First antenna-in-package solution for single-chip 60 GHz radio

October 21 2008

With the rising demand for low-cost, small-size, high-speed, highly functional and high volume wireless communications, the development of highly-integrated 60 GHz radio chipsets in semiconductor technology have received much attention in recent years. The current circuit board solutions are not able to meet the rising demand, especially for unlicensed 57 – 64 GHz frequency band, while the conventional antenna designs have been too large, expensive and difficult to integrate with 60-GHz radio chipsets.

The revolutionary Antenna-in-ackage (AiP) solution in LTCC technology for single-chip 60-GHz radio combines antennas with a highly integrated 60 GHz radio into a compact standard surface mounted device. This solution is made possible based on NTU's expertise in 60 GHz radio electronics, antenna design and characterisation, and SIMTech's strength in package design and fabrication.

This solution is set to pave the way for the research and development of new system architectures and wireless communication products in Singapore. Emerging applications using highly-integrated 60 GHz radios include home video streaming, high speed wireless LAN, sychronisation of mobile phones with desktops/laptops, and instantaneous file transfer using wireless USB.

The team behind this project, comprising Assoc Prof Zhang Yue Ping, Dr Sun Mei of NTU, and Mr Chua Kai Meng, and Ms Wai Lai Lai of

SIMTech, a research institute of the Agency for Science, Technology and Research (A*STAR), was awarded the Best Paper Prize at the Institute of Electrical and Electronic Engineers International Workshop on Antenna Technology 2007 held in Cambridge University, United Kingdom.

"The ability to overcome the challenges of packaging of 60GHz radios and yet simultaneously meet the multiple and conflicting needs of the miniaturisation and high performance in telecommunication applications is an engineering achievement. This affirms the capabilities of local research institutes such as SIMTech to develop relevant technology for emerging and demanding requirements for cutting edge product development," said Dr Lim Ser Yong, Executive Director of SIMTech.

"The IEEE is working toward standardization of applications in the 60-GHz band through the IEEE 802.15.3c working group. The 60 GHz band, allocated for unlicensed use worldwide, is going to provide universal solutions and opportunities. We are very happy that our team, being at the forefront of research development, has successfully demonstrated the world's first antenna-in-package solution which can be customised for all 60 GHz chipsets. We look forward to collaborating with interested industry partners to commercialise this invention," says Assoc Prof Zhang, principal investigator from NTU.

Source: Nanyang Technological University