



Margin Master

Profit More from Wireless

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Chalk up another victim of the commodity syndrome. Only a couple of years ago, wireless networking was a distinguishing feature for PC products. But as the technology has made its way into enterprises, small businesses, homes and coffee shops around the world, prices have tumbled and users have come to **expect it as a check-list offering** in laptops and desktops.

But OEMs should not write off wireless as a way of increasing revenues and profits. According to the Scottsdale, Ariz. analyst firm In-Stat/MDR, customers and OEMs alike often have a poor understanding of the variations available in wireless. By matching the version to the customer need - and by paying more attention to the under-utilized 802.11a standard -- **OEMs can boost their margins even in this commodity-like market**. In addition, new types of wireless connectivity will offer additional margin opportunities in the near future.

The leading wireless LAN standard is 802.11, a family of related technologies that provide for communications. Currently there are three shipping variations: 802.11a, 802.11b and 802.11g. The most widely implemented is 802.11b, with a peak bandwidth of 11 megabits per second and a carrier frequency of 2.4 gigahertz. Products supporting only 802.11b **have largely become commodities** as this version of wireless is now an expected feature of PCs and laptops.

802.11 Wireless: Increasingly Affordable

802.11 Version	Costs to OEM (\$ USD)	Street Prices* (\$ USD)
a	\$11 - \$12	\$60 - \$100
b	\$7	\$30 - \$50
g or b/g	\$8 - \$9	\$40 - \$60
a/b/g combo	\$12 - \$13	\$80 - \$90

* Street price refers to least expensive prices for add-in boards to provide similar capability

Source: In-Stat/MDR

While the newer 802.11g standard increases the bandwidth of a wireless network substantially, its backward compatibility with ubiquitous 802.11b networks is also moving it into commodity territory. Intel's new desktop platform design **calls for a b/g option** to be available on all consumer machines and on computers for corporate power users (see "New PCs Configured for Profits " October, 2003 OEM Connect), practically guaranteeing its widespread adoption.

Finding the Margin in Wireless

What is missing from the Intel plan, though -- and creating an opportunity for OEMs -- is 802.11a. Somewhat more expensive than the other options, **802.11a is well suited to many enterprise users** as well as to certain consumers. The older "a" standard operates at a higher frequency and can avoid interference from some cordless telephones and other consumer devices that can plague other frequencies. Knowing how to communicate these differences can give OEMs a boost over their competition. "There is a lot of misconception and misunderstanding by customers and OEMs" about these technologies, says In-Stat/MDR principal analyst Allen Noguee.

For example, both the b and g versions of 802.11 use wireless chips that support any of the 14 communications channels for LANs that the IEEE has set aside for country use. Most wireless chips can

Matching 802.11 Features and Markets

802.11 Version	Characteristics	Markets
a	<ul style="list-style-type: none"> ● Moderate cost ● Short range* ● 54 Mbps bandwidth ● Not compatible with "b" or "g" unless sold as part of a "combo card" 	<ul style="list-style-type: none"> ● Higher data transfer needs ● Corporate implementations in high network density situations ● Consumers looking to avoid interference problems
b	<ul style="list-style-type: none"> ● Low cost 	<ul style="list-style-type: none"> ● Cost sensitive consumers

support any of the channels and get the operating country information they need from [Microsoft® Windows® XP](#). Because the channels overlap, any region of the world effectively offers only three channels for 802.11 communications. Combine their well-known 2.4 GHz range, the small number of available channels and growing number of consumer products **fighting for the same spectrum**, and it's easy to see why the b and g standards often lead to interference problems.

That is why 802.11a -- far less widely used -- is a potentially good recommendation for those operating in crowded spaces. In the 5 GHz band, **much of the interference problems fall away**.

"802.11a in the 5 GHz band has approximately 23 non-overlapping channels, and not that many cordless phones use that higher frequency," says Noguee. The additional channels allow more networks to operate in close proximity. In addition, the higher frequency has a shorter range than with 2.4 GHz since higher frequencies are more easily stopped by walls and objects. Because networks can be placed closer together, 802.11a is **well suited for crowded enterprise settings** and for consumers in high density apartment buildings.

g

- Longer range*
- Public hotspot compatibility
- 11 Mbps bandwidth
- Moderate cost
- Longer Range*
- Compatible with "b" standard
- 54 Mbps bandwidth
- Small businesses in low network density situations
- Corporations with high data transfer needs or large numbers of employees per network
- Consumers demanding bandwidth (whether they need it or not)

* Transmission range depends on many location factors

Source: In-Stat/MDR

From a profit margin view, even better is an a/b/g combination. These chips **support all variations of 802.11** and work on any of the available networks. The target is typically higher-end consumers or enterprise customers who might be using an 802.11a network in the home or office, but want the option to use public hotspots, too. Notebook PCs are prime candidates for this option.

Other Network Margin Builders

As customers are switching from b to either g or a, OEMs should remember that **adding wireless to new PCs is not enough**. Most customers are going to need access points, either to tie the wireless LAN into the greater corporate network, or to connect a consumers' cable or DSL modem into a combination access point and router to provide Internet access for all their PCs.

While new 802.11g chips are backwards compatible with 802.11b access points, it is only at the slower speeds of the older standard. To gain all the increased speed, the customer **must buy new access points**. The same is true for 802.11a, which will not interact with b and g because it operates on a different frequency.

An extended bandwidth option called SuperG offers yet another margin opportunity. This variation of 802.11g **bonds together two channels** to obtain 108 megabits per second bandwidth. The real beneficiaries of SuperG are businesses -- either those with users transmitting huge volumes of data, or those which need the extra capacity to support a greater number of users.

Business Use of Telephony and Wireless Technologies

% of companies using or expecting to use technology at small, medium and large businesses

Year	2003	2005
IP PBX	18%	30%
Wireless LAN	13%	38%
Traditional Telephony	84%	69%

Source: Infonetics Research

The higher bandwidth is also good for an important future use of wireless: as a **carrier for VoIP telephony**. Unfortunately, because it uses two channels, the chance of interference is more likely.

A better solution for VoIP is the upcoming 802.11n standard. This variation will -- like 802.11a -- operate on the 5 GHz band, but with a single-channel top bandwidth of at least 100 megabits per second and possibly as much as 200 megabits. There are competing proposals for standard, and the IEEE is not expected to settle on an approach until 2005. However, some vendors are already announcing that they will have pre-standard 802.11n products shipping by early next year. Presumably firmware upgrades will allow these products to meet the final standard.

So the good news is that even while some areas of wireless are hitting the commodity shelf, others are **providing new, no-strings (or wires) attached opportunities** for watchful OEMs.

For More Information

Wi-Fi Security Still Spotty

PC World recently found that not all 802.11g products claiming WPA certification really support the security technology.

802.11i Security Specification Finalized

The IEEE has just ratified a new security standard that is a superset of WPA.

802.11n: Defining a High-Throughput WLAN

Sean Coffee of *EE Times* discusses the development of the new high bandwidth version of 802.11.

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