3-dB bandwidth, 62

airgap, 191
amorphous silicon, 185
amplifier
   low-noise, 5, 77, 117–18, 123, 131
   power, 4, 117
analog modulation, 3
anechoic chamber, 125, 127
antenna
   bandwidth, 8–9
   dielectric resonator, 32, 188
   directional, 12
   E-shaped patch, 219
   fractal patch, 103
   gain, 12
   leaky-wave, 8, 105
   nonplanar, 7, 16
   omnidirectional, 12
   oscillating, 145
   planar, 7, 14
   quasi-Yagi, 161
   reconfigurable, 85
   slot, 54, 89
   solar-cell-integrated, 185, 188, 204
   surface-wave, 8
   suspended plate, 208
   wearable, 118
   wire, 208
   Yagi, 91
   Yagi-Uda, 109
antenna array, 199, 210, 221
antenna filter
   configuration, 29
   dielectric resonator, 31
   microstrip-based, 50
   ring-patch, 50, 52
   ring-slot, 54
   ultrawideband, 57
   antenna amplifier, 117
   antennamitter, 117
   antenna-in-package, 78
   antenna-on-package, 78
   antenna oscillator
      coupled-load, 149, 167
      coupled-load microstrip patch, 167
      dielectric resonator, 151–2, 158
      differential planar, 161
      microstrip patch, 151, 171
      reflection amplifier, 149, 152
      slot, 151
      substrate integrated waveguide, 151
      voltage-controlled integrated, 161
   antenna package, 67
   argon laser, 195
   axial ratio, 13
   balun filter
      magnetic-coupled, 64
      multiband, 60, 62
      patch, 65
      ring, 60
      single-band, 60, 62
   Barkhausen criterion, 147, 170
   baseband modules, 3
   biasing scheme
      common-base, 149
      common-emitter, 150
      common-source, 119
   bidirectional radiation, 59
   bilateral transceiver, 5
   bits
      channel, 2
      source, 2
   block diagram, 146
   borosilicate crown glass, 189
   cadmium telluride, 185
   calibration, 154
carrier, 4–5, 145
center frequency, 9, 63
channel, 3
Chu’s criterion, 10
clad boards, 73, 156
co-design, 22, 120–121, 128, 131
co-optimization, 22, 120–121, 128
copper indium selenide, 185
co-simulation, 22, 121
communication system
  analog, 2
digital, 2
  protocols,
schemes, 3
  wired, 1
  wireless, 1
compact-range anechoic chamber, 153
computer-aided design, 20
conformal strip, 189
conversion efficiency, 148, 158–9, 180
corrector
  analog-to-digital, 2
digital-to-analog, 2
  cost function, 121
cross-pole rejection, 12
cross-slots, 65
decoder, 2
demodulation, 2
demodulator, 3
dielectric probe kit, 189
digital modulation, 3
director, 110
diversity, 46
double-sided parallel-strip line, 161
Dielectric Resonator Antenna (DRA)
  active, 77
cylindrical, 34, 48
  hollow, 70
  passive, 77
  rectangular, 201
  transparent hemispherical, 189
driver, 111
effective aperture, 125
effective illumination area, 185
effective transmission gain, 135
electromagnetic discharge, 68
electromagnetic interference, 67, 85
electronic jamming, 99
encoder, 2
equalizing resistors, 131, 135
equivalent noise voltage generator, 134
excitation-strip loadings, 201
far-field condition, 12, 125
far-field distance, 11, 153, 166, 214
feedback element, 171, 173
feedback load, 167
feedback loop, 171
feedback network, 147
feeding method
  aperture-fed, 33
coaxial-probe, 32, 50
  conformal-strip-fed, 33
  microstrip-fed, 33
  side-coupling, 39
FET switches, 88
field
  co-polarized, 12
cross-polarized, 12
focusing length, 197
focusing lens, 189
free-running, 148, 156
free space loss, 154
frequency discriminator method, 177
Friis transmission equation, 125, 166
focal point, 207
forward-biased resistance, 86
front-to-back ratio, 12, 164, 167
full-wave analysis, 21
gain
  available, 125
directional, 125, 133, 135
gate conductance, 134
generalized S parameters, 133
global maximum, 121
green antenna, 207
half-power beamwidth, 12
harmonic tuning load, 117
heliostat, 204
