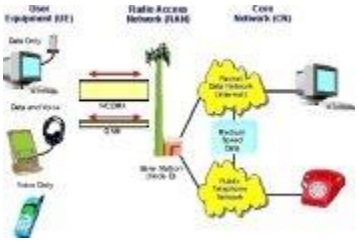
W-CDMA (Wideband Code Division Multiple Access)

WCDMA (Wideband Code Division Multiple Access) is the radio access scheme used for third generation cellular systems that are being rolled out in various parts of the globe. The 3G systems support wide band services like high speed Internet access and video and high quality image transmission with the same quality as the fixed networks. In WCDMA systems, the CDMA airinterface is combined with GSM based networks. The WCDMA standard evolved through the Third Generation Partnership Project (3GPP), which aims to ensure interoperability between different 3G networks.



The standard that has emerged through this partnership project is based on ETSI's Universal Mobile Telecommunication System (UMTS) and is commonly known as UMTS Terrestrial Radio Access (UTRA). The access scheme for UTRA is Direct SequenceCode Division Multiple Access (DS-CDMA). The information is spread over a band of approximately 5 MHz. This wide bandwidth has given rise to the name Wideband CDMA or WCDMA.

In WCDMA, there are two different modes of operation possible:

- **TDD**: In this duplex method, uplink and downlink transmissions are carried over the same frequency band by using synchronized time intervals. Thus, time slots in a physical channel are divided into transmission and reception.
- **FDD**: The uplink and downlink transmissions employ two separate frequency bands for this duplex method. A pair of frequency bands with specified separation is assigned for a connection. Since different regions have different frequency allocation schemes, the capability to operate in either FDD or TDD mode allows for efficient utilization of the available spectrum.

Key Features of WCDMA

The key operational features of the WCDMA radio interface are listed below:

1. Supports high data rate transmission: 384 Kbps with wide area coverage, 2 Mbps with local coverage.

2. High service flexibility: supports multiple parallel variable rate services on each connection.
3. Both Frequency Division Duplex (FDD) and Time Division Duplex (TDD).
4. Built in support for future capacity and coverage enhancing technologies like adaptive antennas, advanced receiver structures, and transmitter diversity.
5. Supports inter frequency hand over and hand over to other systems, including hand over to GSM.
6. Efficient packet access.
7.

WCDMA Technical Specifications

Multiple Access Scheme	DS-CDMA
Duplex Scheme	FDD/TDD
Packet Access Dual mode	(Combined and dedicated channel)
Multirate/Variable rate scheme	Variable spreading factor and multi-code
Chip Rate	3.84 Mcps
Carrier Spacing	4.4-5.2 MHz (200 kHz carrier raster)
Frame Length	4.4-5.2 MHz (200 kHz carrier raster)
Inter Base Station synchronization	FDD: No synchronization neededTDD: Synchronization required

The chip rate may be extended to two or three times the standard 3.84 Mcps to accommodate data rates higher than 2 Mbps. The 200 kHz carrier raster has been chosen to facilitate coexistence and interoperability with GSM.

Source: http://www.tech-faq.com/wcdma.html