An Amateur Radio publication for the Microwave Enthusiast

scatterpoint

June 2016

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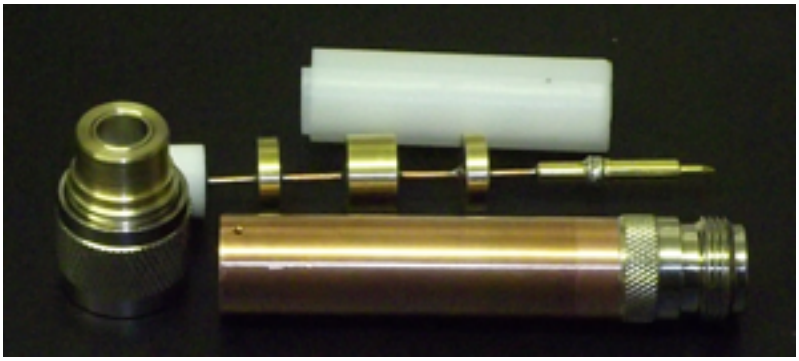
Low Pass Filter (Part 3)

By Ken Vickers G3YKI



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Loan Equipment

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

5.7GHz 10GHz 76GHz

Contact John G4BAO for more information.

Subscription Information

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

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

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

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

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

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

PLEASE QUOTE YOUR CALLSIGN!

Payment can be made by: PayPal to

ukug@microwavers.org

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

Articles for Scatterpoint

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

Please send them to

editor@microwavers.org

The CLOSING date is
the FIRST day of the month

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

Please submit your articles in any of the following formats:

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

Spreadsheets: Excel, OpenOffice, Numbers

Images: tiff, png, jpg

Schematics: sch (Eagle preferred)

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

Thank you for you co-operation.

Martin G8BHC

Reproducing articles from Scatterpoint

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

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UKµG Chip Bank – A free service for members

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

Non members can join the UKuG 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!

Mike G3LYP

UKµG Project support

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

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

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

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

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

www.microwavers.org/proj-support.htm

UKµG Technical support

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

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

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

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

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

Derek Atter G3GRO SK

Photo courtesy of CARC newsletter Editor.

Mike, G0KAD

I have just learned that Derek, G3GRO the Honorary President of the Crawley Amateur Radio Club and keen UHF and Microwave contester passed away yesterday, Friday 27th May.

He last visited the club last Sunday 22nd which, of course, was the May Postcode contest.

Details of any arrangements will be posted on the Crawley ARC blog, direct to members via email and on this group <CARCRATS@yahoogroups.com>.

From Stewart Bryant G3YSX

The blog URL mentioned above is
http://carconline.blogspot.co.uk/

Although not so active in recent times due to ill health and physical disability, he was once very active.

From Chris G0FDZ

I first met Derek G3GRO at Crawley Court in Hampshire at one of the early microwave round tables at the then IBA headquarters. This was back in the days when 10 GHz wideband ruled in the main, and the South Downs were an important meeting place for microwavers on 10GHz ever month for the cumulative contest rounds. The round tables were at the time organised by Don G3JHM but It was then that we found out that the IBA were not prepared to host any further round table events and Derek kindly stepped in and offered the use of the Crawley Club in West Sussex for future events, thus the first Crawley Microwave Round table was born some thirty odd years ago.

Derek was always interested in microwaves and had equipment for all bands up to and including 10 GHz and much of it was available for use at his home. That wasn't the start of his interest in microwaves as anyone who was at the Crawley round table some four years ago will recall that Derek gave a talk on the massive cold war radar installations that he was involved in maintaining back in the 50's.

Microwaves weren't Derek's only interest in amateur radio as he was very involved with early LF experiments especially on 73kHz, and also laser communications which preceded the currently LED based nanowaves, and Derek and the Crawley club hosted the first ever lightwave round table some years back.

The Crawley microwave round tables initially were so well attended that it was necessary to have the talks in the adjacent photographic club hut as more space was available there. Over the years the round tables have continued and Derek has played a part in every one until recently when his disability and declining heath put paid to active participation.

Microwaves has lost a real gentleman, who always had time to chat to the experienced and beginners alike and he was a very important cog in the round table program for many years.

From Sam G4DDK

I am very, very, sorry to hear of the passing of Derek. A fine gentleman and someone who was involved in amateur microwave activities for many years.

I enjoyed meeting and talking to Derek at the Crawley Microwave Round Table meetings.

He will be missed.

Vale Derek

From Peter G3PHO

I'm extremely saddened to read this news about Derek, a fellow northerner, who I knew for many years both over the air and personally. Please pass along my sincere condolences to his family.

From Dave G4HUP

Very sad to hear this Chris. A great loss to the club there, and to microwaves in the area.

RIP Derek.

From Peter G3SMT

Very sad news indeed. Derek encouraged me to become a radio amateur in the early sixties and helped me along a rather steep learning curve - a most valuable experience. Please pass on my condolences.

From Murray G6JYB

That is indeed very sad. I used to get regular info from Derek about Crawley Roundtable as well as some other historical work we had an interest in.

From John G4BAO

Sorry to hear that, Chris. Lovely Guy. Please pass on my condolences to his family.

I'll give him a mench in the August Column. The news was a couple of days too late for July.

Many will be aware that in his later years, Derek had been confined to a wheel chair since his leg amputation after complications following a knee replacement but maybe not all will be aware of Derek's brilliant career in microwave engineering during the Cold War years and the contribution he made in the fields of Radar, radio communications and electronic aircraft landing systems.

There a full obituary in the CARC News Bulletin by Peter G4FYY, compiled with additional material from G3VJM, G3VLH & G3YSX, plus notes on CARC Early Days by Ken Franklin G3JKF.

BroadBand HamNet (BBHN)

Source: CARC June 2016 News Bulletin

On Sunday 22nd May, CARC hosted the first meeting of the Broadband HamNet Mesh Operators and those interested in this system of digital communications on the amateur microwave bands – 2.4 GHz and above. The event was arranged along similar lines to the Microwave Roundtable that we host in September, with **Dick, G0RXZ** as usual providing excellent support with the catering.

*From the days events, led by Ted Jewell G4ELM and others, Club Secretary **Phil, M0TZZ** provides the following synopsis:*

Broadband HamNet is a wireless mesh of routers using a part of the 2.4GHz band which is shared by normal household wi-fi and Amateur allocations. Very cheap to get going, a Netgear router (£10-£15 on eBay) of a certain model is all you need to get started, then some modified firmware from BBHN website. Not all routers can have the custom software flashed to them – website has a list of suitable models. Mesh extends around the world but disappointingly little or no contact between nodes is by RF – mainly IP traffic. Good demonstrations of IP camera and of cheap to buy IP phones forming a PBX system between suitably equipped nodes which can be managed on a RaspberryPi or similar. Since good amplifiers are not readily available, gain is mainly acquired from directional antennas which are easy to make (due to the size) but the range may still only be 2km since the routers run only <100mW.

To find out more, go to: www.broadband-hamnet.org and select the 'Just Starting' link on the home page.

Low level AS tests on 10GHz

John Fell G0API

It is not too often these days that I have a proverbial Eureka moment .... but on 23 May 2016 I was able to prove that low level 10GHz Aircraft reflected signal enhancement was workable.

This story started 2 weeks ago during rain scatter (RS) tests with Adrian G4UVZ , who lives approx 70 km away over a well obstructed path .Like me Adrian has run u-wave beacons for many years and we have both "officially" retired /started being paid for doing nothing .

We decided to build/re-build 10GHz /P systems using 21st Century kit and this was a test of a 60cm Sat offset dish and Skobelev feed inside the shack at G4UVZ , using 2W of RF .Signals were solid enough for ssb and we were using Skype in Shared screens mode , so live video/audio feedback- ideal for double optimisation.

During the test I saw several seconds of what looked like a Doppler shifted carrier appear - I have been active on 10GHz since the early days of narrowband and the "possible" instances of AS could be counted on the index finger of one hand .I was not convinced but stored this observation away ....

Fast forward 2 weeks and I noticed that GB3KBQ , run by G4UVZ , was missing - a site visit revealed no obvious fault , but no RF , so a return to base with the beacon TX followed .On application of power in his shack G4UVZ found all was well , so he called me on Skype and suggested he couple the 1W TX into his 60cm dish for a test /thermal cycle .

Using my normal 60cm offset and Octagon LNB , in its unlocked state , I could see RF and with the help of on-screen feedback Adrian peaked the dish .His QTH is behind part of the Blackdown Hills in Somerset so has to add a degree or 2 of Elevation to overcome the wooded slopes .

I found that I needed a similar amount of Elevation , compared to the normal value when monitoring my local Beacon GB3SCX or GB3KBQ .

During this period I stored the image showing the rapid movements around the carrier trace and got VERY interested indeed!

As at that point I was not frequency locked , I rapidly deployed my local 10368.000 MHz reference , generated by a synth at 1296MHz via a 3 - section WG filter(G3JVL) and 20dB horn and locked the LNB output using a G4JNT 618MHz /144MHz downconverter and LoTracking software ; in my haste I set it approx 5kHz off from true but for this test it did not matter as frequency stability was the important aspect.

So now I was peaked for maximum signal and holding frequency to within a few Hz (images show 28MHz as I use a 144/28MHz Meon TVTR as the downconverter into an SDR-IQ).

The waterfall now showed a steady signal at approx 20dB above noise floor in a 6Hz bandwidth and 5kHz span.Just then Adrian said "I can hear a plane " and looked out of his shack window .Almost overhead a large high tailed twin engined transport passed him by heading NNE .I was watching intently with nothing out of the ordinary showing , when up popped the screen grab showing the very definite , almost straight line Doppler trace .At peak the shifted signal was well over 10dB stronger (it was off the top of the screen) .Note the duration on the embedded time stamps of the waterfall - plenty of scope for signal exchanges.

The captions on the screen plot indicate the distance from the TX to the reflector , putting it approx 65km from G0API .We are certain that that was AS and from a low altitude vehicle.

I postulate that the slight Elevations used probably made a difference to signal enhancements and the aircraft was probably within a common volume roughly on bore sight between us .

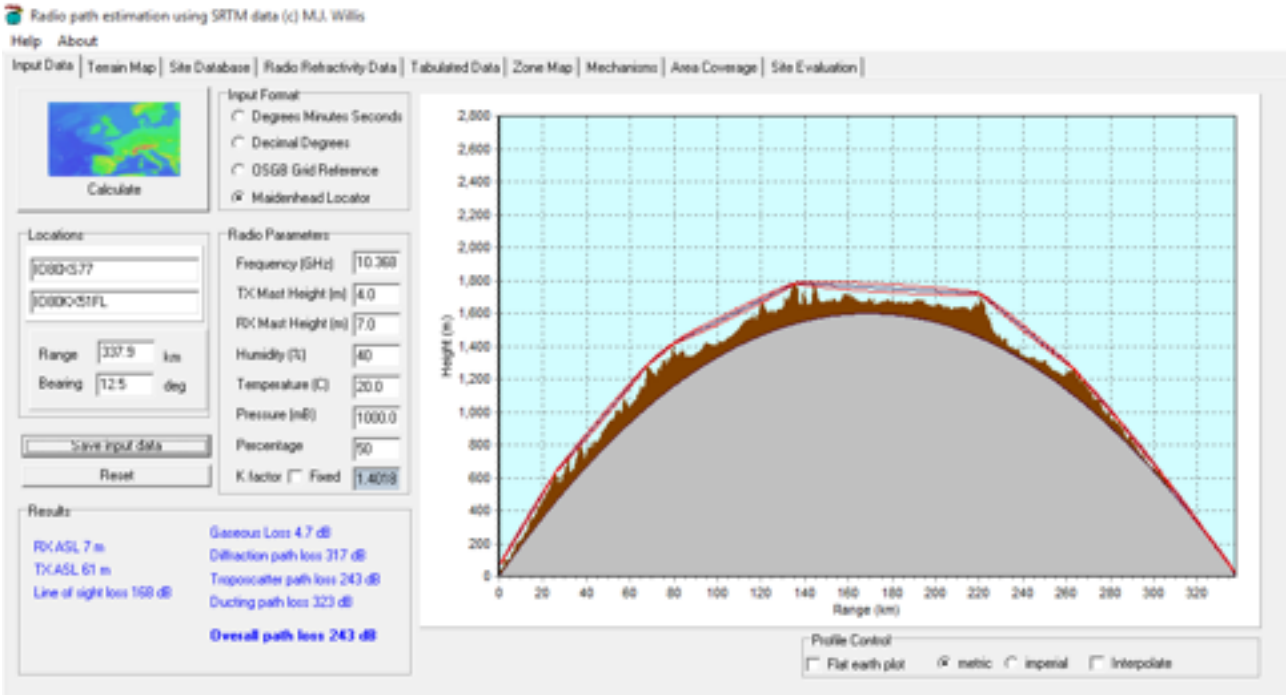
So I have sat here for the last few hours now and have seen several instances of similar AS - looking at Flight radar24.com indicates several possible reflectors passing close to G4UVZ , with varying degrees of enhancement and or AS .The curious curved images could be due to local helicopter activties as G4UVZ is near to Yeovilton Fleet Air Arm base and Westland Helicopters at Yeovil ? Flight activities tend to peak in early pm and now in early evening the AS has nearly dried up.

The following morning saw a reduction of the peak signal , due to WX conditions but several more AS observations from the curly Helicopter to the more classic secondary straight line Doppler .

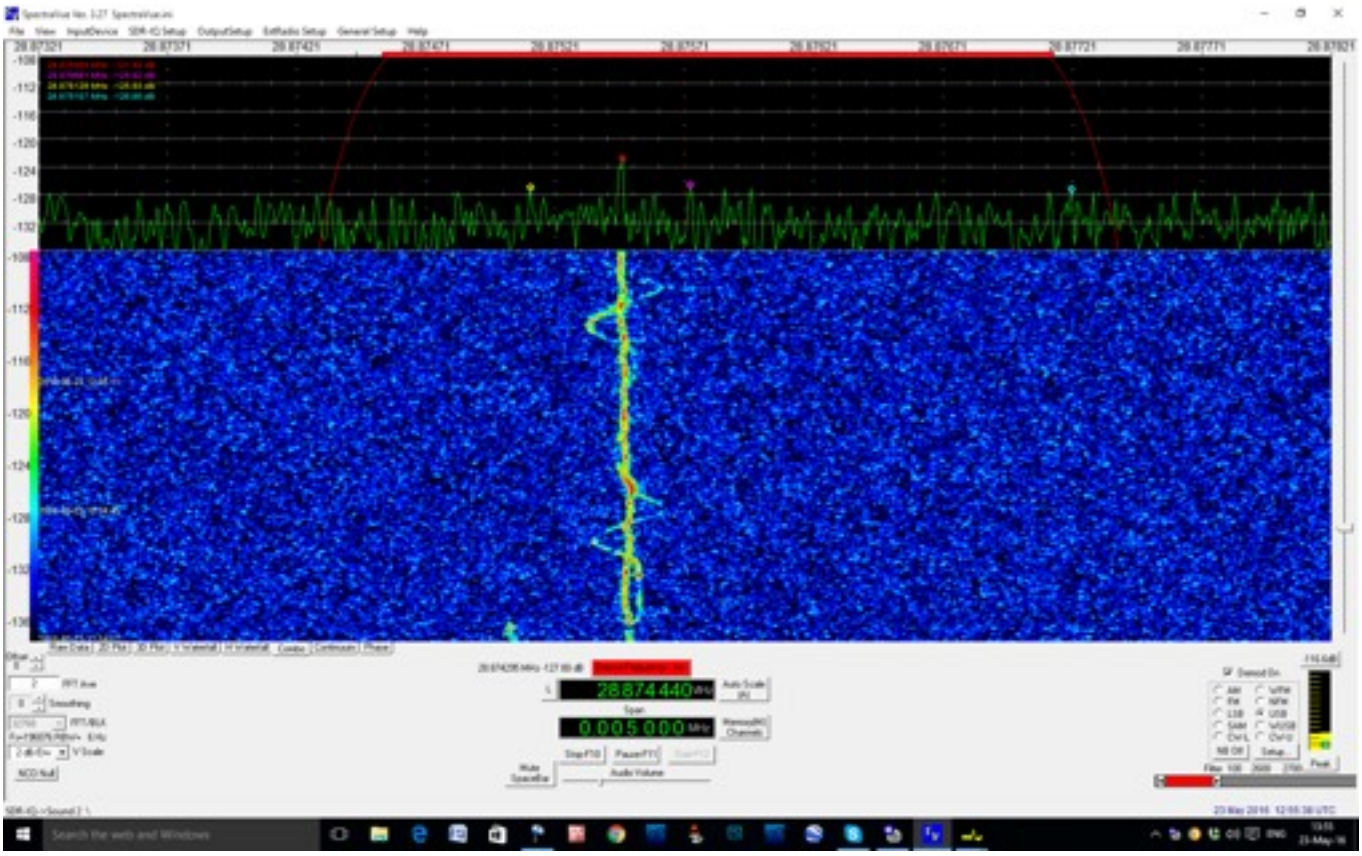
So , why not choose a 10GHz sked partner over a defined shortish pre- set path with low level aircraft activity and see if this happens for you - I live under the main East /West corridor for Heathrow/Gatwick and often see

high altitude AS on 1.3GHz /144MHz etc using fixed elevation long Yagis, but some of these 10GHz images look even more interesting .

