

# Project: 5.8 GHz High-Directivity Antenna



ECE 4370: Antenna Engineering

## Objective

The student team will design, analyze, fabricate, and measure a directional antenna with 50- $\Omega$  SMA connectorization.

## Design Specifications

Each student team is expected to design and build a directional antenna in the 5.725-5.850 GHz ISM band. The key design targets for the device are

- Interfaces with a 50 $\Omega$  SMA line input
- No active electrical components on the antenna are allowed
- Total size of the antenna must fit within a 20 cm x 20 cm x 5 cm rectangular bounding prism
- Design for linear polarization

This antenna may use *any* topology, whether it is a type we discussed in class (dipole, yagi, patch array, etc.) or a type described in a reference (source must be cited in your paper).

A final report must be submitted in PDF format that contains the following components:

- Design methodology for selecting antenna type
- Description of construction methods and costs, including any printed circuit board layout files
- Analysis using numerical tools of your choice (NEC, Ansoft HFSS, Matlab code, etc.)
- Measurements from REAL antenna range (<http://research.ece.ncsu.edu/preal/>)

## Grading

Grading for the student teams is based primarily on the written report. The base score of this project will depend on both the absolute peak gain achieved by the antenna as well as the written documentation of the group's project design and implementation. Key grading points for good design documentation:

- a. Technical Correctness and Completeness
- b. Thorough Design Methodology

- c. Clear, *Concise* Writing
- d. Professional Content
- e. References

Design documentation should strive for succinct repeatability.