
VHF/UHF – An Expanding World

David Smith VK3HZ

Weak Signal

David Smith - VK3HZ

It's a short month this month with the AR deadlines being brought back a bit to give you the magazine a bit earlier. Nevertheless, there's been a bit happening of interest.

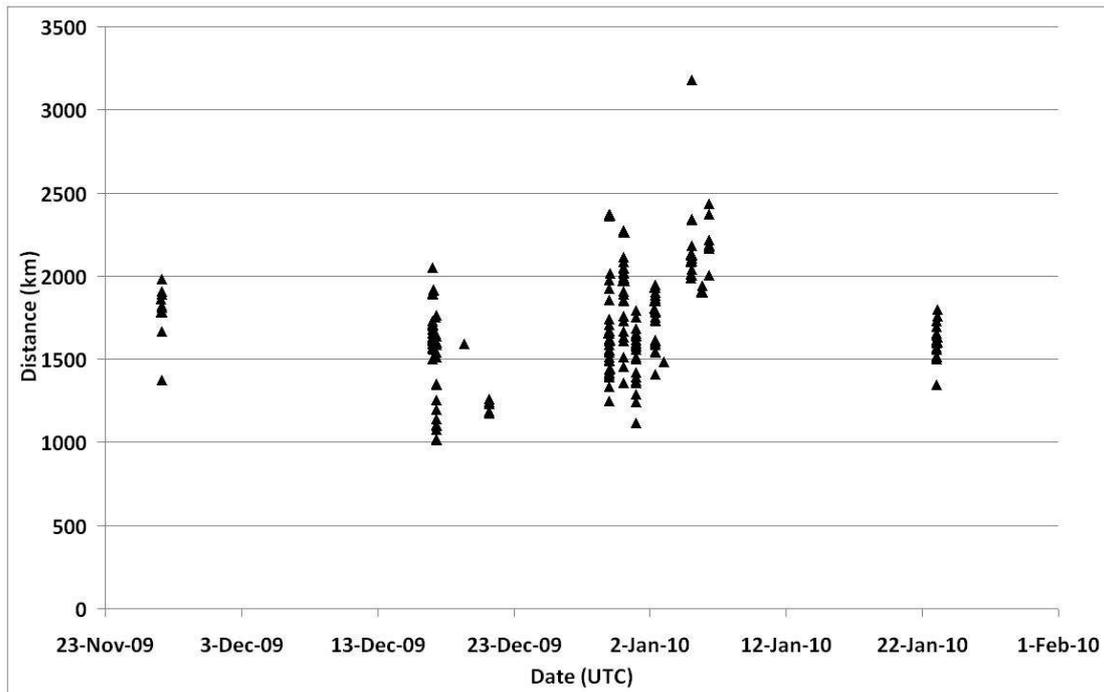
On January 23rd, a large Sporadic E opening produced some good 2 m contacts. At 0054Z, Ron VK4DD worked Brian VK5BC over 1567 km. Then followed a series of contacts involving VK4's DD, CDI, JMC, OX, ARN, ACE, WR, EKA and EME with VK5's BC, ZK, NY and DL. At 0137Z, Ray VK4LK further north worked VK3AMZ (1730 km) and VK3ZRT. By 0150Z, the skip had shortened so that VK5BC worked VK2XW (1345 km). After a short lull, the E's moved further south allowing Rex VK7MO to work VK4JMC and VK4DD. By 0300Z, the band had closed.

On the evening of January 28th, tropo conditions were excellent between VK5 and VK6. At 0715Z, Phil VK5AKK worked Wally VK6WG on 2 m (5x3) and 70 cm (5x1). By 0930Z, Brian VK5BC reported that both the VK6REP and VK6RST 2 m beacons were 5x9. He also worked Wally on 2 m (5x9) and 70 cm (5x5). VK5ZK and VK5ACY also had good contacts with Wally.

