

Abstract

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MDW and EDW/DDW codes with and subtraction/single photodiode detection for high performance hybrid SAC-OCDMA/OFDM system efficient SAC-OCDMA system

In this paper, a hybrid system is introduced using orthogonal frequency division multiplexing (OFDM) technique with spectral amplitude coding optical code division multiple access (SAC-OCDMA). In this system, the and subtraction detection is used with the modified double weight (MDW) and enhanced double weight (EDW) codes, in addition to the single photodiode detection with the diagonal double weight (DDW) code. The proposed system achieves performance enhancement in the performance enhancement concerning the maximum allowable number of users, signal to noise ratio and (minimum) bit error rate (BER) . The proposed codes that used with and subtraction detection techniques are: MDW and EDW, while the DDW codes are used with single photodiode detection (SPD). Detection techniques are investigated to reduce the effect of both the multiple access interference and phase induced intensity noise. A comparison is performed between the conventional SAC-OCDMA systems and OFDM with SAC-OCDMA. The obtained results reveal that OFDM with SAC-OCDMA gives better performance than conventional SAC-OCDMA. OFDM with SAC-OCDMA using DDW code with SPD detection can support a high bit rate up to 10 Gbps for 70 users with a BER of 10^{-9} .