An Amateur Radio publication for the Microwave Enthusiast

scatterpoint

April 2019

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In This Issue

Martlesham 2019

241 GHz Record contact

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Loan Equipment

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

5. 7GHz 10GHz 24GHz 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

https://groups.io/g/Scatterpoint 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, OpenOfÞce, 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.

Roger G8CUB

Reproducing articles from Scatterpoint

If you plan to reproduce an article exactly as in Scatterpoint then please contact the Editor – otherwise you need to seek permission from the original source/author.

You may not reproduce articles for profit or other commercial purpose. You may not publish Scatterpoint on a website or other document server.

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

By Mike Scott, G3LYP

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

The service is run as a free benefit to all members of the UK Microwave Group. The service may be withdrawn at the discretion of the committee if abused. Such as reselling of components.

There is an order form on the website with an address label which will make processing the orders slightly easier.

Minimum quantity of small components is 10.

These will be sent out in a small jiffy back using a second class large letter stamp. The group is currently covering this cost.

As many components are from unknown sources. It is suggested values are checked before they are used in construction. The UKµG can have no responsibility in this respect.

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

Chairman's thoughts – Thoughts of an outgoing Chairman

That's outgoing as in stepping down and not what you might think!
It has been my privilege to be the Group Chairman for the last three years. I stepped in when the Group looked like it would not find a Chairman amongst the then Committee. I had already served one three year term as Chairman, back when the Group was formed and only reluctantly agreed to take on the role again but this time, initially, as acting Chairman.

As acting Chairman, for the first year, I oversaw a number of activities and managed to visit all of the Microwave Round Tables staged that year. Subsequently, I only managed a few each year after, due to other commitments.

One of the responsibilities of the Chairman is to respond, on behalf of the Group, to OFCOM Consultations that possibly might affect our amateur microwave allocations. I had several of these to do!

I also oversaw our implementation of GDPR. That was not a straightforward task, and for which I was very thankful for support from more knowledgeable Committee members.

I want to wish, Neil, our new Chairman, all the very best during his tenure. I know Neil well enough to know that he will be really good for the Group.

Thank you to our members for your support this last three years. As an ordinary member of the Group I will enjoy the advantage of belonging to the very best Special Interest Group within amateur radio (and beyond).

Sam, G4DDK

Chairman's thoughts – Response of our new Chairman

I would like to thank Sam, G4DDK for his dedicated work as Chairman over the last three years as well as the committee; whether they have agreed to continue in their roles or have stood down.

Much of the work of the Chairman and Committee is not visible to the membership but nonetheless is vital to ensuring our continued access to the microwave bands, particularly with increasing demand for bandwidth by commercial communication organizations of all kinds.

I hope by standing down as Chairman Sam can find more time to follow whatever aspect of our hobby he wishes to.

Neil Underwood, G4LDR, Chairman UKuW Group.

Writing in the Waterfall- Update

From Barry, G8AGN

Following on from the article in the February 2019 issue of Scatterpoint about Scriber (sequential multi-tone Hellscreiber), Graham G8HAJ and Barry G8AGN had what is believed to be the first duplex contact via QO100 using this mode (see screen shot below).

Following beta-testing, Graham has now made some improvements to the circuit and software described in the Scatterpoint article and a PCB and pre-programmed PIC for v2 was on sale at the Martlesham Round Table for a nominal sum, with proceeds going to UKuWG funds.

A Measurement of Frequency Accuracy and Doppler of the QO-100 Satellite Transponder and Beacon

Andy Talbot G4JNT 6 April 2019

I wanted to know, once-and-for-all, what sort of frequency uncertainty can be expected though this transponder, and how much the beacon can be relied on. So a fully locked receiving system and uplink test signal were used.

Receive System

This starts with a Dual Octagon LNB modified for external 27MHz reference. This comes from a VCXO locked to a master 10MHz reference using an MC145170 synthesizer chip.

739MHz IF from the LNB (with the known and previously calibrated and independently verified 50Hz offset removed) is converted to 28MHz using a U2794 quadrature downconverter chip and LMX2541 fractional-N synthesizer clocked from the 10MHz reference. Taking the known 50Hz offset into account, the LO is 711.000050MHz

The 2nd IF from the mixer goes to an Elad FDM-Duo tuned to 28.549MHz. The net result is that a beacon on 10489.55MHz should come out as a tone frequency of 1000.0Hz and the local reference uplink at a tone of 3500.0Hz

Reference Uplink

An ADF4351 Synthesizer locked to the same 10MHz reference generates 2400.0525MHz so it appears 2.5kHz above the nominal beacon frequency. This feeds a 0.8 Watt amplifier going to a 30 turn helix antenna, approximately 18dBiC, located indoors and looking at the satellite though a closed window. The received downlink from this was 26dB down on the beacon signal

Master Frequency Reference

The master 10MHz reference comes from a HP5061 Caesium frequency standard with the Cs beam turned on an hour before the 24 hour measurement period was started. A timing comparison of this reference divided down to 1 Hz against the 1 PPS signal from a GPS receiver was used to confirm the Cs accuracy. Timing shift of the two 1 PPS signals was less than the 100us of timing measurement resolution and meant that over the 24 hour period there was certainly no more than 10^{-12} mean frequency error on the 10MHz reference.

Measurement System

The two tones from the receiver, the beacon on nominally 1kHz and the local reference at 3.5kHz, were fed to two instances of *SignalToNoiseMon.exe*, each tuned to one of the two tones. Both were set to 12kHz sampling, FFT size 64K and 43 seconds averaging. Frequency measurements of the two tones to a resolution of 0.18Hz were stored approximately every two minutes for the 24 hour monitoring period. Although the exact timing of each two minute period was asynchronous between the two instances of the software, the resulting epochs were never more than 90 seconds apart, so differential drift between the two due to measurement time offset is insignificant

Results

Figure 1 shows the absolute received tone frequency of the beacon and that of the local reference after subtracting the 2.5kHz fixed offset.

There is clearly a cyclic variation due to Doppler of around 50Hz peak-to-peak.

The mean is around 1100Hz and as this offset can be seen equally on both beacon and local reference uplink, it means the satellite LO is 100Hz high at this time (5 April 2019
(*This absolute frequency error does assume the 50Hz offset in the Octagon LNB local oscillator, discovered recently and confirmed independently, is EXACTLY 50Hz*)

Figure 2 shows the difference between the two received tones with the 2.5kHz offset removed.
With a tone frequency measurement uncertainty of 0.18Hz a massive granularity in this measurement can be seen in the green points on the plot. Excel's trendline tool was used to add a 6th order polynomial trendline to this differential tone measurement. This appears as the smoothed black line.

There is a mean difference of approximately 2Hz between the received and corrected uplink tone and the beacon. Until known otherwise, this has to be assumed to be in the uplink frequency accuracy. A 2Hz error at 10GHz, (0.2 parts per billion) is considerably in excess of what the HP5061 caesium reference is capable of (even without local magnetic field compensation) and tests described earlier suggest less than 10^{-12}. A 0.2 PPB error is probably beyond what might be expected if the beacon were generated from a good quality ovened oscillator, but is typical of the absolute accuracy of a rubidium source that has not been recently calibrated.

