

5G NSA Signalling - 3 days

CONTENTS

The 5G network architecture is a significant evolution from the 4G LTE EPC. Multi-Access Edge Computing (MEC) and Network Slicing are new abilities that enable the operator to improve the network to meet specific applications' requirements.

During this course you will go through key operations such as power up and system acquisition, RRC connection setup, bearer setup with 5G NR, and DL and UL operations on 5G NR. This course covers key operations through call flows with details of major messages and their key parameters.

This course offers an insight into the signalling protocols applied in the 5G RAN. You will focus on the details of the NR interface signalling exchanged between the UE and the network, but the most important aspects of other NG-RAN interfaces are also covered. Most important network procedures, such as signalling connection establishment, registration, service request and handover are discussed and presented on signalling diagrams.

TARGET AUDIENCE

Network engineers, people involved in network design or systems performance, and operations related job functions who need to get an in-depth understanding of signalling procedures and function.

PREREQUISITES

- LTE Signalling - strongly recommended
- 5G System Overview - strongly recommended

COURSE OUTLINE

5G NSA Overview

- 5G NSA architecture
- 5G NSA gNB functional blocks and interfaces
- 5G core (5GC)
- MIMO TM1-10 and massive MIMO introduction
- 5G NSA LTE & NR measurements
- EN_DC (option 3x) description
- EN_DC split bearer setup, maintain, release

5G NSA L3 Signalling

- 3GPP LTE/5G NAS signalling for (option 3x) EN_DC architecture
- 3GPP LTE/5G RRC signalling procedures and services
- 3GPP 5G RRC signalling messages
- 3GPP 5G RRC Information Elements (IE) and parameters
- BCCH SIB messages indicating EN_DC cell support
- SIB parameters description for 5G cell support
- 3GPP EN_DC service setup, split bearer setup, release signalling flow
- Practical Exercises: RRC signalling log files analysis

5G NSA L2 Signalling

- 3GPP PDCP protocol procedures and services
- 3GPP RLC protocol procedures and services
- 3GPP MAC protocol procedures and services
- 3GPP MAC scheduler
- LTE Random Access analysis
- EN_DC Random Access analysis

- 5G NR HARQ procedures
- 5G NR LDPC and polar coding
- 5G NSA NR MIMO-OFDM mapping
- 5G NSA & SA NR mMIMO-OFDM mapping (analog and digital beamforming)
- Practical Exercises: L2 MAC signalling log files analysis

5G NSA Mobility

- 5G NSA EN_DC Mobility overview
- 5G NSA re-establishment (EN_DC splitting bearer to LTE MCG bearer)
- 3GPP re-establishment Parameters - related discussion for vendor specific parameters
- Practical Exercises: EN_DC split bearer setup and EN_DC split bearer to LTE MCG bearer signalling log files analysis

5G NSA Optimization

- 5G NSA EN_DC split bearer failure
- Failure analysis and related parameters
- Practical Exercises: split bearer failure signalling log files analysis
- Parameter configuration and Optimization discussion