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**PATENTS**

Ropes & Gray attorneys contend that the technological diversity involved in Internet-of-Things offerings will create new competitors facing an unbalanced licensing environment, lead to more litigation, and complicate standards development and adoption.

**Internet of Things: Next Patent War Zone**

BY STEVEN PEPE, KEVIN J. POST, AND LANCE W. SHAPIRO

The Internet of Things, or IoT, has the characteristics to become the next patent war zone as new standards are adopted and the convergence of disparate technologies leads to new disputes. This convergence of technologies will likely result in an increase in litigation between both traditional competitors and companies that historically have not competed. While there are numerous legal issues associated with the emergence of IoT-enabled technology, patent lawyers and in-house counsel should be aware of three particular issues.

First, the convergence of different technological fields and patent licensing schemes may lead to atypical rates proposed during licensing negotiations, including very high royalty rates that may prevent a product from being successful in the market or very low royalty rates that dis-incentivize future innovation. Second,

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the convergence of technology and resulting complications in licensing negotiations may result in an increase in litigation. Third, because convergence of technology may complicate the patent licensing environment for IoT technology, there may be an increase in patent pool activity, specifically involving those that directly deal with IoT-specific issues or technological fields, in an effort to address the wide disparity in sales prices for IoT devices. Finally, fair, reasonable, and non-discriminatory (FRAND) licensing of patents essential to IoT standards (or standards that relate to IoT technologies) will become more prominent.

Each of these primary issues is discussed in more detail below.

**IoT Technology and the Consequences of Convergence**

IoT is a ubiquitous term generally describing technology that is connected, operated, and manipulated through its connectivity with the internet, and more importantly, other IoT-enabled devices. Devices that use traditional, non-IoT technology usually operate as independent devices with limited connectivity.

For example, a sport utility vehicle (SUV) in a non-IoT world could connect to a dealer or manufacturer through a local network or physical connection, and typically only for a limited purpose. In the IoT world, however, an internet-connected SUV can interoperate with many diverse devices in different ways, such as receiving over-the-air software updates from the manufacturer, downloading third-party apps, browsing the internet, streaming video from Netflix, and communicating with a driver's smartphone and other vehicles.

IoT also allows for entire systems of multiple components and devices to be connected, amassing an immense volume of shared data that companies can leverage for the benefits of end users and for their own efficient and effective operation. Moreover, IoT changes the way that users interact with technology. For example, a wearable fitness or smart watch provides an around-the-clock connection of a user to the internet and simultaneously collects, processes, and if permitted, distributes data of the user, such as a heartbeat, steps, and GPS position.

All of these developments can increase the potential utility of an IoT device to an end user, but it will also substantially increase the risk of disputes with new competitors holding newly applicable patents.

## IoT Will Result in Increased Litigation

The emergence of IoT and the convergence of technologies will lead to an increase in both competitor litigation and litigation between traditional non-competitors who become competitors (or at least encroach on each other's technological spaces) through the emergence of IoT devices. The recent smartphone patent wars provide an example of how convergence can result in non-competitors (and even partners) becoming competitors, and the widespread litigation that can result.

For example, through 2010, Microsoft and Motorola had rarely offered competing products—Microsoft was a software company developing and selling operating systems for servers and personal computers, and Motorola was mainly a hardware and telecommunications company. But with the emergence of Motorola's smartphones (which used Android's OS) and Microsoft's Windows Phone 7 mobile phone and Surface tablet, Microsoft and Motorola became instant competitors.

Motorola licensed its standard-essential patents (SEPs), such as patents essential to the H.264 video coding standard, at a rate of 2.25 percent of the net selling price of the end product. While this program resulted in royalty rates of several dollars for a typical smartphone of that time, it would result in a royalty rate of over \$30 for a laptop computer that used Windows OS. The issue of whether the 2.25 percent rate was FRAND was ultimately litigated by the parties over several years and in multiple jurisdictions worldwide. This real-world example demonstrates just one way in which unique licensing issues may result from convergence.

For IoT technology, this issue may become more significant because of the greater diversity of technological fields involved and their wide-ranging products and price points. For example, smartphones can interact with internet-connected thermostats, lights, door locks, security systems, televisions, refrigerators, wearables, vehicles, and many more devices that implicate a wide spectrum of functionality and technologies. Devices

such as these will implicate the technology of many different companies, including those which have not historically been competitors. An IoT-enabled thermostat, as one example, may implicate a variety of communication technologies, including WiFi, Bluetooth, 3G, or LTE, that can be used to communicate with not just smartphones, but also home computers and potentially even third-party monitoring companies.

The unbalanced alignment of patent portfolios among newly aligned competitors will likely lead to a disparity in licensing leverage and potentially increased litigation. Traditionally, companies in related technological fields intentionally built their patent portfolios for the dual purpose of offensive patent assertion and defensive patent protection. In other words, competitors in the same field often had patents that were equally applicable to one another's products, which often led to mutually beneficial cross-licensing. In the IoT landscape—where a technology company cannot or could not have easily identified its future competitors and may not have patents that are applicable to a new competitor's business—there may not be the same balance of patent portfolios.

