**A STUDY ON HOW MUCH THE CHANNEL ACTION IMPACTS OVER SIGNALS TO RECOGNIZE AUTHENTIC AND NOT AUTHENTIC TRANSMISSIONS**

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

The first phase of the presented work focused on building a simulation that allows to observe 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; 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 observing how much the fading, the distance transmitter-receiver, and the SNR (signal-to-noise ratio) had an impact on the transmitted signal. This work was carried out to study the distance, in terms of number of different bits, between the original signal emitted and the one heard by the receiver in order to obtain an effective threshold, characterized by the error admitted on the number of bits for a signal transmitted on a specific distance, capable of determining which signals are authentic and which are not.

The simulation consisted in reproducing the transmission of two different signals, a random message, and a random key for the authentication, mixed and transmitted with a certain power for different distances transmitter-receiver. Each simulation sent the same signal (message and key) for different and increasing distance values in the range [1,150]. This has been done to obtain a statistic of how much information has been lost during the different transmissions of the same message just changing the distance between transmitter-receiver. Again, the lost information has been expressed with the number of bits that differed from the original signal.

Several simulations have been run to observe the behaviour of different transmitted signals and to obtain the average threshold values for the errors admitted for each distance considered.

This statistic then has been used to classify the authentic transmissions for the successive simulations, determining the probability of false-alarm and missed-detection for those tested signals. (EXPAND THIS POINT WITH TODAY’S WORK)

NOTE: change the abstract 🡪 the goal is no more the encoding/decoding algorithm but study “**HOW MUCH THE CHANNEL ACTION IMPACTS OVER SIGNALS TO RECOGNIZE AUTHENTIC AND NOT AUTHENTIC TRANSMISSIONS**”