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선택 목록에 추가

&lt; 1 / 1 &gt;

## Impact of Outdated CSI on the Secure Communication in Untrusted In-Band Full-Duplex Relay Networks

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강화된 인용 문헌

## 초록

To provide reliable connectivity in recent and future wireless communication systems, it is necessary to deploy several relay nodes. Further, a full-duplex (FD) technique has been in the spotlight since it can significantly improve spectral efficiency, and thus recent studies in relaying networks have considered FD relays. In relaying networks, confidentiality between the source and destination nodes from the relay node should be carefully kept since the relay node cannot be fully trusted, so called untrusted relay node. To this end, in this paper, we consider physical-layer security taking into account an untrusted FD relay node. We investigate a secure relaying protocol against the untrusted relay node where the destination generates artificial noise to prevent the untrusted relay from decoding the source information. We derive the analytical expression of the lower bound of the ergodic secrecy rate  $(R)_{\text{over bar}}$ . We find two main factors affecting the secrecy performance: residual self-interference (RSI) at the FD-available nodes (i.e., relay and destination), and outdated channel state information (CSI) at the destination. Thereafter, we evaluate their effects on  $(R)_{\text{over bar}}$  and suggest the algorithm to find the sub-optimal artificial noise power level at the destination for maximizing  $(R)_{\text{over bar}}$ . Through simulations, we have verified our mathematical derivation and shown that our secure relaying protocol can achieve near-optimal secrecy performance. Numerical results imply that the artificial noise power level should be carefully considered when the channel is severely outdated and RSI is irresistible.

## 키워드

저자 키워드: Relays; Jamming; Wireless communication; Receiving antennas; Full-duplex system; Interference cancellation; Relay networks (telecommunication); Physical-layer security; untrusted relay; full-duplex; outdated channel state information; artificial noise

Keywords Plus: PHYSICAL-LAYER SECURITY; PERFORMANCE; ALLOCATION; CHANNEL

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## 인용 네트워크

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인용

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28

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He, BT; Lv, L; Chen, J; et al.

Enhancing Secrecy for NOMA Untrusted Relay Networks With User Scheduling and Jamming  
IEEE COMMUNICATIONS LETTERS

He, HL; Ren, PY; Wang, YC; et al.

Jamming or Forwarding? Full-Duplex Relaying for Physical Layer Security  
2016 IEEE GLOBECOM WORKSHOPS (GC WKSHPs)

Dang, C; Jimenez-Rodriguez, L; Sastry, S; et al.  
On Secrecy Rate and Optimal Power Allocation of the Full-Duplex Amplify-and-Forward Relay Wire-Tap Channel  
IEEE TRANSACTIONS ON VEHICULAR TECHNOLOGY

Dash, M; Bajpai, R; Aggarwal, P; et al.

A Nonlinear MIMO-OFDM Based Full-Duplex Cooperative D2D Communications System  
IEEE ACCESS

Mabrouk, A; Tourki, K; Hamdi, N; et al.

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