جامعة بيرزيت

BIRZEIT UNIVERSITY

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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Software Prelab:

1. Signals information:

1.1.Message signal:

1.1.1.in time domain:

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

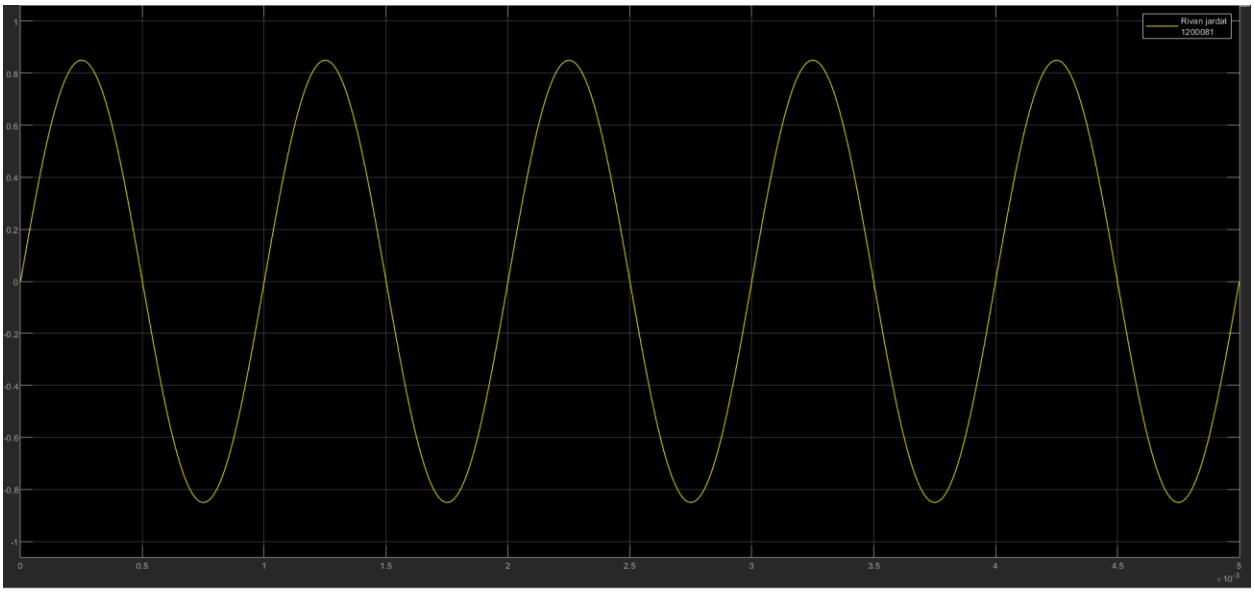


Figure 1.Message signal in time domain

1.1.2. in Frequency Domine:

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

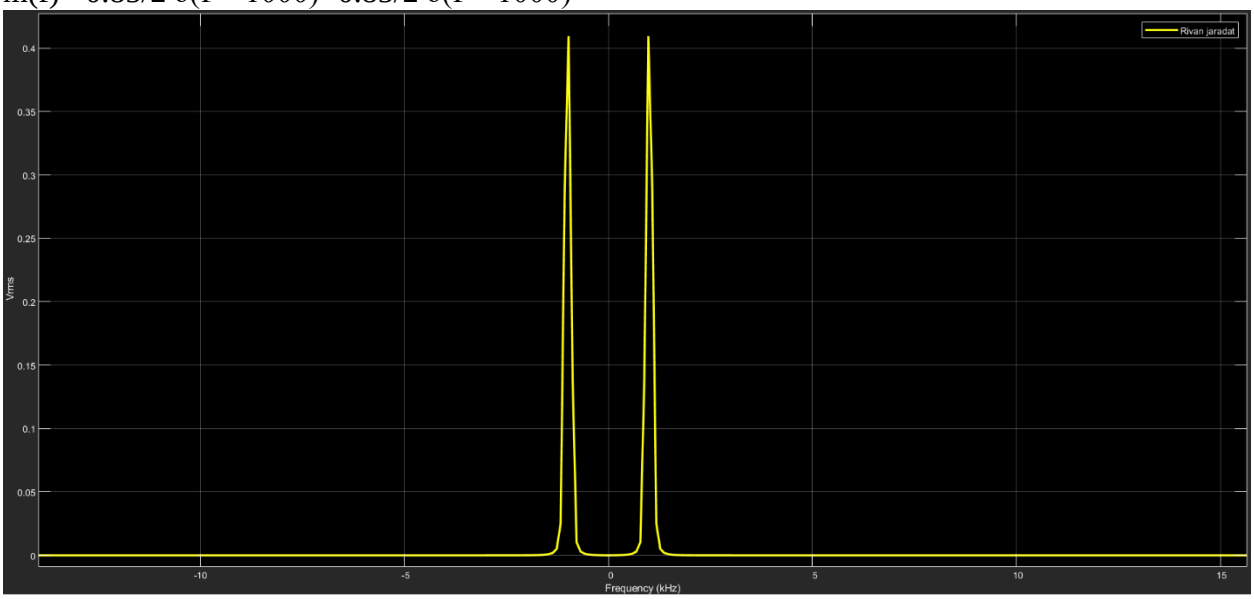


Figure 2..Message signal in Frequency domain

1.1.3. Parameters for message signal:

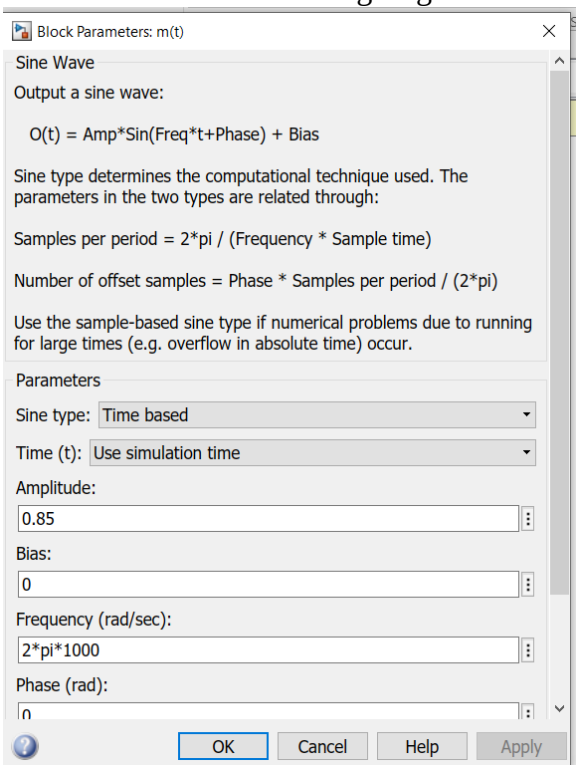


Figure 3.Parameters for message signal

1.2.carrier signal:

1.2.1.in time domain:

