

Patent litigation trends in the Internet of Things

This article is an extract of an ongoing study around patent activities in the space of IoT technologies. The analysis conducted by IPlytics intends to shed light on the potential legal risks for any IoT business in the market.

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Introduction

The Internet of Things (IoT) is one of the most discussed technology concepts right now. It refers to the use of sensors, actuators and communication technology embedded into physical objects, which enables them to communicate over the Internet. The increasing internet bandwidth and availability, the growing number of devices with built-in sensors, skyrocketing smartphone use and falling technology costs have paved the way for effective and fast-moving IoT integration. IoT data is supposed to result in improved processes and also to offer new types of products and services in multiple application areas. These include tracking machinery status in factories, monitoring inventory flow, predicting the usage of resources such as electricity or water, managing traffic and improving security systems. The scale of the number of IoT devices and IoT market forecast spending is staggering. It is estimated that the number of global IoT devices in 2018 reached 7 billion, with a market spend exceeding \$150 billion. Forecasts for 2025 indicate that the number of IoT devices will increase to 22 billion, with a market spend of \$1.5 trillion.

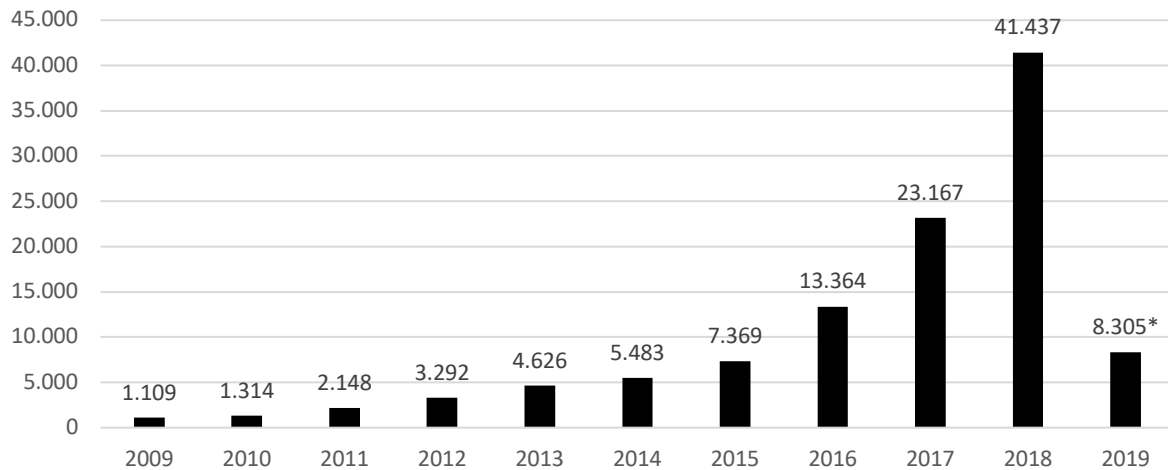
The vision of the IoT is for vehicles, roadways, machines, containers, ships, pacemakers and even refrigerators, among others, to be equipped with sensors that track useful information. Objects have a unique address and are connected to the Internet, which enables an understanding of complex systems and allows automated responses without human intervention.

Companies are increasingly filing, selling, acquiring and monetising IoT patents. Further, a growing number of IoT patents are being aggressively enforced in patent litigation. Broad patent claims can cover an unforeseeable range of solutions that run on critical IoT infrastructure. Such patents have the potential to threaten numerous industries and businesses that integrate IoT technologies, raising the specter of an uncertain level of legal risk. Due to the complexity of IoT systems, it is challenging for companies to determine whether their products or services unintentionally infringe patented IoT inventions. This article investigates recent trends in patent litigation and transfers of IoT patents and tracks patent ownership of patent assertion entities (PAEs).

