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## COMPETITION LAW AND POLICY FOR THE INTERNET OF THINGS

**Abstract:** *The Internet of Things (IoT) brings mobile internet connectivity to many different sectors of the economy. 5G standard is expected to play a key role in fostering seamless connectivity between devices. However, it also requires licensing patents essential for 5G standards to a diverse group of companies. How to effectively license essential patents in IoT has been the central question in recent policy debates before the European Commission. Competition law has often been invoked as a solution to either directly regulate certain licensing practices or to take a step back and enable the industry to collectively agree on certain licensing solutions. The article analyses three situations where the role of competition law was discussed: i) refusal to license patents to different levels of the production chain; ii) collective price-setting of a standard and iii) collective licensing of patents. The article examines each situation and discusses the appropriate role of competition law in fostering efficient licensing of essential patents in the IoT.*

**Key words:** standard-essential patents, IoT, 5G, competition law.

### 1. INTRODUCTION

The Internet of Things (IoT) refers to seamless connectivity between different objects that are able to communicate with each other and the environment.<sup>1</sup> We will see “smart” cars, domestic appliances, buildings, healthcare devices, manufacturing machines and cities all connected to the internet with the ability to interact with each other and with users. Already around 10 billion devices are estimated to have connectivity, with an expected rise to as much as 25 billion by 2025.<sup>2</sup> The economic impact of IoT will be enormous, with estimated growth of much as \$11.1 trillion per year in 2025,<sup>3</sup> and \$12.3 trillion by 2035.<sup>4</sup>

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1 Commission, Advancing the Internet of Things in Europe, SWD(2016) 110 final.

2 Ericsson Mobility Report (June 2020), p. 23.

3 McKinsey Global Institute, 2015, *The Internet of Things: Mapping the Value Beyond the Hype*, June.

4 IHS Economics & HIS Technology, 2017, *The 5G Economy: How 5G Technology Will Contribute to the Global Economy*, January.

Internet connectivity is largely expected to be facilitated by the 5G cellular communication standard. The 5G will be up to 100 times faster than the existing 4G LTE,<sup>5</sup> with end-to-end latency going down to 1 millisecond which may allow remote surgeries or self-driving cars that depend on the uninterrupted transmission of data. 5G and other interoperability standards are estimated to represent 40% of the potential value of IoT.<sup>6</sup> Besides connectivity standards such as Wi-Fi, 5G, Bluetooth, IoT objects will also cover different quality and security standards; standards for cooperation between IoT devices and cloud services; standards within IoT devices and cyber security standards.<sup>7</sup>

The plurality of standards used by IoT objects raises certain challenges from the competition law perspective. The use of IoT objects and successful market implementation may be jeopardized if access to the standard is blocked or if companies are unable to interoperate with each other's products. The role of competition law is therefore increasingly seen as a mechanism for ensuring open access to standards, which is recognised by the European Commission as crucial for the success of IoT.<sup>8</sup> Issues have already emerged regarding the licensing of patents essential for cellular standards (*i.e.* standard-essential patents or SEPs) in the automotive industry. Telecommunications companies have approached car manufacturers to license patents for 2G, 3G and 4G standards, but they have instead suggested turning to their component manufacturers and pointed to established practices in the automotive industry of supplying components clear of all IP rights.<sup>9</sup> Unable to reach an agreement, automotive manufacturers complained about anti-competitive refusal to license SEPs, as well as an excessively high price for SEPs when measured against the price of components. Additionally, with so many standards used by IoT objects, it may appear surprising that an overall price for numerous standards is unknown.<sup>10</sup> Thus, IoT device manufacturers are unable to plan the costs of production in advance, making licensing disputes more likely. Different measures are being discussed on how to increase the transparency of standards' prices, including collectively negotiating and fixing the price in advance, which is traditionally strongly prohibited by competition laws.

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5 5GPPP, 2017, *5G Innovations for New Business Opportunities*, March.

6 McKinsey Global Institute, 2015.

7 Baron, J. *et al.*, 2021, *Group of Experts on Licensing and Valuation of Standard Essential Patents – Contribution to the Debate on SEPs*, January, p. 9.

8 Commission, Making the Most of the EU's Innovative Potential: An Intellectual Property Action Plan to Support the EU's Recovery and Resilience, COM(2020) 760 final.

9 See Section 3 below

10 See Section 4 below.

Moreover, with countless IoT companies needing to take a license for standards and numerous SEP owners, measures to facilitate collective licensing are being explored. Competition law in this regard is being asked to take a more lenient approach and enable allegedly pro-competitive price negotiations and industry self-regulation.

The current view on the role of competition law and policy for SEP licensing in the IoT is apparently contradictory. On the one hand, competition law is being asked to take the role of a central planner and directly regulate complex questions of where to license in the production chain of diverse IoT devices and uses. On the other hand, competition law is requested to take a step back and enable market-wide price-fixing and collective industry negotiations in order to increase predictability, stability and the efficient use of interoperability standards across IoT industries. Thus, the competition law is currently being tasked with a dual role of both restrictive and flexible enforcement in the IoT at the same time.

Against this background, the article aims to describe and resolve current competition law issues related to the use of interoperability standards in IoT and define the appropriate role of competition law in enabling efficient access to SEPs. The article will argue that we should be cautious against both extremes and avoid using competition law as a tool for market regulation. Instead, competition law should continue to carefully guard against the harmful effects of buyers cartels and downstream collusion that may ultimately be harmful to innovation.

The article will first describe interoperability standards in the IoT, distinguishing between infrastructure interoperability and data interoperability, and explain the problem with licensing SEP. It will then proceed to examine current competition law challenges for the successful use of IoT interoperability standards – value chain licensing of SEPs, increasing the price transparency of SEPs and facilitating collective licensing mechanisms.

## 2. IOT AND INTEROPERABILITY STANDARDS

Products today need to interoperate with their ‘ecosystem’ to a much greater degree than before. In fact, a product’s degree of compatibility with a system is of significant importance when a consumer makes a decision whether to purchase a product or not. To achieve compatibility, firms need to agree on the interfaces between products so that essential parts of a product may interoperate with its surrounding. Standardised solutions enable interoperability or compatibility between products from different manufacturers to work together, leading to numerous benefits to the whole

economy and consumers.<sup>11</sup> For instance, standards allow for the early market adoption of innovative products and services, making products less costly for companies to produce and more valuable to consumers,<sup>12</sup> interoperability between different products in particular allows manufacturers to obtain sufficient economies of scale, reducing costs and price.

There are several layers of interoperability standards, and we may distinguish between standards for the “lower” and the “upper” layer, pointing to a division between infrastructural interoperability and data interoperability. While infrastructural interoperability enables devices to exchange data under common network protocols, data interoperability concerns more directly users and developers of IoT applications within separate ecosystems, allowing them to meaningfully connect their software interfaces.<sup>13</sup> Indeed, upper layer interoperability is attained by reading and reproducing specific parts of computer programs, called interfaces, which contain the information necessary to “run” programs in a compatible format.<sup>14</sup> With IoT, devices will communicate with other devices, telecom technology, and the Cloud, making interoperability between devices and manufacturers necessary for the full benefits of IoT to materialise.

In the lower layer, infrastructure interoperability (connectivity) standards specify how different products interact with one another and work together successfully.<sup>15</sup> Connectivity standards are especially relevant for the IoT, as they will enable connected devices such as cars,

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11 For the benefits of standards see Commission, European Standards for the 21<sup>st</sup> Century, (Communication) COM(2016) 358 final; US Department of Justice and the Federal Trade Commission, Antitrust Enforcement and Intellectual Property Rights: Promoting Innovation and Competition, (2007). A standard can be defined as: “a document established by consensus and approved by a recognized body that provides for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context” see ISO/IEC Guide 2:2004, Standardization and related activities – General vocabulary, (2014).

12 US Department of Justice and the Federal Trade Commission, 2007, Antitrust Enforcement and Intellectual Property Rights: Promoting Innovation and Competition, p. 33.

13 Zingales, N., 2015, Of Coffee Pods, Videogames, and Missed Interoperability: Reflections for EU Governance of the Internet of Things, *TILEC Discussion Paper No. 2015–026* (2015).

14 *Ibid.*

15 On benefits of interoperability see Maskus, K., Merrill, S., (eds.), 2013, *Patent Challenges for Standard-Setting in the Global Economy: Lessons from Information and Communication Technology*, National Research Council, p. 16; Biddle, B. *et al.*, 2012, The Expanding Role and Importance of Standards in Information and Communications Technology Industry, *Jurimetrics*, 53, p. 177 (explaining the benefits interoperability standards in ICT industry).

domestic appliances, wearables and industrial equipment to communicate seamlessly with each other, regardless of manufacturer, operating system, or other technical components.<sup>16</sup> An example of well-known connectivity standards are 3G (UMTS), 4G (LTE) and current 5G (NR) cellular standard, Wi-Fi, Bluetooth and USB. With the improved capacity to handle a significantly greater number of devices using high volumes of data, the 5G standard is expected to be a key enabler of IoT connectivity.<sup>17</sup>

On the other hand, in the upper layer, IoT devices will gather large amounts of user data. Such data will be both personal, relating to identifiable individuals, and non-personal, where the information about an individual person cannot be discerned.<sup>18</sup> However, for the seamless functioning of the IoT system, such data will need to be shared among different manufacturers of IoT equipment. Precisely how the sharing and interoperability of IoT data is to be achieved remains an open question.

IoT standards are usually developed by numerous Standard-Development Organisations (SDO) or may emerge as a *de facto* standard if one firm's solution is widely accepted on the market. Many different SDOs are currently competing to be leaders in enacting standards for the IoT era, with large international formal SDOs such as ISO, ITU-T, IEC, ETSI, CEN-CENELEC; quasi-formals SSOs such as IEEE, W3C, as well as numerous smaller consortia present in the IoT standardisation system.<sup>19</sup> In 2015, the EU Commission and various IoT players launched a large-scale alliance called AIOTI (Alliance for Internet of Things Innovation) with the aim to assist the Commission in innovation and standardisation

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16 Commission, ICT Standardisation Priorities for the Digital Single Market, (Communication) COM (2016) 176 final, p. 2.

17 For more information on the benefits of 5G see: IHS Economics and IHS Technology, 2017, *The 5G Economy: How 5G Technology Will Contribute to the Global Economy*, January.

18 Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC, L 119/1 (GDPR) Article 4, point 1 ('personal data' means any information relating to an identified or identifiable natural person ('data subject'); an identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person).

19 ETSI, 2016, *IoT Standards Landscape and Future Evolutions*, Technical Report 103 375 V1.1.1. For classification of SDOs and their governance see: Baron, J., Contreras, J., Husovec, M., Larouche, P., 2019, *Making the Rules: the Governance of Standard-Development Organisations and their Policies on Intellectual Property Rights*.

policies.<sup>20</sup> However, whether these collective efforts under SDOs will be relevant in a world where Google (Brillo and Weave), Apple (HomeKit), Samsung (SmartThings), Amazon (Alexa) and Microsoft (Windows 10 IoT editions) are all bringing out their own unilateral IoT solutions and aim to position themselves as *de facto* standards on the market remains to be seen. Thus in the IoT, we will see a number of different SDO and *de facto* standards mutually competing and co-existing in the market.

Interoperability standards are not free but are usually covered by a large number of patents. The European Patent Office found that applications for patents in the IoT field are increasing, with a growth rate of 54% in contrast to the 7.6% growth rate of other patent applications.<sup>21</sup> Moreover, more than 5,000 patent applications for inventions related to autonomous objects were filed in 2016 alone.<sup>22</sup> Only 5G is estimated to have over 95,000 declared patents or patent applications,<sup>23</sup> while 4G and 3G standards were estimated to have over 45,000 and 39,000 declared SEPs respectively.<sup>24</sup> The ETSI database contains 25,070 disclosed patent families, with a strong upward trend of new patents being disclosed, about a third of SEP disclosures occurred in 2017–2018.<sup>25</sup> However, it should be recognised that not all declared essential patents are factually essential for a standard because of the well-documented over-disclosure problem within SDOs and the lack of independent verification of patent's essentiality.<sup>26</sup>

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20 Ciani, J., A Competition-Law-Oriented Look at the Application of Data Protection and IP law to the Internet of Things: Towards a Wider Holistic Approach, in: Bakhoum, M. *et al.* (eds.), 2018, *Personal Data in Competition, Consumer Protection and Intellectual Property Law*, Springer.

