



**Faculty of Engineering & Technology**  
**Electrical & Computer Engineering Department**  
**COMMUNICATIONS LAB**

**ENEE4113**

**Experiment No. 2**

**DSB-SC & SSB-SC Experiment**

**PreLab-2**

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**Section:** 5

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## Contents

<b>1. Signals information:</b>	1
1.1.Message signal:	1
1.1.1.in time domain:	1
1.1.2. in Frequency Domine	1
1.1.3. Parameters for message signal:	2
1.2.carrier signal:	2
1.2.1.in time domain:	2
1.2.2. in Frequency Domine:	3
1.1.3. Parameters for carrier signal:	3
<b>2.DSB-SC:</b>	4
2.1.modulation:	4
2.1.1. block diagram of the modulation :	4
2.1.2.in time domain :	4
2.2.Demodulation:	5
2.2.1. block diagram of the demodulation:	5
2.2.2.in time domain :	6
2.2.3.in frequency domain:	6
From this plot we noticed that the filter returned the message signal at $f=1\text{kHz}$ .	6
<b>3. SSB-SC</b>	7
3.1. SSB-SC method 1(Lower Side):	7
3.1.1.Modulation :	7
3.1.2.Demodulation:	9
3.2. SSB-SC method 2(Lower Side):	10
3.2.1.Modulation:	10
3.2.2.Demodulation:	12

## Table of figure:

Figure 1.Message signal in time domain.....	1
Figure 2..Message signal in Frequency domain .....	2
Figure 3.Parameters for message signal .....	2
Figure 4.carrier signal in time domain .....	2
Figure 5.carrier signal in Frequency domain.....	3
Figure 6.Parameters for carrier signal .....	3
Figure 7.block diagram for DSB modulation .....	4
Figure 8.DSB-SC modulation in time domain.....	4
Figure 9.DSB-SC modulation in frequency domain.....	5
Figure 10.block diagram for DSB Demodulation.....	5
Figure 11.DSB-SC demodulation in time domain.....	6
Figure 12.DSB-SC demodulation in frequency domain.....	6
Figure 13SSB-SC method 1(Lower Side) block diagram modulation .....	7
Figure 14.Bandpass Filter parameters .....	7
Figure 15.SSB-SC method 1(Lower Side)modulation in time domain .....	8
Figure 16.SSB-SC method 1(Lower Side)modulation in frequency domain.....	8
Figure 17.SSB-SC method 1(Lower Side) block diagram demodulation .....	9
Figure 18.SSB-SC method 1(Lower Side)demodulation in time domain .....	9
Figure 19.SSB-SC method 1(Lower Side)demodulation in frequency domain .....	10
Figure 20.SSB-SC method 2(Lower Side) block diagram modulation .....	10
Figure 21.SSB-SC method 2(Lower Side)modulation in time domain .....	11
Figure 22.SSB-SC method 2(Lower Side)modulation in frequency domain.....	11
Figure 23.SSB-SC method 2(Lower Side) block diagram demodulation .....	12
Figure 24.SSB-SC method 2(Lower Side)demodulation in time domain .....	12
Figure 25.SSB-SC method 2(Lower Side)demodulation in frequency domain .....	13

Software Prelab:

### 1. Signals information:

1.1.Message signal:

1.1.1.in time domain:

$$m(t) = 0.85\cos(2\pi(1000)t)$$

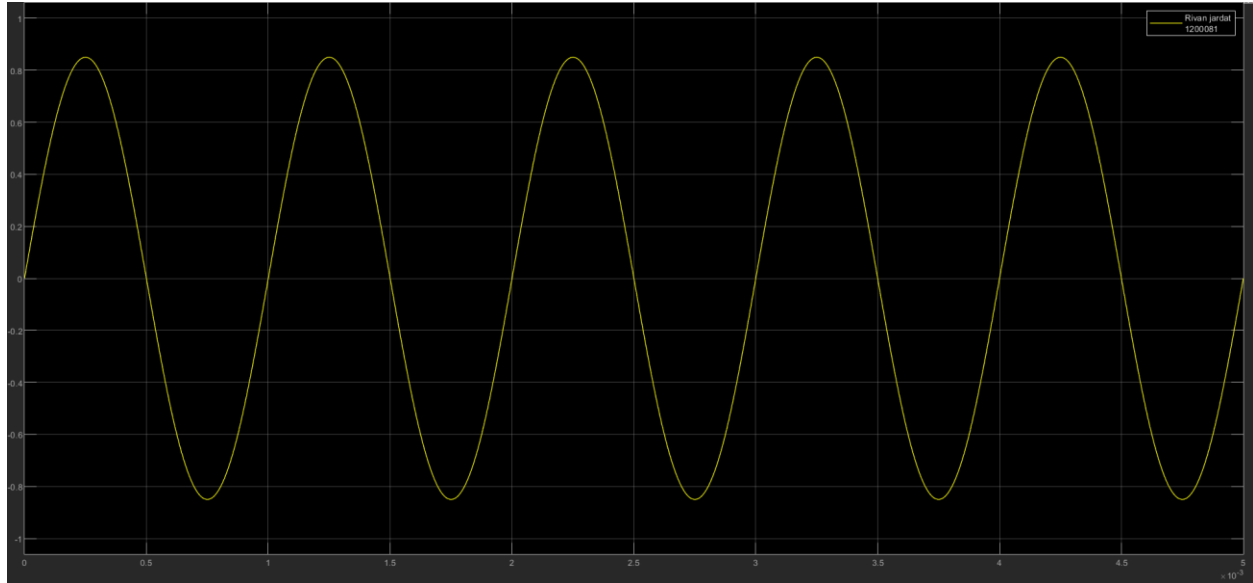


Figure 1.Message signal in time domain

1.1.2. in Frequency Domine:

$$m(f) = 0.85/2 \delta(f - 1000) + 0.85/2 \delta(f + 1000)$$

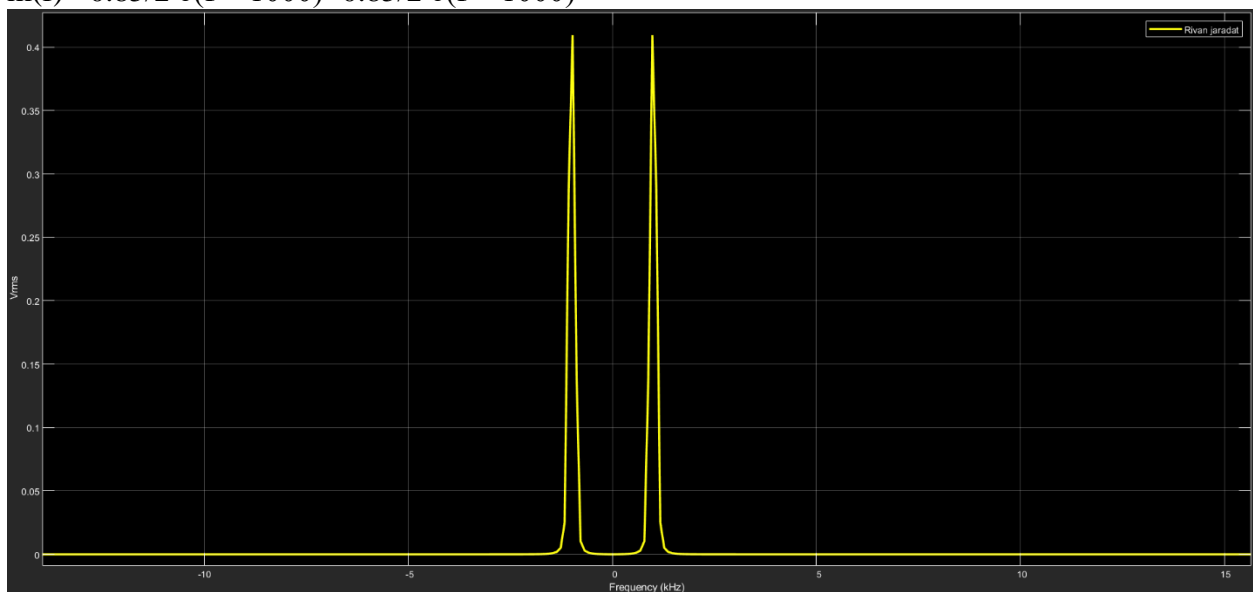


Figure 2..Message signal in Frequency domain

### 1.1.3. Parameters for message signal:

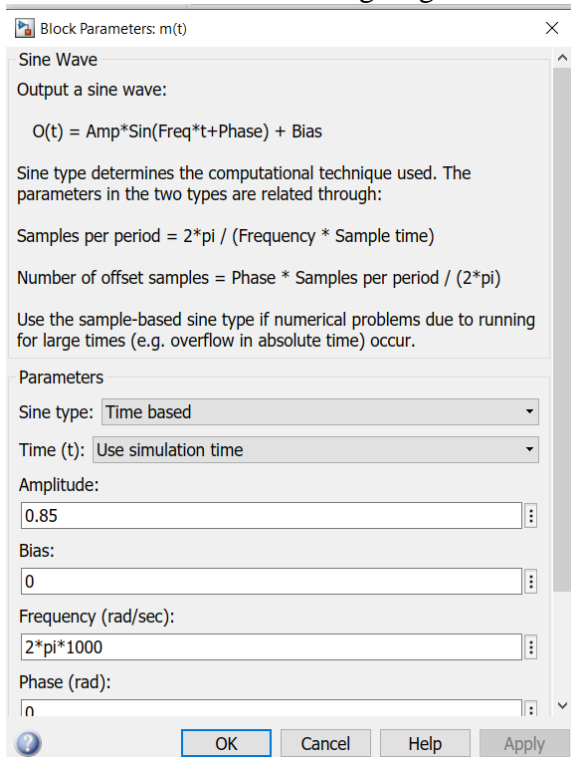


Figure 3.Parameters for message signal

### 1.2.carrier signal:

#### 1.2.1.in time domain:

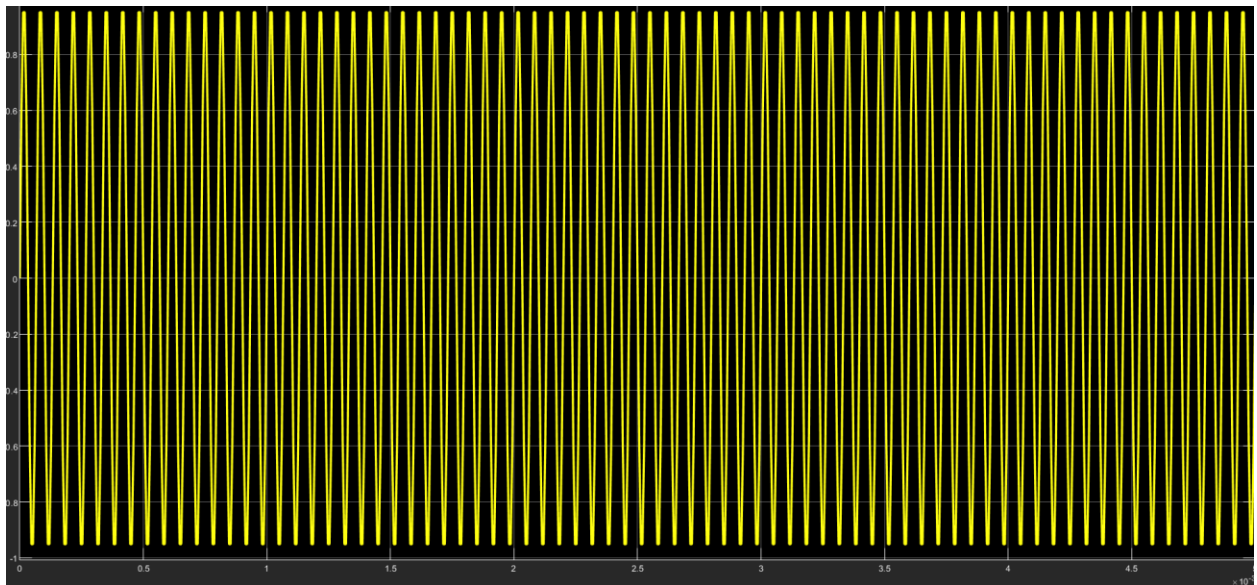


Figure 4.carrier signal in time domain

### 1.2.2. in Frequency Domine:

$$m(f) = 1/2\delta(f - 15000) + 1/2\delta(f + 15000)$$

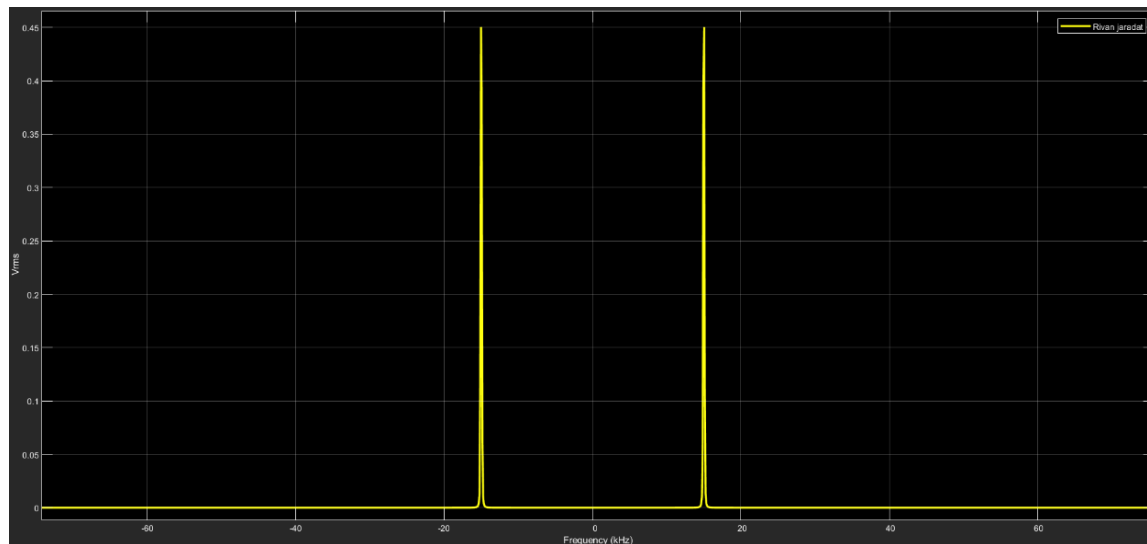


Figure 5. carrier signal in Frequency domain

### 1.1.3. Parameters for carrier signal:

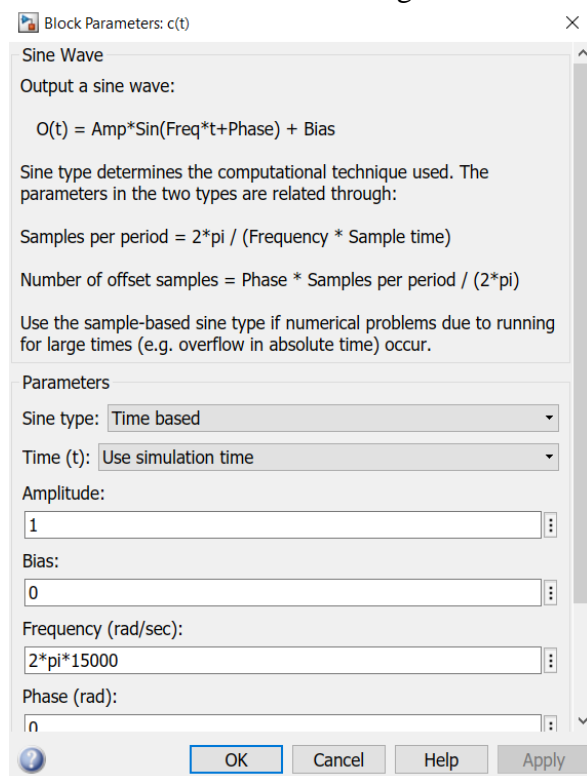