In order to identify IoT related patents, the IPlytics Platform database was used to perform an extensive keyword search of worldwide filed patents in the field of IoT

technologies. The search was based on the patent's content, making use of state-of-the-art stemming and semantic indexing methods. Figure 1 illustrates sharp increase of patent filings over time. Since 2015 the patent numbers almost doubled year by year to a total of over 40,000 patents filed in 2018. The numbers confirm the increasing importance of IoT technologies.

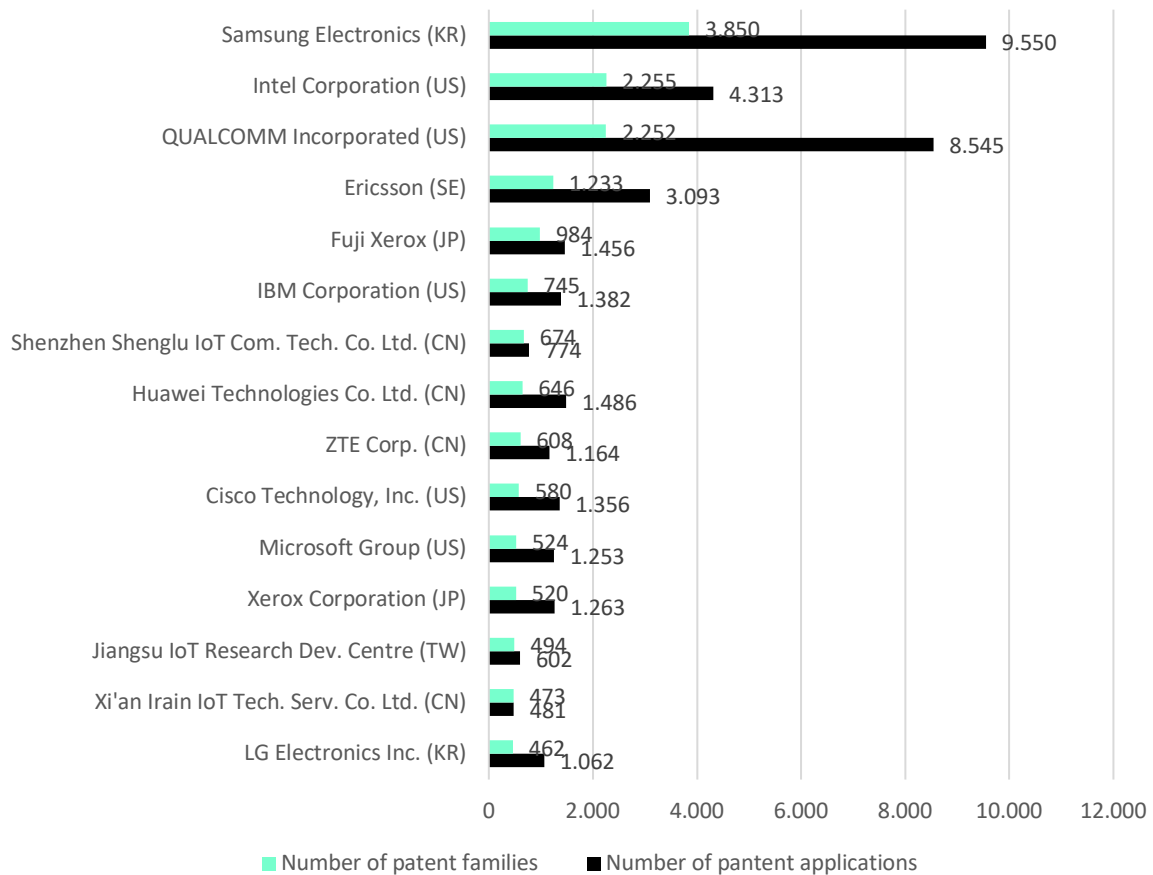
Figure 1: Yearly number of IoT patent applications over time



