



CDMA – An Access Method that Makes a Difference

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Executive Summary

This white paper describes the basics of CDMA (Code Division Multiple Access) technology. It is a newer technology for providing wireless mobile communications.

The white paper discusses different frequencies used by this technology and compares this technology with GSM technology in detail.

Introduction

The world is increasingly adapting faster and advanced ways of communication for better quality and CDMA is one of these technologies in wireless world. CDMA stands for Code Division Multiple Access. It is an access method that operates on Spread Spectrum Technique and differentiates various communicators on the basis of codes.

Spread Spectrum technique is a method that transmits a signal by spreading its bandwidth over broad range of frequencies. The bandwidth for the signal is greater than the frequency of the original content to be transmitted. The whole spectrum is divided on the basis of access method.

There have been different access methods used in various technologies like FDMA (Frequency Division Multiple Access) used in AMPS (Advanced Mobile Phone System) and TDMA (Time Division Multiple Access) used in GSM (Global System for Mobile Communications). While nowadays, CDMA is preferably used for wireless communication.

FDMA divides the spectrum on the basis of different frequencies and TDMA divides on the basis of time slots. On the other hand, CDMA utilizes the entire spectrum and different communicators are identified on the basis of distinct code segments. Following figure depicts a basic idea of each method:

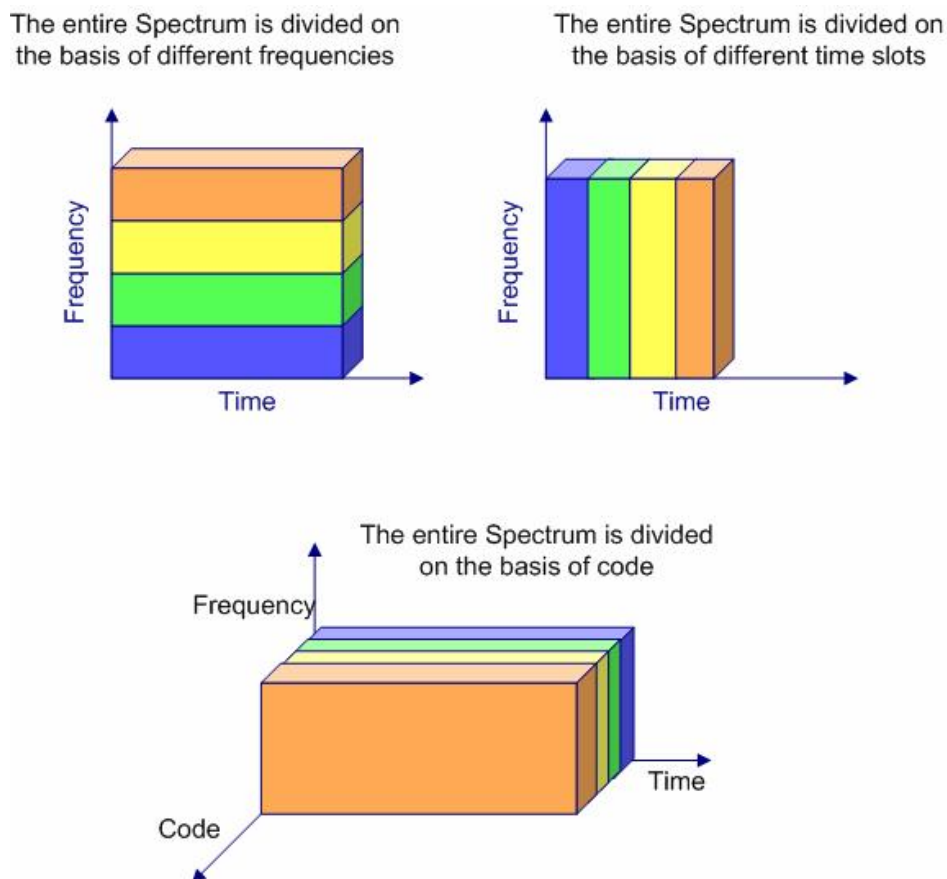


Figure 01: Comparison of FDMA, TDMA and CDMA

CDMA is also known as IS-95 and is developed by Qualcomm. It competes with GSM technology in cellular communications. There are different types of CDMA but the first one is known as cdmaOne. In 1993, Telecommunications Industry Association (TIA) selected CDMA for wireless communications and till now there are 60 million worldwide subscribers for cdmaOne. Manufacturers from almost all parts of the world are coming to CDMA technology for wireless communication.

CDMA is an access technique in which each base station can transmit information simultaneously and at the same frequency. CDMA requires unique identifying code that is embedded in the communications signal. It uses multiple access schemes introduced by Qualcomm and employs spread-spectrum data distribution.

Another type of CDMA is wideband CDMA that uses spread-spectrum technology and special coding scheme. WCDMA, 1X and HDR (High Data Rate) are also known as CDMA third generation applications.