By the following morning, conditions had shifted, strongly favouring an inland path to Leigh VK2KRR. At 1930Z, he reported hearing many VK5 beacons and repeaters up to S9+. At 2000Z, the VK6RST 2 m beacon was heard at 5x1 – a distance of 2675 km. Soon after, VK6REP (2310 km) was heard at 5x1. He then worked Wally VK6KZ via the VK6RMS repeater (2817 km distance to the repeater). He also worked simplex to Max VK6FN in Manjimup (2821 km). The signal was a stable S5 for nearly an hour, and Max was only running a 1/4 wave vertical with 60W. Signals were building and at 2115Z, Leigh worked VK5s BC, AKK, ZK and GF on 23 cm - all at 5x9+ levels. At 2159Z, Wally VK6WG in Albany was worked on 2 m at 5x5 over 2648 km. At 2237Z, they made contact on 70 cm (5x1), setting a new VK2 record. They tried on 23 cm, but were unable to make a contact.

2 m Band Sporadic-E Summary

The season for sporadic E on 2 m is effectively over now. Based on reports logged on the VK Logger since the first Sporadic E contacts for the season, Rex VK7MO has prepared an interesting summary graph showing distances worked via Sporadic E over the season.



2 m Sporadic E Contacts

After the first burst on November 27th, there was a lull of 3 weeks until the next good opening on December 17th. The band opened with a vengeance on December 29th continuing each day (except the 4th) until January 6th. The longest-distance contact (3182 km) from ZL1IU to VK5AKK occurred on January 5th – probably tropo-assisted sporadic E contact given the strong signals from ZL1 into VK3 at the time. Finally, as reported above, there was a good opening on January 23rd reaching to southern Tasmania.

East Gippsland Report

Norm VK3DUT is located between Bairnsdale and Lakes Entrance in East Gippsland. He is a regular on the VHF/UHF bands and sent in a short summary of the highlights for his summer period:

A few brief notes of my operation over last couple of months, between the 'salt mine' commitments of running a small, but very busy, blueberry farm. I do try to get on most mornings for a few minutes for regular A/E contacts to VK1/2 etc. Needless to say, I've also missed a few openings, especially the sporadic-E ones.

The QTH is about 50m ASL, surrounded with light to moderate bush and rising ground to the west, NW and the east - nothing too drastic but still a very noticeable attenuator, especially at the higher frequencies.

I run 4x7-el light-weight quads on 6m, 100 w to 4x13-el yagi's on 2 m, 10 w to 4x25's on 70 cm and a single 42-el on 23cm with 40 w. All antennas are homebrew (see photo).



The VK3DUT Antenna Farm

Some Log notes :

15/11/09 - heard VK5RSE at 5x5 which is fairly good for this loc and ended up working Russell VK3ZQB on 2 m S9++ then on 1296 at 5x2;

17/11/09 - worked Bill VK5ACY on 2 m on a long M/S burn S9+ both ways;

6/12/09 - heard DL8EBW digi sigs off the moon - first time;

10/12/09 - heard JE6EXN s1-2 off the moon (probably good enough for ssb?);

15/12/09 - VK7AC worked 2 m / 70 cm / 23 cm, VK7MO 2 m / 23 cm,

16/12/09 - VK7AC peaked S9+ on 23 cm, also VK7HDX 2 m and 70 and VK7JG on 6 / 2 / 70 - a very strong duct!;

17/12/09 - VK4BLK 2 m S4-5;

20/12/09 - VK5AKK 5x3, heard 5NY 5x4;

30/12/09 - Troppo & E's, 2 m -VK5DK, VK1BG, VK2ZRE, VK2KOL, VK7MO, VK4's LMB, JOO, FNQ, BLK, BKP, FP, VK7XX, VK7JG

30/12/09 - ZL1IU up to S9 on 2 m and S1-2 on 70 cm for my first ZL1 on 70 with only 10 w - 2337.5km, nil on 23 so far.;

31/12/09 - VK4FNQ, BKP, FP, EK, MDX, ZD;

5/1/10 - 2 m ZL1IU, ZL1RS E's this time;

20/1/10 - 2 m VK5AKK, VK5NY;

