



An Amateur Radio publication for the Microwave enthusiast

MICROWAVE NEWSLETTER

Published by the Radio Society of Great Britain and edited by G3PHO and G8AGN.

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FROM THE EDITOR

2003 – SEPTEMBER



This issue is being prepared a little earlier than usual as the editor is getting ready to fly off to Seattle, USA, and Microwave Update 2003. A report on what is held to be the premier

amateur microwave event in the world will hopefully appear in the October newsletter, that is if your humble editor can squeeze in a session or two of desk top publishing in the week he has between returning from Update and flying off for a month in Australia and New Zealand! So, please do not email the editorial desk between Sept 24-Oct and from Oct 8th to Nov 6th .. You'll get no reply of you do!

On the subject of emails, there is a change (see the foot of this page) to the editor's email addresses. Please **delete** the virgin.net address from your email address book and use either one or both of the ones shown below. Mail sent to virgin net will be deleted by the editor's "spam filter"!

Many thanks to all our authors this month. Without them and those who sent in activity reports, there would be no newsletter.

Don't forget the **21st September 6cm and 3cm Cumulative Contests**. Activity has been on the increase this year so keep up the good work!

The **Martlesham Round Table** will be upon us in November. Check out G4DDK's website for information as it comes in..

<http://www.btinternet.com/~jewell/>



In this issue ...

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- In the news this month
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- A Cheap Attenuator for 24GHz
- More ideas for home made microwave dummy loads
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- A useful tip from G4ALY
- 10GHz Trophy 2003 - results
- Activity News

News, views and articles for this newsletter are always welcome. Please send them to G3PHO (preferably by email) to the address shown below. 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.



G3PHO: Peter Day

0114 2816701



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146 Springvale Road,
Sheffield, S6 3NU, UK



G3PHO: Email: microwaves@blueyonder.co.uk
or microwaves@g3pho.org.uk

SUBSCRIPTION ENQUIRIES SHOULD BE SENT TO RSGB HEADQUARTERS AT THE ADDRESS SHOWN AT THE TOP OF THIS PAGE AND NOT TO THE EDITOR ..



**MACOMM
10GHz "WHITEBOX"**

Bob, G3GNR, has an unmodified unit for sale at just **£75**. For those not yet on 10GHz this represents a very economical way of getting on the band, You will need, in addition, a replacement 106.5MHz crystal, a microwave coaxial relay and a homebrew power supply (+12, -5V and +20V). Full modification details are available at www.g3pho.org.

For further details of the unit contact Bob G3GNR by email at: ohfour2@ntlworld.com



TWT fitted into rack tray (some components missing). Unit labelled Marconi Radar Systems, R.F. Driver, Identity 5-72-4245-01, Serial No. 001. R/CYA/89. TWT itself marked English Electric Valve Co. Ltd., Type N1082 No.136 7839. Black finish. Approx. dimensions: L = 9 ins (22.9 cm); W = 2 ins (5.1 cm); D = 1-1/4 ins (3.2 cm) max. Bolted to heat sink L = 11 ins (28 cm); W = 2-3/4 ins (7 cm); D = 5/16 ins (0.8 cm) with 2-inch heat dissipation vanes at one end. Unit R.F. section is connected in semi rigid and sma. Section also contains apparent ring mixer, circulator(?) and a cavity(?).

The TWT is a low power, 1 watt type but may be of use and/or interest to someone! **Price: £20** .

I would like the buyer to collect. I live between Braintree, Essex and Sudbury, Suffolk.

Contact Donald Imber, G0VIS on 01787-461059 or email him at: dmimber@tesco.net

WANTED URGENTLY!

I'm rebuilding my 10GHz transverter. For the new box, I've acquired some nice little combine bandpass filters which have enough flexibility in their design to retune to 10368MHz **but** they are fitted with 0.036inch diameter, 50 ohm feedthroughs designed to mate with 2-hole flange field-replaceable SMA connectors, or semi-rigid cable transitions.

I can buy the connectors from people like Pasternack in the US, but I'd then hit a \$100 minimum order limit. So, I was wondering...

Does anyone have any of these connectors lying at the bottom of a drawer, gathering dust? I'm quite happy to pay for them! Or.....

Does anybody know a UK source for similar connectors, without a heavy-duty MOQ? Or.....

Does somebody else need some special connectors and would like to join me in making an order to the US?

I'm also in the market for a connectorised mixer with an RF bandwidth covering 10GHz, and IF BW including 432MHz.

Many thanks, in anticipation!

Chris, GW4DGU

gw4dgu@blaenffos.org

**Chris Bartram, Blaenffos, Pen-y-Bont
CAERFYRDDIN/CARMARTHEN
Cymru/Wales SA33 6QG UK**



IN THE NEWS THIS MONTH



The photo above shows the recently refurbished GB3KBQ 10GHz beacon, provided and maintained by Adrian, G4UVZ in Taunton.

The beacon is still being driven by a modified Pye HS400. 27MHz is sent up the coax from this unit to the microwave head seen in the picture on the top of the HS400. Here, the LO from a MACom "white box" is driven via a X4 multiplier. The 50mW O/P from the box is then attenuated by 20dB and drives a Qualcomm PA to just about a watt.

Thanks go to Neil, G4BRK for the Qualcomm and to Doug, GW3ATM, for the attenuators . I would be pleased to receive any reports to my email address.

The opportunity was also taken to clean out the 3m of WG16 which had gained a few cobwebs over the last 8 years. When the beacon was taken down it was still within 1KHz of freq ! It is now reset and should stay +or- 200 Hz. 73 from G4UVZ email: Adrian.Whatmore@tst.nhs.uk

IS THIS THE WRITING ON THE WALL?

From: Graham Shirville
[g.shirville@btinternet.com]
Sent: 10 August 2003

It seems that we will be having wireless LANs operating on

Band A 5150-5350 200mW eirp indoors only
Band B 5470-5725 1 watt eirp indoor/outdoor
Band C 5725-5875 (will be subject to a new spec not yet published but perhaps 2 watts eirp)

It suggests that only bands A and B should be in use in the UK at the moment, since 12th Feb 2003. Band C appears to be related only to 802.16A .

See also this Jan 2003 paper which may be of interest

<http://www.radio.gov.uk/topics/mobiledata/wlan/regulatory/wagreg02-03rev2.doc>

and check this site where this is described as WMAN wireless metropolitan area networks... I assume metropolitan describes a larger area than local?

