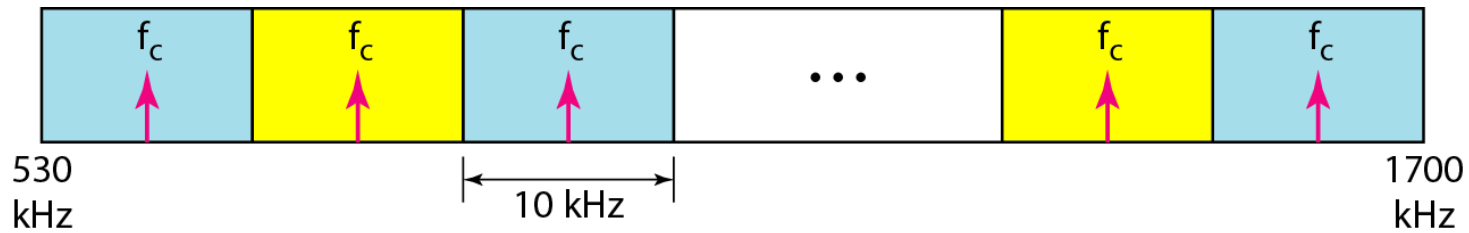**Note**

The total bandwidth required for AM
can be determined
from the bandwidth of the audio
signal: $B_{AM} = 2B$.

Figure 5.17 *AM band allocation*

Note

The total bandwidth required for FM can be determined from the bandwidth of the audio signal: $B_{FM} = 2(1 + \beta)B$.

Figure 5.18 *Frequency modulation*

Amplitude

Modulating signal (audio)

