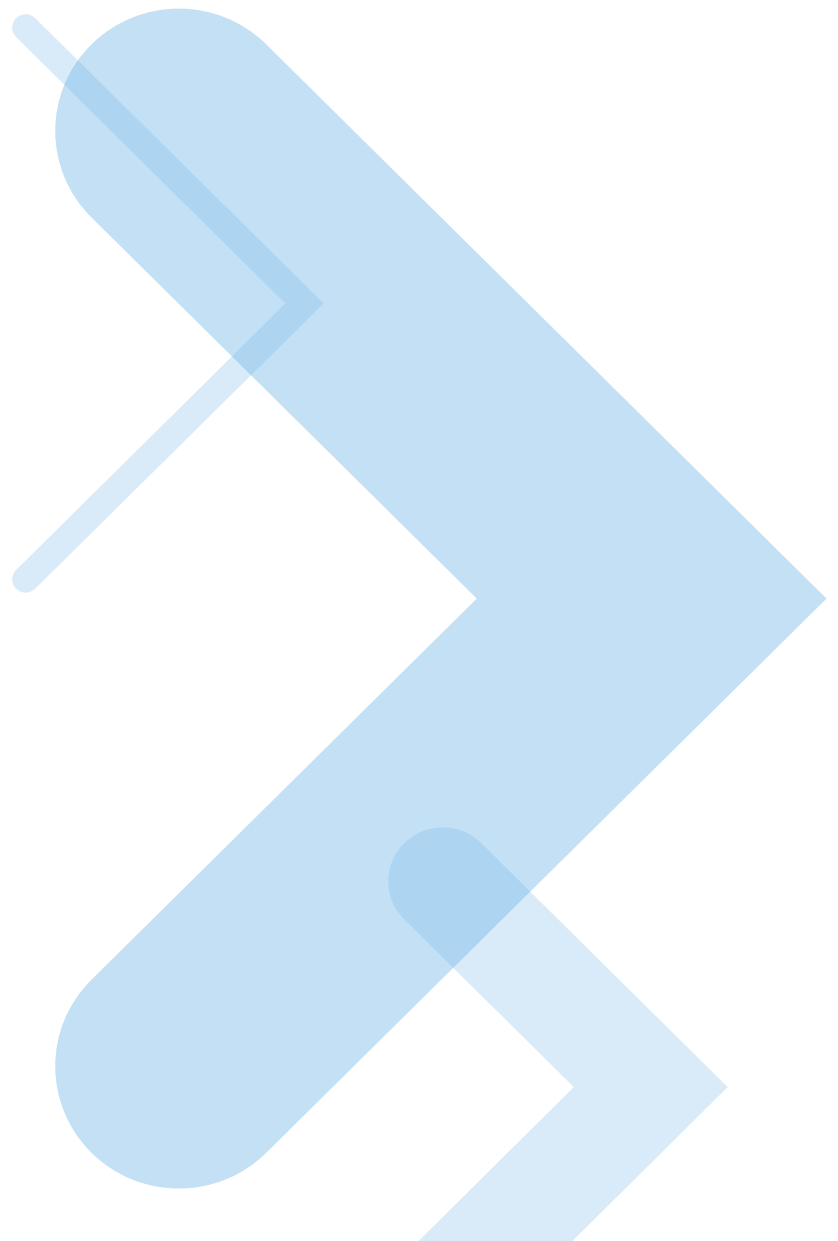




# Eliminating Guesswork From Wireless Network Design and Deployment

Motorola's One Point Wireless Suite helps you easily design and deploy networks that deliver optimum performance while reducing costs





## DESIGN AND DEPLOYMENT

It wasn't so long ago that someone somewhere asked a simple question. "What if we could get two computers talking to each other?" The answer has turned out to be anything but simple. Because as we all know, networking has become a lot more than two computers talking. Now organizations all over the world are basing their entire businesses on their wireless networks and a myriad of wireless devices. Their business models rely on their networks to perform at peak levels of performance and availability. They rely on their networks to ensure that their business-critical applications perform at their highest levels, enabling the enterprise not only to survive but to grow and prosper. All of which brings up another simple question. "How do you create a wireless network you can be sure will meet your crucial performance and reliability requirements?"

Fortunately, there's a simple answer to that simple question: plan your network using the Motorola One Point Wireless Suite of software-based network design, deployment and management tools.