<http://www.ieee802.org/16/>

Does this mean the end of 6cm satellite, EME and terrestrial work or am I having a bad day?

Graham G3VZV

Dave Robison G4FRE (WW2R) Honoured in the States

From: Kent Britain [WA5VJB@FLASH.NET]
Sent: 30 July 2003

Subject: News about a Brit

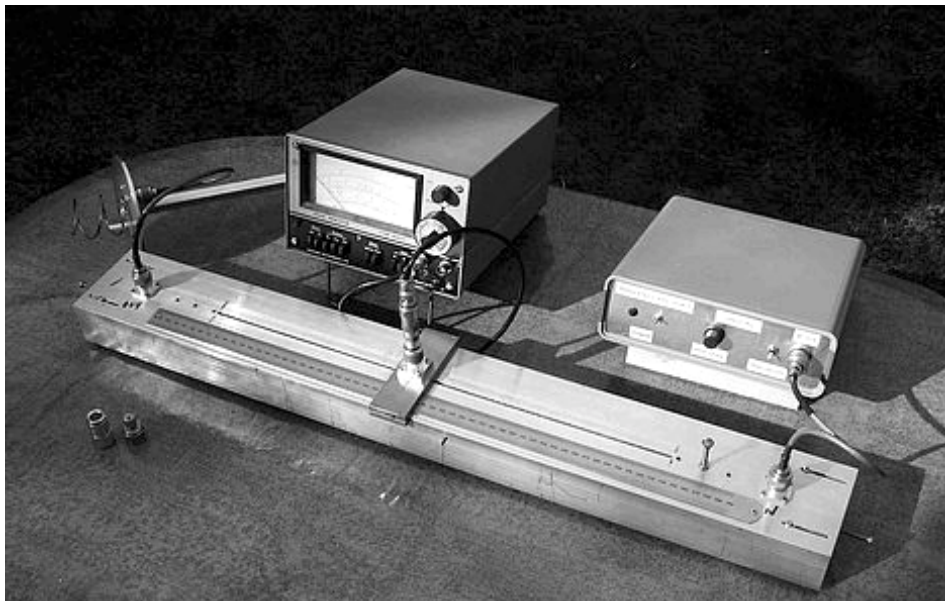
Mr. G4FRE receiving the 2003 Chambers award from the Central States VHF Society for his technical contributions to the hobby.

(. and many congratulations from all of us here in the UK Dave ... editor)

A Slotted Line for 2.4GHz

By Mike Scott, G3LYP

Since the launch of OSCAR-40, I have been experimenting with various antennas and converters for



reception of the S-Band signals on about 2401.32MHz. Sam, G4DDK and David, G0MRF, have kindly carried out gain measurements at Martlesham and also at the AMSAT-UK Colloquia held each July at Guildford (see articles by Kent Britain WA5VJB in Scatterpoint No.1, and Sam Jewell G4DDK in Scatterpoint No.6). As these opportunities only occur at relatively infrequent intervals and as the equipment required is quite inexpensive to buy or build, I decided to develop facilities for making my own measurements.

I have now built a 2.4GHz source consisting of a G4DDK 004 oscillator, the final doubler of which is modulated by a 1 kHz 555 oscillator, which is used to supply the collector bias. The modulated signal collected from the antenna under test, is rectified with a coaxial detector and the resulting AF signal measured on a selective logarithmic amplifier (Marconi Type 6593A, or a G4PMK tuned audio amplifier as described in chapter 12 p. 23 of "The VHF/UHF DX Book", edited by G3SEK, and updated in Scatterpoint Nos 4 & 5).

If a good quality directional coupler, which is capable of giving reliable results at 2.4GHz is available, VSWR and Return Loss measurements can be made using the same source and amplifier, so that matching of antennas and other items can be optimised. Unfortunately I do not possess a coupler with the required directivity to give accurate results, so I have had to consider alternative approaches. In the Microwave Handbook Vol. 1 p.5.23 the use of slotted waveguide and a diode probe is recommended as an alternative. I considered this approach and looked around for some

WG 9 or WG9A, but have not seen any at rallies or boot sales of suitable length to be of use and so discounted the idea. At the Newbury boot sale in June this year, I managed to purchase a laboratory quality slotted line in WG16 complete with diode probe mounted on a rack and pinion mount with a vernier scale. The price asked was very low and so I immediately purchased it. Within a short time I had greatly improved the matching of various items of 10GHz equipment, and the idea of a 2.4GHz version was reconsidered.

As no suitable waveguide was available, I considered the possibility of making some from sheet brass or tinplate, but rejected the idea and decided to find out what sizes of rectangular aluminium box section were available. As luck would have it 2"x 4" with a wall thickness of 10swg is a stock size. The internal dimensions are 95mm X 44mm which falls somewhere between WG8 and WG9A. The internal aspect ratio is not quite 2:1 (actually 2.2:1) but then a number of commercial waveguides are not 2:1 (eg. WG16). I decided to purchase a metre of this material. Buying small quantities of aluminium is not always easy, but I have been going to John Keatley Metals Ltd of Shadwell Street, Birmingham for some years and find them very helpful and willing to cut short lengths of many different metals, including aluminium, brass, copper, stainless steel, and tinplate. In addition, they have shelves of offcuts of all of these metals which they sell by weight. Martin Kinder, GOCZD, told me of this firm some years ago and now I make a point of visiting them whenever I go near Birmingham

The construction of the slotted line is shown in the attached drawing. The only difficult job is making the slot, which I did on a small milling machine using a 1/8" slot drill. As the travel on my machine is only 11" I had to cut the slot in two stages, using a strip of steel mounted on the table as a datum. I am sure that if it is not possible to get access to a milling machine, it would be possible, with care, to chain drill and file the slot but it would be very tedious!

With the exception of a couple of 15dB horns, I do not use waveguide in any equipment at this frequency, so it is necessary to provide transitions to coax from the slotted line. If measurements of return loss and VSWR are to be meaningful, it is essential that these transitions are as near a perfect match as possible. To allow for adjustment and experiment, I decided to make the shorts across the ends of the waveguide adjustable and I also made provision for three matching screws should these be necessary. The dimensions for the probes were calculated using formulae published many years ago in "The Microwave Newsletter Technical Collection" p3.2.2 by G4KNZ using data from G3JVL.

