Development of telecommunications technology, especially cable networks are increasingly growing rapidly. It is characterized by the development of services offered by carriers including voice, ADSL, Internet Protocol Television (IPTV), and wifi. To meet growing bandwidth requirements and supports Jakarta Free Cooper Project, PT.Telkom do moderinasi access networks Fiber To The Curb (FTTC) using the Multi Service Access Node (MSAN) throughout the Greater Jakarta area. In addition to lower cost, modernization using the Multi Service Access Node (MSAN) is also more economical and support services Indihome the Triple Play services from Telkom, which consists of the Home Phone, Internet and IPTV.

In this thesis, the researchers devised a Fiber To The Curb (FTTC) technology using 10 Gigabit Capable Passive Optical Network (XGPON) on STO Cempaka white to 7 MSAN be designed and simulating using the software to create the initial path and the determination of the device, specifications , layout and volume. Then to the feasibility of the system in the analysis used the link power budget, while for performance analysis system with parameter BER (Bit Error Rate) and will be compared with the results percancangan whether the system has been designed feasible or not. Bandwidth used in this design is 10 Gbps downstream and 2.5 Gbps upstream. and will be analyzed using appropriate ducting along with aesthetics and beauty of the place. Final difference with previous final task is to use ducting and also by using technology 10 Gigabit Capable Passive Optical Network (XGPON).

Based on the feasibility calculation system to link power budget available for downstream greatest attenuation value worth 9.56 dB with PRX value of -12.56 dBm. As for the largest upstream attenuation value worth 10.2591 dB with PRX value of -15.9591 dBm. The calculation result obtained is still above the standard specified by ITU-T and PT. Telkom, which amounted to -28 dBm. While the eligibility calculation system for the rise time budget, NRZ and RZ encoding type can be used in this design. NRZ encoding has a limit of 70% of the data rate is 70 ps to 35 ps for the downstream and upstream. RZ encoding has a limit of 35% of the data speed is 280 ps to 140 ps for the downstream and upstream. From the calculation results obtained tsystem value of 50 ps to 49 ps upstream and downstream. Tsystem value downstream rise time budget only meet NRZ, while the value of Upstream tsystem meet rise time budget NRZ and RZ. Based on the simulation results on the network design software Opti System to see the value of BER, the transmission quality is good design. Values obtained in the simulation BER is equal to 3.729 x 10-99 for downstream and close to zero (0) to upstream. The ideal value for the bit error rate in the optical fiber transmission is 10-9.

Keyword : ***FTTC, MSAN, LinkPower Budget, Rise Time Budget, Bit Error Rate,XGPON***