21 European Patent Office, 2017, *Patents and the Fourth Industrial Revolution*, p. 11.

22 *Ibid.*

23 Pohlmann, T., Blind, K., 2020, *Fact Finding Study on Patents Declared to 5G Standards*.

24 Baron, J., Pohlman, T., 2018, Mapping Standards to Patents Using Databases of Declared Standard-Essential Patents and Systems of Technological Classification, *Journal of Economics & Management Strategy*, 27, pp. 504, 521.

25 Bekkers, R. *et al.*, 2020, *Landscaping Study of Potentially Essential patents Disclosed to ETSI*, p. 1.

26 For various reasons a patent disclosed to the SDO as essential for a standards may in fact not be truly essential, some of the factors include uncertainty during standard's development whether disclosed patent will ultimately read on a finally agreed version of a standard; the evolution of standard over time making some patents non-essential; expiration, invalidity or successfully opposition of patents; patent applications may be narrowed down or opposed during review; and inherent unreliability built in the system that requires companies to disclose patents they believe are essential for a standard without any third party verification of such claims. For the literature on over-declaration see: Stitzing, R. *et al.*, 2018, *Over-Declaration of Standard Essential*

Nevertheless, there are still a large number of SEP and SEP owners making efficient access to the standard by a diverse range of IoT implementers doubtful.<sup>27</sup> The sheer transaction costs of identifying and negotiating licenses with each and every SEP owner may be prohibitively high especially for SMEs, while the complex and non-transparent SEP landscape creates uncertainty over which patents IoT manufacturers precisely use and infringe.

The problems with SEPs licensing for connectivity standards are not new, global SEP litigation, competition investigations and policy debates have played out for years in the telecommunications industry.<sup>28</sup> On the one hand, standard users were complaining of a patent holdup, where SEP owners would demand excessive licensing terms after their patents are included in a standard and implementers are locked-in to using standardised technologies, and royalty stacking where royalties that need to be paid to multiple SEP owners would stack-up making the use of a standard prohibitively costly in the aggregate.<sup>29</sup> On the other hand, SEP owners submit that it is in fact implementers that are engaging in a holdout, strategically delaying negotiations and conclusion of licensing agreements to avoid paying any royalties or exert pressure to lower royalties below

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*Patents and Determinants of Essentiality*; Bekkers, R. et al., 2020, *Pilot Study for Essentiality Assessment of Standard Essential Patents*, pp. 29–39. Litigated cases also confirm that not all declared SEP are truly essential see: *Unwired Planet v. Huawei* [2017] EWHC 2988 (Pat), pp. 377–378 (finding that out of thousands of declared SEPs, of 4G, 3G and 2G standards, there are only 800 truly essential patents for 4G LTE, and 479 and 154 truly essential patents for 3G and 2G standards respectively); and *TCL v. Ericsson*, 2018 WL 4488286 (C.D. Cal. 2018), pp. 15, 18 (also examining 4G, 3G and 2G SEPs declared at ETSI and holding that out of 153,000 patents and patent applications in ETSI database only 1481 patent families are truly essential for 4G standard, and 953 and 365 truly essential patent families for 3G and 2G respectively).

- 27 According to one study, 67 companies disclosed 10 or more patents at ETSI see: Bekkers, R. et al., 2020, *Landscaping Study of Potentially Essential Patents Disclosed to ETSI*, p. 29; however the ownership is highly skewed with only a few companies contributing to the most of standard's development, see: Baron, J., Gupta, K., 2018, *Unpacking 3GPP Standards*, *Journal of Economics & Management Strategy*, 27, p. 433 (finding that only nine companies accounted for 60% standard's contribution); and Pohlmann, T., Blind, K., 2020, *Fact Finding Study on Patents Declared to 5G Standards* (finding that top ten companies together hold 82% of all submitted 5G declarations).
- 28 For overview of cases see: Pentheroudakis, C., Baron, J., 2017, *Licensing Terms of Standard Essential Patents: A Comprehensive Analysis of Cases*, Joint Research Centre.
- 29 See: Lemley, M., Shapiro, C., 2007, *Patent Holdup and Royalty Stacking*, *Texas Law Review*, 85, p. 1991; Contreras, J., 2019, *Much Ado About Holdup*, *University of Illinois Law Review*, 3, p. 875; Shapiro, C., Lemley, M., 2020, *The Role of Antitrust in Preventing Patent Holdup*, *University of Pennsylvania Law Review*, Vol. 168, Issue 1.



competitive levels.<sup>30</sup> Additionally, SEPs are normally committed by their owners to be licensed on fair, reasonable and non-discriminatory (FRAND) terms and the precise scope and content of a FRAND obligation was a matter of intensive disputes. The smartphone patent wars involved a clash between virtually every company in the smartphone industry about the precise meaning of FRAND licensing terms. Some of the contested issues related to methodologies and principles for calculating FRAND royalties; the content of the non-discrimination obligation; the use and availability of injunctions for SEPs; whether a FRAND license is global or local in scope, and the role of competition law and policy in constraining the licensing conduct of SEP owners.<sup>31</sup> Over the years many of the issues have been clarified but regular disputes still remain.

IoT, however, brings new challenges to efficient SEP licensing. As seen, new industries will be using connectivity standards but have little to no experience with SEPs. The sheer plurality of implementations and uses will create mass SEP infringement problems, and it would be practically unfeasible for SEP to identify, negotiate and conclude bilateral licenses with all implementers. IoT device makers too will encounter unclear licensing framework and diverse SEP landscape. They currently lack the key information on the price of the standard, the number of truly essential patents they use and the names of licensors they need to contact to conclude licenses. Moreover, the IP licensing practice developed in different IoT sectors may also be different from the one used in telecommunications industries. Thus, the unclear and unpredictable SEP licensing framework risks jeopardising the successful implementation of interoperability standards in IoT devices.

Three issues have been pertinent in legal and policy circles regarding the role of competition law in the IoT: 1) a refusal to license SEPs to different levels of the production chain; 2) increasing the transparency on standards' price (*i.e.* standard's price-fixing) and 3) collective licensing of SEPs. In all these cases competition law has been invoked to ensure market access and a stable licensing environment but at potential risk of collusion, downstream cartelisation and harm to future innovation incentives.

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30 Heiden, B., Petit, N., 2018, Patent Trespass and the Royalty Gap: Exploring the Nature and Impact of Patent Holdout, *Santa Clara High Technology Journal*, 34, p. 179; Epstein, R., Noroozi, K., 2018, Why Incentives for Patent Holdout Threaten to Dismantle FRAND and Why It Matters, *Berkeley Technology Law Journal*, 32, p. 1381.

31 Nikolic, I., 2021, *Licensing Standard Essential Patents: FRAND and the Internet of Things*, Hart Publishing.



### 3. REFUSAL TO LICENSE SEPs TO DIFFERENT LEVELS OF THE PRODUCTION CHAIN

The practice in the telecommunications industry is to license SEPs to final end-device manufacturers.<sup>32</sup> This is because end products, in this case, smartphones, are said to reflect the true value of the interoperability standard most accurately as the functionality of the standard is only fully realised in the end device. Additionally, it enables transaction costs savings by negotiating with one group of licensees; provides the ease of monitoring the compliance with royalty payments, and allows mutual cross-licensing between vertically integrated SEP owners.<sup>33</sup> An approach from the telecommunications sector is often called “access to all” to reflect the view that SEP owners are free to choose the level of the supply chain at which they want to conclude licenses. Once this is done, firms located elsewhere in the value chain indirectly benefit by having access to standards without the need to directly obtain a license.<sup>34</sup> In other words, other companies in the supply chain are free to use and implement the standard, licensing is done only at one level of the supply chain.

However, other industries may have different licensing practices. For example, in the automotive sector licensing is done at a component level and manufacturers are expected to deliver components free of any third-party rights. Supply agreements include indemnity clauses in favour of OEMs to compensate for any IP infringement.<sup>35</sup> It is further argued that SEPs are largely implemented in a component (typically a baseband chip) and, as a result, components best reflect the value of standardised technology. Component manufacturers are then logical counterparts in licensing negotiations as they possess the necessary knowledge directly relating to the standardised technology. Basing royalties and licensing at the end-product level was compared to a “tax on innovation” that inappropriately overcompensates SEP holders for other unrelated inventions and components. An additional argument is that component-level licensing would be efficient and bring transaction cost savings as SEP owners would be negotiating only with relatively few chip manufacturers, rather than numerous end-device

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32 Baron, J. *et al.*, 2021, *Group of Experts on Licensing and Valuation of Standard Essential Patents – Contribution to the Debate on SEPs*, January, pp. 76–79.

33 Blecker, M., Sanchez, T., Stasik, E., 2016, *An Experience-Based Look at the Licensing Practices That Drive the Cellular Communications Industry: Whole Portfolio/Whole Device Licensing*, December, *les Nouvelles*, p. 221.

34 CEN/CENELEC, 2019, *Principles and Guidance for Licensing Standards Essential Patents in 5G and the Internet of Things (IoT), including the Industrial Internet*, June, p. 7.

35 Baron, J. *et al.*, 2021, p. 82.

makers.<sup>36</sup> A component-level licensing approach is often referred to as “license to all” meaning that SEP owners are required to license to any company in the supply chain that requests so, and cannot unilaterally choose one level of the supply chain to license and refuse to license to other levels.<sup>37</sup>

Ultimately, however, the debate behind “access to all” and “license to all” approaches is about the price. Namely, SEP royalties based on the value of components would be much lower than if applied to the value of end devices. Consider, for example, using the 1% royalty on the price of an end-device (\$500) or a component (\$10) would lead to radically different amounts (\$5 and \$0.5 respectively). Similarly, if SEP owners would use a per-unit royalty of \$5, it would be easier justified and collected on a \$500 end-device, than on a \$10 component. Often, profit margins of components are set at a lower level in order to stay competitive. A SEP royalty may exceed the current profit margin of component manufacturers who would be unable to pay or if they do, they will need to increase the price of components which may put them at a competitive disadvantage against other unlicensed competitors. Thus, the value chain licensing question has important practical implications.

Against this background, the clashes between two different industry practices and pricing have led to disputes between SEP owners and IoT device makers. While SEP owners are pursuing licensing at the end-device level, IoT OEMs are claiming that their component manufacturers are the right licensing counterparty. After unsuccessfully trying to obtain a license, component manufacturers are claiming that refusal by SEP owners to directly offer them a license is anti-competitive. The European Commission at the moment is reluctant to directly intervene stressing that there is “no one-size-fits-all solution” and that the approach differs “from sector to sector and over time”,<sup>38</sup> leaving the industry to arrive at a satisfactory outcome.

Therefore, this section will explain cases where competition law was invoked to a refusal to license SEPs at different levels of the production chain and assess the suitability of competition law in this context.

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36 Henkel, J., 2021, *How to License SEPs to Promote Innovation and Entrepreneurship in the IoT*, ([https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3808987](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3808987)).

37 See: Fair Standards Alliance, 2020, *Competitive and Industry Harms Related to Refusal to License SEPs and Other Forms of “Level Discrimination” in SEP Licensing*, 2 December; Apple, 2019, *A Statement on FRAND Licensing of SEPs*; CEN/CENELEC Workshop Agreement, 2019, *Core Principles and Approaches for Licensing of Standard Essential Patents*, June; Grasso, R., 2017, *Standard Essential Patents: Royalty Determination in the Supply Chain*, *Journal of Competition Law & Practice*, 8, p. 283; Ordovery, J., Shampine, A., 2014, *Implementing the FRAND Commitment*, October, *The Antitrust Source*, 1.

