INTELLIGENT BIO-IMPEDANCE SENSOR FOR BIOMEDICAL APPLICATIONS

ABSTRACT
The present invention refers to a portable sensor capable of taking bio-impedance measurements for multiple frequencies, processing data to obtain both magnitude and phase of bio-impedance for every frequency, and transmitting the results wirelessly.

It was developed by researchers belonging to the University of Sevilla (US); and the Biomedical Research Networking Center in Bioengineering, Biomaterials and Nanomedicine (CIBER-BBN).

DESCRIPTION
The sensor is in contact with the biological environment to be measured through several electrodes, in a way that both injects electrical current inside the biological environment and measures the tension produced by the said current circulation, according to the whole operation of the following subsystems:

1- Sensing subsystem: it produces and injects an alternating current in the human body through two electrodes, and, by means of other two electrodes, it measures bio-impedance in a part of the body, an organ, a tissue or a fluid.

2- Processing subsystem: it calculates magnitude and phase of bio-impedance for every frequency.

3- Communication subsystem: wireless communication in both directions. In one sense, it sends results and, in the other, it sends commands for the remote configuration of the sensor.

4- Timing subsystem: it registers the moment when every measurement is taken. It also commands the proper time for every scheduled operation to be done.

5- Data storage subsystem

6- Energy subsystem: power supply
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APPLICATIONS
• mHealth, eHealth
• Continuous monitoring of physiological variables and health condition
• Portable electronic device useful in the areas of information and communications technology, biomedical engineering and medical technology

DEVELOPMENT STATUS
Developed
Laboratory tested

IP STATUS
Spanish Patent granted

AVAILABLE FOR
• Exclusive license agreement
• Non-exclusive license agreement
• Further research or development

INDUSTRIAL PROPERTY
Spanish Patent ES 2537351 B1

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INNOVATIVE ASPECTS AND ADVANTAGES
Improved accuracy in bio-impedance measurement
Integration of novel features, not previously gathered.
Advanced capability of measurement
Two new different and complementary models of detection
Measurement in different sections of the biological environment
Analysis mono- and multi-frequency
Independent of both the type of electrode and different trademark medical tool
Number and values of the frequencies can be remotely configured, even in real time.
Capable of updating and adjusting to the monitored subject for a customized measurement
Bidirectional communication: sending data and receiving remote commands and configurations.
Accessible design, no training needed.
Reduced size, portability, cost and energy saving.

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