Brussels
ecoc 2008
www.ecoc2008.org

34th European Conference and Exhibition on Optical Communication

21-25 September 2008
Brussels Expo
Belgium

Invited paper

Extended-Reach PON Employing 10Gb/s Integrated Reflective EAM-SOA

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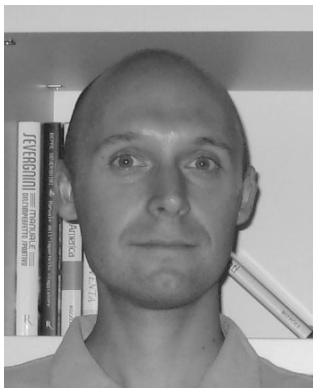
Abstract

A novel integrated reflective EAM-SOA, capable of tolerating optical carrier power variations of up to 13dB, is operated in a 10Gb/s, 128-way split, 100km reach DWDM-TDMA PON.

Extended Abstract

Extended-reach PONs (ER-PONs) are receiving increasing interest as a next generation access network architecture capable to reduce the cost of delivering future broadband services. EU project PIEMAN is developing a potential next-generation, ER-PON solution, which employs a hybrid dense wavelength division multiplexing, time-division multiple access (DWDM-TDMA) approach comprising up to 32 TDMA sub-PONs, each working at distinct up- and downstream wavelengths. The scheme aims to support up to 16,000 customers over distances of up to 100km from a single network service node (SN), with 10Gb/s symmetric data rates on the individual TDMA PONs. This paper presents the first system tests obtained using a novel, monolithically-integrated, reflective electro-absorption modulator and semiconductor optical amplifier (R-EAM-SOA), which is designed specifically for use in the customer-end optical networking unit (ONU) of the PIEMAN scheme. The results show that the current version of the device is capable of supporting 10Gb/s upstream channel operation in a 128-way split PIEMAN network. The device can operate in a highly saturated regime with low patterning-induced penalty, which increases to 13dB the tolerance to variations in optical carrier power that arise from the differential access path loss in the network.



Giuseppe Talli

Giuseppe Talli received the Laurea degree in electronic engineering from the University of Padova, Padova, Italy, in 2000 and the Ph.D. degree in electronic engineering from the University of Essex, Essex, U.K., in 2003, for work on the effects of the amplified spontaneous emission in semiconductor optical amplifiers and their gain dynamics. Since 2004 he has been with the Tyndall National Institute and the Department of Physics, University College Cork, Ireland where he is Staff Research Scientist in the Photonic Systems Group working in the area of optical access networks.