

Effective Handheld Radio Communication in Emergencies

A Guide for CERT and GMRS Operators

Woody Phillips KJ7YYI / WRMK486
GEMCOM / PS-CERT / PSNRW



Background

Full time Strawberry resident since 2013, Retired Technology Industry Executive, USAF Veteran – 304x1 Ground Communications / Flight Facilities, Training Manager for Gila County Emergency Communications (GEMCOM) 2023-2024, Licensed Amateur Radio Operator (KJ7YYI), licensed GMRS Operator (WRMK486), Founder of PSNRW, PS-CERT volunteer – Radio Communications.

Effective Handheld Radio Communications in Emergencies

A Practical Guide to Using YOUR Radio - 2026

Introduction

This is a short course on how to communicate using hand held, and sometimes mobile, 2-way radios during an emergency in Pine and Strawberry. It is specific to radios used by CERT, and FRS and GMRS radios used by the general public, with an emphasis on PSNRW volunteers.

CERT – Community Emergency Response Team. A FEMA organized group of local volunteers sponsored by the Gila County Sheriff and working closely with the Pine Strawberry Fire District. PSCERT.com

PSNRW – Local residents volunteering to use their own FRS and GMRS radios as part of the *Pine Strawberry Neighborhood Radio Watch* which conducts training, helps with programming radios, and operates a weekly net for practice, education, and fun. PSNRW.ORG

The Mission

Provide clear, concise, messages during an emergency to the proper personnel in a timely manner.

CERT & PSNRW volunteers **may** be part of a communications network when participating in an emergency response, whether you are serving as a runner, or coordinating multiple teams as a Net Control Operator. Having some basic familiarity with communications modes and techniques and an overview of how CERTs fit into the communications plan will go a long way towards ensuring that CERTs remain a part of the solution, rather than complicating the problem.

The Plan

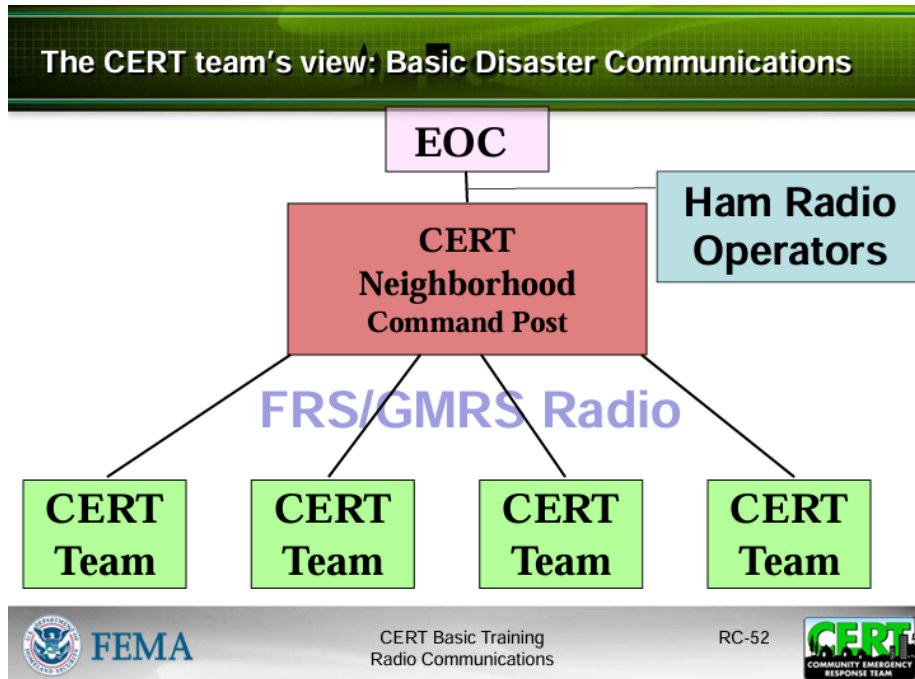
A ***Pine Strawberry Community Radio Response Plan*** has been developed for use by Pine Strawberry CERT and Pine Strawberry Neighborhood Radio Watch. This plan is able to expand or contract as necessary to allow community volunteers to communicate effectively with each responding component whether that is just a single CERT team, the Local Fire or Sheriff's Department personnel, or the County or State EOCs. The plan is meant to be executed by trained operators and managers, but relies heavily on **YOU!**

Importance of Communication: During an emergency, effective communications is one of the greatest logistical problems. Without effective communications, first responders, including CERTs, will not know where to respond or what to expect. Without well-coordinated communications, an emergency response organization will be unable to effectively coordinate its resources. Without clear communications, responders may misunderstand a situation, responding to the wrong location or responding unprepared for the actual situation.

