

# GSM/EGPRS Air Interface

Course Number: GSM2200-01EN | Duration: 4 Days

## Target Audience

- Network Planning/ Performance Engineering Staff
- System Test / IOT Test Engineers and Optimisation Personnel

## Prerequisites

- GSM/EGPRS Overview (GSM2000-01EN)

## Learning Objectives

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

- Evaluate features like power control, HO control and UL/DL DTX on speech timeslots.
- Understand how AMR Codec adaptation is performed and when TrFO is possible.
- Analyse the RXLEV and RXQUAL measurements and reasons for handover.
- Know how final ACK is delayed to identify with the global TFI the setup of a new TBF.
- Judge the performance of EGPRS link adaptation & resource allocation.

## Course Outline

1. GSM & EGPRS Network Layout
  - 1.1 Network Overview
  - 1.2 Functionality of CS/PS CN
  - 1.3 Functionality of RAN
  - 1.4 Mobile Station Classes
2. Radio Frequency Planning Fundamentals
  - 2.1 Frequency Bands & ARFCNs
  - 2.2 Interference & Frequency Re-Use
  - 2.3 RF Propagation & Multipath
3. TDMA & FDMA Resources
  - 3.1 TDMA Frame & Timeslots
  - 3.2 Physical & Logical Channels
  - 3.3 CCH, TCH & PDCH Multiframes
  - 3.4 Need for Timing Advance
4. Physical Layer - Modulation
  - 4.1 GMSK versus 8-PSK Modulation
  - 4.2 Bursts – Structure & Timing
  - 4.3 Training Sequence & ISI
  - 4.4 Cell Search – FCCH & SCH Decoding
  - 4.5 RXLEV & RXQUAL Measurement
  - 4.6 SAIC & VAMOS – MIMO for GSM
5. CS Idle Mode & Connected Mode Procedures
  - 5.1 Cell Selection & Reselection
  - 5.2 Random Access – RACH for EGPRS
  - 5.3 Location Update
  - 5.4 Call Setup & Release (MTC/MOC)
  - 5.5 Power Control & DTX (Full/Sub Values)
  - 5.6 Handover Signalling & HO Types
  - 5.7 Call Waiting & Multiparty Call
  - 5.8 AMR Codec Adaptation
  - 5.9 Inter-RAT HO & Redirections
6. RAN Failure & Drops
  - 6.1 Downlink Signaling Failure
  - 6.2 Radio Link Timeout & Layer 2 Drops
  - 6.3 BSSMAP Clear Request Procedure
  - 6.4 HO Failure & Drops
7. PS Idle Mode & Connected Mode Procedures
  - 7.1 Ready & Standby States
  - 7.2 Cell Reselection & Cell Update
  - 7.3 Attach & Routing Area Update - NMO
  - 7.4 CS/PS Paging Coordination
  - 7.5 PDP Context Activation & Deactivation
  - 7.6 BVCI & MS Flow Control
  - 7.7 BSSGP Radio Status Signaling
  - 7.8 GPRS Detach and Rejects
8. EGPRS Resource Allocation & TBF Handling
  - 8.1 UL/DL TBF Setup & Concurrent TBF
  - 8.2 Dynamic UL TBF vs. EDA
  - 8.3 Normal & Abnormal TBF Release
  - 8.4 Extended Uplink TBF
  - 8.5 Delayed Downlink TBF Release
9. RLC/MAC Operation
  - 9.1 LLC Segmentation & Reassembly
  - 9.2 Polling for RLC/MAC Ctrl vs. Data Blocks
  - 9.3 RLC/MAC (E)PDAN & (E)PUAN
  - 9.4 RLC Window & Stalling
  - 9.5 ARQ and IR - MCS Family's
10. EGPRS Mobility
  - 10.1 Network Control Order & Cell Changes
  - 10.2 NACC & PCCO
  - 10.3 Packet SI Status & Serving Cell Data
  - 10.4 Inter-RAT Cell Changes