The One Point Wireless Suite empowers data engineers and other professionals to plan and deliver high-performance networks that help organizations meet their technology and business goals. The suite enables the simplified design, installation, verification and ongoing management of today's complex wireless networks. Working interactively with you, the software helps ensure that you establish the strongest links and use the right equipment—and the right amount of equipment—to build networks that maximize performance while minimizing cost.

### Holistic Approach

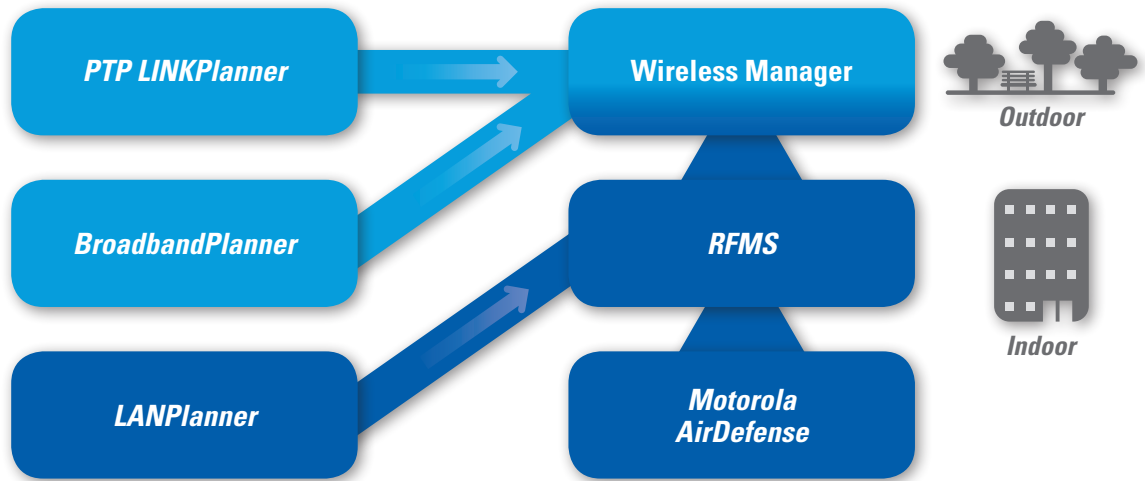
The One Point Wireless Suite software tools help customers leverage Motorola's years of wireless leadership, experience and innovation. Because today's wireless communications networks normally contain many types of technologies, the suite takes a holistic approach. The suite's design tools use advanced RF prediction engines to help create each layer of the network, including Point-to-Point (PTP) links,

Point-to-Multipoint access, wireless Mesh networks and indoor wireless Local Area Networks (LANs).

Optimal designs are used as deployment guides and transferred to management tools that provide a single-pane-of-glass approach to network monitoring and control, including outdoor Google maps and indoor floor layout real-time views. Using the One Point Wireless Suite enables you to create high-speed wireless networks that assure consistent high performance, significantly reduced risk and substantial dollar savings realized from using only the equipment needed, eliminating unnecessary trial and error in deployments, and speeding up problem localization, diagnosis and correction.

### Design and Deployment

This paper focuses on the design and deployment capabilities of the One Point Wireless Suite, with the integrated management capabilities of Motorola's Wireless Manager, RF Management System and the Motorola AirDefense solution to be outlined in a subsequent publication. The following three sections present the suite's advanced network design and deployment tools, PTP LINKPlanner, BroadbandPlanner and LANPlanner.



**PTP LINKPlanner**

The One Point PTP LINKPlanner is one of the industry's most accurate and respected Point-to-Point design tools, now helping to calculate more than 16,000 link path profiles for more than 1,500 organizations each and every month. The PTP LINKPlanner is a highly intuitive tool that takes the guesswork out of developing accurate performance projections for Point-to-Point networks. It enables you to select the best system configuration for your organization's wireless objectives, applications and path conditions even before purchasing the actual equipment. The application is proving extraordinarily successful in helping to plan

and deploy wireless networks that meet and exceed organization-specific performance, reliability and budget requirements.

