An Amateur Radio publication for the Microwave Enthusiast

scatterpoint

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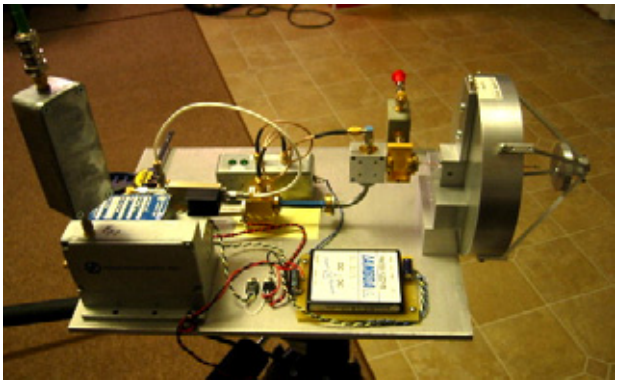
2009 SEPTEMBER

The World above 600GHz

This month's cover photo shows the remarkable transceiver built by Brian Justin WA1ZMS/4 for the 633GHz band.... Yes 633GHz!

It uses direct multiplication from a 5MHz OCXO to 633GHz and outputs at 432MHz IF. The beautifully machined dish is just 6 inches (15cm) diameter and the power output is just -45dBm.



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Latest News ...

- **UKuG seeks new chairman**
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- **First OH to SM 24GHz QSO**

MANY THANKS TO ALL OUR CONTRIBUTORS THIS SEPTEMBER ... WITHOUT YOU THERE WOULD BE NO SCATTERPOINT!

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From the Editor's Desk

Hello again after the summer break.

What a summer! Where did it go? As I put this issue together, a long awaited High Pressure system is spreading over the UK so there could soon be some good tropo to report in the next edition. I've spent much of my "spare" time over the past couple of months operating HF and VHF contests with my local club so microwaves have taken a back seat. I don't think I've missed much! In any case, I'm finding that the regular microwave cumulatives are not pushing the limits these days. Too many people are content to go to the same old sites and work the same old stations every time. It doesn't turn me on. Where's that sense of adventure that we had in the 80s gone to? One excuse is that we are all getting older and less inclined to travel far afield to try new paths. Don't believe it.... you are as old you let yourself be. If we are to extend distances on bands like 24 and 47GHz it's essential that we get out of our shacks, spend some cash on petrol and head for those distant hills! So go to it folks!

Finally, I'd like to thank all our contributors this month. Just when I think I've nothing to put in a new Scatterpoint, along come a couple of articles. In fact I've had to hold two items back for next time ... that's the way I like it!

Enjoy the Autumn tropo and maybe we'll meet up at the RSGB Convention in early October... we have a UKuG Stand there.

73 from Peter, G3PHO

News, views and articles for this newsletter are always welcome. Please send them to G3PHO (preferably by email) to the address shown above. **The closing date is the Friday at the end of the first full week of the month** if you want your material to be published in the next issue.

A NOTE FROM THE OUTGOING UKuG CHAIRMAN G4NNS

It has been an honour and a privilege to serve as chairman of the UK Microwave Group for the last three years. We have an excellent team covering the various functions of the group most notably the excellent editorial team, beacon and spectrum planning, membership, secretary and contest functions. All this means that the chairman's role is not too taxing. Most of the committee business is transacted by email, phone/Skype or by conference call. So a central location and frequent travel are unnecessary.

I am particularly proud of the additions we have made to the beacon network and the development, by Robin G8APZ, of the beaconspot.eu web site which will be a very valuable tool for beacon users and keepers and for the study of microwave propagation.

I feel that three years is long enough for a chairman to remain in office and that in order to continue the development of the group new blood is required.

So if you, or anyone you know would like to stand for the post of UKuG chairman (at this year's Martlesham AGM) and take this opportunity of putting something back into this interesting and challenging aspect of our hobby, please come forward now.

Candidates need to be members of the UK Microwave Group, and if you are proposing someone else you should check with them that they are indeed a member and that they are prepared to stand.

The incoming chairman can expect considerable support from the team and from the outgoing chairman so there is nothing to be afraid of.

73 Brian, G4NNS

Chairman UKuG

UK MICROWAVE GROUP SUBSCRIPTION INFORMATION

The following subscription rates now apply. **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!

Your personal renewal date is shown at the foot of your address label if you receive Scatterpoint in paper format. If you are an email subscriber then you will have to make a quick check with the membership secretary if you have forgotten the renewal date. From now 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 (the editor suggests having it tattooed on your forearm!).
Please also note the payment methods and be meticulous with Paypal and cheque details.

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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!)

The standard membership rate for 2009 is:

UK	**£6.00**
US	**$12.00**
Europe	**€10.00**

This basic sum is for **UKuG membership.** For this you receive Scatterpoint for FREE by email. If you want a paper copy **then the higher rates apply.**

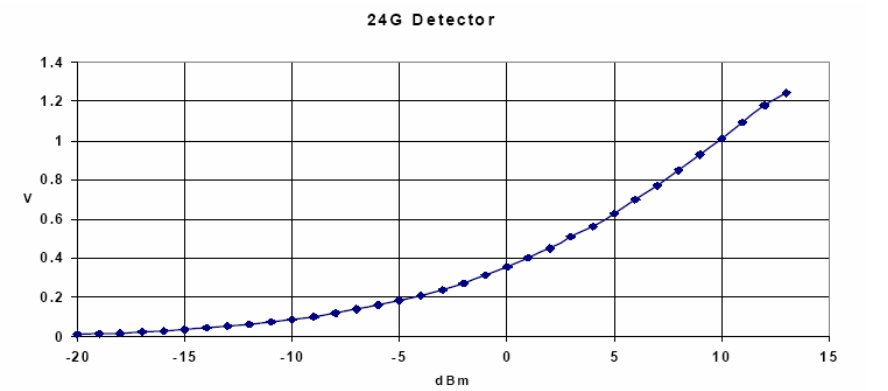
Alcatel 'Test Module'

by Roger Ray G8CUB

It wasn't until I was looking for something to help me tune up the Pasolink 50 transceiver on 47GHz, did I discover this little module. It had been sitting discarded, in my junk box, since building a 24GHz Alcatel based transverter. It is originally situated on the coupler in the Alcatel ODU. It is used as both a detector, and a method of providing 'loop round' normally being fed from a dedicated synthesiser at 1008MHz (difference frequency between Tx and Rx).

In one go, it answered my requirements for an RF detector, harmonic multiplier and, most surprisingly, a harmonic mixer. Its use at 24GHz, I later found, had been given in an article by G4JNT *. Operation as a detector / multiplier at 47GHz and 76GHz was less obvious and performance as a harmonic mixer a revelation.

