

EFC-400[®] Telecommunication - RF Calculation

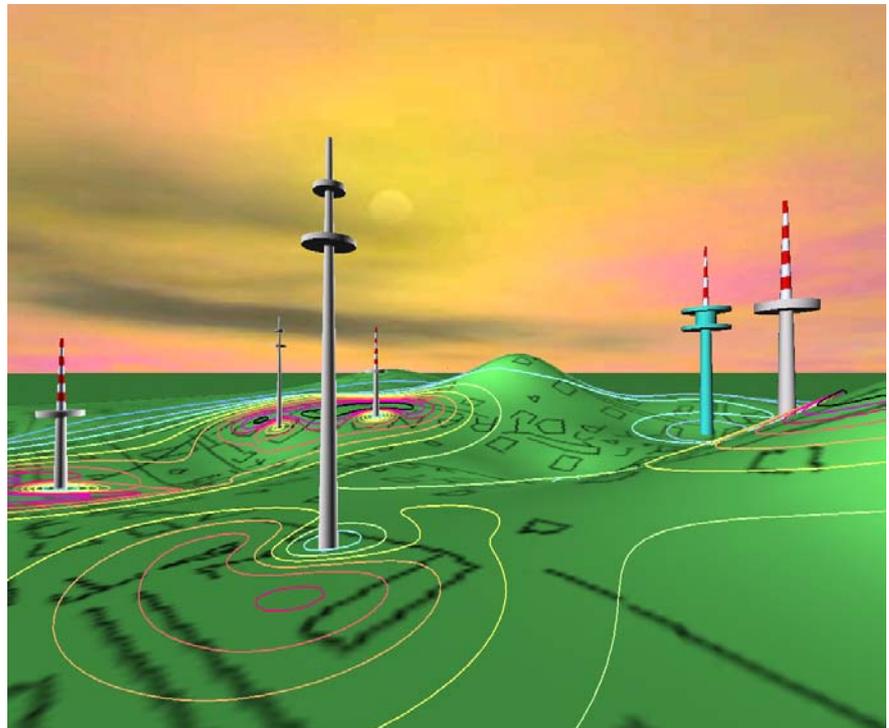
Magnetic and Electric RF-Field Calculation

'EFC-400 Telecommunication' is the solution for radio transmitters and telecommunication systems in the high frequency domain. The essential features are:

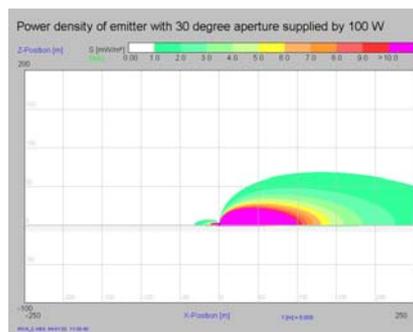
- ❑ E/H-field and power density
- ❑ Radiation pattern due to the antenna characteristics
- ❑ Directional beam diagram import
- ❑ Losses through buildings
- ❑ Plot as % of limit values
- ❑ Set-up of HF-field land registers
- ❑ Measurement data import and interpolation

'EFC-400 Telecommunication' calculates field strengths and power density according to DIN VDE 0848, while the radiation pattern is taken into account by the angle quota of normalized spherical harmonics.

The form of the spherical functions gets determined numerically by the technical data such as the aperture angles etc. or can be imported as measured radiation pattern. 'EFC-400 Telecommunication' normalizes the angle quota by integration over the spherical surfaces in dependence of the radial quota function.

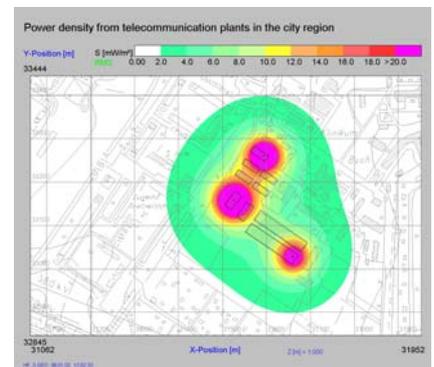


Power flux through any surface therefore is constant over the topography from near to far distance, supposed conductive ground condition is valid.



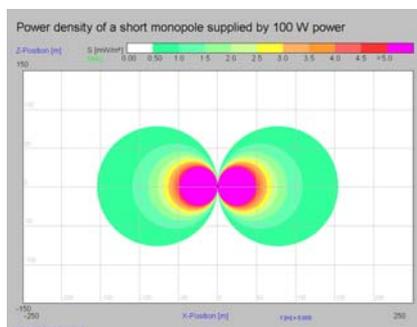
Illus.: emitter with aperture angle of 30°

Since conservation of energy is presupposed this method is superior to other methods for unperturbed field calculation with regard to precision and speed, while the influence of buildings can be taken into account by specifying a shielding factor.



