

U.S. Robotics®

Wireless Speeds and Standards – Confusion?



Background

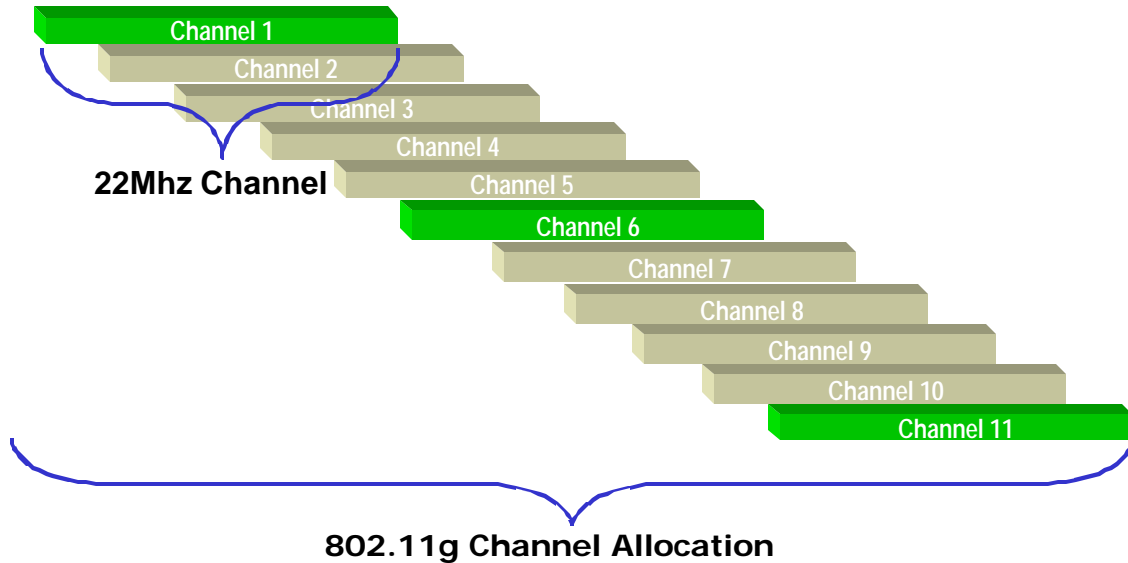
The recent success of the wireless industry in the 2.4 GHz band has produced innovative products that are compatible both with the letter and the spirit of the standards. It has generated products that make the best use of the available spectrum for network performance and compatibility. The 100 Mbps Turbo Wireless product range from U.S. Robotics remains true to the industry standards by transmitting in one channel and staying with the standard clock rates, while significantly enhancing the throughput. They deliver higher effective performance by the removal of wasted space and overheads in the wireless transmissions. It is in the customers' interest to stay with standard-compliant products, like the 100 Mbps Turbo Wireless product line, for the best, and most consistent overall performance.

The latest product variant to arrive in the market is called 108 Mbps 802.11g. While the name suggests that the customer would see faster performance with the 108 Mbps than the U.S. Robotics 100 Mbps Turbo Wireless, the numbers are actually deceiving. The U.S. Robotics Turbo products are often faster, more reliable and the universally compatible choice. The 108 Mbps 802.11g depart from the industry standards and are of questionable merit for a number of reasons which we identify in the sections that follow.

