

Miniaturized Antenna Design with Genetic Algorithm Optimization for Implantable Systems



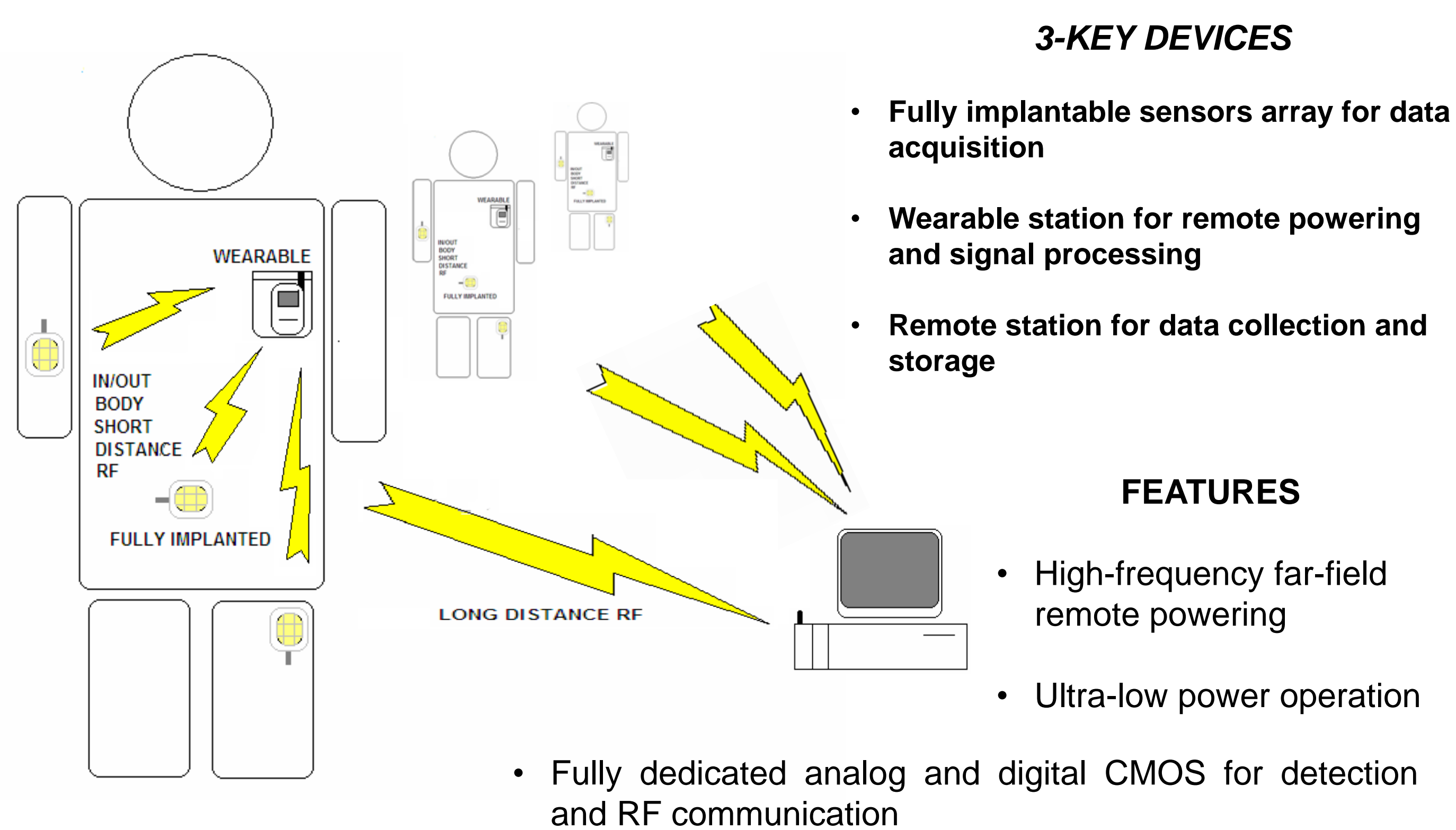
Onur Kazanc¹, Franco Maloberti², Catherine Dehollain¹
EPFL-RFIC¹, University of Pavia²



