San Jose EMCOMM Radio Introduction

The Short Course

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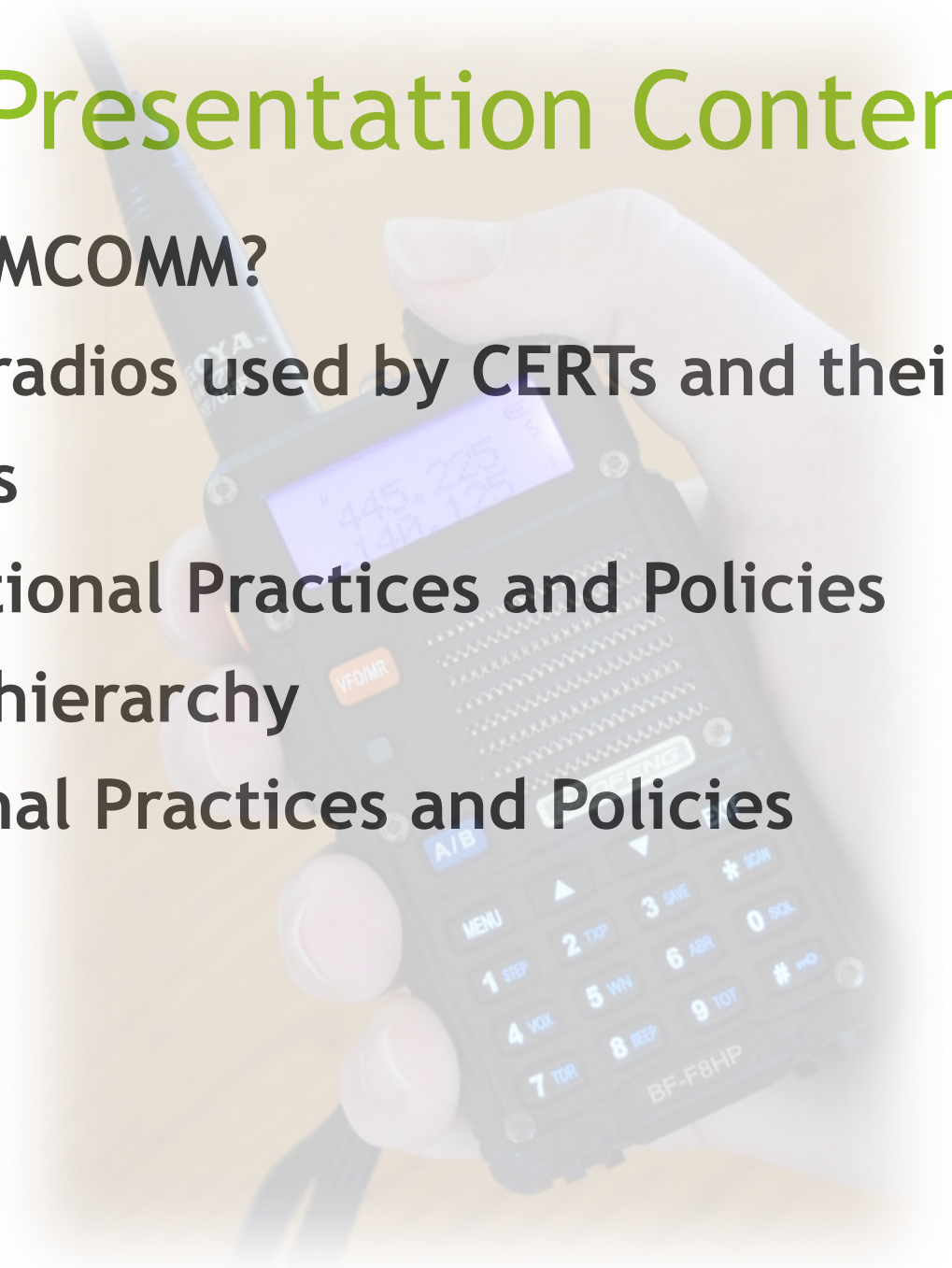
Preface

- This is not official CERT or FEMA training material.
- **A more comprehensive training slide deck is available for MURS radio here:** http://sjncert.org/wp-content/uploads/2023/07/MURS-Radio-Training-at-FIre-Museum-071523.pdf
  for GMRS radio including how to use the Wouxun K905G here: http://sjncert.org/wp-content/uploads/2023/09/D5-GMRS-Radio-Training-at-Mayfair-CC-083123v2.pdf
- Important terms and phrases are indicated in **bold** and **green** text.
- All CERT members should be radio-trained and **always** follow FCC regulations.
- There are exceptions to the context in this presentation but we can ignore them as SJ CERT members.
- We will mention three radio types but focus on MURS and GMRS handheld radios.

Presentation Contents

- What is EMCOMM?
- Types of radios used by CERTs and their characteristics
- Repeaters
- Organizational Practices and Policies
- Network hierarchy
- Operational Practices and Policies
- Appendix



What is EMCOMM radio?

Two-way radio use is at the core of many CERT operations. In an emergency, we always attempt to communicate initially via conventional media infrastructure (i.e., landlines, cellular, VoIP, Internet, etc.) But we must assume that in a major emergency event, conventional communications will be unreliable or unavailable. Radio Emergency Communication, EMCOMM, becomes our sole alternative medium. In that case, we rely on two-way radios.

Fortunately, radios are relatively affordable. While we can equip CERT members with radios, members must also learn how their radios operate, know which radios they can operate, and, as importantly, understand how to use them in an emergency event.

