



scatterpoint

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Heelweg Report

By Martin G8BHC



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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, rtf, 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 your co-operation.

Martin G8BHC

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.

UK μ G Chip Bank – A free service for members

The catalogue is on the UK μ G web site at www.microwavers.org/chipbank.htm

Non members can join the UK μ G by following the non-members link on the same page and members will be able to email Mike with requests for components. All will be subject to availability, and a listing of a component on the site will not be a guarantee of availability of that component. The service is run as a free benefit to all members and the UK Microwave Group will pick up the cost of packaging and postage.

Minimum quantity of small components supplied is 10. Some people have ordered a single smd resistor!

The service may be withdrawn at the discretion of the committee if abuse such as reselling of components is suspected.

There is an order form on the website with an address label which will slightly reduce what I have to do in dealing with orders so please could you use it. Also, as many of the components are from unknown sources, if you have the facility to check the value, particularly unmarked items such as capacitors, do so, and let me know if any items have been mislabelled. G4HUP's [Inductance/capacitance meter](#) with SM probes is ideal for this (Unsolicited testimonial!)

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

I have just updated the Inductor file and the ATC file in the chipbank catalogue on the website to reflect some acquisitions at Finningley, and to make a few corrections and clarifications.

Mike G3LYP

UK μ G Project support

The UK Microwave Group is pleased to encourage and support microwave projects such as Beacons, Synthesiser development, etc. Collectively UK μ G 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 UK μ G Secretary, after which they are reviewed/agreed by the committee

www.microwavers.org/proj-support.htm

UK μ G 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 UK μ G 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

80m UK Microwavers net – Tuesdays 08:30 local on 3626 kHz (+/- QRM)

73 Martyn Vincent G3UKV

Chairman's thoughts for January 2017

A very Happy New Year to all our members and associates.

We are now well into the New Year. It promises to be a year of change following some interesting decisions made during 2016. As radio amateurs I'm sure some of these will both directly and indirectly affect us, even it is just the continuing increase in price of some of the more interesting black boxes. Those of us who tend to travel to radio events outside the UK might start to notice some changes in attitudes as we prepare to leave EU. I'm expecting some interesting discussions at the Heelweg Microwave meeting in The Netherlands.

I am currently planning to attend the new 'Dayton' Hamvention in Xenia, but airfares seem to have been steadily rising and it is something I will have to look at very carefully in the next month or so.

I know that the organisers of the event have been having problems sorting out the fleamarket arrangements and as of the time of writing have not yet taken bookings for preferred pitches. As the outside fleamarket is likely to be located on grass, boots and tow ropes seem to be the primary requirements. Ohio in May can be very wet!

I normally stay in the excellent Dayton University student accommodation, courtesy of WA5VJB. The student accommodation booking was also fraught last year due to IT problems at the Uni, but it seems to have been solved now.

Back in the UK, the arrangements for the Martlesham Microwave Round Table are progressing well and the organisers hope to see many of you in early April. We plan to bring you some first rate talks in addition to the usual fleamarket, measurements facility and Saturday evening dinner. More details of the MMRT

arrangements and programme will appear in Scatterpoint and on the web page in due course.

We are re-running the advert for someone to become our beacon coordinator as no one came forward last month. May I remind you that if you are a beacon NoV holder then re-validation will be required by March/April 2017. I am told that OFCOM may be less forgiving of our 'forgetfulness' if this is not done and we risk permanently losing a number of our precious beacons through our own fault. The Group's beacon coordinator role is crucial in following up on the beacon situation in order that we maintain and build on our beacon 'fleet'. If you feel that you would like to contribute to our hobby in a very real way, we want to hear from you. Soon!

Our thanks go to John Cooke, GM8OTI, who has served as our Scotland UKMG representative for several years. John has announced he would be giving up the role this year and we are now seeking someone to take John's place. We take very seriously our role as the elected amateur radio group representing amateur microwave radio in the UK. As part of this it is important to your Committee that we have representatives in the various parts of the UK. We are therefore seeking a person to take over this Scotland role from John. If you would like to apply for this role, please contact one of your UKMG Committee members and let them know. You will find our contact details on the UKMG web page www.microwavers.org or in Scatterpoint.

It remains for me to wish you all the very best in your amateur microwave projects in 2017.

Have a great 2017

**73 de Sam, G4DDK
Acting Chairman, UKuG**

Scatterpoint renewals - email addresses bouncing

If you have changed your email provider/address in the last 18 months would you please confirm the new address to the membership secretary forthwith.

A recent batch of membership renewal reminders resulted in 9 bouncing emails. Failure to submit a renewal subscription as a result of receiving no reminder when overdue will result in termination of UKuG membership and no access to the Scatterpoint Yahoo group.

Please confirm new email addresses to the membership secretary at:

bryanharber@fastmail.co.uk and **give your callsign**.

Thanks

Bryan, G8DKK

Errata

1. SP1612 p27: DL0SHF 10GHz EME beacon is using JT4F, not JT65 as reported. (HT G3WDG)

Beacon Coordinator Vacancy

The UKuG Committee would like to recruit a volunteer to assist the group to coordinate UK microwave Band beacons.

The UKuG supports the UK beacon network with hardware finance, technical help and beacon applications.

The RSGB ETC Committee and the RSGB Microwave Manager are responsible for the interface to OFCOM, specifying beacon frequency allocations and overseeing the issue of the NoV to the beacon keeper.

The beacon keeper (NoV holder) is responsible for the technical design and maintenance of their beacon, maintaining the close-down list details and ensuring that the NoV is renewed at the specified intervals.

The successful candidate will be responsible for interfacing between the Committee and beacon keepers/groups to enable the smooth operation of the network, identifying problems and keeping the Committee up to date on issues and the state of the beacon network.

