

General Mobile Radio Service

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The **General Mobile Radio Service** (GMRS) is a licensed land-mobile FM UHF radio service in the United States available for short-distance two-way communication. It is intended for use by an adult individual who possesses a valid GMRS license, as well as his or her immediate family members.^[1] Immediate relatives of the GMRS system licensee are entitled to communicate among themselves for personal or business purposes, but employees of the licensee, who are not family members, are not covered by the same license.

GMRS radios are typically handheld portable devices much like Family Radio Service (FRS) radios, and share some frequencies with FRS. Mobile and base station-style radios are available as well, but these are normally commercial UHF radios as often used in the public service and commercial land mobile bands. These are legal for use in this service as long as they are GMRS type-approved. They are more expensive than the walkie talkies typically found in discount electronics stores, and are generally considered higher quality.



GMRS capable handheld radio

Contents

- 1 Licensing
- 2 Range
- 3 Frequency assignments and FRS
- 4 Frequency chart
- 5 History
- 6 Use of GMRS equipment in other countries
- 7 See also
- 8 References
- 9 External links

Licensing

Any individual in the United States who is at least 18 years of age and not a representative of a foreign government may apply for a GMRS license by completing the application form (either on paper or through the FCC's Universal Licensing System) and paying the license fee (currently \$85.00). No exam is required. A license for a GMRS system is usually issued for a 5-year term.^[2] Prior to July 31, 1987, the FCC issued GMRS licenses to non-individuals (corporations, partnerships, government entities, etc.). These licensees are grandfathered and may renew their existing licenses. No new GMRS licenses are being issued to non-individuals, nor may existing non-individual licensees make major modifications to their licenses.^[3]

The license extends privileges of the primary licensee to include communications with the licensee's immediate family members, and authorizes immediate family members to use the licensee's station(s) to conduct the

activities of the licensee. Additionally, the FCC rules allow GMRS licensees to communicate with other GMRS licensees. GMRS licensees are allowed to communicate with FRS users on those frequencies that are shared between the two services. The rules require each GMRS user family to have a license, rather than (as in the case of commercial and public safety land mobile license) authorizing a licensee's employees to use the same license.

Range

As for other UHF radio services, reliable range is considered to be line-of-sight and the distance to the radio horizon can be estimated based on antenna height. Theoretical range between two hand-held units would be about one or two miles (about one and a half to three km), mobile units have higher antennas and range of around 5 miles (8 km). A GMRS repeater with an antenna that is high above the surrounding terrain can extend the usable range over a wide area, for example up to 20 miles radius around the repeater station.^[4] Obstructions such as hills and buildings can reduce range. Higher power does not necessarily give a proportional increase in range, although it may improve the reliability of communication at the limits of line-of-sight distance.

Frequency assignments and FRS

The GMRS-only channels are defined in pairs, with one frequency in the 462 MHz range for simplex and repeater outputs, and another frequency 5 MHz higher for repeater inputs. There are eight channels exclusively for GMRS and seven "interstitial" channels shared with Family Radio Service. GMRS use requires an FCC license, and licensees are permitted to transmit at up to 50 watts on GMRS frequencies, depending on the type of station^[5], but 1 to 5 watts is more common. Units are allowed to have detachable or external antennas.

GMRS licensees are also able to use the first 7 FRS frequencies (the "interstitial" GMRS frequencies) with a few limitations. Specifically, they may be used as long as one-way pages are not transmitted, communications are limited to voice, and transmission power (ERP) does not exceed 5 watts (FCC Code §95.29, section f). This allows GMRS users to transmit on a total of 15 channels. FRS channels 8 through 14 are not available for GMRS use; use of these frequencies requires an FRS transceiver, or a hybrid transceiver operating under FRS rules.^{[6][7]}

Recently, hybrid FRS/GMRS consumer radios have been introduced with 22 channels, instead of the 14 channels associated with FRS. On this type of radio, channels 8-14 are strictly license-free FRS channels. Transmitting on all channels above channel 14 requires a license. Transmitting on the shared FRS/GMRS channels 1-7 requires a license, if using more than one half watt. It is the responsibility of the radio user to read and understand all applicable rules and regulations regarding GMRS. These hybrid radios are often referred to as "bubble pack" radios, since they are often packed in a plastic shell, for hanging on a display shelf. The massive sales of these radios have led to a term known as "bubble-pack pirates", persons who use GMRS without a license.^[8]

