

5G NEW RADIO AND NEXT GENERATION RADIO ACCESS NETWORK

Course Description

The course 5G New Radio and Next Generation RAN provides a technical description of the emerging standard for 5G radio access New Radio (NR) and Next-Generation Radio Access Network (NGRAN) developed by 3GPP as part of Release-15 and Release-16. The NR part of the course covers physical layer aspects as well as layer 2 and layer 3 aspects, with focus on the physical layer. The NGRAN part covers the RAN-internal interfaces (Xn, F1 and E1) as well as the NG-interfaces towards the 5G core network (5G NAS protocols are mentioned but covered in less detail).

Rel-15 is scheduled for completion in September 2018, with some features moved to March-2019. Rel-16 is expected to be completed in March 2020. This course will continuously be updated according to these new releases.

Content

5G OVERVIEW

- Summary of LTE layer-1 concepts, protocol stacks and RAN features
- Timeline for 5G standardization (3GPP and ITU)
- Expected use cases (eMBB, mMTC, URLLC)
- Formal ITU performance requirements on 5G
- NR connectivity options and radio techniques

5G RADIO ACCESS NETWORK (NGRAN)

- NGRAN nodes and interfaces
- NR deployment scenarios (option 2, option 3 etc)
- 5G NAS protocols (overview)
- NG-interface and NGAP protocol
- Xn-interface and XnAP protocol
- Architectural split options (CU/DU and CP/UP split)
- E1 and F1-interfaces and protocols



NON STAND-ALONE NR DEPLOYMENT (NSA NR)

- Dual Connectivity between eNB and gNB (EN-DC)
- EN-DC control plane
- EN-DC user plane (MCG, SCG and split bearers)
- X2-interface and EPC functions needed for NSA-NR

5G RADIO INTERFACE

- Channel and protocol architecture
- Logical, transport and physical channels
- Layer 2 protocols (SDAP, PDCP, RLC, MAC)

- Radio Resource Control protocol (RRC)
- RRC states and state transitions

NR PHYSICAL LAYERS

- NR frequency ranges and carrier bandwidth options
- Dynamic bandwidth adaptation (in UE and RAN)
- Spectrum sharing with LTE
- Supplemental uplink (SUL)
- OFDM numerologies for NR
- NR radio frame structure
- Channel coding and multiplexing
- Physical channels and modulation
- Cell search procedure (synch and system info)
- Random access procedure
- Procedures for control (PDCCH assignment)
- Procedures for data (PDSCH and PUSCH scheduling)
- Feedback signalling (HARQ, CSI and sounding)
- Expected Rel-16 features (5G Phase 2)

Widermind AB
Drottninggatan 89
113 60 Stockholm
Sweden
Telephone: +46 8 410 757 11
E-mail: info@widermind.com
www.widermind.com

Target audience

This course is aimed at radio-, development- and system engineers who need to understand the 5G Air Interface.

Pre-requisites

Fairly good technical knowledge of the LTE physical layer and the LTE radio and RAN protocols is highly recommended but not compulsory.

Course length

2 days

Widermind communicates the knowledge you need to develop and implement new technologies for current and future network operations. Our clients are telecom operators, system integrators, system suppliers and consultancy firms.

Based in Stockholm, Sweden, we develop courses backed by a comprehensive network of associates. Our instructors employ technical and pedagogical skills that have made Widermind training well known and appreciated as one of the best services in the field.

You are warm welcome to contact our representatives at:

Email: info@widermind.com or telephone: +46 8 410 757 11