

State of the UWB industry

While the IEEE failed to reach consensus on UWB, efforts of the WiMedia Alliance and others has created a huge wave of momentum to ensure its worldwide adoption.

By Jeff Ravencraft and Stephen R. Wood

The closing of 2006 has initiated an increase in the momentum behind ultrawideband (UWB) technology as the industry prepares to launch end-user applications, by way of Certified Wireless USB. While manufacturers are putting the final polish on consumer products and the radio chips that drive them, organizations like the WiMedia Alliance and the USB Implementers Forum (USB-IF) are working on regulatory adoption in preparation for a worldwide market. As this awaited launch draws near, it is important to remember how UWB technology emerged and the vision for the future.

Standards

After a three-year debate within IEEE failed to reach consensus over two UWB modulation techniques, the participants supporting multiband orthogonal frequency division multiplexing (OFDM) and direct-sequence UWB voluntarily ceased IEEE-sanctioned work on UWB standardization. The committee was officially dissolved in January 2006. This occurrence marked the escalation of UWB efforts within two competing organizations: the WiMedia Alliance and the UWB Forum. With the objective of creating a true global standard, the WiMedia Alliance began working with Ecma International before parting from IEEE. Because the Ecma proceedings

were handled under different procedural rules, the WiMedia Alliance was able to generate an approved standard (Ecma 368 and 369) by December 2005.

Ecma 368, which describes the physical (PHY) and media access control (MAC) layers, was subsequently delivered to and approved by the European Telecommunications Standards Institute (ETSI) for use

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within Europe. The Ecma international standards were also combined and submitted into the ISO approval process. They were voted on and are expected to be finalized before the end of 2006. The intent of ISO approval is to establish international recognition for the standard.

This round of standardization is built on the current United States regulations, which provide authorization to use 3.1 GHz to 10.6 GHz of spectrum. As other countries finish their regulatory processes, the standards will be updated to reflect those conditions.

Regulations

Obtaining regulatory approval worldwide is vital to the success of UWB and the products that are dependent on this radio platform. This process was initially started in 1998 and is now coming to fruition. The Federal Communications Commission (FCC) was first to issue rules to allow UWB in early 2002. Once these rules were established, a great deal of work was done to exhaustively evaluate UWB in the International Telecommunications Union (ITU), Europe and Asia. The work within ITU provided a body of data and recommendations that are now being reviewed by countries around the world. Following the conclusion of the ITU evaluation, Japan issued UWB rules in August 2006. Canada, Europe and South Korea

appear to be following suit with acceptance expected between now and mid-2007. By that time, a worldwide UWB footprint should to be established in all major geographies. China is also evaluating UWB and anticipates having regulations in place by the end of 2007.

These regulatory decisions will provide enough spectrum to enable the launch of the UWB industry. This progress, however, does not indicate the conclusion of UWB efforts. Because this is the first time regulators have used the underlay tech-

nique, where spectrum is allocated by overlapping a broad group of allocations, countries are being cautious with regulatory requirements. As more data about UWB's operational characteristics is gathered from industry practice, further refinement of the allocations is probable.

Special interest groups

As a technology, UWB enables applications in the consumer electronics, personal computer and mobile handset markets. The USB-IF is the principal organization managing products in the PC peripheral and CE environments. In the mobile handset market, the Bluetooth SIG is currently the principal organization.

In practice, the PC, CE and mobile handset applications operate near a personal computer and around a television. If each active industry group were to generate a separate UWB radio design to address these needs,

there is a high probability that an unacceptable level of interference would occur. At the very least, the devices would not communicate and market fragmentation, coupled with customer confusion, would result. To combat these potential problems, the WiMedia Alliance structured an approach whereby it created a common radio platform that is shared with multiple protocols such as Certified Wireless USB, Bluetooth and WiMedia's IP stack. Through this approach, it is possible for devices to coordinate their activity, avoid interference and maximize economies of scale.

Launch expectations

UWB is rapidly approaching market launch. Engineers are presently completing final work on interoperability testing and certification. It is expected that this work will be finished and products will start to arrive in customer hands during the last quarter of 2006 and first quarter of 2007. Initially, there will be chips provided from approximately six manufacturers, with this number growing rapidly over the course of the first 12 months. Approximately 12 to 15 manufacturers are believed to be preparing UWB chips for market.

Certified Wireless USB from the USB-IF will be the first UWB protocol to be in products by the end of 2006. Initial products will include host wire adapters (HWA) in the form of dongles or add-in-cards, which will upgrade legacy PCs. Device wire adapters (DWA) will also be available in the form of Wireless USB hubs to upgrade legacy peripherals. First products will introduce the Certified Wireless USB technology and allow users to bring the technology to their legacy equipment. As the marketplace transitions, expect to see the integration of Certified Wireless USB technology into such things as cameras, external hard drives, PCs, printers, and MP3 players—the same applications that support wired USB today.

Certified Wireless USB is the future of mobility. Soon, consumers

will experience a wireless personal area network (WPAN) where hosts and devices interoperate seamlessly, easily and securely without clutter, regardless of their location. It will preserve the functionality of wired USB while also unwiring the cable connection and providing enhanced support for streaming media CE devices and peripherals. Built from the ground up and optimized for a wireless medium, Certified Wireless USB supports high data-rate wireless connectivity and delivers the same speed (480 Mbps at three meters and 110 Mbps at 10 meters) and ease-of-use experienced with wired USB today. It is powered by the WiMedia UWB Common Radio Platform as developed by the WiMedia Alliance. UWB technology delivers a solution for high bandwidth, low-cost, low-power consumption, and physical size requirements of next-generation consumer electronic devices.

Built to perform, Certified Wireless USB is optimized for power management, operating system (OS) support, and data throughput and bandwidth allocation for isochronous support. To ensure performance, the USB-IF will provide testing capabilities for Certified Wireless USB compliance and certification. Member companies can test products for interoperability and compliance to the specification through the Certified Wireless USB compliance and certification program. This program will ensure high-quality, interoperable products enter the marketplace. Member companies whose products receive certification and have signed a logo license agreement with the USB-IF, are permitted to use the Certified Wireless USB logo on all certified products. The USB-IF will promote logo adoption through the Certified Wireless USB logo awareness program, which communicates the brand promise to OEMs/ODMs, the channel and the general consumer. **EWT**

ABOUT THE AUTHOR

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