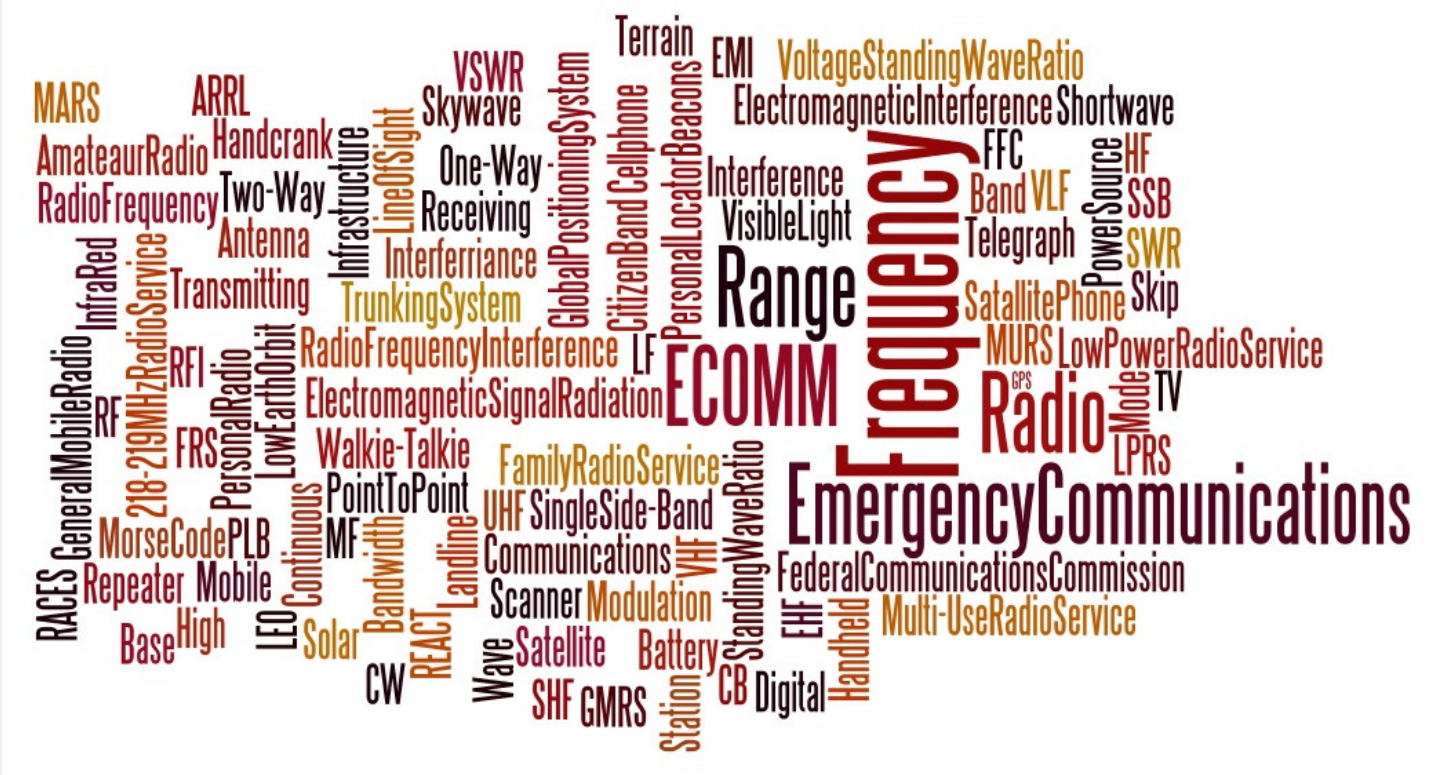
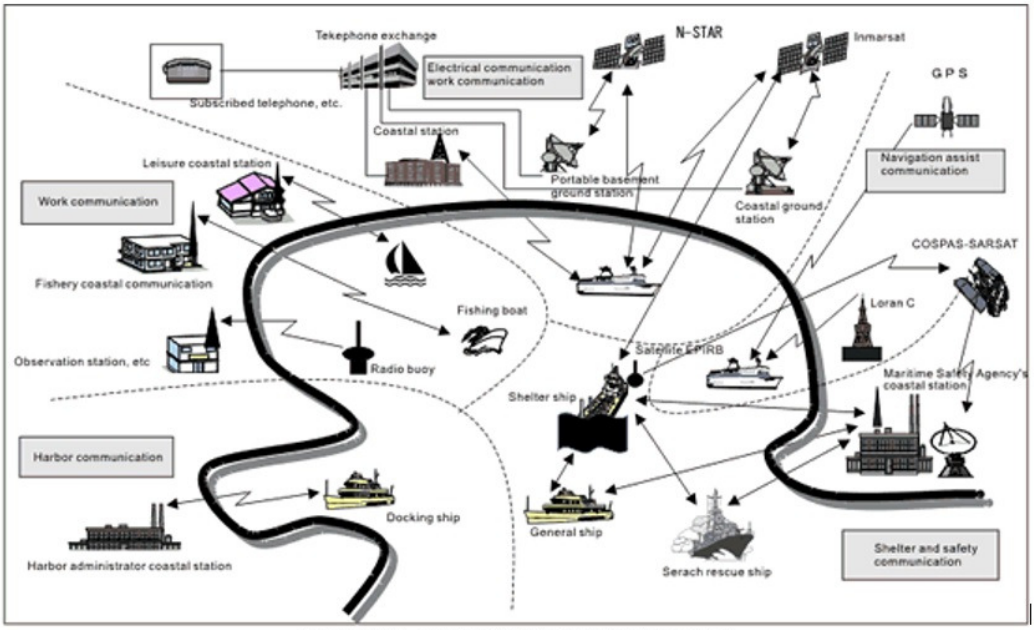
Communications in a Crisis



