An Amateur Radio publication for the Microwave Enthusiast

scatterpoint

October 2013

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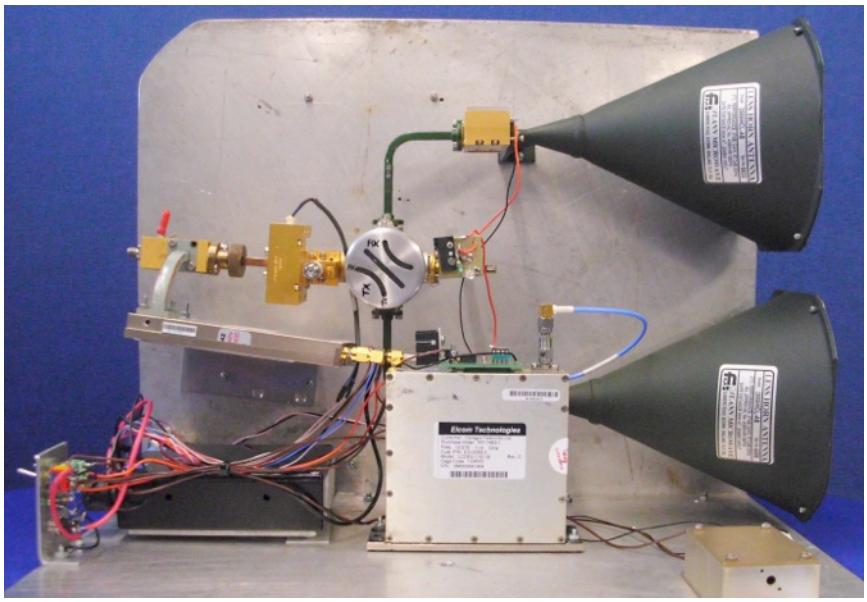
A 76GHz Transverter
Doing things differently!
By Roger Ray G8CUB



In this Issue

Don't forget that

Every Monday evening is Microwave Activity Evening

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Editor's corner

I've had a computer malfunction recently necessitating a major outlay on a new iMac (yes, they do sometimes break down!) so if your contribution this month has disappeared to another part of the multi-verse, please accept my apologies. The new iMac is, however, *very* fast! – so I can publish errata even more quickly… Sadly, my internet isn't.

Meanwhile, this month we are at the go-faster end of the microwave spectrum (don't get too excited, Nanowavers – but congratulations on doing SSTV) with a new distance record and an article on 76GHz.

Dropbox: *Please note* that you do NOT have to subscribe to Dropbox in order to download your copy of Scatterpoint.

73 de Martin G8BHC

Articles for Scatterpoint

News, views and articles for this newsletter are always welcome.

Please send them to

editor@microwavers.org

The CLOSING date is the FIRST day of the month

if you want your material to be published in the next issue.

Please submit your articles in any of the following formats:–

Text: txt, rtf, rtfd, doc, docx, odt, Pages

Spreadsheets: Excel, OpenOffice, Numbers

Images: tiff, png, jpg

Schematics: sch (Eagle preferred)

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

Thank you for you co-operation.

Martin G8BHC

UK MICROWAVE GROUP

SUBSCRIPTION INFORMATION

The following subscription rates apply.

UK £6.00 US $12.00 Europe €10.00

This basic sum is for **UKuG membership.** For this you receive Scatterpoint for **FREE** by electronic means (now internet only) via the Yahoo group.

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.

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Payment can be made by: PayPal to

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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!)

Colour codes

Editorial & Events

Activity & Contests

Technical

Nanowaves (optical)

Commentary

Reproducing articles from Scatterpoint

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New 76GHz Record

By John G8ACE

A new distance record of 102km was achieved on 76GHz Saturday 14th September 2013, a contact between Batcombe Hill, Dorset (IO80RT59) and Eglwysilan Mountain, Glamorgan (IO81IO36). This is also believed to be the first 76GHz contact between Wales and England.

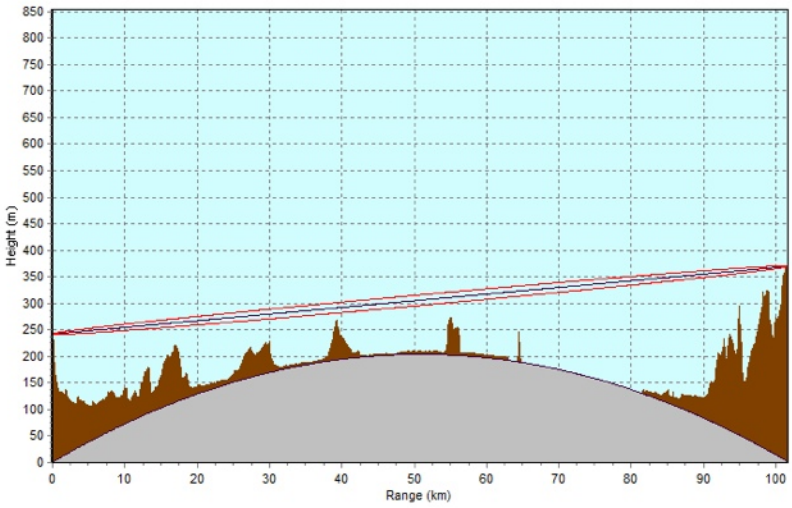
Operating on three mm-bands, 24, 47 and 76GHz, were Chris Towns (G8BKE) and John Hazell (G8ACE) at Batcombe Hill and also on the three bands at Eglwysilan was Ian Lamb (GW8KQW) and with valuable assistance from Keith Winnard (GW3TKH) who was also operational on 24GHz. All three bands were worked using NBFM with full duplex operation on 76GHz between GW8KQW and G8ACE with one way FM between G8BKE and G8KQW. Signals on 76GHz were exchanged for over two hours with a very gradual increase in average signal strength after some QSB initially. Both Tx and Rx were locked using RDDS1 PLLs at G8ACE and the GW8KQW Tx RDDS1 locked. This was the first time RDDS1 locking was used at both ends and meant the 76GHz signal was acquired within seconds due to the highly accurate frequency control therefore no tuning required. References used for the PLLs were 10MHz double oven OCXOs which are readily available on ebay.

It has been very difficult to improve on the previous record distances primarily due to the earth being curved. So far if the path is not optical then it doesn't work, none of this K=1.332 stuff on 76GHz with the relatively low power levels used.

This tremendous success is a result of continual innovation and systematic improvements and testing of the equipment built and used by the Wessex microwave enthusiasts with support from other microwave radio enthusiasts in UK and Germany.

By calculating the link budget and path loss of this path it was possible to predict what environmental conditions would potentially give sufficient margin for success. The 7 day weather forecasts (specifically the dew-point temperature4) have been analyzed for several

Eglwysilan



Batcombe Hill

weeks whilst waiting for the optimum conditions to materialise.

We are indebted to Keith GW3TKH for the suggestion of this path which is LOS and for his assistance in guiding Ian G8KQW up the Welsh mountain, without Keith's suggestion and support this would not have been possible.

73s John G8ACE

References:

1 myweb.tiscali.co.uk/g4nns/RevDDS.html

2 books.google.co.uk/books?id=6_yQ-dEGc5wC&pg=PA201&lpg=PA201&dq=what+is+k-factor+in+telecommunications&source=bl&ots=98X7uhCFtD&sig=k0T0XqpeYOYBpTdzvjxBzh46VMo&hl=en&sa=X&ei=XG81UoSOOomV7QbbhICIDw&ved=0CD4Q6AEwAg#v=onepage&q=what%20is%20k-factor%20in%20telecommunications&f=false

