An Amateur Radio publication for the Microwave Enthusiast

scatterpoint

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UK Microwave Group

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

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

Articles for Scatterpoint

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

Please send them to

editor@microwavers.org

The CLOSING date is

the FIRST day of the month

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

Please submit your articles in any of the following formats:

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

Spreadsheets: Excel, OpenOffice, Numbers

Images: tiff, png, jpg

Schematics: sch (Eagle preferred)

Please send pictures and tables separately, as they can be a bit of a problem.

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.

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 (e.g. 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 contact the committee.

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

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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: **Contact Neil G4DBN for more information**

5.7GHz 10GHz 24GHz 47GHz 76GHz

Custom IF module for the CNBL 10GHz transverter

Maarten Heuvelman PA0MHE

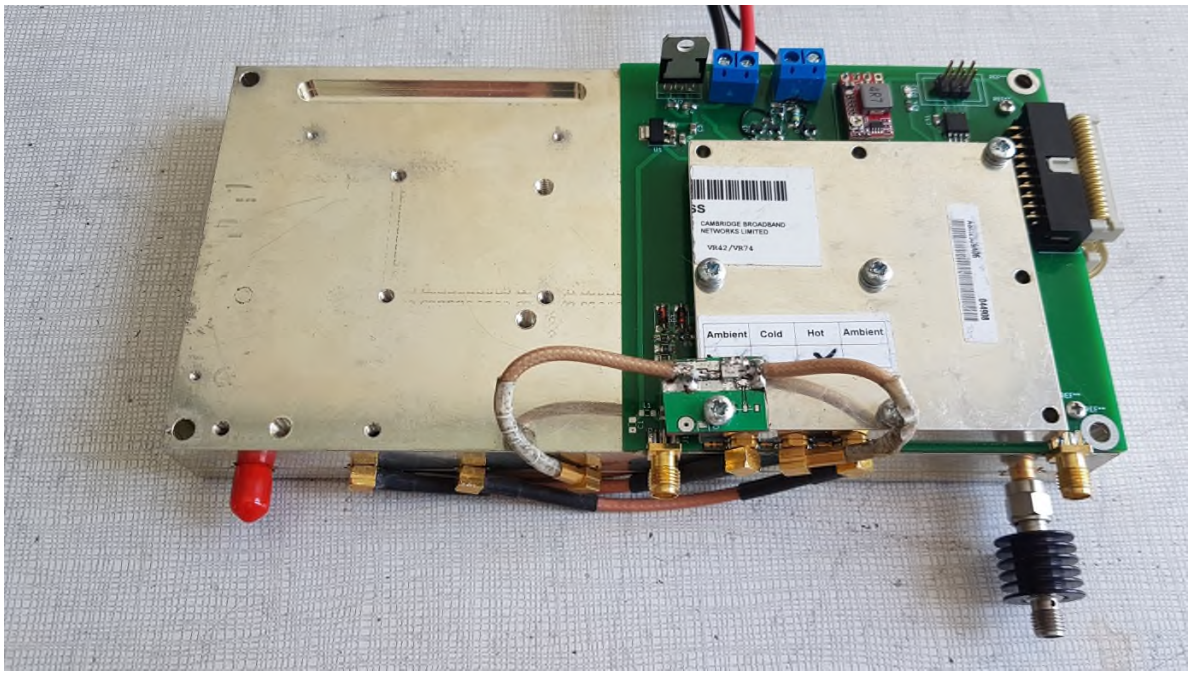


Fig1. Complete 10368 <-->432 transverter

Recently there were some 10GHz transverters (Fig. 2) made by Cambridge Broadband Networks Limited (CBNL) available on eBay from a Polish seller. They originally consisted of 2 PCB's : RF (RX and TX transverter) and IF. The RF PCB (Fig 3) has SMA's for RX-in and TX-out and MCX connectors for TX _IF_in, RX_IF_Out at 2.4 GHz and LO/4_In. The IF PCB is only used as a donor for connectors, sockets and cables.

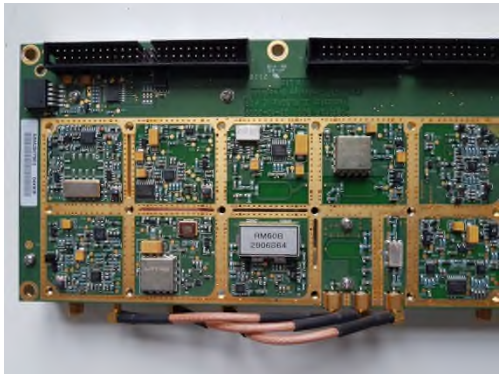


Fig2. Original CNBL module

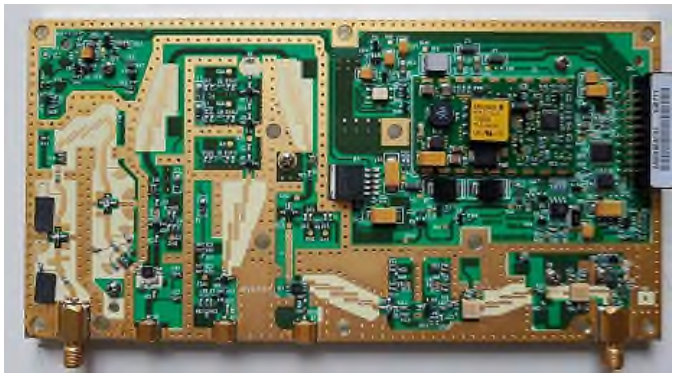


Fig3. RF PCB CNBL module

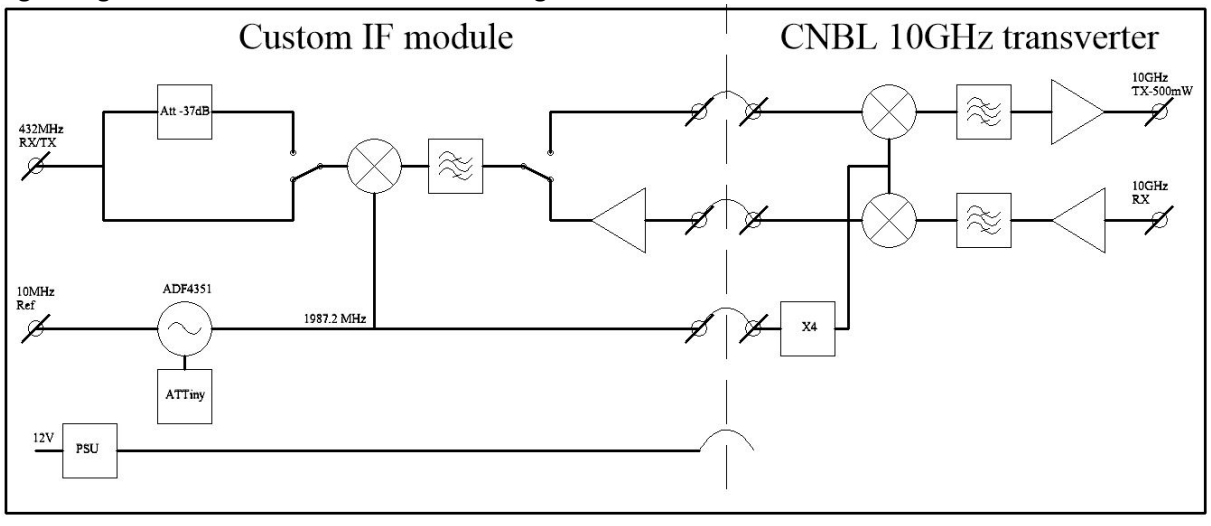


Fig 4. Simplified block diagram

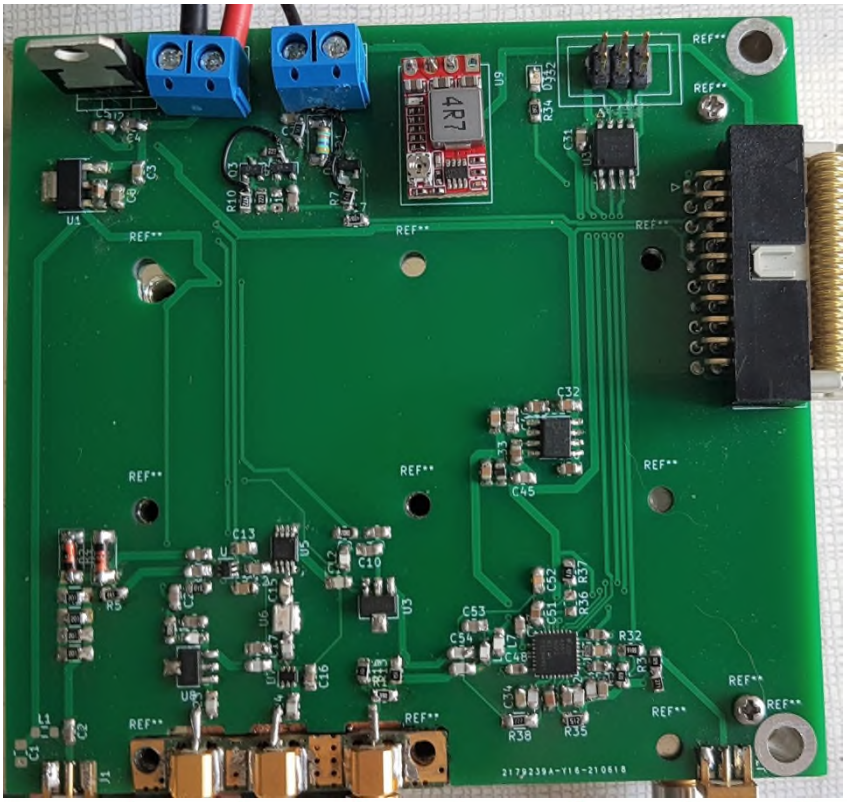


Fig. 5 Custom IF module
2layer 100x100mm JLCPCB which replaces the original IF PCB and mates with the RF module. It fits under a cutoff from the original milled screening. The MCX connectors and 20v WTB connector are donated by the original module. Only 12V, PTT, 10MHz Ref. 432MHz transceiver and 10GHz relay are needed.

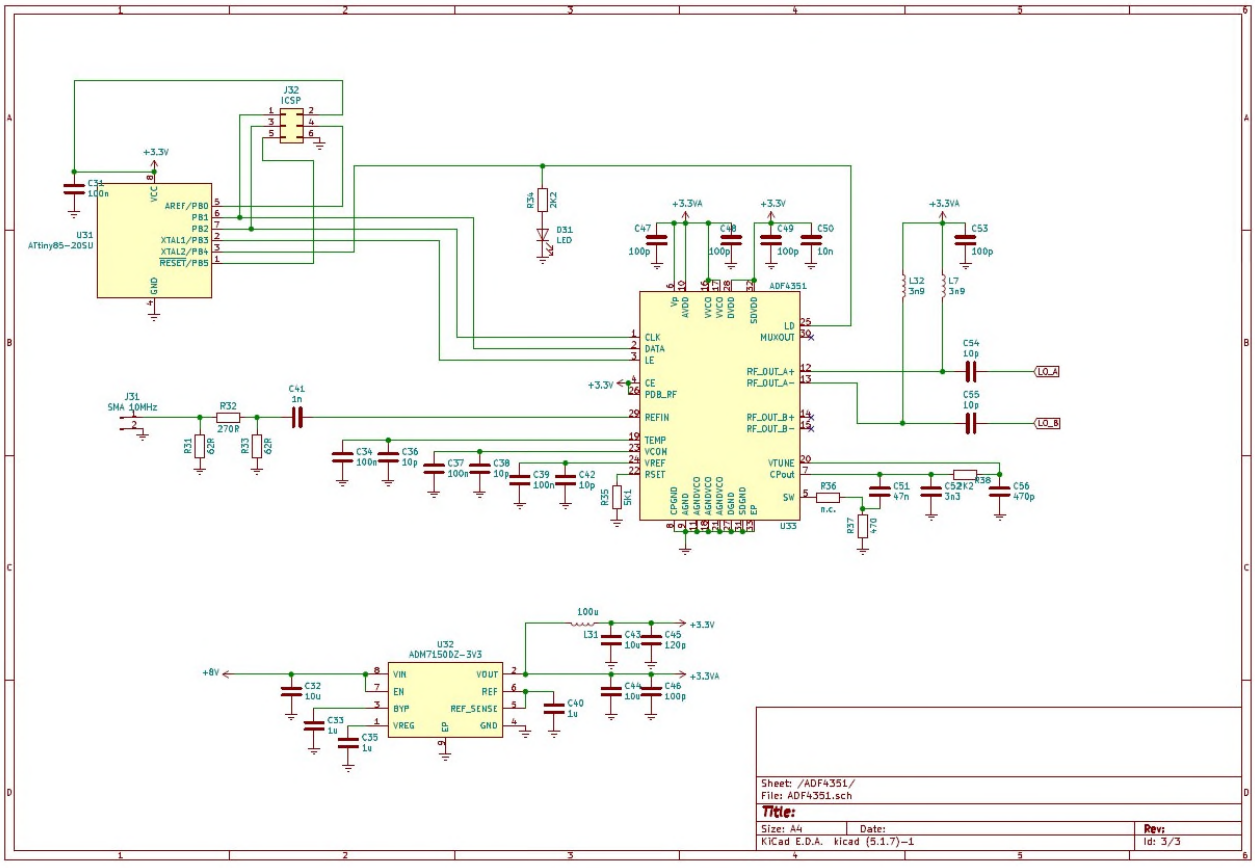


Fig 6. LO ADF4153 – ATTiny – ADM7150

The LO frequency is 1987.2 MHz: It consists of an ADF4351 (hand soldered flat on board), ADM7150 low noise stabiliser, and ATTiny controller for the ADF. . The LO frequency of 1987.2MHz was chosen in such a way that it fits with the RF, LO and IF BP filters on the CBNL RF module and it is used for both first and second mixer. The RF module has a LO/4 input, so 1987.2 MHz is multiplied by 4 to 7948.8 MHz. The first IF is consequently on 10368 – 7948.8 = 2419.2 MHz for both RX and TX. The 1987.2 MHz signal is also

used to transvert 2419.2 MHz to 432 MHz and vice versa. In fact it is (10368 – 432) / 5.

