

THE WORLD BELOW 400 GHz

The Periodical Newsletter of the
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NZART
BRANCH 81

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WAIKATO VHF GROUP EXECUTIVE

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General Meeting November 2012

A General Meeting of the Waikato VHF Group will be held on
Sunday, 25th November, 2012 at 1:30pm.
at the Tauranga Volunteer Coastguard Headquarters
72 Keith Allen Drive, Tauranga.

See website - www.zl1is.info/meetings.html - for location map.

The guest speaker will be Kevin Murphy (ZL1UJG)
who will give a presentation on " Experimenting with AIS Reception"
(AIS = Automatic Identification System) which is used in shipping

Neil Ellis (ZL1TAJ) is also going to demonstrate the 'Flight Radar 24',
live air traffic website using his laptop and mobile internet

Non members and visitors welcome.

Business Items from latest Committee meeting:-

- a. Program your transceiver now to 145.575 MHz to be ready to use the new repeater on Maungakawa - coming soon.
- b. The hardware (server) that runs the IRLP is being upgraded.
- c. Errors effecting Branch 81 repeaters etc. in the latest Call Book have been noted.

General

Following on from the last newsletter, the scribe has had quite a number of successful FSK441 (meteor scatter) contacts into the South Island. The first few weeks of operating were at 25w PEP output into a 4 element Yagi tuned just below 2m . It turned out that the RF changeover relays in the PA were faulty, resulting in the reduced output. The amplifier is capable of 70 to 80w when fully operational.

The scribe is now running about 100w from a DSE 100-150W amplifier. The earlier tests were on an elderly MMT144 transverter which was modified with a replacement crystal oscillator to reduce the drift as seen in the previous newsletter.

Current operations are with a Yaesu FTV707 transverter (also elderly) with a modified RF stage. The transverter has been modified for TX using PTT to ground as the control. A Masthead LNA with good Bandpass filtering is used to further reject any out of band receive signals.

Meteor Scatter signals have been well above the noise, and on some occasions burst length has exceeded 15 seconds, however they are typically up to several 100mS in length.

Measuring RF power

The scribe has previously used a HF to 144 MHz SWR type meter, but has had variable results. (Using UHF connectors and toroid type pickup)

On Ebay, I have located what is known as a REDOT power meter which is fitted with N connectors for the 100-500 MHz version. Comparing displayed power with calibrated test equipment indicated quite good accuracy. The power indication is up to 120 Watts on this version. (See below)



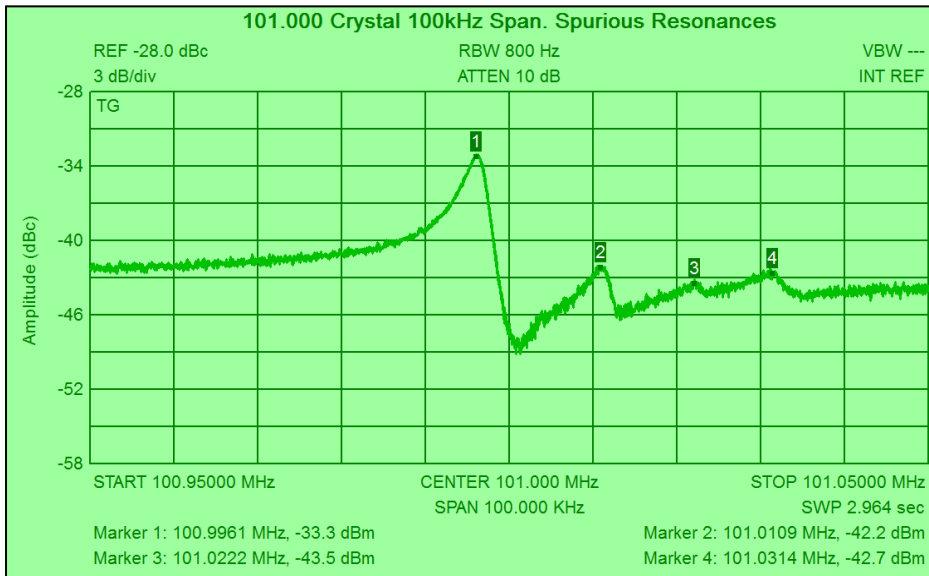
I have also picked up a HF version which goes from 3 to 60 MHz, and offers PEP capability as well. Maximum power is 200 Watts and this unit uses the SO239 connector.

On VHF and UHF, I use additional Low Pass Filters, from Minikits as some external Power Amplifier's dont have any RF filtering fitted, giving quite high harmonics.

This is important for 6M. The 2nd harmonic is in the **FM Broadcast band**.

I have found that RF on DC supply leads can be reduced using ferrite rings/tubes from Jaycar. I have seen DC supplies react violently if there is insufficient RF filtering. I have found some Jaycar Switchmode power supplies to be excellent performers.

