VHF/UHF – An Expanding World

David Smith VK3HZ

Weak Signal

David Smith - VK3HZ

February featured several days of good propagation in the south of the country.

The path across the Bight from VK5 and VK3 to the southern tip of VK6 (Esperance and Albany) normally comes good a number of times over summer. However, reaching further across the land at both ends proves to be a struggle.

On the morning of February 10th, Hepburn was showing a high degree of enhancement across the south of the country, continuing across land from Esperance to Perth and beyond. (In fact, it was showing almost continuous enhancement to Madagascar, but I digress). At 1950Z, Ron VK6VOX at Katanning, halfway between Albany and Perth, reported the Mt Gambier VK5RSE 2 m beacon at 5x9. Soon afterwards, he worked Brian VK5BC on 2 m with a 5x2 report. Max VK6FN at Manjimup was also worked. Brian then reported the Perth VK6RPH 2 m beacon at 5x1. At 2055Z, Ian VK3AXH in Ballarat worked Ron VK6VOX with a 5x9 report for the 2415 km path. At 2155Z, both Phil VK5AKK and Brian VK5BC were hearing the Bunbury VK6RBU 2 m beacon at 5x2. Soon after, Andrew VK6IA in Perth worked Phil VK5AKK (5x5) and David VK5KC (5x2). The opening was extending to the east, and at 2210Z, Jim VK3II near Phillip Island worked Ron VK6VOX on 2 m at 5x1 over a distance of 2558 km. At around 2250Z, Wayne VK6JR on the VK6 west coast near Bunbury worked Phil VK5AKK (5x5) and Ian VK3AXH (5x5) (2640 km), both on 2 m. Phil reported that the Perth VK6RPH 70 cm beacon was 5x1. At 0045Z, after trying for about half an hour, Trevor VK5NC in Mt Gambier finally succeeded in working Andrew VK6IA on 2 m with 5x1 reports.

The morning of February 20th produced similar conditions. At 2215Z, the 2 m VK6RPH beacon was heard by both Phil VK5AKK (5x1) and Brian VK5BC (5x5 – “strongest ever”). Half an hour later, Phil was hearing the 70 cm VK6RPH beacon at 5x1. On 2 m, he then worked Wayne VK6JR (4x1) and Ron VK6VOX (5x2). At 2340Z, he worked Andrew VK6IA on 70 cm with a 5x6 report over a 2145 km path. At about 0100Z, the VK6RBU 2 m beacon appeared out of the noise to 5x1, but no further contacts were made across the path.

The newly installed 23 cm VK7RAE beacon is proving it’s worth. On the morning of February 8th, Peter VK5PJ in the Barossa Valley reported hearing it, peaking to 5x2 over a path of more than 970 km. It re-appeared on the morning of February 27th, with Phil VK5AKK in Adelaide also hearing it (5x1).

More Threats to Band Allocations

The pressure on valuable spectrum continues around the world. In the UK, the entire 70 cm band is under review by OFCOM, the ACMA equivalent. The RSGB are putting up a good fight so it’s hoped that no erosion of the amateur allocations will result.

Unfortunately, the ongoing trend to a mobile society using cloud-based environments means that there will be ever-increasing pressure for more spectrum. We’ve had a bit of a reprieve here with the re-allocation of the 700 MHz spectrum following the closure of Analog TV services, but we should not be complacent.

Our best response is to be vocal whenever any threat arises, and to use the valuable spectrum to which we are privileged.

Summer VHF/UHF Field Day

The results for the Summer VHF/UHF Field Day have been released and can be found on the WIA web site (and probably elsewhere in this magazine).

Several years ago, there was a push to change the scoring system from one based on gridsquares to a purely distance-based tally. Much heated discussion ensued, and the outcome was that the WIA, as a trial, offered to score the contest under two sets of rules – Division 1 (Gridsquare-based) and Division 2 (Distance-based). The number of logs submitted for each Division was to be taken as a "vote" for which of the scoring systems was preferred by the participants in the Field Day.

Examination of the latest results shows that the two different scoring methods give quite different results, with a 6 m Es opening during the contest causing a significant variation in the Division 2 results.

Unfortunately, the vast majority of participants are submitting logs for BOTH Divisions. Thus no preference can be inferred. This also massively increases the workload for the volunteers collating and checking the results for each Division.

