WHITE PAPER

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A global wireless power standard will open the market, encourage consumers to live without power cords

Introduction

As the groundbreaking capability to charge electronic devices without relying on cords continues to grow, a universal wireless power standard that defines common expectations and experiences becomes increasingly important. .

The growing wireless power market – with more than 230 products on store shelves – promises that customers can charge their mobile phones, tablets and other devices wherever they go without having to carry chargers, cables or adapters.

While the market for wireless power is still relatively small, it's growing quickly and is expected to continue at a rapid pace. About 5 million wireless charging units were shipped in 2012. Research firm IHS estimates that 100 million wireless power devices could be in use by 2015. The market today is focused primarily on products for mobile phones, but is expected to include products for industrial, automotive and other consumer goods in the future.

The continued development of the wireless power market depends on broad consensus about technical standards that will ensure interoperability across products and platforms. Much like the standard established by the Wi-Fi Alliance that delivered seamless wireless networking, a standard for wireless power will free millions of people around the world from the inconvenience of power cords.

Three standards bodies at different phases of development are jockeying for position in this still-emerging market. Texas Instruments (TI) is a member of all three organizations.

The first and most-adopted wireless power standard started being developed in 2008 by the Wireless Power Consortium (WPC), a body that has grown steadily and has established the Qi (pronounced "chee") global standard. The WPC's website lists more than 140 members, and the organization has certified more than 230 products. It includes semiconductor manufacturers, mobile phone makers, companies that build magnetic coils, test equipment manufacturers, and companies that test and certify products.

A second standards body, Power Matters Alliance (PMA), was formed in 2012 and offers an alternative solution. Its website lists more than 70 members. A third body, Alliance for Wireless Power (A4WP), was also introduced in 2012 and has more than 40 members.

The standards developed – or under development – by these three bodies differ. They typically define requirements for transmitters that will deliver power, receivers such as mobile phones that will use the power and a communications protocol for devices. For example, current standards established by WPC and in development by PMA rely on tightly coupled systems, which means that transmitter and receiver coils must be closely aligned for wireless charging to take place. Both organizations also are developing loosely coupled extensions to their standards that will provide a larger charging area, charge multiple devices and be backwards-compatible. A4WP is developing standards based on a loosely coupled system that provides a larger charging area and ability to charge multiple devices.

However, standards are complex and are comprised of more than electronics. A successful standard requires:

- **An active, growing consortium** with a membership that works together to reach consensus on standards.
- **Published technical specifications** that enable companies to design and build products.
- **Approved transmitter designs** that support and communicate with different types of receivers. WPC has certified 20 types of transmitters, PMA is working on one and A4WP is developing three.
- **Receiver-equipped devices** such as mobile phones, cameras and other handheld products.
- **Interoperability** that ensures transmitters and receivers work together seamlessly.
- **Regulatory approvals** required to ensure that a product can be marketed and sold in different regions around the world.
- **Service providers** Verizon and DOCOMO Innovations have chosen to use the WPC standard, while AT&T has chosen PMA and T-Mobile is a member of A4WP.
- **Established test houses** to certify that products meet technical specifications. In addition to receiving certification, manufacturers learn from the testing process. WPC has engaged nine test houses that have approved more than 230 products, while PMA and A4WP will identify test houses that support their standards in the future.
- **Certified products** on the market. Competitive products from multiple companies enhance performance and reduce costs for consumers eager to live free of power cords. Products using the WPC standard are on the market; products certified by PMA or A4WP standards are expected to be on the market in the future.
- **Availability of integrated circuits**, which enable the development of innovative products and will speed the adoption of wireless power worldwide. Silicon solutions are designed after specifications are set. Five semiconductor manufacturers, including TI, currently sell ICs that meet the WPC standard, and some of their devices represent the second or third generation of wireless power technology.

The market is beginning to gain momentum. Mobile phone service providers are choosing which standards to incorporate into their devices. A major coffee chain has selected a standard for the wireless power infrastructure in its shops. About 10,000 wireless charging stations are expected to be available in Japan by the end of 2013. But some industries – such as automobile makers – are waiting to see which standard will become dominant before making the significant investment required to include wireless charging in all their products. Three auto makers have committed to implement Qi transmitters in at least one of their models.

One of the three organizations promoting specifications – Wireless Power Consortium, Power Matters Alliance or Alliance for Wireless Power – likely will become dominant as the market matures. It's also possible that these specifications might converge or that some products could be designed to support multiple standards. Designers today rely on discrete ICs supporting one specification, but we believe they will quickly move toward circuits with dual-mode wireless power capability, such as those demonstrated by TI.

A universal standard is important because it will drive wider adoption of wireless charging and ensure customer satisfaction and backwards-compatibility as the technology evolves. Without a common standard, however, the market for wireless power is likely to remain relatively small.

A major key to ensuring a robust, healthy market is to avoid a prolonged conflict over the transition to a universal standard. A standards war will slow the pace for wider adoption of wireless power, stifle innovation and keep costs higher for consumers.

Ultimately, customers want to build products that will be used by many consumers around the world. A global standard will be critical for successfully cutting the power cord.

Summary

Broad consensus about a universal standard for wireless power will ensure interoperability across products and platforms, drive demand for wireless charging, and build momentum for continued development of this promising market.

The Wireless Power Market

WPC
- Established 2008, inductive based, **exploring Mag Res**
- **140+ members**
- **Shipping in volume today**

PMA
- Established 2012, inductive based
- 80+ members
- **Powermat, AT&T**
- **Ecosystem yet to be established**

A4WP
- Established 2012, **Mag Res based**
- 40+ members
- **Samsung and Qualcomm primary drivers**
- **Ecosystem yet to be established**

Market Assessment of Standards (information based on public sources)

	Wireless Power Consortium	PMA	A4WP
Member Companies	140+ members	80+ members	40+ members
Active Consortium	Yes	Yes	Yes
Specification Published	Yes WPC1.1, public	Yes PMA1.1, members only	Yes V1.0, members only
Approved Tx Types	>20	In development	In development
Test Houses Established	9	In development	In development
Certified Products	160	In development	In development
IC Solution Available	Yes (~5 suppliers)	Two in development	None public
Production Coil Set Available	Yes	In progress	In progress
Regulatory Approvals	Yes	Yes	No
Infrastructure Play	U.S., Japan, Europe	U.S., Europe	None
Comments	Well established, products in market, wide design flexibility	Strong U.S. player, strong AT&T support, early stage	Strong push by Samsung and Qualcomm, active development ongoing

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