

List of Acronyms

3GPP third generation partnership project
2G second generation
3G third generation
4G fourth generation
5G fifth generation
ACEPR adjacent channel error power ratio
ACLR adjacent channel leakage ratio
ACE active constellation extension
ACLR adjacent channel leakage ratio
ADC analog-to-digital converter
ADSL asymmetric digital subscriber line
AMPS advanced mobile phone system
AMAM amplitude-to-amplitude modulation
AWGN additive white Gaussian noise
BICM bit-interleaved coded modulation
BP belief propagation
BEC binary erasure channel
BER bit error rate
BLER block error rate
BS base station
CCDF complementary CDF
CDD cyclic delay diversity
CDF cumulative distribution function
CDMA code division multiple access
CFO carrier frequency offset
CN check node
CPE common phase error
CTF channel transfer function
CIR channel impulse response
CoMP coordinated multipoint
CP cyclic prefix
CP-OFDM cyclic prefix OFDM
CPRI common public radio interface
CQI channel quality indicator
CRI CSI-RS resource indicator
CRC cyclic-redundancy check
CRS cell-specific reference signal
CSI channel state information
CSI-IM CSI interference measurement
CSIR channel state information at the receiver
CSI-RS channel state information reference signal
CSIT channel state information at the transmitter
CW continuous wave
D2D device-to-device
DAB digital audio broadcast
DAC digital-to-analog converter
DFT discrete Fourier transform

DFTS-OFDM DFT-spread OFDM
DLL delay-locked loop
DPD digital pre-distortion
DM-RS demodulation reference signal
DPC dirty paper coding
DVB-T digital video broadcast-terrestrial
EDGE enhanced data rates for GSM evolution
EGT equal gain transmission
EMF electromagnetic field
EPDCCCH enhanced physical downlink control channel
eNB evolved Node B
eMBB enhanced MBB
EVM error vector magnitude
FBMC filter bank multicarrier
FCC federal communications commission
FDD frequency division duplex
FDM frequency division multiplexing
FD-MIMO full-dimension MIMO
FEC forward error correction
FFT fast Fourier transform
FIR finite impulse response
F-OFDM filtered OFDM
FS frequency spreading
FSTD frequency-switched transmit diversity
GaN Gallium-Nitride
GI guard interval
GMP generalized memory polynomial
GMSK Gaussian minimum shift keying
gNB the next generation Node B
GoB grid-of-beams
GPRS general packet radio service
GSM global system for mobile communications
HARQ hybrid ARQ
HetNet heterogeneous network
HPBW half-power beam width
HSPA high speed packet access
ICI intercarrier interference
ICT information and communication technologies
ID identity
IFDMA interleaved frequency division multiple access
IFFT inverse FFT
IID independent identically distributed
IMT international mobile telecommunications
IoT internet of things
IP internet protocol
ISI intersymbol interference
ITU international telecommunications union
ITU-R ITU-radiocommunications sector
KPIs key performance indicators
L1-RSRP layer-1 RSRP
LBT listen-before-talk
LDPC low density parity check
LFDMA localized frequency division multiple access

LLR	log-likelihood ratio
LNA	low-noise amplifier
LoS	line-of-sight
LS	least-square
LTE	long term evolution
LUT	look-up table
MBB	mobile broadband
MBSFN	multicast-broadcast single-frequency network
MAC	medium access control
MCS	modulation and coding scheme
MIMO	multiple-input multiple-output
ML	maximum likelihood
MP	memory polynomial
MMS	multimedia message service
MMSE	minimum mean square error
mmMAGIC	millimeter magic project
mMTC	massive machine type communications
MRC	maximum ratio combining
MRT	maximum ratio transmission
MSE	mean squared error
MSK	minimum shift keying
MU	multi user
MU-MIMO	multiuser MIMO
NB	Node B
NB-IoT	narrow band-IoT
NMSE	normalized mean squared error
NMT	nordic mobile telephone
NLoS	non line-of-sight
NR	new radio
NSA	non-stand-alone
NZP CSI-RS	non-zero-power CSI-RS
OFDM	orthogonal frequency division multiplexing
OSTBC	orthogonal space-time block code
OOB	out-of-band
OQAM	offset QAM
OSD	ordered-statistic decoding
PA	power amplifier
PAPR	peak-to-average power ratio
PBCH	physical broadcast channel
PCM	parity check matrix
PDCCH	physical downlink control channel
PDCP	packet data convergence protocol
PDSCH	physical downlink shared channel
PHD	polyharmonic distortion
PHY	physical
PLL	phase-locked loop
PN	phase-noise
PMI	precoding matrix indicator
PPN	polyphase network
PQI	PDSCH rate matching and quasicolocation indicator
PRACH	physical random access channel
PSD	power spectral density
PSK	phase shift keying

PSS	primary synchronization signal
PTS	partial transmit sequence
PT-RS	phase tracking reference signal
PUCCH	physical uplink control channel
PUSCH	physical uplink shared channel
QAM	quadrature amplitude modulation
QoS	Quality of Service
QPSK	quadrature phase shift keying
RAN	radio access network
RB	resource block
RCFO	residual CFO
RF	radio frequency
RFICs	radio frequency integrated circuits
RI	rank indicator
RLC	radio link control
RLF	radio link failure
RMa	rural macro
RMS	root mean square
RRC	radio resource control
RSRP	reference signal received power
Rx	receive
SA	stand-alone
SAR	specific absorption rate
SC-FDMA	single-carrier frequency division multiple access
SDAP	service data adaptation protocol
SDMA	space division multiple access
SER	symbol error rate
SFO	sampling frequency offset
SFBC	space frequency block coding
SFTD	space frequency transmit diversity
SIC	successive interference cancellation
SINDR	signal-to-interference, distortion and noise ratio
SINR	signal-to-interference-and-noise ratio
SIR	signal-to-interference-ratio
SIMO	single-input multiple-output
SISO	single-input single-output
SLI	strongest layer indicator
SLM	selective mapping
SMS	short message service
SNR	signal-to-noise ratio
SORTD	spatial orthogonal-resource transmit diversity
SQNR	signal to quantization noise ratio
SRI	SRS resource indicator
SRS	sounding reference signal
SSB	synchronization signal block
SSS	secondary synchronization signal
SSBRI	SSB resource indicator
STTD	space–time transmit diversity
SU-MIMO	single-user MIMO
SVD	singular value decomposition
TB	tail-biting
TCI	transmission configuration indicator
TDD	time division duplex

TDM time division multiplexing
TI tone injection
TM transmission mode
TPMI transmit precoder matrix indicator
TR tone reservation
TRI transmit rank indicator
TRS tracking reference signal
TS technical specification
TSG technical specification group
TTI transmit time interval
Tx transmit
QCL quasicolocation
UE user equipment
UF-OFDM universally filtered OFDM
ULA uniform linear array
UMa urban macro
UMTS universal mobile telecommunications system
UPA uniform planar array
URLLC ultra-reliable low-latency communications
V2I vehicle-to-infrastructure
V2N vehicle-to-network
V2P vehicle-to-pedestrian
V2X vehicle-to-everything
V2V vehicle-to-vehicle
VCO voltage controlled oscillator
VN variable node
WAP wireless application protocol
WAVA wraparound Viterbi algorithm
WiMAX worldwide inter-operability for microwave access
W-OFDM windowed OFDM
WRC world radiocommunication conference
WSS wide-sense stationary
VNA vector network analyzer
VS-GMP vector switched GMP
WCDMA wideband CDMA
WG working group
WLAN wireless local area network
ZF zero-forcing
ZP CSI-RS zero-power CSI-RS