**Department of Electrical Engineering and   
Computer Science**

**Faculty Member:** Dr. Huma Ghafoor  **Dated:** 9/03/2023

**Semester:** 6th **Section:** BEE 12C

**EE-351 Communication Systems**

Lab 6: Mixer, IF Filter and Envelope Detector

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|  |  |  |  |  |  |  |
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|  |  | **5 Marks** | **5 Marks** | **5 Marks** | **5 Marks** | **5 Marks** |
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# RF Power Amplifier

## Objectives

* When you have completed this exercise, you will be able to explain the operation of the mixer, describe the function of IF filter and describe how the envelope detector converts a 455kHz signal to the message signal. You will use an oscilloscope to make AM signal measurements.

## Introduction

The purpose of this lab report is to explore the properties and characteristics of RF Mixer, IF filter and envelope detector. Overall, the lab report aims to provide a comprehensive understanding of the fundamental concepts and practical applications of RF amplifiers and AM.

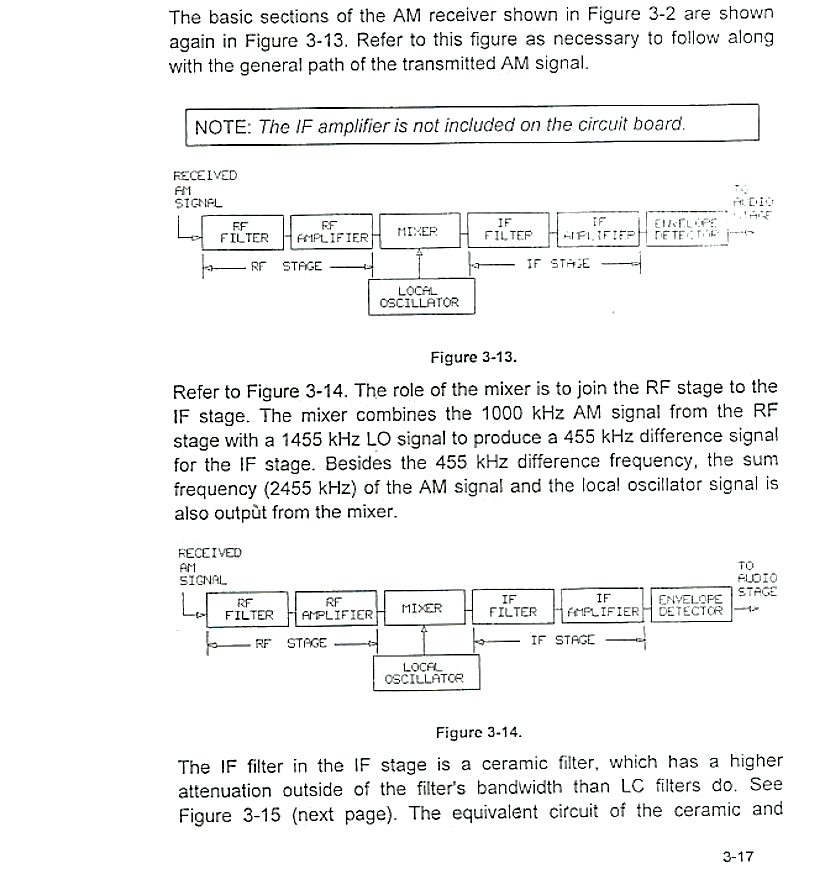
## Lab Report Instructions

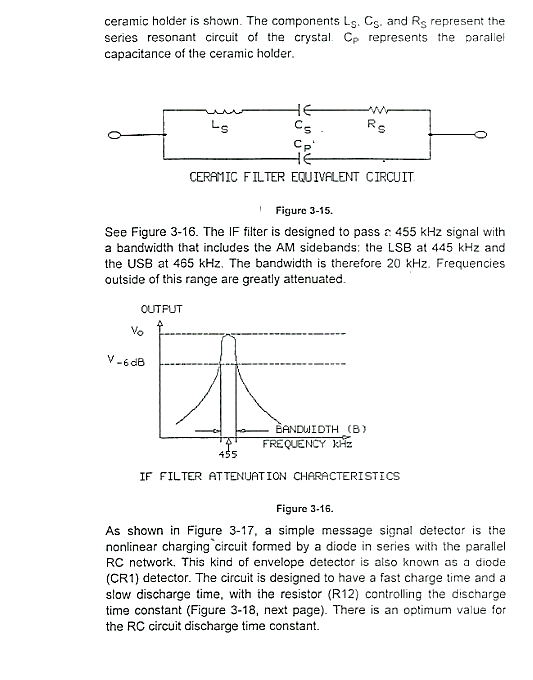
All questions should be answered precisely to get maximum credit. Lab report must ensure following items:

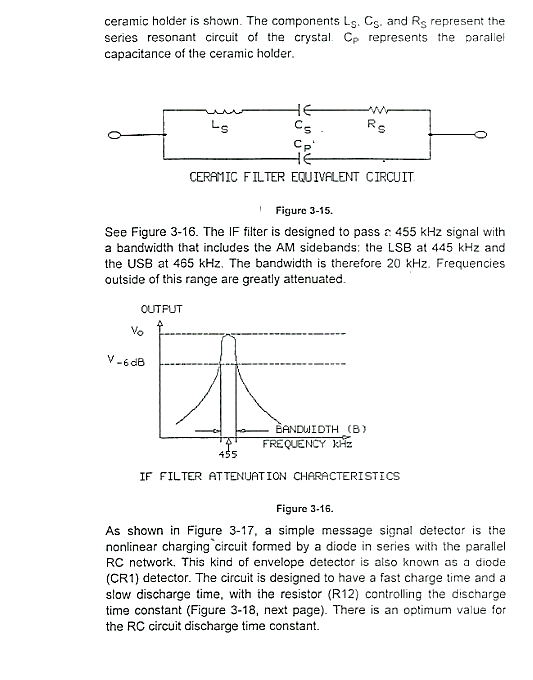
* Lab objective
* Results (screen shots) duly commented and discussed.
* Conclusion