Just about any self-reliant, outdoors/wilderness, homesteading, Prepper or survivalist person should have emergency communications on their list of things to gain knowledge, goods and skills on. This is a very important aspect of preparedness and one well worth discussing.

Selecting the kind of crisis communications you need appears to be an easy task at first glance. However if your crisis plan is complete, you will quickly realize that there are many factors that are involved in determining your communication needs. Not the least of which is money!

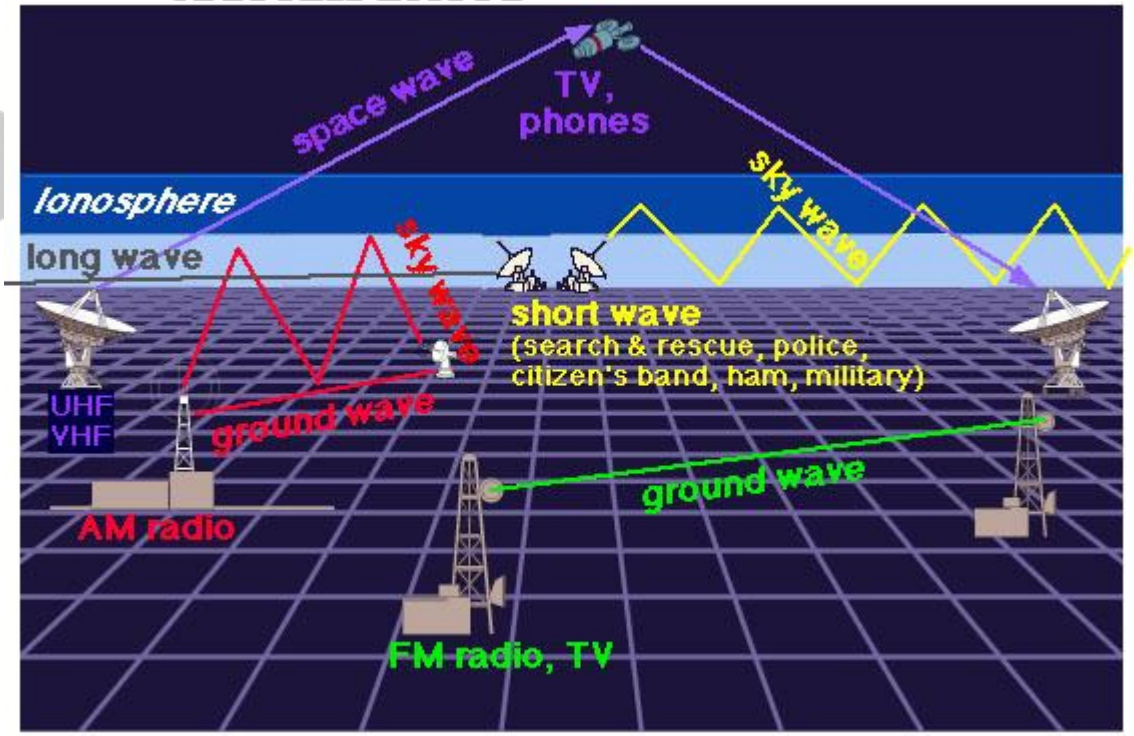


Basic Non-SHTF Communication Network

Let's face it most of us civilians don't have the funds or infrastructure to support an elaborate emergency communications system.