Use as a Detector

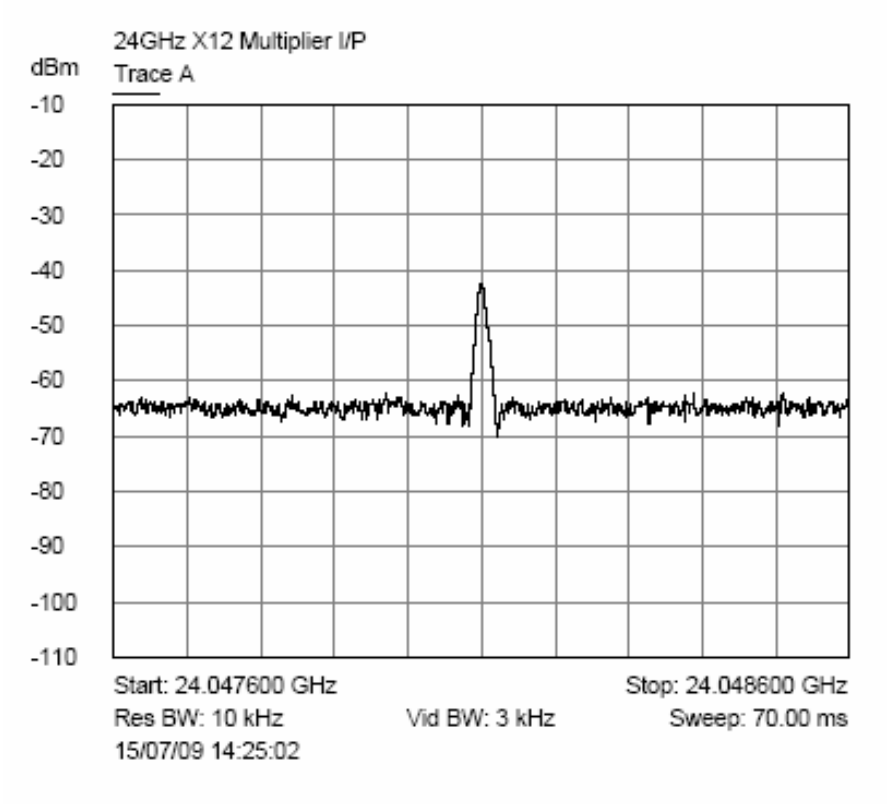


Dynamic range -20 to +13dBm. Measurement was simply made by connecting a DVM onto the detector SMA output. Input via an SMA wg-42 transition. On 47GHz, output was 0.15V for around -10dBm in.

Use as a Multiplier

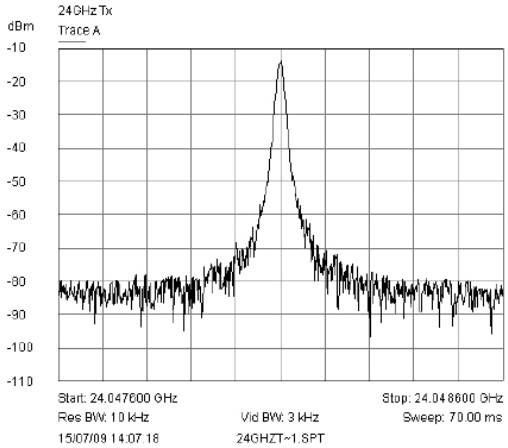
The multiplier input can be driven up to about 2.1GHz, drive +10 to +17dBm. A multiplication of X12 worked well for 24GHz. The drive level required for optimum output changes with frequency / multiplication. It is not linear with power; expect peaks around +10, +14, +17dBm input.

The detector input can be driven as a multiplier up to at least 5GHz level +8 to +17dBm. Output is good at 24GHz and detectable up to 5 metres away on 47GHz (I used a multiplication of X23), and should be detectable at 76GHz. In practice, it is easy to try each of the 2 inputs, and see which is better for the output required. Although at 47GHz the 'det' input definitely gave the best results.

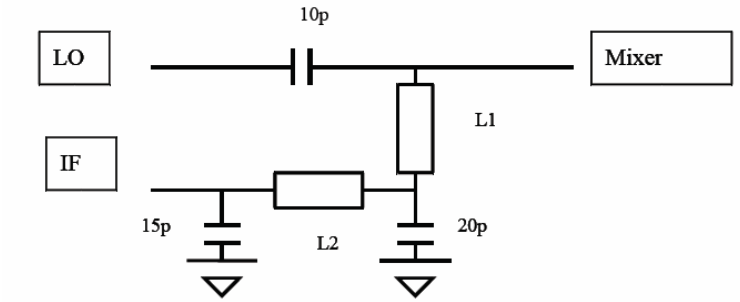


Use as a Harmonic Mixer

The plot, right, shows the module being used as a harmonic mixer on an Advantest R3271 spectrum analyser. Although the analyser will work at 24GHz, in this case it is in external mixer mode. A single connection is used between the analyser and 'Det' SMA on the module. LO drive and IF input are on one coax, as the analyser contains an internal duplexor. Trying to use LO on the 'mlt' input, and using 'det' as an IF output did not work.
For use with an HP8566A or later analyser, a duplexor will be required. A simple duplexor is shown below. I made the IF filtering to cut off around 450MHz. The construction is more important than the actual component values. The inductors were about 8 turns 3mm dia. of fine wire, pulled around to get the best performance at 432MHz. I added a miniature ferrite on L1 to damp a resonance.

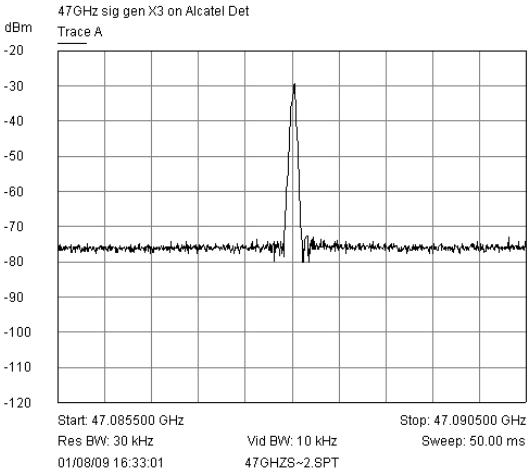


Block diagram



LO / IF Duplexor for HP Analysers

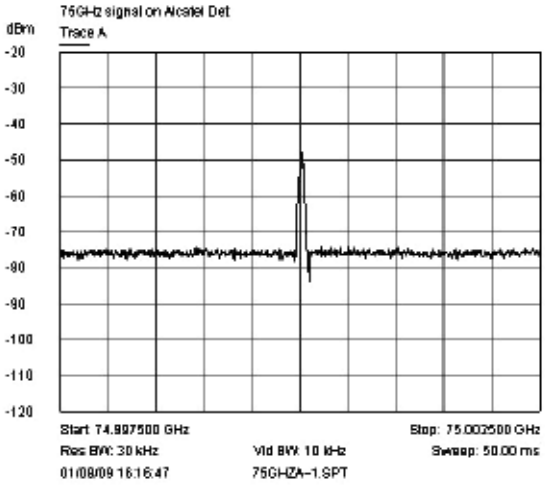
Harmonic Mixer with 0dBm 47GHz input:



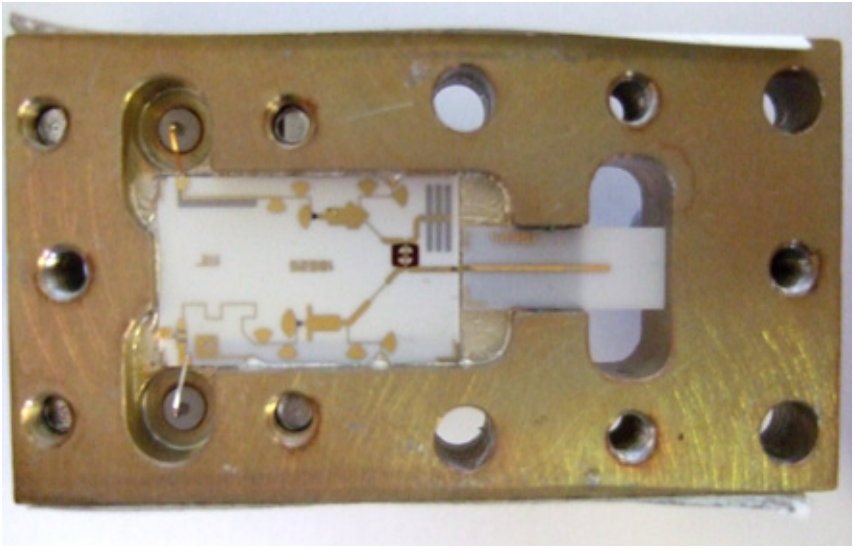
Harmonic Mixer with 75GHz input:

I was surprised how well it worked at 75GHz (it works at 76GHz but my X5 source drops off 10dB unfortunately). Input was via 4 inches of wr-10 waveguide, just to make sure it really was 75GHz.

