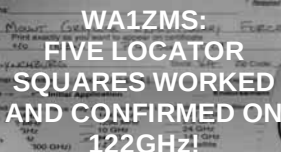


scatterpoint

Formerly the RSGB Microwave Newsletter and now published by the UK Microwave Group

2005 FEBRUARY



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Latest News ...

- ✱ New World 122GHz record
- ✱ Microwave Round Table planned for 17th April
- ✱ UK microwave activity matches the winter air pressure ... low!

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

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From the Editor's Desk

Our thanks go this month to all those who have sent in information for this edition and in particular to **Bernie, G4HJW** for his most interest article on how

you can start out on 10GHz on a shoestring budget, using surplus sat TV LNBS ... quite a way from the DB6NT or G3WDG approaches but easily affordable! We also thank **Brian, G4NNS**, for the thought provoking notes on his experiments with passive reflectors in his region. If you are finding it hard to make contacts then read his article!

However, in spite of these excellent contributions we were very hard pressed this month to fill up our 20 page allocation, so please write in with your ideas, articles, comments, etc. Photographs are also most welcome.

Details of the forthcoming Microwave Round Table meeting at RAL in April appear later in these pages. Please note that the date is provi-

sional and will be confirmed within the next week or so. Visit the UKuG website for up-dated information. Mike Willis, G0MJW, is our "anchor man" at RAL and he's setting up an email registration system for those who wish to attend the meeting. Details will be posted on the Internet and in next month's Scatterpoint.

Activity levels have been very low in the UK over the past month or so, if the paucity of reports to Scatterpoint is anything to go by. It behoves all of us to try to be as active as possible and thus strengthen our case in the struggle with those "higher authorities" who might wish to reduce our precious microwave frequency allocations.

The next organised activity days are:
Sunday 20th March (All bands Activity Day)
Sunday 24th April (1.2, 2.3, 3.4GHz Contest)

Please try to generate some RF on those days!

Until next month, best wishes, and happy microwaving.

Peter, G3PHO



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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.

SUBSCRIPTION ENQUIRIES SHOULD BE SENT TO THE UKuG GROUP SECRETARY AT THE ADDRESS SHOWN AT THE TOP OF THIS PAGE

What ever next?

Editor's note: from time we come across items that verge on the unbelievable ... who would have thought we amateur microwavers would have potential QRM from flying golf balls! Read on (and have a laugh!)

Coming Soon To A Country Club Near You -- Radar Golf !

Roseville, California, 25 January 2005:

Radar Golf Inc. announced today that in tests at an independent laboratory, the company's RadarGolf Ball performed equal to or better than competitive balls from Titleist, Callaway, Nike, and Maxfli. The tests measured both distance and spin. The ball also conforms to U.S. Golf Association standards.

Designed by Larry Cadorniga, the company's CTO and a 25-year veteran of ball design and manufacturing, the RadarGolf Ball contains proprietary Ball Positioning System (BPS) technology that enables the golfer to quickly find a "lost" golf ball with the RadarGolf Handheld that "beeps" when pointed toward the ball. Detection range is 30 to 100 feet.

The company also announced that it has selected Philippine manufacturer Integrated Microelectronics Inc. (IMI) to produce the RadarGolf Handheld unit. Art Tan, IMI CEO, said, "We began working with Radar Golf in December 2003 and it is very exciting to see this breakthrough product now so close to coming to market."

As announced in March 2004, Fantom Co. LTD is now manufacturing the RadarGolf Ball at their factory in Qingdao, China. Fantom factory general manager S.W. Lee said, "This is a very exciting partnership for us and our team is very honored to be the first to mass-produce a findable golf ball."

According to Radar Golf CEO Steve Harari, "Golfers of all handicaps continue to reserve systems and tell us that they would like to minimize lost ball penalties and spend less time looking for balls.

We anticipate that by this fall, one or more

leading ball manufacturers will elect to include our BPS technology in their golf ball line to gain a competitive edge."

The RadarGolf System will sell for \$249, including a dozen golf balls. A dozen balls only will sell for \$39. First shipments are scheduled for June 2005.

Source: Radar Golf

Editor:(who's just got to come back on this one again!) ... Maybe we can try short range golf ball scatter when these become the norm in the PGA Tournament! Also I wonder what frequency the radar handhelds will be using?

Large dishes available in UK

Potential EME-ers...

A supplier of 2.4m Ku band dishes at what I would consider a reasonable price has been found in the UK.

www.wizardsatellite.com are presently selling these at £149 + delivery (beware, the delivery may not be as what comes up on the website shopping basket).

A couple of these dishes have been purchased by Scottish amateurs with a view to EME.

A 2.4m dish is a 'small gun' on 23cm, but useable. I have 20 initials with 125W to this size antenna. I would estimate that at least another 20 stations are big enough to work me (The smallest station worked was running a 3m dish his end)

I have 7 initials on a smaller dish (1.8m) on 10GHz, so these dishes should be very useable up to 10GHz for EME

I have no connection with the company and have not got one of these myself, (I already have a dish that size)

Regards from Mark GM4ISM
www.dc2light.co.uk
<gm4ism@bigfoot.com>

Ailtech Noise Sources

Notes recently gleaned from the WA1MBA Internet Microwave Reflector....



At the risk of losing some choice hamfest finds, a posting of an Ailtech noise source on Ebay reminded me of something I've discovered and should pass along about those noise sources:

If you have an Ailtech 7616 noise source or variant that won't calibrate, i.e. seems dead, don't give up on it. The noise source may actually be a separate module inside, made by Noise Com, MSC, or unlabeled others.

Usually what goes is the attenuator which is used to calibrate the unit. It's a thick film hybrid. Over tightening the N-connector can twist the connection, cracking the attenuator's ceramic substrate, open circuiting it ... Or, at very least, it will be very unpredictably intermittent.

Now the good news ... most of the units I've disassembled had SMA connectors on the noise source internally and a normal SMA inline attenuator following. Disassemble the unit down to the noise source and use it with a new SMA inline attenuator and you are often times back in business.

I've bought a number that looked like they had been drug up and down the flight line, if not outright submerged. Most were in the \$5 - \$10 range since the labels were gone and they were clearly a longshot. I'm 4 for 5 working once I tossed the cracked or fried 16dB input attenuator.

