

# MICROSTRIP RECTANGULAR PATCH ARRAY ANTENNA

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## ABSTRACT

This paper presents the design of microstrip rectangular patch array antenna with operating frequency at 2.5GHz for WiMAX application. The array of 4x1 microstrip rectangular patch antenna with microstrip line feeding based on quarter-wave impedance matching technique was designed and simulated using CST Microwave Environment software. The performance of the designed antenna was analyzed in term of return loss, VSWR, bandwidth, directivity, radiation pattern and gain. The antenna was then fabricated on the substrate type FR-4 with dielectric constant of 4.9 and thickness of 1.6mm respectively. The antenna was measured in the laboratory using Vector Network Analyzer (VNA) and Antenna Training Measurement System (ATMS). The results show good agreement with the simulated performances.

*Keywords - Microstrip Antennas, Array Antenna, Microstrip Line Feeding, Substrate FR4, CST.*

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# CHAPTER 1

## INTRODUCTION

### 1.1 BACKGROUND

Back to recent years, development of microwave technology gives significant impacts to many applications in modern society. As microwave technology keep upgraded and improved, one of the applications that fully utilizes microwave system also experience rapid development. It is telecommunication technology where now people experience a rapid progress in wireless communication which seems to replace wired communication networks. In this case, antennas play a more important role.

There are various antenna used in communication systems and classified to several types. Some of antenna is grouped into certain type due to its function. For example, dual band antenna. Some of them is categorized to their physical assemblment or its structure. For example, microstrip antenna where they are very well known because of their small size. However, the most important one, antenna used in communication field specifically in wireless application should be a low profile, minimal weight, low production cost and ease in fabrication but somehow it is capable of maintaining high performance over a large spectrum of frequencies [1]. For these reasons, microstrip antenna is prefered to fulfill the requirements. With a simple geometry, microstrip antenna offer many advantages not commonly exhibited in other antenna configurations.

Often microstrip antennas are also referred to as patch antennas. The radiating elements and the feed lines are usually photoetched on the dielectric substrate. The shapes of radiating patch could be square, rectangular, thin strip, circular, triangular or