Dedication

To my father

To my husband

To my brother & sister

To My colleagues

Acknowledgements

First of all, I would like to say Alhamdulillah, for giving me the strength and health to do this thesis work until it done. Not forgotten to my family for providing everything, they also supported me and encouraged me to complete this thesis
then I would like to thank my supervisor, Dr. Amin Babiker for introducing me, He has always shown keen interest in discussions. He was ready to help whenever I approached him. Last but not least, my colleagues who have contributed significantly to establish this thesis.

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List of Abbreviations

ADCs	analogue-to-digital converters
AMPS	Advanced Mobile Phone System
APN	Access Point Name
ASN	Access Service Network
ASN-GW	Access service network gateway
bps	bits per second
BPSK	binary phase shift keying
BSC	Base Station Controller
BTS	Base Transceiver Station

BWA	Broadband Wireless Access
CDMA	Code Division Multiple Access
CN	Core Network
CSI	channel state information
CSN	Connectivity Service Network
DACs	digital-to-analogue converters
DHCP	Dynamic Host Control Protocol
Diff Serv	Different services
DL	downlink
DSL	Digital Subscriber Line
EIR	Equipment Identity Register
eNB	e NodeBs
ESN	Electronic Serial Number
E-UTRAN	Evolved UMTS Terrestrial Radio Access
FDD	Frequency Division Duplex
FDMA	Frequency Division Multiple Access
GGSN	Gateway GPRS Support Node
GMSC	Gateway MSC
GPRS	General Packet Radio Service GR
GR	GPRS Register
GSM	Global System for Mobile communication or Group Special Mobile
GUI	Graphical User Interface
HARQ	Hybrid automatic repeat request
HLR	Home Location Register

IMTS	Improved Mobile Telephone Service
Int Serv	Integrated services
IP	Internet Protocol
IS-95	Interim Standard 95
ITU	International Telecommunication Union
JTACS	Japan Total Access Communication System
MAC	Medium Access Control
MIMO	multiple input, multiple output
MISO	multiple input, single output
MME	Mobility Management Entity
MMS	Multimedia Messaging Service
MS	Mobile Station
MSC	Mobile Switching Centre
MT	mobile termination
MTS	Mobile Telephone System
NAS	Non-Access Startum
NLOS	Non-Line-Of-Sight
OFDM	Orthogonal Frequency Division Multiplexing
OFDMA	Orthogonal Frequency Division Multiplexing Access
PAM	Pulse Amplitude Modulation
PAPR	Peak to Average Power Ratio
PDCP	Packet Data Convergence Protocol
PDP	packet data protocol
PPP	Point-to-Point Protocol
PSK	phase-shift keying
PSTN	Public Switched Telephone Network
PTP	Point-To-Point
PTT	Push to talk
QAM	quadrature amplitude modulation
QoS	Quality of service
QPSK	quadrate phase shift keying
RAN	Radio Access Network
RB	resource block
RF	Radio Frequency
RLC	radio link control
RNS	radio network subsystem

RRC	Radio Resource Control
SAE	System Architecture Evolution
SC-FDMA	Single Carrier Frequency Division Multiple Access
SER	signal error rate
SGSN	Serving GPRS Support Node
S-GW	Serving Gateway
SIM	Subscriber Identity Module
SIMO	single input, multiple output
SISO	single input, single output
SMS	Short Message Service
SNR	Signal to Noise Ratio
SOFDMA	Scalable OFDMA
SS	subscriber station
TDD	Time Division Duplex
TDMA	Time Division Multiple Access
TE	terminal equipment
UE	User Equipment
UL	uplink
UMTS	Universal Mobile Telecommunications System
UTRAN	UMTS terrestrial radio access network
VHE	Virtual Home Environment
VLR	Visitor Location Register
VOIP	Voice over IP
VTC	Video teleconferencing
WAP	Wireless Application Protocol
WCDMA	Wideband Code Division Multiple Access
Wimax	Worldwide Interoperability for Microwave Access

Abstract

The objective of this project is to study, analyze and evaluate the performance of digital modulation to the fourth-generation networks through the ability of error rate against signal to noise of BPSK and M-QAM.

The project completed by using descriptive analysis and simulation modeling using Matlab to get the results in the form of screens and graphics.

From results we note that the error rate decreases by increasing the ability of the signal noise. And then found that the 64QAM is the most

appropriate digital modulation for use with the fourth generation networks.

□□□□□□□□

الهدف من هذا المشروع هو دراسة وتحليل وت قييم اداء التعديلات الر قمية علي شبكات الجيل الرابع عن طريق معدل الخطأ ضد قدرة الأشارة للضجيج للدخل والتعديل المفتاحي للطور الثنائي و مصفوفه التعديل المطالي الرباعي.

تم انجاز المشروع باستخدام التحليل الوصفي ونمذجه المحاكاه باستخدام برنامج الماتلاب للحصول علي النتائج في شكل شاشات ورسومات بيانية.

من النتائج نلاحظ أن معدل الخطأ يتنا قص بزيادة قدرة الاشارة للضجيج.ومن ثم وجد أن التعديل المطالي الرباعي 64 هو أنسب تعديل يستخدم مع شبكات الجيل الرابع.