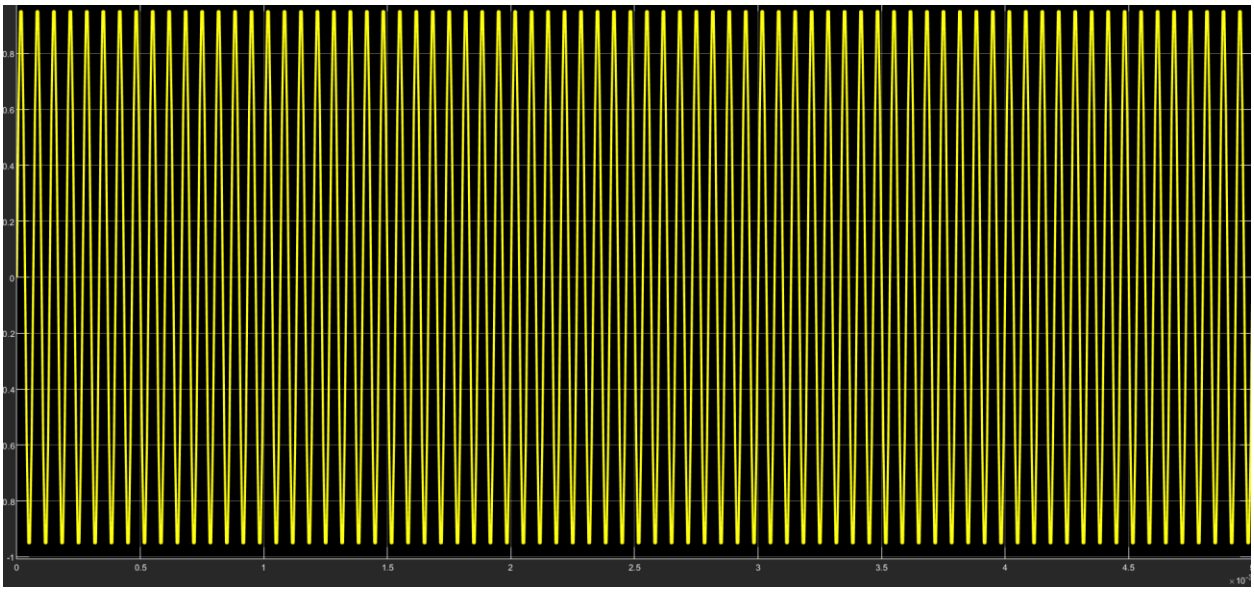


Figure 4.carrier signal in time domain

1.2.2. in Frequency Domine:

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

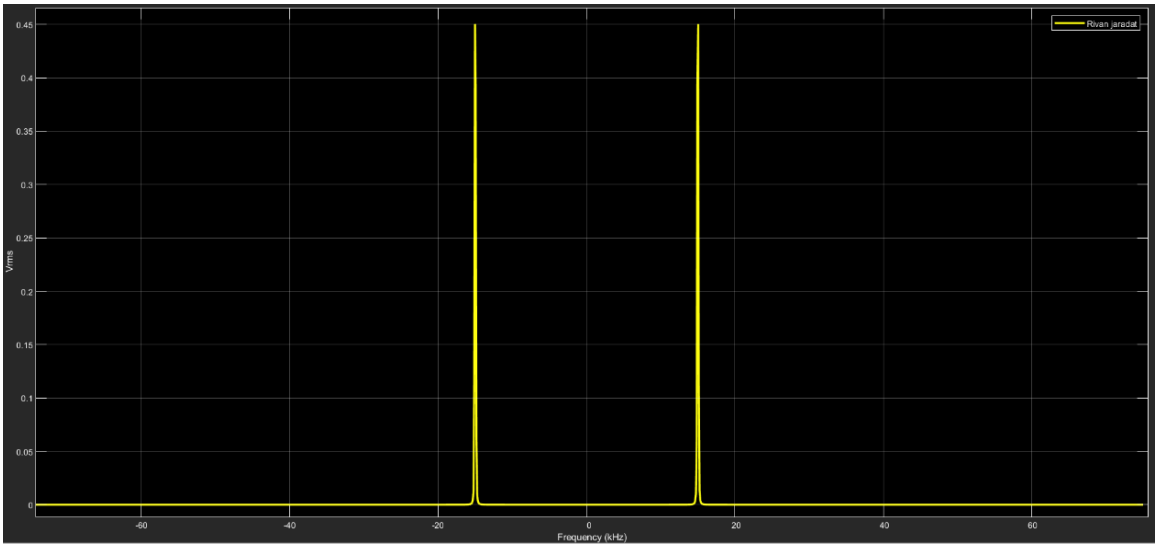


Figure 5.carrier signal in Frequency domain

1.1.3. Parameters for carrier signal:

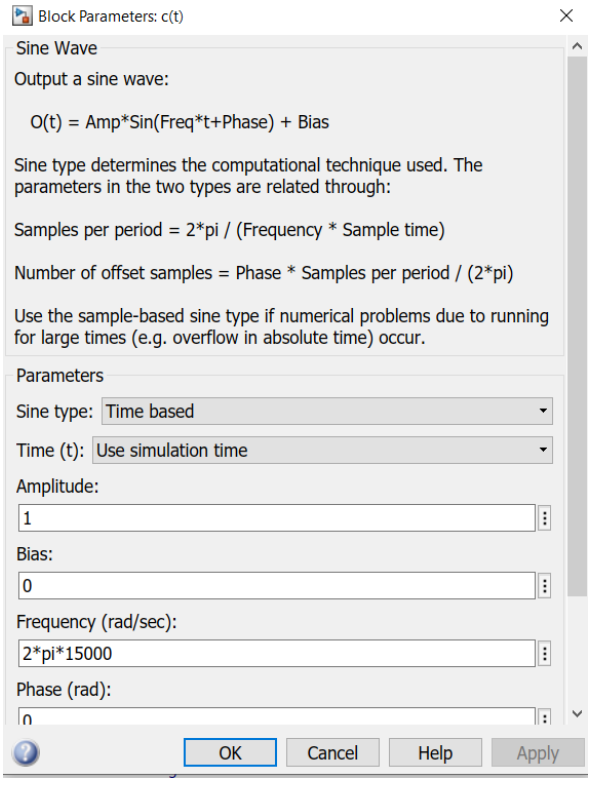


Figure 6.Parameters for carrier signal

2.DSB-SC:

2.1.modulation:

2.1.1. block diagram of the modulation :

