
VHF/UHF – An Expanding World

David Smith VK3HZ
Leigh Rainbird VK2KRR

Weak Signal

David Smith - VK3HZ

Even in the depths of winter, there are still some interesting propagation conditions for the VHF/UHF weak signal operator.

On the evening of 13 July, Leigh VK2KRR encountered some unusual conditions from his QTH near The Rock. The Adelaide 2 m beacon was audible at S5 and the Mt Gambier 2 m beacon was peaking around S2. Contacts were had with Colin VK5DK (5/4) in Mt Gambier and Russell VK3ZQB (5/3) in Port Fairy. However, no stations could be raised in the Adelaide area. At about 11 pm, Leigh checked for the VK6 beacons and saw, on Spectran, a faint line on the frequency of the Esperance beacon (VK6REP - 144.568 MHz) – a distance of over 2300 km. At first, he thought it was probably a birdie. However, after monitoring the signal for a while, the 100 Hz FSK keying offset and timing confirmed unmistakably that it was the beacon. The signal came and went over the next 4 hours, never quite becoming audible, and finally disappearing at 3 am. Leigh believes that an SSB contact may have been possible, and certainly a digital contact (JT44 or JT65) would have been easy.

Speaking of digital contacts, rumour has it that Joe K1JT is working on development of a new, weak-signal digital mode that will have substantially better performance. Tests have shown that it can decode signals that are around 7 dB weaker than JT65 can decode. With performance like that, EME contacts between two single-yagi stations would not be out of the question.

Rod VK2TWR reports that the VK2RSF beacon at Hudson Peak, south of Cooma on 144.414 MHz is back on air after a problem with the antenna. A huge dump from a one-in-twenty year snowfall, together with ice build-up on the top big wheel antenna caused a break in the feedline. It took several weeks before the beacon site became accessible again, for repairs to be carried out.

Graham VK3XDK has been busy constructing a portable 2 m EME setup. The antenna array consists of 4 10-element DL6WU-design yagis mounted on a large tripod. The array can be set up and dismantled by one person in a very short time, and is readily transportable in a normal vehicle. No results yet, but it looks very promising.



News from Christopher, VK2DO:

After thirty years operating from the Canberra region, Chris VK1DO has consolidated activity under his NSW callsign from Carwoola, just east of Canberra. This location has an ideal outlook and ought to be a great catalyst in working further afield on VHF/UHF.

This move has condensed his previous weekend location at Rossi, some 50 kilometres SE of Canberra and his home of 19 years backing the reserve in the southern suburb of Farrer. Chris is well known as a participant in the annual field day contest with brother Andrew, VK1DA and partner in crime, Geoff VK1CO

The new location has some thirty acres of space and initial indications suggest a crackerjack location for VHF/UHF and as well as a peaceful spot, the RF silence is much appreciated. With neighbours no closer than half a kilometre, a little uglification of the skyline is immaterial as is the radiation of a little ERP.

Since early April, progress on antennas has been slow. However, two long yagis are serving well on 2 m, 70 cm is awaiting new feeds, 23 cm is being re-assembled and apart from three Nally towers already in the ground and two more to come, Chris has been distracted working some 80 m grey line DX.

The outlook is very promising based on initial reports from Melbourne, Lakes Entrance, Bendigo, Kyabram etc. However, to again work a VK5 is anxiously awaited. Chris looks forward to reacquainting himself with the many stations in VK2, 3, 4 and 5 that he has worked over the years, with the advantage of a new location.

It is a great pity work gets so inconveniently in the way!

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

Digital Modes

Rex Moncur – VK7MO

Compression of Signal Reports on WSJT: For the JT44 and JT65 modes WSJT provides a signal report in dB with reference to the noise in a 2.5 kHz bandwidth. The reports typically range from -15 to -30 dB. Operators will have noticed that these reports compress at high signal levels and even an S9 signal on your meter will give a report in the minus dB range. Tests have been conducted with a signal generator, which establish that JT44 and JT65 reports are accurate for signal levels lower than -12 dB but compress for stronger signals. In practical terms this is not a significant issue as JT44 and JT65 are normally used at signal levels of less than -12 dB. It is noted that Spectran has much better dynamic range and is linear from -30 dB to +20 dB when it also starts to compress. The problem with Spectran is that it does not have a reference level (such as the noise in 2.5 kHz bandwidth as used by WSJT) and thus must be calibrated against some other source.

