SAFER FUTURE

- STILLNESS IN ACTION -

EMERGENCY COMMUNICATIONS GUIDE FOR COMMUNITIES

AN INTRODUCTION

PREPARED FOR
Byron Shire Council

PREPARED BY
Safer Future
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The Byron Shire Council, recognising the importance of robust emergency communications in enhancing community resilience, has contracted Safer Future to develop an emergency communications guide, as part of a wider community resilience-building initiative.

This document aims to be an introductory guide to community members and grassroots resilience groups in establishing, maintaining, and using effective emergency communication systems.

This publication provides general information to assist the community in preparation for an emergency or natural disaster. The information isn't provided in response to specific emergencies or individual circumstances. Byron Shire Council does not guarantee the accuracy, reliability or timeliness of this information.

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Safer Future acknowledges the Traditional Owners of this land, the Arakwal people, the Minjungbal people and the Widjabul people of the Bundjalung Nation, and pay our respects to Elders past, present, and emerging. We respect and celebrate First Nations peoples as the original storytellers and content creators of the lands on which we work, and honour the enduring strength and commitment of Aboriginal and Torres Strait Islander peoples to the land, waters and their communities.

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Note that Appendix 3 is only available to the Byron Shire Council, the Local Emergency Management Committee, selected emergency services, and the Byron Shire community hubs.

Emergency Communications Guide for Communities – an Introduction

1. Scope and context leading to the writing of this Guide

The Byron Shire Council received grant funding from the NSW Government to support communities in the Byron Shire to build emergency communication capability. Many community resilience groups are developing their own emergency communications systems and purchasing equipment to communicate within their localities. But the ability for communities to communicate externally, (e.g. call 000 etc.) if power and mobile networks fail, is lacking across the shire. To fill this gap, Council has used the funding to purchase Starlink devices and backup power equipment which has been loaned to community groups in high priority areas for emergency purposes.

Council, recognising the importance of robust emergency communications in enhancing community resilience, has contracted Safer Future to develop an emergency communications guide. This initiative, conducted between May and June 2024, involved consultations with local community hubs (known as CHUBs), delivering five emergency communications training workshops across different locations in the Shire, and writing this Guide. It is part of a wider Council initiative, where Council has loaned Starlink satellite systems and portable power stations with solar panel to CHUBs.

This document aims to be an introductory guide to community members and grassroots resilience groups in establishing, maintaining, and using effective emergency communication systems. By its nature, emergency communications can be complex and overly technical, but we have strived to make this guide as accessible as possible.

In line with Council's initiative, the scope of this Guide focuses on UHF radio communication and internet access via Starlink. It also provides an overview of different backup options to power UHF radios and Starlink during power outages.

Safer Future's mission is to help organisations and communities navigate the uncertainties of disasters and crises with confidence and serenity. Combining actionable resilience strategies with deep-rooted mindfulness practices, we offer comprehensive training, consulting, and implementation services to design robust systems, enhance preparedness, and foster a culture of proactive well-being. The principal consultant for this work was Dr. Jean Renouf.

Any suggestion or question regarding this guide can be sent to hello@safer-future.com.

2. Glossary and introductory terms

Term	Definition
UHF	Ultra High Frequency; used for short-range communication, 450-470 MHz. Preferred mode of localised radio-communications for communities.
VHF	Very High Frequency; used for longer-range communication, 30-300 MHz.
HF	High Frequency; used for long-distance communication, 3-30 MHz.
CB	Citizens Band; a land mobile radio system licenced by the Federal Government for community use.
Repeater	A device that receives a signal and retransmits it for extended range.
Squelch	Used to suppress background noise when you are not receiving a signal. When you turn up the squelch control, it mutes the audio output of the radio until a signal of a certain strength is received. This helps prevent constant background noise from being heard when there are no transmissions on the channel. If the squelch is set too high, weak signals may be blocked, so you might miss transmissions. If it's set too low, you may hear a lot of static and interference when there are no transmissions.
Walkie-Talkie	Informal term that generally refers to a handheld, portable two-way radio. It is also used to describe ‘toy’ radio using 2.4ghz not radio frequency.
Two-way radio	A radio that can both transmit and receive, allowing for bidirectional communication.
Transceiver	A device that both transmits and receives radio signals.
Simplex	A communication mode where transmission and reception occur on the same frequency.
Duplex	A communication mode where transmission and reception occur on different frequencies.
Antenna	A device used to transmit and receive radio waves.
Channel	A specific frequency or set of frequencies assigned for communication.
Base station	A fixed radio, typically installed in a permanent location and staffed 24/7, functioning as a central control hub for dispatching and receiving messages or information. In an emergency or disaster, a fixed radio can serve as a base station if it is continuously manned.
Mobile radio	A two-way radio device made to be installed in a vehicle. Can also be used as a fixed radio in a building.
Handheld radio	A portable, battery-operated two-way radio device.
CTCSS	CTCSS (Continuous Tone-Coded Squelch System) is an option on some radios that allows users to selectively mute all received traffic on

Term	Definition
	a channel, except for other radios set with a matching CTCSS tone in their transmission. It does not offer any privacy as all radios will hear every word spoken, but the two radios with matching tone can only hear each other. The downside is that no other transmissions such as from oncoming traffic can be received.
DCS	Digital Coded Squelch; works the same as CTCSS, but is digital instead.
PTT	Push-To-Talk; a button on a radio that allows the user to transmit.
Ham radio	Amateur radio; a hobby and service in which participants use various types of radio communications equipment to communicate with other radio amateurs.

More about CBs
The Citizen Band Radio Service (CBRS, or more famously known as CB) is a two-way, line-of-sight voice communication service accessible to anyone in Australia.

CB radios offer a cost-effective and reliable means of communication and operate on two distinct frequency bands: the HF band (26.965 – 27.405 MHz) and the UHF band (476.4125 – 477.4125 MHz). This service is public and available to everyone.

CB UHF radios is typically what communities use to communicate locally in times of phone and internet disruptions

How does a two-way radio work?
A two-way radio functions by using a frequency band to transmit sounds, such as your voice, over radio waves to another radio. Various frequency bands, or 'channels,' are available, allowing you to select the appropriate one to communicate with your intended recipient. Once turned on, your radio is always ‘listening’ for any incoming transmission. To transmit, you must press the 'push-to-talk' button, which switches from the loudspeaker to the microphone, and releasing the button returns the walkie-talkie to 'listening' mode.

What's the difference between a walkie-talkie and a two-way radio?
The terms walkie-talkie and two-way radio are often used interchangeably, as both can receive and transmit radio signals. This said, walkie-talkie is often used to describe radios that work on 2.4ghz band, with no licence required and no repeaters available, while two-way radios use the radio frequency MHz band. More often, when someone refers to a two-way radio, they are likely describing a walkie-talkie and vice versa.

The PACE acronym (which stands for Primary, Alternate, Contingency, and Emergency) is a useful framework to think of different ways to ensure reliable communication in various situations, particularly in emergency operations. Here's what it means:

1. **Primary**: This is the first and most preferred method of communication, which is usually the most reliable and efficient. For example, during normal operations, mobile phones or internet-based communications might serve as the primary method.
2. **Alternate**: This is a backup for the primary method. It might not be as efficient or reliable but should still function well. For instance, using communication platforms such as WhatsApp, Signal, Telegram, or Messenger via satellite internet, such as Starlink or NBN Sky Muster.
3. **Contingency**: This is a secondary backup used if both the primary and alternate methods fail. This might be a less convenient method but still provides necessary communication. UHF radios serve as a great contingency method when other systems are down.
4. **Emergency**: This is the last resort, used only when all other methods have failed. It should be highly reliable under any conditions. For example, door-to-door, face-to-face messaging, or using community boards, posters, or even visual signals of all sorts.

Why are UHF radios useful for communities during disruptions?
UHF radios are particularly useful for communities during times of disruptions due to several key reasons:

1. **Reliability**: UHF radios operate independently of centralised networks such as mobile phone towers or the internet. This independence means they are less likely to be affected by infrastructure damage caused by natural disasters or other disruptions.
2. **Range and penetration**: While UHF radios have a shorter range compared to VHF radios, they are better at penetrating buildings and dense urban environments. This makes them particularly useful in built-up areas where other forms of communication might struggle.
3. **Ease of use**: UHF radios are generally easy to operate, requiring minimal training. This makes them accessible for all community members, including those without technical expertise.
4. **Instant communication**: UHF radios provide instant push-to-talk communication, which is crucial during emergencies when quick information exchange can save lives.
5. **Portability**: Handheld UHF radios are highly portable, making them easy to carry and use on the move, which is important during evacuations or search and rescue operations.
6. **Cost-effective**: Compared to satellite phones or other high-tech communication devices, UHF radios are relatively affordable, making them a practical option for community-wide emergency preparedness.
7. **No network dependency**: UHF CB radios do not rely on commercial networks, which can become overloaded or fail during major emergencies. This ensures that communication can continue even when other systems are down.

3. Overview of emergency communication systems

A multiplicity of communication systems exists to ensure continuous flow of information in times of disruptions. In Australia, when typical phone and internet services are down, various alternative communication systems ensure connectivity and safety.

- Amateur radio (ham radio) offers reliable two-way communication over long distances without relying on infrastructure.
- UHF CB radio is widely used for short-range communication, ideal for local coordination.
- Satellite phones provide connectivity by linking directly to satellites, suitable for remote areas, but are expensive to use. Satellite internet services, such as Starlink or the NBN's Sky Muster, offer high-speed internet access including in remote locations, ensuring continued connectivity during outages.
- Satellite communicators, including one-way devices like SPOT and two-way devices like Garmin inReach, enable messaging, location tracking, and emergency SOS signals.
- Additionally, Personal Locator Beacons (PLBs) and Emergency Position Indicating Radio Beacons (EPIRBs) are essential for distress signalling, providing location data to rescue authorities, but can't be used to exchange messages beyond the initial distress signal.

These systems collectively ensure communication continuity and safety during emergencies in Australia, but their capacity vary from one to another. Ideally, a community would be equipped with a variety of these communications, to ensure redundancy (i.e. back-up) in their emergency communications.

This Guide focuses on UHF radios and Starlink Satellite systems, which are two of the best options for communities to use in times of disruptions.

