
VHF/UHF – An Expanding World

David Smith VK3HZ

Weak Signal

David Smith - VK3HZ

First an administrative note. John VK5PO has advised that he is no longer able to do the 6 m notes. I'd like to thank John for his valuable contribution to the column. If anyone else would like to step into the role, please contact me at the email address given above.

Last month I reported a distinct lack of Sporadic E propagation on 2 m for the period to December 31. January has followed the same trend with no reports of contacts via Sporadic E. No doubt the Sun's activity has a lot to do with this – recently it was reported that the Sun's magnetic poles have reversed, marking the mid-point of the current solar cycle. I can feel a Roger Harrison presentation coming for the next GippsTech conference in July.

In contrast, tropospheric propagation has not been lacking, with a number of slow-moving, intense high pressure cells moving into the Bight, then either crossing southern NSW across to the Tasman Sea or squeezing through Bass Strait and entering the Tasman from further south.

On the evening of January 11th, Derek VK6DZ/P was portable on the southern tip of VK6. He reported hearing the VK7RAE 70 cm beacon from Devonport (2590 km) a number of times at 4x1. Unfortunately, no contact resulted.

Derek was attempting to work Rex VK7MO at the northeastern tip of Tasmania on 10 GHz via a large high-pressure zone in the Bight. While that attempt was unsuccessful, Rex did manage to work Colin VK5DK on 10 GHz at his home QTH in Mt Gambier on SSB with a 5x8 report – a distance of 706.8 km. This set a new VK7 State Record for 10 GHz.

On the evening of January 16, Ralph VK3WRE was out portable in central Gippsland and worked Nick ZL1IU on 70 cm with a report of 5x1.

The following day – January 17 – Rex VK7MO was experiencing good conditions, this time from his home QTH. At 0020Z, he worked Steve ZL1TPH/P on 70 cm at 5x2 and at 0055Z, he worked Nick ZL1IU on 70 cm with a 5x3 report over a path of 2433 km.

On January 18, Ross VK2DVZ worked Bob ZL3TY on 23 cm SSB (4x1) for the first time for a few years, after a struggle with the QSB. This path is a little more difficult than to the north of NZ, because the enhancement tends to move further northwards as it enters the Tasman.

The following morning – January 19 – conditions across the Bight were huge and Leigh VK2KRR was hearing strong signals from VK5 and VK6. At 2105Z, he worked Ron VK6VOX on 2 m at 5x5 – 2707 km. At 2310Z, Leigh worked Wayne VK6JR on 2 m SSB with a 5x9 report over a distance of 2935 km. Wayne also worked Jim VK3II (5x1) – 2778 km, and Mike VK3KH (5x1) – 2745 km.

On January 29, more good conditions across to ZL. Steve ZL1TPH/P had again travelled to his portable location, working Ross VK2DVZ on 23 cm (5x3). Ross also worked Steve ZL1AVS on 23 cm (5x3).

Once again, Steve ZL1TPH/P featured prominently in the action across to NZ. He worked a large number of VK stations on 2 m, 70 cm and 23 cm. He reports:

On my second trip to the north in January 2014, I activated RF63 and RF65 to VK.

The reason for the trip was to take advantage of the duct which appeared to favour the north of ZL, along with activating these two grid squares that are not that commonly operated from, also to have a holiday with some radio fun added. All contacts are with SSB unless noted otherwise.

Day 1 - Thursday 16 January 2014; drove to RF63 worked VK2IJM, VK2DVZ, VK2AH, VK2ARA, VK2GKA, VK2BCC, VK2KOL, VK2TK on 144, then carried on north and booked into the Kaitaia motel (The Kaitaia motel BTW is in RF64).

Day 2 - Friday 17 January 2014; drove to the top of ZL, RF65 and worked VK2ARA, VK2DVZ, VK2ZT, VK2NC, VK2MAX, VK2AH, VK2IJM, VK2BXT, VK2BCC, VK7MO, VK2GKA, VK2TK on 144, on 70 cm VK2ZT, and VK7MO and VK7MO with JT65.

Day 3 - Saturday 18 January 2014; drove back up to RF65 and this was the best day with a pipe into VK2, worked VK2AMS, VK2DVZ, VK2ZQ, VK2ZT, VK2ARA, VK2AH, VK2KOL, VK2BCC, VK2BLS, VK2MAX, VK2BXT, VK2BZE, VK2NC, VK2FLJD, VK2IJM, VK2TS, VK2TK, VK2BCC, VK2BJ, VK2HLX, VK2GKA on 144, on 432 VK2DVZ, VK2ZT, VK2AH, VK2ARA, VK2BXT, VK2BZE, on 1296 VK2ZT and VK2DVZ, also worked VK2DVZ on 1296 JT65. Of note, heard the Dural VK2RSY 1296.420 MHz beacon for a number of hours. The beacon wobbles a bit with the CW but no complaints from this side of the pond because I used it to align my dish on VK2.

