
VHF/UHF – An Expanding World

David Smith VK3HZ

Weak Signal

David Smith - VK3HZ

Even in the depths of the cold months of winter, there is still plenty of activity on the VHF bands – if you know where to look. Rob VK3MQ reports on various regular happenings in the Melbourne area:

We have had a steady response to the 150 net (144.150 on Wednesday evening at 20:30 VK3 time) even through the darkest months of winter. About 7-10 stations participate each week and even the original net controller - RobbieVK3EK surfaces occasionally. Ballarat is well represented by: Ian VK3AXH, Ian VK3IDL and Craig VK3CMC. City Stations: John VK3ACA, John VK3BLX, Chris VK3KIH, Les VK3SL, Ian VK3TB, Peter VK3TPR and Alan VK3XPD. Gippsland: George VK3HV, Jim VK3II and David VK3AUU.

Co-controller Mike VK3KH has been busy with work, so he doesn't always make the net. But when he is in the control seat Chris VK2DO, Leigh VK2KRR, Colin VK5DK, Jeff VK5GF, Andy VK5LA and Peter VK5PJ have been pulled out of the noise.

The monthly Sunday evening scramble has not been well supported of late but maybe the warmer months will see an improvement.

Thanks for the update, Rob. The remainder of this month's column is once again filled with reports on activities in the Microwave regions. If you would like to hear about happenings in the VHF/UHF region, I'd be happy to print the news provided that people submit it to me!

Microwave Activity Day Update

Doug VK4OE has sent in a photo of some potential candidates for Microwave activities.



He writes:

This picture was taken during the recent Remembrance Day Contest (which was also the inaugural 'Microwave Activity Day'). Three fellows of the Sunshine Coast Amateur radio Club in the club grounds near the Maroochy River are pictured during a QSO on 2.4 GHz from the Sunshine Coast location down to VK4OE who was portable on Mt Gravatt in Brisbane - an obstructed path of a hundred kilometres or so.

The particular significance of this picture is the sharing of the fun of operating microwave radio gear by one experienced amateur with others who are being introduced to this part of the fun of amateur radio! From left to right these operators are: Cec VK4FMOZ, Wayne VK4WS and Ches VK4WT (Ches normally pilots the planes we use for Aircraft Enhancement!)

Note what they termed an 'intelligent antenna aiming arrangement'! The challenge here was that the two fellows holding the antenna (Azimuth and Elevation controllers?) could not hear what the person operating the radio could hear on his headphones - every now and then a slight shift of the antenna led to a dramatic reduction in signal strength received at each end!

Thanks to Harvey Wickes VK4AHW who was the photographer.

New VK4 24 GHz Record

With the increase in Microwave activity in the region, Doug VK4OE has been spurred on and reports on his efforts to further the 24 GHz record:

On Friday afternoon, 03 September 2010, VK4OE/4 at Springbrook Mountain (QG61PS on the NSW-Q'ld border) and VK4WS/4 at Howell's Knob (QG63JE in the Sunshine Coast hinterland) completed a contact on 24.048 GHz, extending the Queensland distance record for this band to 170.1 km.

Equipment used was two 0.5 watt transverters (constructed by VK4OE), each feeding a 320 mm dia. prime focus dish. The only DB6NT modules used were receive preamplifiers, one at each end.

On the same path, Wayne and I have previously worked each other on a variety of 'lower' microwave bands, always with huge signals. It was thus likely that, when the two 24 GHz transverters were completed, a contact over the same nearly-line-of-sight path should be relatively easy to compete. But due to the warm and medium-humidity afternoon, with rain clouds developing, we knew that it wasn't a sure thing. 24 GHz and atmospheric humidity are not compatible with long distance propagation!

After half an hour of calling and listening without a signal heard, we were about to give up when, following a new adjustment to Wayne's beam heading, I briefly heard an extremely weak signal, but for long enough to start to maximise his signal as received at my end. There was also QSB on the path. After that, we planned to complete the QSO using CW, but Wayne quickly discovered that his CW paddle's 6.5 mm plug was incompatible with the 3.5 mm key input on the IC-910 that was being used as a 'tuneable IF'. However, it followed that, after careful dish position optimisation and timing our calls with QSB peaks, signals were strong enough for an SSB contact to be completed. 5x1 and 4x1 reports were exchanged.

