LOW COMPLEXITY SSB LOCATION ESTIMATION IN 5G NR

A Project Report

submitted by

VISHNU RAGHU

in partial fulfilment of the requirements

for the award of the degree of

MASTER OF TECHNOLOGY



DEPARTMENT OF ELECTRICAL ENGINEERING INDIAN INSTITUTE OF TECHNOLOGY MADRAS. MAY 2019

THESIS CERTIFICATE

This is to certify that the thesis titled SSB, submitted by VISHNU RAGHU, to the

Indian Institute of Technology, Madras, for the award of the degree of Master of Tech-

nology, is a bonafide record of the research work done by him under our supervision.

The contents of this thesis, in full or in parts, have not been submitted to any other

Place: Chennai

Institute or University for the award of any degree or diploma.

Prof. Radha Krishna Ganti

Research Guide Assistant Professor Dept. of Electrical Engineering IIT-Madras, 600 036

Date: 5th May 2019

ACKNOWLEDGEMENTS

Throughout my project I received a lot of support and assistance. I take this opportunity to extend my sincere gratitude to all those who have helped me to successfully complete this project work.

I would like to thank my guide **Prof Radha Krishna Ganti** for his proper guidance and support.

I would like to acknowledge my mentor **Dhivagar B.** Lead Research Engineer, Center of Excellence in Wireless Technology (CEWiT). who helped me in formulating the problem statement and guiding me throughout the project.

In addition, I would like to thank my **parents** for their wise counsel and sympathetic ear. Finally, there are my **friends**, who were of great support in deliberating over our problems and findings, as well as providing happy distraction to rest my mind outside of my project work.

ABSTRACT

KEYWORDS: 5G NR, SSB,PSS,Synchronization Procedure.

Synchronization between the user equipment (UE) and the base station (gNB) is a fun-

damental physical layer procedure in the cellular system and performed by synchro-

nization signal. This thesis proposes an algorithm to locate the synchronization signal

block in a faster way by using the correlation property of the PSS sequence even in the

presence of fractional offset in the carrier frequency.

ii

CHAPTER 1

INTRODUCTION

Due to confidentiality issues only abstract is uploaded. Complete thesis has been submitted to Dr. Radha Krishna Ganti. Kindly contact professor for full thesis

REFERENCES

- 1. **3GPP** (2019a). NR; Physical Channels and Modulation Release 15,2019,V.15.5.0.
- 2. **3GPP** (2019b). NR; Physical Layer Procedures for Control Release 15,2019,V.15.5.0.
- 3. **Omri, A., M. Shaqfeh, A. Ali**, and **H. Alnuweiri** (2019). Synchronization procedure in 5g nr systems. *IEEE Access*, **7**, 41286–41295. ISSN 2169-3536.
- 4. **Shoujun Huang, Yongtao Su, Ying He**, and **Shan Tang**, Joint time and frequency offset estimation in lte downlink. *In 7th International Conference on Communications and Networking in China*. 2012.