Dedication

I'm thanking:

" God

" My grandparents and extended family

" My supervisor who coached me through this Research and helped along the way

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مستخلص

ان التقدم الحديث في مجال الاتصالات اللاسكية زاد من كمية المعلومات التي يتم معالجتها في وقت محدد بواسطة الشبكات اللاسلكية وان الاعتماد علي استخدام القنوات اللاسكية زاد استخدامه , وكذلك انتشاراشاره التلفون المحمول خلال القنوات اللاسلكيه تشكل ظواهر متعدده التعقد مثل ظاهره الخفوت. و ان العمليات الرياضيه الدقيقه تحول هذه الظاهره من معقده الي قابله للتحليل والتعلم في مجال الاتصالات . وهنالك مجهودات كثيره بذلت في النمذجه الاحصائيه وكانت نتيجتها الحصول علي طريقه احصائيه منضبطه للنمذجه في الخفوت التي تعتمد علي الانتشار في البيئه ولكن في نفس الوقت هنالك تحديات واجهت الاتصالات اللاسلكية وهي الحوجة الي معدل معلومات عالية ونوعية جودة الخدمة وقابلية الحركة و التنقل والربط في الشبكات اللاسلكية ومشكله التداخل بين المتحدثين مع بعضهم البعض و الخفوت و سرية وحفظ المعلومات. في هذا البحث سوف نري كيف نحسب ونضع حدا متوسطا ليتم حل مشكلة خفوت إشارة الصوت في الموبايل المحمول. و المعروف ان الخفوت يحدث لعدة اسباب منها :-

1-الانعكاس-:نتيجة لارتطام الموجة مع جسم مثال سطح الارض- البنايات - الحيطان

2-الحيود-:نتيجة لتعرض الاشارة المرسلة او المستقبلة مع سطح ذو شفة حادة مثل انحناء الموجات حول العوائق

3-التشتت-: يحدث للموجات الكهرومغنطيسية عندما تسقط علي اجسام لها ابعاد متساوية او اكبر من طولها الموجي – مثال اوراق الشجر- اشارات الشوارع –انوار الاعمدة

4-وسرعه الموبايل

ولحساب مشكلة الخفوت نستخدم عمليات رياضية ونماذج مختلفة مبينه في الاطروحه وان من فضل تلك الوسيله هي الحصول علي الجوده اللازمه في الشبكه وزياده متوسط دخل المستخدم . وتلك هي اهم الخصائص في التعاقد مع الشبكات . وأن التحدي الاكبر الرئيس هو الخفوت والتنقل الذان يوجد ترابط بينهما في الجوده وان طريقه بناء الشبكه للموبايل يعتمد علي عوامل عده اهمها التضاريس .....الخ و بالتعامل مع هذه القيم يمكن أن تغطّي المناطق الفقيره (خارج المدى) بدون تركيب ابراج .....الخ

ان الهدف الرئيس لهذا المشروع هو التعرف علي خصائص التقسيم التشفيري لتعدد الوصوليه واكتشاف اساسياته لدراسه معاملات الخفوت للقنوات واكتشاف الطبقات الفيزيائيه التي يمكن ان تستخدمها بصوره فعاله

ومساهمة هذا البحث هو انه يلخص انواع مسببات الخفوت مثل ظاهرة دبلر وتاخير الانتشار.....الخ ثم عمل علي محاكات وتحليل للنتائج. والنتيجه المحصله يمكن ان تستخدم في تصميم شبكات اي اختيار نتائج عمليه مناسبه مع تضاريس السودان ويمكن التحقيق من جوده الموبايل في الاتصالات والتكيف مع التعديل في قنوات الخفوت واضعا في الاعتبار تحسين مختلف استخدامات الموبايل.

