

## **ABSTRACT**

*The current development of technology, especially in the telecommunication sector, triggers new problems related to the increasing number of network connectivity users so that this increases the traffic load on the Base Station (BS). The Device to Device (D2D) communication system is a communication system that allows users to communicate directly without going through the BS. To overcome these traffic problems, a D2D technology is needed as a solution to improve connectivity on the 5G network. The use of D2D is still not optimal in dealing with the traffic load which is increasing rapidly due to the large number of users. This study proposes the addition of a device in D2D communication, namely the Relay Node (RN) with using frequency 2,6 GHz. With a relay aided scheme, D2D users communicate with each other through relay nodes using a decoding and forward (DF) system located between D2D pairs which can add reinforcement during the transmission process. The results showed that using a relay aided communication scheme could increase the sum rate performance parameter, namely  $1,970 \times 10^7$  bps and the spectral efficiency of 19,704 bps/Hz, but it was less effective in the power efficiency parameter, namely  $7,672 \times 10^3$  bps/mW due to the addition of a relay device which increases power consumption. By using an iterative algorithm in the relay aided communication scheme, it can further increase the value of the performance parameter which is more optimal compared to the full duplex and half duplex communication scheme. Therefore, the relay aided scheme is the most appropriate communication scheme in overcoming the transmission system in D2D because by using the relay aided scheme, the sum rate and spectral efficiency have increased by 55%.*

**Keywords:** D2D, iterative algorithm, really aided, traffic load.