The post would suit an active microwave enthusiast who has good organisational, communications and technical skills and who wishes to help keep the UK amateur beacon network in good operational condition.

If you think that this post would be of interest please contact the (Acting) Chairman, Sam Jewell, G4DDK at sam@g4ddk.com for more details.

UK Beacons and their License Renewals

Above is an advert for a new UKuG Beacon coordinator. Previously this post was held by Tony GW8ASD and, of course, before that, by Graham G4FSG. This is particularly timely given that...

In the coming months almost all UK Beacon NoVs are falling due for renewal as their 3-year term is due to expire. Indeed many Repeaters which are in the same boat are already being called in early by RSGB-ETCC in a phased process to spread the renewal workload rather than waiting to a big peak in April.

In the UK, the GB3xxx Beacons are licensed by NoVs on a 3yr renewable basis provided they can satisfy all the contact info, site access and closedown list requirements and operational status. The latter factor inevitably means that a few defunct beacons/sites will be officially cease to be (though, on the bright side, 3-years ago it was also the opportunity for some long-delayed changes to be approved and rolled out).

A novel factor this time around is that since Summer-2016, Ofcom have a new IT system. This means we will need greater consistency regarding email addresses and other contact info. So if you are involved, please do prepare...

Keepers: If you are a keeper in particular please ensure that you have re-registered and have full access to the new Ofcom IT system and a refreshed personal licence (the latest format includes a '#' symbol in your nominal callsign on its front page to indicate any regional prefix). Email addresses for your Ofcom Logon should match that used on the ETCC renewal process.

Closedown Operators: If you assist beacon keepers by being on a closedown list, please also ensure that your licence details are also valid with the new Ofcom online system and including your contact phone number (mobiles are preferred) – which also helps with the licence condition on the 5MHz/60m band!

One other thing: If there is a keeper change – this must be done **now**, PRIOR to any close down list update or NoV renewal....

All the Beacon forms are on the ETCC website at

<https://www.rsgblicensing.org.uk/forms-index.php>

Hopefully it wont be too onerous!

More broadly whilst we will closely liaise, please help both the RSGB volunteers who continue to facilitate licensing and renewals, as well as the new UKuG beacon coordinator who will be better positioned to advise on technical/funding/support aspects.

Seasons Greetings
Murray G6JYB

These are the 2nd reminders

News from the interweb

From time to time, you'll find items in Scatterpoint that may have been previously posted on various microwave reflectors, including UKuG's own one, before the Scatterpoint publication date. The reason we sometimes do this is that many Scatterpoint readers do not subscribe to the internet reflectors and we feel they should get the benefit of any informative "technical gems" that have appeared there as casual postings. We also feel that a permanent record such as Scatterpoint is a more suitable archive for such information, otherwise it merely gets lost in people's email mail boxes! Occasionally we do use the stuff as fillers when you folks fail to send us anything else to publish! Beginners to the world above 1GHz may find the following sites helpful

Yahoo groups

Scatterpoint	from where you probably get your copy of this magazine and very occasional other snippets of information
ukmicrowaves	NB this group is not run by UkuG A group dedicated to the amateur radio bands 1 GHz and up for UK/EU Microwavers. The group is open to discussions on all modes/bands, not just narrowband terrestrial modes. https://groups.yahoo.com/neo/groups/ukmicrowaves/info
UKNanowaves	This group is dedicated to amateur experimentation and communication using nanowaves, e.g. visible light, infra-red and ultra-violet radiation. https://groups.yahoo.com/neo/groups/UKNanowaves/info
UKQRM	UKQRM discuss issues of non-EMC-compliance of electronic equipment and the danger posed to the radio spectrum. https://groups.yahoo.com/neo/groups/UKQRM/info
wsjtgroup	WSJT Meteor Scatter Weak Signal Group https://groups.yahoo.com/neo/groups/wsjtgroup/info
SDR-IQ	https://groups.yahoo.com/neo/groups/SDR-IQ/info
linuxham	Support group for W1HKJ software (www.w1hkj.com) Ham software for Linux https://groups.yahoo.com/neo/groups/linuxham/info
NBEMSham	for Windows support of all of the W1HKJ products, and
win-fldigi	for support of fldigi.

Recently moved from Yahoo to Google groups.io

Digital radio	This is a site that was established in the year 2000 and has continued to be a leading discussion group regarding digital mode communication in the amateur bands and in the "utility" world. From "how to set up" digital modes as a beginner, to what software is best, and for advanced options such experimental new modes, this is the place that will help with the advancement of the state of the art in digital communications. Many of the authors of the leading software packages are members of this group. https://digitalradio.groups.io/g/main
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Other reflectors

moon-net	EMEers' reflector (!) To subscribe via the World Wide Web, visit: http://mailman.pe1itr.com/mailman/listinfo/moon-net
Ham-Mac	For ham software for the Apple Mac, visit: http://mailman.qth.net/mailman/listinfo/ham-mac
USA Microwave	http://www.wa1mba.org/reflect.htm

Websites with magazines, newsletters and blogs

NTMS	North Texas Microwave Society http://www.ntms.org
USA Microwave	http://www.wa1mba.org
The San Bernadino Microwave Society	http://www.ham-radio.com/sbms/
ZL4PLM	http://zl4plm.com

Do you use other microwave-related sites/reflectors?

Please let Scatterpoint know.

This month I 'ave mostly been...

From John Worsnop G4BAO Saturday, December 24, 2016

Christmas project - Can I injection lock a Mk2 DB6NT transverter?

The excellent G4DDK Anglian transverter range has the facility to "injection lock" its 116MHz Butler Crystal oscillator to a stable 116MHz source such as a synthesiser. This allows the whole transverter to be locked to a stable reference such as a 10MHz GPSDO. Injection locking does this but still retains the clean, low phase noise of its Butler Crystal oscillator. Using just the synthesiser as an external LO would have meant that the whole transverter's noise performance would have been governed by the synthesiser's phase noise performance. Using this method, the crystal is just "nudged" on to the exact frequency by the synthesiser.