Illus.: power density in the city region

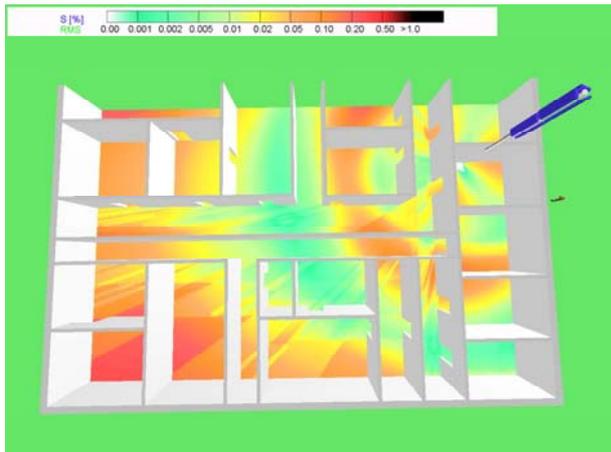
To perform a field calculation only the knowledge of the emitter location and the manufacturer data sheet are required. Because the locations are determined on the topographical map, the set-up of a HF-field land register is directly possible.



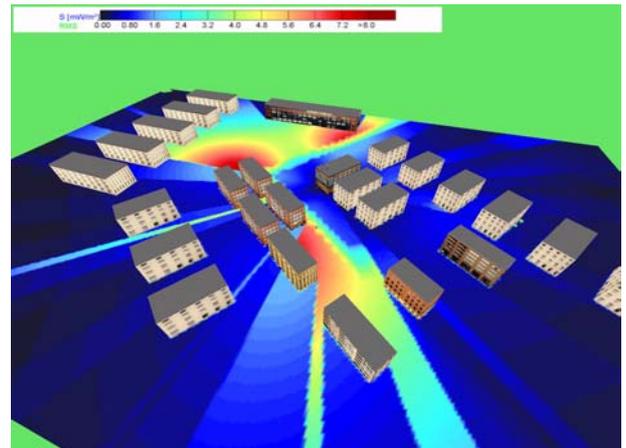
Illus.: power density of a monopole

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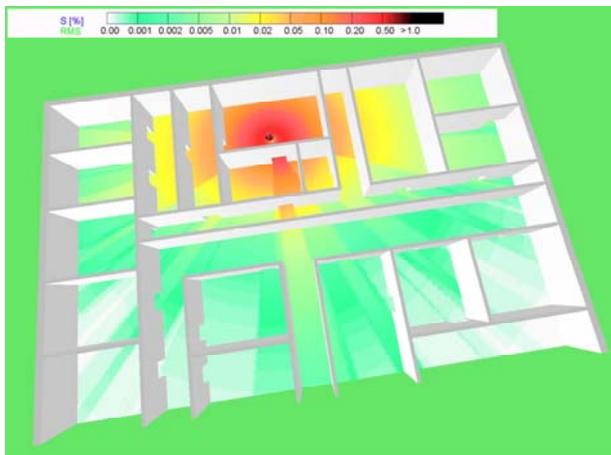
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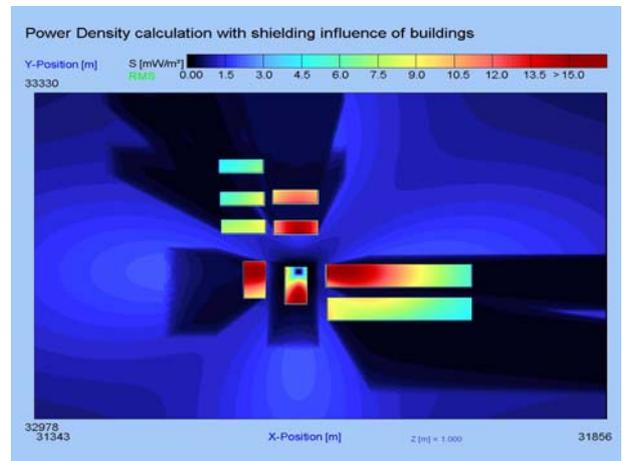
III.: Radiation inside of a building caused base station on roof top



