An Amateur Radio publication for the Microwave Enthusiast

scatterpoint

July 2017

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Goonhilly Earth Station Visit

By Brian Coleman G3NNS

STOP PRESS (see p27)

New UK 23cm DX record

Terry M0VRL (IO70PO) reports that on July 14th he completed a QSO of 2662km with Pedro EA8AVI (IL28FC) in the Canary Islands that breaks the UK and Region 1 23cm tropo records.

In this Issue

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Loan Equipment

Don't forget, UKµG has loan kit in the form of portable transceivers available to members for use on the following bands:

5. 7GHz 10GHz 76GHz

Contact John G4BAO for more information.

Subscription Information

The following subscription rates apply.
UK £6.00 US $12.00 Europe €10.00

This basic sum is for **UKuG membership**. For this you receive Scatterpoint for **FREE** by electronic means (now internet only) via the Yahoo group and/or Dropbox. Also, free access to the Chip Bank.

Please make sure that you pay the stated amounts when you renew your subs next time. If the amount is not correct your subs will be allocated on a pro-rata basis and you could miss out on a newsletter or two!

You will have to make a quick check with the membership secretary if you have forgotten the renewal date. Please try to renew in good time so that continuity of newsletter issues is maintained.

Put a **renewal date reminder** somewhere prominent in your shack.

Please also note the payment methods and be meticulous with PayPal and cheque details.

PLEASE QUOTE YOUR CALLSIGN!

Payment can be made by: PayPal to

ukug@microwavers.org

or a cheque (drawn on a UK bank) payable to 'UK Microwave Group' and sent to the membership secretary (or, as a last resort, by cash sent to the Treasurer!)

Articles for Scatterpoint

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

Please send them to

editor@microwavers.org

The CLOSING date is the FIRST day of the month

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

Please submit your articles in any of the following formats:

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

Spreadsheets: Excel, OpenOffice, Numbers

Images: tiff, png, jpg

Schematics: sch (Eagle preferred)

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

Thank you for you co-operation.

Martin G8BHC

Reproducing articles from Scatterpoint

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You may not reproduce articles for profit or other commercial purpose.

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UKµG Project support

The UK Microwave Group is pleased to encourage and support microwave projects such as Beacons, Synthesiser development, etc. Collectively UKuG has a considerable pool of knowledge and experience available, and now we can financially support worthy projects to a modest degree.

Note that this is essentially a small scale grant scheme, based on 'cash-on-results'. We are unable to provide ongoing financial support for running costs – it is important that such issues are understood at the early stages along with site clearances/licensing, etc.

The application form has a number of guidance tips on it – or just ask us if in doubt! In summary:-

- Please apply in advance of your project
- We effectively reimburse costs - cash on results (eg Beacon on air)
- We regret we are unable to support running costs

Application forms below should be submitted to the UKuG Secretary, after which they are reviewed/ agreed by the committee

www. microwavers. org/proj-support. htm

UKµG Technical support

One of the great things about our hobby is the idea that we give our time freely to help and encourage others, and within the UKuG there are a number of people who are prepared to (within sensible limits!) share their knowledge and, what is more important, test equipment. Our friends in America refer to such amateurs as “Elmers” but that term tends to remind me too much of that rather bumbling nemesis of Bugs Bunny, Elmer Fudd, so let’s call them Tech Support volunteers.

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

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

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

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

The current list is available at

www. microwavers. org/tech-support. htm

UKµG Chip Bank – A free service for members

Interim Chipbank Update

By Mike Scott, G3LYP

Since the Martlesham Roundtable, I have received a number of donations to the Chipbank which will be included in the next catalogue update sometime after the Finningley Roundtable. Included are a considerable number of MMICs from G4HUP’s estate including MARs and the Agilent MSA equivalents. We also have a further supply of Kent’s “Funny” MAR-6s (Thanks Kent!).

Paul Nickalls G8AQA donated 48 pcb mounting SMA sockets (through hole) and Paul Entwistle G8AFC, two large bags of BZX85C5v1 and BZX85C11v 1watt Zener diodes.

John, G8ACE, presented me with a large box of reeled components which has added to our range of SM Rs and Cs. If you need a value not listed in the current catalogue, ask as it may now be available.

Finally, as a result of a posting I made on the Reflector just before Martlesham, Bill,N6GHZ, kindly sent me a large collection of microwave components from California. These are mainly diodes, including Gunn and varactor as well as some transistors. These are listed on the next page. In many cases Google produced full or abbreviated data sheets, some appear to be specials as I could find no data. The quantity available is listed after the item. If you want any items(s) please use the usual Chipbank order form on the website.

The catalogue is on the UKµG web site at www. microwavers. org/chipbank. htm

Chipbank additions

Small Signal Transistors	Qty
HP35831B	5
MGF1200	4
NE7345-D	1
NE88935D	4
FJ250L	10

Power Transistors	Qty
Acrian 4066	1
ACR23A016	1
CTC CD2030	4
TRW J01001	1
TRW MRA 1014-12	8
TRW 2N5177	2
TRW 53602	3
IMD2001S	5
RMT270(?8)5	1
FJ7201/BB	2
NE868299	1
NE86898-6	1

Miscellaneous ICs	Qty
FMM106HG Div by 8	8
NEC UPG501B	1
NEC UPG700B	1
NEC UPG701B	1
BB619 Varicap SOD123	3

Wire Ended Diodes	Qty
HP5082-2912	8x2
DKV4105	5
DKV6533	8
DKV6522BM4	4
MV1404	3
MV1624	1
MV1628	2
KEV2101	2
1N5139	2
MA45115	5
MA4883M	1

Ceramic packaged Diodes		Qty
HP5082-2572		24
DGB8331/⅔		
	Ku band Gunn	11
DKV6550A/B Varactor		11
DDB4517 X band detector		2
DMF4540 Quad mixer		1
MA44706-30 Varactor		7
AVC5050 ? Varactor		4
Varian	VAT63N20	9)
	VAT72BN20	1
	VAB1616N20	1
VAB3201N100		2
Aertech	AL5374	5
	AX1364	4X4
Metellics	MSV3406	7
	MD820-E26	1
	MTV3001/2-42	5/2

Spectrum Matters

2.3 and 3.4 GHz

Ofcom have also confirmed the final details for their forthcoming auction of 2.3 and 3.4GHz spectrum that was removed as part of the 2014 UK Amateur Licence Review. The auction documents include an information memorandum with considerable detail of amateur and Primary User usage in these bands. This includes new government usage in the retained amateur section at 2340 MHz, as well as the 2300-2302 NoVs that were negotiated at the time.

5GHz News

Ofcom have issued a statement confirming the technical parameters for the extension of Wi-Fi in the 5.7GHz amateur band. Following extensive inputs, the RSGB welcomed the conservative approach that Ofcom are taking and look forward to this being properly enforced. The new regulations are effective from the 7th of August.

