

Standard Essential Patents Versus the World: How the Internet of Things Will Change Patent Licensing Forever

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Abstract

Our connected world depends on proper licensing of standard-essential patents (SEPs). Decades of intra-industry SEP disputes have shaped how modern courts resolve SEP licensing issues. Emerging cross-industry SEP disputes, however, present new reasons to question the assumptions made by courts and scholars during the era of intra-industry SEP disputes. This Article examines cross-industry SEP disputes between telecommunications companies and Internet of Things (IoT) implementers to demonstrate how SEP owners use the “exhaustion-avoidance licensing model” to capture more value than they are entitled to receive under U.S. patent damages law. This IoT fact pattern will force U.S. courts to choose one of two paths. Courts could choose to protect established licensing practices by deemphasizing the apportionment rule; this path, however, would erode a bedrock legal doctrine responsible for keeping patent damages tethered to reality. Instead, this Article recommends rigorously enforcing the patent apportionment and misuse doctrines in SEP disputes, even if such enforcement disrupts established SEP licensing practices. No matter which path courts choose, patent licensing will never be the same.

I. Introduction

For the past two decades, a civil war has raged within the patent world over what it means to license standard-essential patents (SEPs) on terms that are fair, reasonable, and non-discriminatory (FRAND).¹ The ensuing battles pitted industry players and standard-setters against each other.² These intra-industry SEP disputes, in turn, shaped how modern courts interpret the FRAND commitment and set SEP license rates. Today, SEP licensing is still one of the biggest issues challenging the global patent system.³

An emerging new type of SEP battle will again reshape SEP jurisprudence and

¹ See Jorge L. Contreras, *A Brief History of FRAND: Analyzing Current Debates in Standard Setting and Antitrust Through a Historical Lens*, 80 ANTITRUST L.J. 39, 44 (2015) (noting how the patent industry’s current interest in FRAND commitments began with a well-known series of cases against Rambus, Inc.).

² See, e.g., *Ericsson Inc. v. TCL Commc’n Tech. Holdings Ltd.*, 955 F.3d 1317 (Fed. Cir. 2020) (involving a manufacturer of cellular network equipment and a cellular handset manufacturer); *Apple, Inc. v. Motorola, Inc.*, 757 F.3d 1286 (Fed. Cir. 2014) (involving two competing manufacturers of cellular handsets); *Apple, Inc. v. Samsung Electronics Co.*, No. 11-CV-01846-LHK (N.D. Cal. Oct. 22, 2017) (involving two competing manufacturers of cellular handsets); *Microsoft Corp. v. Motorola, Inc.*, No. C10-1823JLR, 2013 WL 2111217, at *151 (W.D. Wash. Apr. 25, 2013) (involving two companies who participated in forming the MPEG LA H.264 patent pool); *Nokia Corp. v. Apple Inc.*, No. 09-791-GMS (D. Del. June 1, 2011) (involving two competing manufacturers of cellular handsets); *Research in Motion Ltd. v. Motorola, Inc.*, 644 F.Supp.2d 788 (N.D. Tex. 2008) (involving two competing manufacturers of cellular handsets); *Nokia Corp. v. Qualcomm, Inc.*, No. 06-509-JJF (D. Del. Aug. 29, 2006) (involving a cellular handset manufacturer and a cellular chipmaker).

³ See, e.g., *Current and Emerging Issues Related to Patents*, WORLD INTELL. PROP. ORG., <https://www.wipo.int/patent-law/en/developments/> (last visited Jan. 7, 2022) (identifying “Standards and Patents” as one of the biggest global patent issues).

patent law more generally: *cross-industry SEP* disputes. In cross-industry SEP disputes, SEP owners from a first industry try to recover licensing fees from companies in other industries, often because those companies are downstream consumers of equipment manufactured by the first industry. For example, telecommunications companies are now asserting cellular SEPs against manufacturers in disparate industries because they sell Internet of Things (IoT)⁴ products that include cellular chips made by different telecommunications companies.⁵

Cross-industry SEP disputes raise novel issues that should prompt courts to revisit how they resolve SEP issues. First, cross-industry SEP disputes present a unique fact pattern missing from the past two decades of intra-industry SEP cases. In particular, the automotive industry and other licensing targets have multi-tiered supply chains that further separate the cellular chip maker from the end device manufacturer.⁶ This separation exposes flaws in the “exhaustion-avoidance licensing model” historically favored by the telecommunications industry.⁷

Second, cross-industry SEP disputes could have a broader impact on society than intra-industry SEP disputes. Typical intra-industry SEP assertions merely reshuffle money between wealthy companies situated within the same value ecosystem.⁸ Cross-industry SEP assertions, on the other hand, threaten every industry on earth,⁹ including fragile¹⁰ and emerging sectors.¹¹ Real-world consequences may al-

⁴ Although the IoT is difficult to define, the term generally includes all devices having a network connection. Beatriz Conde Gallego & Josef Drexler, *IoT Connectivity Standards: How Adaptive Is the Current SEP Regulatory Framework?*, 50 INT’L REV. OF INTELL. PROP. & COMPETITION L. 135, 136 (2019). This Article will focus on IoT devices having cellular network connections.

⁵ See, e.g., Evelina Kurgonaite et al., *Looking Back to the Future—Selective SEP Licensing Through a Competition Law Lens?*, 11 J. EUR. COMPETITION L. & PRAC. 133, 137 (2020) (“Many evolving IoT business models entail connectivity and integrate wireless technologies. Ever more companies—large and small—encounter issues related to licensing of wireless communication SEPs; these are no longer confined to the [telecommunications] industry but are becoming a mainstream business consideration in sectors such as automotive, energy or medical devices and others.”), <https://academic.oup.com/jeclap/article-abstract/11/3-4/133/5780097?redirectedFrom=fulltext>.

⁶ *Id.* (“Some of the affected sectors are characterized by complex supply chains that entail multiple levels and players, making SEP licensing more complicated. For example, in sophisticated multi-component products such as connected cars, patented wireless technology can be used at different stages in the production chain: starting at the chip level that may then be integrated into a module that subsequently becomes part of a subsystem or an interim device and is eventually installed into the car.”).

⁷ If SEP owners licensed upstream chip makers who sell infringing cellular chips, then all downstream sales of those chips would be exhausted. Under the exhaustion-avoidance licensing model, patent owners attempt to avoid exhaustion by refusing to license upstream infringers like cellular chip makers. See *infra* notes 33–46 and accompanying text (surveying the telecommunication industry’s historical use of the exhaustion-avoidance licensing model).

⁸ Cf. *supra* note 2 (listing examples of major SEP disputes within the telecommunications industry).

⁹ See, e.g., *How IoT is Changing Every Industry*, BBC, <http://www.bbc.com/storyworks/internet-of-things/how-iot-is-changing-every-industry?obOrigUrl=true> (last visited Oct. 31, 2021); *How IoT is Impacting 7 Key Industries Today*, FORBES, <https://www.forbes.com/sites/insights-inteliot/2018/08/24/how-iot-is-impacting-7-key-industries-today/?sh=21fd930c1a84> (concluding

so extend beyond financial impacts. For example, over-pricing SEPs means over-taxing—and therefore impeding—IoT efforts towards societal goals like improving public health and fighting climate change.¹² In light of these dangers, courts can no longer afford to overlook improprieties in SEP licensing.

This Article examines intra-industry SEP disputes between the telecommunication industry and IoT implementers to reveal flaws in how the patent system resolves SEP licensing issues. Part II of this Article summarizes the telecommunication industry's historical use of the exhaustion-avoidance licensing model in intra-industry SEP disputes and describes the telecommunication industry's efforts to extend this licensing model to automotive manufacturers and other IoT companies. Part III explains how these new cross-industry SEP disputes reveal policy failures in the exhaustion-avoidance licensing model that were never resolved during the era of intra-industry SEP disputes.

Part IV proposes that the nature of intra-industry SEP disputes and the existence of the FRAND commitment have masked flaws in the exhaustion-avoidance licensing model. In support of this position, Part IV analyzes how U.S. patent law would address application of the exhaustion-avoidance licensing model against IoT implementers in the absence of a FRAND commitment. This analysis exposes how the exhaustion-avoidance licensing model permits SEP owners to capture more value than they are otherwise entitled to receive under U.S. patent law. Part IV then explains how U.S. courts can use the patent apportionment and misuse doctrines to address the legal and policy flaws in the exhaustion-avoidance licensing model. By enforcing these two doctrines, courts can do what the FRAND commitment has failed to do thus far: bring SEP licensing practices closer to the plain meaning of “fair,” “reasonable,” and “non-discriminatory.”

that “every industry has the potential to reap the benefits from IoT”) (last visited Oct. 31, 2021); *see also infra* notes 70–72 and accompanying text (discussing anticipated growth in the IoT space).

¹⁰ For example, the telecommunications industry began targeting automakers just a few years after the government bailed out the automotive industry. *Compare* Brent Snavely, *Final Tally: Taxpayers Auto Bailout Loss \$9.3B*, USA TODAY (Dec. 30, 2014, 5:54 PM), <https://www.usatoday.com/story/money/cars/2014/12/30/auto-bailout-tarp-gm-chrysler/21061251/> (reporting in 2014 that U.S. government recovered \$70.42 billion of the \$79.68 billion it gave to the automakers beginning in 2009), *with* Press Release, Avanci, Avanci Launches One-Stop Licensing Platform to Accelerate Wireless Connectivity for the Internet of Things (Sept. 14, 2016), <https://www.avanci.com/2016/09/14/avanci-launches-one-stop-licensing-platform-accelerate-wireless-connectivity-internet-things/>.

¹¹ *See infra* notes 93–95 and accompanying text (discussing how SEP assertion threats loom over start-ups pursuing new IoT use cases).

¹² *See, e.g.*, Mohd Javaid & Ibrahim Haleem Khan, *Internet of Things (IoT) Enabled Healthcare Helps to Take the Challenges of COVID-19 Pandemic*, 11 J. ORAL BIOLOGY & CRANIOFACIAL RES. 209 (2021) (identifying seven ways IoT technologies can help fight the COVID-19 pandemic); ESMIG, STANDARD-ESSENTIAL PATENTS: A MAJOR CHALLENGE FOR THE SMART ENERGY INDUSTRY (2021), <https://www.esmig.eu/esmig-publications/position-paper-standard-essential-patents-a-major-challenge-for-the-smart-energy-industry/> (explaining how SEP assertions threaten the energy industry's ability to meet climate change goals).

Part V concludes by contemplating the future. Cross-industry IoT licensing reveals flaws in the exhaustion-avoidance licensing model that, once learned, cannot be unlearned. This revelation will force courts to choose between either enforcing apportion requirements against SEP licensors or allowing all patent owners to ignore apportionment—a decision that will inevitably change patent licensing forever.

II. FRAND, SEPs, and Other Eyechart Acronyms

Like traditional intra-industry FRAND disputes, the emerging new wave of cross-industry SEP assertions originates out of the telecommunications industry.¹³ Part II will review how years of intra-industry SEP assertions have led to this new era of cross-industry SEP disputes.

A. Overview of Cellular SEP Licensing

Worldwide cellular communication standards are established through the 3rd Generation Partnership Project (3GPP).¹⁴ The 3GPP is not a standard-setting organization (SSO), or even a recognized legal entity.¹⁵ Instead, 3GPP is the brand name for a collaborative activity between seven regional SSOs.¹⁶ Rather than produce standard specifications or manage SEPs directly, 3GPP delegates patent policy matters to the regional SSOs.¹⁷

The European Telecommunications Standard Institute (ETSI) is the most active regional SSO.¹⁸ Like other SSOs, ETSI is responsible for defining its own SEPs policy.¹⁹ Originally, ETSI pursued a compulsory licensing policy that would limit SEP monetization by standard-setting participants.²⁰ In an effort to placate a few large patent owners, however, ETSI ultimately adopted a “licensing by default system” that, among other compromises, allowed patent owners to exclude identified patents from licensing commitments.²¹ ETSI membership approved the “licensing

¹³ See David Arsego, *The Problem with FRAND: How the Licensing Commitments of Standard-Setting Organizations Result in the Misvaluing of Patents*, 41 BROOK. J. INT'L L. 257, 273 (2015) (noting that FRAND disputes were relatively rare before the smartphone wars); Kurgonaitė et al., *supra* note 5, at 137 (noting how telecommunication SEPs disputes are no longer confined to the telecommunications industry).

¹⁴ *About 3GPP*, 3GPP, <https://www.3gpp.org/about-3gpp/about-3gpp> (last visited Oct. 31, 2021).

¹⁵ *Legal Matters*, 3GPP, <https://www.3gpp.org/about-3gpp/legal-matters> (last visited Oct. 31, 2021).

¹⁶ *Id.*

¹⁷ *Call for IPR (Meetings)*, 3GPP, <https://www.3gpp.org/3gpp-calendar/89-call-for-ipr-meetings> (last visited Oct. 31, 2021) (informing companies that their obligations arise under the IPR policies of the regional SSOs).

¹⁸ Richard A. Epstein et al., *Why Incentives for “Patent Holdout” Threaten to Dismantle FRAND, and Why It Matters*, 32 BERKELEY TECH. L.J. 1381, 1395 (2017).

¹⁹ See generally ERIC J. IVERSEN, STANDARDIZATION AND INTELLECTUAL PROPERTY RIGHTS: ETSI'S CONTROVERSIAL SEARCH FOR NEW IPR-PROCEDURES, (IEEE 1999), https://eprints.utas.edu.au/1297/1/Iversen_ETSI_2002.pdf (chronicling the history of ETSI's efforts to define its own SEPs policy).

²⁰ *Id.* at 5.

²¹ *Id.* at 6. “The approach that was ultimately approved in 1993 moved considerably further towards

by default system” by an 88% majority vote.²²

Several large patent owners, however, revolted against the “licensing by default system” by threatening to leave ETSI, lodging a complaint at the European Commission, and lobbying U.S. lawmakers.²³ ETSI ultimately surrendered to the pressure and adopted the FRAND standard,²⁴ which is still in place today.²⁵

ETSI never actually defined what constitutes a FRAND license—outside the words that constitute the acronym.²⁶ Additionally, ETSI has never policed member activities to ensure compliance with the FRAND commitment.²⁷ Instead, ETSI merely expects members to act in “good faith” and relies on other members to use social pressure to ensure members license fairly.²⁸

ETSI permits members to monetize cellular communication standards by selling equipment that implement the standards *and* by licensing the patents required to practice the standards.²⁹ For example, processor companies (such as Qualcomm, Mediatek, and Intel) work with infrastructure companies (such as Ericsson, Huawei, and Alcatel-Lucent) to define the various cellular standards.³⁰ These companies then manufacture and sell processors and infrastructure equipment that embody the rele-

the IPR-holders’ interests.” *Id.* Under this approach, patent owners had 180 days to identify exempted patents. *Id.* The approach permitted patent owners to withhold identified patents “on an ‘unlimited’ basis, subject to procedural conditions.” *Id.*

²² *Id.*

²³ *Id.* (citing Complaint, *CBEMA v. ETSI*, No. IV-34.760 (Eur. Commission filed June 22, 1993)).

²⁴ *Id.* at 8.

²⁵ *Annex 6: ETSI Intellectual Property Rights Policy*, in ETSI RULES OF PROCEDURE 42, 42 (2021) [hereinafter *Annex 6*], <https://www.etsi.org/images/files/IPR/etsi-ipr-policy.pdf>.

²⁶ *Id.*; see also Arsego, *supra* note 13, at 269 (“As of now, ETSI gives no guidance as to what constitutes a FRAND licensing rate, other than the words that make up the acronym.”). Likewise, the Institute of Electrical Electronics Engineers (IEEE) and the International Telecommunication Union (ITU) also declined to define what constitutes FRAND terms and conditions. *Microsoft Corp. v. Motorola, Inc.*, No. C10-1823JLR, 2013 WL 2111217, at *10 (W.D. Wash. Apr. 25, 2013). IEEE is responsible for the 802.11 WiFi standard, and ITU is responsible for the H.264 video coding standard. *Id.* at *2.

²⁷ See Arsego, *supra* note 13, at 269 (highlighting ETSI’s general lack of involvement in its own SEP policy).

²⁸ See IVERSEN, *supra* note 19, at 8 (explaining how the ETSI policy actually allows members to refuse licensing their patents but that doing so would result in reputational harm and damaged relationships among ETSI members). This social enforcement mechanism, of course, does nothing to protect the interests of companies who are not ETSI members.

²⁹ In fact, ETSI’s patent policy may even encourage patent monetization and enforcement. See generally Jorge L. Contreras, *A Tale of Two Layers: Patents, Standardization, and the Internet*, 93 DENV. L. REV. 855 (2016) (showing how patent policies for telecommunications standards have led to more patent disputes than the patent policies for Internet standards, which tend to de-emphasize patent monetization).

³⁰ T. Andrew Culbert et al., *Licensing SEPs After FTC v Qualcomm*, IAM (Oct. 3, 2019), <https://www.iam-media.com/licensing-seps-after-ftc-v-qualcomm> (showing in Figure 1 how telecommunications industry participants at the “processors” and “infrastructure” level are responsible both for defining the relevant cellular standards and for selling equipment that implements the defined cellular standards).

vant cellular standards—as well as any required SEPs.³¹ The companies then monetize SEPs independently from their product sales and other commercial activities.³²

The processor companies and the infrastructure companies, however, do not license each other directly.³³ As explained below, they have developed an exhaustion-avoidance licensing model that targets downstream purchasers of the infrastructure equipment and processors.³⁴ In doing so, SEP owners have targeted what they perceive to be the most profitable tier in the cellular supply chain: companies who sell branded devices to end users.³⁵

Telecommunications companies adopted the exhaustion-avoidance licensing model to avoid patent exhaustion and minimize theoretical exposure to patent suits from upstream participants.³⁶ As Ericsson once explained, granting SEP licenses to chipset manufacturers would exhaust Ericsson’s patent rights against all downstream use of those chips by suppliers, manufacturers, and retailers.³⁷ Instead, by

³¹ *Id.*

³² *Id.* (describing how industry participants like Qualcomm and Ericsson assert SEPs against downstream consumers of processor and infrastructure technology).

³³ *Id.* (describing how industry participants refuse to provide exhaustive upstream licenses). One notable exception is that Qualcomm has granted licenses to Ericsson and Nokia in the past, but this exception can be explained by the fact that Ericsson and Nokia sell both handsets and infrastructure equipment. *See id.* (noting that Qualcomm once licensed its SEPs to Ericsson); Press Release, Qualcomm, Nokia and Qualcomm Enter Into a New Agreement (July 23, 2008), <https://www.qualcomm.com/news/releases/2008/07/23/nokia-and-qualcomm-enter-new-agreement> (announcing a license to Nokia under all Qualcomm’s patents for use in Nokia mobile devices and Nokia Siemens Network infrastructure equipment). Even in these agreements, the telecommunications companies remain committed to the exhaustion-avoidance licensing model. *See* John LeRoy, *Nokia’s U.S. Standard Essential Patents Are Exhausted Against Qualcomm Chipsets*, JDSUPRA (Dec. 23, 2019), <https://www.jdsupra.com/legalnews/nokia-s-u-s-standard-essential-patents-24654/> (noting how the license agreement between Qualcomm and Nokia includes a “‘Revocation Provision’ which purports to void Nokia’s covenants to Qualcomm if a court later finds exhaustion arising from the Agreement”).

³⁴ Culbert et al., *supra* note 30 (“These licensors have developed a model that maximises royalties by refusing to provide exhaustion upstream licenses.”).

³⁵ *Id.* (“As the licensing model developed, SEP owners recognised that licensing programmes which focused on manufacturers of branded devices resulted in substantially higher SEP royalties.”).

³⁶ *Id.* (“[T]he SEP owner licenses the product brand owner, minimising exhaustion and possible exposure to patent suits from upstream participants, while maximising licensing revenues.”); *see also* Kurgonaite et al., *supra* note 5, at 138 (noting how SEP owners are incentivized to license or enforce SEPs primarily at the end-product level of the supply chain to avoid patent exhaustion).

³⁷ THOMAS DANIEL, LICENSING 25–26 (2013) (presenting Ericsson’s theory that licensing the “Product Brand Owner” rather than the “Chipset Manufacturer” helps Ericsson avoid exhaustion and limit exposure to patent counter assertions) https://www.techylib.com/en/view/bottlelewd/ericssons_patent_activities_snitts, *cited in* Brief of Intel Corp. et al. as Amici Curiae Supporting Appellee at 10, *Microsoft Corp. v. Motorola, Inc.*, 795 F.3d 1024 (9th Cir. 2015) (No. 14-35393), Brief of Uber Technologies Inc. as Amicus Curiae Supporting No Party at 13, *Ericsson Inc. v. TCL Commc’n Tech. Holdings Ltd.*, 955 F.3d 1317 (Fed. Cir. 2020) (Nos. 18-1363, 18-1380, 18-1382, & 18-1732), and Ericsson explained publicly why it collects patent royalties from device (not chipset) makers, <http://www.fosspatents.com/2014/01/ericsson-explained-publicly-why-its.html> (Jan. 29, 2014).

choosing to grant SEP licenses only to product brand owners, Ericsson can argue that their patents are not exhausted against suppliers and manufacturers upstream of the end retailers.³⁸ Either way, this is a choice made by Ericsson and other SEP owners; there is no requirement, legal or otherwise, for SEP owners to focus exclusively on product brand owners.

Of course, the exhaustion-avoidance licensing model may not actually avoid patent exhaustion. Patent exhaustion occurs whenever a patent owner authorizes sale of an article that substantially embodies the patent owner's claimed invention.³⁹ First, industry-wide use of the license model arguably reflects an agreement among industry players to not assert SEPs against each other, thereby authorizing industry players to sell infringing equipment.⁴⁰ Second, even in the absence of an industry-wide agreement, individual SEP owners may have "authorized" sales by informing other industry players that they will not assert their SEPs against them.⁴¹ Third, many telecommunications SEP owners are members of Avanci, and membership in Avanci arguably creates patent exhaustion by requiring members to restrain from asserting SEPs against other Avanci members.⁴² Finally, individual SEP owners have agreements among themselves that may exhaust the patent rights of those parties.⁴³

³⁸ *Id.*

³⁹ *See, e.g.*, *Quanta Comput., Inc. v. LG Elecs., Inc.*, 553 U.S. 617, 625 (2008) ("The longstanding doctrine of patent exhaustion provides that the initial authorized sale of a patented item terminates all patent rights to that item."); *see also* 35 U.S.C. § 271(a) (2010) ("Except as otherwise provided in this title, whoever *without authority* makes, uses, offers to sell, or sells any patented invention, within the United States . . . infringes the patent." (emphasis added)).

⁴⁰ *Cf. Minebea Co. Ltd. v. Pabst*, 374 F.Supp.2d 202, 205–09 (D.D.C. 2005) (finding that, for purposes of patent exhaustion, "Minebea was clearly authorized" to sell motors by virtue of a covenant not to sue even though they were never licensed to the patents at issue).

