An Amateur Radio publication for the Microwave Enthusiast

scatterpoint

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Antenna Comparison at 76 & 134 GHz

By Roger Ray G8CUB

In this Issue

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Editor's bit

I discover that every Tuesday there is a µWave net on 80m. See the end of the Activity Report for details.

UKµG still needs a Trophies Manager (p7)

My current plan for the next issue is for it to be a December+January edition so...

Season's Greetings to you all!

73 de Martin G8BHC (notoriously QRT)

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 the Yahoo group and/or Dropbox.

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.

Martin G8BHC

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UKµG Chip Bank – A free service for members

The catalogue is now on the UKµG web site at www.microwavers.org/?chipbank.htm *Latest Stock Update was September 2015 – so do take a look!*

Non members can join the UKuG 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 a component on the site will not be a guarantee of availability of that component. The service is run as a free benefit to all members and the UK Microwave Group will pick up the cost of packaging and postage.

Minimum quantity of small components supplied is 10. Some people have ordered a single smd resistor!

The service may be withdrawn at the discretion of the committee if abuse such as reselling of components is suspected.

There is an order form on the website with an address label which will slightly reduce what I have to do in dealing with orders so please could you use it. Also, as many of the components are from unknown sources, if you have the facility to check the value, particularly unmarked items such as capacitors, do so, and let me know if any items have been mislabelled. G4HUP's Inductance/ capacitance meter with SM probes is ideal for this (Unsolicited testimonial!)

The chipbank catalogue has been updated (September) to reflect donations received at the various RTs this year.

Quite a few resistors and inductors have been added as well as a few other bits and pieces. Have a look at the website and stock up for your winter projects!

Don't forget it is completely free, you don't even have to pay postage!

Mike G3LYP

The Chip Bank was mentioned at a recent Codgers breakfast and was new to one of the non-microwavers so he Googled it. It turns out "The Chip Bank" is a takeaway in Kilmarnock. Hat tip to Bob Barrett G3YCY for the picture. Ed.

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 (eg 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.comThe current list is available at

www.microwavers.org/tech-support.htm

Still Wanted: Trophies Manager

Dave Powis G4HUP retired as Trophies manager at the AGM and we thank him for all his work in discharging this task. We now need a replacement.

Please contact the Chairman or Secretary if you would like to help with this duty.

Loan Equipment

Don't forget, UKµG has loan kit in the form of portable transceivers available to members for use on the following bands:

5.7GHz **10GHz** **76GHz**

Contact John G4BAO for more information.

UK Microwave Group Report to RSGB Spectrum Forum

Introduction to UKuG

The UK Microwave Group represents the interests of amateur GHz bands radio enthusiasts in the UK. Its Committee is an elected body representing the interests of UK amateur microwave enthusiasts. The UKuG is open to membership for both UK and overseas microwavers. UKuG is now 16 years old, having been formed at the Martlesham Microwave Roundtable in November 1999 and it is affiliated to the RSGB. Current membership is: 475, up by 32. So far in 2015 there are 50 new members and 18 members who have not renewed/advised they have left the group.

Events organised and supported during 2015

- Martlesham Microwave Roundtable with UKuG AGM - April
- Microwave Roundtable and buildathon organised by the Finningley Club – July.
- Microwave Roundtable organised by the Crawley Club - September
- Scottish Microwave Roundtable, Burntisland near Dunfermline - November
- Hagbourne Village Microwave Roundtable organised by the Harwell Club.
  This was formerly held at RAL, but unfortunately we lost access to that venue
- RSGB Convention 2015

Club and outreach

We provided technical support to Camb-Hams members who are starting out on the GHz bands. Members presented talks at all the GHz Bands Round Tables this year, on various topics including the Chipbank, a 3.4GHz receiver and small-station EME. Members have visited several clubs to present talks on Microwaves or Millimetre- wave Microwaves (the latest was the Norwich Club) and there are plans to visit more in 2016. The Group membership provided eight speakers and three stream chairmen at the RSGB convention

Technical Support and loan equipment

A number of UKuG members provided technical support as part of our scheme including beacon repair (GB3BSS, GB3MHZ) and construction (GB3PKT 24GHz is under construction) plus equipment testing. Members built and installed a new beacon driver for the GB3MHZ cluster, as well as providing hardware and support to the 432MHz beacon replacement project. Members have been actively supporting Joe Taylor K1JT to further develop the WSJT-X suite of Digimode programs.

Our "members' loan" transverter systems now number four, covering 5.7, 10, 24 and 76GHz. Providing support for beginners and established microwavers.

Chipbank

The chipbank offers a completely free service to members, and includes a fairly comprehensive selection of chip resistors, capacitors and inductors as well as a good selection of useful semiconductors and other components. As a result of component donations, two catalogue updates have been necessary during the past year. In the twelve months to October 2015, twenty seven requests from members have been serviced. In addition, four roundtables were attended allowing members to browse through the stock and select items for their projects.

Publications

UKuG members still write five of the regular columns in RadCom, write for Practical Wireless and regularly contribute technical articles and write the European activity report for Dubus magazine.

Scatterpoint

The e-newsletter of the Group, under the Editorship of Martin, G8BHC, is published at least 10 times a year and continues to attract top-line technical articles as well as being a comprehensive repository of reports of activity. An annual index is published in December and an archive of previous years' issues is maintained on the web site. There are 461 members of the Yahoo Scatterpoint group. Copies of the monthly magazine are also available to members via Dropbox links. Scatterpoint carries a regular activity report column, compiled by Bob G8DTF, which has detailed reports from members of their activities on the microwave and millimetre bands, illustrating the breadth of propagation modes and modes of operation in regular use. These reports cover Wideband, Narrowband and Machine Generated Modes(MGM) activity used for both local and DX operations.

Group website and beaconspot.eu

This year UKuG has added a YouTube video channel and a Twitter feed @UKGHZ to its web activities, in order to highlight innovation such as long-distance QSOs on the 47, 76 and 134 GHz mmWave bands.

Our main website, microwavers.org, also provides listings for Operating Firsts/DX records, Chipbank stock updates, a regularly updated beacon maps and a rolling events calendar.

Our sister site, Beaconspot.eu, also continues to increase its user base and facilities for beacon reports and reception maps. It has been upgraded with a "My beacons" and a "Watch list" facility, plus a locator finder.

Beacons

The Group's major concern at the moment is that there is a growing list of 1296MHz Beacons that are waiting for site moves and changes, but appear to be going nowhere fast within Ofcom. This is causing great frustration amongst our members who are keen to push forward the hobby in this area.

We ask the Society to raise this issue at the highest level within Ofcom at the earliest opportunity.

The excuse that Ofcom staff are too busy with WRC and other issues is not good enough. These delays have been excessive.

See http://www.ukrepeater.net/vetting_beacons.php

Operation

Development continues by a few on all bands with an emphasis on the 47, 76 and 134GHz bands amongst experienced microwavers. The 134GHz UK distance record was extended to 19.2km this year. 1296MHz and 10368MHz continue to be the most popular terrestrial microwave bands. 10GHz, helped by the UKuG's beginner's presentation at the RSGB Convention this year, is showing signs of increased interest as 1296MHz operators look for a new Challenge. The response to the 2300MHz NoVs has been disappointing so far, with a few early takers but no sign of any long term traction on the allocation. I believe that this is down to the "I only go on during contests because that's where the activity is" approach of the majority of active microwavers. Maybe we should move all the 2.3GHz events to be exclusively 2300MHz to encourage uptake. As per last year, activity is clustered around UKAC and other contests, with little activity under "flat band" conditions. Heavy publicity for the LZ5HP low cost 1296MHz transverter in both the GHz Bands column and by UKuG members on social media has resulted in quite an uptake with many new stations planning to start on that band, notably, younger Amateurs have taken this up.

EME

Small dish EME is continuing to generate interest with UKuG members leading the way on 10GHz with QSOs with sub-1m dishes. There continues to be 1296MHz activity pretty much any time the moon is up. Stations with dishes smaller than 2m, are showing what can be done with JT modes and CW on this band. This demonstrates the increasing practicality of every day intercontinental DX on the microwave bands with a low-profile antenna. My personal experience on EME and terrestrial 1296MHz is that it's easier to get a 1296MHz EME QSO outside contests and lifts than one via terrestrial modes.

UKuG Awards

This year's G3BNL, G3EEZ and Fraser Shepherd Award for innovation have not yet been awarded.

G3VVB construction trophy went to G8ACE for his 134GHz transverter.

The 2014 operating awards were awarded at the Martlesham Round table in April 2015 as follows:

5.7GHz	G3KEU Trophy	Ian Lamb G8KQW/P
10GHz	G3RPE Memorial Cup	Nick Peckett G4KUX
10GHz	G3JMB Memorial Trophy	Nick Pearce G4WLC/P
24GHz	G0RRJ Memorial Cup	Roger Ray G8CUB/P
	24GHz Trophy	Keith Winnard GW3TKH/P
	47GHz Trophy	Roger Ray G8CUB/P

UKuG Contests and Certificates

During the year, two squares certificates were issued to Tony Collett G4NBS for 10 squares on 2.3GHz and 65 squares on 1.3GHz. No other certificate awards have been made. The database of UK microwave “Firsts” has continued to be updated, most recently as a result of excellent tropospheric propagation which enabled the first Wales-Denmark contact to be made on 10GHz.

The UKuG contest programme for 2015 was revised to move the 24GHz events to a separate date from 5.7 and 10GHz, in view of the different propagation characteristics of these bands. The new programme has five 5.7/10GHz events during the summer months, and four 24/47GHz events with one date also including the higher bands from 76GHz upwards. Entries for the mm-wave band events have increased as a result, and there are more stations now becoming active on these bands as a result of the increased focus. Entry levels on the other bands have remained fairly static. The

UKuG Contest Manager also adjudicates the SHF UK Activity Contests which continue to grow in popularity, although 2.3GHz operation is somewhat hampered in the summer months by the need to avoid potential interference to other services during mid week daylight hours.

Submitted by G4BAO on behalf of the UK Microwave Group, October 2015

Spectrum Forum reports now available here on the RSGB web site.

Silent Key: Phil Schorah GW3PPF

Phil, GW3PPF, passed away on 25th October.

A great advocate of the microwave bands, 3.4 - 24GHz. Using WBFM in the early 1970's and NBFM/CW in later years gave many their first GW µWave contact. He was still testing paths for super refraction/water ducting propagation modes, until recently he was restricted by poor health.

RIP Phil.

Keith Winnard GW3TKH

That is sad news indeed and Phil was indeed considered by many to be an expert on super refraction over the sea. He gave me my first 10GHz WBFM 150km contact over the famous Dartmoor to Prescelly path and I worked him and conducted tests with him on all the bands many times in the 90's when I was portable in Guernsey. He was able to predict super refraction when most of us considered to to be unlikely and it always seemed to work. A real gentleman of the microwave bands and one to be missed for sure.

Chris G0FDZ

That is such sad news. Phil was a huge noise on 10GHz wide band. He probably gave more a first QSO over 150km than any other. I remember walking up to my local hill above Port Talbot. Where he was trying to work Chris G4DGU. Moving his van to align his dish head that he had in the rear doors. That was in the very early 80's. Phil was Mr Microwave in S Wales in the 70/80's.

