Unlicensed VHF Frequencies

Summary
The TS4000 radio modem can be used without a license, with some restrictions, in the United States on five specific VHF frequencies under the MURS (Multi-Use Radio System) rules of the FCC. The MURS rules allow voice or data communications for personal or business activities of the general public. [see 95.401(e)]

Note that the FCC may change, restrict, modify or amend these rules in the future.

Frequencies and Channel Bandwidth
MURS allows unlicensed use on the following 5 frequencies and bandwidths: [see 95.632(a),(b)}
151.820MHz, bandwidth: 11.25 KHz
151.880MHz, bandwidth: 11.25 KHz
151.940MHz, bandwidth: 11.25 KHz
154.570MHz, bandwidth: 20.0 KHz
154.600MHz. bandwidth: 20.0 KHz

This channel bandwidth (occupied bandwidth) of the TS4000 is configured on the Radio tab of the TS4000 configuration software.

Power
The MURS frequencies can be used with up to 2 watts or transmit power. [see 95.639(h)]

For the TS4000 Radio Modem, the transmit power is set on the Radio tab in the TS4000 configuration software.

Antennas
The MURS rules do not currently limit the type of antenna.

Antenna Height
The highest point of any MURS antenna must be no more than 18.3 meters (60 feet) above the ground or 6.10 meters (20 feet) above the highest point of the structure on which it is mounted. [see 95.1315]

Channel Sharing
The MURS rules specify that the channels must be shared with other users. [see 95.1309] The TS4000 is designed to minimize interference with other users by listening before it transmits. However, the best way to minimize interference with other channel users is to use the TS4000's Clear Channel Scan feature. Clear Channel Scan automatically and dynamically selects the frequency with the least amount of interference. Clear Channel Scan is set on the Radio tab of the TS4000 Configuration software.

The MURS rules do not allow the use of store and forward repeaters. [see 95.1311]

Location
A MURS radio can be used "within or over any area of the world where radio services are regulated by the FCC". [95.405(a), 95.1303]

A MURS radio may not be used aboard an aircraft in flight. [95.1303(b)]

Equipment
The TS4000 Radio Modem (Part# TS4000-05C15SBB) meets the requirements for MURS. Note that the TS4000 must be configured correctly to meet the MURS rules. The TS4000 can be ordered with a MURS compatible configuration using part# TS4000-05C15SBB-MURS.

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Revised as of October 1, 2005

Notes:

1) The rules for MURS first went into effect on November 13, 2000.
2) The FCC may change, add, restrict or modify these rules in the future.
3) A number of changes to the MURS rules were made in October of 2002.

95.401 (CB Rule 1) What are the Citizens Band Radio Services?
The Citizens Band Radio Services are:
* * * * *
(f) The Multi-Use Radio Service (MURS)--a private, two-way, short distance voice or data communications service for personal or business activities of the general public. The rules for this service are contained in subpart J of this part.

95.601 Basis and purpose.
* * * The Personal Radio Services are the GMRS (General Mobile Radio Service)-subpart A, the Family Radio Service (FRS)-subpart B, the R/C(Radio Control Radio Service)-subpart C, the CB (Citizens Band Radio Service)-subpart D, the Low Power Radio Service (LPRS)-subpart G, the Wireless Medical Telemetry Service (WMTS)-subpart H, the Medical Implants Communication Service (MICS)-subpart I, and the Multi-Use Radio Service (MURS)--subpart J.

95.603 Certification required.
(g) Each Multi-Use Radio Service transmitter (a transmitter that operates or is intended to operate in the MURS) must be certificated in accordance with Subpart J of Part 2 of this chapter, Provided however, that those radio units certificated as of November 12, 2002 need not be recertificated.

95.605 Certification procedures.
Any entity may request certification for its transmitter when the transmitter is used in the GMRS, FRS, R/C, CB, IVDS, LPRS, MURS, or MICS following the procedures in part 2 of this chapter. * * *

95.631 Emission types.
(j) A MURS transmitter must transmit only A1D, A2B, A2D, A3E, F2B, F1D, F2D, F3E, G3E. Emission types A3E, F3E and G3E include selective calling or tone-operated squelch tones to establish or continue voice communications. MURS transmitters are prohibited from transmitting in the continuous carrier mode.

95.632 MURS transmitter frequencies.
(a) The MURS transmitter channel frequencies are 151.820MHz, 151.880MHz, 151.940MHz, 154.570MHz, 154.600MHz.
(b) The authorized bandwidth is 11.25kHz on frequencies 151.820MHz, 151.880MHz and 151.940MHz. The authorized bandwidth is 20.0kHz on frequencies 154.570MHz and 154.600MHz.
(c) MURS transmitters must maintain a frequency stability of 5.0 ppm, or 2.0 ppm if designed to operate with a 6.25kHz bandwidth.

