

Evaluation of v2x antenna performance using a multipath simulation tool

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Abstract:

Antennas are one of the key components for efficient and reliable vehicular communications systems; especially for safety related applications the antenna performance is crucial. It is therefore important to be able to evaluate the antenna performance under realistic conditions so that the best antenna solution can be selected. In this paper we present a statistical method for evaluating the antenna performance by using the antennas radiation patterns and a multipath simulation tool. The multipath environment is generated by a number of incident waves with a specific angle of arrival distribution, defined by the user. In order to generate voltage samples at the antenna ports many sets of incident waves are generated. This simulates a changing environment as, e.g., when the vehicle is moving. By studying the cumulative distribution functions (CDFs) for the voltage samples we are able to compare the performance for different antenna types, positions on the vehicle, etc. The method is fast and effective and, when applied to typical vehicular propagation environments, the importance of having antennas with radiation patterns capable of covering the whole azimuth plane is demonstrated.