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# VHF/UHF – An Expanding World

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David Smith VK3HZ

## Weak Signal

David Smith - VK3HZ

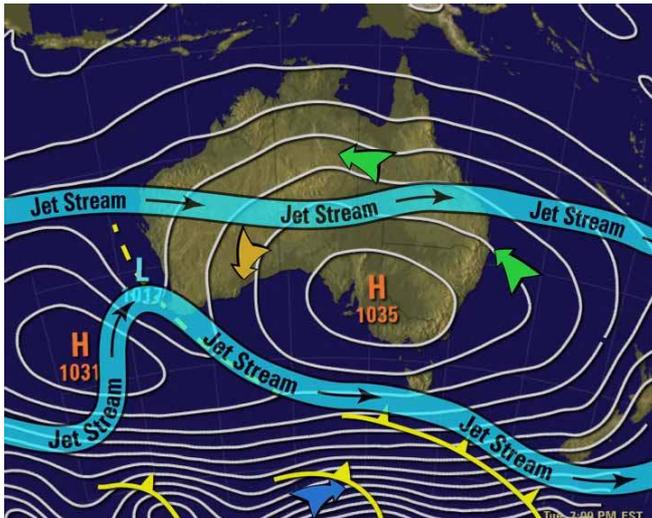
Winter has struck with a vengeance over the last few weeks, with record low temperatures in many areas in the south of the country – not exactly the sort of weather to be out in the shack. Despite the cold temperatures (or perhaps because of them) we have had a few periods of enhancement caused by slow moving high-pressure cells.

Colin VK5DK in Mt Gambier reports that on 13/5 at 0910Z, he worked Leigh VK2KRR at The Rock on 2 m with steady signals up to S9 and also made contact on 70 cm at 0925Z with signals peaking to S5 and deep QSB. Leigh also worked Brian VK5UBC at Gawler on 2 m (56) and 70 cm (41) and Garry VK5ZK at Goolwa on 2 m (58).

On 22/5, weather conditions produced more good propagation with VK5 stations working far into VK3 and VK2. At 0150Z, Peter VK5ZLX in the Barossa Valley was worked from this QTH in Melbourne on 2 m (57) and 70 cm (41). The opening continued for the whole day. That evening at 0816Z, Phil VK5AKK in Adelaide was worked on 2 m (57) and 70 cm (52).

On 12/6, a slow moving high produced good conditions that started across the south of the country and, over the next few days, gradually moved to central NSW. Peter VK5ZLX reports that on 12/6, the 2 m and 70 cm beacons in Geelong were good strength virtually all of the day, but he could only raise Bill VK3WN in Ballarat. The next morning at 2150Z, Mark VK2EMA in Tottenham in central NSW was receiving the Adelaide 2 m beacon on Mt Lofty at S9+20. Mark worked Garry VK5ZK on 2 m (57) and 70 cm (59). He also worked Brian VK5UBC on FM on 2 m (57) and 70 cm (52). The Mildura 2 m beacon was being heard by Rob VK1ZQR in Canberra. That evening, at around 0830Z, the Mt Lofty beacon was still S7 at Mark's QTH. Peter VK5ZLX worked Rhett VK3VHF in Gippsland on 2 m digital. He then worked Rhett on SSB. On the morning of 14/6 Mark VK2EMA again worked Garry VK5ZK with S9+ signals on both 2 m and 70 cm. The Mt Lofty beacons were now even stronger on 2 m (S9+40), 70 cm (S9+30) and 23 cm (S3). However, there was no sign of the Adelaide beacons from the Melbourne area. Mark again worked Garry VK5ZK at 59+ levels on both 2 m and 70 cm. He also worked Peter VK5ZLX on 2 m and 70 cm and they attempted a contact on 23 cm but didn't quite make it. The following morning (15/6), Mark worked Phil VK5AKK on 2 m (55) and 70 cm (59), Peter VK5ZLX on 2 m and 70 cm (both 59+) and Garry VK5ZK on 2 m (57) and 70 cm (59). He also again worked Brian VK5UBC at Stony Point on FM on 2 m (57) and 70 cm (52). Finally, the weather moved on and the opening was over.

