A BRIEF DESCRIPTION OF A WIRELESS SYSTEM

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INTRODUCTION

A Wireless System can be defined as a system that without using wires to connect one point to the other allows the communication of information between these two points by means of an Electromagnetic Field propagating in the free space. Many wireless systems have been developed using different transmission medium. There are many reasons for which modern wireless systems use radio frequency, microwave or signals in the order of giga or peta hertz to carry messages from one point to other. We offer a glimpse of a simple wireless systems that can be useful to beginners students in the field.

CATEGORIZATION OF A WIRELESS SYSTEM

There are several ways to categorize wireless systems. One is taking into account the nature and placement of the users of the system. If the system is just an arrangement of a single transmitter and one receiver, with high gain antennas that maximize the gain by a fixed position the system is categorized as a point to point. A variation of this system is a single trasmitter with several receivers. This is then a point to multipoint system. A system which connect several transmitters to several receivers is called a multipoints to multipoints system. A cellular telephone system is a good example of a multipoint to multipoint system. Another way to categorize wireless systems is in terms of the direction in which the signal travels. Figure 1 shows a simplex communication system.

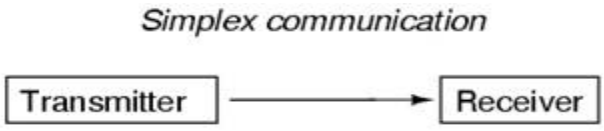

Figure 1: A simplex communication diagram

Television as well as radio, are examples of simplex transmissions. Another type of transmissions with directivity is half duplex. In half duplex thte comunnication can occur in just one of the directions but not in both simultaneously. Full duplex communications allows transmission and reception simultaneously. Figure 2 shows a half and a full-duplex communication systems.

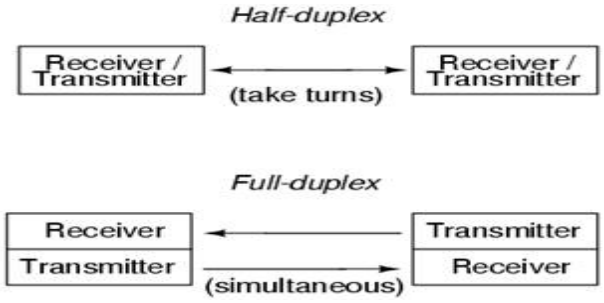

Figure 2: Half and full duplex communications

Cellular telephone systems are full duplex communications with a duplexing technique that avoid interference from other users. This technique can be frequency division multiplexing in which different frequencies are used, time division multiplexing that allows users to transmit and receive in the same channel but in certain predefined time intervals or with a specific code as in Code Division Multiple Access, (CDMA).

Figure 3 is an example of a frequency division multiplexing system.

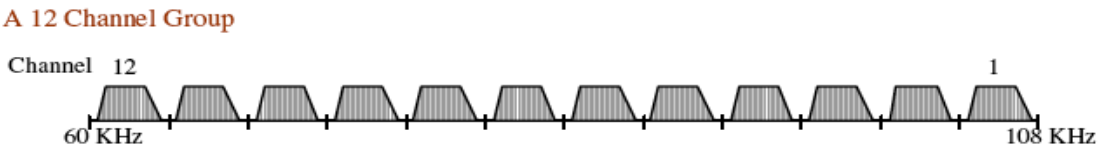

Figure 3: A 12 channel group of frequency multiplexing system

In CDMA data is sent in small pieces over a number of frequencies. Figure 4 represents how data is distributed over these frequencies.

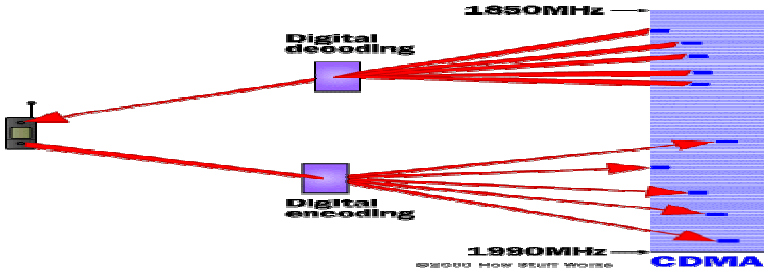

Figure 4: CDMA phone's data with unique code

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