Worse, if communications fail, first responders may find themselves in danger for which they are unprepared.

Handheld Radios as a Vital Tool: The proliferation of small handheld radios operating in the Family Radio Service (FRS) and the General Mobile Radio Service (GMRS) make them a popular choice for back-up neighborhood communications. Such radios have relatively low cost and are widely available. Plus, they operate in a similar way and over the same distances as the commercial radios used by CERT and this interoperability can save time when speed is a critical element. CERT and FRS/GMRS operators may be invaluable during emergencies when the normal methods of communications are not working. Even without leaving home, these operators can provide vital information in emergency situations.

Expect to Communicate on a NET: Anytime there are more than 2 operators on a frequency, you are probably going to find yourself talking on a network. This means one station is Net Control and literally “controls” the communications between the participating operators. An EXCELLENT way to get familiar with operating on a network is to practice. *Locally, every Saturday evening at 7 PM on GMRS Channel 19R (see ICS-217A program no. 3 - PS-CERT), the PSNRW holds a Net for just this purpose.*



IT IS THE MESSAGE THAT IS IMPORTANT! If cell towers or phone lines are working, and you need to call 911, DO SO! If, it is more expedient or effective to use a runner, do that (Kids on bicycles can be excellent runners). Don't just reach for the radio because you have one. Use the BEST method for the situation.

Basic Radio Operation

Know Your Radio(s): READ THE MANUAL! Be sure you know how to turn your radio on and off, how to change the frequency or channel, and even how to add a frequency when in the field.

Anatomy of a Handheld Radio:

Push-to-Talk (PTT): Press and hold while speaking, release to listen. *Be sure to pause for a breath before speaking so you do not cut off the first syllable.*

Microphone Positioning:

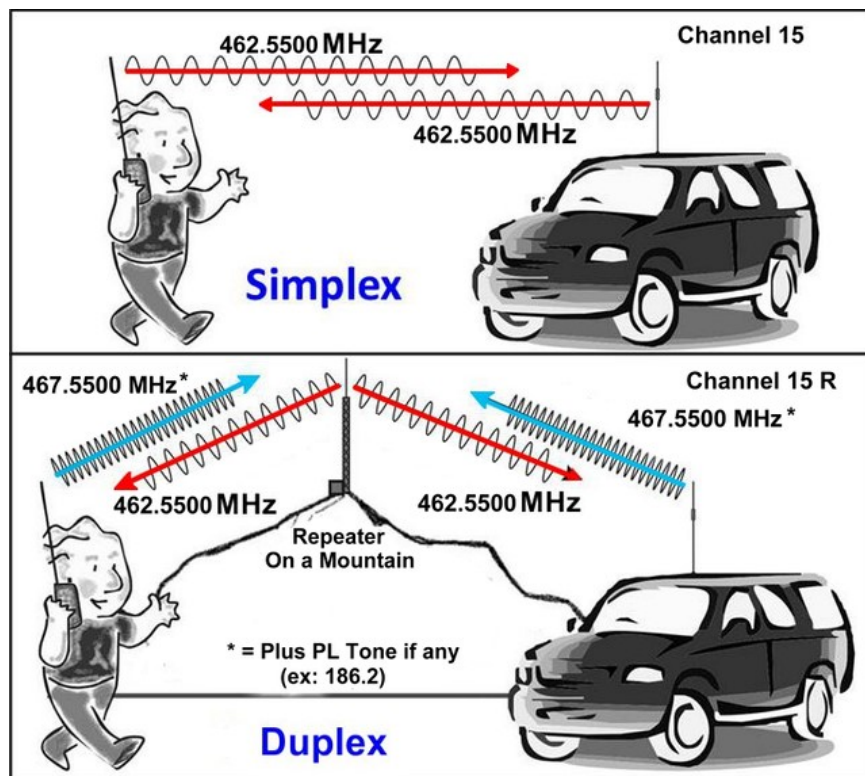
- Hold the microphone away from your face about 2 to 4 inches to the side of your mouth
- Talk across the microphone, not into it
- Speak in a normal voice
- Don't raise your voice
- Use clear pronunciation
- If adjacent noises obscure your speech shift your location. Don't talk louder.

