Impact Of MultiPlay Transmission In Mobile WiMAX Using Overlay Scanning

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Abstract **— The growing demand for mobile internet and wireless multimedia applications has motivated the development of broadband wireless-access technologies in recent years. There are several issues to impact the base station handover is a serious problem in the mobile communication system. In hard handover has a short time break known as handover interruption decrease the QoS due to connection between MS and serving BS closed and ranging hand initiation to establish new connection. Prolong time of request and response due to number of neighbours to scan which causes delay in handover process. This research proposed performance analysis of WiMAX/IEEE 802.16 with mobility supported, scan the channels provided by the mobile station. The proposed strategy required the mobile station for operation with a scan that can be used to reduce the time when trying to establish a network connection or do between neighbouring base station handover. A second type is the fast handovers will propose to reduce the unnecessary surrender to six different access modes. The mobile WiMAX air interface utilizes orthogonal frequency division multiple access (OFDMA) as the preferred multiple-access method in the downlink (DL) and uplink (UL) for improved multipath performance and bandwidth scalability.All simulations are run using MATLAB software to develop a new Overlay Scanning Mechanism (OSMA) algorithm. OSMA mainly focus on when to perform a scan to estimate future needs. Simulation results are expected to show that WiMAX coverage by using real world data to detect movement and show that there are strategies that reduce the time required for scanning operations significantly.**

Keywords— **WiMAX; IEEE**; **MS; BS**

I. INTRODUCTION

The measurement of time is a very important standard, and the progress of technology directly linked to resource is measure. The standards today have a tremendous impact on how we use the product and how we choose it. The continues to become more truly global community many people have to become influent in the modern and standards used in places far from where they work or staying. Associated with this problem many countries including the United Nations has been struggling in terms for mobile wireless communications and it is only relatively recently that the world traveller could uses their cellular phone. The quality and quantity of communications services have more increase from years to years. While wireless communications practitioners are endeavouring to translate exciting recent developments into international standards, the researchers continue scanning for overview in the horizon for something a new ideas and some solutions in order to approach information theoretical performance predictions.

The wireless personal communications standards and broadband access network standard this special issue is dedicated to a range of topical wireless multimedia and video communications aspects. Many transmission of multimedia information or over wire line based links can now be considered a mature area, where a various of interactive and distribution services are offered by range providers across the globe. On the distribution wireless video scene, a range of broadcast services appears in the past few years which were structures for stationary applications. Specifically in Europe a set of mutually compatible cable, terrestrial and satellite based digital video broadcasting (DVB) schemes were standardized which employ the Motion Picture Expert Group (MPEG-2) standard for video compression and Reed Solomon (RS) forward error correction (FEC)[1]. By invoking turbo coding and iterative decoding the FEC performance can be further improved upon, especially when using a high turbo interleaving depth, since the distribution multimedia environment is not sensitive delay. The more hostile propagation environment of the terrestrial DVB system is combated using concatenated RS and rate-compatible, punctured convolution coding (RCPCC) combined with an orthogonal frequency division multiplexing (OFDM) based scheme. By contrast the more begin a cable and satellite based media facilitate the employment. When their more hostile propagation environment scanning the issue special on video transmission for mobile multimedia application.

At present the never ending growth in mobile communication require wireless communications systems that increase network capacity. Mobile devices into the middle of the living. Applications such as VoIP, video streaming and music downloads increasing the use valuable bandwidth share available to current 3G systems. The next generation 4G networks under development in the IEEE 802.16e/WiMAX[2]

standards promise to provide a good infrastructure for future high speed mobile internet. A mobile subscriber station (MS) to join the network it must follow the network entry procedure, involves scanning the frequency of the base station (BS). The expectations MS will be required to perform recurring scans to maintain a connection to the network by moving from one BS to another while moving around the coverage are. BS change process called a handover. Several scenarios can use the MS to improve the scanning time while searching for the downlink from the BS. Strategies to try to provide network during network entry phase as reduce delay during handover procedure. The first set of strategies combing with scan frequencies to guide MS in choosing the frequency for the scan. Second to find out by MS where two BS is the highest target frequency increase scanning operation.