The FCC rules for use of hybrid radios on channels 1-7 require licensing only when operating under the rules that apply to the GMRS.^[9] Many hybrid radios have an ERP that is lower than one half watt on channels 1-7, or can be set by the user to operate at low power on these channels. This allows hybrid radios to be used under the license free FRS rules if the ERP is less than one half watt and the unit is certified for FRS operation. Only two makers of hybrid FRS/GMRS radios (Garmin and Motorola) presently sell radios that will operate on the GMRS repeater channels; the common "22 channel" radios cannot be used with GMRS repeaters. The Icom IC-F21GM is a solely-GMRS radio which will also work repeaters.

Hybrid packaging still contains the notice of the FCC licensing requirement. Estimates of the number of hybrid

FRS/GMRS radios sold to date range from 20 to 50 million units or more. This is compared with approximately 80,000 active GMRS licensees (per the FCC database). Enforcement against individuals is rarely, if ever, attempted.^[10]

Frequency chart

The "Friendly Name" of a frequency is the portion of the frequency to the right of the decimal (the kHz portion).

This first set of frequencies shows the split frequency pairs used in duplex operational mode, often used with repeaters. Simplex (same frequency for receiving and transmitting) mode only utilizes the lower set of frequencies.

All channels are used with narrow-band frequency modulation.

Name	Lower frequency (repeater output) (MHz)	Upper frequency (repeater input) (MHz)	Motorola convention	Icom F21-GM convention	Notes
"550"	462.550	467.550	Ch. 15	Ch. 1	
"575"	462.575	467.575	Ch. 16	Ch. 2	
"600"	462.600	467.600	Ch. 17	Ch. 3	
"625"	462.625	467.625	Ch. 18	Ch. 4	
"650"	462.650	467.650	Ch. 19	Ch. 5	Use not permitted near the Canadian border.
"675"	462.675	467.675	Ch. 20	Ch. 6	Suggested nationwide emergency and road information calling. Nationally recognized coded squelch for 675 emergency repeater operation is 141.3 Hz. ^[citation needed]
"700"	462.700	467.700	Ch. 21	Ch. 7	Use not permitted near the Canadian border.
"725"	462.725	467.725	Ch. 22	Ch. 8	

This second set of frequencies shows the interstitial ranges shared with the Family Radio Service services. These frequencies can only be used for simplex operations.

Name	Frequency (MHz)	Motorola convention	Icom F21-GM convention	Notes
"5625" or "FRS 1"	462.5625	Ch. 1	Ch. 9	
"5875" or "FRS 2"	462.5875	Ch. 2	Ch. 10	
"6125" or "FRS 3"	462.6125	Ch. 3	Ch. 11	
"6375" or "FRS 4"	462.6375	Ch. 4	Ch. 12	
"6625" or "FRS 5"	462.6625	Ch. 5	Ch. 13	

"6875" or "FRS 6"	462.6875	Ch. 6	Ch. 14	
"7125" or "FRS 7"	462.7125	Ch. 7	Ch. 15	

History

The predecessor to GMRS was named **Class A Citizens Radio Service** when it was rolled out in the 1960s. Tube type transceivers were used, and transmitter power was limited to 60 watts (plate input power to the final amplifier tube). The original service ran wideband FM with ± 15 kHz transmitter deviation and 50 kHz channel spacing. At the time, this was the norm for all U.S. land mobile services. There was also a Class B Citizens Radio Service which used a different set of 461 MHz channels and was limited to 5 watts output. Business users were permitted to license in this radio service. Radios were built by consumer electronics firms and commercial two-way radio vendors.

In the 1960s, the UHF 450-470 MHz band was re-allocated to 25 kHz channels. This meant transmitter deviation was reduced to ± 5 kHz. This doubled the number of channels available across the entire 450-470 MHz band. Class B Citizens Radio Service channels were re-allocated to other radio services.

In the 1970s, allowed power was again changed to 50 watts across the output terminals of the transmitter. In 1987, licensing of business users was discontinued and businesses were allowed to continue operating until their licenses expired. There was congestion on all channels in larger metropolitan statistical areas and moving businesses to Business Radio Service channels would provide some relief. The radio service was changed to its present name.

