# ABSTRACT

D2D allows communication between two devices without going through eNodeB. D2D communication can be a solution to reduce traffic and the density of User Equipment (UE). D2D does not have its own resource to communicate, so D2D uses the same resource as Celluler User Equipment (CUE) resource which is called D2D underlay communication. It uses the Cellular User Equipment (CUE) resources simultaneously. However, it can cause interference. Therefore, it needs an efficient allocation of resources for the user.

This research allocates resources for D2D using the Two Phased Auction Based Fair and Interference Resource Allocation (TAFIRA) algorithm, which is carried out in two different perspectives, namely from the CUE side and the D2D side, to determine the effectiveness of resource allocation in this research. Lastly, after the allocation process, the performance parameters are calculated and analyzed. Then the performances are compared with the Greedy algorithm.

The simulation results in the first scenario of the Greedy algorithm gets the best performance with sumrate value of 184,8 Mbps, spectral efficiency of 20,52 bps/Hz, power efficiency of 24,62 Kbps/watt, and fairness of D2D of 0.916. But fairness of CUE value of 0,05 lower than TAFIRA D2D algorithm. While in the second scenario, the TAFIRA D2D algorithm gets the best performance with sumrate value of 168,6 Mbps, spectral efficiency of 18,73 bps/Hz, power efficiency of 16,86 Kbps/watt, fairness of CUE 0,377, and fairness of D2D 0,868.

***Keywords***:*Device to Device*, *Underlaying*, TAFIRA, *Resource Block*.