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## **Finding an efficiency-oriented approach to scrutinise the essentiality of potential SEPs: a survey**

**Abstract:** Over the years, the debate surrounding standard essential patents (SEPs) has focused mainly on the economic and legal meanings of FRAND commitments. However, the assessment of SEPs' true essentiality is a topic that has gained significant interest among policy makers. As the European Commission has recently delivered a legislative proposal to promote an efficient and sustainable SEP licensing ecosystem, this paper aims to provide a review of the literature on different mechanisms that have been proposed to determine the essentiality of a patent. Indeed, whilst any policy intervention stems from the need to ensure a reasonable balance among accuracy, transparency, and cost of the essentiality checks, the available approaches score differently in terms of their efficiency.

**Keywords:** Standard essential patents; Essentiality check; Standard-setting organisations

**JEL Codes:** D22, L15, L24, L63, L96, O30

### **1. Introduction.**

Over the last two decades, standard essential patents (SEPs) have been at the centre of a lively debate among scholars, courts, and competition authorities, mainly on the competitive implications of the successful adoption of a standard. Indeed, standards are key to ensuring interoperability and technical compatibility across a broad range of modern industries, but at the same time, they come with exclusionary effects for companies precluded from practicing the standard. For these reasons, standards development organisations (SDOs) typically adopt disclosure and licensing rules, requiring firms taking part in a standardisation initiative to disclose the existence of any intellectual property right (IPR) that might cover a technology considered to be implemented into the standard and clarify whether they would be willing to offer a license to such patent on fair, reasonable and non-discriminatory (FRAND) terms if implemented into the standard.

Much of the attention has so far been devoted to the economic and legal meanings of FRAND commitments as a mechanism to avoid hold-up and reverse hold-up problems between licensors and licensees, thus preventing SEPs holders from demanding excessively high royalties when implementers are locked-in to a standard and licensees from engaging in strategic practices to escape the payment of royalties or depress prices, respectively. However, SDOs' disclosure rules deserve the similar consideration.

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Disclosure rules and, more generally, SDOs' IPR policies aim at reducing the risk that investment in the preparation, adoption, and application of standards would be wasted as a result of the unavailability of an essential patent for a standard.<sup>1</sup> A patent is deemed to be essential whenever it would be impossible to implement the standard without infringing that patent.<sup>2</sup> The main concern for most SDOs is that a failure to disclose an essential patent could lead to a situation where access to the standardised technology is either "not available at all" or available but not on FRAND terms, as this may force SDOs to change the standard and even to start again with its development.<sup>3</sup>

SDOs rely on different mechanisms to avoid this outcome. Indeed, their policies differ significantly among themselves in terms of the timing for assessing patents' essentiality, the inclusion of optional features, and even the definition of essential, since some of them refer to commercially, rather than just technically, essential patents.<sup>4</sup> Moreover, whereas some SDOs require the disclosure of specific patents, others allow participants to issue blanket declarations, where patent holders declare that they will offer a license on FRAND terms to any of their patents that are or will become essential to a SDO's standard, without having to identify specific patents.<sup>5</sup> Despite these differences, those rules have provided for many years an adequate basis for the development of successful standards.

Yet, SDOs' disclosure rules have been for a long time under scrutiny, particularly with respect to the role they play in alleviating risks of both under- and over-declaration of patents that might be essential to practice an industry standard. The former may result in patent ambush, namely the non-disclosure of patents or patent applications that become essential to the adopted standard. The concern raised by some antitrust authorities is that the failure to disclose potentially essential patents may allow a patent holder to avoid a FRAND commitment and subsequently demand supra-FRAND royalties to license its patents.<sup>6</sup> Concerns with over-disclosure originate, instead, in the first place from the patent holders' alleged benefit from inflating their numbers of patents disclosed as

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<sup>1</sup> See, e.g., ETSI, 'Intellectual Property Rights Policy' (2022) §1.1, available at <https://www.etsi.org/images/files/ipr/etsi-guide-on-ipr.pdf> (accessed 16 March 2023).

<sup>2</sup> See *ibid*, Clause 15.6, stating that essential as applied to IPR "means that it is not possible on technical (but not commercial) grounds, taking into account normal technical practice and the state of the art generally available at the time of standardization, to make, sell, lease, otherwise dispose of, repair, use or operate EQUIPMENT or METHODS which comply with a STANDARD without infringing that IPR. For the avoidance of doubt in exceptional cases where a STANDARD can only be implemented by technical solutions, all of which are infringements of IPRs, all such IPRs shall be considered ESSENTIAL."

<sup>3</sup> See *ibid*, §2, addressing the case of late disclosures.

<sup>4</sup> Rudi Bekkers, Christian Catalini, Arianna Martinelli, Cesare Righi, and Timothy Simcoe, 'Disclosure rules and declared essential patents' (2023) 52 *Research Policy* 104618; Rudi Bekkers and Andrew Updegrave, 'A Study of IPR Policies and Practices of a Representative Group of Standards Setting Organizations Worldwide' (2012) available at [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2333445](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2333445) (accessed 21 March 2023). See also Cody M. Akins, 'Overdeclaration of Standard-Essential Patents' (2020) 98 *Texas Law Review* 579; Rudi Bekkers, Emilio Raiteri, Arianna Martinelli, and Elena M. Tur, 'Landscape study of potentially essential patents disclosed to ETSI' (2020) available at <https://publications.jrc.ec.europa.eu/repository/handle/JRC121411> (accessed 21 March 2023); and Jorge L. Contreras, 'Essentiality and Standards-Essential Patents' (2017) *Cambridge Handbook of Technical Standardization Law - Antitrust, Competition and Patent Law* (Contreras, ed.), Cambridge University Press, 209.

<sup>5</sup> Bekkers and Updegrave (n 4) 61-62.