Crystals The scribe has just completed another order with Krystal. I should be doing another order before Christmas. Contact me at zl1ujg@nzart.org.nz if you have some requirements for amateur radio equipment.



Talking about crystals, the plot left is of a crystal marked for 101.000 MHz. This was done using the crystal as a series element in between two 50 to 12.5 ohm attenuators.

The crystal has aged somewhat and the series resonant frequency is now 4 kHz low (Mkr 1) and the parallel resonance is at 101.000 MHz.

Do not try to adjust this crystal on frequency as it will not be stable!!

In older equipment it is possible that crystals have aged similarly, and also it is quite common to find crystals exhibiting low activity or even stopping operation altogether.

The plot also shows some of the crystals spurious modes. Below is a link to an application note.

<http://www.caliberelectronics.com/pdfs/appnotespuriousmode.pdf>

The crystal also exhibited a inferior temperature characteristic, probably partly due to the manufacturing technology available in the mid-70s. The crystal was from a MMT432-28 MHz transverter.



Antennas

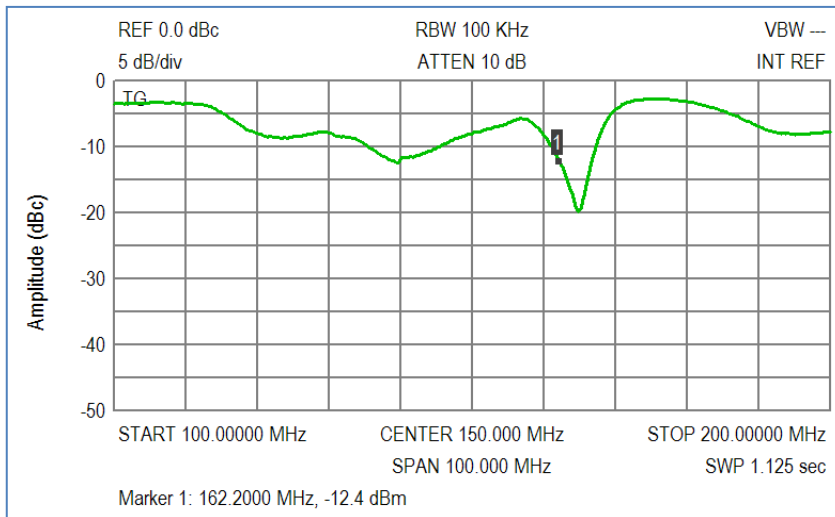
With many antennas being removed for the TV changeover, these become a useful source of parts for VHF antenna experimentation. The scribe recently converted a VHF TV Ch4 to Ch11 5 element Yagi antenna into a Marine band 4 element Yagi antenna, as shown left.

For those living on/near the coast, it is recommended that new hardware is used, due to the corrosive effects of salt laden air.

Software used to design the Yagi is from

<http://www.vk5dj.com/yagi.html>

The reflectors and directors were replaced with some new tubing from Bunnings, while the driven element was extended using bullets of slightly bigger diameter tubing as joiners.



Return loss (SWR) tests indicated best match around 164 MHz, about 1.8% high, not bad for something knocked together from misc parts.

(I think the larger bullets had a shortening effect on the driven element)

Plots of the crystal and the Antenna Return Loss were done with a SignalHound Analyser

Looking at a Power/SWR meter for a Fwd/ Reverse or SWR reading only gives part of the picture. A graphical representation shows simply where the best match is. (A Picture is worth a 1000 words...).

Just because an antenna is well matched doesn't necessarily mean it will radiate/receive well. The proof is having increased coverage or increased signal levels. The 4 element Marine band Yagi shown earlier has resulted in increased signal levels.

Minikits www.minikits.com.au has recently upgraded his website, with a new look, and also making it a webshop. There are a number of new items such as a new sequencer kit, and moderately high power VHF and UHF low pass filters.

RF Connectors One of my recent purchases were some single-hole bulkhead N-N female connectors. These are both useful for joining lengths of coax cable, or for putting in panels for feeding interior coax's outside. I have converted some of my equipment such as VHF Power amplifiers to N connectors, which gained about 5 watts in 75 watts (0.3 dB). Small footprint (ie same as the 4- hole BNC) N connectors are available. A lot of the UHF connectors (ie PL259- SO239) appear to use some strange dielectric, looking like molded mud in some cases.

N, BNC, SMA, TNC connectors use Teflon (PTFE) as the dielectric, and in some other connectors such as the APC 3.5mm (which looks like a precision SMA) the dielectric is air.

An issue I have noticed is that some UHF connectors tend to bind when mating together as though the threads aren't quite compatible. They have to be seated properly for them to work correctly. Another reason not to use them.(or limit their use).

I have seen the result of a faulty (or incorrectly made) UHF plug, which rotated the inner of a SO239, tearing a track off a PCB. Nasty...

Input for newsletter If you have any input/ images for the newsletter drop me an email rfman@xtra.co.nz