

ABSTRACT

Wireless LAN (WLAN) Over Fiber is an application that uses the concept of Radio Over Fiber (RoF) as a technology that combines fiber optic communication systems with wireless communication systems, so with this technology is able to offer a wireless access network with high data transmission, wide bandwidth, and supports flexibility and mobility of the user. The implementation of WLAN Over Fiber needs to be supported by an optical modulator device that can modulate the high frequency signals with high data rates as well.

In this Final project is performed a modeling and simulation of a Mach-Zehnder Modulator as one of the devices that support WLAN over fiber by using OFDM-BPSK signal according to IEEE 802.11g standard as a modulated signal and light waves as a carrier signal. Thus, it can be done an analysis about the influence of modulated signal using the IEEE 802.11g standard to the light intensity at the modulator output. To know that the simulation program has worked correctly, then do the comparison between the results of program calculation and manually calculation.

By using C++ programming in *Borland C++ Builder 6 software*, the output signal in several points of Mach-Zehnder Modulator can be displayed in real time and dinamically. From this simulation is known that the intensity of light in the output Mach-Zehnder Modulator is changing following the change of OFDM-BPSK signal as a modulating signal. The model of this Mach-Zehnder Modulator require voltage of 3,89 Volt to provide a phase shift at both path-length of 180° or equal to V_π voltage and from the relationship of index of refraction shift and phase shift shows as linear characteristic. And this modulator is able to modulate a signal with frequency up to 12 GHz, so it is suitable for WLAN IEEE 802.11g technology.

Keyword : *Mach-Zehnder, OFDM, Optical Modulator, Over Fiber, Wireless LAN*