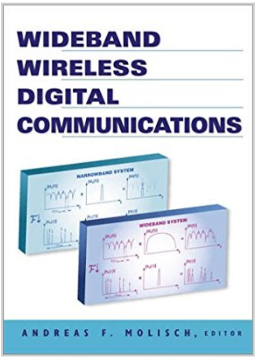

Wideband Wireless Digital Communications

By Andreas F. Molisch

Download now

Read Online

Wideband Wireless Digital Communications By Andreas F. Molisch

The comprehensive, up-to-date guide to wideband digital wireless communication methods Edited by Andreas F. Molisch, with contributions from George Chrisikos, Savo Glisic, Alois M. J. Goiser, Brian Hart, Aarne Mammela, Thomas May, Andreas F. Molisch, Hermann Rohling, Desmond Taylor, Giorgio Vitetta, and Moe Z. Win. Wideband digital wireless systems are poised for enormous growth, driven by wireless Internet access and other compelling applications. In Wideband Wireless Digital Communications, Andreas F. Molisch has brought together the field's leading contributors in a timely, thorough guide to the state of the art. This book offers comprehensive technical explanations and comparisons of every leading wireless wideband approach used in today's systems, as well as those for the new third-generation systems such as UMTS, CDMA-2000, and HIPERLAN2, and features an extensive bibliography.Coverage includes: *Key data for the air interface of leading digital wireless systems, including GSM, IS-95, and IS-54 *Unequalized systems: transmitter and receiver models, computation methods and performance of standard modulation methods, advanced modulation formats, adaptive sampling, and antenna diversity *Equalization: channel description methods, optimum decision rules (maximum likelihood sequence detection, maximum a-posteriori bit and symbol detectors, matched filter bound), and equalization algorithms (Viterbi algorithm, reduced-complexity MLSD, decision feedback equalizers, linear equalizers, diversity) *Orthogonal Frequency Division Multiple Access (OFDM): basic transmission/reception techniques; shaping of basic pulses; timing and carrier frequency synchronization; modulation/demodulation; coding; and peak-to-average reduction techniques *CDMA: design, standard and advanced Rake receiver structures, code acquisition/tracking, channel estimation, and capacity issues Next-generation wideband wireless systems present unprecedented challenges at every stage of the design process. With Wideband Wireless Digital Communications, engineers and other technical professionals have a single comprehensive resource for solving these problems-and delivering systems with optimal performance and capacity.

Download Wideband Wireless Digital Communications ...pdf

Read Online Wideband Wireless Digital Communications ...pdf

Wideband Wireless Digital Communications

By Andreas F. Molisch

Wideband Wireless Digital Communications By Andreas F. Molisch

The comprehensive, up-to-date guide to wideband digital wireless communication methods Edited by Andreas F. Molisch, with contributions from George Chrisikos, Savo Glisic, Alois M. J. Goiser, Brian Hart, Aarne Mammela, Thomas May, Andreas F. Molisch, Hermann Rohling, Desmond Taylor, Giorgio Vitetta, and Moe Z. Win. Wideband digital wireless systems are poised for enormous growth, driven by wireless Internet access and other compelling applications. In Wideband Wireless Digital Communications, Andreas F. Molisch has brought together the field's leading contributors in a timely, thorough guide to the state of the art. This book offers comprehensive technical explanations and comparisons of every leading wireless wideband approach used in today's systems, as well as those for the new third-generation systems such as UMTS, CDMA-2000, and HIPERLAN2, and features an extensive bibliography.Coverage includes: *Key data for the air interface of leading digital wireless systems, including GSM, IS-95, and IS-54 *Unequalized systems: transmitter and receiver models, computation methods and performance of standard modulation methods, advanced modulation formats, adaptive sampling, and antenna diversity *Equalization: channel description methods, optimum decision rules (maximum likelihood sequence detection, maximum a-posteriori bit and symbol detectors, matched filter bound), and equalization algorithms (Viterbi algorithm, reduced-complexity MLSD, decision feedback equalizers, linear equalizers, diversity) *Orthogonal Frequency Division Multiple Access (OFDM): basic transmission/reception techniques; shaping of basic pulses; timing and carrier frequency synchronization; modulation/demodulation; coding; and peak-to-average reduction techniques *CDMA: design, standard and advanced Rake receiver structures, code acquisition/tracking, channel estimation, and capacity issues Next-generation wideband wireless systems present unprecedented challenges at every stage of the design process. With Wideband Wireless Digital Communications, engineers and other technical professionals have a single comprehensive resource for solving these problems-and delivering systems with optimal performance and capacity.

