

A COMPACT KOCH FRACTAL DIPOLE ANTENNA FOR VHF BAND

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ABSTRACT

This thesis presents a design, simulation and fabrication of a dipole antenna applying fractal Koch curve technique. The antenna was designed for VHF frequency (30MHz - 300 MHz) to resonate at 200 MHz. Koch curve technique was applied in order to reduce the antenna size based on the number of iteration and the degree of flare angle. Size reduction was investigated until iteration two with flare angle of 70°. Three types of the antennas; conventional dipole, iteration 1 and iteration 2 of the Koch fractal were designed and simulated using Computer Simulation Technology Microwave Studio (CST-MWS). The antennas have been fabricated using copper wire and were fed by 50 Ω SMA connector. The fabricated antennas were measured using Vector Network Analyzer (VNA). The performances of the antennas such as return loss, gain and directivity has been analyzed. The size of fractal antenna was successfully reduced up to 27.05% and 36.07% for iteration 1 and iteration 2 compare to the conventional dipole antenna.

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CHAPTER 1

INTRODUCTION

This chapter discusses on the overall research project including background, problem statement, objectives, scope of works and outline of the thesis.

1.1 BACKGROUND

Antenna is a device that used to transform an RF signal into an electromagnetic wave in free space. In other words, the antenna is a radiating or receiving radio waves.

A dipole antenna is a fundamental antenna consists of two straight wires. The dipoles antenna which usually use is the half waves dipoles. The term half wave dipoles means the length of the antenna is half of the wavelength of the signal [1]. Dipole antenna consists of electrically conducting wires splitted at the center and each wire is connected to the feed line. This antenna is widely used in the broadcasting, mobile and also maritime mobile.

In today's world of advancements in wireless communication, the need of a low-cost, more compact, multiband and easy to be fabricated antenna has gaining a great growing interest for both military and commercial communication systems [2]. Compact in size and high performance antenna are desired in order to reduce the cost and minimize the size of the device [3].