

**METAMATERIAL PATCH ANTENNA WITH I-SHAPED
DEFECTED GROUND STRUCTURE (DGS) FOR WI-FI
APPLICATION**

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ABSTRACT

Microstrip patch antennas (MPA) is a very famous in mobile and radio wireless Communication. The antenna is quite simple to fabricate and has perfect radiation characteristics. However in upcoming technology, smaller patch antenna needed to match well with future gadgets. The weakness of conventional MPA is that the size is comparable to half of its wavelength. In order to solve this weakness, a new method of using defected ground structure (DGS) having metamaterial characteristic can reduce the antenna size. The metamaterial response is verified in simulation based on scattering parameter using Nicolson-Ross-Weir (NRW) method. This thesis presents design, simulate and fabrication of miniaturized antenna operating at 5 GHz frequency. The DGS structures have been designed and fabricated. The design is I-shaped defect ground structure. The circuits are able to reduce the size from 12.05%. These antenna were simulated using Computer Simulation Technology Microwave Studio (CST MWS) and measured using Vector Network Analyzer (VNA). Both the simulated and measured data were compared. From the simulation, the DGS antennas design at 5 GHz has return loss value of negative 22.292 dB. The DGS antenna also increases the return loss value up to 46.67% compared to conventional one.

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CHAPTER 1

INTRODUCTION

This chapter consists of a brief introduction to my project including problem statement, objectives, scope of work and outline of my thesis. This chapter also highlighted the important of the project and the arrangement of this thesis.

1.1 INTRODUCTION

Antenna is a crucial components in the Radio Frequency system for either transmitting or receiving signals which used the air as medium. Without proper design of the antenna, the signal created by the RF system will not be transmitted and no signal can be received at the receiver. Antenna design is a developed field in communication for future development. A lots types of antenna have been designed to suit with most devices. Most famous categories of antenna is the microstrip patch antenna (MPA). The microstrip antenna are the utmost advanced area in the antenna engineering with its small material budget and simple to fabricate which the process be able to made by research or universities institute. The knowledge of microstrip antenna was main offered in year 1950's however it only got severe responsiveness in the 1970's [1].