

ABSTRACT

The development of telecommunications technology at this time has progressed very rapidly. This is due to the development of society and the development of internet-based services, so that the need for bandwidth also increases. In this final project, the author will design a network for sub-urban and rural areas, for example, in Mahkota Simprug, Kota Tangerang and in Desa Kohod, Kabupaten Tangerang, this location is one of the areas that require high speed and high quality internet-based services. The technology used in the design of this FTTH uses *Gigabit Passive Optical Network* (GPON) technology. This design begins with data collection which will then be simulated on the *OptiSystem* and calculating the *Power Link Budget* manually. The results of the downstream link power budget design are divided into two, namely the closest ODP and the farthest ODP, the results of the calculation of the Sub Urban Area on the *OptiSystem* the closest ODP distance is -16.842 dBm, and for the farthest ODP distance results -17.038 dBm. The results of the calculation of Rural Area on the *OptiSystem* the closest ODP distance is -20.117 dBm, and for the farthest ODP distance result is -20.580 dBm. Whereas for manual calculation of *Power Link Budget* for Sub Urban Area the closest ODP distance is -16,924 dBm, for Rural Area -20.2 dBm. Whereas for manual calculation of *Power Link Budget* for Sub Urban Area, the farthest ODP distance is -17.12 dBm, for Rural Area -20.662 dBm. So it can be said that this implementation test is said to be feasible because the power received is below -28 dBm.

Keyword : FTTH, *Power Link Budget*, Area Sub Urban dan Rural Area, *OptiSystem*