

Freescale set to introduce wireless chip breakthrough

Jane Larson

The Arizona Republic

Jan. 30, 2006 12:00 AM

<http://www.azcentral.com/business/articles/0130Freescale30.html>

Researchers at Freescale Semiconductor Inc.'s Tempe labs capped 10 years of effort with a breakthrough on a tricky material that could make wireless communications faster and more powerful.

The Austin-based company will announce today that its researchers have developed the first fully functioning chip based on gallium arsenide, a material that conducts electrons up to 20 times faster than the silicon widely used in today's semiconductors.

The new communications chips, which are still three to five years away from commercial production, are targeted for use in cellphones, base stations and high-end optoelectronic equipment.

The new devices would speed up transmitting and receiving of wireless signals and allow huge volumes of audio, video and data to be transmitted quickly.

"We believe we've solved most of the technical challenges, and the devices we have fabricated in the test lab have performance that allow you to use them in commercial applications," said Karl Johnson, director of Freescale's microwave and mixed-signal technology lab.

Johnson and five other senior researchers in the lab worked on the project at Freescale's facility at Price and Elliot roads in Tempe starting about 10 years ago.

The semiconductor industry has developed gallium arsenide chips for use in power amplifiers and other parts of communications devices. But it has struggled for ways to manufacture them using the more common processes and equipment for silicon-based chips.

Other researchers have fabricated chips using gallium arsenide and the conventional technology, but they performed like an eight-cylinder car running on one cylinder, Johnson said.

The Tempe team's innovation was in finding a type of material that effectively insulates the part of a chip that carries the current from the part of the chip that controls the current, Tempe researcher Matthias Passlack said. Without good insulation, the current can't be properly controlled and the chip's performance suffers.

The Freescale innovation could play well in booming markets, an industry analyst said.

"This could be very significant because in the future a lot of semiconductor growth is going to occur in the digital environment and high-speed communications market," said Dave Cavanaugh at Semico Research Corp.

Freescale still needs to develop the team's chip into one that can be manufactured in high volume. Availability will depend on investment, the company said, adding that it plans to collaborate with partners eager for the technology.

Freescale's milestone comes as the industry is increasingly concerned that, after decades of finding ways to make silicon-based chips smaller and faster, manufacturers are reaching silicon's physical limits. Success with new materials such as gallium arsenide could allow the progress to continue.

Freescale increased its research and development spending to \$1.2 billion last year from \$1.1 billion the year before. It has performed well financially since spinning off from parent Motorola Inc. and going public in 2004.

Freescale pleasantly surprised analysts when it reported net income more than doubled last year, to \$563 million from \$211 million the year before, on just a 2 percent rise in sales, to \$5.8 billion.

Freescale stock, which closed Friday at \$26 a share, is up more than 52 percent in the past year.