

# Vienna LTE Simulators

## LTE-A Link Level Simulator Documentation, v1.1

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### Abstract

This document contains documentation on how to use the Long Term Evolution Advanced (LTE-A) Link Level simulator [1] from the Vienna LTE simulator suite, as well as some insight on its structure and the assumptions that were made while developing it. This simulator is an extension of the previously published Vienna LTE Link Level Simulator. This document gives an introduction on how to use the simulator. The concept and the structure of the simulator is described in more detail in [2].

### I. FOREWORD

The LTE-A link level simulator is published under a non-commercial academic use license. Please make sure that you understand the terms and conditions of the license before you use any of the available software packages. Would you require a license different to a non-commercial academic one please contact Stefan Schwarz, Michal Simko or Josep Colom Ibane.

The detailed license agreement for the LTE-A Link Level simulator can be found in Section XVIII. Please read the license agreement carefully, as parts of the code are under the GNU Lesser General Public License [3], and the MIT License [4].

### II. RUNNING THE SIMULATOR FOR THE FIRST TIME

The LTE-A Link Level simulator is provided with several test simulation scenarios that can be used to verify that the simulator runs in the expected way.

In the `./examples` directory you can execute the `LTE_sim_batch_quick_test` MATLAB script. This script provides a means to test the performance of a single user Long Term Evolution (LTE) transmission on an uncorrelated TU channel for several transmission modes [5] and antenna configurations (number of transmit antennas  $N_t$ , times number of receive antennas  $N_r$ ). All simulated transmission modes (Single-Input Single-Output (SISO), Transmit Diversity (TxD), Open Loop Spatial Multiplexing (OLSM) and Closed Loop Spatial Multiplexing (CLSM)) utilize User Equipment (UE) feedback to adapt important transmission parameters (code rate, modulation alphabet, Multiple-Input Multiple-Output (MIMO) preprocessing) to the channel quality (see [6] for details). The script produces plots of the cell throughput obtained with the different transmission modes. To verify their correctness, these plots can be compared to the figures provided in the subdirectory `./LTE_quick_test_results` of the directory `./examples` or to the curves shown in Figure 1. The result of the simulation is a group of result files that is stored in the `./results` folder. Details to the simulation setup can be found in [7].

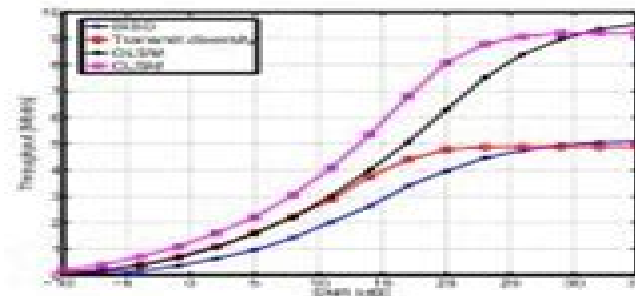


Fig. 1. Plots resulting from running the `LTE_sim_batch_quick_test` MATLAB script

# Lte System Level Simulator Documentation Tu Wien

**Zhe Xu**



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### **Table of Contents Lte System Level Simulator Documentation Tu Wien**

1. Understanding the eBook Lte System Level Simulator Documentation Tu Wien
  - The Rise of Digital Reading Lte System Level Simulator Documentation Tu Wien
  - Advantages of eBooks Over Traditional Books
2. Identifying Lte System Level Simulator Documentation Tu Wien
  - Exploring Different Genres
  - Considering Fiction vs. Non-Fiction
  - Determining Your Reading Goals
3. Choosing the Right eBook Platform
  - Popular eBook Platforms
  - Features to Look for in an Lte System Level Simulator Documentation Tu Wien
  - User-Friendly Interface
4. Exploring eBook Recommendations from Lte System Level Simulator Documentation Tu Wien
  - Personalized Recommendations
  - Lte System Level Simulator Documentation Tu Wien User Reviews and Ratings

- Lte System Level Simulator Documentation Tu Wien and Bestseller Lists
- 5. Accessing Lte System Level Simulator Documentation Tu Wien Free and Paid eBooks
  - Lte System Level Simulator Documentation Tu Wien Public Domain eBooks
  - Lte System Level Simulator Documentation Tu Wien eBook Subscription Services
  - Lte System Level Simulator Documentation Tu Wien Budget-Friendly Options
- 6. Navigating Lte System Level Simulator Documentation Tu Wien eBook Formats
  - ePub, PDF, MOBI, and More
  - Lte System Level Simulator Documentation Tu Wien Compatibility with Devices
  - Lte System Level Simulator Documentation Tu Wien Enhanced eBook Features
- 7. Enhancing Your Reading Experience
  - Adjustable Fonts and Text Sizes of Lte System Level Simulator Documentation Tu Wien
  - Highlighting and Note-Taking Lte System Level Simulator Documentation Tu Wien
  - Interactive Elements Lte System Level Simulator Documentation Tu Wien
- 8. Staying Engaged with Lte System Level Simulator Documentation Tu Wien
  - Joining Online Reading Communities
  - Participating in Virtual Book Clubs
  - Following Authors and Publishers Lte System Level Simulator Documentation Tu Wien
- 9. Balancing eBooks and Physical Books Lte System Level Simulator Documentation Tu Wien
  - Benefits of a Digital Library
  - Creating a Diverse Reading Collection Lte System Level Simulator Documentation Tu Wien
- 10. Overcoming Reading Challenges
  - Dealing with Digital Eye Strain
  - Minimizing Distractions
  - Managing Screen Time
- 11. Cultivating a Reading Routine Lte System Level Simulator Documentation Tu Wien
  - Setting Reading Goals Lte System Level Simulator Documentation Tu Wien
  - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Lte System Level Simulator Documentation Tu Wien
  - Fact-Checking eBook Content of Lte System Level Simulator Documentation Tu Wien
  - Distinguishing Credible Sources

13. Promoting Lifelong Learning
  - Utilizing eBooks for Skill Development
  - Exploring Educational eBooks
14. Embracing eBook Trends
  - Integration of Multimedia Elements
  - Interactive and Gamified eBooks

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