It would be fairly easy to add a tuning screw in the back panel to see if better performance at specific frequencies could be obtained. Using it as a mixer and external duplexer I could listen to my 47GHz transmission using 432MHz as an IF.



Internal construction:
The small black blobs in the photo below are the diodes, the bit looking like 2 back to back Ds in a dark background is the coupler. The printed inductor – bottom left, forms a LPF limiting the input frequency of the 'MLT' input.



*** www.g4jnt.com/whiteboxmods.pdf**

BELGIAN MICROWAVE BEACONS

September 3rd 2009 saw the beacon ON0RUG on 2320.895 MHz become operational.

It outputs 1W into a 10 dBi antenna (slot ON6UG) with A1 modulation.

Any reports are very welcome.
Send your report to **<beaconcall>@gmail.com** where 'beacon call' must be replaced with the proper callsign of the beacon.

Any reports of reception are confirmed with a short description of the antenna used for this beacon (it has not been published elsewhere).

The beacon on **24048.008MHz** is also active with 1W into 10 dBi slotted antenna.

With the 28 year operational 10GHz beacon on **10368.890MHz**, all those beacons are located at the "boekentoren" in Gent JO11UB at 93m asl.

73 Freddy ON6UG

Editor's note: In addition to reporting to Freddy, you might also care to "spot" these beacons on the UKuG beaconspot website: **www.beaconspot.eu**

GREMLINS

Last month's report on the South Yorkshire Microwave Roundtable mention that the Finningley Amateur Radio Society's president open the Sunday session. His callsign was erroneously given as G3KNU when it should have said **G3KPU**. Our apologies go to Eric, G3KPU, the FARS President and Peter G3KNU, who actually don't live that far apart!

Wimo SHF-2344 Antenna Assembly

by Dave, G0DJA

This article is intended to help newcomers to the UHF bands who might be considering various options for buying and building antennas for the 23cm band.

The Wimo SHF-2344 is a Yagi/Uda antenna array optimised using design parameters set out by DL6WU. It consists of a director array of several horizontally mounted rods through a piece of square aluminium stock mounted behind a folded dipole driven element, fed through an N-Type socket with a U shaped hard-line coaxial matching section and reflectors in front of the driven element. Although it is advertised as a 44 element antenna, as far as I can see it is, in fact, a 37 element antenna. This is because Wimo have chosen to count the 8 rods that make up the director array as separate elements. However, to my way of looking at any Yagi/Uda array, the reflector is one item, or element, whether it is a solid sheet of metal, one rod, several rods or even a mesh. The gain of any Yagi/Uda array is, of course, more related to boom length, so the number of elements should be discounted when considering a high gain Yagi/Uda array but many people do seem to go on the number of elements claimed, so you may want to be aware that the Wimo design adds on the number of rods in the reflector to the number of elements claimed for their antennas.

Opening the box you will see the two sections of the boom with the directors already mounted through them, the director with its elements already mounted through it and the smaller screws and fixing brackets in their own wrapping and the driven element, already made up and sealed in its own packing. See **photo 1** below:

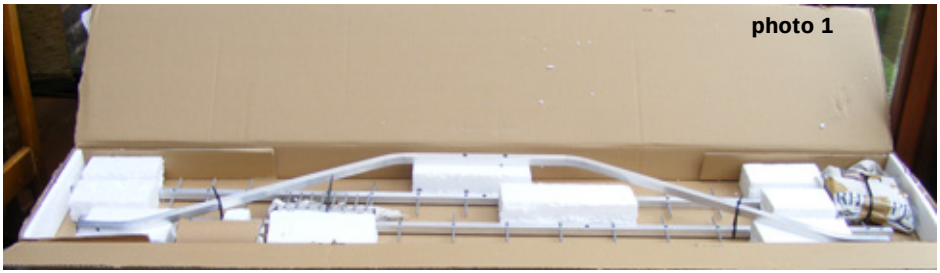


photo 1

photo 2

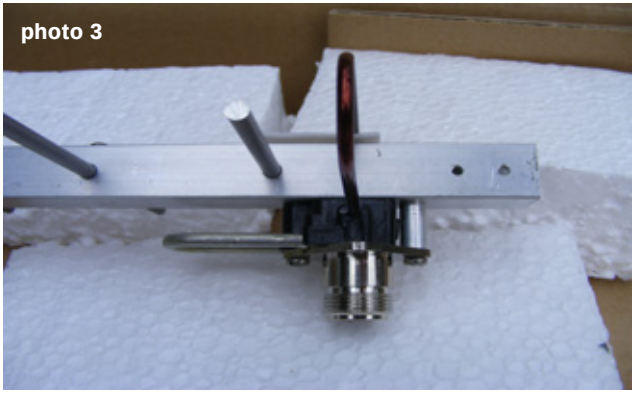
Care needs to be taken when unpacking these items as they are secured with locking plastic straps and some of the elements are pushed into foam. There are also nails pushed through the holes in the bracing bracket into the foam, to hold them in place during delivery.

Once everything is unpacked, you can start to assemble the antenna. However, at this point, I started to notice some manufacturing issues with the parts supplied.

The first concerned the screws fixing the reflector elements to the vertical stock that was to be attached to the back of the boom. These appeared to be slightly offset and, on checking with an Engineers Rule, they were offset on their fixings but the elements appeared to be correctly aligned. See **photo 2,** left.

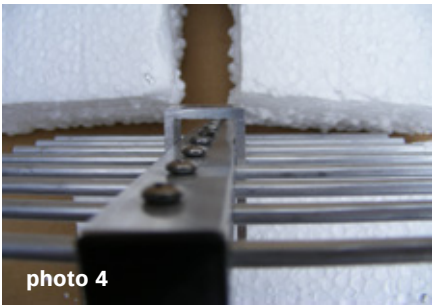
The next job was to mount the driven element onto the boom of the main antenna. The matching 'U' section of semi-rigid coaxial cable needs to point forward and, as long as you remember to mount the aluminium spacer behind one of the mountings and the plain washers under the heads of the screws and not to over tighten the screws into the aluminium stock and hence strip the threads made in the boom, then everything should be OK.

