

**DESIGN OF 2.4GHz ANTENNA USING LOW TEMPERATURE CO-FIRED  
CERAMIC (LTCC)**

Thesis is presented in partial fulfillment for the award of the Bachelor of Engineering  
(Hons.) Electronic (Communication)



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**JULY 2013**

## ACKNOWLEDGEMENT

Assalamualaikum,

Thanks to Allah S.W.T, The All Mighty for the blessing and mercy given for me in completing this project. Peace upon our Prophet Muhamad S.A.W, who has given light to mankind.

I have finally completed my design on 2.4GHz antenna by using LTCC project. During completing this project, there were lots of challenges for me. However, with all of help of many parties that made this project goes well.

I would like to thank to my respective supervisor, Madam Suhaila Binti Subahir who deserve a special mention here. With all her toughness, support and guidance made me work harder which I appreciate a lots and grateful. I also would like to give big thank to Universiti Teknologi MARA (UiTM) and Microwave Technology Centre (MTC) for giving the opportunity by providing facilities during completing this project. Lastly, not forgotten thank to my family for their understanding and to my friend for giving the cooperation to me.

All those cooperation were appreciated and only Allah S.W.T can repay what have given to me.

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(July 2013)

## ABSTRACT

This paper presents the design of rectangular and circular antenna on Low Temperature Co-fired Ceramic (LTCC) operating at 2.4GHz for used of wireless voice and data communication application. LTCC is chosen as the substrate that calls Ferro A6S tape because of the advantages of compactness, highly integrated and small size transceiver systems in the wireless industry. The design also used DGS to increase the performance of the antenna especially the return loss. The design was compared between the conventional antenna and with the DGS for both shape of the antenna which can obtain the best result. The design also has been modified by moving ground plane to observe the performance of the antenna. Those designs used direct feed as feeding method and have been analyzed for different conductors which are copper and silver. The CST Suite Studio Ver. 2012 has been used for simulation to determine the parameter needed such as return loss, bandwidth, VSWR, gain, directivity and radiation pattern. The maximum Return loss,  $S_{11}$  reached at -46.26dB at 2.4GHz with 17.3MHz bandwidth. The maximum gain achieved at 5.263dB.

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# **CHAPTER 1**

## **INTRODUCTION**

### **1.0 INTRODUCTION**

This chapter will explain the introduction of the project and give briefly about general background of 2.4GHz antenna using Low Temperature Co-fired Ceramic (LTCC). The objectives of the project are clearly phased with detailed and the problem statement that is defining the reason of this project is designed with the scope of the project shown.

### **1.1 BACKGROUND GROUND STUDY**

Presently, world developments in communications technology and networks are very fast for advancing society as an important role in everyday life. Internet and mobile cellular heavily depend on wireless interfaces to provide services to their customers due to a lower cost of implementation and maintenance compared to wired alternative [1]. Antennas are an important part of this experience that allows users to receive and transmit data to communicate with the infrastructure. There should be more compact components and modules have better functions are indispensable for modern communication systems nowadays [2]. With the very rapid growth in Wi-Fi communications, an effective antenna in space requirement and easily integrated in the system is a critical part of Wi-Fi devices.