

## **ABSTRACT**

Digital communications using satellite channels are more reliable than those using analog systems. M-QAM is one of digital modulation systems used in high bit rate satellite communications. However, this digital system has wide spectrum and this needs to be limited filterization. The imperfect process of filterization may result in an Inter Symbol Interference (ISI) due to the influence of TWTA nonlinearity.

Pre-distortion technique is used to eliminate the effect of nonlinear distortion. This technique is to make the input-output on microwave band and radio frequency linear. Pre-distortion is an amplifier which has counter characteristics to those of the main amplifier. When they are applied together, their properties will eliminate each other and produce distortion free linear output from the main RF amplifier. One of the pre-distortion types that can be used is feed forward neural network pre-distortion.

The results of the simulation show that TWTA made nonlinearity channel systems have significant low system performance. The system performance in saturated area, namely on IBO of 3 dB, SNR of 5 dB, pre-distortion of 1-4-1 and 1-9-1,

improved BER performance approximately 3,04 and 3,39 times. While the SNR of 12 dB, pre-distortion of 1-4-1 and 1-9-1 improved the BER performance approximately 152 and 361 times.

**Keywords:** *Nonlinear, Pre-distortion, Feed Forward Neural Network, BER*