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Effect of Wind and Humidity on Microwave Links in West North Libya

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Abstract : The propagation of microwave is affected by rain and dust particles by way of signal attenuation and de-polarization. Computations of these effects require knowledge of the propagation characteristics of microwave and millimeter wave energy in the climate conditions of the studied region. This paper presents the effect of wind and humidity on wireless communication such as microwave links in the west north region of Libya (Al-Khoms), experimental procedure to study the effects mentioned above. The experimental procedure is done on three selected antennae towers (Nagaza stations, Al-Khoms center stations, Al-Khoms gateway stations) to determining of the attenuation loss per unit length and cross-polarization discrimination (XPD) change which coverage in the studied region, it is required to collect the dust particles carried out by the wind, measure the particles size distribution (PSD), calculate the concentration, and carry chemical analysis of the contents, then the dielectric constant can be calculated. The result showed that effect of the humidity and dust, the antenna height, the visibility, on the complex permittivity effects both attenuation and phase shift, there is some consideration that has to be taken into account in the communication power budget.

Keywords : attenuation, de-polarization, scattering, transmission loss
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