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The Royalty Rate Is FRAND or Excessive? The Practice in the EU, China, and the Applicability of Selected Economic Models

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Excessive pricing would raise competition concern not only in the EU, but also in China. Dominant undertakings are required, in some refusal-to-license related cases, to license their IPRs on *fair, reasonable, and non-discriminatory* ("FRAND") terms. This paper, firstly from a legal perspective, distinguishes two situations involving the concept of FRAND. Then this paper investigates the definition of FRAND concept and the practice respectively in the EU and China. To strike a balance between maintaining competitive market order and providing sufficient compensation for IPR holders, economists have proposed several models, by which the economic value of the IPR at issue could be indirectly calculated and thus a FRAND royalty rate could be determined. However, those models leave many issues open in the real markets and the limitation is particularly obvious in the licensing scenario following an abusive refusal to license ruling.

Keywords: excessive pricing, FRAND, economic models, refusal to license

Introduction

Licensing fee setting is competition-IPR interface issue. From the perspective of protection of innovation incentives, IPR holders should be compensated for their investment on R&D. From the perspective of competition policy, the royalty rates that IPR holders set for access to their IPRs should not be unduly high, since excessive pricing might trigger the competition of authority's investigation into whether such behaviour has abused the IPR holder's dominant market position assuming that "unfairly high pricing can be identified" (Fox, 1986, p. 992). Excessive pricing would raise competition concern not only in the EU[1], but also in China[2]. Thus, dominant undertakings are required, in some refusal-to-license related cases, to license their IPRs on *fair, reasonable, and non-discriminatory* ("FRAND") terms. This paper, firstly from a legal perspective,

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[1] For example, Vice President of the EU Commission Joaquín Almunia stressed once again that excessive pricing is covered by Article 102 TFEU, in his speech *Competition in the Online World*, delivered on 11 November 2013, London, available at http://europa.eu/rapid/press-release_SPEECH-13-905_en.htm, last visit on 18 November 2013.

[2] *Anti-monopoly Law of the People's Republic of China* (Adopted at the 29th meeting of the Standing Committee of the Tenth National People's Congress of the People's Republic of China on 30 August 2007, translation available by subscription at http://www.lawinfochina.com/display.aspx?id=6351&lib=law&SearchKeyword=&SearchCKeyword=%B7%B4%C2%A2%B6%CF%B7%A8, last visit on 29 October 2013, hereinafter "AML"), Article 17(1).

distinguishes two situations involving the concept of FRAND. Then this paper investigates the definition of FRAND concept and the practice respectively in the EU and China. In the second half, this paper from an economic perspective introduces some approaches to determining a FRAND royalty rate, and intends to analyze their applicability in follow-on refusal to license cases.

Two Situations Involving FRAND Concept

The term FRAND is a competition law-IPR intersection expression. Depending on whether the IP at issue is standard essential patent ("SEP") and whether the IPR holder has committed to standard-setting organizations ("SSOs") that he will license his IPR to third parties on FRAND terms, there might be two situations where the concept FRAND would be connected with the conduct of refusal to license IPR—in a direct way or an indirect way—by one dominant undertaking. One situation could be the scenario where the SEP holder, who is committed to licensing his SEP on FRAND terms[3], seeks and enforces an injunction against specific third party before a court on the basis of his SEP. The EU Commission's *Motorola Mobility* case[4], *Samsung* case[5], and the request to the Court of Justice for a preliminary ruling from the Landgericht Düsseldorf (Germany) in *Huawei/ZTE* case[6] belong to this category. The main question in these cases is whether the seeking of a SEP-based injunction amounts to an abuse. In *Motorola Mobility*, the Commission held that the seeking of a SEP-based injunction may constitute an abuse if the SEP holder has made a FRAND commitment during standard setting and the potential licensee is willing to enter into a license on FRAND terms.[7]

Apart from the SEP cases, the concept FRAND also emerges in non-SEP cases where the conduct of refusal to license IPR has, in exceptional circumstances, been considered abusive under Article 102 TFEU, irrespective of previous relationship between the licensor and the licensees. There might be two things an IPR holder who refuses to grant other undertakings a license to access to his IPR cares the most. One is whether his

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[3] For example, the IPR Policy of the European Telecommunications Standards Institute ("ETSI") provides that when an IPR holder discloses his essential IPR to the ETSI, the holder would be requested to give "an irrevocable undertaking in writing that it is prepared to grant irrevocable licences on fair, reasonable and non-discriminatory ('FRAND') terms and conditions" to those who seek such license and thus waive its right to refuse to grant a license. See ETSI IPR Policy, section 6.1, available at http://www.etsi.org/images/files/IPR/etsi-ipr-policy.pdf, last visit on 18 November 2013.

[4] Case COMP/C-3/39985 Motorola Mobility, Commission Decision of 29 April 2014. In Motorola Mobility's case, Motorola Mobility held standard-essential patents for GPRS standard, which is also a key industry standard for mobile and wireless communications, and gave a commitment to ETSI that it would license the patents which it had declared essential to the standard on FRAND terms to requesting parties. Motorola Mobility sought an injunction against Apple in Germany based on claimed infringement of certain of its GPRS standard-essential patents. The EU Commission adopted a decision on 29 April 2014 finding that Motorola Mobility's seeking a SEP-based injunction constitutes an abuse of a dominant position prohibited by EU competition rules. The Commission has thus ordered Motorola to eliminate the negative effects brought about by such behaviour.

