



**Department of Electrical and Computer Engineering
North South University**

Senior Design Project
**Design and Analysis of a 28GHz 5G Triangular
Shaped Wideband Antenna for Wireless Body Centric
Network**

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Summer, 2023

LETTER OF TRANSMITTAL

June, 2023

To

Dr. Rajesh Palit
Chairman,
Department of Electrical and Computer Engineering
North South University, Dhaka

Subject: **Submission of Capstone Project Report on “Design and Analysis of a 28GHz 5G Triangular Shaped Wideband Antenna for Wireless Body Centric Network”**

Dear Sir,

With due respect, we would like to submit our **Capstone Project Report on “Design and Analysis of a 28GHz 5G Triangular Shaped Wideband Antenna for Wireless Body Centric Network”** as a part of our BSc program. The report deals with a triangular shaped 5G Wideband Antenna for Wireless Body Centric Network. This project was very valuable to us as it helped us gain experience in the practical field and apply it in real life. We tried to the maximum competence to meet all the dimensions required from this report.

We will be highly obliged if you kindly receive this report and provide your valuable judgment. It would be our immense pleasure if you find this report useful and informative to have an apparent perspective.

Sincerely Yours,

Tahsin Rubaiyyat Khan
ECE Department
North South University, Bangladesh

Md.Miftahul Zannat Alif
ECE Department
North South University, Bangladesh

Amit Raiyan
ECE Department
North South University, Bangladesh

APPROVAL

Tahsin Rubaiyyat Khan (1921032643), Md.Miftahul Zannat Alif (1921974043) and Amit Raiyan (1921919643) from the Electrical and Computer Engineering Department of North South University, have worked on the Senior Design Project titled “Design and Analysis of a 28GHz 5G Triangular Shaped Wideband Antenna for Wireless Body Centric Network” under the supervision of Dr. Mohammad Monirujjaman Khan partial fulfillment of the requirement for the degree of Bachelors of Science in Engineering and has been accepted as satisfactory.

Supervisor’s Signature

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Dr. Mohammad Monirujjaman Khan

Associate Professor

Department of Electrical and Computer Engineering

North South University

Dhaka, Bangladesh.

Chairman’s Signature

.....

Dr. Rajesh Palit

Professor

Department of Electrical and Computer Engineering

North South University

Dhaka, Bangladesh.

DECLARATION

This is to declare 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. All project-related information will remain confidential and shall not be disclosed without the formal consent of the project supervisor. Relevant previous works presented in this report have been properly acknowledged and cited. The plagiarism policy, as stated by the supervisor, has been maintained.

Students' names and signatures

1. Tahsin Rubaiyyat Khan

2. Md.Miftahul Zannat Alif

3. Amit Raiyan

ACKNOWLEDGEMENTS

The authors would like to express their heartfelt gratitude towards their project and research supervisor, Dr. Mohammad Monirujjaman Khan, Associate Professor, Department of Electrical and Computer Engineering, North South University, Bangladesh, for his invaluable support, precise guidance and advice about the experiments, research, and theoretical studies carried out during the current project and also in the preparation of the current report.

Furthermore, the authors thank the Department of Electrical and Computer Engineering, North South University, Bangladesh for facilitating the research. We would also like to thank my friends Tahsin Rubaiyyat Khan, Md. Miftahul Zannat Alif, and Amit Raiyan for helping us in this project. The authors would also like to thank their loved ones for their countless sacrifices and continual support.

ABSTRACT

Design and Analysis of a 28GHz 5G Triangular Shaped Wideband Antenna for Wireless Body Centric Network

5G stands for fifth-generation mobile network. 20 GB/s is the maximum speed of 5G, which is also more efficient and has ultra-low latency. We have built and simulated triangular-shaped compact 5G wideband microstrip antennas for body-centric networks (BCN) operating on 28 GHz. A microstrip antenna is made out of a very thin metallic strip placed between a ground plane and a dielectric material. The radiating element and feed lines are etched onto the dielectric material using photoetching. The design of the antenna consists of a triangular radiator patch. This antenna is created and modeled with the aid of computer simulation technology (CST), which is very popular for antenna design. This antenna is designed to operate at 28 GHz. The desired 28 GHz frequency response is achieved by careful parametric modeling. The materials of the triangular antenna of the patch and feedline are copper (annealed), and the substrate and ground are made up of FR-4 (loss-free). The maximum achieved gain at the desired resonance frequency of the triangular antenna in free space is 5.91 dBi, and the total efficiency is 80.24%. On the other hand, the maximum gain in on-body simulation is 8.701 dBi at 4mm body distance, and the highest total efficiency found is 72.57% at 8mm body distance. The value of VSWR in free space is 1.48. In addition, 1.44 is the lowest achieved VSWR value in 4mm and 6mm body distance in on-body simulation. The values we achieved are close enough to the targeted values.