

Los Angeles Fire Department
ACS - Auxiliary Communications Service

FRS Radios - Family Radio Service
GMRS Radios- General Mobile Radio Service

A Brief Lesson – Version dated 08/05/07

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Introduction

FRS/GMRS radios are low power, inexpensive handheld and mobile radios. Despite their relative simplicity and low cost, they can be quite effective for local emergency communications. To maximize their effectiveness, the operator must be familiar with their radio and competent in its use. No license is required for FRS use, while GMRS users must possess a GMRS license.

Power

The FCC limits maximum power to 2-watts on FRS radios and 5-watts on GMRS handheld radios. GMRS mobile radios can transmit with as much as 50-watts. With the rule changes in 2017, manufacturers must decide whether new radios are FRS or GMRS. Combined FRS/GMRS radios are no longer allowed. Radios manufactured prior to the change are classified as FRS if their maximum power is 2-watts or less, or GMRS if their transmit power exceeds 2-watts. As you can see, GMRS radios can be substantially more powerful and will enable longer range communications. But GMRS radio batteries don't usually last as long because they're putting out more power.

Frequencies

The FCC made substantial changes to FRS and GMRS radio services in 2017. The two services now share all 22 basic channels. That means that unlicensed FRS users can communicate with licensed GMRS users on all 22-frequencies, which is excellent for interoperability.

There is no official standard for channel numbering. Most radios number their channels from the lowest frequency to the highest. That said, some manufacturers don't follow that scheme so it's important that you know how your radio is set-up. When working a drill or actual incident, it's critical that you compare your radio's set-up with others on your team.

GMRS radios are also allowed to use repeaters. Repeaters are special radios, usually located on high buildings or mountaintops that can receive signals and "repeat" them, usually at higher power and with the advantage of antennas mounted at high locations. Repeaters can significantly increase the range of GMRS communications. It should be noted, however, that repeaters may not be available following a disaster.

Range

The range of FRS and GMRS radios varies significantly dependent on your radio, location, and other factors such as weather. Both radios use the UHF band, which generally has a moderate range but penetrates objects (walls) fairly well.

Relays

An important skill for radio operators to learn is how to relay messages. If the sender can't reach their recipient but they can reach you and you can reach the recipient, you can relay the message. Relayed messages should be relayed exactly as received. You're simply a conduit for the message.

They will work closer to rated range from hilltop to hilltop, or anywhere with an unobstructed view between the radios. The range is shorter when there is uneven terrain. Things such as buildings, hills, trees, etc. will severely limit your range. When using the radio inside of a car your range will be significantly limited by the metal shell of the car. While FRS radios are limited to the factory installed antenna, many GMRS radios allow user to substitute a higher gain antenna. For vehicle use, a magnetic mount antenna placed on the car's roof can dramatically improve your radio's range. The bottom line is that, generally, the actual range of FRS and GMRS radios will be significantly less than advertised.

Choosing a Radio

Radio choice is really personal. You need to match the radio with your needs. This means taking some time to seriously consider how you're going to use the radio. Here are some considerations:

- FRS or GMRS - FRS requires no license but is limited to 2-watts transmission power and a fixed antenna. Expect reliable communications over 1-mile or less, but your mileage will vary. GMRS requires a license but allows up to 5-watts (handheld) or 50-watts (mobile). Many GMRS radios allow for a higher performing antenna. Some GMRS radios can operate with repeaters, greatly expanding your range.
- Batteries - Most handheld radios come with rechargeable batteries. Some also offer the ability to use disposable batteries. While rechargeable batteries are convenient, you may find it difficult to charge them in an emergency. In addition, rechargeable batteries have a life expectancy of a couple of years. On the other hand, having the ability to use disposable batteries offers you flexibility. Most of us have a bag of AA batteries in our Go Kits. Disposable lithium batteries are a bit more expensive but have an incredible shelf life and work better in extreme temperatures, as well.
- Speaker-Microphone - Speaker-mics are available for most current handheld radios. Speaker-mics are not only convenient but they also can provide for better performance since they allow you to hold the radio above your head while talking into the speaker-mic. Even a few extra feet of antenna height can be the difference between getting your message through or not.
- Cost - Like it or not, most of us have a budget. That said, having good communications could be a life-or-death situation.

Setting-up Your Radio

Every radio is different. It's best to read and understand the user manual for your radio. Here is the set-up for a Motorola Talk-About radio. Many of the other "blister pack" radios are similar.

