

Coaxial feed Archimedean Spiral Antenna for GPS Application

This thesis is presented in partial fulfillment the award of the
Bachelor of Engineering (Hons.) Electrical



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Acknowledgement

With the name of Allah, praise in only Allah S.W.T for His bounty and blessing upon us. It is with deepest sense gratitude to Allah who has given the way and ability to complete this project as it is today.

I wish to express my thankfulness to my supervisor Pn. Kamariah bt Ismail for his invaluable guidance, patience and support through the completion of this project. I also would like to thanks En Mohd Khairil for his help on experimental testing.

Finally, I would like to thank everyone that has been involved in this project directly or indirectly for their help and contribution.

Abstract

This work highlights the design, simulation and analysis of an Archimedean spiral antenna for GPS application. The antenna was fed using coaxial feed and a prototype was fabricated on Roger Duroid(FR4) of dielectric constant, $\epsilon_r = 4.9$ with thickness of 1.54 mm while the center frequency was 1.575 GHz. Antenna design and simulation were carried out using commercial electromagnetic simulator, CST. The prototype ASA was released, measured and analyzed using Vector Network Analyzer (VNA). 2D radiation pattern was obtained by using antenna training system_ED3200. It was observed that the measured and simulated values of the parameters of the ASA were close with each other. An omnidirectional radiation pattern was realized. It was observed that frequency independent was achieved by having the same values of inner radius r , width of arm w and the spacing between each turn, s .

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Chapter 1

Introduction

1.1 BACKGROUND OF STUDY

GPS (Global Positioning System) is a satellite based technology and made up of three main component. There are the satellites segments that transmit the position information, control segment which is the ground stations that are used to control the satellites and update the information, and finally is the user segment which is used by the user [2].

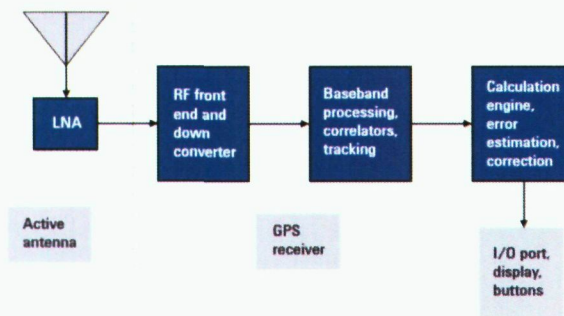


Figure 1.1: GPS receiver block diagram

There are several components in GPS devices but the main component is GPS antenna. Antenna is very essential device that has been seen in a variety of application such as television, radio, satellite, and microwave-link antennas, and is generally consists of various shapes, sizes, and geometries depending on many factors [3]. There are many types of antenna such as Dipole antenna, Yagi-Uda antenna and micropatch antenna. Microstrip patch antennas (MPA), which belong to a large class of printed circuit antennas, are widely used in the microwave frequency range, both as single elements and (more often) in array