Reg G8VHI

I have a number of quite vivid recollections of QSOs with Phil from my time at Bradworthy. One was a failed attempt in the '80's to make a wideband QSO over the Okement Hill, Dartmoor, to Bwlch Gwynt, Presceli path. This on a day when, in retrospect, the refractive index was probably negative. We were unable to detect each other on wideband, but after some discussion and prompting from me, when moving a completely separate narrowband HB waveguide image recovery mixer (not a 'JVL!) set-up, I was able to copy the few mW of CW from Phil's narrowband transmitter. That was a pointer to the way forward.

On another occasion, with Phil again at Bwlch y Gwynt, on one evening we worked from a number of sites stretching down the north coast of Devon and Cornwall, via what I suspect was an elevated duct . I finally had to go home to my wife and family, but I suspect that Phil would have carried-on all night, or until I'd reached West Penwith!

Although I never met him, Phil was an inspiration. One of the small group who, in the '80's, inspired me to move-on from my earlier exploits on VHF and UHF and to explore the higher bands. I'll always be grateful to him for that.

Chris GW4DGU

I'm extremely sad to read this news from Keith. I worked Phil regularly on 10GHz wideband back in the 60s to 80s and we had some great QSOs, including the long (for those days) path between the Cairnsmore of Fleet in SW Scotland and South Stack on Anglesey. We used the I.o.M 2m repeater for talkback!

I have many other fond memories, including the day when around 6 of us, including the late Tim G3KEU, lined up along the road near Axe Edge in the Peak District to work Phil who was /P on Waun Fach in SE Wales.

Concentrations of microwavers in one location was not uncommon in those days when there was a chance of working the benchmark 150km distance and earn an RSGB Microwave Distance Award !

Phil specialised in using the super refraction propagation mode on 10GHz and made some remarkable contacts using just a handful of milliwatts into France and the Channel Islands. He never took to narrowband and especially to SSB! Once narrowband virtually banished wideband techniques to the microwave history books, Phil became less and less active but I was extremely pleased, many years ago, to renew my acquaintance with him and his good friend Keith, GW3TKH, during brief visits to Cardiff, where I have a brother and sister in law. They live very near to both Keith and Phil so we tried to arrange a pint and a chat in a local pub during my visits.

I very recently spoke in person to Keith and he told me of Phil's poor health but, nevertheless it has come as a shock to hear the news of his death.

Phil was one of the icons of what I fondly call the Golden Era of amateur microwaves, when everyone had simple lower power equipment that cost just a few Pounds and when we had Glen Ross's Microwave Society with its hundreds of members

pushing portable operating in the summer months, long before the idea of a UK Microwave Group was even thought of. It was a lot of fun then, perhaps more so that nowadays when we all have to have tens of watts, large dishes, mobile internet and sophisticated frequency locking and other gizmos to make a QSO from a portable location!

Peter, G3PHO

Really saddened to hear about Phil. I too, with Peter, was one of the famous 6 on the road near Axe Edge.

Barry, G8AGN

I am so sorry to hear of Phil's passing.

Phil was at the other end of my 10GHz 150km sheepskin QSO from Hay Bluff to Axe Edge.

I am not sure I was one of the six that Peter referred to, but I also lined up with a group of microwave enthusiasts on Axe Edge in a subsequent attempt to achieve a few more Sheepskin awards. This was about 1976.

A few years later I was fortunate to have a short period of field training at the Wenault, near Cardiff. Phil arranged my accommodation in a B&B nearby to his QTH and I was able to visit with him and accompanied him to the Barry Radio Club.

I met him on a number of occasions in subsequent years and would chat about 10GHz and FM. I never did manage to get a 10GHz CW or SSB QSO with him from East Anglia!

Vale, Phil. Gone but never to be forgotten.

Sam G4DDK

So sorry to hear this. Although I've not seen him recently, Phil featured heavily in my life, from the mid 70s to 90s, as he was the contract rigger for Wales Gas (as it was then). We had many amusing times, on some distant hilltop, often struggling against the elements. Some things will stay with me. Including the fact he seemed to always wear sandals, even in the snow!

As Sam said, gone but will not be forgotten.

Tony GW8ASD

I am saddened to hear of the passing of Phil GW3PPF on 25 Oct., it brings back many memories of him. We first came into contact in the mid 1970,s when he was very active on 10GHZ W/B having just completed the 10GHz record distance Cornwall to Scotland up the Irish sea - this with a few mw and making use of his favourite mode SUPER REFRACTION, this was his speciality. Not long after, we started tests across the Bristol Channel, Tog Hill to near the Blorenge and over the years covered from 3,4 GHz to 47 GHz N/B & W/B always FM or CW – you didn't mention SSB it was his great dislike.

After I retired I used to accompany him on lots of his trips to the coast and also contesting (which didn't interest him) but he liked the chance to hear the distant stations, he drove a VW van with about 220,000 on the clock which he had run up. It had a sliding door & inside was his 4ft fibre-glass dish mounted on pieces of scaffold complete with penny feeds for all bands which he would slide around the floor of the van in conjunction with compass measurements taken outside and he was very good at this, quite often getting his dish aligned before I did with my smaller dish. I well remember one trip to Anglesey to do a 24GHz video test with the Isle of Man. The van's clutch failed and we just got to a VW garage on Anglesey and they replaced the clutch during the afternoon (good going). But we were about 5 hours late for our Sked, we made contact on 24GHz video but failed on TX finding afterwards that a plug had been kicked out in the dark,a bit frustrating but a bit late to try again. Our movements in the dark had alerted the local police and we were stopped on our way back down. Eventually, after a short rest on the way home, I arrived back in Bristol as my wife was opening the curtains. Phil still had to get back to Cardiff.

Most of the trips were to sites near the coast as Super refraction was his speciality, traveling distance being no problem if there was chance of a signal. Bee Sands in Devon was always a favourite and interest always being in Repeaters & beacons, he used the BBC wx forecasts to predict possible sea paths and was very good at it.

It was his interest in beacons that caused us to think, in 1997, about putting a 24GHz W/B on the Isle of Wight after making enquiries he found Bob G8? willing to be beacon keeper and went ahead with the licencing which took time and wasn't easy, while I constructed the beacon powered with a Gunn. After several trips to the ITA site the Beacon was up and running with many trips to the south coast to monitor it. This was followed by GB3CCX on 10GHz N/B in Sept 97 & GB3AMU 24GHz N/B near Cardiff in Nov 97 (a busy time), licencing & finding beacon beacon keepers. A very interesting time was spent driving around monitoring these beacons.

Some 47 GHz Gunns became available and Steve G4KNZ got one working followed by Phil and myself involving us in more tests which were fairly local at first. Thoughts turned to a beacon but we never got round to it and technology moved onto 47GHz N/B.

For many years we kept up what was almost a daily sked on 70cm FM and laterly on 4M FM over the Bristol to Cardiff path not easy as Phil had limited antennas at home(would have been easy on SSB), In

time contacts became more difficult and with Phil's failing health gradually ended.

I will never forget those times with him he was a private & generous man never out to win but to hear.

Rest in peace PHIL

Roy Emery G3FYX

Silent Key: Drs. Eltje Veen, PA3CEE

A very sad announcement from November DKARS magazine: Eltje Veen PA3CEE, their president, suddenly passed away after a brief illness at the age of 54.

His main interest was VHF and weak signal communication, especially WSJT. To get extremely faint signals out of the noise was his biggest thrill. Not being a big gun, the most important thing for him was to grab and use the challenge of digital communication in a way to get contacts all over the world.

He obtained the WAC-award in 2006 just after having restarted with moonbounce (EME).

Source: QRZ.com

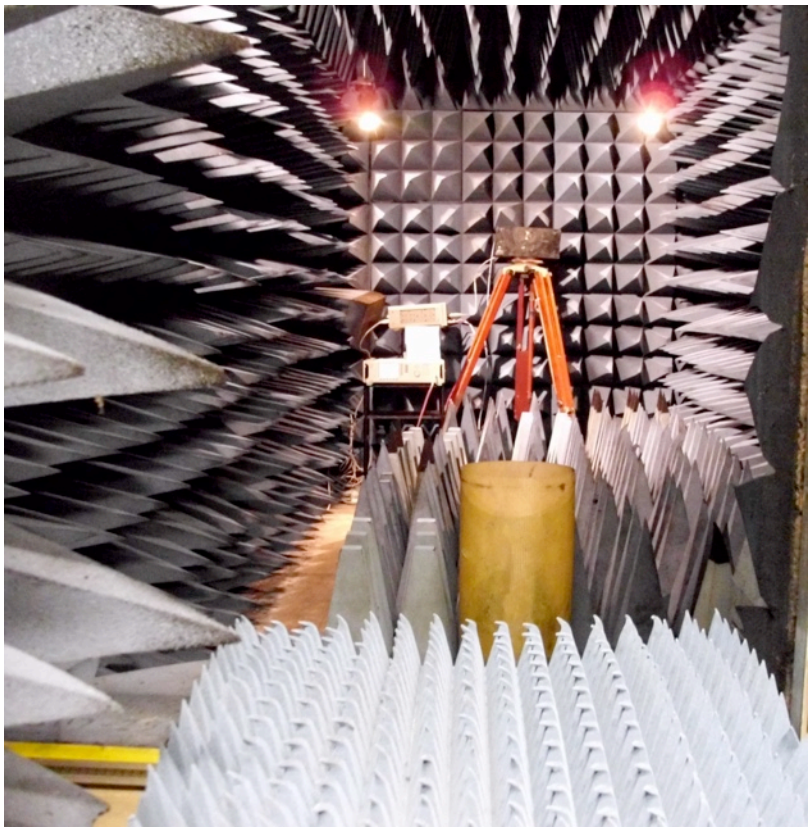
Heelweg Microwave Meeting 2016

NB The location for the "Heelweg Treffen" will change in 2016 –we are going back to Heelweg city.

Map https://goo.gl/maps/nT8Q5ovRNrQ2 De Radstake http://www.radstake.nl

Antenna Comparison at 76 & 134 GHz

By Roger Ray G8CUB



8 Metre test range using anechoic chamber and control room to get the distance

With the upsurge in interest in both 76 and 134GHz, it was decided to do a comparison between antennas. In particular to see if some of the 76GHz antennas would work at 134GHz. The same HP source was used to generate 76.0GHz and 134.4GHz, by utilising it's 5th and 7th harmonic output.

The received signal was measured using an HP 11970W 75 – 110GHz mixer, connected to a spectrum analyser. The 134.4GHz signal was outside of it's range, but still worked fine, as a comparative measurement was being made. The antenna being tested was connected to the mixer. The antenna position was moved around to maximise the received signal (the analyser being on max-hold). A Flann 20dB standard gain horn was used as reference.

