Seminar

Name of the Faculty: M.Suneel   AY: 2022-23

Course: Wireless Communication

Course Code: C421   **Class: IV B.Tech. – II Sem.**   **Sec.: A&B**

Topic: **What is CDMA and explain about CDMA in detail.**

CDMA, which stands for Code Division Multiple Access, is a method of allowing multiple users to share the same frequency band simultaneously in a communication system. It achieves this by assigning each user a unique code, which is used to spread the user's signal over the entire frequency band.

CDMA is a channelization protocol for Multiple Access, where information can be sent simultaneously through several transmitters over a single communication channel. It is achieved in below steps:
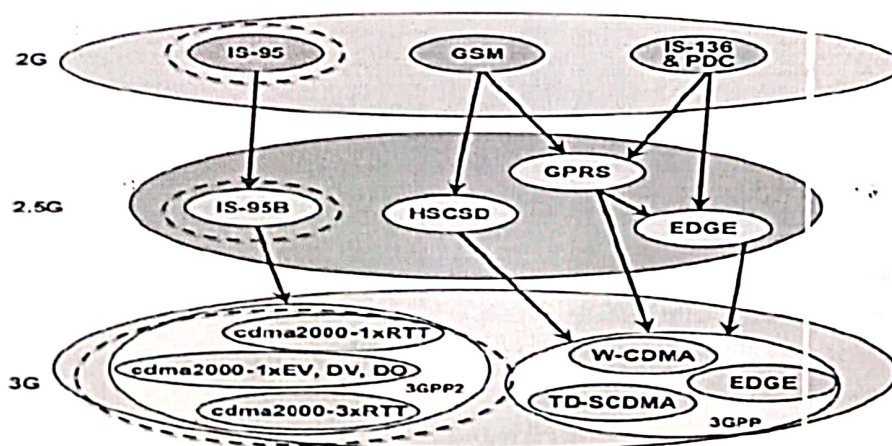
A signal is generated which extends over a wide bandwidth.

The code which performs this action is called spreading code.

Later on, a specific signal can be selected with a given code even in the presence of many other signals.
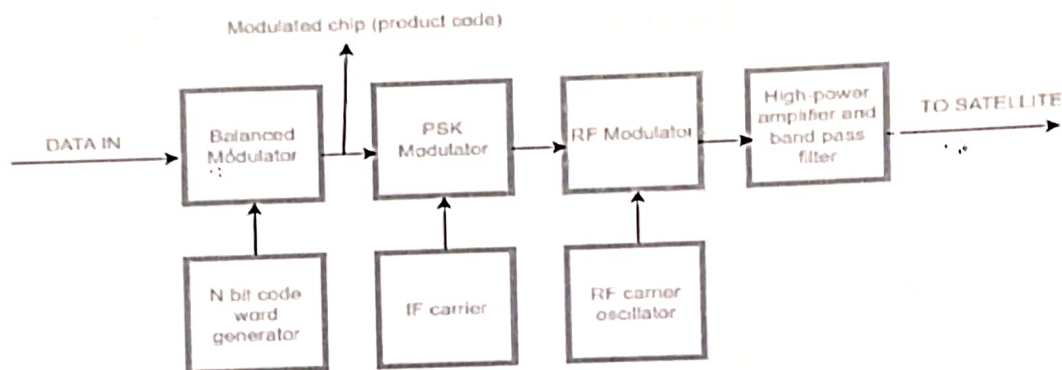
It is mainly used in mobile networks like 2G and 3G.
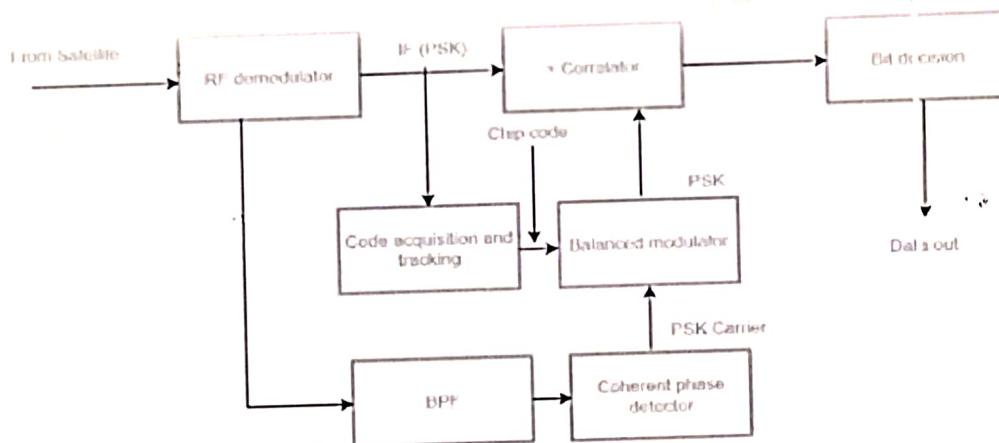
Evolution - 2G to 3G

Encoder for CDMA

The input provided to the CDMA encoder can be in the form of Pulse code modulation (PCM) encoded voice band signal or can be a digital signal from computer.It is multiplied with N bit, which is an unique chip code.The output of balanced modulator is the product code.In IF carrier it is used as an PSK modulation.The balanced modulator is sometimes referred to as multiplier.Further the modulated signal is then converted to RF band and is used for transmission purpose.The high power amplifier basically raises the level of power to a very high level and then the antennas transmit this signal.The encoder is also called as multiplexer

Modulated chip (product code)

DATA IN → Balanced Modulator → PSK Modulator → RF Modulator → High-power amplifier and band pass filter → TO SATELLITE

N bit code word generator

IF carrier

RF carrier oscillator

Decoder for CDMA

From Satellite → RF demodulator → IF (PSK) → Correlator → Bit decision

Chip code

PSK

Code acquisition and tracking → Balanced modulator

Data out

PSK Carrier

BPF → Coherent phase detector

CDMA decoder

The decoder helps in reconverting the RF signal to IF.A coherent PSK carrier is been obtained from IF.The chip code is been used by the receiver and it helps in synchronizing the receiver station's code generator.The recovered chip is then multiplied with recovered PSK carrier to generate PSK modulated signal which contains PSK carrier and the chip code.The IF signal which is received, contains chip code, PSK carrier and data. In correlator it is compared with

the received IF signal.The correlator helps in comparing this two signals and helps in recovering the original data.The decoder is also called as demultiplexer.

Advantages

Increased user capacity is an advantage of the CDMA as it supports a lot more users in comparison to TDMA or FDMA.

CDMA is more secure as the information transmitted is below the noise floor making the intrusion of the spectrum difficult.
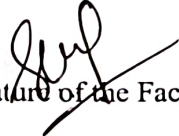
CDMA systems have comparatively fewer dropouts than GSM. Thus, it can also be used in rural areas.

The cost of the calls in CDMA is lower in comparison to the cost in GSM.

CDMA provides a high quality of voice with almost no noise during the calls.

Using CDMA problems like multipath and fading do not occur.

CDMA has a very low power requirement.

Signature of the Faculty