

# Technology Primer: 5G Radio Technologies and Deployments



4.4/5 "Efficient delivery of information with a good high level overview."

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. Enhancements to the traditional 4G OFDM/OFDMA such as Universal Filtered Multi Carrier (UFMC), Filter Bank Multi Carrier (FBMC), and Non-Orthogonal Multiple Access (NOMA) are illustrated. Furthermore, enhancements to advanced antenna techniques such as massive MIMO are explained as well as the new frame structure being investigated by 3GPP. Potential deployment scenarios are summarized along with RF design considerations and transport network issues.

## 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
- List benefits of new multiplexing and multiple access methods
- Explain how massive MIMO facilitates beamforming
- Illustrate potential 5G deployment scenarios
- Describe key design considerations for a transport network
- Give examples of RF design considerations

## Prerequisites

- LTE Overview (eLearning)
- Technology Primer: 5G Services and Network Architecture (Instructor Led)

## Required Equipment

- None

## Course Outline

### 1. 5G Air Interface

- 1.1 Spectrum for 5G
- 1.2 Implications of mmW spectrum
- 1.3 Multiplexing and multiple access
- 1.4 Massive MIMO
- 1.5 Beamforming approaches
- 1.6 Flexible frame structure
- 1.7 5G numerology

### 2. 5G Deployments

- 2.1 Deployment scenarios
- 2.2 RF design considerations
- 2.3 Signal propagation differences
- 2.4 Link budget consideration
- 2.5 Antenna for 5G mmW spectrum
- 2.6 Transport network considerations