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# VHF/UHF – An Expanding World

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David Smith VK3HZ

## Weak Signal

David Smith - VK3HZ

It's still only winter and it seems too early yet to call it a new "season" for VHF/UHF operations, but regardless of that, the bridge from VK to ZL has been crossed already on 2 m – the first for the season!

On August 23<sup>rd</sup>, at about 0500Z, Nick ZL1IU reported hearing the VK2RSY Dural 2 m beacon at 559. At 0546Z, Ross VK2DVZ managed to work Nick over a distance of 2010 km, with a report of 5x2 and only a few brief overs. At 0810Z, Colin VK2BCC worked Nick with 5x9+ reports. They worked again at 0905Z with signals down to 5x5.

The Hepburn chart for the day showed medium level Tropo enhancement for the path. It just goes to show that you should keep an eye on the propagation indicators even in the so-called off-season, as you never know what you might be missing.

## New Microwave Records

As reported in the "Stop Press" last month, Alan VK3XPD and Michael VK3KH have been dabbling in the upper microwave regions, setting new records in the process. Their work has continued as explained by Alan:

*On August 21st, Michael VK3KH and myself, Alan VK3XPD set the first VK, 122 GHz Distance Record over a path of 1.51 km in the Melbourne suburb of Cranbourne.*

*Our signal reports were somewhat generous at 5x1 both ways with fast QSB and even faster frequency drift.*

*Since the Transverter design allows for operation on either 78 or 122 GHz by simply changing an oscillator frequency, our first test QSO over 400 metres was on 78 GHz. Once we had confirmed the Transverters were working and the dish pointing had been optimised, we then changed the Master Oscillator frequency on each Transverter for our 122 GHz attempt.*

*Signal Reports for our SSB QSO were an excellent 5x7 both ways for this shorter path.*

*I then relocated and set up the gear for a 1.51 km path.*

*Unlike our previous 76/78 GHz Record, this contact was not easy. Despite thinking our dish pointing and the Rx mixer bias were set correctly, we initially could not find any sign of our 122.25015 GHz Signal. However, after a few more tweaks, we finally found our elusive signal with Ident way down in the noise. Further optimisation raised it to a workable signal strength.*

*Both of us have noticed that the pointing of a relatively small 300mm dish at this frequency is extremely sharp in both planes!*

*Weather conditions were sunny and warm with light winds - nice for Amateur Radio but not good for 122 GHz propagation due to the rising humidity.*

*The construction techniques used in these Transverters is all homebrew – not DB6NT-based.*

Alan and Michael then went on to extend their 78 GHz record as Alan describes:

*On Monday August 22nd, beginning at 1000 hours EST, Michael and I extended our 78 GHz Record twice. The first QSO was conducted over a 2.8 km path along the Berwick-Cranbourne Rd. Signals were 5x6 both ways.*

*We then decided to try and push the limits a bit so Michael drove to a hill on Old Coach Road in Berwick. This is a path of 11.88 km.*

*Our initial dish pointing (visual) was straightforward and easy but there was no sign of our 78 GHz Signal. However, after repeated fiddling with Rx Bias and dish pointing we finally found our signal with Ident just above the Noise floor. After more specific tweaking to optimise the signal, we finally completed with 5x1 reports both ways. With the changing conditions of late morning, Michael later amended his report to 5x2. Having extended this Record twice, we then had a bit of a rag chew over our 78 GHz link.*

*The distances of 1.5 km on 122 GHz and almost 12 km on 78 GHz would seem to be the limit for the current equipment using Melbourne suburban paths. The local Melbourne weather is now heading for the more humid months of Summer. To achieve any distance increase in either of the 78 GHz or the 122 GHz Records, we will need lower levels of relative humidity. This of course means very early mornings, a trip to the snow or the drier areas of VK - none of which are greatly appealing in the short term. So, for the moment, we will now watch the progress of others.*

*I will shortly be publishing a technical Paper on how we achieved both these Records using a simple Transverter that does not cost an arm and a leg. The hope is that our recent activities on these Bands will inspire a few of you to have a go!*

*I'm already looking at the options for 134 GHz - Homebrew of course !!*

For those wanting to find out a little more about the sort of techniques used by Alan in building the transverter, have a look at the following article by Kerry Banke N6IZW: <http://www.ham-radio.com/sbms/sd/47ghzmxr1.pdf>

Of course, signals at these frequencies are extremely hard to measure without very exotic test equipment. Alan has built homebrew harmonic mixers for testing but "guessestimates" that the transverter is emitting well below 1 mW of power.

The transverter design is based on a sub-harmonic mixer, so the other question that is sometimes asked is how do you know which harmonic you are hearing, or indeed if you are hearing the direct IF leakthrough? Alan overcomes this by using a local oscillator that is not exactly on frequency. So, as he goes up in frequency (and hence harmonic), the frequency offset also rises. For example, if the (12 GHz range) LO is 10 kHz low, then the IF signal at 78 GHz which uses LO x 6 will be 60 kHz high. The IF signal at 122 GHz which uses LO x 10 will be found 100 kHz high. (Note: as explained by Alan, the LO frequency is different for the 78 and 122 contacts).

