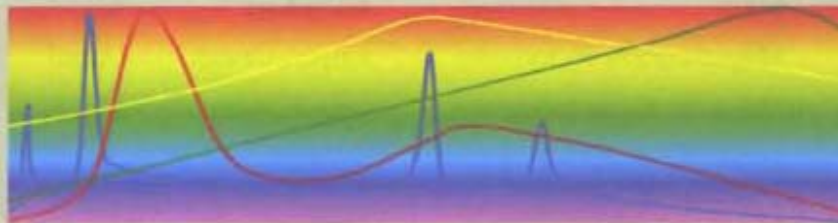


A P P E N D I X

A

Symbols, Quantities, Units, and Abbreviations



Symbol	Quantity	SI Unit	Abbreviation
A	Magnetic potential (vector)	webers/meter	Wb/m
<i>B</i>	Susceptance	siemens	S
B	Magnetic flux density	teslas or webers/meter ²	T or W/m ²
<i>C</i>	Capacitance	farads	F
<i>D</i>	Directivity (antenna)	(dimensionless)	—
D	Electric flux density	coulombs/meter ²	C/m ²
d	Moment arm	meters	m
E	Electric-field intensity	volts/meter	V/m
<i>E_{ds}</i>	Dielectric strength	volts/meter	V/m
<i>F</i>	Radiation intensity (normalized)	(dimensionless)	—
F	Force	newtons	N

Symbol	Quantity	SI Unit	Abbreviation
f	Frequency	hertz	Hz
f_d	Doppler frequency	hertz	Hz
f_{mn}	Cutoff frequency	hertz	Hz
G	Conductance	siemens	S
G	Gain (power)	(dimensionless)	—
H	Magnetic field intensity	amperes/meter	A/m
I	Current	amperes	A
J	Current density (volume)	amperes/meter ²	A/m ²
J_s	Current density (surface)	amperes/meter	A/m
k	Wavenumber	radians/meter	rad/m
k_c	Cutoff wavenumber	radians/second	rad/s
L	Inductance	henrys	H
l	Length	meters	m
M, m	Mass	kilograms	kg
M	Magnetization vector	amperes/meter	A/m
m	Magnetic dipole moment	ampere-meters ²	A·m ²
n	Index of refraction	(dimensionless)	—
P	Power	watts	W
P	Electric polarization vector	coulombs/meter ²	C/m ²
p	Pressure	newtons/meter ²	N/m ²
p	Electric dipole moment	coulomb-meters	C·m
Q	Quality factor	(dimensionless)	—
Q, q	Charge	coulombs	C
R	Reflectivity (reflectance)	(dimensionless)	—
R	Resistance	ohms	Ω
R	Range	meters	m
r	Radial distance	meters	m
S	Standing-wave ratio	(dimensionless)	—
S	Poynting vector	watts/meter ²	W/m ²
S_{av}	Power density	watts/meter ²	W/m ²
T	Temperature	kelvin	K
T	Transmissivity (transmittance)	(dimensionless)	—

Symbol	Quantity	SI Unit	Abbreviation
T	Torque	newton-meters	N·m
<i>t</i>	Time	seconds	s
<i>T</i>	period	seconds	s
<i>u</i>	Velocity	meters/second	m/s
<i>u_g</i>	Group velocity	meters/second	m/s
<i>u_p</i>	Phase velocity	meters/second	m/s
<i>V</i>	Electric potential	volts	V
<i>V</i>	Voltage	volts	V
<i>V_{br}</i>	Voltage breakdown	volts	V
<i>V_{emf}</i>	Electromotive force (emf)	volts	V
<i>W</i>	Energy (work)	joules	J
<i>w</i>	Energy density	joules/meter ³	J/m ³
<i>X</i>	Reactance	ohms	Ω
<i>Y</i>	Admittance	siemens	S
<i>Z</i>	Impedance	ohms	Ω
<i>α</i>	Attenuation constant	nepers/meter	Np/m
<i>β</i>	Beamwidth	degrees	°
<i>β</i>	Phase constant (wavenumber)	radians/meter	rad/m
<i>Γ</i>	Reflection coefficient	(dimensionless)	—
<i>γ</i>	Propagation constant	meters ⁻¹	m ⁻¹
<i>δ_s</i>	Skin depth	meters	m
<i>ε, ε₀</i>	Permittivity	farads/meter	F/m
<i>ε_r</i>	Relative permittivity	(dimensionless)	—
<i>η</i>	Impedance	ohms	Ω
<i>λ</i>	Wavelength	meters	m
<i>μ, μ₀</i>	Permeability	henrys/meter	H/m
<i>μ_r</i>	Relative permeability	(dimensionless)	—
<i>μ_e, μ_h</i>	Mobility (electron, hole)	meters ² /volt·second	m ² /V·s
<i>ρ_l</i>	Charge density (linear)	coulombs/meter	C/m
<i>ρ_s</i>	Charge density (surface)	coulombs/meter ²	C/m ²
<i>ρ_v</i>	Charge density (volume)	coulombs/meter ³	C/m ³
<i>σ</i>	Conductivity	siemens/meter	S/m

Symbol	Quantity	SI Unit	Abbreviation
σ_t	Radar cross section	meters ²	m ²
τ	Transmission coefficient	(dimensionless)	—
τ	Pulse length	seconds	s
Υ	Atmospheric transmissivity	(dimensionless)	—
Φ	Magnetic flux	webers	Wb
Ψ	Gravitational field	newtons/kilogram	N/kg
χ_e	Electric susceptibility	(dimensionless)	—
χ_m	Magnetic susceptibility	(dimensionless)	—
Ω	Solid angle	steradians	sr
ω	Angular frequency	radians/second	rad/s
ω	Angular velocity	radians/second	rad/s