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Throughput Performance Analysis WIMAX Networks Using MIMO Antenna

Wagdi Mohamedsalih Satti[1], Hala Eldaw Idris[2]

[1]Al-Neelain University, Faculty of Engineering, Communication Dept, Khartoum, Sudan

[2] Al-Neelain University, Faculty of Engineering, Communication Dept, Khartoum, Sudan

Abstract: ***The Standard IEEE 802. 16 Worldwide interoperability For Microwave access the products Wimax broadband to aid lasting with mobile or portable and lightweight terminals. That want pertaining to broadband wimax options will likely be increasing on a daily basis. The concept is amongst the majority latest developments with seen as at least one 4G (Fourth Generation) scientific know-how. The concept will depend on with Wimax Town Country Web 2.0 (WMAN). Out of this be a success, this paper focus on throughput performance with effects by using OPNET software applications.***

Keywords: Throughput, OFDM, OPNET, WIMAX, MIMO, SISO, 4G

1. Introduction

Worldwide Interoperability For Microwave Access the name Wimax its a sales and marketing name for this communications technology that will furnish 26 to help forty megabit-per-second info premiums, [1] along with the 2011 bring up to date giving you as much 1 Gbit/s[1] with regard to permanent stops. That identity "Wimax" was made by way of the Wimax Community forum, that's produced with July 2001 to enhance conformity together with interoperability in the usual. That community forum teaches Wimax since "a standards-based technological know-how allowing that sending with previous distance wi-fi broadband connection. instead of connection together with DSL". [2] Wimax identifies interoperable implementations in the IEEE 802. 06 category of wireless-networks principles ratified by way of the Wimax Community forum. (Similarly, Wi-Fi identifies interoperable implementations in the IEEE 802. 11 Wi-fi LAN principles skilled by way of the Wi-Fi Connections) Wimax Community forum accreditation enables stores distribute permanent and mobile or portable solutions since Wimax skilled, consequently providing a good with interoperability using many other skilled solutions, providing they can fit the identical account. The main IEEE 802. 06 usual (now termed "Fixed Wimax") has been produced with 2001. Wimax implemented a number it's technological know-how with Wipro, an email finder service promoted with Korea. [3] Mobile or portable Wimax (originally influenced by 802. 16e-2005) is a revising that's used in most areas, and it is the foundation with regard to forthcoming changes which include 802. 16m-2011. Wimax is occasionally called "Wi-Fi with steroids"[4] together with can be installed for several software programs which include broadband connectors, mobile or portable backhaul, 'hang-outs', or anything else. The idea is related to Wi-Fi, but it surely may well permit use with considerably better ranges. [5].

2. WIMAX Quality of Service

Quality of service (QoS) is usually enable to converse with superior circumstances a variety of potential customers, with regard to amount, throughput, indication hold up, jitter, box deprivation, together with rate…etc. There are end up a key point to help number of software programs that will employ multi-level options. A lot of these software programs comprise several solutions, words across IP…etc.That potential customers executive words Top quality with product identifies that likelihood in the telecommunication multi-level assembly the potential customers agreement, and that likelihood on the making it box inside change concerning a few items inside multi-level. As being the identity has revealed it's some sort of way of measuring precisely how well-performing together with absolutely consistent some sort of multi-level is usually, the most crucial detractors with reputable QoS are generally throughput, latency, jitter together with share with packets sacrificed or anything else. Take care of a lot of these trouble also, you find a carrier-grade product. The principle purpose on the superior QoS may be to offer precedence which include far better throughput, regulated jitter together with latency (requisite just by a few real-time together with interactive traffic), together with better deprivation factors.

2.1Throughput

Throughput is a measure of how many units of information a system can process in a given amount of time. It is applied broadly to systems ranging from various aspects of computer and network systems to organizations. Related measures of system productivity include , the speed with which some specific workload can be completed, and response time, the amount of time between a single interactive user request and receipt of the response.