The probe for measuring the voltage along the line consists of the inner conductor from a piece of semi-rigid coax with the insulation remaining, but the outer copper removed. The diameter of the insulation is such that it is a sliding fit in the slot. The probe is soldered to an "N" connector using a brass sleeve to ensure that it is located in the centre of the tag on the connector. The saddle is made from brass flat stock with ¼"square strips screwed to each end so that it is a close, but sliding fit over the waveguide. A suitable hole is cut in the centre of the saddle in line with the slot on the waveguide. To prevent the tag on the connector shorting on the top of the waveguide, a suitable packing piece is required to raise it about 1/8" above the top of the saddle. A coaxial diode detector is used to sample the voltage on the line. If an unmodulated source of 2.4GHz is used, an analogue voltmeter connected to the detector is all that is required. If a 1kHz modulated source is used, a tuned audio amplifier is required as described above.

I mounted a 600mm rule on the top of the waveguide to enable λ_g to be measured directly. For 2401 MHz the calculated figure for waveguide of this internal dimensions is 165.5mm. The figure I measured was 166mm. The formula for calculating λ_g is in the Microwave Handbook Vol. 1 p.5.17 but there is a misprint, and the correct formula is:

$$\lambda_g = \lambda / \sqrt{1 - (\lambda/2a)^2}$$

Where λ is the free space wavelength and "a" is the internal dimension of the broad face of the waveguide.

Adjustment of the shorts on the transitions is quite simple. The 2.4GHz source is connected to one transition and a good quality 50 ohm termination is connected to the other, and the maximum and minimum voltages on the line, separated by $\lambda/4$, are found, and measured, by sliding the saddle along the waveguide. The sliding short is then carefully adjusted until the difference in voltage at each point is minimised (ideally, if the match is perfect, there should be no difference). As I was unable to get a perfect match with the short, I tried matching screws in the broad face of the waveguide, but these did not improve the situation. Some small improvement was obtained by adjustment of the short at the source end of the line, and also the use of one matching screw.

The use of a termination with good performance at this frequency is obviously important. I have a small selection, and picked the best. Some, available cheaply at rallies, perform very badly at this frequency, but seem to be satisfactory at 144 MHz.

By connecting various items of equipment, such as antennas, filters, and attenuators, in place of the termination, it is possible to get an idea of how well they are matched, and, where adjustment is possible, whether or not, improvements can be made. The results can be in terms of VSWR, return loss, or reflection coefficient. A useful page of formulae showing the relationship between these quantities can be found on page 12-12 of "The VHF/UHF DX Book", and elsewhere in several amateur handbooks.

While I make no claims as to the accuracy of the measurements made with this equipment, it provides considerable scope for experimentation, and results obtained can be verified, or otherwise, when access to professional equipment at Round Tables is possible. I find it very satisfying when measurements made at home with simple equipment, turn out to be reasonably accurate when repeated on expensive laboratory equipment.

This month's good idea ...

24 GHz attenuator - cheap !

I needed some attenuation to check out my 24GHz amp, and the only directional coupler I have is only about 15 dB.

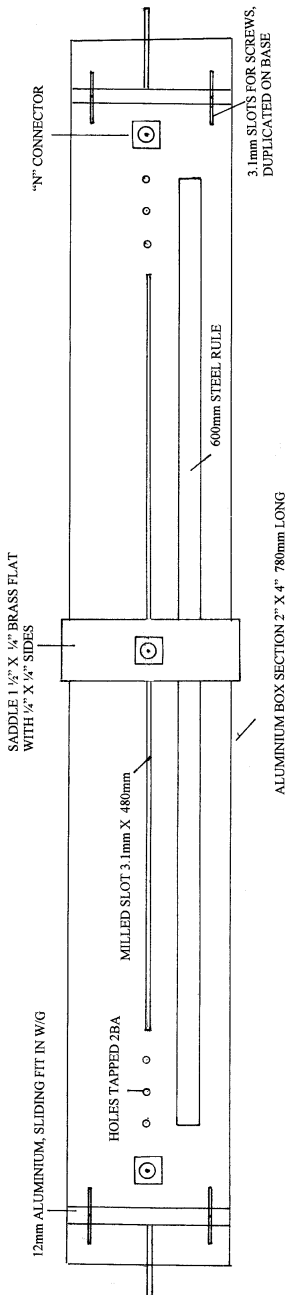
Tyres are made of carbon-loaded rubber and carbon is known to absorb RF. Anti-static foam has very little carbon and is nearly transparent at 10 GHz.

Since I ride a bicycle for exercise, I have a number of tubes with only small holes in them - small and easy to work with. I cut a hunk that fit loosely in WR42 (WG20) and tried it out. About 1.5 inches long provided 16dB attenuation. The VSWR isn't great, about 1.5 or so, but could probably be improved by tapering the ends.

.... and all for a price acceptable to WA5VJB!

if you can't find something suitable on your own, or want a piece of proven material (Continental brand), an SASE will get you 20 or more dB.

73 Paul, W1GHZ



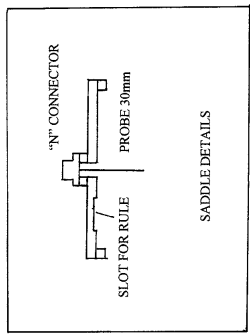
TRANSITION PROBE

Diameter: 4.5mm

Length: 26.5mm

MATCHING SCREWS

Spacing: 20.75mm



2.4 GHz Slotted line – G3LYP

More ideas for home made microwave dummy loads

Editor's comments *The following notes were recently gleaned from WA1MBA's Internet microwave reflector, a most useful forum for all things microwave. Dick Nadle, K2RIW, the author of the notes, needs no introduction to microwaves anywhere in the world ... his name and callsign have appeared in many a publication over the years. Our thanks go to him and to Tom Williams, WA1MBA, for providing this interesting information. While we appreciate that many of our readers may have already seen this on the Internet, we know that there are lots of other folk out there who do not subscribe to the WA1MBA reflector. In any case it's good to have these things in "hard copy" !*

INTRODUCTION -- In 1999 I submitted an article to the Microwave Reflector on the subject of the 10GHz Circular Waveguide experiments that were performed by the Ten-X Microwave Group (from Long Island, New York) using 3/4 inch copper plumbing tubing. One of the components we had constructed multiple times were Circular WG dummy loads by machining a piece of 3/4 inch wooden broomstick handle and placing it inside a piece of the 3/4" copper tubing. This made a high performance "slow absorber". If the point on the broom stick handle was sharp enough, the reflection was less than -35 dB; that's a VSWR of 1.04:1

FANCY MATERIALS REQUIRED? -- Neophyte microwavers have been led to believe that very special materials are required to construct high quality WG dummy loads and attenuators. This is somewhat true only if the performance must be obtained in the smallest possible package and be maintained over all environmental conditions and the recommended frequencies for that particular WG. However, we microwavers are usually not that fussy! If a Home-Brew WG attenuator is 2" long, compared to the commercial and more expensive product that's 1" long, and if the attenuation has a slight slant with respect to frequency, I doubt the crafty microwaver would mind. He will simply calibrate it versus frequency.

