Measurement-Based Statistical Evaluation of On-Body Backscatter RFID Systems

Author(s) - Institution(s):
Jasmin Grosinger, TUGraz
Wolfgang Bösch, TUGraz

Corresponding author email: jasmin.grosinger@tugraz.at

Corresponding WG group: TWGB

Abstract:

In this contribution, we statistically evaluate on-body backscatter radio frequency identification (RFID) systems in the ultra high frequency range. Four different on-body RFID systems are investigated operating monopoles or patch antennas at 900MHz or 2.45GHz. The on-body systems are composed of a stomach-back link, a stomach-chest link, a stomach-wrist link, and a stomach-head link. The system evaluation is based on on-body channel measurements in a realistic test environment. The channel transfer functions were measured with a vector network analyzer versus 18 different stationary and moving body postures in an indoor multipath environment. The measured channel transfer functions allow to calculate ou tage probabilities in the forward link and the backward link of the on-body RFID systems. These outage probabilities define if insufficient power is available for a reliable backscatter communication. An evaluation of these probabilities shows the feasibility of on-body RFID systems. This measurement-based statistical evaluation allows to examine each RFID system parameter individually and thus helps to realize reliable and robust backscatter RFID systems on the human body.