2.2 WIMAX MIMO

MIMO stands for Multiple Input and Multiple Output, and refers to the technology where there are multiple antennas at the base station and multiple antennas at the mobile device. Typical usage of multiple antenna technology includes cellular phones with two antennas, laptops with two antennas (e.g. built in the left and right side of the screen), as well as CPE devices with multiple sprouting antennas. The

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predominant cellular network implementation is to have multiple antennas at the base station and a single antenna on the mobile device. This minimizes the cost of the mobile radio. As the costs for radio frequency (RF) components in mobile devices go down, second antennas in mobile device may become more common. Multiple mobile device antennas are currently used in Wi-Fi technology (e.g. IEEE 802.11n), where WiFi-enabled cellular phones, laptops and other devices often have two or more antennas.

3. Methodology

To make the performance analysis for the wimax network by using MIMO there is many simulator software but we use opnet simulator on pc running microsoft windows (7) professional service pack1 and cofig all the environment variable to make this test in this paper with two scenarios to perform and test of the two type of antenna single input single out put this type one or scenario one and the scond scenario is multiple input multiple out put mimo the opnet simulation model this model is discrete-event simulation and its contain five (4) base station with 5 mobile node connected to base station and the netwok connected to ip backbone and the running application is voice also there is tow different types of configuration for base station in scenario 1 is siso Single Input Single Output and the second scenario is mimo the simulation take an hour for this project for all scenario

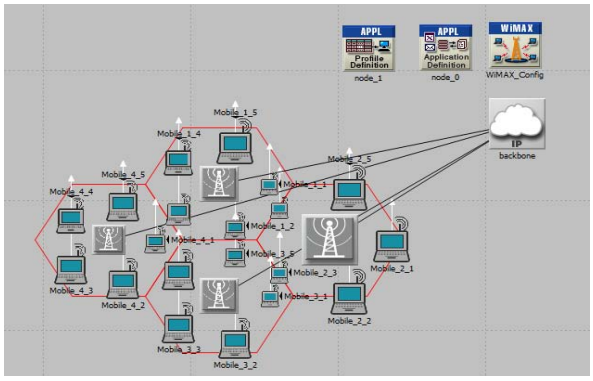


Figure 1: Wimax network

The figure above represent the wimax network with (4) cell connected together to ip backbone

(Base Station_2) Attributes

Type: router

Attribute	Value
name	Base Station_2
WiMAX Parameters	
Antenna Gain (dBi)	15 dBi
BS Parameters	(...)
Maximum Number of SS Nodes	100
Received Power Tolerance	(...)
CDMA Codes	(...)
Backoff Parameters	(...)
Mobility Parameters	Default
Channel Quality Averaging Parameter	4/16
Number of Transmitters	SISO
ASN Gateway IP Address	Disabled
DL AMC Profile Set	Default DL Burst Profile Set
UL AMC Profile Set	Default UL Burst Profile Set
CQICH Period	Accept SS Configured Value
Reserved DL Subframe Capacity (%)	No Reservation
Reserved UL Subframe Capacity (%)	No Reservation
Classifier Definitions	(...)
MAC Address	Auto Assigned
Maximum Transmission Power (W)	0.5
PHY Profile	WirelessOFDMA 20 MHz
PHY Profile Type	OFDM
PermBase	1

Figure 2: Base station configuration single input single output as shown in the above picture the configuration for the wimax parameter in this base station specifically in the number of transmitter is SISO

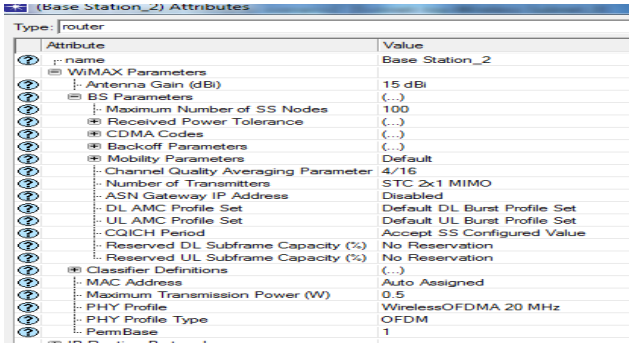


Figure 3: Base station configuration multiple input multiple output as shown in the above picture the configuration for the wimax parameter in this base station specifically in the number of transmitter is STC2X1 MIMO

