

## **ABSTRACT**

The development of technology nowadays is very rapid, one of it is 5G technology as the fifth generation in cellular communication systems after 4G. 5G technology has data that will be transmitted via radio waves. To meet the needs of today's developing telecommunications technology, antenna devices are needed. One of the small antennas that can be used to meet the needs of 5G technology is the microstrip antenna.

Microstrip antennas are antennas that have the advantages of small dimensions and light weight. Microstrip antennas tend to have small gain due to their small dimensions. Therefore, additional devices that can support a microstrip antenna in order to meet the specifications of antenna technology capable of working at a frequency of 3.5 GHz for 5G technology are needed. In this final project, a microstrip antenna is added with an amplifier and metasurface to enhance the gain. The algorithm to be used is the integration of the LNA (Low Noise Amplifier) footprint on the main antenna's ground plane, installing the necessary components of the LNA, and adding a metasurface for wave absorption that helps enhance the gain of the main antenna.

The microstrip antenna as the main antenna is integrated with the LNA as an amplifier to amplify the signal power and maintain the SNR of the very low power system and to add gain to the antenna that will be attached to the main antenna's ground plane. In addition, the antenna is given a metasurface layer that is separate from the main antenna as an absorber that functions as a wave absorption. This microstrip antenna itself has the work and function to transmit and receive electromagnetic waves at a frequency of 3.5 GHz for 5G technology and is supplied with an LNA amplifier.

By subtracting part of the antenna ground plane and installing LNA components and adding a double-sided metasurface using a double circle resonator unit cell, the expected gain specification target can be achieved with a result of 5,519 dBi.

Keywords : Microstrip antenna, 5G antenna, Metasurface, Amplifier, LNA