
VHF/UHF – An Expanding World

David Smith VK3HZ

Weak Signal

David Smith - VK3HZ

After the spectacular end to the year, January began with a bang but then ran out of steam as conditions rapidly fell away.

However, before we get to the new year, I received a number of reports from people about the final day of 2011 that are worthy of inclusion.

Kevin VK4UH, west of Brisbane, reports that after being alerted by a phone call from Colin VK5DK, he briefly (!) left a houseful of guests and the preparations for a New Years celebration and worked VK5DK, VK3HY, VK3KH, VK3HZ, VK3BDL, VK3BBB, VK3OER, VK3LY, VK3BJM, VK3EJ, VK5NY, VK5PJ, VK3AMZ, VK5AKK, VK5JG, VK5ZK, VK5NZ, VK3MIR and VK5CP/p.

Ron VK4BRG near Bundaberg reports:

I worked stations from 0158 to 0514 UTC - a duration of 3h 14m, which is far in excess of anything I have previously experienced.

Stations worked include FK8IA on both SSB and FM, 1 each VK1 and VK7, 3 x VK2, 15 x VK3 and 5 x VK5.

The opening was even more remarkable as far as I was concerned as I was running 100 W to just a 5/8 vertical, 3.5 m high on my garage roof!

From Colin VK5DK:

My first contact was with VK4KR at 0220Z. In all I managed to work 21 VK4 and 4 Northern VK2 stations. They were in order of contacts VK4KR, VK4JF, VK4ACE, VK4OX, VK2XW, VK4IBR, VK4ZAA, VK4KKY, VK2XN, VK4VDX, VK4MJF, VK2FZR, VK4ARN, VK4QSY, VK2PB, VK4ADC, VK4KSY, VK4NWH, VK4NE, VK4UH, VK4CDI, VK4HJ, VK4FPFH, VK4BRG and VK4BLK.

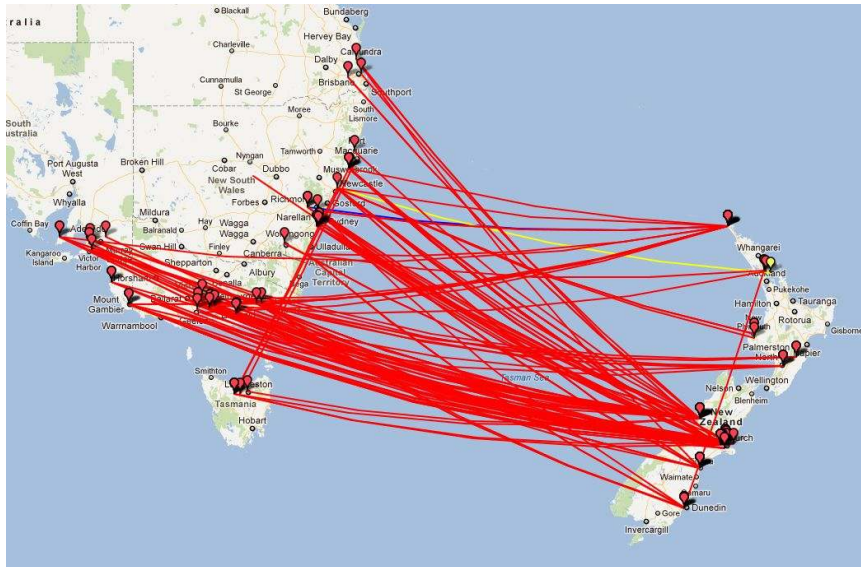
To complete the evening I was able to work Joe VK7JG, Winston VK7EM in Northern Tasmania, Nick VK3VFO in Morwell, Ross VK3MY in Melbourne and, after over 48 years of trying, I was able to work Bob ZL3TY at 1055Z on Tropo. Bob was on CW (5/2/9) and I was on SSB with 5/2 reports exchanged.

So, on to 2012. Following on from the previous column, New Years day had Bob ZL3TY busy working stations up and down the east coast via tropo – as far west as Andrew VK3OE in Melbourne.

On January 2nd, good conditions across to ZL continued with Nick ZL1IU, Steve ZL1TPH/P and Bob ZL3TY working across to VK2 and VK4 stations on both 2 m and 70 cm.