38 Commission, *Setting Out the EU Approach to Standard Essential Patents (Communication) COM(2017) 712 Final*, p. 6.

### 3.1. *FTC V. QUALCOMM*

Qualcomm is a major owner of cellular SEPs for 3G, 4G, and now also 5G, and is additionally a manufacturer of baseband chips for smartphones. It adopted a practice of licensing SEPs only to smartphone manufacturers and not to other upstream chip makers. Namely, Qualcomm refused to sell its baseband processors unless OEMs also accepts to license Qualcomm's SEPs, called a "no license-no chips" policy. According to the Federal Trade Commission (FTC), Qualcomm's conduct breached Section 2 of the Shearman Act because the refusal to license SEPs to other chip competitors foreclosed their effective access to the market. It also increased the costs of using competing baseband chips because OEMs would have to pay not only the price of the chip but also allegedly elevated SEP royalties. The effects of Qualcomm's licensing practices are thus likened to a "tax" on smartphone manufacturers who use non-Qualcomm chips.<sup>39</sup> Raising the all-on costs of baseband processors is said to weaken Qualcomm's competitors by reducing their demand and maintaining Qualcomm's monopoly in the baseband processors market.<sup>40</sup> Therefore, the *FTC v. Qualcomm* case tested whether US antitrust law can apply to the choice of SEP owners where to license in the supply chain.

In the first instance, the Northern District Court of California upheld FTC's complaint by finding Qualcomm's licensing practices anti-competitive.<sup>41</sup> The district court considered that Qualcomm has an antitrust duty to license SEP to its rivals. It considered that the US Supreme Court's limited exception to the general right of companies to freely decide on their business partners, provided in *Aspen Skiing* and *Verizon v. Trinko*, applies in this case.<sup>42</sup> According to the US Supreme Court, a refusal to cooperate with rivals could constitute anticompetitive conduct only in limited circumstances when there is: i) a unilateral termination of a voluntary and profitable course of dealing; ii) a refusal to deal even if compensated at retail price, which suggested that the conduct was anticompetitive; iii) a refusal to provide a product that was already sold in a retail market to other customers.<sup>43</sup> The district court considered all three criteria fulfilled. First, Qualcomm was found to have licensed SEPs to chip manufacturers

39 *FTC v. Qualcomm*, Case 5:17-cv-00220 Complaint (2017).

40 *Ibid.*

41 *FTC v. Qualcomm*, 411 F.Supp.3d 658 (N.D. Cal 2019).

42 *Aspen Skiing Co. v. Aspen Highlands Skiing Corp.*, 472 U.S. 585 (1985); *Verizon Communications Inc. v. Law Offices of Curtis V. Trinko, LLP*, 540 U.S. 398, 408 (2004).

43 *Aspen Skiing Co. v. Aspen Highlands Skiing Corp.*, 472 U.S. 585 (1985); *Verizon Communications Inc. v. Law Offices of Curtis V. Trinko, LLP*, 540 U.S. 398, 408–411 (2004); also *MetroNet Services Corp. v. Qwest Corp.*, 383 F.3d 1124, 1131 (9<sup>th</sup> Cir. 2004).

two decades ago (in the 1990s).<sup>44</sup> Second, a refusal to license chip manufacturers was motivated by “anticompetitive malice” because of alleged willingness to sacrifice short term benefits of profitable licenses from modem chip rivals in order to obtain higher profits in the long run from the exclusion of competition.<sup>45</sup> And finally, the district court held that because Qualcomm was found to have initially licensed its SEP to chip manufacturers, the third factor was also satisfied.<sup>46</sup>

Moreover, the district court also considered that Qualcomm’s no license-no chip policy is anti-competitive towards OEMs.<sup>47</sup> It is said to have effectively provided exclusivity because if OEMs did not want to sign a separate SEP license agreement, Qualcomm would cut off, or threaten to cut off chip supply, as well as delay or withhold technical support.<sup>48</sup> The district court also considered Qualcomm’s royalties as unreasonably high royalties because they were based on the value of the end device, rather than on a chip, which is said to reflect its monopoly power rather than the value of patents.<sup>49</sup>

The case quickly drew both positive and negative commentary. On the one hand, it was praised for correctly applying antitrust laws because SEPs should be licensed to all, including chip manufacturers that substantially embody SEPs.<sup>50</sup> On the other hand, the case was criticised for misapplying the antitrust duty to deal doctrine, overlooking the effects of patent exhaustion doctrine and disregarding incentives to innovate in the future.<sup>51</sup> Namely, *Aspen Skiing*’s relevance as a source of an antitrust duty to deal was limited by the Supreme Court in *Trinko* holding that “*Aspen Skiing* is at or near the outer boundary of Section 2 liability”.<sup>52</sup> The Su-

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44 *FTC v. Qualcomm*, 411 F.Supp.3d 658 (N.D. Cal 2019) 758–762.

45 *Ibid.*, pp. 760–761.

46 *Ibid.*, p. 762.

47 *Ibid.*, pp. 698–744.

48 *Ibid.*, p. 744.

49 *Ibid.*, p. 773.

50 See: Hovenkamp, H., 2020, FRAND and Antitrust, *Cornell Law Review*, 105, p. 101; Cotter, T., 2020, Two Errors in the Ninth Circuit’s Qualcomm Opinion, *Patently-O Patent Law Journal*, 1; Contreras, J., 2019, *Brief of Amicus Curiae Professor Jorge L. Contreras in Support of Appellee and Affirmance in FTC v Qualcomm*; Shapiro, C., Lemley, M., 2020.

51 See: Edwards, L., Ginsburg, D., Wright, J., 2019, Section 2 Mangled: *FTC v Qualcomm* on the Duty to Deal, Price Squeezes and Exclusive Dealing, *George Mason University Law & Economics Research Paper Series*, 19–21; The US Department of Justice also intervened on Qualcomm’s side, see: US Department of Justice, Antitrust Division, 2019, United States’ Statement of Interest Concerning Qualcomm’s Motion for Partial Stay of Injunction Pending Appeal (16 July).

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

preme Court explained that compelling companies to enter into a business relationship “may lessen the incentive for the monopolist, the rival, or both to invest in [...] economically beneficial facilities”,<sup>53</sup> and would require “antitrust courts to act as central planners, identifying the proper price, quantity, and other terms of dealing – a role for which they are ill-suited”.<sup>54</sup> Therefore, the US antitrust agencies confirmed that antitrust “liability for mere unilateral, unconditional refusals to license will not play a meaningful part” in their enforcement efforts.<sup>55</sup> Moreover, Assistant Attorney General Makan Delrahim noted that, in his view, “a unilateral and unconditional refusal to license a patent should be considered as *per se* legal”.<sup>56</sup> Additionally, there were also other plausible motivations for Qualcomm’s conduct, such as a rational profit-maximizing preference to generate licensing revenue from wealthier device makers than from rival chipset makers, as well as avoiding patent exhaustion. The district court was also criticised for not assessing whether consumers were adversely affected by Qualcomm’s refusal to license chip manufacturers.

On appeal, the case was reversed. The Ninth Circuit criticised the district court for misapplying *Aspen Skiing* and erred in holding that Qualcomm was under an antitrust duty to license rival chip manufacturers.<sup>57</sup> It reiterated the Supreme Court’s reasoning that an antitrust duty to deal in *Aspen Skiing* should be applied only in rare circumstances and that this doctrine “is at or near the outer boundary of Section 2 liability”.<sup>58</sup> The Ninth Circuit did not find persuasive evidence that Qualcomm in the past gave exhaustive licenses to chip manufacturers. Qualcomm appeared to have given only non-exhaustive licenses but ceased giving them as soon as the US patent exhaustion doctrine was changed to potentially lead to exhaustion.<sup>59</sup> The second factor of being compensated at a retail price was also not found to have been met. Namely, Qualcomm responded to the change in patent exhaustion law by choosing a more lucrative option both in the short and the long term. The goal of antitrust law is not to force companies to forego profits, which attracts business acumen in the first

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53 *Ibid.*

54 *Ibid.*

55 US Department of Justice and the Federal Trade Commission, 2007, *Antitrust Enforcement and Intellectual Property Right: Promoting Innovation and Competition*, p. 30.

56 Delrahim, M., Assistant Attorney General US Department of Justice, 2018, *The “New Madison” Approach to Antitrust and Intellectual Property Law*, 16 March, p. 5.

57 *Federal Trade Commission v. Qualcomm* 969 F.3d 974 (9<sup>th</sup> Cir. 2020).

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

59 *Federal Trade Commission v. Qualcomm* 969 F.3d 974, 994 (9<sup>th</sup> Cir. 2020).

place. Thus, choosing a more profitable licensing level in itself is not prohibited.<sup>60</sup> Finally, the Ninth Circuit found no evidence that Qualcomm singled out any specific chip supplier for anticompetitive treatment. Instead, it applied OEM level licensing equally and declined to enforce its patents against rival chipmakers. The court described Qualcomm's licensing policy as "no license, no problem".<sup>61</sup> It noted that the situation would be different if Qualcomm were to refuse to license its SEPs to end-device manufacturers unless they first agreed to purchase its chips, described as a "no chips, no license" policy.<sup>62</sup> In this scenario, chip manufacturers might have an antitrust claim because end-device makers would be forced to purchase either Qualcomm's chips or pay for both Qualcomm's and competitor's chips. However, this is not what happened, and Qualcomm's practice was considered to be chip-supplier neutral as regardless of which chip is purchased Qualcomm collects royalties only at the end-device level.

The Ninth Circuit also examined an additional argument raised by the FTC that Qualcomm's conduct was nevertheless anticompetitive because Qualcomm breached its FRAND commitments requiring it to license to all companies in the production chain. Without going into the merits of whether the text of the relevant FRAND commitments imposes a contractual duty to license to all,<sup>63</sup> the court rejected FTC's claim as it was not persuaded that the alleged breach of a contractual commitment itself impaired the opportunities of rivals.<sup>64</sup> The court considered that not enforcing SEPs against rival chip manufacturers under a "no license, no problem" policy is equivalent to a *de facto* license that allows chip manufacturers to practice Qualcomm's SEPs royalty-free.<sup>65</sup> Moreover, Qualcomm's licensing policy was consistent with existing licensing practices in the telecommunications industry. Thus, the Ninth Circuit concluded that the appropriate remedy for a breach of FRAND commitments lies in contract or patent law, not competition law.<sup>66</sup>

The judgment of the Ninth Circuit appears correct, despite some criticism.<sup>67</sup> The key is that there is no exclusion of competing component

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60 *Ibid.*

61 *Ibid.*, p. 995.

62 *Ibid.*, p. 1002.

63 For detailed overview see: Borghetti, J-S., Nikolic, I., Petit, N., 2021, FRAND Licensing Levels Under EU Law, *European Competition Journal*.

64 *Ibid.* p. 995.

65 *Ibid.*, p. 996.

66 *Ibid.*, p. 1005.

67 See: *FTC v. Qualcomm*, Brief of 46 Amici Curiae Law and Economics Scholars in Support of Petition for Rehearing En Banc.

makers, patents are not enforced against them and the licensing is done at the end-device level. In other words, nothing prevents competing chip makers from selling to smartphone manufacturers. Another important point is that the value of IP rights is disassociated from the value of its physical component. The value of cellular connectivity to a smartphone can only be properly measured by the value that consumers derive from the use of connectivity standards. For example, in addition to enabling a phone to make and receive calls, 4G and 5G standards provide faster internet connectivity and sharing of pictures, music and video. Thus, the costs of the standard's physical implementation are not a reliable proxy of its value. As one US judge explained: "The benefit of the patent lies in the idea, not in the small amount of silicon that happens to be where that idea is physically implemented. Basing a royalty solely on chip price is like valuing a copyrighted book based only on the costs of the binding, paper, and ink needed to actually produce the physical product. While such a calculation captures the cost of the physical product, it provides no indication of its actual value."<sup>68</sup>

Indeed, while it is true that it is more profitable to license to end-device makers, the question is not of profitability but of the proper valuation of IP rights. Unlicensed component makers may not be able to pay the full price for the standard. For example, consider the case of *Innovatio* where the court calculated royalties for Innovatio's 19 SEPs for Wi-Fi standard by looking at the average price of a Wi-Fi chip and using the average profit margin as the maximum royalty cap that a chip manufacturer would pay.<sup>69</sup> The court found that the average Wi-Fi chip price between 1997 to 2003 was \$14.85 yielding an average profit of \$1.80 on each chip, which is taken to be the maximum price for Wi-Fi standard. This produced a paradoxical result where the value of Wi-Fi technology is almost ten times less than its physical implementation. Moreover, it would be hard to imagine that the value of the whole Wi-Fi connectivity to end-users is worth less than \$1.80. Thus, the reason why SEP owners may decide to license only to end-device makers is because component manufacturers may not be able to pay the full value of the standard, or if they do decide to take a license, they would need to raise the price of components which they might be reluctant to do.

