Abstracts

RF system concepts for highly integrated RFICs for W-CDMA mobile radio terminals

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The standardization phase for third-generation wide-band CDMA systems like the universal mobile telecommunication system, which will add broad-band data to support video, Internet access, and other high-speed services for untethered devices is running toward its finalization. As is typical for mobile communication systems standardization, sufficient RF performance has been assumed and most efforts have been put to digital baseband issues. This is especially true for the mobile phone transceivers, the RF part of which is (although its baseband part is much more complex in terms of number of devices) still the bottleneck of the entire system. Meanwhile, in the RF concept engineering of today's commercial products, an accurate prediction of the needed RF performance by using RF system simulation is indispensable. This is, in particular, the case with third-generation wireless systems, which, from the RF design point-of-view, are quite different from second-generation time-division multiple access/frequency-division multiple-access systems due to the fact that the user signals are now separated in the code domain rather than in the time and/or frequency domain. The paper gives an insight of how to derive receiver requirements for third-generation mobiles in terms recognizable by microwave designers, reports on the system simulation-based design, and performance of silicon-based RF integrated circuits for mobile terminal use, and discusses some future technologies and techniques and their possible impact on portable wireless devices.

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