Short Range Wireless Data Transmission

Training course for designers and system users

Wireless short range data transmission in the unlicensed frequency bands is becoming more and more important in many industrial, home and office applications. Particularly devices for the transmission in the 434 MHz band and around 900 MHz are penetrating new application areas, the next step is the extensive use of the 2.4 MHz band by the Bluetooth standard, wireless LANs and proprietary applications.

Therefore, engineers coming from other branches of electronic engineering are faced with the need to become familiar with basics of RF and microwave technology, to design RF transmission systems and to build their own transmitters and receivers.

The 5 day course "Short range wireless data transmission" enables engineers to estimate the system requirements of a given application and to design a wireless short range data transmission system using integrated circuit solutions.
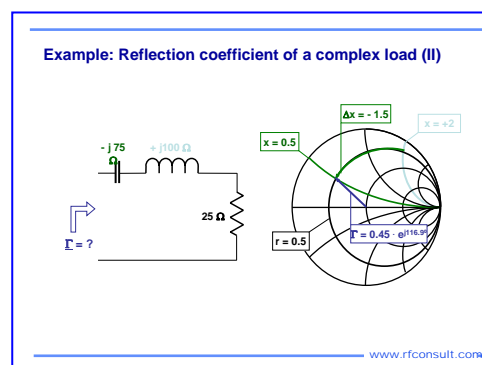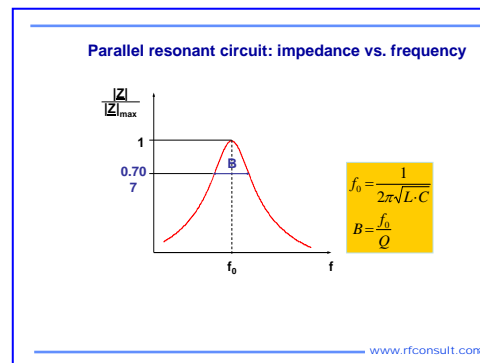
Particular attention is paid on the tuition of immediately applicable knowledge. The tools most frequently used in RF engineering are introduced avoiding off-putting extensive mathematics, their application is exercised on practical examples. The course will conclude with an exercise starting with the requirements of a simple practical design task, ending up with the schematics of af a realization using ICs.

The Course Schedule:

Day one

RF Basics I
- Basic definitions
- Logarithmic scales
- Passive components at RF
- Reflection and matching
- The Smith Chart
- S-Parameters

Parallel resonant circuit: impedance vs. frequency

$$f_0 = \frac{1}{2\pi\sqrt{L \cdot C}}$$

$$B = \frac{f_0}{Q}$$

Example: Reflection coefficient of a complex load (II)

Day two

RF Basics II
- Network analysis software tools
- Nonlinear distortions and noise
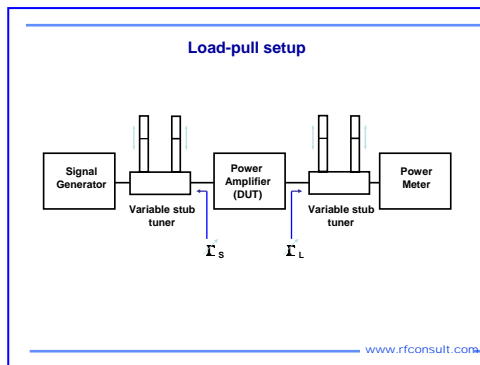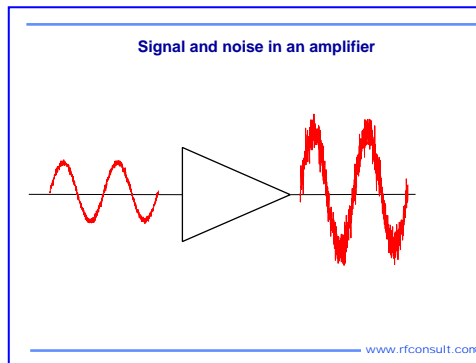- Transmission lines

Building blocks
- Low noise amplifiers
- Power amplifiers
- Oscillators
- Mixers

Day three

Building blocks (continued)

PLL-Synthesizers
- PLL Basics
- Calculation of loop filters
- Simple CAD tools
- Spurs and noise in PLLs
- The DDS Synthesizer
- Examples and practical realizations

Signal and noise in an amplifier

Load-pull setup

Day four

Modulation and Multiple Access Techniques
- Analog amplitude modulation
- Analog phase-/frequency modulation
- Digital modulation, base band filtering
- Amplitude shift keying (ASK)
- Frequency shift keying (FSK)
- Phase shift keying (PSK)
- Multiple access techniques
- Regulation and Standardization

Day five

Antennas and propagation
- Basic antenna principles
- Simple path loss models
- Multipath effects and multipath mitigation, diversity techniques

Available Solutions and practical Realizations
- Overview on available ICs
- Overview on available passive components
- Future architectures
- System example: from the application requirements to a practical realization

The participants will be provided with an extensive set of lecture notes.

For more information please contact:

RF Consult GmbH
Am Gasteig 3
D-83737 Irschenberg
E-Mail: contact@rfconsult.com
phone: +49 8025 99 5000