Antennas tested from top right;

NEC 50GHz dish, Alpha cassegrain 70GHz dish, Plastic 80GHz dish,

Procom '134GHz' dish, 40GHz horn, 60GHz horn, 40GHz horn 2,

Brass horn, JA1xxx feed, Flann standard gain horn

Results as follows, Gain in dB

	76GHz	134GHz
NEC 50G	+41.4	+38.9
Alpha 70G	+43.5	+45.5
60G Horn	+36.0	+35.5
40G Horn	+31.1	+31.8
Procom		+40.0*
Hughes 4” dish		+33.8
JA1 feed horn		+13.5
40G horn2 +JA feed		+36.5
White plastic 80G dish		+29.9
Brass horn		+22.7

*The Procom dish used an adaptor with an unknown loss of possibly 2-3dB. Why do Procom use a flange that does not match with anything?

The NEC dish was slightly bent. Its Cassegrain reflector as standard would be far from optimum at 134G. The 4” Hughes dish should have produced 40dB gain, but the wr-10 J-feed was probably not optimum. Attempts to measure an 80GHz 60cm dish, gave poor results, as the measurement distance was too short for this size of dish.

A gas canister antenna for 134GHz

Barry Chambers, G8AGN

Antennas at 134GHz require high gain as the amount of transmit power generally available is only measured in microwatts and receiver noise figures are very high. In addition, path propagation losses depend greatly on the atmospheric water content as well as the background loss due to oxygen. As on most of the amateur bands above 1GHz, the choice of antenna lies between horns and dishes. Gordon, G0EWN, has utilised a horn antenna which is based on a stainless steel icing nozzle (widely available from kitchen shops and the WWW) and despite its small physical aperture, it has a gain of 20-25dB at 134GHz. Horns with higher gain are possible but will be very long; hence I decided to explore the possibility of constructing a dish with a potential gain in the region of 30-40dB.

My local camping store stocks a range of small camping gas canisters, the largest of which has a concave base with a diameter of about 100mm, which equates to about 45 wavelengths at 134GHz. Although the base profile is probably spherical rather than parabolic it seemed likely that such a “dish”, if fed properly, could result in a useful antenna at 134GHz.

Having purchased a canister, the first step was to determine the f/D and this was done using the sagitta formula

$$s = r - \sqrt{r^2 - 0.25D^2}$$

where s is the base profile sag, r is the base radius of curvature and D is the base diameter.

D and s can be measured and hence r can be determined. Then the focal length f is obtained from

$$f = 0.5r$$

The resulting value of f/D was close to 0.34.

Before the gas canister could be modified, the gas content had to be removed and the only safe way to do this was by burning, using a camping gas stove or blow torch attachment. For reasons which will become clear later, I used a type of gas canister which had a resealable valve. The latter is identical to those used in all aerosol cans but in my case the plastic valve was housed in a threaded metal boss which is normally used to attach the canister to the stove or torch assembly. I used a camping gas stove to burn the gas off and this took about two hours to achieve. However, even after the flame had been extinguished due to lack of gas, I left the stove with the canister still attached and the valve open in a well ventilated area for an additional couple of hours. Only after this did I attempt to start the modification process.

Since even after the above emptying process, the canister will still contain gas, the following initial procedure should be done by hand and definitely not using an electric drill because of the danger of sparking. By close examination of the concave surface of the canister base, it should be possible to see exactly where its centre lies as it will probably be marked by a small circle due to the manufacturing process. Using a pin vice and a small drill (1mm but no larger than 1/16 inch), pierce the base at its centre. Then turn the canister over and repeat this procedure through the centre of the plastic valve. Gradually enlarge the hole passing through the valve until it is big enough to enable the valve body and spring to be extracted. By this stage the smell of gas may be quite strong so it is advisable to again leave the canister for several hours in a well ventilated location outdoors.

The “dish” is now ready for its feed and mounting plate. I decided to retain the whole canister rather than just keeping the useful concave part since this minimises surface distortion and also provides two support surfaces through which the feed waveguide passes.

I chose to use a circular waveguide feed since inexpensive 12 inch lengths of copper tubing are widely available in model shops. For 134GHz, the tubing should theoretically have an internal diameter, ID, of 1/16 inch (3/32 inch external diameter, OD) but I decided to use the next larger size (3/32 inch ID, 1/8 inch OD) since it is mechanically stronger, should have lower attenuation and because my rig already had a low-pass filter in the form of a length of 1.6mm ID tubing at its output (to filter out signals below about 120GHz). Accordingly, the small hole at the centre of the canister concave base was next enlarged by hand to 1/8 inch diameter, again using a pin vice. The hole in the top of the canister where the valve was originally situated is now much larger 1/8 inch and this is where the threaded boss now becomes useful as the thread exactly corresponds to that on the collar of a TNC plug. If a crimp-on plug is used, then the hole in the ferrule may be carefully enlarged to accept the 1/8 inch OD tubing and after removing the plug innards, it may be screwed onto the canister boss. Now the waveguide tubing should be held centrally and securely through the canister at both ends. Next I made up a small brass rectangular mounting plate which was drilled to accept the ferrule of the TNC plug; the two were then soldered together. The result is shown in Photo 1.

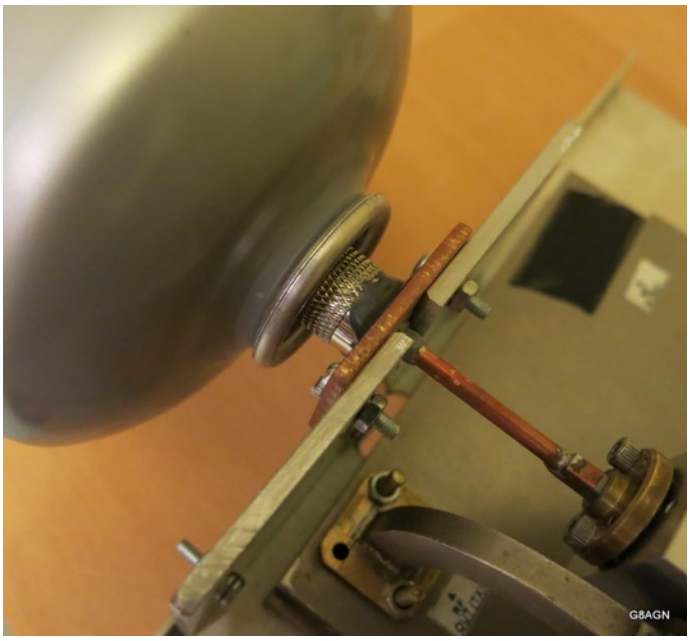


Photo 1: Gas canister rear support using TNC plug

The final part of the antenna to be constructed was the splash plate reflector and this was based on a new (and shiny) one pence piece which is 20mm in diameter. It was decided to support the penny in front of the circular waveguide radiator using three support arms made from 1mm brass wire which is also available from many model shops. Brass wire was used in preference to copper as it is stiffer. The penny was first drilled with three 1mm holes, equispaced around the circumference and at a radius of 9mm. This required careful marking out using a pair of dividers and the holes were then drilled using a bench drill and light pressure to avoid drill breakage. Three pieces of brass wire about 40mm long were then cut and passed through the holes in the penny so that about 1mm of wire was left proud of the surface on one side. The wires were then soldered to the penny, taking care that solder was only on the outside surface (i.e. the surface of the penny away from the dish surface).

The next step was to cut a short piece of copper tubing whose internal diameter, 1/8 inch, meant that it would be a sliding fit over the 1/8 inch OD waveguide tubing. The three brass wires were then bent by eye and trimmed in length so that they would fit snugly around the outside of the short 1/8 inch ID tubing and so that the penny would be perpendicular to the axis of the feed waveguide. Finally, the three wire supports were soldered to the short 1/8 inch ID tubing. The result is shown in Photos 2 and 3 below. As assembled, it is easy to

independently vary the distance between the waveguide aperture and the penny and the waveguide aperture and the dish vertex.

Photo 2: Close up of assembled new penny feed

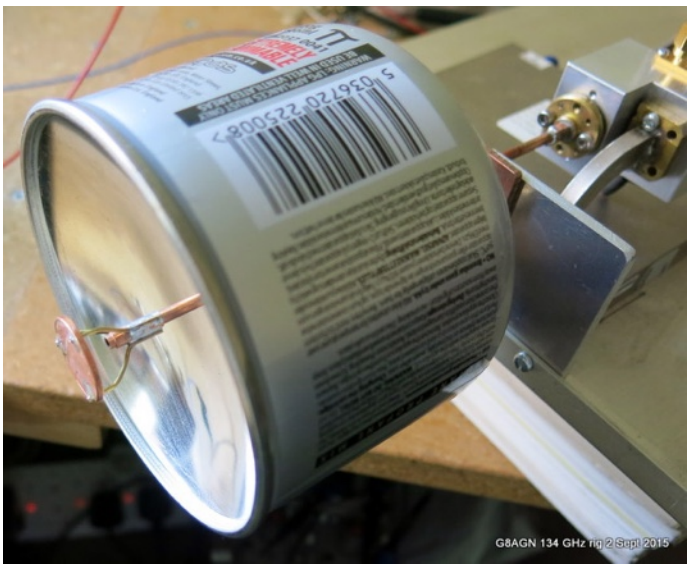


Photo 3: New penny feed fitted to the gas canister dish

As might be expected at 134GHz, the axial positioning of the penny with respect to the feed aperture and dish surface is very critical. Although no radiation pattern measurements have yet been made on the dish, it does exhibit a very narrow main beam with no evident first sidelobes, i.e. at least 10dB down on the main beam. A variation, which hasn't been tried yet, is to substitute a 2p piece for the 1p piece.

This month I 'ave mostly been building…

A column (idea borrowed from the SBMS Newsletter and with a hat tip to Mark Williams' character Jesse of the Fast Show) designed for those of you who don't want to write a full technical article – but also those of you who do but only have a snippet to contribute such as a new project or a progress report.

Not a lot, apparently...but..

From John Worsnop G4BAO

It's looking good for a new batch of kits before Xmas for the 23cm PA I published in RadCom in June 2009. Seems to be renewed interest with the Bulgarian transverter I reviewed in Radcom earlier this year.

Details of the PA are at

http://www.g4bao.com/Files/a45w_amplifier_for_23cm.zip

I've sourced new PCBs and devices, and it's looking like the basic PCB kit will be around the £90 mark but not finalised yet.

Once all the deals are finalised and I have firm prices, I'll start kitting for 50 kits. Watch the reflectors and www.g4bao.com for details.

In the meantime you can express an interest in a kit by mailing me direct, off reflector and I'll start a list! Some of you already have done this so you're at the head of the queue.

Observations of a DUCT on 6cm

Brian Coleman G4NNS

I quite often check the signals from the 5.7GHz and 10GHz beacons in IN88HL some 333km distant over the sea and an obstructed land path see Fig1.

