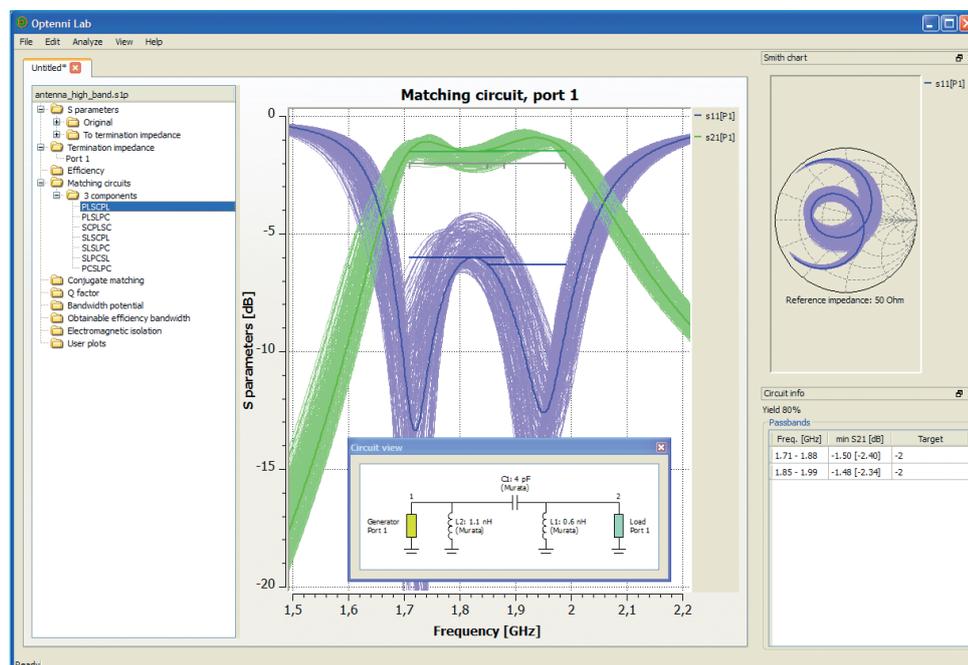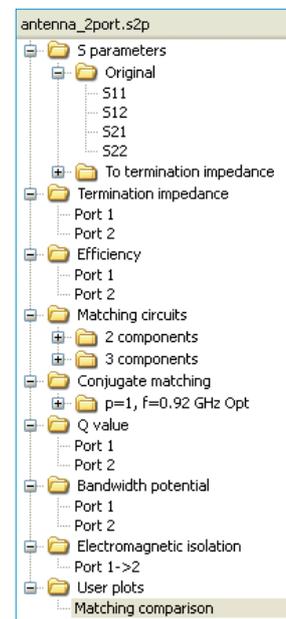# OPTENNI LAB

Easy-to-use matching circuit optimization and antenna analysis software

Optenni Lab is a novel software with innovative analysis features that increases the productivity of antenna designers and speeds up the antenna design process. Optenni Lab offers fast fully automatic matching circuit optimization tools, estimation of the obtainable bandwidth of antennas and calculation of the worst-case isolation in multi-antenna systems. With these tools the antenna designer can quickly evaluate various antenna designs and concepts, including multiport antennas and tunable matching circuits. Optenni Lab is very easy to use and does not require specialist know-ledge in impedance matching.

MAIN FEATURES

- Fast fully automatic generation and optimization of multiband matching circuits for given frequency ranges
- Easy-to-use component library and tolerance analysis
- Simultaneous multiport matching (starting from Optenni Lab 2.0)
- Generation of matching circuits for conjugate matching to the termination impedance or maximizing the bandwidth around a starting frequency
- Estimation of obtainable antenna bandwidth through matching circuits
- Worst-case isolation calculation for two-port systems using the concept of electromagnetic isolation
- Complex frequency-dependent termination impedances
- Calculation of radiation efficiency from impedance and total efficiency data
- Intuitive user-friendly graphical user interface
- Capability to save and load project files containing the previously computed results
- Two-way link with CST STUDIO SUITE®
- Link to Microwave Office™

MATCHING CIRCUIT OPTIMIZATION

Optenni Lab's multiband matching circuit generation is fast and easy. Just read in the impedance file, select the frequency ranges from a menu, select the number of components in the circuit and press OK. Within seconds, Optenni Lab creates, optimizes and ranks a number of circuit topologies. You do not need any impedance matching or circuit simulation skills to use Optenni Lab.

