



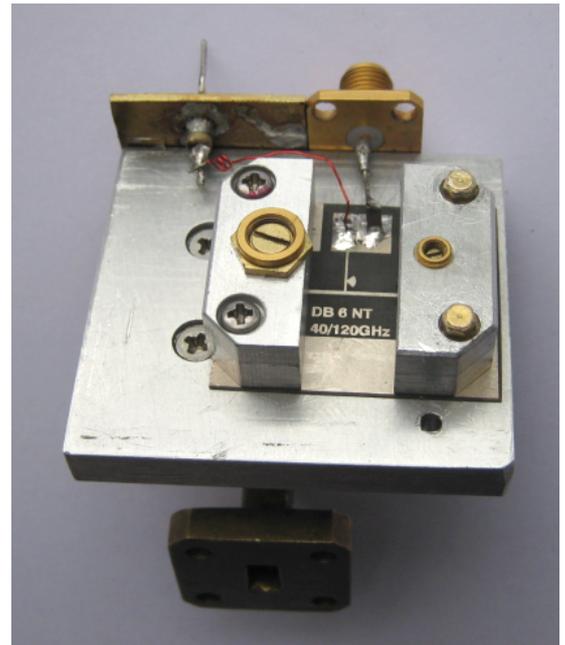
# scatterpoint

September 2015

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## Higher Microwave Bands

Gordon Fiander G0EWN



## In this Issue

UK Microwave Group Contact Information .....	2
Subscription Information.....	3
UK $\mu$ G Chip Bank – A free service for members .....	4
UK $\mu$ G Project support.....	4
UK $\mu$ G Technical support.....	4
Chokes up to 40 GHz! .....	5
Higher Microwave Bands .....	9
This month I 'ave mostly been building... ..	12
39.4GHz converter for AlphaSat.....	13
Wanted: Trophies Manager .....	17
47 and 76 GHz activities in Sweden.....	18
Activity News : August 2015 .....	20
Contest Results .....	28
The 2015 Crawley Roundtable, Sunday 20 September .....	30
Scottish Microwave Round Table .....	31
UKuG Microwave Contest Calendar 2015 .....	32
Events calendar.....	32
Loan Equipment .....	32

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## 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](mailto: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](mailto: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, rtf, 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 your 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](http://www.microwavers.org/?chipbank.htm) *Latest Stock Update was May 2015 – so do take a look!*

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 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 miss-labelled. G4HUP's [Inductance/capacitance meter](#) with SM probes is ideal for this (Unsolicited testimonial!)

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

**Mike G3LYP**

## UKμG Project support

The UK Microwave Group is pleased to encourage and support microwave projects such as Beacons, Synthesiser development, etc. Collectively UKμG 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 UKμG Secretary, after which they are reviewed/agreed by the committee

<http://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 UKμG 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](mailto:john@g4bao.com)

The current list is available at

[www.microwavers.org/tech-support.htm](http://www.microwavers.org/tech-support.htm)

# Chokes up to 40 GHz!

André Jamet F9HX agit@wanaddo.fr

## Reminder

A choke is a component used to block higher-frequency, while passing lower-frequency or direct current.

It is fluent to write coil or inductor to the component itself and the inductance term is reserved for the inductive component expressed in Henrys (H) and its sub-multiples.

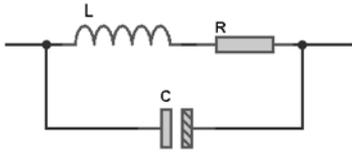


Figure 1. Inductor equivalent circuit

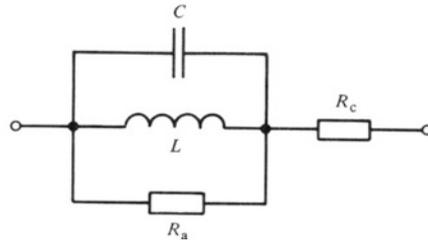


Figure 2. More complete inductor equivalent circuit

The equivalent circuit of an inductor includes the inductance L, the equivalent resistance R and the stray capacitance C (Figure 1). Can be better modelled by an inductor equivalent circuit of Figure 2 distinguishes the parallel  $R_a$  losses (loss of any magnetic circuit) and  $R_c$  series for losses due to the winding wire. The capacitance C between the turns and becomes important as frequency increases. Figure 3 shows the impedance versus frequency. DC, it is only the resistance of the wire. As the frequency increases, the inductance effect shows the increase in impedance to a maximum value corresponding to the resonant frequency of the oscillating circuit formed by R, L and C. Above, the parasitic capacitance dominates and the impedance decreases.

$$f_0 = 1/2\pi\sqrt{LC}$$

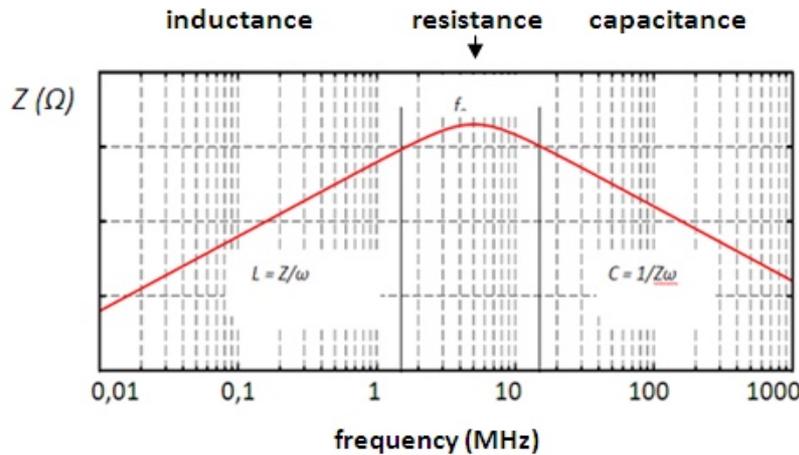


Figure 3. Impedance versus frequency

## Some chokes applications

Three applications are very common. In the figures, A represents an amplifier stage, tube, transistor or integrated circuit. Figure 4 shows an RF stage is loaded by a tuned circuit, supplied with direct current by a choke and a capacitor. Figure 5 shows an HF a periodic stage loaded by a choke. Figure 6 shows a logic stage powered at 5 volts.

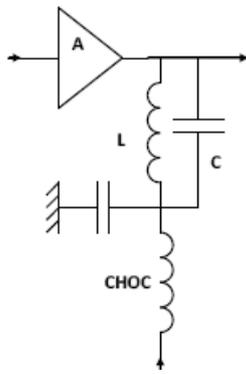


Figure 4. Tuned

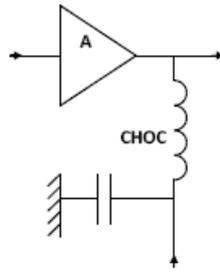


Figure 5. Aperiodic

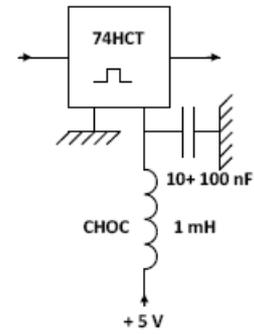


Figure 6. logic

If they are single frequency, the choice of choke seems simple: its impedance at this frequency is sufficient to ensure the blocking effect. On the contrary, for the case of figures 5 and 6, the choice becomes more difficult. Indeed, it is necessary that the impedance is high in the lowest frequency to the highest, so that the natural frequency  $f_0$  of the inductor is greater than it. In practice, it is rare that the single frequency case applies perfectly. Indeed, there are always the harmonic frequencies due to distortion and DC source can cause various spurious signals. In the third case, even if the switching frequency is low, we are dealing with steep edges. If they are injected into the 5 volts supply, it can disrupt some sensitive analogue circuits.

In all cases a capacitor must be associated with the inductor to obtain the necessary attenuation in the frequency range concerned [1, 2].

### "Broadband" chokes

To cover a broad frequency band, it is possible to increase the inductance by increasing the number of coil turns. However, the parasitic capacitance increases and the resonant frequency decrease. Both can compete, the one or the two together, the addition of a magnetic core (increased inductance without that the number of turns) or split and spacing the winding turns. It may therefore start by spaced turns, followed by contiguous coils and one or more windings honeycomb low distributed capacitance.

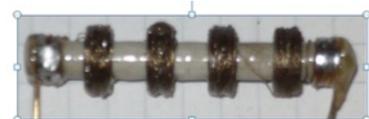


Figure 7. Some various chokes

An inductor that has been widely used is shown in figure 8. It comprises 2.5 turns on a ferrite core 6.3 x 10 mm. Depending on the type ferrite, performance can be very different.



Figure 8. VK 200 inductor

Standard SMD inductors may be used until gigahertz. They may be cascaded with timing of their values to maintain the impedance over a wide range. Figure 9 gives an example of impedances to a housing 1206 CMS.

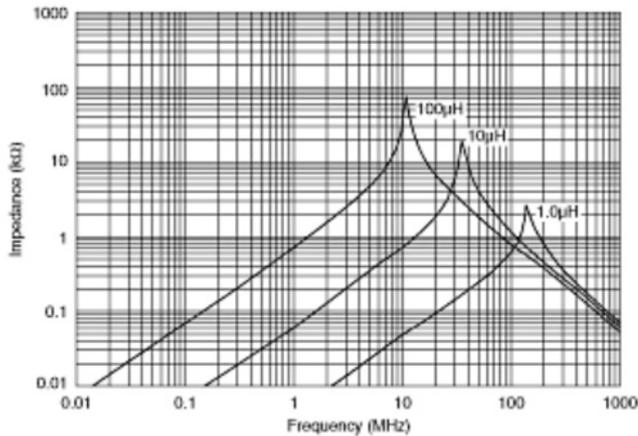


Figure 9. Impedance of a 1206 (Murata)

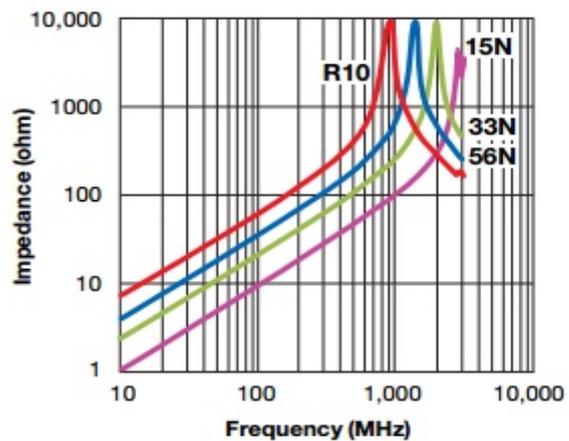


Figure 10. Impedance of a HF coil (AVX)

There are also reactors so-called "HF" having better high frequency characteristics in the same standard cases (Figure 10). They can be used in tuned circuits. All CMS are commonly sold at prices less than one euro.

