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Data Sheet

In-Building and DAS RF Network Design

As the smartphone-driven demand for data across the globe accelerates, your subscribers increasingly expect you to provide coverage where and when they want it. But for high-traffic locations such as sports venues, transportation hubs, malls and university campuses, delivering on those expectations presents a far greater challenge.

While the increasing demand for data provides many welcome benefits for service providers, this is countered by the need to ensure a seamless customer experience. Many are responding by proactively adopting a variety of densification approaches – such as Femto cells, repeaters, small cells, Wi-Fi, public safety and DAS (distributed antenna systems), which allow them to increase network coverage and capacity.

Yet it's the ability to host voice calls on public and private Wi-Fi networks specifically that has proved to be the most efficient offload mechanism to relieve the capacity burden in high-concentration hot spots. Such an ability can be further bolstered by coverage and capacity-enhancing solutions. The advantage of such solutions lies in the ability to deploy them both indoors and outdoors, thereby providing seamless connectivity within buildings and other difficult coverage areas.

Amdocs In-building and DAS RF Network Design provides you with a strong, seamless indoor network, enabling you to provide indoor customers with a standalone service that enhances both performance and the overall user experience without impacting the experience of outdoor users. We achieve this through a combination of densification approaches and end-to-end (E2E) solutions for 5G mmWave, C-Band, and 5G networks designs using different OEMs – including Ericsson, Samsung, CommScope, SOLiD, JMA ADRF, Zinewave & Corning equipment. In turn, this enables the indoor network to offload congested outdoor sectors and leading to improved network KPIs.

Service capabilities

Site survey and walk test

The process begins with a site visit, targeting inbuilding solution venues based on your specific requirements. We perform a detailed walk test inside the inbuilding/venue, considering macro penetration indoors (per band basis) and documenting poor coverage areas. We also document stakeholder feedback, including from the service provider RF, construction, fiber, A&E team and building landlord. The result is a proper inbuilding solution plan, with antenna unit locations and equipment head-end room locations.

We also take photographs to aid document design, and perform construction feasibility checks and record appropriate building materials, installation requirements and proposed cable routing to reflect the actual build and factor in appropriate gains/losses in propagation models.

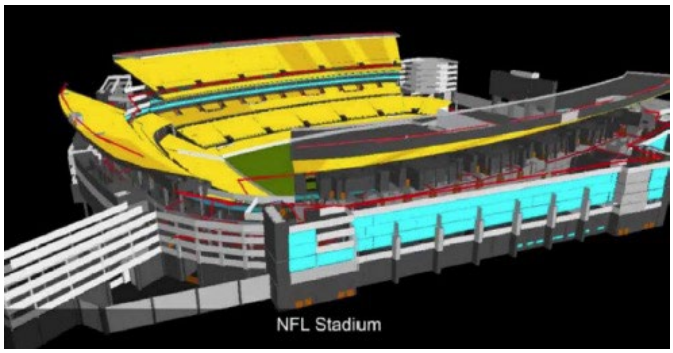
Finally, we identify cable routes, existing conduits and GPS location, while ensuring the system will be sufficiently powered.

iBwave venue 3D modeling

iBwave venue 3D modeling depicts the exact look of the building – enabling us to fine-tune prediction models, improve design quality and DAS performance, as well as improve accuracy of the overall design. The modelling includes depictions of actual surfaces and walls, and provides accurate link budget calculations.

The process is an essential part of the venue inbuilding and DAS design for multi-level heterogeneous RF environments, covering:

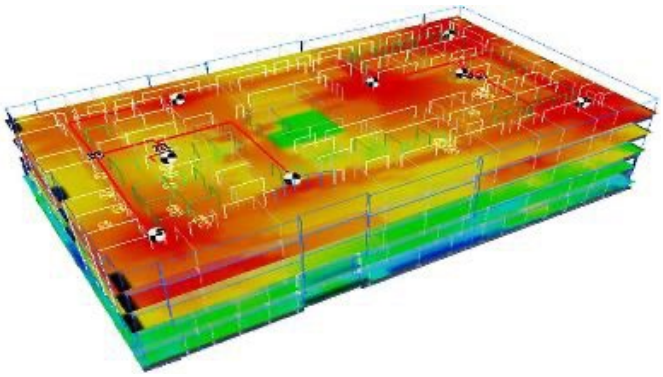
- Inclined surfaces
- Way line of sight (LOS) and non-line of sight (NLOS) signals are directed at almost identical levels from multiple antenna locations

