

# FUN Radio Network Planning Software for UMTS



This brochure provides a description of FUN's UMTS wireless network planning and optimisation functionality. The GIS, open architecture standards, relational database (RDBMS), and distributed computing capabilities are described in the FUN System Overview brochure. Please also see the FUN GSM, and Microwave brochures for more information on the product family.

FUN UMTS has been designed as a comprehensive planning tool to satisfy operator requirements for network planning and optimisation. Its newly designed user interface is intuitive and provides easy access to a rich feature-set of planning functionality. FUN is being used to support large operator networks for a multitude of wireless technologies and is supporting both large regional office deployments and small work-group configurations. FUN UMTS is being used by large technology driven operators to plan and optimise 3G networks. It is available as a stand-alone product, or as part of the FUN wireless network-planning suite of tools.

## Principle Features include:

The UMTS module utilizes all the foundation functionality as described in the FUN GSM brochure. This includes:

- Intuitive User Interface
- Comprehensive multi-technology data model
- Wide range of Macro / Micro / Pico cell propagation models including ray tracing model
- Powerful interference algorithms

In addition, FUN UMTS provides:

## Comprehensive Wireless Planning Capabilities

FUN UMTS enables users to plan W-CDMA UMTS networks, providing full functionality to enable all aspects of: Initial planning (e.g., marketing and preliminary stage planning), network planning, network deployment, and optimisation to be supported.

Transition support is provided enabling existing site databases to be easily imported including PlaNet® site data, XML-import file and plain Text file format.

## Multi-Service Traffic Modelling

Services for multiple voice and data connections can be modelled. Service modelling includes FER, bit rate, and activity - factor for separate uplink and downlink connections. Multiple traffic model service layers are supported and multiple traffic-map data formats can be imported and exported through the powerful FUN GIS.

The service modelling parameters include:

- Circuit and packet data
- Specific service rates
- User equipment
- Traffic environment including in-building, in car etc

## Handover Planning

FUN UMTS is able to plan and visualize the following handovers:

- Intra-system based on ZOW
- Inter-system - 2G and 3G
- Inter-frequency

Interference analysis from these handovers on coverage and capacity is provided.

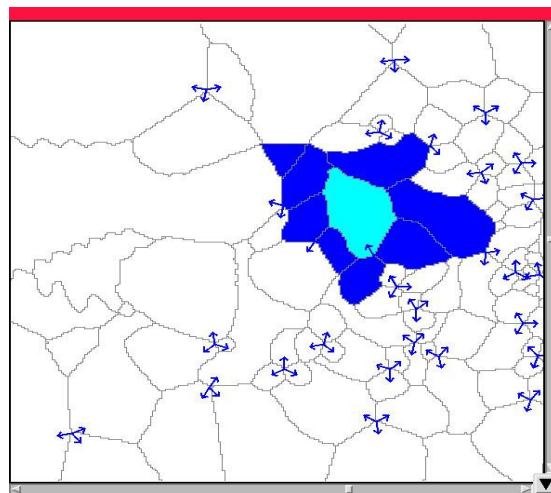


Figure 1 - Neighbour Cell Planning

## UMTS Service Area Simulation

FUN UMTS offers comprehensive network interference analysis with two options:

- Monte Carlo Analysis
- Fast Mathematical Analysis Algorithm

# FUN Radio Network Planning Software for UMTS

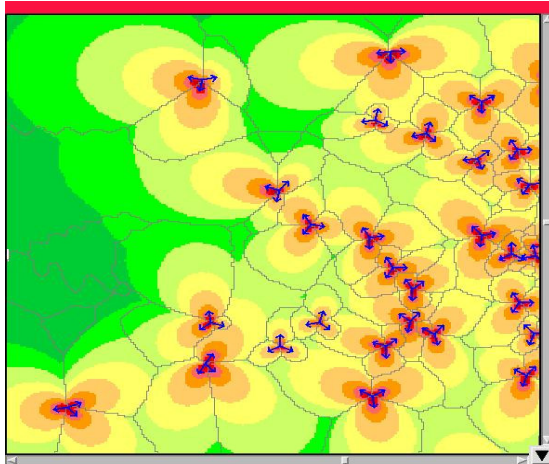


Figure 2 – Monte Carlo Analysis

Both options when used in conjunction with each other provide flexibility and speed to users in their design processes.

**Monte Carlo:** The FUN Monte Carlo algorithm ensures large network convergence with powerful analysis capabilities. Modelling factors include:

- Multi traffic types
- Multi service types
- QoS blocking rates
- User equipment
- Radio link types

In addition, the algorithm establishes the relationship between  $E_b/N_0$  vs. FER for each service through link layer simulation of the UTRA forward and reverse links. Calculation results can be stored for later processing and comparison.

### UMTS/ Fast Analysis Algorithm:

This Algorithm enables users to complete faster analysis for preliminary network design and supporting network optimisation processes. Comparisons between results from the Monte Carlo and Fast Algorithm are supported.

### Powerful UMTS Network Optimisation Engine

This optional plug-in module enables users to optimise their networks based on a number variables including antenna tilt, azimuth, antenna type, antenna height, carrier, pilot power.

### Scrambling Code planning

Automatic Code planning for primary and secondary code allocations is performed for groups of cells using pre-defined code plans.

### Analysis Result Displays

FUN UMTS provides the following analysis displays:

- Coverage (uplink, downlink)
- Best server (downlink)
- Load (downlink)
- Soft handover mode (downlink)
- Soft handover gain
- Frequency re-use factor (downlink)
- Common pilot channel field-strength
- Maximum power per single radio link

Additional displays can be provided upon request. All results depend on the selected service, user equipment, and radio link type.

### Other Supported Features include:

- Orthogonality factors
- Soft hand-over for each type of soft-handover in all directions
- Power Equilibrium algorithms
- Radio link ITU models

### Special UMTS Cell Parameters

Additionally to standard site parameters supported with FUN GSM the following UMTS parameters can be configured:

- Common pilot channel power
- Ratio of common channel power to common pilot channel power
- Ratio of control channel power to common pilot channel power
- Load factor uplink / downlink separately
- Receive noise power
- Soft-handover hysteresis parameter: reporting range, additional hysteresis, removal hysteresis and replacement hysteresis
- General UMTS parameters e.g., chip rate, soft handover hysteresis

# FUN Radio Network Planning Software for UMTS



## Measurement evaluation

FUN provides an interface to MEDAS which is COSIRO's powerful drive test data analysis product. It provides a geographic data warehouse for use both on-site with laptops, and with client-server based analysis of regional and national campaigns. MEDAS compliments model tuning and calibration activities and is described in more detail in the separate MEDAS brochure.

## Contact:

COSIRO GmbH  
Otto-Hahn-Strasse 20  
D- 85609 Dornach, Munich, Germany

Tel. +49 89 90 10 88 10  
Fax +49 89 90 10 88 77  
E-Mail [email@COSIRO.de](mailto:email@COSIRO.de)  
Web [www.COSIRO.com](http://www.COSIRO.com)