Emergency Communications for Non-Hams

Amateur radio can provide long range communication (voice or digital) in case of emergency. But for communication within a couple kilometres, there are options that do not require a radio license or certificate.

License-Exempt Devices

The radiofrequency spectrum is a scarce resource. In Canada, ISED regulates its use to prevent interference between different users. With respect to interference, there are two types of users:

1. *Primary* users are given priority of a frequency and are protected from interference.
2. *Secondary* users cannot interfere with primary users, and are not protected from interference.

For voice communications in Canada, CB radios and FRS radios are the two main license-exempt options. However, from ISED FAQ #6:

> It is illegal for consumers to import radio devices into Canada that do not bear a label with an Industry Canada certification/registration number.

License-exempt radios are always secondary users.

Baofeng radios and the likes are illegal to use without the appropriate certificate.

Check if a certification/registration number is valid.

FRS

For voice, FRS radios are the most practical option.

Channels

There are 22 channels in the 462 and 467 MHz band:

In Canada, repeater and high-power operations are not permitted, where as in the US, they are with a GMRS license.

In the US, Channels

Ch.	Frequency (MHz)	Max Power	Ch.	Frequency (MHz)	Max Power	Ch.	Frequency (MHz)	Max Power
1	462.5625	2 W	8	467.5625	0.5 W	15	462.5500	2 W
2	462.5875	2 W	9	467.5625	0.5 W	16	462.5750	2 W
3	462.6125	2 W	10	467.5875	0.5 W	17	462.6000	2 W
4	462.6375	2 W	11	467.6125	0.5 W	18	462.6250	2 W
5	462.6625	2 W	12	467.6375	0.5 W	19	462.6500	2 W
6	462.6875	2 W	13	467.6625	0.5 W	20	462.6750	2 W
7	462.7125	2 W	14	467.7125	0.5 W	21	462.7000	2 W
						22	462.7250	2 W

15 – 22 are shared with licensed GMRS radios.

Each frequency has the same channel number regardless of the device brand.

CTCSS/DCS

To help quiet (squelch) unwanted signals, FRS radios have the option of transmitting a CTCSS tone or DCS code (AKA: “PL tones”, or “sub-audible tones”). These are low “bass notes” or digital information that the radio transmits on top of the voice, but which can't really be heard. If the receiver is configured to expect a specific tone/code, it will keep the speaker squelched unless that tone/code is detected. This is useful to ignore chatter from others on a busy channel, but if two radios with different tones transmit at the same time on the same channel, they will interfere with one another.

K0TFU has a really good article explaining all of this for FRS radios: FRS/GMRS Privacy Codes Demystified, and our own site goes a little deeper in the context of ham radios.

Different brands of radios use different numbers to represent different tones/codes.

By default (and especially in an emergency situation), CTCSS/DCS should be turned off so that your radio can hear everyone.

Choosing a Radio

Here are three restrictions that preclude Baofeng radios from operating on FRS frequencies. From ISED, RSS-210, Annex E:

> - The antenna of FRS devices shall be an integral part of the unit.
> - FRS/GMRS devices shall not:
>   - be designed to interconnect to public switched telephone networks
>   - be designed to transmit data in store-and-forward packet

FRS radios cannot be connected to a better antenna to extend the range, or be able to transmit

operation mode
    - incorporate one or more scrambling features (e.g. encryption, voice inversion, obscuring)
- All frequency determining circuitry, including crystals and programming controls, shall be internal to the transmitter and made inaccessible to the user from the exterior of the device.

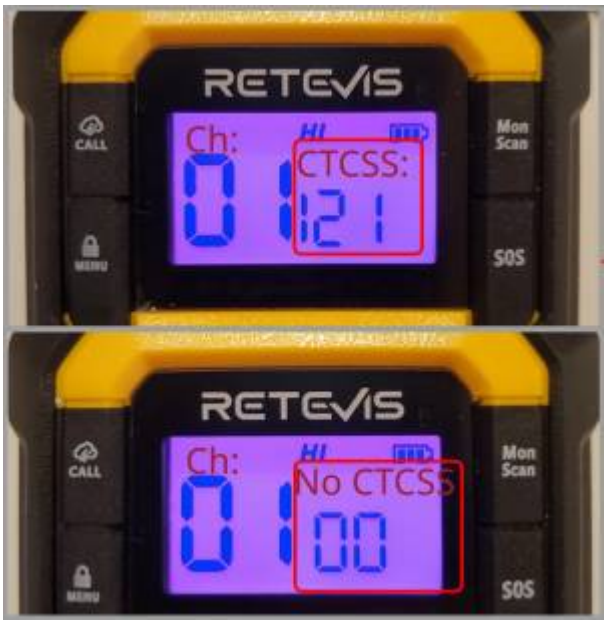
on non-FRS frequencies.

There are a lot of “toy” FRS radios out there, so a good radio will tend to be a bit more expensive. A typical range should be around 1 km or 2 km, but it varies a lot depending on the terrain and elevation. Here's a good explanation of range in the ham radio context.

Wirecutter's top pick (the Rocky Talkie Mountain Radio) is $220 US and their budget pick is $30. The difference is not be range so much as the build quality and ease of use. I personally got a pair of Retevis RB48 for about $100 CAD, but the Backcountry Access BC Link 2.0 also looks pretty sturdy for outdoors use.

First Use Setup

Refer to the user manual for specific instructions, but in general, you should try and:



- Disable the CTCSS/DCS on all 22 channels. On the Revetis RB48, the CTCSS/DCS is represented by a number between 1 and 121 (on the right). The number 0 means that CTCSS or DCS is disabled.
- A Roger Beep is a short chirp that's transmitted when you let go of the PTT button to indicate that you're done talking. It can be pretty annoying for others and you should turn it off.

- VOX is an option to transmit without pressing the PTT. You should turn that off unless you have a good reason for using it since you could transmit without meaning to.

MeshCore

From Wikipedia:

> MeshCore is an open-source mesh networking protocol and software platform designed for off-grid, low-power text communication using LoRa (Long Range) radio technology. The system enables decentralized, multi-hop wireless messaging without reliance on cellular networks or internet infrastructure.
>
> Use cases include emergency and disaster communications, outdoor and remote activities, [...] and experimental and educational deployments of low-power mesh networking.
>
> [It] is designed to [...] operate in unlicensed ISM frequency bands such as 868 MHz and 915 MHz, depending on regional regulations.

The basic idea is that you get a small *companion device* that you pair to your cell phone via bluetooth, and via that device, you can text others or post public messages using the 915 MHz band, all without a special license.

See this page for more information on how to get started.