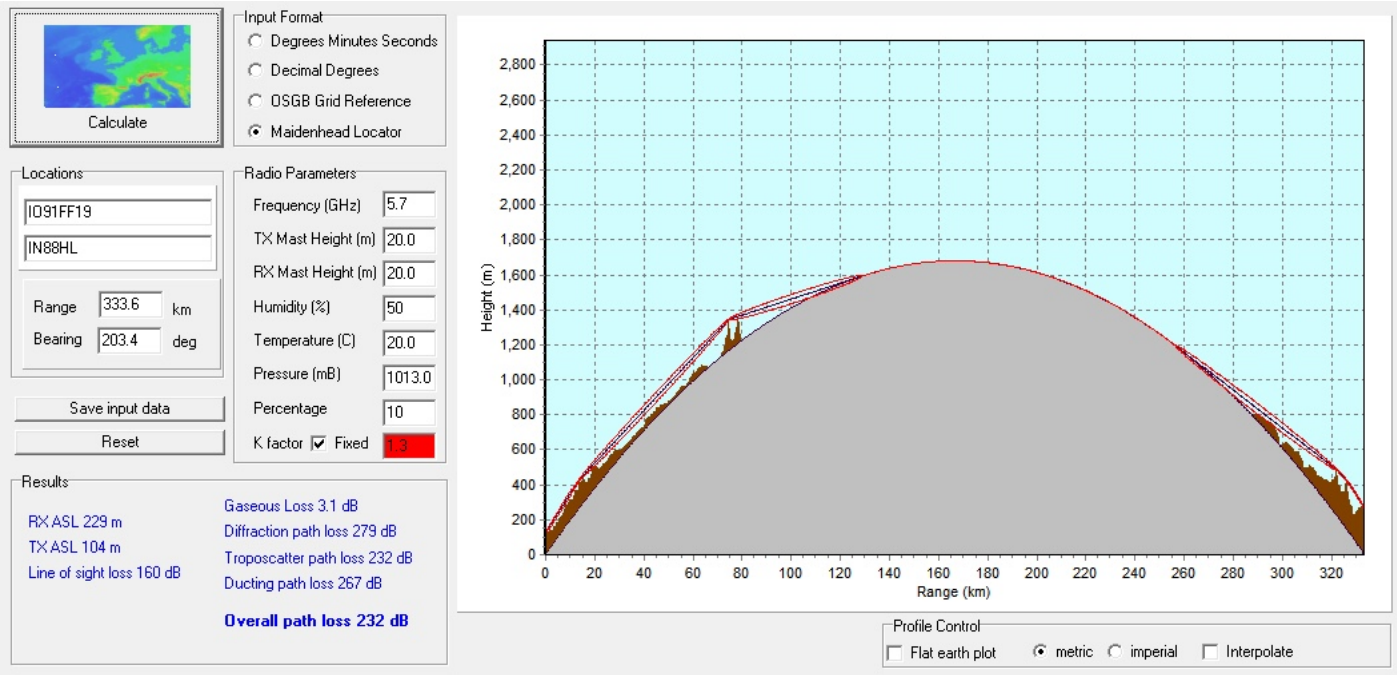


Fig 1 Path from G4NNS to F1ZAO

Before I show spectral displays of the signals I was receiving I should explain, for those not familiar with the IN88 beacons on that they have a unique signature. I believe both bands share the same 48MHz crystal (TCXO) so that the 5.7GHz beacon is on a nominal 5760.060MHz and the 10Ghz beacon is on 10368.108MHz. They use A1 keying so they can send their respective call signs independently, F1ZAO on 5.7GHz and F1ZAP on 10GHz. It seems that the temperature control of the TCXO is “under damped” and cycles slowly over about 30 seconds. This produces a roughly sinusoidal frequency modulation. See Fig 2

I have found this sinusoidal FM useful as you can spot the shape in the “snow” on a spectral display even when the signal is very weak.

Having found the beacon to be unusually strong (at about 08:00z on 9 August) at 40dB – 50dB above the noise, I decided to check the local beacon GB3FNM.

The bearing to F1ZAO is 203 degrees and that to GB3FNM about 90 degrees. I left the receiver tuned to F1ZAO whilst turning the beam and noticed that once it was off the direct heading the signal dropped to between 5 and 10dB above the noise and remained substantially constant as the beam turned through more than 90 degrees. See Fig 3

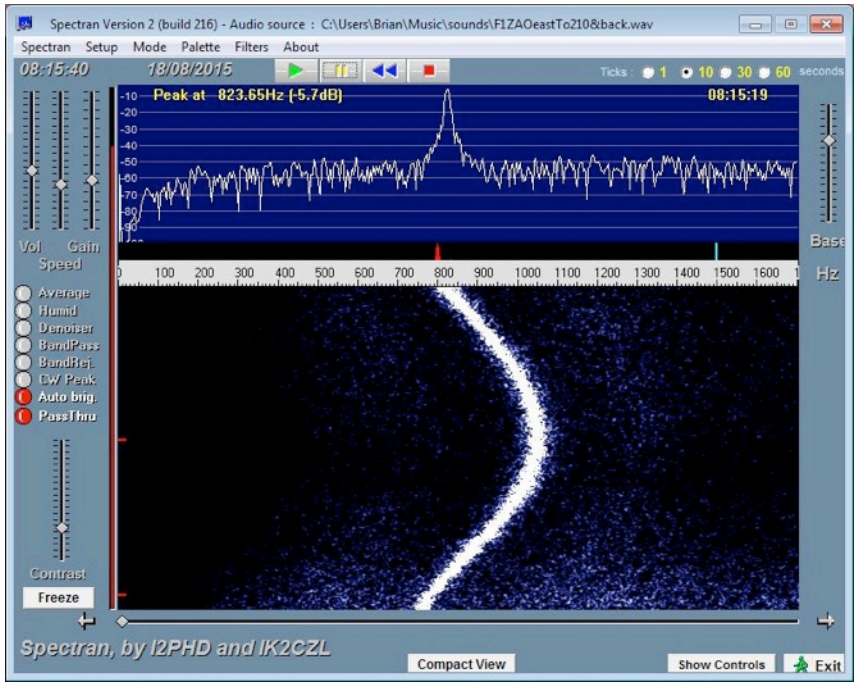


Fig 2 F1ZAO on the direct path showing FM

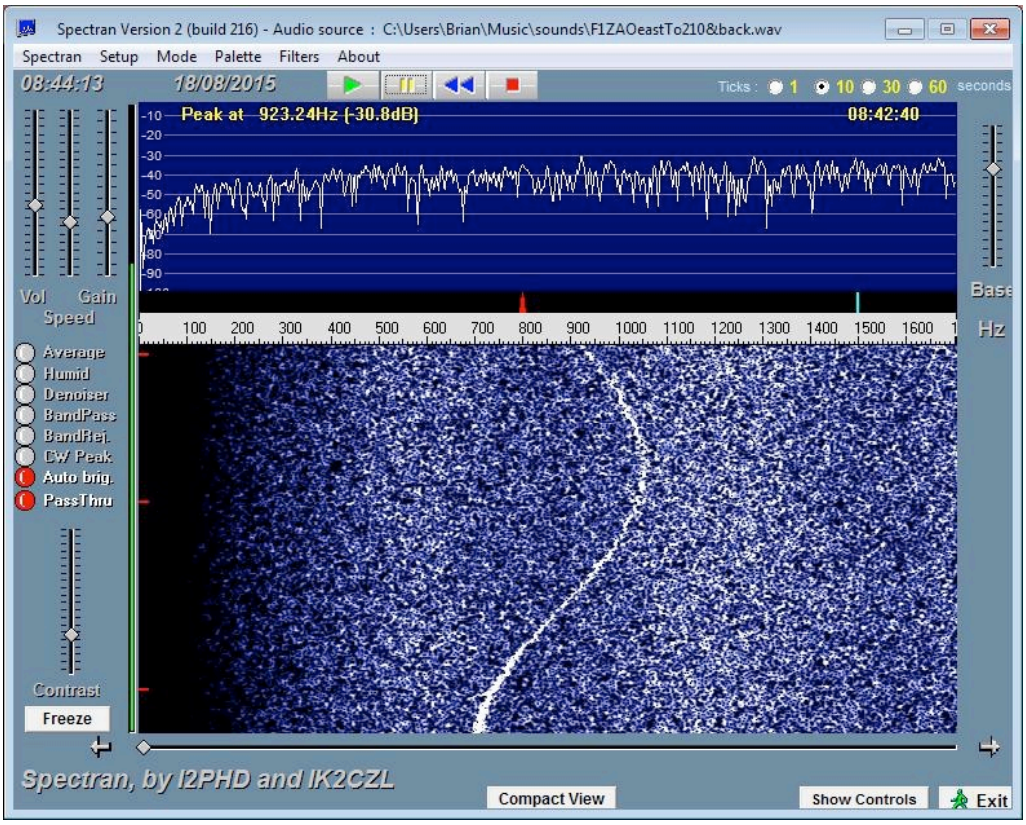


Fig 3 F1ZAO off heading

Had this signal been due to side lobes or reflections in the horizontal plane I would have expected to see big variations in the signal level as I turned the beam but did not.

So I speculate that the this lower level signal was arriving from above ? Due to leakage from the duct ?

Having turned the beam towards GB3FNM I tuned to its frequency and found it to be at normal strength and it disappeared into the noise as I turned the beam away, as normal.

A recording of F1ZAO starting with the antenna beaming East then turning to the direct heading of 203 degrees while the beacon identifies then turning back to East can be found at:-

http://myweb.tiscali.co.uk/g4nns/Sounds/F1ZAO90to203&back.wav

The antenna system in use is a 90cm offset dish mounted on it's side see Fig 4. It is fitted with feed horns for 10GHz and 5.7GHz the latter having an offset in beam heading of 5 to 10 degrees.

It is not thought to exhibit excessive leakage or side lobes in the horizontal plane.

At the time of these observations I was concentrating on the 3.4GHz EME activity week end and did not have time to investigate further. I did however check the 10GHz beacon at IO88HL, F1XAP and it too was very strong but I did not check whether I could still hear it off the direct heading. I did however call John G8ACE who found the signal on a wide range of headings to the SE and E. John has no direct path to F1ZAO. John made a video (only) recording of the beacon which can be found at:-

https://drive.google.com/file/d/0B_ijQuVCB1fMWTZHSjdpMmFRbmM/view?usp=sharing

Fig 4 The dual band offset dish at G4NNS

The antenna system in use is a 90cm offset dish mounted on it's side see Fig 4. It is fitted with feed horns for 10GHz and 5.7GHz the latter having an offset in beam heading of 5 to 10 degrees.

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134 GHz Band Construction by G8ACE and Operating Preparations by G8KQW

G8ACE has spent virtually the whole of 2015 building, testing and optimising equipment variations in order to get going on 134GHz. At last with the help of G8KQW the long-standing UK distance record has been slightly exceeded by these two operators.