Abstract

Recent advances in wireless communication systems have increased the throughput over wireless channels and networks, at the same time; the reliability of wireless communication has been increased. A mobile signal propagation through wireless channel is a complicated phenomenon characterized by such problem as fading .A precise mathematical, description of this phenomenon is either unknown or too complex for tractable communication system analyses, however considerable efforts have been devoted to the statistical modeling and characterization of the different effects ,the result is a range of relatively simple and accurate statistical models of fading channels that depends on particular environmental propagation

Some of the challenges in wireless communications are:-

A need for high data rates, quality of service, mobility , portability, connectivity in wireless networks, interference from other users , (Fade),privacy/Security.

This research shows how to calculate and put suitable parameters to solve the fade out of fading of the signals in mobile station, .Fading, is caused by:-

1- Reflection. – Propagating wave impinges on an object which is large compared to the wavelength– e.g., the surface of the Earth, buildings, walls, etc.

2- Diffraction. – Radio path between transmitter and receiver obstructed by surface with sharp irregular edges– Waves bend around the obstacle, even when the line of the site does not exist.

3- Scattering. – Objects smaller than the wavelength of the propagating wave– e.g., foliage, street signs, lamp posts.

4-The Speed of the mobile handset

This Research aims to calculate and measure the fading uses of different statistical and model in this Research, allows for the graceful introduction of newer applications, thereby increasing the average revenue per user, in contract of network, Quality of Services provisioning in mobile network is more challenging primarily due to the fading and mobility which are most in corporate in the quality of services architectures designed for mobile network depend on the terrain, dealing with these parameters can cover the poor areas (out of range) without installing BTS.……etc.

The primary goal of this research work is to identify the basic characteristics of CDMA, explore fundamental concepts of the fading parameters of wireless channels and the physical layer .This can be consider as contribution which can effectively used. This research also summarizes the types of fading caused by Doppler spread and Delay spread.

Besides making simulation and analysis of results the concluded, the result can be used to design suitable network N.W to Sudan terrain, and make certain of the mobile quality on the communication range and adapted modulation with the fading channels, considering the improvement of the multi-user of mobile.

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Abbreviations

Abbreviation	Full Name
1G	First Generation Mobile Communications
2G	Second Generation Mobile Communications
3G	Third Generation Mobile Communications
A/D	Analog to Digital
AAL	ATM Adaptation Layer
Ac	Traffic carried
Al	Traffic lost
Ao	Traffic offered
APGW	Access Point Gateway
ATM	Asynchronous Transfer Mode
BER	Bit Error Ratio
BPSK	Binary Phase Shift Keying
BS	Base Station
BSC	Base Station Controller
BSS	Base Station System
BTS	Base Transceiver Station
C/I	Carrier-to-Interference Ratio
CDMA	Code Division Multiple Access
CELP	Code Exited Liner Predictive
CPSN	Central Power Switching Network
CRC	Cyclic Redundancy Check
CSM	Center Switch Module
DSSS	Direct-Sequence Spread Spectrum
dB	Decibel

Abbreviation	Full Name
E	Erlang
EFR	Enhanced Full-Rate
EVRC	Enhanced Variable Rate Coder
FCC	Federal Communications Commission
FDMA	Frequency Division Multiple Access
FHSS	Frequency Hopping Spread Spectrum
GMSK	Gaussian Minimum Shift Keying
GSM	Globe System for Mobil Communication
GoS	Grade of Service
GP	Geometric Program
IS-95	Industries Standard
ITU	International Telecommunications Union
LAWN	Local Area Walkup & Wireless Network
LOS	Line-of-Sight
MHz	Mega Hertz
MT	Mobile Station
MTSO	Mobile Telephone Switching Office
N-CDMA	Narrowband CDMA
NLOS	Non-Line of Sight
PN	Pseudo Noise
PSTN	Public Switched Telephone Network
QoS	Quality of Service
RPE-LTP	Regular-Pulse Excited Linear Predictive Codec
R-UIM	Removable User Identity Module
RX	Receive
SIM	Subscriber Identity Module
SS7	Signaling System No.7

Abbreviation	Full Name
TDMA	Time Division Multiple Access
TX	Transmit
UHF	Ultra-High Frequency
VHF	Very- High Frequency
WIN	Wireless Intelligent Network