

Vital Frequency In Satellite Radio

Vital frequency is the maximum frequency of the radio wave which is returned from a layer for normal incident. In case the frequency of the radio wave exceeds the critical frequency the influence of the ionosphere layer on the path of propagation depends upon the angle of incidence at the ionosphere. With the large value of angle of incidence the electron density is small. In such case the radio wave is returned earthward after having penetrated only a slight distance into the ionized layer. As the angle of incidence is progressively decreased the refractive index required for returning the wave earthward progressively decreases and the amount of penetration into the layer increases. If the angle of incidence is reduced so much that the sine value of the incidence angle becomes less than the refractive index corresponding to the maximum electron density in the layer then radio wave penetrates through the layer. As the angle of incidence is progressively reduced the distance from the transmitting antenna at which the radio waves re strike the ground decreases until it reaches a minimum value and it again increase with further decrease of angle of incidence. The minimum distance from the transmitter at which a sky wave of given frequency is returned to earth by ionosphere is called the skip distance. If the angle of incidence is further decreased the wave penetrates the layer.

For short waves the ground wave dies out very rapidly with distance whereas the sky wave returns to the ground at distance exceeding the skip distance. Accordingly in the region beginning a few kilometers from a shot wave transmitting antenna and extending up to the skip distance there are no signals at all even when strong signals are returned to ground at distance greater than the skip distances. The skip distance depends upon frequency of transmission, critical frequency of the ionosphere layer, height of the layer and distribution of ionization within the layer. The skip distance increases as the frequency increases, ionization in the layer reduces and the height of the layer increases. Each layer in the ionosphere has a skip distance for each frequency depending principally on the critical frequency and the virtual height of the layer. The skip distances of the E, F1 and F2 layers at a given frequency are in general different. The smallest skip distance is sometimes for E layer and sometimes for F2 layer but seldom for F1 layer. Other things remaining constant the skip distance increases with frequency hence a fixed receiving point at any particular time there is a maximum frequency which may be used without letting the sky wave to skip over the receiving point. This frequency is called maximum usable frequency.

About the Author

Tymon Hytem has worked in the electronics field for the past 15 years. He enjoys helping people decide on electronic gadgets from finding the right phone for your business and can help you choose the perfect [Background Music](#) for your business needs.

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