The 3rd of January brought the most spectacular day of propagation that has been experienced in many a year – many say it was THE best. From about 2300Z to 0330Z, an Es cloud over the Tasman Sea produced a huge opening on 2 m across to New Zealand. The opening covered all of NZ and extended west to Adelaide and beyond. Stations from VK1, 2, 3, 4, 5 and 7 on one side worked ZL1, 2, 3 and 4.

A plot of the contacts logged on the VK Logger is shown below:



2 m Contacts on 3rd January 2012 from 2200Z to 0400Z

Signals were so strong at times that stations in Melbourne with only a dipole or a vertical whip were easily able to work into ZL. There were so many stations on that 2 m was, at times, like 20 m on a busy day.

Brian VK5BC, who was portable at Corny Point on the southern end of the Yorke Peninsula, worked what could be termed a quadrella of stations - ZL1TPH/P, ZL2WHO, ZL3TY and ZL4PLM. At 0107Z, he also worked Dave ZL2OK on the far side of the north island for possibly the longest distance for the day – 3493 km – and a new VK5 distance record.

Colin VK5DK in Mt Gambier was also having a busy time. He writes:

I was working some very unusual propagation on 50 MHz with very strong backscatter signals into the Melbourne area, all the while checking on 144 MHz. At 2350Z, I heard and worked ZL1TPH/P, which was the beginning of a 3-hour E's opening to ZL from this QTH. The following ZL stations were worked in order of contacts: ZL1TPH/P again worked at 0001Z at 5x9 then ZL1TBG 5x9, ZL2WHO 5x5, ZL3TY 5x9, ZL3AAU 5x5, ZL3NW 5x7, ZL3ADT 5x7, ZL4PLM 5x5 and concluded with ZL3MH 5x5 at 0307Z.

Tony VK5ZAI reports that his best contact on 2 m was 3122 km with Mark ZL2WHO in Palmerston with 5x7 reports both ways. Other 2 m contacts were with Bob ZL3TY and Ross ZL3ADT.

Steve ZL1TPH spent 4 days portable at Cape Reinga (RF65) at the top of New Zealand. He had two days of 2 m Es and three days of tropo. During that time, he logged 86 contacts to 46 different stations. Highlights were working VK5BC/p, VK5NY and VK5DK on Es, the many VK3 stations on Es and also 5 stations worked on 432 MHz from VK2.

Ron VK3AFW reports:

Having missed out on the big VK4/2 to VK3/5/7 Es on 2 m in late December, I was pleased to have a compensation prize.

This morning (3/1), 6 countries on 6 m and then 6 ZL's on 2 m with as many heard but not completed with. I also worked VK5s from Mt Gambier to Corny Point at good strength on backscatter on 6 m.

ZL3TY for 10 minutes was showing all green and two red LEDs on my Guess meter, others giving similar reports. He qualifies as the loudest ZL heard in Melbourne. He

must have worked 30 VK3's during the best hour. Some operators I had presumed were deceased showed up. A couple of VK3s used simple vertical whips to work into ZL.

Most stations came up out of the noise for a short time before sliding back, repeating this several times during the opening. The footprint moved around with stations only a few km apart having quite different signals. All typical E's.

Not to be outdone the VK7's and VK5's managed a number of 2 m ZL contacts. Of course, the coastal VK2's and VK4's had some troppo with perhaps some Es.

Needless to say, January 3rd 2012 will be talked about for many years. The rest of January, however, is another matter.

Conditions dropped back to "normal" with only a few brief Es openings between VK1/2/5 and VK4 on January 8th, 10th and 11th.

Across the Bight, the VK6REP beacon was being heard regularly in Adelaide, but no contacts were being made.

On the morning of January 19th, Norm VK7AC managed to work into Adelaide (1010 km) on 70 cm having contacts with VK5ZK, VK5AKK, VK5TH and VK5ACY.

January 25th brought more good conditions across the Bight – this time with a number of contacts. At 2145Z, Jim VK3II worked Ron VK6VOX (2560 km). That afternoon, Wally VK6WG made an appearance working Colin VK5DK, Chas VK3PY, Graeme VK3GL and several Adelaide stations on 2 m. On 70 cm, he also worked Colin and Brian VK5BC. Bob VK6BE was also on air working Ian VK3AXH and a number of Adelaide stations.

Colin VK5DK again reports:

I heard a signal on 144.100 with the antennas beaming east. It turned out to be Wally VK6WG calling from Albany in WA (2071 km). We were able to complete a good QSO with signals peaking to S9 both ways. A contact on 70 cm was completed at 0629Z with signals from Wally at S9+20 db. An attempt on 23 cm was made, but although Wally received my signals quite well he was having trouble transmitting on 23 cm, so no two-way contact was made. The VK6REP Esperance beacon on 144.5665 MHz had been peaking to S7 at my QTH.