3 www.mike-willis.com/software.html

4 en.wikipedia.org/wiki/Dew_point

5 UK 76 GHz Distance Record Video
https://docs.google.com/file/d/0B9s-pRG6smmGbTF2VkMxcmtjaFk/edit?usp=sharing

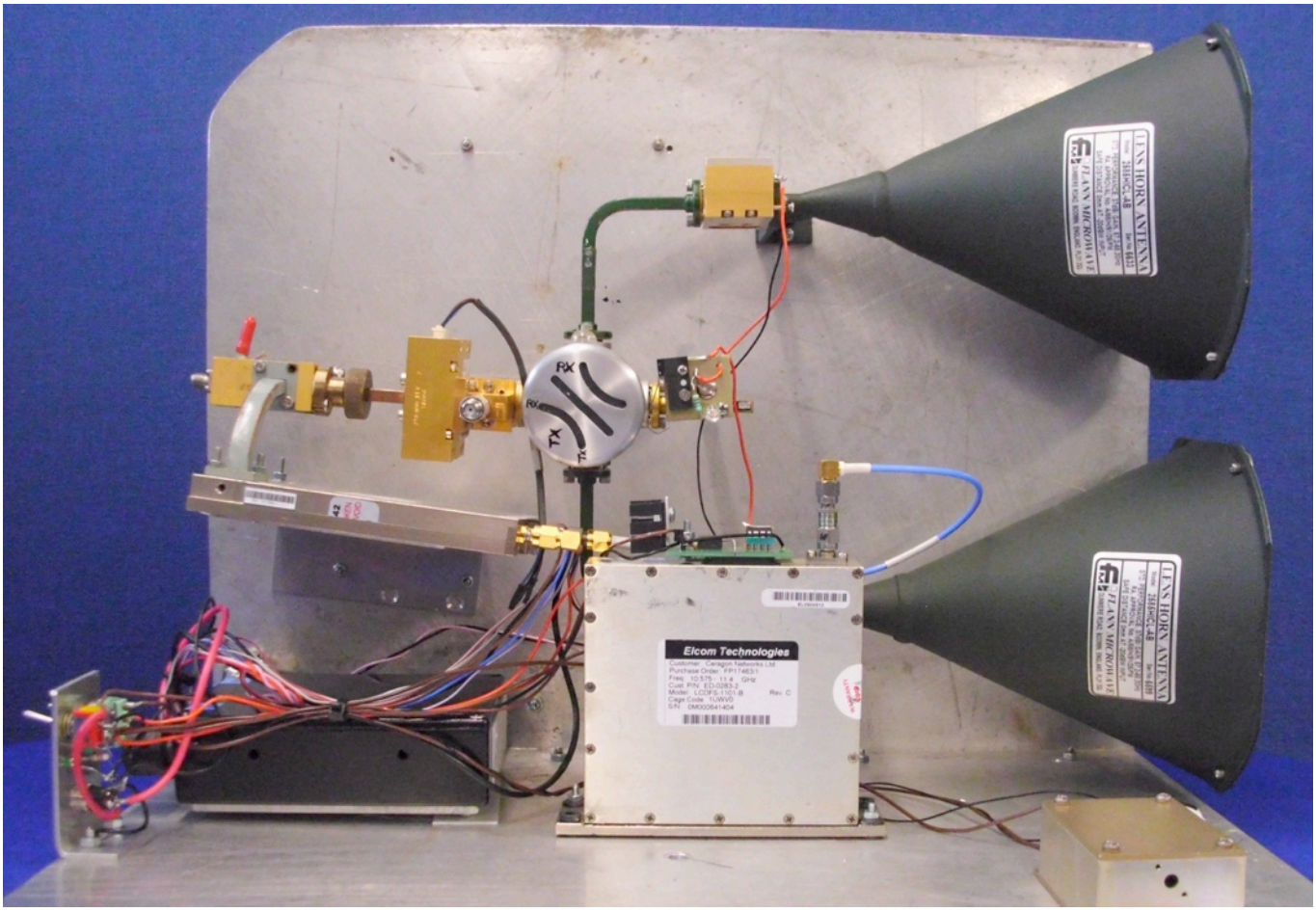
6 http://microwaves.zxq.net/76GHz/76GHz.html

There is a reference to Gwent which is wrong. G8KQW was in Glamorgan.

A 76GHz Transverter

Doing things differently!

By Roger Ray G8CUB



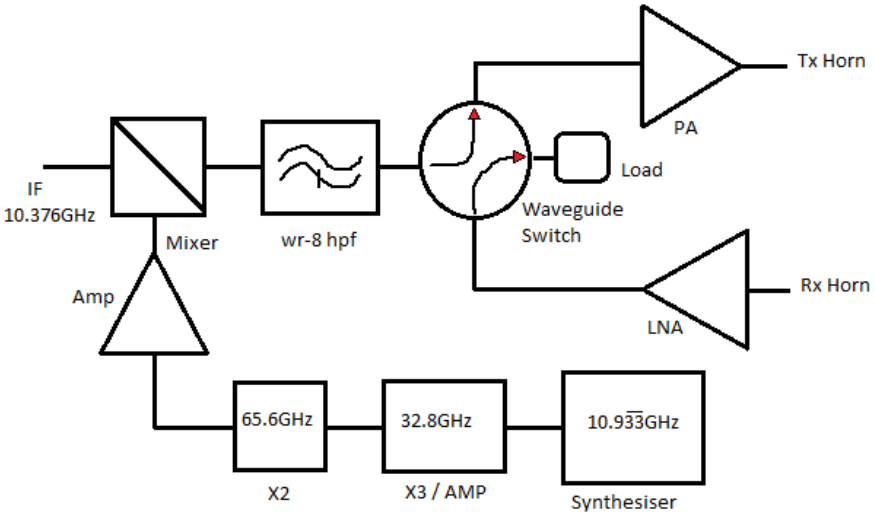
The concept for this 76GHz transverter came about following tests in August 2012. At Ditchling beacon at that time, only John G4EAT could copy signals from Ian G8KMH/P near Ventnor IOW. The difference being that John's transverter was using a fundamental mixer. Chris G0FDZ and myself were using DB6NT type harmonic mixers. These probably had around 16dB NF compared to 8dB or so for the fundamental mixer. John was also using a surplus 58GHz Flann horn, which appeared to work just as well as my 77GHz version.

So to design a new transverter…. Somehow component parts appeared pushing me in direction I eventually took. Harold G3UYM returned my small 10GHz transverter that he had been using. Ebay turned up a pair of 58GHz horns and separately a 60GHz receive system. The later had a plastic dish, a filter, amplifier and harmonic mixer. The amplifier was an Arcom 60N00 which showed around 18dB gain 46 – 70GHz. Not immediately useful, until I hit on the idea of using a 10GHz IF. The advantage of using a high IF is that it would allow image rejection with a length of WR-10 waveguide (cut-off 59GHz).

Looking at what else I had available. I had a Farran fundamental mixer (probably 0-4GHz IF). The Arcom amp and the 2 horns. I also had a WR-15 waveguide switch bought at Martlesham a couple of years ago, and of course the 10GHz transverter. Also I wanted to start with an Elcom synthesiser, as they were proving to be so good.

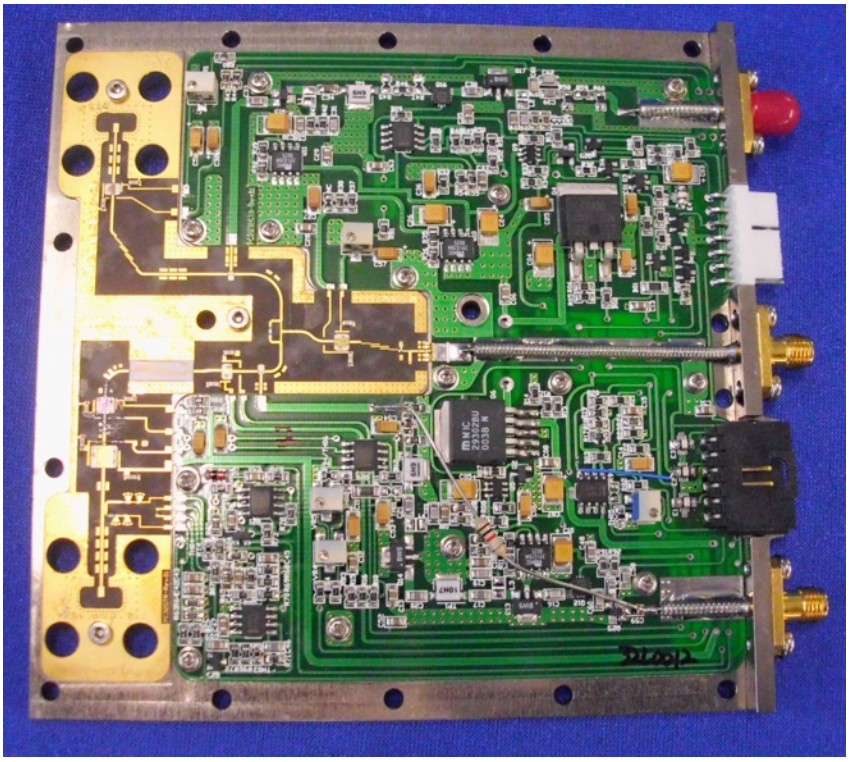
A quick calculation showed that if I used a 65.6GHz LO, I would have an IF of 10.376GHz. This with the existing transverter would give a final IF of 440-442MHz – not a problem with an FT817 (tx de-limited).

Transverter block diagram. Waveguide switch shown in TX position



Unfortunately the Elcom synths that I had started at 11GHz, and I wanted 65.6/6 = 10.933333GHz. There were however back on Ebay some Elcom units starting at 10.575GHz. A check via Doug VK3OE and the Australian group, responded that the programming was the same as for other Elcom synths – 3.333MHz steps. By a stroke of luck, 65.6/2 fell within the range of the Broadern module that I had been using on 134Ghz. Just by adding one resistor the acted as a x3 multiplier / amplifier giving up to 0.5W at 32.8GHz! The trick here I had previously found, was to run both positive supplies at 5V and use a DC bias (via the added resistor) to make the mixer work as an attenuator. As long as the input to the LO port is kept below +3dBm, varying the DC voltage on the mixer gives a controllable output.