Figure 6. Parameters for carrier signal

## 2.DSB-SC:

### 2.1.modulation:

#### 2.1.1. block diagram of the modulation :

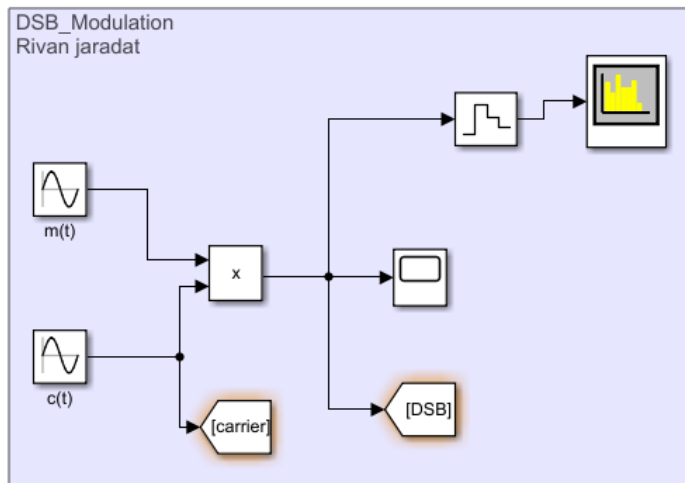


Figure 7.block diagram for DSB modulation

#### 2.1.2.in time domain :

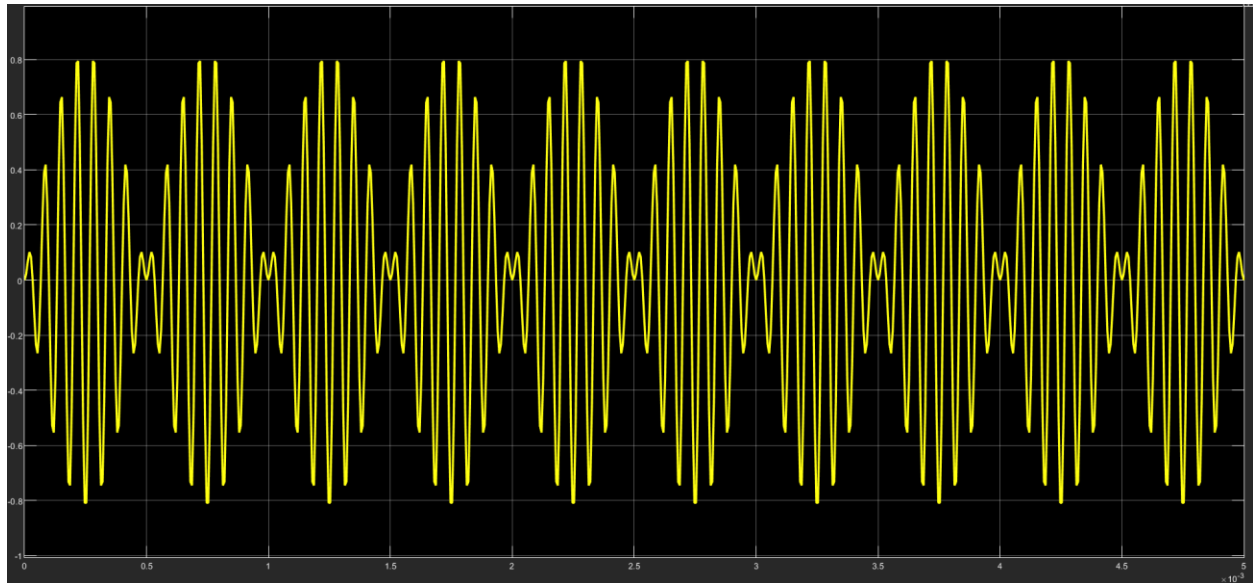


Figure 8.DSB-SC modulation in time domain

### 2.1.3.in frequency domain:

$$S(t) = (0.85/2) \cos ( 2*\pi* (16000)) + (0.85/2) \cos ( 2*\pi* (14000))$$

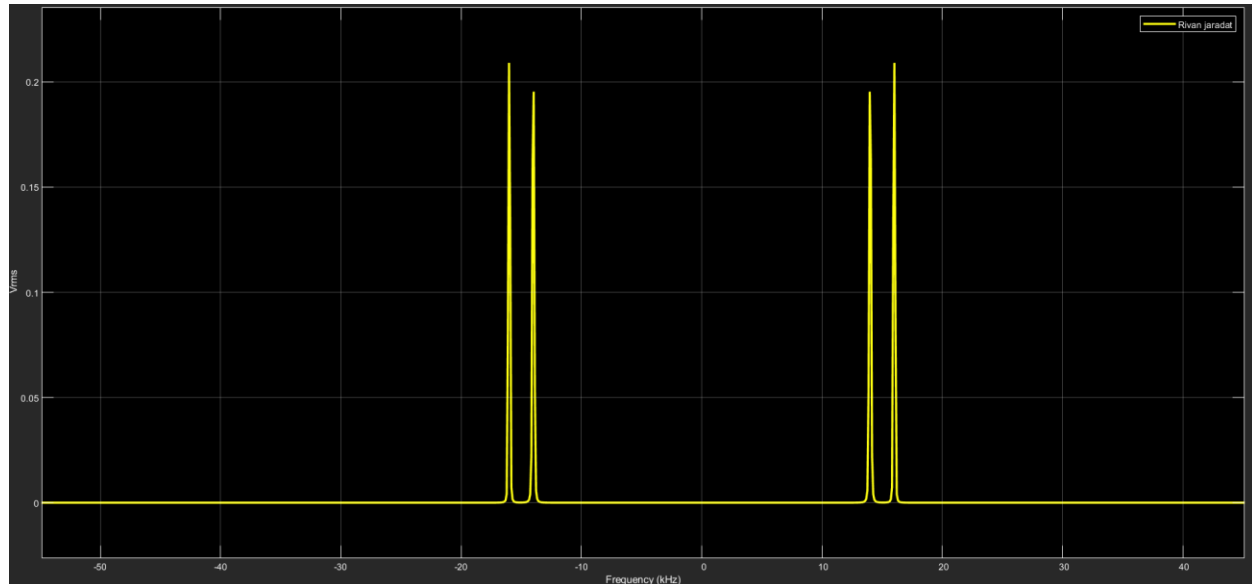


Figure 9.DSB-SC modulation in frequency domain

We noticed from the plot the spectrum was at  $f = 14\text{k}$  and  $f = 16\text{k}$

