FOREWORD

Special Section on Radio Access Techniques for 3G Evolution

Continuous growth in the 3rd generation (3G) cellular systems is vital to fulfilling the increasing demands of customers and achieving prosperity in the telecommunications industry. In the 3GPP (3rd Generation Partnership Project), the work item (WI) specifications were completed on the long-term evolution of the UMTS (Universal Mobile Telecommunications System) called the Evolved UTRA (UMTS Terrestrial Radio Access) and UTRAN (UMTS Terrestrial Radio Access Network). Currently, High-Speed Packet Access (HSPA) is continuously being enhanced to add new technical features. The 3GPP2 (3rd Generation Partnership Project Two) specified UMB (Ultra Mobile Broadband) and the specifications are undergoing enhancement. Moreover, the IEEE (The Institute of Electrical and Electronics Engineers, Inc.) established the IEEE 802.16e standard called Mobile WiMAX (Worldwide Interoperability for Microwave Access), which has similar requirements as those for the 3GPP evolution, and the WiMAX forum is continuing its enhancements.

The 3G evolution systems will achieve packet-based radio access networks with low latency and high affinity to IP-based core networks, in order to provide rich high-rate services at low cost. They focus on high-speed data services such as mobile Internet and multimedia broadcast multicast services (MBMS). Moreover, higher-level requirements than existing cellular systems are specified in the systems such as the peak data rate, spectral efficiency, and area coverage. To achieve such high system requirements and service availability, many key radio access techniques will be introduced and incorporated, which will be competitive even in the future 4G era.

The purpose of this special section is to present timely state-of-the-art research on radio access techniques up to Layer 3 for the 3G evolution systems. In response to our call-for-papers, we received 80 papers. After careful and fair reviews, the editorial committee selected 38 papers and 5 letters. The selected papers and letters cover radio interfaces with respect to physical channels and transport channels, multiple access schemes including orthogonal frequency division multiple access (OFDMA) and single-carrier FDMA, cell search for scalable multi-band transmission, link adaptation including power control and adaptive modulation and coding, radio transmission technologies including modulation and orthogonal transmission, channel estimation and frequency domain equalization, channel coding/decoding including interleaving schemes, hybrid ARQ, transmit diversity, MIMO channel transmissions including precoding, rank adaptation, signal detection, multi-user MIMO, MBMS, inter-cell interference coordination including inter-cell radio resource assignment, experiments, and relay techniques including cooperative transmission. Two invited papers are also solicited to provide an informative overview on 3G radio access evolution and frequency domain equalization, which is an essential technique in single-carrier FDMA radio access.

On behalf of the editorial committee, I would like to express our sincere appreciation to all the authors for their excellent papers submitted to the special section. I would also like to extend our sincere thanks to the great efforts of the paper reviewers and the Editorial Committee members.

Mamoru Sawahashi, Guest Editor-in-Chief