5G NR Air Interface

5G_308x | Expert-Led Live | 5G Access | ⚙⚙⚙
Course Duration: 2 days

This course takes an in-depth look at the 5G NR Air Interface and key operations that enable a 5G network to support the target 5G services. Key features of 5G NR such as flexible frame structure, DL and UL channels and signals and their functions are described in detail. The data transfer in both downlink and uplink, handovers and idle modes operations are discussed. This training is delivered in a blended form with elements of self-paced and instructor led to enhance the learning experience and effectiveness.

Intended Audience

RAN design and performance engineers and related job functions.

Objectives

After completing this course, the student will be able to:

- List 5G requirements and identify 5G NR features to meet these requirements
- Describe the frame structure with numerology of the air interface
- List downlink and uplink signals and channels and describe their function
- Identify key steps of network acquisition, random access, and connection setup
- Explain how data is transferred in the downlink and the uplink
- Step through the handover and idle/inactive mode operations

Course Prerequisites

Welcome to 5G

Outline

1. 5G NR Foundation
1.1 5G Services and performance goals
1.2 5G Building blocks
1.3 Key features of 5G NR Air Interface
1.4 NSA and SA deployments
1.5 5G RAN architecture
Exercise: 5G NR Features and RAN architecture

2. 5G New Radio (NR) Air Interface
2.1 Frequency spectrum for 5G
2.2 Numerology and frame structure
2.3 Beamforming and MIMO
2.4 Downlink Signals and Channels
2.5 Uplink Signals and Channels
2.6 NR Protocols and UE States
Exercise: 5G NR channels

3. Network Access and Connection Setup
3.1 Network Acquisition
3.2 Random access procedure
3.3 RRC Connection Setup
Exercise: Initial access operations

4. DL and UL Data Transfer
4.1 Frame and Slot structure in 5G NR
4.2 Downlink data transfer
4.3 Uplink data transfer
Exercise: DL and UL operation

5. Handovers and Mobility
5.1 Cell- and Beam-level mobility
5.2 Connected Mode Mobility - Handovers
5.3 Inter-DU/Intra-CU Handovers
5.4 Idle Mode mobility
5.5 Paging and RNA Update
Exercise: Handover operation

Final Assessment