<sup>6</sup> See, e.g., U.S. Federal Trade Commission, *In the Matter of Rambus*, File no. 011-0017 (2002).

potentially essential to a standard. Notably, some studies suggest that many patents disclosed as essential or potentially essential to SDOs are not actually essential.<sup>7</sup> Some researches have also tracked an increase in the number of “just-in-time” patents, namely patent applications of alleged low technical merit filed just before SDOs’ working meetings, where the company then attends the meeting to negotiate inclusion of the technology into the standard.<sup>8</sup> According to some commentators, the level of involvement and influence within the standard development process might be a more decisive factor for the inclusion of the patented technology in the standard than the technical value of the patent.<sup>9</sup>

In light of the increased focus on concerns with over-disclosures, some commentators seem to consider essentiality checks like the Wall in the Game of Thrones, that is, the only barrier between the fortress (i.e., SDOs) and the villains (i.e., non-essential patents). Those commentators complain that SDOs are not under any obligation and do not perform any checks to determine whether patents disclosed as potentially essential to a standard are in fact essential, and call for a change in the system.<sup>10</sup>

Against this background, however, although sharing the concerns about the over-disclosure, other scholars questioned the results of several essential patent landscaping studies, raising serious doubts about their accuracy and reliability, such as on the actual number of non-essential patents disclosed.<sup>11</sup>

Further, as pointed out by the UK Supreme Court in *Unwired Planet*, some over-declaration is to a certain extent inevitable as it reflects the natural process of standard

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<sup>7</sup> See, e.g., Bekkers, Catalini, Martinelli, Righi, and Simcoe (n 4); Contreras (n 4); Mark A Lemley and Timothy Simcoe, ‘How Essential are Standard-Essential Patents?’ (2019) 104 *Cornell Law Review* 607; Robin Stitzing, Pekka Sääskilähti, Jimmy Royer, and Marc Van Audenrode, ‘Over-Declaration of Standard Essential Patents and the Determinants of Essentiality’ (2018) available at <https://ssrn.com/abstract=2951617> (accessed 20 March 2023); IPlytics, ‘Landscaping study on Standard Essential Patents (SEPs)’ (2017) Report for the European Commission, available at [https://www.iplytics.com/wp-content/uploads/2017/04/Pohlmann\\_IPlytics\\_2017\\_EU-report\\_landscaping-SEPs.pdf](https://www.iplytics.com/wp-content/uploads/2017/04/Pohlmann_IPlytics_2017_EU-report_landscaping-SEPs.pdf) (accessed 21 March 2023); Charles River Associates, ‘Transparency, Predictability, and Efficiency of SSO-based Standardization and SEP Licensing’ (2016) Report for the European Commission, available at <https://ec.europa.eu/docsroom/documents/48794> (accessed 21 March 2023); Josh Lerner and Jean Tirole, ‘Standard-Essential Patents’ (2015) 123 *Journal of Political Economy* 547.

<sup>8</sup> Byeongwoo Kang and Rudi Bekkers, ‘Just-in-time patents and the development of standards’ (2015) 44 *Research Policy* 1948.

<sup>9</sup> Rudi Bekkers, René Bongard, and Alessandro Nuvolari, ‘An empirical study on the determinants of essential patent claims in compatibility standards’ (2011) 40 *Research Policy* 1001, 1012. See also Junjun Hou, Ya Hou, and Zijin Li, ‘Patent disclosure strategies of companies participating in standard setting: Based on government regulation perspective’ (2022) 43 *Managerial and Decision Economics* 3987. See also Keith Mallinson, ‘Gaming the System: A Scatter-Gun Approach to 5G SEP Declarations’ (2022) available at <https://www.wisearchor.com/wp-content/uploads/2022/12/Mallinson-WiseHarbor-SEP-overdeclarations-2022.12.05.pdf> (accessed 21 March 2023), reporting that, at least some companies, are “gaming” the system and overdisclosing their patents.

<sup>10</sup> Lemley and Simcoe (n 7) 610.

<sup>11</sup> See Keith Mallinson, ‘Essentiality checks might foster SEP licensing, but they won’t stop over-declarations from inflating patent counts and making them unreliable measures’ (2022) available at <https://ssrn.com/abstract=4278639> (accessed 19 March 2023); Igor Nikolic, ‘Estimating 5G Patent Leadership: The Importance of Credible Reports’ (2022) available at <https://ssrn.com/abstract=4109222> (accessed 21 March 2023); Haris Tsilikas, ‘Patent Landscaping Studies and Essentiality Checks: Rigorous (and Less Rigorous) Approaches’ (2022) 53 *les Nouvelles*.

development.<sup>12</sup> Notably, the “problem of over-declaration is in part the result of the IPR Policy process which requires patent owners to declare SEPs in a timely manner when a standard is being prepared, as it encourages patent owners to err on the safe side by making a declaration. In part, there are difficulties in interpreting both the patents and the standards. In part also, patent claims are amended over time; different national patents within a patent family will vary in scope around the world; and standards themselves will vary over time.”<sup>13</sup> As acknowledged in the study delivered by a group of researchers appointed by the European Commission (hereinafter, EU pilot study), actual essentiality can only be determined once the standard’s document in question is final (i.e., adopted or ‘frozen’) and once the patent in question is granted, as, only at that point in time, are the precise normative elements in the standard known and the exact scope of the exclusive rights conferred by the patent.<sup>14</sup> Because disclosures are typically made before these processes are concluded, some inaccuracies in the disclosure process are inevitable even if companies act in good faith.

Moreover, the penalties for under-disclosing patents represent an additional incentive for patent holders to err on the side of over-disclosing patents that might be essential to practice a standard, just to avoid antitrust liability.<sup>15</sup> Indeed, by failing to disclose SEPs, patent holders could face antitrust liability<sup>16</sup> and, in some jurisdictions, they could also risk the undisclosed patents becoming unenforceable, even if those patents are valid, infringed, and essential to the relevant standard.<sup>17</sup>

Finally, it should not be overlooked that, because of the number of technical specifications and patents involved, essentiality checks are a costly and time-consuming activity.<sup>18</sup> Therefore, essentiality checks may provide implementers with a strategic

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<sup>12</sup> *Unwired Planet v. Huawei Technologies* [2020] UKSC 37, para 44. See also Contreras (n 4) 223, arguing that “there are several external and internal factors that could drive even “honest” patent holders to declare the essentiality of patents that may eventually be found not to be essential to particular standards.”