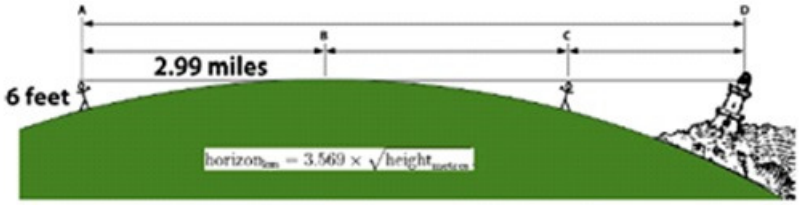
On top of this one must remember that **when selecting electronic equipment for use during emergencies that can last several weeks without electrical power, there are features an emergency radio should have that may not be realized when electrical power is available from the nearest wall outlet – AND - *Nothing is 100% reliable ALL of the time!***

Then there are all those misconceptions out there …

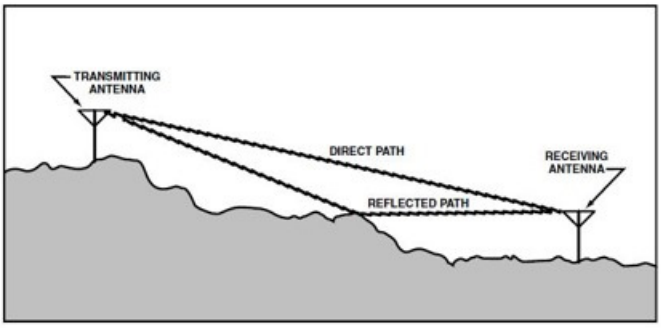


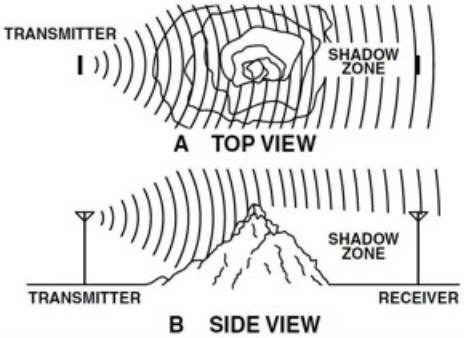
- **There are different types of air wave communications and none are 100% effective in all situations.** So it pays to have at least one secondary means of crisis communication.

    - Each type of radio wave communications has a defined block of 'bands' that it operates in.



- **All radio and even cellular phone communication are Line of Sight**. This means the sending and receiving devices must be within sight of each other or in sight of a working repeater or satellite.





- **All radio waves do not travel through all obstacles.** Some radio waves can travel through some obstacles, like say a small building or small stand of trees. However any heavily wooded area or substantial building has metal and thick concrete or mass that the waves cannot pass through.

- **The power of the communication unit or the power and height of the antenna will NOT completely compensate for the line of sight requirement.** Under certain circumstances they can 'push' the line of sight out a bit farther, *but cannot totally compensate for it*.

    - Some handheld device radio waves won't even penetrate the human body effectively.
    - Distance ranges will be affected by power to the device itself and the antenna height and power.
    - One-way communications tend to have a longer range than two-way. Mostly because there are more repeaters and antennas out there and radio stations are in a different wavelength and power range than civilian devices.
    - Base station two-way communications tend to have a longer range than hand-held.
    - You can talk to someone on the other side of the world IF you have usable repeaters to transmit your message around the curve of the earth.

- **Communicating on the airwaves is NOT for just saying hello or exchanging gossip**. **They are for *minimal* communications,** usually to pass information or to inform another of location and or needed directions/instructions concerning the issue/crisis at hand. Even at the height of CB communications, it was not used as a substitute for a phone conversation.

- **Many of the airwave communications are controlled by government entities and require a license to utilize.** Although it is true that most countries will NOT seek out and punish the person in a wilderness area who only uses their device to say 'check in' once a month (they have much bigger fish to fry).

- Depending on the crisis event, **cell towers or automated repeaters may not be functional and thus the cellphone or radio won't be either.**

- Depending on the crisis event, landline phones may not be functional.

- Depending on the crisis event, **any electronic device may not be functional without alternative electricity and that means the receiving device must also be functioning.**

    - Example: Your laptop may be functional but the internet may not be.
    - If you radio base station relies on a computer program it may not work.

- **Any one, with the right skill and equipment can eavesdrop on any airwave communication.**

- **Although it is illegal to communicate on the air waves in code in the non-SHTF world,** it may be necessary in the SHTF world. This takes planning and needs code phrases that you and your household or group know NOW and when to use them.

- **If one needs to keep their location unknown when on the air,** communications need to be short and to the point to avoid triangulation (locating the sending and or receiving devices).

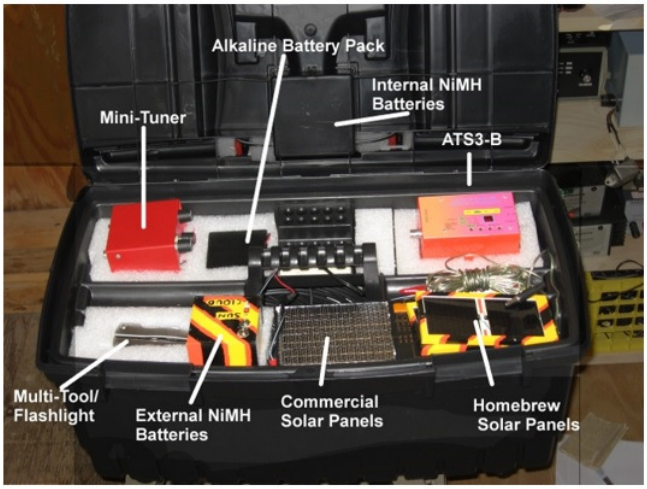
- **Sparks and lightning strikes are many times *less* powerful than a ferro/electromagnetic (CME/EMP) event.**