4. Equipment standards

Effective emergency communication relies on reliable, durable, and user-friendly equipment.

General equipment standards include:

- **Power output** (measured in Watts): Radios with higher wattage (5 watts) provide better range and clearer communication. **It is not recommended to buy handheld UHF radios with a lower wattage than 5W.**
- **Durability**: Equipment should be robust, waterproof, dustproof, adhering to a minimum of IP54 or higher.
- **Battery life**: Devices should have long battery life and options for recharging through various means (240v, 12v). It is recommended that every handheld radio comes with 2 batteries.
- **Ease of use**: Equipment should be simple to operate, with clear instructions and intuitive interfaces.

5. Equipment options – two-way radios and satellite communication device

5.1 Overview

There are several distinct radio communication systems available in Australia: High Frequency (HF), Very High Frequency (VHF), and Ultra High Frequency (UHF). While they function similarly, each has unique features.

- **HF radios**: Ideal for long-range communication, capable of transmitting between 100 and 3000 km or more, depending on frequency, equipment specifications, and atmospheric conditions. Using HF radios requires a license or membership in an HF club, unless operating in the HF CB band (26.965 – 27.405 MHz).
- **VHF radios**: Best suited for longer-distance communication or outdoor use due to their longer wavelength. They are particularly useful when traveling in the bush.
- **UHF radios**: More effective in densely built-up areas, as their higher frequency can penetrate buildings and concrete more easily. UHF radios are best for local communications (5 to 15 kilometres range). They do not require a licence and are the go-to type of radios for communities. They function best in direct line of sight, i.e. when there are fewer buildings, hills or obstructions between two users.

HF, VHF, and UHF radios are not compatible with each other.

5.2 Standard UHF radio equipment

When purchasing a UHF handheld radio, the standard equipment typically included in the package ensures that the radio is ready for use right out of the box. Here's a list of the standard equipment usually provided with a UHF handheld radio:

- **Handheld radio unit**: The main device, which contains the transmitter and receiver.
- **Antenna**: A removable or fixed antenna that allows the radio to transmit and receive signals.
- **Battery**: A rechargeable battery pack that powers the radio. While 'built in' lithium batteries are great, once they are flat there's no backup option without charging. Buying an additional battery can mitigate such a risk. Units that use AA or AAA rechargeable batteries can utilise disposable batteries in a pinch, which is handy for those away from charging options for long periods.
- **Battery charger**: A desktop or wall-mounted charger to recharge the battery pack. Some models might include a docking station for charging. Some units allow USB charging. Others include in-cradle charging with AC power (240v) only. Some also include 12v leads for the cradle, while some have optional 12v leads or adaptors.

- **Belt clip**: A clip that attaches to the back of the radio, allowing it to be worn on a belt for easy access and portability (use them instead of putting the radio in your pocket, which may inadvertently press the ‘push-to-talk’ button!).
- **User manual**: A detailed manual that provides instructions on how to use the radio, troubleshoot common issues, and maintain the equipment.

Depending on the manufacturer and model, additional accessories might be available for purchase separately, such as:

- **Wrist strap**: A strap that can be attached to the radio to prevent it from being dropped.
- **Earpiece/Microphone**: Some models include an earpiece with a microphone for hands-free operation.
- **External speaker/microphone**: Enhances audio quality and allows for more convenient communication.
- **Car charger**: Allows the radio to be charged from a vehicle's power outlet.
- **High-capacity batteries**: Offer extended battery life for longer usage periods.

The Australian Communications and Media Authority (ACMA) is an Australian government statutory authority within the Communications portfolio. In other words, it is Australia’s communications and media regulator. ACMA is responsible, among others, for collecting broadcasting, radiocommunication and telecommunication taxes, and regulating Australian media. Radio-communications, including manufacturing standards, licensing or use, come under ACMA’s authority. ACMA recommends to only buy a device from an Australian supplier that meets technical performance standards and labelling and record keeping requirements.

In particular, ACMA recommends taking care when buying online, by making sure the seller is reputable, checking reviews from other customers, and checking whether the supplier is on the national database (if they are, it shows they have followed ACMA’s rules). More information on this can be found here: https://www.acma.gov.au/beware-2-way-radios-overseas.

5.3 Mobile or handheld?

The answer often boils down to "it depends" or "consider both options."

Your choice between a vehicle-mounted system and a handheld UHF will usually depend on your travel habits and activities. Vehicle-mounted systems are less likely to run out of power since they are connected to the vehicle’s power supply and, for CB radios, operate at the maximum legal power of 5 watts for UHF in Australia. Additionally, their antenna is typically mounted as high as possible on the vehicle, providing better range.

On the other hand, handheld UHFs offer exceptional portability, allowing communication from virtually anywhere. This makes them ideal for scenarios where mobility is essential, such as in times of emergency.

If you can afford it, and if you are into it, get both. If you had to choose one, prefer a handheld radio, which will have a lesser range but greater versatility.

5.4 Suggested models

There are many 5W UHF radio models available in Australia. Reviewing each is beyond the scope of this Guide. However, popular 5W UHF radio models include the following (listed here in no particular order of preference):

1. GME TX6160

Pros:

- IP67 rating for dust and water resistance, making it highly durable and suitable for harsh environments.
- Long battery life, typically lasting up to 30 hours on a full charge.
- Built-in LED torch and emergency alert features.

Cons:

- Higher price point compared to other models.
- Slightly bulky, which might be less convenient for extended handheld use.

Price: Approximately $230 - $300 AUD.

2. Icom IC-41PRO

Pros:
- Robust build quality.
- Reasonable battery life, with up to 17 hours of operation.
- Excellent audio clarity.

Cons:
- Heavier than some other handheld radios, which might be a consideration for prolonged use.
- More expensive, reflecting its advanced features and build quality.

Price: Around $260 - $280 AUD.

3. Uniden UH850S

Pros:
- IPX7 waterproof rating, allowing submersion in water, making it ideal for use in wet conditions.
- Backlit LCD screen for easy readability in low-light conditions.
- Long battery life with up to 30 hours of operation on a single charge.
- Advanced features such as Master Scan™ technology and voice enhancer.

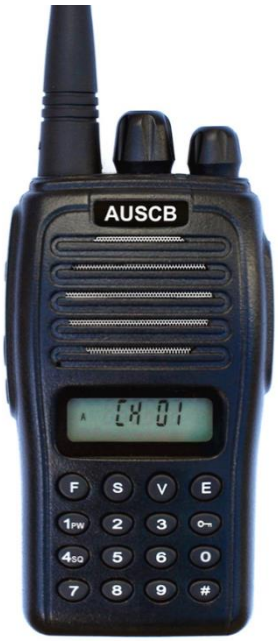
Cons:
- Higher price range compared to simpler models.
- Advanced features can be complex for beginners to use effectively.

Price: Approximately $230 - $300 AUD.

These models are well-regarded in Australia and have received positive feedback from users, indicating reliability and satisfaction. Each of these offers robust features such as high power output, durability (including water and dust resistance), and long battery life, making them suitable for various conditions and uses.

Also, GME, Icom, and Uniden are reputable brands known for producing high-quality communication devices. Their products are widely used and trusted in the industry. And these models are readily available in the Australian market, making them accessible for purchase and support.

Some Byron Shire communities have also started using the AUSCB 5W 80CH UHF CB Handheld Radio, primarily for its cheaper price.



4. AUSCB 5W

Pros:

- Durability: Built with an impact-resistant front shell and a full-length aluminium alloy chassis, ensuring it can withstand tough conditions.
- Battery life: Up to 30 hours of receive time with a 1500mAh rechargeable lithium-ion battery pack.
- Affordable: Priced around $110 AUD, making it an economical choice for users.

Cons:

- Limited advanced features: While it offers essential features, it may lack some of the advanced functionalities found in more expensive models.
- User experience: User reviews indicate satisfaction but suggest that the radio may not have the same level of refinement as the other models listed here.

Price: Approximately $110 AUD.

A review of some of these models and more can be found here: https://www.whichcar.com.au/gear/best-handheld-uhf-radios.

NOTE:
ACMA warns about dodgy radios that can be bought online from overseas, and which may be illegal to use in Australia as they do not respect the Australian requirements. Some have mentioned that these include the BAOFENG brand, and subsidiary brands, as well as some Motorola handsets destined for US markets, where regulations differ. More information can be found

- here: https://www.acma.gov.au/beware-2-way-radios-overseas
- and here: https://radioindustries.com.au/illegal-radios-warning.

6. How to use a UHF radio

6.1 Step-by-step instructions

The following steps are typical of a radio communication:

- **Turn on the radio**: rotate the power/volume knob clockwise until you hear a click. Continue rotating to adjust the volume to a comfortable level.

- **Select a channel**: It depends on the radio you have but typically, use the channel selector knob or buttons to choose the desired channel. Make sure to communicate with others on the same channel.
- **Check for activity**: Before transmitting, listen to ensure the channel is clear. This prevents interrupting ongoing conversations and ensures your message is heard.
- Press the transmit button and **wait a sec or two** before talking to allow the unit to activate. You may miss sending your first word or two otherwise.
- **Transmit your message:** Hold the radio upright, a few inches from your mouth. Press and hold the Push-To-Talk (PTT) button located on the side of the radio while speaking clearly and directly into the microphone. Release the PTT button when you finish speaking to listen to the response.
    - **Say the recipient's call sign.**
    - **Followed by "THIS IS" and your call sign.**
    - **Wait for the person you seek to speak to confirm** that he is hearing and listening to you.
    - **Transmit your message.**
- **Receiving messages:** When someone else is transmitting, you will hear their message through the speaker. There is nothing you have to do as your radio is always ready to receive a transmission (i.e. in 'listening' mode). Ensure the volume is adjusted so you can hear clearly.
- **Adjust squelch** (if available): Squelch controls the threshold at which the radio mutes weak signals. Adjusting the squelch can help reduce background noise and ensure clearer communication.
- When you finish talking **make sure you leave a second or so before releasing the button**, so you don't cut off your last words.
- **Turn off the radio**: Rotate the power/volume knob counterclockwise until you hear a click.

An excellent practice is to repeat the message you have received, to confirm that you have heard and understood it.

Note: when you press the PTT button (to speak or by mistake), no one in the vicinity of your handheld radio can speak on this channel at the same time. So, keep your messages short, and carry your radio with the belt clip, not in your pocket.