The noise source is typically 250,000 K or 28-30dB ENR without the 16 dB attenuator. The attenuator value is factory selected to get the unit into the 15.4 dB ENR = 10,000 K noise customary range. Changing to a good 18GHz 26dB attenuator (even if its a 16+10dB arrangement) gives you a 5dB ENR unit which is better for measuring extremely low noise preamps (if your noise figure meter will calibrate at 5dB ENR).

If you go to a conference where a noise

figure meter is available, you can measure the same preamp with a known head and compare your "rebuilt" one and get even closer on the ENR re-calibration at that spot frequency.

I guess my secret's out ... no more \$5 noise sources once this group gets turned loose on them at the hamfests!

Now, if I could just revive my 20 year old HP8970A to use and calibrate the ones I have. Agilent says they obsoleted the HP8970A in 1987 and its successor the B version in 2001. Story of our lives, right? The interesting thing is they are offering \$10K to get them out of our hands in a buy back deal on one of the new 8974A \$40K noise figure analyzers. I've got about as much chance of getting one of those as a 100ft yacht.

73,
Charles S. Osborne, K4CSO

Technical Director
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<http://www.pari.edu>

Below: The Ailtech 7514 Precision Automatic-Noise Figure Indicator(PANFI)



This item is, from time to time, found on the UK surplus market and is well worth acquiring if you can also find or make a noise head. Three of these and similar PANFIs were for sale at Martlesham just two years ago for around £125 each ... about the same as good surplus Marconi Microwave Power Meter.

A (re) introduction to 10 GHz via modified satellite LNBs

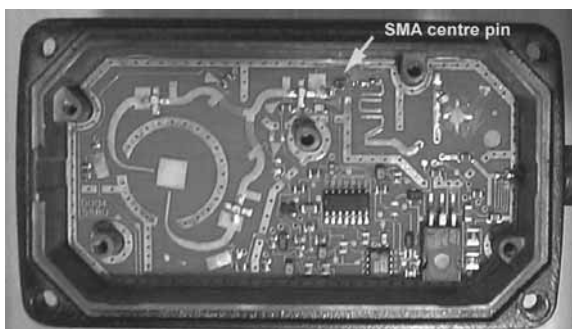
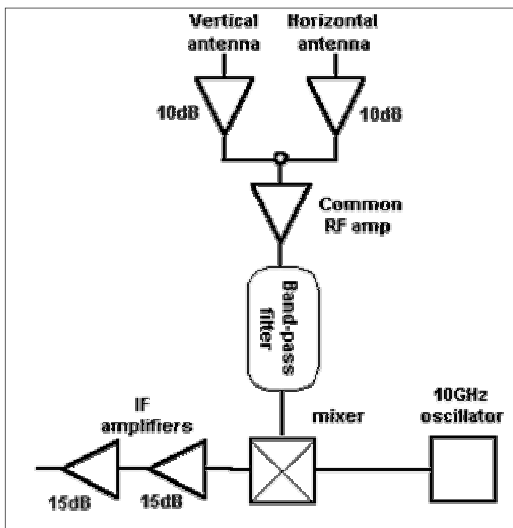
...by Bernie Wright, G4HJW

Dropping in late to the Lincoln Hamfest a few years ago, I found one of the traders selling off a box of about 30 satellite LNBs for £10.00, and just couldn't say no.

Most LNBs are as shown here to the right - the older ones may have more stages and an active, rather than diode, mixer but the block diagram shown should still be quite representative of what is currently around.

The MMIC IF stages were an obvious candidate for re-use, and it was straightforward enough to convert the stages to provide amplifiers with a gain of 40dB or so from HF to a couple of GHz. With these, built onto the back of a dipole/reflector plate combination, noise free signals from the local 23cm TV repeater could be piped down through long lengths of pretty "ropey" coax without having to worry about signal loss.

It was a year or so later that another use came to mind. Interest in SETI had re-kindled a general interest in radio astronomy for several of us and the notion of producing an 11GHz interferometer, using two 60cm dishes with their LNBs, began to appeal. We knew that the RF stages of most LNBs of the time gave about 10dB gain, and that there were always at least 2 stages, so early on we thought about getting in after the second stage on each dish mounted LNB, bringing the feeds out to a combiner (OK, just a BNC T piece!) and feeding the result into a third LNB, which would only be modified by fitting an sma socket in place of integral antenna probe. The loss in even "bog standard" quarter inch coax over a few metres would not approach the 20dB gain figure of the RF stages.



It was soon clear that, with many of the LNB types, you could simply drill through both the pcb and the aluminium housing it was fitted to, after the second RF amplifier. You would then be able to open up the casting hole and sweat an sma socket onto the ground side of the pcb. It turned out to be very easy to do.

On LNB types where part of the casting did get in the way, a hack-saw and file soon resolved the problem...

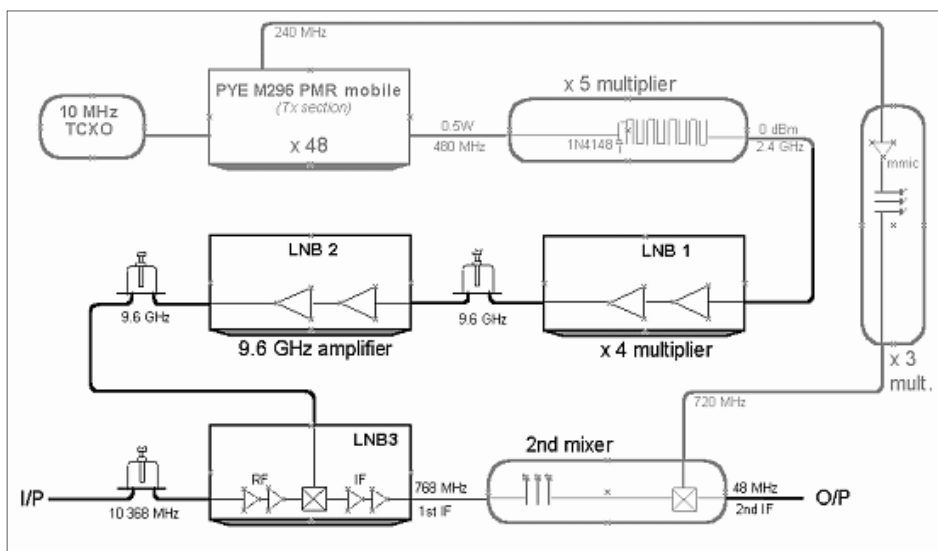
The 1-2 GHz IF from the third LNB was fed via a couple of further MMIC stages into a diode detector. After much adjustment (and fun), good interference patterns were obtained from sun transits with this arrangement.