### A particularly interesting case

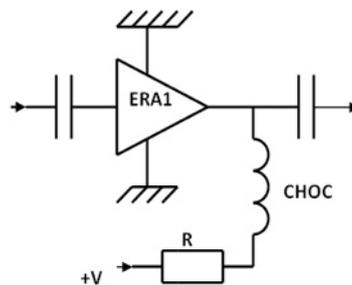


Figure 11. Choke for ERA 1

A MMIC biased by a resistor from a DC voltage. If it is of the order of 12 volts, the bias resistor has a sufficiently high value not to decrease the amplifier gain. On the contrary, for a lower DC voltage, the necessary resistor is low enough to decrease the stage gain. A choke in series with the bias resistor will add an inductance to the shunt impedance, and minimises the effect of the resistor on the performances. A manufacturer [3] recommends the use of a choke designed up to 8 GHz which is the limit of the MMIC concerned (Figure 11). Usable from 50 to 10 000 MHz, 1-7 µH from 0 to 100 mA, 8x3 mm dimensions, stray capacitance 0.1 pF. The cost of these chokes down to less than three dollars per 20 parts from the manufacturer.

### New chokes inductors called "ultra wide-band"

You can find ultra wide-band chokes covering a greater frequency range than the most common components. They are made to minimise the parasitic capacitance. They are cone-shaped with circular section or of square section pyramid exposed or housing. Several manufacturers offer them. [4]. Contrary to what might assume the view of Figures 12 to 14, these components are tiny, the family of CMS.

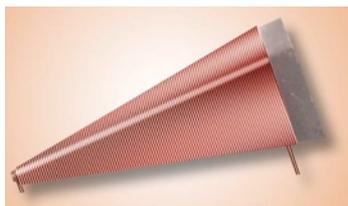


Figure 12. Squared base

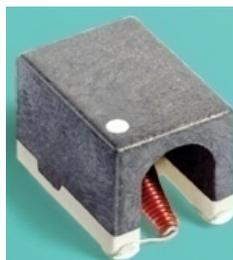


Figure 13. Protection cap

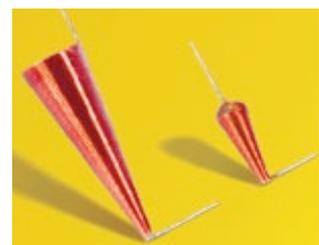


Figure 14. Flying leads

## Characteristics of ultra-wide-band choke

S parameters are given up to 40 GHz. The insertion losses are low, the response is flat. It may be expected of a good reproducibility from one component to another.

For the square base pyramidal coil (figure 12), manufacturers (AVX, ATC) offer three models wound with an extremely thin copper wire. Dimensions: L = 2.6 – 4.6 mm; base: 1.65 – 1.85 mm square.

For the model presented in Figure 13 cover for PCB mounting, the manufacturer offers inductances from 0.22 to 8  $\mu\text{H}$  whose resistance ranges from 0.1 to 3.39  $\Omega$ , the current carrying capacity of 1.2 A to 230 mA, the dimensions of 2.67 x 3.05 to 5.59 x 11.18 mm. The S21 and S11 parameters vary greatly depending on the inductance value. Figure 15 gives values for a 1.2  $\mu\text{H}$  coil (Coilcraft).

inductance	frequency	S21	S11	resistance	current	turns	wire $\varnothing$
$\mu\text{H}$	MHz GHz	dB	dB	$\Omega$	mA	number	$\mu\text{m}$
2	2.3 ----> 40	-0.5	-17	1.45	$\leq 250$	46	50
6	0.9 ----> 40	-0.6	-18	2.9	$\leq 200$	80	36
11	0.5 ----> 40	-0.4	-18	7	$\leq 115$	110	36

Figure 15. S parameters of a 1.2  $\mu\text{H}$  coil

Naked chokes corresponding to Figure 14 are provided by both aforesaid manufacturers and also by a third (Piconics). The performances are all similar. For example, here is a model that is 6.35 mm long with a diameter of 2 to 5.8 mm. Figure 16 give their S parameters.

inductance	frequency	resistance	current	spires	wire $\varnothing$
$\mu\text{H}$	MHz GHz	$\Omega$	mA	number	$\mu\text{m}$
2.35	10 -----> 40	1.6	220	50	50

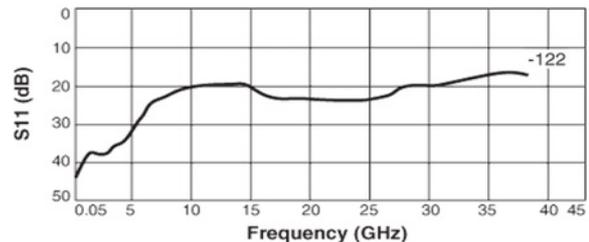
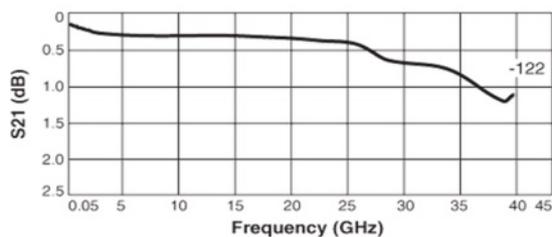


Figure 16. Flying leads Coil S parameters

## Applications

Professional, they are numerous: Broadband decoupling, bias tees, communication systems, subsystems, optical, transimpedance amplifiers, test equipment, high-speed logic, For OM, are the decoupling of switching circuits, logic circuits and switching power, which are jointly achieved with broadband capacitors [2].

These components are accessible to OMs [5]. The unit price is about 15 € for 10 parts.

## References

- [1] Comportement fréquentiel de composants passifs, Olivier Briat, gellii, Université de Bordeaux
- [2] The so-called ceramic capacitors "ultra broadband" up to 40 GHz and more!, F9HX, Scatterpoint June 2015
- [3] Mini-Circuits, AN-20-003, Super Wide Band RF Choke
- [4] Manufacturers: ATC, Coilcraft, AVX Corporation, Piconics
- [5] Suppliers: RS, Farnell, Mouser, Digikey

# Higher Microwave Bands

**Gordon Fiander GOEWN**

## Introduction

One of the positive aspects of visiting Round Table events is that one often comes away fired up, having seen something or listening to talks about other peoples experiences or experimenting. So it was for me with this year's Martlesham RT and a talk given by Chris Whitmarsh and Roger Ray about their experiences on the higher bands. On returning home, I recounted what I had seen to Barry, G8AGN, who likewise seemed to be very interested in the subject – the higher microwave bands.



## Perfect Storm

Sometimes events just seem to come together in the manner of a 'perfect storm'. The conditions that led to this 'storm' were numerous and intertwined.

Interest and activity in the higher microwave bands seemed limited or virtually non-existent in the North, with perhaps the exception of some 24 GHz operation. I had dabbled with 47 GHz—my input amounting to just two contacts—30 km with PHO and 99 km with Ian KQW but lack of other operators to test with meant a loss of interest and the equipment being sold. It was resolved to change this state of affairs.

In the autumn of 2014 I had some email exchanges with John, G4EAT regarding the many similarities between the higher microwave bands and nanowaves. In fact there is probably a greater number of similarities with nanowaves / higher microwave bands than with the higher and the lower bands. (Higher bands I will define as those above and including 24 GHz). It is common practice with both nanowaves and the higher microwave bands to have 'separates'---a separate receiver and a higher power TX.. Lenses start to be used for antennas. Atmospheric gases play an increasing role in path loss. TX powers tend to be low. Path lengths are similar---Red light / 76 GHz both around 130 km (UK), 134 GHz DX similar to UV. Telescopes used for sighting / alignment, winter offers best DX. The list of similarities goes much further.

A quick chat with some of the usual suspects at the Finningley RT showed there was interest in the higher bands – just needing a little prompting.

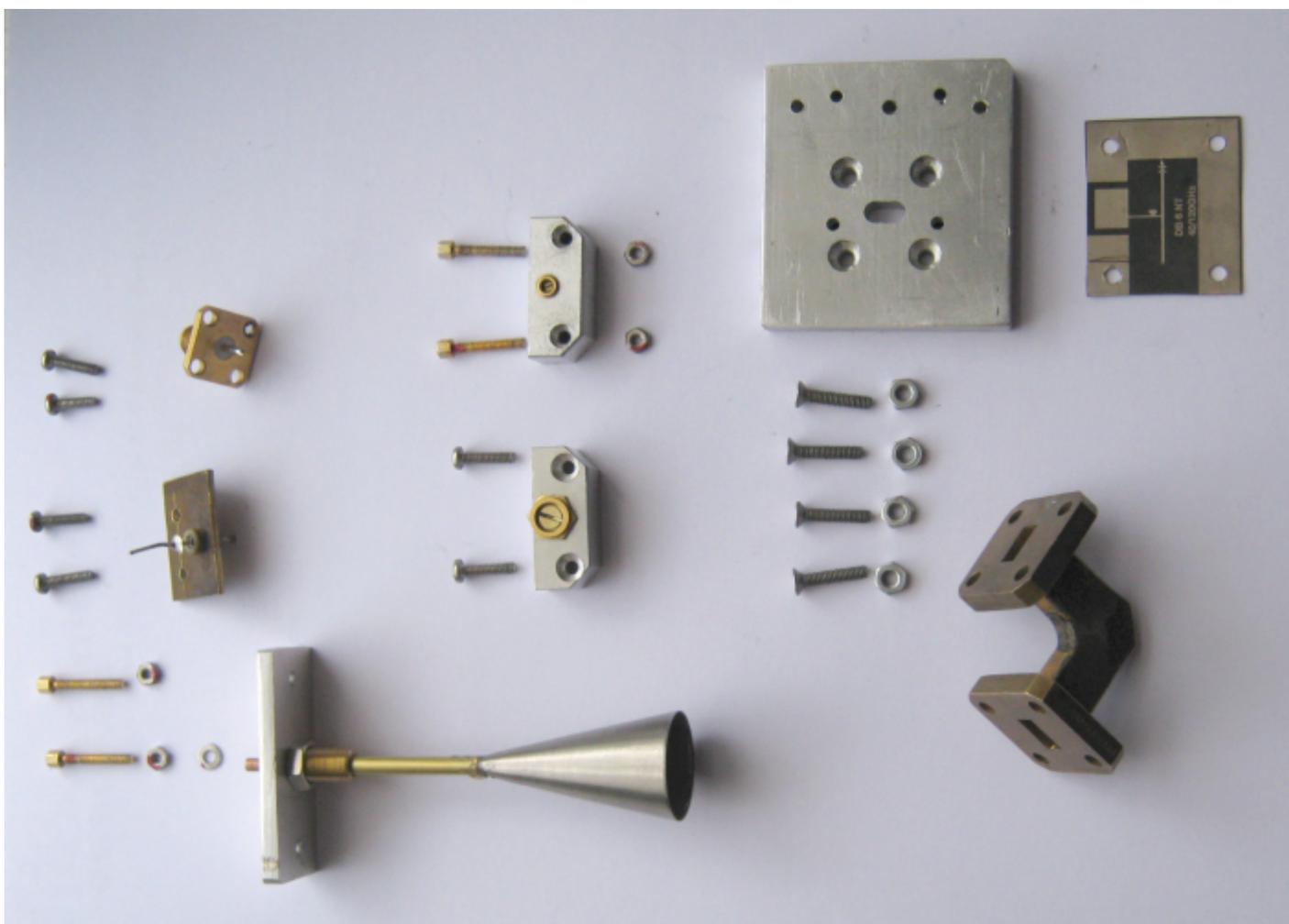
Cost is an issue that might be putting people off trying the higher bands, could anything be done in this area?