This research proposed performance analysis of WiMAX/IEEE 802.16 with mobility supported, scan the channels provided by the mobile station. The proposed strategy required the mobile station for operation with a scan that can be used to reduce the time when trying to establish a network connection or do between neighbouring base station handover. A second type is the fast handovers will propose to reduce the unnecessary surrender to six different access modes.

II. WIMAX NETWORK ARCHITECUTE AND EVOLUTION

The WiMAX of network architecture is designed to meet the requirement while maximizing the use of open standards IETF protocols in a simple all IP architecture. The design requirements are supports for fixed and mobile access deployments as well as unbundling of access, connectivity and application services to allow access infrastructure sharing and multiple access infrastructures aggregation.

The potential of IEEE802.16e related applications seems enormous as illustrated in Fig.2. It can provide high speed mobile data and telecommunication services comparable to the emerging 4G technologies[7]:it offers a wireless alternative to cable and digital subscriber line (DSL) for last mile broadband access, it can also be used to connect WiFi hotsports with each other and to the Internet. However, there are many technical challenges to wide adaptation of WiMAX, in particular its coexistence and interoperability with other wireless technologies [8].

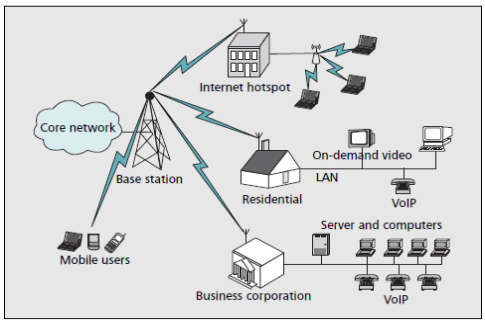

Figure 1:Potential WiMAX scenario

III. WIMAX HANDOVER

The mobile user moves from the coverage area of a base station coverage area to another while performing active call then transfer the call from one base station to another or from one channel to another known as the submission. In the United States it is also called a handoff (HO). It used interchangeably. In 4G systems submission procedures are classified into the following categories depending on the network structure.

- Hard Handover in WiMAX network
  The handoff is between two base stations operating on different channels set then called handoff or hard handoff. It is the primary handoff procedure in GSM networks but also occur in the CDMA network.

- Soft Handover in WiMAX network
  The handoff is between two base stations but the channel remains the same operation then calls this type of handoff called soft handoff. This type of handoff, mobile base station handles only calls but channel change operation remains the same. This type of handover in a CDMA network.

A. Handover Scenario

Handover (HO) is the main function to which support mobility of wireless networks and maintain service quality. HO allows the network to maintain connectivity UE when it moves from the coverage area of one cell or sector to another [13]. HO is continuing the process of transferring voice ,data or video session from one cell to another is connected to the CN. HO divided into two broad categories: hard and soft Host[9]. In Hard HO, current source released before new resources are used. However in Soft HO, the two source of existing and new used during HO process. HO initial start up is the process of deciding upon request HO [12].In IEEE 802.16e standard, there a three type of handover are supported [10]:

1. Hard Handover (HHO)
2. Micro Diversity Handover (MDHO) and
3. Fast BS switching (FBSS)

Among these handover types HHO is the simplest one while the other two types are more complicated and optional. The HHO and FBSS are adequately in the standard for uses practical use. Both of that had a physical radio link broken it is re-established at the target access point that results in handshake latency. The handover process in WiMAX is concluded in the movement of the MS from the BS to another BS with connection. This illustrated in Figure 2

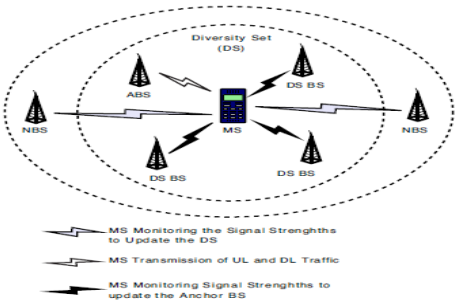

Figure 2: FBSS

B. Hard Handover

The hard handover, a MS has communicates with just one BS in each time. All the connections has serving BS are broken before a new connections to target BS is established. The very short time has interval when the MS is not connected to any BS. Handover is executed after an observed channel parameter signal strength from the neighbouring BS exceeds the same parameter from the serving BS. This situation is illustrated in Figure 3