Around year 2000, the Wessex 76GHz Microwavers, G3FYX, G3PYB, G8BKE and G8ACE got going on that band with quite some good success resulting in an 80km record which stood for a while. Shortly afterwards three of the operators got interested in the next band up and decided to use 134.400 and 134.545GHz frequencies 145MHz apart so the Transmit signal could be used for Receive with the other station to simplify building. This is reminiscent of some types of historic 10GHz operating. Results however were disappointing and none of us managed to succeed in hearing a signal across more than a few inches on the bench. Some of the initial construction still existed when enthusiasm renewed this year so those original frequencies were again pressed into use. In order to test new constructions both frequencies had again to be used to obtain the 145MHz IF signal so two units were built. These used 93 and 116 MHz crystals, RDDS and 10MHz double ovened 10 MHz reference signal OCXOs as the prime signal sources. The crystals multiplied by 1440 and 1152 respectively gave excellent notes and stability on 134GHz. Standard multiplication with home built circuits were used up to 23GHz which was then amplified to the 100mW level using ancient G8ACE designed 24GHz amplifiers of about twenty years ago and rapidly superseded at that time by G3PHO importing 24GHz amplifiers from the USA. These G8ACE 100mW amps have remained unused in storage and have now found a new use as the 100mW power output is just about right for driving fragile beam lead diode multipliers x6 to 134 without burning them out. The two transmitter receivers were finished by April and one unit was taken to the Martlesham Round Table where Roger G8CUB was able to make a valuable power measurement of 130uW output power. A test path was then completed from my home QTH loft window out to the M3, a distance of 6.8km and yielded a good signal then further tests with G8KQW at 8km showed some signal reduction and a test at 12.6km showed that this was indeed going to be a hard / challenging band to deal with.

G8KQW and G8ACE have operated mm-bands together particularly on 76GHz many times and both firmly believe that on these higher bands separate Transmitter and Receiver (opposed to a Transverter) are necessary to confirm everything is performing correctly at both ends. Two 134GHz receivers were therefore constructed switchable between the two frequencies so one's outgoing signal could be monitored as well as that signal hopefully arriving. By having separate systems some other interesting propagation anomalies can also be explored that have been noted by G8ACE and G8KQW over the years.

It was known that G8CUB was using a 33GHz Broadern amplifier so that a greater multiplier diode efficiency and output power could be enjoyed using x4 rather than x6 final multiplication. G8CUB had also obtained DBES diodes and had kindly distributed these to builders and these were now used instead of the obsolete HP diodes used in the x6 units. These higher power units were built as transmitters only as the separate receivers existed and had been satisfactorily tested. With more power it was now time to do further field tests. The

12.6 km path from Cheesefoot Head on the east side of Winchester has a really good line of site view to Farley Mount on the west side of Winchester

however there is no road access to Farley and with equipment batteries and the weighty sturdy tripods the half mile uphill hike from the road was deemed to much for one person following earlier struggles with less kit. So another path from Lane End to a spot we call Butser Triangle below Butser Hill much used in the past for 47 and 76GHz tests was our next best choice at 17.2Km. This could then be increased to 19.2Km to compete with the existing record by moving from Lane End to a site opposite Cheesefoot Head.

Ian G8KQW had set aside the weekend 20th September 2015 for tests and continues the story.

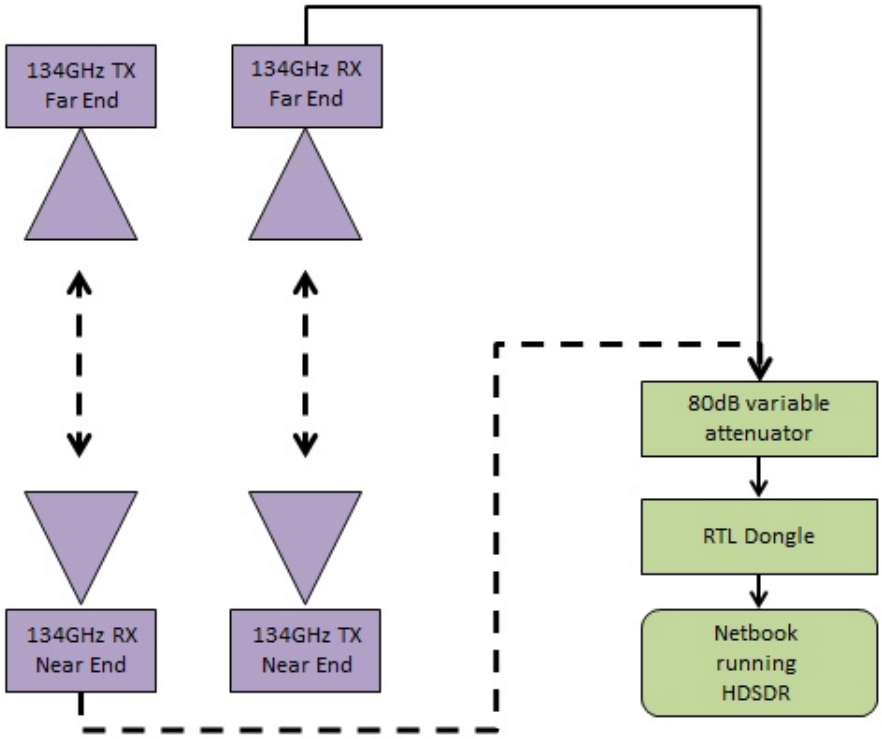
During our many hours of 76GHz testing over land and water paths we have concluded that strong / robust tripods plus slow motion pan / tilt heads for azimuth / elevation adjustment are absolutely required. Using 0.3m dishes or lens horns with even sharper beam-width at 134GHz it is critical that these requirements are met.

When setting up for 76GHz we first 'line-up' and optimise on 47GHz and having the 76GHz Transmitter and Receiver mounted on the same tripod we can be sure that the azimuth and elevation is more or less correct, at least to reliably find signals straight away. Using RDDS-based equipment locked to double ovened 10MHz reference oscillators as described previously completely eliminates any possible frequency error.

Having investigated and chosen various suitable paths for 134GHz testing we knew some of the link end sites would not necessarily allow us the luxury of operating next to our vehicles and that the kit would have to be hand carried some distance, it was therefore decided to go it alone on 134GHz and not take lower band kit for lining up. As frequency error wouldn't be an issue the challenge in establishing contact would be dish alignment without having used a lower band for line-up. There are various professional tools which could be used to do this, at a cost of several thousand dollars, so to save cost and in the spirit of not using expensive toys we decided on an approach whereby we would use rifle sights for visual alignment, these are available for ~ £30 each on Ebay.

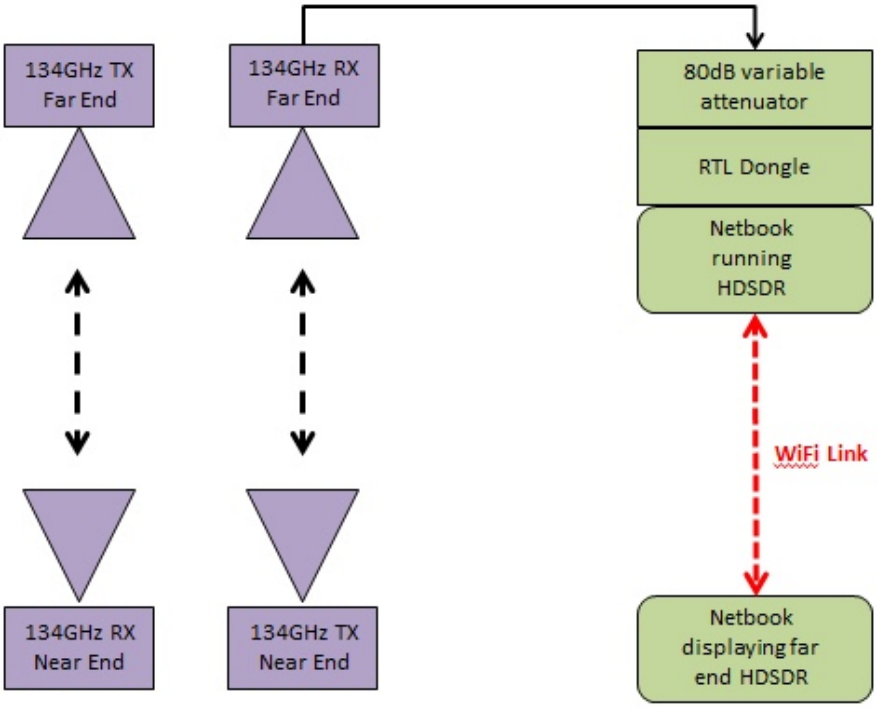
We are currently evaluating two configurations; firstly Transmitter and Receiver on same tripod with one rifle sight with the Transmitter and Receiver able to be fine adjusted in azimuth and elevation with small screw jacks and secondly Transmitter and Receiver on separate tripods each with a rifle sight allowing totally independent adjustment.

The configuration below was used on a 25m antenna test range for testing and alignment to ensure that the rifle sights are perfectly mechanically aligned with the dishes. In the set-up shown an IF cable is run from the far end receiver back to the near end which is under test, by using the attenuator to ensure the received signal is kept weak the rifle sight is adjusted so that at peak signal it is looking at the centre of the far end antenna. To adjust the reverse direction simply requires connection of the near end receiver to the attenuator.



Many hours were spent carefully tweaking and re-testing to ensure perfect mechanical and electrical alignment.

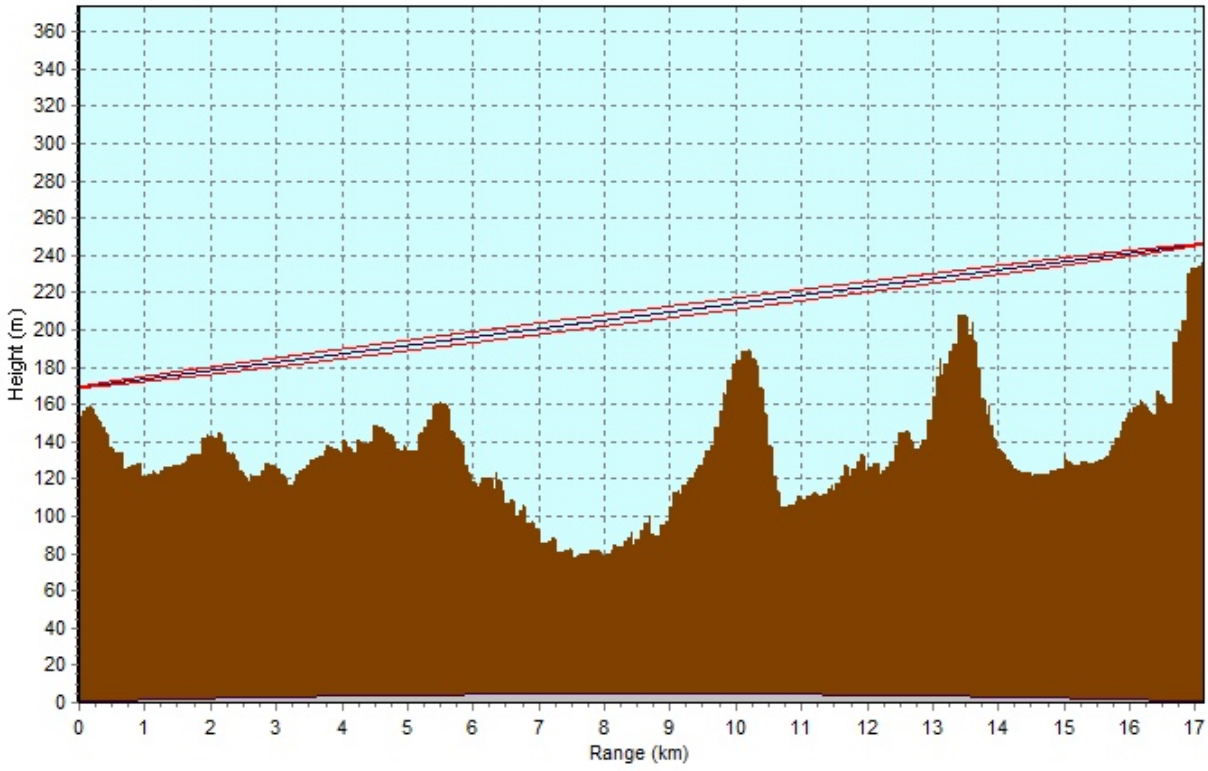
Mindful of how critical dish panning is our testing has proven that existing techniques of either using 2m talkback to talk through signal levels, e.g. “up, up, down, up, ok” or by playing back the received signal over the 2m talkback link are totally unsuitable and very inaccurate. Based on the antenna test range set-up we will be using a Wi-Fi link between laptops in the field as shown below so that the operator at either near end will be able to view the far end received signal in real time whilst making azimuth and elevation adjustments.