We count ourselves lucky to have completed the contact because the cloud was increasing and it had actually started to rain at my end. I relocated 30 metres to a point in the "Best-of-all Lookout" car park that is just across the geographical border into NSW, with a view to possibly also extending the 24 GHz distance record for VK2. Given the worsening weather, the half-hour delay involved in moving and setting up

the gear again was enough to preclude success on this occasion. Signals were there, but ever so much weaker now than before.

The success of the afternoon was doubled because it revealed a significant improvement that could be made to the receive path of one of the transverters, which need could only have been identified under weak signal conditions. After that technical change is effected, more pushing of distances on 24 GHz will ensue - including fixing our sights on the Australian distance record for the band!

Microwaves are real radio fun - with that we both agree whatever the frequency!!!

New 47 GHz Record

Further to last month's report on new 47 GHz band activity, Dan VK2GG reports that he has made some significant progress:

I have solved my deaf receiver problem on 47 GHz. A new Kuhne LO has solved the problem! It injects 40mW - far more than the Elcom, and obviously less phase noise, or so it would seem.

I now have two equally good receivers - identical with Kuhne Mixer and LO in each. In fact yesterday (August 30th) we set a new Australian Record for 47 GHz of 58 km (LOS path - Gan Gan to Mt Sugarloaf)!!! It was a very weak signal, with fade and some noticeable drift, probably attributable to drift in the FT-817, as the transceivers were locked on Rubidium at both ends. Humidity was about 51% - not bad for such a warm day as yesterday. Once dishes were locked at each end, we both had reasonable SSB copy, with terrible drift. Upon leaving the gear set, we tried again about 40 minutes later, with better results, but with humid NE winds expected in the afternoon, things were not going to improve. A great day out. Many thanks to Peter, VK2YGM, Jack VK2TRF, Les VK2APE, and Heather & Irene for the catering! Peter had a sling psychrometer to measure humidity at Mt Sugarloaf.

Please send any Weak Signal reports to David VK3HZ

Digital DX Modes

Rex Moncur – VK7MO

A group in VK continues to test various new WSJT modes for Joe Taylor, K1JT. While the new meteor scatter mode JTMS has been improved, its sensitivity is not quite as good as FSK441. However, as it is faster, it gets more data through on stronger pings. The end result is that all we can say is one or other mode works better in some situations and that it is difficult to draw a conclusion as to which is best overall. Testing has also started on a new EME mode called Diana (Diana is the Moon god). Diana gets to within 1 or 2 dB of JT65's Koetter-Vardy decoder (non-Deep Search decoder) but runs twice as fast in 30-second periods. Rather than use standard size messages, like JT65, Diana can use any free text and for shorter messages it can average the message more times. Thus short messages like CQ VK7MO give around a further 2 dB improvement compared to a longer message like VK3AXH VK7MO QE37. Joe Taylor proposes to add a facility to average over multiple periods (like the old JT44) to further enhance Diana. One significant downside with the present version of Diana is that, as it does not use a sync tone, it is difficult to detect on the waterfall. Still, it is the absence of a sync tone which wastes half the energy on JT65 that gives Diana the potential for a 3 dB performance improvement. It is still early days for Diana so the VK group will continue testing and

hopefully Joe Taylor will come up with further enhancements. It is expected that by the time you read this article a public release version of WSJT 9 will be available for wider testing.

10 GHz Digital – Pointing in the right Direction

One of the problems in working with very weak digital signals on 10 GHz is to be sure that you are beaming in the correct direction while waiting for an aircraft to cross the path or the tropo-scatter to rise out of the noise. The following program can be used to find the bearing of the other station or of a reference marker such as a building or squid pole that is at a known longitude and latitude:

http://reast.asn.au/2010/Great_Circle_Bearing.xls

It has been found that if one uses two GPS units such as the Garmin 60 handheld units (which allow averaging of data) and average the results for 15 minutes, one can get to within 0.5 degrees with a 200 metre baseline. A single GPS will achieve the same accuracy over a 500 metre baseline.

Please send any Digital DX Modes reports to Rex VK7MO