FREQUENCIES VHF, UHF, SHF NEWSLETTER NZ

This newsletter is compiled by Kevin Murphy ZL1UJG to promote operational and construction activity on the VHF, UHF and SHF Amateur Radio allocations in New Zealand (and overseas).

Newsletter Articles may be sent via email to rfman@xtra.co.nz

Post to K Murphy, 8 Tamar Place, Hamilton, 3200, New Zealand. ☎Ph 07 8470041

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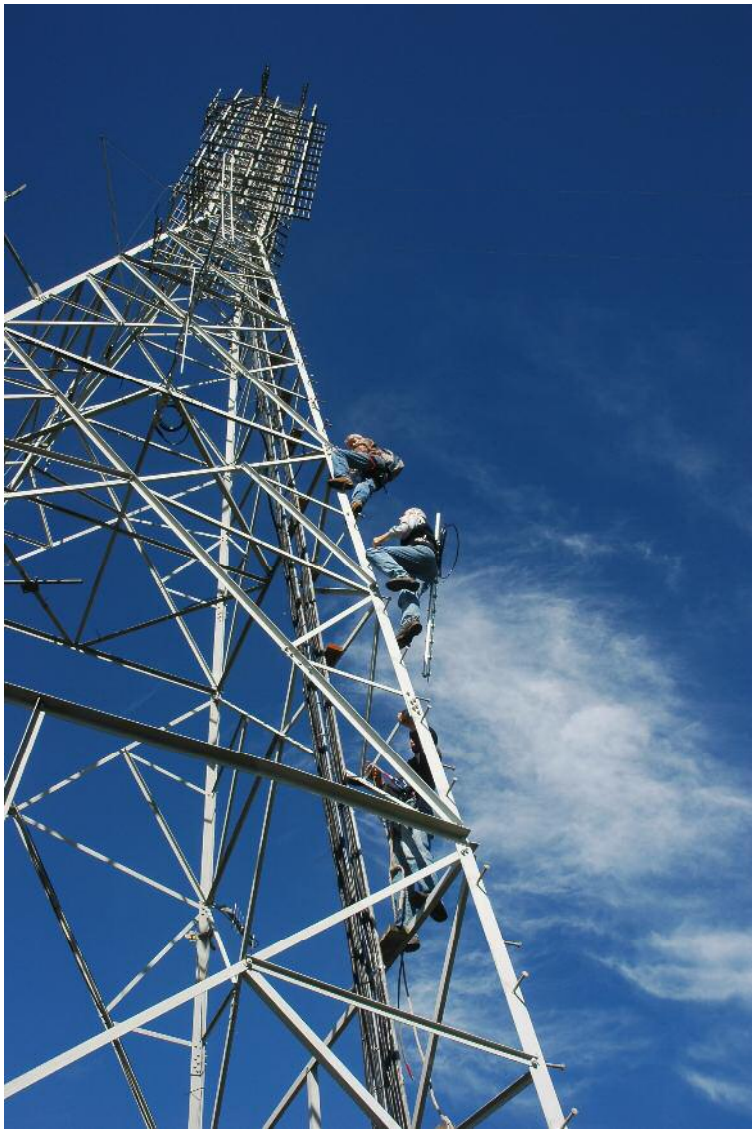
It is nice to see some FM Repeater information in the column. It is an important part of VHF/UHF activities. Excellent reports also from others on their activities.