Looking the trend line, there a cyclic difference between the two signals in the order of 0.26Hz which is possibly due to the differential Doppler introduced by the separation of the two uplinks, in Germany and the South Coast of the UK. The value needs to be taken with care as this 0.26Hz is an average of many measurements, each made with an instantaneous measurement uncertainty of the same order as this averaged value.

One other residual source of frequency error (absolute) is the Elad-FDM duo that uses a Numerically Controlled Oscillator as its LO. This introduces a systematic frequency setting uncertainty of up to 0.016Hz

Short term variations with durations of tens of minutes, visible on the curves and common to both signals cannot be accounted for; possibly they could be PLL locking glitches in the HP5061 reference source, or propagation anomalies.

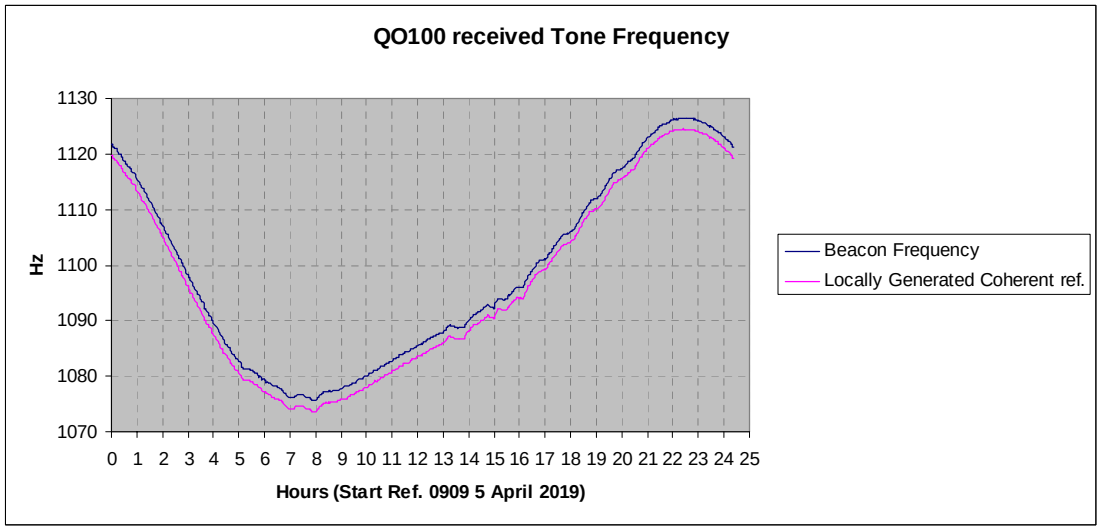


Figure 1 - Measured Tone Frequencies, corrected for the 2.5kHz offset

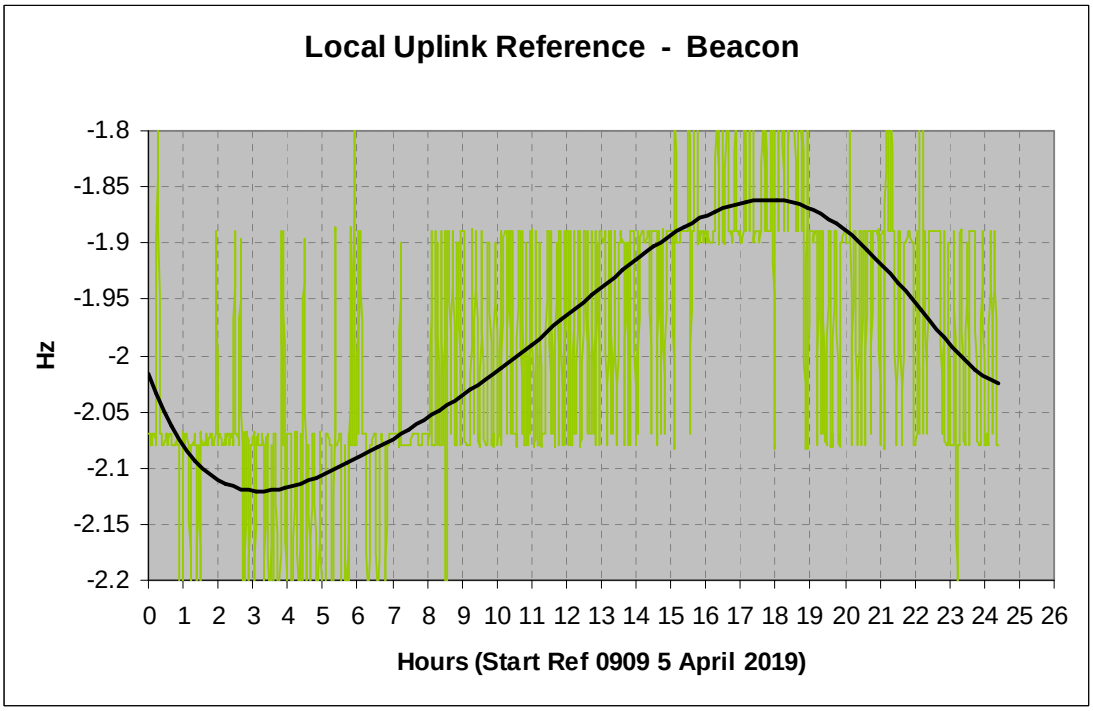


Figure 2 - Difference between the two received tones, corrected for the 2.5kHz offset. (6th order trendline)

Tests Using the BATC Goonhilly Web SDR

A set of measurements on the beacon frequency using the same system were made a few days earlier and the results can be seen in Figure 3. This has about the same start time, around 09:00a, as the later plot where a similar tone frequency and drift can be seen.

While this was underway, a similar recording was made using audio from the Web SDR tuned arbitrarily. Audio was looped-around to the mic input of a laptop for the *SigToNoiseMon* software.

Figure 4 shows the results where the short term wobble due to the GPSDO controlling the WebSDR is clearly visible as random frequency shifts of several Hz spread over tens of minutes. This is normal behaviour for the frequency stability characteristics of a typical GPSDO.

A 6th order polynomial trendline is shown by the black line. This plot mirrors very closely the corresponding interval in the local measurement and suggests most frequency measurement tests on the satellite transponder could be made using the Web SDR or a GPSDO source for locally frequency locked measurements, provided a reliable averaging, such as a trendline, is applied to the results and they are taken over a long-enough period.

