VHF/UHF – An Expanding World

David Smith VK3HZ

Weak Signal

David Smith - VK3HZ

There has been a bit of tropo action during the month with openings across to the west from the eastern states.

On the evening of September 21st, signals were strong between VK5 and VK2. Leigh VK2KRR at The Rock in central NSW was putting 5x9 signals into the Adelaide area on 2 m working Garry VK5ZK, Jeff VK5GF and several others. John VK2YW in Wagga also worked Garry VK5ZK for his first VK5 contact, followed by several other VK5 contacts. David VK5AYD in Coober Pedy also worked a number of stations in Adelaide for the first time.

The following evening, signals had dropped right off. However, VK6DZ reported hearing VK5VF on 2 m at 4x1. VK5AKK reported hearing VK6REP on 2 m at 5x1.

On the 23rd, things improved with good propagation between VK2, 3, 5 and 7. On 1296 MHz, Mike VK3KH worked Garry VK5ZK (5x1) for the first time and Phil VK5AKK (4x1). The VK7RAE 2 m beacon (now GPS-locked) was also being heard in VK5, peaking to S9 at one stage. Leigh VK2KRR was putting a big signal into Adelaide on 1296 MHz working VK5ZK (peaking to 5x9+20), VK5GF (5x9) and VK5AKK (5x9). Leigh was also seeing faint traces of VK6REP on 2 m, peaking to 4x1.

Next day, the good conditions continued. Phil VK5AKK made it across to Canberra on 2 m working VK1CJ, VK1DJA, VK1BG and VK1KW. Phil then worked Steve VK2ZT (5x1) on 2 m over a distance of 1240 km. Brian VK5BC also worked Steve.

Barry VK3BJM also got into the fray:

Having spent Thursday 23rd September in Royal Melbourne Hospital in a state of anaesthetised ignorance of what surgeons were doing to my knee, I was a little slow in turning on the FT-736r on Friday morning. In fact it was nearly lunchtime (0135z 24/9/2010) when I took a look west to the VK5VF 2 m beacon, having not heard anything on 144.1 MHz. Knee injury not withstanding, you could have knocked me down with a feather - VK5VF was 599, pushing into the red on the guessometer.

I returned to 144.1 and heard Brian, VK5BC, calling; he was 56. I called him and received a 52 - this was with less than 20 watts, as I hadn't turned on the AM-17 at that stage. Gordon, VK3EJ, was about and 57 off the side of my array.

I then took a look to the northwest; VK3RRU in Mildura was 589. VK5RSE was only 569 on 2 m, though; the better enhancement was to the west/northwest of me. At 0156z, I logged the VK5VF 70 cm beacon at 419; I couldn't hear anything of the 23 cm beacon.

At 0208z I worked Phil, VK5AKK, on 144.1; he was 59. At 0211z, Gary VK5ZK was worked at 54. Attempts on 70 and 23 cm with Phil, and 23 cm with Gary were, sadly, unsuccessful. QSB was starting to set in on VK5VF 2 m, but it remained audible for the rest of the afternoon at about 529 or so. It was back up to 569 when I took a peek before hitting the sack, at around 1000z.

The next morning (Saturday) offered nothing from VK5VF, though Bill VK3LY was worked from Nhill at 56 with QSB, and Peter, VK5PJ, was worked at 53 via AE. At this time the VK Logger was down, due to an ISP issue. Adam, VK4CP, had it running again by 2252z.

Sunday morning, VK5VF was back; I logged it at 549 at 2210z; VK3RRU was 539 at 2212z. At 2203z, VK5BC was in the log at 51; Geoff VK3FIQ was a healthy 58 from Stawell. Andy VK5LA followed at 2316 at 51-2. Then, having been overstimulated by what the Hepburn Chart suggested might be possible and the VK5VF 2 m beacon getting up to 579 at 2329z, I ran a keyer towards David VK5AYD in Coober Pedy, and David ran one at me. Sadly, apart from numerous meteor pings, no tropo-supported contact eventuated. At 0032z, Peter VK5PJ was worked on 144.100 at 57, and 432.150 at 41.

Weak Signal First Experience

Ian VK1FOTO enjoyed his first time with portable SSB operation on 2 m:

Wow! What a morning. Well worth the effort and definitely something I want to try again!