## 134 GHz.

Barry and I decided to jump in on 134 GHz – it is a primary band and has until recently had little exposure, other than an excellent opening contact between Dave and Meg Robinson. There was mention that the Microwave group might be willing to help with some machining of suitable 'blocks' or slabs/ jigs to help kick start activity if we could prove the concept of a slab mixer mount.

Barry G8AGN had purchased a milled block for 134 GHz but on close inspection found a number of shortcomings – holes in the wrong place/orientation, more milling required, etc. (See Barry's article about 134 GHz in previous Scatterpoint). I thought I had come up with a simple solution – use a flat bar to fabricate the mixer mounting from – cheaper and simpler. On looking at what others had done, it wasn't a new idea – Chris BKE had done much the same. Undeterred, a slab mixer mount has been developed and is still undergoing testing. If successful, as initial testing seems to indicate, it is hoped that others will be able to benefit from a much cheaper solution to buying a milled block.

The picture below shows the 'slab mixer mount' and various components. The slab is just left of the PCB and the small horn is a test antenna.



The assembled unit is shown below and has received first signal over a short distance from a signal marker, driven at 12 GHz. This produces a very low power but very stable marker on 134.840 GHz. The RX LO is at 134.400 GHz. A circular waveguide of 1.6mm cuts off signals below 110 GHz, so it is definitely working and not receiving a lower harmonic. Antennas are now being constructed to take the testing further. We will try to keep people informed of progress and hope others will get involved and build equipment.

### 47 and 76GHz

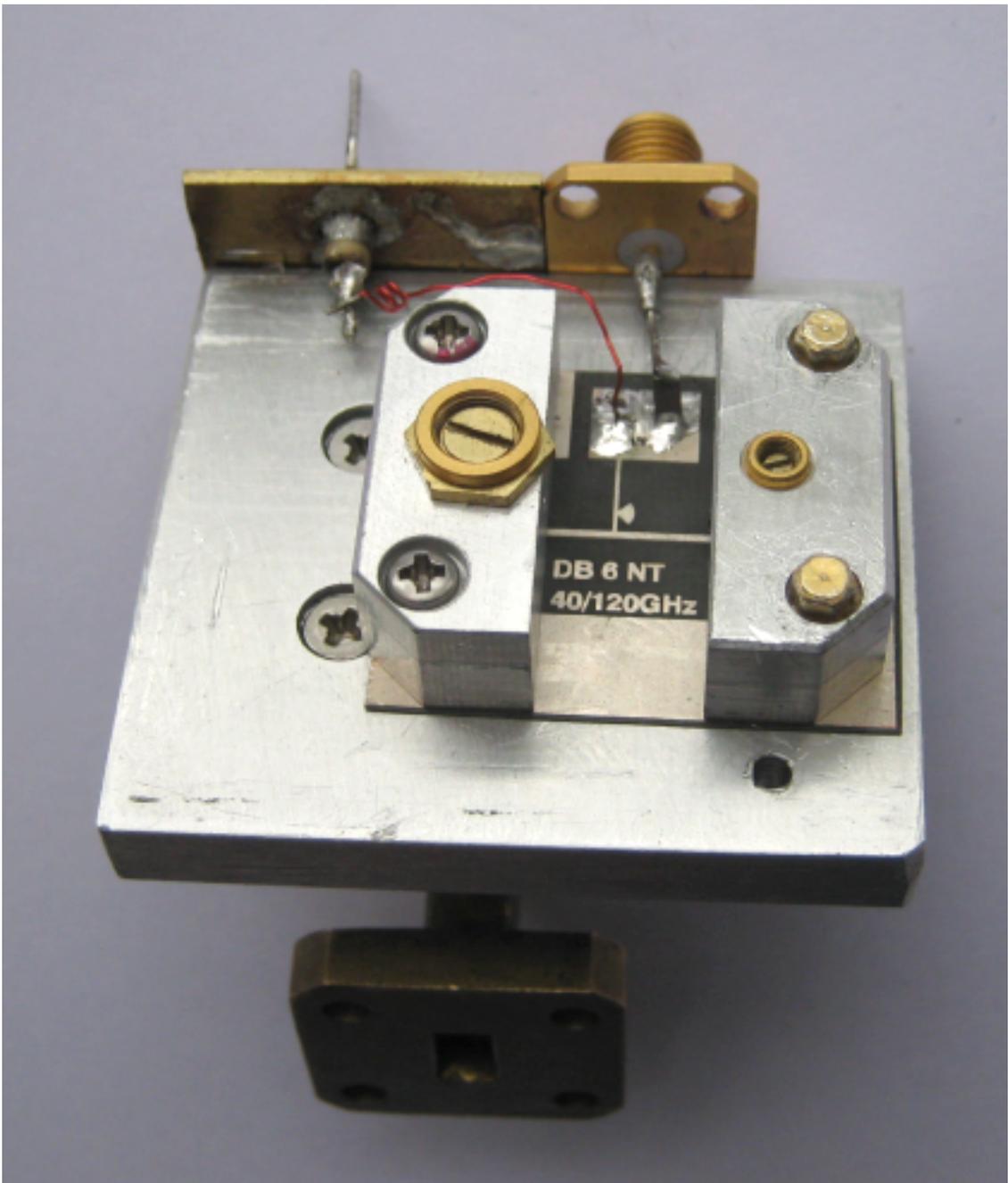
As well as developing equipment for 134 GHz, we also intend to build/operate on 47 and 76 GHz----all part of kick starting activity outside the southern group of active 'higher band' operators. It is often useful to have some working equipment, especially for bands where test equipment is scarce. With this in mind, some equipment originally made by Peter Blakeborough, has now been relocated and is back working and 'on air'. In the next few weeks it is hoped to conduct a test/tests with Peter, G3PHO—the only one I know with 47 GHz within this area. 76GHz tests have already been made between Barry, G8AGN and myself G0EWN – an initial test of 600 m followed by a 10 km path – both were with very strong 59 type signals, longer path tests soon. In the meantime Barry has made a quick 76 GHz unit driven at 6th harmonic – it should be much better when the LO is multiplied by three to enable second harmonic to be used.

### 248GHz

It is hoped the 'slab mixer mount' can also be used on 248 GHz (7th harmonic). Waveguide dimension 0.8 mm (circular)---possibility of using dielectric waveguide as normal copper guide is quite lossy at this frequency.

### Summary

Now that we have some working equipment on all bands from 24 GHz through 47, 76 and 134 GHz we hope to be in a position to help anyone else interested in the higher microwave bands, or interested in combining nanowave / higher band operation. If you are interested in building or operating above 24 GHz then we would like to hear from you.



134 GHz head unit / slab mixer mount.

Thanks to Chris and Roger for the Martlesham Talk and continuing assistance, the Microwave Group Committee for their encouragement, Peter Blakeborough and Kevin Avery for support.

73s Gordon G0EWN

# 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.

## **Gordon Fiander**

I have been trying to make a 10GHz signal source, from a 1153. Not having any success with the standard transistors, BFR series, I was looking for something a little easier. The junk box yielded an amplifier, marked for 900 MHz.

Removing the lid, revealed a stripline with two small mmics and a substantial power transistor. The second mmic, a PM211, I blew up (in the early hours Tch!), but I find it a useful IC.

+ 5 Volt supply, and a negative bias, for 1 mW in, a Watt out – with 50  $\Omega$  in/out, needs to be bonded to a bit of a heatsink, but the output drives the FET, power transistor, to 18 Watts .

May be useful to others .....

Also, used, from Farnell: stock no 186-5180 mmic, MGA-31189-BLKG, 50  $\Omega$  in/out, +5 Volts , 0.25 W out , over 20 dB gain, to GHz.

It worked first time, at 1296 MHz, and provided 23.5 dBm at 5.25 volts supply, and will go a little higher .....

## **John Worsnop G4BAO**

.....putting 23 cms in my EME system.

By mid-September I plan to be fully active on 23 cm EME, both CW and JT using my 1.9m dish with an [SM6FHZ circular polarised patch feed](#). I've run long feeders from the shack to the dish mount so I can use my TS2000X with a dish mounted homebrew 200 W, 2 stage SSPA and a G4DDK VLNA23.

I've already been receiving both CW and JT signals off the moon, but the effort has been to sort out the transmit switchery. Thanks to Bernie G4HJW for a length of LMR600 hidden in the loft that reduces the loss for the bulk of the TX feed length, while leaving only thin RG223 down the outside wall to the dish. A total loss on TX of 9 dB, perfectly attenuating the 10 W from the TS2000X to the correct level to drive the 200w PA. The receive feeder is a similar arrangement using a shorter length of LDF4-50, again hidden in the loft, leaving me with 10 dB loss between the Preamp and the TS2K. The 38 dB gain of the VLNA32 fully compensates for this loss, so the system noise figure is governed by the VLNA32. PTT is via a high impedance 12 V signal up the RX coax to a PIC sequencer and coax relay at the feed to power off, disconnect and terminate the preamp on TX. PTT on bias is provided to the PA via auxiliary contacts on the feedpoint relay.

