

Michelin Embeds RFID Tags in Tires

The tire maker has begun testing a UHF transponder that it adapted for use inside rubber sidewalls.

Jan 17, 2003 - Michelin this week revealed that it has begun fleet testing of an RFID transponder embedded in its tires to enable them to be tracked electronically. After it completes testing, which will likely last 18 months, Michelin will begin offering automakers the option of purchasing tires with embedded transponders. The US Congress passed the TREAD (Transportation, Recall, Enhancement, Accountability and Documentation) Act in the wake of the Firestone/Ford Explorer debacle. The act mandates that car makers closely track tires from the 2004 model year on, so they can be recalled if there's a problem. This technology could be available for the 2005 model year.

Michelin hopes manufacturers will pay a little more for tires with RFID transponders, because it makes the tires easier to track. The microchip stores the tire's unique ID, which can be associated with the vehicle identification number. The chip can also store information about when and where the tire was made, its maximum inflation pressure, size and so on. Information can be updated with a handheld reader.

Other tire makers have demonstrated the ability to read RFID transponders embedded in tires. But Michelin claims to be the first to meet the Automotive Industry Action Group's B-11 standard for North America, which calls for a read distance of 24 inches. Achieving that range has been a challenge because the rubber makes it harder to read the tag.

When Michelin took off-the-shelf, passive UHF transponders and embedded them in tires, the read distance dropped to less than three inches, according to George O'Brien, Michelin's North American technical director for electronic products and services. To boost the read range, the company took microchips from [Fairchild Semiconductor](#) and [Philips Semiconductor](#) and designed its own special antenna.

O'Brien would not reveal details, but he said the antenna was designed to compensate for the fact that electromagnetic waves travel differently through rubber than through air. He said the transponder that his team designed loses only 10 percent of its read range when it is embedded in a tire.

The other key issue was to ensure that the rubber bonds to the antenna. Michelin developed a proprietary coating it puts on the transponders before putting them into the rubber. "The most important concern is making sure the tire is not compromised in any way," O'Brien says. "You have to make sure the rubber bonds carefully to antenna so the wire that the antenna is made from doesn't break and then work its way out of the sidewall of the tire."

The tire is now being tested in several areas of the country by taxi and rental car fleets. Michelin says the transponders cost "several dollars" today, but the price will drop if they are manufactured in mass volumes (Michelin manufactures more than 800,000 tires a day). It's not clear yet whether automakers will be willing to pay the additional cost.

The Fairchild and Philips chips are based on Intermec's Intellitag. Saleem Miyan, Philips global strategic business manager for RFID products, says his company made some refinements to the Intellitag design, which

it has licensed from Intermec. The Philips I-Code HSL chip operates at 868-915 MHz stores about 2 kilobytes of information. It is currently available only in sample quantities. it will be mass-produced starting in the middle of the year.

Philips and [Texas Instruments](#) have also developed pressure and temperature sensors that use battery-powered RFID tags to communicate with a reader in the dashboard. That enables the driver to know when the pressure of one particular tire drops below a certain level (see [RFID Chip To Monitor Tire Pressure](#)). The Michelin transponder is strictly for identification and tracking.

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