

Given the electric field of a complete amplitude modulated wave as

$$\vec{E} = \hat{i} E_c \left(1 + \frac{E_m}{E_c} \cos \omega_m t \right) \cos \omega_c t$$

Where the subscript c stands for the carrier wave and m for the modulating signal. The frequencies present in the modulated wave are

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ω_c and $\sqrt{\omega_c^2 + \omega_m^2}$

$\omega_c, \omega_c + \omega_m$ and $\omega_c - \omega_m$

ω_c and ω_m

ω_c and $\sqrt{\omega_c \omega_m}$

The frequencies present in amplitude modulated wave are Carrier frequency = ω_c

Upper side band frequency = $\omega_c + \omega_m$

Lower side band frequency = $\omega_c - \omega_m$