

**OFDM and MC-CDMA**  
for Broadband Multi-user Communications, WLANs  
and Broadcasting

by

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*We dedicate this monograph to the numerous contributors of this field, many  
of whom are listed in the Author Index*

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# Other Wiley and IEEE Press Books on Related Topics <sup>1</sup>

- R. Steele, L. Hanzo (Ed): *Mobile Radio Communications: Second and Third Generation Cellular and WATM Systems*, John Wiley-IEEE Press, 2nd edition, 1999, ISBN 07 273-1406-8, p 1064
- L. Hanzo, W. Webb, and T. Keller, *Single- and Multi-Carrier Quadrature Amplitude Modulation: Principles and Applications for Personal Communications, WLANs and Broadcasting*. IEEE Press, 2000.
- L. Hanzo, F.C.A. Somerville, J.P. Woodard: *Voice Compression and Communications: Principles and Applications for Fixed and Wireless Channels*; IEEE Press-John Wiley, 2001, p 642
- L. Hanzo, P. Cherriman, J. Streit: *Wireless Video Communications: Second to Third Generation and Beyond*, IEEE Press, 2001, p 1093
- L. Hanzo, T.H. Liew, B.L. Yeap: *Turbo Coding, Turbo Equalisation and Space-Time Coding*, John Wiley, 2002, p 751
- J.S. Blogh, L. Hanzo: *Third-Generation Systems and Intelligent Wireless Networking: Smart Antennas and Adaptive Modulation*, John Wiley, 2002, p408
- L. Hanzo, C.H. Wong, M.S. Yee: *Adaptive wireless transceivers: Turbo-Coded, Turbo-Equalised and Space-Time Coded TDMA, CDMA and OFDM systems*, John Wiley, 2002, p 737

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<sup>1</sup>For detailed contents please refer to <http://www-mobile.ecs.soton.ac.uk>

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# Acknowledgments

We are indebted to our many colleagues who have enhanced our understanding of the subject, in particular to Prof. Emeritus Raymond Steele. These colleagues and valued friends, too numerous to be mentioned, have influenced our views concerning various aspects of wireless multimedia communications. We thank them for the enlightenment gained from our collaborations on various projects, papers and books. We are grateful to Steve Braithwaite, Jan Brecht, Jon Blogh, Marco Breiling, Marco del Buono, Sheng Chen, Peter Cherriman, Stanley Chia, Byoung Jo Choi, Joseph Cheung, Sheyam Lal Dhomeja, Dirk Didascalou, Lim Dongmin, Stephan Ernst, Peter Fortune, Eddie Green, David Greenwood, Hee Thong How, Thomas Keller, Ee Lin Kuan, W. H. Lam, C. C. Lee, Xiao Lin, Chee Siong Lee, Tong-Hooi Liew, Matthias Münster, Vincent Roger-Marchart, Jason Ng, Michael Ng, M. A. Nofal, Jeff Reeve, Redwan Salami, Clare Somerville, Rob Stedman, David Stewart, Jürgen Streit, Jeff Torrance, Spyros Vlahoyiannatos, William Webb, Stephan Weiss, John Williams, Jason Woodard, Choong Hin Wong, Henry Wong, James Wong, Lie-Liang Yang, Bee-Leong Yeap, Mong-Suan Yee, Kai Yen, Andy Yuen, and many others with whom we enjoyed an association.

We also acknowledge our valuable associations with the Virtual Centre of Excellence (VCE) in Mobile Communications, in particular with its chief executive, Dr Walter Tuttlebee, and other leading members of the VCE, namely Dr Keith Baughan, Prof. Hamid Aghvami, Prof. Ed Candy, Prof. John Dunlop, Prof. Barry Evans, Prof. Peter Grant, Dr Mike Barnard, Prof. Joseph McGeehan, Prof. Steve McLaughlin and many other valued colleagues. Our sincere thanks are also due to the EPSRC, UK for supporting our research. We would also like to thank Dr Joao Da Silva, Dr Jorge Pereira, Dr Bartholome Arroyo, Dr Bernard Barani, Dr Demosthenes Ikonomou, Dr Fabrizio Sestini and other valued colleagues from the Commission of the European Communities, Brussels, Belgium.