[5] Case COMP/C-3/39939 Samsung Electronics, Commission Decision of 29 April 2014 in accordance with Article 9 of Regulation 1/2003. In Samsung's case, Samsung owns standard-essential patents for 3G UMTS standard, a key industry standard for mobile and wireless communications, and made a commitment to ETSI that it would license the patents which it had declared essential to the standard on FRAND terms. In 2011, Samsung started to seek injunctive relief before Member States' courts against Apple based on claimed infringements of certain of its 3G UMTS standard-essential patents. The EU Commission on 29 April 2014 rendered commitments offered by Samsung legally binding under EU competition rules.

[6] Case C-170/13, Request for a preliminary ruling from the Landgericht Düsseldorf (Germany) lodged on 5 April 2013—Huawei Technologies Co. Ltd v ZTE Corp., ZTE Deutschland GmbH, OJ C 215/5. The German court has stayed a current dispute between China's largest telecommunications manufactures Huawei and ZTE on SEPs related to 4G/Long-Term-Evolution ("LTE") standard, and referred five questions to the ECJ seeking clarification on the compulsory license defence in SEP cases. So far the ECJ has not issued its preliminary ruling.

[7] See European Commission press release at http://europa.eu/rapid/press-release_IP-14-489_en.htm?locale=en, last visit on 8 June 2014.

refusal to license constitutes an abuse of dominant position under the competition rules. The other concern, as the subject of this paper, is how much benefits he could reap from licensing his IPR once his conduct of refusal to license has been considered as an abuse of dominant position. In EU Commission's decision in *IMS Health* case[8], the Commission held that IMS should

> license the 1860-brick structure on a non-discriminatory basis to NDC and AzyX. In any agreements in which IMS licenses the use of the 1860-brick structure, it is important to ensure that any fee which is charged is reasonable, and that the process does not take an undue amount of time, as this would frustrate the purpose of the order.[9]

Similarly in *Microsoft I* case[10], the Commission required that

> Microsoft Corporation shall […] make the Interoperability Information available to any undertaking having an interest in developing and distributing work group server operating system products and shall, on reasonable and non-discriminatory terms, allow the use of the Interoperability Information by such undertakings for the purpose of developing and distributing work group server operating system products.[11]

However, the exact meaning of FRAND remains unclear. As Swanson and Baumol (2005, p. 5) point out, there are no widely acknowledged tests that could determine whether particular licensing terms do or do not satisfy a FRAND requirement. From the perspective of the SSOs, there is no further guidance with regard to the exact meaning of FRAND within their policies (such as ETSI IPR policy[12], IEEE-SA Standards Board Bylaws[13]). The absence of a concrete definition on the FRAND may, for one thing, secure the widest possible flexibility to establish licensing terms according to specific situations (Geradin & Rato, 2007, p. 112; Geradin, 2006, p. 516). From this perspective, licensing freedom provides not only incentives for IPR holders to make their innovations more available, but also the most advantageous licensing terms for the licensees according to their distinguished relationship with the licensor (Geradin, 2006, p. 516). But for another, the ambiguity in the definition of FRAND is considered to be one of core problems in IPR licensing (Goldstein & Kearsey, 2004, p. 27).

FRAND Royalty Rate Setting in the EU

Meaning of FRAND

With regard to the elements of "fair" and "reasonable", firstly, it is difficult to make a clear distinction between them. According to some commentators, the element "fair" focuses on the well informed procedure which gives equal consideration to both parties of the licensing, while the element "reasonable" makes sure that the result is acceptable (Goldstein & Kearsey, 2004, pp. 27-28). This interpretation might be questionable, since what might raise *ex post* competition concern is whether the licensing terms and conditions are FRAND, but

8 Case COMP D3/38.044, NDC Health/IMS Health, Commission Decision, [2002] OJ L59/18 (3 July 2001), available in full at http://ec.europa.eu/competition/antitrust/cases/dec_docs/38044/38044_15_5.pdf, last visit on 17 November 2013.
9 Ibid, Para. 215.
10 Case COMP/C-3/37.792, Microsoft, Commission Decision, [2007] OJ L 32/23 (24 March 2004), available in full at http://ec.europa.eu/competition/antitrust/cases/dec_docs/37792/37792_4177_1.pdf, last visit on 17 November 2013.
11 Ibid, Article 5(a).
12 The European Telecommunications Standards Institute (ETSI) IPR Policy (Annex 6 of the Rules of Procedure), available at http://www.etsi.org/images/files/IPR/etsi-ipr-policy.pdf, last visit on 18 November 2013 and its Guide on IPRs (version adopted by Board #94 on 19 September 2013), available at http://www.etsi.org/images/files/IPR/etsi-guide-on-ipr.pdf, last visit on 18 November 2013.
13 IEEE Standards Association Standards Board Bylaws, approved by the IEEE-SA Board of Governors December 2012, available at http://standards.ieee.org/develop/policies/bylaws/sb_bylaws.pdf, last visit on 18 November 2013.

not the process of negotiation. Noting the following two points, it appears that the EU Commission is unwilling to make a clear distinction between them. In the first place, within EU competition law sometimes one element equals the other. For instance, the *Commission Guidelines on Horizontal Co-operation Agreements* states that "the assessment of whether fees charged for access to IPR in the standard-setting context are *unfair* or *unreasonable* should be based on whether the fees bear a reasonable relationship to the economic value of the IPR."[14] In the second place, it is questionable whether the element "fair" plays the same role as before. It is noteworthy in the *IMS Health* case and *Microsoft I* case that the EU Commission has, by its wording, implicitly replaced the FRAND with the RAND ("reasonable and non-discriminatory").[15]