It is a pity that there is no beacon operational at the present in Albany - both the 2 metre and 70 cm beacons are off air, reasons unknown at this stage.

And so January came to a close with only a whimper compared to the spectacular opening on the 3rd.

Vale Don Graham VK6HK

Sad news during the month was that VHF/UHF legend Don Graham VK6HK passed away on January 13th. Wally VK6KZ writes:

Don was one of the major drivers of the West Australian VHF Group state-wide system of VHF/UHF and microwave beacons. His understanding of the bureaucratic requirements for licenses together with engineering knowledge and skills were among his key contributions.

Much of his station was constructed by him and his operating techniques were a model for others to copy. His current activities were in the digital world helping Andrew Martin VK3OE and Phil Harman VK6APH develop hardware and software for a world leading chirp radar beacon.

He will be sorely missed!

Please send any Weak Signal reports to David VK3HZ

Digital DX Modes

Rex Moncur – VK7MO

10 GHz Grid Square Tour

During January, 2012, Rex VK7MO activated some rare grid squares on 10 GHz as set out in Table 1.

QF57 was activated from Bald Mountain on the property of Tom Burt VK2TB – thanks to Tom for providing such a great location (See Fig 1).

The location at PF86, near Cleve SA, was identified by Jim VK5JW who also participated (see Fig 2).

It was noted that the tropo-scatter contact with VK5DK from PF85 was spread around 60 Hz (typical of long distance tropo-scatter on 10 GHz) whereas the tropo-ducting contacts from PF75 with VK5DK and VK3HZ showed no spreading. This feature of tropo-ducting should provide a useful advantage when using narrow bandwidth modes such as JT65. It is also noted that aircraft scatter causes no significant spreading giving it an advantage over tropo-scatter with narrow bandwidth modes. These features of tropo-ducting and aircraft scatter suggest that such modes will have even greater benefits at 24 GHz and higher frequencies. An issue with aircraft scatter is the Doppler shift, with JT65 requiring the aircraft to cross at no more than 10 to 15 degrees whereas the wider bandwidth mode ISCAT-A allows the aircraft to cross at right angles – but has about 8 dB less sensitivity.

The digital contacts from PF86 and PF75 to VK3HZ resulted in new national digital records at 832 km and 843 km and the SSB contact from PF75 to VK3HZ a new VK3 record. There is some evidence that the longer distance aircraft scatter contacts are assisted by improved tropo-ducting conditions as indicated on the Hepburn charts and if this proves to be repeatable offers the prospect of making longer aircraft scatter contacts.

Grid	Location	Station	Station's Location	Mode	Propagation	Distance	Rpt Sent &RXed
QF57	Bald Mt NSW	VK3HZ	Near High Camp Vic	ISCAT-A JT65c	Aircraft Aircraft	715 km 715 km	-12, -20 -17, -20
QF29	Tilpa NSW	VK3HZ	Mt Macedon Vic	ISCAT-A	Aircraft	721 km	-20, -11
PF84	Tourbridge Hill SA	VK3HZ	Balwyn Vic	JT65c	Aircraft	728 km	-17, -19
PF85	Near Yorketown SA	VK5DK	Mt Gambier	JT65c	Tropo-Scatter	446 km	-17, -14
PF85	Near Ardrossan SA	VK3HZ	Mt Macedon	JT65c	Aircraft	699 km	-25, -17
QF53	Narooma NSW	VK3HZ	Near High Camp Vic	JT65c SSB	Aircraft Aircraft	482 km 482 km	-15, -13 5/1, 4/1
PF86	Near Cleve SA	VK3HZ	Mt Macedon	JT65c	Aircraft	832 km	-19, -25

PF75	Port Lincoln SA	VK5DK	Mt Gambier	JT65c	Tropo-duct	568 km	-19, -15
PF75	Port Lincoln SA	VK3HZ	Mt Macedon	JT65c SSB	Tropo-duct Tropo-duct	843 km 843 km	-14, -15 2/1, 3/1

Table 1. QSOs on 10 GHz, January 2012, grid square tour



**Fig 1: Operations from QF57 Bald Mountain near Mudgee NSW
Tom Burt VK2BT in photo**



**Fig 2: Operations from PF86 near Cleve South Australia
Jim Walford VK5JW in Photo**

(Rex did manage to attract quite a deal of interest during his operations at Port

Lincoln. One person filming a time-lapse of the dawn view from the lookout was intrigued enough to film an impromptu interview that was immediately uploaded to YouTube:

<http://www.youtube.com/watch?v=tHU85RHURGs>

The local press also interviewed Rex:

<http://www.portlincolntimes.com.au/news/local/news/general/record-set-at-winter-hill/2430604.aspx>

All very good publicity for our hobby).