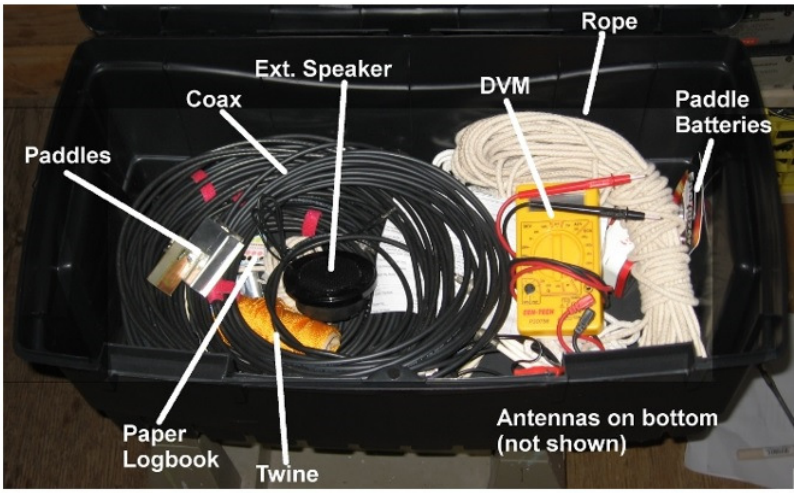
    - A screen or thin sheet metal Farady Cage is NOT substantial enough to protect the device(s) inside from the extreme ranges of an electro/ferromagnetic (CME/EMP) incident. These events are just too strong and require a thick metal (3/4' to 1 inch) protection. Sure it can stop the radio waves from penetrating, but NOT the electro/ferromagnetic wave lengths.

    - Just wrapping a padded device in aluminum foil will NOT protect the device within from an electro/ferromagnetic (CME/EMP) incident. Just as aluminum wiring shorted easily and caused fires, so too will an aluminum foil protected device.

    - For any ferro/electromagnetic protection it pays to layer with several Farady Cages and or burry them with at least 3 feet of soil all around. Example: Thumb drive wrapped in paper & aluminum foil, in an Altoid tin, wrapped in paper again then put inside a metal lunch box and buried in the ground. Or the same device, multiple insulated, inside the lunch box, inside a grounded metal trash can which is then stored in a grounded metal shed.

You want a system you can depend on in an emergency. The only way to do this is by getting comfortable with it ***before*** you need it. **Just purchasing a radio and then storing it in your closet to pull out and unpack during a crisis will NOT cut the cake!**





Things to take into consideration when planning your crisis communications:

- **What crises can take out our non-SHTF communications?**
  - Fero/electromagnetic event (CME/EMP)
  - Power outage caused by some natural or human-made crisis

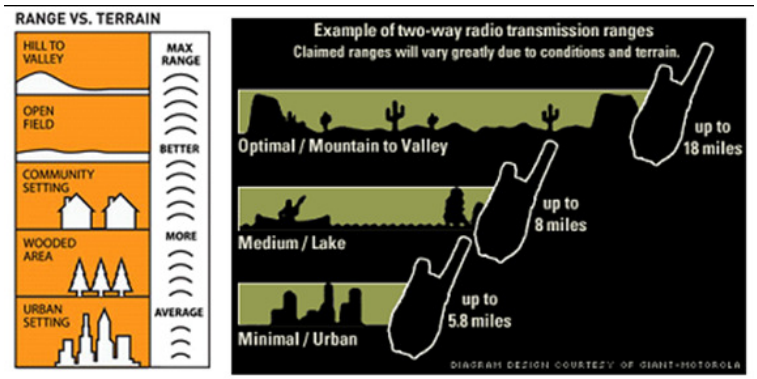
- **Make a list of the people you want to stay in touch with during an emergency.** This will undoubtedly include family members, business associates, church members, friends and neighbors.
  - Where are these people located in relation to where you are located? Same town, different state, etc?
  - What is the terrain where they are located? (Urban, rural, hilly, mountainous, flat, open water, local, cross country, etc?)
  - What crisis communication equipment and knowledge do they have?
  - What repeaters or relays are between you and who you want to communicate with?

- **Determine what it would take to stay in touch with each person** (this includes their environment too).

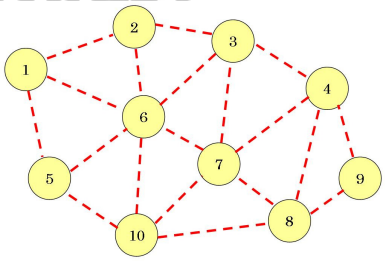
For example, to stay in touch with my relatives who live in another part of the country will require an Amateur Radio, along with relay or repeater stations. To communicate with my fellow self-reliant homesteading friends, who are scattered over a wide geographic area, may also require the same. However, I can use either CB, FRS or GMRS radio to talk to the neighbors and friends who live in my subdivision and city.

