Index

A
Access Phase 38, 42-43, 45, 54
access points (APs) 5, 296
acknowledgment messages (ACK) 93
Adaptive Complex System (CAS) 185
additive white Gaussian noise (AWGN) 10, 211, 250
Akaike information criterion (AIC) 260
Algebraic Space Time Codes (ASTC) 109
amplified-forward (AF) 205
Amplify and Forward (AF) 87, 91
amplitude shift keying (ASK) 41
analog to digital converters (ADCs) 245
Angle-of-Arrival (AoA) 275
Application Data Unit (ADU) 182
Automatic Repeat reQuest (ARQ) 8, 90
Average TimeSync Protocol (ATS) 63

B
band pass filter (BPF) 251
Base Station (BS) 262
Bit-Error-Rate (BER) 227
Blind Combining (BC) 257
Blindly combined energy detection (BCED) 258
Blind source separation (BSS) 260
Blind Subcarrier Suppression (BSS) 100
BlockErase 45
BlockPermalock 45, 49
BlockWrite 45, 49
bluetooth 8
body area sensor network (BASN) 273-274

C
Central Business District (CBD) 291, 298
channel impulse response (CIR) 113
Code division multiple access (CDMA) 57, 232-233, 237
Cognitive cycle 245
Cognitive pilot channel (CPC) 247
Cognitive radio (CR) 203, 224-226, 241-242, 271
cognitive radio relay (CRR) 209
cognitive reconfigurability 245
Combinatorial Framework 89
common time reference (CTR) 59, 62
component plate 300
confidentiality 11
contant bit rate (CBR) 161
Constant False alarm Rate (CFAR) 253
constrained optimization 214
contention-free period (CFP) 57
Cooperative and Collaborative Detection 229, 234-235
Coordinated Universal Time (UTC) 62
CORSIM 159
Cramer-Rao Lower Bound (CRLB) 119
Cross-Layer Designs (CLD) 179
Cross-Layer Signaling Shortcuts (CLASS) 180
Cyclic Autocorrelation Function (CAF) 256
cyclic prefix (CP) 112
Cyclic Spectral Density (CSD) 256

D
Decode and Forward (DF) 87, 91
Digital Network Coding (DNC) 88
Digital subscribers line (DSL) 215
direct method 229
Direct Sequence Spread Spectrum (DSSS) 246
Discrete Fourier Transform (DFT) 109, 116, 118, 129
dual-radio chains 245
Dynamic frequency hopping (DFH) 246

E
eavesdropper channel 12, 15
Index

eigenvalue based detection (EBD) 258
end-to-end (E2E) 175, 187
Energy detector (ED) 251
Enhanced Distributed Channel Access (EDCA) 57
enterprise resource planning (ERP) 39
equal gain combining (EGC) 134, 257
European Transparent Ubiquitous Terminal (TRUST) 236

F
Federal Communications Commission’s (FCC) 203
Filter bank based spectrum estimation (FBSE) 233
forward error control (FEC) 8
frequency division duplex (FDD) 136
Frequency Hopping Spread Spectrum (FHSS) 246
Frequency Offset (FO) 129
Functional Blocks (FB) 181
Function-Behavior-Structure (FBS) 174, 176-177, 194
fusion center 262

G
Gard Interval (GI) 129
Global Positioning System (GPS) 62
Global Positioning System (GPS) 274

H
HCF Controlled Channel Access (HCCA) 57
Hints and Notifications (HAN) 179
hybrid controller (HC) 57
Hybrid Coordination Function (HCF) 57

I
identify friend or foe (IFF) 41
Independent component analysis (ICA) 260
indirect method 229
Information Channels (IC) 182
information-theoretic security 11
inter-carrier interference (ICI) 110
interferences between symbols (IES) 109
Interference Temperature Detection 229
international telecommunication union (ITU) 131
Internet of Things (IoT) 38
Inventory Phase 38, 42-44, 47, 54
Inverse Discrete Fourier Transform (IDFT) 112, 116, 118, 129
Iterative waterfilling (IW) 218

J
jamming attack 47

K
Karush-Kuhn-Tucker (KKT) 215

L
Lagrangian multipliers 217
Leaderless Time Synchronization Protocol (LTSP) 63
legitimate receiver 10
Linear-Programming Framework 89
Line-Graph Framework 89
line-of-site (LOS) 227
local oscillator (LO) 235
long term evolution (LTE) 295

