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McGibney

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(54) **OFDM SYSTEM WITH SIMPLE TERMINALS**

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(57) **ABSTRACT**

This invention is a wireless network based on orthogonal frequency division multiplexing (OFDM) and simple terminals. In a conventional OFDM system, the signal processing hardware is divided equally between the base station and the terminal. In this invention, most of the complex signal processing hardware is shifted to the base station, making the terminal a simpler and more power-efficient device. To send information to the base station, the terminal transmits a series of QPSK symbols that make up an OFDM-code. The code is designed to distribute the signal's energy into a number of OFDM sub-carriers which can be detected and combined within the base station's OFDM receiver. Other users transmit the same OFDM-codes within the same bandwidth and at the same time, but with slightly offset carrier frequencies. Because of the nature of OFDM, the codes from different users remain orthogonal, even in a multipath radio environment. OFDM signals transmitted from the base station are detected at the terminal using a decimator-accumulator structure.

15 Claims, 11 Drawing Sheets

