
VHF/UHF – An Expanding World

David Smith VK3HZ

Weak Signal

David Smith - VK3HZ

With the warmer weather, there's been a bit of tropo activity on the bands.

On the evening of October 17th, Phil VK5AKK in Adelaide heard the VK6REP 2 m beacon near Esperance at 5x2. At 1025Z, he worked Wally VK6WG in Albany on 2 m at 5x2 over the 1897 km path. Wally is now 98 years old and still going strong.

On the morning of October 29th, Peter VK5ZPG near Adelaide worked Glenn VK4BG near Hervey Bay – a difficult path of 1633 km over land. His report was 4x2. Peter had to drop the guy wire of an HF antenna to turn his 2 m beam in the right direction. There was no sign of meteor or aircraft enhancement so it seems it was a purely tropo enhancement contact.

On the morning of November 1st, a high-pressure cell pushing its way between Victoria and Tasmania produced some lift across the region. Signals were good between Melbourne and Adelaide. Karl VK7HDX turned his beam towards Adelaide and his "K" was heard faintly. Phil VK5AKK was hearing the VK7RAE 2 m beacon at 5x1. At 2145Z, Karl worked Phil (4x3) on 2 m over 1030 km. They then also worked on 70 cm (4x2).

That evening, with the High heading east, good conditions across the Tasman produced several contacts between ZL and VK2. At 0714Z, Nick ZL1IU reported hearing Newcastle Ch 5A TV booming in and, first time for a long while, the VK2RSY 2 m beacon at 5x7. Bob ZL1RS and Mark ZL2WHO also reported hearing Ch 5A. Starting at 0730Z, Nick worked VK2BLS (5x4), VK2AH (5x5), VK2ARA (5x5), VK2QO (5x5), VK2KU (5x5), VK2XTT (5x1), VK2ZT (5x9), VK2DVZ (5x2), VK2MER (5x3), VK2DAG/P (5x3) and VK2KOL (5x5) – all on 2 m. At 0825Z, Mark ZL2WHO had his first 2 m contact across the pond to VK2ZT (5x2). ZL2DX and ZL1AOX also worked a number of the VK2 stations. At 0904Z, after several attempts with others, Nick worked VK2ZT (5x1) on 70 cm. At 1008Z, Nick reported hearing the VK2RSY 70 cm beacon at 5x1.

The following morning, conditions were still holding up. At 1847Z, Nick ZL1IU worked VK2DVZ (5x8) and VK2ZT (5x5) on 2 m. He also worked Steve VK2ZT (5x1) on 70 cm. Later, at 0000Z, Nick again worked Steve (5x5) and VK2EI (5x5) on 2 m.

On the evening of November 10th, Rex VK7MO reported hearing the Newcastle Ch 5A TV at good strength. At 1142Z, he worked Steve VK2ZT on JT65a at -14 over the 1196 km path. Signals built up a little and they tried an SSB contact, but there was not quite enough to make it.

VK3TPR Portable Operations

Peter VK3TPR has once again been operating portable, this time trying some Aircraft Enhancement from under a major flight path. He writes:

We arrived in Bright on Saturday afternoon about 2.30 pm, found a suitable motel (one to the XYL's satisfaction, that is) and then thought about a place for a little AE (aircraft enhanced) radio playing. Bright is in the Ovens River valley and almost totally ringed by hills or mountains. It is also directly under the flight path for jets travelling from Sydney or Canberra to Melbourne

I was directed by the lady at the Tourist Information Centre to "Clear Spot" on Clear

Spot Rd (more like a track) 10 km from town via a circular route. I drove up to this 1000 m high lookout on Saturday afternoon to check it out, seemed pretty good so the plan was set to be set up at Clear Spot QF33LG at 8.00 am local on Sunday morning.

