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## ABOUT THE AMERICAN RADIO RELAY LEAGUE

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From: <http://www.arrrl.org/about-arrrl>

"ARRL is the national association for Amateur Radio in the US. Founded in 1914 by Hiram Percy Maxim as The American Radio Relay League, ARRL is a noncommercial organization of radio amateurs. ARRL numbers within its ranks the vast majority of active radio amateurs in the nation and has a proud history of achievement as the standard-bearer in amateur affairs. ARRL's underpinnings as Amateur Radio's witness, partner and forum are defined by five pillars: Public Service, Advocacy, Education, Technology, and Membership. "

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The ARRL promotes and provides support to amateur radio operators across the United States.

There are Amateur Radio clubs across the country that are affiliated with the ARRL. These clubs provide support to their membership and often provide training classes to help bring new people into the amateur radio family.



LOW POWER PORTABLE HAM RADIO

## What is Amateur Radio?

There are over 730,000 Amateur Radio operators in the US, licensed by the Federal Communications Commission. They are trained in communications techniques and basic electronics theory.

During emergencies and other times of need, Amateur Radio operators have provided worldwide public service. Amateur Radio has been recognized by FEMA and the American Red Cross as elements of the critical communications network needed during natural disasters and other emergencies.

FOR MORE INFORMATION VISIT

Parks On The Air Home Page:  
<https://parksontheair.com>

American Radio Relay League Home Page:  
<http://www.arrrl.org>

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# Parks On The Air

PORTABLE AMATEUR RADIO



Cherry Plain State Park, NY

Operating a portable amateur radio station from a park pavilion can afford fantastic views! It also provides an opportunity to expose the public to the amateur radio service.



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## ABOUT PARKS ON THE AIR

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Parks On The Air (POTA) is a non-profit organization that supports the use of amateur radio in our state and national parks. Through promotion by Parks On The Air, more people will discover and enjoy our park system. This also directly helps amateur radio meet its charter of providing communications support in times of emergencies, such as after natural disasters,

POTA provides a website where amateur radio operators, often called "hams", can find nearby parks. Hams then set up temporary portable radio stations and attempt to contact as many fellow hams as possible. Visiting a park and getting on the air is called an "activation" and after each one, the hams will submit a list of their contacts to POTA. The goals are to activate as many parks as possible and to talk to as many stations as possible. Certificate awards are then given for a number of categories.

Hams, like other park visitors, must obey all park regulations and generally leave no trace of their operation after they leave. Some hams have radios in their car and simply operate from the parking lot. Some hams enjoy backpacking and hiking and may explore throughout the park setting up operations almost anywhere. The majority of hams will locate an available picnic or similar area and operate from there.

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## A TYPICAL STATION

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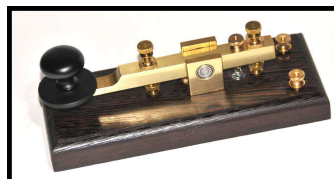
Although there is, perhaps, no "typical" ham radio station set up, all stations do have a few common elements.

### POWER SOURCE

All stations will require a power source, which for portable operations, is usually a battery or possibly a solar panel.

### INPUT MECHANISM

The operator will use either a microphone or a Morse code key to communicate with other hams.



Homemade Morse Code Key

### RADIO

There are many different makes and models of radio and although these come in various sizes, smaller is generally preferred for portable use.

Radios are also available in high and low power versions. Operating a radio with higher power means bringing bigger and heavier batteries!

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## A TYPICAL STATION CONTINUED...

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### ANTENNA

The final required component is an antenna. For portable operation this is generally just a few pieces of wire sometimes attached to a push up pole.

### ACCESSORIES

Accessories might include a pair of headphones or ear buds and a tablet or laptop computer.

A notepad or log book is used to keep track of the stations that have been contacted.



Low Power Station for Morse Code

Some hams gather all this gear into a single backpack for a truly portable setup!

*THE INTERNAL REVENUE SERVICE RECOGNIZES PARKS ON THE AIR, INC. AS A SECTION 501(C)(3) PUBLIC CHARITY.*



# Communicating with Other Hams

## Contact Basics: Good Amateur Practices

### Q-Signals

Q-signals are a system of radio shorthand as old as wireless and developed from even older telegraphy codes. Q-signals are a set of abbreviations for common information that save time and allow communication between operators who don't speak a common language. Modern ham radio uses them extensively. The table below lists the most common Q-signals used by hams. While Q-signals were developed for use by Morse operators, their use is common on phone, as well. You will often hear, "QRZed?" as someone asks "Who is calling me?" or "I'm getting a little QRM" from an operator receiving some interference or "Let's QSY to 146.55" as two operators change from a repeater frequency to a nearby simplex communications frequency.

| Q-Signals |                                                                                                                                                                    |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Abbr.     | Questions                                                                                                                                                          |
| QRG       | Your exact frequency (or that of _____) is _____ kHz.<br>Will you tell me my exact frequency (or that of _____)?                                                   |
| QRL       | I am busy (or I am busy with _____). Are you busy?<br>Usually used to see if a frequency is busy.                                                                  |
| QRM       | Your transmission is being interfered with _____.<br>(1. Nil; 2. Slightly; 3. Moderately; 4. Severely; 5. Extremely.)<br>Is my transmission being interfered with? |
| QRN       | I am troubled by static _____. (1 to 5 as under QRM.)<br>Are you troubled by static?                                                                               |
| QRO       | Increase power. Shall I increase power?                                                                                                                            |
| QRP       | Decrease power. Shall I decrease power?                                                                                                                            |
| QRQ       | Send faster (_____ wpm). Shall I send faster?                                                                                                                      |
| QRS       | Send more slowly (_____ wpm). Shall I send more slowly?                                                                                                            |
| QRT       | Stop sending. Shall I stop sending?                                                                                                                                |
| QRU       | I have nothing for you. Have you anything for me?                                                                                                                  |
| QRV       | I am ready. Are you ready?                                                                                                                                         |
| QRX       | I will call you again at _____ hours (on _____ kHz).<br>When will you call me again? Minutes are usually implied rather than hours.                                |
| QRZ       | You are being called by _____ (on _____ kHz).<br>Who is calling me?                                                                                                |
| QSB       | Your signals are fading. Are my signals fading?                                                                                                                    |
| QSK       | I can hear you between signals; break in on my transmission.<br>Can you hear me between your signals and if so can I break in on your transmission?                |
| QSL       | I am acknowledging receipt.<br>Can you acknowledge receipt (of a message or transmission)?                                                                         |
| QSO       | I can communicate with _____ direct (or relay through _____).<br>Can you communicate with _____ direct or by relay?                                                |
| QSP       | I will relay to _____. Will you relay to _____?                                                                                                                    |
| QST       | General call preceding a message addressed to all amateurs and ARRL members.<br>This is in effect "CQ ARRL."                                                       |
| QSX       | I am listening to _____ on _____ kHz. Will you listen to _____ on _____ kHz?                                                                                       |
| QSY       | Change to transmission on another frequency (or on _____ kHz).<br>Shall I change to transmission on another frequency (or on _____ kHz)?                           |
| QTC       | I have _____ messages for you (or for _____).<br>How many messages have you to send?                                                                               |
| QTH       | My location is _____. What is your location?                                                                                                                       |
| QTR       | The time is _____. What is the correct time?                                                                                                                       |

