Wireless Short Range Data Transmission

Advanced class

Many participants of the basic course on wireless short range data transmission asked for an advanced class, continuing where the basic class has to stop.

This need is met by the 3 day advanced class "Wireless Short Range Data Transmission". While in the basic course a lot of effort is made to teach applicable basic knowledge, the focus in the advanced class is on practical exercises, exchange of experiences and discussion of advanced technologies. As a result, a mix from lecture, discussion and lab exercise is originated.

The course will be finished with a practical debugging session on a RF transmission system which demonstrates frequently occurring mistakes and the difference between a "shoot from the hip" and an optimized solution.

The Course Schedule:

Day One

Repetition and deepening of the basics
- Reflection and matching
- Transformation at the resonant circuit
- S-Parameters
- Impedance transformation and matching of balanced
- Antennas and propagation
- PLL basics

RF measurement technique
- The spectrum analyzer as the most versatile RF measuring instrument: Detailed considerations and practical exercises
- How to use the network analyzer properly?
- Measuring the impedance of balanced ports
- Noise measurements
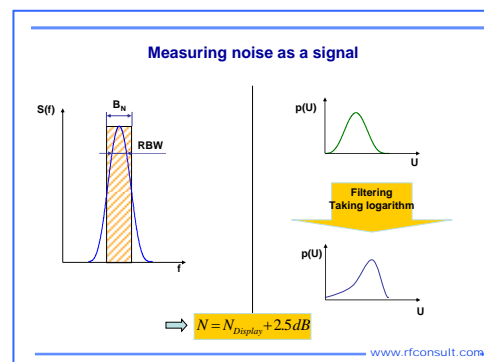
Day Two

Practical Questions of Regulation
- EN 300 220 and the self-declaration in Europe
- FCC- regulations in the USA
- Overview on regulations in China and Japan

Loop Antenna Layout Example

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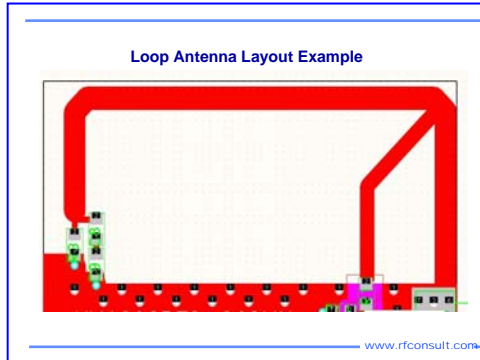
Antennas and Antenna measurements
- Relation between ERP and field strength
- Measuring the antenna gain and the radiated power
- A practical makeshift for antenna characterization
- Sorts of antennas and their behavior in different environment
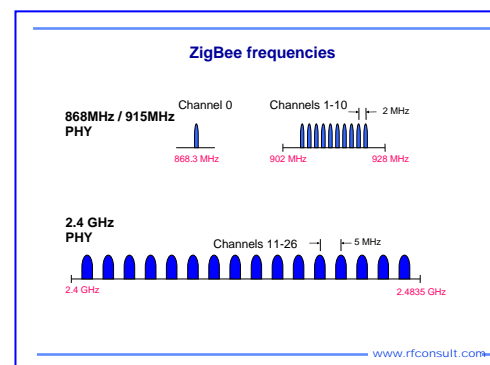
System Calculation
- Higher order modulation techniques, bit rate and maximum distance
- Range calculation

Day Three

Actual trends and new components
- Konnex and ZigBee: Just catchphrases or more?
- 2.4 GHz applications, advantages and disadvantages
- Modern architectures and their features from a practical point of view
- New ICs

ZigBee frequencies

868MHz / 915MHz PHY — Channel 0 — Channels 1-10 — 2 MHz
868.3 MHz — 902 MHz — 928 MHz

2.4 GHz PHY — Channels 11-26 — 5 MHz
2.4 GHz — 2.4835 GHz

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Practical example: Debugging and Optimizing a RF link
- Overview on frequent failures
- Joint debugging of an example RF link, optimizing and test

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