- Turn the radio on by rotating the knob on top of the radio clockwise. This knob also adjusts the volume level.
- The display screen shows several things. Most importantly, it shows the battery status (similar to a cell phone), channel number (large number), and privacy tone number (small number). The item selected will flash indicating that that function is ready to be changed.
- Channel Change - To change the channel, press the menu button once, then use the +/- buttons to move up or down through the available channels. Press the P-T-T to save.
- Privacy Tone Change - To change the privacy tone, press the menu button twice, then use the +/- keys to move up or down through the available tones. "0" means no privacy tone is set. Press the P-T-T to save.

Setting-up Your Radio (continued)

- Other Settings
 - Call Tones - Trigger a tone on receiving radios that a transmission follows. It is recommended that all tones, including call tones, be silenced.
 - VOX - Vox, or voice activation triggers the P-T-T at the sound of your voice without having to push the button. VOX is generally not used in emergency communications due to the risk of transmissions inadvertently caused by nearby sounds.

Transmitting and Receiving

On the left side of the radio (looking at the front) is the PTT – Push to Talk button. Grasp the radio from the back so that you can easily press the PTT button. Locate a small hole on the front of the radio. This is the microphone hole. The other group of holes is the speaker.

Think about what you are going to say before you transmit and listen before pushing the P-T-T button. Make your transmission as brief as possible. Others may be waiting to use that channel.

To transmit, press and hold the PTT button. Wait one second for the radio to transmit the call tone, and then speak across the front of the radio, near the microphone hole. Speak in a normal voice as if you were speaking on the phone. Speaking too loudly will distort your signal.

Release the PTT button when finished speaking so that you can hear the reply. The speaker on your radio will be muted when you are transmitting.

Communication Protocols

Transmitting

When transmitting, start by listening. Make sure the channel is clear. Once you're sure it's clear press your Push To Talk (PTT) button for at least one half second, or more, to allow your radio to start up and for your signal to reach the other radios. First say who you are calling then who you are. This can be your name, your GMRS call sign, or a tactical call sign. Tactical call signs are names that represent a location or a function, for example Incident Command or Net Control. Remember, you may be sharing this channel with others, so the tactical call sign should be specific. Tarzana Incident Command is better than Incident Command. Chatsworth Search Team 1 is better than Search Team 1.

Your transmission might sound like "Tarzana IC, this is Tarzana Search Team 1". As you get more confident on the radio, it might sound like "Tarzana IC, Tarzana Search Team 1".

Wait for a reply before transmitting your information or request. If you do not receive a reply, repeat the call every few minutes or so until you do get a reply. The person you're calling may be extremely busy and can't respond to you right away. Don't call continuously. If the person you're calling is too busy to answer, continuous calling will just encourage them to lower the volume on their radios. Wait a minute or so between calls unless your call is an actual emergency call. If it IS an emergency call, say so. "Tarzana IC, Tarzana Search Team 1 with emergency traffic"

It may be helpful for you to identify the type of message you have, for example, if the recipient needs to have a specific form ready. It might sound like, "Tarzana IC, Tarzana Search Team-1 with an infrastructure report."

If you don't receive an answer after four or five attempts, perhaps your radio is not reaching the person you are calling. First, make sure that you're holding your radio so that your antenna is vertical. Best signal results when both the transmitting and receiving antennas are vertical. Try moving to a new position, higher if possible, and move away from metal and concrete and other material that can block or scatter your signal.

After you receive a reply, transmit your information or request.

Keep your transmissions as short as possible. Think about what you need to say before you start your transmission. P-T-T means Push-To-Talk not Push-To-Think! Decide on the shortest, clearest way to say what needs to be said. If the recipient needs to write your message down, speak *v-e-r-y s-l-o-w-l-y!* Once you've transmitted what you need to say, stop transmitting, release the P-T-T and wait for your party to reply. They may need to think about what you said, and it may take a moment for them to reply. If the person you're calling is using good radio protocol, they will respond as soon as you've reached them and let you know that your message was received. If the receiving party missed something, they should have you repeat only what they missed. It might sound like "say again after 5th and Main". Repeat only what they've asked for. This makes the channel available sooner for other traffic.

Spell any words that might be confused using the Phonetic Alphabet. It might sound like "Cahuenga Blvd., I spell Charlie, Alpha, Hotel, Uniform, Echo, November, Golf, Alpha"

If the other party asks a question and you need a moment to think about the reply, or you need to gather the requested information, ask them to wait by saying their designation followed by 'standby' or 'please standby'.