During the following year, the idea of replacing the ceramic resonator based LO with something more stable grew. It had been 20 years since my last experience with 10GHz (and those free running 723A/B klystrons) but I at least knew that narrowband operation had now made klystrons and Gunn diodes (and Barrett diodes, if anyone remembers those) all but obsolete. About half of the surplus LNBs had a discrete diode pair mixer, with MMIC IF gain stages and a single GaAs FET oscillator. Again, it was easy enough with most of these to drill a hole through both the pcb and casting at the point where the FET oscillator fed the diode mixer and fit another sma connector so that an external crystal multiplier LO could be applied. It took a while to figure out a suitable multiplier, but, in the end, a Philips FR5000 PMR 1W VHF driver module was used to drive a pair of 1N4148 diodes. A 12 stage(!) pcb interdigital filter followed it to give a very clean x6 multiplication up to just over a GHz. Some 'Heath Robinson' MMIC amplifiers and pipe cap filters then took the LO up to 10GHz. I can't remember now what the IF was but it was single conversion to something around 150MHz. With this converter, fed from a second LNB just used as an antenna-with-integral-preamp (one of the interferometer units), a trip down the M11/A130 soon had GB3CMS coming in at good strength on the road side at Ford End.

The real downfall with this converter was the poor stability of the crystal oscillator – but it was a start and the bug had bitten.

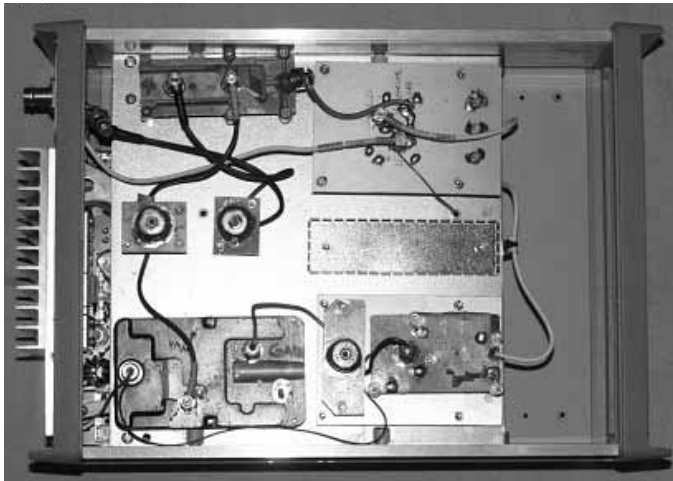
The frequency stability problem eased when it was realised that 10MHz, 12.8MHz and 14.4MHz TCXO's – all readily available, would multiply up to provide useful LO frequencies. Since 14.4 MHz also multiplies up to exactly 10 368MHz, this later became the basis for a CW/FM transmitter [likewise a 12.8MHz TCXO was/is being used as the basis for a low power beacon in the Cambridge area].

The current 10GHz converter here uses a 0.5ppm 10MHz TCXO in a double conversion configuration. The first IF is 768MHz [9.6GHz LO] and this is brought down to 48MHz using a second LO of 720MHz, all driven from the 10MHz oscillator as below:



A more practical approach to the LO multiplier at 480MHz, for anyone who has access to an ex Ionica head, would be to use the duplexer to select the 3.2GHz harmonic. These items have a surprisingly wide tuning range, and both rx and tx sides will cover 3.2GHz (9.6GHz LO) or 3.456GHz (10.368GHz). They can also be operated end-to-end from the tx to the rx port, giving more/sharper selectivity.

Liberal use of surplus satellite LNBs was [deliberately] made in this converter, though no attempt was made to use the integral image filter as part of the 9.6GHz LO multiplier. However, this did work well on the transmitter strip to multiply 3456MHz up to 10.368MHz, giving 40dB plus rejection of all other harmonics (without any modification to the etched filter). Instead, a couple of 15mm pipe cap filters were used. These, together with the single image pipe cap filter, can be seen in this photograph of the convertor:



Yet to be tried is modifying the LNB oscillator so that the stage acts as both buffer and selectivity block using the integral ceramic puck. Has anyone already tried this approach?

The single image filter seems to have been quite adequate with such a high 1st IF, and the through loss not an issue when fed via a remote LNB antenna-with-integral-pre-amp arrangement. Incidentally, RG223 seems to have a loss of 4 to 5 dB/m at 10GHz, so up to 2 or 3 metres of interconnection lead between antenna and converter is OK. For longer lengths, such as chimney to shack use, it just needs another LNB configured as a 20dB amplifier added as a line amp. Two LNBs are used in the LO path (laziness rather than necessity) configured as 20dB amplifiers. The first takes the 2.4GHz feed at about 0dBm, ensuring that this amplifier clips. The fourth harmonic is selected by the pipe cap filter and fed to the second LNB for amplification. About 10dBm is then available, so another pipe cap filter was put in for good measure prior to feeding the third LNB, taken from a mini-dish and fully used as the 10 368 to 768MHz converter stage. The early Cambridge mini-dish LNBs seem to work very well (see photograph on the next page) and the converter is fed from another one of these.

Laziness dictated the use of a separate mini-dish for transmit. With 300mW of CW, there has been no need to power down the receive LNB when on transmit.

Since there is already a very noticeable increase in background noise as the dish is dropped down to the horizon, no attempt has been made to optimise the LNB probe feed at 10 368MHz. GB3CCX at 150km is pretty much always copiable with this set up and thermal noise from nearby trees and buildings can be noticed as the antenna is rotated.

So all in all, the LNBs have proved to be a good buy. Every type of unit that was modified to act as antenna/pre-amp units had a noise figure that were good enough to detect ground noise easily. Some of the mid 90's (analog) Cambridge units had three cascaded stages following the antenna, but most have only two. A good rule of thumb is to expect 10dB of gain per stage. Using a hot air gun to remove devices has proved reliable. Careless handling after that point has destroyed a few devices through static damage, but that is all. The only comment I would make is that current limiting on the GaAs FET stages never seems to be provided, so that shorting the gate to ground always causes device destruction.