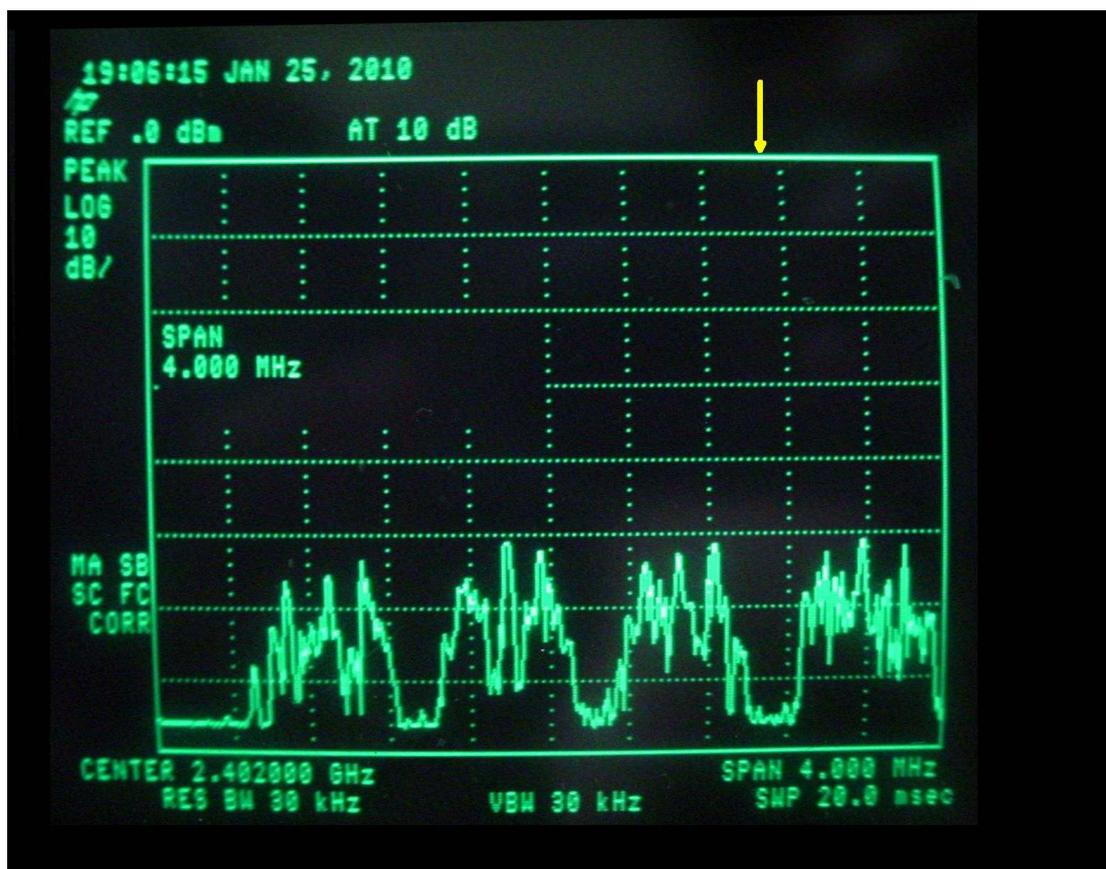
21/1/10 - VK5NY s4-5, VK5VF/b 529

Sadly I missed out on VK9NA (not sure if they worked any VK3) so I still need a VK9 on 2 m. So far, I have worked / confirmed VK1-9 and VK0 (Macquarie) and ZL1 - 4. I'm sure VK9 Norfolk, Lord Howe and Willis are within our reach at least on 2 m given the right opportunities as well as FK8 etc. but we won't hold our breath, Hi.

2.4 GHz Band and WiFi Interference

Rod VK4KZR, in the northwestern suburbs of Brisbane, has been tapping the ether again with his Spectrum Analyser. He attached it to his 2.4 GHz dish, 12 m up his

tower, pointed down the street and then let the Analyser collect data over a 5-minute period in Peak-Hold mode.



Spectrum – 2400 to 2404 MHz

The arrow indicates the standard weak signal operating frequency for Australia – 2403.1 MHz.

