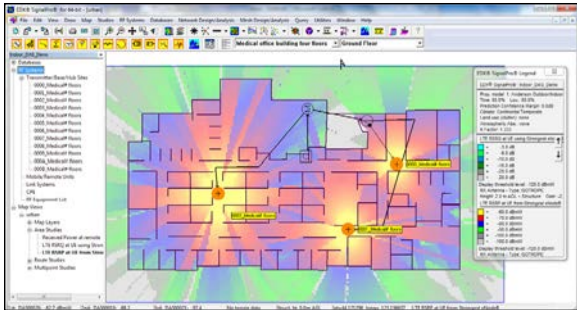


The DAS Design Module is a powerful design tool that enables both indoor and outdoor DAS systems to be designed and visualized in SignalPro®. Use the intuitive DAS component layout tools for placing network equipment throughout the indoor or outdoor environments. The DAS Design Module includes advanced propagation models for both indoor and indoor/outdoor network modeling. Advanced network simulations can be performed on DAS nodes as well as their interaction with other indoor/outdoor cells. In addition, the indoor environment and DAS layouts can be created/modified via the included Building Editor and DAS Design Editor. Add the DAS Design Module to SignalPro to build a versatile set of features for designing/analyzing heterogeneous networks.



Indoor DAS design with multiple floors and LTE RSRP prediction

FEATURES

Streamlined Floor Plan Import

Using the integrated Building Editor, import AutoCAD .DWG files or floor plan image files and easily tag walls and objects of interest with their relevant RF material and height parameters. Tag groups of irrelevant items (such as furniture) as "RF transparent" but allow them to be displayed for visual reference.

Automated Floor Plan Conversion

The Floor Plan Converter automatically creates vector wall lines from floor plan image files, allowing simple floor plan setup. Take advantage of the fast clean-up tools for trimming/adding/deleting wall segments.

Multiple Floor/Building Designs

The DAS Design Module allows multiple buildings and multiple floors of a building in each project, with each floor easily selected from access drop down menus. The integrated Building Editor supports creating/editing multi-floor buildings with necessary workflow included. SignalPro also has a powerful 3D viewing capability that allows for customized views of multiple floor buildings with the DAS equipment layout and prediction plots shown for each floor.

Simple Design Work Flow

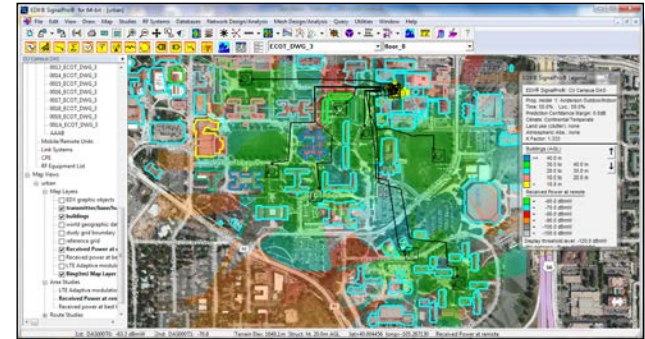
- Import DWG floor plan or scanned floor plan image file and convert to vector wall file using the Floor Plan Converter utility
- Create the DAS design by adding RF components (RF sources, splitters/couplers, antennas, active DAS hubs/remotes, etc.) and connecting them using cable assemblies or the cable tool for either RF or DAS cables
- Easily add risers between floors
- Calculate and display the RF coverage and performance of the DAS design for single and multi-floor systems
- Model outdoor penetration of Macro/Small cells into geo-referenced buildings and use for interference analysis
- Document the DAS design with automatic report generation for bill of materials, RF-interconnection plots, RF link budget and study query reports

Support For Active and Passive DAS Design

The DAS Design Module allows the user to design anything from a simple passive DAS design for a single floor to a complex combination of active and passive DAS design that spans multiple floors.

Link Budget Calculations

Each DAS antenna has its EIRP automatically calculated and updated based on the DAS system RF gains and losses. EIRP's are calculated and used separately for each frequency band used at each DAS antenna.



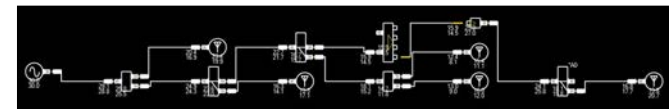
Both indoor and outdoor DAS can be designed and modeled

RF Equipment Library

The DAS Design Module contains a pre-filled library of common RF sources, access points, RF splitters, directional couplers, antennas, RF and DAS cables, combiners, attenuators, DAS hubs and DAS remotes with their associated RF parameters. Additional user-defined RF components can be placed, moved and changed on the floor plan. The user can create a preferred RF objects pick list for ease of insertion into the RF design.

