



Radio Communications

Emergency Communication Plan

- Who Do I need to communicate with?
 - Family, Friends, Neighbors, Emergency Agencies
- What is the distance / terrain to communicate?
 - How many miles, City setting, Open landscape, wooded area, hilly?
- What Method to communicate?
 - Cell Phone, Landline, Internet, Radio

Radio Communications

- Types of Radios
 - Family Radio Service (FRS)
 - General Mobile Radio Service (GMRS)
 - Citizen Band (CB)
 - Amateur Radio (HAM)



Family Radio Service (FRS – 70cm 462Mhz)

Pros

- Widely available
- No License required
- Channelized Frequencies (1-22)

Cons

- Limited Power 2 Watts Max
- Limited Range .25 to 1 mile
- No Repeaters
- No Base Equipment Available

General Mobile Radio Service (GMRS -70cm 462Mhz)

Pros

- License required but no testing
- Power (5w HT, 50w Base)
- Repeaters Allowed
- Channelized Frequencies (1-22)

Cons

- Range (½ Mile HT, 9 Miles Base)
- Limited to channels 1-22

Citizen Band Radio (CB- 11meter 26-27Mhz)

Pros

- Over 5 Million in use
- No License Required
- Channelized Frequencies (1-40)

Cons

- FCC power limit of 4 watts
- Limited Range (14 miles)
- AM Mode (tends to be noisy)

Amateur Radio (Ham – ref band plan chart next slide)

Pros

- Multiple Bands / Freq Available*
- Multiple Modes (Ph, Dig, CW,..)
- Self Govern Guidelines
- Power up to 1500 Watts **
- Range – Worldwide ***

Cons

- Requires Licenses (via Testing)
 - Tech Class
 - General Class
 - Extra Class

Technician Class License

Frequencies Available

- 10M (28.3-28.5 Mhz)
- 6M (50-54 Mhz)
- **2M (144 – 148 Mhz)**
- 1.25M (222-225 Mhz)
- **70cm (420-450 Mhz)**
- 23cm (1240 -1300 Mhz)
- 40M, 15M (CW, RTTY)

Common Use

- Limited HF communication for long distances.
- UHF / VHF communications (Mobile / HT / Base / Repeaters) common for local use.

General / Extra Class License

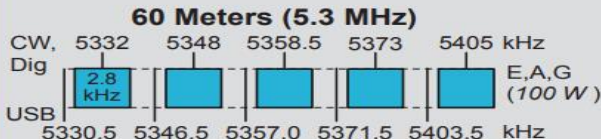
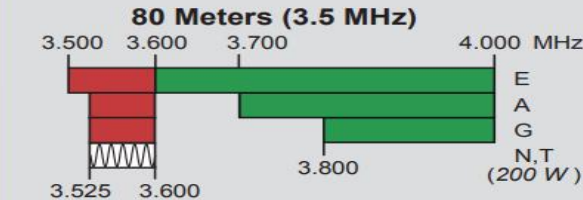
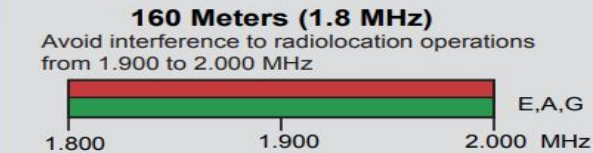
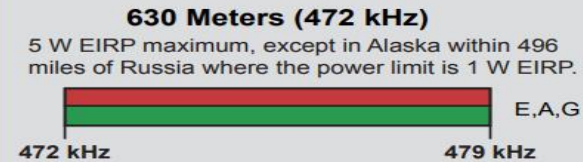
US Amateur Radio Bands

US AMATEUR POWER LIMITS — FCC 97.313 An amateur station must use the minimum transmitter power necessary to carry out the desired communications. (b) No station may transmit with a transmitter power exceeding 1.5 kW PEP.