Therefore, as long as the SEP owners adopt a uniform practice of licensing only at the end-device level there can be no anticompetitive foreclosure as nothing prevents component manufacturers from selling to end-device

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68 *CSIRO v. Cisco*, 2014 WL 3805817, 11 (E.D. Tex. 2014).

69 *In re Innovatio IP Ventures, LLC Patent Litigation*, 2013 WL 5593609 (N.D. Ill. 2013).



makers.<sup>70</sup> It would be anti-competitive, however, if the SEP owner would enforce patents against component manufactures without offering them a license, but it seems that no company to date used such a strategy.

### 3.2. *CONTINENTAL V. AVANCI*

As mentioned, in the IoT cars will be transformed into “smartphones on wheels” for integrating many different technologies and applications powered by 5G connectivity.<sup>71</sup> Following the practice of the telecommunication industry, SEP owners approached car manufacturers for a license for SEPs. However, Daimler initially refused to take a license and pointed to its suppliers as an appropriate licensing counterparty. One of its suppliers of telematics control units (TCUs) that provides cars with cellular connectivity, Continental, brought a suit in the US against Avanci patent pool and some of its members alleging that a refusal to directly license SEPs to component manufacturers is anti-competitive.<sup>72</sup>

The district court however dismissed claims that licensing SEPs only at the end-device level is anticompetitive. It found no antitrust injury on the side of Continental for not being able to directly obtain a license for SEPs because, as the court correctly recognised, Continental can still produce TCUs for OEMs since the defendants are actively licensing SEPs to the OEMs.<sup>73</sup> Moreover, the court noted that Continental may be able to produce TCUs at a lower cost since it would not have to pay a license for any SEPs since OEMs will pay for licensing.<sup>74</sup> Continental also could not allege that it has been unable to continue to produce and sell TCUs to the OEMs or that OEMs cannot obtain SEP licenses, in fact, the opposite is true. Finally, the court explained that Continental might be able to claim antitrust injury if non-FRAND royalties paid by OEMs would be passed on to component manufacturers, but it found that Continental failed to sufficiently alleged that those increased prices will in fact be passed on upstream.

Even assuming there was an antitrust injury, the court was sceptical that any abuse of dominance occurred.<sup>75</sup> One allegation was that SEP own-

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70 See: Padilla, J., Wong-Ervin, K., 2017, Portfolio Licensing to Makers of Downstream End-User Devices: Analyzing Refusals to License FRAND-Assured Standard-Essential Patents at the Component Level, *Antitrust Bulletin*, 62, p. 494.

71 Heitzner, C., 2018, Mercedes Touts New A Class as ‘Smartphone on Wheels’ (2 February) *Automotive News Europe*.

72 *Continental Automotive Systems v. Avanci* 2020 WL 5627224 (N.D. Tex. 2020).

73 *Ibid.*, p. 7.

74 *Ibid.*

75 *Ibid.*, pp. 10–11.

ers extract supra-competitive royalties from end-device manufacturers in contravention of the FRAND licensing commitment. However, the court was not persuaded that simply charging a higher price, without more, is anti-competitive. US antitrust law does not condemn excessive prices, a lawful monopolist's "charging of monopoly prices is not only not unlawful; it is an important element of the free-market system".<sup>76</sup> And even if there is a breach of contractual obligation to license on FRAND terms, the district court concurred with Ninth Circuit's *FTC v. Qualcomm* ruling that such is not necessarily an antitrust violation, and an appropriate remedy lies in contract law.<sup>77</sup>

### 3.3. NOKIA V. DAIMLER

The litigation between SEP owners and car manufacturers is playing out in the EU as well. After failed negotiations, Nokia, Sharp and Conversant sued Daimler in Germany for patent infringement and were able to obtain first-instance injunctions.<sup>78</sup> Daimler and its suppliers complained to the European Commission that refusal to directly license SEPs to component manufacturers is anti-competitive,<sup>79</sup> and made similar claims before courts.

German first-instance courts were not persuaded that the practice of licensing only to car manufacturers is anti-competitive. In *Nokia v. Daimler* Mannheim Regional Court held that the SEP owner under patent law is free to choose the level of the supply chain to assert its rights and did not find that the enforcement of SEPs against end-device manufacturers could lead to consumer harm.<sup>80</sup> Similarly, Munich Regional Court in *Sharp v. Daimler* maintained that it is not abusive for SEP owners to seek licenses only from end-device manufacturers.<sup>81</sup> According to the court, a FRAND commitment creates an obligation to enable access to the standard, but it does not impose a duty to grant licenses at all levels of the production chain.<sup>82</sup> Access to the standard can also be obtained by a license given at the last level in the production chain from which suppliers can benefit by

76 *Ibid.*, p. 11.

77 *Ibid.*

78 Klos, M., 2020, Daimler Feels the Pressure After Losing to Nokia Again, *Juve Patent*, (30 October).

79 Yun Chee, F., 2019, Daimler Asks EU Antitrust Regulators to Probe Nokia Patents, *Reuters*, (29 March).

80 *Nokia v. Daimler*, 2 O 34/19, Mannheim Regional Court (18 August 2020), pp. 202, 213.

81 *Sharp v. Daimler*, 7 O 8818/19 Munich Regional Court (10 September 2020).

82 *Ibid.*, p. 165; see also to that argument by Borghetti, J-S., Nikolic, I., Petit, N., 2021.

selling to licensed end-device manufacturers.<sup>83</sup> Therefore, since there is no potential for exclusion of component manufacturers, courts did not see any competitive harm and the reason for the application of competition law.

There are two possible doctrinal venues for the application of Article 102 TFEU: i) a refusal to license IP rights, and ii) *Huawei v. ZTE* framework for injunctions for SEPs. Both options would be difficult to apply to the level licensing question. Namely, a refusal to license doctrine applies only in “exceptional circumstances”.<sup>84</sup> In *Magill*, *IMS Health* and *Microsoft*, the EU courts held that the following criteria have to be met: i) a refusal to license IPRs relates to a product or service that is indispensable to the exercise of a particular activity on a neighbouring market; ii) the refusal to license IPRs is of such kind to exclude any effective competition on that neighbouring market; iii) the refusal to license IPRs prevents the appearance of a new product for which there is potential consumer demand.<sup>85</sup> These conditions are unlikely to be met when the SEP owner adopts a policy of licensing at the end-device level.

The refusal to license doctrine will hardly be applicable as there is simply no exclusion of component manufacturers from the market. Thus, having a direct license is hardly indispensable under the first condition. Observed empirical realities confirm that a refusal to license component manufacturers does not lead to the elimination of competition in the downstream market or prevent the appearance of a new product. Quite the opposite, in the smartphone industry we have witnessed the rapid entry of new market players, vigorous downstream competition, and an overall decrease in consumer prices.<sup>86</sup> Having a direct license from the

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83 *Ibid.*, p. 171.

84 C/241/91 P *RTE and ITP v. Commission* EU:C:1995:98; C-7/97 *Oscar Bronner v. Media Print* EU:C:1998:569; C-418/01 *IMS Health v. NDC Health* EU:C:2004:257; T-201/04 *Microsoft v. Commission* EU:T:2007:289.

85 T-201/04 *Microsoft v. Commission* EU:T:2007:289, 332; see also: Commission, Enforcement Priorities Guidelines 81 (the European Commission will consider the following legal test in deciding to bring the case in refusal to license cases: i) the refusal to license relates to a product or service that is objectively necessary to be able to compete effectively on a downstream market; ii) the refusal to license is likely to lead to the elimination of effective competition on the downstream market, and iii) the refusal is likely to lead to consumer harm).

86 See: Galetovic, A., Haber, S., Zaretzki, L., 2018, Is There an Anti-Commons Tragedy in the Smartphone Industry, *Berkeley Technology Law Journal*, 32, p. 1527 (the number of smartphone devices sold each year is increasing by 20.1% per year on average, with 1.474 billion smartphone devices being sold only in 2016); Mallinson, K., 2016, Don't Fix What Isn't Broken: The Extraordinary Record of Innovation and Success in the Cellular Industry Under Existing Licensing Practices, *George Mason Law Review*, 23, p. 967 (finding high levels of R&D and innovation in ICT industry; new entrants and exists in the market and industry concentration declining from a highly concen-

SEP owner is only one way of having access to the standard, other equally acceptable methods include indirectly benefiting from a license by selling components to licensed downstream manufacturers, concluding non-assertion agreements, or even not having any license at all if the patent owner has a policy of not monetising its patents and thus not having a licensing program.<sup>87</sup> Moreover, even if the SEP owner would theoretically want to exclude component manufacturers, it would have to sue first for patent infringement and request an injunction. Even if the SEP owner prevails on patent questions, per *Huawei v. ZTE* it would not be able to obtain an injunction without first offering component manufacturers a FRAND license. Thus there is no possibility of exclusion of component manufacturers from the market even if the SEP owner would want to. Therefore, with or without a license, component manufacturers are not precluded from selling their products to downstream manufacturers when SEP owners implement a policy of licensing only at the end-device level.

In the alternative, it is argued that competition law duty to license component manufacturers may arise out of the *Huawei v. ZTE* case which concerned the use of injunctions for the infringement of SEPs.<sup>88</sup> There the CJEU held that particular circumstances of the case involving SEPs that are encumbered by the FRAND commitment justify restricting the use of injunctions.<sup>89</sup> The CJEU in one paragraph said that “FRAND terms create legitimate expectations on the part of third parties that the proprietor of the SEP will in fact grant licenses on such terms, a refusal by the proprietor of the SEP to grant a license on those terms may, in principle, constitute an abuse within the meaning of Article 102 TFEU”.<sup>90</sup> By way of analogy, it is suggested that the reference to the legitimate expectation of third parties implies that the SEP owner has a duty to grant licenses to everyone, including component manufacturers.<sup>91</sup>

However, *Huawei v. ZTE* does not appear to apply in this context as well. Namely, *Huawei v. ZTE* concerned the general conditions under which SEP holders can seek injunctions against unlicensed implement-

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trated to an unconcentrated market); Galetovic, A., Haber, S., Levine, R., 2015, An Empirical Examination of Patent Holdup, *Journal of Competition Law & Economics*, Vol. 11, No. 3, p. 549 (finding that SEP-reliant products have experienced faster price declines than any other goods from 1997 to 2013 and that the average price of a phone in 2013 was 79% lower than in 1997).

87 Borghetti, J-S., Nikolic, I., Petit, N., 2021

88 Nazzini, R., 2017, Level Discrimination and FRAND Commitments Under EU Competition Law, *World Competition*, 40, p. 213.

89 *Huawei v. ZTE*, C-170/13, EU:C:2015:477.

90 *Ibid.*, p. 53.

91 Nazzini, R., 2017, pp. 213, 231.

ers, and it says nothing about a duty to license specifically to component suppliers. The case itself concerned two end-device manufacturers, and it would be difficult to think that the court also had in mind component manufacturers. While it is true that the court discussed legitimate expectations in the context of bilateral negotiations between a SEP owner and a prospective licensee that the SEP owner decided to license, it cannot be said that this reference also implies a competition law duty to license to any party, to which the SEP owner never licensed in the past and which may not infringe all SEPs in the portfolio. Finally, the argument misreads the legitimate expectations requirement of the FRAND commitment.<sup>92</sup> Component suppliers can only be said to have legitimate expectations to obtain a direct license if such an obligation is included in the text of the FRAND commitment itself or in the SDO policy. However, the wording of the FRAND commitment differs among SDOs, most appear not to regulate this issue and leave it to SEP owners to decide where in the production chain to license.<sup>93</sup> Finally, the *Huawei v. ZTE* case itself left the specification of precise FRAND licensing terms to negotiations between the parties and the ECJ refused to be drawn into stipulating exact commercial terms and price regulation. If there are any principles to be drawn from *Huawei v. ZTE*, it is that it only provides a negotiation framework for parties to agree on licensing terms, refraining from direct regulatory intervention into commercial terms.

