

# Dynamic channel modeling and validation for multisensor body area networks

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**Abstract:**

A measurement-based channel model for multilink wireless body area networks (WBAN) is proposed in this paper. A measurement campaign has been conducted to measure the timevariant multilink WBAN, using a multiport channel sounder. A total of 12 nodes were placed on the body to create the WBAN, and the channel model is constructed based on the measurement results. The model takes into account link power, link fading statistics, link autocorrelation and correlation between different links. It is shown that the link power is distance-dependent, and that the link fading can be modeled with a log-normal distribution. The link autocorrelation function is separated into a decaying component and a sinusoidal component to account for the periodical movement of the arms and legs when walking around. The correlation between different links is shown to be quite high for certain links. The model is validated by considering several extraction-independent validation metrics: multi-hop link capacity, level crossing rate (LCR) and average fade duration (AFD). The capacity aims at validating the link powers and fading statistics, while the LCR and AFD aim at validating the time-variant behavior of the model. It is shown that for all validation metrics, the model is able to reproduce the measurements, and the limits of the model are investigated.