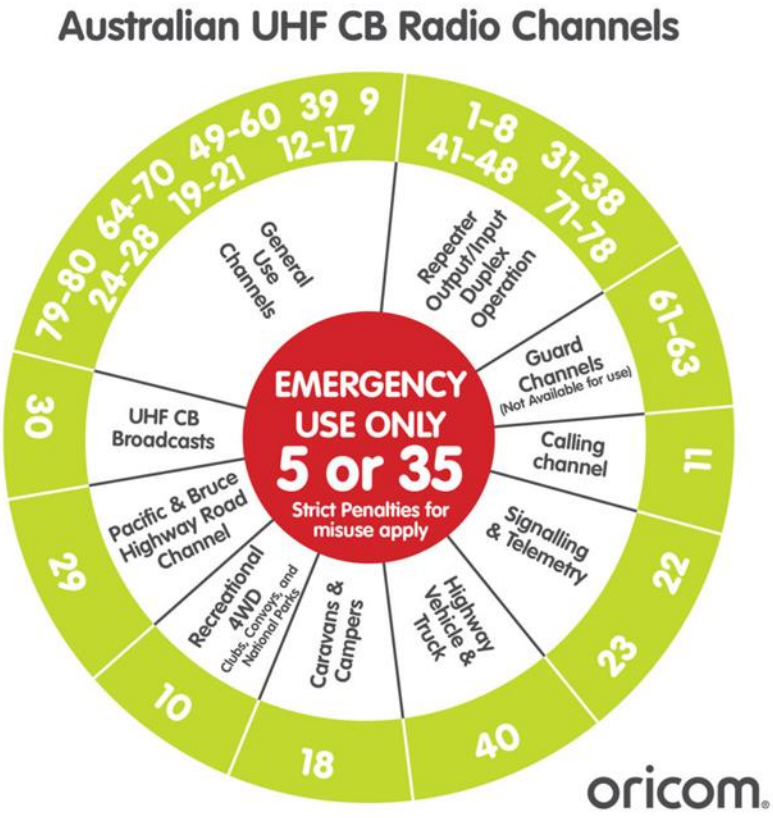
Also,

- regularly perform radio checks to ensure your radio is in good working condition.
- memorise call signs and locations of persons and radio stations you communicate with regularly.
- Think before you speak:
    - Decide what you are going to say, who you are, and who you want to speak to.
    - Make your conversations concise, precise, and clear.

- Avoid long and complicated sentences. If your message is long, divide it into shorter segments.
- Do not use abbreviations unless they are well understood by your group.

6.2 Channels

The UHF CB frequency range is now divided into 80 channels, an increase from the previous 40 channels, enhancing the capacity for clear communication by reducing congestion and providing more options for channel selection in both personal and community use.
These channels are outlined for their various applications in the graphic below:



(source: https://oricom.com.au/everything-you-need-to-know-about-uhf-cb-radios-in-australia/)

There are two types of UHF CB channels: general use and specific public information channels.

General use channels:

- You can choose from channels 9, 12 to 17, 19 to 21, 24 to 28, 39, 49 to 60, 64 to 70, and 79 to 80.
- Channel 18 can be used by caravan owners/campers.
- Channel 10 can be by 4WD clubs or convoys. It is also commonly referred to as the national parks channel.

- Channel 40 (and 29 on the East Coast) is commonly used by truck or oversized vehicle drivers.

In the Northern Rivers region, a community will typically agree on a channel (or various channels) that is/are the most suitable for their local area. Channels must be assessed by someone that understand two-way radios to prevent interferences.

Specific public information channels:

- Channels 5 and 35 are designated emergency channels, and are not to be used except in an emergency. To make an emergency call, switch your radio to Channel 5 with duplex on, if there is no response, try again with duplex off. Both channels are legislated by the Australian government and are reserved exclusively for emergency use. Any misuse, once proven, can lead to prosecution or substantial penalties. However, those channels are not always monitored, so if no one answers on these, seek to get assistance from anyone who hears you, on any channel.
- Channel 29 is the road safety channel for Pacific Highway and Pacific Motorway: You can use this road safety channel if you want information on traffic or sudden closures or detours on these main roads.
- Channel 11: Call channel used for locating friends – a general meeting point for when communications are lost or beginning, before moving to another channel to 'chat'.
- Channels 22 and 23: Telemetry & Telecommand used for automated data communications only.
- Channels 61-63 are unallocated future channels that can't be used.

7. How to speak when using a radio

Communicating on the radio can rapidly becoming confusing if clear protocols aren't used. We use call signs, codes, the phonetic alphabet, and radio language when using UHF radios to ensure clear, concise, and efficient communication.

- **Call signs** provide a unique identifier for each user, preventing confusion and allowing for easy identification and accountability.
- **Codes** enable the transmission of complex information quickly and uniformly, which is essential in time-sensitive or emergency situations.
- The **phonetic alphabet** eliminates misunderstandings caused by similar-sounding letters, ensuring that critical information like names, locations, and call signs are accurately conveyed.
- **Radio language**, including standardised phrases and protocols, promotes consistency and reduces ambiguity, enhancing the effectiveness of communication in diverse and often noisy environments.

It is important that you familiarise yourself with these, as in addition to providing clarity they also provide a level of privacy. As UHF radios can be used by anyone,

there will be other citizens that may use the same channel as you, and will therefore be able to listen to everything you say.

Remember that radio communications are NOT private. Always assume that someone that you don't know is listening to your conversations, so communicate accordingly and never transmit sensitive, confidential or financial information.

Some UHF radios offer options (CTCSS/DCS) for more private communication by creating some sort of sub-channel, thereby reducing interference from other users. They allow for greater clarity among users of the same sub-channel, but conversations can still be heard on the channel, so aren't private.

Some communities in our region have also decided to use a private repeater, to restrict access to their communications to only those radios that are pre-programmed to access a particular private repeater.

7.1 Phonetic alphabet

Here is the phonetic alphabet used in radio communications:

- **A** - Alfa
- **B** - Bravo
- **C** - Charlie
- **D** - Delta
- **E** - Echo
- **F** - Foxtrot
- **G** - Golf
- **H** - Hotel
- **I** - India
- **J** - Juliett
- **K** - Kilo
- **L** - Lima
- **M** - Mike
- **N** - November
- **O** - Oscar
- **P** - Papa
- **Q** - Quebec
- **R** - Romeo
- **S** - Sierra
- **T** - Tango
- **U** - Uniform
- **V** - Victor
- **W** - Whiskey
- **X** - X-ray
- **Y** - Yankee
- **Z** - Zulu

7.2 Radio language

- **Copy that**: Message received and understood – similar to **Ten Four**.
- **Copy so far**: Confirm parts of long message before continuing with rest of message.
- **Affirmative**: Used when a question is asked and the reply is YES.
- **Negative**: Used when a question is asked and the reply is NO.
- **Do you copy?**: Asking another party to acknowledge they understand you.
- **Go ahead** or **Pass your message**: I am ready for your transmission.
- **Say again**: Repeat your last transmission.
- **Say all after/before**: Repeat all after/before a certain key word or phrase.

- **Over**: Your message is finished – invitation for others to respond/transmit.
- **Out**: All conversation is finished – should only be used by the person initiating the call. No answer is required or expected (end just by using “out”, not “over and out”).
- **Radio check**: What’s my signal strength? Can anyone hear me?
- **I copy you loud and clear** (or **I copy you 5 out of 5**): Your transmission signal is good.
- **Wilco:** “will comply”, i.e. I’ll do what you ask of me.
- **Break/Breaker**: Interruption to a transmission to communicate urgently.
- **Emergency, emergency, emergency**: distress call – this is used to tell the network that there is an issue or someone needs help so users need to stop talking.
- **Stand by**: Wait for a short period and I will get back to you.
- **I spell**: The next word will be spelt out using the phonetic alphabet, so get ready to focus on what I’m saying!

7.3 Call-signs

Why call-signs?
Call signs in radio communications serve several crucial purposes, providing a unique identifier for each radio operator or station, which ensures clear distinction between users. This unique identification is often a legal requirement, allowing all transmissions to be traceable to their source.

Call signs also enhance communication efficiency by clearly identifying the speaker and facilitating quick, clear communication, especially in busy or emergency situations. They help maintain accountability and accurate record-keeping, as transmissions can be logged and referenced easily. Moreover, call signs promote standardisation and operational discipline among radio users, ensuring adherence to established protocols and enhancing professionalism.

In terms of privacy and security, call signs offer a level of anonymity by not revealing personal information and maintaining operational security in sensitive contexts.

Choosing call-signs
In a UHF CB radio community, call signs can be chosen by members in several ways, often based on community guidelines, personal preferences, or established conventions. Here are some common methods:

1. Community conventions
(this is the preferred method to allocate call-signs)
- **Local practices**: Some UHF radio communities have specific conventions or traditions for creating call signs. Members might follow these practices to maintain consistency.
- **Geographical indicators**: Call signs might include elements that indicate the user's location, such as abbreviations of the city or region they are in. Using

geographic indicators provide further clarity and as such it is recommended that call-signs are allocated among members of a community using geographic indicators (such as “Lima Bravo” for residents living on Left Bank Road, and “Tango Alpha” for those living in Tallowood), followed by a number for each user (such a “Lima Bravo 1”, “Lima Bravo 2”, etc.).

2. Personal preference

- **Initials or nicknames**: ACMA prefers names not be used.
- **Memorable terms**: Users often choose memorable words or phrases that are easy to recall and communicate. Example includes: “speedy”, “navigator”, “green arrow”, etc.

3. Assigned by group or organisation

- **Pre-assigned call signs**: In organised groups or clubs, call signs might be assigned to members based on a systematic approach, such as a sequence of numbers or letters. Examples include "Alpha 1" and “Bravo 1” as leaders of two different areas/teams and then their team members as: Alpha Team Member - "Alpha 2"; Bravo Team Member - "Bravo 2".
- **Role-based call signs**: In some communities, call signs can reflect the role or function of the member within the group, such as "Medic1" or "Leader2."

4. Regulatory requirements

- **Legal considerations**: Although UHF CB radio typically does not require a license, there might be guidelines or regulations set by local authorities that influence call sign selection. Users might need to adhere to these when choosing a call sign.

