Faculty of Engineering and Technology

Electrical and Computer Engineering Department

ENEE4113

Communications Lab

PreLab No.2

Double-side and Single-side Band Modulation

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Section: 5.

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Table of Contents

Table of Figures

Double Side Band Suppress Carrier (DSBsc) Modulation

First of all, the block diagram for the double sideband modulation block diagrams was implemented as shown in the following figure:
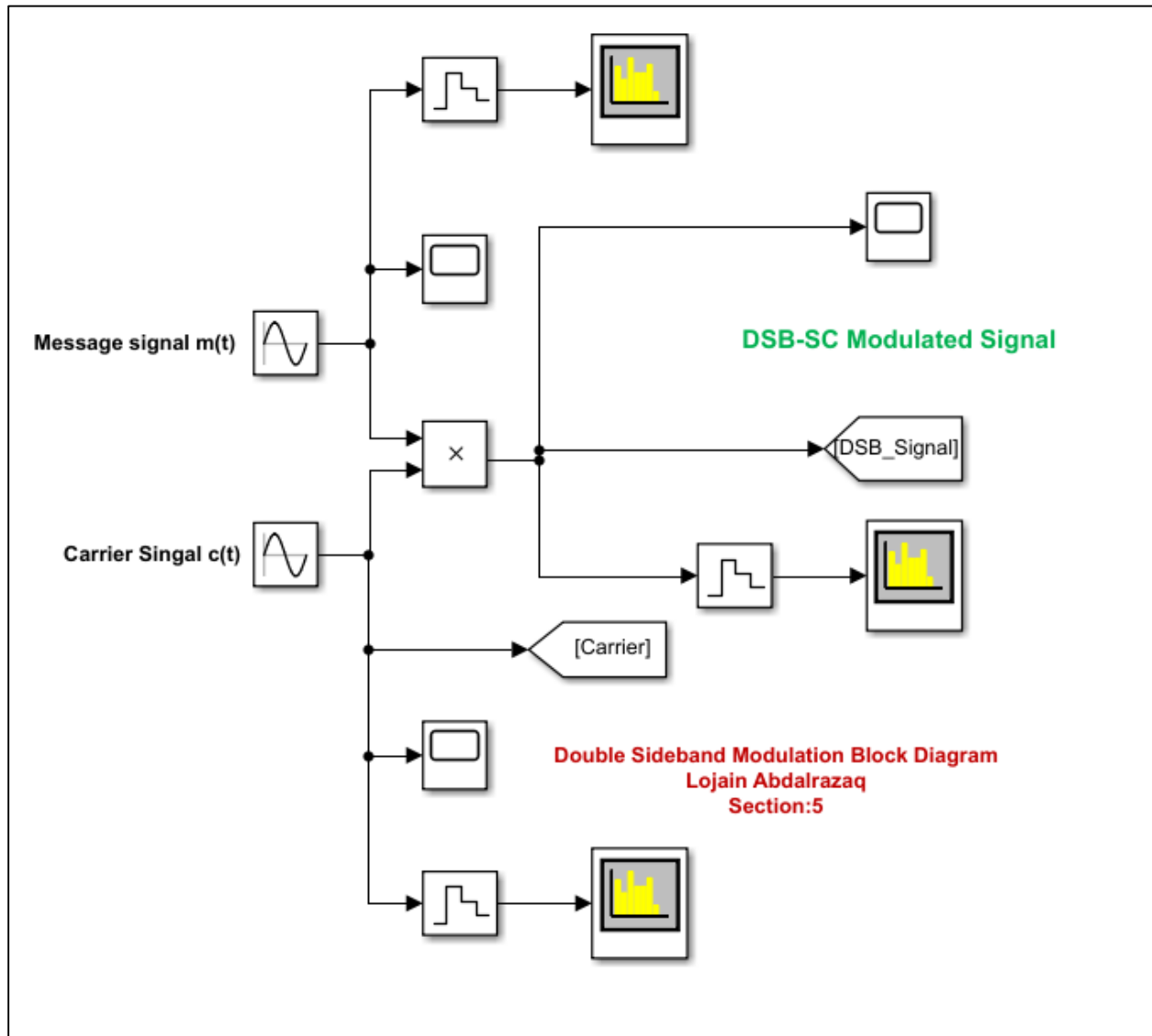
Figure 1 Double Sideband modulation block diagram in Simulink.

Now, the input signals, which are the message signal m(t) and the carrier signal were used according to the following equations:

Message signal:

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

Carrier signal:

$$c(t) = 1\cos(2\pi(15k)t)$$

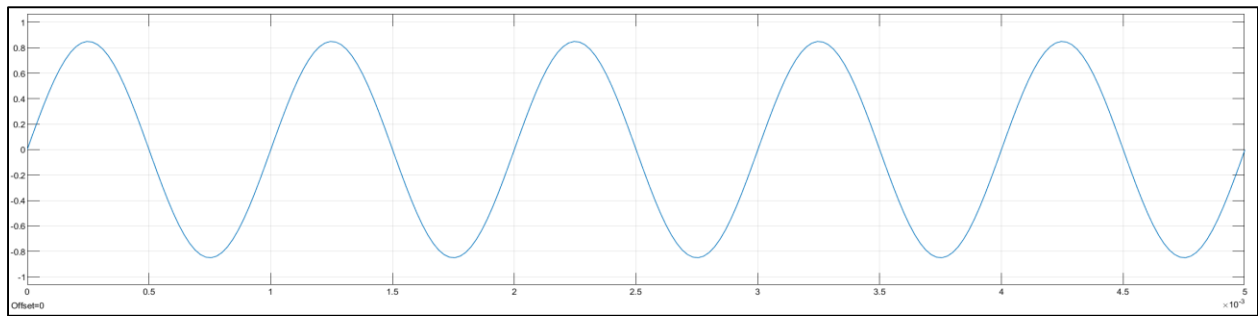So the message signal and carrier signal in time domain:
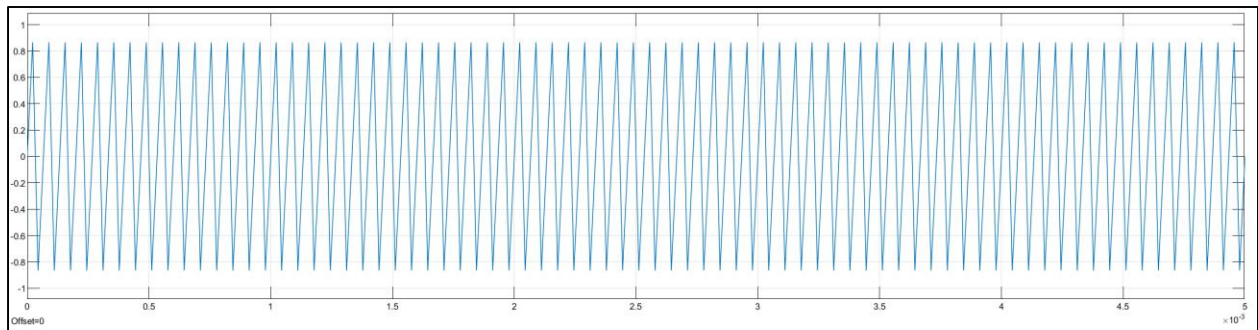

