I would like to give a brief graphical description of the current and voltage distribution of a $\frac{\lambda}{2}$ dipole antenna.

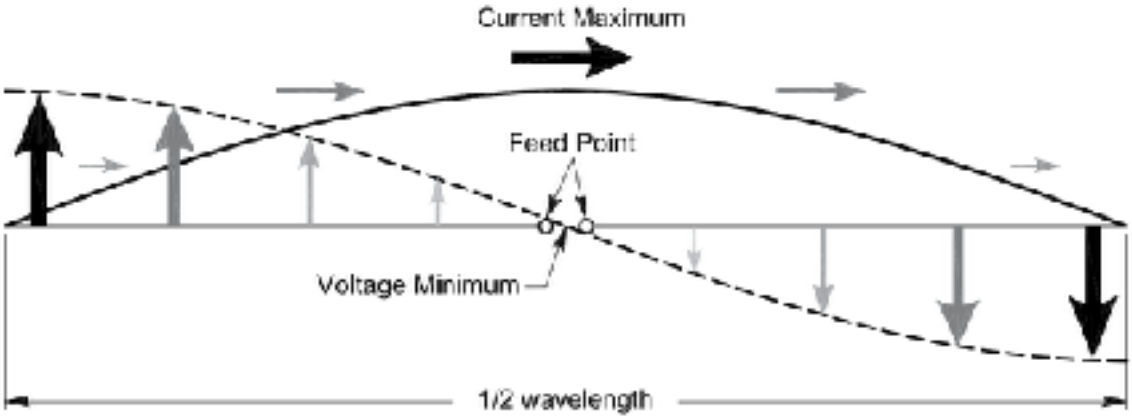

Figure 1

As can be seen from the figure, both the current and the voltage vary sinusoidally. As can be seen, the current reaches some maximum value I_o at $x = \frac{\lambda}{4}$ and falls off to zero at the ends of the antenna. Conversely, the voltage is a minimum at the center of the antenna and reaches its maximum value near the ends of the antenna. If the feed is taken as the zero point it can be seen that the current leads the voltage because it peaks first. For receiving antennas, the feed is nothing more than the component of the antenna that receives incoming waves and converts them to a current which can be transmitted to the rest of the antenna.

The feed can be placed anywhere in an antenna, but typically it is placed at a point where the current is a maximum, corresponding to a minimum voltage. These points of low voltage are easier to control than placing a feed at a point of higher voltage. The feed ideally would use a transmission line corresponding to a $65 - 70\Omega$ impedence. This can be done with a coaxial cable, which has an impedance of roughly 75Ω.

In order to use the coax properly without distorting the radiated power output by the antenna, it must be covered with balun. A balun is a device that converts between a balanced signal and an unbalanced signal. This is necessary because the coax is a single ended line, where as an antenna such as the one described in the figure needs a balanced line. Both lines described above are made of two conductors, the difference is the single line has one of the conductors connected to ground where as a balanced line does not. An example of this configuration can be seen in the figure.

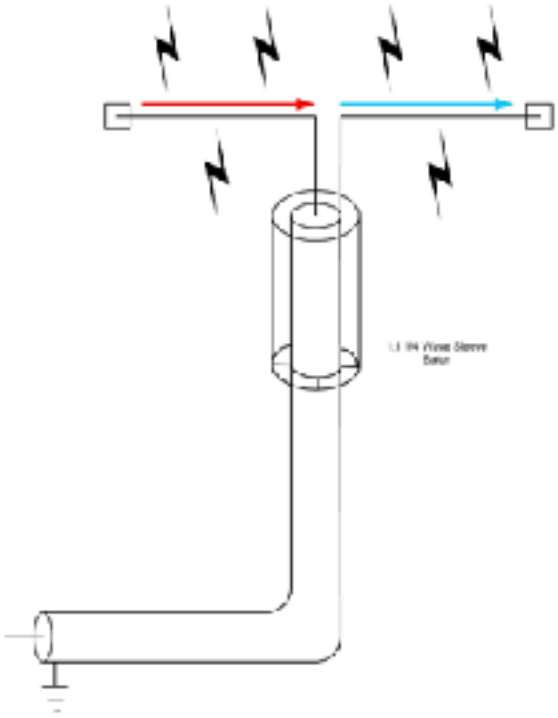

Figure 2

Finally I would like to give a visual description of the power radiated by the $\frac{\lambda}{2}$ dipole antenna.

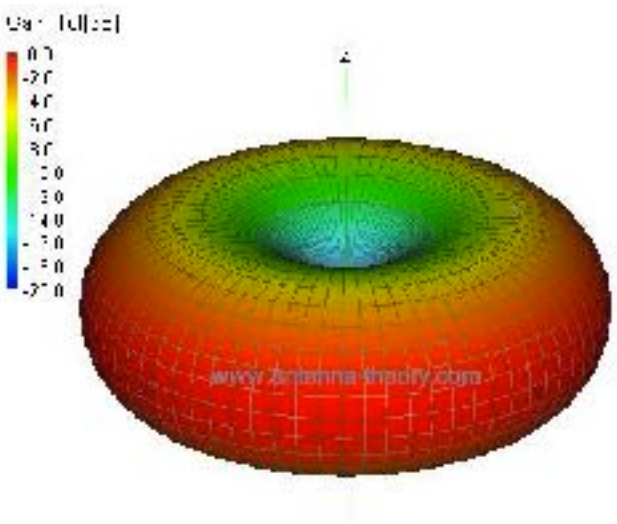

Figure 3

As can be seen from the three dimensional figure, The power radiated from the antenna is symmetric about the axis of the dipole. At the axis, the power radiated is zero. It. can also be seen that the power is a maximum at points perpendicular to the dipole. For this reason, it is why these antennas are so commonly used. They allow for radiation in all directions in space, which is useful when we have devices such as cellphones and other devices that are not just in one fixed location in space.

Figure 1-http://owenduffy.net/blog/?p=7763

Figure 2-https://commons.wikimedia.org/wiki/File:Dipolesleevebalun.png

Figure 3- http://www.antenna-theory.com/antennas/dipole.php

http://www.eznec.com/Amateur/Articles/Baluns.pdf