5G RAN Optimization – 3 days

CONTENT

The advent of 5G and its applications will have a big impact on the world and on how we conduct business. An advanced understanding of how the changes and improvements in capacity, transmission, service quality and the impacts to the 5G marketplace will provide business opportunity to optimize the 5G capabilities.

This course provides an overview of 5G RAN performance monitoring and optimization. Performance KPIs within this course are investigated on a vendor independent perspective, focusing on the concepts and applications. Alongside with the analysis of different KPIs classes and monitoring reports, this course also boosts a comprehensive approach to network troubleshooting and optimization tasks.

This course aims to equip participants with advanced knowledge of the Radio access network and the ways of optimizing the 5G network for the betterment of users.

PREREQUISITES

Good understanding of 5G Radio Access technology, highly prerequisite the 5G Radio Planning.

TARGET AUDIENCE

RAN Optimization Engineers, RAN Planning Engineers, O&M personnel, System Engineers, Post-Graduate students and professionals who need to get an overview of 5G RAN Optimization.

BENEFITS FOR DELEGATES

- Describe and explain the 5G requirements and network architectures
- Understand what NR Air Interface, Physical Layer, Radio Protocols are
- Understand 5G C-RAN architecture, including its expected requirements and performance.
- Differentiate the requirement of 5G RAN planning and optimization in comparison to legacy technologies
- Identify interference issues related radio frequencies between 5G and other technologies and apply available mitigation approaches.

BENEFITS FOR THE ORGANIZATION

- Optimization of 5G technologies
- Reduced risks and threats through successful adoption of new opportunities
- Understand 5G wireless and its objectives, requirements, and major services and applications.
- Describe the 5G standards and proposals
- Explore the 5G wireless RAN technologies

WHAT MAKES THIS COURSE DIFFERENT?

- Delegates will have an opportunity to explore the topic by industry expert driven content.
- Real world case studies and scenarios are used to ensure delegates can practically apply their knowledge
- Cutting edge information delivered by future thinkers and influencers
- Begin planning for the 5G wireless planning issues and techniques and its co-operation with LTE-A

COURSE OUTLINE

5G New Radio (NR) RAN Parameters Overview

- Idle mode measurements overview
  - SS-RSRP, SS-RSRQ, SS-SINR
  - CSI-RSRP, CSI-RSRQ, CSI-SINR
- Pathloss Model Analysis
- Channel model analysis
- Low/Mid/High bands configured & licensed parameters
- Numerology & Channel Bandwidth
- TDD frame structure
- UL/DL spatial multiplexing layers vs beamforming
- Analog/Digital Beamforming & number of supported beams
- Capacity - RRC connected users
- Cell peak throughput
- NSA EN-DC PDCP aggregation
- SA aggregation
- Low Band FDD MIMO antennas
  - FDD 400 MHz-2.6 GHz bands
  - 2T2R, 4T4R, 8T8R
  - TM3, TM4, TM7, TM8, TM9
- Mid Band TDD MIMO antennas
  - 2T2R, 4T4R, 8T8R MIMO antennas
  - TM3, TM4, TM7, TM8, TM9
- Mid/High Band TDD mMIMO antennas
  - 32T32R, 64T64R mMIMO AAS units
    - Elevation beamwidths vs. Azimuthial beamwidths
- CSI-RS based Beam Management
  - CSI-RS vendor equipment port configuration (8, 16, 32)
  - Number of available beams
  - Beamwidth granularity
- PCI planning 3GPP TS 28.541 spec
- RACH planning
- Review Exercises and Examples

5G New Radio (NR) SA Optimization

- Idle mode behavior review
- Cell search Optimization
- SSB synchronization
  - SSB Detection Probability vs. SINR
  - MIB & CORESET0 detection probabilty vs. SINR
  - SSB Coverage optimization (coverage improvements & detection probability enhancements)
- Initial Cell Selection optimization
  - Parameter check
  - Optional features review
- Initial Cell Reselection optimization
  - Parameter check (Priority, Inter RAT, etc)
  - SA Optional Features review
- Random Access successful performance analysis
- Random Access coverage improvements
  - RACH preample pattern vs. Cell range
  - LTE NSA accessibility success rate
  - 5G NSA accessibility success rate
  - 5G SA accessibility success rate
- TDD frame structure optimization

    - TDD special slot vs. Cell range
- NR Throughput optimization
    - Vendor specific RB capacity vs. SINR
    - Cross-Link Interference detection and solution
    - TDD frames optimization
    - DL/UL unbalance
    - UE power saturated
- SA Mobility Optimization
    - 5G SA mobility analysis based on KPIs and log files
- Exercises & examples

5G New Radio (NR) NSA Optimization

- 5G NSA EN-DC connectivity optimization overview
    - EN-DC abnormal NR leg drop analysis
    - 5G NSA EN_DC establishment success rate
    - 5G NSA EN_DC DRB retainability
    - 5G NSA EN_DC mobility analysis (eNodeB & gNB)
- 5G NSA re-establishment
    - EN-DC split bearer to LTE MCG bearer Analysis & Optimization
- NSA mobility optimization
- 5G NSA aggregation optimization
- Exercises & examples