⁴¹ *Cf. No License, No Chips, No Problem: Ninth Circuit Vacates Injunction in* *FTC v. Qualcomm*, CROWELL MORING (Aug. 21, 2020), <https://www.crowell.com/NewsEvents/AlertsNewsletters/all/No-License-No-Chips-No-Problem-Ninth-Circuit-Vacates-Injunction-in-FTC-v-Qualcomm> ("[Q]ualcomm allows rival chip manufacturers to use the patented technology without a license, as long as the rival chip manufacturers agree to only sell their chips to companies that have licensed the patents from Qualcomm."); Jorge Contreras, "No License, No Problem" – *Is Qualcomm's Ninth Circuit Antitrust Victory a Patent Exhaustion Defeat?*, PATENTLY-O, <https://patentlyo.com/patent/2020/09/qualcomms-antitrust-exhaustion.html> (Sept. 1, 2020) [hereinafter Contreras, Patently-O] ("[Q]ualcomm seems to have persuaded the Ninth Circuit that it effectively grants licenses to rival chip manufacturers."). Such authorization may also constitute an implied license or satisfy the elements of equitable estoppel. *See Wang Labs. v. Mitsubishi Elecs. Am.*, 103 F.3d 1571, 1581 (1997) ("The primary difference between the estoppel analysis in implied license cases and the analysis in equitable estoppel cases is that implied license looks for an affirmative grant of consent or permission to make, use, or sell: i.e., a license. Equitable estoppel, on the other hand, focuses on 'misleading' conduct suggesting that the patentee will not enforce patent rights." (citations omitted)).

⁴² *Cf. Cont'l Auto. Sys. v. Avanci, LLC*, No. 19-CV-02520-LHK, slip op. at 4 (N.D. Cal. Dec. 11, 2019) (summarizing Continental's argument that an express agreement among Avanci's members prohibits them from licensing upstream manufacturers, which would include other Avanci members).

⁴³ *See LeRoy, supra* note 33 (explaining how Nokia's patents are exhausted against products incorpo-

SEP owners have used the exhaustion-avoidance licensing model to extract more money from manufacturers than they would be able to recover from their suppliers.⁴⁴ As Ericsson explained back in 2010, “[o]ne big advantage with this [exhaustion-avoidance] strategy is also that it is likely that the royalty income will be higher since we calculate the royalty on a more expensive product.”⁴⁵ Or as Qualcomm’s trial counsel once explained, “licensing SEPs to device makers is ‘humbongously’ more lucrative than licensing them to chip makers.”⁴⁶

B. Cellular SEP Assertions Expand to Cross-Industry Licensing

More recently, telecommunications companies have started asserting SEPs against IoT implementers that operate outside the cellular arena. This effort unofficially began in 2016 when Ericsson, Qualcomm, InterDigital, and others joined forces to form Avanci, a licensing platform that aggregates 2G, 3G, and 4G SEPs into patent pools for licensing to IoT companies.⁴⁷ Avanci’s initial licensing efforts focused on connected cars and smart meters, with “plans to quickly expand to other IoT product areas.”⁴⁸

Avanci uses a modified version of the exhaustion-avoidance licensing model to target end devices. According to Avanci, “[r]oyalties will vary from one type of device to the next based on the value the technology brings to the device, not its sales price.”⁴⁹ In other words, Avanci believes that each specific use case should be priced differently.⁵⁰

Avanci has not announced license rates for all IoT use cases, despite promising “predictability, transparency, and simplicity” for IoT verticals.⁵¹ Instead, Avanci has only made license rates publicly available for one IoT use case: connected cars.⁵² Avanci licenses SEPs on a per vehicle basis ranging from three dollars to fifteen

rating Qualcomm chips due to the license agreement between Nokia and Qualcomm).

⁴⁴ Culbert et al., *supra* note 30 (suggesting that manufacturers of end devices are paying higher royalties due to the combination of (1) large device volumes, (2) significantly higher device prices than component prices, and (3) “the effect of patent exhaustion at various levels in the supply chain”).

⁴⁵ DANIELIND, *supra* note 37, at 26 (speaker’s notes).

⁴⁶ Contreras, *Patently-O*, *supra* note 41 (citing Fed. Trade Comm’n v. Qualcomm Inc., 411 F.Supp.3d 658, 754, 758, 796 (N.D. Cal. 2019)); *see also* Culbert et al., *supra* note 30 (“Qualcomm’s use of the end-user price of a handset as the royalty base for its SEP royalties was calculated to inflate royalties enormously and was unreasonable because modem chips provide only a small portion of the overall value of smartphones and tablets.”).

⁴⁷ Press Release, *supra* note 10.

⁴⁸ *Id.*

⁴⁹ *Enabling the IoT: Wireless Connectivity for the Internet of Things*, AVANCI, <https://www.avanci.com/marketplace/> (last visited Oct. 31, 2021) [hereinafter Avanci Marketplace].

⁵⁰ *But see infra* notes 207–229 and accompanying text (discussing why SEP owners are not entitled to capture the value of an implementer’s use case).

⁵¹ Avanci Marketplace, *supra* note 49.

⁵² *Id.*

dollars per vehicle.⁵³ The price varies depending on whether the vehicle is equipped for eCall only, for 3G communication, or for 4G communication.⁵⁴ Avanci has not announced its proposed license fees for 5G-equipped vehicles.⁵⁵

Avanci has never publicized how it determines royalty rates, claiming “there is no explicit formula.”⁵⁶ Instead, Avanci merely states that its prices “reflect the value cellular connectivity brings to a specific application” and are based on considerations such as “(1) the need for wide-area connectivity and mobility, (2) the amount of use, and (3) the required bandwidth.”⁵⁷ Although these three considerations are certainly important from a technical perspective, Avanci never explains why these considerations are relevant to valuation of a patent license. Avanci also references the “value of connectivity” repeatedly,⁵⁸ even though Avanci is not entitled to cap-

⁵³ *Id.* Avanci does not publicly release its licensing agreements, so it is not clear whether licensees are actually paying Avanci’s publicized license fees or whether licensees have successfully negotiated for different amounts.

⁵⁴ *Id.* Avanci does not explain why it chose these dollar values for the different standards.

⁵⁵ *Id.*

⁵⁶ *Accelerating IoT Connectivity*, AVANCI 7 (2020), <https://www.avanci.com/wp-content/uploads/2020/03/Avanci-White-Paper.pdf>. This statement from 2020 could ultimately doom Avanci’s automotive licensing program. The lack of an explicit formula makes it impossible for Avanci to meet its burden to provide evidence of apportionment. *See* *Garretson v. Clark*, 111 U.S. 120, 121 (1884) (explaining that the patentee has the burden of providing apportionment evidence in every case). At best, Avanci could create a new formula to justify its historical license rates. Courts should be skeptical of any new formula, however, for at least two reasons. First, an SEP licensor should not be able to use lawyer arguments to retroactively demonstrate apportionment when the SEP licensor admittedly did not aim for apportionment value when setting their license rates. *Compare, e.g., infra* note 58 (citing examples of where Avanci admitted that their licensing model claims the “value of connectivity”), *with infra* notes 223–229 and accompanying text (explaining why Avanci is not entitled to capture the “value of connectivity” under the apportionment doctrine). Second, any new formula must feature direct evidence of apportionment. Avanci cannot, for example, create a new formula based on past handset license agreements without providing direct evidence that each of the past license agreements respected apportionment. *See infra* notes 242–249 and accompanying text (discussing why patent owners who cite past license agreements must prove that those past license agreements respected apportionment).

⁵⁷ AVANCI, *supra* note 56, at 7.

⁵⁸ *See, e.g., id.*; Letter from Mark H. Hamer & Daniel S. Gaulich, Counsel for Avanci LLC, to Makan Delrahim, Assistant Att’y Gen., Antitrust Div., U.S. Dep’t of Justice 15 (Nov. 21, 2019) (“Therefore, the value of connectivity may vary significantly depending on the end product in question (e.g., a smart utility meter versus a Vehicle.”), <https://www.justice.gov/atr/page/file/1298631/download>; Press Release, Avanci, Ericsson, Qualcomm, Sony, Others Sign on With DFW Licensing Platform From Former Ericsson CIPO (Sept. 15, 2016), <https://www.avanci.com/2016/09/15/ericsson-qualcomm-sony-others-sign-dfw-licensing-platform-former-ericsson-cipo-2/> (“The value of connectivity in a smart meter or a trash can is different from the value of connectivity in a car.”); *see also* David Cohen, *Cars or Car-tels?*, JDSUPRA (June 21, 2021) (citing BOWMAN HEIDEN, *THE VALUE OF CONNECTIVITY IN THE AUTOMOTIVE SECTOR – A FIRST LOOK* 33 (2019)), <https://www.jdsupra.com/legalnews/carsor-car-tels-4751702/> (arguing that Avanci’s \$15 license fees for automobiles are “in reality a bargain” because “the value of connectivity” in the automotive sector is allegedly worth an average of \$593 in automaker revenue per vehicle).

ture this value under U.S. patent damages law.⁵⁹

Like SEP owners in intra-industry disputes, Avanci uses the exhaustion-avoidance licensing model to extract more money from IoT implementers than they would be able to recover from their suppliers.⁶⁰ For example, Continental is a Tier 1 supplier that sells telematic control units (TCUs) to original equipment manufacturers (OEMs).⁶¹ Each TCU includes a baseband processor providing 4G cellular connectivity.⁶² Avanci wants to charge OEMs \$15 for every vehicle with 4G connectivity.⁶³ According to Continental, however, the baseband processor that provides the cellular functionality only costs \$20, and the TCU only costs \$75.⁶⁴ As a practical matter, Avanci could never expect to recover 20% of TCU revenue or 75% of baseband processor revenue.⁶⁵ Instead, Avanci targets automotive OEMs, where Avanci's royalty rates appear to be substantially smaller when compared to automobile prices.

According to Continental, Avanci also maintains high royalty rates to prevent automotive suppliers from obtaining their own licenses, which would frustrate the exhaustion-avoidance licensing model.⁶⁶ If Avanci licensed automotive suppliers directly, then sales by automotive suppliers to OEMs would be fully exhausted.⁶⁷ To avoid this outcome, Avanci indicated to Continental that "it would only seek authorization from its members to license to Continental if Continental agreed in advance to pay the same rates Avanci demands from the car OEMs."⁶⁸ By requiring high license fees, Avanci can price suppliers out of the market, thereby enabling Avanci to target their licensing efforts solely against automotive OEMs and protect their exhaustion-avoidance licensing model.⁶⁹

Maintaining the exhaustion-avoidance licensing model for cross-industry SEP disputes could prove to be lucrative for SEP licensors like Avanci. The cellular IoT

⁵⁹ The "value of connectivity" is a proxy for the value of standardization, network effects, and other factors that SEP owners cannot include in their damage models. *See infra* notes 223–229 and accompanying text (explaining why SEP value cannot be calculated based on the value of connectivity).

⁶⁰ *See supra* notes 44–46 and accompanying text (discussing intra-industry disputes).

⁶¹ Steven Pepe et al., *Continental Automotive v. Avanci: Wireless SEP Licensing Presents Challenges for Automotive Industry*, ROPES & GRAY (June 4, 2019), <https://www.ropesgray.com/en/newsroom/alerts/2019/06/Continental-v-Avanci—Wireless-SEP-Licensing-Presents-Challenges-to-Automotive-Industry>.

⁶² *Id.*

⁶³ *Id.*

⁶⁴ *Id.*

⁶⁵ *See id.* (calculating Avanci's proposed royalty rates relative to the TCU and the baseband processor).

⁶⁶ *Cont'l Auto. Sys. v. Avanci, LLC*, No. 19-CV-02520-LHK, slip op. at 4 (N.D. Cal. Dec. 11, 2019).

⁶⁷ *Id.*

⁶⁸ *Id.* at 4–5.

⁶⁹ *Id.* at 4.

technology market is projected to grow considerably over the coming years.⁷⁰ According to Ericsson, this market growth will be “driven by new use cases.”⁷¹ Although the cellular SEPs themselves are not necessarily responsible for the growth in new use cases,⁷² SEP licensors can profit from this growth if they use the exhaustion-avoidance licensing model to inflate the licensing fee owed for each different use case.⁷³

⁷⁰ See, e.g., Gallego & Drexler, *supra* note 4, at 136 (noting that IoT could reach a level of \$4-11 trillion in global economic value by 2025) (citing MCKINSEY GLOBAL INSTITUTE, THE INTERNET OF THINGS: MAPPING THE VALUE BEYOND THE HYPE 4 (2015)); ERICSSON, ERICSSON MOBILITY REPORT 11 (2021), <https://www.ericsson.com/4a03c2/assets/local/mobility-report/documents/2021/june-2021-ericsson-mobility-report.pdf> (projecting that cellular IoT connections will grow at a compound annual growth rate of twenty-three percent).

⁷¹ See, e.g., *The Connected Future*, ERICSSON (Sep. 5, 2017), <https://www.ericsson.com/en/mobility-report/internet-of-things-forecast> [<https://web.archive.org/web/20170905123529/https://www.ericsson.com/en/mobility-report/internet-of-things-forecast>] (“Between 2016 and 2022, IoT devices are expected to increase at a CAGR of 21 percent, driven by new use cases.”); ERICSSON, ERICSSON MOBILITY REPORT 10 (2016), <https://web.archive.org/web/20211022132406/https://www.ericsson.com/assets/local/mobility-report/documents/2016/Ericsson-mobility-report-june-2016.pdf> (“IoT devices are expected to increase at a compounded annual growth rate (CAGR) of 23 percent from 2015 to 2021, driven by new use cases.”).

⁷² Factors other than the value contributed by cellular SEPs are fueling the growth in new IoT use cases. For example, advancements in sensor technology creates more opportunities for sensors to transmit cellular data. See *Sensor Market By Type*, ALLIED MARKET RESEARCH, <https://www.alliedmarketresearch.com/sensor-market> (last visited Oct. 31, 2021) (projecting “significant growth” for the global sensor technology market and identifying technical innovations expected to fuel that growth). In addition, improvements in artificial intelligence and machine learning means companies can extract more value out of data transmitted via an IoT communication unit. Cf. Press Release, IDC, IDC Forecasts Companies to Spend Almost \$342 Billion on AI Solutions in 2021 (Aug. 4, 2021), <https://www.idc.com/getdoc.jsp?containerId=prUS48127321> (anticipating worldwide revenues for AI technology to reach \$341.8 billion in 2021). Furthermore, expansion of the “sharing economy” means expensive devices like connected self-driving vehicles become more economically viable because the cost of the equipment can be spread across multiple users. Cf. PRICEWATERHOUSECOOPERS, THE SHARING ECONOMY 14 (2015), <https://www.pwc.com/us/en/technology/publications/assets/pwc-consumer-intelligence-series-the-sharing-economy.pdf> (projecting the sharing economy to grow to \$335 billion in 2025).

In the future, government mandates may further fuel IoT implementation. For example, SEP owners have lobbied governments to require cellular communication over other standards for use cases like vehicle-to-vehicle communications. See, e.g., Posting of Joe Madden to Fierce Wireless, <https://www.fiercewireless.com/tech/madden-dsrc-and-lte-v-will-split-market> (Jan. 3, 2017) (discussing the lobbying battle between the American automobile industry, which generally supports Dedicated Short-Range Communications (DSRC) technology for use in vehicle-to-vehicle communication, and the telecommunications industry, which “has been lobbying to use LTE for vehicle-to-vehicle communications instead of DSRC”).

⁷³ *But see infra* notes 207–229 and accompanying text (explaining why SEP owners are not entitled to capture the value of an implementer’s use case under U.S. damages law).

III. Cross-Industry SEP Disputes Expose Policy Failures Caused by the Exhaustion-Avoidance Licensing Model

An SEP owner's ability to exploit the exhaustion-avoidance licensing model for inflated profits was already an issue in intra-industry disputes. The issue is more pronounced in cross-industry disputes, however, due to differences in supply chain integration across industries. Consider, for example, the handset and automotive industries. In the handset example, the handset manufacturer may buy cellular communication equipment (baseband processors) directly from the chip manufacturer.⁷⁴ In this example, there are no suppliers or sales between the baseband processor and the end product (the handset).

In the automotive industry, however, mid-level suppliers exist between the chip manufacturer and the end product (the automobile). The automotive supply chain for cellular communications equipment notionally includes three tiers. First, a "Tier 3" supplier provides the baseband processor to a "Tier 2" supplier.⁷⁵ The Tier 2 supplier then incorporates the baseband processor into a "network access device" (NAD).⁷⁶ Next, the Tier 2 supplier sells the NAD to a "Tier 1" supplier, who incorporates the NAD into a "telematics control unit" (TCU).⁷⁷ The Tier 1 supplier then provides the TCU to the OEM, who incorporates the TCU into the automobile.⁷⁸ Notably, the baseband processor is responsible for enabling cellular communications,⁷⁹ whereas the downstream equipment is responsible for other functions and features outside the scope of cellular standards.⁸⁰

⁷⁴ See, e.g., Ryan Smith, *Apple and Qualcomm Bury the Hatchet; Sign New Patent and Chip Supply Agreements*, ANANDTECH (Apr. 16, 2019, 9:10 PM), <https://www.anandtech.com/show/14230/apple-and-qualcomm-bury-the-hatchet-sign-new-patent-and-chip-supply-agreements> (describing an agreement that allowed Apple to "resume buying chips from Qualcomm").

⁷⁵ Pepe et al., *supra* note 61.

⁷⁶ *Id.*; see also *French industrial conglomerate Thales suing Avanci and Nokia in Munich over alleged antitrust violations by refusing to grant component-level patent licenses*, FOSS PATENTS (Oct. 14, 2021), <http://www.fosspatents.com/2021/10/french-industrial-conglomerate-thales.html> [hereinafter *Thales Article*] (discussing a recent action in Munich by Thales, a Tier 2 supplier of TCUs).

⁷⁷ Pepe et al., *supra* note 61; *Thales Article*, *supra* note 76.

⁷⁸ Pepe et al., *supra* note 61; *Thales Article*, *supra* note 76.

⁷⁹ 3GPP defines the "Mobile Termination" (MT) as the element within the user equipment that "performs the radio transmission and related functions." 3RD GENERATION PARTNERSHIP PROJECT, TECH. STANDARD No. 23.101, TECHNICAL SPECIFICATION GROUP SERVICES AND SYSTEM ASPECTS, GENERAL UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM (UMTS) ARCHITECTURE 8 (rel. 16, 2020), <https://www.3gpp.org/DynaReport/23101.htm>. The MT communicates with "Terminal Equipment" (TE), which is responsible for running end-to-end applications on the user equipment. *Id.* The TE itself does not contain any functions specific to cellular communication. *What is Mobile Station?*, DIALOGIC, <https://www.dialogic.com/glossary/mobile-station-ms> (last visited Apr. 3, 2022). On a handset, the MT is implemented by a baseband processor. *Id.* The baseband processor includes the antenna, the transceiver, and any other equipment required to perform radio transmission. *Baseband Processing*, SCIENCE DIRECT (2018), <https://www.sciencedirect.com/topics/engineering/baseband-processing>.

⁸⁰ See, e.g., *Network Access Device*, CONTINENTAL AUTOMOTIVE, <https://www.continental->

Thus, unlike the handset example, the automobile example features two obvious component levels between the baseband processor and the end product: the NAD and the TCU. In addition, each component level has an identifiable sales price and profit margin. As will be explained in this Part III, this new fact pattern makes policy issues with the exhaustion-avoidance licensing model more apparent.

A. Vertical Discrimination

The exhaustion-avoidance licensing model causes vertical discrimination by encouraging licensors to pick winners and losers among different tiers in the automotive supply chain. For example, Avanci's licensing program exclusively targets OEMs.⁸¹ By exclusively targeting OEMs, Avanci's licensing model allows automotive suppliers to build infringing equipment for free but requires OEMs to pay all licensing costs.

Theoretically, IoT suppliers should be thankful that Avanci would rather license OEMs directly and allow suppliers to continue manufacturing TCUs without a license. However, despite Avanci's efforts to pick automotive suppliers as the winners and OEMs as the losers, the real-life outcome is complicated by pre-existing indemnification agreements.

The exhaustion-avoidance licensing model reached the automotive industry well after the automotive industry built out its multi-tiered supply chain.⁸² By the time SEP owners started targeting the automotive industry, automotive suppliers like Continental had already agreed to indemnify their OEM customers against infringement allegations.⁸³ Unsurprisingly, automakers are now using their indemnifi-

automotive.com/en-gl/Passenger-Cars/Vehicle-Networking/5G-Connectivity-Solutions/Network-Access-Device (last visited Oct. 31, 2021) (providing an overview of Continental's NAD unit, which can enable communications across multiple communication protocols); *Telematics Control Units*, CONTINENTAL AUTOMOTIVE, <https://www.continental-automotive.com/en-gl/Passenger-Cars/Vehicle-Networking/5G-Connectivity-Solutions/Telematics-Control-Units> (last visited Oct. 31, 2021) (describing TCUs from Continental that incorporate Continental's NAD as well as other diagnostics and on-board applications); *see also What is a Telematics Control Unit & How It Works?*, CAR BIKE TECH. (July 23, 2021), <https://carbiketech.com/telematics-control-unit/> (discussing how the TCU includes non-cellular equipment such as a satellite navigation unit and equipment for interfacing with the vehicle CAN-BUS network).

⁸¹ *See, e.g.*, Avanci Marketplace, *supra* note 49 (identifying 16 OEM licensees and no supplier licensees).

⁸² *Compare* Press Release, Avanci, Avanci Announces Pricing for Auto Sector – Range from \$3 to \$15 per car (Dec. 14, 2017), www.avanci.com/2017/12/14/avanci-announces-pricing-auto-sector-range-3-15-per-car-2/ (announcing in 2017 Avanci's proposed licensing model), *with* Press Release, Continental, Continental LTE Telematics Module for High-Speed Data Access Worldwide (Mar. 27, 2014), www.prnewswire.com/news-releases/continental-lte-telematics-module-for-high-speed-data-access-worldwide-252641461.html (announcing in 2014 that Continental's newest TCU supported 4G LTE communication).