### 2.2.Demodulation:

#### 2.2.1. block diagram of the demodulation:

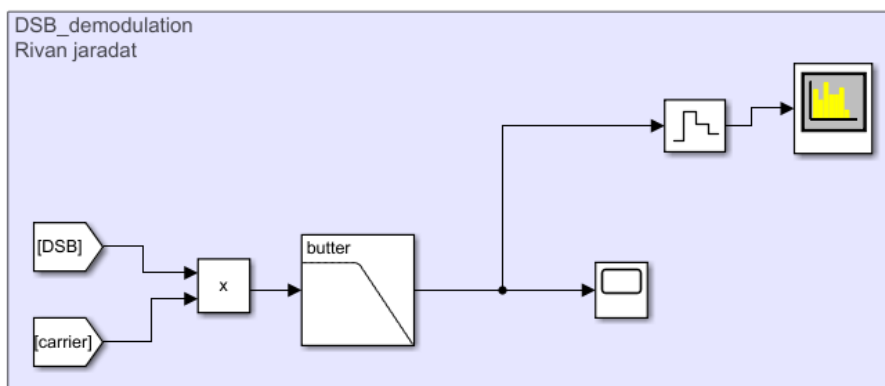


Figure 10.block diagram for DSB Demodulation



### 2.2.2.in time domain :

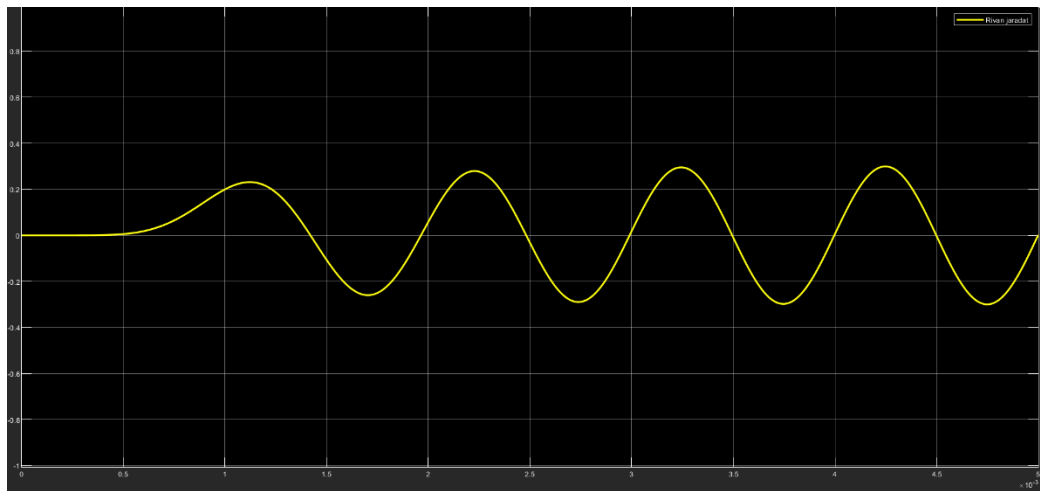
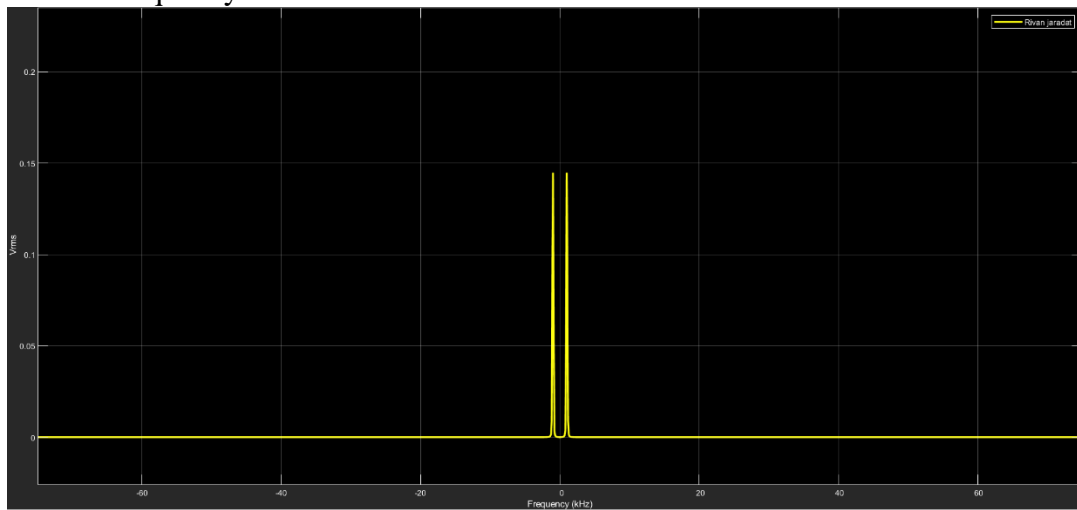


Figure 11.DSB-SC demodulation in time domain

### 2.2.3.in frequency domain:



From this plot we noticed that the filter returned the message signal at  $f=1\text{kHz}$

Figure 12.DSB-SC demodulation in frequency domain

### 3. SSB-SC

#### 3.1. SSB-SC method 1(Lower Side):

##### 3.1.1.Modulation :

##### 3.1.1.1.Block diagram:

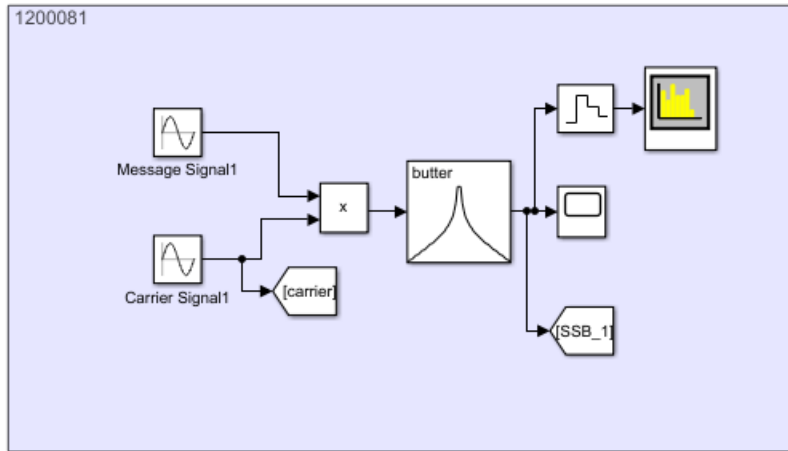


Figure 13SSB-SC method 1(Lower Side) block diagram modulation

Bandpass Filter parameters:

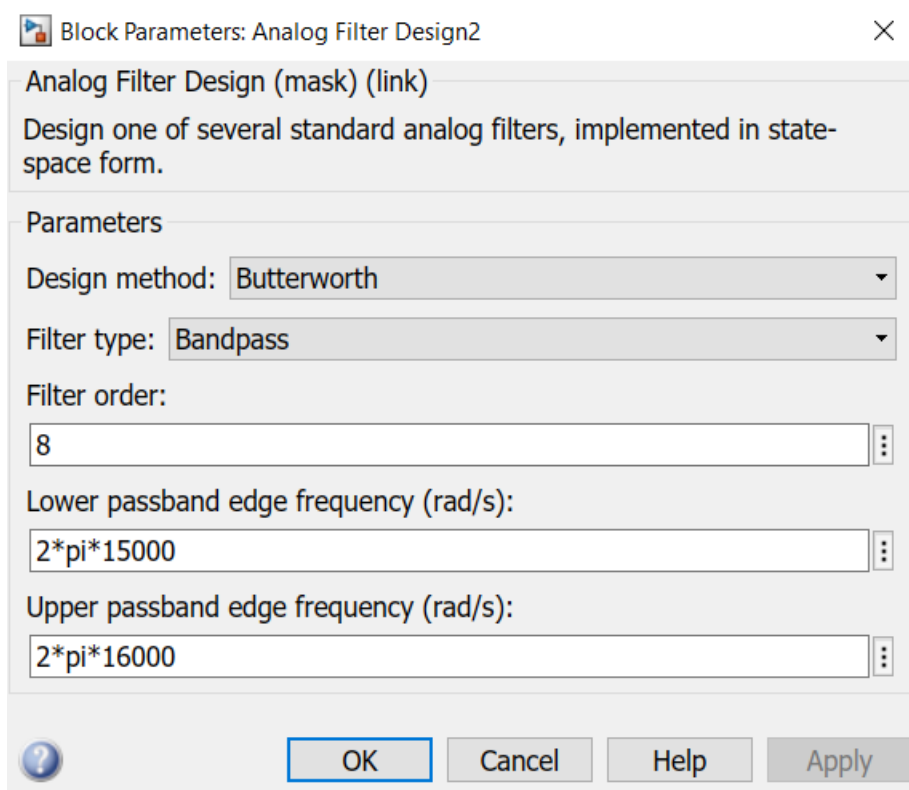


Figure 14.Bandpass Filter parameters

### 3.1.1.2. Time domain:

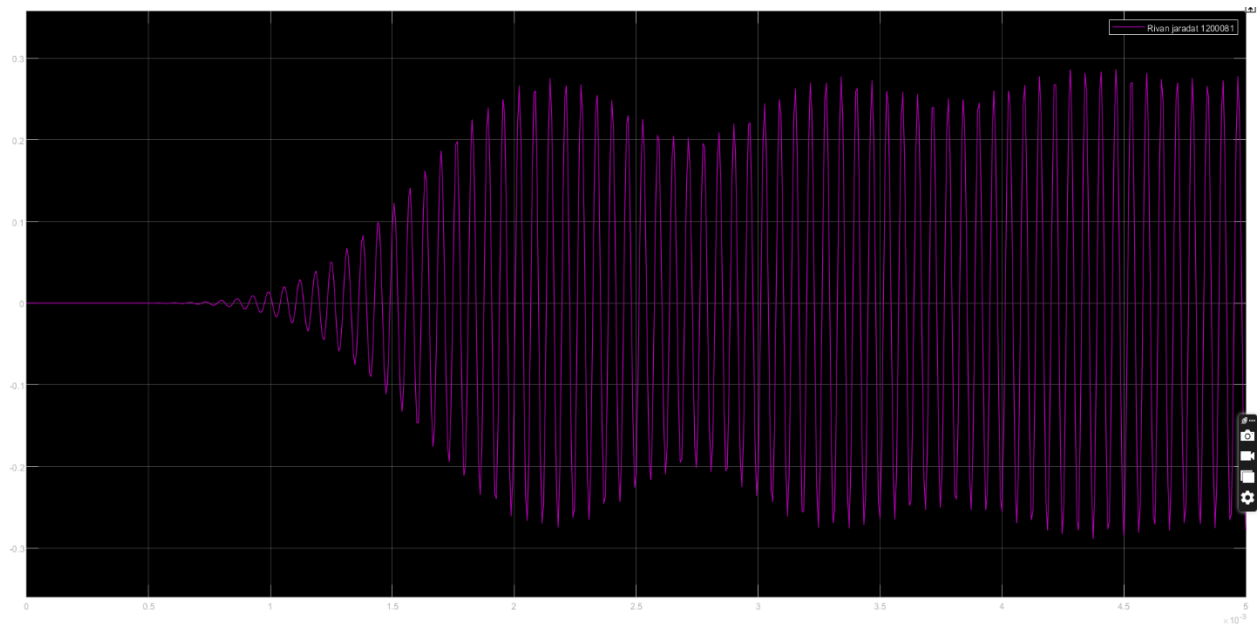


Figure 15.SSB-SC method 1(Lower Side)modulation in time domain

### 3.1.1.3. Frequency domain:

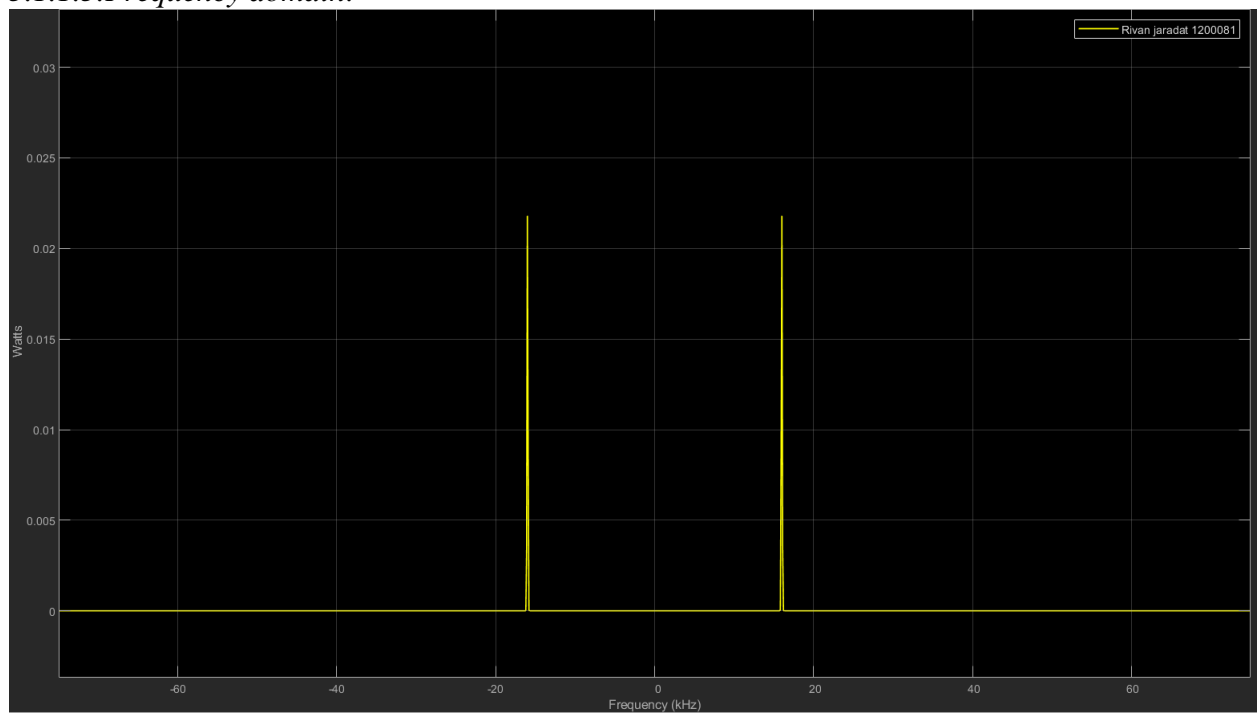


Figure 16.SSB-SC method 1(Lower Side)modulation in frequency domain

### 3.1.2.Demodulation:

#### 3.1.2.1.Block diagram:

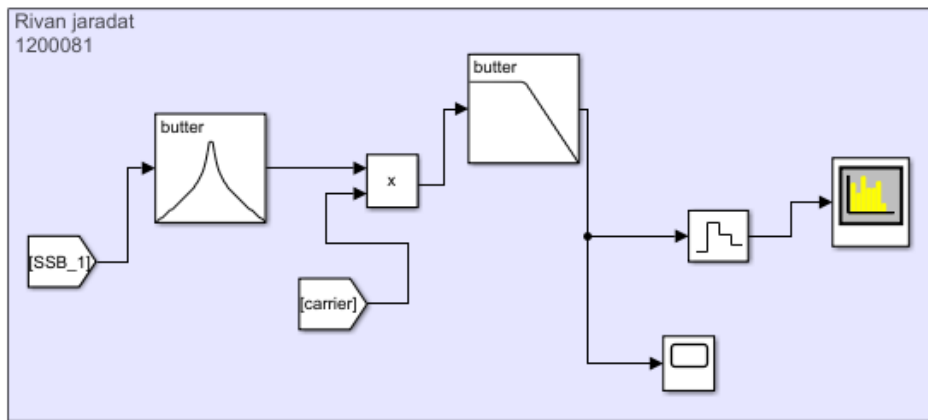


