

SCIENTIFIC MEDIA RELEASE

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A*STAR's IME DEVELOPS SMALLEST ANTENNA THAT CAN INCREASE WIFI SPEED BY 200 TIMES

Singapore, 28 Aug 2012 — Researchers from A*STAR's Institute of Microelectronics (IME) have developed the first compact high performance silicon-based cavity-backed slot (CBS) antenna that operates at 135 GHz. The antenna demonstrated 30 times stronger signal transmission over on-chip antennas at 135 GHz. At just 1.6mm x 1.2mm, approximately the size of a sesame seed, it is the smallest silicon-based CBS antenna reported to date for ready integration with active circuits. IME's innovation will help realise a wireless communication system with very small form factor and almost two-thirds cheaper than a conventional CBS antenna. The antenna, in combination with other millimetre-wave building blocks, can support wireless speed of 20 Gbps – more than 200 times faster than present day Wi-Fi¹, to allow ultra fast point-to-point access to rich media content, relevant to online learning and entertainment.

On the research breakthrough, Dr Hu Sanming, a key researcher from IME leading the antenna project, said, "The novel use of polymer filling enables >70% antenna size shrinkage and a record high gain of 5.68 dBi at 135 GHz. By filling the antenna cavity with polymer instead of air, we can achieve a flat surface for subsequent processing by standard technology that is amenable to mass production."

"The team has also designed a three-dimensional (3D) architecture to integrate the antenna with active circuits to form a fully integrated wireless millimetre-wave system-in-package solution with high performance, reduced footprint and low electromagnetic interference,"

¹ Wi-Fi technology for wireless communication based on newest IEEE standard 802.11 n that can support data rates of more than 100 Mbps.

commented Dr Je Minkyu, Principal Investigator of the Integrated Circuits and Systems Laboratory at IME.

Professor Dim-Lee Kwong, Executive Director of IME, said, “IME’s silicon-based 135 GHz integrative antenna technology and the proposed 3D architecture have immense commercial potential as it combines form with function that can be realised with standard mass production infrastructure. These salient features make our technology extremely attractive to product developers who are looking to capture emerging markets in millimetre-wave applications.”

About the Institute of Microelectronics (IME)

The Institute of Microelectronics (IME) is a research institute of the Science and Engineering Research Council of the Agency for Science, Technology and Research (A*STAR). Positioned to bridge the R&D between academia and industry, IME's mission is to add value to Singapore's semiconductor industry by developing strategic competencies, innovative technologies and intellectual property; enabling enterprises to be technologically competitive; and cultivating a technology talent pool to inject new knowledge to the industry. Its key research areas are in integrated circuits design, advanced packaging, bioelectronics and medical devices, MEMS, nanoelectronics, and photonics. For more information, visit IME on the Internet: <http://www.ime.a-star.edu.sg>.

About the Agency for Science, Technology and Research (A*STAR)

The Agency for Science, Technology and Research (A*STAR) is the lead agency for fostering world-class scientific research and talent for a vibrant knowledge-based and innovation-driven Singapore. A*STAR oversees 14 biomedical sciences, and physical sciences and engineering research institutes, and seven consortia & centre, which are located in Biopolis and Fusionopolis, as well as their immediate vicinity. A*STAR supports Singapore's key economic clusters by providing intellectual, human and industrial capital to its partners in industry. It also supports extramural research in the universities, hospitals, research centres, and with other local and international partners.

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