Abstracts

ACeS communications system phase noise and transient effects

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The ACeS satellite system provides voice and data services to mobile users throughout the Asia Pacific region. The space segment of the ACeS system provides high quality signal on the ground to allow communication with small mobile terminals. The phase noise and transient performance of the overall communications system are very important performance parameters for mobile communications systems. A centralized frequency generation system was employed for generating all local oscillator frequencies for the ACeS payload. A major design criteria was to mitigate the risks associated with single event upsets (SEU), which necessitated the use of either low speed or high speed refresh circuits for each synthesizer device. The high-speed refresh option caused continuous sidebands and degraded phase noise performance on some phase-locked loop designs. This paper provides an overview of how refresh options were chosen to minimize phase noise and spurious degradation effects and also provides phase noise characterization of each local oscillator. The phase noise performance at component, subsystem and system level is also presented.

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