

# Official Bulletin



## MHz to GHz

The West Australian VHF Group Bulletin

**MARCH 2002**

THE WEST AUSTRALIAN VHF GROUP (INC)  
PO BOX 189 APPLECROSS

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## **Editors Note:**

Welcome once again to the VHF group bulletin.

Due to last issues large program listing, there was insufficient room for additional comment and news. So I will be filling in for a few months worth of news.

I received an e-mail from VK6KPH (formerly VK2YJW) detailing his observations in detecting seismic activity using RF noise. Coincidentally I received it a few days before the recent earthquake. I discussed this with Don (VK6HK) who highlighted some of the practical problems with getting directional bearings off very low frequencies. Perhaps some members may wish to comment. His e-mail is contained in the letters to the editor.

Fox hunting has now been active for a couple of months. There has been some excitement generated amongst group members keen to participate. A couple of letters were received detailing the results of the last foxhunt and the time and location of the next. As always the more the merrier.

Over the Christmas period and since, I had the good fortune to experiment with the IRLP repeater (VK6RPD ) on 146.950MHz located in Fremantle. It was only by accident that it was heard, whilst scanning on the way to work. Initially I heard a VE7 callsign and assumed someone was here in Perth from overseas. But No! We were actually talking via the internet to another country. After listening to, and working to a couple of contacts myself it dawned on me that an exciting new addition to amateur radio had been embraced. Discussions with some other colleagues soon formed the opinion that I was not alone in these thoughts. Here was a medium in which amateurs could, without great expense, converse with other stations overseas. It could be construed that this may be a threat to DX operations. I don't believe so. If anything, it will provide a method of liaising with other countries inexpensively for attempts at trying to make a contact. At times it may appear you're the only one on the channel but someone will quickly interject to make a correction to a comment. As with all amateur contacts there are instances where topics of discussion, both technical and local are of great interest and education. This makes driving time more productive and I'll still be trying for DX contacts from my shack.

There have been some mutterings over the proposed foundation license. Alan (VK6ZWZ) recently forwarded a letter showing the current state of play. The real query is, will the new license provide enough access to available amateur facilities to entice new patronage? Perhaps what is really required is a change of the existing structure. Recently the UK has implemented a foundation license with access to all modes and bands except for a couple, but with restricted power. I believe the query is, "are there really any advantages to granting this license", at least in the proposed form? If so, how far are we prepared to go to relaxing the current standards for new amateurs. What do you think?

Last but by no means least we have our field day coming in April. See the club activities section for details.

## **Letters to the Editor:**

Hi,

I am, in the process of software development and trials etc for this detection method, I have located other sites that have detailed this em anomaly I will elaborate at a later stage (they are in the ELF area) I have now seen em anomaly on 132KHZ FM as well as on the 4.5MHz FM area. These include the NASA, the japanese and other groups using the ion detection of ionospheric detection as the em anomaly (as in the reports ) releases free electrons in the ionosphere BEFORE (1-3 days) an earthquake seismic disturbance

de VK6KPH

PS WORKED T30ED ON 14.250 usb (in island of kiribus etc listen out for him around 2330local wst etc

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Hello,

You've been invited to join the vk6foxhunt group, an email group hosted by Yahoo! Groups, a free, easy-to-use email group service.

JOIN NOW, IT'S EASY:

1) REPLY to this email by clicking "Reply" and then "Send" in your email program

-OR-

2) Go to the Yahoo! Groups site at

<http://groups.yahoo.com/invite/vk6foxhunt?email=pi%40multiline%2Ecom%2Eau&i ref=68CfMoxmhbyNx6S9ASsEjWrGKnA>

By joining vk6foxhunt, you will be able to exchange messages with other group members. Yahoo! Groups also makes it easy to store photos and files, coordinate events and more.

Regards,

Rob...

VK6JRC

\*\*\*\*\*

Hi all

The fox hunt on 23rd Feb was set by Phil VK6AD, Charlie VK6ZCK and Peter, VK6PEC on the bank of the Canning River immediately to the north-east of Shelley Bridge. The antenna was a mobile whip on a mag base cleverly hidden beneath some long grass and reeds. A short length of coax cable led under the brush to the fox not far away, also hidden beneath the grass.

Kings Park was packed with people for a concert so was not suitable as a start venue. Teams instead met at the South Perth foreshore and the hunt got under way at 2009.

First to arrive was Rob VK6JRC and XYL Judith in 36 minutes at 2045. Second was John VK6JGF, Glen VK6KY and Malaysian student Lik Wei VK6YLW at 2100.