### 3.4. POLICY OUTCOMES

Having seen that competition law should not be applicable to the situation when the SEP owner adopts a policy of licensing to a certain level of the production chain and not to others, it does not mean that there is

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92 For discussion on the legitimate expectations see: Borghetti, J-S., Nikolic, I., Petit, N., 2021.

93 *Ibid.* The IEEE appears to be the only SDO to date to have imposed a duty to directly license to every company in the production chain that requests a license. However, the faith of IEEE's policy remains uncertainty since many companies have refused to comply with the new IPR Policy and the US DOJ in 2020 revoked a favourable business review it had initially granted back in 2015, instructing the IEEE to reconsider changing its IPR policy. Internal discussion within IEEE about amending its IPR Policies seem to have started in 2021. See: Gupta, K., Effraimidis, G., 2019, IEEE Patent Policy Revisions: An Empirical Examination of Impact, *The Antitrust Bulletin* 64, p. 151 (finding the overall number of new positive letters of assurances accepting to license under the new IPR Policy has dropped by 90% since the adoption); Department of Justice, Letter from Makan Delrahim, Assistant Attorney General to Sophia Muirhead (10 September 2020) (IEEE III Business Review Letter); Loyd, R., 2021, IEEE Opens Review of Controversial Patent Policy (25 February) *IAM*.

nothing to be done to improve the SEP licensing framework for the IoT. Rather, it suggests that a solution lies elsewhere, and not in competition law. In its recent report, the European Commission's SEP Expert Group recommended three policy principles for finding the most appropriate licensing level in the IoT, without recommending any competition law intervention.<sup>94</sup> The policy principles are: i) licensing at a single level in the value chain for a particular licensed product; ii) a uniform FRAND royalty for a particular product irrespective of the level of licensing; iii) FRAND royalty is a cost element in the price of a component and should be passed on downstream.<sup>95</sup>

The policy recommendations from Commission's SEP Expert Group represent sound principles that recognise the efficiency of licensing only at one level of the production chain and the fact that the value of the standard is reflected in its downstream use and not on the price or profit margins of unlicensed component manufacturers. This would make royalties the same irrespective of whether they are paid by end-device makers or component manufacturers as they represent a cost that should be passed on further downstream. The precise licensing level would then be chosen which brings the most efficiencies, such as transaction costs savings, the ease of monitoring the compliance with licensing agreements and the possibility for cross-licensing.<sup>96</sup>

In order to select the most optimal licensing level, the Commission's SEP Expert Group recommends industry-wide coordination between SEP owners and implementers.<sup>97</sup> The idea is to have group discussions among SEP owners about the most appropriate licensing level for each IoT industry and, once they agree, SEP owners would negotiate together with implementers.<sup>98</sup> Implementers would also need to have vertical discussions among them about how to pass on the costs of licensing further downstream.<sup>99</sup> The industry-wide coordination may indeed produce the most widely accepted result, but opens competition concerns of both the upstream technology market and downstream product level collusion. In particular, implementers may act as a covert buyer cartel and exercise

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94 Baron, J. *et al.*, 2021, Group of Experts on Licensing and Valuation of Standard Essential Patents – Contribution to the Debate on SEPs' (January), pp. 84–85.

95 *Ibid.*, see also for similar reasoning in Kuhnen, T., 2019, FRAND Licensing and Implementation Chains, *Journal of Intellectual Property Law & Practice*, 14, p. 964; Heiden, B., Padilla, J., Peters, R., 2020, *The Value of Standard Essential Patents and the Level of Licensing*.

96 Baron, J. *et al.*, 2021, pp. 84–85.

97 *Ibid.*, pp. 86–88.

98 *Ibid.*

99 *Ibid.*, p. 88.

downward pressure on royalties. Thus, competition safeguards need to be implemented to guard against collusion, and any decision must be strictly voluntary, with each party having the possibility to deviate if it is unsatisfied with the results of joint negotiations.

Consequently, the role of competition law should not be to directly regulate the licensing level at which companies should license their SEPs, but should create an environment where the industry can agree on the most optimal solution for each IoT vertical while ensuring that harmful effects of potential upstream and downstream collusion are minimised.

#### 4. COLLECTIVE PRICE SETTING OF A STANDARD

As explained, the current SEP licensing environment is characterised by disaggregated patent ownership and individual bilateral licensing. This situation is unsatisfactory as IoT implementers have no information about the final price of the standard which they can plan in their budgets. They are rightly concerned about potential royalty stacking if approached by numerous SEP owners, making the price excessive in the aggregate. Moreover, the more time passes from the launch of a product to the conclusion of licensing agreement implementers own a higher amount for past-due royalties, making planning and budgeting of IP costs even more difficult.

To improve the transparency and predictability of the SEP licensing market, the Commission's SEP Expert Group suggested for the industry collectively negotiate and set the aggregate royalty for a standard.<sup>100</sup> The idea is to have preferably for each IoT product category a reasonable aggregate royalty determined in advance before product launch.<sup>101</sup> In the first instance, the SEP Expert Group considers that SEP owners should agree among themselves about a reasonable aggregate royalty.<sup>102</sup> Since both upstream and vertically integrated SEP owners will need to negotiate and find an acceptable solution, it is expected that negotiated aggregate royalty

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100 *Ibid.*, pp. 105–107; the proposal is not new, it has been around in the literature, see: Lemley, M., Shapiro, C., 2007, Patent Holdup and Royalty Stacking, *Texas Law Review*, 85, pp. 1991, 2042–2043; Lemley, M., 2007, *Ten Things to Do About Patent Holdup*, (fn. 20) pp. 159–161; Farrell, J., Hayes, J., Shapiro, C. Sullivan, T., 2007, Standard Setting, Patents and Hold-up, *Antitrust Law Journal*, Vol. 74, No. 3, pp. 603, 654–655; Régibeau, P., Coninck, R. de, Zenger, H., 2016, *Transparency, Predictability and Efficiency of SSO-based Standardisation and SEP Licensing: A Report for the European Commission*, pp. 43–46; Contreras, J., 2017, Aggregated Royalties for Top-Down FRAND Determination: Revisiting “Joint Negotiation”, *Antitrust Bulletin*, 62, pp. 690–709.

101 Baron, J. *et al.*, 2021, pp. 105–107.

102 *Ibid.*, p. 106.



will produce widely satisfactory results. Voting rules should ensure that no group would have a decisive vote and outvote the other group.<sup>103</sup> In the next stage, the reasonable aggregate rate royalty will be reviewed by implementers who can give their feedback, possibly leading to the adjustment of royalty.<sup>104</sup> However, the SEP Expert Group does not appear to require the consent of implementers, their role is only consultative and it is up to SEP owners to decide whether to take implementers' feedback into account to ensure that the aggregate royalty gains wider market acceptance.

While setting an aggregate royalty for the standard upfront will certainly increase transparency and predictability in the market, and smoothen licensing negotiations, what is remarkable is that Commission's SEP Expert Group openly endorses collective price-fixing. On the one hand, an aggregate royalty for a standard will help implementers plan their business strategy with the full knowledge of the costs for the use of SEPs. It also effectively resolves royalty stacking and holdup concerns as the standard's aggregate royalty is known in advance and individual royalties will not exceed the maximum agreed amount. On the other hand, collective industry negotiations and setting an aggregate royalty is a form of price-fixing strongly prohibited by competition laws.<sup>105</sup> It signals that the Commission considers that pro-competitive benefits outweigh the dangers of price-fixing in the context of technology standards.

However, the competitive danger lingers on the implementer's side who may act as a covered buyers cartel exercising anticompetitive downwards pressure on royalties. Namely, it is suggested in the literature that an aggregate royalty should be jointly agreed upon between SEP owners and standard implementers.<sup>106</sup> Joint negotiations are said to provide a

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103 *Ibid.*

104 *Ibid.*

105 See: US Department of Justice and the Federal Trade Commission, *Antitrust Enforcement of Intellectual Property Rights: Promoting Innovation and Competition* (2007), pp. 54–55 (Authorities will apply a rule of reason approach in assessing any SDO activity of determining ex-ante licensing terms but also warning that "If intellectual property holders turn joint ex-ante licensing discussions into a sham to cover up naked agreements on the licensing terms each IP holder will offer the SSO, *per se* condemnation of such agreements among 'sellers' of IP rights may be warranted. Similarly, ex-ante discussion of licensing terms within the standard-setting process may provide an opportunity for SSO members to reach side price-fixing agreements that are *per se* illegal."); also Commission, *Guidelines on the Applicability of Article 101 of the Treaty on the Functioning of the European Union to Horizontal Co-operation Agreements* [Communication] (2011) C 11/01 (Horizontal Cooperation Guidelines) 274 (any fixing of technology prices would constitute a restriction of competition by object).

106 Farrell, J., Hayes, J., Shapiro, C., Sullivan, T., 2007, p. 655; Contreras, J., 2017, p. 709.

fairer outcome as an endorsement by implementers would lead to less litigation and disputes over royalties. However, joint negotiations may result in sub-optimal outcomes,<sup>107</sup> as a large group of implementers negotiating license rates with SEP holders may collectively exert anti-competitive pressure to depress royalties below a reasonable level and refuse to license even at the most reasonable rates unless SEP owners agree on their proposals.<sup>108</sup> Economists have confirmed that it is likely that SEP royalties negotiated collectively will be lower than those set by SEP owners individually.<sup>109</sup>

The dangers of buyers' cartel are nothing new in EU competition law. Commission has, for example, fined tobacco processors for colluding on the process and other trading conditions that they would offer to tobacco growers.<sup>110</sup> Recently, it uncovered and fined a cartel of ethylene purchases who colluded to buy ethylene for the lowest possible price.<sup>111</sup> They exchanged sensitive and confidential purchase pricing information and coordinated the price negotiations strategy against the ethylene seller. The Commission considers buyer's cartels just as harmful as cartels on the sellers' side since they replace uncertainty with coordination, preventing companies from competing on the merits and competitive process for inputs.<sup>112</sup> Sellers' cartels are prohibited even though companies conspire to pay lower prices which might theoretically be passed on to consumers in the form of cheaper end-products. However, the danger in the standardisation context is that anti-competitive low prices may seriously damage dynamic efficiency and incentives to invest in the development of new technologies. Deprived of appropriate returns and resources, SEP owners

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107 See: Torti, V., 2016, *Intellectual Property Rights and Competition in Standard Setting: Objectives and Tensions*, Routledge, pp. 99–105 (discussing the shortcomings of joint ex-ante negotiations between patent holders and implementers).

108 Sidak, G., 2009, Patent Holdup and Oligopsonistic Collusion in Standard-Setting Organizations, *Journal of Competition Law & Economics*, 5, p. 123.

109 See: Gilbert, R., 2011, Deal or No Deal? Licensing Negotiations in Standard Setting Organizations, *Antitrust Law Journal*, 77, pp. 855, 866–68 (“ex-ante joint negotiations are likely to result in royalties per firm that are lower than the royalties that most, if not all, licensees would pay with bilateral bargaining”); Layne-Farrar, A., Llobet, G., Padilla, J., 2009, Preventing Patent Hold Up: An Economic Assessment of Ex Ante Licensing Negotiations in Standard Setting, *AIPLA Quarterly Journal*, 37, pp. 445, 461 (“with joint ex-ante negotiations the patent holder will generally be under-rewarded”).

110 See: Case T-24/05 *Alliance One International v. Commission* EU:T:2010:453; Case T-29/05 *Deltafina v. Commission* EU:T:2010:355; Case T-37/05 *World Wide Tobacco Espana v. Commission* EU:T:2011:76.

111 Commission, 2020, Antitrust: Commission Fines Ethylene Purchases €260 Million in Cartel Settlement' [Press Release] (14 July) IP/20/1348.

112 *Ibid.*

may underinvest in the next generation of collaborative standardisation or migrate to proprietary solutions.