So, to the 20th September.

Since the previous tests over 8km and 12.6km G8ACE has worked tirelessly to squeeze more dB out of the systems. Bearing in mind the outcomes of our testing to date we feel comfortable that we can fairly accurately calculate the outcomes given the prevailing conditions on a given day.

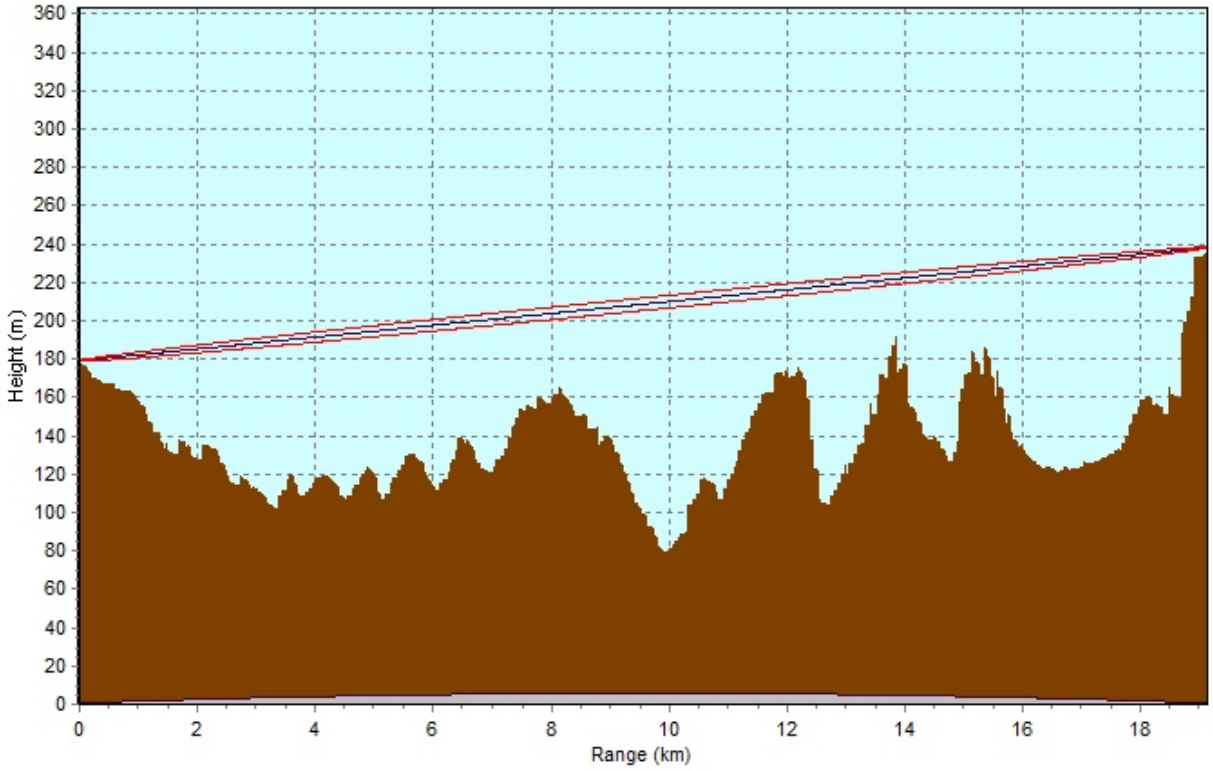
The first path we chose on 20th was from Lane End to the road triangle on Butser Hill, a path of 17.2km.



Although not a classic 'goldfish bowl' profile the ground falls away quickly at both link ends, is clear LOS (Line Of Sight) and there are no potential obstructions anywhere near the Fresnel zone. We've worked this path many times previously on lower mm-bands but to be sure of correct sighting / alignment we used the well know technique of flashing sunlight at each other using mirrors …. And yes we do have other methods available for alignment on cloudy days and at night time!

The results over this path were as expected, 10dB S/N at G8ACE end, 4dB S/N at G8KQW end, the missing 6db is the known performance difference between the two sets of kit. Having achieved a positive result on this path and conscious that we may have enough dB's in hand G8ACE decided to relocate to the trig point near Cheesefoot Head whilst G8KQW stayed put sunbathing!

The second path we attempted was 19.2km; this gave the opportunity to extend the existing UK distance record set by our dear friends Dave & Meg 'FRE.



The key difference on this path profile is that the ground at both ends of the path slopes gradually away and doesn't fall away quickly as in the previous test. One interesting difference on this path was that slightly negative elevation / declination was required at both ends to peak the signals, we believe this may be due to the heating effect of the ground on the air in the near field causing that air to be warmer and therefore different density than that on the path, Avogadro's Law. QSB was also very noticeable on this path, possibly because the signal at G8KQW end was very close to and in / out of the noise.

The loss calculation for this path,

FPSL 161dBm + (19.2km x 2dB/km gas loss) = 200dB

System capability given 100uW TX, 46dBi antenna, 33dB/Hz bandwidth = 203dBm.

This is totally in line with the results achieved on the day. Signals at G8ACE were better than the above due to slightly higher than 100uW Transmitter output and slightly worse at G8KQW due to the slightly lower than 100µW Transmitter output.

This was yet another thought provoking event, both John G8ACE and I are keen to explore further during winter months, so much so that G8ACE has purchased an all in one 'zoot' suit and thermal mittens.

The next steps,

- Improve the second Transmitter and Receiver to achieve reciprocal performance
- Strive to make further improvements to the dish antennas yielding increased gain
- Wait for minus dew-point temperatures / no water vapour to further the distance record
- Keep searching for suitable paths to work
- Continue the 134GHz collaboration with G8BKE, G8CUB and G0FDZ

The help provided by G8BKE, G8CUB, G0FDZ and G8CPJ has been much appreciated during the course of this project.

John Hazell G8ACE and Ian Lamb G8KQW

Activity News : October 2015

By Bob Price G8DTF and Martin RH G8BHC

Please send your activity news to:

scatterpoint@microwavers.org

Introduction

Some readers may be aware that Bob had an incident in February where he was held against his will for almost an hour, by a man with a knife and was ultimately car-jacked.

Since the event his family have been intimidated through 3rd parties in an attempt to stop him testifying.

I'm putting together the report this month so *caveat lector*! [pours a nice Chianti]

Martin RH G8BHC

This month there are some reports of activity in the UKACs and Microwave Group Contests. The beginning of the month saw some very good conditions with a good lift into Europe.

October Lift

From Denis G3UVR IO83

During the major lift conditions 1st October best DX was a CW QSO with LY2R KO15VS at 1746km on 1296mhz who could hear me on 2320mhz for a one way QSO. Other countries worked on 13cm where SM OZ and DL. On the 2nd October 13cm I was pleased to QSO SP1JNY 1169km for a new country on that band plus again SM OZ DL and PA

23/13cm Trophy and IARU Contest

From Mike G8CUL IO91

We also took part in the 23/13cms trophy and UHF contests at the beginning of October with a total of 49 QSOs on 23cms, average distance of 201km. With the much increased non-UK activity over the weekend we had 5 QSOs from PA, 3 ON, 1 F and 1 DF although we managed DR9A but only after the end of the Trophy event. Best DX was DF0MU at 587km. DR9A was 756km but only counted towards the UHF event.

On 13cms we made 18 QSOs with 2 PAs and DF0MU again as the best DX. Again, we worked DR9A but only after the trophy event, with the QSO taking about 20 minutes and 3 737 aircraft! Thanks to Alex in the Northern Black Forest Mountains for his patience – and slow CW to me.

I have just had my first 9cms QSO (with Mike, G0MJW at about 5km!), so I'm hoping for few more during the SHF UKAC event in October although with the equipment entirely in the shack I fear the feeder loss may be a significant factor!

From Bob G8DTF IO83

I had decided I could only do a couple of hours on the Saturday as my wife was in hospital for a minor op. I would have to pick her up in the evening. So I just did the first 2 hours on 23cm and 13cm. To my surprise conditions were very good. Richard G4HGI had alerted me that PA6NL was on 1296.260. Turned the beam and found them immediately – strong signals. QSOs followed on both 23cm and 13cm. About 20mins later I heard OZ1FF and managed to work Kjeld with just 10W on 23cm. A few minutes later we tried on 13cm, again with success and similar signal strengths.

SHF UKAC

From Mike G8CUL IO91

Both the 23cms and 13cms on the September SHF UKAC seemed to be in their usual state with conditions and activity perhaps down a bit. On 23cms we worked 47 stations with Ray, GM4CXM being the best DX at 525km, but sadly only just failed with GM4JTJ. Our average distance was only 175km, but that is mainly due to the plethora of stations in and around IO91! Outside of the UK we worked 2 PAs and 1 ON. No F8BRK this month as Gerard is away on holiday until November.

On 13cms things seemed even worse only having 15 QSOs with Ray again being the best DX. I'm really glad he slows down his CW transmit for me! The average distance was 191km but mainly due to the reduced local activity compared to 23cms. Outside the UK the only QSO was with Simon, PA0S.

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ATV Activity

From Denis G3UVR IO83

Just a report of activity today Sunday 18th October. Brian G4EWJ went portable to Bidston Lighthouse Wirral IO83LJ and successfully sent a 10,390MHz ATV signal to me G3UVR over a distance of 8.1km using a Solfan Gunn osc into a small horn antenna. Signals were P5 a nice strong transmission with QRP.

Other planned activity from G1LWX on Winter Hill running 2.5 watts on 3cm did not take place due to Mike falling unwell.

My RX setup was old LNB modified with 9GHz DRO on the back of Squarial into ancient Zeta satellite receiver.

We hope for more stations on 10GHz ATV or WBFM both very low cost modes in the future.

Other activity

From Denis G3UVR IO83

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New VK4 Records for 432 and 1296 MHz

From John VK3KM

The following new records have been added to the list:

432 MHz	VK4 record: VK4REX - ZL2BRG	06/10/15	2582.3 km
1296 MHz	VK4 record: VK4REX - ZL1SWW	07/10/15	2352.6 km

The full list of current records, and a list of all Australian VHF-UHF records since 1947, are available for download on the WIA web site:

www.wia.org.au/members/records/data/

OT5A/P operation in R1 UHF/Microwave Contest

By Jan ON4CO

The shack

The line-up

The people

Hoping for a report next month...

