STUDY OF COMPARISION BETWEEN WCDMA AND OFDM

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INTRODUCTION

W-CDMA or Wideband Code Division Multiple Access uses direct sequence code division multiple access for the transmission to provide high speed and provide more space of the subscriber in which the information bits are spread over a wide bandwidth by multiplying with spreading codes while Orthogonal frequency division multiplexing or OFDM uses multi carrier transmission of signals for high data rate transmission on MFSK(Minimum phase shift keying).Thus the comparative analysis is done, for achieving high spectral efficiency in communication system, between WCDMA,OFDM along with various access schemes.As MIMO multiple antenna system increases the capacity and quality without any additional bandwidth and power,multimode stacked circular microstrip antenna can be used in form of array.Thus using Adaptive modulation technique,data transmission rate can be seed up for the MIMO aspects.

PROCESS

In WCDMA interface different users can simultaneously transmit at different data rates and data rates can even vary in time. WCDMA increases data transmission rates in GSM systems by using the CDMA air interface instead of TDMA. WCDMA is based on CDMA and is the technology used in UMTS. WCDMA is the dominating 3G technology, providing higher capacity for voice and data and higher data rates. Orthogonal Frequency Division Multiplexing (OFDM) technique increases the amount of information that can be carried over a wireless network works by splitting the radio signal into multiple smaller sub-signals that are then transmitted simultaneously at different frequencies to the receiver. OFDM uses the technique of splitting smaller sub-carriers of frequencies to deal with this multi-path problem. This reduces multi-path distortion and reduces RF interference which allows greater result Multi-path distortion and Radio Frequency interferences is minimized through this way.As WCDMA support both FDD and TDD modes, FDD requires guard bands and more complex hardware, while TDD adds overhead and cannot easily provide traffic-based adaptability. OFDM has been designed to improve the capacity of CDMA systems and satisfies the wireless access method for 4G systems. OFDM is believed to perform a

better way in the case of frequency selective fading or narrowband interference. Moving the antenna indoors, as in TD-SCDMA, results in a lower cell radius and lower data rates. Keeping the antenna outside, as in OFDM, increases the coverage area, but at larger installation and maintenance costs.Also OFDM can combat multipath interference with greater robustness and less complexity.it can achieve higher spectral efficiency with MIMO than CDMA using rake receiver. Since in regular MIMO system ,the channel capacity & transmission quality are dependent on the distance between antenna array elements ,the number of antenna elements and array geomatory. The distance between antenna elements cannot be extended more than a certain limit ,so to achieve compactness in MIMO system use of transmission pattern diversity , multimode diversity and polarization diversity techniques. . Now comparing with WCDMA, working on High Speed Packet Access (HSPA) has been started. The following enhancements are proposed like Adaptive modulation and coding (AMCS), Hybrid automatic-repeat-request (HARQ) ,Smaller frame size ,Position of scheduling mechanism ,Fast cell site selection ,Uplink DCH associated with a access control channel (ACCH) .

Finally some of the advantages of OFDM,

1. Improve quality in multi-path propagation environment.
2. Multiple tolerance of delay spread:
   (1) The symbol period on the sub carriers is enlarged because of using of various sub-carriers which is comparative to the delay spread.
   (2) Inter-symbol interference is minimized in a large way.
   (3) To keep a balance to the single carrier modulation, easier equalization is needed.

CONCLUSION

WCDMA based Release 2000 and 3GPP will give higher data rate.OFDM improves quality in multipath propagation,better resistance quality to fading and improved quality of narrowband interferrance. For transmission rate dealing with upcoming generation,BER is key parameter for system performance with MIMO technique.Using higher order modulation (16QAM &64QAM),Bits Error Ratio(BER) & Signal to Noise Ratio(SNR) increases.

RESULTS

Graphical show of analysis:

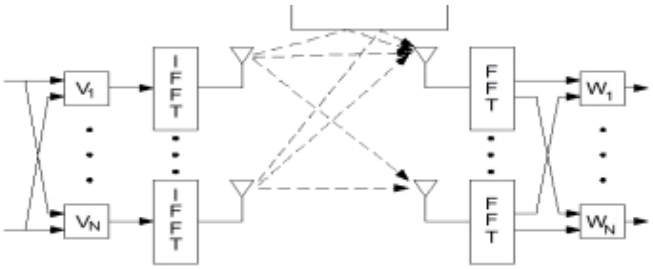

Fig 1:OFDM showing MIMO technology

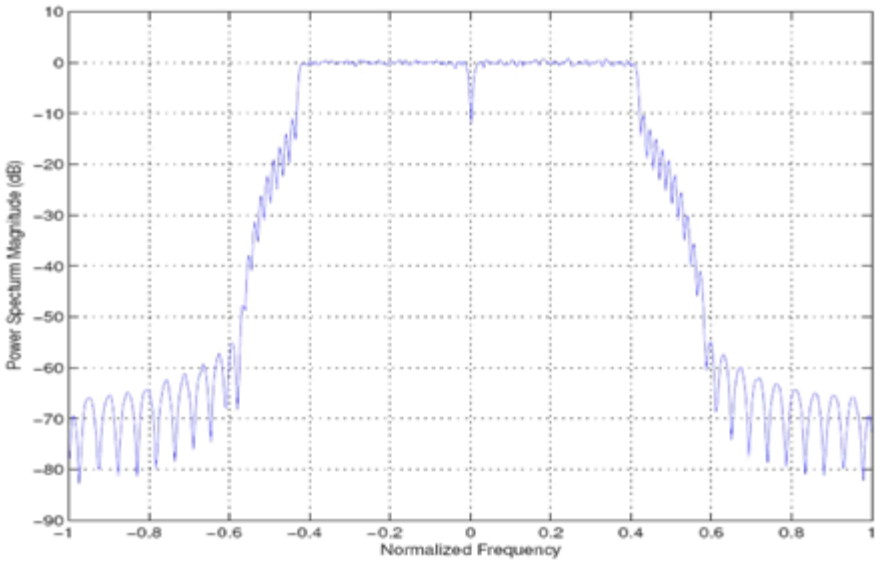

Fig 2: Power spectral density of WCDMA

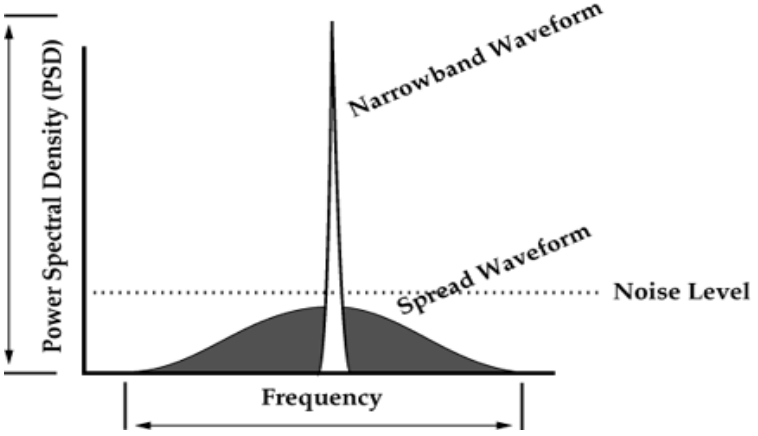

Fig 3:Power spectral density of OFDM

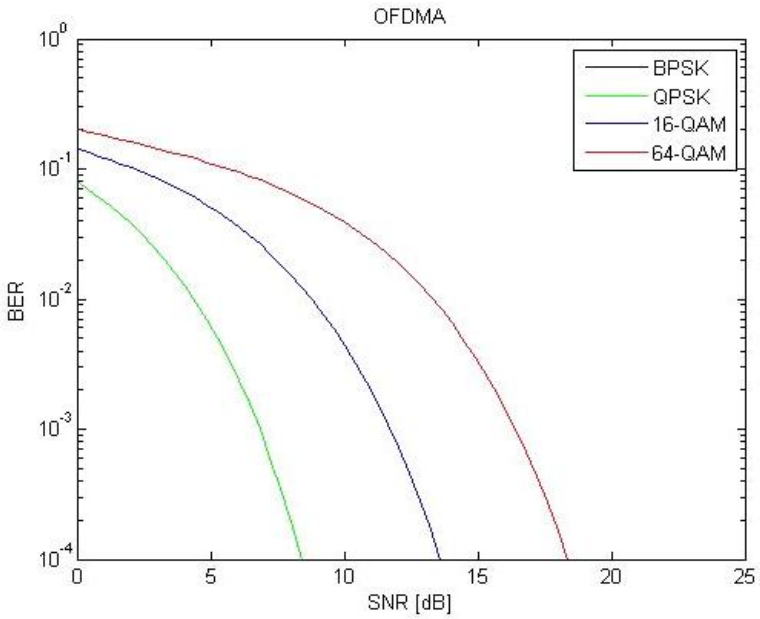

Figure 4.3: BER vs SNR of OFDMA with Adaptive Modulation.

FUTURE SCOPE

It need to work over OFDM to deal with MIMO technique at higher level to achieve high spectral density using linear atch antenna array using transmission pattern diversity.

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