



Motorola WBR 500 Series LTE Macro eNodeB

Profitably deliver compelling services



Frame Based



Remote RF Based

Motorola WBR 500 Series LTE Macro eNodeB

Profitably deliver compelling services with the Motorola WBR 500 Series LTE eNodeB

People need broadband services everywhere for daily transactions, social connections and business acceleration. As part of Motorola's complete LTE solution, the Motorola Wireless Broadband Radio (WBR) 500 series delivers on the promise of LTE with exceptional coverage and capacity performance, deployment flexibility and significant total cost of ownership benefits.

Motorola's WBR 500 series is an award winning LTE standards-based macro eNodeB portfolio that quickly and easily fits into GSM, UMTS, CDMA, TD-SCDMA or HSPA cell sites. The WBR 500 leverages Motorola's OFDM and advanced antenna technology, along with our extensive field experience to provide a spectrally efficient and modular design that supports a large variety of site deployment scenarios.

Lowers the Total Cost of Ownership (TCO) through product design and advanced features:

- Award winning, integrated, Advanced SON (self-organizing network) significantly reduces LTE network planning, installation, optimization, and operational costs.
- Flexible foot-print solution reduces installation costs (less than a day and crew of two for rapid deployment) and maximizes existing site re-use with discrete overlay.
- High receive sensitivity delivers superior uplink performance, increases cell edge data rates and cell radius, reducing the incremental number of sites.

Maximized coverage and capacity that enables increase in ARPU plus retain-and-gain of subscribers through:

- Motorola's Intelligent Scheduler – improves the sector capacity, increases cell edge throughput and provides a consistent Quality of Service (QoS) in the most challenging RF conditions. In addition, from day one, Motorola's Intelligent Scheduler provides flexibility based on call models and user profiles.
- Motorola's implementation of open-loop and closed-loop advanced antenna technologies such as MIMO, Beamforming and implementation of dynamic switching between advanced antenna schemes based on RF conditions and device capabilities.
- Options for optimal transmit power – up to 40 Watts per sector carrier with remote RF based eNodeB or up to 80 Watts per sector carrier with frame based eNodeB.

Mitigate risks of high churn from uncertain LTE performance through:

- Motorola's experience of deploying commercial OFDM solutions since 2003.
- The expertise of a leading LTE RAN standards contributor.
- Motorola assurance of low down-time, high quality, and high reliability coupled with award winning, field proven and high availability - high uptime common baseband controller unit.
- Integrated Advanced SON – ensures that the impact on operations and maintenance of early deployments are minimal.

Environmentally preferred solution: Designed to deliver superior power efficiency through advanced amplifier technologies such as Digital Pre-Distortion (DPD), Crest Factor Reduction (CFR), advanced Doherty, and other proprietary techniques.

Motorola has implemented an Advanced SON solution that leverages years of research in network autonomies and is built on real world data from large-scale OFDM deployments.

LTE Network Architecture

The WBR 500 series eNodeB is located at the edge of the terrestrial network and provides air interface support to user equipment while also terminating signaling and bearer packets as well as communicating with other eNodeB peers in the network. Motorola's WBR 500 will support FDD as well as TDD in a range of frequencies including: 700MHz, 800MHz, 900MHz, 1800MHz, 2100MHz, 2300MHz and 2600MHz.

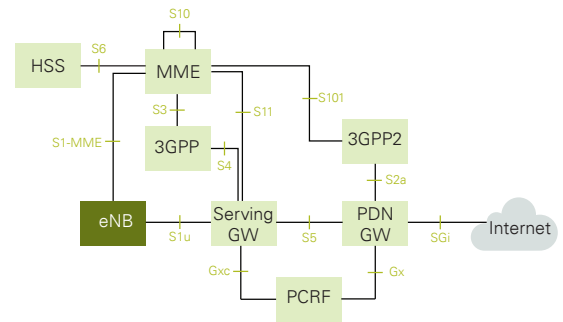


FIGURE 1: Typical LTE Network

Engineered to Maximize Profitability

The wireless broadband business is full of challenges, from site reuse, to fierce margin pressure, and the on-going need to offer truly differentiated services. The Motorola WBR 500 is designed to address these challenges, and positively contribute to an operator's profitability.