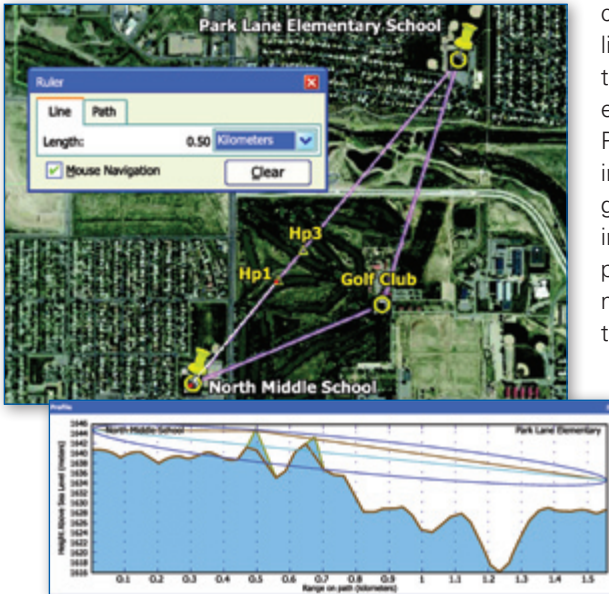
**Network Design, Simplified.** The LINKPlanner software is intuitive and easy to use. Built-in features allow you to design your system by simply entering the end points between which you wish to establish links. PTP LINKPlanner allows you to design networks with multiple PTP links simultaneously. The software guides you through the design process, beginning with selecting the right license for the country in which you are located and suggesting appropriate Motorola equipment that complies with regulations and meets your technology requirements. Since terrain is the most common obstacle to a wireless link, the software helps you

access and import ground profiles compiled from many sources including the U.S. Department of the Interior, U.S. Geological Survey, the European Commission Joint Research Center and a myriad of third-party sources.

**Google Earth Network View.** In one of the suite's most innovative capabilities, you can visualize your network design via Motorola's integration with Google Earth. This enables you to clearly see all of your network links, and pinpoint potential obstacles such as trees, foliage and buildings on the link paths. The link path obstacles are easily entered into the software where they are accounted for and become part of the design.

**Performance Prediction.** PTP LINKPlanner calculates whether or not the link will work, and enables you to view accurate performance predictions. If you're not getting the performance you need, you can tweak the design, adjusting, for example, antenna location and height, to reach your specific requirements. Importantly, you can gain all this detailed network performance knowledge before you ever purchase a single piece of equipment, allowing you to buy the exact type and amount of the equipment that will work best for you.

**Streamlined Deployment.** For deployment, the One Point PTP LINKPlanner outputs a summary screen that serves as a template for network field installation. It provides personnel with specific equipment placement and installation instructions including GPS coordinates, antenna height, bearing, tilt angles, transmit paths, predicted receiving paths and more. In addition, since PTP LINKPlanner is portable enough to run on a laptop, unforeseen challenges can be quickly resolved real-time by predicting the impact of small adjustments to location and height in the field rather than relying simply on a trial and error process.



PTP LINKPlanner Google Earth Network View and Path Obstruction Profile

## BroadbandPlanner

The One Point BroadbandPlanner is a sophisticated software solution that helps take the complexity and uncertainty out of designing and deploying outdoor wireless networks. By enabling network planners to more easily design, deploy and verify complex Mesh and Point-to-Multipoint networks, BroadbandPlanner allows them to focus more of their attention on the strategic issues, such as number of users, types of technology and applications supported.

**Advanced Design Capabilities.** Since physical environment is crucial to wireless networks, detailed geographic and terrain information can easily be imported into BroadbandPlanner. The data also usually includes RF signal obstacles such as buildings, trees and other foliage. Using its advanced proprietary RF performance modeling engine, the software combines all of this environmental information and enables you to easily visualize the entire network—from the predicted throughput performance of the multi-node Mesh backhaul links to the WiFi coverage heat-maps and the Point-to-Multipoint backhaul links—on a single computer screen.

BroadbandPlanner can also automatically suggest placement of Mesh and Point-to-Multipoint nodes to achieve the optimal mix of required coverage and equipment. Finally, “what-if” scenarios can also be run to assess the impact of one or more Mesh node failures thereby ensuring the best possible performance in difficult conditions.