This morning (October 8) I got up nice and early all inspired to give some 2 m SSB a go from Red Hill (QF44NP). Admittedly, I got there a bit later than planned, but still I was on the air by about 0810hrs local time.

Straight away there was activity heard and the calls were being made. In the end a one hour effort resulted in successfully making 6 contacts on 2 m and 2 contacts on 70 cm - glad I bothered to check the SWR of the dipole last night on both bands so that I knew 70 cm was an option. I also heard quite a bit of activity down around 4/1 to 5/1 but those of which I tried could not hear me. That said though, I made a partial contact to VK3DUT which I was rather happy with.

I could hear VK3DUT 5/1 without a problem, but in the end he could only get a partial on my call sign (reporting VK1F something) and reported me at 4/1. Eventually this path faded so I'm wondering if that was maybe my first attempt at some aircraft enhancement??

That also said I was very impressed with the contacts I made to VK2DO down the coast at 5/8 and also VK2GKA in Penrose, NSW. Oh, and I did have another partial contact with VK2KOL in West Sydney but in the end all he heard of me was VK1.

So in the end the list of contacts were:

VL2DO - Long Beach, VK1CJ, VK1BG, VK2GKA – Penrose, VK1PWE and VK1KW

Partial contacts with VK3DUT and VK2KOL

Heard clearly, but no contact with VK2EMA – Tottenham.

And this was all done with a simple dipole and an FT-817ND transmitting 5 W. It is truly impressive the range increase you get with SSB compared to FM. That smaller bandwidth really makes a change, and also the fact you can have completely readable signals that aren't even registering on the S-meter.

One other good thing was that setup and tear down each took less than 5 minutes. So minimal hassle on the way to work of a morning and definitely do-able when dressed in a suit.

I definitely look forward to doing this again! I'm impressed by the level of activity and the ease with which one can have a pretty good level of participation (minimal antenna setup, minimal power level). Plus, I'm now really keen to have a week-end when I can get my beams active!!

VK1FOTO Portable Setup

New 47 GHz VK3 State Record

Charlie VK3NX and David VK3QM have been exercising their new 47 GHz setups. Charlie reports:

David VK3QM and I have been working on getting active on 47 GHz. In addition this new enthusiasm has seen David make a last run attempt at getting his much awaited 24 GHz system operational. As it stands we now have some reasonably well performing 47 GHz transverters operational and decided recently to see what can be achieved as well as taking the opportunity to try some 24 GHz contacts.

Both 47 GHz transverters are based around ready-built Kuhne 47 GHz transverter modules. Both modules are reported to be delivering 0.170 mW and a noise figure of around 6.6dB. To these we built and added the LO chain consisting of a G8ACE OCXO running at 122.250 MHz feeding a DB6NT 12 GHz LO multiplier kit. These deliver well in excess of 40 mW (Up to 80 mW!) to the transverter at 11736 MHz.

David fabricated two 120 mm horns which theoretically would deliver 25 dB of gain and after packaging up our assemblies and running some initial tests at my place we were both keen to see how we would go on this band.

On October 11th, I headed up to our field day site in the Barabool Hills and David became the rover station. Initial contacts at 5 km and 19.6 km proved very easy and having already surpassed the previous VK3 record of 18.1 km on this band we were confident of extending it even more. David proceed to a spot at 28.2 km distance and again at 29.2 km the signals on both 24 and 47 GHz were still good.

At 29.2 km, reports of 52/53 indicated that we might be reaching our limit. The day was warm at about 24 degrees C at this stage and the humidity was in the mid 60's. Our initial path loss calculations had us max'ing out at around 30 km. We decided to try a greater distance and to our surprise a Line Of Site path at 0429 UTC from QF21CU to QF12WC produced 5x3 signals both ways over a 39.0 km path.

The improvement from the 29.2 km path was put down to a much better take-off.

Given that there was still some headroom in our systems, we decided on trying yet a further path and after finding a location at 47.5 km distance and after some initial QSB, David and I had a 5x1 /5x1 contact on SSB at 0512 UTC. Unfortunately I had other commitments and we were unable to try any greater distances.

It was very gratifying to work these distances with such a modest setup and we are already planning the addition of 1 ft dishes and increasing our power from 170 uW to about 20 mW. We are looking forward to trying over greater distances and more importantly, exploring propagation on this band. We were both extremely pleased with how both transverters worked and how stable the OCXO's were in practice. We were able to "chat" for about 10 min each time without the need for retuning and I feel that our weak signal capabilities were enhanced by using free-running local oscillators as opposed to PLLs.