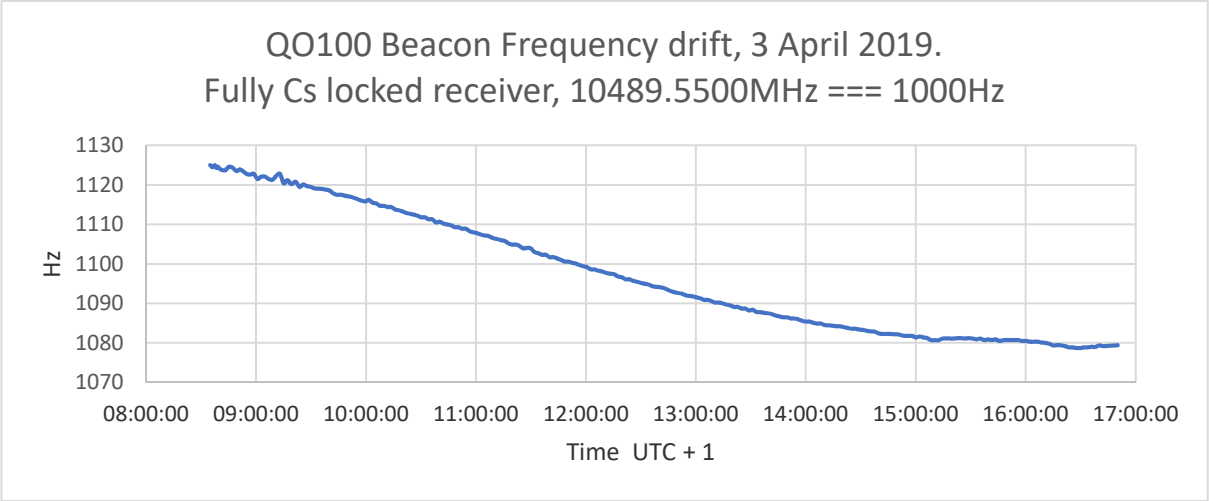


Figure 3 Earlier Test using the locked receiver system.

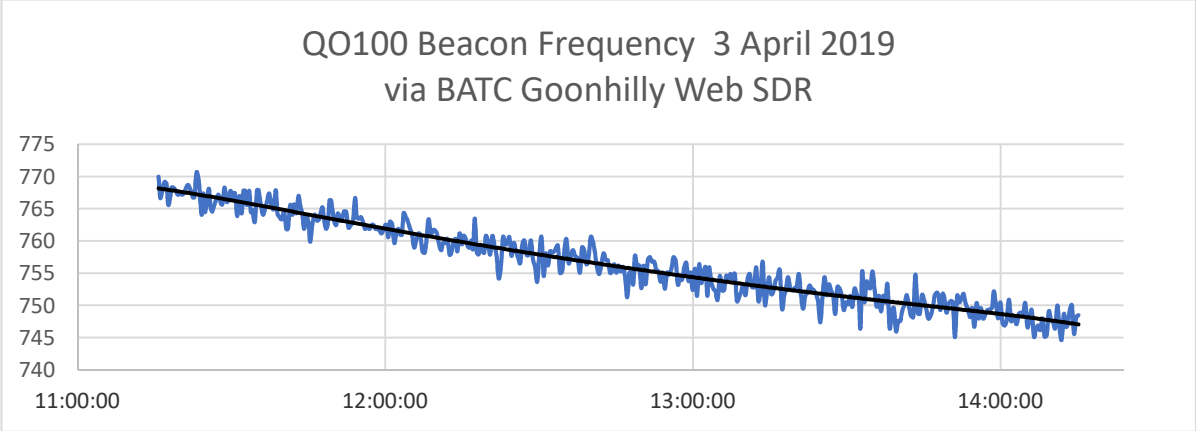


Figure 4 Frequency Measurement of the CW Beacon frequency using the BATC Web SDR

The choice of Millimetre Frequencies

From Roger G8CUB

I was asked at Martlesham about the frequencies used for communication on the millimetre bands. Some of the frequencies used correspond to IARU and/or RSGB band plans, others do not. So that all interested parties know what we are doing. Here is a list and explanation of frequency choice.

47 GHz Band 47.0 – 47.2 GHz Primary Narrow Band Centre of activity 47.088,2 GHz
76 GHz Band 75.875 – 76.000 GHz Primary, 76.0 – 81.0 GHz Secondary
Narrow Band Centre of activity 75.976,2 GHz UK & preferred
Narrow Band Centre of activity 76.032,2 GHz Europe (non-preferred)

122 GHz Band 122.25 – 123.00
Narrow Band Frequencies adopted 122.400 & 122.833,333 (or 122.832)
134 GHz Band 134.00 – 136.00 primary. 134.0 -141.0 Secondary
Narrow Band Frequencies adopted 134.400 & 134.840 (or 134.832)
This differs from the band plan giving 134.928 – 134.930 GHz
241 GHz Band 248.0 – 250.0 GHz primary, 241.0 – 248.0 GHz secondary
Narrow Band Frequencies adopted 241.02 GHz (241.452 LO)
>275GHz various 'green segment bands' 286 -296 GHz chosen as initial band of interest.
Narrow Band Frequency adopted 288.000 GHz

The 47 GHz frequencies have been fixed internationally. This 200 MHz segment is currently a primary Amateur allocation. Narrow band activity is between 47.088 and 47.090 GHz. Generally an IF of 144 or 432 MHz is used. The use of mixing, with a narrow band filter, means the LO can be on the low side of the band. This band is currently under threat, and will be discussed at WRC 2019. Therefore the more reports of operation, and beacons received the better.

On 76GHz there is a difference between the narrow band frequency used in the UK and Europe. The UK is on the correct frequency of 75.976 – 75.978 GHz. Europe continue to use 76.032,2 GHz as their centre of narrow band activity. This required me to re-program the pic controlling the Elcom synthesiser in my 76 GHz transverter, to allow me to work the German DX-pedition on the Great Orme last year.
The use of mixing, with a narrow band filter (or image-rejection), is becoming more common. However going forward simple mixer only systems, need consideration of where the LO and image products lie. Secondary bands between 76 & 81 GHz are under serious threat, and again will be discussed at WRC 2019.
For 122 GHz operating frequencies have been chosen to allow the use of Elcom synthesisers, or others with simple multiplication.
122.400 GHz being 10.200 x 12, 12.240 x 10 or 24.48 x 5. Typical LO (or reverse frequency being 122.833,333) giving an IF of 433.333. This was from a Elcom frequency of 12.283333, multiplied up. With alternatives synthesisers now available, 122.832 GHz can be used. I use 15.300 GHz x 8 to get to 122.400. With this sort of pairing, the LO is kept in band.
Mixing is not generally used, as suitable filters are not available. The 'LO' being keyed, for CW only contacts. Also with one station on 122.400 and the other on say 122.832, both operators can look for the others 'TX' signal (un-keyed) at the same time.
On 134 GHz, we have used 134.400 as TX frequency, paired with 134.840, giving an IF of 440MHz. This is used in a similar way to the 122 GHz band. 134 .400 is derived from a synthesiser on 11.200 GHz using a x12 multiplication. 134 .840 being x12 of 11.236666 GHz.
Typically a harmonic mixer is used being driven from a Broadern module at 33.6 GHz.

241.02 GHz may seem an odd choice. However it was chosen from the highest frequency an Elcom synthesiser could be programmed to. 13.390 GHz x 18. (Elcom 1301 12.65 – 13.35 GHz). Another close frequency used is 241.01, derived from 11.476,666 Ghz x 21.
In time we may migrate to the primary band above 248 GHz.