For future VHF/UHF Field Days, people are strongly encouraged to only submit a log for ONE Division. If there is a clear preference for a Division, then the Field Day should drop back to that one only. If it seems that both Divisions are popular, then perhaps we could alternate scoring. However, the two Divisions running in parallel cannot continue long-term.

Please send any Weak Signal reports to David VK3HZ

Digital DX Modes

Rex Moncur – VK7MO

An Unsuccessful Attempt at Extending the 10 GHz Terrestrial World Record

The proposed new path was some 2796 km or 64 km more than the World Record set on 5 January 2015. The increased distance would be achieved by Derek, VK6DZ working from Peaceful Bay in Western Australia, with Rex, VK7MO at the same site of Cape Portland in North-East Tasmania. The Peaceful Bay site (Fig 1) has a clear path over water towards Tasmania. Fig 2 shows VK7MO's take-off at Cape Portland with a Wind Farm in the background.

Fig 1: The Peaceful Bay site used by VK6DZ

Fig 2: VK7MO's location at Cape Portland with Windmills in the background

The Hepburn charts suggested that conditions should be significantly better around 9 to 11 February than at the time of the earlier World Record. While nothing was seen over the 2796 km path on 10 GHz, there were a number of good results as below:

9 February 2015:

10 GHz, VK6DZ to VK5KK 1986 km, -13 JT4f and 3/1 and 5/3 on SSB

432 MHz, VK6DZ to VK3AXH, 2432 km, -12 dB JT4f

432 MHz, VK6DZ to VK7MO 2796 km, signals seen both ways on JT4f but not complete. VK6DZ was not using a pre-amp and later found losses of around 5 dB

prior to his transceiver.

11 February 2015:

10 GHz, VK6DZ to VK5KK 1986 km, copied both ways on JT4f but not complete, VK5KK later found that his power output had dropped from 10 watts to 1.5 watts which seems to be the reason for non completion.

10 GHz, VK7MO to VK5DK 740 km, JT4f and 5/9 on SSB

10 GHz, VK7MO to VK5KK 1040 km, JT4f -12 and 5/5 SSB

432 MHz, VK7MO to VK5AKK, 1060 km 5/5 SSB

It is worth noting that VK5KK and VK6DZ have now achieved decodes across the Bight on JT4f on 5 occasions in the last 14 Months - in fact every time they have tried. Derek's view is that if he can see the VK5VF beacon on 432 MHz it is possible to complete a 10 GHz QSO.

While the Hepburn Charts suggested propagation should be much better, it appears that the lack of propagation on 10 GHz from VK6DZ to VK7MO was the result of a weak trough and a cold front on the path that showed up on the Bureau of Meteorology Means Sea Level Analysis. It appears that the Hepburn charts, based on global models, did not have sufficient resolution to show up these effects. Accordingly, in planning such attempts, one needs to take account of both the Hepburn charts and the Mean Sea Level Analysis.

It appears, however, that the cold front was the cause of the very strong signals between VK7MO and VK5 on 10 GHz - in the form of a pre-frontal cold front (Fig 3). But this same cold front prevented propagation to VK6DZ.