YOU are part of CERT EMCOMM

Two-way radio communications is vital and becoming increasingly essential in CERT operations. Every CERT member must understand how to operate the radio they use or the radio they're issued in an effective and efficient manner.

The San Jose CERT Communications Group is and has been developing a comprehensive EMCOMM scheme that integrates all of San Jose district CERTs as well as implements a method to coordinate efforts with the San Jose Emergency Operations Center, EOC, and professional responders.

Every CERT member is expected to understand two-way radio use. While not required, San Jose CERT strongly encourages each CERT member to obtain a GMRS license. Fortunately, District 8 CERT has two ham-licensed radio operators but we are always on the lookout for more as ham radio use may become incorporated into CERT operations.

What are three types of radios used in San Jose CERT?

- **MURS** – Multi-Use Radio Service
- **GMRS** – General Mobile Radio Service
- **ARS** – Amateur Radio Service (popularly known as **ham**)

For the purpose of this presentation we limit radio types to handheld radios also known as:

Handheld Transceivers
HTs
Handy Talkies

What about FRS and CB?

- Forget the marketing hype, FRS radios, the radios found in blister packs in department stores, typically are poorly made, have little range, and can't access repeaters. While cheap, there's a reason why they're cheap.
- CB radios, yes, the kind made famous by long-haul truckers in the 1970s also lack features consistent with SJ CERT. While there are inexpensive CB HTs and can have a great range, they're not supported very well and are considered mostly as a curiosity locally.
- District leaders might find these two types can support training or have limited use at the neighborhood/block level. There's little support for them within our communications group.

Why are three types of radios instead of one used in San Jose CERT?

It’s a matter of cost, commitment, and training.

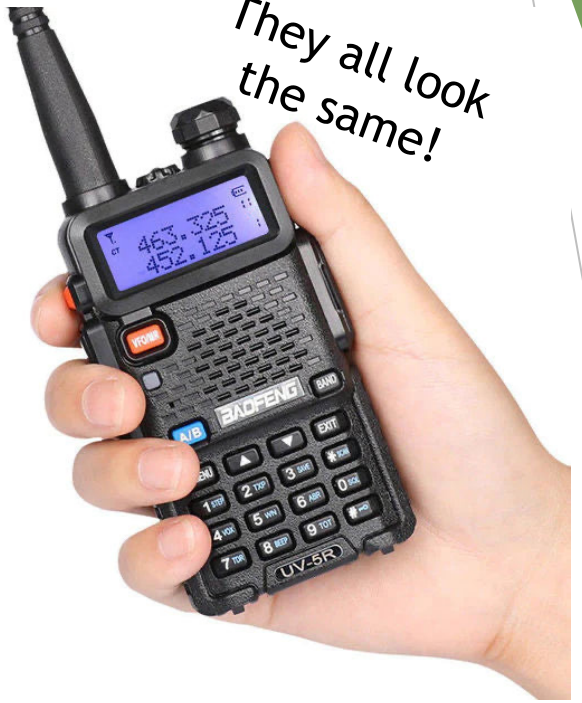
If every CERT member in town committed to buy their own radio, then study, apply for, pay, test, and pass the FCC test for their ham license, learned how to program their radio, and apply and pay an annual subscription to build and maintain repeaters, then YES! We could use just one type of radio.

Until then, the current radio scheme stands.

What are the radio's roles in San Jose CERT operations?

- **MURS** – Multi-Use Radio Service
  - For use at the neighborhood/block level
  - For use to communicate with other teams and with zone IC posts
- **GMRS** – General Mobile Radio Service
  - For use between IC posts within and beyond the district
- **ARS** – Amateur Radio Service (popularly known as **ham**)
  - Conceivably for use between IC posts and city services
  - Ham use for San Jose CERT is currently being explored

What are characteristics of radios used in San Jose CERT?



- **MURS** – Multi-Use Radio Service
  - Low power / modest range
  - Easiest type radio to use
  - Inexpensive - <$20 and up
  - No license required to use
- **GMRS** – General Mobile Radio Service
  - Relatively more power / longer range than MURS radios
  - More features and capability than MURS radios
  - Price/unit ranges from $25 - $500+
  - FCC license required to **transmit** - no test required for the license
- **ARS** – Amateur Radio Service (popularly known as **ham**) (San Jose CERT use is TBD)
  - Most powerful of all radio types
  - Comprehensive feature set
  - Price ranges from $25 – to thousands
  - FCC license required to **transmit** – various levels of licensing, each with its own test

Operational characteristics of each type of radio

- For CERT purposes, MURS can only talk with MURS, GMRS can only talk with GMRS, ham can only talk with ham.*
- Anyone can buy any radio they want but operators must have the appropriate license to transmit with GMRS and ham radios.
- Radio types are selected for appropriateness at different levels by factors including ease-of-use, cost, and features.