### **VK3 Microwave Activity Day – Sunday 16th October 2011**

With the success in VK3 of the Easter Monday 2.4 GHz activities over the last two years, there has been some interest in organising other days focusing on other Microwave bands. So it has been decided that Sunday 16th October 2011 will be 1296 MHz Morning.

The weather is starting to improve by this time of the year, and it is 6 weeks before the Spring FD. It's a good opportunity to test your gear out before the Field day.

Any operator with 23 cm capability is encouraged and welcome to take part. This band has been chosen because it is the easiest Microwave band to access. Whether you operate from home, or take your gear to a high hill somewhere, everyone is

welcome.

A number of operators have already indicated their keenness to be involved, and some will be taking other bands as well.

The operational plan will be:

1. Activity will aim to commence at 0830 Eastern daylight savings Time (2130z)
2. The first hour and a half the focus will be on 1296 MHz, than after 10am activity will progress to other bands
3. 144.150 MHz will be the liason frequency
4. 1296.150 MHz will be the calling frequency. Operation will focus on SSB.

The organiser – Michael VK3KH - will be operational from Arthur's Seat on the Mornington Peninsula, and would welcome a visit from any operator who would like to come and see Microwaves in action. You can contact him via email

### **VK4 Microwave Activity Days**

The Brisbane VHF Group is proud to announce they will be conducting more microwave activity days.

**Sunday 25th September 2011 - Microwave "Tune up day"**

**Sunday 16th October 2011 - Microwave "Demonstration day"**

With the warmer weather approaching, operators will start thinking about getting their equipment prepared for the Spring and Summer VHF/UHF Field Days.

You know what usually happens... these Field Days (and Christmas activities) creep up on you, and it's a mad rush to get things sorted in time.

We are seeing an increased interest in microwave activity, with many new participants on the microwave bands, or operators adding extra bands to their existing capabilities.

The tune up day will allow microwave enthusiasts to bring their gear along, for comparisons, tests, and tweaks. This will be a great opportunity to test things out, compare, (and have time to rectify any issues!) before the Spring Field Day.

Apart from putting a face to the callsign, you will be able to see what others have been building, and no doubt bounce some great ideas off one another.

Operators interested in becoming active on the microwave band are more than welcome to join in as well, and see what these guys get up to.

More details may be found on the VK Logger ([www.vklogger.com](http://www.vklogger.com)) in the Forum area in the Brisbane Microwave Activity Days thread.

### **"VHF/UHF – An Expanding World" Archive Update**

For those of you who might want to browse through news of past years, a reminder that the archive of these columns going back to mid-2003 can be found at: [http://www.vk3hz.net/vhf\\_column/](http://www.vk3hz.net/vhf_column/)

Please send any Weak Signal reports to David VK3HZ

# Digital DX Modes

Rex Moncur – VK7MO

## QE29 Activation

As part of the international lighthouse weekend activities on 20 and 21 August, Rex VK7MO joined Eric VK7NFI and Wayne VK7NET to add a digital VHF and microwave dimension to the activity. Operations were from Table Cape in North West Tasmania from grid square QE29 and provided the opportunity for many in VK3 to gain this relatively rare grid square. Signals across Bass Strait were sufficiently strong that most contacts were completed on SSB with 5/9 signals to the Geelong group of Chas VK3PY, Ken VK3AKK, Charlie VK3NX, David VK3QM and Lou VK3ALB on 144, 432, 1296 and 10368.

Digital proved its value with Michael VK3KH at Berwick working Rex at -15 dB on JT65c on 10 GHz with just 200 mW.

Gavin VK3HY worked Rex from Johns Hill lookout at -22 dB on 10 GHz for his first VK7 contact on this band. David VK3HZ noted that Gavin's offset dish seemed to be set to beam too low to the ground and after adjustment upwards by some 10 degrees it was found that signals improved sufficiently to allow an SSB contact (Rex has been caught the same way with his offset dish). David VK3HZ also completed on 10 GHz digital at -6 dB and on SSB at 5/3.

Overall some 60 contacts were made across Bass Strait and many stations can now add QE29 to their grid square totals.

Thanks to Eric VK7NFI and Wayne VK7NET for inviting Rex to take part in their weekend.

## Portable EME from QE29

Ardent Grid Square chaser Bernd DL9APV worked Rex on 432 MHz JT65b EME at QE29 when the moon was clearly visible early during the Sunday morning and could be tracked manually with Rex's 16 element yagi. This brings Bernd's total to 485 grid squares on 432 MHz. Bernd is keen to make 500 and he welcomes stations who can work him with a single yagi and 100 watts. Bernd watches the VK logger for potential contacts and skeds can be arranged with him by email [dl7apv@gmx.de](mailto:dl7apv@gmx.de).