As for other LNB uses – I wonder if anyone has attempted using dual output units, which have the RF section duplicated, as the basis for a phasing transmitter/transceiver?

73 from Bernie, G4HJW
<Bernie@g4hjlw.demon.co.uk>



USEFUL INFORMATION FROM OUR MAN IN DEEPEST WALES!

From: Chris Bartram, GW4DGU <chris@chris-bartram.co.uk>

B&Q sell a phosphorous - copper hard solder which works well with a simple butane blow-torch. They also have a **hard solder for aluminium** which I've not yet tried. These ought to be of interest to people building dish feeds.

I've been looking further at **high performance crystal oscillators** in the 100MHz region, and, once I clear the current work overhead, I'll try to bring the work I started a few years ago to a conclusion. My latest simulations suggest that I can get loaded Qs to within 20% or so of the unloaded Q of the crystal. One thing is certain: the designs people are currently using can be significantly improved-on! I've also been thinking about ways of phase-locking the oscillator to a 10MHz source, but that's not as simple as might be thought. Using a commercial PLL chip is a reasonable quick fix, but there some problems with that approach which aren't obvious, and will probably show at >24GHz. I'd be happy to share ideas with anyone who is interested in this area.

Looking through the current RS catalogue reveals that they are selling the **Infineon BGA616 amplifier**. This is a potentially very useful SiGe MMIC device with a gain of 18.5dB at 1GHz with an associated NF of less than 3dB. The dynamic range is good, with an input intercept of ~10dBm, making it useful as a second stage for tropo receive systems. It's well matched with both s11 and s22 being below 18dB to ~5GHz. The device is usable to at least 9cm.

The best news is that even at RS prices, the MMIC sells for 67p, although RS only sell the part in 10s!

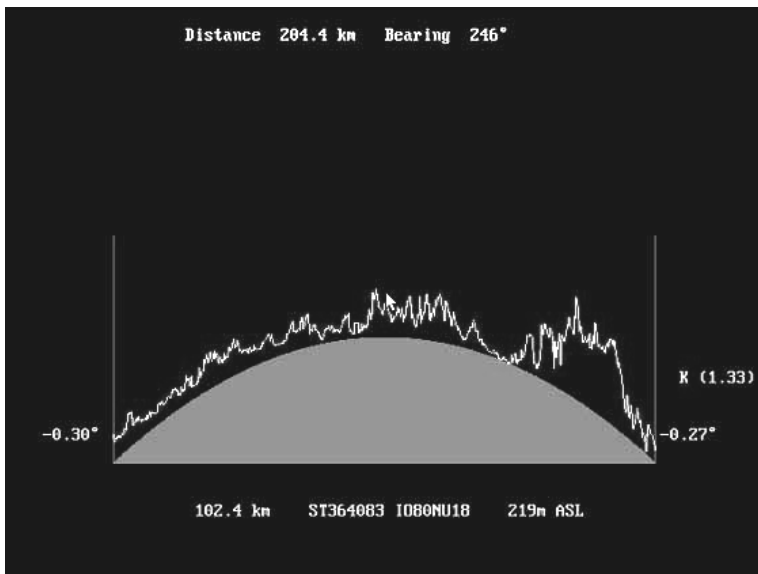
Vy 73 Chris GW4DGU

Reflections on Activity Night

... by Brian, G4NNS

Friday night may be Music Night but Monday Night is Microwave Activity night. Of course we can't expect anyone to go out portable on the dark winter nights but as, activity begets activity, quite a few of us make the effort to come on from home on a Monday evening and these are some observations of this activity.

I usually start with a "sked" with Ralph G4ALY near Saltash, a 204Km path over Salisbury plain, The Blackdown Hills and Dartmoor, to name a few of the obstructions, between IO91FF near Andover and IO70VL. The Profile shown below was done with G4JNT's Terrain software.

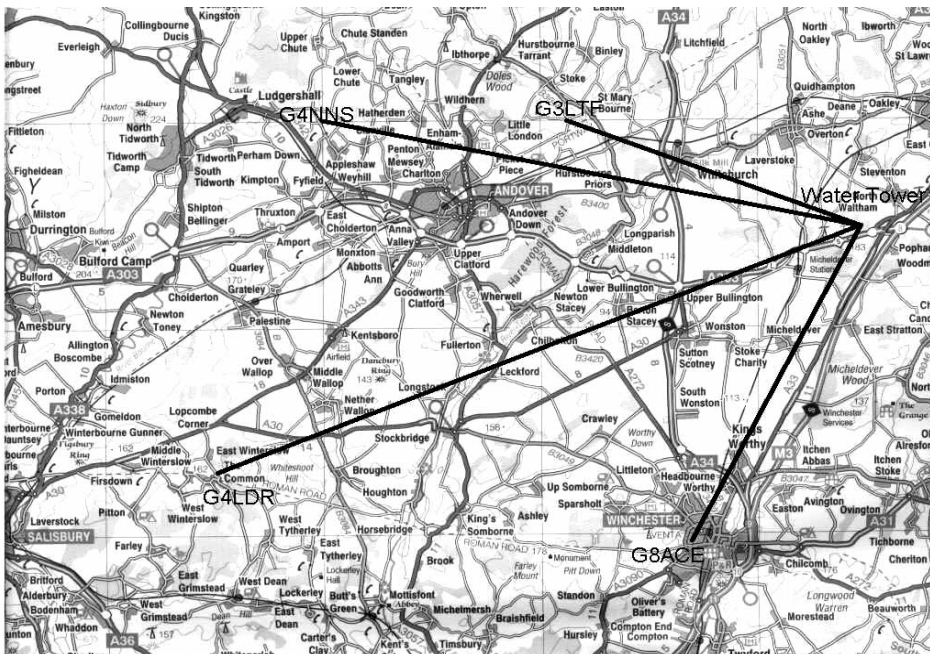


We test on 10GHz and then QSY to 5.7GHz moving to something like 144.195MHz to "tie the ribbons" and to see if there's anyone else about. G4LDR (IO91EC), G0RRJ (IO91FE), G8ACE (IO91IB) and G1JRU (IO90HU) are the most likely locals to join in.

