Rigorous empirical research on intellectual property

STUDENT CONTRIBUTION

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1 Introduction

Intellectual property is a strategic area in innovation ecosystems and especially relevant for the technology sector.[2] Whether the innovation concerns extreme high demand features in smartphones or simple original ideas, patents usually protect innovative technologies that are likely to be implemented. Patents are important to all kind of stakeholders amongst the different fields, from start-ups and SMEs to large technological companies such as Apple, Samsung, Hewlett Packard, Nokia, Ericsson, and Panasonic. To offer consumers compatible products (like smartphones) many companies adopt technical standards which guarantee high reliable, low latency and high-speed connectivity among different devices. A patent that is required for the implementation of a standard is known as a Standard Essential Patent (SEP).[3]

Companies negotiate with each other when licensing SEPs. One of the most frequent discussions is about the royalty fees, the calculation of which requires the use of a royalty base. In this paper, we focus on two different methodologies (for the calculation of royalties): Smallest Salable Patent-Practicing Unit (SSPPU) and Entire Market Value Rule (EMVR). We first introduce an overview of what surrounds the discussion, which institutions are involved in the patent ecosystem, as well as where the SSPPU vs. EMVR discussion arises. We then address the theoretical background of the SSPPU creation and evolution, focusing on the economic disadvantages of SSPPU. Furthermore, we list the consequences of applying a too low basis, mainly attempting to clarify the drawbacks of applying SSPPU.

[1] This paper has been inspired by the master thesis jointly written for the IP Management Master program of the Technical University Berlin. The opinions expressed in the author only reflect the views of the authors.
[2] Holgersson, M., et al. (2017). The evolution of intellectual property strategy in innovation ecosystems: Uncovering complementary and substitute appropriability regimes, Long Range Planning. Available at: http://dx.doi.org/10.1016/ j.lrp.2017.08.007.
[3] According to ETSI, "When it is not possible on technical grounds to make or operate equipment or methods which comply with a standard without infringing a SEP, i.e. without using technologies that are covered by one or more patents, we describe that patent as 'essential'." See ETSI at https://www.etsi.org/intellectual-property-rights.

2 The SEP and the FRAND ecosystem

Standards are necessary because "interoperability is an essential requirement for many electronic devices" and there is a need in assuring compatibility among a substantial number of different devices.[4] Standards bring, amongst others "improved market access as a result of increased competitiveness and efficiency, reduced trading costs, simplified contractual agreements, and increased quality"[5] and are developed by Standard Development Organisations (SDOs). Examples of SDOs are the Institute of Electrical and Electronic Engineers (IEEE), the World Wide Web Consortium (W3C) and the European Telecommunications Standards Institute (ETSI).

SDOs usually encourage their members to license SEPs on Fair, Reasonable and Non-Discriminatory (FRAND) terms and conditions.[6] FRAND incentivises to innovate and contribute to the development of an industry[7] by providing a fair and adequate reward to innovators and access to those implementing SEPs.[8] Therefore, FRAND regime has allowed for the unprecedent innovation diffusion from the last 25 years.[9]

FRAND terms are to be determined in bilateral negotiations. However, if these negotiations fail, parties may end in litigation. Courts will then determine whether behavior of the parties has been FRAND[10] and, if necessary, establish a FRAND royalty.

3 Origin of the SSPPU approach

In the context of patent infringement and contract negotiations, the EMVR refers to calculating royalties considering the current market value of an entire product. While EMVR

[4] *Ericsson Inc. v. D-Link Systems Inc.*, US Court of Appeals for the Federal Circuit, 2014.
[5] See this and other benefits of standards at European Commission, European Standards. Available at https://ec.europa.eu/growth/single-market/european-standards/policy/benefits_en. Interoperability standards increase competition, innovation, product quality and choice. Winn, J.K. and Wright, B.F. (2000). The law of electronic commerce. 4th edn.: Gaithersburg [u.a], Aspen Law Business.
[6] Tapia, C., Patents and Standards in the Telecommunications industry, (chapter) in Derecho TIC, Tirant lo Blanc (ed), 2016.
[7] Pentheroudakis, C. and Baron, J.A. (2017). 'Licensing Terms of Standard Essential Patents: A Comprehensive Analysis of Cases'.
[8] See ETSI IPR Policy. Available at https://www.etsi.org/intellectual-property-rights.
[9] Bauer, M. and Erixon, F. (2017). Standard Essential Patents and the Quest for Faster Diffusion of Technology. Available at: https://ecipe.org/publications/standard-essential-patents/
[10] To have a better understanding of the rights and obligations of the owners and users of SEPs (which would lead to obtaining or avoiding an injunction for the SEP in suit) established by the Court of Justice of the European Union clarified, in Huawei v ZTE (Case No. C-170/13), see 4iP infographic. Available at https://caselaw.4ipcouncil.com/guidance-national-courts.