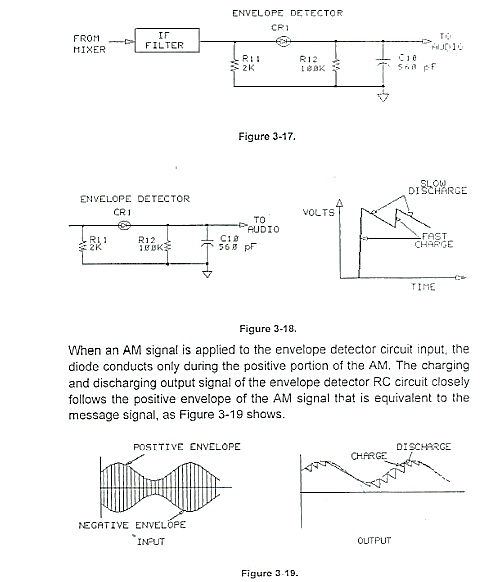
# Lab Procedure

## Introduction

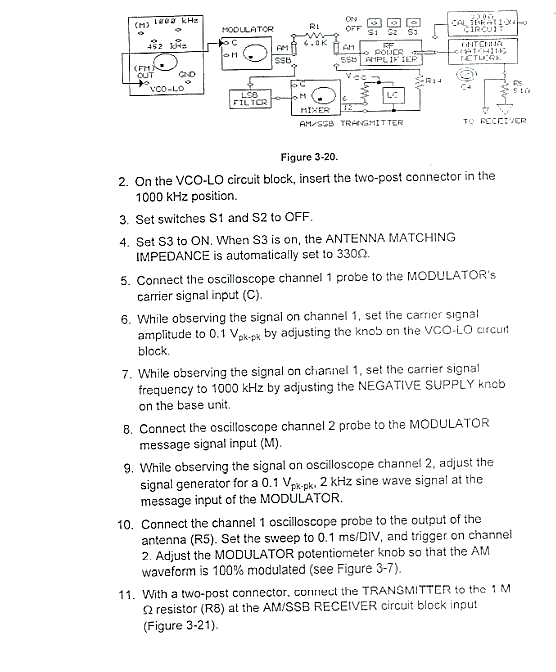


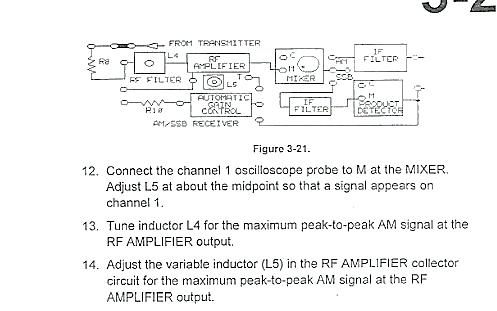




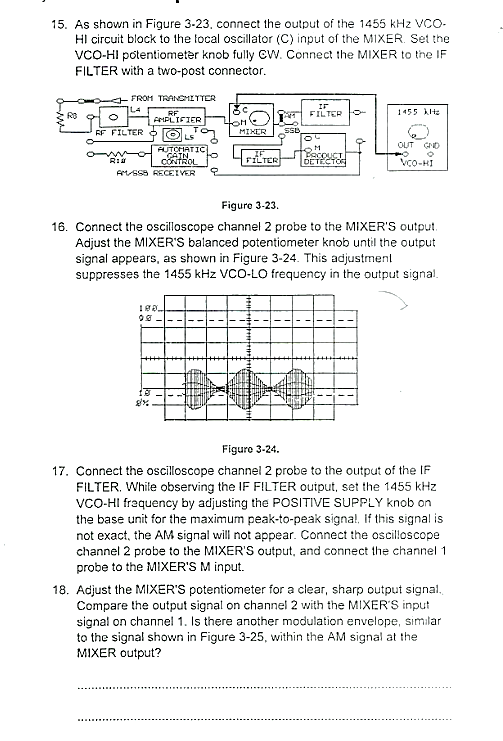


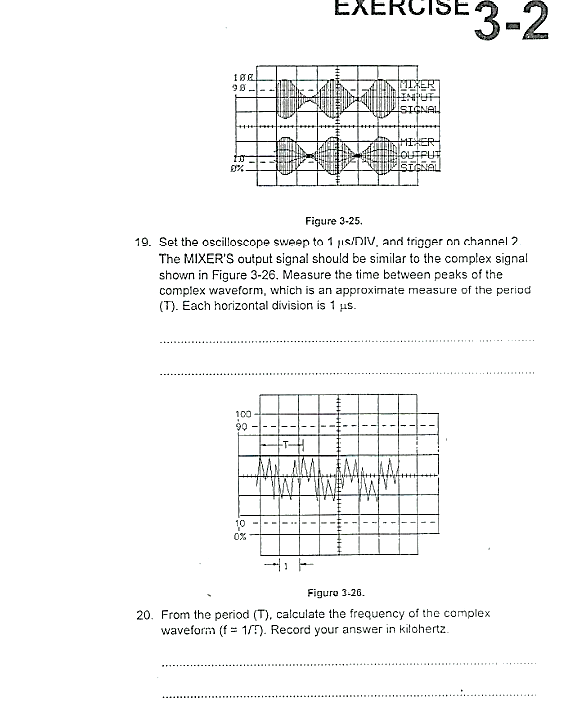
## Procedure A: Connect the AM Transmitter and Set the RF Stage

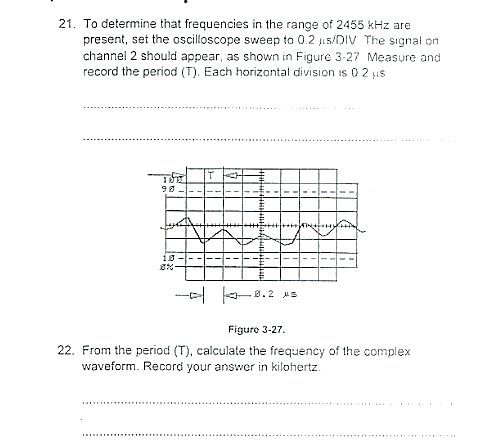




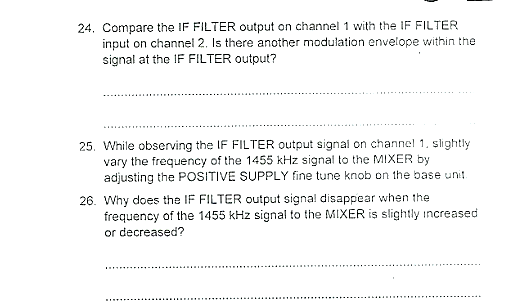
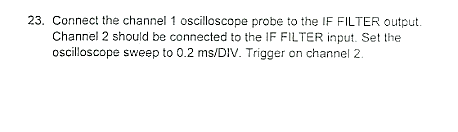
## Procedure B: Mixer