This got me wondering if I could do the same with the single FET oscillator used in all the previous-generation Kuhne G2 series of microwave transverters. I have tested this out on a 5.7GHz G2 with a 117MHz crystal LO, but the oscillator circuit used in the G2 is common to all the Kuhne transverters below 24GHz so should work in all of them given the correct crystal frequency.

Most microwavers know that the G2 series have the facility to remove the crystal and inject an external LO. It's a standard mod used by Kuhne themselves in the "external LO" version of their oscillator chains. The injection point is via a 100pF to one end of the crystal position, so I tried to inject a signal at that point while the crystal was in position and oscillating and see what happened.

I used a +5dBm from a G4JNT LMX2541 fractional N synthesiser. This board is simple has good programming support and has an on chip VCO. It is not though, in the top class for phase noise!

I monitored the transverter LO at the output of the first tripler at 351MHz with a spectrum analyser and a Rubidium - locked frequency counter. As you would expect, a nice clean signal for the crystal but slightly LF of the required frequency. On connection of the external 117MHz synthesiser, the oscillator immediately locked up showing 351.0000MHz but sadly the output noise spectrum immediately degraded to match the synthesiser, not the nice clean crystal. I reduced the synthesiser level and watched the spectrum and frequency. As I reduced the synthesiser drive level, the crystal stayed in lock and the output noise reduced. – "result!"

With about 20dB attenuation - a drive level of -15dBm, the frequency was still 351.0000 and locked but the noise now looked like the unlocked crystal.

So there we have it.

Without removing the crystal, just like the Anglian, you can injection lock your Kuhne G2 transverter to a synthesiser such as the LMX2451 or ADF4350/1 and not spoil the phase noise performance!

Hope you had a Happy and quiet (low phase noise) Christmas!

More from John's Blog <http://g4bao.blogspot.co.uk>

Isn't being an Engineer brilliant?

This afternoon I've been working on the switching for my 5760MHz EME dish feed electronics. Nothing complicated, just a couple of high side MOSFET switches. A 300ms delayed 12 V high current one and a switched, non-delayed 28V rail to activate the coax relay. Standard P channel switch circuitry with the 12V input to the Source of the FET and the output from the Drain. 6.2k resistor from source to gate to keep it off and a NPN transistor from Gate to Ground to turn it on with. CR delay circuit in the base of the driver from the 12V TX out from my DB6NT transverter. Worked fine, so I used the same circuit for the 28V one but with no delay ahead of it.

Built it, connected it up tried it and BANG! the driver transistor fried. Transistor was taking over an Amp and current limiting the 28V supply. FET had also gone phut. Gate Source short circuit dumping the full 28V across the driver transistor.

Whoah! Why do that with the 28V supply and not the huge 8A 12V supply?

Much head scratching and a couple of changed devices later (good job I have aplenty of both) I thought I'd better check the datasheet of the FET. Yep, maximum drain to source voltage was 60V so that's OK. Ah..... maximum drain to GATE voltage +/-20V Lower than $V_{DS_{max}}$ I didn't know that!

Grounding the Gate in this circuit with a transistor would put $28 - V_{ce_{sat}} = 27.8V$ from Source to gate. Yep, that would be more than 20V then. Failure would short gate to source connecting the full 28V across the collector to emitter junction of the driver transistor taking that out as well!

I do like to understand why things happen.

Solution? Add an 8.2k between the transistor collector and the FET Gate. Limiting the Vgs of the FET to $28 \times 8.2 / 14.4 = 15.94$ V below 20V now so that's fine.

Reason for the title of the Blog? Every problem is a learning experience, and Engineers are all about solving problems. Ergo, Engineering is all about learning.... BRILLIANT!! !

Silent Key: Peter Ackley G3LRP

From Peter, G3PHO (via ukmicrowaves)

Fellow microwavers,

I'm very sad indeed to report that my good friend Peter Ackley, G3LRP of Wakefield passed away a few days before Christmas. His long fight with prostate cancer finally caught up with him. He was in his early 80s. Peter was a quiet and reserved person but an avid and active microwaver who would help anyone if he could. However my first QSO with him was back in the early 1960s on Topband CW !

Some of you will have worked him on several microwave bands, as high as 24GHz, but you may not know that, for many years, he kept a twice daily sked with Ralph G4ALY in Cornwall during which they would work each other on every microwave band from 1296MHz to 10GHz, often on CW using aircraft scatter. Peter's log book must be a veritable history of microwave propagation along that 400km+ path!

I had many QSOs with him during my /portable days and also worked him a number of times on 24GHz from home using my indoor 2 watt/45cm dish system aimed at a comms tower some 15km away, at right angles to the true path to his QTH near Wakefield! Unfortunately my move to Chesterfield put a large 750 foot hill in the way of him and my only contacts from here was a 10GHz rainscatter QSO during the summer of 2013.

He was a very kind person, always willing to help a newcomer and supplied most of the modules, including a DB6NT beacon transmitter and 5 watt DB6NT PA, that went into the now defunct GB3KEU 5.7GHz Sheffield beacon (soon to be resurrected at the HQ of the Finningley A.R.S).

His funeral (cremation) will take place at*Pontefract Crematorium, WF8 4HA*, next Tuesday, 10th of January at 12.20 utc. I'm sure his wife Pat would appreciate any of his amateur friends turning up to pay their last respects. If you can't manage that I think a condolence card sent to his QRZ.com or RSGB Callbook address would be gratefully received by his wife.

From Sam Jewell G4DDK

I am so sorry to hear of Peter's passing. He was much respected and a 'constant' in these days of different interests within the hobby.