Rod's results show that, even though there appears to be a quiet spot around our current focus frequency of 2403.1 MHz, there is lots of noise not far away. In practice, the band is very noisy to the point of being almost unusable for weak signals in a suburban area. So why do we persist with this frequency?

Our frequency allocation on 13 cm extends from 2400 to 2450 MHz. We also have a small allocation from 2300 to 2302 MHz.

We could move operations to 2400.1 MHz, just beyond the bottom of the WiFi allocation. This may not solve all interference issues as there are devices like AV Senders that operate in this area using wideband FM. As well, this area is reserved in the Bandplan for satellite operation, although it seems that no active or planned satellites would be operating below about 2400.25 MHz.

The other option, as has been raised before, is to move all operations to the 2300 to 2302 MHz segment. The EME community is already operating in this area for the very reasons discussed here. The problem with this move is that, for most current operators, such a frequency change would involve more than just a crystal change. Many modern 2400 MHz transverters, such as the Minikits / VK5EME design, use filters etched on the PCB. These filters are too narrow to allow operation on 2300 MHz. So, for many, the frequency change would involve buying / building a new transverter.

The other downside to moving to 2300 MHz is that New Zealand - the only country

who we could potentially communicate with (terrestrially) on 13 cm – does not have access to this frequency block. The ZL's are currently pushing for their weak signal operations to move down from 2424 MHz to somewhere between 2396 and 2404 MHz.

The WiFi interference situation is only going to get worse. Perhaps we need to bite the bullet and make the change to either 2400 MHz or 2300 MHz before too many more people become active on 13 cm.

VK3ER Field Day setup

Peter VK3QI has been busily improving the microwave capabilities of the Eastern and Mountain District Radio Club (EMDRC) VK3ER Field Day station. VK3ER is a very professionally run station that always scores well in the 24-hour multi-op section of the VHF/UHF Field Days. However, they were missing out on points by only being operational on bands up to 23 cm.

Additions to the VK3ER setup now include:

- 1296 MHz – 400W to a 1.2 m offset-fed dish (dual 23/13 cm feed)
- 2403 MHz – 180W to a 1.2m offset-fed dish (dual 23/13 cm feed)
- 3400 MHz – 2 W to a 0.8 m offset-fed dish
- 5760 MHz – 2 W to a 0.8 m offset-fed dish
- 10,368 MHz - 3 W to a 0.8 m offset-fed dish

The 3, 5 and 10 GHz Transverters are mounted at the feed points of the dishes with the common 145 MHz IF, 10 MHz GPS-locked reference signal and control signals fed up to them.

The antenna mast is pictured – less the 10 GHz dish which is still to be attached.

Well done Peter, and we look forward to some big Field Day results from VK3ER.