With those concepts in mind, you will soon realize that many of the inexpensive materials at your disposal can be used to construct rather high quality fixed attenuators, variable attenuators and dummy loads.

Paul Wade, W1GHZ used bicycle tyre material as a microwave absorber (see earlier pages ...editor). I believe that the small VSWR that Paul experienced would almost completely disappear if his material had been cut into a tapered (wedge-like) shape. We used wooden dowels and broomstick handles and achieved Home Brewed dummy load VSWRs as low as could be measured, once we used a proper taper.

PAD CONSTRUCTION -- Although we didn't perform the experiment, we speculated that high performance WG fixed attenuators could be constructed by placing a wooden "bullet" in the WG that had been sharpened on both ends. This technique should work equally well on Circular WG and Rectangular WG. The attenuation can be adjusted by changing the length, width and placement of the wooden "bullet", or by placing a number of bullets in the WG. If the desired attenuation is too large, when using a reasonable-sized wooden bullet, there are at least two alternate approaches:

(1) The bullet doesn't have to symmetrically fill the WG. A small diameter, sharp-pointed piece of wood (a dowel, or a sheet of wood) that is placed in one of the WG corners will perform admirably.

The exact cross section of the attenuator doesn't matter. As long as it has a taper that is slow enough in cross sectional change per wavelength, than there will be very little reflected energy (VSWR).

By moving the piece of wood from a WG corner, toward the center of the WG, the insertion loss will increase. This technique can be used as an attenuation Fine Tuner. Again, with proper taper, the VSWR will not change appreciably as the absorber is moved toward the WG center.

(2) A full-sized WG low loss bullet could be constructed from Balsa wood. This low density material will have a much slower attenuation constant in dB per inch.

PAD CONSISTENCY -- The Dissipation Factor (or Loss Tangent) that is caused by the wooden bullet is strongly affected by the moisture content of the wood. Therefore, I recommend painting the wooden bullets with a weather-proofing paint so as to maintain their moisture content (loss consistency). Depending on the Dissipation Factor of the paint that is chosen, I suspect there will be a slight loss increase after the bullet is painted. Don't judge the final insertion loss until the paint has dried. There probably are some low Dissipation Factor paints, such as lacquer, which will have very little impact on the bullet's additional loss.

MORE PAD & ATTENUATOR DATA -- Concerning WG components, here's THE BOOK: George Southworth, "Principles and Applications of Waveguide Transmission", D. Van Nostrand Co., 1950; 689 pages (an oldy but goody). Sometimes this book is available from used book web sites; it's a good buy. It contains some of the best PICTURES of how rectangular and circular WG really works with lots of performance curves (you won't need the math to understand the pictures (pages 166 & 169), it's almost an animation) -- amazing stuff for 1950.

On pages 269 to 276 you'll find pictures of linear, binomial, gaussian, and exponential WG impedance stepping functions for broadband impedance matching, 14 designs for dummy loads (pages 368 to 371), about 25 attenuator designs.

Page 121 (A & B) has pictures are 21 of the circular WG modes (with the relative sizes of pipe shown, same frequency) made with an "RF absorbing camera".

The book shows some great transition devices, hybrids, mode killing devices & devices for launching higher modes (pages 354 to 362), round WG components (pages 269, 327 & 328), circular guide fin line (page 133), a great section explaining choke flanges (page 201), a circular pipe polarization rotating device that's "home brewable" (page 207), the shapes of circular and rectangular WG (of constant periphery) that give minimum loss (page 193)(the popular ones are not optimum), "skeleton WG" (page 175), about 15 kinds of WG irises (page 246 & 255), circular WG filters (page 307), the Qualcomm duplexing filter explained (page 309), rotary vane phase shifter (page 333), rotary vane attenuators defined (page 375), a way of designing a variable conductance dissipative film (page 377), 33 pages of horn data (only portions have appeared in other WG or antenna books), 8 kinds of "backfire" feeds including the Cutler (pages 448 to 454), eight types of WG slot antennas (pages 425 & 430), five kinds of corner reflectors, waveguide lens antennas, some TWT and magnetron info, etc. The picture on page 186 shows me how I could make S-band WG out of rain gutter down spout tubing. Let a microwaver stand in a good hardware store with that book in hand and I think he'll get some great and crafty microwave ideas.

ARTICLE REPEAT (IN PART) -- Below I have repeated two sections of the 1999 article. The numbers refer to the section numbers of the original article; there were 14 sections. If there is

sufficient interest I could "re-publish" the 1999 article. Those who need a copy can request it from me.

Two sections of the 1999 K2RIW article entitled "Circular WG Frequencies, More Accuracy, More Experiment Data"

7. DUMMY LOADS -- In circular WG are quite easy to construct. Simply sharpen a 3/4" broom stick handle and force it into the 3/4" copper pipe. About 3" of taper and 2" of non-taper is FB. The usual moisture in the wood makes a great "slow absorber", which makes it more forgiving of errors. The main difference between a -35 dB S11 dummy load (VSWR = 1.04, [sharp tip]) and a -20 dB S11 (VSWR = 1.22) seems to be how sharp the point was at the tip of the broom stick handle and was the taper too abrupt (too short). There may be some variations caused by knots in the wood, but we didn't seem to have that problem.

The completed circular WG dummy load consists of a ~ 7" piece of 3/4" pipe with the tapered broom stick handle (absorber) in it plus a copper pipe coupler at the open end. Some of the broom stick absorber can stick out the pipe far end, if you prefer. It is easy to place this load on any other piece of circular WG, while running component tests. These pipe couplers really are "sexless" connectors. For experienced rectangular WG users, it will feel strange to make connections in 2 seconds and not worry about screwing down the flanges to get a good VSWR.