To get to 65.6GHz I tried a WR-28 mixer used as a doubler. I have found that generally if you drive the RF port of a mixer, they work well as a doubler, extracting the output from the LO port. Sometimes it is necessary to bias or 'tune' the IF port for maximum output. The only mixer I had was a fixed tuned 38GHz unit. A one off effort to move the tuning blocks, produced an output of -4dBm at 65.6GHz. The output was via a piece of WR-15 waveguide. This had to be carefully positioned and angled to get the maximum output. This the reason that the broadern module is mounted at the odd angle in the transverter.



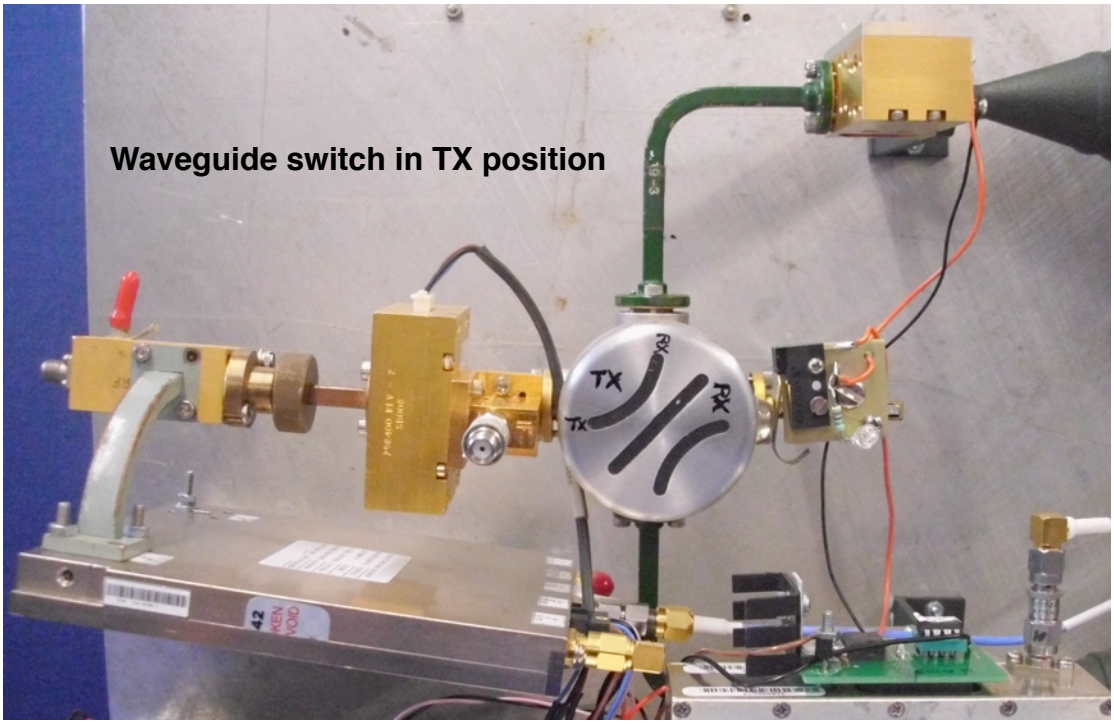
Broadern ED-0296-2 module – resistor added

The output from this mixer used as doubler went via the Arcom amp to the mixer. The amp produced around +11dBm maximum. This was ideal for the fundamental mixer. Input to the mixer was initially a length of WR-10 to reject the image. However when later the PA was added, I found the LO level too high. The solution was to change to WR-8 waveguide (cut-off 73.8GHz). This nicely removed image & LO, to <-60dBC.

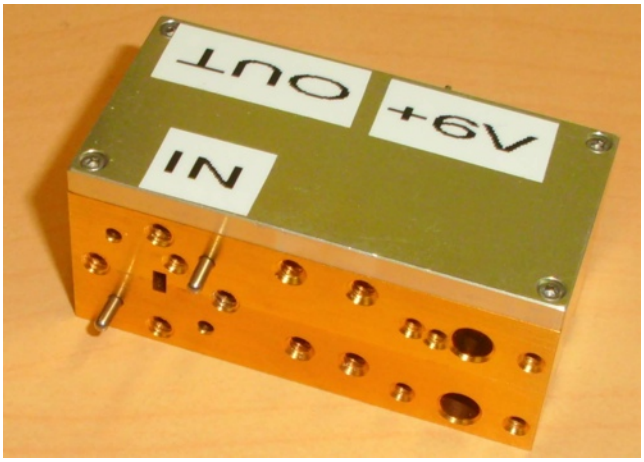
Initially the transverter was used like this, going straight through the WG switch to a single horn. On TX 1dB compression occurred at -3dBm output, with a drive of +12dBm at 10GHz.

Just after this the pre-amplifier from Tom WA1MBA arrived, the culmination of a 6 year project, to produce a batch of pre-amps. This had over 30dB gain and a measured noise figure of 4.0dB.

The same week the PA arrived from the States. This was from a seller on Ebay 'the RF guy'. This was not cheap at $1200 but was something that I also had a work use for, so could justify the expense. Claimed output was 100mW with +23dB gain.



Waveguide switch in TX position



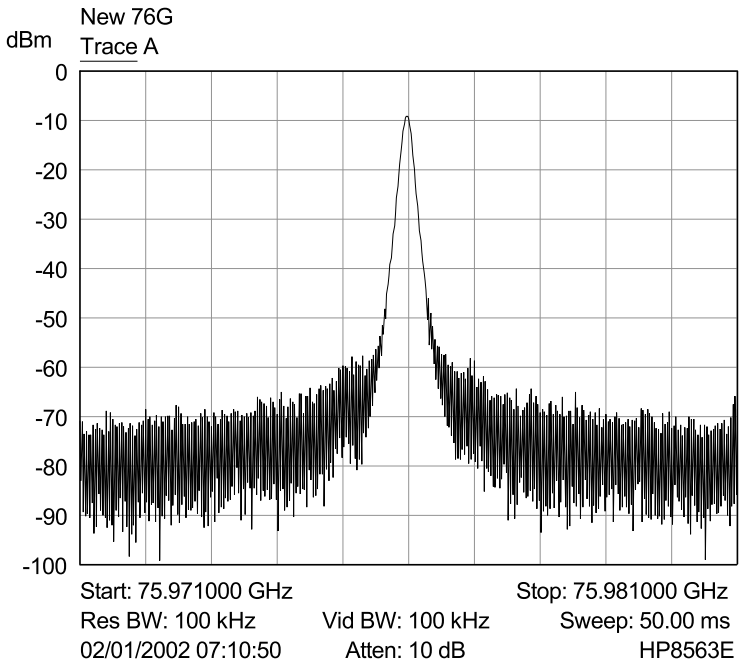
The 100mW PA – single +6V supply

Adding the amplifiers required two waveguide WR-12 bends, that I did not have. These were eventually located in the States surplus and duly arrived. What I had forgotten was the orientation of the switch and horns. To get horizontal polarisation, I had to mount the whole assembly vertically, as can be seen in the pictures.

With the 6 position WG switch there was now a problem. Two horns connected via over 50dB of amplification at 76GHz, in an intermediate switch position! To overcome this I added a plastic 'foot' to the switch knob. Only allowing the TX amp to be on when the switch was in the right position.

Performance of the transverter has been excellent. Reports were 59/59 FM with G8ACE, and 59 / 599 SSB/CW with G8KMH from Firle beacon over a 94km path.

Roger Ray G8CUB



Tx output of +19dBm

In Operation at Firle beacon with 10GHz transverter and FT817 fitted.

Crawley RT

G3VVB Trophy

The G3VVB trophy was won this year by Brian Austin, G1IKV with a beautifully made 10GHz transverter constructed using an increasingly well known range of system components.

Brian is a microwave newbie, and an amateur amateur, which makes his winning the Trophy particularly significant. He's also a very nice guy.

Here are a couple of photos of Brian Austin, G1IKV, showing his 10GHz transverter, and receiving the G3VVB Trophy at the Crawley Roundtable.

The photo credit is to Chris, G0FDZ.

Chris Bartram GW4DGU

The RAGazine

Vol 1
Issue 1

Sep 2013

Photo: GBT at NRAO, Green Bank, WV - courtesy of the editor

www.britastro.org/radio/

British Astronomical Association
Radio Astronomy Group

"The Radio Astronomy Group of the BAA has produced the first of a quarterly newsletter, RAGazine. Edited by Dave James M0JAP the aim is to provide an informal mix of articles and news relating to amateur radio astronomy. This first edition contains articles on feed horn construction by Brian Coleman G4NNS, experiments at 1.4 GHz by Martyn Gawthorpe G8FEK and a complete radio telescope for £160 by Peter East, plus some quite elegant observations at 12 GHz by Jonathan Rawlinson M0ZJO. Dave James would welcome contributions for future editions from all those with an interest in this area, whether RAG members or not. RAGazine can be downloaded from the RAG website at www.britastro.org/radio/"

Paul Hyde G4CSD

UKµG Chip Bank

A free service for members

The catalogue is now on the UKµG web site See www.microwavers.org/?chipbank.htm

Non members can join the UKuG by following the non-members link on the same page and members will be able to email Mike with requests for components. All will be subject to availability, and a listing of a component on the site will not be a guarantee of availability of that component.

