

## **Performance analysis of a variable-weight OCDMA system under the impact of fiber impairments**

### **ABSTRACT**

The impact of Chromatic Dispersion (CD) and Non-Linear Effects (NLE) including Self-Phase Modulation (SPM) and Four-Wave Mixing (FWM), on the performance of a Variable-Weight Optical Code Division Multiple Access (VW-OCDMA) system at 1.25 Gbps is analyzed by simulation. The results show that CD is the most dominant effect, which increases the users bit error rate (BER) especially for the users with higher weights. In order to investigate the performance of system in service differentiation for users with different weights, Dispersion Compensating Fiber (DCF) is used to mitigate the effect of CD caused by Single Mode Fiber (SMF). The results show that users with higher weights have better performance as expected and impact of NLE is negligible for distance up to 150 km, considering low launched power.

**Keyword:** VW-OCDMA; Bit error rate; Self-phase modulation; Optical fibre networks; Multiwave mixing