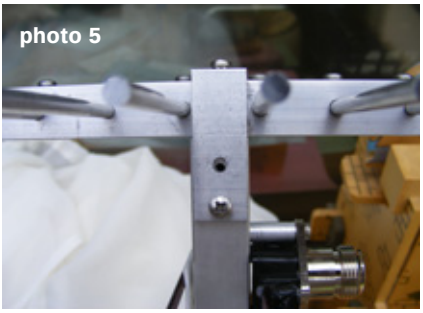
Details of the driven element can be seen in **photo 3** below. (This shows the assembly minus the plain washers. Hence the warning...) Also note the insulating piece of plastic material, which keeps the driven element from making electrical contact with the boom. Although, since the driven element is made from enamelled copper wire, I think that this is provided to guard against vibration and/or environmental conditions breaking down the enamelling and the dipole shorting out to the boom.



When mounting the reflector array, I came across some more problems. The U bracket was too small to fit over the reflector assembly and the boom and I had to file out the bracket so that it would fit. If I were to make another of these antennas up, I would also file out the back of the U Bracket, as the side holes to fix the bracket did not line up properly either.

Photos 4 and 5 illustrate the problems faced before modifying the bracket and then the mis-alignment of the holes on the side of the boom and bracket:





After using a small needle file to open out the holes slightly, I managed to complete the assembly of the reflector unit.

Bolting together the boom and fixing the bracing strut went without a hitch and I also attached the bracket that connects the antenna to the boom.

Conclusions

For the cost of the antenna, I would have expected fewer issues relating to the engineering quality of the parts supplied.

More care needs to be taken over the quality of production. Especially as the Wimo company make advertising claims about their 'robot' assembly techniques.

The number of elements claimed is not actually as many as the antenna really contains, by most accepted systems of calculating the number of elements in a Yagi/Uda array. Although other companies may also use the number of elements in the reflector to boost the element count, this is a poor way of boosting the apparent number of elements in an antenna array just for marketing hype.

New Firsts Claims for 24GHz from Scotland

Three claims that will establish some important firsts on 24GHz from Scotland have been received from **GM3WIL/P**. These are:

First GM - G with G3FNQ/P on 7th August 1988
First GM - GI with GI4SQL/P on 11th March 1989
First GM - GD with GD3ZME/P on 17th August 1991

All contacts were on WBFM using a GDHM33 Gunn transmitter running 5-7mW, and an 18" dish.

The claim for the first GM - GD supercedes that from GM8BJF/P for a contact made in May 2008.

If anyone has any records of previous contacts to those above, please let the UKUG Awards Manager, G3XDY, know within the next month. If no other claims are received, certificates will be issued to GM3WIL for these historic contacts.

73

John G3XDY UKuG Contest and Awards Manager

June 2009 UKuG Lowband Contest Results

Overall

Pos	Callsign	1.3GHz	2.3GHz	3.4GHz	Total
1	G3TCT/P	1000	975	1000	2975
2	G4RFR	832	1000	0	832
3	G8AIM	255	210	764	1229
4	GM4CXM	878	0	0	878
5	G0EHV/P	685	0	0	685
6	G0JMI/P	54	103	484	641
7	G0DJA	530	0	0	530

1.3GHz

Pos	Callsign	Locator	QSOs	Best DX	Points
1	G3TCT/P	IO91GI	19	GM3SBC/P	3509
2	GM4CXM	IO75TW	11	G4DDK	3080
3	G4RFR	IO90AS	14	DR5A	2921
4	G0EHV/P	IO94LI	9	G4RFR	2404
5	G0DJA	IO93IF	7	GM3SBC/P	1861
6	G8AIM	IO92FH	9	G0EHV/P	896
7	G0JMI/P	IO91ME	3	G8AIM	189

2.3GHz

Pos	Callsign	Locator	QSOs	Best DX	Points
1	G4RFR	IO90AS	7	M0DTS/P	1200
2	G3TCT/P	IO91GI	9	M0DTS/P	1170
3	G8AIM	IO92FH	4	G4RFR	252
4	G0JMI/P	IO91ME	2	G4RFR	123

3.4GHz

Pos	Callsign	Locator	QSOs	Best DX	Points
1	G3TCT/P	IO91GI	3	G4DDK	351
2	G8AIM	IO92FH	3	G0JMI/P	268
3	G0JMI/P	IO91ME	2	G8AIM	170

Numbers of entries for this event were on a par with the previous two events this year, although there were several stations active who could have achieved good scores if they had submitted a log.

Although this event is timed to coincide with a European coordinated microwave contest in June, the only QSO recorded in the logs with a station outside the UK was between G4RFR and DR5A at 588km on 1.3GHz. Conditions were reported as poor and activity levels as disappointing.

Congratulations go to the “Combe Gibberlets” operating as G3TCT/P this year, who repeated last year’s overall success in this contest. They were winners on 1.3 and 3.4GHz and runners-up on 2.3GHz.

Second place overall goes to Flight Refuelling ARS G4RFR, who were also winners on 2.3GHz.
Runner up on 1.3GHz was GM4CXM, with G8AIM taking second place on 3.4GHz.
All the above will receive certificates, as will G0EHV/P who was a new entrant to this contest.

73 from John, G3XDY, UKuG Contest & Awards Manager

The BBQ summer 2009 …. by Gordon Fiander, G0EWN

As I sit writing this piece for 'Scatterpoint,' the MET. Office has just revised the forecast for this summer—no BBQ summer, just a procession of lows tracking across the Atlantic. More typical of autumn than summer. This is the third year that the *jet stream* has been too far south bringing yet another disappointing summer—rain, wind and cooler than average temperatures. It also corresponds with poor tropo conditions on the microwave bands. However one mode has been above average — rain scatter.

Here in IO93, all manner of RS signals have been in evidence. Whilst 3cm is the premier band for RS, it does occur on the other microwave bands from 23cm to 24GHz and even higher. During one day last week, I could hear 5 beacons via RS including paths that are normally non-starters. If ever there was a counter argument to those who say ' its not worth me putting up a system from home—I live in a poor location/ black hole' well RS is it. I would say not all RS is equal; my own classification would be as follows:

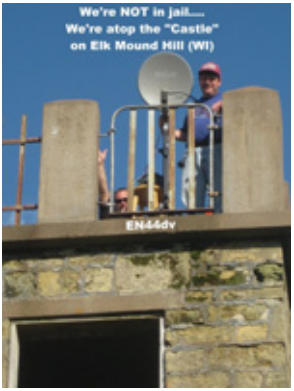
DX RS: This is due to isolated, large, continental thunderstorm activity. Typically storms form over Spain or S. France which then track N and E up over France and Germany. This sort of RS favours those in the S and E of the UK. Often they are just too far to reach from IO93/83 or higher but occasionally they drift up the Channel. This 'summer' I have worked stations in DL, PA, ON and F via such storms. Normally, because of the distance to the SCP (scatterpoint), typically 200- 400kms, no elevation is required—beam at the horizon.

UK Thunderstorm RS: We seldom have thunderstorm activity on the scale of the continent but occasionally we get large, slow moving storms which are great for inter-G working, especially for paths that don't normally work via other modes. Elevation control is a great advantage with this type of RS. There's little attenuation to and from the SCP.

Frontal RS: This is due to the passage of weather fronts --- in particular cold fronts can produce good RS. Fronts often move quickly so it is necessary to check their progress/position to plan which directions will work—usually at right angles to passing front. Elevation control is very useful. The can be little attenuation to and from the SCP.

General widespread rain: This is when the blue colour on the weather map more or less covers the UK. It can be good for local contacts/ beacons but scattered signals can be spread over as much as 1kHz. Distant signals are heavily attenuated. Signals sound more like 'keyed noise'.