Figure 17.SSB-SC method 1(Lower Side) block diagram demodulation

#### 3.1.2.2.Time domain:

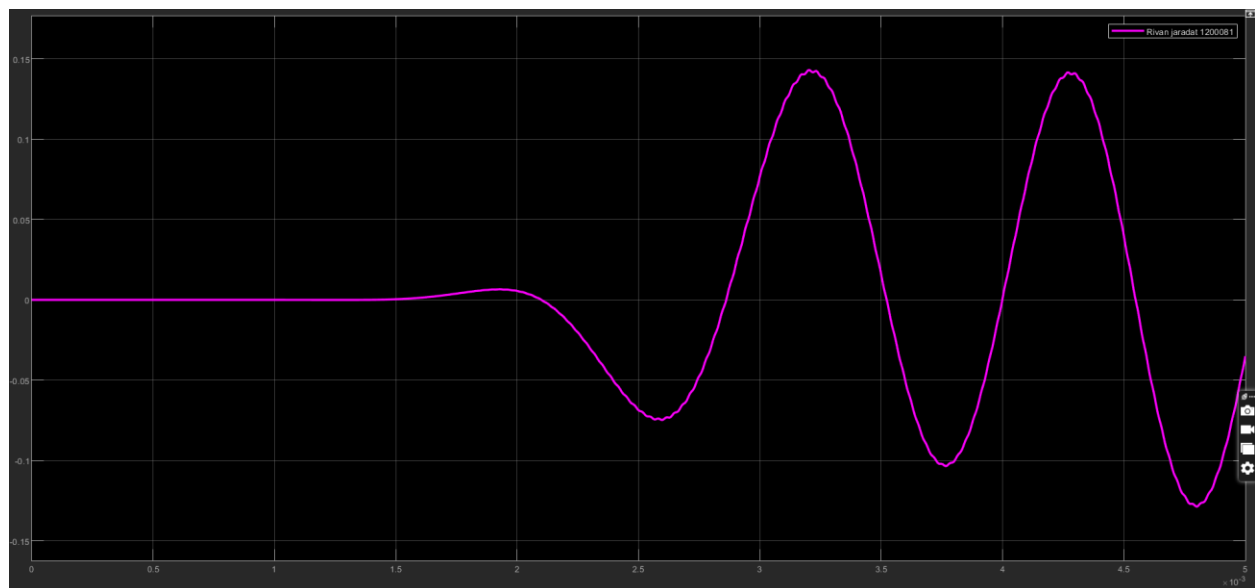


Figure 18.SSB-SC method 1(Lower Side)demodulation in time domain

### 3.1.2.3. Frequency domain:

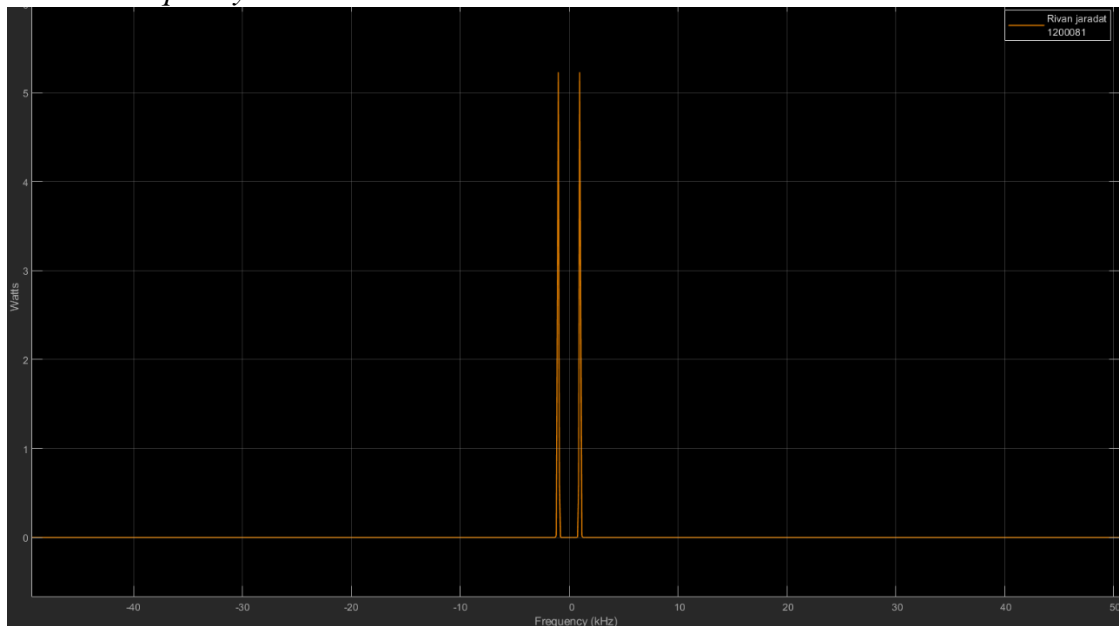


Figure 19.SSB-SC method 1(Lower Side)demodulation in frequency domain