| ITU Phonetic Alphabet |          |                     |
|-----------------------|----------|---------------------|
| Letter                | Word     | Pronunciation       |
| A                     | Alfa     | <b>AL</b> FAH       |
| B                     | Bravo    | <b>BRAH</b> VOH     |
| C                     | Charlie  | <b>CHAR</b> LEE     |
| D                     | Delta    | <b>DELL</b> TAH     |
| E                     | Echo     | <b>ECK</b> OH       |
| F                     | Foxtrot  | <b>FOKS</b> TROT    |
| G                     | Golf     | GOLF                |
| H                     | Hotel    | HOH <b>TELL</b>     |
| I                     | India    | <b>IN</b> DEE AH    |
| J                     | Juliet   | <b>JEW</b> LEE ETT  |
| K                     | Kilo     | <b>KEY</b> LOH      |
| L                     | Lima     | <b>LEE</b> MAH      |
| M                     | Mike     | MIKE                |
| N                     | November | NO <b>VEM</b> BER   |
| O                     | Oscar    | <b>OSS</b> CAH      |
| P                     | Papa     | PAH <b>PAH</b>      |
| Q                     | Quebec   | KEH <b>BECK</b>     |
| R                     | Romeo    | <b>ROW</b> ME OH    |
| S                     | Sierra   | SEE <b>AIR</b> RAH  |
| T                     | Tango    | TANG GO             |
| U                     | Uniform  | <b>YOU</b> NEE FORM |
| V                     | Victor   | <b>VIK</b> TAH      |
| W                     | Whiskey  | <b>WISS</b> KEY     |
| X                     | X-Ray    | <b>ECKS</b> RAY     |
| Y                     | Yankee   | <b>YANG</b> KEY     |
| Z                     | Zulu     | <b>ZOO</b> LOO      |

**Note:** The **boldfaced** syllables are emphasized. The pronunciations shown in this table were designed for those who speak any of the international languages. The pronunciations given for "Oscar" and "Victor" may seem awkward to English-speaking people in the US.



- Time Conversion Chart

| UTC   | EDT/AST | CDT/EST | MDT/CST | PDT/MST | PST   |
|-------|---------|---------|---------|---------|-------|
| 0000* | 2000    | 1900    | 1800    | 1700    | 1600  |
| 0100  | 2100    | 2000    | 1900    | 1800    | 1700  |
| 0200  | 2200    | 2100    | 2000    | 1900    | 1800  |
| 0300  | 2300    | 2200    | 2100    | 2000    | 1900  |
| 0400  | 0000*   | 2300    | 2200    | 2100    | 2000  |
| 0500  | 0100    | 0000*   | 2300    | 2200    | 2100  |
| 0600  | 0200    | 0100    | 0000*   | 2300    | 2200  |
| 0700  | 0300    | 0200    | 0100    | 0000*   | 2300  |
| 0800  | 0400    | 0300    | 0200    | 0100    | 0000* |
| 0900  | 0500    | 0400    | 0300    | 0200    | 0100  |
| 1000  | 0600    | 0500    | 0400    | 0300    | 0200  |
| 1100  | 0700    | 0600    | 0500    | 0400    | 0300  |
| 1200  | 0800    | 0700    | 0600    | 0500    | 0400  |
| 1300  | 0900    | 0800    | 0700    | 0600    | 0500  |
| 1400  | 1000    | 0900    | 0800    | 0700    | 0600  |
| 1500  | 1100    | 1000    | 0900    | 0800    | 0700  |
| 1600  | 1200    | 1100    | 1000    | 0900    | 0800  |
| 1700  | 1300    | 1200    | 1100    | 1000    | 0900  |
| 1800  | 1400    | 1300    | 1200    | 1100    | 1000  |
| 1900  | 1500    | 1400    | 1300    | 1200    | 1100  |
| 2000  | 1600    | 1500    | 1400    | 1300    | 1200  |
| 2100  | 1700    | 1600    | 1500    | 1400    | 1300  |
| 2200  | 1800    | 1700    | 1600    | 1500    | 1400  |
| 2300  | 1900    | 1800    | 1700    | 1600    | 1500  |
| 2400* | 2000    | 1900    | 1800    | 1700    | 1600  |

Coordinated Universal Time (UTC) is the time at the zero or reference meridian. Time changes one hour with each change of 15 degrees in longitude. The five time zones in the US proper and Canada roughly follow these lines.

\* 0000 and 2400 are interchangeable. (2400 is associated with the date of the day ending, 0000 with the day just starting.)



# Propagation

## Conditions That Affect HF Radio Activity

Ham Radio for non Techies has generously provided (free of charge) on his website the charts showing the live conditions around the Earth for radio propagation as well as atmospheric conditions that can affect Ham Radio usage depending on frequency. These are great tools for HF and knowing what the conditions are if you plan on trying to make contacts on a particular day/time.

He includes a chart that breakdowns the three main items (SFI-Solar Flux Index, K-Index & A-Index) and their meaning. Like he says... It's not Gospel, they are a base line! When in doubt - "Try it".

<https://hamradiofornontechies.com/current-ham-radio-conditions/>

## Space Weather Information

An App you should consider having on your phone is - Space Weather Live - It will give you the current Auroral & Solar activity.

[spaceweatherlive.com](https://spaceweatherlive.com)

The Auroral Activity provides information on the current Kp-Index (updated every 3 hours), the Kp-index forecast for the next 3 days, solar wind & related indexes. The Auroral oval, Disturbance Storm Time index, Magnetometers & the moon phase. All while displaying the time in U.T.C. format.

**If the Kp-index exceeds Kp5 unplug your antenna and turn off your rig.**

**Over time, these high Kp numbers will damage your radio!**

The Solar Activity will give you Sunspot regions, Solar flares, Coronal holes, Coronal Mass ejections, Solar protons and Far side.

## Ham HF Bands:

Dave Casler, KE0OG, has a YouTube channel - Ask Dave – who back in 2016 put out a video entitled - Ham HF Bands: Introduction AD#29

[https://www.youtube.com/watch?v=T8\\_MCfDVn6g](https://www.youtube.com/watch?v=T8_MCfDVn6g)

in which he looks at the amateur radio high frequency (HF) bands and describes each. His video helps Hams new to HF understand what bands will work best for them. He also generously provides his PDF used in this video - found on page 7 of this information package - starting with the ARRL US Band information sheet, followed by his 3 page PDF explaining the propagation characteristics of each band.

## Parks on the Air - POTA

A quick video on "What is Parks On the Air and Why It's So Popular?"

<https://www.youtube.com/watch?v=AmUVm-PnV8Q>



# 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®

## 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 [www.arrl.org/band-plan](http://www.arrl.org/band-plan) for detailed band plans.

## ARRL

### We're At Your Service

ARRL Headquarters:  
860-594-0200 (Fax 860-594-0259)  
email: [hq@arrl.org](mailto:hq@arrl.org)

Publication Orders:  
[www.arrl.org/shop](http://www.arrl.org/shop)  
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Toll-Free 1-888-326-3942 (860-594-0338)  
email: [membership@arrl.org](mailto:membership@arrl.org)

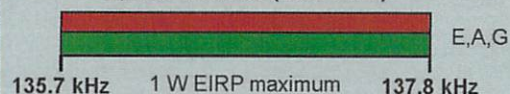
Getting Started in Amateur Radio:  
Toll-Free 1-800-326-3942 (860-594-0355)  
email: [newham@arrl.org](mailto:newham@arrl.org)

Exams: 860-594-0300 email: [vec@arrl.org](mailto:vec@arrl.org)

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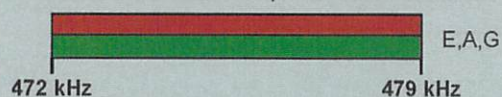
Amateurs wishing to operate on either 2,200 or 630 meters must first register with the Utilities Technology Council online at <https://utc.org/plc-database-amateur-notification-process/>. You need only register once for each band.

