Network Synchronization Training

Synchronization is crucial in telecom networks, especially for mobile networks. With the advent of 5G and its use of TDD mode, synchronization in phase and time has become essential. This training aims to acculturate participants to the basic principles, methods, and constraints of network synchronization, especially for 5G needs.

Duration : 2 days

Module 1 – Generalities

- Definition and importance of synchronization.

- Needs for synchronization.

- Types of synchronization.

- Evolution of networks and synchronization methods.

- Overview of synchronization methods.

- Importance of standardization.

- UTC as an international reference.

Module 2 – Frequency Synchronization :Methods and Recommendations

- Available synchronization methods.
- Synchronous Ethernet description, pros, and cons.
- SyncE on OTN/WDM considerations.
- Protocol methods, satellite methods, their pros and cons.
- Comparison of methods and group recommendations.
- Applicable standards.
- Quiz and conclusion.

Module 3 – Frequency Synchronization : Architectures and Clock Types

- Synchronization network architecture.
- Types of clocks: PRC, SSU, SEC/EEC.
- Operating modes: Injection, regeneration, recovery.
- Suppliers and equipment.

Module 4 – Frequency Synchronization : SSM and Synchronization Plan

- Synchronization Status Message (SSM).
- SSM management and usage.
- Synchronization plan information.

Module 5 – Phase/Time Synchronization : Architectures and Solutions

- Need for TDD and phase/time synchronization.

- Time setting principles, requirements, architectures, and solutions.

- Distributed and centralized architectures, their pros and cons.

- NTP and its limitations for phase/time synchronization.

- Quiz and conclusion.

Module 6 – Phase/Time Synchronization : PTPv2

- Description and principles of PTPv2.

- Network support mechanisms: Boundary Clock, Transparent Clock.

- PTPv2 over OTN, protection mechanisms, and standardization.

- Quiz and conclusion.

Module 7 – Operational Aspects

- Deployment of GNSS, PRC, phase synchronization, PRTC.

- PTP deployment in transport equipment and mobile sites.

- Supervision functionalities and measurement of synchronization signals.

- Metrics and synchronization signal measurement points and devices.