MICROWAVING .. HOW IT'S DONE IN THE USA



Here are some pictures of me along with AI9Z (he's the photographer and didn't get in these pics!) and N0AKC of how I spent Sunday making microwave QSOs during the ARRL 10 GHz and Up contest.. I was very fortunate that I never got any rain during operating times ... only overnight and early Sunday morning as I was waiting for AI9Z and N0AKC to get to my place.

My longest contact was 180 miles with K0AWU from Buck Hill EN44dv (see in the right hand photo) to EN37ed.

Even from my back yard, the Buck Hill group was 4 S units above the noise at 88 miles and certainly NOT the best line of sight path!

Scott N0EDV
http://corbenflyer.tripod.com/
Flying Corben Junior Ace - Building RV-4
UKuG Member

Ken Willis, G8VR (SK) 1909 - 2009

Photo: G4IFX/UK Six Metre Group

Ken was licensed in 1937 at the age of 18. Many readers will remember his "4-2-70" column in RadCom (from 1982 until 1989). I had some email correspondence with Ken, in January 2008 when I was looking for material for the Activity column and I asked him about his EME activities. I was pleased to receive a very detailed reply. I held it back waiting for the EME contact that Ken was after. So over to Ken for the final 4-2-70-(23). ***Robin, G8APZ***

I think my earlier activities in M/S and satellites have been well documented but I have always been fascinated by EME. In the 1970s, I lived in Connecticut and operated as G8VR/W1, mainly via satellites but I helped KA1GT (a "limey") assemble a 432MHz EME station with the antennas located on top of the Engineering Department building at Harvard. We had a stack of quad yagis and I used to stand out on the roof pointing the antennas towards the Moon when it was visible! Charlie, G3WDG, was a willing co-operator at the far end.

After retiring in the early 1980s and moving to this QTH, I became hooked on 23cm which has been my main band ever since. I have a wind-up mast attached to the back of the house but am very limited by way of big aerial systems and a dish, other than a small one for AO-40, has been out of the question. However I do have full elevation control as well as azimuth.

I have been a Moon-net watcher for years and, a few years ago, I began to investigate what I could hear off the Moon on 432 and 1296 using really small antennas. I bought LNAs for both bands from WD5AGO, and had a 19 el K2RIW yagi for 432 and a 23 el Tonna on 1296. I found that I could hear quite a few stations on 432 but 23cm, with such a small antenna, was perhaps asking too much. While I heard more stations off the Moon on 432, I was less interested in that band and took down the K2RIW. I mounted the 1296 WD5AGO LNA literally at the feed-point of the 23 el Tonna with no more than an inch of coax between it and the folded dipole ... and no relay. For transmitting, I put up a second 23el Tonna with its own coax. I never intended transmitting to the Moon on this small antenna though I do have a Muller Linear (2 x 2C39A) which with 1 KV on the lid gives me well over 100 watts. With this simple set-up I found I could copy CW from the really big dish stations such as HB9Q, very weak though (rarely) on the speaker when conditions were good. My best signal was on Marconi Day 200? when I had a 449 signal from the big dish at the radio astronomy observatory station at Bologna signing IY4FGM. Meanwhile I carried out all sorts of tests with G4CCH but never managed to achieve results beyond what the laws of physics allowed.

In February 2007, I decided to improve the RX by building a clone of the Tonna 35 element with a rather more rigid boom and mounting. (Tonna plastic element mountings are great for building experimental antennas). I replaced the RX 23 element, the WD5AGO LNA again being right at the feed-point, with no coax or relays. The first station I copied off the Moon using this antenna was the really big dish station 8N1EME (429) from Japan, when elevation was under 20 degrees at both ends of the link. Incidentally I have a very good take-off all around apart from one or two sparse trees and the flat-lands of Thanet are no disadvantage.

In a UKSMG test a few years ago I copied K6QXY on 50MHz off the Moon using my "G8VR Small Yagi", generally assumed by the aficionados to be due to my "flatlands".

More recently I have been playing with WSJT and have made some tests of the Moon (inconclusive) with Howard, G4CCH who has been a real gem. I have at last yielded to the fact that I must increase RX antenna gain, so a second 35 element Tonna clone is under way and a single coax relay in a box with the LNA has been completed and awaits the arrival of my son to climb the ladder and disconnect the feeders so I can lower the mast and erect "the array". I shall continue to use separate feeders for RX and TX since this simplifies the relay system "up top", firstly with a single 35 ele and, when I have built the harness, a pair. I should have mentioned that my transceiver for 1296MHz is a dinosaur ICOM 1271E which, however, is an ideal driver for my Linear, especially now I have modified it for separate RX/TX sockets --- a boon for my twin coax feeder system.

So how to sum up? Well, several hundred hours of white noise has resulted in a very small return coupled with occasional intense pain from my inherited tinnitus. After the recent first leg ARRL EME contest, when I heard only K9SLQ at 339 (who is said to have 'enormous' power), it was galling to see reports that conditions had been excellent and 579 signals on 23cm off the Moon were commonplace. So I must be daft but it's fun and has brought me into contact with a large group of very friendly, helpful and knowledgeable EME-ers from whom I learn something new almost every day.

On more earthy topics, the ON4KST chat site is a great boon for 23cm operators. By arranging spot tests, it has been a great surprise to find what can be worked under "flat" conditions. Over more than 20 years on 23cm, I had never heard the Cornish beacon nor a single station in that county but, since logging on to ON4KST, I have found that I can work G8ARM in Penzance virtually every time we try, sometimes barely readable but always there. Similarly I heard and worked only 2 GMs in about 20 years on the band but, via ON4KST "immediate" tests, I find I can work GM4LBV most times, and GM4XCXM (sometimes aircraft assisted) also. In other words (at a risk of stating the bl**ding obvious") , if someone is listening for you on a given frequency the chance of a QSO is very high despite the conditions ..... up to a certain (but so far undetected) distance of course, though that distance seems to be well in excess of 200 miles if the far-end station has a reasonable take-off.

So please encourage people to use this resource at all times of the day. I still find the hobby exciting after more than 70 years of hamdom. It's easy with an 18 foot dish and 600 watts but seeking to find the lower limits of EME communication can also be rewarding. I gave up collecting QSL cards years ago and have a few thousand which my poor executors will have to dispose of, so making a contact is less important than hearing a signal against all the odds.

Regards, Ken G8VR.

I replied "Ken, Perhaps I should hold off then until you achieve that magic EME QSO!!! I'm out of space this month, so it will be good to have "here's one I prepared earlier" in the cupboard."

I am flattered to think you might want to reproduce anything I sent describing my eccentricities! And how nice to have too much copy---shades of my 4-2-70 days! Actually it might be more interesting later since I am in the middle of a largish project, the aim being to work 2-way off the Moon on 23cm, probably (if at all) with Howard, G4CCH courtesy of WSJT.

To this end, No.1 son is making up a suitable frame to mount both 35 els on my elevation boom, and all co-ax has been overhauled for this mighty and possibly final appearance of G8VR on Moon-net.

Howard has worked an EA who used 60 watts to a pair of 35 els. I have about 40 feet of co-ax but should have about the same or more power at the feed-point from the Muller 2x2C29A linear. I have ordered Wimo phase splitters. Finally Howard is wiring up one of the new G4DDK VLNA kits for me to replace my WD5AGO.

