4ODA	182
2	G4FRE/P	IO81XW	9	818	G4ZTR	200

August 10GHz Contest 2020

John G4ZTR won this session in the Open section with about a 20% margin over runner up G3ZME/P operated by G8AQA. G3ZME/P recorded the best DX with GM0USI/P at 405km. In the Restricted section Dave G4FRE/P came out as winner, ahead of Barry G4SJH/P. Few comments on propagation were received for this event.

At this stage in the Championship, John G4ZTR has the top place in the Open section sewn up with victories in all four sessions so far. There is still all to play for in the Restricted section between G4SJH/P and G4FRE/P.

73

John G3XDY

UKuG Contest Manager

Open Section

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX Kms
1	G4ZTR	JO01KW	16	3595	F5HRY	377
2	G3ZME/P	IO82QL	21	2978	GM0USI/P	405
3	G4KUX	IO94BP	10	2412	G4LDR	395
4	G4LDR	IO91EC	13	2258	F6DKW	378
5	G0LBK/P	IO93DV	8	1695	G4LDR	311
6	GW3TKH/P	IO81LS	12	1421	G3XDY	294
7	G4ASR	IO81MX	10	1342	G3XDY	286
8	M0GHZ	IO81VK	10	1149	G4DBN	271
9	G3PHO	IO93GG	5	947	G4LDR	242
10	G4BXD	IO82UJ	9	795	G4LDR	151
11	G8AIM	IO92FH	8	752	G4ZTR	171
12	G3VKV	IO81XV	8	554	G4CBW	131
13	M1GSM	IO94DR	2	221	GM0USI/P	206
14	GM4BYF/P	IO85UU	2	122	G4KUX	137

Restricted Section

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX Kms
1	G4FRE/P	IO81XW	15	1706	G4KUX	302
2	G4SJH/P	IO91GI	13	1599	G3PHO	214
3	GW4MBS/P	IO71XW	1	125	G4UVZ	125

5.7/10GHz Championship Tables

Positions after four sessions, best three count to the total

5.7GHz

Pos	Callsign	31/05/2020	28/06/2020	26/07/2020	30/08/2020	TOTAL
1	M0GHZ	1000	700	899	423	2599
2	G1EHF(/P)	225	0	1000	500	1725
3	G4CLA	0	1000	617	0	1617
4	G4LDR	0	0	430	780	1210
5	G3ZME/P	0	0	0	1000	1000
6	G4JNT	0	483	415	0	898
7	G8AIM	52	0	312	385	749
8	G4FRE/P	0	0	382	343	725
9	G4BRK	0	0	662	0	662
10	G3UKV/P	0	0	574	0	574
11	GW4HQX/P	0	0	0	425	425
12	G7LRQ	424	0	0	0	424
13	G8DMU	0	267	0	0	267
14	G3PHO	0	0	0	241	241
15	G3VKV	0	42	0	175	217
16	G1DFL	0	34	27	53	114

10G Open

Pos	Callsign	31/05/2020	28/06/2020	26/07/2020	30/08/2020	TOTAL
1	G4ZTR	1000	1000	1000	1000	3000
2	M0GHZ	888	597	571	320	2056
3	G4CLA	0	759	513	0	1272
4	G4BAO	309	387	398	0	1094
5	G4LDR	0	0	447	628	1075
6	G3ZME/P	0	0	0	828	828
7	G4KUX	0	0	0	671	671
8	G8AQA/P	0	0	666	0	666
9	G4RQI	0	356	283	0	639
10	G0LBK/P	0	0	0	471	471
11	G8AIM	73	0	175	209	457
12	GW3TKH/P	0	0	0	395	395
13	G8DMU	0	393	0	0	393
14	G4ASR	0	0	0	373	373
15	G3YJR	101	240	0	0	341
16	G3VKV	0	124	0	154	278
17	G1PPA/P	0	0	271	0	271
18	G3PHO	0	0	0	263	263
19	G4BXD	0	0	0	221	221
20	M1GSM	0	0	0	61	61
21	GM4BYF/P	0	0	0	34	34

10GHz Restricted

Pos	Callsign	31/05/2020	28/06/2020	26/07/2020	30/08/2020	TOTAL
1	G4SJH/P	0	0	1000	937	1937
2	G4FRE/P	0	0	502	1000	1502
3	G4BXD	0	1000	0	0	1000
4	GW4MBS/P	0	0	0	73	73

24GHz/47GHz/76GHz Contest July 2020

Several stations did some roving in this event, and a number of tests of new 122GHz were also interleaved with activity on the lower mm-wave bands. Conditions did not merit a lot of comment but one or two thought they were above normal.