Secondly, it remains unclear what types of transaction terms and conditions are unfair or unreasonable (Geradin & Rato, 2007, p. 112; Swanson & Baumol, 2005, p. 3; Lemley, 2002, p. 1964). Apart from excessive pricing which will be discussed in the next section, cases involving other non-monetary transaction terms in EU case law might provide some guidance. In *Tetra Pak II*[16], the transaction terms concluded between Tetra Pak and its customers, including limitations placed on the customers' use of the machines, forcing the customers' use of Tetra Pak's repair and maintenance services and surprise inspections right reserved for Tetra Pak, were found to be unfair. In *Amministrazione Autonoma dei Monopoli di Stato* case[17], the General Court upheld the Commission Decision[18] that it is unfair to impose on foreign cigarettes producers non-negotiable terms, such as limitations on the availability to introduce new brands of cigarettes, maximum quantity of new brands production, and monthly production, and restriction on the packaging. In *DSD* case, the General Court[19] and finally the Court of Justice[20] upheld the Commission's finding in its decision[21], in which the Commission found DSD concluded trademark agreements with the sale package manufactures and distributors, according to which the customer shall pay service fee in line with the volume of packaging with DSD's logo on them rather than in line with the volume of packaging for which DSD was providing service itself. The Commission ruled that DSD had abused its dominant position on the German packaging collecting market when it claimed the full fees for all the Green Dot logo packaging even the actual service was provided by its competitors.[22] "No service, no fee" is the underlying principle followed by the EU Commission[23]. Although the EU Commission and EU Courts have not explicitly defined the meaning of fairness or reasonableness, it could be concluded that, to satisfy the fairness or reasonableness requirement, a dominant undertaking should *not*: (1) exploit its dominant position by imposing irrelevant obligations on its customers, or conclude license-relevant clause which would not have been reached without such dominant market position; (2) be unjust enriched (e.g. gaining additional profit, maintaining, or

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[14] *Commission Guidelines on Horizontal Co-operation Agreements*, [2011] OJ C11/1, Para. 289. (emphasis added).
[15] See *supra* fn. 9 and 11.
[16] Case IV/31043 *Tetra Pak II,* Commission Decision, [1992] OJ L-72/1. The Commission Decision was upheld by the General Court, Case T-83/91 *Tetra Pak v. Commission* [1994] ECR II-755, and the Court of Justice, Case C-333/94 P *Tetra Pak v. Commission* [1996] ECR I-5951.
[17] Case T-139/98, *Amministrazione Autonoma dei Monopoli di Stato(AAMS) v. Commission,* [2001] ECR II-3413.
[18] Case IV/36010-F3 *Amministrazione Autonoma dei Monopoli di Stato,* Commission Decision [1998] OJ L-252/47.
[19] Case T-289/01 *Der Grüne Punkt-Duales System Deutschland GmbH v. Commission* [2007] ECR II-1607.
[20] Case C-385/07 P, *Der Grüne Punkt-Duales System Deutschland GmbH v. Commission* [2009] ECR I-6155.
[21] Case COMP D3/34493, *DSD*, Commission Decision [2001] OJ L166/1.
[22] Ibid, Para. 100-109.
[23] See the Commission Press IP/01/584, Brussels, 20 April 2001, available at http://europa.eu/rapid/pressReleasesAction.do?reference=IP/01/584&format=HTML&aged=0&language=EN&guiLanguage=en, last visit on 10 November 2013.

strengthening market power).[24] The end result should be acceptable to both parties, and should be an outcome that they can live with (Goldstein & Kearsey, 2004, p. 27).

EU Practice

According to previous analysis, the ambiguity in the definition of FRAND results in that undertakings could not rely merely on the concept of FRAND to evaluate whether their setting of royalty rates would raise competition concern or not. It is thus necessary for undertakings to seek other approaches to determining a reasonable royalty, from either a legal or an economic perspective. Against another objective of rapid technology diffusion, the royalty compensation should be properly balanced and provide “a socially optimal incentive” for investment in innovative activities (Swanson & Baumol, 2005, pp. 2-3). An unfairly low royalty, which is unlikely but theoretically possible to occur in a follow-on refusal to license case, not only reduces the incentive of the IPR holder to continue to invest and to research. Moreover, the licensees’ cost savings from such lower royalties might not be translated into the promotion of end consumers’ welfare, which depends on the degree of competition on the downstream market (Geradin, 2006, pp. 521-522). Rather than the level of royalty rates, it is widely accessibility of the essential IPR—which affords certain degree of competition on the downstream market—that would be more relevant with the consumer welfare (Geradin, 2006, pp. 521-522).

Compared to the lower royalty rates where concern may arise more from the perspective of protection of incentives on innovative activities investment, the setting of higher royalty rates may cause negative effects on the consumer welfare in the philosophy of EU competition law. It is well known that US antitrust law does not forbid IPR holders from exploiting their monopoly power to charge monopoly prices from the customers, as long as such conduct is not accompanied by other anti-competitive elements (Swanson & Baumol, 2005, pp. 11-12). Judge Posner maintained that “the antitrust laws are not a price-control statute or a public-utility or common-carrier rate-regulation statute”.[25] The Supreme Court in *Verizon v. Trinko*[26] also confirmed that

> [t]he mere possession of monopoly power, and the concomitant charging of monopoly prices, is not only not unlawful; it is an important element of the free-market system. The opportunity to charge monopoly prices – at least for a short period—is what attracts ‘business acumen’ in the first place; it induces risk taking that produces innovation and economic growth.[27]