<sup>13</sup> *Unwired Planet* (n 12) para 44. See also Group of Experts on Licensing and Valuation of Standard Essential Patents, ‘Contribution to the Debate on SEPs’ (2021) 55, available at <https://ec.europa.eu/docsroom/documents/44733> (accessed 15 March 2023). See also Rudi Bekkers, Elena M Tur, Joachim Henkel, Tommy van der Vorst, Menno Driesse, and Jorge L Contreras, ‘Overcoming inefficiencies in patent licensing: A method to assess patent essentiality for technical standards’ (2022) 51 Research Policy 104590, 10, referring to the possibility to implement a two-stage disclosure procedure within SDOs, where companies at an early stage disclose patents that are potentially essential and, later, once the standard is frozen and the potentially essential patent is granted, companies re-assess their patent and make an additional disclosure whether or not they believe the patent is actually essential. As mentioned by the Authors, such proposal has been previously advanced by Qualcomm, but no SDO has reached a consensus to include such an obligation in its IPR policy.

<sup>14</sup> Rudi Bekkers, Joachim Henkel, Elena M Tur, Tommy van der Vorst, Menno Driesse, Byeongwoo Kang, Arianna Martinelli, Wim Maas, Bram Nijhof, Emilio Raiteri, Lisa Teubner, ‘Pilot Study for Essentiality Assessment of Standard Essential Patents’ (2020) JRC Report, 112, available at <https://publications.jrc.ec.europa.eu/repository/handle/JRC119894> (accessed 21 March 2023).

<sup>15</sup> Lemley and Simcoe (n 7) 629; Contreras (n 4) 223.

<sup>16</sup> See, e.g., European Commission, 9 December 2009, Case COMP/38636, *Rambus*; U.S. Federal Trade Commission, *In the Matter of Rambus* (n 6); U.S. Federal Trade Commission, *In the Matter of Dell Computer*, File No. 931-0097 (1996).

<sup>17</sup> See, e.g., *Core Wireless Licensing S.A.R.L. v. Apple Inc.*, 899 F.3d 1356 (Fed. Cir. 2018).

<sup>18</sup> See Bekkers, Henkel, Tur, van der Vorst, Driesse, Kang, Martinelli, Maas, Nijhof, Raiteri, Teubner (n 14), reporting that, for large scale essentiality assessment schemes, the resources spent for commercial studies and for court cases are very diverse (ranging from 300 to 1,000€, with outliers as high as 9,000€ per patent) and that the resources spent in a patent pool to assess a single European patent range from 5,000 to 10,000€. Further, the experiment conducted in the pilot study showed that each essentiality assessment

opportunity for hold-out by delaying or even avoiding royalty payments.<sup>19</sup> Hold-out concerns are further exacerbated by doubts about the legal certainty provided by essentiality checks as many players consider that a legally binding decision on essentiality could only be made by courts.<sup>20</sup> As a consequence, to enhance SEP licensing negotiations policy makers should envisage solutions that can strike a balance between transparency, efficacy, and efficiency.

In recent years, the European Commission has intervened several times, calling for the establishment of principles and a deployment of measures to foster a balanced, smooth, and predictable framework for the licensing of SEPs. Since the European Commission has just delivered a legislative proposal to promote an efficient and sustainable SEP licensing ecosystem<sup>21</sup>, this paper aims at informing the debate, illustrating benefits and flaws of the different mechanisms used to assess the essentiality of SEPs as found in the relevant literature.

The paper is structured as follows. Section 2 illustrates the European initiatives undertaken in the last years to improve the framework of SEP licensing by identifying measures to increase the transparency and quality of patent declarations. Section 3 analyses the promises and pitfalls of the different essentiality assessment approaches, reviewing the relevant literature on this topic. Section 4 concludes.

## 2. The EU initiatives.

The need to enhance transparency in relation to the essentiality of SEPs is not new to the EU policy agenda. The *status quo* based on self-assessment by patent holders is perceived as unsatisfactory particularly in the context of the Internet of Things (IoT) where new players with little experience licensing SEPs are continually entering the market for connectivity.<sup>22</sup>

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takes on average approximately seven hours. See also IPlytics (n 7) 51-52, noting that checking essentiality for different standard projects creates immense costs, notably around 1,000-2,000€ per patent application; Charles River Associates (n 7) 58-59, estimating that a realistic range for independent third party assessments would be between 4,500€, which covers a medium assessment of essentiality plus a preliminary assessment of validity, and 9,000€, which it cited as the cost of a “full” essentiality assessment: “Multiplying the higher bound by our estimate of the total number of declared SEPs for 2G, 3G and 4G (47,500) would give us a total cost of 427,5 million €, which is a quite considerable amount.”

<sup>19</sup> See Charles River Associates (n 7) 32, arguing that introducing more clarity with regard to essentiality might make it harder for unwilling licensees to hold-out by hiding behind the need to make their own thorough assessment.

<sup>20</sup> See, e.g., UK Intellectual Property Office, ‘Standard Essential Patents and Innovation’ (2022) Section 3, available at <https://www.gov.uk/government/consultations/standard-essential-patents-and-innovation-call-for-views/outcome/standard-essential-patents-and-innovation-executive-summary-and-next-steps> (accessed 21 March 2023). See also Group of Experts on Licensing and Valuation of Standard Essential Patents (n 13) 68, suggesting that measures should be introduced to prevent the challenging of independent essentiality confirmations for all or a substantial number of SEPs of one SEP holder as part of licensing negotiations and delay tactics.

<sup>21</sup> European Commission, ‘Proposal for a Regulation on standard essential patents and amending Regulation (EU)2017/1001’ COM(2023) 232 final.

<sup>22</sup> European Commission, ‘Intellectual property – new framework for standard-essential patents’ (2022) Call for evidence for an impact assessment, 4, available at [https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13109-Intellectual-property-new-framework-for-standard-essential-patents\\_en](https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13109-Intellectual-property-new-framework-for-standard-essential-patents_en) (accessed 21 March 2023).