The service is run as a free benefit to all members and the UK Microwave Group will pick up the cost of packaging and postage, that is, Jiffy bags, small plastic bags for individual component values, and Large letter 2nd class postage, currently 69p.

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. We have asked Mike to check with the Chairman (or designated officer) if any individual is making excessive requests, and we will ensure that the service is only available to members.

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!!)

Following the Finningley RT, I came home with a large box of reels of chip components kindly donated by Kevin Avery.

I have now sorted through these and added them to the chipbank catalogue on the UKµG's website.

This donation has considerably expanded the stock of both 0805 and 1206 resistors as well as capacitors, inductors, diodes and transistors.

I plan to bring the stock to the Crawley RT next month, but in the meantime, I am happy to accept e-mail requests as usual.

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

73, Mike, G3LYP

Silent Key: Bob Short G3GNR

I was very sorry to hear of Bob's G3GNR passing on 30th of August. I first met Bob When Tim G3KEU & i were Portable at Charterhouse on the Mendips when he showed great interest in the set up & it wasn't long before he was operational from home on 3 cm followed by his 3cm & 24GHz portable,appearing regularly in the cumulatives – it was the only time you would find him on SSB or FM, being a keen good CW operator.

I well remember the time when he was on Dartmoor with G6XM /P & G8SHF/P and myself along with G0 JMI /P & others on Mynydd Prescelly made the path of 154km on 24GHz with 5mW of N/B FM good going for that power level,also during a big lift when the 3cm record from Sweden gradually coming down country, to Highworth, Bristol then on Down to Bob in Devon. He was very pleased with that from his well set-up station,

For various reasons he moved from his small holding in Devon to Exmouth. Unfortunately the new site was poor for Radio and no good at all for Microwaves from home although he proceeded with some activity on HF/LF. Between us as a new project we decided to try 502 kc/s cw which gave us an interesting time building, winding coils etc ,quite a change

from surface mount & was successful although limited by lack of antenna space. His other interests were Model making & Steam engines which kept him well occupied at times giving rides to the lucky people. I think I can also remember him having interests in model boats, steam. I expect.a couple of years ago he decided to give up radio (due partly I think the poor location) & disposed of his gear. He then concentrated on model train layouts in a room in the house & many pics appeared on U-tube showing what good progress he had made. Unfortunately after a while due to poor breathing he could not get up to the layout room, so thoughts of radio returned. He purchased a complete set of radio gear & with the help of local amateurs to put up an antenna was soon back on the bands rattling his favourite key. I often had a phone call & it would be "Which band, Roy?" and on we would go!!! After this his condition deteriorated quickly & went into a Hospice; a day after returning home he passed away. Always jocular, friendly & helpful, sadly missed.

Good Bye Bob SK

Roy Emery G3FYX

Contest Results

By John Quarmby G3XDY

5.7GHz Contest August 2013

Limited activity was once again a problem in this event, many regulars from previous years seemed to be missing.

Congratulations to Keith Winnard who operated as G3TKH/P at IO81RU and GW3TKH/P at IO81LS. Roving helped to secure the top spot this time out.

G3ZME/P won the unlimited talkback section, with G4SJH/P as runner up, with G4LDR as leading fixed station in this event. The overall table for the championship to date has been updated with the scores from this event, with G3ZME/P having an unassailable lead with one event left.

10GHz Contest August 2013

The leaders thought conditions the worst ever, up in the mist, and others had problems with the wind strength.

Congratulations go to G4RGK who won the Radio Talkback section, with G4GSB/P as runner up. In the Unlimited section G3ZME/P was the winner, with G34SJH/P second, and leading fixed station was G4LDR. The leading Restricted section entrant was G4SJH/P.

The championship table shows the positions for the Open and Restricted sections after four events. In the Open section the competition is between G4LDR and G3ZME/P, and any of the top three stations in the Restricted section could take the winners position at the conclusion of the championship.

24GHz Contest August 2013

With only three entries the event was poorly supported this month. G3ZME/P and GW3TKH/P are the joint winners of the Radio Talkback section and G4LDR is the leader in the Unlimited section.

GW/J3TKH/P is the winner of the G0RRJ Trophy for 2013 as he cannot be caught by any of the other competitors now.

73 John G3XDY
UKuG Contest Manager

5.7GHz Contest August 2013

Unlimited Talkback Section

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX km
1	G3ZME/P	IO82QL	5	668	G3XDY	265
2	G4SJH/P	IO91GI	5	555	G3XDY	200
3	G4LDR	IO91EC	6	506	G3XDY	223

Radio Talkback Section

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX km
1	G(W)3TKH/P	IO81RU/LS	9	827	G4ALY	165

10GHz Contest August 2013

Radio Talkback

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX km
1	G4RGK	IO91ON	7	762	G3ZME/P	162
2	G4GSB/P	IO82WM	1	35	G3ZME/P	35

Unlimited Talkback

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX km
1	G3ZME/P	IO82QL	13	1890	G3XDY	265
2	G4SJH/P	IO91GI	11	1458	G4KUX	368
3	G4WLC/P	IO81WU	11	1403	G4KUX	311
4=	G4LDR	IO91EC	11	1296	G8DTF	275
4=	G4BAO	JO02CG	8	1296	G4KUX	298
6	G8DTF	IO83SM	5	715	G4LDR	275
7	G8CUB/P	JO01DH	3	655	F6APE	446
8	G8OTI/P	IO83PM	2	76	G4CBW	59

24GHz Contest Aug 2013

Radio Talkback

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX km
1=	G3ZME/P	IO82QL	2	152	GW3TKH/P	83
1=	G(W)3TKH/P	IO81RU/LS	2	152	G3ZME/P	83

Unlimited Talkback

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX km
1	G4LDR	IO91EC	2	49	G1JRU	33

5.7/10/24GHz Championship Tables

After 4 events, the best three count towards the total

5.7GHz

Pos	Callsign	5/26/13	6/30/13	7/28/13	8/25/13	TOTAL
1	G3ZME/P	1000	0	1000	808	2808
2	G4LDR	568	801	820	612	2378
3	G(W)3TKH/P	502	0	0	1000	1502
4	G1EHF/P	0	1000	0	0	1000
5	G4SJH/P	317	0	0	671	988
6	G4WYJ/P	0	288	0	0	288
7	G4WGE/P	0	38	0	0	38

10GHz Open

Pos	Callsign	5/26/13	6/30/13	7/28/13	8/25/13	TOTAL
1	G4LDR	948	882	1000	686	2830
2	G3ZME/P	1000	0	547	1000	2547
3	GW/J3TKH/P	0	1000	459	0	1459
4	G8DTF	527	404	0	378	1309
5	G8CUB/P	0	457	353	347	1157
6	G4EML/P	0	298	480	0	778
7	M0DTS/P	342	386	0	0	728
8	G1MPW/P	0	704	0	0	704
9	G4BAO	0	0	0	686	686
10	G3PHO	0	0	365	0	365
11	G8KMH/P	304	0	0	0	304
12	GW4NOS/P	96	0	0	0	96
13	G8AIM	0	0	21	0	21

10GHz Restricted

Pos	Callsign	5/26/13	6/30/13	7/28/13	8/25/13	TOTAL
1	G4WLC/P	1000	943	787	962	2905
2	GW/J4HQX/P	781	563	1000	467	2344
3	G4SJH/P	960	0	0	1000	1960
4	G4GSB/P	164	483	478	24	1125
5	G1EHF/P	0	1000	0	0	1000
6	G4RGK	0	0	390	523	913
7	G4WYJ/P	0	694	0	0	694
8	GM8OTI/P	518	0	0	0	518
9	G0EHV/P	322	141	0	0	463
10	G0API/P	0	0	119	0	119
11	G4WGE/P	0	85	0	0	85

24GHz

Pos	Callsign	5/26/13	6/30/13	7/28/13	8/25/13	TOTAL
1	GW/J3TKH/P	920	1000	1000	1000	3000
2	G4LDR	718	1000	213	302	2189
3=	G0API/P	0	0	1000	0	1000
3=	G3ZME/P				1000	1000
3=	G8KQW	1000	0	0	0	1000

UKµG Technical support

Another free service for members!

While many of you will have taken advantage of the "test equipment rooms" that we run at the Round Tables, sometimes that project just cannot wait for the few occasions per year when we hold them. One of the great things about our hobby is the idea that we give our time freely to help and encourage others, and within the UKuG there are a number of people who are prepared to (within sensible limits!) share their knowledge and, more importantly, test equipment. Our friends in America refer to such amateurs as "Elmers" but that term tends to remind me too much of that rather bumbling nemesis of Bugs Bunny, Elmer Fudd, so let's call them Tech Support volunteers.

