الايه:

قال تعالى:

﴿ يَرْفَعِ اللَّهُ الَّذِينَ آمَنُوا مِنْكُمْ وَالَّذِينَ أُوتُوا الْعِلْمَ دَرَجَاتٍ وَاللَّهُ بِمَا تَعْمَلُونَ خَبِيرٌ)

صدق الله العظيم

(سورة المجادلة الآية (11

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First of all and always I thank our God "Allah" to make me live these moments.

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I send my greetings to my department, faculty, and my dear university of "SUST", and all there who helped me to achieve the master degree. Last but by no means least I would like to say: My parents, sisters(Noha, Nada, Sara, Mardeia), friend(safaa shabbo, M.Haroon), I missed you very much. You have a special place in my heart.

Dedications

To My Father ,

Mother,

Sisters, and

All Who Are in My Mind.

Abstract :

The Project present a vision for 4G cellular networks based on the concept. Long Term Evolution (LTE) has developed a new technology in order to enhance indoor coverage. This new technology is called femtocells (short distance) and is achieved with the use of access points installed by home users. However, interference problem between the femtocells and the macrocell to femtocell decreases the system's capacity.

The problem can be solved by process of cognitive interference management in user deployed 4G femtocell networks. Each femtocell cognitively recognizes an interference signature from the network environment and opportunistically locations. The proper channel patterns for interference minimization and base station pilot power is autonomously configured in order to maximize the cellular coverage.

Simulation results show great channel SINR improvement . cognitive interference recognition and data rate have improvement in femtocell .

:المستخلص

المشروع يوضح رؤية الشبكات الخلوية للجيل الرابع تعمل على أساس مفهوم التطوير المستمر وهى تكنولوجيا جديدة من اجل تعزيز التغطية فى الاماكن المغل قة تسمى الخلية المتناهية الصغر وتم تنفيذها عن طريق ذ قاط الوصول المهيئة بواسطة المستخدمين، بينما ان مشكلة التداخل بين الخلية المتناهية الصغر و الخلية الاساسية تؤدي الي ف قدان في سعة النظام.

يمكن حل المشكلة عن طريق عملية ادارة التداخل المدرک فى نشر الخلايا المتناهية الصغرعن طريق المستخدمين لشبكات الجيل الرابع .كل خلية متناهية الصغر ت قوم بادراک تداخل مرمز من بيئة الشبكة ومو قع تواجدها. النموذج المثالي لا قناة لت قليل التداخل و قدرة المحطة الاساسية من اجل زيادة مساحة التغطية للشبكات الخلوية.

نتائج المحاكاة تظهر قناة ذات افضل معدل تشويش لتداخل الاشارة ومعدل البيانات وهو تحسين يطبق من خلال تنفيذ طريق ة تطويرالخلية المتناهية الصغر.

Contents

Chapter One : Introduction

Chapter Two :Long Term Evolution

Chapter Three :Femtocell Concept

Chapter Fourth :Cognitive downlink interference management

Chapter five: Simulation and Results

List of Figures

List of Table

List of Abbreviations

2G	Second Generation
3G	Third Generation
3GPP	Third Generation Partnership Project
AGW	Access Gateway
4G	Fourth Generation of wireless cellular
BSC	Base Station Controller
BPSK	Binary Quadrature Phase Shift Keying
CSG	Closed Subscriber Group
CQI	Channel Quality Indicator
DL	Downlink
EPC	Evolved Packet Core
E-UTRAN	Evolved UMTS Terrestrial Radio Access Network
FAP	Femtocell Access Point
GGSN	Gateway GPRS Support Node
GPRS	General Packet Radio Service
GSM	Global System for Mobile Telephony
HeNB	Home Enhanced Node-B
HSPA	High Speed Packet Access
HSS	Home Subscriber Service
IFFT	Inverse Fast Fourier Transform
IP	Internet Protocol
ITU	International Telecommunication Union

LTE	Long Term Evolution
MME	Mobility Management Entity
MSC	Mobile Switching Center
OFDM	Orthogonal Frequency Division Multiplexing
OFDMA	Orthogonal Frequency Division Multiple Access
PAPR	Peak to Average Power Ratio
PCRF	Policy and Charging Rules Function
PDN	Public Data Network
P-GW	PDN Gateway
PL	Path Loss
PSTN	Public Switched Telephone Network
QAM	Quadrature Amplitude Modulation
QoS	Quality of Service
QPSK	Quadrature Phase Shift Keying
RAN	Radio Access Network
RN	Relay Node
RNC	Radio Network Controller
SAE	System Architecture Evolution
SC-FDMA	Single Carrier – Frequency Division Multiple Access
SGSN	Serving GPRS Support Node
S-GW	Serving Gateway
SINR	Signal to Interference plus Noise Ratio
SNR	Signal to Noise Ratio
UE	User Equipment
UL	Uplink
UMTS	Universal Mobile Telecommunication System
UPE	User Plane Entity
WCDMA	Wideband Code Division Multiple Access
WiMAX	Worldwide Interoperability for Microwave Access