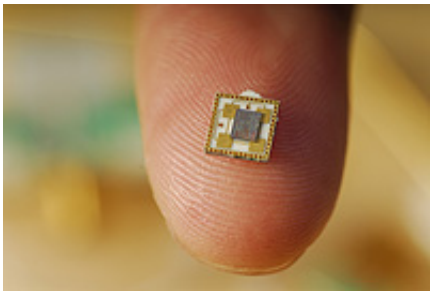
New Wireless 60 GHz Standard Promises Ultra-Fast Applications

January 15 2009, By Rick Robinson



This 60 GHz single-chip CMOS radio-frequency device, developed at the Georgia Electronic Design Center by Joy Laskar and Stephane Pinel, is currently the world's most integrated chip for 60 GHz wireless applications.

(PhysOrg.com) -- Ultra-high-speed wireless connectivity - capable of transferring 15 gigabits of data per second over short distances - has taken a significant step toward reality. A recent decision by an international standards group could help bring this technology to market soon.

Short-distance 60 gigahertz (GHz) technology could offer many benefits to bandwidth-hungry applications such as high-definition video and high-capacity data storage. The new standard would support extremely fast wireless peer-to-peer connectivity, PC connectivity and High-Definition Multimedia Interface (HDMI) cable replacement.

Among the many potential 60 GHz applications are virtually wireless desktop-computer setups and data centers, wireless home DVD systems, in-store kiosks that transfer movies to handheld devices in seconds, and the potential to move gigabytes of photos or video from a camera to a PC almost instantly.

Industry group Ecma International recently announced a worldwide standard for the radio frequency (RF) technology that makes 60 GHz "multi-gigabit" data transfer possible. The specifications for this technology, which involves chips capable of sending RF signals in the 60 GHz range, are expected to be published as an ISO standard in 2009.

"We believe this new standard represents a major step forward," said Joy Laskar, a member of the Ecma 60 GHz standards committee and director of the Georgia Electronic Design Center (GEDC) at Georgia Tech. "Consumers could see products capable of ultra-fast short-range data transfer within two or three years."

He added that multi-gigabit technology could also help enable "viral communications." Viral communications scenarios envision a future of decentralized, ubiquitous, wireless devices that aren't directly connected to a central communications conduit. Instead, they cooperate with one another to both utilize and expand bandwidth and data availability.

GEDC, a microelectronics design center at the Georgia Institute of Technology, has already produced a CMOS chip capable of transmitting 60 GHz digital RF signals. This chip design could speed up commercialization of high-speed short-range wireless applications because CMOS technology is both low cost and low in power consumption.

"Multi-gigabit technology definitely has major promise for new consumer and IT applications," said Darko Kirovski, senior researcher at

the Microsoft Research division of the Redmond, Washington, software giant. “Ecma’s move on international standardization of 60 GHz frequency range brings us closer to realizing that promise.”

GEDC researchers have already achieved very high data transfer rates that promise unprecedented short-range wireless speeds—15 Gbps at a distance of 1 meter, 10 Gbps at 2 meters and 5 Gbps at 5 meters.

Laskar recently discussed 60 GHz wireless technology at a MIT Enterprise Forum of Atlanta panel discussion on “The Future of Wireless Communications.” The panel, which included Walt Mossberg of The Wall Street Journal and AT&T Mobility CEO Ralph de La Vega, was broadcast Nov. 24, 2008, and can be viewed at (www.mitforum-atlanta.org).

“Multi-gigabit wireless technology is widely perceived as a means to bring important new wireless applications to both consumer and IT markets,” said Ann Revell-Pechar, chair of the MIT Enterprise Forum of Atlanta Chapter board.

Ecma International members finalized the details of the 60 GHz short-range unlicensed communications standard at international meetings in Montreux, Switzerland, in November 2008. The technology was demonstrated using a GEDC-designed CMOS chip.

The GEDC-developed chip is the first 60GHz embedded chip for multimedia multi-gigabit wireless use. The chip unites 60GHz CMOS digital radio capability and multi-gigabit signal processing in an ultra-compact package.

“This new technology represents the highest level of integration for 60GHz wireless single-chip solutions,” Laskar said. “It offers the lowest energy per bit transmitted wirelessly at multi-gigabit data rates reported

to date.”

Since its inception in 1961, Ecma International has developed standards for information and communication technology and consumer electronics. Ecma submits its work for approval as ISO, ISO/IEC and ETSI standards. Ecma practices “fast tracking” of specifications through the standardization process in global standards bodies such as the ISO.

Provided by Georgia Institute of Technology