

Universiti Teknologi MARA

**Design Of Dual – Band 2.4/5.8 GHz
Antenna Using LTCC Multilayer
Technology**

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ABSTRACT

This paper proposed the design of a single – feed Dual – Band 2.4/5.8GHz antenna for WiFi and WiMax application using Low Temperature Co-fired Ceramic (LTCC) multilayer technology. The used of LTCC in this project is for the purposed of providing a compact microstrip-like antenna with high gain and good performance. The design consists of 8 LTCC layers with a single silver patch mounted which resonates the lower frequency of 2.4GHz and upper frequency of 5.8GHz with the bandwidth of 47.3MHz and 56.8MHz respectively. The gain for lower band is -0.7dB and 1.6dB for the upper band. By modifying the rectangular patch with inserted slits and a single feed line attach, the proposed antenna had meet its purposed in this design which is to achieve the target frequencies 2.4/5.8GHz. The antenna comprises a total dimension of 35 x 30 x 0.788 mm³.

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CHAPTER 1

INTRODUCTION

This chapter provides the background and relevant for the project. It elaborates the concept and specification of the antenna and the application as well as the structure of the substrate layer. This chapter as well provides the problem statement of the project and gives details on the scope of work for the project.

1.1 Background of Study

An antenna is a device for transmitting or receiving radio waves [1]. The antenna is usually used with a radio transmitter or radio receiver. At transmitter, a radio transmitter supplies an oscillating radio frequency electric current to the antenna's terminals, and the antenna radiates the energy from the current as radio waves while at the receiver, an antenna intercepts some of the power of the radio waves in order to produce a tiny voltage at its terminals, which is applied to a receiver to be amplified[2]. Microstrip antennas consist of a metallic patch on a grounded substrate. These antennas are low profile antenna and used in high-performance aircraft, spacecraft, missile applications and satellite [3]. Besides low profile, microstrip antennas are conformable to planar and non-planar surface, simple and inexpensive to manufacture using modern printed-circuit technology, compatible with Monolithic Microwave Integrated Circuit (MMIC) design and mechanically robust when mounted on rigid surfaces [4].

In designing an antenna, operating frequency is set based on its application. WiFi is a wireless networking technology that uses radio waves to provide wireless high-speed internet and network connections [5]. Since WiFi need no physical wired connection, it work when a radio frequency (RF) current is supplied to an antenna and created an electromagnetic field that is able to propagate through space [5]. Radio frequency