

CHARACTERIZATION OF ADC FOR SOFTWARE DEFINED GSM RADIO RECEIVER

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Abstract

Next generation mobile communication systems mainly focus on seamless integration of existing wireless technologies and standards. Major challenge, in integrating such technologies and standards, is that these standards have different system specifications and operational requirements. Thus hardware and software requirements of radios, needed for various wireless system standards, are totally different. Concept of Software Defined Radio can be considered as futuristic solution over this problem. Software Defined Radio is emerging as a radio technology in which implementation of all radio functions is performed through software on single hardware platform. The flexibility in functions implementation and operations is achieved through software. All radio functions can be implemented totally through software if incoming signal is digitized immediately after an antenna section using wideband Analog to Digital Converter in the communication receiver. This puts tremendous burden on ADC operations. Function of ADC is mostly bottlenecking in the receive signal path of the receiver. This paper characterizes Nyquist ADC for Software Defined GSM Radio receiver using standard metrics. Most popular GSM-900 standard receiver specifications are considered. The outcome of this work shows that ADC with high dynamic range (16 to 19 bit) and high sampling frequency (in MSPS) is essential to digitize an input signal at RF stage. ADC with very high figure of merit, IIP3 and noise figure is essential.

Keywords: SDR, ADC, GSM