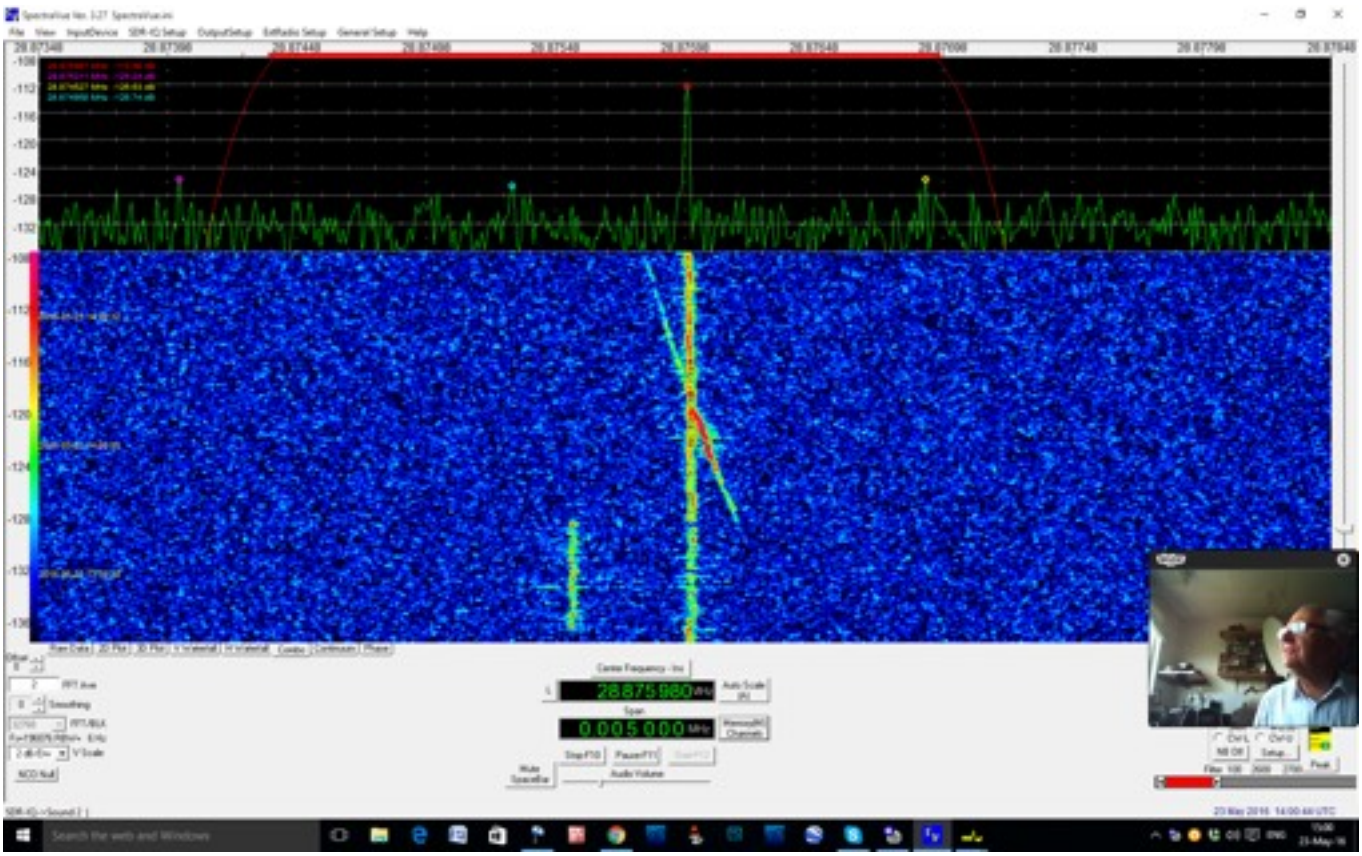
My only other 10GHz AS "could " have been from GB3PKT which popped up one day whilst beaming directly towards it - perhaps a descending aircraft near London ?



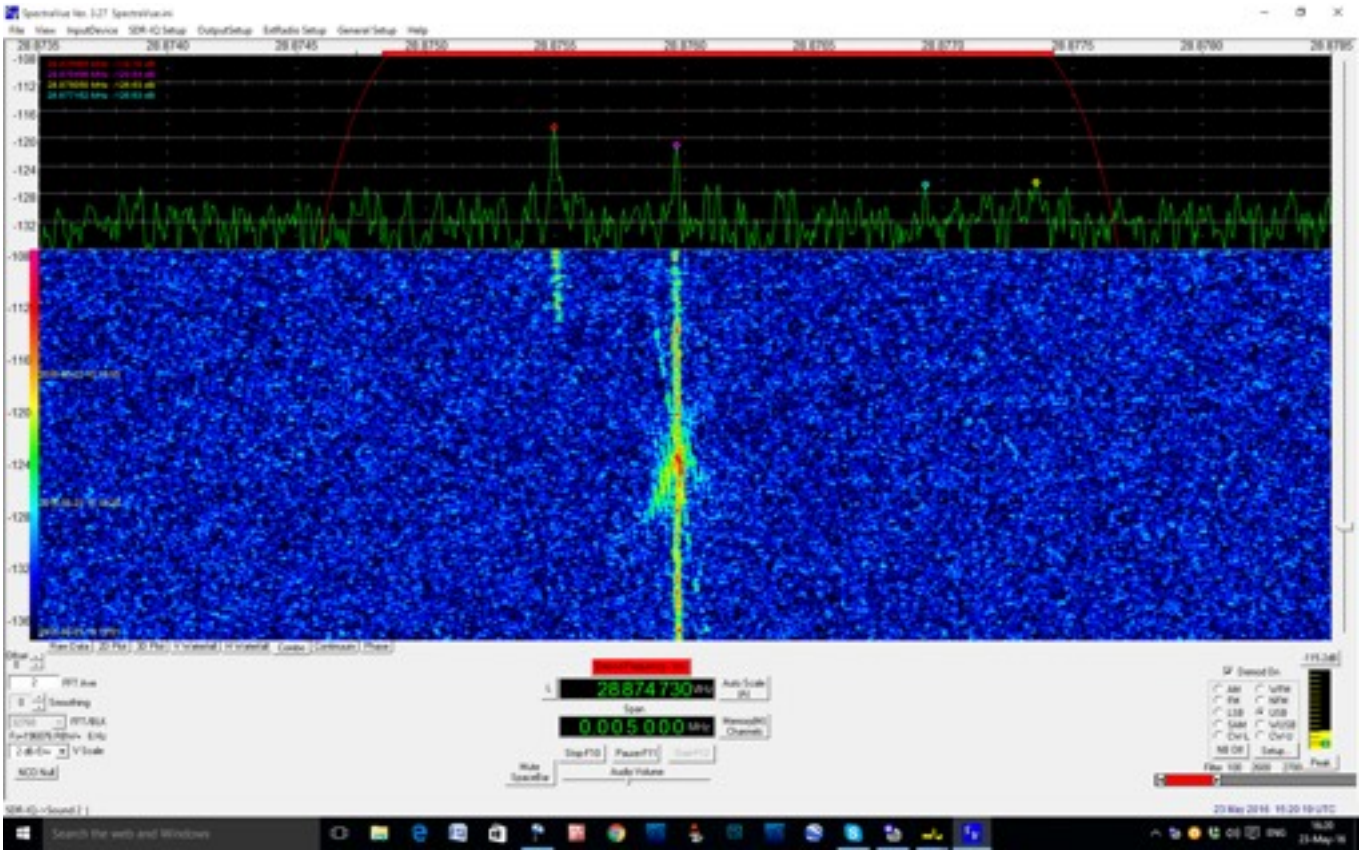
The path profile is far from LOS….



G4UVZ test /KBQ - are these low level Helicopters near G4UVZ ?



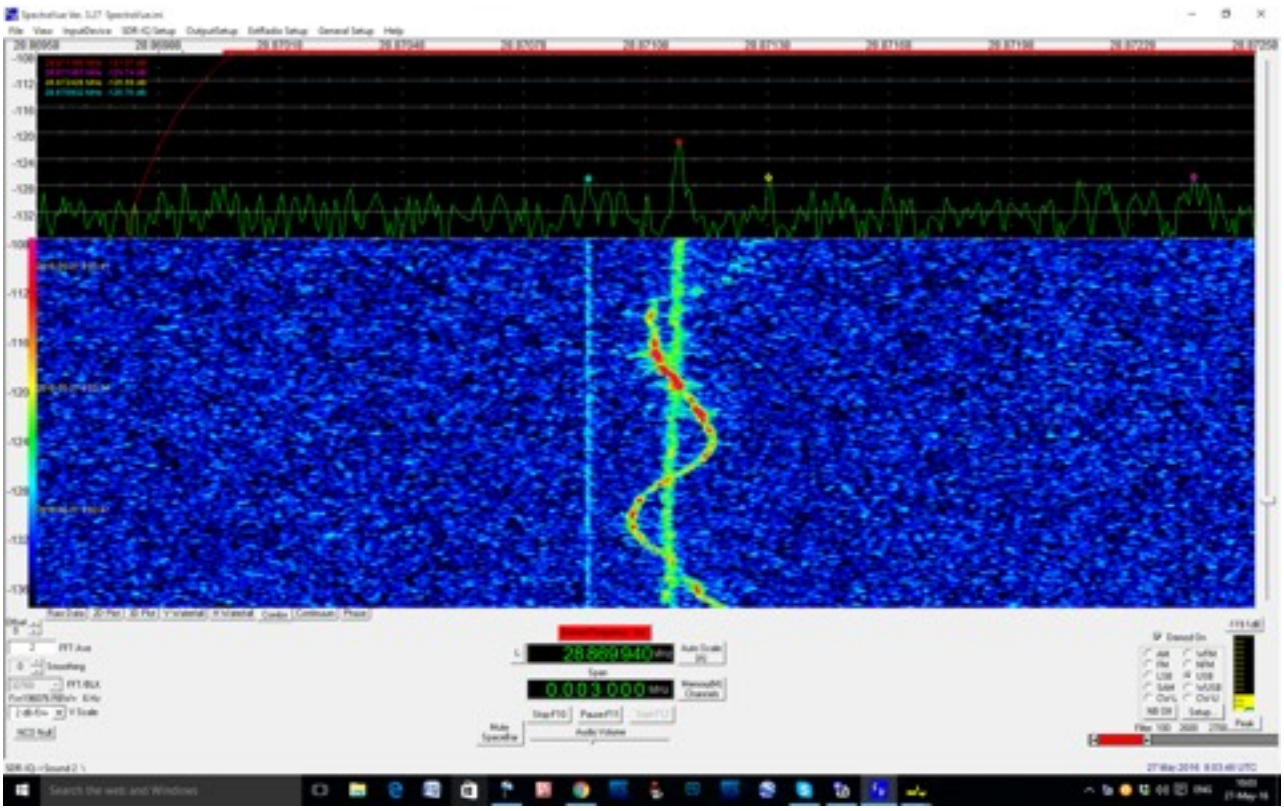
G4UVZ on 10GHz sending afsk -AS showing - aircraft at 4000ft travelling at approx. 120 knots heading NNE , approx 3.5km to East of G4UVZ .Possibly an Airbus A304 transport , wide body high tail and has been seen on test flights over Southern parts recently holding a steady course .G4UVZ inset with the 60cm dish in use behind him.



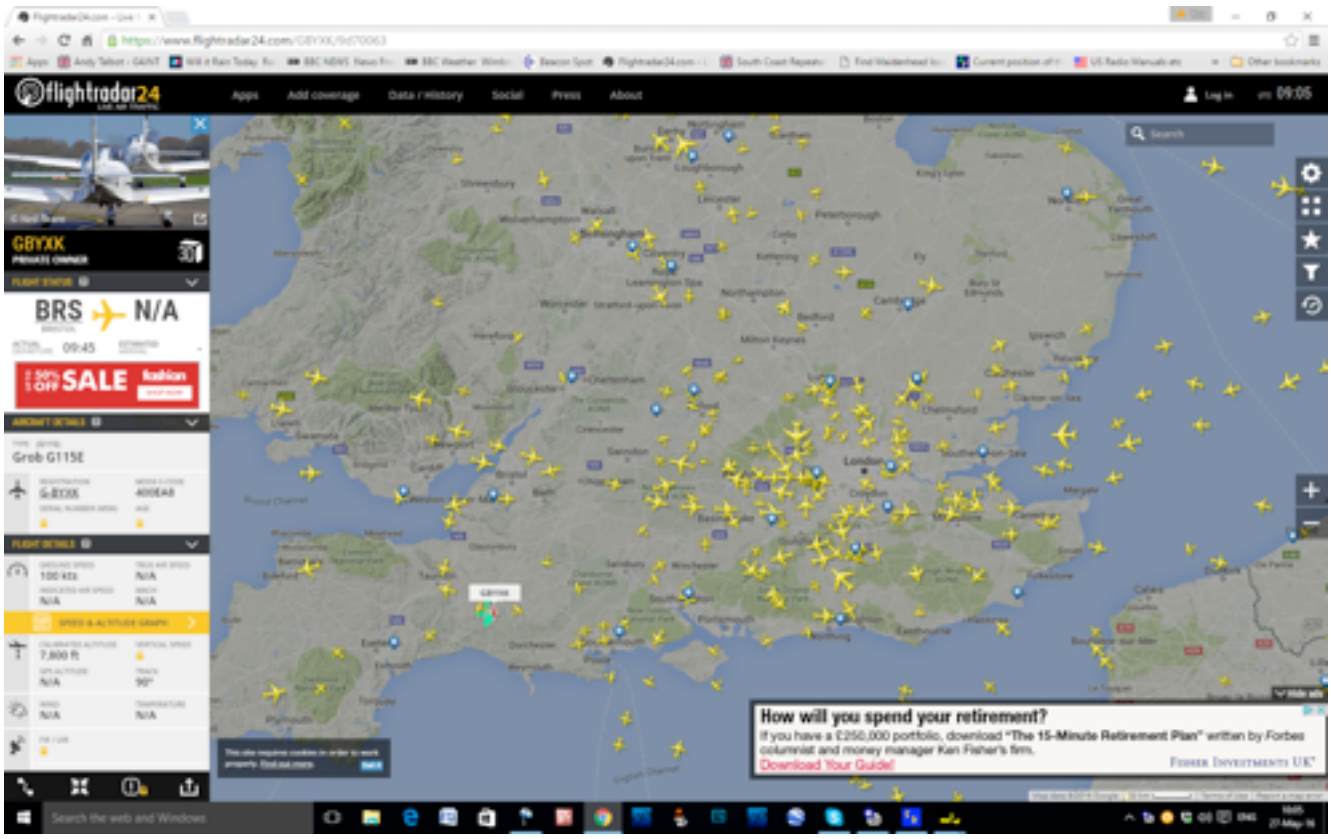
AS from G4UVZ, Flight Radar showing twin-engined jet heading SSW over Yeovil, nearer mid path and at normal height

The images below are from Day 5 of this test and I can now see a positive relationship between low flying reflectors and the Bi-Static radar images seen on 10GHz RX. Many , many reflected /forward scattered Doppler images recorded every day of test.

