

OPINION

**of a dissertation
for the acquisition of the educational and scientific degree "Doctor" in**

**in the field of higher education – 5. Technical Sciences
the professional field – 5.3 “Communication and Computer Engineering”
doctoral program – "Communication Networks and Systems"**

Author: Eng. Michail Georgios Angelakis

**Topic: Methods and means for the intelligent monitoring and control of radio channels
in wireless communication networks**

Member of the scientific jury: Prof. Eng. Grigor Mihaylov, PhD

1. Topic and relevance of the dissertation work

The problems of modern wireless communication networks, and in particular the improvement of reliability, efficiency and quality of services, are the subject of constant research and improvement.

Despite the intensive scientific and research activity that has been developing in the world in recent years in this area, there are still unresolved issues, which is why the relevance of the dissertation problem stands out very clearly.

In this sense, it can be assumed that the dissertation addresses current problems related to the development and application of the fundamental theory and practice of communication systems.

I accept the justification for the relevance made by the doctoral student and I believe that the considerations presented are correct and well-founded.

2. Research methodology

The purpose of the dissertation is formulated on the basis of a thorough and reasoned analysis of the current state of the problems of implementing intelligent monitoring, control and evaluation of signal parameters in wireless communication channels.

For the analyses and research conducted in the main part of the dissertation, modern mathematical tools are applied, i.e. appropriate methods of analysis and synthesis, as well as modeling of processes for improving the reliability, efficiency and quality of services in wireless communication networks. These methods can be attributed to the theory and practice of information transmission systems, digital signal processing, computer modeling, etc. The simulation studies, which have high evidentiary value, are implemented in an appropriate programming environment, confirm the correctness of the methods, algorithms and mathematical proofs developed in the dissertation work. The results are presented in tabular and graphical form, with a thorough analysis of the same. A summary and conclusions from the main results obtained are made for each chapter.

The tasks set in the dissertation are adequate to the problem and have been solved to the required extent and at a high scientific level.

3. Contributions of the dissertation work

In the process of work and in the preparation of the dissertation, a number of contributions have been achieved, which can be qualified as:

Contributions of a scientific and applied nature:

1. A complex methodology for multi-criteria analysis and assessment of the state of wireless radio channels and an architectural model for proactive monitoring of wireless networks have been developed, based on the effective combination of standard telemetry protocols (such as SNMP) with algorithms for dynamic monitoring of parameters in heterogeneous hardware infrastructure (multi-vendor environments).
2. Criteria and algorithmic rules have been formulated for automatic identification of anomalies and emergency conditions, which allow mathematically based prediction of connection degradation before an actual communication breakdown occurs.
3. An innovative wireless channel model with an integrated intelligent noise and interference suppression algorithm is proposed and investigated. The model successfully solves the critical problem of the lack of correct channel state information (CSI) by implementing a specialized training module for filtering. This allows for more accurate reconstruction of CSI and achieving significantly lower mean square error (NMSE) in prediction compared to the application of traditional algorithms.

Contributions of an applied nature:

1. A specialized platform for intelligent monitoring has been designed, software implemented and experimentally verified, which provides reliable collection and processing of real-time data on the status of the wireless infrastructure.
2. Software solutions for graphical interfaces have been developed to increase situational awareness, including interactive logical maps on a real geographical background and optimized visualizations for video walls in dispatch and network operations centers (NOCs).
3. An automated signaling and event management module has been developed, which automates the process of detecting and localizing problems in the radio channel of wireless communication networks. By conducting a series of tests in real conditions and simulated critical scenarios, the high accuracy, speed and fault tolerance of the developed solution have been experimentally verified.

4. Publications and citations of publications on the dissertation work

From the publications of the doctoral student, presented and discussed at various scientific forums, it is evident that as a result of the work on the dissertation, the relevant conclusions were obtained, which are the work of the doctoral student Eng. Michail Angelakis and have value for the theory and practice of communication networks and systems at the present time. No information is presented about the author's citations.

5. Authorship of the obtained results

Judging by the publications, it is clear that the doctoral student works hard on this topic. The authorship of the contributions to the dissertation work is also indicated by the fact that two of the publications are independent, and in two others the doctoral student is the lead author in the team. This, as well as the specific style of presentation of the author, give me reason to have no doubt about the leading role of Eng. Michail Georgios Angelakis in the preparation of the publications.

6. Comments, recommendations and remarks on the dissertation work

Certain weaknesses in the dissertation work can be pointed out. In places, minor grammatical errors have been made. The style of presentation needs refinement. It is necessary for the doctoral student to continue working to improve the style of presentation in scientific articles, reports, accounts, etc.

The weaknesses indicated above can be easily eliminated in the future scientific research work of Eng. Michail Georgios Angelakis.

These notes do not reduce the value of the dissertation.

7. Conclusion

I consider that the presented dissertation **meets** the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria.

The achieved results give me reason **to propose** that the educational and scientific degree "Doctor" be acquired by Eng. Michail Georgios Angelakis in the field of higher education - 5. Technical Sciences, professional field – 5.3 Communication and Computer Engineering, doctoral program – “Communication Networks and Systems”.

03.08.2026

Member of the scientific jury:

/Prof. Eng. Grigor Mihaylov, PhD/