So a long-term plan nears its end and with a bit of luck I shall see some copy on screen from Howard via the Moon, having previously seen only reflections from aircraft from him.

Ken never did achieve his elusive contact.

By Robin Lucas, G8APZ

Another good month of activity reports, and this month I have had to edit some of them in order to fit them all in! There is no lack of activity on the microwave bands, although maybe there is some effort required to find the stations. Some excellent DX has been worked in the past month, so read on!

CONTEST and ACTIVITY REMINDER

SEPTEMBER

15-Sep 1900 - 2130 1.3/2.3GHz Activity Contest
(Arranged by VHFCC - RSGB Contest)
27-Sep 0900 - 2000 5th 5.7GHz Cumulative
27-Sep 0900 - 2000 5th 10GHz Cumulative
27-Sep 0900 - 2000 5th 24GHz Cumulative ******

OCTOBER

3-Oct 1400 - 2200 1.3 & 2.3GHz Trophies
(Arranged by VHFCC - RSGB Contest)
3/4-Oct 1400 - 1400 432MHz & up
(Arranged by VHFCC - IARU/RSGB Contest)
3/4-Oct 1400 - 1400 3rd 24/47/76 GHz Cumulative
(Aligned with IARU date)
20-Oct 1900 - 2130 1.3/2.3GHz Activity Contest
(Arranged by VHFCC RSGB Contest)
25-Oct 0900 - 2000 All-band Activity Day
(Non competitive)

**** G0RRJ Memorial Trophy**

FRENCH JOURNEES d'ACTIVITE (JA)

26th-27th September - 1296MHz and up
24th-25th October - 1296MHz and up

Duration of all the JAs is from 17:00 Saturday to 17:00 Sunday

10GHZ FROM F1VJQ (IN95)

I have been in France since the end of June, and this year, I brought the **3cm** box (**G8APZ** and **M1CRO/p**) together with an old PW 50cm penny feed dish with me to France. It was a last minute decision, since my temporary 9m pole mast can only hold a few antennas.

The mounting arrangement required a 90 degree waveguide bend, which was duly packed, but ..... it needed a square to round adapter... which I forgot to pack!

Graham, **F5VHX** came to the rescue with a different mounting plate, and so on 1st July I was QRV on **3cm** from a square which is still sought after even on 6m and 2m.

Following the rainscatter contacts with **G4ALY** and **G4EAT**, which I mentioned last month, I have since worked **G4ALY** several more times on RS and have worked both of these stations again on tropo.

On 17th August, **G4EAT** spotted a **13cm** beacon not far from here, and I suggested a **3cm** test. I sent a carrier, and was most surprised when John got it straight away, and said on 'KST that it was loud! Needless to say, we went straight to SSB, for 56 both ways, at 702km. Signals peaked at 59 with deep QSB.

On 23rd August, **G4ALY** was worked 54/55 SSB over a 611km path. Predictably, a few hours later, when the UK cumulative started, conditions had dropped out!

I'm quite pleased with 21 different stations in the log, in 13 squares and 3 countries in just six weeks. Maybe it will be more in the next six!

MORE on EA8 10GHz TESTS

In the July/August issue, I mentioned the **10GHz** tests between **CT7** and **EA8**. On 19th June, Jean-Claude **CT7/F5BUU** (IM57NH) set up a beacon on **10GHz** aimed 24/7 towards Peter, **EA8BFK**. The beacon used a 50 watt TWTA designed for spacecraft, which was light and compact and running off a 36 volts main supply. The main portable rig was also equipped with an identical 50W TWTA.

Unfortunately the **D44** team never received anything from the **CT7 10GHz** beacon, but they were worked at 59+ on 2m in the evening of their first day of operation when their **10GHz** rig was not yet operational! This path remains to be tested!

Jean-Claude said that a few days after leaving **CT7**, Joe **CT1HZE** worked Peter **EA8BFK** on **10GHz** from his terrace with just 200 mw into a 60cm dish! Peter was not portable, but at home with Lanzarotte island just in front of him!

If Peter **EA8BFK** is able to be QRV regularly,

it should be very interesting to see whether the regular summer Atlantic tropo from **EA8** to **G** which is experienced on 2m, 70cm and **23cm** will support a **3cm** path to the UK. If it does, then someone who is in the right place at the right time will go into the record books! The distance from **EA8** to the UK is > 2600km.

CT7/F5BUU/p setup on the roof terrace.

FIRST 24GHz OH TO SM

In what is claimed to be the first ever **24GHz** contact between Finland and Sweden, contact was established around sunset at 1833 UTC August 4th, 2009 between **OH2AUE** and **SM0DFP**.

The contact was planned and set up by **OH2AUE** and this cross Baltic QSO covered a distance of 173km. The full story with pictures and sound recordings can be found at this website address:

www.kolumbus.fi/michael.fletcher/sm_oh_24g.htm

(N.B. the characters between **sm**, **oh**, and **24g** are underscores not spaces).

10GHZ JULY CUMULATIVE

Ralph, **G4ALY** had a very wet and windy day at IO70VL (15km NW of Plymouth) with 12 hours of constant rain. Nevertheless, he managed to get four French stations in the log on **5.7GHz,** and five on **10GHz**, including **F1TBP** who worked his first **G** on both bands.

In addition to the French stations, five UK stations were contacted with Ralph's best DX being **G3PHO/p** at 452km. Ralph's QTH between 005-028 degrees is totally blocked by a very large tree in the adjacent garden, and another tree blocks 121-130 degrees cutting off the Cherbourg area.

G3PHO/P was also out during the cumulative, from IO93PW, Nr Pocklington, E. Yorkshire, and reports a very poor set of results during the morning part of the contest. Peter reckoned the conditions were dire, at least until lunchtime.

Morning attempts on **10GHz** with **G4ALY**, **GB4LBV** and **F6DWG/p** failed (the path to France usually goes on at least **5.7G Hz** or **10GHz** by aircraft scatter). The Sheffield **5.7GHz** beacon **GB3KEU** was a paltry 53 (normally S6/7) and there was no sign of the new **G0GHK/B 10GHz** beacon at Finningley until later in the day when it was a rock crushing signal at 45km.

During the late afternoon the conditions improved and Peter worked **G4ALY** for best DX of the day (454km) on both **3cm** and **6cm** CW.

The day's highlight though were the very unexpected QSOs on both **3cm** and **6cm** with **PA/ON7BV/p**. Peter was surprised to find he was only 380km or so away... nearer than **G4ALY**!

Bart, **PA/ON7BV/p** operated during the **10GHz** cumulative contest on 26th July, and says he enjoyed the contest and was surprised to find quite a few stations on 2m talkback. Bart's internet failed this time, since he couldn't find a free access point and the UMTS router he had borrowed was not working in Holland.

This is the portable location beside the sea at JO11rm Westkapelle showing the excellent takeoff to UK.

Clive **G4FVP/p** operated from near Richmond, North Yorkshire (IO94CK) at 311m ASL, a site which has a good takeoff to the South East but is less good in other directions. The weather was fairly wet, but some rain scatter helped with several stations. In just over three hours operating, Clive made 7 QSOs using 2 watts to a 40cm dish, his best DX was **G8DKK** at 292km.

Barry, **G8AGN** made six contacts on **10GHz** from IO93FK - all of them "locals" with his best DX being **G4FVP/p** at 113km.