5. Avoiding conflicts

- **Uniqueness**: It’s important to choose a call sign that is unique within the community to avoid confusion. Members might check with a central registry or database maintained by the community to ensure their chosen call sign is not already in use.

6. Using phonetics

- **Clarity in communication**: Members often choose call signs that can be easily communicated using the phonetic alphabet to ensure clarity during transmissions.

7.4 Tips for clear communication

- Be polite, keep it short, and acknowledge that you have heard and understood the message.
- Talk across the face of the mic and not directly into it for a clearer transmission.
- Talk at normal volume and don’t blow into the mic when talking.
- Talk clearly and not too fast. If someone is receiving you with a weak signal they may need to hear very clear speech to be able to understand you, so slow down.

When using a radio, you cannot speak and listen at the same time, as you can with a phone. In other words, only one radio transmission will be heard at one time so wait till the airways are clear before trying to talk.

If you interrupt a conversation, the person with the stronger radio signal will dominate the transmission and override the call.

7.5 Codes

Why codes?
When used well, radio codes can enhance communication efficiency and clarity, especially in high-stakes environments like emergency situations. These codes streamline communication by conveying complex information quickly and unambiguously, which is crucial when every second counts. By standardising phrases and terms, radio codes reduce the risk of misunderstandings caused by noise, language differences, or signal distortion. Additionally, they provide a level of confidentiality and security, making it harder for unauthorised individuals to interpret the communications.

However, they can also be confusing, and it is far easier to say the words instead of codes, unless users have been properly informed and trained.

Examples of codes

1. **Code Black:** Someone has died.
2. **Code Pink**: Infant or child related issue.
3. **Code Violet**: Violent or combative individual.
4. **Code Gold**: Intruder.
5. **Code Yellow**: Missing person.
6. **Code Red**: Fire or fire alarm.
7. **Code Blue**: Medical emergency.
8. **Code Orange**: Hazardous material spill.
9. **Code Maroon**: Civil disturbance or large fight.
10. **Code White**: Evacuation.
11. **Code Green**: All clear or return to normal operations.

It is suggested that communities make up the codes that are the most relevant to them – and then educate members of the local network in their meaning and use.

Additional Useful Codes and Terms

1. **All Clear**: Situation is resolved, and it is safe to resume normal activities.
2. **Standby**: Be prepared for potential action.
3. **Shelter in Place**: Stay where you are and take cover.
4. **Evacuate**: Leave the area immediately and proceed to a designated safe location.
5. **Lockdown**: Secure the area, and do not allow anyone to enter or exit.
6. **Hazmat**: Hazardous materials present.
7. **Medical Assist**: Need medical personnel or assistance.
8. **Priority 1**: Immediate response required.
9. **Priority 2**: Response needed, but not urgent.
10. **Priority 3**: Routine or low-priority response.

11. **Perimeter**: Secure boundary established around an incident area.
12. **Recon**: Reconnaissance or assessment of a situation.
13. **Search and Rescue**: Operations focused on locating and assisting individuals in danger.

Codes can also be given to locations to make conversations more private.

7.6 Example

Scenario: Community members Charlie One and Delta Two are coordinating the response to a road closure due to a landslide.

Charlie One: "Delta Two, this is Charlie One, do you copy? Over."
Delta Two: "Charlie One, this is Delta Two, I copy. Go ahead. Over."
Charlie One: "Delta Two, we have a Code Brown situation. Landslide reported at grid location Hotel-Juliet-202. Road is blocked. How copy? Over."
Delta Two: "Charlie One, copy that. Code Brown at Hotel-Juliet-202. Road is blocked. I will take an alternate route. Over."
Charlie One: "Delta Two, recommend using Route Alpha through grid location India-Kilo-305. Over."
Delta Two: "Wilco, Charlie One. Out."

A simpler version would be:

Charlie One: "Delta Two, this is Charlie One, do you copy? Over."
Delta Two: "Charlie One, this is Delta Two, I copy. Go ahead. Over."
Charlie One: "Delta Two, we have a landslide reported at the bottom of Paris Road. The road is now blocked. How copy? Over."
Delta Two: "Charlie One, copy that. Landslide reported at the bottom of Paris Road. Road is blocked. I will take an alternate route. Over."
Charlie One: "Delta Two, recommend using Sydney Road instead. Over."
Delta Two: "Wilco, Charlie One. Out."

8. Improving the quality of transmission and the use of a repeater

8.1 Improving the quality of transmission

Improving the quality of transmission when using UHF handheld radios can be achieved through several techniques and practices:

Antenna quality and placement

- Upgrade the antenna: Use a high-quality antenna.
- Proper orientation: Hold the radio upright with the antenna vertical. This helps maintain a better signal.
- External antenna: If possible, use an external antenna mounted higher up, such as on a vehicle or a building.

Clear line of sight

- Minimise obstructions: Try to have a clear line of sight between the transmitting and receiving radios. Buildings, trees, and hills can block or weaken signals.
- Elevate the radio: Holding the radio higher or moving to a higher elevation can improve signal quality.

Battery management

- Fully charged batteries: Ensure the batteries are fully charged as low battery power can reduce transmission quality.
- High-capacity batteries: Consider using high-capacity rechargeable batteries for longer operation time and better performance.

Channel selection

- Use less congested channels: If possible, choose a channel that is less congested to reduce interference from other users.
- Avoid interference: Stay away from channels used for other purposes, like emergency channels, to avoid interference.

Reduce background noise

- Speak clearly: Speak directly into the microphone in a clear and calm voice. **Do not scream in the radio, and if anything, slow down.**
- Reduce ambient noise: Move to a quieter location or use the radio away from sources of loud noise.

Radio maintenance

- Keep the radio clean and well-maintained. Dust and dirt can affect performance.
- Firmware updates: Ensure the radio's firmware is up to date if applicable.

Effective communication techniques

- Use the call sign: Start with a call sign or identifier to let the other party know you are transmitting.
- Pause before speaking: Press the push-to-talk button and wait a moment before speaking to ensure the beginning of your message is not cut off.

Using repeater channels

- Repeaters: Use repeater channels when available to extend the range of your transmission.

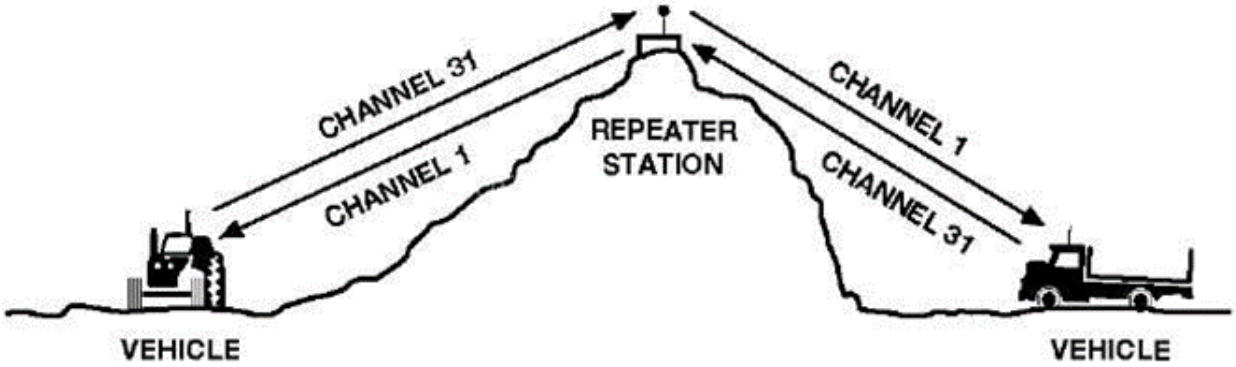
8.2 Using a repeater

A repeater is a device that receives radio transmissions and rebroadcasts ("repeats") them on a different frequency. Repeaters are typically placed in elevated locations, such as on mountains, hilltops, or tall buildings, where they can capture transmissions from greater distances. This elevation allows the repeater to transmit further due to an unobstructed line of sight towards the horizon.

Using a repeater significantly extends the range of your radio by leveraging the height advantage of the repeater.

Some repeaters are private, and some public. These repeaters are established and maintained by community groups or individuals who obtain the necessary license

from the ACMA. In the Northern Rivers region, notable public repeaters include ‘BAL07’ on Buckombil Hill, Tregeagle, East of Lismore, ‘CAS03’ and ‘GIB05’ at Casino, and ‘KGL01’ at Kyogle.



(Source: https://cbreference.com/index.php/2020/01/14/what-is-a-uhf-cb-repeater-and-how-does-it-work/)

How do I use a repeater?

Repeaters function by receiving signals on one channel and rebroadcasting them on another. Typically, your radio transmits and receives on the same channel, known as “simplex.” When using a repeater, your radio must transmit on a different channel than it receives on, known as “duplex.”

By selecting the “duplex” function on your radio, it automatically differentiates between the transmit and receive channels. You don’t need to manually set the input and output channels—just select the correct repeater channel and enable the “duplex” function, and the radio will handle the rest.

To use the repeater, set your radio to ‘Duplex’ or an ‘R’ channel. Press the talk button for a second or so, release it, and listen for the ‘repeater tail’—a slightly delayed return signal. If you don’t hear it, try again using the Monitor (or ‘Mon’) function (if your radio has such an option) or by lowering the squelch. You can also try calling and requesting a signal check.

What are the repeater channels?

Channels 1 to 8 and 41 to 48 are repeater output channels. Channels 31 to 38 and 71 to 78 are the matching repeater input channels. For example, a repeater that transmits on Channel 1 will always receive on Channel 31. While it is possible to use these channels for simplex communications, it is highly recommended to reserve these channels for repeater use only.

You can find below lists for CB UHF repeater locations in the Northern Rivers: https://tropinet.com/uhf-repeaters/repeaters?nr-135941-50894 and https://www.wia.org.au/members/repeaters/data/.

9. Establishing a communication network for grassroots communities

Establishing a UHF radio network for a local community involves several steps to ensure effective communication during emergencies and everyday activities. For this, identifying the channels that work best locally, establishing a communication network with clear communication protocols within and outside the local area, allocating of call-signs and radio equipment, providing training and maintenance of equipment are essential. This should be done by someone trained to do radio surveys.

