A traditional communication system aims at the specific standard so that its application scope is extremely limited. The rapid development of the third generation of mobile communication has formed a situation where various communication standards coexist in the same world. Three major standards have appeared: WCDMA in Europe, CDMA2000 in North America and TD-SCDMA in China. They are independent of each other causing challenges to their intercommunication.

The existence of diverse communication system standards in the same world makes software defined radio necessary. A software defined radio system is a general hardware platform in a position to be reconfigurable or updated for new communication system standards and applications. Therefore, it brings good flexibility and generality to communication systems. The software defined radio is a feasible scheme to realize compatibility of distinct systems, thus making international roaming possible between different communication system standards. It has potential to reduce the Research&Development costs of future communication systems.

This thesis describes the leading technologies used in a software defined radio system and the necessity of these technologies. In the end, one general hardware platform, which can deal with two kinds of communication system signals, is simulated.

Keywords: Software Defined Radio, digital communication system, SystemC, WCDMA, TD-SCDMA.