

Analysis on The Licensing of Standard Essential Patents and Its Anti-trust Regulation for Intelligent Connected Vehicle

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Abstract: Intelligent Connected Vehicle (ICV) is one of the most important strategic industries in China, which with both technology and standard intensive characteristics. Standard Essential Patents (SEPs) have become the focus of competition globally in the automotive industry. Even though resources are invested heavily in research and development by automotive related companies, almost all the major automotive companies are facing the licensing and litigation problems caused by SEPs. In comparison with the patent law and other private laws, it is more applicable to regulate the abuse of SEPs from the perspective of anti-trust in China. Topics like how to deal with the “patent hold-up”, how to deal with the potential anti-trust violations, how to apply FRAND principles and anti-trust regulations to SEPs licensing, and how to build a rate calculation framework in the automotive industry, should be analyzed seriously.

Keywords: Standard Essential Patent, Intelligent Connected Vehicle (ICV), Anti-monopoly Regulation.

1. Introduction

As an exclusive right, the patent right has a certain monopoly, which is embodied in the protection mode and the effective scope of the patent right. When the technology protected by the patent right is incorporated into a technical standard, a Standard Essential Patent (SEP) is created. With the support of standards, the monopoly of patent rights is combined with the authority of standards, and the exclusivity of SEPs is greatly enhanced. SEP holders can often gain a strong market position, which easily leads to the abusing the dominant market position and excluding or restricting competition in other markets. Compared with the private law adjustment of contract law and patent law, it is more applicable to regulate the abuse of standard-essential patents from the perspective of anti-monopoly. The abuse of standard-essential patents can easily facilitate the implementation of monopolistic behaviors by enterprises. When a fair and effective market competition environment is seriously affected and a market monopoly is formed, it can become the object of anti-monopoly laws and regulations.

Intelligent Connected Vehicle (ICV) is one of the key strategic industries in China. It has great strategic significance in shaping the industrial ecology, promoting national innovation, improving traffic safety, and realizing energy conservation and emission reduction. National and local governments have issued corresponding policies to encourage and support the development of the ICV market. ICV-related standards involve communication, audio and video, wireless charging and other fields. In-vehicle communication technology is the key technology for ICVs to realize inter-connection and inter-operability. The standard essential patents involved in this field are complex and numerous. The royalty basis and royalty rate are still difficult problems in the industry.

This article will take the standard-essential patents of intelligent networked vehicles as the research object, analyze the mainstream licensing models of standard-essential patents

in the current automobile market and the problems they face, and analyze the problems faced by the automobile industry under the background of intelligent network connection from the perspective of anti-monopoly laws and regulations. This paper proposes a licensing path that meets the characteristics of the automobile industry, the FRAND principle and anti-monopoly regulations, and provides reference and inspiration for the automobile industry to deal with the risks of standard-essential patent licensing and anti-monopoly regulations.

2. Licensing of Standard Essential Patents for Intelligent Connected Vehicles

Intelligent Connected Vehicle (ICV) refers to the organic combination of Internet of vehicles and Intelligent vehicles. It is equipped with advanced on-board sensors, controllers, actuators and other devices, and integrates modern communication and network technology to realize Intelligent information exchange and sharing between vehicles and X (people, vehicles, roads, cloud, etc.). As a result, this enables safe, comfortable, energy-efficient, efficient driving and, ultimately, a new generation of human-operated vehicles. In recent years, the state has successively issued industrial policies such as "Guidelines for the Construction of the National Standard System for the Internet of Vehicles Industry" and "Guidelines for the Access Management of Intelligent Connected Vehicle Manufacturers and Products", which provide a good development environment for the industry. With the deep integration of the automotive industry with technologies such as communications, artificial intelligence, and big data, the ICV industry has ushered in vigorous development, and at the same time, a series of cross-industry standard-essential patent licensing issues represented by communications standard-essential patents have emerged.

