ABSTRACT

Device-to-Device (D2D) communication is direct communication between two cellphone users without an intermediary node in the data exchange process, which is one of the features of the 5th generation (5G) technology being developed. In D2D hybrid networks and cellular communications, reducing interference is always a hot issue. The development of cellular technology has now entered the 4th generation (4G) and in 2018 a 5G mobile network was developed to significantly increase network data rates and reduce traffic loads on a cellular system.

Interference involves between D2D terminals or between cellular and D2D networks. Lower interference can increase the efficiency of the performance value more effectively. The Voronoi algorithm in the D2D-pairing scheme is used to mitigate the influence of interference between terminals in D2D communication by means of resource allocation. The system model is depicted based on the Voronoi diagram, the D2D-pairing scheme, and the proposed algorithm. The Voronoi algorithm is an algorithm used to determine the destination of resource allocation using the t value function obtained from processing the distance between the D2D transmitter and the D2D receiver. Then the algorithm was tested in two scenarios, namely the increase in cell radius variation and the increase in the number of D2D transmitter variations. Then the system sumrate value, system average data rate, system spectral efficiency, system fairness, and system energy efficiency from the simulation results are compared with the random allocation algorithm and the minimum interference algorithm.

The general results obtained from the two scenarios are that the minimum interference algorithm is dominant, the Voronoi algorithm in the second position, while the random allocation algorithm is in the third position. This is because the parameter that used by minimum interference algorithm is more complex than other algorithms. Also the minimum interference algorithm chooses the least interference so that the performance results are good. The Voronoi algorithm is good at fairness system performance almost the same as interference minimum algorithm because the distribution of resources for each user in the Voronoi algorithm is good. The random allocation algorithm is bad at each performance value because the random allocation algorithm is determined randomly.

Keywords : Device to device (D2D), sumrate, average data rate, spectrum efficiency, fairness, Voronoi