ABSTRACT

Technological developments in the field of telecommunications are currently growing rapidly. One of them is the development of 5G NR (New Radio) technology which has speeds of up to 20 Gbps using a frequency range between 1 GHz – 100 GHz. Even though it has a high speed, on the other hand 5G NR technology has a sensitive effect on natural and surrounding influences. The use of high frequencies and the influence of the surrounding environment affects the transmission process to be disrupted due to bad signals and data sent to be errors. This can be minimized by using channel coding. This study analyzes the Bit Error Rate (BER) performance using channel coding convolutional codes with multipath channels on a 5G system using a frequency of 2.3 GHz, bandwidth of 99 MHz (numerology 1) with the influence of human blockage. This study uses Quadrature Phase Shift Keying (QPSK) modulation with Cyclic Prefix Orthogonal Frequency Division Multiplexing (CP-OFDM) and coding rates R = 1 and 1/2. This study will evaluate the convolutional BER codes compared to the uncoded BER (CP-OFDM). The results of this study show a representative Power Delay Profile (PDP) of 34 paths. The performance of the BER convolutional codes to reach the average BER 10^{-3} point requires an SNR of 32.18 dB, and the performance of BER 10^{-4} requires a SNR of 39.95 dB while the uncoded BER performance of BER 10^{-3} requires an SNR of 32.24 dB and BER 10^{-4} performance requires an SNR of 43.03 dB. The performance results of convolutional and uncoded codes on BER 10^{-3} have an SNR gap of 0.06 dB while BER 10^{-4} has an SNR gap of 3.08 dB. The results show that the use of channel coding convolutional codes can reduce the value of the Bit Error Rate (BER).

Keywords: 5G, BER, *Convolutional Codes, Uncoded, Human Blockage,* QPSK