General Information

Basic properties of a quarterwave monopole antenna

A quarterwave monopole is a ground plane dependent antenna that must be fed single-ended. The antenna must have a ground plane to be efficient, and ideally the ground plane should spread out at least a quarter wavelength, or more, around the feed-point of the antenna. The size of the ground plane influences the gain, resonance frequency and impedance of the antenna.
The length of the monopole PCB trace mainly determines the resonant frequency of the antenna, but because of the very wide gain bandwidth of a quarterwave monopole, the antenna length is not too critical. But like any other antenna types, the gain of a quarterwave monopole will vary if parameters in the surroundings, such as case/box materials, distance to the ground plane, size of the ground plane, width and thickness of the PCB trace are varied. If any of these parameters are changed, a retuning of the monopole PCB trace length may be necessary for optimum performance in each application.

Determining the length of the printed monopole antenna

The antenna is fabricated on a standard 1.0mm FR4 substrate material.
Typical dielectric constant of about 4.4 at 2.45GHz.
The width of the monopole trace is about W =0.9mm.
The wavelength in free air is λ0 = 122mm.

It may be approximated that the guided wavelength λg on the FR4 substrate is about
λg ˜ 0.75 * λ0 = 0.75 * 122mm ˜ 92mm

The approximate, physical length of a printed quarterwave monopole antenna is then
L = 92mm / 4 = 23mm

Electrical Properties

Frequency Range	:	2400 – 2500 MHz
Peak Gain	:	3 dBi
Operating Temperature	:	-40 to +125 °C

rcB 1400, rcB 2000 Antenna

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