Moreover, a practical problem with the implementation of joint negotiations between SEP holders and standard implementers is how to reach a consensus between entities with fundamentality diverging interests. The requirement to strike a deal may lead to endless battles between SEP owners and implementers. Moreover, if the decision on the aggregate royalty would be made by a simple majority vote, it risks SEP owners being outvoted on the crucial decision on the pricing of their technology. However, Contreras argues that joint ex-ante negotiations would be efficient as SEP holders would have an option to defect from SDOs if implementers exert too much downward pressure on royalties, acting as a counterbalance to any potential harmful collective behaviour by standard implementers.<sup>113</sup> However, forcing technology developers to leave SDOs and establish proprietary solutions does not appear to be a socially desirable outcome. Moreover, permitting companies that have not developed and do not own technology to decide on its price would effectively resemble an expropriation of technology.<sup>114</sup>

Apparently recognising these concerns the Commission's SEP Expert Group suggests that implementers should only be consulted about the aggregate royalty with the final decision remaining on SEP owners. This would prevent implementers from acting as covered sellers' cartel, but safeguards should be put in place to ensure that collusion does not occur in practice. On the hand, on the technology market side, certain market factors ensure that the pricing decision of SEP owners will be reasonable. First, SEP owners have an incentive to price reasonably as the amount of collected royalties depends on a standard's successful adoption in the market. Pricing too high would jeopardise the successful implementation of the standard and IoT device makers might migrate to alternative solutions if the aggregate royalty burden becomes excessive. Next, SEP owners themselves have different business interests, some are pure upstream companies that rely primarily on licensing income, while others are vertically integrated and have an incentive to keep overall royalties as low as possible to reduce their production costs.<sup>115</sup> Thus, the opposing interests

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113 Contreras, J., 2017, p. 707.

114 Nikolic, I., Galli, N., 2021, SEP Expert Group Report: A Look into the IoT Future of SEP Licensing, (May), *CPI Columns* 1, p. 6.

115 Commission, Horizontal Cooperation Guidelines, para 267; Aoki, R., Nagaoka, S., 2004, The Consortium Standards and Patent Pools, *Economic Review*, 55, p. 345; Heiden, B., 2016, The Viability of FRAND: How The Seminal Landmark *Microsoft* Ruling Could Impact the Value of Standard Essential Patents and the Future of Telecom Standards, *Telecommunications Policy*, 40, pp. 870, 879, 883.

of SEP owners are expected to converge to the optimal royalty level that is neither too high to the detriment of vertically integrated companies nor too low to the disadvantage of upstream SEP owners.

It remains to be seen whether the proposal for the industry-wide agreement on the reasonable aggregate royalty for a standard will be implemented. The IoT context, however, appears to have changed competition law's traditional suspicion of price-fixing. Competition authorities seem to recognise that in a standardisation context fragmented and uncoordinated individual licensing creates more harm than good. Nevertheless, competition law should still remain vigilant that coordination on the buyers' side does not harm innovation incentives and exert anticompetitive pressure on SEP owners.

## 5. COLLECTIVE LICENSING OF SEPS

Even with an agreed reasonable aggregate royalty for a standard, the challenge in the IoT remains with uncoordinated individual licensing. Namely, SEP owners would still have to target and negotiate licenses with a limitless number of IoT companies and industries. This will often not be feasible. A piecemeal solution where only some companies on the market are licensed distorts the level playing field among competitors, which may make implementers reluctant to be the first to take a license. Moreover, even with an aggregate royalty cap, the problem remains on how to determine the level of individual royalties.

A solution for the changing environment of IoT may come from patents pools, which are arrangements among patent owners to assemble a package of SEPs and jointly license them under common terms and conditions between themselves and third parties.<sup>116</sup> Patent pools offer many efficiencies. They reduce transaction costs by offering a 'one-stop shop' to implementers who need to conclude only one license for the whole SEP portfolio, instead of bilaterally negotiating and paying royalties separately with each SEP owner. Similarly, pools are a one-stop-shop also for SEP owners who do not need to individual approach and negotiation with each and every implementer, licensing is done collectively via the pool. A study by Merges and Mattioli estimated that MPEG and HEVC standard patent pools have saved approximately \$600 million and \$400 million

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116 Commission, 2014, Guidelines on the Application of Article 101 of the Treaty on the Functioning of the European Union to Technology Transfer Agreements, (2014) C 89/03 (Technology Transfer Guidelines), p. 244; Department of Justice and the Federal Trade Commission, 2007, Antitrust Enforcement and Intellectual Property Rights: Promoting Innovation and Competition p. 64.

respectively in transaction costs.<sup>117</sup> Another positive aspect of standard related pools is the transparency and predictability they bring to SEP licensing – the pool’s royalty provides an estimate of the aggregate royalty for a standard; the mandatory essentiality checks of patents included in a pool weed’s out non-essential patents; the publication of SEPs included in a pool enables licensees to verify whether they are infringing patents, and the publication of uniform licensing terms promotes non-discriminatory licensing.<sup>118</sup> Moreover, pools are also said to reduce litigation and encourage research and development.<sup>119</sup> Because of these characteristics, the European Commission increasingly sees them as a way to facilitate SEP licensing for the IoT and the SEP Expert Groups recommends pool formation for the IoT.<sup>120</sup>

However, pools may raise some competition concerns, if they include substitute patents they may act as a cartel, and as with any gathering of competitors, there is a risk of collusion. If pools include patents that cover technologies that are substitutes, it will lead to a loss of competition in the technology market and amount to a price-fixing cartel.<sup>121</sup> However, this is rarely a concern in standard-related pools as SEP are by definition complementary patents, and pools of complementary patents are shown to resolve royalty stacking and double-marginalisation, leading to overall lower royalties than when complementary patents are priced separately.<sup>122</sup> Thus, with standard related pools, the primary concern is potential collusion between SEP owners who may use patent pools as a vehicle for

117 Merges, R., Mattioli, M., 2017, Measuring the Costs and Benefits of Patent Pools, *Ohio State Law Journal*, 78, pp. 281, 322.

118 Baron, J. *et al.*, 2021, p. 153.

119 Shapiro, C. 2000, Navigating the Patent Thicket: Cross Licensing, Patent Pools, and Standard Setting, *Innovation Policy and the Economy*, 1, p. 119.

120 Commission, 2017, Setting out the EU Approach to Standard Essential Patents, COM(2017) 712 final, p. 7; Commission, 2020, Making the Most of the EU’s Innovative Potential: An Intellectual Property Action Plan to Support the EU’s Recovery and Resilience’ COM(2020) 760 final, p. 3; Commission, IP Action Plan. Baron, J. *et al.*, 2021, pp. 162–166.

121 Gilbert, R., 2004, Antitrust for Patent Pools: A Century of Policy Evolution, *Stanford Technology Law Review*, 3 (describing the history of US antitrust policy towards patent pools); Hovenkamp, E., Hovenkamp, H., Patent Pools and Related Technology Sharing, in: Blair, R. Sokol, D. (eds.), 2017, *The Cambridge Handbook of Antitrust, Intellectual Property, and High Tech*, Cambridge University Press, p. 358.

122 Lerner, J., Tirole, J., 2014, Efficient Patent Pools, *The American Economic Review*, 94 pp. 691, 706; Gilbert, R., Collective Rights Organizations: A Guide to Benefits, Costs and Antitrust Safeguards, in: Contreras, J. (ed.), 2018, *The Cambridge Handbook of Technical Standardization Law: Competition, Antitrust and Patents* Cambridge University Press, pp. 125, 133.

price restrictions and outpost limitations.<sup>123</sup> Exclusivity arrangements in pool licenses may also be used to strengthen the pool's market power and reduce innovation incentives by licensees. Thus, safeguards should be included to prevent sharing of sensitive information, screening exclusivity clauses for potential anticompetitive effects and promote independent licensing by pool members.<sup>124</sup>

Overall, standard-related pools consisting of complementary patents are seen in a positive light. The US and EU competition authorities produced guidelines for assessing the conditions for pool formation that will not raise competition concerns.<sup>125</sup> Common principles include: i) patents included in a pool must be essential and an independent mechanism for verification of essentiality must be established; ii) safeguards must be included to ensure that the exchange of sensitive information is restricted; iii) pooled patents should be licensed into the pool on a non-exclusive basis and licensed out of the pool on FRAND terms; iv) independent licensing by pool members must be allowed; v) grant-back clauses should be limited only to essential patents, parties must remain free to develop competing technologies and vi) licensors and licensees should remain free to challenge the validity and essentiality of pooled patents. Patent pools formed in accordance with these criteria will normally not be challenged by competition authorities.

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123 Hovenkamp, E., Hovenkamp, H., 2017, (fn. 73); US Department of Justice and the Federal Trade Commission, 2017, *Antitrust Guidelines for the Licensing of Intellectual Property*, p. 30 ("when cross-licensing or pooling arrangements are mechanisms to accomplish naked price-fixing or market division, they are subject to challenge under the per se rule").

124 Lerner, J., Tirole, J., 2007, *The Design of Patent Pools: The Determinants of Licensing Rules*, *RAND Journal of Economics*, 38, p. 610; Commission, *Technology Transfer Guidelines* (fn. 64), pp. 248–261.

125 Commission, 2014, *Guidelines on the Application of Article 101 of the Treaty on the Functioning of the European Union to Technology Transfer Agreements'* (2014) C 89/03 (*Technology Transfer Guidelines*), pp. 248–261; Department of Justice, Letter from Joel Klein, Assistant Attorney General to Garrard Beeney (26 June 1997) (*MPEG-LA Business Review Letter*); Department of Justice, Letter from Joel Klein, Assistant Attorney General to Garrard Beeney (16 December 1998) (*DVD3 Business Review Letter*); Department of Justice, Letter from Joel Klein, Assistant Attorney General to Carey Ramos (10 June 1999) (*DVD6 Business Review Letter*); Department of Justice, Letter from Charles James, Assistant Attorney General to Ky Ewing (12 November 2002) (*3GPP Partnership Business Review Letter*); Department of Justice, Letter from Makan Delrahim, Assistant Attorney General to Mark Hamer (28 July 2020) (*Avanci Business Review Letter*); Department of Justice and the Federal Trade Commission, 2017, *Antitrust Guidelines for the Licensing of Intellectual Property*, p. 30.

However, despite their appeal large and successful pools have not formed for connectivity standards in the ICT industry,<sup>126</sup> and the SEP Expert Group considers the way to facilitate their formation.<sup>127</sup> As explained elsewhere, successful pools for IoT would need to gather a critical number of upstream SEP owners and various policy measures could be implemented to foster their creation, such as adopting value proportionality rules for the division of pool's royalties, simplifying mandatory essentiality checks and agreeing on different licensing programs for different IoT products or markets.<sup>128</sup>

The role of competition law in this context is to be more permissive to pool formation. Having established that a critical number of upstream SEP owners is needed to join the pool, competition authorities could be more tolerant of a pool setting a perceivably "high" royalty in order to incentivise upstream SEP owners to join the pool while, at the same time, disincentivise free riding and staying outside the pool.<sup>129</sup> Setting a low royalty is shown to discourage participation of upstream SEP owners,<sup>130</sup> preventing the pool from reaching a critical level of upstream SEP owners necessary for the broad market acceptance of the pool. Low pool royalty also encourages independent licensing outside the pool, since pool outsiders can charge high royalty because the pool has lowered the royalty or reduced transaction costs for other SEPs, leaving more value to outsiders.<sup>131</sup> Therefore, competition authorities should not look unfavourable to pool royalties.

How "high" royalty should be and whether it is too high is naturally subjective, but some guiding principles can be found. If SEP owners could agree on the reasonable aggregate royalty for a standard with consultations with implementers, such could represent a cap on the pool's royalties and could be proportionally reduced based on the number of SEP owners

126 Pohlmann, T., Blind, K., 2016, *Landscaping Study on Standard Essential Patents (SEPs)*, pp. 36–37 (finding only 9% of worldwide declared SEPs are licensed in a pool); Biddle, B., White, A., Woods, S., 2010, How Many Patents in a Laptop (and other empirical questions)?, (only 3% of interoperability standards in an average laptop are licensing in a pool). For further discussion see: Nikolic, I., Galli, N., 2021, Patent Pools in 5G: The Principles for Facilitating Pool Licensing, *Telecommunications Policy*.

