CHAPTER 1

INTRODUCTION

1.1 Introduction

In this chapter, a summary of this project is presented. The objective of this project is explained briefly. A clear view of this title and project implementation strategy is discussed also. Lastly, at the end of this chapter provide the dissertation overview of this thesis.

1.2 Objectives and Scope

The objective of the project is to design a 4x1 microstrip patch array antenna that operates at 2.45 GHz for Wireless Local Area Network (WLAN) application. The design is focused on rectangular shape that operates at 2.45 GHz. Two microstrip antennas are designed which is single patch and 4x1 patch array. The antennas are tested and compared for the best performance.

1.3 Project Introduction

Microstrips array antenna have received lots of attention since the last decade because of their advantages such as low cost, lightweight and ease of fabrication and integration. Microstrips are also able to operate in a wide range of frequencies.

Antennas play an important role in today's wireless communication. Without the use of an antenna, signals are not able to be transmitted out or received. The raise of using microstrip for antennas has been due to the several advantages of microstrips.

In this project, microstrip antennas are studied, analyzed and designed with the help of Microwave Office software. Literature reviews will be done on existing microstrip patch and microstrip array antennas. A microstrip patch and microstrip array then will be simulated using Microwave Office. The design then sent for fabrication and testing of it performance.

1.4 Array Elements

Many applications require radiation characteristics that may not be achievable by a single element. The arrangement of the array may be such that the radiation from the element adds up to give a radiation maximum in particular direction or directions, minimum in others, otherwise as desired [1]. The arrays are very versatile and are used among others things to synthesize a required pattern that cannot be achieved with a single element. The arrays have better directivity, and higher gain. The arrays of elements provide a much larger effective aperture which produce higher gain [5].

1.5 Project Implementation Strategy

Figure 1.0 shows the flow chart of the process involved in this project. The first step to start this project by doing background studies about microstrip patch antenna. The suitable Computer Aided Design (CAD) tool is chosen for designing the antenna.

The design process start by using Microwave Office software to run simulation for the designed antenna either it achieved the objective of this project. After the simulation successful, the design will be fabricated and tested for it characteristics. The results are compared and discussed between both simulated and measured.

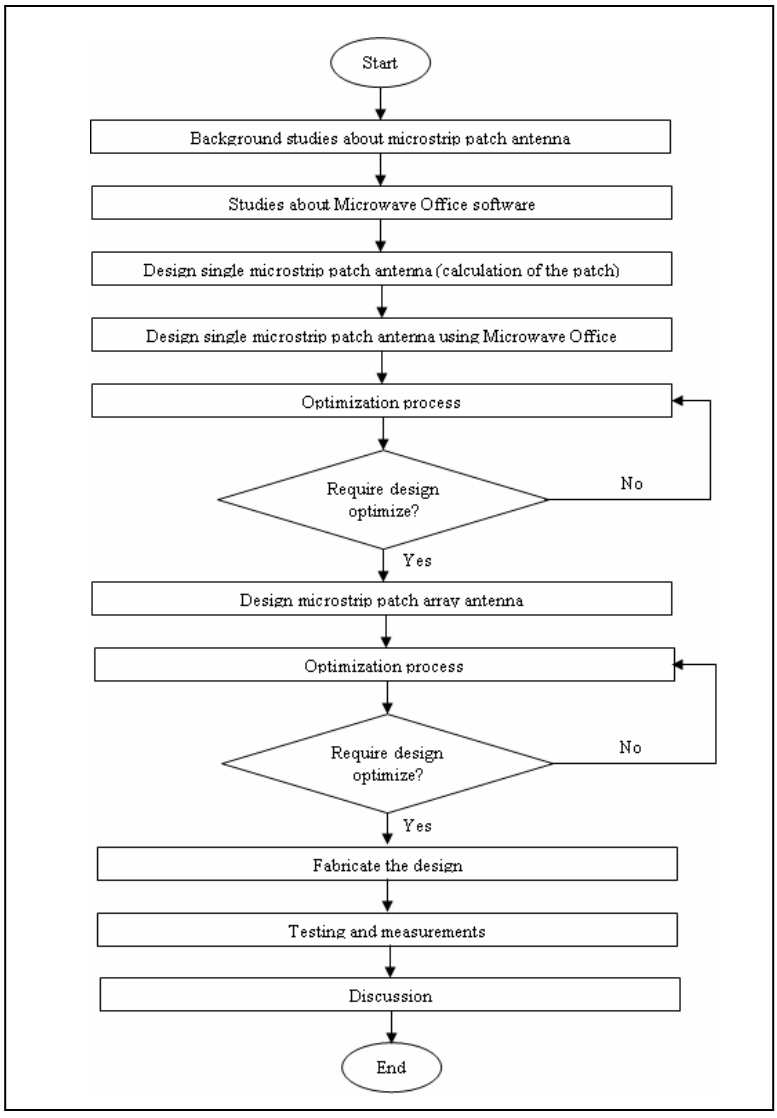

Figure 1.0: Flow Chart of the Project

1.6 Dissertation Overview

In this dissertation, several topics are covered and they are organized into five chapters. Chapter 1 described the introduction to the project, gives the explanation project's objectives.

Chapter 2 described literature reviews that have been done for this project. Basic antenna theory, operation of microstrips and characteristics of microstrip antennas are the topics covered in this chapter.

Chapter 3 is on methodology. The step by step method to design the microstrip patch and array antenna. It discussed the design procedures, the parameters table and the equations needed for the design of the rectangular patch antenna and four element patch array antenna. The Computer Aided Design (CAD) tools that have been use in this project which is Microwave Office (MWO) also introduced. The MWO will be introduced as alternative software in addition to the CAD tools that have in market today such as Agilent Design System (ADS) or MICROPATCH.

Results and discussion are elaborated in Chapter 4. In this chapter the MWO simulation results and the actual measurement results are discussed. All results and finding for simulation and measurement will be explained. As an addition, the antenna also will be tested for its application in WLAN by connecting it to the wireless router as a transmission element. The antenna is tested for it performance to transmit the signal. At the end of this chapter, the overall discussion for this project will be present base on the results.

Finally, this work is summarized and concluded in Chapter 5. Suggestions for future improvement and advancement of this study are also discussed in this chapter.