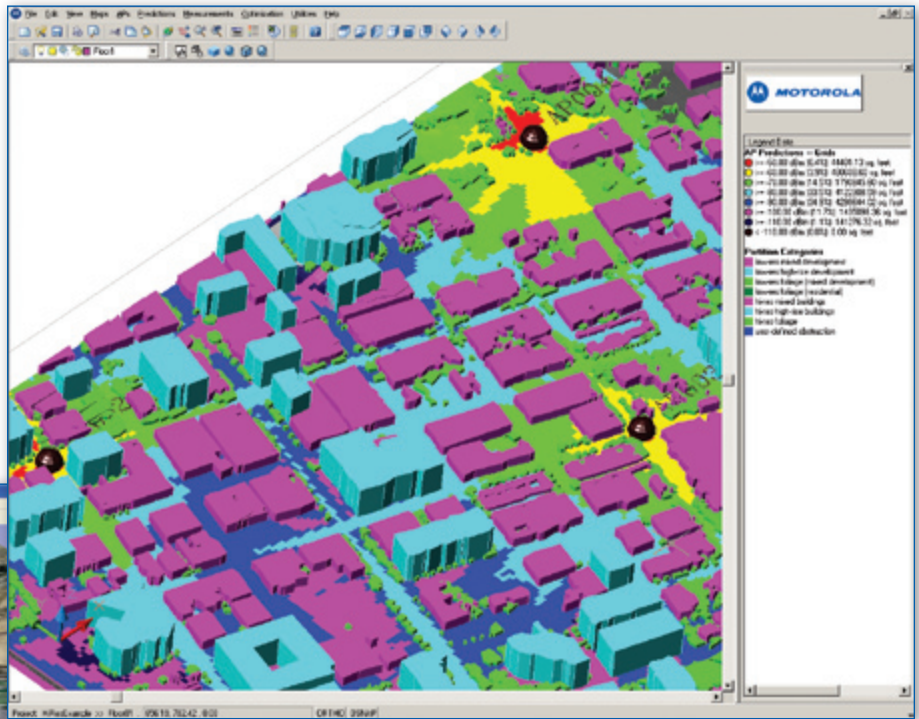
“We use Motorola’s network design tools extensively here at Scientel. These powerful tools have helped us many times to deliver competitive and realistic project quotes and deploy solidly reliable Motorola wireless network solutions for our customers. They have a great intuitive interface and I trust the coverage and throughput predictions. I think these Motorola wireless design tools are the best available today.”

**Dennis Broderick,  
Scientel Engineering  
Manager**

## Leveraging Real-World Measurements.

A crucial part of the software is the GPS-driven BroadbandScanner, which allows you to plan a drive-route through the service area and then collect and analyze potential sources of 802.11 interference in the network. Residing on a laptop computer, BroadbandScanner automatically detects and collects specific noise and interference information on a real-time basis as you drive the network area. BroadbandPlanner then incorporates signal interference data into the network design, assuring that network planning includes current interference information. If you cannot drive the network, the software offers default levels of interference for environments similar to yours.