Vale Peter.

From Martyn G3UKV for the Telford uW group. (aka G3ZME/P)

Hi Peter

Your namesake was a regular in our G3ZME/P (Telford) portable logbook for many years. He would call us 'out of the blue' on various microwave bands in his characteristically quiet SSB voice, usually in the afternoon. He was noticeable by his absence in 2016, but we knew he had had health problems over an extended period.

Like a number of other prominent SK microwavers, he will be sorely missed.

From John Worsnop G4BAO

So sorry to hear of Peter's passing. Worked him a number of times on 10GHz.

I'll make sure he gets a mention in the next column, so send any reminiscences to me please.

From John Quarmby G3XDY

So sorry to hear Peter has passed on. I worked him on all bands from 432MHz to 10GHz during the period from 1979 to a couple of years ago. He was always a good signal down here from his site near Wakefield. RIP Peter.

From Conrad PA5Y

I knew Peter quite well as he was local to me and he helped me quite often. I still have a couple of nice waveguide switches that he ac are for a 3cm EME project which is likely to happen this year at last. A sad loss indeed he was a really lovely man.

Heelweg 2017

Martin RH G8BHC

G4BAO, G4DDK, G4HUP and myself travelled to the Netherlands on the windiest night of the year. The crossing from Harwich to Hoek van Holland was better than expected and we all arrived without being ill. The most exciting part of the drive was actually in the UK at Manningtree where yours truly attempted to go round the roundabout by the station the wrong way!



Here we are being antisocial prior to setting sail.



Lunchtime socializing at [Kulturhus de Vos](#):
Ian G4EZP/PA4ZP, Roger G8CUB, John G4BAO, Dave G4HUP, Sam G4DDK, Conrad PA5Y
Also present from the UK were Bernie G4HJW and Kevin G3AAF



The traders were there.

Dave Powis G4HUP
"You need one of these..."

Bernie Wright G4HJW
assisting Kevin G3AAF





And lots of test equipment

After the event we adjourned, as is traditional, to the Fu Hing Restaurant in nearby Varsseveld www.fuhing.nl where we partook of an excellent Chinese/Indonesian buffet. www.fuhing.nl/restaurant/chinees-indisch-buffet

We stayed in Lichtenvoorde at the comfortable and welcoming Hotel Restaurant 't Zwaantje (the little swan) and after a welcome night's rest and hearty breakfast, set off for a bit of tourist travel.

First stop was the War Museum outside Arnhem www.arnhemsoorlogsmuseum.com

They have quite a collection including items from Operation Market Garden.

There's also a mass of old radio equipment...







... and a few old radio hams – G8BHC, G4DDK, G4HUP and G4BAO

We went for lunch in Arnhem followed by a stroll by the river.

The rest of the tourist trip turned into a mystery tour as yours truly hasn't lived in Den Haag for 40 years and it's changed quite a lot!. We did however discover the local industrial estate, the chinese district and the red light district before, with some GPS assistance, we got on the road to Hoek van Holland.

Grocery shopping at Albert Heijn at the Hoek (open until 8pm on Sunday) <https://www.ah.nl/winkel/8793> for naughty dutch comestibles you can't get in the UK then on board after experiencing the *whichever-queue-you-join-will-be-the-slowest* effect. Still, it helped to keep BAO's grump factor raised ;-)

Altogether *A grand weekend out.*

Thanks and 73 to the PA Microwave Group.

Martin G8BHC

UKuG Microwave Contests – 2017

John G3XDY, UKuG Contest Manager

Aims and comments:

There will only be a few minor changes for 2017. Dates for some of the millimeter wave contests will change in response to feedback received. In the Low Band events the 2300-2302MHz band will count as a separate band from 2320MHz, so they will now run on the four bands 1296, 2300, 2320, and 3400MHz.

The low band championship table will be based on the best three sessions out of five. The event dates will be similar to last year, with the March, May and June sessions running on IARU coordinated dates. Stations wishing to take part on 2300MHz are reminded that they must be in possession of the relevant Notice of Variation, and to take part on 2320MHz that they must register their station with Ofcom by emailing pssramateurs@ofcom.org.uk to provide the following information:

1. Name
2. Address
3. Call sign
4. Location of use
5. Frequency range used
6. Type of use
7. Regularity of use (e.g. evenings and weekends; 24/7; occasional)
8. Transmit power (ie. EIRP).

The high band events will continue on 5.7 and 10GHz only, the dates will continue to be on the last Sunday of May, June, July, August and September. The sessions will run between 0600 to 1800 UTC, with operators able to choose any 8 hour slot (or two slots with at least a 1 hour gap). As in previous years the overall table and trophies will be determined using the best three scores made by each station across the five events.

The millimetre events will continue as last year, they will comprise the all band event in June covering 24GHz – 248GHz, and 24/47/76GHz events in May, September and October. The 24GHz trophy will be awarded for the June event, the 24GHz scores from the best three of the four events will count towards an overall score for the G0RRJ Memorial Trophy, and the best three session scores on 47GHz will determine the award of the 47GHz Trophy. The 76GHz events will contribute to the 76GHz championship where the best three session scores will count to the total.

Microwavers outside the UK are most welcome to join in our contests. There is already a core of French, Dutch and Belgian stations that appear regularly in our summer contests. We would like many more to do the same!