Lower the Total Cost of Ownership (TCO)

Integrated Advanced SON: The WBR 500 Integrated Advanced SON capabilities significantly reduce overall costs by lowering expenditures on:

- Network Planning
- Network Installation
- Network Optimization
- Network Deployment

WBR 500 Advanced SON greatly reduces:

- The need for expensive truck-rolls
- On site manual network optimization

Mobile operators want access network infrastructure that can be:

- Deployed quickly - without requiring highly specialized technical expertise
- Configured easily - with automatic neighbor discovery
- Failure proof - with automatic reconfiguration around network failures.
- Optimized - with automatic radio parameters changes.

These needs drove the inclusion of SON in the LTE standard. As one of the few LTE vendors with extensive expertise in planning, deploying, optimizing and managing OFDM/All IP mobile broadband networks, Motorola has implemented an Advanced SON solution that leverages years of research in

network autonomies and is built on real world data from large-scale OFDM deployments, not theoretical models. The testimonies to Motorola's superior WBR 500 Advanced SON are:

- Award for LTE SON at CTIA Wireless 2009.
- Award for LTE SON from 2009 NGN Leadership.

Flexible footprint option: The WBR 500 includes:

- Baseband Controller Unit (BCU).
- Remote Radio Unit (RRU).

The RRU can be placed on the top of the tower/pole or wall, or at the tower base. The BCU can be placed at the tower base either inside or outside with integrated backhaul. Also the BCU is common broadband platform for other OFDM solutions – offering benefit of economies of scale. The testimony to this best-in-the-industry, most innovative base controller unit is:

- The TMC 2008 Communications solutions Product of the year award.

The RRU and BCU are connected with simple thin fiber that enables extended flexibility in deployments and removes RF losses typical of coaxial cable.

The flexible foot print option reduces costs further by:

- Eliminating the need for costly air conditioning and its utility expenses.
- Reducing site acquisition, installation and lease costs by eliminating the need for expensive equipment hut/shelter at the tower base.
- Providing more flexibility in site selection by reducing the facilities requirements for a site and maximizing the reuse of existing GSM/UMTS/CDMA/TD-SCDMA or HSPA sites through a discrete solution that delivers an unobtrusive site overlay.

The Intelligent Scheduler dynamically adapts to a matrix of factors that maximize the overall efficiency of radio resource assignments in a cell.

High receive sensitivity: The WBR 500 advanced receiver design delivers high receive sensitivity:

- Extending cell site coverage.
- Enabling operators to maximize cell site effectiveness.
- Delivering a better customer experience – reducing churn, increasing word-of-mouth referrals and reducing total customer acquisition costs.

The WBR 500 is built using FLeX Modem technology that is fully programmable with field programmable gate arrays (FPGA) and digital signal processors (DSP). The FLeX modem technology allows Motorola to use advanced receiver processing techniques. The WBR 500 is powered by the latest generation of Motorola's OFDM baseband software coupled with advanced receiver design. The WBR 500 eNodeB is an ideal solution for an operator's next generation service offerings.

Increase ARPU + Retain and Gain Subscribers

Intelligent Scheduler: Motorola Intelligent Scheduler provides a rich user experience at the edge of a cell, even in the most challenging environments. The Intelligent Scheduler dynamically adapts to a matrix of factors that maximize the overall efficiency of radio resource assignments in a cell and is the foundation for delivering Media Mobility services both now and in the future. Some of the key factors are:

- QoS level
- The number of users in a sector
- Individual subscriber's conditions
- End user device capabilities

Motorola's Intelligent Scheduler also offers the capability to fine tune multiple parameters based on the service provider business model and stage of network deployment. For example, during the initial stages operators can modify the scheduler rules to increase the cell edge performance, postponing the need to build more sites until more capacity is required. Motorola Intelligent Scheduler helps exceed customer expectations as the network evolves.

Advanced antenna technologies: All of Motorola's LTE eNodeBs leverage Motorola's advanced antenna open-loop and closed-loop (including MIMO and Beamforming) technologies. With Motorola's advanced antenna technologies, WBR 500 delivers the promise of site re-use and the overall maximization of coverage initially, and capacity later – as the network matures.