Speaking of locals, unless there is rainscatter, a three or four way qso can be difficult to achieve on the higher microwave bands ... but not impossible if you can find a suitable reflection point. After some careful tests, we have found a useful reflector at Popham, just off the A303, close to junction 8 of the M3.

Popham is on high ground and has a small airfield. As any of you involved in private aviation will know, there is something of a tradition of putting water towers close to small airfields, presumably to ensure that the fliers are paying attention! Popham not only boasts a water tower but also a petrol filling station almost exactly aligned with the eastern end of the runway and only a few hundred meters from the airfield boundary. The fliers from Popham unwittingly share these riches with the local microwave

community as both the water tower and the canopy of the petrol filling station appear to provide good reflectors at 3cm and 6cm and have enabled us to have QSOs with up to 4 participants so far. Needless to say we are working to increase this number and try for some kind of record.



So far we have managed 4 way QSOs on a number of occasions and very often using FM. With SSB or CW we hope to break the 6 barrier some day soon and rival the 80m Microwave net ! *(3625kHz every Monday, Wednesday and Saturday at 0830 local .. ed)*

For anyone within "range" of Popham, its location is approx IO91JE16 (SU530440). We have also found another useful reflector, thought to be a phone mast, near Itchen Stocke, to the East of Winchester, at about IO91JC (SU552352).

Editor's comment: This kind of activity is to be applauded. There must be dozens of similar, potential nodes of regular microwave activity in the UK. If you haven't made many QSOs from home why not do a few tests with others within, say a 100km radius, and find out if you have one or more reflectors of the kind that Brian and his friends have found? Used on a regular basis, this can only increase general activity levels and give us all a firmer footing on which to conduct frequency allocation negotiations with OFCOM !



MICROWAVE ROUND TABLE MEETING RUTHERFORD APPLETON LABORATORIES

DIDCOT, OXON.

Preliminary Notice

Sunday 17 April 2005

(note: this date is provisional)

The UK Microwave Group, with the co-operation of Mike Willis, G0MJW, is organising a Microwave Round Table Meeting for Sunday the 17th April, at the Rutherford Appleton Laboratory (RAL), near Didcot, SW of Oxford. We are still awaiting official confirmation of the date. A final notice will be circulated via UKuG internet reflector and the UKuG website as soon as the confirmation is available. It will also, of course, appear in the March issue of Scatterpoint

Details of the programme for the day are also still being worked out but we can assure you that there will be interesting talks in both morning and afternoon sessions), a trophy presentation, test gear facilities and the usual "horse trading table". It's a one day event starting at 10.30am and finishing at 4pm. This is a grand opportunity to meet your microwave pals and test out your winter projects.

Please note that this year there will **not** be the usual excellent restaurant facility and attendees are therefore advised to bring their own sandwiches, etc to enable them to survive the day!

As in previous years, because of the security arrangements needed these days, every RAL attendee will need to register their intention to come to the meeting by the Tuesday preceding the meeting (ie by 12th April 2005). **Registration is mandatory** and anyone who turns up "out of the blue" will, I'm afraid, be refused entry. You will be able to register online and an email address for this will be announced in the next Scatterpoint

Last year a number of attendees arrived early and queued at the security gate. This caused a problem between the security staff and the roundtable organisers! **PLEASE do not enter the RAL campus before the scheduled meeting opening time. There is now nowhere to park at RAL while you wait for the gate to be opened. If you arrive at the campus early, please drive for a short distance elsewhere to wait for the opening time. We emphasise this as our continued use of the RAL establishment for such meetings depends on your co-operation in this matter.**

Please pass this information around to other microwavers. If anyone cannot register online, they can send in a "snailmail" application to myself. My address is shown on the front of this Newsletter. Once again, registrations will close at midnight on the 12th April!

As you can read on the next page, Brian, G4NNS, has kindly arranged a **microwave antenna test range** facility for the previous day so you could make the RAL event a weekend affair if you arranged accommodation in the Didcot area. There are also rumours of a **Saturday night pub/hotel dinner** being planned.

So, keep looking at the UKuG website <www.microwavers.org> and <www.g3pho.org.uk> where details will be posted as they become available.

73 from Peter, G3PHO
Chairman UK Microwave Group

MICROWAVE ANTENNA TEST RANGE

Saturday 16th April 2005

An Antenna Test session is planned for the Saturday before the RAL "round table" and will be held at the QTH of G4NNS IO91FF19 / SU300500 / SP11 9AN. This is about 30 minutes from RAL by car. At present, I understand that RAL is "pencilled in" for Sunday 17th April and is yet to be confirmed.

We plan to have capability for all bands from 2.3 to 24GHz, the higher two bands thanks to Sam, G4DDK.

Due to limitations of the test range, antenna aperture will be limited to 1m on bands up to 5.7GHz, 80cm on 10GHz and probably no more than 50cm on 24GHz (yet to be determined). It is not yet possible to offer this facility elsewhere.

The session has been set up particularly so that it will be possible to check multi band systems but anyone with a microwave antenna to test will be welcome.

I have no idea what the demand for this facility will be so please e-mail me if you wish to take advantage of it and specify which bands you want to test. In the unlikely event that we are over-subscribed, I will try to plan another session for the more local participants to cope with demand although the 24GHz facility may not be available again in the near future.

Having registered your interest with me by e-mail, I should have some idea of how many are likely to attend and how much time we will need. I will then provide more details including location, timing and technical requirements closer to the event.

73 Brian G4NNS

Email: brian-coleman@tiscali.co.uk

Antenna Test Range ... Texan Style

The photo to the right shows the range set up by Kent, WA5VJB, at last year's Microwave Update in Dallas. Sam, G4DDK, is seen on the left holding up the test antenna which receives a signal from the 1kHz AM modulated microwave source in the right background. Ground reflection allows a relatively short range and hand-held antennas to be used. The trick is knowing exactly where to hold the antenna under test!



Researchers Study Effect Of Millimeter Wave Frequencies On Human Tissue

21 January 2005

Cranfield, UK -- Groundbreaking research in understanding the characteristics of human skin at millimetric waveband (MMW) frequencies is being conducted at Cranfield University -- academic partner to the Royal Military College of Science at Shrivenham, UK.