is the traditionally applied methodology, the SSPPU approach is a rather recent development, an evidentiary concept only applied in US court jury trials and born in *Cornell v HP*.[11]

In *Cornell v HP* the patented technology at issue encompassed an Instruction Reorder Buffer, which is a small part of a processor built in a Central Processing Unit (CPU) Brick.[12] In pre-trial sessions, Cornell's damages expert claimed damages based on the "CPU Brick" revenues. Nevertheless, the Court stated that "the entire market value rule permits recovery of damages based on the value of the entire apparatus containing several features, where the patent related feature is the basis for customer demand", and considered that in this case there was no evidence of consumer demand at the CPU Brick level, and that the parts were sold together for "mere business advantage". Therefore, the Court granted HP the motion by using only the processors' revenue as damages base, leading to drastically lower damages (from $23 billion - originally granted by the jury applying CPU Brick as base - to $6 billion).[13]

The main argument for applying the SSPPU in jury trials has been the perceived risk the cognitive bias of jurors,[14] if using as base an amount that includes non-patented elements, would lead to over-compensating the patent holder.[15] SSPPU was later on adopted in cases like *LaserDynamic v Quanta* (by the Federal Circuit)[16] and *In re Innovatio*.[17] Finally, the Federal Circuit later on clarified that SSPPU is *not* mandatory[18] and allowed for an apportionment of the end product.[19]

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[11] See *Cornell University v. Hewlett-Packard Co*., 609 F. Supp. 2d 279 (2009). Available at: https://www.law.berkeley.edu/wp-content/uploads/2016/05/Cornell-v-HP-609_F.Supp_.2d_279.pdf. Under this ruling EMVR can be applicable only if it meets the three below mentioned conditions: (1) the infringing components must be the basis for customer demand for the entire machine including the parts beyond the claimed invention; (2) the individual infringing and non-infringing components must be sold together so that they constitute a functional unit or are parts of a complete machine or single assembly of parts; and (3) the individual infringing and non-infringing components must be analogous to a single functioning unit, p. 286.

[12] Chaikovsky et al. (2012). Berkeley Center for Law and Technology Patent Damages Panel. Available at: https://www.slideshare.net/YarChaikovsky/bclt-patent-damagestrialattorneyspanel.

[13] *Cornell University v Hewlett-Packard Company,* 609 F. Supp. 2d 279, N.D.N.Y. 2009.

[14] See below Section 4.5.

[15] Sidak, J.G, The proper royalty base for patent damages, *Journal of Competition Law& Economics*, 10(4),989–1037, Nov. 2014. Available at https://www.criterioneconomics.com/docs/emvr-entire-market-value-rule-proper-royalty-base-for-patent-damages.pdf.

[16] *LaserDynamics, Inc v Quanta Computer, Inc*, 694 F 3d 51 (Fed Cir 2012).

[17] *In re Innovatio*, 886 F Supp 2d 888 (ND Ill 2012).

[18] *Commonwealth Sci & Indus Research Org (CSIRO) v Cisco Sys, Inc*, 2015-1066 (Fed Cir 2015).

[19] On apportionment see Geradin, D., & Layne-Farrar, A. (2011). Patent Value Apportionment Rules for Complex, Multi-Patent Products. Available at: https://digitalcommons.law.scu.edu/cgi/viewcontent.cgi?article=1528&context=chtlj.

4 Disadvantages of deviating from commercial practice: SSPPU

According to Bauer and Erixon,[20] three main problems arise from the point of view of the technical legal terms when applying SSPPU in FRAND royalty determination: (1) Opaque information about SEP exposures, (2) Unclear valuation of the patented technologies and (3) Risks of uncertainty in enforcement. A compilation of SSPPU disadvantages is presented below.