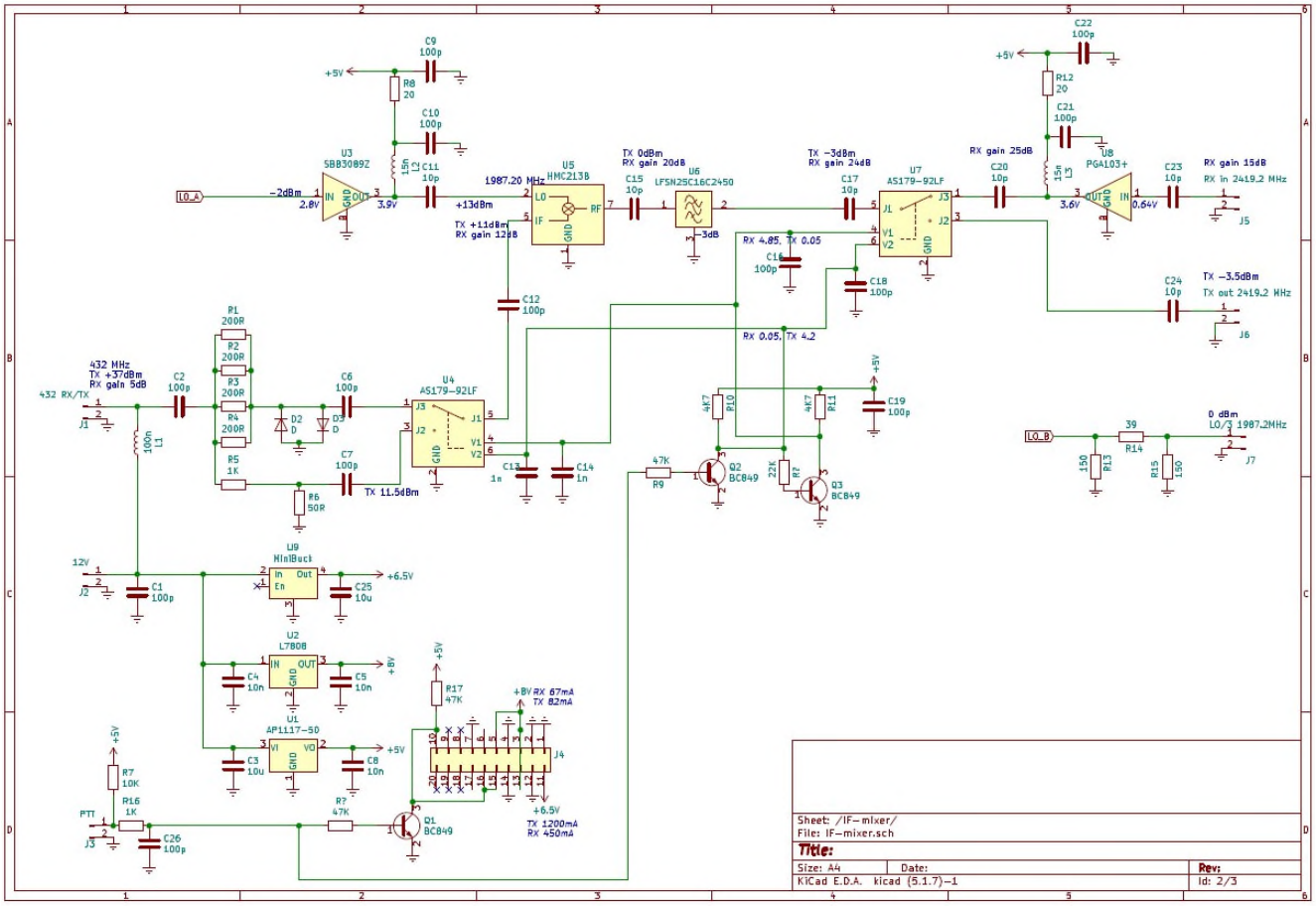


Fig 7. IF_Mixer, Supply and PTT

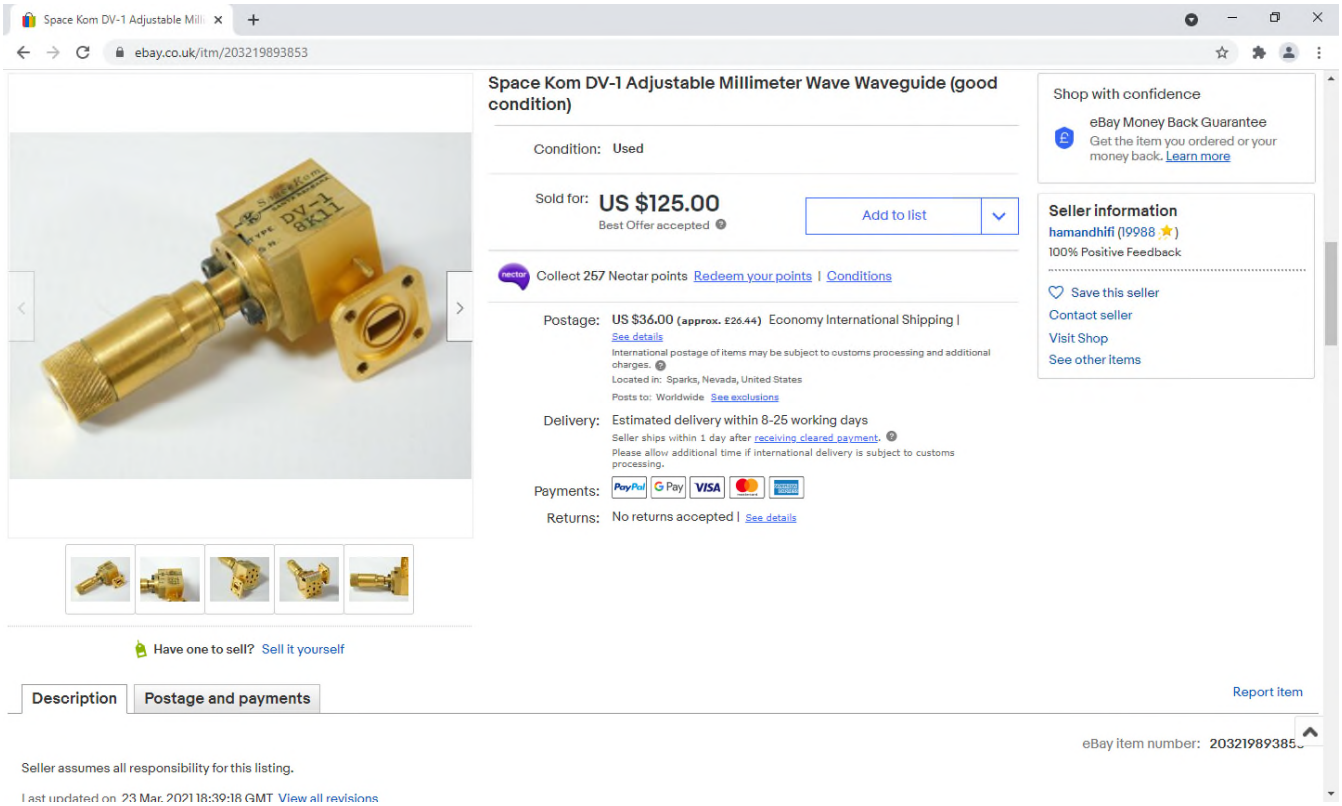
RX-TX:
Between the two AS179 switches the mixer HMC213B and 2.4GHz ceramic layer LC filter (from Chipbank) are used both for RX and TX; in the RX path an extra MMIC gain stage is used.
PSU is 12V in, 8V and 5V stabilised out and buck conversion to 6.5V for PA. The RF original module required 60V and 8V; the internal DC-DC converter is replaced by a 12V to 6.5V buck converter.
PTT provides some switching logic to control it all.

Lessons learned:
- Pay much more attention to the layout around the ceramic multilayer LC filter at 2.4GHz. I had to add an external extra 2.4GHz BP filter
- Hand soldering ADF4351 went fairly smoothly.
- Unexpected spurious emissions can occur e.g. +/-172.8MHz around carrier 5 x 432 - 1987.2 MHz when over-driving the mixer.

Results:
A handy 10GHz transverter with 28dBm O/P.
I could not measure the NF but I have 15dB of nicely distributed gain.
The supply voltage is 12V, 600mA for RX, 1000mA for TX.

Buying a Millimetre Doubler

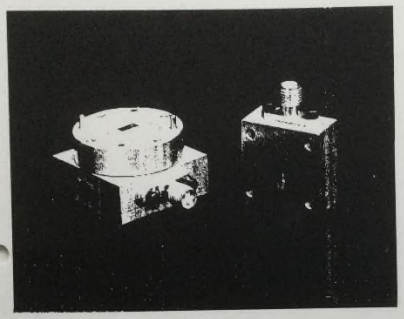
Roger Ray G8CUB



Rather than just looking at the technical aspects, of a doubler purchased. I am going to outline the process of investigation, offer to buy, further research, and finally measurement.
While the chance of an identical unit appearing on Ebay, may be low. The rational leading to making an offer may be of interest. At higher millimetre frequencies, there is a limit to what can be constructed, using designs from DL2AM and others. Commercial units offer higher performance, power, and durability. The problem being, to find a product at a reasonable cost.
So, back to the nice looking gold block above. Firstly, what is it? The clue is in the part number DV-1.
D would suggest a doubler, V could be V-band (50-75GHz). This ties up with the WR-28 (input) port, and probable WR-15 output.
An initial web search showed nothing for the product. Almost nothing for Space Kom. However there was an address in Santa Barbara. This proved to be the same address as for Honeywell. Though again not too much info on microwave products from them.

However a look in the archives produced the following:

Honeywell



Waveguide Multipliers

Features:

- Output frequency ranges from 18 to 110 GHz
- Broad and full bandwidths
- Low conversion loss
- High rejection of harmonics
- Many models available from stock
- Field replaceable diodes
- Rugged design

Honeywell frequency doublers (18 to 110 GHz output) and quadruplers (33 to 75 GHz output) are available in a series of convenient broadband models. Using Schottky barrier diodes in a balanced configuration, they provide enhanced even harmonic outputs in conjunction with suppressed odd harmonics. Linear dynamic range is typically 6 dB, and several standard models are available in both high and low power versions. Waveguide output construction, full guide bandwidths are offered in all bands through WR10 for doublers and WR15 for quadruplers.

Waveguide output frequency triplers are available from 18 to 110 GHz in a similar series of broad band models. Using Schottky barrier diodes in a patented anti-parallel balanced design, they provide enhanced odd harmonic outputs in conjunction with suppressed even harmonics.

All multipliers are available as discrete devices, or may be integrated with mixers and other sub-assemblies. Most standard models are available from stock, and custom items will be quoted on request. Quadruplers and other multipliers will also be quoted upon request.