Using the example above, a company that is manufacturing an IoT-enabled thermostat may not have patents to assert against a company that is enforcing its WiFi patent portfolio. This creates an imbalance in negotiating leverage, eliminates the possibility of entering into a beneficial cross-license, and ultimately may produce more litigation.

## Patent Pools Emerge

IoT may result in the creation of new patent pools to mitigate litigation risks. In general terms, a patent pool can be defined as an agreement among multiple patent owners to license their patents to each other or to third parties. Thus, a patent pool can be used to reduce or eliminate patent litigation between the patent pool's members and increase innovation relating to pooled patents. As noted above, as IoT expands the universe of a companies' competitors, it also increases the potential risk of litigation. This risk, combined with potentially unbalanced patent portfolios and divergent licensing programs from company to company, may result in more companies opting to participate in patent pools as licensors, licensees, or both.

In simplistic terms, if company A owns patents related to thermostat technology, company B owns patents related to WiFi technology, and company C owns patents related to a cellular technology, then all three companies, as members of a patent pool sharing these patents, can each incorporate technology from these patents into their products under a pool license. Absent a patent pool, the parties would otherwise separately negotiate licenses with each other. Patent pools also can reduce the barriers to entry for cash-strapped new entrants into the IoT field. A patent pool thus can reduce transaction costs, and in the context of IoT technology, align companies within different fields to reduce the "patent thicket" (where many different patent holders own patents applicable for a device).

One IoT patent pool, Avanci, is designed specifically as an open marketplace where companies and individuals with essential wireless patents can license their innovations, and companies creating IoT-connected devices can access the patented wireless technologies

they need in order to have a commercially-viable product. Avanci is backed by Ericsson, Qualcomm, Interdigital, Sony, ZTE, and others. Avanci advertises that patents will be offered for a transparent, flat-rate price for each device and that this flat-rate price is dependent on the value the technology brings to the device.

But this pricing model raises a few potential questions, including whether the royalty rates will remain fixed regardless of the quantity, quality, and scope of the patents within the pool. If fixed, the rates must strike a balance between the interests of licensees and licensors based on the expected quantity, quality, and scope of the patents. And although, in theory, making the rate for a given device dependent on the value the technology adds is beneficial, determining this “customized rate” will require additional analysis and negotiation between multiple interested patent holders, the implementer, and the pool.

## FRAND Licensing Issues Remain

Ultimately, FRAND licensing will likely become more prominent as standard setting organizations identify and adopt standards applicable to IoT devices. Today, there is a large number of competing standards created specifically for IoT technology. To name a few, there is the Open Connectivity Foundation (OCF) (which merged with the AllSeen Alliance), oneM2M for network layer connectivity, IEEE Standards Association’s P2413 draft architectural framework, Thread for household IoT technology, the Industrial Internet Consortium (IIC) for industrial use, and the International Society of Automation (ISA) ISA100 Wireless standard. As with other standards, the patents covering aspects of these standards likely will be licensed on FRAND terms.

IoT technology creates new FRAND issues beyond those in the smartphone patent wars, largely due to the wildly disparate technology that is built into IoT systems and devices. In the smartphone wars, other than in the case of Microsoft, competitors like Motorola, Nokia, and Apple generally sold substitute products where consumer prices did not vary considerably.

In the IoT space, however, the disparity of sales prices of consumer devices will be greatly increased be-

cause, for example, an IoT-enabled car will be substantially more expensive than a WiFi home automation device. If the same percentage royalty rate is applied universally to the end price of each device, the royalty rate will yield a substantially larger royalty payment based on the sales price of the car than for the home automation device. A flat-rate amount also is not ideal given the large disparity in types of devices (and price points) that will be licensed. A \$5 flat fee for WiFi, for example, may be reasonable for a SUV with WiFi but likely will not be for a smaller device like an IoT-enabled thermostat. Moreover, as IoT devices scale and the price of IoT technology falls (as happened with smartphones), flat-rate royalties will consume a larger amount of the sale price of a device.

While the underlying concept of requiring patent holders of SEPs to license on FRAND terms should reduce disputes, in application, FRAND licensing does not completely eliminate patent litigation. This is because legal battles often ensue to determine whether patents are essential to a standard, and if so, whether the patents are offered under FRAND terms. Because of the variety of technological fields of IoT companies, merely identifying the relevant community of SEP holders is not straightforward.

Perhaps even more important, there likely will be an ongoing battle between SEP holders, arguing that their substantial investment in developing the essential patents are being unfairly compensated, and SEP prospective licensees, arguing that the demanded royalty rate is too high.

## Conclusion

The emergence of IoT technology and patents, combined with the growing number of IoT companies and business segments, will likely lead to novel issues, new competitors, and a new battleground for players in IoT fields. While the nature of IoT—integrating devices from many distinct technological fields—will be useful for consumers, the patent-related issues discussed here will impact the development and adoption of IoT standards and devices, and will likely lead to an increase of patent litigation as this emerging industry sorts itself out.