Leading the research study, Dr. Clive Alabaster of the Radar Systems Group at Cranfield University, said: "This research study is important because MMW frequencies are increasingly being used in a large number of applications in radar as well as defense and civilian communications, such as guided missiles, 3G mobile phones, radio antennas, car cruise control and collision avoidance radarsystems, and even airport security check-points."

To date, only predictive studies have attempted to describe human skin at these very high frequencies. This research study is for the first time collecting hard data in order to assess the potential risks associated with this technology.

"The simple fact is that skin exposed to these very high frequencies bears the brunt of radiation exposure. As a result, the skin absorbs MMW frequencies and is heated on the surface with very little power penetrating to other tissue types which are deeper in the body," Alabaster explained.

The research program, sponsored by Japanese measurement equipment manufacturer Anritsu, has arrived at some preliminary results. Using the safety benchmark set by the National Radiological

Protection Board (NRPB) of 10 milliWatts per square centimeter, Alabaster calculated the temperature rise of skin exposed to this level of MMW radiation over a 30 second period. "The initial results on a single skin sample showed that this exposure would cause the surface of the skin to heat by only 0.2° C. The body will hardly notice this increase in temperature and so we can conclude that current legislation will avoid any burning hazard. Our future work in this area will reaffirm these results and seek to extend the study to a much wider variety of skin samples," Alabaster added.

"Sponsorship of the vector network analyzer (VNA) equipment used by Alabaster is a key part of our own research and development program and provides us with valuable access to an important customer base which includes the Ministry of Defence, DSTL and QinetiQ," Gerald Os-theimer, European general manager, Anritsu, said.

The same techniques that Alabaster has applied to the measurement of skin are now being employed in the investigation of damage sustained by composite materials and structures. "These range from novel bridge materials through to helicopter rotor blades and even the materials of today's modern sports cars," Alabaster concluded.

Source: Cranfield University

SEIGY ... FRENCH VHF/UHF/ MICROWAVE MEETING

Each year, Michel and Phillipe (F6ETI) together with Gilles (F5JCB) organise the French vhf/uhf/microwave meeting at Seigy in the Loire. this is known in France as CJ.

The flavour of this event is specialist, both in terms of items you might find and people you might meet. There are almost no black boxes, home made cakes or computer junk but there **are** a lot of serious connectors, cables, microwave parts recovered from pro' systems plus adequate eating , drinking and bon humour!

It's along the lines of a Martelsham meeting but with a bigger attendance (2000+). VHFers welcome as well as UHF. Around 200 + people attend.

Friday afternoon:

People arrive during Friday in the area and informal meetings at the CJ venue take place.

Friday evening:

There's an organised dinner at a central hotel in town. Not all attend as some just take dinner in smaller groups in restaurants around and about in the little town/villages. The main event is a full sit down, several course, affair. Around 100 people can be accommodated. This generally ends 'formally' at around 23.00 to 23.30 , ie. eating ends then. However, people continue discussions until much later. I think the prior record is somewhere around 03.00!

Saturday morning:

The main hall opens and one day only visitors start arriving. The area has:-

An excellent Italian supplier. These guys have between them more or less all the parts you need for many of the famous German vhf/uhf/shf kits and a lot of other parts. The hall also houses surplus test gear of good quality and some specialty interest groups such as ATV, Radio Astronomy, etc.

The main hall also houses a large chat area, snack bar and drinks. There are plenty of tables and chairs. Off the main hall is a small conference taking place with a range of subjects such as French contest rules and other local subjects. There are also some technical presentations.

Also available is the CJ annual meeting book (Proceedings) and occasionally a CD, written by many French amateurs who present their latest ideas.

A marquee area flea-market ...

'Junk' available here is rarely 'junk' and is generally appropriate for a vhf/uhf/microwave event. The flea-market is approximately 30 to 40 stands ranging from single radio amateurs doing a shack clearance to commercial traders offering recovered/recycled test gear and parts. This opens ahead of official opening time and early attendees are generally rewarded with some

excellent finds.

Dining Marquee ... here lunch can be bought at good prices, excellent quality and wines are available ... Also a stand up 'tent' style bar

Saturday evening: Another formal dinner. Again, this is a mass sit down affair for between 100 to 120 people. There is no formal seating plan but generally small tables form up naturally with the 3cm guys together, the 144 square hunters/contesters together and the EME guys together, etc.

At the two dinners many private deals are done. French junk boxes trend to be somewhat deeper than UK ones. Also available here are a lot of surplus units from commercial markets that someone, somewhere, has done a PCB to use it, or has all the modifications you need to do written up.

What a you get out of this event is going to be directly proportional to effort expended. Remember this is a French event. However, most of the movers and shakers on the French VHF/UHF/Microwave scene speak adequate (or indeed many, excellent) English. If you show up, just march up and introduce yourself to anyone and tell them what your specialty interests are you WILL surely immediately be directed to your corresponding number(s) here in France.

The history of the last two events, together with some pictures and the announcement of 2005 event are here:

<http://www.ref-union.org/cj/>

Places at the dinners need to be booked in advance and clearly hotels need finding and reserving. If anyone has interest is coming over and joining in then they are free to drop me an email , **PLEASE PUT "CJ2005" in the subject line.**

Depending on interest and numbers involved Michel and I will then discuss how we can best put together a little hand holding package to help, I envisage this would take the form of :-

1. Putting those interested in coming from G in touch with each other so that you can figure out the best way to get to the Loire Valley, ie car & ferry sharing or PERHAPS airport meetings.
2. Arranging some hotel reservations, we can help to organise that from here perhaps (it is relatively inexpensive also)
3. Helping with introductions to like-minded people on arrival and ensuring that those a little more linguistically challenged (on both sides) do at least get to meet each other.

73 Graham F5VHX (G8MB1)

R.F. Professionals <http://www.rfpa.com>
Radio Amateurs <http://www.rfham.com>
(email me to the group address shown there)



ACTIVITY NEWS FROM THE WORLD ABOVE 1000MHz

The winter doldrums are still with us as this column is being written. **Where is everyone?** One can only assume that the UK microwave operators who are not being heard these days are busy with construction projects that will see the light of day and be aired during the forthcoming summer "operating season" (for that is what we appear to have these days!). Exceptions to this are, of course, the Monday night people like Brian, G4NNS, and friends see page 9 of this issue.

Once again it's Brian Justin, WA1ZMS who captures the headlines this month ...

