QTC

Messages and news from RASA
The Radio Amateur Society of Australia

RASA

May 2022

90 Years
VK90ABC

Amateur Radio Celebrates with a Special Event Callsign

Can Power Line interference warn us of fire dangers? QTC Investigates…

The Bayside District Amateur Radio Club (Brisbane) built a FlexRadio remote HF station Find out how they did it!

1KW – Why not?

QRM Guru author receives WIA Technical Excellence Award

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You are welcome to join RASA or make a donation to support our work.

Email us at info@vkradioamateurs.org

Cover picture credit: Ian VK3BUF

QTC from the Editorial Team

Welcome to our first edition of 2022.

It's been a very tumultuous couple of years and 2022 has presented us with new challenges and deeply concerning world events. On behalf of RASA, we hope all our members and readers are safe and healthy, and we hope for a speedy resolution to the conflict in Europe.

As has become the norm, QTC opens with a copy of the "ethos and ethics of amateur radio". Australian amateurs want to see a strong ethos maintained, and to this end we cover off a few related topics in this issue:

- Harassment & Bullying: RASA's updated policy
- Rote learning – a slippery slope
- Amateurs supporting flood victims

We've also decided to ask some very honest questions about high power for Advanced licensees using 1kW – and why not?

Every month we hear from VK amateurs, and you tell us that QRM/RFI continues to be one of the big issues in the hobby. We continue our regular articles on QRM with real world stories about how you can attack this endemic problem.

Our cover story this edition investigates the possible relationship between power line noise and bush fire risk…. It's an interesting topic and our investigations will flow over to the next edition of QTC.

We are also thrilled to report that the WIA have acknowledged QRM Guru and the significant contribution by Ian Jackson VK3BUF. You can read about Ian's award in this issue.

In other news a Brisbane club reports its successful application for a financial grant and installation of a remote HF station.

We also hear about a great network of repeaters covering a large swathe of VK4.

If you didn't know, this year marks the ABC's 90th anniversary. And we're helping to celebrate, with the special event callsign VK90ABC. Read about it in this edition.

It's been a long 24 months with Covid-19 and the immeasurable impact this virus has had on so many lives. Whilst we are learning to live with the virus, it is still virulent and dangerous, so please exercise caution as you go about your daily activities.

And most importantly, whatever element of our hobby interests you, get active, promote the hobby, and have fun doing it.

Stay safe and healthy, and very best wishes for a successful 2022.

73, QTC Editorial Team

QTC Editorial Team
info@vkradioamateurs.org

RASA Membership

BEING HEARD IS IMPORTANT

The Radio Amateur Society of Australia inc.

vkradioamateurs.org

We believe we should be measured by our achievements. And we can only succeed with your support, so thanks to all our members and supporters for helping us make this happen.

And thanks to everyone who has sent us emails with feedback.

We listen to our members and respond to emails and questions about our initiatives, policies and priorities.

Please support us by joining or renewing your membership today. It's just $10 and its simple – follow this link.

We have heard from a number of members who are not receiving our bulletins or emails.

Some of you are overdue with your annual membership fees.

Please drop us an email if you're not sure if your membership is up-to-date and we'll get back to you.

Also, please check your spam or junk folders; some ISPs and mail clients are very aggressive with how they categorise incoming emails.

The ethos and ethics of Amateur Radio

Like many hobbies, Amateur Radio has traditions, jargon and practices that are not always apparent to the newcomer. Your licence entitles you to get on the air and transmit, but, as a newcomer, you need to familiarise yourself with the way the hobby works operationally before transmitting.

Getting to know how amateur radio stations operate will provide a smooth and stress-free entry to this great hobby of ours.

Have a listen around the bands before you first transmit (if you haven't already) – monitor typical amateur QSOs (conversations). This will give you a feel for on air practices.

Once you start transmitting, steer well clear of controversial topics including:

- religion;
- politics;
- business (you can talk about your profession/trade, but you cannot advertise your services or those of anyone else);
- derogatory remarks/observations/jokes directed at any group (gender, ethnic, religious, political, sexual orientation, etc.); and
- off-colour humour.

Above all, apply **common sense and good taste.**

Do NOT use CB jargon – you will annoy your fellow amateurs and will be ostracised at best or roundly criticised on air at worst... Amateur and CB radio are different hobbies, with different operating practices. This hobby has many participants with as many differing views.

Remember, you are also prohibited from transmitting any form of entertainment.

The American Radio Relay League has, for many years, published a guide for new amateurs, known as The Amateurs Code:

The Radio Amateur is:

CONSIDERATE... They/Them never knowingly operates in such a way as to lessen the pleasure of others.

LOYAL... They/Them offer loyalty, encouragement and support to other amateurs.

PROGRESSIVE... They/Them keep his/her station up to date. It is well-built and efficient. His/Her operating practice is above reproach.

FRIENDLY...They/Them operate slowly and patiently when requested; offers friendly advice and counsel to beginners; kind assistance, cooperation and consideration for the interests of others. These are the marks of the amateur spirit.

BALANCED…. Radio is a hobby, never interfering with duties owed to family, job, school or community.

(adapted from the original Amateur's Code, written by Paul M. Segal, W9EEA, in 1928)

RASA supports and promotes this ethos and ethics code.

ACMA and Regulations

The ACMA continue their review of Licencing Conditions and are preparing a series of consultations in the first half of 2022.

It's probably fair to say that we'll be moved to a Class Licence sometime later in 2022.

We don't see a dramatic impact for amateur radio. A Class Licence will have little impact on day-to-day activities for most radio amateurs. The changes proposed by ACMA are summarised as follows:

- there will be no annual licence fee;
- interference protection and management will remain unchanged; QRM Guru is the best path to mitigating your local noise issues;
- EMC compliance will remain unchanged;
- callsign issue will be conducted by a 3rd party under contract to ACMA;
- ACMA will need to consider some form of online register of amateur callsigns, either directly or via a 3rd party;
- ACMA will need to provide a suitable certificate or wording on a certificate issued by a 3rd party for amateurs travelling overseas seeking reciprocal licencing rights; and
- ACMA will need to produce an operating procedures document.

RASA continues to actively engage ACMA on matters relating to the Class Licence and providing focus on the following areas:

Protection from Interference

RASA is the only national body that is actively working here in Australia to protect our bands from interference. We lobby ACMA to ensure our interference protection rights under the Radiocommunications Act are retained, and we promote the benefits of QRM Guru to ACMA.

We know that ACMA is more responsive to complaints that are supported with evidence and a properly documented submission. QRM Guru provides the framework for such submissions.

On the ground we continue to assist amateurs to hunt down and resolve local QRM issues. We present to clubs regularly and constantly seek feedback from fellow amateurs.

Repeater and Beacon Assignments

Existing legacy arrangements are out-dated, inefficient, chronically slow and exhibit a single point of failure. There are no performance management regimes, and we are aware of numerous complaints from clubs and individuals.

RASA has proposed a more equitable, transparent, and responsive service as a part of the recent consultation process with ACMA.

50-54MHz for Standard Class Licencees

RASA continues to lobby the ACMA to have this anomaly addressed.

1kW for Advanced Amateurs

RASA continues to lobby for 1kW.

2x1 Contest Callsigns

RASA won this new privilege, which was implemented in October 2021

To express interest in making a presentation on Saturday, we're asking you to provide an abstract of up to 300 words to tell us what you want to talk about.

To present a practical workshop, you only need to describe the topic, and approximately the number of attendees you think will be right for the group.

The expression of interest form is HERE. For more info visit vk6.net

Please submit your expression of interest by 30th June.

73, Bob VK6POP

RASA will be attending PerthTech. Bob and the convening committee put a huge amount of work into making this an event of national significance

Congratulations Ian VK3BUF

We are thrilled to report that RASA Founding member and QRM Guru developer/ researcher, Ian Jackson VK3BUF has been awarded the WIA Technical Excellence Award for 2022.

In presenting the award, WIA President, Scott Williams VK3KJ noted Ian's outstanding contribution to help radio amateurs identify and fight local QRM issues. Scott made special mention of Ian's educational videos and his articles, including the very information "The Truth about Ferrites".

This is great news. We trust the WIA will continue its support in the promotion of this highly respected resource in the fight against what is regarded by many as one of the largest threats to their enjoyment of the hobby,

In cities and metropolitan environments, local RFI and QRM has become one of the most deleterious influences on radio amateurs in modern times. The plethora of electrical devices that now flood our homes (and those of our neighbours) have made amateur radio almost unusable for many hobbyists. For many, it has heralded the end of the hobby.

Ian VK3BUF is a key collaborator in the online resource QRM Guru. This resource is provided free of charge to all radio amateurs to assist in identifying and resolving or minimizing local RFI/QRM issues. It has also proven to be an effective educational resource.

Over 29 hams from around the world have contributed to QRM Guru, but perhaps the most notable is Ian Jackson, VK3BUF. Ian has conducted a number of experiments and written articles which take some of the mystery out of hitherto complex concepts. Perhaps his most notable article demystifies ferrites and how they can be applied to RFI suppression.

https://qrm.guru/the-truth-about-ferrites/

This article has been read over 16,400 times across 88 countries since it was published on 12 Feb 2020.

It was listed in DXZones "Best Amateur Radio Links of 2020"
https://www.dxzone.com/the-best-amateur-radio-links-of-2020/

Along with other QRM Guru articles it has been translated into multiple languages (inc. Dutch, German, Italian, Greek).

Ian has developed 12 educational videos to introduce complex topics in a pragmatic manner and has conducted experiments to illustrate otherwise very "difficult to understand" concepts.

https://qrm.guru/qrm-guru-videos/

Ian produced this video on ferrites and their application in reducing QRM/RFI.

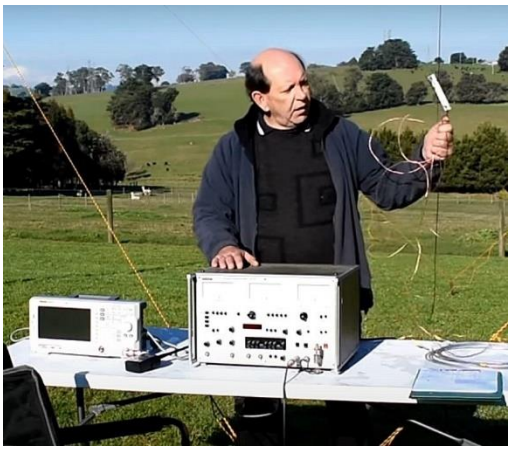
https://www.youtube.com/watch?v=fEsmarnM6nE

Ian also developed and was instrumental in a kit of ferrites available to VK hams along with practical instructions in how to apply them for maximum effect. There are over 30 examples where Ian and his collaborators have assisted VK hams in resolving RFI issues. Countless others have benefited from this resource.

