Software Requirements Specification (SRS) for Cell Phone Detector

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1. Introduction

1.1 Purpose

The purpose of this document is to provide a comprehensive Software Requirements Specification (SRS) for the implementation of a Cell Phone Detector using the RF spectrum approach. This SRS outlines the methodology, working principles, and results of the project. It also details the components used, testing procedures, and references.

2. System Overview

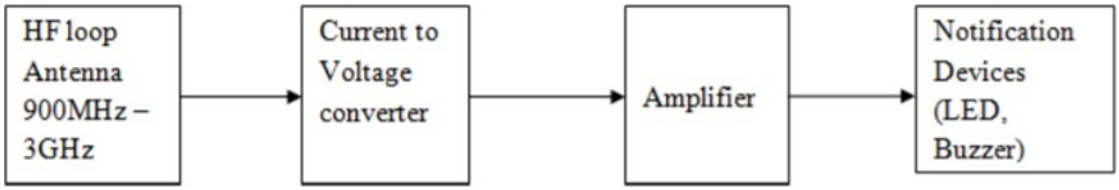
2.1 System Description

The Cell Phone Detector is a technological device designed to detect the presence and existence of cell phones within a specified range. The chosen detection technique is based on the RF spectrum approach, utilising a voltage-controlled oscillator (VCO), frequency down-converter, and a band-pass filter.

3. Methodology

3.1 Detection Technique

The selected detection technique involves the use of a voltage-controlled oscillator (VCO), frequency down-converter, and a band-pass filter. Unfortunately, due to unavailability of specific components, this method couldn't be implemented within the project timeline. However, the chosen RF spectrum approach still provides effective detection capabilities.



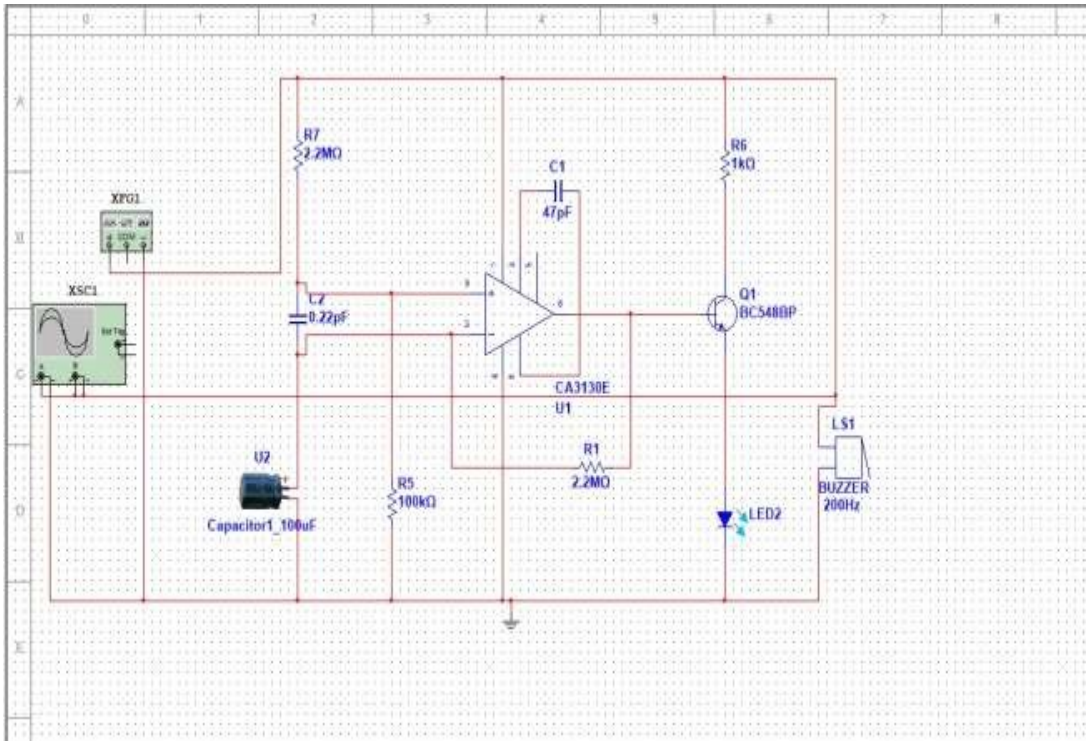
4. Working Principles

4.1 Alarm System

Upon detecting the RF transmission signal from an activated cell phone, the Cell Phone Detector triggers an alarm. The alarm can take the form of LED light blinking, a beep sound, or a ringtone. The system is designed to alert the user to switch off their mobile phone.