New 122GHz DX claim and the 1st ARRL VUCC claim

From <wa1zms@att.net>

Date: Sun, 16 Jan 2005

Myself and Pete, W4WWQ would like to report what should be a new World and North American DX record for the 122GHz band. (This band in "new" in the USA as of March 2004 and W0EOM reported the 1st QSO on the band several months ago.)

Using the club callsign W2SZ/4 from a fixed location in FM07fm, we managed to work the required 5 grids (FM06, FM07, FM08, EM96, EM97) for the ARRL's VUCC award. The first grid was worked last week, while the final four were worked in a "grid square blitz" over a 10 hour period last night. *(A photo of Brian's VUCC application and QSL cards appears on the front cover of Scatterpoint this month ... editor)*

Our best DX was:

Date: Jan 16, 2005

Time: 04:22z

WA1ZMS/4 EM96wx

W2SZ/4 (W4WWQ op.) FM07fm

Distance: 79.6Km

WX at WA1ZMS QTH:

Temp: -2.6C

Dew Point: -10C

Relative Humidity: 58%

Pressure: 937mb

Atmospheric loss: 0.472db/km)

Equipment used (short version):

12" parabolic with Cassegrain feed

TX power: 5mW at feed

Rigs are phase locked 61GHz Gunn sources driving a pair of GaAs frequency doublers.

The doublers serve as harmonic mixers for receive with active DC bias control.

Frequency references are Wenzel ultra-low-noise 5MHz crystal oscillators.

More details will be posted at www.mgef.org over the next few days.

73, Brian, WA1ZMS/4

Even more 122GHz DX...

From: <wa1zms@att.net>

Date: 18 Jan 2005 2005

Since we had some tiny signal margin on 122GHz at 79km and we knew we could get a few more dB from the use of Spectran software, we were able brave the cold night air and better **our World DX record to 114km.**

Details of QSO:

Date: Jan 18, 2005

Time: 03:46z

WA1ZMS/4 EM9UR

W4WWQ/4 FM07FM

Distance: 114.4Km

WX at WA1ZMS QTH:

Temp: -12.0C (10F)

Dew Point: -23.1C

Relative Humidity: 37%

Pressure: 920mb

Atmospheric loss: 0.336db/km

WX at W4WWQ QTH:

Temp: -17.5C (0F)

Dew Point: -21C

Relative Humidity: 74%

Pressure: 877mb

Wind: 24km/hr
Wind chill: -28C (-18F) <--- !!
Atmospheric loss: 0.362db/km

Photos, Spectran screen shots, and some audio files should be posted at www.mgef.org in a few days.

I'd like to really thank Pete for dealing with sub-zero wind chill temperatures while making the QSO. It took us about 40 minutes to send and copy all the necessary info via QRSS mode. My feet were so cold just standing around waiting for the very slow CW to be sent that I put a pair of chemical/air-activated hand warmers in my shoes. They worked very well. No more cold toes!

73 from Brian, WA1ZMS

(Congratulations once again Brian and Pete ...we always have a space reserved each month in this newsletter for your latest exploits! ... editor)

UK and EU Microwave News

From: GW4DGU, Chris Bartram <chris@chris-bartram.co.uk> Date: 19 Jan 2005

I haven't been active on terrestrial 1.3/10GHz since November due to a combination of work and my desire to get on 10GHz EME. Both are progressing well. I have been able to detect my echoes on 10GHz, although there's still a lot to do. I've had to rebuild the feed, as my dish turns-out to have an f/D of ~0.94! I've also had to look critically at my preamp, but I understand what I have to do there. Wouldn't it be easy if I just brought gear? But I'd find life boring if I did!

From Dave, G0RRJ (IO91FF):

I am now up and running on 9cm G3XDY, G4BRK, G1JRU & G8ACE worked already. I hear GB3MHS, GB3ZME & GB3SCF but not all the time.

**From: Keith, GW3TKH, (Cardiff)
<GW3TKH@aol.com>**

Date: Thu, 3 Feb 2005

Subject: 3.GHz etc.

A note to tell you what's been going on down here in South Wales

I completed the 3cm 1watt amp in December and it is now incorporated in the transverter box. It seems to be reliable and I work Phil, GW3PPF, most days on FM so the cooling fan gets a good hammering!

My 9cm equipment will soon be operating at 15 watts. I built the psu to G3PHO's website article, with a couple of minor mods. On the LT1083CP regulator chip, I've increased the value of the i/p capacitor to 22uF, and the o/p capacitor to 150uF. The datasheet

states that the o/p capacitor particularly, is critical for stability. Due to the large tolerance on electrolytics, I thought it best err on the higher side!

I'm drilling and cutting metal at the moment to get it all boxed up for portable use.

In the contest in January worked just two stations on 23cm and heard three others, GB3MHL was extremely weak, in and out of the noise, so conditions were worse than usual.

73 from Keith, GW3TKH

MICROWAVE DXPEDITION TO IRELAND ...

F1HDF and F6DPH plan to be QRV from IO51 at the end of September on all bands from 144 to 47GHz .

73 from Dom/F6DRO

BELGIAN BEACON NEWS ...

After an extended holiday, ON4KUL/B is up again in JO20KV at about 140 meters ASL and with a good view to the west. The parameters are 31.2 dBm into a 12dBi antenna. Every few minutes, the power is reduced in 2 second steps to 26 / 21.2 / 15.9 / 9.3 and 2.1dBm.

The frequency is still 10368.975MHz with the famous +/- !

Reports are appreciated. Please send them to <on4iy@qsl.net>.

Danny, ON4AOD, has built the beacon and it was for many years QRV from JO21IV.

In the beacon, a 1.152 GHz signal is generated from a TCXO in a fairly standard multiplier chain. This signal is split. One part is modulated (we'll call this IF), the other part is multiplied by 8 (from now on called 'LO').

The 10.368 GHz is generated in a mixing stage, by mixing the IF signal with the LO. Amplitude modulation of the IF is done in a solid-state stepped attenuator.

The on-off-keying is done at 10 GHz in a pin switch. There is also a BPSK modulator right before or after the on-off switch but it is currently unused. It was intended to be used for PSK31. Please give your opinions if you think it is useful to do experiments with PSK31 at 10 GHz. Probably we can include this experiment at the next upgrade. (I'm not sure when this happens, but for sure it will take a while....) The last parts in the chain are the power amplifier and circulator.