Bob VK6YBN was not far behind but had no snoop loop to actually locate the fox.

The next hunt will be set by John VK6JGF possibly on the 23rd March but the date is yet to be confirmed.

73

Phil VK6AD

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And details of the next foxhunt... :

Hi everybody,

Yes, the next foxhunt will be: Saturday 23rd March, same place, same time. As always we could do with more numbers, so lets see if each team can enthuse a new hunter. Perhaps the team with a new hunter can have a five minute start on other hunters to take into account "training delay" !! ? ? Mark the calender, stick it on the fridge, See you March

23 73s John (VK6JGF) / Glenn (VK6KY) / FOX

\*\*\*\*\*

Hi Everybody,

Just a reminder about the next foxhunt, 23rd March. Are there any new hounds out there ?? Is anybody interested in a dry run during daylight hours for testing equipment, training new dogs...er....I mean hounds! I am on leave for the next week, so let me know if anybody is interested.

John

VK6JGF

0427 470 673

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The following piece from Alan VK6ZWZ is about no persons living or ... . Alan tells me that in reality his harmonics are really not that interested.

#### **WHY MORE ENTRY LEVEL PRIVILEGES ARE NEEDED**

The scene: An old man (OM) is busy programming DC to daylight (well 70 cm anyway) into the memories of his new ultra portable FT 817, when approached by a harmonic wanting help with TEE Physics.

Harmonic: **Standing waves are cool now Dad. What about this question - if the car is going this way, and the Earth's magnetic field is this way, which end of the car's antenna becomes positive?**

OM, holding up a thumb and 2 fingers: **OK Daughter! I seem to remember it has something to do with the right hand rule ...**

Harmonic: **That's your *left* hand Dad!**

Harmonic, spying the FT 817: **What a neat fashion accessory! That would go really well with my new shoes.**

OM, seeing the rig in a new light: **If you get a Limited Novice licence, I'll give it to you.**

Harmonic: **Does it do HF?**

OM: **Yes.**

Harmonic: **So I'll be able to talk all over the world?**

OM: **Well, not on HF, unless you pass a morse test.**

Harmonic: **Here's a riddle. What goes dah dah in its dotage?**

OM: **Let's not go there.**

Harmonic: **But at least I'll be able to use VHF/UHF like you do. I can talk to all those JA's my age on 6 metres.**

OM: **Novices don't have 6 metres in Australia.**

Harmonic: **Well can it be used for that great new satellite - what's it called, Oscar 40?**

OM: **Well it could be used for the uplink, and you could probably put together your own 2.4 Gig downlink from what's in my junk box, but although Novices do have part of the 70 cm band, they aren't allowed on the satellite segment.**

Harmonic: **Well at least I can take part in those scrambles and field days the VHF Group sponsors.**

OM: **Yes, but unless you can use SSB you won't get many contacts.**

Harmonic: **Doesn't that new toy of your's do SSB, and anyway don't you have to study SSB for the Limited Novice Test?**

OM: **Yes on both counts. But Limited Novices are only allowed to use FM.**

Harmonic: **You mean *analogue* FM, like those obsolete mobile phones used to use! Can't I do that on UHF CB? Some of my friends at school already work right up and down the coast on UHF CB, and they don't need a licence!**

OM: **Well Novices can also use packet.**

Harmonic: **Packet! That's that obsolescent mode that people used before they had the Internet. Stop living in the past Dad! What about that sexy new PSK 31 stuff some other guy called Alan has been writing about in your comics?**

OM: **Well the radio's configured for that, but Novices aren't allowed ...**

Harmonic: **I think I'll wait until they bring in a Foundation thingee, like in the UK. I hear they can do all the interesting stuff there.**

**OM: Well everything we've been talking about. But the Aussie proposals so far rule out most of it. And anyway, I'd rather you knew something before being let loose on the air.**

