

Investigation of 60 GHz Wireless Propagation in an Indoor Environment

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Comparison between measured and simulated Received Signal Strength Indicator (RSSI) test results in a residential 2-story model house is presented. Simulation based on ray tracing method is carried out and compared with measurement data.

The measurement setup consists of a transmitter station (access point) and a receiver station. A 4×4 patch array antenna is used for the transmitter and 2×2 patch array antenna is in the receiver side. The access point is configured using a linux machine. The receiver station is also a linux machine and its WLAN kit is configured with a 60 GHz 2×2 patch array antenna.

Figure 1 shows the customized floor layout of a residential 2-story model house. Blue color represents 1st floor and green color represents 2nd floor. No measurement data is taken in the (×) marked area. The asterisk mark (*) shows the transmitter positions of the four different measurement setups. Two different trolleys of same height are used for both transmitter and receiver stations. Measurement setups 2 and 3 were the same position but for measurement setup 2, a thick wooden chair was in front of the transmitter. For measurement setup 3, the wooden chair was removed. As shown in the Figure 1, the living room, kitchen and garden room are in the 1st floor but the master bedroom and walkway are in the 2nd floor. For each measurement setup, 20 different positions are chosen for received signal strength measurement. One small grid represents one receiver position for every room except the master bedroom. In case of the master bedroom only one position was taken as signal strength was very weak throughout the whole area of the master bedroom.

Measured and simulated results agree well in those different transmitter positions. RSSI is decreased significantly in the presence of metal objects. A substantial wooden object in front the 60 GHz transmitter also deteriorated the signal level.

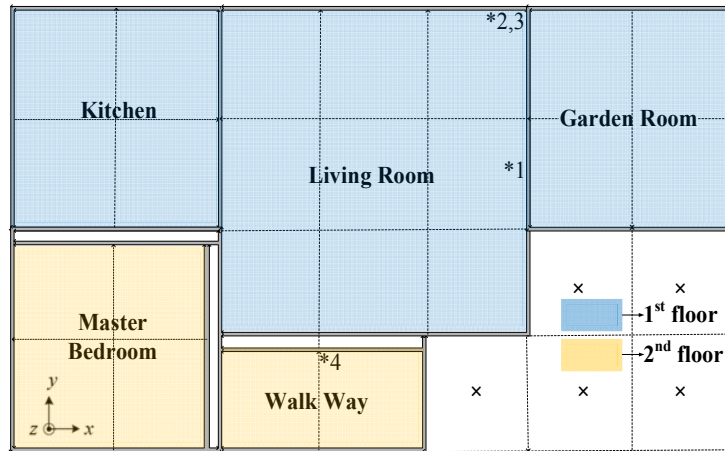


Figure 1. Floor layout.