The enhancement from a small single engine aircraft, 50km from me, doing figure eights over Yeovil is very good and would support plenty of communication.



The enhancement from a small single engine aircraft 50km from me, doing figure eights over Yeovil, is very good and would support plenty of communication .



This month I ‘ave mostly been building…

A column (idea borrowed from the SBMS Newsletter and with a hat tip to Mark Williams’ character Jesse of the Fast Show) designed for those of you who don’t want to write a full technical article – but also those of you who do but only have a snippet to contribute such as a new project or a progress report.

From John Fell G0API

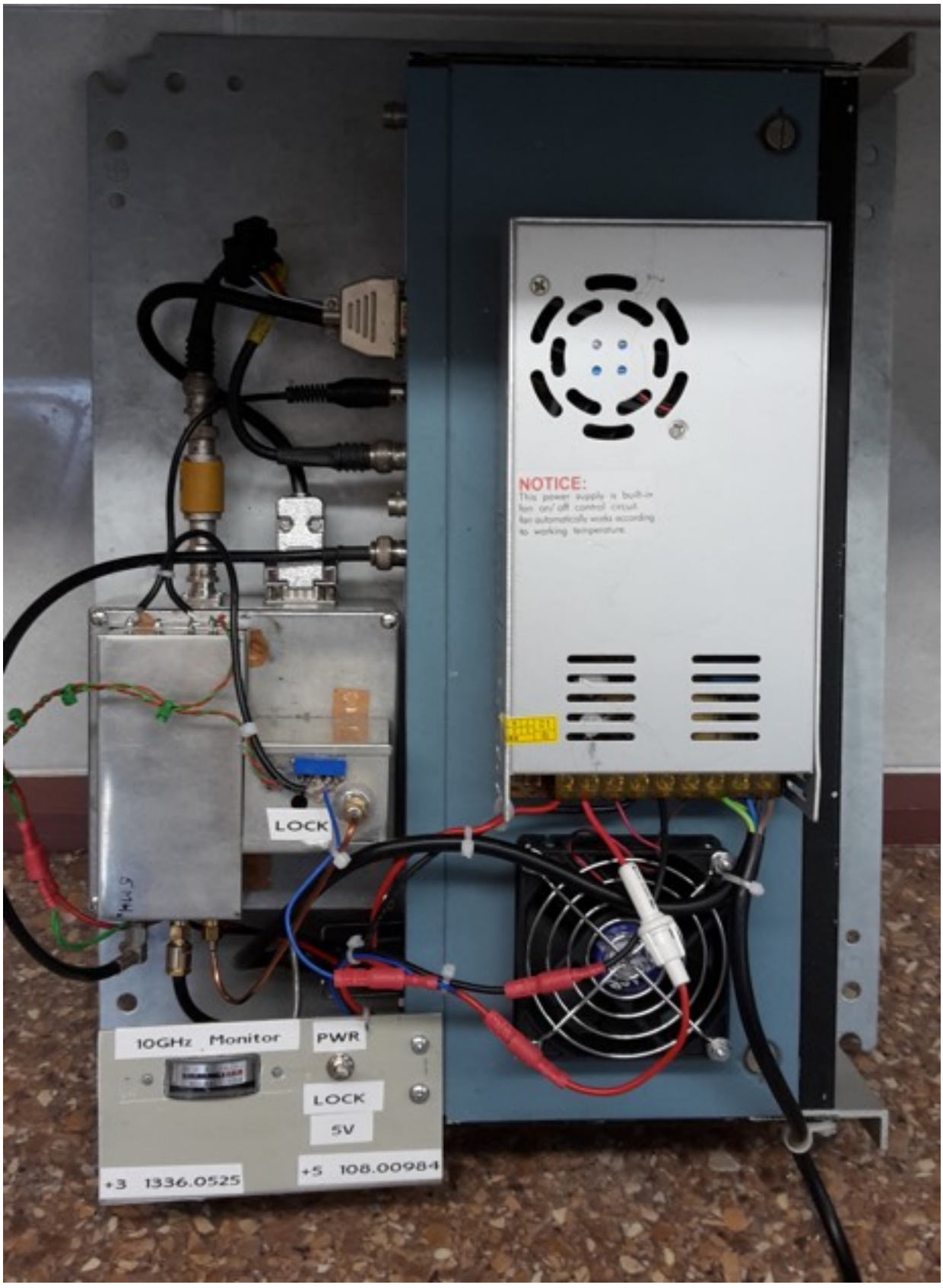
I have been setting up a new 23cm system ,based on the S G Labs built transverter that sells for £129 inc. delivery and a free HB9CV. It works very well in all respects, 2W+ RF out , low noise synth LO and the new version 2.5 includes selectable 10MHz ref input so, linked to a Leo Bodnar GPS module, is spot on frequency. Internal links allow several PTT options and it even has onboard VSWR monitoring (Forward and Reflected). A bargain!

Also have been testing low altitude 10GHz aircraft scattering [*See page 7, Ed.*] and building a new AZ/EL mount for 10GHz backyard EME reception.

From John Worsnop G4BAO

Rebuilding the GB3PKT 10GHz Clacton beacon and adding a 24GHz module and antenna. The 24GHz application is with Ofcom, so lets hope that, as 24GHz is an exclusive allocation, the licensing goes through quickly. Thanks to G0MBA, G4DDK, G3WDG, G8CUB and the UKUG for providing support and parts for the new 24GHz unit.

Outdoor unit



Indoor unit

STOP PRESS

GB3PKT on 24 GHz was approved by Ofcom in less than a week. (remarkable - but certainly facilitated by it being a Primary band!)

Murray

2016 Finningley µWave Roundtable

Saturday 9 and Sunday 10 July 2016

- FRT 16 to feature talks and demos on the millimetric bands – 24GHz upwards
- FRT 15 had a full Lecture programme of talks, **the 2016 agenda TBA soon** -23/4/16
- A test lab: noise figure measurement
- Power measurement & swept measurement
- UK microwave group Chipbank
- Flea market in building 2

Register at www.g0ghk.com/events/round-table/

BATC 2016 Convention for Amateur TV (CAT 16)

The BATC has run a number of highly successful rallies and conventions known as CAT (Convention for Amateur Television) at locations around the UK.

The 2016 Convention for Amateur TV will be held at the **RAF Museum Cosford** on **24 and 25 September** 2016.

The Events will start at around 1:00 pm on the Saturday, and conclude with the Biennial General Meeting early afternoon on the Sunday. Attendees will be free to wander around the Museum at no extra charge; we hope to arrange some guided tours. Arrangements are also being made for an informal dinner at a Hotel in Telford on the Saturday evening.

Latest news and discussion about the Convention can be found on the **BATC Forum**.

Previous events have been recorded and are available online:

- The recording from the 2015 and previous years conventions are now available on the BATC Online Youtube channel - **Click here for more details.**
- Some rare black and white footage from **CAT70** is available here.

Some Tests with Direct Baseband I/Q drive of a 10GHz Subharmonic Mixer

Andy Talbot G4JNT

I have long been a fan of direct up-conversion using quadrature baseband drive of mixers for image cancellation. This reduces the need for filtering of image responses and, when true baseband drive is employed, there is no need for image filtering as the spectrum of the unwanted sideband falls on top of itself. When used for generating SSB voice, this folded spectrum up-conversion technique is usually referred to as the 'Third Method' More on I/Q mixing in general and the third method can be found at [1] and [2]

Several microwave mixer designs are around that use a pair of mixers fed with 0/90° IF signals and a quadrature hybrid on the RF side to give the corresponding RF quadrature shift. (The LO is fed in-phase to each mixer). One such up-converter is the Alcatel 'White Box' modules used on 24GHz, and I reported some quickie tests made driving those mixers with quadrature signals at [3] and [4]. However that test was just a qualitative one and not terribly scientific as I have no decent 24GHz test equipment. But it did prove the idea worked and successfully generated JT4G modulation at 24GHz. So, where could I lay my hands on a similar type of I/Q up-converter mixer for the lower bands ?

Enter the UDC10368

A few years ago Chris Bartram GW4DGU produced his 10GHz bidirectional converter design that used a subharmonic mixer in image-cancelling mode with a 144MHz IF. I approached Chris who kindly supplied one of his early test-bench models for me to play with.

The unit very conveniently included an LTC6946 synthesizer and associated PIC controller so it was a straightforward matter to replace the code in the PIC with a version of my own LTC6946 control code [5] that allows the synthesizer to be controlled via a serial (RS232 type) interface. The PIC code had to be slightly modified as Chris used a different set of interconnections between the PIC and the synth chip, and he used the 12F675 processor whereas I'd used the 12F629. (The difference amounted to a mere four lines of PIC code).

By suitable choice of R and N values in the integer-N PLL, a few frequencies could be generated , using a 10MHz reference input, that lay within the narrowband segment of 10GHz band.

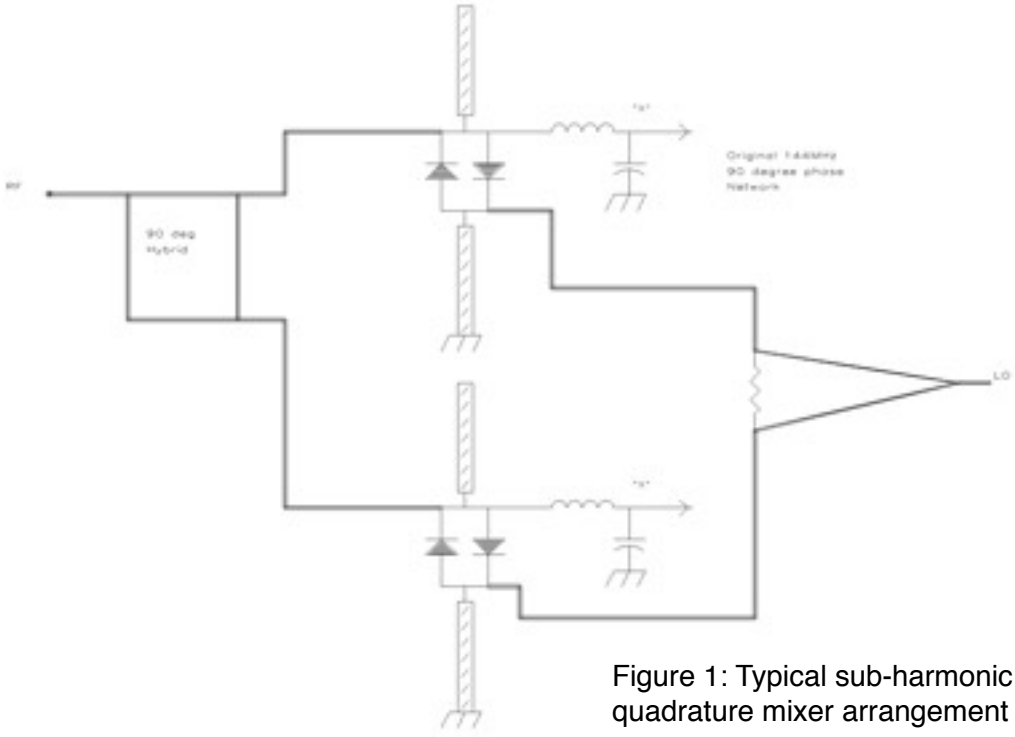


Figure 1: Typical sub-harmonic quadrature mixer arrangement

Driving the Mixer

The original circuitry around the two quadrature mixers is shown in Figure 1 and it is fortuitous that a direct DC connection can be made at the points marked 'X' without having to break any existing connections, remove any components , or even add extra decoupling.

Some previous work with a Double Balanced Mixer as a controlled attenuator [6] suggested that driving diodes from a voltage source in series with a 50Ω resistance gives a remarkably linear relationship up to with

up to about 1 to 2V peak. Somewhat inconveniently, drive has to go positive and negative so any drive circuitry calls for a negative rail.

Few opamps are happy driving 50Ω loads, but, since the drive requirement is only 1-2V peak, the 50Ω drive source can conveniently be made using a Thévenin equivalent source with a potential divider where the two resistors in parallel give the 50Ω source resistance, and the input voltage drive is increased appropriately. That way the opamp need only drive a resistance of a couple of hundred Ohms – and many types can manage that.

The diode mixer interface circuit of Figure 2 was put together to allow testing to be made using I/Q drive signals from a low frequency PIC based quadrature DDS source. An LMC7660 charge pump negative voltage converter supplies the negative rail for the opamps. An 8V regulator keeps voltages under control and provides a fixed reference. The preset resistor VR1 allows any input offset to be cancelled out, so the 0 to 5V drive from the D/A converters on the DDS can be converted to a plus/minus mixer drive.

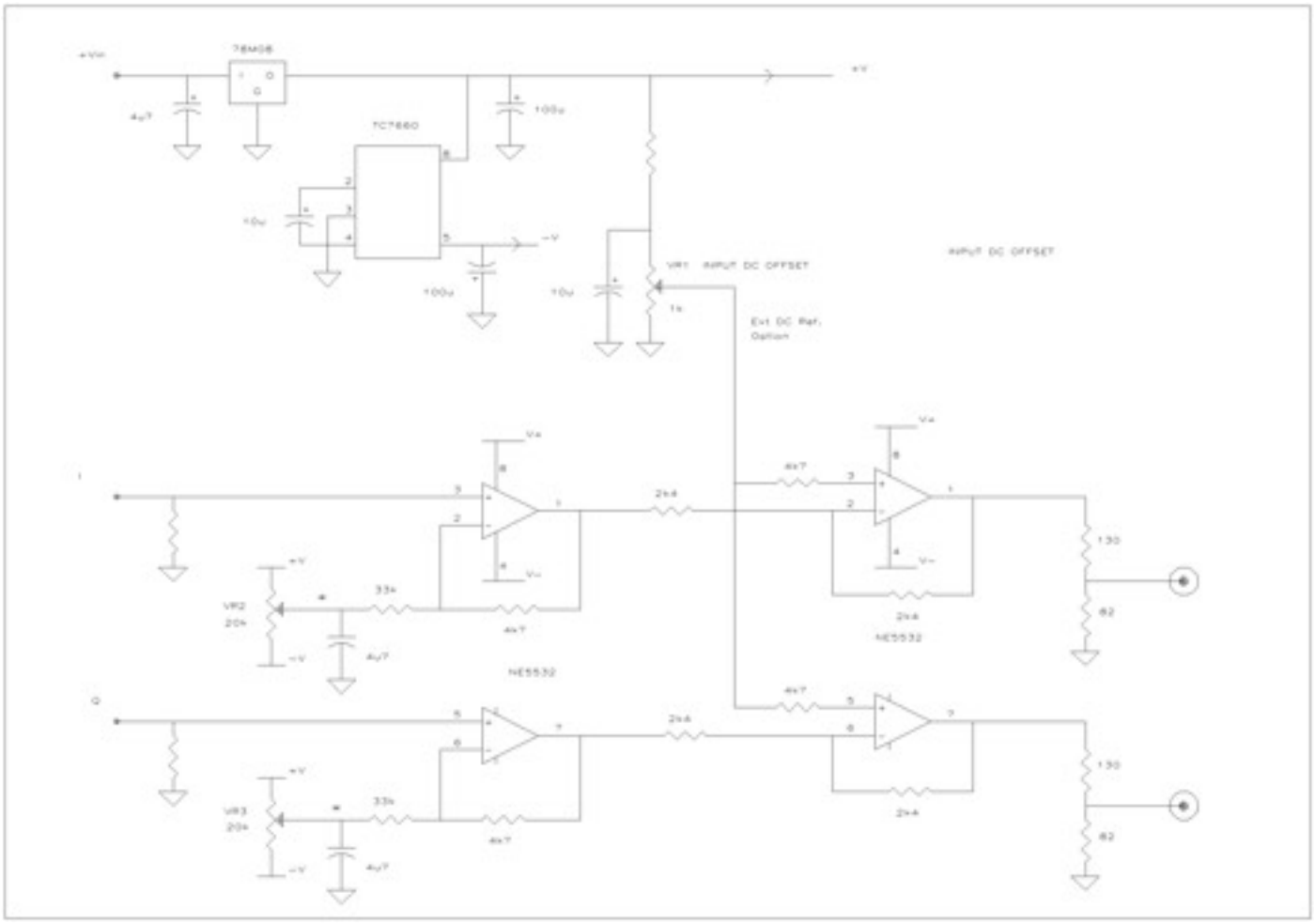


Figure 2: Mixer drive circuitry providing dual polarity drive to the diodes from a source impedance of 50Ω

First Tests

The 10GHz output from the UDC10368 was connected via a switchable attenuator to my shack based 10GHz transverter (an old set of WDG modules with RDDS LO locking). The output spectrum was displayed on an SDR-IQ so that all sidebands and close in spurii could be seen. The DDS delivered a 1kHz quadrature square wave to the interface circuitry, and I cheated somewhat by using separate pots on each channel to control the amplitude – I had no simple way of getting an accurately matched dual attenuator. Drive levels were monitored on a dual channel scope.