## 3.2. SSB-SC method 2(Lower Side):

### 3.2.1.Modulation:

#### 3.2.1.1.Block diagram:

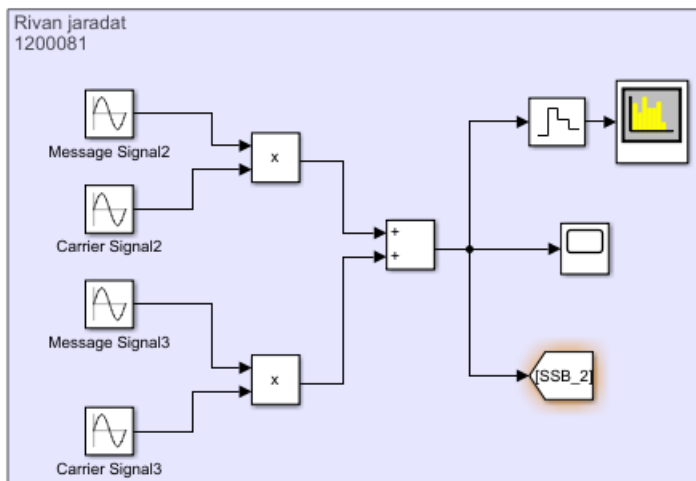


Figure 20.SSB-SC method 2(Lower Side) block diagram modulation

### 3.2.1.2. Time domain:

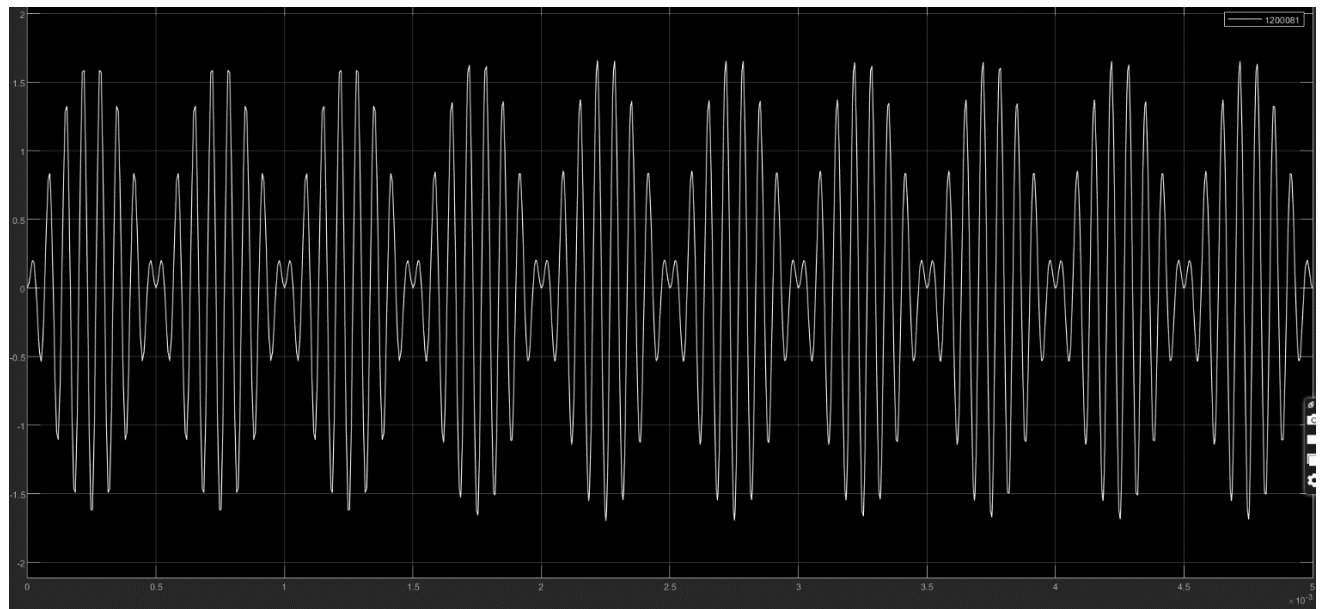


Figure 21.SSB-SC method 2(Lower Side)modulation in time domain

### 3.2.1.3. Frequency domain:

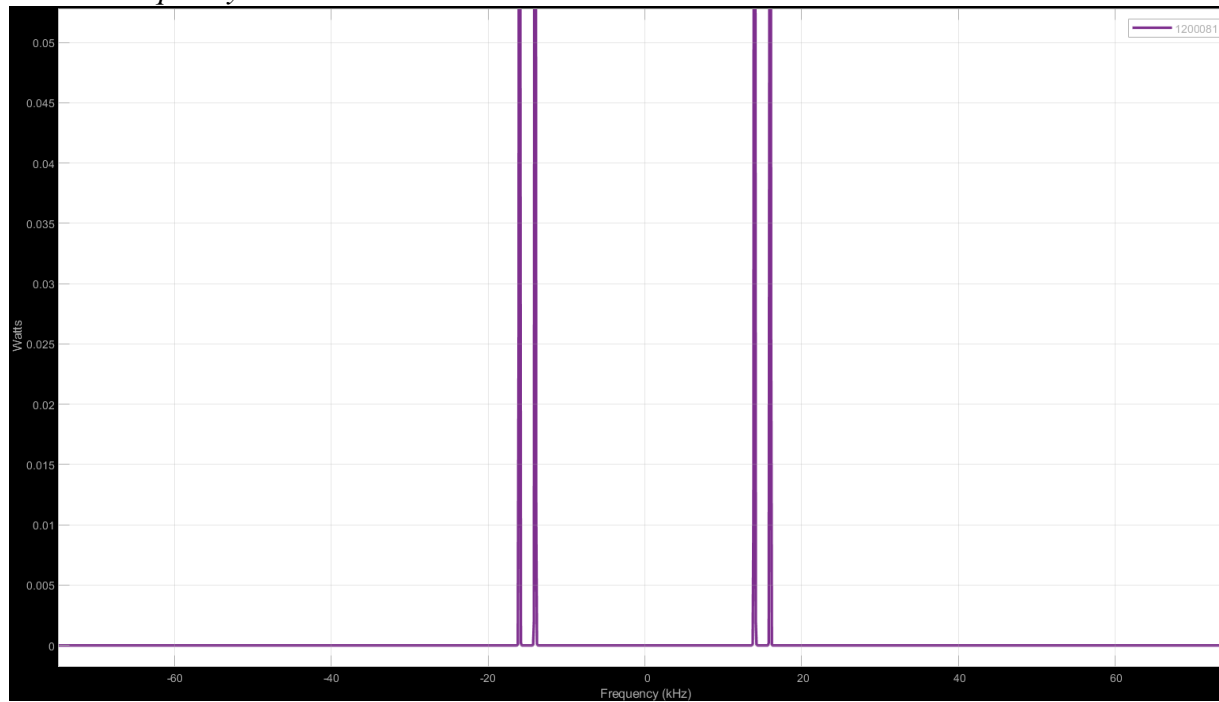


Figure 22.SSB-SC method 2(Lower Side)modulation in frequency domain

