VHF/UHF – An Expanding World

David Smith VK3HZ

Weak Signal

David Smith - VK3HZ

Despite the approach of summer and (hopefully) good times for VHF/UHF propagation, not much has been happening on the bands to date. However, there has been at least one event of interest.

On the morning of 20th October, Leigh VK2KRR at The Rock was scanning the bands checking for conditions. Signals from VK5 were up significantly from normal levels, and at 1930Z, he reported hearing the VK6REP 2 m beacon at Esperance at S1 – a distance of 2312 km. Terry VK3ATS in Mildura was also hearing the beacon at S5 – a leisurely 1870 km. However, nothing was being heard in Melbourne so it seems the enhancement wasn't reaching that far south. Brian VK5BC reported hearing the beacon up to S7, but nothing from Albany, slightly further afield, on 2 m or 70 cm. Unfortunately, VK6 hadn't at that stage gone onto Daylight Saving time, so their local time was very early (2.30 am). At 2300Z, with the beacon still just audible, Leigh rang Bill VK6AS in Esperance to see if he could come on air but unfortunately an issue with a coax relay prevented this. Bill did have the good news that his station would be fully operational on 2 m, 70 cm and 23 cm within a few weeks. So, while the beacon was heard for a period of nearly 4 hours, unfortunately no contacts were made.

47 GHz Contact

Doug VK4OE reports on some exciting happenings at the upper extremes of our frequency bands.

On the morning of Sunday 2nd November, Rob VK4ZDX and I had what is probably the first QSO in VK4 on 47.0881 GHz USB. The distance was only a couple of hundred metres but, considering that it was a first out-of-the-shack test and that no antennas were used other than open WR22 waveguide, I am happy with the result. The only previous experiments on 47 GHz that I know of in VK were by VK6ZAY some years ago in the Perth area. He still holds the VK distance record for this band (45.7 km), at least for the time being …

We used two transverters of different design that I have been working on for several years (off and on). The transverters use different LO and IF frequencies with the side benefit that there can never be confusion between receiving IF leakthrough and true 47 GHz RF. Although the output stages use similar circuits, one transverter produces nearly 1 mW while the other can only currently manage 70 uW.

This result should be regarded as an initial successful test. Further optimisation will now take place, plus the construction of 'real' antennas, both of which will make the system work a whole lot better. Greater and greater distances will become possible! Apart from five years acquiring on the 'surplus' market many of the various key components, it's all my own construction - quite satisfying

I intend to be operational on 47 GHz for the Spring VHF/UHF Field Day. Now I'm looking for other stations on the band …

Analogue TV Shutdown

The government powers that be have announced that all analogue TV services will be definitely shut down between 2010 and 2013 (perhaps). While some of the TV frequency channels will probably be re-allocated to Digital TV services, the Low Band services will be put to other uses. Of interest to weak-signal enthusiasts, Channel 5A, which is a non-standard allocation just below our 2 m band, will probably also be reused for other services. The Mt Dundas Channel 5A transmitter in western Victoria is due to cease operations on June 30th 2010. For those living in the region of Channel 5A transmitters, the shutdown will be a welcome relief, allowing weak signal operation on the 2 m. However, those who are more distant will lose the ability to use these powerful transmitters as both beacons and frequency references. One thing we hope is that, if Channel 5A is allocated to other services, they are not going to produce substantial interference on the low end of the band as, for example, Pagers services do at the high end.

2 Metre Scramble

Mike VK3KH reports that the revival of the 2 metre Scramble was a great success. The first event was held on the evening of Sunday 26th October. Action was fast and furious for the 15 minutes duration and 21 stations called in at the end to report a score.

Congratulations go to the inaugural winner, Jim VK3II, who scored 61 points.

The Scramble is held on the last Sunday of the month at 0930UTC, with the next events on 28th December 2008 and 25th January 2009. The event lasts for 15 minutes with a call back for scoring on 144.150 immediately after.

