DEDICATION

I dedicate this work . . .

To my mother . . .

To my Father.....

To my Brothers.....

To my family . . .

To my friends . . .

To my country . . .

Acknowledgment

First of all I thank **Allah** who gives me the power to bring this dream comes true.

My gratitude to my supervisor **Assoc. Prof. Dr. Rashid A. Saeed** who showed me a lot of patience and gave me precious direction and he was very interested in the study.

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ABSTRACT

This research investigates a handover problem occurring with current power control mechanisms in co-channel WCDMA heterogeneous networks. The problem is associated to the mismatch between the required uplink transmit power when a user is communicating to a small cell and an underlying microcellular base-station. As a result, there is a need for significant increases of users' transmit power when handing off from small cell to the macrocell tier. This sudden increase of the transmit power results in increased uplink interference and major SIR drops for existing small cell users. This research introduces a realistic and efficient solution to adapt the transmit power of the small cell users during the handover regime to prevent such SINR drops. Simulation results confirm significant performance improvement when using the proposed scheme.

المستخلص

هذا البحث يعمل علي حل مشكلة التسليم الصلب (Hard Handover) والتي تحدث زيادة أو انقاص في قدرة اشارة الهاتف والتي تعرف ب Power control mechanism في شبكة متنوعة (Heterogeneous network) تعمل بنظام الايصال بتقسيم الخوارزميات الواسع المتعدد (WCDMA). وتتجلي المشكلة في عدم التطابق ما بين القدرة المرسلة الصاعدة عندما يكون المستخدم متصلا ب الخلية الصغري (Smallcell) والخلية من نوع ماكرو(Macrocell) في نفس الوقت. هنا يحتاج المستخدم الي زيادة قدرته عند حدوث عملية الانتقال من الخلية الصغري الي الخلية ماكرو. الزيادة المفاجئه في القدرة ينتج عنها زيادة في عملية التداخل بين اشارات المستخدم والمستخدمين الاخرين. هذا البحث وضع طريقة حل واقعية وفعالة ليتم تكييف قدرة اشارة المستخدم أثناء عملية الانتقال والتسليم. نتائج المحاكاة أثبتت كفائة الحل.

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List of Abbreviations

Abbreviation	Abbreviation name
AMPS	Advanced Mobile Phone Service
BSC	Base Station Controller
CDMA	Code Division Multiple Access
CN	Core Network
CPICH Ec/No	Common Pilot Channel energy per noise density
CR	Critical Ratio
DCH	Dedicated Channel
DPDCH	Dedicated Physical Data Channel
DS-CDMA	Direct-Sequence Code Division Multiple Access
ETSI	Europe Telecommunications Standards Institute
FDD	Frequency Division Multiple Access
FDMA	Frequency Division Duplexing
GPRS	General Packet Radio Service
GSM	Global System for Mobile
HSCSD	High Speed Circuit Switched Data
ISDNs	Integrated Services Digital Networks
MS	Mobile Station
PDC	Personal Digital Cellular
PLMNs	Public Land Mobile Networks
PSTNs	Public Switched Telephone Networks
RNC	Radio Network Controller
RRM	Radio Resource Management
RTT	Radio Transmission Technology
SIR	Signal to interference ratio
TDD	Time Division Duplex
TDMA	Time Division Multiple Access
TIA	Telecommunications Industry Association
TW	Time Window
UE	User Equipment

UMTS	Universal Mobile Telecommunication Services
USIM	Subscriber Identity Module
WCDMA	Wide Code Division Multiple Access