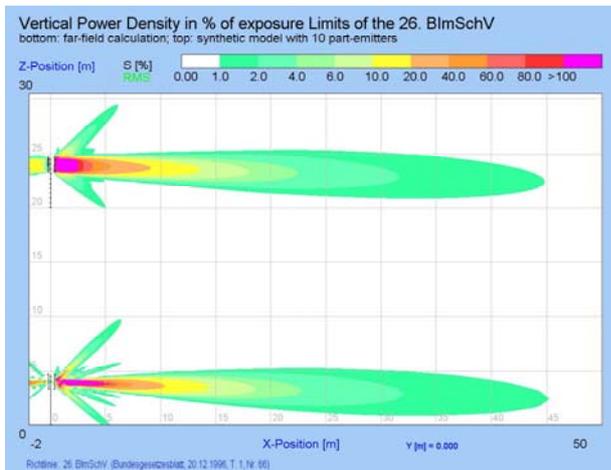
III.: Shielding effects caused by buildings / 3D view



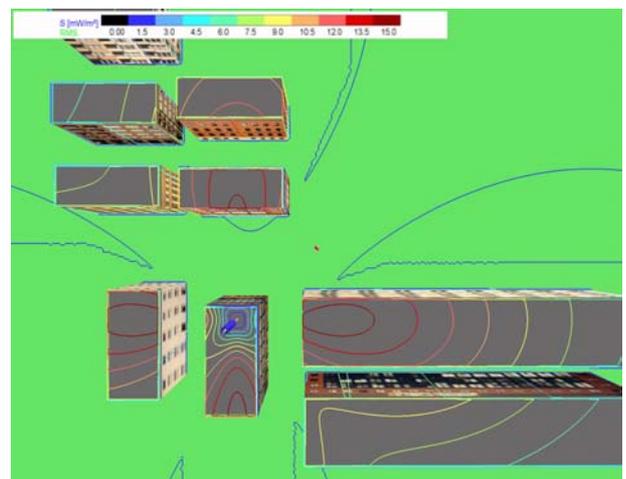
III.: Radiation inside of a building due to a mobile phone



III.: Shielding effects of buildings / view from above



III.: Comparison between far field calculation and synthetic model with segmentation into 10 part emitters



III.: Iso lines representation on roof tops

EFC-400[®] Telecommunication - RF Calculation

Magnetic and Electric RF-Field Calculation

Technical Data:

Field Calculation

- 3D-calculation of power density / field strengths
- calculation of RMS value and peak
- angle quota by spherical harmonics or pattern
- normalisation by energy conservation
- segmentation of transmitter
- synthetic model for emitting near-field region
- frequency range 1 kHz to 300 GHz
- % of exposure limits frequency corrected

Geometric Objects

- max. 100000 transmitter
- max. 1000 buildings
- max. 10000 blocks

Calculation Modes

- max. 32000 x 32000 points
- calculation along a straight 3D-line
- calculation on an area in space
- calculation on building surfaces
- profile series in z-direction
- dynamic interpolation of data points

Object Manipulation

- good survey and easy input of geometry data
- shift, rotation, insertion etc. of geometry data
- reusable blocks
- polylines, circles etc.
- loading of transmitters from library

Data Presentation

- X, Y, Z-axis plots
- 2D-Isoline plots
- 3D-surface plots
- 3D virtual reality interface
- representation of transmitters
- statistics, histograms
- average value, L05, L50, L95-value
- plot as % of limit values
- zoom function
- proportional view

Performance

- max. 1.000.000 points/sec (Pentium[™], 1 GHz)
- integrated data compression
- user interface configuration
- user defined colors and isolines
- support of 256 and true color graphics

Special Calculation Features

- radiation pattern from technical data sheet
- import of directional beam diagrams (*.msi, *.txt)
- interpolation of directional beam diagrams
- smooth of directional beam diagrams
- ground influence
- calculation of building influence

Data Interface

- ground profiles loadable
- import of measurement data
- map-import as DXF, BMP, PCX, Tiff and JPEG
- DXF-export of Isolines, hatch pattern, solids
- ASCII-export (EXCEL[™]-readable format)
- export of 4D - colored areas (Stanford Graphics[™])
- export/import of XML, txt, dBase[™] and Paradox[™]
- creation of database reports and protocols
- BMP, WMF, JPG, Tiff, AVI, html and CD export

Integrated Tools

- Editor, Calculator
- Project manager
- Paint-Tool
- Videos, Assistant and Help
- DXF-object filter

Hardware Requirements

- 128 MB RAM, HD 1.5 GB free
- WIN NT / Win 2000 / Win 2002 / Win XP[™]