

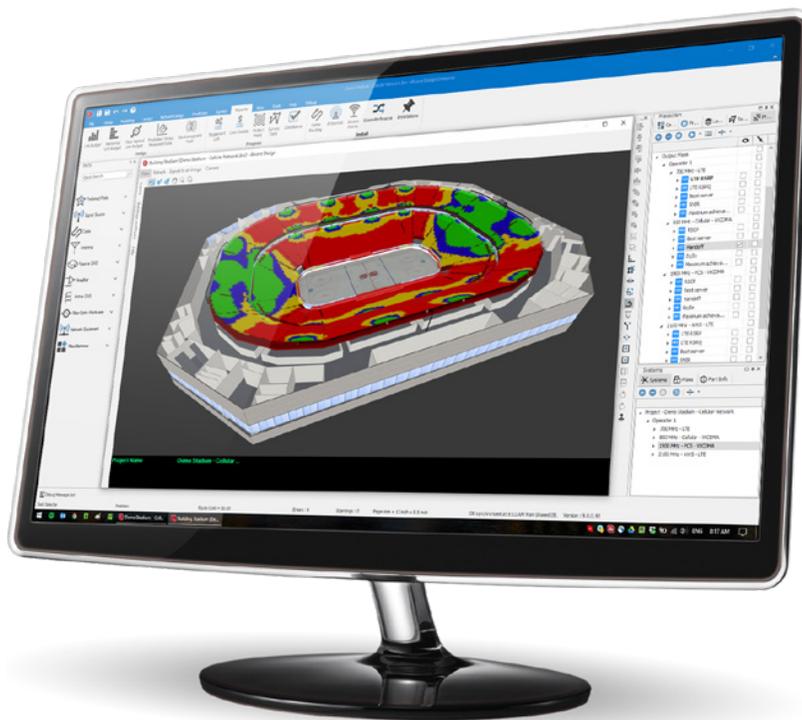


iBwave

Design **ENTERPRISE**

THE INDUSTRY STANDARD FOR DESIGNING IN-BUILDING WIRELESS NETWORKS

As the most powerful software to design large and complex in-building wireless networks, **iBwave Design Enterprise** is the most productive way to deliver all of your wireless network projects. With multi-technology, multi-building support, advanced 3D modeling, coverage and advanced capacity simulations for increased network densification, automatic link budget calculations, error checking and a customizable database of over 34,000 parts and growing, iBwave Design Enterprise is a user-friendly tool for all your in-building RF projects.



KEY BENEFITS



HetNet Design with a database of 34,000+ parts



Built-in 3D modeler to improve design accuracy and wow customers



Advanced RF propagation and capacity analysis



Integration with 3rd party collection & outdoor planning tools

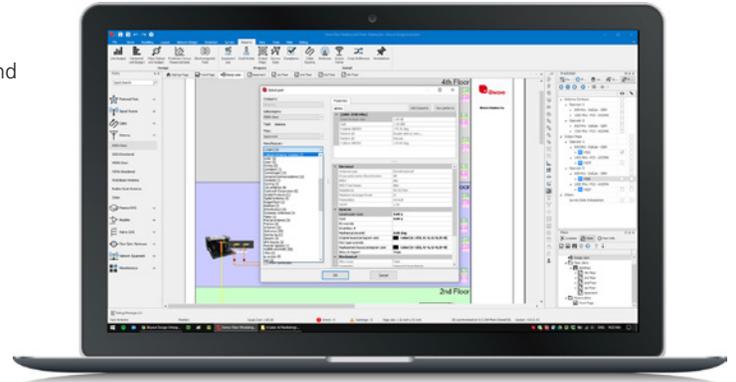


Automated reports and proposals to close projects faster

HetNet Design with a database of over 34,000 parts

Design every detail of your in-building wireless networks using our database of over 34,000 components and counting for all wireless technologies. Automate and simplify designing large and complex in-building wireless networks. Deliver more projects in less time and watch your project pipeline and revenues grow.

