VHF/UHF – An Expanding World

David Smith VK3HZ

Weak Signal

David Smith - VK3HZ

In mid-June, there were some good conditions in the south of the country as a high-pressure cell moved over the area. Barry VK3BJM reports:

The weekend of June 14/15 was another interesting one on 2 m and above. Saturday morning, conditions were a little flat, with the highlights being a 53 contact with Chris VK2DO/m (parked in his driveway) and a 53/52 exchange with Phil VK5AKK at 2314Z. I monitored the VK5VF 2 m beacon on and off for the rest of the afternoon and, while it was audible, it was not hair-partingly loud.

That was not the case Sunday morning. In the shack at 2210Z, VK5VF 2 m was 10 over 9. The VK5VF 70 cm beacon was also audible. Swinging to Mt Gambier for a moment, the VK5RSE 23 cm beacon was 56 and touched 59 several times during the morning. Back in the Adelaide direction, I worked Brian VK5BC (56), Jeff VK5GF (53), Phil VK5AKK (57), and Bill VK5ACY (54) on 2m. Brian VK5BC was also worked on 70 cm at 41-51. Attempts at working Phil on 23 cm at that time were unsuccessful. This took me up until 2250, at which time I swung round to the northeast for the last 10 minutes of the AE hour. After working VK1BG on 2 m and 23 cm, I returned to the west as I could hear Peter VK5ZLX through the back of the 2m array. Reports of 59++ were exchanged on 2 m, followed by 23 cm (52 both ways) and 70 cm. Working Peter on 23 cm for the first time from home provided a new grid locator for me on that band - thanks, Peter! An attempt was also made with VK5BC on 23 cm, but nothing truly readable was heard.

VK7 was also coming in well, and at 0014Z I worked Joe VK7JG for more than 10 minutes, with reports again at 59+. Also worked John VK7CEJ for the first time (55) at 0028Z. At 0042Z I heard Norm VK3DUT through the back of array at 52; with array pointed at Johnsonville, Norm was 58.

Kept the array pointed at VK5 for the rest of the day; the Mt Lofty beacon didn't drop below 57 until Monday morning, after 2300Z. Worked Phil VK5AKK at 1300Z Sunday night and again at 2151Z Monday morning - Phil was 59+10 both times, but 23 cm continues to elude us. We exchanged 52/53 reports on 70 cm at 2159Z.

I didn't keep a tally of all the unfamiliar callsigns heard over the period of the enhancement, but there were quite a number who I heard working Phil - his logbook must be noticeably fuller today!

New 24 GHz World Record

In Australia, there is increasing interest in operation on the higher microwave bands. Operations on 10 GHz have been going on for many years, but more recently, a number of stations have acquired 24 GHz capability. These stations have discovered that 24 GHz is quite a different band to 10 GHz with path losses sharply increasing with the amount of moisture in the air. Best results seem to be achieved well before sunset (after which humidity rises rapidly), and in very dry conditions - for example, in the middle of a cold-climate winter when all of the moisture has frozen out of the air!

With this in mind, it is interesting to hear of world record contacts in France in the

middle of their summer. On June 23, Marc F6DWG/P near Picardie in the north and Guy F2CT/P in the south-central had a remarkable 637 km QSO late in the night. This exceeded the previous tropo record of 544 km by some margin. Christophe ON1CFX in Belgium reported hearing Guy F2CT/P on 10 GHz at 805 km for 45 minutes, but nothing on 24 GHz. Then on the following day, Guy worked Willi LX1DB in Luxembourg on 24 GHz via rainscatter, resetting the record to 710 km.

By way of comparison, the VK 24 GHz record between VK3ZQB/P and VK3XPD/P currently stands at 230 km.

VK2DO Mobile Operations

With a recent change of work vehicle, Chris VK2DO has redesigned his mobile 2 m DX setup. His old vehicle – a twincab ute - had a 2 m yagi mounted low above the canopy. However, pressures from offspring who (perhaps understandably) refused to be dropped off at school in such a vehicle, meant that the new system had to be much more stealthy. So, Chris built a yagi using the supporting cross spar inside the fibreglass canopy as the boom. Chris' route to work in Canberra (generally to the northwest) means that the yagi is usually pointing in the right directions for Melbourne and Sydney (I gather the F/B ratio is not great). Chris reports on operations:

Last Saturday, on my way to work, I was listening to the 2 m Aircraft operations on 144.200 MHz when Ian VK1BG took Mark VK2EMA up to 70 cm. I flicked the rig up to 432.150 and of course, through my 4-element beam that exhibits a good match on 432, I could hear Ian. As I changed direction, I was also copying Mark at about S5. During one handover, I called Mark and he gave me 5x7. (the IC7000 uses the same connector on 2 & 70 cm so without additional bricks in circuit, you are automatically able to work on 70 cm if the 2 m antenna will take power). The new antenna, now built into the spar that holds the canopy at the top, is four elements with I suppose a beta match of a kind, but the radiation efficiency is an odd one surely?