**Harmonic: Dad, when can I have my own mobile?**

**OM, patiently: When you get you get your Limited Novice.**

**Harmonic: Don't play dumb! You know what I mean.**

### **Club Activities:**

On Sunday the 3<sup>rd</sup> of March. Members of the group sortied to Busselton to install the VK6RBS Beacon. Being a remote site (remote from Perth) all manner of equipment was packed, such that the back of one vehicle looked like a mobile workshop. On the downside there were many unknown parameters, such as where the equipment was finally to be installed. The original location was, from all the pictures of the site available, going to be extremely difficult to wire. As such, we catered for just about every conceivable situation. Fortunately, through Wally's (VK6KZ) diplomatic efforts, we were able to secure a place in the existing control room. This made our job significantly easier. Using some cable mounts and ties we quickly fastened the cable along one wall of the operations room and up the tower. As Murphy's law would have it, a misunderstanding mean't we didn't have a protective cover to place over the tower legs where our antenna was to be clamp. This was eventually overcome with the gracious assistance of the local yacht club members. The tubing supplied, though thick and rigid, did make the overall clamping diameter larger than the available 'U' bolts. With some persuasion (aka hammer) we managed to coax the 'U' bolts into their mounting holes. This being accomplished, a bearing was taken for alignment. A call to Don (VK6HK) confirmed a strong beacon signal was heard in Perth. The successful deployment was a tribute to all those behind the scene players including Al (VK6ZAY), Cec (VK6AO), Terry (VK6TRG) and Terry (VK6ZLT). Apologies if anyone was overlooked.

The beacon may now be heard on 1296.560MHz.

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### **SEVENTH WA VHF/UHF/SHF FIELD DAY**

**Sunday, 14 April, 2002.**

1. The contest is open to all individual licensed amateurs. All bands above 50 MHz, and all licensed modes, may be used.

2. Points are scored for two way contacts between pairs of stations, at least one of which must be portable, and at least one of which must be in the VK6 call area. (Repeater contacts do not count towards the score, but may be used for liaison purposes.) For the purposes of the contest, a portable station is one which is being operated away from the usual station address and which is not powered from the AC mains. Mobile stations (including permanently mobile) count as portable, as does the VHF Group station VK6WH.

3. CONTEST TIME: 1030-1500 WST (0230Z-0700Z) on Sunday, 14 April, 2002.

The contest is divided into 2 intervals of 2 hours each, 1030-1230 WST and 1300-1500 WST. These are separated by a half hour (1230-1300 WST) for lunch. Two stations may work each other for a scoring contact once on each band in each 2 hour interval.

4. The contest exchange will consist of a signal report, 3 digit serial number starting from 001, and the station location.

5. Each scoring monoband contact is worth 1 point times the following multipliers:

**DISTANCE MULTIPLIER:**

One point for each 25km or part thereof, up to a maximum of 15 points.

Up to (km)	25	50	75	100	125	150	175	200	225	250	275
Multiplier	1	2	3	4	5	6	7	8	9	10	11

Up to (km)	300	325	350	350+
Multiplier	12	13	14	15

**BAND MULTIPLIER:**

Nom. Freq. MHz	50	144	432	1296	2400	3400	5760	10368
Multiplier	3	2	3	5	8	8	8	8

Nom. Freq. MHz	24000	47000 & up
Multiplier	12	16

**PORTABLE TO PORTABLE MULTIPLIER: 2**

**PORTABLE TO COUNTRY FIXED STATION MULTIPLIER: 2**

Contacts count double if both stations are portable, or if one is portable and the other is a country fixed station. A country station is one which is at least 100km from GPO Perth.

**NOVICE STATION MULTIPLIER: 4**

Contacts with Limited Novice and Novice stations count quadruple.

6. **SECTIONS:** 1. Portable (All band), 2. Portable (Single Band),  
3. Fixed (All band), 4. Novice.

All portable contestants should submit with their logs, a tally of their score for each band (for section 2) and their total score (for section 1).

7. **GROUP OPERATION:** There is no section for club stations, but contacts with club stations count towards the scores of individual amateurs entering sections 1 to 4. Groups of up to 3 licensed amateurs may pool their equipment, and operate from a single portable site under their own individual call signs. (An exception is made for VK6WH, which is allowed multiple operators, and can enter the portable section even if operated from Wireless Hill.)

The use of multiple call signs by a single individual is not allowed.

8. **CROSSBAND CONTACTS** are permitted, but only score in special circumstances. If two stations work crossband from band A to some other band (B, say), but do *not* have a two way contact on band A in the relevant 2 hour time period, then *once, and only once*, in that period, each may claim towards their band A (and total) score *half* the points that would have resulted from a band A contact. This means that if they do *not* have a two way contact on band B in the time period, they may also claim (once only) *half* the points that would have resulted from a band B contact.

9. LOGS should be sent by Monday, 22 April, 2002 (April Meeting night) to:

CONTEST MANAGER, WEST AUSTRALIAN VHF GROUP (INC),  
 PO BOX 189 APPECROSS, W.A. 6953

The Contest Manager's decisions and interpretation of the rules are final.

