ABSTRACT

It is hoped that the presence of fifth generation (5G) cellular technology can answer problems and can meet the needs of today's cellular users. 5G is believed to be able to answer the challenge of providing services that have high quality, low latency and large bandwidth. There are several problems in the implementation of millimeter waves (MmWave) that support the implementation of the 5G cellular technology. The high frequency spectrum of MmWave (30-300 Ghz) makes the coverage area of the MmWave cell much smaller and vulnerable to obstacles such as buildings, humans, houses which will have an impact on the movement of user mobility, because this is done. Integration between Long Term Evolution (LTE) technology and MmWave.

Cellular users moving at varying speeds make congestion more likely. Transmission Control Protocol (TCP) as a performance transfer protocol will be affected by this variable user speed by causing congestion to occur. However, TCP has a congestion control method that is useful for solving congestion problems in the network. This congestion control can be used to maximize TCP performance in scenarios that still use the core network of the EPC with users of varying speeds.

In this study, the TCP congestion control used was the Highspeed TCP and the Illinois TCP. The performance of the TCP congestion control is analyzed on the 5G MmWave network that uses the EPC core network with users moving at various speeds through simulations on Network Simulator-3. From the study, it was found that scenario 1 (5G-4G-5G) TCP Illinois was superior 0.06 ms in delay while TCP Highspeed was superior 0.12 Mbps in throughput, in scenario 2 (4G-5G-5G) TCP Illinois was superior. 0.06 ms in delay and 0.32 Mbps in throughput on TCP Highspeed.

Keywords: *Millimeter Wave, 5G, TCP, TCP Highspeed, TCP Illinois, Network Simulator 3*