

Preface

The book you're holding, physically or electronically, is the result of a very interesting, challenging but also rewarding research project. The research was carried out in different contexts and cooperations but it was centered around the following question: how can we make the RF transmitters of our modern communication systems (WiFi, GSM, LTE, and so on) more flexible and more efficient at the same time. We engaged on a digitalization route to realize this. What this means in terms of digital modulation is the subject of this book. This modulation problem is treated in many of its dimensions: we make high-level system considerations, go through the system's mathematics, and proceed all the way down to implementation in 65 and 40 nm standard CMOS.

You read this well. There are a lot of different abstraction levels in this book. It is our strong belief that this is the only way to come to optimal solutions. Keep the different abstractions in place to handle complexity. However, try to think as much as possible across the levels to find the co-optimization opportunities. For the topic of digital RF, anything else simply does not make sense. What may look mathematically very attractive is not always implementable. Straightforward implementations often don't meet the performance requirements. System-circuit co-design is the answer in that case. Also RF-PA and digital modulator co-design is required. We set first steps in this.

Research these days is per definition collaborative: Ph.D. students interact with their advisors, together they interact with interested industrial partners, and so on. Only when there is sufficient match in these interactions, the research outcome will be both scientifically relevant and industrially applicable. In this context, the authors would like to thank Franz Dielacher and Peter Singerl from Infineon Austria for their continuous support and belief in our work. Even when the work was rather academic or heavily mathematical they kept up the encouragement and made us go on in the direction needed in their industrial applications. This cooperation was essential in the realization of the results we are presenting in this manuscript. Special thanks also go to Brecht François for his cooperation in making the link with the domain of RF power amplification.

Dear reader, we hope you enjoy reading this book as much as we enjoyed the research that led to it.

Leuven, October 2013

Wim Dehaene
Pieter A. J. Nuyts
Patrick Reynaert

Continuous-Time Digital Front-Ends for Multistandard
Wireless Transmission

Nuyts, P.; Reynaert, P.; Dehaene, W.

2014, XXV, 309 p. 164 illus., 3 illus. in color., Hardcover

ISBN: 978-3-319-03924-4