### 2,200 Meters (135 kHz)



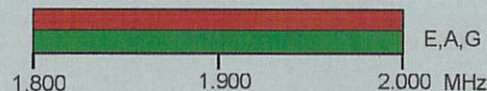
### 630 Meters (472 kHz)

5 W EIRP maximum, except in Alaska within 496 miles of Russia where the power limit is 1 W EIRP.

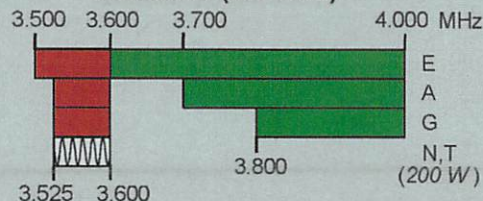


### 160 Meters (1.8 MHz)

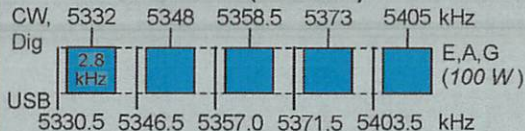
Avoid interference to radiolocation operations from 1.900 to 2.000 MHz



### 80 Meters (3.5 MHz)

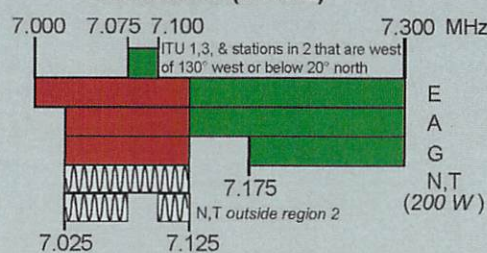


### 60 Meters (5.3 MHz)



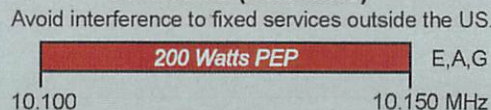
General, Advanced, and Extra licensees may operate on a secondary basis with a maximum ERP of 100 W (relative to a half-wave dipole antenna).

### 40 Meters (7 MHz)

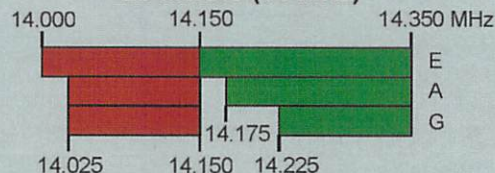


See Sections 97.305(c), 97.307(f)(11) and 97.301(e). These exemptions do not apply to stations in the continental US.

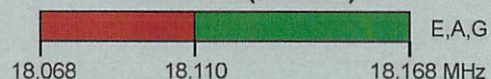
### 30 Meters (10.1 MHz)



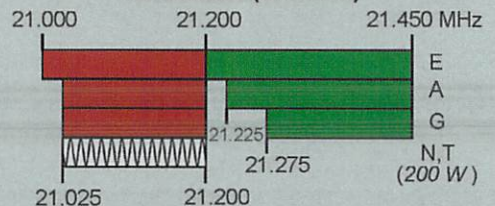
### 20 Meters (14 MHz)



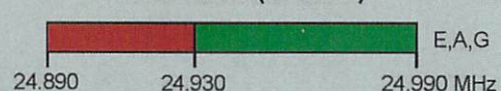
### 17 Meters (18 MHz)



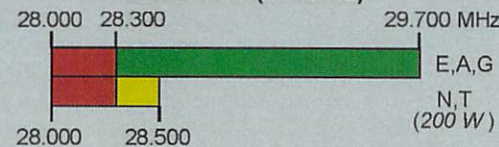
### 15 Meters (21 MHz)



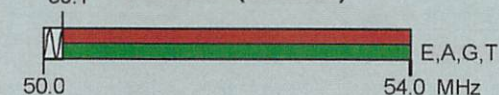
### 12 Meters (24 MHz)



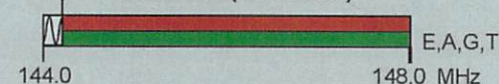
### 10 Meters (28 MHz)



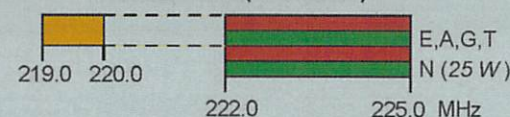
### 6 Meters (50 MHz)



### 2 Meters (144 MHz)

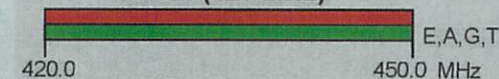


### 1.25 Meters (222 MHz)



\*Geographical and power restrictions may apply to all bands above 420 MHz. See FCC Part 97.303 for information about your area.

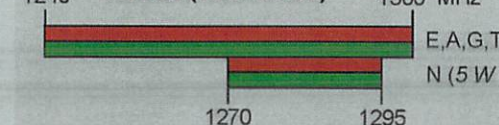
### 70 cm (420 MHz)\*



### 33 cm (902 MHz)\*



### 23 cm (1240 MHz)\*



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       |
| 3400-3450 MHz | 47.0-47.2 GHz   | 241-250 GHz       |
| 5650-5925 MHz | 76.0-81.0 GHz   | All above 275 GHz |

‡ No pulse emissions



KEØOG Band Charts for Ask Dave #29

| Parameter                               | 160                                                                                                                                      | 80                                                                                                                                   | 60                                                      | 40                                                                                                                                                                       |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Antenna size                            | Unwieldy, must put up high, often need separate receiving antenna                                                                        | Unwieldy, hard to get high, need separate antennas for each end of band                                                              | Manageable, often used for NVIS, so lower antenna okay. | Manageable, but half wavelength is 60 feet. Usually single dipole can cover entire band. Full-size verticals common but can                                              |
| Propagation characteristics             | Usually a winter band. Very noisy in summer from QRN. Daytime use severely hampered by D-layer absorption. Is viewed as serious DX band. | Often a winter, night-time band, but both ground wave and NVIS can cover several hundred miles even with daytime D layer absorption. | Propagation characteristics between 80 and 40 meters    | Less D-layer absorption and can cover distances of at least 200 miles more easily in daytime. Stays open much of evening and opens in early morning. DX during grayline. |
| Novice and Tech privileges              | No                                                                                                                                       | Yes, CW only                                                                                                                         | No                                                      | Yes, CW only                                                                                                                                                             |
| Power limitations less than 1.5 KW PEP? | No                                                                                                                                       | No                                                                                                                                   | Yes, 100 W EIRP                                         | No                                                                                                                                                                       |
| General Class privileges                | Entire band                                                                                                                              | Upper 200 kHz                                                                                                                        | Entire band                                             | Upper 125 kHz                                                                                                                                                            |
| Open for contesting?                    | Yes                                                                                                                                      | Yes                                                                                                                                  | No                                                      | Yes                                                                                                                                                                      |
| Sideband used                           | LSB                                                                                                                                      | LSB                                                                                                                                  | USB                                                     | LSB                                                                                                                                                                      |
| FM?                                     | No                                                                                                                                       | No                                                                                                                                   | No                                                      | No                                                                                                                                                                       |
| Digital modes?                          | Not so popular                                                                                                                           | Sometimes used                                                                                                                       | Rare                                                    | Common, especially evening                                                                                                                                               |