Initial results weren't very encouraging. Carrier leakage was quite high and it was only when approaching saturation that the wanted sideband was some 10dB above the residual carrier. Furthermore, although sideband rejection could be tweaked by using the two drive control pots, optimum rejection needed around 20% higher drive voltage on one diode pair than the other. However, a sideband rejection approaching 20dB could be achieved over a reasonable drive level range, so things could be promising...

Table 1 shows the results obtained, and Figures 3, 4, and 5 show the spectra for the three of these drive level settings shown highlighted.

Vdrive p-p	Main peak	Carrier Leakage	Sideband Suppr.	-3.F Suppr.	Drive Relative	O/P rel dB
via 50Ω	dB	dB			dB	
0.11	-52	-39	18		-23.3	-21.5
0.19	-47	-39	16		-18.5	-16.5
0.46	-39	-39	18		-10.8	-8.5
0.66	-35	-39	18		-7.7	-4.5
0.81	-34	-39	17	33	-5.9	-3.5
1.1	-33	-40	18	27	-3.3	-2.5
1.4	-31	-41	18	21	-1.2	-0.5
1.6	-30.5	-43	15	13	0.0	0
2.1	-31	-45	14	12	2.4	-0.5
1kHz Quadrature drive to mixers, Vsource + 50 ohm						

Table 1: Measurements at different drive levels

Figure 3: 110mV pk-pk mixer drive (via 50Ω)

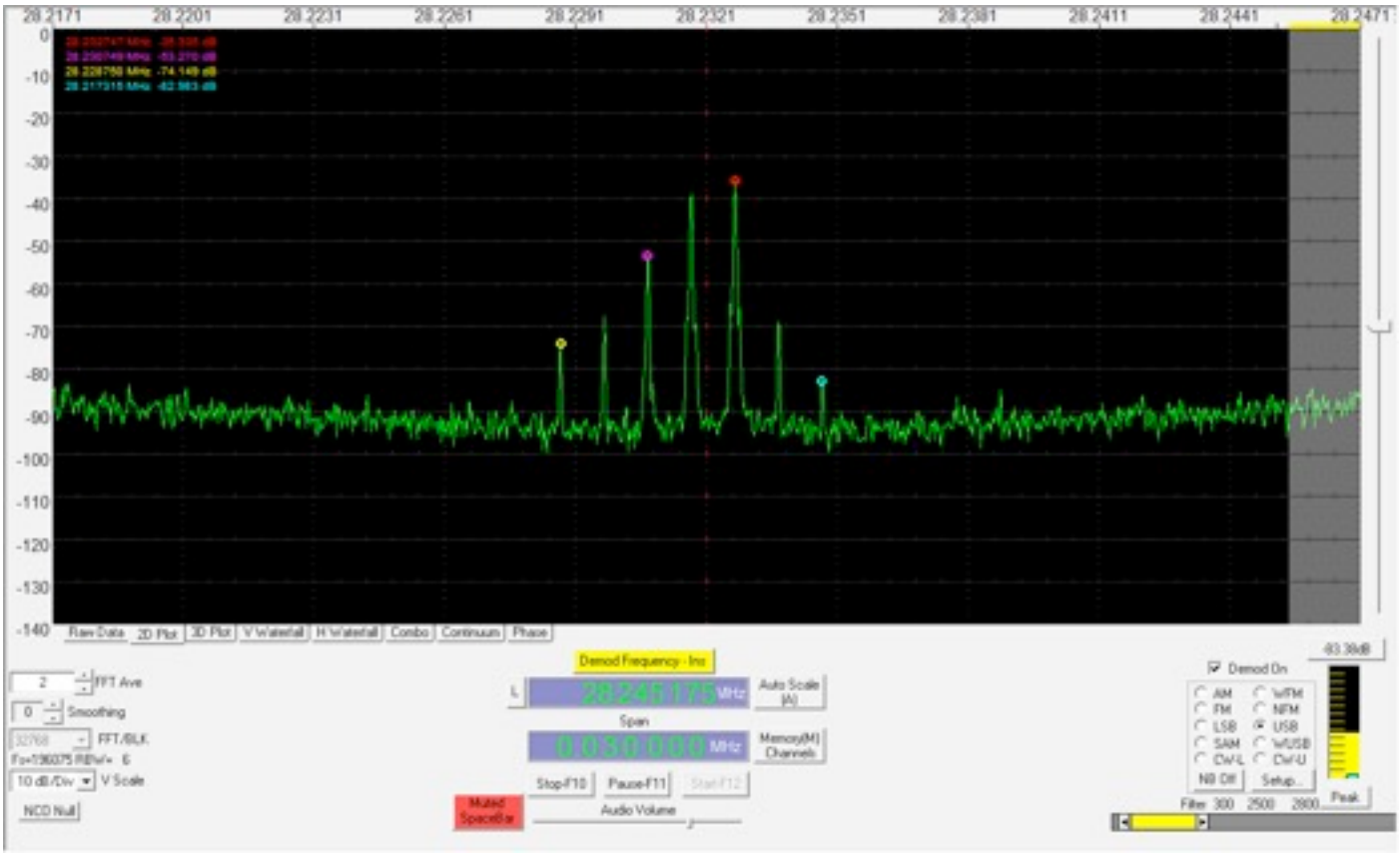


Figure 4: 660mV pk-pk mixer drive

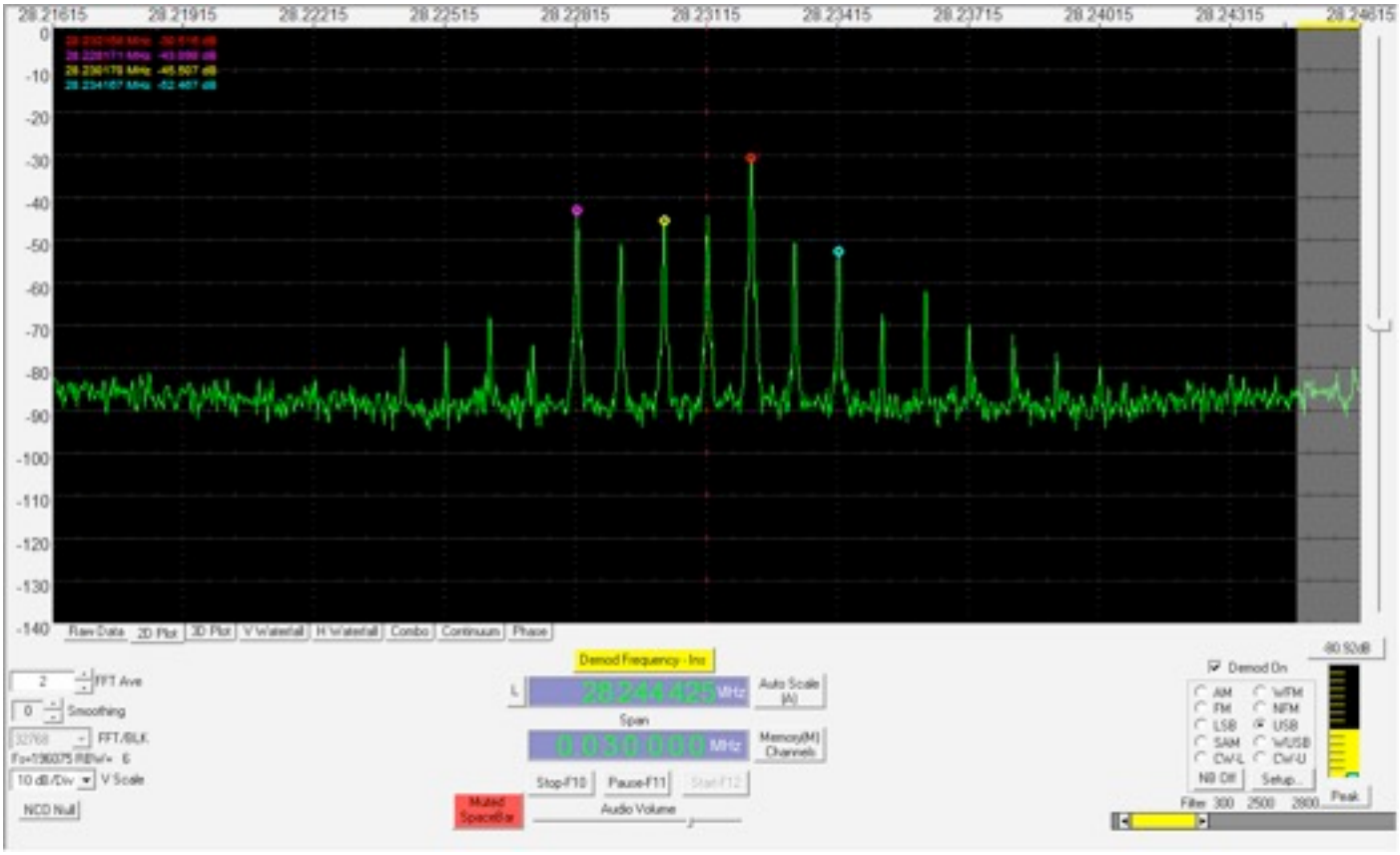


Figure 5: 1.6v pk-pk mixer drive

At the maximum drive, as saturation is approached, note the rapidly increasing spurious sideband at 3kHz below the carrier , labelled '-3.F supp' in the table. This is an artefact of I/Q up-conversion that comes about as follows: If there is a 90° phase shift at the drive frequency (1kHz here) then its third harmonic undergoes three times this, or 270° phase shift. This corresponds to -90° and as the phase is now swapped, the opposite sideband is generated 3kHz below the carrier. The fifth harmonic, 5 * 90° == 90° falls on the wanted side, the 7th on the opposite sideband, and so on. The level of this spurious 'minus third-order product' can usefully form a convenient indicator for optimising the drive level.

BUT.... the carrier leakage was more of a problem. When used for folded-over baseband drive, this leakage would fall in the middle of the final output spectrum and introduce an unwanted tone. For third method voice it would show as a very annoying screech at 1.6kHz; for data modes an unwanted tone in the middle of the waveform at a high level. Ideally this carrier leakage needs to be reduced to 15dBc or lower for MFSK data modes like JT4 or JT65, and -20dB or better to not be annoying for voice.

Carrier Nulling

After mentioning this issue to Chris in an Email, I went for along walk over the Downs to think (as one does!) , and it occurred to me that applying individual bias to each diode pair may improve things. On getting back and looking at email replies, Chris had suggested exactly the same thing, and by the timings of the emails, we had thought of it only some twenty minutes apart! Chris suggested a few mV or tens of mV might be needed based on some of his original development work.

The driver circuitry was modified by adding two more presets, VR2 and VR3 in Figure 2 along with the associated input resistors to inject a voltage into the summing junction of the input opamps that would result in up to plus/minus 200mV DC across each individual diode pair. With no audio drive, tweaking the two presets allowed a quite considerable reduction in carrier output to be seen; nearly 30dB reduction could be achieved. The Final optimum value ended up with an effective +80mV on one diode pair, and -11mV across the other (in both cases this is referred to input of the effective Thevenin 50Ω source resistance. The actual voltage measured with a scope or DVM at the output of the opamp, has to be divided by the potential divider ratio.

The improved carrier rejection was maintained with increasing drive levels at least until saturation and non linearity appeared, where the -3kHz product then increased in sympathy with the carrier leakage.

Figures 6 and 7 show the result at two drive levels of 230mV and 2V pk-pk. Again, optimum sideband rejection required a drive to one diode pair significantly greater, by about 20 – 30%, than the other, but fortunately the ratio for optimum cancellation appeared to be maintained over varying drive levels.