hemispherical lens, 194
HiK Powder, 73, 156, 159
human body, 123, 128
ideal switches, 86
illumination angle, 196–7, 215
imbalance
  amplitude, 63
  phase, 63
impedance
  characteristic, 8
  input, 8
insulator, 189
integrated antenna
  active, 18
  passive, 19
intermediate frequency, 3
isolation
  RF-dc, 87
  RF-RF, 87
K9 glass, 189
L-probe, 209
L-shaped wire, 208
light concentrator, 204
linearity, 121, 150
local oscillator, 4
locus, 135
loss
  dielectric, 10
  ohmic, 10
  radiation, 10
low-temperature co-fired ceramics, 78
major cut planes, 12
matching network, 111, 118–19, 121
MEMS switches, 88
meshed patch antennas, 188
metallic plate, 207
method
  network-based, 21
  stochastic, 22
microwave components
  active, 6
  passive, 6
minimum noise figure, 131, 134
mixer
  DOWN, 5
  microwave, 145
  UP, 4–5
mode
  HEM$_{113}$, 36
  higher-order, 51, 55
  TE$_{013}$, 36, 48
  TE$_{111}$, 189
  TE$_{211}$, 152
  TM$_{011}$, 212
  TM$_{013}$, 48
  TM$_{101}$, 93
mode chart, 36
model
  equivalent-circuit, 64
  network, 147
modeling, 21
modulation, 2–3
modulator, 3
module
  antenna-circuit, 17
  circuit-circuit, 17
  monocrystalline silicon, 185
natural signals, 1
noise factor, 118
noise figure, 118–19, 126, 138
nonimaging planar mirror, 207
open-loop angle, 171
open-loop magnitude, 171
optical dark room, 217
optimal noise, 119, 128, 133
optimization, 21, 121
optimum drain resistance, 135
optimum gate resistance, 135
oscillation conditions, 146
oscillator
  active voltage-controlled, 148
  dielectric resonator, 31, 148
  microstrip, 148
  microwave, 145
  resonant cell, 148
  semiconductor, 148
  voltage-controlled, 5
  YIG, 148
oscillator load, 152
output power, 148, 150
package, 67, 69, 78
package capacitance, 86
package inductance, 86
packaging
  DRA, 70
parabolic disks, 205
parabolic optical dish, 217
parallel light beam, 196, 216
parasitic effect, 121
parasitic patch, 110
phase-locked loop, 145, 148
phase noise, 148–9, 158, 160, 167, 171, 177
phased array, 199
photoconducting switches, 88
photoelectric, 185
photovoltaic, 185
PIN diode, 86
plane
  E-., 12
  H-., 12
point source, 11
polarization
  left-handed, 13
  right-handed, 13
polarized wave
  circular, 13
  elliptical, 13
  linear, 13
polycrystalline silicon, 185
power
  effective isotropic radiated, 166, 178
  input, 8
  radiated, 8, 166
  received, 154
  transmitted, 154
  transmitting, 149, 159, 166
power-added efficiency, 117
power consumption, 148
power divider, 48, 199, 214
Poynting vector, 12
propagation constant, 8
Pyrex, 189
quality factor, 6–7, 10, 42, 88, 148–9, 160, 178
radiation efficiency, 10
radiation pattern, 11
radiation resistance, 10
receiver
  RF, 2, 5
  unilateral RF, 4
reception, 2
reconfigurable antenna
  frequency-, 86, 88
  multi-, 86, 109
  pattern-, 86, 98
  polarization-, 86
reflection coefficient, 8
reflective index, 195
reflector, 110
renewable energy, 207
resistive equalization technique, 128, 131, 133
RF frontend, 3
second harmonics, 148, 158, 160
silicon mirror, 205
simulated annealing, 121
Solant, 185
solar cell, 185, 192, 202, 209
solar-cell-integrated antenna
  nonplanar, 188
  planar, 204
solar concentrator, 205
solar power plant, 204, 206
spatial power combining, 145
special absorption rate, 14
sun-tracking system, 207
synthesizer, 5
system-on-package, 50, 80
Teflon, 189
total noise figure, 138
transcendental equation, 71, 152
transfer function, 147, 170
transmission-line equivalent circuit, 86
transmitter
  RF, 2–5
  unilateral RF, 4
transmission, 2
tunable frequency, 149
unconditional stability, 118, 123
varactor, 166
wave
  standing, 7
  travelling, 7
wave-guiding resonator, 7
wave number, 152
Wheeler cap method, 11
Wilkinson power divider, 214
xenon light source, 215