

HIGH-PASS CHEBYSHEV FILTER FOR IEEE 802.16/ WiMAX APPLICATIONS

This thesis is presented in partial fulfillment for the award of Bachelor of Electrical Engineering
(Honours) (Communication)



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ACKNOWLEDGEMENT

In the name of Allah, the most Gracious and the most Merciful. It is with the deepest sense of gratitude to Allah who has given the strength and the ability to me to complete this project and the thesis as it is today.

I would like to express my sincere gratitude and appreciation to my supervisor, Professor Dr. Zaiki Bin Awang for providing the support, concern and precious guidance towards the success of this project. All the regular discussions that we had gone through the period of study have contributed to the success of this project.

I would also like to wish my acknowledge to all the staff of Electrical Engineering especially to En. Hisham Bin Mahamad for their time and effort in giving me guidance on how to use the equipment in the Microwave Laboratory (Microwave Technology Center).

Last but not least, I would also like to express my special gratitude and appreciation to my family and to all my friends especially to Nurul Elieya BT Che Muda, Nuraisya Alwanie BT Aluyi and Maizatun BT Muhamad for their inspiration and invaluable support, along the duration of my studies and until this thesis is successfully completed.

ABSTRACT

This project described the design, simulation and fabrication of a high-pass Chebyshev filter. The high-pass filter is designed for IEEE 802.16/WiMAX application. The filter designed to be operated at 10 GHz. The microstrip filter was designed and simulated using Genesys and measured using Vector Network Analyzer (VNA). In this filter designed, Rogers RT Duroid 5870 has been used as substrate with 0.5 mm, relative dielectric constant, ϵ_r of 2.33 and dielectric loss tangent of 0.0012.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

A filter is one of the essential components in communication network. It acts very important role in communications systems. The filters design is highly specialized field within RF engineering. They are the most essential fundamental building blocks for achieving frequency range, transmitting certain frequencies without attenuation while rejecting other frequencies. In other words, it can be said that their main function is to separate analog signals into specific, well-defined frequency bands. Filters design dates back nearly a century with the development of image parameter techniques. In the 1940s, exact synthesis techniques were developed that required extensive numerical computations [1].

1.2 THEORY OF FILTERS

Filters attenuate heavily the unwanted signals frequencies while permitting transmission of wanted frequencies. Filters are one of the most widely used components for radio frequency as well as for microwave communications. The basic part in filter design is low VSWR in the passband and enough attenuation in the stopband. Most filters achieve its frequency selection by reflection, a small class of filters called diplexers or absorptive filters achieve attenuation by absorbing the incoming energy while presenting a good impedance match in both passband and stopband [2].

Generally, there are four types of filters that exist in communication systems nowadays. They are low-pass, high-pass, bandpass, and bandstop filters. The characteristics of all the filters are described and elaborated in this chapter.