

Notice of dissertation defense

31.01.2018

MMICs in CMOS technologies

Title	CMOS radio front-end circuit blocks for millimeter-wave communications and atmospheric remote sensing receivers
Content	<p>Larger bandwidth, higher resolution, and smaller size of the equipment for the higher level of integration push the technology to higher frequencies. Short-range wireless data communication links and automotive radars are good examples, which have been realized successfully in today's systems operating at millimeter-wave (mm-wave) frequencies. Traditionally, technologies such as gallium arsenide (GaAs) and indium phosphide (InP) have been used to realize mm-wave circuits, but those are suffering from achieving high-level of integration and higher costs. The recent development of the CMOS technologies enables designers to develop mm-wave circuitries on silicon technologies that has potential to offer high-level of integration with a lower price. However, there are also significant challenges in the realization of mm-wave circuits in CMOS technology. Although SiGe BiCMOS technology could be the answer, we want to demonstrate that one can reach the required performance level also with CMOS chips. A highly integrated CMOS solution provides the possibility of supplementing of the radio front-end with baseband and digital signal processing (DSP) circuits. Hence, a full CMOS solution can be an excellent candidate for future mm-wave wireless communications.</p> <p>This dissertation, therefore, was motivated by the enormous possibilities of CMOS technologies in the development of compact mm-wave ICs and focuses on solving the key challenges associated with the CMOS technologies. The state-of-the-art circuits, developed within the scope of this thesis will directly contribute to the development of the upcoming 5G wireless system and future Earth remote sensing receivers and cubesats.</p>
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The dissertation is publicly available on the notice board of the Aalto University School of Electrical Engineering, Maarintie 8.