4. Results and Discussion

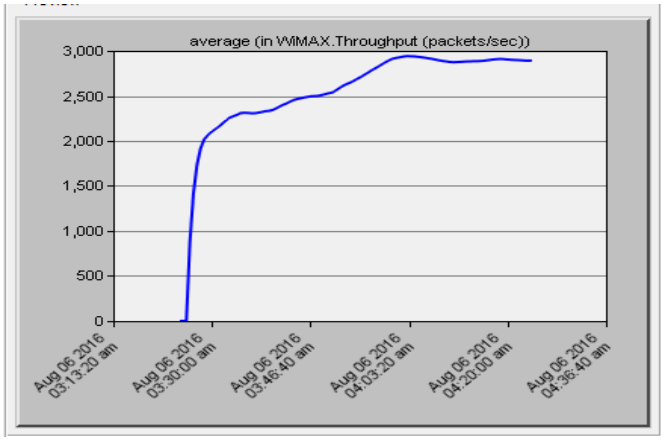


Figure 4: Throughput For scenario (1) using SISO fig.4 represent average of throughput(packet/sec) for wimax in the project specifically for the scenario with using SISO.

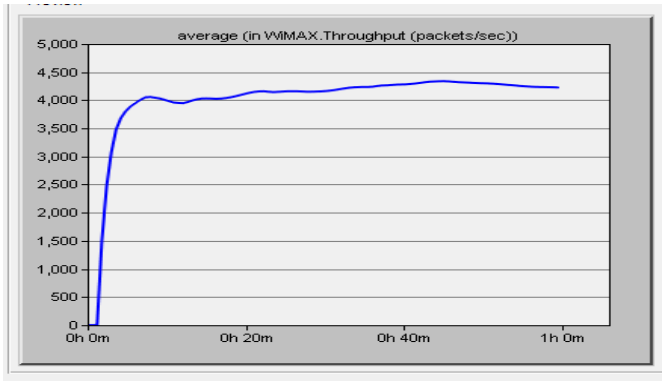


Figure 5: Throughput for scenario (2) Using MIMO

The figure above represent average of throughput(packet/sec) for wimax in the project specificly for the scenario with using MIMO

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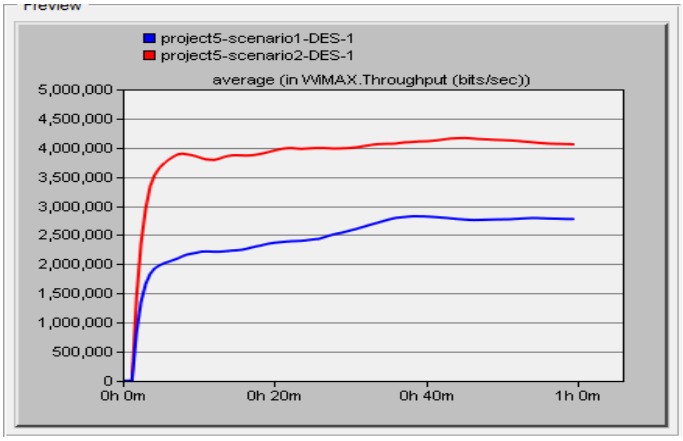


Figure 6: comparison between two scenarios the average of throughput the figure above represent the comparison for the scenarios their is tow line in the result above:

- the blue line for scenario one (SISO)
- the red line for scenario two (MIMO)

From figure 6 we noticed the throughput in MIMO higher than SISO.

5. Conclusions

This paper covers that throughput effectiveness test with MIMO & SISO FOR WIMAX multi-level, together with assessment concerning together SISO with STC 2*1 MIMO which often demonstrates that effectiveness with MIMO process supplies far better at the end result as compared to SISO process and this also is usually anticipated. The following end result suggests that will Mobile Wimax may well offer high performance by using MIMO.

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