VK3ER New Microwave Field Day Mast

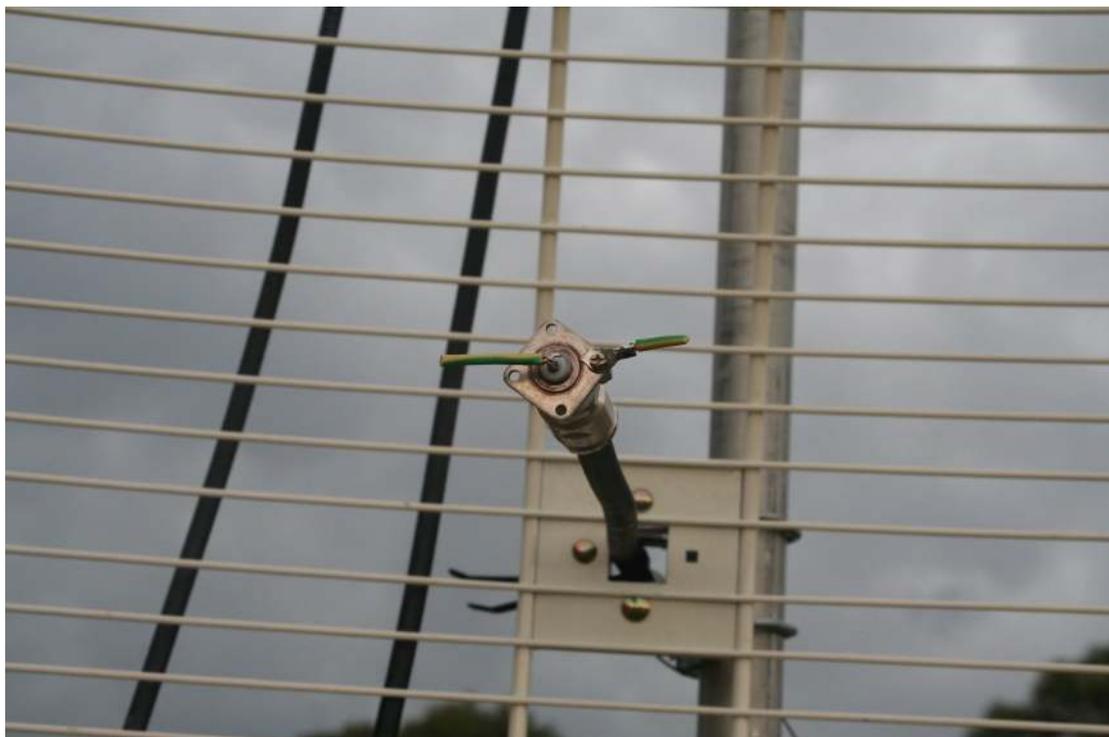
VK1DA Summer VHF/UHF Field Day Activities

Andrew VK1DA sent in this report of his efforts for the recent field day:

Dale VK1DSH and I operated from Mt Ginini for the Summer VHF/UHF field day contest. The weather was initially fine but a thunderstorm developed by late afternoon. By about 7pm this had cleared and the night was eventually clear and

relatively mild and even the wind was only slight overnight.

The station was operated on the lower four bands (6 m to 23 cm) and on 3 cm. The 13 cm band was to have been used but a vital component, the feed for the grid dish had been left at home. By late Saturday a replacement feed had been built (see picture) in the hope that it would allow some contacts to be made with the only other station operating on 13 cm, which was Andy VK2AES operating from east of Bungendore. The makeshift feed was put into use on Sunday morning and turned out to be sufficient for a good contact to be made over a 70 km distance.



VK1DA Makeshift 13 cm Feed

After perseverance and patience from Dave VK2JDS several contacts were made with him on 23 cm after initial easy contacts on 2 m and 70 cm.

The first successful contact with Dave on 23 cm took about 45 mins of trying various things on both SSB and CW. It's only 272 km - not a huge distance for 23cm - but the terrain is not friendly and our location on the south side of the hill is not ideal for northerly directions. Then the next morning we repeated that success, which was great.

By the end of the event the log contained about 146 contacts across all bands. Activity was lower than hoped for, which we thought may have been due to the recent intense activity of many keen operators trying to work VK9NA, plus we knew of one rover operation, which unfortunately was not contactable from our location. The thunderstorm activity in southern VK2 had affected several stations in our region, in particular the Kosciusko operation, and the rain in Victoria also probably discouraged some operations there on Sunday.

Despite this we had an enjoyable time on the hill and I was particularly happy to make the contact with Andy on 13 cm using the makeshift dish feed. Proves the benefit of taking spare cables and connectors to your field events. Dale's 3 cm contacts were also very helpful for our score.

But the main thing is we did get out in the field and had some fun, talked to friends old and new, used the radios and got more experience to make next time even better.

February's Missing Bit

Those reading last month's column may have noticed that a section of it was missing at the bottom of page 17. As this included part of a contributed report, I've included the missing part below:

"... At 0520Z, Phil VK5AKK worked Wally on 23 cm at 5x1 over 1897 km. At 1030Z, Mike VK3BDL worked Wally on 2 m (5x2) and 70 cm (5x2) over a path of 2447 km. Wally was also worked on 2 m by Jim VK3II (5x3 at 2483 km) and Graeme VK3GL (5x1 at 2476 km).