*Legally true, technically untrue

Significant technical features of each type of radio

- **MURS** – Multi-Use Radio Service
  - Five (5) channels
  - Relatively little consumer-use – thus, fewer chances of interference
  - Simplex only – can not use repeaters
- **GMRS** – General Mobile Radio Service
  - 22 channels + 8 repeater channels
  - Requires programming to work in the SJ CERT radio environment
  - Can use repeaters
- **ARS** – Amateur Radio Service (popularly known as **ham**)
  - Channels can be arbitrarily set, hams speak in “frequencies”
  - Can use repeaters
  - Can possibly communicate with others hundreds or thousands of miles away via simplex

Significant features of all radios

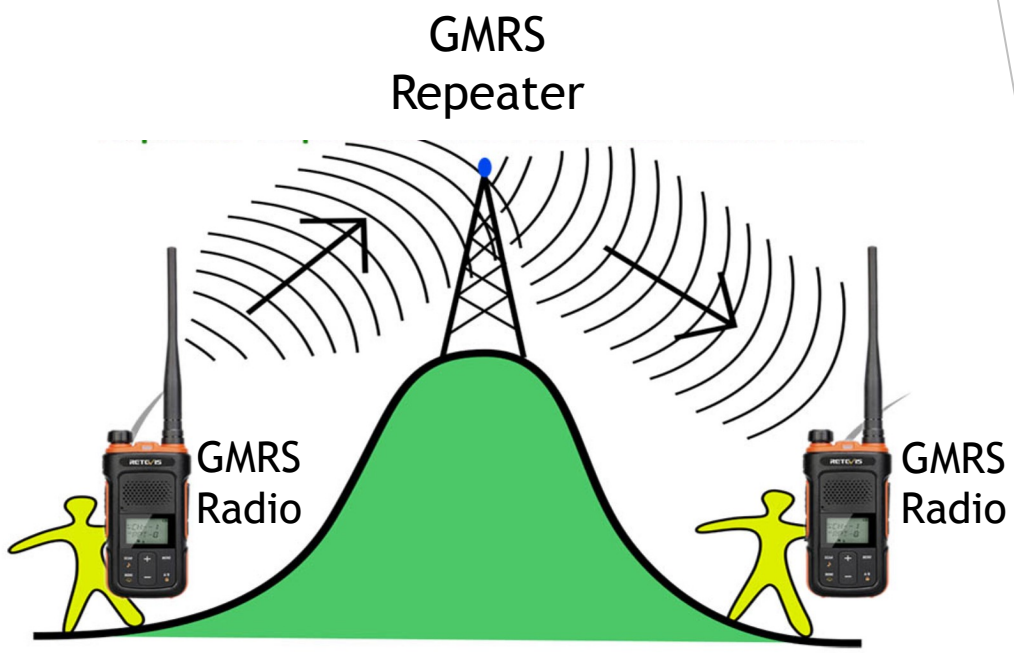
- Radios must be on the same channel (frequency) to communicate.
- All two-way radios are “Push To Talk” in operation. You can not receive while transmitting.
- The range of MURS and GMRS radios is **heavily** influenced by terrain, foliage, landscape topography, and antenna type. The range is **moderately** influenced by the radio’s power.
- Sometimes, especially for GMRS, moving the radio just a few feet or even inches can make the difference between receiving a signal or not. To improve reception, move outdoors, get higher, move away from foliage, trees, and buildings.

What are Repeaters and what are their advantages?

- Repeaters are special radio stations that receive transmission signals and retransmit them instantly at a slightly different frequency.
- Repeaters are typically located at prominent heights such as hilltops, atop tall structures, or tower tops.
- GMRS Repeaters often transmit at high power, >5 up to 50 watts.
- Repeaters are usually owned and operated by private citizens who may give users permission to access them.
- Repeaters are usually restricted to one or the other GMRS and ham frequencies.
- GMRS and ham repeaters effectively broaden the area of a transmission by as far as dozens to hundreds of miles.
- Typically, radios must be programmed to access repeaters.

How do Repeaters Work? (We'll focus on GMRS radio repeaters)

Like light, Radio waves propagate from the source (line of sight) but are blocked fully or partially by obstacles. In CASE #1, the transmission signal between GMRS radios is blocked by a hill. However, the repeater atop the hill receives a transmission from the radio on the left and retransmits the message so that the recipient can get the message.

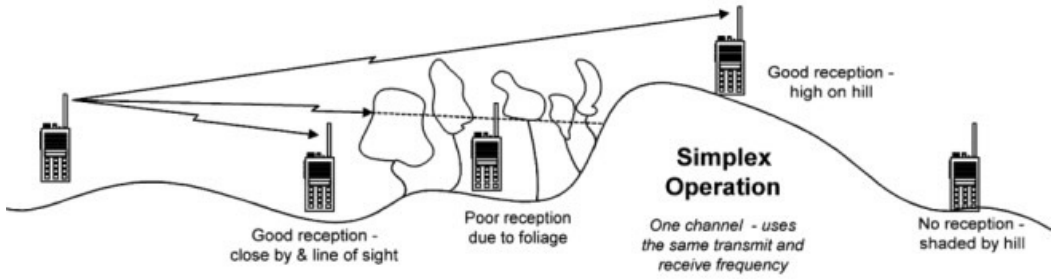


CASE #1

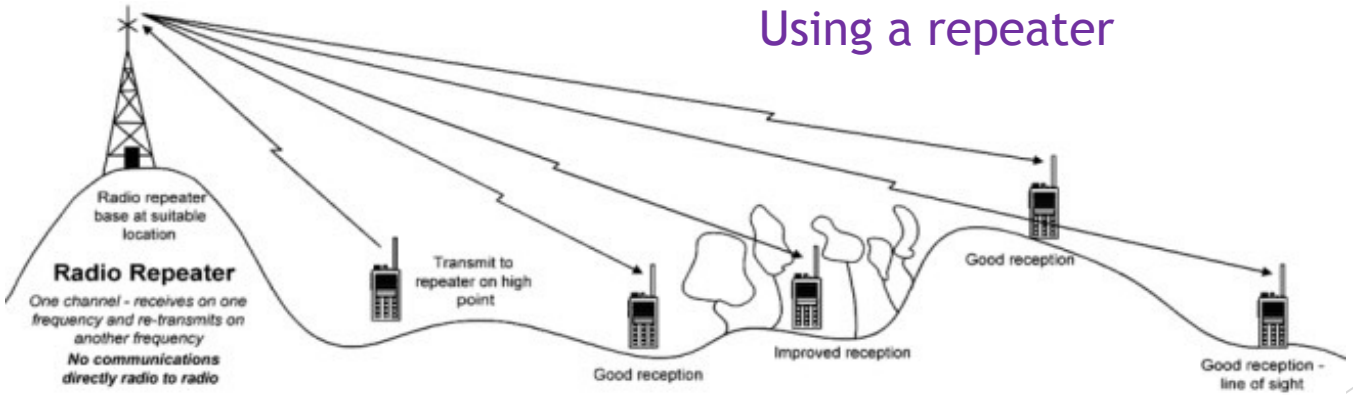
How do Repeaters Work? (We'll focus on GMRS radio repeaters)