National System Update

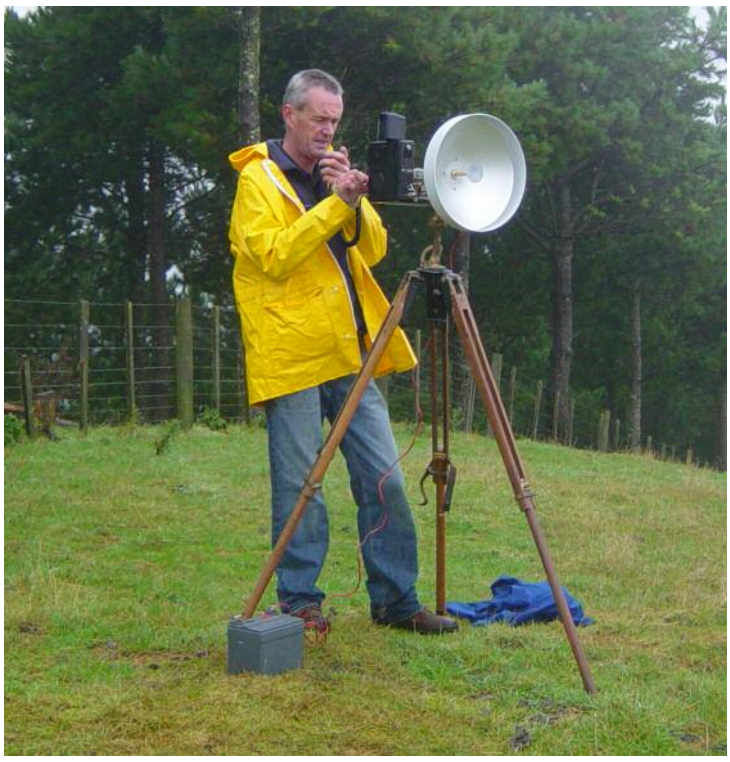
Recent work at the Auckland VHF Group's Klondyke node has again allowed the Kaimai port to be turned on. A problem with insufficient isolation between transmit and receive antennas for the link frequencies to and from Egmont meant that when the Kaimai link was enabled, too much RF energy was being coupled into the shared South Receive bay of 4 x 7-element Yagi antennas. These are connected to a 4-output preamplifier supplying the receive signal to the local 438.975 MHz repeater, the Kaimai link plus the link North to Brynderwyn. Net effect was RF re-circulation causing the micro-controller at Klondyke to lock up.

Prior to the National System frequency change, the Auckland VHF Group had to move the Egmont link transmit antenna higher up the tower to keep it above the rapidly growing pine trees. This was recognized at the time as a temporary measure, as moving the 7-element Yagi further up the tower was reducing the vertical separation between transmit and receive antennas and along with it, the dB isolation between Tx and Rx frequencies.

The final solution was to fit a new antenna for the Egmont transmit path at the top of the tower, some 27 metres higher up than the previous location. To further improve the Egmont link fade margin, a higher gain 10-element Yagi was selected, a model Y10U made

by Hi-Tech industries in Christchurch. This Yagi antenna has a DC grounded dipole so problems due to lighting strikes onto the Klondyke tower would be minimised.
Report by Vaughan ZL1TGC
Image of Peter ZL1UKG and Harry ZL1BK climbing the tower. This image made the cover of Break In

Microwaves.
24 GHz Distance Record Attempts (Steve ZL1TPH)
Earlier in the year, Steve ZL1TPH and Ted ZL2IP had completed a +30dB S/N LOS contact on 24GHz at 169 km. It was decided to attempt 221km from the Klondyke repeater site to Ted ZL2IP on the North face of Egmont.
The 221km path chosen was not LOS by about 20km. With the curvature of the earth and at our altitudes we had 20km of water to go through. We would then assume that the 4/3 radio horizon rule would extend this non LOS path.
So Ted ZL2IP did some path calculations for this 221 km 24GHz record attempt. Path loss capability for our 24GHz equipment = 235dB (0dBS/N). The loss for 221 km is 167dB (Spreading loss at 24GHz only)
The 0^2 + $H^2$0 loss for 221 km = 43dB. So 167 + 43 = 210dB. That is a 25dB margin if the path was LOS.
Uncertainties are the water loss on the day with a predicted 70% humidity and what happens along the sea grazing path because of non-LOS.
So on Sunday 12 March, both Harry ZL1BK and I set off for Klondyke. Driving down the Southern Motorway out of Auckland we were greeted with heavy torrential rain. We were all very determined at achieving an outcome, so there was no turning back. Ted ZL2IP was assisted by Ray ZL2TAL at their end.
Once on the Klondyke site, it was clearly a big no go as the pine trees were in fact too tall and would attenuate severely. So we relocated to the other side of the tree plantation. We asked permission from the land owner and then carried the gear up this small hill. The rain and low cloud cover gave minimal visibility, so we were unsure that we had a clear shot to the horizon. Harry located the direction with GPS and compass. We had no 144.200 MHz liaison because that gear was left behind in the car, so we gave a cellphone text to Ted ZL2IP to put the 24 GHz carrier on. And to our surprise we heard it with ease. A quick cellphone call was made to Ted, to tell him to take off the carrier and come up on 24 GHz SSB.
We completed 5/5 both way with ease. The QSB had peaks to 5/6 and then into the noise at about one minute intervals. Drift was a problem once again, but short overs are the secret. We exchanged callsigns and signal reports to each other and many confirmations to each other. Harry ZL1BK also had a contact with Ted ZL2IP.



