ABSTRACT

The telecommunications system consists of two sides, namely the transmitter and receiver sides. The transmission process on a wireless communication network often contains Additive White Gaussian Noise (AWGN) or unavoidable noise. This causes the quality of the data received to decrease. On the communication channel, the Filter Bank Multicarrier system (FBMC) transmits and receives an information signal through a grouping of symbols on the receiver section. The symbol detection algorithm used is the Zero Forcing (ZF) method. In this study using the K-Means Clustering technique to replace the usual FBMC demapper function. The K-Means demapper uses the manhattan distance calculation method to group the bits from the block diagram after OQAM processing to the 16-QAM diagram. Like the BER of the FBMC OQAM ZF decreased from 0.4009 at 0 dB SNR and 0.016 at 20 dB SNR, while the OQAM FBMC had a BER of 0.4502 at 0 dB SNR and 0.4459 at 20 dB SNR. SNR affects the resulting channel capacity value, as shown in the graph of channel capacity at 0 db SNR it produces 0.8251 bps/Hz while at 20 db SNR it produces 3.952 bps/Hz. As in the silhouette value of FBMC OQAM ZF produces 0.5727 at 0 dB SNR and 0.9965 at 20 dB SNR, so this system has a moderate and strong cluster structure. Whereas the OQAM FBMC system has a weak cluster structure because it produces a silhouette value of 0.4668 at 0 dB SNR and 0.4986 at 20 dB SNR.

*Keywords**:** K-Means Clustering, 16 QAM, FBMC, Zero Forcing, Manhattan Distance, Bit Error Rate (BER), Signal to Noise Ratio (SNR) and Channel Capacity.*