

ABSTRACT

Device to device (D2D) communication system is a communication system performed by two users who communicate directly without going through eNodeB. D2D has been used as a solution to overcome the rapid number of cellular user (CU) along with the rapid development of internet of things (IoT) in 5 generation (5G) networks and the increasing number of new applications emerging such as multimedia and social networks. However, the use of D2D is not optimal for tackling the rapidly increasing load of traffic caused by the user's rapid growth. Therefore, we propose an addition of a device to communicate the surges CU number.

In this study, propose a relay on an uplink to a link with the addition of a node relay device. The process in obtaining optimal power allocations using a iterative algorithm. The performance of the proposed scheme is then analyzed in terms of sumrate, spectral efficiency, and power efficiency of RA-D2D. Based on the performance parameters, it will be compared with half duplex and full duplex communication schemes.

After that, the optimal power allocation for the three communication schemes is carried out and then analyzed based on performance parameters. The simulation results show that using a relay aided communication scheme produces good parameters with a sumrate value of 1.486×10^7 bps, a spectral efficiency of 14,860 bps/Hz, and a power efficiency of $2,255 \times 10^4$ bps/mWatt.

Keywords: Device to Device, Relay Aided, Full Duplex, Half Duplex