The power steps should theoretically all be 5dB (specs of attenuator at 1 GHz). This attenuator is used on 1.152 GHz and that gives already some deviation. On the IF, the steps look better than on the RF. Some RF amplifiers are pushed a bit too hard, so we lose some linearity...

73 from Christophe, ON4IY, Peter, ON4CDQ and Hans, ON4CDU

That's all for this month ...73 from Peter, G3PHO

Entries ranked on squares. In cases of a tie the countries score determines the final order. Entries must be from defined locations. An asterisk (*) denotes UK record.

AS AT 14 FEBRUARY 2005

Microwave League 2003

MICROWAVE OPERATING LADDER -- 2004

	1.3G Wkd	1.3G Dx	1.3G Score	2.3G Wkd	2.3G Dx	2.3G Score	3.4G Wkd	3.4G Dx	3.4G Score	5.7G Wkd	5.7G Dx	5.7G Score	10G Wkd	10G Dx	10G Score	24G Wkd	24G Dx	24G Score	47G Wkd	47G Dx	47G Score	76G Wkd	76G Dx	76G Score	Grand Total
G3XDY	201	1337	3333	78	1325	3078	23	585	1504	29	1178	2594	72	1012	2008										12517
G4BRK	132	1184	1954	57	1194	2080	12	828	1110	24	1058	1931	77	1072	2275										9350
G3PHO(P)	17	288	60				12	302	405	19.5	622	922	45.5	667	836	10	156	2390	5.5	94	1000				5613
OZ1FF	124	920	1414	24	808	591				7	265	141	46	824	1044	5	19	145							3194
G4DDK	65	1336	1077	21	307	197				14	395	420	53	685	1000										2415
G0RRJ	67	607	504	21	479	307							31	431	368										1589
G8DKK	26	571	184										15	545	225										409

BAND SCORING CALLSIGNS	7	5	3	5	7	2	1
AVERAGE DX	883	822	571	703	748	87	94
AVERAGE CALLS	90.3	39.8	15.7	18.7	48.5	7.5	5.5
TOTAL SCORING CALLSIGNS	7						

BAND SCORE CALCULATED •

No OF STATIONS WORKED

X

MAX. PERSONAL DX WORKED

X

1000

AVERAGE DX FOR THE BAND

See January 1999 Microwave Newsletter for Rules
or www.g3pho.org.uk

Compiled by G3PHO

UPDATED: 9 FEBRUARY 2005

MICROWAVE TEST GEAR FOR SALE

* MI Sanders 10GHz/X-band Waveguide Slotted Line/VSWR 'meter' (original box-'pristine') **£30.00**

* Flann Microwave Signal Generator Type 501-2P 800MHz to 3.5GHz, 130dB Variable attn. μ V to 100mV output 50 Ohm plus direct/higher power output. With Handbook? **£30.00**



* Flann Microwave Signal Generator Type 504-2P 3.5 to 12GHz, 130dB Variable attn. μ V to 100mV output 50 Ohm plus direct/higher power output. With Handbook. **£30.00**

* Marconi TF2008 10kHz to 510MHz Signal Generator, 105dB variable attn and sweep facility. With Operator/Maintenance Handbook **£30.00**



* CATV Sweep Generator Model 1067, 0-500MHz **£25.00**

* Racal-Dana 9303 True RMS RF Power Meter with 1.5GHz 'head' unit. * possible 'head' fault?? **£20.00**

* Racal 1MHz Frequency Standard Module Type SA510 (with temperature controlled 'oven' and Calibration report. **£25.00**

* 'Plessey' 5MHz Frequency Reference module (with temperature controlled 'oven') **£10.00**

* Hewlett Packard HP11683A Power Meter Range Calibrator **£10.00**

* 2 off High/Medium/Low power Nicad Battery Charger Kits, with full documentation Auto charge current regulated, mA to several Amps charge (more than 1/2 built, professionally) **£ 20.00 per kit?**

* Services Text Book/ Admiralty Handbook 'Transmission and Propagation' (Hard bound) **£5.00**

BARGAIN BASEMENT

* Rhode & Schwarz Signal Generator Type SMLM 30 - 300MHz, 120dB Quality Variable Attenuator, <2 μ V to 2V or more into 50 Ohm. **£ 5.00**

* Rhode & Schwarz Signal Generator Type SDR 300 - 1000MHz, 120dB Quality Variable Attenuator, <2 μ V to 2V or more into 50 Ohm. **£10.00**

* Rhode & Schwarz Signal Generator Type SCR 1000 - 1900MHz, 120dB Quality Variable Attenuator, <2 μ V to 2V or more into 50 Ohm. **£15.00**

Contact:

Roy, G8CKN

Antenna & Electronic Consultancy Co Ltd

44 (0)1420 563 571

antennas@tiscali.co.uk



FOR SALE

Tektronix 7603 scope mainframe with 7L13 (2.5 GHz) and 7L18 (1.5 to 18 GHz) spectrum analyser plugins, with all manuals **Price: £600.**

(Picture left shows 2.5 GHz plug in ... the other one is similar)

Narda 7000A microwave multimeter system complete with RF modules 7105 (8-10 GHz), 7202 (10 MHz-2 GHz), 7206 (2-18 GHz) and 7113 (2.7-3.5 GHz). The unit can measure VSWR, insertion loss and power. The narrowband units contain an internal osc, the other units require an external sweeper. All contain power meter heads for 10 MHz to 18 GHz (-50 to +13 dBm). Main unit and one plug in has ruggedised case the other modules have wooden cases, (see photo right). All manuals are included **Price: £100.**



Commercial solid state power amplifier 9W o/p @ 5.7 GHz with less than 1 mW drive, from 12V supply. Beautifully milled housing but needs bolting to a heatsink. **Price: £150**

DB6NT 24 GHz NE32584C 3 stage LNA in milled aluminum housing. **Price: £40**

HP TWT amplifiers HP491C 2-4 GHz and HP493A 4-8 GHz. **Price: £20 each**

Hughes TWT amp 1177H02 10W 4-8 GHz tube suspect but EHT PSU OK manual. **Price: £15.**

For more details contact David, G0IVA by telephone at 01539 737015 or email at:

g0iva@freeuk.com

(The equipment is located in Southern Cumbria, IO84)