

## ABSTRACT

The ocean makes up a large part of Indonesia's geography. From Sabang to Merauke, there are tens of thousands of islands that hinder the development of communication infrastructure. Submarine Cable Communication System, is a communication backbone located under the sea that serves as the main passageway in the network connecting islands and countries.

This plan aims to implement a Sea Cable Communication System, *Lastmile*, and Fiber to the Mobile (FTTM) in Anyar Banten to Kalianda Lampung to improve connectivity and quality in the area. The network quality improvement uses Gigabite Passive Optical Network (GPON) technology. The implementation of this network starts from Sentral Telepon Otomat (STO) Anyar to Kalianda City, using a location mapping simulasi to determine the optical cable path that is passed, an optical simulasi used to determine the quality of optical fiber, and a mobile broadband simulasi for mobile network planning. The workflow includes several main components namely Central, Submarine Cable, Optical Line Terminal (OLT), Optical Distribution Point (ODP), Optical Distribution Cabinet (ODC), and Base Transceiver Station (BTS).

Based on the Mobile Broadband Planning with Support System Sea Cable from Anyar Banten to Kalianda Lampung, it shows that the Quality of Service (QoS) value obtained is in accordance with the eligibility standards with Link Power Budget (LPB) for Downstream Sea Cable Communication System (SKKL) obtained results of 40.204 dBm, Signal to Noise Ratio (SNR) 25.117dB,  $-Q$ -Factor 3.108, and Bit Error Rate (BER)  $9 \times 10^{-4}$ . Link Power Budget (LPB) for the nearest and farthest Downstream *Lastmile* obtained results of -21.617 dBm and -21.757 dBm, Signal to Noise Ratio (SNR) 30.155 dB and 33.668 dB,  $-Q$ -Factor 9.619 and 8.717, and Bit Error Rate (BER)  $3.302 \times 10^{-22}$  and  $1.421 \times 10^{-19}$  Based on Key Indicator Performance (KPI), the value of SS-RSRP -72.95, SS-SINR 13.07, and Throughput 125 are obtained. Based on the Bill of quantity (BoQ), the cost of designing Gigabite Passive Optical Network (GPON) through the Central Telephone Automation (STO) Anyar and Kalianda City is Rp19.593.565.340.

**Kata kunci :** GPON, *LASTMILE*, FTTM, *submarine cable*, *Quality of Service*, *Fiber Optic*