



Senior Design Project

Design, Performance, and Analysis of 60GHz Logo-type Textile Antenna for Body-Centric Wireless Communication

Rasel Ahmed	ID: 1611867043
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Faculty Advisor

Dr. Mohammad Monirujjaman Khan

ECE Department

Summer 2021

DECLARATION

This is to certify that this Project is our original work. No part of this work has been submitted elsewhere partially or fully for the award of any other degree or diploma. Any material reproduced in this project has been properly acknowledged.

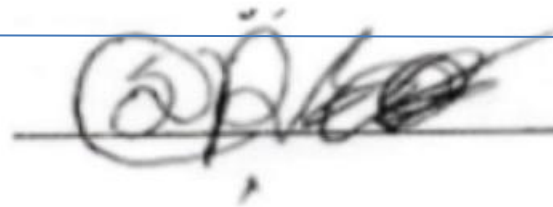
Students' name & Signature

- 1. Rasel Ahmed**

APPROVAL

The capstone project entitled “**Design, Performance, and Analysis of 60GHz Logo-type Textile Antenna for Body-Centric Wireless Communication**” by **Rasel Ahmed (ID#1611867043)** is approved in partial fulfillment of the requirement of the Degree of Bachelor of Science in Electrical and Electronics Engineering has been accepted as satisfactory.

Supervisor’s Signature



Dr. Mohammad Monirujjaman Khan

Associate Professor

Department of Electrical and Computer Engineering

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Dhaka, Bangladesh.

Department Chair’s Signature



Dr. Rezaul Bari

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ACKNOWLEDGMENT

First of all, we wish to express our gratitude to the Almighty for giving us the strength to perform our responsibilities and complete the report.

The capstone project program is very helpful to bridge the gap between the theoretical knowledge and real life experience as part of Bachelor of Science (BSc) program. This report has been designed to have a practical experience through the theoretical understanding.

We also acknowledge our profound sense of gratitude to all the teachers who have been instrumental for providing us the technical knowledge and moral support to complete the project with full understanding.

It is imperative to show our appreciation for our honorable faculty member Mohammad Monirujjaman Khan for his undivided attention and help to achieve this milestone. Also, our gratefulness is divine to the North South University, ECE department for providing us a course such as EEE 499 in which we could really work on this project and materialize it the way we have dreamt of.

We thank our friends and family for their moral support to carve out this project and always offer their support.

ABSTRACT

This research presents a 60GHz compact and innovative shaped micro-strip patch antenna based on a textile substrate for body centric wireless communication. The textile substrate is comprised of 1.6mm thick hypalon coated dacron fabric, and the antenna has a partial ground. The antenna is designed like a circular disc, and inside the disc is my institution's logo, NSU. Computer simulation technology (CST) microwave studio software was used to develop and simulate the antenna. Simulated findings indicated that when the center frequency is 60GHz, the antenna achieves a high bandwidth in free space, with 76.53 percent radiation efficiency and a maximum gain of 7.89dBi. The antenna was simulated on a human torso phantom at five various distances for the on-body simulation. 2mm, 4mm, 8mm, 10mm, and 12mm were the distances between the human torso phantom and the antenna. This design acquired the maximum bandwidth with the best gain and radiation efficiency for a distance of 12mm. Every aspect related to these observations has been demonstrated in the body of this text. Because of its compact size, textile-based substrate, and excellent on-body performance, this antenna will be a promising choice for body-centric wireless communication.