

Terrestrial Trunked Radio Propagation Simulation in Subways

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Propagation simulation tools are used to analyze Tetra protocols and applications in Subway systems. In subway system generally simple radio propagation models that neglect obstacles of a propagation environment. In this paper, we try to solve more accurate radio propagation model with a simulation tool. The model is based on fast ray tracing methods and considers obstacles (walls, doors,) in stations simulation area. We try to prove more precise propagation model according to antenna location& polarization in subway systems. System design considerations are optimized by reducing the number of required antenna installations and greatly cutting down on time and costs.

We consider radio propagation models for 380-430 MHz bandwidth communication in subway systems. Empirical models are given as statistical formulas that provide estimations for receive power based on the distance between the communication equipment's. Fast Ray optical models use ray tracing to determine possible signal paths between the transmitter and the receiver in the given area. With the conventional methods of propagation is computationally challenging. In a large infrastructure projects such as metro stations or tunnels, there are so much of possible propagation paths. Using "Ibwave Design" simulation tool to generate 3D station models and compute each part of the strength on the 3D construction stages. Calculations shall be done according to our technical specifications that can be written. Technical specification refers that the minimum coverage area predictions shall be -85 dB coverage in all areas in subway stations. Moreover the results also proves that the accuracy and efficiency of that realistic propagation models.