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Performance Improve of Wimax System Using Turbo Code Method with Modulation Technique-A Survey

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Abstract: In the field of WiMAX is Worldwide Interoperability for Microwave Access technology used for long-distance wireless communication with higher data rates. It will be used as alternate broadband. This paper covers basic information about WiMAX, WiMAX features, its specification, Portable WiMAX, QoS of WiMAX, and its parameter, the communication system is way needed as communication services. Wi-max networks are used Orthogonal Frequency Division Multiplexing (OFDM) with different adaptive modulation techniques. This paper is to review of Wireless networks are extremely popular nowadays. The wireless local area network that uses the IEEE 802.11 standard and WiMAX that uses the IEEE 802.16 standard are networks that we would like to explore. WiMAX has been developed over a few years, but it's still unknown to most people. Its many advantages in transmission speed and coverage area, WiMAX system by using different modulator and demodulator techniques like binary phase-shift keying, quadrature AM and quadrature phase-shift keying. Wi-Max system achieves performance by using the turbo codes method (existing scheme) but not optimization because BER performance has been simulated high and SNR is low. Proposed technique minimizing less noise (BER) and improved signal power (SNR). The signal is transmitted through the channel (AWGN) and WiMax Mobile networks in terms of higher data handling capacity and less noise or BER low. Mat lab Tool is used to develop the WiMAX system model.

Keywords- Wireless Communication, Wireless Network, WiMAX, OFDM, Modulation Techniques, BER, Binary Phase Shift Keying, Quadrature Phase Shift Keying, SNR, Proposed Trellis Encoder, AWGN.

I. INTRODUCTION

WiMAX networks are providing an important element to satisfy on-demand media with high data rates. This element is that the QoS and repair classes per application. In Broadband Wireless communications, QoS remains a crucial criterion. Therefore the basic feature of the WiMAX network is that the guarantee of QoS for various service flows with diverse QoS requirements. While extensive bandwidth allocation and QoS mechanisms are provided, the small print of scheduling and reservation management are left not standardized. The quality supports scheduling just for fixed-size real-time service flows. The scheduling of both variable-size real-time and non-real-time connections isn't considered within the standard. Thus, WiMAX QoS remains an open field of research and development for both constructors and academic researchers. The quality should also maintain connections for users and guarantee a particular level of QoS. Scheduling is the key model in computer multiprocessing OS. It's the way during which processes are designed priorities during a queue. Scheduling algorithms provide a mechanism for bandwidth allocation and multiplexing at the packet level. The newest development in wireless Metropolitan area network is IEEE 802.16[1].it is that the Standard to state the frequency of fixed Broadband Wireless Access (BWA).WiMAX is the brand name of "IEEE 802.16 Standard". IEEE 802.16 was first planned to supply the walk for Wireless Metropolitan Area Network (WMAN) with the road of sight (LOS) of 30 – 50 km.]With the increasing popularity of Broadband internet, wireless networking market is flourishing; Wireless network isn't fully secure because of the rapid release of latest technologies, market competition and lack of physical infrastructure. In IEEE 802.16, security has been considered because of the main issue during the planning of the protocol. However, the security mechanism of the IEEE 802.16 (WiMAX) remains an issue. WiMAX is comparatively a replacement technology; not deployed widely to justify the evidence of threats, risk, and vulnerability in real situations [2]. WiMAX technology has attracted significant attention and interest due to its long transmission range, high transmission rate, and mobility support [3].

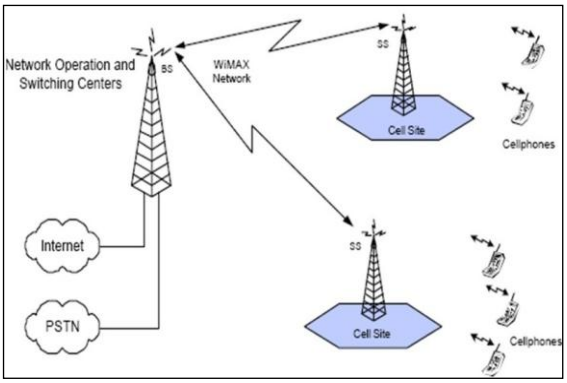

Fig1: Wi-max Network Architecture

But to form WiMAX networks usable and reliable, several security issues must be addressed in both the quality and its protocols [4]. The architecture of wireless communication systems is way simple than that of wired network connections. This is often the rationale why now

