CHIRplus_TC

User-friendly and efficient planning of radio networks
Wireless service providers today see their transmission and radio access network as a strategic asset which determines overall operational performance and profitability.

The rapid growth in traffic volumes and service diversity associated with mobile technologies directly affects the size and complexity of the network. The huge demand placed on radio networks requires an infrastructure which is scalable, robust and cost-effective to install, operate and manage.

To address these challenges, radio planning engineers need flexible, resilient and easy-to-use software based on well-established engineering procedures and algorithms: CHIRplus_TC is an advanced network design, planning and optimization software for well-engineered and economically optimized wireless solutions.

CHIRplus_TC supports the end-to-end engineering of backhaul networks including site selection, line-of-sight (LOS) analysis, detailed link engineering, channel assignment, coordination and interference analysis, as well as automated generation of license applications and bills of material (BoM).

In addition, CHIRplus_TC provides functions for the design of complete wireless networks considering mobile technologies such as mobile, TETRA, DMR or wireless IoT (Internet of Things) technologies (e.g. LoRa™). This includes powerful coverage prediction and interference assessment.

CHIRplus_TC, based on many years of expert engineering knowledge and customer experience, is the most modern software solution in terms of architecture, technology and ease of use.

The key to fast and cost-effective network planning is operational efficiency. Radio engineers want to concentrate on their planning job and need software which is highly convenient to use. CHIRplus_TC is second to none when it comes to software usability, database access and database analytics.
Key Advantages and Benefits of CHIRplus_TC

Highly modern engineering

- The highly modern and interactive engineering desktop based on synchronous data binding displays the result of a parameter change in one window in real-time in the adjacent window:
  - Change e.g. a value in a data field and immediately see your link budget changed accordingly (without specific saving of the parameter entered).
- Process optimization is reached through automation of numerous steps in the engineering processes.
- Ergonomic access to functions is available with the aid of mouse gestures.
- CHIRplus_TC includes adaptive modulation for evaluation and selection of latest network technologies, enabling higher throughputs and better spectral efficiency to attain optimal quality and availability objectives in all weather conditions.

State-of-the-art technology

- Complex calculations are based on multithreading which reduces calculation time considerably.
- CHIRplus_TC is based on the latest software development technology. Innovative features and functionality are therefore added in no time at all.
- More flexibility is offered through Cloud Computing. Accessible via the internet, CHIRplus_TC can be used literally anywhere; in the office, at home, in the field during a site visit or at a conference venue.

Database analytics

CHIRplus_TC includes superior import and export functionalities based on industry standards such as XML or XLS. This facilitates greatly data migration processes from third party systems towards CHIRplus_TC. In addition, powerful reporting and statistics capabilities are available using Crystal Reports® and HTML formats.

Customizable query forms enable you to sort, filter and search any kind of information needed for regular reporting and the tracking of key performance indicators (KPIs). Determine your own search criteria with the advanced filter editor to extract company KPIs and managerial reports whenever needed.

For even more flexibility and customization, configurable database fields allowing you to enter any additional key information, such as IP addresses, equipment configuration or capacity to display, for example, bottlenecks in the network.
Smart grid

In order to cope with new challenges regarding the design of smart metering or SCADA networks, CHIRplus_TC assists you with an advanced functionality. Networks for a wide range of applications can be planned with the aid of our solution. No matter if we are talking about network connections for smart meters, transformer stations, water throughput control, remote inquiry or remote control units – by using CHIRplus_TC you can plan and simulate radio networks in a reliable and secure manner. During planning and conception, CHIRplus_TC takes into consideration all relevant technical characteristics as well as the network hierarchy of master, repeater and slave.

Fixed service

Nowadays, spectrum is a scarce and expensive resource that needs to be used in the most efficient manner. Mobile operators spend huge amounts of money for spectrum licenses in order to provide the respective service to their clients. The radio networks rely on a stable and powerful backhaul network that is in many cases realized with the aid of microwave links. The great amount of complex demands of such networks requires a scalable and robust network infrastructure with cost-efficient construction, operation and administration. Also in the context of critical communications, fixed radio links play an important role.

To assist you in the design and realization of those networks, LS telcom provides the optimal solution: CHIRplus_TC is second to none when it comes to the user-friendly and efficient fixed link planning. For this purpose, CHIRplus_TC provides user-friendly editors and well-arranged planning windows. Within short time, you can create and analyze new microwave links. You will benefit from comprehensive technical libraries that allow you to choose from different device and antenna data. Manual data entry, which can be time-consuming and error-prone, is thus eliminated.

