



Judge Selna’s Errors in *TCL v. Ericsson* Concerning
Apportionment, Nondiscrimination, and
Royalties Under the FRAND Contract

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In November 2017, District Judge James Selna of the Central District of California determined, in *TCL v. Ericsson*, a fair, reasonable, and nondiscriminatory (FRAND) royalty for Ericsson’s portfolio of standard-essential patents (SEPs).¹ In doing so, he rejected Ericsson’s proposed approach, which used evidence from comparable licenses “to measure in absolute terms the value which Ericsson’s patents add to a product.”² Instead, Judge Selna used two sets of observations to determine whether Ericsson’s offers to TCL were FRAND. First, using a top-down analysis, which “begins with an aggregate royalty for all patents encompassed in a standard . . . [and] then determines a firm’s portion of that aggregate,”³ he concluded that Ericsson’s offers were not “fair or reasonable.”⁴ Second, on the basis of the differences between the royalties implied in Ericsson’s offers to TCL and the royalties that Judge Selna derived from comparable licenses that Ericsson had executed with licensees similarly situated to TCL, he concluded that Ericsson’s offers to TCL were discriminatory. Judge Selna then combined the royalty estimates that he derived from his top-down analysis and his analysis of comparable licenses to determine a FRAND royalty for Ericsson’s SEP portfolio. It does not appear

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¹ *TCL Commc’n Tech. Holdings, Ltd. v. Telefonaktiebolaget LM Ericsson*, Nos. SACV 14-341 JVS, CV 15-2370 JVS, 2018 WL 4488286 (C.D. Cal. Sept. 14, 2018). Judge Selna released a corrected public version of his opinion nine months after its initial release. All citations to his opinion in this article are to the corrected, public version released on September 14, 2018.

² *Id.* at *1.

³ *Id.*

⁴ *Id.* at *26.

that Judge Selna based his precise choice of a royalty rate on the mean (or any other measure of central tendency) of the examined observations. As of this writing, *TCL v. Ericsson* is on appeal to the U.S. Court of Appeals for the Federal Circuit.

Judge Selna's decision rests on material errors of legal or economic analysis. First, he failed to identify the precise rights and obligations arising from Ericsson's FRAND contract with ETSI; and he did not ask, much less answer, whether TCL had exhausted its rights as a third-party beneficiary of Ericsson's FRAND contract with ETSI. Second, Judge Selna's top down analysis used arbitrary inputs that undermined the reliability of his results. Third, his unpacking of comparable licenses violated established legal and economic principles and consequently failed to identify correctly the implied royalties contained in the license agreements that Ericsson had executed with third parties. Fourth, Judge Selna's calculation of a FRAND royalty (based on observations that he combined from the two different methodologies) contained arithmetic errors and failed to explain why particular assumptions or computations supported his conclusions. In sum, the analysis presented in Judge Selna's decision neither supported his conclusion that Ericsson's offers to TCL were not FRAND, nor did it reliably estimate a legitimately FRAND royalty for a license to Ericsson's SEP portfolio.

In Part I of this article, I outline Judge Selna's incorrect understanding of the obligations arising from Ericsson's FRAND contract with ETSI. In Part II, I describe Judge Selna's top down analysis. In Part III, I address the weaknesses of that analysis. In Part IV, I address Judge Selna's unpacking of license agreements that he considered to be sufficiently comparable to inform the determination of a FRAND royalty. In Part V, I examine in detail the computations and assumptions by which Judge Selna determined a FRAND royalty for a license to Ericsson's SEP portfolio, and I show why his conclusions are not reliable.

I. JUDGE SELNA'S INTERPRETATION OF THE FRAND CONTRACT

To resolve the dispute between Ericsson and TCL, Judge Selna sought to determine whether "Ericsson met its FRAND obligation [to the European Telecommunications Standards Institute (ETSI)], and then whether Ericsson's final offers before litigation . . . satisfy FRAND."⁵ He explained that, if Ericsson's offers to TCL were not FRAND, "the Court must determine what terms are material to a FRAND license, and then supply the FRAND terms."⁶ Although Judge Selna concluded that Ericsson's offers to

⁵ *Id.* at *1.

⁶ *Id.*

TCL were not FRAND, he nonetheless found that Ericsson complied with its FRAND obligation by negotiating in good faith with TCL.⁷ Those conclusions are incongruous. Judge Selna's vague and contradictory findings originate from his failure to identify the precise rights and obligations contained in Ericsson's FRAND contract with ETSI.

A. The FRAND Contract

Several courts around the world—applying contract law of different jurisdictions (including Wisconsin state law, Washington state law, and French law)—have found that an SEP holder's FRAND (or reasonable and nondiscriminatory (RAND)) commitment to a given standard-setting organization (SSO) constitutes a binding contract between the SEP holder and the SSO, and that an implementer of the standard is an intended third-party beneficiary of that FRAND (or RAND) contract, entitled to enforce the SEP holder's obligations arising from that contract.⁸ Similarly, Judge Selna (applying French law) concluded that the FRAND commitment that Ericsson gave to ETSI constituted a binding contract.⁹ He also found that, “through the [French law] doctrine of *stipulation pour autrui*, or stipulation on behalf of a third party,” TCL, as an implementer of ETSI's standards, had the right to enforce Ericsson's contractual obligations.¹⁰

When a FRAND commitment constitutes a binding contract, first principles of contract law identify the rights and obligations of the contracting parties.¹¹ Judge Selna explained that, “[u]nder French law, a contract must be interpreted unless its terms are ‘clear and precise.’”¹² He added that, “[a]lthough many contract interpretation rules exist, none are mandatory.

⁷ *Id.* at *2 (“Ericsson negotiated in good faith and its conduct during the course of negotiations did not violate its FRAND obligation. . . . Ericsson's Offer A and Offer B are not FRAND rates.”).

⁸ *See, e.g.,* Apple, Inc. v. Motorola Mobility, Inc., 886 F. Supp. 2d 1061, 1085 (W.D. Wis. 2012) (Crabb, J.) (interpreting an SEP holder's FRAND contract with ETSI by applying Wisconsin state law); Microsoft Corp. v. Motorola, Inc., 696 F.3d 872, 878 (9th Cir. 2012) (interpreting the Institute of Electrical and Electronics Engineers' (IEEE's) RAND commitment by applying Washington state law); Unwired Planet Int'l Ltd v. Huawei Techs. Co. [2017] EWHC (Pat) 2988 [139] (Eng.) (Birss, J.) (interpreting an SEP holder's FRAND contract with ETSI by applying French law), *aff'd*, [2018] EWCA (Civ) 2344 (Eng.). To my knowledge, one U.S. administrative law judge of the U.S. International Trade Commission (ITC) has found that a RAND contract between an SEP holder and a prominent U.S. SSO—the Joint Electron Device Engineering Council (JEDEC)—was *not* enforceable because of indefiniteness. Certain Memory Modules and Components Thereof, and Products Containing Same, Inv. No. 337-TA-1023, at 195 (USITC Nov. 14, 2017) (Recommended Determination). I submitted expert economic testimony to the ITC in the 1023 Investigation on behalf of the complainant, Netlist, Inc.

⁹ *TCL v. Ericsson*, 2018 WL 4488286, at *5.

¹⁰ *Id.* (“ETSI is the promisee, the owner of a SEP who submits the IPR licensing declaration is the promisor, and the third-party beneficiaries are prospective licensees who benefit from the stipulation.”); *see also* Simon Whittaker, *The Law of Obligations*, in PRINCIPLES OF FRENCH LAW 294, 336 (John Bell, Sophie Byron & Simon Whittaker eds., Oxford Univ. Press 2d ed. 2008) (“[T]he parties to a contract may by their agreement create rights in third parties against one or other of them (by *stipulation pour autrui*), support being found for this in article 1121 of the Civil Code.”).

¹¹ J. Gregory Sidak, *The FRAND Contract*, 3 CRITERION J. ON INNOVATION 1, 6 (2018).

¹² *TCL v. Ericsson*, 2018 WL 4488286, at *5.

The main objective is to determine the common intent of the parties.”¹³ Yet, despite acknowledging those principles, Judge Selna did not apply them to the facts of the case to identify (1) Ericsson’s duties imposed by its FRAND contract and (2) TCL’s rights as a third-party beneficiary of that contract.

1. *Do an SEP Holder and an Implementer Each Have a Duty to Negotiate a FRAND License in Good Faith?*

Ericsson and TCL agreed that Ericsson’s FRAND contract with ETSI imposed “a mutual duty” on Ericsson and TCL “to negotiate in good faith,”¹⁴ which Judge Selna seemed to adopt as his own finding of law.¹⁵ However, he did not identify the source of that duty. Judge Selna did not say whether the obligation to negotiate in good faith arises from U.S. patent law, from Ericsson’s FRAND contract with ETSI (construed according to French law), from U.S. contract law, or from something else. Nor did he explain how the SEP holder and the implementer discharge their respective duties to negotiate in good faith.

Other U.S. courts have said that an SEP holder has a duty to negotiate a FRAND license in good faith. In *Microsoft Corp. v. Motorola, Inc.*, for example, Judge James Robart, construing Motorola’s RAND contracts with the IEEE and the International Telecommunication Union (ITU), said that Motorola cannot make “blatantly unreasonable offers to implementers.”¹⁶ He explained that “any offer by Motorola . . . must comport with the implied duty of good faith and fair dealing inherent in every contract.”¹⁷ I have explained elsewhere that the SEP holder discharges this duty to negotiate in good faith by making an offer to the implementer of a royalty that is situated within the FRAND range.¹⁸ The duty to negotiate the licensing terms in good faith does not obligate the SEP holder, having made a legitimately FRAND offer, to continue to negotiate licensing terms with the implementer. By making a legitimately FRAND offer, the SEP holder discharges its duty under the FRAND contract to negotiate in good faith with the implementer in question; any further negotiation that happens between those two parties is at the SEP holder’s discretion, on commercial terms no longer constrained by the FRAND contract.¹⁹

¹³ *Id.*

¹⁴ *Id.* at *55.

¹⁵ *See id.* (“The Court finds that Ericsson negotiated in good faith and did not commit a breach of contract by virtue of its conduct.”).

¹⁶ 864 F. Supp. 2d 1023, 1038 (W.D. Wash. 2012).

¹⁷ *Id.* (citing *Badgett v. Sec. State Bank*, 807 P.2d 356, 360 (Wash. 1991)).

¹⁸ *See, e.g.*, J. Gregory Sidak, *The Meaning of FRAND, Part II: Injunctions*, J. COMPETITION L & ECON. 201, 217 (2015); J. Gregory Sidak, *A FRAND Contract’s Intended Third-Party Beneficiary*, 1 CRITERION J. ON INNOVATION 1001, 1006 (2016).

¹⁹ *See Sidak, The Meaning of FRAND, Part II: Injunctions, supra* note 18, at 216–17; Sidak, *The FRAND Contract, supra* note 11, at 15–18.

Like Judge Selna, at least one other U.S. court, applying French law, has found that an SEP holder has a duty to negotiate in good faith with an implementer. Judge Lucy Koh of the Northern District of California, when interpreting Samsung's FRAND contract with ETSI in *Apple v. Samsung* in 2012, said that the parties' respective experts on French law "agree that[,] under French law, the parties can enter into a valid contract to negotiate in good faith."²⁰ She added that "Samsung's contractual obligation arising from its FRAND declarations to ETSI at the very least created a duty to negotiate in good faith with Apple regarding FRAND terms."²¹ However, neither Judge Selna nor Judge Koh explained whether the SEP holder's duty to negotiate in good faith under French law is identical to the implied covenant of good faith and fair dealing in U.S. contract law. They also did not explain what kind of evidence a court would need to conclude that an SEP holder has discharged its duty to negotiate in good faith.

To the extent that Judge Selna's and Judge Koh's conclusions concerning the SEP holder's duty under French law to negotiate in good faith relied upon analysis of the implied covenant of good faith and fair dealing in U.S. contract law, neither judge acknowledged that the scope of the implied covenant of good faith and fair dealing depends on the controlling state law. The Restatement (Second) of Contracts provides that "[e]very contract imposes upon each party a duty of good faith and fair dealing in its performance and its enforcement."²² However, as Justice Samuel Alito wrote for a unanimous Supreme Court in *Northwest, Inc. v. Ginsberg* in 2014, "[w]hile most States recognize some form of the good faith and fair dealing doctrine, it does not appear that there is any uniform understanding of the doctrine's precise meaning."²³ In Texas, where much litigation over SEPs occurs, state law does not even recognize an implied covenant of good faith and fair dealing.²⁴ Those states that do recognize such an implied covenant impute to it varied meanings. Justice Alito wrote for the Court that, "while some states are said to use the doctrine 'to effectuate the intentions of the parties or to protect their reasonable expectations,' other States clearly employ the doctrine to ensure that a party does not 'violate community standards of decency, fairness, or reasonableness.'"²⁵ For example, Delaware—where much litigation over SEPs

²⁰ *Apple Inc. v. Samsung Elecs. Co.*, No. 11-cv-01864, 2012 WL 1672493, at *12 (N.D. Cal. May 14, 2012) (emphasis omitted).

²¹ *Id.*

²² RESTATEMENT (SECOND) OF CONTRACTS § 205 (AM. LAW INST. 1981).

²³ 572 U.S. 273, 285 (2014).

²⁴ See, e.g., *Formosa Plastics Corp. USA v. Presidio Engineers and Contractors, Inc.*, 960 S.W.2d 41, 52 (Tex. 1998) ("There is no general duty of good faith and fair dealing in ordinary, arms-length commercial transactions.").

²⁵ *Northwest v. Ginsberg*, 572 U.S. at 286 (first quoting Steven J. Burton, *Breach of Contract and the Common Law Duty to Perform in Good Faith*, 93 HARV. L. REV. 369, 371 (1980); and then quoting *Universal Drilling Co., LLC v. R&R Rig Serv., LLC*, 271 P.3d 987, 998 (Wyo. 2012)).

also occurs—occupies the former category,²⁶ and Arizona occupies the latter category.²⁷ Thus, Judge Selna could have clarified the basis for his finding that Ericsson, as the SEP holder, had a duty to negotiate in good faith. Was that finding based on California law or French law?

Whether French law resembles Anglo-American law on the issue of an implied covenant of good faith and fair dealing is a separate question. Neither Judge Selna nor Judge Koh explains whether French law controls or whether the law of a U.S. state controls the court's interpretation of the SEP holder's contract with ETSI. If French law controls the interpretation, the judges do not explain the origin in French law of the duty to negotiate in good faith. Alternatively, if the law of a U.S. state controls, Judge Selna and Judge Koh do not acknowledge (as the Supreme Court observed in 2014) how the states variously interpret and apply the doctrine of the implied covenant of good faith and fair dealing. For example, if a judge were to use Texas law to interpret the SEP holder's contract with ETSI, then, barring a finding of some special and preexisting relationship between the SEP holder and ETSI, the judge could not conclude that the SEP holder has a *contractual* duty to negotiate with implementers in good faith. Perhaps the many pairs of opposing experts on French law who have testified in ETSI FRAND cases in the United States themselves have failed to produce testimony on this topic that is helpful and useful to the finder of fact rather than confusing and circular. It is striking that the only topic on which opposing French law experts seem continually to agree is that there exists a doctrine of *stipulation pour autrui* that closely resembles the Anglo-American doctrine of a third-party beneficiary; but confirmation of the existence of that doctrine is evident from the leading English-language treatises on French law and surely does not require the testimony of French-law experts.²⁸ To avoid this issue, parties

²⁶ See, e.g., *Miller v. HCP & Co.*, No. 2017-0291-SG, 2018 WL 656378, at *9 (Del. Ch. Feb. 1, 2018) (“And the implied covenant does not ‘establish a free-floating requirement that a party act in some morally commendable sense.’ Instead, ‘good faith’ in the implied covenant context entails ‘faithfulness to the scope, purpose, and terms of the parties’ contract.’ Similarly, ‘fair dealing’ here does not imply equitable behavior. The term ‘fair’ is something of a misnomer here; it simply means actions consonant ‘with the terms of the parties’ agreement and its purpose.’ Put differently, any implied obligation ‘must be consistent with the terms of the agreement as a whole.’” (internal citations omitted)).

²⁷ See, e.g., *Bike Fashion Corp. v. Kramer*, 46 P.3d 431, 435 (Ariz. 2002) (“Arizona law recognizes that a party can breach the implied covenant of good faith and fair dealing both by exercising express discretion in a way inconsistent with a party’s reasonable expectations and by acting in ways not expressly excluded by the contract’s terms but which nevertheless bear adversely on the party’s reasonably expected benefits of the bargain.”).

²⁸ See Whittaker, *supra* note 10, at 336; Jean-Sébastien Borghetti, *The Effects of Contracts and Third Parties*, in *THE CODE NAPOLÉON REWRITTEN: FRENCH CONTRACT LAW AFTER THE 2016 REFORMS* 227, 235 (John Cartwright & Simon Whittaker eds., Hart 2017) (“In the Code Napoléon, the stipulation for third parties was the subject of a single provision, article 1121, which allowed this mechanism only in a restrictive way. . . . Quite soon after its promulgation, however, the courts relaxed the conditions laid down by the Code and made stipulation for third parties a very general mechanism. . . . The stipulation for a third party has become an extremely common and usual mechanism. . . . The reforms of 2016 could not have done other than recognise this development—and this is what it has done in the new articles 1205 to 1209 [of the

could stipulate to the choice of law provision concerning the interpretation of the SEP holder's FRAND contract with ETSI or another SSO during patent-infringement or breach-of-contract litigation (or in the renewal provisions of an SEP license upon which the parties ultimately reach agreement).

Every judicial opinion is a public good that can shed light on the law.²⁹ If the proposition is uncontroversial that a duty of good faith and fair dealing applies to the negotiation between an SEP holder and an implementer of an ETSI standard, then it would be helpful for judges to explain why and from where that duty arises.

An even greater puzzle in *TCL v. Ericsson* is that Judge Selna did not identify the source of the *implementer's* duty to negotiate in good faith. He said that, “[i]n assessing the breach of contract claim, the parties focus on two components: the *mutual* duty of the parties to negotiate in good faith and the duty to offer a rate which are [sic] in fact FRAND.”³⁰ But what is the source of the implementer's duty to negotiate a FRAND license in good faith? In a contract controlled by the law of a U.S. state that recognizes the doctrine of good faith and fair dealing, the Restatement (Second) of Contracts specifies that “[e]very contract imposes upon *each party* a duty of good faith and fair dealing in its performance and its enforcement.”³¹ However, the implementer is not a party to an SEP holder's FRAND contract with ETSI; the SEP holder and ETSI are parties to the contract, but the implementer is merely their intended third-party beneficiary.³² Hence, one can question whether the FRAND contract can impose *any* duty on the implementer, including the duty to negotiate for a license in good faith. Perhaps the civil law of France imposes a general duty to negotiate in good faith.³³ But Judge Selna did not address that possibility, nor has any other judge to my knowledge asked the question in a reported decision.

French Civil Code], which form the bulk of the sub-section devoted to Standing Surety and Stipulations for Third Parties.” (internal citations omitted).

²⁹ See, e.g., RICHARD A. POSNER, *ECONOMIC ANALYSIS OF LAW* 760–62 (Wolters Kluwer 9th ed. 2014).

³⁰ *TCL Comm'n Tech. Holdings, Ltd. v. Telefonaktiebolaget LM Ericsson*, Nos. SACV 14-341 JVS, CV 15-2370 JVS, 2018 WL 4488286, at *55 (C.D. Cal. Sept. 14, 2018) (emphasis added).

³¹ RESTATEMENT (SECOND) OF CONTRACTS § 205 (AM. LAW INST. 1981) (emphasis added).

³² The duties of the implementer change if it is negotiating a cross license, and, like the SEP holder, it has also executed a FRAND contract with the same standard setting organization. See, e.g., *HTC Corp. v. Telefonaktiebolaget LM Ericsson*, No. 6:18-CV-00243-JRG, 2018 WL 6617795, at *5–6 (E.D. Tex. Dec. 17, 2018) (Gilstrap, J.) (finding that HTC, the implementer, had a duty to negotiate a cross-license with Ericsson in good faith because it was also an SEP holder that had committed to license its SEPs on FRAND terms to ETSI).

³³ See Gregory J. Marsden & George J. Siedel, *The Duty to Negotiate in Good Faith: Are BATNA Strategies Legal?*, 14 *BERKELEY BUS. L.J.* 127, 133 (2017) (“While the common law does not impose a general obligation or duty to negotiate in good faith before a contract is formed, the civil law does.” (citing E. Allan Farnsworth, *Precontractual Liability and Preliminary Agreements: Fair Dealing and Failed Negotiations*, 87 *COLUM. L. REV.* 217, 221 (1987); Nadia E. Nedzel, *A Comparative Study of Good Faith, Fair Dealing and Precontractual Liability*, 12 *TUL. EUR. & CIV. L.F.* 97, 98 (1997))).

2. *Does an SEP Holder Have a Duty to Make a FRAND Offer?*

Ericsson and TCL also disagreed over whether the FRAND contract imposed on Ericsson “the duty to offer a rate which [is] in fact FRAND.”³⁴ TCL argued that, in addition to having the duty to negotiate in good faith, the SEP holder has a contractual duty “to *grant* a FRAND license”—which necessarily requires the SEP holder not only to offer a license on FRAND terms, but also to ensure the execution of a license agreement on FRAND terms.³⁵

Conversely, Ericsson argued that “there is a range of offers which can satisfy the FRAND obligation,” and that “[t]he FRAND commitment does not require each offer and counter-offer exchanged during the course of negotiations to be FRAND.”³⁶ Judge Selna wrote that “Ericsson believes there is no duty to bring good faith negotiations to conclusion with an offer which is in fact FRAND; it need only be prepared to offer FRAND terms.”³⁷ His statement is confusing. It is unclear whether Ericsson believes (according to Judge Selna’s description of Ericsson’s position) that an SEP holder “satisfies” its FRAND obligation by merely negotiating for a FRAND license in good faith or by negotiating for a FRAND license in good faith and *also* extending an offer to license its portfolio on FRAND terms. Perhaps Judge Selna mischaracterized Ericsson’s interpretation of the duties arising from its FRAND contract with ETSI. In a post-trial filing, Ericsson argued that an SEP holder “satisfies its FRAND commitment in relation to a prospective licensee when it is prepared to grant a license under its Essential Patents on FRAND terms and conditions, including acting in good faith to offer such a license to the prospective licensee.”³⁸ One could argue that, for an SEP holder to show that it is prepared to grant a license on FRAND terms, the SEP holder must make a legitimately FRAND offer to the given implementer. Under that interpretation of Ericsson’s position, an SEP holder has discharged its contractual duty to ETSI only after the SEP holder has made a legitimately FRAND offer to the implementer in question.

Judge Selna declined to resolve the parties’ disagreement over the SEP holder’s obligations imposed by the FRAND contract. That is, he did not determine whether, to discharge its FRAND obligation, Ericsson needed merely to negotiate in good faith for a FRAND license, or to extend a FRAND licensing offer, or to execute a license on FRAND terms with

³⁴ *TCL v. Ericsson*, 2018 WL 4488286, at *55 (“The parties take diametrically opposing positions on whether the licensor must make an offer which in fact meets all FRAND requirements.”).

³⁵ *Id.* (emphasis added).

³⁶ *Id.*

³⁷ *Id.*

³⁸ Ericsson’s Post-Trial [Proposed] Findings of Fact and Conclusions of Law at 92, *TCL Commc’n Tech. Holdings, Ltd. v. Telefonaktiebolaget LM Ericsson*, No. 8:14-cv-00341-JVS-DFM (C.D. Cal. Apr. 26, 2017).

TCL. Judge Selna gave two reasons for declining to resolve that dispute over contract interpretation. First, he explained that “no damages will flow from any putative breach” of Ericsson’s contractual duties, because TCL failed to produce evidence of any harm resulting from such a breach.³⁹ Second, Judge Selna reasoned that, “while finding a breach would be necessary for granting specific performance under TCL’s breach of contract claim, it would also be superfluous,” because, regardless of whether a breach occurred, the court needed to determine the FRAND rates for a license to Ericsson’s SEPs.⁴⁰ Thus, he found that determining whether Ericsson discharged its FRAND obligation was immaterial to resolving the dispute that the parties put before the court. In my view, this conclusion was a serious mistake that obscures rather than clarifies all of the analysis that follows in Judge Selna’s opinion in *TCL v. Ericsson*.

Regrettably, Judge Selna neglected an important opportunity to reduce the ambiguity concerning the SEP holder’s and the implementer’s respective legal obligations and rights when negotiating over the licensing of SEPs. Ericsson’s FRAND contract requires Ericsson “to give . . . an irrevocable undertaking in writing that it is *prepared to grant* irrevocable licenses on fair, reasonable and non-discriminatory . . . terms and conditions” to implementers of ETSI’s standards.⁴¹ The phrase “prepared to grant” indicates that the SEP holder must *offer* a license on FRAND terms to an implementer of the standard. By extending a binding FRAND offer, the SEP holder demonstrates that it is prepared to grant a FRAND license. Conversely, an SEP holder that has not extended a binding FRAND offer has not yet demonstrated that it is prepared to grant a FRAND license.⁴²

Interpreting a FRAND contract as imposing on the SEP holder the duty to *offer* to license on FRAND terms (rather than the duty to license or the duty to negotiate in good faith) also strikes the proper balance between the SEP holder’s interests and the implementer’s interests; thus, this interpretation most likely reflects the original intent of the contracting parties. On the one hand, a duty to license would be unduly burdensome on the SEP holder. A duty to license would lead to the perverse situation in which an SEP holder, after extending a legitimately FRAND offer to an implementer

³⁹ *TCL v. Ericsson*, 2018 WL 4488286, at *55.

⁴⁰ *Id.* at *56 (“Both TCL and Ericsson assert claims for declaratory relief. . . . The availability of declaratory relief depends on whether there is a live dispute between the parties, and a request for declaratory relief may be considered independently of whether other forms of relief are appropriate.”).

⁴¹ *See id.* at *6 (quoting European Telecommunications Standards Institute [ETSI], ETSI Rules of Procedure, Annex 6: ETSI Intellectual Property Rights Policy § 6.1, at 38 (Apr. 18, 2018) [hereinafter ETSI IPR Policy], <https://www.etsi.org/images/files/ipr/etsi-ipr-policy.pdf>) (emphasis added).

⁴² First principles of U.S. contract law indicate that the SEP holder’s offer needs to be sufficiently specific to permit an implementer to accept the offer and to enter into a binding license agreement. *See* RESTATEMENT (SECOND) OF CONTRACTS § 24 (AM. LAW INST. 1981) (defining an offer as “the manifestation of willingness to enter into a bargain, so made as to justify another person in understanding that his assent to that bargain is invited and will conclude it”).

who rejects that offer, could not discharge its FRAND obligation. The SEP holder cannot ensure that a FRAND license agreement will eventuate with each licensee.⁴³ Even if the SEP holder makes a FRAND offer, the ensuing bilateral negotiation with a given implementer might fail if the implementer rejects the offer or ignores it. Thus, a duty to license would ask too much of the SEP holder and give the implementer an incentive to engage in opportunism during the licensing negotiation.