>275 GHz. On all the higher millimetre bands, phase noise of the LO is critical, due to the high multiplication. 288GHz was chosen as being 16 GHz x18. 16 GHz hopefully being an easy multiple in the synthesiser. I use 4GHz x 4 to get to 16 at the moment. Also there are Gunn diode oscillators working around 96GHz, that could be injection locked. LO frequency being chosen for a 432 MHz IF. As it is the LO that is critical on phase noise, there may be logic in making the LO 288 .000 GHz, and having the TX frequency 288.432.

Editors Comments

I am still looking forward to receiving a deluge of technical articles for Scatterpoint. So far despite April showers they have not appeared.
Innovation in Amateur microwave circles is high, together with basic practices that we can pass on to others.
So, please get writing……

Roger G8CUB

News from Down Under

New VK Microwave & Optical Records Set

Date : 03 / 04 / 2019
Author : WIA

John Martin VK3KM - WIA Records Keeper lets us know that there have been many new microwave records and a new optical record set in VK.

The records list has been updated to include a number of new records set by Iain Crawford VK5ZD, Tim Dixon VK5ZT and David Minchin VK5KK.

New VK1 record for 24 GHz: VK5ZD/1 VK5KK/2 18/03/19 84.2 km
New VK1 and VK2 records for 47 GHz: VK5ZD/1 VK5KK/2 8/03/19 84.2 km
New VK1 and VK2 records for 76 GHz: VK5ZD/1 VK5KK/2 18/03/19 84.2 km
Further VK2 record for 76 GHz: VK5ZD/2 VK5KK/2 21/03/19 95.7 KM
New VK3 and national record for 76 GHz: VK5ZD/3 VK5KK/3 17/03/19 141.1 km
New VK3 record for 122 GHz: VK5ZD/3 VK5KK/3 18/03/19 5.0 km
National Mobile records for 24 GHz, 47 GHz and 76 GHz: K5ZD/M5 VK5KK/M2 25/03/19 28.5 km
New VK1 record for optical comms: VK5ZD/1 VK5ZT/2 18/03/19 84.2 km

There is also a new national Digital Modes record for the 122 GHz band, set by Andrew Anderson VK3CV and Noel Higgins VK3NH:
VK3CV VK3NH 22/03/19 1.6 km

The full lists of past and current VHF-UHF records are available on the Records Update web page:
Link

John Martin VK3KM

Martlesham AGM 2019

UK Microwave Group AGM Minutes 2019

The AGM of the UK Microwave Group took place on 14 April 2019, at the Martlesham Microwave Round Table.

Minutes 2018

Minutes 2018 (as published in Scatterpoint April 2018) – no comments had been received, there were no matters arising.

Chairman's Report

Sam Jewell commenced his report by thanking the committee for their efforts during the year, including G3XDY for organising the Skype committee meetings and contests, G4BAO for looking after the finances, G8DKK as membership secretary, G8CUL/G8NVI as our trophy managers, G3LYP for the component service, G8BHC and G8CUB for Scatterpoint, G4LDR for activity reports, G0OLX for beacon coordination, G4SJH for liaison on microwave spectrum issues, and all our other regional members and co-opts.

A number of committee changes had taken place during the year, with Heather Lomond M0HMO and Paul Nickalls G8AQA joining the committee with a particular focus on Microwave Software Defined Radios. Roger Ray G8CUB has taken over editorship of Scatterpoint at short notice from Martin G8BHC who stood down due to health issues. He is thanked for all his time and effort producing the newsletter. Also standing down this time is Barry G8AGN (mm-wave representative).

Membership stands at 533, up 3%, with 16 new members joining during the year.

Round Tables were held in 2018 at Martlesham, RAL, Finningley, Crawley, and Burntisland, and most recently at Cardiff in March 2019. Thanks went to all the speakers and those that entered the project competitions. The group also had its usual presence at the RSGB Convention in October 2018, with G4BAO organising an Gnu Radio course there.

The chairman attends the RSGB Spectrum Forum on behalf of UKuG, in addition to the presence of committee members G4SJH and G6JYB (Spectrum Forum Chairman). There is continuing pressure on our allocations, particularly 47GHz, but almost every band has its challenges.

Some highlights on the beacon front include the activation of GB3NGI on 1.3GHz, GB3FNM on 2.3GHz, GB3SCQ on 47GHz, and the re-establishment of GB3MHZ on 24GHz and GB3LEX on 10GHz. Less good news was the loss of site for the GB3CCX 10GHz and 47GHz beacons, and the failure of appeals for approval of the GB3CLE and GB3IOW 1.3GHz beacon site changes. Several beacons are licensed but not yet on air.

Beaconspot continues to be the premier source of beacon info for microwaves and VHF, the URL has now changed to www.beaconspot.uk

Please follow our twitter feed @UKGHZ, and videos for upload to You Tube would be very welcome, please send them to G6JYB for uploading.

The UK Microwave Group web site has migrated to using https for improved security.

The General Data Protection Regulations came into force in May 2018, several changes were implemented to ensure the group is compliant.

Loan transverter systems are available for 5.7GHz, 10GHz (x2), 24GHz and 76GHz.

The chip bank fulfilled 43 requests in 2018, a 30% increase. Thanks to all that donated components to the bank. A very big thanks to Mike G3LYP for all his hard work running the chip bank.

This year marks the 20th anniversary of the founding of the UKuG by G4KNZ, G8KMH and G4DDK in response to the demise of the RSGB Microwave Committee, with its formal establishment at the Martlesham Round Table in November 1999.

The chairman announced he was standing down, and thanked everyone for their support.

Treasurer's Report – John Worsnop G4BAO (presented by Graham Murchie G4FSG in his absence)

UK Microwave Group Accounts **2018**

Covering period 01/Jan/2018 to 31/Dec/2018

Item	Income	Expenditure	Balance	Notes
Opening C/A+PayPal +Deposit + petty cash balance 01/Jan/18			**22673.66**	
Subscriptions	£3,323.46			
Chipbank donations	£26.95			
Interest	£9.87			
PayPal fees		£158.41		
RSGB Affiliation		£47.00		
Websites (inc beaconspot)		£455.55		
Beacon Support		£135.95		
Trophies		£115.45		
Chipbank Expenses		£31.30		
10GHz Loan transverter parts		£847.50		
Loan equipment insurance		£358.04		2 years
Sub-totals excluding transfers	**£3,360.28**	**£2,149.20**		
Closing C/A+PayPal +Deposit + petty cash balance 31st Dec 2018			**£23,884.74**	

J C Worsnop G4BAO
Treasurer

Group funds increased by £1171.08 for a subscription income of £3323.46
We managed to spend some of your cash but are still looking for projects to fund. Please put forward your ideas to the treasurer or at the AGM.
The group donated £135.95 to the Farnham Web SDR.
The group purchased and built a second 10GHz loan system totalling £847.50
We supported beaconspot.eu paying the web fees.
Chipbank made £26.95 from donations this year, with costs of £31.30, justifying its continuation as a free service. Big thanks again to Mike G3LYP for running it!
Despite the treasurer's best efforts we still have £23,000 sitting in the accounts, so no subscription increase is proposed this year.
Thanks to Graham Philips G0KRB for again examining the accounts free of charge.
We are STILL looking for people with projects to fund!
… put forward your ideas to the Treasurer or at this AGM
Three out of four ideas proposed last year resulted in no further action from the proposers so no funding was forthcoming.
The three were:

- A Midlands 10GHz beacon
- A 47GHz loan system
- Second 24GHz and 76GHz systems

These projects will be funded if volunteers step forward to implement them with a plan and costings. G8CUB offered to build the 47GHz loan system.