95.633 Emission bandwidth.
(f) The authorized bandwidth for any emission type transmitted by a MURS transmitter is specified as follows:
(1) Emissions on frequencies 151.820MHz, 151.880MHz and 151.940MHz are limited to 11.25KHz.
(2) Emissions on frequencies 154.570MHz and 154.600MHz are limited to 20.0KHz.
(3) Provided, however, that all A3E emissions are limited to 8KHz.

95.635 Unwanted radiation.
(e) For transmitters designed to operate in the MURS, transmitters shall comply with the following: * * * * *

95.639 Maximum transmitter power.
(h) No MURS unit, under any condition of modulation, shall exceed 2 Watts transmitter power output.

95.649 Power capability
No CB, R/C, LPRS, FRS, MICS, MURS or WMTS unit shall incorporate provisions for increasing its transmitter power to any level in excess of the limits specified in 95.639.

95.651 Crystal control required
All transmitters used in the Personal Radio Services must be crystal controlled, except an R/C station that transmits in the 26-27 MHz frequency band, a FRS unit, a LPRS unit, a MURS unit, a MICS transmitter, or a WMTS unit.

Subpart J-Multi-Use Radio Service (MURS)

General Provisions

95.1301 Eligibility.
An entity is authorized by rule to operate a MURS transmitter if it is not a foreign government or a representative of a foreign government and if it uses the transmitter in accordance with 95.1309 and otherwise operates in accordance with the rules contained in this subpart. No license will be issued.

95.1303 Authorized locations.
(a) MURS operation is authorized:
(1) Anywhere CB station operation is permitted under 95.405; and
(2) Aboard any vessel of the United States, with the permission of the captain, while the vessel is traveling either domestically or in international waters.
(b) MURS operation is not authorized aboard aircraft in flight.
(c) Anyone intending to operate a MURS unit on the islands of Puerto Rico, Desecheo, Mona, Vieques, and Culebra in a manner that could pose an interference threat to the Arecibo Observatory shall notify the Interference Office, Arecibo Observatory, Post Office Box 995, Arecibo, Puerto Rico 00613, in writing or electronically, of the location of the unit. Operators may wish to consult interference guidelines, which will be provided by Cornell University. Operators who choose to transmit information electronically should e-mail to: prcz@naic.edu.
(1) The notification to the Interference Office, Arecibo Observatory shall be made 45 days prior to commencing operation of the unit. The notification shall state the geographical coordinates of the unit.
(2) After receipt of such notifications, the Commission will allow the Arecibo Observatory a period of 20 days for comments or objections. The operator will be required to make reasonable efforts in order to resolve or mitigate any potential interference problem with the Arecibo Observatory. If the Commission determines that an operator has satisfied its responsibility to make reasonable efforts to protect the Observatory from interference, the unit may be allowed to operate.

95.1305 Station identification.
A MURS station is not required to transmit a station identification announcement.

95.1307 Permissible communications.
(a) MURS stations may transmit voice or data signals as permitted in this subpart.
(b) A MURS station may transmit any emission type listed in 95.631(j) of this chapter.
(c) MURS frequencies may be used for remote control and telemetering functions. MURS transmitters may not be operated in the continuous carrier transmit mode.

95.1309 Channel use policy.
(a) The channels authorized to MURS systems by this part are available on a shared basis only and will not be assigned for the exclusive use of any entity.
(b) Those using MURS transmitters must cooperate in the selection and use of channels in order to reduce interference and make the most effective use of authorized facilities. Channels must be selected in an effort to avoid interference to other MURS transmissions.

95.1311 Repeater operations an signal boosters prohibited.
MURS stations are prohibited from operating as a repeater station or as a signal booster. This prohibition include store-and-forward packet operation.

95.1313 Interconnection prohibited.
MURS stations are prohibited from interconnection with the public switched network. *Interconnection Defined.* Connection through automatic or manual means of multi-use radio stations with the facilities of the public switched telephone network to permit the transmission of messages or signals between points in the wireline or radio network of a public telephone company and persons served by multi-use radio stations. Wireline or radio circuits or links furnished by common carriers, which are used by licensees or other authorized persons for transmitter control (including dial-up transmitter control circuits) or as an integral part of an authorized, private, internal system of communication or as an integral part of dispatch point circuits in a multi-use radio station are not considered to be interconnection for purposes of this rule part.

95.1315 Antenna height restriction.

The highest point of any MURS antenna must be no more than 18.3 meters (60 feet) above the ground or 6.10 meters (20 feet) above the highest point of the structure on which it is mounted.

95.1317 Grandfathered MURS stations.

Stations that were licensed under Part 90 of the Commission's Rules to operate on MURS frequencies as of November 13, 2000, are granted a license by rule that authorizes continued operations under the terms of such nullified part 90 authorizations, including any rule waivers.