However, on the other side of the Atlantic, once the refusal to license has been deemed as an abuse by the EU Commission, the IPR holders should be cautious in setting the licensing fee. The rates should not be set so high as to constitute a constructive refusal to license in negotiation (Geradin & Rato, 2007, p. 113), or to constitute an excessive pricing under Article 102 TFEU, although not always the case (Geradin & Rato, 2007). The EU Commission was reluctant to pursue dominant undertakings’ conducts of charging excessively high

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[24] As the Court of Justice put in *United Brands* that “it is advisable to ascertain whether the dominant undertaking has made use of the opportunities arising out of its dominant position in such a way as to reap trading benefits which it would not have reaped if there had been normal and sufficiently effective competition.” (Case 27/76 *United Brands v. Commission* [1978] ECR 207, Para. 249)

[25] Blue Cross, et al. v. Marshfield Clinic, et al., 65 F.3d 1406, at 1413 (1995).

[26] Verizon Communications Inc. v. Law Offices of Curtis V. Trinko, LLP, 540 U.S. 398 (2004).

[27] Ibid, at 407.

prices.[28] This is because of the difficulty in determining at which point a price could be considered excessive (Geradin & Rato, 2007, p. 150; Jones & Sufrin, 2007, p. 588). However, the Commission turned to condemn practice of excessive pricing if the behaviour is "designed to preserve its dominance, usually directly against competitors or new entrants who would normally bring about effective competition and the price level associated with it".[29] The Commission's on-going investigation against Russian energy giant Gazprom demonstrates that the EU competition top enforcer is still pursuing excessive pricing, as in that investigation one of the suspected anti-competitive practices is that Gazprom may have imposed unfairly high prices on its customers in Central and Eastern Europe.[30]

With regard to the analytical framework to assess whether a high price could be qualified as an excessive price under Article 102, the ECJ in *United Brands* formulated a two-step approach: firstly, whether the difference the costs incurred and the price charged is excessive, and secondly if the answer to the first step is affirmative whether the price charged is unfair either in itself or compared to competing products.[31] The ECJ made it clear in *Isabella Scippacercola and Ioannis Terezakis*[32] that the two prongs of the second step of the *United Brands* test are not cumulative but parallel.[33] The EU Commission in the significant excessive pricing case *Port of Helsingborg*, for one thing, applied the *United Brands* two-step approach.[34] For another, for concluding that the price charged bears no relation to the economic value of the service provided, the Commission has adopted a high standard of proof by taking into account a wide range of tangible and intangible factors, such as demand-side aspects, initial investment, intangible value, and opportunity cost.[35]

FRAND Royalty Rate in China

Excessive Pricing and FRAND in The Legal Instruments

Within the abuse of dominant position chapter of the Chinese Anti-Monopoly Law ("AML"), Article 17 explicitly prohibits dominant undertakings from selling products at unfairly high prices.[36] The AML however does not make it clear whether this prohibition on excessive pricing could be extended to dominant undertaking's IPR licensing behaviour. With regard to the competition-IPR interface in China, one has to consult the *Guide on*

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[28] See EU Commission's *Fifth Report on Competition Policy* (1975), available at http://ec.europa.eu/competition/publications/annual_report/ar_1975_en.pdf, last visit on 18 November 2013, Point 3 at p. 13. ("[M]easures to halt the abuse of dominant positions cannot be converted into systematic monitoring of prices. In proceedings against abuse consisting of charging excessively high prices, it is difficult to tell whether in any given case an abusive price has been set for there is no objective way of establishing exactly what price covers costs plus a reasonable profit margin.")

[29] The EU Commission's *XXIVth Report on Competition Policy* (1994), available at http://bookshop.europa.eu/is-bin/INTERSHOP.enfinity/WFS/EU-Bookshop-Site/en_GB/-/EUR/ViewPublication-Start?PublicationKey=CM9095283, last visit on 18 November 2013, Point 207 at p. 120.

[30] EU Commission Press release at http://europa.eu/rapid/press-release_IP-12-937_en.htm, last visit on 8 June 2014.

[31] Case 27/76 *United Brands v. Commission* [1978] ECR 207, Para. 251-252. See also Joaquín Almunia, Vice president of the European Commission responsible for competition policy, speech "Abuse of Dominance: A View from the EU", at the *Fordham's Competition Law Institute Annual Conference*, New York, 27 September 2013, available at http://europa.eu/rapid/press-release_SPEECH-13-758_en.htm?locale=en, last visit on 17 November 2013.

[32] Case C-159/08 P Isabella Scippacercola and Ioannis Terezakis v Commission [2009] ECR I-46.

[33] Ibid, Para. 47.

[34] Case COMP/A.36.568/D3—*Scandlines Sverige AB v. Port of Helsingborg*, Commission decision on 23 July 2004, Para. 146, 147.

[35] Ibid, Para. 209, 226, 227, 234.

[36] *AML*, supra Note 2, Article 17(1).

Anti-Monopoly Law Enforcement in the Field of Intellectual Property Rights ("AML IP Guideline").[37] So far the draft IP Guideline is the only legal instrument where conduct of setting an excessive licensing fee by dominant undertakings is explicitly prohibited. Article 16 of the draft IP Guideline stipulates that dominant undertakings whose market positions are achieved largely through their intellectual property rights are prohibited from licensing intellectual property rights at "unfairly high prices".[38] Unlike other specifically prohibited behaviour such as refusal to license or tying involving IPRs on which there are separate and more detailed provisions, the draft IP Guideline does not provide further criteria for the undertakings as to at which level the dominant undertaking's conduct of setting the licensing fee would amount to charging an unfairly high price. The boundary between an unfairly high price and an acceptable licensing fee is highly uncertain (Evrard & Zhang, 2013, p. 139).

