DEVELOPMENTS IN SENSORISED SMART RFID TAGS: MONITORING AND TRACEABILITY OF SENSITIVE PRODUCTS

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- State of the art
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- Operating Principle
- Sensor tag
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- Applications
- Results and Conclusions.
Motivation

Public concern about the traceability of products

Tracking and monitoring a big variety of products

European directives for special products

Low cost and reliability.
State Of The Art

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ZigBee standards

Wireless LAN

LF and HF combined

New features:
- use of 2.45 GHz and RFID technology
- long operating life.
System Features

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Data identification-registration. RFID: LF (125kHz) vs HF (2.45 GHz)

Low consumption mode normally active: 2µA

Efficient memory management

Ethernet 100/10: use EPC and remote control.
Operating Principle

- BASE STATION
- WIRELESS SMART SENSOR-IDENTIFIER
- DATA AND COMMAND
- UHF 2.45Ghz GFSK
- 125 KHz ACTIVATION FRAME

TCP/IP over ETHERNET 10/100
Sensor Tag
Sensor Tag

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Base Station (BS)

CC2500
- 2.45 GHz Transceiver

ST3232
- RS232 Adapter

RJ45 Adapter
- Magnetic Coupler

MC9S12NE64
- 16 bit processor with PHY and MAC
- Ethernet 10/100

LM2575 KF33
- Power Supply

PCF8583
- Real Time Clock

U2270B
- ANALOG FRONT-END

PCF8583
- Field Clock
- GAP Control

LM2575 KF33
- 5V
- 3.3V

WALL ADAPTER
- ENABLE

PROGRAMMING AND DEBUG INTERFACE

UHF 2.45GHz
GFSK

INTERNET TCP/IP
- RS232C
- RJ45 Adapter

ETHERNET
- SPI
- UART

3V
- 125 Khz
- ACTIVATION FRAME

25 MHz

32 Khz

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Applications.

Related developments:

- RFID smart temperature sensor: Application in monitoring and traceability of hemoderivates
Applications.

Application on European Project:

FP7-ICT-2007-1

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Application. NORNS

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Application: NORNS

RFID tracking systems for non-homogeneous loads

**Level 1** (box-item)
- Passive tag
- (6-12 items)

**Level 2** (pallet)
- Smart tag
- (complex mixed pallet)

**Level 3** (container)
- Wi-fi enabled reader/identifier
- (complex shipment)
Results and Conclusions

- Low energy consumption
- Operating range of 5 or 6 meters
- Economically viable to introduce for every company
- Data retaining of several years
- Possible remote control
- RFID capabilities: EPC’s and extra memory (EPCIS).