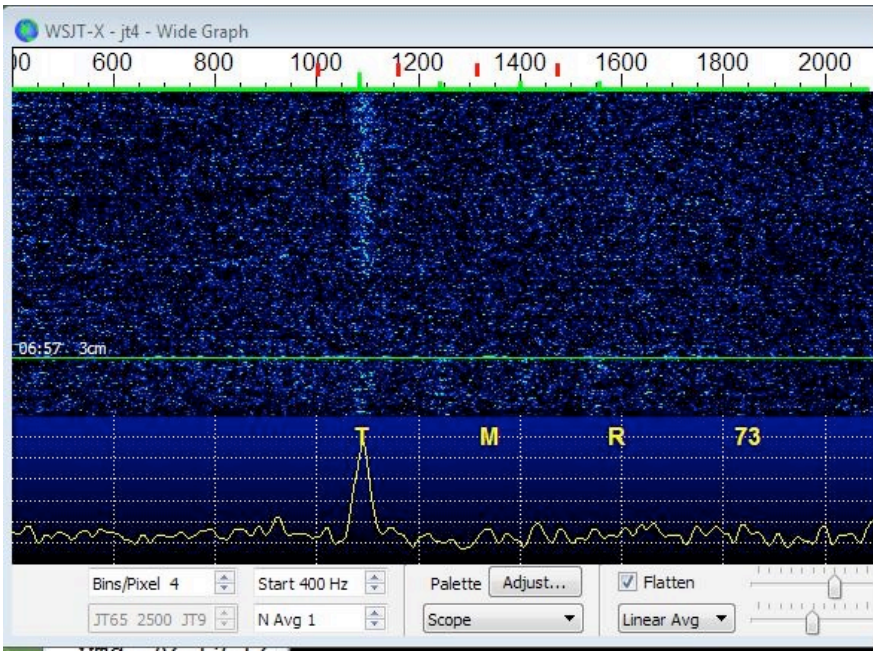
Recent 10/24GHz EME activity at G3WDG

From Charlie Suckling G3WDG

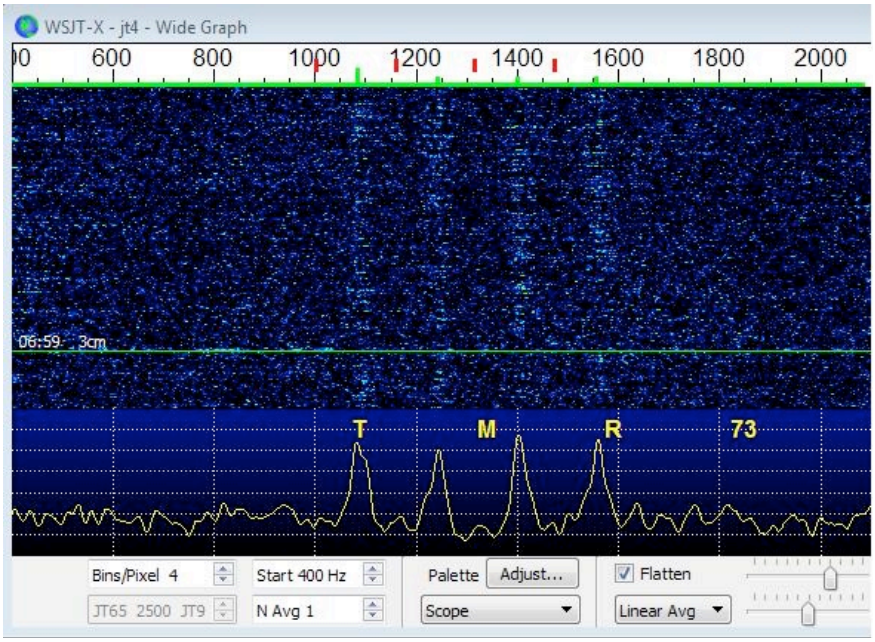
I have been experimenting with a prime focus 1.3m dish for 10GHz EME over the past few weeks as a candidate for future portable operations. The dish has an f/D ratio of 0.33 and seems to work well with the same the linear polarisation SM6FHZ feed that I have been using with the 76cm dish. I managed to make a number of JT4F QSOs with it using the 2 x TGA2623-CP 50W PA: OZ1LPR (-13/-16) best -8, OK1KIR (-9/-12) WA3LBI (-12/-14) and HB9Q (-10/-9).

I also did some one-way tests with VK7MO with the same system, who reported reliable decodes with a 113cm prime focus dish at his end, with some 7dB margin. Rex commented that it ought to be possible to get decodes using his 77cm dish, but this has yet to be tried. At the time of this test, conditions were favourable – near to perigee with a degradation of only 0.1dB, and low libration spreading.

WSJT-X v1.6.0 Wide Graph plots of my tuning tone and JT4 message received by VK7MO are shown below:



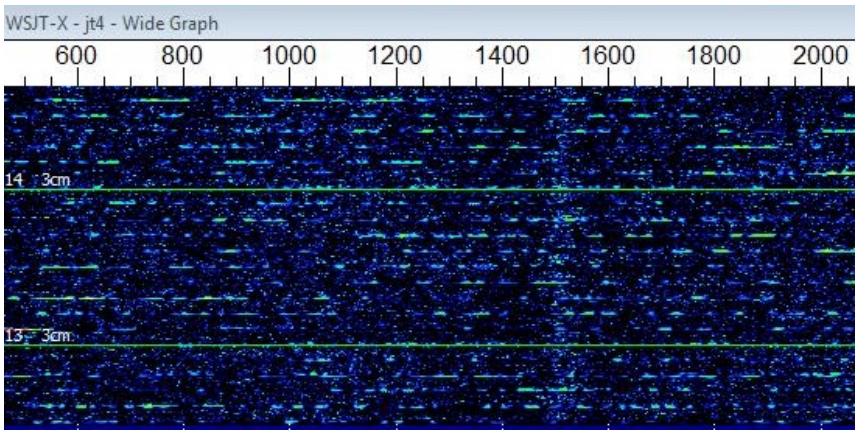
Single tone from G3WDG received by VK7MO



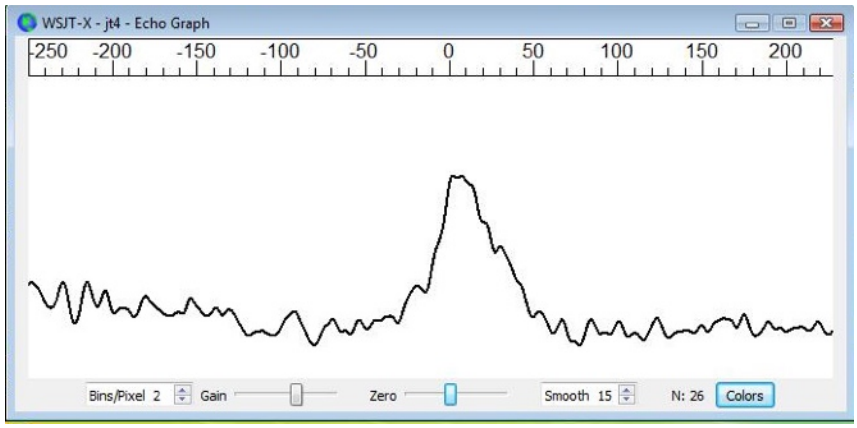
JT4F transmission from G3WDG received by VK7MO

Echo tests with the 1.3m dish were tried using WSJT-X Echo mode and the signal was seen on the waterfall, as well as in Echo Graph. Predicted signal spreading at the time was fairly low (70Hz) which tends to make echoes easier to see than with high spreading.

1.3m dish echoes (at 1500Hz)



Echo Graph display
(accumulation of 26 echoes)



Using the 3m dish, I just managed to work G4CBW on 10GHz using Tony's tropo system with (-18/-10) reports. Tony's tropo system is a 1m offset dish with approximately 18W at the feed. Tony commented that his tropo system is not really optimised for EME operation, having an SMA relay, various adaptors etc which together probably cost about 1.5dB in performance. I got one single line decode from Tony (calls + locator), while averaging was needed to pull out the report.

Another recent JT4 QSO was with LU8ENU (-17/-13) for a new country, and continent. The QSO took place initially with a 45 degree spatial offset – after that I tried rotating polarisation and LU8ENU's signal increased by 3dB to (-14).

The dish "farm"

Also with the 3m dish, some tests were carried out with VK7MO with Rex trying reduced power levels on his 76cm dish. Good decodes were obtained at 15W with (-15) signal level, and at 10W a couple of good sync/DT frames were received with (-18 to -19) signal level. Had more time been available, decodes should have been possible using averaging.

I dusted off the equipment for the 24GHz EME Activity period in October and managed to make several JT4 and CW QSOs, including OZ1FF (-12/-12) for a new country, and was heard by EA3HMJ using a 1.5m dish.

Microwave Net on 80m

No, it's not how to reheat your Meals-on-Wheels lunch. Ed.

From Martyn Vincent G3UKV

Every Tuesday there is a µWave net on 80m – but it's been a VERY long time since it was mentioned in *Scatterpoint* and, as a result, there is only a very small group of us currently active.

Essentially, the UK Microwave net is held on Tuesday mornings from 08:30 on, or close to, 3626 kHz. Typically it lasts about half an hour at present. All are welcome to join in to share with others what they are up to, planning, worked, constructed, tested or experimenting with. Sometimes the content is unrelated to microwaves, but that's 80m for you!

...and finally

I want to encourage you get on the air as often as possible and report your activity to clearly document use of the amateur microwave bands. This means not just DX and EME, but also local activity with ATV, low power or WB equipment. Please send your reports to Scatterpoint@microwavers.org, remember the deadline is the 1st of the month.

73 Bob Price G8DTF

Scottish Microwave Round Table 2015

John GM8OTI http://www.gmroundtable.org.uk/

A record number of participants (49) had registered for the fifth Scottish Microwave Round Table (GMRT), held on Saturday 7 November 2015 at the Museum of Communication (MOC), Burntisland.

Test and measurement facilities were set up by Brian Flynn GM8BJF, David Stockton GM4ZNX and Dave Nugent. These were kept busy during the many breaks in the programme, organised to allow lots of time for socialising and checking out what was available for sale on several tables.

Prof. Tom Stevenson from the MOC welcomed us, and we were well supplied with tea, coffee, biscuits and jam scones (those went down well!) throughout the day. The morning session of the formal programme was chaired by John Cooke GM8OTI, UK Microwave Group (UKuG) GM representative.

The first talk was given by Stan Frey GM8ZQY on "Meshers". He described experiments around the Firth of Forth area for a high speed communications network on 2.4GHz (website http://www.feednet.org.uk) intended for use by Raynet for emergency communications, but also available to radio amateurs as an open network. The nodes are self-discovering, and "mesh" together.

After a short break Alan Dimmick GM0USI talked about "Getting started on 24GHz". Alan initially borrowed 24GHz gear from Brian GM8BJF but soon had his own setup under way, and described the work undertaken on path planning for what might seem to be a tricky band, but which produced some amazing successes; the recordings of a 240km SSB contact with Tony G4CBW (including a successful test on open waveguide!) were very impressive.