The Ofcom move is likely to influence ongoing work in CEPT which is preparing for WRC-19 which seeks to extend 5GHz usage for Wi-Fi, LTE-U and Intelligent Transport Systems. CEPT has also just started work on a new Wi-Fi band that will cover 5.9-6.4GHz

IARU Region-1 Conference - Landshut, Germany, 17 – 21 September 2017

Further papers are available online for the IARU Region-1 Conference papers

All can be downloaded from:

https://www.iaru-r1.org/index.php/general-conference/landshut-2017

Some of the areas addressed by RSGB papers include:-

- Threats to 24 and 47 GHz from the WRC-19 proposal for 5G phones
- The state of the 5GHz band. Whilst UKuG is typically concerned with narrowband usage, the 5GHz band also provides the backbone for Hamnet in central Europe as well as supporting DATV and Mesh usage.
- Millimetre wave progress and innovation at 122, 134 and 241 GHz

Other microwave papers include one from the Slovenian national society ZRS that proposes to include 9cm in IARU contests

RSGB Microwave Manager Barry Lewis G4SJH will be attending the C5 VHF/Microwave committee and welcomes comments

Chairman's thoughts on Finningley

This year I attended Finningley for the full two days unlike previous years. I'm glad I did. Saturday was less hectic than the Sunday, allowing more time to chat and (this year) for the mmw and nanowave demonstrations cross the site, plundering the surplus items in the 'store' room and checking out the goodies on the trader stands and 'take it away' area.

I was tasked with setting up the UKuG Construction Contest round at Finningley, and thanks to Kevin, G3AAF, and his excellent advertising, we had eight entries on the Saturday and two more on the Sunday. Our 'scoring' system for entries allows us to judge across a number of events as long as there is at least one common judge involved across a number of events. G8DKK and G3AAF were my fellow judges at Finningley, with G3XDY and myself at Martlesham and RAL.

The winning entry stood out from the other very fine entries. VK5ZD's dual millimetre wave transverter for 76GHz and 134GHz was beautifully implemented and ticked all the right boxes. There should be a picture of it elsewhere in this issue of SP.

The other entries were more than worthy with G4HJW's mini oscilloscope standing out as an example of miniaturisation and novel thinking. It came joint second with another of VK5ZD's mmw transverters.

The varied talks programme included one by G4DZU about his journey from 23cm EME to 3cm EME. It covered the trails and tribulations he had gone through.

G8DKK gave a most enlightening talk on network analysers. I repeated my (updated) RAL talk on modern VHF transverter considerations.

There was an extra talk on the Saturday. As I didn't attend, I forgot to note the title and speaker. No doubt someone will remind me! Unforgivable of me……..

The Saturday evening meal at the nearby Reindeer pub was well attended and unusual in that we were able to choose our meal from the restaurant menu. As I had to drive back to the Travelodge at the motorway junction I was unable to sample the local brews! I was too late to book a room at the Reindeer and with some other event on, the accommodation was rather restricted this year.

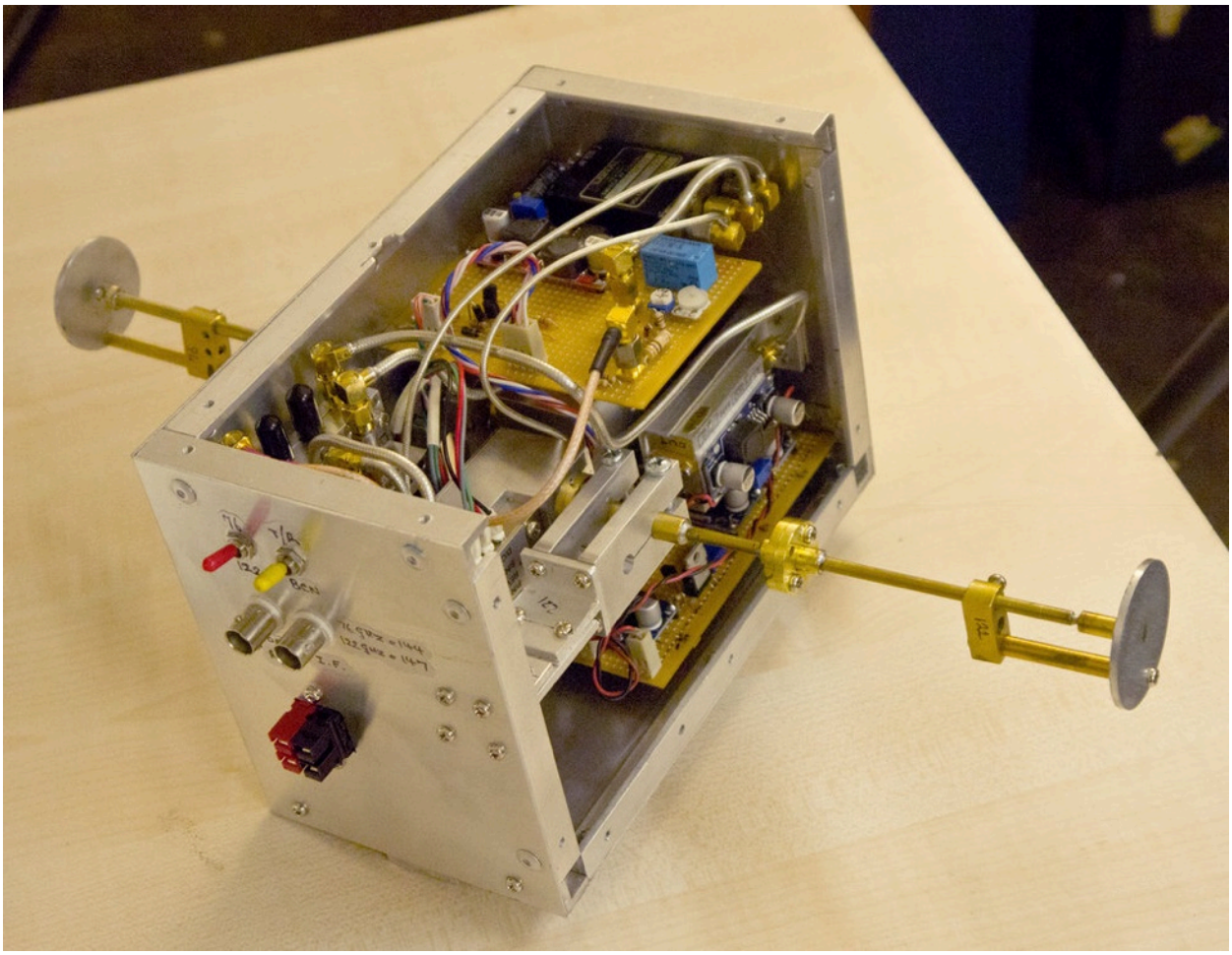
Both days were blessed with fine weather and that really helped the event as it was so pleasant to sit outside, under the Gazebos, talking and planning.

Unfortunately the journey home was marred by an accident on the northbound carriageway of the A1 at the same place as last year, leading to yet another delay of over an hour to get through it.

My thanks to Kevin and the guys at the Finningley Radio Club for staging yet another very successful Microwave Round Table.

73 de Sam, chairman UKuG

VK5ZT and VK5ZD at Finningley



Winning entry at Finningley – VK5ZD's dual mmw Transverter

Stuart's (G8CYW) photophone at Finningley (for those that remember it)

Some of the available surplus at Finningley

More Finningley surplus

Packing away the mmw gear for travel back to Friedrichshafen

SK: Philip Bagshaw, G3NEO, of Todwick

From Peter Day, G3PHO

I received some very sad news a couple of hours ago [29 June] ... Philip, G3NEO passed away at the age of 95 in Rotherham Hospital at 3.30pm Thursday (yesterday). I'd known Philip since I was a young SWL in 1958. We were very good friends ever since. He was found collapsed in his house a few days ago and was whisked off to hospital. He made a slight recovery but deteriorated in the past day or two.