Rob VK3EK near Bairnsdale reports that on the evening of 13/6, *"I was alerted by Rhett VK3VHF at 1010Z that he was working Peter VK5ZLX in the Barossa Valley on 144.225. They had been playing Digital and ended up on the real stuff (tongue in cheek). I didn't have any VHF gear running at the time but that soon changed and I also worked Peter up to S7 over about a 10-minute period. I had to go or we could have kept going. The distance is 851 km over a difficult path with the Baw Baw ranges directly in the way less than 100 km from me. This is a rare contact for me and the path only seems to open when there is a large high-pressure cell in the system like the one at the time of contact (see chart). We tried on 70 cm but I could only just tell there was a voice in the noise. Thanks to Rhett VK3VHF for alerting me, and Peter for being there. It pays to keep an eye on the (VK/ZL) logger as well.*



**Weather Chart for 13/6**

### **Aircraft Enhanced Propagation**

Many stations continue to “play the aircraft” during the daily AE net. Of course, the aircraft continue to fly all day, but the peak operating activity between Melbourne, Canberra and Sydney occurs between about 0815 to 0900 EST, corresponding to the morning rush hour of flights on that path. On one day recently, Rob VK1ZQR noted the following stations on 144.2 - VK2DO, VK1CJ, VK1BG, VK2RS, VK2AWD, VK3VZP, VK3HY, VK3AFW, VK3HZ, VK3BJM, VK2TG, and VK2KGX. To that list, I’d also add VK2TP, VK3VG, VK3AXH and VK3AZG as regulars. There is also activity to the north between Sydney and Brisbane, which I understand occurs earlier in the morning.

Of course, AE is not limited to those paths. Any path between two stations that is crossed by an aircraft will see some level of enhancement. Ian VK3AXH in Ballarat and Garry VK5ZK in Goolwa have been experimenting with AE between their locations using the Melbourne / Adelaide flights. A large aircraft crosses the path each day at about 0830 EST and provides some level of enhancement between Garry and, at different times, Ian, Barry VK3BJM, Jim VK3II and David VK3HZ. Unfortunately, the flight path is not aligned to provide AE into the more populated Adelaide area.

### **150 Net**

The weekly net at 2030 EST each Wednesday, hosted by Rob VK3EK near Bairnsdale, continues to attract many participants. The net has been run by Rob since October 1999, and existed prior to that. It commences on 144.150 MHz and moves up through the bands as far as 2.4 GHz, if people are interested. A recent net (mid-winter) had the following participants – VK3EK, VK3AXH, VK3IDL, VK3KQB, VK3ALA, VK3XL, VK3NF, VK3HZ, VK3DMW, VK3ZYC, VK3VZP, VK3VHF, VK3HV and VK3KAI. It would be good to see people in other states start up a regular VHF/UHF activity net such as this.

### **EME**

Congratulations to Alan VK3XPD in Burwood who recently achieved the first VK EME contact on 5.7 GHz, breaking a world record in the process. Alan reports:

*“On May 23, 2006 at 0225 hours UTC, a new World Record distance of circa 15,931 kilometres for a 5760 MHz EME contact was set by myself - Alan VK3XPD - and the Czech Republic's OK1KIR EME Team of Vladimir OK1DAK, Tonda OK1DAI and Jan OK1VAO. This QSO is also the first ever 5760 MHz EME contact for Australia.*

*Signal Reports were "O" Copy from VK3XPD & "M" Copy from OK1KIR.*

*The OK1KIR station uses circular polarisation with a 60 watt solid-state PA feeding a 4.5 metre dish. The VK3XPD station uses a VE4MA Feed, horizontally polarised with a rear dish mounted TWTA feeding a 3 metre dish. It is fully coaxial (coax relay at the feed) because no waveguide bits were available at the time, so my in-circuit losses are somewhat higher than they could be.*

*The event was also not without it's problems. My TWTA recently developed an RF output problem, which resulted in the output power dropping (varying slowly and unpredictably) by up to 10 dB from the maximum available output of about 100 watts. Additionally, there were overcast conditions (no visible Moon) in VK and very poor wet weather in the Czech Republic at that time. I'm hoping to resolve my TWTA difficulties soon and chase a few more QSO's shortly.*

*My thanks to Vlad and his OK1KIR Team for persisting.”*

Interestingly (and coincidentally), the contact occurred 30 years to the day after the first ever EME contact from OK, which was also made by OK1KIR on 70 cm.

