

TEMS™ LinkPlanner

Links without limitations



Powerful planning tool

TEMS™ LinkPlanner is a powerful PC tool for radio transmission network planning of mobile telephony systems. It supports both point-to-point and point-to-multipoint radio network planning and management.

The software uses advanced map display and presentation techniques for efficient and powerful planning tasks. TEMS LinkPlanner can be set up as a multi-user system.

Key features

- Map presentations
- Network management
- Point-to-point planning
- Path calculations
- Frequency allocation support
- Interference analysis
- Point-to-multi-point planning
- Coverage calculations
- Traffic calculations



Database handling

The network information in TEMS LinkPlanner is stored in Microsoft® Access databases for easy management. User-defined projects and version handling processes help manage various planning tasks.

Information regarding sites, paths, radio terminals, and multisectors are stored in the project database. Site configuration can be interchanged with TEMS CellPlanner Universal or imported from other external sources.

A wide range of data is defined and stored in the default parameters database for easy retrieval, including radio equipment parameters for equipment from any vendor, channel tables, and antenna diagrams. Pre-configured MINI-LINK™ equipment data is also available.

The multi-user support feature synchronizes a master database with client databases. This ensures that common planning parameters are used and that the planning process is shared.

Map data is stored in the GeoBox database, the format especially developed for Ericsson TEMS planning products. Different map data sets with different projection parameters can easily be used. The following geographical data can be utilized:

- Elevation data
- Clutter or land-usage data
- Vector background map data
- Raster background map, including scanned maps, aerial photos, and satellite images
- Map text data
- Path profile data
- Building or obstacle data
- Object area data
- Traffic data

Map presentations

The strength of this tool is demonstrated in the presentation of the geographical data in maps. TEMS LinkPlanner presents continuous maps with full zoom functionality and an overview map.

Each map window can be customized to ensure the best presentation of each combination of data. The different map appearances may include combinations of elevation, clutter, buildings, object area, text, vector, raster, and traffic data. It is also possible to

work with several map windows in parallel with different map settings. Advanced functionality allows for quick display of selected network objects in a map window as well as combined map search/zoom functionality.

Network management

The network layout is presented on the screen, together with any combination of map data. The mouse is used to pinpoint sites on the map background, and then to connect radio links, rapidly defining a network configuration. Arbitrarily selected data from the database is displayed in labeled areas. These labels, in combination with symbols, colors, and patterns, give a quick overview of the network. In addition, numerous software functions make it easy to find the optimal network configuration.

Point-to-point planning

TEMS LinkPlanner has all the necessary functions for planning point-to-point systems. TEMS LinkPlanner can analyze line-of-sight conditions, path quality, and availability, as well as near-end and far-end interference. The results are presented in detailed, user-configurable reports. Repeater sites can easily be found with line-of-sight diagrams.

Path calculations

The signal quality of a specific radio connection is calculated from the automatically generated path profile and the radio equipment allocated to the path. The calculation includes attenuation from terrain or building obstacles, as well as atmospheric attenuation and other fading mechanisms.

All calculations are based on ITU-R recommendations, or on well-established analytical propagation methods. The following are the major propagation calculations:

- Free space attenuation
- Rain attenuation
- Atmospheric losses
- Obstacle losses
- Reflection point location
- Refraction, rain, and multipath fading
- Rain and clear-air XPD outage

Hardware failure, space, and frequency diversity are also included in the analysis. The quality and availability targets are calculated for a single path or

a path chain, according to the ITU-T recommendations G.821 and G.826.

Frequency allocation support

The main challenge in planning a point-to-point network lies in ensuring that the quality and availability of the network reaches the planning targets, while at the same time using limited frequency resources wisely. Frequency allocation support assists the transmission engineer in this task by defining the available channels as recommended, reserved, or unsuitable, depending on the interference situation for each channel.

Interference analysis

TEMS LinkPlanner includes a near-end interference calculation for co-located sets of equipment to determine intermodulation influence.

The far-end interference calculation determines the total far-end interference level at the receiver from the co-channel and adjacent channel sources. Interfered-with links and interfering links are displayed in the map window. One path or a whole network can be analyzed; adjacent networks can also be part of the analysis. The interference calculation result, including correlated fading, is displayed in a form with detailed information for all interfering signals.

Point-to-multipoint planning

TEMS LinkPlanner supports planning of LMDS, including MINI-LINK Point-to-multipoint, as well as point-to-multipoint systems on other frequency bands. Terminals can automatically be connected to the “best” sector in a multisector (hub) according to selected criteria. The connections and the line-of-sight conditions are presented in the map display. Path quality and interference situations can be analyzed and presented in reports. The multisector feature can also be used for radio coverage predictions and traffic calculations.

Coverage calculations

When coverage is analyzed, the calculated results are displayed as a map overlay using various patterns. The analysis can include equipment and climate parameters, line-of-sight conditions, signal levels, and interferences. The result will be a best server, interference, or availability prediction.

TEMS LinkPlanner also displays field survey data and can use this reference data to automatically tune the coverage prediction algorithm.

Traffic calculation

TEMS LinkPlanner can carry out traffic capacity calculations. The traffic density data can be edited for specified types of areas. The traffic load on the multisectors can be analyzed either as a nominal planning prediction, or be based on a best server prediction. Multisectors with at least one sector with insufficient capacity will appear on the map in red; traffic load per sector will also be displayed.

Product package

- TEMS LinkPlanner software application
- Demonstration project
- Demonstration map database
- User's Guide (printed and on CD)

Hardware and software requirements

- Windows® 2000 Professional or Windows® XP Professional
- Processor: Pentium III, 500 MHz or higher
- Memory: 512 MB of RAM
- Network card: 10-100 Mbps
- Drive: CD-ROM