ABSTRACT

Increasing number of population in metropolitan areas every year is getting higher, this causes an increase in traffic which results in leakage coverage. In this case, we need a new communication process that can be implemented to maintain the amount of coverage. In the Long Term Evolution Advanced (LTE-A) which is the development of LTE developed a new way of communication that is Device-to-Device (D2D) communication.

D2D communication is a new paradigm in the cellular world because this communication allows between user equipment (EU) to be able to interact directly without having to be connected by Base Station (BS) so the traffic will not be too high because it does not use the network main. The D2D communication used is the cooperative clustering method. There are two conditions, namely cooperative clustering with one CH using the WCA algorithm and the addition of UE which makes the status change from one of the CM to SH using the Collaborative Clustering algorithm.

The performance is reviewed by calculating D2D communication in the form of Average User Throughput, Fairness and Delay. Then the CH variations produced. The performance produced by the two scenarios results in an average throughput value of scenario II being higher than scenario I with a difference of 1.68 kbps. The fairness value of scenario I is at the highest index, which is 1 while the fairness in scenario II is 0.99988. The result of delay shows scenario I has a lower delay of 0.135422503 s compared to scenario II. Based on variations in the number of nodes in the cluster, the number of CH generated by scenario II is far less than in scenario I.

Keywords : *LTE-A, Device-to-device Communication, Wireless Communication, Cellular Network, Clustering Method.*