Membership – Bryan Harber G8DKK

2018/19 Membership Stats

2018:	2019:
517 Members (4/2018)	533 Members (4/2019)
74 New Members (calendar year 2017)	59 New members (Calendar 2018)
19 New Members (January to April 2018)	25 New Members (January to April 2019)
Groups.io Scatterpoint	Groups.io Scatterpoint
503 members subscribed	522 members subscribed
10 pending	3 pending
84% members pay by PayPal	85% members pay by PayPal

Scatterpoint Transition to Groups.io

The migration to Groups.io/Scatterpoint took place in October 2017.
Members can no longer have more than one ID.
Members with bouncing or defunct email addresses were removed.

Many members have requested changes to their ID, which requires a complex process to approve the new ID and update databases. Requests with obscure IDs and no name/callsign are not actioned.

Election of Officers & Committee

Apart from Sam Jewell G4DDK, Graham Murchie G4FSG, Barry Chambers G8AGN, and Martin Richmond-Hardy G8BHC who are standing down, the remaining committee members are all willing to stand again for re-election. Neil Underwood G4LDR was nominated for the post of Chairman, proposed by Graham Murchie G4FSG and seconded by Martin Richmond- Hardy G8BHC. Other nominations were requested from the floor, none were forthcoming, so the following committee was declared elected:

Chairman	Neil Underwood	G4LDR
Treasurer	John Worsnop	G4BAO
Secretary	John Quarmby	G3XDY
Membership Secretary	Bryan Harber	G8DKK
Beacon Coordinator	Denis Stanton	G0OLX
Web Master	Murray Niman	G6JYB
Contests/Awards	John Quarmby	G3XDY
24GHz and Up		
Microwave SDR Projects	Heather Lomond	M0HMO
	Paul Nickalls	G8AQA
Corresponding Members		
USA Liaision	Kent Britain	WA5VJB/G8EMY
Northern Ireland	Gordon Curry	GI6ATZ
Scotland	Martin Hall	GM8IEM
Wales	Peter Harston	GW4JQP
ATV	Noel Matthews	G8GTZ
Beaconspot	Robin Lucas	G8APZ
Trophies Manager	Mike & Ann Stevens	G8CUL/G8NVI
Scatterpoint Editor	Roger Ray	G8CUB
RSGB Microwave Manager	Barry Lewis	G4SJH

*Subsequent to the meeting Chris Whitmarsh G0FDZ offered to fill the mm-wave rep role and he will be co-opted onto the committee in due course.

Motion Regarding Exemption from the Novice and Intermediate Licence

Richard Bown G8JVM had requested the following motion be put to the AGM:

In pursuance of section 2, para e, of the Constitution of the UK Microwave Group, the committee of the fore mentioned group shall make every effort to robustly liaise with the RSGB/OFCOM to obtain exemption of the Novice and Intermediate stages of the Amateur radio licence conditions for the following:-
Students ,Graduates and Chartered Engineers of RF Engineering at recognised Universities within the United Kingdom of Great Britain and Northern Ireland.

Richard Bown G8JVM introduced the motion and spoke about its benefits, other members then responded including Graham Murchie G4FSG, and Prof Denis Nicole M0CYJ. After some debate a vote was taken, and the motion was defeated. Votes in favour: 1, against: >30.

Any Other Business

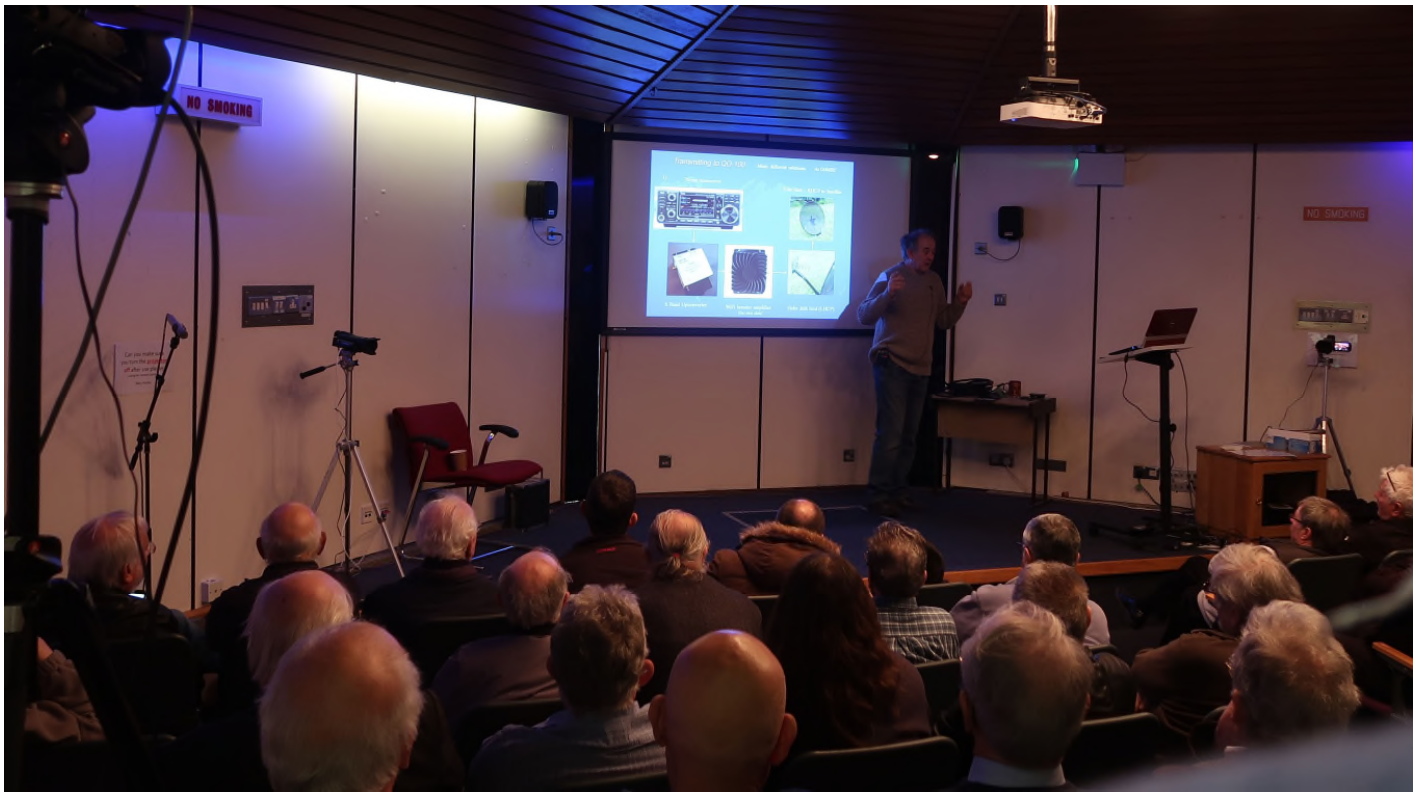
None raised.
The AGM was then closed by the ex-chairman and thanked by the incoming chairman.

