ABSTRACT

This report investigates the baseband processing system of WCDMA base station (BS), aiming at the ASIC chip (chipset) design of the baseband process of WCDMA base station. Following is the content included.

1. Three main standards for third generation (3G) mobile communication WCDMA, cdma2000, and TD-SCDMA are introduced, and their technical features are compared.

2. The performance test conditions for WCDMA base station baseband processing and the performance requirements of baseband processing for WCDMA base station such as demodulation performance and acquisition performance are introduced.

3. The hardware and software partition of the baseband processing system for WCDMA base station is researched.

4. The key algorithms on WCDMA base station baseband processing are researched thoroughly. The algorithm structures and algorithm performances of multi-path search, channel estimation, multi-path tracking, automatic frequency correction, and fast power control are investigated in detail. The encode/decode technica for WCDMA and their implementation are discussed. Inter-path interference cancellation technic is also discussed.

5. The experimental system design is researched. The structure of experimental system and its working principle, the main technical
guideline and technical requirements, the partition between module in
system and the interface relationship, and the higher layer software flow
of the system are discussed.

**Key Words:** WCDMA, base station, baseband processing, multi-path
search, channel estimation, multi-path tracking, automatic
frequency correction, fast power control, Viterbi decode,
Turbo encode/decode