

Overview

This brochure provides a description of FUN's UMTS wireless network planning and optimisation functionality. The general features, like GIS (Geographic Information System), open architecture standards, RDBMS, and distributed computing capabilities are described in the FUN 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 supports large operator networks for a multitude of wireless technologies in large regional office deployments as well as 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

Algorithms

FUN UMTS provides three algorithms for network load calculations based on traffic models, one for quick calculations of large networks and the others for more detailed analyses.

Load dependent cell assignment probabilities provide the basis for automatic generation of neighbour lists. Automatic scrambling code planning is available. All algorithms are available for multi carrier scenarios.

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.

UMTS Traffic Simulations

FUN UMTS offers comprehensive network load analysis with three methods:

- Monte Carlo Simulation
- Analysis on Traffic Distributions
- UMTS Fast Radio Planning Algorithm

Results of all methods can be stored for further evaluation and comparison.

The three options when used in conjunction provide flexibility and speed to users in their design processes.

Monte Carlo Simulation:

For randomly distributed users according to the traffic model, network load is determined. Handover gains and outage are taken into account. Final results are generated as averages of multiple simulation runs.

Analysis on Traffic Distributions:

The algorithm is the same as Monte Carlo Analysis, not using randomly distributed users but evaluating traffic distributions directly.

UMTS Fast Radio Planning Algorithm:

This algorithm enables users to complete faster analysis for preliminary network design and supporting network optimisation processes.

Comparisons between results of all algorithms are supported.

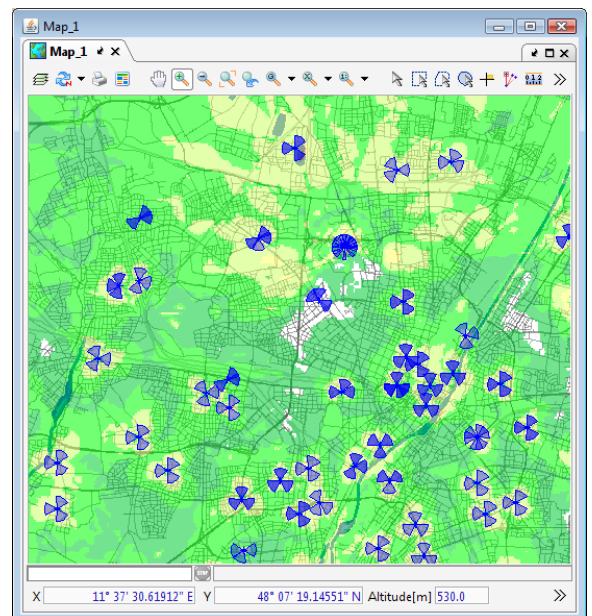


Figure 1: UMTS Coverage Display

Traffic Modelling

Traffic can be configured per pixel for multi service, radio link type and user equipment models. Parameters are:

- bit rate, activity factor, target Eb/No
- fading margins, orthogonality

- max. radiated power, receiver noise power, active set size, Ec/Io threshold

Geographical Displays, Reports

FUN UMTS provides lots of displays to analyse load scenarios: Ec/Io, Best Server, Ec, Io, SHO Gain, SHO Mode, Re-Use Factor, Pilot Pollution, Mobile Power Headroom etc.

Additional displays can be provided upon request. Displays depend on service, radio link type and user equipments.

For each traffic simulation the following standard reports are available:

- Cell parameters
- Soft handover statistics
- Outage statistics

HSDPA Analysis

HSDPA coverage analysis is based on traffic simulation results, i. e. on network load scenarios. Given maximum radiated power for HSDPA per cell, coverage for different throughput classes can be displayed geographically.

Vice versa given a fixed maximum throughput, maximum required power for HSDPA at best server can be visualized per pixel.

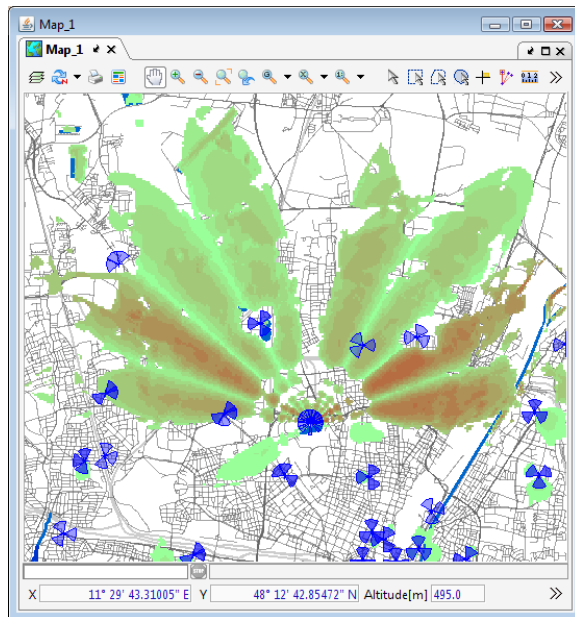


Figure 2: HSDPA Throughput

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.

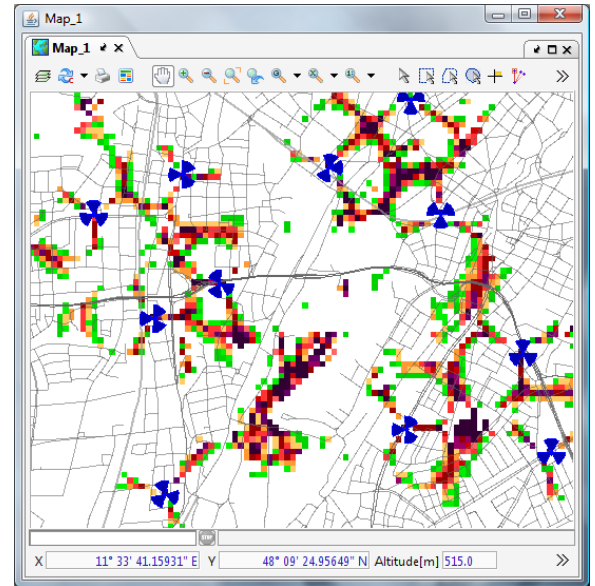


Figure 3: Soft Handover Gain

Automatic Code planning

Automatic Code planning is performed for groups of cells using pre-defined code plans. Beside overlap and interference analysis, neighbours and 2nd order neighbours (cells being neighbours of the same cell) are taken into account.

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