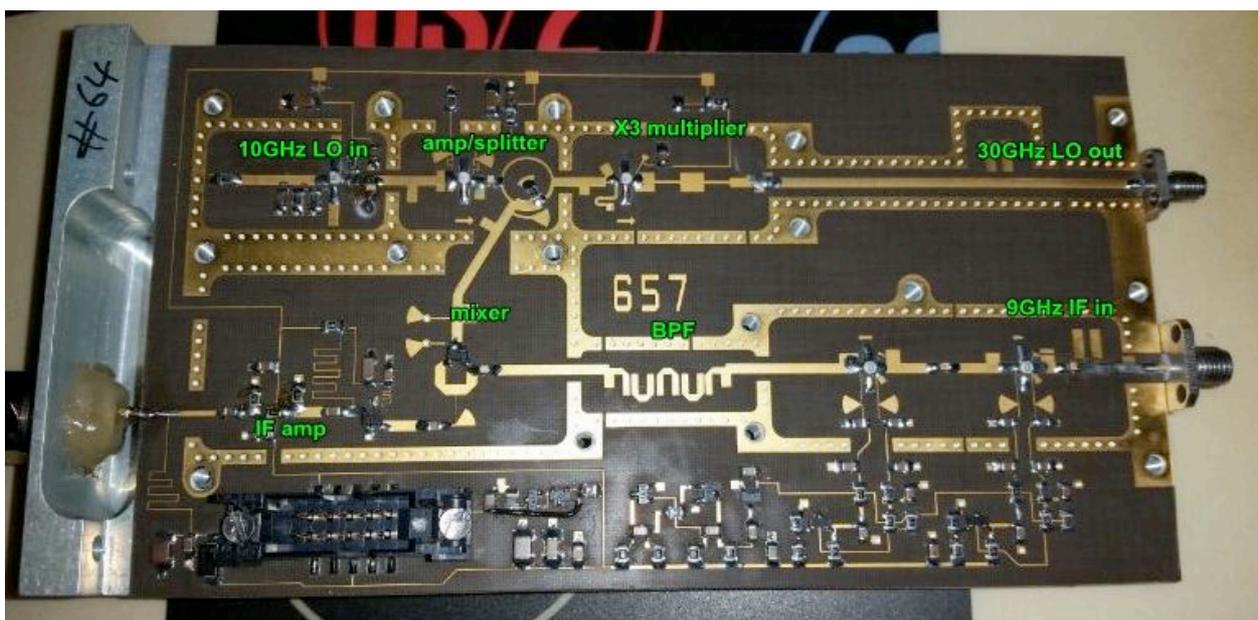
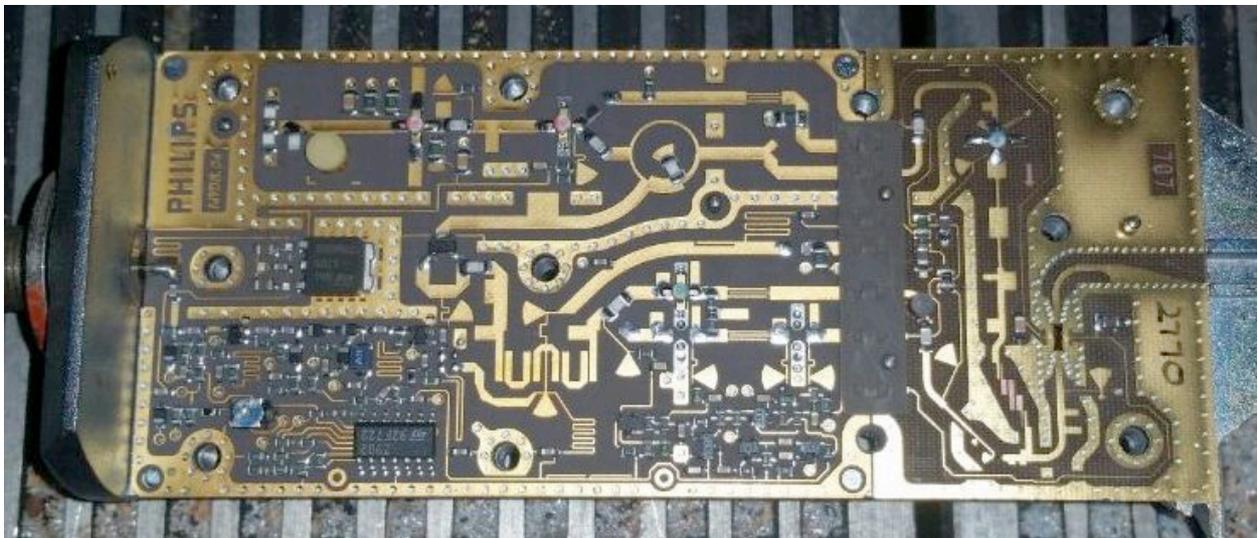
I have consolidated 28 V DC power and interconnects so I can now, reasonably quickly, swap plugs and units to change band from 13 cm to 23 cm.

# 39.4GHz converter for AlphaSat

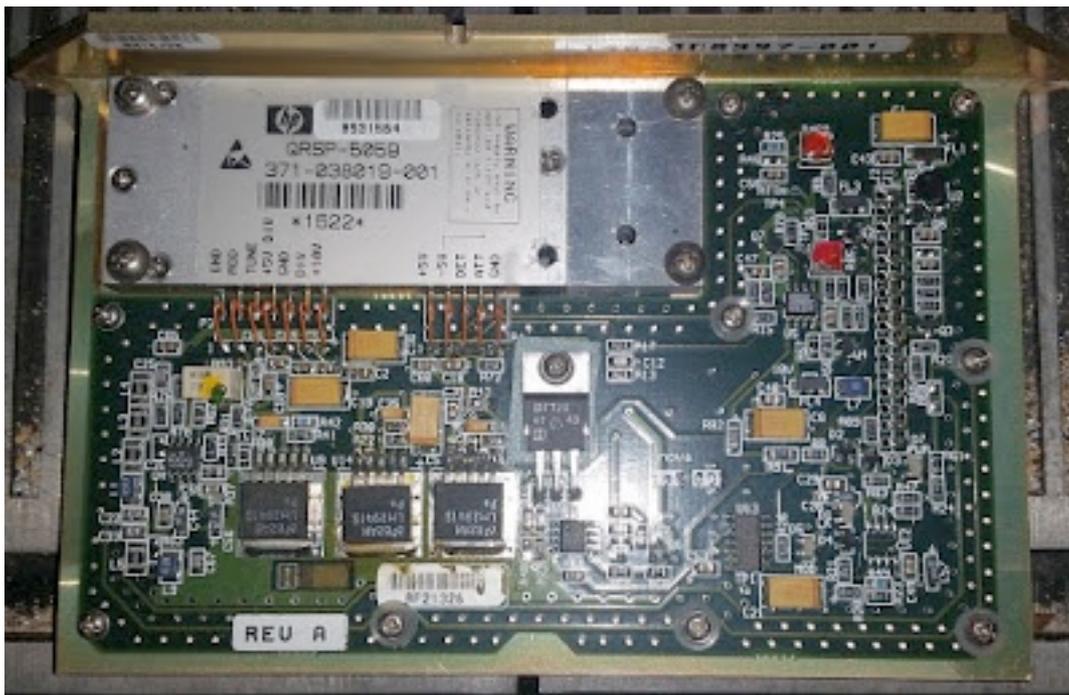
Paul Marsh MOEYT

Having worked my way up in frequency topping off at 32GHz for the NASA Kepler mission, I needed to refine my microwave construction skills once again and try to build a converter for higher frequencies. I had looked around at 38GHz microwave links but terrestrial stuff is very strong and therefore pretty easy to receive. I needed to find some signal from space around this frequency. Having a dig around on the Internet I found a Czech site detailing their commercial 39.4GHz AlphaSat receiver, <http://www.btv.cz/en/alphasat-receiver>. Looking at the antennas showed that with relatively small apertures reception would be possible. AlphaSat's primary mission is maritime communications in the L and Ka bands but it hosts a number of Technological Demonstration Payloads, the most interesting one is Payload 5; there is a summary write up on the ESA here: [Aldo Paraboni Q V Band Payload](#)

To start on the down converter project, I had a dig around in the various boxes of junk and found some Phillips 40GHz MVDS equipment (top picture below) including production-run down converters and a prototype converter unit (bottom picture below) with a low-noise amplifier and lens antenna. First, I looked at how the 40GHz converters worked, they have a ~14GHz DRO oscillator; this was replaced with a SMA socket and an external LO was injected just to see how wideband the front end was – needless to say there wasn't a lot of success at 39GHz. A local 4.75 GHz 'brick' oscillator, locked to a 10 MHz GPSDO was used with a diode multiplier to generate spurs up to 39GHz for the initial tests.



Next on the list were the XP4 microwave link units made by Stratex. I have a few of these out-door-units including some for the 38GHz band. The transmit side is shown below and is very much similar in board layout / design to the receiver.



The receiver has a few PSU requirements +5 V, -5 V, 8 V and was quickly run up with a test PSU. The IF output was examined on a spectrum analyser and showed plenty of bandwidth extending up to around 2.6 GHz. The inbuilt local oscillator's VCO was fed with an external 0 V to 5 V supply and runs around 1 GHz. Extending the tuning voltage input up to 8 or 9 Volts tunes up to 1.2 GHz so for the LO we are getting into the right ballpark. For my converter project I wanted a conversion LO of 40.000 GHz with a high side mix making the resulting 39.4 GHz signal from AlphaSat appear at an IF frequency of about 600 MHz. All doable and within the passband of the converter. I wasn't too concerned about image noise as I didn't expect 40.6 GHz signals to exist.

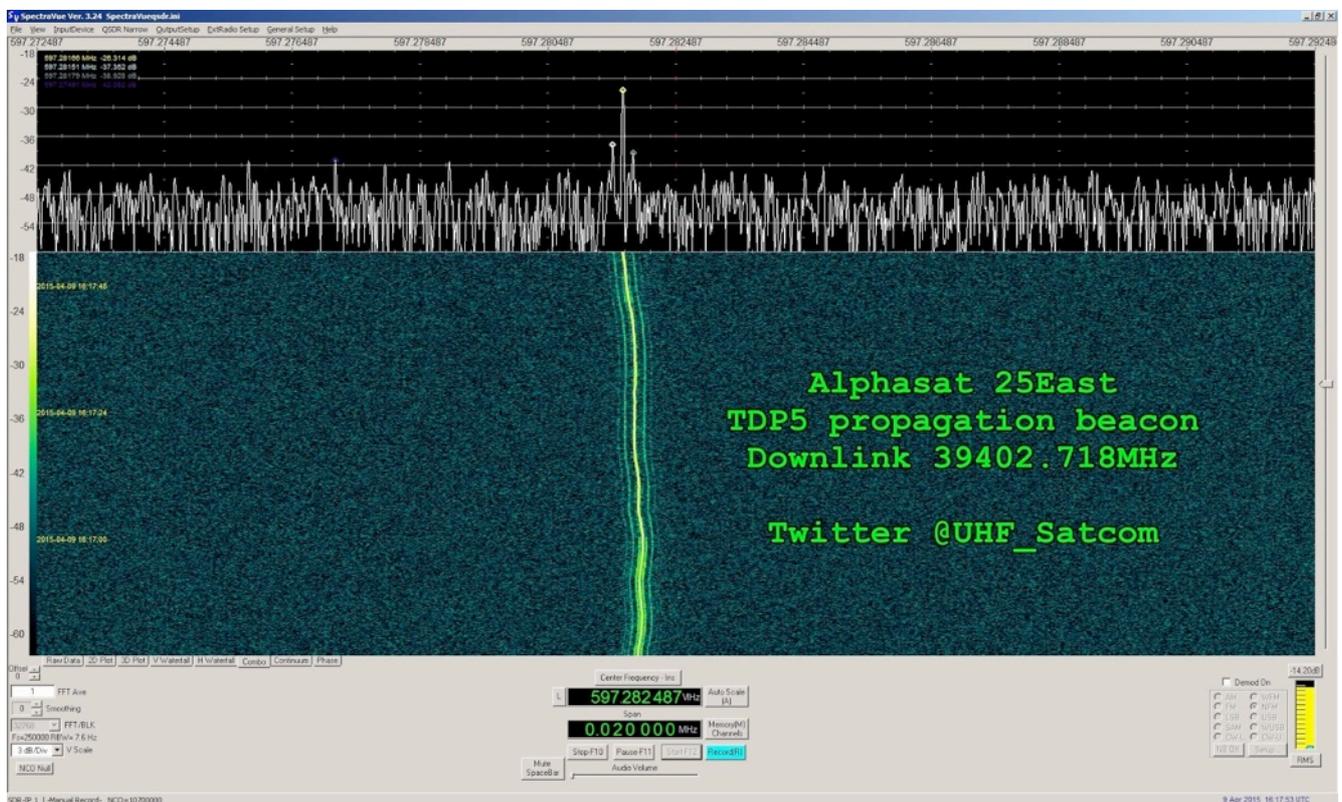
Initial tests were made with the LO free running and connected to a multi-turn pot to adjust the tuning voltage between 0 and 8 volts. The local test carrier could be seen on the spectrum analyser but it was basically an unstable mess. The general setup with the manual LO adjustment is shown below. The lens antenna has 37 dB of gain at 42 GHz so one might expect a dB less at 39 GHz given its broadband nature. These are similar horn antennas that appear on eBay from time to time but they are not cheap.