Finally got 2 m, 70 cm and 23 cm set up by 8.40 am Sunday and pointed to Canberra (about 50 degrees bearing) immediately hearing Chris VK1DO on 144.200 with a 5/9 signal. Chris gave me a 5/4 from my IC706 - 50 watts into 9-element yagi. Also worked Chris on 70 cm with the Yaesu FT897 and 100 watt amp, for 5/7 5/3 reports. I worked Chris several more times over the next hour and a half, even off the back of the beam. No need for AE to hear Chris!

Worked Rob VK3XQ in Yea on 2 m 5/7's each way.

Then started to work Melbourne stations with the beams pointed SE.

Michael VK3KH 5/9 5/7 on 2 m, 5/3 5/1 on 70 cm, but try as we might, Michael and I just could not complete a QSO on 23 cm over the next hour. Michael was spotting the planes on Plane Plotter and I was reporting to him on 2 m as they flew overhead - I could hear them roar/echo above at 30 - 40 thousand feet. I estimate 15 or more planes went over in 2 hours.

Alan VK3XPD came up with a 5/7 signal on 2 m, was 5/1 on 70 cm and after several attempts (and several planes) we confirmed a contact with 4/1's each way on 23 cm. Later I worked Alan for 5/1 4/1 - perhaps my AE technique was improving.

Worked Jim VK3II on 2 m 5/5 and 5/5

Worked Andrew VK3OE on 2 m 5/7 5/5 and 70 cm 5/1's each way.

All this time i was liaising with Michael and Alan on 2 m, sometimes receiving signals over 5/9. Somewhere about this time Dave VK3HZ came up with a big signal on 2m so I worked him a few moments later but signals faded a bit for a 5/1 each way.

Then came the biggest AE lift of the morning, around 10.20 - 10.25 local and very excitedly I worked Alan VK3XPD 5/1 and 4/1 on 23 cm and then Dave VK3HZ 5/5 5/2 on 70 cm and 5/2 5/1 on 23 cm - yippee, good signals at last on 23 cm. For 23 cm portable, I was using a Minikits transverter with 10 watts into a 24-element yagi and an FT817 as IF.

What a great morning - logged over 20 contacts with those listed above. Many thanks to all for being there.

10 GHz Operations

It is good to see more people becoming active on one of the last frontiers of amateur radio experimentation - the microwave bands.

Tim VK3JTM in Ararat reports on his first contact on 10 GHz:

On Sunday 1/11/09, Alan VK3XPD and Russell VK3ZQB tested my recently constructed 10 GHz Transverter. First contact was with Alan at 48.5km who was received at 5x9+40 and my report was 5x1. Alan was running 8 watts portable at QF12gh to my 320 mW at QF12lo.

I also heard Russell on CW at 128 km with a 529 report one way. Russell was running 2 watts from his home QTH

I was very pleased to see the transverter working, although it looks like there is still more work to be done fine tuning the feed for better output.

Thanks to Alan and Russell for their time for testing it so far.

ZL Beacon Change

Russell ZL3NW reports that he has changed the ZL3VHF 2 metre beacon antenna from a vertical whip to a horizontal turnstile. The power was also measured at 8 watts to the antenna. ZL3VHF is located in Christchurch and operates on 144.285 MHz. Hopefully this will make it easier for us horizontally-polarised VK's to hear it. Any reception reports would be appreciated.

EME Birdies

Doug VK3UM was measuring his EME system performance on 23 cm recently and noticed that receive performance seemed to be down a few dB. After investigating all of the usual things, he finally did a detailed inspection of his antenna feedhorn. When he removed the Teflon end cover, he discovered that a family of swallows had moved in.



So now he knows that a swallows nest in the feed is worth 2.2dB off the receiver. The nest was carefully relocated and a more secure cover was fabricated to prevent any further invasions. The swallows are probably missing that nice warm feeling they encountered during the recent EME contest.

Please send any Weak Signal reports to David VK3HZ

Digital DX Modes

Rex Moncur – VK7MO

Mt Arden DXpedition: On 10 and 11 October, Barry VK3BJM and partner ventured to Mt Arden in the Flinders ranges to operate from grid locator PF87. On this

occasion, Barry took digital modes, which enabled a much wider group of stations to access this rare grid square. Barry reports working 11 stations via meteor scatter using FSK441 on two metres covering VK2, 3, 4 and 7. He worked four stations on two metres JT65 and was good copy in Melbourne at around 900 km with the best distance being to Jim VK3II at 950 km.