No, don't rush out and start using a 2 m beam on 70 cm. I think it was just one of those astonishing contacts that might not be readily repeated. On 70 cm, everything in the driven element of the yagi is just an odd number of half or quarter waves, but who knows what the radiation pattern truly is, or whether there is really any gain to speak of. Also, although the feed line isn't long, 2.5 m of RG214 probably starts to hide an odd match. 350 km on 70 cm isn't that amazing, especially with Mark running EME type antenna gain. But with just my 35 watts it was a lot of fun to see it take place.

Meteor Scatter

While Rex VK7MO normally reports on digital mode MS contact in his section, there has been a small revival of interest in SSB MS contacts, driven by an apparent increase in large meteors recently. On July 27, Ron VK4KDD reports:

I was alert for possible SSB MS contacts, because I saw VK3SO reporting on the VK Logger a 15 sec burn on the digital stuff more than an hour earlier. Just seconds before the opening, I heard an indication and reported on the logger that I was hearing "weak signals". I started to call and … woops … heard the world coming back - VK2's, VK3's, so many letters and voices at the other end, that I got no single callsign. There must have been at least a dozen stations with signals peaking S9 and stronger. I heard them all replying, but that does not make it any easier. No reports exhanged.

Mike VK3AAK was also trying hard to make an SSB MS contact. A few weeks later, he succeeded:

After several weeks of teasing, the delta Aquarids meteor showers have produced an SSB MS contact between VK2 and VK3. During the regular Aircraft Net on Sunday 16th August at 2249Z, Steve VK2ZT's CQ was heard in Melbourne. Several stations responded with Steve hearing my report of 5x7. He immediately confirmed and returned a 5x7 report for me. The contact was over in less than ten seconds. The burn was long enough for Steve to also hear Peter VK3KAI, but I believe it died before exchanges could be completed.

This contact comes after several weeks of one way signals including one very strong burst from Ron VK4KDD being heard in VK1,2 & 3; Steve VK2ZT being heard in Melbourne, and I have been heard in Sydney. These events have all been observed between 2200Z and 2300Z during the Aircraft Net on 144.200, obviously coinciding with the high activity level on 2 metres at this time.

Beacons

Mark VK2XOF reports the good news that the VK2 beacons are being resurrected. Work is progressing on the 2 m and 70 cm beacons. The 23 cm beacon on 1296.420MHz is operational at the Dural VK2WI QTH. Power is now 20 W and the signal is generated from a cavity oscillator locked to a 0.1 ppm oven. It has been running since mid July and Mark would appreciate any signal reports. Ian VK1BG has already reported hearing it consistently in Canberra at S1, lifting to S4 with aircraft enhancement – the first time Ian has heard the 23 cm beacon from Sydney.

Doug VK4OE reports that the VK4RBB beacons are back on air on all of their licensed frequencies: 432.440 MHz; 1296.440 MHz; 2403.440 MHz, and 10368.440 MHz. They should all be within 100 Hz of frequency after an extended soak test. Doug would appreciate any reception reports from SE Queensland and further afield.

