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**FINAL REPORT:  
PRINTED DIPOLE ANTENNA FOR 2.45GHz**

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## ABSTRACT

This final year project proposes the printed dipole antenna. The antenna was design to operate at 2.45GHz for WLAN application using 50 Hz frequency for fabrication; this antenna used FR-4 substrate. This antenna was design and simulated using CST Microwave Environment Software. The performance of the designed antenna was analyzed in term of return loss, VSWR, bandwidth, radiation pattern and gain. The antenna was then fabricated on the substrate type FR-4 and the output was measured using Vector Network Analyzer (VNA) to evaluate its performance measure result in S-parameter (S11), voltage standing wave ratio (VSWR), and bandwidth. The final S-parameter (S11) result for the single element dipole antenna frequency resonant shows at 2.51GHz WLAN with -11.41 dB to match the input resistant, the output of the feed line was accurate at 50  $\Omega$  resistant so that it can test at the lab using Vector Network Analyzer (VNA) to measure the network parameter of electrical network. The antenna design, simulate and measured dipole antenna are deliberate within this report.

# CHAPTER 1

## INTRODUCTION

### 1.1 Background of study

Printed dipole antenna is very popular because of their ease of fabrication. If the antenna is to be implemented on the same PCB as the circuitry, practically no additional cost a rise [1]. A printed dipole antenna is the most basic and popular antenna type. It comes in various geometries with different feeding mechanisms and radiating element [2].

In designing antenna, microstrip antenna loaded with a shorting pin for compact operation is well known. So by using shorting pin we manage to fulfill our intention to design a dipole antenna.

Printed dipole antennas are the main focus in this thesis. These antennas are chosen because they are simple and yet have potential for future improvement. Therefore the selection of the substrate material will affect the performance of the antenna.

Most existing printed dipole antennas are based on the popular printed dipole design first proposed in 1987 [3]. Avoiding differential input facilitates the testing process because most vector network analyzer (VNA) only has single-ended port that cannot directly measure differential parameter. The printed dipole antennas designs propose in this thesis are all based on this modified design. The major improvement techniques, including miniaturization, bandwidth enhancement, and pattern correction, have been studied [4].

Successful designs are fabricated and tested to show the difference between simulation model and fabricated real product. The major challenge of this thesis is to design a printed dipole that is compact enough for wireless application without compromising the good characteristics (e.g. wide bandwidth, omnidirectional radiation pattern, simple configuration, etc) of the traditional large-sized dipole antenna. Thus, it is necessary to research new design techniques and configuration to tackle this problem.