

A MICROSTRIP PATCH ANTENNA USING LTCC FOR X-BAND APPLICATIONS

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ABSTRACT

A design, model and simulation of a 2×1 array microstrip rectangular patch antenna with Low Temperature Co-fired Ceramic substrate is presented in this paper. The specifications for the proposed antenna is it has a frequency of 10 GHz, Ferro A6S LTCC substrate, an epsilon 5.9, a substrate thickness of 0.096 mm and copper thickness of 0.01 mm. Parametric study was done with different conducting material, height of antenna by multilayer substrate and distance between radiating patch. The simulation was done using Computer Simulation Technology (CST) Microwave Studio. Results of the design were analyzed in terms of gain, directivity, return loss and Voltage Standing Wave Ratio. By comparing the FerroA6S and FR4 substrate design in calculation to prove the design of LTCC using Ferro A6S will reduce the size of antenna.

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CHAPTER 1

INTRODUCTION

This chapter to briefly discuss of an introduction about the background of an overall research project including background, problem statement, objectives, scopes of works and outline of this thesis.

1.1 BACKGROUND

Microstrip patch antenna is a metallic strip or patch mounted on a dielectric layer or substrate which is supported by a ground plane. Microstrip antennas are attractive due to their light weight, conformability and low cost. The characteristics of microstrip antenna are low profile, conformable to planar and no planar surface, and also that will be simple to manufacture. Major operational disadvantages of microstrip antenna are their low efficiency, low power, poor polarization purity, poor scan performance, spurious feed radiation and very narrow frequency bandwidth[1]. Rectangular patch antenna is simplifies the analysis and prediction on the performance.

Low Temperature Co-fired Ceramic (LTCC) is a multilayer platform technology that have benefits are high packaging density, dielectric constant, high thermal conductivity, reliability and stability[5]. Using the method will be reducing the size of antenna and also functionality for the portable electronic devices. LTCC large scale array antenna an attracted some attention due its flexibility in manufacturing, the