

GSM + GPRS + EDGE & 2G RF Engineering

Pre-request: General Knowledge about Communications

Course duration: 40 Hours

On completing this course you will be able to:

- understand and explain GSM Concepts, Network Architecture, Air Interface and protocols
- understand and explain GPRS and EDGE Concepts, Network Architecture, Air Interface and protocols
- Pass any 2G interview to work in any mobile operator, vendor or Sub-contractor
- Make any graduation project based on 2G mobile communications
- Knowing the RF Career path and basics of Drive testing For 2G

Course Content:

Part I 2G Survey

CH1: Fundamentals of Cellular System

- Types of Telephones
- Modes of Communications
- History of Mobile Communication
- The cellular System
- Frequency Reuse
- Adaptive Power Control
- Cell Splitting
- Types of Cells
- Channel Allocation Techniques
- Mobile Radio Channel Characteristics
- Multi-path fading and diversity techniques
- Shadow Fading

- Doppler Shift
- Co-Channel Interface
- Adjacent Channel Interface
- Delay Spread and Time Dispersion
- Path Loss
- Distance between MS and BS

CH2: GSM Network Architecture

- The Mobile Station (MS)
- The Base Station System (BSS)
- The mobile switching center (MSC)
- The home location register (HLR)
- The visitor location register (VLR)
- The authentication center (AUC)
- The equipment identity register (EIR)
- The operation and maintenance center (OMC)
- The GSM geographical network structure

CH3: GSM Air Interface

- The GSM Frequency Bands.
- The TDMA scheme in GSM.
- Features of TDMA in GSM.
- The physical channels.
- The logical channels.
- Traffic channels (FR, EFR, HR).
- Signaling channels.

CH4: Digital Mobile Elements

- Basic Elements of GSM transmission chain
- Source Coding and speech processing
- Channel Coding in GSM
- Interleaving in GSM
- Security Features in GSM
- Burst formatting
- GMSK Modulation in GSM

CH5: GSM Network Protocols

- Transmission Functions
- Radio Resource management
- Mobility Management Functions
- Connection Functions

CH6: Introduction to GPRS&EDGE

- Mobile Radio Evolution
- Use of GPRS
- GPRS Services
- Network Structure
- Functions in GPRS
- Signaling
- Air Interface
- EDGE Evolution

Part II 2G RF Engineering

- What is the Drive Test and why we need it
- Types of the different sites
- Mechanical and electrical tilt and its effects
- Types of the tests (2G & 3G)
- Cell file
- Tools used in the DT
- Field problem that should be detected by the DT
- 2G (Case analysis)
 - Overshooting cells
 - Cross sectors
 - Cross feeders and its types
 - Missing neighbor
 - Dropped call.
 - Blocked call.
 - HO failure.