Passive UHF RFID Tag for Multispectral Assessment

This work presents the design, fabrication, and characterization of a passive printed radiofrequency identification tag in the ultra-high-frequency band with multiple optical sensing capabilities. This tag includes five photodiodes to cover a wide spectral range from near-infrared to visible and ultraviolet spectral regions. The tag antenna and circuit connections have been screen-printed on a flexible polymeric substrate. An ultra-low-power microcontroller-based switch has been included to measure the five magnitudes issuing from the optical sensors, providing a spectral fingerprint of the incident electromagnetic radiation from ultraviolet to infrared, without requiring energy from a battery. The normalization procedure has been designed applying illuminants, and the entire system was tested by measuring cards from a colour chart and sensing fruit ripening.

Stichworte:
- screen printing
- printed electronics
- passive RFID tag
- optical sensor
- microcontroller
- spectral fingerprint

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