⁸³ *Cont'l Auto. Sys. v. Avanci, LLC*, No. 19-CV-02520-LHK, slip op. at 5 (N.D. Cal. Dec. 11, 2019) (summarizing allegations from Continental that they owe indemnification obligations to OEM customers); *see also* Culbert et al., *supra* note 30 (explaining how upstream component suppliers may be necessary parties in any SEP disputes due to their indemnification obligations); Letter from

cation rights to push licensing expenses back up the supply chain.⁸⁴

Thanks to these indemnification obligations, suppliers are the ultimate losers under Avanci's licensing scheme. If Avanci recovers its license fees against the automotive OEMs and the automotive OEMs use their indemnification rights to push these expenses onto their suppliers, then automotive suppliers will end up paying significantly more in license fees than they would have paid had Avanci licensed the suppliers directly. Thus far, Avanci has refused to adjust its licensing model to avoid such an unfair outcome; instead, Avanci maintains that it will not license suppliers like Continental unless the suppliers agree to pay the higher royalty rates Avanci charges OEMs.⁸⁵

B. Horizontal Discrimination

During oral arguments in *TCL v. Ericsson*, the appellate panel asked two important questions related to horizontal discrimination. First, Judge Chen asked, "Why is it reasonable if one company is paying a quarter and another company is paying \$4 for the exact same thing?"⁸⁶ Likewise, Judge Hughes asked whether the court should apply "a flat dollar fee versus a royalty rate that varies based upon the price of the phone."⁸⁷

Although *TCL v. Ericsson* was an intra-industry SEP dispute between an infrastructure company and handset manufacturer, the questions posed by Judge Chen and Judge Hughes are even more relevant to cross-industry disputes. In intra-industry disputes, SEP owners use the exhaustion-avoidance licensing model to require different handset manufacturers to pay different license fees for the same licenses.⁸⁸ In cross-industry SEP disputes, SEP owners use the same exhaustion-

Makan Delrahim, Assistant Att'y Gen., U.S. Dep't of Justice, Antitrust Div., to Mark H. Hamer, Baker & McKenzie (July 28, 2020), www.justice.gov/atr/page/file/1298626/download ("The Department understands, based on our investigation, that vehicle manufacturers are often indemnified by their suppliers for intellectual property infringement and that suppliers in the automotive industry typically take a license to any intellectual property necessary to produce a particular component.").

⁸⁴ See, e.g., Eric Stasik, *Nokia-Daimler SEP Licensing Stand-Off Shows Why Auto Supplier Indemnification is Crucial*, IAM, May 12, 2021 ("Since Nokia began its licensing campaign in the automotive industry, and continuing through the present, Continental has faced numerous customer demands for indemnity based on the assertion and licensing of Nokia's patents, including demands that Continental reimburse the customer for royalties paid pursuant to a pool license which includes Nokia's patents.").

⁸⁵ *Cont'l Auto. Sys.*, No. 19-CV-02520-LHK at 4–5.

⁸⁶ Britain Eakin, *Fed. Cir. Befuddled in Hearing on Ericsson IP License Rates*, LAW 360 (Aug. 7, 2019), <https://www.law360.com/articles/1185452/fed-circ-befuddled-in-hearing-on-ericsson-ip-license-rates>.

⁸⁷ *Id.*

⁸⁸ See, e.g., Curtis Dodd & Chris Dubuc, *FRAND Royalty Base Statements and Cellular Wireless Standard Essential Patents (Part III)*, IPWATCHDOG (Nov. 17, 2020), <https://www.ipwatchdog.com/2020/11/17/frand-royalty-base-statements-and-cellular-wireless-standard-essential-patents-part-iii/id=127397/> (noting how large SEP asserters like InterDigital and

avoidance licensing model to charge automotive OEMs entirely different license fees than they charge handset manufacturers.⁸⁹ Likewise, licensors like Avanci expect other IoT implementers to pay different licensing fees than both automotive OEMs and handset manufacturers.⁹⁰

If left unchecked, every industry will pay different license fees for the same licenses to the same patents. Rather than paying license fees based on the value of the underlying inventions, each industry will pay the maximum potential royalty rate that industry can sustain. In this way, SEP licensing acts as a success tax: the more successful the use case, the more licensees will pay for the same licenses to the same patents.

At the other end of the spectrum, some industries may not pay any license fees. For example, some industries will be too small to justify a licensing campaign.⁹¹ Other industries will evoke too much sympathy to license.⁹² Although these industries would be licensed if SEP owners simply licensed chip manufacturers at the top of the value chain and allowed exhaustion to apply to downstream sales, the exhaustion-avoidance licensing model precludes this outcome, encouraging discrimination across industries that is otherwise avoidable.

Today, a start-up pursuing a new use case cannot predict whether it will be a winner or a loser under the exhaustion-avoidance licensing model. First, the start-up has no way of knowing whether it will be a licensing target in the future. The start-up also cannot project or model its potential licensing exposure because SEP own-

Nokia determine different license rates for different end devices without explaining “how their per unit rates vary from one end user product to the next, instead opting to post rates for handsets along with some language about being flexible to ‘accommodate the needs and circumstances of individual ‘licensees[.]’”).

⁸⁹ Compare Avanci Marketplace, *supra* note 49 (summarizing Avanci’s tiered pricing structure for automakers), with Dodd & Dubuc, *supra* note 88 (discussing the disparate and unpublished license fees SEP owners use for handset manufacturers).

⁹⁰ For example, Avanci’s public pricing structure only applies to automobiles, not to smart sensors. Avanci Marketplace, *supra* note 49.

⁹¹ Varying license fees based on use case increases the administrative cost of licensing a new use case. For example, licensors need to study the new use case and the industry where that use case exists to set license rates. The licensors will then need to approach each company in that industry to begin license negotiations. If a licensor wishes to license a new use case using the exhaustion-avoidance licensing model, then the licensor will have to dedicate resources and staffing to focus on that new use case. If the target industry is too small, however, then the use case may not be worth this administrative cost.

⁹² For example, SEP owners with strong public reputations might not feel comfortable asserting patents against companies that make cellular-connected home alarm systems or medical devices because juries may side with the companies that protect and save lives. Of course, other patent owners are more comfortable ignoring optics and asserting patents against sympathetic defendants. See, e.g., Complaint at 62, Labrador Diagnostics LLC v. Biofire Diagnostics, LLC et al., No. 20-348 (D. Del. Mar. 9, 2020) (seeking an injunction against defendant’s manufacturing of COVID-19 tests based on allegations that the tests infringe two patents that were originally issued to Theranos and that list Elizabeth Holmes as the first-named inventor).

ers do not publish their fee structures or formulae for new use cases.⁹³ Instead, the start-up must begin using the standardized technology and then wait years for an SEP licensor to decide how much the start-up's use case is worth.⁹⁴ Meanwhile, the licensor suffers little to no penalty for waiting to start license discussions, allowing the licensor to delay price negotiations until the optimal moment.⁹⁵ When the SEP licensor finally approaches the start-up, the start-up will be in the same situation automotive suppliers face today: grappling with unexpected license costs that were not priced into its business model.

C. Imbalance of Bargaining Power

Licensors like Avanci are deploying the license-exhaustion avoidance model in cross-industry disputes to intentionally target those companies least-equipped to mount a strong defense. SEP cases are significantly more complex than non-SEP cases,⁹⁶ and automotive OEMs and other IoT implementers outside the telecommunications industry do not have the necessary experience or technical knowledge to contest patent assertions related to cellular communication standards.⁹⁷ From a technical perspective, automotive OEMs are several tiers removed from the baseband processor and are not equipped to scrutinize whether the asserted patents are truly essential, valid, and infringed.⁹⁸ Automotive OEMs also typically lack experi-

⁹³ See, e.g., AVANCI, *supra* note 56, at 7 (claiming instead there is “no explicit formula” for how they set their royalty rates).

⁹⁴ Although years of free infringement might sound appealing to start-ups, the delay can be quite damaging. First, if the start-up is targeted, the start-up will need to pay the SEP owner back for the years of “free” infringement, assuming laches does not apply. Also, the delay may lead to the start-up dealing with patent assertions at inopportune times, such as during a fundraising round. See, e.g., Darrell Etherington, *Twitter Acquires Over 900 IBM Patents Following Infringement Claim, Enters Cross-Licensing Agreement*, TECHCRUNCH (Jan. 31, 2014), <https://techcrunch.com/2014/01/31/twitter-acquires-ibm-patents/> (reporting on how IBM targeted companies like Twitter as they prepared to go public). Furthermore, the delay prevents the start-up from establishing its cost structure prior to scaling its business; if, for example, the start-up knew the full cost of standard adoption in advance, the start-up might have pivoted to a different business model.

⁹⁵ See Douglas Lichtman, *Understanding the RAND Commitment*, 47 HOUS. L. REV. 1023, 1026 (2010) (“My main point is that participating firms are attempting to delay price negotiation, but in a way that does not distort that negotiation when it ultimately does take place.”).

⁹⁶ Mark A. Lemley & Timothy Simcoe, *How Essential Are Standard-Essential Patents?*, 104 CORNELL L. REV. 607, 623 (2019).

⁹⁷ See Erik R. Puknys et al., *Strategic Considerations for the Escalating SEP Battles*, FINNEGAN (June 29, 2020), <https://www.finnegan.com/en/insights/articles/strategic-considerations-for-the-escalating-sep-battles.html> (“Lack of a coherent essentiality test and specificity in SEP declarations require both technical and legal expertise to determine whether a patent is truly essential.”); see also Samuel F. Ernst, *Patent Exhaustion for the Exhausted Defendant*, 2014 U. ILL. J. OF L., TECH., & POL’Y 445, 476 (2014) (“Because the downstream purchasers did not design the accused technology, they do not possess the technical information to effectively defend against the patents.”).

⁹⁸ See *supra* notes 75–80 (describing the levels of separation between the OEM and the Tier 3 supplier); see also Gallego & Drexler, *supra* note 4, at 152 (“The informational needs of standard implementers are greater the less acquainted they are with the relevant technologies.”); cf. Gaia Bern-

ence with SEP licensing generally, with the FRAND standard specifically, and with how such topics have evolved within the past two decades of intra-industry disputes.⁹⁹

Not only do automotive OEMs lack the necessary experience or knowledge to grapple with SEP assertions, but OEMs have few options for acquiring such experience and knowledge. Companies cannot necessarily rely on outside counsel and experts to cure these deficiencies because company management and in-house counsel are ultimately responsible for strategic decision making. In addition, SEP monetization efforts are often covered by non-disclosure agreements, and the resulting licenses are typically kept confidential.¹⁰⁰ Thus, companies often must negotiate without knowledge of past SEP licensing positions, tactics, terms, royalty structures, and fee amounts.¹⁰¹ Even if the licensor shares some of this information, the licensee has no way of confirming whether the provided materials are cherry-picked or whether the past deals represent the actual value of the licensed patents.¹⁰²

In addition, licensees in cross-industry patent disputes cannot reduce their financial exposure by leveraging their own patent portfolio. In an intra-industry patent dispute between a licensee and a practicing entity,¹⁰³ the negotiation is analogous to buying a new car.¹⁰⁴ In a car purchase, the purchaser can reduce the net purchase price for a new car by offering to trade in a used car and receive a trade-in allowance towards the sales price.¹⁰⁵ In an intra-industry patent dispute between two companies operating in the cellular arena, the licensee may be able to “trade in” its

stein, *The Rise of the End User in Patent Litigation*, 55 B.C. L. REV. 1443, 1463–64 (2014) (“[End users] lack of technological sophistication puts them at a significant disadvantage in patent conflicts.”).

⁹⁹ See Puknys et al., *supra* note 97 (“That problem becomes more difficult when one side is a relative newcomer to SEP/FRAND licensing. For instance, an auto or medical device manufacturer will generally lack the FRAND licensing experience of a smartphone maker.”).

¹⁰⁰ See Gallego & Drexler, *supra* note 4, at 145 (“Even where patent owners have already granted licenses to third parties, the royalty rates agreed upon will rarely be known to the public due to non-disclosure obligations.”).

¹⁰¹ See BRIAN J. LOVE ET AL., DO STANDARD-ESSENTIAL PATENT OWNERS BEHAVE OPPORTUNISTICALLY? EVIDENCE FROM U.S. DISTRICT COURT DOCKETS 1 (2020), https://www.tse-fr.eu/sites/default/files/TSE/documents/doc/wp/2020/wp_tse_1160.pdf (“As private contracts, virtually all deals are negotiated in secret and thereafter rarely come to light. Consequently, data on SEP licensing positions and tactics, proposed and agreed upon terms, and royalty structures and amounts are dispersed among myriad companies that are generally obligated to keep what they know confidential.”).

¹⁰² In all likelihood, the past license deals do not reflect the true value of the patents being licensed. See *infra* notes 245–250 and accompanying text (discussing how license agreements tend to reflect negotiation leverage and human factors, not the actual value of the licensed patents).

¹⁰³ Of course, most SEP assertions come from non-practicing entities, who are impervious to counter-assertions. See Lemley & Simcoe, *supra* note 96, at 621 (reporting that non-practicing entities are responsible for over 70% of the SEP assertions included in their study).

¹⁰⁴ Gregory Sidak, *How Licensing Standard-Essential Patents Is Like Buying a Car*, WIPO MAG., June 2015, https://www.wipo.int/wipo_magazine/en/2015/03/article_0003.html.

¹⁰⁵ *Id.*

own patents by seeking a cross-license agreement with the licensor.¹⁰⁶ By licensing its own patents back to the licensor, the licensee can reduce the net royalty amount owed to the licensor.¹⁰⁷

Licensees in cross-industry patent disputes, however, typically cannot use this negotiation technique against practicing SEP owners. For example, although automakers do own large patent portfolios, automakers are unlikely to own patents that read on telecommunications infrastructure, baseband processors, or other equipment manufactured and sold by the SEP licensor.¹⁰⁸ As a result, automakers lack the necessary patents to counter assert against SEP licensors. Instead, Tier 2 and Tier 3 suppliers are more likely to own these patents.¹⁰⁹ By avoiding licensing Tier 2 and Tier 3 suppliers, SEP licensors can prey on those companies least capable of defending themselves with their own patent portfolio.

IV. Analyzing the Exhaustion-Avoidance Licensing Model

The FRAND commitment *should* address the flaws described in Part III. For example, the non-discrimination element of FRAND should prohibit licensors from discriminating between different supply chain tiers (vertical discrimination) and between industries (horizontal discrimination). Likewise, the fairness element should require SEP owners to make licenses to everyone without delay. In particular, “fairness” should require SEP owners to license Tier 3 suppliers first rather than targeting downstream customers of their products.¹¹⁰

Instead, SEP owners have weaponized the FRAND commitment to insulate discrimination and unfair licensing practices. As explained in Part II, patent owners forced ETSI to adopt the FRAND commitment without defining what the FRAND commitment means.¹¹¹ This ambiguity allows SEP owners today to argue what FRAND *is not* without ever saying what FRAND actually *is*. With each argument, the FRAND commitment moves further away from the plain meaning of the words “fair,” “reasonable,” and “non-discriminatory.”¹¹² As the FRAND commitment

¹⁰⁶ *Id.*

¹⁰⁷ *Id.*

¹⁰⁸ *Qualcomm proposes non-solution to automotive component-level patent licensing conflict: only courts can provide much-needed clarity now*, FOSS PATENTS, (Oct. 22, 2020) <http://www.fosspatents.com/2020/10/qualcomm-proposes-non-solution-to.html> (noting that companies higher in the supply chain are more likely than automakers and Tier 1 suppliers to hold patents relevant to cellular technologies).

¹⁰⁹ *Id.*

¹¹⁰ *Cf. Aro Mfg. Co. v. Convertible Top Replacement Co.*, 377 U.S. 476, 523–24 (1964) (Black, J., dissenting) (“Fairness would require that if recovery can be had from the chief wrongdoer, here Ford, the first obligation of the injured person is to try to hold Ford completely responsible.”); *id.* at 524 (“I can think of nothing much more unfair than to visit the infringement sins of a large manufacturer upon the thousands of ultimate purchasers who buy or use its goods.”).

¹¹¹ *See supra* notes 19–28 and accompanying text.

¹¹² *See, e.g., Continental Automotive Sys., Inc., v. Avanci, L.L.C.*, No. 20-CV-11032, slip op. at 11 (5th Cir. Feb. 28, 2022) (concluding the FRAND commitment does not apply to mid-tier compo-

erodes, companies become free to act as if the FRAND commitment does not place any material restrictions on their licensing activities.¹¹³

Years of erosion have left the FRAND commitment mostly hollow—superficially existing on paper but without much meaning or potency. Today, the FRAND commitment’s nominal existence allows SEP owners to justify their licensing activities as being FRAND-compliant without their activities necessarily being fair, reasonable, and non-discriminatory.¹¹⁴ SEP owners enjoy the façade of legitimacy and relative lack of scrutiny afforded to them by the nominal FRAND commitment,¹¹⁵ even though the FRAND commitment offers little protection to standard implementers.¹¹⁶

ment suppliers who practice the standard because they are not intended beneficiaries under the FRAND commitment); *HTC Corp. v. Telefonaktiebolaget LM Ericsson*, 12 F.4th 476, 484–85 (5th Cir. 2021) (asserting that the FRAND commitment does not require SEP owners to comply with apportionment or other patent law principles because the FRAND commitment is a matter of French contract law, not U.S. patent law); *In re Certain Wireless Devices With 3G Capabilities and Components Thereof*, Inv. No. 337-TA-800, USITC Pub. 4475 (Dec. 13, 2013) (Final) (asserting that the FRAND non-discrimination requirement “does not require uniform treatment across licensees”); ERICSSON, *OPEN STANDARDS: TOGETHER WE INNOVATE 6* (2019), <https://www.ericsson.com/en/reports-and-papers/white-papers/open-standards-together-we-innovate> (arguing that the FRAND commitment does not prohibit SEP owners from seeking and obtaining injunctions that would prohibit companies from implementing standards); *In re Certain Elec. Devices, Including Wireless Commc’n Devices, Portable Music & Data Processing Devices, & Tablet Computs.*, Inv. No. 337-TA-794 (I.T.C. July 5, 2013) [hereinafter *Commission Opinion (public version)*] (arguing that the FRAND commitment does not require SEP owners to make initial licensing offers on FRAND terms because the FRAND obligation only attaches to final license agreements); Anne Layne-Farrar & Richard J. Stark, *FRAND Does Not Mean License-to-All in the US*, IAM (Sept. 28, 2020), https://media.crai.com/wp-content/uploads/2020/11/20092612/FRAND-does-not-mean-license-to-all-in-the-US_-IAM.pdf (arguing that the FRAND commitment does not require SEP owners to offer licenses to all companies who request a license).

¹¹³ For example, over-declaration of SEPs has been a rampant problem for years. *See, e.g.*, Jason R. Bartlett & Jorge L. Contreras, *Rationalizing FRAND Royalties: Can Interpleader Save the Internet of Things?*, 36 REV. LITIG. 285, 301 (2017) (citing various studies finding that less than half of the patent families declared “essential” to ETSI’s 2G, 3G, and 4G wireless standards were, in fact, essential); *see also* Lemley & Simcoe, *supra* note 96, at 628–32 (suggesting that over-declaration of SEPs may help explain why “[w]hen SEPs are asserted in court, most of them turn out not to be infringed”). Admittedly, SEP owners may be motivated to over-declare since failing to disclose essential patents might lead to liability for the SEP owner. Bartlett & Contreras, *supra*, at 301. Over-declaring SEPs, however, results in encumbering patents with a FRAND commitment that otherwise would not be encumbered. If SEP owners believed that the FRAND commitment meaningfully restricts an SEP owner’s ability to assert and monetize SEPs, then one would expect SEP owners to avoid over-declaration wherever possible.

¹¹⁴ *E.g.*, Avanci Marketplace, *supra* note 49 (touting Avanci’s commitment to license SEPs on FRAND terms).

¹¹⁵ *See, e.g.*, Letter from Makan Delrahim, Assistant Att’y Gen., U.S. Dep’t of Justice, Antitrust Div., to Mark H. Hamer, Baker & McKenzie, *supra* note 83, at 20 (blessing Avanci’s patent licensing pool, in part, because Avanci has publicly committed to licensing on FRAND terms).

¹¹⁶ The biggest benefit to implementers might be increasing the likelihood of protection against U.S. injunctions. *See Apple Inc. v. Motorola, Inc.*, 869 F.Supp.2d 901, 914 (N.D. Ill. June 22, 2012) (refusing to enjoin Apple because, “[b]y committing to license its patents on FRAND terms, Motorola

Even if a court were to suddenly define and enforce FRAND's plain meaning, historical FRAND violations would continue to infect new SEP disputes. Specifically, courts rely heavily on comparable licenses when setting royalty rates, often without evidence that the prior licenses complied with FRAND or U.S. damages law.¹¹⁷ These past license agreements rarely reflect the actual value of the patented technology.¹¹⁸ This is especially true in the SEPs context, as the FRAND commit-

committed to license the [patent] to anyone willing to pay a FRAND royalty and thus implicitly acknowledged that a royalty is adequate compensation for a license to use that patent"). Of course, this benefit has limited value since plaintiffs in the U.S. are unlikely to obtain an injunction against non-competitors even in the absence of a FRAND commitment. *Cf.* Christopher B. Seaman, *Permanent Injunctions in Patent Litigation After eBay: An Empirical Study*, 101 IOWA L. REV. 1949, 1990 (2016) (reporting that competitors have an 84% chance of receiving a requested permanent injunction, whereas courts granted permanent injunctions to companies who were not market competitors in only 21% of cases).

¹¹⁷ *See, e.g.*, *Commonwealth Sci. & Indus. Rsch. Org. v. Cisco Sys., Inc.*, 809 F.3d 1295, 1303 (Fed. Cir. 2015) (assuming, without evidence, that prior license negotiations complied with apportionment requirements on the belief that the parties "negotiated over the value of the asserted patent, 'and no more'" (quoting *Ericsson, Inc. v. D-Link Sys., Inc.*, 773 F.3d 1201, 1226 (2014))). Likewise, courts in non-SEP cases also heavily rely on comparable licenses when setting reasonable royalty rates. *See* Jonathan S. Masur, *The Use and Misuse of Patent Licenses*, 110 NW. U. L. REV. 115, 120 (2015) ("Courts have relied upon existing licenses in calculating damages for decades, and the practice has grown even more prominent in recent years."). This practice became popular after Judge Tenney identified the existence of an established royalty for the patent in question as the first of the fifteen so-called *Georgia-Pacific* factors. *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970), *mod. and aff'd*, 446 F.2d 295 (2d Cir. 1971); *see also* *Tektronix, Inc. v. U.S.*, 552 F.2d 343, 347 (Ct. Cl. 1977) ("Where an established royalty rate for the patented inventions is shown to exist, that rate will usually be adopted as the best measure of reasonable and entire compensation."), opinion modified on denial of reh'g, 557 F.2d 265 (Ct. Cl. 1977).

This approach fully bled into SEPs disputes after Judge Robart translated the *Georgia-Pacific* factors for use in SEPs cases. *See* *Microsoft Corp. v. Motorola, Inc.*, No. C10-1823JLR, 2013 WL 2111217, at *3, 16–20 (W.D. Wash. Apr. 25, 2013) (analyzing each *Georgia Pacific* factor to determine whether and how each applies to SEP disputes). Judge Robart, however, merely required that "the past royalty rates for a patent . . . be negotiated under the RAND obligation or a comparable negotiation." *Id.* at *18. Prior licenses meet this standard simply if "the parties clearly understood the RAND obligation," *id.*, regardless of whether the actual license terms are FRAND. If a licensor forced a past licensee to accept license terms that are not FRAND-compliant, cases like *Microsoft v. Motorola* allow the licensor to reuse the past license to force subsequent licensees to also accept license terms that are not FRAND-compliant. As a result, SEP owners are motivated to game license settlements to set up future profits. *See, e.g.*, Erik Hovenkamp, *Tying, Exclusivity, and Standard-Essential Patents*, 19 COLUM. SCI. & TECH. L. REV. 79, 110–11 (2017) (explaining how an SEP owner can require a licensee to accept a high upfront royalty rate that is significantly above the FRAND level, offer rebate payments to lower the *effective* royalty closer to the FRAND level for that licensee, and then use the high upfront royalty rate as the established royalty rate for future SEP enforcement actions against other licensees).