KEØOG Band Charts for Ask Dave #29

| Parameter                               | 30                                                                            | 20                                                                                                                              | 17                                                                                                                       | 15                                                                                                                                  |
|-----------------------------------------|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| Antenna size                            | Easier, half wave in air is 45 feet, single dipole covers entire band         | Easy dipole. Increased gain from yagi, quad, etc. Tribanders always include this band. Always included in multi-band verticals. | Smaller still. Dipole or vertical just fine. Often found in multi-band verticals. Five band yagis will include this band | Can use a 40m dipole with a tuner, or construct 15 m dipole. All tribander yagis include this band. Note: the band is wide, antenna |
| Propagation characteristics             | Better long distance propagation, open early morn, daytime, and into evening. | Strong propagation during daytime and often into evening. DX band. When band conditions are good, open worldwide. Try grayline. | Tends to be a daylight band. Can go very long at times, also during grayline. Good DX band. Not usually open at night.   | Tends to be a daylight band. Can go very long at times, also during grayline. Good DX band. Not usually open at night.              |
| Novice and Tech privileges              | No                                                                            | No                                                                                                                              | No                                                                                                                       | Yes, CW only                                                                                                                        |
| Power limitations less than 1.5 KW PEP? | Yes, 200 W PEP                                                                | No                                                                                                                              | No                                                                                                                       | No                                                                                                                                  |
| General Class privileges                | Entire band                                                                   | Upper 175 kHz                                                                                                                   | Entire band                                                                                                              | Upper 175 kHz                                                                                                                       |
| Open for contesting?                    | No                                                                            | Yes                                                                                                                             | No                                                                                                                       | Yes                                                                                                                                 |
| Sideband used                           | n/a (code only)                                                               | USB                                                                                                                             | USB                                                                                                                      | USB                                                                                                                                 |
| FM?                                     | No                                                                            | No                                                                                                                              | No                                                                                                                       | No                                                                                                                                  |
| Digital modes?                          | Relatively common                                                             | Very common, many modes, esp PSK-31 and JT65, also RTTY                                                                         | From time to time                                                                                                        | Common when propagation permits                                                                                                     |

KEØOG Band Charts for Ask Dave #29

| Parameter                               | 12                                                                                                                     | 10                                                                                                                                                                                                                       |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Antenna size                            | Multiband verticals often include this band. Five band Yagis include this band. Easy to construct and erect a dipole   | All tribander yagis include this band. Multiband verticals usually include this band. Dipole easy to construct and erect                                                                                                 |
| Propagation characteristics             | Tends to be a daylight band. Can go very long at times, also during grayline. Good DX band. Not usually open at night. | Tends to be a daylight band. Can go very long at times, also during grayline. Good DX band. Not usually open at night. When the band is open, very long distances can be reached with lower power and ordinary antennas. |
| Novice and Tech privileges              | No                                                                                                                     | Yes, both CW and voice                                                                                                                                                                                                   |
| Power limitations less than 1.5 KW PEP? | No                                                                                                                     | No                                                                                                                                                                                                                       |
| General Class privileges                | Entire band                                                                                                            | Entire band                                                                                                                                                                                                              |
| Open for contesting?                    | No                                                                                                                     | Yes                                                                                                                                                                                                                      |
| Sideband used                           | USB                                                                                                                    | USB                                                                                                                                                                                                                      |
| FM?                                     | No                                                                                                                     | Yes, above 29 MHz                                                                                                                                                                                                        |
| Digital modes?                          | From time to time                                                                                                      | Common when propagation permits                                                                                                                                                                                          |





