Technical white paper

# HP MSM460 and HP MSM466 dual-radio 802.11n access points

HP delivers market-leading near Gigabit Ethernet performance with the industry's first three-spatial-stream 802.11n dual-radio access points: MSM460 and MSM466

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# Executive summary

Enterprises are looking to high-performing 802.11n WLANs to support the rapid growth of mobile devices and the increasing adoption of bandwidth-intensive multimedia applications. HP sets the benchmark for 802.11n performance with the industry's first three-spatial-stream 802.11n dual-radio access points. The HP MSM460 and HP MSM466 dual-radio 802.11n APs deliver near Gigabit Ethernet client access and offer superior range and coverage, providing unmatched performance and reliability for today's on-the-go workforce.

# Introduction–802.11n market drivers

The widespread adoption of mobile technology and the growing popularity of interactive multimedia applications are pushing legacy Wireless Local Area Networks (WLANs) to the brink. Several market trends are driving the implementation of 802.11n WLANs that offer improved performance, and deliver more reliable and consistent user experiences. The trends are:

- **Proliferation of mobile devices:** Remarkable advancements in mobile technology have fundamentally transformed IT over the past decade. Laptops and notebooks now regularly outsell desktop PCs. At least 50 billion Devices will connect to wireless networks by the year 2020.[1] Legacy 802.11 a/b/g wireless networks designed for an era of occasional access and casual hotspots can't keep pace with the onslaught of mobile devices.
- **Explosion of wireless users:** Armed with laptops, notebooks, smartphones, and now tablet PCs, today's information professionals are inherently mobile. They depend on wireless LANs to efficiently conduct business from any place, at any time, and demand predictable experiences and reliable connectivity.
- **Growing popularity of interactive multimedia applications:** Enterprises are deploying interactive rich media applications (video conferencing, unified communications, Web conferencing, telemedicine, and the like) to increase productivity, improve collaboration, and contain costs. These bandwidth-intensive, delay-sensitive applications require high-throughput, low-latency networks.
- **Support for mission-critical services:** From medical solutions to financial applications, today's wireless networks enable mission-critical services with stringent performance, reliability, and security requirements.
- **Challenging radio-frequency (RF) environments:** As mobile devices become ubiquitous, wireless LANs are being deployed in hospitals, campuses, warehouses, and other spaces where construction materials, building structures, and legacy devices can cause interference and create unique RF challenges for 802.11 a/b/g networks.

## 802.11n innovations

The IEEE 802.11n wireless networking standard was specifically created to extend the performance and reliability of 802.11 LANs. It has the potential to bring wired Ethernet performance to wireless networks and is certain to usher in a new era of mobile innovation and productivity. Going forward, many enterprises will use wireless as their primary means of network connectivity. Some organizations—healthcare, higher education—may forego cabling altogether.

Key 802.11n advancements include:

- **Multiple Input Multiple Output (MIMO) technology:** MIMO employs parallel radio streams and spatial division multiplexing techniques (transmitting multiple streams of data over a single channel) to boost network capacity and improve reliability. The 802.11n standard supports up to four 150 Mb/s streams per channel (and mandates support for at least two streams per channel).
- **Channel bonding:** 802.11n channel bonding allows two 20 MHz channels to be combined to form a single 40 MHz channel, effectively doubling the transmission channel width.
- **2.4 GHz or 5 GHz operation:** 802.11n supports 5 GHz operation (higher data rates, less radio interference, less-crowded spectrum) as well as 2.4 GHz operation for compatibility with legacy 802.11 b/g clients.

[1] Ericsson, February 2011

## 802.11n advantages

Key 802.11n advantages over legacy 802.11 networks include:

- **Greater performance:** Numerous radio layer (PHY) and media access control (MAC) layer improvements raise data rates from 54 Mb/s to 450 Mb/s with three spatial streams per channel enabling better application performance and support for more users.
- **Better coverage:** The use of multiple antenna systems reduces dead spots and provides greater range and coverage—even when using legacy 802.1a/b/g clients.
- **Improved reliability:** MIMO technology significantly reduces packet loss and retransmissions delivering better support for mission-critical and delay-sensitive applications.
- **Greater capacity:** The 5 GHz radio band offers greater capacity than the crowded 2.4 GHz band.