In the 2016 Communication on standardisation priorities for the Digital Single Market, the Commission committed to work in collaboration with stakeholders on the identification of possible measures to increase the transparency and quality of SEP declarations.<sup>23</sup> One year later, the Commission considered that SEPs should be subject to reliable scrutiny of their essentiality and announced the launch of a pilot project to facilitate the introduction of an appropriate scrutiny mechanism.<sup>24</sup> Indeed, while stressing the need for a higher degree of scrutiny on essentiality claims, the Commission also acknowledged that such a scrutiny requirement on SEPs must be balanced against the cost, hence the related burden needs to remain “proportionate.”<sup>25</sup> To this aim, the Commission stated that “an incremental approach, whereby scrutiny takes place at the request of either rightholders or prospective users, calibrating the depth of scrutiny and limiting checks to one patent within a family and to samples, could ensure the right cost-benefit balance of this measure.”<sup>26</sup>

Building on such approach, in the 2020 IP Action Plan, the Commission reiterated its willingness to consider reforms to further clarify and improve the framework governing the declaration, licensing, and enforcement of SEPs, by also exploring the creation of an independent system of third-party essentiality checks.<sup>27</sup> Some studies recommended entrusting patent offices with the task of carrying out essentiality assessments.<sup>28</sup> They argue that patent officers are considered to be in the best position to this end, as they are seen as trusted and neutral organisations with the required knowledge and skills. To make administrative procedures involving patent offices more effective, it has been suggested that their judgments be made binding in some manner, such as by introducing a presumption of infringement by standard-compliant products once patents are deemed essential by the patent office.<sup>29</sup> Such a presumption would work akin to the statutory presumption of patent validity and could reduce the risks and costs of litigation enough to encourage SEP holders to invest in essentiality determinations made by a neutral third-party.<sup>30</sup> Further, although procedural-fairness concerns cannot be overlooked, the presumption would just change the burden of proof, hence it would not violate the judicial power of courts and would not preclude a party from litigating the issue and receiving less demanding due process scrutiny.<sup>31</sup>

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<sup>23</sup> European Commission, ‘ICT Standardisation Priorities for the Digital Single Market’ COM(2016) 176 final, 14.

<sup>24</sup> European Commission, ‘Setting out the EU approach to Standard Essential Patents’ COM(2017) 712 final, 5.

<sup>25</sup> Ibid. See also Group of Experts on Licensing and Valuation of Standard Essential Patents (n 13) 55, arguing that essentiality checks should be introduced in a pragmatic manner balancing the complementary goals of precision versus reasonable effort, and early availability versus certainty.

<sup>26</sup> European Commission (n 24) 5.

<sup>27</sup> European 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, 13.

<sup>28</sup> See, e.g., Akins (n 4); Bekkers, Henkel, Tur, van der Vorst, Driesse, Kang, Martinelli, Maas, Nijhof, Raiteri, Teubner (n 14); Group of Experts on Licensing and Valuation of Standard Essential Patents (n 13); IPlytics (n 7).

<sup>29</sup> See Akins (n 4), arguing that such a presumption, akin to the statutory presumption of patent validity, could reduce the risks and costs of litigation enough to encourage SEP holders to invest in essentiality determinations made by a neutral third-party.

<sup>30</sup> Akins (n 4) 594. See also Group of Experts on Licensing and Valuation of Standard Essential Patents (n 13) 61, raising concerns that, if results are not legally binding, substantial litigation may still occur.

<sup>31</sup> See Akins (n 4) 596, noting that, although a presumption of infringement would lower the patentee’s burden in litigation, the patentee should still prove that an accused product is standard-compliant and

On these premises, the European Commission has been inspired by the Japanese *hantei* system, which represents the only attempt so far at introducing an essentiality review of SEPs by a patent office.<sup>32</sup> Notably, under the *hantei* model, the patent office provides a non-binding essentiality analysis when parties are engaged in a SEP dispute and submit the patent for an advisory opinion on a voluntary basis. However, for various reasons, this procedure has not yet been invoked by market parties. It has been reported that the likely reasons why the Japanese patent office has not received any requests include stringent admission criteria and a narrowly defined test.<sup>33</sup> A further limit comes from the fact that only one single patent is investigated, therefore no insights are gained on essentiality at the portfolio level.

Moreover, in 2020 the Commission published a pilot study delivered by a group of researchers appointed to investigate the technical and institutional feasibility of a system ensuring large-scale essentiality scrutiny for SEPs.<sup>34</sup> Notably, the study explored nine potential scenarios. Setting aside the hypotheses where no action is taken or the patent owners perform a self-assessment of the essentiality of their patents, the attention focused on scenarios involving an assessment based on: a) all the patents disclosed to SDOs for a given standard; b) a random sample of disclosed patents; c) an automated system; and d) patents voluntarily requested by the patent owner. The latter scenario is split into three additional hypotheses taking into account the possibility that: e) third parties are also allowed to file requests; f) a random sampling approach complements the assessment, targeting the patents of those firms that choose not to put their patents forward for the assessment; and g) an artificial intelligence (AI) system assists in the evaluation of the patents of those firms that choose not to put their patents forward for the assessment.

Finally, in 2022 the Commission launched a call for evidence to evaluate a legislative initiative that, among the different policy options, would enhance transparency on SEPs by requiring the disclosure and update of certain information to improve publicly available information and introducing a system for independent third-party assessments of essentiality under the management and control of an independent body.<sup>35</sup>

Against this backdrop, the Commission has very recently advanced a proposal for a regulation entrusting the European Union Intellectual Property Office (EUIPO) with the main tasks regarding the licensing and litigation of SEPs.<sup>36</sup> Indeed, under the purview of the EUIPO, a competence center will be established and it will perform, among the other things, the tasks of setting up and administering a system for the assessment of the essentiality of SEPs, setting up and administering the process for the FRAND determination, and administering a process for aggregate royalty determination.<sup>37</sup>

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defendants could still argue noninfringement either by rebutting the presumption of infringement or by showing noncompliance with the portion of the standard covered by the SEP.

