Abstracts

Modulation/Microwave Integrated Digital Wireless Developments

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Simultaneous study and joint optimization of digital modulation techniques and of microwave components, presented in this paper, lead to spectrally efficient, high capacity, fast transmission, and throughput rate wireless systems. The choice of a particular modulation/demodulation (modem) technique has a major impact on the overall microwave system design, transceiver architecture and on the choice of all intermediate frequency (IF) as well as radio frequency (RF) component specifications. The performances of the most frequently used digital modulation techniques, including pi/4-DQPSK, conventional BPSK, DQPSK, GMSK, GFSK, 4FSK, and FQPSK systems are compared. Study of crosscorrelated quadrature modulated GMSK systems used in GSM, PCS-1900, and other standards indicate that the subject technologies applied to GMSK improve the performance of these systems. We demonstrate that with the patented family of digitally modulated Feher's FQPSK systems, the power efficiency of conventional QPSK systems, which require linear microwave amplifiers, can be increased by about 300%, and the spectral efficiency of standardized nonlinearly amplified microwave integrated circuit GMSK systems can be increased by 60-200 %. Similar advantages are obtained with our new FBPSK over BPSK modulated systems.

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