On the other hand, merely imposing on the SEP holder a duty to negotiate in good faith would delay the efficacious implementation of the standard. This interpretation invites the SEP holder to waste time for strategic bargaining reasons, without regard to how its dilatory behavior might harm the implementer, the SSO, and consumers.⁴⁴ Furthermore, if the SEP holder does not have a duty to make the implementer a legitimately FRAND offer from the outset, the respective rights and obligations of the SEP holder and the implementer become murky. Such an interpretation produces uncertainty over when the SEP holder definitively discharges its FRAND obligation.⁴⁵ This uncertainty generates further costs and delays in the licensing of SEPs, which compromises the objectives of the SSO and diminishes the present value of the consumer surplus and the producer surplus that the standard can create by making it possible to bring new products to market. It is inconceivable that Ericsson and ETSI would both intend to impose only a vague duty on the SEP holder to negotiate in good faith, particularly when that interpretation of the FRAND contract contravenes the objectives of standards development.

Thus, clarifying that Ericsson's FRAND contract with ETSI imposes on Ericsson the duty to offer to license on FRAND terms (rather than the duty to negotiate in good faith or the duty to license) is both consistent with the actual language of that FRAND contract and, as a matter of simple logic, most plausibly comports with the original intent of the SEP holder and ETSI in forming that contract.

3. *Can an Implementer Exhaust Its Right as a Third-Party Beneficiary of a FRAND Contract?*

Judge Selna also neglected existing legal principles when interpreting TCL's rights as an intended third-party beneficiary of the FRAND contract. In

⁴³ See Sidak, *The Meaning of FRAND, Part II: Injunctions*, *supra* note 18, at 206 n.19 (explaining why the SEP holder cannot be a guarantor of successful contract formation in FRAND licensing negotiations).

⁴⁴ See, e.g., J. Gregory Sidak, *Irreparable Harm from Patent Infringement*, 2 CRITERION J. ON INNOVATION 1 (2017); J. Gregory Sidak, *Is Harm Ever Irreparable?*, 2 CRITERION J. ON INNOVATION 7 (2017); Sidak, *A FRAND Contract's Intended Third-Party Beneficiary*, *supra* note 18, at 1013–14 (explaining that, in FRAND licensing, time is of the essence).

⁴⁵ See Sidak, *The FRAND Contract*, *supra* note 11, at 14–15.

particular, he failed to acknowledge that an implementer's rights that flow from the FRAND contract are limited. Judge Selna ignored that, if an implementer exhausts its rights as a third-party beneficiary, then the SEP holder can once more pursue the full array of its statutory remedies against infringement provided under national patent law.⁴⁶

Judge Selna correctly recognized that “the FRAND undertaking is an encumbrance and commitment that exists on top of national patent systems.”⁴⁷ He thus acknowledged that a FRAND contract limits the statutory rights of the SEP holder that the SEP holder would otherwise possess by virtue of owning patents. However, Judge Selna did not consider whether, after an SEP holder has discharged its obligations under the FRAND contract, the “encumbrance and commitment” imposed by the FRAND contract cease to have any binding legal effect. For example, if the SEPs are U.S. patents, and if the SEP holder has discharged its FRAND obligation to the implementer pursuant to the FRAND contract, then the Patent Act (along with section 337 of the Tariff Act of 1930⁴⁸) is the controlling law. Under those statutory provisions, the SEP holder may, among other things, (1) seek an injunction against an infringer, (2) seek an exclusion order against the infringing articles, (3) request the court to award damages “adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use of the invention by the infringer,”⁴⁹ and (4) seek enhanced damages for the infringer's willful infringement of those SEPs.⁵⁰

Under U.S. contract law, it is well established that an intended third-party beneficiary of a contract has no greater bundle of rights than what the parties to the contract agreed to convey to the third party.⁵¹ As I explained in Part I.A.1, pursuant to the FRAND contract between Ericsson and ETSI, TCL is entitled to receive a FRAND offer from the SEP holder. However, an implementer that fails to accept a legitimately FRAND offer can exhaust its rights as a third-party beneficiary. Consistent with first principles of U.S. contract law, an implementer will lose its power of acceptance—that is, the power to accept a FRAND offer and transform it into a binding license agreement for the SEPs in question—if it rejects the SEP holder's legitimately

⁴⁶ See *id.* at 16–18; Sidak, *A FRAND Contract's Intended Third-Party Beneficiary*, *supra* note 18, at 1007–14 (analyzing how an implementer can exhaust its rights as a third-party beneficiary of a FRAND contract).

⁴⁷ *TCL v. Ericsson*, 2018 WL 4488286, at *20.

⁴⁸ 19 U.S.C. § 1337.

⁴⁹ 35 U.S.C. § 284.

⁵⁰ See, e.g., *Core Wireless Licensing S.A.R.L. v. LG Elecs., Inc.*, No. 2:14-cv-911, 2016 WL 4596118, at *2 (E.D. Tex. Sept. 3, 2016) (Gilstrap, C.J.); see also J. Gregory Sidak, *Enhanced Damages for Infringement of Standard-Essential Patents*, 1 CRITERION J. ON INNOVATION 1101 (2016).

⁵¹ See Sidak, *A FRAND Contract's Intended Third-Party Beneficiary*, *supra* note 18, at 1007–14 (“It is basic contract law that the promisor and the promisee define the scope of the rights of a third-party beneficiary.” (citing RESTATEMENT (SECOND) OF CONTRACTS § 309 cmt. b (AM. LAW INST. 1981); 9 JOSEPH M. PERILLO, CORBIN ON CONTRACTS § 44.7 (Matthew Bender & Co. rev. ed. 2013))).

FRAND offer, either explicitly or by making a counteroffer.⁵² In addition, an implementer will lose its power of acceptance by operation of law if it fails to reply to the SEP holder's offer within a commercially reasonable period of time.⁵³ Therefore, an implementer that engages in dilatory tactics when negotiating a license agreement with an SEP holder does so at its extreme peril, for it might manage to exhaust its rights as a third-party beneficiary of the SEP holder's contract with the SSO.

Several courts have recognized that the SEP holder's FRAND obligation to a given implementer is limited. For example, the Federal Circuit observed in 2014 in *Apple v. Motorola* that "an infringer [that] unilaterally refuses a FRAND royalty or unreasonably delays negotiations to the same effect" may be enjoined from continuing to sell its infringing standard-compliant products.⁵⁴ Similarly, at least one U.S. district court has explicitly found that an implementer can exhaust its rights as a third-party beneficiary of an SEP holder's FRAND contract with an SSO. In *Apple v. Qualcomm*, Judge Gonzalo Curiel ruled in September 2017 that, "if Apple wishes to enforce Qualcomm's commitment to ETSI[,] it must demonstrate that it was a willing licensee and, therefore, a proper third-party beneficiary. . . . If Apple is not a willing licensee, it . . . loses the right to enforce Qualcomm's contract with ETSI."⁵⁵ Most recently, in March 2019, Mr. Justice Henry Carr of the High Court of Justice of England and Wales ruled that, because the prospective licensee (ZyXEL) had been holding out on executing a license with the SEP holder (TQ Delta) since 2013, ZyXEL was not entitled to a court determination of a RAND royalty for a license to TQ Delta's SEP portfolio.⁵⁶ In other words,

⁵² RESTATEMENT (SECOND) OF CONTRACTS § 36(1)(a) (AM. LAW INST. 1981); *see also* Great Lakes Commc'n Corp. v. AT&T Corp., No. C 13-4117-MWB, 2015 WL 5021693, at *7-8 (N.D. Iowa Aug. 21, 2015).

⁵³ What constitutes a commercially reasonable time within which to communicate acceptance of an offer depends on industry practice, as well as other case-specific factors, which, in an SEP licensing negotiation, could include the number of SEPs in the portfolio, the potential licensee's familiarity with the licensed technology, and the prior business relationship between the SEP holder and the potential licensee. RESTATEMENT (SECOND) OF CONTRACTS § 41(1) cmt. b (AM. LAW INST. 1981); *see also* Bull Bag, LLC v. Remorques Savage, Inc., No. 3:16-CV-01735, 2017 WL 3763836, at *7 (D. Conn. Aug. 30, 2017) ("Indeed, whether this three-month delay [in responding to an offer] was reasonable is a question of fact that would require consideration of standard industry practices.").

⁵⁴ *Apple Inc. v. Motorola Corp.*, 757 F.3d 1286, 1331-32 (Fed. Cir. 2014); *see also* Realtek Semiconductor Corp. v. LSI Corp., 946 F. Supp. 998, 1007 (N.D. Cal. 2013) ("[A]n injunction may be warranted where an accused infringer of a standard-essential patent outright *refuses* to accept a RAND license." (emphasis in original)).

⁵⁵ *Apple Inc. v. Qualcomm Inc.*, No. 3:17-CV-00108-GPC-MDD, 2017 WL 3966944, at *10 n.7 (S.D. Cal. Sept. 7, 2017); *see also* Order Denying Apple's Motion for Partial Judgment on the Pleadings at 13, *Apple Inc. v. Qualcomm Inc.*, No. 3:17-CV-00108-GPC-MDD (S.D. Cal. Mar. 20, 2019) (Curiel, J.), ECF No. 593 ("If Apple is found to have forfeited its rights to a FRAND license, then Qualcomm is not obligated to offer Apple a FRAND license to its SEPs.").

⁵⁶ *TQ Delta LLC v. Zyxel Commc'ns Ltd* [2019] EWHC (Pat) 745 [12]-[13] (Eng.) ("On the evidence before me, I accept that this is a case of 'hold-out' by ZyXEL. They have not paid any royalties to TQ Delta (or any other patent holder) in respect of any standards essential patent. Of the two patents from TQ Delta's portfolio which have now been litigated in this jurisdiction, infringement of the '268 Patent has been established, and has been continuing for many years. ZyXEL have blown hot and cold as to whether they will accept whatever licence is considered by the Court to be RAND. They have refused

Mr. Justice Carr determined that ZyXEL had lost its right to a RAND license and that its infringing products should be enjoined.

Judge Selna, however, ignored the relevance of these first principles of contract law for resolving the FRAND dispute between Ericsson and TCL. As he observed, at the commencement of litigation, Ericsson and TCL “had already engaged in more than *six years* of negotiations” and Ericsson had “made over a *dozen* offers to TCL and multiple concessions in the process.”⁵⁷ It is striking that, despite that finding, Judge Selna did not pause to ask whether TCL had, by the time of trial, long since exhausted its rights as a third-party beneficiary of Ericsson’s contract with ETSI. Consequently, he never considered the possibility that the “encumbrance and commitment” that Ericsson’s FRAND contract with ETSI imposed above the public law of national patent systems had ceased to control.

In sum, although Judge Selna recognized that a FRAND commitment constitutes a binding contract, he failed to apply familiar legal principles to identify the precise rights and obligations that arise from that contract. By neglecting to apply those principles to resolve the parties’ contractual dispute, Judge Selna perpetuated the ambiguity regarding whether Ericsson in fact had discharged its FRAND obligations during its licensing negotiations with TCL.

B. Judge Selna’s Interpretation of the Nondiscrimination Requirement of a FRAND Contract

Judge Selna’s failure to apply conventional principles of contract interpretation when identifying the rights and obligations of the FRAND contract becomes particularly evident when one examines how he construed the nondiscrimination requirement of Ericsson’s FRAND contract with ETSI. He said that “[n]either the history of ETSI’s policy development nor the meager case law development of the FRAND concept provides the Court definitive guidance in assessing whether Ericsson’s offers have been non-discriminatory” and that, consequently, “the Court must turn to law, logic, and

to ‘agree to submit to the outcome of an appropriate [RAND] determination’ and yet have claimed the benefit of the RAND undertaking. I bear these facts in mind when considering whether an injunction should be granted in the present case. Mr. [Iain] Purvis’s submission is that, relying on such cases as *Coventry v Lawrence*, the grant of an injunction at this stage, with no more than three months of the life of the ’268 Patent remaining, would be disproportionate. It would not enable ZyXEL to know the terms of any RAND licence which it could or could not accept. I reject that submission. It would enable ZyXEL to benefit from their strategy of hold-out, including their refusal to submit to the outcome of an appropriate RAND determination, whilst still seeking to benefit from the RAND undertaking. ZyXEL would avoid an injunction, and if the terms of a RAND licence are not as they wish, could refuse to enter into a licence on the terms deemed appropriate by the Court.” (citing *Coventry v. Lawrence* [2015] UKSC 50 (Eng)).

⁵⁷ *TCL Comm’n Tech. Holdings, Ltd. v. Telefonaktiebolaget LM Ericsson, Nos. SACV 14-341 JVS, CV 15-2370 JVS*, 2018 WL 4488286, at *3 (C.D. Cal. Sept. 14, 2018) (emphasis added).

economics.”⁵⁸ That assessment is accurate. However, neither law nor economics supports the interpretation of the nondiscrimination requirement that Judge Selna then adopted. As I will explain in Part IV.C.2.c, in many cases, his adopted interpretation would frustrate the purpose of the FRAND contract. It is thus implausible that the parties to the FRAND contract—ETSI and Ericsson, in this case—intended to give nondiscrimination the impractical meaning on which Judge Selna settled.

Judge Selna failed to examine whether Ericsson and ETSI intended the nondiscrimination requirement to have the same meaning that it has in public law. Put differently, if the court lacked evidence that the parties to the FRAND contract specifically defined “discrimination,” the court could permissibly analyze whether the parties intended to use the same definition that appears in a source of public law. In *Unwired Planet*, for example, Mr. Justice Birss said that in presenting their views on the correct interpretation of nondiscrimination, “[b]oth sides approached this issue on the basis that concepts such as similarly situated parties, equivalent/comparable transactions, and objective justifications, were the same under the non-discrimination limb of FRAND as they are in competition law.”⁵⁹ Unfortunately, Judge Selna did not consider the possibility that ETSI and Ericsson intended the nondiscrimination requirement of their FRAND contract to have the same meaning as it does in EU competition law or some other relevant and informative source of public law. As I explain elsewhere,⁶⁰ in the United States, such sources could include regulatory or antitrust statutes such as section 202(a) of the Communications Act of 1934,⁶¹ the Federal Powers Act,⁶² or the Robinson-Patman Act.⁶³

Instead, Judge Selna gave his own interpretation to the nondiscrimination requirement of Ericsson’s FRAND contract with ETSI. However, as I will show in the following sections, his interpretation of the nondiscrimination requirement conflicts with his own determination of a FRAND royalty for TCL’s license to Ericsson’s SEP portfolio. For example, Judge Selna said that the nondiscrimination requirement prohibits an SEP holder from charging a higher royalty to small-sized and medium-sized implementers than it does to large implementers; but, in determining whether Ericsson’s offers

⁵⁸ *Id.* at *8.

⁵⁹ *Unwired Planet Int’l Ltd v. Huawei Techs. Co.* [2017] EWHC (Pat) 2988 [487] (Eng.); see also J. Gregory Sidak & Urška Petrovčič, *Will the CJEU’s Decision in MEO Change FRAND Disputes Globally?*, 3 CRITERION J. ON INNOVATION 301, 303 (2018) (noting that the parties in *Unwired Planet v. Huawei* agreed that the nondiscrimination requirement of an SEP holder’s FRAND contract with ETSI has the same basic meaning as discrimination in Article 102(c) TFEU).

⁶⁰ See J. Gregory Sidak, *Fair and Unfair Discrimination in Royalties for Standard-Essential Patents Encumbered by a FRAND or RAND Commitment*, 2 CRITERION J. ON INNOVATION 301, 348–56 (2017).

⁶¹ 47 U.S.C. § 202(a).

⁶² 16 U.S.C. § 824d(b).

⁶³ Pub. L. No. 74–692, 49 Stat. 1526 (1936), codified at 15 U.S.C. § 13.

to TCL were discriminatory, he refused to consider the license agreements that Ericsson had executed with smaller firms.⁶⁴ Judge Selna also said that, to comply with the nondiscrimination requirement, an SEP holder must make similar *offers* to similarly situated licensees, but he never examined the offers that Ericsson made to similarly situated licensees.⁶⁵ Instead, he compared the actual per-unit royalties that those licensees were paying Ericsson with Ericsson's offers to TCL.⁶⁶ Moreover, when comparing Ericsson's offers to TCL with the royalties that he derived from comparable licenses, Judge Selna evidently considered that any differential between the compared royalties would be discriminatory, irrespective of the effect that the difference would have on either the success of the standard or market competition.⁶⁷ Yet he determined that the FRAND royalty that TCL should pay for a license to Ericsson's SEP portfolio should be *lower* than the royalties paid by other similarly situated licensees.⁶⁸ In sum, Judge Selna ignored that his estimated FRAND royalty would be considered discriminatory under his own interpretation of the nondiscrimination requirement.

I. *Does the Nondiscrimination Requirement of the FRAND Contract Prohibit an SEP Holder from Engaging in Price Discrimination?*

Judge Selna's analysis of whether Ericsson's offers to TCL were discriminatory contradicted his findings concerning ETSI's motivation for including the nondiscrimination requirement in its FRAND contract.

Judge Selna found that ETSI's motivation for adopting the nondiscrimination requirement originated from ETSI's goal of preventing price discrimination in SEP licensing.⁶⁹ He said that "ETSI organic documents specifically note the concern with protecting small and medium-sized enterprises."⁷⁰ Judge Selna added that "[t]he ETSI IPR Policy forbids discrimination based on nationality or ETSI membership, but the policy is not so limited."⁷¹ Quoting sealed testimony by Rudi Bekkers, Judge Selna wrote that, "absent uniform IPR commitments, 'there will be a serious risk of distortion of market forces against [small-sized and medium-sized enterprises] and in favor of large multinationals.'"⁷² In other words, he concluded that ETSI intended

⁶⁴ *TCL v. Ericsson*, 2018 WL 4488286, at *31.

⁶⁵ *Id.* at *29 ("The parties agree that like, or close to, like rates must be offered to firms which are similarly situated.")

⁶⁶ *Id.* at *50.

⁶⁷ *Id.* at *49 ("Ericsson's experts suggest that discrimination must have the effect of impairing the development or adoption of standards. . . . [T]he Court finds that harm to the competitor firm offered discriminatory rates is sufficient.")

⁶⁸ *Id.* at *51–52.

⁶⁹ *Id.* at *7 ("ETSI was also concerned with price discrimination among potential licensees.")

⁷⁰ *Id.*

⁷¹ *Id.*

⁷² *Id.* (quoting Sealed Declaration of Rudi Bekkers) (alteration in original).

the nondiscrimination requirement to protect small-sized and medium-sized firms by prohibiting SEP holders from engaging in price discrimination.

However, Judge Selna's explanation for why ETSI supposedly prohibited SEP holders from engaging in price discrimination rests on unsound economic reasoning. Economic theory has long explained that price discrimination typically benefits consumers with a lower willingness (or ability) to pay who, in the absence of price discrimination, would be priced out of the market.⁷³ Discounted cinema tickets for students, food coupons, and discounted airfare are classic examples of how price discrimination enables a consumer to purchase a product or service that she would (or could) not otherwise purchase.⁷⁴ Price discrimination in SEP licensing might similarly favor small-sized and medium-sized firms if it permits the SEP holder to charge a lower price to implementers that have a lower ability to pay. In that case, the SEP holder's price discrimination would *facilitate* the entry of small-sized and medium-sized firms into the market for the standard-compliant product. Thus, it is entirely backwards to conclude, as Judge Selna did, that ETSI categorically prohibited SEP holders from engaging in price discrimination to protect small-sized and medium-sized firms.

Indeed, Judge Selna was not concerned with an SEP holder's ability to engage in price discrimination generally, but rather with an SEP holder's ability to charge high royalties to small-sized and medium-sized firms and low royalties to large firms.⁷⁵ He said that, because such a practice could undermine the ability of small-sized and medium-sized firms to compete in the market, ETSI prohibited SEP holders from engaging in discriminatory licensing practices.⁷⁶ Judge Selna added that "excluding from the analysis the largest firms in the market would have the effect of insulating them" and would further contribute "to their dominant positions, by imposing a barrier in the form of higher rates for those not at the top end of the market."⁷⁷ Thus, Judge Selna found that ETSI's nondiscrimination requirement prevented an SEP holder from charging a higher royalty to small-sized and medium-sized

⁷³ See, e.g., ROBERT PINDYCK & DANIEL RUBINFELD, MICROECONOMICS 395 (Pearson 9th ed. 2018) ("Note that those customers who would not have been willing to pay a price of [\$X] or greater are actually better off in this situation [of price discrimination]—they are now in the market and may be enjoying at least some consumer surplus."); DENNIS CARLTON & JEFFREY PERLOFF, MODERN INDUSTRIAL ORGANIZATION 307 (Pearson 4th ed. 2005) ("For example, suppose there are two groups of consumers and a non-discriminating monopoly finds it optimal to set a price so high that one group [with a lower willingness to pay] buys no units. Then, because a discriminating monopoly serves both groups, output expands and consumers benefit in aggregate.")

⁷⁴ See Sidak & Petrovčić, *Will the CJEU's Decision in MEO Change FRAND Disputes Globally?*, *supra* note 60, at 301.

⁷⁵ *TCL v. Ericsson*, 2018 WL 4488286, at *7.

⁷⁶ *Id.* at *30 ("ETSI contemplates facilitating competition in the market, particularly from emerging firms."); *id.* at *33 ("Ericsson would clearly prefer that Apple and Samsung be considered *sui generis*, but the prohibition on discrimination would mean very little if the largest, most profitable firms could always be a category unto themselves simply because they were the largest and most profitable firms.")

⁷⁷ *Id.* at *30.

firms than it charges to large implementers. In economic terms, this practice is an example of second-degree price discrimination, which occurs when a company charges a different price depending on the quantity of the purchased product or service.⁷⁸

However, the approach that Judge Selna adopted to determine whether Ericsson's offers to TCL were discriminatory contradicts his finding about the purpose of the nondiscrimination requirement of Ericsson's FRAND contract with ETSI. As I will explain in Part IV.A, Judge Selna said that, to determine whether Ericsson's offers to TCL were discriminatory, it was necessary to examine the license agreements that Ericsson had executed with similarly situated licensees. However, in examining the existing license agreements, he refused to consider licenses that Ericsson had executed with implementers that sold their products only in limited geographic areas—which would presumably be the smaller or “emerging” implementers that Judge Selna believed had elicited ETSI's special protection. Rather, Judge Selna confined his analysis to licenses executed with implementers who, like TCL, have “substantial sales volume” all around the world, such as Apple and Samsung.⁷⁹ Judge Selna seemed not to recognize that, by limiting his analysis to only those licenses that Ericsson had executed with large implementers, he had adopted a methodology that flouted what he had inferred to be the “goal” of the nondiscrimination requirement of Ericsson's FRAND contract with ETSI.

2. *Does the Nondiscrimination Requirement of the FRAND Contract Ensure That All Implementers Pay the Same Royalty?*

Judge Selna observed that Ericsson and TCL agreed that, for Ericsson to comply with the nondiscrimination requirement of its FRAND contract with ETSI, “like, or close to, like rates must be *offered* to firms which are similarly situated.”⁸⁰ However, in determining whether Ericsson complied with that nondiscrimination requirement, Judge Selna did not examine whether Ericsson made comparable *offers* to TCL and other licensees that he considered to be similarly situated to TCL. He also did not compare Ericsson's offers to TCL with the implied royalties that Ericsson negotiated with similarly situated licensees. Instead, Judge Selna examined whether Ericsson's *offers* to TCL contained implied royalties comparable to the *effective royalties* that other similarly situated licensees were actually paying pursuant to an executed license to use Ericsson's SEP portfolio.

⁷⁸ See, e.g., PINDYCK & RUBINFELD, *supra* note 74, at 395.

⁷⁹ *TCL v. Ericsson*, 2018 WL 4488286, at *33.

⁸⁰ *Id.* at *29 (emphasis added).

The strict approach that Judge Selna adopted in defining the nondiscrimination requirement of Ericsson's FRAND contract with ETSI became particularly evident when he unpacked the lump-sum payments specified in license agreements that Ericsson had executed with third parties. As I will explain in Part IV.C, when unpacking those license agreements, Judge Selna did not consider the implied royalty upon which the parties based their calculation of the specified lump-sum payments *on the date of license execution*. Instead, he relied on actual revenue data to identify the implicit one-way royalty that each similarly situated licensee actually paid. Judge Selna reasoned that what matters for purposes of assessing compliance with the nondiscrimination requirement of Ericsson's FRAND contract with ETSI are the license's "actual terms and conditions."⁸¹ As I will explain in Part IV.C.1.c, Judge Selna's reliance on data about actual sales when unpacking the license agreement is wrong, because it contradicts well-established legal and economic principles for the analysis of bargaining and contracting. However, setting aside that deficiency, it is worth noting that Judge Selna's methodology for unpacking Ericsson's comparable license agreements contradicts his own finding that the nondiscrimination requirement of an SEP holder's FRAND contract with ETSI imposes a duty on the SEP holder merely to *offer* similar rates to similarly situated licensees.

Therefore, in examining whether Ericsson violated the nondiscrimination requirement of its FRAND contract with ETSI, Judge Selna failed to answer the question that both parties considered essential to resolving their dispute: whether Ericsson had *offered* the same or similar rates to similarly situated licensees.

3. *Does Evidence of Differential Pricing Suffice to Show Discrimination?*

Judge Selna said that the nondiscrimination requirement of an SEP holder's FRAND contract with ETSI does not require the SEP holder to license its SEPs for the same royalty to all licensees.⁸² He did not provide any limiting principle for identifying permissible differences in royalties among similarly situated licensees.⁸³ Although Judge Selna did not explain how much of a royalty differential the nondiscrimination requirement would permit, his decision suggests that in his view *any* royalty differential among similarly situated licensees would violate the nondiscrimination requirement of an SEP holder's FRAND contract with ETSI.

⁸¹ *Id.* at *40.

⁸² *Id.* at *54.

⁸³ *Id.* ("Based on the drafting history of ETSI's IPR Policy, Dr. [Bertram] Huber concluded that 'the drafters did not intend "non-discriminatory" to ensure the exact same treatment or identical license terms for all licensees to the same portfolio of essential patents.'").

Specifically, Judge Selna rejected Ericsson's argument that, to show discrimination, the differential pricing would need to have "the effect of impairing the development or adoption of standards."⁸⁴ Judge Selna did not examine whether, as a matter of contract law, it is plausible that ETSI sought to prohibit only the type of discrimination that could undermine the widespread adoption of the standard. Instead, he interpreted Ericsson's argument as requiring evidence that the royalty differential harmed *competition* to establish a violation of the nondiscrimination requirement of its FRAND contract with ETSI.

