

# Bringing GMRS to Athens County

A Case for Supporting GMRS as a  
2024/2025 ACARA Club Offering

# What is GMRS?

The General Mobile Radio Service was created by the FCC as a 2-way personal communication option for local operation between individuals. GMRS requires a license and station ID. All GMRS equipment must be commercially built and type certified. GMRS shares its band and channels with the Family Radio Service (FRS) but GMRS regulations allow for enhanced power and repeater capabilities for greater range and flexibility.

# GMRS Advantages

- Low cost of entry (GMRS Radios for \$25-30)
- Repeater capability with most GMRS radios
- Channelized service is less intimidating for new operators
- Easy license requirements – Online application and no testing
- Low cost of licensing – \$35
- Entire family is covered by 1 license
- Compatible with FRS radios in simplex operation
- A well placed repeater can cover most of the county as well as large swaths of neighboring counties

# GMRS is Channelized

- The FCC has created GMRS as a channelized UHF radio service to be used for local communication
  - GMRS band extends from 462.55 – 467.725 Mhz
  - A blend of both main and interstitial channels
  - 14 Simplex Channels (1-14)
  - 8 Shared Channels for Simplex and Repeater Output (15-22)
  - 8 Repeater Input Channels (15R-22R) using a 5Mhz positive offset
  - Actual FCC Part 95 regulations on GMRS channels are a bit more specific.
- All simplex channels are shared with the FRS (Family Radio Service) although FRS is limited by power and radio hardware configuration restrictions
- GMRS maximum power limitations
  - 5 watts on channels 1-7
  - ½ watt on channels 8-14 (handheld radios only here. No base/mobile)
  - 50 watts on 15-22 and 15R-22R

# Band, Frequency, and Channel

- **Band**

- An allotment of radio frequency spectrum given to a particular radio service by a national or international governing body. Will have a upper and lower frequency limit which establishes the borders of the band and may have other conditional factors such as mode, channel definitions, purpose, and power limits. Examples include:
  - AM Broadcast Band; FM Broadcast Band; Weather Radio Band; GMRS Band; Marine Radio Band; Ham Radio Band(s)

- **Frequency** (Radio Frequency)

- A known and measurable fixed point within the electromagnetic spectrum usually represented numerically in Hertz (Hz), Kilohertz (KHz), Megahertz (MHz), Gigahertz (GHz)
  - 910 KHz
  - 7.125 MHz
  - 145.15 MHz
  - 1.2 GHz

- **Channel** (Common attributes)

- Formal Identification such as a Name, Number, or Alpha-numeric channel identifier
- Receive Frequency
- Transmit Frequency (if allowed)
- Mode: FM, AM, SSB, Digital, etc
- Squelch/Privacy Tone Type: PL/CTCSS Tone, DCS Tone, DTMF Tones
- Squelch Tone identifier: Which Tone Setting within the Tone Type
- Origin Story: Channels may be officially created within the radio service by a governing body (FCC), unofficially created by a radio manufacturer, or established by private groups, clubs, and individuals.

# The GMRS Channel Challenge

- Although the FCC did establish GMRS as a channelized service and did establish the precise frequencies to be used in the channels, they were not prescriptive in channel identifiers. No name or number assignment was officially given to each channel frequency. This has allowed for some confusion as radio manufacturers may use differing channel identifiers to represent a single FCC established channel frequency.
- Fortunately there is a de facto standard that has been adopted and most GMRS manufacturers and users abide by this channel list for channels 1-22. Any GMRS radio channel above 22 is usually a manufacturer created channel that blends a standard channel with a sub audible privacy tone in order to appear to be a unique channel offering. These types of channels are not universal across all brands and models of GMRS radios.

Caution should be taken to ensure all GMRS radios designated as emergency use follow a single naming/numbering standard for GMRS channels.

# De facto GMRS Channel Guide

## GMRS/FRS Channels and Frequencies

1 - 462.5625	12 - 467.6625
2 - 462.5875	13 - 467.6875
3 - 462.6125	14 - 467.7125
4 - 462.6375	15 - 462.5500
5 - 462.6625	16 - 462.5750
6 - 462.6875	17 - 462.6000
7 - 462.7125	18 - 462.6250
8 - 467.5625	19 - 462.6500
9 - 467.5875	20 - 462.6750
10 - 467.6125	21 - 462.7000
11 - 467.6375	22 - 462.7250

## GMRS Repeater Input Channels and Frequencies

15r - 467.5500
16r - 467.5750
17r - 467.6000
18r - 467.6250
19r - 467.6500
20r - 467.6750
21r - 467.7000
22r - 467.7250

# GMRS Licensing

- Only individuals can apply for a GMRS License
  - Older corporate licenses are grandfathered in
- Requires an FCC CORES account and FRN registration
- Must be 18 or older
- Must not be a representative of a foreign government
- \$35 fee for 10 year license duration
- New licenses follows a 4x3 format (WXGY-297)
- License can be shared with immediate family
- FCC allows for “Unit” designators for any additional family member users: (“WXGY-297 Unit 2” or “Dash 2”)
- License allows for radios that are any combination of Base unit, mobile, or handheld.