<sup>32</sup> Japan Patent Office, 'Manual of Hantei for Essentiality Check' (2018) available at [https://www.jpo.go.jp/e/system/trial\\_appeal/hantei\\_hyojun.html](https://www.jpo.go.jp/e/system/trial_appeal/hantei_hyojun.html) (accessed 15 March 2023). In the Japanese system, the *hantei* mechanism has been introduced in 1959, but it is just from 2018 that it has been extended to essentiality checks in SEP disputes.

<sup>33</sup> Bekkers, Henkel, Tur, van der Vorst, Driesse, Kang, Martinelli, Maas, Nijhof, Raiteri, Teubner (n 14) 51-54. Nonetheless, given that the *hantei* system has been recently revised to tackle some of the mentioned limits, the Authors did not exclude that system might be more appealing in the future.

<sup>34</sup> Bekkers, Henkel, Tur, van der Vorst, Driesse, Kang, Martinelli, Maas, Nijhof, Raiteri, Teubner (n 14).

<sup>35</sup> European Commission (n 22) 4.

<sup>36</sup> European Commission (n 21).

<sup>37</sup> *Ibid*, Article 3.

With specific regard to essentiality checks, the competence center will create and manage a register where SEP owners that seek to license their SEPs in the EU will specify which patents they consider to be essential to a particular standard.<sup>38</sup> The registration is mandatory for enforcement purposes: if a SEP is not registered, the owner will not be able to assert it in court and it will not be able to collect royalties or past damages for any use of a SEP prior to the date of registration. For the registration, at least one patent claim shall have correspondence with at least one requirement or recommendation of the standard, identified by standard name, version (and/or release) and sub-clause.

Essentiality checks will be conducted randomly by independent evaluators (selected according to objective criteria to be determined by the Commission) on a sampling from SEP portfolios, based on a methodology to be developed by the Commission to ensure that the sample is capable of producing statistically valid results.<sup>39</sup> Only one SEP from the same patent family will be checked. SEP owners may designate up to 100 registered SEPs for essentiality checks and may submit a claim chart for each SEP that is checked, including for the peer evaluation process. The results of the essentiality checks are not legally binding, thus any disputes with regard to essentiality have to be addressed in the relevant court.

The official release of the proposal has been preceded by a wace of criticism that can be effectively summarised by the concerns expressed in the letter sent to the European Commission by former heads of U.S. government agencies (i.e., the U.S. Department of Justice Antitrust Division, the U.S. Federal Trade Commission, the U.S. Patent and Trademark Office, and the National Institute of Standards and Technology) where it is argued that the proposal would “threaten the standards-based technology ecosystem” by, among the other things, “unnecessarily insert[ing] the European Union Intellectual Property Office (EUIPO)—an institution that currently has no meaningful experience with patents—into one of the most complex areas of patent policy.”<sup>40</sup>

### 3. Essentiality test mechanisms.

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<sup>38</sup> Ibid, Articles 19-25.

<sup>39</sup> Ibid, Articles 28-33. See also Commission Staff Working Document, ‘Impact Assessment Report’ accompanying the Proposal for Regulation on standard essential patents and amending Regulation (EU)2017/1001’ SWD(2023) 124 final, 28, arguing that, while measures taken at national level aiming at increasing transparency and facilitating licensing of SEPs may not be efficient, under an EU-wide approach, it will not be necessary to conduct more than one essentiality check per patent family to find that patents are indeed truly essential to a standard and that the check would be done based on a single EU-wide methodology.

<sup>40</sup> See Christine A. Varney, Makan Delrahim, David J. Kappos, Andrei Iancu Walter G. Copan, and Noah Joshua Phillips, ‘Comments on European Commission’s Draft “Proposal For Regulation of the European Parliament and of the Council Establishing a Framework for Transparent Licensing of Standard Essential Patents” (2023) 3-4, available at <https://s3.documentcloud.org/documents/23785175/2023-04-20-comments-on-european-commission-draft-sepregulation-by-former-us-officials.pdf> (accessed 26 April 2023), also stating that “[t]his, frankly, makes no sense. The EUIPO should not be tasked with objectives completely outside its ambit when there are already institutions designed to perform those same duties—namely, the Court of Justice of the European Union and lower courts.” Similar concerns have been raised by ETSI, ‘Proposal for a Regulation on SEPs – ETSI views’ (2023) available at [https://www.documentcloud.org/documents/23780757-dg-23-07\\_proposal-for-a-regulation-on-seps-etsi-views56](https://www.documentcloud.org/documents/23780757-dg-23-07_proposal-for-a-regulation-on-seps-etsi-views56) (accessed 26 April 2023).



Given that the design of a system for essentiality checks requires a trade-off between the degree of transparency ensured and the cost of its implementation, the different policy options envisaged in the EU pilot study provides the opportunity to feed the debate on the recent Commission's legislative proposal illustrating the findings of a literature review on the main mechanisms that could ensure an efficient solution. Indeed, the scenarios analysed in the study basically reflect three different approaches, namely the assessment of every patent disclosed to an SDO, an analysis based on subsets or samples, and an investigation performed by automated systems.

### **3.1. Patent-by-patent examination.**

The approach supporting patent-by-patent checks is inspired by the experience of patent pools, where independent experts are usually appointed to ensure that the pool includes only complementary and essential technologies. As the risks of anticompetitive effects are related to the way in which patent pools are organised, antitrust authorities take into account, among other things, the selection and nature of the pooled technologies (requiring that only essential technologies are pooled), and the extent to which independent experts are involved in the creation and operation of the pool.<sup>41</sup>

Although patent pools are considered a useful case study for SDOs' essentiality assessment mechanisms,<sup>42</sup> the context and costs at stake differ significantly from those concerning SDOs. The main argument against such solution adopted by patent pools regards its feasibility. Indeed, while patent-by-patent assessments are effective in the case of small portfolios, the application of this method to large portfolios of patents implies enormous costs, which are likely to be prohibitive, especially for start-ups and small and medium enterprises (SMEs). The latter would be significantly affected by burdensome solutions, which may undermine their involvement in the standard setting process.

