MAC Protocol Implementation
for Wireless Optical CDMA Access Networks

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In CDMA, users are allowed to access the entire bandwidth of the channel simultaneously. Each user is assigned a unique code in order to distinguish it from other users in the network. Only a receiver which is tuned to the unique code is able to receive the desired information. However, there is only single channel in ordinary Wireless CDMA system e.g. Mobile Network. In WDM-based Optical Network, there are multiple channels or wavelength that can be assigned to users.

Each user is connected via broadcast star located at the hub or access point. Assumed that all transmitters and receivers are able to tune to all channels. Each channel is usually equipped with multiple code words. Problems are raised. How can the access point schedule each channel to each active user and how users access the control channel is the question this project will try to answer.

A single-hop network is simulated. Only one code word per channel is assumed. The proposed solution for first question is to divide scheduling algorithm into two tasks. First, it selects one of the transmitters that request for a single receiver. And then it assigns available wavelength to the selected transmitters. This project will show the result from this solution. To address the second problem, this project will show the improvement of access protocol based on unslotted ALOHA. A contention-based MAC protocol will be proposed to improve the optical wireless network performance. It may adapt some techniques from carrier-sensing protocol e.g. CSMA/CD, a listen-before-transmit protocol, which is deployed in regular LAN Network or ALOHA scheme. It will then be implemented in our simulated wireless O-CDMA network.

This will benefit to the networks as a whole, core networks and access networks. It will have good throughput-delay characteristic and so will gain more popularity in the optical networks as a result.