Figure 3 Message signal in time domain.

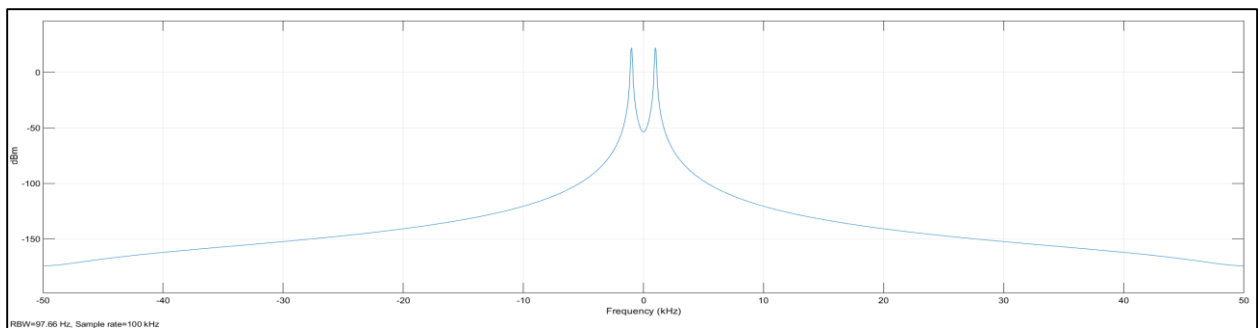*Figure 2 Carrier Signal in time domain.*

While in frequency domain:

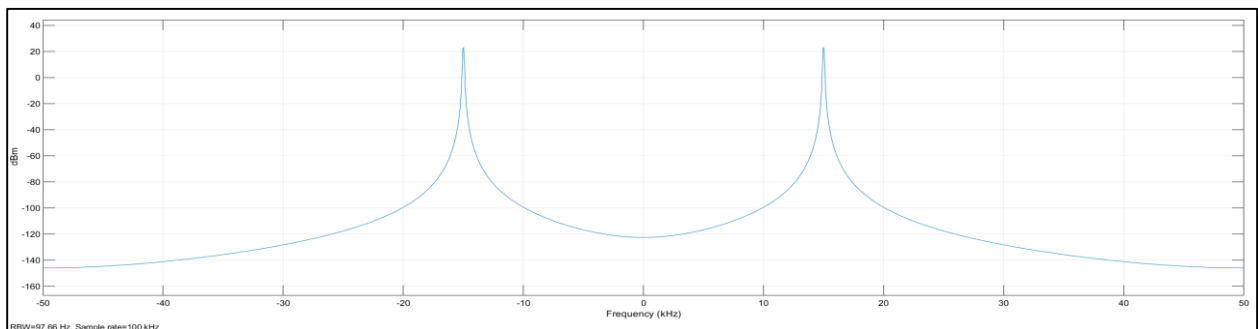*Figure 4 Message signal in frequency domain.*

Figure 5 Carrier Signal in frequency domain.

2

Now, the modulated signal using double sideband suppressed carrier modulation in time and frequency domain is as the following:
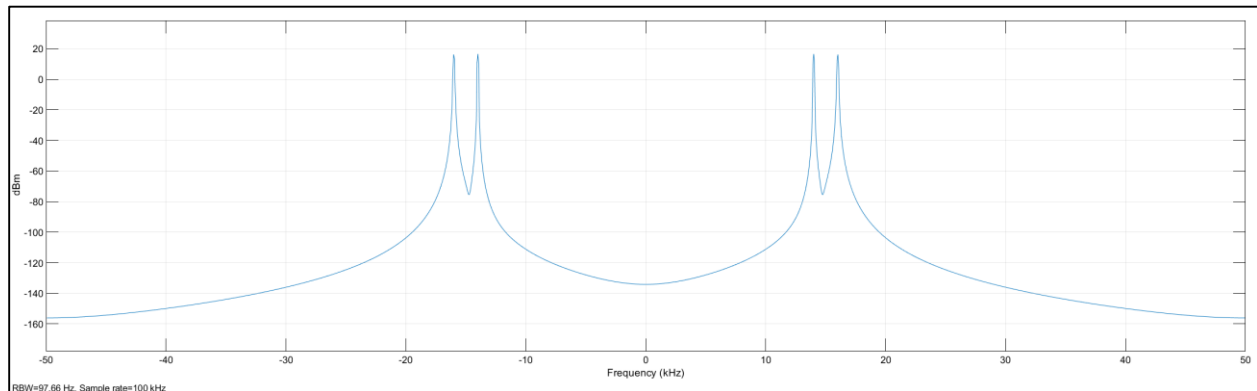

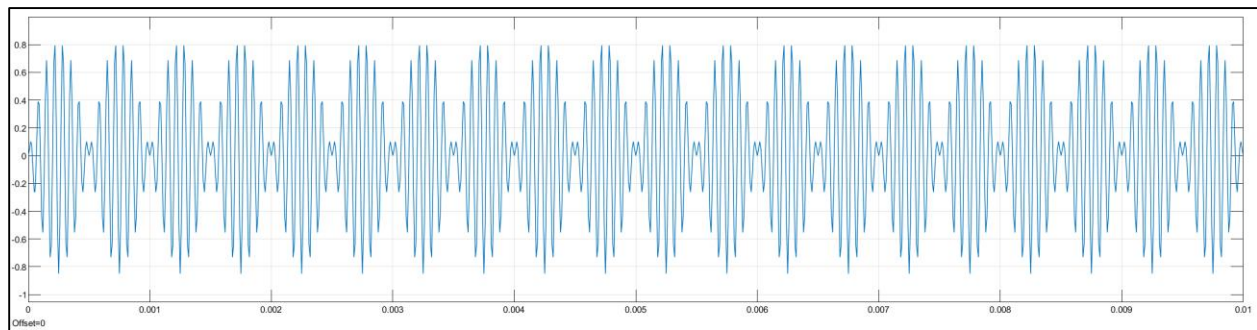*Figure 6 Double sideband modulated signal in frequency domain.*

Figure 7 Double sideband modulated signal in time domain.