On the premise that essentiality determinations undertaken by pools are too costly to be feasible within the context of SDOs, Contreras suggested a "pseudo-pool" approach based upon the ex ante determination of aggregate royalty rates for different standards with an incentive structure to discourage over-declaration.<sup>43</sup> Under this proposal, participants may challenge each other's essentiality determinations and, if a patent is deemed non-essential, the holder's share of the standard's aggregate royalty is reduced by more than the value of that single patent.

The limits of an approach that determines the essentiality of all patents are acknowledged by the EU pilot study. By its view, while the advantage of the scenario in question is that it satisfies many interests for transparent data on essentiality and its implementation is independent of the willingness of parties to participate or provide input, its major

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<sup>41</sup> See European Commission, 'Guidelines on the application of Article 101 of the Treaty on the Functioning of the European Union to technology transfer agreements' (2014) OJ C 89/3, Section 4.4; U.S. Department of Justice, Business Review Letters, *University Technology Licensing Program* (2021), *Avanci* (2020), *IPXI* (2013), *RFID Consortium* (2008), *Hitachi/Matsushita* (1999), *Philips/Sony/Pioneer* (1998), *MPEG LA* (1997), available at <https://www.justice.gov/atr/business-review-letters-and-request-letters> (accessed 19 March 2023).

<sup>42</sup> See Bekkers, Henkel, Tur, van der Vorst, Driesse, Kang, Martinelli, Maas, Nijhof, Raiteri, Teubner (n 14) 48.

<sup>43</sup> Jorge L Contreras, 'Fixing FRAND: A Pseudo-Pool Approach to Standards-Based Patent Licensing' (2013) 79 *Antitrust Law Journal* 47.

downsides are that it requires very significant resources and it does not generate information on patent ownership, which is important for many users of essentiality data.<sup>44</sup> Moreover, it requires that the SDO in question publishes all the disclosed patents' identities and this is not possible for SDOs that allow blanket declarations.<sup>45</sup>

Nonetheless, relying on the data collected for the EU pilot study and with the aim of supporting the technical feasibility of a large-scale system of essentiality assessment, Bekkers et al. reported the results of a field experiment conducted with twenty patent examiners, employed by six different European patent offices, spending around eight hours (i.e., a one-day budget) on each assessment.<sup>46</sup> The experiment showed that 74% of the outcomes are consistent with patent pools' essentiality assessments and the consistency increases to 84% when the assessors were provided with claim charts. Despite such results, however, there seems to be a general agreement that the overall effort required in terms of human resources and time does not seem compatible with large patent portfolios.

### **3.2. Subsets and sampling.**

Given the huge cost of an examination targeting all the patents disclosed to SDOs, the other potential solutions aim at lowering the costs of the assessment to a reasonable level without compromising too much on accuracy and the level confidence.

One suggestion is to limit the analysis of essentiality to only a subset of patents, and through this, avoid excessive costs. However, questions emerge with respect to how to determine a subset of patents that should be subject to an essentiality check. Notably, one of the most important questions is who should select the subset of patents that should be examined.

One option is that the subset may be represented by patents put forward for evaluation by patent owners, which may be also complemented by third party requests, or with an assistive semantic/AI system.

Among the policy options on the table, the EU pilot study proposes the assessment initiated at the request of the patent owner, who then provides claim charts as input to the process.<sup>47</sup> In particular, according to the study, such system provides several advantages as: a) the owner will only file requests for patents they really believe to be essential, given the final standard and given the actual claims in the granted patent; b) the owner may be asked for specific information on the standard and on the precise standard's document for which the patent is believed to be essential; c) the owner may be asked to submit additional documents, such as a claim chart; and d) information is also obtained about the current ownership of the patent. The relevance of submitting claim charts has been confirmed by a field experiment conducted by Bekkers et al.<sup>48</sup> and has been also

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<sup>44</sup> Bekkers, Henkel, Tur, van der Vorst, Driesse, Kang, Martinelli, Maas, Nijhof, Raiteri, Teubner (n 14) 120.

<sup>45</sup> Ibid.

<sup>46</sup> Bekkers, Tur, Henkel, van der Vorst, Driesse, and Contreras (n 13).

<sup>47</sup> Bekkers, Henkel, Tur, van der Vorst, Driesse, Kang, Martinelli, Maas, Nijhof, Raiteri, Teubner (n 14) 107, 109, and 118.

<sup>48</sup> Bekkers, Tur, Henkel, van der Vorst, Driesse, and Contreras (n 13).

highlighted by the group of experts appointed by the European Commission<sup>49</sup>, which further suggested to limit the essentiality checks to those SEPs that patent holders intend to commercialise.<sup>50</sup> Such solution would have the advantage to lower the costs for essentiality checks to patent holders.<sup>51</sup>

On the flip side, it has been noted that, being legal work products of SEP holders that should be protected by non-disclosure agreements, claim charts might include information that should not be publicly available.<sup>52</sup> Further, published claim charts would potentially be used for invalidation of SEPs, hence the proposal might increase the number of invalidity proceedings.<sup>53</sup> An implementer could strategically exploit invalidity proceedings to impose further delays and costs on patent holders. That would be particularly likely if, after performing an essentiality check, parties are still free to challenge the result of that check in court. Therefore, insofar as the proposal is not accompanied by a provision introducing a binding effect (by introducing a presumption of infringement from independent essentiality confirmations), disclosing claim charts could impose a further burden on SEP holders without enhancing the efficiency of licensing negotiations, but rather having the opposite effect.

In any case, given that the availability of claim charts has a relevant impact on the quality of the essentiality assessments, this scenario is preferred to the alternative option in which the patent owner's request is complemented by third party requests.<sup>54</sup> Indeed, such variant does not show the previous advantages in terms of information availability, while it may favour the same aforementioned opportunities for hold-out tactics.

Another option in selecting the subset of patents may be complementing the patent owner's request with an AI system which assists assessors by selecting patents most likely to be essential among those firms that choose not to put their patents forward for evaluation.<sup>55</sup> Although receiving the highest score in terms of transparency, this solution is considered not yet feasible for the reasons illustrated in the next section devoted to automated systems.

