Abstracts

An investigation of the high-frequency limit of a miniaturized commercial voltage-controlled oscillator used in 900-MHz-band mobile-communication handset

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The 900-MHz-band voltage-controlled oscillator (VCO) currently used in a commercial mobile-communication handset has the features of light weight, small size, low phase noise, and low DC current consumption. This paper investigates the problems that may occur when these types of VCO's are employed in next-generation high-frequency mobile-communication handsets. The results show that oscillation may not commence above frequency f/sub T///sup 2/ /spl radic/(R/sub eq//T/sub bb/), which is significantly below the f/sub max/ of the device itself, due to the effects of the circuit elements. In addition, a new formula is proposed which provides a practical guideline for selection of the active devices. The procedure for extraction of the small-signal model required by the proposed formula is also described in detail. The results obtained with the formula are in good agreement with those obtained from the measured S-parameters.

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