TECHNOLOGY

Power Controlled Channel Allocation for Multiuser Multiband Ultra-Wideband Systems

OVERVIEW

The emerging ultra-wideband (UWB) system offers a great potential for the design of high-speed short-range communications. However, UWB faces a significant challenge in achieving a low transmit power level, while assuring adequate system performance. An efficient management of the limited power is thus a key to fully exploiting the advantages of UWB.

The inventors have a scheme to obtain the optimal sub-band and power allocation strategy. Optimization criteria involve minimization of power consumption under the constraints on the packet error rate, transmission rate, and FCC regulations. To ensure the system feasibility in variable channel conditions, an algorithm to jointly manage the rate assignment of UWB devices, subband allocation and power control is proposed. Simulation results under UWB channel model specified in the IEEE 802.15.3a standard show that the proposed algorithm achieves comparable performances to those of the complex optimal full search approach, and it can save up to 61% of transmit power compared to the current multi-band scheme in the standard proposal. Moreover, the proposed algorithm can obtain the feasible solutions adaptively when the initial system is not feasible for the users' rate requirements.

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CATEGORIES

- Microelectronics
- Information Technology

EXTERNAL RESOURCES

- US Patent 7,653,122

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