

5G Introduction

5G (5th generation of mobile networks) represents the next step in the mobile telecommunication standards evolution, following its 4th generation (4G), reflecting IMT-Advanced requirement, and being represented by LTE/LTE-A and LTE-A pro releases. As in case of every previous generation of mobile network, 5G networks are expected to further extend and broaden the requirements, to make mobile services more attractive for end users, expanding the capabilities on top of the existing 4G networks. Depending on the use case, 5G networks are expected to offer peak speed of up to 1 Gbps, improved coverage, reduced latency, etc.

In terms of mobile services, 5G networks are expected to broaden the range of services, being collected in three main groups: Enhanced Mobile Broadband (eMBB), massive Machine Type Communication (mMTC) and Ultra-Reliable and Low Latency Communication (URLLC).

To achieve all the above requirements, network architecture, as well as radio access and spectrum availability have to be re-defined for 5G networks. This course presents motivation and path towards definition of key technologies for 5G.

Target audience

The course is intended for engineers and managers interested in mobile networks evolution towards 5G, with emphasis on the strategy planners and design engineers who need to understand 5G principles and basic design concepts, as well as challenges, which will be faced with the introduction of the 5G concepts in future networks.

Training contents

- **Introduction**
- **5G motivation**
- **Mobile data traffic forecasts – 1000x hype**
- **Envisioned evolution of service requirements**
- **5G market players**
- **NGMN White Paper**
(NGMN use case families, NGMN use case categories)
- **5G design principles**
 - Technology elements for RAN
 - Technology elements for network architecture
 - Technology mapping
- **IMT-2020 requirements**
 - IMT timeline
 - IMT-2020 timeline
 - IMT-2020 use cases
 - IMT-A vs. IMT-2020 requirements

- **Key technologies for 5G**
 - 5G RAN
(Ultra-Dense Networks (UDN), Multi-connectivity)
 - 5G architecture
(SDN, NFV, Network slicing, Spectrum sharing, Cloud RAN, Self-backhauling)
- **WRC conferences**
 - WRC-15/19/23
 - WRC-15 spectrum allocation
 - WRC-19 expectations
 - WRC-23 timeline
- **5G developments in 3GPP**
 - 3GPP introduction
 - 5G timeline in 3GPP
 - Converged 5G roadmap
 - RAN workshop on 5G
 - 3GPP SMARTER SI summary
 - 5G schedule in 3GPP
 - 5G study in 3GPP: Radio Access Network
 - 5G study in 3GPP: System Architecture
 - 5G specifications
- **5G: next steps**
 - Proposed deep-dive 5G trainings

Prerequisites

The participants should have general knowledge on mobile networks and 4G network functionalities. Electrical engineering education or equivalent experience is recommended.

Training method

Lecture

Duration

1 day

Level

Intermediate

