5G Radio Technologies and Deployments

TPR1022d | On-Demand | 5G Access | Expanded
Course Duration: 4 hours

3GPP is evaluating various technologies to determine specific elements of a 5G wireless network. These technologies enable the 5G wireless network to achieve the 5G performance goals defined by ITU as part of IMT2020 requirements. This course describes potential spectrum for 5G including millimeter wave spectrum. 5G RF Planning based on the new spectrum is covered. Furthermore, the course discusses enhancements to advanced antenna techniques such as massive MIMO are explained as well as the new frame structure being investigated by 3GPP. Finally, potential deployment and evolution scenarios are summarized.

Intended Audience

A high-level technical overview to personnel involved in product management, marketing, planning, design, engineering, and operations

Objectives

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

- Give examples of spectrum bands for 5G
- Summarize RF propagation differences between sub-6 GHz signals and mmW signals
- Explain how massive MIMO facilitates beamforming
- List the key features of 5G NR including the air interface, frame structure, and related numerology
- Sketch the 5G NG-RAN architecture
- Illustrate potential 5G deployment scenarios

Course Prerequisites

Welcome to 5G

Outline

1. 5G Spectrum
1.1 Performance Targets
1.2 Low, Mid, High Spectrum

2. 5G RF Planning Considerations
2.1 Propagation Characteristics
2.2 Inputs to RF Design

3. Massive MIMO and Beamforming
3.1 Beamforming Techniques
3.2 Full Dimension MIMO

4. 5G NR Frame Structure and Numerology
4.1 Frame Structure Enhancements
4.2 5G NR Parameter Relationships

5. 5G RAN Evolution
5.1 gNB Split Architecture
5.2 RAN Transport Connectivity

6. 5G Deployment Scenarios
6.1 NSA and SA Deployment
6.2 NSA Architecture