TABLE 2.2 Probability Density Function (PDF) and Moment Generating Function (MGF) of the SNR per Symbol γ for Some Common Fading Channels

Type of Fading	Fading Parameter	PDF $p_\gamma(\gamma)$	MGF $M_\gamma(s)$
Rayleigh		$\frac{1}{\overline{\gamma}} \exp\left(-\frac{\gamma}{\overline{\gamma}}\right)$	$(1 - s\overline{\gamma})^{-1}$
Nakagami-q (Hoyt)	$0 \leq q \leq 1$	$\frac{(1+q^2)}{2q\overline{\gamma}} \exp\left(-\frac{(1+q^2)^2\gamma}{4q^2\overline{\gamma}}\right) \times I_0\left(\frac{(1-q^4)\gamma}{4q^2\,\overline{\gamma}}\right)$	$\left(1 - 2s\overline{\gamma} + \frac{(2s\overline{\gamma})^2 q^2}{(1+q^2)^2}\right)^{-1/2}$
Nakagami-n (Rice)	$0 \leq n$	$\frac{(1+n^2)e^{-n^2}}{\overline{\gamma}} \exp\left(-\frac{(1+n^2)\gamma}{\overline{\gamma}}\right) \times I_0\left(2n\sqrt{\frac{(1+n^2)\gamma}{\overline{\gamma}}}\right)$	$\frac{(1+n^2)}{(1+n^2) - s\overline{\gamma}} \exp\left(\frac{n^2 s\overline{\gamma}}{(1+n^2) - s\overline{\gamma}}\right)$
Nakagami-m	$\frac{1}{2} \leq m$	$\frac{m^m \gamma^{m-1}}{\overline{\gamma}^m \Gamma(m)} \exp\left(-\frac{m\gamma}{\overline{\gamma}}\right)$	$\left(1 - \frac{s\overline{\gamma}}{m}\right)^{-m}$
Log-normal shadowing	σ	$\frac{4.34}{\sqrt{2\pi}\sigma\gamma} \exp\left[-\frac{(10\log_{10}\gamma - \mu)^2}{2\sigma^2}\right]$	$\frac{1}{\sqrt{\pi}} \sum_{n=1}^{N_p} H_{x_n} \exp\left(10^{(\sqrt{2}\sigma x_n + \mu)/10}\, s\right)$
Composite gamma/log-normal	m and $0 \leq \sigma$	$\int_0^\infty \frac{m^m \gamma^{m-1}}{w^m \Gamma(m)} \exp\left[-\frac{m\gamma}{w}\right] \times \frac{\xi}{\sqrt{2\pi}\sigma w} \exp\left[-\frac{(10\log_{10} w - \mu)^2}{2\sigma^2}\right] dw$	$\frac{1}{\sqrt{\pi}} \sum_{n=1}^{N_p} H_{x_n} \left(1 - 10^{(\sqrt{2}\sigma x_n + \mu)/10} s/m\right)^{-m}$