

ABSTRACT

As the rapid development of technology, especially information and communication technology, triggers the public to get services that are practically easy and efficient. A significant increase in the number of cellular users leads to an increase in traffic density on cellular network communications, so an increase in network capacity is needed. And one solution to deal with these problems is to implement Device to Device (D2D) communication in cellular communication networks. Where D2D allows between EU can communicate directly without having to go through eNB. D2D is also a technology that was introduced via 3GPP Rel. 12 for LTE 4G which promises the future to be adopted by 5G because it can increase bandwidth capacity.

D2D communication increases high spectral and horizontal efficiency but instead introduces interference to cellular users because they share the same Resource Block (RB). Therefore to overcome the existing problems, the application of resource allocation distribution is needed that can increase the *data rate*, and reduce interference. One algorithm used for the distribution of resource allocation in communication network systems is the auction algorithm. In this Final Project uses a carrier frequency of 1.8 GHz, bandwidth of 180 KHz which is assumed to be 50 cellular users and 30 D2D users.

In this Final Project the parameters observed are sumrate, spectral efficiency, energy efficiency and fairness. From the simulation results, auction algorithm has the highest sumrate, spectral efficiency and energy efficiency between the two comparison algorithms, which are greedy algorithm and random algorithm.

Keywords : *User Equipment (UE), Device to Device (D2D), ENB, Data rate, Auction, Resource Block (RB)*