THE INFORMATION OF THE DOCTORAL THESIS

Thesis title: **Study on the energy efficiency at base station of multiple antennas radio communication system**

Speciality: **Telecommunications**

Code**: 62.52.02.08**

PhD. Candidate: **Nguyen ThiThanh Huong**

Scientific supervisors:

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NEW FINDINGS OF THE THESIS:

The thesis focus on generalizes the theory of methods of efficient energy at the base station in a radio network using multiple antennas, analyzes data, proposes building mathematical models for efficient energy through research, analysis, calculation and simulation to solve the problem of efficient energy at the base station in the radio communication system in general and in the radio communication system using multiple antennas. while still meeting the requirements of information transmission at high speed and ensuring the quality of service standards. The using efficiency energy not only brings economic benefits but also bring ecological benefits and social responsibility in the fight against climate change and environmental protection. The new findings of the research process are as following:

(1). Study on the efficiency energy model in heterogeneous Full Dimention multiple antennas system (space - time), using intelligent algorithms for "soft handover " service in heterogeneous network by intelligent ontology algorithms in fuzzy logic decision of handover between different services based on information context to increase the probability of successful handover and minimize power consumption in base station while still ensuring the quality of information according to the allowed standards in order to effectively manage system resources.

(2). Study on the efficiency energy model in Time Division Duplex TDD multiple antennas, optimizing the number of needed antennas at each base station when increasing the number of subscribers in a cell covering so that the number of subscribers providing services simultaneously in a cell is always more than the number of allowed antennas at the base station to reduce the

overhead. Base station consumption and increase the system's efficiency energy. Analysis and calculation based on the total amount of transmitted information, power consumption at base stations with multiple antennas at base stations with multiple cells operating on the same frequency band on the required amount of information, combining parameters system effects such as line of sight loss, pilot interference, and quality of services by finding equivalent deterministic values.

APPLICATIONS, PRACTICAL APPLICABILITY AND RELATED ISSUES NEEDING FURTHER RESEARCH:

In generally the using efficiency energy in communication systems and in multiple antenna systems is a very important issue. In a technology era, the strong development of industry and services, the demand for energy is huge, so that it is very necessary to find the solutions can develop sustainably, use energy most efficiently, contributing to saving costs. increasing reinvestment capacity, improving customer quality of services, and ensuring the sustainable development of telecommunications service providers.

However, within the scope of the thesis, it is focused on the problem of efficiency energy in multple-antenna multiple user systems with simple transmission channels. Base on the related study contents of thesis, propose some directions for further research as follows:

(1). Study on the efficiency energy in multi-user multi-cell and multi-user in very large antenna system as masive MIMO with more complex channel model.

(2). Study on the efficiency energy in very large multiple antenna systems with other signal processing such as MMSE.

(3). Study on the efficiency energy in very large antenna systems to improve energy efficiency in signal processing, microelectronics, and network architecture organization with a more complex and intelligent processing channel model to resource management and the mostly using efficient energy in the system.

Confirmation of representative
Scientific supervisor   **PhD. Candidate**

Assoc.Prof. Le Huu Lap, PhD   **Nguyen ThiThanh Huong**