

ABSTRACT

Nowadays, the data rate that required for local area networks has increased dramatically to over 1 Gbps. The only medium which can support such high data rate with small attenuation is the optical fiber. However, optical fibers that are available in most LAN links are multimode fibers, which normally have a base band bandwidth-distance product less than 500 MHz-km. SCM (Subcarrier Multiplexing) is the alternative way to increasing bandwidth distance product in multimode fiber optic, since replacing the multimode fiber with a single mode fiber is generally too expensive.

SCM is a scheme that can modulate signal from low frequency into higher frequency. To get bandwidth efficiency, some high frequency sub-carriers are multiplexed in the RF domain and transmitted by a single wavelength. This technique make multimode fiber can transmit higher data rate with good quality.

For knowing how far this technique can improve the performance of multimode fiber, then on this final assignment is analyzed and simulated some number of sub-carriers with used parameters so it can be known the effect of number of sub-carriers at BER to power receive. This is followed by a discussion of subcarrier multiplexing (SCM) and types of system modifications for improving the performance of high bit-rate transmission on multimode fiber. The modification that is used is the different modulation format, the value optical modulation index, the use of carrier suppression, and the spacing between two adjustment channels. This simulation is made in Matlab 7.1.3.

The performance of the SCM multimode fiber system is presented, and the performance of the SCM system is significantly degraded if there are some sub-carriers located at the deep nulls of the fiber. It is shown that a signal with a bit rate of 2.5 Gbps can be transmitted over a distance up to 5 km with 20 sub-carriers.

Key word: SCM (Subcarrier Multiplexing), multimode fiber.