



# 5G NR Air Interface

5G\_308d | On-Demand | 5G Access | ⚙️

Course Duration: 2 days

This learning takes an in-depth look at the 5G New Radio (NR) Air Interface and key operations that enable a 5G Standalone (SA) network to support the 5G services.

## Intended Audience

Design, Development, and Performance Engineers of Radio Network, Device, and Tools.

## Objectives

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

- Describe the frame structure with numerology of the 5G NR 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 Key features of 5G NR Air Interface
  - 1.2 5G Network Deployments
  - 1.3 5G Radio Access NetworkExercise: 5G Radio Access Network
2. Spectrum and Numerology of 5G NR
  - 2.1 Frequency Spectrum
  - 2.2 OFDM and Numerology Overview
  - 2.3 5G NR Frame Structure
  - 2.4 Overview and Configuration of DSS
3. Spectral Efficiency
  - 3.1 Massive MIMO
  - 3.2 Beamforming Overview
  - 3.3 SDMA and Frequency Reuse
4. Meeting Service Requirements
  - 4.1 RAN Slicing
  - 4.2 Bandwidth Adaptation
  - 4.3 Low Latency
5. Channels and Signals
  - 5.1 5G Channels and Signals
  - 5.2 Sync Signals and PBCH
  - 5.3 SSB and Random Access in 5G
6. 5G Operations
  - 6.1 5G NSA Operations

- 6.2 SA Network Acquisition
  - 6.3 Registration and PDU Session
  - 6.4 Overview of DL and UL Data
- Exercise: SA Network Acquisition

7. Mobility Operations
  - 7.1 Beam Switching
  - 7.2 Xn Handover
  - 7.3 Idle and Inactive in 5GExercise: 5G Xn Handover

Final Assessment