The funeral will take place on Monday, 10th July at 11am at St Peter & St Paul Church, Todwick Church, SE Sheffield, S26 1HN. (http://www.todwick.org.uk/church/).

Phil's niece, Susan, would appreciate as many of his radio pals as possible being present so I hope some of you can be there. It is the only church in the village so you can't go wrong!

I'm honoured to have been asked to speak about him at the service. After the service, Philip will be interred in the a family grave, in the church's cemetery. I believe his cousin Susan has organised refreshments for after the burial.

Those who knew Phil personally will surely agree with me that he was really kind and gentle person, a true gentleman in fact. I never saw him lose his temper or even be angry! I have much to thank him for as he was my amateur radio mentor when I was a short wave listener in the late 1950s. It was he and Ron, G8KB, who pushed me into getting my transmitting licence in 1961 and thereby changed my whole life for ever!

Philip was a keen experimenter and was noted for making bits of wire work all over the world on the HF bands. In his younger days he was a keen Field Day contester, in the days when HF field day was all CW and when computers were not even thought of.

Philip never married and ended up having to care for his elderly mother. He would have made a lovely father, I'm sure, but he told me he "left it too late". I believe he has/had a sister who became a headmistress in a school in Dumbleton, near Cheltenham. He used to go down to stay with her for holidays and take an HF radio with him and a piece of wire he called the 'Dumbleton Dipole' ! I worked him dozens of times when he was using it.

He tried lots of different bands with his wire antennas, working New Zealand on 160 metres with a 270 foot dipole and just 7 watts. He also often worked the VHF/UHF bands from 50MHz to 1296MHz and I had the pleasure of working him over a distance of 100km on 10GHz ssb when he used just 300 milliwatts to an 18 inch diameter dish. I think his best DX with that little G3JVL transverter was 200km.

He was a highly respected member of the Sheffield Amateur Radio Club in the 1950s through to the late 60s but then moved over to the Bolsover Club where he became a good friend of Ray, G4AGE, a friendship that lasted until Philip passed away just a short time ago.

In later years, as old age took its toll, he had to give up driving and I saw little of him apart from his annual visit to the Finningley Microwave Round Table meeting in July. That was where I met him last, about three years ago.

He sometimes used the phonetics "George Three Never Ever On" when speaking to old friends!

The 1st photo shows Philip (left) demonstrating his 10GHz low power (5mW) ssb/cw transverter to a couple of much younger folk who were eager to learn from the Old Timer. Philip would have been 88 years old when this photo was taken at the Finningley Microwave meeting in July 2010.

Goodbye, Philip old pal ... rest in peace.

The second photo sees him having lunch at the same meeting with Peter G3PYB (left and now SK) and Ted G8AZA (centre).

Tributes via ukmicrowaves reflector

From Barry, G8AGN

I'm sorry to hear about Philip. He was a good friend in earlier times and always willing to try out new things in AR. I would echo your comments about Philip - a real gentleman. RIP

Ian GM3SEK

Another sad loss. Although we only met once or twice, it was always a pleasure to talk with Philip somewhere on the bands.

Thanks also to Peter for such an eloquent appreciation of the man and his life.

John G3XDY

I'm very sorry to hear of Philip's passing, I worked G3NEO many times over a 40 year period, starting in the early 70's on the VHF bands from North Lincolnshire and more latterly on 23cm from Suffolk. I had the pleasure of meeting him at the Finningley round table on a couple of occasions and enjoyed chatting about old times. As Peter says, a real gentleman.

Doug G4DZU

To quote Phillip, he was a 'wizard' of a man. He will be missed.

John G3UUT

Philip was actually my 2nd QSO on the day that I got my licence in 1965. I came straight onto 2m with some scary (looking back on it) homebrew AM gear and a 5 el yagi with a wooden boom and a VSWR of about 10:1. I was in York and Philip was always a good signal from Sheffield and gave me lots of help on the air to get my station and operating up to scratch.

Graham Kimball G3TCT

I remember Philip operating on 4m fairly regularly in the days when most stations were crystal controlled. I have a recording taken on 10 April 1966 of G3NEO in Yorkshire calling CQ prior to working me (in Guildford) on cw and you can hear him use the "QHL" code, meaning tuning from the high end to the low end of the band. It's surprising that we managed to work anyone at all!

www.g3tct.co.uk/G3NEO_QHL.mp3

John G4BAO

Sorry to hear this, but at 95 you celebrate the life not mourn the passing!

I remember Philip on the radio from my very early days as a young lad in Leeds in the late 60s. I had the pleasure of meeting him only once, at Finningley a few years back and found him a charming man and full of life at over 90.

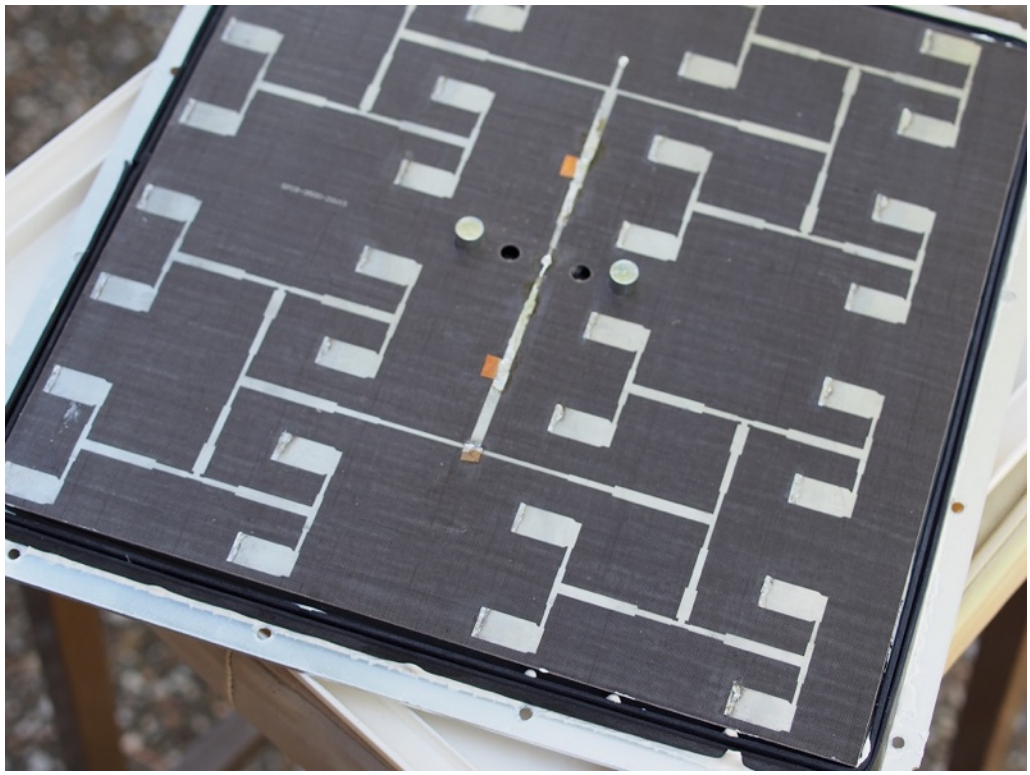
Modifying a 3.5 GHz Panel Antenna

by Doug Friend, VK4OE

On US eBay at item 122280881473 there are available (at least at the time of writing this article) some 'patch' panel antennas designated for use in the 3.5 GHz band. The seller states that these antennas are usable from 3.4 to 3.5 GHz. In Australia, due to the spread of wireless internet services, radio amateurs have had to move down below 3.4 GHz so there was a question as to whether this antenna would work well (or at all?) at our chosen new frequency of 3398 MHz. So I took a chance and, after the seller had accepted my reduced offer, I recently took delivery of one of these antennas. Thus I set out to see how well it would 'go'.

