Family Radio Service

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The **Family Radio Service** (FRS) is an improved walkie talkie radio system authorized in the United States since 1996. This personal radio service uses channelized frequencies around 462 and 467 MHz in the ultra high frequency (UHF) band. It does not suffer the interference effects found on citizens' band (CB) at 27 MHz, or the 49 MHz band also used by cordless phones, toys, and baby monitors. FRS uses frequency modulation (FM) instead of amplitude modulation (AM). Since the UHF band has different radio propagation characteristics, short-range use of FRS may be more predictable but shorter ranged that than the more powerful license-free radios operating in the HF CB band.

Initially proposed by Radio Shack in 1994 for use by families, FRS has also seen significant adoption by business interests, as an unlicensed, low-cost alternative to the business band.

Worldwide, a number of similar personal radio services exist; these share the characteristics of low power, operation in the UHF (or upper VHF) band using FM, and simplified or no end-user licenses. Exact frequency allocations differ, so equipment legal to operate in one country may cause unacceptable interference in another.

Motorola T5320 FRS handheld radio

Contents

Technical information

FRS radios are limited to 500 milliwatts according to FCC regulations. Channels 1 to 7 are shared with low-power interstitial channels of GMRS, the General Mobile Radio Service. A license is required for those channels if the power output is over FRS limits.

Unlike Citizens' Band (CB) radios, FRS radios frequently have provisions for using sub-audible tone squelch (CTCSS and DCS) codes, filtering out unwanted chatter from other users on the same frequency. Although these codes are sometimes called "privacy codes" or "private line codes" (PL codes), they offer no protection from eavesdropping and are only intended to help share busy channels. Tone codes also do nothing to prevent desired transmissions from being swamped by stronger signals having a different code.

FRS rules permit only +/-2.5KHz maximum deviation (NFM).

FRS stations on channels 1 through 7 may communicate with GMRS stations on those shared channels; the GMRS stations may use up to 5 watts of power, while the FRS stations are restricted to 500 milliwatts (half a watt).

FRS radios must use only permanently attached antennas, such as walkie-talkies; there are also table-top FRS "base station" radios that have whip antennas. This limitation intentionally restricts the range of communications, allowing greatest use of the available channels. The use of duplex radio repeaters and interconnects to the telephone network are prohibited under FRS rules, unlike other radio services.

FRS manufacturers generally claim exaggerated range. The presence of large buildings, trees, etc., will reduce range. Under exceptional conditions, (such as hilltop to hilltop) communication is possible over 60 km (37 mi) or more, but that is rare. Under normal conditions, with line of sight blocked by a few buildings or trees, FRS has an actual range of about 0.5 to 1.5 km (0.3 to 1 mile).

FRS/GMRS hybrid radios in the United States

Hybrid FRS/GMRS consumer radios have been introduced that have 22 channels. Many of these radios have been certified for unlicensed operation (on the 7 FRS frequencies, channels 8-14) under FRS rules.[1]

Motorola FV150 FRS and GMRS handheld radio

The FCC rules and statements regarding the use of hybrid radios on channels 1-7 stipulate the need for a GMRS license when operating under the rules that apply to the GMRS. Many hybrid radios have an ERP that is lower than 0.5 watts 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 0.5 watts and the unit is certified for FRS operation on these frequencies.

In the United States of America, operation on channels 15-22 requires an FCC GMRS license.[2] Interference to licensed services may be investigated by the FCC.[3]

Channels 8-14 are exclusively for FRS. Accordingly, GMRS operation is not allowed on these channels. Channels 15-22 are reserved exclusively for GMRS. As noted, FRS operation is not allowed on these channels.

List of FRS channels

Channel	Frequency (MHz)	Notes
1	462.5625	Shared with GMRS
2	462.5875	Shared with GMRS
3	462.6125	Shared with GMRS
4	462.6375	Shared with GMRS
5	462.6625	Shared with GMRS
6	462.6875	Shared with GMRS
7	462.7125	Shared with GMRS
8	467.5625	FRS use only
9	467.5875	FRS use only
10	467.6125	FRS use only
11	467.6375	FRS use only
12	467.6625	FRS use only
13	467.6875	FRS use only
14	467.7125	FRS use only

Some clubs have recommended FRS Channel 1 as a national emergency/calling channel, such as REACT International, Inc. (http://www.REACTintl.org) and the National SOS Radio Network (http://www.NationalSOS.com).