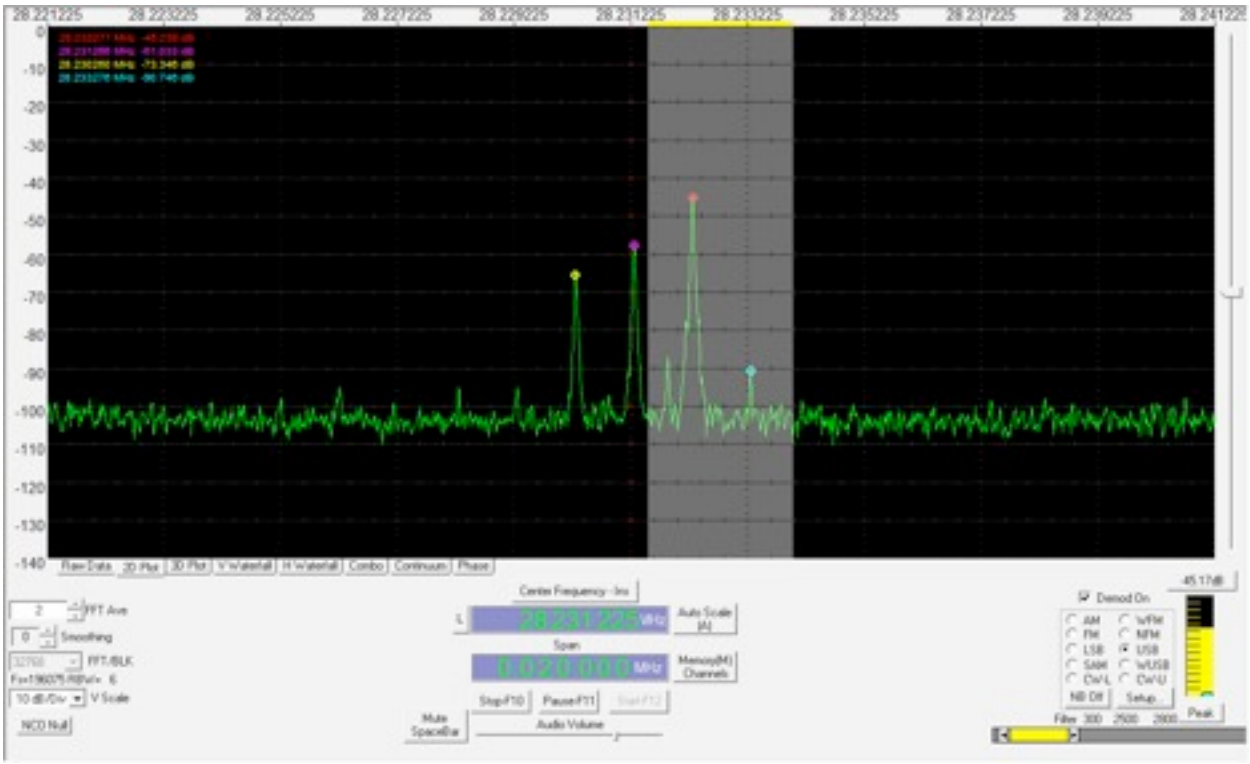


Fig 6: 230mV drive, diode bias trimmed

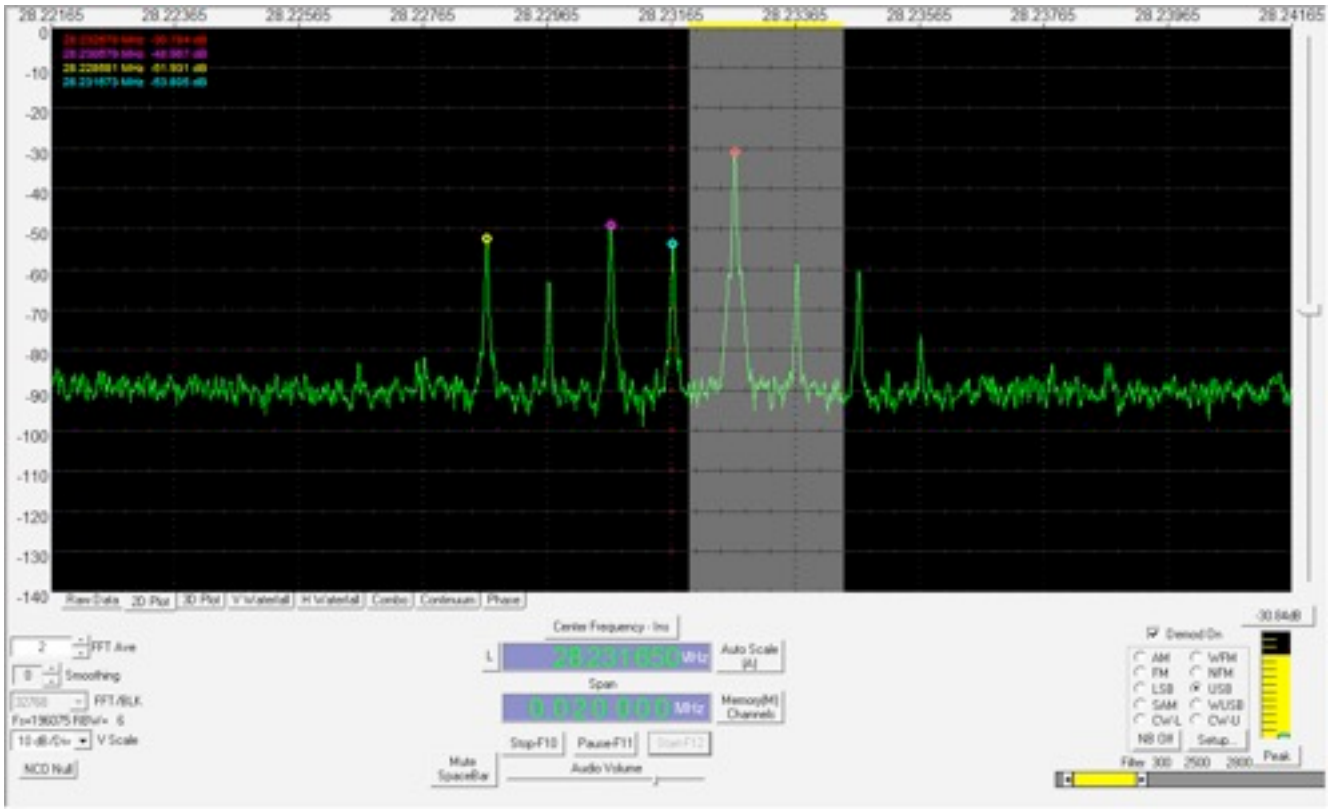


Fig 7: 2V drive, diode bias trimmed

Conclusions

Carrier rejection proved to be more of a problem than sideband cancellation. But so long as the DC offset bias can be adjusted for I/Q channels, and individual I/Q amplitude drive can be tweaked, a perfectly acceptable level of sideband rejection and carrier leakage appears to be possible using this simple mixer arrangement using off the shelf diodes. Although not tested, it is quite likely that if the diode pairs could be matched, for example by selecting those with very close DC drops (and this has to be done for all four diodes, in the two packs) an inherently better carrier rejection could be managed at zero bias.

The leakage and rejection values observed, once levels and bias were optimised, are more than adequate for transmitting any data mode. Third method SSB may be marred by a tone in the passband that would be noticeable on strong signals but in weak signal conditions would probably be undetected at -15 to -20dBc. Poor sideband rejection with third method SSB has generally been reported to be not too much of an issue, as it varies with the syllabic rate of the voice, and appears as a random sort of high pitched “twitter”.

Clearly there is further scope for development of this technique. Generating complex waveforms at baseband is straightforward these days using processors or DSP chips with D/A converters. The simple PIC DDS used for this test has scope for inputting data from another controller generating multi-frequency MFSK modes. In fact the original test on 24GHz did just that, generating JT4G by programming the PIC DDS as described in [4].. But direct upconversion also allows waveforms that have a linear amplitude component to be upconverted, allowing more complex modulation types such as PSK or OFDM waveforms.

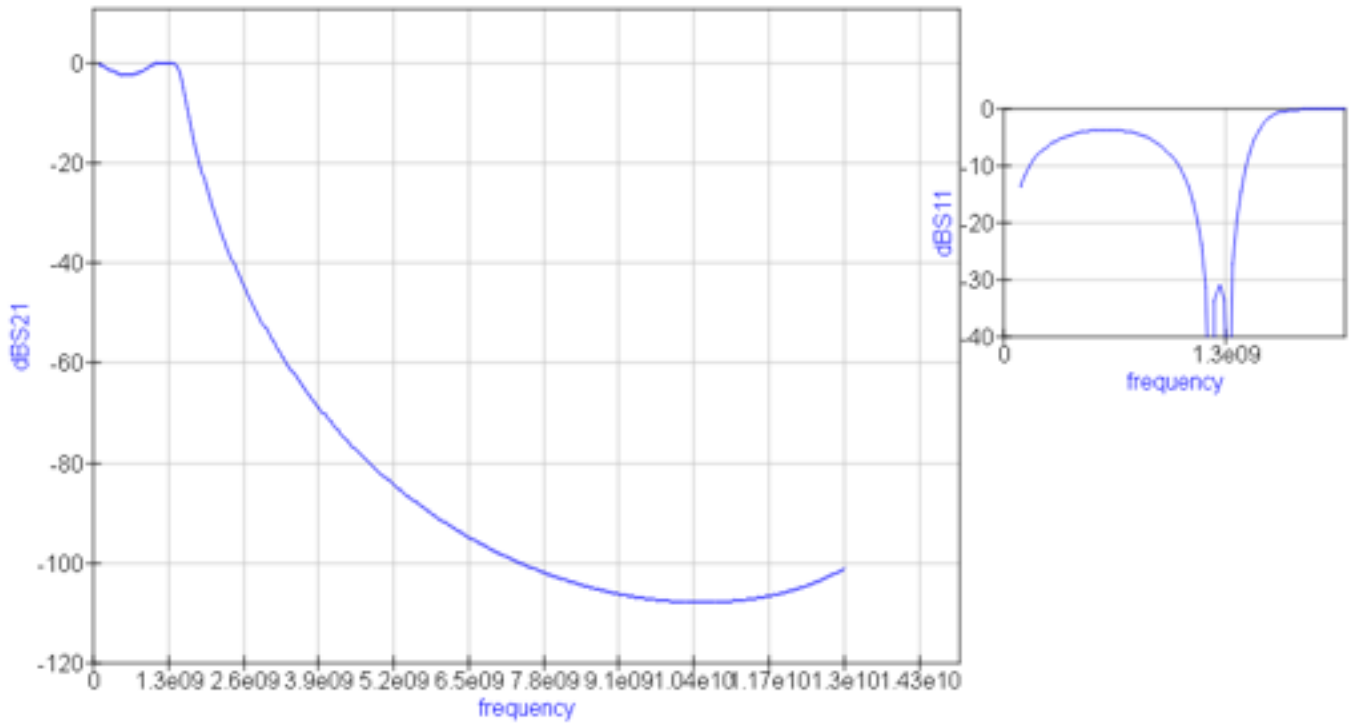
References

1. http://www.g4jnt.com/IQConverters.htm and http://www.g4jnt.com/ThirdMethodUpconverter.pdf
2. “*Third Method SSB*” , ‘Design Notes’, RadCom May 2016, page 68
3. “*Direct IQ upconversion with the Alcatel White Box Transmit Modules*” G4JNT, Scatterpoint, October 2015 page 12
4. *Quadrature DDS* and *Negative Frequencies*, ‘Data’ RadCom,June 2016 Page 81
5. http://www.g4jnt.com/LTC6946_Synth_Module.pdf Appendix A
6. “*Diode Ring Mixers at DC*” Design Notes, RadCom June 2014, page 72

Sixpenny Low Pass Filter (Part 3)

Ken Vickers G3YKI

Last month I gave a prediction of the results for a Mark 2 Low pass filter with an extended stopband... before it was made and measured.



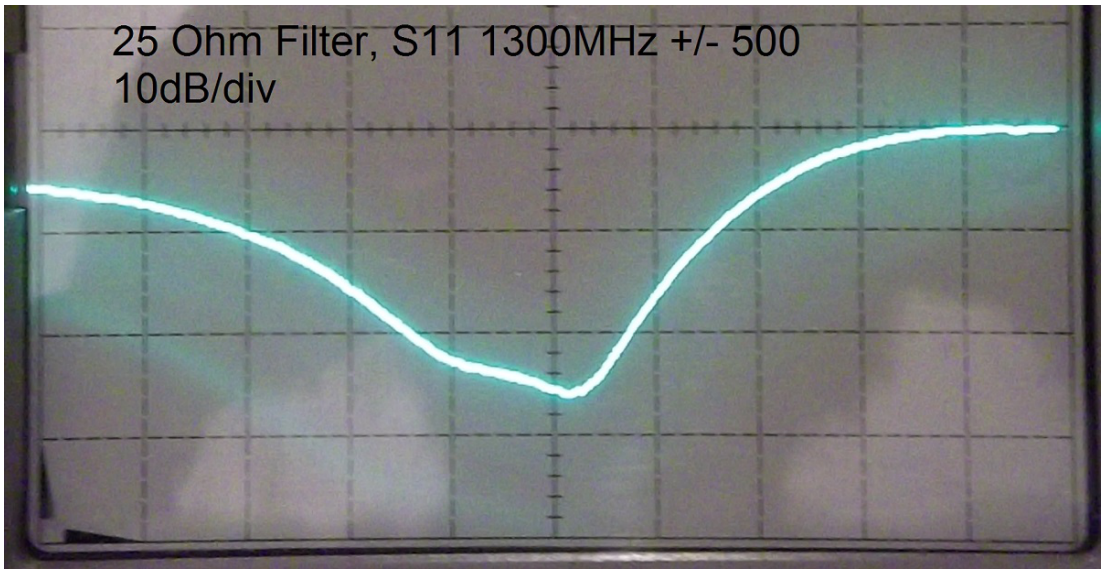
Measured results:

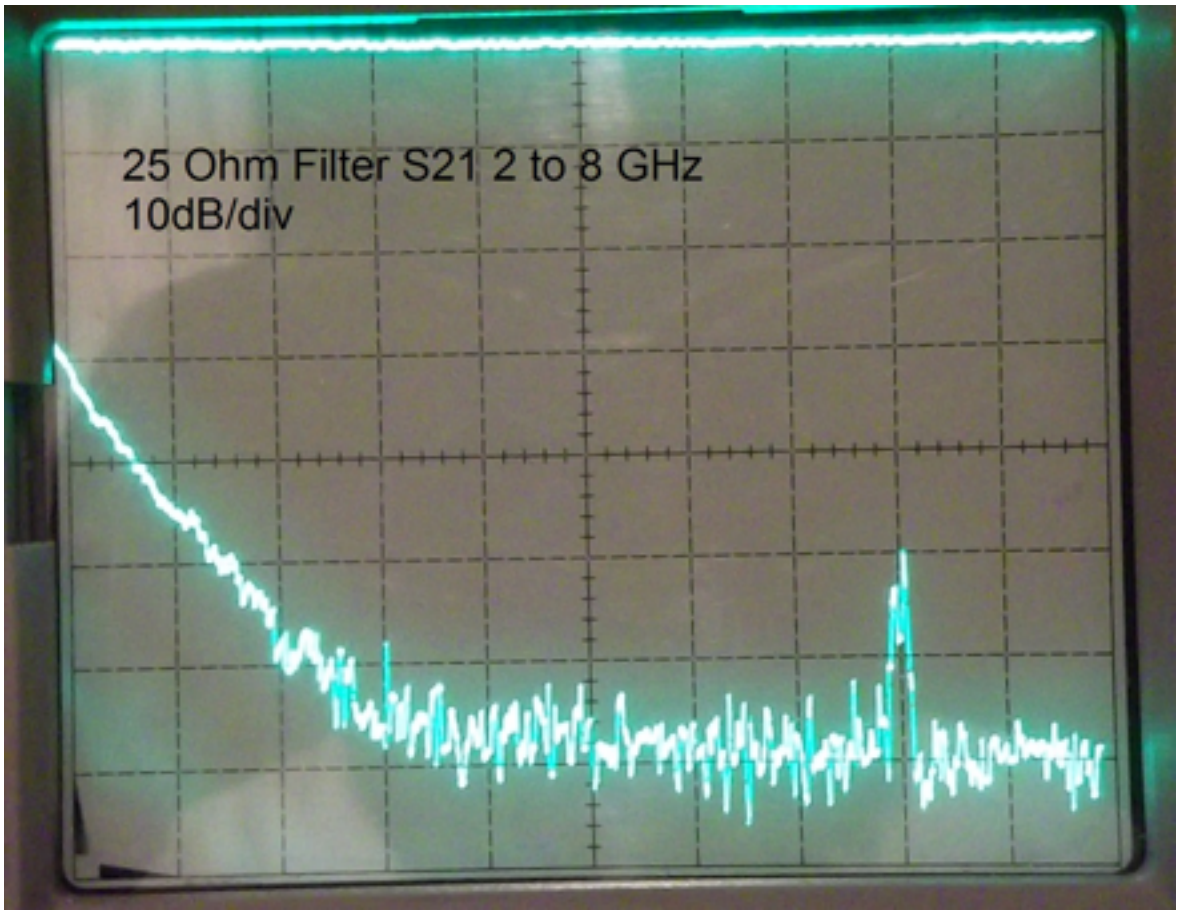
Attenuation of 45 dB at 2.6GHz and more than 65 dB from 3.9 to 11GHz is fairly well on the target. 65 dB is the limit of my measurement. There is a small (-50dB) response at 6.8GHz. I believe this is due to non-TEM mode resonance and would not be present had I managed to build the filter with perfect co-axial symmetry.

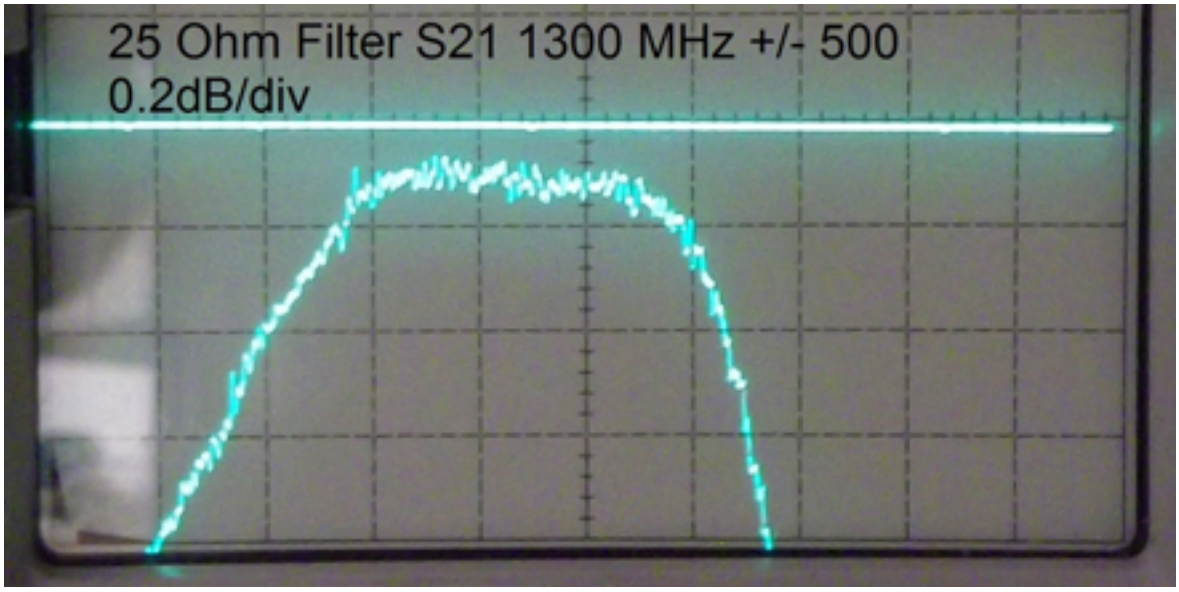
Return loss of 26dB at 1.3 GHz, and the double dip is clearly present.