While this is described as a "service to members" it is not a "right of membership!"

Please understand that you, as a user of this service, must expect to fit in with the timetable and lives of the volunteers. Without a doubt, the best way to make people withdraw the service is to hassle them and complain if they cannot fit in with YOUR timetable!

Please remember that a service like our support people can provide would cost lots of money per hour professionally and it's costing you nothing and will probably include tea and biscuits!

If anyone would like to step forward and volunteer, especially in the regions where we have no representative, please email john@g4bao.com

The current list is available at www.microwavers.org/tech-support.htm

Region	TechSupp. volunteer	Facilities
NW England, N Wales Wales	David Wrigley G6GXK 07811776432 Chris Bartram GW4DGU	Spectrum Analysis to 24GHz Power measurement to 76GHz Freq Measurement to 26GHz Freq sources to 47GHz NF Measurement to 10GHz Antenna Test range to 24GHz
NE England Yorks and Humberside	Peter Day G3PHO microwaves@blueyonder.co.uk	Available from Spring 2013 Spec Analyser to 24GHz Power measurement to 24GHz (up to 5W on 24GHz), RF sources to 24GHz, direct freq measurement to 3GHz. Setting up/tuning up transverters, etc + general advice.
S and SW England	Brian Coleman G4NNS Paul Marsh M0EYT pjmarsh@uhf-satcom.com	Spectrum analyser to 24GHz Power measurement to 26 GHz Scalar Network analyser and sweeper 2 to 15GHz Antenna test range 2.3, 3.4, 5.7, 10 and 24GHz Wavegide directional couplers for 10GHz and 24GHz Coax couplers 1.3 – 26GHz. Power measurement to 12GHz High power dummy load @ 10GHz (500W) Frequency measurement to 22GHz Spectrum analysers to 6 and 18GHz Frequency generation to 18GHz.
SE England and London	Allan Wyatt G8LSD allan@virtual-museums.org	not known
East Anglia, Essex & Suffolk Herts.	Sam Jewell G4DDK sam@g4ddk.com Bryan Harber G8DKK Letchworth, Herts	Spectrum analysis to 24GHz Power measurement to 24GHz Direct frequency measurement up to 3GHz VNA to 3GHz RF sources to 24GHz
West Anglia East Midlands	John Worsnop G4BAO john@g4bao.com	Spectrum analysis to 24GHz Power measurement to 24GHz Direct frequency measurement up to 18GHz VNA to 1.3GHz RF sources to 24GHz High current PSUs at 12, 28 and 48V
W Midlands	Richard Bown G8JVM richard@g8jvm.com	power measurement to 18 GHz Sig gen to 1.3 GHz but can mix up to 3cms SA to 1.3 GHz but can down convert from 3 cms and probably other lower bands , check NF to 3 cms with IFs of 144 and others , check Freq measurement to 18 GHz, Rb standard
Scotland	Ray James GM4CXM	Lot of mutual assistance in GM via GM microwave reflector
N Ireland	Gordon Curry GI6ATZ	

Activity News : September

By Bob Price G8DTF

Please send your activity news to:

scatterpoint@microwavers.org

Introduction

This month we have some reports of Nanowave activity as well as the activity in UKAC and Microwave Group contests. Conditions over the month have been very mixed with some good conditions and a good Tropo opening on the 22-24th September.

Conditions for the 23cm UKAC were very poor with many stations struggling with normally easy contacts.

Nanowaves

From Barry G8AGN IO93

On the evening of the 14 Sept 2013, Barry G8AGN/P and Richard G0RPH/P successfully passed SSTV pictures both ways over the 66km path between High Bradfield near Sheffield and Manton near Kirton in Lindsey, Lincs. Visibility along the path was very good and the received pictures were of P4/5 quality. Both stations used phlatlight transmitters and A4 size Fresnel lens antennas.

Some of the received pictures are shown here.

Millimetre Waves

From John G8ACE IO91

A video of the 76GHz 102km distance record announced is now available for viewing. Two site URLs below. First one is possibly the better quality. Second one, a web page seems to limit daily connection usage.

https://docs.google.com/file/d/0B9s-pRG6smmGbTF2VkMxcmtjaFk/edit?usp=sharing

www.microwaves.zxq.net/76GHz/76GHz.html

There is quite a lot of wind noise to the audio at times. All of the cameras suffered this with the internal mics. Also I managed to leave my 47G Rx hissing at one time.

It's a fairly long video at 19 minutes duration, but hopefully will convey the good time we were having pushing the boundaries on 76GHz.

Beacons

From Bob G8DTF IO83

On the 22nd of September Hepburn was showing a good probability of ducting. I was monitoring the Mow Cop reverse beacon during the early evening and GB3CCX became a very strong trace on the SDR. I turned my 3cm gear on and got the mast up. During the evening the GB3CCX beacon was at times significantly stronger than my local beacon GB3XGH, peaking at S9+ on my FT817 S meter. I had several attempts at QSOs with G4BAO, G4RGK and F6DKW, but none of those stations benefitted from the duct.

On the 23rd after returning from the Bolton Wireless Club meeting the Mow Cop reverse beacon was showing many traces including F1ZAI, F5ZBA and HB9G as well as several strong UK beacons.

On 9cm with my recently fixed transverter I was able to hear GB3OHM, GB3ZME and at one point GB3SCF. I have been able to adjust my OCXO to be on the correct frequency against GB3SCF and now know where to look for the other 2 beacons.

6 cm

From Jim, GM3UAG, IO87

When Alan, GM0USI, announced on the microwave reflector that he had access to 6cm gear and he was looking for contacts I responded immediately. Over the years we have tried unsuccessfully on 23cm – there's an awful lot of Grampian granite between Aberdeen and Glasgow!

He very kindly offered to go portable to IO86PB, North Berwick, which is a much better direction for me. We had worked on 3cm before on one of his portable forays so it seemed logical to try that band as well. Then he suggested he could have 9cm capability.

Today, by arrangement, we hooked up first on 3cm at S9 both ways; then on 6cm, S9 again; then on 9cm, S9 again. So within an hour I enjoyed more contacts on more bands than I get in a year! (A good tropo excepted, of course).

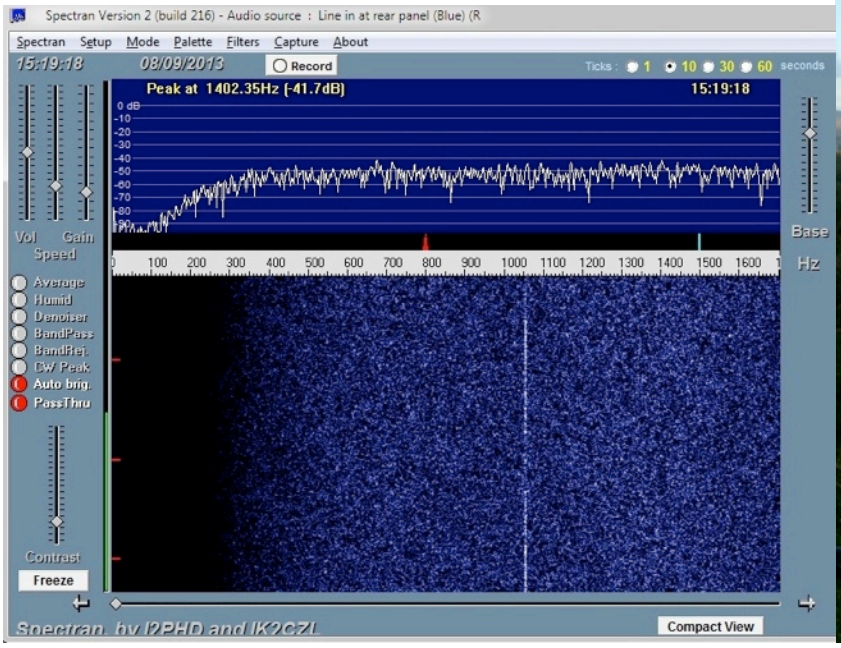
At 152km, on a largely sea path, it's not outstanding DX, but it's fine to get confirmation that the gear does work!

From Tony G4CBW IO83

I have my 6cm running now, not worked anyone on it so far but was seeing GB3MAN on spectran using a tripod-mounted system beaming through trees. Attached is a picture of the system looking thru the trees also a frame grab of GB3MAN. I expect it'll be loud when I can get the system on the mast.

I also worked Alan today on 9cm from his holiday location; IO75ms. He was a great signal on SSB, we then tried a cw qso with Alan using a hand held horn and we made it at 519/529.

I'm hoping to get out portable some time this week to have a go with Alan on 6cm, probably from Mow Cop. I will let you how we get on.