The following morning, conditions were good up along the VK2 coast. At 2040Z, following a JT65 contact, Steve VK2ZT worked Rex VK7MO on 70 cm SSB at 5x6 over 1196 km.

So, a bumper start to 2010 and I'm sure there's plenty more to come.

Northern VK6

We don't hear very much, if anything, about weak signal activity in northern VK6. Steve VK6HV located in Wickham, approximately 1600 km north of Perth sent in a brief report on recent activity in the area:

VHF tropospheric ducting has arrived to the Pilbara region in the North West of Western Australia as usual and on schedule. In my 12 years in the townships of Karratha and Wickham, I can't say I remember NOT having numerous openings during the hot and humid summer months. And again, the beginning to this summer has been no different. I've just seemed to take a bit more interest in it this year..."

Please send any Weak Signal reports to David VK3HZ

Digital DX Modes

Rex Moncur – VK7MO

JT65M on Six Metres

During January, a number of stations were seen to be experimenting with JT65M on 6 metres using meteor scatter. In comparison with two metres, the duration of meteor pings are around 9 times (frequency ratio squared) as long and the strength about 27 times (frequency ratio cubed) as much. The longer duration pings allows the use of the slower JT65M mode which works some 15 dB lower into the noise than FSK441 used on two metres. The improved weak signal performance of JT65M combined with the increased signal levels more than overcomes the higher external noise and lower antenna gains at 6 metres and QSOs can typically be completed in 5 to 10 minutes compared to 20 to 40 minutes on 2 metres. Stations seen on the VK logger experimenting with JT65M during January 2010 included, Darrell VK2BLS, Gerry VK2APG, Scott VK4CZ, Brian VK4EK, Phil VK4FIL, Glenn VK7AB and John VK7XX. In line with the WIA band plan stations are using the focus frequency of 50.230 MHz.

Newcastle Channel 5a TV as a Frequency Reference and Propagation Indicator

Back in 2006, Rex VK7MO reported (GippsTech 2006 page 60) that the Newcastle

channel 5a TV video carrier provided a very stable frequency reference with a drift of less than a mHz over 2 months on a frequency of 138.276025 MHz (+/- 0.1 Hz). Within a few months of that report the frequency jumped to around 138.276011 MHz and was much less stable. Recently, shortwave listener Todd Emslie reported in the VK logger forum on his method of measuring TV video carrier frequencies to 1 Hz precision using the frame frequency of TV stations in Sydney as a the reference. Todd concluded that Sydney's ABN2 and TCN9 are both equally effective as accurate reference sources for the 15625 Hz TV-derived unit, but that TEN10 and (especially) ATN7 are totally useless as reference sources. A comparison with Rex's measurements of Newcastle 5a at the same time showed an error of less than 30 mHz.

In these tests Rex was monitoring 5a video carrier on tropo-scatter by using Spectrum Lab with a bin-width of 1 mHz. Rex reports that the 5a video carrier does vary on a daily basis by up to 250 mHz. If we take the nominal frequency as 138.276 MHz then the actual frequency typically varies from 10.7 Hz high on a hot day in Newcastle to 10.9 Hz high during a summer evening and is likely to rise further during the winter. While winter measurements still need to be made it appears that even in its current and less stable condition Newcastle 5a can provide a reference to within 1 Hz based on 138.276011 MHz.

For these tests Rex was monitoring what is a very weak signal via tropo-scatter over a 1142 km path by using very narrow binwidths on Spectrum Lab and comparing against a double oven GPS (2 parts in 10^{11}) locked HP synthesizer with a 10 mHz resolution. The multi-pathing on tropo-scatter introduces spreading of the signal by around +/- 30 mHz so the error should be no worse than 50 mHz. The effect of tropo-scatter spreading means that narrowing the binwidth below about 100 mHz by factors of 10 does not provide a full 10 dB improvement in Signal to Noise ratio (S/N) as some of the energy is lost. Nevertheless, narrowing from 100 mHz to 10 mHz still gave an 8 dB gain in S/N while a further narrowing to 1 mHz gave only an additional 3 dB. Still for those who might be using Newcastle 5a as propagation monitor it is worth using very narrow bandwidths of 10 mHz or less to find the signal. The downside of using such a narrow binwidth is that at 10 mHz the receiver must be stable within the bin for 100 seconds.

