Ultra high capacity inter-satellite optical wireless communication system using different optimized modulation formats

A. Alipour, A. Mir*, A. Shekhi
Faculty of Engineering, Lorestan University, Khorram-Abad, Iran

1. Introduction

Combination of Dense Wavelength Division Multiplexing (DWDM) with Optical Wireless Communication (OWC) systems results in high speed and high bandwidth as well as higher bit rate transmission over long distance. An optical communication system consists of three main blocks such as transmitter, transmission channel and receiver. The channel block consists of different devices such as fiber and wireless component [1]. Free space optical (FSO) communication can be defined as a type of optical transmission technology, which transmit signal and data through air, water or vacuum [2]. The OWC could be operated in several electromagnetic bands such as infrared wavelength (750–1600 nm) or ultraviolet communications (200–280 nm) [3]. In digital transmission, the bit errors is the received bits of signal that has reaction with noise, interference and distortion, and bit rate is the number of bits that carried per unit of time [4]. Using of OWC system at inter-satellite, results in high bit rate, low bit errors and sufficient security [5]. In [6], the comparison of Quadrature phase shift keying (QPSK) modulation and Differential Phase Shift Keying (DPSK) modulation systems on FSO communication have been presented. Results show that QPSK has high Q-factor in comparison to DPSK modulation. A 32 channel OWC system operating at 10 Gbps with two modulation method of Return to Zero (RZ) and Non-Return to Zero (NRZ) was designed and simulated in [7]. In [8], the free space link with various numbers of transmitter and receiver has been proposed. The OWC is a form of the optical communication in which unguided visible, infrared (IR) or ultraviolet (UV) wavelengths, which is used to carry

* Corresponding author.
E-mail address: mir.a@lu.ac.ir (A. Mir).

http://dx.doi.org/10.1016/j.ijleo.2016.06.011
0030-4026/© 2016 Elsevier GmbH. All rights reserved.