

Frequencies and Band Plans

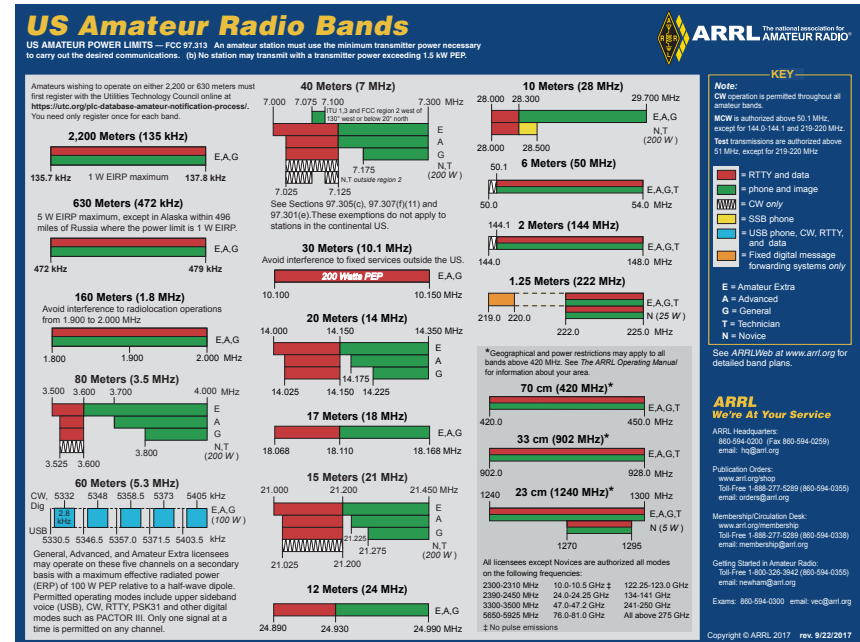
Technician Exam Preparation Class
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Session 5

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Technician Privileges

- CW (morse code) in small segments of the high frequency (HF) bands
- Full privileges in the VHF, UHF, and higher
- Satellites, Space Station, moon bounce, meteor scatter, mesh networks, amateur TV, and much more



There will be questions about whether or not a Technician Class Operator may transmit on certain frequencies.

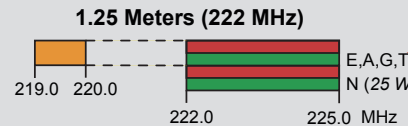
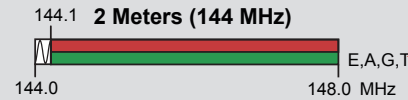
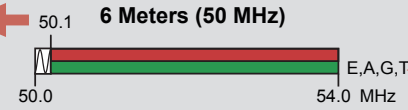
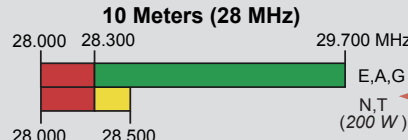
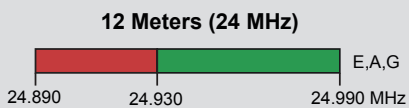
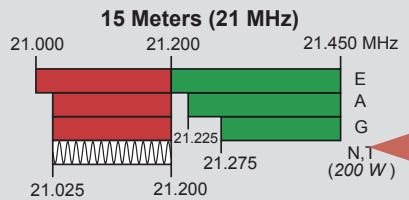
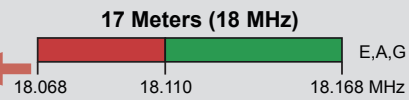
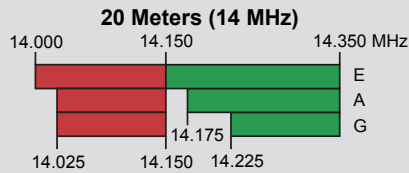
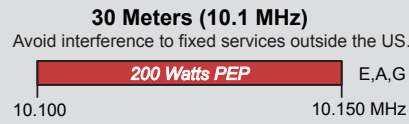
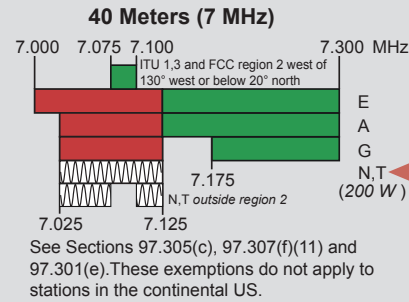
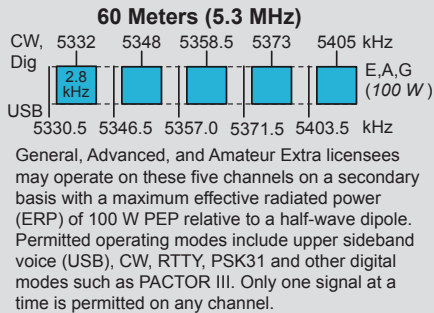
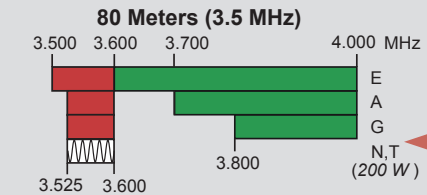
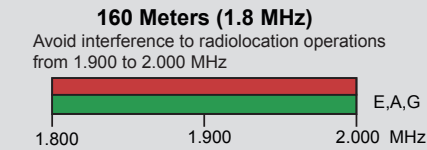
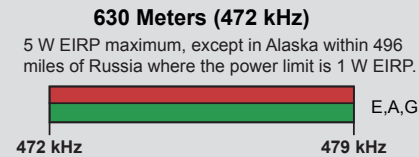
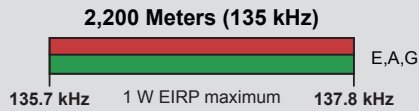
US Amateur Radio Bands

