

**UNIVERSITI TEKNOLOGI MARA
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**DESIGN OF NARROWBAND
MICROSTRIP ANTENNA OF
FLEXIBLE MATERIAL FOR
HEALTH MONITORING SYSTEM**

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ABSTRACT

This paper presents the design of a microstrip antenna and its characteristics for narrow band application by using Computer Simulation Technology (CST). Main purpose for this project is to implement the antenna on a flexible dielectric material that is Poly Vinyl Chloride (PVC) having dielectric constant $\epsilon_r = 2.7$ as the substrate and it is for easy fitted on human body for health monitoring. The antenna is designed to wearable and flexible for Body centric Wireless Communication (BCWCs) application, especially in the 2.45 GHz Industrial, Scientific and Medical (ISM) band. The radiation characteristics are simulated and analyzed when the antenna is under flat and bend conditions. In the simulation result, the antenna under flat achieve 2.47 GHz at (S11), return loss -48.6 dB in flat antenna. While in bending condition there have four angle which is 20°, 30°, 40° and 50° angle degree bending of the antenna. The good conductivity and flexibility of the material used, based on the good performance of the flexible antenna that used in the antenna. The radiating element of the antenna is able to stand a mechanical deformation for example bending. So the flexibility of wearable antenna is achieved.

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CHAPTER 1

INTRODUCTION

1.0 OVERVIEW OF THE STUDY

In recent years, application of textiles as sensors in wearable biomedical health monitoring is gradually more trendy and popular. This because to integrate wearable and flexible antenna onto such wearable monitors to ensure ease to users and who needs to interpret at the fixed time-cycle, the wireless data link for bio-signal transmission back to the care- givers. A Wireless body area network (WBAN) is a special purpose sensor network designed to connect various sensors and appliances, placed inside and outside of a human body [1].

This project is focusing in design of narrowband microstrip antenna on flexible material that can perform for health monitoring system. Low profile, cheap for fabricate, relieve of integration with feeding networks, compactness, light in weight and have found extensive application in wireless communication are the several advantages of the microstrip patch antenna [2]. It is an energy efficient and better for polarize diversity with the use of microstrip patch antenna. For this antenna design, the specific frequency is focus on upper human arm area that is 2.45 GHz Industrial, Science and Medical (ISM) band. Besides that, body centric wireless communications (BCWCs) were become more important to the research on wearable antenna.

Specific requirements are needed to design a suitable wearable antennas such as flexible conductive materials in the patch and ground plane and flexible dielectric materials. More flexible substrates such as fabric textile, polymer, paper and plastic have been suggested in flexible antenna development [3]. They are manufactured at low cost, easy to fabricate and light in weight are the reasons why flexible antennas are more compatible for upcoming generation of consumer electronic [4] by this project is used Poly Vinyl Chloride (PVC) as the substrate having dielectric constant $\epsilon_r = 2.7$. Other than that, the flexible electronics, compared with current silicon technologies, are low- cost manufacturing (e.g. inkjet printing) and inexpensive flexible substrates (e.g. plastics). Besides, it can make an attractive for next generation consumer products which require portable, low-cost