214 E. Gutierrez Street • Santa Barbara, CA 93101-1705
(805) 965-1013 • TWX: 910-334-4838
Santa Barbara Microwave Center

Waveguide Doublers—Specifications at 25 °C

Model Number	Old Model Number	Input Frequency Range (GHz)	RF Input Power Range (dBm)	Maximum Input (dBm)	Input Connector	Output Frequency Range (GHz)	Conversion Loss (in linear range)	Output Connector	Output Harmonic Rejection	
									Fundamental	3rd & 4th Harmonic
K2200N	DK-1	9.0-18.25	10-18	+20	SMA(F)	18.0-36.0	9.0 dB typ 11.0 dB max	UG595/U WR42	35 dBc typ 30 dBc min	25 dBc typ 20 dBc min
K2100N	DK-2(SB)	9.0-13.25	14-20	+25	SMA(F)	18.0-26.5	10.0 dB typ 12.0 dB max.	UG595/U WR42	30 dBc typ 30 dBc min	25 dBc typ 20 dBc min
D2200N	DK/Ka-1	9.0-20.0	10-16	+20	SMA(F)	18.0-40.0	12.0 dB typ 15.0 dB max	UG1688/U WDR-180	30 dBc typ 30 dBc min	25 dBc typ 20 dBc min
A2000N	DKa-1	13.25-20.0	10-16	+20	SMA(F)	26.5-40.0	10.0 dB typ 12.0 dB max	UG599/U WR28	35 dBc typ 30 dBc min	25 dBc typ 20 dBc min
A2000N	DKa-2(SB)	13.25-20.0	14-20	+25	SMA(F)	26.5-40.0	10.0 dB typ 12.0 dB max	UG599/U WR28	30 dBc typ 30 dBc min	25 dBc typ 20 dBc min
B2200N	DB-1	16.5-25.0	10-16	+20	UG596/U, WR42	33.0-50.0	11.0 dB typ 13.0 dB max	UG383/U WR22	35 dBc typ 30 dBc min	25 dBc typ 20 dBc min
C2200N	DC-1	20.0-30.0	10-16	+20	UG598/U, WR42	40.0-60.0	12.0 dB typ 14.0 dB max	UG383/U Mod WR19	30 dBc typ 30 dBc min	25 dBc typ 20 dBc min
V2200N	DV-1	25.0-37.5	12-18	+20	UG600A/U, WR28	50.0-75.0	15.0 dB typ 18.0 dB max	UG385/U WR15	30 dBc typ 30 dBc min	25 dBc typ 20 dBc min
E2200N	DE-1	30.0-45.0	12-18	+20	UG393/U, WR22	60.0-90.0	15.0 dB typ 18.0 dB max	UG387/U WR12	35 dBc typ 30 dBc min	25 dBc typ 20 dBc min
W2200N	DW-1	37.5-55.0	12-18	+20	UG383/U (Mod) WR19	75.0-110.0	18.0 dB typ	UG387/U Mod WR10	35 dBc typ 30 dBc min	25 dBc typ 20 dBc min

Notes:
1) K-connectors are available instead of stated connectors. Please consult factory.
2) Any 25 GHz output bandwidth. Consult factory or sales representative for wider bandwidth requirements.
3) Any 20 GHz output bandwidth. Consult factory or sales representative for wider bandwidth requirements.
4) For applications requiring extra flatness, double-biased doublers are available. Consult factory or sales representative.
5) Operating temperature is 0° to +50°C.
6) Storage temperature is 0° to +65°C.
7) All specifications are subject to change without notice.

There is a doubler with the numbering DV-1, input frequency 25-37.5GHz, input power 12-16 (18?)dBm, with maximum input +20dBm.
This could be the same product, except that the pictured one has micrometer tuning. Though it is reasonable to assume that it is based on the listed unit. Then absolute maximum drive is 100mW, which is what can generally assumed to be the maximum drive that a diode can take at this sort of frequency. That is not true for higher frequency multipliers, where the diodes are smaller, and can thus take less power. 25mW is the input power limit for a 240GHz tripler.

Going back to the description on Ebay:

‘The unit came from the estate of a retired microwave engineer. He had an impressive test bench and collection of equipment/accessories at this home, most of which he acquired as surplus from his employer. We aren't very familiar with this type of equipment, so I apologize for the lack of description. We hope the photos will suffice, but please feel free to ask any questions you may have and we'll do our best to answer them. While we can't test any of these pieces, we will gladly take it back for a full refund if you are unhappy for any reason.’

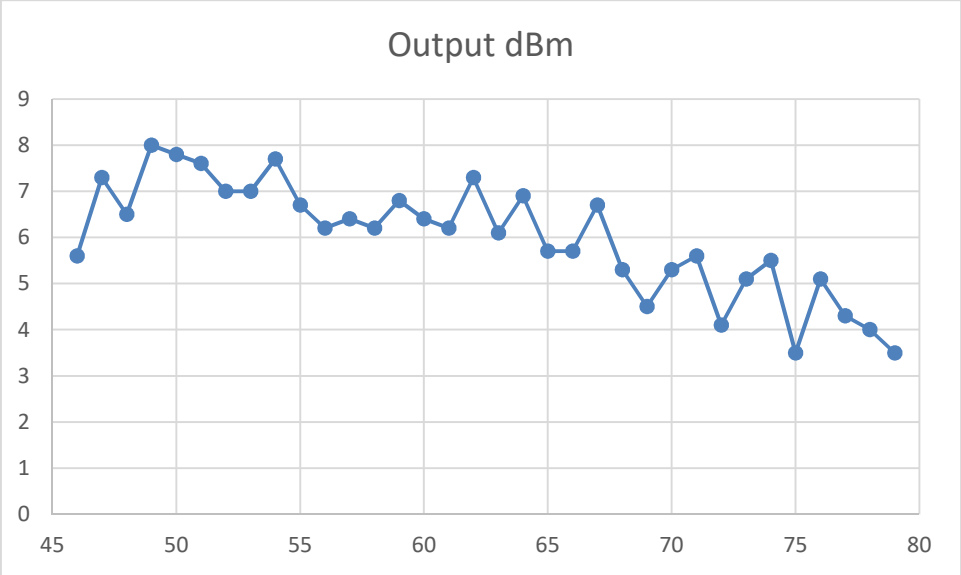
That reads well, but is there a clue as to where it came from?

The label is interesting. LBL is a designation used for the Lawrence Berkeley Laboratory in California. Another unit that the seller has, has a similar label. That one said ‘DOE LBL’, DOE being Department of Energy, as in Atomic energy. ERDA here stands for Energy Research and Development Administration. Thus it is from a decent research lab. A pin either side suggests a two diode configuration. This makes it less sensitive to having been damaged from a bias port. There is nothing to say that it has not been over-driven of course.
So, having decided what it is, and where it came from. It was time to make an offer. It had been listed for 6 months at $350. Not a price that I was willing to pay. Six months with no takers, leaves the possibility of the seller accepting a low offer. I offered $100, which was rejected, though we quickly settled on $125.
Postage was reasonable, but fairly slow via USPS. It arrived in mid-August 2021, after paying the post offices duty / administration charge of £23.

A quick test showed that it was not broken, good news….
Before testing further, I found more info on SpaceKom. Searching for SpaceKom, rather than Space Kom.
‘George C. Spacek, founded SpaceKom in 1965, which became a world-famous manufacturer of millimeter-wave components, where the most important contribution to the industry was his patented stripline mixer. SpaceKom was acquired by Honeywell in 1979. In 1982, he established Spacek Labs Inc. George Spacek will be remembered as a master in the field of millimeter-waves.’
Spacek have a range of very nice products.
Then a reference to the actual product at Berkeley!
‘The output of the Gunn diode is divided into two equal parts by a 3dB directional coupler. One half of the power is fed to a Spacekom model DV-1 frequency doubler to provide approximately 4 mW of local oscillator power at 70 GHz.’
https://www.osti.gov/servlets/purl/6603463
‘2. 1 The Signal Oscillator The signal oscillator consists of a Hughes Model 41620H Gunn diode oscillator followed by a microwave isolator and a (4- LBL-6128) Spacekom Model DV-1 frequency doubler. With this combination up to approximately 5mW of microwave power is available over a band of frequencies in the vicinity of 76 GHz.’
https://escholarship.org/content/qt6m5760mx/qt6m5760mx.pdf

Now to testing. Output was measured on an Anritsu power meter, with 50-75GHz head.
Drive was obtained from the Avantek doubler, and below 26.5GHz input, from an amplifier.

Avantek SWM88 **Doubler** 26 (23) – 40 (40.5)GHz. It looks like an amplifier, but is a doubler! Input +7 to +10dBm in, output +14 to +16dBm. For broadband operation in needs an input attenuator of at least 3dB. Common to a lot of multipliers, the input match is otherwise poor.

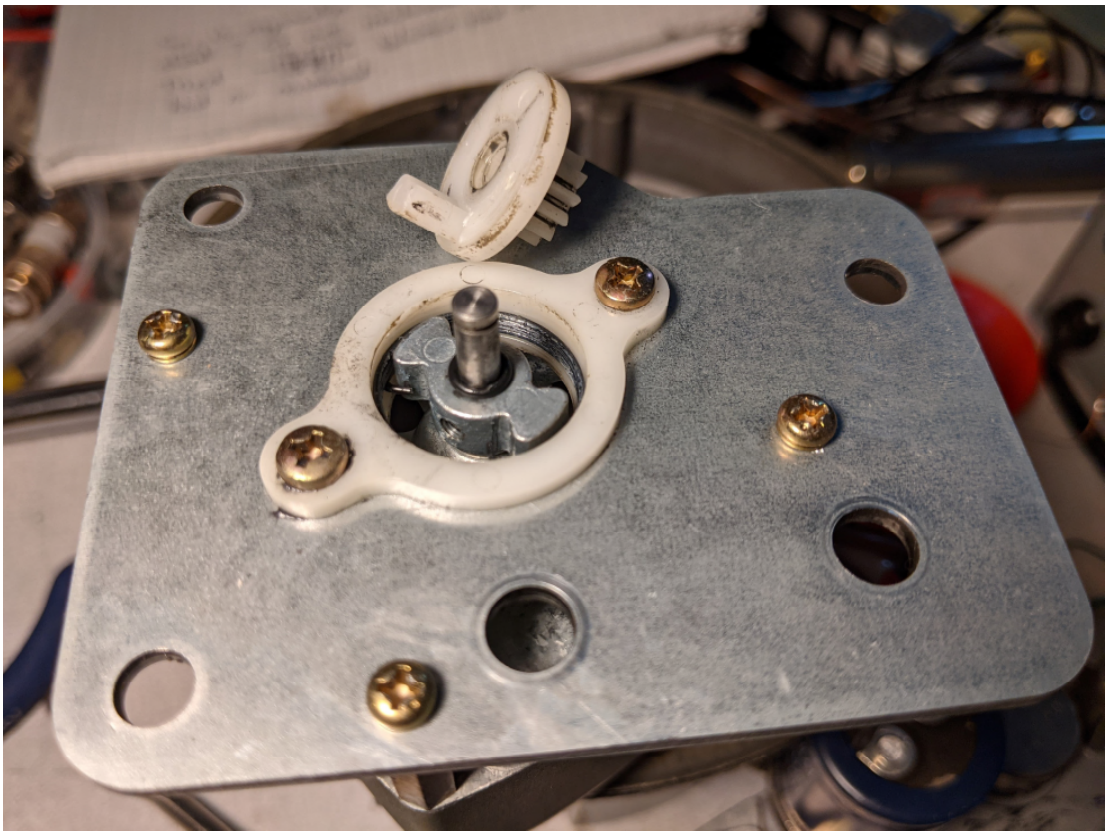


Graph shows output against frequency in GHz. A consistent 4-6mW 47-67GHz, and useful 3mW at 76GHz.
This is consistent with the description of use at Berkeley, with the limitation of drive power that I had available (+14 to +17dBm across the band).

Rotator Rumblings (or lack of)

Dave Austen G1EHF

Here's something that's not exactly a microwave matter but possibly of interest to the community. I have a couple of stub masts with rotators on my house and one of the rotators failed recently. It is a Yaesu G-450C and it simply stopped and refused to budge. After replacing it with a chunkier G-1000DXC, I investigated the G-450 failure to see if it was easily fixed. I spoke to Phil G3TCU who had a similar problem some time ago and recalled his was related to the brake spring and possibly a loose grub screw. After dismantling the rotator head unit I found that my problem was the same, simply a loose grub screw between a cast aluminium 'bow-tie' drive element and the AC motor output shaft. Rotation of the 'bow-tie' serves to both loosen the brake spring and drive a spline on a nylon cog wheel. The photo shows the assembly and the grub screw hole can be seen. Unfortunately a lot of work and expense resulted from such a minor problem but it seems that it could be common and worth the effort to fix. I now have a useful spare rotator!