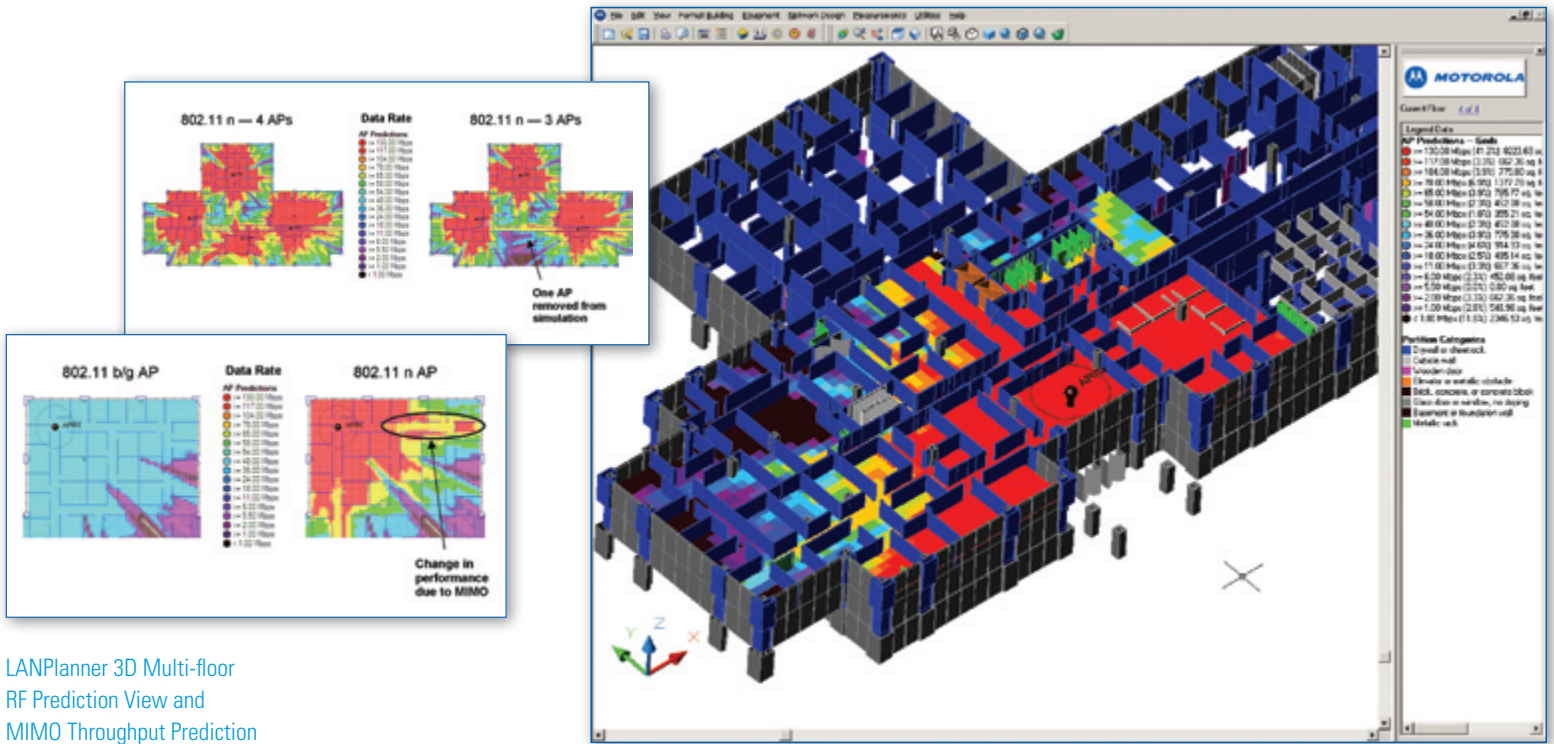
**Deployment Made Easy.** Portable enough to run on a laptop, the software provides installation teams with detailed instructions on location and configuration for every piece of equipment in the network. In addition, it provides a real-time feedback loop that allows network designers to verify performance of the network as it is installed, and facilitating adjustments in real-time.



BroadbandPlanner  
3D Obstructions and  
Prediction View



BroadbandPlanner  
Google Earth View



LANPlanner 3D Multi-floor  
RF Prediction View and  
MIMO Throughput Prediction

### LANPlanner

With Motorola's broad indoor/outdoor portfolio and expansive end-to-end experience in designing and deploying wireless communications systems, you can easily source the finest solutions from a single supplier. Complementing PTP LINKPlanner and BroadbandPlanner in the One Point Wireless Suite is LANPlanner, the design and deployment tool that allows network planners to design and deploy indoor wireless LANs that deliver maximum performance at minimum cost.

### Designing Wireless LANs That Deliver on the Promise.

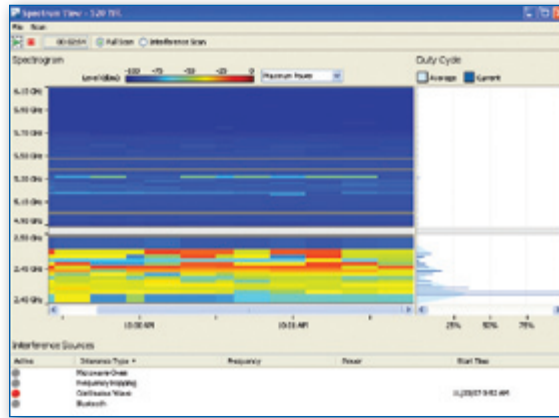
Wireless LANs have evolved from "nice-to-have" indoor mobility extensions of a wired network to being primary networks which organizations increasingly use for their business-critical applications ranging from accounting and business processing to VoIP. As with outdoor networks, many environmental factors affect wireless performance and advanced prediction engines are needed to answer key questions in the design stage, including:

- How much equipment do we need and where should it be mounted to ensure full coverage?
- How do we make sure the network works in elevators?
- Will we be able to get a signal down that 300-ft. corridor?
- How do we ensure data and voice work in every conference room?
- How will construction materials affect the signals?

