

UNIVERSITI TEKNOLOGI MARA

**PAPR REDUCTION USING
SELECTED CODEWORD SHIFT
(SCS) TECHNIQUE AND SCS-SLM
TECHNIQUE FOR SPACE TIME
CODING MIMO-OFDM**

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ABSTRACT

In the world of increasing mobility, the emerging needs for the cellular and wireless communications have increased enormously. The demand of efficient, reliable and also high speed wireless communications network can be achieved by implementing multiple input multiple output (MIMO) and orthogonal frequency division multiplexing (OFDM). However, in recent years, information technology has progressively led to global energy consumption due to the demands of mobile communications around the world. In this level, the main component to reduce power consumption depends on the high-power amplifier (HPA) efficiency which is associated to the peak-to-average power ratio (PAPR). However, various techniques that have been proposed to reduce the high PAPR are encountered with some drawbacks such as computational complexity and bit error rate (BER) degradation. These drawbacks are due to the formulation and algorithm of the PAPR reduction techniques in the OFDM system to achieve substantial PAPR reduction. In this thesis, a new formulation for interleaving technique using circulant shift is proposed to form an optimum permutation for interleaving technique. In addition, an appended bit side information (SI) is proposed to avoid the BER degradation at the receiver. This technique is called selected codeword shift (SCS) technique. The technique has reduced the PAPR with approximately 19% using only six candidates and avoid the BER degradation effectively. Due to the advantages of proposed SCS, an enhancement of selective mapping (SLM) technique using SCS is proposed. This approach aim to give a booster to SLM in order to achieve substantial PAPR reduction as well as to improve BER degradation. This technique is called SCS-SLM technique in conjunction with combination of SCS and SLM. The results show that both aims are achieved with 28.6% PAPR reduction using six candidates and avoid 8% of the BER degradation in conventional SLM. Finally, the SCS technique and SCS-SLM technique are implemented in the MIMO-OFDM system in order to reduce the inherited PAPR problem. Diversity scheme which are space time (ST), space frequency (SF) and space time frequency (STF) are also introduced in this work to improve the BER performance. The results show that the SCS technique and SCS-SLM technique reduced the PAPR in all schemes and the best improvement is 33% of the PAPR reduction and 55% of the BER.