A very quick test from AlphaSat with the free running oscillator did produce a signal, as expected it wobbled about a bit. The picture below shows the setup for the very first test.



The FFT below shows the result of having the entire converter assembly wrapped in bubble-wrap and left to stabilise for 10 minutes.



The solution to the wobble would be to phase lock the VCO to a good 10 MHz reference. I had previously had the luck to find German Ham DF9NP <http://df9np.de/> and he makes and sells great quality, low-cost PLL boards that can generate the frequency of your choice from a few hundred MHz to 6 GHz or so; this was the answer so a custom PLL board was ordered to generate a 1111.1111 MHz signal when locked to a 10 MHz source.

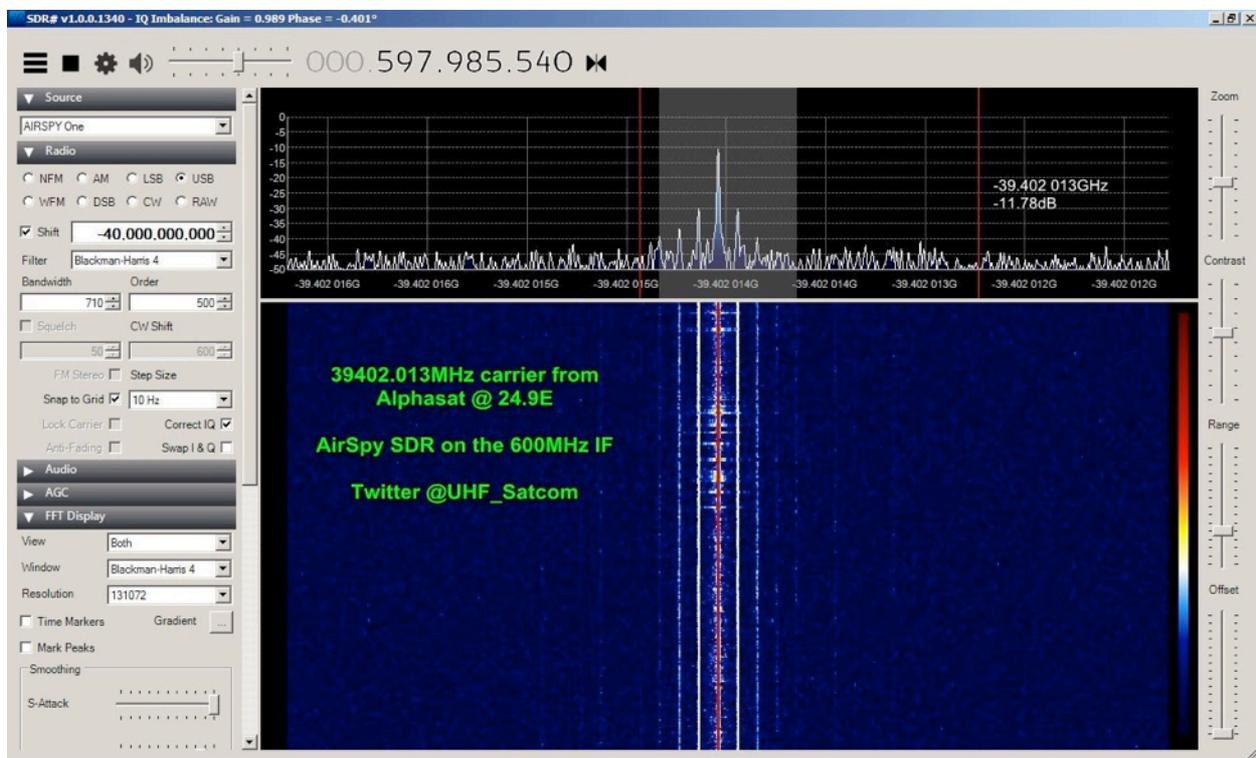
The PLL board can be seen in the above image in the lower left hand side. Its internal VCO has been disconnected and the 1st LO output running around 1 GHz from the 38 GHz module connected in its place. Since the PLL chip only tunes between 0 V and 5 V, an op-amp level shifter is made to add about 3 V to the tuning voltage which is sufficient to get the PLL to lock the 38 GHz modules LO. The note when checked with a communications receiver sounded pretty good and no signs of massively bad 'noise' could be seen in FFT.



I decided to add the broadband LNA from the pre-production Phillips MVDS unit in front of the 38GHz module since it was operating about 1GHz away from its optimised frequency, the assembly is shown below;

A horn antenna, again from the Phillips MVDS system, was used as the antenna, the thinking here being that it would have a fairly wide beamwidth at 39GHz so antenna pointing should be less critical than with a dish. I set up the converter on a tripod and fed it with volts, 10 MHz reference and returned the IF to an AirSpy software radio. The appropriate azimuth and elevation was set and the SDR tuned around 600 MHz to see if the signal could be improved over the initial attempt.





As expected, with the PLL locked 40GHz LO the signal is massively improved and easy to copy with just a small lens antenna. The FFT above shows the AirSpy SDR tuned to the IF frequency of 597.985MHz which corresponds to an off-air signal downlinking on 39.402013GHz. Incidentally, I did meet Volkmar HB9DUK, a fellow millimetre wave chap, at Friedrichshafen HamRadio in 2015 and he had quite a few 40GHz amplifiers and modules present, so it was good to catch up and chat about the possibilities of receiving AlphaSat and other EHF signals.

To summarise, an interesting experiment resulting in good 39GHz DX! Next on the list is to measure sun noise and cold sky / ground to guesstimate the system noise figure.

## Reference

Paul's blog from which was taken (with permission!)

<http://blog.uhf-satcom.com/2015/08/394ghz-converter-for-alphasat.html>

## 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.

# 47 and 76 GHz activities in Sweden



Kullens fyr

We were really surprised by the good results. Perhaps we had luck with the over water propagations. No site was more than 60 m a.s.l. Further tests will show how often the over water propagations on 47 & 76 GHz is present. The temperature was 23-24° C, DP 12-13° and RH 60-63% during the tests.

The terrain profiles are shown in Figure 1 and 2.

## Summary of the QSOs:

### 47 GHz

- 6/8, 13:55 SNT, SM6HYG/p – SM6AFV/p, 59+/59+ SSB, **76.8 km**  
Kungshamn – Hönö vattentorn, JO58PI05LM – JO57TQ74LK
- 6/8 14:05 SNT, SM6HYG/p – SM6EAN/p, 59/529 SSB/CW, **29.5 km**  
Kungshamn – Måseskär, JO58PI05LM – JO58PC92XU
- 6/8, 17:01 SNT, SM7EYW/p – OZ/DF9IC/p 59/59 SSB, **56.2 km**  
Skåre – Möns Klint Denmark, JO65MJ72EA - JO64GX51XR
- 9/8 14:56 SNT, SK7MW – DF9IC/p, 59/59 SSB, **83.2 km, first SM/DL**  
Skåre – Rügen Germany, JO65MJ72EA – JO64RQ13VC
- 13/8 11:30 SNT, 47 GHz, SM6HYG/p – SM6AFV/p, 559/559 CW, 55/55 SSB, **89.4 km, distance record SM.** Apelvikshöjd – Kullens fyr, JO67CC91XX - JO66FH42GL

### 76 GHz

- 6/8 08:28 SNT, SK7MW/p – OZ/SM7FMX/p, 59/59 SSB, **15.4 km, first SM/OZ**  
Klagshamn – Dragör Denmark, JO65KM75CT - JO65IO12IO
- 6/8 15:05 SNT, SM6HYG/p – SM6AFV/p, 519/519 CW, **76.8 km, distance record SM**  
Kungshamn – Hönö vattentorn, JO58PI05LM – JO57TQ74LK
- 6/8 17:04 SNT, SK7MW – OZ/SM7FMX/p, 59/59 SSB, **56.2 km**  
Skåre – Möns Klint Denmark, JO65MJ72EA - JO64GX51XR

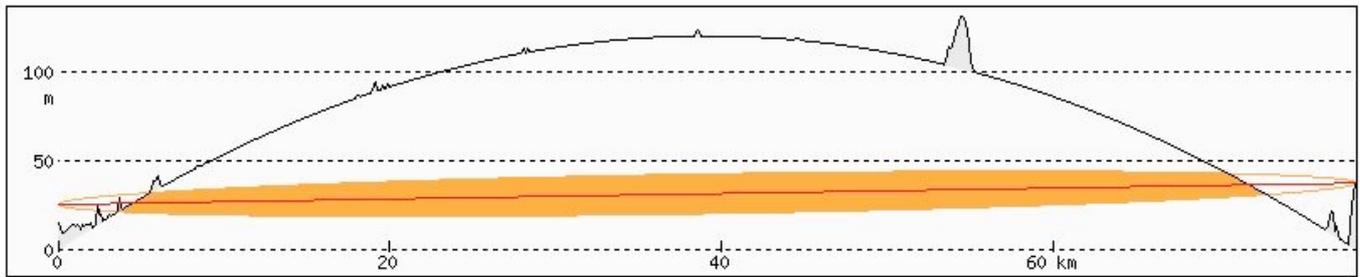


Fig 1: Hönö vattentorn

Kungshamn

(Source "HeyWhatsThat")