All stations with 2 metre SSB capabilities are invited to take part, and stations are invited to post their intention to participate on the VK Logger in the 30 minutes prior to the Scramble commencing. This alerts stations to look out for others from distant grid squares, as the grid square count is used as a score multiplier.

Operating guidelines and updates are posted on the VK Logger Forum in 144 MHz Band section. If anyone needs more information they can email Mike on mdc@cranbournemusic.com.au

Please send any Weak Signal reports to David VK3HZ

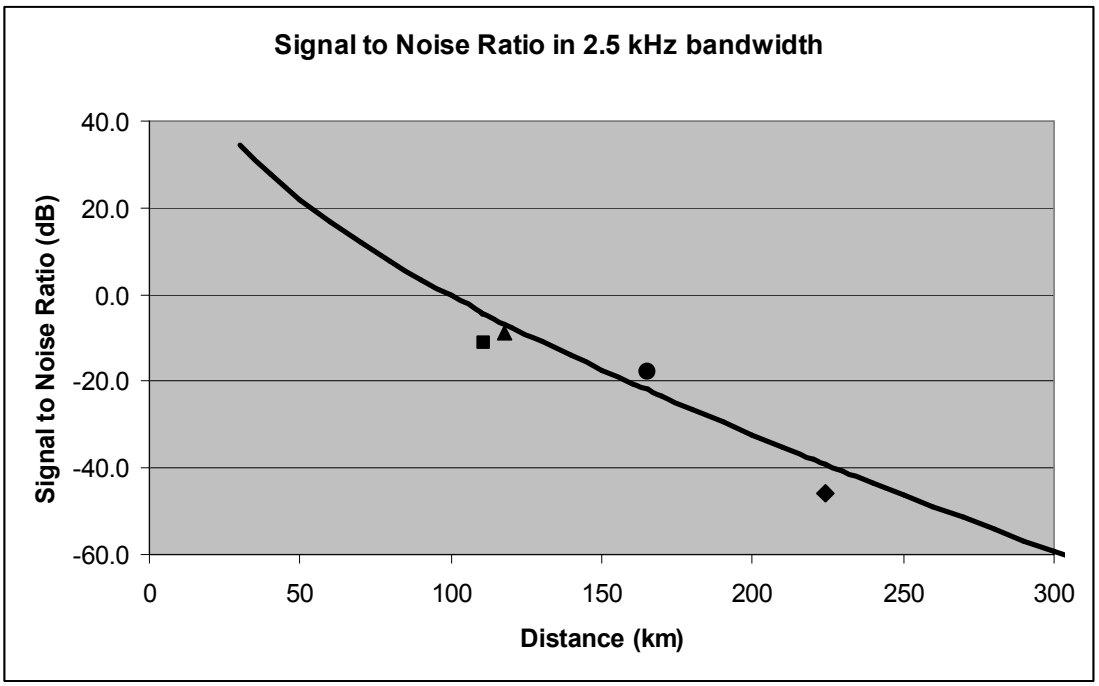
Digital DX Modes

Rex Moncur – VK7MO

Recently, significant advances have been made with non-line-of-sight optical cloudbounce using WSJT, with the distance being increased to 165 km at signal levels of -18 dB on the WSJT scale. A tone has been measured at 18 dB signal to noise ratio in a 1 milliHertz bandwidth at a distance of 224 km. These advances are primarily the result of using a large area Avalanche Photo Diode (10 mm square). These diodes have gains of around 50 to overcome pre-amp noise and also pick up more light with their large areas.

Optical signal levels reduce in accordance with the inverse square law for a cloud larger than the beamwidth, and also due to what is called extinction loss due to scattering of light along the path. Extinction loss is estimated at 0.1 dB per km for red light in very clear air. As optical signals produce a current in the detector

proportional to the number of photons, the received power increases as the square of the current and thus the amount of light. Thus the propagation losses increase as the 4th power of distance due to inverse square law and by a factor of about 0.2 dB per km due to extinction in very clear air. The following graph applies this relationship to some of the results to date with the 10 mm square APD receiver with a 375 x 375 mm Fresnel Lens and a 60 Luxeon Red LED transmitter using small torch type 20 mm plastic lenses.