- **Receive only,** like the NWS radio station.
  - A crank, battery or alternative powered radio with the NWS radio band is what you will want.

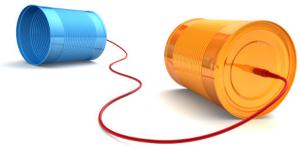
- **Two-way communications:** If you need 2-way communications ask yourself the following:
  - **What is your commitment in time and money** to not only acquire the communication system you need, but also the tenacity to learn any new knowledge, skills or licensing necessary to utilize the equipment?
  - **Consider your resources.** Make sure that you attend to first things first. As important as staying in touch may be, it's not as important as food, water, and shelter. Make sure you take care of those things first, before you blow a bunch of money on high-tech communication gadgets.
    - If you have less that $100 to spend and need one-way communication, get a simple AM/FM/NOAA radio that will run on solar power or via a hand-crank mechanism to keep you "in the know" of what is going on around you.
    - If you need two-way communications and have a couple of hundred dollars, you can add a CB or FRS radio.
    - If you have a bit more to spend on 2-way communications you can go Amateur (HAM), GMRS or MURS.



- **What type of environment will you be communicating in**?
  - Urban, rural, hilly, mountainous, flat, open water, local, cross country, etc?
    - Most radios are "line of sight" meaning that the single needs clear passage between the transmitter and the receiver. Concrete buildings or bridges, metal structures, hills, mountains, tunnels, caves and the like will absorb the transmission signal reducing the distance the signal travels.
  - The antenna will be the most important 'distance' factor after terrain.



- **Get a commitment from the people you want to talk to.** It won't do you any good to buy a radio if the people you want to talk to don't have one. Go figure.
  - This is why buying a radio is often a group decision. It's also helps if you are using similar equipment so you can help one another when there are problems.
  - Form a Radio Communication Network. Have a scheduled date and time to "check-in".
  - Keep an annual hardcopy of the HAM repeaters for your and your listening members areas.



- **Develop a communications plan as part of your preparedness plan.**
  - How often do you want to talk to the people in your network?
  - What are your procedures and protocols? Any "codes" that mean important things particular to your group?
  - These are things you need to figure out together, long before you are in the middle of a crisis.
  - Run periodic test drills. Take a page from the military: practice, practice, practice.

If you are new to preparedness communications and need 2-way communication abilities these three rules are first and foremost, when considering preparedness communications. ***DO NOT put this off for later.***

1. It takes someone listening for communications to work and the best radios in the world are useless if no one hears you call for help.

2. Establishing or connecting to a radio net of listeners, making sure that someone is out there listening for you, is VITAL and cannot be bypassed.

3. It's impractical for most people to listen to radios continuously, so having a schedule for stations on your "net" to listen makes radio communication practical. Either use a published schedule, or a regular interval (every day at 7pm, for example) for the net to come on-line.

Bottom Line: Form this "radio net" **NOW**; set a non-SHTF schedule for regular practice. If you live rural you may want some kind of weekly or monthly "check in" communication scheduled.

For example when I evaluated all these questions I discovered that:

- I have family and friends scattered not only locally, but nationally too.
- There are various buildings, mountains and other obstacles to overcome between me and the people I will want to communicate with - both locally and nationally.
- I have minimum to average funds and time to devote to equipment and learning.
- I have some previous "radio" experience through C.E.R.T., the Red Cross and CB REACT.; yet I know relatively little about the current technology for civilian 2-way radio communications.
- I need a system that will not only work for me in my current urban environment; I need it to work in my near future rural environment too.
- My family and friends currently have several existing radio services. Some are HAM, some GMRS and a few are CB.
- Whatever system I choose it has to be compatible with my existing group/network of "radio listeners"; whom I currently keep in touch with via a neighbor or my existing CB.

This means that for my specific situation I need an Amateur Radio System and if I can afford it, for the rest of my in town friends, some kind of shorter range FRS, GMRS, CB or more learning to modify the HAM to receive and transmit on these other frequencies – which by the way is currently illegal in the U.S.A. due to FCC regulations.

When you first start out *Keep It Simple* – get a good set-up that is upgradable and expandable. You can always add to it as monies, time and experience call for it.

Recap

- Select the type of communications needed: One-way or Two-way
- Select the conditions which you will be transmitting and receiving in. (Terrain, distance, mobile, base, hand-held)
- Determine who you wish to talk with and where they are and what equipment they have.
- For two-way communications form a "listener network" of people and set a schedule to practice via pre-scheduled check-in exercises.

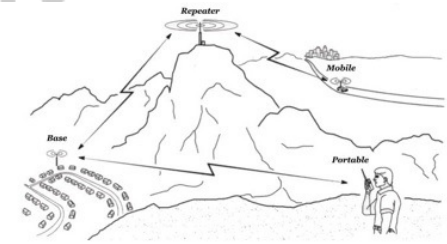
- Review your budget to determine the funds needed to obtain the knowledge, training, licensing (if necessary) and equipment to meet your crisis communication needs.

