

## Investigation of WI-Fi indoor signals under LOS and NLOS conditions

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### ABSTRACT

In this work the propagation of radio waves at 2.4 GHz in NLOS conditions has been studied. The study was carried out using two transmitters operating on different standards: 802.11g (D-Link) and 802.11n (TrendNet). The experiments were carried out under different scenarios in order to investigate the effect of the walls on signal propagation. Experimental results were processed using statistical methods and were compared with "log-distance" and free space models and with the network simulation programme "Aerohive online planner" results. A new signal prediction model, which allows predicting signal propagation depending on the number of walls, was created. In this work 802.11g and 802.11n standards were also compared. The results can be used to further investigate radio wave propagation in indoor NLOS conditions and in the development of wave propagation models.

### KEYWORDS

WLAN, 802.11 signal indoor propagation, LOS, NLOS.

### 1 INTRODUCTION

Data transfer is a key component of the Information Society. Its impact on daily life increases constantly.

Wireless Local Area Networks (WLAN) technologies and the application thereof in the indoor environment have gained especially high acceleration. Signals are transmitted under the line-of-sight (LOS) and/or non LOS (NLOS) conditions in such environments. During the WLAN design, it is necessary to pre-evaluate LOS and NLOS radio-wave propagation in the indoor environment. But in practice systems generally work under NLOS conditions. The main problem is that it is very difficult to predict indoor radio wave propagation in the absence of direct visibility between the transmitter and the receiver. Although some number of radio waves propagation prediction methods [1-4] have been proposed recently, it is still difficult to predict how the radio frequency waves act. The existing simulation programmes are mainly intended to simulate signal propagation under LOS conditions.

The goal of this research paper was the experimental investigation of the 802.11 g and n standards (further 802.11g/n) radio waves NLOS propagation in the multi partitions indoors. Experimental results were compared with the log-