¹¹⁸ *See* David O. Taylor, *Using Reasonable Royalties to Value Patented Technology*, 49 GA. L. REV. 79, 130–31 (2014) (discussing how negotiated license agreements deviate from the value of the patented technology); *see also* *infra* notes 245–250 and accompanying text (discussing how license agreements tend to reflect negotiation leverage and human factors, not the actual value of the licensed patents).

ment does not necessarily require SEP owners to make initial license offers that comply with FRAND¹¹⁹ or offers that respect U.S. law on patent damages.¹²⁰ Unless courts stop using past license agreements to set new royalty rates, past mistakes will continue to haunt future SEP disputes.

Rather than prevent discrimination and unfair licensing practices, the FRAND commitment encourages this behavior by distracting from other legal inquiries.¹²¹ Although compliance with FRAND has no bearing on whether the SEP licensing model complies with prevailing law,¹²² the modern focus on FRAND has effectively preempted discussion of other legal issues raised by the exhaustion-avoidance licensing model.

To demonstrate this point, Part IV will address how current U.S. law applies to

¹¹⁹ See, e.g., Commission Opinion (public version), *supra* note 112, at 60 (rejecting arguments that the FRAND commitment requires SEP owners to make initial licensing offers on FRAND terms on the grounds that the FRAND obligation only attaches to final license agreements). *But see* Case C-170/13, *Huawei Techs. Co. Ltd. v. ZTE Corp.*, 2015 E.C.R. 477 (requiring an SEP owner to make an initial written offer on FRAND terms if the alleged infringer has expressed a willingness to take a license on FRAND terms). Of course, there is also no mechanism to confirm that the final terms of a license agreement signed out of court actually comply with the FRAND commitment.

¹²⁰ See *HTC Corp.*, 12 F.4th 476 at 484–85 (holding that the FRAND commitment did not require Ericsson’s license offer to comply with apportionment or other patent law principles on the grounds that the FRAND commitment is a matter of French contract law, not U.S. patent law). The *HTC* decision, however, may be an outlier. Unlike typical SEP cases, the district court in this case never created a license or set a FRAND rate. *Id.* at 483. Rather, the dispute focused solely on whether the parties breached FRAND or negotiated in bad faith. *Id.* at 482–83. According to the Fifth Circuit, this procedural quirk allowed the district court to ignore U.S. patent law because the case only involved breach-of-contract claims. *Id.* at 484–85. *But see id.* at 492 (Higginson, J., concurring) (explaining how the procedural quirk is irrelevant because “a jury assessing patent infringement undertakes the same task of assessing whether an offered rate is FRAND”). In more typical SEP disputes subject to U.S. patent law, courts should recognize that SEP owners breach the “fair” element of FRAND when they demand more compensation from licensees than permitted under prevailing patent law. See *id.* at 491 (Higginson, J., concurring) (noting that U.S. apportionment requirements “are rooted in practical fairness considerations”).

¹²¹ See, e.g., Jorge Padilla & Koren W. Wong-Ervin, *Portfolio Licensing to Makers of Downstream End-User Devices: Analyzing Refusals to License FRAND-Assured Standard-Essential Patents at the Component Level*, 62 ANTITRUST BULL. 494, 497 (2017) (analyzing the FRAND commitment and antitrust law and then concluding, without any apportionment or other patent damages analysis, that “there is no justification, as a matter of either law or economics, to intervene against the decision of a[n] SEP holder to refuse licensing patents to component manufacturers when it does not assert its patents at the component level *and* licenses its portfolio to end-device manufacturers on FRAND terms irrespective of where they source their components”).

¹²² Failure to comply with the FRAND commitment is not sufficient to establish an antitrust violation. *Cont’l Auto. Sys. v. Avanci, LLC*, No. 19-CV-02933-M, slip op. at 21 (5th Cir. Sept. 10, 2020) (holding that “[i]t is not anticompetitive for an SEP holder to violate its FRAND obligations”). The reverse must also be true. Compliance with FRAND commitment—whatever that actually means—does not prove that SEP owners lack monopoly power or are not acting anticompetitively. Cf. ROGER G. BROOKS & DAMIEN GERADIN, INTERPRETING AND ENFORCING THE VOLUNTARY FRAND COMMITMENT 8 (2010), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1645878 (noting that organizations like ETSI did not adopt the FRAND standard for the purpose of ensuring compliance with EU competition law).

SEP assertions against IoT companies in the absence of a FRAND commitment. Subpart A applies U.S. precedent on patent apportionment to the exhaustion-avoidance licensing model. Subpart B proposes patent misuse as a recommended remedy for the apportionment violations identified in Subpart A. Subpart C explains how enforcing U.S. law on patent apportionment would achieve what the FRAND commitment has failed to do: address the policy failures described in Part III.

A. Exhaustion Avoidance or Apportionment Avoidance?

1. *The Smallest Salable Patent-Practicing Unit*

One cannot analyze how U.S. law would apply to the exhaustion-avoidance licensing model in the absence of a FRAND commitment without discussing another controversial acronym: SSPPU, which stands for the “smallest salable patent-practicing unit.” Although often mislabeled as a valuation method¹²³ or a legal doctrine,¹²⁴ the SSPPU itself is merely what the name suggests: a unit or component of a device—or the device itself. Contrary to some characterizations, the SSPPU is not a theory,¹²⁵ rather, the SSPPU is an item that exists in the real world.

In fact, a real-world SSPPU exists in every infringement case. If an article infringes a patent, then that article must contain, or itself constitute, a smallest-salable unit that practices the claimed invention. Although some may disagree over what constitutes the SSPPU, they cannot deny the existence of an SSPPU where infringement exists.

Conveniently, identifying the SSPPU in an SEP dispute does not necessarily require an analysis of each individual patent. For a patent to qualify as an SEP, infringement of the patent must be technically required in order to implement part of the applicable standard.¹²⁶ Conversely, if the standard does not require infringement of the patent, then the patent does not qualify as an SEP and therefore falls outside

¹²³ See, e.g., Axel Gautier & Nicolas Petit, *The Smallest Salable Patent Practicing Unit and Component Licensing: Why \$1 is Not \$1*, 15 J. COMPETITION L. & ECON. 690 (2019) (describing the SSPPU as a “valuation method”).

¹²⁴ See, e.g., Mark Snyder, *SSPPU: A Tool for Avoiding Jury Confusion*, 17 SEDONA CONF. J. 373 (2016) (describing the SSPPU as a “tool”); Jonathan Putnam, ‘*Smallest Saleable Patent Practicing Unit*’ Doctrine: Development and Challenges, IAM (Oct. 12, 2017), <https://www.iam-media.com/litigation/smallest-saleable-patent-practising-unit-doctrine-developments-and-challenges> (describing the SSPPU as a “doctrine”).

¹²⁵ See, e.g., Richard J. Stark, *Debunking the Smallest Salable Unit Theory*, COMPETITION POL’Y INT’L 2, 7–8 (2015), https://www.cravath.com/a/web/529/3550382_1.pdf (describing the SSPPU as a “theory” that “plainly cannot apply in portfolio licensing of SEPs” because, among other reasons, asserted portfolios typically include both SEPs and non-SEPs). *But see infra* note 127 (discussing how tying non-SEPs to SEPs in a patent dispute may be improper).

¹²⁶ See *Annex 6, supra* note 25, at 47 (defining “essential” under the ETSI patent policy as meaning “that it is not possible on technical (but not commercial) grounds . . . to make, sell, lease, otherwise dispose of, repair, use or operate EQUIPMENT or METHODS which comply with a STANDARD without infringing” the patent).

the scope of the SEP dispute.¹²⁷ Accordingly, the SSPPU can be identified simply by referring to the technical requirements of the applicable standard.

In the IoT context, it is not even necessary to identify the SSPPU with specificity to understand how the SSPPU impacts the patent damages inquiry. In the automotive supply chain example, one must merely agree that the car itself is not the SSPPU. This point should be uncontroversial, as relevant cellular communications standards do not require automotive components that exist outside the TCU.¹²⁸

If an automobile does not have any equipment or features required for compliance with the applicable standard—other than equipment or features contained within the TCU—then the SSPPU must exist at a higher tier in the supply chain, anywhere from the Tier 1 supplier all the way up to the baseband processor manufacturer. If the SSPPU exists somewhere within the TCU, then any feature or function found outside the TCU cannot infringe any SEPs.

2. *The Apportionment Doctrine*

A patentee seeking damages on a product that includes both patented and un-

¹²⁷ This Article assumes that SEP licensing assertions only include SEPs. To the extent that an SEP owner wants to tie its SEPs to non-SEPs in an effort to maximize its overall licensing revenue, that activity may also qualify as patent misuse if the SEP licensors are overcharging licensees for SEP licenses but shifting this overcharge to non-SEPs tied to the SEPs in the license. *See* 35 U.S.C. § 271(d)(5) (2010) (allowing patent misuse to apply to such tying scenarios if, “in view of the circumstances, the patent owner has market power in the relevant market for the patent or patented product on which the license or sale is conditioned”); *see also* Gallego & Drexler, *supra* note 4, at 142 (“[I]t is not the standard essentiality of a patent, but the ‘market essentiality’ of a standard which is crucial to conclude that an SEP owner holds a dominant position.”); Erik Hovenkamp, *Tying, Exclusivity, and Standard-Essential Patents*, 19 COLUM. SCI. & TECH. L. REV. 79, 102–103 (2017) (explaining how firms can evade price regulation by tying unregulated components to its price-controlled goods and requiring customers to buy them as a pair); A. Douglas Melamed & Carl Shapiro, *How Antitrust Law Can Make FRAND Commitments More Effective*, 127 YALE L.J. 2110, 2127 (2018) (suggesting that tying SEPs to non-SEPs in an effort to obtain more than a “reasonable” royalty for the SEPs may violate Section 1 of the Sherman Act). *But see* *Princo Corp. v. Int’l Trade Comm’n*, 616 F.3d 1318, 1325 (Fed. Cir. 2010) (en banc) (noting that “while grouping patents together in package licenses has anticompetitive potential, it ‘also has potential to create substantial procompetitive efficiencies’ such as clearing possible blocking patents, integrating complementary technology, and avoiding litigation”); *Saint Lawrence Commc’ns LLC v. Motorola Mobility LLC*, No. 2:15-CV-351-JRG, slip op. at 20–21 (E.D. Tex. Feb. 15, 2018) (declining to find patent misuse where, in the court’s opinion, Motorola failed to show that the potentially anticompetitive harms outweighed the potential benefits of the SEP owner’s licensing practices).

¹²⁸ *See supra* notes 78–79 and accompanying text (discussing what equipment is responsible for cellular communications). To the extent that the cellular standards or any SEPs recite any elements that exist outside the TCU, recitation of such elements does not automatically mean that the automobile is the SSPPU. Rather, the SSPPU is the smallest salable infringing unit “with close relation to the claimed invention.” *Cornell Univ. v. Hewlett-Packard Co.*, 609 F.Supp.2d 279, 283, 287–88 (N.D.N.Y. 2009), *quoted in* *LaserDynamics, Inc. v. Quanta Comput., Inc.*, 694 F.3d 51, 67 (Fed. Cir. 2012). The mere fact that a cellular standard or SEP claim recites an element existing in the automobile does not mean that the element has a close relation to the claimed invention in a cellular SEP. To hold otherwise would mean that a human being would have a “close relation” to a software invention merely because the claim recites existence of a user.

patented features must “apportion damages only to the patented features.”¹²⁹ The Supreme Court first recognized this “general rule”¹³⁰ in *Garretson v. Clark*, stating that the patentee must provide apportionment evidence in “every case.”¹³¹ This rule ensures that the patentee receives compensation for the “value of what was taken”¹³² without allowing the patentee to overreach and capture value outside asserted patents.¹³³

The apportionment rule applies to all patents, not just SEPs.¹³⁴ In SEP cases, however, the apportionment rule can be particularly instructive. Return to the example of the Tier 1 supplier who sells a TCU containing the SSPPU to an automotive OEM. First, any features found outside the TCU do not infringe any SEPs.¹³⁵ Second, the apportionment rule requires that the patentee apportion out the value of any non-infringing features (e.g., any features outside the SSPPU).¹³⁶ Therefore, any features or value added by the OEM outside the TCU must be apportioned out.

Judge Holderman reached a similar conclusion when analyzing SEPs essential to 802.11 wireless network standards. In the case *In re Innovatio IP Ventures, LLC Patent Litigation*, the patent owner, Innovatio, asserted twenty-three patents against various companies—coffee shops, hotels, restaurants, supermarkets, and such—because these companies used Wi-Fi equipment in their businesses.¹³⁷ In response, several Wi-Fi equipment manufacturers filed declaratory judgment actions against Innovatio.¹³⁸ In an effort to expedite a settlement, the parties agreed to pause claim construction and asked the court to evaluate the potential damages available to In-

¹²⁹ *Power Integrations, Inc. v. Fairchild Semiconductor Int’l, Inc.*, 904 F.3d 965, 970 (Fed. Cir. 2018) (quoting *VirnetX, Inc. v. Cisco Sys., Inc.*, 767 F.3d 1308, 1329 (Fed. Cir. 2014)).

¹³⁰ *Id.*

¹³¹ *Garretson v. Clark*, 111 U.S. 120, 121 (1884). The Supreme Court carved out a narrow exception for cases where the patentee can prove that the total-market-value rule applies. *Id.*; see also *LaserDynamics*, 694 F.3d at 67 (“The entire market value rule is a narrow exception to this general [apportionment] rule.”). The total-market-value rule is not discussed here since it would strain credibility to argue that the entire market value of a car is legally attributable back to the cellular communication technology.

¹³² *Power Integrations*, 904 F.3d at 977 (“As a substantive matter, it is the ‘value of what was taken’ that measures a ‘reasonable royalty’ under 35 U.S.C. § 284.” (quoting *D-Link*, 773 F.3d at 1226)); *D-Link*, 773 F.3d at 1233 (“In other words, the patent holder should only be compensated for the approximate incremental benefit derived from his invention.”).

¹³³ *VirnetX*, 767 F.3d at 1326 (“These strict requirements limiting the entire market value exception ensure that a reasonable royalty ‘does not overreach and encompass components not covered by the patent.’” (quoting *LaserDynamics*, 694 F.3d at 70)).

¹³⁴ *D-Link*, 773 F.3d at 1232 (citing *Garretson*, 111 U.S. at 121) (“As with all patents, the royalty rate for SEPs must be apportioned to the value of the patented invention.”).

¹³⁵ See *supra* note 128 and accompanying text.

¹³⁶ Apportioning out value outside the SSPPU is only the first step in this analysis. If the SSPPU includes both infringing and non-infringing features, the patentee “must do more to estimate what portion of the product is attributable to the patented technology.” *VirnetX*, 767 F.3d at 1328–29.

¹³⁷ *In re Innovatio IP Ventures, LLC Patent Litig. (Innovatio)*, No. 11 C 9308, slip op. at 1 (N.D. Ill. Oct. 3, 2013).

¹³⁸ *Id.*

novatio if the patents were found to be valid and infringed.¹³⁹

Innovatio argued that the court should calculate royalties as a percentage of the selling price of the end products that incorporated Wi-Fi functionality: laptops, tablets, printers, routers, and similar equipment.¹⁴⁰ According to Judge Holderman, however, Innovatio failed to present a credible method to apportion its damages down to the value of Innovatio's patented features.¹⁴¹ Instead, Judge Holderman concluded that royalties must be calculated relative to the value of the SSPPU, which in this case was the Wi-Fi chip.¹⁴² Next, the court embraced a "top down" royalty calculation that started with the average price of a Wi-Fi chip and the average profit earned from sales of a Wi-Fi chip.¹⁴³ Notably, this approach put the Wi-Fi equipment manufacturers in the same financial position as the Wi-Fi chip manufacturers. The "top down" royalty calculation focused entirely on Innovatio's relative contribution to Wi-Fi chip sales without referencing end product sales or capturing the value of features outside the 802.11 standard.¹⁴⁴ This approach effectively capped the Wi-Fi equipment manufacturer's patent exposure at the Wi-Fi chip manufacturer's patent exposure, thereby apportioning out the value of all the non-infringing features added by the Wi-Fi equipment manufacturer.

Importantly, Judge Holderman reached this conclusion without directly relying on the FRAND commitment. Instead, Judge Holderman noted that the "top down" approach, which complied with the apportionment rule, had the "advantage" of also complying with FRAND's non-discrimination element.¹⁴⁵ Specifically, Judge

¹³⁹ *Id.*

¹⁴⁰ *Id.*, slip op. at 12.

¹⁴¹ *Id.*, slip op. at 14.

¹⁴² *Id.*, slip op. at 14.

¹⁴³ *Id.*, slip op. at 37–38. *But see* Commonwealth Sci. & Indus. Rsch. Org. v. Cisco Sys., Inc. (CSIRO), No. 11-CV-00343-LED, slip op. at 22 (E.D. Tex. July 23, 2014), vacated and remanded, 809 F.3d 1295 (Fed. Cir. 2015). At the district court in *CSIRO*, Judge Leonard Davis disagreed with starting the royalty calculation with the chip price. According to the district court, "[t]he 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." *CSIRO*, slip op. at 22 (E.D. Tex. July 23, 2014). The district court reasoned that "[b]asing 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." *Id.*

Judge Davis's analogy is flawed, however, for at least two reasons. First, his analogy confuses sales price of a device with the device's cost of materials. Second, baseband processors do not fit his analogy. Judge Davis correctly states that a book's material costs does not reflect the true market value of the book itself. Wireless chip prices, however, *do* capture the actual market value of the wireless chips. Companies buy baseband processors for the function they provide (enabling enable cellular communications), not for their raw material value. The chip prices thus reflect how the market values connectivity, the technology that enables such connectivity, and the innovations implemented by such technology.

¹⁴⁴ *Innovatio*, No. 11 C 9308, slip op. at 38–39 ("The method requires verifiable data points, such as the number of 802.11 standard-essential patents, the average price of a chip, and the average profit of a chip manufacturer, as inputs.").

¹⁴⁵ *Id.*, slip op. at 38.

Holderman noted that a FRAND licensor “cannot discriminate between licensees on the basis of their position in the market.”¹⁴⁶ In order to comply with this FRAND commitment, the FRAND rate “the court determines here should be the same [F]RAND rate that Innovatio could charge to chip manufacturers on its patent portfolio.”¹⁴⁷ By applying the apportionment doctrine to put the downstream SSPPU customer in the same position as the SSPPU maker, Judge Holderman achieved an outcome that also satisfied the FRAND commitment.

Likewise, an automotive OEM who buys a TCU from a Tier 1 supplier must have the same license exposure as the SSPPU manufacturer, whether that be the Tier 1 supplier or an upstream manufacturer. Not only does apportionment law compel such a result, but the outcome is consistent with other key patent law principles.

First, if patent damages law compensates inventors for the “value of what was taken,”¹⁴⁸ then courts should not allow SEP owners to capture additional value based on events occurring after the “taking,” such as when a downstream recipient incorporates what was taken into a larger product.¹⁴⁹ Likewise, if the “benefit of the patent lies in the idea,”¹⁵⁰ then courts should hold that value constant everywhere along the supply chain since the idea itself is the same at each supply chain level.

Second, the outcome is consistent with the Supreme Court’s patent exhaustion doctrine.¹⁵¹ If, for example, the patent owner licensed the Tier 1 supplier instead of the OEM, the result for the patent owner would be the same—the patent owner would recover the same amount from the Tier 1 supplier as would have been recov-

¹⁴⁶ *Id.*

¹⁴⁷ *Id.*

¹⁴⁸ *Power Integrations*, 904 F.3d at 977 (“As a substantive matter, it is the ‘value of what was taken’ that measures a ‘reasonable royalty’ under 35 U.S.C. § 284.” (quoting *D-Link*, 773 F.3d at 1226)).

¹⁴⁹ To this end, courts calculate patent license value from the time of first infringement, which necessarily ignores events occurring after the “taking.” See, e.g., *Georgia-Pacific*, 318 F.Supp. at 1120 (describing hypothetical negotiations as being set “at the time the infringement began”).

¹⁵⁰ *Commonwealth Sci. & Indus. Rsch. Org. v. Cisco Sys., Inc. (CSIRO)*, No. 11-CV-00343-LED, slip op. at 22 (E.D. Tex. July 23, 2014), vacated and remanded, 809 F.3d 1295 (Fed. Cir. 2015) (“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.”). Although Judge Davis was trying to substantiate his position that the court should base royalty calculations off the end device rather than the baseband processor, his larger point about the benefit of the patent applies equally to both end devices and baseband processors. The mere fact that different devices are made of different materials and have different costs is irrelevant to the value of the idea, which exists without physical manifestation and does not change between devices. Thus, if courts want to accurately value the benefit of the patent, then courts should embrace valuation methods that value the idea independent of the value of the idea’s physical manifestation, which would necessarily result in the value of the idea being constant across all physical manifestations. Such approaches would help ensure compliance with apportionment law by preventing the value of the physical manifestation from creeping into the valuation of the patented idea.

¹⁵¹ See, e.g., *Quanta Comput., Inc. v. LG Elecs., Inc.*, 553 U.S. 617, 638 (2008) (“The authorized sale of an article that substantially embodies a patent exhausts the patent holder’s rights and prevents the patent holder from invoking patent law to control postsale use of the article.”).

ered from the OEM, and the patent owner's rights would be exhausted against the OEM's use of the infringing product. The outcome also ensures consistency with *Aro Manufacturing*, which prohibits patent owners from collecting more aggregate damages from customers than could be recovered from the supplier.¹⁵²

Finally, although Judge Holderman used apportionment law and an SSPPU analysis in *Innovatio* to determine the proper royalty base for a hypothetical patent license negotiation, a thoughtful analysis of the "hypothetical negotiation" framework alone should have yielded the same result. Consider, for example, a hypothetical negotiation where the parties truly "negotiated over the value of the asserted patent, 'and no more,'"¹⁵³ free from outside leverage and other influences that distort patent valuation.¹⁵⁴ In this example, a commercially-reasonable licensee would treat licensed SEPs more like commoditized goods.¹⁵⁵ No reasonable buyer would willingly pay more than the value of the commoditized goods or share product sales revenue with the seller in order to buy goods that do not drive consumer demand.¹⁵⁶ Likewise, a commercially reasonable seller would not expect to receive such compensation for commoditized goods.¹⁵⁷ Even if the Supreme Court did not require patent owners to apportion value between the patented and unpatented features, commercially reasonable parties to a hypothetical negotiation over the true value of a patent license would have done so anyway.