*as to April 1st 2019

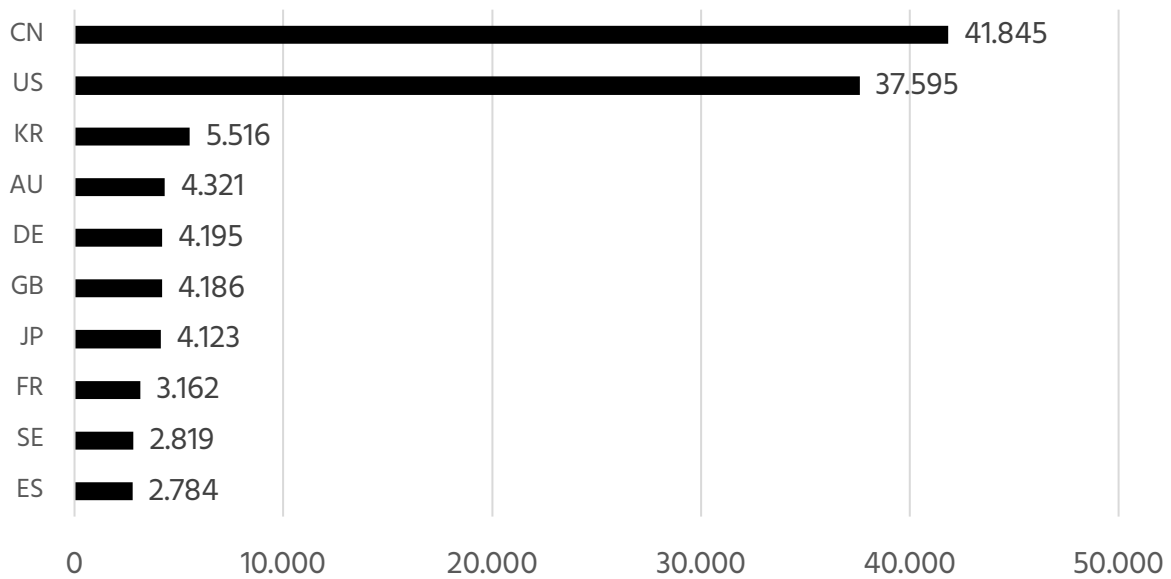
In order to identify patent ownership IPlytics aggregates patents as to the patent portfolio of each company, making use of entity disambiguation techniques. Furthermore, the patent applications are counted as to the corresponding patent family (INPADOC) in order to count the number of unique patented inventions per company. Figure 2 illustrates that the Korean company Samsung, the US companies Intel and Qualcomm, the Swedish company Ericsson and the Japanese company Fuji Xerox are the companies with the largest portfolios. The figure also identifies 3 Chinese research organizations that show very large IoT patent portfolios.

Figure 2: Number of IoT patent applications and patent families as to patent owner



In order to identify at which patent office the patents have been filed we count IoT related patents as to the office's country. In case of PCT (WIPO) applications or EP applications we take into account the designated states. As illustrated in figure 3 most IoT patents have been filed in China followed by the United States. As to these numbers 3 out of 4 IoT patents are filed in China or the US. The numbers confirm a strong dominance of patent filings for these markets.

Figure 3: Number of IoT patents as to country of application



In order to identify IoT-related patent litigation, the IPlytics Platform database was used to perform an extensive keyword search of worldwide filed patents in the IoT field. The search was based on the patent's content (title, abstracts, description and claims). In addition, in a search of the IPlytics Platform database, patent transfer data (worldwide) and patent litigation data (United States) was identified in order to analyse how IoT technologies are affected by patent infringement lawsuits. For litigated patents, the description of the allegedly infringing products and docketed court documents were also used to ensure that the litigated patents and/or products described an IoT technology. Finally, plaintiff's main business models were categorised. Companies whose main purpose is to monetise and assert patents were labelled PAEs. For IoT patent transfers, the reassignment analysis was focused on the latest assignee identified as a PAE. To ensure actual patent transfers among independent companies, the applicant and new owner company were differentiated with regard to the ultimate parent company. Cases where the former and new owners were subsidiaries of the same ultimate parent corporation were filtered out.