30THz solar reflector turntable design

Barry Chambers, G8AGN

Figure 1, below, shows a plan view of a prototype stepper motor azimuth drive for the 30THz solar reflector source which was described recently in Scatterpoint. Experience has shown that this is needed to compensate for the Sun's movement across the sky from East to West.

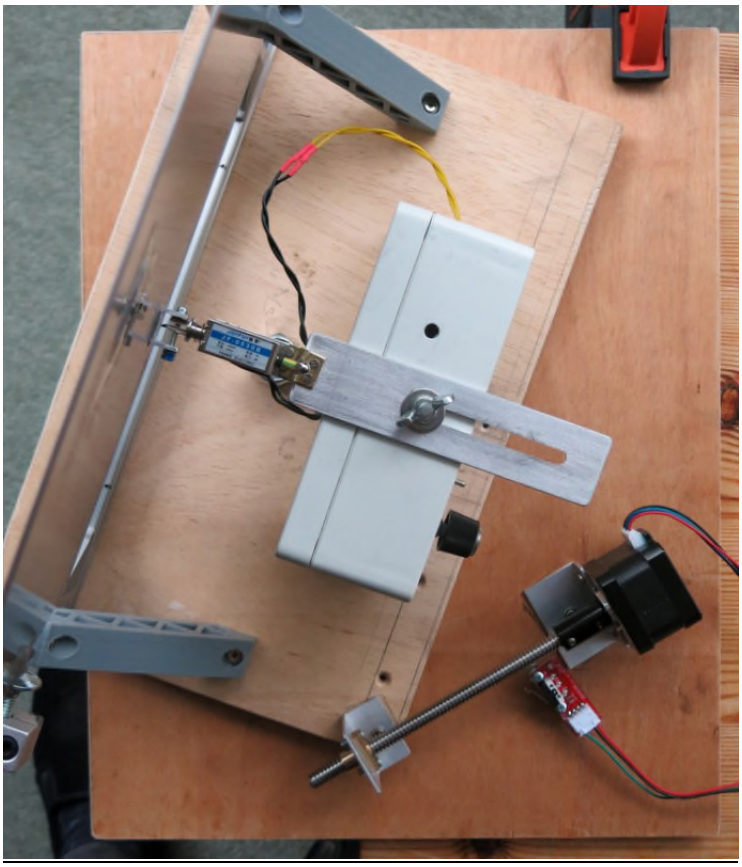


Figure 1

The NEMA 17 stepper motor drives a single start leadscrew with a 2mm pitch and this rotates the reflector turntable via a captive nut. The latter and the motor are mounted on pivots and these, together with that for the turntable form the vertices of a triangle, one of whose sides is formed from the length of leadscrew between the motor and nut pivots, as shown in Figure 2. It is of interest to derive the relationship between the leadscrew length a and the turntable rotation angle θ. This may be done using the Cosine Rule for a triangle whose three sides a, b and c are known, as shown below.

$$a^2 = b^2 + c^2 - 2bc\ cos\theta \qquad (1)$$

Hence

$$\theta = cos^{-1}\left(\frac{b^2+c^2-a^2}{2bc}\right) \qquad (2)$$

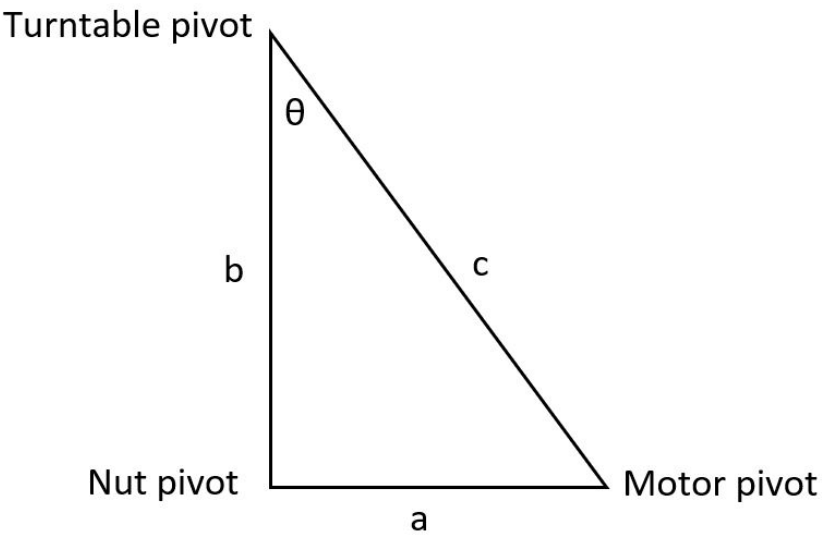


Figure 2: Turntable geometry

Equation 2 has been plotted in Figure 3 for the dimensions of my turntable geometry and it can be seen that the relationship between the turntable angle and the leadscrew length is very linear over at least 25°.

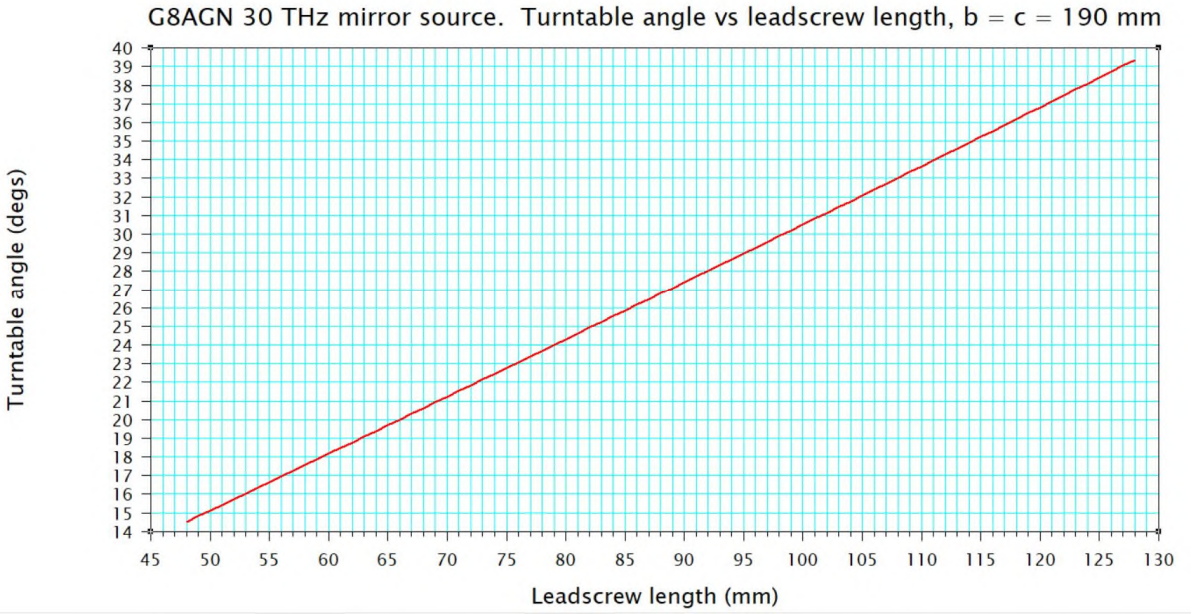


Figure 3: Turntable rotation angle vs leadscrew length

From Figure 3, the number of stepper motor steps required to rotate the turntable through a certain angle may be estimated as follows. The NEMA 17 motor needs 200 steps per revolution and when used with a x4 micro-stepping driver this gives 800 steps per revolution. A change in leadscrew length of 80mm leads to a turntable rotation of 25°. The single start leadscrew has a 2mm pitch; hence 40 revolutions = 40 x 800 = 32000 motor steps are needed to turn through 25°. Then the nominal number of motor steps per degree is 32000/25 = 1280.

The next step in the design process is to make use of the above information to enable the 30THz reflector to compensate for the Sun's movement from East to West. Since the Earth revolves on its axis at the rate of one revolution in 24 hours, this gives a nominal angular rate for the Sun's apparent azimuthal movement across the sky of 15° per hour. This figure is only nominal, however, since the Earth's orbit around the Sun is elliptical rather than circular and the Earth's axis is tilted. The result is that the Sun moves across the sky at varying rates throughout the day and this variation changes from day to day throughout the year and is also dependent on the observer's position on the Earth's surface. As an example, Figure 4 shows the predicted variation of the Sun's azimuthal and elevation position with time as seen by an observer at approximately 53°N, 1.5°W, on 21 June 2021.

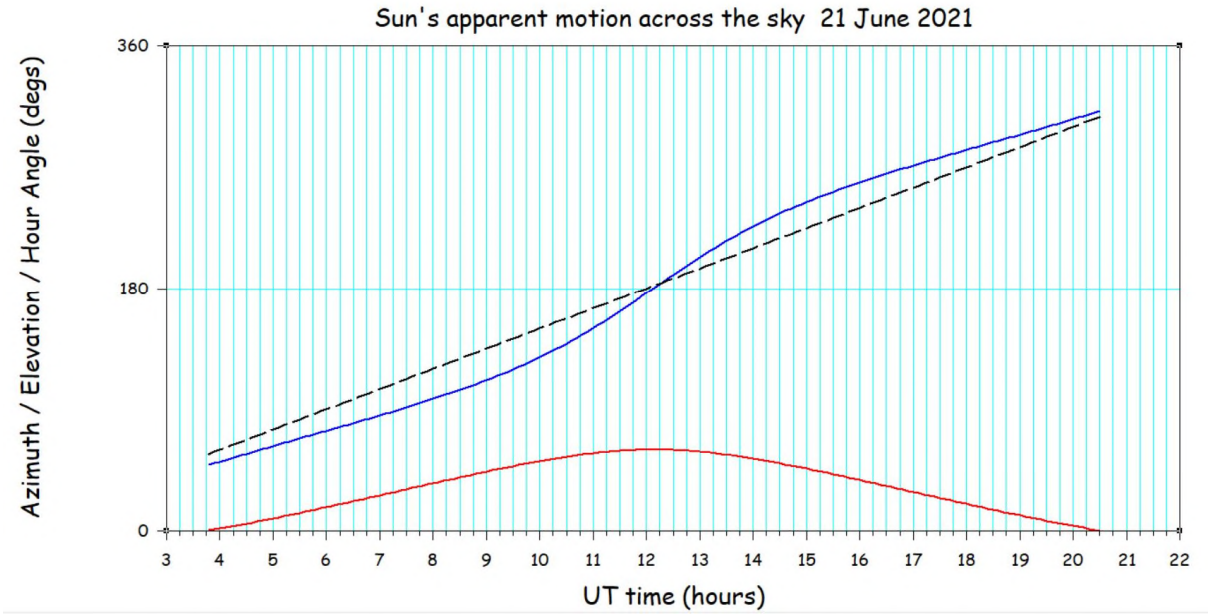


Figure 4: Sun's azimuth (Blue) and elevation (Red) variation with time.

The black dashed line in Figure 4 shows the so-called Hour Angle variation which assumes a linear azimuth variation of 15^{o} per hour. The data shown in Figure 4 were calculated using an Arduino sketch [1], which is based on equations given in [2] – see also [3]. The results have been checked against other "more accurate" software and are believed to be correct to an accuracy of less than 1' which is sufficient for our purpose.

In operation, the 30THz solar reflector is used as both a heliostat and a heliograph. A heliostat reflects incoming radiation from the moving Sun so that it is always directed towards a distant fixed receiver. The heliograph then tilts the reflector slightly in a controlled way so as to send a message via QRSS. These two modes of operation are independent of each other and so it was decided to implement each using a separate controller based on an Arduino Nano. The QRSS heliograph function had already been implemented on the original 30THz reflector as described in a recent Scatterpoint article so this just left the heliostat function to be incorporated.

When power is first applied to the system, the stepper motor rotates so as to bring the mirror to its most Easterly position. This is defined using a limit switch. The mirror system baseboard azimuth angle and the mirror "key down" tilt angle are then adjusted manually to direct the Sun's 30THz radiation towards the distant receiver; this completes the initial mirror alignment. Date/time data and the reflector's location on the Earth's surface are then determined at intervals of one minute using a ublox NEO 6M GPS module and this information is used to calculate the Sun's azimuth position which is stored. One minute later, the Sun's azimuth position is again calculated and the change in value is used to determine how many motor steps are required to turn the 30THz reflector through one-half of this azimuth angle change since rotating a mirror by an angle θ moves a reflected ray through 2θ. This process is repeated at one-minute intervals until the turntable has been rotated through a total of 32000 steps which corresponds to a total azimuthal angle of 25^{o} and which takes approximately 3 hours. If more reflector angular movement is required, then the mirror must again be aligned manually and the whole movement cycle repeated.

