List of Abbreviations

AMC	Adaptive Modulation and Coding
AWGN	Additive White Gaussian Noise
BPSK	Bipolar Phase Shift Keying
BER	Bit Error Rate
BS	Base Station
CDMA	Code Division Multiple Access
CFO	Carrier Frequency Offset
CIR	Channel Impulse Response
CP	Cyclic Prefix
DAB	Digital Audio Broadcasting
DFT	Discrete Fourier Transform
DL	Downlink
DPSK	Differential Phase Shift Keying
DVB	Digital Video Broadcasting
EDGE	Enhanced Data Rate for Global Evolution
FDD	Frequency Division Duplexing
FDM	Frequency Division Multiplexing
FEC	Forward Error Correction
FFT	Fast Fourier Transform
GPRS	General Packet Radio Services
GSM	Global System for Mobile Communications
ICI	Inter-Carrier Interference
IDFT	Inverse Discrete Fourier Transform
IEEE	Institute of Electrical and Electronics Engineers
IFFT	Inverse Fast Fourier Transform
ISI	Inter Symbol Interference
ITU	International Telecommunication Union
LTE	Long Term Evolution

MAI	Multiple Access Interferences
MBSFN	Multicast/Broadcast over a Single Frequency Network
MIMO	Multi-Input Multi-output
ML	Maximum Likelihood
MSE	Mean Square Error
MSE-OFDM	Multiple Symbol Encapsulated Orthogonal Frequency Division Multiplexing
OFDM	Orthogonal Frequency Division Multiplexing
OFDMA	Orthogonal Frequency Division Multiple Access
PSK	Phase Shift Keying
PAPR	Peak to Average Power Ratio
QAM	Quadrature Amplitude Modulation
QPSK	Quadrature Phase-Shift Keying
SDR	Software Defined Radio
SFC	Space-Frequency Coding
SNR	Signal to Noise Ratio
SS	Subscriber Station
STC	Space-Time Coding
SUI	Stanford University Interim
S-OFDMA	Scalable Orthogonal Frequency Division Multiple Access
TDD	Time Division Duplex
TDMA	Time Division Multiple Access
UL	Uplink
UMTS	Universal Mobile Telecommunications Services
Wi-MAX	Worldwide Interoperability Microwave access
WLAN	Wireless Local Area Network
WMAN	Wireless Metropolitan Area Networks
2G	Second Generation
3G	Third Generation
4G	Fourth Generation

List of Symbols

B	number of groups in one time frame of MSE-OFDMA
$b_{k,g}(n)$	input data symbols of k-th user of g-th group
$c_k(l)$	spreading code
Δf	subcarrier spacing of OFDM signal
Δk	relative carrier frequency offset
Δn	relative symbol timing offset
ε	carrier frequency offset
E_b	bit energy
E_s	symbol energy
E[:]	expectation operator
F	IDFT matrix
H	channel matrix
K	number of users
M	number of OFDM symbols in one MSE-OFDM frame
N	order of FFT/IFFT
N_{cp}	length of CP
N_d	number of data rates
N_k	number of subcarriers for k-th user
N_o	noise variance
Nt	number of transmit antennas
Nr	number of receive antennas
N_{os}	number of OFDM symbols in one time slot
N_s	number of time slots of duration
η_f	frame efficiency
P_e	probability of error
P_s	signal power
$\tilde{r}_l^{FEQ}$	equalized received signal

R_c	chip rate
R_k	data rate of user k
σ_{ICI}^2	variance of ICI
σ_{ISI}^2	variance of ISI
Sf	spreading factor
T	OFDM symbol duration
T_g	time slot duration
T_{pre}.	preamble duration
TN_s	time slots
T_F	frame duration
T_{sym}	OFDM symbol period including CP
T_c	chip duration
T_p	guard period duration
T_{sym}	OFDM symbol period including CP
T_{cp}	cyclic prefix duration
θ_k	random carrier phase
w_m	m-th subcarrier frequency
w_c	radio frequency
w(n)	additive white Gaussian noise (AWGN)

List of Figures

List of Tables