

Comparison of AM techniques

Technique name	Power efficiency $\eta_P = \frac{P_m}{P_c}$	Bandwidth B	Bandwidth efficiency $\eta_B = \frac{\text{message BW}}{B}$	Demodulator complexity
DSB-SC (Double sideband)	1	$2W$	$1/2$	Needs synchronous detector
DSB-LC (Conventional AM) $m(t) = \cos(2\pi f_m t)$	$\frac{a^2}{2 + a^2}$	$2W$	$1/2$	Simple non-synchronous envelope detector
SSB-SC (Single sideband)	1	W	1	Needs synchronous detector
SSB-LC $m(t) = \cos(2\pi f_m t)$	$\frac{a^2}{4 + a^2}$	W	1	Simple non-synchronous envelope detector
QM-DSB (Quadrature modulation)	$1/2$	$2W$	1 (Two signals in the same bandwidth)	Needs synchronous detector Two oscillators and two lowpass filters
QM-SSB	$1/2$	W	2 (Two signals in the same bandwidth)	Needs synchronous detector Two oscillators and two lowpass filters