In practice, it might also be necessary to compensate for the change in the Sun's elevation as it travels from East to West. This change will occur at a much slower rate than that for azimuth motion and will again vary according to the time of year, being a maximum around the summer solstice. Further testing of the system "in the field" will be needed to establish how important this elevation error is and hence the need for its compensation. If required, however, this will need an additional stepper motor and leadscrew, but since the software already calculates the Sun's real-time elevation data, implementation of mirror elevation correction will be straightforward with minimal software development effort. The reflector system in its present form is shown in Figure 5.

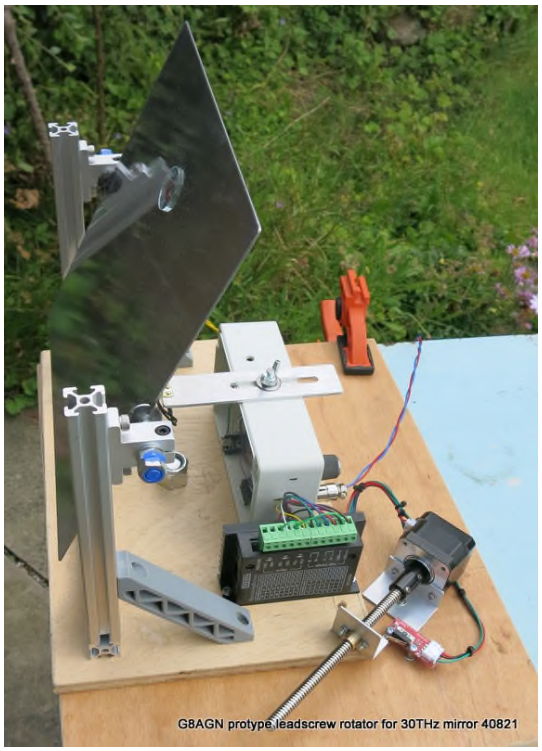


Figure 5: 30THz reflector source with azimuthal compensation

References

1. Arduino and Solar Position Calculations, David Brooks, ArduinoUnoSolarCalculations.pdf (instesre.org)
2. Astronomical Formulae for Calculators, 4th ed, Jean Meeus, 1988, ISBN 0-943396-220
3. Practical Astronomy with your Calculator, Peter Duffett-Smith, 1979, ISBN 0-521-29636

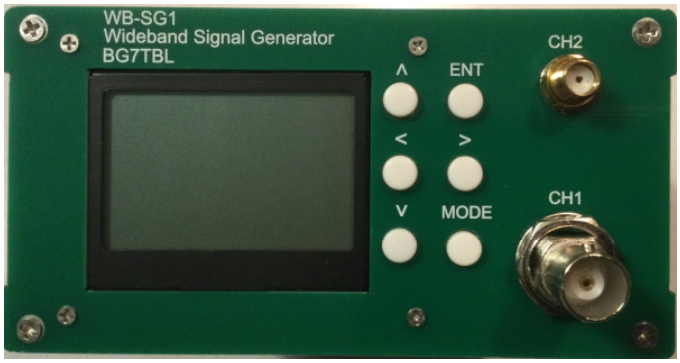
Publicity Officer Position

The UK Microwave Group is looking for a member who is willing to take on the role of Publicity Officer.
The main role will be to provide visibility of the UKuG and what it does, to the wider radio amateur community. This will include making contact with local radio clubs and offering information and speakers who can talk about microwave techniques and operating.
The Publicity officer will also be required to identify other opportunities to publicise the UKuG and to make recommendations to the committee as to where our limited resources may best be directed.
The review, updating and the generation of new publicity material including on the UKuG website will also be part of the role.
The person appointed to the role will be expected to attend committee meeting and provide reports to the committee. (Committee meetings are normally held three or four times a year using 'Zoom').
If you are interested in offering to take on the role of Publicity Officer or would like to discuss the role further please contact me.
Neil Underwood, G4LDR, Chairman UKuG.

More about the WB-SG1 15GHz Signal Source

Bryan Harber G8DKK

After reading Roger's (G8CUB) assessment of the WB-SG1 signal source by BG7TBL in the May/June edition of Scatterpoint I decided to purchase one of the 15GHz units. There are models with maximum frequencies of 8GHz, 15GHz, 18GHz and 20GHz.



In order to give further insight into the construction of these units I removed the extruded top and bottom case sections and photographed the 3 main boards, these are shown below in photos 1, 2 and 3.
I have also made a spreadsheet of level measurements against frequencies to give some idea of the output level range.

Section 1: Initial "Tear Down"

The case construction is identical to the BG7TBL 10MHz GPSDO that I also have and has been running 24/7 since purchase 4 years ago.
The top and bottom case sections are extruded aluminium and the front and rear panels are single sided, 1.6mm FR4 with roller tinned copper surfaces on the inside to provide some screening. In practice there is some leakage of signals from the case mainly, I think, through the front panel LCD cut-out.

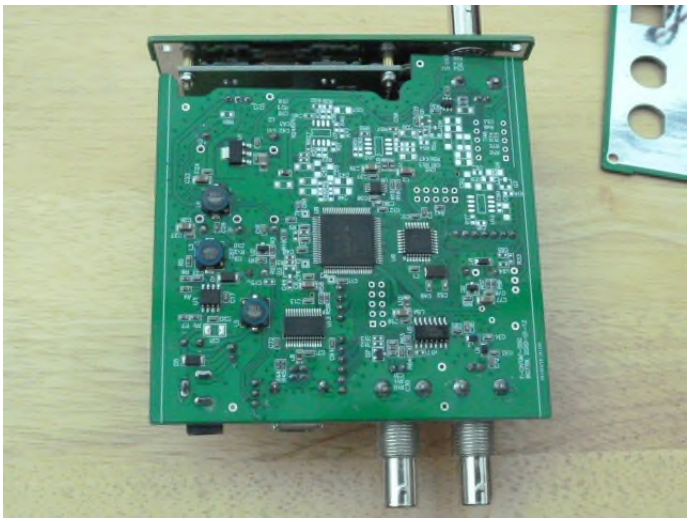


Photo 1. control board underside

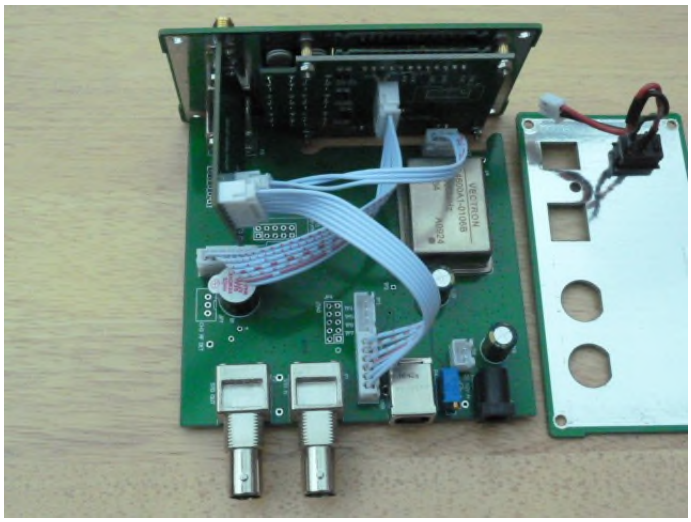


Photo 2. top view Vectron

There are 3 main circuit boards: photo 1 shows the underside of the main board labelled "control board". Here is the location of all the processor and frequency & level control devices as well as the low frequency (1Hz to 200MHz) front panel BNC output. The top side of the control board (photo 2) is populated with connector headers for connections to the other boards plus the 12V DC input from the rear panel. There are several parts of the control board where unpopulated legends are visible; these are believed to be available for the alternative frequency versions of the unit. Photo 2 also shows the 10MHz OCXO that provides the frequency reference for the synthesiser. In my unit the OCXO is by Vectron, this company is a well-established name in the industry and their products are used in many pieces of professional equipment. Photo 2 also shows a multi-turn potentiometer that can be adjusted through the rear panel to trim the internal OCXO frequency by comparison with an available frequency reference.

There are two BNC connectors for internal 10MHz reference frequency output and external reference frequency input. The unit has a default of internal reference but automatically switches to external reference on connection of an external reference frequency of 10MHz. On my unit a level of -14dBm or greater was required.

Fitted to the front panel is the LCD display board that also houses the 6 push button switches in addition to the 45mm diagonal, monochrome LCD display. DC power and data is fed to the LCD display board via a PCB header connected to the control board.

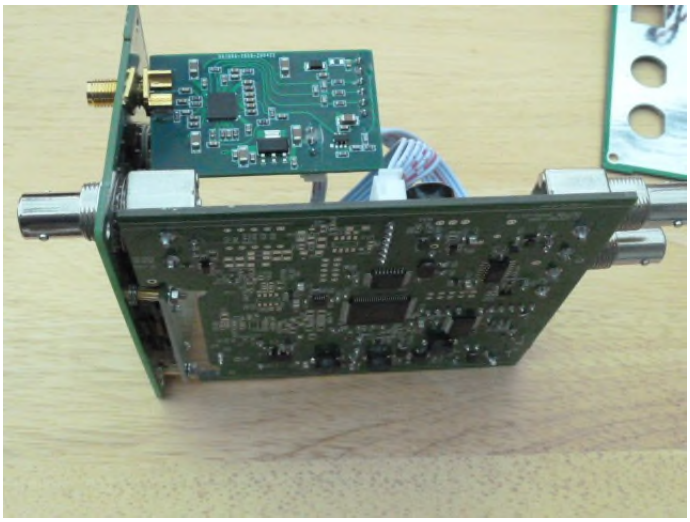


Photo 3. synth board


Photo 4. power measurement

The final board (photo 3) is the synthesiser board containing the 10MHz to 15GHz synthesiser chip along with power supply conditioning. The SMA output connector is fitted directly to this board and the board is held in place against the front panel by the SMA connector. Control of the synthesiser chip is via a single wire serial bus within one of the two connector headers.
Surprisingly, the 10MHz reference signal is also fed in via a wire within the same connector header.
It would appear that level control of the output is also within the synthesiser chip there being 32 programmable output levels, labelled on the LCD display from “00” to “31”.
In section 2 following I describe the calibration process I used to obtain a spreadsheet of output levels over the 32 selection points against programmed frequency.

Section 2: Output Levels versus Frequency

The WB-SG1 does not have calibrated output level but does have a user variable range of levels labelled as “00” to “31”. I wanted to measure these 32 levels over a range of frequencies. There are many frequencies that I could have chosen but I decided upon 30+ frequencies starting from 50MHz up to 15GHz. Why 50MHz? Well, I would be using a professional RF/microwave power meter equipped with a thermocouple power sensor covering 10MHz to 18GHz. The meter contains an internal calibration source that sets up an accurate 1mW (0dBm) level that is used to calibrate the power sensor. The frequency of this source is at approximately 50MHz. I have both Marconi and HP (now Keysight) power meters and this frequency and level is universal to both manufacturers.
Roger (G8CUB) had pointed out that as the VCO is divided down for the lower frequencies the output is close to being a square wave with the odd harmonics being maybe only 10dB or so down on the fundamental. I confirmed this by setting an output of 960MHz and measuring the 2nd & 3rd harmonic levels on my spectrum analyser.

The use of a thermocouple sensor means the output levels measured are the total (true RMS) heating power summed at the output rather than just the fundamental but this is better than would be obtained with a diode sensor because the result is the vector sum of the signals and depending upon the relative phase angles a peak reading diode sensor can get awfully confused!
My HP meter is the HP435A that has an analogue moving coil meter and I also have a Marconi equivalent (6950). I also have two, digital readout Marconi meters and I decided these would be quicker to read over multiple measurements. Note that 30+ frequencies at 32 levels represent over 1000 measurement points to be taken manually!

Photo 4 shows one of the configurations used to make these measurements. A limitation of choosing a SMA connector as the output connector of this signal source is that SMA connectors are not very robust and so some support is required when connecting a heavy power sensor with its N (f) to SMA adapter to the output. It looks a bit crude in the photo but was effective in supporting the power sensor. I started measuring at 50MHz as I had first calibrated the sensor against the internal calibrator of the power meter. Having decided on the frequencies I set up a spreadsheet of frequency against level and worked through the 32 levels at each chosen frequency.
As this spreadsheet is quite large I copied and pasted only the amateur band frequencies to a second spreadsheet. This includes the bands from 6m through 3cm (9 bands) and added a frequency of 12.024GHz that microwavers will recognise as half of 24048GHz for use driving a frequency doubler.