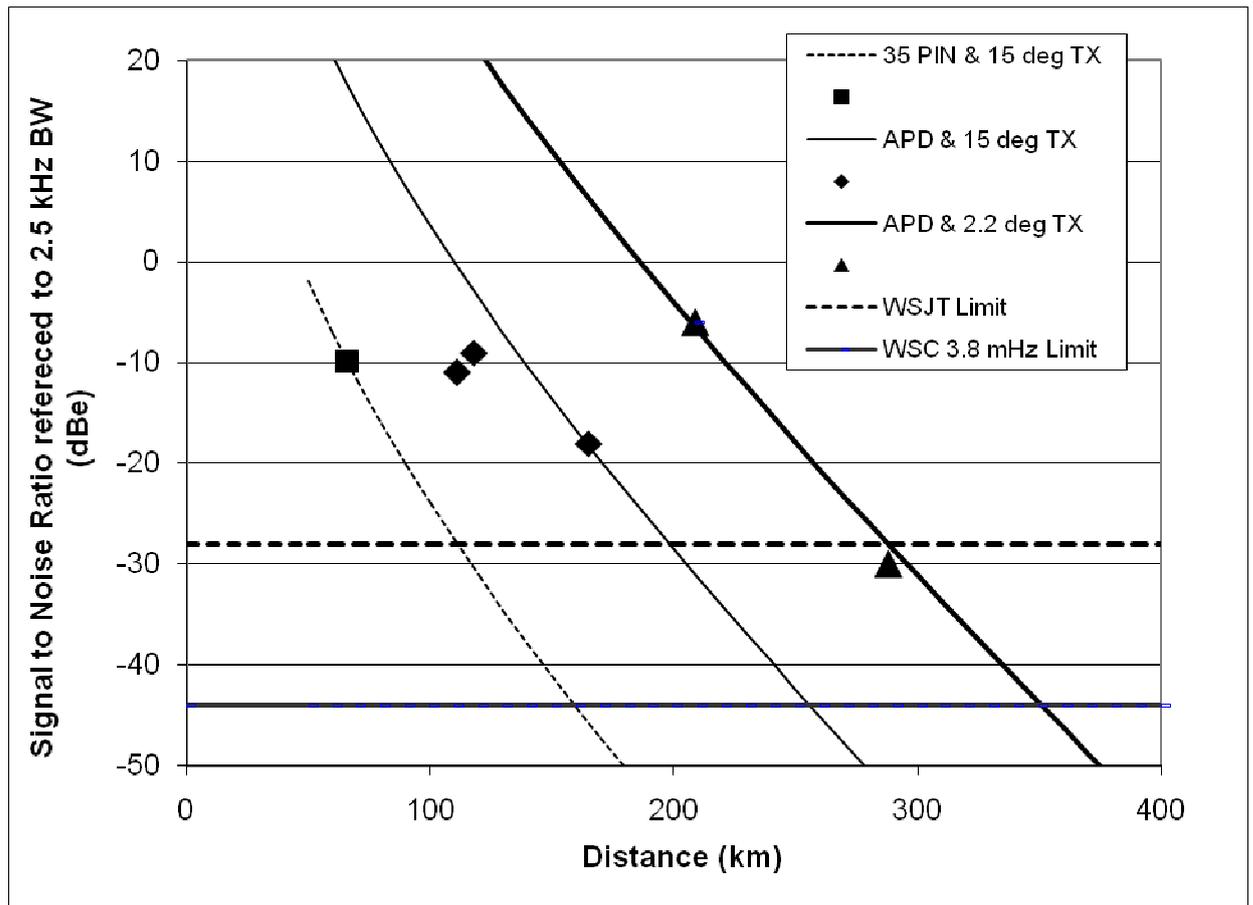
10 GHz Digital: Colin VK5DK reports that both he and Russell VK3ZQB have their 10 GHz systems GPS locked and have JT65 working one way and JT6M in the other over a 140 km path between their home stations. Colin says this is a work in progress.