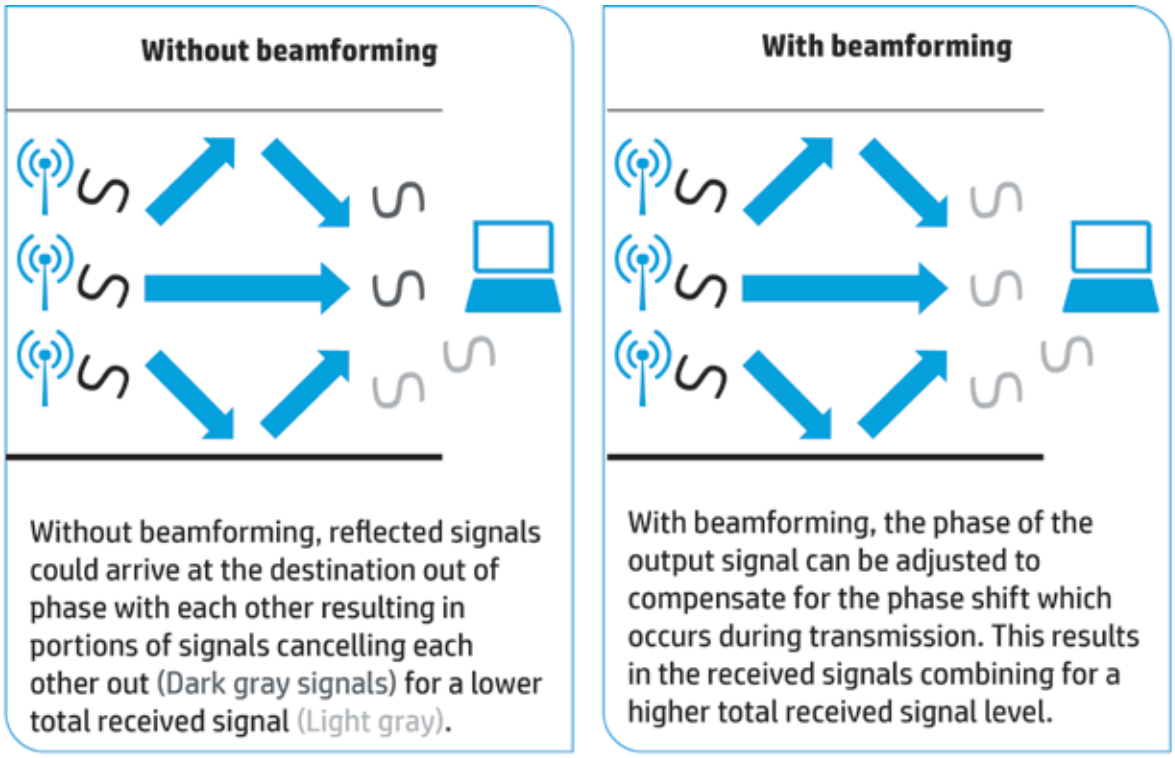
# Industry-leading performance and reliability from HP series 802.11n dual-radio APs

HP is one of the first in the industries to offer near Gigabit Ethernet performance with the new HP MSM460 and HP MSM466 802.11n dual-radio access points (APs). The series 802.11n dual-radio AP product family offers superior range, improved application processing and speed, and industry-leading price/performance. The product family also provides a solid foundation for current and future bandwidth-intensive, delay-sensitive applications, while preserving full compatibility with legacy 802.11 clients and existing HP wireless controllers.

Key differentiators include:

- **Three-spatial-stream MIMO for industry-leading throughput:** HP is one of the first vendors in the industry to offer three-spatial-stream 802.11n dual-radio APs. The HP MSM460 and HP MSM466 APs support three 150 Mb/s streams per radio (900 Mb/s per AP) delivering near Gigabit Ethernet WLAN client access. HP offers three-stream 900 Mb/s dual-radio APs at the same price as competitive two-stream 600 Mb/s dual-radio products.
- **Closed loop beamforming for improved coverage with less transmission overhead:** Some enterprise APs employ transmit beamforming (TxBF) techniques to extend coverage. Transmit beamforming uses multiple transmitters and antennas to focus output power in the direction of the receivers. In closed loop beamforming the transmitter uses explicit receiver feedback to direct output (the receiver creates what is known as a steering matrix). In open loop beamforming, the transmitter calculates the steering matrix by tracking incoming training symbols (less transmission overhead). Unlike competitive solutions that rely on proprietary beamforming techniques, HP supports standards-based 802.11n closed loop explicit beamforming to improve RF coverage areas (better performance at distance from the AP) and reduce roaming dead spots while reducing transmission overhead. Beamforming provides more reliable and predictable user experiences, and improves coverage in RF-challenging environments as well. By providing a standards-based beamforming solution, HP offers customers greater choice and flexibility in networking solutions.

