

COMMUNICATIONS DATA SHEET 501

USEFUL AERIAL AND RADIO WAVE PROPAGATION TERMS

<u>TERM</u>	<u>DEFINITION</u>
Aerial	That part of a radio system which is designed to radiate electro-magnetic waves into free space. This does not include the transmission lines or waveguide to the radiator.
Isotropic radiator	An aerial which radiates uniformly in all directions. This is a hypothetical concept used as a standard in connection with the gain function.
Aperture	The surface at or near the aerial over which the field due to the aerial has values which are significant and sufficient for the determination of the radiation pattern of the aerial.
Front-to-back ratio	The ratio of the maximum power flux density in the main lobe to that in the back lobe of a directional aerial.
Omnidirectional aerial	Any aerial whose radiating properties are substantially the same on all bearings.
Directional aerial	An aerial designed to radiate more strongly in some directions than in others.
Whip aerial	An aerial consisting of a flexible rod supported at one end.
Yagi aerial	An aerial comprising one primary radiator and two or more secondary radiators lying parallel to it in a single plane so as to constitute an end-fire array. The usual arrangement of secondary radiators consist of one reflector and one or more directors. The reflector may, however, sometimes consist of a metallic sheet.
Parabolic aerial	An aerial comprising a reflector whose shape is that of a paraboloid of revolution and a feed usually situated approximately at the focus of the reflector.
Dish	A reflector the surface of which is part of a sphere or paraboloid of revolution.
Radome	A cover, for a primary radiator or aerial system, which is weatherproof and transparent to radio-frequency energy.
Reflection coefficient	The ratio of the specified component of the electric field in the reflected wave to that of the same component in the incident wave.
Attenuation	The reduction in amplitude of a radio wave as the distance from the source increases.
Basic path attenuation	In radio-wave propagation. The path attenuation when the specified aeriels are hypothetical isotropic elements.

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Free-space attenuation	The basic path attenuation that would result were all obstructing, scattering or reflecting influences sufficiently removed to have no effect in propagation and when the propagating medium is free space.
Transmission loss	In radio-wave propagation, over a given transmission path. The amount, expressed in decibels, by which the available power at the input to a receiver is less than that available from the output stage of a transmitter.
Multipath propagation	Propagation from the transmitter to the receiver by two or more paths simultaneously.
Fading	A variation of strength of received signals due to variations with time in the conditions of propagation.
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.
Temperature inversion	An increase in temperature with height in part of the troposphere.
Tropospheric wave	A wave which travels between points on or near the surface of the earth by a path or paths lying wholly within the troposphere and the propagation of which is determined primarily by the distribution of refractive index in the troposphere.
Tropospheric radio duct	A stratum of the troposphere within which an abnormally large proportion of any radiation of sufficiently high frequency is confined.
Ground-based duct	A tropospheric radio duct having the earth as its lower boundary.
Elevated duct	A tropospheric radio duct of which the lower boundary is above the earth's surface.
Duct height	The height above the earth's surface of the lower boundary of an elevated duct.
Duct width	The difference in height between the upper and lower boundaries of a tropospheric radio duct.
Trapped mode	A mode of propagation in which the energy is substantially confined within a tropospheric radio duct.
Radio horizon	The point at which a direct ray from a transmitting aerial would become tangential to the earth's surface.
Effective radius of the earth	The radius of a hypothetical earth for which the distance to the radio horizon, assuming rectilinear propagation, is the same as that for the actual earth with an assumed uniform vertical gradient of refractive index.