September 23cm UKAC

From Eddie G0EHV/P IO94

This month's UKAC was pretty dire with very poor band conditions, rapid QSB made things very difficult at times. A total of 28 QSOs with 14 multipliers, best DX being a new one for me - 2E0NEY @ 378 Km.

Attempts with three stations set up on 'KST with no success – next time hopefully!

Activity locally around Tyneside has now grown with two new stations active in the area. Brian G8KPD and Peter G8POG are now part of the small cluster of G8PNN, G8CYW, G4OIV and myself.

I used the usual IO94 portable site with 100 Watts to a 55 element Tonna antenna. No equipment problems, my new pair of 65Ah batteries powered the amplifier nicely with no "sag" on transmit.

From Bob G8DTF IO83

Conditions last night on 23cm were very poor to the South, West and East with me.

I had a number of attempts with stations who I can normally work easily and failed. G4BRK, G3PYE/P, G0EHV/P, GD8EXI and 2W0HRO/P were all heard, but no QSOs. QSB was severe on these stations.

I did manage to work some good distances, with 3 GMs (GM4CXM (IO75), GM4JR (IO85) and GM0USI (IO75)). I worked GI6ATZ in IO74, G4KCT in IO93, G8OHM in IO92, GW4BVE/P and M0BUL/P both in IO82, G8CUL in IO91 and G4NBS in JO02, plus 7 in IO83.

Very odd conditions for sure.

September 22–24th Opening

From Bob G8DTF IO83

On the 24th I put my antennas up and heard F1ZAI direct. There were a couple of strong UK beacons (GB3CCX, and GB3SEE). I had a couple of failed attempts at QSOs set up via KST. Then I had an attempt with Maurice F6DKW (JN18). I found Maurice straight away – good solid signal with some slow QSB. An easy SSB QSO followed. This is my first non UK station on 3cm and my best DX so far at 619km.

2.5W 78cm dish at 10m.

From Rainer DF6NA JN49

23.09.

G4AJC	IO91	23cm	742km
G0WUU	IO92	23cm	797km
M0GHZ	IO81	23+**13**+**9**+**3**cm	**877**km
new QDX tropo and new #			
G3UVR	IO83	**23**cm	985km new #
G3XDY	JO02	**9**+3cm	664km new #

24.09.

G4CBW	IO83	23cm	924 km

Many thanks for QSOs and test to everyone. Please QSL !!!

From Ralph G4ALY IO70

Here just one contact here which is above normal...

23 Sept 2013 2208UTC - DB6NT 5760.200 for my first DL on that band and new ODX of 1123km

It only took about 9-10 years to break the 1000km barrier hi. Still to do it on 9/3cm.

From John G3XDY JO02

I hope you managed to add some DX contacts to your logs during the recent lift. Conditions were good here, but did not extend far enough eastwards to bring in any really long DX.

1.3GHz

22/9/13	GI6ATZ	IO74	Loudest ever heard here
22/9/13	GI4SNA	IO64	59
22/9/13	GM0USI	IO75	First time on tropo
23/9/13	DJ5AR	JN49	
23/9/13	DL7QY	JN59	
23/9/13	DF6NA	JN49	
23/9/13	OE5XBL	JN68	599
23/9/13	F6AFC	JN38	
23/9/13	DB6NT	JO50	59+
23/9/13	DJ5NQ	JO50	
25/9/13	F1VL	JN03	
25/9/13	F5BUU	JN03	

The beacon HB9BBD/P in JN47GA was audible during this lift for the first time, and I also copied GB3CSB (IO75) for the first time. HB9EME (JN36) was so loud I could hear it clearly at the lowest power level during its power step sequence, which equates to just 12mW RF output. The EA2TZ beacon was also heard early on the 23rd at reasonable strength. DC8EC (JN57) was a got-away, just not enough signal for a QSO.

2.3GHz

23/9/13	DJ5NQ	JO50	59
24/9/13	DL0VV	JO64	Aircraft reflection
24/9/13	DH2SAV	JN48	59
24/9/13	DL7QY	JN59	
24/9/13	DF9IC	JN48	
24/9/13	SK7MW	JO65	Aircraft Reflection, 55 peak on SSB
25/9/13	F5DQK	JN18	

There were some got-aways too, with DF6NA (too much noise/QSB) OZ3Z (aircraft reflection too short), and F1VL (too weak). Beacons heard on this band included F1ZQU (IN95), and F1ZUM (JN07)

3.4GHz

23/9/13	DL7QY	JN59
23/9/13	DJ5NQ	JO50 57 on SSB
23/9/13	DF6NA	JN49
24/9/13	DK6JL	JO31
24/9/13	DL7QY	JN59
24/9/13	DF9IC	JN48

5.7GHz

23/9/13	DJ5NQ	JO50	59 on SSB
24/9/13	G4CBW	IO83	first time worked on 6cm

HB9G (JN36) was heard for long periods at good strength. Other beacons included F1ZBD (JN07) and DB0FGB (JO50).

10GHz

23/9/13	DL7QY	JN59	
23/9/13	DL6NAA	JO50	
23/9/13	DB6NT	JO50	
23/9/13	DG5CST	JO60	781km
23/9/13	DJ5NQ	JO50	SSB
23/9/13	DF6NA	JN49	
24/9/13	F6DKW	JN18	59 SSB

Beacons heard on 3cm included F1ZAI (JN07) and HB9G (JN36). Several tests were not successful; I'm rebuilding the 3cm system over the autumn and expect to have a revamped capability in 2014.

September SHF UKAC

From Bob G8DTF IO83SM

I am finding it difficult to juggle 3 bands at the moment. Conditions were OK for the SHF UKAC. I worked the following stations.

13cm

G3UVR, G4MVU, M0UFC/P and GW8ASD all in IO83.
G0MJW, G8CUL, G4BRK and G8NVI all in IO91
G3VKV and M0GHZ in IO81
G8OHM in IO92
G3UKV in IO82
GM4CXM in IO75

9cm

G4MVU, G4JLG/P and M0UFC/P in IO83
G0MJW in IO91 for my best DX on this band yet.

3cm

G4MVU in IO83
G3VKV in IO81
G4WLC/P in IO81

From Dave G4RGK IO91

23/9/2013

23cm

I worked: DH2SAV (JN48); DL7QY (JN59); OE5XBL (JN68); F6AFC (JN38); DJ5NQ (JO50);

13cm

DB6NT (JO50); DJ5NQ (JO50).

3cm

On 10 GHz I had a pipeline into JO50 and nowhere else, I worked:

DL6NAA (JO50)ODX at 894 km
DB6NT (JO50)
DJ5NQ (JO50)

Tropo station here:

1296 = homemade tvtr 30years old. N6CA Cavity about 100W, ant 35el Tonna

2320 = homemade DB6NT Tvtr 8W, ant – Horn fed yagi.

10 GHZ homemade DB6NT Tvtr 475mW, ant – 60cm prime focus dish.

September 5.7/10/24GHz Microwave Group Cumulative Contest

From Bob G8DTF IO83SM

I was active for a few hours in this contest on 3cm. Conditions were OK. I did not work anyone in my own square (IO83), but worked G4WLC/P and G3VKV in IO81, G3UKV in IO82 and my best DX as usual was G4LDR in IO91 at 275km.

EME

From Dave G4RGK

23cms

1/9 N4PZ (cw); LU8ENU (JT)
22/9 MJ/SA6BUN (CW)(M&M dxpedition)

13cms

28/9 ARRL EME Contest: HB9Q (CW); G3LTF (CW)(contest still running as I write)

Station 23cm = 4.6m dish - 250w; 13cm 4.6m dish – 80W

From John G0API IO80

I have just completed some tests on 1296MHz using the Moon as a source of signal:

ON0EME from the back garden .... just

I built 10 DL6WU long Yagis some 25 years ago for contest and home uses on 1296MHz and found them to be as good as the G(M)3SEK software predicted .

After many years of occasional contesting at Flight Refuelling ARS G4RFR the antennas had suffered a bit, so this year I decided to refurbish them at home and needed some way of measuring performance .

I initially used a cold sky /ground and cold sky/Sun test , which looked promising in conjunction with my "vintage" SSB Electronics and Minikits LNAs .Jules G0NZO lent me a G4DDK VLNA he had almost finished (Jules builds a lot of things but tends to need a push to finish them!) and this was an eye opener in terms of noise level - it also indicated that the normal household environment is a hostile place ....

The Yagis are 38 element with a folded dipole and 1/2 wave balun combination at each feed - I tested 2 boxes of 4 antennas and built two 4 way and one 2 way combiner, using data from the usual RSGB Microwave Handbook .The centre combiner was bolted straight into the DDK first stage and followed by a Minikits second stage to overcome a run of 15m of UR67 feeder.

I live on a 66m hill top and the array was mounted on an AZ/EL capable mount, built using an old office chair base that happened to allow interface with standard alum scaffold. A 1.5m AGL centre point was deemed suitable as it had to sit in the centre of my rear grass and be high enough to avoid damage from passing Grandchildren – the grown up ones have their own Amateur Licences so know better than to clout the OMs antennas...