# ITU Common Amateur Radio Country Prefixes

|                                   |                                    |                                                                     |                                       |                                 |
|-----------------------------------|------------------------------------|---------------------------------------------------------------------|---------------------------------------|---------------------------------|
| 1A** (SMO) of Malta (Rome)        | BV, BN-BX Taiwan                   | GM Scotland                                                         | OD Lebanon                            | V8 Brunei                       |
| 1S** Spratly Is                   | BV9P Pratas Is                     | GP, GU Guernsey                                                     | OE Austria                            | VA-VG Canada                    |
| 2I Northern Ireland               | BY China                           | GS Scotland                                                         | OF-OI Finland                         | VK Australia                    |
| 3A Monaco                         | C2 Nauru                           | GT Isle of Man                                                      | OHØ Aland Is                          | VK9C Cocos (Keeling) Is         |
| 3B6, 3B7 Agalega & St. Brandon Is | C3 Andora                          | GW Wales                                                            | OJØ Market Reef                       | VK9L Lord Howe Is               |
| 3B8 Mauritius                     | C4 Cyprus                          | GX England                                                          | OK-OL Czech Republic                  | VK9M Mellish Reef               |
| 3B9 Rodriguez Is                  | C5 The Gambia                      | H44 Solomon Is                                                      | OM Slovak Republic (Slovakia)         | VK9N Norfolk Is                 |
| 3CØ Annobon Is                    | C6 Bahamas, The                    | H4Ø Temotu Is                                                       | ON-OT Belgium                         | VK9W Willis Is                  |
| 3C1 Equatorial Guinea             | C8-C9 Mozambique                   | H6-H7 Nicaragua                                                     | OX Greenland                          | VK9X Christmas Is               |
| 3D2/C Conway Reef                 | CA-CE Chile                        | HA Hungary                                                          | OY Faroe Is                           | VKØ Heard Is & Macquarie Is     |
| 3D2/F Fiji                        | CE9 Antarctica & South Shetland Is | HB Switzerland                                                      | OZ Denmark                            | VO Canada                       |
| 3D2/R Rotuma Is                   |                                    | HBØ Liechtenstein                                                   | P2 Papua New Guinea                   | VP2E Anguilla                   |
| 3DA Swaziland                     | CEØX San Felix & San Ambrosio Is   | HC-HD Ecuador                                                       | P3 Cyprus                             | VP2M Montserrat                 |
| 3V Tunisia                        | CEØY Easter Is                     | HC8-HD8 Galapagos Is                                                | P4 Aruba                              | VP2V British Virgin Is          |
| 3W Vietnam                        | CEØZ Juan Fernandez Is             | HFØ South Shetland Is                                               | P5 Korea, North                       | VP5, VQ5 Turks & Caicos Is      |
| 3X Guinea                         | CF-CK Canada                       | HG Hungary                                                          | PA-PI Netherlands                     | VP6 Pitcairn & Ducie Is         |
| 3Y Bouvet Is                      | CL-CM Cuba                         | HH Haiti                                                            | PJ2 Curacao                           | VP8 Antarctica                  |
| 3Y Peter 1 Is                     | CN Morocco                         | HI Dominican Rep.                                                   | PJ4 Bonaire                           | VP8 Falkland Is                 |
| 4J-4K Azerbaijan                  | CO Cuba                            | HJ-HK Colombia                                                      | PJ5 St. Eustatius                     | VP8 So Georgia Is               |
| 4L Georgia                        | CP Bolivia                         | HKØ Malpelo Is                                                      | PJ6 Saba                              | VP8 So Orkney Is                |
| 4O Montenegro                     | CT Portugal                        | HKØ San Andres & Providencia                                        | PJ7 Sint Maarten                      | VP8 So Sandwich Is              |
| 4P-4S Sri Lanka                   | CT3 Madeira Is                     | HL Korea, South                                                     | PP-PY Brazil                          | VP8, RI1 So Shetland Is         |
| 4U, 4UØITU- ITU Headquarters      | CU Azores                          | HO-HP Panama                                                        | PPØ-PYØF Fernando de Noronha          | VP9 Bermuda                     |
| 4U9ITU,                           | CV-CX Uruguay                      | HQ-HR Honduras                                                      | PPØ-PYØS Saint Peter & St. Paul Rocks | VQ9 Chagos Is                   |
| 4U1WRC                            |                                    |                                                                     |                                       |                                 |
| 4U, 4UØUN- United Nations HQ      | CY9 Saint Paul Is                  | HS Thailand                                                         | PPØ-PYØT Trindade Is & Martim Vaz Is  | VR Hong Kong                    |
| 4U9UN                             |                                    |                                                                     |                                       |                                 |
| 4W East Timor                     | CYØ Sable Is                       | HV Vatican (Holy See)                                               | PZ Suriname                           | VU India                        |
| 4X, 4Z Israel                     | D2-D3 Angola                       | HZ Saudi Arabia                                                     | R1-7 European Russia                  | VU4 Andaman & Nicobar Is        |
| 5A Libya                          | D4 Cape Verde                      | I Italy                                                             | R8-0 Asiatic Russia                   | VU7 Lakshadweep Is              |
| 5B Cyprus                         | D6 Comoros                         | IMØ, ISØ Sardinia                                                   | R1AN Antarctica                       | VY Canada                       |
| 5C-5D Morocco                     | D7-D9 Korea, South                 | J2 Djibouti                                                         | R1FJ Franz Josef Land                 | W U.S.A.                        |
| 5H-5I Tanzania                    | DA-DR Germany                      | J3 Grenada                                                          | R1MV Malyj Vysotskij Is               | WH6-WH7 Hawaii                  |
| 5J-5K Colombia                    | DS-DT Korea, South                 | J4 Greece                                                           | S2 Bangladesh                         | WL Alaska                       |
| 5N-5O Nigeria                     | DU-DZ Philippines                  | J5 Guinea-Bissau                                                    | S5 Slovenia                           | XA-XI Mexico                    |
| 5R-5S Madagascar                  | E2 Thailand                        | J6 Saint Lucia                                                      | S7 Seychelles                         | XA-XI Revillagigedo             |
| 5T Mauritania                     | E3 Eritrea                         | J7 Dominica                                                         | S9 Sao Tome & Principe                | XT Burkina Faso                 |
| 5U Niger                          | E4 Palestine                       | J8 Saint Vincent                                                    | SA-SM Sweden                          | XU Cambodia                     |
| 5V Togo                           | E5 Cook Is                         | JA-JS Japan                                                         | SN-SR Poland                          | XV Vietnam                      |
| 5W Samoa                          | E6 Niue                            | JD1 Minami-Torishima                                                | SØ* Western Sahara                    | XW Laos                         |
| 5X Uganda                         | E7 Bosnia-Herzegovina              | JD1 Ogasawara                                                       | ST Sudan                              | XX9 Macao                       |
| 5Y-5Z Kenya                       | EA-EH Spain                        | JT-JV Mongolia                                                      | SU Egypt                              | XY-XZ Myanmar (Burma)           |
| 6D-6J Mexico                      | EA6-EH6 Balearic Is                | JW Svalbard                                                         | SV-SZ Greece                          | YA Afghanistan                  |
| 6K-6N Korea, South                | EA8-EH8 Canary Is                  | JX Jan Mayen                                                        | SV/A Mount Athos                      | YB-YH Indonesia                 |
| 6V-6W Senegal                     | EA9-EH9 Ceuta & Melilla            | JY Jordan                                                           | SV5 Dodecanese                        | YI Iraq                         |
| 6Y Jamaica                        | EI-EJ Ireland                      | K U.S.A.                                                            | SV9 Crete                             | YJ Vanuatu                      |
| 7J-7N Japan                       | EK Armenia                         | KC4 Antarctica                                                      | T19 Cocos Is                          | YK Syria                        |
| 7O Yemen                          | EL Liberia                         | KG4 Guantanamo Bay                                                  | T2 Tuvalu                             | YL Latvia                       |
| 7P Lesotho                        | EM-EO Ukraine                      | KH1 Baker & Howland Is                                              | T3Ø Western Kiribati Is               | YM Turkey                       |
| 7Q Malawi                         | EP Iran                            | KH2 Guam                                                            | T31 Central Kiribati Is               | YN Nicaragua                    |
| 7S, 8S Sweden                     | ER Moldova                         | KH3 Johnston Is                                                     | T32 Eastern Kiribati Is               | YO-YR Romania                   |
| 7T-7Y Algeria                     | ES Estonia                         | KH4 Midway Is                                                       | T33 Banaba Is                         | YS El Salvador                  |
| 7Z Saudi Arabia                   | ET Ethiopia                        | KH5 Palmyra & Jarvis Is                                             | T4 Cuba                               | YT-YU Serbia                    |
| 8J-8N Japan                       | EU-EW Belarus                      | KH5K Kingman Reef                                                   | T5 Somalia                            | YV-YY Venezuela                 |
| 8P Barbados                       | EX Kyrgyzstan                      | KH6-KH7 Hawaii                                                      | T6 Afghanistan                        | YVØ Aves Is                     |
| 8Q Maldives                       | EY Tajikstan                       | KH7K Kure Is                                                        | T7 San Marino                         | Z2 Zimbabwe                     |
| 8R Guyana                         | EZ Turkmenistan                    | KH8 American Samoa                                                  | T8 Palau                              | Z3 Macedonia                    |
| 9A Croatia                        | F France                           | KH8 Swains Is                                                       | TA-TC Turkey                          | Z6 Kosovo                       |
| 9G Ghana                          | FG Guadeloupe                      | KH9 Wake Is                                                         | TD Guatemala                          | Z8 South Sudan                  |
| 9H Malta                          | FH Mayotte                         | KHØ North Mariana Is                                                | TE Costa Rica                         | ZA Albania                      |
| 9I-9J Zambia                      | FJ Saint Barthelemy                | KL Alaska                                                           | TF Iceland                            | ZB Gibraltar                    |
| 9K Kuwait                         | FK New Caledonia                   | KP1 Navassa Is                                                      | TG Guatemala                          | ZC4 U.K. Sov. Base on Cyprus    |
| 9L Sierra Leone                   | FK/C Chesterfield Is               | KP2 Virgin Is                                                       | TI Costa Rica                         | ZD7 Saint Helena Is             |
| 9M2-9M4 West Malaysia             | FM Martinique                      | KP3-KP4 Puerto Rico                                                 | TJ Cameroon                           | ZD8 Ascension Is                |
| 9M6-9M8 East Malaysia             | FO French Polynesia                | KP5 Desecheo Is                                                     | TK Corsica                            | ZD9 Tristan da Cunha & Gough Is |
| 9MØ Spratly Is                    | FO/A Austral Is                    | LA-LN Norway                                                        | TL Central African Rep.               | ZF Cayman Is                    |
| 9N Nepal                          | FO/C Clipperton Is                 | LO-LW, LU Argentina                                                 | TN Congo, Rep. of                     | ZK3 Tokelau Is                  |
| 9Q-9T Congo, Dem. Rep. of         | FO/M Marquesas Is                  | LU/Z South Shetland Is, So Georgia Is, So Orkney Is, So Sandwich Is | TR Gabon                              | ZL-ZM New Zealand               |
| 9U Burundi                        | FP Saint Pierre & Miquelon         |                                                                     | TT Chad                               | ZL7 Chatham Is                  |
| 9V Singapore                      | FR Reunion Is                      |                                                                     | TU Cote d'Ivoire (Ivory Coast)        | ZL8 Kermadec Is                 |
| 9X Rwanda                         | FS Saint Martin                    | LX Luxembourg                                                       | TY Benin                              | ZL9 Auckland & Campbell Is      |
| 9Y-9Z Trinidad & Tobago           | FT/E Juan de Nova & Europa Is      | LY Lithuania                                                        | TZ Mali                               | ZP Paraguay                     |
| A2 Botswana                       | FT/G Glorioso Is                   | LZ Bulgaria                                                         | UA-UI 1-7 European Russia             | ZR-ZU South Africa              |
| A3 Tonga                          | FT/J Juan de Nova & Europa Is      | M England                                                           | UA2F, UA2K Kaliningrad                | ZS8 Prince Edward & Marion Is   |
| A4 Oman                           | FT/T Tromelin Is                   | MD Isle of Man                                                      | UA-UI 8-Ø Asiatic Russia              |                                 |
| A5 Bhutan                         | FT5W Crozet Is                     | MI, MN Northern Ireland                                             | UJ-UM Uzbekistan                      |                                 |
| A6 United Arab Emirates           | FT5X Kerguelen Is                  | MJ Jersey                                                           | UN-UQ Kazakstan                       |                                 |
| A7 Qatar                          | FT5Z Amsterdam & St. Paul Is       | MM Scotland                                                         | UR-UZ Ukraine                         |                                 |
| A9 Bahrain                        | FW Wallis & Futuna Is              | MU Guernsey                                                         | V2 Antigua & Barbuda                  |                                 |
| AA-AK U.S.A.                      | FY French Guiana                   | MW Wales                                                            | V3 Belize                             |                                 |
| AP Pakistan                       | G England                          | N U.S.A.                                                            | V4 Saint Kitts & Nevis                |                                 |
| B China                           | GD Isle of Man                     | NH6-NH7 Hawaii                                                      | V5 Namibia                            |                                 |
| BS7H Scarborough Reef             | GI, GN Northern Ireland            | NL Alaska                                                           | V6 Micronesia                         |                                 |
|                                   | GJ, GH Jersey                      | OA-OC Peru                                                          | V7 Marshall Is                        |                                 |

