## Abstract

The project aims to design and implement an inset feed antenna suitable for 5G applications, focusing on efficient operation in the millimeter-wave spectrum (~30 GHz). Using ANSYS software Student Version 2023, the student will simulate and optimize the antenna design, considering parameters such as substrate material, patch dimensions, feed location, and matching network design. The goal is to achieve high efficiency and performance within the designated 5G frequency bands.

The implementation phase will involve translating the optimized design into a practical antenna prototype. The student will focus on ensuring that the fabricated antenna closely matches the simulated design. This phase will also include validating the antenna's performance through simulation, without physical testing. Through this project, the student will gain valuable experience in antenna design and simulation, specifically for 5G applications, and enhance their proficiency in using ANSYS software for RF and microwave engineering projects.

The project's focus on designing and implementing an inset feed antenna for 5G applications is particularly relevant in the context of the Internet of Things (IoT). 5G technology is crucial for enabling the massive connectivity and high data transfer speeds required by IoT devices. The millimeter-wave spectrum, around 30 GHz, is especially important for 5G IoT applications as it offers increased bandwidth and capacity, allowing for the simultaneous connection of a large number of devices.

By designing an antenna optimized for 5G, the project directly addresses the need for efficient and reliable communication in IoT systems. The use of ANSYS software Student Version 2023 for simulation and optimization ensures that the antenna meets the stringent requirements of 5G IoT applications, such as low latency, high reliability, and energy efficiency. The project's implementation phase, focusing on translating the optimized design into a practical prototype, will demonstrate the antenna's suitability for real-world IoT deployments.

**Keywords :** Millimeter-wave , Inset feed, spectrum, ANSYS software,HFSS,VSWR,S-Parameter