Here's an overview of the steps required:

1. Assessment and planning

- **Identify needs**: Determine the communication needs of your community, including coverage area, user groups (e.g., beginners, experienced users), and potential scenarios requiring communication.
- **Evaluate resources**: Assess available resources such as existing radios, potential funding, and skilled individuals who can help with the setup.

2. Network design

- **Coverage area mapping**: This should be done by someone trained to do radio surveys. Map out the area you need to cover, using topographical maps and tools like Google Earth or GIS software to understand the terrain and identify high points for optimal radio placement. This helps in determining the best locations for base stations and repeaters. Consider factors like hills, buildings, and other obstructions that might affect signal strength.
- **Designation of communication roles**: Assign clear roles and responsibilities for the functioning of the communication network. This can include appointing community communication coordinators or wardens, message dispatchers or street leaders, and liaisons with external agencies.
- **Channel allocation**: Channels must be assessed by someone that understand two-way radios to prevent interferences. Depending on the landscape and size of the area, decide whether to use a single channel for the entire area or divide it between different channels for better communication across the entire area. If so, assess which channels operate best and which locations (i.e. neighbourhoods, valleys, etc.), by physically testing the range of different channels in different parts of the area, and allocate specific channels for different locations accordingly. Specialist tools for predicting radio coverage such as Radio Mobile can be used for this.
- **Repeaters**: Consider using a repeater to extend the range in areas with difficult terrain or large coverage needs. Consider the pros and cons of private vs. public repeaters:
    - **Private repeaters (owned by the community)**: Provide dedicated communication lines but require more investment, access to land, and maintenance issues, etc.
    - **Public repeaters (already existing)**: More cost-effective and easier to use, but is shared with other users, potentially causing congestion.

3. Equipment selection

- **Handheld radios**: Choose durable, user-friendly UHF handheld radios with sufficient range and battery life. Ensure they have the standard 80 channels used in Australia. If using a private repeater, they will have to be pre-programmed to connect to that repeater.
- **Redundant communication methods**: Equip these stations/team leaders with multiple forms of communication technology such as UHF radios for local networking and HF/VHF radios and/or Starlink for long-distance communication, all supported with power back-ups such as generators, solar panels with batteries and/or portable power stations.

4. Training and education

- **Training programs**: Conduct regular training sessions for community members on how to use the radios, including basic operations, emergency procedures, and radio etiquette.
- **Regular drills**: Organise monthly drills to practice using the network in various scenarios. This helps identify potential issues and ensures everyone is familiar with the protocols. Make them informative, short (30 mins!) and fun so that people want to look forward to these.

5. Standard operating procedures (SOPs)

- **Develop SOPs**: Create clear SOPs for different types of communication, including emergency alerts, routine updates, and specific codes, and ensure community members are educated about these.
- **Radio protocols**: Teach and enforce the use of radio protocols and phonetic alphabets to ensure clear and concise communication.

6. Maintenance

- **Regular maintenance**: Schedule regular maintenance checks for all communication equipment to ensure it remains functional. This includes checking batteries, antennas, and connections.

7. Community engagement and inclusivity

- **Inclusivity**: Ensure that the communication network is inclusive and accessible to all community members, including culturally and linguistically diverse people (CALD) and those with disabilities.
- **Feedback mechanisms**: Establish feedback mechanisms to continuously improve the communication network based on community input. It has to work for everyone, otherwise it won't work!

8. Integration with external networks

- **Link with local authorities**: If possible, establish connections with local emergency services, Byron Shire council (via the Community Resilience Network), and other relevant organisations to ensure integrated communication during larger-scale emergencies. Note that they may not want – or have the capacity to – to create such connections.
- **Regular joint exercises**: Ideally, conduct regular drills and simulations with external services to ensure that communication flows smoothly across all levels during real emergencies. This also helps to identify any gaps in the communication strategy that need to be addressed.

Example network setup

1. **Base station**: Possibly located at the community hall, serving as the main hub, but not necessarily if the location isn't ideal.

2. **Repeater**: Positioned on high ground or central locations to extend range.
3. **Handheld radios**: Distributed to key community members and volunteers.
4. **Training**: Regular sessions held at the community hall.
5. **Drills**: Monthly drills simulating different emergency scenarios.

Inspiring example from Nimbin

"What is the Nimbin Emergency Radio Network?

The Nimbin Emergency Radio Network has been developed in consultation with local Police and RFS, to provide an effective way for residents of the Nimbin Valley to contact response personnel when our region becomes geographically isolated and communication services are lost. Community members in strategic locations were invited to become Radio holders in early 2022 and have been provided with equipment and training. The role of the Radio holder is to access 000 emergency services as needed, request necessary items and services (food, water, medical supplies etc.) and to provide information to response agencies as needed. The project divides the Nimbin Valley into 17 localities with at least 1 trained Radio holder in each locality.

I have my own CB radio; can I join the Nimbin Emergency Radio Network?

Because critical information will be shared with response agencies (e.g. RFS, Police) only official Radio holders will be able to use the network, to maintain privacy and also confidence in the reliability of information being relayed to response agencies."

Source: https://nnic.org.au/pub/index.php/disasters.

While this example from Nimbin offers rich insights, the way they have organised their radio network might not be relevant to your local community.

As other examples, the Wilson's Creek, Huonbrook, Wanganui association has developed a different set-up, with different local channels for each valley, and a private repeater only accessible to a selected number of pre-programmed radios. Other community groups in the Northern Rivers, such as The Channon Hub or Resilient Uki, have yet again designed their local radio network differently. The Channon Hub provides useful radio communications page and resources here: https://thechannonhub.org/emergency-radio-network.

In addition to this Guide, we recommend you read the Community Emergency Radio Network NSW policy and procedure guide by CREST as it sets out how a community UHF CB or other network could be "arranged, operated and managed, before, during and after a disaster impacts the public communications infrastructure." It can be found here: https://www.facebook.com/groups/745318144165838/files/files.

Make sure that whatever system you design for your community meets the specific needs and constraints of your local area.

10. Maintenance of the hardware

Proper maintenance of radio equipment is crucial for ensuring reliability and longevity. Here are some best practices for storage, maintenance, frequency of use, and battery management:

10.1 Storage

1. **Environment:**
    - Store radios in a cool, dry place to prevent moisture damage.
    - Keep them away from direct sunlight, excessive heat, and extreme cold.
    - Avoid storing radios near chemicals, oils, or corrosive substances.
2. **Organisation:**
    - Use storage cases or racks to keep radios organised and protected from physical damage.
    - Label radios and accessories for easy identification and tracking.
3. **Protection:**
    - Use dust covers or protective cases to shield radios from dust and debris.
    - Ensure antennas are retracted or secured to avoid bending or breaking.

10.2 Maintenance

1. **Regular Inspections:**
    - Perform visual inspections to check for physical damage, loose connections, and wear and tear.
    - Ensure antennas are secure and undamaged.
2. **Cleaning:**
    - Clean radios regularly with a soft, dry cloth. For tougher grime, use a slightly damp cloth with mild soap.
    - Avoid using harsh chemicals or solvents that can damage the equipment.
3. **Firmware updates:**
    - Depending on the type of radio being used, regularly check for and install firmware updates from the manufacturer to ensure optimal performance and security.
4. **Functional testing:**
    - Conduct periodic tests to ensure radios are transmitting and receiving correctly.
    - Test all functions.

10.3 Frequency of use

1. **Regular Use:**

- Use radios regularly to keep batteries in good condition and ensure functionality.
- Avoid prolonged periods of inactivity, which can lead to battery degradation and internal component issues.

10.4 Battery management

1. **Charging:**
   - Follow the manufacturer's guidelines for charging cycles and durations.
   - Use the correct chargers to prevent overcharging or damaging batteries.
   - Remove radios from the charger once fully charged to avoid overcharging.
2. **Storage:**
   - Store batteries in a cool, dry place when not in use.
   - If storing radios for an extended period, remove the batteries to prevent leakage and damage.
3. **Battery rotation:**
   - If you have multiple batteries, rotate them to ensure even wear and maintain battery health.
   - Label batteries with purchase or first-use dates to track their age and performance.
4. **Replacement:**
   - Replace batteries that show signs of swelling, leakage, or significant loss of capacity.
   - Follow manufacturer recommendations for battery replacement intervals.

10.5 Additional tips

1. **Documentation:**
   - Keep records of maintenance, inspections, and repairs for each radio.
   - Document any issues and the steps taken to resolve them.
2. **Training:**
   - Train users on proper handling, usage, and maintenance of radios.
   - Ensure users know how to perform basic troubleshooting and report issues.
3. **Professional servicing:**
   - Schedule periodic professional servicing to address any issues beyond basic maintenance.
   - Use authorised service centres for repairs to ensure quality and warranty compliance.

11. Maintenance of radio communication skills

Maintaining radio communication skills requires regular practice and engagement, even when radios are not in frequent use. Here are some strategies to help users keep their skills sharp:

11.1 Regular practice

1. **Scheduled drills:**
    - Organise regular communication drills, such as monthly, to practice radio protocols and procedures.
    - Simulate different scenarios, including emergencies, to keep skills relevant and versatile.
2. **Community check-ins:**
    - Establish a routine check-in schedule for the community network, where users perform a brief communication check.
    - Rotate the responsibility of initiating the check-in to ensure all users participate.

11.2 Training and refresher courses

Organise periodic workshops or training sessions to review and practice communication skills. Include topics like proper radio etiquette, emergency procedures, and troubleshooting techniques.

11.3 Peer learning and mentorship

1. **Peer review:**
    - Encourage users to review each other's communication during drills and exercises, providing constructive feedback.
    - Create a supportive environment where users can learn from each other's experiences.
2. **Mentorship programs:**
    - Pair experienced radio operators with less experienced users to provide guidance and support.
    - Use mentorship to reinforce best practices and build confidence in communication skills.

11.4 Community engagement

1. **Local events:**
    - Encourage users to volunteer their radio communication skills at local events, such as festivals, sporting events or public gatherings.
    - Use these events as real-world practice opportunities.
2. **Collaborations:**
    - Partner with local emergency services or community organisations to provide mutual training and practice opportunities.

- Engage in joint exercises that benefit both the community network and external partners.