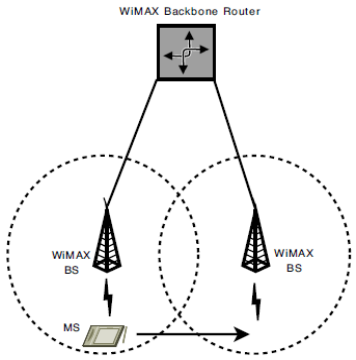

Figure 3: HHO

2. Scanning Procedure

In the scan phase of HO, the MS scans and synchronizes with the neighbouring BSs based on channel information from the neighbour advertisement. In order to find an appropriate BS target, the serving BS scans the available channels of the downlink(DL) frequency band. The MS is looking for a well known DL. preamble frame[11]. As a result of receiving preamble frame, the channel estimation initialization and equalization procedure are taken place. If the synchronization successes, it then starts the ranging procedure. The scanning and ranging process are shown in 4. The MS selects a candidate target BSs based on the signal strength and response time of each BS, acquired from scanning. This response message includes the primary management the transmission power information and the frequency timing offset adjustments. This procedure ends after the MS has completed ranging with all its neighbours. In the ranging phase, a MS may switch to a new channel, thus temporally loosing connection with the serving BS. As mention earlier, by using this method it needs at least three base stations to estimate the position [8].

IV. RESEARCH METHODOLOGY

This research started with analysing several that are being used for and system to identify the most accurate technique. For this research, methods were selected to determine for improves scanning time reduced in according the number eliminated BSs based on the negotiations. The next section describes the MS neighbourhood scanning procedure in WiMAX according to the standard IEEE802.16e and proposed optimization of the scanning procedure.

The developing algorithm in Matlab Software is focuses in this paper. The basic parameter of the simulation are set as listed in the table 1. Figure 4 shows the flowchart of handover strategy under the overlay scanning system. The MS scanning selecting a target BS (selected in higher frequency) to perform. Provide faster network access during the network entry. The third activity in this research is to design software that can be used to simulate some data to estimate the scanning .

Table 1. Simulation parameters and scenario definition for channel characteristics

Parameter	Value
Number of BS	22
Number of MS	100
BS transmitting Power [db]	46
MS height [m]	1.5
BS height [m]	32
MS speed [m/s]	14, 25, 33
Frequency band [GHz]	2.5
Bandwidth [Mhz]	1Ghz
Cell Radius	1 KM