How To talk on a Radio <https://youtu.be/C896Lpgre8c?si=cYEEKAKwDE7TVUFA>

Summary of Content

1. Press PTT throughout Transmisson
2. Hold Microphone 2 - 5 cm from mouth
3. Talk past microphone - not straight into it
4. Don't rattle the microphone
5. Avoid noise around microphone
6. Speak clearly

Repeaters versus Simplex



GMRS Frequencies Versus CERT Public Safety Frequencies

The CERT issued radios are Type Certified for Public Safety Frequencies. They can also be legally used on GMRS frequencies. GMRS radios are type certified for GMRS ONLY and should NOT be used on CERT frequencies. Since we have over 30 licensed GMRS operators in Pine and Strawberry, our Community Radio Response plan relies heavily on GMRS frequencies (see *Appendix C – Introduction to GMRS*)

GMRS/FRS Frequency Chart

Channel	Frequency	FRS Power	FRS Bandwidth	GMRS Power	GMRS Bandwidth
01	462.5625	2 W	12.5 kHz	5 W	25 kHz
02	462.5875	2 W	12.5 kHz	5 W	25 kHz
03	462.6125	2 W	12.5 kHz	5 W	25 kHz
04	462.6375	2 W	12.5 kHz	5 W	25 kHz
05	462.6625	2 W	12.5 kHz	5 W	25 kHz
06	462.6875	2 W	12.5 kHz	5 W	25 kHz
07	462.7125	2 W	12.5 kHz	5 W	25 kHz
08	467.5625	0.5 W	12.5 kHz	0.5 W	12.5 kHz
09	467.5875	0.5 W	12.5 kHz	0.5 W	12.5 kHz
10	467.6125	0.5 W	12.5 kHz	0.5 W	12.5 kHz
11	467.6375	0.5 W	12.5 kHz	0.5 W	12.5 kHz
12	467.6625	0.5 W	12.5 kHz	0.5 W	12.5 kHz
13	467.6875	0.5 W	12.5 kHz	0.5 W	12.5 kHz
14	467.7125	0.5 W	12.5 kHz	0.5 W	12.5 kHz
15	462.5500	2 W	12.5 kHz	50 W	25 kHz
16	462.5750	2 W	12.5 kHz	50 W	25 kHz
17	462.6000	2 W	12.5 kHz	50 W	25 kHz
18	462.6250	2 W	12.5 kHz	50 W	25 kHz
19	462.6500	2 W	12.5 kHz	50 W	25 kHz
20	462.6750	2 W	12.5 kHz	50 W	25 kHz
21	462.7000	2 W	12.5 kHz	50 W	25 kHz
22	462.7250	2 W	12.5 kHz	50 W	25 kHz

What are “TONES”?

In two-way radio communication, **PL** (Private Line) or **Privacy Tones** are sub-audible frequencies added to a radio transmission that act as a filter to screen out unwanted traffic.

While often marketed as "Privacy Codes," they do **not** encrypt your conversation or provide actual security; anyone monitoring the frequency without a tone set can still hear everything you say.

How PL Tones Work

- **The "Handshake":** Think of a PL tone as a secret handshake or a "lock and key". When you transmit, your radio sends a continuous, low-frequency tone (usually between 67 Hz and 254 Hz) alongside your voice.
- **Filtering:** A receiving radio set with the same tone will "unlock" its speaker (open squelch) only when it detects that specific tone.
- **Muting Chatter:** If another group transmits on the same frequency but uses a different tone (or no tone at all), your radio remains silent, effectively filtering out their "nuisance traffic".

