

## **Effect of guard band on the performance of AP-DCDM technique in 40 Gb/s optical fiber communication system**

### **ABSTRACT**

The effect of guard band (GB) on the performance of 40 Gb/s Absolute Polar Duty Cycle Division Multiplexing (AP-DCDM) is investigated and reported. It is demonstrated that the spectral width occupied by 40 Gb/s AP-DCDM with GB is 100 GHz (with minimum spectral efficiency of 0.4 b/s/Hz) whereas, this value can be reduced to around 80 GHz for AP-DCDM without GB (with minimum spectral efficiency of 0.5 b/s/Hz). In addition to better spectral efficiency, this amount of saving in the spectral width leads to  $\sim 60$  ps/nm improvement in chromatic dispersion tolerance.

**Keyword:** Optical communication; Multiplexing; Guard band; Absolute polar duty cycle division multiplexing