Analysis and design of HF RFID Tags

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Abstract:

In this contribution we present a method for designing HF RFID tags. For this it is necessary to accurately model both planar spiral coils which are used as an antenna and the non-linearity of the internal electronic circuitry(chip). We made an EM simulator of the spiral coils based on PEEC(partial element equivalent circuit) method. For the synthesis and optimization of an antenna the simulator is combined with non-linear optimization algorithm. Furthermore we present the procedure for measuring impedance of coils and chips. Non-linear behavior of a chip is modeled with a simplified harmonic model. The last part of the paper is devoted to the study of the achieved resonance frequency and available bandwidth of HF RFID tags.