بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

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MONA MAGHRABY

A GILBERT CELL BASED GAIN AND PHASE MISMATCH CALIBRATION LOOP FOR 5G BEAMFORMERS

By

Mohamed Kamel Mohamed Hussein

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the Degree of
MASTER OF SCIENCE
in
Electronics and Communications Engineering

FACULTY OF ENGINEERING ,CAIRO UNIVERSITY
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Title of Thesis:

A Gilbert Cell Based Gain and Phase Mismatch Calibration Loop for 5G Beamformers

Key Words:
5G mobile networks; mm-Wave beamformers; calibration; Gilbert cell

Summary:
This thesis explores some calibration methods for gain and phase mismatch between beamformer channels responsible for either RF signals transmission or reception through a mmw 5G antenna array. These methods eliminates thos e mismatches leading to improve the accuracy of the direction of the beam and the exact distance between the transmitter and the receiver . The thesis represents an innovative low power calibration loop that is implemented in TSMC 65nm BiCMOS technology. The design procedure and the layout implementation for all of the building blocks are studied in detail and the simulation results for each block and for the top level will be presented to show the impact of the loop on the overall system performance

Disclaimer

I hereby declare that this thesis is my own original work and that no part of it has been submitted for a degree qualification at any other university or institute.

I further declare that I have appropriately acknowledged all sources used and have cited them in the references section.

Name: Mohamed Kamel Mohamed Hussein Date:

Signature:

Dedication

To Mom, Zeinab Omar

To Dad, Kamel Mohamed Hussein

To my sister, Noha

To my nieces, Jana and Jomana

To All of my great teachers and Professors

To my friend and Colleagues

And to all of my colleagues at Analog Devices, Egypt design center.

THANK YOU...

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