

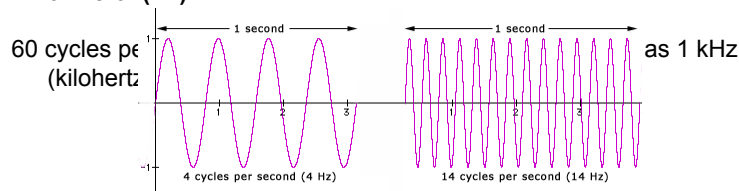
CHAPTER 5

WAVE, WAVELENGTHS, FREQUENCIES

Frequency

The number of cycles per unit of time is called the **frequency**.

For convenience, frequency is most often measured in **cycles per second** or **Hertz (Hz)**

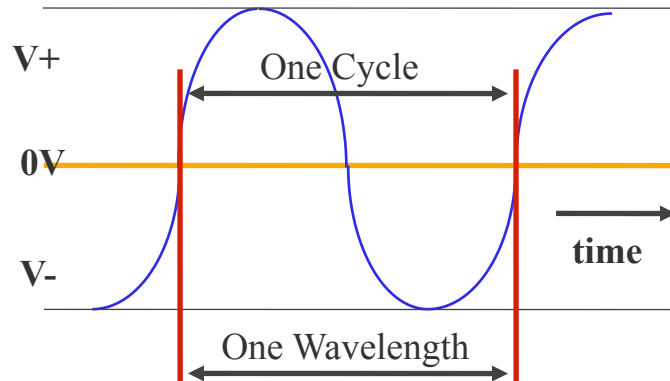


The range of human hearing in the young is approximately 20 Hz to 20 kHz. The higher number tends to decrease with age (as do many other things). A 60-year-old may hear a maximum of 16,000 Hz.

Signals in the range of 20 Hz to 20,000 Hz are called audio frequencies, because the human ear can sense sounds in this range.

Relationship of Frequency and Wavelength

The distance a radio wave travels in one cycle is called its wavelength.



Classes of Waves

- Voice frequencies are low-frequency **sound waves** in the range between 300 and 3000 Hertz.
- **Electromagnetic waves** that oscillate more than 20,000 times per second as they travel through space are generally referred to as **radio waves**
- Most of the radio waves that amateurs create and listen to are in the range of 1.8 MHz to 440 MHz, with some amateurs using higher frequencies up into the gigahertz range

Frequency & Wavelength

- **Frequency** is the number of times that current alternates back and forth per second
- **Wavelength** is the distance a radio wave travels during one complete cycle
- The wavelength gets shorter as the frequency increases
- The wavelength in meters equals 300 divided by the frequency in megahertz. For example, for a radio tuned to 14.200 MHz:
Wavelength = $300 / 14.200 \text{ MHz} = 21.13 \text{ meters}$
(commonly rounded and referred to as "the 20-meter band")
- A radio wave travels through space at the speed of light!

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Frequencies and Bands

- The **wavelength** property of a radio wave is used to identify the different **bands** that are available for amateur radio operators to use.
- The frequency range of the "**2-meter band**" in Canada is **144 to 148 MHz**
Example: $300 / 145.350 \text{ Mhz} = 2.06 \text{ meters}$
- The frequency range of the "**6-meter band**" in Canada is **50 to 54 MHz**
Example: $300 / 52.0 \text{ MHz} = 5.77 \text{ meters}$
- The frequency range of the "**70-centimeter band**" in Canada is **420 to 450 MHz**
Example: $300 / 440.0 \text{ MHz} = 0.68 \text{ meters}$
- The frequency range of the "**160-meter band**" in Canada is **1.8 to 2.0 MHz**
Example: $300 / 1.850 \text{ MHz} = 162.16 \text{ meters}$

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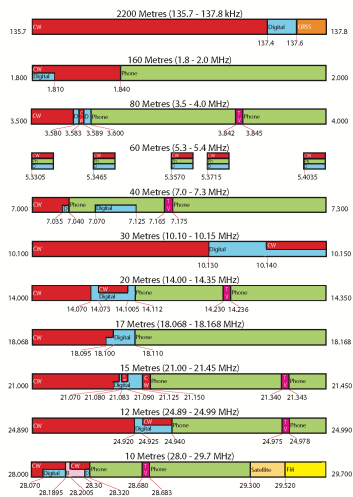


Canadian 0 - 30MHz Band Plan

Effective Date:
December 1, 2015

1. This is a simplified version of the official RAC Band Plan. Not all permissible modes/activities are represented.
2. USB is used on 160, 80 and 40m, LSB is used on all other bands that permit SSB, including 60m.
3. Consult various online resources for detailed information on what digital modes are used.
4. Maximum bandwidth permitted on 2200m is 100 kHz. Maximum power is 1 Watt EIRP.
5. Refer to the IC and RAC websites for full details before operating on the new 60m channels.
6. Remember not to allow your signal to spill over into adjoining band segments when operating close to the edges. During major weekend contests, activity in certain modes can spill over into other segments. Operators should avoid NCCCF beacons on 14.100, 18.110, 21.150, 24.930 and 29.200 MHz.
7. This graphic is a living document and will be reviewed and updated periodically to reflect changes in the band plans and operating habits.

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