## **ATV**

Good to hear of some ATV activity in the upper microwave region, with impressive results. Jack VK2TRF reports:

*“Dan VK2GG and I are now active on 10 GHz ATV. We are currently using 200 mW into 17 dB horn antennas about 20 cm long. Operation is on 10.236 GHz with an FM deviation of 15 MHz.*

*Our last QSO was from Dobroyd Point in Sydney to Wybung Head north of Norah head lighthouse near Newcastle - a distance of 76 km.*

*We are planning the construction of 60 cm dishes with penny feeds, which will increase our antenna gain to 30dB plus. However, the extra gain comes at a penalty of a 4-degree beamwidth.*

Please send any Weak Signal reports to David VK3HZ

## **Digital DX Modes**

Rex Moncur – VK7MO

JT65 is starting to make its mark on 1296 MHz EME where it allows relatively modest stations with 100 Watts and dishes of 2 to 3 metres diameter to work each other. VK4AFL - 3.7 metre dish - and VK7MO - 2.3 metre dish - have worked each other on 20 watts. A big advantage of 1296 MHz is that one can get good gain from relatively small antennas. In addition, as almost all stations use circular polarization, one does not have problems with cross polarisation as often occurs on the lower bands due to Faraday rotation and Spatial polarisation offsets. External noise is also significantly lower. The disadvantages are that few commercial rigs are sufficiently stable to gain the full benefit of JT65 and one needs to find ways to improve stability such as by locking reference oscillators to GPS. Cable losses must be an absolute minimum and

dish mounted pre-amps are a must. On receive, one can achieve system noise temperatures of 100 degrees or less but even the temperature of light tree cover can mask this so a clear view of the moon well away from the horizon is essential. The effects of Doppler frequency variation, primarily due to Earth rotation, and frequency spreading due to Moon libration all add to the difficulty at this frequency.

The JT65c sub-mode is more tolerant of frequency instability and is almost universally used on 1296 MHz. The use of short-hand messages is not as effective as on the lower bands due to libration frequency spreading and frequency drift and it is better to send OOO, RO, RRR and 73 as text in place of the grid square. This is an alternate format available with the JT65 mode. Because of the effects of libration, the limiting factor is normally to achieve sync – once sync is achieved one will often achieve decodes without the use of the JT65 deep search decoder. Most JT65 activity is in the frequency band 1296.065 to 1296.085 with a trend to use 1296.065 as a focus frequency where you have the best chance of seeing someone.

There seems to be scope to improve the effectiveness of JT65 on 1296 MHz though automatic correction for Doppler and a decoding algorithm that takes account of the frequency spreading due to libration. If these issues can be solved a further 4 to 6 dB performance improvement may well be possible. There is every possibility that within the next year or so newer versions of the WSJT program will make 1296 MHz EME available to stations with a few 10's of watts and relatively small dishes of 2 metres diameter.

Please send any Digital DX Modes reports to Rex VK7MO

## The Magic Band – 6 m DX

Brian Cleland – VK5UBC

After a few quiet months on 6 m, particularly in the southern states, the band began bursting into life in late May and early June with some excellent winter sporadic E openings.

After hearing the ZL TV on the previous 2 days, Norm VK3DUT worked Peter ZL4LV on the 1st June at 5/9. Then on the morning of the 2nd June Norm reports very good conditions into VK5 with both the Barossa VK5RBV and Adelaide VK5VF beacons strong and contacts with Keith VK5AKM and VK5BM. Norm also worked Paul VK2YVG at Broken Hill at 5/9+ and Joe VK7JG in Launceston.

On the same day (2nd June) as well as working Norm, Keith VK5AKM from Wasleys 50km north of Adelaide had good contacts with George VK3HV, Tim VK3ALA and Rob VK1ZQR. Later that day Col VK5RO and Brian VK5UBC worked Allan VK4ID and Bob VK4BT.

On the 6th June Norm VK3DUT was at it again this time working several VK4's and the a little later ZL3AUU and Rod ZL3NW.

On the morning of the 8th June, an exceptional opening occurred with the band open from New Zealand to VK2, 3 & 5 and from VK3 & 5 to VK6. At the same time the Alice Springs and Hobart beacons were being heard in VK3 & 5. From VK5 Ian VK5AIC and Brian VK5UBC were in the thick of the action working Bob ZL3TY and Rod ZL3NW whilst Norm VK3DUT was 5/9++ in VK5 and ZL. Rob VK1ZQR and Mike VK2BZE were also working both the ZL and VK5 directions. Despite many calls no contacts were made into VK6 or 7, although both the Perth and Hobart beacons were over S9 into VK3 & 5.

From northern Queensland John VK4FNQ reports hearing several JA beacons on the 3rd May and working JR2ULS and JI5OZF at 5/9. On the same day Gary

VK4ABW worked several JA's as well as Korean stations HL0NHQ and DS4OVT. John also reports hearing the VK2 Sydney and Hunter Valley beacons on 27th & 28th May.

Sad to hear that John VK4PU passed away in late May. He will be missed on 6 m.

Please remember to send any 6 m information to Brian VK5UBC.