In 2019 and early 2020 (prior to the Covid-19 lockdowns), Ian and his fellow collaborator visited 13 VK radio clubs across four states to introduce and demonstrate QRM Guru. He received excellent reviews from these presentations.

Leigh Turner VK5KLT a Professional RF Engineer, reviewed Ian's article "The Truth about ferrites" and commended Ian on a "brass-tacks practical AR oriented article" that will "materially advanced amateur knowledge about RFI and noise mitigation techniques".

This practical resource, accessible to all radio amateurs is a first of its kind and evolves as new case studies and experiences are shared by the collaborators and contributors. Ian's work represents the very foundations of the amateur radio spirit. He is to be commended for this work and we submit that his efforts are worthy of a WIA Award.



RASA Presents to GGREC and EMDRC in VK3

RASA presented to GGREC & EMDRC earlier in the year. If your club would like a presentation please send us an email.

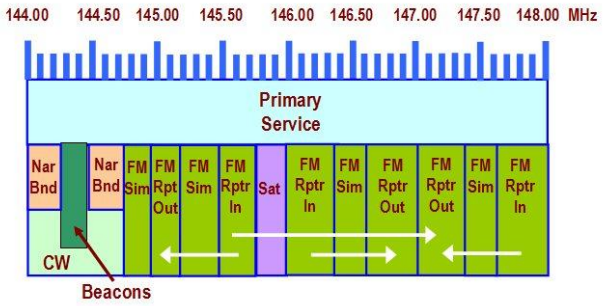
We are always keen to get feedback and hear what's important to clubs and individuals alike.

Our preference is to attend club meetings in person, but if this isn't possible, we can setup a session with Zoom.

Just send an email to info@vkradioamateurs.org and we'll be in touch.

Use it or lose it!....aaahh, no.

Your humble scribe was listening to a net on a local 2m repeater the other day. The net control station was bemoaning the lack of activity after the net finished: the repeater is dead for the rest of the day.



Other net stations made the comment that low activity on 2m will lead to the "Government taking the band back", and that we should "use it or lose it".

This is incorrect.

As RASA has pointed out, 2m is what is known as a "primary" allocation in the Australian Radiofrequency Spectrum Plan.

Primary allocations (2m) cannot be removed from the primary user (us) without a proposal to a World Radio Conference at the ITU. Given the ITU processes, this would take many years, if not a decade.

As we saw with the French attempt to gain access to the bottom half of 2m, such proposals are ultimately doomed to failure, given the immense popularity of the 2m band worldwide.

70cm, of course, is another matter. We are secondary there. We have already lost 10 MHz at the bottom, and it is likely that we will lose 440-450MHz at some stage.

Primary service or not, there are indeed dozens of repeaters sitting idle all day across Australia….press that PTT button!

Take a portable radio and go for a stroll…get active.

Take your handheld up a SOTA summit.

Instead of sending your friend a message on social media, give him a call on the radio.

Start a regular net talking about tech projects, HF propagation or contesting skills; it doesn't matter….

Just get active!

RASA attends Moorabbin & District Radio Club Hamfest

On the 14th May, two RASA members attended the MDRC Hamfest at the local town hall.

It was a successful day and the committee of MDRC are to be congratulated on hosting one of the first such events for 2022.

QRM Guru continues to be very popular with dozens of visitors stopping by to discuss their own QRM challenges or just see what it is all about.

Amateur Radio celebrates the ABC's 90th anniversary

Australian Amateur Radio enthusiasts are helping to promote and celebrate Aunty's 90th birthday both here at home and around the world.

Amateur Radio continues an on-air campaign to celebrate the ABC's 90th anniversary with fellow ham radio operators across Australia and around the world.

The ABC and Amateur Radio have a lot in common. Both utilise the magic of radio wave propagation and for the best part of 100 years this magic has informed, entertained, saved lives, and brought people together. Our world is a smaller place thanks to the magic of radio.

Amateur Radio is a hobby like no other. Amateurs (also called "hams") can build their own radio stations, antennas, learn about new technologies and communicate with others all around the world. All without a mobile phone or the internet!

What's so exciting about Amateur Radio? You can learn and apply new skills across a range of technologies and activities.

You can enter contests, chase awards, build your own equipment and antennas, operate portable from a mountain top or whilst camping. You can hook up to a computer and use digital modes, send and receive pictures and videos.

During 2022 hams from across Australia will be using the special event callsign VK90ABC to contact other hams here at home and around the world. We'll be talking about our national broadcaster, its history and helping Aunty celebrate this magnificent milestone.

Operators around Australia have already logged over 3,100 QSOs across 91 DXCC entities. There have been two very successful interviews by ABC local radio; you can listen to them here.

This special event callsign provides a unique opportunity to promote our hobby far and wide, and we'll be aiming for more ABC interviews in the leadup to the formal anniversary on 1 July 2022.

To learn more about what we're doing or to schedule time using VK90ABC visit www.vk90abc.net

The Radio Amateur Society of Australia provides effective representation for Australian radio amateurs. We promote, support, educate as well as liaising with the government regulator. Globally, there are 3,000,000 hams and Australia has about 13,000 licenced radio amateurs.

For more information, please visit www.vkradioamateurs.org

Powerline noise and bushfire risk

By Ian Jackson VK3BUF & Chris Chapman VK3QB

Power lines can be a major source of interference on HF bands, with the QRM sometimes going as high as VHF and UHF. Such interference is usually the result of major corona discharge or arcing between two points. Power lines have been responsible for some catastrophic bushfires during our increasingly hot summers.

"The problem was clearly identified by the 2009 Black Saturday Victorian Bushfire Royal Commission. The Director of Energy Safe Victoria told the Commission it was "probably self-evident" that there was an increased chance of fires caused by electrical assets on days of extreme fire danger.

The Bushfire Royal Commission found that on 7 February 2009, electrical faults caused five of the 11 major fires.

This significant risk led the Royal Commission to make a number of recommendations. These are now being acted on as part of the Victorian Government's Powerline Bushfire Safety Program. More than $750 million is being invested in new safety measures for Victoria's electricity grid. Changes include improved maintenance of existing infrastructure and roll out of technology to target high risk areas."

Ref: https://theconversation.com/hot-issue-bushfires-powerlines-and-climate-change-9383

Power line companies have worked hard to reduce this risk and have upgraded a lot of their infrastructure. However, there is still a lot of exposed infrastructure across Australia and around the world.

Some facts about power line interference

It is easy to blame power lines as the source of interference, but in most contemporary homes it is poor quality appliances that cause most RFI.

Before filing a complaint with a power company, or ACMA, we recommend you verify that the interference is actually coming from the mains supply.

Start by running your receiver from a battery, then briefly turn of all power to the home at the switchboard, including any solar inverters. If the interference stops, it is a strong indicator that the problem is not with the power lines.

There is an Australian Standard which defines how much disruptive radiation may be emitted from power line infrastructure (AS2344).

All power service providers are required to comply with this standard, even though many support staff will never have heard of it. The interference signatures we are looking for would be well above these compliance thresholds.

The important point is that regardless of how actively staff may try to ignore or defer interference complaints, there is an underlying obligation for them to respond to a genuine, **well documented** interference complaint.

Overhead power lines that may seem fine under casual examination can still create immense RF static through poor bonding or accumulation of debris. Often the only time a fault is evident is *after* it has ignited a fire.

Some power companies are using technology which automatically disconnects lines due to small current disruptions . (Rapid Earth Fault Current Limiter). However, this system does not identify all faults. There have been reports of false triggering and dangerous surges on adjacent infrastructure. (ref ABC News) Also, this technology does not precisely pinpoint fault locations.

An intermittent defect could trip many times without being found, which is also extremely disruptive to power customers.

We could not find any studies which examined the presence of Radio Frequency Interference (RFI) as a precursor to fire ignition.

Power line service crews will be completely unaware of RFI unless someone brings it to their attention.

abc NEWS VIDEO LIVE SHOWS CORONAVIRUS JAN. 6 RIOT

Deadliest wildfire in California history sparked by PG&E power lines, investigators say

The fire killed 85 people and scorched 153,336 acres, fire officials said.

By Julia Jacobo
16 May 2019, 09:03 • 5 min read

6:07

News headlines today: May 15, 2019

Catch up on the developing stories making headlines.
Noah Berger/AP

Investigators from the California Department of Forestry and Fire Protection have determined that the Camp Fire, the deadliest fire in the state's history, was sparked by power lines, the agency announced

Powerlines alongside our roads

There are almost 900,000km of power lines in Australia(1). Most of what we see are the 22,000V feeders to rural and residential areas. These may be **3 Wire 3-Phase** lines or **2 Wire Single Phase** lines. These higher voltages will feed a cluster of homes via a pole mounted step down transformer, reducing the supply to a more usable 230VAC.

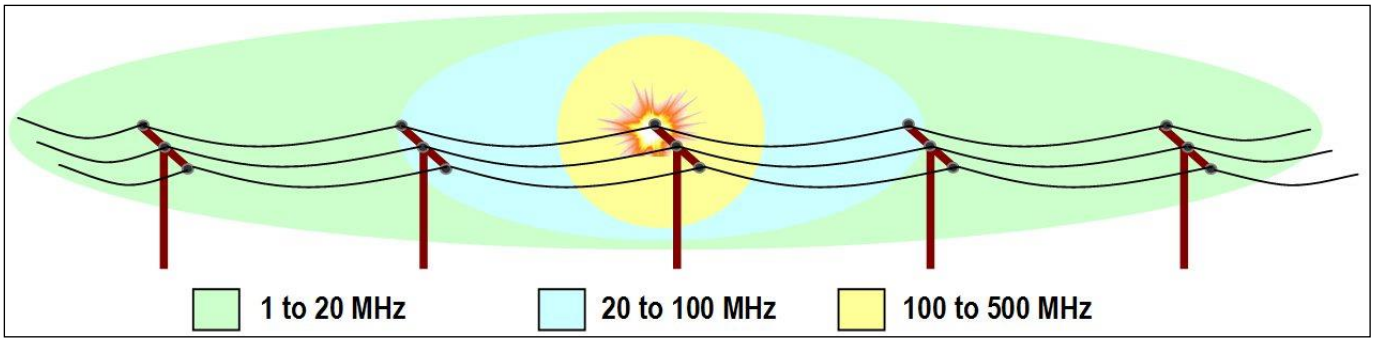
In rural areas there are a lot of **Single Wire Earth Return** (**SWER**) lines. These SWER lines operate at 12,700V and often have spans of up to 500 metres between poles.

Closer to the farm, a transformer is added between the SWER wire and a quality earth, with an output tapping of approximately 230V for domestic use.

There is an effect that occurs in all long transmission lines where the capacitance to ground slowly ratchets up the line voltage. This is known as the *Ferranti Effect* and it can be a problem on long SWER lines.

