

Validation of Statistical Channel Models for 60 GHz Radio Systems in Hospital Environments

Author(s) - Institution(s):

Mikko Kyro, AALTO

Ken-ichi Takizawa, AALTO and NICT

Katsuyuki Haneda, AALTO

Pertti Vainikainen, AALTO

Corresponding author email: katsuyuki.haneda@aalto.fi

Corresponding WG group: TWGI

Abstract:

Statistical channel models for 60 GHz communications systems in hospital environments are validated using channel capacity and throughput of a physical layer as figures of merit. The channel models are validated by comparing the performance figures with channels from the measurements and the channel models. The throughput evaluation is based on system specifications given by the IEEE 802.15.3c standard for high data rate wireless personal area networks, namely orthogonal frequency division multiplexing and single carrier transmissions. The channel capacity serves as a metric of the potential of the two transmission schemes since it defines the upper bound of the throughput. The capacity is derived based on the signal formats of the transmission schemes. The capacity shows that 97 % of the measurement results are within 2 σ ranges of the modeled results. The throughput shows that the channel models predict the maximum achievable throughput of the measured channels precisely, while the mean throughput in some cases shows difference because of the interpolation of small-scale fading effects in the statistical channel model. The interpolation allows us to analyze outage performance more rigorously than with the measured channels where the number of channel samples is limited.