

# Time-varying Radio Channel Parameters: Characterization in Vehicular Channels

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## Abstract:

In order to derive proper channel models, accurate channel characterization is needed. Therefore, radio channel measurement campaigns have to be performed. From the large amount of collected impulse responses, channel parameters can be extracted and be used for channel modeling.

In vehicular communications, the environment changes very rapidly. The fading process in these channels is strongly time-varying, and the wide-sense stationarity uncorrelated-scattering assumption can not be granted for long periods. The statistical properties of the fading process are time-varying, which corroborates the non-stationarity of the fading process.

In this paper the authors present a detailed analysis of the time-varying condensed channel parameters for a whole set of measurements collected in the ITS-application oriented measurement campaign DRIVEWAY'09.

We present the investigated scenarios in the DRIVEWAY'09 measurement campaign, and derive the time-varying rms delay and Doppler spread, as well as the time-varying stationarity time. The stationarity time is the length in time where one can assume the WSSUS assumption holds. Furthermore, we show that these parameters are statistically distributed following a bi-modal Gaussian mixture distribution.