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Abstract ABSTRACT
Orthogonal frequency division multiplexing (OFDM) signal, defined by the IEEE 802.11a, consists of a number of independently modulated sub-carriers, which can give a large peak-to average power ratio. When the signal is amplified by a RF amplifier, the signal would be distorted from the nonlinear intermodulation. First, we change the number of the sub-carriers and the input powers to study that the clipping method how to improve the communication performance of class-A nonlinear power amplifier. A traditional parameter, called third-order intercept point (IP3), is used and we can predict the error vector magnitude (EVM) by computer simulation.
Secondly, we consider the influence of the I-Q imbalance in an OFDM receiver. A receiver architecture, called direct conversion, can be used for the front-end in the OFDM system. In that architecture it offers one important advantage that the problem of image is circumvented and no image filter is required. However, this approach suffers from some impacts such as DC offset and I-Q imbalance. The second part in this thesis, we try to analyze the influence of I-Q imbalance with IEEE 802.11a standard.
Finally, we concern the influence of the phase noise in the OFDM/QPSK system. The considerations of the distortion can be separated into two parts, the common phase error and the ICI error. The former can be corrected by the pilot, so we only consider the effect of the ICI error. The simulation is based on the multi-band OFDM system, which is made by the UWB standard committee (802.15.3a task group) in 2003. These simulation methods and numerical results are useful for RF circuit/system designers in OFDM system.
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