# iBwave
Private Networks

A SINGLE SOLUTION TO DESIGN PRIVATE LTE & 5G AND WI-FI NETWORKS YOU CAN RELY ON

With cloud-connectivity, seamless integration to **iBwave Mobile Survey** for surveys, advanced 3D modeling, a powerful prediction engine focused on delivering design accuracy even in complex venues, and a large database of vendor-modeled network parts, **iBwave Private Networks** is the simplest and most reliable solution to plan, design and deliver high-performance Private LTE & 5G and Wi-Fi networks.
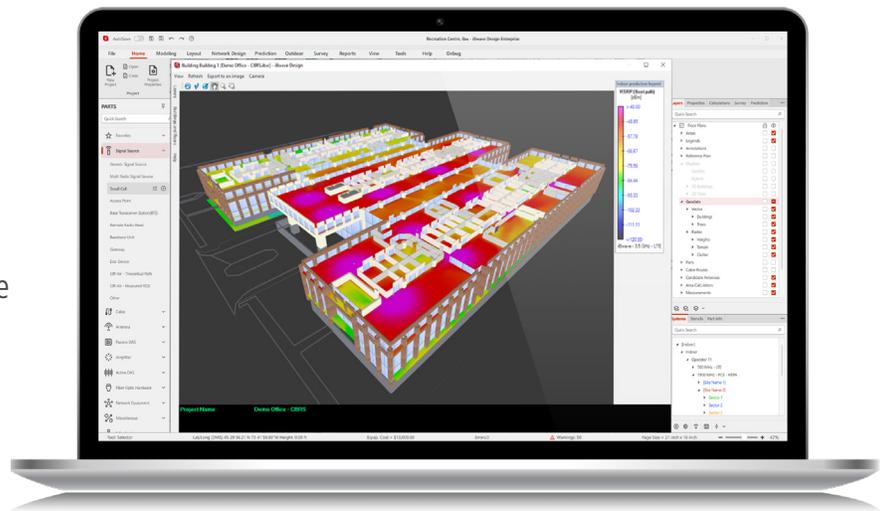
This software comes with either Wi-Fi only solution or as a Private LTE & 5G and Wi-Fi solution to give you complete flexibility.

KEY FEATURES & BENEFITS

Flexible licensing. Choose Wi-Fi only or Private LTE & 5G + Wi-Fi

Advanced 3D modeling & network design simulation

Unparalleled design accuracy to ensure reliable connectivity.

Full reporting & digitization of site documentation

Seamless integration to survey app and cloud-based site management

iBwave
Private Networks

Flexible Licensing

iBwave Private Networks licensing is flexible to cater to your business and license needs. When you purchase you can choose if you want to start with the base solution of just the Wi-Fi design or the full Private Networks with Wi-Fi solution. You can also choose the best licensing model for your business.
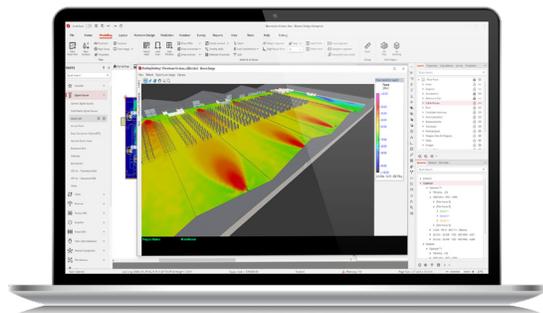
› **Private Networks (with Wi-Fi) Solution.** A full Private Networks solution that includes Wi-Fi (All gens through 7) to give you the full network design solution. Bands include: n48 - 3.5Ghz for CBRS and Private LTE & 5G bands for EMEA, APAC and Latin America.

- Subscription: 3 or 12 months
- Single or Unlimited Users Options

› **Subscription Licenses.** Licensing is offered via a 3-month or 12-month subscription for a single user.

› **Floating Licenses.** Floating licenses enable you to share one license amongst a team of users.

