

Measurements and Statistical Modeling of radio Propagation in Railway Tunnels at Frequencies of 900/2400 and 5800 MHz

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In the last few years the impact of mobile communications in railway environment has increased, showing the vital importance of these systems for management and control of train traffic and also for the communications services of the passengers. Therefore, this work has been focused on the study of propagation in a key element of rail transport -a tunnel.

The propagation on radio frequencies in tunnels is complex and depends of several parameters therefore is very important to get an accurate modeling to understand, improve and thus stimulate the implementation of new communications systems.

Radio coverage of tunnels using antennas is much more flexible and less expensive than the use of leaky feeder but requires an accurate modeling of the propagation and this modeling has to be validated using measurements. Consequently, comprehensive measurement campaign has been carried out in various types of tunnels of Metro Madrid to achieve this goal. Specifically, different segments such as straight curve and passing through station in metropolitan lines has been measured. These measurements were carried out in three different frequency bands: 900 MHz, 2.4GHz and 5.8 GHz commonly used by mobile communication. The results have been processed extracting principal statistics.