We feel particularly indebted to Denise Harvey for her skilful assistance in correcting the final manuscript in LaTeX. Without the kind support of Mark Hammond, Sarah Hinton, Zöe Pinnock and their colleagues at the Wiley editorial office in Chichester, UK this monograph would never have reached the readers. *Finally, our sincere gratitude is due to the numerous authors listed in the Author Index — as well as to those whose work was not cited owing to space limitations — for their contributions to the state of the art, without whom this book would not have materialised.*

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# Glossary

<b>ACF</b>	Auto-correlation Function
<b>ACTS</b>	Advanced Communications Technologies and Services - a European research programme
<b>ADSL</b>	Asynchronous Digital Subscriber Loop
<b>AOFDM</b>	Adaptive Orthogonal Frequency Division Multiplexing
<b>APR</b>	A Priori
<b>APT</b>	A Posteriori
<b>AWGN</b>	Additive White Gaussian Noise
<b>BER</b>	Bit-Error Ratio
<b>BLAST</b>	Bell Labs Space-Time architecture
<b>BPOS</b>	Bit per OFDM Symbol
<b>BPSK</b>	Binary Phase-Shift Keying
<b>BS</b>	Basestation
<b>CDF</b>	Cumulative Distribution Function
<b>CDMA</b>	Code-Division Multiple Access
<b>CE</b>	Channel Estimation
<b>CIR</b>	Channel Impulse Response
<b>DAB</b>	Digital Audio Broadcasting
<b>DDCE</b>	Decision-Directed Channel Estimation

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<b>DDCP</b>	Decision-Directed Channel Prediction
<b>DFT</b>	Discrete Fourier Transform
<b>DMUX</b>	Demultiplexer
<b>DTTB</b>	Digital Terrestrial Television Broadcast
<b>D-BLAST</b>	Diagonal BLAST
<b>EM</b>	Expectation Maximization
<b>EVD</b>	EigenValue Decomposition
<b>FDM</b>	Frequency Division Multiplexing
<b>FDMA</b>	Frequency Division Multiple Access
<b>FEC</b>	Forward Error Correction
<b>FFT</b>	Fast Fourier Transform
<b>FIR</b>	Finite Impulse Response
<b>HF</b>	High-Frequency
<b>ICI</b>	Inter-subCarrier Interference
<b>IDFT</b>	Inverse Discrete Fourier Transform
<b>IFFT</b>	Inverse Fast Fourier Transform
<b>IIR</b>	Infinite Impulse Response
<b>ISI</b>	Inter-Symbol Interference
<b>IWHT</b>	Inverse Walsh Hadamard Transform
<b>KLT</b>	Karhunen-Loeve Transform
<b>LLR</b>	Log-Likelihood Ratio
<b>LS</b>	Least-Squares
<b>LSE</b>	Least-Squares Error
<b>MA</b>	Multiple Access
<b>MC</b>	Multi-Carrier
<b>MIMO</b>	Multiple-Input Multiple-Output
<b>ML</b>	Maximum Likelihood

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<b>MLSE</b>	Maximum Likelihood Sequence Estimation
<b>MMSE</b>	Minimum Mean-Square Error
<b>MSE</b>	Mean-Square Error
<b>MU</b>	Multi-User
<b>MUD</b>	Multi-User Detection
<b>MUI</b>	Multi-User Interference
<b>MUX</b>	Multiplexer
<b>MV</b>	Minimum Variance
<b>MVDR</b>	Minimum Variance Distortionless Response
<b>OFDM</b>	Orthogonal Frequency Division Multiplexing
<b>PAPR</b>	Peak-to-Average Power Ratio
<b>PDF</b>	Probability Density Function
<b>PIC</b>	Parallel Interference Cancellation
<b>PSAM</b>	Pilot Symbol Aided Modulation
<b>PSD</b>	Power Spectral Density
<b>PSK</b>	Phase-Shift Keying
<b>QAM</b>	Quadrature Amplitude Modulation
<b>QPSK</b>	Quadrature Phase-Shift Keying
<b>RLS</b>	Recursive Least-Squares
<b>RNS</b>	Residue Number System
<b>SB</b>	Subband
<b>SDM</b>	Space-Division Multiplexing
<b>SDMA</b>	Space-Division Multiple Access
<b>SDI</b>	Selective Decision Insertion
<b>SER</b>	Symbol Error Ratio
<b>SIC</b>	Successive Interference Cancellation
<b>SINR</b>	Signal-to-Interference-plus-Noise Ratio

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<b>SIR</b>	Signal-to-Interference Ratio
<b>SMI</b>	Sample Matrix Inversion
<b>SNR</b>	Signal-to-Noise Ratio
<b>STC</b>	Space-Time Coding
<b>SVD</b>	Singular-Value Decomposition
<b>TCM</b>	Trellis-Coded Modulation
<b>TDD</b>	Time-Division Duplexing
<b>TDMA</b>	Time-Division Multiple Access
<b>TTCM</b>	Turbo-Trellis Coded Modulation
<b>V-BLAST</b>	Vertical BLAST
<b>WATM</b>	Wireless Asynchronous Transfer Mode
<b>WHT</b>	Walsh-Hadamard Transform
<b>WHTS</b>	Walsh-Hadamard Transform Spreading
<b>ZF</b>	Zero-Forcing
<b>1D</b>	One-Dimensional
<b>2D</b>	Two-Dimensional

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