Private Networks
(with Wi-Fi) Solution
———
Full Private Network
solution includes
LTE & 5G
Wi-Fi
———
n48 - 3.5Ghz for CBRS
and bands for Europe,
APAC and Latin America

Subscription / Floating License

single user / mutiple users

Wi-Fi
Only Solution
———
Base solution includes
Wi-Fi
Zigbee
———
2.4Ghz, 5Ghz, 6Ghz, Zigbee

3 or 12 month Subscription

Advanced 3D Modeling and Network Performance Simulation

Model your venues and environments in full 3D and then run accurate simulation of how your wireless networks will perform in real-life.

› **Simplify Private Networks Design with our 'Basic' and 'Advanced' Modes.** The 'Basic' mode offers the most common features for designing private networks, so you can work faster and simpler. You still have the option to switch between the modes and choose the one that suits you the best.

› **Advanced 3D Modeling.** Import floor plans in AutoCAD, PDF or any image file to model your buildings in a CAD-powered modeling engine. Draw walls, floors, horizontal, circular and inclined surfaces. Assign materials from an extensive database of materials - or add your own material. View the model in a powerful 3D viewer and watch it come to life.

› **View prediction and design details in 3D.** View prediction and the placement of your network components and cabling from floor-to-

floor throughout the venue. Use the 3D viewer to visually show your customer exactly what the network will look like and how it will perform once it is implemented.

› **Adjust 3D view layers.** In the 3D modeler, you can adjust all planes of your design (x,y,z) to view your building as a whole or floor by floor. You can also adjust visible layers to choose what you are looking at: cabling, APs, network equipment, prediction. Zoom in, walk through and pan your design and export an image to include in reports or send to your customer.

› **Accelerated Modeling with Stencil Library.** Eliminate repetitious object and surface modeling with Stencil Library - a collection of user-defined templates and stencils, of frequently used 3D objects, materials, markups and images. Simply grab a stencil and paste it to your floor plan to radically accelerate your modeling.

› **Share in 3D with your customers.** Share the free 'iBwave Viewer' with your customers so they can open the design file and view it themselves in 3D.

› **Cloud connectivity.** Save your projects to the cloud so you and your team can access your projects from anywhere, anytime.

› **Seamless connectivity with iBwave Private Networks.** Work on your designs from either your tablet or PC knowing your files will always be accessible from both.

› **Share projects with your customers with iBwave Viewer+.** Send your design to your customers for review via a secure link so they can open it up in iBwave Viewer and provide you with feedback.

iBwave
Private Networks

Unparalleled Design Accuracy

Recognized across the industry for design accuracy, iBwave Private Networks has powerful features built in to ensure that network you install and deploy will perform exactly as predicted in the software.

> **Fast Ray Tracing Prediction Engine.** The fast ray tracing prediction engine goes beyond Free-space path loss and is the most accurate in the industry. It considers reflection, diffraction, walls, horizontal surfaces and inclined surfaces when it simulates how the network will perform within the 3D modeled environment.

> **Prediction Calibration.** Calibrate prediction with your survey measurements to increase the accuracy of the network's predicted performance. Calibrate all coefficients or just material coefficients, and then save the model to apply to similar environments in future projects.

> **Inclined Surface Modeling.** The more accurate you can model, the more accurate prediction will be - especially with inclined surfaces. Ensure accuracy with the ability to model inclined surfaces the prediction engine will take into account when simulating performance.
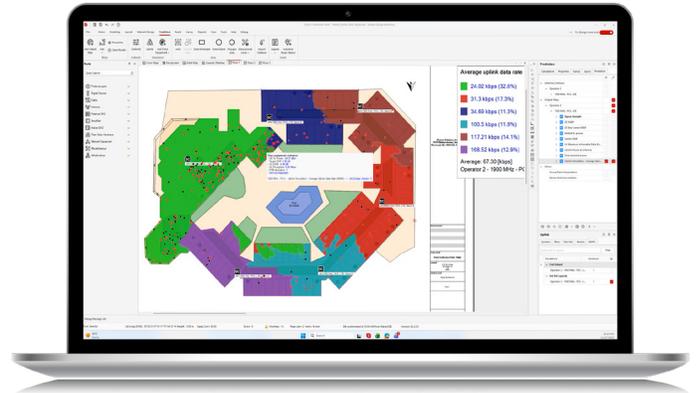
> **Attenuation by Frequency.** All materials are modeled with frequency-specific attenuation values ensuring more realistic prediction results across different environments and technologies.

