Reginaldo Barbosa Nunes, J Laser Opt Photonics 2017, 4:4 (Suppl)
DOI: 10.4172/2469-410X-C1-017



# A MAC layer protocol for a bandwidth scalable OFDMA PON architecture

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The need for high bandwidth networks driven by new digital services and technologies has culminated in the emergence of the new standards for passive optical networks (PONs) such as 10 Gigabit Capable PON (XGPON) recommended by the ITU-T (International Telecommunications Union - Telecommunications) and 10 Gigabit Ethernet PON (10G EPON) standardized by the IEEE (Institute of Electrical and Electronic Engineers), both provide rates up to 10 Gb/s per wavelength to the end user. More recently, the ITUT standard NGPON2 started using TWDM technology that provides rates up to 40 Gb/s, but for that, it needs to use four wavelengths. In this context, this we propose a PON architecture based on Orthogonal Frequency Division Multiple Access (OFDMA), capable to offer an efficient bandwidth control with greater flexibility and granularity in bandwidth allocation to the end users according their demand or required Quality of Service (QoS). The proposed architecture exploits the Orthogonal Frequency Division Multiplexing (OFDM) to provide transmission rates above 33 Gb/s per wavelength. The proposal considers a tree topology where each optical line terminal (OLT) is connected to at least one passive device splitter/combiner, provides multiple services for up to 32 optical network units (ONUs). Our work presents experimental results that demonstrate the feasibility of this physical infrastructure for passive optical network based on OFDM/OFDMA, suggests adaptations in the architecture and presents techniques for improving the system spectral efficiency. In addition, it also describes the main recommendations to build a medium access layer in accordance with this proposal, named BS OFDMA PON (Bandwidth Scalable OFDMA PON).

## Biography

Reginaldo Barbosa Nunes has completed his PhD degree in Electrical Engineering from Federal University of Espírito Santo (2016), graduated in Electrical Engineering, Master's in Computer Science and Computer Network Specialist. He is working as a Professor of higher and technical education at the Federal Institute of Espírito Santo from 1997. He has recently published more than 15 papers in reputed journals and international conferences, has been serving as reviewer member in several international periodics.

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