In CASE #2, we see an example of a Simplex transmission (top) and an example when a repeater is employed

Simplex Operation



Using a repeater



CASE #2

San Jose CERT EMCOMM Organizational Practices and Policies

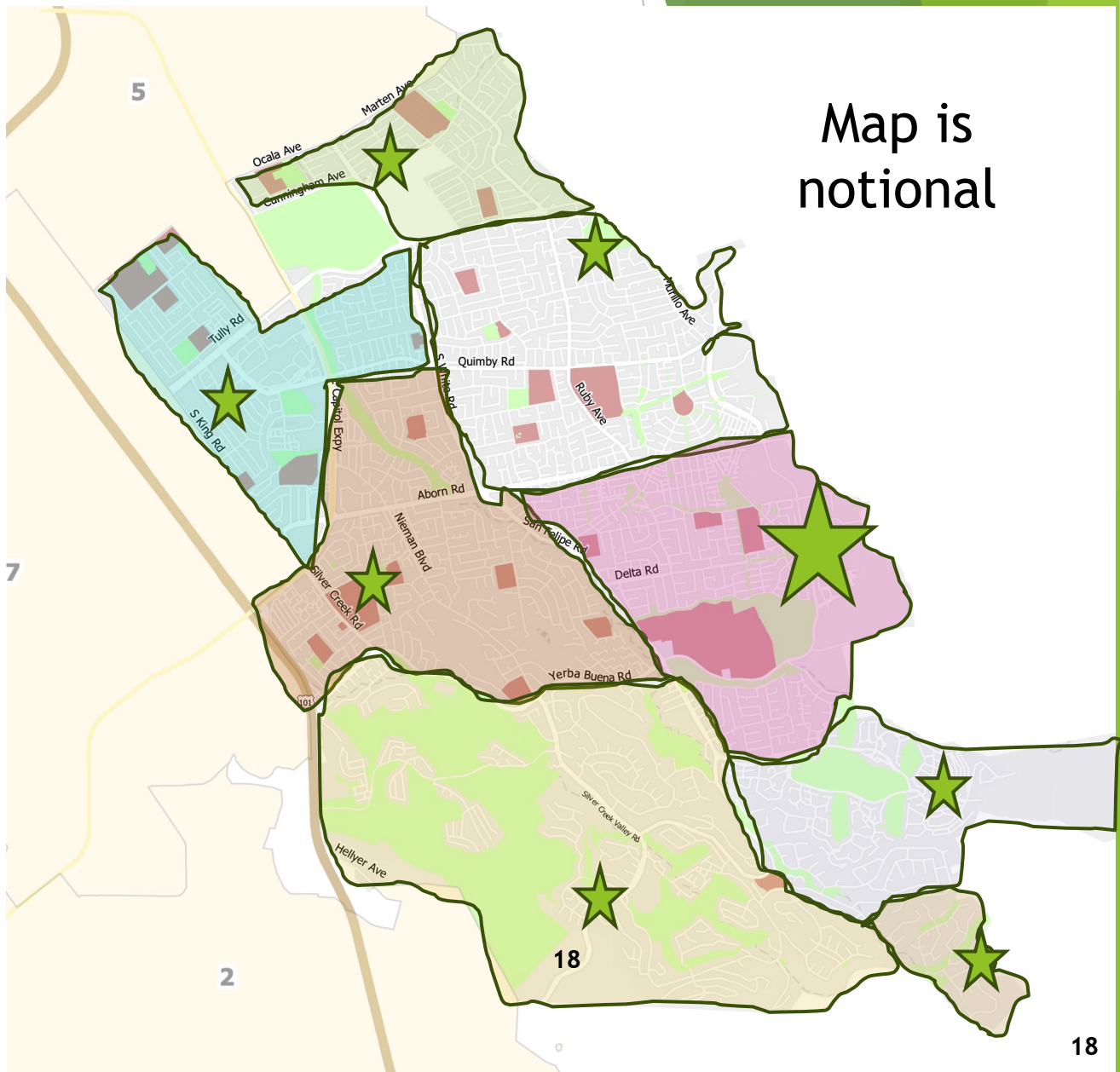
- Each district develops its own EMCOMM radio map based on the ”rule of seven” – a radio span-of-control network hierarchy. Essentially each net controller operates with no more than seven (or so) other radio operators.
- Districts develop a method of quickly identifying IC Post, team, and radio operator names for radio use. (e.g. “Southern Cross Post, this is Rover 2”)
- Each district has one Primary IC Post
  - Outfitted with at least one GMRS
- Each district is divided into zones (zones may have their own IC post)
- Zones are divided into neighborhoods* or “blocks”. At this level, they use MURS radios.
- Districts should test the GMRS radio ability to communicate within their zones via simplex rather than via repeater to free up repeater bandwidth.