> **Advanced Uplink Capacity Simulation** NEW. Use the Uplink Module to design LTE & 5G upstream capacity up to 6–8× faster and improve prediction accuracy by leveraging Monte-Carlo simulations that auto-run multiple randomized device/user placements and traffic scenarios.

Full Reporting & Digitization of Site Documentation

Quickly generate key project reports to distribute to your internal and external stakeholders.
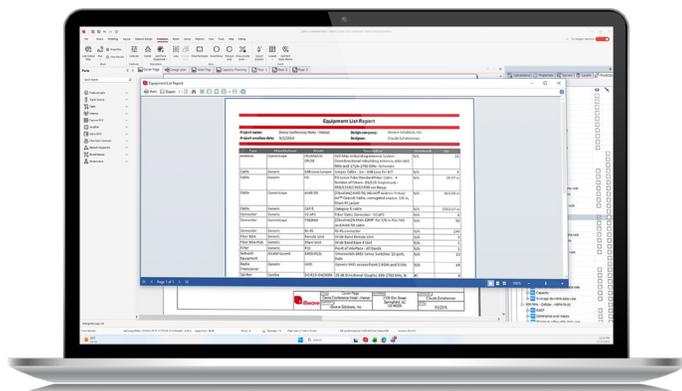
> Automatic Equipment List (BOM) & Cost Details

> Prediction vs. Measured Data (for Calibrated designs)

> Access Points, Cable Routing & Cross-reference

> Annotations, Survey Data

> Output Maps (See 'Feature Set' below for full list)

> Electromagnetic Field (EMF)

> Compliance

> **Survey Analysis.** View KPIs, interpolate survey data, validate compliance criteria and filter survey data

> **iBwave Viewer +.** This software lets your customers open design files, view the design and prediction in 3D, leave comments, and run their own project reports anytime they want.

iBwave
Private Networks

Seamless Integration to Survey & Site Management Tools

> **Integration to iBwave Mobile Survey.** Perform your Wi-Fi and/or LTE/5G surveys from iBwave Mobile Survey and then seamlessly access the survey data, notes and documentation from within the iBwave Private Network software. Analyze the data, filter by criteria and incorporate the insights into your designs.

> **Integration to iBwave Unity**. Gain total oversight into all your wireless sites by connecting iBwave Private Networks to our cloud-based collaboration platform iBwave Unity. Manage all sites from a single location, run reports across all sites, and digitize all documentation in one place to easily access for future maintenance or upgrade initiatives.
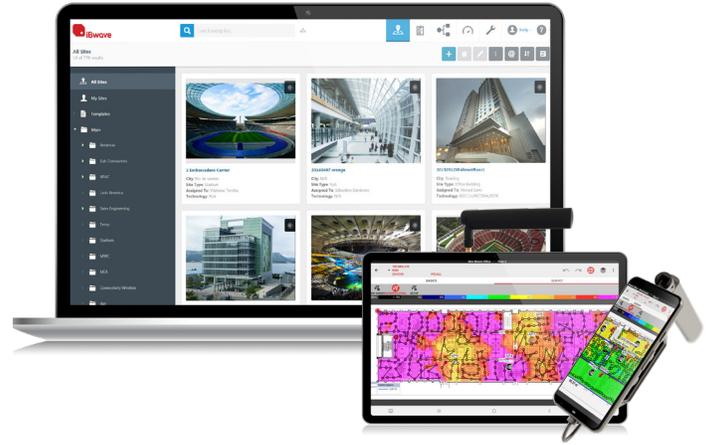
FEATURE SET

