VHF/UHF – An Expanding World

David Smith VK3HZ

Weak Signal

David Smith - VK3HZ

There's not a great deal to report this month of enhanced propagation conditions. There have been a number of periods of low-level enhancement corresponding to high-pressure cells moving across the south of the country. However, no contacts of note have been made.

At this time of year, because of the quieter conditions, many people seem to shut up shop on VHF/UHF, even to the extent of pulling down the antennas. However, there are still lots of opportunities for long-distance contacts, independent of the weather conditions. You just need to know where to look.

As an aside, newcomers to our hobby tend to be introduced to the VHF/UHF end of the spectrum with a handheld and a few contacts on the local repeater. Perhaps they might try some simplex contacts. Anything beyond 100 km is considered DX. They don't realise that there's a whole 'nother word out there at the weak signal end of the band.

So, I thought I should give a brief explanation of the possibilities of weak signal communication on the 2 m band, starting from (relatively) close in and working outwards in distance.

Starting with station setup, weak signal work doesn't necessarily require a super station. Many of the commercial manufacturers have in their range a multiband HF/VHF(/UHF) rig that is good for this – the Yaesu FT-847/857/897, Icom IC-706/7000/7400, Kenwood TS-2000 etc. Then you need a 10-12 element yagi (horizontally polarised, of course) mounted on a rotator. A run of RG-213 coax connects back to the rig. If the bug takes you, then down the track you can add a power amplifier, masthead preamp, multiple yagis and a length of Heliax to the list.

With this simple setup, we can work another similarly equipped station up to 300 km away in normal conditions via troposcatter. This assumes that both stations have a reasonable takeoff – no big hills in the way. If the band opens (a tropospheric duct forms), then distances of 2000+ km are quite possible – from Melbourne to Albany, WA or from the east coast across to NZ. If the opening is via Sporadic E, then even longer distances are possible (V5 to ZL).

However, for much of the time, the band is not open (some of the more paranoid among us believe that the band does not open BECAUSE they are in the shack). So, what to do in these conditions?

If you're interested in working into areas up to 900 km from you, then Aircraft Enhanced Propagation (AEP) is a viable method of doing so. With AEP, signals can rise from inaudible to S9 in the matter of minutes, and disappear just as quickly. AEP relies on there being an aircraft in line between you and the other station, visible (in the RF sense) to both of you. Then the phenomenon of Bistatic Radar comes into effect and boosts the signal. Many of us experience AEP fairly randomly on signals. However, there are ways of accurately predicting AEP by finding out aircraft positions, either using your own ADS-B receiver to receive position reports from aircraft in the vicinity, or by using a program like PlanePlotter to get position information from a server. Then using Google Earth and the Radio Site Display (RSD), we can overlay the path between stations with the aircraft positions and see when AEP will occur.

For a good starter paper on AEP by Mike VK3KH, together with information on RSD and Planeplotter, see www.vk3hz.net

2 m AEP sessions between Melbourne, Canberra, Sydney, Brisbane and beyond are held every morning on 144.2 MHz between 0800 and 0900 EST, corresponding to peak period for aircraft traffic between those cities.

AEP is not just limited to the 2 m band either. AEP contact have been achieved on 70 cm, 23 cm and 13 cm and I have seen what I believe was very brief AEP on 10 GHz. Enhancement tends to become briefer but more intense with increasing frequency.

If we want to work further than 900 km, then Meteor Scatter (MS) is possible for distances from about 800 km up to 2400 km. Using SSB via MS is possible but you'll need to be extremely patient as the longer meteor burns required for such a contact are very few and far between. Ron VK4DD has been heard in Melbourne via MS on numerous occasions during the morning AEP sessions. Each time, he is inundated with replies, but the meteor has moved on before any contact can be made.

If you really want to exploit MS, then the WSJT FSK441 digital mode is the way to go. You'll need a PC and an interface to your rig to use this. Rex VK7MO regularly reports on activity in this area in his Digital DX Modes piece below. More information can be found at: www.vhfdx.radiocorner.net/docs/FSK441-Proc.pdf

Unlike AEP, 2 m is the practical upper limit in frequency for MS. The pings become extremely short on 70 cm. However, it's not impossible and is perhaps an area for further investigation.

If you want to go beyond 2400 km, then EME (Moon bounce) is a possibility. An average-to-large tropo station can make contacts via the moon using the WSJT JT65 digital mode. For more information, see: www.vhfdx.net/jt65bintro.html

So, as you can see, there's plenty to use your station for, even if the band conditions are lousy.

Beacons

Mark VK2XOF reports that the last of the VK2RSY beacons at Dural has been successfully replaced with new equipment. The beacon on 432.420 MHz joins the 2 m (144.420 MHz) and 23 cm (1296.420 MHz) beacons. Congratulations to all who put the effort into resurrecting these beacons. Reports would be very welcome.