Figure 4 shows the growth in the cumulative number of IoT patents litigated in the United States since 2010. During the five-year period from 2013 to 2018, the cumulative number of IoT-litigated patents witnessed an increase of more than 400%, with a sharp spike from 2017 to 2018.

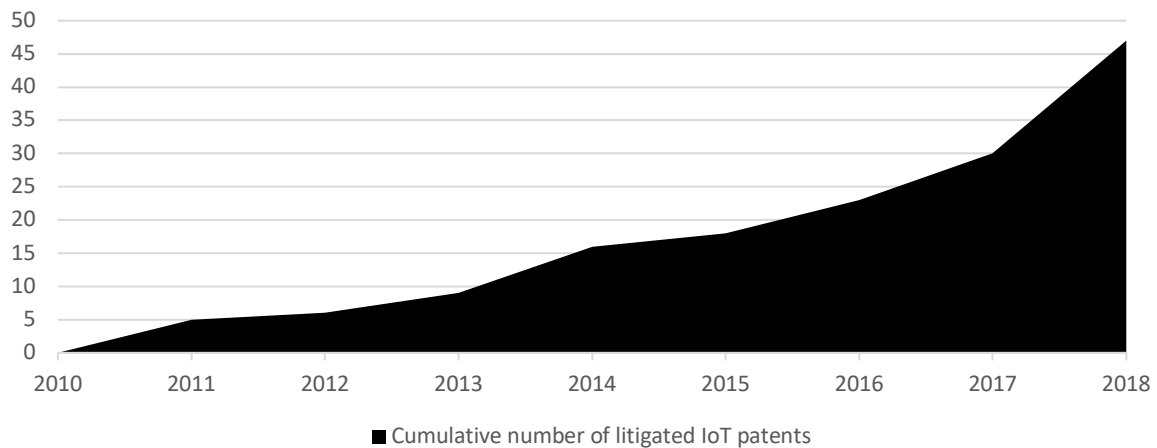
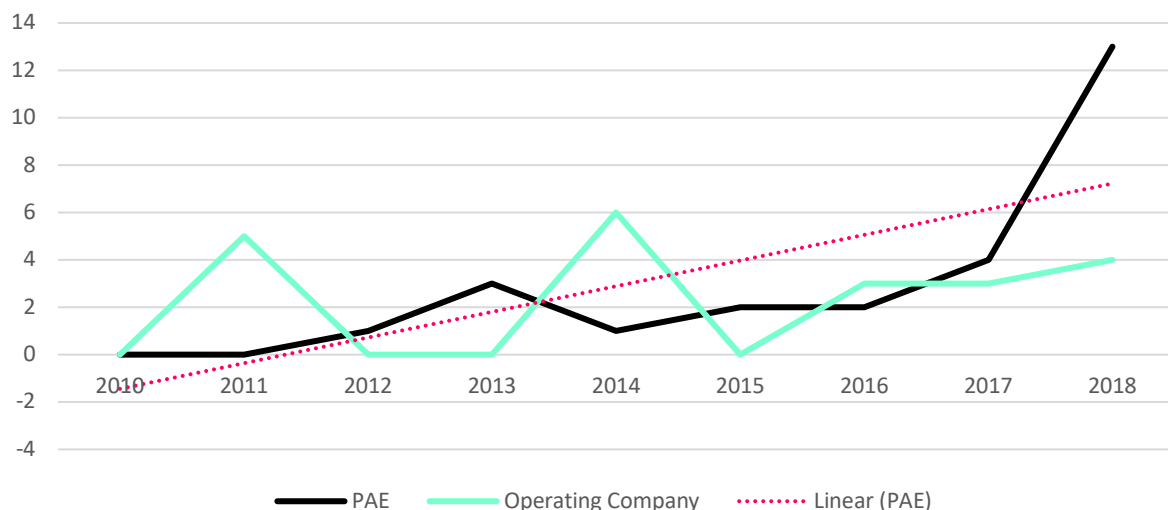
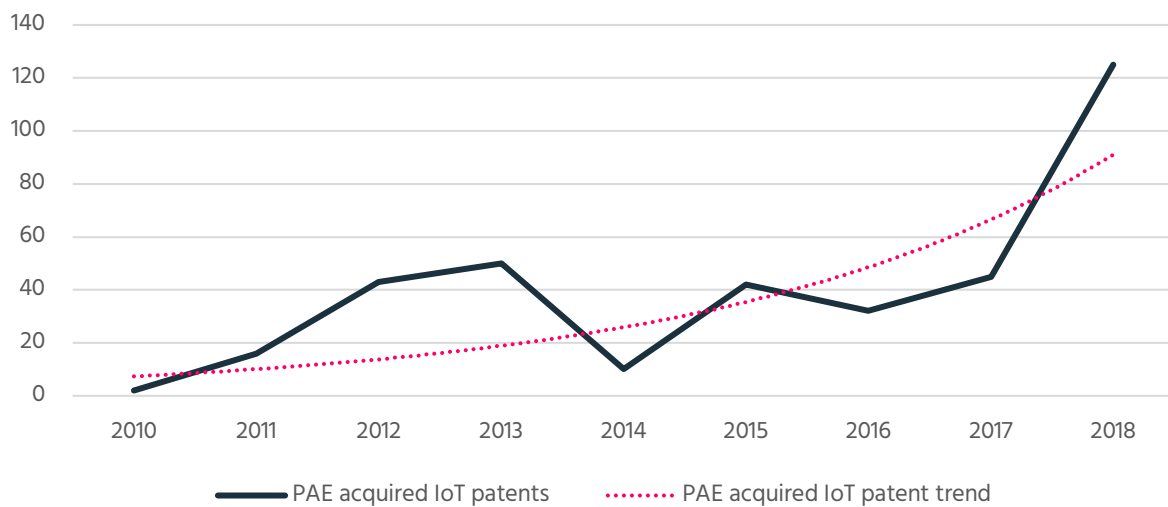
Figure 4: Cumulative number of litigated IoT patents as to date of first litigation (US litigation)