\* Common Country Prefixes are awarded through the ITU (International Telecommunications Union), a specialized agency under the UN for information and communication technologies. More information regarding the ITU and their activities regarding radio can be found here: [www.itu.int/en/ITU-R/Pages/default.aspx](http://www.itu.int/en/ITU-R/Pages/default.aspx).

A list of International Country Codes are also available through the ARRL. Please visit [www.arrl.org/country-lists-prefixes](http://www.arrl.org/country-lists-prefixes) for any updates and changes. As of Jan. 1st. 2016, this list is up to date. Icom America is not responsible for information that changes regarding these codes. For an accurate listing, always check with the ITU and the ARRL.

\*\* A special unofficial callsign used for Awards purposes by amateur radio operators.

## ITU Phonetic Alphabet

|           |            |           |           |
|-----------|------------|-----------|-----------|
| A Alpha   | H Hotel    | O Oscar   | V Victor  |
| B Bravo   | I India    | P Papa    | W Whiskey |
| C Charlie | J Juliet   | Q Quebec  | X X-ray   |
| D Delta   | K Kilo     | R Romeo   | Y Yankee  |
| E Echo    | L Lima     | S Sierra  | Z Zulu    |
| F Foxtrot | M Mike     | T Tango   |           |
| G Golf    | N November | U Uniform |           |

## Common Q Signals

|     |                      |                                                                                       |
|-----|----------------------|---------------------------------------------------------------------------------------|
| QTH | Location             | "What's your QTH?"                                                                    |
| QRZ | Who is calling me?   | "KE7XXX QRZ?"                                                                         |
| QRP | Low Power            | "I'm running QRP from Washington" (<5 watts on HF, 10 on VHF)                         |
| QSY | Change Frequency     | "Can you QSY up to 10 (kHz)?"                                                         |
| QSO | Conversation/Contact | "Thanks for the QSO"                                                                  |
| QRM | Man-made Noise       | "I have a lot of QRM here in the car" / QRN - Atmospheric Noise - "Lots of QRN today" |
| QSL | Acknowledge Receipt  | "Copy KE7XXX in Redmond, Washington. QSL?" Response: "QSL Redmond, Washington"        |



This Band Plan is meant to be a general guide and local band plans take precedence.

Amateur TV Fast Scan

Satellite

CW

Digital

FM Simplex

SSB & Weak Signal (No FM)

FM Repeater

Extra Voice - CW - Image

Advanced Voice - CW - Image

General Voice - CW - Image

CW - RTTY - DATA

Novice / Technician - CW

Novice / Technician - Voice

No Privileges

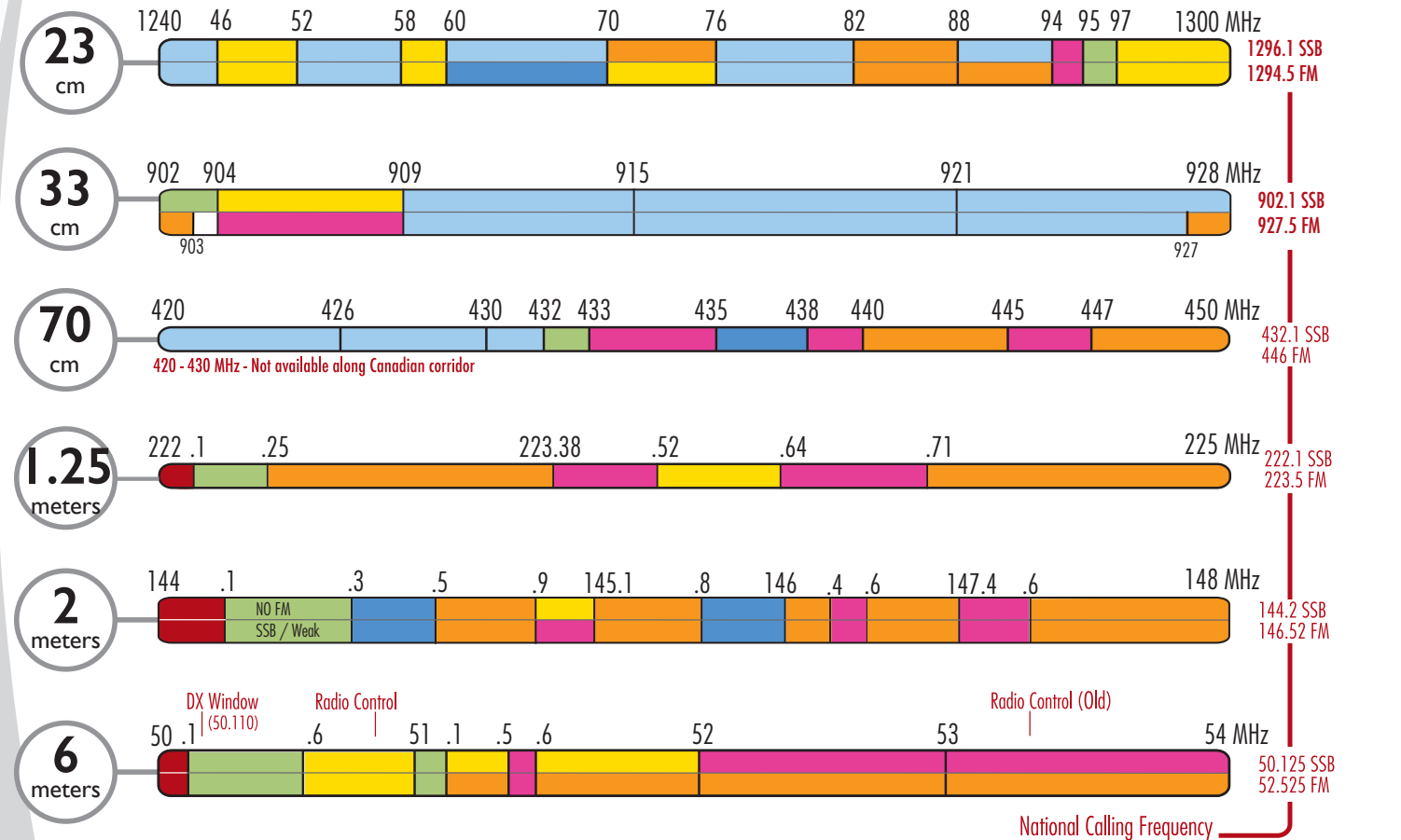
E Extra A Advanced G General  
\* Novice and Technician

Under restructuring, all Advanced license classes retain their operating privileges.

