



# UTRAN Architecture & Protocols

GEN3029

3 day

## Overview :

This course is an UMTS System Overview with a bias towards the UTRAN (UMTS Terrestrial Radio Access Network). As well as providing a comprehensive technical overview of the UMTS Terrestrial Radio Access Network (UTRAN) functions, structure and operation, it covers transmission planning and traffic capacity for both the standard voice-based UMTS and also the Voice over IP-based core networks. The Core Network and air interface are described as far as is necessary to understand the impact and requirements placed on the UTRAN.

## Target Audience :

The course is aimed at delegates who need to convert their existing knowledge and experience from GSM to 3G. There is a bias in the course towards delegates who are involved with capacity and transmission planning.

## At the end of the course, delegates will be able to:

Upon completion of this course, the participant will have:

- An overall understanding of UMTS
- An in-depth appreciation of the UTRAN (UMTS Terrestrial Radio Access Network).
- Guidance of how transmission planning and traffic capacity for both the standard voice-based UMTS and also the Voice over IP-based core networks can be achieved
- Sufficient appreciation of the 3G Core Network and air interface as is necessary to understand the impact and requirements placed on the UTRAN.

## Course Content :

### 1. 3G Standards/Specifications

- IMT-2000
- 3GPP and OHG
- 3G Variants

### 2. CDMA, its Principle and its Impact on the Network

- Multiple Access Methods
- Benefits of CDMA
- Spread Spectrum

### 3. GPRS – A Refresher

- Frequency Effects
- Basic GSM refresher
- Signalling System #7

### 4. System Architecture/Network Interfaces

- 3G System Architecture
- 3G Network Building Blocks
- 3G Network Interfaces

### 5. W-CDMA Channel Structures

- Logical Channels
- Transport Channels
- Physical Channels

### 6. Power Control & Handovers

- Open and Closed Loop Power Control
- Hard Handover
- Soft Handover

### 7. Air-Interface (RAN)

- Node-B
- WCDMA TRX
- Radio Resource Control

### 8. 3G Capacity & Planning

- RNC Capacity Considerations
- Capacity of a Cell
- The Traffic Chain and Overheads

### 9. Call/Connection Transactions

- Call Set Up procedure
- Location Update
- Transaction Set up

### 10. Core Network

- CN CS & PS Domains
- Mobility Management
- Cell Attach & Detach

### 11. Interfaces and Protocols

- Protocols Model (Architecture, User and Control Planes)
- NAS
- AS

### 12. Operations and Procedures

- System areas (LA, RA & URA)
- Protocol Termination
- Channel types and functions

### 13. Transport Protocols

- Frame Protocols ( Data / Control, MAC function, frames types lub/lur structures, Dedicated/Common Channel Transport)
- ATM (Expand on previous – more UTRAN specific, UNI/NNI, ALCAP, SSCOP)
- Protocol Structures (Transport and Interface protocols)

### 14. Synchronisation

- Node Synch
- Transport Synch

### 15. 3G Key Driver

- Location-based Services
- Messaging
- Key Growth Factors
- 3G Business Case

## Course Prerequisites :

As UMTS is strongly based on GSM and GPRS, the course assumes a familiarity with GSM and its channels. A refresher on GPRS, however, is included in the course.

## Testing and Certification :

## Follow on Courses :

<b>Further Information :</b>
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	Global Knowledge, Box 1519, Franstorpsvägen 25, 172 29 Sundbyberg	