

An Analysis of 16 Channel 64 User Hybrid WDM/TDM Topology in the Optiwave Simulation Environment

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Abstract— The aim of the present work is to demonstrate the concept of a packet- interleaved WDM system i.e; hybrid optical access network, which serve as the important candidate of next generation access networks. The entire network topology design was simulated in the OPTIWAWE development environment, consisting of transmitter, channel and receiver section. Each section is elaborated, while the analysis of measured values from topology is presented in the last part of the article.

Keywords- Hybrid PON, WDM, TDM, APD.

I. INTRODUCTION

Currently, Network operators are adapting their broadband access networks for offering emerging bandwidth hungry applications such as high-definition (HDTV), interactive gaming, videoconferencing, high speed internet, online gaming ,VOIP, etc. etc[1]. Optical fiber networks with it high bandwidth are considered the most future-proof next generation access (NGA) technologies. This access Network encompassing the elements between a local office and the subscriber, are very often called as PON (passive optical network). The motivation of passive optical network (PON) technology is to provide a cost-effective, interference-free and high-bandwidth, access mechanism to the end-user. The general PON topology consists of optical line terminals (OLTs) situated at the CO (Central Office) and the optical network units (ONUs) with an optical distribution network (ODN) situated at the customer premises[2].

Time division multiplexing (TDM) and wavelength division multiplexing (WDM) techniques are both associated with their pros and cons . TDM and WDM are compliments of one another[3]. Introduction of WDM dimension on top of a TDM PON is called as Hybrid PON. The high capacity delivered by WDM and the inherent sharing capacity of a TDM , and it is an important candidate for next-generation optical access (NGOA) networks[4].

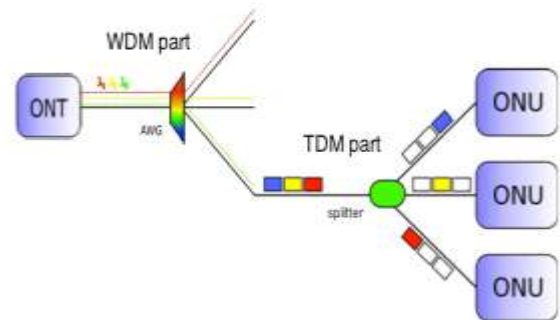


Figure 1. Hybrid passive optical network. (© ESBCO information services)

A. Contribution

This paper demonstrates the concept of a packet-interleaved wdm system i.e; hybrid optical access network. The effect of the performance of network at different data rates and transmission distance is studied. The effect of APD and PIN on the quality factor at the receiver is also observed.

The remainder of paper is organized as follows. In Section 2, WDM/TDM PON simulation setup(in optiwave environment [5]) is provided in which OLT connecting line between CO(central office) and ONUs are described. Section 3, includes the analysis of simulated network. Section 4 concludes the paper.

II. HYBRID WDM?TDM PON ARCHITECTURE

Simulated architecture of Hybrid PON ,consisting of transmitter ,channel and receiver section, is shown as;

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