This page lists the dataset that we collected to study the characteristics of low-power IEEE 802.15.4 wireless links.

We conducted tests in five increasingly complex RF environments: an outdoor parking lot spanning approximately 600 m$^2$, an open lawn area with a higher diffraction index than the parking lot, a building hallway with line-of-sight transmissions, an indoors testbed deployed over multiple offices, and finally sensor networks deployed in two forests.

All experiments use TelosB motes equipped with IEEE 802.15.4 compliant TI CC2420 radios. We use two network topologies to measure the log-normal path loss parameters for the parking lot, hallway and indoors testbed environments. The first is the line topology in which every mote takes its turn as the transmitter. The distance between adjacent nodes in this case is 100 to 280 cm. The other is the tee topology in which all the receivers form a straight line, 15 to 100 cm apart from each other, while the transmitter moves away from the receivers on a trajectory that is perpendicular to the line of the receivers.

We automated the data collection process in the second topology by connecting the transmitter to an Ebox-3854 Linux PC mounted on top of an iRobot Create robot. At each measurement step, the robot moves by $D_t = 5$ cm and pauses to allow the transmitter to send a batch of packets. The benefit of the second topology is that it enables us to easily collect a large number of measurements distributed over space. Only the line topology was used in the lawn environment. All experiments use 114-byte packets and each transmitter sends at least 500 packets per batch, with the inter-packet-interval (IPI) set to 500 milliseconds. Here we set the IPI to 500 ms such that we will not be measuring the PRR of bursty windows. Upon receiving a packet, each receiver records the corresponding source ID, RSSI, LQI, sequence number, and batch number. The receiver also samples the ambient noise level immediately after each packet reception.

Table 1 summarizes the different experiment configurations we used. The elevation listed in this table corresponds to the motes’ vertical distance from the ground. All motes were placed at the same height for the line topologies. On the other hand, only the receivers are elevated to the listed height for the tee topologies. The transmitter is carried by the robot and its height is fixed at 12 cm. Last, symbols P, L, H, O and F correspond to the parking lot, lawn, hallway, office, and the forest environments respectively. For the two forests, we used the measurements collected by the motes deployed there for the purpose of environmental monitoring.
Table 1: Test sites and sensor node configurations

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Line topology, Elevation 0 cm {P, L}</td>
</tr>
<tr>
<td>2</td>
<td>Line topology, Elevation 15.1 cm {P, L, O}</td>
</tr>
<tr>
<td>3</td>
<td>Line topology, Elevation 31.2 cm {P}</td>
</tr>
<tr>
<td>4</td>
<td>Tee topology, Elevation 0 cm {P, H, O}</td>
</tr>
<tr>
<td>5</td>
<td>Tee topology, Elevation 15.1 cm {P, H}</td>
</tr>
<tr>
<td>6</td>
<td>Real-life deployment {FA, FB}</td>
</tr>
</tbody>
</table>

The data for various environments and topologies are available on this link.