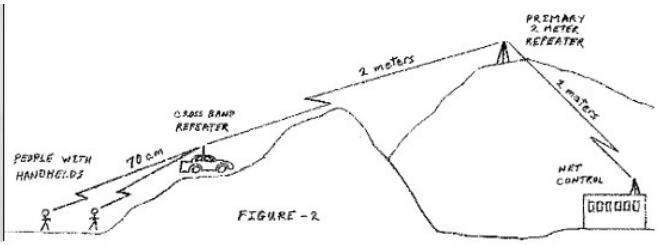
Remember no communication method is 100% perfect for 100% of the situations you may find yourself in. You may need more than one method.

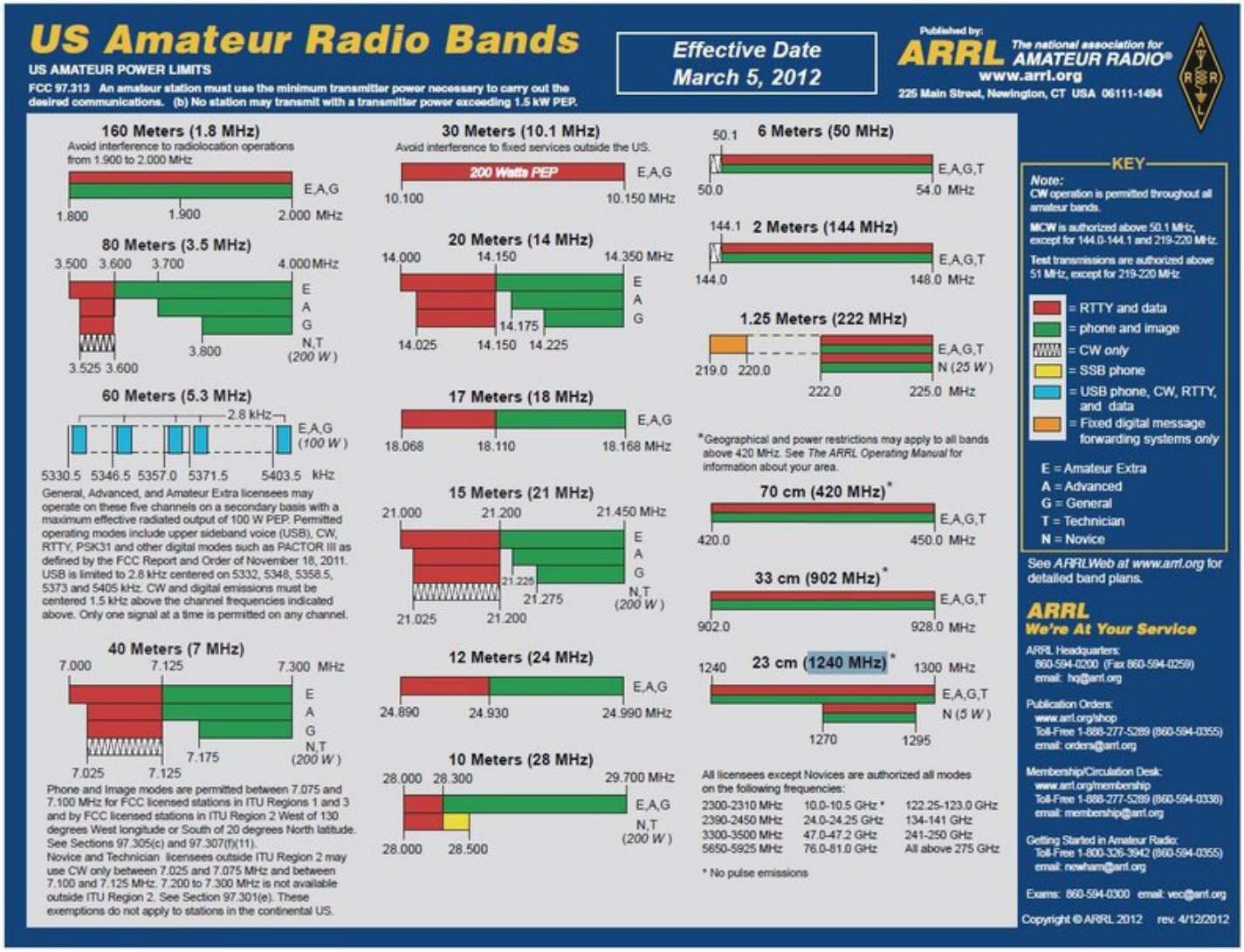
TNT

For detailed and in some cases technical information on the various types of two-way communications see:

- Crisis Communications http://formerlynmurbanhomesteader.weebly.com/uploads/2/2/5/0/22509786/crisis_communications_new_site.pdf
- FCC Wireless Services at a Glance (last updated May 2011) http://formerlynmurbanhomesteader.weebly.com/uploads/2/2/5/0/22509786/fcc_wireless_services_at_a_glance_may_2011_new_site.pdf
- National Weather Radio (NWR NOAA) Stations http://www.nws.noaa.gov/nwr/resources/NWR_Brochure_NOAA_PA_94062.pdf
- More downloadable Communication information can be found @ http://formerlynmurbanhomesteader.weebly.com/communication--technology.html
- The American Radio Relay League (ARRL) Founded in 1914 by Hiram Percy Maxim, ARRL (American Radio Relay League) is the national association for Amateur Radio in the US. Today, with more than 161,000 members, ARRL is the largest organization of radio amateurs in the world. ARRL's mission is based on five pillars: Public Service, Advocacy, Education, Technology, and Membership. http://www.arrl.org/
- The North American Shortwave Association (NASWA) Focuses on domestic and international broadcasts on shortwave frequencies between 2 and 30 MHz. They are the premiere organization in North America for shortwave listeners and DXers since 1961. http://www.naswa.net/
- The North American Shortwave Association (NASWA) Radio Country List http://www.naswa.net/images/NASWA_country_list.pdf
- FCC Wireless Services http://wireless.fcc.gov/services/index.htm?job=wtb_services_home
- FCC Radio Spectrum Frequency Allocation Table http://transition.fcc.gov/oet/spectrum/table/fcctable.pdf