*Use Google Maps for neighborhood names

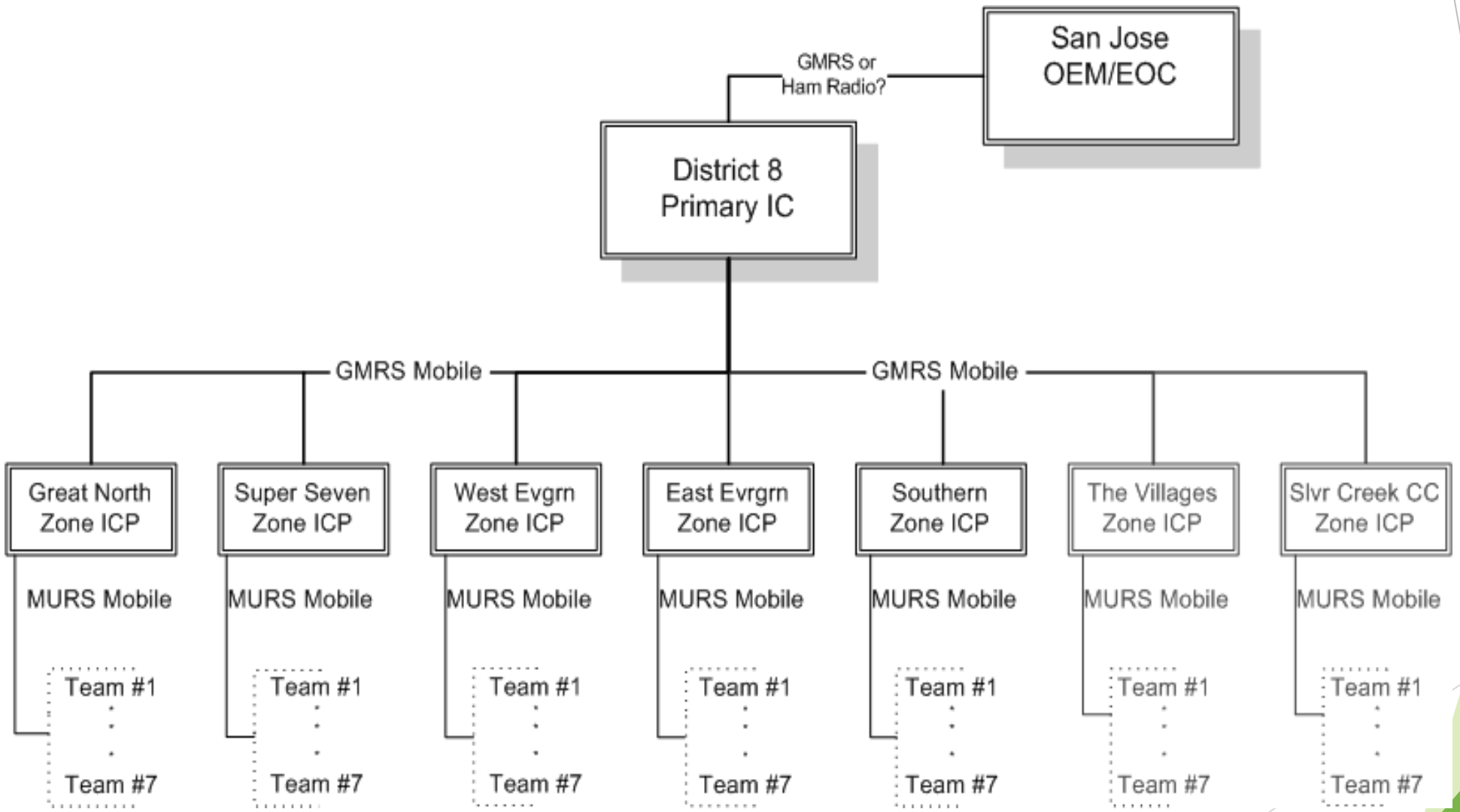
San Jose CERT EMCOMM - Practices and Policies

EXAMPLE

- District 8 has eight (8) zones.
- Each zone has its own IC Post with a MURS and GMRS operator (most likely the Operations Manager) and encompasses about 7 Google-named neighborhoods.
- Each neighborhood has CERTs equipped with a MURS radio. MURS radio operators can talk to others in their zone.
- The Zone IC Post radio operator is the network controller for the zone. Each zone can communicate with other zones via GMRS. The Zone IC post Operations Manager is most likely the network controller.
- One zone IC Post is Primary (big star in purple zone). The Primary IC Post has a separate radio operator who acts as the network controller and liaison with city services via ham or GMRS (TBD).



Team EMCOMM Structure



San Jose CERT EMCOMM Operational Practices and Policies

- The Incident Command System (ICS), FCC regulations, local subject matter experts, and well-established EMCOMM routines guide San Jose CERT EMCOMM Operational Practices and Policies.
- San Jose CERTs have access to a number of repeaters (see Appendix) District 8 is ideally situated. How's your district?
- We are at the baby-stage of implementing CERT EMCOMM practices and policies. Expect changes as the SJ CERT EMCOMM scheme matures.
- Having a GMRS or ham license implies you are fully familiar with the regulations governing the radio's operation.
- Train, practice, train, practice, then train and practice some more.

