Evolving Smart Technologies Across Home Appliance and Consumer Electronics Markets
Contents

Talking Refrigerators and Other Emerging Trends .................................................. 2
Chapter 1: New Technologies in Home Appliance and Consumer Electronics Markets ................................................................................................................................. 3
Chapter 2: The Energy Efficiency Challenge .............................................................. 7
Chapter 3: Get There First, Get There Fast ............................................................... 9
Chapter 4: Future-Proof Your Product with Intertek ................................................. 12
Bibliography ............................................................................................................... 14
Talking Refrigerators and Other Emerging Trends

The advent of smartphones and tablet computers have enabled people to stay connected at all times. People tweet, post and update across various social media networks, receiving almost real-time feedback from friends, family and followers. Many track their finances and spending trends on Mint.com and other aggregated financial tools. Social media guides us every step of the way, so it is no leap of faith to expect our home appliances to do the same. Why wouldn’t a household refrigerator automatically tell consumers which recipes they can make from the ingredients they have on hand, or rather than let them discover that the milk has gone bad, just order more, providing a seamless experience?

As the cost of the technology to manufacture and power smart appliances has decreased, consumer expectations for the next generation of smart appliances have increased. Consumers now expect their appliances, smart or otherwise, to provide interconnectedness, intelligence and longevity. These advanced features impact energy consumption which in turn affects consumers’ utility bills. According to a TechNet poll conducted by Zogby International (1), if Americans are given the technological solutions in the form of smarter, more sophisticated and more environmentally friendly products and services, 74% of them are likely to change their energy usage to save money on their utility bills. However, the increased complexity of these products can lead to challenges in getting them to market quickly.

In today’s ever-changing market, it is more important than ever that your product not only delivers what it promises, but also exceeds customer expectations, enabling you to establish and build potential buyers’ trust in your product and win valuable mind share and market share, thereby increasing your profits. To meet the requirements for sale or distribution within North America and globally, you need to prove that your product is compliant with stringent safety and performance certifications, thus these requirements need to be an integrated part of your design and manufacturing lifecycle.

A testing and certification laboratory can smooth the way through regulatory certification, answering any questions you may have about applicable safety and performance standards for smart home appliances or consumer electronics in your target markets. As improved technology drives consumer expectations ever higher, your partnership with a testing and certification lab will ensure that your product remains compliant with evolving safety and performance standards and keeps up with emerging global trends. A strong partnership will help you avoid surprises and eliminate obstacles, thereby increasing your product’s speed-to-market while saving you precious time and resources.
Chapter 1: New Technologies in Home Appliance and Consumer Electronics Markets

In September 2010, the National Bureau of Economic Research (NBER) released its official assessment that the US emerged from the Great Recession in June 2009. The U.S. Commerce Department reports positive key economic indicators that may indicate pent-up consumer demand, including an increased amount of disposable income and higher household savings rate. In the home appliance and consumer electronics markets, this pent-up demand is clearly illustrated by the end-of-year sales, which hit a low in December 2009 (Figure 1). Data shows that sales have recovered to pre-recession levels and are projected to continue climbing.

![Figure 1: US CE and Appliances Monthly December Sales, 2008-2010 (2)](image)

The global economic recovery, particularly in emerging markets, has been even stronger than in the US, as reflected in the Brazilian market’s home appliance and consumer electronics sales. This market showed an increase of 11% in 2010 and is predicted to climb another 13% in 2011, reaching an unprecedented $140 billion in annual sales (3).

Home Appliances Market Trends - Connectivity

According to Pike Research, no longer is it a distant dream to imagine household items that can be remotely turned on and off or contact repair staff when necessary. Imagine if your refrigerator could recommend recipes based on what items were in the refrigerator. As more and more home appliances are able to connect wirelessly to smartphones, tablets and other devices, no longer will refrigerators, washers, dryers, dishwashers and ovens be just “plain” white goods. As illustrated in Figure 2, the market for these connected appliances is expanding rapidly and is projected to reach $6.2 billion by 2015, an increase from $40 million in 2010 (4).
Government subsidies are expected to drive the rapid development of the smart, energy-efficient home appliance market. Major manufacturers, supported by connectivity technology partners, will be another driving force, as consumers are expected to begin purchasing larger energy-efficient appliances such as refrigerators, dishwashers, clothes washers, dryers, stoves and ovens.

Today, the United States’ household appliance manufacturing industry consists of about 300 companies with combined annual revenue of more than $20 billion. The industry follows the 80/20 rule with the top 20 companies generating about 85% of the revenue (5).

