

GMRS and FRS Radio Services

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As Amateur radio operators know, when on outings, group conversations at a distance can be challenging using cell phones. Cell service may be limited or non-existent. When there is service, group conversations during group activities using cell phones is awkward. Using push-talk radios is a much simpler means of doing group conversations. Using these radios in an extended environment, may include persons who are not Ham radio literate, so I have oversimplified these instructions to hopefully talk directly to them.

To fill this need, the FCC has established a mobile radio service tailored to families. It is called General Mobile Radio Service (GMRS). The FCC has allocated 30 channels in the UHF frequency band just for this family oriented GMRS service. The radios can talk across the valley 30 miles or more with unobstructed views. With increasing obstructions, the distance will diminish. Generally, you can expect to talk at a distance of a mile or more in denser forests. However, this service also supports use of repeaters to provide more dependable long-distance communication.

There are actually two family oriented services provided by the FCC. One is the more limited original Family Radio Service (FRS) and the newer GMRS. The FRS does not require a license. It includes channels 1-14. GMRS, which does require a license, expands on this to include 16 additional channels: 15-30. Channels 23-30 are repeater channels.

GMRS License

GMRS service does require an FCC license. However, it requires only one license which is good for all extended families. The GMRS definition of family is very broad and liberal, and there is no limit on the number of radios that can be allocated to one license. The GMRS family license fee is \$35.00 and will need to be renewed every 10 years. You can still legally talk on FRS channels 1-14 without a group GMRS license. When using GMRS channels, the GMRS call sign should be given over the radio when ending a conversation, or once about every 15 minutes during an extended conversation.

FRS/GMRS Channels

1) *Simplex Channels*

- a.** FRS Channels 1-7 use full 5 watts of transmitting power. These are better for communicating over longer distances.
- b.** FRS Channels 8-14 use low .5 watts of transmitting power, limiting their use over shorter, less obstructed distances.
- c.** GMRS Channels 15-22 allow full 50 watts of transmitting power. Handheld radios are only able to use up to 5 watts of the 50 watts, due to physical battery

limitations. These 8 channels share their frequencies with repeaters. (see GMRS repeaters list below)

2) *GMRS Repeater Channels* (duplex channels)

a. Repeater channels are called duplex, because they transmit on one frequency and listen on another frequency (duplex). Repeaters and radios on these channels may transmit using up to 50 Watts.

b. Channels 23-30 are reserved for use with repeaters, which share frequencies with simplex Channels 15-22. (see GMRS repeater list below)

GMRS Repeaters

Normally, GMRS radios will talk directly to each other over one of the 22 simplex channels. Use of repeaters is optional but can be useful when attempting to communicate over longer distances. When using repeaters, it is important to use your family GMRS call sign.

a. Repeaters located at strategic locations may provide better communication between radios at greater distances or in areas with obstructions. These repeaters use up to 50 watts of power. Two GMRS HT radios that might experience difficulty talking to each other over the simplex channels (1-22) because of obstructions or distance between the radios, may connect instead over a local repeater on one of the repeater channels. This will usually provide a clear and dependable signal between the radios.

b. There are 8 repeater channels (23-30). Repeaters in different towns or other rural locations may use the same 8 repeater channels. However, because they are widely separated from each other, they don't usually interfere with each other. GMRS repeaters in St. George, may use some of the same channels as other repeaters in the Wasatch Front for example.

c. To talk to repeaters, your radio must transmit an inaudible tone code, that allows the repeater to hear you. Repeaters ignore all transmissions on their channel that does not send the tone code with each transmission. Different repeaters in overlapping areas may use the same channel but use a different tone. So, you may need to adjust the tone on your radio to match the tone of the repeater you want to talk through. (See GMRS repeater list below)

MyGMRS.com

a. GMRS repeaters across the country are listed online at:

https://mygmrs.com/browse?name=&location=&state=&frequency=&output_tone=&input_tone=&type=&ori=&travel=&sort=State&step=25