3. **Annual community-wide simulations:**
   - Once a year (ideally), conduct a comprehensive drill that involves the entire community, simulating a large-scale emergency, such as a bushfire or flood. This will test the integration of CHUB communications with the whole community as well as broader emergency management systems.

11.5 Organising monthly radio training simulation exercises

General guidelines

1. **Plan in advance:**
   - Schedule the exercises well in advance and provide participants with a calendar of events.
   - Ensure all necessary equipment is prepared and tested beforehand.
2. **Clear objectives:**
   - Define clear objectives for each exercise to ensure participants understand the goals and expected outcomes.
3. **Engage participants:**
   - Involve participants in the planning process to gather input and increase buy-in.
   - Assign roles and responsibilities to ensure active participation from all members.
4. **Debrief and Feedback:**
   - Conduct a debrief after each exercise to discuss what went well and identify areas for improvement.
   - Encourage feedback from participants to continuously improve the training experience.

Proposed monthly simulation exercises for the Northern Rivers sub-tropical climate:

January - Bushfire response

- Simulate a bushfire scenario with participants coordinating evacuation and firefighting efforts.

February - Search and rescue in national park

- Conduct a virtual search and rescue mission using online maps and communication tools to locate a "lost hiker."

March - Flooding after heavy rains

- Coordinate food, fuel, and medical drugs distribution between the community centre and different communities isolated due to cut-off roads.

April - Medical evacuation

- Simulate a medical emergency and coordinate a virtual medical evacuation.

May - Cyclone preparedness
- Conduct a tabletop exercise simulating a cyclone's approach, focusing on preparation and evacuation.

June - Community festival coordination
- Plan and manage a mock festival, coordinating safety, logistics, and emergency response.

July - Early winter storm
- Simulate a winter storm with activities focused on shelter setup and assisting stranded individuals.

August – Lost child at local market
- Set up a mock market virtually with participants acting as vendors and customers, practicing search and communication protocols from home.

September - Bushfire preparedness
- Participants simulate preparing for a potential bushfire threat by practicing communication protocols for bushfire warnings and evacuations; coordinating with emergency services and community members and ensuring readiness of emergency supplies and evacuation plans.

October - Thunderstorm and lightning strike
- Simulate a severe thunderstorm with virtual power outage, lightning strike scenarios and roads cut-off due to fallen trees.

November - Heatwave emergency
- Simulate a heatwave scenario with activities focused on evacuating vulnerable people to multiple cooling centres and medical aid, until a power black-out turn most air conditioning off.

December – Ten-day long power outage
- Participants simulate a prolonged power outage lasting ten days, by discussing options to extend battery life or recharged power-dependent devices, coordinating resource sharing and support among community members and managing information dissemination and emergency responses.

Additional tips:
1. **Themed events:**
    - Create themed events around holidays or local celebrations to make the exercises more engaging and relevant.
2. **Prizes and recognition:**
    - Offer small prizes or certificates for participants who perform exceptionally well or show significant improvement.
3. **Family involvement:**

- Involve family members in some exercises to increase community engagement and understanding of emergency protocols.

4. **Engagement with CALD and people with disabilities:**
   Explore, in consultation with CALD and people with disabilities, ways to ensure there are truly included in the radio communications network. These could include for instance:
   - Allocating a role that suits their circumstances such as having a person using a wheelchair as manning a fixed radio.
   - Choosing UHF radios with features that accommodate users with disabilities, such as tactile buttons, voice-activated controls, and visual indicators.
   - Providing accessories like headsets or earpieces that can assist users with hearing impairments.
   - Providing translated user manuals and quick reference guides for UHF radios.
   - Encouraging buddy systems to ensure everyone has someone to turn to for assistance.
5. **Social media:**
   - Share photos and stories from the exercises on social media to highlight the importance of preparedness and encourage broader participation.
6. **Make it fun!**
   - Create a vibe so participants feel safe to make mistakes, are happy to connect one with each other, enjoy this monthly scenario and even look forward to the next!

12. Emergency management communication arrangements

Establishing emergency management communication arrangements between a radio community network and local emergency services and authorities can significantly enhance community resilience and response capabilities.

This can be challenging, as both communities and local institutions are learning to work better together. **Note however that in the Byron Shire, emergency services and council have currently little to no capacity for it as ensuring proper communication arrangements requires a significant amount of resources and liability.**

However, here are some steps to explore:

1. **Build relationships:**
   - **Initial contact:** Start by reaching out to local emergency services and authorities to introduce the community radio network. Explain its purpose, capabilities, and how it can support emergency management.

Ask if the Byron Shire Council Community Resilience Network can facilitate such meetings.
    - **Regular meetings:** Schedule regular meetings, even if informal, to discuss potential collaboration and communication protocols.
2. **Memorandum of Understanding (MoU):**
    - Draft an MoU outlining the roles, responsibilities, and communication protocols between the radio community network and emergency services. This formal agreement helps clarify expectations and commitment.
    - Note however, that **some emergency services (i.e. your local fire station made of volunteers only) may not want to engage in such a formal manner, and would prefer an informal, trust-based, system instead.**
3. **Integration with existing systems:**
    - Work on integrating the community radio network with existing emergency communication systems. This may involve frequency coordination, shared channels, or cross-training on equipment. The example of Nimbin is relevant here (see Section 9.)
    - Understand that for emergency services to formally commit to integrate your radio network with their systems is a big ask that will require a significant amount of resources and liability.
4. **Training and exercises:**
    - Conduct joint training sessions and exercises to ensure both the community network and emergency services are familiar with each other's procedures and capabilities. This helps build trust and operational efficiency.

Overcoming limited capacity

1. **Demonstrate value:**
    - Show the benefits of collaboration by highlighting past successes or case studies where community radio networks have effectively supported emergency management.
2. **Pilot projects:**
    - Propose a pilot project to demonstrate the effectiveness of the communication network in a controlled, low-risk scenario. This can help build confidence and interest in further collaboration.
3. **Leverage existing relationships:**
    - Use existing relationships to bridge any ‘cultural’ gap (communities tend to work horizontally, while emergency services vertically) which may exist between the local community resilience network and the local emergency services.

Maintenance of arrangements

1. **Regular communication:**
    - Maintain regular communication through scheduled check-ins, updates, and joint exercises. This keeps the relationship active and ensures readiness.
2. **Feedback mechanism:**

    - Establish a feedback mechanism to evaluate the effectiveness of the communication arrangements and identify areas for improvement. This can be done through debriefs, or regular review meetings.
3. **Documentation:**
    - Keep detailed records of all interactions, agreements, and training sessions. Documentation ensures continuity and helps onboard new members or partners.
4. **Flexibility:**
    - Stay flexible and open to adjustments based on feedback and changing needs. Adapt the communication arrangements as necessary to remain effective and relevant.

Regardless of such arrangements, when you are preparing for future disasters and disruptions, establish a direct line of contact with local fire, police, SES and medical services whenever possible and ensure that CHUBs are familiar with the emergency contact numbers and protocols for reaching out to these services. In times of disasters, use the emergency numbers 000 and 132 500.

13. How to use a Starlink device

13.1 Step-by-step guide to using a Starlink device

1. Unbox your Starlink kit

- **Contents:** Your Starlink kit should include a dish (satellite antenna), a mounting tripod, a Wi-Fi router, power supply, and necessary cables.

2. Initial setup and app installation

- **Download the Starlink app:** Available on both iOS and Android, the app helps you set up and monitor your Starlink connection.
- **Follow the app instructions:** Open the app and follow the on-screen instructions to complete the setup. This usually involves connecting to the router's Wi-Fi network and finalising the configuration.

3. Choose a location

- **Outdoor setup:** Find an open area with a clear view of the sky, free from obstructions like trees, buildings, or other structures. The dish needs to have an unobstructed view to connect with Starlink satellites.
- **Indoor consideration:** Ensure the router is placed in a central location inside your home for optimal Wi-Fi coverage.

4. Assemble the dish

- **Mounting:** Attach the dish to the mounting tripod or a permanent mount if available. Make sure the dish is stable and secure.
- **Positioning:** Place the dish in your chosen location. The dish will automatically adjust itself to the optimal angle to connect with the satellites.

5. Connect the cables

- **Power cable:** Connect the power cable to the dish and plug it into a power outlet.
- **Ethernet cable:** Connect one end of the provided Ethernet cable to the dish and the other end to the Starlink router.

6. Power up the system

- **Router:** Plug the router into a power outlet. You should see the lights on the router indicate it is powering up and attempting to connect.

7. Wait for connection

- **Initial connection:** The dish will take some time to establish a connection with the Starlink satellites. This can take up to 15 minutes.
- **Status check:** Use the app to monitor the status of your connection. The app will show when you are online and the signal strength.

8. Test your internet connection

- **Speed Test:** Once connected, you can perform a speed test via the Starlink app or a web-based speed test tool to check your internet speed.
- **Troubleshooting:** If you encounter issues, ensure the dish has a clear view of the sky and all cables are securely connected. The app also provides troubleshooting tips.

9. Optimise and enjoy

- **Router placement:** If needed, reposition the router to ensure optimal Wi-Fi coverage in your home.
- **Monitor performance:** Regularly check the app for updates on performance and any potential issues.

13.2 Tips for optimal performance

- **Regularly check for obstructions:** Ensure the dish's view of the sky remains clear from any new obstructions.
- **Weather considerations:** The dish is designed to withstand various weather conditions, but extreme weather can temporarily affect performance.
- **Firmware updates:** The Starlink system updates its firmware automatically. Ensure it stays plugged in to receive these updates.

13.3 Troubleshooting common issues

- **Connection drops:** Verify the dish has an unobstructed view and the router is placed centrally.
- **Slow speeds:** Check for interference from other electronic devices and ensure your router is in an optimal location.
- **No signal:** Restart the system by unplugging the power, waiting for 10 seconds, and plugging it back in.

14. Overview of power backup options for UHF radios and Starlink during power outages

Ensuring reliable power backup for UHF radios and Starlink satellite communications is crucial for maintaining communication during power outages. Here are some power backup options to consider:

14.1 Uninterruptible Power Supplies (UPS)

- **Description:** A UPS provides immediate backup power to devices during an outage, using an internal battery.
- **Pros:** Instant power supply, surge protection, easy to set up.
- **Cons:** Limited run-time depending on battery capacity, generally suitable for short-term outages.
- **Suitable for:** Short-term power disruptions, ensuring uninterrupted operation until a longer-term solution is activated.