127 Baron, J. *et al.*, 2021, pp. 162–166.

128 Nikolic, I., Galli, N., 2021,

129 *Ibid.*

130 Layne-Farrar, A. Lerner, J., 2011, To Join or Not to Join: Examining Patent Pool Participation and Rent Sharing Rules, *International Journal of Industrial Organization*, 29, p. 294.

131 Gilbert, R., 2011, Ties that Bind: Policies to Promote (Good) Patent Pool, *Antitrust Law Journal*, 77, pp. 1, 31.



and SEP included in a pool. Furthermore, patent pools have no incentives to charge an excessive royalty because it would start a vicious cycle of diminished 5G SEP licensing demand, impeding the deployment of 5G networks and products.<sup>132</sup> Finally, whether the royalty is too high should be compared with the alternative of having disaggregated licensing, unknown aggregate price of the standards and transaction costs of bilateral licensing. As shown, transaction costs savings and the ease of one-stop-shop licensing from pools are significant.<sup>133</sup>

A move into establishing an IoT patent pool can be observed in Avanci, which gathers 2G to 4G SEPs, and soon also 5G SEPs, for licensing in the IoT.<sup>134</sup> Currently, it provides a licensing program only for connected vehicles, with more programs for different IoT verticals expected in the future. It remains to be seen how such an initiative will fare in the SEP licensing markets in the future.

A related proposal is to have implementers form their own licensing negotiations groups (LNGs) for the purposes of collectively negotiating and licensing with SEP owners.<sup>135</sup> This would additionally reduce transaction costs as SEP owners would be negotiating with only one group of implementers instead of every single company from the specific IoT sector. However, there are important differences between LNGs and patent pools and proposals for LNGs, as they are currently envisaged, raise significant competition risks.<sup>136</sup> First, patent pools aggregate complementary patents that are necessary for all standard-implementers and, as such, do not increase the market power of their members. In contrast, LNGs are a collection of direct competitors, and their aggregate increases the market power of their members. Thus, there is a serious risk of LNGs being a *façade* for buyers cartels, unless their market power is constrained, and competition safeguards are adopted. As seen above, a collective of implementers risk turning into a buyers cartel and depress royalties to anti-competitive

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132 See: Aron, D., Ukhaneva, O., Sun, C., 2020, The Economics of 5G Deployment in the “Race” to 5G: The Role of Mid-Band Spectrum, *Charles River Associates Insights*, July, p. 5.

133 Merges, R., Mattioli, M., 2017, Measuring the Costs and Benefits of Patent Pools, *Ohio State Law Journal*, 78, p. 281.

134 <https://www.avanci.com/>

135 Baron, J. *et al.*, 2021, pp. 168–171.

136 See: Nikolic, I., 2021, Licensing Negotiation Groups for SEPs: Collusive Technology Buyers Arrangements? Their Pitfalls and Reasonable Alternatives, *les Nouvelles*, December; Peters, R., Nikolic, I., Hayden, B., Designing SEP Licensing Negotiation Groups to Reduce Patent Holdout in 5G/IoT Markets in: Barnett, J., O’Connor, S. (eds.), 2022, *5G and beyond: Intellectual Property and Competition Policy in the Internet of Thing*, Cambridge University Press, (forthcoming).

levels. In relation to LNGs competition law should be vigilant and guard against potential cartelisation on the downstream market level.

In conclusion, the competition trend in the IoT is to encourage industry-wide negotiations and licensing of SEPs. However, a crucial distinction must be appreciated between upstream patent pools and downstream LNG collaborations. Patent pools do not increase the market power of their members, and competition law should accordingly promote their formation in order to achieve efficiencies of one-stop-shop licensing and price transparency. On the other hand, LNGs increase the market power of their members and competition law should remain vigilant that downstream collaboration does not turn into a harmful buyers' cartel.

## 6. CONCLUSION

The IoT will bring cellular connectivity to many different industries such as automotive, healthcare, home appliances, agriculture, and utilities. It will also bring SEP licensing issues to the front. The debate is on what role competition law should have in promoting access to SEPs and efficient licensing practices.

The article described three key areas where competition law has been invoked: i) refusal to license SEPs to different levels of the productions chain; ii) collective price-setting of a standard, and iii) collective licensing of SEPs. It showed different competition concerns associated with each situation. In the first scenario, a refusal to license SEPs to different levels of the production chain was shown not to cause competitive harm since component manufacturers benefit from uninterrupted access to the standard by different means. They may be indirectly licensed by selling to licensed end-device manufacturers; may conclude non-assertion agreements or may benefit from a policy of non-enforcement of SEPs at a component level. The second scenario, collective price setting of a standard, may be pro-competitive if done by SEP owners on the upstream technology market, while the involvement of downstream implementers risks harming innovation incentives and may lead to downstream collusion and cartelisation. And third, patent pools may be an effective solution for licensing SEPs in the IoT. They aggregate complementary patents, create a one-stop-shop licensing solution and significantly lower transaction costs. On the hand, aggregation of implementers in LNGs raises competitive concerns as it increases the market power of members and risks turning into a buyers' cartel. These distinctions should be kept in mind when debating solutions for the efficient licensing of SEPs in the IoT market.

## BIBLIOGRAPHY

1. Aoki, R., Nagaoka, S., 2004, The Consortium Standards and Patent Pools, *Economic Review*, 55, p. 345.
2. Baron, J., Gupta, K., 2018, Unpacking 3GPP Standards, *Journal of Economics & Management Strategy*, 27, p. 433.
3. Baron, J., Pohlman, T., 2018, Mapping Standards to Patents Using Databases of Declared Standard-Essential Patents and Systems of Technological Classification, *Journal of Economics & Management Strategy*, 27, p. 504.
4. Biddle, B. *et al.*, 2010, *How Many Patents in a Laptop (and other empirical questions)?* ([https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1619440](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1619440)).
5. Biddle, B. *et al.*, 2012, The Expanding Role and Importance of Standards in Information and Communications Technology Industry, *Jurimetrics*, 53, p. 177.
6. Blecker, M., Sanchez, T., Stasik, E., 2016, An Experience-Based Look at the Licensing Practices That Drive the Cellular Communications Industry: Whole Portfolio/Whole Device Licensing, *les Nouvelles*, December, p. 221.
7. Borghetti, J-S., Nikolic, I., Petit, N., 2021, FRAND Licensing Levels Under EU Law, *European Competition Journal*, 17, p. 205.
8. Ciani, J., A Competition-Law-Oriented Look at the Application of Data Protection and IP law to the Internet of Things: Towards a Wider Holistic Approach, in: Bakhom, M. *et al.* (eds.), 2018, *Personal Data in Competition, Consumer Protection and Intellectual Property Law*, Springer.
9. Contreras, J., 2019, Much Ado About Holdup, *University of Illinois Law Review*, 3, p. 875.
10. Contreras, J., 2017 Aggregated Royalties for Top-Down FRAND Determination: Revisiting “Joint Negotiation”, *Antitrust Bulletin*, 62, p. 690.
11. Cotter, T., 2020, Two Errors in the Ninth Circuit’s Qualcomm Opinion, *Patently-O Patent Law Journal*, 1.
12. Edwards, L., Ginsburg, D., Wright, J., 2019, Section 2 Mangled: FTC v Qualcomm on the Duty to Deal, Price Squeezes and Exclusive Dealing, *George Mason University Law & Economics Research Paper Series*, 19–21.
13. Epstein, R., Noroozi, K., 2018, Why Incentives for Patent Holdout Threaten to Dismantle FRAND and Why It Matters, *Berkeley Technology Law Journal*, 32, p. 1381.
14. Farrell, J. *et al.*, 2007, Standard Setting, Patents and Hold-up, *Antitrust Law Journal*, Vol. 74, No. 3, p. 603.
15. Galetovic, A., Haber, S., Zaretzki, L., 2018, Is There an Anti-Commons Tragedy in the Smartphone Industry, *Berkeley Technology Law Journal*, 32, p. 1527.
16. Galetovic, A., Haber, S., Levine, R., 2015 An Empirical Examination of Patent Holdup, *Journal of Competition Law & Economics*, Vol. 11, No. 3, p. 549.
17. Gilbert, R., 2004, Antitrust for Patent Pools: A Century of Policy Evolution, *Stanford Technology Law Review* 3, p. 1.
18. Gilbert, R., 2011, Deal or No Deal? Licensing Negotiations in Standard Setting Organizations, *Antitrust Law Journal*, 77, p. 855.

19. Gilbert, R., 2011, Ties that Bind: Policies to Promote (Good) Patent Pool, *Anti-trust Law Journal*, 77, p. 1.
20. Gilbert, R., Collective Rights Organizatons: A Guide to Benefits, Costs and Anti-trust Safeguards, in: Contreras, J. (ed.), 2018, *The Cambridge Handbook of Technical Standardization Law: Competition, Antitrust and Patents*, Cambridge University Press, p. 125.
21. Grasso, R., 2017, Standard Essential Patents: Royalty Determination in the Supply Chain, *Journal of Competition Law & Practice*, 8, p. 283.
22. Gupta, K., Effraimidis, G., 2019, IEEE Patent Policy Revisions: An Empirical Examination of Impact, *The Antitrust Bulletin*, 64, p. 151.
23. Heiden, B., 2016, The Viability of FRAND: How The Seminal Landmark *Microsoft* Ruling Could Impact the Value of Standard Essential Patents and the Future of Telecom Standards, *Telecommunications Policy*, 40, p. 870.
24. Heiden, B., Petit N., 2018, Patent Trespass and the Royalty Gap: Exploring the Nature and Impact of Patent Holdout, *Santa Clara High Technology Journal*, 34, p. 179.
25. Heiden, B., Padilla, J., Peters, R., 2021, The Value of Standard Essential Patents and the Level of Licensing, *AIPLA Quarterly Journal*, 49–1.
26. Henkel, J., 2021, How to License SEPs to Promote Innovation and Entrepreneurship in the IoT, ([https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3808987](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3808987)).
27. Hovenkamp, E., Hovenkamp, H., Patent Pools and Related Technology Sharing, in: Blair, R., Sokol, D. (eds), 2017, *The Cambridge Handbook of Antitrust, Intellectual Property, and High Tech*, Cambridge University Press, p. 358.
28. Hovenkamp, H., 2020, FRAND and Antitrust, *Cornell Law Review*, 105, p. 101.
29. Kuhnen, T., 2019, FRAND Licensing and Implementation Chains, *Journal of Intellectual Property Law & Practice*, 14, p. 964.
30. Layne-Farrar, A., Llobet, G., Padilla, J., 2009, Preventing Patent Hold Up: An Economic Assessment of Ex Ante Licensing Negotiations in Standard Setting, *AIPLA Quarterly Journal*, 37, p. 445.
31. Layne-Farrar, A., Lerner, J., 2011, To Join or Not to Join: Examining Patent Pool Participation and Rent Sharing Rules, *International Journal of Industrial Organization*, 29, p. 294.
32. Lemley, M., Shapiro, C., 2007, Patent Holdup and Royalty Stacking, *Texas Law Review*, 85, p. 1991.
33. Lerner, J., Tirole, J., 2007, The Design of Patent Pools: The Determinants of Licensing Rules, *RAND Journal of Economics*, 38, p. 610.
34. Lerner, J., Tirole, J., 2014, Efficient Patent Pools, *The American Economic Review*, 94, p. 691.
35. Mallinson, K., 2016, Don't Fix What Isn't Broken: The Extraordinary Record of Innovation and Success in the Cellular Industry Under Existing Licensing Practices, *George Mason Law Review*, 23, p. 967.
36. Merges, R., Mattioli, M., 2017, Measuring the Costs and Benefits of Patent Pools, *Ohio State Law Journal*, 78, p. 281.
37. Nazzini, R., 2017, Level Discrimination and FRAND Commitments Under EU Competition Law, *World Competition*, 40, p. 213.

