



WIRELESS STANDARDS

Not all wireless devices are created equally. Device manufacturers can choose to conform to many wireless standards, each with its pros and cons. This Q&A will help mobile computing users identify the various wireless standards in use today.

WHAT ARE THE IEEE WLAN STANDARDS?

The Institute of Electrical and Electronics Engineers (IEEE) created the first standard to define the communication rules used by devices operating within a wireless local area network (WLAN). The base standard, called 802.11 supported only 1 to 2 Megabits per second (Mbps) and is now considered too slow to support communication needs. As technology advances, the 802.11 standard is modified. With each modification, a new identification letter is added to the base standard:

STANDARD	ENTERTAINMENT
802.11.	<ul style="list-style-type: none"> • Original standard for 2.4 GHz frequency band • 1-2 Mbps maximum data rate
802.11a	<ul style="list-style-type: none"> • High-speed WLAN standard for 5 GHz frequency band • 54 Mbps maximum data rate
802.11b	<ul style="list-style-type: none"> • Lower frequency 2.4 GHz band standard to reduce interference • 11 Mbps maximum data rate
802.11e	<ul style="list-style-type: none"> • Used by IEEE WLAN radio interfaces to guarantee the quality of voice and video traffict
802.11f	<ul style="list-style-type: none"> • Inter-access point communications defined to facilitate multiple vendor-distributed WLAN networks
802.11g	<ul style="list-style-type: none"> • Additional modulation technique for 2.4 GHz frequency band • 54 Mbps maximum data rate
802.11h	<ul style="list-style-type: none"> • Modification of the 5 GHz frequency band for use in Europe and Asia Pacific
802.11i	<ul style="list-style-type: none"> • Corrects authentication and security protocol weaknesses.



The a, b, and g standards are the most commonly used, and consumer devices manufactured today typically conform to one of these three standards. 802.11a operates at a fast data transfer speed, but on a higher frequency regulated band. 802.11b, while operating at a slower data transfer speed, operates on an unregulated 2.4 GHz frequency. Production costs are significantly higher for conformance to regulated frequency bands, rendering 802.11a compliant devices more expensive. 802.11g combines the benefits of both the a and b standards: faster speed on an unregulated frequency.

While IEEE sets the wireless standards, the organization does not enforce these standards, nor does it ensure compatibility between the standards. Instead, the Wi-Fi Alliance was created to certify product interoperability. The Wi-Fi Alliance, a global, non-profit industry trade association, is devoted to promoting the growth of wireless Local Area Networks (WLAN). A product that passes the Wi-Fi Alliance testing is awarded the label “Wi-Fi CERTIFIED”, a registered trademark of the Wi-Fi Alliance.

WHICH WIRELESS STANDARDS ARE COMPATIBLE?

When building a WLAN, all devices within the wireless network must be able to communicate using the same standard. However, not all standards are compatible.

For two devices to be compatible, they must communicate on the same frequency band. The 802.11a standard uses the 5 GHz frequency band, and is not compatible with other standards due to the regulations governing this frequency. The 802.11b and 802.11g standards use the unregulated 2.4 GHz frequency band. As a result, 802.11g access points will communicate with 802.11b network adapters and vice versa.

Some device manufacturers offer ‘hybrid’ devices that allow the 802.11b/g and 802.11a standards to co-exist on the same device. However, these devices merely allow the two standards to run side by side on their different frequencies, as opposed to communicating on the same frequency.

HOW DO I KNOW WHICH WLAN STANDARD IS USED ON MY TOSHIBA NOTEBOOK?

Refer to the Toshiba product specifications page and use the search tools to locate your model. The WLAN standard and the corresponding WLAN standard will be listed on the site.

HOW DO I UPGRADE MY NOTEBOOK FOR WIRELESS SUPPORT IF IT IS NOT ALREADY EMBEDDED?

Upgrading is a simple matter of selecting the correct mini PCI card (also called a network adapter). The Toshiba website provides a search function to locate devices compatible with your existing Toshiba hardware, and also provides a list of vendors where you can purchase the wireless cards. (http://eu.computers.toshiba-europe.com/cgi-bin/ToshibaCSG/options_and_accessories_search.jsp?service=EU&oldOptionCategory=4697&selOptionCategory=4696).

**WHAT IS THE DIFFERENCE BETWEEN WLAN AND BLUETOOTH™?**

Bluetooth is a wireless technology that was developed separately from the 802.11 standard. Unlike the WLAN standards, Bluetooth supports a very short physical distance range from access point to wireless device. Bluetooth offers a low 1 Mbps bandwidth, but at a low development cost.

Most home-based and large organization WLANs use the 802.11 standard, mainly due to the faster speed of data transfer and the broader roaming range. However, Bluetooth is beneficial for networking PDAs or cell phones with PCs.

CAN I USE BOTH BLUETOOTH AND WLAN WITH MY TOSHIBA NOTEBOOK?

Yes. Selected Toshiba notebooks provide two Wi-Fi antennae and one Bluetooth antenna to support dual-band frequency (2.4 GHz and 5 GHz) and connect via Bluetooth at the same time. The Diversity Antenna, a feature included with Toshiba EasyGuard, examines the incoming wireless signals and selects the signal that is strongest, providing you with the most reliable connection.

For a list of notebooks equipped with the Diversity Antenna, refer to the Toshiba EasyGuard website at www.toshiba-easyguard.com.