### 3.2.2.Demodulation:

#### 3.2.2.1.Block diagram:

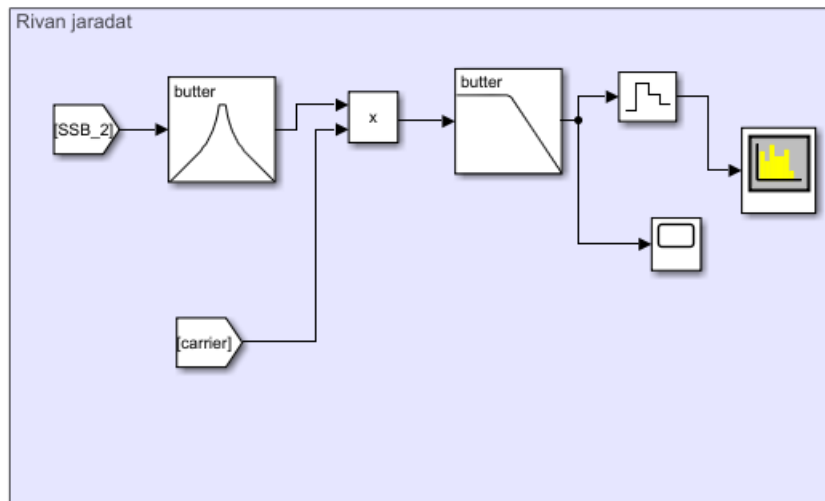


Figure 23.SSB-SC method 2(Lower Side) block diagram demodulation

#### 3.2.2.2.Time domain:

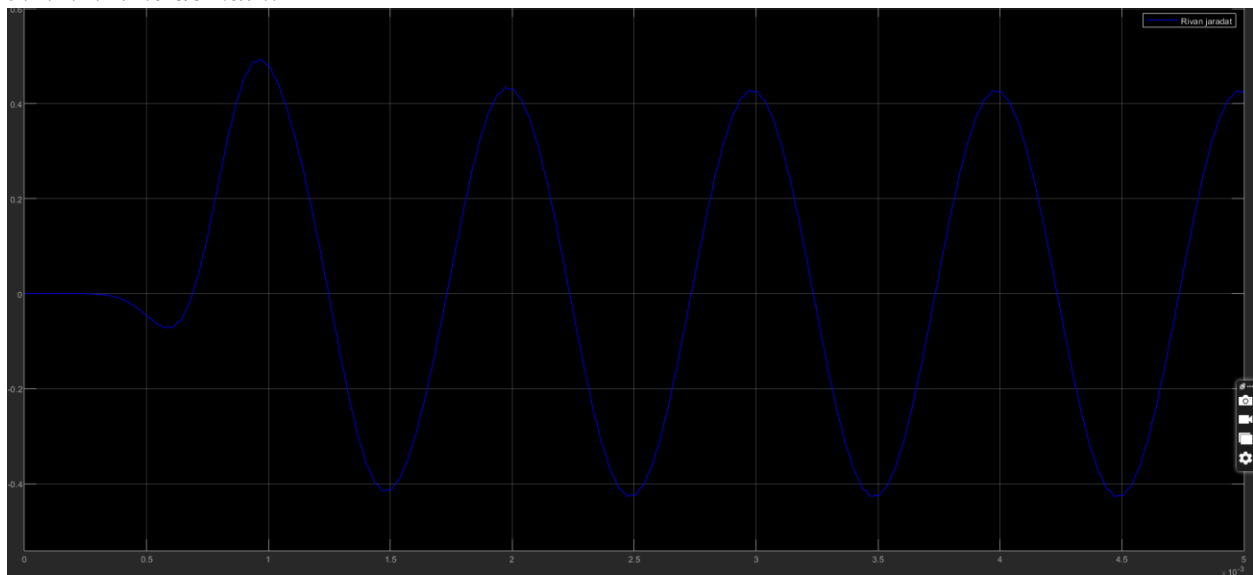


Figure 24.SSB-SC method 2(Lower Side)demodulation in time domain

### 3.2.2.3. Time domain:

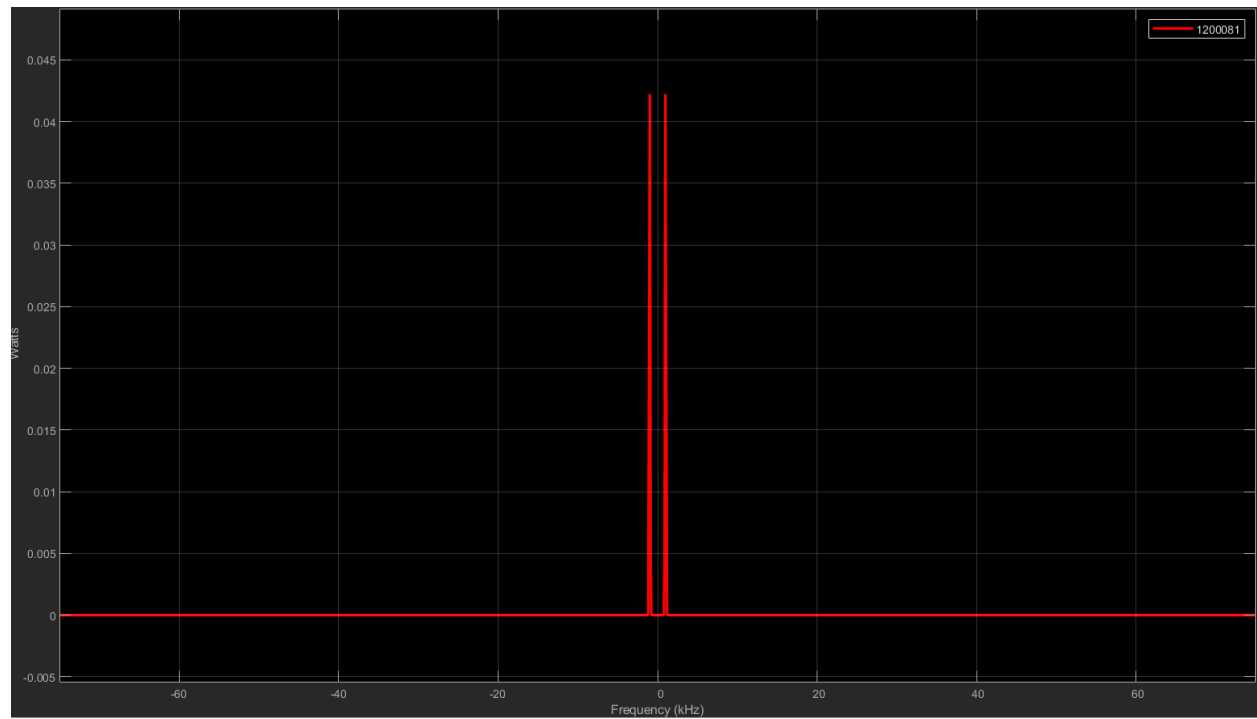


Figure 25.SSB-SC method 2(Lower Side)demodulation in frequency domain