Unfortunately, Newcastle 5a will close in the next year or so with the conversion to digital and a new propagation monitor and frequency reference will need to be found. VK7 is working on up-grading its beacons with GPS locking. Of course the upside of the closure of channel 5a is that it will eliminate a source of interference for those close to the TV transmitters.

Please send any Digital DX Modes reports to Rex VK7MO

The Magic Band – 6 m DX

Brian Cleland – VK5BC

January continued to be an interesting month on 6 m. Good VK 'E' openings continued with some further interest being added by the Norfolk Island VK9NA and YJ0MM DXpeditions.

Michael VK3KH reports:

The team from the recent VHF / UHF / uWave DXpedition to Norfolk Island always knew Six Metres would play an important part in our operation, but we were definitely not ready for what eventuated.

Arriving on the island late on the 1st January, the gear was picked up from the Freight company early the next morning, Saturday 2nd. The Six Metre gear consisted of an FT897d running 100 w to a 3 element Cushcraft yagi ,4 metres high. The gear was set up at the accommodation and was operational by 4pm that afternoon. We scanned the bands, and put out a few calls. Nothing happened, then at 4.25pm local NI time (0455z) on 50.125 out of the speaker jumped Adam VK4CP at 5/9. Then it started... and for the next 3.5 hrs Michael (VK3KH) and Alan (VK3XPD) worked 75 stations. This included A35.

Sunday 3rd January at 8.30am local time (yes, that early), 6 metres came to life again and over the next 30 minutes we worked 21 stations. We then went off to breakfast and the Sunday Market. We returned at 10.45am local and 6 metres was still open. Alan JUMPED back on the mike and almost immediately worked E51CG & 3D2JS, he then continued working stations till Noon when we stopped for lunch. Alan, a previous 6 metre sceptic, was definitely enjoying working the pileup.

After lunch we returned to 6 metres and continued working stations until 4.16 pm local time, when the band closed. All in all, an amazing day with 71 stations worked including VK4UH (Kevin, who was to join us several days later) while he was mobile on Bribie Island in his car.

Over the next few days, Six Metres slowed as the Sporadic E seemed to go into hibernation. On Thursday 7/1 Kevin (VK4UH) took over the mike and worked 45 stations, including VK6JJ to give us our 7th Australian call area. He also worked a 2010 commemorative station VI2AJ2010.

It was not until the last few days of operation that it returned for one final blast. We had several hours of 6 metre openings with another 70 contacts added. I guess that was as it should be, as we were there to work other higher bands as well.

In Summary, after 10 days of operation, VK9NA had worked 6 countries and 61 grid squares for a total 261 contacts on 6 metres. Call areas include A35, E51, 3D2, ZL1,2 3 & 4 and ZK1,2,3,4,5,6,7 &9. The longest distance worked was to VK6JJ, at a total of 4922km. For many of those contacted it was their first on 6 metres to VK9N. A good result for everyone. Thanks to all who worked hard to contact us.



Michael VK3KH and Alan VK3XPD working 6 m from Norfolk Island

Late in the month another DXpedition using the callsign YJ0MM took place from Vanuata and it was great that they activated 6m. Adam VK4CP was again alert and first to work them on 25th January. Contacts were then complete with ZL4LV, ZL1RS, ZL3NW, ZL3JT and finally with Norm VK7AC. Australia Day 26th proved to be better with several contacts into VK4 and then extending to VK3 and eventually contacts into VK5 with contacts complete with VK5's BC, ZK & PJ up to 5/3. The 27th was also successful with several contacts being completed into VK4 including northern VK4, VK2 and again VK3 and VK5NY. They also completed a contact with Paul A35A in Tonga.

The above again showed that many contacts are possible into the Pacific Islands areas and it has been great to have at least a couple of DXpeditions activate 6m.