Martlesham Microwave Roundtable 2019

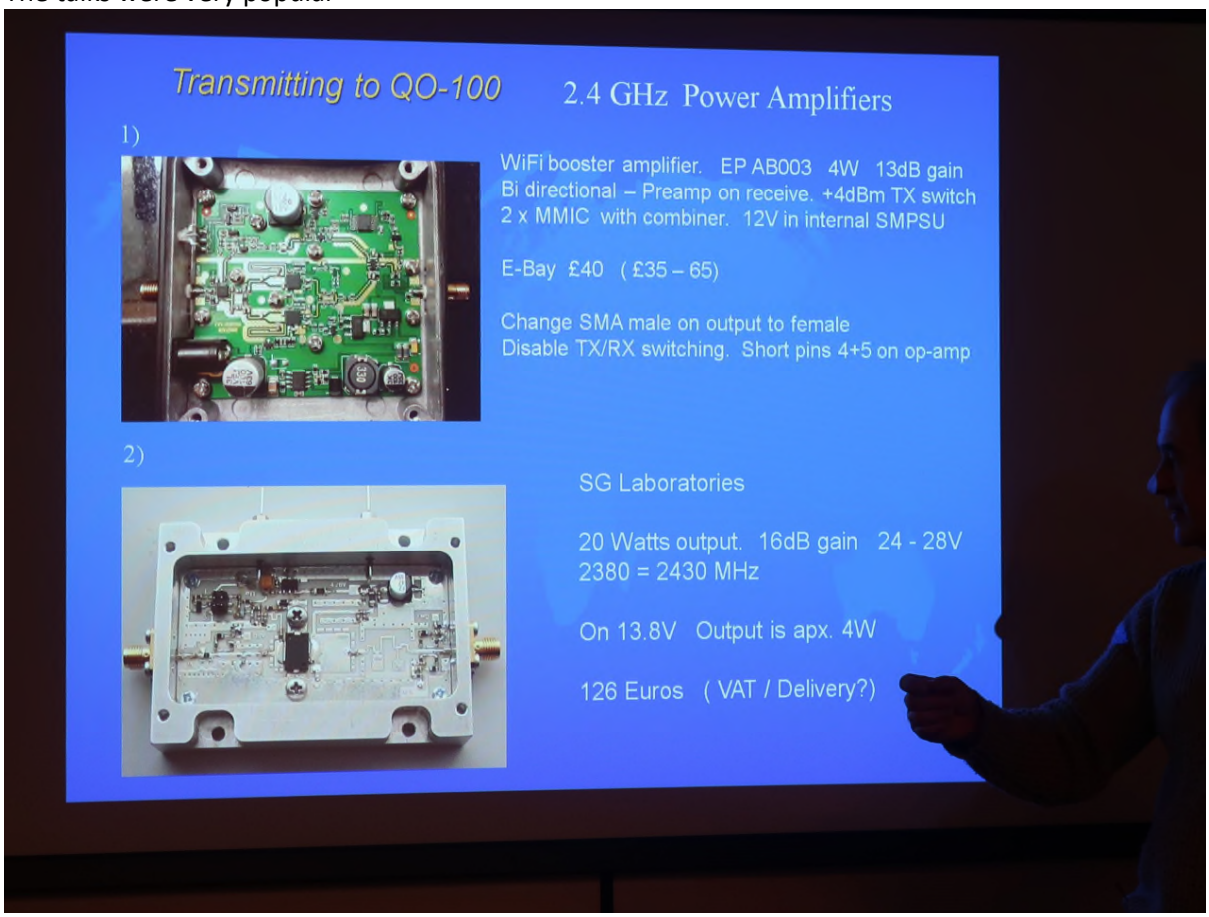
We had over 100 visitors on the Sunday at the Martlesham Round Table and several tens more watching the live feed of the lectures via the BATC web server. The organisers would like to thank all those that attended for making the 40th Martlesham Round Table a success, and to all the helpers who made the event run smoothly and provided catering, plus our loyal band of traders that provided lots of useful microwave components and systems.

Nearly everyone was in the talks, when this picture was taken!

The construction competition had the largest entry for a long time. We hope to have some pictures in the next issue of Scatterpoint
The Martlesham project competition round was won by Jen Easdown G4HIZ for a well engineered QO-100 satellite terminal.

