

IMPROVEMENT IN PERFORMANCE OF BER VS SNR OF DIRECT SEQUENCE SPREAD SPECTRUM CDMA HARDWARE USING GOLD, MLS AND BARKER CODES AND BPSK, QPSK MODULATION TECHNIQUES WITH AWGN

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Abstract

In Code Division Multiple Access (CDMA) system all users transmit in the same bandwidth simultaneously. Communication systems following this concept are “spread spectrum systems”. The Code Division Multiple Access (CDMA) is a form of Direct Sequence Spread Spectrum (DSSS) communication. Here, it spreads the message signal to a relatively wide bandwidth by using a unique code that reduces interference, enhances system processing and differentiates users. In order to protect the signal, the code used is pseudo-random. It appears random, but is actually deterministic, so that the receiver can reconstruct the code for synchronous detection. This pseudo-random code is also called pseudo-noise. Here, the codes used are GOLD, MLS & Barker codes with BPSK & QPSK code modulation techniques. With the increased demand of DSSS CDMA technology, the utmost requirement is for the vigorous analysis and design of techniques with spreading codes and code modulation techniques.

This paper aims to compare & improve BER vs SNR performance of DSSS CDMA using hardware consist FPGA Transceiver & BER module given for typical BER measurement for the transmission of different number of bits. The BER vs SNR performance check is made with GOLD, MLS and Barker codes which are generated with typical mathematical analysis and calculations. The BER values are obtained with the insertion of above codes and its transmission with either BPSK & QPSK code modulation techniques with change in number of bits transmitted and at the same time changing the signal power. The change is made in spreading code, code modulation technique, number of bits transmitted and signal power and then with number of successful performances check the BER vs SNR comparison is presented.

Keywords : Code Division Multiple Access (CDMA), Direct Sequence Spread Spectrum (DSSS), Maximum Length Sequence (MLS), BPSK (Binary Phase Shift Keying), QPSK (Quadrature Phase Shift Keying), Additive White Gaussian Noise (AWGN), BER (Bit Error Rate), SNR (Signal to Noise Ratio).