The trends for home appliances can be summarized in four main areas:

- Functionality
- Aesthetics
- Technology
- Energy efficiency

A greater focus on health and well-being is one lifestyle trend carrying over into home appliance selection and consumer expectations. With the increase in social and environmental consciousness, many consumers are looking for ways to reduce their impact on the environment. Driven by the desire to help the environment and to save money, consumers will seek appliances that are energy-efficient and cost-effective. In an effort to cut manufacturing and shipping costs as well as to be responsive to consumers’ desires, many companies are now realizing the direct and indirect cost benefits of going green.
Consumer Electronics Market Trends

According to research provider IHS iSuppli, the consumer electronics market, which is comprised of televisions, stereos and audio components, portable media players, set-top boxes, gaming devices, DVD and Blu-ray players, digital cameras, projectors and camcorders, digital picture frames, e-book readers, and consumer appliances, is projected to reach 1.60 billion units in 2011, up from 1.56 billion in 2010, as illustrated in Figure 3 (6).

However, in terms of revenue for 2011, the consumer electronic market is not predicted to grow by nearly as much as unit shipments, due to the substantial price declines beginning in 2010 and expected to continue into 2011, impacting certain devices such as e-book readers.

In the United States, the consumer electronics devices market, which encompasses computing devices, mobile handsets, and AV products, has projected revenues of around US $232.9 billion in 2010. By 2014, it is expected to increase to US $268.1 billion at a CAGR of 3.6%. This increase is driven primarily through the sale of premium televisions, smartphones and notebooks (7).

One trend that IHS iSuppli notes is that media tablets are expected to be the fastest-growing market in 2011 for microelectromechanical systems in the consumer electronics and mobile segment. Sales of microelectromechanical systems for use in tablets are projected to more than quadruple to $140.4 million this year (8).

In determining the success of consumer electronics devices, consumers’ perception of each device’s long-term future in a connected home remains a major factor. Widespread access and connectivity truly represent the evolution of consumer electronics.
Staying Ahead of the Curve

There is tremendous pressure upon appliance and consumer electronics manufacturers to be first-to-market with better, faster, more cost-effective and energy-efficient products. Even upon delivering the best new product on the market, manufacturers must contend with the ensuing batch of similar products from their competitors. Thus, to remain competitive and to keep up with changing technologies, manufacturers must continually upgrade and even completely reinvent their products. Though the US may be the dominant smart appliance market today, it is predicted that other emerging markets will be close behind, with the Chinese market expected to increase dramatically in just four years (9).

![Figure 4: Smart Appliances Revenue Forecast, 2011-2015](image)

With a softer consumer market, many consumers are becoming more energy-conscious, choosing to invest in ENERGY STAR® appliances and other energy-efficient devices to cut costs and help the environment. The rapid growth and widespread support for this green movement will have a major impact on manufacturers, utility companies and the environment. Approximately two thirds of all household electricity is consumed by kitchen appliances, lighting and heating, ventilation, and air conditioning (HVAC) systems (Figure 5). Thus, not only do appliances need to be greener and smarter, but lighting and HVAC need to be considered as part of any energy-efficient solution.

![Figure 5: Residential Electricity Consumption by End Use (2001) (10)](image)
Chapter 2: The Energy Efficiency Challenge

Smarter Products for a Smarter Grid

Smart energy demand is a broad concept, encompassing any energy-efficient users’ actions, including reducing peak demand, lowering total energy consumption and buying more efficient appliances and equipment.

To encourage consumers to limit electricity usage during periods of peak demand, utility companies are beginning to install smart meters, which enable them to implement time-of-use pricing structures. This allows consumers to enjoy lower electricity prices during periods of lower demand, while enabling utilities to charge higher prices during periods of high demand. By 2012, Park Associates estimates that 44 million smart meters will be installed on homes in the United States (11).

Smart appliances, as shown in Figure 6, will be key to the success of a smarter grid, enabling utilities to more reliably and efficiently deliver electricity to consumers. By 2015, the smart washer will have taken the lion’s share of this smart appliance market. As the United States continues to face significant energy challenges, the smart grid will become increasingly important. Currently, the United States’ electric grid costs businesses more than $150 billion annually (12). To further compound these challenges, global energy consumption is expected to triple by 2050 (13).

![Figure 6: Revenue Forecast by Type of Appliance by 2015 (14)](image)

Smart, connected homes will help shift peak energy usage within the United States, offering vast possibilities in overall energy management and savings. Smart appliances will allow consumers to realize the cost savings of shifting their energy usage to off-peak times, while also benefiting the environment.

As smart grid technologies continue to improve and consumers continue to demand higher performance and interconnectedness from their appliances, major advances will be made possible with real-time information about energy creation, transportation, storage and usage. By providing consumers with transparency into electricity costs during peak and off-peak hours, a growing number of socially- and environmentally-aware consumers will be empowered to assess and react to their own environmental impact.
In response to consumer demand and economic necessity, even large corporations such as Walmart and Best Buy have identified sustainability as a key strategic goal, thereby driving their supply chain to comply by manufacturing ENERGY STAR qualified appliances.

