**FIRST TESTS TO BUILD THE DECODING ALGORITHM**

The entire work has been developed using MATLAB environment since there are several toolbox and plugins that allow to work with signals. MATLAB also allows to easily plot graphs, useful to observe the signals’ behaviour.

The first phase of the presented work focused on building a simulation that allows to understand the behaviour of transmitted signals over a Bluetooth channel between a transmitter and a receiver. The simulation has been run on a channel with the standard Bluetooth configuration; in particular the configuration was the following:

* transmitting power was in the range [-20dB, 20dB];
* distance between transmitter and receiver in the range [1m, 150m].

The simulation’s purpose was reproducing a signal transmission and observe how much the fading, the distance transmitter-receiver and the SNR (signal-to-noise ratio) had an impact on the transmitted signal in order to write an appropriate decoding algorithm that take into account also these factors.

In particular the simulation consisted in reproducing a transmission of a random message mixed with a random key authentication with a fixed distance transmitter-receiver. For every fixed distance value, the simulation has been repeated a hundred times and for every time the message, key and transmitting power values were changed in order to obtain more reliable results. This has been done to obtain a statistic of how much information has been lost during the hundred transmissions for a certain distance between transmitter and receiver, regardless the transmitted message. The lost information has been expressed in “number of bits that were different between the original message and the received one”.

As final result of this first set of simulations, an interesting result was observed. This result has been useful to write an effective decoding algorithm that allows to get the original message also taking into account all the other factors that affect the wireless transmissions.