RF and mmWave Circuit Design

DESIGN ASSIGNMENT 1 – WIRELESS TIN CAN TELEPHONE SYSTEM ANALYSIS

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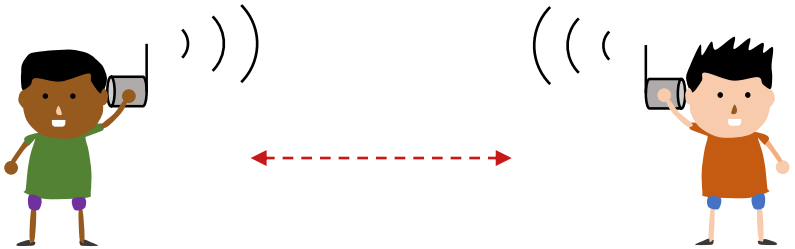
coursera TU/e

Wireless Tin Can Telephone

Introduction

Problem definition: You want to have a live, audible and private communication with you neighbour but you cannot use any of the available ready-to-use comm systems, e.g., cell phone. So you will need to fully design a system all the way from specifications to implementation in a breadboard. It also has to be a simple, portable device and the communication has to travel at least 10 meters on air.



Summary – Problem definition

1. Live communication
2. Audible communication
3. Private communication
4. Range of 10 meter
5. Simple device
6. Portable device

Design Assignment

Tasks

1. Derive system specifications from the problem definition.
2. Derive system requirements from the specifications.
3. Choose adequate system architecture for the wireless system.
4. Once the architecture is defined, derive all the important sub-systems requirements
   - (gain, noise figure, 1dB compression point, input and output impedances, etc.).

This is a Peer Review Assignment, so you must upload <u>all</u> necessary design files and a design report (with the all aforementioned topics) describing and explaining the choices you made.

Design Assignment

Rules and Tips

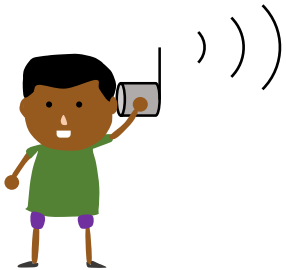
1. You may use the example shown in related video and the related files as you starting point, but **you should not copy** the exact values and decisions used there.
2. You **may (and should) interact** with other student to get the best system you can think of.
3. You **shall not copy and paste** other students' work.
4. You may use a table editor, Qucs-s, and Octave for your design.
5. **Commercial off-the-shelf** solutions are **not permitted**.
6. You should bear in mind that the simulation and implementation will make use of the **CD4007** as the main component.

Rubrik for Peer Review - Report

	Excellent (5 pts)	Very good (4 pts)	Good (3 pts)	Fair (2 pts)	Sufficient (1)	Insufficient (0 pts)
Task Integrity	The report describes **all** design tasks in detail.	The report describes almost all design tasks in detail. Only **minor details are missing.**	The report describes most design tasks in detail. **A few details are missing.**	The report describes most design tasks in detail. **Some details are missing.**	The report describes most design tasks. **Several details are missing.**	The report provides **insufficient detail.**
Task Accuracy	**All** design tasks are explained clearly and correctly.	Most design tasks are explained clearly and correctly. **Only minor inaccuracies** are present. The understanding is **not significantly affected** by this.	There are **only a few inaccuracies/inconsistencies** in the explanation of the design tasks. The understanding of a few design tasks is **slightly affected**.	There are **some inaccuracies/inconsistencies** in the explanation of the design tasks. **Not every** design task is entirely clear.	There are **several inaccuracies/inconsistencies or some mistakes** in the explanation of the design tasks. **About half** of the design tasks are not entirely clear.	There are **major design tasks missing** or are **mostly incorrectly** explained.
Problem Adequacy	The design solves more than **five problems defined**.	The design solves at least **four problems defined**.	The design solves at least **three problems defined**.	The design solves at least **two problems defined**.	The design solves at least **one problems defined**.	The **design does not solve any of the problems defined.**

OBS.: The report may have different combinations, e.g. Excellent task integrity (5 pts) and Good Problem Fitness (3 pts).

Have fun!



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