THE RULES listed below are final and binding for 2017 (there are few changes from 2016). The following contests are scheduled for 2017:

- Low Microwave Bands - 1.3GHz/2.30GHz/2.32GHz/3.4GHz (5 contest days). An overall championship will be decided on the best three scores out of five.
- 5.7GHz (5 contest days with 3 to count for the championship), on the same days as the 10GHz contests.
- 10GHz (5 contest days with 3 to count for the championship), on the same days as the 5.7GHz contests.
- 24GHz G0RRJ Memorial Trophy Contests (4 contest days with 3 to count for the championship).
- 24GHz Trophy awarded to the leading station on 24GHz in the 24GHz -248GHz event in June.
- 47GHz (4 contest days with 3 to count for the championship)
- 76GHz (4 contest days with 3 to count for the championship)

The full contest program and rules are published in the January 2017 issue of the Scatterpoint Microwave Newsletter and are also available on the Internet on the UKuG website at <http://www.microwavers.org>

General Rules (applicable to all events)

The Contests are open to all comers (you do not have to be an RSGB or UK Microwave Group member). Stations located outside the UK (G, GW, GM, GI, GD, GU, GJ) may enter a contest, and will be tabulated within the overall results tables, but will not be eligible for UK Microwave Group awards.

Contestants are expected to enter in the true spirit of the event and to adhere strictly to any equipment or power restrictions that apply to the particular contest.

Operators may enter as home station or portable (either mixed or separately in the championships) unless specified in the rules for a specific event. In multi-band contests, single-band entries are always acceptable.

Stations:

Entrants must not change their location or callsign during the contest, unless the Rover rule is invoked. In multi-band events, all stations forming one entry must be located within a circle of 1000m radius. An operator may reside outside the station's area ("remote station"), connected to the station via a "remote control terminal". In such a case, the Locator for the contest is the Locator of the station's position. An operator may only operate one single station, regardless if it is locally or remotely operated, during the same event.

Contacts:

Only one scoring contact may be made with a given station on each band, regardless of suffix (/P, /M, etc) during an individual contest or cumulative activity period, unless the Rover rule is invoked. Contacts made using repeaters or satellites will not count for points. Contacts with callsigns appearing as operators on any of the cover sheets forming an entry will not count for points or multipliers.

Scoring:

Contacts are scored on the basis of 1 point per kilometre for full, two-way microwave contacts and at half points for one-way (ie crossband) contacts. Any contacts made by EME are scored at 1 point per kilometer up to 1000km, and will be scored at 1000 points above that distance.

Exchanges:

Contest exchanges on the microwave bands consist of RS(T) + serial number (starting at 001). In addition, the six (or eight) figure QTH Locator must be exchanged either via the microwave band or on the talkback medium. In multiband contests, the serial number will start at 001 for each band (ie a common sequence across the bands is NOT to be used). No points will be lost if a non-competing station cannot provide an IARU locator, serial number, or any other information that may be required. However, the receiving operator must receive and record sufficient information to be able to calculate the score.

Talkback:

Talkback can be used to assist in setting up a QSO, but note that the contest exchange must be made via the microwave band. It is not permissible to use the talkback as a means of checking the report or serial number – they must be copied via microwaves – and after the QSO is complete, care should be taken to avoid accidentally repeating the exchange via talkback. There is no restriction on the talkback methods that can be used – other amateur band, internet, phone, etc. In setting up the QSO, it is also permissible to send back received audio to the other station, for example to help with antenna alignment. An exception is that our contests do allow one way (cross-band) QSOs for half points, and in this case, the other band can be used by one of the stations.

Entries:

Contestants are asked to make sure their entries have been scored correctly and that all relevant bonus points and multipliers have been claimed.

Log entries must be submitted via the online log portal at <http://microwave.rsgbcc.org/cgi-bin/vhfenter.pl>. When uploading electronic logs, the format should be one of the following: ASCII text, RSGB Standard Format, Cabrillo, SDV and G0GJV log outputs, and IARU REG1TEST format (preferred). Paper logs may be entered using the online log editor at <http://microwave.rsgbcc.org/cgi-bin/cover.pl>

Awards:

Certificates will be awarded to overall contest winners and individual section leaders and their runners up. Additional Certificates of Merit will be awarded to stations in certain categories, as indicated in the rules for each event. With these, as with the logs, the adjudicator's decision is final.

Special Rules:

Applicable if called up for the specific contest:

Rover Concept:

The 'Rover' concept is to encourage lightweight, low power portable activity. This allows the location of the station to be moved as many times as desired and by a minimum of 5 linear kilometres, at any time during the contest period. From each new location, stations worked from any of the previous locations

during the event may be worked again, both stations involved in the contact gaining points. The serial number, however, will not revert to 001 each time a move is made but will carry on consecutively from the previous contact.

Low Band Microwave Contest Rules

First introduced in 2004, these contests aim to encourage operation on the lower microwave bands, particularly as there is growing UK availability of 2.3GHz and 3.4GHz equipment. For 2017, there are five of these events, in March, April, May, June, and November. The March, May and June events are timed to overlap with UHF/SHF events in some other IARU Region 1 countries. The times for the November event are shortened to make portable operation more practical.

1. The General Rules listed above apply except as modified by these rules.
2. There are five contests, one each in March, April, May, June and November. The March, April and June events run from 1000 to 1600 UTC. The May event runs from 0800 to 1400 UTC to coincide with the RSGB UHF Contest. The November event is from 1000 to 1400 UTC.
3. Entrants in the May event need not start serial numbers from 001 if they are also participating in the RSGB UHF Contest.
4. Operation may take place on the following bands: 1240-1325MHz, 2300 – 2302MHz, 2310 – 2350MHz, 3400 – 3410MHz. The same station may be contacted for points on each of the four bands.
5. Each event will be scored and tabulated separately. There is an annual championship determined by taking the best three normalized scores from each entrant across the five events for each band. The overall champion will be declared based on the normalized championship scores from each band.
6. For each session, certificates will be awarded to the leading entry plus runner-up on each band, the overall leading entry and runner-up across the three bands, plus for each band the leading stations in each of the following categories: home station, portable station, station running less than 10 watts output. Championship certificates will be awarded to the winners and runners up for each band, and to the overall championship winner and runner up.