Main Features of the Implantable Sensor System

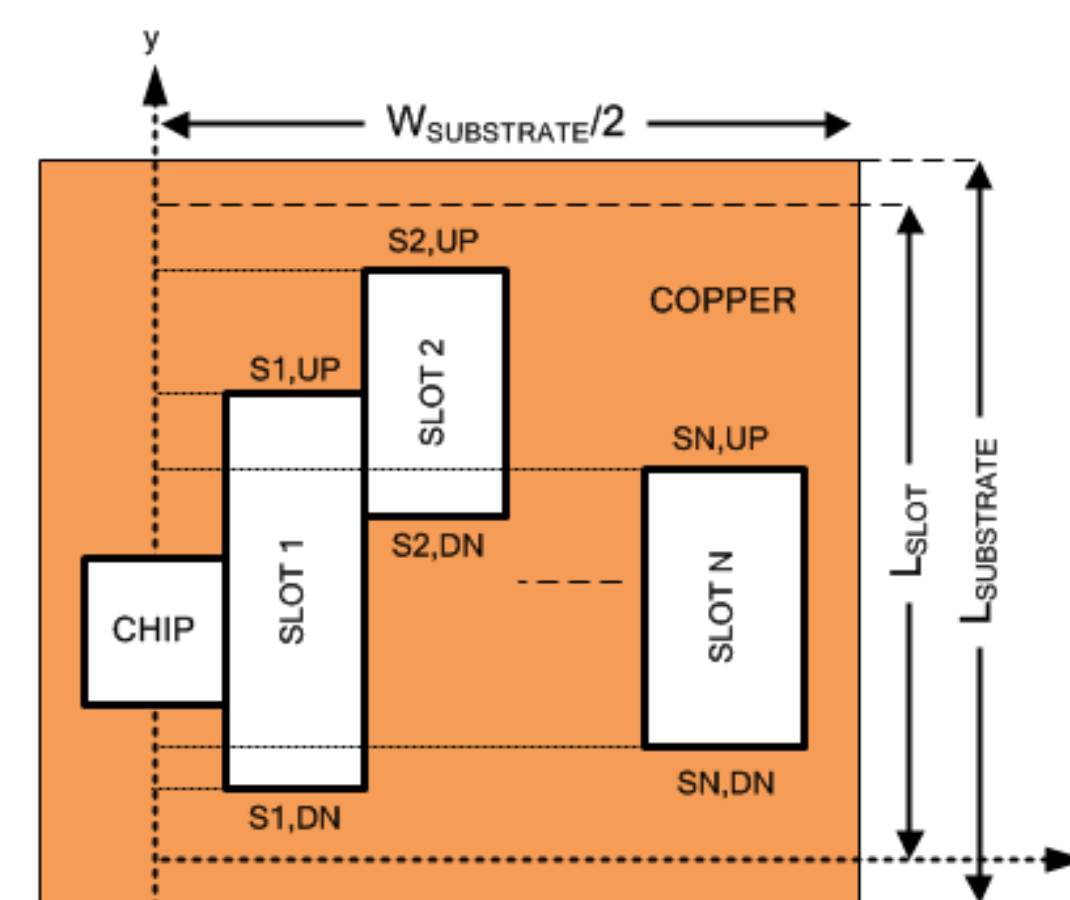
- Fully implanted multi-sensor system
- RF short distance communication
- Communication on mobile phones platform
- Body Area Sensor Network

Conceptual Application and Features of the Project



Impedance Matched Tag Antenna Design with Genetic Algorithm Optimization

Non-resonant inductive impedance of meandered-slot antenna is used to match the capacitive rectifier impedance for remote powering. This technique eliminates additional matching network components therefore ensuring compact and minimum-size sensor-tag design