Judge Selna then said that Ericsson's argument "would engraft into the FRAND analysis the distinction which American antitrust law makes between the harm to competition, which is actionable, and mere harm to a competitor which is not," but he added that "[t]he Sherman Act and its long history provide no guide to understanding ETSI's non discrimination under FRAND."⁸⁵ Judge Selna concluded that evidence of harm to a competitor (rather than harm to competition) was sufficient to show a violation of the nondiscrimination requirement of Ericsson's FRAND contract with ETSI.⁸⁶ However, in adopting that interpretation of Ericsson's FRAND contract with ETSI, Judge Selna never examined whether the difference between the royalties that Ericsson offered to TCL and those that other licensees were supposedly actually paying to Ericsson would, if the offered rate to TCL were actually paid, harm TCL or its ability to compete with Ericsson's licensees that were similarly situated to TCL. Instead, Judge Selna appeared to assume that *any* difference in royalties would harm TCL and would therefore violate the nondiscrimination requirement of Ericsson's FRAND contract with ETSI. Put differently, he failed to apply his own standard to determine whether the royalty differential should be considered discriminatory.

Judge Selna's approach starkly contrasts with the reasoning of Mr. Justice Birss in *Unwired Planet*. As I have explained elsewhere, Mr. Justice Birss rejected Huawei's argument that the nondiscrimination requirement of an SEP holder's FRAND contract with ETSI granted an implementer the right to demand the same royalty that another similarly situated licensee paid.⁸⁷ Mr. Justice Birss said that if, contrary to his understanding, the nondiscrimination requirement of an SEP holder's FRAND contract with ETSI did indeed grant a licensee the right to demand the same royalty that another licensee was paying, it did so only if the evidence proved that the price differential "would distort competition between the two licensees."⁸⁸ He

⁸⁴ *Id.* at *49.

⁸⁵ *Id.*

⁸⁶ *Id.* ("[H]arm to the competitor firm offered discriminatory rates is sufficient.")

⁸⁷ See Sidak & Petrovčić, *Will the CJEU's Decision in MEO Change FRAND Disputes Globally?*, *supra* note 60, at 329.

⁸⁸ *Unwired Planet Int'l Ltd v. Huawei Techs. Co.* [2017] EWHC (Pat) 2988 [503] (Eng.).

then emphasized that one cannot assume that any price differential at all would cause such harm. Mr. Justice Birss reiterated that “there must be some evidential basis from which an inference can be drawn that the [challenged practice] tends to distort the relevant competitive relationship.”⁸⁹ In contrast, Judge Selna did not require such an evidentiary basis. He appeared to assume conclusively that any difference in royalties would harm TCL and, consequently, would violate the nondiscrimination requirement of Ericsson’s FRAND contract with ETSI.

It bears emphasis that, despite adopting such a strict interpretation of the nondiscrimination requirement, Judge Selna subsequently determined that the FRAND royalty that TCL should pay for a license to Ericsson’s 3G SEP portfolio should be *lower* than any other royalty that a third-party licensee was paying Ericsson for the same license.⁹⁰ Similarly, he ordered TCL to pay a FRAND royalty for a license to Ericsson’s 4G SEP portfolio that was *lower* than all but two royalty observations that he derived from unpacking Ericsson’s license agreements.⁹¹ Judge Selna did not explain why, under his own definition of nondiscrimination, such royalties would not be considered discriminatory to the third-party licensees. By giving TCL a lower royalty, he was, by his own logic, giving TCL a competitive advantage over Ericsson’s similarly situated licensees. Thus, Judge Selna failed to recognize that his ultimate FRAND determination contradicted the principles that he announced when he interpreted the nondiscrimination requirement of Ericsson’s FRAND contract with ETSI.

II. JUDGE SELNA’S RELIANCE ON THE TOP-DOWN APPROACH

TCL argued that Judge Selna should determine a FRAND royalty for Ericsson’s SEP portfolio by using a top-down approach. Judge Selna agreed. However, he rejected the estimated royalties presented by TCL’s experts. Instead, he adjusted outcomes of the top-down methodology to correct some of the errors that he concluded that TCL’s experts had committed.⁹² Relying on the estimates derived from his own modification of the top-down analysis, Judge Selna concluded that the offers that Ericsson made to TCL were “not fair or reasonable.”⁹³ However, he did not differentiate between the two criteria. In other words, Judge Selna treated “fair and reasonable” as

⁸⁹ *Id.* [510].

⁹⁰ *TCL v. Ericsson*, 2018 WL 4488286, at *51.

⁹¹ *Id.*

⁹² *Id.* at *9.

⁹³ *Id.* at *26 (“Option A and Option B are therefore not fair or reasonable offers by the top down measure.”).

a single criterion, much like public utility regulation tends to use “just and reasonable” as a single criterion.⁹⁴

A. The Aggregate Royalties for the 2G, 3G, and 4G Standards

To determine the appropriate aggregate royalty for the 2G, 3G, and 4G standards, Judge Selna relied on public statements made by industry participants, including Ericsson, between 2002 and 2008. He reasoned that those statements are important in determining the aggregate royalty because

(1) they were made prior to, or around, the time the respective standards were being set, such that they reflect the *ex ante* expectations of what a reasonable aggregate royalty burden should be before the standard was adopted and manufacturers are locked-in; and (2) they were made at a time when Ericsson was both a licensor and licensee with respect to SEPs that read on handsets, and thus Ericsson had an incentive to strike a reasonable balance.⁹⁵

In Judge Selna’s view, those statements were “intended to provide insight and incentives to encourage other companies to invest in the standard,” and they should be considered when setting a FRAND royalty for a license to Ericsson’s SEP portfolio.⁹⁶

Judge Selna relied primarily on two public statements that Ericsson and other industry participants made in 2008 to determine an appropriate aggregate royalty for the SEPs relevant to the 4G standard.⁹⁷ First, he observed that, in April 2008, Ericsson published on its website a statement in which it said that “Ericsson believes the market will drive all players . . . to a reasonable maximum aggregate royalty level of 6-8% for handsets.”⁹⁸ Judge Selna also observed that, in April 2008, Ericsson issued a joint press release with other industry participants supporting a maximum aggregate royalty for 4G

⁹⁴ See, e.g., J. GREGORY SIDAK & DANIEL F. SPULBER, DEREGULATORY TAKINGS AND THE REGULATORY CONTRACT: THE COMPETITIVE TRANSFORMATION OF NETWORK INDUSTRIES IN THE UNITED STATES 274–76 (Cambridge Univ. Press 1997).

⁹⁵ *TCL v. Ericsson*, 2018 WL 4488286, at *11; see also *id.* at *14 (“While this approach is not perfect, it has merit because: (1) it relies on statements that Ericsson and other SEP owners made to induce people to adopt and invest in each standard when the risk of hold-up was low; (2) these statements were made before the standard was adopted, providing the SEP owners with incentive to be reasonable with their overall expectations and greatly reducing the risk of hold-up and royalty stacking; (3) Ericsson was a licensor and licensee, giving it stronger incentive to be fair and reasonable with its own estimate; (4) Ericsson still stands by this methodology; and (5) it at least provides the ceiling for a FRAND rate, because increasing the royalty rate after the standard has been adopted, without showing that the increase is due to additions to the standard, is the definition of hold-up.” (citation omitted)).

⁹⁶ *Id.* at *11.

⁹⁷ *Id.* at *12–13.

⁹⁸ *Id.* at *12.

that would equal “a single-digit percentage of the sales price.”⁹⁹ On the basis of those statements, he concluded that the lower bound on an aggregate royalty for the 4G standard would be 6 percent of the average selling price of the handset, and that the upper bound on an aggregate royalty for the 4G standard would be 10 percent of the average selling price of the handset.¹⁰⁰

Second, Judge Selna relied on public statements that industry participants (including Ericsson, Nokia, NTT DoCoMo, and Siemens) made in the 2000s to determine an aggregate royalty for all SEPs relevant to the 2G and 3G standards.¹⁰¹ He observed that, in 2002, those companies issued a joint press release stating that the arrangement among the listed companies “would enable the cumulative royalty rate for W-CDMA”—a 3G standard—“to be at a modest single digit level.”¹⁰² Judge Selna said that, although companies that were “not a part of this press release may have expected higher rates, Ericsson advocated and expected a rate close to 5%.”¹⁰³ He also explained that “Ericsson does not dispute that if 5% is an appropriate total aggregate royalty figure for 3G, it is also an appropriate total aggregate royalty for 2G.”¹⁰⁴ Thus, Judge Selna found that 5 percent of the average handset selling price was the appropriate aggregate royalty for both the 2G and 3G standards.¹⁰⁵

Thus, on the basis of public statements by Ericsson and other industry participants, Judge Selna concluded that the aggregate royalty for all SEPs relevant to the 4G standard would range between 6 percent and 10 percent of a handset’s average selling price and that the 2G and 3G standards would each have an aggregate royalty of 5 percent of a handset’s average selling price.¹⁰⁶ According to Judge Selna, for multimode handsets (that is, handsets compatible with more than one standard), Ericsson was seeking royalties only for the most advanced standard of a multimode handset (except for certain 3G multimode handsets).¹⁰⁷ In other words, it would seem from Judge Selna’s opinion that a licensee selling a 4G multimode handset would pay an aggregate 4G royalty of between 6 and 10 percent, but it would not

⁹⁹ *Id.* (quoting Press Release, Ericsson, Wireless Industry Leaders Commit to Framework for LTE Technology IPR Licensing (Apr. 14, 2008), <https://www.ericsson.com/en/press-releases/2008/4/wireless-industry-leaders-commit-to-framework-for-lte-technology-ipr-licensing>).

¹⁰⁰ *Id.* at *13.

¹⁰¹ *Id.* at *11–12.

¹⁰² *Id.* at *11 (quoting Press Release, Nokia, Industry Leaders NTT DoCoMo, Ericsson, Nokia and Siemens, and Japanese Manufacturers Reach a Mutual Understanding to Support Modest Royalty Rates for the W-CDMA Technology Worldwide (Nov. 6, 2002)).

¹⁰³ *Id.* at *12.

¹⁰⁴ *Id.* at *12 n.12.

¹⁰⁵ *Id.* at *12.

¹⁰⁶ *Id.* at *26.

¹⁰⁷ *Id.* at *53 (“While there are real concerns about stacking in the future if Ericsson believes that it is entitled to the full rate for each standard all backwards-compatible devices [sic], such concerns are not present in this case because Ericsson is only demanding multi-standard royalties on 3G devices with Qualcomm chipsets, and the Court’s calculated 2G and 3G rates are relatively low compared to the total aggregate royalties for 2G and 3G.”).

additionally pay a 5-percent 3G royalty and a 5-percent 2G royalty. However, it is not possible to confirm whether Judge Selna ultimately treated sales of multimode handsets in this manner.

B. Apportioning Ericsson's Proportional Share of the Aggregate Royalty to Each Standard

Judge Selna proceeded to estimate Ericsson's share of the aggregate royalty for each standard. He calculated that share by dividing (1) the estimated number of Ericsson's SEP families including at least one SEP registered in the United States for each standard (which, for simplicity of exposition, I call "Ericsson's U.S. SEP families") by (2) the total number of SEP families for that standard containing at least one U.S. patent (which I will call "the total number of U.S. SEP families").¹⁰⁸

Thus, a critical input in the analyses of Judge Selna and TCL's experts was the number of SEP *families* owned by Ericsson, instead of the number of SEPs. Unfortunately, Judge Selna did not provide a definition of an SEP family. ETSI defines a patent family as "all the documents having at least one priority in common, including the priority document(s) themselves," where "documents" refers to "patents, utility models, and applications therefor."¹⁰⁹ TCL's experts retrieved data from ETSI's database,¹¹⁰ which categorizes patents into patent families for the searcher.¹¹¹ It thus appears that Judge Selna relied, without elaboration, on ETSI's own definition of a patent family.

1. The Total Number of U.S. SEP Families

To determine the total number of U.S. SEP families relevant to each standard, Judge Selna relied primarily on TCL's estimates, although he adjusted those estimates downward.

a. Estimates by TCL's Experts

TCL's experts—Dr. Gregory Leonard, Dr. Zhi Ding, Dr. Apostolos Kakaes, and teams at Concur IP and Ernst & Young India—first identified all IPR declarations for the 2G, 3G, and 4G standards submitted to ETSI as of September 2015.¹¹² From over 153,000 patents and patent applications that

¹⁰⁸ *Id.* at *9.

¹⁰⁹ ETSI IPR Policy, *supra* note 41, § 13, at 44.

¹¹⁰ *TCL v. Ericsson*, 2018 WL 4488286, at *15.

¹¹¹ See, e.g., *IPR Information Statement and Licensing Declaration*, ETSI, https://ipr.etsi.org/IPRDetails.aspx?IPRD_ID=1581&IPRD_TYPE_ID=2&MODE=2&sessionkey=1fc4f8.

¹¹² *TCL v. Ericsson*, 2018 WL 4488286, at *15. Concur IP, based in India, is an IP consulting firm that provides "end-to-end solutions that span the entire IP lifecycle and cater to various IP needs of corporates [sic], law firms, universities, research organizations, consulting firms, and licensing support firms." *About Us*, CONCUR IP, <http://www.concurip.com/about.php>. Those services include "Patent Licensing &

were declared essential to those standards, Dr. Kakaes excluded patent families that contained only expired patents or contained no patent in English.¹¹³ He also excluded patent families that contained no patents for user equipment.¹¹⁴ After applying those filters, TCL's experts found that there were 7,106 total patent families essential to the 2G, 3G, and 4G standards. TCL's experts then allocated those SEP families to the standards to which those SEP families had been declared essential.¹¹⁵

Next, Concur IP assessed the essentiality of the identified SEP families, so as to exclude those patents that (in Concur IP's opinion) had been declared essential but were not in fact essential to the relevant standard.¹¹⁶ Concur IP did so by examining a random sample of patent families for each standard. The sample represented approximately one-third of all SEP families. Dr. Ding then double-checked 17 percent of Concur IP's determinations for accuracy, and he found that, although Concur IP had both misidentified as being essential some patent families that were not essential and misidentified as being non-essential some patent families that were essential, the error rates were small and errors were made in both directions; therefore, in Dr. Ding's opinion, the errors largely offset each other.¹¹⁷ Dr. Ding ultimately confirmed Concur IP's findings that there were in total 446 SEP families essential to the 2G standard, 1,166 SEP families essential to the 3G standard, and 1,796 SEP families essential to the 4G standard.¹¹⁸ He did not say how many SEPs were in each of those families.

To limit the estimates that he had obtained to U.S. SEP families, Dr. Leonard subsequently excluded SEP families for which there was no patent registered in the United States. On the basis of that adjustment, he concluded that there were 413 SEP families relevant to the 2G standard, 1,076 SEP families relevant to the 3G standard, and 1,673 SEP families relevant to the 4G standard.¹¹⁹ Like Dr. Ding, Dr. Leonard (as described by Judge Selna) did not say how many SEPs were in each of those families.

Litigation Support," "Patent Preparation & Prosecution," and "Patent Search & Analytics." *Service Areas*, CONCUR IP, <http://www.concurip.com/index.php>.

¹¹³ *TCL v. Ericsson*, 2018 WL 4488286, at *16.

¹¹⁴ *Id.*

¹¹⁵ *Id.*

¹¹⁶ *Id.*

¹¹⁷ *Id.* Specifically, Dr. Ding found that the overall error rate for Concur IP was 9.5 percent. *Id.* Of the 442 patent families that Dr. Ding reviewed, 36 of 305 patent families (or 11.8%) were misidentified as non-essential, and 6 of 137 patent families (or 4.4%) were misidentified as essential. *Id.* The first error rate is nearly 2.7 times the second error rate; so it is unclear why, as Dr. Ding evidently testified, the errors largely offset each other. Judge Selna's opinion does not explain this discrepancy.

¹¹⁸ *Id.*

¹¹⁹ *Id.*

b. Judge Selna's Adjusted Estimates

Ericsson did not provide an alternative estimate of the total number of U.S. SEP families relevant to each standard. Nonetheless, it criticized several aspects of Concur IP's analysis. Ericsson's criticisms included arguments that (1) the individuals on the Concur IP team lacked the qualifications to perform the necessary analysis, (2) Concur IP performed only a cursory analysis of the SEP families (to which it devoted only 20 minutes per patent family), and (3) because of the cursory analysis, Concur IP's team did not read the patent specifications in their entirety to determine whether a patent family was in fact essential to practice a standard.¹²⁰

Although Judge Selna agreed that the analysis presented by TCL's experts was flawed, he still found it appropriate to rely on TCL's estimates to determine the total number of U.S. SEP families. For example, he acknowledged that Concur IP spent less time determining whether an SEP was essential to practice a given standard than a patent pool typically spends to make the same determination.¹²¹ However, Judge Selna concluded that this deficiency did not destroy the credibility of Concur IP's results:

Patent pools ask customers to pay for each specific patent in the pool, so the greater the certainty in their process and the stronger the patents the more they can charge and convince customers and patent owners to join. Conversely, if prospective licensees discovered that a patent pool included non-essential patents it would undermine the patent pool's entire business model. Patent pools therefore require substantially greater certainty than is necessary or reasonable for counting the number of SEPs in a standard. . . . [In contrast, Concur IP's analysis] is only intended to provide a workable size of the relevant universe and has no need to be as precise as a licensing pool must be. The Court does not think that the internal procedures used by either patent pools or Ericsson to determine the essentiality of their own patents are fair bench marks for assessing quality of the analysis done by Concur IP. While they are similar tasks, they require very different levels of certainty because the results are being used in very different ways.¹²²

In other words, Judge Selna concluded that Concur IP's analysis, although imprecise, permitted a sufficiently reliable estimate of the total number of U.S. SEP families.

Nonetheless, Judge Selna found that it was appropriate to adjust TCL's estimates downward. He observed that Dr. Kakaes found that Concur IP

¹²⁰ *Id.* at *17; *see also* Corrected Non-Confidential Brief for Appellants Ericsson Inc. and Telefonaktiebolaget LM Ericsson, TCL Commc'n Tech. Holdings Ltd. v. Telefonaktiebolaget LM Ericsson, Nos. 18-1363, 18-1380, 18-1382, 18-1732, 2018 WL 3440544, at *47 (Fed. Cir. July 5, 2018) [hereinafter Ericsson's Appellate Brief].

¹²¹ *TCL v. Ericsson*, 2018 WL 4488286, at *17.

¹²² *Id.*

“over-declared 4G patents to be essential four out of thirty-five times,” or 11.4 percent of the observations.¹²³ Judge Selna thus reduced TCL’s estimates of the total number of SEP families for each of the 2G, 3G, and 4G standards by 11.4 percent.¹²⁴ (Judge Selna did not explain why it is reasonable to assume as an economic or a technical matter that the error rate for overdeclaration of SEPs will be constant across the three generations of mobile communication standards.) Table 1 summarizes Judge Selna’s conclusions regarding the total number of U.S. SEP families for each standard.

Table 1. Judge Selna’s Estimates of the Total Number of U.S. SEP Families for the 2G, 3G, and 4G Standards

Standard	Total Number of U.S. SEP Families
2G	365
3G	953
4G	1481

Source: *TCL v. Ericsson*, 2018 WL 4488286, at *18.

As Part II.B.3 will explain, Judge Selna relied on those adjusted estimates to determine Ericsson’s share of the SEP families relevant to each of the three standards.

2. *The Total Number of SEP Families Owned by Ericsson*

The procedure that the parties (and ultimately Judge Selna) used to estimate the number of U.S. SEP families owned by Ericsson differed materially from the procedure that Judge Selna applied to estimate the total number of SEP families.

To estimate the number of SEP families that it owned, Ericsson performed a detailed analysis of its patent portfolio and produced “claim charts” for SEP families that it claimed were essential to practice each relevant standard.¹²⁵ On the basis of that analysis, Ericsson identified 41 2G SEP families, 51 3G SEP families, and 127 4G SEP families in its SEP portfolio.¹²⁶ Ericsson said that “Ericsson patent families were included in the numerator only if proved essential after dozens of hours of claim-chart review.”¹²⁷

¹²³ *Id.* at *18.

¹²⁴ *Id.* That is, $1673 \times (1 - 0.114) = 1481$ relevant 4G SEP families; $1076 \times (1 - 0.114) = 953$ relevant 3G SEP families; $413 \times (1 - 0.114) = 365$ relevant 2G SEP families.

¹²⁵ *Id.* at *18.

¹²⁶ *Id.* at *18–19.

¹²⁷ Ericsson’s Appellate Brief, *supra* note 120, at *25.

In contrast, as explained in Part II.B.1.b, TCL's experts spent only 20 minutes per patent family on average when estimating the total number of SEP families. However, TCL did not apply the same methodology to identify the number of SEP families owned by Ericsson as it did to identify the total number of SEP families. Instead, TCL relied on Ericsson's estimates and then contended that many of those SEP families were in fact not essential to practice the relevant standard.¹²⁸ TCL argued that Ericsson owned only 29 2G SEP families, 33 3G SEP families, and 74 4G SEP families.¹²⁹

Judge Selna did not address the differences in the procedures that the parties' experts used to estimate the number of relevant SEP families owned by Ericsson and the total number of relevant SEP families. He also did not criticize any specific steps of the procedures that the parties applied to identify the number of SEP families owned by Ericsson. Instead, to determine the total number of SEP families owned by Ericsson and relevant to the 2G, 3G, and 4G standards, Judge Selna relied on both Ericsson's and TCL's estimates. He found that relying on both estimates "more accurately reflects the reality faced by parties in a licensing negotiation who each have different views [of] how many SEPs the licensor owns."¹³⁰ Thus, Judge Selna calculated a FRAND royalty based on the top-down methodology using two different estimates of the number of Ericsson's relevant U.S. SEP families—one advocated by Ericsson and the other advocated by TCL.

Nonetheless, Judge Selna found that it was necessary to revise the parties' estimated number of Ericsson's SEP families to account for "expired and expiring" SEPs.¹³¹ He said that "United States patent law does not permit Ericsson to demand value for patents that have expired."¹³² He added that "SEPs that expire before a license begins therefore have no bearing on a fair and reasonable prospective royalty rate."¹³³ Consequently, he revised the estimated number of SEP families owned by Ericsson to account for U.S. SEPs that would expire during the term of the license between Ericsson and TCL. He compiled the expiration dates of Ericsson's U.S. SEPs to calculate the number of months that "each SEP will be valid over the course of the license" between Ericsson and TCL.¹³⁴ Because he found that the duration of a license between Ericsson and TCL would be 60 months, Judge Selna divided the total number of months until expiration for all of Ericsson's SEP families by

¹²⁸ *TCL v. Ericsson*, 2018 WL 4488286, at *19.

¹²⁹ *Id.*

¹³⁰ *Id.* at *18.

¹³¹ *Id.* at *20.

¹³² *Id.*

¹³³ *Id.*

¹³⁴ *Id.* ("The first step in adjusting for SEPs that expire during the course of the license is to determine when Ericsson's U.S. patents expire. . . . [T]he Court applies that expiration date to all other standards covered by this family if Ericsson argued that the U.S. patent was essential to each standard.")

60 to “represent the effective number of unexpired SEPs Ericsson will own throughout the license.”¹³⁵

After applying that adjustment, Judge Selna concluded that, on the basis of TCL’s estimates, Ericsson owned 12 2G SEP families, 19.65 3G SEP families, and 69.88 4G SEP families.¹³⁶ On the basis of Ericsson’s estimates, Judge Selna concluded that Ericsson owned 12 2G SEP families, 24.65 3G SEP families, and 111.51 4G SEP families.¹³⁷ Table 2 summarizes Judge Selna’s conclusion about Ericsson’s SEP families.

Table 2. Judge Selna’s Estimates of Ericsson’s U.S. SEP Families for the 2G, 3G, and 4G Standards

Standard	U.S. SEP Families Owned by Ericsson
TCL’s Estimates	
2G	12
3G	19.65
4G	69.88
Ericsson’s Estimates	
2G	12
3G	24.65
4G	111.51

Source: *TCL v. Ericsson*, 2018 WL 4488286, at *20.

It bears emphasis that Judge Selna said that it was *not* necessary to adjust the denominator (the total number of U.S. SEP families) to account for expired and expiring patents.¹³⁸ He said:

Because the total aggregate royalty represents the value of all expired and unexpired inventions in the standard, also removing an expired SEP from the denominator treats the invention as no longer having value. The invention, however, still has value, that value has merely been transferred to the public domain. To remove expired patents from the denominator (without decreasing the total aggregate royalty) would result in transferring the value from expired inventions to the remaining patents in the standard instead of the public. By removing expired SEPs from only the numerator of the top down formula the Court therefore apportions their value from the still patented features of the standard.¹³⁹

¹³⁵ *Id.*

¹³⁶ *Id.*

¹³⁷ *Id.*

¹³⁸ *Id.*

¹³⁹ *Id.*

However, TCL's experts excluded from their estimates of the total number of SEP families those families that contained only expired patents. Judge Selna said that "this was an error."¹⁴⁰ Nonetheless, because he found that excluding expired patents from the denominator was "an error which favor[ed] Ericsson, and it may have been necessary to conduct a feasible study," he relied on TCL's estimates to determine the total number of U.S. SEP families.¹⁴¹ Thus, like the numerator, the denominator did not include expired SEPs. However, Judge Selna did include in the denominator SEPs that would expire during the term of the license.

3. *Ericsson's Share of the U.S. SEP Families Relevant to the 2G, 3G, and 4G Standards*

With the obtained estimates for the number of U.S. SEP families owned by Ericsson and the total number of U.S. SEP families, Judge Selna calculated Ericsson's share of U.S. SEP families for each standard (S). He did so by dividing the number of U.S. SEP families owned by Ericsson for each standard (N_E) (the numerator) by the total number of U.S. SEP families for that standard (N_T) (the denominator) as Equation 1 shows:¹⁴²

$$S = N_E \div N_T \quad (1)$$

Table 3 summarizes Judge Selna's calculations of Ericsson's share of 2G, 3G, and 4G SEP families.

¹⁴⁰ *Id.* at *16.

¹⁴¹ *Id.*

¹⁴² *Id.* at *9.

Table 3. Judge Selna's Calculated Proportional Shares of Ericsson's SEP Families for the 2G, 3G, and 4G Standards

Standard	U.S. SEP Families Owned by Ericsson	Total Number of U.S. SEP Families	Proportional Share of Ericsson's U.S. SEP Families
TCL's Estimates			
	$[N_{E,TCL}]$	$[N_T]$	$[S_{TCL}] = [N_{E,TCL}] \div [N_T]$
2G	12	365	3.280%
3G	19.65	953	2.061%
4G	69.88	1481	4.761%
Ericsson's Estimates			
	$[N_{E,Ericsson}]$	$[N_T]$	$[S_{Ericsson}] = [N_{E,Ericsson}] \div [N_T]$
2G	12	365	3.280%
3G	24.65	953	2.58%
4G	111.51	1481	7.525%

Source: *TCL v. Ericsson*, 2018 WL 4488286, at *20–21.