Acquiring GMRS and MURS Radios

- A variety of radio services (types of radios) have been and are being investigated for use by San Jose district CERTs. Common radio models for each service for use across the entire city will be effective in the way we buy and train on EMCOMM. Fortunately, San Jose has a cadre of well-versed and experienced radio experts. CERT radio training is already underway and at least two districts are settling on particular models for use in the field.
- Price, features, value, user experience, and CERT-specific requirements drive the list of recommended SJ CERT radios.
- A common set of radio models for use in SJ CERT operations allows bulk buys, consistent training, and speed and ease of programming updates.
- Acquisitions of models not included in the recommended list should meet CERT-specific requirements including repeater capability, minimum transmission power, availability of programming software, programming hardware, and compliance with FCC regulations. Contact the SJ CERT Communication Group before buying unlisted radios and ancillary gear.
- Some radios are available only through certain vendors. Pricing on radio models constantly change. A good deal today may be not-so-good next week. Prices on the recommended model list are relatively stable and available through a number of sources.
- See the **recommended radio models** list in the Appendix.

Example of a Radio Exchange

- Identify who you are trying to reach and identify yourself
- Acknowledge that you heard transmission
- Repeat back critical information (as necessary)

Note Order: Person you are trying to reach, followed by yourself

• Rover 1	Command Post, (this is) Rover 1.
• Command Post	Rover 1, go ahead.
• Rover 1	Bernal Shelter needs water bottles and blankets.
• Command Post	Roger, Rover 1. Shelter needs water and blankets.
• Rover 1	Clear, Rover 1, ABCD123.

• Command Post	All stations, (this is) Paseos Net Control, for health and welfare check. Please respond with your status. Rover 1, status
• Rover 1	Rover 1 location is 1234 Sea Court. I spell SIERRA ECHO ALPHA Court. Continuing damage assessment.
• Command Post	Copy, Rover 1.
…	…

Example of a Radio Exchange

Rover 1	Rover 1 with emergency traffic.
Command Post	This is Paseos Net Control, go ahead.
Rover 1	We have a downed power line at Avenida Rotella and Via Del Oro.
Command Post	Break. Any station in vicinity of Fire Station 28, advise Duty Officer of downed power line. Report back when completed.
Rover 2	Rover 2 with update.
Command Post	Paseos Net Control, go ahead.
Rover 2	I am at Fire Station 28, informing Duty Officer about downed power line.
Command Post	Roger, Rover 2.
…	…

- Identify who you are trying to reach and identify yourself
- Acknowledge that you heard transmission
- Repeat back critical information (as necessary)

Remain Compliant with FCC Rules

- As responsible citizens, CERT members follow FCC regulations
- We may and should use individual calls signs and team call signs. We end our conversations (not necessarily each transmission) with our individual or team calls signs plus our FCC-assigned call sign. Example:

  "I hear we will deliver two cases of water to Rover 2 at the front of Miller Middle School. Rover 4, WXXX123, clear"

  Team Call Sign

  FCC Call Sign

  "Clear" means you are finished with your conversation but continue to monitor the channel.
- MURS radio operators do not use FCC call signs.
- The Operations Manager and Resource Manager must know every team's and everyone's call signs and who is in each team.

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Good EMCOMM Radio Practices

- Remember your ABCs: Accuracy, Brevity, Clarity
- Know what you're going to say before you say it
- Learn the NATO Phonetic Spelling Alphabet, Oscar Kilo?
- Avoid codespeak – speak in plain English
- Transmit at the lowest effective power
- Keep your radio in a quickly accessible place
- Keep your radio charged
- Consider a backup battery and keep that charged
- Protect your radio from water
- Participate regularly in check-ins and radio surveys
- Consider a family communication plan that includes EMCOMM
  - Remember: Your GMRS license extends to your family members!

More Good EMCOMM Radio Practices

- Consider what and how you'll say something before transmitting. It's all about ABC – Accuracy, Brevity, Clarity. Don't shout.
- There is no expectation of privacy in radio. Avoid mentioning personal information, your own and others, especially when reporting health conditions.
- When wanting to transmit, select the proper channel (frequency), then first listen to hear if other users are talking.
- When relaying information, say the originating message exactly. Word-for-word if possible.
- In an exercise when training with the radio, end each transmission with, "This is a drill." You don't want to start a panic

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About “that” FCC Emergency Clause

CERT members follow FCC rules even during EMCOMM activities. That is, licensing and operation regulations always apply.

The FCC permits the use of any radio transmission by unlicensed operators, **ONLY** if there is an immediate threat to life or property and there is no other available media. Don’t let this clause suggest any unlicensed CERT member can transmit any time in an emergency event. To this point, district CERT leadership should assure that GMRS and ham radios be issued ONLY to appropriately licensed and CERT-trained members. Unlicensed CERT members should work in teams with authorized radio operators.

Final Note

A special thank you goes to the San Jose CERT communication group including Wyman Pang, Walter Chang, and John Nourse who work in the background developing the San Jose CERT communication scheme.

Appendix Contents

- Currently recommended radio models for MURS and GMRS
- NATO Phonetic Alphabet (Spelling Alphabet)
- Weekly CERT GMRS Radio Check-Ins
- Current San Jose CERT GMRS Channel Assignments
- Current San Jose CERT Frequency Assignments
- How to participate in San Jose CERT Check-Ins
- Basic Radio Terms
- How to apply for a GMRS license

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Recommended MURS and GMRS radios As of September 2023

- Recommended models need only to download the standard program file. Application and programming cable are required.
- Non-recommended models require individual radio programming. Application and programming cable cable are required.

