



## ESG-NetCOP

**Network Configuration,  
Optimisation and  
Planning Tool**

**BSS/GERAN Access  
Network Planning**

### Planning Basis

BSS/GERAN access network planning is usually started by importing radio network planning data of the current network. It consists of the sites where BSS network equipment is located and important information regarding configuration of the base stations (e.g. number of cells and TRX per cell).

Alternatively, the planning basis can be derived from marketing data. In this case existing BTS can be upgraded or new BTS can be distributed automatically in the planning area, for example depending on the subscriber density.

### Access Network Planning

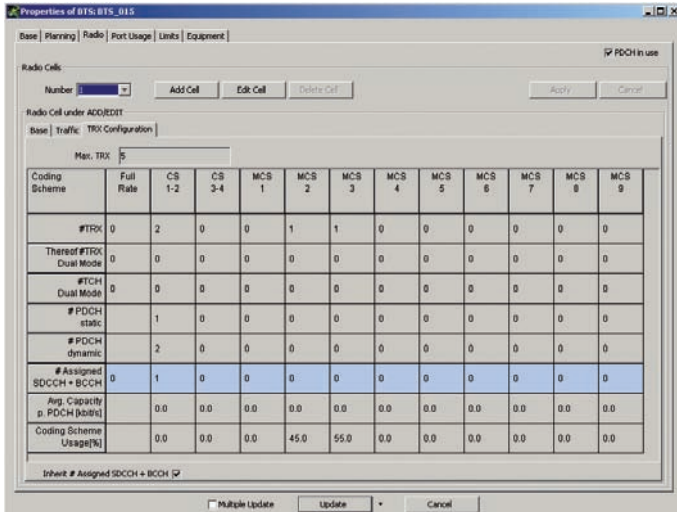
The BSS/GERAN planner defines the capabilities of the network equipment through equipment releases. This highly detailed modelling of network equipment enables the loading of each node to be easily monitored. If for example a BTS is assigned to a BSC or a BSC is re-homed to another MSC, the tool will immediately validate whether the target node is able to handle this additional terminal, i.e. whether its equipment limits are exceeded. Overload situations are clearly indicated to the user and can also be visualised.

ESG-NetCOP features two state-of-the-art planning approaches, both of which are based on cell traffic. It is common practice to plan MSC regions first and to deduce BSC regions from that result (top-down approach) - whereas the reverse method (bottom-up approach) is also supported.

Besides manual network planning capabilities, the tool also offers algorithms that can be used to perform more extensive network planning tasks. For instance, the tool features an algorithm that helps you to find suitable locations for concentrators (BSC or CC). This algorithm tries to trade off the costs of additional concentrators against the savings possible due to reduced link lengths in the access network. It will create a network structure that minimises network costs, computing the appropriate number of concentration nodes, their respective regions, and the connection of base stations to the concentration nodes. To determine cost-efficient connections, both cross-connect and multi-drop architectures are taken into account.

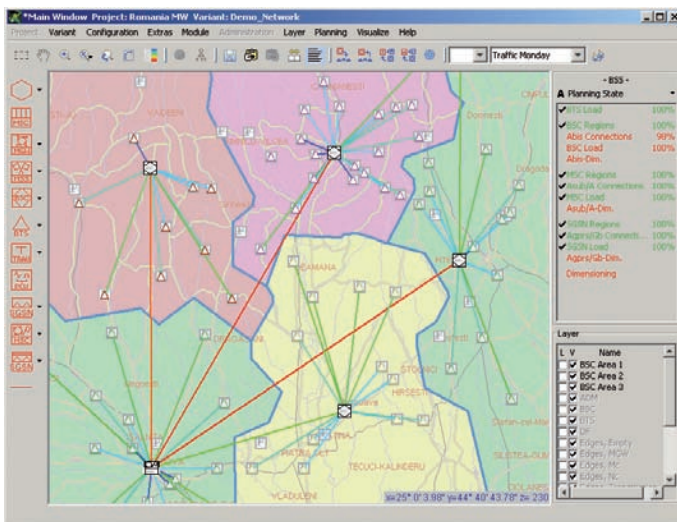
### HIGHLIGHTS

- ▶ Continuous, highly detailed monitoring of equipment load
- ▶ Easy simulation of re-homing (both of BTS and BSCs) and its consequences for the core network
- ▶ Dimensioning of  $A_{bis}$ ,  $A_{ter}$  and A-Interface
- ▶ Support of GPRS with PCU cards and allocation of PDCHs
- ▶ Dimensioning of the Gb-Interface
- ▶ Identification of traffic hot-spots
- ▶ Identification of cells with over-provisioned TRX
- ▶ Extensive possibilities for visualisation of network properties and results
- ▶ Easy supervision of properly designed BSC regions



Coding Scheme	Full Rate	CS 1-2	CS 3-4	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
#TRX	0	2	0	0	1	1	0	0	0	0	0	0
Thereof#TRX Dual Mode	0	0	0	0	0	0	0	0	0	0	0	0
#TCH Dual Mode	0	0	0	0	0	0	0	0	0	0	0	0
#PDCH static	1	0	0	0	0	0	0	0	0	0	0	0
#PDCH dynamic	2	0	0	0	0	0	0	0	0	0	0	0
# Assigned SDCCH + BCCH	0	1	0	0	0	0	0	0	0	0	0	0
Avg. Capacity p. PDCH (kb/s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Coding Scheme Usage[%]	0.0	0.0	0.0	45.0	55.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

The BTS property sheet shows, for example, the configuration of the radio cells



This figure shows a base station subsystem (BSS), the BSC regions are coloured.

## Access Network Analysis

ESG-NetCOP offers many capabilities to analyse an access network. The major ones are:

- ▶ Estimation of the blocking probability experienced in a BTS cell from the number of TCHs available in the cell
- ▶ Detection of over-provisioning of TRX
- ▶ Detection of traffic hot-spots (traffic bottlenecks)
- ▶ Identification of spare capacity at the Abis / Ater interface
- ▶ Indication whether a specific site could be upgraded or not
- ▶ Estimation of the traffic that has to be expected per BSC/MS
- ▶ Identification of BTS that are connected to their BSC in a way that triggers a lot of handover traffic
- ▶ Calculation of required network updates (TRX, cells, nodes) based on forecasted traffic and subscribers

## GPRS/GERAN Extension

GPRS enables a GSM network to offer packet-oriented services with "always on" functionality. ESG-NetCOP offers three easy ways to upgrade your BTS:

- ▶ Import from radio network planning
- ▶ Upgrade based on installed infrastructure
- ▶ Upgrade based on voice hot-spots.

Upgrading relevant BSCs is also straightforward – packet features are obtained simply by allocating new releases. These releases already contain a PCU that separates data traffic from traditional 2G traffic and carries that data traffic on separate links to the SGSN.

Making use of the application model and the GPRS traffic model, the tool can compute the capacity required to carry the packet data traffic. In this way, the Gb interface to the SGSN is properly dimensioned.

## Benefits

- ▶ Supports cost-optimised access networks design
- ▶ Automatic detection of overloaded network equipment
- ▶ Quick assessment of re-homing activities (both BTS and BSC) and their consequences for the network
- ▶ Easy supervision of the consequences of BTS upgrades/downgrades
- ▶ Rapid re-dimensioning of the BSS network in response to modifications in the network structure
- ▶ Strategic planning forecast and budget estimation