As Table 3 shows, Judge Selna concluded that Ericsson owned 3.280 percent of all 2G SEP families.¹⁴³ For the 3G standard, he calculated that Ericsson owned 2.061 percent of 3G SEP families on the basis of the adjusted TCL estimate, or 2.58 percent of 3G SEP families on the basis of the adjusted Ericsson estimate.¹⁴⁴ For the 4G standard, Judge Selna found that Ericsson owned 4.761 percent of 4G SEP families on the basis of the adjusted TCL estimate, or 7.525 percent of 4G SEP families on the basis of the adjusted Ericsson estimate.¹⁴⁵

4. Judge Selna's Assumption That All SEPs Have Equal Value

Judge Selna examined whether it was appropriate to adjust Ericsson's share to account for the strength of Ericsson's SEP portfolio relative to the strength of the SEP portfolios owned by other SEP holders.¹⁴⁶ He considered, but ultimately rejected, TCL's proposal to account for the weighted value of Ericsson's SEPs (based on the "importance and contribution" of the SEPs to the standard) because he found the methodology "too flawed."¹⁴⁷ Instead, Judge Selna assumed that all SEPs have equal value.

¹⁴³ *Id.* at *20.

¹⁴⁴ *Id.*

¹⁴⁵ *Id.* at *21.

¹⁴⁶ *Id.* at *24.

¹⁴⁷ *Id.* at *21.

a. TCL's Importance-and-Contribution Analysis

TCL argued that the court should adjust Ericsson's proportional share of SEPs according to the strength of Ericsson's SEPs relative to the strength of the other SEPs included in the same standard.¹⁴⁸ As Judge Selna explained, "[t]he rationale . . . is that even in the universe of standard essential patents, many are relatively trivial, while some are key features of the standard."¹⁴⁹

To estimate the relative strength of Ericsson's SEP portfolio, TCL presented an "importance and contribution" analysis. TCL's experts, Dr. Kakaes (an electrical engineer¹⁵⁰) and Dr. Nikil Jayant (an expert in speech coding¹⁵¹), assigned to a sample of Ericsson's SEPs (1) an importance score ranging from 1 to 3 (with 1 indicating the highest importance) and (2) a contribution rank on a scale of 1 to 4 (with 1 indicating the highest contribution).¹⁵² Whereas the "importance" score sought to estimate the technical value of Ericsson's SEPs, the "contribution" score sought to evaluate the value of Ericsson's SEPs relative to alternative technologies that were available at the time the standard was adopted.¹⁵³ Judge Selna explained that TCL believed that the latter evaluation was necessary because even technologies that have "substantial value" might offer only "a small contribution [to the standard] because there were other almost as useful options [that the standard-setting organization] could have chosen when the standard was adopted."¹⁵⁴

At this point, a brief digression from the facts and reasoning of Judge Selna's decision in *TCL v. Ericsson* is necessary. I have previously explained at length how some economists have given expert testimony in FRAND or RAND cases predicated on the fallacious argument that, because the SSO could have chosen an alternative technology to the one adopted into the standard, the incremental contribution of the chosen technology must be slight and therefore justifies only a modest FRAND or RAND royalty.¹⁵⁵ For example, in *Innovatio*, Judge James Holderman wrote in 2013 that Dr. Leonard "testified that . . . if two patented and equally effective alternatives both cost the same amount, . . . the two patent holders would negotiate the price down

¹⁴⁸ *Id.*

¹⁴⁹ *Id.*

¹⁵⁰ *Id.* at *10.

¹⁵¹ *Id.* at *18.

¹⁵² *Id.* at *21 ("TCL ranked Ericsson's SEPs on a scale from 1–3, with a 1 for patents that were important or technically valuable, 2 for patents that were moderately important, and 3 for patents that were only marginally important.")

¹⁵³ *Id.* ("A contribution rank of 1 meant that TCL did not identify a viable alternative to the patent, a 2 meant the patent provided moderate improvement relative to the alternative, a 3 meant the feature provided marginal improvement relative to the alternative, and a 4 meant it provided no improvement to the standard relative to the alternative.")

¹⁵⁴ *Id.*

¹⁵⁵ See J. Gregory Sidak, *The Meaning of FRAND, Part I: Royalties*, 9 J. COMPETITION L. & ECON. 931, 936–38 (2013).

to effectively zero.”¹⁵⁶ The argument that a FRAND royalty is “effectively zero” implicitly depends on modeling competition between the technologies in standard setting as a static Bertrand pricing game without capacity restraints. For a price war between SEP holders to drive down a FRAND royalty nearly to zero requires assuming, at a minimum, (1) that there is no differentiation between the competing (substitute) technologies, and (2) that the inventors lack any outside option for monetizing their technologies, and (3) that the inventor has some ancillary revenue stream generating a positive return to participation in the SSO, at least sufficient to cover the inventor’s costs of participation.¹⁵⁷ Often, an expert economic witness making the “effectively zero” argument tacitly ignores the opportunity cost to the implementer of acquiring lawful use of the technology of the next-best alternative to the technology chosen. The legerdemain often used for doing so is to ask the finder of fact to assume that the next-best alternative is in the public domain and is therefore costless. However, that assumption, which of course is entirely dependent on the facts of the case, rigs the outcome and dupes the finder of fact if he or she lacks the sophistication in microeconomic theory necessary to spot the dispositive implications of the public-domain assumption. Certainly, there is no reason to believe that the public-domain assumption holds in the real world with any generality.

We return now to Judge Selna’s opinion. Dr. Leonard, an expert economic witness for TCL, then “used the importance and contribution scores to determine how many of Ericsson’s SEPs would be ranked in the top 10% of SEPs.”¹⁵⁸ Relying on findings from an academic paper by Dr. Jonathan Putnam, Dr. Leonard opined that the top 10 percent of SEPs account for 65 percent of the value of all SEPs included in the standard, whereas the bottom 90 percent of SEPs contribute only 35 percent of the value of all SEPs.¹⁵⁹ Dr. Leonard then assumed that any patent that received a contribution score of 1 or 2 belonged in the top 10 percent of the patents essential to a given standard.¹⁶⁰ On the basis of that assumption, Dr. Leonard opined that Ericsson’s SEPs accounted

¹⁵⁶ *In re Innovatio IP Ventures, LLC*, No. 11-cv-09308, 2013 WL 5593609, at *20 (N.D. Ill. Oct. 3, 2013).

¹⁵⁷ See J. Gregory Sidak, *Tournaments and FRAND Royalties*, 1 *CRITERION J. ON INNOVATION* 101, 103–05 (2016).

¹⁵⁸ *TCL v. Ericsson*, 2018 WL 4488286, at *21.

¹⁵⁹ *Id.* at *22 (“[A]cross numerous industries most patents are worth very little, and . . . the top 10% of patents are worth 65% of the value of patents in the industry, the next 10% make up 14.6%, and eventually the bottom 50% of patents make up 4.8% of the value in the industry.”). Although Judge Selna did not identify the title of the paper by Dr. Putnam upon which Dr. Leonard relied, it is reasonable to infer from the information that Judge Selna did disclose in his decision that Dr. Leonard relied on Jonathan D. Putnam, *Value Shares of Technologically Complex Products* (Competition Dynamics Working Paper, Apr. 16, 2014).

¹⁶⁰ *TCL v. Ericsson*, 2018 WL 4488286, at *22. Judge Selna observed that Dr. Leonard considered only the contribution score of a patent, and not its importance score, in determining the value of the patent. *Id.* at *23 (“As it turned out, the importance scores had no impact on Dr. Leonard’s estimate of [the SEPs] value.”).

for 3.1 percent of the value of 4G SEPs, 4.0 percent of the value of 3G SEPs, and 6.7 percent of the value of 2G SEPs.¹⁶¹

Dr. Leonard cross-checked the results that he obtained from the importance-and-contribution analysis by using a forward-citation analysis of U.S. patents, “which attempted to determine the strength of patents by examining how often they are cited in future patent applications.”¹⁶² As Judge Selna explained, “[t]he economic logic behind using forward citations as an indicator of patent value is that a patent that is more important and valuable would be expected to generate a greater number of future innovations that then cite back to the patent in question.”¹⁶³ On the basis of the forward-citation analysis, Dr. Leonard concluded that “Ericsson owns a 4.0% value share of U.S. 4G patents, a 5.7% value share of U.S. 3G patents, and an 8.1% value share of 2G patents.”¹⁶⁴

Figure 1 compares Ericsson’s estimated value shares based on (1) the patent-counting analysis, (2) the importance-and-contribution analysis, and (3) the forward-citation analysis.

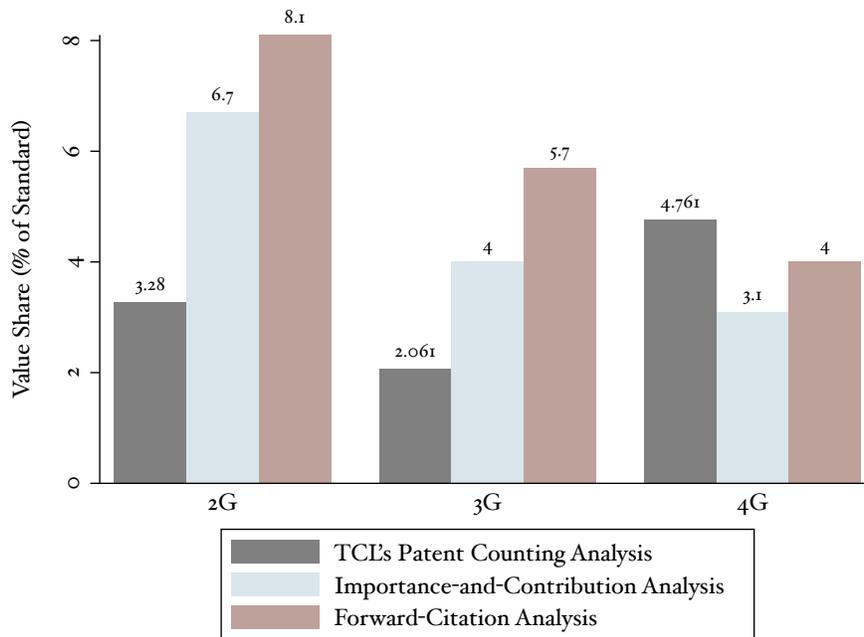
¹⁶¹ *Id.* at *22.

¹⁶² *Id.*

¹⁶³ *Id.*

¹⁶⁴ *Id.*

Figure 1. Ericsson's Value Share of the 2G, 3G, and 4G Standards Based on Patent Counting, the Importance-and-Contribution Analysis, and the Forward-Citation Analysis



Source: *TCL v. Ericsson*, 2018 WL 4488286, at *20, *22.

As Figure 1 reports, whereas TCL's importance-and-contribution analysis increased the value share of Ericsson's SEP families for the 2G and 3G standards relative to the patent-counting analysis, it decreased Ericsson's share of the 4G standard relative to the patent-counting analysis.

b. Judge Selna's Rejection of TCL's Importance-and-Contribution Analysis

Judge Selna refused to adjust Ericsson's proportional share because he found several flaws in TCL's analysis. He said that TCL used its importance-and-contribution analysis to examine Ericsson's SEPs in isolation, in the sense that TCL never analyzed the importance or contribution of SEPs owned by other SEP holders that are also essential to the 2G, 3G, and 4G standards.¹⁶⁵ Judge Selna found that this inconsistency made it difficult to assess the value shares: "TCL uses the importance-and-contribution analysis to weight Ericsson's portfolio according to its relative value, but it never applied that analysis to the rest of the SEPs in the standard. This means that TCL's 'value share' is a

¹⁶⁵ *Id.*

ratio with inconsistent units, and it is unclear what it actually represents.”¹⁶⁶ Although Judge Selna did not elaborate, it appears that he questioned the accuracy of Dr. Leonard’s assumption that any SEP with a contribution score of 1 or 2 belongs in the top 10 percent of the patents essential to a given standard. If Dr. Leonard had performed the importance-and-contribution analysis on *every* patent declared essential to the 2G, 3G, and 4G standards, he might have found that more than 10 percent of the SEPs for a given standard had a contribution score of 1 or 2.

In addition, Judge Selna faulted TCL for failing to identify the owners of technologies that were alternatives to Ericsson’s SEPs at the time of standard adoption.¹⁶⁷ He said that “[t]he degree to which alternatives will lower the value of a patent will depend on the quality of the alternatives,” as well as on other variables such as “who owns the alternatives.”¹⁶⁸ Judge Selna elaborated that the royalty for a given SEP might vary depending on whether the owner of the alternative technology is a company that licenses its patents for free or a company that rigorously enforces its patent rights or whether an alternative technology is currently covered by an unexpired patent.¹⁶⁹ In particular, Judge Selna recognized the fallacy (explained above) of ignoring the opportunity cost to the implementer of securing the lawful right to use the next-best alternative to the patented technology chosen for the standard: “How much proposed alternatives will affect the value of a patent depends on a number of variables, including whether the alternative is unpatented, expired, part of the previous standard, owned by another company that lets manufacturers use it for free or at a low rate, an entity that aggressively protects its intellectual property, or by the company itself.”¹⁷⁰

Furthermore, Judge Selna found that TCL did not clearly distinguish between patents that received different importance-and-contribution scores. For example, TCL’s experts could not explain what distinguished a patent that received a contribution score of 2 from a patent that received a contribution score of 3.¹⁷¹ However, that difference had an important practical implication for TCL’s analysis, because a contribution score of 2 placed a patent in the top 10 percent of patents, but a contribution score of 3 placed a patent in the bottom 90 percent of patents.

Judge Selna was also not persuaded by Dr. Leonard’s opinion that the top 10 percent of SEPs in a standard account for 65 percent the value of the standard.¹⁷² Judge Selna found that it was not clear that Dr. Putnam’s paper,

¹⁶⁶ *Id.*

¹⁶⁷ *Id.* at *23.

¹⁶⁸ *Id.*

¹⁶⁹ *Id.*

¹⁷⁰ *Id.*

¹⁷¹ *Id.*

¹⁷² *Id.*

upon which Dr. Leonard relied to support that assumption, is “applicable to telecommunications SEPs.”¹⁷³ Indeed, none of the nine empirical research papers that Dr. Putnam used to build his model specifically examines telecommunications patents.¹⁷⁴

Judge Selna also criticized Dr. Leonard’s forward-citation analysis. He found that the forward-citation analysis produced results that contradicted the results of Dr. Kakaes’ importance-and-contribution analysis, as Figure 1 demonstrates.¹⁷⁵ He also said that “it does not appear” that another court or company had previously used a forward-citation analysis to value SEPs, and added that “it is unclear whether companies would have the same incentives to cite to potential prior art, particularly in the context of multiple standards.”¹⁷⁶ However, this criticism appears unjustified. A number of U.S. courts have recognized that forward-citation analysis, when sufficiently tied to the facts of the case, is a reliable and useful apportionment methodology to determine the value of a given patent relative to the value of other patents.¹⁷⁷ From an economic perspective, that conclusion applies to both implementation patents and SEPs. That a patent is essential to practice an industry standard or is subject to a FRAND contract does not affect the results of a forward-citation analysis.¹⁷⁸ It would be incorrect economic reasoning to contend that a forward-citation analysis is unreliable simply because it was used to examine the value of SEPs, as opposed to non-SEPs.

¹⁷³ *Id.*

¹⁷⁴ Putnam, *Value Shares of Technologically Complex Products*, *supra* note 159, manuscript at Table 1 (showing that under the type of “technology” that each paper examines, none examines only telecommunications technology).

¹⁷⁵ *TCL v. Ericsson*, 2018 WL 4488286, at *24.

¹⁷⁶ *Id.*

¹⁷⁷ See, e.g., *Intel Corp. v. Future Link Sys., LLC*, No. 14-cv-00377, 2017 WL 2482881, at *5 (D. Del. June 1, 2017) (“In cases where forward citation analysis has been found unreliable, it was because the expert failed to ‘tie the methodology to the facts’” (quoting *Finjan, Inc. v. Blue Coat Sys., Inc.*, No. 13-cv-03999, 2015 WL 4272870, at *8 (N.D. Cal. July 14, 2015)); *Comcast Cable Commc’ns, LLC v. Sprint Commc’ns Co.*, 218 F. Supp. 3d 375, 383 (E.D. Pa. 2016) (“[C]ourts have not rejected forward citation analysis outright.”); *Comcast Cable Commc’ns, LLC v. Sprint Commc’ns Co.*, No. 12-859, 2016 WL 8612563, slip op. at 12 (E.D. Pa. Nov. 21, 2016) (“Dr. [Alan] Cox’s use of forward citation analysis in his expert opinion is . . . reliable under *Daubert*.”); *Better Mouse Co. v. SteelSeries ApS*, No. 2:14-cv-00198, 2016 WL 3611528, at *2 (E.D. Tex. Jan. 5, 2016) (“To the extent Plaintiff claims that forward citation analysis is never relevant for patent valuation, the Court rejects that claim. No binding authority states that forward citation analysis is per se not relevant to the facts of any case.”); *Finjan*, 2015 WL 4272870, at *7 (“[A] qualitative analysis of asserted patents based upon forward citations may be probative of a reasonable royalty in some instances.”); *Comcast Cable Commc’ns, LLC v. Sprint Commc’ns Co.*, No. 2-12-cv-00859, slip op. at 41 (E.D. Pa. Aug. 16, 2017) (“[F]orward citation analysis is reliable when . . . it is tied to the facts of the case.”); *Evolved Wireless, LLC v. Apple Inc.*, No. 15-542-JFB-SRF, 2019 WL 1178517, slip op. at 11 n.7 (D. Del. Mar. 13, 2019) (“The forward citation method has generally been regarded as reliable.”) (citing *Comcast v. Sprint*, 218 F. Supp. 3d at 383 & n.8).

¹⁷⁸ See, e.g., Initial Determination on Violation of Section 337 and Recommended Determination on Remedy and Bond at 187, 190, Certain Memory Modules and Components Thereof, and Products Containing Same, Inv. No. 337-TA-1023 (USITC Nov. 14, 2017); see also J. Gregory Sidak & Jeremy O. Skog, *Citation Weighting, Patent Ranking, and Apportionment of Value for Standard-Essential Patents*, 3 CRITERION J. ON INNOVATION 201 (2018); J. Gregory Sidak & Jeremy O. Skog, *Hedonic Prices and Patent Royalties*, 2 CRITERION J. ON INNOVATION 601 (2017).

In sum, because of the several flaws that he perceived to exist in TCL's importance-and-contribution analysis, Judge Selna rejected the results of that analysis in adjusting Ericsson's proportional share of SEPs. Instead, he assumed that all SEPs have equal value.

5. *Adjusting Ericsson's Proportional Share of the 2G, 3G and 4G Standards by Geographic Region*

Judge Selna said that because Ericsson's portfolio was "weaker outside the U.S."—in the sense that Ericsson owned fewer SEPs issued in foreign jurisdictions than in the United States—it was appropriate to adjust Ericsson's proportional share of SEP families for each of the various geographic regions in which TCL sells its licensed products.¹⁷⁹ It bears emphasis that Judge Selna's concept of the "strength" of an SEP portfolio did not directly measure what licensors and licensees typically consider to be the "quality" of an SEP portfolio. An SEP portfolio's quality typically refers to the commercial value of the patented technology in one portfolio relative to either the commercial value of the patented technology in another portfolio or the commercial value of unpatented technology that is in the public domain. In contrast to an SEP portfolio's quality, an SEP portfolio's "strength," as understood by Judge Selna, is purely a function of the number of SEPs that it contains. Thus, Judge Selna essentially addressed the relative *scale* of Ericsson's SEP portfolio in different geographic regions, not the relative quality of Ericsson's SEP portfolio in those same regions.

Although Judge Selna recognized that it is a "commercial reality" for firms to "adopt a single world-wide rate" that applies across different regions,¹⁸⁰ he found it appropriate to account for "regional disparities" in the coverage of Ericsson's SEP portfolio when calculating a FRAND royalty rate for Ericsson's SEPs.¹⁸¹ He said that uniformly applying the same rate across all regions globally "would result in a subsidy to consumers in countries where the SEP owner has more enforceable patents from consumers that are not legally obligated to pay such a royalty."¹⁸² Consequently, he found it appropriate to assess the strength of Ericsson's SEP portfolio in different geographic regions and, on the basis of those estimates, adjust the FRAND royalty for each region.

Judge Selna did not identify his source of legal authority for adjusting the FRAND rates by geographic region. Nothing in either Ericsson's FRAND contract with ETSI or U.S. patent law requires a FRAND rate to be adjusted according to what Judge Selna called the strength of the SEP

¹⁷⁹ *TCL v. Ericsson*, 2018 WL 4488286, at *24.

¹⁸⁰ *Id.*

¹⁸¹ *Id.* at *25.

¹⁸² *Id.* at *24. Judge Selna did not elaborate on this economic finding.

holder's portfolio in different geographic regions. Nor did Judge Selna find that it is industry practice to do so; to the contrary, he acknowledged that, "as a matter of commercial reality, firms regularly adopt a single world-wide rate."¹⁸³ Moreover, as I will explain in Part II.D.1, according to Judge Selna's characterization of Ericsson's two offers to TCL, Ericsson offered TCL a single worldwide rate in one of the offers and, in the other, offered a single rate with a 50 percent discount for TCL's sales occurring in China. It is therefore unclear as a matter of contract interpretation why Judge Selna took it upon himself to adjust Ericsson's FRAND rates by geographic region.

a. Judge Selna's Determination of Appropriate Geographic Adjustments

To determine FRAND royalties across different geographic regions, Judge Selna first noted that a rate floor exists for a worldwide license to Ericsson's SEP portfolio because "patents can . . . be enforced where the product is manufactured" such that "the SEP owner's patent portfolio strength in the country where the products are made effectively sets a global floor for the manufacturer's FRAND rate."¹⁸⁴ Therefore, "[b]ecause TCL manufactures its products in China, the strength of Ericsson's SEP portfolio in China will . . . determine the lowest FRAND rate for any product TCL sells globally."¹⁸⁵ In other words, Judge Selna found that the strength of Ericsson's SEP portfolio in China (or the "rest of the world," or "ROW") would determine the minimum royalty rate that TCL would need to pay for a worldwide license to use Ericsson's SEPs.

Next, Judge Selna noted that, "[a]side from the United States, the only other region where Ericsson has a stronger patent portfolio than China is Europe, and only for 2G and 3G."¹⁸⁶ Consequently, for Ericsson's 2G and 3G SEPs, he estimated the strength of Ericsson's portfolio not only in the United States and China (or ROW), but also in Europe. Table 4 summarizes Judge Selna's conclusions regarding the relative strength of Ericsson's portfolio in those three geographic regions.

¹⁸³ *Id.*

¹⁸⁴ *Id.*

¹⁸⁵ *Id.*

¹⁸⁶ *Id.* at *25.

Table 4. Judge Selna's Findings on the Strength of Ericsson's SEP Portfolio in Different Geographic Regions, as a Percentage of the Strength of Ericsson's U.S. SEP Portfolio

Region	2G	3G	4G
USA	100%	100%	100%
Europe	72.2%	87.9%	69.8%*
China (ROW)	54.9%	74.8%	69.8%

Source: *TCL v. Ericsson*, 2018 WL 4488286, at *25.

Note: * As I explain above, Judge Selna found that the strength of Ericsson's SEP portfolio differed from that portfolio's strength in China only for 2G and 3G. Therefore, the FRAND rate for Ericsson's 4G portfolio in Europe equals the FRAND rate for that portfolio in China (or ROW).

As Table 4 reports, Judge Selna found that the strength of Ericsson's 2G portfolio in Europe was 72.2 percent of the strength of Ericsson's 2G portfolio in the United States, and that the strength of Ericsson's 3G portfolio in Europe was 87.9 percent of the strength of Ericsson's 3G portfolio in the United States.¹⁸⁷ He also found that the strength of Ericsson's 2G portfolio in China was 54.9 percent of the strength of Ericsson's 2G portfolio in the United States, the strength of Ericsson's 3G portfolio in China was 74.8 percent of the strength of Ericsson's 3G portfolio in the United States, and that the strength of Ericsson's 4G portfolio in China was 69.8 percent of the strength of Ericsson's 4G portfolio in the United States.¹⁸⁸

b. Accounting for the Rejected Importance-and-Contribution Analysis

Judge Selna recognized that his findings on the relative strength of Ericsson's SEP portfolio rested on Dr. Leonard's analysis of Ericsson's SEP portfolio, "which incorporat[ed] the importance-and-contribution analysis which the Court rejected."¹⁸⁹ As I explained in Part II.B.4.b, Judge Selna found that analysis to be unreliable. Nonetheless, he found that relying on Dr. Leonard's estimates of the regional strength of Ericsson's SEP portfolio would *not* be problematic "because the regional numbers . . . are a ratio of one value share to another."¹⁹⁰ Judge Selna reasoned that the importance-and-contribution analysis would affect that ratio only if "Ericsson has disproportionately registered [relative to the United States] its less valuable patents . . . in Europe and China."¹⁹¹ Judge Selna found, however, that "there is no reason to believe this is true."¹⁹² He found that, because Dr. Leonard's importance-and-con-

¹⁸⁷ *Id.*

¹⁸⁸ *Id.*

¹⁸⁹ *Id.* at *26.

¹⁹⁰ *Id.*

¹⁹¹ *Id.*

¹⁹² *Id.*

tribution analysis affected each region equally, that analysis would not skew the information regarding the relative strength of Ericsson's portfolio across regions. Consequently, Judge Selna found it appropriate to rely upon Dr. Leonard's analysis for the limited purpose of estimating the relative strength of Ericsson's SEP portfolio in the United States, Europe, and China.

In sum, Judge Selna adjusted Ericsson's proportional share of 2G, 3G, and 4G SEPs on the basis of the relative strength of Ericsson's SEP portfolio in three geographic regions. As I explain in Part II.C, Judge Selna used those computations as inputs in his top-down analysis to calculate a FRAND royalty rate for a license to Ericsson's SEP portfolio. In addition, as I explain in Part V.A, he also used that information to convert the global rates that he derived from unpacking the license agreements that Ericsson had executed with third parties into U.S. rates and, ultimately, to determine a FRAND rate for a license to Ericsson's SEPs.

C. Royalty Estimates Derived from the Top-Down Methodology

After obtaining the estimates of (1) an aggregate royalty rate for the 2G, 3G, and 4G standards (*A*), (2) the proportional share of Ericsson's SEP families for each of the three standards (*S*), and (3) the relative strength of Ericsson's SEP portfolio in the United States, Europe, and the rest of the world (*G*), Judge Selna calculated a royalty rate (*R*) for a license to Ericsson's SEP portfolio by multiplying the three variables, as Equation 2 shows:¹⁹³

$$R = A \times S \times G. \quad (2)$$

Using Equation 2, Judge Selna calculated a royalty rate for (1) Ericsson's 2G portfolio, (2) Ericsson's 3G portfolio, and (3) Ericsson's 4G portfolio in each of the three geographic regions. However, because he ultimately relied on only the U.S. rates derived from the top-down analysis to calculate a FRAND royalty rate for a license to Ericsson's SEPs, I summarize here only Judge Selna's conclusions regarding royalty rates for a license to Ericsson's SEP portfolio in the United States.