As an aside we also had some excellent contacts on 24 GHz with signals always 59+ both ways. Both 24 GHz systems run between 100 and 600 mW into 1 ft dishes and employ similar OCXO and multiplier chains. We also look forward to trying over longer paths on this band.

New 24 GHz VK2 State Record

Following on from last month's report, Doug VK4OE advises that he and Wayne VK4WS have been busy and have established a new VK2 distance record for 24 GHz. Doug writes:

I just thought a short mention here is in order to say that Wayne VK4WS and I this afternoon (1/10) increased the VK2 distance record for the 24 GHz band to 170.5 Km. This was the same distance and same path (give or take twenty metres or so) that we used for extending the VK4 distance record four weeks ago.

The reason that it is essentially the same distance is that the car park that serves the 'Best-of-All' Lookout on Springbrook Mountain actually straddles the Queensland-NSW border. Four weeks ago we did try to 'do' the VK2 record as well, but increasing rain and weak signals at my end precluded that.

Earlier this week after adding a low noise pre-amplifier in my IF line, Wayne and I brought both units together and optimised their performance on both Tx and Rx. We reckon that we obtained at least a 6 dB improvement, which has led to today's contact being easy to complete (after some initial headaches associated with dish alignment and rainforest tree leaves a few hundred metres away from where I was).

As there was some rain on the path (closer to Wayne's end this time) we reckon that there is still a good deal of potential left in the performance of the two transverters with respect to possible further extensions of distance records for this band.

Please send any Weak Signal reports to David VK3HZ

Digital DX Modes

Rex Moncur – VK7MO

WSJT9 has now been publicly released as a beta version. It includes:

- Echo Mode for EME station performance testing

- ISCAT for ionscatter on 6 metres

- An improved detector for FSK441 which gives fewer garbage decodes

- Experimental mode JTMS for meteor scatter

- Experimental mode Diana for EME

- An improved GUI

It has been found that the timing of echoes in Echo mode can be out due to latencies in some versions of the Windows operating system and specifically XP. The problem can mean the receiver is only listening to half of the period that echoes are received and thus give lower echo values than should be the case. This has been resolved in revision r2177 and should be sorted out in the next public release of the program.

Dave VK2JDS, Phil VK4CDI and Rex VK7MO have been testing the Diana mode on 1296 EME. Dave has reported some timing problems with this also, which should be resolved in the next release of the program. Initial tests show that its performance is a few dB below that of JT65c at 1296.

The VK-ZL meteor scatter group has been testing JTMS on the weekend activity sessions. While the results show it decodes around 5% more characters on stronger pings, it is no better than FSK441 on weaker pings. Overall we have concluded that the small advantage of JTMS is not sufficient to justify a change and, at least for the time being, activity sessions will continue on FSK441.

GPS-Locked VK7RAE Beacons

Joe VK7JG has now installed the GPS-locked 6 and 2 metre VK7RAE beacons at Don Head, Northern Tasmania. The details are:

- 6 metres - 50.057 MHz, 20 watts to omni-directional antenna, idents every 45 seconds.

- 2 metres - 144.474 MHz, 20 watts to omni-directional antenna, idents every 5 minutes.

Tests on 2 metres show the beacon frequency to be within 0.05 Hz which is as close as one can measure at a distance due to tropo-scatter spreading. The two-metre beacon has almost 5 minutes key down period to allow for very narrow bandwidth experiments such as looking at the variation of tropo-scatter spreading which it is expected will decrease during ducting. Because of the long key down period, it is also useful for long term meteor scatter monitoring for those within 2000 km. If you tune to 144.473 you should copy pings at 1000 Hz plus/minus the Doppler. 1000 Hz should give shorthand decodes of R27 at a DF of -118 Hz on WSJT's FSK441. Counting the number of R27 decodes over an evening will give you an idea of the variation of meteor activity and the variation of the DF some idea of the variation of meteor scatter Doppler on 2 meters. A similar test could be done on the 6 metre frequency where the pings are much more frequent.

Thanks go to Joe VK7JG for modifying and setting up the beacons and providing the PA units, Dave VK3HZ for designing and constructing a reverse DDS exciter that derives the carrier from the GPS, the Northern Tasmanian Amateur Radio Club for funding the exciter units and Rex VK7MO for providing the GPS unit.