3

Double Side Band Suppress Carrier (DSBsc) Demodulation

Then, the block diagram of the double sideband demodulation is as the following:
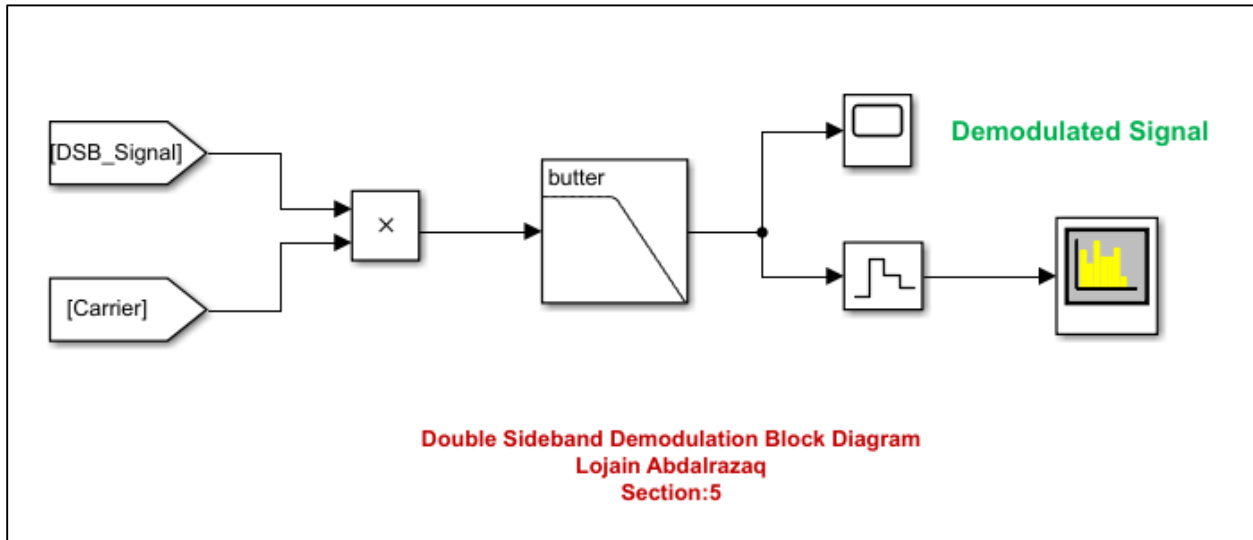

Figure 8 Double sideband demodulation block diagram.

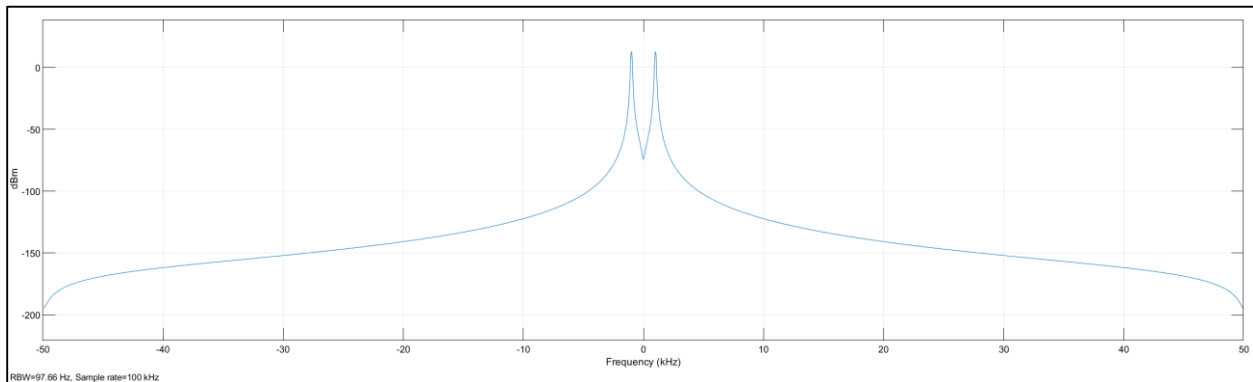And the following figures shows the demodulated signal in time and frequency domain:

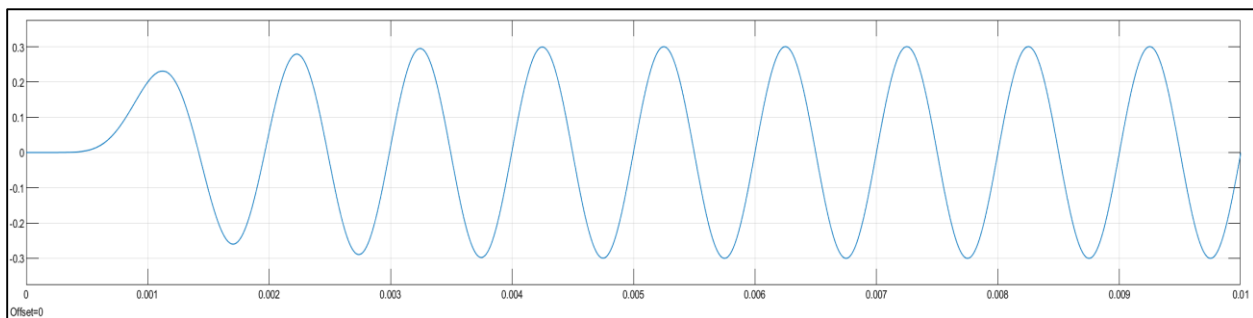*Figure 10 double sideband demodulated signal in frequency domain.*

Figure 9 double sideband demodulated signal in time domain.