5.7GHz Contest Rules

The 5.7GHz and 10GHz contests are being run concurrently to grow activity on 5.7GHz. Although they are on the same days, they are completely separate contests. Any band or both bands can be used on any of the 5 days.

1. The general rules shown above apply.
2. There are five, monthly, events from May to September inclusive, and the events run from 0600 to 1800 UTC on a Sunday. Entrants can operate for a period of up to eight hours during each event, either as a single period or two separate periods with a minimum off time of 1 hour between.
3. Logs for all events entered should be submitted in the two weeks after each session.
4. Moving location during the contest is allowed - the Rover concept is applicable.
5. Certificates will be awarded to the leading station and runner-up, and to the leading fixed, portable and low power (<1W) stations.
6. The G3KEU Memorial Trophy will be awarded to the leading entry in the championship, determined from the best three normalized scores during the series of events.

10GHz Contest Rules

The 5.7GHz and 10GHz contests are being run concurrently to grow activity on 5.7GHz. Although they are on the same days, they are completely separate contests. Any band or both bands can be used on any of the 5 days.

1. The general rules shown above apply.
2. There are five, monthly, events from May to September inclusive, and the events run from 0600 to 1800 UTC on a Sunday. Entrants can operate for a period of up to eight hours during each event, either as a single period or two separate periods with a minimum off time of 1 hour between.
3. Logs for all events entered should be submitted in the two weeks after each session
4. Contestants may submit logs for any one of the following sections:

Open

No power or antenna restrictions (other than those laid down in the amateur licence).

The 'Rover' concept does not apply to this section.

Restricted

10GHz transmit output not to exceed 1.0 watt to the antenna.

Moving location during the contest is allowed - the Rover concept is applicable.

5. Certificates will be awarded to the leading station and runner-up in each section, and to the leading portable and fixed stations.
6. The 10GHz championship will be determined based on the best three normalized scores from each entrant over the five sessions. In addition to winners and runners-up certificates for each section, the following certificates/trophies will be awarded:
 - Leading entry in the Open section - The G3RPE Memorial Trophy
 - Leading entry in the Restricted section - The G3JMB Memorial Trophy
 - Certificates to the leading home station and portable station in each section.

24GHz G0RRJ Contest Rules

The 24GHz G0RRJ Contest will take place over four sessions, coincident with 47GHz events and also the all millimeter wave event in June.

1. The general rules shown above apply.
2. There are four events from June to October inclusive, and the events run from 0900 to 1700 UTC on a Sunday.
3. Logs for all events entered should be submitted in the two weeks after each session
4. Moving location during the contest is allowed - the Rover concept is applicable.
5. Certificates will be awarded to the leading station and runner-up in each section, plus the leading home and portable stations.
6. The G0RRJ Memorial Trophy will be awarded to the leading entry in the championship, determined from the best three normalized scores during the series of events.

24GHz Trophy Rules

The 24GHz Trophy contest coincides with the 47GHz/76GHz and 122GHz - 248GHz events

1. The general rules shown above apply.
2. The contest will run from 0900 to 1700 UTC on a Sunday.
3. Moving location during the contest is allowed - the Rover concept is applicable.
4. Certificates will be awarded to the leading station and runner-up, and the winner will receive the 24GHz Trophy.

47GHz Contest Rules

The 47GHz contest will take place over four sessions, coincident with 24GHz/76GHz events and also the all millimeter wave event in June.

1. The General Rules listed above apply.
2. The contest will run from 0900 to 1700 UTC on a Sunday.
3. Moving location during the contest is allowed - the Rover concept is applicable.
4. Certificates will be awarded to the leading station and runner-up.
5. The 47GHz Trophy will be awarded to the leading entry in the championship, determined from the best three normalized scores during the series of events.

76GHz Contest Rules

The 76GHz contest will take place over four sessions, coincident with 24GHz/47GHz events and also the all millimeter wave event in June.

1. The General Rules listed above apply.
2. The contest will run from 0900 to 1700 UTC on a Sunday.

3. Moving location during the contest is allowed - the Rover concept is applicable.
4. Certificates will be awarded to the leading station and runner-up.
5. A certificate will be awarded to the leading entry in the championship, determined from the best three normalized scores during the series of events.

122GHz – 248GHz Contest Rules

The 122GHz – 248GHz contest coincides with the 24GHz Trophy, and 47GHz event in June

1. The General Rules listed above apply.
2. The contest will run from 0900 to 1700 UTC on a Sunday.
3. Moving location during the contest is allowed - the Rover concept is applicable.
4. The overall score will be determined by adding together the normalized scores from all bands entered.
5. Certificates will be awarded to the leading station and runner-up on each band and overall.

Other Microwave Contests

The first weekend of May sees the RSGB 432MHz – 248GHz Multiband Contest staged in parallel with the RSGB UHF/SHF Contest. The 10GHz Trophy is run in parallel by the RSGB VHF Contest Committee on the Saturday of that weekend, and the rules can be found in the RSGB VHF contest rules.

BATC run the UK section of the IARU ATV contest on the second weekend in June, plus other ATV events, see http://www.batc.org.uk/contests/contest_news.html

The first weekend in July is RSGB VHF National Field Day which includes 1.3GHz as one of the bands.

The first weekend of October sees the RSGB 432MHz -248GHz Multiband Contest staged in parallel with the Region 1 IARU UHF/SHF Contest. The 1.3GHz Trophy and the 2.3GHz Trophy are run in parallel by the RSGB VHF Contest Committee on the Saturday, and the rules can also be found in the RSGB VHF contest rules.

The RSGB also runs a cumulative UK Activity Contest on 1.3GHz on the third Tuesday from 2000-2230 local time, and on 2.3GHz – 10GHz on the fourth Tuesday of every month, from 2000 – 2230 local time (subject to some variations in timing on 2.3GHz).

