

Antennas

The most common, and perhaps the simplest, antenna is the half-wave dipole antenna. As the name suggests, it measures close to one half wavelength from one end of the antenna to the other. A simple dipole mounted so the conductor is parallel to the Earth's surface is a horizontally polarized antenna. (T9A03) The direction that radiation is strongest from a half-wave dipole antenna in free space is broadside to the antenna. (T9A10)

The length of a dipole antenna is actually about 5% shorter than the value that you would calculate using the formula wavelength in meters equals 300 divided by frequency in megahertz. The reason for this is that there will be some stray capacitance between the wire and the ground and other objects near the antenna. Consequently, the approximate length of a 6 meter 1/2-wavelength wire dipole antenna is 112 inches. (T9A09) To make a dipole antenna resonant on a higher frequency, you would shorten it. (T9A05)

Perhaps the second-most popular type of amateur radio antenna is the quarter-wave vertical antenna. For vertical antennas, the electric field is perpendicular to the Earth. (T9A02) This makes them vertically-polarized antennas. The approximate length of a quarter-wavelength vertical antenna for 146 MHz is 19 inches. (T9A08)

Because HF antennas can be very long, many amateurs use a technique called “loading” to shorten them. When referring to “loading an antenna” it means inserting an inductor in the radiating portion of the antenna to make it electrically longer. (T9A14)

Another popular type of antenna is the beam antenna. A beam antenna is an antenna that concentrates signals in one direction. (T9A01) The quad, Yagi, and dish antennas are directional antennas. (T9A06) The gain of an antenna is the increase in signal strength in a specified direction when compared to a reference antenna. (T9A11)

Most hand-held VHF and UHF transceivers come with what’s called a “rubber duck” antenna. Rubber duck antennas use inductive loading to make them shorter than a full-sized antenna. A disadvantage of the “rubber duck” antenna supplied with most handheld radio transceivers is that it does not transmit or receive as effectively as a full-sized antenna. (T9A04) A good reason not to use a “rubber duck” antenna inside your car is that signals can be significantly weaker than when it is outside of the vehicle. (T9A07)

A better option is to use an externally-mounted antenna. VHF or UHF mobile antennas are often mounted in the center of the vehicle roof because a roof mounted antenna normally provides the most uniform radiation pattern. (T9A13) Many mobile installations use a 5/8-wavelength vertical antenna. One reason to use a properly mounted 5/8 wavelength antenna for VHF or UHF mobile service is that it offers a lower angle of radiation and more gain than a 1/4 wavelength antenna and usually provides improved coverage. (T9A12)

REVIEW QUESTIONS: (14)

T9A03	T9A10	T9A09	T9A05	T9A02	T9A08	T9A14
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