3. Alternatives to Referencing the SSPPU

Judicial reliance on the SSPPU is a controversial subject. Rather than engage in the subject and help courts identify the applicable SSPPU, advocates for SEP owners tend to argue that there is no SSPPU¹⁵⁸ or that the SSPPU should be ig-

¹⁵² See Daniel Harris Brean, *Ending Unreasonable Royalties: Why Nominal Damages are Adequate to Compensate Patent Assertion Entities for Infringement*, 39 VERMONT L. REV. 867, 907 (2015) ("For example, if ten users of a technology product were sued and the reasonable royalty value of a license to the vendor would be \$100,000, *Aro* would suggest that the proper measure of damages might be \$10,000 for each end user." (citing *Aro Mfg. Co. v. Convertible Top Replacement Co.*, 377 U.S. 476, 507, 509–10 (1964)).

¹⁵³ *CSIRO*, 809 F.3d at 1303 (quoting *D-Link*, 773 F.3d at 1226).

¹⁵⁴ See *infra* note 242 (discussing how SEP owners use outside leverage to obtain license fees higher than the value of the licensed patents).

¹⁵⁵ See *infra* note 217 (explaining how standardized technology is a commoditized good).

¹⁵⁶ See *infra* notes 163–166 and accompanying text (explaining why SEPs do not drive consumer demand).

¹⁵⁷ The exception, of course, is price gouging. In a price gouging scenario, the seller takes advantage of leverage against the buyer to charge exorbitant prices for commoditized goods. Examples of such leverage might include natural disasters creating demand spikes or supply chain shortages limiting inventory. In the SEPs context, patent owners may use the threat of litigation and injunctions in an effort to compel licensees to pay more than the value of the patents at issue. See *infra* notes 242–249 and accompanying text.

¹⁵⁸ See, e.g., JONATHAN D. PUTNAM & TIM WILLIAMS, *THE SMALLEST SALABLE PATENT-PRACTICING UNIT (SSPPU): THEORY AND EVIDENCE* 43 (2016) (available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2835617) (asserting that "there is no single 'unit' reliably could be considered 'patent-practicing'"). This paper's approach is flawed for at least two reasons. First, their analysis is based on a sample of patents that Ericsson declared as es-

nored.¹⁵⁹ The SSPPU must exist, however, in order for infringement to exist.¹⁶⁰ As for ignoring the SSPPU, although an SSPPU analysis is not technically required in order to calculate a reasonable royalty, courts must still require patent owners to apportion their damages “in every case.”¹⁶¹ Today, analyzing the SSPPU remains the best available technique for confirming that a damages theory complies with the apportionment doctrine.¹⁶²

Alternatives to analyzing the SSPPU typically fail because the proposals themselves do not respect apportionment or because the proposals are worse at ensuring compliance with apportionment law than analyzing the SSPPU. This section ad-

sential to ETSI. *Id.* at 35–38. The authors, however, never actually verified that the patents were essential. Shockingly, they skipped this step even though over declaration of SEPs has been a rampant problem for years. *See supra* note 113. There is little reason to think that the SEPs analyzed in the study were all actually SEPs.

Second, the paper uses a word search instead of analyzing the claims. The authors would like the reader to believe, for example, that many SEPs are directed to an application processor. *See* PUTNAM & WILLIAMS at 42 (providing statistics on how frequently the words “baseband processor” and “application processor” appeared together in the claims). Assuming any of the referenced patents actually qualify as essential, casual recitation of elements outside the baseband processor does not change the SSPPU analysis. *See supra* note 128 (explaining how the SSPPU only includes equipment and features that have a “close relation” to the licensed SEPs). Just because claims might reference the existence of an application processor is irrelevant to whether the baseband processor actually implements the claimed invention. *Cf. Quanta Comput.*, 553 U.S. at 632 (concluding that “[e]verything inventive about each patent is embodied in the Intel Products” even though the Intel Products did not include every element of the claims).

¹⁵⁹ *See, e.g.,* David Kappos & Paul R. Michel, *The Smallest Salable Patent-Practicing Unit: Observations on Its Origins, Development, and Future*, 32 BERKLEY TECH. L.J. 1433, 1448–49 (2017) (arguing that the SSPPU is not useful for valuating large and diverse portfolios); *id.* at 1449 (“Importing SSPPU into the standards context is also problematic [because] FRAND negotiations often involve large and diverse portfolios of patents, and, again, the SSPPU concept cannot be applied in such cases.”). Of course, by definition, SEP portfolios are not diverse portfolios. Rather, SEP portfolios consist only of patents that are essential to the standard at issue. Although an SEP portfolio directed to a networking standard may read on multiple SSPPUs because networking standards necessarily involve multiple roles coming together to form the network (e.g., baseband processors and infrastructure equipment), each standard implementer only fulfills one of these roles. As a result, only one SSPPU within an SEP portfolio ends up being relevant since the standard implementer does not infringe any claims directed towards the other roles.

¹⁶⁰ Some have argued that the baseband processor does not infringe until it is combined with other elements in the communication network. *See, e.g.,* CUBICIBUC, SSPPU, <https://www.cubicibuc.com/ssppu> (last accessed Oct. 31, 2021) (“A baseband chip alone cannot practice any patents, but it is capable of doing so when integrated into a wider system.”). If that were true, however, then SEP assertions would fail due to divided infringement. *See Akamai Techs., Inc. v. Limelight Networks, Inc.*, 797 F.3d 1020 (Fed. Cir. 2015) (requiring that a single accused infringer direct or control performance of all steps of a claim or form a joint enterprise with other actors that perform all claim steps).

¹⁶¹ *Garretson*, 111 U.S. at 121.

¹⁶² *Cf. Brief of Uber Technologies Inc. as Amicus Curiae Supporting No Party, supra* note 37, at 16 (“Although application of the SSPPU approach can be effective in many cases, the SSPPU is not a magic talisman that somehow determines the value of the patented contribution. Instead, the power of the SSPPU lies in what it teaches about inappropriate valuation methods.”).

dresses two such proposals: (1) expanding the entire-market value rule (EMVR) and (2) using hedonic regression to isolate feature value.

The first proposal, from Anne Layne-Farrar, contemplates extending the EMVR to situations where multiple features serve as the “basis of demand.”¹⁶³ If, for example, three features (A, B, and C) drive consumer demand equally, then a damages expert could rely on the end-product price by applying “an appropriate apportionment percentage (say 33%, reflecting that feature C is one of three features in the product driving consumer demand).”¹⁶⁴ The proposal fails, however, for at least two reasons.

First, the proposal does not apply to SEPs because SEPs do not drive consumer demand. Although tolerable as a theoretical concept, Layne-Farrar’s example assumes—but cites no evidence supporting—a real-world application where the SEPs and related technologies embodied by the chip drive consumer demand. For Layne-Farrar’s example to be relevant, a reader would need to believe that consumers buy phones for their antennae, packet-switching, or other patented technology—without that technology being capable of interoperating with a standardized network. Instead, Layne-Farrar appears to be confusing the value of SEPs with the value of connectivity,¹⁶⁵ even though SEP owners are not entitled to capture the value of connectivity.¹⁶⁶ Without supporting evidence that SEPs *independently* drive consumer demand, Layne-Farrar’s proposal is irrelevant to actual SEP disputes.

Second, Layne-Farrar treats the requirement to apportion value between patented and non-patented features as an obligation to merely apportion value between patented and “other-patented” features.¹⁶⁷ As a result, her example 33% apportionment percentage (for a device having three “features” that drive value) for the royalty base in her hypothetical damages case¹⁶⁸ would vastly overstate the value of a patent’s contribution by failing to apportion out the value contributed by things that fall outside the realm of patents. Consider, for example, an iPhone and a Blackberry that both feature 4G LTE connectivity. The reasons why Apple sells more 4G LTE phones at higher prices have nothing to do with the chips, connectivity, or SEPs. Rather, Apple has achieved consumer success by, for example, maintaining an excellent brand, fostering an ecosystem of users and app providers, building an advanced supply chain, and implementing a hybrid retail strategy consisting of online

¹⁶³ Anne Layne-Farrar, *The Patent Damages Gap: An Economist’s Review of U.S. Statutory Patent Damages Apportionment Rules*, 26 TEX. INTELL. PROP. L.J. 31, 49 (2018).

¹⁶⁴ *Id.*

¹⁶⁵ *See id.* at 39 (“RF functionality is physically implemented on a semiconductor chip within a smartphone, but technically unrelated features within that phone can have enhanced value because of innovations in radio-enabled connectivity, and radio-enabled connectivity can enjoy enhanced value resulting from the presence of those features.”).

¹⁶⁶ *See infra* notes 223–229 and accompanying text (distinguishing between the “value of connectivity” and the value of SEPs).

¹⁶⁷ Layne-Farrar, *supra* note 163, at 31.

¹⁶⁸ *See id.* at 49.

sales, Apple Stores, and sales through cellular network providers. These value generators are completely missed in a framework that focuses solely on apportioning value between technical features. If Layne-Farrar extended her proposed framework to apportion out value generators outside the scope of the patent system (and then adjusted the framework for the fact that drivers of consumer demand do not deserve equal weight), she would find a financial outcome closer to the royalty amount suggested by an SSPPU analysis.

The second proposal, from Gregory Sidak and Jeremy Skog, uses hedonic models in an effort to identify the value of a patented feature.¹⁶⁹ This approach attempts to identify a patent's value "by comparing the prices and features among similar products to determine the specific contribution of the patented technology to the overall value of the infringing product, thus revealing the value that the patent adds to the price that consumers actually pay for the infringing product."¹⁷⁰ This proposal, however, fails for at least three reasons.

First, as Sidak and Skog explained, "the theory of hedonic prices posits that consumers select goods based on their characteristics."¹⁷¹ Furthermore, the theory "assumes that consumers know the features of the product they are purchasing and that the quality of the measurement of those features is accurate."¹⁷² These assumptions, however, do not apply to SEP disputes because SEPs do not drive consumer demand.¹⁷³ Thus, the hedonic theory does not apply to SEP disputes—or any other patent disputes where the patented invention does not drive consumer demand.

Second, the Federal Circuit requires SEP owners to "differentiate the added benefit [of the innovation] from any *value the innovation gains* because it has become standard essential."¹⁷⁴ Although Sidak and Skog cite this Federal Circuit test,¹⁷⁵ he does not actually separate the value of the invention from the value the innovation gains from standardization.¹⁷⁶ Instead, they replaced the Federal Circuit's "value the innovation gains" test with their own alternative, focusing instead

¹⁶⁹ J. Gregory Sidak & Jeremy O. Skog, *Hedonic Prices and Patent Royalties*, 2 CRITERION J. ON INNOV. 601, 611 (2017) (available at <https://www.criterioneconomics.com/docs/hedonic-prices-and-patent-royalties.pdf>) ("The role of hedonic prices as economic evidence in patent-infringement litigation is to identify the value of a patented feature.").

¹⁷⁰ *Id.*

¹⁷¹ *Id.* at 612.

¹⁷² *Id.*

¹⁷³ See *supra* notes 163–166 and accompanying text.

¹⁷⁴ *Ericsson, Inc. v. D-Link Sys., Inc.*, 773 F.3d 1201, 1233 (Fed. Cir. 2014) (emphasis added).

¹⁷⁵ See, e.g., Sidak & Skog, *supra* note 169, at 613 (referencing "the Federal Circuit's requirement to net out the value of standardization from the value of a particular standard") (citing *D-Link*, 773 F.3d at 1233).

¹⁷⁶ Allan L. Shampine, *Paper Trail: Working Paper and Recent Scholarship*, ANTITRUST SOURCE, Oct. 2017, at 3, https://www.americanbar.org/content/dam/aba/publishing/antitrust-magazine-online/oct17_full_source.pdf (reviewing Sidak & Skog, *supra* note 169) ("That is, the hedonic regression is being used to explain the end good price as a function of certain characteristics, but one of those characteristics is the fact that it is used in the standard at issue.").

on how a generalized “value of standardization”¹⁷⁷ provides cost savings value to implementers.¹⁷⁸ Although their deviation from the Federal Circuit standard may be convenient from a mathematics perspective,¹⁷⁹ they never corrected for this deviation elsewhere in their approach.¹⁸⁰ The end result is a hedonic model that fails to separate the value of the innovation from the value the innovation gains from the standard-setting process.

Finally, and most importantly, hedonic models were never created to “apportion damages only to the patented features.”¹⁸¹ Instead, hedonic models merely measure how much consumers pay for a particular feature *when that feature is bundled with unpatented features*. To illustrate, imagine a patented invention that enables a smartphone company to increase storage capacity from 128GB to 256GB. Apple currently charges iPhone customers \$100 for this upgrade.¹⁸² A hedonic regression analysis on an Apple data set would suggest that additional storage capacity is worth \$100 to smartphone consumers.¹⁸³ Samsung, however, only charges consumers \$50 to upgrade their Galaxy S21 storage capacity from 128GB to 256GB.¹⁸⁴ In this second example, a hedonic regression analysis would suggest that the same additional storage capacity is only worth \$50 to same smartphone consumers.¹⁸⁵

¹⁷⁷ According to Sidak, “the value of standardization can be reduced to two components: (1) a reduction in transaction costs for implementers of the standard and for SEP holders and (2) the network effects generated by interoperability between standard-compliant products.” J. Gregory Sidak, *Misconceptions Concerning the Use of Hedonic Prices to Determine FRAND or RAND Royalties for Standard-Essential Patents*, 4 CRITERION J. ON INNOV. 501, 521 (2019), <https://www.criterioneconomics.com/docs/sidak-misconceptions-concerning-hedonic-prices.pdf>.

¹⁷⁸ See, e.g., *id.* at 522 (“The value of standardization is not the value of those technologies, but rather the cost savings to parties participating in incorporating those technologies into standardized products.”).

¹⁷⁹ The authors chose this approach so that he could hold the “value of standardization” constant and then cancel it out when comparing the standard at issues to the “next best” standard. Sidak & Skog, *supra* note 169, at 613.

¹⁸⁰ For example, Allan Shampine correctly noted that Sidak & Skog ignore how “a firm can charge more for the use of its patented technology [after the technology is incorporated into a standard] than it could before, simply because of inclusion in the standard.” Shampine, *supra* note 176, at 4. Amazingly, ‘Sidak’s thirty-two page rebuttal to Shampine’s critique fails to address this specific point. See Sidak, *supra* note 177. Sidak does address Shampine’s related argument that the value of standardization between two standards is not necessarily identical, but this argument is a strawman. The generalized value of standardization (and whether this value is constant across multiple standards) is mostly irrelevant to determining the additional value that standardization contributes to each technology incorporated in that standard.

¹⁸¹ Power Integrations, Inc. v. Fairchild Semiconductor Int’l, Inc., 904 F.3d 965, 970 (Fed. Cir. 2018) (quoting VirnetX, Inc. v. Cisco Sys., Inc., 767 F.3d 1308, 1329 (Fed. Cir. 2014)).

¹⁸² Kelly, *infra* note 197.

¹⁸³ Note there are many other issues with using consumer value to approximate patent value that are outside the scope of this Article.

¹⁸⁴ Jason Cipriani, *Buy a Galaxy S21 now: Here’s where to find one of Samsung’s newest phones*, CNET (Jan. 14, 2021, 7:04 AM), <https://www.cnet.com/tech/mobile/buy-a-galaxy-s21-now-heres-where-to-find-one-of-samsung-newest-phones/>.

¹⁸⁵ Although Apple customers are different from Samsung customers, these differences should be immaterial to the hedonic patent analysis. See Sidak & Skog, *supra* note 169, at 615 (“[T]he rele-

This discrepancy exists because neither upgrade cost reflects the inherent value of added storage capacity. Instead, both upgrade costs reflect the value of storage capacity *tied to the overall value of the phone*.¹⁸⁶ This tying concept is inherent in all hedonic pricing:

When goods can be treated as tied packages of characteristics, observed market prices are also comparable on those terms. The economic content of the relationship between observed prices and observed characteristics becomes evident once price differences among goods are recognized as equalizing differences for the alternative packages they embody.¹⁸⁷

Although hedonic regression is useful for non-patent applications where it makes sense to assess the value of a characteristic tied to the value of other characteristics,¹⁸⁸ the approach does not work for patent disputes because it cannot untie the value of a patented feature from the value contributed by non-patented features. Instead, hedonic modeling merely appears to apportion value without actually apportioning value.

4. *How the Exhaustion-Avoidance Licensing Model Encourages Apportionment Violations*

Accordingly, identifying and referencing the SSPPU remains the best available technique for confirming that a damages theory complies with apportionment law. In the SEPs context, analyzing the SSPPU reveals that the exhaustion-avoidance licensing model is really an “apportionment-avoidance licensing model.”

As explained previously, the exhaustion-avoidance licensing model encourages vertical discrimination among participants in a supply chain,¹⁸⁹ specifically to extract more money from OEMs than could be extracted from automotive suppliers

vant task is the clean identification of what customers are actually willing to pay to have access to the standardized technology, regardless of whether they are high-willingness-to-pay customers (who make their purchases soon after the standard has been adopted) or price-constrained mass-market customers (who make their purchases once the standard has become more widespread and manufacturing processes have become more efficient).”).

¹⁸⁶ In the smartphone example, consumers pay \$100 to have additional storage capacity added to an iPhone. This is a different value proposition than merely acquiring storage capacity on a standalone basis.

¹⁸⁷ *Id.* at 609 (quoting Sherwin Rosen, *Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition*, 82 J. POL. ECON. 34, 54 (1974)).

¹⁸⁸ For example, hedonic models were originally developed to calculate how housing characteristics impact the real estate rental prices. Sidak & Skog, *supra* note 169, at 609. This use case makes sense, as there was no need to identify the value of an attic independent from the value created by attaching that attic to a house.

Patent owners, however, are not entitled to capture the additional value created by attaching the attic to a house, so to speak. Instead, patent owners are only entitled to royalties based on the isolated value of the attic. Hedonic modeling, however, has no mechanism for untying the attic value from the house value.

¹⁸⁹ *See supra* Part III.A.

directly.¹⁹⁰ This form of vertical discrimination, however, violates U.S. law on apportionment of patent damages because it allows SEP owners to overreach and capture value beyond the scope of the asserted patents.¹⁹¹ Under the apportionment doctrine, patent owners are not entitled to collect more licensing revenues from an OEMs than what they could charge the manufacturer of the SSPPU.¹⁹²

Similarly, licensors seeking the highest-possible return are not entitled to discriminate horizontally across licensees and charge different amounts for the same license rights. This point is best explained in the form of an algebraic proof. Consider a first OEM (“A”) who buys equipment that includes the SSPPU. Supplier B manufactures and sells the equipment somewhere above A in the supply chain. As explained previously, apportionment law prohibits licensors from charging OEMs more for a license than what they could charge the SSPPU manufacturer. Therefore, the licensor’s maximum per-unit royalty recovery from A can be expressed as $A=B$.

If the outcome described above is true for A, then it must be true for all OEMs who receive the SSPPU directly or indirectly from Supplier B. Consider, for example, a second OEM (“C”) who buys hardware containing the SSPPU supplied by Supplier B. In this example, $B=C$ for the same reasons as $A=B$. Therefore, according to the “Transitive Property of Patent Damages,”¹⁹³ if $A=B$ and $B=C$, then A must also equal C.¹⁹⁴

¹⁹⁰ See *supra* notes 60–65 and accompanying text.

¹⁹¹ See *LaserDynamics*, 694 F.3d at 70 (prohibiting licensors from overreaching and encompassing components not covered by the patent).

¹⁹² See *supra* notes 136–157 and accompanying text (explaining why an automotive OEM who buys a TCU from a Tier 1 supplier must have the same license exposure as the SSPPU manufacturer, whether that be the Tier 1 supplier or an upstream manufacturer); see also *Innovatio*, No. 11 C 9308, slip op. at 74 (calculating a reasonable royalty relative to the SSPPU to put the end product manufacturer in the same financial position as the chip manufacturer).

¹⁹³ I coined this term during the writing process for this Article and hope that it catches on elsewhere.

¹⁹⁴ One recent paper preemptively disagrees with applying the Transitive Property of Patent Damages to SEPs disputes. According to the authors, the “determination of SEP/FRAND royalty payments should be independent of the choice of licensing level” Bowman Heiden, Jorge Padilla, & Ruud Peters, *The Value of Standard Essential Patents and the Level of Licensing*, 49 AIPLA QUARTERLY J. 1, [11] (2021). In other words, $A=B$ and $B=C$.

But the quote continues. “The determination of SEP/FRAND royalty payments should be independent of the choice of licensing level *but dependent on its value in end-use.*” *Id.* (emphasis added). If a supplier sells equipment downstream to two different customers who use the equipment for two different uses, their approach would require the supplier to pay two different license fees for the exact same equipment. In terms of the algebraic proof, the authors argue that B is not equal to B.

Their approach fails because it never considers what value SEP owners are legally allowed to capture. Instead, the paper states, without support, that “[l]icensors should be able to extract higher royalty payments from those end-product manufacturers that derive more value from the licensor’s technology, but that requires being able to price differentiate across different uses of the technology.” *Id.* at [23]. Even if one believed that standard-setters *should* be able to extract higher payments based on use case, it does not necessarily follow that patent law is the correct mechanism for standard-setters to capture this value. See *infra* notes 207–229 and accompanying text (discussing

This algebraic proof answers the questions posed by Judge Chen and Judge Hughes.¹⁹⁵ To answer Judge Chen's question, not only is it unreasonable for one company to pay a quarter and another company to pay \$4 for the exact same thing, but it suggests that the licensing model used to generate both license fees fails to respect apportionment.¹⁹⁶ Similarly, Judge Hughes correctly suggests that the court should apply a flat dollar fee instead of a royalty rate that varies based upon the price of the end device. If, for example, A and C both source the same SSPPU from the same supplier, then any difference in sales price between A's products and C's products cannot be due to differences in value in the SSPPU, the standards implemented by the SSPPU, or the SEPs that encumber the implemented standards.¹⁹⁷

why SEP owners are not entitled to capture the value of an implementer's use case). If these different use cases are worth different amounts to the standard setters, then the standard setters should consider reflecting these value differences in the products they sell.

¹⁹⁵ See *supra* Part III.B.

¹⁹⁶ Hypothetically, the licensor in Judge Chen's example could be in compliance with apportionment requirements if the true value of the patent license is at least \$4 dollars, as evidenced by a complete and thorough apportionment analysis. As one author has asked in a related hypothetical, "Why not assume that the \$4.00 royalty accurately values the technical contributions of the patents in question, and the [lower] royalty undercompensates the patent holder?" STARK, *supra* note 125, at 9–10.

