

Microwave Propagation (RP 4.1.15)

Maxwell's Equation: Maxwell's field equation in different field configurations and media, Field equation with sinusoidal time variation, Transverse nature of electromagnetic wave, Solution of wave equation in a) Rectangular co-ordinate system, b) Cylindrical co-ordinate system, c) Spherical co-ordinate system, Units in a) Electrostatic system, b) Electromagnetic system, c) Gaussian system, d) Heaviside-Lorentz System, e) Rationalized System

Classification of Radiowaves according to Propagation Mechanism: a) Direct wave b) Ground wave c) Tropospheric wave

Reflection and Interference of Radio Waves: plane wave at dielectric interface, Reflection coefficient for flat smooth Earth, Field strength due to reflection from flat Earth, Effect of curvature of the Earth, Mechanism of ground wave propagation,

Refraction and Path Delay: Radius of curvature of ray path, Refractivity is complex and Frequency dependent, Turbulence induced scintillation and Estimation of C_n^2 , Propagation over in homogeneous surface, Tropospheric Ducting, Propagation delay and its estimation

Absorption of Microwaves: Absorption by atmospheric constituents, and its intensity calculation, Centrifugal distortion, Absorption Spectra, Water vapour and Microwave attenuation, Absorption calculation at peak and window frequencies, absorption due to rain, procedure for calculating rain attenuation depending on different prescribed models

Attenuation by Hydrometeors other than Rain: Snow, Hail, Fog, Aerosols, Clouds etc.

Microwave Link Design: Design Process flowchart, Fading and Fade margin, Link Multipath Outage Models, Quality and availability Calculations