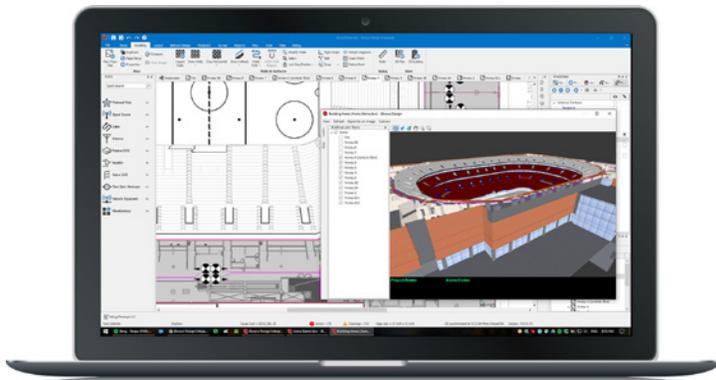
- ✓ Active/Passive DAS, Wi-Fi, small cells, public safety
- ✓ 5G, LTE, LTE Advanced, LTE LAA, CBRS, IoT, LoRa support
- ✓ Database of more than 34,000 network components
- ✓ Detailed network diagrams with automated link budget calculations
- ✓ Coax, CAT5 or Fiber cabling backhaul modeling
- ✓ Automated AP/SC placement and optimal antenna placement
- ✓ Customizable equipment cost and list of approved parts
- ✓ Network validation and error checking



Built-in 3D modeler to improve design accuracy and wow customers

View network designs in advanced 3D. View the height and placement of components, how components are connected floor-to-floor, and toggle your design layers to customize your view. Use iBwave Viewer to share the 3D view of the design with your customer, showing them exactly what the network will look like, and how it will perform after deployment.

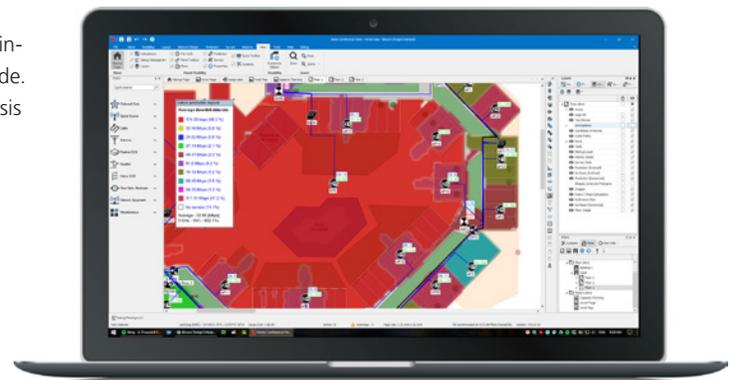
- ✓ Model multiple buildings and multi-layered floor plans
- ✓ Import floor plans from CAD, PDF and image files
- ✓ Automate modeling of linear and curved walls, horizontal and inclined surfaces
- ✓ Zone layer per wireless service
- ✓ Toggle design layers
- ✓ Export to Google Earth



Advanced RF propagation and capacity analysis to validate your design before deployment

Test the coverage and throughput of your network before it is deployed using the in-building prediction engine proven and trusted by thousands of customers worldwide. Simulate the traffic usage on your network with the most advanced capacity analysis tool on the market to ensure that you will meet traffic demands. Validate the performance compliance based on your customer requirements and prevent costly changes post installation.