Profile: Hönövattentorn, 37m asl – Kungshamn, 25m asl: 78.1km

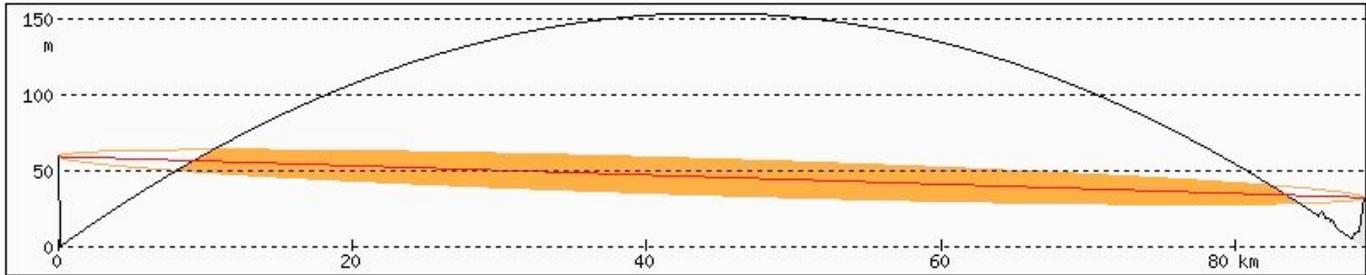


Fig 2: Kullens fyr

Apelvikshöjd

(Source "HeyWhatsThat")

Kullens fyr, 60 m asl – Apelvikshöjd, 33 m asl: 88.7km

The first test on 6/8 between Hönö vattentorn – Kungshamn started at 13:00 SNT on 47 GHz. We immediately heard each other and after fine tuning the antennas signals were 59+. The distance was 76,8 km over water. Switching to low power/no preamp 0,15 mW also gave readable signals!

There was an island in between with a height of 30 m a.s.l. so we actually had our doubts for a successful qso. Moving to 76 GHz no signals was heard initially. Finally we manage to find each other and exchanged 519 reports on CW.

Inspired by the results we planned for new tests over longer distances. On 13/8 we started the tests at 08:00 SNT Between Kullens fyr (Lighthouse) - Bua. Distance 105 km. NIL was heard at repeated tests on 47 GHz. SM6HYG at Bua then moved to Apelvikshöjd a bit closer to Kullens fyr. Still no signals heard at repeated tests. Suddenly at 11:30 SNT we had 559 signals over the distance 89 km. Test on 76 GHz gave NIL. The tests on 76 GHz continued for another hour but NIL signals heard.

I often check the propagation to the OZ1EHF, 24 GHz Beacon in Denmark. The distance to the beacon is 128 km, 60-70% over water. I do not hear the beacon every day but during the summer I hear it more frequent and often with 55+ signals early mornings and late evenings. I did check the beacon before and after the tests. I could not hear the beacon even if Hepburn indicated elevated propagation.

At these test the best propagations seems to appear between 12–17 SNT when we often have a minimum of RH. This is a contradiction to 24 GHz where the propagation often decline between 11 – 17 SNT.

The equipment used was: TRXs DB6NT/DL2AM/User design with Preamp and PA. Output power between 0,15–150 mW.

Dish sizes between 25 – 40 cm.

OCXOs locked to a 10 MHz reference

**Jens – SM6AFV**

**Email: jens.tunare@gmail.com**



# Activity News : August 2015

By Bob Price G8DTF

**Please send your activity news to:**

[scatterpoint@microwavers.org](mailto:scatterpoint@microwavers.org)

## Introduction

This month there are some reports of activity in the UKACs and Microwave Group Contests, plus some other activity outside contest periods.

## 23 cm UKAC

**From Bob G8DTF IO83**

12 stations worked in IO83 plus:-

GW8REQ/P	IO82	G8SFI/P	IO93
G8OHM	IO92	G7LRQ	IO91
G8CUL	IO91	G4CLA	IO92
G3VKV	IO81	G4BAO	JO02
GM4CXM	IO75	G4KIY	IO92
G8XVJ/P	IO93	M0MDY	IO93
G0EHV/P	IO84	M0COP/P	IO82
G3TCU/P	IO91	G4BRK	IO91
G0MJW	IO91	M1DDD/P	IO93
G4ODA	IO92		

**From Graham G3TCT IO81**

I operated in the 23 cm UKAC in August from IO81VC for the first time – this is the GB3JB repeater site where I hope to put the GB3USK beacon back on the air in due course. Dave G3ZXX kindly allowed me access and gave a much needed helping hand with the antenna and packing up in the dark.

It was certainly a better site than home - I actually had stations answering CQ calls – this is very rare from home!! I was very pleased to work two PAs including PA0BAT at 607 km for best DX, and GM4CXM at 557 km. The site was rather busy that night with tractors and balers collecting hay, but there was no noise on 23 cm. Conditions were reported by others as mediocre or poor. For me, it was a bit strange – several regulars were not heard at all, but the DX came through nicely, but I'm still not in the top 5 in the AO section, so I'll have to try harder next time!

**From Eddie G0EHV/P IO84**

As usual out /P in IO84 for the UKAC contest this month. As far as conditions go the best description for me was "Average".

41 QSO's, the best being G4LDR @ 414 km, but missed quite a few including my own square (as usual!). QRM and finding a clear frequency to run is getting worse as activity improves, but not complaining!

The new preamp seem to have improved things a bit and no blocking noticed from the nearby CAA radar on Great Dun Fell.

## 13 cm SHF UKAC

### From Bob G8DTF IO83

4 stations in IO83 (G3UVR, G4JLG/P, GW8ASD, and G6GVI/P) plus

G4BRK	IO91	G8OHM	IO92
G3VKV	IO81	G3UKV	IO82
G8CUL	IO91	M0UFC/P	IO93
G8EOP	IO93	G4LDR	IO91
G8SFI/P	IO93	G0MJW	IO91
GM4CXM	IO75	M0GHZ	IO81
G4ODA	IO92		

9 cm equipment failed as LO would not lock.

## 5.7/10GHz Contest

### From Chris GW4DGU IO71

I finally managed to spend some time on the air this month. Not a lot, but it was quite productive. For some time I'd intended to go out portable to a new 470 m ASL site very close to the geographical centre of Wales, just 4.3km from my home.

Getting access involved some negotiation... Permission to use the location – which is personal to me – finally came through a couple of months ago, but various factors, including work, conspired against me using it for a contest until today. I would have been on sooner: the day before the 24/47GHz contest in the middle of August I was involved as a passenger in a motoring accident, and missed that. So, I was looking very much looking forward to today's 5.7/10GHz event as an activity period.

I'd planned to spend about 5 hours operating, but after forgetting my GPS-locked reference, I had to spend a bit of time hunting for beacons in order to fine-tune my dish-pointing, and to determine the frequency offset to which the system had settled in the absence of an external reference. After taking far too long to find the first beacon, GB3CCX at about 130k, and setting-up the dish, I was able to hear GB3MAN (153 km), GB3LEX (159 km), and GB3SCX (205 km) all at levels where the call could be read on CW by ear. Despite looking quite hard, I couldn't hear GB3MCB. I didn't look for any other beacons.

I finally made it onto the air just after 12 local, and worked 16 stations from the Central belt of Scotland to Cornwall before my battery died just over three hours later. The best DX was GM0USI (IO75TW) at ~381km. There was some RS about, but I suspect that most of the stations I worked could have been contacted without too much trouble by troposcatter. As time was limited I didn't run any aircraft scatter tests.

Of the stations I worked, 5 were beyond 300k, 2 in the range 250 - 300k, 3 between 200 and 250 km, three between 150 and 200 km, 2 between 100 and a solitary QSO of 66 km! The mean QSO distance was 232 km.

It was good to work a lot of old friends, many of whom weren't usually within range from IO71.

I was running 8 W from a new transverter built from the system components I used to sell, driving a GaAsFET 10 W satellite TV amplifier (for which I don't have quite enough drive – yet!) The antenna is a 0.8m offset dish fed with a Skobelev feed, also of my design. The system noise figure is 2.2dB measured at the feed, including the ~0.5dB loss in the length of Sucoflex cable between the feed and the antenna relay.

### From John GM8OTI

I've not been on the air for ages but got out for this last weekend's 10GHz contest. Here's a small report: John Cooke GM8OTI operated /P for the UK Microwave Group 10GHz contest on 30th August. Operation was from the car park high up on East Lomond in Fife. The site is 335 m ASL and has an excellent takeoff from Northeast round to Southwest.

Setting up just after 1100Z the personal beacon of Brian Flynn GM8BJF was clearly audible by reflections from close to his home location in Edinburgh; the beacon is aimed roughly West. Brian himself had set out for a location near Soutra hill, line of sight to East Lomond, so a very easy contact was made, with

extremely strong signals at each end (both stations running 1W output to a small dish). Michael MM6MWF was also contacted on the same set-up (not counted for contest purposes!).

The next contact was with Eddie G0EHV who was also out /P. Although not line of sight John was hopeful of a contact, and this was achieved easily once the beams were lined up; Eddie was running 8 W to a small dish. The 134 km path was obstructed by the Lammermuir and Cheviot hills.

In an inactive interlude John decided to see if he could hear the personal beacon of GM8FFX up the coast south of Aberdeen. Although the radio station North of the car park has a large wire fence around it, the coast to the Northeast was just visible, and a weak and fluttery direct signal was heard. However, as the dish was swung round in preparation for the next contact, the GM8FFX beacon signal went up enormously as two large rigs anchored in the Forth went through the beam – apparently producing an enormous reflection. Of course, it's also possible that the reflection was from some land feature behind the rigs.

Alan GM0USI was next up, also out portable, but at a location obstructed for John by a low local hill. However, a suitable bearing at each end giving a reasonably strong reflected signal for a contact was easily found.

The last contact was with Nick G4KUX. Dish alignment was set up using CW (dashes from GM8OTI!), but once achieved an SSB contact was fairly easy - Nick was running 8 W to an 80 cm dish. This was a very pleasing contact, at 196 km not John's best DX ever at 10GHz, but certainly the longest obstructed path worked by him. The path went over the Lammermuir hills, the Cheviots, and the North Pennines.

John's setup (photograph) is a home brew system with an old 1 W PA, using a 40 cm dish. All contacts were SSB - GM8OTI only reads slow CW from beacons and uses a microswitch as a CW key. Contacts were co-ordinated mostly using SMS text messages; the ON4KST system is sometimes a bit difficult to use on a small phone screen at a portable location.



