

## ABSTRACT

Technological advancements in telecommunications, driven by globalization, enhance the speed and efficiency of digital communication. The 4 GHz IP radiolink system ensures data security through authentication and encryption, supporting voice and video transmission. Additionally, troposcatter technology utilizes the troposphere for cost-effective long-distance communication, making it suitable for military use, disaster management, and internet access in remote areas. The quality of wireless data transmission systems is greatly influenced by the type and quality of the antennas applied. Antennas are made up of different types such as dipoles, monopoles, Yagi-Uda, microstrips, parabolas, horns, helixes, log-periodics, slots, and loops. The satellite dish reflector was chosen in this final project because it has high gain and directivity, reduces interference, is efficient in focusing signals, and is widely used in satellites, radar, and long-distance communications.

This final assignment evaluates the optimal design of the parabolic reflector antenna for the 4 GHz frequency, which can improve the efficiency of the transmission signal, and the frequency compatibility to suit the needs of the radiolink and troposcatter systems. The study looks at designs with feed proximity coupled horn and microstrip to improve performance through optimal characteristics. The analysis compares a feedhorn pyramid, which offers higher gain but is larger, with a smaller microstrip design that performs adequately. The test results of the feedpoint proximity coupled microstrip reflector antenna showed a return loss of -17.38 dB and a VSWR of 1.66. Simulations show a gain of 10 dB for the antenna. Meanwhile, the gain of the pyramidal feedhorn reflector antenna reaches 21 dB.

**Keywords:** *Reflector Antenna, 4Ghz, IP Radio, Troposcatter, Antenna Simulator, Frequency*