38. Nikolic, I., 2021, *Licensing Standard Essential Patents: FRAND and the Internet of Things*, Hart Publishing.
39. Nikolic, I., Galli, N., 2021, SEP Expert Group Report: A Look into the IoT Future of SEP Licensing, *CPI Columns*, May, p. 1.
40. Nikolic, I., Galli, N., 2021, Patent Pools in 5G: The Principles for Facilitating Pool Licensing, *Telecommunications Policy*.
41. Nikolic, I., 2021, Licensing Negotiation Groups for SEPs: Collusive Technology Buyers Arrangements? Their Pitfalls and Reasonable Alternatives, *les Nouvelles*, December.
42. Ordovery, J., Shampine, A., 2014, Implementing the FRAND Commitment, *The Antitrust Source*, October, 1.
43. Padilla, J., Wong-Ervin, K., 2017, Portfolio Licensing to Makers of Downstream End-User Devices: Analyzing Refusals to License FRAND-Assured Standard-Essential Patents at the Component Level, *Antitrust Bulletin*, 62, p. 494.
44. Peters, R., Nikolic, I., Hayden B., Designing SEP Licensing Negotiation Groups to Reduce Patent Holdout in 5G/IoT Markets, in: Barnett, J., O'Connor, S. (eds.), 2022, *5G and beyond: Intellectual Property and Competition Policy in the Internet of Things*, Cambridge University Press, (forthcoming).
45. Shapiro, C., 2000 Navigating the Patent Thicket: Cross Licensing, Patent Pools, and Standard Setting, *Innovation Policy and the Economy*, 1, p. 119.
46. Sidak, G., 2009, Patent Holdup and Oligopsonistic Collusion in Standard-Setting Organizations, *Journal of Competition Law & Economics*, 5, p. 123.
47. Shapiro, C., Lemley, M., 2020, The Role of Antitrust in Preventing Patent Holdup, *University of Pennsylvania Law Review*, Vol. 168, Issue 1.
48. Stitzing, R. *et al.*, 2018, Over-Declaration of Standard Essential Patents and Determinants of Essentiality, ([https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2951617](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2951617)).
49. Zingales, N., 2015, Of Coffee Pods, Videogames, and Missed Interoperability: Reflections for EU Governance of the Internet of Things, *TILEC Discussion Paper No. 2015-026*.
50. Torti, V., 2016, *Intellectual Property Rights and Competition in Standard Setting: Objectives and Tensions*, Routledge.

## CASE LAW

### EU

1. C/241/91 P *RTE and ITP v. Commission* EU:C:1995:98.
2. C-7/97 *Oscar Bronner v. Media Print* EU:C:1998:569.
3. C-418/01 *IMS Health v. NDC Health* EU:C:2004:257.
4. T-201/04 *Microsoft v. Commission* EU:T:2007:289.
5. T-24/05 *Alliance One International v. Commission* EU:T:2010:453.
6. T-29/05 *Deltafina v. Commission* EU:T:2010:355.
7. T-37/05 *World Wide Tobacco Espana v. Commission* EU:T:2011:76.
8. C-170/13, *Huawei v. ZTE* EU:C:2015:477.

## Germany

1. *Nokia v. Daimler*, 2 0 34/19, Mannheim Regional Court (18 August 2020).
2. *Sharp v. Daimler*, 7 O 8818/19 Munich Regional Court (10 September 2020).

## UK

1. *Unwired Planet v. Huawei* [2017] EWHC 2988 (Pat).

## US

1. *Aspen Skiing Co. v. Aspen Highlands Skiing Corp.*, 472 U.S. 585 (1985).
2. *Continental Automotive Systems v. Avanci* 2020 WL 5627224 (N.D. Tex. 2020).
3. *CSIRO v. Cisco*, 2014 WL 3805817, 11 (E.D. Tex. 2014).
4. *FTC v. Qualcomm*, Case 5:17-cv-00220 Complaint (2017).
5. *FTC v. Qualcomm*, 411 F.Supp.3d 658 (N.D. Cal 2019).
6. *FTC v. Qualcomm* 969 F.3d 974 (9<sup>th</sup> Cir. 2020).
7. *In re Innovatio IP Ventures, LLC Patent Litigation*, 2013 WL 5593609 (N.D. Ill. 2013).
8. *MetroNet Services Corp. v. Qwest Corp.*, 383 F.3d 1124, 1131 (9<sup>th</sup> Cir. 2004).
9. *TCL v. Ericsson*, 2018 WL 4488286 (C.D. Cal. 2018).
10. *Verizon Communications Inc. v. Law Offices of Curtis V. Trinko, LLP*, 540 U.S. 398, 408 (2004).

## REPORTS

1. 5GPPP, 2017, 5G Innovations for New Business Opportunities, March.
2. Baron, J., *et al.*, 2019. *Making the Rules: the Governance of Standard-Development Organisations and their Policies on Intellectual Property Rights*.
3. Baron, J. *et al.*, 2021, *Group of Experts on Licensing and Valuation of Standard Essential Patents – Contribution to the Debate on SEPs*, January.
4. Bekkers, R., *et al.*, 2020, *Pilot Study for Essentiality Assessment of Standard Essential Patents*.
5. Bekkers, R., *et al.*, 2020, *Landscaping Study of Potentially Essential patents Disclosed to ETSI*.
6. CEN/CENELEC, 2019, Principles and Guidance for Licensing Standards Essential Patents in 5G and the Internet of Things (IoT), including the Industrial Internet, June.
7. CEN/CENELEC Workshop Agreement, 2019, Core Principles and Approaches for Licensing of Standard Essential Patents, June.
8. Ericsson Mobility Report (June 2020)
9. ETSI, 2016, IoT Standards Landscape and Future Evolutions, Technical Report 103 375 V1.1.1.
10. European Patent Office, 2017, Patents and the Fourth Industrial Revolution.

11. IHS Economics & HIS Technology, 2017, *The 5G Economy: How 5G Technology Will Contribute to the Global Economy*, January.
12. ISO/IEC Guide 2:2004, 2014, *Standardization and related activities – General vocabulary*.
13. Maskus, K., Merrill, S., (eds.), 2013, *Patent Challenges for Standard-Setting in the Global Economy: Lessons from Information and Communication Technology*, National Research Council.
14. McKinsey Global Institute, 2015, *The Internet of Things: Mapping the Value Beyond the Hype*, June.
15. Pentheroudakis, C., Baron, J., 2017, *Licensing Terms of Standard Essential Patents: A Comprehensive Analysis of Cases*, Joint Research Centre.
16. Pohlmann, T., Blind, K., 2016, *Landscaping Study on Standard Essential Patents (SEPs)*.
17. Pohlmann, T., Blind, K., 2020, *Fact Finding Study on Patents Declared to 5G Standards*.
18. Régibeau, P., Coninck, R. de, Zenger, H., 2016, *Transparency, Predictability and Efficiency of SSO-based Standardisation and SEP Licensing: A Report for the European Commission*.

## ACTS AND AGENCY MATERIALS

1. Commission, *Guidelines on the Applicability of Article 101 of the Treaty on the Functioning of the European Union to Horizontal Co-operation Agreements*, [Communication] (2011) C 11/01.
2. Commission, *Guidelines on the Application of Article 101 of the Treaty on the Functioning of the European Union to Technology Transfer Agreements* (2014) C 89/03.
3. Commission, *European Standards for the 21<sup>st</sup> Century*, (Communication) COM(2016) 358 final.
4. Commission, *Advancing the Internet of Things in Europe*, SWD(2016) 110 final.
5. Commission, *ICT Standardisation Priorities for the Digital Single Market*, (Communication) COM (2016) 176 final.
6. Commission, *Setting Out the EU Approach to Standard Essential Patents*, (Communication) COM(2017) 712 final.
7. Commission, *Making the Most of the EU's Innovative Potential: An Intellectual Property Action Plan to Support the EU's Recovery and Resilience*, COM(2020) 760 final.
8. Commission, *Antitrust: Commission Fines Ethylene Purchases €260 Million in Cartel Settlement*, [Press Release] (14 July 2020) IP/20/1348.
9. Commission, *Making the Most of the EU's Innovative Potential: An Intellectual Property Action Plan to Support the EU's Recovery and Resilience*, COM(2020) 760 final.
10. Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of



- personal data and on the free movement of such data, and repealing Directive 95/46/EC, L 119/1 (GDPR).
11. US Department of Justice, Letter from Joel Klein, Assistant Attorney General to Garrard Beeney (26 June 1997) (MPEG-LA Business Review Letter).
  12. US Department of Justice, Letter from Joel Klein, Assistant Attorney General to Garrard Beeney (16 December 1998) (DVD3 Business Review Letter).
  13. US Department of Justice, Letter from Joel Klein, Assistant Attorney General to Carey Ramos (10 June 1999) (DVD6 Business Review Letter).
  14. US Department of Justice, Letter from Charles James, Assistant Attorney General to Ky Ewing (12 November 2002) (3GPP Partnership Business Review Letter).
  15. US Department of Justice and the Federal Trade Commission, 2007, Antitrust Enforcement and Intellectual Property Rights: Promoting Innovation and Competition.
  16. US Department of Justice and the Federal Trade Commission, 2017, Antitrust Guidelines for the Licensing of Intellectual Property.
  17. US Department of Justice, Antitrust Division, 2019, United States' Statement of Interest Concerning Qualcomm's Motion for Partial Stay of Injunction Pending Appeal, (16 July).
  18. US Department of Justice, 2020, Letter from Makan Delrahim, Assistant Attorney General to Sophia Muirhead (10 September).
  19. US Department of Justice, Letter from Makan Delrahim, Assistant Attorney General to Mark Hamer (28 July 2020) (Avanci Business Review Letter).

## INTERNET SOURCES

1. Aron, D. *et al.*, 2020, The Economics of 5G Deployment in the “Race” to 5G: The Role of Mid-Band Spectrum, (July) *Charles River Associates Insights*, 5.
2. Apple, 2019, A Statement on FRAND Licensing of SEPs.
3. Chee, F-Y., 2019, Daimler Asks EU Antitrust Regulators to Probe Nokia Patents, (29 March) *Reuters*.
4. Delrahim, M., Assistant Attorney General US Department of Justice, 2018, *The “New Madison” Approach to Antitrust and Intellectual Property Law*, 16 March.
5. Fair Standards Alliance, 2020, Competitive and Industry Harms Related to Refusal to License SEPs and Other Forms of “Level Discrimination” in SEP Licensing, (2 December).
6. Heitzner, C., 2018, Mercedes Touts New A Class as ‘Smartphone on Wheels’, *Automotive News Europe*, (2 February).
7. Klos, M., 2020, Daimler Feels the Pressure After Losing to Nokia Again, *Juve Patent*, (30 October).
8. Loyd, R., 2021, IEEE Opens Review of Controversial Patent Policy, *IAM*, (25 February).

## PRAVO KONKURENCIJE U ERI INTERNETA INTELIGENTNIH UREĐAJA

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### APSTRAKT

Internet inteligentnih stvari (IIS) uvodi mobilnu internet vezu u mnoge ekonomske sektore. Od 5G standarda se očekuje da igra ključnu ulogu u povezivanju različitih uređaja. Međutim, uvođenje mobilne internet veze zahteva od raznolike grupe kompanija licenciranje patenata esencijalnih za 5G standard. Trenutno, jedno od glavnih pitanja pred Evropskom komisijom je kako efektivno licencirati esencijalne patente u IIS. Pravo konkurencije se često navodi kao moguće rešenje koje bi ili direktno regulisalo određenje prakse u licenciranju ili bi trebalo da se povuče i omogući privredi da kolektivno dogovara o najboljim rešenjima za licenciranje esencijalnih patenata. Autor analizira tri situacije u kojima se razmatra odgovarajuća uloga prava konkurencije: i) odbijanje licenciranja patenata na različitim nivoima proizvodnje; ii) kolektivno formiranje cena za standard i iii) kolektivno licenciranje patenata. U članku se posebno razmatra svaka situacija i analizira odgovarajuća uloga prava konkurencije u doprinošenju efikasnom licenciranju esencijalnih patenata u IIS.

**Ključne reči:** patenti esencijalni za standard, internet inteligentnih uređaja, 5G, pravo konkurencije.

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