At least you can be sure that I didn't tweak the model to match the measurements, as I am sure has been done many times!

Note: Although I labelled the plots "25 ohm filter" this was just a name reflecting the fact that the first stage of making it was to halve the impedances in the first filter. It does not mean anything else, and the filter is for a 50 ohm system and is measured in a 50 ohm system.



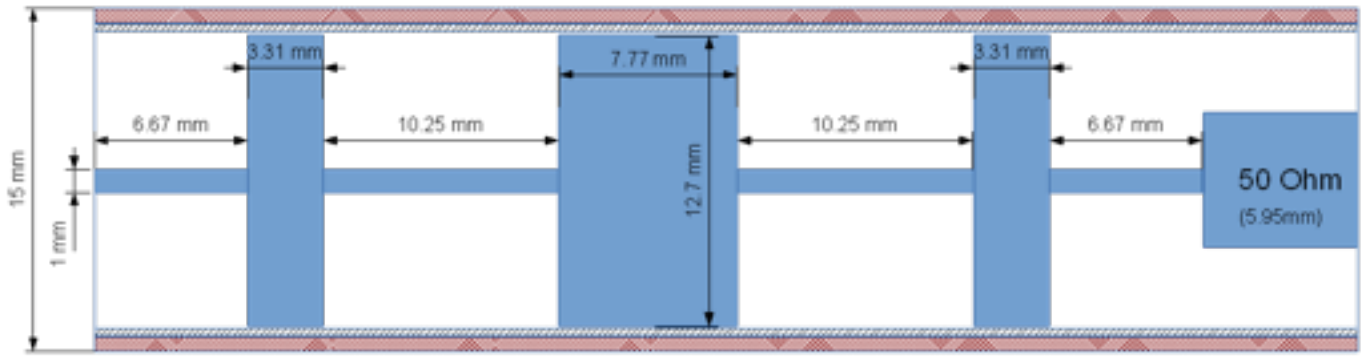

25 Ohm Filter S21 2 to 8 GHz
10dB/div


25 Ohm Filter S21 1300 MHz +/- 500
0.2dB/div

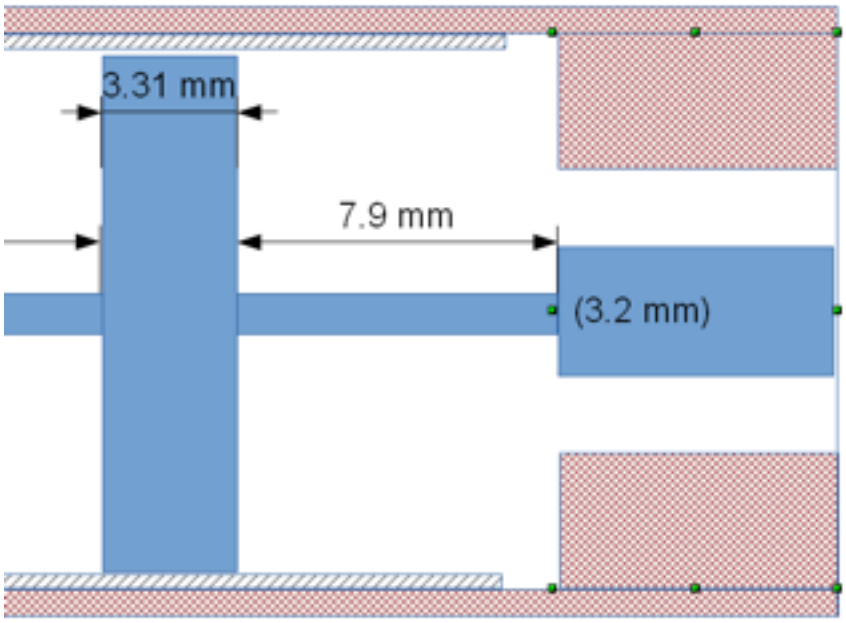
How it is made

This one was made in 15mm water pipe, 13.7mm I.D. Inner is a 1mm copper wire with 12.7mm diameter brass discs soldered on.

My first, incorrect, assumption was that I could make the inner 12.7 mm diameter and use 2 x 0.25mm thick PTFE sheet as the insulator. Of course it was impossible to assemble the soft PTFE with such a tight fit, and I suppose that water pipe is not a particularly close tolerance material anyway. The second version used the same inner diameter, but 3 layers of 0.11mm thick film to allow some clearance. (The PTFE film is available from Mike's Chip Bank) This change means recalculation of the dimensions and does change the length of the low impedance sections significantly. The final dimensions are as follows and lead to Zo of 157 ohms for the high impedance sections and 3.7 ohms for the low impedance sections with an effective dielectric constant of 1.54 for .33mm of PTFE in a 0.5mm gap[1].



The end sections (6.67mm) include an allowance (0.6mm) to compensate for the step in the inner to a 50 Ohm line. In my case the connectors I was using effectively stepped down the size of the outer as well to 7mm and the chart indicated that an additional 1.2mm is required to compensate the extra fringing capacitance at the step, making the end sections 7.9mm. Some minor adjustments here should improve the return loss if you think that is necessary.



I used connectors designed for inners to be soldered, but a crimp attachment to the cable outer. That part of the connector has a diameter of about 9.5mm. The male N was threaded 3/8" x 32 to go into a brass adapter to fit the 15mm pipe. The insulator remains fixed in it, but the pin is not captive in the insulator. The Female N was modified to fit the pipe directly and that released the insulator, however the contact locks into the insulator in this case, so needs to be attached to something before uniting the two. The overall result is that it is possible to dismantle the filter if the male connector is attached to the tube with some screws.

The filter has operated for a period at 250 watts PEP with no ill effects. I would expect it to work at 400W. It would be warm if operated continuously at that level, as would anything with N connectors!

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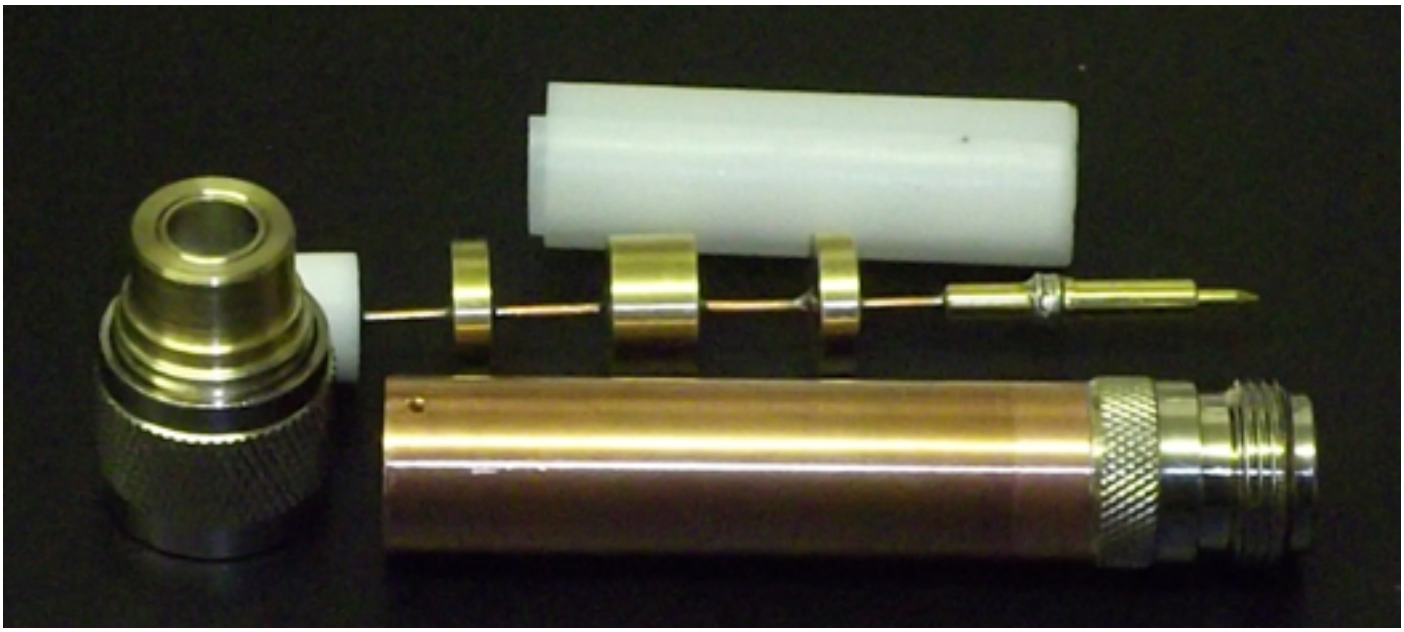
1 You cannot take the mean value of the the dielectric constants. It is like two capacitors in series. If you fill half of an air gap with dielectric Er=2 the effective Er is 1.33, not 1.5.



Another question

Do I need a low pass filter at the output of my valve amplifier? I have not tested any LDMOS amplifiers, but figures in the range from 20 dB upwards have been mentioned for harmonic suppression levels.

At the output of 2C39 amplifier running 10W PEP I measured second and third harmonics at -56dBc and fourth at -60dBc.

At the output of a TH328 running 200W PEP I measured harmonics at -51,-54 and -65dBc.

So while the first of these would meet the 43+10log(PEP) specification in EN 301 783, the second falls short of the required suppression, which would be 66dB

Incidentally, these amplifiers also provide significant suppression of the image frequency at 1296-(2 x 28) MHz, of between 25 and 30 dB in each stage. When the 2C39 is replaced by a solid state amplifier I will incorporate a new 4 pole bandpass filter in the system to maintain the image suppression and make it fit to use even without the PA.

UKµG YouTube videos

I have just uploaded a new 241 GHz video from John G8ACE to our Youtube channel and web page

http://www.microwavers.org/?241ghz.htm

Tx is on 241.02 GHz and it includes a nice test of double glazing attenuation!

Murray

Contest Results

John G3XDY, UKuG Contest Manager

April 2016 Lowband Contest Results

Activity was quite poor for this event, well down on last year's levels.

Conditions were generally rated as poor too, and DX was reduced as few continental stations were active.

Some logging errors were encountered, for example all dates out by 6 days. Please check your log carefully for errors, entries can be overwritten with corrected versions up to the closing date. No points were deducted on this occasion, but a more severe penalty may be imposed in future.

On 1.3GHz G4BAO was active on EME and worked G4CCH, OZ4MM and OK1CA. Unfortunately the logged time for OK1CA fell just outside the contest period, which meant that M0HNA/P were the winners on this band.

On 2.3GHz G4KCT was the clear winner and was the best DX for most entrants. M0HNA/P were in the runners up spot on this band.

M0HNA/p was the leader on 3.4GHz, with G4LDR in pursuit.

The overall winner was the Combe Gibberlets group M0HNA/P consisting of G3TCU, G4SJH, and G1EHF, who won 1.3GHz and 3.4GHz and were runners up on 2.3GHz. Overall runner up and leading fixed station is Mike G8CUL.

Certificates go to the overall Winner M0HNA/P and Runner-up G8CUL and to the following winners:

1.3GHz	M0HNA/P, G4BAO, G3YJR (Low Power)
2.3GHz	G4KCT, M0HNA/P
3.4GHz	M0HNA/P, G4LDR

May 2016 Lowband Contest Results

The IARU region 1 coordinated contest weekend provided some good DX on all three bands for several entrants. Entries were up somewhat for this session which is encouraging.

1.3GHz saw most of the action with M0HNA/P achieving a creditable total of 49 QSOs. G4BRK was runner up and leading fixed station despite limited time on the band. G4LDR worked the best DX of the event with a contact to DL0GTH (JO50JP) at 872km.

The tables were turned on 2.3GHz, where G4BRK came out on top with a good lead over M0HNA/P in the runner up position. G4BRK also worked the best DX on this band, a contact with DF0MU at 597km.

On 3.4GHz M0HNA/P were in the top slot, with G4BRK as the runner up. DF0MU again provided the best DX, working M0HNA/P over 549km.

The overall winner was the Combe Gibberlets, M0HNA/P, with leading scores on 1.3 and 3.4GHz and runner up position on 2.3GHz. Overall runner up was Neil G4BRK who won 2.3GHz and was runner up on 1.3GHz and 3.4GHz.

Certificates go to the overall Winner M0HNA/P and Runner-up G4BRK and to the following winners and runners–up:

1.3GHz	M0HNA/P, G4BRK, G3YJR (Low Power)
2.3GHz	G4BRK, M0HNA/P
3.4GHz	M0HNA/P, G4BRK

April 2016 Low Band Contest Results

Overall						
Pos	**Callsign**	**1.3GHz**	**2.3GHz**	**3.4GHz**	**Total**	
1	M0HNA/P	1000	682	1000	2682	
2	G8CUL	735	279	791	1805	
3	G4KCT	748	1000	0	1748	
4	G4LDR	255	539	875	1669	
5	G4BRK	435	524	688	1647	
6	G4BAO	873	0	0	873	
7	G3YJR	468	0	0	468	
8	G4DBN	256	0	0	256	
9	G3ZMF	67	0	0	67	
1.3GHz						
Pos	**Callsign**	**Locator**	**QSOs**	**Best DX**	**km**	**Points**
1	M0HNA/P	IO91RF	21	M0DTS	365	3634
2	G4BAO	JO02CG	16	OZ4MM	758	3174
3	G4KCT	IO93LW	15	G4LDR	318	2720
4	G8CUL	IO91JO	17	F6DKW	398	2672
5	G3YJR	IO93FJ	12	M0HNA/P	251	1700
6	G4BRK	IO91HP	11	GU6EFB	260	1581
7	G4DBN	IO93NR	7	G3XDY	233	930
8	G4LDR	IO91EC	6	G4KCT	318	926
9	G3ZMF	IO91VH	3	G4KIY	140	242
2.3GHz						
Pos	**Callsign**	**Locator**	**QSOs**	**Best DX**	**km**	**Points**
1	G4KCT	IO93LW	5	1381	G4LDR	318
2	M0HNA/P	IO91RF	7	942	G4KCT	304
3	G4LDR	IO91EC	5	744	G4KCT	318
4	G4BRK	IO91HP	6	724	G4KCT	256
5	G8CUL	IO91JO	5	385	G3XDY	174
3.4GHz						
Pos	**Callsign**	**Locator**	**QSOs**	**Best DX**	**km**	**Points**
1	M0HNA/P	IO91RF	5	487	G3XDY	153
2	G4LDR	IO91EC	4	426	G3XDY	223
3	G8CUL	IO91JO	5	385	G3XDY	174
4	G4BRK	IO91HP	4	335	G3XDY	184

May Low Band Contest 2016

Overall							
Pos	**Callsign**	**1.3GHz**	**2.3GHz**	**3.4GHz**	**Total**		
1	M0HNA/P	1000	688	1000	2688		
2	G4BRK	604	1000	396	2000		
3	G4LDR	571	450	278	1299		
4	G3UKV	452	253	153	858		
5	G4BAO	397	0	0	397		
6	G3YJR	306	0	0	306		
7	G0PEB/P	266	0	0	266		
8	G8EOP	259	274	0	533		
9	GM3HAM/P	142	0	0	142		
10	GM8IEM	117	0	0	117		
11	G1DFL	83	0	0	83		
12	G1TYY/A	8	0	0	8		
13	M0XIG	5	0	0	5		
1.3GHz							
Pos	**Callsign**	**Locator**	**QSOs**	**ODX Call**	**ODX km**	**Score**	
1	M0HNA/P	IO91RF	49	GM0USI	575	9989	1000
2	G4BRK	IO91HP	26	DF0MU	597	6033	604
3	G4BAO	JO02CG	27	DJ5AR	678	5704	571
4	G3YJR	IO93FJ	20	DF0MU	612	4517	452
5	G0PEB/P	IO90JO	22	G4KUX	452	3969	397
6	GM3HAM/P	IO74WV	10	M0HNA/P	473	3054	306
7	G4LDR	IO91EC	14	DL0GTH	872	2659	266
8	G3UKV	IO82RR	13	ON4HCC	549	2583	259
9	GM8IEM	IO78HF	3	G4KCT	548	1416	142
10	G8EOP	IO93EQ	8	G3XDY	263	1171	117
11	G1DFL	IO91NL	5	ON4HCC	406	829	83
12	G1TYY/A	IO91NL	2	G7LRQ	42	79	8
13	M0XIG	IO90EX	1	G0PEB/P	51	51	5
2.3GHz							
Pos	**Callsign**	**Locator**	**QSOs**	**ODX Call**	**ODX km**	**Score**	
1	G4BRK	IO91HP	13	DF0MU	597	2598	1000
2	M0HNA/P	IO91RF	11	DF0MU	549	1787	688
3	G4LDR	IO91EC	8	G8DTF	275	1168	450
4	G8EOP	IO93EQ	4	G3XDY	263	711	274
5	G3UKV	IO82RR	6	G4LDR	192	656	253
3.4GHz							
Pos	**Callsign**	**Locator**	**QSOs**	**ODX Call**	**ODX km**	**Score**	
1	M0HNA/P	IO91RF	10	DF0MU	549	1896	1000
2	G4BRK	IO91HP	5	PI4Z	363	750	396
3	G4LDR	IO91EC	4	G4ALY	195	527	278
4	G3UKV	IO82RR	2	G4LDR	192	291	153

