

IBM, Ericsson Unveil 28GHz 5G Antenna



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IBM Research and Ericsson said they have created a compact, silicon-based millimeter wave (mmWave) phased array antenna operating at 28 GHz.

The antenna, described by [IBM Corp.](#) (NYSE: IBM) and [Ericsson AB](#) (Nasdaq: ERIC) as a research breakthrough, is an encouraging sign for the commercialization of 5G wireless networking in the spectrum favored by [AT&T Inc.](#) (NYSE: T) and [Verizon Communications Inc.](#) (NYSE: VZ).

"Compact" is a relative term. The size of a phased-array antenna system is dependent on operational frequency. A phased array at the much lower frequencies used in 2G, 3G and 4G wireless systems are at least a few feet across, [explained](#) Bodhisatwa (Bodhi) Sadhu, a communication circuits and systems scientist at IBM Research who helped lead the design of the new 28 GHz antenna.

At 28 GHz, however, an array can be much smaller. The one devised by IBM and Ericsson measures roughly 2.8 inches a side. Given the physics, however, it is unlikely it can be made much smaller in silicon.

At that size, it is unlikely to be appropriate for handsets. Instead, the two companies say, it will be used in base stations, vehicles and gateway systems. Gateways might come into play, Sadhu said, should gigabit-level 5G wireless end up being used for last-mile broadband connectivity.

The module consists of four monolithic integrated circuits and 64 dual-polarized antennas, IBM reports. The array was built using silicon germanium (SiGe) and a BiCMOS process. Using a silicon-based process, IBM said, means the antenna can be made at a relatively low cost.

That the antenna is a phased array will also minimize the power consumption of the wireless systems built around it.

The value of using a phased array antenna is that the signal beam can be dynamically directed or focused in a specific direction toward the receiving antenna. The IBM and Ericsson team's phased array design supports beam-steering resolution of less than 1.4 degrees for high precision pointing of the beam towards users.

The beam-steering capability contrasts with most 2G, 3G and 4G antennas, which typically broadcast signals in wide and indiscriminate beams, wasting energy pushing signals in directions they don't need to go. This is energy that does not have to be expended if the antenna is a phased array.

The [paper](#) on the array that IBM and Ericsson presented at the ISSCC conference says they have also devised a new switch for the chip that increases output power.

IBM and Ericsson have been collaborating on antenna designs since at least 2014.

— Brian Santo, Senior Editor, Components, T&M, [Light Reading](#)

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