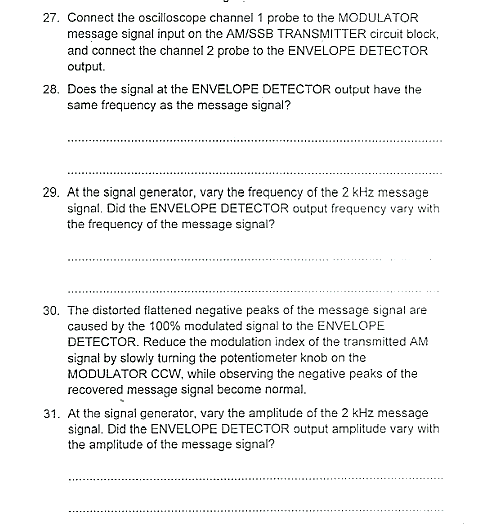




## Procedure C: IF Filter



## Procedure D: Envelope Detector



## Deliverables

* **Step 9**

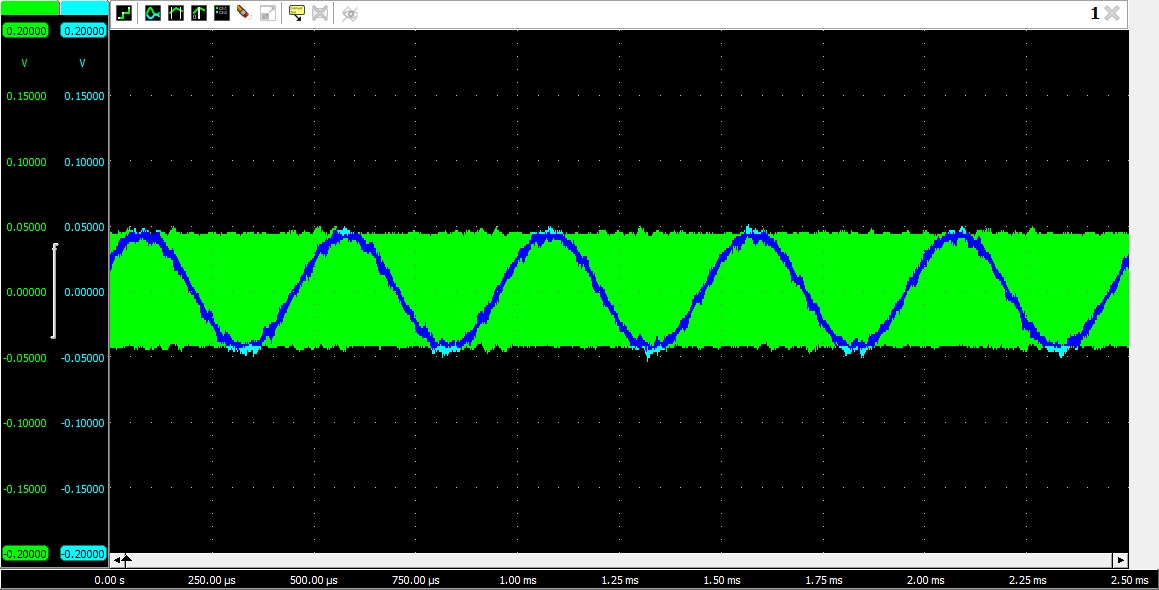


Figure : Message (M) and Carrier Signal (C) at MODULATOR Input

