
VHF/UHF – An Expanding World

David Smith VK3HZ

Weak Signal

David Smith - VK3HZ

There has been a bit of tropo action during September. The weather in Melbourne has been up and down like a yoyo – summer one day and winter the next. However, we've had some good high-pressure cells pass over giving good radio conditions.

On the evening of September 8th, conditions were good from Adelaide into eastern Victoria with Phil VK5AKK and Peter VK5PJ hearing the VK3RGI beacon on 70 cm for an extended period. The following morning at 1000Z, Bill VK5ACY worked Joe VK7JG on 2 m at 5x5 over a path of 980 km. They repeated the contacts on the 14th (5x1) and 15th (QSB up to 5x9).

On the afternoon of September 28th, Bob ZL3TY reported hearing the Newcastle Channel 5A TV at 5x7. At 0800Z, he worked Steve VK2ZT (5x9+) and Ross VK2DVZ (5x7) on 2 m. They then switched to 70 cm with 5x3 reports. Bob then worked Mark VK2AMS on 70 cm (5x5) and 2 m (5x1). Unfortunately, Bob was not operational on 23 cm.

AIS

With the imminent demise of the analogue TV transmission network, we will lose some important propagation beacons. As mentioned above, the Newcastle Channel 5A transmitter provides a good indication of conditions from VK to ZL. However, this will be shut down by the end of November.

A few years ago, the aircraft system ADS-B on 1090 MHz was looked at as a possible indicator of good tropo propagation. However, having run an ADS-B receiver here for several years, I have seen little extension of ADS-B coverage in different conditions. It's possible that for aircraft flying above the tropo layer, the signals passing through the inversion to ground may in fact be degraded by good tropo enhancement.

Another promising substitute is AIS (Automatic Identification System) used by ships to transmit information including their current location. AIS uses 162 MHz for signalling, so could be a good indicator for conditions on the 2 m band.

Bob ZL3TY recently started using AIS and reports:

Last week I installed a 5 el yagi and AIS receiver on 162 MHz. AIS (Automatic Identification System) is an automatic tracking system used on ships. The yagi is aimed west at the eastern side of VK while the receiver is connected via the Internet to MarineTraffic.com. The receiver was supplied at no cost by the University of the Aegean in Greece who run the Marinetransport project.

Initially I was receiving some Korean fishing boats working off the coast, out to about 100 km maximum, with one spot 300 km to the NW from a ship heading to Port Nelson. The ships logged are displayed on a world map on the MarineTraffic.com site. There are several receivers around the NZ coast, mostly logging ships near ports.

On Friday afternoon at 4.00 pm I noticed a spot from a ship in the Tasman from a VK2 near Sydney, then later at 4.50 pm there was one in mid-Tasman logged by my receiver. I checked Channel 5a and it was about S5, soon rising to S9.

Later in the evening at 8.00 pm worked VK2ZT on 2m, followed by VK2DVZ and VK2AMS, shortly afterwards worked all three on 70 cm. The AIS reports kept coming all along the VK2 coast from Sydney northwards, the furthest north being a ship about 100 km east of Brisbane.

Most of the ships transmit 12W, however there was one ship logged with a class B TX running 2W, located near Newcastle.

By Saturday morning the VK AIS reports were gone, however there were reports from ships in the north Tasman, one being 400km west of Northland. The last logged were two early on Sunday morning at 900 km in the north Tasman.

The AIS system will be a useful indicator of propagation in the Tasman for me, currently I use Ch5a at Newcastle but it will be gone soon. It will also be good for monitoring propagation north from here along the west coast to northern ZL. All international shipping is required to have an AIS beacon.

For more information on AIS look at Marinetraffic.com and Wikipedia has extensive coverage.

Use of AIS is obviously limited to the paths containing some over-water sections where shipping is active, such as VK-ZL and the Bight. However, in VK, these are the paths that provide the longest distance contacts. Also, the relatively low power of the ship transmitters would not provide quite the early warning that the 100 kW EIRP of Ch 5A Newcastle can.

