

GSM in the new Millennium



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Course Length	Two Days
Course Code:	NFSGSM1
Prerequisites	None. A basic understanding of telecommunications transmission principles will be useful for students taking course.
Course Overview:	This is a customized course focused on technicians in the Wireless/Mobile Communications Industry. The course will give brief overviews of technologies and equipment, but will focus on installation and maintenance testing of the system. Special emphasis will be put on troubleshooting in the A-bis interface.

*This course can be customized or combined to meet specific system requirements

Course Outline

Industry Overview

Wireless Communications Overview

Growth of wireless communications

1G/Analog systems (AMPS, TACS...)

2G/Digital systems (TDMA, CDMA, GSM...)

2.5G/The "transition"

3G /Data systems (UMTS, GPRS...)

4G systems (next generation...high speed data services)

Frequency bands

800/900MHz

1800/1900MHz

The move to Data Networking

Circuit-switched v/s packet-switched

CDPD, Data over GSM networks, GPRS, EDGE

W-CDMA

GSM

GSM Network Overview

GSM topology and architecture review
MSC, BTS/BS, BSC, MS, databases

Overview of “Standard” Interfaces

Um (Mobile-to-BTS)
A-bis (Link/BSS-to-BTS)
A (MSC-to-BSS)
Mapn/IS- 41 (Network Interfaces)

Functional Planes v/s OSI layers
Physical Layer up Testing approach

Signaling model from the MSC to the MS

Addresses/Identifiers
SIM, IMSI, TMSI, LAI...

Channel Organization
DSO level
Sub channels (16K)

Physical Layer Overview

T1/DS1 Overview (Hands-on)
Framing, Coding
Error Types/Alarms
Equipment

A-bis Testing

The testing process

T1/DS1 Testing

In Service Monitoring
Levels, Frequency, Errors, Alarms

Out of Service Testing
Stress Patterns
End-End Testing
Loopback Testing



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DS1/T1 Trouble Isolation Techniques

- Loop emulation
- Equipment emulation
- Response to Loop Codes
- Testing with the carrier/service provider

Traffic/Call/Channel testing

- Monitor calls (Voice)
- 16K BERT
- 16K Drop/Insert

Management in the A-bis

- LAP-D overview/relationship to the A-bis
- TRAU framing
- Management Links (BTSM, RR...)
- Links speeds/usage
- Typical Message types

Monitoring for Link Information

- Signaling Links
- TRAU framing results
- RF Decodes (Full/Sub)
- Balance
- Interference
- Island Detection

Overview of Next Generation Wireless Networks

- GPRS
- EDGE
- UMTS
- W-CDMA



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