

UNIVERSITI TEKNOLOGI MARA

**MODELING OF DUAL-BAND
BANDPASS FILTER WITH TRIANGULAR
SHAPED DGS**

NUR WAHIDA BINTI MISKON

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ABSTRACT

This thesis presents the design of dual-band bandpass filter with triangular shaped defective ground structure (DGS). The filter topology made up of a coupled-line connected directly to line impedance with a same structure connected in parallel which produce a dual-path filter design. Triangular shaped DGS is added to the design in order to observe the changes in frequency response. It is found that the implementation of triangular shaped DGS improves the first passband with centre frequency of 1.086 GHz when compared with non DGS filter. The optimised size of the DGS is 150 mm^2 located at the centre and at the quarter wavelength lines of the filter.

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CHAPTER 1

1 INTRODUCTION

1.1 OVERVIEW

In order for the wireless communication applications to perform better, various configurations have been proposed and applied to the existing microwave devices including photonic bandgap (PBG), stepped impedance resonator (SIR) and defected ground structure (DGS). Although PBG improves directivity of antennas, DGS is easier to be designed and implemented. Moreover, it has a higher precision with regular defect structure which is very practical for microwave circuit.

Various slot geometries have been reported [1-5] such as spiral head, square, dumbbell, hexagonal, arrow head and interdigital DGS. Since each DGS provides its own distinctive characteristics depending on its geometry, such circuit functionalities as filtering unwanted signals and tuning high-order harmonics can easily be accomplished by means of placing the required DGS patterns, which correspond to the desired circuit operations without increasing circuit complexity [6]. A triangle-shaped coplanar waveguide DGS in [7] increased the path of current and area of capacitance, which suggest that this design has a potential to be applied RF and microwave circuits applications.