Use of GMRS equipment in other countries

The use of radio transmitters is regulated by national laws and international agreements. Often radio equipment accepted for use in one part of the world may not be operated in other parts due to conflicts with frequency assignments and technical standards. Some of the roles that the licensed GMRS service fills in the United States are, in other countries, filled by unlicensed or class-licensed services. Generally these services have strict technical standards for equipment to prevent interference with licensed transmitters and systems.

In Canada, hand-held GMRS radios up to 2 watts have been approved for use without a license since September 2004.^[11] Typically these are dual FRS and GMRS units, with fixed antennas, and operating at 2 watts on some GMRS channels and 0.5 watts on the FRS-only channels. Mobile units (permanently mounted in vehicles), base stations and repeaters are not currently permitted on the GMRS channels in Canada.

Other countries have licensed and unlicensed personal radio services with somewhat similar characteristics, but technical details and operating conditions vary according to national rules. Many European countries use a similar 8 channel system near 446 MHz known as PMR446, as well as a 69-channel low-power LPD433 which is shared with the ISM band. GMRS equipment that is approved for use in the United States will not communicate with PMR446 radios, and generally will not be approved for operation in other countries.

See also

- Multi-Use Radio Service

References

- ¹ ^ The FCC definition of immediate family includes a spouse, children, parents, grandparents, aunts, uncles, nephews, nieces, and in-laws , see 47 CFR 95.179
- ² ^ 47 CFR 95.105 (http://edocket.access.gpo.gov/cfr_2009/octqtr/47cfr95.105.htm)
- ³ ^ FCC: Wireless Services: General Mobile Radio Service: Licensing: Eligibility (http://wireless.fcc.gov/services/index.htm?job=licensing_1&id=general_mobile)
- ⁴ ^ H. Ward Silver *Two-way radios & scanners for dummies* For Dummies, 2005 ISBN 0-7645-9582-2, page 56
- ⁵ ^ "Electronic Code of Federal Regulations Title 47" (<http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&rgn=div5&view=text&node=47:5.0.1.1.5&idno=47#47:5.0.1.1.5.1.139.21>) . Federal Communications Commission. §95.135. <http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&rgn=div5&view=text&node=47:5.0.1.1.5&idno=47#47:5.0.1.1.5.1.139.21>.
- ⁶ ^ GMRS Rules (<http://www.provide.net/~prsg/part95ae.htm>)
- ⁷ ^ Federal Communications Commission (<http://www.fcc.gov/>) . *Chapter 1—Federal Communications Commission, Part 95—Personal Radio Services* (<http://www.gpo.gov/fdsys/pkg/CFR-2009-title47-vol5/pdf/CFR-2009-title47-vol5-part95.pdf>) . United States Government Printing Office. pp. §95.29; §95.603(a); §95.603(d); §95.621; §95.627. <http://www.gpo.gov/fdsys/pkg/CFR-2009-title47-vol5/pdf/CFR-2009-title47-vol5-part95.pdf>.
- ⁸ ^ Andrew Cantor (2005-01-07). "CyberSpeak - Walkie-talkies still fit in the dreams of little boys" (http://www.usatoday.com/tech/columnist/andrewcantor/2005-01-07-cantor_x.htm) . *USATODAY.com*. USA Today, division of Gannett Co. Inc.. http://www.usatoday.com/tech/columnist/andrewcantor/2005-01-07-cantor_x.htm. Retrieved 2011-03-11.
- ⁹ ^ http://wireless.fcc.gov/services/index.htm?job=service_home&id=general_mobile General Mobile Radio Service, retrieved 2011 01 31
- ¹⁰ ^ <http://home.provide.net/~prsg/frs-home.htm> FRS Home Page
- ¹¹ ^ See Industry Canada RSS 210 *Low-Power Licence Exempt Radiocommunications Devices*

External links

- FCC: GMRS Specifications and U.S. Licensing Info (<http://wireless.fcc.gov/services/personal/generalmobile/>)
- FCC FRS Band Plan (http://wireless.fcc.gov/services/index.htm?job=service_bandplan&id=family)
- The Personal Radio Steering Group (<http://www.provide.net/~prsg/wi-gmrs.htm>)

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