

ABSTRACT

Since the demand for broadband wireless access has experienced tremendous growth should over any communication service at any time, any place, and any media in addition the next generation wireless access systems will operate in the upper microwave/millimeter wave frequency band. As the result both increased traffic and propagation properties of millimeter-waves require small cells. One emerging technology applicable in high capacity, broadband millimeter-wave access systems is Radio over Fiber (RoF), the high capacity of optical networks integrated with the flexibility of radio networks. Radio over Fiber (RoF) is technology by which microwave signal are distributed by means of optical components and techniques. Wireless LAN (WLAN) is the largest fix wireless network these days, that's the reason why this reasech take a part in WLAN over Fiber system.

In this research focused on Optical Fiber link in WLAN over Fiber. Fiber Optic distribute WLAN analog signal to the remote stations using BPSK modulation. These research uses Finite Difference Time Domain (FDTD) as numeric analysis method and the simulation is built by C # programming language. Focus of the simulation is the electric field in the fiber during the signal the spread.

Based on the simulation result, there's only one propagation mode obtained in the Single-Mode Step-Index fiber. Propagation modes that meet the nature of the signal traveling in the optical fiber Single-Mode Step-Index is the HE_{11} mode. The simulation results show the electrical field has two degenerate modes that are polarized in two orthogonal directions. The electric field which excited with its polarization in the x direction, E_x has a quite small E_y component which having perpendicular polarization, and vice versa. In others side, the simulation show the Mode Filed Diameter (MFD) that occur is about $4,73 \mu\text{m}$ toward $8 \mu\text{m}$ core diameter, or 59% by the core region. The mode also show the difference of transversal field and the z axis field about 16,74 dB, so the mode that occur can be say as a Linearly Polarized (LP) mode.