Please send any Digital DX Modes reports to Rex VK7MO

The Magic Band – 6 m DX

Brian Cleland – VK5BC

As reported in last month's notes, the first few days of January were very exciting on 6 m with a great opening to W5 on 1st January followed by openings to Central America, XE, TI5, HP3 & OA4 on 2nd & 3rd. Roger VK2ZRH has produced a great analysis of these openings as follows:

Spectacular Trans-Pacific 6m Event 2-3 January 2012

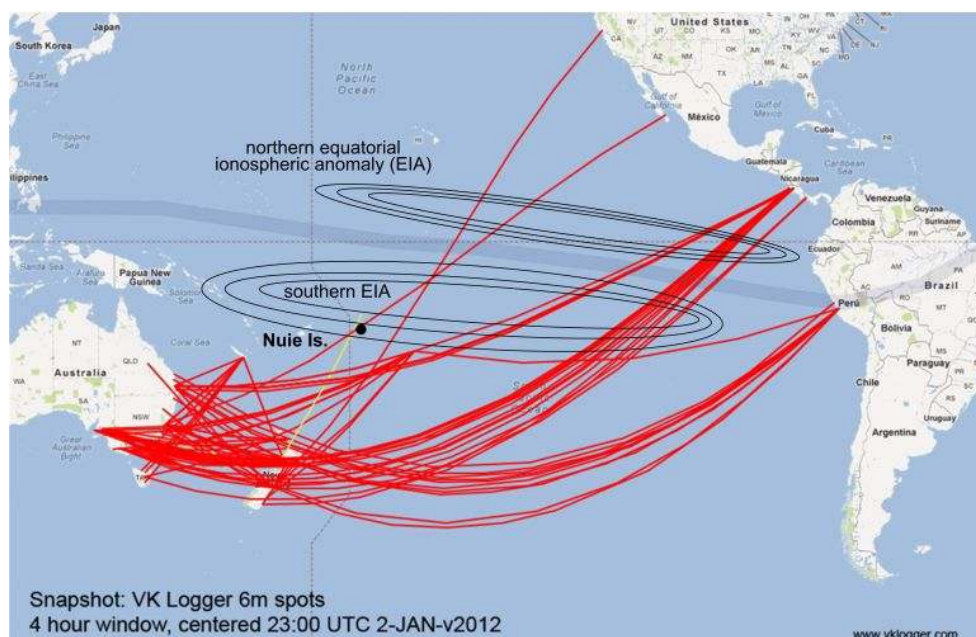


Figure 1. A spectacular day on six metres!

Six metre propagation put on a spectacular performance over the first couple of days of the New Year for 6 m operators on either side of the Pacific, in both northern and southern hemispheres. The snapshot map in Figure 1 here, created from VKLogger spots by Adam VK4GHZ, gives an overview. Intense Es openings around Australasia over 2-3 January UT bloomed into transequatorial propagation to North and Central America, and a surprise – long-range Es between Peru and VK/ZL.

As reported in the Jan/Feb issue of Amateur Radio, on New Year's day (VK time), 6 m was open to FK8 from 0005 UT, a foretaste of what was to come. From 0020, stations in EM00 Texas – W3XO/5, W5OZI and N5TSP – worked VK2, VK3, VK5 and VK7; K5RK in EL29 joined in and the XE2HWB/B beacon was heard in VK5. The opening lasted nearly two hours.