The measured results show the variation in output levels on a frequency by frequency basis. A change in level across each VCO band of the synthesiser seems the most likely explanation. At frequencies in the VHF and UHF range the total level range is around 13dB but reducing in the GHz bands to around 9dB or 10dB.
It was also noted that the output amplifier of the synthesiser chip is in gain compression at the highest power of some of the frequencies as the output reaches a constant level before reaching level “31”. I note the 8GHz unit has a fixed output at around 0dBm.

I have made the amateur bands spreadsheet available to the editor for publication if space allows. The full table is quite large so either or both tables are available from me at: membership@microwavers.org.

An operating manual in PDF format can be found on the web but it is very basic. I have noticed the “ENT” key has a dual function: a short press confirms the entered frequency although it captures after a few seconds anyway. A long press (about 1 second) stores the frequency and output level for the 15GHz model which are then retained after switching off.
Leakage from the case is detectable and includes both the wanted output and an unstable signal that “wanders” down from 144.5MHz to 144.2MHz as the unit warms up.
Overall though the 15GHz unit is good value at around £225 especially as it covers all the amateur microwave bands from 1.3GHz to 10GHz with good stability and 1Hz frequency resolution. For receiver measurements an external step attenuator is required although leakage from the case needs to be taken into account.

Bryan G8DKK
August 2021

BG7TBL WB-SG1 15GHz Signal Source

Level	Output in dBm												
	50	**70**	**145**	**432**	**435**	**1296**	**2320**	**2400**	**3400**	**5670**	**10368**	**10480**	**12024**
"00"	-5.2	-5	-5.1	-4.9	-5.1	-4.8	-3.4	-3.2	-2.2	0	-7.3	-7	-3.3
"01"	-4.2	-4	-4.1	-3.9	-4.1	-3.8	-2.5	-2.3	-1.3	0.9	-6.3	-6	-2.4
"02"	-3.3	-3.1	-3.2	-3	-3.2	-3	-1.7	-1.5	-0.5	1.6	-5.5	-5.2	-1.6
"03"	-2.5	-2.3	-2.4	-2.2	-2.4	-2.3	-0.9	-0.7	0.26	2.4	-4.8	-4.5	-0.8
"04"	-1.7	-1.5	-1.7	-1.5	-1.6	-1.5	-0.22	0	1	3	-4	-3.8	-0.15
"05"	-1.1	-0.8	-1	-0.8	-0.9	-0.9	0.4	0.6	1.6	3.6	-3.4	-3.2	0.45
"06"	-0.5	-0.2	-0.4	-0.2	-0.3	-0.3	0.95	1.2	2.2	4.1	-2.8	-2.6	1
"07"	0.14	0.4	0.22	0.38	0.3	0.26	1.5	1.7	2.7	4.5	-2.3	-2.1	1.4
"08"	0.7	0.9	0.77	0.9	0.8	0.78	2	2.2	3.2	5	-1.8	-1.6	1.9
"09"	1.2	1.4	1.3	1.4	1.3	1.3	2.5	2.7	3.7	5.4	-1.3	-1.1	2.2
"10"	1.7	1.9	1.75	1.9	1.8	1.7	2.9	3.1	4.1	5.7	-0.9	-0.7	2.6
11	2.14	2.3	2.2	2.3	2.2	2.1	3.3	3.5	4.5	6.1	-0.5	-0.3	2.9
12	2.6	2.8	2.7	2.8	2.7	2.6	3.7	3.9	4.9	6.4	-0.1	0.12	3.2
13	3	3.2	3.1	3.2	3.1	3	4.1	4.3	5.3	6.7	0.24	0.5	3.4
14	3.4	3.6	3.5	3.5	3.5	3.3	4.4	4.6	5.6	6.9	0.55	0.8	3.6
15	3.8	3.9	3.8	3.9	3.8	3.7	4.8	5	6	7.1	0.9	1.1	3.8
16	4.1	4.3	4.1	4.2	4.2	4	5	5.2	6.3	7.3	1.1	1.3	4
17	4.4	4.6	4.5	4.6	4.5	4.3	5.4	5.6	6.6	7.5	1.4	1.6	4.1
18	4.7	5	4.8	4.9	4.8	4.6	5.7	5.9	6.9	7.7	1.6	1.8	4.2
19	5.1	5.3	5.1	5.2	5.1	4.9	5.9	6.1	7.1	7.9	1.8	2	4.3
20	5.4	5.6	5.4	5.5	5.4	5.2	6.2	6.4	7.4	8.1	2	2.2	4.4
21	5.7	5.9	5.7	5.8	5.7	5.5	6.5	6.7	7.7	8.2	2.2	2.4	4.4
22	5.9	6.1	6	6	6	5.7	6.7	6.9	7.9	8.3	2.3	2.6	4.5
23	6.2	6.4	6.25	6.3	6.2	6	7	7.1	8.1	8.4	2.5	2.7	4.5
24	6.5	6.7	6.5	6.6	6.5	6.2	7.2	7.4	8.3	8.6	2.6	2.8	4.5
25	6.7	6.9	6.8	6.8	6.7	6.5	7.4	7.6	8.5	8.7	2.7	3	4.5
26	7	7.1	7	7.03	7	6.7	7.6	7.8	8.7	8.8	2.8	3.1	4.5
27	7.2	7.4	7.2	7.25	7.2	6.9	7.8	8	8.9	8.8	2.9	3.2	4.5
28	7.4	7.6	7.45	7.5	7.4	7.1	8	8.1	9	8.9	3	3.2	4.5
29	7.6	7.8	7.7	7.7	7.6	7.3	8.2	8.3	9.2	8.9	3.1	3.3	4.4
30	7.8	8	7.9	7.9	7.8	7.5	8.3	8.5	9.3	8.9	3.2	3.4	4.4
31	8	8.2	8	8.04	8	7.6	8.5	8.6	9.4	9	3.2	3.4	4.4

Scatterpoint activity report

Activity News: August 2021

 By John G4BAO

Please send your activity news to: **scatterpoint@microwavers.org**

From John G4BAO

It's been a good July and August for rainscatter on the GHz bands. I've written a primer on rainscatter propagation and operation that will be published in the October RadCom GHz Bands column.
While my attention has been lower in frequency recently. Namely 144MHz meteor Scatter in the Perseids, and a mind-blowing 144MHz 3000km-plus FT8 contact with EA8JK from the Fen Edge to Las Canarias, the two July 10GHz contests coincided with some super rainscatter conditions. During the Sunday contest I worked 16 stations with five at over 200km, all by rainscatter from a line of heavy showers from Southampton to Ipswich. Highlights were F6DKW JN18CS 414km and GW0MDQ/P IO82KW 237km on CW and G8DMU/P IO94CB 240km on SSB. Maurice, F6DKW worked three Welsh stations, each at over 500km on 10GHz. The stand out QSO being with GW0MDQ at 596km. Conditions were not quite as good on the following Tuesday night's SHFUKAC, with my 10GHz ODX being G4RQI IO93IR at 191km.
Both contests featured proper backscatter rainscatter QSOs. G4RQI and G4DBN both North West of me were huge signals when I worked them with my dish pointing south.
On August 6th I had the pleasure of working G4HTZ in JO01JN my first new station on 24GHz this year. We managed a QSO using Q65D-60 digimode over a very obstructed 90km path.
Other stations known to be available for skeds East of the Greenwich Meridian are G8CUB, G8APZ, G3XDY, G0JBA, and (just slightly West of it in IO92WS), G4ODA.

From Neil G4DBN

I've made my first 47 GHz one-way "contact", over a less-than-amazing 25 metres, using an old Kuhne transverter on transmit, driven from a Kuhne multiplier local oscillator and a UR3LMZ 70cm transverter, using the HP11970Q harmonic mixer from my 8562A spectrum analyser on receive.
Experiments continue on 10 GHz over the obstructed 342 km path between my home station and Adrian G4UVZ (IO80), with powers down to 50 mW still giving good decodes using Q65-60D. On several occasions, the path has been good enough for SSB.
Only notable RS contacts on 3cm during August from IO93NR, here in the Humberhead Levels, were with John G4BAO (JO02) on backscatter via a storm over Kent, with Clive GW4MBS in his deep valley at home in IO71 and with Paul GW0MDQ (IO83) over Bleaklow Hill, which is more than 2000 ft. Paul was operating from inside his bedroom.

From Keith G4ODA

Further to the write up in a recent GHz Bands column in RadCom about his activity from Shetland this summer, Keith adds, "I don't think there was any propagation South of North Lincolnshire. No beacons were heard on any bands from 144 to 3cm from JO02/01 or PA/ON. There was a small lift across the Sea to Scandinavia and I went up to IP90 to work

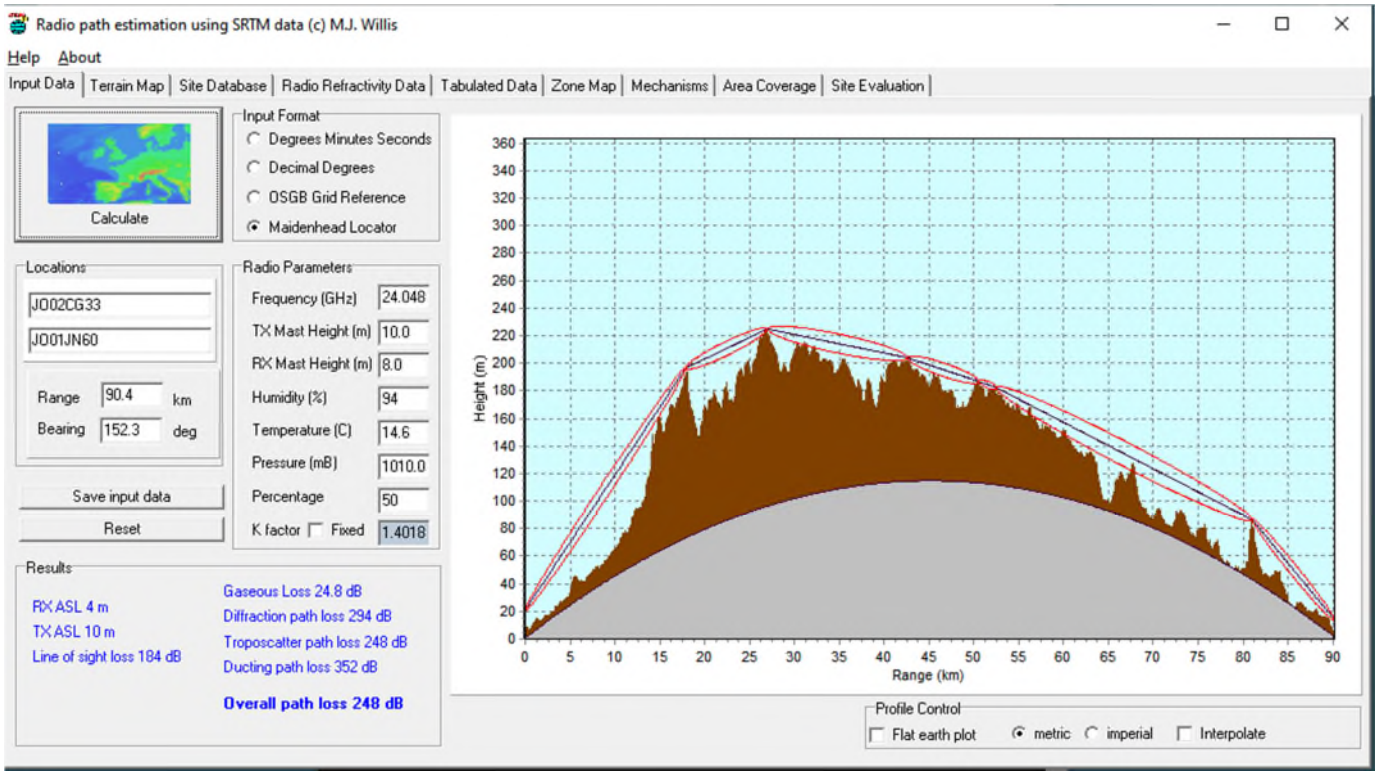
Kjeld OZ1FF from his 1st class near coastal site on 3cm plus 6cm and 23cm (See photo for Keith's Shetland setup operating from a layby overlooking the coast).
I could hear band 2 tropo down the coast from Aberdeen through Newcastle to Lincs but nothing beyond. Very happy given the circumstances to catch Neil G4DBN."
Keith was amused by my reference in the RadCom write-up of him "returning to his hotel" before I managed to work him. He told me, "I like the idea of a hotel, sadly it was back to campsite for an evening meal!
From home in IO92WS, Keith's impressive setup consists of one tower with 2.3. 3.4 and 5.7GHz on a 1.9 mesh dish, plus 10 and 24GHz on solid dishes above. Plus a second tower with 4x23cm Yagis.
His comment on the dish tower was "given the weight of all that plus mast mounted transverters etc. you'll understand why I've not added elevation. A step too far although I do miss out at times!"

