Multiple Antenna Techniques

TRND104d | On-Demand | LTE and VoLTE | Express
Course Duration: 3 hours

Advanced multiple antenna technologies enable emerging 4G cellular technologies to achieve superior data rates over the air interface (e.g., in excess of 100 Mbps). While 4G networks utilize an efficient multiple access technique called Orthogonal Frequency Division Multiple Access (OFDMA), OFDMA on its own cannot deliver the expected superior throughput in 4G systems. Multiple antenna techniques play a critical role in increasing spectral efficiency. This on-demand course provides fundamental knowledge of numerous multiple antenna techniques that will be an integral part of emerging radio access standards.

Intended Audience

This course is intended for those seeking a fundamental understanding of how multiple antenna techniques work. This includes those in a systems engineering, sales engineering, network engineering, or verification role.

Objectives

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

- Outline key benefits and challenges of multiple antenna techniques
- Provide examples of various types of multiple antenna techniques
- Explain transmit and receive diversity techniques such as STC and antenna grouping
- Contrast a switched-beam system with an adaptive beamforming technique
- Describe MIMO spatial multiplexing techniques
- Discuss the implementation of SDMA
- Give examples of multiple antenna techniques defined in emerging 4G cellular networks

Course Prerequisites

No Prerequisites

Outline

1. Antenna Basics
1.1 Antenna Characteristics
1.2 Antennas in commercial deployments
1.3 Motivation for MIMO

2. Transmit and Receive Diversity Techniques
2.1 Introduction to Diversity
2.2 Receive Diversity Techniques
2.3 Transmit Diversity Techniques

3. Beamforming Techniques
3.1 Basics of Beamforming
3.2 Receive and Transmit Beamforming
3.3 Advanced Beamforming techniques

4. MIMO - Spatial Multiplexing
4.1 Basics of spatial multiplexing
4.2 MIMO and channel coding
4.3 Advanced MIMO Techniques

Putting It All Together

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