Such a hypothetical is not plausible, however, for at least three reasons. First, if the invention's true inherent value is \$4, that would suggest that an SEP monetizer is willingly foregoing profit and giving an 85% discount to the company only paying a quarter. Absent evidence to the contrary, courts should not blindly assume that SEP asserters are so charitable. Second, the exhaustion-avoidance licensing model is designed to capture the value added by end manufacturers outside the scope of the licensed SEPs. See *supra* notes 61–72 and accompanying text (discussing how the model is designed to extract more money out of manufacturers than could be extracted from their suppliers). An SEP owner using the exhaustion-avoidance licensing model cannot credibly argue that it is not using the licensing model to do exactly what the licensing model was designed to do. Finally, SEP monetizers publicly justify their license rates based on factors that have little to do with patent value. See, e.g., *supra* notes 207–229 and accompanying text (discussing how SEP owners attempt to capture value outside the scope of the licensed patents by seeking damages calculated based on the "value of connectivity" provided to different use cases). If SEP owners are publicly claiming rights in value that exists outside the patent grant, one can assume their internal licensing formulae also claim non-patent value.

¹⁹⁷ Although this principle is true for two products offered by different companies, the principle is easier to appreciate when comparing two products offered by the same company. Consider, for example, how Apple has historically priced new iPhone models. For each phone model, prices typically vary based solely on one criterion: storage capacity. Compare, e.g., Peter Cohen, *Macworld Expo Keynote Live Update: Introducing the iPhone*, MACWORD (Jan. 8, 2007), <https://www.macworld.com/article/183052/liveupdate-15.html> (reporting that price for the original iPhone 1 was \$499 for a 4 GB model and \$599 for an 8 GB model), with Gordon Kelly, *Apple iPhone 13 Prices Expected to Match iPhone 12 Models*, FORBES (Aug. 14, 2021), <https://www.forbes.com/sites/gordonkelly/2021/08/14/apple-iphone-13-pro-max-price-cost-release-upgrade-iphone-12-pro-max/> (reporting that the new iPhone 13 would cost \$799 for a 64 GB model, \$849 for a 128 GB model, and \$949 for a 256 GB model).

Price variations based solely on storage capacity are irrelevant to the value of the cellular chip, the standards implemented by the cellular chip, or the SEPs infringed by the cellular chip. A royalty rate that varies based upon the price of the end device, however, would compensate SEP owners

At this point in the discussion, specific identification of the SSPPU in the context of IoT licensing becomes more relevant. If, for example, Supplier B is a Tier 1 supplier who sells the TCU only to automakers, then Avanci's licensing model potentially satisfies the algebraic proof since Avanci charges every automaker the same price.¹⁹⁸

If, instead, Supplier B is a Tier 2 supplier who supplies NADs for both automotive and other use cases, then Avanci's licensing model might fail because Avanci intends to charge different license fees for different use cases.¹⁹⁹ Charging different license fees for different use cases would violate the algebraic proof by charging companies from different industries different amounts for a license to the same SSPPU provided by the same supplier.

In reality, the SSPPU should be defined at the Tier 3 chip level.²⁰⁰ This is the same conclusion reached by district court judges who have endeavored to identify the SSPPU.²⁰¹ Returning to the algebraic proof, identifying Supplier B as the Tier 3

more merely because a consumer wanted a larger hard drive. Hard drive capacity, of course, is not a patented feature within the scope of a cellular SEP portfolio. Accordingly, the value contributed by hard drive capacity must be apportioned out of any SEPs damages model.

Despite these apportionment requirements, SEP monetizers still insist that SEP owners are entitled to capture the additional value associated with the 256 GB iPhone model. *See, e.g.*, STARK, *supra* note 125, at 9 (arguing that more expensive devices “likely have more functionality and place greater demands on the always-on connectivity provided by the SEP technologies”). First, these arguments are factually flawed as evidenced by the iPhone example. In fact, a more expensive iPhone with more storage capacity likely places fewer demands on cellular technology since more local storage reduces the user's reliance on cloud storage and media streaming. Second, these arguments are legally flawed because they confuse patent value with the value of connectivity, and SEP owners are not entitled to capture the value of connectivity. *See infra* notes 223–229 and accompanying text.

¹⁹⁸ Avanci Marketplace, *supra* note 49 (representing that license fees will not vary based on sales price).

¹⁹⁹ *Id.* (“Royalties will vary from one type of device to the next based on the value the technology brings to the device, not its sales price.”).

²⁰⁰ The MT, or baseband processor, is responsible for cellular communications on a user device. *See supra* note 79 and accompanying text. Cellular standards and SEPs may recite additional elements that exist outside the baseband processor, but these additional elements are not necessarily part of the SSPPU. *See supra* note 128 (explaining how the SSPPU only includes equipment and features that have a “close relation” to the licensed SEPs).

²⁰¹ *See, e.g.*, Fed. Trade Comm'n v. Qualcomm Inc., 411 F.Supp.3d at 783; (Koh, J.) (holding that Qualcomm's collection of a royalty based on the value of the entire handset violates Federal Circuit apportionment law because the baseband processor, not the handset, is the SSPPU), *rev'd*, 969 F.3d 974 (9th Cir. 2020) (avoiding the question of whether the baseband processor is the SSPPU); GPNE Corp. v. Apple, Inc., No. 12-CV-02885-LHK, 2014 WL 1494247, at *13 (N.D. Cal. Apr. 16, 2014) (Koh, J.) (holding, as a matter of law, that the baseband processor is the proper SSPPU in the cellular SEPs dispute), *aff'd*, 830 F.3d 1365 (Fed. Cir. 2016); *cf.*, *e.g.*, *Innovatio*, No. 11 C 9308, slip op. at 25–26 (holding that the chip is the SSPPU for purposes of 802.11 WiFi standards). *But see HTC Corp.*, 407 F. Supp. 3d at 638 (E.D. Tex. 2019) (finding that Ericsson presented credible evidence to the jury that the baseband processor is not the SSPPU).

Even courts that avoid identifying the SSPPU end up acknowledging it indirectly. For example, in *CSIRO*, Judge Davis asserted that wireless chip processes do not reflect the value of the pa-

baseband processor manufacturer has significant consequences. Tier 3 chip manufacturers sell baseband processors into every industry that uses baseband processors. Furthermore, although there may be differences in baseband processors across suppliers, these differences should be immaterial from a patent licensing perspective if all processors are implementing the same standard and all the licensed patents are SEPs. Therefore, A and C may be end device manufacturers from any industry, which means the maximum-allowable per-unit royalty must be the same across every industry and every use case.

Accordingly, an SEP licensor seeking the maximum-allowable license rates while respecting apportionment must set license rates for each standard that are consistent across all industries, all use cases, and all supply chain tiers.²⁰² Not only is this conclusion compelled by apportionment principles, but it brings damages awards one step closer to matching the actual value contributed by the licensed patents.²⁰³

tents at issue due to “rampant infringement” depressing chip prices. *CSIRO*, No. 11-CV-00343-LED, slip op. at 22 (E.D. Tex. July 23, 2014). However, rampant infringement among chip makers would suggest that the chips themselves are infringing, suggesting that the chips are the SSPPUs.

²⁰² Different standards, however, may still be licensed differently to the extent different patents are required to implement the different standards. For example, IoT-related standards like the Long Term Evolution for Machines (LTE-M) and the Narrowband Internet of Things (NB-IoT) may involve different SEPs than the 2G/3G/4G standards implemented by handset manufacturers. *Cf.* Gallego & Drexler, *supra* note 4, at 138–39 (describing how 3GPP produced new standards specifically targeting cellular IoT use cases based on the 2G/3G/4G standards). Courts should be cautious, of course, about standard-setting bodies broadening the scope of standards to cover individual use cases to influence the outcomes of patent disputes. *Cf.* Contreras, *supra* note 29, at 864 (noting the potential for SSO participants to “[intentionally include] optional and non-essential patented feature sin ETSI standards (sometimes referred to as patent ‘stuffing’)”).

²⁰³ Despite their complaints, SEP owners have still not convincingly proven that starting a royalty analysis with the value of the SSPPU leads to an incorrect patent license value determination. For example, Judge Davis sided with *CSIRO* in concluding that “[i]t is simply illogical to attempt to value the contributions of the [asserted patent] based on wireless chip prices that were artificially deflated because of pervasive infringement.” *CSIRO*, No. 11-CV-00343-LED, slip op. at 22 (E.D. Tex. July 23, 2014); *see also HTC Corp.*, 407 F.Supp.3d at 637 (summarizing testimony from an Ericsson witness who asserted that “the profit margin that a component supplier makes is not necessarily reflective of the value of the intellectual property embodied in that component, especially in a situation . . . where the component supplier does not pay royalties for that intellectual property”).

This line of reasoning, however, fails for at least three reasons. First, “pervasive infringement” can only exist among chip manufacturers if the chips are infringing, which would imply that the chips are the SSPPUs. Although Judge Davis is correct in that courts are not required to always start the damages analysis by referencing the SSPPU, courts cannot opt out of requiring plaintiffs to apportion their damages. Referencing the SSPPU remains the best method for ensuring that plaintiffs satisfy their apportionment obligations. *See infra* Part IV.3.

Second, every patent infringement case involves a company that sells infringing products without paying for a license. Yet courts do not adjust damages calculations in every case under the belief that the company’s sales price fails to reflect the value of the asserted patents. Doing so would only add to the over-inflated assertion value of patents used in litigation campaigns without bringing courts any closer to determining the true value of the asserted patents.

Eliminating price variations based on use case is an important step towards normalizing patent valuations in SEPs disputes. A critical but often overlooked question in patent valuation is “value to whom”: should courts measure patent value based on the patent’s value to the patent owner or to the infringer?²⁰⁴ Avanci believes that the patent value should be measured based on the value of the patented technology to the infringer.²⁰⁵ The correct approach, however, is measuring patent license value based on value to the patent owner, independent of the value of the infringer’s implementation or use case.²⁰⁶

As the Supreme Court first explained back in 1915, “the normal measure of [patent infringement] damages was *the value of what was taken*.”²⁰⁷ In this way, the reasonable royalty ensures that patent owners receive some form of compensation for the value that they lost.²⁰⁸ Patent owners are not, however, entitled to compensation for the value that infringers gain. Unlike other buckets of intellectual property, owners of utility patents are not entitled to disgorgement of an infringer’s profits.²⁰⁹ Congress banned this form of damages remedy in 1946.²¹⁰ As the Supreme Court later explained, “[t]he purpose of the [statutory] change [in 1946] was precisely to eliminate the recovery of profits as such and allow recovery of damages only.”²¹¹ Notably, the statutory change requires such damages to be calculated “without regard to the question whether the defendant has gained or lost by his unlawful actions.”²¹²

Finally, Judge Davis’s argument ignores *why* the supposed “pervasive infringement” exists among component suppliers. Any pervasive infringement exists because certain SEP licensors want this infringement to exist. After all, licensing component suppliers would undermine the exhaustion-avoidance licensing model since exhaustion would apply downstream. Courts should outright reject arguments that the SSPPU is undervalued due to pervasive infringement from plaintiffs whose licensing practices contribute to the pervasive infringement.

²⁰⁴ Taylor, *supra* note 118, at 133. Taylor also mentions a third option: calculating reasonable royalties based on the value of the patented technology to society. *Id.* at 134. This third option, though intriguing as a theoretical concept, is not discussed here.

²⁰⁵ See, e.g., Avanci Marketplace, *supra* note 49 (claiming that they set royalties “based on the value the technology brings to the device”). 118

²⁰⁶ See Taylor, *supra* note 118, at 133 (acknowledging that, “[o]f these two options, the value to the patent owner seems more appropriate because royalties are presumed damages provided to compensate patent owners for infringement and to stimulate or reward their inventive activities”).

²⁰⁷ Dowagiac Mfg. Co. v. Minnesota Moline Plow Co., 235 U.S. 641, 648 (1915) (emphasis added).

²⁰⁸ See Erick S. Lee, *Historical Perspectives on Reasonable Royalty Patent Damages and Current Congressional Efforts for Reform*, 13 UCLA J. L. & TECH. 1, 24–25 (2009) (describing how judicial development of the reasonable royalty approach to awarding damages stemmed from the inability of a plaintiff to establish any damages other than nominal damages without direct evidence of lost sales).

²⁰⁹ Pamela Samuelson et al., *Recalibrating the Disgorgement Remedy in Intellectual Property Cases*, 100 B.U. L. Rev. 1999, 2003–04 (2020).

²¹⁰ *Id.* at 2067 (citing SCA Hygiene Prods. Artiebolag v. First Quality Baby Prods., 137 S. Ct. 954, 964 (2017)).

²¹¹ Aro Mfg. Co. v. Convertible Top Replacement Co., 377 U.S. 476, 505 (1964); see Taylor, *supra* note 118, at 133 & n.222 (quoting *Aro Manufacturing* as evidence that precedent indicates that courts must measure reasonable royalties based on the value lost by the patent owner).

²¹² *Aro Mfg.*, 377 U.S. at 507 (quoting *Coupe v. Royer*, 155 U.S. 565, 582 (1895)).

Royalty setting is still an imprecise endeavor,²¹³ however, and evidence of the infringer's use or profits does creep its way into royalty-setting calculations.²¹⁴ Referencing the infringer's profits is theoretically acceptable where the value of what was gained might inform the "value of what was taken" in the absence of better evidence. Courts cannot, however, presume that the "value of what was taken" is always equal to the value gained by the infringer or that patent owners are entitled to capture the value of the infringer's use or profits.²¹⁵ Instead, courts should disregard evidence of the infringer's use or profits where better evidence is available.²¹⁶

For SEPs, the "value of what was taken" is always the same regardless of how much the infringer gained or profited. It does not matter if some licensees may have found better use cases or achieved more success using the same standardized technology.²¹⁷ Any differences between suppliers or manufacturers implementing the

²¹³ See Samuelson, *supra* note 209, at 2073 (noting how calculating a reasonable royalty is an imprecise task that "may involve some degree of approximation and uncertainty" (quoting *VirnetX*, 767 F.3d at 1328)).

²¹⁴ See *id.* at 2072–73 (discussing how evidence of an infringer's profits can work its way into the entire market value rule and into the hypothetical-negotiation approach).

²¹⁵ See *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 243 F. Supp. 500, 516 (S.D.N.Y. 1965) (Herrlands, J.) ("There is no necessary correlation between the amounts of [the infringer's] profits and [the patent owner's] losses."); see also Peter Lee, *Distinguishing Damages Paid from Compensation Received: A Thought Experiment*, 26 TEX. INTEL. PROP. L.J. 231, 234 (recognizing the gap between "the amount of compensation" that patentees based on the patentee's losses and the amount that infringers pay based on the value of the infringer's implementation).

²¹⁶ See, e.g., *D-Link*, 773 F.3d at 1231 (criticizing the use of *Georgia-Pacific* factor eight, profitability of the product, in SEP disputes); *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1335 (Fed. Cir. 2009) (acknowledging that *Georgia-Pacific* factor eight would support a higher reasonable royalty in the instant case but that such evidence cannot overcome the other evidence suggesting that a lower reasonable royalty is more appropriate).

²¹⁷ This point is sometimes lost when courts discuss hypothetical negotiations between SEP owners and implementers. For example, in *Microsoft v. Motorola*, Judge Robart incorrectly concludes that parties to a hypothetical SEPs negotiation would consider the importance of the patented technology to the infringing product. See *Microsoft Corp. v. Motorola, Inc.*, 2013 WL 2111217, at *8 (setting different royalty rates for Microsoft Windows, Microsoft Xbox, and other Microsoft products, in part, based on the belief that parties to a hypothetical negotiation would consider the importance of the standardized technology to the infringing products). Standardized technology, however, is a commoditized good. See *Commodity*, INVESTOPEdia, <https://www.investopedia.com/terms/c/commodity.asp> (last visited Oct. 31, 2021) ("A commodity is a basic good used in commerce that is interchangeable with other goods of the same type."). In order for the standard to achieve interoperability, every communication device on the network must be interchangeable (even if the devices otherwise offer features or benefits that fall outside the scope of the standard).

In reality, buyers of commoditized goods do not pay more for commodities simply because their use case happens to be more lucrative. Lumber is more important to a homebuilder than it is to a beer garden that wants to offer giant Jenga to patrons, but both companies still pay the same price for wood at the lumber yard. It is immaterial that the homebuilder found a use case for lumber that offers more profit than the beer garden. Of course, material quality and other factors may cause price variations between commoditized goods, but such factors fall outside the scope of the standard (and outside the scope of patent law generally).

same standard are due to the contributions of those companies, not the contributions of the standardized technology or the SEP owners. SEP owners cannot profit from these activities, just as regular patent owners cannot overreach and capture the value outside the scope of the asserted patents.²¹⁸

Anne Layne-Farrar has argued that the Patent Act textually requires courts to value patents differently based on the value of each use case.²¹⁹ She cites Section 284, which says that patent owners must receive compensation that is “in no event less than a reasonable royalty for the *use* made of the invention by the infringer.”²²⁰ This argument, although creative, misinterprets the statute. The word “use” in Section 284 merely references the fact that a defendant needs a patent license to legally use a patented invention.²²¹ Not only does the legislative history of Section 284 support this interpretation,²²² but allowing patent owners to capture the value of an infringer’s use case would conflict with Supreme Court precedent requiring apportionment of patent damages and prohibiting disgorgement of an infringer’s profits.

Some SEP owners justify differential pricing based on use case by arguing that licenses should reflect “the value of connectivity.”²²³ The value of connectivity,

²¹⁸ See *LaserDynamics*, 694 F.3d at 70 (prohibiting licensors from overreaching and encompassing components not covered by the patent).

²¹⁹ See Anne Layne-Farrar, *supra* note 163, at 36–37 (citing 35 U.S.C. § 284 (2017)).

²²⁰ *Id.* (emphasis added).

²²¹ Extending the analogy from note 217, *supra*, one cannot use lumber from a lumber yard without paying the lumber yard; the amount paid, however, does not change depending on how the purchaser uses the lumber after leaving the lumber yard.

²²² The “use” language dates all the way back to the Patent Act of 1793. See Patent Act of 1793, ch. 11, § 5, 1 Stat. 318–323 (providing for damages “at least equal to three times the price, for which the patentee has usually sold or licensed to other persons, the use of the said invention”). This original provision more clearly shows that damages are not calculated based on the value of “use” to the infringer since the provision itself requires a calculation solely based on prevailing license rates paid by other infringers.

Congress eventually added “reasonable sum” language in 1922 and “reasonable royalty” language in 1946. See Lee, *supra* note 208, at 5–8. The 1946 language provided that “the complainant shall be entitled to recover general damages which shall be due compensation for making, using, or selling the invention, not less than a reasonable royalty therefore.” Patent Act of 1946, ch. 726, 60 Stat. 778 (1946). The legislative history suggests this language was added “to abrogate the recovery of the infringer’s profits and instead base compensation on *the patentee’s damages*.” Lee, *supra* note 208, at 10 (emphasis added) (citations omitted). Thus, the 1946 language clearly contemplated that damages should be calculated based on the patentee’s loss, not based on the value the infringer gained from its use case.

Congress enacted the modern statutory language in 1952. *Id.* at 9. However, “while the 1952 Act changed the explicit wording of the provision, it nonetheless integrated the concepts of the previous iteration” from 1946. *Id.* (cleaned up).

²²³ See *supra* note 58; see also, e.g., Gallego & Drexler, *supra* note 4, at 137 (citing NORTHSTREAM, CONNECTIVITY TECHNOLOGIES FOR IOT 4–9 (2016), <https://northstream.se/wp-content/uploads/2017/01/Northstream-White-Paper-Connectivity-Technologies-for-IoT.pdf> (“Each IoT use cases poses its own requirements for connectivity in terms of coverage, data rate, latency and energy efficiency.”); Rana Foroohar, *Let the 5G Battles Begin*, FINANCIAL TIMES, Nov. 26, 2017, <https://www.ft.com/content/d8d615ae-cf9c-11e7-b781-794ce08b24dc> (“Companies such as Qualcomm want it based on the price of a finished product, a phone or even a car, for example.

however, includes value well outside the scope of SEPs that patent owners are not entitled to capture. For example, the value of connectivity reflects the value created by standardizing connectivity technology to create interoperability.²²⁴ Patent owners, however, are not entitled to capture the value added by standardization.²²⁵ Courts must “differentiate the added benefit from any value the innovation gains because it has become standard essential.”²²⁶ Thus, even if the “value of connectivity” varies between use cases, this variation is irrelevant to patent valuation because SEP owners are not entitled to use the patent system to capture the value of connectivity. Instead, judges must use their “gatekeeping authority”²²⁷ to prevent testimony on the value of connectivity from reaching the jury.²²⁸

They argue that connectivity needs are very different for a device that, say, monitors water levels in soil once a week versus an always-on autonomous vehicle, and prices should reflect that.”)

²²⁴ Or, as Judge Selna correctly observed, “connectivity [is] in essence the standard.” *Ericsson Inc. v. TCL Commc’n Tech. Holdings Ltd.*, No. 14-CV-00341, slip op. at 11 (C.D. Cal. Feb. 2, 2017) (minute order).

²²⁵ *See, e.g.*, *Commonwealth Sci. & Indus. Rsch. Org. v. Cisco Sys., Inc.*, 809 F.3d 1295, 1304 (Fed. Cir. 2015) (“We therefore reaffirm that reasonable royalties for SEPs generally—and not only those subject to a RAND commitment—must not include any value flowing to the patent from the standard’s adoption.”); *Ericsson, Inc. v. D-Link Sys., Inc.*, 773 F.3d 1201, 1233 (2014) (“Turning to the value of a patent’s standardization, we conclude that Supreme Court precedent also requires apportionment of the value of the patented technology from the value of its standardization.”); *In re Innovatio IP Ventures, LLC Pat. Litig.*, No. 11 C 9308, slip op. at 9 (N.D. Ill. Oct. 3, 2013) (“The court’s RAND rate therefore must, to the extent possible, reflect only the value of the underlying technology and not the hold-up value of standardization.”) (citing *Microsoft Corp. v. Motorola, Inc.*, No. C10-1823JLR, 2013 WL 2111217, at *12 (W.D. Wash. Apr. 25, 2013)); *see also* Richard H. Stern, *Who Should Own the Benefits of Standardization and the Value It Creates?*, 19 MINN. J. L. SCI. & TECH. 107, 205–42 (2018) (summarizing and rejecting arguments made by SEP owners and their advocates that SEP owners are entitled to capture the value of standardization and network effects due to extra-legal justifications).

Although cases like *CSIRO* and *D-Link* only addressed interoperability standards, their holdings should apply to all standards, including quality and product standards. *Cf.* Mark A. Lemley, *Intellectual Property Rights and Standard-Setting Organizations*, 90 CAL. L. REV. 1889, 1897–98 (2002) (distinguishing between the “two different types of standards: standards that control interoperability in a network market and those that govern the quality or safety of a product”). First, apportionment applies “in every case,” *Garretson v. Clark*, 111 U.S. 120, 121 (1884), not just interoperability cases. Second, all standards exist to encourage outside parties to adopt technologies that they otherwise would not adopt, and any successful standard can potentially inflate SEP value beyond the value of the inventor’s contribution. As such, courts should forbid SEP owners from capturing the value of standardization in all standards cases, not just cases involving interoperability standards.