To combat this, a reactive load to ground is added at intervals. If there are any breaks or cracks in any of the bonding of these loads, then arcing and RF noise can be produced.

To be fair, hundreds of millions of dollars have been spent over the past decade upgrading poles and wires across Australia. The infrastructure is generally good. This does not mean that all power lines are clean; we should still follow a step-by-step process before attributing blame. This is described in some detail on the QRM Guru website.



The QRM Guru team decided to test a hypothesis that tracking down RFI may be useful in identifying potential bushfire ignition sources during high fire danger periods.

Power line noise can be direct, continuous arcing. It can be an unstable crackling from a poorly bonded joint, or even corona discharge hash from a high voltage potential discharging into the air from one or more sharp points. Each noise has its own unique sound signature on the radio spectrum.

Not all parts of the radio spectrum are affected equally. The diagram above is a generalisation and the frequencies will vary, but it describes a valuable aspect of hunting down the noise source. Low frequency interference on power lines can radiate up and down the lines for hundreds, even thousands of metres, making it very hard to pinpoint the noise. However, as the interference radiates higher up the spectrum, it becomes more localised.

Once an interference source has been heard, try to monitor higher up the spectrum until it begins to fade, then do your direction finding at the highest frequency. For example, on 7MHz it may be difficult to pinpoint the source within a kilometre. If you can track the same interference on UHF with a small beam, it may take you directly to the offending pole.

Once a pole has been identified, it can still be difficult to pinpoint which part of the pole is causing the radiation. Additional equipment, such as an ultrasonic microphone have a role to play for close proximity work.

In this article we begin the process of investigation and will conclude with a final report in the next edition of QTC. In the meantime, we invite readers to share your experiences with power infrastructure RFI and potential bushfire ignition sources.

It is important to highlight that we had no special access to power line infrastructure and did not influence any operations. We made observations standing at street level or from a stationary (or moving) vehicle. Our tools are non-contact RF, acoustic, and infrared monitoring equipment.

There are two ways to approach the task of tracking down RFI. We can follow RFI reports from radio amateurs, or we can travel along rural roads with adjacent power lines looking for RF noise signatures. We decided to commence with the latter option.

The tools for the job

We used both directional and non-directional antennas. The non-directional antenna was a vertical whip on the 40M band. Whilst driving, this antenna was used to identify any significant HF noise and the non-resonant DF loop would help us triangulate the source.

A heavy duty DF-loop

The loop is essentially the same design featured on the QRM Guru website; the mobile version is larger and formed with LDF450 coax so it retains its shape at freeway speeds. For monitoring we used an FT950 HF transceiver tuned mostly between 7-10 MHz on AM. In addition, we had a Rigol Spectrum Analyser, sweeping between 1 and 50 MHz. A switch allowed us to easily swap between receivers and antennas.

On future on-road exercises, we plan to use an SDR connected to a laptop; it is our expectation this configuration will be easier to transport and provide the same (or better) data from a more user-friendly setup.

To get around we used an old 1985 L300 van. It had a permanent mast that could be rotated by hand from a side window. Whilst the engine has been fitted with RF suppressed spark plugs, there was still a little ignition noise in the background. For sensitive measurements, the engine was shut off.

A fixed AC inverter under the seat powered the 240V analyser. It has a low RF signature. Other tools included a Garmin GPS, an Icom T90 handheld radio with its general coverage receiver hooked up to a portable loop, and an infra-red camera combining infrared and normal video into a composite thermal image.

We also borrowed an ultrasonic receiver with a parabolic microphone capable of pinpointing corona discharge noises well above human hearing range.

On the road

Our first field investigation took us along Grand Ridge Road in South Gippsland, Victoria. This is a scenic route that winds its way through farms and forest. It suffered bushfires in 2018. The most telling observation was that most power infrastructure was new, with concrete poles and quality cross-arms. Stopping at regular intervals revealed they were RF quiet.

It confirmed our hypothesis that newer infrastructure was unlikely to contribute to bush fire risk. It was also noted that over hanging trees and bush had been cleared in these locations.

We encountered one site near Seaview that crackled to S9 levels across HF where a power line crossed the road.

It was a moderately windy day and each gust brought about another blast of interference.

Whilst we were close to the source, we were unable to identify the offending pole. It was likely to be a crack or poor bonding in materials carrying load current. In this instance the poles were some distance from the road on private property. We recorded the observation and moved on.

One area visited was Jindivick in West Gippsland.
Here there are many high voltage lines, with spans fairly low to the road.

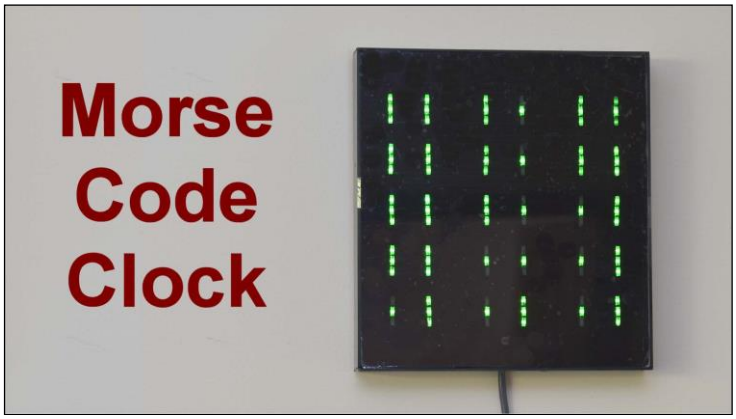
At one site, S9+ interference was heard over all HF bands. Most of it appeared to emanate from X-shaped cross-spacers in the centre of the line spans. Because of the relative height, the fire risk from this is reduced, but not zero, as there was plenty of long, dry grass below these lines.

What we have found in these investigations is that new infrastructure, coupled with well-maintained “power line corridors” creates a low-risk environment for bush fire ignition sources.

In Part 2 of this article, appearing in the next edition of QTC, we will dig a little deeper and discuss our findings from this research in greater detail.

If you have experiences you wish to share, please email info@vkradioamateurs.org. We would like to hear from you.

(1) https://www.cleanenergycouncil.org.au/resources/technologies/grid



Is your shack complete?

Build this LED Clock that silently tells the time in Morse Code.

Never be late for dinner again!

Only available in kit form, it's a fun way to introduce the art of surface mount soldering.

When visitors out-stay their welcome, point to it and say "*Shouldn't you be heading home soon*?"

The time is attractively displayed in **Hours Minutes** and **Seconds**. (10:26:30 **shown**). It can be mounted vertically or horizontally, as preferred.

Assembled from a mix of Through Hole and Surface Mount components, this clock is crystal locked, battery backed and 12/24 hour time selectable, so its UTC ready. Size is 160 x 190mm, with an enclosure fabricated from screen-printed pcb material. It is powered by a 9 to 12V plug pack, or 5V USB connection. A photocell makes it auto-dim at night, so it's great next to the bed. Low QRM design!

Assembly time is approximately 2-3 hours.

Prove to your family that Morse Code is alive and well and that your time in the shack is never wasted. The perfect gift idea. Or dare to take that final step and remove all the regular clocks from around the house.

View this **YouTube** link to see the construction steps:
https://www.youtube.com/watch?v=BvNlWvE5BsE

The kit is $156.00 including postage & gst. Visit the website for more information:
http://www.alianelectronics.com.au/sm456-morse-code-clock-kit.html

(Paid advertisement)

Establishing a remote HF Station

By BDARS

Photos - Bambi Page VK4AYL

Email: secretary@bdars.org.au

Abstract.

The future of amateur radio is remote operating, ideally with your "shack" placed in a noise free location. Members of the Bayside District Amateur Radio Society, in Brisbane, enjoy such a HF station, equipped with a state-of-the-art FlexRadio SDR transceiver.

A Dream HF Station

How would you fancy a HF station located on a hilltop, away from electrical noise, with a well located and broadband 80 to 6 metre dipole? Even better, its operable from your inner-city apartment or even when you are traveling interstate. And you do not have to pay for it!

That is the promise that modern remotely operable HF transceivers can offer in a club environment. And this is what the Bayside District Amateur Radio Society (BDARS) set out to deliver for its members in early 2019.

It took two years of solid work, but the outcome is fantastic. BDARS now has a FlexRadio 6400 SDR 100 watt transceiver installed at its Mt Cotton repeater site on the south-eastern outskirts of Brisbane. The antenna is a Bushcomm BBA 100CS broadband folded dipole, installed nice and high at 12 metres up, on top of Mt Cotton.

Being semi-rural, the site is well away from modern RF interference that plagues so many suburbs. This means the club's new HF station has an RF performance that is hard for the average city dweller to match.

Technical specs

The Bayside District Amateur Radio Society is a vibrant ham radio club, located in the Redlands area, a south-eastern bayside suburb of Brisbane. In 2018, the club negotiated for the use of a disused 30 m ex-Motorola tower and radio hut near the crest of Mt Cotton. It is approximately 200 metres above sea level, but this is still prominent against the largely flat topography of Brisbane.

The HF station was just one part of a much larger site re-development. All up, the club garnered close to $40,000 in grant funding.

The in-kind effort by members probably amounted to a similar value. Distinct from the HF station, the club refurbished the hut and made it watertight and vermin proof, installed two new repeaters and antennae together with power supplies and a sophisticated network and control system.

The club assembled a small team of volunteers to design the station. We knew that we needed a multi-band HF antenna that was rugged and simple to use. The obvious choice was the Bushcomm BBA 100CS broadband folded dipole. This is a commercial grade product, made from stainless steel wire.

It is 27 m long and the construction of three, spaced parallel wires gives the broadband behaviour with SWR of less than 2:1 from 2 to 30 MHz. It is installed in a slightly sloping fashion. The high end is fixed to the 30 metre communications tower, up at about 15 metres.

The other end is supported by a homebrew stayed galvanised steel mast constructed by a club member.

This is bolted to a concrete base, 1 m deep and 400 mm x 400 mm wide with a steel reinforcing cage and tie-down bolts.

Excavating this in the rocky terrain required jackhammering. Site access is only by 4WD so concrete mix, cement and water were all trucked up to site.

The BDARS hut and existing comms tower. Refurbishing the hut was the single biggest expense.

The Joy of FlexRadio for Remote Operation

Before seeking grant funding, we had to carefully define the full scope of works and budget. This meant we were faced with every amateur's dream dilemma – what HF transceiver to buy?

High on the list was the need for easy remote operation, but then most modern transceivers can be configured that way.

However, we wanted ease of installation and operation in the user's "shack", not to mention low cost per user. FlexRadio scored high in this regard as the user software is free. And from the outset, the FlexRadio is designed for remote operation. It requires no PC in the remote "shack", just internet access.

