**Chaotic PLC Modem**

Project ID: PoC5\_12\_14

Lead beneficiary: Faculty of Electrical Engineering Osijek

Project leader: Dr. Marijan Herceg, Assistant Professor

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In this proof of innovative concept a new chaos-based communication system for data transmission using power line (Power Line Communication - PLC) is proposed. Advantages of chaos-based transmission of information are, first of all, a simple hardware implementation (simple way of chaos signal generation, demodulation in time domain, non-coherent receiver), robustness to multipath propagation, a very wide frequency spectrum with low amplitudes that allows coexistence with other communication systems, high level of data security due to the aperiodic nature of chaotic signals.

The project aims to demonstrate the technical feasibility and to construct a chaotic PLC modem prototype for digital signals based on:

- one of the existing modulations („On-off“ modulation, modulation using discrete change of a chaotic signal, etc.);

- a completely new modulation method, in respect of which the team members have been recommended by the registered European patent agent to protect their intellectual property rights.

Therefore, in parallel with the process of demonstration of the technical feasibility, the process for the protection of intellectual property rights would be initiated.

The realization concept and expected results:

In the first phase, the focus would be on the demonstration of technical feasibility of the proposed solution and on activities related to the protection of intellectual property rights. If the technical feasibility were confirmed, the second phase of the project would start, which would consist of creating a chaotic PLC modem functional prototype based on one of the existing modulations. In the third phase, the prototype would be tested in laboratory conditions and compared with PLC modems based on the existing standards. After evaluating the results, the commercialization plan would determine both the market potential and direction for the commercialization of the proposed solution.

The expected project results include the intellectual property rights protection for the new modulation, demonstration of the chaotic PLC modem technical feasibility, which includes the transmission of a digital signal over PLC with a chaotic signal carrier and the construction of a chaotic PLC modem functional prototype based on some of the existing modulations as well as on a completely new modulation method.