* **Step 11**

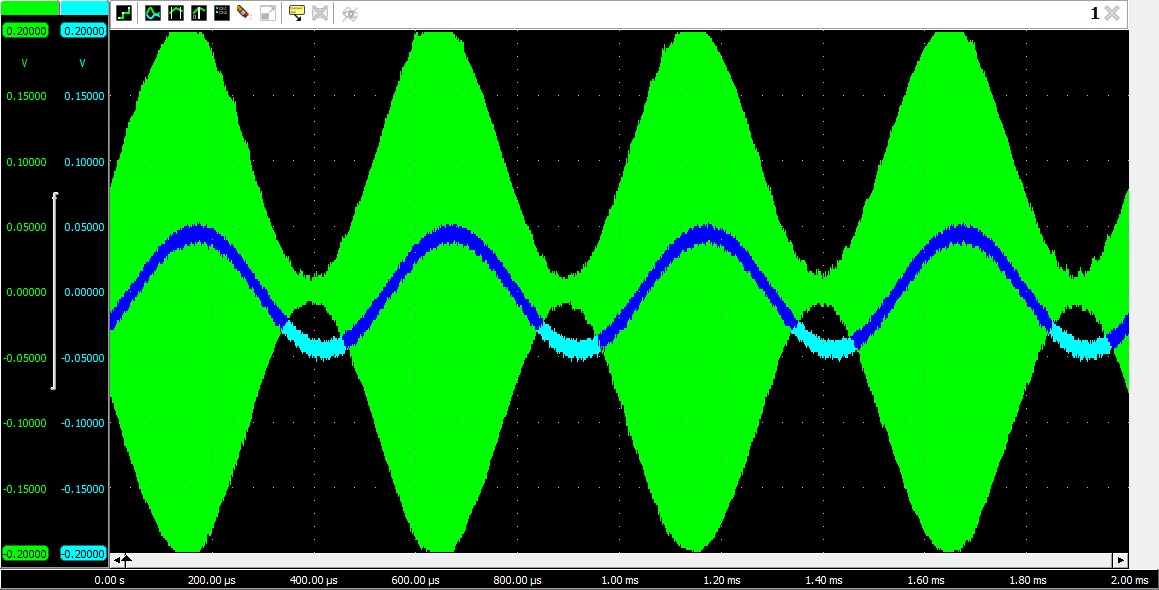


Figure : 100% Modulation AM Signal

* **Step 17**

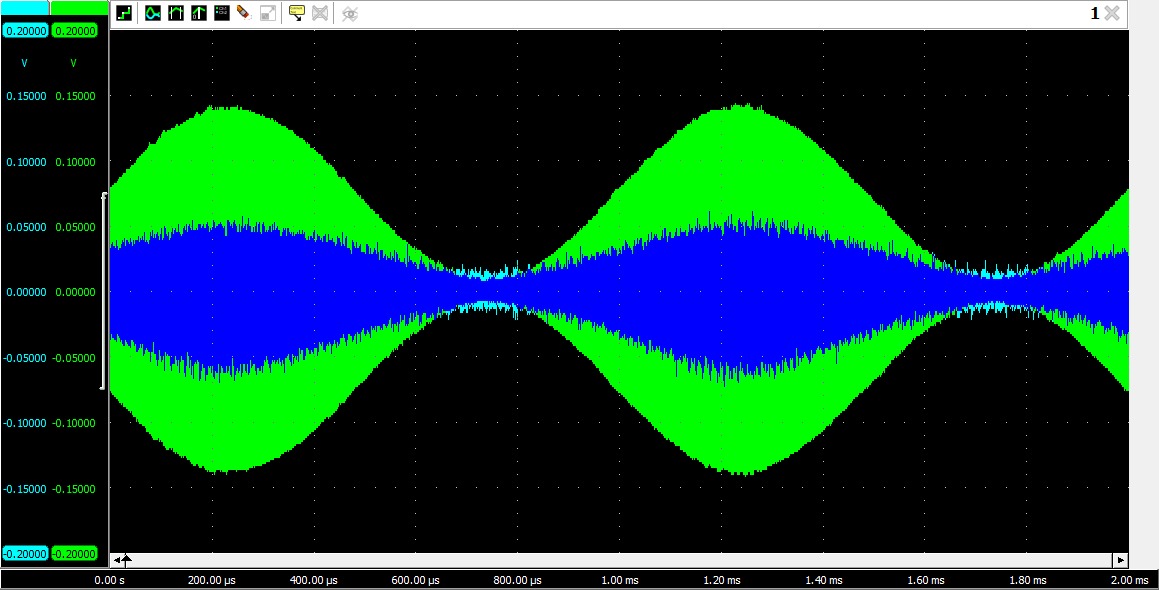


Figure : VCO-HI and AM signal

* **Step 18**

Yes, the presence of another modulation envelope is observed.