Another approach in selecting a subset of patents to undergo essentiality checks may be the adoption of random sampling. The report prepared for the Commission by Charles River Associates supported, for example, a system of random evaluation of the patent-holder's disclosed SEP portfolio.<sup>56</sup> In a similar vein, Baron and Pohlman recommended random sampling for the estimation of essentiality ratios in large firm portfolios of disclosed SEPs, considering it less susceptible to bias and more accurate than the other

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<sup>49</sup> See Group of Experts on Licensing and Valuation of Standard Essential Patents (n 13) 65-66, arguing that SEP holders should submit essentiality confirmations for their SEPs together with the relevant claim charts.

<sup>50</sup> Ibid, 56.

<sup>51</sup> See also Igor Nikolic and Niccolò Galli, 'The European Commission Expert Group's Take on Standard-Essential Patents: A Short Commentary for a Long Report', (2021) *EU intellectual property: innovations and intellectual property in various fields of human life* (Lazíková and Rumanovská, eds.), Nitra, 32, 38.

<sup>52</sup> Group of Experts on Licensing and Valuation of Standard Essential Patents (n 13) 66.

<sup>53</sup> Ibid.

<sup>54</sup> Bekkers, Henkel, Tur, van der Vorst, Driesse, Kang, Martinelli, Maas, Nijhof, Raiteri, Teubner (n 14) 107, 109, and 118.

<sup>55</sup> Ibid, 104.

<sup>56</sup> Charles River Associates (n 7) 60-61.

methods.<sup>57</sup> It is, indeed, evident that the added value provided by sampling increases with the number of patents to scrutinize, whereas patent-by-patent examinations are more effective in case of small portfolios.<sup>58</sup> Once a random sample is drawn, the group of experts appointed by the European Commission recommended that essentiality checks be performed by an independent body for only one patent in a patent family.<sup>59</sup>

The scenario proposed by the EU pilot study requires that the patent owner's request is complemented by an assessment of a sample of patents disclosed to SDOs for non-compliant SEP holders—that is, those that do not voluntarily present claim charts as input to the process.<sup>60</sup> Such solution scores highly in terms of creating transparent data on essentiality, combining the strengths of the scenario based on a subset of patents with a system to collect data on non-participating firms at a reasonable cost.

Nonetheless, it bears emphasizing that some studies have warned against the limitations of random sampling. After all, as noted in the EU pilot study, any type of sampling inevitably results in lower accuracy and confidence level.<sup>61</sup> Indeed, while the “required dataset confidence level for numerator data is usually high, regardless of whether it is used by an implementer, a patent owner, or by court... [t]he required dataset confidence level for [de]nominator data is usually lower, as it is the aggregated data of all the relevant patent owners. Here, a properly taken sample of all patents could suffice, where it is important that all relevant statistical considerations are taken into account to ensure the sample results in a representative data set” (e.g., stratified sampling).<sup>62</sup>

Moreover, the empirical research conducted by Mallinson showed that bias in checking and random errors in sampling are too great to provide even a more modest accuracy.<sup>63</sup> Mallinson also identified a “statistical bias” occurring due to impartial, but imperfect, essentiality determinations that tend to skew results towards a 50% essentiality rate. However, if essentiality rates are less than 50%, numbers of false positive determinations tend to exceed numbers of false negatives. According to Mallinson, such factors (i.e., true essentiality rates below 50% and the probability of any individual determination being more likely a false positive than a false negative) determine a high inflation in found essentiality rates.<sup>64</sup> As a consequence, this inadequacy may incentivize even more over-disclosures by some patent holders, while instilling a false sense of security in others.

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<sup>57</sup> Justus Baron and Tim Pohlman, ‘Precision and bias in the assessment of essentiality rates in firms’ portfolios of declared SEPs’ (2021) 3, available at [https://wwws.law.northwestern.edu/research-faculty/clbe/events/standardization/documents/baron\\_pohlmann\\_bias\\_and\\_precision\\_essentiality\\_rates.pdf](https://wwws.law.northwestern.edu/research-faculty/clbe/events/standardization/documents/baron_pohlmann_bias_and_precision_essentiality_rates.pdf) (accessed 21 March 2023).

<sup>58</sup> Quite at odds with their argument supporting sampling as the preferred option for the estimation of large portfolios, Baron and Pohlman found useful to adopt predictive modeling for the analysis of small portfolios. However, in such scenario, given that the activity would be significantly less costly and time-consuming, there are no compelling reasons to derogate from a patent-by-patent examination.

<sup>59</sup> Group of Experts on Licensing and Valuation of Standard Essential Patents (n 13) 59-61.

<sup>60</sup> *Ibid.*, 107, 109, and 118.

<sup>61</sup> *Ibid.*, 87-88.

<sup>62</sup> *Ibid.*

<sup>63</sup> Mallinson (n 9). See also Keith Mallinson, ‘Essentiality Rate Inflation and Random Variability in SEP Counts with Sampling and Essentiality Checking for Top-Down FRAND Royalty Rate Setting’ (2021) available at <https://www.wisearbor.com/wp-content/uploads/2021/09/Perils-of-sampling-SEPs-Mallinson-30-Sept-2021.pdf> (accessed 21 March 2023).

<sup>64</sup> Mallinson (n 11) 3 and 8.

### 3.3. Automated systems.

As some analytics companies are releasing tools which rely on machine learning algorithms to identify SEPs<sup>65</sup>, one last approach that has gained traction is represented by automated text comparison based on AI and semantic similarity measures.