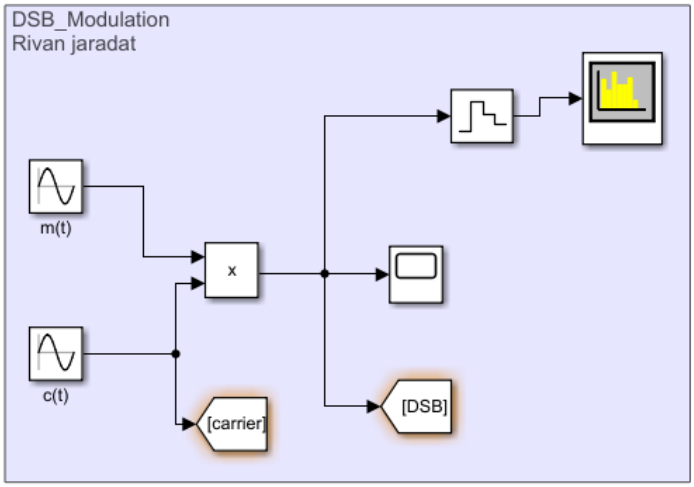


Figure 7.block diagram for DSB modulation

2.1.2.in time domain :

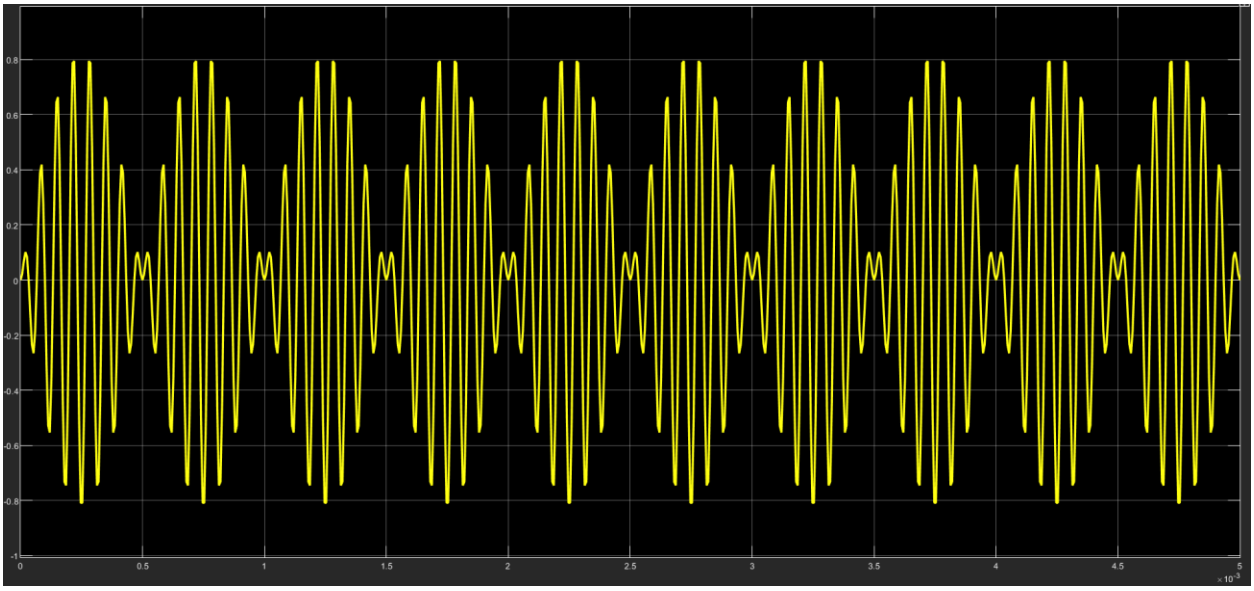


Figure 8.DSB-SC modulation in time domain

2.1.3.in frequency domain:

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

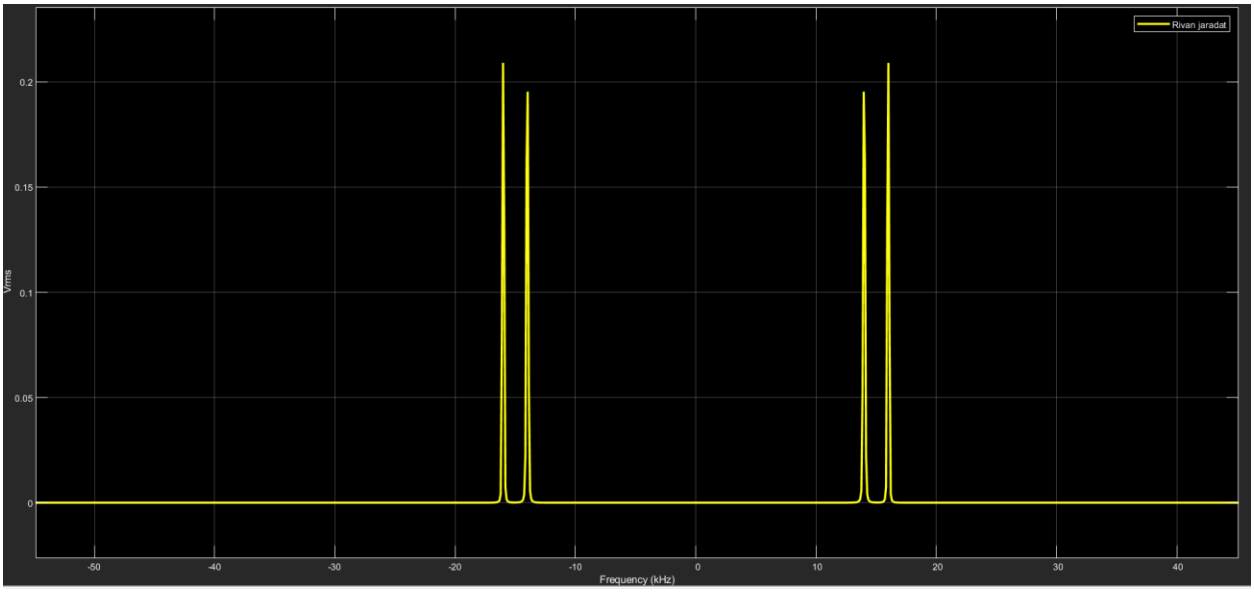


Figure 9.DSB-SC modulation in frequency domain

We noticed from the plot the spectrum was at f = 14k and f = 16 k

2.2.Demodulation:

2.2.1. block diagram of the demodulation:

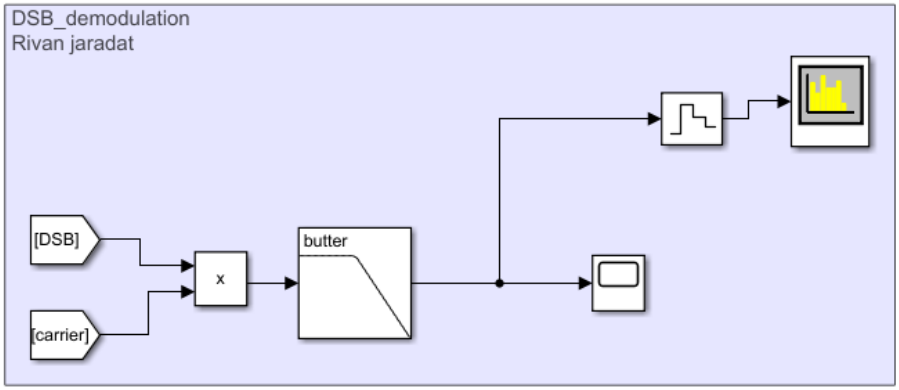


Figure 10.block diagram for DSB Demodulation

2.2.2.in time domain :

