

LTE EVOLUTION AND 5G

Course Description

The course LTE Evolution and 5G provides a technical overview of the most important features introduced/planned for LTE in 3GPP Release 13, 14 and 15 (the Rel-13+ evolution of LTE is, by 3GPP, referred to as "LTE-Advanced Pro"). The course also describes emerging 5G technologies as defined by 3GPP from Rel-15 and onwards. Both radio and core network related features are covered, but focus is on radio interface/network functionality.

This course is kept up to date in step with evolving standards for LTE and 5G. The contents listed in bullets below may therefore change slightly from one course event to the next. The chapters on 5G will be expanded as the standard develops and other chapters will therefore, as a consequence, be reduced in length/detail.

Content

LTE/LTE-A Overview

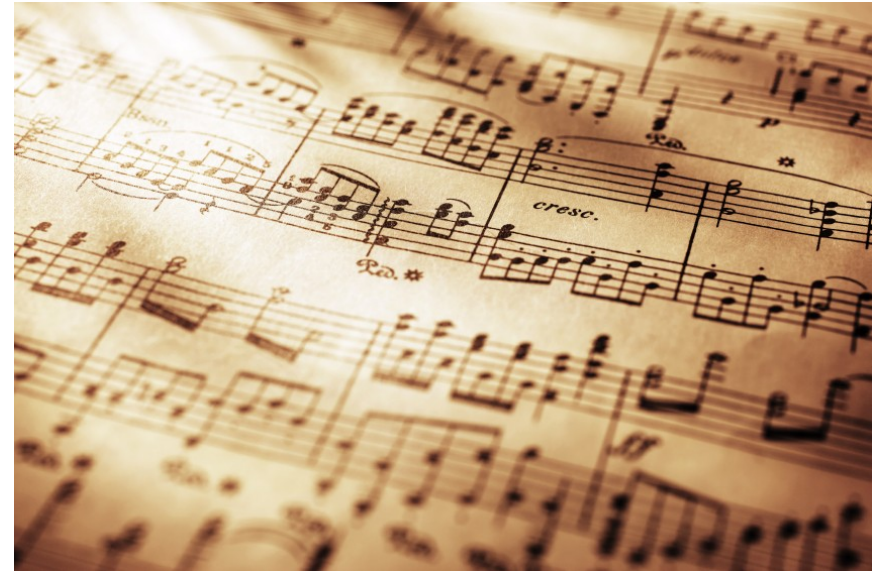
- Refresh of LTE/LTE-A physical layer concepts
- Central LTE-A features in R10-R12 (8x8 MIMO, Carrier Aggregation, CoMP, Dual Connectivity, ...)

LAA and LWA

- Unlicensed spectrum deployment challenges
- Licensed-Assisted Access (LAA)
- LTE/WLAN Aggregation (LWA)

DEVICE-TO-DEVICE SERVICES (D2D/ProSe)

- Direct Discovery and Direct Communication
- New nodes, interfaces and protocols
- Sidelink radio resource management



VEHICLE-TO-ANYTHING SERVICES (V2X)

- Basic concepts (V2V, V2P, V2I etc)
- New network architecture for V2X
- V2X use of LTE Sidelink radio resources

CELLULAR INTERNET OF THINGS

- eMTC: category M1 and M2 UEs
- NB-IoT: category NB1 and NB2 UEs
- EPC optimizations for CioT

5G OVERVIEW

- Expected use cases (eMBB, mMTC, URLLC) and related performance requirements
- Timeline for 5G standards (radio and core)

5G RADIO ACCESS NETWORK (NGRAN)

- NGRAN nodes and interfaces
- Architecture (CU/DU split and CP/UP split)
- Dual Connectivity scenarios for LTE/NR
- NGRAN protocol stacks

5G NEW RADIO (NR)

- Non-Stand Alone NR (first deployment)
- NR protocol stack
- NR spectrum usage
- Massive MIMO and Beamforming
- NR radio frames and OFDM numerology
- Overview of NR physical channels

5G CORE NETWORK (5GC)

- EPC evolution towards 5GC (DCN, CUPS, ...)
- Introduction to SDN, NFV and network slicing
- 5GC network functions and interfaces
- Service-based architecture
- 5GC QoS concepts

Target audience

This course is applicable for Engineering Professionals within the Telecom community. Radio Access Network Engineers, Core Network Specialists, Quality and Performance Engineers, NMC and NOC specialists, Mobile Application Development Managers and other Technical Specialists working in the sector.

Pre-requisites

Good technical knowledge about the LTE physical layer and, to some extent, the Evolved Packet Core is highly recommended but not mandatory.

Course length

2 days

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