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Breakthrough NTU technology heralds new era in communications devices
- Communications devices, such as mobile phones, to shrink with NTU technology

A team from Nanyang Technological University (NTU) has developed the technology for the world’s smallest and thinnest integrated circuit antenna. This will lead to smaller communications devices using radio frequency transmission, such as mobile phones.

In the late 1990s, a revolution in the mobile phone market occurred when Nokia became the first mobile phone manufacturer worldwide to incorporate mobile phone antennas in phone casings, doing away with protruding external antennas. Indeed the use of internal antennas marked an important milestone in the development of mobile phones worldwide.

However, whether internal or external, antennas still take up about 15% of mobile phone sizes, depending on the model. To meet the continual demand for yet smaller phones and phones packed with more features, a breakthrough technology is needed.

Researchers from NTU’s School of Electrical and Electronic Engineering (EEE) have just such a technology.

The EEE team has developed a technology that integrates the functions of an antenna with the mobile phone’s integrated circuit (IC) package or “brain”. The result is an IC antenna, which is small and thin, like the chip on a subscriber identity module (SIM) card. Such an antenna is also the smallest the world has ever seen. When used in mobile phones, it will free up considerable space in
mobile phones so that they could become smaller or pack in even more features using now available space.

Led by EEE’s Assoc Professor Zhang Yue Ping, the 11-member research team of two professors, five postgraduate and four undergraduate students took five years to develop the technology. The ambitious project was highly multidisciplinary in nature, requiring the team to marry antenna technology with IC package technology and to use materials technology to put the IC antenna together.

The results have caused a stir. Major US and European electronic companies have expressed interest in the technology, for which both local and US patents have been filed.

Says Assoc Prof Zhang, “We are excited to have scored a world’s first in such a highly competitive area, and look forward to commercialising our technology and seeing our research applied in wireless communications devices worldwide. This would be yet another example of how research at NTU meets real world needs.”

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About Nanyang Technological University

Nanyang Technological University (NTU) is an established international institution in tertiary education.

Our university has a distinguished lineage with roots that go back to 1955. We began as Nanyang University, a private university set up with donations from people of all walks of life, from Singapore and the region. The university grounds, Yunnan Garden Campus, was donated by the Hokkien Clan Association as part of this campaign.

We were reborn as Nanyang Technological Institute, established on the same campus in 1981 with government funding to educate practice-oriented engineers for the burgeoning Singapore economy. In 1991 we became Nanyang Technological University with the absorption of the National Institute of Education.

Today, we are a research-intensive university ranked among the top 50 universities in the world. We have a strong engineering college ranked among the best globally, a business school with one of the top 100 MBA programmes in the world, an internationally acclaimed National Institute of Education, one of the best communication and information schools in Asia, and a biological sciences school at the forefront of Singapore’s life sciences initiative.
Undergraduate enrolment will swell from 17,500 to 23,500 with the establishment of three new schools – the School of Humanities and Social Sciences, School of Art, Design and Media, and School of Physical and Mathematical Sciences.

A traditional strength of the university is the high employment rate and high remuneration received by its graduates. The university is now in the process of realising its New Undergraduate Experience initiative with a comprehensive curriculum, wide choices of options for students, vibrant campus life and international experience. Strong international relationships and collaboration programmes is a hallmark of the university. This includes the Singapore-MIT Alliance, Singapore-Stanford Partnership, Cornell-Nanyang Institute of Hospitality Management, Singapore – University of Washington Alliance in Bioengineering, Global Immersion Programme with Peking University, Tsinghua University, Shanghai Jiaotong University, University of Washington and Georgia Institute of Technology, among many other programmes in US, China, India, Japan and Europe.

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