

System Level Assessment of Vehicular MIMO Antennas in 4G LTE Live Networks

Author(s) - Institution(s):

Levent Ekiz, BMW
Adrian Posselt, BMW
Buon Kiong Lau, Lund
Oliver Klemp, BMW
Christoph F. Mecklenbräuker, VUT

Corresponding author email: Levent.Ekiz@bmw.de

Corresponding WG group: TWGV

Abstract:

In this contribution, we present the results of a measurement campaign targeting at system level evaluation of vehicular multiple-input-multiple-out (MIMO) antennas. Our measurements are performed on a test track served by a Long Term Evolution (LTE) base station operating in the 800 MHz band. We present system level evaluation results obtained by using reference monopole antennas and two automotive qualified, integrated prototype antennas. The presented results are gathered in line-of-sight (LOS) as well as non-LOS conditions. As vehicular antenna systems are limited by the available integration space, we analyze the impact of antenna decoupling on system level performance. System level performance metrics include parameters such as capacity and condition number of the MIMO channel matrix. We achieve antenna decoupling for the reference monopoles by increasing their separation. In case of the integrated antenna system we use a decoupling branch to decrease antenna coupling and correlation at the measurement frequency. We discuss a system level evaluation process for ranking antenna systems based on impedance- or radiation-level parameters as well as channel specific parameters. We illustrate the applicability of the process for MIMO system performance benchmark.