

ABSTRACT

Today a communication sistem that is fast and has wide bandwidth has become a necessity. To accommodate a communication system that has high speed one of the solution is modulation with a multicarrier. But conventional multicarrier modulation has a weakness in wasteful bandwidth allocation because it requires guardband in its frequency domain.

OFDM is a multicarrier modulation technique that has the ability to transmit at high speeds and is efficient in the use of frequency spectrum or bandwidth. The working principle of OFDM is to divide high-speed data into several low-speed data by modulation with orthogonal subcarriers. Even so, one of the major weaknesses of the OFDM system which if not applied by High Power Amplifier (HPA) with a high dynamic range is the high Peak to Average Power Ratio (PAPR), which will cause in-band distortion and out-of-band radiation.

This Final Project analyze a combination of serial Orthogonal Pilot Sequences (OPS) techniques - Simple Amplitude Predistortion (SAP). In the OPS-SAP technique, PAPR reduction is carried out in two stages. The first stage is the OPS stage, placed after the Inverse Fast Fourier Transform (IFFT) process with data added by pilot symbols on the orthogonal time domain. In the second stage, SAP is carried out after the OPS stage, where if the PAPR value is still high, it will be processed with metric calculation and samples updates to minimize PAPR. The above technique was chosen because the OPS technique has the advantage of reducing system complexity and allowing Blind Detection in the receiver and in SAP techniques it has the advantage of reducing PAPR without sending Side Information to the receiver. It is expected that by combining the two techniques there will be an improvement in the value of the PAPR.

The results of the simulation in this final project is a technique that has a value of PAPR performance improvement of 1.4 dB in OPS $M = 8$ at probability $2,564 \times 10^{-5}$, 1 dB in SAP at probability $1,2 \times 10^{-2}$, and 2.4 dB in the OPS-SAP combination at probability 4×10^{-4} on QAM 128 Subcarrier compared to OFDM conventional.

Keywords: OFDM, PAPR, OPS, SAP