Spread Spectrum

Spread Spectrum is a technique implemented or used for wireless communications. There are three different types of Spread Spectrum technology "Frequency Hopping", "Time Hopping" and "Direct Sequence". Unlike conventional wireless communications, Spread Spectrum uses varying frequencies to minimize interference and achieve higher bandwidth.

CDMA implements Direct Sequence Spread Spectrum (DSSS) and supports 64 Kbps digital signals like ISDN channels, voice and modem data. As it is obvious from its name, CDMA depends on code division and allows multiple accesses simultaneously to communicate. It is called Spread Spectrum because in DSSS transmitted signal obtains more bandwidth than the information signal.

CDMA vs GSM

CDMA is an ideal, third generation technology for wireless access with heavy multimedia messaging support. CDMA is widely used in Asia and South Korea. It targets only 14% from the world wide market. CDMA uses Spread Spectrum technique that makes it distinctive from GSM.

CDMA has many advantages over other wireless technologies but most common of all are:

- Higher capacity to transmit data
- Resistance from interference

GSM is an older technology than CDMA but is not, by any means, substandard or worse than CDMA. It is preferably used in Europe and targets 73% market in the world. GSM had two main advantages over CDMA:

- It provides efficient fraud management
- It gives roaming readiness

CDMA phones are lot cheaper than GSM cellular phones. Following is the list of differences between CDMA and GSM:

1. CDMA operates in 450 MHz frequency band while GSM Most GSM networks operate in the 900 MHz or 1800 MHz bands. Some countries in the Americas (including the USA and Canada) use the 850 MHz and 1900 MHz bands.

2. CDMA uses code division multiplexing (CDM) while GSM uses TDM (Time Division Multiplexing).
3. CDMA sets uses R-UIM (Re-Usable Identification Module) cards while GSM sets uses SIM (Subscriber Identify Module) cards.
4. For CDMA subscribers, roaming is an issue but GSM subscribers feel no difficulty in roaming around the world.

Companies that offer WLL (Wireless Local Loop) services to their subscribers are heading towards CDMA and their charging rates are comparatively less costly than GSM providers.

WLL stands for Wireless Local Loop. It is also known as RITL (Radio in the Loop) and FRA (Fixed Radio Access). The technology of WLL (Wireless Local Loop) deals with providing wireless telephone sets and used as an alternative technology for laying copper cables. Placement of copper cables is cost prohibitive in those areas where population is divided into small segments and is geographical dispersed into vast areas.

Prior to all that, CDMA phones offer limited mobility and cannot provide coverage beyond SDCA (Short Distance Charging Area). These phones almost cover distance having radius of 25 kms. While GSM phones take an edge by providing roaming around the world.

Frequency Ranges

Frequency Spectrum for communication purposes is 3Hz to 300 GHz and it is divided into sub regions such as:

- ∅ ELF (Extreme Low Frequency) 3Hz-30Hz (Sub Audible Range)
- ∅ SLF (Super Low Frequency) 30Hz-300Hz (Low Frequency Voice)
- ∅ ULF (Ultra Low Frequency) 300Hz-3000Hz (Telephonic Voice Range)
- ∅ VLF (Very Low Frequency) 3KHz-30KHz (Audible Range)
- ∅ LF (Low Frequency) 30KHz-300KHz (Ultra Sounds)
- ∅ MF (Medium Frequency) 300KHz-3000KHz (AM Radio long range)
- ∅ HF (High Frequency) 3MHz-30MHz
- ∅ VHF (Very High Frequency) 30MHz-300MHz (FM Transmissions short range)
- ∅ UHF (Ultra High Frequency) 300MHz-2400MHz (Mobile Communications GSM and CDMA)
- ∅ SHF (Super High Frequency) 2.4GHz-30GHz (Wi-Fi and Wi-Max Broadband wireless)
- ∅ EHF (Extremely High Frequency) 30 GHz-300GHz (Point to Point Microwaves)

Summary

CDMA stands for Code Division Multiple Access. It is an access method that operates on Spread Spectrum Technique and differentiates various communicators on the basis of codes.

Spread Spectrum is a technique implemented or used for wireless communications.

CDMA implements Direct Sequence Spread Spectrum (DSSS) and supports 64 Kbps digital signals like ISDN channels, voice and modem data. CDMA is an ideal technology for third generation for wireless access with heavy multimedia messaging support.

CDMA uses Spread Spectrum technique that makes it distinctive from GSM. GSM is an older technology than CDMA but is not, by any means, substandard or worse than CDMA.

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Contact Information

In case of any ambiguity regarding the concept, explained in the whitepaper, please feel free to contact us at support@AdvOSS.com or please, visit http://www.AdvOSS.com/voip_contact.html

For further information please, visit www.AdvOSS.com

We welcome your suggestions

Thank You for reading this whitepaper. We will be pleased to receive your response and suggestions.