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PAPR Reduction Using Advanced Partial Transmission Scheme for 5G Waveforms

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Abstract: The implementation of Peak Average to Power Ratio (PAPR) reduction technologies will play an important role in the regularization of Fifth Generation (5G) radio communication. PAPR reduction in the advanced waveform will be the key part of designing a 5G network for different applications. This work introduces the simulation of an Advanced Partial Transmission Sequence (A-PTS) reduction techniques for Orthogonal Frequency Division Multiplexing (OFDM) and Filter Bank Multi-Carrier (FBMC) transmission schemes. In the projected A-PTS, the FBMC signals are mapped into the number of sub-blocks and Inverse Fast Fourier transform (IFFT) is performed to estimate the high peak power in the time domain. The FBMC sub-blocks are multiplied with the phase elements to achieve an optimal PAPR value. A MATLAB 2014v simulation is used to estimate the PAPR, Bit Error Rate (BER), Error Vector Magnitude (EVM), and Modulation Error Rate (MER) performance of the proposed reduction schemes. The simulated result reveals that the performance of the projected algorithm is better than the conventional algorithms.

Keywords: PAPR; PTS; OFDM; FBMC; 5G

1 Introduction

Due to the increase in requirement of high data speed, low latency, efficient spectral accessing, and connectivity with a large number of machines, it has become essential to investigate an advanced multi-carrier technique [1]. It is predicted that the data consumption will increase to 30% by 2021, which cannot be handled by the current used waveform method known as OFDM. The schematic of OFDM is given in Fig. 1. OFDM is currently utilized in Fourth Generation (4G) radio and it has several applications [2]. In OFDM, a cyclic prefix (CP) is introduced to overcome the Inter Symbol Interference (ISI), which was regarded as a serious problem in the Third Generation (3G) radio system. However, the addition of CP results in the 11% wastage of bandwidth. PAPR, spectrum leakage due to the large side lobes, bad performance in Cognitive Radio (Cr) scenario, and sensitivity to frequency and time scattering are few concerns of the OFDM structure [3]. Several studies [4–6] suggested that OFDM is not a suitable