

## **ABSTRACT**

*Fifth Generation (5G) technology provides live streaming services with a latency of less than 1ms. To meet the needs of users, 5G technology adopts the use of a Multiple Input Multiple Output (MIMO) system with low interconnected aspect so that the emitted power is not received by other antennas. The Minister of Communication and Informatics (Menkominfo) prepares a 3.5 GHz frequency spectrum for 5G application in Indonesia.*

*Therefore, this final project studies the effect of circular polarization on the MIMO 4x4 antenna system by looking at return loss, mutual coupling, and bandwidth. Using MIMO antenna specification rectangular microstrip patch that works at a frequency of 3.5 GHz substrate Roger Duroid RO4003C with a thickness of 0,813 mm, dan  $\epsilon_r = 3,38$  and using truncated method. Starting with designing a single element antenna according to specifications, then use it when designing MIMO 4x4 antennas consisting of co-polarization LHCP and RHCP configurations, and cross-polarization of RHCP-LHCP MIMO configurations and see a comparison of each configuration and see the effect of circular polarization on mimo antenna system 4x4 patch rectangular.*

*Polarizing the circular patch element for MIMO antennas in cross-polarization polarization configurations can increase the return loss value of antenna elements. In addition, the mutual coupling results obtained in mimo antenna simulation 4x4 co-polarization and cross-polarization did not have significant value differences. Based on the cross-polarization (RHCP-LHCP) and co polarization (LHCP and RHCP) configuration settings on mimo antennas, Cross-polarization configurations have lower resulting mutual coupling values with the highest values of  $-21,821$  dB at  $MC_{8,12}$  and  $-20,620$  dB at  $MC_{6,11}$  for co-polarization (LHCP and RHCP).*

**Keywords :** antenna, MIMO, return loss, mutual coupling, bandwidth, polarization