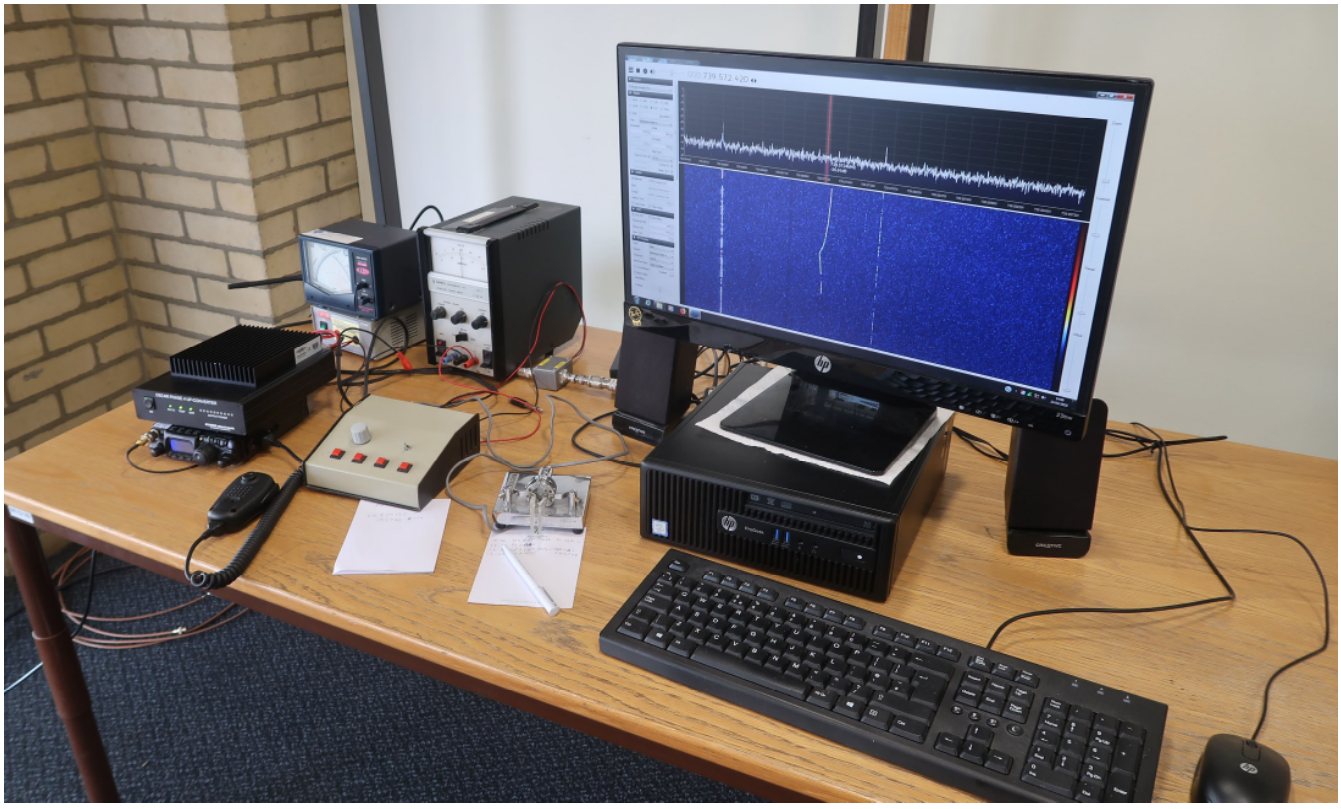


The talks were very popular



Talks on equipment to use Es'hail2 were video streamed through the satellite

Note the simple but effective dish mount for the satellite link



Reception and NB transmitter in the foyer

Activity News: March and April 2019

 By Neil Underwood, G4LDR

Please send your activity news to:

scatterpoint@microwavers.org

Introduction

This is my final activity report as I will have stood down as activity news editor by the time of the AGM in April.
I would like to thank everyone who has contributed a report over the last three years. It is always good to hear what members have been up to on the microwave bands and hopefully it stimulates others to get on the air on any microwave band using any mode.
I hope your continue to support the new activity news editor by sending in lots of activity reports.

cm-bands

From Graham G3YJR
I have started rebuilding my 13cm set-up. I have activated 2400MHz & hope to be on 2300 as well as 2320 soon, with more power than my current 2W.

Along with many others I have been setting up a link to Es'Hail-2. I used a 40el Wimo for the uplink and an Octagon LNB with Bernie's mod. for the down. I've had a few contacts.

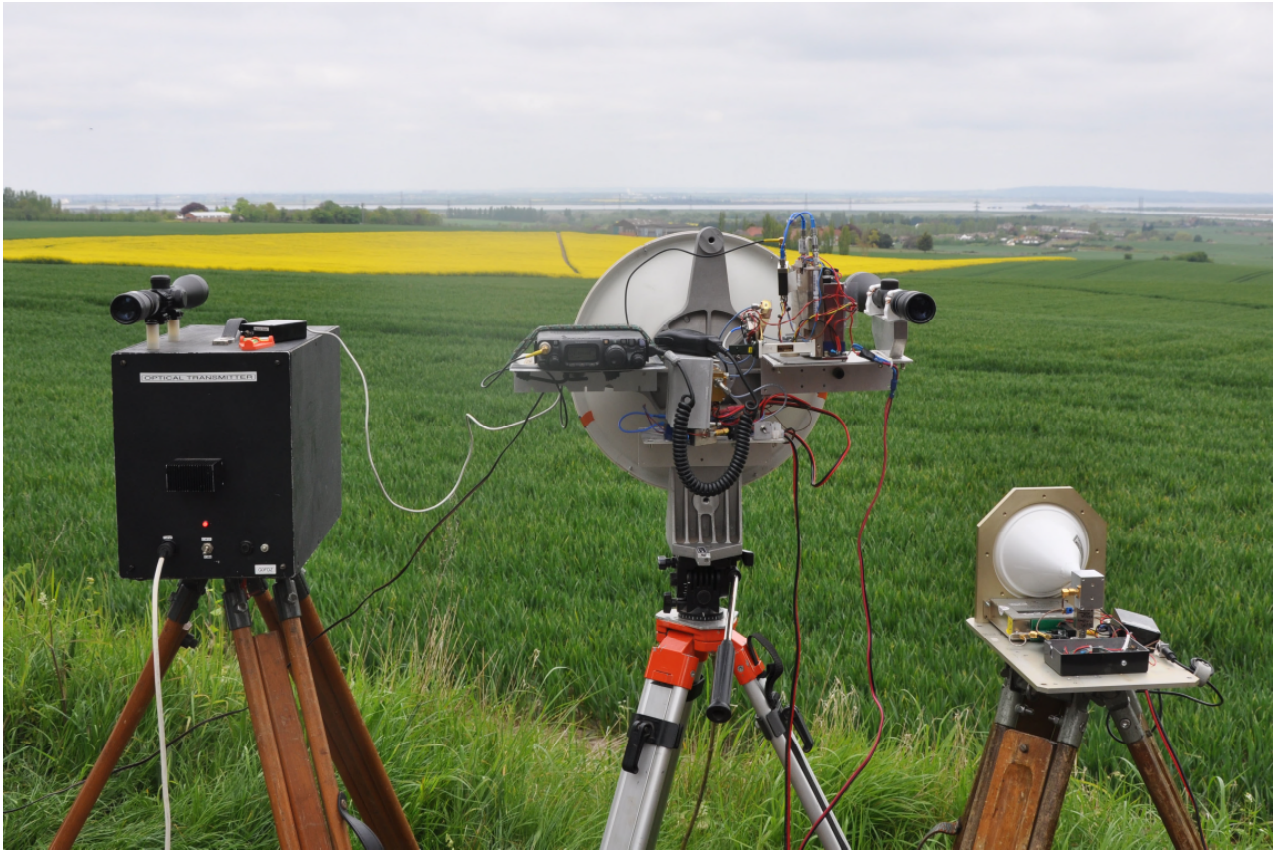
I'm going to try to set up a separate dish for the satellite. I've been sorting out a dual band feed for this. Building a patch antenna is something new for me.

g3yjr.wordpress.com/2019/03/25/eshail-dual-band-feed-with-patch-tuning-screws/

73 Graham

mm-Wave Band Report

UK 241 GHz Record Broken – Twice!



