[[1]](#footnote-1)

Digital Channel Sounding and Noise Filtering

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*Abstract*—This report presents our study of digital channel sounding and noise filtering. We were able to estimate the amplitude frequency-response of a digital channel between a transmitter and a receiver in the frequency range given. We designed a digital filter using MATLAB program that reduces added noise in the wireless transmission of a telephony speech signal which was applied to the speech signal in the given frequency range.

# INTRODUCTION

A

digital wireless communication channel can be modeled as a discrete-time LTI system with additive noise. The aim of this project was to apply advanced MATLAB functions to design and implement the channel for the transmitted and received signals. The channel; model in which x(n) is the transmitted signal, h(n) is the channel’s unit sample response, N(n) is the noise, and y(n) is the received signal. The effects of additive noise could be reduced through the use of noise filtering..

# THEORY

## Determining the Noise

## Channel Sounding

## Filtering

## Flowcharts

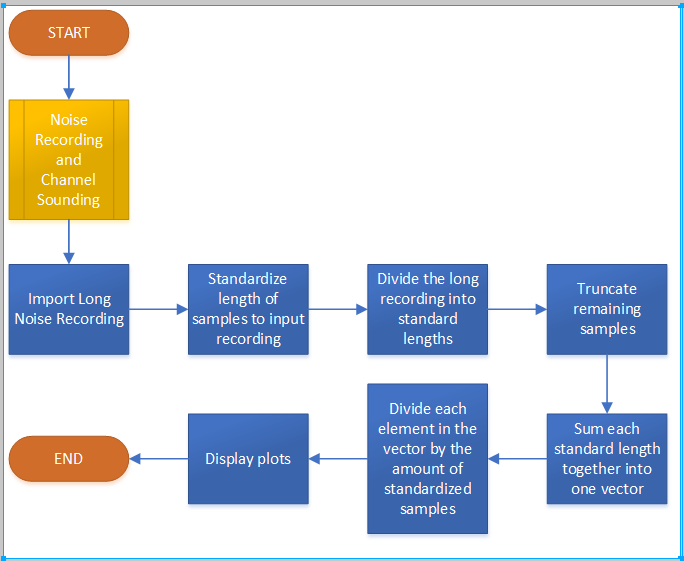


Fig. 1. This shows the process of getting the noise recording and channel sounding.

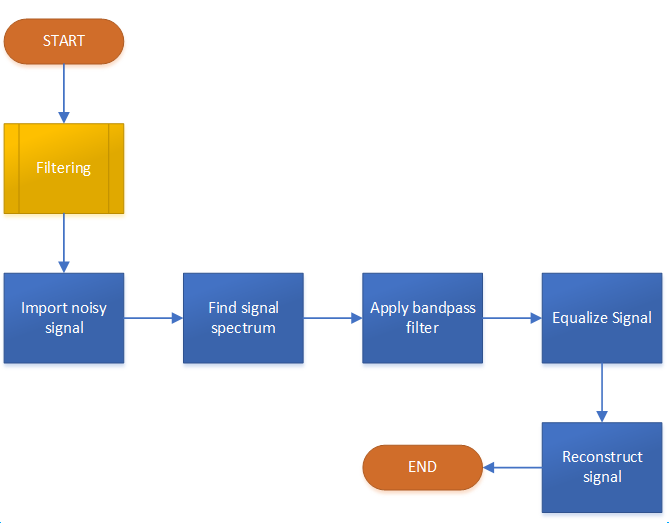


Fig. 2. This shows the process of filtering the sound.

# MATH

## Equations

*System model:*

x(n) \* h(n) + N(n) = y(n) (1)

*Frequency domain equation:*

X(ω) H(ω) + N(ω) = Y(ω) (2)

Remove noise and equalize:

X(ω) = (Y(ω) - N(ω)) /(H(ω)) (3)

# Conclusion

With the noise being filtered

1. [↑](#footnote-ref-1)