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Metallic Coupling Frame-based HF RFID Cards

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Abstract—A novel design for HF RFID cards uses a module (containing a coil with a chip) and a metallic coupling frame with a slot which allows better coupling and higher performance compared to the standalone module. This design eliminates the need for a mechanical physical connection between the card body (coupling frame) and module, which reduces the manufacturing costs. We explain the theory of operation of such a design and the effect of the slot, in addition to creating the circuit model of the card. Furthermore, we propose an enhancement to the card design which improves the voltage transferred from the reader to the module by nearly 3 times. The enhancement is shown by HFSS simulations, circuit simulations and measurements including a chip.

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