UNIVERSITI TEKNOLOGI MARA

MINIATURIZATION OF 3.5GHZ MICROSTRIP PATCH ANTENNA FOR WIMAX APPLICATION

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ABSTRACT

Method of reducing size and improving performance for Microstrip Patch Antenna using oval Defected Ground Structure (DGS) and rectangular slot is presented in this paper. The patch antenna was designed to operate at 3.5GHz for WiMAX application and fabricated on Roger RO3003 Microstrip with dielectric constant of 3.00 and a thickness of 0.75mm. An oval DGS changes the characteristic of conventional antenna which allowed the size to be reduced and rectangular slot will increase the return loss, S_{11}. Computer Simulation Technology - Microwave Studio CST-MWS is used for simulation both conventional and DGS antennas, Vector Network Analyzer (VNA) for antenna measurement in-term of gain, return loss and bandwidth for results comparison with simulation. Based on the results, the overall antenna size was reduced by 25.92%, return loss was improved by 51.74% and bandwidth was about 38.69%. This new approach may able to replace the conventional antenna in market.

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CHAPTER ONE
INTRODUCTION

Chapter One describes the overall project such as research background, problem statement, objectives, scope of works and the thesis organization.

1.1 RESEARCH BACKGROUND

Microwave technology has started before World War II but mushroomed during World War II by necessity. Wireless personal data and communication is expected to be one of the fastest-growing technologies in next two decade. Various investigators were trying to solve the problem of device that could operate in microwave bands with high power. Important component and circuit design for wireless communication such as transmission lines, matching network, filter, coupler, switches, amplifier, mixer, frequency converter, oscillator, modulator and antennas.

Nowadays, microstrip patch antenna application has been widely used. It is widely used in telecommunication, military system, satellite communication and medical application. The design approach of the devices is more important to the sizing, light weight and low cost. In microwave technology, microstrip patch antenna is becomes a most discussed topic among researchers. Microstrip patch antenna is easy to use because the physical shape is small and its ease to fabricate, print directly on the circuit board.

1.1.1 Microstrip Patch Antenna

Antenna is a device that used to transmit or receive the electromagnetic wave especially for communication purposes. Microstrip antenna has widely use in telecommunication, military system, satellite communication, medical application and etc since it offer more valuable advantages such as low profile, low cost and ease to fabricate. A microstrip antenna divided into four basic categories; microstrip patch antenna, microstrip dipoles, printed slot antennas and microstrip travelling wave antennas [1].