2.1. Standard Essential Patents for Intelligent Connected Vehicles

According to The Beijing Higher People's Court "Guidelines for Patent Infringement Determination (2017)", Paragraph 3 of Article 140: "Standard-essential patents refer to patents that must be used to implement technical standards." Therefore, standard-essential patents in the automotive field are those in the automotive field. Effective patented technology that must be used in the field in order for the product to meet a certain technical standard.

In recent years, technologies such as the ICV and autonomous driving have brought about major changes in the automotive industry. As a cross-technology and cross-industry emerging automotive system, ICV integrates technologies such as communication networks, environmental perception, information security, and artificial intelligence with deep integration of the traditional automotive industry. The standard essential patents in the field of intelligent networked vehicles also involve many aspects, such as communication, audio and video, wireless charging, etc. Among them, the standard essential patents of in-vehicle communication are the key technologies for intelligent networked vehicles to realize inter-connection and inter-operability. It is mainly manifested as the continuous communication and deep interaction between the vehicle and the vehicle, the vehicle and the base station, and the vehicle and the external environment. According to the competition situation of 5G standard-essential patents in the automotive industry released by the German patent data company IPlytics in 2019, the report pointed out: "In addition to smartphones, the automotive industry may become one of the first industries in the world that rely most on 5G technology."

At present, there are two standard systems for in-vehicle communication: Dedicated Short Range Communication (DSRC) and Long Term Evolution-V2X (LTE-V2X). DSRC is formulated by the IEEE organization (Institute of Electrical and Electronics Engineers), and its corresponding standard text is IEEE 802.11p, which is suitable for short-distance communication. Due to the difficulty of supporting high-speed mobile scenarios, there are certain limitations. LTE-V2X was formulated by the 3GPP organization (3rd Generation Partnership Project), and its corresponding standard text is 3GPP Rel.14/15/16, which is a set of vehicle-to-infrastructure (V2I) and vehicle-to-vehicle (V2V) communication physical layer protocol, which can meet various application requirements such as intelligent driving and safety control. Compared with DSRC, LTE-V2X technology is applicable to all fields of V2X (Vehicle to Everything) and has a broader development prospect. At present, LTE-V2X technology takes 5G-V2X as the future development direction, and has a mature evolution plan. It has a large number of members, covering major global car companies, telecom-operators, and chip suppliers.

2.2. FRAND Principles for Standard Essential Patents

Standard-essential patents refer to patents that are included in technical standards and must be used when implementing the standards. Due to the uniqueness and irreplaceability of Standard-essential patents (SEPs) in the relevant technical fields, SEP holders have strong control over the relevant market, which can easily lead to abuse of rights and disrupted market competition. Therefore, some standardization

organizations require SEP holders to make "fair, reasonable and non-discriminatory" (Fair, Reasonable and Non-Discriminatory, abbreviated: FRAND) licensing commitments in their intellectual property policies. According to statistics, among the 36 standard-setting organizations with written intellectual property policies in the field of communications and computer networks, 29 require their members to implement standard-essential patent licensing in accordance with the FRAND principle.

At present, there is no further clear definition and interpretation of the FRAND principle by various standardization organizations. It is generally believed that "fair" means that both parties are in an equal negotiating position, with equal rights, obligations and risks. "Reasonable" means that the royalty is reasonable, and the phenomenon of patent "hold up" cannot be caused by the irreplaceability of SEPs. "Non-discriminatory" means that the patentee should not give different trading conditions to the implementers of the same transaction, and thus put them in a disadvantageous competitive position.

From a practical point of view, although the major standardization organizations have clarified the important position of the FRAND principle in the licensing of SEPs, due to the ambiguity of its definition, how to determine whether the licensing of SEPs conforms to the FRAND principle is still the focus of controversy in the industry.