- ✓ Fast Ray Tracing COST231 and VPLE (quick design) propagation
- ✓ Precise 3D coverage output maps (RSSI, RSCP, RSRP, PDSCH-RP, SS-RSRQ)
- ✓ Signal quality and data rate output maps (SNIR, RSRQ, MADR)
- ✓ Smart Antenna Contouring to show live signal strength predictions
- ✓ Body loss modeling for highly dense venues (stadium, arena, etc.)
- ✓ Detailed multi-technology traffic definition and network capacity validation
- ✓ LTE best server & hand-off matrix to optimize existing design for higher data rate
- ✓ LTE frequency re-use to increase overall user data throughput
- ✓ Body loss modeling for highly dense venues e.g. stadium, arena,...
- ✓ Capacity and average downlink data rate per user maps

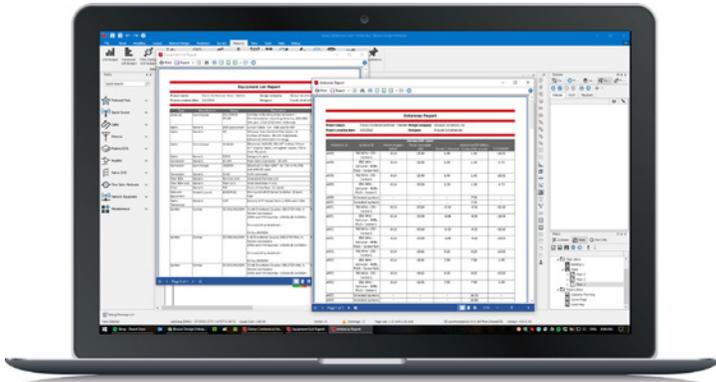
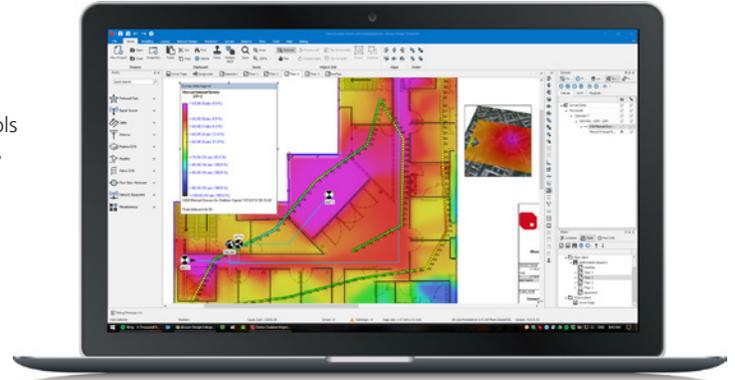


- ✓ Wi-Fi Offload modeling (VoWi-Fi and VoLTE)
- ✓ PIM calculations and EMF calculation and analysis
- ✓ Compliance results based on user defined pass/fail criteria

Integration with 3rd party collection and outdoor planning tools

iBwave Design integrates with all the major collection tools and outdoor planning tools. This means you will spend less time manually transferring data between tools and more time leveraging RF measurements and outdoor prediction to deliver the most accurate and optimized designs for your customers.

- ✓ Import RF measurements from any leading RF collection tool
- ✓ Import RF prediction data from any leading outdoor planning tool
- ✓ Consider macro network using a given value, macro planning tool, or survey measurements
- ✓ Calibrate the prediction model using CW field measurements
- ✓ Survey measurement and prediction vs. measured reports
- ✓ Wi-Fi active and passive surveys



Automatic reports and proposals to close projects faster

Closing out a project can take a lot of manual effort and valuable time. With iBwave Design Enterprise, key project reports for closing projects can be produced with the click of a button and then easily reproduced again and again when design changes occur. Reports can also be customized and branded to suit your needs.

- ✓ Annotations, Output maps & Survey data reports
- ✓ Equipment list & Cost Details reports
- ✓ Link budget and horizontal link budget reports
- ✓ Antennas report
- ✓ Cable Routing & Cross-reference report
- ✓ Access Points & Small Cells report
- ✓ Version tracking to ensure design consistency across multiple projects
- ✓ Compliance report

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Without a doubt, iBwave spared us many hours of work. We not only built a network to support the 15,000 people that the stadium can accommodate but we also delivered it within record budget and timescales – within a third of the time when compared with conventional methods.

