QUARTER-WAVELENGTH SIDE-COUPLED RING FILTER WITH OPEN STUBS FOR NARROW-BAND APPLICATION

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ABSTRACT

In this paper, quarter-wavelength side-coupled ring filter with two open stubs for narrow-band application is designed at 1GHz centre frequency. The filter consists of two open stubs on top of two coupled lines that are connected in parallel at the input and output port of a one-wavelength ring. The filter is fabricated on FR4 substrate with a relative dielectric constant of 5.4, thickness of 1.6 mm and loss tangent of 0.02. The measured and simulated results are presented to show the validity of the concept.

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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND STUDY

Filter is use to remove unwanted component or feature from a signal in microwave and wireless communication system. The purpose of filter design is to approximate the ideal requirements within acceptable tolerance with circuits or systems consisting of real components. The perfect filter would have zero insertion loss in the passband, infinite attenuation in the stopband, and a linear phase response in the passband. Definitely, such filters do not exist in practice, so compromises must be made [1].

In designing a filter that has specified frequency response, one of the major problems that occur is network synthesis. Many types of synthesis procedures have been developed which are applicable to lumped-element networks that is to networks consisting of inductances, capacitances and resistances. However, in microwave systems these lumped elements cannot be used for clear reasons and must therefore be replaced by more suitable elements such as sections of transmission lines or waveguides and cavity resonators [2]