With the aid of an up to date library of wave propagation models the following properties are calculated and considered:
- Pathloss
- Link availability
- Adaptive modulation
- Frequency- / space diversity
- etc.

Mobile service

No matter what kind of radio service (TETRA, DMR, 2G/3G/4G/5G, etc.) is relevant for you: CHIRplus_TC is your tool to analyze and optimize the performance of the network. The tool includes area calculations allowing you to determine which areas are covered by a base station, or by a single sector antenna. A network processor combines single calculation results to analyze the performance of the whole network. In addition, a powerful population analysis enables you to determine the area as well as the amount of people that are covered by the respective base station, sector antenna or network.

This is how you can identify and eliminate gaps in areas that should have coverage. Especially safety critical radio networks such as TETRA rely on a technically flawless and hardened network. For this purpose, the calculation results may also be verified with the aid of measurement data. Make use of the integrated import functionality and correlate simulations with real world data. By this means, the propagation simulations can be fine-tuned and the transmitter data stored in the integrated database can be validated.

Correlation analysis: comparison of calculated and measured levels
Easy of use

- Multi-database access
  Benefit from the multi-user database access, which is flexible, scalable and future-proof. Select your database, such as MS Access™, MS SQL™ or Oracle®, from a dropdown list and start planning immediately.

- Intuitive Graphical User Interface (GUI)
  The intuitive GUI guides you step-by-step through the network planning process with less clicks. Through the self-evident and faster click sequence the network planning engineer is able to plan more rapidly.
  - The GUI with data navigator, map window, map overview, database manager and display layers manager can be customized according to your requirements.
  - As in Google™, the instant search function in text fields helps you to select information from a long data list faster - even before you finish typing the full text.

- Better map handling and visualization
  - Overlay your maps through automatic fading and visualize in real-time the exact overlay you want. Orient yourself easily on the map.
  - Benefit from better visualization of interference results: interferer path profiles are indicated on the map, as well as transmitter/receiver filters and antenna patterns.
  - Visualize the network in Google Earth™.
  - Make use of seamlessly integrated web mapping sources (OpenStreetMaps).

Internet of Things (IoT) and Industry 4.0

The Internet of Things (IoT) and Industry 4.0 will have a major impact on our personal and professional life. All forecasts predict a significant growth of devices that will be connected to the internet. The variety of applications is endless, from weather sensors, parking sensors, automatic plant watering systems to connected streetlamps, mousetraps, garbage bins, soap dispensers and many more. As most of these devices operate wirelessly, they demand spectrum and connectivity. But not only the amount of sensors and devices will increase, there is also a growing number of standards and communication protocols such as LoRa™, Sigfox, NB-IoT, etc.

The IoT planning tool CHIRplus_TC assists you in coping with the increased complexity brought by the variety of connected devices and IoT standards.

With CHIRplus_TC you can perform dedicated coverage analysis to assure that IoT devices will have sufficient connection and bandwidth for the respective application. The flexible data editor for the devices is able to accommodate basically all IoT devices and antennas. The software also comprises the relevant frequency plans for IoT communications. CHIRplus_TC analyzes specific parameters such as the LoRa™ spreading factors and displays them graphically for a clear overview of network and connection performance. For the verification and validation of coverage predictions, measurement data can be imported and compared with the simulations.
Today’s competitiveness is based on greatest efficiency! CHIRplus_TC in brief:

<table>
<thead>
<tr>
<th>Key Points</th>
<th>Benefits</th>
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<tbody>
<tr>
<td>Based on many years of engineering expertise and customer experience</td>
<td>Fully-fledged and sound engineering features, functionality and calculation methods</td>
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<tr>
<td>Incorporates latest ITU and other national and international recommendations</td>
<td>Highly modern planning methods, greater accuracy in planning</td>
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<td>Incorporates latest technologies, e.g. wireless IoT or Smart Grids</td>
<td>Future-proof solutions</td>
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<td>Multiple calculations based on multithreading</td>
<td>Reduced calculation time</td>
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<td>Database independent development, selection of any market standard database</td>
<td>Scalable, flexible solution</td>
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<td>Smooth workflows &amp; ease of use</td>
<td>Faster planning process</td>
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<td>Interactive real-time engineering desktop</td>
<td>Less clicks, more convenience</td>
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<td>Optimized map handling &amp; visualisation</td>
<td>Optimized presentation of results, possible use of Web Maps</td>
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<td>.NET, HTML5 and other highly modern technologies to reduce development time</td>
<td>Faster integration of new functionalities &amp; features</td>
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<td>Customer configurable database fields</td>
<td>More flexibility and usability for the customer</td>
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