

B-1. ABOUT 4G TELECOMMUNICATIONS RESEARCH AT VILNIUS UNIVERSITY

Rimvydas Aleksiejūnas, Kęstutis Svirskas, Jevgenij Krivochiza, Bronislovas Dzindzeleta, Anatolij Pantelejev

Telecommunication Research Centre, Department of Radiophysics, Vilnius university
Saulėtekio 9, bldg. III, LT-10222 Vilnius, Lithuania
email: kestutis.svirskas@ff.vu.lt

Vilnius University Telecommunication centre founded in late 2012 is equipped with the newest 2G-3G-4G base stations from Huawei. This paper presents a brief information of the centre research work related to LTE technology.

Wide spread nature of today's telecommunication networks provides not only extensive possibilities and many advances in various fields of human life, but requires constant development of new technologies to support growing demand for communications capacity. Telecommunications Research Centre has been founded at Faculty of Physics, Vilnius University in collaboration with telecommunication industry companies UAB Huawei technologies, UAB Omnitel, UAB Blue Bridge to provide an experimental testbed for research and adoption of new telecommunication technologies. The aim of our presentation would be demonstration of recent trends and research topics we are involved in and capabilities of our laboratory arrangement.

Most important questions under study in Telecommunication Research Centre are related to 4G LTE (Long Term Evolution) mobile wireless networks currently coming into commercial market [1]. Introduction of new network technologies always depends on many technological and economic factors such as limited frequency resource availability, the cost and operational conditions of sophisticated radio equipment and thorough network planning and optimization process.

Our laboratory is equipped with fully functional Huawei LTE DBS 3900 1800 MHz base station, core network infrastructure, such as modems, switches, routers and measurement equipment. It allows us to perform communication system load tests with controllable conditions to estimate network capacity under various equipment configurations and different environment conditions.

One of our latest research topics is concerned with interference to which new LTE technology will be subjected, such as TV and radar signals operating in the neighbouring frequency bands. To estimate proper conditions under which new techno-

logy would coexist with established wireless systems is of uttermost importance before starting implementation of new network infrastructure.

A new feature in 4G voice communications is VoLTE (Voice over LTE) representing an evolutionary step of VoIP (Voice over IP) [2]. Currently we have been performing tests for network capacity and voice transmission quality using VoIP technology subjected to various interference effects. Having in mind high data bit rates and many impairments in real world transmission channels, such experiments require many fine / well-tuned measurements, especially focusing on time synchronization between remote network nodes.

Attention is given also to physical layer modeling of 4G networks [3] – the radio propagation channel, its limitations imposed on data transmission and technological means to improve the performance, such as MIMO antennas, spatial modulation and diversity.

References

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