4.1 Patent claim covers more than a small component

The first argument against the use of SSPPU is related to the fact that technical inventions typically cover more than the smallest saleable unit. In the SEP environment this is especially true for systems, methods and multi-component devices. For example, when analysing patents declared as potentially essential of a major contributor of standardisation, Williams and Putnam concluded that no patents contained claims restricted to the baseband processor only.[21]

4.2 Comparable licenses, typically used in industry, do not apply SSPPU

Using comparable license, i.e. determining FRAND by 'comparing' licenses signed between SEP holder and similar situated licensees, is a common industry practice in bilateral FRAND negotiations.[22] In these FRAND agreements the parties typically negotiate a percentage-rate running royalty based on the price of the *end product*. As recognised by the Federal Circuit, comparable agreements can be considered "sufficiently comparable to the hypothetical licenses".[23]

[20] Bauer and Erixon (2017).
[21] According to the experts "about 13.7% of patents contained claims directed to the user equipment only; the majority (59.4%) contained claims directed to both the user equipment and the network, while about 25.7% contained claims directed to the network only". See Putnam, J. 'Smallest saleable patent practising unit' doctrine: developments and challenges. *IAM Magazine*, 12 Oct. 2017.
[22] In *HTC Inc. v. Telefonaktiebolaget LM Ericsson*, Case No. 6:18-CV-00243-JRG (E.D. Texas, 2019), HTC expert were unable to identify any licensing agreement applying SSPPU.
[23] *VirnetX, Inc. v. Cisco Sys., Inc*., 767 F.3d 1308, 1330 (Fed. Cir. 2014) (quoting Lucent Techs., Inc. v. Gateway, Inc., 580 F.3d 1301, 1325 (Fed. Cir. 2009) in Sidak, J.G. (2016). 'Apportionment, FRAND Royalties, and Comparable Licenses after Ericsson v. D-Link', *University of Illinois Law Review*. Available at: https://www.criterioneconomics.com/docs/apportionment-frand-royalties-comparable-licenses-ericsson-dlink.pdf.

4.3 **Risk of under-compensating the SEP holder**

When the license is calculated based on SSPPU, following aspects are ignored "(1) the effects that the patented technology has on the value of the downstream product and (2) the value that synergies between complementary technologies create".[24]

As a result, some argue that by applying SSPPU the return for 10 years of R&D investments by the Small and Medium Enterprises that co-invented NCF would be reduced by a factor of 30 to 50.[25] In *Ericsson v HTC*, HTC claimed that under the SSPPU approach, Ericsson's royalty should be between $0.01 and $0.08 per 4G device. The court, however, concluded that based on market-based evidence of the value of cellular and Ericsson's submitted comparable licenses, both of Ericsson's offers to HTC [not following SSPPU] –$2.50 or 1% with a $1 floor and a $4 cap per 4G device– were fair, reasonable, and non-discriminatory.[26]

4.4 **Synergies on entire device usage**

When the SSPPU approach fails to recognise the overall value created from the patented technologies, which is higher than the sum up value of individual technologies. This is because "the synergies, or additional value obtained by combining assets, are the result of complementarities among the assets".[27] For example, when camera and cellular connectivity is used together in the device, it is possible to share the photos, enlarging the value created by both camera and connectivity isolated, which are theoretically unrelated.[28]

4.5 **Cognitive bias of the jurors**

SSPPU approach is only used in jury trials (in the US). The reason to favor this approach is because the initial piece of information impacts people's decisions massively.[29] This is called cognitive bias. Main biases in damages calculations are called "framing"[30] and "anchoring". As explained before, it was assumed by US courts that if a jury would be presented to a "too

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[24] Sidak (2014).
[25] See IPEurope, The New IEEE rules: A threat to innovation and consumers. Available at https://www.iptalks.eu/ieee.
[26] *HTC Inc. v. Telefonaktiebolaget LM Ericsson*, Case No. 6:18-CV-00243-JRG (E.D. Texas, 2019).
[27] Bailey, E. M., Leonard G. K. & Lopez M. A. (2011). Making Sense of "Apportionment" in Patent Damages, XII, 256–271. Available at: https://www.researchgate.net/publication/228458008_Making_Sense_of_Apportionment_in_Patent_Damages.
[28] Sherry, E. F.; Teece, D. (2016). On the 'Smallest Saleable Patent Practicing Unit' Doctrine: An Economic and Public Policy Analysis. In *SSRN Journal*. Available at http://dx.doi.org/10.2139/ssrn.2764614.
[29] Kappos, D. & Michel, P. R. (2017). The Smallest Salable Patent-Practicing Unit: Observations on Its Origins, Development, And Future, *32:1433*, 1434–1456.
[30] Framing means that the people shape their decisions based on the way of giving the options.

large" base (i.e. the end product), the jury might "anchor" to a too high royalty rate. Therefore, the jury would tend to give their verdict with excessively large damages award.