From Steve G4HTZ

I've finally got my 24ghz transverter boxed up and mounted on the mast at 15m agl.
GB3PKT is a reasonable signal at 33km
Transverter is not locked yet …hope to get that done by the weekend ….currently about 40khz high .
Also using an elevation rotator for fine tweaking. It's currently off the mast due to a switching fault

JO01JN60

I did work G4BAO at 90km on Q65D and also Phil G0JBA at 42km on ssb with S9 signals …I may use it myself portable .
This was path from G4BAO who produced this path plot



From Iain GM0ONN

As I slowly approach retirement, I will be increasing my activity on the microwave bands. Having worked Martin, GM8IEM on two occasions on 13cm, I decided to go /P from Cairn O'Mount south of Aberdeen with 13cm and 3cm for the 3cm Contest on 25 July 21.

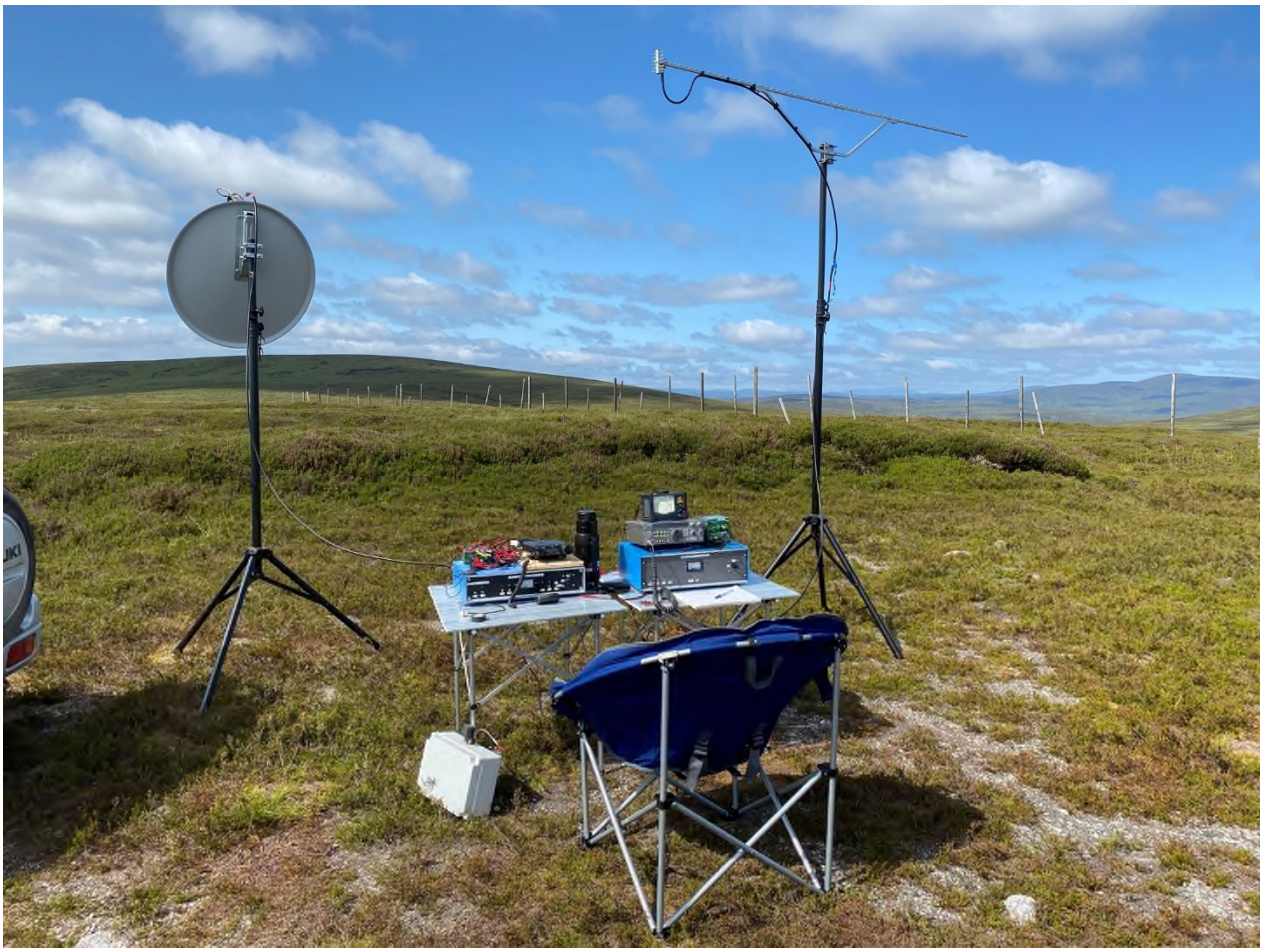
This activity was mostly a systems test which highlighted my issue of Battery Power Voltage drop on the 55 Ah battery, the 110Ah was fine. I have however, taken action as advised by Mark Ism on the subject and purchased a Boost DC – DC Convertor to eliminate a small issue encountered.

My afternoon out resulted in 2 x 3cm contacts and 4 x 13cm contacts. Sadly no G stations were worked, though some should have been quite possible from my /P site. Whilst I had Internet and Laptop, the Bright Day and my lack of cover made ON4KST Comms difficult, with a struggle to read the screen.

I ran DB6NT 10W on 3cm to 80cm Dish and DB6NT 13cm, 25W to 67 Ele.

I have attached a few shots of the set up. 3cm has short run of LDF2-50, not ideal, but allows me to elevate the dish, regaining what is lost in some locations. 13cm, short run of LMR400. These small Tripod Masts do elevate to about 4m.

I do intent next year to get a small group together and operate from the same location on 23cm (250W), 13cm (25W), 6cm (1W), 3cm (10W) and 1.2cm (1.8W). it will be well advertised in plenty of time. Ok, hope to work more of you in the near future, Iain, GM0ONN.



From Paul GW0MDQ

I thought it would be good to send you some information of my recent 3cm activity along with a few pictures. I've been active only a few months now and entered the first UKAC contest in May (2 completed now) and a first entry for me in the UK microwave group contest on 25th July. The contest in July was very rewarding with 9 contacts made along with new locator squares for me,
(almost every contact was a new square!) and to top it all some real DX with a rain scatter contact with Maurice located near Paris.

My gear is an FT818, Khune transverter, Preamp and Bert Moderman PA with 5 watt to the Horn antenna.
Contacts
25th July - G4CLA, G4CBW, F6DKW, G4ODA, G4SJH/p, M0GHZ, G3XDY, G4LDR, G4ZTR, G0WZV, G4HWR, G4BAO, G4RQI
F6DKW DX 596Km, Maurice was using 25watts and a 90cm dish
6th +7th August - G4DBN @ 165km from the bedroom window.

Out portable for the microwave group contest, the external battery is running the 10MHz oscillator, the rest of the gear is plugged into the cigarette lighter socket.

Front bedroom, contacts made with G4DBN Neil on 6th + 7th August, Flann standard gain horn antenna with 25dB. Gain. This antenna looks out through the window nicely.

Detail of contact on the contest on 25th July

HB9Q Team EME DXpedition to Rhodes SV5

Late September- October 20121

We are very happy to announce our next Q-Team EME DXpedition!
Due to Covid-19 we had to twice postpone our DXpedition to Rhodes, the major island of the Dodecanes. Although the situation still isn't perfect, we will be on the island for 14 days (from 27. September to 11. October 2021), for some sightseeing/vacation and of course EME on 432 (QRP only), 1296, 23xx,n3400, 5760 and 10xxx MHz.

The house on the southeast side of the island is booked, so are the flights from Zurich to Rhodes and back. Team members are Sam HB9COG, Dan HB9CRQ and Sue, Dan's partner.

Our QTH is in KM36xa, is directly at the beach. So, Moonrise should be perfect! For Moonset, we expect some 10 to 25° elevation limitation due to houses nearby, some trees and the mountains at the horizon (we will only know exactly once we are there). But in anyway, we should have good enough MS to work the US-Westcoast.

Here our operation plan:
28. September
2320.100 Q65C SV5/HB9COG 1st RX Own Echo, 20.45z until 09.15z (29. September)
2301.990 and 2400.100 (on request only, please send e-mail to dan@hb9q.ch),
2304.100 during NA window, QSY will be announced on HB9Q 23xx logger

29. September
3399.990 Q65C SV5/HB9COG 1st RX Own Echo 21.40z until 23.00z on request only, please send e-mail to dan@hb9q.ch before 28. September

30. September
3400.100 Q65C SV5/HB9COG 1st RX Own Echo, 03.00z until 10.00z
5760.100 Q65D SV5/HB9COG 1st CFOM, 22.30z until 11.00z (1.Oktober)

1. October
10368.100 Q65D SV5/HB9COG 1st CFOM, 23.30z until 11.30z (2.Oktober)
10450.100 1st (on request only, please send e-mail to dan@hb9q.ch), QSY will be announced on HB9Q 10xxx logger

3. October
1296.100 JT65C SV5/HB9COG 1st RX Own Echo, 00.30z until 12.30z

4. October
1296.100 Q65C SV5/HB9COG 1st RX Own Echo, 01.40z until 13.00z

5. October
432.085 Q65B SV5/HB9COG 1st RX Own Echo, 05.30z until 13.00z CW: Although it is on the limit, we will work CW on 1296-10450 bands.
However only with big-guns and after the pile-up on Q65 is worked.

Equipment:
1.5m dish 1x2mm mesh, homemade automatic az/el control:
1296: 50W at feed, circular, preamp at horn
23xx: 50W at feed, circular, preamp at horn
3400: 50W at feed, circular, preamp at horn
5760: 50W at feed, circular, preamp at horn
10xxx: 50W at feed, v-pol, preamp at horn
432: 50W at dipole, 1x11el FLA, preamp

We will be using WSJT-X 2.5 on all bands. On 70cm Q65B with Doppler Control

("Own Echo", in other words we listen on our own echo). On 23, 13 and 9cm Q65C with Doppler Control ("Own Echo"). On 6 and 3cm Q65D with Doppler Control ("Constant Frequency On Moon" and if necessary "Full Doppler to DX Grid"). Hopefully more people take advantage of automated Doppler control.
Especially on 6 and 3cm it is a MUST for successful QRP operations. We'll have internet access. During our activities we'll be stand-by on the HB9Q band loggers. We also will check our e-mails several times a day.

How big does your station need to be to work us?
On 70cm 16x long Yagis and 1KW
On 23cm 2m dish and 150W at the feed
On 13cm 2m dish and 100W at the feed
On 9cm 2m dish and 50W at the feed
On 6cm 1.5m dish and 80W at the feed
On 3cm 0.75m solid dish with 60W at the feed

QSL policy: QSL only direct including SAE to: HB9Q, P.O.Box 39, CH-5737 Menziken
If you wish to sponsor our activity, you are welcome to do so by using PayPal dan@hb9q.ch (please mention your call).
More information late September.