- Peter Liseborg, Senior Net Planner for Telenor Denmark -

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FEATURE SET

SYSTEM DESIGN

- ▶ Automatic wireless services creation for multi-band small cells and Wi-Fi components
- ▶ Trunking diagram for indoor RF system design
- ▶ Multiple systems, technologies, and bands - including 5G
- ▶ Support base stations and off-air repeaters
- ▶ Power sharing interface (%) for neutral host system designs
- ▶ Coaxial, radiating, fiber-optic and CAT5 cable signal distribution
- ▶ Multi-strand fiber-optic cables and components support for fiber modeling
- ▶ 5G individual beamforming capabilities
- ▶ Redundant DAS designs
- ▶ Preferred lists of components
- ▶ Connector validation for coaxial and fiber-optic cables
- ▶ Automatic cable and splitter selection for optimal system balancing
- ▶ Network validation and error checking
- ▶ Grouping of systems by operator and wireless services
- ▶ Full 3D antenna patterns
- ▶ Wizard to duplicate sectors
- ▶ LTE Nth Best Server and hand-off matrix
- ▶ Body loss modeling
- ▶ LTE frequency re-use
- ▶ LTE-Advanced Carrier Aggregation
- ▶ LTE LAA - Licensed Assisted Access
- ▶ Edit properties for multiple components at once
- ▶ Support MIMO 2X2, 3X3, and 4X4

FLOOR PLANS

- ▶ Multi-layered floor plans with layout plans, walls, DAS equipment, cables and more
- ▶ Import floor plans from .dwg, .dxf, .jpeg, .bmp, .tiff, .gif or .pdf files
- ▶ Automatic cable length measurements
- ▶ Automatic cable alignment
- ▶ Drawing tools for walls, lines, shapes, text and images
- ▶ Ruler to calculate dimensions and areas
- ▶ Display antenna contours and calculations

RF CALCULATION

- ▶ Downlink calculations
- ▶ Uplink calculations

3D BUILDING MODELING

- ▶ Draw generic walls and surfaces
- ▶ Show floor plan and building in 3D with DAS equipment
- ▶ Show building cuts in 3D
- ▶ Draw inclined surfaces automatically
- ▶ Support inclined surfaces as trapezoids
- ▶ Draw cables running along inclined surfaces with the ability to stop walls at incline

3D BUILDING MODELING (cont.)

- ▶ Create elevation view of the building on the Design Plan
- ▶ Show building location in Google Maps or Bing Maps
- ▶ Export building to Google Earth

PROJECT DOCUMENTATION

- ▶ Use drawing tools to add lines and shapes, also add text and images
- ▶ Create picture plans and photo mock-ups
- ▶ Create annotations (text, audio, picture, video)
- ▶ Create project revisions
- ▶ Protect project file with password
- ▶ Export project to .dxf format and all annotations to zip file
- ▶ Print project documentation

REPORTS

- ▶ Antennas, Access Points, Cable routing and Cross-reference
- ▶ Equipment list and Cost details
- ▶ Link budget and Horizontal link budget
- ▶ Annotations, Survey data, output maps and Prediction vs. measured data
- ▶ Electromagnetic Field (EMF)
- ▶ Compliance
- ▶ Design version tracking

COMPONENTS DATABASE

- ▶ Centralized component database of active and passive components including detailed technical specifications
- ▶ Over 34,000+ components from more than 300 vendors
- ▶ Import and export libraries of components
- ▶ Sub-component support
- ▶ Database editor to add, edit or delete components
- ▶ Customized pricing and part numbers
- ▶ Share component database between multiple users
- ▶ List of approved parts
- ▶ List of equivalent parts
- ▶ List of errors and warnings configurable in the database of components

TOOLS

- ▶ Frequency calculator
- ▶ Power convertor
- ▶ Intermodulation calculator
- ▶ Net scan

PLATFORM SUPPORT

- ▶ 64-bit support
- ▶ Multiple processor support