Schematic View

A separate schematic view that displays only the RF components and interconnecting cables with cable lengths and calculated RF power levels shown. This allows the RF engineer to check for missing connections and RF connector gender mismatches.



Example of schematic view showing DAS components and their interconnection

DAS Design Module

Easily Add Risers to Enable Inter-Floor Cable Connections

The DAS Design Module has a graphical riser tool that allows for easy interconnection of RF and DAS cables between floors with automatic calculations of cable lengths.

Wide Range of RF Design Tools

- Snap walls to other walls to form continuous floor plans without gaps as well as snap RF cable ends to nearby RF objects
- An RF cable tool allows a rapid and intuitive connection between RF Objects
- Cable lengths and RF losses are automatically stored in the Bill of Materials and RF link budget lists
- A scaling tool that will adjust all items, including imported floor plan images, walls and RF cable lengths to the user-specified scale

STUDIES

Propagation Models

The DAS Design Module includes advanced propagation models that predict indoor coverage from indoor cells using wall-crossing methods as well as indoor coverage from outdoor cells using the Anderson Indoor/Outdoor universal propagation model. An indoor and outdoor Ray-tracing capability can be added with the optional Advanced Propagation Module.

Accurate RF Coverage Predictions

Accurate simulation of the DAS RF coverage can be easily created and displayed. If desired, combined simulations of the DAS and the surrounding area cells can be created in order to properly model heterogeneous, real-world combined system performance. Macro, pico, femto and small cell architectures are supported in SignalPro.

The DAS Design Module enables the full SignalPro library of coverage, interference and performance studies to be used with DAS nodes. Multiple calculation and display options are available.

Coverage Studies

The DAS Module has all of the studies that are available in SignalPro, including the following:

Basic Studies

- Received Power at remote
- C/(I+N) at remote for strongest or user-selected base station
- Strongest (most likely) Server
- Bit error rate at remote
- Percent service availability
- Simulcast RMS delay spread
- Minimum and Maximum delay spread

LTE Studies (available with LTE Module)

- LTE RSRP at UE from Strongest eNodeB
- LTE RSRQ at UE using Strongest eNodeB
- LTE CQI Regions
- LTE Adaptive modulation data rate
- LTE Number of ICIC Suppressed Interferers
- LTE automatic PCI (Physical Cell ID)

3G Studies (available with Mobile/Cellular Module)

- Strongest 3G Pilot Ec/Io
- 3G Eb/No
- 3G scrambling code offset conflicts
- 3G automatic scrambling code assignment

Most SignalPro studies can predict both downlink and uplink performance. SignalPro optional Design Modules also include sophisticated Stochastic and Monte Carlo methods to predict uplink performance

Powerful Query Tool for Coverage Statistics

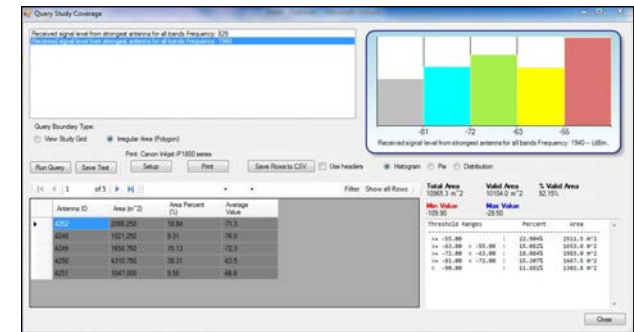
The DAS Design Module includes a powerful study query capability that allows the user to quickly determine the following:

- Histograms showing percentage of total coverage between user-specified coverage thresholds. Histograms are both displayed in graphical and text table format.

- Coverage probability distribution showing likelihood of coverage levels exceeding any level of interest.
- Coverage levels and percent of total coverage from each DAS antenna and/or WiFi AP. This allows the designer to see if antenna coverage balancing is required.

The query tool includes multiple study query result reporting options including:

- Automatic PDF report of study query plots, results and statistics
- CSV output of coverage statistics data



Example of a RF coverage query dialog showing histogram and per-antenna coverage statistics

Automatic Report Generation Tools

The DAS Design Module automatically creates the following reports:

- Bill of Materials
- Downlink RF power calculations for each antenna and each frequency band
- Coverage query statistics



1400 Executive Pkwy Suite 430
Eugene, Oregon 97401 • USA
phone 1.541.345.0019 fax 1.541.345.8154
email info@edx.com web www.edx.com