* **Step 19**

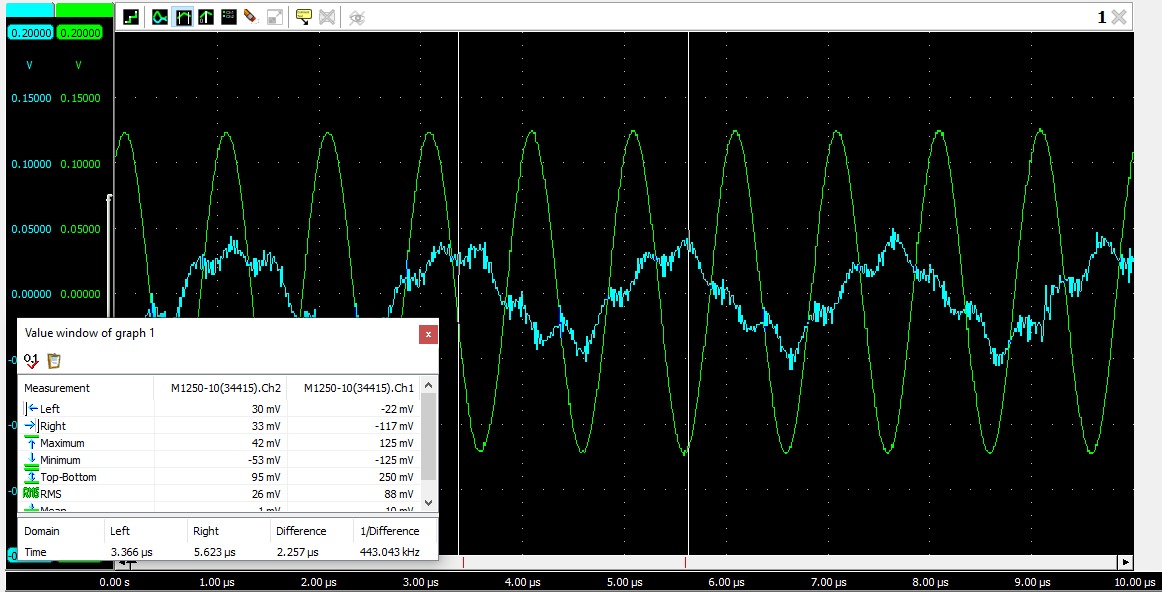


Figure : Period Calculation

T = 2.25

* **Step 20**

= 444.44

* **Step 21**

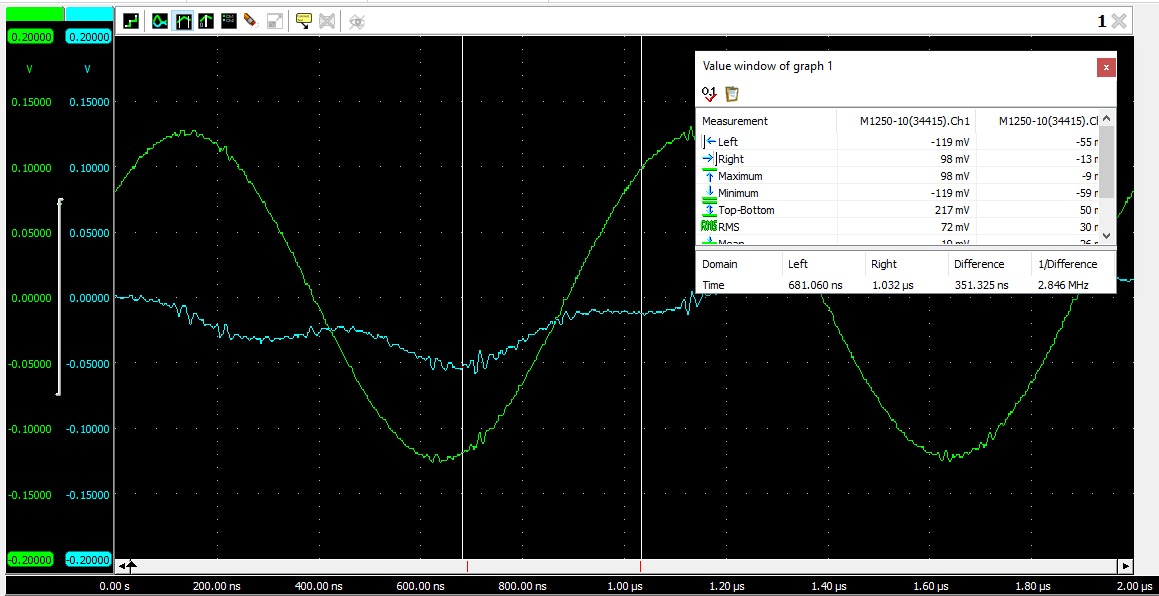


Figure : Period Calculation

T = 351

* **Step 22**

= 1/351

* **Step 24**

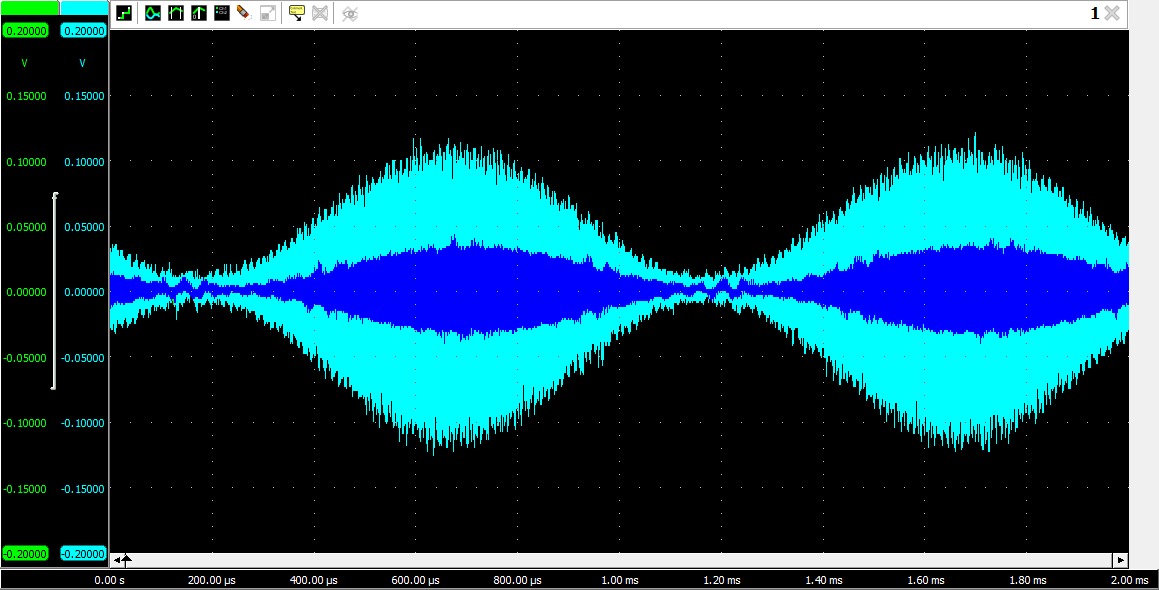