The potential advantages of such tools are significant, though the same can be said of their current limitations. On the bright side, automated systems are expected to increase the speed of the process and reduce its cost in comparison to pure human expert assessment. Therefore, their main potential advantage is their scalability. Further, they are assumed to be impartial and objective. Supporting the claim that semantic similarity could be a strong predictor of essentiality among disclosed SEPs, a recent study by Brachtendorf, Gaessler, and Harhoff proposed a method to approximate essentiality based on the semantic similarity between patents and technical standards, testing it among a set of SEPs disclosed to ETSI telecommunication standards.<sup>66</sup> On the same path, the EU pilot study said that AI may assist the essentiality review as a very useful tool for efficient pre-screening.<sup>67</sup>

However, the EU pilot study also found that automated approaches, including assistive AI approaches, will not be able to replace human efforts for full essentiality assessments, at least in the short or medium term.<sup>68</sup> Indeed, the study highlighted several reasons undermining the possibility of relying on automated systems for full essentiality assessments, mentioning in particular the fact that: the precise meaning of terminology cannot easily be understood by an automated system; semantic approaches can face difficulties dealing with changes in terminology over time; patents are written in a different vocabulary from standards; technology required to implement the standard may not be explicitly mentioned in the standard's text; an essentiality assessment should consider possible alternatives to the patent under investigation that may also satisfy the standard; an AI system would require a reference training set with a sufficiently large number of verified assessment outcomes; and finally, such systems are prone to gaming, whereby patent owners, anticipating the workings of such a system, will adapt the wording in their patent applications and in their technological contributions to SDOs.<sup>69</sup>

Similar concerns about the limitations of automated tools and AI assisted mechanisms have been raised in several recent academic papers.<sup>70</sup> For example, discussing tools

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<sup>65</sup> See, e.g., the tools launched by IPlytics (<https://www.iplytics.com/platform/semantic-essentiality-score>), Alium (<https://www.aliun-llc.com/blog/aliun-introduces-open-ran-patent-portfolio-license>), Amplified (<https://www.amplified.ai>), Apex Standards (<https://www.apexstandards.com>), and AI Patents (<https://www.aipatents.com/seps>).

<sup>66</sup> Lorenz Brachtendorf, Fabian Gaessler, and Dietmar Harhoff, 'Truly standard-essential patents? A semantics-based analysis', (forthcoming) *Journal of Economics and Management Strategy*.

<sup>67</sup> Bekkers, Henkel, Tur, van der Vorst, Driesse, Kang, Martinelli, Maas, Nijhof, Raiteri, Teubner (n 14) 58.

<sup>68</sup> Ibid.

<sup>69</sup> Ibid, 58-59.

<sup>70</sup> See Katie Atkinson and Danushka Bollegala, 'AI for Patent Essentiality Review' (2022) available at <https://ssrn.com/abstract=4277799> (accessed 21 March 2023), describing such risks as insensitivity to polysemous and temporal semantic variations and arguing that reducing essentiality to a one-dimensional score is suboptimal; Axel Contreras-Alvarez, 'Why automated patent analysis can be wrong, even when it's right' (2021) *The Patent Lawyer* 30; Nikolic (n 9) 7-8, noting that the meaning and interpretation of words and terminology in patent claims and standards' technical specifications is context and jurisdiction-specific; and Tim A Williams, 'A Study of the IPlytics Platform and its Semantic Essentiality Score' (2022)

focusing on semantic similarity, Atkinson and Bollegala noted that similarity and essentiality are not equivalent concepts as a patent might be essential to a standard but might not necessarily have a high similarity in terms of textual overlap.<sup>71</sup> Two main implications derive from this view: “First, the patents that are essential but not similar to the standard would not be retrieved by a similarity-based essentiality score. Second, if we wanted to retrieve all essential patents, we must reduce the cutoff threshold for similarity, thereby retrieving a potentially large set of non-essential patents in the process.”<sup>72</sup> As a result, even as an assisting tool for pre-screening, AI will not ensure an accurate narrowing down of the number of patents to analyze. Therefore, this critical issue is going to increase, rather than reduce, the manual effort required to assess the real essentiality of retrieved patents.

#### **4. Concluding remarks. The search for purity: a Sisyphean task?**

This paper starts from two fundamental and, to a certain extent, conflicting premises. Namely, the key role assigned by the European Commission to essentiality checks in the context of SEP licensing and the peculiar features of these assessments. Whilst on the one side, ensuring the true essentiality of disclosed SEPs is considered functional to enhance transparency, on the other side essentiality checks represent a costly and time-consuming activity and the accuracy of the different potential methods is heavily debated. As a result, they need to be performed in a reasonable and feasible way by safeguarding transparency and accuracy without imposing prohibitive costs that would overburden the system and penalize companies contributing to the standard setting process. In short, the challenge for policy makers is to select an efficient and effective essentiality test mechanism.

Starting from the findings and recommendations of the recent EU pilot study, the literature review provides some useful insights. Whereas a patent-by-patent examination, like the one performed in the context of patent pools, cannot satisfy the requirement of feasibility, automated systems and AI assisted methodologies appear, at the best, promising, but not yet suitable to replace human assessment. Therefore, the only feasible approaches rely on the analysis of a subset of patents as the most compelling solution. Nonetheless, it cannot be overlooked that those approaches have their limitations too, including the risk of benefitting companies that over-disclose, thus furthering, rather than addressing, the roots of the problem. Hence, academic analyses suggest that the proposals presented so far need further improvements before their implementation could enhance the *status quo*.

Finally, other questions remain to be addressed in addition to identifying an accurate and feasible system for essentiality checks. To enhance SEP licensing negotiations and safeguard the effectiveness of essentiality checks, it is appropriate to ensure that the related decisions are legally binding by introducing a presumption of infringement once patents are deemed essential. Indeed, given the costs involved in essentiality checks, it would be unfair and inefficient to make those checks meaningless and, instead, only provide some implementers with the chance to misuse such process in an attempt to delay negotiations or avoid the payment of royalties.

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available at <https://ssrn.com/abstract=4223782> (accessed 21 March 2023), questioning IPlytics Platform’s ability to predict essentiality.

<sup>71</sup> Atkinson and Bollegala (n 70) 3.

<sup>72</sup> Ibid, 3-4.

In summary, as noted in the EU pilot study, even if essentiality is a binary concept, its assessment is a complex process.<sup>73</sup> Moreover, any essentiality evaluation is inherently uncertain. This implies the awareness that, in the search for SEP purity, a Pareto optimal solution is not available. Rather, an efficiency-oriented approach is desperately needed in order to avoid a Sisyphean ending.

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<sup>73</sup> Bekkers, Henkel, Tur, van der Vorst, Driesse, Kang, Martinelli, Maas, Nijhof, Raiteri, Teubner (n 14) 111.