BDARS Station Manager Russ VK4DCM with the equipment rack. The Flex 6400 is almost hidden at lower right

For most of us, this would be our first introduction to contemporary SDR transceivers, providing a perfect learning experience. The Australian distributor based in Perth did an online demonstration of a Flex 6400 at a regular club meeting, which sealed the deal. This showed that we, in Brisbane, could make QSO's on a transceiver physically located in Perth. FlexRadio remote software SmartSDR is free and readily usable.

So, our choice settled on the FlexRadio 6400. This is a 100 W HF and 6 metre all mode transceiver. It is a direct sampling software defined radio, the "gold standard" for SDR layout. Conceptually, it is a computer with RF capabilities, and this is most noticeable with the boot-up time, like a PC. We specified the optional ATU, as this would handle the modest SWR imbalance of our Bushcomm dipole.

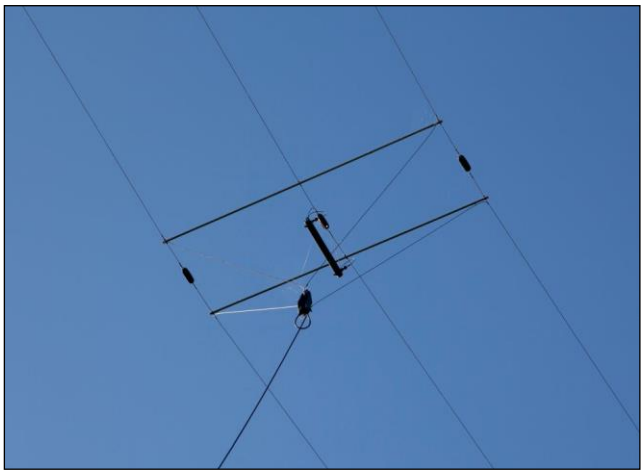
In appearance, the 6400 looks like a PC – just a box. Some of us old-timer hams at first missed the knobs and readouts.

However, all that functionality (plus more) is built into the Smart SDR software and is accessible with keyboard and mouse. Moreover, the waterfall display is a gamechanger. A user can see activity across the whole band.

However, that still left us with the issue of a booking and access system so that usage could be shared amongst club members equitably. After a good degree of scoping, our more IT-talented club members developed ShedWeb. This is an internet access system which allows members to book timeslots (up to two hours) for FlexRadio use. At the assigned time, the user can power on the FlexRadio and connect using SmartSDR.

ShedWeb means that access is controlled by username/password and usage is monitored and recorded. At the conclusion of a user's booking, the FlexRadio is powered off, back to its normal state.

The BDARS FlexRadio combined with ShedWeb has allowed us to redefine the whole concept of a "radio shack". Our members use it from holiday destinations or from their iPhones.



The feedpoint of the BBA100 broadband dipole

We also have a couple of vision impaired members, who access the station using a screen reader and a refreshable Braille display.

The software which provides this access is called JJFlex. The waterfall is displayed as a line of Braille, allowing the operator to identify the stronger signals across the band in much the same manner as a sighted user.

Network for Reliable and Redundant Control

In designing the remote control system, we had dual requirements of network security and statutory emergency radio shut down capability. At the outset, we had not tested suitable limits for reliable bandwidth. Our initial concept had triple redundancy with three Internet connection types - 4G, ADSL and a 900MHz LIPD class microwave link.

In normal mode, the system selects the best connection type according to an algorithm with automatic fail-over if necessary.

After some months of operation, we found budget 4G data SIMS to provide adequate bandwidth at acceptable cost for primary traffic.

Inside the hut, the Local Area Network (LAN) is divided into two security branches. We have a Supervisory LAN (SLAN) and a Demilitarised Zone LAN (DMZ). The latter connects to all the third party devices such as the Flex Radio.

The SLAN is used for the command and control system. This is based on a Node-RED® based application and controls devices including a Power Distribution Unit.

The PDU has 24 software driven AC mains switches. Node-RED also has some autonomous capabilities including an orderly command sequence to power off PC's after mains failure, and while a UPS is supplying temporary backup power.

Node-Red operates as a 'slave' for the most part. It runs a Command and Control dialogue with the primary 'ShedWeb' server housed in an off-site secure data centre.

The server acts as fast, stable Internet point of contact for users; it manages bookings and presents a web interface for users to control the shed radio hardware.

All user traffic including the FlexRadio SmartSDR traffic is routed through ShedWeb. This gives us the capability to intervene in an emergency and to direct the remote radio protocol traffic to the currently booked user exclusively.

How We Financed It

Right from the start, we knew this would a big project. It involved refurbishing the hut to make it vermin and waterproof. Thereafter, we added two repeaters and one new high performance antenna for general club use, together with battery backup. The HF remote station was a smaller part of the entire project.

The key to obtaining grants was settling the scope of work to a reasonable degree of detail. This allowed us to obtain quotes and set an overall budget including contingency for unknown factors. We approached the Redland City Council under its Community Grants program, and Gambling Community Benefit Fund in Queensland, both with success. There is a large amount of detail and paperwork required in these programs. Both applications were successful which provided BDARS with almost $40,000 in funding.

There is a modest annual cost in running this station – power, internet access and server time and insurance. BDARS covers these through its normal fundraising program and member's fees.

How We Built It

The hut was in a poor state of repair when we gained access to the site. This refurbishment required the club to engage a builder to effect repairs; the largest single cost of the whole project.

We then undertook a series of club working bees to paint the interior, equip it with shelving and racks, a new smart metered switchboard, reconfigured electrical layout, a multi entry coax bulkhead and the new 12 metre dipole mast.

The homebrew self-supporting 12 m high steel tower at one end of the HF dipole.

We were fortunate to have a qualified rigger volunteer his time to install the new VHF and UHF antenna and a pulley support of the HF dipole. Club members installed a 900 MHz Ubiquiti microwave link to provide internet access with an access point at a member's QTH eight km distant from the hut.

Once we started work on site, the project was completed and commissioned inside 9 months.

However, like all "shacks", the BDARS has a steady stream of upgrades and refinements ongoing, not to mention regular system maintenance.

Invitation to Join BDARS Club

All members of the Bayside District Amateur Radio Society have access to the FlexRadio remote HF station. A small number of our club members are located interstate and even overseas.

Provided they have valid Australian amateur licences, they can operate the HF station, in accordance with their licence privileges. There is scope for a limited number of additional interstate members. Those interested should contact the secretary at secretary@bdars.org.au to request membership.

Many readers will have watched the tragedy unfolding in northern NSW and SE Queensland over the last couple of months. Once again, the term, “unprecedented” is being used to describe a natural disaster. This time its floods.

Amateurs have always been generous with resources in times of need, and this is no different.

The North-East Victoria Amateur Radio Club has risen to the challenge and established a Flood Recovery Initiative. This initiative comprises two elements to assist amateurs directly impacted by the floods.

The first and most immediate is cash assistance to those in need. The second is a “radio drive” to provide equipment once impacted hams start to re-equip their shacks.
For more information on this fantastic initiative, head over to the NEVARC website, www.nevarc.org.au and follow the links.

This is a true example of the spirit of amateur radio…. NEVARC have already chipped in $2,000, with at least two other national clubs providing financial support. Head over to their website www.nevarc.org.au to read all the details.

Great work, NEVARC

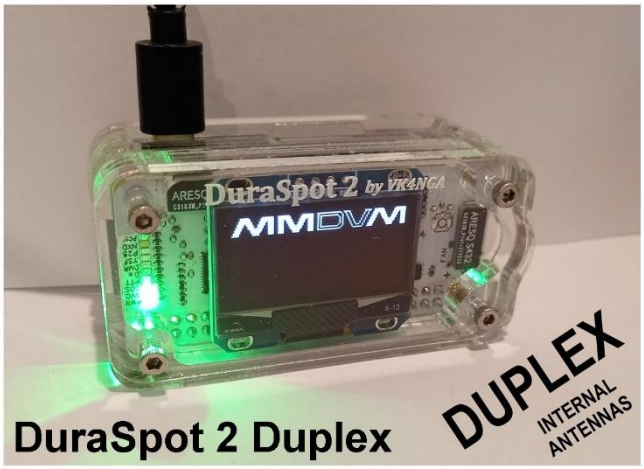
Hotspots for Digital Voice Modes

DMR | Fusion | D-Star | P25

DuraSpot 1

DuraSpot 2

ShackSpot 2 Plus



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VK4NGA Digital Amateur Radio | Glenn Allemand

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Why not use 1kW…?

By RASA Committee

It is time that we, as amateurs, were honest with ourselves about high power.

Advanced licensees have waited *years* for action on approval to use 1kW. One of RASA's first initiatives was to review the work done (or not) since the WIA's failed 2012 high power trial.

As far as we can ascertain, the WIA has done nothing proactive to progress this issue with the ACMA.

RASA first presented the ACMA with the case for 1kW for Advanced licensees in 2019. The ACMA noted our submission and advised it would be considered. The consideration for 1KW was included in their FYSO at that time.

The ACMA indicated to RASA that this issue would be included within the 2021 LCD review.

You can read the RASA submission and Dr Andrew Smith's (VK6AS) paper on the lack of health impacts from high power operation here:
https://vkradioamateurs.org/%ef%bb%bf1-kw-for-advanced-licencees/

As far as RASA can determine, the ACMA has made no progress on this matter. We note that the topic has again been included in their latest FYSO (2022-27). We expect their next activity will be advice that they intend to consult the sector.

Both RASA and the WIA have consulted the sector and share a common view that 1kW for Advanced Licensees is supported.

There is no point consulting the sector yet again on a topic that enjoys considerable support.

It is common knowledge that some amateurs transmit in excess of 120W CW/data and 400W SSB. Anecdotal evidence indicates that there have been no noticeable increases in complaints about amateur sourced interference to other spectrum users. (e.g. neighbour's TV or broadcast radio receivers).

Informal discussions with HF DXers and contesters support these observations. We believe the underlying reasons for this lack of interference from high power transmissions are largely due to:

- sound engineering principles and practices being adopted by users;
- the design of modern transistor amplifiers, which limits spurious emissions, as well as providing protection against poorly matched antennas; and
- the shift by consumers to digital services which are less prone to interference from HF amateur radio signals.

Whilst RASA does not endorse amateurs breaching the LCD, we believe that Advanced Licensees are quite capable of operating 1kW amplifiers safely under the following conditions:

Station properly designed:

- effective earthing;
- no spurious emissions (i.e. don't overdrive your SSB or digital transmissions);
- appropriate transmission lines and patch cables (RG213 as a minimum); and
- properly matched antennas with low VSWR

Antenna design and layout complies with EMR guidelines:

- antenna height meets EMR guidelines (in practice, your HF beam or dipole is at least 10 metres off the ground)
- you ensure public access is restricted (i.e. a fence).