people prefer wireless internet connections. WiMax network forum is liable for guiding the rule for WiMax architecture. Components of WiMax Network Architecture: There are three main components of WiMax specification. 1. Mobile Stations which are used as a source of network connection for the user. 2. An access service network which is made of quite two or three base stations. It also contains ASN gateways which build the radio access at the top. 3. Connectivity Service Network which is liable for providing IP functions. The bottom station provides the air interface for the mobile stations. The bottom stations also provide mobility management functions, triggering and tunnel establishment, radio resource management, dynamic host control protocol proxy, quality of service enforcement, and multicast group management. ASN is liable for radio resource management, encryption keys, routing to the chosen network, and client functionality. The connectivity service network is liable for internet connections, corporate and public networks, and lots of other useful services.

Modulation Techniques: The modulation is that the process to convert one side data to a different side with the proper channel and to reply to the sender with a signal. WiMAX technology is nowadays considered one among the foremost prominent solutions capable to supply a Broadband Wireless Access in metropolitan areas with an easier installation and lower cost than traditional wired alternatives, proposed a state model supported the state transition diagrams) that are wont to compare the performance of two different adaptation algorithms supported the maximization of various functional costs suitable to be used in WiMAX system with an OFDMA natural object. Performance comparison of Fixed and Mobile Frequency Division Multiplexing (OFDM) based WiMAX transmission with adaptive modulation and coding (AMC) over different fading channels has done MATLAB. Various modulation techniques such as BPSK, QPSK, QAM [5].

OFDM Technology: during this section, the adaptive OFDM technique is discussed with differing types. The bit error probability of various OFDM subcarriers transmitted in time dispersive channels depends on the Frequency domain channel transfer function. The occurrence of bit errors is generally concentrated during a set of several faded subcarriers, while within the other subcarriers often no bit errors are observed. OFDM divides a wideband channel into narrowband sub-channels to mitigate ISI. The features of OFDM in multi-user system are, in multiuser systems, these subchannels are often allocated among different users orthogonal allocation: Multiuser OFDM, Spatial techniques help to mitigate interference between users, OFDM overlaps sub-streams, Sub streams separated in the receiver, Minimum sub-stream separation is B/N, total BW is B[6].

II. LITERATURE SURVEY

X. Bai et al. [7] proposed a new distributed QoS control scheme that guarantees specific service parameter settings for both uplink and downlink connections. By specifying a selected set of service parameters, the media access control (MAC) mechanisms defined within the standard are capable of giving service guarantees on the connection basis. This scheme specifies detailed operations performed at the base station and each subscriber station. IEEE 802.16 Wireless MAN system contains one central Base Station (BS) and one or more Subscriber Stations (SSs) in one architectural cell. The BS is responsible for communicating with each SS and regulating its behavior. Two operation modes are defined in the standard, i.e. point-to-multipoint (PMP) and mesh modes, along with different physical layer specifications. The physical layer operation is frame primarily based and supports each
Time Division Duplex (TDD) and Frequency Division Duplex (FDD) configurations. A transmission frame is outlined as a fixed time during which each the downlink and uplink transmission complete one round. A-frame consists of two subframes, i.e., downlink and uplink, designated for BS-to-SS and SS-to-BS transmissions, respectively. The downlink subframe begins with information for synchronization and a frame control section that defines the transmission burst profile, together with modulation and coding schemes also as relevant timing information, for each SS. Following the frame control section is that the downlink information destined to individual SSs. The downlink data is grouped into several transmission bursts using the TDM technique. These transmission bursts are differentiated by their applied Downlink Interval Usage Code (DIUC) that represents a particular set of modulation and coding scheme for transmission. The uplink subframe follows the downlink subframe. Uplink data transmission is organized in TDMA fashion where the uplink bursts are differentiated by the sending SSs. Every scheduled SS transmits into the uplink during its granted window using a burst profile related to the Uplink Interval Usage Code (UIUC) that was informed in the frame control section. During this methodology As Sing-Carrier Scheduling Algorithm SCSA scheme guarantees service parameters for each uplink and downlink connection and minimizes signaling overhead within the data control plane.

