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Software Platforms Of 5g

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Abstract

With the rapid development of technology, the 5th generation of wireless communications has begun to be used in different countries, and we are also used in some places. 5G systems are expected to have significantly higher network capacity and channel bandwidth, which will satisfy the increased demands of users and provide support for new services. However, the development of 5G systems will inevitably face new technical problems, in particular, the need to guarantee inter-terminal communication, high energy consumption, the widespread availability of wireless communications. This dissertation examined new technologies that implement the 5G network infrastructure, analyze the prospects for standardization of new generation wireless systems.

Key words: high energy consumption, the widespread availability of wireless communications, MATLAB, Transmitter, Channel, Receiver, Synchronization.

Introduction

The Open-Air Interface(OAI) platform includes a full software implementation of fourth generation mobile cellular systems which complies with 3GPP LTE standards which is coded

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in C language under real-time Linux which dedicated for x86. At the physical layer, it provides the following features:

- LTE release 8.6, with a subset of Release 10;
- FDD and TDD configurations in 5, 10 and 20 MHz bandwidth;
- Transmission mode: 1 (SISO), and 2, 4, 5, and 6 (MIMO 2x2);
- CQI/PMI reporting;
- HARQ support (UL and DL);
- Highly optimized baseband processing (including turbo decoder).

This are the operations made and practically defined when the LTE was new. Currently, MATLAB has performed some operations to generate the type of signals which would be expected during 5G. We have picked MATLAB simulations to define the different results being obtained between WLAN (Wireless Local Area Network), LTE (Long Term Evolution) and LTE A (LTE Advanced) and 5G.

Wireless Local Area Network (WLAN):

As a necessity, wireless connectivity for computers has been well established and basically all new laptops have a Wi-Fi capability. The WLAN solutions that are available the IEEE 802.11 standard, often termed as Wi-Fi has become the de-facto standard. With operating speeds of systems using the IEEE 802.11 standards of around 54 Mbps being commonplace, Wi-Fi can compete well with wired systems.

To increase the flexibility and performance of the system, Wi-Fi “hotspots” are widespread and in common use. These enable people to use their laptop computers as they wait in hotels, airport lounges, cafes and many other places using a wire-less link rather than needing to use a cable.

In addition to the 802.11 standards being used for temporary connections, and for temporary Wireless Local Area Network, WLAN applications, they may also be used for more permanent installations. In offices WLAN equipment may be used to provide semi-permanent WLAN solutions. Here the use of WLAN equipment enables offices to be set up without the need for permanent wiring, and this can provide a considerable cost saving. The use of WLAN equipment allows changes to be made around the office without the need to re-wiring.

WLAN simulations results from Matlab:
WLAN transceiver:

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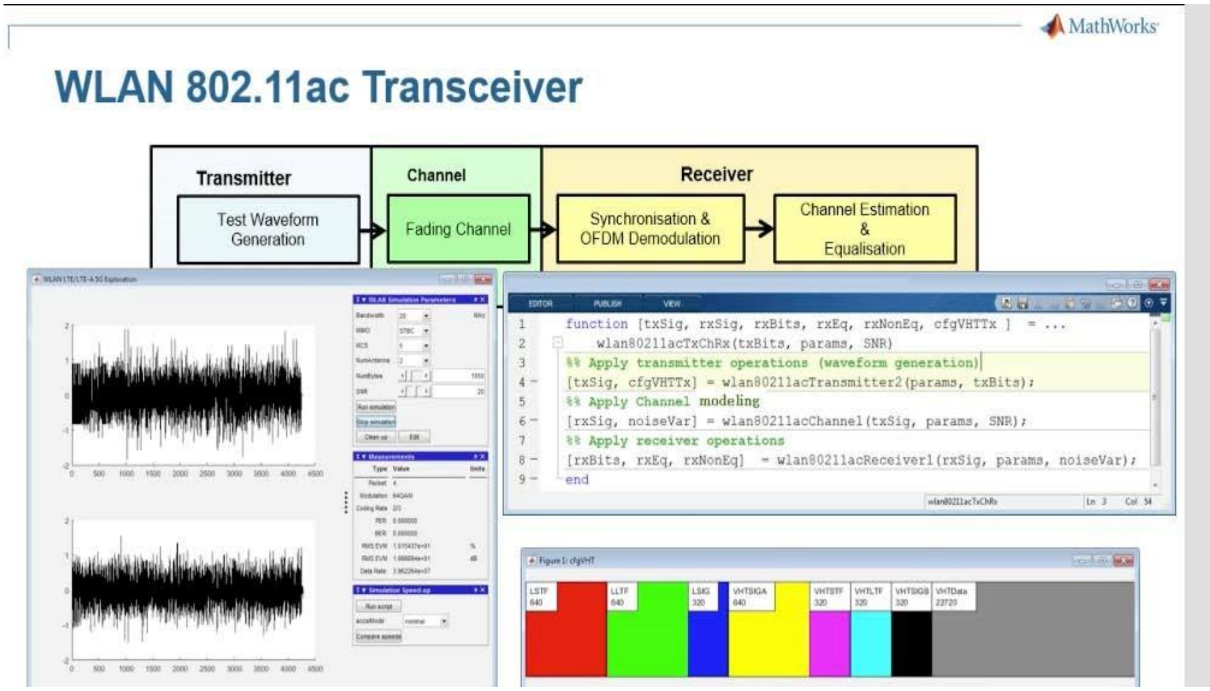

