

**CIRCULAR PATCH MICROSTRIP ANTENNA USING AN
ELLIPTICAL HEAD DUMBBELL DEFECTED GROUND
STRUCTURE FOR WiMAX**

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The purpose of this project is to develop skill in order to solve multiple problems in much simpler ways. This is first step to be an engineer in the future where all the skill will be tested in research, design and build the project.

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ABSTRACT

This thesis presents the design of a circular patch microstrip antenna using an elliptical head dumbbell defected ground structure (DGS). The miniature circular patch antenna was simulated using Computer Simulation Technology (CST) Microwave Studio. The antenna was designed to operate at 3.5 GHz and applicable for WiMAX (Worldwide Interoperability for Microwave access). A comparison is also presented for the antenna structure with defected ground and without defected ground. The performances of the both antennas were analyzed and compared including size of microstrip. The performance of the proposed antenna was characterized by varying the geometry and dimension of the Defected Ground Structure (DGS) and also by locating the DGS at specific position which were simulated. Vector Network Analyzer (VNA) was used to measure both antennas and the results were compared with the simulation results. Return loss of -26.29 dB, Voltage Standing Wave Ratio (VSWR) of 1.102 and bandwidth of 3% is obtained from the defected ground structure. The size also reduces about 0.8 mm from the actual size.

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CHAPTER 1

INTRODUCTION

This particular chapter includes a simple introduction to this project including problem statement, objectives, scope of work and description of this thesis. This particular chapter highlighted the significant of this project and also the arrangement of project thesis.

1.1 INTRODUCTION

Antenna is the one of the important component that widely used for wireless communication systems as for receiving and transmitting signal. A good design of the antenna can modify system requirement and improve the performance of overall system. It well known that there are several types of antenna such as wire antennas, aperture antenna, array antennas and one of the famous antennas that used for wireless communication is microstrip antennas. First implementation of microstrip antenna was in 1970s and since that it become more popular and used for government and commercial applications [1].