

Lab # 2

MODULATION INDEX OF DSB WAVE BY TRAPEZOIDAL PATTERN

OBJECTIVE:

MODULATION INDEX:

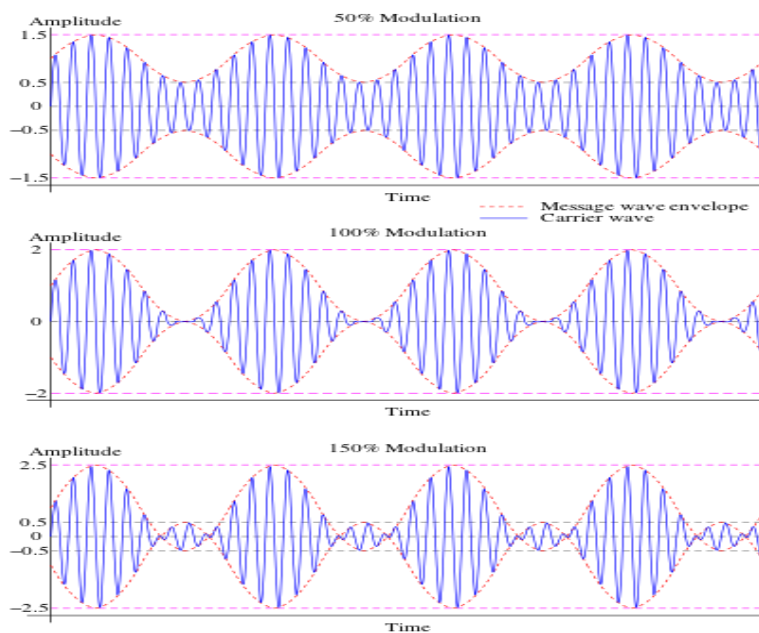
Increasing or decreasing the amplitude of the message signal causes higher or lower peaks and valleys in the envelope of the AM signal. This corresponds to changing the percentage modulation which is the term used when the modulation index m is expressed as a percentage. Percentage modulation is equal to m multiplied by 100%.

The modulation index is an important parameter in AM. It is defined as the ratio between the amplitudes of the message signal and the un-modulated carrier.

$$m = \frac{V_m}{V_c}$$

It indicates by how much the modulated signal varies around its 'original' level. So if $m = 0.5$, the carrier amplitude varies by 50% above and below its un-modulated level, for $m = 1.0$ it varies by 100%.

Modulation depth greater than 100% is generally to be avoided as it creates distortion.

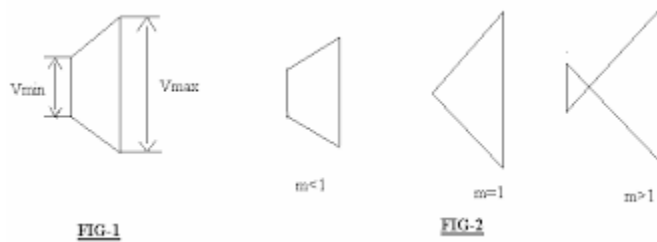


ALTERNATIVE FORM OF MODULATION INDEX:

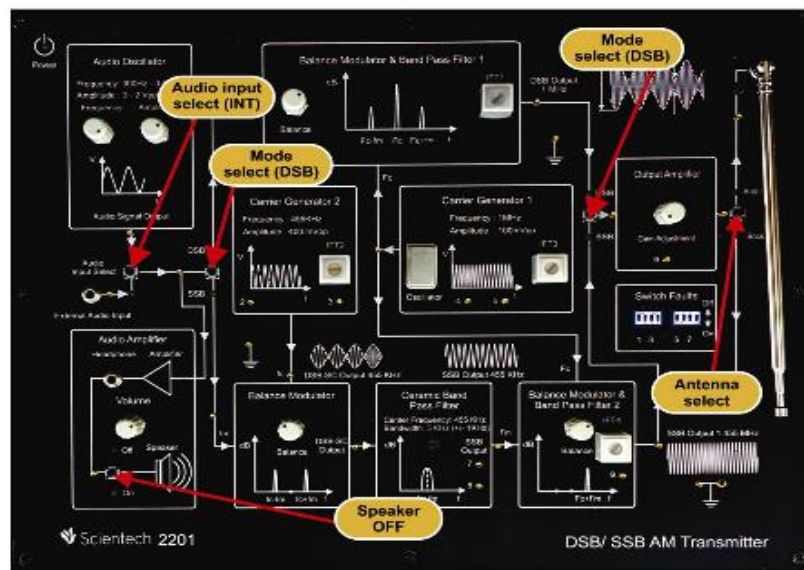
If an AM signal is being displayed on an oscilloscope it can be difficult to read V_m and V_c . Instead the form for expressing m can be modified to make it easier to read.

$$\text{Modulation index: } m = \frac{\text{Max Amplitude} - \text{Min Amplitude}}{\text{Max Amplitude} + \text{Min Amplitude}}$$

This is done by displaying trapezoidal pattern on oscilloscope. The oscilloscope is placed in X-Y mode. The modulating signal is connected to X channel and modulated to Y. By this a trapezoidal pattern will be obtained. Calculate the value of maximum and minimum amplitudes and modulation index will be known.



EQUIPMENT USED:



Post Lab Questions

a) What is Modulation index?

b) For what value of modulation index ' m ' do we observe over modulation?

c) Trapezoid pattern of DSB wave can be observed in which mode on oscilloscope?