Common Terms

Different manufacturers use different names for this exact same technology:

- **CTCSS (Continuous Tone-Coded Squelch System):** The technical, industry-standard name.
- **PL (Private Line):** Motorola's trademarked term.
- **Channel Guard (CG):** General Electric's term.
- **Quiet Talk (QT):** Kenwood's term.
- **DCS (Digital Coded Squelch):** A digital version that uses a bitstream instead of an analog tone to achieve the same filtering effect.

Key Benefits

1. **Shared Channels:** Multiple groups can use the same frequency in the same area without constantly hearing each other's conversations.
2. **Repeater Access:** Many repeaters require a specific PL tone to be triggered; the repeater "listens" for the correct tone before re-broadcasting the signal.
3. **Reduced Interference:** They help eliminate "static bursts" or interference from distant stations that might otherwise break your radio's squelch.

Standard Operating Procedures (SOPs)

Pre-Incident Checks: When responding to an incident, whether at home or in the field, be sure to check your equipment first. What is the battery status? Do you know what channel / frequency to use and are you on it? Does the radio work? Do a radio check if unsure.

Establishing Contact: “Hey you, this is me!” For example: “Incident Command, CERT 301”. This indicates that the individual assigned CERT badge number 301 is calling Incident Command.

NOTE: Police do this in the reverse order for some reason but WE ARE NOT POLICE!

Pro Words: There are special phrases called “Pro Words” which are used to make communication more concise but also more accurate. For example, use “Over” when you are done speaking and expect a response from the other party. See Appendix A for a list of other useful Pro Words.

ITU Phonetics: When radio conditions are not optimal, it may be necessary to spell out certain words or specific pieces of information such as addresses. This is done using ITU Phonetics (see Appendix B). For example: “Command this is CERT 301. We are at the corner of Sith and Jedi. OVER.” Command replies: “CERT 301 is at the corner of Sixth and Jedi.” CERT 301 replies: “Command, CERT 301. Negative. We are at the corner of SITH and Jedi. I say again Sith. I SPELL. Sierra India Tango Hotel. OVER.” Command replies: “Roger, SITH and Jedi.” CERT 301 Replies: “Affirmative Command. CERT 301.”

Be Brief: The most important thing, even if you forget everything else is to be clear and brief. ALWAYS use plain language and avoid jargon or codes unless absolutely necessary and understood by all.

Message Format:

1. Compose your message before you speak.
2. Start by listening - Is the channel clear?
3. If clear, press the transmit button and take a breath (this pause allows the repeater to “key-up”).
4. Then speak, giving call sign of who you are calling, then your call sign.
5. Then let go of the transmit button.
6. Wait for an acknowledgement.
7. Once acknowledged, wait a second then press the PTT button, breath.
8. Speak, give your call sign, then your message. Slowly.
9. Then let go of the transmit button.
10. Wait for a confirmation.
11. If confirmed. Acknowledge. You are done.
12. If not confirmed. Resend message.

Example of how to make a complicated message brief:

Today: 7:50 PM. Your team discovers **a fire in an apartment building.** There are **people screaming inside.** One woman is begging you to help save her baby and her mother in apartment 8. The apartment building is at **7452 Iberville.** The unmistakable **smell of gas is in the air.** Your team has discovered **seven people with first degree burns.**

Transmission: "Command, CERT 301. Apartment building fire at 7452 Iberville with people trapped. Smell of gas in the air. Seven patients have first degree burns. Over."

Summary: When "sending traffic" (passing a message over the radio) remember 3 things.

1. "Hey you, this is Me".
2. Use Pro Words and ITU phonetics when necessary but no jargon or Codes.
3. Sign-off with your Tactical Call.

NOTE: If you are on a GMRS Frequency, at the end of your communication, and after you sign-off with your Tactical Call, immediately follow with your GMRS FCC Call.

https://youtu.be/Ib6Aw-Jh-Wc?si=rs1P_3FZDuzXoEoP

Pine Strawberry Specific Information

FRS/GMRS:

The local FRS/GMRS Simplex Channel currently in use is Channel 15. 462.5500 MHz with NO tones.

Non-Licensed FRS/GMRS users use Tactical call or First name on FRS radios.

The local GMRS Repeater Channel is CH19R. The specifics are: 462.6500 MHz with a +5 MHz offset and a tone of 156.7 on BOTH transmit and receive.