Table 5 summarizes the results of the top-down calculations for Ericsson's U.S. 2G and 3G portfolios.

¹⁹³ *Id.*

Table 5. Judge Selna's Calculations of a FRAND Royalty Rate for Ericsson's U.S. 2G and 3G SEP Families Following the Top-Down Approach

Standard	Aggregate Royalty Rate	Share of Ericsson's SEP Families	Regional Strength Ratio in the U.S.	FRAND Royalty Rate
	[A]	[S]	[G]	[R] = [A] × [S] × [G]
2G	5%	3.280%	100%	0.16402%
TCL's Adjusted 3G Estimate				
3G	5%	2.061%	100%	0.10309%
Ericsson's Adjusted 3G Estimate				
3G	5%	2.580%	100%	0.12932%

Source: *TCL v. Ericsson*, 2018 WL 4488286, at *26.

As Table 5 shows, Judge Selna found that a royalty rate for Ericsson's 2G SEP portfolio would equal 0.16402 percent of the average selling price of TCL's 2G devices sold in the United States.¹⁹⁴ Because TCL and Ericsson had different estimates of the number of 3G SEP families that Ericsson owned, Judge Selna calculated two different royalty rates for the 3G standard on the basis of their estimates. He found, using TCL's adjusted 3G estimate, that Ericsson's 3G FRAND royalty rate would equal 0.10309 percent of the average selling price of TCL's 3G devices sold in the United States.¹⁹⁵ Alternatively, using Ericsson's adjusted 3G estimate, Judge Selna found that Ericsson's 3G royalty rate would equal 0.12932 percent of the average selling price of TCL's 3G devices sold in the United States.¹⁹⁶

Judge Selna used Equation 2 also to derive a royalty rate for a license to Ericsson's U.S. 4G portfolio. In doing so, he (1) used in the alternative both TCL's and Ericsson's estimates of the number of 4G SEP families owned by Ericsson and (2) considered two alternative aggregate royalty rates for 4G SEPs (6 percent and 10 percent).¹⁹⁷ Therefore, he derived in total four estimates of a 4G FRAND rate in the United States. Table 6 summarizes Judge Selna's calculations of a FRAND royalty rate for Ericsson's SEP families for the 4G standard in the United States.

¹⁹⁴ *Id.*

¹⁹⁵ *Id.*

¹⁹⁶ *Id.*

¹⁹⁷ *Id.*

Table 6. Judge Selna's Calculations of FRAND Royalty Rate for Ericsson's U.S. SEP Families for the 4G Standard Following the Top-Down Approach

Aggregate Royalty Rate	Share of Ericsson's SEP Families	Regional Strength Ratio in the U.S.	FRAND Royalty Rate
[A]	[S]	[G]	[R] = [A] × [S] × [G]
TCL's Adjusted 4G Estimate			
6%	4.718%	100%	0.28297%
10%	4.718%	100%	0.471611%
Ericsson's Adjusted 4G Estimate			
6%	7.529%	100%	0.45145%
10%	7.529%	100%	0.752576%

Source: *TCL v. Ericsson*, 2018 WL 4488286, at *26.

Table 6 shows that, on the basis of TCL's adjusted 4G estimate, Judge Selna found that Ericsson's 4G FRAND royalty rate would equal (1) 0.28297 percent of the average selling price of TCL's 4G devices sold in the United States when using 6 percent as the aggregate royalty rate and (2) 0.471611 percent of the average selling price of TCL's 4G devices sold in the United States when using 10 percent as the aggregate royalty rate.¹⁹⁸ Alternatively, on the basis of Ericsson's adjusted 4G estimate, he found that Ericsson's 4G FRAND royalty rate would equal (1) 0.45145 percent of the average selling price of TCL's 4G devices sold in the United States when using a 6 percent aggregate royalty rate and (2) 0.752576 percent of the average selling price of TCL's 4G devices sold in the United States when using a 10 percent aggregate royalty rate.¹⁹⁹

D. Judge Selna's Conclusion That Ericsson's Offers to TCL Were Unfair and Unreasonable

To determine whether Ericsson's offers to TCL were "fair or reasonable," Judge Selna compared the royalty rates obtained from the top-down analysis to the offers that Ericsson made to TCL. However, in making that comparison, Judge Selna did not use the rates contained in Ericsson's actual offers. Instead, he unpacked those offers to derive a running royalty rate for a license

¹⁹⁸ *Id.*

¹⁹⁹ *Id.*

limited to Ericsson's U.S. SEP portfolio. Judge Selna then concluded that the offers that Ericsson made to TCL were *not* "fair or reasonable" offers.²⁰⁰

1. *Unpacking Ericsson's Offers to TCL*

Judge Selna examined two offers that Ericsson made to TCL: Option *A* and Option *B*.²⁰¹ Option *A* specified that TCL would pay Ericsson an annual lump-sum royalty of \$30 million for TCL's first \$3 billion in licensed sales of devices practicing any of the licensed standards, "implying a 1 [percent] effective royalty rate."²⁰² For annual sales exceeding \$3 billion, TCL would pay a running royalty of 0.8 percent of the net selling price of 2G GSM/GPRS devices, 1.1 percent of the net selling price of 2G EDGE devices, 1.5 percent of the net selling price of 3G devices, and 2.0 percent of the net selling price of 4G devices, with a 50 percent discount on all running royalties for sales in China.²⁰³ Option *B* did not specify a lump-sum royalty but specified a running royalty rate of 0.8 percent of the net selling price of 2G GSM/GPRS devices, 1.0 percent of the net selling price of 2G EDGE devices, 1.2 percent of the net selling price of 3G devices, and 1.5 percent of the net selling price of 4G devices.²⁰⁴ Option *B* also specified a royalty floor of \$2 and a royalty cap of \$4.50 for 4G devices per unit, and it did not include any discount on royalties for sales in China.²⁰⁵

Table 7 summarizes the royalties specified in Option *A* and Option *B*.

²⁰⁰ *Id.*

²⁰¹ *Id.* at *48.

²⁰² *Id.*

²⁰³ *Id.*

²⁰⁴ *Id.*

²⁰⁵ *Id.*

Table 7. Ericsson's Offers to TCL

Option A			
Lump Sum (for the First \$3 Billion in Sales)	Running Royalty (for Sales That Exceed \$3 billion)		
Payment	Standard	Royalty Rate	Discount in China
\$30 million	2G GSM/GPRS	0.8%	50-percent discount on all running royalties
	2G EDGE	1.1%	
	3G	1.5%	
	4G	2.0%	
Option B			
Payment	Standard	Royalty Rate	Discount in China
N/A	2G GSM/GPRS	0.8%	N/A
	2G EDGE	1.0%	
	3G	1.2%	
	4G	1.5% (\$2 floor; \$4.50 cap)	

Source: *TCL v. Ericsson*, 2018 WL 4488286, at *4.

Judge Selna found it necessary to derive the royalties specified in Option A and Option B to compare them to the royalties derived from the top-down analysis. Although he acknowledged that neither Ericsson nor TCL unpacked those offers, he said that unpacking was necessary because (1) Option A included a “unique multi-standard lump sum provision” that he needed to unpack into running royalty rates across the 2G, 3G, and 4G standards, (2) Option B included a royalty floor and cap for 4G devices that he needed to unpack to account for devices with very high or low prices,²⁰⁶ and (3) both Option A and Option B specified different royalty rates for 2G GSM/GPRS devices and 2G EDGE devices that he needed to blend into one royalty rate for the 2G standard.²⁰⁷

Unfortunately, Judge Selna's explanation of his unpacking methodology is incomplete. He said that, to derive the royalty payments from Option A, he assumed that 20 percent of TCL's sales of devices practicing the 2G, 3G, and 4G standards occurred in China and that Option A was a one-way license that did not contain any discounted running-royalty rate.²⁰⁸ He also assumed that “Option A allocates the \$3 billion and corresponding lump sum

²⁰⁶ *Id.* at *49 (“While [the] 4G rate for Option B is expressed as a running percentage royalty, it still needs to be unpacked because 4G units that are sold for less than \$133 will pay a higher effective percentage because of the \$2 per-unit floor.”).

²⁰⁷ *Id.* at *48–49. Judge Selna did not derive the royalty rate for 3G from Option B.

²⁰⁸ *Id.* at *48.

payment proportionally by standard according to TCL's revenue breakdown for . . . [each] year."²⁰⁹ Using TCL's actual 2014 and 2015 sales data, Judge Selna (1) apportioned the \$30 million lump-sum royalty among the 2G, 3G, and 4G standards (on the basis of TCL's revenue breakdown) and (2) added the lump-sum royalty apportioned to each standard with "the running percentage royalty for each standard on its share of revenue over \$3 billion" to calculate the combined royalty payment for each standard.²¹⁰ Although he did not specify the calculation to compute the implied royalty rate, the logical final step would be to divide the combined royalty payment for each standard by TCL's sales from devices implementing at least that standard.²¹¹

Judge Selna provided less explanation of how he unpacked Option *B*. He said that he relied upon the report of TCL's economic expert, Dr. Matthew Lynde, to determine the derived 4G royalty rate from Option *B*.²¹² He also explained that he "blended" the royalty rates for 2G GSM/GPRS and the royalty rates for 2G EDGE from Option *B* "by revenue per standard from 2014-2015."²¹³ Table 8 reports the royalty rates that Judge Selna derived from Option *A* and Option *B*.

Table 8. Judge Selna's Derived Royalty Rates from Ericsson's Offers to TCL

Standard	Derived Royalty Rates
Option <i>A</i>	
2G	1.0079%
3G	1.0535%
4G	1.0738%
Option <i>B</i>	
2G	0.8701%
3G	1.2000%
4G	1.9878%

Source: *TCL v. Ericsson*, 2018 WL 4488286, at *49.

Judge Selna then observed that Option *A* and Option *B* specified royalty rates for a license to Ericsson's *global* SEP portfolio.²¹⁴ In contrast, the rates calculated using the top-down analysis were royalty rates strictly for Ericsson's

²⁰⁹ *Id.*

²¹⁰ *Id.* Judge Selna did not explain why he chose to rely on TCL's sales data in 2014 and 2015.

²¹¹ *Id.* Judge Selna did not explain how he treated sales of multi-mode devices. He might have considered devices practicing 4G, 3G, and 2G as 4G devices and devices practicing 3G and 2G as 3G devices.

²¹² *Id.* at *49.

²¹³ *Id.*

²¹⁴ *Id.* at *4.

U.S. SEP portfolio.²¹⁵ Consequently, Judge Selna needed to convert the 3G and 4G royalty rates derived from Option *A* and Option *B* into royalty rates for a license to Ericsson's U.S. SEP portfolio.²¹⁶ His conversion followed the same approach (which I analyze in Part V.A) that he used to convert into U.S. royalty rates the royalty rates derived from licenses that Ericsson had executed with third parties. Table 9 reports Judge Selna's conclusions regarding the running royalty rates that Option *A* and Option *B* imply for a license to Ericsson's SEP portfolio in the United States.

Table 9. Judge Selna's Converted U.S. Royalty Rates from Ericsson's Offers Compared with His Derived Global Royalty Rates from Ericsson's Offers

Standard	Derived Global Royalty Rates [A]	Converted U.S. Royalty Rates [B]	Difference in Percentage ([B] ÷ [A]) – 100%
Option <i>A</i>			
3G	1.0535%	1.3168%	24.9929%
4G	1.0738%	1.4659%	36.5152%
Option <i>B</i>			
3G	1.2000%	1.5000%	25.0000%
4G	1.9878%	2.5918%	30.3854%

Source: *TCL v. Ericsson*, 2018 WL 4488286, at *26, *49.

Note: Judge Selna did not convert the 2G royalty rates derived from Option *A* and Option *B* into U.S. royalty rates.

As Table 9 shows, the royalty rates for a license to Ericsson's U.S. SEP portfolio that Judge Selna derived from Ericsson's offers to TCL exceed the global royalty rates that he derived from Ericsson's offers by at least 25 percent.

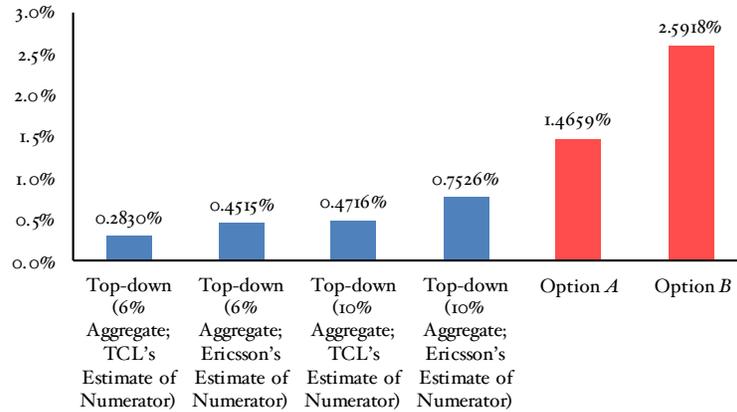
2. *Judge Selna's Comparison of the Rates Derived from the Top-Down Methodology with the Rates Obtained from Unpacking Ericsson's Offers*

After unpacking the offers contained in Option *A* and Option *B*, Judge Selna compared the derived rates with the royalty rates obtained from the top-down analysis. First, he compared the 4G royalties derived from Option *A* and Option *B* with the results of the top-down analysis, as Figure 2 shows.

²¹⁵ *Id.* at *51.

²¹⁶ *Id.*

Figure 2. Comparison of Judge Selna's 4G Top-Down Rates with U.S. Rates for Option A and Option B



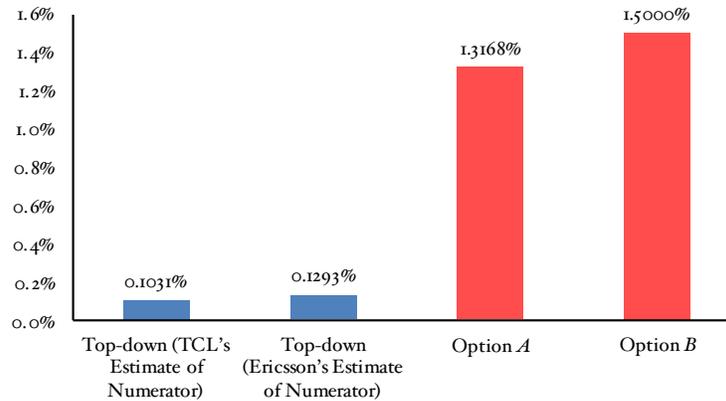
Source: *TCL v. Ericsson*, 2018 WL 4488286, at *26.

Because Judge Selna found that the implied 4G royalty rates in Option A and Option B substantially exceeded the royalty rates that he derived from the top-down analysis, he concluded that the royalty rates that Ericsson offered to TCL were “not fair or reasonable.”²¹⁷ Judge Selna did not say by how much the royalty rates in Option A and Option B could exceed the rates derived from the top-down analysis without being unfair or unreasonable. He also did not explain whether there was any difference between a fair or a reasonable offer. In other words, he treated “fair and reasonable” as a single criterion.

Similarly, Judge Selna compared the 3G royalties derived from Option A and Option B with the results of the top-down analysis, as Figure 3 shows.

²¹⁷ *Id.* at *26.

Figure 3. Comparison of Judge Selna's 3G Top-Down Rates with U.S. Rates for Option A and Option B



Source: *TCL v. Ericsson*, 2018 WL 4488286, at *26.

Because Judge Selna found that the 3G royalty rates implied in Ericsson's offers to TCL exceeded the 3G royalty rates that he derived from the top-down analysis, he concluded that Ericsson's offers to TCL were neither fair nor reasonable.²¹⁸ Again, Judge Selna did not say by how much the implied royalty rates from Ericsson's offers to TCL could exceed the rates derived from the top-down analysis without being unfair or unreasonable.

In sum, both of Judge Selna's calculations of the royalty rates implied in Ericsson's offers differed from the royalty rates that he obtained from the top-down analysis. On the basis of those differences, Judge Selna concluded that Ericsson's offers to TCL were neither fair nor reasonable.

III. ARE JUDGE SELNA'S CONCLUSIONS BASED ON THE TOP-DOWN ANALYSIS CORRECT?

Judge Selna said that, "[w]hile the Court has some reservations about the top down analysis, there is no basis to reconcile the results of the top down analysis with Option A or Option B."²¹⁹ He reasoned that, even if the court were to (1) assume that all of Ericsson's SEPs were in fact essential, (2) apply a 10-percent aggregate royalty rate for the 4G standard (as opposed to a 6-percent aggregate royalty rate), and (3) include Ericsson's SEPs that had expired in the top-down analysis, "the 4G U.S. royalty rate would still only be .843%"—which is lower than the court's calculated 4G U.S. royalty rate of

²¹⁸ *Id.*

²¹⁹ *Id.*

1.4659 percent for Option A and 2.5918 percent for Option B.²²⁰ Judge Selna concluded that the results of the top-down analysis largely supported his finding that the offers that Ericsson made to TCL were not fair or reasonable.²²¹ However, a close examination of Judge Selna's top-down analysis suggests that it might not be sufficiently reliable to support his conclusion.

From an economic perspective, a top-down analysis can be a reliable methodology to determine a FRAND royalty for a license to an SEP portfolio.²²² If one can accurately determine both (1) the aggregate royalty and (2) the SEP holder's share of that aggregate royalty, then the analysis provides a reliable estimate of a FRAND royalty for a license to a given portfolio of SEPs. However, as I have explained elsewhere, the reliability of the results of a top-down analysis depends on the inputs that one uses for the analysis.²²³ If one lacks a cogent rationale for what the aggregate royalty should be, or if one lacks the data to calculate the SEP holder's share of that aggregate royalty, a top-down analysis will produce speculative results. In that case, the royalty calculated from the top-down analysis might deviate significantly from a royalty upon which the parties would have willingly agreed in a hypothetical negotiation.²²⁴

The inputs that Judge Selna used in his top-down analysis were not identified by applying rigorous economic analysis. For example, when estimating Ericsson's proportional share of the aggregate royalty, Judge Selna failed to rely on consistent methodologies to identify the numerator and the denominator. He also based his estimate of Ericsson's proportional share on unsupported assumptions, such as the assumption that all SEPs have equal value. Consequently, the inputs that Judge Selna used in his top-down analysis were too speculative to provide a reliable estimate of a fair and reasonable royalty for a license to Ericsson's SEP portfolio. It is no surprise that the results of

²²⁰ *Id.*

²²¹ *Id.*

²²² See J. Gregory Sidak, *Why Unwired Planet Might Revolutionize the Resolution of FRAND Licensing Disputes*, 3 CRITERION J. ON INNOVATION 601, 653 (2018).

²²³ See, e.g., *id.* at 652–54.

²²⁴ It bears emphasis that, although the top-down analysis might be a reliable methodology to determine a FRAND royalty, it might not be admissible under U.S. law if it relies on certain incorrect inputs. The Federal Circuit, in an opinion by Judge Richard Taranto, emphasized that the infringer's profit earned during the period of infringement cannot be treated as a royalty cap when calculating a reasonable royalty. The Federal Circuit said that “[a]n especially inefficient infringer—e.g., one operating with needlessly high costs, wasteful practices, or poor management—is not entitled to an especially low royalty rate simply because that is all it can afford to pay without forfeiting or unduly limiting its profit.” *Aqua Shield v. Inter Pool Cover Team*, 774 F.3d 766, 771 (Fed. Cir. 2014). The Federal Circuit emphasized that the “royalty the particular infringer could profitably pay . . . does not set the market value that the hypothetical negotiation aims to identify.” *Id.* Such a methodology “incorrectly replaces the inquiry into the parties’ anticipation of what profits would be earned if a royalty . . . were to be paid with an inquiry into what profits were earned when [the alleged infringer] was charging prices without accounting for any royalty.” *Id.* at 772. Extending Judge Taranto’s reasoning, one should thus question whether computing a FRAND royalty based on the setting aside of a cumulative SEP royalty cap, expressed as a maximum percentage of the net selling price of a handset, is a reliable and admissible methodology for calculating FRAND compensation. See Sidak, *The Meaning of FRAND, Part II: Injunctions*, *supra* note 18, at 227–28.

the top-down analysis differ from the royalties that Judge Selna obtained from unpacking Ericsson's license agreements.

A. The Unproven Assumptions Underlying Judge Selna's Reliance on Public Statements

Although Judge Selna found Ericsson's public statements (issued jointly with other industry participants) to be legally binding—and he therefore used them to determine the aggregate royalty for the 2G, 3G, and 4G standards—he did not specify the legal basis for that conclusion. That is, he did not explain whether he based his conclusion on the doctrine of promissory estoppel, on some obligation arising from Ericsson's FRAND contract with ETSI, or some other legal principle.

Under the doctrine of promissory estoppel, a promise may be enforceable, even if it was made without the exchange of bargained-for consideration.²²⁵ However, to rely on the doctrine of promissory estoppel, one must show that several conditions are satisfied, including (1) that the promisee actually relied on the promise made by the promisor and (2) that the promisee suffered an economic loss by relying on the promise.²²⁶ Judge Selna said that Ericsson's joint press release about a single-digit aggregate 3G SEP royalty was the cause-in-fact for "manufacturers to adopt the 3G W-CDMA standard"²²⁷ and that Ericsson's joint press release in 2008 predicting the 4G aggregate royalty "entice[d] manufacturers to invest in LTE over WiMAX and UMB."²²⁸ Unfortunately, he did not provide any evidence on the public record for those factual findings. In other words, Judge Selna did not show whether or how the public statements issued by Ericsson and third parties actually induced TCL (or manufacturers of standard-compliant products in general) to invest in the manufacturing of W-CDMA and LTE-compliant products, or that TCL (or any other manufacturer) suffered an economic loss by investing in those products. Thus, he did not show that the conditions necessary to apply the doctrine of promissory estoppel obtained.

²²⁵ RESTATEMENT (SECOND) OF CONTRACTS § 90 (AM. LAW INST. 1981) ("A promise which the promisor should reasonably expect to induce action or forbearance on the part of the promisee or a third person and which does induce such action or forbearance is binding if injustice can be avoided only by enforcement of the promise. The remedy granted for breach may be limited as justice requires.")

²²⁶ See, e.g., *Goldstick v. ICM Realty*, 788 F.2d 456, 462 (7th Cir. 1984) (Posner, J.) ("The plaintiffs have two other strings to their bow. The first is promissory estoppel. If an unambiguous promise is made in circumstances calculated to induce reliance, and it does so, the promisee if hurt as a result can recover damages."); *Bixler v. First Nat'l Bank of Or.*, 619 P.2d 895, 899 (Or. 1980) ("In determining when action renders a promise enforceable, the principal criteria are: (1) a promise, (2) which the promisor, as a reasonable person, could foresee would induce conduct of the kind which occurred, (3) actual reliance on the promise, (4) resulting in a substantial change in position.")

²²⁷ *TCL v. Ericsson*, 2018 WL 4488286, at *12.

²²⁸ *Id.* at *13.

It is also unclear whether Judge Selna considered Ericsson's FRAND contract with ETSI to be the source of the binding nature of the public statements. Judge Selna seemed to create his own notion of an *ad hoc* contract among SEP holders collectively and implementers collectively—one in which an aggregate SEP royalty is publicly “offered” by the former and “accepted” by the latter, as manifested in their being “induced” to adopt the standard.²²⁹ Then, within Judge Selna's construct, Ericsson is supposedly bound (by contract) to that representation, made in 2008.²³⁰ However, this legal theory does not withstand scrutiny. A FRAND contract is not a contract into which one SEP holder enters with other SEP holders for the purpose of collectively bargaining with implementers, who themselves are collectively bargaining over what the aggregate royalty will be for the use of all SEPs in a given standard. It is possible to imagine different lawful contracts undertaken to achieve that purpose, as well as different contracts or conspiracies in restraint of trade that might pursue the same goal unlawfully.²³¹ But those various lawful and unlawful forms of collective action are certainly *not* part of what constitutes the FRAND contract between Ericsson and ETSI. Given that ETSI's IPR Policy contains no guidance on the economic meaning of “fair,” “reasonable,” or “nondiscriminatory,” it is far-fetched for Judge Selna

²²⁹ This construct quickly collapses under scrutiny because not all SEP holders joined Ericsson's joint press releases. Qualcomm—a major SEP holder of 2G, 3G, and 4G SEPs—notably said in 2008 that, “[c]ontrary to recent claims by a small number of manufacturers, FRAND does not, and never has, prescribed formulas for imposing cumulative royalty caps or proportional allocations of such royalty caps.” QUALCOMM, LTE/WiMAX PATENT LICENSING STATEMENT 1 (Dec. 2008), <https://www.qualcomm.com/media/documents/files/lte-wimax-patent-licensing-statement.pdf>.

²³⁰ This construct mirrors what Jorge Contreras has called “market reliance” on “patent pledges” made by SEP holders. See Jorge L. Contreras, *A Market Reliance Theory for FRAND Commitments and Other Patent Pledges*, 2015 UTAH L. REV. 479, 482 (“Though patent pledges are made by different means and with different outward objectives, they share one key feature: they are intended to assure the *market*, rather than specific firms, that the pledgor's patents will not be used to block adoption of a common technology platform. With such pledges in place, market participants are more likely to make investments in the covered technology platforms. Accordingly, it is critical that patent pledges, which offer essential assurances to the market and its participants, be binding and enforceable.” (emphasis in original) (internal citations omitted)).

²³¹ See, e.g., Makan Delrahim, Assistant Attorney Gen., U.S. Dep't of Justice, Remarks as Prepared for Delivery at the USC Gould School of Law's Center for Transnational Law and Business Conference—Application of Competition Policy to Technology and IP Licensing: Take It to the Limit: Respecting Innovation Incentives in the Application of Antitrust Law 4 n.6, 10 n.27 [hereinafter Delrahim, *Take It to the Limit: Respecting Innovation Incentives in the Application of Antitrust Law*] (Nov. 10, 2017) (citing J. Gregory Sidak, *The Antitrust Division's Devaluation of Standard-Essential Patents*, 104 GEO. L.J. ONLINE 48, 61 (2015); J. Gregory Sidak, *Patent Holdup and Oligopsonistic Collusion in Standard Setting Organizations*, 5 J. COMPETITION L. & ECON. 123, 126 (2009)); see also J. Gregory Sidak, *Testing for Bias to Suppress Royalties for Standard-Essential Patents*, 1 CRITERION J. ON INNOVATION 301 (2016). In my early writings on the FRAND contract, I analogized the collective-action problem facing SEP holders to a joint venture addressing the perishability of a common pool, with its attendant fiduciary duty of loyalty not to frustrate the purpose of the SSO. See Sidak, *The Meaning of FRAND, Part I: Royalties*, *supra* note 155, at 1025–28. That analysis was intended to conceptualize the larger economic problem to be solved. It was not to suggest that such a joint venture impliedly exists as a matter of contract law—much less that it was expressly created by a specific SSO's FRAND obligation, such as the ETSI obligation that Ericsson accepted.

to treat Ericsson's representation in 2008 as a legally binding and immutable interpretation of "fair" or "reasonable" within the FRAND contract.

