

Challenges of Multi-Interface UHF RFID Transponders

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The integration of multiple communication interfaces or an additional sensor interface on a radiofrequency identification (RFID) transponder chip enables versatile applications beyond item identification. For example, RFID transponders with a simple one-bit resistive sensor interface allow a monitoring of item sealings assuring product authenticity and preventing theft. HF/UHF dual-band RFID transponders, on the other hand, facilitate customer interactions in retail using near-field communication (NFC) in addition to enabling an automated item inventorying via a UHF interface.

This talk addresses the design challenges of UHF RFID transponders using multi-interface transponder chips. As a first step, the characteristics of single-ended and differential UHF RFID front-end architectures are reviewed. In the second step, the impact of the interaction between the front-end circuitry of a multi-interface transponder chip and the transponder antenna structures on the UHF performance is discussed. A simulation flow is introduced that allows an accurate evaluation of the UHF performance of multi-interface UHF RFID transponders, considering the example of an one-bit sensor transponder for the monitoring of item sealings.