# *ABSTRACT*

*The rapid development of cellular telecommunications technology is driven by the increasing demand from users for high data transfer speeds. The fifth generation of cellular technology, 5G New Radio, offers speeds of up to 20 Gbps. However, 5G is less optimal in overcoming obstacles such as buildings, walls, concrete, and the human body. The issue addressed in this research is the implementation of 5G at a frequency of 26 GHz, for which there has been no prior research evaluating Bit Error Rate (BER) using polar codes in an OFDM system. Therefore, this study conducts a performance analysis of BER with polar codes in 5G, considering the impact of human blockage at a frequency of 26 GHz. This research employs polar codes with QPSK modulation, including cyclic prefix (CP) and a coding rate of R=1/2, in the NYUSIM environment with 1000 users experiencing human blockage. The presence of human blockage adversely affects the BER of polar codes, leading to a deterioration in channel conditions and an increase in BER. The rise in BER occurs when the Signal-to-Noise Ratio (SNR) decreases due to blockage, resulting in a higher probability of error in BER. The Power Delay Profile (PDP) affected by human blockage shows a decrease in peak power, indicating a weakening of the Line of Sight (LOS) path, as more Non-Line of Sight (NLOS) paths with greater delays become dominant. The highest BER recorded was 8.5 x 10^-2 with a received power of 0.001 watts and a code length of (N=1024, K=512). In contrast, the lowest BER was 6.0 x 10^-4 with a received power of 0.0050 watts and a code length of (N=2048, K=1024). As the SNR increases to 7 dB, the BER decreases to (10^{-5}), resulting in improved signal quality, allowing for more accurate information transmission. Increasing the code length and the number of information bits helps reduce bit errors. Consequently, polar codes perform better and minimize BER, yielding lower error rates compared to other channel coding methods.*

*Keywords : 5G, BER, Human Blockage, OFDM, Polar Codes, QPSK.*