For the last year or so, Leigh VK2KRR has been experimenting with AIS signals from his inland location near Wagga and has been reporting his findings on the Logger. His experience seems to show that even if the ships are at the end, or beyond the path of interest (e.g. to Adelaide), the AIS still provides a very worthwhile indication.

For more information, see the VK Logger Forum:

<http://www.vklogger.com/forum/viewtopic.php?f=47&t=10161>

VK3 Microwave Test Day

Planning for the VK3 Microwave Test Day has advanced. The date has been set to Sunday November 4th starting at 10am. Yes, that's in the middle of the Melbourne Cup Day "long weekend" but hopefully will be suitable for most.

The EMDRC have very kindly offered the use of their club rooms and grounds at 13a McCubbin St, Burwood (see http://www.emdrc.com.au/club_rooms.html for details). We'll be locating the test range across the park at the rear. There is a BBQ in the clubrooms that we will fire up for lunch.

VK4 Microwave Test Day Video

Following the recent VK4 Microwave Test Day, Adam VK4GHZ (aka Mr Logger) has produced an excellent video of the day covering, in simple terms, many of the techniques used to tune microwave equipment - highly recommended viewing for microwave "newbies". You'll find the video, in two parts, on the VK Logger forum at:

<http://www.vklogger.com/forum/viewtopic.php?f=31&t=10884>

VHF/UHF Field Day Scoring

A proposal for a change to distance based scoring has been published by Andrew VK1DA and Colin VK5DK. It follows several years of discussion among some of the

operators in the VHF/UHF Field days, who have found that the scoring system used in these contests seems to have problems for operators in country areas. This proposal has been developed recently after several months of discussion via email.

The sponsors of the proposal believe that instead of calculating scores on the basis of the grid squares worked, a distance based score would make more sense for vhf-uhf contacts and could be consistently applied in all parts of the country.

What about rovers? Rovers are stations who try to operate from as many different grid squares as possible, to maximise their grid bonuses. As a distance formula would not work well with rovers, it has been suggested that the rover stations would continue to use grid squares for their scoring. They would continue to make contacts with all stations, whether they were rovers or not, the contacts qualifying both operators for the points applying to their operating category.

The other major change proposed is the introduction of a separate category for the 6m, 2m and 70cm bands. This category caters directly for the large number of operators who have multiband radios such as the popular FT857, FT897, FT817, IC706, IC7000, TS2000 and who do not have equipment for any higher bands. This proposal suggests creating a separate category for stations limited to the 6m, 2m and 70cm bands. Colin and Andrew believe this will boost interest in these events.

The proposal is available on the net for all to read. The web address is vk1da.net where you'll find a link to the proposal. The net-based survey was planned to run for a month ending mid October, with a summary of views to be made available as soon as possible afterwards. Depending on the outcome of the survey, the proposal was to be updated to take up suggestions made, and a submission sent to the WIA contest manager and the VHF contests manager.

VK3 144.150 Net

The VK3 144.150 MHz Net held each Wednesday at 2030 local time continues to attract a good turnout. Michael VK3KH in Mt Eliza and Rob VK3MQ on Mt Dandenong jointly run the Net, sharing the call-in duties according to their respective coverage areas.

A recent Net included 12 participants braving the cold conditions in their shacks. Stations included Colin VK5DK in Mt Gambier and Rob VK1KW in Canberra via a convenient Aircraft Enhancement opportunity.

Beacons

The VK Logger includes a database of VHF/UHF/Microwave Beacons, including their current status. Unfortunately, the information for many of the beacons is quite old making the data much less useful – it's frustrating looking for a beacon that you later find is off-air. So, in preparation for the summer, could people have a listen for their local beacons and update the beacon database accordingly.

Alan VK3XPD advises that he has repaired the VK3RLP 2.4 GHz beacon, which had been out of operation for several years. It is currently undergoing testing at his QTH and will be re-installed at its Frankston location shortly. The beacon is nominally on a frequency of 2403.542 MHz.

