By Gabriel Gache, Science News Editor

RFID Testbed Rapidly and Reliably Identifies Multiple Tags

Simulaneous identification enables the measuring of hundreds of RFID tags

Usually the reading of multiple radio frequency identification tags, or RFID's, is made sequentially so that any collision between transmitted information is removed. For example, while dealing with high amounts of tags the RFID reader sends a radio signal to the passive tags. The strongest signal received back from the tags is usually the one associated to the closest one to the reader. The reader then gives priority to the strongest signal and information transfer can commence. Once the identification is complete, the reader sends back a signal to the tag which will prevent it from sending repeatedly the same information and the process can start again with the next strongest radio signal. However, this technique is very time consuming and sometimes hundreds of radio frequencies are involved. Georgia Institute of Technology researchers claim they have developed a system that will allow a much faster tag identification."This testbed allows us to measure the signal strength of tags hidden behind other tags and to rapidly test unique antenna configurations and multiple antennas without actually constructing new tags for each experiment. We designed a really inexpensive, simple anti-collision system that transmits multiple unique signals back to us simultaneously without this complicated back and forth process", says Gregory Durgin from the Georgia Institute of Technology's School of Electrical and Computer Engineering.The system involves a transmitter, a receiver and an emulator. The emulator is connected to the antenna and has the role of simulating an integrated circuit, thus enhancing the spread spectrum signal sent to the tag. The radio signals are then separated to allow simultaneous signal processing. The researchers reported that during the experiments the system was able to identify 256 antennas simultaneously."To test new signaling schemes and frequencies, we just have to change the emulator's signal - we don't have to fabricate a new chip that could cost 100,000 US dollars in a silicon foundry. We can also evaluate multiple custom antennas in numerous configurations in realistic tag environments for only a fraction of the time and cost of previous methods", said Durghin.The system is currently working at 915 megahertz, but further research could raise the frequency to 5.7 gigahertz. "At higher frequencies, even though the tag is physically stationary, you are electromagnetically lifting the antenna signal off the object and it starts to work better. Plus, at higher frequencies, smaller antennas can be constructed, which means more antennas can be placed on a tag to produce more energy for communications", he said.With higher frequencies the chip will also be able to be read from a higher distance with enhanced accuracy."This testbed is just the beginning of our ability to characterize the performance of different RFID tag antennas in a real channel and push these technologies to higher frequencies, longer read ranges and overall higher reliability", concluded Durghin.