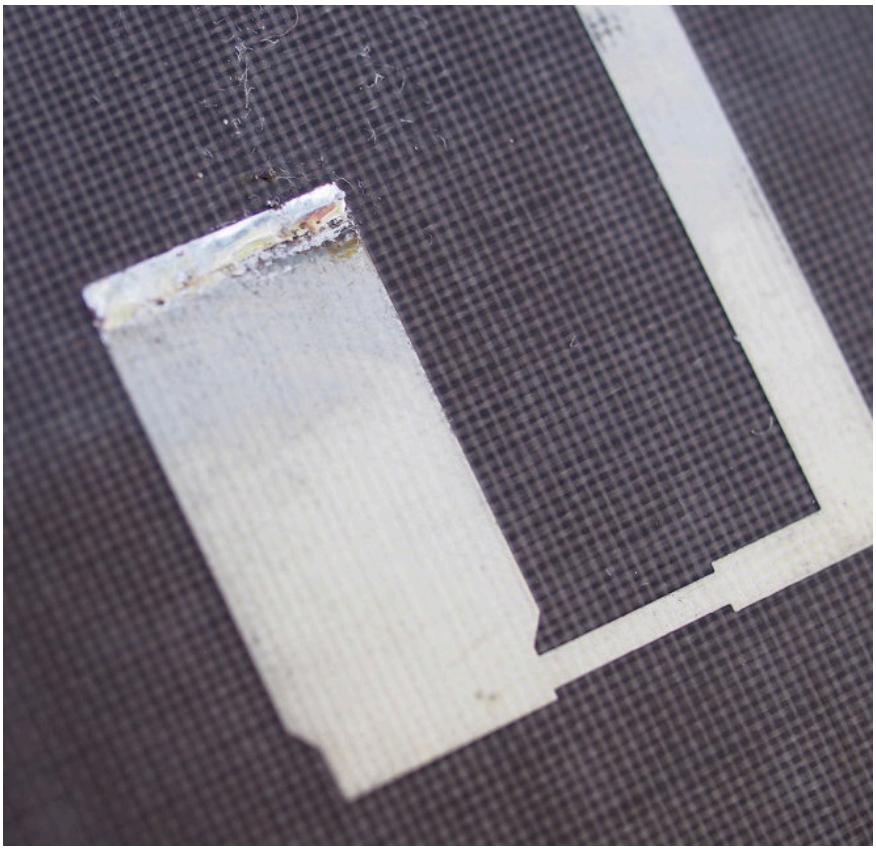
Initial sweeping, whilst measuring return loss at the 'N' input connector, showed the not unexpected result that the optimum frequency range is definitely above 3.4 GHz, going as far up as 4.0 GHz. From 3.45 GHz to about 4.0 GHz the return loss was considerably better than -20 dB, tapering off to only about -10 dB at 3.4 GHz. At my desired 3398 MHz, the return loss was barely making -10 dB, there being a noticeable downwards 'slope' even across the two megahertz between 3400 and 3398 MHz. In that the item is presented for use at 3.4 to 3.5 GHz I am left feeling that the excellent performance above that range may suggest that these antennas are on the market relatively cheaply due to the apparent shortfall in performance in that frequency range.

So all that led to my desire to try and see if it is possible to 'pull' the performance down in frequency to enable more efficient use at 3398 MHz. Readers who don't need to go to 3398 MHz should 'read' 3400 MHz where radio amateurs in different countries are still able to operate – the difference in performance between the two frequencies of the modified result being nearly insignificant.



Firstly, I was pleased to discover that, after removing the sixteen self-tapping screws around the perimeter, the front cover was fairly easily able to be lifted off. This revealed the interesting array of thirty-two 'patch' dipoles, each fed at one end, and the printed matching network repetitively splitting the 50 ohm feed to match the high-impedance feed point of each dipole. The fact that the manufacturer had already added some 'snow flakes' to the primary part of the matching network (not photographed) demonstrated that similar optimisation should be possible for 'my' new frequency.

So, with the 'patch' dipoles as they were, I tried 'poking around' the matching network with a snow flaking tab but I did not achieve a conclusive result, which brought attention to the 'patch' dipoles themselves. Noting that the return loss was very good at and above 3500 MHz and presuming (rightly or wrongly) that this was due to the dimensions of the 'patch' dipoles, a simple bit of maths suggested that I should lengthen each of the 32 'patch' dipoles by 0.5 mm to have them all achieve better resonance at or below 3400 MHz.



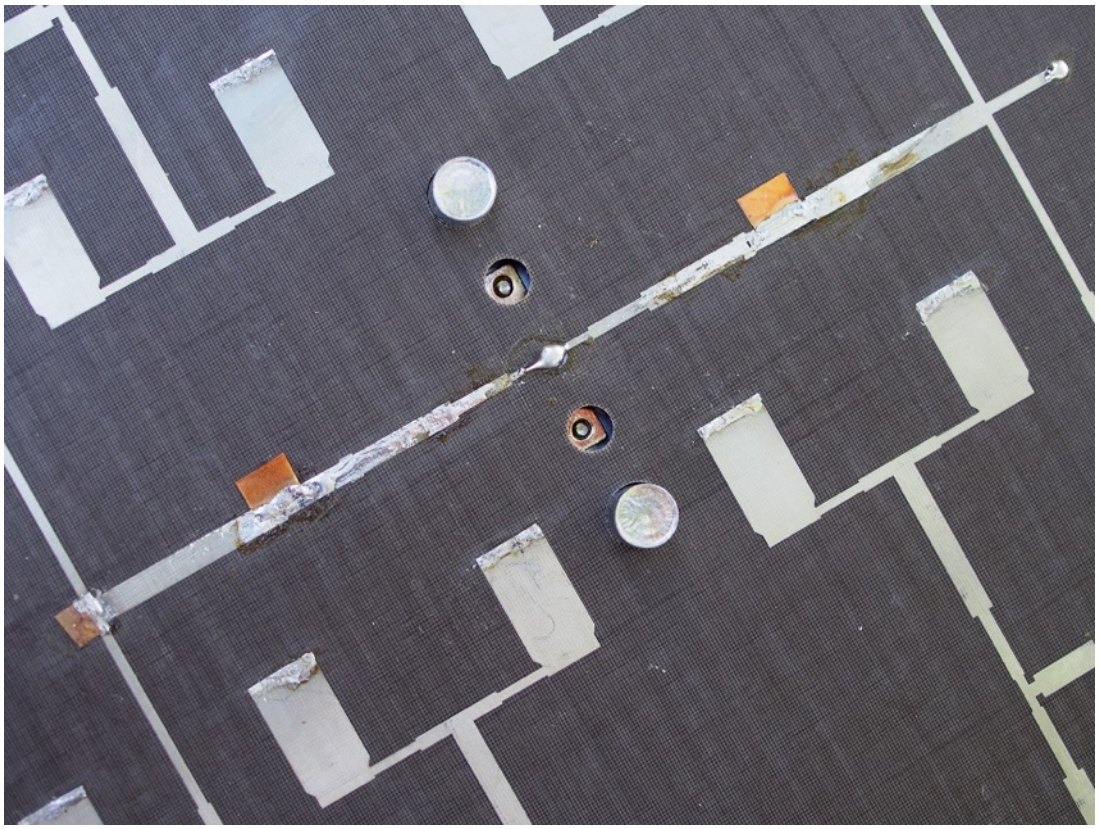
Doing this accurately for every one of the 'patch' dipoles was a little tedious and time consuming. The first challenge here was that the manufacturer's printed 'patches' did not readily take soldering due to what appears to be a thin sprayed plastic coating over all of the antenna elements and the matching array. Clearly, this was to afford some resistance to corrosion associated with any moisture that may get inside. But some firm attention to the desired area of each dipole with a hot soldering iron to melt the plastic did lead to a narrow 'tinned' strip on the 'other end' of each dipole adequate to take a small amount of extra length.