To avoid setting an unfairly high licensing fee, one concern has been raised as to on what principle the IPR holders—the SEP holders and non-SEP holders—should base to determine the appropriate royalty rate. Like the situation in the EU, the concept of FRAND is currently one issue in the process of standardization. The FRAND issue has been tackled by both the IP regulator and competition law regulator. The State Intellectual Property Office[39] and the National Standardization Administration Committee[40] issued the *Interim Provisions on the Administration of National Standards Involving Patents,*[41] providing that if the patent holder is willing to include his patent in a national standard, he may license his patent either on a royalty-free basis, or on a FRAND basis.[42] It has not been specified, however, as to what constitutes a FRAND licensing.

From the perspective of competition law regulator, the setting of royalty level appears in both of the draft IP Guideline and *implementing rules on the Prohibition of Abuses of Intellectual Property Rights for Purposes of Eliminating or Restricting Competition* ("IP Regulation")[43]. The draft IP Guideline states that, in the absence of

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[37] The fifth draft AML IP Guideline was released in the International Symposium of Forefront Issues of Anti-Monopoly Law Enforcement on 14 August 2012. An unofficial English translation is available as an appendix to the Joint Comments of the American Bar Association Section of Antitrust Law, Section of Intellectual Property Law and Section of International Law on the SAIC Draft Guide on Anti-Monopoly Law Enforcement in the Field of Intellectual Property Rights, available at http://chinaipr2.files.wordpress.com/2012/10/aba-china-aml-ip-guidelines-comments_finalpackage.pdf, last visit on 29 January 2014.

[38] Ibid, Article 16(1).

[39] The State Intellectual Property Office of the People's Republic of China ('SIPO'), directly affiliated to the State Council, is mainly responsible for patent-related administrative work and comprehensively coordination of foreign-related affairs in the field of intellectual property. See more at http://english.sipo.gov.cn/about/basicfacts/200904/t20090415_451001.html, last visit on 15 May 2014.

[40] The National Standardization Administration Committee was established by the State Council to undertake administrative management, supervision and coordination of standardization works in China, and represent China in international and regional standardization organizations. See more at http://www.sac.gov.cn/sac_en/introductionofSAC/201011/t20101123_4166.htm, last visit on 15 May 2014.

[41] *Interim Provisions on the Administration of National Standards Involving Patents*, issued by National Standardization Administration Committee and State Intellectual Property Office of China, 19 December 2013, available at http://www.sipo.gov.cn/zcfg/flfg/zl/bmgfxwj/201401/t20140103_894910.html (in Chinese), last visit on 31 March 2014.

[42] Ibid, Articles 9 and 10.

[43] It seems that this AML IP Guideline is not likely to be approved soon due to its complexity even though such guideline has no binding effect. Given this backdrop, from the end of 2012 the State Administration for Industry and Commerce ("SAIC") turned to draft its own IP Enforcement Regulation, which will be binding in SAIC's proceedings in non-price related cases. In 2013 the SAIC issued two IP Enforcement Regulation drafts. The second draft—the latest version—was issued on 18 September 2013 and circulated within a limited number of government officials, scholars, and practitioners for comments. The latest SAIC's IP enforcement regulation has not been publicly available. However, the author obtained a copy of the latest draft via personal contact from a Chinese anti-monopoly lawyer Ken Dai who was involved in a conference held by the SAIC in Shanghai aiming to circulate the draft within a limited scope.

due justifications, the SEP holder's conduct of refusal to license his patented technology to any potential licensee *on reasonable terms* within the process of standardization is an example of abusive behaviour, which is prohibited since it could cause or is likely to have anticompetitive effect on the market competition and innovation.[44] The draft IP Guideline then in the same Article requires that once the SEP holder's patented technology is included into national or industrial standard, the upper limit of the licensing fee set by the SEP holder should not be significantly higher than that charged before such patented technology is included in the standard.[45] Thus in determining a FRAND royalty rate, guidance provided in this Article is applicable only in limited situations where there are directly comparable licensing transactions (Sokol & Zheng, 2014, pp. 24-25). On the other hand, the draft IP Regulation is the very legislation where FRAND principle has been officially recognized for the first time in Chinese competition legal system. According to Article 13 of the draft IP Regulation, the dominant undertakings are prohibited from violating their FRAND commitments by refusing other undertakings to implement their SEPs on reasonable terms if there is no due justification.[46]

Thus to some extent the concept FRAND has been established in the SEP-related licensing scenario. However, in the absence of a determined refusal to license case, it is uncertain whether the enforcement authorities will impose upon IP holders an obligation to license on FRAND conditions in non SEP-related scenario (e.g. *de facto* standard) after a refusal to license has been treated as abusive.

