Hochschule Offenburg
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ivESK Institut für verlässliche Embedded Systems und Kommunikationselektronik

Offenburg University of Applied Sciences
Institute of reliable Embedded Systems and Communication Electronics (ivESK)

Unified Field Test and Performance Measurement for Narrow Band Long Range Networks (NBLRN)

The Institute for Reliable Embedded Systems and Communication Electronics (ivESK) designs, implements and tests algorithms, protocols and platforms for efficient, secure and reliable wireless and wired communication solutions using embedded systems.

For the entire development process, ivESK follows a continuous test-driven design flow for the distributed communication nodes, which includes various abstraction levels and is based on identical software or firmware implementations and identical test cases at these levels. These range from simulation to virtualization and emulation of the network to field tests. To support our work related to field tests, we are looking for,

a student for a Bachelor's or Master's thesis

in combination with a

Work as a research assistant

From a recent project around Narrow Band Long Range Networks (NBLRN) base station / gateway and end devices for LoRa/LoRaWAN, SigFox, MIOTY and Cellular IoT are available at ivESK. We are also in the process of extending the test coverage with new measurement and analysis equipment's for tests. Initial tests and measurements are performed for various technologies, however an extended performance measurement campaign is planned to study the co-existence behavior and systematically measure the power consumption in field environment. Test cases considered are communication

range test (LoS/ NLoS), network performance measurements including network application performance tests (such as throughput, packet error rate, end to end delay) and power consumption (application, networks stack, RF front-end) measurements.

More specifically, the tasks will include:

- Field testbed environment building for NBLRN technologies, including testing network architecture and deployment, wireless propagation modelling and measurements using measurement devices
- Field test cases implementation and automated execution using TTCN-3
- Performance evaluation of identical test cases and comparison analysis

What you can expect:

- Practical experience of various wireless technologies both in hardware and software
- This role requires 50% of test environment preparation work (in the lab) and 50% of field measurement work
- Hands on experience with various NBLRN devices and measurement equipment's

What you should bring:

- Experience in programming, preferably using C/ C++
- Willing to experience with TTCN3 based test case development
- Basic knowledge of Wireless Protocol Stack
- Practical experience using Signal Analyzers, Signal Generators, Communication Analyzers

For questions please contact:
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