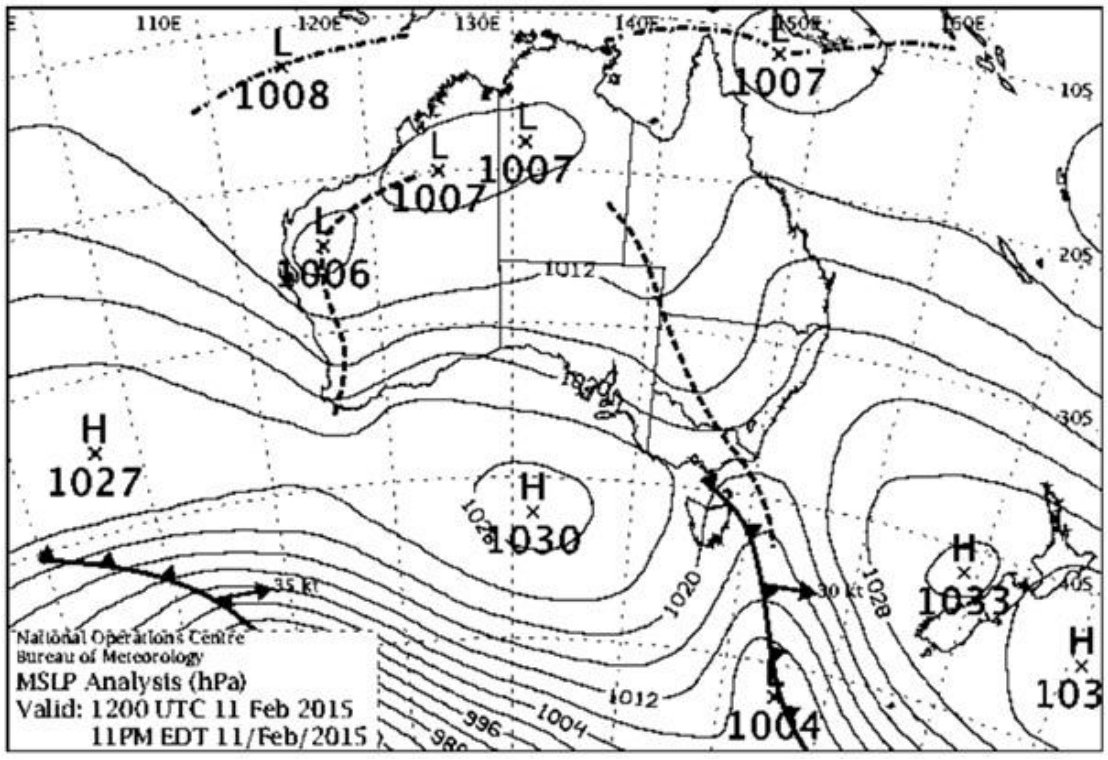

Fig 3: Note the cold front crossing VK7MO's location and sloping towards VK5 that is likely to have produced a pre-frontal duct

One useful thing to come from all this testing is that there is very little spreading, if any, on tropo-ducting compared to tropo-scatter and thus narrower bin-width modes such as JT65a might be of advantage. JT65a has around 3 dB more sensitivity than JT4 and also has many more error correction bits and should cope better with the heavy QSB on these tropo-ducting paths. Certainly worth testing JT65a on future attempts.

It was also noted that there was some odd spreading of VK7MO's signals on both 432 MHz and 10368 MHz (Fig 4). After much testing and frustration to find the problem with VK7MO's rig, this was traced to the effects of wind-generators at the Cape Portland site. On looking back at the World Record contact on 5 January this effect was present on the 2732 km path even though the Wind-generator was 3.5 km away.

