Mobile Networks

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Project description

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Context (i)

Radio frequency spectrum is one of the most scarce resources in telecommunications.

Efficient use of the spectrum requires the use of advanced modulation and coding methods to:

- provide high data rate services
- offer services to an increasing number of users
- increase network capacity

Context (ii)

One of the methods used to provide multiple access in radio-based telecommunication networks is CDMA – Code Division Multiple Access.

CDMA allows multiple users to share the same frequency band simultaneously.

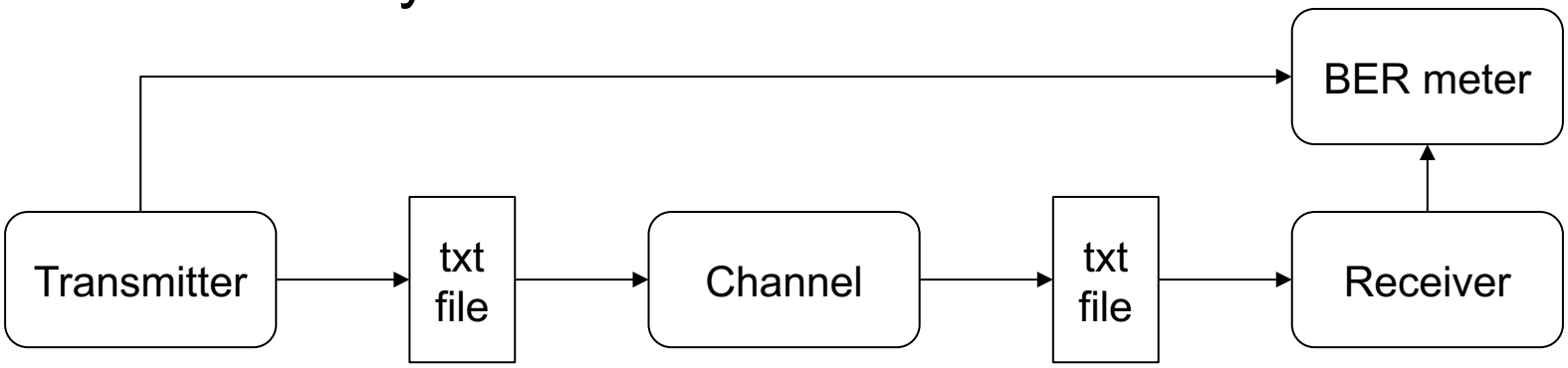
The challenge

The challenge of this project is to estimate how many users can share the same channel simultaneously.

Approach

The proposed approach is based on creating a simulator of CDMA, including:

- a transmitter
- a noisy channel
- a receiver
- a data analyzer



Technical details

- all groups should use the same format for the txt files (to be defined later)
- a complete system is made of several transmitters, one channel and several receivers
- no carrier will be used (baseband)
- (more details to be defined later)

Millestones

- week 18.10.2021 - first presentation:
  - prepare a presentation (a few slides) with:
    - short presentation about CDMA
    - a proposal for the format of the txt files

Millestones

- week 08.11.2021 - second presentation:
  - prepare a presentation (a few slides) with:
    - short presentation the status of the project
  - a demo of one transmitter, channel and one receiver
    - showing the transmitted signals, signals after the channel, and transmitted and received bit stream

Millestones

- 07.01.2022 - final report:
  - the final report should include:
    - a detailed description of the developed system
    - prints of the several waveforms
    - performance results
      - BER vs. noise level vs. number of simultaneous users

Millestones

- week 10.01.2022 - final presentation:
  - prepare a presentation (a few slides) with:
    - a brief description of the system
    - a detailed description of the final simulation results
  - prepare a demonstration showing:
    - the system working