

ABSTRACT

Currently the access network has developed quite rapidly. It can be seen from the migration process copper cable to optical fiber that is being worked by PT.Telkom because of the need for capacity and higher bandwidth. This phenomenon can be clearly encountered in urban or metropolitan areas. CWDM is a technology that can be the solution will those needs. The basic working principle of CWDM which transmits a combination of a number of different wavelengths in a single fiber. CWDM technology is suitable for metro area (<80km) due to lower costs to increase capacity up to 18 channels ^[1].

In this essay, the researchers designed a network *Fiber To The Home* (FTTH) technology using *Coarse Wavelength Division Multiplexing* (CWDM) of STO Cijaura to residential charm Ciwastra Village and simulating using software to make the initial path and the determination of the device, specifications, layout and volumes used. Then to feasibility analysis system using the parameter *link power budget* and *rise time budget*, while for performance analysis system with parameter SNR (*Signal to Noise Ratio*) and BER (*Bit Error Rate*) as well as, comparative analysis and optimization of CWDM technology to existing technology. Bandwidth used in this design is 2.5 Gbps to 1:25 Gbps *downstream* and *upstream*.

Results of analysis and calculation with the furthest distance attenuation per kilometer wavelength obtained most *link power budget* calculation results with Prx -27.0455 dBm for the *downstream* and Prx -27.7647 dBm for the *upstream*. While the analysis of simulation results obtained Prx value -24.479 dBm for the *downstream* and -25.281 dBm for the *upstream*. *link power budget* results remain above the level of receiver sensitivity is -28 dBm. *rise time budget* calculation results for the optical network furthest produce a total maximum period 0.1815 ns for the *downstream* and 0.1852 ns for the *upstream*, when they are still below the value of NRZ encoding time 0.28 ns. Network performance calculation results obtained value of smallest SNR 27.033 dB and largest BER worth of 1.36×10^{-29} for the *downstream* and smallest SNR 28.6518 dB and largest BER worth 1.52×10^{-42} for the *upstream*. The system design has excellent performance because SNR is still above the standard that is owned by PT. Telkom is 21.5 dB, as well as smaller BER of 10^{-9} .

Keywords: FTTH, CWDM, *Link Power Budget*, *Rise Time Budget*, SNR, BER