2.3. The Licensing Model of Standard Essential Patents in the Automotive Industry and Its Problems

"Should the licensee be an OEM or a component supplier?" has become a hotly debated issue in the current automotive industry standard-essential patent licensing model. In the traditional automobile industry chain, patent licensing is often vertical, that is, suppliers are responsible for obtaining patent authorizations for corresponding parts and bearing the cost of patent licensing, and OEMs purchase parts from various suppliers and assemble them into complete vehicles. On the contrary, the communication industry is accustomed to charging royalty to terminal product manufacturers. This habit has also been extended from the communication industry to ICVs, and has become the mainstream licensing model in the standard-essential patent market of ICVs, such as wireless technology. The licensees of 3G, 4G, and 5G-related standard essential patents operated by the patent licensing platform Avanci are all car manufacturers.

At the theoretical level, from the perspective of the "patent exhaustion doctrine", in order to reflect the actual value of SEPs and avoid the problem of repeated licensing in the industry chain, products that reflect the characteristics of the end use (vehicle), the patentee should in principle receive a certain share of the economic interest of his technology in the saleable end product at the last stage of the value chain. This view is supported by most SEP holders. Taking the whole vehicle as the licensing unit can bring them greater bargaining power and higher licensing income. At the same time, the object of licensing negotiation is only the vehicle. It avoids the problems of high negotiation costs and difficulty in proving infringement caused by docking with multiple parts suppliers.

However, this behavior of using the whole vehicle as the license unit violates the "fair, non-discriminatory" principle in FRAND. In May 2019, Continental Automotive Systems Inc. took Avanci and its alliance members to court in

California, USA, suing them for violating the FRAND principle by refusing to license 2G/3G/4G standard essential patents. According to the FRAND principle, under reasonable conditions, SEP holders should not treat licensees differently based on their position in the industry chain, but should treat component suppliers and vehicle manufacturers equally. At the same time, according to the theory of "the smallest salable patent pricing unit (SSPPU)", communication is only one of functions of the car, and it is more reasonable to use the functional modules that SEPs play an actual role (communication) in the vehicle as a unit. Since this view can effectively avoid patent disputes that may be involved in terminal car companies, it has been supported by many OEMs.

2.4. Discussion on the Solution to The Licensing Problem of Septs In the Automotive Industry

According to the "Internet of Vehicles Intellectual Property White Paper" issued by the China Institute of Communications in 2020, as of July 2020, the cumulative number of patent applications in the field of Internet of Vehicles in China is close to 35,000, most of which require the support of communication modules to achieve interconnection and Intercommunication. As the next SEP "battlefield" in the automotive industry, OEMs must prepare for the upcoming SEP licensing challenge.

First of all, OEMs should improve their understanding of standard-essential patents as soon as possible, and do a good job in technical research and development and talent reserves related to standard-essential patents. In the traditional automobile industry, the main function of the OEM is to assemble various parts, and it lacks a technical team that can understand and develop these parts, coupled with a lack of understanding of standard-essential patents, it is unable to identify legal issues that may be caused by standard-essential patents. Risk, in the licensing negotiation stage, is also difficult to distinguish the package licensing of non-standard essential patents from standard essential patents. Therefore, in order not to be constrained by the licensing of standard essential patents, OEMs should seek internal and external resources as soon as possible to build a professional team to actively respond to future challenges.

In addition, OEMs can join hands with standardization organizations and SEP holders to jointly establish a cooperative ecosystem for the automotive industry. To reduce conflicts of interest between owners and implementers, they can establish a unified understanding of standard-essential patents in the automotive industry, and promote the standardization process and innovative development of the automotive industry.

3. Anti-monopoly Regulation of Standard Necessary Patent Licensing in The Automobile Industry Under the Background of Intelligent Internet

In the field of ICV communication, patent standardization is more thorough. To produce products that meet communication standards, implementers must negotiate licenses with various SEP holders, which is more likely to lead to the phenomenon of patent "hold-up". The patent law grants the patentee the "monopoly right" to prohibit others

from implementing the patented technology, and the combination of the patent and the standard will further aggravate this monopoly state, which is very likely to result in the abuse of the patent and the restriction of competition, causing the implementer to face the bundled license., abuse of injunction, unreasonable monopolistic pricing and other monopolistic market behaviors.