- b.** To use a repeater, you will usually need to get permission from the repeater owner/manager, using the family GMRS callsign. With permission, you will be given the repeater tone code, which you can program into that repeater channel. Some few repeaters may list the code in their repeater entry. They do not require permission.
- c.** To use MyGMRS properly, you will need to log in with your GMRS call sign. Since all family members will be using the same call sign, all will then be able to log in using that callsign to see more details about the repeaters.
- d.** In the Search pane, you can select various search options, including a state. *When using this list, you will want to press the VFO/MR button to show the frequencies instead of the channel names, as the list shows only the frequency of each channel, rather than the channel name.*
- e.** Enter repeater tones only in the repeater channels 23-30. Though channels 15-22 have the same frequencies, *do not set tones to them.* They share simplex with the repeaters (duplex) on that same frequency.
- f.** Tone 141.3 is called a Travel Tone. It is a tone used commonly across the country for the convenience of travelers.
- g.** Some repeaters on the same repeater channel may service overlapping areas. Each such repeater will use a different tone code. This allows each repeater to ignore traffic on other repeaters using the same frequency/channel.
- h.** Since the simplex channels 15-22 share the same transmit frequencies with the repeaters, if you choose one of the simplex channels, and somebody is talking via a repeater on the associated repeater channel with the same frequency, you will hear that traffic, but the repeater will not hear you. If a repeater channel is busy on the same frequency as the simplex channel you are on, you can switch to another shared simplex channel which is not busy.

Programming Software

A general Amateur radio software to program the radios is called “Chirp.” It has versions for Windows and for Apple Mac. Go to the link below and choose the version for your computer.

[Chirp](#)

Recommended Radio Brand/Model

Baofeng UV-5X (UV-5G) GMRS radio comes highly recommended in the Amateur radio community. It is inexpensive and well featured and includes both FRS and GMRS. It is also able to converse through GMRS repeaters.

Using the radio

This radio was converted to a GMRS radio from an Amateur class Radio. Because of this, it has more capabilities than a simple GMRS radio. One important feature of this radio is that it can also talk through a repeater. Many GMRS radios cannot do this. The radio user manual makes understanding the radio seem complicated, because it talks about features beyond those needed just for GMRS. So, I have provided a very basic GMRS user manual here. This radio also includes a number of NOAA weather channels. You can download a digital version of the manual from this site: [User manual](#)

Accessories

Refer to page 9 of the manual for instructions on installing the optional belt clip, lanyard, and speaker/ microphone accessories.

Charging and storing the battery (pages 7-8)

Pay particular attention to the following items:

- a. Section 2.5-a (80% - the battery charge indicator is down 1 dot from a full charge)
- b. Do not leave the radio in the charger for more than 6 hours (page 8, second paragraph)
- c. Battery charge level icon is displayed in the top right corner of the display.
- e. Recharge the battery every 2-3 months when not being used.
- f. Recharge the battery soon after using the radio . Don't let it sit for several days without recharging it after use.
- g. Recharge the battery to full charge before taking it out for a planned outing. When using the radio for several days in a row, recharge overnight.

Radio Overview (pages 10-11, 13)

Refer to these pages in the manual as needed to understand the following instructions for using the radio.

Buttons and controls of the radio (basic controls)

This simplified manual discusses only those controls needed for basic GMRS use. The button/display numbers reflect the numbers used to describe each button/screen feature in the manual.

3. Power/Volume knob

4. Two-line display

The screen display shown on page 11 shows a non-GMRS display for more advanced uses, which we don't need for simple GMRS use. When you turn on the radio you will see GMRS1 in the upper display and NOAA1 in the lower display. This radio can monitor two channels simultaneously. Both the upper and lower banks can be tuned to any GMRS or NOAA channel.