Next, I cut off narrow strips of shim copper about 1.5 mm wide and tinned them on each side. Then, after cutting them into 10 mm lengths, they were carefully soldered into place so the new length of each 'patch' dipole was close to 19.5 mm in length. If you think about it, and given the typically narrow range of operating frequency used by radio amateurs, a small spread in these lengths is probably not all that significant, but it's nice to have them all 'right'.

Testing again for return loss at 3398 MHz did show some improvement, but not a lot initially. That's when I set up the panel antenna facing upwards on the test bench with the feed from the signal generator and the directional coupler all attached underneath. In this way I could continuously monitor return loss whilst making adjustments. Now, after removal of the manufacturer's 'snowflakes' and all of the gross solder associated with them, new and relatively symmetrical locations for the 'snow flakes' shown in the pictures were determined.

The next interesting challenge that arose was some 'de-tuning' arising from replacement of the cover. In an unexpected way, this was overcome by increasing the size of the two 'snowflakes' on the primary section of the matching array, and adding one small one at the left hand end (see pictures). Now, when the cover is screwed back in place, the return loss at 3398 MHz is close to -20 dB, and hardly any better than that at 3400 MHz – I was content with that as a final result of my efforts.

I offer this article describing these experiences for the information and possible inspiration of others. A similar approach could be taken to adjustment of panel antennas for other bands, as they are available from time to time. The 3.5 GHz example described did need some modification/adjustment but, for instance a couple of panel antennas that I have which are labelled for 5.8 GHz are perfectly all right for use at 5760 MHz without modification. Similarly, another panel antenna that I have, manufactured for 2450 MHz, is perfectly useable at 2403 MHz where we Australian amateurs operate. I suspect that attempted use of such an antenna down at 2320 MHz (or even 2304 MHz) would probably need some serious snow flaking in ways described above.



Goonhilly Earth Station Visit

Brian Coleman G4NNS

Goonhilly Earth Station Limited on the Goonhilly Down is the location of one of the UK's main satellite communications Earth stations with more than 20 dish antennas ranging in size up to 32m. The antennas are designated with numbers, such as GHY1, their first large (26m) antenna also known as "Arthur" and GHY6, which at 32m is their largest dish and is known as "Merlin".

Goonhilly Earth Station is located on the Lizard peninsular in SW England at Lat 50.0503N Longitude 5.1835 W. Maidenhead Locator IO70JB.

As the communications satellite receivers becomes more sensitive some of the larger antennas have become redundant and new uses for them are being sought.

Noel Matthews G8GTZ of the British Amateur Television Club (BATC) had been working with Goonhilly Earth Station Ltd to provide TV links from the International Space Station with feeds provided to enable schools to link with the ISS for educational purposes.

It was through this relationship that Noel was invited by Goonhilly Earth Station Limited to carry out some EME tests using GHY6, the 32m dish. Noel recruited Brian Coleman G4NNS and David Crump G8GKQ to assist in the tests.

The dish is of the Cassegrain type with a beam waveguide feed system consisting of "mirrors" providing the signal path from the static control room beneath the dish to the feed point at the back of the dish to illuminate the Cassegrain sub-reflector.

This is a very convenient system as it means that all the RF equipment and the feeds for various bands along with their polarisers for LH and RH circular polarisation are located at ground level and are static as the dish rotates and elevates. GHY6 has four sets of feeds at the base, one for 3.6 to 4.2 GHz, another for 5.8 to 6.4GHz and Ku band at 10.7 to 11.7 and 14.0 to 14.5. All feeds are provided with left and right handed circular polarisation and the system was designed to use the 4GHz band for receive and the 6GHz band for transmit.

Our objective for this visit was to test the practicality of using the C band feed system at 3.4GHz. We knew that there would be a lot of work to do and limited time on site so we didn't want to raise expectations of the EME community in terms of our availability to make many contacts. Achim DH2VA, using the Bochum dish and Dan HB9Q, using his 10m dish had kindly agreed to assist us with our tests and thus had QSOs.

Goonhilly Earth Station staff had kindly arranged access to the C band WG11A inputs for RHC and LHC circular polarisation and had used a network analyser to check return loss for us. Unfortunately the return loss increased sharply at 3400MHz and was measured at 8.4dB on that frequency! We decided to proceed anyway as there was no realistic chance to make changes to the feed. We inserted a 3.4GHz circulator in the transmit RHC feed and measured around 4 of our 50 watts being reflected back down. But at least the PA was being protected by the circulator. We also checked isolation to the Receive LHC port and found another 4 of our 50W appearing there! So we took deep breaths and hoped that our isolation relay and sequencer would protect the LNA.

Goonhilly Earth Station Ltd had done a great job in getting the 32m dish tracking the Sun and the Moon for us and we started by checking sun noise. We were seeing around 20dB cold sky to sun Y factor with Solar Flux of 104, slightly less than that predicted by the VK3UM software but not too bad and easily accounted for by the less than optimal feed characteristics.

We waited with bated breath for moon rise, saw about 2dB of moon noise and soon heard our first echoes at very good strength. We exchanged 59 reports both ways with Dan HB9Q on both CW and SSB. We also had good quality NBFM echoes. I'm sorry we could not stay on longer but after the 200 mile drive and equipment set up we were all too tired to continue after 2130 local time and needed to get to our hotel.

On day two and after QSOs with HB9Q and DH2VA, all on SSB, we concentrated on TV echo tests which had been the main purpose of our visit. Due to the low observed strength of the returns, only Amplitude Modulated fast-scan TV was attempted. The carrier and the first 15625 Hz sidebands were visible on an SDR waterfall display, but no pictures were resolved. Although largely unsuccessful much was learnt.

Meanwhile Goonhilly Earth Station staff had kindly provided us with access to the WG14 feeds which enabled us to run a quick echo test on 5.7GHz after our 3.4GHz tests were completed. We had good echoes for CW and SSB but curiously the NBFM echoes were not good with the ripping paper effect resulting from libration. As these tests were carried out after all others we were again running out of time so were unable to make any contacts on this band.

We hope there will be other opportunities to activate Goonhilly in the future.

The Photo shows, seated from left to right Dave G8GKQ and Noel G8GTZ and standing Gavin Foster and Matt Cosby of GES. I'm behind the camera. Hopefully everyone is amazed at the 59 echoes off the moon.

I also attach for your info a sound clip with my echo followed by Dan HB9Q using his 10m dish.

Editor's Note

Sound clip (209kB) will download to your computer as HB9Q.MP3. Open it with whatever you use to play MP3 files.