Although Judge Selna considered Ericsson's predictions concerning the aggregate royalty to be binding, he ignored Ericsson's accompanying statements about the individual royalty that it intended to charge for its 4G SEPs. In the very same April 2008 press release that Judge Selna quotes in his decision, Ericsson said, after presenting its expectation about the aggregate royalty, that its "fair royalty rate for LTE is therefore expected to be around 1.5% for handsets."²³² Judge Selna did not consider that part of Ericsson's statement to be binding. In fact, he did not consider that statement to be relevant at all when determining a FRAND royalty for Ericsson's 4G portfolio. Unfortunately, Judge Selna did not explain why he found one part of Ericsson's statement (concerning the expected aggregate royalty for 4G handsets) to be binding, but another part of the same document (regarding Ericsson's expected royalty rate for 4G handsets) to be so irrelevant as to be completely ignored.

In sum, Judge Selna failed (1) to provide a valid legal justification for considering Ericsson's joint public statements in 2008 to be legally binding upon the company and (2) to apply his approach consistently when analyzing those statements.

B. Did Judge Selna Use a Reliable Methodology to Determine Ericsson's Proportional Share of the Aggregate Royalty?

Even if one accepts Judge Selna's determination of the aggregate royalty for the 2G, 3G, and 4G standards, further uncertainty arises with respect to the methodology that he used to estimate Ericsson's proportional share of the aggregate royalty.

1. Is Judge Selna's Reliance on Different Methodologies to Identify the Total Number of U.S. SEPs and Ericsson's Number of U.S. SEPs Appropriate?

As explained in Part II.B.3, Judge Selna estimated Ericsson's proportional share by dividing (1) the number of Ericsson's U.S. SEPs for the 2G, 3G, and 4G standards (the numerator) by (2) the total number of U.S. SEPs for each of those standards (the denominator). However, he relied on different methodologies to estimate the two variables. Judge Selna estimated the denominator by relying on the analysis of engineers from Concur IP, who devoted approximately 20 minutes per patent.²³³ In contrast, he estimated the numer-

²³² Press Release, Ericsson, Wireless Industry Leaders Commit to Framework for LTE Technology IPR Licensing (Apr. 14, 2008), <https://www.ericsson.com/en/press-releases/2008/4/wireless-industry-leaders-commit-to-framework-for-lte-technology-ipr-licensing>.

²³³ *TCL v. Ericsson*, 2018 WL 4488286, at *17.

ator on the basis of Ericsson's essentiality analysis, which Ericsson described as requiring "dozens of hours of claim-chart review" for each of Ericsson's SEPs.²³⁴

From an economic perspective, a reliable methodology would apply the same level of rigor in identifying the total number of relevant U.S. SEPs as in identifying the number of Ericsson's relevant U.S. SEPs. Judge Selna's top-down analysis, however, invites one to ask whether the amount of time that TCL's experts spent analyzing each declared-essential patent (20 minutes) implies that the estimation of the denominator was less rigorous than the estimation of the numerator. To the extent that a cursory analysis of declared essential patents is more likely than a thorough analysis to produce the erroneous conclusion that a given patent is essential in fact to a standard, the procedure upon which Judge Selna relied would inflate the estimated number of U.S. SEPs for each standard, which in turn would understate Ericsson's proportional share of the value of each standard. Consequently, Judge Selna's reliance on different methodologies to estimate the numerator and denominator casts doubt on the reliability of his estimate of Ericsson's proportional share of SEPs for the 2G, 3G, and 4G standards.

2. *Are Judge Selna's Estimates of the Total Number of SEP Families Consistent with the Estimates of Other Courts?*

As explained in Part II.B.1.b, Judge Selna accepted Ericsson's criticisms of TCL's procedures for estimating the total number of SEP families, but he found that the errors in TCL's procedures did not undermine the reliability of TCL's estimates of the total number of SEP families. (Because the reports of TCL's experts are not publicly available, I am unable to evaluate the accuracy of those experts' conclusions.) However, it is worth noting that Judge Selna's estimated number of SEP families significantly exceeds the estimates reported by other courts.

As explained in Part II.B.1, Judge Selna determined only the total number of U.S. SEP families (as opposed to the total number of SEP families), basing his number on TCL's estimate of the total number of U.S. SEP families. However, on the basis of his finding that Concur IP (acting on behalf of TCL) incorrectly categorized declared-essential 4G patents as in-fact essential "four out of thirty-five times, or 11.4%" of the time, Judge Selna ultimately decreased TCL's estimate of the number of U.S. SEPs by 11.4 percent to obtain his estimate of the number of U.S. SEPs.²³⁵ Thus, one could obtain a proxy for Judge Selna's estimate of the total number of SEP families by applying the same 11.4-percent downward adjustment to TCL's estimates of the

²³⁴ Ericsson's Appellate Brief, *supra* note 120, at *25; see also *TCL v. Ericsson*, 2018 WL 4488286, at *18.

²³⁵ *TCL v. Ericsson*, 2018 WL 4488286, at *18.

total number of SEP families. That adjusted total number of SEP families (which I call “Judge Selna’s estimates” strictly for simplicity of exposition) deviates substantially from at least one other court’s estimates of the total number of SEP families relevant to those standards.

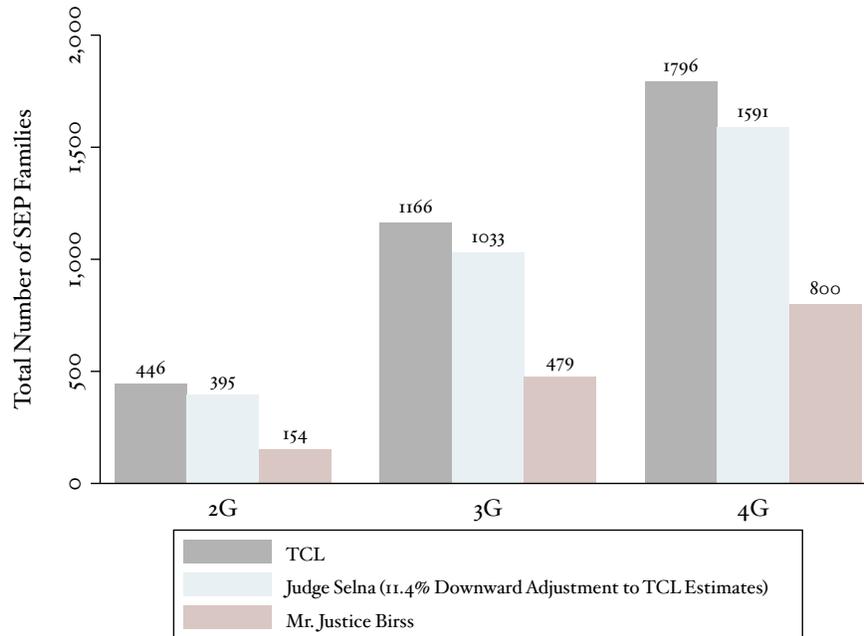
Specifically, in his 2017 decision in *Unwired Planet*, Mr. Justice Colin Birss of the High Court of Justice of England and Wales estimated the total number of SEP families that are relevant to the 2G, 3G, and 4G standards.²³⁶ A comparison of Judge Selna’s estimates and Mr. Justice Birss’ estimates of the total number of SEP families shows that Mr. Justice Birss’ estimates were significantly lower than Judge Selna’s estimates. Whereas Judge Selna found that there were in total 395 SEP families relevant to the 2G standard, 1,033 SEP families relevant to the 3G standard, and 1,591 SEP families relevant to the 4G standard,²³⁷ Mr. Justice Birss found that there were only 154 SEP families relevant to the 2G standard, 479 SEP families relevant to the 3G standard, and 800 SEP families relevant to the 4G standard.²³⁸ Figure 4 compares the divergent results that Judge Selna and Mr. Justice Birss obtained regarding the total number of SEP families that are relevant to the 2G, 3G, and 4G standards.

²³⁶ *Unwired Planet Int’l Ltd v. Huawei Techs. Co.* [2017] EWHC (Pat) 2988 [378] (Eng.).

²³⁷ *TCL v. Ericsson*, 2018 WL 4488286, at *16–18.

²³⁸ *Unwired Planet* [2017] EWHC (Pat) 2988 [378]; see also Sidak, *Why Unwired Planet Might Revolutionize the Resolution of FRAND Licensing Disputes*, *supra* note 222, at 639. Mr. Justice Birss estimated both the total number of handset SEP families and the total number of infrastructure SEP families. See *Unwired Planet* [2017] EWHC (Pat) 2988 [378]. For purposes of my analysis here, I refer only to Mr. Justice Birss’ estimates of the total number of handset SEP families because Judge Selna’s analysis concerns only user-equipment SEP families, which are equivalent to handset SEP families. See *Unwired Planet* [2017] EWHC (Pat) 2988 [288] (“UE means user equipment, i.e. handsets.”); *TCL v. Ericsson*, 2018 WL 4488286, at *15 (describing how the parties “estimate[d] the total number of industry-wide patent families related to user equipment (‘UE’) (such as handsets) that are essential to the 2G, 3G, and 4G standards”).

Figure 4. A Comparison of Judge Selna's Estimates of the Total Number of SEP Families and Mr. Justice Birss' Estimates of the Total Number of SEP Families for the 2G, 3G, and 4G Standards



Sources: *TCL v. Ericsson*, 2018 WL 4488286, at *18; *Unwired Planet* [2017] EWHC (Pat) 2988 [378].

As Figure 4 shows, across all three standards, Mr. Justice Birss' estimated total number of SEP families in *Unwired Planet* was substantially lower than both (1) TCL's estimates of the total number of SEP families and (2) Judge Selna's estimates of the total number of SEP families—that is, the estimated total number of SEP families after applying Judge Selna's 11.4-percent downward adjustment to TCL's estimates.

Indeed, Judge Selna's top-down analysis would produce substantially different results if one were to rely on Mr. Justice Birss' estimates of the total number of SEP families in *Unwired Planet*.²³⁹ Here I show, strictly for illustrative purposes, how relying on Mr. Justice Birss' estimates of the total number of SEP families would alter the results of Judge Selna's top-down analysis. Table 10 summarizes the calculated FRAND royalty rates for Ericsson's U.S. SEPs for the 2G, 3G, and 4G standards based on the top-down analysis if one were to use Mr. Justice Birss' estimates of the total number of SEP families; the table then compares those calculated rates with Judge Selna's calculated FRAND royalty rates.

²³⁹ *Unwired Planet* [2017] EWHC (Pat) 2988 [378]–[379].

Table 10. The Calculated FRAND Royalty Rates Based on Mr. Justice Birss' Estimates of the Total Number of SEP Families and Judge Selna's Calculated FRAND Royalty Rates for the 2G, 3G, and 4G Standards

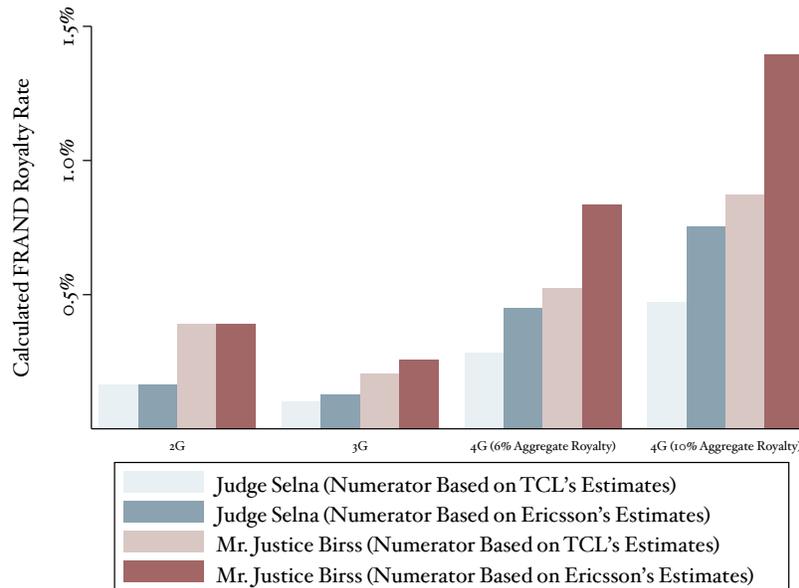
Standard	Aggregate Royalty Rate (%)	Ericsson's Proportional Share Based on Mr. Justice Birss' Estimated Total Number of SEP Families' (%)	Regional Strength Ratio in the United States (%)	Calculated FRAND Royalty Rate Based on Mr. Justice Birss' Estimates (%)	Judge Selna's Calculated FRAND Royalty Rate (%)
	[A]	[S _B]	[G]	[R _B] = [A] × [S _B] × [G]	[R _S]
2G	5%	7.792%	100%	0.390%	0.164%
3G	5%	5.146% ^E	100%	0.257%	0.129%
3G	5%	4.102% ^T	100%	0.205%	0.103%
4G	6%	13.939% ^E	100%	0.836%	0.452%
4G	6%	8.735% ^T	100%	0.524%	0.283%
4G	10%	13.939% ^E	100%	1.394%	0.753%
4G	10%	8.735% ^T	100%	0.874%	0.472%

Sources: *TCL v. Ericsson*, 2018 WL 4488286, at *14, *26; *Unwired Planet* [2017] EWHC (Pat) 2988 [378]. I obtained [R_S] from Table 5 and Table 6.

Notes: * To calculate [S_B], I used Mr. Justice Birss' adjusted estimate of the total number of SEP families for handsets (that is, 154 for 2G, 479 for 3G, and 800 for 4G) instead of Judge Selna's estimates of the total number of U.S. SEPs for each standard. The superscript *E* indicates that the value is based on Ericsson's estimate of the number of SEP families that Ericsson owns. The superscript *T* indicates that the value is based on TCL's estimate of the number of SEP families that Ericsson owns.

Figure 5 shows a graphic comparison of the results reported in Table 10.

Figure 5. A Comparison of Judge Selna's Calculated FRAND Royalty Rates and the Calculated FRAND Royalty Rates Based on Mr. Justice Birss' Estimates of the Total Number of SEP Families for the 2G, 3G, and 4G Standards



Sources: *TCL v. Ericsson*, 2018 WL 4488286, at*14, *26; *Unwired Planet* [2017] EWHC (Pat) 2988 [378]–[379].

As Figure 5 shows, across all three standards, the calculated FRAND royalty rates based on Mr. Justice Birss' estimates of the total number of SEP families are approximately *twice* Judge Selna's calculated FRAND royalty rates.

Because Mr. Justice Birss did not estimate the number of U.S. SEPs in his decision, I use Mr. Justice Birss' estimate of the total number of SEP families as a proxy for the number of U.S. SEPs. The total number of SEP families necessarily equals or exceeds the number of U.S. SEPs. Thus, holding all other factors of a top-down analysis constant, using a denominator that equals the total number of SEP families (rather than the number of U.S. SEPs) would produce a lower-bound estimate of the SEP holder's share of the standard in the United States and, consequently, a lower-bound estimate of a FRAND royalty for the use of Ericsson's U.S. SEP portfolio. If one were to limit Mr. Justice Birss' estimate of the total number of SEP families to U.S. SEPs, one would derive FRAND royalty rates that further exceed Judge Selna's estimated FRAND royalties.

Of course, that there exist discrepancies between Judge Selna's and Mr. Justice Birss' estimates of the total number of SEP families relevant to each standard does not necessarily indicate that Judge Selna's estimates are

incorrect. To determine whether either judge (or perhaps both judges) used erroneous estimates of the total number of SEP families relevant to the 2G, 3G, and 4G standards, one would need to analyze in detail every step of the procedures that the experts in each case used to identify those numbers. That analysis is not possible for me to perform because, as noted above, the expert reports are not public. Nonetheless, that there exist significant discrepancies between Judge Selna's and Mr. Justice Birss' estimates casts doubt on the reliability of Judge Selna's estimates of the total number of SEP families relevant to each standard and, more generally, on the reliability of the ultimate results of his top-down analysis. As the example above illustrates, a top-down analysis could produce materially different results if one changes the value of even one input. Thus, to obtain a reliable estimate of a FRAND royalty from a top-down analysis, it is important to ensure that the estimation of all inputs to a top-down analysis is sufficiently precise.

3. *Was Judge Selna Correct to Assume That All SEPs Have Equal Value?*

To estimate Ericsson's proportional share of the 2G, 3G, and 4G SEPs, Judge Selna relied on a patent-counting methodology, which assigns an equal value to all patents essential to a given standard.²⁴⁰ The patent-counting methodology requires no information to implement beyond a list of all the patents declared essential to the standard and the number of those patents that the SEP holder at issue owns.²⁴¹ Although Judge Selna's patent-counting methodology is simple and requires little data, it relies on the dubious assumption that all SEPs are equally valuable. In other words, he assumes that each patented technology contributes the same "incremental value" to the standard at issue.²⁴²

Economists have questioned the assumption that all patents are equally valuable.²⁴³ Empirical evidence shows that the distribution of the economic

²⁴⁰ *TCL v. Ericsson*, 2018 WL 4488286, at *9 ("The Court adopts a simple patent counting system which treats every patent as possessing identical value.")

²⁴¹ See Sidak & Skog, *Citation Weighting, Patent Ranking, and Apportionment of Value for Standard-Essential Patents*, *supra* note 178, at 213–14. Given the ability to identify patents that are in-fact essential (as opposed to merely declared-essential) to a given standard, it is preferable to limit the patent-counting analysis to in-fact essential patents.

²⁴² *Ericsson, Inc. v. D-Link Systems, Inc.*, 773 F.3d 1201, 1226 (Fed. Cir. 2014) ("[T]he ultimate reasonable royalty award must be based on the incremental value that the patented invention adds to the end product.")

²⁴³ See, e.g., Anne Layne-Farrar, A. Jorge Padilla & Richard Schmalensee, *Pricing Patents for Licensing in Standard Setting Organizations: Making Sense of FRAND Commitments*, 74 *ANTITRUST L.J.* 671, 682–85 (2007); F.M. Scherer & Dietmar Harhoff, *Technology Policy for a World of Skew-Distributed Outcomes*, 29 *RES. POL'Y* 559 (2000); Mark Schankerman & Ariel Pakes, *Estimates of the Value of Patent Rights in European Countries During the Post-1950 Period*, 96 *ECON. J.* 1052 (1986); Sidak, *The Meaning of FRAND, Part I: Royalties*, *supra* note 155, at 1019–20, 1049–52; Jean O. Lanjouw, Ariel Pakes & Jonathan Putnam, *How to Count Patents and Value Intellectual Property: The Uses of Patent Renewal and Application Data*, 46 *J. INDUS. ECON.* 405 (1998); Manuel Trajtenberg, *A Penny for Your Quotes: Patent Citations and the Value of Innovations*, 21 *RAND J. ECON.* 172 (1990); DAVID J. TEECE, PETER C. GRINDLEY & EDWARD F. SHERRY, *SDO IP POLICIES IN DYNAMIC*

value of patents is highly skewed.²⁴⁴ That is, the economic value of patents is concentrated among only a handful of extremely valuable patents. It is reasonable to expect that the distribution of the economic value of SEPs is also skewed.²⁴⁵ A small number of SEPs might cover critical, high-value technologies used in implementing a standard, whereas most other SEPs might cover peripheral or ancillary technologies. In that case, the failure to account for differences in the economic value or “quality” of patents would cause a patent-counting exercise to overestimate the value share of an SEP holder whose essential patent covers an ancillary technology and to underestimate the value share of an SEP holder whose essential patent covers a key technology.

Thus, a patent-counting methodology would likely fail to satisfy the legal requirement in the United States that “the ultimate reasonable royalty award must be based on the incremental value that the patented invention adds to the end product.”²⁴⁶ It consequently should come as no surprise that U.S. courts typically have been skeptical about FRAND royalty estimations that rely on the assumption that all SEPs are equally valuable. For example, in *Microsoft v. Motorola*, Judge James Robart observed that “[p]atent pools generally . . . distribute royalties on a per patent basis as part of a patent-counting system.”²⁴⁷ He found it inappropriate to use “the Via Licensing 802.11 patent pool as a *de facto* RAND royalty rate for Motorola’s 802.11 SEP portfolio,” because, among other things, “the Via Licensing 802.11 pool does not distinguish between patents in the pool on the basis of technical merit, but rather

INDUSTRIES, SUBMISSION TO THE ITU PATENT ROUNDTABLE 19 (Oct. 10, 2012) (“[T]here is no reason to believe that the value of different patents (or portfolios of patents) is proportional to the number of patents in the portfolio, even for ‘essential’ patents.”).

²⁴⁴ See, e.g., Schankerman & Pakes, *supra* note 243, at 1067–68; Mark A. Lemley, *Rational Ignorance at the Patent Office*, 95 NW. U. L. REV. 1495 (2001); John R. Allison, Mark A. Lemley, Kimberly A. Moore & Derek R. Trunkey, *Valuable Patents*, 92 GEO. L.J. 435 (2004); Bronwyn H. Hall, Adam Jaffe & Manuel Trajtenberg, *Market Value and Patent Citations*, 36 RAND J. ECON. 16 (2005); Bronwyn H. Hall, Adam B. Jaffe & Manuel Trajtenberg, *The NBER Patent Citations Data File: Lessons, Insights and Methodological Tools 6* (National Bureau of Economic Research, Working Paper No. 8498, 2001) (“[I]t has long been known that innovations vary enormously in their technological and economic ‘importance’, ‘significance’ or ‘value’, and moreover, that the distribution of such ‘values’ is extremely skewed.”).

²⁴⁵ It bears emphasis that the distribution of the economic value of patents essential to a given standard is a factual inquiry requiring rigorous technical and economic analysis. Indeed, in a 1998 study, Mark Schankerman analyzed the relative value of patents in different industries and observed sharp differences in the distribution of patent value among those industries. Mark Schankerman, *How Valuable Is Patent Protection? Estimates by Technology Field*, 29 RAND J. ECON. 77, 94 tbl.5 (1998). Thus, in calculating a FRAND royalty for SEPs, a court should not put undue weight on outdated analysis that does not specifically focus on the value distribution of SEPs. Rather, courts should use recent data that are specific to SEPs for the standard at issue. See Sidak, *The Meaning of FRAND, Part I: Royalties*, *supra* note 155, at 1019–20.

²⁴⁶ *Ericsson v. D-Link*, 773 F.3d at 1226.

²⁴⁷ *Microsoft Corp. v. Motorola, Inc.*, No. C10-1823-JLR, 2013 WL 2111217, at *74 (W.D. Wash. Apr. 25, 2013) (Robart, J.); see also *id.* (“[T]his structure [of a patent pool] generally provides equal compensation for any given patent in the pool without regard to the technology of each patent, its merit, its importance, or its contribution to the standard.”).

gives the exact same royalty to all patents in the pool.”²⁴⁸ Quoting Judge Robart’s reasoning, Judge Holderman similarly concluded in *Innovatio* that he would “not consider the Via patent pool when determining a RAND rate” for *Innovatio*’s SEPs, which he found to be “of moderate to moderate-high importance to the 802.11 standard.”²⁴⁹

From an economic perspective, a reliable and intellectually rigorous assessment of the value of an SEP portfolio must use a methodology that controls for the variation in value across the relevant universe of SEPs.²⁵⁰ Evidence from comparable licenses typically provides the best estimate of how sophisticated market participants value the licensed SEP portfolio. Where sufficiently comparable licenses do not exist, a court could weight the value of the SEPs on the basis of certain features of a patent, such as the number of forward citations that a patent receives from subsequent inventions.²⁵¹ (However, as explained in Part II.B.4.b, Judge Selna rejected the use of that methodology.²⁵²) Patent citation data are publicly available for U.S. patents through the online database of the U.S. Patent and Trademark Office (USPTO).²⁵³ Alternatively, a court could rely on the opinion of a technical expert to estimate the relative technical value of each SEP relevant to a given standard, and then apportion that value across SEPs using survey methodologies such as a conjoint analysis to determine consumers’ willingness to pay for a patented feature in a multicomponent product, relative to that product’s other features.²⁵⁴

The information necessary to estimate the actual value of the SEPs included in a given portfolio might not always be available to a court. In those circumstances, a court might need to rely on a simple patent-counting methodology to apportion the value of a standard across declared-essential patents. However, when the necessary information *is* available, reliance on a

²⁴⁸ *Id.* at *88 (emphasis in original). However, Judge Robart found that Motorola’s 802.11 patents “contribute very little to the [802.11] standard.” *Id.* at *64. On the basis of this and other evidence, he ultimately relied on the Via Licensing 802.11 patent pool to determine a reasonable royalty for Motorola’s SEPs. *Id.* at *89.

²⁴⁹ *In re Innovatio IP Ventures, LLC Patent Litig.*, No. 11 C 9308, 2013 WL 5593609, at *36 (N.D. Ill. Oct. 3, 2013) (Holderman, J.).

²⁵⁰ See *GPNE Corp. v. Apple, Inc.*, No. 12-cv-02885, 2014 WL 1494247, at *7 (N.D. Cal. Apr. 16, 2014) (Koh, J.) (“Patent counting, or counting the number of patents essential to a standard and determining the value of a single patent by dividing the value of the standard by the number of essential patents, is imprecise because it does not account for the value of the asserted patent relative to the other standard essential patents.”).

²⁵¹ See Sidak & Skog, *Citation Weighting, Patent Ranking, and Apportionment of Value for Standard-Essential Patents*, *supra* note 178, at 220–21.

²⁵² *TCL Comm’n Tech. Holdings, Ltd. v. Telefonaktiebolaget LM Ericsson*, Nos. SACV 14-341 JVS, CV 15-2370 JVS, 2018 WL 4488286, at *24 (C.D. Cal. Sept. 14, 2018).

²⁵³ *Data Query*, PATENTSVIEW, <http://www.patentsview.org/query/>. PatentsView is “a prototype patent data visualization and analysis platform intended to increase the value, utility, and transparency of US patent data,” an initiative supported by the USPTO’s Office of Chief Economist. *FAQs—What Is PatentsView?*, USPTO, <http://www.patentsview.org/api/faqs.html>.