12. A/B Select Key

- a.** Pressing this key will switch the active channel between the upper and the lower (A and B banks) displays. Be sure the displayed GMRS channel is active before transmitting on GMRS. You cannot transmit on the NOAA channels.
- b.** The active display is indicated by the small triangle just to the left of the channel name.
- c.** Changing channels can be done only in the active bank.
- d.** There are 30 GMRS channels to select.
- e.** There are 11 NOAA channels to select. When a bank is selected for a NOAA channel, it will provide weather alerts even when it is not the active channel.

7. PTT key

- a.** Push-To-Talk key to transmit on the selected GMRS channel. You cannot transmit on the NOAA channels.
- b.** Release the key when done talking to listen (monitor) again.

13. Keypad

For basic GMRS use, you will only need to use 3 of the keys.

a. Up and Down arrow keys

Use these key to change channels up or down.

b. #/key icon key

This key toggles the keypad between locked and unlocked modes. When not changing channels, it is helpful to lock out the keypad to avoid accidental selections on the keypad, such as inadvertently changing

channels, or changing the active bank. It only disables the keypad. The PTT button will not be locked.

- To lock the keypad, press and hold the # key for 2 seconds.
- To unlock the keypad, press and hold the # key for 2 seconds.

8. VFO/MR button

You will not normally use this key, but you need to understand what it does. This button toggles between VFO mode (display frequencies) and Channel mode (display channel names). The default mode is Channel mode. If you unintentionally toggle the display to frequency mode, press it again to toggle back to Channel mode.

6. Monitor Key

In basic use, this key turns on the LED flashlight. 1st press – Light on steady, 2nd press – light flashes. 3rd press turns off the flashlight.

Squelch (SQL) display icon shows the “Antenna/SQL” level in top-left corner of the radio display, display an antenna icon and a standard progressive bar (0 bars to 5 bars). It displays when transmitting or when receiving.

- a.** This icon displays the squelch level. Squelch allows you to reduce background noise on the channel. The default SQL level is 5. If you do need to reduce noise on the channel, the easiest solution will often be to agree with others in the talk group to switch to a different channel. Increasing SQL will reduce noise and sensitivity.
- b.** To adjust the squelch level, press the Menu key once and adjust the level up or down with the up and down arrow keys on the keypad. The squelch level is displayed next to the Antenna Icon as standard signal strength bars.
- c.** When done adjusting the squelch, press the Exit key on the keypad to exit from the Menu.
- d.** Adjust the level up just enough to eliminate the background noise and no more.
- e.** As the squelch level is increased, weaker signals will be ignored. So, it is best to keep the squelch level at 0 (no bars) when possible.

Corrections to the manual

The manual correctly defines the use of the “* SCN” key on page 14. But when the manual talks about scanning, it says to press the “Menu” instead of the “* SCN” key to begin the scan. [page 18: 6.3 and 6.4]

Transmitting

Hold the Transmit button (7) down to talk. While transmitting, hold the radio to the side of your mouth rather than directly in front of your mouth, so you do not speak directly into it. Speaking directly into the mike may cause breath and popping sounds. Hold the radio so your mouth is within 1-2” from the mike. The mike is located just above the A/B button.

Setting a repeater tone code

- 1) On your radio, press the *Menu* key on the keyboard
- 2) If *T-CTCS* is not displayed, press the Up-Arrow key until you see T-CTCS displayed in the window (slot 13).
- 3) Press the *Menu* key again to select the tone code.
- 4) Press the *Up* or *Dn Arrow* key until you see the tone the repeater uses.
- 5) With the tone selected, press the *Menu* key again to save the selection.
- 6) Press the *Exit* key to exit the menu.

You are all set to start talking through the desired repeater.

GMRS Repeater List for Utah

Select strategic GMRS repeaters available in Utah.

