

RECOMMENDATION 310-8

DEFINITIONS OF TERMS RELATING TO PROPAGATION
IN NON-IONIZED MEDIA

(1951-1959-1966-1970-1974-1978-1982-1986-1990-1992)

The CCIR,

considering

that it is important to have agreed definitions of propagation terms used in the texts of Study Group 5,

recommends

that the list of definitions annexed hereto be adopted for incorporation in the vocabulary;

VOCABULARY OF TERMS USED IN RADIO PROPAGATION IN NON-IONIZED MEDIA

Term	Definition
A. <i>Terms related to radio waves</i>	
A1. <i>Cross-polarization</i>	The appearance, in the course of propagation, of a polarization component which is orthogonal to the expected polarization.
A2. <i>Cross-polarization discrimination</i>	For a radio wave transmitted with a given polarization, the ratio at the reception point of the power received with the expected polarization to the power received with the orthogonal polarization. <i>Note 1</i> – The cross-polarization discrimination depends both on the characteristics of the antenna and on the propagation medium.
A3. <i>Cross-polarization isolation</i>	For two radio waves transmitted with the same frequency with the same power and orthogonal polarization, the ratio of the co-polarized power in a given receiver to the cross-polarized power in that receiver.
A4. <i>Depolarization</i>	A phenomenon by virtue of which all or part of the power of a radio wave transmitted with a defined polarization may no longer have a defined polarization after propagation.
B. <i>Terms related to ground effects on radio-wave propagation</i>	
B1. <i>Free-space propagation</i>	Propagation of an electromagnetic wave in a homogeneous ideal dielectric medium which may be considered of infinite extent in all directions.
B2. <i>Line of sight propagation</i>	Propagation between two points for which the direct ray is sufficiently clear of obstacles for diffraction to be of negligible effect.
B3. <i>Radio horizon</i>	The locus of points at which direct rays from a point of radio waves are tangential to the surface of the Earth. <i>Note 1</i> – As a general rule, the radio and geometric horizons are different because of atmospheric refraction.
B4. <i>Penetration depth</i>	The depth within the Earth at which the amplitude of a radio wave incident at the surface falls to a value $1/e$ (0.368) of its value at the surface.

- B5. *Smooth surface; specular surface* A surface separating two media which is sufficiently large and the irregularities of which are sufficiently small to cause specular reflection.
- Note 1* – In practice, the minimum size of the surface corresponds to the first Fresnel zone and the importance of irregularities is estimated using the Rayleigh criterion.
- B6. *Rough surface* A surface separating two media which does not fulfil the smooth surface conditions and the irregularities of which are randomly located and cause diffuse reflection.
- B7. *Diffuse reflection coefficient* The ratio of the amplitude of the incoherent wave reflected from a rough surface to the amplitude of the incident wave.
- B8. *Measure of terrain irregularity; Δh* A statistical parameter which characterizes the variations in ground height along part or all of a propagation path.
- Note 1* – For example, Δh is often defined as the difference between the heights exceeded by 10% and 90% respectively of the terrain heights measured at regular intervals (the interdecile height range) along a specified section of a path.
- B9. *Obstacle gain* The ratio of the electromagnetic field due to edge diffraction by an isolated obstacle to the field which would occur due only to spherical diffraction in the absence of the obstacle.

C. *Terms related to tropospheric effects on radio-wave propagation*

- C1. *Troposphere* The lower part of the Earth's atmosphere extending upwards from the Earth's surface, in which temperature decreases with height except in local layers of temperature inversion. This part of the atmosphere extends to an altitude of about 9 km at the Earth's poles and 17 km at the equator.
- C2. *Temperature inversion (in the troposphere)* An increase in temperature with height in the troposphere.
- C3. *Mixing ratio* The ratio of the mass of water vapour to the mass of dry air in a given volume of air (generally expressed in g/kg).
- C4. *Refractive index; n* Ratio of the speed of radio waves in vacuo to the speed in the medium under consideration.
- C5. *Refractivity; N* One million times the amount by which the refractive index n in the atmosphere exceeds unity:

$$N = (n - 1) 10^6$$

- C6. *N -unit* A dimensionless unit in terms of which refractivity is expressed.
- C7. *Modified refractive index* The sum of the refractive index n of the air at height h and the ratio of this height to the radius of the Earth, a :

$$n + \frac{h}{a}$$

- C8. *Refractive modulus; M* One million times the amount by which the modified refractive index exceeds unity:

$$M = \left[n + \frac{h}{a} - 1 \right] 10^6 = N + 10^6 \frac{h}{a}$$

- C9. *M -unit* A dimensionless unit in terms of which refractive modulus M is expressed.