FSK441A or FSK441B on 2 m: Operators during the weekend activity sessions have conducted extensive tests to establish whether FSK441A or B is the best mode for 2 m. These tests have shown that the B mode produces 10 to 20% more valid characters for short pings such as those that produce a single call sign. The typical range for the tests would be 1000 km. Theory predicts that at longer ranges the advantage would be even greater while at shorter ranges such as 500 km there may be little in it. For pings of longer duration the advantage of FSK441B is likely to be less but then in any case you would receive sufficient information on either mode. Operators are encouraged to conduct further comparative tests at longer (2000 km) and shorter (500 km) ranges, but in the meantime I suggest that FSK441B should be the standard mode in VK.

Auroral Event

There were periods of strong auroral activity on the evenings of 22, 25 and 27 July that produced signals as far North as VK2KRR near Wagga and VK2TWR at Nimmitabel. Stations heard making contacts were VK3BG, VK3HZ, VK3HY, VK3AFW, VK3AXH, VK3BRZ, VK3XLD, VK5DK, VK5ZK and VK7MO. During this period a number of stations conducted tests by measuring the Doppler shift using a known single tone signal generated by WSJT and watching the shift on Spectrogram or Spectran. The objective of the tests is to establish if we could relate the direction of the Doppler shift dependent to whether it is a morning or afternoon/evening Aurora. Each of the three periods of this event were afternoon/evening Aurora and for a large majority of the time produced positive shifts or 250 to 500 Hz. This compares with measurements undertaken by VK3UM on an event during the morning of 21 November 2003, which produced a negative shift of 400 to 500 Hz.

Some excellent results and spectrograms of Doppler shift were recorded by a number of stations. The Spectrogram screen shot below was captured by Leigh VK2KRR. It shows VK7MO and VK3HZ transmitting in alternate 30 second periods, both beaming south into the aurora. The auroral reflection can be seen as the lighter band above the signals. The direct signal from VK3HZ appears as a horizontal line on the display and multiple aircraft reflections can also be seen, producing Doppler shifted signals offset above and below the main signal.

More detailed summaries of the tests are recorded on Leigh, VK2KRR's, web site at: http://www.users.bigpond.com/anvdq/australian_aurora_scatter_studie.htm .

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



2 m & 70 cm FM DX

Leigh Rainbird - VK2KRR

With weather conditions seemingly reverting back to a more normal situation, very few openings for southern FM DX operators occurred during July, as weather front after weather front moved from west to east across the southern part of Australia. Similarly, though without the southern type weather fronts, stations in north Queensland also found it was rather quiet, though picking up slightly at times.

Mike VK4MIK near Cairns has noted that the number of openings into the Townsville 2 m repeater has been up in July in comparison to previous months. Unfortunately the path has not extended further down the coast beyond Townsville. Mike has also had a few simplex contacts on 2 m with VK4FNQ in Charters Towers and VK4ABW in Townsville.

In the south, there was only one period of enhanced conditions during July. This was in the evening of the 13th and morning of 14th July, between areas of VK2, VK3 and VK5. Conditions were noted as being quite poor and had slow QSB, which made a QSO difficult as the path would constantly get too weak and drop out. From Victoria, I heard Bill VK3LY in Nhill making it to Adelaide's Crafers repeater for a short period. From here I was able to get to the higher repeaters, Lobethal at 747 km, Crafers at 764 km, Barossa Valley at 741 km and Murray Bridge at 733 km was also there. Things were not the best with QSB and weak signals.

That's as good as it gets for this month, slightly depressing. But, the poor conditions make you all the more appreciative of those amazing enhanced openings. Just think, if the band was always open, it would end up being quite boring.

Please remember to send through any 2 & 70 FM DX reports to Leigh VK2KRR at ...