Up to km MHz	25	50	75	100	125	150	175	200	225	250	275
50/432	3	6	9	12	15	18	21	24	27	30	33
144	2	4	6	8	10	12	14	16	18	20	22
1296	5	10	15	20	25	30	35	40	45	50	55
2-10GHz	8	16	24	32	40	48	56	64	72	80	88
24GHz	12	24	36	48	60	72	84	96	108	120	132
47GHz & higher	16	32	48	64	80	96	112	128	144	160	176

Up to km MHz	300	325	350	350+
50/432	36	39	42	45
144	24	26	28	30
1296	60	65	70	75
2-10GHz	96	104	112	120
24GHz	144	156	168	180
47GHz & higher	192	208	224	240

REMEMBER: Contacts between a portable station, and a portable or country fixed station, count double. Contacts with Novice stations count quadruple.

If things get a bit quiet, some suggested frequencies to try are:

SSB: 50.175, 144.120, 432.120, 1296.120  
 FM: 53.5, 146.5, 434.0, 439.0, 1296.3  
 Liaison: 144.175 (SSB), 432.175 (SSB), 145.375 (FM)

## Technical Article:

### Scalar Network Analyzer

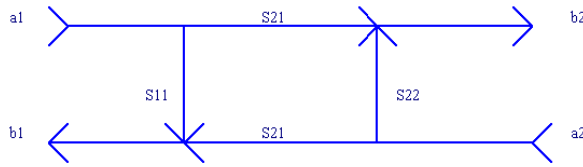
This article is based on the talk given by AI (VK6ZAY) to the VHF group discussing his work on producing a scalar network analyzer.

It should be noted that this analyzer displays the magnitude portion of the device under test and not its phase. More sophisticated circuitry would be required to implement this feature which was out of the original scope. The original objectives of a simple design to obtain a visual model which can quickly indicate the performance of a system was met. Subsequent tests on items such as antennas and filters showed how easily tuning could be achieved over conventional methods available to the amateur. Even items that were long thought to be optimally configured could be improved up to 3dB.

To obtain a better understanding of the operation of the network analyzer we must

review two port networks using Scattering Parameters (or ‘S’ Parameters)

S Parameters are the transmission coefficients directly related to VSWR and impedance. The inputs and outputs are expressed in terms of power where all the parameters are measured with the actual characteristic line impedance of the system. Taking a typical two port network shown in the figure below, the incident wave  $a_1$  has some proportion reflected in  $b_1$ . This portion is termed  $S_{11}$ . The portion passed to the second port is termed  $S_{21}$ . Conversely the incident wave  $a_2$  at the output port has a portion reflected to become  $b_2$ . This is passed via  $S_{22}$ . The portion passed back to the input is  $S_{12}$ . The inputs and outputs are related by the following equations.



TWO PORT DEVICE

The inputs and outputs are related by the following equations.

$$b_1 = S_{11} a_1 + S_{12} a_2$$

$$b_2 = S_{21} a_1 + S_{22} a_2$$

With reference to the diagram on the following page, the network analyzer operates in the following manner. A waveform of 20kHz to 35kHz modulates the frequency sweeper. This modulation provides a low frequency component, which can be used to enhance the detection properties of the analyzer. This will be described in more detail later in this paper. A 1kHz square wave provides the trigger input for the sweeper. The sweep output has the gain adjusted to suit the scan width of the oscilloscope. The RF output is passed through a splitter. One output of the splitter goes to a reference detector. This can be used to calibrate the display with a known signal level. The second output goes via a directional coupler to the device under test. The reflected wave is measured via the  $S_{11}$  detector and the wave passed through the device by the  $S_{21}$  detector. This gives an indication of power passed through the device to that reflected. A properly tuned filter will pass most of the injected power with minimal return. In the case of an antenna one need only monitor the reflected power to see how well it is tuned.

As mentioned earlier the signal is modulated to provide better low signal detection. Where an unmodulated signal is used, the output from the detectors would be a DC voltage. By modulating the signal an AC waveform is produced which is easier to isolate using the NE615. The low pass filters (LPF) remove the unwanted RF component and let the modulation frequency pass through to the NE615. These devices are normally used as intermediate frequency (IF) mixers. In this case, the internal logarithmic amplifier and RSSI outputs are being used to obtain a large signal suitable for amplification by a standard op-amp. The final amplifier stages allow gain control for calibration purposes. To provide a dual channel display where only one may be available, the amplified signals are ‘chopped’ into the ‘Y’ input of the display via the analog switches controlled by the 4017. The display usually ‘chops’ between the  $S_{11}$  and  $S_{12}$  detector outputs. As already mentioned, the reference detector can be used to indicate relative amplitudes.

