

ABSTRACT

Sparse Code Multiple Access (SCMA) is a technology to meet the needs of increasing users' numbers with large overloading factor. SCMA is expected to answer the challenging and heterogeneous performance of the fifth generation telecommunication network.

SCMA is a non-orthogonal multiple access (NOMA) technique based on codebook. The number of layers in SCMA allow large users support. In SCMA system, bits are directly mapped into multidimensional codewords. Message passing algorithm (MPA) is used in receivers as multiple user detection algorithm by reducing interference between users.

This research analyzes SCMA codebooks by varying phase rotations ($\frac{\pi}{6}$, $\frac{\pi}{5}$, and $\frac{\pi}{4}$); crossed and line-shaped base constellations; also implementing Latin and non-Latin generator. Minimum Euclidean distance, the number of points collide, and d_{\min} pairs are performance indicator of a constellation which affect bit error rate (BER) of the system. Crossed constellation is rotated to design square-shaped constellation. Applying square constellation, Latin generator using $\frac{\pi}{6}$ phase rotation results optimal BER of 10^{-5} with 6 dB SNR value.

Keywords: SCMA, phase rotation, base constellation, BER