Time

Carrier frequency
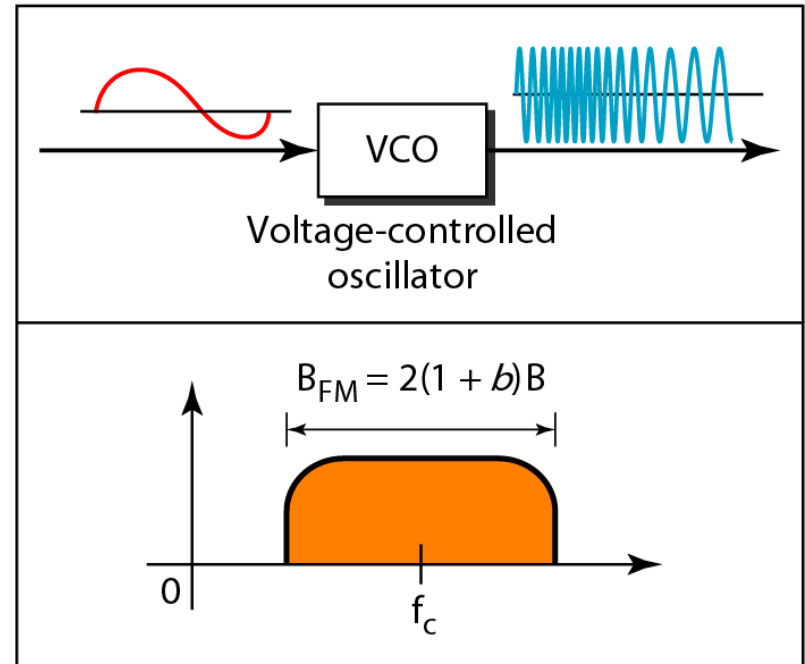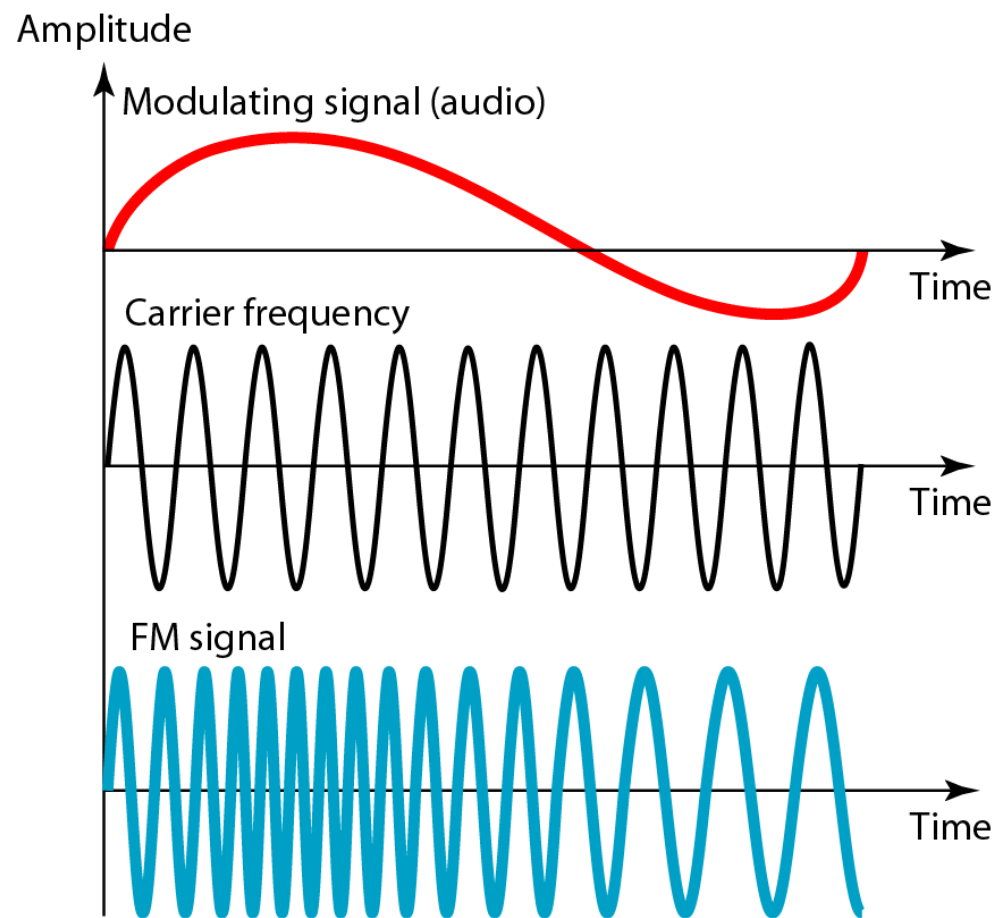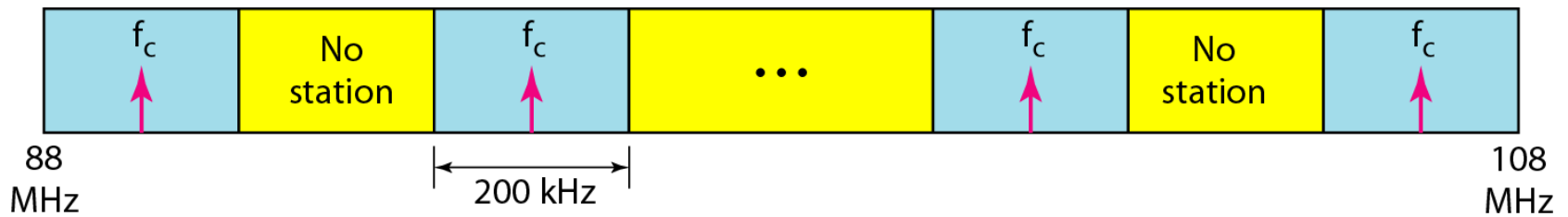
Time