Meanwhile Paul A35A from Tonga continued to regularly work into VK/ZL and logged the following;

1st January

VK5ZK 50.110 CW 529, VK4WR 50.110 USB 55, VK4CZ 50.110 USB 59, VK4EK 50.110 USB 57, ZL1AVZ 50.110 USB 57, VK2DJ/P 50.110 USB 55, VK4FI 50.110 USB 57, VK4ADC 50.110 USB 53, VK4KLC 50.110 USB 57, ZL1AVO 50.110 USB 55, VK4CAG 50.110 USB 55, VK4HG 50.110 USB 55, ZL4PW 50.110 CW 539.

2nd January

VK9NA 50.125 USB 57, VK2HN 50.110 USB 59, VK2APG 50.110 USB 59, VK2ZQ 50.110 USB 55, VK2IR 50.110 USB 57, ZL3AAU 50.110 USB 57, ZL3NW 50.110 USB 57, ZL3ADT 50.110 USB 55, VK2PB 50.110 USB 55, VK2JDS 50.110 USB 55.

3rd January

VK2FAD 50.110 USB 55, VK4AHW 50.110 USB 59, VK4DDC 50.110 USB 59, VK9NA 50.110 USB 59, VK2BA 50.110 USB 59, VK4MA 50.110 USB 57, VK4DD 50.120 USB 55, VK4RY 50.120 USB 55, VK4HJ 50.120 USB 55, VK4CWJ 50.120 USB 33, VK4KAC 50.120 USB 55, VK4BEG 50.110 CW 339.

7th January

ZL3AAA 50.110 USB 57, ZL3JT 50.110 CW 559, VK7GK 50.110 CW 549, ZL3NW 50.110 CW 579.

8th January

VK7XX 50.110 CW 599, VK7GK 50.110 USB 55, VK7XX 50.110 USB 59, VK3DUT 50.110 USB 59.

14th January

VK2BCC 50.110 CW 559.

22nd January

VK3AUU 50.110 CW 538.

27th January

YJ0MM 50.110 USB 53, VK4DD 50.130 USB 57, VK4NA 50.130 USB 55, VK4CZ 50.130 USB 57. 28th January

ZL3NW 50.110 CW 539, VK2BHO 50.110 CW 559, VK7AC 50.105 CW 579, VK6KXW 50.105 USB 43, VK6RO 50.105 USB 33, VK6JJ 50.105 USB 53.

Well done Paul and good to see the month ending with contacts into VK6 (7000 km).

Willem DU7/PA0HIP in Lapu-Lapu City, Philippines continued to look for VK/ZL most days and was rewarded with some good contacts into VK2, 3, 4 and 5 on the 25th January. Willem also worked Norm VK7AC on the 29th January.

Victor E51CG Raratonga, South Cook Islands also worked into VK several days during January. On the 1st January Victor worked Garry VK5ZK, Roger VK5NY and Graeme VK4CAG then on the 2nd and 3rd January worked several VK2 and 4's and VK9NA. 4th January Victor had a good opening into VK7 working several stations including John VK7XX, Norm VK7AC, Laurie VK7ZE, Joe VK7JG and Dave VK7AAD and then conditions moved north and Victor worked Russell VK4BEG in Malanda, Col VK4CC and VK4HJ. Things then went quiet for Victor until the 27th January when the band opened early in the morning with good contacts completed into VK2, 4 and 5.

Dave VK9WBM Willis Island was also worked from VK2 and 4 on the 3rd January and on the 7th Dave managed good contacts with VK5ZK, VK5GF, VK5BC/p and VK7XX, VK7AC and finished the day working VK6OX and VK6SIX. On the 28th January Dave worked into ZL3.

Although there were some quiet days good local VK/ZL 'E's continued throughout the month. Although it had been a reasonably quiet summer on 6 m for VK6, late in the month there were some good openings from VK6 to the eastern states and ZL with a good opening on 30th January to ZL1, 2 and 3.

Please send any 6 m information to Brian VK5BC