Figure 1: Block Diagram and Code functionalities of WLAN

Transmitter: A transmitter side is an equipment or tool used to generate and transmit electromagnetic waves carrying messages or signals especially those of like radio signals. Here we would be using transmitter as an input function used to generate a test waveform.

Channel: A channel can be defined as the bandwidth used to allocate the frequencies used for radio and television transmission. A fading channel can be referred to a communication channel that experiences fading. In wireless systems, fading can be due to a multipath propagation and due to shadowing from obstacles affecting the wave propagation, referred to as shadow fading.

Receiver: Similarly, to the transmitter side which is used to transmit the signals, there is a receiver side which is there to receive those signals. We have two operations at the receiver side they are synchronization and OFDM demodulation and channel estimation and equalization.

Synchronization: In wireless communication, the receiver side should determine the time instants for the incoming signal which needs to be sampled (timing synchronization). For bandpass communications, the receiver needs to take the frequency and the phase of its local carrier oscillator with those of the received signal which will be termed as carrier synchronization.

WLAN Transceiver:

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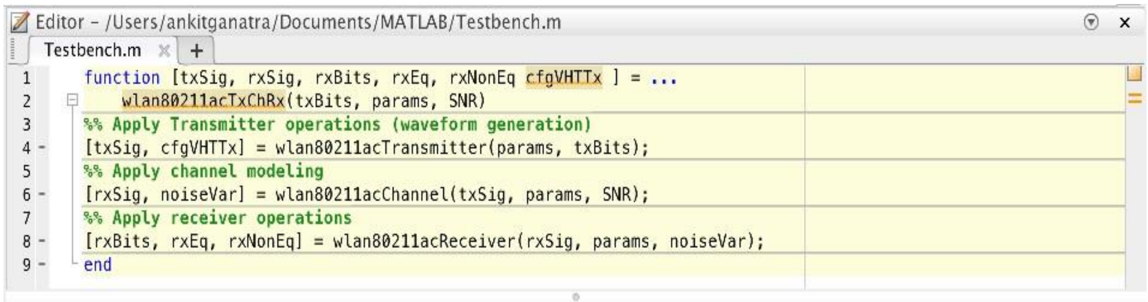