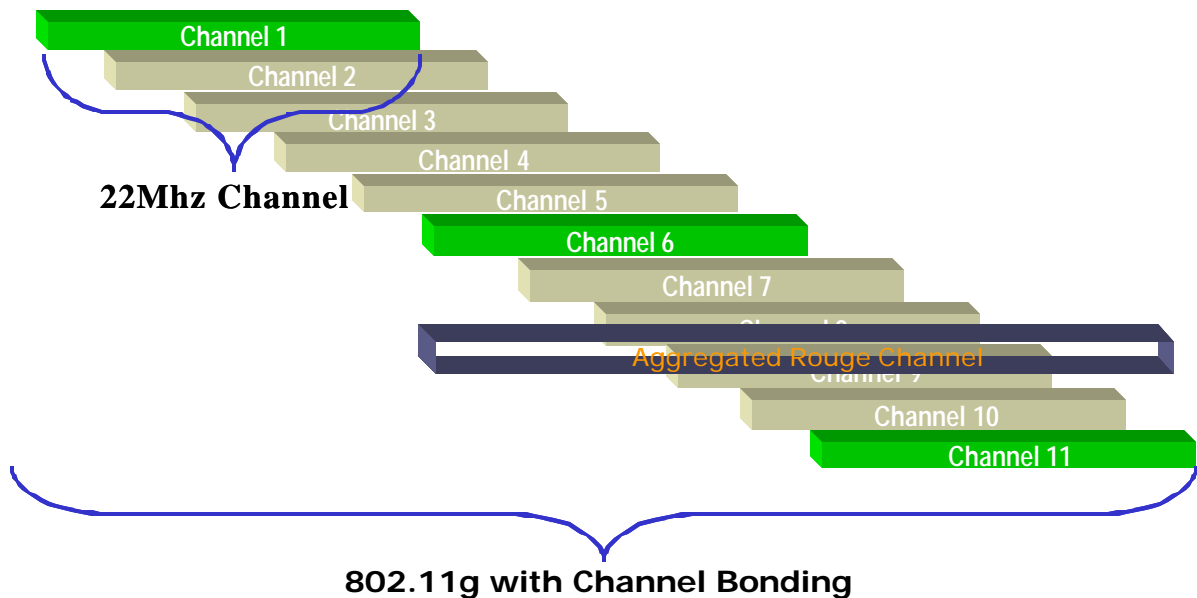
Wireless Channel Utilization

The 2.4 GHz radio spectrum, while increasingly popular both for wireless data networking, is also home to a variety of devices from wireless telephones to baby monitors and even wireless speaker systems for entertainment centers. At this time, the spectrum of the 2.4 GHz is limited (and shows no promise of being changed in the short term) so any products using more than one of the three available, non-overlapping channels (among the 11 defined for North America or the 13 defined for Europe) will cause issues for consumers.

As an example, in North America the 802.11g standard calls for the 2.4Mhz frequency to be split into 11 overlapping channels. Channels 1, 6 and 11 are considered non-overlapping. Each channel is 22Mhz wide with a 5Mhz space between them. Sounds complicated, but the diagram below basically makes the salient points.



The 108 Mbps technology being promoted by some wireless providers uses multiple radio channels simultaneously.



By aggregating channels within the 802.11g specification these products cause significant problems with other products that would naturally co-exist. This co-existence with other standards-based products in the market is vital in such a crowded space.

Wireless 802.11g Compatibility Issue

A second important issue with the 108 Mbps technology is one of compatibility. One of the primary purposes in developing and defining a standard is for companies to be able to deliver products to the market that interoperate. The industry has tried, and to a great extent succeeded, in this regard. This has led to a high level of confidence amongst customers, which in turn has led to an incredibly rapid acceptance of the 802.11g products.

In interoperability testing of one competitor's 108 Mbps Access Point (Base Station) it was found that nearly 60 seconds passed while a standards based PC Card attempted to connect, and it was only successful after the AP dropped out of 108 Mbps mode. Most people expect connection times to be much quicker than this, with the result that some potential customers could be put off by 'wireless performance'. This is not good for the industry or the consumers of the technology.

Also, only running in standard 54 Mbps mode will 108 Mbps products support the other vendors' products. In a mixed mode environment (i.e. one where you have standards based 802.11g products or even 802.11b products) the 108 Mbps AP would not provide you with the speed boost anticipated - even between the same vendor's client devices (e.g. PC Card, PCI Card, etc.).

Support and Management

With the growth of 802.11g wireless networking, there has been a concurrent growth in the management tools available to businesses to support and manage their networks. This is another area where a network that deployed the 108 Mbps technology will have issues. For instance tools such as NetStumbler, which are commonly used to plan and monitor wireless networks, are not able to see the 108 Mbps signals. These tools are typically used for spotting rogue Access Points in a business network and would be useless. With security an area of great concern for many customers (as it should be for all customers) venturing outside the standards to such an extent that management and security solutions no longer are effective is a cause for alarm. By devaluing products such as NetStumbler, the industry risks taking a backward step in this important area of improving the security of wireless networks.

Wireless Network Design and Implementation

As wireless networking matures the products available to assist customers in the design, implementation and troubleshooting do also. Products often provide flexibility that allows customers to customize their implementations. For example, the U.S. Robotics 802.11g Wireless Turbo Multi-Function Access Point has

removable antennas that allow you to meet specific needs with high gain or directional antennas. It also has adjustable power levels, so you can adjust the coverage area. This type of flexibility is dependent on products that stick to the standards developed for 802.11g wireless networking. It is extremely difficult to implement a wireless network if products do not stick to the IEEE radio channel rules.

It is often the case that a network or community will contain multiple access points or wireless bridges that require multiple channels to avoid interference. Fundamentally, any technology that does not support concurrent operation of 3 channels, such as 108 Mbps technology, prevents correct network planning, both inside and with the community of users. One 108 Mbps network within an office tower, for instance, could cause incredible issues with neighboring networks.

108 Mbps, 802.11g Standard and Wi-Fi

Lastly, though it has been implied, 108 Mbps is NOT a part of the 802.11g standard and Wi-Fi. Today the standards only allow for the following nominal rates: 11, 22 and 54 Mbps. While the standards do not preclude the designers from inventing proprietary protocols or modulation options to provide greater throughput which would normally require higher nominal rates (and advertise these equivalent nominal rates based on relative bottom-line performance), these enhancements should not be claimed to be part of the standard. If such enhanced operating modes support mixed-mode they can be considered standard compliant (i.e., both enhanced operation amongst enhanced devices and standard 802.11g operation with standard devices in the same network). Unfortunately, 108 Mbps does not support mixed-mode.

In summary, for the best overall performance, consumers should stay with standard-compliant products. The 100 Mbps Turbo Wireless product range from U.S. Robotics transmits in one channel, maintains the standard clock rates but does significantly enhance the throughput, giving higher effective performance, by the removal of wasted space and overheads in the wireless transmissions.
