

## ABSTRACT

As time passes with development, human needs for telecommunication technology are increasing. The increase in the number of users of technology of mobile networks can cause traffic density in Base Station (BS). The increase in the number of cellular network users affects the cellular traffic at Base Station (BS). One of the solutions which is offered to overcome the problem is by using Device-to-Device (D2D) communication. D2D communications that allow the users to communicate without traversing the BS, so that could reduce the traffic load. In the other hand, D2D communication has a lack, which is susceptible to interferences, thus, the research for minimizing the interferences should be conducted.

In this study, the author offered a solution to minimize the impact of interference by allocating Resource Block (RB) using greedy algorithms, the minimization of allocating power with mixed strategy algorithms. The simulation system that will be designed is all user equipment using the SC-FDMA uplink scheme.

When it comes to simulation, the authors used two different scenarios, in order to vary the number of D2D pairs and vary the radius distance of cells. Based on the results of the simulation obtained, the proposed method of the author has good results on both proposed scenarios, with the best results in the first scenario with an average sumrate of  $2.49 \times 10^8$  bps, average Power efficiency  $12.37 \times 10^4$  bps/mWatt, average Spectral Efficiency 2.510 bps/Hz and average Total Power Used 2106.61 mWatt.

Keywords: Device-to-Device, Mixed Strategy, Sumrate, and Power Efficiency.