A SIMULATION STUDY ON AMPLIFIED WiMAX AND WiFi SIGNAL OF TIKRIT UNIVERSITY

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List of Abbreviations

3GGP: 3rd Generation Partnership Project.

AAA: Authentication, Authorization and Accounting Administrations.

AM: Amplitude Modulation.

ASK: Amplitude Shift Keying.

ASN: Access Service Network.

ASP: Application Service Provider.

AWGN: Additive White Gaussian Noise.

BER: Bit Error Rate.

BPSK: Binary Phase Shift Keying.

BS: Base Station.

CC: Convolution Code.

CEPT: European Conference of Postal and Telecommunications.

CSN: Connectivity Service Network.

DAA: Detect and Avoid.

DL: Downlink.

DoS: Denial of Service.

DPSK: Differential Phase Shift Keying.

DSL: Digital Subscriber Line.

DSSS: Direct sequence Spread Spectrum.

DUR: Downlink to Uplink Ratio.

ECC: Electronic Communications Committee.

FCC: Federal Communications Commission.

FDM: Frequency Division Multiplexing.

FDMA: Frequency Division Multiple Access.

FEC: Forward Error Correction.

FFT: Fast Fourier Transform.

FHSS: Frequency-hopping spread spectrum.

FM: Frequency Modulation.

FSK: Frequency Shift Keying.

GW: Gateway.

HAP: High Altitude Platform.

IEEE: Institute of Electrical and Electronic Engineers.

IFFT: Inverse Fast Fourier Transform.

IMS: IP Multimedia Subsystem.

IP: Internet Protocol.

ISI: Inter Symbol Interference.

ISP: Internet service provider.

ITU: International Telecommunication Union.

ITU: International Telecommunication Union.

LAN: Local Area Network.

LOS: Line of Sight.

LTE: Long Term Evaluation.

MAC: Media Access Control.

MB-OFDM: Multiband OFDM.

Mbps: Mega bit per second.

MBWA: Mobile Broadband Wireless Access.

MFSK: Multiple Frequency Shift Keying.

MGF: Moment Generating Function.

MPSK: Multilevel Phase Shift Keying.

MS: Mobile Station.

MTRNG: Mersenne Twister Random Number Generator.

NLOS: None-Line of Sight.

NS: Network Simulator.

NSP: Network Service Provider.

NWG: Network Group.

OECD: Organization for Economic Co-operation and Development.

OFDM: Orthogonal Frequency Division Multiplexing.

OFDMA: Orthogonal Frequency Division Multiple Access.

PAPR: Peak-to-Average Power Ratio.

PE: Probability of Error.

PHY: Physical layer.

PSD: Power Spectral Density.

PSK: Phase Shift Keying.

PSTN: Public Switched Telephone Network.

PUSC: Partially Used Sub-Carrier.

QAM: Quadrature Amplitude Modulation.

QoS: Quality of Service.

QPSK: Quadrature Phase Shift Keying

RNG: Random Number Generator.

RS: Reed-Solomon.

SNR: Signal to Noise Ratio.

SS: Subscriber station.

TDMA: Time Division Multiple Access.

UP: Uplink.

WiFi: Wireless Fidelity.

WiMAX: Worldwide Interoperability for Microwave Access.

WLAN: Wireless Local Area Network.

WLAN: Wireless Local Area Network.

WMAN: Wireless Metropolitan Area Network.

ABSTRACT

The limitation of WiFi coverage and free frequency create problems as well as weaken security and degrade quality of services. Therefore, a complementary wireless technology, WiMAX, is required. WiMAX and WiFi are chosen as both technology are the most highly popular by wireless network protocols usage in Iraq. Simulation on both of the network environments will be used to imitate the real situation in Tikrit University. This study provides a comprehensive field survey on wireless networking in Tikrit University of Iraq. Suitable wireless protocol, expanding coverage, performance of network will be included after the application of this study. The major benefits that have achieved as the outcome of this study are packet delivery ratio and throughput. Both WiFi scenarios achieved packet delivery ratios of 97.2% and 96.012% respectively, while WiMAX scenario scored 98.0% on packet delivery ratio. On the other hand, the throughput was found to produce interesting results and increased with packet size. WiMAX throughput had been discovered to be increasing linearly to the throughput. The maximum throughput achieved by WiMAX was 22.12 Mbps while the WiFi obtained throughputs of 22.46 Kbps and 11.61 Kbps for the different scenarios.

CHAPTER 1

INTRODUCTION

In this chapter, wireless implementation is discussed in order to improve communication performance. This chapter highlights sections that cover the concepts of both WiFi and WiMAX in term of standards and protocols. The attempt is to reduce the challenges facing the Wi-Fi performance and therefore presents WiMAX technology base on the one that convenient to the real work. The research problem, objectives and research questions together with significance of the study are included in this chapter.

1.1 Background

Iraq is one of the Arab countries in the western Asia, situated on top of the Arabian Peninsula and consists of 18 provinces, which lies on borders with Turkey, Iran, Kuwait, Saudi Arabia, Jordan and Syria. Population of Iraq is about 30,399,572 million people with varying density distribution. Iraq is regarded as one of the richest countries in the world because of its natural resources, such as petroleum, gas, sulfur and agricultural products.

The weather condition of Iraq is harsh with hot and dusty in the summer and almost devoid of rain with dry cold in the winter. Iraq has more than 54 universities which cut across all the provinces and control by private organizations and government. Wireless network works proper within a short period of time [1, 4, 5] to integrate infrastructures. It's recommendation depends on verity networks resources so that when Wireless networks are augmented with (Ethernets and Fiber optics) networks, there will be increase in reliability and performance,

The contents of the thesis is for internal user only

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