Digital from Norfolk Island 3-14 January 2010: The team of Michael VK3KH, Alan VK3XPD and Kevin VK4UH will be taking digital and propose to work FSK441 on two metres and JT65 on all bands up to 10 GHz using GPS locked equipment. On two metres, FSK441, they should be in meteor scatter range of most of the East Coast of Australia and ZL. Also look out for tropo-ducting extensions of meteor scatter as Hepburn often indicates large yellow patches around Norfolk Island that could be used to extend the meteor scatter range to VK5 and VK7.

Bass Strait crossed on 474 THz (Red light): On 27 October Rex VK7MO and Joe VK7JG assisted by Paul VK7KPG achieved one way communication across Bass Strait on 474 THz over a distance of 288 km from Mt Horror in Tasmania to Mt Liptrap in Victoria. Communication was achieved using a new mode “Weak Signal Communications” (WSC) developed by David VK3HZ as an enhancement to the audio spectrum analysis program Spectrum Lab by DL4YHF. WSC can work down to -44 dB and achieves this performance by using very narrow binwidths – in this case 3.8 mHz – at the expense of spending 20 minutes to send two callsigns. Initially both stations beamed just above the horizon and while callsigns could be copied, signals were marginal varying from -50 to -44 dB. Joe suggested he raise the elevation and immediately signals improved and by around 2 degrees became rock solid. Rex then also raised the elevation and signals peaked at -28 dB on the WSJT scale, some 16 dB above the detection limit for WSC. While a few attempts were made to use JT65a the best result was -30 dB without any decode. The following is a simplified example of the output of WSC decoding the callsign VK7JG during the Bass Strait tests:

Time	Freq	S/N	MsgA	MsgB
23:02:01	1038.509	21.5	VK7	
23:02:11	1038.509	20.9	VK7	
23:02:21	1038.508	20.1	VK7	
23:02:31	1038.508	19.2	VK7	
23:02:41	1038.508	18.2	VK7	
23:02:51	1072.957	19.1		JG~
23:03:01	1072.957	20.1		JG~
23:03:11	1072.955	20.9		JG~
23:03:21	1072.955	21.6		JG~
23:03:31	1072.955	22.1		JG~

The first column is the time and is used to identify whether the first or second part of the callsigns is being sent. The second column is the frequency of the tone being sent of which there are some 18,000 possible tones to represent every possible combination of the first or second parts of a callsign. As binwidths are only mHz, frequency stability was achieved by GPS locking of the sound cards at both ends. The third column is the signal to noise ratio and messages A and B represent the first or second parts of a callsign. The following graph shows the results of this and earlier tests compared to a propagation model outlined by Paul Edwards VK7ZAS in DUBUS volume 1/2009.



It is seen that the 288 km data lines up quite close to the model prediction. This is despite the fact that on the occasion of these tests there was an excess of 3 dB noise due to moon light and the clouds were much higher leading to increased scatter angle and less scatter gain but compensated by lower losses through the air at higher altitudes.

The tests results confirm the modeling and suggest that with the WSC mode and the present equipment it should be possible to achieve a distance of around 350 km.

The successful trial reported above did not occur on the first attempt as it was necessary to find just the right conditions with cloud high enough to allow line of sight from both stations to the scattering point and no cloud beneath. It took some 10 days to find the right conditions and some failures due to fog. The support of Brendon McMahon and David James of the Bureau of Meteorology was critical in forecasting the conditions that allowed success. Brendon also produced an excellent post trial

meteorological assessment which showed that scattering was from cirrus clouds at around 7000 metres which explains why it was necessary to increase the elevation.

These trials have for the first time shown that scattering from thin high-level clouds is useful for propagation and that a critical element to success is information on cloud height for elevation alignment of the TX and RX.