4

The above results occurred when we having the low pass filter settings (when passband edge frequency is 2*pi*1000):
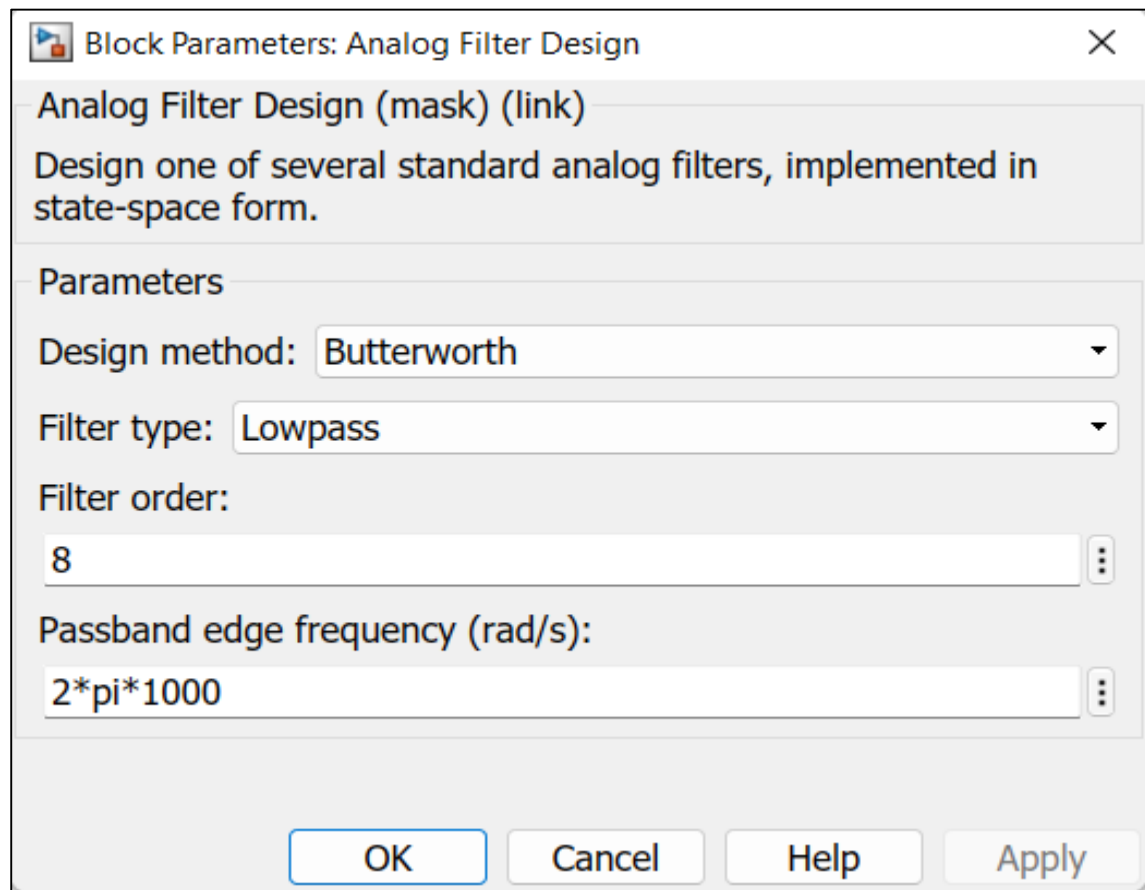

Figure 11 Filter settings in double sideband demodulation.

While the settings for the zero-order hold is as the following:
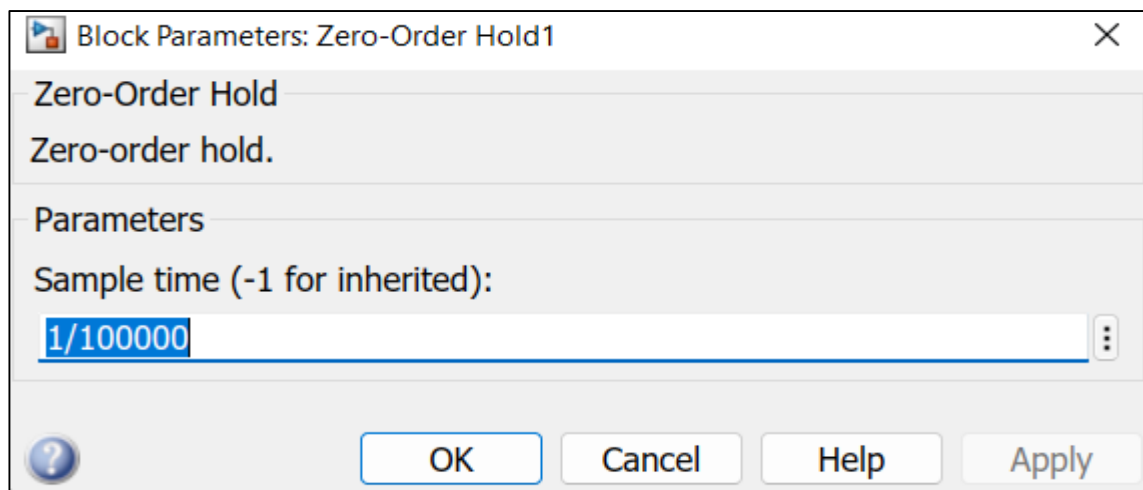

Figure 12 Zero-order hold settings.