Finningley: Antenna Test Range

David Wrigley, G6GXK

Results of the antenna test range, 9 July 2017. Next year I will provide a commentary on the individual results.

Each year we get antennas which look good but don't perform. If we can help fix the problems we do, but yagi construction makes changes difficult, whereas dish focus adjustments can be much easier. Also we can change transitions for commercial ones which sometimes reveals the source of the problem.

By next year I will have transferred the antenna test range (70cms to 24GHz) to Finningley in order to provide an all year round facility at that site.

Band: 1.296 GHz				**Relative**	
Antenna description	**Reading**	**Range**	**Total**	**Level dB**	**Gain dBi**
Reference dipole	-8.5	-30	-38.5	0	2.15
G3AAF yagi	-5.5	-20	-25.5	13	15.15
Very long Yagi - European source	-9	-20	-29	9.5	11.65
G8AQA SG Labs printed Antenna	-3.4	-30	-33.4	5.1	7.25
Band: 2.320 GHz				**Relative**	
Antenna description	**Reading**	**Range**	**Total**	**Level dB**	**Gain dBi**
Reference Horn	-3	-40	-43	0	12.7
2.4GHz WIFi 19 ele. Yagi - rev SMA	-7	-50	-57	-14	-1.3
G8JVM Sealed Yagi -mid supported	0	-40	-40	3	15.7
G8JVM Sealed Yagi -end supported	-7.5	-30	-37.5	5.5	18.2
Corner reflector antenna	-4	-40	-44	-1	11.7
Band: 3.400 GHz				**Relative**	
Antenna description	**Reading**	**Range**	**Total**	**Level dB**	**Gain dBi**
Reference Horn	-2.8	-50	-52.8	0	12.7
IONICA Octagonal Antenna	-5	-40	-45	7.8	20.5
Band: 5.760 GHz				**Relative**	
Antenna description	**Reading**	**Range**	**Total**	**Level dB**	**Gain dBi**
Reference Horn	-5.8	-50	-55.8	0	12.7
G3KYI Horn Antenna	-9.2	-50	-59.2	-3.4	9.3
Band: 10.368 GHz				**Relative**	
Antenna description	**Reading**	**Range**	**Total**	**Level dB**	**Gain dBi**
Reference Horn	-2	-40	-42	0	17.2
G8AQA WG16 Horn	-2	-40	-42	0	17.2
Small Horn and transition	-4.3	-40	-44.3	-2.3	14.9
Chapparel feed Horn	-6.4	-40	-46.4	-4.4	12.8
M1EGI Metallised plastic horn	-1.8	-40	-41.8	0.2	17.4
Plastic 3D printed horn	-0.5	-50	-50.5	-8.5	8.7
Small Dish with duplex feed	-8.5	-30	-38.5	3.5	20.7
Small Dish with duplex feed	-5.5	-30	-35.5	6.5	23.7
Band: 24.048 GHz				**Relative**	
Antenna description	**Reading**	**Range**	**Total**	**Level dB**	**Gain dBi**
Reference Horn	-7.5	-50	-57.5	0	13
G3FAA Flann Horn + transition	-6.5	-50	-56.5	1	14
G6GXK small horn	-9	-50	-59	-1.5	11.5
G4TWJ Horn	-3.5	-50	-53.5	4	17
M1EGI small plated Horn	-7.5	-50	-57.5	0	13
G3FAA Flann Horn + com transition	-6	-50	-56	1.5	14.5

Contest Results

John G3XDY, UKuG Contest Manager

May 5.7GHz Contest 2017

Conditions were quite good for this event, with French stations worked by some, and reasonable activity levels, augmented by some new stations using modified video sender gear. Congratulations go to G3ZME/P as winners and G4LDR as runner up.

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX km
1	G3ZME/P	IO82QL	9	1800	F6DWG/P	474
2	G4LDR	IO91EC	7	900	G3XDY	223
3	GW3TKH/P	IO81LS	5	829	G3XDY	299
4	GW4HQX/P	IO81LS	4	663	G3XDY	299
5	G4JNT	IO90IV	3	388	G3ZME/P	199
6	M0RKX/P	IO92DB	4	112	M0BUX	29
7=	G4NZV	IO82WA	3	51	M0RKX/P	29
7=	M0BUX	IO82WA	3	51	M0RKX/P	29
9=	2E0MDJ/P	IO81XW	3	49	M0RKX/P	27
9=	G0LGS/P	IO81XW	3	49	M0RKX/P	27

May 10GHz Contest 2017

Activity and conditions were judged to be good, with some rain-scatter enhancement and several French stations appearing in the best DX column. Congratulations go to G3ZME/P as the winner of the Open section, G4LDR as runner-up and leading fixed station, and in the Restricted section the family team of G0LGS/P and 2E0MDJ/Pas winner and runner up.

Open Section

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX km
1	G3ZME/P	IO82QL	24	5045	F1NPX/P	548
2	G4LDR	IO91EC	22	4391	F6APE	423
3	G6TRM/P	JO01QD	12	2863	F6APE	448
4	G8HAJ	JO01JR	13	2822	F6DKW	345
5	GW3TKH/P	IO81LS	9	2200	F1NPX/P	527
6	G4CLA	IO92JL	9	1199	G4UVZ	213

Restricted Section

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX km
1	G0LGS/P	IO81XW	10	1157	M0DTS/P	277
2	2E0MDJ/P	IO81XW	9	718	G8HAJ	197
3	GW4HQX/P	IO81LS	4	716	F4BUC/P	488
4	G1DFL/P	IO91OQ	6	659	G6TRM/P	162
5	M0RKX/P	IO92DB	6	497	G3XDY	200

24GHz Contest June 2017

The high temperatures and humidity really took their toll on this event, with the high path losses limiting G3ZME/P to a single local contact. Neil G4LDR/P and Roger G8CUB/P roved between two locations each to good effect.

Congratulations go to Neil G4LDR/P as winner, with Roger G8CUB/P as runner up by a small margin.

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX km
1	G4LDR/P	IO81XG	5	385	GW3TKH/P	89
2	G8CUB/P	IO81WU	5	380	G4LDR/P	66
3	GW4HQX/P	IO81LS	4	339	G8CUB/P	93
4	GW3TKH/P	IO81LS	3	246	G4LDR/P	93
5	G3ZME/P	IO82NN	1	1	G8UGL/P	1

47GHz Contest June 2017

Neil G4LDR/P used roving to good effect to win this event, but scoring was quite close between all the entrants, with Roger G8CUB/P taking the runner-up slot.

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX km
1	G4LDR/P	IO81XG	5	393	GW3TKH/P	89
2	G8CUB/P	IO81WU	5	343	G4LDR/P	66
3=	GW4HQX/P	IO81LS	4	339	G8CUB/P	93
3=	GW3TKH/P	IO81LS	4	339	G8CUB/P	93

76GHz Contest June 2017

Roger G8CUB/P roved between two sites to good effect for this event, and made some good contacts with GW3TKH/P and GW4HQX/P. Neil G4LDR/P found that the high temperature and humidity were too much of a handicap to make the longer distance QSOs.

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX km
1	G8CUB/P	IO81WU	4	250	G4LDR/P	66
2	G4LDR/P	IO81XG	1	29	G8CUB/P	29

24/47/76GHz Championship Tables

No entries were received for the bands above 76GHz this year.