Channel 2 is typically used by geocaching groups when trying to connect with other geocachers.[4]

FRS radios in other countries

Personal UHF radio services similar to the American FRS exist in other countries, although since technical standards and frequency bands will differ, usually FCC-approved FRS equipment may not be used in other jurisdictions.

Canada

American-standard FRS radios have been approved for use in Canada since April 2000. The revised technical standard RSS 210 has essentially the same technical requirements as in the United States. Since September 2004, low-power GMRS radios and dual-standard FRS/GMRS radios have also been approved for use in Canada, giving additional channels. In Canada, no license is required and no restrictions are imposed on the GMRS channels.[5]

Mexico

Since tourists often bring their FRS radios with them, and since trade between the U.S., Canada, and Mexico is of great value to all three countries, the Mexican Secretary of Communication and Transportation has authorized use of the FRS frequencies and equipment similar to that in the US. However, dual-mode FRS/GMRS equipment is not

approved in Mexico, so caution should be exercised in operating hybrid FRS/GMRS devices purchased elsewhere.[6]

South America

Dual-mode GMRS/FRS equipment is also approved in Brazil (GMRS only in simplex mode, GMRS frequencies 462.550, 467.550, 462.725, 467.725 are not allowed)[7] and most other South American countries. Portable radios are heavily used in private communications, mainly by security staff in nightclubs and malls, but also in private parking, maintenance, and delivery services.

Other personal radio services

Main article: Personal radio service

Many personal radio services similar to the FRS exist around the world. Because radio spectrum allocation varies around the world, a personal radio service device may not be usable outside its original area of purchase. FRS equipment may not be legally permitted in other countries because it uses frequencies allocated to services such as police or fire; however, many countries have equivalents to the FRS.

See also

- General Mobile Radio Service
- Multi-Use Radio Service
- PMR446
- CTCSS

References

1. ^ FCC: Wireless Services: Family Radio Service: Family Home (http://wireless.fcc.gov/services/index.htm?job=service_home&id=family)
2. ^ http://wireless.fcc.gov/services/index.htm?job=service_home&id=general_mobile General Mobile Radio Service, retrieved 2011 01 31
3. ^ "EB - Spectrum Enforcement Division" (http://www.fcc.gov/eb/sed/). *Federal Communications Commission*. 26 January 2010. Retrieved 31 January 2011. "The Spectrum Enforcement Division is responsible for resolution of complaints involving public safety and technical issues such as tower registration, marking and lighting and equipment requirements. The Division is also responsible for taking enforcement actions regarding such violations as unauthorized construction or operation of radio stations."
4. ^ "Frequently Asked Questions" (http://www.geocaching.com/faq/). Groundspeak Inc. Retrieved 29 July 2009.
5. ^ http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf01320.html Industry Canada *RSS-210 - Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands)* retrieved 23 October 2009
6. ^ http://web.archive.org/web/20091026203800/http://geocities.com/wd9ewk/xe-frs.html *Mexico's Family Radio Service (FRS) equivalent* retrieved 23 October 2009
7. ^ http://www.anatel.gov.br/Portal/exibirPortalRedireciona.do?codigoDocumento=252434 *RESOLUÇÃO No 506, DE 1o DE JULHO DE 2008* page 28, Seção XIV, retrieved 12 May 2012

External links

- CTCSS Codes for some Radios (http://www.gmrsweb.com/codetable.html)
- FRS Radios in Mexico (http://web.archive.org/web/20091026203800/http://geocities.com/wd9ewk/xe-frs.html)
- Industry Canada discussion on the approval of FRS in Canada (http://strategis.ic.gc.ca/epic/internet/insmt-gst.nsf/vwapj/rabc1.pdf/$FILE/rabc1.pdf)
- NWI General Mobile Radio Services (http://nwigmrs.com)
- FRS and GMRS radio information and forums (http://www.gmrs.net.tc)
- F-R-S Communications Center (http://www.f-r-s.org/)
- The situation of License Free Radio System in Japan (http://yasuo.k-server.org/FX886/situetion.htm)
- REACT International, Inc. (http://www.REACTintl.org)
- National SOS Radio Network (http://www.NationalSOS.com)
- Join the International FRS DX Group (http://groupe-frs.hamstation.eu/index_english.htm)

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