		Cost	Suggested Antenna	Antenna Cost	Output Power	Environmental	CHIRP Compatible?	Comments
MURS radio models								
	Retevis RT21V	$ 15	Retevis HA01 SMA-F	$ 7	2 watts	None	Yes	Consult with SJNCERT Communications Group before ordering
GMRS radio models								
	Wouxun KG-805G	$ 99	NA-771G SMA female	$ 18	5 watts	IP66	No	Consult with SJNCERT Communications Group before ordering
	Wouxun KG-905G	$ 120	NA-771G SMA female	$ 18	5 watts	IP66	No	Consult with SJNCERT Communications Group before ordering

NATO Phonetic Alphabet (Spelling Alphabet)

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

The NATO Phonetic Alphabet is used to spell words over the radio for clarity.
For example, the letters “B” (bee) and “P” (pee) can sound similar, especially if there is radio static. Using the phonetic alphabet you can say “Bravo” for “B” or “Papa” for “P” to avoid confusion.

Use the phonetic alphabet to spell out words clearly.
Example: You want to report there is an injured person at 123 “Park” Street -> spell “Park” as “Papa - Alpha - Romeo - Kilo” to avoid misunderstanding.

Weekly CERT GMRS Radio Check-ins

Updated 8/6/23

http://sjncert.org/?page_id=799

Repeater	Date/Time	Location	Notes	Comments
CERT2*	Tue. / 6:50 PM	Willow Glen	Backup	*J. Nourse, can also check in with VARA FM (data over ham radio) ** Private repeaters, Owners allow CERT use; also available on Zello app -> need GMRS license to transmit on app Bandit = SJ CERT SmokeyBandit
CERT1*	Tue. / 7:00 PM	Mt. Pleasant	Backup	
CERT Bandit**	Tue. / 7:15 PM	Alum Rock	Primary	
Zello**	Sat. / 6:50 PM-radio 7:00 PM-app Updated 8/6/23	Santa Cruz Mtn	Backup	

Above sjncert.org link shows frequency details & Weekly CERT & Ham Check-In Nets

Current Channel Assignments

subject to change

KG-905G Channel Assignments

STANDARD GMRS CHANNELS						SJ CERT GMRS CHANNELS								
CH	G	NAME	CH	G	NAME	CH	G	NAME	CH	G	NAME	CH	G	NAME
1	01	GMRS01	1	03	GMRS15	1	05	D1-15	1	06	TAC15	1	07	CERT1
2	01	GMRS02	2	03	GMRS16	2	05	D2-16	2	06	TAC16	2	07	CERT2
3	01	GMRS03	3	03	GMRS17	3	05	D3-17	3	06	TAC17	3	07	CERT3
4	01	GMRS04	4	03	GMRS18	4	05	D4-18	4	06	TAC18	4	07	BANDIT
5	01	GMRS05	5	03	GMRS19	5	05	D5-19	5	06	TAC19	5	07	ZELLO
6	01	GMRS06	6	03	GMRS20	6	05	D6-20	6	06	TAC20			
7	01	GMRS07	7	03	GMRS21	7	05	D7-21	7	06	TAC21			
1	02	GMRS08	8	03	GMRS22	8	05	D8-22	8	06	TAC22			
2	02	GMRS09	1	04	RPT15	9	05	D9-15	10	06	CALL			
3	02	GMRS10	2	04	RPT16	10	05	D10-16	11	06	SJ OEM			
4	02	GMRS11	3	04	RPT17				13	06	W6UU			
5	02	GMRS12	4	04	RPT18				14	06	WA2IBM			
6	02	GMRS13	5	04	RPT19									
7	02	GMRS14	6	04	RPT20									
			7	04	RPT21									
			8	04	RPT22									

For Channel details refer to San Jose CERT Radio Frequency Assignments (sjncert.org)

http://sjncert.org/?page_id=799

The 2 digit suffix in the Channel NAME refers to a specific frequency

Shown on your Radio Display

CH = Channel No.

G = Channel Group

NAME = Channel Name

Note: Your Wouxun KG-905G is programmed with these channels

G = 01-03 - Standard GMRS Simplex channels (no tones)

G = 04 -Standard GMRS Repeater channels (no tones)

G = 05 - SJ DISTRICT Simplex (w/tones)

G = 06 - SJ TACTICAL, CALL & OEM Simplex (w/tones); Listen only Ham W6UU (SJRACES) & WA2IBM

G = 07 - SJ CERT repeaters

Current GMRS Repeater Frequency Assignments

subject to change

- Recommended models need only to download the standard program file. Application and programming cable are required.
- Non-recommended models require individual radio programming. Application and programming cable cable are required.

CH	Name	Rx Freq	Tx Freq	Tone Mode	Encode Tone	Decode Tone	Encode DTCS	Decode DTCS	DTCS Polarity	Cross Mode	BW	Comment
1	AVPSN			TSQL	100.0	100.0					NFM	AV Private Business Band Channel
3	SJCERT1	462.7250	467.7250	TSQL	114.8	114.8					NFM	Backup repeater, GMRS 22
4	SJCERT2	462.7250	467.7250	Cross	123.0	114.8				Tone->Tone	NFM	Backup repeater, GMRS 22
5	SJCERT3	462.5750	467.5750	Cross	77.0	114.8				Tone->Tone	FM	Backup repeater, GRMS 16 (SJ EOC)
6	ZELLO	462.7000	467.7000	Cross			532	465	RN	DTCS->DTCS	FM	Backup repeater, GRMS 21, 532R/465N
7	CERT BANDIT	462.7250	467.7250	TSQL	100.0	100.0					FM	Primary repeater, GMRS 22 (SJCERT SMOKEYBANDIT)