FM signal

Time

VCO

Voltage-controlled oscillator

$B_{FM} = 2(1 + b)B$

0

f_c

Figure 5.19 *FM band allocation*

Figure 5.20 *Phase modulation*

Amplitude

Modulating signal (audio)
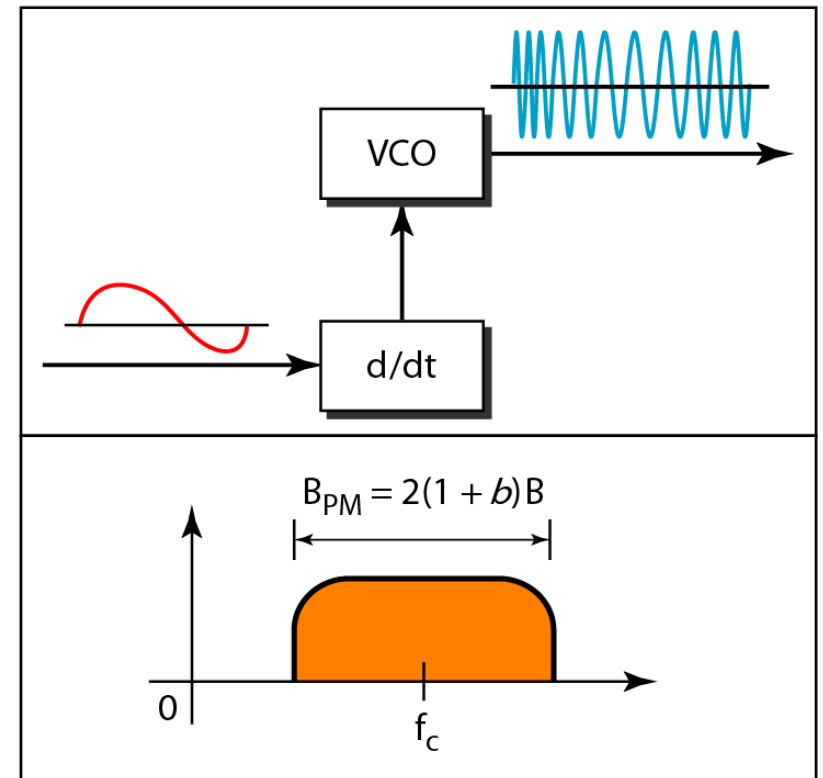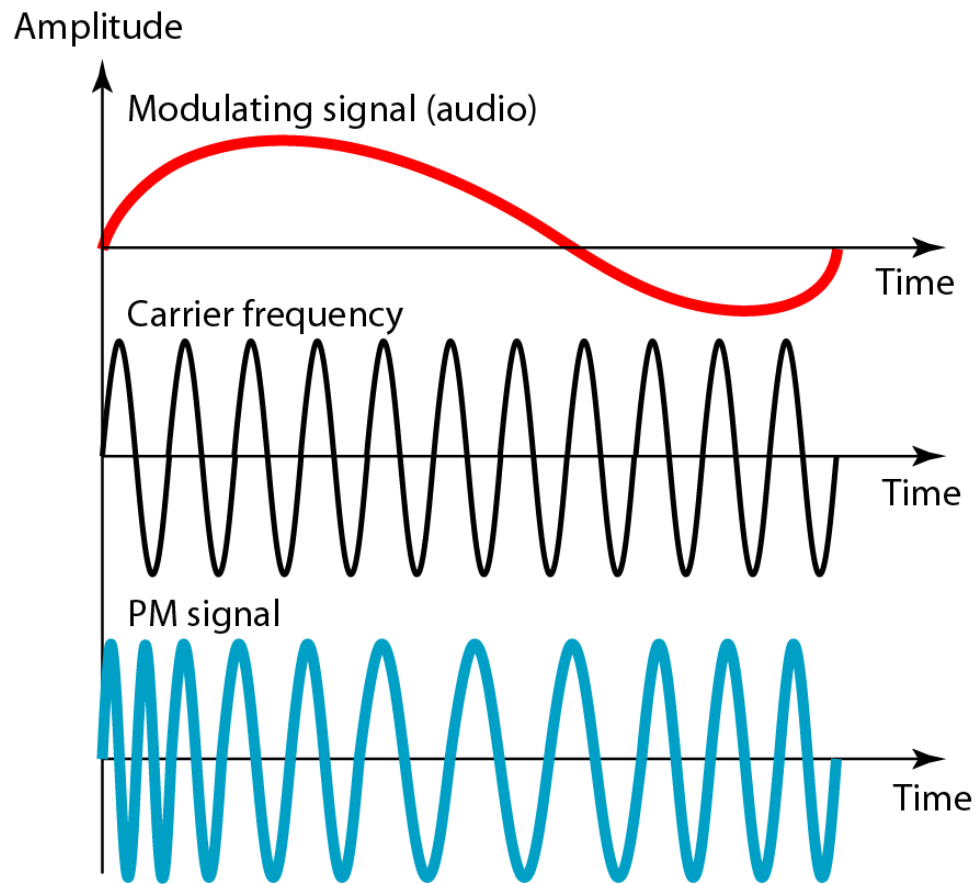
Time

Carrier frequency

Time

PM signal

Time

VCO

d/dt

$B_{PM} = 2(1 + b)B$

0

f_c

The total bandwidth required for PM can be determined from the bandwidth and maximum amplitude of the modulating signal:

$$B_{PM} = 2(1 + \beta)B.$$