

## INFORMATION OF THE DOCTORAL THESIS

Thesis title:

### **RESEARCH ON IMPROVING THE PERFORMANCE OF THE WIRELESS COMMUNICATION SYSTEMS USING RELAYING TECHNIQUE**

Specified field of study: **Telecommunication Engineering**

Code of specialty: **9.52.02.08**

Name of PhD candidate: **Ngo The Anh**

Supervisors:

- 1. Assoc.Prof. Sc.Dr. Hoang Dang Hai**
- 2. Assoc.Prof.Dr. Nguyen Canh Minh**

Academic Institution: Posts and Telecommunications Institute of Technology

### **NEW RESULTS OF THE DISSERTATION:**

- 1) Proposed the solution to efficiency utilize the operations of the relay stations (RS) to support the successful handover, minimize the handover call dropping probability (CDP) of the real time calls in the high traffic intensity areas that are potential to be a local congested region. Meanwhile, the problem in calculation of handover probability is solved simpler. By efficiency utilizing the operations of the RS, frequency resources in the new generations of wireless communication systems using relaying technique have been maximally exploited to improve CDP for radio connection maintaining in handover process in these systems.
- 2) Pointed out the new closed forms of end to end outage probability (OP) and intercept probability (IP) in the new research models, which are more complicated, to evaluate the stable connection ability of the wireless communication systems using relaying technique. The parameters of the system have been studied more generally, including: the number of hops, the number of antennas of the nodes in the multi-hop wireless communication network, and the hardware imperfection. Moreover, this thesis proposed the improvement in applications of energy harvesting (EH) and cooperative jamming (CJ) techniques in comparison with previous researches in OP and IP calculations. The closed forms of end to end OP and IP are the main contributions of this research. The results derived from these calculations and simulations can be referred to evaluate and maintain network's connection.

### **APPLICATIONS, PRACTICAL APPLICABILITIES OR FURTHER STUDIES:**

The results derived from the thesis can be used in analyzing, evaluating, and improving the connection maintaining performance related to the CDP, OP, and IP parameters of the new generations of wireless communications systems. These analyses and results also can be used in teaching and studying at universities. The research directions can be developed from this thesis including: calculating the CDP in the condition of high traffic intensity with different bandwidths of UE and with mobile RS in different models of the new generations of wireless communications systems; and calculating end to end OP and IP in the network models more complicated.

**Confirmation of representative supervisors**

**PhD candidate**

**Assoc.Prof. Sc.Dr. Hoang Dang Hai    Assoc.Prof.Dr. Nguyen Canh Minh    Ngo The Anh**