Low Band Championship 2016

After three events, the best three events count towards the total

Overall

Pos	Callsign	6 Mar 2016	10 Apr 2016	8 May 2016	TOTAL
1	M0HNA/P	2962	2682	2688	5644
2	G4LDR	1759	1669	1299	3428
3	G4BRK	343	1647	2000	1990
4	G8CUL	0	1805	0	1805
5	G4KCT	0	1748	0	1748
6	G3UKV	1137	0	858	1137
7	G4BAO	0	873	397	873
8	M0GHZ	678	0	0	678
9	G3YJR	139	468	306	607
10	G0PEB/P	0	0	266	266
11	G4DBN	0	256	0	256
12	G8EOP	224	0	533	224
13	GM3HAM/P	0	0	142	142
14	GM8IEM	0	0	117	117
15	G3ZMF	29	67	0	96
16	G1DFL	0	0	83	83
17	G1TYY/A	0	0	8	8
18	M0XIG	0	0	5	5

1.3GHz

Pos	Callsign	6 Mar 2016	10 Apr 2016	8 May 2016	TOTAL
1	M0HNA/P	1000	1000	1000	2000
2	G4BAO	0	873	571	873
3	G4KCT	0	748	0	748
4	G8CUL	0	735	0	735
5	G4LDR	379	255	266	634
6	G3YJR	139	468	452	607
7	G4BRK	90	435	604	525
8	G0PEB/P	0	0	397	397
9	GM3HAM/P	0	0	306	306
10	G4DBN	0	256	0	256
11	G3UKV	209	0	259	209
12	GM8IEM	0	0	142	142
13	M0GHZ	141	0	0	141
14	G8EOP	6	0	117	123
15	G3ZMF	29	67	0	96
16	G1DFL	0	0	83	83
17	G1TYY/A	0	0	8	8
18	M0XIG	0	0	5	5

continued...

2.3GHz					
Pos	**Callsign**	**6 Mar 2016**	**10 Apr 2016**	**8 May 2016**	**TOTAL**
1	M0HNA/P	1000	682	688	2370
2	G4BRK	24	524	1000	1548
3	G4LDR	380	539	450	1369
4	G4KCT	0	1000	0	1000
5	G3UKV	282	0	253	535
6	G8EOP	218	0	274	492
7	G8CUL	0	279	0	279
8	M0GHZ	197	0	0	197

3.4GHz					
Pos	**Callsign**	**6 Mar 2016**	**10 Apr 2016**	**8 May 2016**	**TOTAL**
1	M0HNA/P	962	1000	1000	2962
2	G4LDR	1000	875	278	2153
3	G4BRK	229	688	396	1313
4	G3UKV	646	0	153	799
5	G8CUL	0	791	0	791
6	M0GHZ	340	0	0	340

Chairman's Thoughts : Dayton

Sam Jewell, G4DDK, Acting Chairman, UKuG

This was my tenth visit to Dayton Hamvention. I am not sure what it is that keeps drawing me back to this event, after all the Hara Arena and surrounds are becoming quite dilapidated and the future of the venue has been in doubt for some years. I heard confirmation this was the last year and I heard confirmation contracts had been signed for another year! Believe what you want.

By contrast, Friedrichshafen is modern, efficient and very central in Europe – and at the same time, boring. Not much changes from year to year, meaning that you can go one year and then not again for several years, when you can probably take up that same conversation you were having with one of our European friends last time you were there. Just kidding. I love it, but can't take it every year.

Dayton has character and that is what attracts. The May-time weather in Ohio, at least for most of the years I have been attending, has been wet and sometimes cold. Occasionally you can wear shorts. In short, unpredictable.

At Dayton, as a radio amateur, I look forward to meeting my American and friends from elsewhere in the world. They all come to Dayton. Even Solar Impulse made an appearance in the sky nearby. Dayton has a certain 'buzz' about it. The new Friday evening VHF Weak signal group dinner in Miamisburg was a big success and likely to continue if the Hamvention remains in Dayton. The previous Friday evening dinner was organised by our friend and frequent visitor to UK shores, Tony Emanuele, WA8RJF. There was a hole after Tony gave up organising the dinner and this has now been filled by a efficient and attentive new organiser and venue in downtown Miamisburg.

Saturday evening was spent in the Spaghetti Warehouse in downtown Dayton, in the pleasant company of fellow microwave and UK visitor, WA1ZMS, and some of the Mount Greylock Expeditionary Force Contest group. You'll understand why they call themselves an Expeditionary force if you Google Mt Greylock.

Apart from the social side to Dayton it has (or at least had) one of the best microwave surplus outlets anywhere. In the last few years the number of bits has noticeably diminished, but they are still there and the prices put microwave parts at Friedrichshafen to shame.

Getting to Dayton has always been interesting for me. For the first few years I attended I flew to Dallas and then co-drove the 1150 miles to Dayton with WA5VJB in one of his two 'minivans', loaded with stuff to sell on his flea market pitch, under the North Texas Microwave Society (NTMS) banner and the flag of St George for England).

As I have gotten older I have tended to shy away from long drives and opted to fly to Dayton, via one of the many hubs, or to fly to the east coast and cadge a lift with one of the guys who only have 500 miles to drive (but through some wonderful Appalachian mountain countryside). This year I flew to Detroit and then by regional jet to Dayton (just 30 minutes flying time). There I was picked up by WA5VJB and taken for dinner before on to our usual Dayton University accommodation. Whilst it is the usual spartan student accommodation, it has the advantage of lowish cost and plenty of space.

As for the Hamvention itself, the Friday was warm but Saturday morning was cold and wet from overnight rain. Unlike any previous year on Saturday we didn't even bother to set up the tents and tables until mid day, although we were there from around 7am. Attendance in the flea market was definitely down on previous Saturdays, which are normally the best trading day. However, the RSGB contingent, inside one of the 7 or 8 halls that make up the complex, reported a good footfall. It will be interesting to see the final, audited, attendance.

If Dayton Hamvention actually takes place next year I will probably plan to go there as well. If it moves to a new venue then I'll probably elect to leave it a few years until it all settles down in the new location.

EME 2016

The Programme

Saturday:

- Welcome and conference briefing, IW3HVB
- Chapter II – Signal polarity in V/UHF bands, IK1UWL & IK3XTV
- Failure levels in LNAs, G4DDK
- On the Theoretical and Practical Limits of Digital QSOs, DJ5HG
- Q-ary Repeat-Accumulate Codes for Weak Signals Communications, IV3NWV
- Stress Offset Dish for 1296 MHz, K2UYH
- Portable EME MW Setups, OK1DFC
- High Power Switching Class E and F amplifiers, AD6IW
- PB8 13m Cassegrain Dish Adventure with ORPB society, F2CT
- Experiences with Circular Polarization on 10 GHz, G3WDG
- Techniques used in construction of a home brew 10m parabolic antenna, VK5MC
- Azimuth Drive for Small Dishes, G4HUP

Sunday:

- Let's Bounce, PA3FXB
- New Codes, Modes, and Tools for EME, K1JT
- Optimized EME reception with Linrad and WSJT under multi-polarization configuration, ZS6EME
- The Stealth Dish, I0NAA
- Please Don't Throw Tomatoes – ARRL EME Rules, K1DS
- Roundtable and Conclusion

Registration

The registrations are coming in, we should be aligned with all the requests up to today's date, if yours is still missing, please contact me, maybe some spam filter acting weirdly (experienced that with a couple of German providers).

We broke the 100 participants barrier, but we can accommodate many more :-)

Time is running out for registration – **the deadline is set for June 10th**. After that, we will not guarantee availability at the conference hotel, although I am trying to stretch the deadline with their management.

Please register here: http://www.eme2016.org/index.php/registration/

I remind you that you can send even a partially compiled form, if you don't have all the requested data at the moment, and that there is no obligation to book the room at the conference hotel if you want to find something different (you would have to deal with the transfers btw, so do it if you have a vehicle available).

If you want to be creative, use the last field "Your message" for any inquiry.

Many have asked to extend their stay to enjoy a vacation here, and we are happy to help! If you need any information just ask and we'll try to accommodate you.

Remember that we can also host table-top presentations, or you can simply send a paper just to be published on the proceedings.

A quick update abt II3EME station too: It will be active for the most part of August on 144 MHz, and we are working to activate the call also on 1296, 2304, 5760 MHz.

73 de Giulio Pico IW3HVB
Organizing Committee
XVII International EME Conference 2016
Venice Italy
iw3hvb@eme2016.org www.eme2016.org

Activity News : May 2016

By Neil Underwood G4LDR

Please send your activity news to:

scatterpoint@microwavers.org

Introduction

I would like to begin by apologising to Keith GW3TKH for getting his call sign wrong in the last issue.

I have received input from G3VPF, G8DTF, G3UVR, G4HTZ, G4BAO and G3XDY, thank you.

May has been a busy month the RSGB/IARU Region 1 May 432MHz and up contest, the RSGB 10GHz Trophy contest and the UKuW Group May Low Bands contest at the beginning of the month, the usual RSGB UKAC events towards the end of the month and the first UKuW Group 5.7GHz and 10GHz of the year on the last Sunday of the month. Unfortunately I and others found conditions, particularly on the higher microwave bands, generally poor whilst these contest took place.

Monday Night Activity

From Neil, G4LDR (IO91)

G4ALY, G4NNS, G4UKV and G4LDR have continued to be active on most Monday evenings, from 19:00UTC. We usually use 144.195MHz for talkback, and I have been monitoring 144.175MHz once we have completed our tests. I have also started to monitor KST more regularly than I did. If you would like a test on any band from 1.3GHz to 24GHz please call in.

Contest Operating

From Bob, G8DTF (IO83)

I have managed to get myself back on the air this month. My rotator broke down at the end of last year, and despite my best efforts I now find I cannot solder, because of my Essential Tremor. I had to find a solution which required no soldering, so I have bought a G650 with a pre-terminated cable. I have managed to get it on the mast and waterproofed. I put up some antennas for the 432MHz and up contest (just 70cm and 13cm).

I will try and get on, with the bands I have working, but I suspect it will only be until something else fails.

May UHF Contest: On 13cm I managed to work 10 stations. I had several attempts with M0HNA/P, but no success.

The stations I did work were: G8EOP IO93 59km; G8OHM IO92 130km; G4BRK IO91 221km;

G3XDY JO02 296km; G3UKV IO82 89km; G4KCT IO93 105km; G4LDR IO91 275km;

G3UVR IO83 50km; M1CRO/P JO01 314km and G2L IO92 233km.

23cm UKAC: Again not great conditions, but I worked the following:

In IO83: G3TDH, GW8ASD, G4NTY, M0OMB, G8HXE/P, G1SWH, G0CDA, G4JLG, G3UVR, M0INY, G6GVI and G4AQB. In IO93: G8XVJ/P, M1DDD/P, G8BUN and G8SFI/P. In IO82: M0COP/P, G3SMT, G4FRE/P and GW8REQ/P. In IO92: G4CLA. In IO84: G4VFL/P. In IO74: GD8EXI.In IO91: G0ODQ, G4BRK, G7LRQ and G8CUL.In IO81: G3VKV and M0GHZ.

SHF UKAC: Conditions during the contest were quite poor, with QSB on more distant stations.

After having an early supper, I stayed on until about 11.20pm. I had attempts with a couple of stations, which failed. These were with John G3XDY and GM4JTJ, although I did hear some CW from GM4JTJ, but he could not hear me. I worked 17 in total, with 8 of those being in IO93.

In IO83: G4JLG/P, G8APB and G3UVR. In IO93: M0UFC/P, G8EOP, M0ORO, G4DBN, G4RQI, 2E0YZA, G8BUN and M0MDY.In IO81: G3VKV and

M0GHZ.In IO91: G8CUL, G4LDR and G4BRK. In IO92: G8OHM.

From Denis G3UVR (IO83)

Just writing to say I was pleased in the May UHF contest Saturday evening on 3cm to have two complete QSOs with G5B JO03 and G4KUX IO94. M1CRO/P JO01 was heard 559 on every over but I failed to raise them with 1W although they could detect my signal at 340km from IO83.

On the Sunday I had no further 3cm QSOs but can copy all the time the beacon GB3FNY IO93NN at 150km screened by over 2000ft of mountain. Enhancements with Aircraft and rain scatter can be observed.

From Ed, G3VPF (IO90)

Following the May UHF and up contest I have the following comments:

I attempted to take part in the 7/8th May contest on 3 cms, going portable on both the Saturday afternoon and Sunday morning. The result - no contacts. Calling CQ on 3cms resulted in no response. Calling on 2 metres produced an equal amount of silence. Attempted to use KST, but the tenuous internet connection resulted in time-scrambled messages and messages being blocked-up to arrive every 30 seconds or so, which made setting up a contact impossible! So how do I make contacts? I can increase the transmit power and change to a bigger dish to get a bigger signal out on 3cms, but the real problem is making my presence known in real time. Guess the best bet is to limit my participation to the smaller contests when KST is less busy and also carefully choose location to optimise the internet signal rather than microwave performance. Hope to be out /P again for the June UKAC (3cms) and VHF NFD (23cms). Also happy to go portable at other times from various West Dorset sites on request.

Here is part of my (G4LDR) reply to Ed,

> '….The only time I have ever had contacts by calling direct on 3cm is during very good rain scatter events. The only other way is if you hear a QSO in progress on 3cm is to call in and hope you are heard. The likelihood of being heard by another station by calling CQ on 3cms is very unlikely unless very local, (both dishes will need to be pointing at each other and you both need to be on the same frequency!).
>
> I would suggest you come on during one of the UKuW group contest Sundays (most activity probably from mid-morning to mid-afternoon). You are more likely to have people monitoring talkback on 144.175MHz during these events and more people out portable …

From John, G3XDY (JO02)

Some nice DX around in May:

May UHF Contest 7-8 May:

On 1.3GHz: GW4HXO IO71; OK2A JO60; DM5D JO61;GM3HAM/P IO74; DK2ZF/P JO43; GM4JTJ IO86; F6KFH JN39; DL0GTH JO50; F6DZR IN96; OZ9PZ JO46; F1AZJ/P JN28; DF0YY JO62; DF4IAO JN48; DH1FM JO60; DJ6OL JO52; DH0LS JO61; DL3IAE JN49.

On 2.3GHz: DF0MU JO32; PA0JUS JO33; PI4GN JO33; DL0GTH JO50; F1AZJ/P JN28; DL3IAE JN49.

On 3.4GHz: DF0MU JO32; PI4GN JO33; DL0GTH JO50; DK0PU JO31; DL3IAE JN49

On 5.7GHz: G3Z IO82; DF0MU JO32; DL0GTH JO50; F6DWG/P JN19; G8OHM IO92.

On 10GHz: G3Z IO82; DF0HS/P JO31; DF0MU JO32; F6DKW JN18; DK0PU JO31;

G5B JO03; G8OHM IO92; G4KUX IO94; PI4GN JO33; DL0GTH JO50; F1AZJ/P JN28; F6DWG/P JN19.

The 5 QSOs with DL0GTH from 1.3GHz to 10GHz took place over a 12 minute period by aircraft scatter, where two planes flew in succession directly along the path between us. This is my best DX by aircraft scatter on 10GHz (684km).