Colin VK5DK reports:

Thanks to David VK3HZ and Graham VK3XDK, I can advise that a 10 GHz beacon for VK5RSE Mt Gambier is taking shape.

This beacon transmitter will operate on a frequency of 10.368.550 GHz, using a

modified VK3XDK PLL unit and programmed by David VK3HZ. It will be GPS locked. David has programmed the PLL to have two outputs, one on 1656 MHz which is multiplied by six to 9936 MHz, the second frequency from the PLL is on 432.550 MHz which has the CW keying programmed into it. These signals are then combined in a VK3XDK 10 GHz transverter (transmit side only) to produce the beacon signal.

The Beacon is planned to run around two watts output into an Omni Directional Wave Guide Slotted antenna with around 10db antenna gain.

At this stage the beacon driver stage running around 20 mW is under test at my QTH into a HP432A power meter. The P.A. stage has not yet been added owing to availability from the chip supplier at this time.

Barring other issues, we hope to have the beacon installed by the end of November.

Future plans may be to GPS lock our 144.550, 432.550 and 1296.550 beacons.

Please send any Weak Signal reports to David VK3HZ

Digital DX Modes

Rex Moncur – VK7MO

FSK441 Activity Sessions

Welcome to Colin VK4MIL and George VK4AML who have both made contacts with Arie VK3AMZ. Also welcome to Wayne VK4NWH who is active and Norm VK3DUT has just got digital operational and reported copying Bob ZL3TY. Activity Sessions are held each Saturday and Sunday morning from 0700 to 0800 local on 144.230.

FSK441 Tropo-Extension of Meteor Scatter

On 28 September Arie VK3AMZ and Bob ZL3TY commented on the VK Logger that there was the possibility of a tropo-extension as shown on the Hepburn chart at fig 1. The path is 2328 km and under normal conditions it is rare to get more than a ping in an hour. While most of the chart between Arie and Bob shows black for nil propagation, there is a good patch of Yellow out for about a third of the way from Bob. A meteor scatter QSO was quickly completed with Bob reporting "Thanks Arie, got 7 pings from you - outstanding !!". While it has been some time since we have experienced tropo-extensions of meteor scatter, this multi-mode propagation is well worth exploring for long paths of over 2200 km when there is an indication of good tropo at one end of a meteor scatter path.

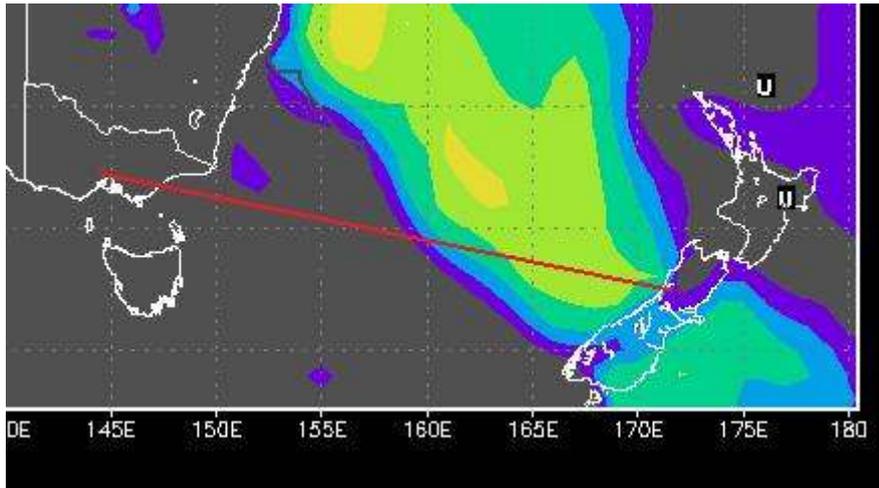


Figure 1 – Tropo Extension of the VM3AMZ to ZL3TY path

WSJT version 9.3

The experimental modes ISCAT-A, JT65B2 and JT65C2 have now been released as standard modes and are available in WSJT 9.3 version r2585 at:

http://physics.princeton.edu/pulsar/K1JT/WSJT9_r2585.EXE

The former ISCAT mode now comes in two sub-modes - ISCAT-A designed for microwave aircraft scatter and ISCAT-B which is the mode previously just called ISCAT which was designed for 6 metres meteor scatter but should also work well on 6 meters for tropo-scatter, ion-scatter and F2. It should also have potential for MS extensions of F2. ISCAT-B is thus a good general purpose digital mode for 6 metres as it can work with most types of propagation other than auroral. ISCAT-B works to about -18 dB on the WSJT scale for a continuous steady signal but will also decode short bursts of a second or so of stronger signal. It is possible to set ISCAT-B to run in 15 or 30 second periods.

Ross VK2DVZ and Rex VK7MO have been testing ISCAT-B on 2 metres meteor scatter and while it does work it is not nearly as useful as FSK441 on two metres which can respond to pings of just a fraction of a second which are typical on two metres. Tests with ISCAT-A showed it also worked but required burns of at least several seconds. While FSK441 should continue to be used on 2 metres, 6 metre operators are encouraged to try ISCAT-B.

ISCAT-A was designed specifically for microwave aircraft scatter such as at 10 GHz where it can cope with the very large changes in Doppler that occur when an aircraft crosses the path at right angles. ISCAT-A is about 1 dB more sensitive than ISCAT-B but takes twice as long as ISCAT-B, about 6 seconds, to send two callsigns and a report – this is generally sufficient for the short bursts of signal that result from microwave aircraft scatter where the aircraft crosses the path at near right angles.

Joe Taylor, K1JT, advises that the primary purpose of the JT65B2 and JT65C2 modes is to speed up exchanges for EME contests in situations where both stations have good signals. The JT65B2 and JT65C2 modes are not compatible with the standard versions of JT65. Joe has suggested that the JT65B2 mode be used in the frequency range 144.100 to 144.115 MHz, to differentiate it from the JT65B mode which is used from 144.100 to 144.160. These new modes work in 30 second periods compared to 60 second periods for the standard JT65 modes. The cost is that performance is reduced by 3 dB. Signal generator tests show that for about 50% correct decodes in Deep Search, JT65C2 works to -24.7 dB compared to JT65C

which works to -27.7 dB. For most VK operators the 3 dB performance reduction is likely to outweigh the advantage of making a few QSO's with large stations more quickly.

The spread of tones is identical between JT65C and JT65C2 but the rate at which tones are sent is twice as fast and thus the binwidth required for individual tones is twice as wide. Doubling the binwidth, and thus the noise per bin, results in the 3 dB reduction in performance.

My small station on 23cm EME – by VK2DVZ

A few years ago, one of the newer local amateurs, namely Mark VK2AMS was showing signs of an interest in the 23cm band, so I encouraged and assisted him in various ways as able. His interest mushroomed and soon he was planning to try 23cm EME. The rest is history - Mark runs a successful 23cm EME station.

After seeing and hearing about his ever-increasing successes, it was time to 'have a go' and join in on the fun or be left behind.

Yes, I had heard a few signals previously off the moon, mainly CW but did not think my station was 'up to speed' performance wise, even though I had participated in several 23cm SSB and digital successes, some of which still stand today. My existing elevation system was not stable enough in breezy conditions. It was time to get busy.

Busy meant removing the dish off the 6.25m tower, rebuild portion of the support structure that attached to the 2.4m solid Andrew dish (see Fig 2) as corrosion had taken its toll, remove the KR-500 elevation rotor that had served me well for many years and replace it with a HD linear actuator, build an OK1DFC septum feed and organise a different isolation relay, new preamp and rework the existing cabling. (I have always run separate TX and RX cabling, so most of it has been reused). Then it was time to put it all together in a workable and reliable state, so everything had to be spot-on first time!