**Figure 1.** Transmit beamforming (TxBF) improves coverage




- **Band steering for improved WLAN performance:** Most enterprise access points contain two radios. Typically, one radio is set to 5 GHz for 802.11a/n clients and the other is set to 2.4 GHz for 802.11b/g clients. By default, most clients are configured to prefer the 2.4 GHz band. HP supports band steering to automatically and transparently direct 5 GHz-capable clients to the higher-performing, less-congested 5 GHz band. Band steering increases wireless network capacity and helps solve client density issues by reducing the number of clients in the crowded 2.4 GHz space. It also improves performance for clients that remain on the 2.4 GHz network. Band steering can be implemented quickly and easily, since it requires no client-side configuration.
- **Concurrent operation in 5 GHz band:** HP MSM466 802.11n dual-radio APs support the concurrent operation of both radios in the 5 GHz band. Concurrent operation in the 5 GHz band improves noise immunity (fewer sources of interference), increases channel availability, and enables greater utilization of 40 MHz channels and supports higher density Wi-Fi environments.
- **Optimized WLAN architecture:** Any HP Series 802.11n dual-radio AP can be deployed as an integral component of our next generation non-blocking WLAN architecture. The HP optimized WLAN architecture supports flexible traffic distribution models and combines centralized management and control with intelligent access points at the edge of the network for unmatched scalability, performance, and ease-of-deployment. The architecture enables optimal application delivery, with low impact on the wired core, no single point of failure or performance bottlenecks, cost-effective scalability, and strong investment protection.
- **Backward compatibility for graceful and cost-effective deployment:** HP helps customers protect and extend previous investments and avoid costly and disruptive forklift upgrades by overlaying the new family of access points within their current wired/wireless network. The new HP MSM4xx 802.11n APs are 100 percent compatible with existing MSM7xx wireless controllers and backward-compatible with legacy wireless 802.11a/b/g networks.

## Understanding 802.11n access point designations

802.11n APs are typically described in terms of their MIMO attributes. Some APs are characterized solely by a TxR designation, where T denotes the number of transmit antennas and R denotes the number of receive antennas. For example, a 3x3 device has three transmit antennas and three receive antennas. It is important to understand that the TxR designations do not convey the number of spatial streams supported by the device. A 3x3 device may use three transmit antennas for diversity, while supporting only two spatial streams. Many AP manufacturers have adopted a TxR:S designation to explicitly callout the number of supported spatial streams. A 3x3:2 AP has three transmit antennas, three receive antennas, and supports two spatial streams. A 3x3:3 AP has three transmit antennas, three receive antennas, and supports three spatial streams. HP is one of the first vendors in the industry to offer 3x3:3 802.11n dual-radio APs.

# HP series 802.11n dual-radio access point series

To future proof your network, the MSM460 and 466 access points provide high density and high speed throughput ideally suited for HD video applications and the influx of Wi-Fi devices connecting to your network. In addition, if you want to be able to manage your wire and Wi-Fi devices all from a single management platform, consider HP Intelligent Management Center (IMC), which provides you single pane-of-glass management and security. They can operate with or without a wireless controller and support all the same enterprise features as the prior HP series MSM wireless products, plus new features such as beamforming and band steering. The MSM466 access point supports concurrent 5 GHz operation and a variety of indoor and outdoor MIMO antennas.

These new WLAN mobility solutions build on our market success, delivering superior user experiences for interactive and rich media applications such as HD video streaming, mobile video conferencing, or bedside-viewing of high-resolution radiological images. The new APs are also ideal for hospitality and other public access applications, where 802.11n WLANs will enable ongoing revenue opportunities by offering considerable performance and coverage advantages over emerging 4G wireless services.

**Table 1.** HP 802.11n dual-radio access point series specification summary

| | MSM430 | MSM460 | MSM466 |
|---|---|---|---|
| Radios | Dual (n/a/b/g) | Dual (n/a/b/g) | Dual (n/a/b/g) |
| TxR:S | 2x3:2 | 3x3:3 | 3x3:3 |
| Max data rate/radio | 300 Mb/s | 450 Mb/s | 450 Mb/s |
| Supported operating bands | 2.4 GHz and 5 GHz | 2.4 GHz and 5 GHz | 2.4 GHz and 5 GHz or 5 GHz and 5 GHz |
| Antenna | Integrated | Integrated | Several Optional External |
| IEEE 802.3af PoE support | Yes | Yes | Yes |

## Summary

HP unified wired and wireless solutions deliver the high density high performance networks to address today and tomorrows BYOD (Bring your own device) demands.

## Resources

To learn more about HP series 802.11n dual-radio APs please refer the following resources:

- HP MultiService mobility solutions
  **HP Networking Wireless Home Page**

## For more information

If you are looking for superior range and coverage to provide unmatched performance and reliability for your on-the-go workforce, try the HP MSM430, MSM460, and MSM466 access points, refer HP 802.11n Dual Radio Access Point Series data sheet at **http://h17007.www1.hp.com/docs/products/4AA3-2358ENW.pdf**.



4AA3-2702ENW, Created February 2011; Updated December 2012, Rev. 2