9. PADS -- We never did this, but it would be easy to design circular WG fixed attenuators by decreasing the length of broom stick absorber and tapering both ends to have a good impedance match from either direction. In this case I would recommend painting the absorber to keep the moisture content (absorption) constant.

If it is found that the loss is too great for a convenient length of tapered wood absorber, consider making the absorber out of six "splines" by using thin sheets of wood, or out of balsa wood. These low density materials (with tapered ends) will allow a lower insertion loss to be constructed from a longer length of wood absorber. Also, the slower loss characteristic will cause a lower VSWR for a particular taper rate.

**73 and Good UHF/SHF/EHF DX,
Dick, K2RIW
Grid: FN30HT84DC27
web: <http://consult-li.com/listings/RKnadle.htm>**

MARTLESHAM MICROWAVE ROUND TABLE .. PRELIMINARY INFORMATION

Some changes are likely to be made regarding the hotel and dinner venue for this year's meeting. Please check the G4DDK website over the next few weeks for further information and a link to the website where you can register your intentions. G3DDK's website can be found at: <http://www.btinternet.com/~jewell/>

Due to the Newsletter Editor's unavoidable absence over the coming weeks it will not be possible for this information to be sent out via his email list or be published in the Newsletter in time for you to take the necessary action.

IT'S YOUR SAY

This newsletter offers all readers the chance to freely air their views and opinions on any microwave matter. This month, Noel Matthews, G8GTZ, shares his strong feelings about the future of our UK UHF and microwave allocations in an email to the editor. Like many others, he is greatly concerned at the possible loss of frequency allocations in the (near?) future but feels he is not getting the support from the people that matter. What do others think? Please discuss this important topic at your next club meeting and be prepared for some powerful debate at forthcoming microwave round table meetings! Please note that the views expressed in this feature are those of the contributor and not necessarily those of the editor or of the RSGB Microwave Committee.

From: Noel Matthews [Noel@snap.clara.net]

Sent: 29 August 2003

Subject: The future of the microwave bands in the UK

I think we should all be concerned for the future of our bands above 144MHz - see the notes below - but what can we do about it? Well for a start someone might care to raise a few questions at the RSGB open meetings. After that I believe we need to lobby hard to protect our valuable spectrum since, as they say, once it's gone.

430MHz - Quote from the RMC website

"The RSGB has been informed by the Radio Communications Agency that the Primary User has stated that it is unable to clear any outstanding or new Packet Mailbox / Nodes or Repeaters in the 70 centimetre band for the foreseeable future. The RA has stated that it will contact the RSGB as soon as the restriction has been lifted or if any further information is received regarding this issue. - Text from GB2RS"

1296MHz

The application for a TV repeater in Southampton (and many other groups across the country) have been flatly refused by the CAA who are refusing to allow any input frequency to be allocated in the range 1248 - 1280 MHz. They have, strangely, accepted in principle, outputs above 1300 MHz.

2.3GHz

Similar problems as 23cm but this time with the Home Office who have refused anything in the range of 2320 to 2390MHz and as we know the ISM band makes 2400MHz up unusable.

3.4GHz

Rumour has it that HO digital helicopter down links have moved in to part of 3.4 GHz.

5.6GHz

Now been allocated for Fixed Wireless Access and likely to see an increase in activity due to the 5.8 GHz unlicensed spectrum.

10GHz

Already cut in half. Most TV repeaters have had to move and rumour has it the HO are already grabbing chunks for local video surveillance.

24GHz

Reallocation is going on.

As you can see from the above, all bands are under threat and I appreciate this appears, at first sight, to just affect repeaters and, in particular, TV repeaters which are very bandwidth hungry. However, I believe this gives us a worrying insight in to pressures on our allocations and I would

like to think that even the true narrowbanders who could argue we only need 50kHz on each band will be concerned by the long term threat to our hobby.

These changes are of course being brought about by a realisation of the value of spectrum and improving mass produced technology making the higher bands useable at an economic price. Therefore everyone is going on a spectrum grab...

However, I do also believe it is being made worse in the UK by the establishment of OFCOM which in turn means the RA is being dismantled. The people in the RA who were amateur friendly are now worrying more about their own individual future (I know that our local RIS person had to re-apply for his own job!) and they, both at an individual level and departmental level are not going to jeopardise their futures by pushing the amateur cause in deference to those of say the HO or CAA, who may have a major say in their future career path.

I have it on good authority that OFCOM will be very focussed on profitable spectrum management and the amateur fraternity will have a very difficult corner to fight. One person involved commented he felt amateur radio at VHF/UHF was at a watershed and unless we go our act together and presented a well reasoned case to OFCOM we will continue to be fighting and losing what would be a steep uphill battle.

This brings me to my final point in that I do not see anyone representing amateur radio in a professional way to the authorities and in particular arguing our case in the spectrum management of the higher bands. I was convinced of this position by 2 incidents:

Very recently, I wrote to the chairman of the RMC asking what the escalation procedures were within the RSGB when the RMC could not resolve repeater applications with the RA. ie did the RSGB management committee discuss such things and did the GM make approaches to the RA at a higher level. Perhaps, not surprisingly, I did not get an answer!

Also nearly 3 years ago I wrote to the GM an email about the future of 2.4GHz - this got referred to the Microwave Committee. Again no answer.

I therefore believe the RSGB is not representing the interests of the microwave community but is more concerned with winning another 100(?) kHz at 7 MHz than losing 70MHz at 10GHz. While some of us have always chosen to ignore their shortcomings, perhaps this issue is too serious to let pass.

73 from Noel, G8GTZ

Postscript.... See also G3VZV's poignant comments on page 3 of this issue.

BEACON NEWS

Scottish 9cm Beacon

The 9cm beacon previously operated from near Dundee as GM4ISM/B is back on using **GM4LBV/B** from **IO86RQ**, located near Montrose and overlooking the sea. The frequency is **3400.064MHz**. 132 ETN 120 deg beamwidth. The TX uses an Ionica PA so the beacon has a good ERP. Please spot and **send reports to: gm4ism@bigfoot.com**

UK South Coast Beacons

From: Andy Talbot, G4JNT Talbot Andrew [ACTALBOT@mail.dstl.gov.uk] Sent: 01 September 2003
After a site visit last weekend to lower the mast, a couple of the South Coast beacons are currently off air:

GB3SCS on **2.3GHz** needs attention to some of its multiplier stages to cure a tuning drift that causes it to reduce in power over time/temperature. The easiest cure is probably for me to just rebuild these modules.