However, biases can go in either direction; excessive or too low damages. A patentee can be under-compensated if applying a too low base, which is typically the case of SSPPU.

4.6 Use-value relation

Although US law declares that the damages awarded should "in no event [be] less than a reasonable royalty for the *use* made of the invention by the infringer",[31] SSPPU approach disconnects the "use" part of the invention.[32] Also, the widespread use of Georgia Pacific rules which was established in *Georgia Pacific Corp. v US Plywood Corp.*[33] highlight the importance of using the value of the patent-in-suit.[34] The rule 11, i.e. "the extent to which the infringer has made use of the invention; and any evidence probative of the value of that use", underlines use value of the patent license in calculation of reasonable royalty.

SSPPU approach, on the other hand, fails to explain the correlation for customer demand on a wider appreciation of the product.[35]

5 Conclusions

Royalty calculation is often the most challenging tasks for US juries in SEP infringement cases. Concerned about the cognitive bias of jurors if applying a too high base for FRAND royalty calculations, some US courts have chosen to apply SSPPU, i.e. "a component of a product that can be used as a royalty base".[36]

Despite not being mandatory, the use of SSPPU is still a deviation from the industry practice and could easily lead to an insufficient reward for SEP holders (as the cognitive bias works also in the other direction, i.e. when using a too low base). According to a European Commission's report "FRAND determination requires taking into account the present value

[31] 35 U.S. Code Section 284.
[32] Layne-Farrar, Anne (2017). The Patent Damages Gap: An Economist's Review of U.S. Patent Damages Apportionment Rules. In *SSRN Journal*. Available at: http://dx.doi.org/10.2139/ssrn.2911289. See also Petit, N. (2016). The Smallest Salable Patent-Practicing Unit ('SSPPU') Experiment, General Purpose Technologies and the Coase Theorem. *SSRN Journal*. Available at https://doi.org/10.2139/ssrn.2734245.
[33] *Georgia-Pacific Corp. v. United States Plywood Corp.,* 318 F. Supp. 1116 (S.D.N.Y. 1970)
[34] Yang, Z. (2014). Damaging Royalties: An Overview of Reasonable Royalty Damages, *29:647*, 648–678.
[35] Layne-Farrar, 2017. See also Layne-Farrar, Anne (2016). The Practicalities and Pitfalls of The Smallest Saleable Patent Practicing Unit Doctrine: A Review of Teece And Sherry, 234–238.
[36] See Pentheroudakis & Baron (2017), 8.

added of the patented technology".[37] However, if determining FRAND based on SSPPU, innovators would no longer benefit from the value created by themselves. This in turn which could lead to an increase of efficient litigation,[38] and a decreased incentive to innovate, meaning lower investments in R&D.[39] Another possible consequence would be that companies would stop sharing the result of massive R&D investments in standardisation, so that consumers would suffer lower quality standards, in detriment of consumer welfare.

In times where a highly reliable, low latency and high-speed standardised connectivity is necessary for the digital transformation,[40] it is indispensable that innovators can obtain a return on investment on their cutting-edge technologies. SSPPU put this important goal at risk.

[37] European Commission, Communication from the Commission to the Institutions on Setting out the EU approach to Standard Essential Patents, 29. Nov. 2017, available at https://ec.europa.eu/docsroom/documents/26583.
[38] Innovators would have to go through expensive trials that would likely end in royalties below FRAND. On the high costs of litigating internationally see Spense, W. C. Prepare for litigation and avoid it where possible. 3. Oct. 2019. *IAM Magazine*. Available at: https://www.iam-media.com/prepare-litigation-and-avoid-it-where-possible.
[39] Baudry, M. & Dumont, B. (2017). Patents: Prompting or restricting innovation? 1st. London: Wiley-ISTE.
[40] European Commission, Digital transformation. Available at https://ec.europa.eu/growth/industry/policy/digital-transformation_en.