

Outage analysis of mixed underlay cognitive RF MIMO and FSO relaying with interference reduction

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Abstract:

In this paper, we study the outage performance of multiuser mixed underlay radio frequency (RF)/multidestinations free-space optical (FSO) links. For RF links, we consider a secondary network with multiple users that can communicate with multiple destinations through a relaying node. The relay is equipped with an antenna array at the RF side, and it uses the amplify-and-forward (AF) protocol. The primary users (PUs) are equipped with multiple antennas at transmit and receive nodes. The RF link is subjected to the aggregate PUs interference effect on the secondary network. To reduce the effect of PUs interference on secondary network at the relay node, two interference cancellation (IC) schemes are adopted, which vary in terms of complexity and achieved performance. On the other hand, the multidestination FSO links can be exploited to further enhance the quality of the second hop, and their associated channel models account for pointing errors, intensity modulation/direct detection, and heterodyne detection. For the aforementioned system model, we obtain exact and asymptotic closed-form expressions for the end-to-end outage probability. To further enhance system performance, optimal power allocation between the two hops is obtained based on the derived asymptotic outage probability expressions. © 2009-2012 IEEE.

Reference:

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