GB3SCX (10GHz) has been completely removed pending a major rebuild, one part of which is to replace the head unit with a more reliable 2 Watt PA.

Currently the other three beacons are operating, but the mast is at reduced height which should not seriously affect South East/North West propagation, but may reduce signals to the NE due to local trees. This situation will likely remain for several weeks.

At some point in this **period GB3SCK (24GHz)** will also be taken off the air for its frequency change to 24048.9MHz - which by a fluke of the original application a few years ago is already licensed for that freq - we could have had a dual band beacon if we'd wanted one!

I [may] rebuild the exciter for GB3SCX with a high stability source based around a DDS - but that does not necessarily have to be part of this refurbishment exercise - although doing it now will prevent a future period of its being off-air.

Andy G4JNT

A USEFUL TIP ..

Take a look at www.anquet.co.uk They do very detailed maps for computer use at 1:50,000 scale. They also have a facility for profiling heights over a path, on a flat earth principle but with accuracy. The maps run at about £35 pounds each. covering the whole of the UK, but in separate N/S areas. I think they may be of use to us lads!

73 from Ralph, G4ALY

10 GHz Trophy 2003 Results

Conditions were around average during the early stages of this contest although there was a little rain scatter around, and some very unpleasant windy weather at some sites. Telford & DARS went QRT very early having been blown off the hill but made many a large number of QSOs while they were on the band – many on wideband ATV. Later in the contest conditions improved somewhat across the North Sea, and John Wood, G4EAT was able to take good advantage of this to just edge the South Birmingham RS out of first place.

Andy Cook, G4PIQ, Contest Adjudicator VHFCC

Pos	Callsign	Loc	QSO	Mult	Score	Pwr	Ant	Best DX	km
1*	G4EAT	JO01HR	18	14	56616	10	0.6m	GD0EMG	443
2*	G4MAP/P	IO92GB	17	16	53152	10	0.9m	F5HRY	463
3	G3XDY	JO02OB	11	10	30450	10	0.6m	DK2MN	416
4	G4RFR/P	IO80UU	12	12	24060			GD0EMG	399
5	G4BRK	IO91DP	10	13	21801	10	0.8m	PA6NL	403
6	G3ZME/P	IO82QL	20	9	16254	5	0.9m	GD0EMG	228
7	G4LDR	IO91EC	10	10	12690	8	0.9m	F6DKW	378
8	G4NNS	IO91FF	9	7	6993	4	0.55m	F6DKW	383
9	GD0EMG	IO74QD	6	6	6405	15	1m	G4RFR/P	399

* Certificate Winner



ACTIVITY NEWS FROM THE WORLD ABOVE 1000MHz

SUMMER MICROWAVE DX OPENINGS REJUVENATE ACTIVITY LEVELS

The summer of 2003 will go down in the annals of history as not only being the hottest on record (and one of the driest) but also for providing some of the best microwave propagation for many a year. This month we concentrate on reports of the June rainscatter event and the excellent August Tropo lift ...

Rainscatter

The period from 31st May over into the first week in June saw some remarkable rainscatter conditions. The following reports give a flavour of what it was all about ..

From: John. G3XDY [g3xdy@btinternet.com], near Ipswich) JO02OB

The 31st May had a good mix of excellent rainscatter and tropo. I worked F5PMB/P in JO00 early in the morning with S9+ signals on 3cm, but had to go QRT before he got his 6cm gear fired up. Later in the afternoon I was able to get on at the end of a good rainscatter opening, working DM2AFN (JO61), DL3IAS and DF6NA (JN49). DM2AFN's card arrived direct a few days later to confirm my best DX on this mode of 881km.

Later in the evening the bands opened to Scandinavia with very good tropo duct to Northern OZ and Western Sweden. The OZ1UHF beacon is definitely back in service, it was copied here on 23, 13, 9, 6 and 3 cm. On 23cm I worked SM6PGP (JO67), SM6HYG (JO58), SM6CEN (JO57), OZ6OL (JO65), OZ6AQ (JO44), OZ6HY (JO45), OZ8AFC (JO45), LA6MV and LA3FV (JO59). On 13cm I worked SM6HYG at 59+. On 9cm OZ1CTZ was worked for a new square and country, and SM6HYG heard me at S9+ but has no licence for the band at present. On 6cm SM6HYG was also 59, his signals were a little weaker on 3cm at 57. The 6cm QSO was a new square and best DX for the band.

A WORD OF THANKS....

From: jfell@crydom.com
Subject: Flight Refuelling HAMFEST 10th August 2003
On behalf of the South Coast Beacon & Repeater Group, I would like to thank all those who attended and offered tangible support by way of a donation or purchase of "pre-owned"(junk) equipment . So far we have raised a shade over £220 as a result of Hamfest 03, some way short of the £500 annual rent for the GB3SC series of 5 microwave beacons , but a good start . All this was on the official hottest day since they started to worry about such things . I was particularly pleased with my purchase for £1 from G3YGF (the asking price -honest guv) of a 5.7GHz waveguide branched coupler from Marconi - I will give it pride of place on my mantelpiece Julian - well I would if it was strong enough! I wonder what the going rate is for copper guide these days.....it must weigh many kgs..... Last but not least a very BIG thank you to the Chairman and Committee of FRARS for the table space for this fund raising . I guess it helps when the Chairman is also Paul MOEYT who most of you on 10GHz will have worked as G4RFR/P from Bell Hill . If he twists my arm enough I will probably organise a Microwave Round Table Event if anyone is interested .

73 de GOAPI

The following day saw an intense rainscatter opening to France. F6DKW (JN18) and F6DWG/P (JN19) were worked mid morning with good signals, later in the afternoon F6APE (IN97) was worked on both 3 and 6cm, with strong signals on 6cm, due to a very severe storm over northern Normandy. G4NNS was worked on both 3 and 6cm by back scatter, and I also exchanged weak backscatter signals with G4BRK on 9cm.

The 4th June saw F5HRY on 3 and 6cm RS, plus F6DWG from his home station.