You can read more about the EMR guidelines here:
http://vkregs.info/electromagnetic-radiation/

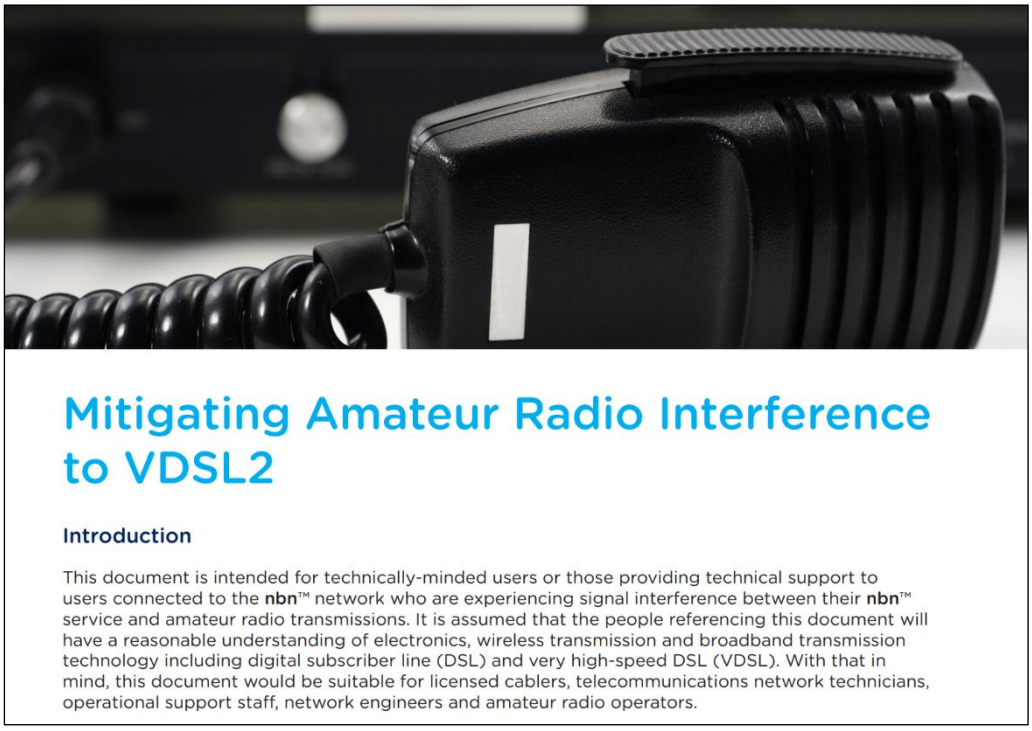
We understand that the WIA support RASA in this matter and would welcome ACMA's endorsement of our proposal. In fact, we understand that at least three WIA Directors own and operate HF linear amplifiers. A RASA committee member also uses an amplifier.

We are advised that one WIA Director actively sells HF amplifiers capable of 1.5kW.

This issue has dragged on for too long - it needs to be resolved. Advanced class amateurs should be permitted 1kW output power under the new class licence arrangements.

NBN: Mitigating Amateur Radio Interference to VDSL2

NBN Co. have recently published a very helpful article on Amateur Radio interference and the NBN. The PDF can be downloaded from the NBN website; click on the image below. You'll also find plans for a simple 40m notch filter here, thanks to Andrew VK3FS.



Mitigating Amateur Radio Interference to VDSL2

Introduction

This document is intended for technically-minded users or those providing technical support to users connected to the **nbn**™ network who are experiencing signal interference between their **nbn**™ service and amateur radio transmissions. It is assumed that the people referencing this document will have a reasonable understanding of electronics, wireless transmission and broadband transmission technology including digital subscriber line (DSL) and very high-speed DSL (VDSL). With that in mind, this document would be suitable for licensed cablers, telecommunications network technicians, operational support staff, network engineers and amateur radio operators.

Queensland linked repeater networks

Queensland has two analogue linked repeater networks. Between them, they cover probably 80% of the VK4 amateur population.

The Central Queensland network

This network was put in place by the Central Highlands ARC. It links 12 repeaters from Proserpine in the north, to Ipswich in the south, out to Emerald, Clermont and Blackwater.

The South East linked network

This network is the brainchild of Andrew VK4QF. It links 7 repeaters across Brisbane, the Sunshine Coast, the Gold Coast, Ipswich, Toowoomba, Warwick and the Bunya Mountains.

Coverage is excellent. The Gold Coast ARC runs a net on the network at 0800 local time every day.

Links

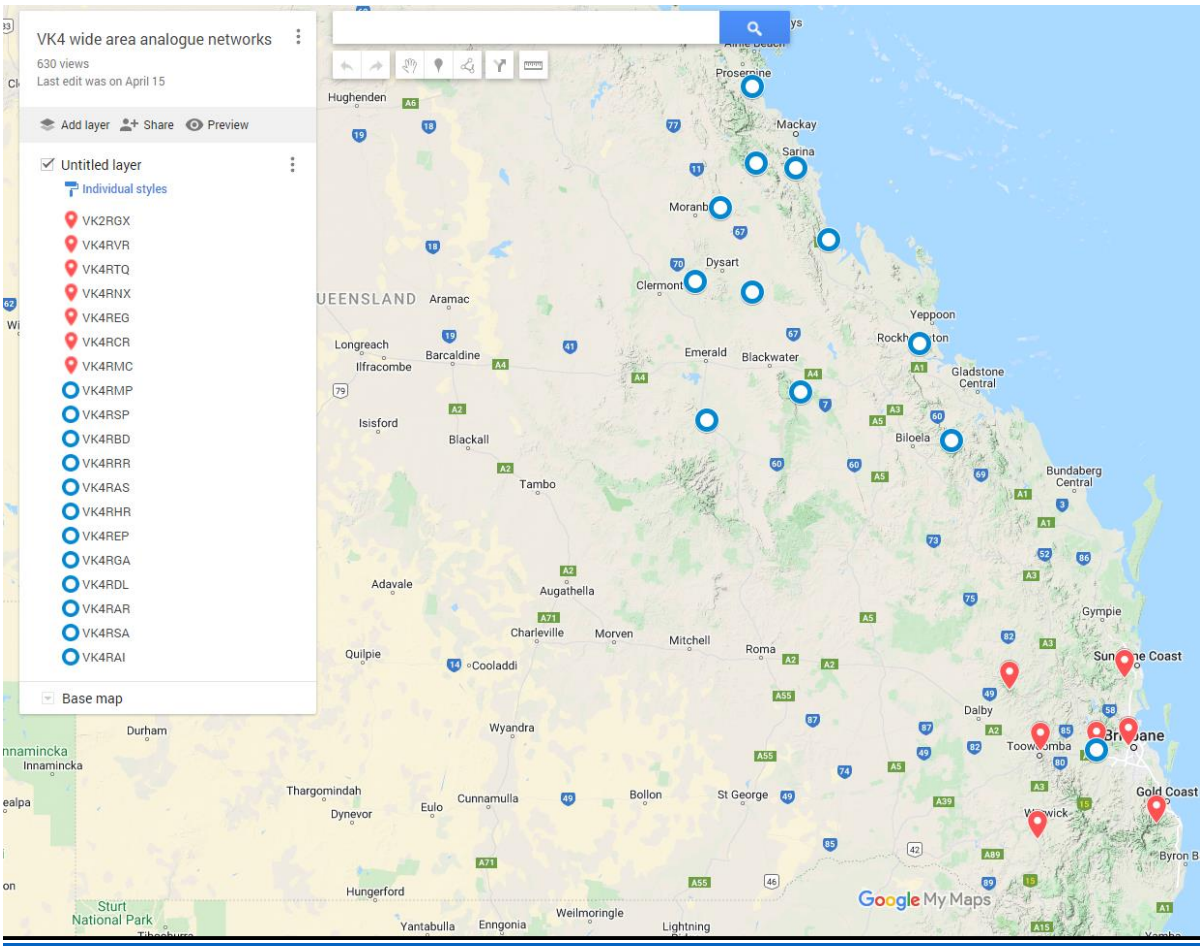
Both networks are very robust – the repeaters are mainly connected via 430/440 MHz RF links, which means that they do not depend on the internet.

Network map

A Google map showing both networks is reproduced below.

An on line version – which is zoomable and includes frequencies and CTCSS tones for all repeaters may be found at:

[VK4 wide area analogue networks - Google My Maps]



Local News & Info

World Map for your shack

Here is a great free program you can use in the your shack. Simon's World Map. Check it out at:

https://www.dit-dit-dit.com/world-map

Amateur Radio News

For the most informative Amateur Radio news, on-air, online and Podcast. Click the image below for more info.

Support

We remember how hard it is when first starting out in Amateur Radio.

Amateur Radio Tech Support is an online Knowledge Base with a ticketing support portal.

It is aimed at newcomers and provides a selection of Knowledge Base articles to help as you get started in the hobby.

Get outdoors

Pack your gear up and try operating in the great outdoors. Try activating a summit… Paul VK5PAS provides some good information on this very popular radio sport activity.

VK6POP active on VKFF weekend

NORFOLK ISLAND

Three VK ops, Alan VK6CQ, Luke VK3HJ and Chris VK3QB have recently returned from Norfolk Island, where they operated VK9NT between 14-26 April 2022. There will be a complete write-up in the next edition of QTC.

QRM Guru

By QRM Guru team

This month we are focussing on power line noise and *getting back to basics*. Bob VK3XP has put together some very handy notes to help with locating power line noise, and Ian has pulled the covers of cheap, low power wireless chargers… to answer the question… "*are these friend or foe for amateur radio?*"

We also have a great article from a local amateur successfully using ferrite rings to suppress RFI from his local area network equipment.

Our cover article this month commences an investigation into a possible link between power line noise and bushfire risk.

ONLINE SUPPORT: QRM Guru assists radio amateurs with QRM issues

QRM Guru is now linked to the Amateur Radio Tech Support (ARTS) ticketing system. This enables users from VK and around the world to raise support tickets if they need a little extra assistance in working through the process.

As word spreads, we are seeing more international amateurs using QRM guru and requesting support via our online ticketing system.

ARTS is a great example of how a member based organisation can use a Help Desk Ticketing System to provide real value to its members.

You can visit ARTS here.

How's your noise floor?

By Bob VK3XP

I have lived in my present location for over 40 years, and in the early days the noise floor was just detectable. These days it ranges from S3 to S8 to 9.

So, how does one go about finding where the noise is coming from?

Over the years I have built a number of gadgets to assist in identifying noise sources

These noise sources can be divided into many categories.

Appliance noise, power line noise, static discharge and RF interference, to name a few.

Finding appliance noise sources can be simply a matter of systematically turning your appliance off then back on again and observing the result. However, be aware that some appliances radiate noise rather than it being conducted through the mains wiring.

Power line noise can be loose connections at power poles, salt spray on the insulators, rusty hardware in cross arms can rectify the AC leakage creating harmonics all up the band. Static discharge produces random crackling usually in dry weather.

