Editor's note

With the gradual success of the 3rd generation (3G) mobile communication technology, the R&D of the 4th generation (4G) mobile communication has been initiated worldwide. The 4G mobile communication system was formally nominated as IMT Advanced by the International Telecommunication Union (ITU), and the spectrum allocation for the 4G was specified by the World Radio Congress in 2007. According to the plan of ITU, the 4G standardization will be finished in 2011, and the 4G mobile communication system will be accordingly in commercial use step by step thereafter.

The orthogonal frequency division multiplex (OFDM) combined with the multiple-input multiple-output (MIMO) technique and some of its variations would be undoubtedly adopted by the 4G radio network. However, there are a number of important challenges that arise in the design of 4G wireless networks. To reach the technique target of the 4G system, some improvements should be made on not only the OFDM and MIMO themselves, but also multiple user or multiple cell level, e.g., multiple user/cell interference suppression and coordination, multiple user diversity and radio resource scheduling, and cross layer design and link adaptation. Furthermore, the room for system performance enhancement would be in the area of radio network, with some new techniques probably to be introduced. The relay or distributed antenna techniques can be used to greatly improve the cell edge performance. The spectrum cognition should be introduced in order to improve the spectrum utility, etc.

This special issue contains 23 carefully selected papers, which covers the techniques related to MIMO, OFDM and its variations, channel coding/decoding, cognitive radio transmission, interference suppression, radio access protocols, and radio channel measurement. This special issue reflects to an extent the state-of-the-art research progresses in the area of 4G wireless transmission and radio networking in China. It is my sincere hope that this special issue can contribute to the future development of 4G technology.

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