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A novel resource allocation for HAP wireless networks exploiting TVWS spectrum

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Abstract

Cognitive radio-based TV White Space (TVWS) is a promising idea which seeks to increase spectrum utilization by opportunistically accessing spectrum initially licensed to TV transmitters or incumbents. Orthogonal frequency multiple access (OFDM) is thought to be a promising technology for TVWS systems. In this paper, we consider an OFDM based cognitive High-Altitude Platform (HAP) exploiting the TVWS spectrum. We employ dynamic resource allocation for providing wireless access from a HAP at an altitude of 20km, while utilizing the TVWS spectrum. This paper focuses on the resource allocation algorithms, which are designed to increase the system transmission rate of secondary users while keeping the disturbance applied to the incumbent band below a threshold level and the overall power within a range using the Artificial Immune System Algorithm. As per the simulation demonstrated so far, the proposed algorithm outperforms the water-filling algorithm, implying that the system transmission rate is greatly optimized. Moreover, the proposed resource allocation algorithm allocates resources to users in a fair manner, without favoring any particular user, and has good convergence performance.