

Comments on “A Passive and Wireless Sensor Based on RFID Antenna for Detecting Mechanical Deformation”

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Abstract—He et al. proposed a mechanical deformation sensor based on a microstrip patch antenna matched to a radio frequency identification (RFID) integrated circuit (IC). In Fig. 6 in [1], a near-field coupled RFID system was shown, whereas the developed system operated in the far-field region. This comment presents a more representative figure explaining the operation principle of UHF RFID system, supplementing the information in [1].

Index Terms—Sensor, RFID, antenna, mechanical deformation, structural health monitoring, rectifiers.

THE authors He *et al.* proposed an interesting application of Ultrahigh Frequency (UHF) Radio Frequency Identification (RFID)-based sensing in structural health monitoring, using a microstrip antenna matched to a commercial RFID integrated circuit (IC) [1].

The operation principle of an example RFID system was introduced by the authors in Fig. 6 in [1], reproduced in Fig. 1(a). This figure is based on the explanation from the RFID Handbook [2], illustrating the operation of a near-field coupled RFID system, where the information and power transmission between the reader and the tag is shown as the coupled field lines between the coils. While Fig. 6 in [1] showed a coupled RFID system, the system proposed by He *et al.* operates in the uncoupled far-field region, where the information and power are transferred through electromagnetic propagation [3], as in Fig 1(b), as opposed to near-field coupling between coils. Furthermore, Fig 1(a), from [1], shows the rectifier, tuning and charge-pumping capacitors, and the modulating transistor-switch as “off-chip” components. However, the commercially-available IC used in the work includes the power conversion and modulation/demodulation circuitry within the IC “chip”, as shown in the suggested explanation of the operation principle of UHF RFID, in Fig. 1(b) [3], supplementing the figure by He *et al.*, which was based on a coupled near-field system with off-chip components [2].

REFERENCES

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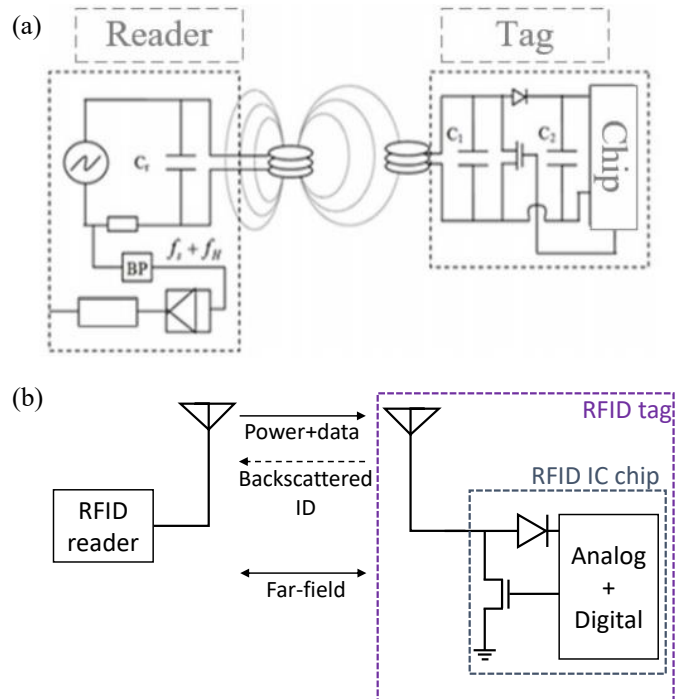


Fig. 1. Operation principle of a UHF RFID system: (a) Figure 6 from [1], showing a near-field coupled RFID system with the RF front-end “off-chip”. (b) the operation principle of a far-field UHF RFID system based on a commercial RFID IC.

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