Characterization of the Stationarity for Vehicle-to-Vehicle Radio Channels

Author(s) - Institution(s):
Ruisi He, Beijing, BJTU
Olivier Renaudin, UCL
Veli-Matti Kolmonen, Philips Medical Systems MR
Katsuyuki Haneda, AALTO
Zhangdui Zhong, BJTU
Bo Ai, BJTU
Claude Oestges, UCL

Corresponding author email: ruisi.he@ieee.org

Corresponding WG group: TWGV, WG1

Abstract:

We analyze the non-stationarity of vehicle-to-vehicle (V2V) radio channels using three metrics: the correlation matrix distance (CMD), the wideband spectral divergence (SD), and the shadow fading correlation. The analysis is based on measurements carried out at 5.3 GHz using a 30 4 MIMO system in suburban, urban, and underground parking areas. Several factors such as the existence of a line-of-sight (LOS), the speed of cars, and the antenna array size and configuration are considered in the analysis of stationarity. It is found that the stationarity distance ranges from 3 to 80 m in different V2V scenarios, and is strongly affected by the above factors. Based on the comparison of the equivalent stationarity distances estimated by the three metrics, it is suggested to use SD and shadowing correlation metrics for systems with small electrical array apertures and to use CMD metric only for arrays with large electrical apertures.