Please send any Digital DX Modes reports to Rex VK7MO

The Magic Band – 6 m DX

Brian Cleland – VK5BC

Activity improved during October with some 'E' openings and Meteor scatter continuing to provide many successful contacts but the highlight was toward the end of the month when the Solar Flux rose to the low 80's and there were several TEP openings to JA from most areas of VK4.

Gary VK4ABW from just north of Townsville reports the following:

I've been monitoring 49 MHz a fair bit and updating my database. Not too much to report from up north. I was listening to 49 MHz on Friday night (23rd Oct) and noticed it was getting fairly strong, so I went and checked for beacons on 50 MHz. I heard the JA2IGY and JA6YBR beacons coming in nicely around 1031z, so I called on 50.110 CW. Unfortunately signals were way down with a JA3 hearing me but we never completed. Saturday afternoon (24th) the Chinese TV returned with a vengeance at 0601z but unfortunately didn't produce any contacts on 50 MHz, despite calling for about 15 minutes on CW and SSB.

Sunday afternoon (25th) the 43 MHz data burst transmitter was S7 at 0421z and quickly rose to pound the needle +30db by 0426z. By 0431z the Chinese TV on 49.750 was quickly rising out of the noise and peaked at S9 shortly after. I snooped around on 49.750 and spotted a Middle East TV signal (Ashgabat) at S2, so I then checked on 50 MHz and heard the JA2 and JA6 beacons S2 at 0515z. I called CQ on 50.110 and JA3APL immediately responded with a 5/5. We completed the contact and I announced that I was moving up to 50.128. Well ... didn't I drag a dog pile with me! I spent the next hour and 10 minutes working JA's and China. I quickly worked JA3APL, JF1LXO and JR6EXN from 0520z till 0526z and noticed a station signing D7 in the pile up. I QRZ'd him and got BD7NWF (Vicki) 5/7 just north of Hong Kong, China at 0528z. I completed with him quickly as many JA's were still calling. At 0531z I then went on to work JA4GXS, JH4ADV, JH6SQZ, JH6RON, JI3CJP, JH1OCO, JA1PVI, JH2LFG, JI1CUL, JA2IVK, JE3TJS, JH3EEF, JR1MLE, JA9SJI, JR3QLC, JA1CCO, JA6TEW, JA1QVM, JA1RJU, JA2DDN, JM1TWR, JM1IGJ, JA1FNA, JA1SST, JA7EVP, JL1MTY, JH2JUG, JA4TOH, JR1USO, JR1LZK portable 2, JH1PWA, JH1KYA, JR1MLT, JA1KQA and JA2IVK rounding it out at 0626z. My signal was hopping all over JA, going from east to west many times during the pile up. There was still many JA's calling after 0630z but they were rapidly fading down.

Many JA's reported that I was 5/9+ in Japan.

Lloyd VK4FP in Townsville also worked the BD7 and a couple of the JA's but could not hear the stations that I worked at the beginning and end of the opening. This appears to be due to my angle of radiation as Lloyd is not far from my place.

A little further south Kevin VK4BKP in Mackay reports working several JA's between 0455UTC - 0523UTC on the 24th Oct. Stations worked as follows:

JA1RJU 5/9, JM1TWR 5/9, JH6SQZ 5/9, JM1WBB 5/9, JK1TWQ 5/7, JA1CUL 5/8,

JA1VZV 5/5.

Then on 25th Oct Kevin again worked a further 4 JA's between 0515UTC & 0519UTC.

Andrew VK4KAY also in Mackay reports hearing the 49.750MHz Chinese TV carriers on both the afternoons of the 24th & 25th Oct. On the 24th there was dog pile of JA stations on 50.110 but Andrew only managed to work JA1RJU around 0500UTC.

The JA openings on the 24th & 25th also extended down as far as the Hervey Bay area with Paul VK4MA and Wade VK4WM working many JA's (CW). Wade reports further openings on the 26th Oct when he worked JA2HCB, JN1NDY & JA1FNA (all CW) between 0559UTC & 0626UTC and then on the 30th working a further 5 JA's (2 SSB & 3 CW) between 0411UTC & 0440UTC.