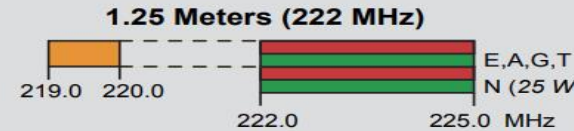
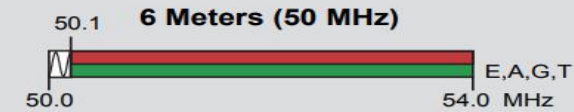
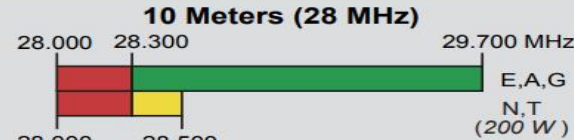
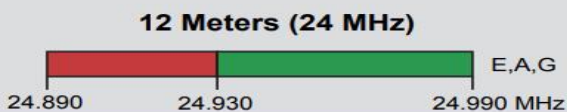
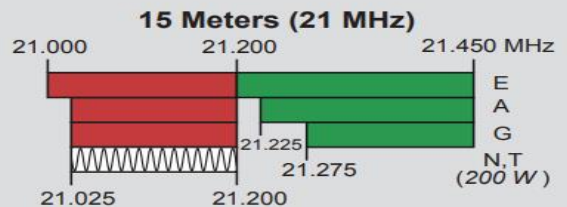
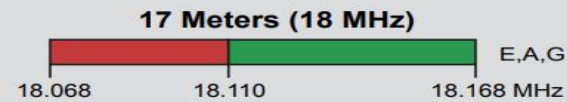
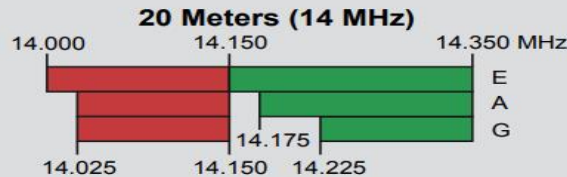
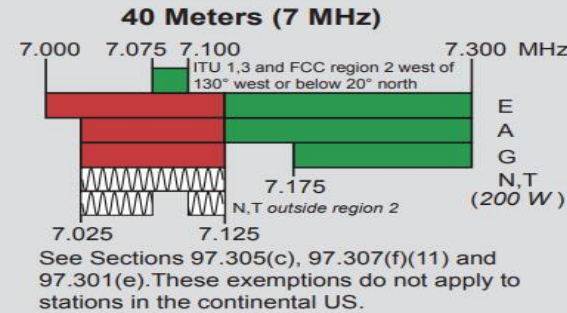


ARRL The national association for **AMATEUR RADIO**

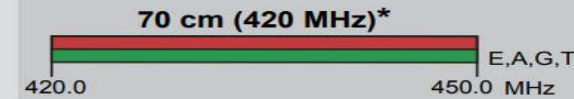
Amateurs wishing to operate on either 2,200 or 630 meters must first register with the Utilities Technology Council online at <https://utc.org/plc-database-amateur-notification-process/>. You need only register once for each band.



General, Advanced, and Amateur Extra licensees may operate on these five channels on a secondary basis with a maximum effective radiated power (ERP) of 100 W PEP relative to a half-wave dipole. Permitted operating modes include upper sideband voice (USB), CW, RTTY, PSK31 and other digital modes such as PACTOR III. Only one signal at a time is permitted on any channel.



*Geographical and power restrictions may apply to all bands above 420 MHz. See *The ARRL Operating Manual* for information about your area.



All licensees except Novices are authorized all modes on the following frequencies:

2300-2310 MHz	10.0-10.5 GHz ‡	122.25-123.0 GHz
2390-2450 MHz	24.0-24.25 GHz	134-141 GHz
3300-3500 MHz	47.0-47.2 GHz	241-250 GHz
5650-5925 MHz	76.0-81.0 GHz	All above 275 GHz

‡ No pulse emissions

KEY

Note:

CW operation is permitted throughout all amateur bands.

MCW is authorized above 50.1 MHz, except for 144.0-144.1 and 219-220 MHz.

Test transmissions are authorized above 51 MHz, except for 219-220 MHz

- = RTTY and data
- = phone and image
- = CW only
- = SSB phone
- = USB phone, CW, RTTY, and data
- = Fixed digital message forwarding systems only

- E = Amateur Extra
- A = Advanced
- G = General
- T = Technician
- N = Novice

See *ARRLWeb* at www.arrl.org for detailed band plans.

ARRL We're At Your Service

ARRL Headquarters:
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email: hq@arrl.org

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Getting Started in Amateur Radio:
Toll-Free 1-800-326-3942 (860-594-0355)
email: newham@arrl.org

Exams: 860-594-0300 email: vec@arrl.org

Ham Radio Equipment

Mobile Radio Operations (DON'T BE THESE GUYS)



Ham Radio Equipment (Base Station)

Flex Radio 6400 (SDR 6M – 160M)



Flex Radio Software Display



Base Station Antennas

Four Antennas on 50ft Tower



List of Antennas from Top Down

- 2M / 70cm Vertical
- 6M Yagi
- 10M-40M Yagi
- 80M Multi Band Wire

Recommended Video

Introduction to Radios and Emergency Communications

- <https://www.youtube.com/watch?v=nzDj0u1HhvE>