■ 111 km Path from Kyneton Victoria, VK3HZ & VK3BJM, to Wedderburn Victoria, VK7MO & VK3CY.

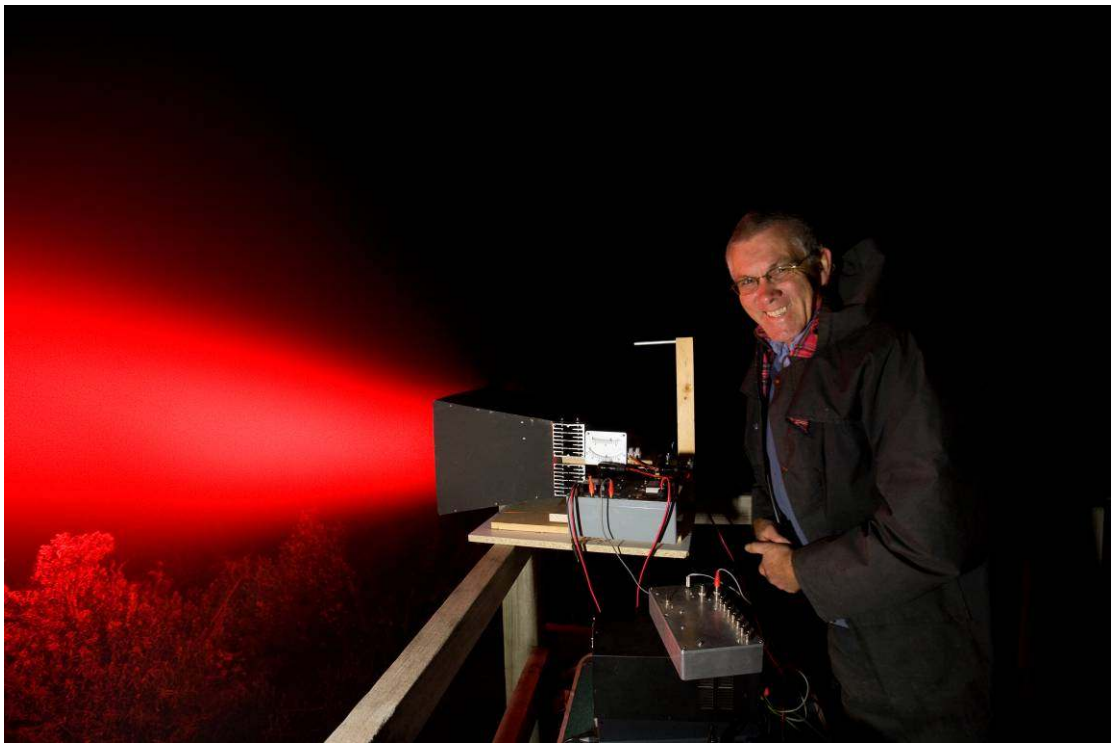
▲118 km path from Tolmans Hill Tasmania, VKTW, to VK7MO Coles Bay Tasmania.

● 165 km Path from Kyneton Victoria, VK3HZ & VK3BJM to Wycheproof Victoria VK7MO.

♦ 224 km path from Cape Portland North East Tasmania, VK7JG, to Stanley, North West Tasmania, VK7MO. In this case signal levels were too low for WSJT but a tone could be detected at 18 dB signal to noise ratio in 1 mHz bandwidth. The received signal to noise ratio has been adjusted to the equivalent level in a 2.5 kHz bandwidth.

It is seen that WSJT, which works to around -28 dB, should be useful to around 180 km with the present equipment, but this is not quite enough to span the 212 km across Bass Strait. However the program JASON is reputed to work down to -45 dB and should meet this requirement even though in its most sensitive mode it takes around 40 minutes to transmit two callsigns. On 29 October 2008, Joe VK7JG ventured up Mt Horror in north eastern Tasmania to attempt a JASON contact with Rex VK7MO at Stanley over a 209 km path. Almost as soon as Joe arrived at the top of Mt Horror, low clouds or fog rolled in and most of the transmitted light was scattered in the immediate area. No signals were detected at Stanley over a period of two hours using at 1 mHz bandwidth. While this attempt failed, more attempts will be made with JASON. Alvin VK7NDQ did take some great photos of the light being scattered by the fog as per the example with Joe VK7JG operating included with this report.

