

3G CONCEPTS AND INFRASTRUCTURE

A fierce battle is being fought between mobile voice and wireless data camps. The mobile voice camp maintains that voice is the true wireless application and that the cellular infrastructure originally created for voice can and should be upgraded to an advanced third generation, or 3G, network that will support data and video as well as voice. The wireless data camp claims that the reverse is true: wireless LAN systems should be enhanced to support Voice over IP and similar technologies in an all-IP play. This ALS course, 3G Concepts and Infrastructure will help the attendee completely understand the 3G side of the issue.

Audience:

Planners, system designers, technical marketing specialists and engineers implementing, or considering the implementation of 3G cellular systems.

Prerequisites:

Thorough knowledge of digital wireless technologies and concepts and understanding of 1G, 2G and 2.5G wireless systems.

Objectives:

At the conclusion of this course the student will be able to:

- Describe the advancements of 3G relative to 2G and 2.5G
- Defend 3G as an approach to multimedia wireless networking
- Explain pros and cons of 3G vs WiFi/WLAN systems
- Choose 3G technologies for performance, interoperability and applications

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COURSE OUTLINE

Day 1

1. Introduction to Wireless and 3G

- Basic Radio theory
 - Cellular Systems
- Frequency Reuse
- Analog vs. Digital Wireless Systems
- Spectrum Allocation & Interference
- Analog Frequency Division Multiple Access (FDMA)
- Time Division Multiple Access (TDMA)
 - Code Division Multiple Access (CDMA)
 - Global System Mobile (GSM)
- Interoperability with CDMA & GSM

2. Code Division Multiple Access (CDMA)

- CDMA standards & services
- Network architecture & components
- CDMA: Fundamental Principles
- Spread Spectrum & Multiplexing in CDMA standard
- Walsh Codes, short & long PN codes
- Handovers: hard, soft and softer
- CDMA Capacity and Cell Planning Issues
- CDMA capacity limitations
- CDMA spectral efficiency

3. Global System Mobile

- GSM standard & services
- Network Architecture & components
 - Authentication & Roaming

Day 1 Review

Day 2

4. Emerging 3G Technologies

- IMT-2000 Standardization Process
- Business Drivers for 3G technologies
- Data rate requirements
- CDMA2000 (TIA TR45.5 / 3GPP2)
- IS-95 A/B implementation
- CDMA2000 evolution from IS-9

5. W-CDMA

- Overview of Wideband CDMA & GSM integration
- 3G Wideband for TDMA - Evolution of IS-136 to 2.5G "136+"
- Overview of IS-136 TDMA physical layer
- High Speed IS-136 (IS-136 HS) Outdoor & Indoor

6. Wireless Data Communications

- What is wireless data?
- Overview of existing and emerging standards
- High Speed Circuit Switched Data Service (HSCSD)
- Cellular Digital Packet Data (CDPD)
- Wireless LANs (W-LANs)
- Wireless Local Loop (WLL)
- Wireless WWW and Wireless Application Protocol (WAP)
- Bluetooth

Day 2 Review