On the 30th Oct the JA opening extended as far south as the Gold Coast with Brian VK4DDC working several JA's.

Ron VK4DD in Brisbane reports hearing Paul VK4MA working several JA's in CW on the 28th Oct and although hearing the JA's could not complete a CW contact but did finally work JN1NDY in SSB.

Further news from Bob ZL1RS who reports:

We are going back to Rarotonga mid November for another visit (Barbara and I love the place). During this trip Victor E51CG and I will install the 6 m beacon supplied from Dave N3DB and "The Worldwide 6 m Beacon Project Inc" guys. Some preliminary beacon information is available on my web site at <http://www.qsl.net/zl1rs> under the "Where in the world is Bob going next?" link. Hopefully there will also be some more early openings in the new Es season while we are there, and we can get a few 6 m QSO's in!

I'll also be taking a 7-element YU7EF 6 m yagi that I built for Warwick E51WL on Penrhyn Atoll in the northern Cook Islands (separate DXCC entity). When we are in "Raro" we will ship the yagi up to Warwick via the "island trader boat" ... so we can expect him to be about on the band this summer as well. Warwick has a short boom 5-element yagi at the moment but the extra few dB of gain from the bigger yagi will make a difference when it counts. I understand he wants to try 6 m EME and so is building an amplifier to make that possible.

Thanks Bob for all your efforts to get E51 activated and the good news is that Victor E51CG has heard two KH6 beacons and worked KH7Y and KH6HI during October. Victor on one occasion also heard K6FV/b from California and listens for the VK/ZL beacons most days following the ANZA 14 MHz net at around 0515. Hopefully during December we hear Victor in VK/ZL.

Meteor scatter digital activity is continuing early each morning and Brad VK2QO reports that October has been one of the better months for scatter thanks to the Orionids and Taurids with many contacts being made on 50.200 in SSB and CW also 50.220/230 with the digital modes. Scott VK4CZ has the most contacts for the month with 26 the best day being the morning of the 10th Oct working Dave VK1DJA 5/3, Brad VK2QO 5/2, Norm VK3DUT 5/1, Brian VK4EK 5/1, Peter VK5PJ 5/2, David VK7AAD 5/1, Glenn VK7AB 5/1 and Joe VK7JG 5/7. Brad is offering the following certificates for scatter contacts that are confirmed each way during 2009;

- longest distance on SSB, CW & Digital,
- first ZL confirmed in either SSB, CW and Digital (limited offer till 1st ZL contact on 6 m),

- all states worked (VK1 to VK8 only) in any mode,
- VK9 any mode.

So make sure you record your contacts and the distance from the stations worked.

Brad says they will be designed by the person that designed his new QSL card and will be laminated and sent free of charge.

During the month there were several 'E' openings, most of them of short duration. The best opening was on the 23rd Oct with a good opening from VK4 (Brisbane area) to VK2, 3 & 7. Ron VK4DD reports the band was open for 1.5 hours when he worked 2 x VK2's, 7 x VK3's & 4 x VK7's. The same opening Doug VK4ADC worked VK3OE & VK7AAD and Brad VK2QO reports working Phil VK4FIL 5/9, Harvey VK4AHW 5/3, Ron VK4DD 5/9 and Les VK4ALH 5/5.

On the 30th Oct John VK4FNQ Charters Towers worked Brian VK5BC and Bill VK5ACY.

Lets hope we have another good summer 'E' season with some good multi hop openings to A35, E51, DU7 etc. and that the new sunspot cycle starts to improve.

A late update from Victor E51CG in Rarotonga:

The E51USA Beacon Is now on 50.051 MHz - 20 watts into a 5-element beam at 58 feet. Thanks to Bob ZL1RS and Barb who are here at the moment looking for smoke and flames from the beacon ... and thanks to all who helped with this project

Please send any 6 m information to Brian VK5BC