Corona discharge is similar but continuous.

What do you use to locate these noise sources?

The first thing to do is to study the character of the noise and log the times it occurs.

Try and describe what it sounds like, is there a pattern, how strong is it, what frequency is it?

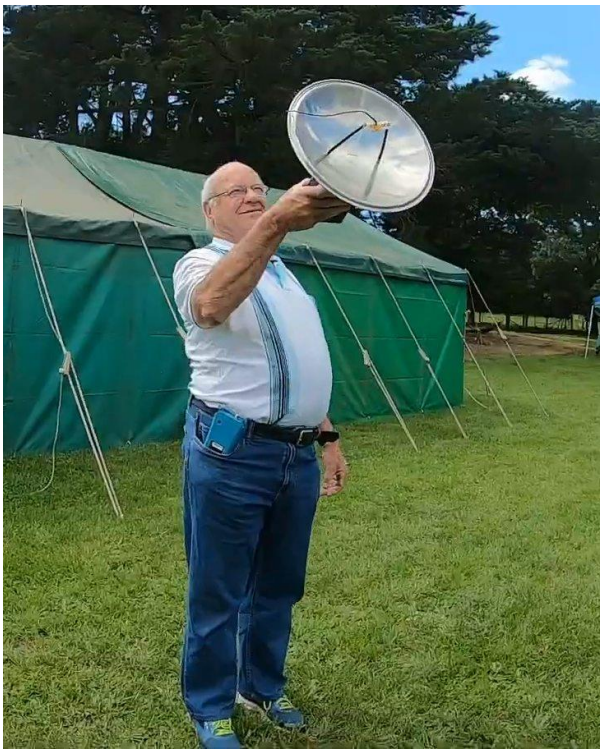
This will save you a lot of running around later.

An old AM radio with a loop stick antenna is a good place to start, null out the signal and plot the bearing on Foxhunt or Triangulex applications on your iPad or similar. Take a number of bearings from different locations until you get a small triangle formed on screen. Inside this triangle is your noise source.

To search for corona noise, you will need an ultrasonic receiver that can tune 20 KHz to 44 KHz. The receivers use a parabolic dish to pinpoint and focus the noise into a small microphone (ultrasonic). Reverse parking sensors for cars work well; using similar technology.

The receiver amplifies the noise and feeds this to a mixer where it is converted into an audible signal and fed to an audio amplifier. See CTT at the end of the article.

A small log periodic antenna is useful for searching in the UHF bands. I use an ICOM ICR5 on AM to look for interference from LIPD devices.



On HF, a two turn loop with a 200p or 350p connected across the ends to tune the loop on frequency. A small coupling loop 1/5th the diameter of your main loop connected to form a Faraday shield works very well.

My method of tuning the loop is to use my antenna analyser to move the SWR plot onto the centre frequency of the noise source; this produces the best result than trying to hand tune as the loop has a very narrow bandwidth.

Brian VK3YNG makes a very nice foxhunting box to use with a 2 metre Yagi.

This has been useful in locating switch mode power supply noise. (And pirates)

Laptop power supplyies that are plugged into the wall but not connected to the laptop are really good radiators of wideband noise, detectable up to ½ a KM away.

The cheap Chinese LED lights that do not have the ACMA tick in a triangle are to be avoided at all costs.

I recently found an unusual noise source in my house, whilst walking down my hallway with an AM receiver tuned to 150kHz I got a very loud AC hum in the radio when I walked past my whiteboard, touching the board attenuated the noise greatly. I scratched my head, how can this be; there is nothing connected to it. It has a metal frame and a laminate centre.

This was being excited by a LED PIR night light plugged into an outlet on the other side of the wall. Turned the outlet off, noise was gone. This unit contained a small switch mode power supply.

I also have a wideband noise that extends from 3.0 MHz to 11.9 MHz it is pulsed at the 1 Hz rate and is around S8 to at its peak of 8.804 MHz. This turned out to be my Smartmeter.

My neighbours weather station goes chirp every 30 seconds or so, I can put up with this as it does not have much effect on SSB signals.

I am now waiting for a response from the supplier.

Tip: Search on the highest frequency you can hear the noise source. The antenna are much smaller and more directional.

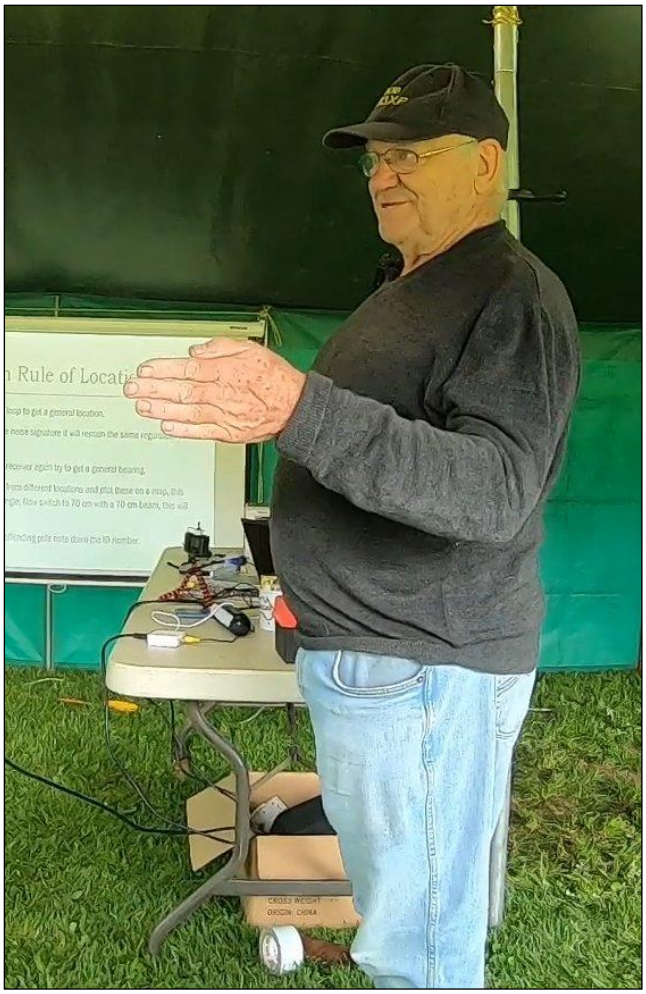
Use an attenuator in the antenna feedline; increase the attenuation as you get closer to the source. This avoids overload and false indications.

Plug packs using switch mode are a common source of noise, infrared night lights are good sources of noise. Negative Ion generators are great comb generators up to SHF.

I have accumulated an array of devices to search for noise, the old TV field strength meter for analogue signal is very useful as it tunes 37MHz to about 890 MHz continuously.

Weapons in the fight against noise:

- A VK3YNG foxhunting box on 2M
- A two metre loop, A two turn magnet loop 5MHZ to 19MHz.
- The ICR5 scanner.
- A log periodic antenna 400MHz to 900 MHz.
- A homebrew Ultrasonic receiver 22KHz to 44 KHz
- A Palomar field strength meter for up close.



Bob has delivered a number of very informative and interesting presentations at clubs and Antennapalooza.

As always, you can search QRM Guru for hints and tips on how to hunt down local noise, what tools to use and refer to useful case studies from real world situations.

The saga of the network switch and 20m QRM

These days, the internet is connected to just about everything electronic in the modern house, from TVs to refrigerators.

My family and I are serious internet users, so when the new QTH was being built, I had the electricians run Cat6 cable to 14 outlets throughout the house.

I installed a 24-port network IP switch in a dedicated server cabinet in the garage and connected my NBN modem to it. All good so far – lots of pretty lights on the switch, and all the TVs, PCs, Sonos music systems and Bose internet radios worked perfectly.

All was great….until I put my HF rig on 20m….to be confronted with this:

S7 spikes about every 60 kHz…

There was a lovely birdie right on 14150 kHz. Armed with my trusty Sony portable HF receiver, I wandered about the house listening for the QRM. The signal sounded like a multi tone data stream. Sure enough, the signal was strong at all the Cat 6 wall outlets and the patch cables to the equipment. It was almost full scale at the switch itself.

I confirmed the problem by turning the switch off. The QRM stopped.

After some head scratching, I decided to do a system reconfiguration, with the aim of reducing the number of Cat6 ports used in the house, and therefore the amount of noise generated on 20m.

I managed to reduce the ports I needed down to 10 – with a particular focus on eliminating the ports with the longest runs of Cat6 cable, and the wall outlets closest to the 20m antenna.

I replaced the 24-port switch with an 8-port model from a different company. With this and 3 spare ports on the NBN modem, I had enough network capacity.

The QRM was now down to S3, but it was still there.

So, I consulted the chaps at QRM Guru (www.qrm.guru) and purchased a number of clip-on ferrites and ferrite rings.

I put rings with at least 6 turns of cable on every patch cable coming from the switch, every cable from the NBN modem and every patch cable at the Cat 6 wall outlets throughout the house. I also used clip on ferrites on all the cables coming from the patch panel.

As you can see from the photos overleaf, I installed ferrites onto every length of cable I could see.

Success! The QRM is down to S0-1 now.

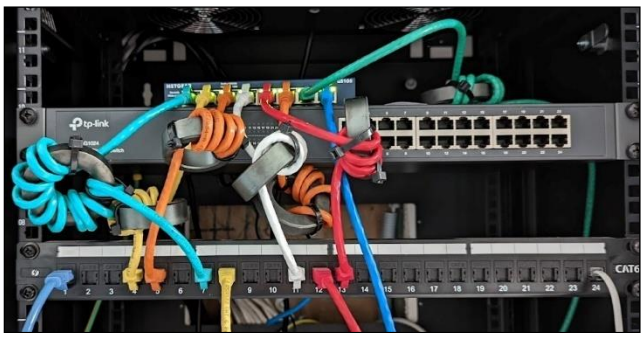
The moral of the story?

Ferrites work and persistence pays off.

This is definitely a case of "*more is more*" and the theory paid dividends.

If you haven't read this article it very effectively illustrates what's going on in practice - The Truth about Ferrites by Ian VK3BUF.

Ferrites everywhere!



More ferrites everywhere! note the new 8-port switch on top of its 24-port predecessor

You guessed it, more ferrites

(Ed: You can buy ferrites from our online shop.)

Low power wireless charging: friend or foe?

By Ian Jackson, VK3BUF

On a recent visit to Aldi, I couldn't help but notice some new products stacked up in the centre aisle.

There was a handheld LED lantern and a wall-mounted emergency lamp. The larger lamp had warm-white and colour-changing modes. The smaller unit plugged into an electrical outlet and activated automatically with proximity movement or mains failure. They were inexpensive at around $15 each. What caught my attention was that both units used wireless induction charging technology.