²⁵⁴ See VITHALA R. RAO, *APPLIED CONJOINT ANALYSIS* 196 (Springer 2014); see also J. Gregory Sidak & Jeremy O. Skog, *Using Conjoint Analysis to Apportion Patent Damages*, 25 *FED. CIR. B.J.* 581, 591 (2016).

methodology that attempts to estimate the actual value of the SEPs at issue would produce a more reliable determination of a royalty—one that more likely reflects the incremental value of the licensed SEPs.²⁵⁵

C. Was Judge Selna Correct to Derive a U.S. Royalty Rate from the Top-Down Analysis?

One can also question whether it was appropriate for Judge Selna to derive from the top-down analysis a U.S. rate rather than a global rate. He found (apparently on the basis of the evidence from the examined license agreements) that, “as a matter of commercial reality, firms regularly adopt a single world-wide rate,” rather than multiple rates for different geographic regions.²⁵⁶ Indeed, Ericsson’s offers to TCL specified terms for a global license and therefore included global rates.²⁵⁷ In addition, Judge Selna acknowledged that it would be possible to obtain a rate for a global license from a top-down analysis:

It would be very easy to construct a FRAND rate using any of the approaches presented in this case without examining where an SEP owner actually has enforceable patents. In a top down approach, one would simply calculate the number of SEPs owned by Ericsson, divided by the total number of SEPs, and then multiply that by the total aggregate royalty. Indeed, TCL began its top down model in such a way. It is not until Dr. Leonard generated U.S.-specific numbers that TCL began to tie its FRAND royalty to patents filed in a particular country.²⁵⁸

Yet, Judge Selna decided to derive U.S. rates, rather than global rates, from his top-down analysis. That decision required the court both (1) to convert the royalties contained in Ericsson’s offers to TCL into regional rates and (2) to convert the royalties derived from global licenses into regional rates. Although converting royalty rates is possible, it requires the court to make additional assumptions—if not also to use additional facts or sources of data whose reliability might be dubious—that further reduce the certainty with which one can determine the implied royalty rate from a comparable license agreement. Therefore, Judge Selna’s decision to derive U.S. rates, rather than a global rate, implicitly imposed additional (unstated) assumptions and data demands on his royalty calculations and unnecessarily injected additional uncertainty into his top-down analysis.

²⁵⁵ *Ericsson, Inc. v. D-Link Sys., Inc.*, 773 F.3d 1201, 1226 (Fed. Cir. 2014).

²⁵⁶ *TCL v. Ericsson*, 2018 WL 4488286, at *24.

²⁵⁷ *Id.* at *4.

²⁵⁸ *Id.* at *24.

D. Does Judge Selna's Concern with Patent Holdup Justify His Preference for a Top-Down Analysis?

Judge Selna sought to justify his reliance on the top-down approach by saying that relying on that approach “prevents royalty stacking,” which, he said, occurs “when each individual SEP holder demands a royalty which when totaled exceeds the value of all the SEPs in a standard.”²⁵⁹ He found that, “[i]f the total aggregate royalty is properly based upon the total value of the patents in the standard, [the top-down method] . . . can also prevent hold-up because it prevents SEP owners from charging a premium for the value added by standardization.”²⁶⁰ However, Judge Selna did not explain why other generally accepted methodologies, such as reliance on evidence from comparable licenses, could not produce a royalty that reflects the value of Ericsson’s SEP portfolio.

Courts have acknowledged that different methodologies—most notably, evidence from comparable licenses—can ensure that the estimated royalty reflects the value of the licensed portfolio and no more. Moreover, as I explain below, that concern is not unique to SEPs; it animates the “apportionment” exercise in any patent-infringement case, in which the court confines a reasonable royalty to the footprint of the relevant claims of the patented invention. Hence, Judge Selna’s concern over the theoretical risk of patent holdup does not justify his preference for one methodology over other methodologies to determine a FRAND royalty.

1. Holdup as Defined in Transaction-Cost Economics

At the outset, it bears emphasis that Judge Selna’s definition of patent holdup does not comport with the definition of holdup as understood in transaction-cost economics. In transaction-cost economics, “holdup” has a precise meaning. It refers to the opportunistic appropriation of another firm’s quasi rents.²⁶¹

To understand how Nobel laureate Oliver Williamson defined holdup, consider the following example involving a landlord and a coffee bar owner, which I borrow from the seminal article by Alexander Galetovic and Stephen

²⁵⁹ *Id.* at *8; see also J. Gregory Sidak, *Is Patent Holdup a Hoax?*, 3 CRITERION J. ON INNOVATION 401, 455–56 (2018) (“The royalty-stacking conjecture predicts that the sum of all royalties that each SEP holder demands might impose an excessive royalty burden on the licensee—the royalty stack—and thereby limit the licensee’s ability to commercialize its product.”).

²⁶⁰ *TCL v. Ericsson*, 2018 WL 4488286, at *8.

²⁶¹ See, e.g., Oliver E. Williamson, *Transaction-Cost Economics: The Governance of Contractual Relations*, 22 J.L. & ECON. 233, 234 (1979); Benjamin Klein, Robert G. Crawford & Armen A. Alchian, *Vertical Integration, Appropriable Rents, and the Competitive Contracting Process*, 21 J.L. & ECON. 297, 297–98 (1978); Benjamin Klein & Keith Leffler, *The Role of Market Forces in Assuring Contractual Performance*, 89 J. POL. ECON. 615, 617–18 (1981); see also Sidak, *Is Patent Holdup a Hoax?*, *supra* note 259, at 412.

Haber.²⁶² Suppose that the coffee bar owner's expected revenue is \$2000 per month (R), and that the coffee bar owner must make a long-run profit within one year of opening her coffee bar. Suppose further for ease of exposition that the coffee bar owner has no operating costs other than rent and that the coffee bar owner and the landlord have an incomplete rent contract for \$1000 per month (c). Suppose further that the coffee bar owner has invested \$5000 (k) to install an expensive commercial-grade espresso machine and decorate the coffee bar.²⁶³ In economic terms, the cost of \$5000 to install the espresso machine and decorate the coffee bar is a sunk cost,²⁶⁴ because that cost is specific to the location of the coffee bar that the owner has chosen to use. To be clear, the sunk cost is not the purchase price of the espresso machine itself (which is salvageable), but rather the cost of the machine's installation and the cost of decorating the coffee bar. When facing rent of \$1000 per month, the coffee bar owner will enter the market, because even though her economic rent is negative in the first month ($R - c - k = -\$4000$), after the first month her economic rent becomes positive ($R - c = \$1000$). It will take only five months for the coffee bar owner to recoup her sunk investment and begin making a long-run profit.

But suppose that, after one month—and after the coffee bar owner has invested in the installation of the commercial-grade espresso machine and the décor of the coffee bar—the landlord increases the rent for the premises to \$1800 per month.²⁶⁵ After the rent increase, the coffee bar owner will remain in the market in the short run because her quasi rents—her revenue (R) net of her rent for the premises (c)—are still positive. After the rent increases, her quasi rents from the business decrease from \$1000 to \$200. The landlord has thus appropriated part of the coffee bar owner's quasi rents. Indeed, had the landlord charged the coffee bar owner \$1800 for rent at the outset, before she had made the sunk investments, the coffee bar owner would not have entered the market, because it would take her 25 months to recoup her sunk costs and begin making a long-run profit.

²⁶² Alexander Galetovic & Stephen Haber, *The Fallacies of Patent-Holdup Theory*, 13 J. COMPETITION L. & ECON. 1, 14–20 (2017). This discussion reprises the discussion in Sidak, *Is Patent Holdup a Hoax?*, *supra* note 259, at 413–14.

²⁶³ Galetovic & Haber, *The Fallacies of Patent-Holdup Theory*, *supra* note 262, at 17 (“Believing that they had secure, long-term leases, they decorated their properties and purchased expensive commercial-grade espresso machines, much of whose cost was for installation: a water line needed to be run to the espresso machine and a drain needed to be run from the espresso machine to the waste pipe.”).

²⁶⁴ *Id.*

²⁶⁵ *Id.* It is an unfortunate coincidence that the economic concepts of rent and quasi rent sound like the word used in law and commerce to describe a lease payment—rent. But, as the example here indicates, the former are terms of art unrelated to the latter. CARLTON & PERLOFF, *supra* note 74, at 96–97 (“Because firms compete to earn the ‘rent’ (monopoly profits) from the monopoly, the expenditure of resources to attain government created monopoly profits is called rent seeking.”).

The example of the coffee bar owner and the landlord demonstrates that, for holdup to occur, three necessary conditions must be satisfied.²⁶⁶ First, it is necessary that there be a relationship-specific investment. That is, the coffee bar owner must not be able to reinstall the espresso machine inexpensively elsewhere, because “if the coffee bar owner can easily shift her equipment to another use (for example, by moving it down the street), she can reject the demand for a higher rent.”²⁶⁷ Second, it is also necessary that the rent contract for the premises be incomplete, because if the coffee bar owner and the landlord had contractually foreclosed the option of increasing the rent during the lease, the landlord could not subsequently increase the price.²⁶⁸ Williamson calls this element the requirement of “uncertainty.”²⁶⁹ If the coffee bar owner had anticipated that the landlord would act opportunistically, she (1) would have taken precautions to avoid the effects of such a rent increase (for example, by contractually precluding the landlord’s option to increase the price)²⁷⁰ or (2) would not have entered the market in the first place. Third, it is necessary that the landlord act opportunistically. Williamson describes opportunism as “self-interest seeking with guile.”²⁷¹ Of course, there will be no holdup if the coffee bar owner makes a sunk investment and, although the contract is incomplete, the landlord nonetheless continues to charge the same rent. In that case, the landlord would be forbearing from opportunism. In sum, only when these three conditions are satisfied can holdup occur.

2. *Does Judge Selna’s Theory of Excessive Pricing Justify His Reliance on a Top-Down Analysis?*

Judge Selna did not examine whether the facts in *TCL v. Ericsson* satisfied Williamson’s three conditions for holdup to occur. Indeed, he presented varying definitions of patent holdup, none of which comports with Williamsonian holdup. For example, Judge Selna said that patent holdup occurs when an SEP holder attempts to capture value attributable to standardization.²⁷² He also said that patent holdup involves anticompetitive

²⁶⁶ OLIVER E. WILLIAMSON, *THE ECONOMIC INSTITUTIONS OF CAPITALISM* 56–57 (Free Press 1985).

²⁶⁷ Galetovic & Haber, *The Fallacies of Patent-Holdup Theory*, *supra* note 262, at 20.

²⁶⁸ *Id.* (“[I]f every contingency could be contractually anticipated, then there would be no room for renegotiation; any excuse for a rent increase conceived of by the landlord would already be in the contract.”).

²⁶⁹ WILLIAMSON, *THE ECONOMIC INSTITUTIONS OF CAPITALISM*, *supra* note 266, at 79–80.

²⁷⁰ Galetovic & Haber, *The Fallacies of Patent-Holdup Theory*, *supra* note 262, at 20 (“The coffee bar owner did not install her espresso machine so that the landlord could appropriate her quasi rents, leaving her with a business that is losing money in the long run.”).

²⁷¹ *Id.* at 23 (quoting WILLIAMSON, *THE ECONOMIC INSTITUTIONS OF CAPITALISM*, *supra* note 266, at 47); *see also* WILLIAMSON, *THE ECONOMIC INSTITUTIONS OF CAPITALISM*, *supra* note 266, at 47 (“[O]pportunism refers to the incomplete or distorted disclosure of information, especially to calculated efforts to mislead, distort, disguise, obfuscate, or otherwise confuse.”).

²⁷² *TCL Comm’n Tech. Holdings, Ltd. v. Telefonaktiebolaget LM Ericsson*, Nos. SACV 14-341 JVS, CV 15-2370 JVS, 2018 WL 4488286, at *8 (C.D. Cal. Sept. 14, 2018) (“[The top-down methodology] prevents SEP owners from charging a premium for the value added by standardization.”); *id.* at *14 (“[I]ncreasing

conduct. Quoting both Judge James Robart of the Western District of Washington and Judge Marsha Berzon of the Ninth Circuit in *Microsoft v. Motorola*, Judge Selna said:

“When the standard becomes widely used, the holders of SEPs obtain substantial leverage to demand more than the value of their specific patented technology.” This monopoly power can lead standard-essential patent owners to overvalue their patents and “engage in anti-competitive behavior.” “The tactic of withholding a license unless and until a manufacturer agrees to pay an unduly high royalty rate for an SEP is referred to as ‘hold-up.’”²⁷³

Unfortunately, Judge Selna did not explain the type of “anti-competitive behavior” in which an SEP holder engages by charging a royalty that “overvalues” a patent. As I have explained elsewhere, U.S. courts have long recognized that a firm’s unilateral decision to charge high prices does not constitute anticompetitive conduct.²⁷⁴ The Supreme Court’s 2004 decision in *Trinko* said that the unilateral charging of monopoly prices is both lawful and “an important element of the free-market system.”²⁷⁵ Put differently, a firm’s unilateral decision to charge “excessive” patent royalties is not an anti-trust violation. Assistant Attorney General Delrahim emphasized in a speech delivered on September 18, 2018, that “Section 2 [of the Sherman Act] . . . is agnostic to the price that a patent-holder seeks to charge after committing to [offer to license its SEPs on FRAND terms].”²⁷⁶

It appears that Judge Selna was not concerned with anticompetitive conduct (or holdup as understood in transaction-cost economics), but rather with an SEP holder’s ability to charge what he deemed an excessive royalty for a license to its SEPs. However, it is unclear why Judge Selna subsequently reasoned that adopting a top-down approach best ensured that the FRAND royalty that he awarded did not exceed the value of Ericsson’s SEPs. The Supreme Court has recognized for more than 130 years that patent damages

the royalty rate after the standard has been adopted, without showing that the increase is due to additions to the standard, is the definition of hold-up.”).

²⁷³ *Id.* at *53 (first quoting *Microsoft Corp. v. Motorola, Inc.*, No. C10-1823, 2013 WL 2111217, at *10 (W.D. Wash. Apr. 25, 2013); then quoting *Microsoft Corp. v. Motorola, Inc.*, 795 F.3d 1024, 1031 (9th Cir. 2015); and then quoting *Microsoft v. Motorola*, 795 F.3d at 1031).

²⁷⁴ See, e.g., Sidak, *Is Patent Holdup a Hoax?*, *supra* note 259, at 482–83, 487–89.

²⁷⁵ *Verizon Commc’ns v. Law Offices of Curtis V. Trinko, LLP*, 540 U.S. 398, 407 (2004).

²⁷⁶ Makan Delrahim, Assistant Attorney Gen., U.S. Dep’t of Justice, Remarks as Prepared for Delivery at the IAM’s Patent Licensing Conference: Antitrust Law and Patent Licensing in the New Wild West 7 (Sept. 18, 2018); see also *id.* at 2 (“[A]n antitrust cause of action premised on a failure to abide by FRAND commitments would be inconsistent with Section 2 of the Sherman Act.”); Delrahim, *Take It to the Limit: Respecting Innovation Incentives in the Application of Antitrust Law*, *supra* note 231, at 9 (“Under the existing statutory scheme, it is not the duty or the proper role of antitrust law to referee what unilateral behavior is reasonable for patent holders in this context [of SEPs]. Patent holders make decisions every day about how to exploit their property rights, knowing that the consequence of those actions may be to subject themselves to contractual or other common law liability.”).

must be apportioned to the value of the invention.²⁷⁷ Furthermore, the Federal Circuit has emphasized in the context of SEPs that a royalty should not include any value attributable to standardization.²⁷⁸ Thus, existing legal principles in the United States already restrict patent damages to the value of the invention.

U.S. courts have also recognized that several economic methodologies can ensure that the awarded damages are apportioned to the value of the patented invention. In *Apple v. Motorola*, for example, the Federal Circuit said with respect to the SEPs involved:

[T]here may be more than one reliable method for estimating a reasonable royalty. For example, a party may use the royalty rate from sufficiently comparable licenses, value the infringed features based upon comparable features in the marketplace, or estimate the value of the benefit provided by the infringed features by comparing the accused product to non-infringing alternatives. All approaches have certain strengths and weaknesses and, depending upon the facts, one or all may produce admissible testimony in a single case. It is common for parties to choose different, reliable approaches in a single case and, when they do, the relative strengths and weaknesses may be exposed at trial or attacked during cross-examination. That one approach may better account for one aspect of a royalty estimation does not make other approaches inadmissible.²⁷⁹

²⁷⁷ See, e.g., *Garretson v. Clark*, 111 U.S. 120, 121 (1884) (“The patentee . . . must in every case give evidence tending to separate or apportion the defendant’s profits and the patentee’s damages between the patented feature and the unpatented features.” (quoting *Garretson v. Clark*, 10 F. Cas. 40, 44 (N.D.N.Y. 1878)); see also *Keystone Mfg. Co. v. Adams*, 151 U.S. 139, 148 (1894); *City of Elizabeth v. Am. Nicholson Pavement Co.*, 97 U.S. 126, 138–39 (1877); *Core Wireless Licensing S.A.R.L. v. LG Elecs., Inc.*, No. 2:14-cv-00911, at 6 (E.D. Tex. Sept. 27, 2018) (Gilstrap, C.J.), ECF No. 677; Sidak, *Is Patent Holdup a Hoax?*, *supra* note 259, at 477–80.

²⁷⁸ See, e.g., *Ericsson Inc. v. D-Link Sys., Inc.*, 773 F.3d 1201, 1232 (Fed. Cir. 2014) (“When dealing with SEPs, there are two special apportionment issues that arise. First, the patented feature must be apportioned from all of the unpatented features reflected in the standard. Second, the patentee’s royalty must be premised on the value of the patented feature, not any value added by the standard’s adoption of the patented technology. These steps are necessary to ensure that the royalty award is based on the incremental value that the patented *invention* adds to the product, not any value added by the standardization of that technology.” (emphasis in original)). The second apportionment exercise is not necessarily required under the law of jurisdictions other than the United States. For example, Mr. Justice Birss did not rule that a FRAND royalty must exclude any share of the value from the creation of the standard. See *Unwired Planet Int’l Ltd v. Huawei Techs. Co.* [2017] EWHC (Pat) 2988 [97] (Eng.) (“In the concurrent evidence session Prof [Damien] Neven explained that he did not regard FRAND as a scheme which meant the patentee could not appropriate some of the value that is associated with the inclusion of his technology into the standard and the value of the products that are using those standards. Dr [Gunnar] Niels agreed with that. Neither side disputed this and to the extent it is a matter for the economists, I accept their evidence. The economists’ opinions show that it is not necessary to deprive the patentee of its fair share of those two sources of value in order to eliminate hold up and fulfil the purpose of FRAND. To that extent I may be differing from certain parts of the decisions in *Innovatio IP Ventures* and *Ericsson v D-Link* in the US but it is not necessary to look into that any further since neither side before me took the point.”).

²⁷⁹ *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1315 (Fed. Cir. 2014) (internal citation omitted).

In other words, a top-down analysis is not the only methodology that can ensure that the determined royalty reflects the value of the invention. The analysis of comparable licenses (provided that comparable licenses exist) can similarly serve as a reliable economic methodology to determine a FRAND royalty that accurately reflects the value of the SEP portfolio.²⁸⁰

In sum, Judge Selna's concerns over patent hold-up do not justify his preference for the top-down analysis over other reliable economic methodologies for estimating a FRAND royalty. Rather, given the difficulty of determining in a reliable way the necessary inputs of the top-down methodology, it would have been more appropriate for Judge Selna to have relied on less speculative methodologies to identify a fair and reasonable royalty for a license to Ericsson's SEP portfolio.

IV. JUDGE SELNA'S DETERMINATION OF A NONDISCRIMINATORY ROYALTY FOR ERICSSON'S SEPs BASED ON COMPARABLE LICENSE AGREEMENTS

Although Judge Selna found that Ericsson's offers to TCL were "not fair or reasonable," he said that a top-down analysis cannot aid the court in determining whether the offers were discriminatory.²⁸¹ He said that, to make such a determination, the court must examine licenses that the SEP holder executed with similarly situated licensees.²⁸² Hence, Judge Selna first identified license agreements that Ericsson had executed with licensees similarly situated to TCL, and he then unpacked those licenses to derive their implied one-way running royalty rates for the use of Ericsson's SEPs.²⁸³ However, one can criticize both steps of Judge Selna's analysis. First, it is unclear whether he correctly identified the set of relevant license agreements. Second, his unpacking analysis violated fundamental legal and economic principles; consequently, it failed to identify correctly the implied per-unit royalties that third-parties considered to be FRAND compensation for a license to Ericsson's SEP portfolio.

²⁸⁰ See *Ericsson v. D-Link*, 773 F.3d at 1227 ("This court has recognized that licenses may be presented to the jury to help the jury decide an appropriate royalty award."). Alexander Galetovic and Stephen Haber have argued that courts should use *only* comparable licenses as evidence of a reasonable royalty. See Alexander Galetovic & Stephen H. Haber, *SEP Royalties: What Theory of Value and Distribution Should Courts Apply?* (Hoover IP², Working Paper Series No. 19001, Jan. 5, 2019).

²⁸¹ *TCL Comm'n Tech. Holdings, Ltd. v. Telefonaktiebolaget LM Ericsson*, Nos. SACV 14-341 JVS, CV 15-2370 JVS, 2018 WL 4488286, at *29 (C.D. Cal. Sept. 14, 2018).

²⁸² *Id.*

²⁸³ *Id.*

A. Identifying Comparable License Agreements Executed with Licensees Similarly Situated to TCL

When analyzing the license agreements that Ericsson had executed with third parties, Judge Selna first determined which licensees were similarly situated to TCL. At trial, Ericsson and TCL agreed that, for Ericsson to comply with the nondiscrimination requirement of its FRAND contract with ETSI, “like rates must be offered to firms which are similarly situated.”²⁸⁴ They agreed that the licensees similarly situated to TCL included Huawei, LG, HTC, and ZTE.²⁸⁵ However, the parties disagreed about Apple, Coolpad, Karbonn, and Samsung.²⁸⁶ Whereas TCL argued (and Ericsson disagreed) that Apple and Samsung were similarly situated to TCL, Ericsson argued (and TCL disagreed) that Coolpad and Karbonn—two handset manufacturers that primarily sell their products in China and India—were similarly situated to TCL.²⁸⁷ Concluding that he should focus his analysis on licenses that Ericsson had executed with licensees that were, like TCL, “reasonably well-established in the world market,”²⁸⁸ Judge Selna determined that Apple and Samsung fell into this category, but Coolpad and Karbonn did not.²⁸⁹

Judge Selna said that it is necessary to adopt a “broad view” when identifying similarly situated licensees for the purpose of determining whether an SEP holder has complied with the nondiscrimination requirement of its FRAND contract with ETSI.²⁹⁰ As explained in Part I.B.1, he said that excluding from the analysis of comparable license agreements those agreements that the SEP holder executed with the largest implementers would have the effect of “insulating” large implementers, “by imposing a barrier in the form of higher rates for those not at the top end of the market.”²⁹¹ However, the approach that Judge Selna ultimately adopted in identifying similarly situated licensees seems to contradict his professed position.

Judge Selna described criteria for identifying licensees that are similarly situated to TCL. He said that “the geographic scope of the firm, the licenses required by the firm, and a reasonable sales volume” are firm-specific factors that the court should consider to identify similarly situated licensees.²⁹² He also listed four factors—“the firm’s overall financial success or risk, brand recognition, the operating system of their devices, [and] the existence of retail stores”—that he said were irrelevant for determining whether a licensee

²⁸⁴ *Id.*

²⁸⁵ *Id.* at *31.

²⁸⁶ *Id.*

²⁸⁷ *Id.* at *31–32.

²⁸⁸ *Id.* at *30.

²⁸⁹ *Id.* at *31.

²⁹⁰ *Id.* at *30–31.

²⁹¹ *Id.* at *30.

²⁹² *Id.* at *31.

is similarly situated to TCL.²⁹³ Of those firm-specific factors that he considered to be dispositive, he then said, without providing any support for his conclusion, that “geographic scope is the most important factor” in determining whether a licensee is similarly situated to TCL.²⁹⁴

Judge Selna then distinguished between a well-established global firm and a “local king,” a term that he used to refer to “a company that sells most or all of its devices in a single country, often the same country where it is headquartered and manufactures the devices.”²⁹⁵ He said that a local king is *not* similarly situated to a global firm, such as TCL, because the former typically operates in only one country and needs a license in only one jurisdiction.²⁹⁶ He found that both Karbonn and Coolpad were local kings, because most of Karbonn’s sales occurred in India and most of Coolpad’s sales occurred in China.²⁹⁷ (Unfortunately, Judge Selna did not clarify in which other countries Coolpad and Karbonn sold their products; however, according to Karbonn, it is “[c]urrently in the process of creating [a] presence in 40 countries including Africa, South [and] South East Asia, CIS [Commonwealth of Independent States], Eastern Europe[,] and [the] Middle East.”²⁹⁸) Ericsson emphasized in its brief to the Federal Circuit that, regardless of the current geographic distribution of their sales, both Karbonn and Coolpad had executed a *global* license with Ericsson that would permit them to sell phones that practice Ericsson’s SEPs anywhere in the world.²⁹⁹ Nonetheless, Judge Selna evidently concluded that this fact was not a sufficient reason to consider Karbonn and Coolpad similarly situated to TCL.

In contrast, Judge Selna found that Apple and Samsung were similarly situated to TCL. He reasoned that “[a]ll three firms are all global firms, Ericsson has asked all three to pay a global blended rate for a multi-modal 4G license, they all create phones of similar technical specifications, and they all have substantial sales volume.”³⁰⁰ Therefore, Judge Selna concluded that—in addition to Huawei, HTC, LG, and ZTE—Apple and Samsung met his criteria for well-established global firms that are similarly situated to TCL.³⁰¹ Judge Selna never examined whether excluding Karbonn and Coolpad from the set of similarly situated licensees would have exactly the effect that he sought to avoid—that is, isolating larger implementers from emerging firms.

It bears emphasis that, despite his professed adoption of a broad approach to identifying the relevant license agreements, Judge Selna adopted

²⁹³ *Id.*

²⁹⁴ *Id.* at *32.

²⁹⁵ *Id.*

²⁹⁶ *Id.*

²⁹⁷ *Id.*

²⁹⁸ *Karbonn—Celebrate Simplicity*, KARBONN, <https://www.karbonnmobiles.com/company>.

²⁹⁹ Ericsson’s Appellate Brief, *supra* note 120, at *66.

³⁰⁰ *TCL v. Ericsson*, 2018 WL 4488286, at *33.

³⁰¹ *Id.* at *31.

a narrower approach than Mr. Justice Birss did in *Unwired Planet*. When examining an SEP holder's compliance with the nondiscrimination requirement of its FRAND contract with ETSI, Mr. Justice Birss refused to limit his analysis of comparable licenses to the agreements that the SEP holder had executed with similarly situated licensees.³⁰² He reasoned that it would be "unfair (and discriminatory)" to select comparable licenses based on the licensee's characteristics.³⁰³ Mr. Justice Birss said that a FRAND royalty should be determined on the basis of the value of the licensed SEPs, such that "all licensees who need the same kind of licence will be charged the same kind of rate."³⁰⁴ Thus, he found that it would be inappropriate "to elevate a small subset [of licenses] above the others" and limit the analysis to licenses executed with similarly situated licensees.³⁰⁵

In contrast, Judge Selna limited his comparable-license analysis to include only licenses that Ericsson had executed with licensees with a geographic scope and market position comparable to those of TCL. Accordingly, Judge Selna did not consider it necessary to compare Ericsson's offers to TCL with the royalties specified in the license agreements that Ericsson had executed with Karbonn and Coolpad.

