

REMS Sensors for Environmental Monitoring (#4561)

A passive sensor based on reflected electro-material signatures (REMS) for monitoring an environmental condition

Georgia Tech inventors have created a sensor concept based on reflected electro-material signatures (REMS) that consists of three distinct components working together to provide passive sensing capability of environment information. The first part of the component includes a electro-material line consisting of a chemical strip sandwiched between the ground plane and top trace of an RF tag's micro-strip transmission line. The second component is a reflector circuitry, consisting of the transmission line itself, and the radio-frequency integrated circuit (RFIC) that performs backscatter and identification functions, and any RF tag antennas. Lastly, the third component is a RF reader that must be used to interrogate the REMS sensor as well as perform the signal processing for data extraction.

Benefits/Advantages

- **Low cost** – decreases expenses by being compatible with existing UHF or microwave passive RFID integrated circuits
- **Precise** – because an RFID readers filters out unmodulated scatter components, an RFID-based REMS sensor is more precise
- Allows passive interrogation of the sensor

Potential Commercial Applications

- Monitoring environmental conditions for perishable goods
- Tracking and recording changes in environmental conditions
- Condition verification during the supply process

Background/Context for This Invention

The ability to monitor environmental conditions for perishable goods can provide significant value to the supply chain by ensuring that products remain fresh and safe when supplied to the consumer. In some cases, tracking changes in the environmental conditions over time without battery-operated conventional electronics may be desirable for condition verification during the supply process.

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More Information

U.S. Patent Issued - [8,564,435](#)

Publications

For more information about this technology, please visit:

<https://licensing.research.gatech.edu/technology/rem-sensors-environmental-monitoring>

Images:

The automated sequential delivery of multiple fluids. A varying number of delay gates imprinted in the

branches are shown in the figure.

COVID-19 and flu saliva test on paper: (A) The automatic sequential delivery of multiple reagents required for virus test; (B) Water pouring into the device triggers the virus assay, allowing the presence of SARS-CoV-2 and influenza A & B viruses to be visually identified by the color changes in the corresponding detection spot