

# Metamaterial UHF-RFID Near-field Antenna for Retail Applications

## THE INVENTION

An electric near-field antenna based on metamaterial structures, compatible with far-field tags, has been developed in order to provide a solution to the current limitations. The use of this device at POS allows for a fast checkout and fast inventory process, being all items tagged uniquely with one far-field UHF-RFID tag.

### Innovative aspects and advantages

- > Fast checkout: All items read and security disabled simultaneously.
- > POS area perfectly defined: only desired items are detected.
- > Items labeled with only one far-field, long read-range, tag for all applications (payment, inventory, security...).
- > Detection for any tag orientation.
- > Very low far-field radiation.
- > Low-cost fabrication using PCB standard processes.

### IP Rights

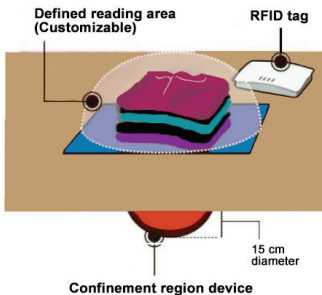
PCT/EP2014/064806  
Priority patent application EP13382287.4 10/07/2013

### Scientific Team

CIMITEC – Innovative and customized solutions for communication system

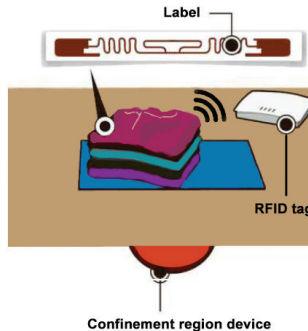
#### 1. PLACE THE ITEMS

Place the items inside the reading area. No item outside this area is read.



#### 2. READ THE LABEL

All items simultaneously read and security disabled.



#### 3. COUNT ITEMS



Adds the items with all the information needed (e.g: price, reference, etc.) automatically.

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## Summary

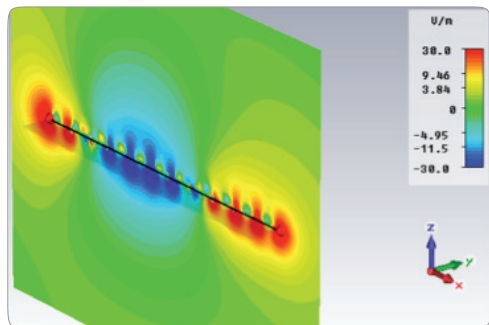
Radiofrequency Identification (RFID) is expected to replace barcode technology, since it provides more functionalities and there is no need of line-of-sight between the reader and the tag. The introduction of UHF-RFID in retail industry offers multiple benefits, such as improved inventory management and time, accurate tracking at item-level, improved security, and better efficiency of stores operation, among others. However, there are still some technology limitations that delay the expansion of RFID in this sector. One of this limitations affects the point-of-sale (POS) of the stores.

The use of RFID at POS allows for a fast checkout, reading all items simultaneously and disabling anti-theft alarms. However, using a conventional, i.e., far-field, reader antenna, some items out of the POS may be read, thus introducing errors. Magnetic, i.e., near-field, antennas are used in order to solve this problem, but in this case items must be labeled with tags sensitive to the magnetic field only, which have a short read range. This kind of tags prevents from having a fast inventory process, since far-field, long read range tags, sensitive to electric field, are needed for these application.

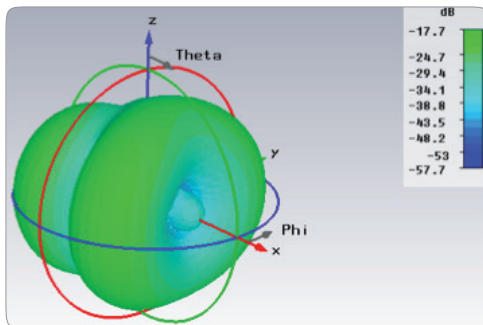
## State of development

Several prototypes, with different field confinement regions, have been designed, fabricated, characterized and tested. The expected behavior has been obtained. A demonstration video is available at [cimitec.uab.cat](http://cimitec.uab.cat)

The invention is nearly ready for industrialization.



► Electric Field distribution around the device



► Very low (Far Field) Radiation Gain



## Contact

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