Pseudo-Dynamic UWB Radio Channel Modelling for WBAN Communications

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Abstract:

In this paper, pseudo-dynamic radio channel models for ultra wideband (UWB) wireless body area network communications are presented. To produce the model, frequency domain on-body measurements were conducted in an anechoic chamber within the frequency band of 2-8 GHz. The study was conducted for two UWB antenna types (dipole and double loop). A walking sequence with five positions was modelled and the antennas were placed on both wrists and the left ankle of a person. At first, the amplitudes of the first arriving paths were solved for all links and positions. In the second phase, the resulting channels were divided into three cl asses: line-of-sight, (partially) obstructed line-of-sight and non-line-of-sight. Statistical channel models were developed for all classes. As a result, six models were obtained for both antennas to be used, e.g., as time-cyclic channel models in computer simulations. The channel impulse responses were modelled by 7-10 taps, depending on the class and antenna. The amplitude statistics can be modelled with the inverse Gaussian distribution.