

UNIVERSITI TEKNOLOGI MARA

**RECTANGULAR SPIRAL MICROSTRIP PATCH
ANTENNA INTEGRATED WITH LED FOR WIFI
APPLICATION**

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ABSTRACT

This thesis investigates the characteristic of a rectangular spiral microstrip patch antenna integrated with Light Emitting Diode (LED) for Wifi application. The antenna was designed at 2.4 GHz and Genetic Algorithm (GA) technique was used to optimize the position of LED between the spirals. The performances of spiral antenna in term of return loss, gain and radiation pattern was verified through simulation by using Computer Simulation Technology (CST) Microwave Studio. The antenna was fabricated on FR4 substrate and was measured by Vector Network Analyzer (VNA) to demonstrate the capability and potential of the antenna.

Keywords— Rectangular Spiral, Microstrip Patch Antenna, Genetic Algorithm, FR4 substrate, Light Emitting Diode (LED), Wifi and CST

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CHAPTER 1

INTRODUCTION

1.1 Background Of Study

An antenna can act as a transmitter or receiver or transducer (transmit and receive) radio frequency (RF) through the air medium [1]. Currently, microstrip antenna has been used widely in commercial and military application [2]. This is due to the benefits of its bandwidth and high directional gain [3]. However, two major disadvantages associated with microstrip antennas are an unstable performance and inappropriate size. In order to overcome the problems for this antenna, a design has been proposed to fabricate rectangular spiral microstrip patch antenna integrated with LED for Wifi application. The main focus of this paper is to analyse the effect of LED between the spirals in achieving 2.4 GHz frequency antenna [4].

Currently, the demand for small antenna is increasing with the growth rapidly amongst wireless technology. This is due to the benefits came from its physical features, cheaper price, durability and the antennas resistivity. Nevertheless, research in small antenna is fewer compared with others. Hence, further study is required in improving the bandwidth of the antenna and performance of the antenna gain.