Figure 5 shows the number of IoT patents litigated in the United States over the past nine years relative to the plaintiff's business model. Litigated patents are counted separately for PAEs and for operating companies with regard to the first litigation date. IoT patent litigation involving PAEs as plaintiffs has been increasing on a year-by-year basis by 250% on average (see PAE litigation trend line) since 2014. In 2018, IoT patents litigated by PAEs soared by a factor of three compared to 2017, while IoT patent litigation with operating companies as plaintiffs has essentially stagnated.

Figure 5: Number of litigated IoT patents as to date of first litigation (United States)

Not only has the litigation of IoT patent families increased, but the trade of IoT patents has also grown in recent years. In particular, PAEs are actively acquiring IoT patent portfolios to monetise and assert them in litigation. Figure 6 counts the number of reassigned IoT patents acquired by PAEs. The results show that reassignments of IoT patents to PAEs have skyrocketed by 230% on average between 2014 and 2018. This surge of IoT patent reassignments by PAEs is alarming and suggests a likely increase in both assertions and IoT patent litigation in the upcoming years.

Figure 6: Number of reassigned IoT patents where the latest assignee was identified as a PAE



Comment

The numbers show that IoT technologies are increasingly subject to patent litigation, especially when PAEs are involved. Further, PAEs are rapidly acquiring IoT patents, which they will likely monetise, assert and litigate over the coming years. Based on our analysis we expect to see an increasing number of patent litigations in the IoT space. IoT technologies are often integrated in complex systems that run on various applications communicating with a vast number of products or services. Broadly written IoT patents in the hands of an aggressive PAE may pose legal risks for every IoT business.