Proposed District-level GMRS Frequency Assignments

subject to change

99	SJ EOC	462.6000		TSQL	136.5	136.5					FM	GMRS 17 simplex
100	SJ CALL	462.6250		TSQL	141.3	141.3					FM	GMRS 18 simplex
101	D1 CH15	462.5500		TSQL	97.4	97.4					FM	District 1 GMRS 15 simplex
102	D2 CH16	462.5750		TSQL	100.0	100.0					FM	District 2 GMRS 16 simplex
103	D3 CH17	462.6000		TSQL	103.5	103.5					FM	District 3 GMRS 17 simplex
104	D4 CH18	462.6250		TSQL	107.2	107.2					FM	District 4 GMRS 18 simplex
105	D5 CH19	462.6500		TSQL	110.9	110.9					FM	District 5 GMRS 19 simplex
106	D6 CH20	462.6750		TSQL	114.8	114.8					FM	District 6 GMRS 20 simplex
107	D7 CH21	462.7000		TSQL	118.8	118.8					FM	District 7 GMRS 21 simplex
108	D8 CH22	462.7250		TSQL	123.0	123.0					FM	District 8 GMRS 22 simplex
109	D9 CH15	462.5500		TSQL	127.3	127.3					FM	District 9 GMRS 15 simplex
110	D10CH16	462.5750		TSQL	131.8	131.8					FM	District 10 GMRS 16 simplex
111	TAC15	462.5500		TSQL	196.6	196.6					FM	GMRS TAC15 simplex
112	TAC16	462.5750		TSQL	199.5	199.5					FM	GMRS TAC16 simplex
113	TAC17	462.6000		TSQL	203.5	203.5					FM	GMRS TAC17 simplex
114	TAC18	462.6250		TSQL	206.5	206.5					FM	GMRS TAC18 simplex
115	TAC19	462.6500		TSQL	210.7	210.7					FM	GMRS TAC19 simplex
116	TAC20	462.6750		TSQL	218.1	218.1					FM	GMRS TAC20 simplex
117	TAC21	462.7000		TSQL	225.7	225.7					FM	GMRS TAC21 simplex
118	TAC22	462.7250		TSQL	229.1	229.1					FM	GMRS TAC22 simplex

Proposed District-level MURS Frequency* Assignments

subject to change

119	TAC1MRS	151.8200		TSQL	97.4	97.4					NFM	TAC 1 MURS simplex
120	TAC2MRS	151.8800		TSQL	100.0	100.0					NFM	TAC 2 MURS simplex
121	TAC3MRS	151.9400		TSQL	103.5	103.5					NFM	TAC 3 MURS simplex
122	TAC4MRS	154.5700		TSQL	107.2	107.2					FM	TAC 4 MURS simplex
123	TAC5MRS	154.6000		TSQL	110.9	110.9					FM	TAC 5 MURS simplex
124	TAC6MRS	151.8200		TSQL	114.8	114.8					NFM	TAC 6 MURS simplex
125	TAC7MRS	151.8800		TSQL	118.8	118.8					NFM	TAC 7 MURS simplex
126	TAC8MRS	151.9400		TSQL	123.0	123.0					NFM	TAC 8 MURS simplex
127	TAC9MRS	154.5700		TSQL	127.3	127.3					FM	TAC 9 MURS simplex
128	T10MRS	154.6000		TSQL	131.8	131.8					FM	TAC 10 MURS simplex
129	MURS 1	151.8200									NFM	MURS Open Channel 1
130	MURS 2	151.8800									NFM	MURS Open Channel 2
131	MURS 3	151.9400									NFM	MURS Open Channel 3
132	MURS 4	154.5700									FM	MURS Open Channel 4
133	MURS 5	154.6000									FM	MURS Open Channel 5

*Can be monitored (receive only) on GMRS and ham radios.

San Jose CERT Repeater Check-In

- How to check-in to a weekly CERT GMRS Repeater Net
  - Instructions for the beginner
    - On the net date & time, turn your radio on and set to the repeater channel
    - Monitor the net from the beginning (listen in early)
      - The Net Control Operator will announce specific instructions for check-in
      - Also: Listen to several other participants to learn how they check-in
    - When invited to check-in:
      - Press & hold your radio PTT and wait about 2 seconds
      - Speak slowly & clearly
      - Announce your Call Sign (phonetically) and your first name
      - Announce your city & neighborhood
      - Indicate if you have “traffic” or “no traffic”
    - Don’t be shy, it takes some practices!
    - After you check-in, the Net Control Operator will acknowledge your check-in
      - If you are not acknowledged -> repeat your check-in

Basic Radio Terms

Term	Meaning
Affirmative	Yes
Negative	No
Radio check	How is my signal?
Do you copy?	Can you hear me?
Loud and clear	Your signal is good
Copy	Message Understood
Roger	Message Understood
Say again	Repeat your message again
Come again	Repeat your message again
Go ahead	I am ready to receive your message
Break	Interrupting transmission with urgent matter
Stand-by	Your message received, but I am unable to reply right away
Over	My message is over, waiting for your reply
Out	End of my transmission
Clear	End of my transmission

Avoid use of "coded" terms
Examples:
- *10-4 (Roger)*
- *QTH (What is your location?)*

Applying for a GMRS license

Relax. Settle in. Put on some smooth jazz and let the cat nap on your lap. You'll need a bit of time to complete your application. It's a two (three?)-part process that involves obtaining a FRN ID designator, applying for the actual license, and paying. It's not a difficult process. It's just a lot of stuff that you have to slosh through. If I got through it, you can too!

Wyman Pang has a step-by-step method described here: http://sjncert.org/wp-content/uploads/2023/09/How-to-Apply-for-a-GMRS-License-080323v3.pdf