The 7th and 8th of June are a microwave contest in Germany, and a major French multiband contest. On the 7th I worked a few DLs on 23cm, and tried on 3cm with F8BRK/P in IN98, but was too late to get into a good scatter point for him. On the 8th F1DBN/P provided JO00 on 13cm as a new square, and the rain returned so that a further test with F8BRK/P was successful for IN98 on 3cm.

On the 9th, at the end of a good UK RS opening, I worked G4PBP with excellent signals on 6cm, plus G4BRK on 3cm.

From John, G4EAT (JO01HR)

I decided I would upgrade my antenna system in stages to check for improvements. On 30th May at lunchtime, I had replaced 2m of semi-rigid from the transverter to the antenna feed with a 1m length of flex-waveguide bought at Martlesham last November. Within 2 hours an excellent RS event took place and over 3-4 hours I worked 4 new

squares in JO's 40, 41, 50 and 60 with best dx OK1JKT at 891km (report 52s) and a new country for me. Summary: 15 DLs, 1 F and 1 OK. DB6NT was 53s ssb from JO50. Calculated feed loss improvement is 2dB. I start to wonder if I have missed all this dx for the last 3 years!

The next day saw a similar event but the scatter point was a little further east and fewer contacts resulted. However DM2AFM in JO61 was new ODX at 923km. I heard OK1JKT again. To round the day off, tropo across North Sea brought OZ1CTZ for the first time, in JO46. The 1st June saw a long 8 hour RS storm over Northern France giving me 6 contacts, all 59s.

**From: G3FYX,
(royg3fyx@emery48.freeseve.co.uk) Bristol,
IO81RM**

There was a nice bit of activity on the 1st June via Rain scatter. I was alerted by the DX cluster & worked GORRJ, G3LTF, G4BRK, G3LRP, G3LQR, F6DWG/P, F6APE, F6DKW, &PA0WWM F6DKW was a terrific signal on ssb with little scatter!

**From: Peter, G3LRP[g3lrp@thersgb.net] Nr
Wakefield, IO93HO...**

Via rainscatter I worked, during the June 1st RS event: G3LQR JO02QF 55S out 57S in, G4BRK IO91DP 52S out 52S in, G3FYX IO81RM 53S out 53S in, F6DKW JN18CS 549 out 55S in 595.6km, G4PCS IO91WV 54S out 55S in I couldn't hear PA0WWM when other stns were working him. I missed lot of DX with my late arrival on the band but only knew about it after a phone call from Ralph, G4ALY. I nearly dropped off chair on hearing F6DKW calling CQ! I wasn't sure if it was tropo or forward scatter through the rainstorm for F6DKW as his note was T9. In future I'll keep my eyes more open, for these storms, on wx maps!

**From: G8DKK, Bryan [bryan@harber.f9.co.uk]
Letchworth, IO91VX**

There was good tropo on 30/31 May and Sunday June 1st. Early Saturday morning produced a 59 +20dB signal from GB3MLE and a check on 10GHz found 'MLE (S)' at 559 and a signal about 10 - 15 kHz lower that was not keyed - was this 'MLE (N)'? In fact I had detected 'MLE on 10GHz on the Friday before I left for work and again it was still there at 8.00am on Sunday morning. As if this wasn't enough, Sunday afternoon at 17.15 produced good rain scatter signals via an E. coast thunderstorm. 10368.100 MHz sounded more like 20m. The best DX was F6DKW (JN18) and F6DWG/P (JN19) - (59s). So, quite a week! 73, Bryan, G8DKK

AUGUST TROPO LIFT CONDITIONS ...

Many of you will have been enjoyed the excellent microwave conditions that prevailed for over a week in early August. There were many remarkable contacts made from 23cm to 24GHz. The opening appears to rival that of 1994, the "Mother of 10GHz Lifts" ! As a result, the Operating Ladders should see some

interesting changes!

Peter, G3PHO (IO93GI, Sheffield) dusted the cobwebs from the **indoor** home station gear (5 watt 10GHz TVTR to a 60cm offset dish in the bedroom!!) Switching on the indoor equipment at 0450GMT (!) on 5th August found P17EHG (beacon) at RST 599+ on 10368.170MHz ! Then a feast of 3cm beacons ... P17TGA (569), DB0GHZ (JO34WE), at 624km, RST 579, and DB0JK (JO30LX) RST 439qsb at 637km. At 0610 a massive S9+40dB ssb signal was heard from G4EAT in JO1HR. This was remarkable in that the direct path is very obstructed at G3PHO's end and John's signal was being received through a double glazed window and off the next door's slate roof, 90 degrees off the beam heading!). Needless to say a FB QSO resulted. This was followed by an S9+++ ssb contact with PA0WWM (437km) and a new square in the shape of DL3YEE (JO42GE) at 690km, a cw qso at RST559 both ways.

For the evening of that Tuesday, Peter went out /P locally in IO93EI with the 60cm dish on 10GHz and had another nine DX contacts. The best of these were PA0WWM again, PA3AOH, PA0EZ and DC6UW(JO44VJ). Attempts to work OZ1DOQ/P (JO55SW), DJ8ES (JO43SX) and PA0JUS (JO22OO) failed, surprisingly as the /P location was infinitely better than the home one! Peter used 432.350MHz for talkback on this portable foray and it brought loads of replies! Throughout this remarkable day there was one very outstanding signal ... DB0GHZ, the Heligoland beacon (JO43WE) on 10368,810MHz. It was "end stopping" for hour after hour!

And that was that ... the conditions dropped out at G3PHO for the rest of the week but not for some others in the UK .. Read on!

**From: Nicholas Shaxted, GM4OGI, IO85DX
[mailto:Nick.Shaxted@blueyonder.co.uk]**

I may have worked only two stations but I did hear 5 beacons during the lift on the evening 7th August 2003 SK6MH1, SK6YH/B, OZ1UHF, OZ5UHF and DB0GHZ.

On 8th August all the beacons listed above were present and especially DB0GHZ (at one point it was literally end stopping) At 07:35utc I logged for the first time DB0VC. I have never heard this beacon on 23cm so it was a surprise to hear it on 3cm My 10GHz contacts were as follows: OZ1CTZ 559/519 19:20utc 07/08/03 on cw OZ1CTZ 59/59 20:15utc on SSB OZ2OE 519/- 20:25 on cw. I heard him but then lost the signal.