The 13cm and 3cm QSOs with F1AZJ/P were all time new squares.

1.3GHz UKAC, 17th May: DL0VV JO64; PG0DX JO33; DL3IAE JN49; DL3IAS JN49;

SK7MW JO65; OZ1FF JO45; DD8DW JO41; DL1DBR JO41; DJ5AR JN49; DF9IC JN48; GW4HXO IO71; GM4JTJ IO86; G8PNN IO95; G0EHV/P IO84; GD8EXI IO74.

French Contest 22nd May

On 1.3GH: F1AZJ/P JN28; F6DZR IN96.

On 2.3GHz: F1AZJ/P JN28; F8DLS JN19.

From John, G4BAO (JO02)

Not too many notable QSOs in May, condition in general have been dire.

Usual 23cms Aircraft Scatter QSOs over 600km in the UKACs with DF9IC (ODX, 704km) DL0GTH and DJ5AR.

On 10GHz ODX was F6DKW at 414km in the 10GHz cumulative via CW aircraft scatter plus ODX on Tropo was G4KUX at 298km plus G0PEB/P, ON7FLY and PI4Z all over 200km, all on CW.

From Neil, G4LDR (IO91)

During the May 432MHz and up contest I managed a few contacts on all bands from 1296MHz to 10GHz, but had no successful contacts on 24GHz. The only notable DX was with DL0GTH in JO50 at a distance of 872km on 1296MHz and with ON4HCC in JO20 on 10GHz.

The UKAC 1296MHz and UKAC 2.3GHz and up contest were hard work due to the relatively poor conditions. The same poor conditions were evident during the May UKuW group 5.7GHz and 10GHz contest. Stations normally workable were barely perceptible.

Other Activity on the cm bands

From Bob, G8DTF (IO83)

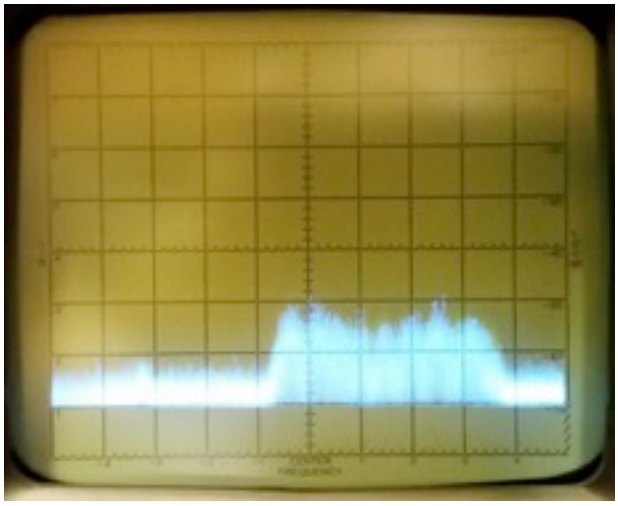
On the19th May I had a test with G8APB near Stoke on 13cm. Chris was end-stopping with me so should be able to make quite a few contacts in the SHF UKACs. This was Chris's first QSO on 13cm.

From Dennis, G3UVR (IO83)

Dennis has noticed an increase in noise on 13cms as he explains here.

Turning to 13cm again for the first time I noted a large increase in noise to the South East of me not normally there. Having now spent a few days monitoring and taking notes I wonder if any reader knows what it can be?

It has only recently come on. It was not there in the last SHF 13cm contest and now seems to be on 24 hours a day which is very worrying. Having put an additional five pole interdigital filter between the aerial and preamp I have reached the conclusion it is in band and not a mixing product in my system. I can see it with the aerial connected to my Analyzer photo attached. Its lower frequency limit is 2319.580 and the upper limit is 2321.915 making the interference 2.335MHz wide right in our narrow band working section. The horizontal scan is a total of 5MHz wide with each division 500KHz. Centre scale is 2320.000 mainly the signal is noise but with carriers in it. The carriers are most noticed in the first and last 10KHz of the signal. The strength is 10-15dB above my usual noise floor beaming at the noise source 130deg from my QTH IO83KH SJ269820….Any ideas????



Wide band noise on 13cms received by G3UVR

I did have a similar noise about 2-3years ago on 23cms on a heading of 45deg which lasted continuously for 18 months and one day it was no longer there thankfully. That signal was a total of 1.172MHz wide starting at 1295.411 and going to 1296.583MHz. At least it didn't go into the beacon band. For over a year I have been clear on 23cm but this signal was very similar to the current 13cm one but less than half the width.

Any suggestions gratefully welcomed.

From John, G3XDY (JO02)

On the 11th May, on 10GHz John worked: F6DKW JN18; F1RJ JN18. The first reasonable rain scatter opening this year, with strong signals from the Paris area.

mm- wave Activity

From John, G4BAO (JO02)

To prove my 24GHz system is now repaired I worked G4BEL at the stunning DX of 11km. I really ought to give that band up, it's too hard, and there's just no-one on!

I did though finish the GB3PKT 24GHz beacon which is now on site waiting it's NoV (now issued (within one week)) and rebuilt the 10GHz one for the same site. They now share a common driver and PSU cabinet.

I'm sure John would welcome reception reports of this new 24GHz beacon (Ed.)

From Neil, G4LDR (IO91)

Martyn, G3UKV has been carrying out some initial testing of the Group's 76GHz loan equipment and it looking for someone to have a QSO with. Unfortunately my 76GHz system is still not boxed up and I don't yet have a

dish for that band so I am unable to conduct any tests yet. I must finish building the system before the mm bands contest start!

EME

From John, G4BAO (JO02)

On 23cms EME I got two new ones on CW, RA3EC and W5LUA and two on JT65C, I5YDI and KD3UY.

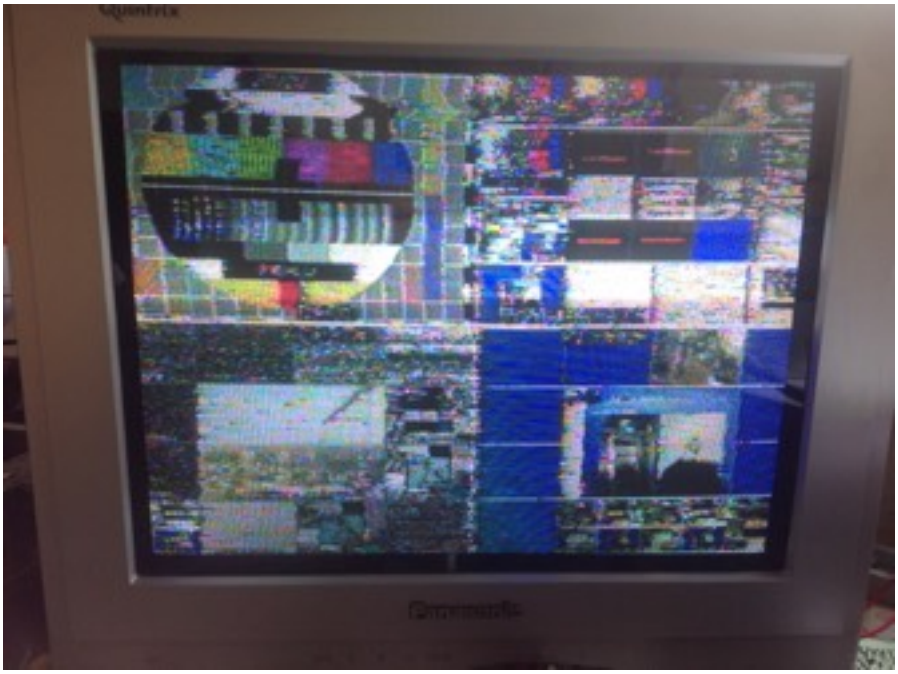
ATV

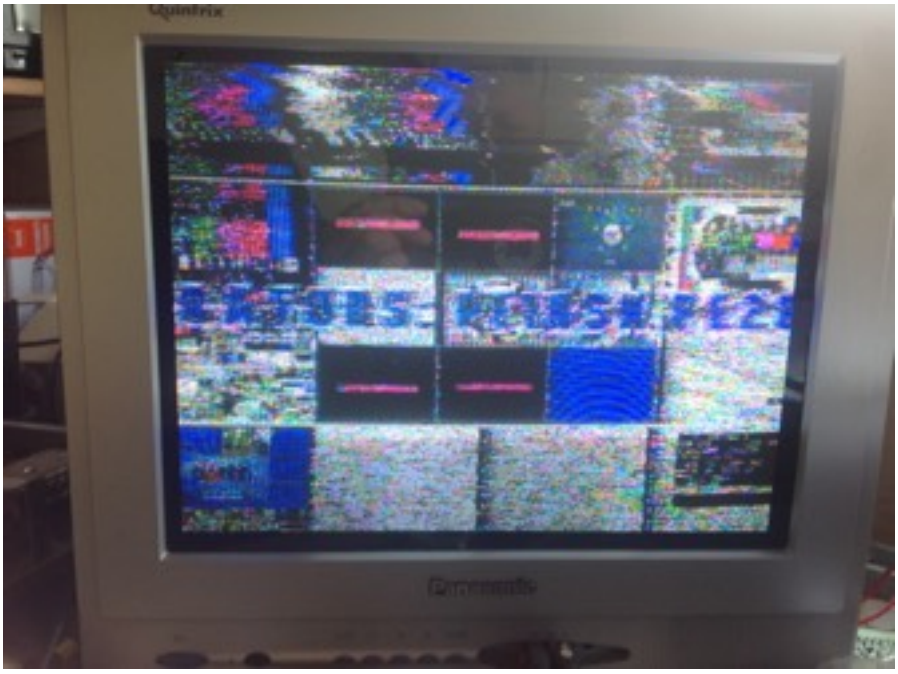
From Steve, G4HTZ (JO01)

I received a couple of Dutch 10GHz ATV repeaters in south east Essex JO01JN on 9th/10th of May, at a distance of around 280km.

Steve Barrett G4HTZ

Received a couple of Dutch 10GHz ATV repeaters in south east Essex JO01JN 9th 10th of May around 280km.





… and finally

The deadline for activity news for the next edition of Scatterpoint is Friday 1st July. Hopefully there will be plenty to report including the first of this year's 24,47 and 76GHz contests.

The Dutch WEB SDR

Jan PA0PLY **www.pa0ply.nl**

Recently we activated a new WEBSDR with reception on 23 and 3cm.

WEBSITE: http://erc-websdr.esa.int/

PI9ESA in JO22FF along the North Sea Coast in Noordwijk

One of the 23cm antennas is directed to the UK, while 3cm is 360°

At the moment the antenna location is somewhat low but will improve shortly.

Please spread around the news and give it a try during sunset!

UKµG Microwave Contest Calendar 2016

Dates	Time UTC	Contest name	Certificates
6-Mar	1000 - 1600	1st Low band 1.3/2.3/3.4GHz	F, P,L
10-Apr	1000 - 1600	2nd Low band 1.3/2.3/3.4GHz	F, P,L
8-May	0800 - 1400	3rd Low band 1.3/2.3/3.4GHz	F, P,L
29-May	0600 - 1800	1st 5.7GHz Contest	F, P,L
29-May	0600 - 1800	1st 10GHz Contest	F, P,L
5-Jun	1000 - 1600	4th Low band 1.3/2.3/3.4GHz	F, P,L
19-Jun	0900 - 1700	1st 24GHz Contest	
19-Jun	0900 – 1700	1st 47GHz Contest	
19-Jun	0900 – 1700	1st 76GHz Contest	
26-Jun	0600 - 1800	2nd 5.7GHz Contest	F, P,L
26-Jun	0600 - 1800	2nd 10GHz Contest	F, P,L
17 -Jul	0900 - 1700	24GHz Trophy / 47 / 76/122-248 GHz	
31 -Jul	0600 - 1800	3rd 5.7GHz Contest	F, P,L
31 -Jul	0600 - 1800	3rd 10GHz Contest	F, P,L
14- Aug	0900 - 1700	3rd 24GHz Contest	
14- Aug	0900 - 1700	3rd 47GHz Contest	
14- Aug	0900 – 1700	3rd 76GHz Contest	
28 -Aug	0600 - 1800	4th 5.7GHz Contest	F, P,L
28 -Aug	0600 - 1800	4th 10GHz Contest	F, P,L
11 -Sep	0900 - 1700	4th 24GHz Contest	
11 -Sep	0900 - 1700	4th 47GHz Contest	
11 -Sep	0900 – 1700	4th 76GHz Contest	
25 -Sep	0600 - 1800	5th 5.7GHz Contest	F, P,L
25 -Sep	0600 - 1800	5th 10GHz Contest	F, P,L
13 -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)

Contest results are also published online – please follow the link from the UKuG Contests page at:

www.microwavers.org/?contesting.htm

73
John Quarmby G3XDY

Microwave activity days in France. Journeés d'Activité

JA March	WE 26 & 27	JA July	WE 30 & 31
JA of April	WE 23 & 24	JA August	WE 20 et 21
JA May	WE 28 et 29	JA September	WE 24 & 25
JA June	WE 18 & 19	JA October	WE 29 et 30

On the 17th July in the morning will be a special JA in memory of F6BSJ, all contacts will be done by reflection on Mont Blanc.

73 Jean Paul F5AYE

Events calendar

2016

Jan 23	Heelweg	www.pamicrowaves.nl/
Feb 13	Tagung Dorsten	www.ghz-tagung.de/
Apr 9	CJ-2016, Seigy	cj.ref-union.org/
Apr 16–17	Martlesham Microwave Round Table & UKμG AGM	http://mmrt.homedns.org
Apr 16–17	IARU-R1, Vienna	
Apr 16–17	EUCARA (European Conference on Amateur Radio Astronomy)	https://www.eucara.nl
Apr 23	RSGB AGM, Scotland	rsgb.org/agm
May 20 – 22	Hamvention, Dayton	www.hamvention.org/
May 22	BroadBand HamNet (BBHN) Meeting, Crawley ARC	BBHN.Event.2016@gmail.com
Jun 24 – 26	Ham Radio, Friedrichshafen	www.hamradio-friedrichshafen.de/
July 9–10	Finningley Round Table	www.g0ghk.com/events/round-table/
Jul 29 – 31	Amsat-UK Colloquium, Holiday Inn, Guildford	www.amsat-uk.org/colloquium/
Aug 19–21	EME2016, Venice	www.eme2016.org/
Sept 9–11	61.UKW Tagung Weinheim	www.ukw-tagung.de/
Sept 18	Crawley Round Table	
Sept 24 –25	BATC Convention, RAF Museum Cosford	www.batc.org.uk/convention.html
Sept 30–Oct 1	National Hamfest	www.nationalhamfest.org.uk/
Oct 3 – 7	European Microwave Week, London	www.eumweek.com/
Oct 7 – 9	RSGB Convention	rsgb.org/convention/
Oct 14–15	Microwave Update, Saint Louis, Missouri	www.microwaveupdate.org/
Nov 12 (tbc)	Scottish Round Table	www.gmroundtable.org.uk/

2017

Apr 22–23	Martlesham Microwave Round Table & UKμG AGM	http://mmrt.homedns.org
July 14 – 16	Ham Radio, Friedrichshafen	www.hamradio-friedrichshafen.de/
Oct 6 – 8	RSGB Convention	rsgb.org/convention/
Oct 8 – 13	European Microwave Week, Nurembourg	www.eumweek.com/

2018

June 22–24	Ham Radio, Friedrichshafen	http://www.hamradio-friedrichshafen.de/
Sept 23–28	European Microwave Week, Madrid	http://www.eumweek.com/

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

Yahoo log-in for Scatterpoint

We have received a number of reports from members advising they are no longer able to log into Yahoo groups. Some months ago Yahoo Groups made changes to its formatting including a change to the sign-in page where the original single page requested entry of Yahoo ID or email and a password.

The revised sign-in now has two pages where the first page requests an email address only. If you enter a non-Yahoo email address and click "Next" you will see a message: "sorry, we don't recognise this email".

The solution is to enter your normal Yahoo ID into the "email box" and click "Next", this will bring in the second page requesting your Yahoo password.

Enter your password and click "Sign in" and you should now be in your Yahoo groups Home page.

If you are aware of any UKuG members having difficulty with their login to Yahoo groups please pass this information on to them.