In reality on the day, received signal strength peaked 6dB above the noise floor, with rolling QSB taking received signal strength down to 2dB and less. Ted had an estimated EIRP of 4 kW and I was 6 kW. Polarization was horizontal.
Still enthused a week or two later it was decided to attempt 253km from the Waitakere ranges to Egmont. We used a site called Mt Donald McClean. But we had no success. We had arrived at our limit.
In total Ted and I had 3 attempts and only 2 were successful. We have all enjoyed the outings and I would like to thank the many others that have assisted in this build project with technical assistance, team effort and support. So as to all promote more inspired activity on this 24GHz amateur allocation.
Brian ZL1AVZ, Ray ZL2TAL, Harry ZL1BK, Leon ZL2AOC, Ralph ZL1TBG, Kevin ZL1UJG, Tom ZL1THG, Vaughan ZL1TGC, Dick ZL2TGQ, Ted ZL2IP, John ZL2TWS and Wellington VHF Group Branch 74.
Great report Steve. (Image of Steve ZL1TPH operating 24 GHz)

Lightwaves

With the success of the VK's in their optical experiments, Murray ZL3MH has become interested in this exciting area of communication, as his report shows. With the new super bright Luxeon 3 Watt red LEDs and the BPW34 light sensitive diode, great distances can be covered especially with a large frensel lenses.
I brought some trial lenses 10 inches by 7 inches for $4.29 from Whitcoulls booksellers. These are really reading book lenses but are good for a test and to get others interested in ZL3. I have put them into two separate boxes for one way light transmission test. (A scrapped formica kitchen unit was sawed it up to create these boxes). I brought from RS Components four BPW34 photodiodes for tests at $3.21 each.
Jaycar have the 3 watt Luxeon LED's
Some useful websites are
http://groups.yahoo.com/group/Optical_DX/
http://www.bluehaze.com.au/modlight/
Murray ZL3MH had a successful 1 way test on 6th May with Robin ZL3TCM over a 1.6 km path.

General

Rod, ZL3NW was overseas last year, as his report shows.
Last August my wife and I attended the Chris Gare G3WOS 6 metre barbeque held in the UK. About 50 attended it, with amateurs from several countries in Europe, USA, South Africa etc. As part of our trip we went to Sweden and stayed with Kjell SM7BAE. Kjell had a 144 MHz CW EME contact with John Morgan ZL1AZR way back in March 4th 1969 and has been involved with EME work ever since. The contact was a World Distance Record at the time. Antenna used by Kjell was 16 x 10 element Yagis.
After I put an article in Six News about my new antenna, Kjell approached me to try EME skeds on 6 metres. We had many skeds and on the 5th Jan 2001 we completed a 6m cw EME contact, a current distance world record. Kjell has an impressive array of eight 6m yagis. Kjell also arranged for me to visit two club stations. SK0UX north of Stockholm and SK7MW south of Malmo. SK0UX have the use of an old communications site and the club members are very keen and are active on all HF VHF UHF and microwave bands. A very impressive site with lots of towers and converted commercial equipment. A lot of the members are Ericsson Engineers etc. SK7MW club has the use of a multi room building which was the base for a hugh wind turbine site. The original tower was 80 metres and it generated 3MW. It was dismantled because of the noise it generated and hence the club has the use of the building etc. Once again very impressive and they work huge distances on microwave tropo, EME etc.
Quentin, ZL1QF reports that the Auckland 2M beacon is operational again. Reception reports are welcomed
Roger ZL1RWB is starting to look into SDR (software defined radio) for VHF and UHF. He wonders if any other's have interest in this area. Both Roger ZL1RWB and Grant ZL1WTT are also interested in high data rates on 10 GHz.
Useful links
DUBUS is a German/English VHF/UHF magazine. See www.dubus.org
British Amateur Television Club produces the magazine CQ-TV. The website is www.cq-tv.com/ or www.batc.org.uk
The UK Microwave Group has members all over the world including NZ. Website at www.microwavers.org/