But the next day (2nd and 3rd UTC) was even better. 6 m opened from 0000 UTC to Costa Rica and Panama. TI5XP (EK70NM), worked into VK2, VK4 and VK5. TI7/N5BEK (EK70CK) worked into VK4, VK5 and VK7, followed by TI2KI/8 (EJ79) into VK2. HP3TA in Panama (EJ88) worked into VK3 and VK5. XE2HWB worked into VK2 and VK3. In the midst of the action, the previous day's US stations in EM00 worked into VK2, VK3, VK5 and VK7, picking up ZL contacts along the way. All these contacts, and those the day before, were clearly E's-extended, skewed-path transequatorial propagation (TEP). Over the South Pacific end of these paths, E's provided the extra skip between the southern equatorial ionospheric anomaly (EIA). The ionosonde on Niue Island lies pretty much beneath the southern EIA. The combination of foF2 values and height of the F2 layer over the period the contacts occurred created the necessary conditions to support chordal hop (TEP) across the geomagnetic equator.

At 2158 UTC, 2 January, OA4TT (Canete, Peru) worked VK4DDC, followed a minute later by E51EME (BG80CT) on Raratonga, Cook Islands. 6m was open between VK and ZL, and in the half hour after 2200 UT, OA4TT worked VK2OT, ZL2TPY, ZL1NX, ZL3ADT, VK4WTN, VK2FLR, VK4HJ and VK4CZ. Distances extended from 8870 km (E51EME) to 13,239 km (VK4WTN). The time difference between OA4TT and eastern VK is 9 hours – morning in VK (and ZL) and afternoon in Peru. So the event fits the 'classic' summer solstice short path (SSSP), or "extreme range" E's, propagation characteristics.

The event provided an opportunity to characterise the OA4TT-VK/ZL path, based on the methodology I have detailed online in a posting titled, "*Signal Strengths of VHF sporadic E propagation*" (on the VKLogger Forum at Band by Band>Propagation & Solar Cycle News). This enables the determination of total transmission path losses for E's propagation. For the exercise, my friend of 40 years, Mike VK2FLR, provided key details of his contact and station equipment. OA4TT's qrz.com pages provided details of his station. IPS ionosondes at the VK end, together with a backscatter radar sounding [2] by VK3OER, in Figure 2 here, added useful information.

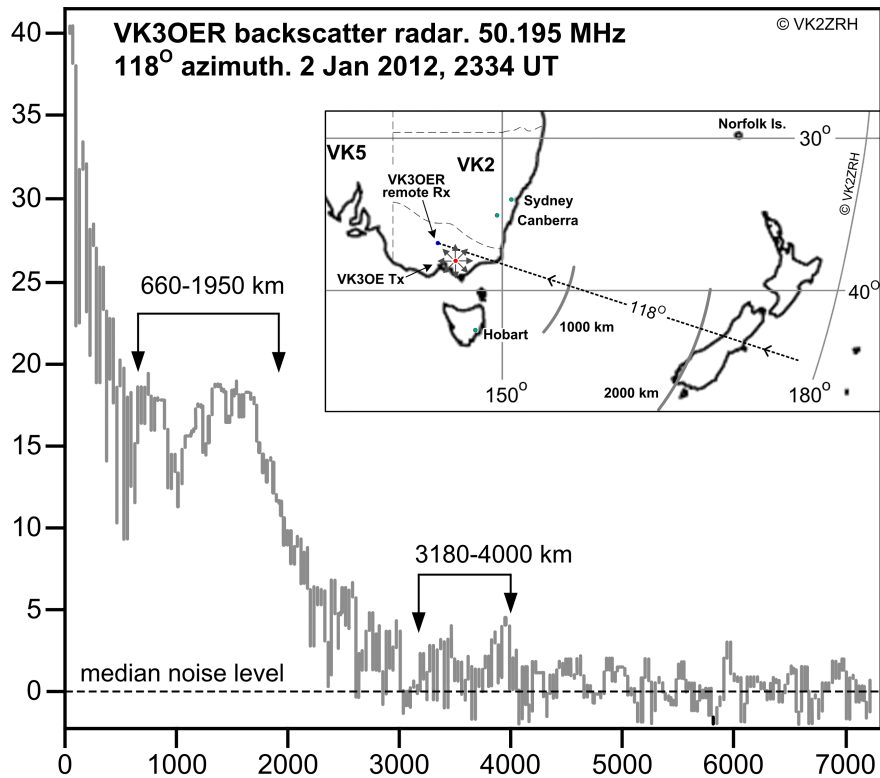


Figure 2. Bistatic backscatter chirp radar sounding by VK3OE during the great trans-Pacific 6m opening.