Some radios send a tone to indicate that you have released the PTT button and have ended that portion of your transmission. Those tones can be quite distracting and it's recommend that you disable them. To indicate that you're done say 'over' at the end of each portion of your transmission. If your transmission is complete say your tactical call sign to indicate you're done.

If you're a GMRS operator, you must say your call sign every 15-minutes during a conversation and at the end of a conversation. Using your call sign at the end of a transmission also lets the other party know you're done. While not legally required, it's good practice to use your call sign at the beginning of a transmission. Use of tactical call signs does not relieve you of the duty to say your FCC Call Sign as indicated above.

Receiving a Transmission

When you hear your designation being called, push the PTT button and respond by saying the designation of the calling station followed by the word 'go' or 'go ahead'. Release the PTT button. This lets the calling party know that they have gotten your attention and you are ready to listen to their information or request.

If you have received the information or request clearly and wish to respond with a positive response, you can say, 'understood,' 'roger' or 'copy'. If you don't understand any of the message say "say again" or if you need part of the message repeated say "say again after (the last thing your understood) or "say again between (two parts you did understand. Terms like 'affirmative' and 'negative' should be used to answer yes or no questions, not for acknowledging receipt of a message.

Obtaining a GMRS License

GMRS licenses are issued for a ten year period. The cost as of May 2022 is \$35. GMRS licenses are family licenses, which means that an entire family can use one license. Remember, however, that the licensee is responsible for all family members using their license. Make sure everyone you authorize to use your license knows and follows the FCC rules. Better yet, allow them to use the license only under your supervision.

RADIO USE IN AN EMERGENCY

When any radio user declares that they have an emergency, all other radio operators must stop any transmissions immediately. Other operators should listen to the emergency traffic and respond only if they can assist the operator who has declared an emergency.

PRIVACY IN RADIO TRANSMISSIONS

There is no privacy in radio transmissions. Anyone with the proper radio receiver can listen to what you say. Accordingly, it is important to carefully screen what you say over the air.

- Never use a victim's name or specific medical condition over the air. Provide only the minimum information needed to get the assistance needed. Your transmission might sound like "Tarzana IC, Tarzana Search Team-1. I have a 25-year old female, conscious and breathing, complaining of severe back pain. Requesting an EMS resource."
- Avoid transmitting telephone numbers, email addresses, and other personal information. Your Incident Commander should have collected that information prior to deploying you.

The bottom line is to respect the privacy of all people that you come in contact with.

Use of GMRS Frequencies by Unlicensed Users in an Emergency

It is illegal for an unlicensed radio operator to use frequencies that require a license. The only exception in the FCC rules is that licensed AMATEUR Radio Operators may use any frequency available to them if a life threatening emergency exists and no other method of communication is available. Should you decide to use frequencies for which you're not licensed, you should document the circumstances that lead you to use the frequencies. That way, in the unlikely event the FCC questions what you've done, you're prepared to respond. Under no circumstances should you interfere with Public Safety Communications!

GMRS TYPE ACCEPTANCE

While many radios can be programmed to work on GMRS frequencies, FCC rules clearly state that all radios used in the GMRS radio service must be Part 95 certified (type accepted) for that use. That means that Part 90 (commercial) and Part 97 (amateur) radios may not be used on GMRS frequencies despite being physically capable of doing so. Up until a few years ago, this presented a real problem since there were very few, if any, type accepted GMRS radios available. With the 2017 rule changes, interest in GMRS has significantly grown and radio manufacturers have responded with many new GMRS radios. Many very good GMRS handheld and mobile radios now exist offering GMRS operators good choices.

PRACTICE, PRACTICE, PRACTICE!

The single most important thing to do with your radio is to practice. That's the only way to be prepared to be a competent communicator. The stakes are too high, and the stresses too overwhelming to try to learn when an emergency strikes. Many CERT Teams have local FRS-GMRS weekly or monthly Nets. Join in. Participate in drills as often as possible and volunteer to be the radio operator. Read your users manual. It's always a good idea to carry either a paper version of your manual or an electronic copy on your phone.

Listen to your local police and fire radios. Hear how the Fire Captain radios the incident size-up. Listen to air traffic control. ATC and pilots are generally very good at concise radio transmissions. These all can be heard on scanner apps on your phone or online at broadcastify.com/listen. A good example is Captain Sullenberger's audio at <https://www.youtube.com/watch?v=mLFZTzR5u84>