ABSTRACT

Internet use is increasing rapidly because most activities are carried out online, especially since the last few years during the Covid-19 pandemic era. Because of this, the Indonesian government is pursuing an internet network distribution program, so that all people can enjoy internet facilities for their daily needs smoothly.

The research was conducted in the area of Belakang Padang Island, Batam which is connected via Bukit Dangas CO (Central Office) Batam with a distance of 6.8 Km. Network design is using computational methods and simulations. Last Mile network design with 2 working schemes, for the first scheme using Radio Over Fiber (RoF) with a Mach-Zehnder modulator as a converter that converts electrical information into optical information. Then the second scheme is designing an access network with a simulation application.

The location of the Point of Presence (PoP) is on Belakang Padang Island which uses a frequency of 11 GHz sent from Bukit Dangas CO, so that the RF spectrum transmit power is 18.62 dBm and the RF spectrum received power is -13.84 dBm. Transmitter power used is -13.84 dBm on the island of Back Padang, the BER value for the user can be seen at the furthest point, namely Sukana ODP to SDN 016 Belakang Padang by calculating the BER value of $3,88x10^{-9}$ and the Q-Factor value of 5,77 while the simulation method obtained a BER value of $6,03x10^{-14}$ and a Q-Factor value of 7,41.

Keywords: Internet, Last Mile, Point of Presence (PoP), BER, Q-Factor