Positions after two events, the best three count to the overall total

24GHz

Pos	Callsign	5/21/17	6/18/17	TOTAL
1	G4LDR/P	747	1000	1747
2	GW3TKH/P	544	639	1183
3	G3ZME/P	1000	3	1003
4	G8CUB/P	0	987	987
5	GW4HQX/P	0	881	881

47GHz

Pos	Callsign	5/21/17	6/18/17	TOTAL
1	GW3TKH/P	1000	863	1863
2	G4LDR/P	790	1000	1790
3	G8CUB/P	656	873	1529
4	GW4HQX/P	0	863	863

76GHz

Pos	Callsign	5/21/17	6/18/17	TOTAL
1	G8CUB/P	1000	1000	2000
2	GW3TKH/P	762	0	762
3	G4LDR/P	475	116	591

UKuG Microwave Contest Calendar 2017

Dates	Time UTC	Contest name	Certificates
30 -Jul	0600 - 1800	3rd 5.7GHz Contest	F, P,L
30 -Jul	0600 - 1800	3rd 10GHz Contest	F, P,L
27-Aug	0600 - 1800	4th 5.7GHz Contest	F, P,L
27-Aug	0600 - 1800	4th 10GHz Contest	F, P,L
17- Sep	0900 - 1700	3rd 24GHz Contest	
17- Sep	0900 - 1700	3rd 47GHz Contest	
17- Sep	0900 – 1700	3rd 76GHz Contest	
24 -Sep	0600 - 1800	5th 5.7GHz Contest	F, P,L
24 -Sep	0600 - 1800	5th 10GHz Contest	F, P,L
22 -Oct	0900 - 1700	4th 24GHz Contest	
22 -Oct	0900 - 1700	4th 47GHz Contest	
22 -Oct	0900 – 1700	4th 76GHz Contest	
19 -Nov	1000 - 1400	5th Low band 1.3/2.3/3.4GHz	F, P,L
Key:	F	Fixed / home station	
	P	Portable	
	L	Low-power (<10W on 1.3-3.4GHz, <1W on 5.7/10GHz)	

80m UK Microwavers net

Tuesdays 08:30 local on 3626 kHz (+/- QRM)

73 Martyn Vincent G3UKV

GW4DGU 10GHz Feed For TV Offset Dishes and Dual-Mode Bandpass Filter

These ARE still available!

I've had a few emails recently asking if my dish feed and filter are still available. People apparently believe that I discontinued these when withdrawing my transverter modules from sale. That wasn't the case. I've kept them available because there are relatively few really satisfactory alternatives available to buy.

The reason for discontinuing the transverter modules was that the power amplifier device and another microwave semiconductor had been suddenly obsoleted by their manufacturers. Demand for the modules simply wasn't big enough to justify the cost of the redesigns which would have been necessary.

The dish feed, which I specifically designed for offset dishes with f/D = 0.65, and the bandpass filter, which has much better performance than any pipecap filter I've measured, are both still available! I can be contacted at <gw4dgu@chris-bartram.co.uk> if you are interested.

Activity News : June 2017

By Neil Underwood G4LDR

Please send your activity news to:

scatterpoint@microwavers. org

Introduction

June has seen more activity on the mm wave bands, both at the RAL RoundTable and during the 24 to 241GHz contest. The UKuW Group 5.7, 10GHz and Low Bands contests as well as the RSGB UKAC microwave contests have seen a good number of portable stations active due to the relatively good weather conditions during much of June. It is also good to see some new call signs appearing in my log.

cm Wave Bands

From G1DFL/P IO91

UKuG 10GHz contest Sunday 30th June.

It was a very windy dry afternoon on Remenham Hill (IO91NM) near Henley-On-Thames, which made dish pointing particularly interesting! I took 10GHz and 24GHz and wanted to try a slightly different site avoiding the lay-by on the A4130 which has high hedges. I parked near a bridleway/footpath and walked along it into a field until I found a gate that gave clear views.

After setting up, I quickly found M0HNA/P (Barry G4SJH and Dave G1EHF) on Walbury Hill (IO91GI at 45km) on 2m talkback and their signals on 3cm were very strong. Really pleased to finally work the "Coombe Gibberlets" team on 10GHz after several failed attempts.

We tried on 24GHz but nothing was heard either end. I'm still eagerly waiting my first QSO on that band! I intend to meet Dave and test with his gear at close quarters one evening.

G1DFL/P at Remenham Hill on 24GHz and 10GHz

Next in the log was Neil G4LDR (IO91EC at 70km) near Salisbury. I also tried with Noel G8GTZ/P, Stu G0LGS/P and Graham G8HAJ but all attempts failed. Pleased to get out again on the bands, and add a couple more QSOs to my GHz log!

mm Wave Bands.

During the lunch break at the RAL Round Table meeting on the 11th June, John, G8ACE and Roger G8CUB carried out tests on 122GHz. They first set up adjacent to each other to confirm they were on the same frequency within the 122GHz band. Once the 2m talk back had been sorted out John set off for the Ridgeway choosing a location that had a clear line of sight path back to Roger (the distance was 2.6km). Very strong signals were received both ways which made for a very easy QSO. I number of people shot video of the contact which John has edited and placed on his YouTube site (search UKG8ACE on YouTube).

From Neil G4LDR/P IO81 and IO91

Having completed my higher performance system for 47GHz in time for the May mm wave contest I was keen to complete the building of my higher performance 76GHz system for the June 24GHz to 241GHz contest, which I just managed to do.

Sunday 18th May turned out to be a hot humid day which is not good for mm wave propagation but that was not the only issue I had that day.

I began the day at Stock Hill on the northwest edge of Salisbury Plain and which is on the Army's training area (but generally open to the public). On approaching Stock Hill from the east I was stopped by two soldiers who told me that I could proceed as long as I stayed on or north of the unmade public road as there was live firing taking place on the south side of the road. As I proceeded I noticed a number of what looked like large bushes on the north side of the road, which as I got closer turned out to be armoured fighting vehicles with their guns pointing across the road towards me. Undeterred I carried on through the middle of the military exercise to reach the top of the hill.

I got set up in my usual location (IO81XG25) and was having my first QSO with GW3TKH/P when the local farm contractor came to cut the grass in the area in which I was located. Luckily he was kind enough to cut around me so I didn't have to pack up and move.

One of the hazards facing G4LDR/P whilst operating from Stock Hill IO81XG

Finally I got a visit from the Army's Range Safety officer who was brandishing a copy of the range bye-laws. He asked me what I was doing and said he could find no reference to amateur radio activities being a prohibited activity on the ranges in the bye-laws so he said I could stay!

The 89km none line of sight path from Stock Hill to the Blorenge, Gwent (IO81LS) went as usual with 55 (GW3TKH/P) and 59 (GW4HQX/P) reports on 24GHz. What was surprising was that QSOs on 47GHz was also completed at 55 signal reports. An attempt to work G3ZME/P on 24GHz in Shropshire over a very obstructed path failed. Finally contacts were made over the relatively short line of sight path between Stock Hill and Hackpen Hill (IO91CL) on 24, 47 and 76GHz with G8CUB/P who had been at Birdlip Hill in Gloucestershire earlier in the day.

