

Development of Multi-Service (MS) for SAC-OCDMA systems

ABSTRACT

A Multi-Service Optical Code Division Multiple Access (MS-OCDMA) code based on Spectral Amplitude Coding (SAC) is proposed in this paper. The advantage of proposed code on setting a variable number of users in a basic code matrix with a fixed code weight makes it more flexible in generating codewords. The appropriate quality of service required for various network applications can be provided by choosing a different number of users for the basic code matrix of MS code. The properties of the proposed code is compared with other OCDMA codes in terms of code length and maximum cross-correlation. The performance of the MS code mathematically analysed and probability of error for users is plotted as a function of the number of active users and optical received power. Shot, phase induced intensity and thermal noises are considered in mathematical analysis. Results show that by choosing code weight of 4 and optimizing number of users per sequence, the MS code supports up to 82 users, each operating at a bit-rate of 622 Mbps with reference to the Bit Error Rate (BER) of 10^{-9} .

Keyword: Optical Code Division Multiple Access (OCDMA); Spectral Amplitude Coding (SAC); Multiple Access Interference (MAI)