# GMRS vs FRS

## General Mobile Radio Service

- Shares Band and Channels with FRS
- GMRS is an FCC licensed service (\$35 fee)
- GMRS may use repeaters
- GMRS limited to 50 watts
- GMRS has very few antenna restrictions

## Family Radio Service

- Shares Band and Channels with GMRS
- FRS requires no license
- FRS cannot use repeaters
- FRS limited to a maximum of 2 watts ERP
- FRS radios must use a non-removable, vertically polarized antenna with zero Db gain (Dbd)

Although the band and channels overlap between the two, the many limitations placed on FRS ensure that GMRS is a far superior radio communication service while maintaining backwards compatibility with FRS radios in simplex mode

# Ham Radio vs GMRS

## Amateur (Ham) Radio Service

- License Required (3 types or classes)
- Tests required for each license class
- Non-sharable license
- Renew/upgrade license every 10yrs
- Multiple Bands and Modes allowed
- Up to 1500 Watts Allowed
- World Wide Communication Possible
- Variable Frequency Operation within upper/lower band limits
- Many facets to the service/hobby
  - Social outreach and entertainment
  - Adventure and Experimentation
  - Local, Regional, National Emergency Communication

## General Mobile Radio Service

- License Required (1 type)
- No Test required for license
- License sharable with family
- Renew license every 10yrs
- Single Band and Limited Modes
- .5, 5, and 50 Watt limits depending on channel used
- Local Communication – limited range
- Channelized Operation: 22 Channels
- Utilitarian communication focus
  - General personal / business use
  - Local emergency communication
  - Good choice for supporting other hobbies such as off-roading, hiking, camping

Ham Radio is a superior radio service but may present barriers to entry such as theory study, license testing, and perceived costs. For many, GMRS is a “Just right” fit for local communication.

# Basic GMRS Repeater Info

- The FCC estimates that a repeater will typically extend the usable range of a GMRS radio by 25-30 miles
- Any GMRS license holder may set up and administer a repeater
- GMRS Repeaters may use CW (Morse) for ID
- GMRS Repeaters may not be linked to any other radio service
- GMRS Repeaters may be connected to Telcom systems for remote control/management
- There is no centralized coordination of repeater location or frequency. Separation and interference control is up to the licensee. Tone encoding is the most popular means signal separation
- Some GMRS repeaters are multi-homed / voting-based systems using CTCSS for host separation
- GMRS repeaters are commonly referred to by the last 3 digits of their channel frequency: “The 650 machine” or “The St Mary’s 650 repeater”

# Typical GMRS Repeater Costs

- Installation cost estimate of \$5000
  - Icom/Kenwood/Motorola UHF Repeater: \$1700 - \$3500
  - Duplexer: \$250 - \$800
  - Antenna: \$150
  - Feedline: \$300
  - Misc Hardware: \$0-500
  - Tower Climber: \$0-1500
  - Tower and Building Rent: Variable (Often free)
  - Installation labor provided by volunteers

# Sample of Regional GMRS Repeaters

- Belpre, OH 462.725 /D265 Ch. 22r
- Vienna, WV 462.575 /103.5 Ch. 16r
- Pomeroy, OH 462.700 /91.5 Ch. 22r
- Newport, OH 462.600 /141.3 Ch. 17r
- St Mary's, WV 462.650 /123.0 Ch. 19r
- Chillicothe, OH 462.550 /141.3 Ch. 15r
- Columbus, OH 462.575 /123.0 Ch. 16r

# Operating Observations

There is only a small cultural divide that exists between amateur radio and GMRS and is mostly manifested in slight shifts in vernacular and style.

- GMRS is not a hobby. Communication seems generally more purposeful. Many use GMRS to support other hobbies such as off-road motoring and as a grid-down communication alternative.
- A high level of friendliness and courtesy is noticeable and common.
- Call sign usage is sporadic when not on repeater channels
- Call signs are often shortened to the numbers for efficiency: “Go ahead ‘297”
- Unit or Sub-part calls are common. “This is WXGY-297 Unit 2”
- Low recognition or use of common Q Codes and standard phonetics
- Some use of older CB lingo such as “10-4” and “I’m out” or “I’m on the side”
- GMRS repeater nets are generally well run and informational, yet they may appear less structured and formal than average amateur service nets.
- End of Transmission Tones (Roger Beeps) are not uncommon on simplex
- Business use or business channel overlap is also not uncommon

# Why GMRS for Athens County

- The GMRS community in Athens County is currently underserved
  - The only known Athens County repeater is in The Plains and has limited coverage
- Neighboring counties are already leveraging GMRS in their emergency communication plans
  - Wood County, WV
  - Meigs County, OH
- Additional communication services like GMRS expand our community's capabilities and provide an entry path into other radio services

# GMRS License Growth

- Over 330,000 GMRS license holders in the US
  - Number of GMRS *users* is far greater
- Over 149,000 new licenses issued in the US in the last 24 months.
  - Fastest growing licensed radio service
- Over 4600 new Ohio license holders in the last 24 months
- 881 new West Virginia license holders in the last 24 months

# GMRS fits the ACARA Mission

## *The Athens County, Ohio Amateur Radio Association*

***The ACARA is the oldest and largest of the four Amateur radio organizations in Athens County, Ohio. It is a 501(c)(3) non-profit Ohio scientific and education corporation devoted to the advancement of wireless telecommunications. Our members also provide emergency and public service communications to Athens and surrounding counties.***

- GMRS fits well with the ACARA mission of advancement of wireless telecommunication
- GMRS excels at supplementing the ACARA footprint in the realms of emergency and public service communications for our community
- GMRS is a proven gateway to amateur radio licensing. It allows additional community members to experience and practice good radio operating techniques and helps drive interest in other radio communication possibilities

# Proposal to ACARA

## Vote on the following individual resolutions

1. Officially adopt GMRS as an additional means of general and emergency communications between ACARA members, non-ham, and pre-ham members of the public
2. Encourage ACARA members to apply for a GMRS license
3. Create an ACARA led GMRS simplex net until such time as a GMRS repeater can be established in Athens county
4. A) Create a new ACARA membership tier for GMRS license holders or B) Create a ACARA affiliated GMRS club
5. Authorize and fund the purchase and installation of a permanent GMRS repeater for county-wide GMRS coverage
6. Authorize and fund a temporary GMRS repeater at the Red Cross for expediency and service testing.