Figure : Presence of Modulation Envelope

* **Step 25**

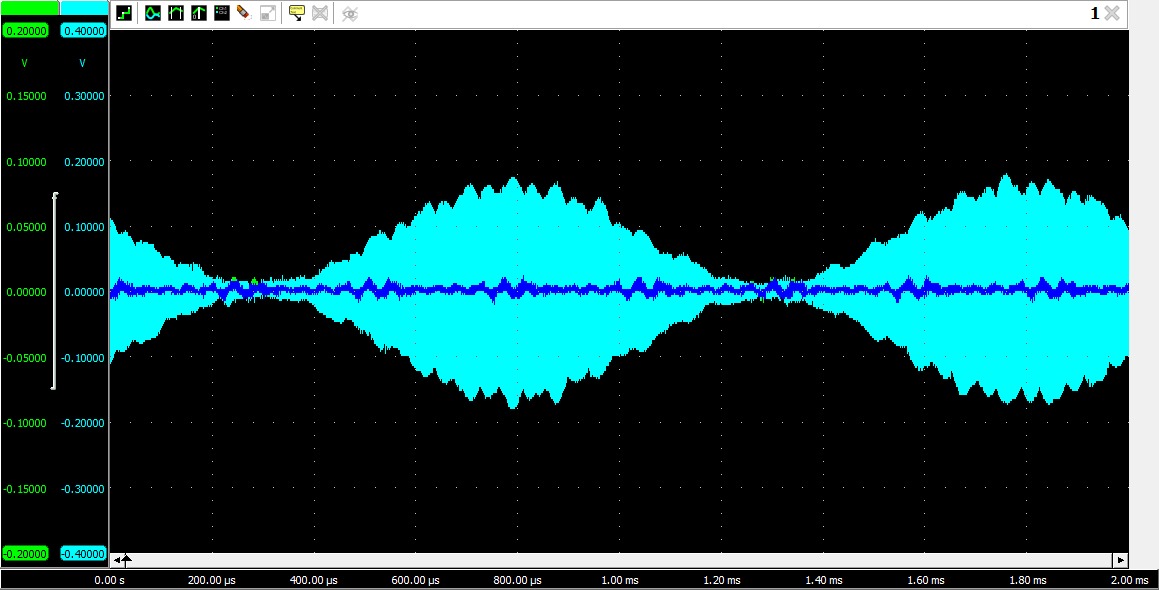


Figure : IF Filter Output

* **Step 28**

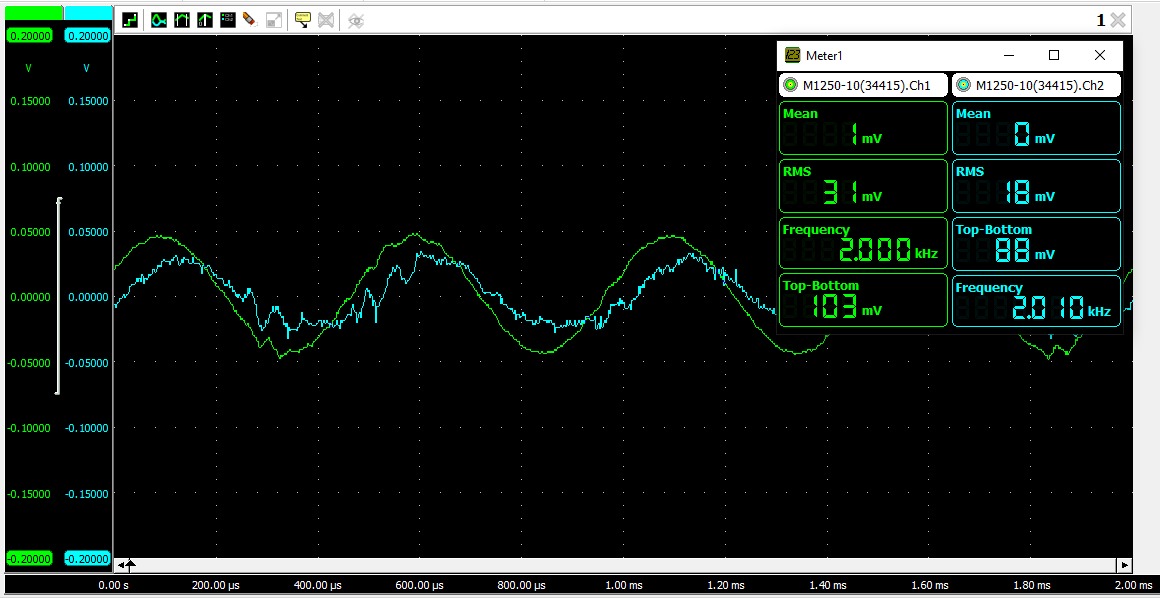


Figure : Envelope Detector Output

* **Step 29**

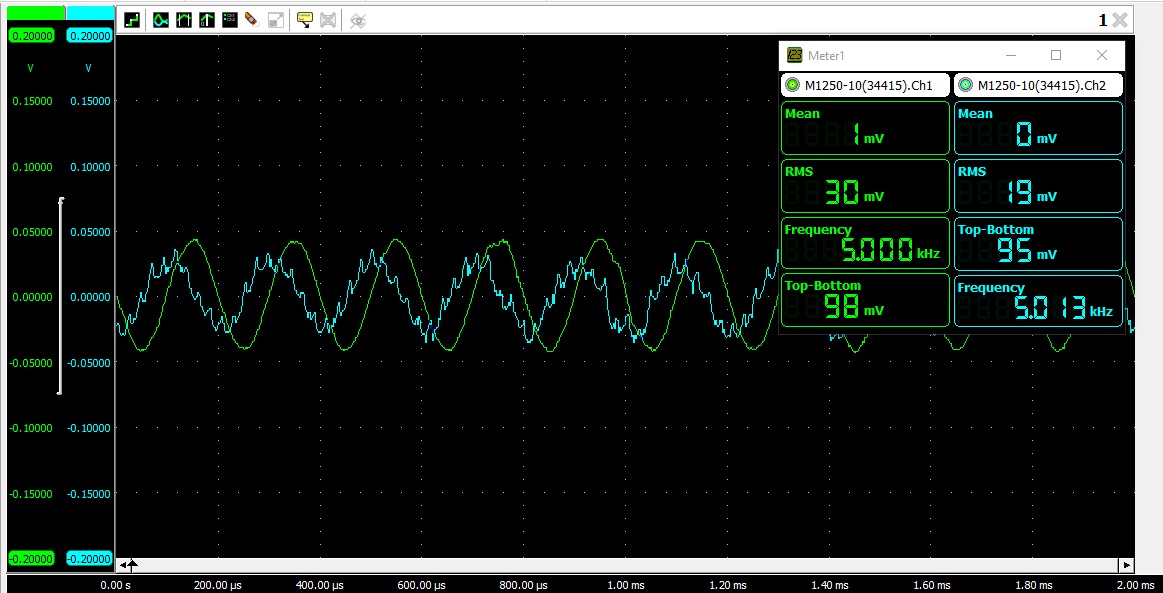


Figure : Frequency Variation

# Conclusion

We completed the lab exercise and gained practical knowledge and hands-on experience in understanding the fundamentals of communication systems. By the end of this lab, we had a better understanding of the mixer, IF filter, and envelope detector, as well as their individual functions in the context of modulation in a communication system.