Dave **G0DJA** was on from Claxby, Lincolnshire, but poor conditions, and difficulties in keeping the dish pointing in the right direction, due to the winds, and an apparent initial lack of 2m talk back activity meant that he didn't make a single contact. Once home, with about an hour of the cumulative to go, he managed two contacts through the bedroom window. One with

Bryan (**G8DKK**) on RS at 157km and one with Gordon (**G0EWN**) at 29km.

10GHZ AUGUST CUMULATIVE

Tony, **EI4GHB/p** in IO63VF was QRV for much of the contest at 1600 feet asl, with poor weather conditions. From what I saw on 'KST, he was making a determined effort to work stations, but unfortunately, not many QSOs in the bag.

Steve **G1MPW** and Dave **G6KIE** worked from their usual site near Firle Beacon JO00AU and found that, after a slow start, it turned out to be quite a good day.

Talkback on 2m proved to be considerably better than 'KST at raising contacts - and they went on to make a total of fifteen **10GHz** contacts with their best DX being **M0DTS/p** in IO94LI at 395km. Six of the QSOs were with portables and the rest were home stations. They were pleased to work three new squares which they thought quite unusual, and four countries.

24GHz was less than successful - Steve's gear developed a fault on the PTT line so it wouldn't go into TX, and Dave had a problem with a broken bolt on the tripod mount assembly. Steve managed a QSO with **G4ZXO/p** on Ditchling Beacon at 12km by pressing the "call " button on the FT790 to transmit a burst of carrier and send the RST and serial number in very slow CW. Tests with **G4EAT** (105km) and **GW3TKH/p** (237km) once again didn't result in a QSO, but as the saying goes - " you never know until you try" !!

ACTIVITY FROM CORNWALL

Ralph, G4ALY (IO70VL) notes that the microwave bands have brought some surprising RS and TR in what has been overall a very quiet period for him. Most of Ralph's contacts tend to be in France but, despite being rather quiet, Ralph's log reveals some very good distances achieved, especially on **3cm**.

The **23cm** log for July contains:
17th **F5HGO**(652km) and **F5DQK**(524km), and on the 18th **F6HRO**(212km). In August the 7th produced **F1DBE/p** (429km), whilst the 16th brought in **F2CT/p** (869km), **F6APE**(435km) **F6FHP**(701km), **F5FLN/p**(695km), and finally **EA2TO** at (743km).

6cm : 25July **F1GHB/p** 59 SSB (223km) **F1TBP** (405km) 2nd Aug **F1DBE/p** (429km). On 13th Aug. **F6DWG/p** 59+ (318km). 16th Aug. **F6APE** (435km), **F2CT/p** (869km) 18th Aug. **F6DRO** 549 (903km).

3cm QSOs July 13th **F6DWG** (463km). 26th **ON4IY** 55S on RS (687km) for Ralph's first ON station. 19th **ON4SHF/p** 539 in JO11. 26th. **F1GHB/p** 599 (223km), **F4SGU/p** (342km), **F6APE** 52s (435km), **F5KPL** 55s and **G3PHO/p** (452km).

3cm QSOs August 2nd **F1DBE/p** (429km) 6th **F1VJQ** (611km) 13th **F6DWG/p** (318km) and **F6CBC/p** (804km). 16th Aug **F6APE** (435km), **F2CT/p** (869km). On 18th Aug **F6DRO** in JN03 (903km) was worked with signals at 56 on SSB.

Ralph's daily tests on **3cm** using aircraft reflection to **G3LRP** at 399km have a 99% success rate, together with daily tests with **F9OE** at 362km.

There is some pretty impressive DX in Ralph's log, and it just shows what can be done on microwaves even when you are far away from the activity centres.

24GHz ACTIVITY REPORTS

From: Brian Coleman, G4NNS, Andover, IO91FF
Since putting the **24GHz** system on the top of my mast some months ago I have had a few QSOs with portable stations but have been waiting for an opportunity to make a **24GHz** QSO with a fixed station. Dell, **G1JRU**, was an obvious candidate so when he came back on the air with his **24GHz** system I was very keen to have a try. Although the path at 45Km is non optical, we have consistently exchanged "rock crushing" signals on **5.GHz** and **10GHz** in the past. We have attributed this to the valley of the River Test providing a guide effect past the main obstruction. When we tested **24GHz** one Monday evening, during the regular microwave activity session, Dell and I were delighted that the Test Valley waveguide worked well at **24GHz** and FM strength signals were exchanged.

The idea of including **24GHz** in the **10** and **5.7GHz** events was put forward to encourage more to become active, particularly from fixed stations, by giving them the opportunity to make some contacts with well sited portables. Some portable stations, particularly single operator ones, have expressed their view that three bands are too many and unless groups who are prepared to take the third band out for an airing speak up, the practise is now likely to be dropped. But it is a pity that this will set back the cause of getting more home stations on **24GHz**.

Mike, **G0JMI/p** operated on **24GHz** from Beacon Hill, Warnford, Hants (IO91KA20) and during the August Activity contest worked **G1JRU** (IO90HU) 25.5km, **G4LDR** (IO91EC) 36km, and **G4NNS** (IO91FF) for his best DX at 37km. All the contacts were on SSB. Mike runs just 20mw to an 18inch dish, and he also received the **GB3SCK** beacon (IO80UU) 559 at 84km.

Steve **G1MPW** repaired his **24GHz** gear after the Cumulative, and next day, Monday had a test with John **G4EAT** from a site near Reigate. It worked very well with SSB over the 78km path. John was 5/9 with Steve, who got a respectable 5/5 from John.

EME 6cm ACTIVITY WEEKEND

From: Peter Blair, G3LTF, Andover
I spent a great deal of time this month building a **6cm** station for the **6cm** Activity Weekend (AW) and despite a few problems I did get it going in time and made several QSOs. I had a LO chain giving me 10mW

TCXO controlled that I had built last year but everything else, transverter, CP feed, preamp all got built in about two weeks plus of course integrating it all into the system.

I used the same "system architecture" as I did for **9cm** so its plug compatible with that system but there are a few loose ends to tidy up in the spectral purity area!

I started out with the idea of listening only, but Brian **G4NNS** kindly loaned me a 7W SSPA that only needed a heat sink and the **9cm** PSU was close enough in voltage to use.

Although I measured sun noise on the Friday before the AW, I didn't get the system pointed at the moon until Saturday morning and some rain overnight had made a leakage path to the TX inhibit line so I couldn't transmit - but by Sunday morning, 16th August, I'd fixed that and immediately saw an echo on the SDR and could just hear it as well.

I called CQ and was answered by **OK1KIR** #1 followed by **F2TU** #2 and **OE9ERC** #3 and **ES5PC** #4. Next I worked **G4NNS** #5 and **DF9QX** #6 but by this time I was having big problems with the wind moving the dish. I then worked **W5LUA** #7. I heard **PA0EHG** and also **IK2RTI** and the previous day I also heard **WD5AGO**, **CT1DMK** and **LX1DB**.

There is lots to do to analyse the overall performance and select where to focus for improvements but I was very pleased indeed with the dish performance at **6cm**. My dish is 6m 0.375 f/d with the centre 4m in 6mm mesh, the rest is 12mm. The receive side is an ATF36077 preamp built to **W5LUA** design, NF 0.7-0.75dB, The feed is the **RA3AQ** septum design for 0.37-0.45 dimensions scaled from **3.4GHz** data.