A partial upgrade of some in-shack equipment and the re-use of my 25 year old SSB Electronics 23cm-2m and 2m-28MHz receive down converters and existing sequencing controller ensure the station performance is satisfactory for my small station, as determined by measured sun noise and confirmed by EME signals.

Initial EME contacts, using JT65C mode of the WSJT suite, have proved successful. My first 30 contacts off the moon were made using my single 2c39 water cooled PA that had literally gone off-the-boil as it must have a dying tube and was only producing 40-45 watts in the shack, about 30-35 watts maximum at the feed!

With that low power I was thrilled to work OK1DFC on JT65C and to be asked to try CW off the moon. "No" said I, as I had not yet figured out how to operate my station on CW mode following the station up-grade. I was then asked to try SSB, to which I agreed.

An SSB contact did result, taking me many minutes to complete the 2-way contact – It's time like that that a larger dish and more power would be extremely useful. I now have higher power capability, but will still continue to use the 2.4m dish because it is elevated at about 6.5m above the ground, lets me work the moon at moon-set down about 7 degrees due to obstructions and to 1 degree elevation without obstructions. Moon rise is generally good and without obstruction. A larger ground mounted dish would experience far too much blocking by obstructions at my place and on neighbouring properties. A larger dish on the tower may not stand up to the wind forces.