3.1. The Monopoly Problem That the Automobile Industry May Face When Implementing SEPs

According to the current judicial practice in China, the abuse of SEPs in the field of intelligent connected vehicles may involve abuse of injunction, excessive monopoly pricing, and bundled license. If the SEP holder conducts relevant abuses, it may lead to the abuse of the dominant market position, which constitutes the destruction of market competition, and is the object of anti-monopoly law.

3.1.1. Abuse of Injunction

Abuse of injunction has been a focal point in SEP antitrust research. When the SEP holder and the license negotiation fail to reach an agreement, the holder often seeks injunction as a bargaining chip in the license negotiation. Applying for injunction is the core remedy afforded to the right holder by the patent law. However, compared with general patent infringement injunction, the implementers of standard essential patents are most likely to be excluded from market competition due to injunctions, resulting in problems such as patent "hold-up". At present, courts around the world maintain a relatively strict attitude towards injunction, and China has not simply identified the abuse of injunctive relief as an abuse of market dominance. In the case of Huawei v. InterDigital (IDC), the court did not take Huawei's action of IDC seeking injunction as an independent determination of abuse of its dominant market position, but made a comprehensive analysis in combination with its license negotiation conditions, the purpose of the injunction, the competitive environment and other factors.

In the field of intelligent connected vehicles, due to the commitment of FRAND, the behavior of "implementation before licensing" of communication standard essential patents has become the default norm in the industry, which may lead to the threat of injunctive relief by the standard essential patentee to force the implementer to accept its proposed licensing conditions. In August 2020, the District Court of Mannheim, Germany, in the case of Nokia suing Daimler for infringement, ruled that Daimler infringed and issued an injunction prohibiting the sale of Daimler cars in Germany. Then Daimler was under pressure to sign a licensing agreement with Nokia. At a time when car companies are embracing intelligent connectivity, OEMs must focus on the potential abuse of injunctive relief by relevant SEP holders and take appropriate measures.

3.1.2. Excessive Monopoly Pricing

Excessive standard-essential patent license prices are a key investigation content in anti-monopoly practice in China. Paragraph 1 of Article 22 in "Anti-Monopoly Law" clearly states that high-priced licensing may constitute an abuse of dominant market position. In terms of licensing pricing, the Standardization Organization requires SEP holders to abide by the FRAND principle and give non-discriminatory licensing treatment to all potential patent implementers, but does not give a clear definition of "fair, reasonable and non-

discriminatory". It is difficult to define in judicial practice. The exclusivity of standard-essential patent rights, due to the technical standards that must be implemented, gives the patentee a strong voice, and it is very easy to make unreasonable royalty rates for the implementer, which leads to the problem of monopoly pricing. In 2019, Continental Automotive Systems Inc. sued the patent licensing platform Avanci and its alliance members in the U.S. District Court for the Northern District of California, requesting the court to rule on its violation of the application and market monopoly of the standard essential patent license FRAND commitment. It can be seen from the disclosed indictment that the standard essential patent royalty that Avanci requires car companies to pay accounts for 20% of the cost of the TCU (telematics control units, telematics control system) module that realizes the communication function. If the licensing cost is passed on to the parts manufacturer Continental, it is obviously beyond the price range that it can reasonably accept.

3.1.3. The Bundled License of Standard Essential Patents

The bundled license of SEPs means that the patentee implements a package license without distinguishing between SEPs and non-SEPs, SEPs implemented by the implementer and SEPs that have not been implemented. This lack of justification and compulsory purchase of tying sales is prohibited by Chinese Anti-Monopoly Law. In the "Qualcomm Monopoly Case", Qualcomm sold non-wireless communication SEP licenses without justifiable reasons, forcing some licensees to obtain non-SEP licenses from it, which was determined by the court as abusive monopolistic behavior of market dominance.

