# IBM preps new wireless chip technology to allow mobile operators to clear the data bottleneck

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IBM today introduced the fifth generation of semiconductor technology specialized for high performance communications. The company's latest silicon-germanium (SiGe) chip-making process is designed to enable ever-increasing amounts of data to flow through network backbones in applications such as Wi-Fi, LTE cellular, wireless backhaul and high speed optical communications.

Since its introduction in 1995, IBM's SiGe semiconductor technology has helped spur a revolution in radio frequency (RF) performance, enabling engineers to develop breakthrough devices such as satellite global positioning systems, WiFi radios and high speed optical links. IBM's new "9HP" SiGe technology continues to put advanced capability in the hands of engineers who design chips for LTE cellular base stations, millimeter-wave wireless communication links, and next generation short and long-haul optical communications. Outside of communications, 9HP performance will advance the state of the art in other applications such as high-performance test equipment, automotive radar and security imaging.

"Silicon-germanium is one of the key technologies that have enabled wireless operators to keep up with the explosive growth in data traffic generated from mobile handsets," said David Harame, IBM Fellow. "Before SiGe, the high-performance chips used in base stations and optical links were built using expensive, esoteric processes. SiGe

provides the necessary performance as well as integration and cost savings via its CMOS base."

## Open Collaboration is Key to Success

Over the years, a number of leading technology companies have come to rely on the benefits and advantages of SiGe, working closely with IBM to develop and refine new versions of the chip-making process. IBM believes that open collaboration among companies will drive future breakthrough innovation in semiconductors.

"As early adopters of IBM's SiGe technology, Semtech has consistently pushed the envelope on what can be achieved in high-speed wired and wireless communications systems and in high performance analog devices," said Charles Harper, Senior Vice President of Semtech's Systems Innovation Group. "With today's technology, Semtech is a leader in 40Gbps and 100Gbps Communications Systems and with IBM's latest SiGe technology we believe we can emerge as a leader in several new analog segments where performance, integration and power are critical requirements."

"Our long collaboration with IBM on SiGe technology has enabled Tektronix to break new barriers on what can be achieved in high-fidelity, high-bandwidth oscilloscopes," said Kevin Ilcisin, chief technology officer, Tektronix. "We utilized IBM's SiGe 9HP for our patent-pending asynchronous interleaving approach, and expect to break new ground by providing customers bandwidth capabilities of 70 GHz and beyond while significantly improving our signal-to-noise ratio."

## Key Technology Details, Specs

9HP will be the first SiGe technology in the industry featuring the

density of 90nm CMOS which will enable the highest level of integration in a fully production qualified SiGe BiCMOS technology. IBM's new SiGe BiCMOS technology delivers higher performance, lower power and higher levels of integration than current 180nm or 130nm SiGe offerings.

The technology maintains compatibility with IBM's 90nm low power CMOS technology platform, enabling foundry clients to port a wide range of intellectual property circuit blocks and standard cell library elements. The 90nm foundry platform also includes an RF CMOS technology option, giving IBM foundry customers a broad range of technology choices for RF and mixed-signal applications.

Additional technical specifics include:

- 90nm Lithography based SiGe BiCMOS
- Advanced SiGe HBT NPNs, Ft = 300GHz, Fmax > 350GHz
- 90nm CMOS FETs, 1.5, 2.5v/3.3v
- Thick Dielectric Add-On Modules – Low-K, Cu, Al
- Full Suite of Passives-Resistors, Varactors, MOS and MIM Capacitors, High Q Inductors, mmWave elements
- PIN and THz Schottky Barrier Diodes
- Process Design Kits featuring precision RF device models

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