

## **Multi-criteria handover decision for heterogeneous networks: carrier aggregation deployment scenario**

### **ABSTRACT**

Carrier aggregation and integration of heterogeneous networks allow the mobile user equipment to benefit from wider bandwidth and radio coverage of different access technologies. However, these technologies have increased handoff scenario probability through user equipment's mobility, leading to high outage probability and low throughput. Handover is an important aspect of mobility management which allows users to migrate from one cell to another without losing connections. But no lone access technology meets the requirements of providing seamless communication without loss and delay. Therefore, high-quality service continuity and reliable user equipment access to network anywhere and at any time require the design of an appropriate handover decision algorithm. In this paper, a multi-criteria based handover decision-making algorithm is proposed to evade loss of communication and provide better performance to the system. It adaptively makes handover decisions based on different decision criteria (load, availability of resources, and the handover scenario type) in addition to signal interference to noise ratio. The multicriteria handover decision making algorithm-based method chooses among the cells that satisfy the requirements for the handover. As compared to some existing handover decision algorithms, simulation result shows that this algorithm improves system performance in terms of handover failure by 93%, 72%, and 58%; radio link failure reduction by 77%, 43%, and 22%; and handover ping-pong by 81%, 59%, and 36% over the conventional received signal strength, received wireless transmission line, and multiinfluence factor hand over decisions respectively.

**Keyword:** Carrier aggregation; Handover decision; User equipment; Heterogeneous network; Long time evolutionadvanced; Multi-criteria; Signal-to-interference-plus-noise-ratio