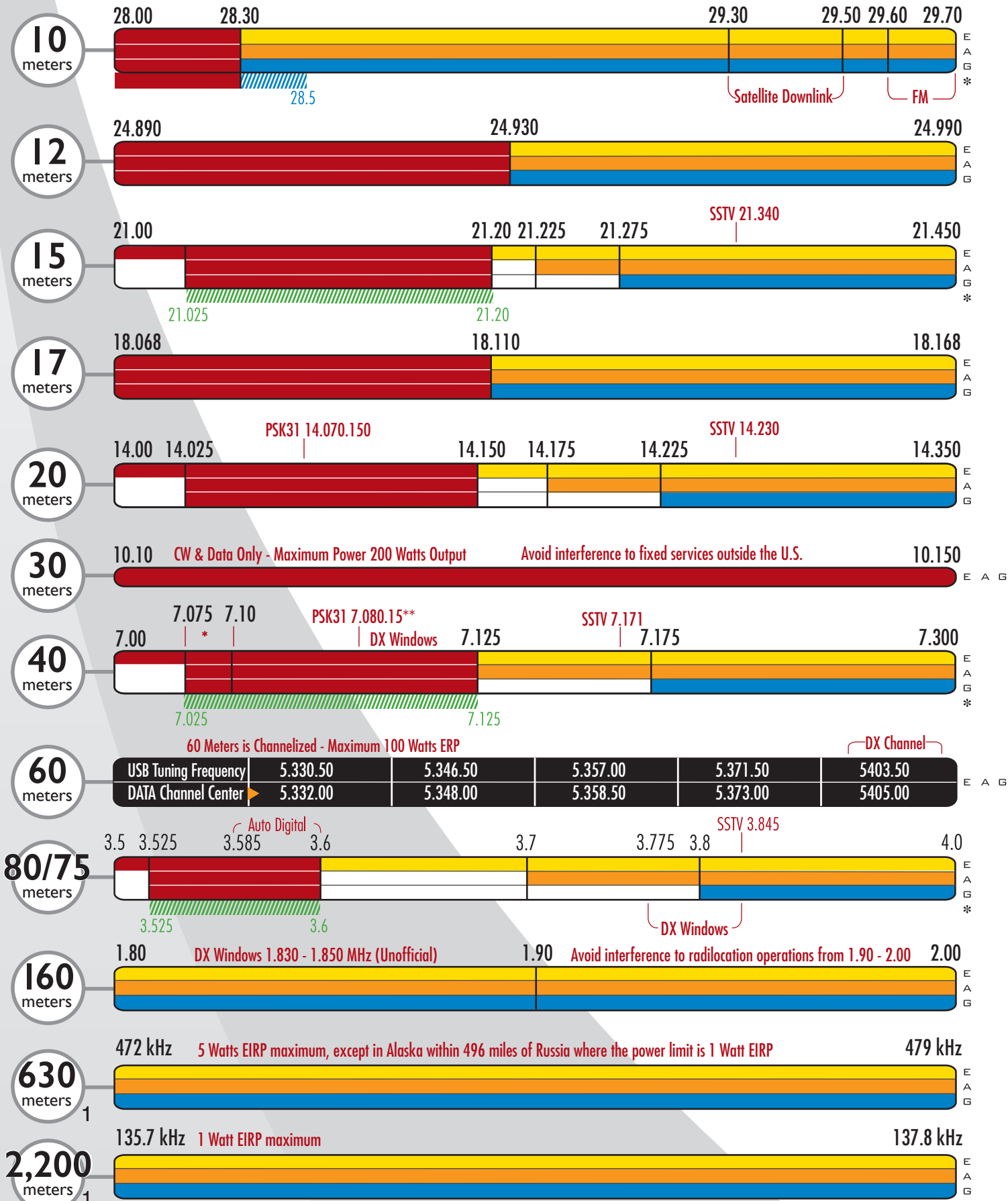
<sup>1</sup>Amateurs wishing to operate on either 630 meters or 2,200 meters must first register with the Utilities Technology Council online at:  
<https://utc.org/plc-database-amateur-notification-process/>.  
You will need to register once for each band.

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# U.S.A. Amateur Radio VHF/UHF Band Plan