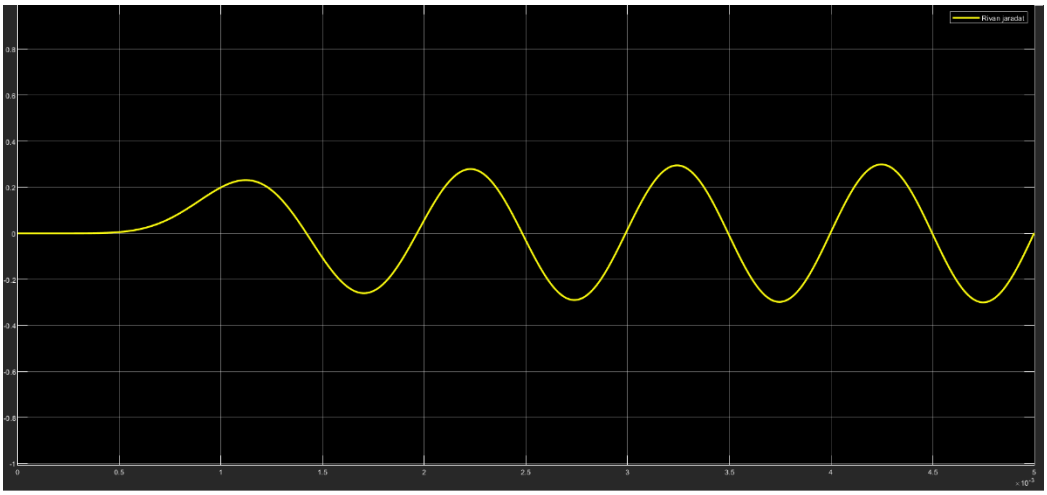
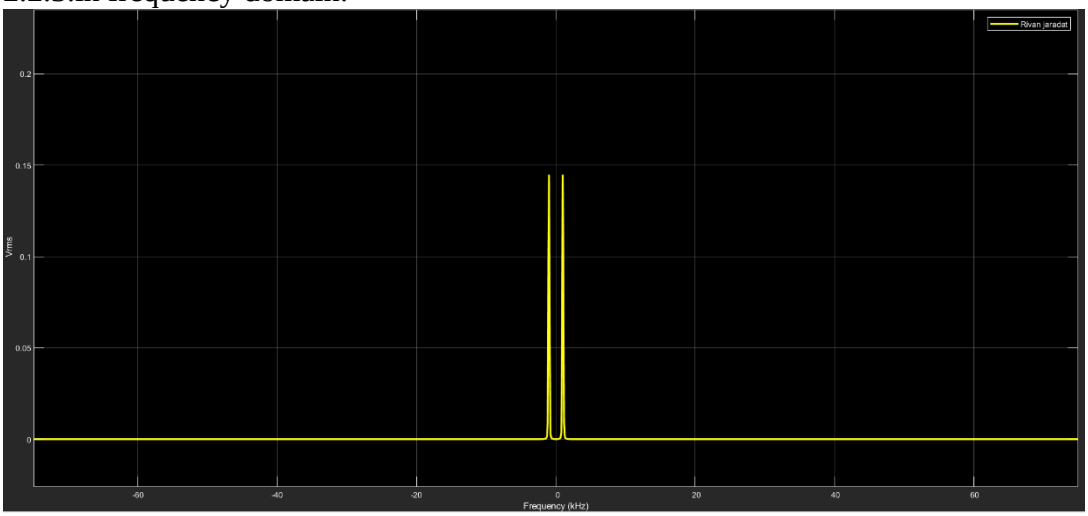


Figure 11.DSB-SC demodulation in time domain

2.2.3.in frequency domain:



From this plot we noticed that the filter returned the message signal at f=1khz

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:

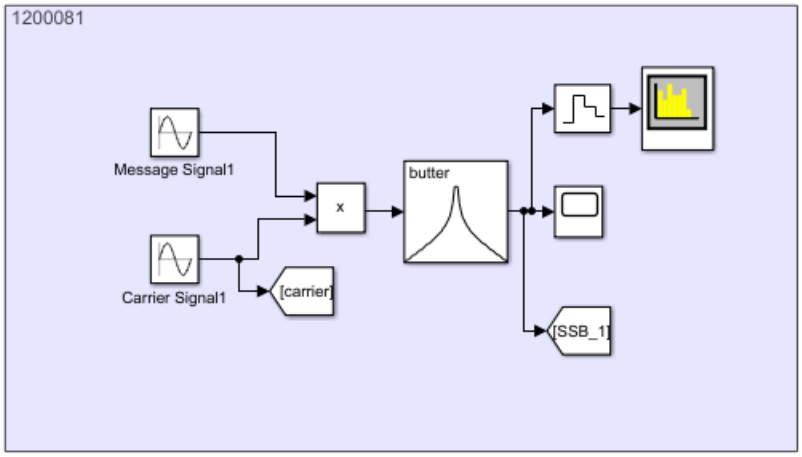


Figure 13SSB-SC method 1(Lower Side) block diagram modulation

Bandpass Filter parameters:

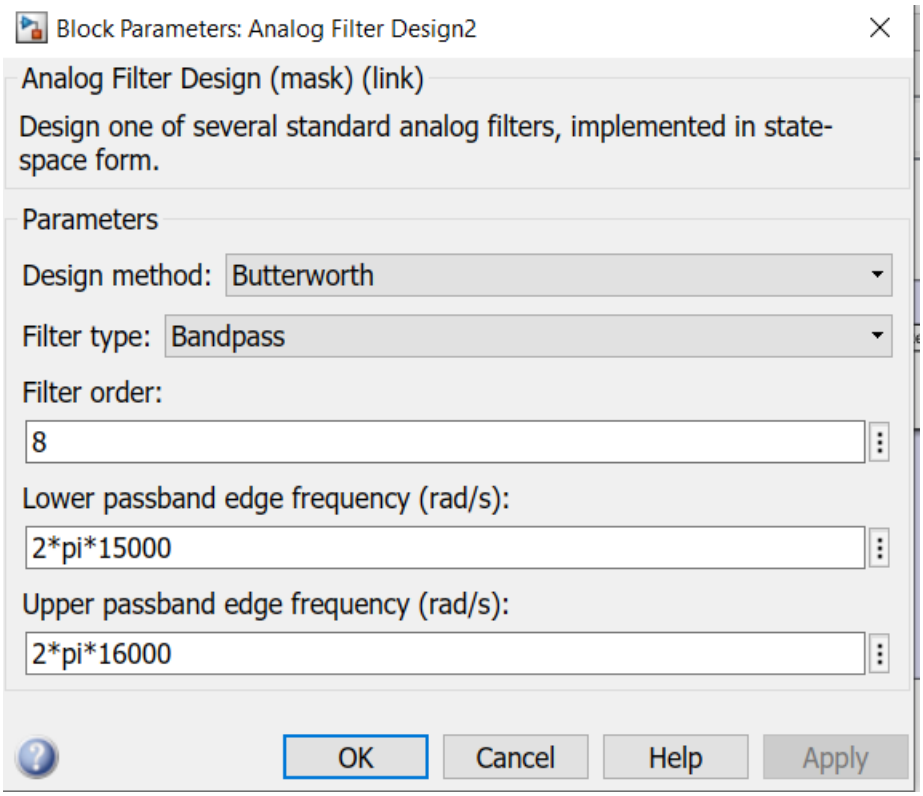


Figure 14.Bandpass Filter parameters

3.1.1.2.Time domain:

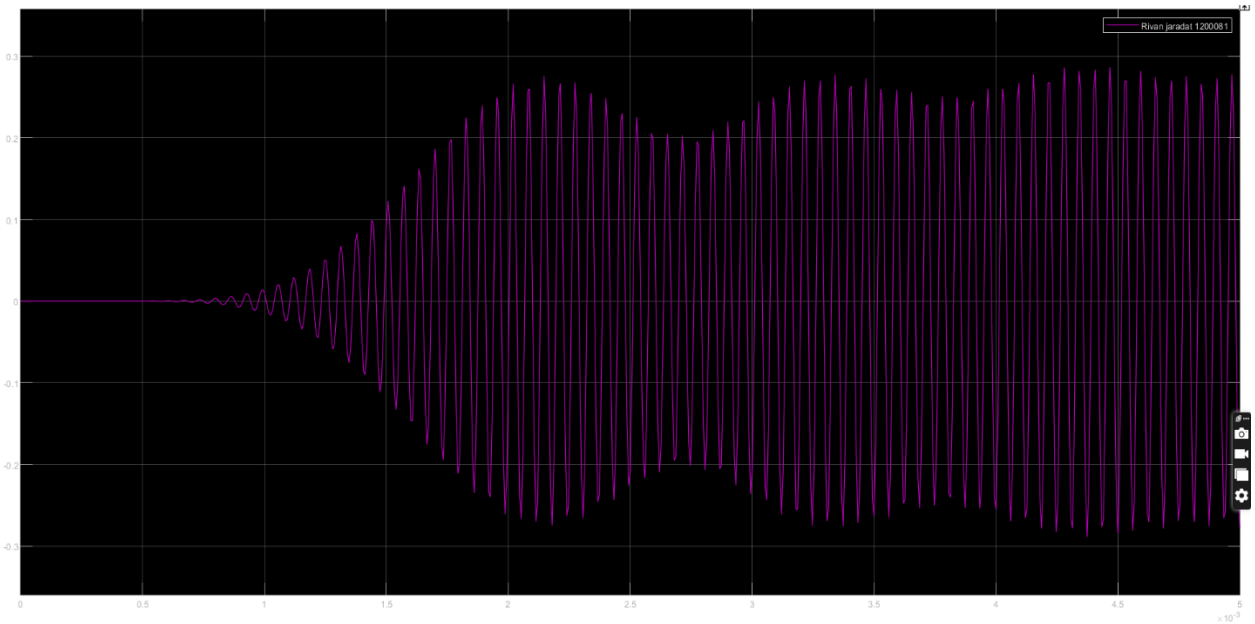


Figure 15.SSB-SC method 1(Lower Side)modulation in time domain

3.1.1.3.Frequency domain:

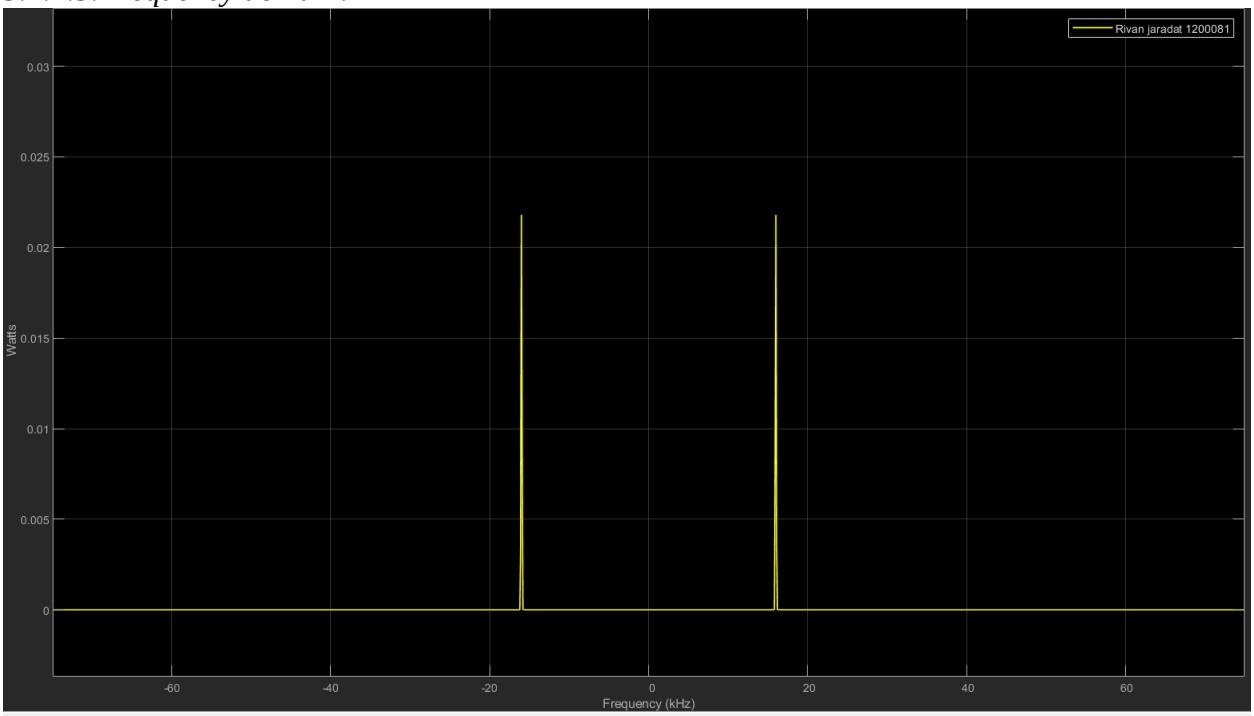


Figure 16.SSB-SC method 1(Lower Side)modulation in frequency domain

3.1.2.Demodulation:

3.1.2.1.Block diagram:

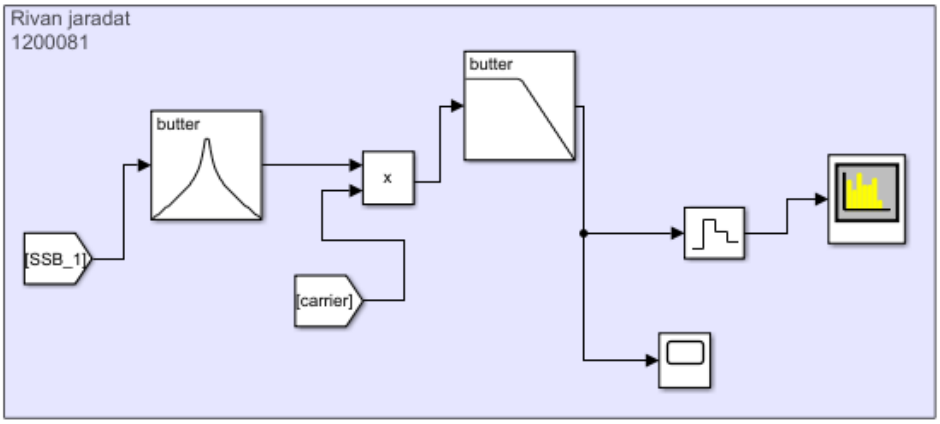


Figure 17.SSB-SC method 1(Lower Side) block diagram demodulation

3.1.2.2.Time domain:

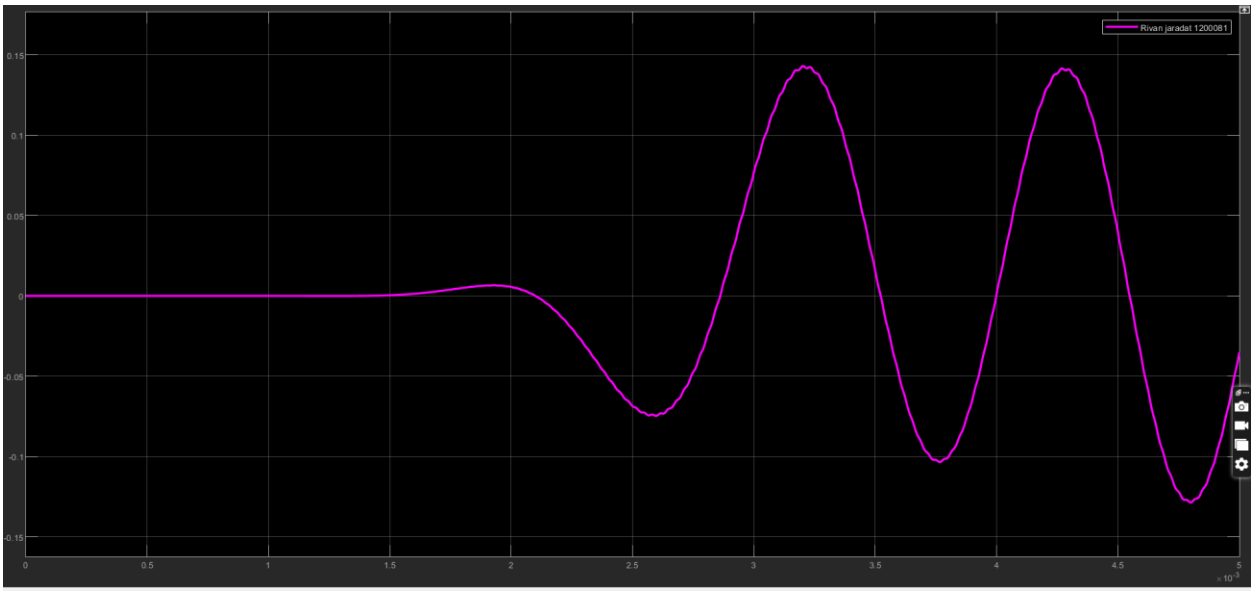


Figure 18.SSB-SC method 1(Lower Side)demodulation in time domain

3.1.2.3. Frequency domain:

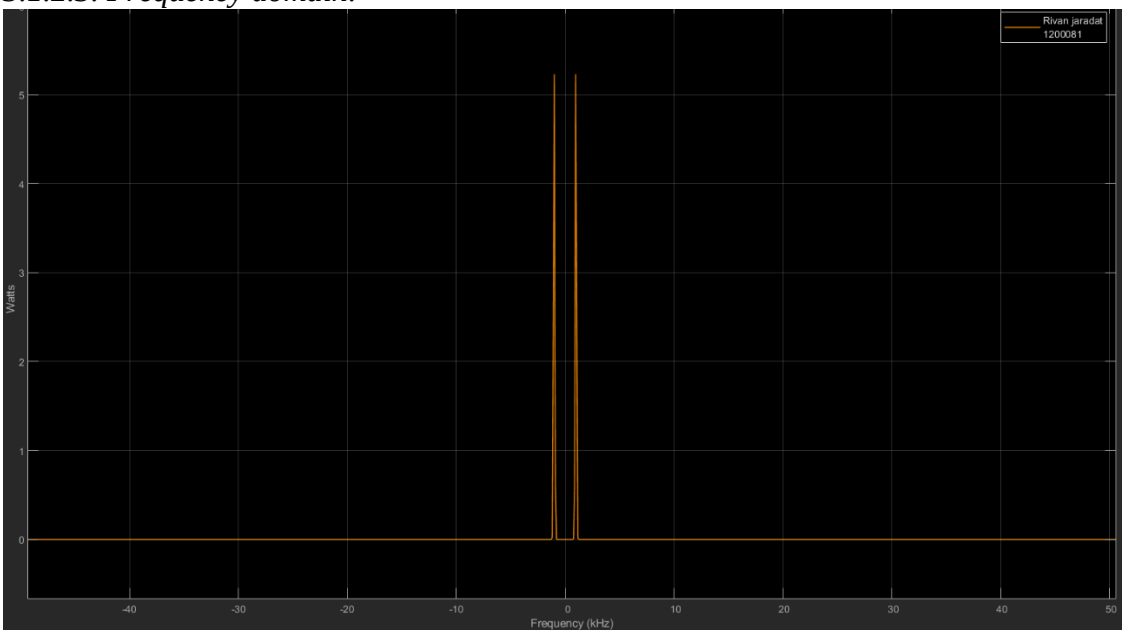


Figure 19.SSB-SC method 1(Lower Side)demodulation in frequency domain

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

3.2.1.Modulation:

3.2.1.1.Block diagram:

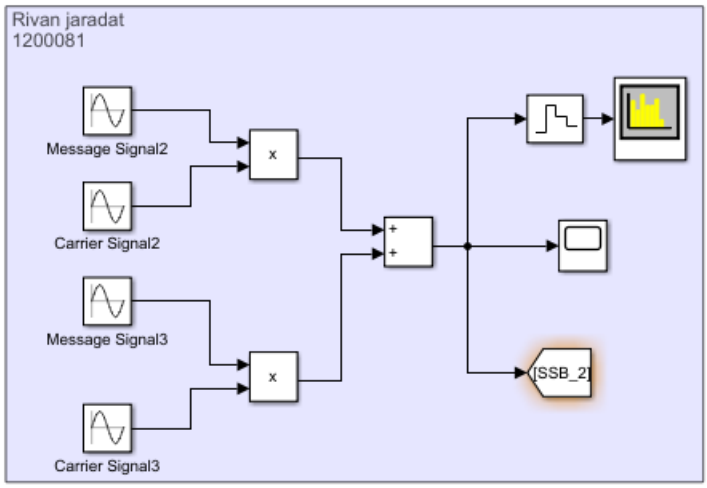


Figure 20.SSB-SC method 2(Lower Side) block diagram modulation

3.2.1.2.Time domain:

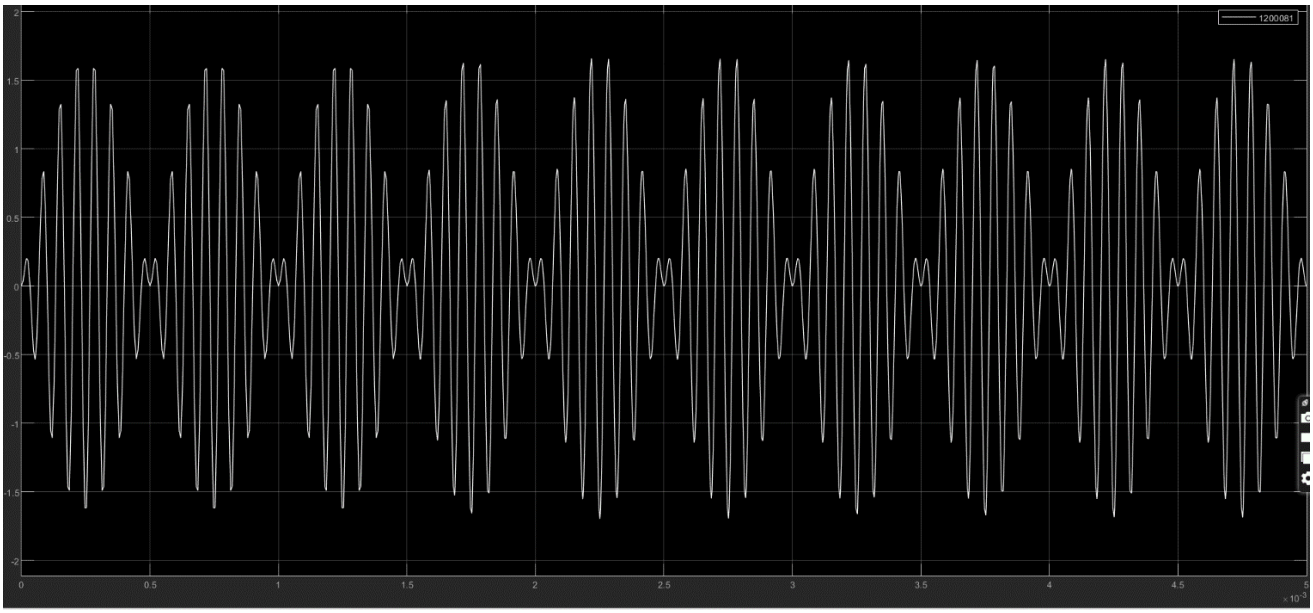


Figure 21.SSB-SC method 2(Lower Side)modulation in time domain

3.2.1.3.Frequency domain:

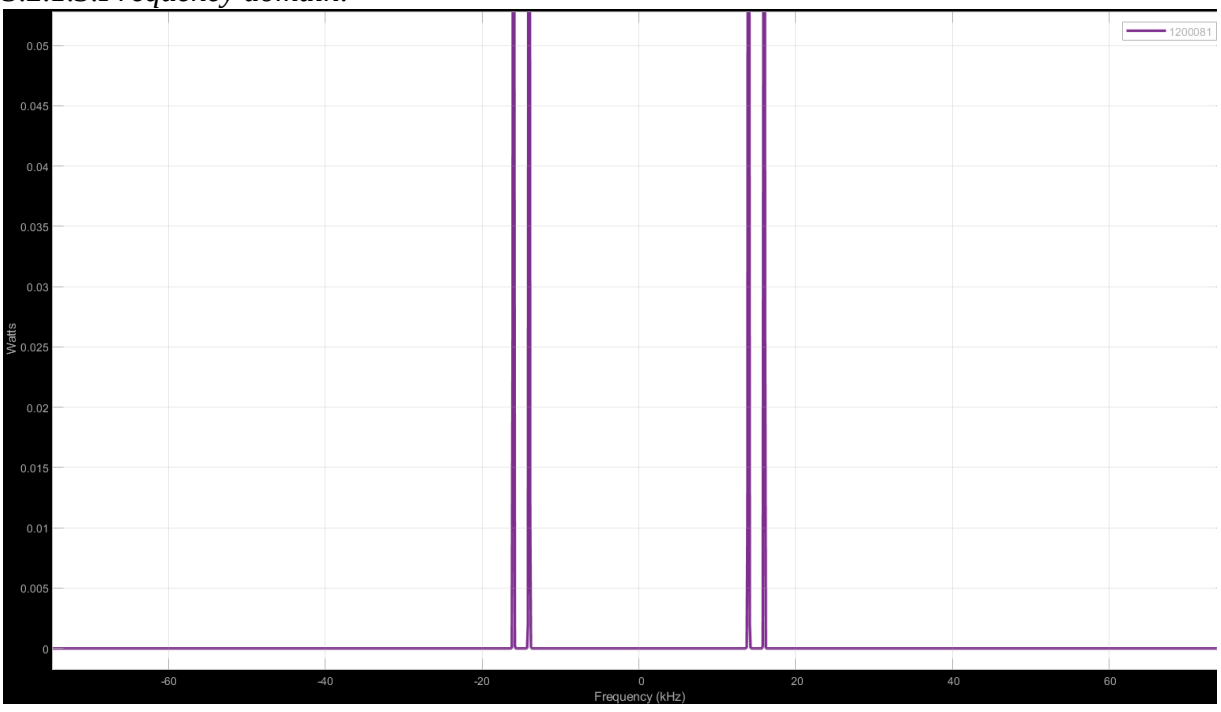


Figure 22.SSB-SC method 2(Lower Side)modulation in frequency domain

3.2.2.Demodulation:

3.2.2.1.Block diagram:

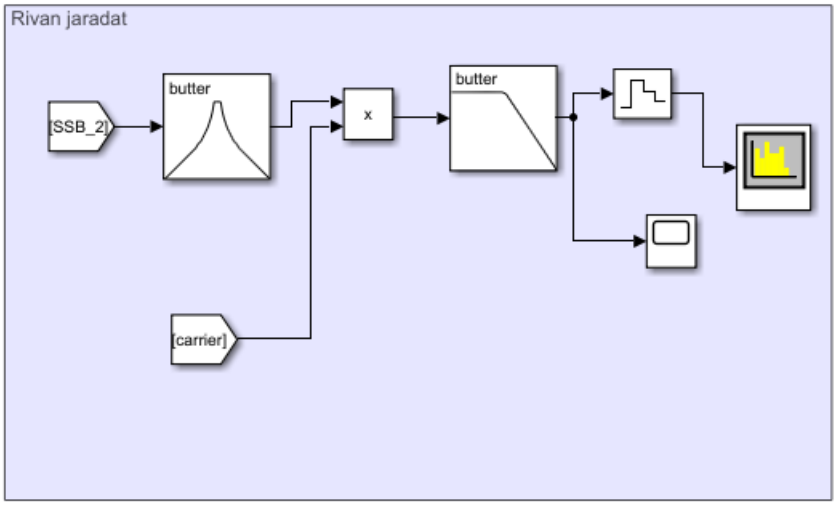


Figure 23.SSB-SC method 2(Lower Side) block diagram demodulation

3.2.2.2.Time domain:

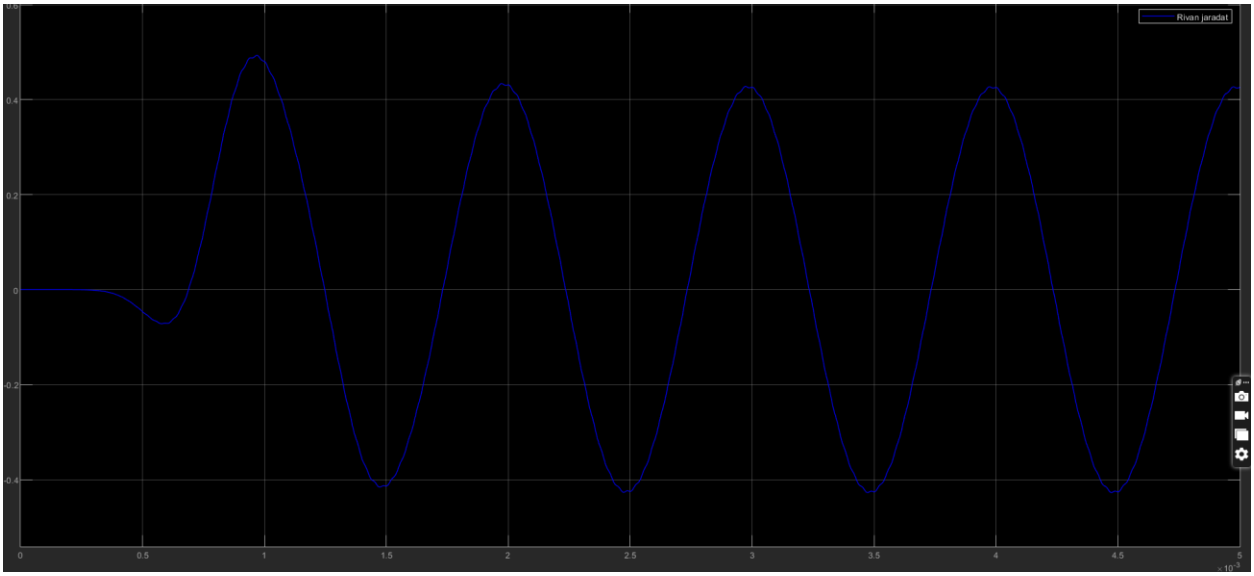


Figure 24.SSB-SC method 2(Lower Side)demodulation in time domain

3.2.2.3.Time domain:

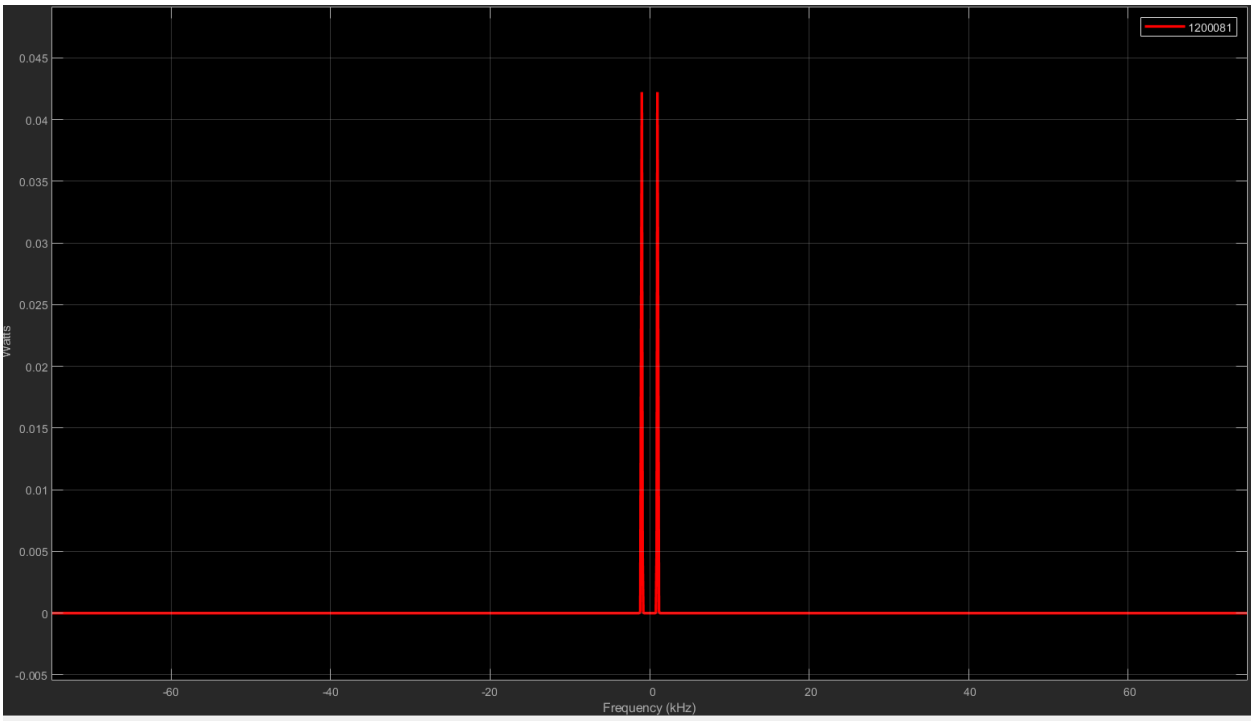


Figure 25.SSB-SC method 2(Lower Side)demodulation in frequency domain