On 24GHz Keith GW3TKH/P is the winner, with Pete GW4HQX/P operating alongside as runner up. 47GHz sees Roger G8CUB/P in the lead with a total of 6 contacts made from two locations, and Keith GW3TKH/P in the runner up slot. The 76GHz results were another one-two for G8CUB/P and GW3TKH/P.

John G3XDY

UKuG Contest Manager

24GHz Contest July 2020

Pos	Callsign	QSOs	Score	ODX Call	ODX kms
1	GW3TKH/P	7	707	G1EHF/P	122
2	GW4HQX/P	6	617	G1DFL/P	122
3	G8CUB/P	8	609	G3UKV/P	123
4	G3UKV/P	5	436	G8CUB/P	123
5	G4FRE/P	6	373	GW3TKH/P	75
6	G1EHF/P	8	365	GW4HQX/P	122
7	G1DFL/P	6	347	GW3TKH/P	122
8	G4LDR/P	6	232	G8ACE/P	67

47GHz Contest July 2020

Pos	Callsign	QSOs	Score	ODX Call	ODX kms
1	G8CUB/P	6	338	GW3TKH/P	94
2	GW3TKH/P	2	169	G8CUB/P	94
3	G4FRE/P	2	150	GW3TKH/P	75
4	GW4HQX/P	1	75	G4FRE/P	75
5	G4LDR/P	2	58	G8CUB/P	44

76GHz Contest July 2020

Pos	Callsign	QSOs	Score	ODX Call	ODX kms
1	G8CUB/P	2	142	GW3TKH/P	94
2=	GW3TKH/P	1	94	G8CUB/P	94
2=	GW4HQX/P	1	94	G8CUB/P	94
4	G4LDR/P	2	49	G8CUB/P	27

UKuG MICROWAVE CONTEST / ACTIVITY WEEKEND CALENDAR 2020

Dates, 2020	Time UTC	Contest name	Certificates
26- 27 Sep		Activity Weekend	
27 -Sep	0600 - 1800	5th 5.7GHz Contest	F, P,L
27 -Sep	0600 - 1800	5th 10GHz Contest	F, P,L
18 -Oct	0900 - 1700	3rd 24GHz Contest	
18 -Oct	0900 - 1700	3rd 47GHz Contest	
18 -Oct	0900 – 1700	3rd 76GHz Contest	
18 -Oct	0900 - 1700	122GHz Activity Day	
24-25 Oct		Activity Weekend	
15 -Nov	1000 - 1400	5th Low band 1.3/2.3/3.4GHz	F, P,L
28-29 Nov		Activity Weekend	
26-27 Dec		Activity Weekend	

Key: F Fixed / home station
P Portable L
Low-power (<10W on 1.3-3.4GHz, <1W on 5.7/10GHz)

EVENTS 2020

Events may be subject to cancellation due to the Coronavirus
For latest information consult https://microwavers.org

2020

September 13-18	European Microwave Week, Utrecht *postponed to Jan 2021*	www.eumweek.com/
September 20	Crawley Roundtable *cancelled*	
September 26	AMSAT-DL Online Symposium - online	
September 25-26	National Hamfest	http://www.nationalhamfest.org.uk/
October 9-11	RSGB Convention & Amsat-UK Colloquium *now virtual*	**http://rsgb.org/convention/**
October15-18	Microwave Update, Sterling, Virginia *postponed to 2021*	www.microwaveupdate.org
October 10-16	IARU-R1 General Conference, Novi Sad	www.iaru2020.org
October 24-25	BATC Convention, Online	https://batc.org.uk/events/
November 7	Scottish Round Table	www.gmroundtable.org.uk/

2021

January ?	Heelweg	www.pamicrowaves.nl/
January 10-15	European Microwave Week, Utrecht	www.eumweek.com/

80m UK Microwavers net

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

73 Martyn Vincent G3UKV