UNIVERSITI TEKNOLOGI MARA

Enhancement of Return Loss and Gain using 10mm air-cut technique for Integrated SIW Filtenna

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January 2017

ACKNOWLEDGEMENT

Peace and blessing of Allah s.w.t be upon His beloved messenger, Muhammad s.a.w and upon his family, companion and beloved followers. Alhamdulillah, all praises to Him for the strengths and blessing in completing this project. This research is dedicated to my dearest family especially my parents for their patience and continuous moral support. They have certainly given a great inspiration for me to deliver the best out of my ability towards achieving my goals.

However, this preparation and completion of the project would not be possible without the help of other important figures. I would like to extend my deepest appreciation to my supervisor and co-supervisor, Encik Mohd Nor Md Tan and Dr Aziati Husna Binti Awang and pn Hashimah Baba for their advice, guidance and constructive criticism throughout the tenure of this research. I also wish to thank my course mate and those who have helped me in one way or another in making the thesis a reality.

My acknowledgement also goes to all the beloved lecturers especially Pn Hashimah Baba and technician of Faculty of Electrical Engineering and for their contribution and dedication throughout my study at UiTM.

ABSTRACT

This paper presents a design of integrated substrate integrated waveguide (SIW) filter and microstrip antenna using multilayer approach at the nearest frequency of 2.38GHz. The design has been using Roger RT/Duroid 5880 with permittivity of εr =2.2 and a thickness of 0.787mm as a substrate. The design has been simulated using Computer Simulation Technology. It is based on the circular cavity structure using TM_{010} mode for the filter and TM_{110} mode for the antenna. Both design techniques of SIW filter and microstrip antenna are coupled by rectangular iris at the common ground plane. However, losses are the main factor in SIW technology. The decreasing in dielectric loss will contribute to the reduction of total dissipated power and both filter and antenna response. Thus, to overcome the losses, lower dielectric loss is used by using air (conceptual) as the transmission medium in SIW. The simulation result show good antenna and radiation pattern that prove the capability to integrate SIW filter and microstrip antenna directly without requirement of external matching and also it will reduce the size of the device, thus the 10mm air-cut filtenna has chosen as the best air-cut size as it shows improvement by 15.51% than its recent study.

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CHAPTER 1

INTRODUCTION

1.1 RESEARCH BACKGROUND

The wireless communication technology has been experiencing a rapid change of improvement nowadays. The invention of many wireless products and services such as GSM, WLANs, satellite applications and the latest technology is LTE. All those applications is using microwave devices such filters and antennas at the front end of the system [1]. In wireless communication system, filter and antennas are mainly needed both at the base station [2]. However, as shown in figure 1.0, traditional communication system whereby antenna and filter is usually connected to one or two filters to separate the transmitted and received signal

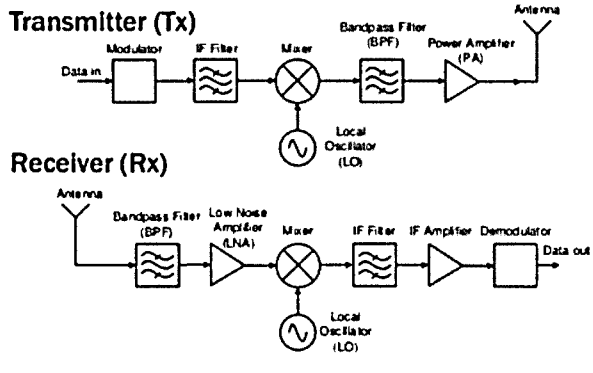

Figure 1.0: **Traditional Block Diagram of Communication System [3]**