Figure 2: Test bench code for WLAN Transceiver

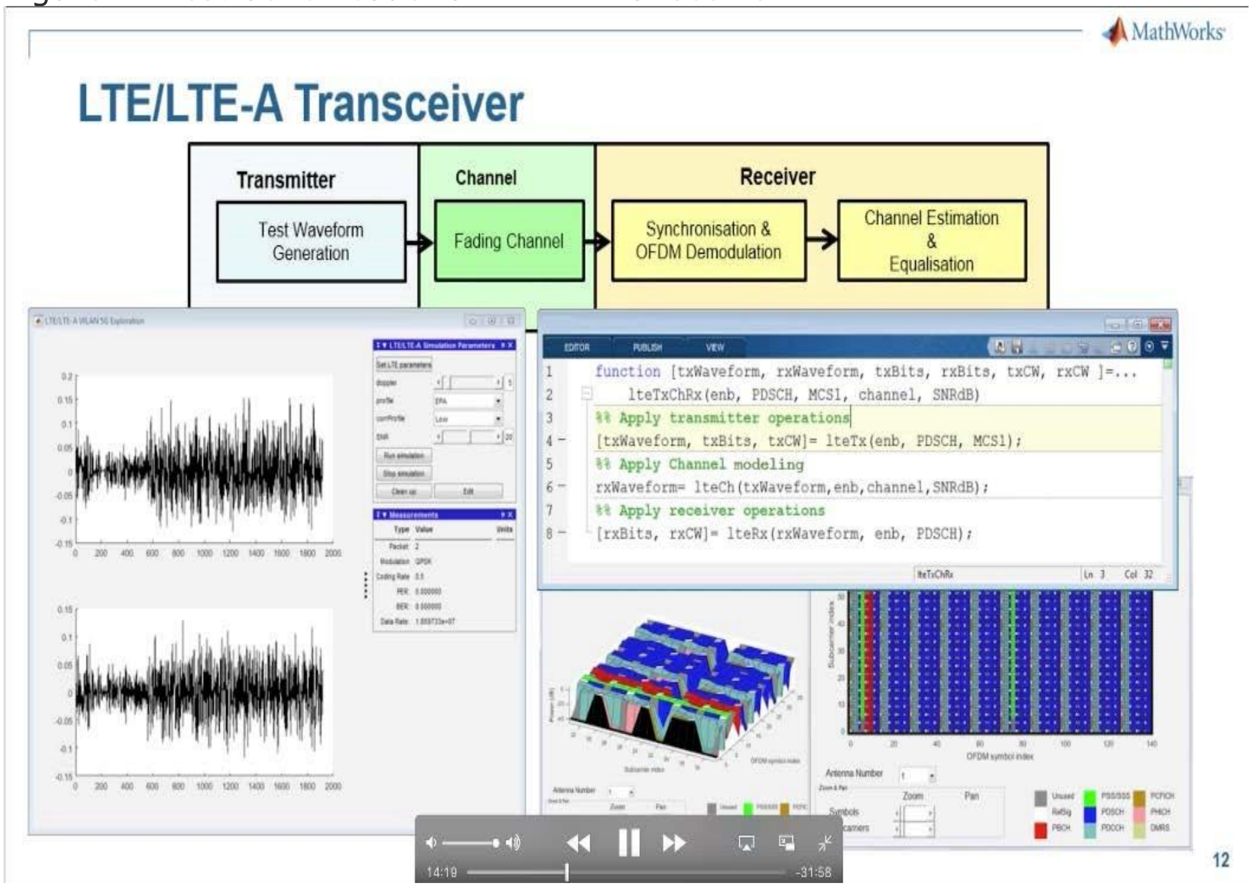

Figure 3: Block Diagram and Code functionalities of LTE/LTE A

LTE/LTE A Transceiver:

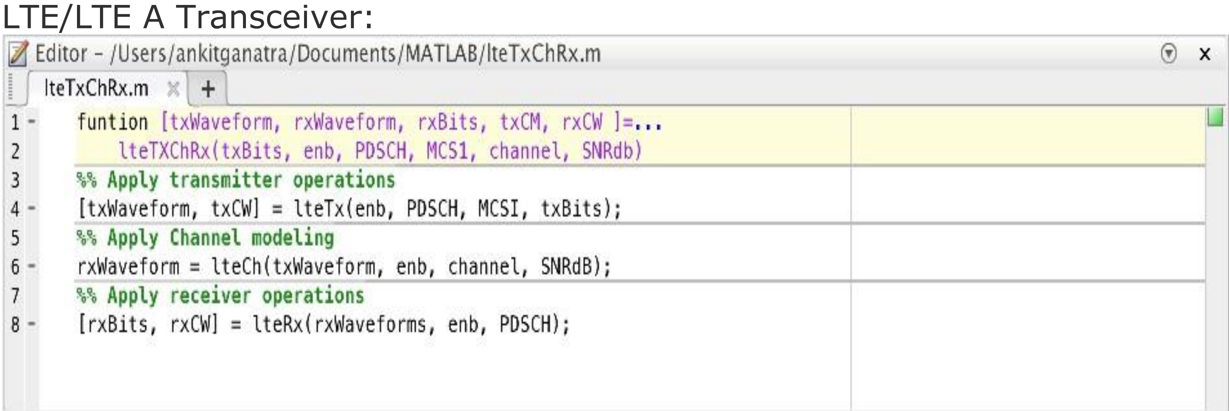

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Figure 4: Function code for LTE/LTE A

We can observe that we have set some different and unique parameters which are capable of giving us some good waveforms defining the LTE parameters and specifications. Here we are setting a eNodeB (Enhanced node B) Parameters or Physical Downlink Shared Channel (PDSCH) the parameters that reflect the MIMO mode which goes through the PDSCH which contains the used data. The first function at eNodeB relates with the transmission bandwidth.

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