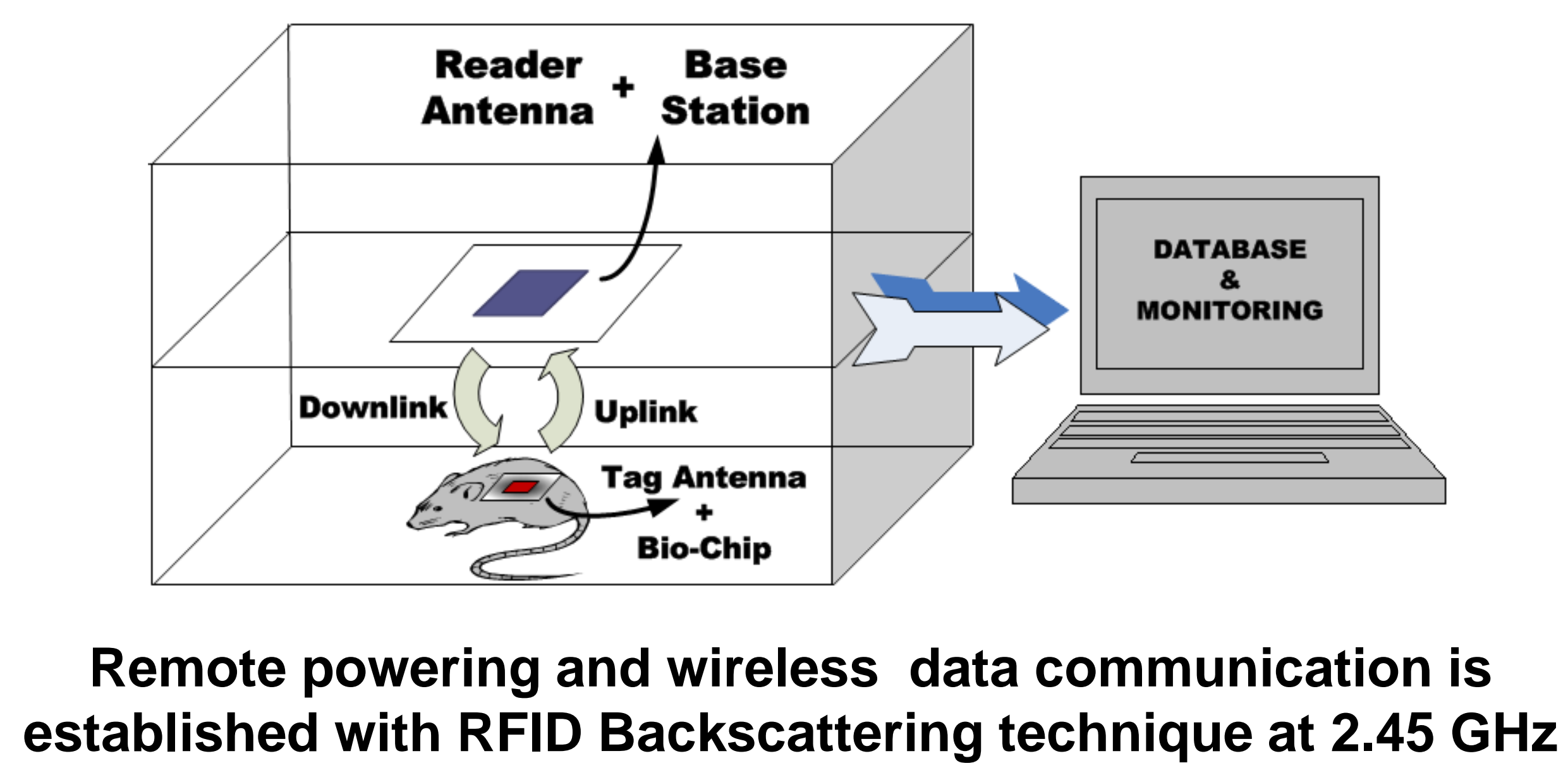


Parameterized Meandered-Slot Antenna Layout

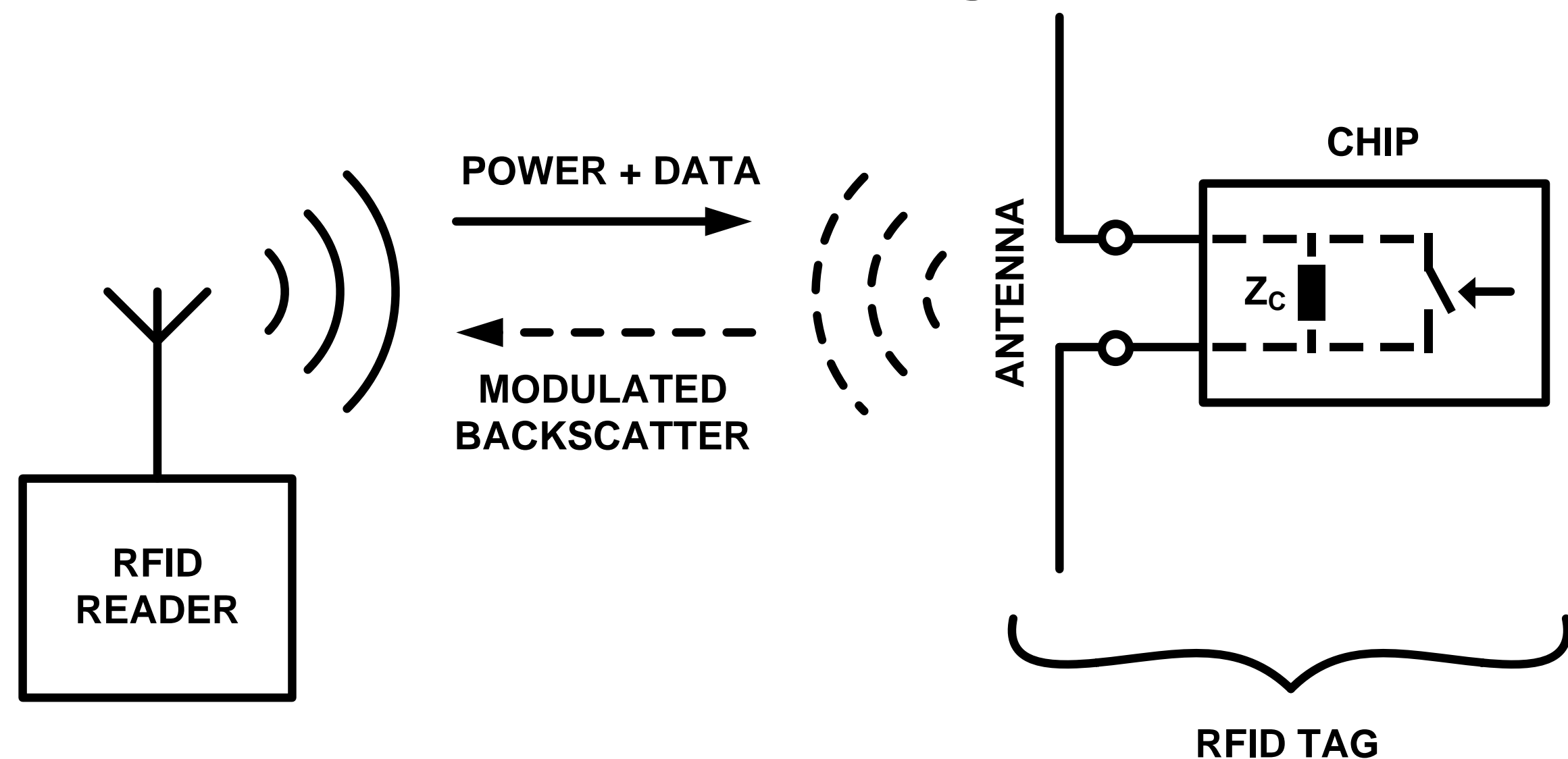


Meandered slot antenna optimized for $Z_{CHIP} = 15 - j250 \Omega$ at 2.45 GHz (20 mm x 20 mm)