According to statistics, there are nearly 100,000 standard essential patents related to 5G. As a standard-intensive industry, intelligent networked vehicles involve a large number of standard-essential patents, and it is often difficult for OEMs to clearly distinguish between standard-essential patents and non-standard-essential patents. At the same time, since most of the patent licensing operation platforms implement "one-stop" package licenses for OEMs, the problem of bundled license of 3G, 4G, and 5G standard essential patents is very likely to occur. When seeking licenses for SEPs, car companies should pay attention to screening. If tying issues are found, they can be resolved through judicial channels such as seeking anti-monopoly regulations.

3.2. Licensing Pricing Suggestions for Anti-monopoly Regulation of Standard-essential Patents in the Automobile Industry

Under the premise of complying with FRAND commitments, the core issue in the anti-monopoly regulation of SEPs is how to define the specific calculation method of royalty. For standard essential patent licensing in the automotive industry, the Avanci platform currently implements fixed-rate royalty, and the royalty does not vary depending on factors such as the brand, class, and price of the car. In this regard, first of all, it should be considered that the value of a patent is the concentrated expression of its technical value and market value, and the royalty of a patent should also be the result of a comprehensive evaluation of technology and the market. It would be unfair and inconsistent with the FRAND principle to use the same royalty rate for different models. Therefore, it is more reasonable to base the licensing

rate on the final sale price of the vehicle rather than a flat rate.

Secondly, the contribution of the technical standard to the use value of the product should also be considered when calculating the royalty rate. Communication is the core function of a mobile phone. If the mobile phone cannot communicate with the outside world, it will lose the use value that the product should have. For traditional cars, communication is only an additional function and does not affect its driving function. For intelligent networked cars, communication is a necessary functional module. Without communication, data exchange, autonomous driving, and interconnection cannot be achieved. Therefore, when formulating the licensing rate of standard essential patents, the contribution degree of technology to the use value of end products should be considered, and the rate model should be constructed according to the degree of importance, which cannot be generalized.

Finally, most standard-setting organizations adopt an active disclosure system for the declaration of SEPs. Standard-setting organizations will not review the content of disclosed patent information, nor will they hire a third party to conduct independent review, which may lead to standard organization members deliberately exaggerate the quality and quantity of patents for the greater good. Therefore, when calculating the royalty rate, the importance of the licensed standard-essential patent technology in the technical standard should also be considered, and the standard-essential patents with different contributions should be screened and graded as the basis for the royalty rate to avoid "minority hold-up" of SEPs.

4. Conclusion

The vigorous development of technologies such as communications, the Internet, and artificial intelligence has accelerated the process of technology standardization. The automotive industry in the context of intelligent network connectivity will face more SEP licensing issues. Correspondingly, its royalty and anti-monopoly regulations will also be increasingly important. From the perspective of antitrust regulation, we can comprehensively consider the free competition order, market competition factors and licensing behavior, FRAND principle, technical value, market value and standard contribution of standard essential patents, so as to provide guidance for the licensing of standard essential patents. This paper argues that, in view of the SEP problems faced by the ICV field, first of all, car companies should improve their intellectual property strategy awareness, make good technology and talent reserves, actively build a cooperation ecosystem, and establish the unification of SEPs in the automotive industry as soon as possible. Moreover, all standardization organizations, SEP holders and car companies should, on the premise of meeting the FRAND principle and anti-monopoly regulations, base on the market value, technical value, technical contribution, and importance of SEPs in standards, etc. , to comprehensively build a royalty rate calculation model that conforms to the characteristics of the automobile industry, further quantify the fuzzy FRAND principle royalty rate model, promote a license consensus between the patentee and the implementer, and promote the implementation process of the ICV industry standard.

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