# Dedication

To my father, Dr.MohammedElrida, my mother Najat Omer, my lovely wife NuhaEdres, my wonderful child Moemen, my brothers and sisters.

# ACKNOWLEDGEMENTS

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# المستخلص:

هناك نوعان من إشارات التزامن المستخدمة في التزامن والبحث الخلوي اشارة التزامن الاساسية(PSS)واشارة التزامن الثانوية(SSS). اشارة التزامن الاساسية تستخدم عندما يحتاج جهاز المستخدم للاتصال للمرة الاولى او التطلع لتسليم خلية اخرى(Hand Over) واشارة التزامن الثانوية تستخدم لمد جهاز المستخدم بالمعلومات حول هوية الخلية والخصائص الزمنية للاطار (Frame). تم عمل الصناديق في الرسم البياني تبعا لبعضها البعض والتغذية الاسترجاعية تتحكم بالاشارات لضمان استقرارالمستقبللنظام الفرعي(Receiver sub-system) .

التطور طويل الأمد للمستقبل(Receiver)لابد من استخدام(Cross-correlation) لتقدير تعريف القطاع وتمكين تعريف هوية الخلية.وقمنا ببناء اجراءات تتضمن سرعة وتعزيزمزامنةالتردد ومزامنة الزمن والقطاع وتحديد هوية الخلية .

النتائج من مخططنا تبين ان معدل الفشل لتحديد هوية الخليه ان تكون على الاقل يصل إلى معدل غياب القطاع اذا تم الحصول على معلومات القطاع بشكل صحيح باشارة التزامن الاساسية (PSS) فان تقدير الخلية يكون صحيحا في اغلب الحالات. القمم الكبيرة تشير الى نجاح التزامن ونجاح تحديد هوية الخلية.

# ABSTRACT

There are synchronization signals used in the cell search and synchronization is the Primary Synchronization Signal (PSS) and Secondary Synchronization Signal (SSS). Primary Synchronization Signal is used when user equipment (UE) connects to a cell or it is looking to make a cell handover and SSS is used to get information about the cell identity and frame timing properties.Blocks in flow chart are adjusted to each other and feedback control signals guarantee the stability of the receiver sub-system.

For the Long Term Evolution (LTE) receiver, cross-correlation used to estimate the sector identity and enable cell identification. The proposed procedure including fast and enhanced frequency synchronization, timesynchronization, and cell identification.

The results of the scheme show that the fail rate of the overall cell identity must be at least as high as the sector miss rate .If the sector information is correctly acquired by the PSS signal; the cell is estimated correctly in most cases. A significant peak indicates a successful synchronization and cell identification.

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# List of Abbreviations:

3G Third Generations

4GFourth Generation

3GPP3rd Generation Partnership Project

3GPP23rd Generation Partnership Project2

BCH Broadcast Channel

CDMACode Division Multiple Access

CFOCarrier Frequency Offset

CPCyclic Prefix

DCDirect Sequence

DS-CDMADirect Sequence-Code Division Multiple Access

FDDFrequency Division Duplexing

FDMFrequency Division Multiplexing

FDMAFrequency Division Multiple Access

FFT Fast Fourier Transform

FMFrequency Modulation

GPRSGeneral Packet Radio Service

GSMGlobal System of Mobile

ICIInter Carrier Interference

IFFTInverse Fast Fourier Transform

ISIInter Symbol Interference

LTELong Term Evolution

MIBMaster Information Block

OFDMAOrthogonal Frequency Division Multiple Access

PAPRPeak -to- Average Power Ratio

PBCHPhysical Broadcast Channel

PCIPhysical Cell Identity

PRACHPhysical Random Access Channel

PSSPrimary Synchronization Signal

RSSIReceived Signal Strength Indicator

SC-FDMA Single Carrier-Frequency Division Multiple Access

SIB System Information Block

SSS Secondary Synchronization Signal

TDDTime Division Dublexing

TDMA Time Division Multiple Access

UEUser Equipment

UMTSUniversal Mobile Telecommunications System

WCDMA Wide Code Division Multiple Access

ZCZadoff-chu