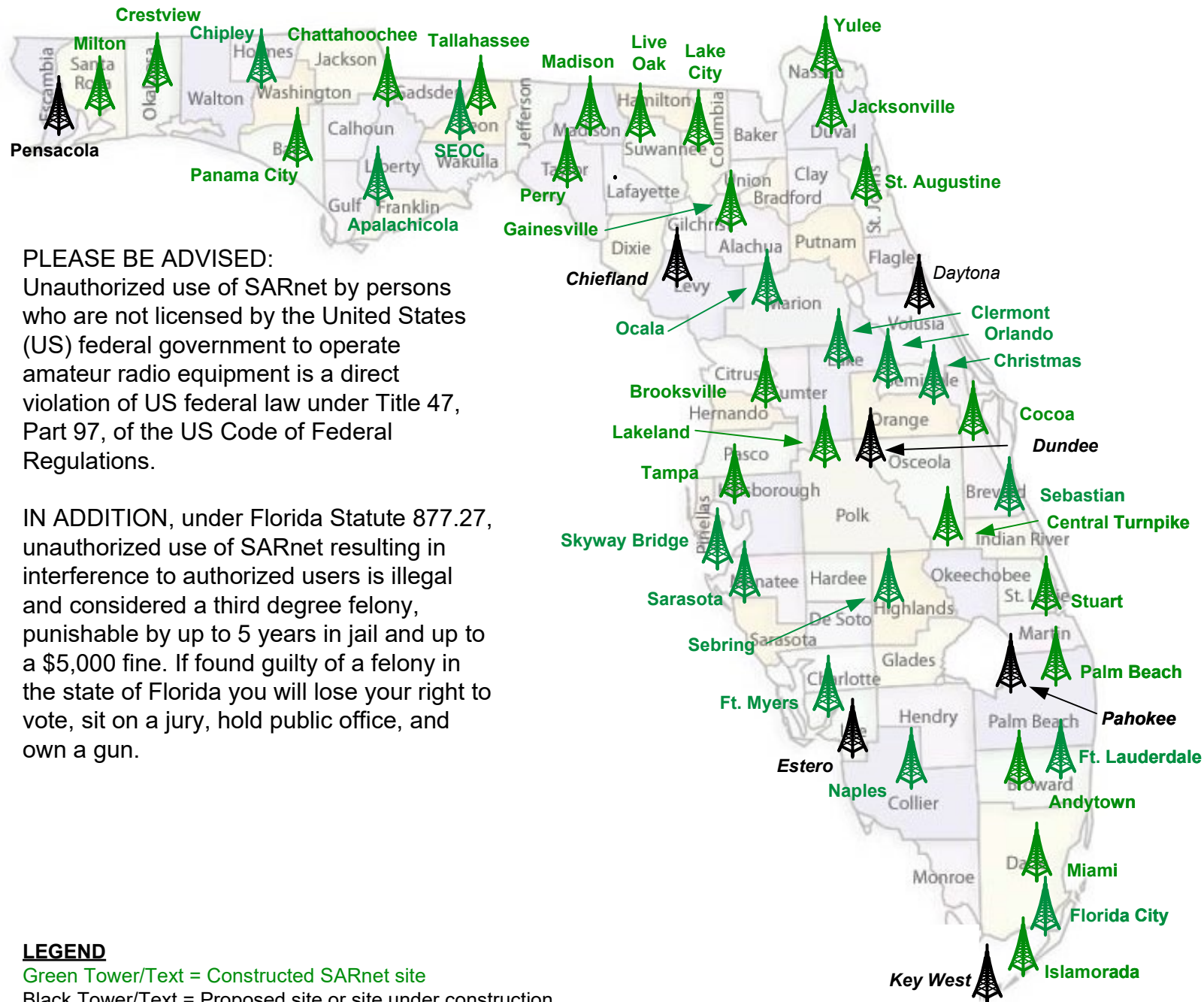
# U.S.A. Amateur Radio MF/HF Band Plan



# Statewide Amateur Radio Network "SARNET"

## Constructed Sites as of September 10, 2023

**YOU MUST BE A FEDERALLY LICENSED AMATEUR  
RADIO OPERATOR WITH A CALLSIGN TO USE SARnet**



### PLEASE BE ADVISED:

Unauthorized use of SARnet by persons who are not licensed by the United States (US) federal government to operate amateur radio equipment is a direct violation of US federal law under Title 47, Part 97, of the US Code of Federal Regulations.

IN ADDITION, under Florida Statute 877.27, unauthorized use of SARnet resulting in interference to authorized users is illegal and considered a third degree felony, punishable by up to 5 years in jail and up to a \$5,000 fine. If found guilty of a felony in the state of Florida you will lose your right to vote, sit on a jury, hold public office, and own a gun.

### LEGEND

Green Tower/Text = Constructed SARnet site

Black Tower/Text = Proposed site or site under construction

TX frequency is repeater talk-out. All UHF repeaters have a +5MHz offset for the talk-in repeater receiver

| <b>SARnet SITE</b> | <b>TX (MHz)</b> | <b>Tone (Hz)</b> |
|--------------------|-----------------|------------------|
| Andytown           | 442.825         | 110.9            |
| Apalachicola       | 444.400         | 94.8             |
| Brooksville        | 444.825         | 146.2            |
| Central Turnpike   | 444.975         | 107.2            |
| Chattahoochee      | 444.975         | 94.8             |
| Chiefland          | 442.725         | 123.0            |
| Chipley            | 444.750         | 100.0            |
| Christmas          | 442.875         | 123.0            |
| Clermont           | 444.975         | 103.5            |
| Cocoa              | 444.650         | 107.2            |
| Crestview          | 444.900         | 100.0            |
| Daytona            | 444.850         | 123.0            |
| Dundee             | 444.350         | 103.5            |
| Estero             | TBD             | TBD              |
| Ft. Lauderdale     | 442.850         | 110.9            |
| Florida City       | 442.050         | 114.8            |
| Ft. Myers          | 444.225         | 136.5            |
| Gainesville        | 444.925         | 123.0            |
| Islamorada         | 442.850         | 114.8            |
| Jacksonville       | 444.700         | 127.3            |
| Key West           | 444.400         | 114.8            |
| Lake City          | 444.900         | 110.9            |
| Lakeland           | 442.275         | 82.5             |
| Live Oak           | 443.700         | 110.9            |
| Madison            | 444.300         | 94.8             |
| Miami              | 444.600         | 167.9            |
| Milton             | 444.725         | 100.0            |
| Naples             | 444.950         | 103.5            |
| Ocala              | 444.025         | 123.0            |
| Orlando            | 444.075         | 103.5            |
| Pahokee            | TBD             | TBD              |
| Palm Beach         | 444.325         | 110.9            |
| Panama City        | 444.175         | 100.0            |
| Pensacola          | 444.875         | 100.0            |
| Perry              | 443.100         | 94.8             |
| Sarasota           | 444.800         | 100.0            |
| Sebastian          | 444.375         | 107.2            |
| Sebring            | 442.900         | 100.0            |
| SEOC               | 443.500         | 94.8             |
| Skyway Bridge      | 442.250         | 146.2            |
| St. Augustine      | 442.800         | 127.3            |
| Stuart             | 444.150         | 107.2            |
| Tallahassee        | 442.100         | 94.8             |
| Tampa              | 442.850         | 146.2            |
| Yulee              | 442.900         | 127.3            |



# **SARNET: Statewide Amateur Radio Networking in Florida**

## **WHAT IS SARNET?**

The Statewide Amateur Radio Network (SARnet) is a network of linked UHF voice repeaters that serves the State of Florida. The repeaters are operated by their local trustees and the network that connects them together does not interfere with the local use of the repeaters. These UHF repeaters were specifically chosen in part because the voice traffic on them is light. This helps ensure that long conversations and rag-chews are rare on SARnet since any SARnet traffic brings up ALL of the repeaters on the network. But always remember when using these UHF frequencies that the government has primary use of the amateur spectrum near 440MHz. See this [discussion](#) on the government use of the band.

The key to what makes SARnet work so well is that this network uses dedicated bandwidth that is separate from the internet. Statewide connectivity is achieved without the use of any commercial telecommunications services. SARnet does not use the internet, cellular telephones, or land lines.

## **WHY WAS SARNET STARTED?**

The state of Florida Department of Transportation is continually investigating new IP technologies for use in improving its own voice radio network and to meet its mandate to provide inter-operable communications with other state agencies and public safety entities. Instead of using their live voice radio network as an ongoing test bed for these new IP technologies, the FDOT has partnered with the amateur radio community to use their radio systems throughout the state as part of a test bed to support the FDOT's research. The benefit for the FDOT is that they gain valuable knowledge about how to install, operate, troubleshoot, expand, upgrade, and maintain a sophisticated IP radio network. With SARnet, the FDOT can conduct their research without jeopardizing their live voice radio system and creating potentially unsafe and counter productive conditions for the FDOT personnel who work on the state's highways every day. In exchange for supporting this research, the amateur radio community can talk across the state using the same amateur radio equipment they use everyday. The fact that the FDOT network that connects these amateur radio repeaters together is a stand-alone carrier class microwave network means that SARnet is much more likely to remain operational during a severe weather event like a hurricane that might cause disruptions to the internet, cellular telephone and other commercial communication services.

## **IS SARNET ONLY FOR EMCOMM?**

No. SARnet is a network of amateur repeaters owned mostly by non-emcomm affiliated hams. So it is not just for emergency communications. That being said, the creators of the network behind SARnet are active in public safety communications, both commercial and amateur, and they have an understanding of what SARnet can do for emergency communications in the state of Florida.

During a significant emergency event, SARnet may be called upon for support, through an official state emergency request, and radio traffic in and out of an affected area may become heavy. Under such a scenario, It is hoped that all of the local repeater trustees in the affected area will agree to let their repeaters continue to be used as part of SARnet. During such an emergency, if a controlled net is called, it will be by hams working with the county and state EOCs, not SARnet personnel. We have enough to do keeping the network running.