Day 4 - Sunday 19 January 2014; left the Kaitaia motel and drove back down to RF63, worked VK2ZT, VK2IJM, VK2AH, VK2BCC, VK2NC, VK2BXT, VK2KOL and VK2MAX on 144, on 432 VK2BCC only, of interest while running JT65 towards VK4 was seen by VK4EDD and his report back on the logger confirmed to me that he saw me because he reported back to me what I was sending without anyone knowing beforehand, also worked VK2KOL on JT65.

A good 4 days activity. I'm sure I spent more time driving than operating, but with tropo ducting you can only work so much in so many hours or in one half day and it's nice to get back to the comforts of home or the motel each evening, because operating many bands out of a car or wagon can be stressful at the best of times and tiring. I had 3.4 and 2.4 GHz just in case but never used. Found having WSJT capabilities added the interest of doing something different and have learnt a lot by doing so.



ZL1TPH/P Antennas for 2m, 70cm and 23cm

On 23 cm, I use an old MMT feeding a 10 Watt brick then into a W6PQL 150 Watt PA. On the hill or portable its good for a 100 Watts or so, because I use the same 24

volt battery bank to power my 144 PA, volts do drop after a while with most activity on 144. It has a low noise preamp build by Kevin ZL1UJG, the 4 metres of coax to the dish has 0.9 dB of loss.

There's an IC202 on the unit, but set up to use my FT817 also with a quick swap of coax leads if required. My FT817 can run all bands, but the idea is to have the TS700a run 144, the FT817 run 432 and the 202 run 23 cm.

I encourage anyone to run or operate portable to take advantage of propagation, because I don't have a good home QTH to work VK, so have to operate portable. Up in the far north of ZL, it is magic for DX to VK, when the prop is in that is.

First 24 GHz Tropo across Bass Strait and New National SSB Records

In late January, the Hepburn charts were indicating red and pink across Bass Strait from 31 Jan to 2 Feb. So Rex VK7MO arranged with a number of 10 and 24 GHz operators to be available while he travelled to the North Coast of Tasmania.

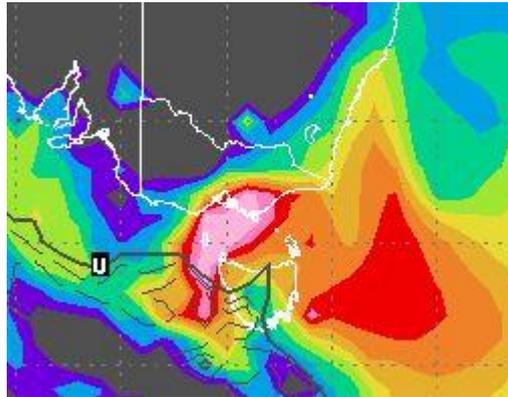
On the afternoon of January 31, he set up on 10 GHz at Table Cape in QE29 and soon worked Alan VK3XPD, David VK3HZ, Rob VK3MQ, Rhett VK3GHZ and Colin VK5DK (and later David VK5DG who was running only 200 mw) with signal levels up to S9+. A 24 GHz test with David VK3HZ initially showed no indication of propagation but by running a 1270 Hz single tone and using JT4F, evidence of weak propagation was noted after some 15 minutes. Once a signal was seen both Rex and David were able to slightly peak their antennas (beamwidth of less than a degree on Rex's 114 cm dish) and a JT4F QSO was completed with -14 dB reports both ways. They continued with JT4F until the signal peaked and it was possible to complete an SSB QSO 5/1, 5/2 for a new National Record of 339 km.

The next day (February 1), Rex set up at Dion VK7DB's family farm in QE28 and again 10 GHz was wide open with 5/9 plus signals to VK3HZ. David VK5KK in the Adelaide hills ran a 10 GHz test with Rex and while both stations decoded call signs, the band collapsed and a QSO was not completed. The band remained open to VK3 with Rex working VK3QM and VK3HZ on 10 GHz with a three way QSO without the need to turn antennas. Rex then undertook 24 GHz tests with David VK3HZ and later David VK3QM but nothing at all was seen on 24 GHz and a later test on 10 GHz showed that signals were now much weaker but still 5/9. It seemed that the peak time had passed and that they should have moved to 24 GHz earlier in the morning.

On Sunday February 2, Rex moved to Devonport in QE38. David VK3HZ was again at John's Hill in the Dandenong Ranges and reported seeing a solid inversion layer in the VK7 direction.