Excessive Pricing and FRAND in Practice

The excessive licensing fee issue not only has raised competition concern for the AML enforcement authorities, it has also been tackled in private enforcement before the Chinese courts. This could be demonstrated by the recent civil litigation lodged by Huawei against the royalty rate setting practice of InterDigital Corporation ("IDC"), whose licensing practice was also subject to the scrutiny of AML enforcement authority as mentioned in the previous section. The SEP royalty rate dispute between Huawei and IDC, which was the subject of the first instance decision of Shenzhen Intermediate Court and the final decision of Guangdong High Court in appeal, could demonstrate the answer of the Chinese courts to the question of what constitutes a reasonable licensing fee. This is the first and so far the only antimonopoly litigation related to SEP and FRAND royalty setting in China (Ye, Zhu, & Chen, 2013a, p. 46). Huawei sued to Shenzhen Intermediate Court in December 2011, alleging that IDC as an owner of several SEPs for 2G, 3G, and 4G telecommunications technologies, had abused its dominant market position by failing to license these patents on FRAND terms. These FRAND commitments were required by the intellectual property rights policy of the standard setting organization European Telecommunications Standardisation Institute ("ETSI") when IDC was accepted as a member of ETSI in September 2009. In February 2013, Shenzhen Intermediate Court issued its decision (Ye, Zhu, & Chen, 2013a, p. 46; Ye, Zhu, & Chen, 2013b, p. 54).[47] The first instance judgment found that each SEP in 3G wireless telecommunications industry constitutes an independent patent licensing market, resulting that the SEP holder (IDC in this case) possesses a

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[44] AML IP Guideline (fifth draft), *supra* Note 37, Article 22, Para 2(4).
[45] Ibid, Article 22, Para 3.
[46] IP Regulation (second draft), Article 13.
[47] The first instance decision of Shenzhen Intermediate Court has not been published due to business secrets reason. The case facts and the analysis of the court, as will be elaborated below, are generally based on two articles published by the three judges. The case summary could see news report, for instance at http://sztqb.sznews.com/html/2014-01/14/content_2753404.htm, last visit on 1 April 2014.

dominant position in each relevant licensing market (Ye, Zhu, & Chen, 2013a, pp. 48-50). With respect to the royalty setting complaint, the court ruled that IDC had violated its FRAND commitment and IDC's conduct had constituted abuse of dominant position by demanding excessive licensing fee (Ye, Zhu, & Chen, 2013a, pp. 50-52). This first instance judgment was affirmed by the Guangdong High Court in October 2013.[48]

The judges stated in their published article with the starting point that, the SEPs holder would violate his FRAND commitment if he directly refuses to license his SEPs to the potential patented technologies implementer who is willing to pay reasonable licensing fee (Ye, Zhu, & Chen, 2013b, p. 60). Concerning the calculation of a FRAND royalty rate, there are two ways to determine a FRAND rate: the approach in theory and the approach in practice. Theoretically, the value of SEPs should be quantified in proportion to their contribution to the profit of the final product, and royalty rates should be allocated among each SEP in line with their varied contribution in an industry standard (Ye, Zhu, & Chen, 2013b, p. 61). However, the judges admitted that such royalty allocation approach is unpractical due to the amount of SEPs involved in a telecommunications industry standard and the lack of a proper method to examine the contribution of each SEP (Ye, Zhu, & Chen, 2013b, p. 61). The judges held that to be a FRAND royalty rate, in practice the licensing fee should be reasonable in itself (the first question), and the licensing fee should be reasonable compared to existing licensing fees negotiated in the same industry as well (the second question) (Ye, Zhu, & Chen, 2013b, p. 61). Two general principles should be considered in answering the first question—whether the licensing fee is reasonable in itself. Patent licensing fee should only account for a certain proportion of the profit originated from the final product, since other elements, such as capital, other technologies (including those from other SEPs holders) and licensee's business operation, all have contributed to the profit (Ye, Zhu, & Chen, 2013b, p. 61). The other principle that should be kept in mind is that, the reward the licensor could obtain should be in line with the value of the patent itself, but not result from the fact that the patented technology is included in an industry standard (Ye, Zhu, & Chen, 2013b, p. 61). With regard to the second question, it would be rather difficult to answer if there is no comparable licensing fee existing in the same industry. The judges proposed that the royalty rates should be set roughly at the same level towards equivalent SEPs implementers (Ye, Zhu, & Chen, 2013b, p. 61).

As to the Huawei v. IDC case, the judges held that the following factors should be taken into consideration in the analysis whether the licensing fee proposed by the SEP holder has met the FRAND requirement: the normal profit range in the wireless telecommunication industry, the SEP holder's investment in R&D (including the amount of research personnel), and the quality and quantity of SEPs he possessed, the existing royalty rates negotiated between the licensor and other licensees in the same industry (Apple and Samsung in this case), and whether the patented technologies are standard-essential in China or standard-essential worldwide (Ye, Zhu, & Chen, 2013b, p. 51). According to the judges, the licensing fees proposed by IDC to Huawei were much higher than those asked from Apple or Samsung, thus constituting excessive and discriminatory pricing which is prohibited by the AML (Ye, Zhu, & Chen, 2013a, p. 51). It is quite natural, however, to doubt the judges' determination that the assessment of a reasonable royalty rate should take into account the number of SEP holder's research personnel and the quantity of his SEPs, which are apparently not relevant indicators in measuring the value of the SEPs (Sokol & Zheng, 2014, p. 32). Shenzhen Intermediate Court, basing on its

[48] The final judgment of Guangdong High Court has not been published due to the business secrets reason as well.

findings, ordered IDC to cease the alleged excessive pricing. According to publicly available document released by IDC, Shenzhen Intermediate court further ruled that

> the royalties to be paid by Huawei for InterDigital's 2G, 3G and 4G essential Chinese patents under Chinese law should not exceed 0.019% of the actual sales price of each Huawei product, without explanation as to how it arrived at this calculation.[49]

Therefore, according to publicly available information, it remains unknown as to how the Court figured out this specific rate.

