Impact of a Truck as an Obstacle on Vehicle-to-Vehicle Communications in Rural and Highway Scenarios

Author(s) - Institution(s):
Dimitrios, Vlastaras, Lund
Taimoor, Abbas, Lund
Mikael, Nilsson, VolvoCars
Russ, Whiton, Volvo
Magnus, Olbäck, Volvo
Fredrik, Tufvesson, Lund

Corresponding author email: dimitrios.vlastaras@eit.lth.se

Corresponding WG group: TWGV, WG1, SWG 1.2

Abstract:

Shadowing from other vehicles can degrade the performance of vehicle-to-vehicle communication systems significantly. It is thus important to characterize and model the influence of common shadowing objects like trucks in a proper way. However, the scenario of a truck as an obstacle in highly dynamic rural and highway environments is not yet well understood. In this paper we analyze the distance dependent path loss and the additional shadowing loss due to a truck through dynamic measurements. We further characterize the large scale fading and the delay and Doppler sprea ds as a measure of the channel dispersion in the time and frequency domains. It has been found that a truck as an obstacle reduces the received power by 12 and 13 dB on average, for roof antenna, in rural and highway scenarios, respectively. Also, the dispersion in time and frequency domains is highly increased when the line-of-sight is obstructed by the truck.