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.
Effective Date March 5, 2012
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225 Main Street, Newington, CT USA 06111-1494
160 Meters (1.8 MHz)
Avoid interference to radiolocation operations from 1.900 to 2.000 MHz
E,A,G
1.800 1.900 2.000 MHz
80 Meters (3.5 MHz)
3.500 3.600 3.700 4.000 MHz
E A G
N,T (200 W)
3.525 3.600 3.800
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2.8 kHz
E,A,G (100 W)
5330.5 5346.5 5357.0 5371.5 5403.5 kHz
General, Advanced, and Amateur Extra licensees may operate on these five channels on a secondary basis with a maximum effective radiated output of 100 W PEP. Permitted operating modes include upper sideband voice (USB), CW, RTTY, PSK31 and other digital modes such as PACTOR III as defined by the FCC Report and Order of November 18, 2011. USB is limited to 2.8 kHz centered on 5332, 5348, 5358.5, 5373 and 5405 kHz. CW and digital emissions must be centered 1.5 kHz above the channel frequencies indicated above. Only one signal at a time is permitted on any channel.
40 Meters (7 MHz)
7.000 7.125 7.300 MHz
E A G
N,T (200 W)
7.025 7.125 7.175
Phone and Image modes are permitted between 7.075 and 7.100 MHz for FCC licensed stations in ITU Regions 1 and 3 and by FCC licensed stations in ITU Region 2 West of 130 degrees West longitude or South of 20 degrees North latitude. See Sections 97.305(c) and 97.307(f)(11).
Novice and Technician licensees outside ITU Region 2 may use CW only between 7.025 and 7.075 MHz and between 7.100 and 7.125 MHz. 7.200 to 7.300 MHz is not available outside ITU Region 2. See Section 97.301(e). These exemptions do not apply to stations in the continental US.
30 Meters (10.1 MHz)
Avoid interference to fixed services outside the US.
200 Watts PEP
E,A,G
10.100 10.150 MHz
20 Meters (14 MHz)
14.000 14.150 14.350 MHz
E A G
14.175
14.025 14.150 14.225
17 Meters (18 MHz)
E,A,G
18.068 18.110 18.168 MHz
15 Meters (21 MHz)
21.000 21.200 21.450 MHz
E A G
21.225
N,T (200 W)
21.025 21.200 21.275
12 Meters (24 MHz)
E,A,G
24.890 24.930 24.990 MHz
10 Meters (28 MHz)
28.000 28.300 29.700 MHz
E,A,G
N,T (200 W)
28.000 28.500
6 Meters (50 MHz)
50.1
E,A,G,T
50.0 54.0 MHz
2 Meters (144 MHz)
144.1
E,A,G,T
144.0 148.0 MHz
1.25 Meters (222 MHz)
E,A,G,T
N (25 W)
219.0 220.0 222.0 225.0 MHz
*Geographical and power restrictions may apply to all bands above 420 MHz. See The ARRL Operating Manual for information about your area.
70 cm (420 MHz)*
E,A,G,T
420.0 450.0 MHz
33 cm (902 MHz)*
E,A,G,T
902.0 928.0 MHz
23 cm (1240 MHz)*
1240 1300 MHz
E,A,G,T
N (5 W)
1270 1295
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
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= USB phone, CW, RTTY, and data
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A = Advanced
G = General
T = Technician
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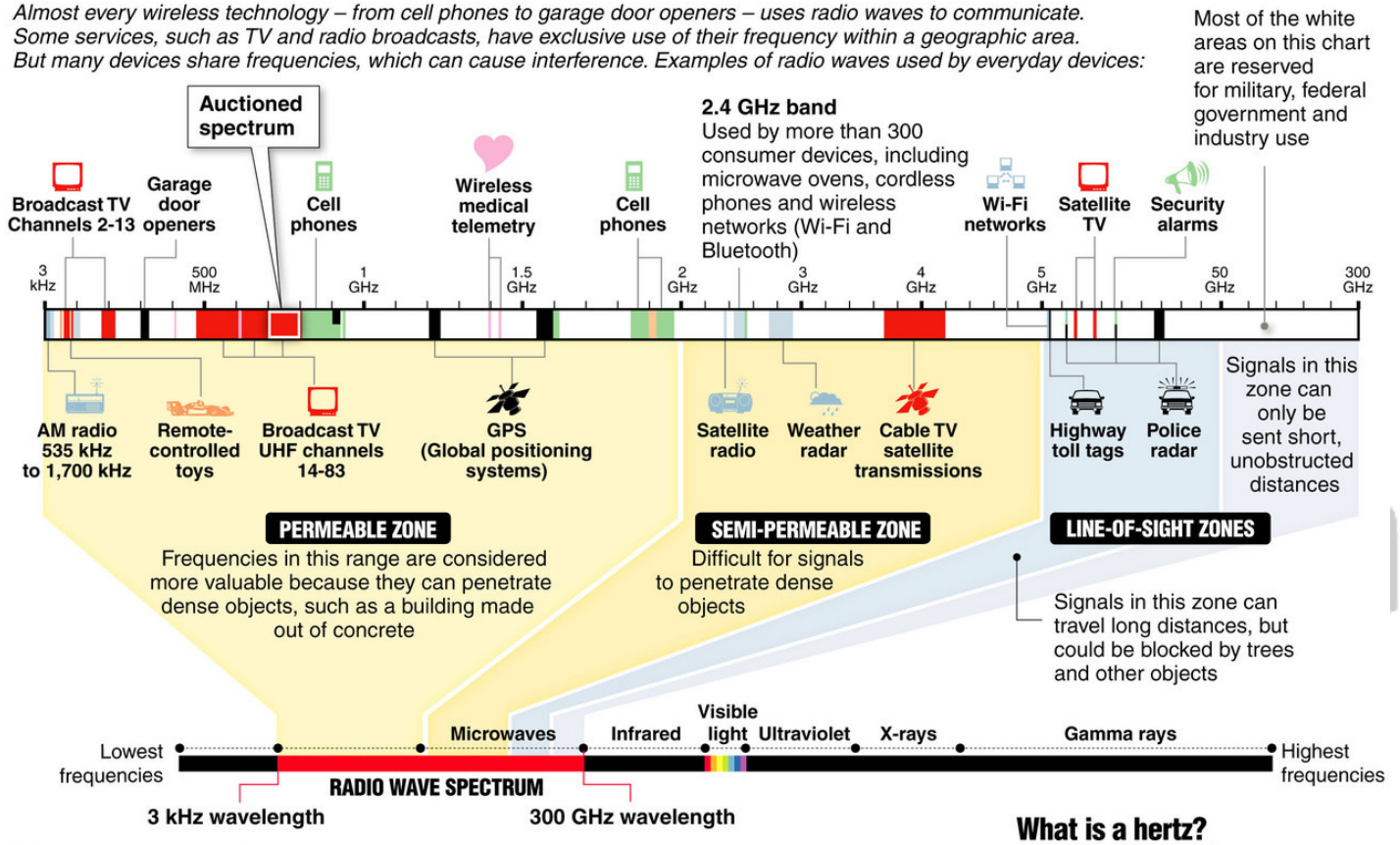
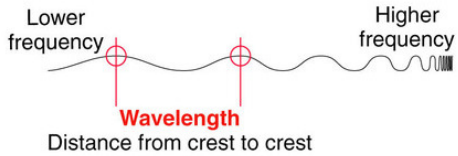
Inside the radio wave spectrum

Almost every wireless technology – from cell phones to garage door openers – uses radio waves to communicate. Some services, such as TV and radio broadcasts, have exclusive use of their frequency within a geographic area. But many devices share frequencies, which can cause interference. Examples of radio waves used by everyday devices:



The electromagnetic spectrum

Radio waves occupy part of the electromagnetic spectrum, a range of electric and magnetic waves of different lengths that travel at the speed of light; other parts of the spectrum include visible light and x-rays; the shortest wavelengths have the highest frequency, measured in hertz



What is a hertz?

One hertz is one cycle per second. For radio waves, a cycle is the distance from wave crest to crest

1 kilohertz (kHz) = 1,000 hertz

1 megahertz (MHz) = 1 million hertz

1 gigahertz (GHz) = 1 billion hertz

Source: New America Foundation, MCT, Howstuffworks.com
Graphic: Nathaniel Levine, Sacramento Bee