VK3HZ at Johns Hill with Thick Inversion Layer on Horizon



Hepburn Chart for Jan 29

This time, they started on 24 GHz. Initially nothing was seen but after several minutes a short single tone peak on 1000 Hz indicated to Rex that David was copying and ready to receive messages. A JT4F contact was completed with -15 dB reports both ways and they continued with JT4F while they waited to see if the signal would peak. When it did, an SSB QSO was completed with reports of 3/1 both ways to extend the National Record to 372 km. JT4F was continued for almost two hours with 100% copy to see if signals would improve but they gradually faded. The JT4F results showed that Rex and David maintained frequency on 24 GHz to generally +/- 2 Hz indicating very little propagation variation. However, it was noted that if either station changed elevation, this changed the path length and introduced Doppler of several tens of Hz.

Their conclusion is that achieving new SSB record distances was greatly assisted by having digital capability (with GPS locking) and the use of single tones on JT4 to monitor propagation conditions and peak antennas.

New ZL 2 m Beacon

Bob ZL3TY advises:

There is a new 2m beacon, ZL3MHB, operating on 144.286MHz from a location about 10 km north of Hokitika (RE57mi). It is running 14 W to a horizontal 5-element yagi pointing west. It is at 40m ASL, about 3 km inland with a clear view to the west.

We are hoping it will fill a large gap in the ZL beacon network, in particular towards VK.

There is a 6 m beacon co-sited and it will be QRV as soon as we can sort out an unexpected licensing problem.

Please send any Weak Signal reports to David VK3HZ

Digital DX Modes

Rex Moncur – VK7MO

144 MHz Digital Record

During the morning of the 19th January, Wayne VK6JR at Dunsborough W.A and Leigh VK2KRR at The Rock, NSW, extended the 144 MHz Digital Modes record. The previous record was the 2664 km path between Derek VK6DZ and Leigh VK2KRR. This has now been extended to 2933 km when VK6JR completed a JT65b contact with VK2KRR. Signal strengths were as strong as -2dB at Leigh's end from Wayne's 10 Watts. Equipment at Leigh's end currently is 4 x 17-element yagis on 40 ft booms at 80 ft above ground. At Wayne's end he is using a 9-element yagi. On the same morning Wayne worked or heard VK3KH, VK3HY, VK3DXE and VK3II.

432 MHz Digital to ZL

On 11 January Steve ZL1TPH was worked by VK7MO on JT4f with signals levels of -12 and -13 dB over a 2389 km path.

Recommended Terrestrial Procedures on JT65

The default set-up for JT65 is designed for EME and only gives the option of sending an OOO signal report. While such reports are accepted for EME, terrestrial contacts require the exchange of some unknown information usually in the form of a signal report. For terrestrial records and contest purposes in VK the unknown information must be based on at least two characters. To meet this criterion WSJT provides for the exchange of a two character signal report in dB form which is implemented by double right clicking on the other station's callsign after it is received (this procedure is not intuitive so one needs to practice it). A valid QSO at VHF, as originally set down by Edward Tilton W1HDQ back in March 1957 in QST "The World Above 50 MHz" column, requires the identification of both callsigns, the exchange of some unknown information and confirmation both ways that the exchange is complete. In line with this definition a valid JT65 QSO at VHF would be of the following form:

Transmitting Station	Message Transmitted
VK1ABC	CQ VK1ABC
ZL2XYZ	VK1ABC ZL2XYZ -27
VK1ABC	ZL2XYZ VK1ABC R-26
ZL2XYZ	RRR

In terms of a QSO it is unnecessary to send 73 but this is often sent as a courtesy so the other station knows that you have received RRR and can move on to work other stations.

Please send any Digital DX Modes reports to Rex VK7MO

Meteor Scatter

Dr Kevin Johnston – VK4UH

Having a little time off from the salt-mine over the Christmas and New Year's break was good for the radio-activity at this QTH. The latter part of the summer is normally associated with the best of the years VHF propagation, with both Sporadic-E (Es) and Tropo-ducting expected.

Episodes of enhanced ZL propagation have certainly been present but, to date, have been well down this season compared to previous years.

Last month I touched on the use of mixed propagation mode meteor-scatter where the traditionally accepted maximum distances achievable can be extended by tropo enhancement at one or both ends of the path. I mentioned the extension of the world record for 2 m Meteor-Scatter propagation to a staggering 3377 km between the Canary Islands and Africa where tropo ducting coincided with the Perseids Meteor Shower in August 2013.

Looking for more evidence of this combined mode of propagation during this year's summer period I participated in a number of skeds with Steve ZL1TPH operating from a number of portable sites on the ZL North Island. As I have often complained previously, despite almost three years of trying in the weekend ZL-VK MS activity sessions, I had never previously received a single ping from across the Tasman at this location. Likewise Steve ZL1TPH had never heard VK on MS

On 1st January, a sked was pre-arranged from Steve's portable site at Cape Reinga (RF65jm) at the most North-Westerly tip of NZ - a site which has seen many VK-ZL records achieved on VHF and microwave bands particularly during the VK9NA activities on Norfolk Island. The site is an 8-hour round trip from Auckland and has no mobile phone coverage at all. It's worth looking on Steve's website at <http://zl1tph.yolasite.com>, or just google "ZL1TPH" to see some amazing photographs from this site.