**From Ian G8KQW/P IO90**

### **5.7 & 10GHz Contest July 15<sup>th</sup>**

Operating from St. Catherine's Point on the Isle of Wight, the weather was forecast to be fine until 8am worsening thereafter to heavy rain, thunderstorms and gale force winds. I made a decision to start early as St Catherine's is totally exposed and extremely dangerous in a storm, I was only QRV for 2 hours, until the wind was so strong it blew the 2m antenna down and it was impossible to hold the dish on heading. Dish was relatively safe due to being pegged to the ground using 2 foot long stakes.

I wanted to take a photo of the 5.7GHz dish feed full of water but the rain was really too heavy to get the camera out! Nevertheless contacts made were:

5.7GHz F1HNF/P (best DX @ 389 km), F6APE, F5IGK and G4CBW.

10 GHz as above plus F6DKW, F1RJ, F1NPX/P, F5NXU and F9OE, so only one G station in each log before going QRT. I was able to format, check and submit my logs on the Portsmouth ferry!

Impressive activity level from our French friends and well done to our contest manager for aligning the dates otherwise I would only have made one QSO per band.

#### **From Eddie G0EHV/P IO84**

After a tortuous journey through the centre of Newcastle eventually got set up (late) in Northumberland, IO85 for the UK Microwaves contest.

Plenty of activity this month and happy to make 10 QSO's. Three greater than 400Km, best being G8KQW/P in IO90 at 499Km. Average distance was 272 Km which is greater than most of my VHF/UHF attempts.

Nice to work a couple of GM stations (John GM8OTI/P and Alan GM0USI/P) and have a bit of a chat rather than just doing the numbers.

Condition fair with some rainscatter noticed from locals beaming South. Biggest issue was getting the 'KST going. Eventually we managed a Vodafone connection thanks to G8KPD using and lending us his mobile phone for the duration. An enjoyable day out in quite nice weather.

## **24/47/76GHz Contest**

#### **From Ian G8KQW/P IO90**

*I've finally found time to pen you a brief activity report!*

#### **24 & 47 & 76GHz Contest July 19<sup>th</sup>**

Operating from Luccombe Down, Ventnor on the Isle of Wight – IO90JO

For once fine weather and average summer conditions for mm-band operating, contacts made on:

76GHz & 47GHz G8ACE/P (53 km), G8CUB/P (51 km) & G8BKE/P (46 km)

24GHz 9 contacts with best DX to G0OLX/P (146 km to Detling)

#### **24 & 47GHz Contest August 16<sup>th</sup>**

I've never roamed in a contest before so I decided to leave the electric kettle and all the gizmo's at home and plan a route comprising 4 different sites which I could possibly complete in the given time.

The route I planned started at Hackpen Hill near Swindon, Morgan's Hill (never used by anyone before to my knowledge, Westbury White Horse and finally Chute Causeway near Andover. Not only did I manage to complete the route I also called in to see Neil G4LDR at Stoke Hill.

Despite using  $\frac{3}{4}$  of a tank of diesel and ending up struggling to stay awake I thoroughly enjoyed the day with 15 QSOs on 24GHz (best DX GW4HQX/P & GW3TKH/P at 97 km from Hackpen) and 9 QSOs on 47GHz (best DX as above). I will certainly be roving again, next time I will probably get the maid to do the driving so that I can concentrate on the radio!

## **Other Activity**

#### **From Mans 9H1GB JM75**

Yesterday 16th August 2015 myself 9H1GB and Joe 9H1CG, had a sked with Johnny IW9ARO and Francesco IT9HZM from Mt. Entna 2500M (JM77LR) and Mario IT9/I3EME from a Mt. Bonifato (JM67LX). We were in JM75EX a new location we tried for the first time.

Weather here in 9H was terrible Windy and raining but we managed to make the QSO with Mario via rainscatter. This was my first experience with rainscatter.

Signal were sent 57 received 51, but considering I was only running 118mW for a 255 km distance with such low power is in my opinion fantastic.

A few minutes later we tried with Johnny and Francesco exchanging 58 53 reports via TR.

We all had brought with us our 24GHz equipment, but were unable to make a contact. I think due to the bad weather.

Better luck next time.

Although soaking wet we still had fun and looking forward to our next test.

Pictures follow.



Mans 9H1GB



Joe 9H1CG



Johnny IW9ARO



Mario I3EME

**From John G3XDY JO02**

Some goings on this month – a little tropo, but some good RS to close the month, with good activity levels in the UKuG contest on 30th August.

**16th August - French F8TD microwave contest**

Not much activity accessible from the UK on this occasion but a few stations worked:

1.3GHz	F5KMB/P	JN19
	TM4A	IN96
	F6APE	IN97

2.3, 5.7 & 10GHz F5KMB/P JN19 on all three bands with good signals.

**22nd/23rd August - Tropo**

Late on 22nd August the lower microwave bands were open with many beacons audible out as far as JO59 (LA1UHG on 23 cm). However, it was too late in the day for any QSOs. The following morning I looked before breakfast and found several SM beacons up to 6 cm and SM6HYG (JO58) calling CQ on 23 cm, so we had a chat and then worked up the bands to 5.7GHz. A test on 10GHz was negative. Conditions then dropped away as the temperature rose.

## 30th August - Rainscatter and Contest

I had seen forecasts for storms over the weekend so looked at the rain and lightning maps early on Sunday morning and saw there was a strong storm front just East of the German border with the Netherlands. DL7QY requested a sked, but I couldn't find any sign of him, however whilst tuning and turning the dish I found OK1JKT calling CQ from JO60RN (866 km) This was my first QSO with him for several years. After our QSO he came up further and was a steady 54S for about 30 minutes. Other contacts during this spell included DL3IAS (JN49), DL6NAA (JO50), DL7QY (JN59). The rain cell had then moved too far east to be useful. During the rest of the contest period there was some minor RS enhancement on some signals, but nothing notable.

Other QSOs in the contest were:

5.7GHz: G8KQW/P, G4LDR, G3ZME/P, G4CBW and 2E0NEY

10GHz: G8KQW/P, G4KUX, G0PEB/P, G4LDR, M0DTS/P, G0EHV/P, GW4DGU/P, F6DKW, G4CBW, G0LGS/P, 2E0NEY

Then later in the evening another good RS session at about 2000z, with a storm in the Netherlands providing very strong scatter signals. Stations worked (all 10GHz): F1RJ (JN18), PA0TGA (JO21) (on SSB), DK7QX (JO42), ON5TA (JO20) and DL5EBS (JO31)

Most stations were a real S9, with ON5TA at 10 dB over. F6DKW was heard on side scatter with a very wide signal at 57S with my beam virtually due East. Maurice was audible as he was trying to work PA0TGA on SSB, but the spreading was so great he was totally unreadable. Several beacons were heard, including DB0GHZ (JO34) and LX1DB (JN39).

### From Pete GM4BYF IO76/86/85

A brief report on my first days activity on 24 GHz on Sunday 16th August.

Finally got my 24GHz system together by Wednesday 12th August. (endwave module with usual DFS1201 frequency synthesiser). So 1 W to a 70 cm dish, but it would not transmit or receive.

First problem: an interconnector which didn't.

Second problem: an Arduino which lost its marbles so finally got receive side going – then a quick QSY on Friday to GM8BJF's QTH to test for transmission. Nil. So went back and at 2.30am on Sunday morning traced the problem to a changeover relay which had had a slightly crossed thread in the past (not by me) and some gentle persuasion got the connector on correctly.

There are 4 GMs active on the band and we had arranged to all come on with me acting as rover. Sunday morning at 8.30am I made a list of bearings to each of the locations from the 3 chosen sites that I was going to visit and sent these out with an itinerary. Since I do not currently have access to the internet when out portable, this proved a very valuable sheet. I set out with great trepidation, not knowing how the system would stand up to being bounced around in the car. Results were encouraging, but my signal on both transmit and receive was fairly dire with a huge amount of drift – I am looking into reasons for that now. Nevertheless 6 contacts were made. The most interesting was made by between myself and GM0USI/P by bouncing off the Black hill TV mast at a distance of 18 km from me and 34 km from Alan. Signals were 59 both ways. So for myself a great day out with success but a list of improvements to be made.

Summary of contacts:

GMT	Callsign	Sent	Rcvd	km	Loc	My Loc
1050	GM4ISM	57	54	33	IO85AR	IO76XA
1103	GM8BJF	58	56	54	IO85JV	IO76XA
1229	GM8BJF	58	57	48	IO85JV	IO86AA
1305	GM4ISM	519	519	32	IO85AR	IO86AA
1323	GM0USI/P	59	59	23	IO75TW	IO86AA reflection off Black Hill TV mast
1459	GM0USI/P	59	59	46	IO75TW	IO85EW

### From Neil G4LDR IO91

During the UK Microwave Monday evening activity period at the beginning of August tests were carried out on 10GHz with Peter G1DFL who had travelled to Walbury PMR mast. Signal reports were 59+ confirming Peter's system was working well following the attempts during the July 10GHz contest where we failed to hear each other over an obstructed path. Peter also tried tests with Brian G4NNS but Brian subsequently discovered he had an intermittent fault with his 10GHz system.

At the RAL roundtable, measurements on my 24GHz system showed poor noise figure (12db) and low gain (9 dB). I replaced both the pin diode switch in the transverter and the front end device in the preamplifier. During the successful contact with Keith GJ3TKH/P on Jersey in July I was still concerned that my RX performance was not as good as it should be. Following one of the regular Friday lunch time meetings of local microwave and EME operators at the Cricketers pub near Andover, Brian G4NNS, John G8ACE, Martyn G8OFA and I set up Brian's and my 24GHz systems on the Chute Causeway north of Andover. We compared the received signal strength of GB3SCK, both systems seemed comparable.

On the 16<sup>th</sup> July I operated /P from Stoke Hill (IO81XG) which is on the northern edge of Salisbury Plain for the 24GHz contest. I managed to have 9 contacts, 3 of them with G8KQW/P who was roving around the Salisbury Plain area and 2 contacts with G3ZME/P as they roved near Brown Clee. The contact with ZME was at 141 km. I also had two attempts with G4CBW/P in IO93AD at over 200 km. Tony could just hear my signal, but I could not hear him. We tried a one way contact with me keying my system with the microphone ppt. Not being a CW operator I had forgotten to bring a key. Unfortunately it was not successful partly due to the change over time of the waveguide switch preventing proper sending of dots. We plan to try again in September when I will fit a 65 cm dish to my system instead of the 30 cm dish I have been using. Should provide an extra 6 dB of gain. I'll also have to remember to take the Morse key!