Please send any Weak Signal reports to David VK3HZ

Digital DX Modes

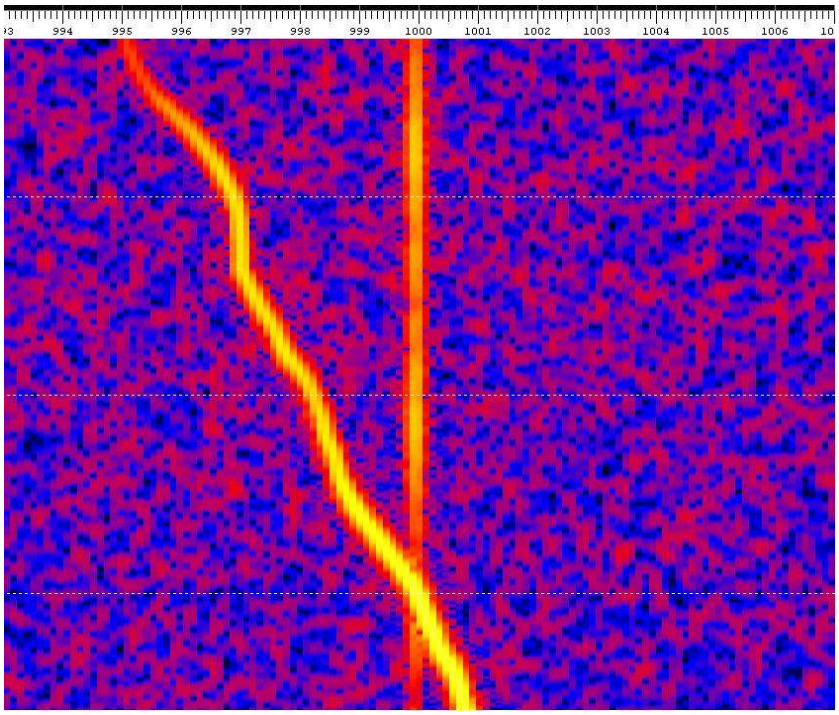
Rex Moncur – VK7MO

Welcome to the following new operators who are joining in or listening in to the 144.230 MHz FSK activity sessions – Rex VK3OF, Nigel VK3KSD, Owen VK1OD, Glenn VK4BG and John VK7CEJ. Rex completed his first FSK441 contact with VK4WS and Owen his first with VK4JMC.

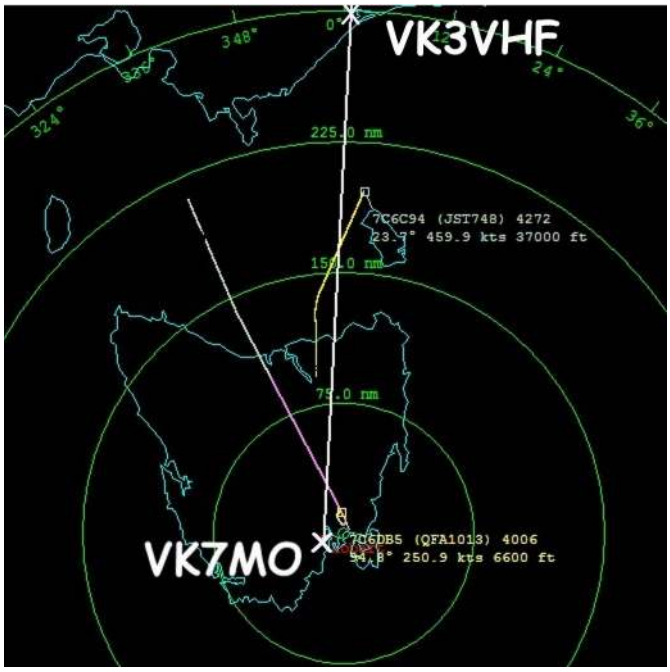
Following the GippsTech presentations on locking rigs to GPS and the use of the ADS-B virtual radar system for aircraft tracking Rhett VK3VHF has his IC-910-H GPS locked and has been monitoring the Doppler shift from aircraft on two metres as shown in the Spectrum Lab waterfall display below. Also shown is a diagram of the aircraft tracks at the same time from the ADS-B system. The aircraft which produced the reflected signal is the one which left Launceston (JST748) and headed roughly North before crossing the direct line between the transmitting and receiving stations heading for Sydney. The Spectrum Lab waterfall display shows the direct troposcatter signal as a straight line at 1000 Hz with the aircraft reflected signal starting high in frequency at 1001 Hz crossing the tropo-scatter frequency at about the same time as it was seen to cross the path between the transmitting and

receiving stations and then falling in frequency to 995 Hz as it moves further away from the direct path.

On 26 July 2008 Rex, VK7MO, assisted by Eric VK7TAS as the dish driver were successful in breaking the 13 cm, 2300 MHz, Earth Moon Earth World distance record, twice. Rex was running 120 watts to a 2.3 metre dish. The previous record was held by Charlie VK3NX and Peter G3LTF at 16970 km. Eric's job was to keep the 2.3 metre dish antenna directed at the moon within less than half a degree. A sked had been set up with Howard G4CCH and shortly after the moon cleared the trees at Howard's QTH, weak digital signals were copied at 25 dB below the noise. At 13 cm or 2300 MHz, frequency drift is a major issue and Howard's signals were difficult to copy due to drift of 60 to 80 Hz each transmission. Nevertheless, after a few missed decodes, a QSO was completed for a new 13 cm EME World record of 17385 km. As the moon cleared the trees in England, signals improved to the point that they were audible and a CW QSO was also completed. Peter, G3LTF, at 17491 km then called on CW and the World record was extended a second time in less than half an hour by a further 106 km.



Spectrum Lab waterfall display showing Doppler Shifted frequency from aircraft as the slanted line and the direct troposcatter signal as the straight line at 1000 Hz.



ADS-B Virtual Radar view of aircraft JST748 which produced the reflections shown on the waterfall. The line between the Xs shows the direct path between the stations.

Please send any Digital DX Modes reports to Rex VK7MO