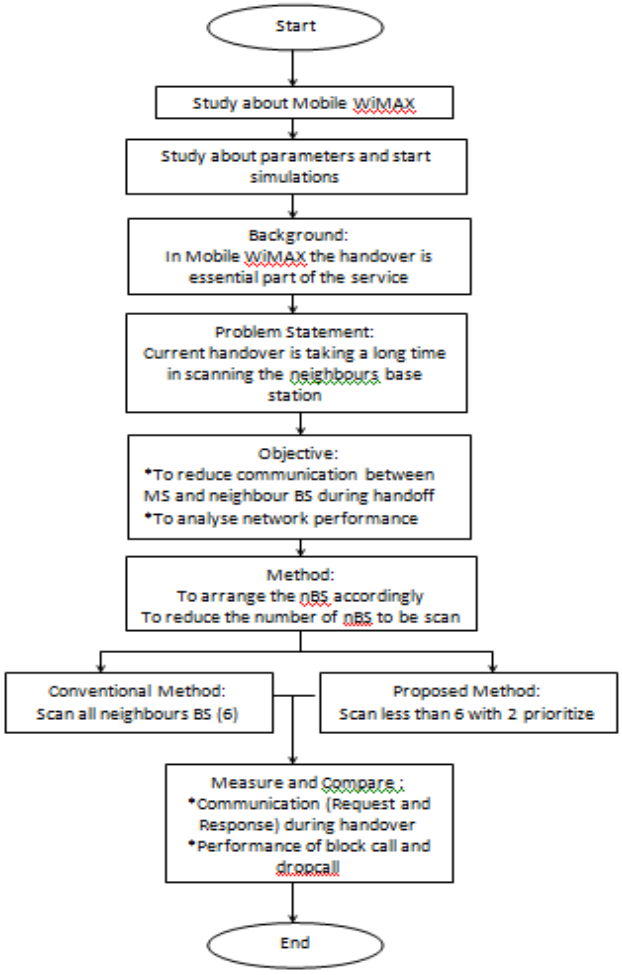

Figure 4 : Proposed handover strategy in Scanning Overlay System

The propose handover method is used to analyse the performance of mobile station that run multi type of services such as video downloading, web browsing, real time game, and voice over internet protocol (VoIP) .

V. PERFORMANCE ANALYSIS

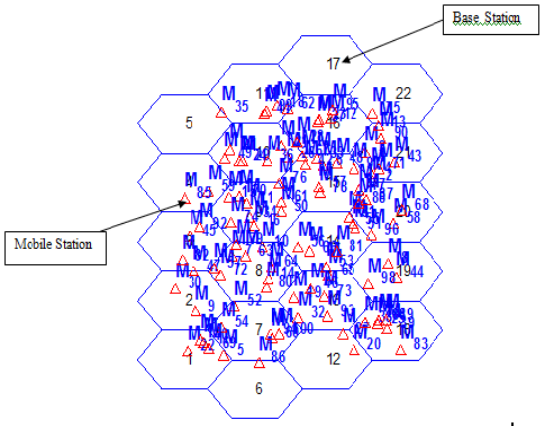

Figure 5: Simulation Topology

Simulation performance of the proposed handover strategy performed. We assume that there are 100 MS and 22 Base Station in proposed topology. The radius of cell area is 1KM. MS will start handover process at threshold time -90db. All mobile was located randomly and move with 3 different speed from 14, 25, 33 m/s. In our proposed method we arrange the 6 neighbour BS based on the RSSI and location of the mobile station. Next, the overlay scanning will be done by selecting the first 2 BS first to scan and carry out the HO process. If the first 2 candidates are not fits to become the new serving BS then the next 2 BSs will be scan.

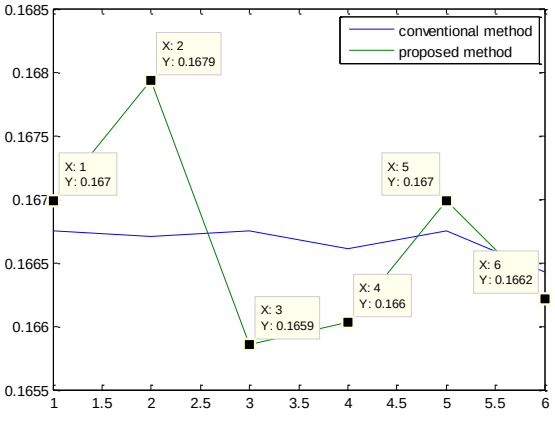

Figure 6(a) :Y axis Probability (%), X axis Mobile Station

Figure 6(a) show the probability percentage of 6 neighbour BSs, which the highest is BS 2 at 0.1679% and 0.167% for both BS 1 and 5. Meanwhile the probability of handover to 6 BSs using conventional method is almost similar due to the assumption of all BSs have equal probability to be next serving Base station. Therefore, results shows the significant of overlay scanning for the proposed method.

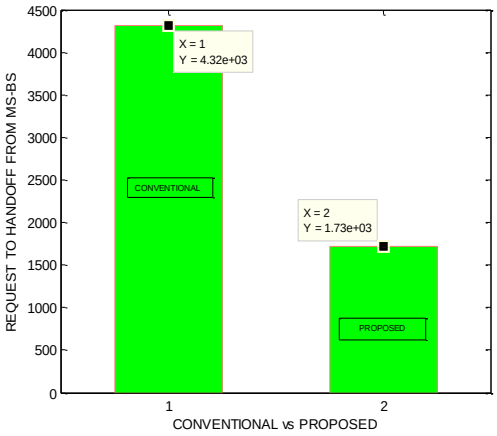

Figure 6 (b): Conventional vs Proposed

In this simulation we assume the request made by mobile station to base station during appropriate time to handoff is a two way communications. As for successful handoff process will equal 1 request and response. The duration of interruption caused by handover depends on the duration of network re-entry. Synchronization indicates several process including communication request to handoff between mobile and BS.

