**Experiment No.: Date:**

**Aim:** To study DSB-FC modulator using kit

**Diagram:**

**Theory:**

Modulation is the process by which some characteristics of a carrier are varied in accordance with a modulating frequency. Amplitude modulation is the process of changing the amplitude of a high frequency carrier signal in proportion with the instantaneous value of modulating signal. This is called as double sideband full carrier (DSB-FC) modulation. Modulation Index is defined as the ratio of amplitudes of modulating wave and carrier wave.

m=Em

Ec

If m=1 then it is called as perfect modulation. If m>1 then it is called as over modulation. If m<1 then it is called as under modulation. The formula for m from observing the output is given by:

m= Emax-Emin

Emax+Emin

The equation of am wave is given by:

eAM= Ec (1+m cosωmt) cosωct

**Advantages:**

1. AM transmitters are less complex.
2. AM receivers are simple, detection is easy.
3. Low bandwidth.
4. AM waves can travel a long distance.

**Disadvantages:**

1. AM gets affected due to noise.
2. Power wastage is more.

**Applications:**

1. Radio broadcasting.
2. Picture Transmitting in a TV.

**Procedure:**

1. Connect OUT post of SINEWAVE section (ACL-01) to the input of Balance modulator (ACL-01) SIG. Post.
2. Connect output of VCO (ACL-01) OUT post to the input of balance modulator CAR. Post (ACL-01).
3. Connect the power supply with proper polarity to the kit. While connecting this, ensure the power supply is OFF.
4. Switch on the power supply and Carry out the following presetting:

* SINEWAVE: OUT post LEVEL about 0.5Vpp; FREQ. About 1 kHz.
* VCO: LEVEL about 1Vpp; FREQ. about 450 kHz, Switch on about 500 kHz.
* Balanced MODULATOR: CARRIER NULL completely rotated clockwise or counter clockwise, so as “unbalance” the modulator and to obtain an AM signal with not suppressed carrier across the output; OUT LEVEL in fully clockwise.

1. Connect the Oscilloscope to the inputs of the modulator post (SIG and CAR) and to detect the modulating signal and the carrier signal.
2. Move the probe from post SIG to post OUT (output of the modulator), where signal modulated in amplitude is detected. Note that the modulated signal envelope corresponds to the wave form of the DSB AM modulating signal.
3. Vary the amplitude of the modulating signal and check the 3 following conditions: m<1 (under modulation), m>1 (over modulation), m=1 (perfect modulation).
4. Vary the frequency and amplitude of the modulating signal, and check the corresponding variations of modulated signal.
5. Vary the amplitude of the modulating signal and note that the modulated signal can result saturation or over modulation.

**Observation:**

|  |  |  |
| --- | --- | --- |
| Emax | Emin | Modulation Index (m) |
|  |  |  |
|  |  |  |
|  |  |  |

**Result:**

**Conclusion:**