Two Economic Models

The Lemley-Shapiro Model

The fact remains that neither the EU nor China has formulated an exactly clear and predictable test that would allow an IPR holder to evaluate *ex ante* whether the royalty rates are reasonable. This has led a number of commentators to propose economic models in FRAND royalty rates determination. The first Lemley-Shapiro economic model was proposed to determine a reasonable royalty rate in the situation where the IPR holder alleges a downstream producer has infringed his IPR. Lemley and Shapiro firstly define some economic variables which are used in the model as follows (Lemley & Shapiro, 1991, pp. 1996-1997):

V is the value enhanced or the cost reduced per unit of the final product by incorporating the IPR at issue;

B is the bargaining skill of the IPR holder, as measured by the percentage of the gains captured by the IPR holder from the licensing negotiation, ranging from 0 to 1;

θ is the strength of the IPR at issue—which might vary during the process of negotiation and litigation in a more complex model (Lemley & Shapiro, 1991), as measured by the likelihood that the result of the IPR infringement lawsuit will be in favour of the IPR holder in the sense that the IPR is found valid and it has been infringed by the downstream competitor;

M is the margin, or the profit earned per unit;

C is the proportion of the cost incurred in the downstream producer's redesigning its product to avoid infringing the IPR at issue, in the total value of the final product;

L is the proportion of the total sales lost of the downstream producer expected during the IPR lifetime if the producer is excluded from the market by an injunction.

Lemley and Shapiro firstly set up the benchmark level for the royalty rate. If the IPR at issue is certainly valid, the benchmark royalty rate should take into account the value of the IPR for the downstream production and the IPR holder's bargaining skill, namely the rate should be the result of $\mathbf{B} \times \mathbf{V}$ (Lemley & Shapiro, 1991, p. 1999). If it is not certain whether the validity of the IPR at issue will be confirmed by a court decision, the benchmark royalty rate should be equal to the result of $\boldsymbol{\theta} \times \mathbf{B} \times \mathbf{V}$ (Lemley & Shapiro, 1991, p. 1999). In other words, the royalty rate should consider as well the probability that the licensor possesses a valid IPR and could win the IPR infringement case, thus the reward for the IPR holder should be proportional to the IPR strength (Lemley & Shapiro, 1991, pp. 1999-2000).

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[49] See Inter-Digital 2014 Annual Report, 24 February 2014, available at http://files.shareholder.com/downloads/IDCC/3061303688x0xS1405495-14-10/1405495/filing.pdf, p. 26, last visit on 2 April 2014.

The benchmark royalty rate, according to the authors, is not designed for replacing the negotiated royalty rate, since there is a "royalty overcharge" gap between the former and the latter (Lemley & Shapiro, 1991, p. 2000). The amount of such royalty overcharge varies according to the downstream producer's strategy choice in negotiating with the IPR holder. The downstream producer could, either choose wait-and-see strategy and redesign his product only if he loses the IPR infringement case ("Litigate Strategy"), or choose to develop a backup version of his product during the litigation ("Redesign and Litigate Strategy") (Lemley & Shapiro, 1991, p. 2000). The "litigate strategy" will normally be employed if the licensee considers the validity of the IPR at issue is weak, while the "redesign and litigate strategy" will be adopted if he considers the IPR is strong. If the downstream producer chooses to adopt the "litigate strategy", the percentage of the overcharged royalty rate should reflect the downstream producer's expenses on redesigning his product and his sales lost due to the injunction, so the percentage gap should be defined as $\mathbf{C} + \frac{\mathbf{M-V}}{\mathbf{V}} \times \mathbf{L}$ (Lemley & Shapiro, 1991, p. 2001). It is important to remind that the further the margins (M) are in excess of the value of the IPR at issue (**V**), the more the downstream producer will lose on that market before he redesigns his product. In this case, based on the previous benchmark royalty rate, the negotiated royalty rate should be the result of $\boldsymbol{\theta} \times \mathbf{B} \times \mathbf{V} \times (\mathbf{1} + \mathbf{C} + \frac{\mathbf{M-V}}{\mathbf{V}} \times \mathbf{L})$.

On the other hand, if the downstream producer chooses the "redesign and litigate strategy"—namely redesigning his product during the process of the IPR infringement litigation in order to avoid the risk of losing the market sales, the percentage of the overcharged royalty rate should be calculated differently. Unlike the "litigate strategy", the downstream producer in this situation will not be forced off the market, so there is no market sales lost. Another difference that could be observed is that the IPR strength should be taken into account in measuring the costs of redesigning the product. Because in this case the litigation is still on-going, while in the "Litigate Strategy" the costs of redesigning occurs only when the downstream producer loses his case. Therefore the percentage of the overcharged royalty rate, according to Lemley and Shapiro, should be equal to $\frac{\mathbf{C}}{\boldsymbol{\theta}}$ (Lemley & Shapiro, 1991, p. 2002). The rationale here is that more likely the IPR is found invalid or not infringed by a court decision, more money will be wasted on the part of the downstream producer on redesigning his product (Lemley & Shapiro, 1991, p. 2002). Thus the negotiated royalty rate would be the result of $\boldsymbol{\theta} \times \mathbf{B} \times \mathbf{V} \times (\mathbf{1} + \frac{\mathbf{C}}{\boldsymbol{\theta}})$.

