

## ABSTRACT

In recent years all individuals want to access a data that more faster and more reliable, for these needs 5G comes to answer those challenges. To answer this challenge, an antenna is needed as part of that technology. Antenna is an electronic device that aims to transmit and receive electromagnetic waves. One antenna that has a suitable use to answer the challenges in the future, is an antenna array.

Array antenna has an effect named mutual coupling. Mutual coupling is an effect that generate antenna parameter characteristic. Reduction of the parameter from the antenna could take an effect towards the quality that already produced. For that concerns, this research we're analyze an effect from mutual coupling towards beamforming results, where we can see the effects it self from mutual coupling towards the result of the beam that will be produced. Outcome from this analysis will give an information towards coupling effects that usefull to get the bet configuration to optimize antenna in 5G areas.

In the research on the effect of mutual coupling on the results of beamforming, it can be concluded that the effect is indeed influential. The effect of mutual coupling depends on the distance or distance between the antenna elements. In the simulation the beam is set to 60 degrees. At a distance of  $\frac{1}{4}$  lambda the beam results shift towards 8 degrees. At  $\frac{1}{2}$  lambda distance the beam shifts towards 45 degrees, while at a distance of  $\frac{3}{4}$  lambda the beam shift is not so far or close to the direction we want, precisely at 64 degrees. At the lambda distance there is an effect called grating lobe, an effect that causes the side lobe to resemble a play lobe. The value of the mutual coupling effect itself can be seen from the S-Parameter value.

**Keywords** : Antenna, Beamforming, Mutual Coupling, Array, S-Parameter.