14.2 Generators

- **Description:** Portable generators can provide power for extended periods, running on petrol or diesel.
- **Pros:** High power output, long run-time if there is sufficient fuel, can power multiple devices.
- **Cons:** Requires fuel storage, noisy, regular maintenance needed.
- **Suitable for:** Prolonged power outages, outdoor or remote locations where grid power is unavailable.

14.3 Battery packs and portable power stations

- **Description:** These are high-capacity rechargeable battery units that can power devices for several hours to days, depending on the usage. An example of a portable power station includes the Bluetti AX200 Max that the Byron Shire Council has loaned to multiple community hubs, and which can be recharged, if needed, with a solar panel.
- **Pros:** Silent operation, portable, environmentally friendly, easy to use.
- **Cons:** Limited by battery capacity, requires recharging after use.
- **Suitable for:** Medium-term power outages, portable use, and indoor environments.

14.4 Solar power systems with battery storage

- **Description:** Solar panels paired with battery storage can provide a renewable power source.
- **Pros:** Renewable energy, low running costs after initial setup, scalable to needs.
- **Cons:** High initial setup cost, dependent on sunlight availability, requires sufficient space for panels.
- **Suitable for:** Long-term and sustainable power backup, ideal for sunny regions.

14.5 Vehicle power inverters

- **Description:** Inverters can convert a vehicle's DC power (from the battery) to AC power to run standard household devices.
- **Pros:** Utilises existing vehicle battery, portable, relatively inexpensive.

- **Cons:** Can drain vehicle battery, limited power output.
- **Suitable for:** Short to medium-term power needs, particularly in mobile or remote scenarios.

When choosing your backup system, **calculate the total power consumption of your UHF radios and Starlink equipment to ensure the chosen backup option can handle the load.** Information about how to do this can be found in the Autonomous Resilience Project report: https://assets.nationbuilder.com/boomerangalliance/pages/295/attachments/original/1657688880/TEC_Autonomous_Resilience_20220630_final_clean_sm.pdf?1657688880.

Beyond this, we invite you to also read the Energy Ready Toolkit, a first-of-its-kind free resource for Australian communities to help us prepare for when the power goes out and ensure we remain energy resilient. More information can be found here: https://www.uts.edu.au/isf/explore-research/projects/energy-ready-empowering-energy-resilient-communities.

Final words

By learning and practicing emergency communications, you're playing a crucial role in strengthening our community's resilience. Your efforts ensure that we can stay connected and support each other in times of need. Setting up emergency communications systems that work take time and effort, yet you're doing the work!

Every bit of knowledge and preparation helps us to be better prepared for emergencies. Thank you for your dedication and commitment.

Appendix 1: Local suppliers and telecommunications providers

The following suppliers and telecommunications consultants, listed in alphabetical order, can be accessed for technical, or other, assistance.

Connectivity Innovation Network

Jointly led by the University of Technology Sydney (UTS) and the University of Sydney, the Connectivity Innovation Network brings together national and globally recognised expertise, researchers and industry to solve connectivity challenges and deliver improved digital outcomes for NSW citizens.

www.connectivityinnovationnetwork.com

CREST Citizens Radio Emergency Service Team NSW

CREST is a voluntary emergency organisation. CREST commenced operations in September 1976 in most Australian capital cities and major towns. The initial role of CREST was to monitor the emergency frequencies on the Citizens Band Radio Service (CBRS), relaying calls for assistance from the public to the relevant emergency service. This role has since grown to include many forms of specialist communications support for other emergency service and community organisations. CREST members are often called upon to provide valuable safety communications for schools and sporting clubs for events such as fun runs, bicycle rides and the like.

CREST NSW Incorporated has been recognised as a "S*pecialist Communications Support Unit to the Emergency Services"*. This means that CREST NSW Inc can, and is, called upon by the authorities to provide communications and other support during disasters and other emergencies. CREST NSW Inc is primarily a self funded organisation and relies on donations from the public.

www.crest.org.au

A useful Community Emergency Radio Network NSW policy and procedure guide can be found here, and act as a complement to this Guide: https://www.facebook.com/groups/745318144165838/files/files.

You can also join their Community Emergency Radio Network Facebook pages here:

- CERN NSW: https://www.facebook.com/groups/745318144165838
- CERN Northern Rivers: https://www.facebook.com/groups/523818639372392.

John Nolan 2 Way Radio

They sell, install, and maintain all types of new and second hand UHF, VHF and Commercial 2way Radios and also offer complete system and network design if required. They also supply all the accessories required to fit, operate or upgrade new and existing Radios.

John Nolan

02 6672 2077 / 0410 555 688

480 Tweed Valley Way, Murwillumbah

johnnolan2wayradio@gmail.com

www.johnnolan2wayradio.com

Karera Communications

Karera offers a wide range of customised solutions, including Digital Two-Way radios, GPS tracking, Satellite and Emergency systems.

+61 2 4355 1599

Unit 2 / 49 Gavenlock Rd, Tuggerah NSW 2259

sales@karera.com

www.karera.com.au

Mobile Communications Services

From cars to semi-trailers, HF radios to Satellite phones ... Mobile Communications (QLD) Pty Ltd offers a complete range of installation services for all types of communications products and accessories we represent, just call our service department to discuss your needs.

1/53 Boyland Avenue Coopers Plains Qld 4108

+61 7 3373 2345

https://www.mobilecomms.com.au/

Nimbin Neighbourhood and Information Centre

Useful resources related to the Nimbin Community Disaster Plan:
https://nnic.org.au/pub/index.php/disasters

Northern Rivers Communications

88 Victoria Street, Grafton NSW 2460

(02) 6642 7287

admin@nrcomms.com.au

Rainbow Power Company

Rainbow Power Company is an unlisted public company, based in Nimbin and established in 1987, to promote and provide high-quality renewable energy sources.

Useful FAQs: www.rpc.com.au/pages/faqs

Radio Mobile

Radio Mobile is a software by Roger Coudé VE2DBE. The program simulates Radio Frequency propagation and is for free to the amateur radio community.

www.ve2dbe.com/rmonline_s.asp

URSYS

URSYS is a private Australian company specialising in remote area communications for communities, industry and commerce.

ursys.com.au

Starlink

www.starlink.com

Summerland Amateur Radio Club

The Summerland Amateur Radio Club Inc. is a NSW incorporated association The clubrooms are at 412 Richmond Hill Road, Richmond Hill, about a 10 minute drive east of Lismore. We use repeater sites near Lismore and Woodburn and on Mount Nardi. The club services the North East corner of NSW, extending roughly south to Yamba and Grafton, north to Byron Bay, west to Tenterfield and east to the Pacific Ocean. The club has a library with collections of amateur radio and electronics magazines and reference books. These can be scanned at the clubrooms directly on to a thumb drive. We also have a small lab for equipment testing, and a basic

workshop with various mechanical and electrical tools. The club shop offers a range of consumables and surplus gear for sale.

vk2src@gmail.com

https://sarc.org.au

The Channon Hub

Radio communications page and resources: https://thechannonhub.org/emergency-radio-network

WICEN NSW Communications

WICEN NSW is a volunteer group comprised of licensed amateur radio operators who provide emergency communications in times when the public communications infrastructure degrades or fails. WICEN NSW is a communications support squad of VRA Rescue NSW providing recognition through the State Emergency and Rescue Management Act 1989 and the State Rescue Board.

https://nsw.wicen.org.au

Appendix 2: How and when to call 000

Triple Zero (000)
Triple Zero (000) is Australia's main emergency service number. You should call 000 if you need urgent help from police, fire or ambulance services.

Telstra answers calls to the emergency service numbers 000 and 112 and transfers the call, and information about your location, to the emergency service you request. 911 should not be used. If dialled within Australia, this number will not re-route emergency calls to Triple Zero (000).

You should only call 000 when:

- someone is seriously injured or in need of urgent medical help
- your life or property is being threatened
- you have just witnessed a serious accident or crime

If a situation is not urgent, you should look up the number of your local police, fire or ambulance service.

Other emergency service numbers
Australia also has 2 other emergency service numbers, but they only work on some services:

- 112 can only be dialed on a mobile phone
- 106 can only be used with a teletypewriter (TTY) or a device for the deaf. 106 is a text-based emergency service number for people who are deaf, or who have a hearing or speech impairment

Call charges
You will not be charged for calling Triple Zero (000). These calls are free from any kind of phone.

Types of phone services you can use
You can call 000 from any fixed or mobile phone and certain VoIP and satellite services.
You can also call 000 from any 'handheld' satellite phone.
You can call 000 using the Emergency+ app on your smartphone. One advantage of using the Emergency+ app to call 000 is that if you don’t know your exact location, the app will use the GPS on your smartphone to help you to give emergency services your location.
The Emergency+ app is available to download free of charge from the Google Play store and Apple App store.

Locked handsets
You can call 000 without having to unlock the keypad or enter a security-protection Personal Identification Number (PIN). You should check your handset manual for information about emergency call dialing.

Network coverage

You can call 000 even if your mobile provider doesn't have network in the area. You must be in the coverage area of one of the mobile providers in Australia to make emergency calls.

Text messages
You cannot contact 000 or 112 by text message.

When you dial Triple Zero (000)
When you dial 000 you will first hear the recorded message 'You have dialed emergency Triple Zero. Your call is being connected.'
Your call is then answered by a Telstra operator who will ask whether you need police, fire or ambulance. You may also be asked to give the state and town you are calling from. The operator will then connect you to the emergency service you requested and will stay on the line with you until the call is answered by them.

In extreme events, such as major bushfires or storms, there may be a short delay before your call is answered due to a higher number of calls. You should stay on the line if this happens or you will lose your place in the queue.

How to give your location

- **From a fixed line phone**

The address details for the fixed line will automatically appear on the operator's screen and be given to the emergency service organisation you requested.

- **From a mobile or VoIP service**

The operator will ask you for the town and state you are calling from. This is because you may not be at your home or billing address.

- **Use the Emergency+ app**

The Emergency+ app can help you if you don't know your exact location when you call 000. The app uses the GPS on your smartphone to give you a street address where available, or 3 words (go to what3words for further information) that help the operator identify your location.