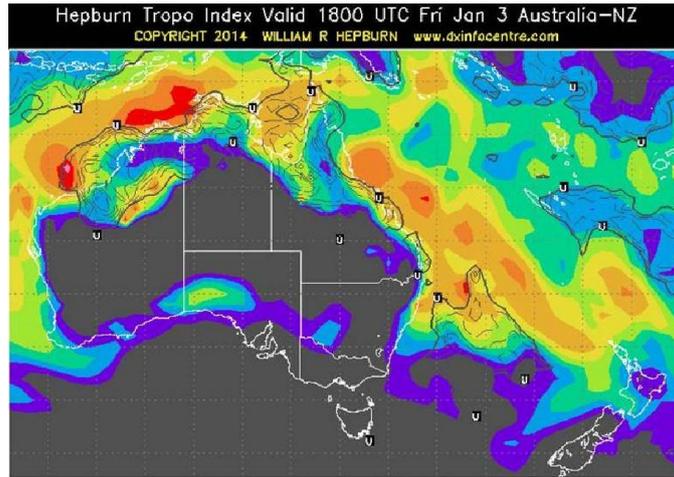
Being beyond mobile, internet or VHF Logger contact, agreement was confirmed in advance on operating frequency, mode, period selection and timing etc. to be used.

Commencing at 20:00 strong pings were immediately received in both directions and the contact was completed in less than 5 minutes, all without the use of the logger or of internet time syncing and only 100 watts at the ZL1TPH end. This contact was an MS Personal Best for both stations at a distance of 2056 km. A new initial (callsign), a new grid-square and indeed a new DXCC country for us both, using this mode. Review of the Hepburn Chart at that time strongly suggested the high likelihood of tropo enhancement along long sections of the path between Brisbane and Cape Reinga but with no evidence at that time of a complete tropo opening between the two sites.

Steve then also completed with Ross VK2DVZ (QF68gd) via enhanced MS.

On 3rd January, another sked was set up with Steve portable from Kaitaia (RF64ou) a distance of 2113 km, a further increase of 47 km. Again 2-way MS contacts were completed with myself VK4UH (QG62kp) and with Ross VK2DVZ.

Three hours later a tropo duct did open completely between the two locations. Alerted by continuous FSK441 signals, Steve and I were able to complete a QSO on SSB first on 2 m and then on 70 cm. Steve immediately headed North back to Cape Reinga and went on to complete SSB contacts on both 144 and 432 with several other stations including VK4OX, VK4CZ, VK4ARN, VK4AML, VK4IBR, VK4REX and VK4MFJ. Attempts were also made on 1296 but without success. Steve has included photographs, details and Hepburn charts from around these contacts on his website, as above.



Hepburn Chart for January 3rd



VK Logger Map for January 3rd

On 25 January, Steve and I arranged another sked, this time with him operating portable from RF73hm gridsquare - a site closer to his home QTH. Although a far more difficult challenge, a 2-way MS contact was finally achieved after 55 minutes over a distance of 2286 km - an increase of 173 km over the previous best again with only 100 watts at the ZL end. The contact was completed using the WSJT- ST mode (Short-Text /Single-Tone) which I have described in earlier columns. Again review of the Hepburn charts at that time showed a “pool of yellow” at the ZL end of the path and again the likelihood of tropo enhancement of the MS path.

The take home message here is clear. Tropo enhancement of Meteor Scatter propagation is real and it is a useful mode for extending absolute distance and in increasing the apparent elevation of signals over obstructions in the path where this would normally be a restriction. Again, keep this enhanced tropo-MS propagation mode in mind at this time of year even when complete openings are not apparent. There may still be enough ducting to bridge the gap, also remembering that there are meteors at all times of the day and night, not just before dawn and not just during the weekend activity sessions.

On another tack, there is again interest in attempting MS paths to stations in the North and Far North of Queensland. Currently to the best of my knowledge, and please correct me if I am wrong, there are no stations currently active on FSK441 from these areas. Again a plea for anyone up in FNQ already equipped for digital operation on 2m, or anyone who would like to get active, to get in contact and arrange some tests with us down South. Only a modest 2 m station with an 8-

element yagi in the clear to the South would be required to make a start. A rotator yes but elevation control is not required. Perhaps even a portable station for a sked?

Finally the next significant Meteor Shower will be the Lyrids Shower expected around 22nd April.

Please send any reports, questions or enquiries about Meteor Scatter in general or the digital modes used to Kevin VK4UH