On Friday 28<sup>th</sup> August I carried out some further tests with the UK Microwave 76GHz loan system. I set up the separate beacon source (with open waveguide) on a tripod in my garden (near Salisbury) and then travelled to Farley Mount (near Winchester) equipped with the 76GHz transverter, a laptop and a FunCube dongle as the receiver for the 147 MHz IF. I immediately found the signal using HDSDR as the software to listen to the output of the FunCube dongle. Signals were 25 dB over noise as indicated by HDSDR (not sure if that's real dBs as I had no way of calibrating the receiver set up). The line of sight path length was 16.5km. Spurred on by this I am planning to extend the range. According to the G0MJW path profile programme there is a 48 km line of sight path from my home to Portsdown Hill near Portsmouth. I will probably need an antenna of 10 to 20 dB gain on the beacon transmitter (can't be too directional as I need to roughly aim it at the remote site before travelling there) and G8CUB has offered to lend me one.

During the UK Microwave 5.7GHz and 10GHz contest on the 30<sup>th</sup> August I was pleased to have worked 24 Stations on 10GHz and 11 on 5.7GHz, almost like the old days 10 to 15 years ago when I would regularly work 30 or more stations on a Sunday afternoon. Best DX on 10GHz was G4EVH/P in IO85 at 460 km and on 5.7GHz was F6APE in IN97 at 424 km. I was also active for the 1.3GHz and the 2.3 to 10 GHz UKAC contests.

### ...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](mailto:Scatterpoint@microwavers.org), remember the deadline is the 1st of the month.

**73 Bob Price G8DTF**

# Contest Results

John G3XDY, UKuG Contest Manager

## July 5.7GHz Contest 2015

Despite finishing early due to the wind and rain, Ian G8KQW/P ran out the winner of this event thanks to QSOs with several French stations. Neil G4LDR took the runner up spot, again taking advantage of activity and conditions towards France.

5.7GHz Contest July 2015						
Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX km
1	G8KQW/P	IO90IO	4	1230	F1HNF/P	389
2	G4LDR	IO91EC	2	647	F6APE	424
3	GJ4HQX/P	IN89WG	1	207	G4LDR	207
4	G3VKV	IO81XV	1	131	G4CBW	131

## July 10GHz Contest 2015

Uncooperative weather limited activity but did provide some rain scatter for many entrants. Despite only being active for a short period, Ian G8KQW/P was able to find several French stations in the coincident activity day, which was enough for him to come out top of the list. Runner up slot goes to Neil G4LDR.

10GHz Contest July 2015						
Open Section						
Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX km
1	G8KQW/P	IO90JO	9	2912	F1HNF/P	387
2	G4LDR	IO91EC	7	2074	F6APE	424
3	G4KUX	IO94BP	7	1545	G4LDR	395
4	G0EHV/P	IO85XF	3	818	G4LDR	460
5	G3UKV	IO82RR	5	727	G4KUX	218
6	G3VKV	IO81XV	3	323	G4CBW	131
Restricted Section						
Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX km
1	G1DFL/P	IO91OM	0	0		0

## August 24GHz Contest 2015

Fine weather and good levels of activity plus lots of stations using the rover rule made this an enjoyable contest for participants. Congratulations go to Ian G8KQW/P who used no less than four locations to amass a substantial lead over runner up G3ZME/P who used two locations in IO82 square.

24GHz August 2015						
Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX km
1	G8KQW/P	IO91CL	15	756	GW3TKH/P	97
2	G3ZME/P	IO82RJ	4	457	G4LDR/P	130
3	G4LDR/P	IO81XG	8	437	G3ZME/P	130
4	GW3TKH/P	IO81KR	4	363	G8KQW/P	97
5	G8ACE/P	IO91JB	7	346	G8KQW/P	68
6	GM4BYF/P	IO76XA	6	239	GM8BJF	54
7	G8CUB/P	IO92LJ	2	206	G4CBW/P	104
8	GM0USI/P	IO75TW	2	108	GM8BJF	73
9	GM8BJF	IO85JV	2	103	GM4BYF/P	54

## August 47GHz Contest 2015

Good weather and reasonable activity levels plus lots of roving gave Ian G8KQW/P the leading position by some margin, with GW3TKH/P and GW4HQX/P as joint runners-up. Congratulations to all three.

47GHz August 2015						
Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX km
1	G8KQW/P	IO91CL	9	700	GW3TKH/P	97
2	GW3TKH/P	IO81KR	3	272	G8KQW/P	97
3	GW4HQX/P	IO81KR	3	272	G8KQW/P	97
4	G8ACE/P	IO91JB	3	158	G8KQW/P	65

## 5.7/10GHz Championship Tables

5.7/10GHz Championship Tables					
Positions after three events, the best three count to the overall total					
5.7GHz					
Pos	Callsign	5/31/15	6/28/15	7/26/15	TOTAL
1	G4LDR	784	773	526	2083
2	G8KQW/P		1000	1000	2000
3	M0HNA/P	736	350		1086
4	G3ZME/P	1000			1000
5	G3VKV		241	107	348
6	GW3TKH/P		223		223
7	GJ4HQX/P			168	168
10GHz Open					
Pos	Callsign	5/31/15	6/28/15	7/26/15	TOTAL
1	G4LDR	1000	603	711	2314
2	G8KQW/P		1000	1000	2000
3	G4KUX	382	0	531	913
4	G4BAO		546		546
5	G8CUB/P		487		487
6	GW3TKH/P	117	361		478
7	G3UKV	225	0	250	475
8	G3ZME/P	355	0		355
9	G3VKV	130	102	111	343
10	G0EHV/P			281	281
10GHz Restricted					
Pos	Callsign	5/31/15	6/28/15	7/26/15	TOTAL
1=	G0LGS/P		1000		1000
1=	M0HNA/P	1000			1000
3	G0PEB/P		751		751
4	G1DFL/P			0	0

# The 2015 Crawley Roundtable, Sunday 20 September



We will be holding a heat for the UK Microwave Group annual project contest for the [G3VVB trophy](#). Please do bring along your constructed equipment or project and enter. Entries do not necessarily need to have been finished during the last year. This year the contest will also accept software entries as well as hardware. The winner of this round will go on to be considered together with entries from all the other roundtables over the past year after this event.

The morning will feature the usual 'bring and buy' sale, so if you have something to sell then please bring it along.

The program this year offers the microwaver something different – come along and support the construction contest and hear the talk(s).

Thanks and regards  
Chris G0FDZ

## Location: Crawley Amateur Radio Club

<http://www.carc.org.uk/>

- 10:00 Venue opens
- 12:00 UKuG Project contest round judging starts
- 13:00 Lunch (rolls, sandwiches, tea/coffee available)
- 14:00 Opening address by Derek G3GRO and the results of the Project contest heat
- 14:15 Talk-1 - Easy ways to getting onto 24GHz, by Roger Ray G8CUB
- 15:00 Talk-2 - A Stable Masthead 9 cm Receiver, by Mike Scott G3LYP
- 15:45 Break (tea & coffee available)
- 16:00 Talk-3 - Threats and Opportunities at mmWaves, by Murray Niman G6JYB
- 16:30 End of meeting

If you need further information, contact Chris Whitmarsh G0FDZ or Derek Atter G3GRO

## Access to Site:

The access road into Tilgate Recreational Centre and the CARC Clubhouse (Hut18) is via the sliproad at the new traffic lights on the southbound carriageway of the A23 (Brighton Road), just south of Crawley heading towards Brighton, and about 200 m from the Broadfield Football Stadium roundabout which is well signposted.

The Clubhouse is accessed via a fairly narrow track for about 200 m. Watch out for anti-traveller caravan chicanes then turn right at the 3rd sleeping policeman!

More Directions: [CARC Directions](#)



# Scottish Microwave Round Table

Saturday 7 November



**GMRT 2015 - registration now open**

<http://www.gmroundtable.org.uk/>

We now have both the event venue (Museum of Communication, Burntisland) and the venue for the evening dinner (the Kingswood Hotel) finalised, so can confirm the date of the GM Round Table is Saturday 7 November.

Details of the programme will follow in due course. As before it will include the GM round of the UK Microwave Group Projects Trophy, so get that project completed before November - built, modified, hardware or software.

Places will be limited to about 50 as usual, and booking will be available through this website later in the year.

Announcements will also appear on the ukmicrowaves Yahoo reflector.

The registration forms for GMRT 2015 on Saturday 7 November are now open. Follow the links in the right hand menu on the website.

We are sorry that the process is complicated as last year; hopefully next time we will have found a better registration add-on to handle the bookings.

Key points:

- please give your forename, surname **and callsign** in the "name" box
- if you want to register for dinner, you need to register on both forms
- if you want to register your XYL (or OM) for dinner then you need to do a separate registration (use their name, but you can use the same email as for your own registration)

The system should send you an email confirming your registration.

The dinner menu and meal price are now confirmed (see the website).

Please remember that you need to do bookings for both the event and the dinner if you intend to be at both.

# UKuG Microwave Contest Calendar 2015

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

[www.microwavers.org/?contesting.htm](http://www.microwavers.org/?contesting.htm)

## Events calendar

### 2015

Sept 20	Crawley Round Table	<a href="http://www.microwavers.org/cra-prog.htm">www.microwavers.org/cra-prog.htm</a>
Sept 25 – 26	National Hamfest	<a href="http://www.nationalhamfest.org.uk/">www.nationalhamfest.org.uk/</a>
Oct 9–11	RSGB Convention	<a href="http://rsgb.org/convention/">rsgb.org/convention/</a>
Oct 15–18	Microwave Update, San Diego	<a href="http://www.microwaveupdate.org/">www.microwaveupdate.org/</a>
Nov 7	Scottish Round Table	<a href="http://www.gmroundtable.org.uk/">www.gmroundtable.org.uk/</a>

### 2016

Jan 23	Heelweg	<a href="http://www.pamicrowaves.nl/">www.pamicrowaves.nl/</a>
Apr 9	CJ-2016, Seigy	<a href="http://cj.ref-union.org/">http://cj.ref-union.org/</a>
Apr 16–17	Martlesham Microwave Round Table & UK $\mu$ G AGM	
Apr 23	RSGB AGM, Scotland	
May 20 – 22	Hamvention, Dayton	<a href="http://www.hamvention.org/">www.hamvention.org/</a>
Jun 24 – 26	Ham Radio, Friedrichshafen	<a href="http://www.hamradio-friedrichshafen.de/">www.hamradio-friedrichshafen.de/</a>
Aug 19–21	EME2016, Venice	<a href="http://www.eme2016.org/">www.eme2016.org/</a>
Oct 3 – 7	European Microwave Week, London	<a href="http://www.eumweek.com/">www.eumweek.com/</a>
Oct 7 – 9	RSGB Convention	<a href="http://rsgb.org/convention/">rsgb.org/convention/</a>

### 2017

Jun 23 – 25	Ham Radio, Friedrichshafen	<a href="http://www.hamradio-friedrichshafen.de/">www.hamradio-friedrichshafen.de/</a>
Oct 8 – 13	European Microwave Week, Nurembourg	<a href="http://www.eumweek.com/">www.eumweek.com/</a>

## Loan Equipment

Don't forget, UK $\mu$ G 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.