

## ABSTRACT

*The number of users accessing the internet can cause traffic congestion at the base station (BS). One way to overcome this is a Device to Device (D2D) communication system. Device to Device is communication between one user and another user directly over a short distance without going through the BS so as to reduce BS traffic density and increase system capacity. However, D2D communication has interference problems because one Resource Block (RB) is used by Cellular User Equipment (CUE) and a pair of D2D Users Equipment (DUE) simultaneously.*

*This research was conducted to overcome the interference problem that occurs by allocating resources using a greedy algorithm and a graph algorithm. The simulation scheme used to allocate resource on a D2D communication system underlay with a communication direction of uplink. This study applies 2 scenarios, the first scenario is to vary the number of DUE pairs and the second scenario is to vary the cell radius.*

*Based on the results of simulations that are run using the graph algorithm and the greedy algorithm. Graph algorithm has poor performance in terms of sumrate around  $7.8 \times 10^7$  bps, spectral efficiency around 10.8334 bps/Hz, power efficiency around  $9.1894 \times 10^3$  bps/mWatt and fairness DUE is about 0.9216 of the greedy algorithm. Meanwhile, in terms of fairness BS and fairness the total algorithm graph has better performance than greedy. Fairness The BS of the graph algorithm has a value of about 0.8667 and a total fairness of about 0.8766 which is better than the greedy algorithm.*

**Keyword :** *resource allocation, device-to-device, algoritma graph, algoritma greedy*