

**[Invited Talk]****Evolution of mobile broadband and smart-phones  
~LTE-A technologies and new antenna era~**

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**Abstract**

The mobile phones to which high-speed data transmission became possible over the 3rd generation mobile communication network are rapidly shifted to smart-phones with the advent of Android OS and iOS over the world. This worldwide trend brings major impacts on mobile communication operators, especially massive traffic expansion, and accommodating huge traffic becomes most important issue.

In order to handle the traffic expansion and realize further broadband services, the Long Term Evolution (LTE) has been standardized by the 3rd generation partnership project (3GPP). In Japan, NTT DOCOMO launched a commercial LTE service in December 2010 under the new service brand of “Xi” (crossy), and its service is continuously expanding. LTE allows significant improvement of the spectrum use efficiency and user data throughput. The LTE downlink peak throughput has been improved up to 300 Mbps compared to 14 Mbps of 3G (W-CDMA/HSDPA). Moreover, toward further enhancement of LTE, the standardization of LTE-Advanced (LTE-A) is now progressing in 3GPP. Here, further improvement of spectrum use efficiency and user data throughput e.g. the maximum of 1 Gbps at downlink can be achieved in LTE-A.

In this talk, the evolution of mobile broadband and smart-phones is introduced. Furthermore outline of the LTE-A with touching the latest experimental results of the LTE-A prototype in NTT DOCOMO is presented. Requirements and directions of antenna and propagation research contributing to the LTE-A technologies and systems are also discussed.

**About the speaker**

He is Managing Director of Radio Access Network Development Department, NTT DOCOMO.

He received his B.S., M.S. and Ph.D. degrees in Electronics Engineering from Hokkaido University, Hokkaido, Japan in 1985, 1987, and 2007, respectively. He joined the Nippon Telegraph and Telephone Corporation (NTT) Laboratories in 1987, and in 1992 he was transferred to NTT Mobile Communications Network, Inc. (now NTT DOCOMO, INC.).

He has broad experiences on research and development of mobile communication systems especially for the radio access networks for almost 25 years in NTT and NTT DOCOMO. He actually has been engaged in research on the radio link control for Personal Digital Cellular (PDC), IMT-2000 and 4th generation mobile communication systems (beyond 3G).

He was a co-recipient of the Japan Institute of Invention and Innovation (JIII) Imperial Invention Prize in 1998 and the Best Paper Award of the International Conference on Telecommunications (ICT2002). He is a member of IEICE and IEEE.