Please send any Digital DX Modes reports to Rex VK7MO

The Magic Band – 6 m DX

Brian Cleland – VK5BC

6 m has continued to be disappointing with very little to report. The equinox came

and went with no significant openings. The only activity has been from northern areas of Queensland and Darwin.

Mark VK8MS in Darwin has managed some good contacts to the north in the second half of September. Openings occurred on the 15th, 16th, 18th, 20th 21st, 22nd and 26th September and 1st October. Mark has worked several Japanese & Chinese and East Malaysian stations as well as Willem DU7/PA0HIP, Charlie VR2XMT and Joel KG6DX in this period. Good work Mark.

Gary VK4ABW near Townsville reports the following:

20th Sep, early evening BY TV rose to S9 and I caught up with Ken (JE1CUS) S5 at 1100z. The band was not very stable and Ken called a few more times but there were no takers.

22nd Sep, early evening BY TV again, rose +10db and I worked Hide (JR6EXN) S9 at 1145z for a quick one. I had both JA2IGY and JA6YBR beacons in for about 30 minutes before they faded away.

23rd Sep, afternoon TEP BY TV rose quickly to +20db and I worked Mitsuru (JA9SJI) S7 at 0605z. He called many times but there were no takers this end.

28th Sep, early evening BY TV rose to +20db and I heard Hide (JR6EXN) working Mark (VK8MS) shortly after. The JA2IGY beacon was S3 for about 20 minutes but no other stations were heard.

Meanwhile John VK4FNQ in Charters Towers worked JR6EXN on 22nd September and then on the 23rd worked several JA's including JA2BNV @ 59 SSB, JH1WHS @ 59 SSB JF2RDG @ 57 SSB, JK1JXB @ 55 SSB, JA1RJU @ 59 SSB, JL3LSF @ 55 SSB. John VK4TL also worked several JA's on the 23rd.

On the 1st October JA's were worked as far south as Yeppoon by Ray VK4BLK and Sapphire by Brian VK4EK. Brian reports he worked JA1RJU 04:55UTC @ 5/9 SSB and JA3EGE 04:55UTC @ 5/8 SSB. At the time JS2IR DATA ON 43.659.5 MHz was peaking 5/9.

Willem DU7/PA0HIP has recently completed building and erecting 2 x 7-element yagis on the 28th September. Willem had immediate success and reports working several JA's on the 28th and on 1st October VK4's TL, ABW, FNQ all 59+ and VK4ZFC 57. Willem reports signals stronger than he had previously received. It will be interesting to hear Willem again during our summer season. Willem's antennas are pictured below:

Brad VK2QO who coordinates the meteor scatter contacts each morning reports the following:

Not a lot of contacts this month but when they were made some big signal reports were exchanged with 59 both ways but most were around the s1 to s5 mark.

The main showers for September were the September Perseids and the delta-Aurigids both class 2. I was absent for two weeks this month while a few others helped me mount my 6 m beam on top of the new tower. Here are some contacts made for during those two showers:

The September Perseids:

8th: Glenn VK7AB 53 at 970km, Frank VK7DX 54 at 896km, Dave VK7DD 51 at 864km, Brian VK4EK 53 at 1264km, Ron VK4CRO 51 at 812km...

9th: Brian VK4EK 53 at 1264km, Glenn VK7AB 55 at 970km...

10th: Frank VK7DX 55 at 896km, Glenn VK7AB 52 at 970km...

11th: Wayne VK4WTN 53 at 1049km...

Then a two week absence.

The delta-Aurigids...

28th: Wayne VK4WTN 52 at 1049km, Brian VK4EK 55 at 1264km...

29th: Frank VK7DX 59 at 896km and again at 55 half an hour later, Brian VK4EK 57 at 1264km.

A few stations are having a lot of success with the digital modes on 50.230 such as FSK441, JT65 and some of the new modes such as ISCAT. SSB contacts take place on 50.200. The 2000 km barrier was finally broken when Frank VK7DX and Brian VK4EK had a contact at 2058 km on the 28th September at 2235z. Congratulations Brian and Frank.

I apologise for the lack of notes in the last couple of magazines but I was away on an overseas holidays. Fortunately for me and unfortunately for 6 m operators there was not a lot to report. Let's hope the coming summer season provides some surprises.

Please send any 6 m information to Brian VK5BC