More of this cheap imported technology is creeping into our households. I was sceptical of the impact it may or may not have on Amateur Radio receivers. Would these be like the terrible switch-mode Christmas lights that wreak havoc on HF – but do it all year round? Or would they be a useful addition to the shack. I wanted to find out, so I purchased these products for testing purposes.

The larger lantern unit came with a USB style cable so that it could charge from a PC, wall adapter or USB battery pack. Like many of these units, it sat neatly in a base unit for charging. A touch on the side of the lamp activated white, warm-white or colour changing light. It was actually an attractive looking unit.

Undoubtedly, there was some type of induction coil in the base that would couple to another coil in the lamp, rectifying a current to charge the battery. I had visions of S9 noise on all bands.

This didn't happen. I switched between bands and could not detect any noise when the charger was engaged. Even when an internal antenna wire was strung up in the shack it was all clear on the RF front!

This simple test was repeated with the wall charging lamp. The induction charging cradle was attached to a 2-pin plug in a 230V power outlet. It was actually quite clever. There was a light sensor working with a passive infrared movement sensor so that movement in the dark would briefly trigger the lamp.

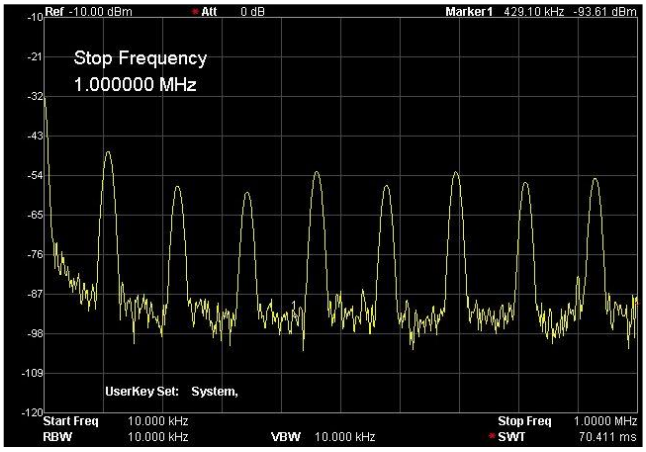
A row of high-intensity LEDs at one end acted as a spot-lamp that would trigger automatically during a power failure.

Presumably several of these around the household could form a basic emergency lighting service.

I have little faith in the CE and FCC labelling that accompanies our cheap imported products. Yet this appliance had no apparent QRM impact on all the regular amateur bands. The energy was obviously coupling from the charger to the lamp on some part of the spectrum. It was time to escalate these tests to the next level.

Using the Rigol 815 spectrum analyser and a combination of antennas and pickup coils, the RF spectrum was analysed looking for spikes present when the charger was engaged. No significant RF signals were measured – even into UHF.

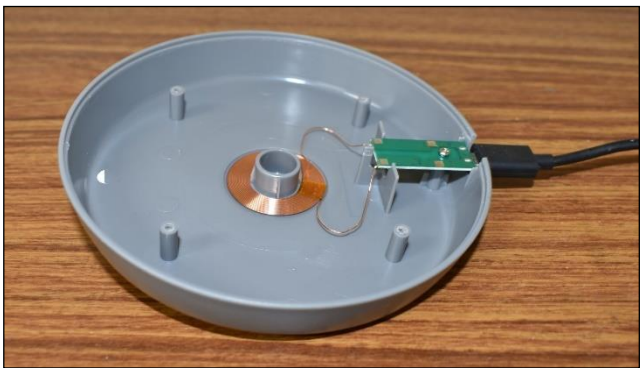
Only when the range was reduced to low in the spectrum could signals be observed. In the 10KHz to 1MHz range there was a low-level series of spikes. They began at 116 KHz and repeated at 116KHz intervals before petering out just short of 2 MHz.



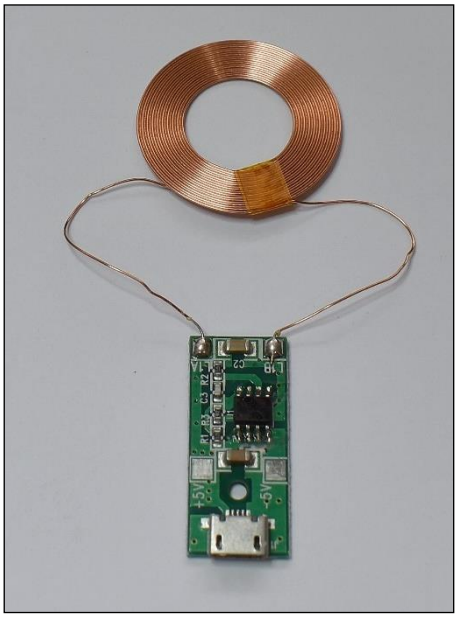
The RF levels were low, and I had to get quite close to each device to make these observations.

The next step was to find out what was going on inside these units. After removing the rubber feet from the lamp base, four screws were found to be holding the unit together.

There was not much inside. A coil and a small circuit board. At least I could see that the main coupling point was close to the centre of the unit. The energy levels involved must be very small indeed.



The circuit board had a single chip on it. It was a basic modulator that would pulse the coil to generate a usable magnetic field. Starting with a low 5V power rail from a USB port it didn't give the designers much to work with, but it had to be doing something worthwhile.



I wanted to see what kind of waveform was being delivered to that coil. An oscilloscope is a better tool for this type of discovery, so I hooked it to the Keysight 1204G scope and analysed the output.

What I saw was a reasonable clean pulse train at 116 KHz, just as I had seen as the fundamental frequency with the spectrum analyser. The device had stepped up the 5V supply to produce a 21V peak signal into the coil. Whenever the coil was being pulsed, the circuit was generating harmonics, but they did not reach far into the RF spectrum.

Presumably the harmonic energy also adds to the charging current. The chip (only 4mm x 5mm) was very faintly engraved with a part number (which I could make out under a microscope). It was an XKT-510; a dedicated CMOS induction charging device. It had some smarts in it to track outgoing coil current. Detail on the device is scarce, but it seems to fold back its drive level if the target coil is not detected

Overall, it was a simple but clever circuit. As always, I am astounded that such things can be made on the far side of our planet and delivered to our supermarket, presumably for a profit, for under $15. From an RF perspective, I didn't see anything that would curtail my Amateur Radio activities.

I'm tempted to go back to the store and purchase another one. It also looks like I get to keep my electric toothbrush which appears to use the same technology. Low-current induction charging seems fine for low energy appliances used infrequently, but if companies roll out wireless charging for electric vehicles with several kW of coupling, I would not be as confident about side effects.

We live in a peculiar world where new technologies (or re-purposed old technologies) have the habit of showing up in consumer goods without much fanfare or information. We are expected to buy them on face value and just accept that they are safe and have low impact on our lives.

Frankly we should maintain a healthy scepticism and be prepared to look deeper.
On this occasion, I have put these concerns to rest. What shows up next may be a different story.

Supporting observations from Chris VK3QB

Last year I put the RF-Explorer (handheld spectrum analyser) alongside induction chargers for a mobile phone and toothbrush… the results very much aligned with Ian's tests.

Low level RF interference was observed from below the 160m amateur band. Moving 10-15cm away from the charging unit and the noise became imperceptible.

RF Explorer and a wireless charger for a toothbrush

RF Explorer and a wireless charger for an iPhone

RASA Harassment and Bullying Policy

By RASA Committee

The Radio Amateur Society of Australia is committed to an environment free of bullying and harassment. We believe our officers, volunteers, members, and those who interact with us should conduct themselves in a manner that respects others and promotes a friendly and tolerant community.

To support this, we have implemented this Bullying and Harassment Policy, effective 1 March 2022.

RASA opposes all forms of harassment, discrimination, and bullying. This includes treating or proposing to treat someone less favourably because of a particular characteristic; imposing or intending to impose an unreasonable requirement, condition or practice which has an unequal or disproportionate effect on people with a particular characteristic; or any behaviour that is offensive, abusive, belittling, intimidating, or threatening – whether this is face-to-face, indirectly or via communication technologies such as mobile phones and computers.

Some forms of harassment, discrimination and bullying are against the law and are based on particular characteristics, such as age, disability, gender, sexual orientation, pregnancy, political or religious beliefs, race, and marital status.

RASA takes all claims of harassment, discrimination, bullying and cyber bullying seriously. We encourage anyone who believes they have been harassed, discriminated against, or bullied to raise the issue with us.

Adult cyber abuse is online communication to or about someone which is menacing, harassing or offensive and also intended to cause serious harm to their reputation, physical or mental health.

What does cyberbullying look like?

Cyberbullying behaviour might include:

- abusive texts and emails
- hurtful messages, images, or videos
- imitating others online
- excluding others online
- humiliating others online
- spreading nasty online gossip and chat
- creating fake accounts to trick someone or humiliate them
- threatening emails, social media posts or texts
- statements that are defamatory

Bullying is when someone, or a group of people (this may include organisations), who have more power at the time, to deliberately upset or hurt another person, their property, reputation, or social acceptance on more than one occasion. It may involve discrimination, exclusion, or denial of access to resources or services.

Where an organisation has a culture of bullying, or bullies individuals, this is called institutional bullying.

Institutional bullying can be very damaging to an individual as the power imbalance is significant. Institutional bullying is also more damaging, as the “power” and “reputation” of the organisation carries more weight, reaches more people, and provides a sense of agency for others to follow this path of behaviour.

What Bullying is Not

Many distressing behaviours are not examples of bullying even though they are unpleasant and may require intervention. There are three socially unpleasant situations that are often confused with bullying:

Mutual Conflict: In mutual conflict situations, there is an argument or disagreement between people but not an imbalance of power. Both parties are upset and usually both want a resolution to the problem. However, unresolved mutual conflict sometimes develops into a bullying situation with one person becoming targeted repeatedly for ‘retaliation’ in a one-sided way.

Social Rejection or Dislike: Unless the social rejection is directed towards someone specific and involves deliberate and repeated attempts to cause distress, exclude or create dislike by others, it is not bullying.

Single-episode acts of nastiness or meanness, or random acts of aggression or intimidation: Single episodes of nastiness or physical aggression are not the same as bullying. If a person is verbally abused or pushed on one occasion they are not being bullied. Nastiness or physical aggression that is directed towards many different people is not the same as bullying.

What do you do if you are being bullied or harassed?

- Keep a record of the bullying or harassment. This may include a written journal, copies of emails or screen shots of social media posts.

- Tell the person to stop. Provide them with examples of the bullying if you feel comfortable doing so.
- If the bullying continues, bring the matter to the attention of the RASA committee
- Of you believe the bullying or harassment is serious enough that you are concerned for your personal welfare or property, you should contact the police.