Wideband Wireless Digital Communications By Andreas F. Molisch Bibliography

- Rank: #4036641 in Books
- Published on: 2000-12-13
- Original language: English
- Number of items: 1
- Dimensions: 9.66" h x 1.08" w x 7.24" l,
- Binding: Hardcover
- 576 pages

Download Wideband Wireless Digital Communications ...pdf

Read Online Wideband Wireless Digital Communications ...pdf

Download and Read Free Online Wideband Wireless Digital Communications By Andreas F. Molisch

---

Editorial Review

From the Author
"Wideband" wireless communications are those where the time dispersion, i.e. the existence of echoes with different delays, plays a marked role. Practically all existing and future wireless systems are wideband in this sense, so that the treatment of time dispersion is one of the most important aspects of wireless engineering.

However, a range of different methods have been developed to deal with time dispersion: unequalized systems, equalizers for TDMA systems, Rake receivers for CDMA systems, and multicarrier modulation OFDM. While they all have the same aim, the actual methods are quite different. We thus agreed that a team of authors, each being a specialist in one of the above-mentioned four fields, was the only way to treat those different methods at a high level.

In all these different fields, there has been intensive research, and thus there is a bewildering amount of different methods and papers. One main purpose of this book is to bring order into that, and present the different methods in a systematic way. To give but one example, Part III (equalizers), presents a new classification of equalizer structures that is based on the question of whether the channel impulse response is measured, estimated, or averaged over.

Thus, work started three years ago, with countless hours of sifting through the literature, and continued until the production of the book in the fall of 2000. We also added an introductory part, which contains some key data describing the air interface of existing systems. However, our approach is not to give a "recipe" for the simulation of existing systems. Rather, we are concentrating on the underlying science, which can then be applied to both existing and future systems. We hope to have succeeded in producing a volume that allows the interested reader to extract a lot of relevant information, to help him decide what approaches and methods to use in the future, and which provides a useful research reference.

From the Inside Flap
Outline

After the introductory focus in this part, the rest of this book covers (i) unequalized systems, (ii) equalizers, (iii) OFDM, and (iv) Rake receivers. All these four parts are self-contained, so they can be read in arbitrary sequence.

PART II - UNEQUALIZED SYSTEMS by Molisch discusses those systems at the boundary between wideband and narrowband where the time dispersion is smaller, but not much smaller, than the symbol duration (slightly time-dispersive systems) and do not contain equalizers. Typically, those systems were originally designed as true narrowband systems, where it later turned out that under some circumstances time dispersion can play a role, or where equalizers were simply too expensive.

After a brief introduction, Chapter 7 gives a generic system description for both transmitter and receiver. The most important modulation formats, namely, phase-shift keying, quadrature amplitude modulation, and continuous-phase frequency shift keying are described mathematically, together with the standard detection methods (coherent, differentially coherent, and incoherent).

Chapter 8 then describes various mathematical methods for computing the bit error probability (BER) of unequalized systems under the influence of time-dispersive signals. Although most textbooks on mobile radio describe the standard approach for flat-fading, namely, first computing the BER for AWGN channels and then averaging over the distribution of channel attenuation, this approach is no longer possible for time-dispersive channels. Methods that circumvent these problems are, e.g., based on certain properties of quadratic forms of Gaussian variables, probability density functions of the angles between Gauss-distributed vectors, or the group delay distributions of the channel. Unfortunately, none of these can be considered to be a master approach that is optimum for all possible cases. Methods based on Gaussian variables are usually the simplest but always require the channel to be Rayleigh- or Rice-fading, and encounter problems, e.g., in Nakagami channels. Within this group, the method based on quadratic forms can most easily include arbitrary time dispersion but cannot easily be extended to multilevel modulation formats, e.g., A -ary PSK, which can be better treated by pdfs of Gaussian vectors or the two-path equivalent matrix method. Chapter 8 describes the different methods in sufficient detail for the reader to judge what is needed to solve a specific problem, but details are covered only in a few examples.

Closed-form equations and figures of the performance of standard systems are the contents of Chapter 9. The influence of modulation format, delay spread, shape of the power delay profile, sampling instant, and other parameters are presented.

In Chapter 10, the author describes special modulation formats and receiver structures that are used for the reduction of ISI-induced errors (error floor). Some modulation formats try to actually exploit the time dispersion and thus approach the performance of an equalized system in a time-dispersive environment. The penalty paid for this approach lies in a higher bandwidth requirement, which precludes these formats from application in cellular systems, but the technique might be interesting for wireless LANs and cordless applications.