In addition there are other Continental UHF/SHF Contests held during the year and interested UK microwavers are urged to be active during these. Their details may be found on the Internet.

UKuG Microwave Contest Calendar 2017

Dates	Time UTC	Contest name	Certificates
5-Mar	1000 - 1600	1st Low band 1.3/2.3/3.4GHz	F, P,L
23-Apr	1000 - 1600	2nd Low band 1.3/2.3/3.4GHz	F, P,L
7-May	0800 - 1400	3rd Low band 1.3/2.3/3.4GHz	F, P,L
21-May	0900 – 1700	1st 24GHz Contest	
21-May	0900 – 1700	1st 47GHz Contest	
21-May	0900 – 1700	1st 76GHz Contest	
28-May	0600 - 1800	1st 5.7GHz Contest	F, P,L
28-May	0600 - 1800	1st 10GHz Contest	F, P,L
4-Jun	1000 - 1600	4th Low band 1.3/2.3/3.4GHz	F, P,L
18-Jun	0900 - 1700	24/47GHz Trophy / 76/122-248 GHz	
25-Jun	0600 - 1800	2nd 5.7GHz Contest	F, P,L
25-Jun	0600 - 1800	2nd 10GHz Contest	F, P,L
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)

UKuG Contest Overview

Note * SHF UKAC timings vary by band and time of year, see RSGBCC website

Sections:

F	Fixed / home station
P	Portable
L	Low-power <10W 1.3/2.3/3.4GHz, <1W 5.7/10GHz)

Main changes from 2016 calendar: Change of dates for mm-wave events

Table follows...

UKuG Contest Overview

Month	Contest name	Certificates	Date 2017	Time GMT	Notes
Jan	1.3GHz Activity Contest	Arranged by RSGB	17-Jan	2000 - 2230	RSGB Contest
Jan	2.3GHz+ Activity Contest	Arranged by RSGB	24-Jan	2000 - 2230*	RSGB Contest
Feb	1.3GHz Activity Contest	Arranged by RSGB	21-Feb	2000 - 2230	RSGB Contest
Feb	2.3GHz+ Activity Contest	Arranged by RSGB	28-Feb	2000 - 2230*	RSGB Contest
Mar	Low band 1.3/2.3/3.4GHz	F, P, L	5-Mar	1000 - 1600	First 4 hours coincide with IARU event
Mar	2.3GHz EME	Arranged by DUBUS	11-Mar to 12-Mar	0000 - 2359	DUBUS/REF EME Contest
Mar	1.3GHz Activity Contest	Arranged by RSGB	21-Mar	2000 - 2230	RSGB Contest
Mar	2.3GHz+ Activity Contest	Arranged by RSGB	28-Mar	2000 - 2230*	RSGB Contest
Apr	1.3GHz EME	Arranged by DUBUS	1-Apr to 2-Apr	0000 - 2359	DUBUS/REF EME Contest
Apr	1.3GHz Activity Contest	Arranged by RSGB	18-Apr	1900 - 2130	RSGB Contest
Apr	Low band 1.3/2.3/3.4GHz 2	F, P, L	23-Apr	1000 - 1600	
Apr	2.3GHz+ Activity Contest	Arranged by RSGB	25-Apr	1900 - 2130*	RSGB Contest
Apr	3.4GHz EME	Arranged by DUBUS	29-Apr to 30-Apr	0000 - 2359	DUBUS/REF EME Contest
May	10GHz Trophy	Arranged by RSGB	6-May	1400 - 2200	Saturday, to coincide with IARU
May	432MHz & up	Arranged by RSGB	6-May to 7-May	1400 - 1400	RSGB Contest
May	Low band 1.3/2.3/3.4GHz 3	F, P, L	7-May	0800 - 1400	Aligned with RSGB/IARU event
May	1.3GHz Activity Contest	Arranged by RSGB	16-May	1900 - 2130	RSGB Contest
May	2.3GHz+ Activity Contest	Arranged by RSGB	23-May	1900 - 2130*	RSGB Contest
May	5.7GHz EME	Arranged by DUBUS	27-May to 28-May	0000-2359	DUBUS/REF EME Contest
May	5.7GHz/10GHz	F, P, L	28-May	0600-1800	
Jun	Low band 1.3/2.3/3.4GHz 4	F, P, L	4-Jun	1000 - 1600	Aligned with some Eu events
Jun	International ATV Contest	Arranged by IARU/BATC	10-Jun to 11-Jun	1200 - 1800	http://www.batc.org.uk/contests/contest_news.html
Jun	24GHz–248GHz Contest		18-Jun	0900-1700	
Jun	1.3GHz Activity Contest	Arranged by RSGB	20-Jun	1900 - 2130	RSGB Contest