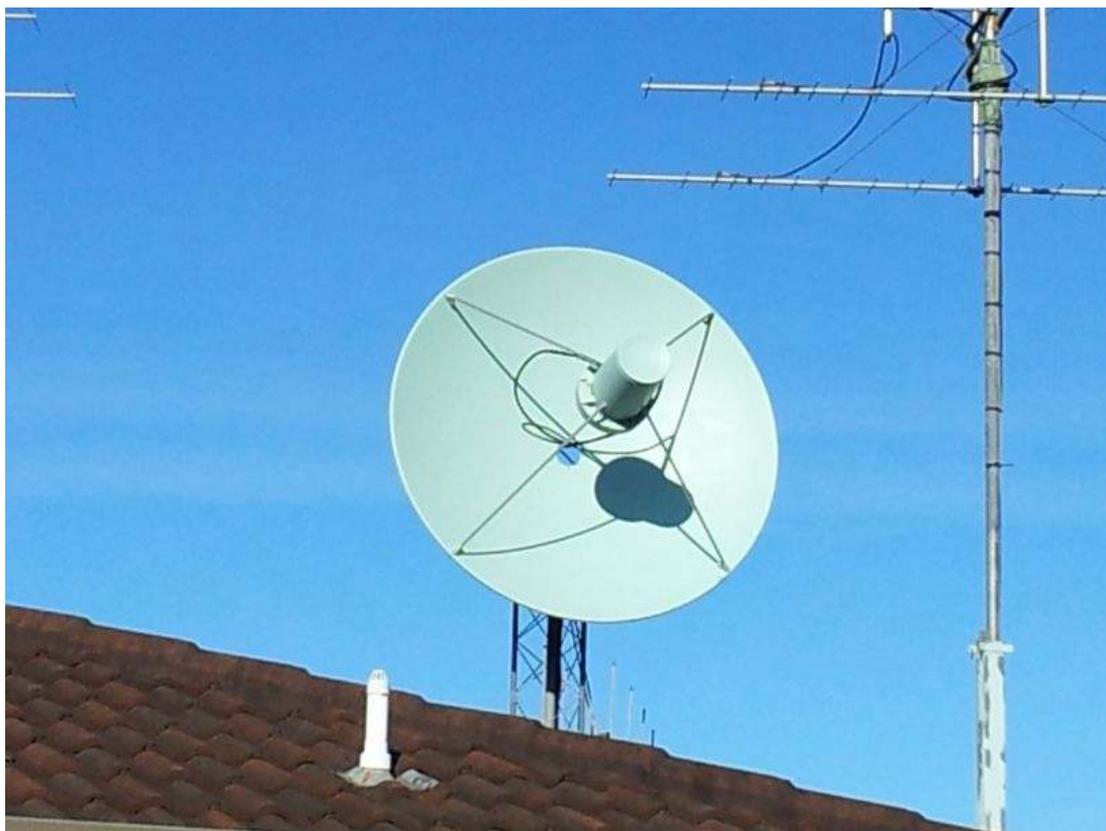


Figure 2 – VK2DVZ 23 cm EME Dish

Running 120 watts at the feed has made a lot of difference to the ability of other stations to copy my signals off the moon, but having a smaller dish than many other operators around the world means I have to try harder to work smaller stations – so that is my ongoing challenge.

23cm EME is totally different to 2m EME as circular polarisation of the Septum feed horn does not experience the severe QSB as on my 2m linear polarised array, due to Faraday rotation. Do I have any complaints about 23cm EME? Yes - it is not as 'busy' as on 2m EME, so give it a try and come and join in on the fun. EME is a challenging facet of our amateur radio hobby, but very rewarding.

Please send any Digital DX Modes reports to Rex VK7MO

The Magic Band – 6 m DX

Brian Cleland – VK5BC

September began with good openings from VK4 to Hawaii and as the month progressed openings from northern areas of VK to Japan, China and Korea becoming more regular and the month ended with openings extending down to the Perth area. Contacts from the Darwin area were also made into the Middle East

The month began on the evening of 1st with Gary VK8AW hearing the A92 and working Dave A92IO in Bahrain. Gary also heard the beacon again on the 2nd and worked DU7/PA0HIP.

On the 4th September the southern areas of VK4, Hervey Bay to Brisbane started to

hear Hawaiian beacons and several VK4 including Wade VK4WM, Scott VK4CZ, Brian VK4EK (Sapphire) and Wayne VK4WTN worked several KH's including KH6SIX, KH7Y and KH6HI.

6th September day started with Victor E51USA South Cook Islands working into Central America, Mexico and Southern USA areas and then around 0300UTC another opening from Hawaii to VK4. The opening extended from Scott VK4CZ in Brisbane to Ray VK4BLK in Yeppoon and west to Brian VK4EK in Sapphire with Wayne VK4WTN, Wade VK4WM from the Hervey Bay area also in the action. Several KH's were worked including Fred KH7Y, Ned KH7JJ, Albert KH6HI and Tets AH7C. Later around 0630UTC Mark VK8MS in Darwin also worked KH7Y. Then in the evening Gary VK8AW in Darwin reported hearing the Oman A47RB beacon at 539 and working BA8ASG. Michael VK6BHY in Karratha also worked BA8ASG whilst Mark VK8MS worked BA8AT.

Following the above, on most days contacts were reported from VK4, northern VK6 and VK8 (Darwin area) to the northern countries including Japan, Korea, China and Philippines. Contacts of note were made by Gary VK8AW and Mark VK8MS to VK9CS in the Cocos Keeling Islands 23rd September and Mark also working A92IO.

Late evening 18th September at 1311 UTC Brian VK5BC worked Roger 9W6RT in East Malaysia.

The afternoon of the 28th September the band opened from VK4 but then switched to Southern VK6. Andy VK6OX reports the following:-

At around 0430Z, with the rig monitoring R1/C1 TV, the sigs suddenly increased. I gave a couple of CW CQ calls on .110 and quickly worked JR2HCB 559. A few minutes later, worked him on SSB, also S5.

Over the next few hours, the band opened to JA1, 2,3,6,7 and 8 (from this QTH) along with various HL and DS (South Korea) stations joining in. Signal strengths were variable with peaks to S9+ at times over the period. Stations in the Perth metro and adjacent regional areas who joined in the fun included VK6s Glen IQ, Ken AKT, Graham RO, Peter KXW, John JJ, Barry ZSB, Jack KDX and yours truly. The opening faded out around 0830Z.

This was the first southern TEP opening of note this spring season and hopefully conditions will extend to the south more regularly during October/November.

Please send any 6 m information to Brian VK5BC