I am seeing 12dB of sun noise and 0.7dB moon noise. The dish beamwidth measures 0.75degrees which means that the centre 5m is being illuminated. I'm interested in getting hold of a TWT for **6cm** with anything >50W output.

Many thanks to Brian, **G4NNS**, for organising the event and also to Joe, **K1RQG**, for his support with the sked lists.

73 Peter G3LTF

From: Brian Coleman, G4NNS, Andover, IO91FF

Following on from Peter's **3.4GHz** EME Activity Weekend I proposed, and received considerable support for, a **5.7GHz** EME Activity weekend. This took place on the 15th and 16th August with some 18 or more stations taking part. These "events" are non competitive and are intended to provide an opportunity to test and improve equipment and encourage newcomers to the band.

I was able to test my new Septum CP feed and to compare it's performance against my **VE4MA** linear feed. CP showed less spectral spreading and offered advantages when working other CP stations, but the better sun noise figures using the **VE4MA** linear feed show that improvements to the CP feed are needed.

I have updated my **5.7GHz** EME web page at http://myweb.tiscali.co.uk/g4nns/ with some more information.

Stations participating included:- **CT1DMK**, **DF9QX**, **ES5PC**, **F2TU**, **G3LTF**, **G4NNS**, **HB9SV**, **IK2RTI**, **JA4BLC**, **JA6CZD**, **LX1DB**, **OE9ERC**, **OK1KIR**, **ON5TA**, **PA0EHG**, **W5LUA**, **WA6PY**, and **WD5AGO**

73 Brian

STRANGE PENNY FEED PROBLEM

Marcel **F5DQK**, took his **3cm** transverter box from the mast to check its performance. Imagine his surprise at what he found in the waveguide to the penny feed on

his Procom dish! There were dozens of tiny green sauterelles (grasshoppers) together with some dry grass. This photo shows what was in the waveguide. It is a puzzle as to how they got in there, (presumably through the 15mm slots). Clearly, Marcel needs to add at least 10dB to his TX output!!

MORE NEW SQUARES ON 3cm

From: John Wood, G4EAT, Danbury, JO01HR

August 7th: Good RS to east but activity low. Best **3cm DL7QY** (JN59). 10th: Local tropo up. **F6DKW** 59+20 on **3cms** but nil over 348km on **24GHz**.

16th: French contest. Conditions average but pleased to work **F1NPX/p** in JO20 for a new square.

17th: Heard several beacons on **23cm** for first time IN94 and IN95. 4 new ODX beacons on **23cm** and **13cm**! Worked **F1VJQ** (IN95) on **3cm** for the first time on tropo. Excellent SSB signal. Complements the first RS QSO of 16th July (new square).

19th August: Excellent 2m tropo to EA. Worked **F2CT/p** on **3cm** in IN93 steady tropo signal on CW for another new square. Also Claude **F9OE** IN78 on **3cm** first time in a long time.

20th August: Another RS opening to east. Best DX was **DB6NT** in JO50.

23rd August Cumulative. Conditions average.

24th Worked Steve **G1MPW/p** from Reigate IO91vg on **24GHz** 77km (his ODX) to prove his system works

TROPO OPENING 27th AUGUST

From John Quarmby, G3XDY, Suffolk, JO02OB
I noticed earlier in the evening that EA's were being worked from this part of the UK on 2m, so went looking for beacons on the higher bands, starting on 70cm. I was hearing the IN95 beacon on 432MHz moderately well, but nothing on higher bands at that stage.

At around 20:00 I tried with **F1VJQ** (IN95) on **3cm** but no signals heard. I then heard **F6CBC** (IN94) briefly on **23cm** but signals were weak, so it looked like nothing much would happen. Shortly after the **F5XBF** beacon appeared on **23cm** from IN94 so I continued to listen around.

Dom, **F6DRO** contacted me on 'KST and suggested a sked on **3cm** but I was not very optimistic. I sent to him for a while and after one period thought I heard some brief CW signals, a tweak on the dish heading and there he was, weak but solid signals. In a few overs we had exchanged reports and rogers. JN03TJ to JO02OB is 964km over a predominantly land path. Dom was using his new QRO rig (40W output), which certainly helped with copy this end.

I then tried the **F1VJQ** path again, and positively identified signals for a short while, but conditions dropped before we could exchange reports.

A little later I tried with **F6DRO** on **13cm**, we could hear each other but signals were very weak, with no peaks sufficient to complete the QSO, although reports were exchanged. Signals were consistent but very weak, more like troposcatter than ducting. A final test on **6cm** was unsuccessful with nil heard.

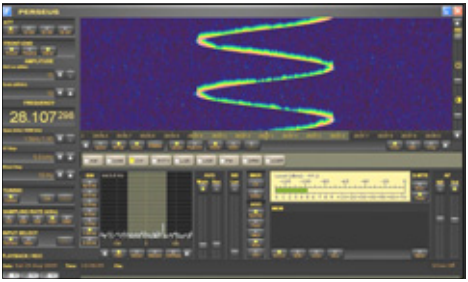
I also had nice contacts with **F6DWG/p** in IN87 on **5.7GHz/10GHz** in some tropo on 19th August, whilst he was operating on holiday.

On RS I had recent contacts on 20th August with **DC6UW** (JO44) who was 59+40dB, the loudest RS signal I think I have ever heard, plus **OZ1FF** in JO45 and **DF6NA** in JN49.

73, John G3XDY

BEACONS

F1XAP (**10GHz**) and **F1XAO** (**5.7GHz**) beacons both exhibit a rather strange sine wave drift. Ralph **G4ALY** sent a screenshot of the drift on his Perseus SDR.



10GHz IN SCOTLAND

Dave, **G0DJA** spent a few days in Scotland at the beginning of July and had **10GHz** contacts with Mark (**GM4ISM**), John (**GM4LBV**) and Ed (**GM3SBC**). The contacts were made pointing the horn in totally the 'wrong' direction, mainly at a scatter point somewhere up the Firth.

Gerry, **GM4GQM** is now QRV on **3cm** in the far north on the Shetland Isles (IP90). He will be very much in demand when conditions allow, especially during the autumn tropo (if it ever returns!) and rainscatter events.

UK RAINSCATTER

From: Keith Winnard, GW3TKH
On 16th July, I had two excellent QSOs with **G4ALY** on **6cm** and **3cm**. Looking at the Met. Office rain radar showed intense rain cells over the Bristol Channel and the South West peninsular. The initial call on **6cm** was in CW, signals were very strong so we moved to SSB then to FM. Having found the scatterpoint, the **3cm** contact went directly in FM. Ralph was 59S on both bands. The direct path between us (IO81JM<>IO70VL) is 138Km and includes Dartmoor and Exmoor so signals are usually weak and well scattered.

I then tried a test with **F9OE** in IN78 on **3cm**, but no QSO resulted despite Claude hearing a weak carrier. As there is so much rain around this summer we should have another chance to test soon!
Keith, GW3TKH

F2CT F6HPP F6AJW

On 16th August, operating at Issarbe IN93OA, the team worked Ralph, **G4ALY** on **23cm**, **5.7GHz**, and **10GHz** at a distance of 869km. **Photo: Guy, F2CT**

...AND FINALLY

Thanks for all the input this month. **73, Robin, G8APZ**

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