

## ABSTRACT

The fifth generation technology (5G) is a wireless network technology that offers internet access with very high data rates and greater user capacity. One important element in realizing 5G technology is the antenna. Based on the provisions of Technical Specification Release 16 by 3GPP, an antenna with beamforming capability is one of the key 5G technologies. Beamforming is an antenna's ability to direct the radiation patterns produced with certain characteristics. One type of antenna that can be used for 5G technology is a microstrip antenna. Microstrip antenna has the ease of design and fabrication, however, it has several disadvantages, including the gain and small bandwidth.

Based on the 2019 World Radio Communication (WRC) Conference, the 26 and 28 GHz frequencies are receive the most spectrum licenses in the Asia Pacific region. In this Final Project, an 8x8 rectangular patch linear array microstrip antenna design with beamforming capability operates at a working frequency of 5G 28 GHz. The use of array antennas is expected to be able to obtain a gain in accordance with the characteristics of the 5G communication. The beamforming technique itself is done by giving the phase difference to each excitation and adjusting the distance between the excitation (port) of the antenna.

The simulation results show that the excitation distance between antennas of  $0.5\lambda$  results in a radiation pattern with the desired beamforming characteristics, namely beam width  $<10$  degrees and beam direction of 60 degrees. Giving a phase difference of 45 degrees and 90 degrees also produces the desired radiation pattern direction that is the direction of 60 degrees. The gain and bandwidth produced by the 8x8 array antenna design have a value of 20.1 dBi and 1,662 GHz.

**Keywords :** *5G Technology, microstrip antenna, array, beam, beamforming.*