²²⁶ *See D-Link*, 773 F.3d at 1233 (discussing appropriate jury instructions for determining royalty rates among SEPs).

²²⁷ *VirnetX, Inc. v. Cisco Sys., Inc.*, 767 F.3d 1308, 1328 (Fed. Cir. 2014) (finding that “the district court should have exercised its gatekeeping authority to ensure that only theories comporting with settled principles of apportionment were allowed to reach the jury.”).

²²⁸ *Ericsson*, No. 14-CV-00341, slip op. at 6 (granting TCL’s motion to exclude testimony from Ericsson’s witnesses because their analysis of the value of cellular connectivity “does not answer the question of the incremental value of Ericsson’s patent portfolio to the 4G standard,” which “undermine[s] the fundamental reliability of the analysis.”).

HTC v. Ericsson illustrates what happens when courts confuse the value of technology with the value of connectivity. In that case, Judge Gilstrap found that “customers value cellular technology more highly than HTC suggests” based on evidence that an HTC Nexus 9 with 4G cellular connectivity sells for \$120 higher than a Nexus 9 with only Wi-Fi connectivity.²²⁹ That \$120 figure, however, does not reflect the value of “cellular technology.” Consumers do not spend \$120 more for a phone because it has packet switching, a “MIMO” antenna, or other cellular technologies included in the 4G standard. If, for example, the HTC Nexus 9 was the only device on earth that implemented the claimed technologies, an average customer would not place any value on the claimed cellular technologies. Instead, customers value the fact that, outside the phone, a cellular network exists that can communicate with the HTC Nexus 9 using the 4G standard. By confusing the value of cellular technology with the value of cellular interoperability, Judge Gilstrap incorrectly attributed \$120 worth of consumer value to cellular technology without any evidence that consumers value the cellular technology separately from the value added by standardization and interoperability.

B. Apportionment Violations May Constitute Patent Misuse

As discussed above, SEP licensors are using the exhaustion-avoidance licensing model to violate apportionment and charge implementers more based on their use case and their position within the supply chain. Apportionment law, however, does not end the relevant inquiry. In some situations, apportionment violations in SEP licensing may be so pervasive that they constitute patent misuse.

The patent misuse doctrine exists to limit a licensor’s ability to impose conditions on a licensee that exceed the scope of the patent right.²³⁰ According to the Federal Circuit, “the key inquiry under the patent misuse doctrine is whether, by imposing the condition [on licenses or sales] in question, the patentee has impermissibly broadened the physical or temporal scope of the patent grant and has done so in a manner that has anticompetitive effects.”²³¹ This judicial doctrine furthers the policy-based desire to discourage patentees from using patents to obtain benefits beyond the statutory patent right.²³²

The exhaustion-avoidance licensing model is a particularly appropriate target for the patent misuse doctrine. Both the exhaustion and misuse doctrines prevent litigants from using the judicial system to obtain more benefit than they are entitled to receive under U.S. patent law.²³³ The exhaustion doctrine, in particular, exists be-

²²⁹ *HTC Corp. v. Telefonaktiebolaget LM Ericsson*, 407 F. Supp. 3d 631, 637 (E.D. Tex. 2019).

²³⁰ *Princo Corp. v. Int’l Trade Comm’n*, 616 F.3d 1318, 1321 (Fed. Cir. 2010) (en banc).

²³¹ *Id.* at 1328 (citing *B. Braun Med., Inc. v. Abbott Lab’ys.*, 124 F.3d 1419, 1426 (Fed. Cir. 1997)).

²³² *Id.* at 1328 (quoting *Mallinckrodt, Inc. v. Medipart, Inc.*, 976 F.2d 700, 704 (Fed. Cir. 1992)).

²³³ *Compare Quanta Comput., Inc. v. LG Elecs., Inc.*, 553 U.S. 617, 638 (2008) (explaining how the patent exhaustion doctrine “prevents the patent holder from invoking patent law to control postsale use of the article.”), with *B. Braun*, 124 F.3d at 1427 (citing *Senza-Gel Corp. v. Seiffhart*, 803 F.2d 661, 668 (Fed. Cir. 1986)) (“[T]he patent misuse doctrine is an extension of the equitable doctrine

cause “the primary purpose of our patent laws is not the creation of private fortunes for the owners of patents but is ‘to promote the progress of science and useful arts.’”²³⁴ SEP owners contravene this purpose when they avoid exhaustion in pursuit of more licensing revenue than they are entitled to receive under U.S. patent law. In fact, exhaustion avoidance is so problematic that the Supreme Court has called such activity “‘hateful to the law’” and “‘obnoxious to the public interest.’”²³⁵ Accordingly, courts should invoke the patent misuse doctrine to protect the primary purpose of U.S. patent laws and prevent the courts from abetting exhaustion avoidance.

1. *Expanding the Physical Scope of a Patent*

Defendants can establish the first element of patent misuse by proving the SEP owner’s proposed damages model violates apportionment. If an SEP owner’s proposed license violates apportionment to capture value in an accused device that falls outside the scope of the claimed invention, this is tantamount to expanding the physical scope of the patent to cover unpatented features in the accused device.²³⁶ Returning to the algebraic proof, if the SEP owner’s license model results in $A > B$, then the SEP owner’s proposed license to A violates apportionment by impermissibly expanding the physical scope of the patent to capture unpatented value in the accused device.²³⁷

of unclean hands, whereby a court of equity will not lend its support to enforcement of a patent that has been misused.”).

²³⁴ *Quanta Comput.*, 553 U.S. at 626 (quoting *Motion Picture Patents Co. v. Universal Film Mfg. Co.*, 243 U.S. 502, 511 (1917)).

²³⁵ *See Impression Prods., Inc. v. Lexmark Int’l. Inc.*, 137 S.Ct. 1523, 1532 (2017) (“The patent laws do not include the right to ‘restrain [] . . . further alienation’ after an initial sale; such conditions have been ‘hateful to the law from Lord Coke’s day to ours’ and are ‘obnoxious to the public interest.’” (quoting *Straus v. Victor Talking Mach. Co.*, 243 U.S. 490, 501 (1917))).

²³⁶ Although the patent misuse doctrine is stated in terms of the “physical” scope of the patent grant, it should not matter whether the licensor expands the scope of the patent to capture the value of unpatented physical features or unpatented non-physical features. For example, consider two handset manufacturers, D and E. If E sells handsets at a higher price than D, that higher price may be justified in the eyes of the consumer by physical features (e.g., better camera or operating system) or non-physical features (e.g., cooler brand or marketing). In either case, the licensor is not permitted to capture the value of these features that fall outside the scope of the licensor’s patents.

²³⁷ It should not matter whether the SEP owner is impermissibly capturing the value of unpatented features of a device that contains the SSPPU or the value of unpatented features of a separate device that does not contain the SSPPU. Both are impermissible expansions of the physical scope of the patent. *Princo Corp. v. Int’l Trade Comm’n*, 616 F.3d 1318, 1327 (Fed. Cir. 2010) (en banc).

The Northern District of California held otherwise, however, in *Samsung Electronics Co. Ltd. v. Panasonic Corp.* *Samsung Elecs. Co., Ltd. v. Panasonic Corp.*, No C10-03098, slip op. at 6 (N.D. Cal. Aug. 25, 2011). In that case, the court distinguished *Zenith Radio Corp. v. Hazeltine Research, Inc.* because *Zenith* involved a license model that covered different infringing and non-infringing products. *Id.* at 5–6 (citing *Zenith Radio Corp. v. Hazeltine Rsch., Inc.*, 395 U.S. 100, 134, 136–37, 139–40 (1969)). The Northern District of California, however, never even considered apportionment in its analysis, which caused the court to miss how the plaintiff was attempting to expand the physical scope of the asserted patents.

Merely proving that the SEP owner's proposed license to one implementer impermissibly expands the physical scope of the patent, however, may be of little consequence. Patent misuse renders the asserted patent(s) unenforceable only until the misconduct is purged.²³⁸ If the scope of patent misuse is limited to the negotiations between one SEP owner and one implementer, then the SEP owner could purge its misconduct simply by offering the implementer new license terms that do not impermissibly expand the physical scope of the patent.²³⁹

The SEP owner may struggle to purge its misconduct, however, if the SEP owner repeatedly failed to apportion damages in its patent licensing program across multiple implementers. Courts can identify repeated apportionment violations in several ways. For example, in a two-party dispute, the patent owner must prove that its royalty model properly apportions value between the patented and unpatented features.²⁴⁰ Likewise, the party offering past license agreements to support its royalty model must prove that the past license agreements are sufficiently comparable to the licensing dispute at issue.²⁴¹ In light of these two principles, if an SEP licensor relies on past license agreements to support its damages model, then the SEP licensor must provide evidence proving that those past license agreements also properly apportioned value between the patented and unpatented features.

Holding otherwise would allow licensors to avoid apportioning value in every future dispute simply because they forced past licensees to sign agreements that did not properly apportion value between the patented and unpatented features.²⁴² The Federal Circuit made this mistake in *CSIRO*. There, the Federal Circuit held that royalty models may be based on past license negotiations without violating the apportionment doctrine.²⁴³ In that case, the court ignored apportionment requirements when considering past license negotiations. Instead, the court assumed, without citing any supporting evidence, that the prior license negotiations "already built-in apportionment" under the belief that the parties to those licenses must have "negotiated over the value of the asserted patent, 'and no more.'"²⁴⁴

This assumption is false. License negotiations are not academic exercises where both parties are focused on achieving the correct outcome consistent with all legal constraints and representative of the value being conferred. Rather, each party uses all available leverage to obtain the best achievable outcome. A patent owner with the ability to threaten litigation will use that leverage to force the licensee to

²³⁸ *B. Braun Med., Inc. v. Abbott Lab'y's.*, 124 F.3d 1419, 1427 (Fed. Cir. 1997).

²³⁹ *Cf. Altmayer-Pizzorno v. L-Soft Int'l, Inc.*, 302 Fed. Appx. 148, 157 (4th Cir. 2008) ("If the defendant fails to show that the misuse had anti-competitive consequences, the termination of the contract containing the anti-competitive clause may be sufficient to purge the misuse.").

²⁴⁰ *Garretson v. Clark*, 111 U.S. 120, 121 (1884).

²⁴¹ *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1332 (Fed. Cir. 2009).

²⁴² *Cf. Taylor*, *supra* note 118, at 115–16 (describing how the "circularity problem" created when patent rights are valued based on negotiated royalties in past agreements).

²⁴³ *Commonwealth Sci. & Indus. Rsch. Org. v. Cisco Sys., Inc.*, 809 F.3d 1295, 1304 (Fed. Cir. 2015).

²⁴⁴ *Id.* at 1303 (quoting *Ericsson, Inc. v. D-Link Sys., Inc.*, 773 F.3d 1201, 1226 (2014)).

pay higher royalty rates.²⁴⁵ In the SEP context, licensors can exert additional leverage over licensees by, for example, filing lawsuits, seeking injunctions, or withholding product.²⁴⁶ This additional leverage forces licensees into paying SEP owners more than the value of the licensed SEPs.²⁴⁷

In a world where outside leverage exists in license negotiations, courts should not blindly assume that parties to past license agreements “negotiated over the value of the asserted patent, ‘and no more.’”²⁴⁸ Rather, courts should avoid relying on past licenses where possible.²⁴⁹ If a court must consider past license agreements, then the court must also investigate whether those past license agreements also properly apportioned value between the patented and unpatented features.²⁵⁰

Through this investigation, courts can determine whether any apportionment violations are limited to the instant dispute or whether they are consistent with the licensor’s pattern of behavior. For SEP licensors, long-standing use of the exhaustion-avoidance licensing model alone could establish repeated failures to apportion damages. After all, one of the biggest benefits of the exhaustion-avoidance licensing model is to extract more money from OEMs than they would be entitled to recover

²⁴⁵ See *LaserDynamics, Inc. v. Quanta Computer, Inc.*, 694 F.3d 51, 77 (Fed. Cir. 2012) (expressing a “longstanding disapproval” of relying on settlement agreements as comparable licenses); see also *ResQNet.com, Inc. v. Lansa, Inc.*, 594 F.3d 860, 872 (Fed. Cir. 2010) (noting that “litigation itself can skew the results of the hypothetical negotiation”).

²⁴⁶ See Florian Mueller, *Patent Injunctions Remain the Norm in Germany*, FOSS PATENTS (Oct. 21, 2021), <http://www.fosspatents.com/2021/10/patent-injunctions-remain-norm-in.html> (reporting on how injunctions are easily obtainable in German SEP cases); Jeremy Horwitz, *Apple Settles with Qualcomm, Licenses Patents for Chips Ahead of 5G*, VENTUREBEAT (Apr. 16, 2019), <https://venturebeat.com/2019/04/16/apple-settles-with-qualcomm-licenses-patents-for-chips-ahead-of-5g/> (reporting on how Apple signed a patent license deal with Qualcomm so that Qualcomm would sell 5G chips to Apple).

²⁴⁷ For example, when Daimler settled its SEP disputes and agreed to Avanci’s license terms, Daimler almost certainly was not negotiating “over the value of the asserted patent”; rather, they were negotiating over the value of selling vehicles in Germany—which has nothing to do with the value of the licensed patents. Cf. Florian Mueller, *Daimler takes Avanci patent license*, FOSS PATENTS (Dec. 22, 2021), <http://www.fosspatents.com/2021/12/daimler-takes-avanci-patent-license-all.html> (reporting how Daimler agreed to Avanci’s patent license and settled its SEP disputes to avoid enforcement of injunctions in Germany); Karin Matussek, *Daimler, Nokia End Mobile Tech War That Threatened Car Sales*, BLOOMBERG (June 1, 2021), <https://www.bloomberg.com/news/articles/2021-06-01/daimler-nokia-call-truce-to-end-war-over-mobile-patents> (reporting that Daimler settled litigation with Nokia, despite Daimler’s insistence that Daimler’s suppliers are responsible for paying SEP license fees, to avert the enforcement of injunctions while appeals were still pending).

²⁴⁸ *Commonwealth Sci. & Indus. Rsch. Org.*, 809 F.3d at 1303 (quoting *Ericsson*, 773 F.3d at 1226).

²⁴⁹ See, e.g., *In re Innovatio IP Ventures, LLC Patent Litigation*, No. 11 C 9308, slip op. at *39 (N.D. Ill. Oct. 3, 2013) (expressing preference for a top-down valuation approach that “apportions to the value of Innovatio’s patented features without relying on information about other licenses that may or may not be comparable to accomplish the apportionment”).

²⁵⁰ Cf. Taylor, *supra* note 118, at 130–32 (recommending that courts adjust past license agreements before relying on them as comparable licenses).

from their suppliers.²⁵¹ If a licensor repeatedly used the exhaustion-avoidance licensing model to obtain different license fees from different implementers in exchange for the same license rights, a court could easily find that the licensor obtained those different license fees by violating apportionment principles in those past license agreements.²⁵²

2. Anticompetitive Effects

As for the Federal Circuit's second element of patent misuse, the Supreme Court has never expressly required an "anticompetitive effect" in a patent misuse case. Instead, the Federal Circuit added the "with anticompetitive effect" language on its own.²⁵³ The Federal Circuit also added, without citing any authority, that patent misuse must "tend[] to restrain competition in an appropriately defined relevant market."²⁵⁴ The Supreme Court, however, reaffirmed in *Kimble v. Marvel Entertainment* that patent misuse does not necessarily require evidence of an "anticompetitive effect."²⁵⁵ *Kimble* may signal that the Supreme Court does not approve of

²⁵¹ See *supra* notes 44–46 and accompanying text.

²⁵² In *Saint Lawrence Communications*, Judge Gilstrap was "not persuaded" that the patent owner engaged in patent misuse "by negotiating different rates and terms for different licensees when presented with different circumstances." *Saint Lawrence Communications LLC v. Motorola Mobility LLC*, No. 2:15-CV-351-JRG, slip op. at 16–17 (E.D. Tex. Feb. 15, 2018). According to Judge Gilstrap, "[t]o hold as such would tell patent owners that their first license for a FRAND encumbered patent must also be their last, tying the hands of patent owners and future licensees who may not be similarly situated." *Id.*

Although patent owners are free to set different license rates based on "different circumstances," those circumstances must be relevant to the underlying value of the licensed patents. Although evidence of different license rates alone may not be sufficient to establish expansion of the physical scope of the patent, varying license rates in combination with long-standing use of the exhaustion-avoidance licensing model does suggest that the SEP owner is intentionally expanding the physical scope of protection beyond the patent grant. Unless the SEP owner provides evidence that the varying license rates are due to the value of the licensed SEPs somehow varying between licensees, courts should presume that the SEP owner violated apportionment and used outside leverage in past license agreements to expand the scope of the patent grant.

²⁵³ Geoffrey D. Oliver, *Princo v. International Trade Commission: Antitrust Law and the Patent Misuse Doctrine Part Company*, 25 ANTITRUST 62, 63 (2011) (explaining how the Federal Circuit in *Windsurfing International* added the language to the Supreme Court's original patent misuse language in *Blonder-Tongue*).

²⁵⁴ *Id.* (quoting *Windsurfing Int'l, Inc. v. AMF, Inc.*, 782 F.2d 995, 1001–02 (Fed. Cir. 1986)); see also Cassandra E. Havens, *Saving Patent Law from Competition Policy and Economic Theories: Kimble v. Marvel Entertainment*, 31 BERKLEY TECH. L.J. 371, 378 (2016) ("By adding a new phrase, 'with anticompetitive effect,' into a Supreme Court rule, the Federal Circuit grafted an antitrust interest in market control into the doctrine of patent misuse."); *id.* at 378 n.66 (noting that the Supreme Court did not originally require anticompetitive effects in *Blonder-Tongue*). "[T]his was a genuinely startling pronouncement because existing case law, including controlling Supreme Court precedent, had never held that a relevant market finding or a finding of an anticompetitive effect had been required to support a finding of extension of the monopoly-type patent misuse." Daryl Lim, *Patent Misuse and Antitrust: Rebirth or False Dawn?*, 20 MICH. TELECOMM. & TECH L. REV. 299, 333 (2014) (quoting Robert J. Hoerner, *The Decline (and Fall?) of the Patent Misuse Doctrine in Federal Circuit*, 69 ANTITRUST L.J. 669, 697 (2002)).

²⁵⁵ *Kimble v. Marvel Entm't Inc.*, 576 U.S. 446, 449 (2015) (declining to overrule the Supreme

the Federal Circuit's anticompetitive-effect requirement.²⁵⁶

Assuming, *arguendo*, that anticompetitive effect is required, implementers can establish anticompetitive effect in several ways. After all, establishing an anticompetitive effect does not necessarily require a separate antitrust violation.²⁵⁷ In addition, compliance with the FRAND commitment is not relevant to whether an anticompetitive effect has occurred.²⁵⁸ Furthermore, an "anticompetitive effect" can exist even if the perpetrator even benefit directly from the anticompetitive effect.

Rather than rehash all the various competition arguments raised by others, this section will focus on the SEP owner's ability to use the exhaustion-avoidance licensing model to pick winners and losers both within an industry and across industries.²⁵⁹ The licensor's ability to pick winners and losers creates at least three anticompetitive effects.

The first is excessive prices. Excessive prices are a recognized anticompetitive effect under U.S. antitrust law.²⁶⁰ Here, SEP licensors are using the exhaustion-avoidance licensing model to extract higher royalties from license targets than they are otherwise entitled to recover under U.S. patent law.²⁶¹ This alone should satisfy the Federal Circuit's requirement for an "anticompetitive effect," regardless of whether the licensor is also doing business in the relevant market where the anti-

Court's prior decision in *Brulotte v. Thys Co.*, 379 U.S. 29, 32 (1964)).

²⁵⁶ In the meantime, the Federal Circuit test may still apply. *Princo* held that prior Supreme Court cases are per se anticompetitive, and all *Kimble* did was choose not to overrule *Brulotte*, a prior Supreme Court case. Therefore, *Princo* may have survived *Kimble* even though *Princo* otherwise contradicts *Brulotte*, which was reaffirmed in *Kimble*.

²⁵⁷ See *Zenith Radio*, 395 U.S. at 140 (holding that the patent owner's license activities amounted to patent misuse even though the misuse did not necessarily satisfy the requirements of a Sherman Act violation); *Senza-Gel Corp. v. Seiffhart*, 803 F.2d 661, 668 (Fed. Cir. 1986) ("Thus, as the Supreme Court has said, the patentee's act may constitute patent misuse without rising to the level of an antitrust violation." (citing *Zenith*, 395 U.S. at 140)).

²⁵⁸ See Herbert J. Hovenkamp, *FRAND and Antitrust*, 105 CORNELL L. REV. 1683, 1685–86 (2020) (explaining that violation of a FRAND commitment can also be an antitrust violation, but mere violation of the FRAND commitment alone does not prove that an antitrust violation has occurred); BROOKS & GERADIN, *supra* note 122, at 8 (concluding that organizations like ETSI did not adopt the FRAND standard for the purpose of ensuring compliance with EU competition law).

²⁵⁹ See *supra* Parts III.A & III.B.

²⁶⁰ Although U.S. antitrust law does not prohibit excessive pricing on a standalone basis, excessive prices may be an anticompetitive effect resulting from other violations of antitrust law. See, e.g., *Berkey Photo, Inc. v. Eastman Kodak Co.*, 603 F.2d 263, 294 (2d Cir. 1979) (identifying excessive prices as "one of the primary evils that the Sherman Act was intended to correct"); ORG. FOR ECON. CO-OPERATION & DEV., EXCESSIVE PRICES 2–5 (2011), <https://www.justice.gov/sites/default/files/atr/legacy/2014/05/30/278823.pdf> (explaining how "some higher prices may be addressed as an anticompetitive effect of other underlying antitrust violations" under U.S. law (cleaned up)); see also Kurgonaitė et al., *supra* note 5, at 142 ("If it were established that selective SEP licensing enabled an SEP holder to extract unjustifiably high royalties, not reasonably related to the economic value of the innovation covered by the relevant SEP, this could be deemed exploitive abuse under [antitrust law].").

²⁶¹ See *supra* notes 44–46 and accompanying text; *supra* notes 59–65 and accompanying text.

competitive effect has occurred.

Second, selective SEP licensing and price discrimination may also distort competition long-term by excluding certain market participants or their activities.

For example, such exclusion might restrict R&D at intermediate levels [tiers in the supply chain] and/or limit the ability to compete for all customers. If the intermediary is neither licensed itself, nor covered by the ‘have made’ provisions of a downstream license, this might chill incentives to innovate. It might be argued that potential customer foreclosure is more likely in multi-tier markets where intermediate suppliers could be wary of developing new or aftermarket products not already contracted for by end-product manufacturers.²⁶²

Consider, for example, the potential impact on Tier 1 suppliers in the automotive industry. Thanks to indemnification obligations, Tier 1 suppliers may end up taking a loss on products that were previously profitable. Even if these Tier 1 suppliers decide to continue selling TCUs in the future, they risk losing OEM customers if they charge higher prices or remove indemnification obligations. In addition, the loss on past sales will undoubtedly hinder the Tier 1 supplier’s ability to invest in research and development towards next-generation products.