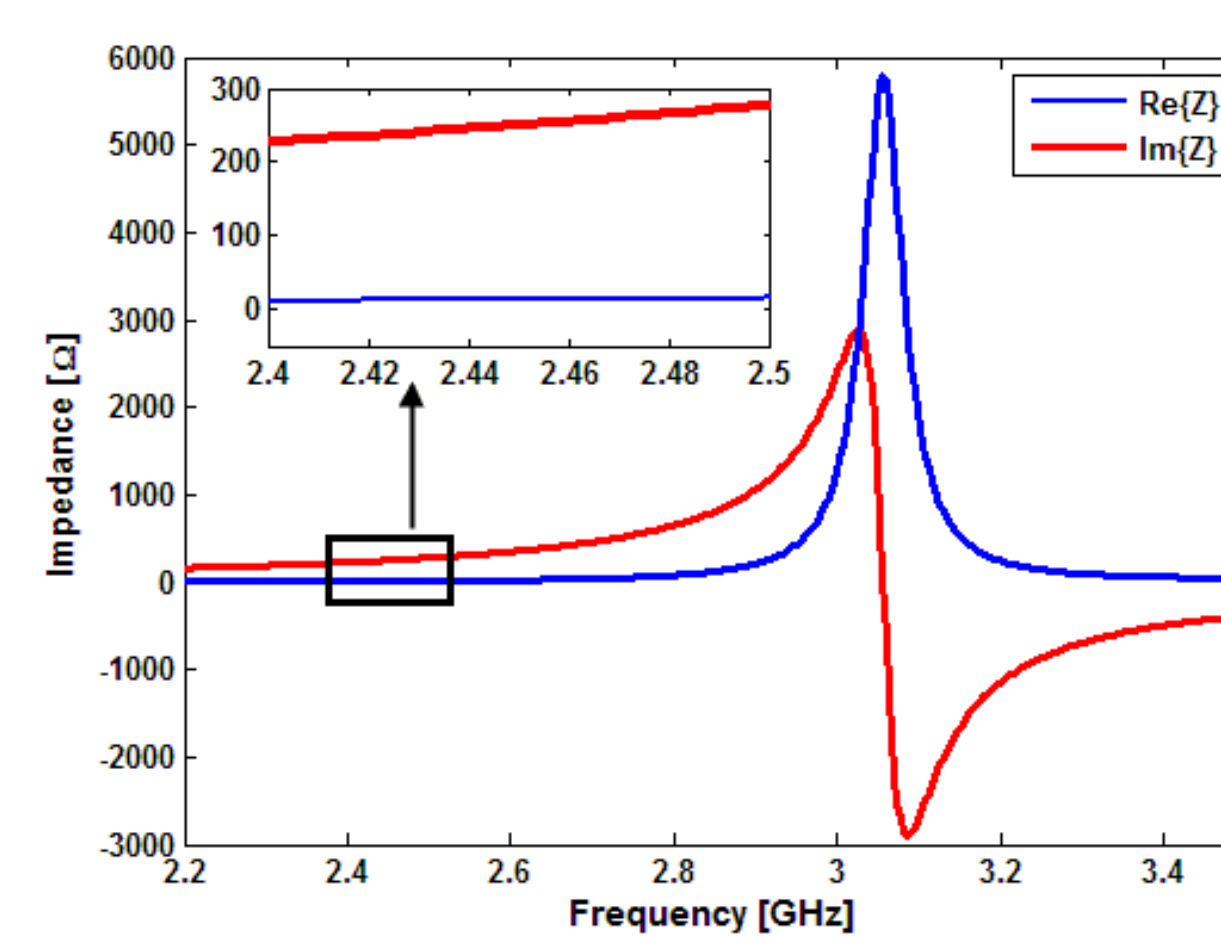
Application Platform with Mouse



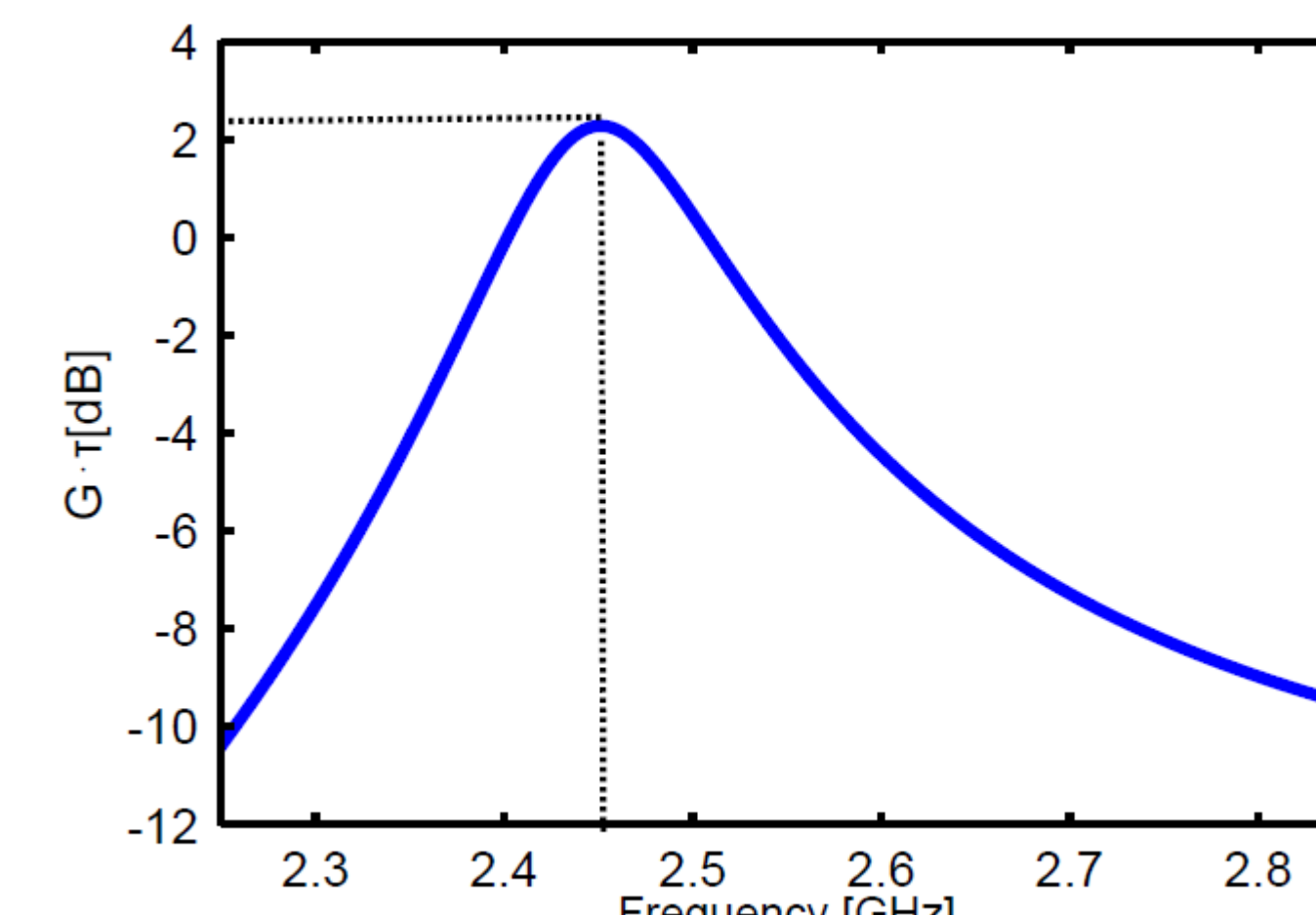
Remote powering and wireless data communication is established with RFID Backscattering technique at 2.45 GHz



