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Internet Through a Can???

The purpose of this project was to test various kinds of WiFi antennas and discover if the data supported theory for these resonant structures. The performance of 50 Wireless Local Area Network (WLAN) radio antennas (45 homemade vertical antennas, 4 homemade wave guide antennas, and 1 commercial vertical antenna) was determined by measuring the radio signal strength at a distance of 100 meters for each antenna. The vertical antennas varied in length from 3 cm to 40 cm. The waveguide antennas were made from tin cans with diameters of 7.4 cm to 16.7 cm. The vertical antennas performed best when their lengths were close to some multiple of a wavelength (about 6.15 cm at 2.41 GHz). The waveguide antennas performed best when the can's diameter supported one mode, and the antenna feed was placed about $\frac{1}{4}$ of a waveguide wavelength from the back and closed end of the can. The waveguide antennas performed better than any vertical antenna and at least 5.9 dB better than the commercial vertical antenna. This was expected because the waveguide antennas are directional antennas and the signal strength was tested in the aimed direction. Finally, the relative performance of each antenna qualitatively agreed with calculations made using a Windows program based on the Numerical Electromagnetics Code (NEC) developed at Lawrence Livermore National Labs in 1981.