With multiple antenna configurations including 2x2 MIMO and the ability for expansion to 4x2 MIMO, the Motorola WBR 500 can be deployed to meet a wide array of requirements within the economic constraints of the business, all without sacrificing the quality of experience delivered to end users. Our portfolio offers the flexibility required to deliver service in a cost-effective manner, in the most challenging RF environments and enables operators to tailor each site for coverage or capacity.

Mitigates Risks

The promise of LTE is very compelling, but as with all new technologies it presents an array of new challenges. Factors like new frequencies, the unique behaviors of OFDM, MIMO antenna schemes and the approach to designing, deploying and optimizing an end-to-end all-IP flat network are new to most vendors. Since 2003, Motorola has shipped solutions for fixed broadband wireless, mobile broadband wireless and backhaul commercial deployments around the world.

- Deployed more than 87,000 OFDM base station radios¹
- Shipped more than one million OFDM CPEs¹

In more than 25 countries, Motorola has successfully helped wireless broadband operators meet the challenge of re-using existing sites, deploying at less than ideal site locations, and balancing the economic realities of a competitive marketplace – such as managing churn. Motorola is laser focused on maximizing each operator's unique conditions to maximize coverage and capacity and has engineered its LTE solution, including the WBR 500 for that exact objective.

Environmentally Preferred Solution

Historically, base station efficiencies of final stage power amplifier have been 20 to 30 percent. Motorola's advanced radio solutions are designed with power efficiencies greater than 40 percent, while still meeting the toughest class B inter-modulation and emission requirements using state of the art implementation of amplifier technologies such as Digital Pre-Distortion (DPD), Crest Factor Reduction (CFR), advanced Doherty, and other proprietary techniques – translating to a reduction in energy requirements and a more environmentally friendly solution.

Motorola's WBR 500 LTE eNodeB offers lower TCO and maximizes coverage and capacity by incorporating an Intelligent Scheduler, Advanced SON, advanced antenna techniques and advanced product design.

The WBR 500 series introduces the latest energy-saving techniques such as:

- No power consumption for Power Amplifier (PA) devices during off-peak or low utilization periods.
- No need of air conditioning.
- No need of expensive shelters and huts.

The WBR 500 is built on the experience gained from two commercial OFDM hardware platforms and three commercial OFDM software releases. With each hardware and software release change the Motorola OFDM platform has:

- Increased processing power while reducing its size
- Significantly lowered its power consumption

Summary

Motorola's WBR 500 LTE eNodeB offers lower TCO and maximizes coverage and capacity by incorporating an Intelligent Scheduler, Advanced SON, advanced antenna techniques and advanced product design. These combine with a complete portfolio of professional services that leverage a wealth of experience gained from real world OFDM deployments.

Motorola has aligned its business units and roadmaps to provide a comprehensive, end-to-end solution covering all aspects of LTE broadband wireless access deployment for all existing or non-existing cell site applications. The end-to-end LTE solution portfolio includes flexible eNodeB deployment options, including remote RF based and frame based eNodeB, evolved packet core elements,

compelling end-user devices, backhaul network, network management solutions and video solutions that monetize LTE investment. The testimony to Motorola's most innovative, end-to-end LTE solution industry recognition is:

- Motorola LTE eNodeB – 2009 NGN Leadership Award
- Motorola LTE eNodeB - Best in Wireless Broadband Mobility Solutions Award from Network Products Guide
- Motorola LTE and WiMAX BCU - The TMC 2008 Communications Solutions Product of the Year Award
- Motorola LTE SON Award at CTIA Wireless 2009
- Motorola LTE SON Award from 2009 NGN Leadership
- Motorola LTE EPC – 2009 NGN Leadership Award
- Motorola LTE EPC – 2009 InfoVision Awards finalist

With our leading contribution to the LTE standard, over a decade of R&D investment, and our experience as a global supplier of broadband wireless OFDM access solutions, Motorola is primed to deliver best-of-breed LTE solutions.

For more information, please engage your Motorola account representative and please visit the Motorola LTE home page at www.motorola.com/lte

¹ As of December 31st 2008



www.motorola.com