Construction

Grant ZL1WTT has been experimenting with GALI-4 MMIC's (Minicircuits) on the Waikato VHF Group Amplifier PCB. GALI MMIC's are in a SOT-89 SMD package, whereas ERA MMIC's is in a leaded SOT-86 package. The PCB's were connectorised with SMA PCB mount connectors from DSE. SMD components were used and a 7808 regulator included on the board. The unit has ~12 dB gain from 70cm to 9cm. The unit is enclosed in a tinplate box. Grant's website is at www.qsl.net/zl1wtt/.
The scribe has also experimented with GALI-5 devices on the same Amplifier PCB. This was for a one off board for a 5.7 GHz Amplifier. By using lots of vias (10 pins just near the device, alone) and 0603 2.2pF capacitors, I was able to achieve 13 dB gain. The manufacturer states ~ 14.5 dB gain, so the 1.6mm FR4 PCB wasn't too bad. However, this is well above the PCB manufacturer's recommendations. Usually thinner PCB at 0.8mm or less is used. Additionally PCB's using special dielectrics are available. It was noticable that the

maximum power from the GALI-5 dropped significantly at 5.7 GHz, reducing from +18 dBm (~60mW) to +8 dBm (6mW). This was confirmed, after I commented about the unit on the UK Microwave Group reflector http://groups.yahoo.com/group/ukmicrowaves/ (GALI-39 is a better device for 5.7 GHz).
For information on PCB's see www.rogerscorporation.com/acm/index.htm .
Simon ZL1SWW has also completed his "Bitser" 925 MHz transverter up to a low level TX stages (~ 50 mW) and had a full contact with Tim ZL1TN across about 4 km. The antenna was homemade and details appear at www.qsl.net/zl1sww
He increased the TX level with a MRF559 device to ~ 300 mW, and also is making up a GaAsfet preamp to improve sensitivity. (MRF559 from Auckland VHF Group)
Simon has also been working on the DXR700 equipment (retuned to 5.76 GHz). Following communications with Chris Bartram GW4DGU, he has changed some of the PLL settings and also some PCB changes. This has resulted in an almost T9 note, with a very small amount of warble (wobble). This is a considerable improvement over the original configuration which was more suitable for wideband modes. Some of you may remember the name Chris Bartram, (ex-G4DGU) as he had started the company Mutek, in the UK during the 1980's. He also has a good website at www.blaenffos.org/. Follow the link under GW4DGU homepage.

Propagation
A report from Bob, ZL3NE/1.
Following on from my tests with QST, my son mentioned he had a unused website, which I am now placing Propagation prediction information.
I am placing predictions for the following day for 6 and 2 metres for ZL/ VK. I am now covering the South Pacific , FK8 etc to VK6 along with ZL. Along with this I am also covering North America and Europe on a daily basis! For VK, I include TEP and also for Europe.
It seems quite uncanny to be here and predicting what will transpire the other side of the world, but really it is not that difficult? In early April, there was Trans- Equatorial Propagation (TEP) into the Scandinavian Countries LA, SM by sporadic E extensions over a lightning storm over Southern Europe! All gone now but quite interesting.
Bob has his predictions available as a daily prediction.doc on
http://homepages.slingshot.co.nz/~split21204/ZL3NE/. He also has very interesting Propagation documents.

DX.
Not too much on the DX front. Nick ZL1IU had a 144 MHz CW contact with Bob, ZL3TY on May 6th at 2107z. Nick has got his rotator going again on the 2m array, but is not sure of the rotator's longevity.Nick should be fully operational on digital modes by the time this issue is received.

Satellites
Murray ZL3MH has been very active on VU-52, Hamsat,AO-07 and FO-29. Murray supplied a good list of ZL1-ZL4 stations, and many stations in almost all states of Australia. Murray is also on the Australian Satellite Enthusiasts group.
http://au.groups.yahoo.com/group/ozsatgroup/
As well as being on SSB/CW, Murray also uses SSTV using his PC sound card. All this is quite a challenge, due to doppler correction. More modern equipment can be PC controlled to allow for doppler, using suitable software. However Murray's equipment is entirely manual (IC202, IC402, FT101ZD and other hardware) so he multitasks to achieve his excellent results. SSTV is especially difficult, but he has received some excellent images. Murray may be contacted at murrayhely@yahoo.co.nz

Thanks to those who sent information for the column. I am looking for more contributors.
Information may be sent to Kevin at rfman@xtra.co.nz