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.

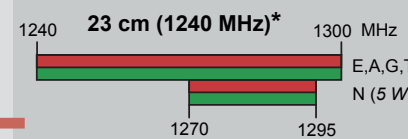
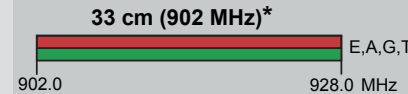


The national association for **ARRL** AMATEUR RADIO®

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



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



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

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

‡ No pulse emissions

KEY

Note:
CW operation is permitted throughout all amateur bands.
MCW is authorized above 50.1 MHz, except for 144.0-144.1 and 219-220 MHz.
Test transmissions are authorized above 51 MHz, except for 219-220 MHz

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

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

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

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You Need to Know:

- You need to know the frequency ranges of the 6-meter, 2-meter, and 70-cm bands.
- You need to know on which bands Technician Class Amateur Radio Operators are 'secondary' and what that means.
- You need to know what power you may use on each band.
- You need to know about sub-bands, i.e., where CW is allowed, where digital message forwarding systems operate, and which HF bands Technicians have phone privileges.

Specific Technician Class Privileges

- Technician Class license holders are permitted phone, RTTY, and other digital modes on 10 meters ... which is part of the HF spectrum.
- Technician Class license holders have CW privileges on 80-meters, 40-meters, and 15-meters.
- CW is the only allowed emission mode from 50.0 MHz to 50.1 MHz and 144.0 MHz to 144.1 MHz.
- Note that only digital message forwarding systems are allowed between 219 and 220 MHz (in the 1.25cm band)
- During periods of high sunspot activities, 10 meters works around the world and technicians have phone privileges on portions of 10 meters and 6 meters

T1B05, T1B06, T1B07, T1B10, T2B13

Important Items

- Technicians have HF phone privileges only on 10 meters
- HF has the advantage over VHF and higher frequencies of long-distance skywave propagation
- Technicians have HF RTTY (teletype) privileges on 10 meters
- The best time for long-distance 10 meter band propagation via the F layer is from dawn to shortly after sunset during periods of high sunspot activity
- “Beacons” are deployed by other amateurs around the world to help identify when communications between two points might be possible and to perform similar experimental activities

T1A06, T3C02, T3C09, T3C10

On the “Air”

- Communication is made on radio frequencies
- Electromagnetic waves carry the communication
 - It has both an electrical and a magnetic component
- Radio waves travel at the speed of light or about 300,000,000 meters/second

