

INFORMATION ON DOCTORAL DISSERTATION

Title of Thesis:

Building an algorithm for transmitting data over the voice channel of GSM network and applying pseudo-random number generation algorithms based on integrated nonlinear sequences to crypto data

Specified field of study: **Electronic Engineering**

Code of specialty: **9.52.02.03**

Name of PhD candidate: **Binh Thanh Nguyen**

Committees:

Professor, Doctor of science Quynh Xuan Nguyen

Academic Institution: **Posts and Telecommunications Institute of Technology**

NEW RESULTS OF THE DISSERTATION:

(1) Propose a new integrated architecture for integrated m-sequences (a new method of generating nonlinear integrated and integrated sequences) and build a voice data crypto solution using pseudo-random number generation algorithms based on new type integrated nonlinear sequences;

(2) Propose algorithms to improve compression speed, improve MELPe voice code quality;

(3) Propose the implementation of modulation and demodulation techniques for voice data encrypted transmission over devices e2e and networks, propose solutions for secure voice data transmission via GSM voice channel, wireline channels and other narrowband radio.

APPLICATION AND USED IN THE REAL WORLD OR FUTURE WORKS:

With the above-mentioned scientific contributions, the thesis is the basis for research and development for secure transmission systems of voice signals over GSM voice channels and through different platforms based on voice channels. Proven and simulated algorithms, solutions and devices, clearly evaluated, algorithmic installations on FPGA or ARM chips create modules that are tested for safety, appraised for proper implementation with theory so that they can be applied to meet urgent needs in practice (specifically: customizable to bring compression execution programs, digital signal transformation modulation running on STM32 processor).

In relation to the new proposals of the thesis, it is possible to list the issues to be

studied in subsequent works as follows:

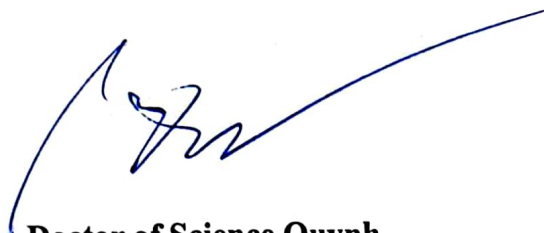
Developing voice quality improvement algorithms allows designing and manufacturing mobile phone device hardware, installing libraries, control programs, algorithms and completing into a secure mobile phone device using the 2G channel of the GSM mobile telecommunications network to ensure the safety of algorithm installation into the device.

Studying the theory of sampling according to Nyquist multiband subband to speed up the modulation / deconditioning of the OFDM Modem, implementing the integration of this entire Modem into the ARM Chip so that it can be inserted into a mobile phone. Programming on the chip with tight space, limited resources, requires optimization in speed, program code size, data memory space and memory space for computational operations.

The other direction is the study of integrating modem functionality into the software of smart mobile phones.

Research supervisors

PhD candidate



**Professor Doctor of Science Quynh
Xuan Nguyen**

Binh Thanh Nguyen