

## GSM 900/DCS 1800 fractional-N modulator with two-point-modulation

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*B. Neurauter, G. Marzinger, A. Schwarz, R. Vuketich, M. Scholz, R. Weigel and J. Fenk. "GSM 900/DCS 1800 fractional-N modulator with two-point-modulation." 2002 MTT-S International Microwave Symposium Digest 02.1 (2002 Vol. 1 [MWSYM]): 425-428 vol.1.*

This paper presents a fractional-N modulator architecture that uses the technique of two-point-modulation. This technique allows direct modulation of the VCO within the closed loop of a high resolution PLL based fractional-N frequency synthesizer, without restriction due to loop bandwidth and PLL dynamics. A prototype transmitter was implemented using the GSM standard to verify the superior performance predicted by simulation. The core element of this new modulator architecture is a PLL-based fractional-N frequency synthesizer. This prototype synthesizer consists essentially of a full custom IC for the analog section, and the digital functionality was implemented in a filed programmable gate array (FPGA). The analog circuitry was fabricated in a 25 GHz BiCMOS process with 0.8  $\mu\text{m}$  as minimum feature size. Measurements of the spectrum for the GSM modulated signal and of the demodulated signal show that the strict demands of the GSM specification can be met.

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