M
MAC layer NC (MAC-NC) 87
main channel 12
management entity (ME) 180
Matched filtering (MF) 232
material safety data sheet (MSDS) 47
maximal ratio combining (MRC) 134
Maximum Likelihood (ML) decoding 138
Mean Square Error (MSE) 121, 129, 145
media access control (MAC) 207
medium access control (MAC) 41, 86, 293
metropolitan-area wireless mesh networks (MAWMN) 291
Minimum Mean Square Error (MMSE) Receiver 138
mobile ad hoc network (MANET) 295
mobile broadband service 3
MOVE 160
MultiDomain Communications Model (MDCM) 181
Multi-Input Multi-Output (MIMO) 103, 110, 112, 115, 119, 121, 126, 129-139, 141, 152, 154-156, 310
Multi-Protocol Label Switching (MPLS) 65
Multi Taper spectrum estimation (MTSE) 233
Index

N
Nakagami-m fading 15
network adapters (NICs) 5
Network coding (NC) 86
Network Time Protocol (NTP) 63
NeXt Generation (xG) 242
non-blind 248
Non-coherent Random Network Coding (NRNC) 90
non-parametric method 229
nonrepudiation 11

O
Open Systems Interconnection (OSI) 63
Optimizing Subsystem (OSS) 180
orthogonal space time block codes (OSTBC) 135

P
packet delivery ratio (PDR) 161
packet error rate (PER) 90
packet reception ratio (PRR) 164
parametric method 229
PARAMICS 159, 169
person tracking system 281
phase shift keying (PSK) 41
Physical Layer NC (PLNC) 87
physical (PHY) 86
power spectral density (PSD) 236, 251
Primary Receiver Detection 230, 235
Primary Transmitter Detection 229-231, 242, 247-248
Primary user emulation (PUE) 247
Primary Users (PU) 203, 224, 242
Protocol Optimizers (POs) 180

Q
Quality of Service (QoS) 56-57

R
Radio frequency identification (RFID) 38
Random Linear Network Coding (RLNC) 90
Random matrix theory (RMT) 258
range-based 273, 275, 277, 281, 286-287
range-free 273, 275, 277, 281, 286-287
rate adaptation scheme 27
Received Signal Strength Indicator (RSSI) 275-276
Recursive Network Architecture (RNA) 181
regional computers (RC) 291
regularized Block diagonalization (RBD) 143, 146
Resource Reservation Protocols with Traffic Engineering (RSVP-TE) 56
Resource State Management Protocol (RSMP) 56, 64, 68
RFID active tags 39
RFID battery-assisted passive (BAP) tags 39
RFID passive tags 20, 38-41, 50-51, 53-54, 189, 192, 201, 264
RFID systems 39
RFID backend software 39, 49
RFID middleware 39
RFID readers 39
RFID tags 39-41, 47, 49, 53-55
RN16 44
Roads and Traffic Authority (RTA) 292
road-side units (RSUs) 159

S
Schnorr-Euchner algorithms 118
Secondary Users (SU) 204, 224, 242
secrecy capacity 11, 14
secure outage performance 34
selection combining (SC) 134
Selection Phase 42-43, 54-55
semi-blind 249, 265
signal-to-noise ratio (SNR) 14, 232
single-input single-output (SISO) 13, 26
single radio 245
slot counter 44
Software Adaptable Network (SAN) 184
Software Engineering (SE) 186
space time block codes (STBC) 135
space time codes (STC) 135
space time trellis codes (STTC) 135
spatial spectrum hole 244
Spectrum Correlation Function (SCF) 256
Spectrum Hole (SH) 224
Spectrum Management 243
Spectrum Mobility 243
Spectrum sensing (SS) 241-242, 271
spectrum underlay 226
spectrvm overlay 226
Sphere Decoding Family 138
spread-spectrum 3
Successive Interference Cancelation (SIC) method 138
Index

SUMO 160
Supervisory Control and Data Acquisition (SCADA) 38
Sydney Coordinated Adaptive Traffic System (SCATS) 292

T
tag identification (TID) 41
temporal spectrum hole 243-244
TIGER database 160
time division duplex (TDD) 136
Time-Division Unbalanced Carrier Sense Multiple Access (TD-uCSMA) 56, 58, 81
time frame (TF) 59
Time-of-Arrival (ToA) 275
total blind 249
Traffic Control Interface (TraCI) 160
traffic management centre (TMC) 292
Transmission Control Protocol (TCP) 175
transmission opportunities (TXOPs) 57
Tuning Layers (TL) 180
Two Step Compressed spectrum sensing (TS-CSS) 255
Two-Way Relay Network (TWRN) 87

U
ultra-wide band (UWB) 229
unique item identifier (UII) 41, 54
UWB 8

V
Vehicular Ad-Hoc Network (VANET) 158
VISSIM 159, 169

W
WAND project 294
wireless local area network (WLAN) 1, 5, 8, 262
Wireless mesh networks (WMN) 290
wireless personal area network (WPAN) 1, 8
wireless wide area network (WWAN) 1, 3
Worldwide Interoperability for Microwave Access (WiMAX) 5

Z
zero-forcing precoding (ZFP) 143
zero-forcing (ZF) method 137
ZigBee 8