

# Design of CMOS Continuous-Time Low-pass Delta-Sigma Modulator for Digital Distributed Antenna System based on IF-over-Fiber Transmission

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**Abstract**—A CMOS continuous-time low-pass delta-sigma modulator (DSM) circuit that digitizes an analog mobile signal at 10 MHz intermediate frequency (IF) in a digital distributed antenna system (DAS) with IF-over-fiber scheme is designed in this paper. Detailed design processes and results from system to circuit levels are provided, which is helpful for the design of a DSM circuit for another digital DAS system based on DSM technique. The simulated peak signal-to-noise and distortion ratio of the designed DSM circuit was 49.4 dB, and high stop-band rejection ratios were achieved by exploiting the zero optimization technique in the noise transfer function of the designed DSM.

**Keywords**— DAS, DSM, IFoF, RoF



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