Conventional method shows that successful handover done after more than 4000 communication between mobile station and BS meanwhile the proposed method only takes about 1410 communication to facilitates successful handover. It shows a significant time consumption for both method which the proposed will takes less time during communication to handoff .

From the figure 6 (c) below, the performance of both conventional and proposed method seems to have only a slight difference with 3 block-calls at 53% for both methods and 9 block-calls at 85% for conventional method which is less only 1 block-call for proposed method with 10 block-calls at 85%.

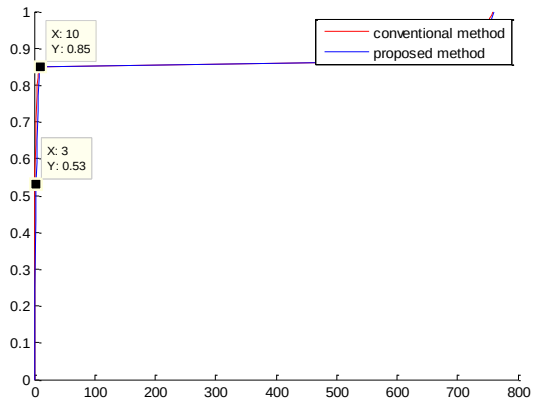

Figure 6(c) : Y axis Cumulative Probability (%), X axis No of Block Call

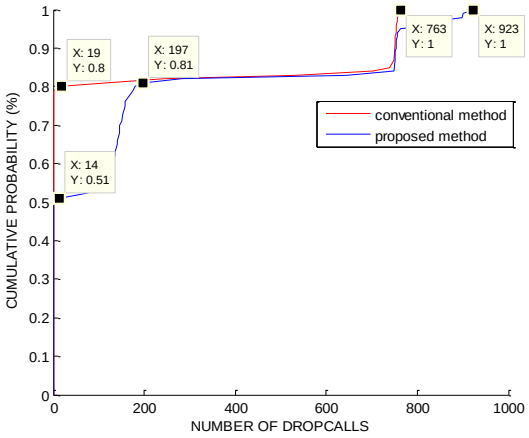

Figure 6(d) : Y axis Cumulative Probability (%), No Of Drop Call

Figure 6(d), shows the number of drop call from 0 to 1000 drop calls, the least value at 14 calls is 51% for both methods. Then it gradually increase until 197 calls at 81% for proposed method, it has differential 178 drop calls at 80% with the conventional method. This dropped-call rate in conventional method is extremely low and is significantly less than 0.1% drop calls in proposed method. The main reasons for dropped calls in mobile networks are lack of radio coverage (either in the downlink or the uplink), radio interference between different subscribers, imperfections in the functioning of the network (such as failed handover or cell-reselection attempts), overload of the different elements of the network (such as cells). In this case, there are probabilities of certain mobiles experience difficulties to handoff to new serving base station due to first 2 candidates are unable to support or facilitates the handoff process and this will increase time in order to request permission to handoff from another set of base stations and eventually will cause drop calls.

VI. CONCLUSION

In this paper the impact of multi-play transmission in mobile WiMAX using Overlay Scanning were proposed and analysed. The handover strategy was done by focusing at the scanning mechanism in handover process by using overlay scanning. Simulations results shows that both proposed and conventional mechanism has its own advantages. Proposed method significantly reduce the scanning time which can result to reduce the handover time generally. The future works includes the optimization of overlay scanning method by using different speeds of mobile and considering more than 1 threshold value of RSSI to start handover process

FUTURE RECOMMENDATION

To predict best candidates to handoff by adding more parameters such as channel characteristic and to prioritize mobile station that in need of emergency handoff.

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