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Fundamental of RF Engineering

Course objective:

- To give a basic and background of radio frequency to RF engineer.
- To introduce the necessary parameters that impact to RF quality.
- To be a fundamental for all engineer for operation and maintenances.

Audience qualification : Mobile or RF engineer

Course Duration : 2 day

Course Description:

1. Basic Radio and RF Concepts

- Introduction to RF & Wireless Communications Systems
- dB and dBm power conversions
- Analog and Digital Modulation of RF Signals
- Filtering and Equalizers
- Multiple Access Techniques
- Spread-Spectrum Modulation
- Frequency division multiplexing
- Duplexing
- Channel Coding

2. RF Propagation Principals

- Maxwell & Waves
- Path / Propagation Losses
- Scattering
- Fading
- Fade Margin and Fresnel Zone
- Link Budgets
- Receiver Sensitivity
- Noise Figure
- Guard Band



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- BER vs. Noise
- Sample Link Budget Calculations

3. Antennas

- Antennas Basics
- VSWR
- Effective Radiated Power (ERP)
- Directivity and Gain Antenna Types
- Antenna Radiation Patterns
- Polarization
- Diversity Antenna Systems

4. RF System Planning

- Wireless Topologies PTP and PMP
- LOS, NrLOS, NLOS
- Licensed & Unlicensed Frequency Bands
- Frequency Planning
- Frequency Reuse

5. Types Of Propagation Models And Their Uses

- Simple Analytical models
- General Area models
- Point-to-Point models
- Local Variability models
- The Okumura Model
- The Hata Model
- The EURO COST-231 Model
- Morphological Zones
- Walfisch-Betroni/Walfisch-Ikegami Models

6. RF & Communications Terminology