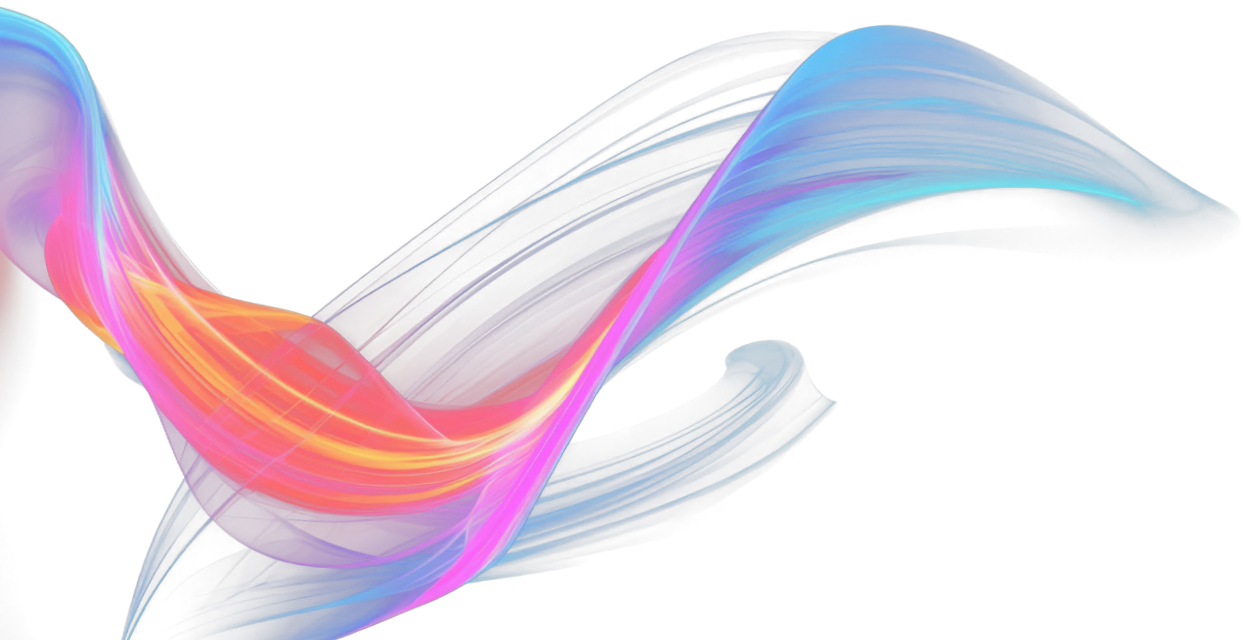


iBwave design

Based on the inbuilding solution, as well as technology and site survey data, we then provide solution type suggestions and methods, as well as type of system and provider recommendations. Based on this, we design the site using iBwave, including:

- All floor/level schematics
- Ceiling/antenna location heights
- Cable diagram
- Coverage predictions
- Bill of materials
- EMF report
- Link budget report (both iBwave as well as Excelbased calculation clearly showing target RSRP per band with current channel count
- Plots meeting SINR, RSRP and throughputs criterion as per RF design





RF configuration data fill

Leveraging the RF design configuration from the final design tool, we then populate the initial design in your databases, working closely with the different teams to ensure all relevant documentation is provided. We then co-ordinate scoping of existing network assets and update the RF configuration datasheet in accordance with any constraints.

The RF configuration datasheet includes the following final site build data:

- Antenna model
- Azimuth
- Electrical/mechanical tilt
- Antenna height
- Type of indoor venue
- Feeder cable type and length
- Plumbing diagram
- eNodeB/NodeB
- Number of hardware units
- Tower height and structure
- Other co-located operator information

Finally, we provide CQ documentation, which is designed to guide operation teams for in-building database work, scripting and 911.

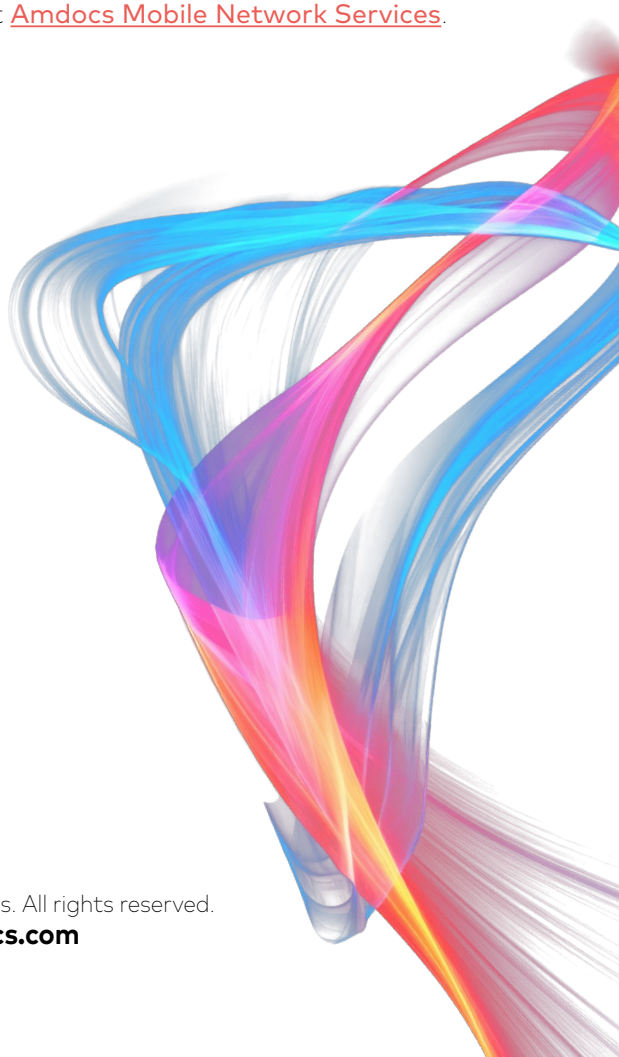
Why Amdocs

Amdocs adopts a customer-centric approach, focusing on continuous improvement to enable service providers to build low-cost networks, plan system expansions, re-engineer networks and improve overall customer satisfaction.

With simulation-based tools and leveraging customer-provided site location information, capacity information and quality of service requirements, our RF Design and Planning service team designs networks that are maximally optimized for coverage, capacity, as well as both indoor and outdoor network usage.

Our wealth of experience in inbuilding/DAS RF network design spans all major wireless technologies, including 5G, 4G and 3G. This includes involvement in model tuning, frequency and PSC/PCI planning for a range of network technologies – among them 5G, LTE and UMTS – for multiple Tier 1 US operators.

For more information on our network planning services, visit Amdocs Mobile Network Services.



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