Finally, the exhaustion-avoidance licensing model encourages licensors to delay licensing efforts,²⁶³ causing patent holdup against the eventual license targets.²⁶⁴ Although patent holdup itself is not necessarily an anticompetitive effect, SEP owners in the telecom industry used delayed licensing and patent holdup to create an anticompetitive effect. Specifically, the telecommunications industry sold equipment for years that implemented the relevant standards without licenses.²⁶⁵ Instead, they waited to reveal the license costs until after implementers were locked into the standards.²⁶⁶ By failing to set patent license rates for other industries before standard implementation by those industries, SEP owners hid the full cost of standard implementation and induced more companies to implement the relevant standards.²⁶⁷

²⁶² Kurgonaitė et al., *supra* note 5, at 140.

²⁶³ See *supra* notes 93–95 and accompanying text.

²⁶⁴ See, e.g., Gallego & Drexler, *supra* note 4, at 143–44 (explaining that when an SEP owner delays licensing efforts until after its licensing target “has already invested in the implementation of a connectivity technology,” the implementer becomes “locked into this technology in such a way that the [SEP] owner is in a position to impose unreasonable and/or discriminatory license conditions vis-à-vis this single implementer”).

²⁶⁵ See *Commonwealth Sci. & Indus. Rsch. Org. v. Cisco Sys., Inc. (CSIRO)*, No. 11-CV-00343-LED, slip op. at 22 (E.D. Tex. July 23, 2014), vacated and remanded, 809 F.3d 1295 (Fed. Cir. 2015) (taking notice of “pervasive infringement” that existed among wireless chip manufacturers); *HTC Corp.*, 407 F.Supp.3d 633, 637 (E.D. Tex. 2019) (summarizing testimony from an Ericsson witness who asserted that “the profit margin that a component supplier makes is not necessarily reflective of the value of the intellectual property embodied in that component, especially in a situation like the one presented here where the component supplier does not pay royalties for that intellectual property”).

²⁶⁶ See, e.g., Gallego & Drexler, *supra* note 4, at 143–44 (describing the “considerable information problems” that implementers face when trying to determine license costs at the time of implementation, in part, because the FRAND commitment does not convey a specific royalty rate).

²⁶⁷ FTC Commissioner Lina M. Khan explored a related phenomenon in her now-famous Yale Law

3. *The Remedy for Patent Misuse*

A finding of patent misuse renders the asserted patent(s) unenforceable until the misconduct is purged.²⁶⁸ A patent owner can purge the misuse by abandoning the misusing activity and allowing its effects to dissipate fully.²⁶⁹ In the SEP context, however, causing the misuse to fully dissipate may require considerable effort. As explained above, SEP misuse arguably causes anticompetitive effects including excessive prices, discriminatory pricing, market distortion, and patent holdup caused by delayed rate setting. SEP owners must eliminate these effects if they want to purge their misuse.²⁷⁰

Courts should require SEP licensors who committed patent misuse to take at least three remedial actions before allowing SEP owners to assert the misused patents.²⁷¹ First, the SEP owners should establish a new license model and rate that (1) respects apportionment, (2) reflects the actual value of the patented idea separate from the value of its standardization or implementation, and (3) does not vary based on use case, sales price, implementer profits, or other criteria that SEP owners have historically used to violate apportionment. Second, the SEP owners should make

Journal student note. Lina M. Khan, *Amazon's Antitrust Paradox*, 126 YALE L.J. 564 (2017). According to Khan, Amazon underpriced their services for years to invest in adding customers and building long-term market power. *Id.* at 746–50. Antitrust law, however, was unequipped to address the anticompetitive effects of this activity because the antitrust framework was overly focused on short-term price effects. *Id.* at 716–17. Since the short-term effects of predatory pricing benefited consumers, Amazon's business strategy escaped antitrust scrutiny. *Id.* The situation is analogous to SEP owners in the telecom industry: telecommunications companies artificially lowered up-front adoption costs by unbundling the patent rights from the products, which fueled short-term network growth while the public waited to learn the long-term patent cost. *Cf.* Mark A. Lemley, *Ten Things to do About Patent Holdup of Standards (And One Not To)*, 48 B.C. L. Rev. 149, 158 (2007) (“SSOs need to find out what the true cost of a standard is before they adopt it, not after the fact.”).

²⁶⁸ *B. Braun Med., Inc. v. Abbott Labs.*, 124 F.3d 1419, 1427 (Fed. Cir. 1997).

²⁶⁹ *B. B. Chem. Co. v. Ellis*, 314 U.S. 495, 498 (1942) (placing the burden on the patent owner to “show that it has fully abandoned its present method of restraining competition in the sale of unpatented articles and that the consequences of that practice have been fully dissipated”).

²⁷⁰ *Cf.* HERBERT HOVENKAMP, MARK JANIS, & MARK LEMLEY, *IP AND ANTITRUST: AN ANALYSIS OF ANTITRUST PRINCIPLES APPLIED TO INTELLECTUAL PROPERTY LAW* § 3.06[A], at 3-88 (3rd ed. Supp. 2019) (“When and how misuse is purged should properly depend on the severity of the misuse and the harm it inflicts.”).

²⁷¹ Courts should also consider whether a finding of patent misuse should apply only to the SEP owner's U.S. patents or to all of the patents participating in the misuse. “[T]he patent misuse doctrine is an extension of the equitable doctrine of unclean hands, whereby a court of equity will not lend its support to enforcement of a patent that has been misused.” *B. Braun*, 124 F.3d at 1427 (citing *Senza-Gel Corp. v. Seiffhart*, 803 F.2d 661, 668). On one hand, limiting the patent misuse remedy only to U.S. courts would prevent the U.S. legal system from actively enforcing misused patents. On the other hand, such a ruling would merely invite the SEP owner to continue the misuse in a foreign jurisdiction, where the SEP owner could resume applying leverage against the assertion target to force the target to accept a global license (including a license to the unenforceable U.S. patents). From this perspective, judicial actions such as denying a defendant's request for an anti-suit injunction could be seen as lending support to an SEP owner attempting to enforce misused patents.

this new license available to anyone who requests a license, regardless of the implementer's position within a supply chain. Third, the SEP owners should make this same license available to all implementers who have already taken a license, refunding those implementers who were forced to pay for licenses that did not respect apportionment.²⁷²

Not only are such remedial actions necessary to dissipate the full effects of the misuse, but they also show that the patent misuse doctrine still has application in modern patent disputes. For example, critics have argued that courts should abolish the remedy of unenforceability because it creates a windfall profit for uninjured infringers.²⁷³ Applying the patent misuse doctrine to licensing models that violate apportionment, however, does not cause any windfall profit for uninjured infringers. Patent misuse remedies are temporary; patent owners can regain the right to assert their patents by purging the effects of their misuse. Prior to purging, all standard implementers are injured infringers, either because they are currently paying license rates that violate apportionment or because the threat of unlawful license demands loom over their future.²⁷⁴ After purging, the patent misuse remedy vanishes, eliminating any "windfalls" and allowing SEP owners to resume asserting their patents lawfully. In this way, allowing SEP owners to purge their misuse ensures that the misuse doctrine balances the otherwise competing goals of encouraging innovation and discouraging apportionment violations.²⁷⁵

As another example, critics have argued that the patent misuse doctrine "detracts from commercial certainty needed by businesses and innovators."²⁷⁶ In the SEP context, however, application of the patent misuse doctrine improves commercial certainty across a variety of industries by guaranteeing implementers the right to license SEPs on the same terms as every other implementer.²⁷⁷ As for SEP owners, the patent misuse doctrine merely requires them to choose between two options: maintain commercial certainty by respecting apportionment or risk commercial certainty by pursuing license fees that violate apportionment.

²⁷² Alternatively, the SEP owners could satisfy all three required actions simply by licensing at the highest level of the supply chain (i.e., chip manufacturers) and issuing refunds to licensees who paid license fees for exhausted products.

²⁷³ Christa Laser, *Continuing the Conversation of 'The Economic Irrationality of the Patent Misuse Doctrine'*, 11 CHI.-KENT J. INTELL. PROP. 104, 114 (2012) (citing Mark A. Lemley, Comment, *The Economic Irrationality of the Patent Misuse Doctrine*, 78 CAL. L. REV. 1599, 1619 (1990)).

²⁷⁴ See Part III.B, *supra* (explaining how implementers cannot predict whether SEP owners will eventually target them).

²⁷⁵ See Laser, *supra* note 273, at 108 ("An efficient solution will (1) adequately discourage patentees from seeking to exceed their patent scope and (2) continue to encourage innovation by permitting patentees to benefit up to the intended scope.").

²⁷⁶ Lim, *supra* note 254, at 363 (recapping arguments that the patent misuse doctrine is too vague to provide commercial certainty); see also *id.* at 363–85 (addressing and dispatching a variety of criticisms of the patent misuse doctrine).

²⁷⁷ See also text accompanying notes 93–95, *supra* (discussing delayed licensing tactics prevent startups and other companies from making educated financial decisions).

SEP owners will complain, of course, about applying the patent misuse doctrine to the exhaustion-avoidance licensing model after that license model has been in place for decades. Courts should not, however, excuse reliance on improper patent valuation methods merely because improper patent valuation methods have been widely accepted in the past.²⁷⁸ Additionally, if SEP owners did not want the exhaustion-avoidance licensing model to face new scrutiny, then they should not have tried extending the exhaustion-avoidance licensing model to cross-industry disputes where the license model's flaws would be more apparent.²⁷⁹ More generally, if SEP owners did not want their licensing activities to trigger the patent misuse doctrine, then they should have implemented a licensing program that respected patent apportionment law at the outset.²⁸⁰ Likewise, if the standard-setters wanted even more assurance that they would be able to recover their upfront research expenses,²⁸¹ then they should have raised the sales prices of their standard-implementing products²⁸² or established their license rates *ex ante*.²⁸³

²⁷⁸ *Contra* Samsung Elecs. Co. Ltd. v. Panasonic Corp., No C10-03098, slip op. at 9 (N.D. Cal. Aug. 25, 2011) (rejecting Samsung's argument that the defendants committed patent misuse by requiring that royalties be paid based on the net sales price of the entire end product solely because "[t]he practice of charging royalties based on a percentage of the total price of a finished product is a widely accepted method for calculating patent royalties where the final product includes, but is not limited to, parts or components that are covered by other patents or are unpatented").

²⁷⁹ See Part III, *supra*.

²⁸⁰ Unlike other criticisms levied against the patent misuse doctrine, here the remedy is closely proportional to the offense committed: the only real punishment for violating apportionment in a way that constitutes patent misuse is that the patent owner is banned from violating apportionment. *Cf.* Lim, *supra* note 254, at 380–85 (considering arguments about whether the patent misuse doctrine disproportionately penalizes patentees).

²⁸¹ See, e.g., Gene Quinn, *Standard Essential Patents: The Myths and Realities of Standard Implementation*, IPWATCHDOG (Feb. 4, 2019), <https://www.ipwatchdog.com/2019/02/04/standard-essential-patents-myth-realities-standard-implementation/id=105940/> (complaining about the hardships faced by SEP owners who purportedly “invested massive sums of sunk costs innovating the technologies” and face implementers who “are trying to reduce their costs and the return to standards developers when those developers have already sunk their R&D investments”) (quoting Matteo Sabattini, Director of IP Policy for Ericsson). *But see infra* note 282 (showing how Ericsson recovers its research and development expenses through product sales, not patent licensing).

²⁸² In reality, standard setters cover their research expenses through product sales rather than patent licensing. For example, Ericsson only started reporting patent licensing revenue as a separate income stream in 2005, despite decades of prior research expenses. See ERICSSON ANNUAL REPORT 59, 49 (2005), (available at

<https://www.ericsson.com/492b46/assets/local/investors/documents/financial-reports-and-filings/annual-reports/annual-report-2005-complete-en.pdf>) (reporting license revenues separately from capital gains/losses and other operating revenues for the first time); *Annual Reports*, <https://www.ericsson.com/en/about-us/history/sources/annual-reports> (linking to all Ericsson annual financial reports since 1901). From 2005 through 2020, Ericsson's total reported research expenses were more four times higher than its total patent licensing revenue, which also represented less than four percent of Ericsson's total net revenue. *Id.*; see also ERICSSON ANNUAL REPORT 46, 13 (2020), (available at

<https://www.ericsson.com/494193/assets/local/investors/documents/2020/annual-report-2020-en.pdf>) (reporting that its 2020 licensing revenues were 25% of its 2020 R&D expenses and 4.3%

C. Addressing Policy Failures in the Exhaustion-Avoidance Licensing Model

In *Innovatio*, Judge Holderman analyzed a dispute involving SEPs without directly relying on policy arguments or the FRAND commitment.²⁸⁴ Instead, Judge Holderman's apportionment analysis happened to have the "advantage" of ensuring that the licensor complied with its FRAND commitment.²⁸⁵ Similarly, application of the patent apportionment and patent misuse doctrines to the exhaustion-avoidance licensing model also has the advantage of resolving policy issues and raising the bar for the FRAND commitment.

The apportionment doctrine resolves each policy issue identified in Part III, *supra*. By prohibiting SEP licensors from capturing value contributed by features outside the SSPPU, apportionment law removes the economic incentive for SEP licensors to engage in vertical and horizontal discrimination. In addition, apportionment law prevents SEP owners from preying on those companies least equipped to defend themselves by prohibiting SEP licensors from overcharging implementers based on value outside the scope of the patent grant.

Using the patent misuse doctrine to enforce apportionment principles will also bring SEP licensing activity closer to the plain meaning of FRAND. For example, by requiring SEP licensors to purge the anticompetitive effects of excessive prices and price discrimination from their licensing program, the patent misuse doctrine prevents the horizontal and vertical discrimination that should have already been prohibited by FRAND's non-discrimination element.²⁸⁶ Addressing excessive pric-

of its total net revenue). Thus, for standard setters like Ericsson, patent licensing merely represents an additional, high-profit revenue stream that is otherwise unnecessary to justify investments in research and development.

²⁸³ See Lemley, *supra* note 267, at 158–59 (suggesting that SSOs require patentees to specify license rates ex ante so that SSOs and the public knows the full cost of the standard before adoption).

²⁸⁴ In re *Innovatio IP Ventures, LLC Patent Litig.*, No. 11 C 9308, slip op. at 74 (N.D. Ill. Oct. 3, 2013).

²⁸⁵ *Id.*

²⁸⁶ On the other hand, Professor Richard Gilbert has argued that the non-discrimination element of FRAND should not require licensors to charge everyone the same amount for the same thing. Richard J. Gilbert, *Deal or No Deal? Licensing Negotiations in Standard Setting Organizations*, 77 ANTITRUST L.J. 855, 875 (2011) (arguing that standardized license fees are unfair to small producers). Specifically, he argues that the non-discrimination element of FRAND should not require licensors to charge fixed per-unit license fees or fixed one-time license fees. *Id.* Regarding fixed per-unit license fees, Professor Gilbert argues that fees and royalties that decline with output have desirable economic effects. *Id.* Of course, the non-discrimination prong of FRAND does not actually prevent such a license structure. An SEP owner could, for example, offer everyone who requests a license a declining rate structure and not violate the non-discrimination requirement. This rate structure would still need to comply with underlying patent law, of course, and avoid charging for value beyond the value associated with the licensed SEPs.

As for fixed one-time license fees, Professor Gilbert argues that "[i]t is not fair to require a firm that sells 1000 wireless units per year to pay the same fixed patent license fee as a firm that sells 1 million wireless units per year." *Id.* On the contrary, this may actually be a fair result. The second firm's ability to sell 999,000 more units may have nothing to do with the licensed patents.

es, in particular, also helps ensure that SEP owners offer licenses on fair and reasonable financial terms and eliminates a key motivator for selective enforcement.²⁸⁷

Finally, the patent misuse doctrine fills in the gap created by the Ninth Circuit's decision in *FTC v. Qualcomm*.²⁸⁸ In that case, the Ninth Circuit refused to consider the anticompetitive effects identified by the trial court because such effects primarily harmed "customers and consumers outside the defined market."²⁸⁹ By declaring such harms to be "outside the scope of antitrust law," the Ninth Circuit's decision permitted Qualcomm to continue engaging in licensing practices that harmed OEMs.²⁹⁰ Patent courts, however, need not be so permissive. The patent misuse doctrine instructs courts "not to lend its support to enforcement of a patent that has been misused."²⁹¹ As such, patent courts should not assist patent owners in causing *any* anticompetitive harms, regardless of which markets or consumers are primarily impacted by such harms.

V. Conclusion

This Article's title predicts that the IoT will change patent licensing forever. Parts I-IV, however, never address this prediction. Instead, they introduce the story about how SEP owners are extending the exhaustion-avoidance licensing model to cross-industry SEP assertions,²⁹² in the face of significant policy issues²⁹³ and viola-

Instead, the second firm's ability to sell more units may be due to better sales teams, better quality, better manufacturing, better brand, better reputation, better customer service, or any number of other factors irrelevant to the cellular SEPs. Professor Gilbert's example only *seems* unfair because it inherently assumes that the firm selling one million units is paying a fair license fee and that the firm selling one thousand units is overpaying. In reality, both firms may be over-paying if the licensor is violating apportionment in its licensing model.

²⁸⁷ The patent misuse doctrine does not, however, eliminate selective enforcement like the FRAND commitment can and should. In the absence of a FRAND commitment, patent owners are generally free to choose who they license. Patent owners must, however, properly apportion value in every case. *Garretson v. Clark*, 111 U.S. 120, 121 (1884). Thus, although patent owners may target licensees who have the financial resources to pay the required patent royalties, they cannot require those targeted licensees to pay more for value outside the scope of the licensed patents.

The FRAND commitment, however, should prevent all selective licensing by requiring SEP owners to grant a license to any implementer who requests a license. See Jorge L. Contreras, *Sometimes FRAND Does Mean License-to-All*, IAM (Oct. 10, 2020), <https://www.iam-media.com/frandseps/sometimes-frand-does-mean-license-all> (explaining why FRAND should be interpreted as imposing a "License to All" requirement). Although apportionment law and the patent misuse doctrine can reduce the incentive for selective licensing, only the FRAND commitment has the power to eliminate it.

²⁸⁸ *Fed. Trade Comm'n v. Qualcomm Inc.*, 969 F.3d 974 (9th Cir. 2020).

²⁸⁹ *Id.* at 992–93.

²⁹⁰ *Id.* at 993.

²⁹¹ *B. Braun Med., Inc. v. Abbott Lab'ys*, 124 F.3d 1419, 1427 (Fed. Cir. 1997) (citing *Senza-Gel Corp. v. Seiffhart*, 803 F.2d 661, 668 (Fed. Cir. 1986)) ("[T]he patent misuse doctrine is an extension of the equitable doctrine of unclean hands, whereby a court of equity will not lend its support to enforcement of a patent that has been misused.").

²⁹² See *supra* Part II.

²⁹³ See *supra* Part III.

tions of U.S. patent damages law.²⁹⁴ So how does this story end? How will the IoT change patent licensing forever?

In the best-case scenario, the patent system self-corrects and forces SEP licensors to properly apportion patent value in all assertion efforts. In this scenario, courts may also start enforcing the plain meaning of the FRAND commitment, rejecting proposed comparable license agreements for not complying with apportionment, and finding that certain SEP assertion behavior constitutes patent misuse. This scenario would change patent licensing by forcing large patent empires to abandon the exhaustion-avoidance licensing model and modify their licensing practices.

In the alternative scenario, the patent system refuses to self-correct, thereby allowing SEP licensors to continue using the exhaustion-avoidance licensing model to violate apportionment and recover larger licensing fees than permitted under U.S. patent law. This alternative scenario would change patent licensing even more than the first scenario for at least two reasons.

First, unlike past intra-industry SEP disputes, IoT licensing will affect almost every industry on earth.²⁹⁵ If SEP owners are successful in leveraging SEPs to extract excessive license fees from many other industries, people will notice. The more people notice, the more people will question why a cabal of telecommunications companies can extract excessive license fees from so many other industries—on top of earning profits on the equipment they sell downstream to those industries. Left unchecked, SEP assertions against IoT companies may become such a prominent issue that policymakers from outside the patent world will feel compelled to act—leading to unpredictable changes for the patent industry.

Second, waiving apportionment requirements for SEP owners means waiving apportionment requirements for all patent owners. The apportionment doctrine, however, is a bedrock principle of patent law, keeping patent damages tethered to the value of the claimed invention.²⁹⁶ Ignoring apportionment requirements would allow patent owners to overreach and capture value well beyond the value of the asserted patent.²⁹⁷ For this reason, courts serve as a “gatekeeping authority to ensure

²⁹⁴ See *supra* Part IV.

²⁹⁵ See sources cited *supra* note 9.

²⁹⁶ See, e.g., *Ericsson, Inc. v. D-Link Sys., Inc.*, 773 F.3d 1201, 1226 (Fed. Cir. 2014) (“The essential requirement is that the ultimate reasonable royalty award must be based on the incremental value that the patented invention adds to the end product.”) (citing *Garretson v. Clark*, 111 U.S. 120, 121 (1884)).

²⁹⁷ See, e.g., Jury Verdict Form at 6–7, *VLSI Tech. LLC v. Intel Corp.*, No. 6:21-cv-00057-ADA (W.D. Tex. Mar. 2, 2021), ECF No. 564 (awarding VLSI \$2.18 billion in damages for infringement of two patents despite no finding of willfulness); Jason Rantanen, *Guest Post by Alan Cox: The Damages Testimony in VLSI Technologies v. Intel*, PATENTLY-O (Mar. 19, 2021), <https://patentlyo.com/patent/2021/03/damages-testimony-technologies.html> (recapping the damages portion of jury trial and explaining how VLSI used a hedonic regression model to justify awarding VLSI 79.3 percent of Intel’s profits); *supra* notes 181–188 and accompanying text (explaining

that only theories comporting with settled principles of apportionment [are] allowed to reach the jury.”²⁹⁸ If courts keep the gate ajar for SEP owners, the gate will swing open further and allow all patent asserters to inflate their damages claims.

In short, the IoT fact pattern will force courts to choose between two paths: either address the policy and legal issues raised by the exhaustion-avoidance licensing model or try to ignore them. No matter which path they choose, IoT licensing disputes will change patent licensing forever.

why hedonic models only give the appearance of apportioning value without actually satisfying apportionment requirements); Sources cited *supra* notes 209–216 (discussing how plaintiffs are not entitled to disgorgement of an infringer’s profits).

²⁹⁸ *VirnetX, Inc. v. Cisco Sys., Inc.*, 767 F.3d 1308, 1328 (Fed. Cir. 2014).