SM7ECM -/- 20:30

SM7ECM and I tried every hour on the hour and more (check the cluster!!!) but nil sigs

Then finally I got him ... SM7ECM 549/419 05:50utc 08/08/03 on cw, confirmations received at 06:05utc (IO85dx - JO65NQ about 1049km) Unsuccessful attempts were DL3YEE, DF5JJ and DK1KR on the 8th August. During the evening at 21:25utc on a seemingly dead band I had an SSB contact with

OZ1CTZ 59/59. It all shows what can be done when one tries!

From John, G4EAT (Essex, JO01HR)

10GHz CONTACTS AUGUST 3rd to 11th 2003 ..

3rd: PA3AOH 58/59, JO31, 408km.
4th: DGORG 219/NC, JO62jv 837km 3W, 60cm
DG1KJG 55/55 JO31nt 461km
5th: G3PHO 58/59+ IO93gj 233km
DG1KJG 59/59 JO31nt 461km
G8HMV 59/59+ IO82qi 234km 250mW !
DC6UW 319/NC JO44vj 681km Not a CW op!
DJ8ES 529/559 O43sx 649km
9th: G4ALY 55/55 IO70vl 366km
F1PYR/P 59+/59 JN19bc 313km
F1BZG 59/59+20 JN07vu 686km New Square!
F1GHB 54/55 IN88gr 443km New Square!
F6APE 56/56 IN97qi 495km
ON1CDU/P 52/54 JO20hu 295km
OZ1DOO/P 58/59 JO55sw 856km, New Square!
OZ1CTZ 559/579 JO46oe 749km
10th: DL3YEE 57/58 JO42ge 545km
DL4BBU/P 58/59 JO31lp 437km Random QSO!
DK2MN 59+/59+JO32mc 443km New Square !
11th: OZ1CTZ 59+/59+JO46oe 749kkm Best ever sigs
with Brian

Beacons heard at G4EAT for first time ...

GB3MLE IO93eo 259km
F1XAI JN07wt 445km
DB0VC JO54if 730km! My ODX for beacon
DB0HEX JO51ht 689km No one active JO51 !!
DB0HW JO51gt 683km No one active JO51 !!
Plus .. many days of DB0GHZ at 599 !

From: Peter, G3LTF, IO91GG

[100633.1656@compuserve.com]

I made some good QSOs on all the bands that I am on over the period 31/7 to 13/8. I will only list the dx on 13cm and 3cm. It was my first serious tropo on 3cm. On 13cm, 4th August, I worked DL3YEE JO42 693km, F6CBH JN19,331km, F6APE IN97 437km. On 8 Aug DB5KN JO31 596km, PA0BAT JO31 550km, F5HRY JN18 394km, ON7YK,JO20 524.7km. On 12 Aug F6BQX IN96 500km. On 13 Aug F6AJW/P, IN93 871km! On 3cm on 8 Aug PA0BAT JO31 550km, F1PYR/P JN19 348km, F6APE, IN97 437km F6DKW JN18 380km. On both bands I found the internal G activity very low.

David, G4RQI (Castleford, W. Yorkshire) is brand new to microwaves, making his first ever 10GHz QSO from a /P location in IO93PW, on the 5th August, just in time to catch the opening to Europe! After working G3PHO/P (IO93EI) for his first QSO, he then worked G3LRP (IO93HO) and then had some fun, as his email describes ...

From: David [g4rqi@blueyonder.co.uk]

after I had finished working G3LRP I had a look around the band for beacons, GB3MHX was S9 as was DB0GHZ but I couldn't hear GB3CCX or GB3CEM. I called CQ for quite a while before QSying to 2m where I worked

DJ8ES in JO43SX at S9 who happened to be QRV on 3cm. So we moved from 2m to 3cm where we exchanged S3 - S7 ! Unfortunately my transverter was drifting very badly by the end of the QSO and at one stage it was 50kHz low so I will have to do something about this before I go out portable again. (Editor comment ... how many other folk could be so lucky as to have their first microwave contacts under such excellent tropo conditions?)

From: Martyn, G3UKV [ukv@globalnet.co.uk]

Shropshire: I thought conditions were excellent but rather more selective than in the much celebrated 1994 affair. I only had one DX QSO - mainly because my 10 GHz gear was sitting in the garage, until I put it up on the mast mid-week. I worked F1PYR/P in JN19BC (520km) on 9th August at 07:19 UTC on 10368 MHz. Reports 53/33 exchanged. In comparison, Richard G8JVM on the Telford ridge south of me exchanged 59/59 reports - which says something about our relative sites !

John, G3XDY (JO02OB), sends in a very detailed log of his contacts during the tropo lift periods. We can only extra the highlights for the space we have left but there is some superb DX in his list just look ...

23cm: 26 stations worked, the best being **EA1CRK** (IN73DM, 1080km), **EA1DAX** (IN53TH, 1206km), DGORG (JO62JU, 789km), SM6DJH (JO58PI, 946km), LA6LCA (JO59FE, 980km)

13cm: 9 stations worked, the best being LA6LCA (JO59FE, 980km), F6APE (IN97QI, 540km) and DL3YEE (JO42GE, 500km)

9cm: 4 stations worked - DL3YEE(500km), DG1KJG (JO30NT, 433km), DGORG(JO62JU, 789km), LA6LCA (JO59FE, 980km)

6cm: 8 stations worked, the best being DL3YEE (500km), F6APE (IN97QI, 540km) and LA6LCA (JO59FE, 980km)

3cm: 9 stations worked, the best being DGORG (JO62JU, 789km), F6APE (IN97QI, 540km), LA6LCA (JO59FE, 980km) and OZ5BZ (JO45OU, 671km). F5PEJ was also worked at 256km but he was running only 10 milliwatts!

Neil, G4BRK (IO91DP) found excellent conditions almost a month earlier between **13-15 July**. His highlights include OZ1FF (14th July 59/59 from JO45) on **23cm**, plus DK3BU (JO33), LA8AV (JO59 1156km) on the same band. **OZ1FF was also worked on 3cm.**

15 July saw the Oslo beacons on both 23 and 13cm. **The real highlight was a qso with SM6ESG (JO67, 1083km) worked on 23, 13, 6 and 3cm !!** Neil thinks this may equal the European DX record.

OUT OF SPACE AGAIN !

If your activity notes were not listed this time they will appear in the October issue.

73 until October