The key point Lemley and Shapiro have stressed in their analysis is that, IPR should be something probabilistic as opposed to certain. Therefore, the authors argue that, compared to the proposed negotiated royalty rate out of court, the court-based rules, such as the *Georgia-Pacific factors*, would result in an overcharged rate on the grounds that the IPR strength has not been taken into consideration ((Lemley & Shapiro, 1991, pp. 2019-2020; Durie & Lemley, 2010, p. 642). In the court-based rules there are other problems that drive the royalty rates up in favour of the IPR holders. The problem could be the reliance on other royalty rates in the same industry, since other royalty rates might already exceed the reasonable rates (Lemley & Shapiro, 1991, pp. 2021-2022). This might result in a degree of circularity, which is even more apparent if the first court-determined rate infects all subsequent royalty rates (Lemley & Shapiro, 1991, pp. 2021-2022). The problem could also originate from the ill-informed experts, whose source of available information about industry royalty rate overestimates the reasonable royalty rate (Lemley & Shapiro, 1991, pp. 2022-2023). Moreover, the problem could derive from the calculation of the value of the IPR at issue ***V***. The value of the IPR should be based on the contribution of the IPR as a component to the final product, rather than on the price of the entire downstream product. It is however difficult, either to separately observe the value of the IPR at issue, or to determine the contribution of other inputs to the final product other than the IPR input (in the latter approach the value of the IPR at issue could be the result of the price of the entire final product minus the value of other inputs) (Lemley & Shapiro, 1991, pp. 2021, 2023-2025).

The Epstein-Marcus Model

Another economic framework—Financial Indicative Running Royalty Model ("FIRRM") is proposed by Epstein and Marcus, aiming at reducing the uncertainty deriving from the *Georgia-Pacific* approach and realising more reliable results with less time and expense (Epstein & Marcus, 2003, p. 555). FIRRM compares the difference in profit between the best project choice incorporating the IPR at issue and the "next-best" project choice (i.e. the downstream producer switches to adopt other alternative IPR or designs around the IPR at issue), thus determining a reasonable royalty rate from the perspective of investor's profitability and cash flow (Epstein & Marcus, 2003, p. 557). Epstein and Marcus use economic concepts "net present value" ("NPV") and "internal rate of return" ("IRR") to set up this model. NPV is "the present value of the expected future cash flows, discounted at the cost of capital, net of the amount of any initial investment", where the cost of capital is the rate required by the project investors to guarantee that they will not lose money as time goes by (Epstein & Marcus, 2003, pp. 558-559). For example, assume that the up-front investment of certain project and cash flow in one year is respectively 100 euro and 121 euro, and the cost of capital is 10%. Then the future cash flow in this project will have a present value of 110 euro ($\frac{121}{1+10\%} = 110$). The NPV in this case would be 10 euro, namely the result of the discounted value of future cash flow (110 euro) minus the value of the up-front investment (100 euro). The IRR is "the effective rate of interest rate earned on the investment, irrespective of the cost of capital" (Epstein & Marcus, 2003, p. 560). So in the example above, the IRR would be 21% ($\frac{121-100}{100} = 21\%$), irrespective of the outside cost of capital 10% in that example. Subsequently Epstein and Marcus come to their first conclusion that a project is able to afford a royalty payment only when the IRR exceeds the cost of capital (the amount is called "IRR spread") (Epstein & Marcus, 2003, p. 560).

Following the fundamental rationale of FIRRM that a reasonable royalty rate could be determined by comparing the profit difference between the best choice incorporating the IPR at issue and the "next-best" choice, Epstein and Marcus then consider that the maximum royalty rate would be equal to the difference in NPV between the best choice and the "next-best" choice (Epstein & Marcus, 2003, p. 560). For example, suppose that the best project in which the license of the IPR at issue is required need up-front investment of 100 euro and would generate cash flow of 121 euro after one year, with the cost of capital of 10%, the NPV of the best project would be 10 euro as explained in the previous paragraph. If the NPV of the "next-best" project is 5 euro (which means, with the same cost of capital in the market, its potential cash flow after one year is 115.5 euro), the maximum chargeable royalty could be 5 euro (the best choice NPV 10 euro—the "next-best" choice NPV 5 euro = 5 euro) if other elements in these two projects are equal. Thus, the maximum reasonable royalty rate would make the potential licensee(s) indifferent between paying for access to the IPR at issue, and switching to the "next-best" alternative (Epstein & Marcus, 2003, p. 562). A royalty rate below that maximum level would tempt the potential licensee(s) to pay for using the IPR at issue.

Conclusion

This paper distinguishes two situations where the concept FRAND could be related to IPR holder's direct refusal to license in non-SEP cases or indirect refusal to license in SEP cases, finding that in the EU neither situation has provided a meaningful definition of FRAND. Moreover, the two-step approach established in *United Brands* is also unworkable in assessing whether a high price is unfair when intellectual property is involved. In the SEP-related cases *Motorola Mobility* and *Samsung*, the EU Commission has not outlined what a reasonable royalty rate should be, and declared that "courts and arbitrators are well-placed to set FRAND rates in cases of disputes".[50] Nevertheless, at the EU level the fact remains that either the EU Commission or the EU courts has not formulated a predictable approach that allows the IPR holders to evaluate whether their royalty rates comply with the FRAND requirement. The review of FRAND cases in China has demonstrated that in practice China generally takes an EU-like position, especially in the *Huawei/IDC* case. To strike a balance between maintaining competitive market order and providing sufficient compensation for IPR holders, economists have, from different angles, proposed several models, by which the economic value of the IPR at issue could be indirectly calculated and thus a FRAND royalty rate could be determined. However, even the economic discussion on FRAND royalties remains somewhat limited helpful since the "abstract and simplified" models leave many issues open in the real markets (Valimaki, 2008, p. 689). The limitation, as analyzed above, is particularly obvious in the licensing scenario following an abusive refusal to license ruling.

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[50] See EU Commission Press Release at http://europa.eu/rapid/press-release_MEMO-14-322_en.htm, last visit on 8 June 2014.

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