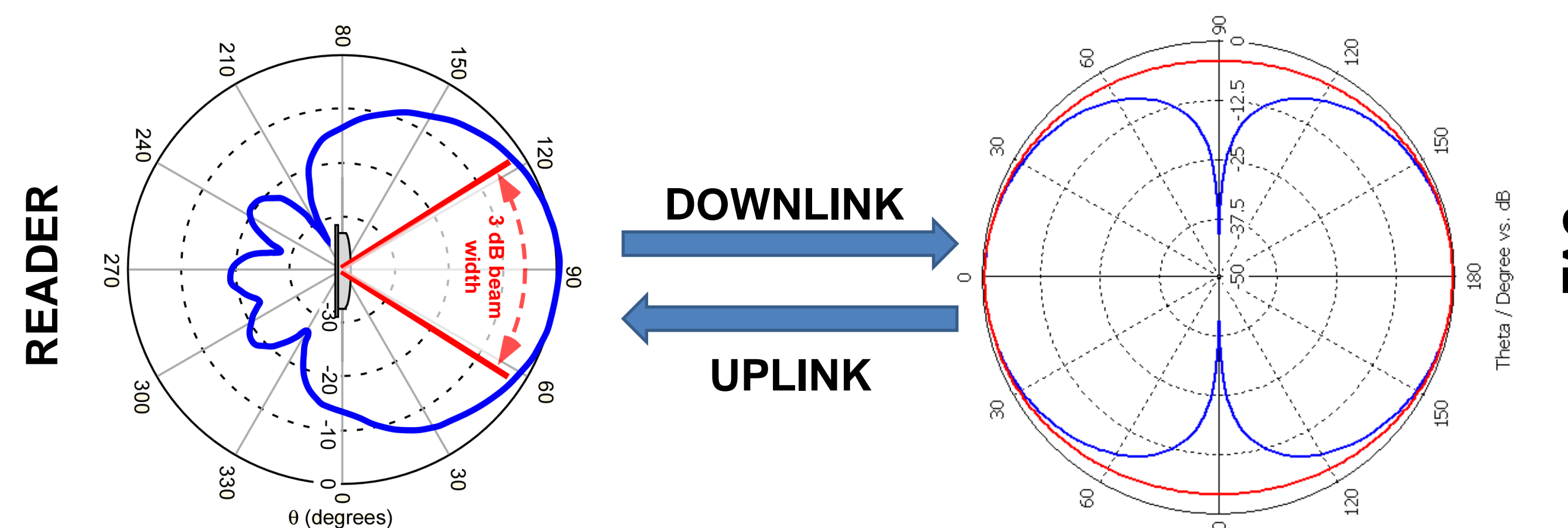
Characteristics of the Antenna



Input Impedance Characteristic



Realized Gain with $Z_{CHIP} = 15 - j250 \Omega$



Far-field radiation pattern orientation of reader and tag antennas

Academic Partners



Publications

O. Kazanc, C. Dehollain, F. Maloberti, "Impedance-Matched Sensor-Tag Antenna Design Using Genetic Algorithm Optimization", ISMICT, pp.61-64, 2011

Industrial Partners