County	Channel Frequency		Name	Tone
Cash				
Bear Lake	27	462.650	Rprt 5	Pending
Hyrum ¹	26	462.625	Rptr 4	Pending
Logan (River Heights)	23	462.550	Rptr 1	Pending
Logan North	24	462.575	Rptr 2	Pending
Tremonton (Riverside) ¹	29	462.700	Rptr 7	Pending
Smithfield ¹	30	462.725	Rptr 8	Pending
Davis				

Farmington	26	462.625	Rptr 4	141.3
Ogden	30	462.725	Rptr 8	Pending
Syracuse	25	462.600	Rptr 3	Pending
Iron County				
Cedar City	26	462.625	Rptr 4	141.3 (tentative)
Millard				
Fish Lake Nat Forest	30	462.725	Rptr 4	Pending
Salt Lake				
Oquirrh (W. SL Valley)	23	462.550	Rptr 1	Pending
This is the Place Park	23	462.550	Rptr 1	Pending
Salt Lake City	25	462.600	Rptr 4	Pending
San Juan				
Monticello (Abajo Peak) ²	29	462.700	Rptr 7	Pending
Sanpete County				
Manti	28	462.675	Rptr 6	141.3
Tooele				
Grantsville	25	462.600	Rptr 3	Pending
Strawberry Reservoir				
Strawberry Reservoir	29	462.700	Rptr 7	141.3
Utah County				
Orem (SCATeam)	27	462.650	Rptr 5	131.8
Springville	28	462.675	Rptr 6	167.9
Eureka	29	462.700	Rptr 7	Pending
Washington				
Hurricane	25	462.600	Rptr 3	Pending
Pine Valley (Vejo)	26	462.625	Rptr 4	141.3
St George (Little Valley)	25	462.600	Rptr 3	141.3 (tentative)
Santa Clara	23	462.550	Rptr 1	141.3

- 1 Linked GMRS Repeaters: Hyrum, Preston, ID, Smithfield, Fruit Heights, Tremonton (Riverside). Covers a very wide area from Malad City, ID to North Ogden
- 2 Elevation: 10,500' west of Monticello; Linked to San Juan GMRS repeater system; Covers much of San Juan County.

Washington State

For those who may have family in Washington State, as do I, I have included a few select strategic GMRS repeaters around the state of Washington. Check with the MyGmrs.com link above to see more repeaters in Washington, Oregon, and Idaho.

City/Area	Channel			
Bellingham	23	462.550	Rptr1	Pending
Badger Mountain (Waterville)	30	462.725	Rptr8	Pending
Colville ERC	30	462.725	Rptr8	Pending
Colville Reservation ¹	24	426.575	Rptr2	Pending
Colville Reservation ¹	23	462.550	Rptr1	Pending
Cultus Mountain (Skagit Bay area)	23	462.550	Rptr1	Pending
Portland, Oregon (Camas)	25	464.600	Rptr3	Pending
Seattle (Cap Hill 600)	25	464.600	Rptr3	Pending
Spokane	26	462.625	Rptr4	Pending
Spokane Valley (KC7GKY)	23	462.550	Rptr1	Pending
Spokane Valley ERC	29	462.700	Rptr7	Pending
Coeur D'Alene, Ida ³	28	462.675	Rptr6	77.0

- 1) Located in the mountains just west of Pollard and Curlew Lake State Park. It is purported to Cover a very wide area from north well into British Columbia Canada to Spokane in the south, including Priest Lake, Sand Point, to just north of Moses Lake including Coulee Dam and west to Stehekin, WA, Located at coordinates: 48.728910, -118.698904, with a radius of over 100 miles.
- 2) Covers a radius from west of Spokane to east of Coeur d'Alene, Idaho, including Deer Park, Airway Heights, Rathdrum, Spirit Lake, Post Falls, Idaho, and south to Plummer, Idaho. Parts of CDA and CDA Lake are obstructed by mountains.
- 3) Includes CDA, north CDA Lake, Post Falls, Rathdrum, and Hayden. Linked with Spokane GMRS repeater ch 26 and Cheney repeater ch 28.