
VHF/UHF – An Expanding World

David Smith VK3HZ

Weak Signal

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We've had our first VK-ZL opening on 2 metres – very early in the season.

On the evening of September 26th at around 0845Z, Bob ZL3TY at Greymouth on the west coast of the south island reported hearing the Newcastle Channel 5A sound carrier on 143.776 MHz. Steve VK2ZT at Medowie just north of Newcastle began monitoring 144.1 and reported hearing weak CW, although he was suffering from a strong birdie on the frequency. At 0908Z, they finally made an SSB contact with 5x1 reports each way over a path of 2012 km. Signals rose to S3 before they faded out.

Well done, and hopefully that's an indicator of a good season to come.

2 Metre Scramble

With the success of the VK3 144.150 net each Wednesday night, there has been wide support for the re-introduction of a regular 2 metre Scramble to promote further activity on the VHF bands. Mike VK3KH (ex-VK3AAK) has formulated a simple set of rules summarised below:

WHEN:

Last Sunday night of each month at 8.30pm AEST
(1030UTC – 0930UTC during Daylight Saving)

DURATION:

15 minutes only, with call back from 8.45 till 9.00pm on 144.150 MHz

GENERAL RULES:

1. Work each station only once. Exchange will be RS report plus 4-digit Maidenhead locator.
2. Each month there will be a bonus station worth 2 points.
3. Operation will be between 144.110 and 144.200 on USB.
4. Power output is maximum 100 watts PEP

SCORING:

1. Each gridsquare worked will act as a multiplier.
2. Scoring will be: (number of QSO) x (number of grid squares worked)
3. The bonus station will count as two QSO.

BONUS STATION:

The winner each month will be the bonus station, and the callback controller, for the following month's scramble. They are excluded from winning in the month they are bonus station.

The first event is scheduled for Sunday 26th October.

Refer to the VK Logger Forums area for any late changes to the rules.

Aircraft Enhancement

Barry VK3BJM in Kyneton has been refining his Aircraft Enhancement techniques with the help of his ADS-B receiver. He reports on some recent activities:

This Monday morning (2042Z, 5/10/08) when I fired up the ADS-B receiver the first aircraft that caught my eye was a QANTAS bird, flight QF565. Turns out this is a Sydney to Perth flight, of which there are six flights daily (with QANTAS, at least). I cannot recall having seen one on this track before, however, along which the aircraft was shown as having a bearing of 263 degrees (True) from over Canberra to the Bordertown waypoint, where it converges with the Melbourne-Adelaide track before heading out over the Coorong and the ocean. This track is designated J142 on ERC H3 (air traffic chart, High #3).

Helpfully (!) this morning there was very little by the way of troposcatter signal from the VK3RRU 2 m beacon at Mildura, and the VK5VF 2 m beacon on Mt Lofty was inaudible.

At 2044Z the aircraft was 93.7 nautical miles (173.5 km) from my QTH, and a heading of 313 degrees (True), at which point I lost visibility of it (about 25 km east of Warracknabeal, VIC). I listened to VK5VF for the next 10 minutes, and noted at 2047Z a very faint fluttery signal start to appear. This was very brief, but at 2051Z the beacon came up out of the noise at 419 for about a minute, during which time there was no QSB. The aircraft was cruising at 40,025 feet at the time it was visible to my ADS-B receiver.

I was still in the shack, after the usual "AE Alley" on 144.200, at 2230Z when I noticed the second Sydney-Perth flight for the morning (QF575) appear on the screen near Culcairn, NSW. It was also cruising at 40,025 feet. I prepared to take notes...

VK3RRU is at 388 km and 328 degrees from my QTH; VK5VF is at 571 km and 294 degrees. I listened, firstly for VK3RRU then VK5VF, over the next 25 minutes, and my observations are as follows:

*2246:50Z: QF575 due north of VK3BJM
2248:48Z: QF575 @ 350° - VK3RRU 319 (troposcatter level)
2250:50Z: QF575 @ 340° - VK3RRU 319
2251:45Z: QF575 @ 335° - VK3RRU rest period (no key-down tail).
2252:20Z: QF575 @ 333° - VK3RRU 319 with fast flutter.
2253:00Z: QF575 @ 330° - VK3RRU rest period.
2253:30Z: QF575 @ 328° - VK3RRU 539
2254:10Z: QF575 @ 325° - VK3RRU 419
2254:50Z: QF575 @ 324° - VK3RRU 319 with fast flutter.
2255:20Z: QF575 @ 321° - VK3RRU 319 with fast flutter.
2256:10Z: QF575 @ 320° - Temporarily lost radar visibility of aircraft. Shifted array, and receiver, from VK3RRU to VK5VF.
2256:35Z: QF575 @ 316° - Aircraft reappeared.
2257:40Z: QF575 @ 314° - Temporarily lost radar visibility of aircraft.
2258:35Z: QF575 @ 310° - Aircraft reappeared. Still nil signal audible from VK5VF.
2300:35Z: QF575 @ 304° - Still nil signal audible from VK5VF.
2302:00Z: QF575 @ 304° - Temporarily lost radar visibility of aircraft (location 36.208 S, 142.547 E - again, close to Warracknabeal). Still nil signal audible from VK5VF.
2304:40Z: QF575 @ 296° - Aircraft reappeared briefly - marginal signal with position update before data froze.
2305:00Z: QF575 @ 296° - VK5VF 419 with fast flutter.
2305:25Z: QF575 @ 296° - Lost radar visibility of aircraft. VK5VF 419 without flutter.
2307:00Z VK5VF faded into the noise floor.*

Perhaps one day I'll have improved my ADS-B receive capability so that I can follow

these aircraft past the convergence of their track and the VK5VF beam heading. My view to the WNW and W suffers from "Lumps" - things, I believe, like Patten's Hill at Drummond... However, it was interesting enough to see just how much inline the aircraft was before enhancement was observed on the signal from VK3RRU. If that beacon had a key-down tail of some sort, that could be viewed better, of course; but the beacon has power supply limitations, I believe, so there's nowt to be done about it.

Addendum: In the shack just after 2000Z Tuesday morning, and QF565 has just appeared on the screen, over Kyeamba Gap (halfway between Holbrook and Tarcutta, NSW). It took 30 minutes, flying at about 405 knots, to cross the VK3RRU heading; this time it enhanced the signal to 559 (background level 519 this morning) at 2035Z. The aircraft is at about 150 km from my QTH when it crosses the beam heading - very close to halfway to VK3RRU. The aircraft was at 38,000 ft this morning.

The aircraft then enhanced the VK5VF beacon between 2044Z and 2047Z from inaudible to 419 - steady and without flutter for at least 60 seconds between 2045Z and 2046Z. The aircraft is at 250 km from my QTH when it crosses the VK5VF beam heading - it is 320 km from the Mt Lofty site.

I recall Gordon VK3EJ (ex-VK2ZAB) a few years ago asking via the VHF Reflector why AE is not used between Adelaide and Melbourne, the way it is between Melbourne and Canberra/Sydney. I would suggest that the main reason is that the M-A flight paths are not situated as favourably as the M-S paths... Combine that with the majority of Adelaide stations being located west of the Lofty Ranges, and fewer flights to utilise, and it's a no-go. However, this particular track should be able to support AE between Melbourne and stations in the clear in Greater Adelaide - VK5AKK, probably, and VK5NY. The track crosses the beam heading between my old QTH in Box Hill South, say, and VK5AKK very close to the mid-point of the signal path.

The things to bear in mind are the brevity of the "openings" - exchanges will have to be quick; the number of daily flights (only 6), and that the aircraft really needs to be on your beam heading to the distant station. Plane Plotter would be a great help for those who do not have a ADS-B receiver or range to display the enhancement area. Low local noise floors would be of some assistance! Station ERP greater than VK5VF should ensure better RS reports than those I've recorded from VK5VF.

Please send any Weak Signal reports to David VK3HZ

Digital DX Modes

Rex Moncur – VK7MO

This month's report comes from Ian VK3AXH, who gives us some insights into the development of his station and EME operations using WSJT as follows:

Some years ago I was involved with experiments using Hellschrieber, receiving signals via meteor scatter from Rex VK7MO on 6 metres. With the advent of a new digital mode JT44 by Joe Taylor K1JT, these experiments continued on 2 metres. The WSJT digital modes by K1JT are used by EME stations with small antenna arrays and moderate power to take part in weak signal operation via the moon.

My first EME contact took place on 21st of August 2004 using JT44 with W5UN. I used a single 13-el yagi and AM17 amplifier. Dave W5UN uses 32 yagis so you can guess who was doing all the work. After some research into what I could do to

improve my station, I visited Des VK3CY and had a look at this 4-yagi system and results obtained.

It took another 10 months before I was finally up and running with my 4x18 element yagis on 10 m booms designed by the late DJ9BV and optimised by VE7BQH with all elements insulated. The array is mounted on a Nally Tower and is not fully extended for obvious reasons.



