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著者(和文)	森下陽平
Author(English)	Yohei Morishita
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Abstract

The Direct Sampling Mixer (DSM) is a promising RF front-end building block that can realize a low cost and low power consumption Software Defined Radio (SDR) receiver. However, several issues of the discrete time RF systems have not been well studied. In addition, the frequency response of conventional DSMs is not sufficient for the requirement of several modern wireless systems. This thesis describes the rigorous analysis of the DSMs focusing on the frequency response, nonlinearity and noise characteristics. Furthermore improving methods of the frequency response are proposed. The prototypes are fabricated in a standard CMOS process. The measurement results show the validity of the proposed architecture and design procedure. The analysis and design of the DSMs in this thesis show that DSM is one of the solutions for realizing a single chip SDR receiver in a deep sub-micron CMOS process.