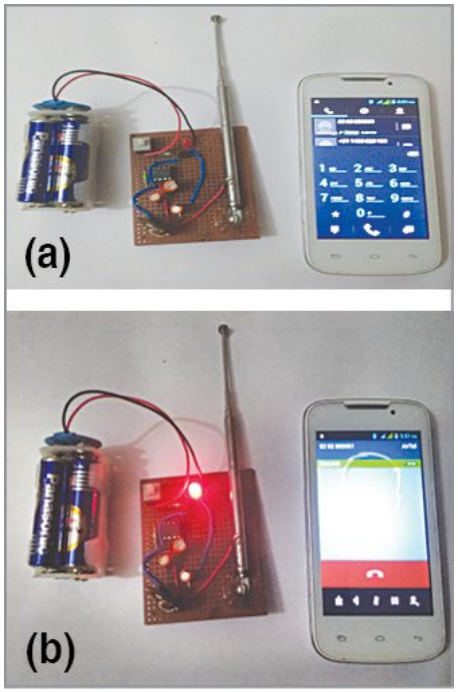
4.2 Distance Detection

The circuit is capable of detecting the distance from the source by observing the movement of LEDs. Proximity to the source results in uniform LED speed, while increased distance leads to random LED movement. This characteristic is attributed to the 4017 decade counter and the nature of RF signals on circuits.



5. Results

5.1 Testing and Validation



The design was successfully tested using a Jio mobile phone, demonstrating effective detection and alarm activation when a call was made. The circuit's ability to detect distance from the source was also validated through LED movement.

6. Components Used

6.1 Hardware Components

- Oscilloscope
- Function Generator
- LED
- IC CA3130
- Capacitors – 100µF, 0.22µF, 47pF
- Resistors – 1kΩ, 100kΩ, 2.2M Ω
- Alarm Buzzer (Piezo)
- Transistor BC548
- Connecting Wires

Component	Current	Voltage	Manufacturer	Price
IC CA3130	10mA	5-16 V	Sharvi company	139
Transistor			Technical hut	169(pack of 10)
LED			Morning vale	77(pack of 100)
Battery			HI WATT	118(pack of 2)
Function Generator	100mA	25mV – 5V	Generic	169
OSCILLOSCOPE	10Amp	+-50mV to +-50V	REES52	2500
Resistors			Sunbiotic store	295(resistor kit 1 ohm – 2Mohm)
Capacitors			Zyme store	54(pack of 15)
Alarm Buzzer			Taodaw	960(pack of 5)

7. References

1. "Innovative Systems Design and Engineering," 2016
2. "A study on working and performance of Cell Phone Detector" by Thilagavathi S, 2022
3. "Cellular Device Detection in Restricted Premises," October 2019
4. "Study of Cellular Phone Detection Techniques" by Nicholas W. Scott, 2011
5. "International Journal of Engineering Research & Technology," July 2014
6. "New Solutions for Cell Phone Detection," January 2007
7. "Smart Mobile Detector for Unapproved Usage of Cell Phones" by Naveen Raj, 2019
8. "Examination hall centralized mobile detection using Arduino Duemilanove," 2021

8. Future Enhancements

8.1 Integration of Digital Signal Processing (DSP)

Future iterations of the Cell Phone Detector could explore the integration of Digital Signal Processing (DSP) techniques for more precise signal analysis. This could enhance the detector's ability to distinguish between different types of RF signals and improve overall performance.

8.2 Component Availability Considerations

Efforts should be made to address component availability issues, possibly by exploring alternative sources or collaborating with suppliers. This would facilitate the implementation of the originally intended method involving a voltage-controlled oscillator, frequency down-converter, and band-pass filter.

8.3 Incorporation of Machine Learning

Exploring the integration of machine learning algorithms could enhance the Cell Phone Detector's ability to adapt and learn from different RF signal patterns, reducing false positives and improving overall accuracy in detecting cell phones.

9. Conclusion

The Cell Phone Detector project successfully utilizes the RF spectrum approach for effective detection of cell phones. Despite challenges in component availability, the chosen methodology and components provide a reliable solution for alerting users to switch off their mobile phones within a specified range.