The VK2FLR-OA4TT path is 12,817 km long. The usual rule-of-thumb would indicate 6-hop E's at 2137 km per hop, close to the limiting case maximum (zero raypath elevation angle) [3]. I analysed the likely path characteristics based on ionograms at the western end, showing sufficient Es electron density, with the height at 99 km. The backscatter sounding from VK3OER, in Figure 3, shows contiguous multi-hop E's from 660 km out to 4000 km, east of ZL. From VK/ZL to Peru, across the South Pacific region, E's events most often occur at 105 km height, based on studies of radio occultation of GPS signals. The resultant propagation analysis is shown in Figure 3. It's 8 hops, sporadic E all the way! A check against the passage of the southern EIA showed that the last hop or two closest to OA4TT were quite unlikely to be F2 skip as electron densities that late in the day near South America would not have supported 50 MHz.

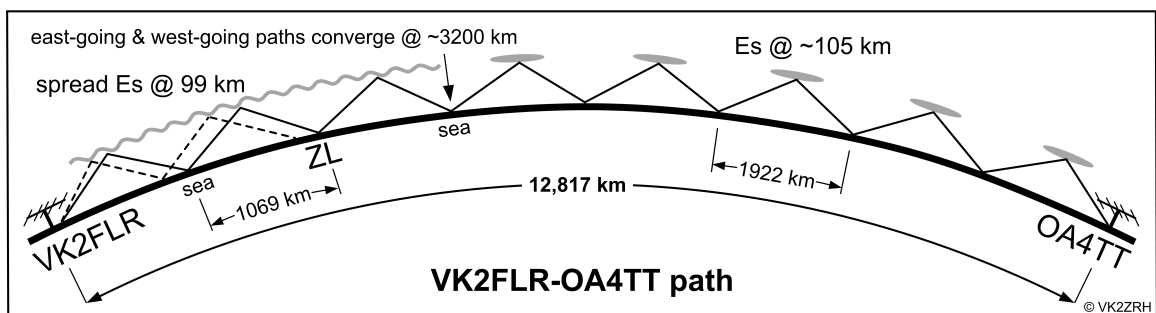


Figure 3. Propagation analysis of the VK2FLR-OA4TT contact.

The VK2FLR-OA4TT transmission path loss analysis gave a S/N ratio for OA4TT at VK2FLR of 18 dB, confirmed by VK2FLR (quote: "S3 by ear" – Mike's an

experienced operator). Could it have been 7 hops? The analysis gave a negative SNR! Could it have been more hops? At raypath elevation angles best suited to the antenna elevation radiation angles at each end, the path would be 12 hops, but losses reduce the SNR well below that reported.

OA4TT runs 1 kW to an 8-element Yagi at 20 metres height, while VK2FLR was running around 100 W to a 3-element Yagi at 10 metres height at his inner-city location of Glebe Point, in Sydney.

Amazing stuff!

Roger Harrison VK2ZRH

[1] "Afternoon Transequatorial VHF Propagation", Roger Harrison VK2ZRH, at: <http://home.iprimus.com.au/toddemsle/aTEP-Harrison.htm>

[2] "A Bistatic Backscatter Chirp Radar for Amateur Radio Use", Andrew Martin VK3OE, DUBUS 2/2010.

[2] "On Sporadic E, VHF Propagation, MUFs and Petit Chordal Hop", Roger Harrison VK2ZRH, DUBUS 2/2011.

Thanks Roger, great report.

1st January – as well as the W opening in the afternoon good opening VK5 to JA1, 2 & 3.

The morning of 3rd January many VK3 & 5's worked both TI5XP & TI7/N5BEK Costa Rica with Steve VK3ZAZ, Garry VK5ZK and John VK5PO also working HP3TA Panama.

4th January - good opening to Northern Japan with many VK3, 5 & 7's working JA8GFB & JA8CIC.

8th January - Brian VK4DDC worked HP3TA CW 519 and Tony 3D2AG/p Rotuma Is worked into VK2 & 4.

15th January - Frank VK7DX had good early evening opening with contacts into VK4, 5, 6 and Mark VK8MS in Darwin plus ZL.

16th January - an early opening VK6 to VK5 with VK6RO working Col VK5RO & Brian VK5BC/p.

17th January - opening from JA to VK2 with John VK2BHO & Mike VK2ZQ working several JA's. Mike reported working JR2HCB, JA2KRE, JA2NBV, JA3APL, JA9RKU on 50.130.

John VK7XX also worked several JA's.

23rd January - good E's from VK5 to VK2 & 4 in morning and VK5 to VK6 in afternoon. ZL3NW worked 3 stations in W4 & 5 in morning.