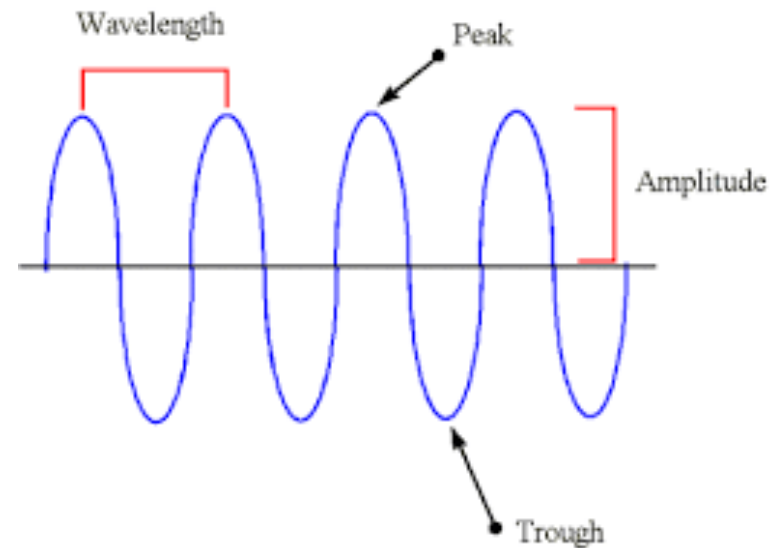


The speed of light is actually 299,792,458 meters per second. That rounds up nicely to 300,000,000.

Radio Frequency is usually abbreviated as “RF”

Radio Waves

- Measured in cycles per second
- Measurement term is “Hertz” which means, cycles per second
 - The number of cycles per second is the “Frequency”
- Wavelength is the peak to peak distance in one cycle and is measured in meters
 - Wavelength and Frequency are inversely related to each other



Frequency is depicted by the letter 'f' and is measured in thousands of Hertz (kHz), millions of Hertz (MHz), or billions of Hertz (GHz)

Note that the proper abbreviation for kilohertz is "kHz" (lower case 'k') while the proper abbreviation for megahertz is "MHz" (upper case 'M').

Wavelength is depicted by the Greek letter Lambda: λ and is measured in meters

Wavelength gets shorter as Frequency increases

$$\lambda(\text{meters}) * f(\text{MHz}) = 300$$

*The wavelength of a radio station broadcasting in the AM band at 1010 kilohertz is 297 meters (3 football fields)
Wavelength is often used to identify the different frequency bands allocated to the Amateur Radio Service, such as '40 meters' or '2 meters'.*

The Two Formulas

To convert a frequency (f) expressed in MHz into a wavelength (λ) expressed in meters:

$$\lambda = 300 / f$$

To convert a wavelength (λ) expressed in meters to a frequency (f) expressed in MHz:

$$f = 300 / \lambda$$

A key to remembering this formula: the speed of light (300) is always in the numerator

Frequency Spectrum

High Frequency (HF)

3 to 30 MHz
100 to 10 meters

Very High Frequency (VHF)

30 to 300 MHz
10 to 1 meters

Ultra High Frequency (UHF)

300 to 3000 MHz
1 to 0.1 meters

Super High Frequency
(SHF)

Above 3000 MHz
Shorter than 0.1 meters

T1B11, T1B12, T3B08, T3B09, T3B10, T5C14

Band Plans

- Band Plans are the dictated ways in which the authorized spectrum may be used as well as the generally accepted segmentation of the authorized spectrum
- In some cases, Amateur Radio is a secondary user of certain frequency ranges
 - The 70cm band is primary for military radar and secondary for amateur radio
 - We must avoid interfering with the primary user
- Stay away from band edges
 - Emissions have width, so transmitting on a band edge means that some of the emission will be outside of the band

T1B08,T1B09, T2A10

2 Meters (144-148 MHz)

144.00-144.05	EME (CW)
144.05-144.10	General CW and weak signals
144.10-144.20	EME and weak-signal SSB
144.200	National calling frequency
144.200-144.275	General SSB operation
144.275-144.300	Propagation beacons
144.30-144.50	New OSCAR subband
144.50-144.60	Linear translator inputs
144.60-144.90	FM repeater inputs
144.90-145.10	Weak signal and FM simplex (145.01,03,05,07,09 are widely used for packet)
145.10-145.20	Linear translator outputs
145.20-145.50	FM repeater outputs
145.50-145.80	Miscellaneous and experimental modes
145.80-146.00	OSCAR subband
146.01-146.37	Repeater inputs
146.40-146.58	Simplex
146.52	National Simplex Calling Frequency
146.61-146.97	Repeater outputs
147.00-147.39	Repeater outputs
147.42-147.57	Simplex
147.60-147.99	Repeater inputs

T2A02, T2A11, T2B12

**Jot down any questions
you may have to ask
during the online meeting**