Wireless Technologies

> Wi-Fi (802.11 a/b/be/n/ac/ax)
> Free Active survey server
> Simultaneous Active and Passive walk test
> Supports multi-adapter Passive survey

Network Design

> Design Plan for indoor Wi-Fi system design (building and/or floors)
> Centralized database with vendor-modeled network parts: APs, cables, switches, routers, controllers, racks, cabinets and more
> Smart Antenna Contouring for live signal strength predictions during AP placement
> Cable tray modeling
> Cable routing
> Advanced 3D prediction visualizations
> Multi-Radio AP support
> Network validation and error checking
> Zigbee support
> Mist integration
> Advanced and Basic Design Modes

Automation

> Automatic Inclined Surfaces
> Automatic access point placement
> Automatic channel assignment
> Automatic Design Plan organizer
> Automatic cable length measurements

Building Modeling

> Create multiple buildings and multi-layered floor plans
> Use Stencils for frequently used objects and surfaces
> Surface modeling with the ability to stop walls at an incline
> Import floor plans and walls from .dwg, .dxf, .jpeg, .bmp, .tiff, .gif or .pdf files
> Draw walls and surfaces (including diagonally and inclined), assign materials or create your own.
> Curved wall design for stadiums
> Advanced 3D Viewer to display buildings and floors
> Show building location in Google Maps or Bing Maps
> Export building to Google Earth

Propagation

> Simultaneous multi-band / technology propagation and capacity 3D prediction analysis
> Variable Path Loss Exponent, COST 231 Multi-Wall or Fast Ray Tracing propagation models
> Probe to display multi-system prediction results
> Compliance results and report based on user defined criteria
> Prediction model and material calibration from survey data

Output Maps

> Signal strength (RSSI), Maximum Achievable Data Rate (MADR) and Signal to Noise Ratio (SNR)
> Best AP and Best Channel

> Advanced uplink capacity simulation with Uplink Module **NEW**
> Co-Channel Interference (CCI), AP count and Overlap zone
> Capacity and Average Downlink Data Rate

Project Documentation

> Use drawing tools to add lines, shapes, 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

> Annotations, Output maps, RF Survey reports
> Equipment list and Cost Details report
> Access Points, Cable Routing and Cross-Reference reports
> Prediction vs. Measured report
> Compliance Report
> Free report viewer for project stakeholders

Tools

> Net scan
> Frequency calculator
> Power converter
> Intermodulation calculator

Private LTE & 5G

Wireless Technologies

> Band n48 - 3.5 GHz (CBRS Only)
> Bands b1, b3, b7, b8, b10, b20, b31, b32, b33, b34, b38, b40, b42, b43, b48 for LTE (Europe)
> Bands n2, n3, n7, n8, n20, n38, n40, n41, n48, n66, n70, n77, n78, n258 for 5G (Europe)
> Bands 28, 29, 41, 42 for LTE (APAC)
> Bands n12, n28, n29, n41, n77, n78, n79, n257, n258, n261 for 5G (APAC)
> Band b43 for LTE (Latin America)
> Bands n78, n257 for 5G (Latin America)

Network Design

> Small Cells

Output Maps (Private LTE & 5G Solution)

> Signal Strength
> LTE RSRP
> LTE RSRQ
> SNIR
> Average Downlink Data Rate
> Maximum Downlink Data Rate
> UL Maximum Achievable Data Rate
> Best Server
> Field Strength
> Handoff
> LTE Best Server RSRP
> LTE Best Server RSRQ
> LTE Overlapping Zones
> LTE Reference Signal SNIR
> MIMO Rank
> Mobile Tx. Power
> Nature of the Path
> Service Count
> Total Received power
> Uplink SNIR
> Capacity
> Dominance over Macro
> Interpolation Signal Strength
> Map Subtraction
> 5G NR Best Serving Beam
> 5G NR Downlink Carrier Aggregation
> 5G NR PDSCH-RP
> 5G NR SS-RSRP
> 5G NR SS-RSRQ
> 5G NR SS-SNIR
> 5G NR Uplink Carrier Aggregation