Month	Contest name	Certificates	Date 2017	Time GMT	Notes
Jun	10GHz & up EME	<i>Arranged by DUBUS</i>	24-Jun to 25-Jun	0000-2359	DUBUS/REF EME Contest
Jun	5.7GHz/10GHz	F, P, L	25-Jun	0600-1800	
Jun	2.3GHz+ Activity Contest	<i>Arranged by RSGB</i>	27-Jun	1900 - 2130*	RSGB Contest
Jul	VHF NFD (1.3GHz)	<i>Arranged by RSGB</i>	1-Jul to 2-Jul	1400 - 1400	RSGB Contest
Jul	1.3GHz Activity Contest	<i>Arranged by RSGB</i>	18-Jul	1900 - 2130	RSGB Contest
Jul	2.3GHz+ Activity Contest	<i>Arranged by RSGB</i>	25-Jul	1900 - 2130*	RSGB Contest
Jul	5.7GHz/10GHz	F, P, L	30-Jul	0600-1800	
Aug	1.3GHz Activity Contest	<i>Arranged by RSGB</i>	15-Aug	1900 - 2130	RSGB Contest
Aug	2.3GHz+ Activity Contest	<i>Arranged by RSGB</i>	22-Aug	1900 - 2130*	RSGB Contest
Aug	5.7GHz/10GHz	F, P, L	27-Aug	0600-1800	
Sep	ARRL Microwave EME	<i>Arranged by ARRL</i>	9-Sep to 10-Sep	0000 - 2359	ARRL EME 2.3GHz & Up
Sep	24GHz/47GHz/76GHz		17-Sep	0900-1700	
Sep	1.3GHz Activity Contest	<i>Arranged by RSGB</i>	19-Sep	1900 - 2130	RSGB Contest
Sep	5.7GHz/10GHz	F, P, L	24-Sep	0600-1800	
Sep	2.3GHz+ Activity Contest	<i>Arranged by RSGB</i>	26-Sep	1900 - 2130*	RSGB Contest
Oct	1.3 & 2.3GHz Trophies	<i>Arranged by RSGB</i>	7-Oct	1400 - 2200	RSGB Contest
Oct	432MHz & up	<i>Arranged by RSGB</i>	7-Oct to 8-Oct	1400 - 1400	IARU/RSGB Contest
Oct	ARRL EME 50-1296MHz	<i>Arranged by ARRL</i>	7-Oct to 8-Oct	0000 - 2359	ARRL EME Contest
Oct	24GHz/47GHz/76GHz		22-Oct	0900-1700	
Oct	1.3GHz Activity Contest	<i>Arranged by RSGB</i>	17-Oct	1900 - 2130	RSGB Contest
Oct	2.3GHz+ Activity Contest	<i>Arranged by RSGB</i>	24-Oct	1900 - 2130*	RSGB Contest
Nov	ARRL EME 50-1296MHz	<i>Arranged by ARRL</i>	4-Nov to 5-Nov	0000 - 2359	ARRL EME Contest
Nov	Low band 1.3/2.3/3.4GHz 5	F, P, L	19-Nov	1000 - 1400	
Nov	1.3GHz Activity Contest	<i>Arranged by RSGB</i>	21-Nov	2000 - 2230	RSGB Contest
Nov	2.3GHz+ Activity Contest	<i>Arranged by RSGB</i>	28-Nov	2000 - 2230*	RSGB Contest
Dec	1.3GHz Activity Contest	<i>Arranged by RSGB</i>	19-Dec	2000 - 2230	RSGB Contest



Activity News : December 2016

By Neil Underwood G4LDR

Please send your activity news to:

scatterpoint@microwavers.org

Introduction

I have not received any reports of activity on the microwave and millimetre bands covering the month of December. I guess everyone has been enjoying the festive season or have been concentrating on building equipment for future use on the microwave bands.

There was a good tropo opening from the south of the UK between Christmas and New Year. The opening seemed to favour paths from the southwest of England across the Bay of Biscay to southwest France and northern Spain, as well as eastwards into The Netherlands, Belgium and Germany. I saw on the DX cluster and ON4KST paths in excess of 900km being worked on 3cms. Enhancements were also evident on 24GHz with the GB3SEE beacon (Reigate) heard at my QTH (Salisbury) for several days. I also heard briefly the GB3CAM beacon (Cambridge) on 24GHz for the first time.

... and finally

The deadline for activity news for the next edition of Scatterpoint is Wednesday 1st February 2017.

Still some items for sale

As some of you will be aware I am dealing with the radio aspects of Bob G4BAH's estate. Whilst most of the newer equipment, masts and antennas will be kept for HF and VHF contest use, there are also a considerable number of items still for disposal. See last month's list.

My apologies to some who have emailed me and not yet got a reply. This pile is on hold whilst I deal with a number of more urgent issues with the estate. lawyers, etc. There is about 1/3 of the items left.

John G4SWX john.regnault@btinternet.com

Events calendar

2017

Jan 14	Heelweg, Westendorp NL	www.pamicrowaves.nl/
Feb 11	Tagung Dorsten	www.ghz-tagung.de/
Apr 8	CJ-2017, Seigy	cj.ref-union.org/
Apr 8–9	Martlesham Microwave Round Table & UKμG AGM	http://mmrt.homedns.org
Apr 22	RSGB AGM, Cardiff	http://rsgb.org/agm
May 19 – 21	Hamvention, Dayton	www.hamvention.org/
June 11	RAL @ Chiltern Village Hall OX11 0SH	
July 14 – 16	Ham Radio, Friedrichshafen	www.hamradio-friedrichshafen.de/
July 8 – 9	Finningley Roundtable	http://www.g0ghk.com/
Sept 8 – 10	62. UKW Tagung Weinheim	http://www.ukw-tagung.de/
Sept 17–21	IARU-R1 Conference, Landshut, Germany	http://www.iaru2017.org/
Sept 29–30	National Hamfest	http://www.nationalhamfest.org.uk/
Sept 10	Crawley Roundtable	
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 8 – 13	European Microwave Week, Nürnberg	www.eumweek.com/
Nov 4 (tbc)	Scottish Round Table	www.gmroundtable.org.uk/
tbc	Microwave Update, San Jose, California	

2018

June 22–24	Ham Radio, Friedrichshafen	http://www.hamradio-friedrichshafen.de/
August 17–19	EME2018, Egmond aan Zee,NL	
Sept 23–28	European Microwave Week, Madrid	http://www.eumweek.com/

2019

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

NB Some of the 2017/18/19 event links may not be working/updated yet.

EME 2018

The website <http://eme2018.nl/> is online. Only very basic info yet. More soon!

And a Facebook page was created: <https://www.facebook.com/EME2018/>

73!

Jan

PA3FXB (team PI9CAM)

team EME 2018