24th January - Steve VK3ZAZ started hear signals from ZL (E's) in the morning and after calling CQ was answered by a K4MM and completed a CW contact over a distance of 15868Kms. Steve went on to work several W's & XE1FAA all in cw.

27th January – late afternoon opening VK5 to JA with Garry VK5ZK & Brian VK5BC/p working JR2HCB.

Andy VK6OX reports the following from VK6;

December last year saw a continuation of Sporadic E openings to the East, with contacts made on 20 days to VK2, 3, 4, 5 and 7 plus ZL. Openings of note included a good afternoon session to JA on 7th December spanning 0800Z- 1000Z. JA areas 2, 3, 6 and 9 were worked.

On 21st December, several of us here in Perth were fortunate enough to hear Bob E51EME from the South Cook Islands calling CQ on 50.1106 but conditions were marginal so he wasn't worked. However on the 30th I finally managed to work him on CW at 0235Z. Distance between stations 8293kms, a fair haul!

On to January 2012, where Es conditions started to taper off, with just the odd opening to Eastern states with only moderate signals. New Year's Day provided some excitement with FK8IA and 3D2AG/P Rotuma Island both worked. Bob E51EME was again worked on two occasions: 2nd January 0857Z and 21st January 0710Z, the latter QSO via JT65A.

John VK6JJ has kindly sent me a summary of his activities over the past 2 months:

13.12.11 0726 50 SSB VK5PO 59 59 ----- JOHN --
20.12.11 0436 50 SSB VK5BC 59 59 ----- BRIAN --
27.12.11 0614 50 CW ZL3NW 559 539 ----- ----- --
27.12.11 0637 50 SSB ZL3ADT 53 44 ----- ROSS --
31.12.11 0245 50 SSB VK2HC 57 57 ----- PETER --
31.12.11 0249 50 SSB VK4KLC 57 57 ----- RON --
31.12.11 0315 50 CW VK2BJ 559 559 ----- BARRY --
31.12.11 0319 50 CW VK4WTN 579 579 ----- WAYNE --
31.12.11 0322 50 CW VK2OT 569 569 ----- MIKE --
31.12.11 0335 50 SSB VK2OT 58 58 ----- MIKE --
31.12.11 0356 50 SSB VK2IZI 59 59 ----- NEIL --
31.12.11 0457 50 SSB VK4AMG 57 57 ----- GEORGE --
31.12.11 0517 50 CW VK4WM 589 599 ----- WADE --
31.12.11 0613 50 SSB VK4IIO 55 55 ----- PHIL --
31.12.11 0724 50 SSB VK4WQ 59 59 ----- GEORGE --
31.12.11 0739 50 SSB VK4KR 53 44 ----- EROL --
01.01.12 0658 50 CW 3D2AG/P 559 559 ----- ----- --
01.01.12 0706 50 SSB VK4VN 59 59 ----- STEVE --
02.01.12 0430 50 CW VK5PO 559 559 ----- JOHN --
02.01.12 0640 50 SSB VK5AYD 59 59 ----- ----- --
02.01.12 0645 50 SSB VK8MS 59 58 ----- MARK --
02.01.12 0734 50 SSB VK6ARW 59 53 ----- REX --
02.01.12 0843 50 SSB VK5NY 59 59 ----- ROGER --
08.01.12 0610 50 SSB 9V1TT 55 55 ----- ANDREW --
10.01.12 0340 50 SSB VK4HJ 57 57 ----- CHRIS --
10.01.12 0344 50 SSB VK4AHW 57 57 ----- HARVEY --
10.01.12 0418 50 SSB VK4VN 56 56 ----- STEVE --
10.01.12 0447 50 SSB VK4WDM 56 59 ----- LOST IN QSB --
11.01.12 0149 50 SSB ZL2WHA 52 41 ----- ----- --
11.01.12 0232 50 SSB ZL2WHO 55 42 ----- MARK --
11.01.12 0300 50 SSB ZL3NW 55 55 ----- ROD --

13.01.12 0205 50 SSB VK4HJ 59 59 ----- CHRIS --
13.01.12 0305 50 SSB VK6KP 59 59 ----- ROD --
25.01.12 0310 50 SSB VK5BC 55 55 ----- BRIAN --
29.01.12 0153 50 SSB VK5BC/P 57 57 ----- BRIAN --

Please send any 6 m information to Brian VK5BC