

Bachelor's Thesis

Bachelor's study program **Electronics and Communication Technologies**

Department of Radio Electronics

Student: Michal Hanus

ID: 240621

**Year of
study:** 3

Academic year: 2023/24

TITLE OF THESIS:

Application of 4G/5G Communication in Embedded Systems

INSTRUCTION:

Study and describe the basic principles of 4G/5G cellular networks with a focus on the use in the Internet of Things (IoT). Become familiar with the Quectel RM520N and Nordic Semiconductor nRF9160 chipsets, conduct research on available modules. Demonstrate the functionality of a device with 4G/5G connectivity using a selected development kit.

Propose scenarios and opportunities for 4G/5G communication and standards (URLLC, LTE-M, NB-IoT) for industrial IoT communication. Perform detailed parameter measurements. Process the obtained data and compare with theoretical assumptions and other currently existing communication systems.

RECOMMENDED LITERATURE:

- [1] SAUTER, Martin. From GSM to LTE-Advanced Pro and 5G an introduction to mobile networks and mobile broadband. Third edition. Hoboken, NJ, USA: Wiley, 2017. ISBN 978-1119346869.
- [2] STUBER, Gordon L. Principles of Mobile Communication. 4th ed. 2017. Imprint: Springer, 2017. ISBN 978-3319556147.

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submission:** 27.5.2024

Supervisor: Ing. Aleš Povalač, Ph.D.

Consultant: Ing. Matěj Očenášek

doc. Ing. Lucie Hudcová, Ph.D.
Chair of study program board

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