Some receiver structures, on the other hand, try just to reduce the error floor by eliminating the ISI before detection, thus making the performance comparable to a true flat-fading channel. These stay within the framework of standard modulation formats and thus usually have only a penalty in the form of a slightly more complex receiver structure (but still much simpler than an equalizer). A technique that also has these properties is adaptive sampling, more exactly, the adaptive choice of the sampling instant according to the channel constellation. Adaptive sampling is described in Chapter 11.

Chapter 12 describes antenna diversity. Although antenna diversity is usually known to reduce noise-induced errors, it was also shown to be an effective countermeasure for ISI-induced errors. After a description of the different ways to combine the diversity signals, the mathematical methods of Chapter 8 are modified to include the diversity effects. Those methods are useful not only for conventional multidimensional diversity, but also for the performance of Rake receivers, since these use the time-delayed echoes of the original signal as diversity signals that are combined with maximum-ratio combining. Subsequently, the performance with the diversity antennas is presented in some examples. A summary (Chapter 13) concludes this part.

PART III - EQUALIZERS by Vitetta, Hart, Mammela, and Taylor focuses on the equalization techniques for single-carrier, unspread digital signals transmitted over multipath fading channels and is organized as described below.

Some preliminary topics are presented in Chapter 14, where the mathematical models of the transmitted signal and of the wireless channel are illustrated. An optimal receiver must not discard useful information present in the continuous time received signal; digital processing, however, is an inevitable requirement of any modern receiver. Therefore, filtering and discretizing of the received signal are discussed. Notations for the various scalar and matrix quantities needed in the remainder of the Part are given; in particular, matrix representations for the received signal samples are provided to simplify the derivation of equalization algorithms. Finally, reduced complexity channel models, i.e., parsimonious representations or parameterizations of the channel impulse response, are introduced to simplify the channel estimation problem and the equalizer design. In particular, the authors focus on the Karhunen-Loeve expansion, on the complex exponential parameterization, and on the power series models.

Any equalization algorithm processes the received signal, producing a set of real quantities, known as metrics, that are evaluated by the receiver to make decisions on the transmitted data. In Chapter 15 we derive, interpret and analyze the performance of the metrics computed by optimal detectors under the assumption that the CIR (or some equivalent quantity) is known, estimated, or averaged over for the doubly selective wireless channel and its special cases: the frequency-flat and frequency-selective channels. Both the maximum likelihood (ML) and maximum a posteriori (MAP) methods are discussed as optimality criteria, and their application to bits, symbols and sequences of symbols is illustrated. In particular MAP bit detectors (MAPBDs), MAP symbol detectors (MAPSDs) and ML sequence detectors (MLSDs) are considered. In addition, performance bounds for both the ML and MAP detectors are provided; they represent useful tool to assess their error performance in some situations.

In Chapter 16, we describe various equalization algorithms corresponding to different ways of implementing the computation of the derived metrics, ranging from optimal to highly suboptimal. Again the primary division into sections is related to how the CIR is treated. Within each section, the structure, complexity, and performance measures of each type of equalizer are described. In particular, in Section 16.1 we begin by assuming that the CIR is known exactly a priori, and we derive five important classes of equalizers: MLSDs, MAPSDs and MAPBDs, reduced complexity sequence detectors, decision feedback equalizers (DFEs), and linear equalizers (LEs). The aim of Section 16.2 is twofold. First, we show some mathematical tools for channel estimation and we discuss blind equalization techniques. Secondly, we illustrate equalization techniques incorporating channel estimation strategies, like adaptive MLSDs and adaptive MAPBD/MAPSDs. Adaptive LEs and DFEs and pilot-based detection techniques for frequency-flat fading channels are also considered. Equalization when the CIR is averaged-over is investigated in Section 16.3. MLSDs and MAPSDs are developed and are related to their adaptive counterparts. Finally, various equalization/detection strategies for FF fading channels are illustrated.

PART IV - OFDM by May and Rohling describes orthogonal frequency division multiple access (OFDM), also known as multicarrier modulation. Chapter 17 introduces OFDM and describes its historical evolution. Chapter 18 describes the basic transmission/reception technique, both in a time-continuous formulation that is intuitively appealing and in a time-discrete formulation that illuminates the important relation to discrete Fourier transforms. The shaping of the basic pulses is discussed. In a conventional system, rectangular pulses are used as a basis for constructing the total signal, but this might not be optimum in dispersive channels. Chapter 19 then treats frame, timing, and carrier frequency synchronization.

Chapters 20 and 21 are devoted to modulation and demodulation. Many aspects are identical to those of single-carrier systems, but there are also some specific points that are unique to OFDM systems. W

From the Back Cover
The comprehensive, up-to-date guide to wideband digital wireless communication methods

Edited by Andreas F. Molisch, with contributions from George Chrisikos, Savo Glisic, Alois M. J. Goiser, Brian Hart, Aarne Mammela, Thomas May, Andreas F. Molisch, Hermann Rohling, Desmond Taylor, Giorgio Vitetta, and Moe Z. Win.