Dania Mafabissi et al. [8] proposed a state model based on the state transition diagrams (STD) that are used to compare the performance of two different adaptation algorithms based on the maximization of different functional costs suitable for use in WiMAX system with an OFDMA physical structure. Two techniques have been considered by taking into account the channel behavior in terms of attenuation and the frame error rate. The first technique is based on the physical channel estimation on the uplink and selects the best modulation order by using a three-stage model. Three algorithms such that the

Maximum Throughput technique, Target SER technique, and Minimum SER technique have been introduced to minimize the SER, maximize the throughput or select the best modulation order for a certain SNR value. On the other side, the frame error rate technique has been considered also by taking into account the effect of the previous frames on the actual one. The proposed techniques allow viewing with a different flavor of the QoS in terms of SER or throughput, even if all of them show advantages for statistical modulation schemes. Multiple modulation and coding schemes to instantaneously adapt spectral efficiency to the variations in the channel SNR while maintaining an acceptable BER. According to this mechanism, as the range increases, the system steps down to a lower modulation, but as closer to the base station, higher-order modulations can be used for increased throughput. By setting threshold Eb/No, adaptive modulation schemes can be used to attain the highest transmission speed with a target BER.

Yang et al. [9] consider an 802.11 wireless local area network that shares a common set of multi-radio devices with another network named co-network which uses WiMAX. They assume saturated network conditions for all WLAN radios. They study how the throughput of a WLAN can be affected by scheduling the co-network. Based on teletraffic modeling, they show that this issue can be minimized using the proposed scheduling optimization criteria for the co-network.

P Portela et al. [10] have presented Performance Comparison between the Air Interfaces of LTE and Mobile Wi-MAX. Shown that there is no doubt nowadays that the Orthogonal Frequency Division Multiplexing (OFDM) is the dominant technology in the area of mobile wireless access. The objective of this work is to analyze and compare the performance and spectral efficiency of 3GPP Long Term Evolution (LTE) and mobile Worldwide Interoperability for Microwave Access (Wi-MAX). Both technologies (based in OFDM) are the dominant options to provide mobile broadband access today and shortly.

Hwang et al. [11] a teletraffic mathematical analysis for the delay of bandwidth requests based on unicast, multicast, and broadcast IEEE802.16d/e polling in IEEE802.16d/e under error-free/error-prone wireless channel conditions. They derived the distribution for delays and the truncated binary exponential back-off (adopted as a contention resolution) utilizing analytical methods. The authors study bandwidth efficiency and the utilization of transmission opportunity which is defined as a ratio of successful transmission opportunities and total transmission opportunities within a frame. Based on numerical analysis, they obtained optimum values for parameters such as some transmission opportunities (or slots), the initial backoff window size, and the Quality of Service (QoS) requirement on delay and loss.

J D. Kene et al. [12] have presented the Turbo code gives relatively better performance as compare to convolution codes. Turbo code offers an impressive cryptography gain terribly near the Shannon limit for the AWGN channel to realize most output (Typical Wi-Max application). The target of this paper is to review the Mobile Wi-Max system performance by exploiting turbo codes and setting the system parameters to realize performance optimization. For various transmission conditions, BER performance has been simulated. Finally, for the performance optimization of the mobile Wi-Max system, the effect of various Decoding algorithms, Frame size, and Code rates are considered for simulation to evaluate the system performance. The improvement achieved within the options of a Mobile Wi-Max system for a specific choice of the set of parameters has been reported.

S. H.O. Salih et al. [13] have shown the implementation of adaptive modulation and coding techniques using Mat lab. The different order modulations are combined with different coding schemes. It gives higher throughput and better spectral efficiency by sending more bits per symbol. Here the various modulation types are implemented using a single Matlab function that can be called with the appropriate coefficients. The simulation plot of BER vs. SNR for different modulation techniques for Broadband Wireless Access System using WiMAX. In traditional communication systems, the transmission is designed for the "worst-case" channel scenario, giving an error rate below the fixed limit. The adaptive transmission has the advantage of changing the transmitted power level, symbol rate, coding scheme, constellation size, or any combination of these parameters to deliver better link average spectral efficiency given by bits/sec/Hz.