F2TU SK

Few people can have had more influence on the world of EME and microwaves than Phillipe Pierrat F2TU who, sadly, finally succumbed to injuries sustained in a serious accident in 2012. For me and many others he was our first ever EME QSO partner. I met him at EME2012 in Cambridge and we had many QSOs via the Moon before that. He became QRV on EME in 1971 and operated on bands up to 10GHz, installing an 8m dish in 2000.
There have been so many tributes, but I'll just quote that other EME pioneer Peter G3LTF, who wrote on Moon-net, "Our good friend Philippe, F2TU, passed away this morning. Many of you will remember that he suffered terrible injuries in a fall while changing his dish feeds in September 2012 and has now eventually succumbed. Philippe was one of the greats of EME from the early days, very active on the UHF and microwave bands, an experimenter, and an excellent engineer, always with a big signal on CW and SSB and a regular attendee at the conferences. He has been missed by us all since that awful accident, which made many of us review how we worked on our dishes. RIP my dear friend"

Contests

24GHz/47GHz/76GHz Contest July 2021

Activity was much better than the first event in April, with several entries on all three bands. Propagation was viewed as being below average by most, with damp weather for many.
Congratulations to the following:
24GHz Winner - Barry G4SJH/P
24GHz Runner Up – Telford & DARS G3ZME/P
47GHz Winner – Neil G4LDR/P
47GHz Runner Up – Pete G4HQX/P & Roger GW8CUB/P
76GHz Winners – Pete G4HQX/P & Roger GW8CUB/P

John G3XDY
UKuG Contest Manager

24GHz Contest July 2021

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX kms
1	G4SJH/P	IO91GI44	7	299	GW3TKH/P	122
2	G3ZME/P	IO82QL83	5	292	GW8CUB/P	83
3=	GW3TKH/P	IO81LS19	3	260	G4SJH/P	122
3=	GW8CUB/P	IO81LS19	3	260	G4SJH/P	122
5	G1DFL/P	IO91ON71	8	226	G4SJH/P	53
6	G1EHF/P	IO91GI44	6	177	G1DFL/P	53
7	G8ACE/P	IO91JA47	5	173	G1DFL/P	41
8	G4LDR	IO91EC02	4	113	G8ACE/P	33
9	G4HQX/P	IO81UR40	2	110	GW3TKH/P	55
10	M0HMO/P	IO82NN60	1	20	G3ZME/P	20

47GHz Contest July 2021

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX kms
1	G4LDR/P	IO91GC68	3	76	G8ACE/P	33
2=	G4HQX/P	IO81UR40	1	55	GW8CUB/P	55
2=	GW8CUB/P	IO81LS19	1	55	G4HQX/P	55
4	G1EHF/P	IO91GI44	3	54	G4LDR/P	26
5	G8ACE/P	IO91JA47	2	52	G4LDR	33
6	G1DFL/P	IO91GI25	2	29	G8GTZ/P	27

76GHz Contest July 2021

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX kms
1=	G4HQX/P	IO81UR40	1	55	GW8CUB/P	55
1=	GW8CUB/P	IO81LS19	1	55	G4HQX/P	55
3	G4LDR/P	IO91GC68	1	17	G8GTZ/P	17

24/47/76GHz Championship Tables 2021

Positions after the first two events, best three count to the final total

24GHz

Pos	Callsign	16/05/2021	11/07/2021	**TOTAL**
1	G3ZME/P	1000	977	1977
2	G4SJH/P	660	1000	1660
3	G1DFL/P	597	756	1353
4	G1EHF/P	660	592	1252
5	G8ACE(/P)	312	579	891
6=	GW8CUB/P	0	870	870
6=	GW3TKH/P	0	870	870
8	G4LDR(/P)	348	378	726
9	G4HQX/P	0	368	368
10	M0HMO/P	0	67	67

47GHz

Pos	Callsign	16/05/2021	11/07/2021	TOTAL
1	G4LDR/P	0	1000	1000
2=	G4HQX/P	0	724	724
2=	GW8CUB/P	0	724	724
4	G1EHF/P	0	711	711
5	G8ACE/P	0	684	684
6	G1DFL/P	0	382	382

76GHz

Pos	Callsign	16/05/2021	11/07/2021	TOTAL
1=	G4HQX/P	0	1000	1000
1=	GW8CUB/P	0	1000	1000
3	G4LDR/P	0	309	309

July 10GHz Contest 2021

Activity improved for this event and some good rainscatter conditions were apparent during the afternoon which resulted in some nice contacts. Of particular note was the best DX in the contest, worked by GW0MDQ/P with F6DKW, using 5W to a 25dB horn over a path of 596km

The Restricted section result was a rerun of the June event, with Barry G4SJH/P as winner, with Pete G1DFL/P runner up.

In the Open section John G4ZTR once again prevailed, this time it was David M0GHZ providing the competition.

Thanks go to Keith G4ODA for his checklog.

73

John G3XDY

UKuG Contest Manager

10GHz Contest July 2021

Open Section

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX kms
1	G4ZTR	JO01KW	26	5218	F6DKW	365
2	M0GHZ	IO81VK	22	3825	F8DLS	479
3	GW0MDQ/P	IO82KW	9	2386	F6DKW	596
4	G4BAO	JO02CG	16	2331	F6DKW	415
5	G0WZV	JO01KV	14	2225	F8DLS	356
6	GW3TKH/P	IO81LS	12	2214	F6DKW	501
7	G4LDR	IO91EC	14	1951	GW0MDQ/P	229
8	GW4MBS/P	IO71XW	8	1780	F6DKW	566
9	G4RQI	IO93IR	6	1222	G0WZV	251
10	G4BXD	IO82UJ	7	914	G4ZTR	222
11	GM0ONN/P	IO86RV	2	221	GM4ISM	157
12	GM4DIJ/P	IO74MS	1	220	G8DMU/P	220

Restricted Section

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX kms
1	G4SJH/P	IO91GI	17	2220	G8DMU/P	303
2	G1DFL/P	IO91IN	8	934	G8DMU/P	281

July 5.7GHz Contest 2021

Rainscatter provided several entrants the opportunity to make contacts that do not normally go, which made a nice change. Best DX was the contact from G4BRK to F8DLS at 443km
Neil G4BRK takes the winning position this time, thanks to the contribution from the rain scatter contacts. Runner up is Dave G1EHF/P.
Thanks go to Keith G4ODA for his check-log.
73
John G3XDY
UKuG Contest Manager

5.7GHz Contest July 2021

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX Kms
1	G4BRK	IO91HP	11	1397	F8DLS	443
2	G1EHF/P	IO91GI	10	1275	F8DLS	430
3	M0GHZ	IO81VK	9	1009	G3XDY	246
4	G4LDR	IO91EC	9	940	G3XDY	223
5	GW4HQX/P	IO81LS	6	751	G4ODA	228
6	G7LRQ	IO91TQ	5	545	M0GHZ	130

5.7/10GHz Championship Tables

Positions after three sessions, best three count to the total

5.7GHz

Pos	Callsign	30/05/2021	27/06/2021	25/07/2021	TOTAL
1	G1EHF/P	633	1000	913	2546
2	M0GHZ	628	886	722	2236
3	G4BRK	544	474	1000	2018
4	G4LDR	692	636	673	2001
5	G6ZME/P	1000	930	0	1930
6	GW4HQX/P	578	0	538	1116
7	G7LRQ	688	0	390	1078
8	G4CLA	737	0	0	737
9	G1DFL/P	44	477	0	521
10	G0WUS	64	0	0	64

10GHz Open

Pos	Callsign	30/05/2021	27/06/2021	25/07/2021	TOTAL
1	G4ZTR	801	1000	1000	2801
2	G3ZME/P	1000	764	0	1764
3	M0GHZ	397	375	733	1505
4	G4LDR	423	676	374	1473
5	G4KUX	532	497	0	1029
6	GW4MBS/P	339	338	341	1018
7	GW3TKH/P	428	0	424	852
8	G4CLA	709	0	0	709
9	G4BAO	0	162	447	609
10	G4DBN	341	215	0	556
11	GW0MDQ/P	0	0	457	457
12	G4BXD	184	95	175	454
13	G0WZV	0	0	426	426
14	G1PPA/P	264	0	0	264
15	G4RQI	0	0	234	234
16	G0HIK/P	147	0	0	147
17	G3YJR	0	87	0	87
18	GM4DIJ/P	16	0	42	58
19	GM0ONN/P	0	0	42	42

10GHz Restricted

Pos	Callsign	30/05/2021	27/06/2021	25/07/2021	TOTAL
1	G4SJH/P	1000	1000	1000	3000
2	G1DFL/P	771	242	421	1434
3	GW4HQX/P	698	0	0	698
4	G0WUS	301	0	0	301

UKuG MICROWAVE CONTEST CALENDAR 2021

Dates, 2021	Time UTC	Contest name	Certificates
29-Aug	0600 - 1800	4th 5.7GHz Contest	F, P,L
29-Aug	0600 - 1800	4th 10GHz Contest	F, P,L
12-Sep	0900 - 1700	3rd 24GHz Contest & 24GHz Trophy	
12-Sep	0900 - 1700	3rd 47GHz Contest	
12-Sep	0900 – 1700	3rd 76GHz Contest	
26 -Sep	0600 - 1800	5th 5.7GHz Contest	F, P,L
26 -Sep	0600 - 1800	5th 10GHz Contest	F, P,L
10-Oct	0900 - 1700	122-248 GHz	
17-Oct	0900 - 1700	4th 24GHz Contest	
17-Oct	0900 - 1700	4th 47GHz Contest	
17-Oct	0900 – 1700	4th 76GHz Contest	
15-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)

Editors Comments

Many thanks to all the contributors this month.

It looks like there is light at the end of the tunnel, and that some face-to-face meetings are now taking place. With high pressure at last here, we may have a decent end to August weather wise, and even get some decent propagation.

As always any contribution to Scatterpoint appreciated.

2021 Contest Calendar

Aug	1.3GHz Activity Contest	*Arranged by RSGB*	17-Aug	1900 - 2130	RSGB Contest
Aug	2.3GHz+ Activity Contest	*Arranged by RSGB*	24-Aug	1830 - 2130	RSGB Contest
Aug	5.7GHz/10GHz	F, P,L	29-Aug	0600-1800	
Sep	24GHz/47GHz/76GHz		12-Sep	0900-1700	
Sep	1.3GHz Activity Contest	*Arranged by RSGB*	21-Sep	1900 - 2130	RSGB Contest
Sep	5.7GHz/10GHz	F, P,L	26-Sep	0600-1800	
Sep	2.3GHz+ Activity Contest	*Arranged by RSGB*	28-Sep	1830 - 2130	RSGB Contest
Oct	*1.3 & 2.3GHz Trophies*	*Arranged by RSGB*	*3-Oct*	*1400 - 2200*	RSGB Contest
Oct	*432MHz & up*	*Arranged by RSGB*	*3 to 4-Oct*	*1400 - 1400*	IARU/RSGB Contest
Oct	122-248GHz		10-Oct	0900-1700	
Oct	24GHz/47GHz/76GHz		17-Oct	0900-1700	
Oct	1.3GHz Activity Contest	*Arranged by RSGB*	19-Oct	1900 - 2130	RSGB Contest
Oct	ARRL Microwave EME	*Arranged by ARRL*	23 to 24-Oct	0000 - 2359	ARRL EME 2.3GHz & Up
Oct	2.3GHz+ Activity Contest	*Arranged by RSGB*	26-Oct	1830 - 2130	RSGB Contest
Nov	Low band 1.3/2.3/3.4GHz 5	F, P,L	14-Nov	1000 - 1400	
Nov	1.3GHz Activity Contest	*Arranged by RSGB*	16-Nov	2000 - 2230	RSGB Contest
Nov	ARRL EME 50-1296MHz	*Arranged by ARRL*	20 to 21-Nov	0000 - 2359	ARRL EME Contest
Nov	2.3GHz+ Activity Contest	*Arranged by RSGB*	23-Nov	1930 - 2230	RSGB Contest
Dec	ARRL EME 50-1296MHz	*Arranged by ARRL*	18 to 19-Dec	0000 - 2359	ARRL EME Contest
Dec	1.3GHz Activity Contest	*Arranged by RSGB*	21-Dec	2000 - 2230	RSGB Contest

EVENTS 2021

Events may be subject to cancellation due to the Coronavirus
For latest information consult https://microwavers.org

2021

August 19-22	EME 2021, Prague - Now 12-14 August 2022	www.eme2020.cz
August 21-22	BATV Convention, Midland Air Museum, Coventry	www.batc.org.uk
September 24-25	National Hamfest - Postponed until 2022	www.nationalhamfest.org.uk
October 9	RSGB Convention – Online	rsgb.org/convention
October 10-15	European Microwave Week, London, Excel - Postponed until 2022	www.eumweek.com
October 17-21	IARU-R1 Conference, Part-2 Novi Sad	conf.iaru-r1.org

2022

February 13-18	European Microwave Week, London, Excel	www.eumweek.com
March 26	CJ-2022 Seigy	cj.r-e-f.org
May 20-22	Hamvention, Dayton	www.hamvention.org
June 24-26	Ham Radio, Friedrichshafen	www.hamradio-friedrichshafen.de
August 12-14	EME 2022, Prague	www.eme2020.cz
September 25-30	European Microwave Week, Milan, Italy	www.eumweek.com

80m UK Microwavers net

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

73 Martyn Vincent G3UKV