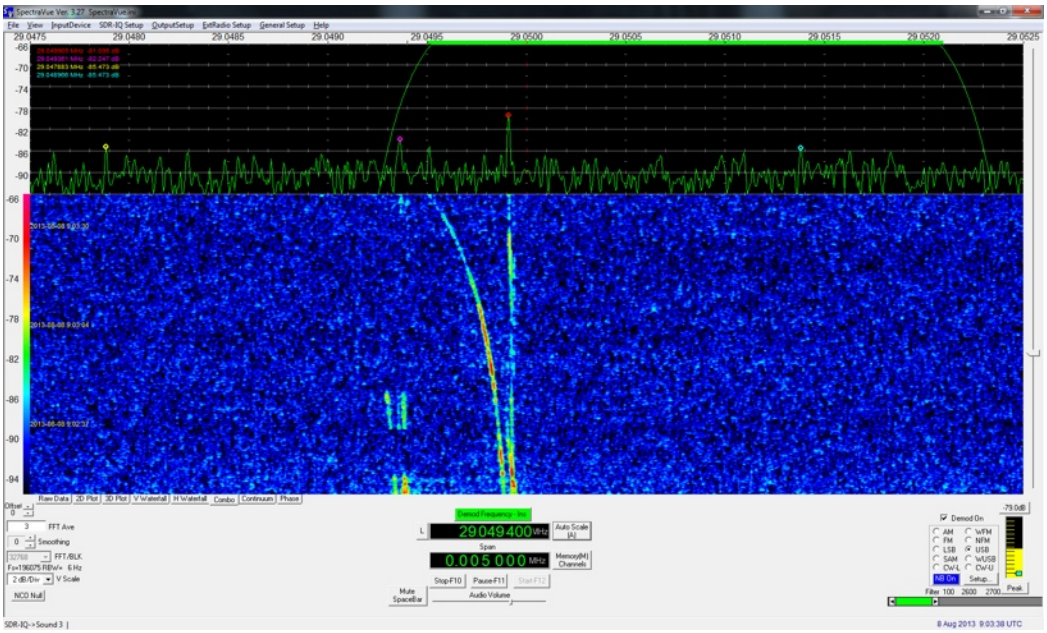
A check was made using terrestrial sources – in fact I found that with 10 degrees of EL I could see a signal from GB3FM and via aircraft scatter GB3MHL. These were at 99 and 270km respectively – not too hard to do BUT my array at 1.5m AGL was pointing at the elevated hilltop in that direction which rises by 4.5m within 75m of the antennas - rock borers they ain't.

The signal from GB3FM was solid, but the aircraft enhanced signals were something else - at times hammering my RX and producing some fantastic Doppler displays on my PC screen. The line of shoot coincides with the main East/West path from Heathrow.

So, it looked good, but how good would it be on EME or because I like playing in the garden during the daylight could I see the ON0EME beacon off the Moon when everyone else was earning a crust?

The individual Yagis have a theoretical gain claimed of 17.8dbd, so an array of 8 in a linear polarised array probably in the order of 26dBd - maybe optimistic for combiner losses, but they do seem to have a reasonable return loss and I remade and tested all 10 of the array coaxial feeder links in Heliax – loads of N types ...

So the final proof – the array was mounted as described on the back lawn and the shack end of the UR67 terminated in an SSB Electronics GaAsFET lump, followed by a 2 stage interdigital filter, feeding a G4JNT TVTR module that had its input mod amps removed .



GB3FM aircraft scattering on 4 yagi array Aug 2013, 10° EL

Output from the TVTR was at 144MHz into a Datong DC144/28MHz downconverter and into my SDR-IQ .The TVTR was locked to GPS at 10MHz via a G4JNT synth LO, but the Datong DC was unlocked .The preamp output when checked on my SpecAnn was quite lively /wideband, so the filter was a definite requirement to avoid humungus cell phone QRM etc.

I use the Moon predictions shown on the WSJT9 software as I can have several windows open on the monitor and Spectraview on the SDR-IQ.

Initially I was seeing a lot of "noises off "and not too much Moon, but after a few attempts I realised that local vegitation clutter was limiting things – trees are so loud!

I resolved to remove a 20 year old pine tree, as it was obviously a safety hazard and ummm rather in the way of the Lunar thingy. That opened up a useable "window" of perhaps 50 degrees starting at 140 degrees of Az and at least 25 degrees of EL.

So today ,30/9/2013,it was several weeks since the array was finished and the Moon was "right" – it was also threatening to rain and 10/10 cloud cover, but whatever ...

I could see a line on the display as soon as I turned it all on and it was not the 1296.000000MHz reference I was generating from my GPS locked sig gen/diode combe multiplier. The clincher was the exact Doppler offset shown on the software and the fact that it moved downwards and disappeared when the array was tweaked off bore-sight.

At the peak, which I could only hold for a few minutes as it started to rain after drizzling, the signal could just be heard and my XYL Sue G7MHO says she detected keying ... on-screen it was probably 2 to 3 dB above noise floor in a 6Hz bandwidth but, hey ho, that's EME – it's not meant to be too easy!

I notice on the ON0EME website that they use a G4JNT supplied keyer, so the addition of JT65 would make it even easier to identify, with small systems such as this – it is also linearly polarised and has a 3dB resulting loss as the Moon beacon is circular .

The plot shows the ref at 1296.000000MHz and the Doppler shifted (negative) signal from ON0EME.

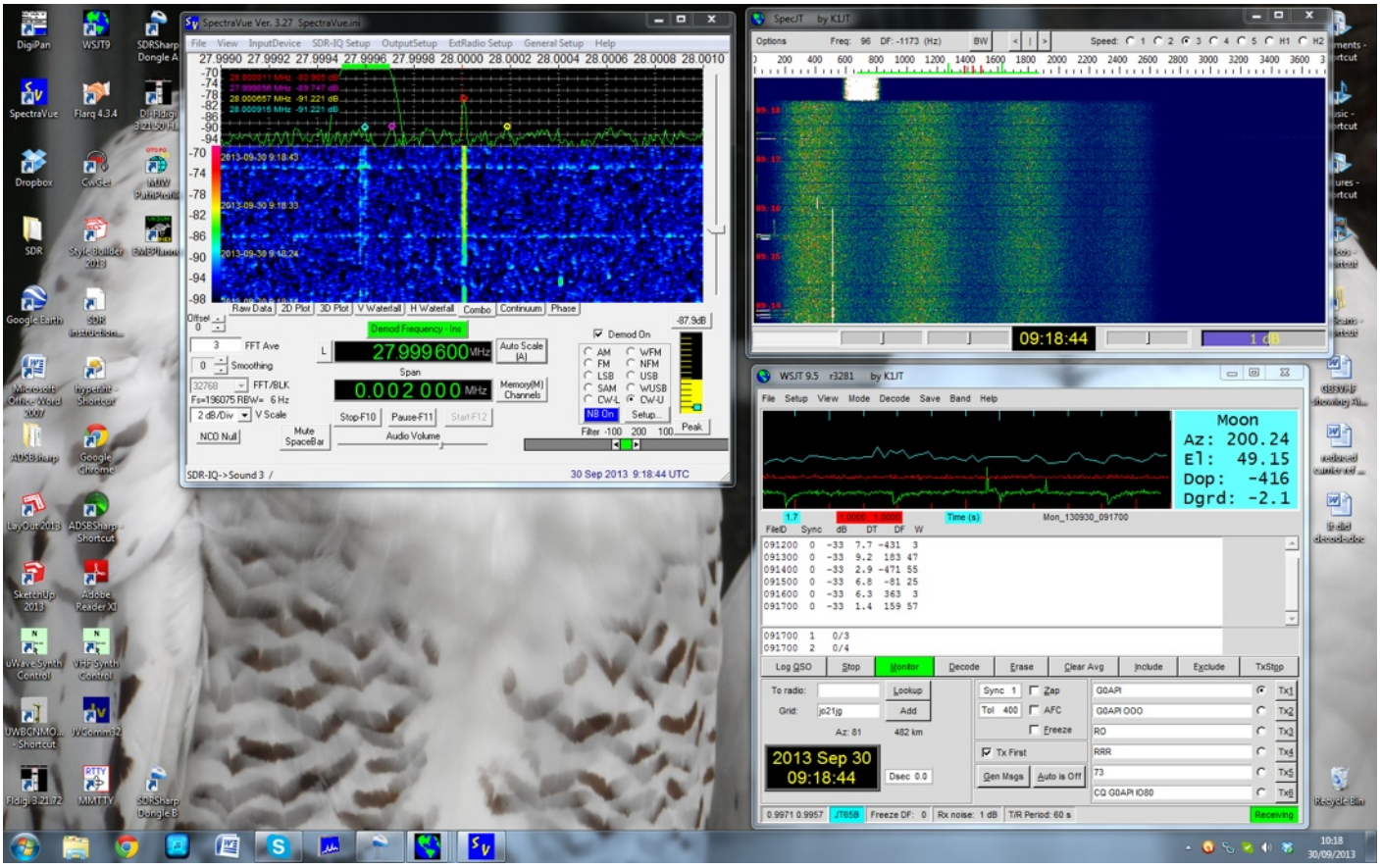
So now I can take it all down and back to the club - next time I hope will be a report using the refurbished 3.2m dish at G4RFR – it should be easier.

