# Buffer-Aided Relay Selection for Secure Two-Hop Wireless Networks with Decode-and-Forward Relays and a Diversity-Combining Eavesdropper

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This paper investigates the buffer-aided relay selection issue for achieving physical layer security (PLS) in two-hop wireless networks with Decode-and-Forward (DF) relays. Available works mainly focus on scenarios with independent- decoding eavesdroppers. However, the more hazardous scenarios with diversity-combining eavesdroppers that combine the signals in two hops to decode the packets are largely ignored. This paper considers a two-hop wireless network with multiple DF relays and one diversity-combining eavesdropper under two cases with perfect and partial eavesdropper channel state information (CSI) respectively. We first propose two secure buffer-aided relay selection schemes to suppress the eavesdropper for both eavesdropper CSI cases respectively. We then derive analytical expressions for the end-to-end (E2E) secure transmission probability (STP) and E2E delay of the network. Finally, we provide extensive simulation and numerical results to validate the correctness of the expressions and also to investigate the E2E STP and E2E delay performances. The results showed that the proposed schemes can achieve better E2E STP performance than the well-known Max-ratio buffer-aided relay selection scheme but at the cost of an increased E2E delay.

Index Terms—Physical layer security, buffer-aided relay selection, two-hop wireless networks.

## I. Introduction

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### A. Subsection Heading Here

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#### 1) Subsubsection Heading Here

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## II. Conclusion

The conclusion goes here.

## Appendix A
## Proof of the First Zonklar Equation

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## Appendix B

Appendix two text goes here.

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## References

[1] H. Kopka and P. W. Daly, A Guide to LaTeX, 3rd ed. Harlow, England: Addison-Wesley, 1999.

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