Mohamed Al Wohaishi et al. [14]. Have shown the analysis of digitally modulated signals in communication systems which use software-defined radio concept and modern synthetic instruments. M-QAM is used for transmission of information in DVB-T, DVB-T2. A simple picture is transmitted through the simulated radio channel to show the result of signal impairments. Experiments were done using the software-defined radio concept of the communication system. Modular PXI HW platform was used in connection with graphically oriented development environment. Terrestrial DVB-T broadcasting uses QPSK, 16-QAM and 64-QAM modulation schemes, while terrestrial DVB-T2 broadcasting, which allows Transmission of high definition picture format uses 256-QAM modulation scheme. The simulation of different M-QAM modulation shows that increasing of the state number, leads to an increase of transfer rate (transfer more bits per

symbol).The downside however is that with the growing number of states BER increases at the same transmission power as a result of worse distribution of symbols in constellation diagram.

Banerjee et al. [15]. Communication systems need for regeneration of consistent information by controlling errors in a noisy environment. This is accomplished by incorporating suitable forward error correcting coding techniques into the system. In this context, Turbo Code (TC) is regarded as one of the high performance forward error correcting codes whose BER performances tends to the "Shannon limit". An advanced form of Turbo Code (TC) named as 3-Dimensional Turbo Code (3D-TC) has been appeared as a thought-provoking investigation zone in recent past. Meanwhile an exhaustive research has been carried out on Superposition Modulation (SM) techniques in which switching from bit to symbols is occurred using non-objective mapping method. Considering the above facts, a novel SM based 3D-TC has been suggested in this paper to enrich the Bit Error Rate (BER) act ominously by choosing right combination of generator polynomial for each constituent encoder as well as interleavers. The effectiveness of the projected code has also been evaluated by comparing its BER performance with other existing codes in WiMAX system under different fading channel conditions.

Indu Chandran1 et al [16].OFDM is being widely used in wireless communication systems for its ability to reduce the bandwidth and enhance the data rate. The scheme provides robustness against interference and can adapt easily to fading scenarios. This paper gives a comparison of channel performance using various modulation techniques over different fading environments. Modulation schemes include BPSK, QPSK, 64- QAM which have been employed under the influence of AWGN, Rayleigh, flat fading, frequency selective and radian fading channels. BER (Bit Error Rate) and SNR (Signal to Noise ratio) functions are used to analyze the performance of data transmitted over these channels.

III. EXPECT OUTCOME

To analysis within the field of WiMAX system and determine numerous challenges. The WiMAX technologies to make it more secure, strong and supply the customer more reliable service. Our objective could also be a better SNR and less BER.

IV. CONCLUSION

In this paper we've studied the vulnerabilities and threats of IEEE 802.16 (WiMAX). It are often seen that WiMAX provides a strong user authentication, access control, data privacy and data integrity using sophisticated authentication and encryption technology. WiMAX has both a classy set of security protocols in its security suite and advanced bandwidth allocation mechanisms, which makes it an appropriate candidate for enterprise application. IEEE 802.16 standard, commonly referred to as Worldwide Interoperability for Microwave Access(WiMAX) is that the most recent technology that has promised to supply broadband wireless access over long distance. This standard was designed to support the bandwidth demanding applications with quality of service (QoS) and an answer to broadband wireless access (BWA) commonly called as (WiMAX), could also be a recent wireless broadband standard that has promised high bandwidth over long-range transmission. The WiMAX technology is extremely fast and advance technique used for mobile purposes. This technology provides various protocols and features as compared to older technologies. Wireless communications are expanding their field of action. WiMAX technology is taken into account one among the foremost prominent solutions capable to supply a Broadband Wireless Access in metropolitan areas. Additionally to those modulation schemes, the paper proposes a BPSK modulation scheme has got to be included in an adaptive modulation framework to support very low SNR value also

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