Single Sideband Suppress Carrier (SSBsc) Method -1- Modulation

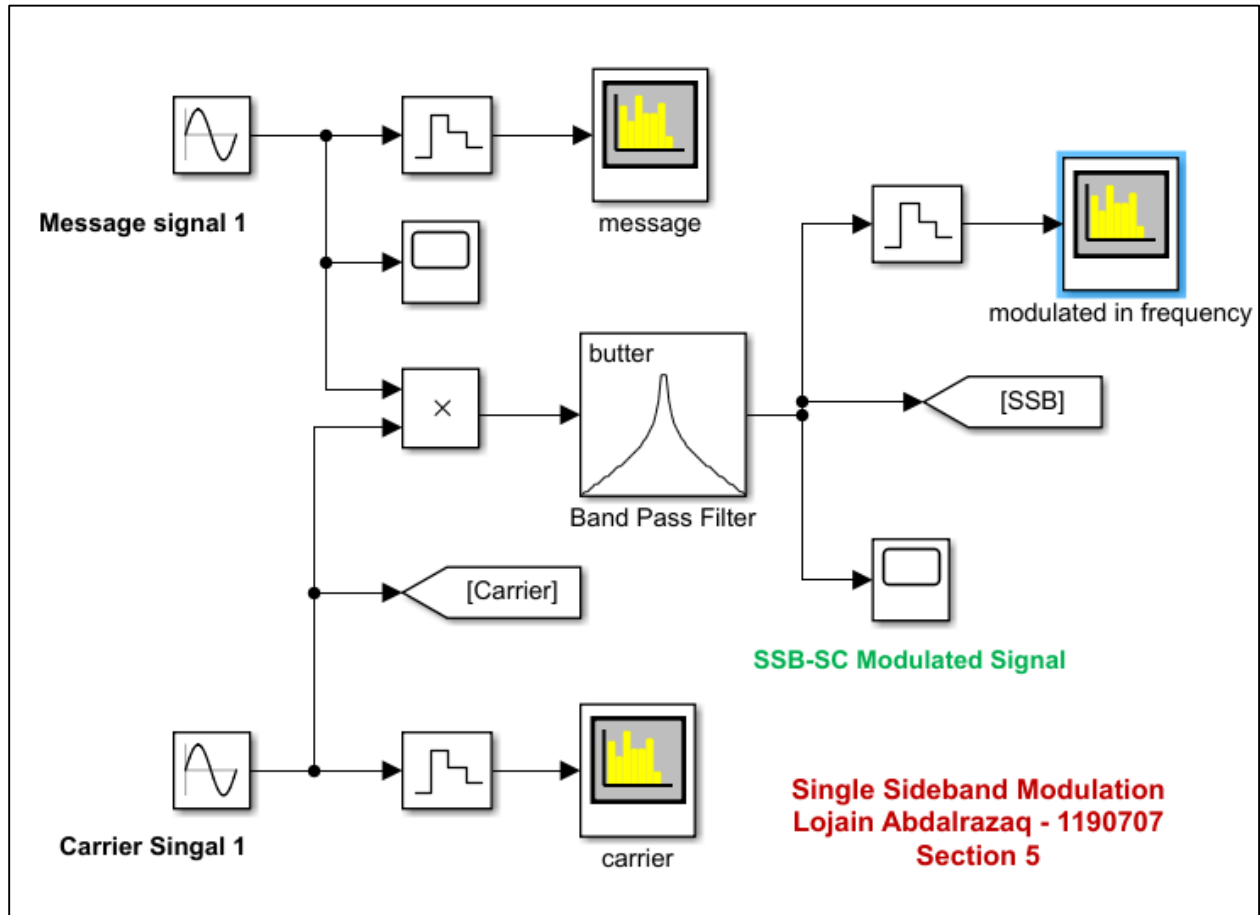Here is the block diagram using Simulink of the single sideband modulation:

Figure 13 Single sideband block diagram.

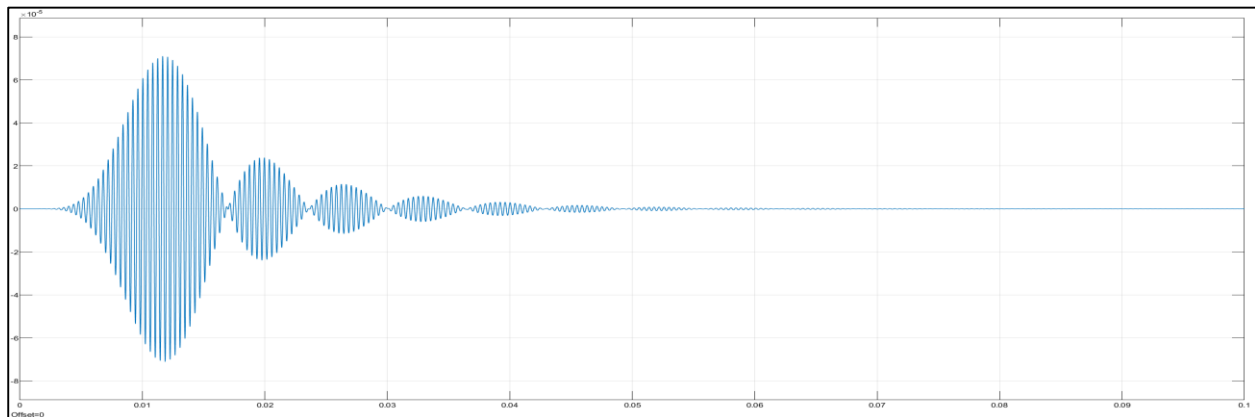The modulated signal in time and frequency domain:

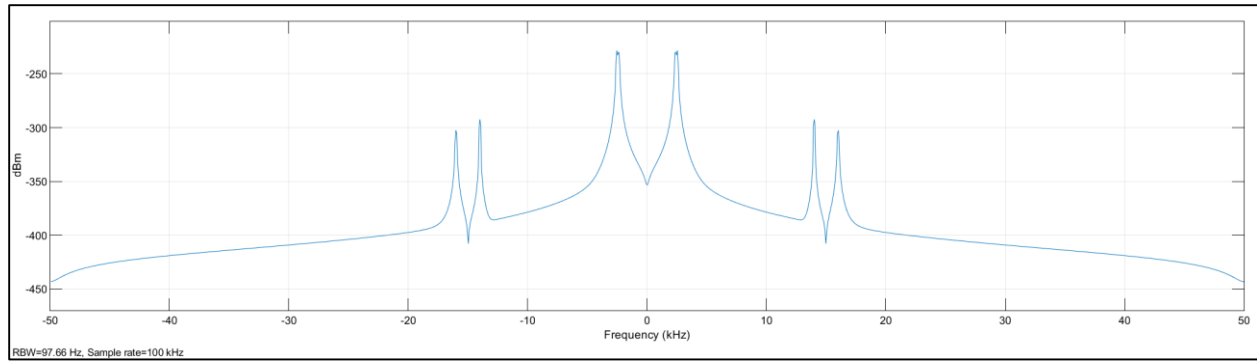*Figure 14 Single sideband modulated signal.*

Figure 15 Single sideband in frequency domain.