In matching circuit optimization you can also:
- Take into account losses in matching circuit components
- Use library models of inductors and capacitors from major component manufacturers in the easy-to-use component library
- Verify the sensitivity of matching circuits with respect to component tolerances
- Match multiple ports simultaneously (starting from Optenni Lab 2.0)
- Specify stop band criteria for the optimization
- Set upper and lower limits for the component values
- Specify the topology manually using inductors, capacitors, resistors, transmission lines, library components and 2-port S parameter blocks
- Study tunable S parameter blocks in the S2PMDIF format
- Tune the generated circuits interactively
- Visualize the operation of the matching circuit on the Smith chart at a given frequency
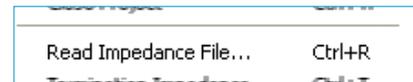- Import plots as images or text files

ESTIMATING ANTENNA BANDWIDTH

Optenni Lab offers tools for estimating the obtainable bandwidth from antenna impedance curves using the Q-value and bandwidth potential approaches. In the bandwidth potential calculation, Optenni Lab constructs for each frequency a two-component matching circuit and calculates the obtained maximal impedance bandwidth. It repeats the analysis for all frequencies and gives a curve that shows what kinds of bandwidths can be obtained at different frequencies. With the bandwidth potential calculation you can compare differently matched antennas to show which one offers best obtainable bandwidth and verify if the bandwidth is large enough for the desired application.
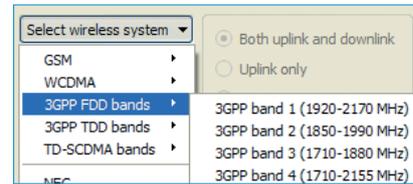
BENEFITS OF OPTENNI LAB

Optenni Lab increases the productivity of antenna designers and speeds up the antenna design process. It has an intuitive graphical user interface and is very easy to learn and to use. With Optenni Lab the antenna designer can quickly evaluate new antenna designs and concepts. Optenni Lab offers many new innovative analysis features not found in other software. It helps the antenna designer to design antennas with optimal total performance.
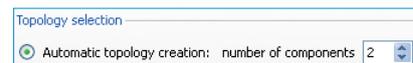
1. Read the impedance file

Read Impedance File...	Ctrl+R

2. Select frequency ranges

Select wireless system
- GSM
- WCDMA
- 3GPP FDD bands
- 3GPP TDD bands
- TD-SCDMA bands

○ Both uplink and downlink
○ Uplink only

- 3GPP band 1 (1920-2170 MHz)
- 3GPP band 2 (1850-1990 MHz)
- 3GPP band 3 (1710-1880 MHz)
- 3GPP band 4 (1710-2155 MHz)

3. Enter number of components

Topology selection
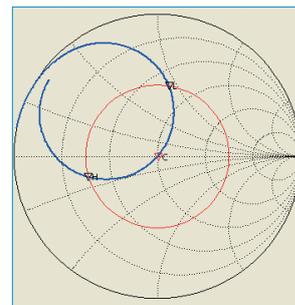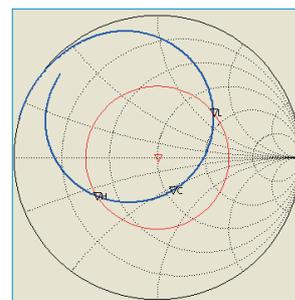⊙ Automatic topology creation: number of components 2

4. Press OK

Procedure for matching circuit generation

Matching to 50 Ohms

Matching with optimized symmetric bandwidth

Optenni Lab is a product of Optenni Ltd. It can be purchased through CST distribution channels.