Attendees had brought along six entries for the GM4LBV Projects Trophy, which were available for perusal during the next break. These were: "CANFI - Cheap Automatic Noise Figure Indicator" (Ian White GM3SEK); "6cm transverter" (Jon Joyce GM4JTJ); "10GHz GW4DGU system" (Jim Davidson GM3UAG, brought by Robert West GM4GUF); "24GHz Transverter" (Peter Bates GM4BYF); "24GHz signal

source" (Brian Flynn GM8BJF); and "10GHz preamp for £5" (Peter Bates GM4BYF).

The usual excellent buffet lunch (included in the entrance fee) was then provided by the MOC staff.

The afternoon session was chaired by Lothians RS President Andy Sinclair MM0FMF, the first talk being given by Chris Bartram GW4DGU who spoke on "Solid state 23cm PA design". Chris went through aspects of design, explaining the importance of critical features such as linearisation, protective sensing, and reproducability.

This was followed by Martin Hall GM8IEM who talked about "Microwaves at the fringes", particularly from his remote location in the far north west of Scotland. Martin's location has a good UHF/microwave take-off only in the direction of Northern Ireland and the Hebrides of Scotland, so has to make extensive use of aircraft scatter for the relatively small number (18 over 5 years) of successful 23cm contacts, although his first two contacts were via tropo scatter, with OZ and DL! Martin described the techniques needed for setting up successful contacts from his location.

After a further break, Ian White GM3SEK gave a talk on "Weatherproofing RF equipment - from DC to Microwaves" which was followed by some keen discussion. He explained the specifications of enclosures, and spent some time on describing how to combat condensation and water ingress.

The formal part of the meeting concluded with the award of the GM4LBV trophy for the GM Construction Competition, judged by David Stockton GM4ZNX and Dave Nugent (both press-ganged into the job earlier in the day). David picked out good points from each of the entries, noting that judging was difficult, but after considerable consideration the judges had decided that the trophy should be awarded to Jon Joyce GM4JTJ for his 6cm transverter with "a wonderful amount of plumbing". Jon will be expected to write up the entry for "Scatterpoint", and it will be taken forward to next year's UK Microwave Group G3VVB Projects Trophy competition. GM microwavers please remember to submit something next year: built, modified, hardware or software.

Again many attendees (and some YL/XYLs) moved on to the Kingswood Hotel in the evening for an excellent meal, followed by an auction of microwave related publications and some very interesting bits and pieces which raised money for MOC funds. This was followed by musical entertainment provided by the "Microwave Band": Chris Bartram GW4DGU, Ian White GM3SEK, Nadine White MM0WNW and John Cooke GM8OTI.

The "organising committee" (Pete Bates GM4BYF, Roger Blackwell GM4PMK, John Cooke GM8OTI, Brian Flynn GM8BJF, Ray James GM4CXM, David Stockton GM4ZNX, Ian White GM3SEK and Colin Wright GM4HWO) thanks the MOC Staff for all their efforts before and during the event, and Lothians RS members Peter Dick GM4DTH, Andy Sinclair MM0FMF and Alan Masson GM3PSP for local support.

Contest Results

John G3XDY, UKuG Contest Manager

September 5.7GHz Contest 2015

Everyone that entered this event submitted a perfect log, so adjudication was straightforward. Once again Ian G8KQW/P emerges at the head of the field, with Telford &DARS (G3ZME/P) in the runner up spot. Congratulations to both.

In the overall championship, Ian G8KQW/P is the clear winner with leading scores in the four events he entered. Runner up is G3ZME/P (Telford & DARS) who just pipped G4LDR thanks to the last event in the series. Congratulations to both, and the G3KEU Trophy will be awarded to Ian G8KQW/P.

5.7GHz Contest September 2015

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX km
1	G8KQW/P	IO80DO	10	1997	F6APE	426
2	G3ZME/P	IO82QL	11	1520	G4ALY	248
3	M0HNA/P	IO91GI	11	1195	G4ALY	216
4	G4BRK	IO91HP	9	1135	G4ALY	237
5	GW3TKH/P	IO81KR	9	1024	G4ALY	159
6	G4LDR	IO91EC	9	937	G4ALY	195
7	2E0NEY	IO81VK	8	627	G8KQW/P	140
8	G3VKV	IO81XV	5	435	G4CBW	131

September 10GHz Contest 2015

Although not as good as August, activity levels were quite good, aided by pleasant weather, but conditions turned out to be rather average.

Ian G8KQW/P again takes the top spot in the Open section , with Telford & DARS (G3ZME/P) as runner up. In the restricted category M0HNA/P (The Combe Gibberlets group) step up to take the leading position, with Stewart G0LGS/P following as runner up.

In the overall 10GHz Championship, decided on the best three events from the five in the series, Ian G8KQW/P is the clear winner of the Open section with four outright wins. Runner up is Neil G4LDR with one win and three runner up slots. In the Restricted section Stewart G0LGS/P takes the top spot with a win and two runners up positions, and the Combe Gibberlets (M0HNA/P) are runners up, despite winning two sessions. Congratulations go to them all. The G3RPE Memorial Cup will go Ian G8KQW/P and the G3JMB Memorial Trophy to Stewart G0LGS/P.

10GHz Contest September 2015

Open Section

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX km
1	G8KQW/P	IO80DO	16	3575	F6DKW	472
2	G3ZME/P	IO82QL	16	2501	G4KUX	246
3	G4LDR	IO91EC	15	2185	F6DKW	378
4	G4KUX	IO94BP	8	2018	G4LDR	395
5	G4BAO	JO02CG	9	1909	F6DZK	419
6	G8CUB/P	IO91CL	14	1859	G4KUX	353
7	GW3TKH/P	IO81KR	13	1730	G4BAO	236
8	G3VKV	IO81XV	6	359	GW3TKH/P	77

10GHz Contest September 2015

Restricted Section

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX km
1	M0HNA/P	IO91GI	17	2296	G4KUX	368
2	G0LGS/P	IO81XW	16	1706	M0DTS/P	277
3	G0PEB/P	IO90JO	9	1212	G3ZME/P	231
4	2E0NEY	IO81VK	10	875	G8KQW/P	140
5	G1DFL/P	IO91MP	1	147	G3ZME/P	147

5.7/10GHz Championship Tables

Final positions after five events, the best three count to the overall total

5.7GHz

Pos	Callsign	5/31/15	6/28/15	7/26/15	8/30/15	9/27/15	TOTAL
1	G8KQW/P		1000	1000	1000	1000	3000
2	G3ZME/P	1000			514	761	2275
3	G4LDR	784	773	526	572	469	2129
4	M0HNA/P	736	350		254	598	1684
5	GW3TKH/P		223		261	513	997
6	G4BRK				326	568	894
7	2E0NEY				406	314	720
8	G3VKV		241	107	116	218	575
9	GJ4HQX/P			168			168

10GHz Open

Pos	Callsign	5/31/15	6/28/15	7/26/15	8/30/15	9/27/15	TOTAL
1	G8KQW/P		1000	1000	1000	1000	3000
2	G4LDR	1000	603	711	806	611	2517
3	G3ZME/P	355	0		516	700	1571
4	G4KUX	382	0	531	590	564	1536
5	G8CUB/P		487		85	520	1092
6	G4BAO		546			534	1080
7	GW3TKH/P	117	361		125	484	970
8	G0EHV/P			281	458	0	739
9	G3UKV	225	0	250		0	475
10	G3VKV	130	102	111	188	100	429

10GHz Restricted

Pos	Callsign	5/31/15	6/28/15	7/26/15	8/30/15	9/27/15	TOTAL
1	G0LGS/P		1000		903	743	2646
2	M0HNA/P	1000			493	1000	2493
3	G0PEB/P		751		514	528	1793
4	2E0NEY				1000	381	1381
5	GM8OTI/P				196	0	196
6	G1DFL/P			0		64	64
7	G6MXL/P				28	0	28

47GHz Championship – Errata

A gremlin crept into the spreadsheet for the 47GHz results last month which resulted in incorrect addition of the totals. A corrected version is published here, and has the effect of elevating Keith GW3TKH/P to the runner up position, ahead of Roger G8CUB/P who is now in third place. Apologies for this error.

24/47GHz Championship Tables

Final Positions, the best three count to the overall total

24GHz

Pos	Callsign	6/21/15	7/19/15	8/16/15	9/13/15	TOTAL
1	G8KQW/P	1000	1000	1000		3000
2	GW3TKH/P	945		480	1000	2425
3	G4LDR/P		319	578	890	1787
4	G8CUB/P	576	229	272	527	1375
5	G0FDZ/P		229		527	756
6	G4NNS/P		609			609
7	G8ACE/P		149	458		607
8	G3ZME/P	193	359	604		552
9	GM4BYF/P			316		316
10	GM0USI/P			143		143
11	GM8BJF			136		136
12	G3UKV	133				133

47GHz

Pos	Callsign	6/21/15	7/19/15	8/16/15	9/13/15	TOTAL
1	G8KQW/P	956	1000	1000		2956
2	GW3TKH/P	1000		389	1000	2389
3	G8CUB/P	891	420		1000	2311
4	G8ACE/P		433	226		659
5	GW4HQX/P			389		389

Calendar and Rules for 2016

The calendar and rules for 2016 will be reviewed shortly. The changes made for 2015 seem to have been generally well received, and a suggestion has been received to include 76GHz with the 24GHz and 47GHz events. I would welcome input on any aspects of the calendar or rules that you feel need attention. Please let me have comments and suggestions by the end of November by email, to g3xdy@btinternet.com

I aim to get the calendar and rules for 2016 published in the December / January issue of Scatterpoint.

Contest results are also published online - please follow the link from the UKuG Contests Page at:

www.microwavers.org/?contesting.htm

73

John Quarmby G3XDY

"Microwave Band": Chris Bartram GW4DGU, Ian White GM3SEK, Nadine White MM0WNW and John Cooke GM8OTI. at the Scottish Round Table.

Events calendar

2016

Jan 26	Heelweg	www.pamicrowaves.nl/
Feb 13	Tagung Dorsten	www.ghz-tagung.de/
Apr 9	CJ-2016, Seigy	cj.ref-union.org/
Apr 16–17	Martlesham Microwave Round Table & UKμG AGM	
Apr 23	RSGB AGM, Scotland	rsgb.org/agm
May 20 – 22	Hamvention, Dayton	www.hamvention.org/
Jun 24 – 26	Ham Radio, Friedrichshafen	www.hamradio-friedrichshafen.de/
Jul 29 – 31	Amsat-UK Colloquium, Holiday Inn, Guildford	www.amsat-uk.org/colloquium/
Aug 19–21	EME2016, Venice	www.eme2016.org/
Oct 3 – 7	European Microwave Week, London	www.eumweek.com/
Oct 7 – 9	RSGB Convention	rsgb.org/convention/

2017

Jun 23 – 25	Ham Radio, Friedrichshafen	www.hamradio-friedrichshafen.de/
Oct 7 – 8	RSGB Convention	rsgb.org/convention/
Oct 8 – 13	European Microwave Week, Nurembourg	www.eumweek.com/