Single Sideband Suppress Carrier (SSBsc)Method -1- Demodulation

The following is the block diagram of the demodulation using single sideband:
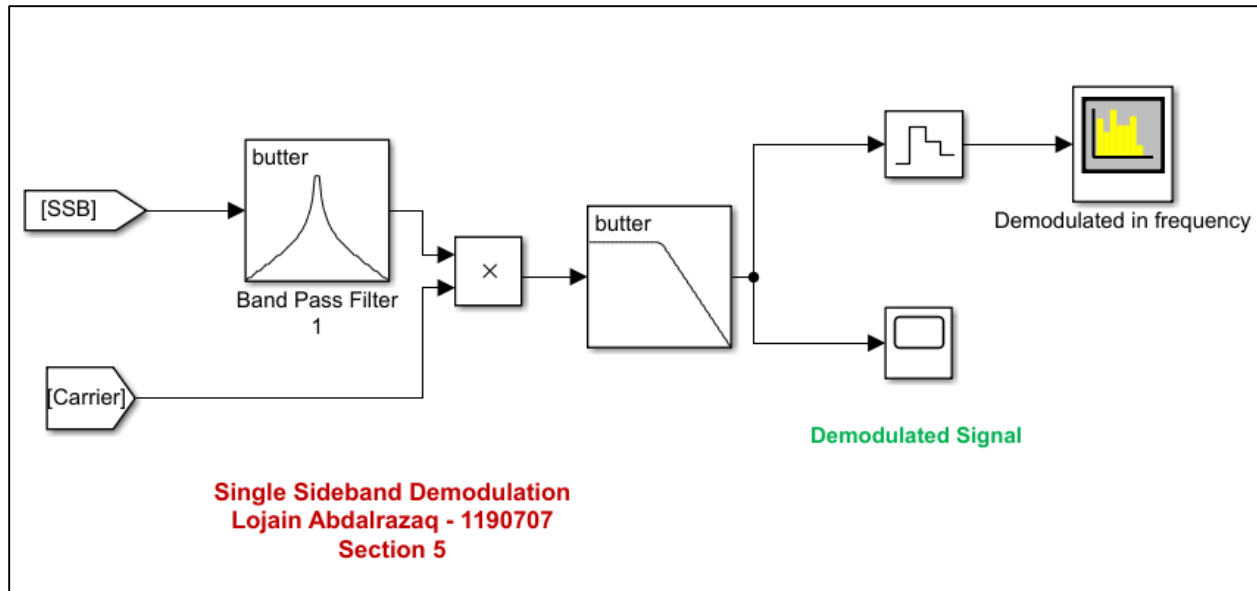

Figure 16 Single Sideband demodulation block diagram.
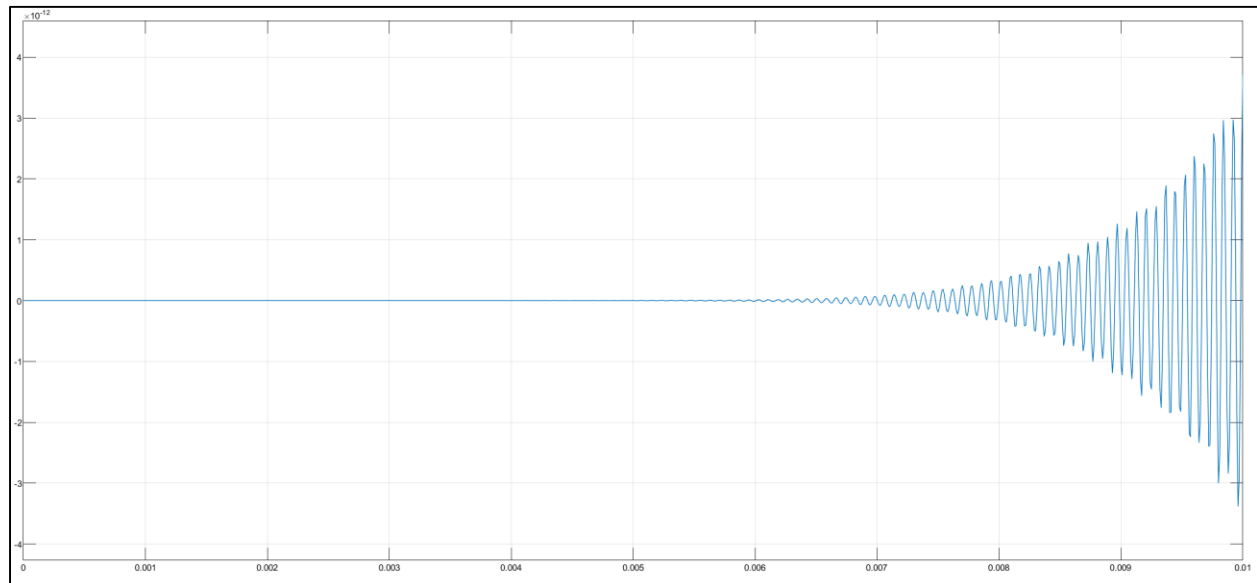
The demodulation signal in time and frequency domain:

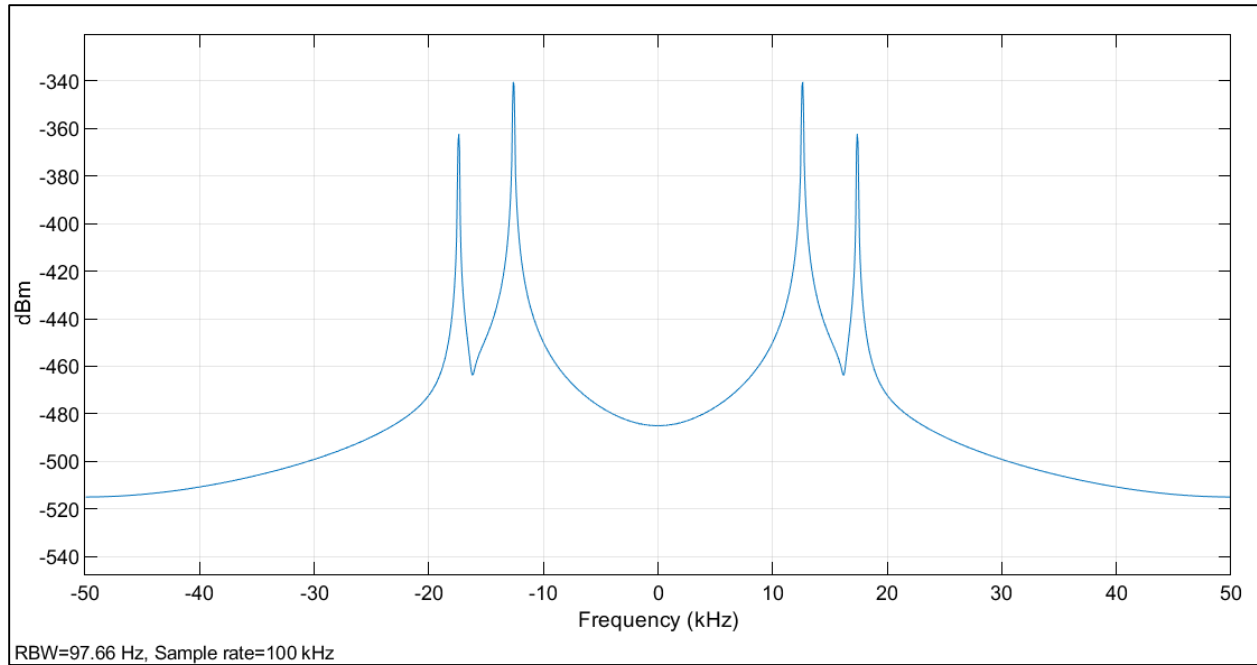*Figure 17 Demodulation Signal in time domain.*

Figure 18 Demodulation signal in frequency domain.

Single Sideband Suppress Carrier (SSBsc) Method -2- Modulation
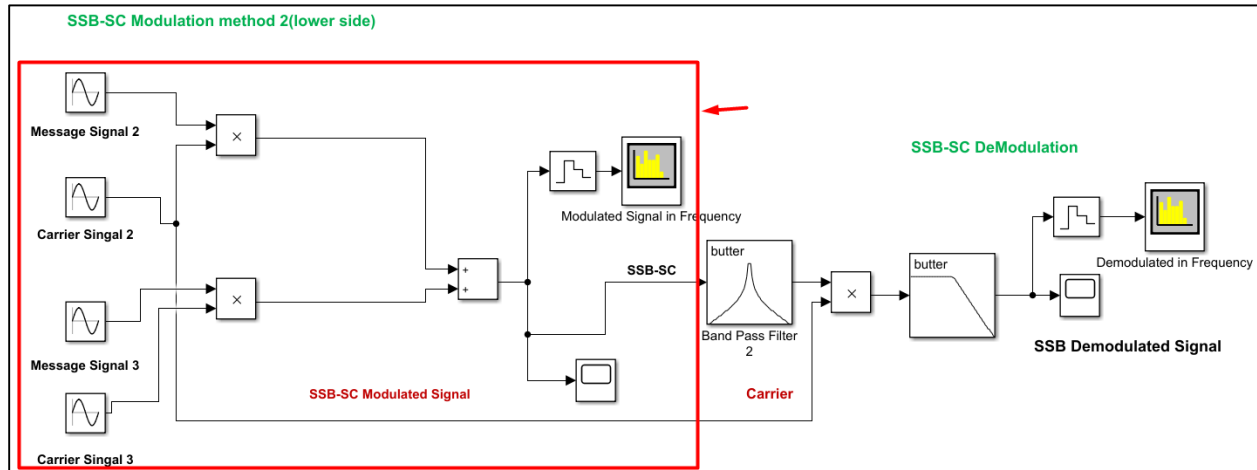
Here is the block diagram:

Figure 19 Block Diagram of the Single sideband method 2.
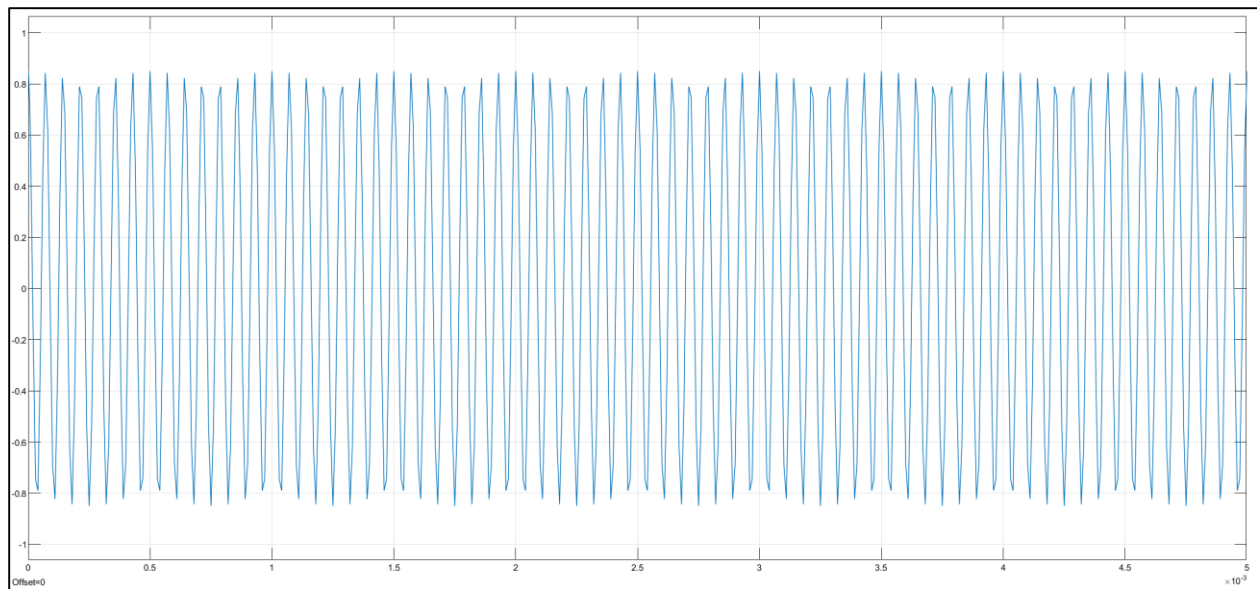
The modulated signal in time domain:

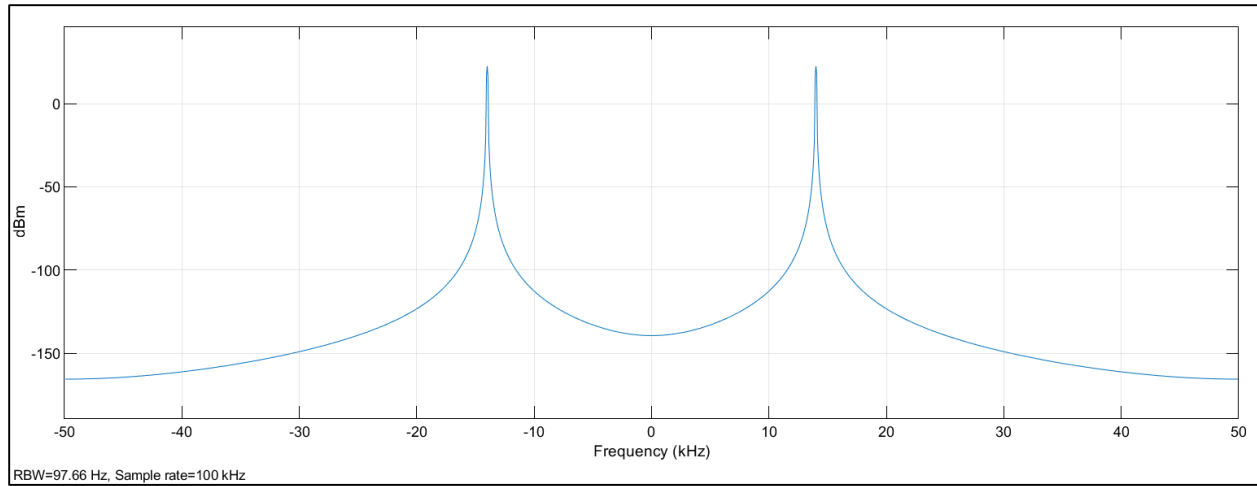*Figure 20 Single sideband modulated signal in time domain.*

Figure 21 Single sideband modulated signal in frequency domain.

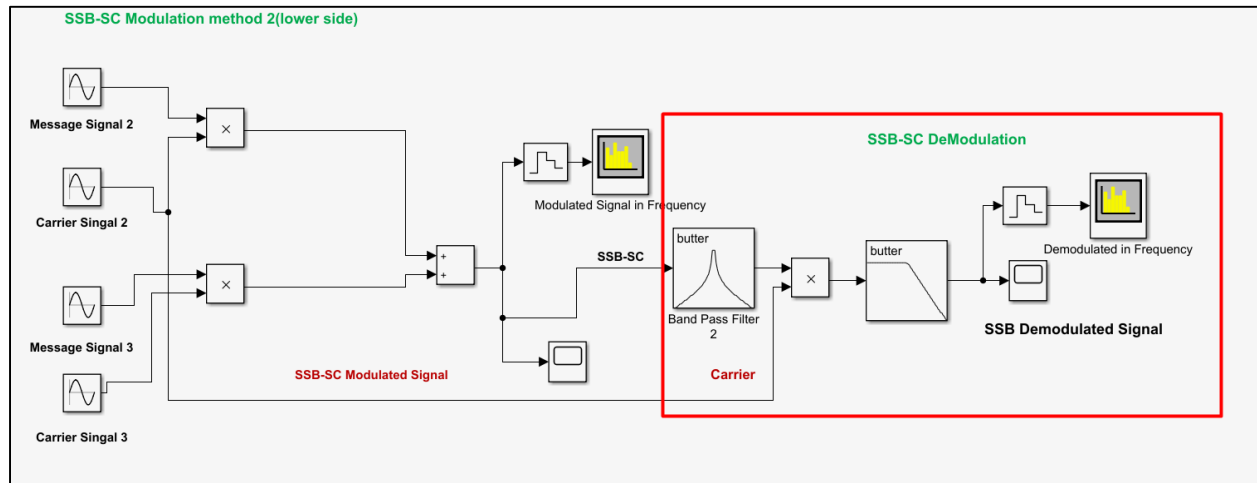# Single Sideband Suppress Carrier (SSBsc) Method-2- Demodulation

Figure 22 The block diagram of the single sideband demodulation.

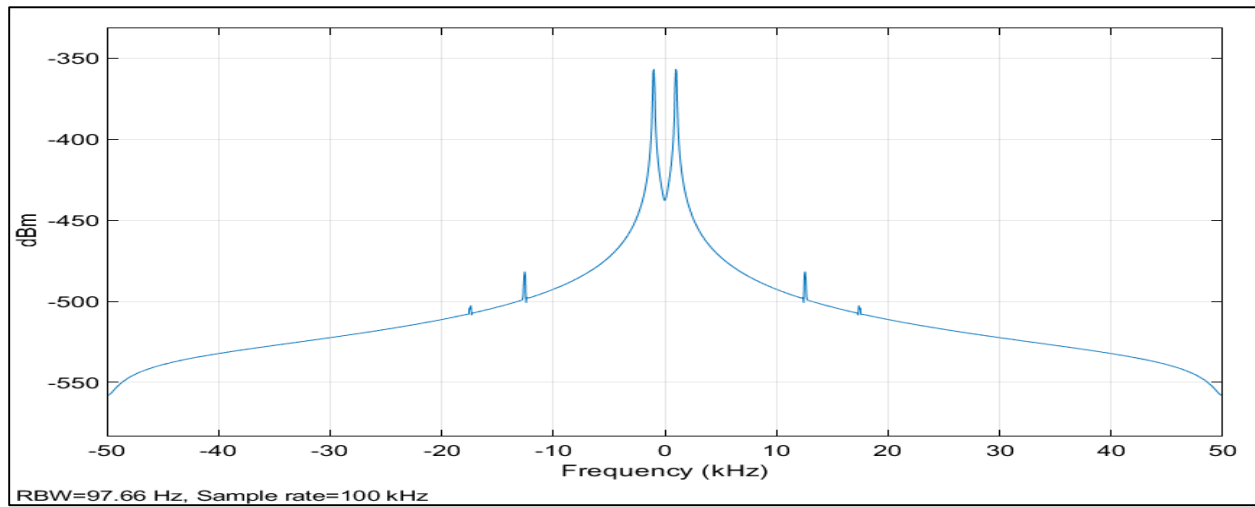The demodulated signal of the single sideband in frequency domain:

Figure 23 Single sideband demodulated signal in frequency domain.

12