



Overview

This course takes the participant through the transition of a LTE network to a 5G network based on the current 3GPP standardization process following the ITU IMT2020 framework. It highlights the main additions and modifications to overlay 5G on top of existing network infrastructures as well as options for new *greenfield* network deployments. The participant will learn the key roles of the new and updated network elements and how these elements are connected together via the transmission system. The role and impact of virtualization and software defined networking (SDN) will be explained in a 5G concept. The basic concepts of what makes 5G systems different to a LTE network are also highlighted.

You will be able to

- Explain the 5G roadmap
- Compare 5G and LTE
- Understand the operation of the 5G air interface
- Identify the 5G network components
- Describe the 5G connection life cycle

Who can benefit

Technical managers, consultants, engineers and communications professionals who need to understand more detail regarding the 5G network.

Pre requisite knowledge

Participants should have a basic understanding of cellular communications.

Outline

Introduction

- What is 5G?
- The IMT-2020 process
- 5G system capabilities
- Spectrum & licencing
- mmWave radio frequency
- Licensed Assisted Access (LAA)
- LTE/WLAN Aggregation (LWA)

Network Evolution

- Evolution from LTE to LTE-Advanced Pro
- LTE Release 8-13
- Roadmap to 5G
- 5G System Architecture

NR Air Interface

- Basic principles of OFDMA
- Carrier aggregation
- Radio frame structure
- Radio Resource Management
- The radio protocol architecture
- Radio channels

The 5G NG-RAN

- NG-RAN standalone & non standalone architecture and terminology
- Dual connectivity
- The Next Generation Node B (gNB)
- Cloud RAN concepts
- NG-RAN Interfaces
- The bearer model
- The control plane
- Massive MIMO and Beamforming
- The transmission network & SD-WAN

The 5G NG-Core

- NG-Core system architecture and terminology
- Core network principles of operation
- QoS architecture
- Use of NFV, SDN & Orchestration
- Network security for 5G

5G Connection Life Cycle

- Initial network connection
- Registration & security procedures
- Connection establishment
- Handover & mobility management
- Intersystem handover to/from LTE & UMTS

5G Service Architecture

- Service architecture and Web APIs
- Network slicing
- uRLCC
- Internet of Things, NB-IoT and Machine Type Communications
- eMBB
- V2X applications
- Critical communications

Practical scenarios, review questions & section summaries throughout

DURATION 3 days

MAXIMUM CLASS SIZE 12