# ABSTRACT

Device-To-Device (D2D) communication is a communication concept that allows direct communication from User Equipment (UE) without needing to communicate via Base Station (BS) and also increases system data rate. D2D communication can expand cell coverage which makes communication easier. However, D2D communication can experience problems, because it does not take into account the interference caused by the user in the allocation of resource blocks. Therefore, it is necessary to allocate an effective relay to the D2D pair.

In this study, two types of users were used, namely cellular users (CU) and D2D partners, and the scheme used was D2D grouping with relay. This research focuses on the optimal allocation of relays in the downlink direction. Determination of the optimal relay position is based on the point that has the highest number of users from the simulation results with the genetic algorithm.

Optimal relay allocation in D2D grouping communication is expected to reduce interference caused by users in resource block allocation. By using the D2D Group-Casting communication concept, it can improve 5G NR services for D2D paired users in communicating.

**Keyword**: Device-To-Device, Resource Block, Grouping, Relay, SINR