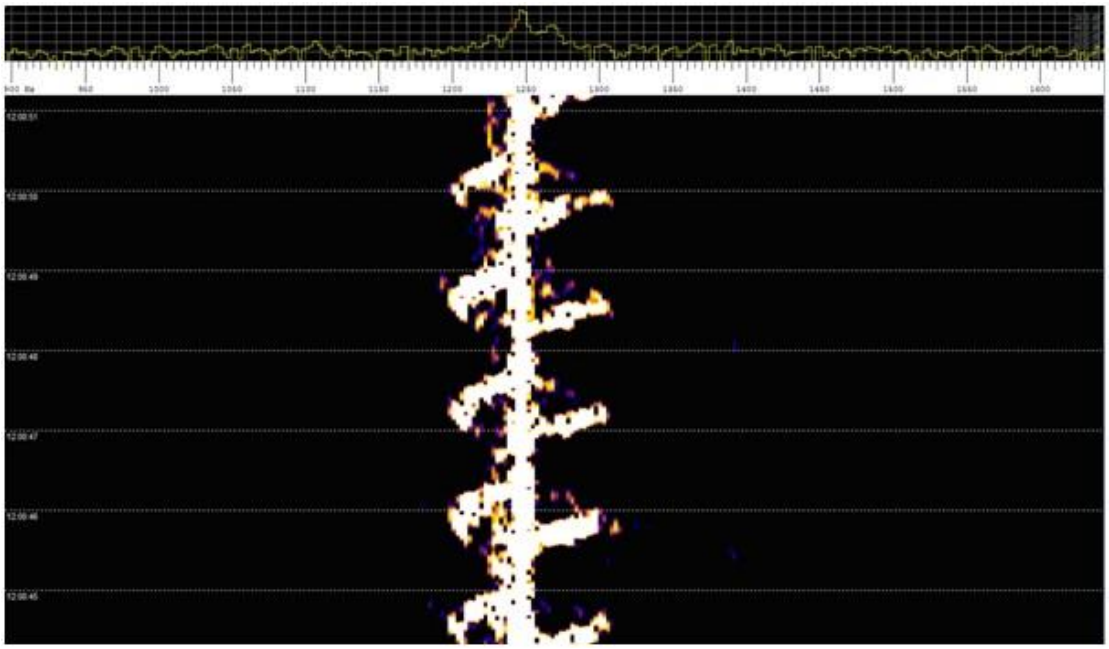

Fig 4: Spreading due to wind-generator some 3.5 km away over a 1040 km 10 GHz path from VK7MO to VK5KK. Note that the pattern repeats around every 1.3 seconds consistent with the speed of the wind-generator.

More information on this effect is given in a talk that VK7MO gave to the Radio and Electronics Association of Southern Tasmania. The talk can be watched on YouTube on the VK7TW channel. Also available is an earlier talk that VK7MO gave on the 10 GHz Terrestrial World Record and the 24 GHz EME World records.

Please send any Digital DX Modes reports to Rex VK7MO

Meteor Scatter

Dr Kevin Johnston – VK4UH

Normally the summer period, following the Christmas and New Year holidays, is associated with the best of the year's conditions for tropospheric, Sporadic E (Es) and Meteor Scatter (M/S) propagation on 2 m. We have been disappointed by all three this year. In general, the weekend Meteor Scatter activity periods have been well populated by stations across VK1 to 5 and 7. There have even been some new calls appearing including VK2EMA (QF37qs), VK3DUT (QF32vf) VK2IUW (QF56if)

and VK1DJA (QF44mr) which is great to see. Most stations however reported M/S conditions as being poor to average at best over this period. The number of random meteors has been lower than expected and most pings have been both shorter and weaker than hoped for. The number of hyper-dense “Burns” lasting more than 10 seconds has been low. Conditions have also deteriorated rapidly after dawn, which is a problem at this time of year as the sessions are probably starting too late in the day to take full advantage of what meteors there are. Further, there have been no major Meteor Shower events since the Geminid Shower last December. From VK4, I have felt lucky to complete with even 2-3 stations during each session, indeed on some occasions I have failed to complete with any. Stations further south appeared to be having better luck than I but still well below previous year’s conditions.

Since 2 m meteor scatter conditions have been disappointing, during the weekend sessions this month, a number of operators have been QSY’ing to 50 MHz at the completion of the normal 2 m sessions. From 21:00 UTC onwards, activity has been occurring on 50.230 FSK441. Active stations over the month have included VK1DJA, VK2BLS, VK2EMA, VK2IUW, VK3HY, VK3DUT, VK3AMZ, VK3II, VK3AXF, VK4UH, VK4CZ, VK4NE, VK4JMC, VK5RM, VK5PJ, VK7JG and VK7XX.

Although I have completed a small number of MS QSOs on 50 MHz in the past, a number of interesting differences are apparent when a large number of stations are on air at this time. As has been well discussed in previous articles, 50 MHz pings are much stronger and of much longer duration than their 144 MHz equivalents. More importantly, the period of “useful” meteor activity continues for much longer after the pre-dawn peak on 50 MHz as compared to on 144MHz. Useful Meteor Scatter propagation is still present long after 2 m has dried up

The long 50 MHz pings, however, can be a mixed blessing. WSJT/FSK441 does sometimes fail to decode effectively where the signal returns continue for many seconds or tens of seconds. This is well recognised if for example decodes are attempted on FSK signals from local stations or arriving via propagation other than meteor scatter. It is apparent however that MSRX, the alternative receive-only software, decodes very well indeed under these conditions. I have strongly recommended having MSRX running in the background behind WSJT for serious MS operation and am now even more convinced of its usefulness for operation on 50 MHz where the received pings are so prolonged and often coming from multiple sources in the same frame.

The next major Meteor showers this year include:-

LYRIDs Class 1, Peak expected on or around 23 April 2015 ZHR 15-90/hour

Eta AQUARIIDS Class 1, Peak expected 6 May 2015 ZHR 70/hour

Thanks to all who have provided positive feedback on this column and on my recent “getting Started” articles. Most appreciated.

Please send any reports, questions or enquiries about Meteor Scatter in general or the digital modes used to Kevin VK4UH