One Point LANPlanner is an intuitive, powerful application that leverages Motorola's deep expertise in designing today's larger-scale WLANs. LANPlanner is highly adept at helping you get the best answers to these critical questions as well as ensuring that your WLAN delivers the required coverage, especially for critical applications like VoIP. Importantly, LANPlanner was the first application that allowed predictive design based on the powerful new 802.11n wireless standard and is one of the only tools that can predict data rates based on 802.11n MIMO performance, not just on basic signal strength.

**3-D RF Modeling.** LANPlanner makes it easy to import building layout and site information from a variety of sources, including AutoCAD files, blueprints, scanned images, even hand-drawn floor plans. Using its embedded library of RF attenuation characteristics, the software creates a site-specific three-dimensional model of the wireless network. By adding the organization's specific usage information—such as number of users, their locations, required applications—and reliability, capacity and coverage goals, LANPlanner recommends the optimum number and location of access points to ensure that your network meets both your performance and business objectives.

**Visualization.** The building- and organization-specific 3-D simulation allows designers to visualize coverage, RF environment and even composite heatmaps of application-specific performance of VoWLAN and other key applications. You can see



## NETWORK MANAGEMENT WITH ONE POINT WIRELESS MANAGER

The One Point Wireless Suite's design and deployment tools discussed in this paper are designed to interoperate with the suite's comprehensive management applications, One Point Wireless Manager and RF Management System, for unified 24/7 indoor/outdoor wireless network management. As soon as the network is operational, management tools enable full management capabilities including quick detection and resolution of problems that impact network performance and user satisfaction, maintenance and reports scheduling, automated firmware upgrades and security provisioning and enforcement. Equipment locations can be transferred from design to management tools, and designs can be viewed from within the management tools.

data rate performance predictions, and utilize "what if" scenarios like adding, moving or removing access points to adjust for peak performance. LANPlanner includes wizards for either upgrading existing access points to a newer technology or calculating the optimal locations for access points in a new network based on specified performance criteria and supported applications. The result is superior voice, video and data Quality of Service and reduced planning, deployment, hardware and operating costs.

**Motorola AirDefense Security.** LANPlanner also enables network designers to plan and deploy Motorola's powerful wireless LAN Motorola AirDefense network security solution that protects the network, mobile devices and traffic from attacks and unauthorized access. The Motorola AirDefense solution provides enhanced network security by placing a series of dedicated security sensors that listen to all network wireless data signals and relay relevant information to network management for assessment. LANPlanner helps designers to place sensors—either as stand-alones or embedded in access points—in the proper locations to ensure maximum network security.

**Deployment and Verification.** One Point LANPlanner facilitates smooth, efficient deployment by delivering a site-specific plan with detailed deployment specifications and instructions. These include equipment configuration, placement and installation as well as identification of optimal locations for Motorola AirDefense sensors. Once the network is deployed, the application's SiteScanner functionality can help a deployment team plan a coverage survey route and capture measurements in order to assess, verify and optimize the design, increasing performance and reducing expense. As the Gartner Group decisively points out, "An investment in network design can create a 50 percent savings in WLAN setup costs."

**Buy With Confidence.** One of the most important benefits of the design and deployment tools in the One Point Wireless Suite is that you won't buy equipment that is either unworkable or unneeded. With comprehensive PTP LINKPlanner, BroadbandPlanner and LANPlanner designs, you know exactly which equipment is best for your network, and how much equipment you will need to meet your goals. Bottom line, you can be sure you've made the right equipment choices before committing the funds. This can save you substantial dollars in hardware costs alone, and helps ensure that your wireless network delivers the full value of ubiquitous access to your users.

Whether you are making a network solution proposal to a prospective client or you are an enterprise IT professional planning and installing your organization's own network, the network design and deployment tools of the One Point Wireless Suite—PTP LINKPlanner, BroadbandPlanner and LANPlanner—are your link to high-performance, highly reliable wireless networks that meet crucial technical, business and budgetary parameters.

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Motorola's comprehensive portfolio of reliable and cost-effective wireless broadband solutions together with our WLAN solutions provide and extend coverage both indoors and outdoors. The Motorola Wireless Broadband portfolio offers high-speed Point-to-Point, Point-to-Multipoint, Mesh, Wi-Fi and WiMAX networks that support data, voice and video communications, enabling a broad range of fixed and mobile applications for public and private systems. With Motorola's innovative software solutions, customers can design, deploy and manage a broadband network, maximizing uptime and reliability while lowering installation costs.



**MOTOROLA**

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