

## ABSTRACT

The large number of vehicles has the potential to increase the risk of road accidents. To reduce the risk of accidents occurring is one of the reasons that a smart transportation system is needed. Cellular network technologies such as 5G are used for vehicle-to-vehicle(V2V) communications. In V2V communication, vehicles share information with each other, one of which is to avoid collisions. D2D was introduced to 5G in 3GPP to support V2V communication services. With the underlay mode in D2D communication, the best spectrum efficiency can be obtained, but interference can occur between users on V2V and users on V2I. Therefore, the allocation of radio resources (RRA) is one of the main aspects in implementing V2V communication.

In this study, a resource block allocation scheme was carried out in a single cell with uplink communication direction. The process of allocating radio resources (RRA) uses the Efficient Resource Allocation for V2X Communication (ERAVC) algorithm. Performance is compared using a greedy algorithm.

The results of this study indicate that the ERAVC algorithm with SINR V2V produces quite good performance parameters, i.e.  $1.362 \times 10^8$  bps on sum rate, 12.614 bps/Hz on spectral efficiency, and  $7.65 \times 10^6$  bps/watt on energy efficiency. However, overall fairness has a fairly low value, such as the V2V fairness index of 0.3170, the V2I fairness index of 0.3391 and the total fairness index of 0.2568.

**Keyword :** *Device To Device (D2D), Vehicle To Vehicle (V2V), ERAVC*