Silicon Labs Newsroom

BANF and Silicon Labs Digitize the "Last Analog Domain" with Intelligent Tire Monitoring Solution

Ultra-Low-Power BG22 Bluetooth SoC Enables Real-Time, Battery-Free 4 kHz Tire Data Processing for Autonomous and Fleet Applications

SEOUL, South Korea and AUSTIN, Texas, March 10, 2026 /PRNewswire/ -- BANF, a Korean intelligent tire system company, and Silicon Labs, the leading innovator in low-power wireless, today announced a breakthrough in tire monitoring technology. By integrating Silicon Labs' ultra-low-power Bluetooth® LE SoC, the BG22, into its in-tire sensor platform, BANF has developed a real-time, high-resolution tire data processing system designed for autonomous vehicles and connected fleet environments.

For decades, tires have represented an industry "black box." Traditional Tire Pressure Monitoring Systems (TPMS) provide alerts only when pressure drops significantly, limiting their ability to prevent fuel inefficiency or safety risks at a fundamental level. BANF's solution transforms the tire into a connected intelligence node capable of delivering actionable data in real time.

The two companies also published a joint case study on the new sensor on Silabs.com.

Turning the Tire into a Real-Time Intelligence Platform

At the heart of BANF's system is the Silicon Labs BG22 Bluetooth LE SoC, engineered for ultra-low-power operation and robust RF performance. Despite the tire's challenging environment—where steel belts and thick rubber layers create a near "Faraday cage" effect—the BG22 ensures reliable wireless communication.

BANF's iSensor, mounted inside the tire, measures 3-axis acceleration, pressure, temperature, and tread depth at thousands of samples per second (4 kHz). Instead of transmitting raw data, the system processes and filters it within the tire, extracting key signals such as wheel-nut loosening, slip events, or reduced friction before sending concise alerts to the vehicle. This architecture reduces communication load while significantly improving response time.

To meet automotive-grade security requirements, Silicon Labs' Secure Vault™ technology is embedded in the system, protecting tire data from tampering or spoofing—an essential safeguard for autonomous vehicles and large fleet operators.

Overcoming Power Constraints with Wireless Energy Transfer

Power delivery has historically been the greatest obstacle to advanced tire sensing. The interior of a tire is exposed to high heat, centrifugal force, and constant mechanical stress. Batteries degrade quickly under such conditions, and wired power connections are impractical.

BANF addresses this challenge through proprietary wireless power transfer technology. Its Smart Profiler, mounted on the vehicle's mudguard or fender, delivers continuous power to the in-tire iSensor using magnetic resonance. This battery-free architecture enables thousands of Hertz of uninterrupted data acquisition and processing.

"Tires generate terabytes of data related to friction, load, and mechanical stress, but until now there was no viable way to capture and transmit that information in real time," said Adam Sunghan You, CEO of BANF. "By combining Silicon Labs' BG22 with our wireless power technology, we have unlocked a new level of tire intelligence."

Enabling Autonomous and Fleet Infrastructure

BANF sees this solution as foundational infrastructure for autonomous driving and connected fleets. In driverless trucks and buses, tire slip or traction loss cannot be detected by human intuition. Real-time tire data processed by BG22 can feed directly into chassis control, stability systems, and autonomous driving algorithms.

"Compute is no longer confined to the CPU—it extends across intelligent peripherals and sensors," said Ross Sabolcik, Senior Vice President of Product Lines, Silicon Labs. "BG22 enables reliable, secure connectivity even in extreme environments, empowering innovators like BANF to digitize traditionally analog systems."

BANF plans to leverage accumulated tire data to expand into predictive maintenance, route optimization, and insurance-linked services. By converting tires into intelligent, data-generating assets, the company aims to redefine the value model of vehicle operations.

Redefining the Future of Tire Intelligence

Through this collaboration, BANF and Silicon Labs are digitizing what has long been considered the "last analog domain" within the vehicle. The partnership demonstrates how advanced semiconductor technology and domain-specific innovation can converge to establish new standards in mobility.

Read more about how Silicon Labs and BANF built this battery-free sensor in a joint case study on Silabs.com.

About BANF

BANF is a Korea-based intelligent tire system company focused on real-time tire sensing and wireless power solutions for autonomous and fleet applications.

About Silicon Labs

Silicon Labs (NASDAQ: SLAB) is the leading innovator in low-power connectivity, building embedded technology that connects devices and improves lives. Merging cutting-edge technology into the world's most highly integrated SoCs, Silicon Labs provides device makers with the solutions, support, and ecosystems needed to create advanced edge connectivity applications. Headquartered in Austin, Texas, Silicon Labs has operations in over 16 countries and is the trusted partner for innovative solutions in smart home, industrial IoT, and smart cities markets. Learn more at https://www.silabs.com.

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For further information: Sam Ponedal, sam.ponedal@silabs.com

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