**Phantom Power – Always-on and Always Costly**

Many household appliances, like microwaves and televisions, spend the vast majority of time in stand-by mode. Even when they are plugged in (but turned off) they still use electricity. In fact, some studies have found that appliances in stand-by mode (aka phantom mode) can consume up to 13% of the total household energy consumption. In order to reduce this needless power consumption, new voluntary certification programs, like the ENERGY STAR program, are being put in place to encourage manufacturers to make more energy-efficient products. By 2012, the goal is to have new products meet the one-watt standard, meaning that products could be ENERGY STAR qualified if they consume less than 1 watt in phantom mode (15).

Let’s take a look at the role a testing and certification lab plays in a product’s success within this smarter, greener market.

**Certification Labs: Your Partner for Going Green**

As consumers become increasingly aware of environmental issues, manufacturers will feel the pressure to earn energy efficiency certification for their home appliances and consumer electronics. Cash-conscious consumers are increasingly concerned with what they are buying, how much electricity it consumes, whether it is connected, and how long it will last.

Partnering with a testing and certification laboratory allows manufacturers to not only fulfill government requirements, but also gain insight into regulations that shape the industry. This partnership also helps manufacturers to simplify their energy verification process, while producing products with a competitive edge, and allowing them to achieve first-mover advantage, as detailed in the next chapter.
Chapter 3: Get There First, Get There Fast

The race is on: Energy Efficiency and Government Subsidies
As mentioned earlier, the smart appliance market is being driven by a trend towards energy efficiency and transparent pricing, and aided by government subsidies. Although China currently leads in total smart grid stimulus funding with $7.3 billion, the US leads in smart grid stimulus per capita.

![Figure 7: Appliance Energy Efficiency: Smart Grid Funding, 2008-2010 (14)](image)

While different geographical markets may have similar safety requirements, each country or region may have national or regional regulatory concerns, or may provide different options to enable manufacturers to meet these requirements. Depending on market expectations, manufacturers may also need to consider voluntary certification marks. Navigating these major and minor differences could result in considerable delays in introducing new products to the market.

In addition, regulations and compliance requirements tend to evolve with changing technology, consumer awareness and expectations. Therefore, keeping products already on the market in compliance with these evolving standards requires constant vigilance.

Breaking the EMC Barrier to Global Markets
To gain access to global markets, your appliance or consumer electronic device must meet EMC (electromagnetic compatibility) requirements across multiple markets. Partnering with a testing and certification lab is the best approach to assessing the applicable regulations and standards for your specific product and region to avoid obstacles and delays.

As trends indicate the migration of appliance technology from electromechanical to programmable, electronic and wireless has significant consequences for EMC design
and regulatory compliance. Even for simple appliances, the designer may be faced with unfamiliar standards governing user safety and radio interference.

Whether EMC is subject to government regulations in a particular market or not, EMC can be an important design goal to assure reliable appliance operation and to avoid interference with nearby devices and radio services. Utilize EMC testing to ensure proper communication between your appliance and the device with which it communicates.

Incorporating the testing and certification process from the beginning of the product development lifecycle is crucial as the following factors should be considered during the early hardware and software design stages (16):

- Emission compliance
- Disturbance power compliance
- Harmonic and flicker emissions compliance
- Susceptibility/immunity compliance
- Communications compliance
- Product safety
- Functional safety
- Electromagnetic exposure
- EMF compliance
- RF exposure compliance
- Interoperability

The Certification Lab Advantage

If your product lacks proper certification or fails to perform reliably in its intended working environment, it can cause injuries, legal woes, customs delays, and considerable damage to your brand reputation. The appropriate safety, performance and efficiency marks on your product indicates to the consumer that your product has been independently tested and found to be compliant with applicable regulatory requirements for sale or distribution within your target markets.

With extensive knowledge and experience, a certification lab partner can help you avoid delays and increase the likelihood that your product will be certified. In addition to ensuring compliance with regulations, a certification lab partner offers:

- **Improved productivity**: By incorporating critical construction criteria and compliance requirements from the design stage to the end of the product’s lifecycle, your productivity will increase.

- **Cost reduction**: Minimizing design iterations or production delays saves money! Emersion of your certification lab partner into your design team delivers this key benefit.
• **Feature velocity:** A lab should provide fast quality service that improves your speed-to-market. Quick turnarounds on quality evaluations and certification marks are crucial to enabling your product to succeed in this ever-changing green market.

• **Customer value:** A certification mark on your appliance ensures customers that they are getting a high level of performance, safety and efficiency.

• **Market differentiator:** Certification and approval marks guarantee your product’s safety to your channel of distribution (retailers, wholesalers, etc.). Maximize your product’s potential and access to the global market.