In the early afternoon I moved to Hackpen Hill to join Roger because we had discussed trying a 122 and 134GHz contact (with me using some of Roger's and Chris's (G0FDZ) gear for those bands as Chris was unable operate during the contest). On arrival at Hackpen Roger reported he had had easy contacts with GW3TKH/P and GW4HQX/P on 24 and 47GHz over the 93km line of sight path, but on 76GHz signals were relatively weak and both he and GW3TKH/P had to beam up to 20 degrees off the nominal heading to copy each other, indicating significant bending of the 76GHz signal. An attempt between G8CUB/P and GW4HQX/P had followed immediately but without success even although equipment and power levels were the same as the successful contact with GW3TKH/P.

I had successful contacts with both GW3TKH/P and GW4HQX/P on 24 and 47GHz, although on 47GHz signal strengths were less than they had been in May, (interestingly the Cleeve Common 47GHz beacon appeared to be at a similar strength at Hackpen as it had been in May). Attempts by me to work both GW stations on 76GHz failed despite some considerable time panning the dish in both azimuth and elevation.

Later I used the G0MJW path prediction programme to estimate the path loss at 76GHz on the 93km line of sight path between Hackpen (IO91CL) and the Blorenge (IO81LS) for the temperature and humidity conditions that existed at the time of our QSO attempt. I used Met data from Boscomb Down as the nearest Met station to Hackpen and made the assumption that the same conditions existed along the whole path from Hackpen to the Blorenge (highly unlikely!). The temperature was 27oC and the relative humidity 55%. These conditions added nearly 30dB extra path loss compared to 20oC and 50% relative humidity.

As a consequence of the increased dew point and very poor propagation on 76GHz Roger and I decided it was not worth attempting QSOs on 122 or 134GHz. Also by mid-afternoon the high temperature and high dew point coupled with no breeze was making it very uncomfortable to stay out in the open, so we decided to pack up and go home.

From David Austin G1EHF

I successfully achieved my first contact on 24GHz with a recently completed transverter. The contact (as M0HNA/P) was 31km from Walbury Hill to Neil G4LDR and took place during the 5.7/10GHz June contest, with 59 reports both ways.

The transverter is based on surplus DMC link modules, with a retuned synth and filter and I use an 18GHz mixer and transfer coax switch, both of which appear to perform reasonably well at 24GHz.

Having recently collected the Microwave Group 24GHz loan kit, Barry G4SJH, Pete G1DFL and I plan to do some local testing on the band.

76GHz Loan Equipment Tests

Martyn Vincent G3UKV

Having had the UK microwave group's 76GHz loan equipment (ex G4EAT sk) for at least a year, I felt it was time (a) to have a real QSO with it (b) to pass it on to someone else.

I had had several checks of the included beacon up to a distance of about 7km from my home QTH, and that was fine. But it's not a QSO !

Activity in the midlands is approximately zero - well, no, absolutely zero on 76G. In desperation, I decided to take up Keith's (GW3TKH) offer to carry out tests, so on Wednesday 5th July I travelled 80 miles to Keith's portable haunt in the Abergavenny area and set up alongside Keith's Land Rover. My estimates on frequency were quite close - what's 3 MHz at 76,000 MHz ? I reckon I was within less than 4% of the nominal frequency. Anyway - after some hectic knob twiddling by Keith, we copied each others FM, fully quieting. Keith then

moved to his 'upper car park' (Cefn y Galchen) by the masts, and we extended the DX to 0.9km: no problem - S9 both ways.

A phone call to Pete G4HQX led to a 50+ km test, to him travelling to an elevated site near Stroud (Glos.), with a line-of-sight path. Initial line-up on 47GHz between Keith and Pete was a bit erratic, with equipment uncertainties at both ends, despite previous successful QSOs over the path. Anyway, time was moving on, so 76GHz it had to be. With the best will in the world, the path between us failed - even with the G4EAT beacon plus GW3UKV/P and GW3TKH/P transmitters consuming endless battery power. Humidity was quite high (60% ?), and there was still some uncertainty over equipment and frequency . Not to be beaten, Keith suggested I moved north to Sugar Loaf Mountain, about 7km away. My third and final QSO with Keith was successful with S9 SSB signals both directions. Quick descent back down to the A40, and homeward bound with a smile on my face the whole way.

The 76GHz kit is back now with John 'BAO. I hope someone else will take up the challenge. The included beacon is a real plus, as it allows you to listen to more than just white noise. I have added some info based on my experiences, and info from those with more experience than me in its travel box – why not give it a try ?

Keith GW3TKH setting up his dual 47 and 76GHz gear at Cefn y Galchen.

The loan 76GHz set up on a workmate, with FT817 IF.

New UK 23cm DX record

Terry M0VRL (IO70PO) reports that on July 14th he completed a QSO of 2662km with Pedro EA8AVI (IL28FC) in the Canary Islands that breaks the UK and Region 1 23cm tropo records.

M0VRL runs an Icom IC910X, a Gemini 23 Power Amp amp and a 67 element Wimo Yagi. EA8AVI runs an Icom 910X to a 23 element Tonna Yagi

Reports of 51 both ways were exchanged on SSB. The QSO was completed at 2021 UTC with an exchange of reports and locators.

Well done!

…..and finally

The deadline for activity reports to be included in the next issue is Tuesday 1st August 2017.

Events calendar

2017

July 8 – 9	Finningley Roundtable	www.g0ghk.com/
July 14 – 16	Ham Radio, Friedrichshafen	www.hamradio-friedrichshafen.de/
August 18 – 20	SP VHF Convention and Technical Meeting - Poland	www.mikrofale.iq24.pl
Sept 8 – 10	62.UKW Tagung Weinheim	www.ukw-tagung.de/
Sept 9–10	BATC Convention (CAT 17) at Finningley	http://batc.org.uk/convention.html
Sept 10	Crawley Roundtable	carc.org.uk
Sept 17–21	IARU-R1 Conference, Landshut, Germany	www.iaru2017.org/
Sept 29–30	National Hamfest	www.nationalhamfest.org.uk/
Oct 8 – 13	European Microwave Week, Nürnberg	www.eumweek.com/
Oct 13 – 15	RSGB Convention, Kents Hill Park Conference Centre, Milton Keynes	rsgb.org/convention/
Oct 14 – 15	Amsat-UK International Space Colloquium, Kents Hill Park Conference Centre, Milton Keynes	https://amsat-uk.org
Oct 26 – 29	Microwave Update, Santa Clara, California	www.microwaveupdate.org
Nov 4 (tbc)	Scottish Round Table	www.gmroundtable.org.uk/

2018

February 9–11	Hamcation, Orlando, Florida	www.hamcation.com
April 7	CJ-2018, Seigy	http://cj.r-e-f.org
April 21	RSGB AGM	http://rsgb.org/agm
May 18–20	Hamvention, Dayton	http://www.hamvention.org/
June 22–24	Ham Radio, Friedrichshafen	www.hamradio-friedrichshafen.de/
August 17–19	EME2018, Egmond aan Zee,NL	https://www.eme2018.nl
Sept 23–28	European Microwave Week, Madrid	www.eumweek.com/

2019

June 28–30	Ham Radio, Friedrichshafen	www.hamradio-friedrichshafen.de/
Sept 15–20	European Microwave Week, Utrecht	www.eumweek.com/

NB Some of the 2018/19 event links may not be working/updated yet.

EME 2018

The website http://eme2018.nl/ is online. Booking now open! Email info@eme2018.nl to register interest and for updates.

There's also a Facebook page: https://www.facebook.com/EME2018/

73!
Jan
PA3FXB (team PI9CAM)
team EME 2018