

A HAIRPIN BANDPASS FILTER FOR 5GHZ UNLICENSED WIMAX

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ABSTRACT

This thesis presents an improved design of Chebyshev three poles microstrip hairpin bandpass filter for unlicensed WiMAX applications. The filter is designed to operate within the 10% operating bandwidth with center frequency of 5.78 GHz. The specified passband insertion loss must not exceed 3dB while the passband return loss to be at least 10 dB. The filter was designed using Genesys software and implemented on Roger 5870 substrate. The simulated results using Genesys were then compared with the previous work done by [6] to evaluate the overall performance. Based on the experimental analysis, it was observed that the results from Genesys show good results compared to [6].

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CHAPTER I

INTRODUCTION

1.1 BACKGROUND

Bandpass filter was investigated and exploited extensively as a key circuit-block in modern communication systems. As technologies advances, more stringent requirements for filters are required. In order to fulfill these requirements, microwave bandpass filter with a compact size, high quality in performance and low cost is required. In many applications, especially including satellite and mobile communications, keeping filter structures to a minimum size and weight is very important [1].

One of the most popular microstrip filter configurations used in the lower microwave frequencies is the hairpin resonator filter. In term of manufacturing, it is considered easy to manufacture a hairpin filter because it has open-circuited ends that require no grounding [2]. A hairpin filter is one of a modified structure that comes from parallel coupled lines [3]. The main idea is to obtain a better couple affect by folding the resonators from parallel-coupled transmission line, half wavelength resonator was modified and adjusted into a "U" shape and was recognized as hairpin. The structure is widely utilized in designing a microwave resonator due to the ability of providing a flexible coupling variation and producing a compact size in a package of simple design procedures [4].