ABSTRACT

Fifth generation mobile communication technology (5G) requires high data rates and low latency. The use of high frequency is influenced by several environmental factors such as humidity, temperature, air pressure, and different rainfall. This study uses environmental data for the city of Medan as input parameters for the NYUSIM simulator. Different environmental conditions cause signal and data loss during the data transmission process which can be overcome by using channel coding to reduce errors and error detection. This study simulates and analyzes the performance of the Frame Error Rate (FER) using channel coding Repetition Codes and Polar Codes with the Statistical Spatial Channel Model (SSCM) channel. The use of 2.1 GHz frequency with 100 MHz bandwidth, and applying BPSK modulation and OFDM principles will be carried out in this study. SSCM channel modeling showing the characteristics of the Power Delay Profile (PDP) between power (dBm) and delay (ns). Representative PDP results produce 43 paths to represent the power of each user with multiples of 10 ns. The results of the comparison of repetition codes and polar codes with the SSCM channel show that at an average FER of 10^{-3} *the repetition codes require an SNR of 23.4 dB. Whereas for an average FER of* 10^{-3} *in polar codes, an SNR value of 14.6 dB dB is required. The results of the performance of repetition codes and polar codes show that there is a difference between the performance of FER and the SNR range of 8.8 dB on the curve shown. The results of the simulation and analysis show that the performance of FER using polar codes is better able to minimize the frame error rate (FER) compared to the performance of FER repetition codes.*

Keywords: Channel coding, Frame Error Rate, Power Delay Profile (PDP), *5G*