...and finally

I want to encourage you all to report your activity to clearly document use of the amateur microwave bands. This means not just DX, but also local activity with low power or WB equipment.

Please send your reports to
Scatterpoint@ukmicrowaves.org

Remember the deadline is the 1st of the month.



RSGB & UKµG Contests 2013

Month	Contest name	Certificates	Date 2013	Time GMT	Notes
Mar	Low band 1.3/2.3/3.4GHz	F, P,U,R,L	3-Mar	1000 - 1600	First 4 hours coincide with IARU event
Mar	1.3GHz Activity Contest	*Arranged by RSGB*	19-Mar	2000 - 2230	RSGB Contest
Mar	2.3GHz+ Activity Contest	*Arranged by RSGB*	26-Mar	2000 - 2230	RSGB Contest
Apr	10GHz & Up EME	*Arranged by DUBUS*	*13–14-Apr*	0000-2359	DUBUS EME Contest
Apr	1.3GHz Activity Contest	*Arranged by RSGB*	16-Apr	1900 - 2130	RSGB Contest
Apr	Low band 1.3/2.3/3.4GHz 2	F, P,U,R,L	21-Apr	1000 - 1600	
Apr	2.3GHz+ Activity Contest	*Arranged by RSGB*	23-Apr	1900 - 2100	RSGB Contest
May	*10GHz Trophy*	*Arranged by RSGB*	*4-May*	*1400 - 2200*	Saturday, to coincide with IARU
May	*432MHz & up*	*Arranged by RSGB*	*4–5-May*	*1400 -1400*	RSGB Contest
May	1.3GHz EME	*Arranged by DUBUS*	*11–12-May*	0000-2359	DUBUS EME Contest
May	5.7GHz EME	*Arranged by DUBUS*	*18–19-May*	0000-2359	DUBUS EME Contest
May	1.3GHz Activity Contest	*Arranged by RSGB*	21-May	1900 - 2130	RSGB Contest
May	5.7GHz/10GHz/24GHz	F, P,U,R,L	26-May	0600-1800	
May	2.3GHz+ Activity Contest	*Arranged by RSGB*	28-May	1900 - 2130	RSGB Contest
Jun	Low band 1.3/2.3/3.4GHz 3	F, P,U,R,L	2-Jun	1000 - 1600	Aligned with some Eu events
Jun	2.3GHz EME	*Arranged by DUBUS*	*15–16-Jun*	0000-2359	DUBUS EME Contest
Jun	1.3GHz Activity Contest	*Arranged by RSGB*	18-Jun	1900 - 2130	RSGB Contest
Jun	2.3GHz+ Activity Contest	*Arranged by RSGB*	25-Jun	1900 - 2130	RSGB Contest
Jun	3.4GHz EME	*Arranged by DUBUS*	*29–30-Jun*	0000-2359	DUBUS EME Contest
Jun	5.7GHz/10GHz/24GHz	F, P,U,R,L	30-Jun	0600-1800	
Jul	VHF NFD (1.3GHz)	*Arranged by RSGB*	6– 7-Jul	1400 - 1400	RSGB Contest
Jul	1.3GHz Activity Contest	*Arranged by RSGB*	16-Jul	1900 - 2130	RSGB Contest
Jul	24GHz - 1THz Contest	O	21-Jul	0900 - 1700	New Format
Jul	2.3GHz+ Activity Contest	*Arranged by RSGB*	23-Jul	1900 - 2130	RSGB Contest
Jul	5.7GHz/10GHz/24GHz	F, P,U,R,L	28-Jul	0600-1800	
Aug	Microwave Field Day	O,L	4-Aug	0900 - 1700	
Aug	1.3GHz Activity Contest	*Arranged by RSGB*	20-Aug	1900 - 2130	RSGB Contest
Aug	5.7GHz/10GHz/24GHz	F, P,U,R,L	25-Aug	0600-1800	
Aug	2.3GHz+ Activity Contest	*Arranged by RSGB*	27-Aug	1900 - 2130	RSGB Contest
Sep	1.3GHz Activity Contest	*Arranged by RSGB*	17-Sep	1900 - 2130	RSGB Contest
Sep	2.3GHz+ Activity Contest	*Arranged by RSGB*	24-Sep	1900 - 2130	RSGB Contest
Sep	ARRL Microwave EME	*Arranged by ARRL*	28–29-Sep	0000 - 2359	
Sep	5.7GHz/10GHz/24GHz	F, P,U,R,L	29-Sep	0600-1800	
Oct	*1.3 & 2.3GHz Trophies*	*Arranged by RSGB*	*5-Oct*	*1400 - 2200*	RSGB Contest
Oct	*432MHz & up*	*Arranged by RSGB*	*5–6-Oct*	*1400 - 1400*	IARU/RSGB Contest
Oct	1.3GHz Activity Contest	*Arranged by RSGB*	15-Oct	1900 - 2130	RSGB Contest
Oct	2.3GHz+ Activity Contest	*Arranged by RSGB*	22-Oct	1900 - 2130	RSGB Contest
Oct	ARRL EME 50-1296MHz	*Arranged by ARRL*	26–27-Oct	0000 - 2359	
Nov	ARRL EME 50-1296MHz	*Arranged by ARRL*	16–17-Nov	0000 - 2359	
Nov	1.3GHz Activity Contest	*Arranged by RSGB*	19-Nov	2000 - 2230	RSGB Contest
Nov	Low band 1.3/2.3/3.4GHz 4	F, P,U,R,L	24-Nov	1000 - 1400	
Nov	2.3GHz+ Activity Contest	*Arranged by RSGB*	26-Nov	2000 - 2230	RSGB Contest
Dec	1.3GHz Activity Contest	*Arranged by RSGB*	17-Dec	2000 - 2230	RSGB Contest

Sections		
	F	Fixed / home station
	P	Portable
	L	Low-power <10W 1.3/2.3/3.4GHz, <1W 5.7/10GHz)
	R	Radio talkback
	U	Unlimited Talkback

Main changes from 2012 calendar	
1	ARRL/DUBUS EME updated
2	Lightwave event deleted
3	5.7/10/24GHz Cumulatives replaced with individual events

73 John G3XDY, UKUG Contest Adjudicator

UKµG Contest Portal

Journées d'Activité Dates in 2013

From Robin Lucas G8APZ

October JA: W/E 26 and 27.

F6BSJ memorial JA: QSOs by reflection via Mt Blanc will take place on Sunday morning July 14.

Duration of JAs: Saturday 5:00 p.m. Sunday 5:00 p.m.

The latest EME calendar is available from DL7APV's website

Events calendar 2013 – 16

2013

Oct 8–10	European Microwave Week, Nuremberg	www.eumweek.com/
Oct 11–13	**RSGB Convention**	www.rsgb.org/rsgbconvention/
Oct 18–19	Microwave Update, Morehead, Kentucky	www.microwaveupdate.org/
Oct 26-27	BATC Convention, Finningley	www.g0ghk.co.uk/calendar/viewevent/90-batc-convention
Nov 2	**Scottish Roundtable**	www.rayjames.biz/microwavert/

2014

Jan 18	Heelweg	www.pamicrowaves.nl/
Feb 15	GHz-Tagung Dorsten	www.ghz-tagung.de/
Apr 12	CJ-2014, Seigy	cj.ref-union.org/
April 26-27	Martlesham Round Table	
May 16-18	Hamvention, Dayton	www.hamvention.org/
Jun ??	RAL Roundtable	
Jun 27-29	Ham Radio, Friedrichshafen	www.hamradio-friedrichshafen.de/
July 1	Scatterpoint 10th Anniversary	www.scatterpoint.org/
August	EME2014, Pleumeur-Bodou near Lannion	
Sept 26–27	National Hamfest	www.nationalhamfest.org.uk/
Oct 6-9	European Microwave Week, Rome	www.eumweek.com/
Oct 10-12	RSGB Convention	www.rsgb.org/rsgbconvention/
Oct ??-??	Microwave Update, Rochester, New York	www.microwaveupdate.org/

2015

Apr 11	CJ-2015, Seigy	http://cj.ref-union.org/
May 15-17	Hamvention, Dayton	www.hamvention.org/
Sep 28 – Oct 2	European Microwave Week, Paris	www.eumweek.com/

2016

May 20-22	Hamvention, Dayton	www.hamvention.org/
Oct 4-7	European Microwave Week, London	www.eumweek.com/