Please send any Digital DX Modes reports to Rex VK7MO

# The Magic Band – 6 m DX

Brian Cleland – VK5BC

After a good winter 'E' season in June & July the band went quiet in August with very few 'E' openings. The openings are summarized below.

1st August John VK2BHO worked Rod ZL3NW.

7th August produce the best 'E's' for August with openings occurring all over VK, ZL and FK8. VK6's reporting VK5 beacons with Graham VK6SIX working David VK5AYD in Coober Pedy. Scott VK4CZ worked Bob ZL1RS and Mark ZL2WHO while Brian VK4IK in Sapphire completed a contact with Remi FK8CP. John VK2BHO also worked ZL1RS and Wayne VK4WTN in Hervey Bay worked Frank VK7DX.

21st August Wade VK4WM in Hervey Bay worked FK8CP.

With the sunspot cycle slowly improving there have been signs of some TEP propagation. Gary VK8AW (ex VK4ABW) in Darwin reports;

The C1 TV has been coming in virtually every afternoon/evening. Sometimes it barely lifts the needle, other times its 20/30db over.

On the 2 August I worked George, DU1GM on 50.110 MHz at 5/3 around 0740z who was the only station to appear that night.

The VR2SIX beacon was 5/1 on the 4th Aug at 1250z and I also heard DU1EV beacon at 5/3 around 1303z that night. The 12th Aug saw lots of beacons coming in from 1200z. JA2IGY 5/2, JA6YBR 4/1 and JR6YAG 5/3 for around 1 hour. The 16th Aug was bumper night with the C1 around 20db over from 1142z and JA2IGY at 5/3, JA6YBR at 5/1 also. Joe, KG6DX made it into the log at 20over on 50.110 MHz at 1200z that night. I then had a good chat with Dave, KH2/N2NL who was 5/7 and said I was his first VK in a long time. Li, BA4SI was 5/5 on 50.110 MHz at 1205z and the AH2G/B beacon was switched on at this time too and was S7 here in Darwin.

The 24 August saw my first WSPR contact with JE3AKE on 50.293 MHz with my CP10/6 vertical at 30ft. On the 25 Aug at 1249z I spotted the BV2YA beacon 5/2 for the 1st time in awhile. The usual beacons were coming in too, JA6YBR 5/3, JR6YAG 5/5 and Hong Kong VR2SIX 5/1 made an appearance at 1300z. I spotted BA4SI on 50.110 who was 5/3 but I did not transmit as my WSPR was running on 50.293 MHz at the same time.

On the 26 August I had a WSPR contact on 50.293MHz with VK4EK at 0736z at a distance of 2161km. Not bad for 10w to a vertical.

On the 26th Aug Brian VK4EK worked JG2TSL and on the 27th John VK4ZJB in Gympie worked Joel KG6DX.

Brad VK2QO reports that many meteor scatter contacts are being made most morning on 50.200 MHz SSB and 50.230 MHz for digital modes. The group coordinates activity on VKChat and reports contacts on VKLOGGER. Here is a list of up and coming meteor showers for October, the major class1 for this month will be the Orionids and the rest will vary from class 2 to class 4. Showers are: Eta Cetids peak around 3/4 Oct, Sextantids peak around Oct 4, October Cygnids peak around Oct 4/5, Arietids peak around Oct 8/9, Draconids peak around 9/10, Delta Aurigids peak around Oct 9/10, Northern Piscids peak around Oct 12/13, Epsilon Geminids peak around Oct 18/19, Orionids peak around Oct 20 to 23, Leo Minorids peak around Oct 22/23. There are many more showers for the month of October but they are mainly in the northern hemisphere. A lot of these showers will peak in the early hours of the morning but should produce some good contacts at the early time of 6am (5am VK4).

I have been travelling Queensland for the last 3 months which has given me the opportunity to meet some of the regular VK4 6 m operators including John VK4FNQ in Charters Towers, Wade VK4WM and Wayne VK4WTN in Hervey Bay, Brian VK4EK in Sapphire, Scott VK4CZ, Phil VK4FIL, Allan VK4WR and Peter VK4APG in Brisbane. A special thanks to Scott who arranged for the other Brisbane operators to be at his QTH for drinks and BBQ as well as providing us with a free camping site for the caravan (needed to be able to walk home). Pictured below at Scott's VK4CZ QTH.



From left Peter VK4APG, Alan VK4WR, Scott VK4CZ, Campbell (junior VK4CZ), Phil VK4FIL, Brian VK5BC.



Wade VK4WM showing Wayne VK4WTN the QSL card he received from UX0UN for his contact with him on 6m in March.



Wayne's VK4WTN 7 element YU7EF design yagi.

Please send any 6 m information to Brian VK5BC