On the receive side, my IC910 is coupled via a preamp using a ATF54143 designed by PA3BIY. At present it is mounted in the shack, but will hopefully end up on the mast. It's mounted in a weatherproof box with switching so it's just a matter of relocation. Azimuth and Elevation make use of a CDE Tailtwister rotator and 2 foot screwjack which gives elevation up to 55 degrees. Manual control is used to track the moon. Elevation readout makes use of the innards from a digital spirit level to give 1-degree accuracy. I have programmed the steps into the control unit for the screwjack which means if 15 degrees is needed, 15 is pressed on the remote control and the antenna elevates to that elevation position.

An EME logger by N0UK is used to liaise with other EME operators or to see who is calling CQ. Using the WSJT software, if a signal is seen in the waterfall it's then possible to reply and see if contact can be made. EME can be frustrating particularly when you can clearly see signals yet when you call them there is no response. Some reasons for this include Faraday Rotation and Spatial Polarisation Offset. In addition, if you have any hiccups with your sequencer there is a fair chance you will get RF into your preamp and destroy the active device ... I have lost several due to an intermittent PTT line.

There are several stations using single yagi's with moderate power - a couple of hundred watts - on the band and I've been lucky to work a number of them.

The digital mode used for 2 metres is JT65B. This program can also be used for weak signal terrestrial contacts and is in regular use by enthusiasts within VK. Good results are obtained using this mode when there is no chance of having a qso on either SSB or CW. The site to download the software is at:

<http://www.physics.princeton.edu/pulsar/K1JT/>

To date I have had 677 QSO's, 223 grids and 45 DXCC. If you are contemplating trying this exciting activity and I can be of any assistance, please get in touch by email

Please send any Digital DX Modes reports to Rex VK7MO

The Magic Band – 6 m DX

Brian Cleland – VK5BC

September was a very quiet month on 6m without any reports of significant openings, only the odd report of a beacon being heard briefly.

David VK3AUU is certainly preparing for the next sunspot cycle in a big way. He has recently constructed and erected a 16-element yagi based on the DL6WU design on a 26.3m boom. Pictured below is the yagi;



To assist newcomers to 6 m, below is a list of Australian, New Zealand and New Caledonian 6m beacons that are presently operational and most likely to be heard at this point of the Sunspot cycle.

Australia

Frequency	Callsign	Location	Grid locator	Mode
50.046	VK8RAS	Alice Springs	PG66wf	CW

50.057	VK7RAE	NW Tasmania	QE38du	CW
50.058	VK4RGG	Gold Coast	QG62qa	CW
50.066	VK6RPH	Perth	OF88aa	CW
50.087	VK4RTL	Townsville	QH30jp	CW
50.288	VK2RHV	Hunter Valley	QF57sc	CW
50.289	VK2RSY	Sydney	QF56mh	CW
50.293	VK3RMV	Wannon	QF02wh	CW
50.297	VK7RST	Hobart	QE37pb	FSK
50.304	VK6RSX	Dampier	OG89ii	CW
50.306	VK6RBU	Bunbury	OF76wr	CW
50.310	VK8VF	Darwin	PH57kn	CW
50.315	VK5RBV	Barossa Valley	PF95mk	CW
50.345	VK4ABP	Longreach	QG26dn	CW
52.438	VK3FGN	Mildura	QF15ct	CW
52.450	VK5VF	Adelaide	PF95	CW

New Zealand

50.040	ZL3SIX	Christchurch	RE66ej	CW
50.043	ZL1VHF	Auckland	RF73	CW
51.030	ZL2MBH	Napier	RF80	FSK
52.275	ZL2MHF	Upper Hutt	RE78ns	FSK
52.490	ZL2SIX	Blenheim	RE68	FSK

New Caledonia

50.080	FK8SIX	Noumea	RG37fr	FSK
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There may be other beacons either planned or not operating at present and I will advise of any updates. If your equipment has the capabilities, you should program the above frequencies into memories and regularly scan them. It is surprising how often you will find the band opens and you hear a beacon. It is also useful to listen for Channel 0 TV, in particular, Toowoomba sound on 51.672 and Wagga Wagga sound on 51.740. The International call frequency is 50.110 MHz and the Australian calling frequency 50.200 MHz with most SSB operation taking place between 50.110 MHz and 50.200 MHz. For more information check the Australian Amateur Callbook. Also don't forget that Standard Licenses can only operate in the 52 – 54 MHz portion of the band. There are several Standard Licenses who operate in this portion of the band and can be found calling on 52.1 MHz.

Hopefully 6 m will start coming to life during November and leads into another good sporadic E season.

Please send any 6 m information to Brian VK5BC