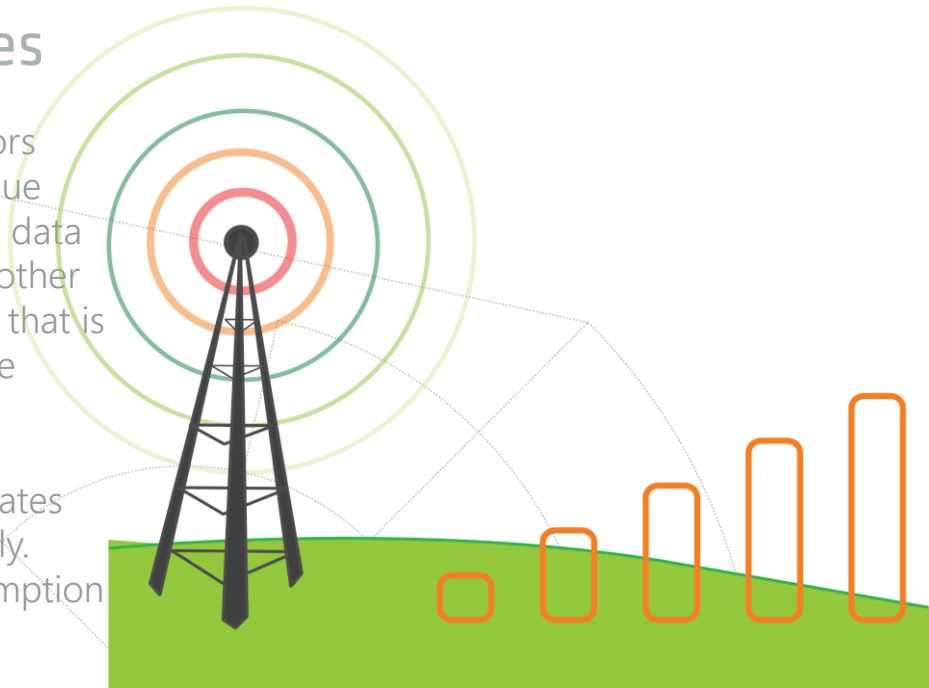




Network of wireless and passive sensors (without batteries), using a set of unique sensors which use a frequency for the data transfer (obtained by sensors) and another frequency for the reception of energy that is emitted by transmitters that power the sensors. For this, only a central data reception and wireless transmission structure is required which communicates with each of the sensors independently. These sensors have low power consumption and high data rates (up to 960 Mb/s).



Tech offer | Passive sensor system powered by wireless power transmission

Wireless sensors, which transmit the collected information without the need of wiring, have gained increasing commercial importance. These sensors can be used in a wide range of situations, from environmental monitoring to farm and industrial control. However, most sensors still need to use batteries, which increases maintenance and environmental costs.

The presented sensors are an alternative since they do not require any type of battery and receive energy through a specific frequency emitted by an energy transmitter. These passive sensors gain even more relevance if sensor networks are formed, in which several nearby sensors detect and transmit environmental data. These sensors can have the capability of reusing ambient electromagnetic waves to perform the communication (e.g. Wi-Fi, Bluetooth, LoRa, etc.)

APPLICATIONS

This passive sensor system can be used in a wide range of applications, such as:

COLLECTION OF ENVIRONMENTAL DATA
e.g. farm fields, inside buildings

ACCESSES CONTROL
e.g. parking lots, buildings

USES REQUIRING HIGH TRANSMISSION RATES
e.g. audio or video sensors

BENEFITS

Compared to traditional sensors:

LOWER COST: no batteries, of any kind.

INCREASED CONVENIENCE: no battery charge or change, no wiring.

Compared to other passive sensors:

LOWER POWER CONSUMPTION

HIGHER DATA TRANSMISSION RATES: up to 960Mb/s.

POSSIBILITY TO USE AMBIENT ELECTROMAGNETIC WAVES: Wi-Fi, Bluetooth, LoRa, etc.



INTELLECTUAL PROPERTY

Patent granted in

- USA ([US201716466883](#))
- Europe ([EP20170825932](#))

SCIENTIFIC PUBLICATIONS

D. Matos, R. Correia and N. B. Carvalho, "Millimeter-Wave Hybrid RF-DC Converter Based on a GaAs Chip for IoT-WPT Applications," in *IEEE Microwave and Wireless Components Letters*, vol. 31, no. 6, pp. 787-790, June 2021, doi: [10.1109/LMWC.2021.3058542](#).

D. Belo et al., "IQ Impedance Modulator Front-End for Low-Power LoRa Backscattering Devices," in *IEEE Transactions on Microwave Theory and Techniques*, vol. 67, no. 12, pp. 5307-5314, Dec. 2019, doi: [10.1109/TMTT.2019.2941854](#).

DEVELOPMENT STAGE

TRL 4

Field tests performed with prototypes

KEYWORDS

BACKSCATTER

WIRELESS POWER TRANSMISSION

PASSIVE SENSORS

INVENTORS

Researchers from:

- Instituto de Telecomunicações (IT)
- Universidade de Aveiro

COMMERCIAL OFFERING

- Licensing agreement
- Testing new applications
- Joint further developments
- Adaptation to specific needs
- Industrialization

TARGET MARKET

IT seeks partners within the area of sensor development and manufacturing.

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