

LTE Made Simple

Web Based Training Duration:

- app. 3 hours

Web Based Training Description:

- This Web Based Training addresses the needs of everybody who needs to understand the technology and concepts of LTE as the future 4G standard of 3GPP.
- After the general introduction to 4G standards is given, the Web Based Training starts with an introduction of the requirements of LTE.
- The following part presents important characteristics of the key layer 1 technologies: OFDM and MIMO.
- The Web Based Training continues with a description of the LTE L1. Among others we evaluate in detail the application of essential technologies like OFDMA for the downlink and SC-FDMA for the uplink in LTE as well as the LTE frame structure.
- This part concludes with the discussion of the physical layer procedures.
- The next chapter evaluates in detail the higher layer protocols of E-UTRAN.
- This chapter is presenting the initial context setup procedure of LTE and is describing the data flow of a TCP/IP packet through the protocol layers.

Some of your Questions that will be answered:

- What is LTE and why it is introduced in the first place?
- What are the requirements for LTE and how do they differentiate from those of UMTS?
- What are the key characteristics of LTE's (E-UTRAN's) layer 1 and layer 2/3?
- How does the LTE and SAE (System Architecture Evolution) evolved mobile radio network look like?
- How do the basic physical layer technologies of LTE like OFDM and MIMO work?
- How the physical frame structure is facilitating the use of a flexible bandwidth allocation?
- How the physical layer procedures work in LTE?
- How the throughput of the UE categories can be calculated?
- What are the tasks of the higher layer protocol entities and functions of the enhanced node B: MAC, RLC, PDCP, and RRC?
- How in detail the TCP packets travel through the protocol layers?

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- Overview and Outlook of the technical Evolution
- Performance and Mobility Management related Issues
- Architecture related Issues
- Procedure and Radio related Issues
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- AIPN - What does it mean?
- LTE and System Architecture Evolution (SAE)
- The Control Plane Protocol Stack
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- X2 Interface Control Plane Protocol Stack
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- Quiz 2: E-UTRAN Protocol Stack and Channel Overview

Part 2: Key Technologies of the LTE Physical Layer

- Introduction of OFDM Technology
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- LTE Modulation schemes
- OFDM Issues and Solutions
- ... and the solution in OFDM: Cyclic Prefix
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- Logical Channels in E-UTRAN
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- LTE Frame Structure (FDD)
- Resource Block and Resource Element Definition
- Overview of Important Identifiers in LTE
- Quiz 6: Frames and Identifiers
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Part 4: The Higher Layers of E-UTRAN

- Features of the MAC Layer
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- RRC State Characteristics
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- **Quiz 8: Higher Layer Protocols**
- **LTE and SAE Bearer Architecture and Relationships**
- **The QoS-Profile of the LTE / SAE-Bearer**
- **QoS Classes Identifier**
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- **The Initial Context Setup Procedure**
- **The Initial Context Setup Procedure (continued)**
- **The Initial Context Setup Procedure (continued)**
- **How a TCP/IP MTU reaches the UE / the Internet**
- **Quiz 10: Initial Attachment**