G0FDZ/P Higham LED light - 241GHz transverter with 24GHz IF – 241GHz beacon

From Chris G0FDZ

The UK 241 GHz record was broken twice on Tuesday 30th April, when Roger G8CUB/P worked Chris G0FDZ/P first over a 7.36km path from West Tilbury Essex (JO01EL92) to Higham Kent (JO01FK60). Roger then moved Thurrock Thameside (JO01FL39) and worked Chris at Higham (JO01FK60) over a 9.33 km path. The first contact was completed on SSB with signals averaging 56 each way and over the second path (which was over more of the Thames) CW signals were exchanged at the 549/529 level. Fading of up to two S points was certainly noticeable on each occasion. Dew point was 7 deg.C

G8CUB/P West Tilbury 241GHz transverter with 432MHz IF

G8CUB/P Thurrock Thameside 241GHz CW beacon and 241GHz transverter

The cross-Thames contacts were completed at the fifth attempt this year. On each previous occasion signals were only copied in one direction.
The first qso was made after Chris detected Roger's separate beacon transmitter, then replied with a transverted signal, first in CW. The SSB exchanged was finally quite easy, but had required over 30 minutes warm-up of the equipment. Chris's FT817 transmitted usb, while Roger's similar radio was on lsb, as he was using high-side LO.
The path loss for the second qso was much higher than expected attenuation. This has been put down to the longer cross-Thames path at a lower elevation. It this case the G8CUB beacon transmitter pictured was the CW transmitter, the transverter just used on receive.

Equipment details will be in the next issue of Scatterpoint.

May Contest

Lorenz DL6NCI will be QRV on the microwave bands during the UHF Contest on 4/5th May from JO40XL as DA0FF - details are attached below. It's a good site and should be workable from up to 800km+ away by aircraft scatter.

73

John G3XDY

.....and finally

The deadline for activity reports to be included in the next issue is Friday 1st June 2019.

Contests

March 2019 Low Band Contest Results

Overall

Pos	Callsign	1296MHz	2300MHz	2320MHz	3400MHz	Overall
1	M0HNA/P	1000	1000	595	1000	3595
2	G3UVR	541	0	1000	0	1541
3	M0GHZ	396	0	338	357	1091
4	G4LDR	253	0	540	270	1063
5	G3UKV	288	0	540	0	828
6	G4KIY	464	0	0	0	464
7	GM8IEM	406	0	0	0	406
8	G0HIK/P	63	0	51	0	114
9	GM4DIJ/A	103	0	0	0	103
10	G3YJR	53	0	0	0	53
11	M0KPW/P	34	0	0	0	34

1296MHz

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX Kms
1	M0HNA/P	IO91RF	20	4468	GI6ATZ	507
2	G3UVR	IO83KH	12	2419	G3XDY	324
3	G4KIY	IO92WN	7	2071	PI4GN	466
4	GM8IEM	IO78HF	4	1814	G4KCT	548
5	M0GHZ	IO81VK	9	1768	PI4Z	422
6	G3UKV	IO82RR	9	1286	G3XDY	265
7	G4LDR	IO91EC	6	1132	G4KCT	318
8	GM4DIJ/A	IO74MT	2	461	GM8IEM	381
9	G0HIK/P	IO84IH	3	280	G3OHH	153
10	G3YJR	IO93FJ	1	238	G3XDY	238
11	M0KPW/P	IO84KF	2	154	G3OHH	139

2300MHz

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX Kms
1	M0HNA/P	IO91RF	1	153	G3XDY	153

2320MHz

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX Kms
1	G3UVR	IO83KH	11	2198	G3XDY	324
2	M0HNA/P	IO91RF	8	1307	G3UVR	291
3=	G3UKV	IO82RR	8	1188	G3XDY	265

3=	G4LDR	IO91EC	6	1188	G8DMU	320
5	M0GHZ	IO81VK	4	742	PI4Z	422
6	G0HIK/P	IO84IH	1	112	G3UVR	112

3400MHz

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX Kms
1	M0HNA/P	IO91RF	4	488	G3XDY	153
2	M0GHZ	IO81VK	2	174	M0HNA/P	119
3	G4LDR	IO91EC	2	132	M0HNA/P	77

73
John G3XDY
UKuG Contest Manager

UKuG MICROWAVE CONTESTS – 2019 Date Change

A change of date for the mm-wave contest in June was discussed at Martlesham as the RAL Round Table clashes with the date published in the January Scatterpoint. Following consultation the date will change to Sunday 23rd June. This does lead to a rather packed calendar in June/July with RAL, mm-wave contest, Finningley, and VHF NFD on successive weekends, so some further tuning may be needed in 2020. A revised contest calendar is on the website.

UKuG MICROWAVE CONTEST CALENDAR 2019

Dates, 2019	Time UTC	Contest name	Certificates
5-May	0800 - 1400	3rd Low band 1.3/2.3/3.4GHz	F, P,L
19-May	0900 – 1700	1st 24GHz Contest	
19-May	0900 – 1700	1st 47GHz Contest	
19-May	0900 – 1700	1st 76GHz Contest	
26-May	0600 - 1800	1st 5.7GHz Contest	F, P,L
26-May	0600 - 1800	1st 10GHz Contest	F, P,L
2-Jun	1000 - 1600	4th Low band 1.3/2.3/3.4GHz	F, P,L
23-Jun	0900 - 1700	24/47GHz Trophy /76/122-248 GHz	
30-Jun	0600 - 1800	2nd 5.7GHz Contest	F, P,L
30-Jun	0600 - 1800	2nd 10GHz Contest	F, P,L
28 -Jul	0600 - 1800	3rd 5.7GHz Contest	F, P,L
28 -Jul	0600 - 1800	3rd 10GHz Contest	F, P,L
25-Aug	0600 - 1800	4th 5.7GHz Contest	F, P,L
25-Aug	0600 - 1800	4th 10GHz Contest	F, P,L
15- Sep	0900 - 1700	3rd 24GHz Contest	
15- Sep	0900 - 1700	3rd 47GHz Contest	
15- Sep	0900 – 1700	3rd 76GHz Contest	
29 -Sep	0600 - 1800	5th 5.7GHz Contest	F, P,L
29 -Sep	0600 - 1800	5th 10GHz Contest	F, P,L
20 -Oct	0900 - 1700	4th 24GHz Contest	
20 -Oct	0900 - 1700	4th 47GHz Contest	
20 -Oct	0900 – 1700	4th 76GHz Contest	
17 -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)

Events calendar

2019

April 27	RSGB AGM, Birmingham	www.rsgb.org/agm
May 17–18	Hamvention, Dayton	www.hamvention.org/
June 16	RAL Round Table Chilton Village Hall	rally@g3pia.net
June 21-23	Ham Radio, Friedrichshafen	www.hamradio-friedrichshafen.de/
June 29/30	Finningley Round Table	www.g0ghk.com/
Sept 6-8	63.UKW Tagung Weinheim	www.ukw-tagung.de/
Sept 22	Crawley Roundtable	
Sept 27/28	National Hamfest	www.nationalhamfest.org.uk
Sept 29-Oct 4	European Microwave Week, Paris	www.eumweek.com/
October tbc	Microwave Update, Dallas, Texas	www.microwaveupdate.org
Oct 28-Nov 22	ITU WRC-19, Sharm el-Sheikh	http://rsgb.org/wrc-19
Nov 2	Scottish Round Table	www.gmroundtable.org.uk/

2020

Aug tbc	EME 2020 Prague	
Sept 13–18	European Microwave Week, Utrecht	www.eumweek.com/
Oct 10-16	IARU-R1 General Conference, Novi Sad	

80m UK Microwavers net

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

73 Martyn Vincent G3UKV