144.150 Net

The weekly net in Melbourne on 144.150 MHz on Wednesday evening at 2030 EST continues to be popular. Mike VK3KH and Rob VK3MQ are the net controllers. Both have good locations in the Melbourne area and coverage regularly extends from VK3 into VK1, 2, 5 and 7. On a recent net, participating stations included VK5GF, VK5HR, VK5DK, VK7JG, VK3KH, VK3MQ, VK3NJP, VK3ACA, VK3IDL, VK3AXH, VK3KQB, VK3CMC, VK3II, VK3HV and VK3ZYC. If you have nothing else on, call in and join the fun. For more distant stations, use the VK Logger to make the net controllers aware of your presence so they can swing their antennas in your direction.

GippsTech 2009

A reminder that GippsTech 2009 is to be held over the weekend of 11-12 July. This

is THE event for the weak signal enthusiast and should not be missed. I suggest arriving on Friday afternoon to join in on the informal Friday night meal at the Morwell Hotel and catch up with other like-minded amateurs. Then the action commences at 9am on Saturday with a solid program of presentations on a wide variety of topics. The Saturday night dinner is another opportunity to catch up with people. Then Sunday morning sees the program continuing up to the lunchtime conclusion. More information at: www.vk3bez.org/gippstech.htm

I had the pleasure recently of attending the GippsTech Special Edition (aka GT Lite) held in conjunction with the WIA AGM. As well as some repeat presentations from past GippsTech events, the program was expanded to include Software Defined Radio, VLF and even Amplitude Modulation! All presentations were of a very high standard and it was very interesting to see the multitude of directions people are taking in the technical side of our hobby. Well done to all involved in organising and running the event.

Please send any Weak Signal reports to David VK3HZ at ...

Digital DX Modes

Rex Moncur – VK7MO

ZL provides the opportunity for many on the east coast of Australia to try out long distance meteor scatter on two metres using the WSJT program and FSK441 mode. A VK-ZL activity session is held each Saturday morning from 0600 to 0700 local time in VK1/2/3/7 on 144.330 MHz with ZL transmitting first period. Active ZL stations are listed below:

Station	Location	Approx Take-off Angle
ZL3TY, Bob*	Greymouth	Zero degrees
ZL3CU, Starr*	Christchurch	1 degree
ZL4LV, Peter*	Dunedin	2 - 4 degrees
ZL4DK, Dave*	Dunedin	1 - 2 degrees
ZL1RS, Bob#	Bay of Islands	Less than 1 degree

* Regular operators during activity sessions
\# Need to set up a sked but can work from North of Brisbane down to Sydney

Under normal conditions the maximum range is 2400 km less around 100 km for each degree of take-off angle at each end of the path. Bob ZL3TY is both the closest station and has the best take-off and is regularly worked from Hobart and Canberra, often from Sydney and occasionally as far North as the Queensland border for stations with a good take-off. Starr, ZL3CU is regularly worked from Hobart. The ZL4 stations work occasionally into Hobart. Bob ZL1RS has worked John VK4JMC west of Brisbane. To decide if it is worth a try, determine your own take-off angle, subtract 100 km for the total take-off angle of both stations from 2400 km to give you approximate maximum distance and see if the station is within this range. The range of a station can be worked out using the grid locators of both stations as can be obtained on the VK logger and inserting this data in the WSJT program.

Please send any Digital DX Modes reports to Rex VK7MO at ...

The Magic Band – 6 m DX

Brian Cleland – VK5BC

April has been another quiet month on 6 m with very little to report.

From far north Queensland, John VK4TL reports they have been hearing quite a few indicators with the Chinese TV signals being up to S9 on 49.750. On the 20th April John worked 16 x JA stations (TEP) and Trevor VK4ZFC worked 12 x JA's. On the 23rd John worked another 2. Generally though John says TEP on 6 m has been poor.

Locally there have only been a couple of 'E' openings. On the 13th April Wade VK4ACB in Hervey Bay worked Norm VK3DUT, Mike VK3ALZ and Glen VK7AB and a little later a brief opening from VK4 to VK5 when Brian VK5BC/p at Corny Point worked Scott VK4CZ, Brian VK4QB and Doug VK4ADC.

Then on the 19th April a good opening from VK6 to VK5 when the band opened for nearly 2 hours but unfortunately not many stations were listening. Brian VK5BC/p at Corny Point worked John VK6JJ, Peter VK6KXW and Allan VK6ZWZ.

Only other point of interest has been the regular reporting of the VK5RBV Barossa beacon, usually early in the morning by Brad VK2GWB south of Wollongong, Scott VK4CZ Brisbane, Brian VK4QB Rockhampton and Peter VK6KXW Beverley. They all have reported hearing or getting regular bursts from the beacon. Seems this beacon is well located for all areas of VK.

Please send any 6 m information to Brian VK5BC at ...