Discrimination, bullying and sexual harassment are unacceptable at RASA and are unlawful under the following legislation:

- *Sex Discrimination Act 1984* (Cth)
- *Racial Discrimination Act 1975* (Cth)
- *Disability Discrimination Act 1992* (Cth)
- *Age Discrimination Act 2004* (Cth)
- *Australian Human Rights Commission Act 1986* (Cth).

If your club would like to use this policy, please send us an email.

Radio Amateur Society of Australia.

18 March 2022

Rote learning

Amateur radio is a technical hobby. Amateurs recognise that we need to keep up with the times and acknowledge that social expectations have changed.

Learning about valves, analogue TV and complex transmission line theory is far less relevant to the modern-day radio amateur. Our syllabus needed to change, and the recent move by ACMA to adopt the European CEPT syllabus is very good news.

Ours is a hobby of technical investigation, self-improvement, participation, and continual learning.

Our hobby is also merit based… the more you put in the more you get out. This not only applies to our privileges model but also to broader participation in the hobby.

And of course, the bulk of learning and self-improvement will happen long after you pass the exam and obtain your callsign. However, Amateurs tell us that we must maintain a basic level of competence for those entering the hobby.

In recent years we've seen a relaxation in the standards expected to obtain a callsign and enter the hobby. And, for the most part, this has been a good thing.

However, it is not uncommon to see questions on social media that expose a fundamental failure of our education and examination systems. We see questions such as:

"*I have a Yaecomwood radio. Will ATU model xyz work with it?"*

"*My HF radio requires a DC supply voltage of 13.8V +/- 15%. Can I hook it up to a 12V car battery?"*

Now, it is not our intention to embarrass or criticise the individuals asking these questions… but we are challenging the system that fails them in their education and examination testing processes.

We see US advertisements for courses that offer quotes such as:

"This is NOT a ham radio training course. You will not be learning how to operate a ham radio when you complete our course."

These "courses" result in amateurs that do not understand the fundamental theory underpinning the hobby. This often means "dirty" signals on-air, RF feedback to the shack and local QRM in the house.

These failings also mean that some new amateurs lack the basic skills to investigate problems, research solutions and ask the right questions. It also means many amateurs don't know how to offer critical signal reports.

And this is why so many amateurs are against rote learning and question banks being published online.

We note that AMC, backed by a sandstone Australian University has also called out this issue:

The AMC AR Office is aware organisations have online revision questions for use when preparing for Foundation amateur radio examinations. It should be noted that these revision questions are not in any way endorsed by the AMC AR Office.

It is reasonable to assume that the AMC comment is directed at the WIA, who continue to publish a FL question bank on their website.

We have discussed this issue with the WIA President numerous times, and yet he refuses to remove the questions. Why?

Rote learning ***"Doesn't allow for a deeper understanding of a subject****. Doesn't encourage the use of social skills. No connection between new and previous knowledge. May result in wrong impression or understanding a concept*."

Ref: Oxford learning

Publishing question banks and quick on-line courses which teach students to answer questions are not the answer to growing our hobby.

Dodgy pathways via foreign licence systems aren't working either.

Let's work together to raise the standards and encourage newcomers to undertake effective training with local clubs, Ham College (in Perth) and the Radio & Electronics School.

Exams and Callsign Administration

Since early 2019, the AMC has been providing exams and callsign administration services on behalf of the ACMA.

For more information, visit the AMC Website and follow the links.

Training Courses

Looking to get your licence or upgrade? If you are in Perth, contact Ham College for excellence in face-to-face training.

National Online and Remote Training from the Radio & Electronics School. Since 1997.

Club Visits

Even through the Covid lockdowns of the past two years, RASA has been offering Zoom presentations. We hope we can get back to face-to-face meetings in 2022.

We can talk about what we've been up to, and perhaps more importantly, hear your views and answer your questions.

In the meantime, if your club would like a Zoom presentation, please drop us an email.

RASA is the only national body that visits clubs regularly (in-person or by Zoom).

Email us info@vkradioamateurs.org

RASA's YouTube Channel

Did you know RASA has our own YouTube Channel? Click the YouTube logo below to visit our channel.

Welcome Packs: Free resources for Clubs

Does your club run training courses or exams for newcomers? If so, read on…

RASA has put together a free ***Amateur Radio Welcome Pack***. These packs comprise a portfolio folder which includes a number of useful documents and reference sheets.

Give your students some practical and relevant material to take away at the end of the course.

Included in this ***Welcome Pack*** are some documents and information sheets to help your students get started.

- Welcome to Amateur Radio Guide Book
- VK Regulations Handbook
- Getting started with Repeaters
- Australian Band Plan Quick Reference Guide
- Interference Resolution (QRM) Process Guide
- Useful Web sites information sheet

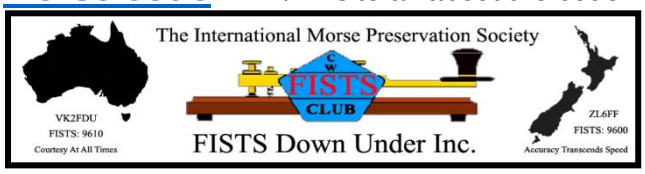
If your club is running a course and would like to provide these resources to your students just send us an email. The is a free resource. We only ask that you cover postage costs.

Have your Club President email us at info@vkradioamateurs.org

National Special Interest Groups

Links to VK national groups with a brief explanation of their activites. Click on the image to visit their web site.

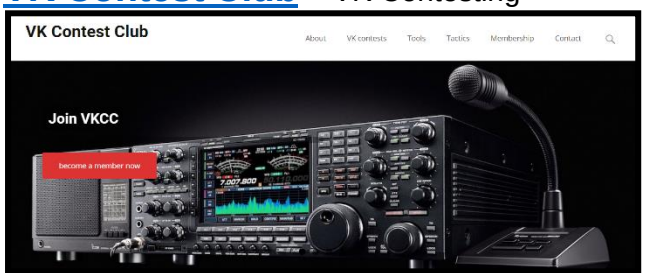
Morse code – VK/ZL site all about the code



VK QRP Club – low power operation

Parks n Peaks – all about operating portable

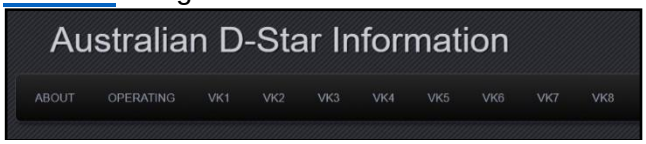
VK Contest Club – VK Contesting



QRM Guru – resolving interference

VK DMR Network – Australia's largest amateur digital radio network

D-Star – Digital Radio

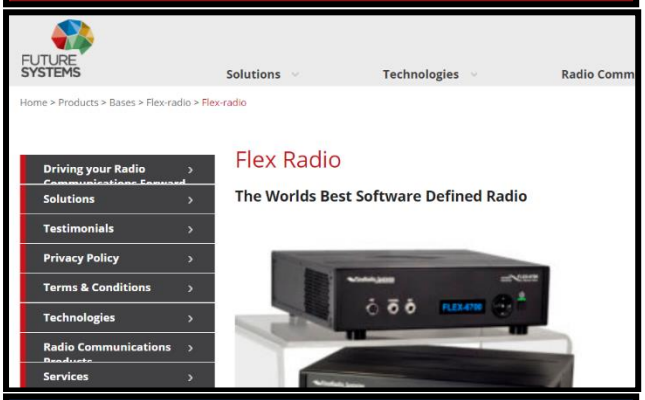


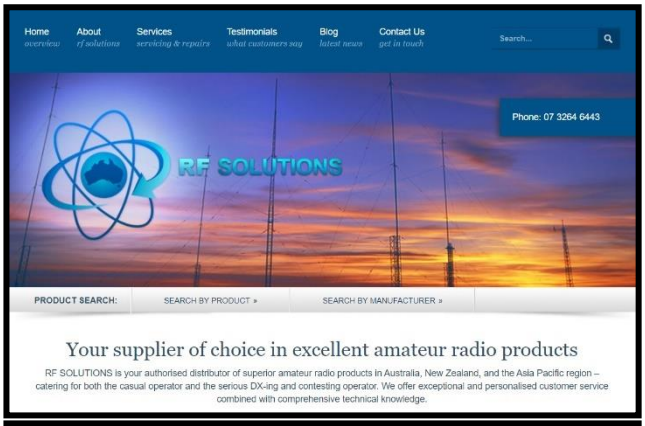
RAOTC – for amateurs licenced 25 years or more

ALARA – Ladies Amateur Radio Association

If you see we've overlooked something, please send us an email to editor@qtcmag.com

VK Suppliers of AR Products

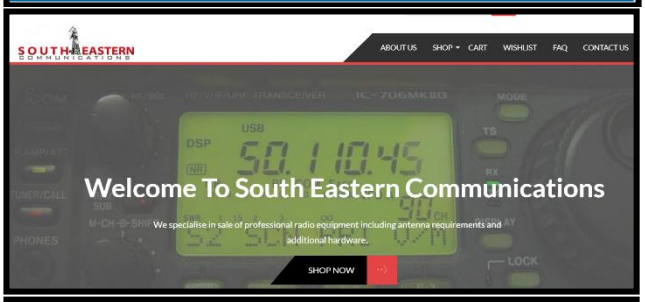


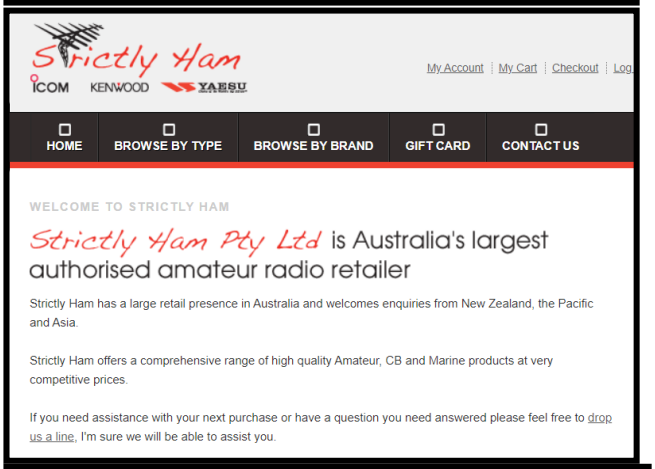


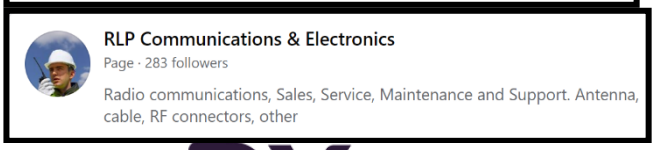
Rippletech Electronics

Phone 03 9887 4936 or Mob 0402 622 562

Email : order or inquiry - sales@rippletech.com.au







DX Radio SYSTEMS

https://dxradiosystems.com.au/

Neither RASA nor QTC Mag endorse or have any affiliation with suppliers on this list.