The Pine Strawberry Neighborhood Watch weekly net is on Saturday at 7 pm on the repeater.

CERT:

During all CERT deployments, all INTER-Team communications will go through a Net Control Station. This may be Incident Command (GCSO, TRSAR or CERT), or some other entity. INTRA-Team communications are normally on a separate simplex frequency. Make sure you understand the communication frequencies and structures in use BEFORE deploying. These are normally distributed during the incident briefing.

Pine Strawberry CERT typically uses Channel 1 on their CERT radios which is labeled CERT-D. It is on 458.1625 MHz with no tones or offset (Simplex) and is **ONLY to be used by BADGED CERT members using their Tactical call.**

CERT Net Control will log ALL notable calls on ICS Form 214 Activity Log or ICS Form 309 Message Log as appropriate to the situation.

Amateur Radio:

Interactions with Amateur Radio stations will ONLY be accomplished by FCC licensed amateur operators and only by way of a Net Control Station. This may be a SUB-Net rather than the Incident Commander's Net Control as defined by the ***Pine Strawberry Community Radio Response Plan.***

EXERCISE

One operator will act as net control and handle the following scenario using a previously provided roster of CERT and PSNRW members:

You are monitoring the PS-CERT Repeater (GMRS channel 19R) during a bad storm. CERT is activated to man a makeshift EOC at PSFD station 41. A Communications Net is set-up and you hear a call for all CERT and PSNRW stations monitoring the frequency to "check-in" and provide a status report of the situation at your location.

Respond to the following call:

NET CONTROL: "All Stations. All Stations. This is the Pine Strawberry CERT Command Center <Announce your FCC GMRS Call>. We are responding to a local weather event. The Command Center is activating the communications roster. Please respond when you hear your FCC or Tactical Call."

"CERT333"

CERT333 Responds: "CERT333"

NET CONTROL: "CERT333, Command. What is your situation. Over."

CERT333 Responds: "Command, CERT333. Roads are unplowed. A tree is down blocking Jan Drive at Bradshaw. Power is out. The creek is approaching flood level. Over."

NET CONTROL: "CERT333, Command. Roads are unplowed. A tree is down blocking Jan Drive at Bradshaw. Power is out. The creek is approaching flood level. Over."

CERT333 Responds: "Command, CERT333. Readback correct. CERT333 standing by. <Announce your FCC GMRS Call>".

"WRMK486"

WRMK486 Responds: "Command, WRMK486. Tonto Rim Drive has not been plowed and is not drivable. Power is on. Over."

NET CONTROL: "WRMK486, Command. Tonto Rim Drive is not plowed and not drivable. Power is on. Over."

WRMK486 Responds: "Command, WRMK486. Readback correct. WRMK486 standing by."

Appendix A – Pro Words

Affirmative – “Yes” (in answer to a specific question)

Break – “I am pausing for a moment.”

Break-Break or “**Emergency**” - “I have emergency traffic.”

Out – “I am finished with this communication.”

Clear – see Out

Copy – “I acknowledge receipt of message.”

Negative – “No”

Over – end of transmission, waiting for response

Roger - "I have received and understand your transmission." It does not mean yes, affirmative, I agree, or I will comply.

Wilco – “I will comply”

Say Again – asking person to repeat what was said

I Say Again – “I will repeat”

OPS Normal – “All operations are routine”

I spell – “I will spell out a word using phonetic alphabet”

Appendix B – ITU Phonetic Alphabet

A	ALPHA	J	JULIETT	S	SIERRA
B	BRAVO	K	KILO	T	TANGO
C	CHARLIE	L	LIMA	U	UNIFORM
D	DELTA	M	MIKE	V	VICTOR
E	ECHO	N	NOVEMBER	W	WHISKEY
F	FOXTROT	O	OSCAR	X	X-RAY
G	GOLF	P	PAPA	Y	YANKEE
H	HOTEL	Q	QUEBEC	Z	ZULU
I	INDIA	R	ROMEO		

Appendix C – See attachment: **“Introduction to GMRS”**.

Appendix D– See attachment: **“ICS 214 Activity Log”**.

Appendix E– See attachment: **“ICS 309 Communications Log”**.