**The Design of Modern Microwave Oscillators for Wireless Applications: Theory and Optimization**

*Ulrich L. Rohde, Ajay K. Poddar, Georg Böck*

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**DESCRIPTION**

Delivering the best possible solution for phase noise and output power efficiency in oscillators

This complete and thorough analysis of microwave oscillators investigates all aspects of design, with particular emphasis on operating conditions, choice of resonators and transistors, phase noise, and output power. It covers both bipolar transistors and FETs. Following the authors' guidance, readers learn how to design microwave oscillators and VCOs that can be tuned over a very wide frequency range, yet have good phase noise, are low cost, and are small in size. All the essential topics in oscillator design and development are covered, including:

* Device and resonator technology
* Study of noise sources
* Analysis methods
* Design, calculation, and optimization methodologies
* Practical design of single and coupled oscillators

While most of the current literature in the field concentrates on classic design strategies based on measurements, simulation, and optimization of output power and phase noise, this text offers a unique approach that focuses on the complete understanding of the design process. The material demonstrates important design rules starting with the selection of best oscillator topology, choice of
transistors, and complete phase noise analysis that leads to optimum performance of all relevant oscillator features. Also included are CMOS oscillators, which recently have become important in cellular applications. For readers interested in specialized applications and topics, a full chapter provides all the necessary references.

The contents of the text fall into two major categories:

* Chapters 1 through 9 deal with a very detailed and expanded single resonator oscillator, including a thorough treatment of both nonlinear analysis and phase noise

* Chapters 10 and 11 use the knowledge obtained and apply it to multiple coupled oscillators (synchronized oscillators)

This text is partially based on research sponsored by the Defense Advanced Research Projects Agency (DARPA) and the United States Army and conducted by Synergy Microwave Corporation. With the wealth of information provided for the analysis and practical design of single and synchronized low-noise microwave oscillators, it is recommended reading for all RF microwave engineers. In addition, the text's comprehensive, step-by-step approach makes it an excellent graduate-level textbook.

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**ABOUT THE AUTHOR**

ULRICH L. ROHDE, PhD, Dr-Ing, IEEE Fellow, is Chairman of Synergy Microwave Corporation; a partner of Rohde & Schwarz, a Munich, Germany firm specializing in test equipment and advanced communications systems; and Professor of Microwave and RF Technology at the Brandenburgische Technische Universität Cottbus, Germany. He was previously president of Compact Software, Inc. and a member of the Board of Directors of Ansoft Corporation. Dr. Rohde has published more than sixty scientific articles, and has authored or coauthored six books in the field of microwaves and communications.

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GEORG BÖCK, Dr-Ing, IEEE Senior Member, is Professor of Microwave Engineering at the Technische Universität Berlin, Germany, and head of the Microwave Department. His main areas of research are the characterization, modeling, and design of microwave passive and semiconductor devices; MICs; and MMICs up to the millimeterwave range. Dr. Böck has published more than 100 scientific papers.

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