Optical Transmission from Kyneton Victoria with Barry VK3BJM and son Cameron
Photo by David VK3HZ.



Optical Transmission into fog at Mt Horror Tasmania - operator Joe VK7JG.
Photo by Alvin de Quincey VK7NDQ.

Please send any Digital DX Modes reports to Rex VK7MO

The Magic Band – 6 m DX

Brian Cleland – VK5BC

October realised several good 'E' openings occurring in all states. The other interest during the month was the Willis Island DXpedition, which was operational on 6 m. Unfortunately they only completed one contact on 6 m with Gary VK4ABW on the 17th October - well done Gary.

On the 12th October Mark VK8MS in Darwin worked Kevin VK4BKP in Mackay and the13th October the band was open for several hours from northern VK4 to VK5. Jeff VK5GF at Victor Harbour and Brian VK5BC worked several VK4's including BEG, ACB, BKP, ABW & FNQ whilst the VK4's also enjoyed good conditions to VK2 & 3. Kevin VK4BKP reports working VK2's ZQ & DJ, VK3's DUT, VG, & WN.

The morning of the 18th October was interesting with long meteor burns being experienced. Several stations including Scott VK4CZ, David VK3AUU, Joe VK7JG, Gerry VK2APG, Steve VK3OT and Brian VK5BC were heard & completed some contacts via these long meteor burns. On the same morning, John VK3TCT at Mildura who had just erected a 5-element yagi completed a tropo contact with Brian VK5BC over a distance of 300 km.

On the 20th October, the band again opened from VK5 to northern VK4 raising hopes of a contact with VK9DWX but unfortunately only short bursts of their CW beacon were heard. Again VK5BC worked VK4's BKP, SIX, MS & QB. The Alice Springs VK8RAS beacon was also up to S9 in VK5 and was also heard in VK4.

Dale VK4SIX reported working Mark VK8MS in Darwin on the 26th October.

The 27th October saw the band open from VK5 to VK6 as well as northern VK4. Peter VK6KXW worked David VK5AYD at Coober Pedy and VK5BC as well as hearing the Alice Springs beacon and Toowoomba TV. Alex VK5ALX at Whyalla worked Noel VK6BJ in Kalgoorlie and reported both the Perth & Bunbury beacons while Brian VK5BC worked John VK4FNQ Charters Towers and Russell VK4BEG in Malanda.

Another good day on the 28th with the band opening throughout the day in VK1, 2, 3, 4 & 5. Rob VK1ZQR reported working Russell VK4BEG, John VK4FNQ & Kevin VK4BKP. Garry VK5ZK & VK5BC worked several VK4's and Bill VK5ACY reported working VK4BKP on a Moxon rectangle at 5 feet on a broom handle. Paul VK4MA near Hervey Bay was a big signal working into VK2, 3 & 5 and Richard VK5UK/4 on Fraser Island managed to work Brian VK5BC. Several VK3's & 2's also worked into VK4 and Joe VK8VTX in Darwin completed contacts with several northern VK4's.

The good conditions continued on Wednesday 29th October with conditions extending further south to include VK2 to VK5 and VK7 to VK4. Dave VK1DJA worked several VK5's and Norm VK7AC had good conditions into VK4. The Riverland stations Andy VK5LA, Larry VK5LY and Ivan VK5HS worked many VK2 & 4 stations. Alan VK4WR could be heard in VK5 working many VK2, 3 & 7 stations well into the evening.

It has been very pleasing to find so many stations active in all states early in the season. There were certainly many good days in October and lets hope it is the start of a bumper summer 'E' season.

Please send any 6 m information to Brian VK5BC