As you begin development on a new product, creating a strategic alliance with a lab can help accelerate your entry into more countries and provide a cost-effective solution throughout the product’s lifecycle. By integrating the safety and performance requirements of your target markets into your development cycle, you can get your product to market faster and more confidently.
Chapter 4: Future-Proof Your Product with Intertek

Why Intertek is the Clear Leader for your Certification

Intertek is a Nationally Recognized Testing Laboratory (NRTL) staffed by a global force of engineers committed to providing consumers with real answers to their concerns regarding regulatory and certification compliance. Delivering timely market access and professional service, Intertek can provide the ETL Mark as well as many others. The ETL Mark is recognized as the fastest growing electrical safety mark in North America.

In the European Union, the ETL-EU mark is the new mark of truth, the first pan-European Union mark of its kind, guaranteeing that the product complies with applicable European Union (EU) safety standards and directives. This certification will give the market truth and transparency, not typically found with CE Marking alone (17).

Intertek’s ETL Mark has clear benefits:

- **Third-party assurance:** Your home appliance or consumer electronic device is certified by a renowned certification body – Intertek.
- **Expedited Verification:** We offer a fast and simplified process for authorities and customs officials by maintaining telephone hotlines and searchable online directories.
- **Speed to Market:** The timeframe in which products are tested and listed is the fastest on the market. This allows you to be more competitive.
- **Increased Revenue:** Getting your products to market faster maximizes your revenue potential, increasing mind and market share.
- **Variety:** Intertek’s combined services offer you multiple testing options. In addition to cETLus (Canada and the United States), we provide ETL Sanitation, ETL Field Evaluation, ETL EU (Europe) and other proprietary marks such as the Green Leaf for energy efficiency testing, and QPM for quality and performance testing.

As a compliance partner, Intertek is committed to making conformity assessment more flexible and accommodating so that manufacturers can view the regulatory process as a value-add opportunity within product development cycles.

The ENERGY STAR® Label and the ETL Mark

Intertek is a thought leader and trailblazer in smart appliance technology. We were among the first laboratories in the world to obtain status as both an EPA-Recognized Testing Laboratory and an EPA-Recognized Certification Body (CB). Furthermore, Intertek was the first recognized CB to cover certification for all gas and electrical ENERGY STAR product categories.
Intertek is uniquely positioned to deliver usable, intuitive, and cost-effective Energy Related Products (ErP) solutions, which are comprised of any goods that impact energy consumption during use. If you are selling (or wish to sell) products to the European market, Intertek’s consulting, training and compliance verification services can help you meet applicable requirements. Please refer to Intertek’s white paper ErP Directive: Analysis of the Household Refrigerating Appliances Implementing Measure (18).

As one of the largest third-party global energy efficiency testing organizations, Intertek maintains 19 EPA-Recognized Testing Laboratories throughout North America, Asia and Europe. In both smart appliances and consumer electronics markets, Intertek leads testing and certification advancements via its continuous education and training programs, available worldwide.

Smart Testing Now
Starting today, you can leverage Intertek’s global network and compliance expertise for your appliances (whether smart-enabled or not) and consumer electronics. The apparent increase in consumer awareness of environmental issues related to their products and devices has heightened the need for manufacturers to pursue Energy Efficiency testing. Creating a strategic alliance with a lab can help accelerate your entry into global markets and provide a cost-effective solution throughout the lifecycle of your product. Consumers are growing more concerned with what they are buying, how much electricity it consumes, and how long it will last.

You may have quite a bit to do before your current home appliances and consumer electronics are ready for the “smart” world, but when refrigerators and other appliances start talking, you’ll be ready.

Begin Today
To learn how Intertek can partner with you to and help you meet your home appliance or Consumer Electronic testing and certification, please contact Intertek today at 1-800-WORLDLAB or icenter@intertek.com.
Bibliography

(1) http://www.technet.org/pr4jan2010/
(3) http://www.abinee.org.br/abinee/decon/decon15.htm
(4) http://www.pikerresearch.com/blog/articles/smart-appliances-as-fictional-as-the-jetsons
(7) http://www.prlog.org/11005840-united-states-consumer-electronics-report-q4-2010-now-available-at-fast-market-research.html
(9) http://www.remanufacturing.org.uk/pdf/story/1p293.pdf
(10) http://www.pewclimate.org/technology/overview/electricity
(13) U.S. Army Corp of Engineers, 2005 (www.itsyoursmartgrid.com)
(15) http://www.economist.com/node/5571582
(16) Intertek: White paper “Effects of EMC on Smart Appliance Designs US”.
(17) http://www.intertek.com/marks/etleu/
(18) http://www.intertek.com/electrical/erp-directive/electric-motors/white-paper/