Wideband digital wireless systems are poised for enormous growth, driven by wireless Internet access and other compelling applications. In *Wideband Wireless Digital Communications*, Andreas F. Molisch has brought together the field's leading contributors in a timely, thorough guide to the state of the art. This book offers comprehensive technical explanations and comparisons of every leading wireless wideband approach used in today's systems, as well as those for the new third-generation systems such as UMTS, CDMA-2000, and HIPERLAN2, and features an extensive bibliography. Coverage includes:

- Key data for the air interface of leading digital wireless systems, including GSM, IS-95, and IS-54
- Unequalized systems: transmitter and receiver models, computation methods and performance of standard modulation methods, advanced modulation formats, adaptive sampling, and antenna diversity
- Equalization: channel description methods, optimum decision rules (maximum likelihood sequence detection, maximum a-posteriori bit and symbol detectors, matched filter bound), and equalization algorithms (Viterbi algorithm, reduced-complexity MLSD, decision feedback equalizers, linear equalizers, diversity)
- Orthogonal Frequency Division Multiple Access (OFDM): basic transmission/reception techniques; shaping of basic pulses; timing and carrier frequency synchronization; modulation/demodulation; coding; and peak-to-average reduction techniques
- CDMA: design, standard and advanced Rake receiver structures, code acquisition/tracking, channel estimation, and capacity issues

Next-generation wideband wireless systems present unprecedented challenges at every stage of the design process. With *Wideband Wireless Digital Communications*, engineers and other technical professionals have a single comprehensive resource for solving these problems—and delivering systems with optimal performance and capacity.

Users Review

From reader reviews:

Pauline Mueller:

In this 21st centuries, people become competitive in each and every way. By being competitive at this point, people have do something to make these individuals survives, being in the middle of typically the crowded place and notice by means of surrounding. One thing that at times many people have underestimated it for a while is reading. Yeah, by reading a e-book your ability to survive enhance then having chance to endure than other is high. For you who want to start reading any book, we give you this specific Wideband Wireless Digital Communications book as beginner and daily reading guide. Why, because this book is greater than just a book.

Theresa Walker:

As people who live in the actual modest era should be up-date about what going on or details even knowledge to make all of them keep up with the era that is certainly always change and progress. Some of you maybe may update themselves by looking at books. It is a good choice to suit your needs but the problems coming to you actually is you don't know what kind you should start with. This Wideband Wireless Digital Communications is our recommendation to help you keep up with the world. Why, because book serves what you want and need in this era.

Eli Gaddy:

Your reading sixth sense will not betray an individual, why because this Wideband Wireless Digital Communications e-book written by well-known writer who knows well how to make book which can be understand by anyone who have read the book. Written inside good manner for you, still dripping wet every ideas and composing skill only for eliminate your own personal hunger then you still doubt Wideband Wireless Digital Communications as good book not only by the cover but also with the content. This is one guide that can break don't ascertain book by its handle, so do you still needing one more sixth sense to pick this!? Oh come on your studying sixth sense already alerted you so why you have to listening to a different sixth sense.

Regina Hash:

A lot of people said that they feel uninterested when they reading a e-book. They are directly felt the idea when they get a half areas of the book. You can choose the book Wideband Wireless Digital Communications to make your personal reading is interesting. Your own skill of reading ability is developing when you including reading. Try to choose simple book to make you enjoy you just read it and mingle the feeling about book and reading through especially. It is to be initial opinion for you to like to wide open a book and read it. Beside that the publication Wideband Wireless Digital Communications can to be your friend when you're really feel alone and confuse with what must you're doing of that time.

Download and Read Online Wideband Wireless Digital Communications By Andreas F. Molisch #US1JCNBLPM4

Read Wideband Wireless Digital Communications By Andreas F. Molisch for online ebook

Wideband Wireless Digital Communications By Andreas F. Molisch Free PDF d0wnl0ad, audio books, books to read, good books to read, cheap books, good books, online books, books online, book reviews epub, read books online, books to read online, online library, greatbooks to read, PDF best books to read, top books to read Wideband Wireless Digital Communications By Andreas F. Molisch books to read online.

Online Wideband Wireless Digital Communications By Andreas F. Molisch ebook PDF download

Wideband Wireless Digital Communications By Andreas F. Molisch Doc

Wideband Wireless Digital Communications By Andreas F. Molisch Mobipocket

Wideband Wireless Digital Communications By Andreas F. Molisch EPub

US1JCNBLPM4: Wideband Wireless Digital Communications By Andreas F. Molisch