Hearing or speech impairments
People who are deaf or have a hearing or speech impairment can use a TTY to call 106. 106 is a text-based Emergency Call Service provided as a part of the National Relay Service (NRS).
When you call 106, the operator will connect you with the emergency service organisation (police, fire or ambulance) you request.
You cannot access 106 by SMS.
You can also ask the NRS for a captioned relay, internet relay, SMS relay, video relay or voice relay call to be transferred to Triple Zero if you need emergency help from police, fire or an ambulance service.

(Note: this information originates from the Australian Communications and Media Authority (ACMA). More information about 000 can be found here: https://www.acma.gov.au/emergency-calls and here: https://www.triplezero.gov.au/triple-zero/home)

Appendix 3: Overview of CHUBs emergency communication systems

This appendix is only available to the Byron Shire Council, the Local Emergency Management Committee, selected emergency services, and the Byron Shire community hubs.

Appendix 4: Key information to be distributed to UHF radio-communications users

1. How to use a UHF radio

Step-by-step instructions

The following steps are typical of a radio communication:

- **Turn on the radio**: rotate the power/volume knob clockwise until you hear a click. Continue rotating to adjust the volume to a comfortable level.
- **Select a channel**: It depends on the radio you have but typically, use the channel selector knob or buttons to choose the desired channel. Make sure to communicate with others on the same channel.
- **Check for activity**: Before transmitting, listen to ensure the channel is clear. This prevents interrupting ongoing conversations and ensures your message is heard.
- Press the transmit button and **wait a sec or two** before talking to allow the unit to activate. You may miss sending your first word or two otherwise.
- **Transmit your message:** Hold the radio upright, a few inches from your mouth. Press and hold the Push-To-Talk (PTT) button located on the side of the radio while speaking clearly and directly into the microphone. Release the PTT button when you finish speaking to listen to the response.
    - **Say the recipient's call sign.**
    - **Followed by "THIS IS" and your call sign.**
    - **Wait for the person you seek to speak to confirm** that he is hearing and listening to you.
    - **Transmit your message.**
- **Receiving messages:** When someone else is transmitting, you will hear their message through the speaker. There is nothing you have to do as your radio is always ready to receive a transmission (i.e. in 'listening' mode). Ensure the volume is adjusted so you can hear clearly.
- **Adjust squelch** (if available): Squelch controls the threshold at which the radio mutes weak signals. Adjusting the squelch can help reduce background noise and ensure clearer communication.
- When you finish talking **make sure you leave a second or so before releasing the button**, so you don't cut off your last words.
- **Turn off the radio**: Rotate the power/volume knob counterclockwise until you hear a click.

An excellent practice is to repeat the message you have received, to confirm that you have heard and understood it.

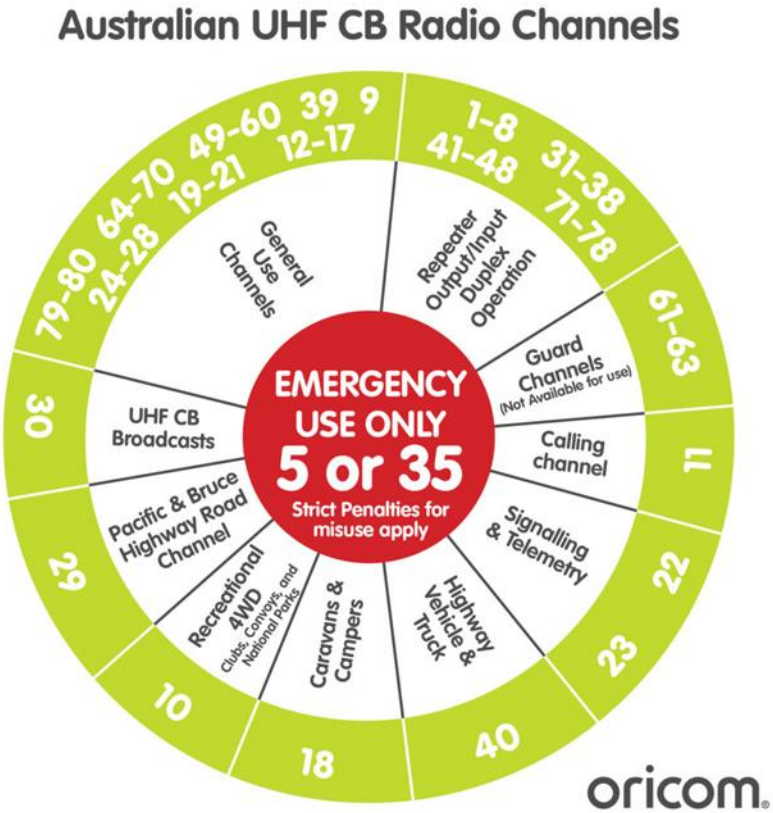
Note: when you press the PTT button (to speak or by mistake), no one in the vicinity of your handheld radio can speak on this channel at the same time. Keep messages short, and carry your radio with the belt clip, not in your pocket.

Also,

- regularly perform radio checks to ensure your radio is in good working condition.
- memorise call signs and locations of persons and radio stations you communicate with regularly.
- Think before you speak:
  - Decide what you are going to say, who you are, and who you want to speak to.
  - Make your conversations concise, precise, and clear.
  - Avoid long and complicated sentences. If your message is long, divide it into shorter segments.
  - Do not use abbreviations unless they are well understood by your group.

Channels

The UHF CB frequency range is now divided into 80 channels, an increase from the previous 40 channels, enhancing the capacity for clear communication by reducing congestion and providing more options for channel selection in both personal and community use.
These channels are outlined for their various applications in the graphic below:



(source: https://oricom.com.au/everything-you-need-to-know-about-uhf-cb-radios-in-australia/)

There are two types of UHF CB channels: general use and specific public information channels.

General use channels:

- You can choose from channels 9, 12 to 17, 19 to 21, 24 to 28, 39, 49 to 60, 64 to 70, and 79 to 80.
- Channel 18 can be used by caravan owners/campers.
- Channel 10 can be by 4WD clubs or convoys. It is also commonly referred to as the national parks channel.
- Channel 40 (and 29 on the East Coast) is commonly used by truck or oversized vehicle drivers.

In our region, a community will typically agree on a channel (or various channels) that is/are the most suitable for their local area. Channels must be assessed by someone that understand two-way radios to prevent interferences.

Specific public information channels:

- Channels 5 and 35 are designated emergency channels, and are not to be used except in an emergency. To make an emergency call, switch your radio to Channel 5 with duplex on, if there is no response, try again with duplex off. Both channels are legislated by the Australian government and are reserved exclusively for emergency use. Any misuse, once proven, can lead to prosecution or substantial penalties. However, those channels are not always monitored, so if no one answers on these, seek to get assistance from anyone who hears you, on any channel.
- Channel 29 is the road safety channel for Pacific Highway and Pacific Motorway: You can use this road safety channel if you want information on traffic or sudden closures or detours on these main roads.
- Channel 11: Call channel used for locating friends – a general meeting point for when communications are lost or beginning, before moving to another channel to 'chat'.
- Channels 22 and 23: Telemetry & Telecommand used for automated data communications only.
- Channels 61-63 are unallocated future channels that can’t be used.

2. How to speak when using a radio

Communicating on the radio can rapidly becoming confusing if clear protocols aren’t use. We use call signs, codes, the phonetic alphabet, and radio language when using UHF radios to ensure clear, concise, and efficient communication.

Remember that radio communications are NOT private. Always assume that someone that you don’t know is listening to your conversations, so communicate accordingly and never transmit sensitive, confidential or financial information.

Phonetic alphabet

Here is the phonetic alphabet used in radio communications:

- **A** - Alfa
- **B** - Bravo
- **C** - Charlie
- **D** - Delta
- **E** - Echo
- **F** - Foxtrot
- **G** - Golf
- **H** - Hotel
- **I** - India
- **J** - Juliett
- **K** - Kilo
- **L** - Lima
- **M** - Mike
- **N** - November
- **O** - Oscar
- **P** - Papa
- **Q** - Quebec
- **R** - Romeo
- **S** - Sierra
- **T** - Tango
- **U** - Uniform
- **V** - Victor
- **W** - Whiskey
- **X** - X-ray
- **Y** - Yankee
- **Z** - Zulu

Radio language

- **Copy that**: Message received and understood – similar to **Ten Four**.
- **Copy so far**: Confirm parts of long message before continuing with rest of message.
- **Affirmative**: Used when a question is asked and the reply is YES.
- **Negative**: Used when a question is asked and the reply is NO.
- **Do you copy?**: Asking another party to acknowledge they understand you.
- **Go ahead** or **Pass your message**: I am ready for your transmission.
- **Say again**: Repeat your last transmission.
- **Say all after/before**: Repeat all after/before a certain key word or phrase.
- **Over**: Your message is finished – invitation for others to respond/transmit.
- **Out**: All conversation is finished – should only be used by the person initiating the call. No answer is required or expected (end just by using “out”, not “over and out”).
- **Radio check**: What’s my signal strength? Can anyone hear me?
- **I copy you loud and clear** (or **I copy you 5 out of 5**): Your transmission signal is good.
- **Wilco:** “will comply”, i.e. I’ll do what you ask of me.
- **Break/Breaker**: Interruption to a transmission to communicate urgently.
- **Emergency, emergency, emergency**: distress call – this is used to tell the network that there is an issue or someone needs help so users need to stop talking.
- **Stand by**: Wait for a short period and I will get back to you.
- **I spell**: The next word will be spelt out using the phonetic alphabet, so get ready to focus on what I’m saying!

Tips for clear communication

- Be polite, keep it short, and acknowledge that you have heard and understood the message.
- Talk across the face of the mic and not directly into it for a clearer transmission.
- Talk at normal volume and don’t blow into the mic when talking.
- Talk clearly and not too fast. If someone is receiving you with a weak signal they may need to hear very clear speech to be able to understand you, so slow down.

When using a radio, you cannot speak and listen at the same time, as you can with a phone. In other words, only one radio transmission will be heard at one time so wait till the airways are clear before trying to talk.

SAFER FUTURE

- STILLNESS IN ACTION -

FOR MORE INFORMATION

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