ABSTRACT

The Central Statistics Agency explained the number of train passengers has increased by 1.1% annually. Soon, the government will develop the Jakarta - Surabaya high-speed train project. Cellular network operators should be able to provide customer needs. One of the important factors to support cellular networks is the backhaul network which can carry traffic data in accordance with LTE cellular network technology standards.

This Final Project connects the optical fiber backhaul network consisting of backbone network, access, and Evolved Packet Core (EPC) for passenger trains with a maximum speed of 160 km / hour from Cepu station to Pasar Turi Surabaya station. Optical backbone technology used is Synchronous Digital Hierarchy (SDH) STM-64 Dense Wavelength Division Multiplexing (DWDM), access network technology using XG-PON1, and LTE network core technology using EPC. The existing optical backbone network along the rail can be used to save costs. The design made takes into account parameter delays, rise time budgets, power link budgets, Q-factors, SNR, and BER, according to ITU-T standards G.987, ITU-T G.691, ITU-T G.696.1, and 3GPP TS23.203.

The results of calculations and simulation of the backhaul design require one of each EPC element (HSS, MME, S / P-GW). This design is fulfilled by the delay parameter on the farthest link on the downstream side, namely 1.707611 ms, while on the upstream side 1.707562 ms. The lowest parameter of LPB is -21.62 dBm, Q-factor 7.62644, BER 1.18 x 10-14 and RTB 0.0460977867828442 ns for downstream access links. While the lowest parameter for the upstream access link is -23.873 dBm, Q-factor 7.00755, BER 1.21 x 10-12, and RTB 0.046097828 ns. On the backbone link the lowest parameter values for LPB are -23.502 dBm, Q-factor 7.93476, BER 1.04 x 10-15 and RTB 0.046097939 ns

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