B. Judge Selna's Reliance on Only a Subset of the Comparable License Agreements

After identifying the license agreements that Ericsson had executed with licensees that he deemed similarly situated to TCL, Judge Selna proceeded with his unpacking analysis. He observed that "[u]npacking is used to derive a one-way royalty rate so that licenses can be compared on a common basis. Here, unpacking requires the Court to account for cross-licenses, lump sum payments, pass-through rights, and other issues."³⁰⁶ Thus, Judge Selna found that it was necessary to unpack the consideration exchanged in the comparable licenses to identify the implicit one-way *ad valorem* royalty that each licensee agreed to pay for a license to Ericsson's SEP portfolio.³⁰⁷

However, Judge Selna did not unpack *every* license agreement that Ericsson had executed with a licensee that he found to be similarly situated to TCL to determine whether Ericsson's offers to TCL were discriminatory. Instead, he limited his analysis to three license agreements when determining whether Ericsson's 4G offers were discriminatory and to only two licenses when determining whether Ericsson's 3G offers were discriminatory. Put differently, Judge Selna narrowed even further the set of comparable

³⁰² *Unwired Planet Int'l Ltd v. Huawei Techs. Co.* [2017] EWHC (Pat) 2988 [173]–[175] (Eng.).

³⁰³ *Id.* [175].

³⁰⁴ *Id.*

³⁰⁵ *Id.* [173].

³⁰⁶ *TCL v. Ericsson*, 2018 WL 4488286, at *29.

³⁰⁷ *Id.*

license agreements to determine whether Ericsson's offers to TCL were discriminatory.

Specifically, Judge Selna did not rely on the 2015 amended 2G/3G license and the 2014 4G license that Ericsson had executed with ZTE. He found that it would be difficult for the court to unpack the ZTE licenses in a reliable manner due to limited data on ZTE's revenue in specific regions and uncertainty regarding why Ericsson treated licensees' pass-through rights for 2G and 3G SEPs differently in different licenses.³⁰⁸ In other words, Judge Selna refused to unpack the license agreements that Ericsson had executed with ZTE because he found that it was not possible to determine the implied per-unit royalty with a sufficient degree of certainty.

It would thus be obviously incorrect to claim that Judge Selna's decision requires an economic expert to unpack *every* license agreement that the SEP holder has executed with third parties. To the contrary, Judge Selna excluded from his analysis both license agreements that Ericsson had executed with ZTE. Similarly, because the license that Ericsson had executed with LG in 2014 did not require LG to pay any 3G royalties to Ericsson, that license was unpacked only to identify a 4G royalty rate.³⁰⁹ In sum, Judge Selna found that Ericsson's two licenses with ZTE had no informative value at all, and he found that Ericsson's license with LG was informative only to assess Ericsson's 4G offers.

Judge Selna also said that, for purposes of assessing whether Ericsson's licensing offers to TCL were discriminatory, he would give little weight to the licenses that Ericsson had executed with Apple and Huawei.³¹⁰ Although Judge Selna derived a 4G royalty rate from the 2015 Ericsson-Apple license³¹¹ and adopted the 3G and 4G running royalty rates "expressly state[d]" in the 2016 Ericsson-Huawei license,³¹² he said that he would use those two licenses only as "bench marks to test reasonableness of the license comparisons which it uses, but not as absolute standards which must be met."³¹³ He said that giving the licenses that Ericsson had executed with Huawei and Apple

³⁰⁸ *Id.* at *47 ("Dr. Lynde provided multiple reasons for why he could not unpack the ZTE 4G licenses. The most persuasive reasons are that: (1) the business cases used by Ericsson and analyzed by [Ericsson's economic expert David] Kennedy did not provide regional breakdowns of sales that matched the territory breakdowns in the license[]; (2) the 4G license became effective on April 1, 2014, and the amended 2016 4G license became effective on July 1, 2016, replacing both the 2014 4G license, and the 2015 amended 2G/3G license; and (3) the 2014 4G license was valid for a fairly short period of time and therefore has minimal relevance to the question of ZTE's effective 4G royalty rate.").

³⁰⁹ *Id.* at *45.

³¹⁰ *Id.* at *49.

³¹¹ *Id.* at *43. Because Judge Selna found that, for the 2015 license agreement that Ericsson had executed with Apple, "[n]either [party's] expert provided a satisfactory method to unpack Apple's released sales [of devices practicing the 2G and 3G standards]," he treated Apple's 2G and 3G release payment as a 4G royalty payment to derive the implied *ad valorem* 4G royalty rate. *Id.*

³¹² *Id.* at *44. Judge Selna found that the 2016 Ericsson-Huawei license expressly specified running royalty rates that did not need to be unpacked. *Id.*

³¹³ *Id.* at *49.

little weight was appropriate because those two licenses “came into effect after Offers A and B were made.”³¹⁴ Unfortunately, Judge Selna did not say specifically how he would use the licenses that Ericsson had executed with Apple and Huawei differently from how he used the licenses that Ericsson had executed with other companies.

Nonetheless, Judge Selna derived multiple royalty rates from each of the licenses that he unpacked. For example, when unpacking the 2014 Ericsson-Samsung license, Judge Selna derived three estimates of royalty rates for a license to Ericsson’s 3G and 4G portfolio.³¹⁵ He did so by relying on three estimates of Samsung’s revenue between 2011 and 2015: (1) revenue data provided by the International Data Corporation (IDC), (2) a conservative revenue projection provided by Ericsson, and (3) a high revenue projection provided by Ericsson.³¹⁶ Similarly, when unpacking the 2014 Ericsson-LG license and the 2014 Ericsson-HTC license, Judge Selna also unpacked two royalty rates for each standard: one derived from relying on the IDC data and another derived from relying on Ericsson’s projection.³¹⁷ Table 11 reports the number of royalty rates that Judge Selna unpacked from each license that he examined.

Table 11. The Number of Royalty Rates That Judge Selna Derived from License Agreements That Ericsson Executed with Licensees Similarly Situated to TCL

License Agreement	Importance of the Agreement	Number of Derived 3G Royalty Rates	Number of Derived 4G Royalty Rates
2014 Ericsson-HTC	Licenses on which Judge Selna focused	2	2
2014 Ericsson-LG		0	2
2014 Ericsson-Samsung		3	3
2015 Ericsson-Apple	Licenses used as benchmarks	0	1
2016 Ericsson-Huawei		1	1
Total		6	9

Source: *TCL v. Ericsson*, 2018 WL 4488286, at *42–47.

³¹⁴ *Id.*

³¹⁵ *Id.* at *44.

³¹⁶ *Id.*

³¹⁷ *Id.* at *46. For the 2014 Ericsson-HTC license, Ericsson provided one projection of HTC’s revenue, and Judge Selna derived two royalty rates relying on Ericsson’s projection and IDC data. For the 2014 Ericsson-LG license, Ericsson provided three projections of LG’s revenue, and Judge Selna used only the lowest projection and derived two royalty rates relying on the lowest Ericsson projection and IDC data. For the 2014 Ericsson-Samsung license, Ericsson provided two projections of Samsung’s revenue, and Judge Selna used both projections and derived three royalty rates relying on both Ericsson’s projections and IDC data. For the 2015 Ericsson-Apple license, because Ericsson’s projection of Apple’s revenue and IDC data covered different time periods, Judge Selna derived only one royalty rate. *Id.* at *42–47.

As Table 11 shows, to determine whether Ericsson's offers for 4G were discriminatory, Judge Selna derived seven 4G royalty rates from three license agreements that Ericsson had executed with Samsung, LG, and HTC and two "benchmark" royalty rates from two licenses that Ericsson had executed with Apple and Huawei. For 3G, Judge Selna derived five royalty rates from two licenses that Ericsson had executed with Samsung and HTC and one "benchmark" royalty rate from the license that Ericsson had executed with Huawei.

In sum, although Ericsson executed many license agreements with third parties, Judge Selna focused his analysis on only a subset of those license agreements to determine whether Ericsson's offers to TCL were discriminatory.

C. Judge Selna's Methodology for Unpacking Comparable License Agreements

Although a full examination of Judge Selna's unpacking analysis exceeds the scope of this article, it is worth examining two particular aspects of his analysis that contradict fundamental economic and legal principles—(1) his reliance on each licensee's actual (rather than projected) revenue from selling licensed products to unpack the consideration exchanged in Ericsson's comparable licenses and (2) his refusal to combine a one-way *ad valorem* royalty with rate caps or floors. As I will explain, those errors undermine Judge Selna's unpacking analysis and his conclusions about the implicit one-way royalty that each similarly situated licensee agreed to pay for a license to Ericsson's SEP portfolio.

1. Judge Selna's Decision to Rely on Actual (Rather Than Predicted) Revenue to Unpack Consideration Exchanged in Ericsson's Comparable License Agreements

When unpacking Ericsson's license agreements, Judge Selna refused to rely exclusively on data available to the parties at the time of license execution. In so doing, he violated basic economic principles embodied in U.S. patent law.

a. Judge Selna's Unpacking Methodology

Judge Selna said that the value of a license equals the product of (1) the licensor's one-way royalty rate and (2) the licensee's revenues.³¹⁸ He observed that, "[i]n the case of a cross license, . . . the party which receives less value will have to give cash or other consideration to make up the difference [in value]. This cash difference is called a net balancing payment."³¹⁹ He expressed the

³¹⁸ *Id.* at *34.

³¹⁹ *Id.*

net-balancing payment that Ericsson received from each cross license using the following equation:

$$P = (R_E \times L) - (R_L \times E), \quad (3)$$

where P is the net-balancing payment that Ericsson received from the cross-license, R_E is the implicit one-way royalty that a licensee paid for a license to Ericsson's SEP portfolio, L is the licensee's revenue earned from selling licensed products, R_L is the implicit one-way royalty that Ericsson paid for a license to the licensee's SEP portfolio, and E is Ericsson's revenue earned from selling licensed products.³²⁰

Because Equation 3 has two unknown variables (R_E and R_L)—which complicated solving the equation to derive R_E —Judge Selna used a measure of portfolio strength ratio (S), defined as the ratio of R_E to R_L (that is, $R_E \div R_L$), to eliminate one of the unknown variables.³²¹ By (1) substituting R_L in Equation 3 with $R_E \div S$ ³²² and (2) rearranging the terms of the equation, Judge Selna derived the following equation:³²³

$$R_E = \frac{P}{L - (E \div S)}. \quad (4)$$

It bears emphasis that, if one holds all other variables in Equation 4 constant, then increasing the licensee's revenue (L) decreases the implicit one-way royalty that Ericsson received pursuant to the license. Conversely, all else held equal, decreasing the licensee's revenue increases Ericsson's implicit one-way royalty. Thus, Judge Selna's unpacking analysis was sensitive to the estimates that he used for each licensee's revenue.

To unpack the consideration exchanged in Ericsson's comparable licenses, Judge Selna relied on both actual observations and projected estimates of each licensee's revenue.³²⁴ He observed that Dr. Matthew Lynde (TCL's expert economic witness) and Mr. David Kennedy (Ericsson's expert economic witness) "used two sources for revenue information" to unpack the consideration in Ericsson's comparable licenses: "Ericsson's internal projections in its business[] cases and data from International Data Corporation."³²⁵ Judge Selna explained that Ericsson's business cases were documents that "Ericsson created . . . after signing each license agreement to memorialize

³²⁰ *Id.*

³²¹ *Id.*

³²² Because $S = R_E \div R_L$, it follows that $R_L = R_E \div S$.

³²³ *TCL v. Ericsson*, 2018 WL 4488286, at *34.

³²⁴ *Id.*

³²⁵ *Id.* at *39.

some of [Ericsson's] projections and assumptions, and to act as a 'memo to the file.'³²⁶ In contrast, he explained, the IDC data are "based on actual handset sales."³²⁷ Both Dr. Lynde and Mr. Kennedy relied on the licensee's revenue projections as reported in Ericsson's business cases to unpack each comparable license.³²⁸ However, Dr. Lynde also relied on actual revenue data subsequently reported by IDC to unpack for a second time Ericsson's licenses with HTC, LG, and Samsung.³²⁹

Judge Selna said that the IDC data were "much more reliable" than Ericsson's internal revenue projections for the purpose of unpacking the license agreements, but he noted that the IDC data had limitations.³³⁰ Ultimately, when unpacking Ericsson's comparable licenses, Judge Selna relied on both data sources to estimate each licensee's revenue.³³¹ In particular, he unpacked each of Ericsson's licenses with HTC, LG, and Samsung twice—once using Ericsson's projections and once using the IDC data.³³² Judge Selna unpacked Ericsson's license with Apple only once, using a combination of the IDC data and Ericsson's projections.³³³ It appears that he relied on all of these unpacked rates (the rates unpacked with Ericsson's projection, the rates unpacked with the IDC data, and the rates unpacked with both) in his final determination of a FRAND royalty for TCL's use of Ericsson's SEPs.

For two primary reasons, Judge Selna found that it was appropriate to rely on IDC's actual revenue data to unpack Ericsson's comparable licenses. First, he found that Ericsson's projections "dramatically underestimated the licensee's revenue when compared to IDC data," a factor that, in his view, weighed against reliance on those projections and in favor of reliance on IDC data.³³⁴ Second, Judge Selna said that it was inappropriate to rely on only Ericsson's revenue projections because "the non-discrimination prong of FRAND does not incorporate an SEP-holder's projections; it applies to the actual terms and conditions" of the license agreements.³³⁵ He added that, by agreeing to a lump-sum royalty, Ericsson knowingly accepted the risk that the licensee might outperform the parties' projections regarding the licensee's sales at the date of license execution and thus be granted the right to use the patented technology for a price lower than the price that the parties initially negotiated.³³⁶ Judge Selna concluded that unpacking Ericsson's comparable

³²⁶ *Id.* at *34 (quoting Sealed Declaration of Gustav Brismark).

³²⁷ *Id.* at *39.

³²⁸ *Id.*

³²⁹ *Id.*

³³⁰ *Id.* ("IDC data is based on actual handset sales, which makes it much more reliable, but more limited because only data through 2015 was available, and IDC does not report infrastructure revenue.")

³³¹ *Id.* at *42-48.

³³² *Id.* at *43-48.

³³³ *Id.* at *42-43.

³³⁴ *Id.* at *40.

³³⁵ *Id.*

³³⁶ *Id.*

licenses with projected revenue rather than actual revenue “would allow Ericsson to take the benefits that come with lump sum deals, . . . but none of the risk.”³³⁷ However, as I will explain below, that reasoning is incorrect. Judge Selna’s decision to rely on actual revenue data to unpack the comparable license agreements contradicts well-established economic and legal principles.

b. Is Judge Selna’s Reliance on Actual Sales Data to Unpack a License Agreement Economically Sound?

Comparable license agreements can provide reliable evidence of a reasonable royalty for a given patent portfolio, because they reveal what other firms have voluntarily agreed to pay for a license to the patented technology covered by that portfolio.³³⁸ When a license agreement specifies a lump-sum payment, one must unpack the license agreement to determine the implied per-unit or *ad valorem* royalty upon which the parties agreed when executing the license. In so doing, one must consider the information available to the parties at the date that the parties executed the license. *Ex post* information upon which one could not reasonably expect the negotiating parties to have been able to rely at the date of license execution (such as information about actual, rather than projected, sales of the licensees’ patent-practicing products) should not be considered.

Relying on information that became available only after the parties executed the license agreement could produce an unpacked royalty far removed from the royalty that the licensing parties actually negotiated. Suppose, for example, that a patent holder and a licensee agree to execute a license to the patent holder’s portfolio in exchange for a royalty rate of 1 percent of the revenue earned from selling the licensed product. Suppose further that, at the time of license execution, the parties projected that the licensee would earn the present value equivalent of \$1 billion in revenue from its licensed products during the license’s term. Consequently, on the basis of the parties’ expectations at the time of license execution, the licensee agreed to pay the patent holder a one-time lump-sum payment of \$10 million ($0.01 \times \$1,000,000,000$), which both parties considered to be reasonable.

Now, suppose that, during the term of the license agreement, the licensee’s actual revenue from selling its licensed products drastically exceeded the parties’ initial revenue expectations. Suppose that, instead of earning the present value equivalent of \$1 billion in revenue from selling its

³³⁷ *Id.*

³³⁸ See, e.g., *Ericsson, Inc. v. D-Link Sys., Inc.*, 773 F.3d 1201, 1227–28 (Fed. Cir. 2014); see also J. Gregory Sidak, *Apportionment, FRAND Royalties, and Comparable Licenses After Ericsson v. D-Link*, 2016 U. ILL. L. REV. 1809, 1821 (“Royalties negotiated in real-world transactions accurately reveal the prices that the parties to those licenses consider to be fair, reasonable, and nondiscriminatory.”).

licensed products, the licensee actually earned the present value equivalent of \$2 billion—twice the amount initially projected. If a court were to unpack that license based on the licensee’s actual revenue, it would erroneously find that the licensee and the patent holder had implicitly agreed to a one-way *ad valorem* rate of 0.5 percent ($\$10,000,000 \div \$2,000,000,000$), rather than the 1-percent rate upon which the parties actually based the calculation of the \$10 million lump-sum payment. If the court then subsequently awarded a reasonable royalty of 0.5 percent to compensate the patent holder for another firm’s infringement of the same portfolio, the court might fail to provide compensation adequate to recoup the patent holder’s investment in the patented technology. Similarly, if the licensee’s actual revenue fell short of, rather than exceeded, the parties’ initial expectations, then using the licensee’s actual revenue to unpack the terms of the license would overestimate the implicit one-way royalty.

Thus, using information about each licensee’s actual revenue, rather than projected revenue, to unpack comparable licenses might obscure the implicit one-way royalty that the licensee agreed to pay for the patented technology. Depending on the facts of the case, using actual revenue to unpack a comparable license might result in the underestimation of the implied royalty (if the licensee’s actual use of the SEPs exceeds the parties’ *ex ante* expectations) or its overestimation (if the licensee’s actual use of the SEPs falls short of the parties’ *ex ante* expectations).

c. Does Judge Selma’s Decision to Rely on Actual (Post-Negotiation) Data Comport with General Principles of U.S. Patent Law and of Economics for Unpacking Comparable License Agreements?

U.S. courts have long recognized in the context of patent damages the economic principle that, when unpacking a comparable license to support the determination of a reasonable royalty, one must consider information that was available to the parties *on the date of license execution*.³³⁹ When a U.S. court seeks to determine a reasonable royalty, it typically does so through the hypothetical-negotiation framework, which seeks to identify the royalty that the parties would have willingly negotiated on the date of first infringement.³⁴⁰ The Federal Circuit has repeatedly emphasized that a court must calculate a reasonable royalty using information that was available to the parties on

³³⁹ For an extensive discussion and analysis of the subject, see J. Gregory Sidak, *How Relevant Is Justice Cardozo’s “Book of Wisdom” to Patent Damages?*, 17 COLUM. SCI. & TECH. L. REV. 246 (2016).

³⁴⁰ See, e.g., *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1324 (Fed. Cir. 2009) (“[T]he hypothetical negotiation[,] or the ‘willing licensor-willing licensee’ approach, attempts to ascertain the royalty upon which the parties would have agreed had they successfully negotiated an agreement just before infringement began.”); *State Indus., Inc. v. Mor-Flo Indus., Inc.*, 883 F.2d 1573, 1580 (Fed. Cir. 1989) (“The determination of a reasonable royalty . . . is based . . . on what a willing licensor and licensee would bargain for at hypothetical negotiations on the date infringement started.”).

the date of the hypothetical negotiation.³⁴¹ For example, in *Interactive Pictures Corp. v. Infinite Picture, Inc.*, the Federal Circuit affirmed the district court's damages award after the court had refused to account for the infringer's failure to meet expected sales projections.³⁴² The Federal Circuit said that reliance on evidence of what actually happened in the market (as opposed to what the parties expected to happen) "would essentially eviscerate the rule that . . . sales *expectations* at the time when infringement begins" provide the basis for determining a reasonable royalty.³⁴³

U.S. courts have permitted reliance on post-infringement information (or information that became available to the parties only after the date of first infringement) only in limited circumstances. The Federal Circuit has emphasized that reliance on post-infringement data is appropriate to the extent that that information assists the court in discerning the parties' negotiating positions *on the date of first infringement*.³⁴⁴ In contrast, the court must avoid reliance on post-infringement information if such information is irrelevant to or contradicts other reliable information regarding the parties' negotiating positions on the date of first infringement.³⁴⁵

The same principles apply when unpacking a comparable license agreement to observe what other market participants in the industry have in the past considered to be FRAND compensation for the use of a patented standard-essential technology. Courts must strive to examine the licensing parties' expectations regarding the value of a given SEP portfolio as of the date of license execution. Determining the parties' expectations of the value of the portfolio is critical for unpacking a license in a reliable manner to derive a royalty rate that is, in fact, what the parties considered to be FRAND compensation for the licensed SEPs. In *HTC v. Ericsson*, Chief Judge Rodney Gilstrap

³⁴¹ See, e.g., *Hanson v. Alpine Valley Ski Area Inc.*, 718 F.2d 1075, 1079 (Fed. Cir. 1983) ("The key element in setting a reasonable royalty . . . is the *necessity* for return to the date when the infringement began." (quoting *Panduit Corp. v. Stahl Bros. Fibre Work, Inc.*, 575 F.2d 1152, 1158 (6th Cir. 1983)) (emphasis added)).

³⁴² 274 F.3d 1371, 1385 (Fed. Cir. 2001).

³⁴³ *Id.* (emphasis added).

³⁴⁴ *Lucent*, 580 F.3d at 1334 (explaining that the infringer's actual use of the patented technology "may provide information that the parties would frequently have estimated during the negotiation"); *Finjan, Inc. v. Secure Computing Corp.*, 626 F.3d 1197, 1209–10 (Fed. Cir. 2010) (affirming the decision of the district court, which had declined to exclude the damages expert's testimony that relied on the infringer's financial data for years after the infringement, reasoning that the expert used the subsequent data about the infringer's actual profit margins "as a reflection of the profits the parties might have anticipated . . . in the hypothetical negotiation").

³⁴⁵ See, e.g., *Radio Steel & Mfg. Co. v. MTD Prods., Inc.*, 788 F.2d 1554, 1557 (Fed. Cir. 1986) ("The determination of a reasonable royalty . . . is based not on the infringer's profit, but on the royalty to which a willing licensor and a willing licensee would have agreed at the time the infringement began."); *Interactive Pictures*, 274 F.3d at 1385 ("Lindemann does not require that estimates of sales revenues, as referenced in a hypothetical negotiation at the time infringement began, must later bear a close relation to actual sales revenue. Such a proposition would essentially eviscerate the rule that recognizes sales *expectations* at the time when infringement begins as a basis for a royalty base as opposed to an after-the-fact counting of actual sales." (citing *Lindemann Maschinenfabrik GmbH v. Am. Hoist & Derrick Co.*, 895 F.2d 1403, 1407–08 (Fed. Cir. 1990)) (emphasis added)).

of the Eastern District of Texas recognized this insight when he issued an order in February 2019 addressing the parties' various motions *in limine*.³⁴⁶ In that order, he said that, "[i]f a party seeks to introduce evidence and argument regarding whether a particular offer or license agreement is FRAND, then the party may only introduce evidence and/or facts which 'those parties [to the offer or license agreement] knew or reasonably should have known'" at the time the offer was made or the license was executed.³⁴⁷ Chief Judge Gilstrap emphasized that "[i]t would be improper and impermissible for a party to introduce evidence and/or facts that were not known or could not have been reasonably known to the parties at the time of the offer or license agreement."³⁴⁸

It is thus evident in light of the guidance provided by the Federal Circuit and other U.S. courts that Judge Selna's reasoning for relying on the IDC data of actual sales of the licensee's product contradicts basic economic principles animating U.S. patent law. Indeed, Judge Selna said that he found that the IDC data were more reliable than Ericsson's projections precisely because those projections "dramatically underestimated the licensee's revenue when compared to IDC data."³⁴⁹ He added that "[d]iscrepancies of this magnitude are not attributable to rounding errors or using different discount rates,"³⁵⁰ thus emphasizing that the parties perhaps based their royalty calculations on revenue expectations that significantly differed from IDC's actual revenue data. That fact indicates that Judge Selna's reliance on IDC data to unpack Ericsson's comparable licenses likely caused him to underestimate the implicit one-way royalties that Ericsson's third-party licensees actually agreed to pay for a license to Ericsson's SEPs. Thus, the fact that Ericsson's business projections materially differed from the IDC data should have weighed against, rather than in favor of, Judge Selna's reliance on the IDC data to unpack Ericsson's comparable licenses.

d. Is Judge Selna's Decision to Rely on Actual (Post-Negotiation) Data Necessary for an SEP Holder to Comply with Its FRAND Contract with ETSI?

Judge Selna said that Ericsson's FRAND contract with ETSI required him to use actual revenue data when unpacking the implicit one-way royalty rates that other third-party licensees paid to use Ericsson's SEPs, because

³⁴⁶ HTC Corp. v. Telefonaktiebolaget LM Ericsson, No. 6-18-cv-00243, slip op. at 4 (E.D. Tex. Feb. 8, 2019) (Gilstrap, C.J.) (order on motions *in limine* and pending motions).

³⁴⁷ *Id.* (quoting Sealed Pretrial Hearing Transcript at 31:15-19, HTC Corp. v. Telefonaktiebolaget LM Ericsson, No. 6-18-cv-00243 (E.D. Tex. Feb. 2, 2019) (Gilstrap, C.J.)).

³⁴⁸ *Id.*

³⁴⁹ TCL Comm'n Tech. Holdings, Ltd. v. Telefonaktiebolaget LM Ericsson, Nos. SACV 14-341 JVS, CV 15-2370 JVS, 2018 WL 4488286, at *40 (C.D. Cal. Sept. 14, 2018).

³⁵⁰ *Id.*

“the non-discrimination prong of FRAND . . . applies to the actual terms and conditions” of a given license agreement.³⁵¹ However, Ericsson’s FRAND contract with ETSI says nothing of the sort. The contract is absolutely silent on the proper information upon which a court must rely when unpacking comparable licenses to determine a FRAND royalty for another similarly situated licensee. Furthermore, an SEP holder’s FRAND contract does not require basing the SEP holder’s FRAND compensation on the actual use of the technology covered by the SEPs. In fact, an SEP holder’s FRAND contract with ETSI does not even suggest a preferred methodology for determining a FRAND royalty.³⁵² Thus, Judge Selna’s conclusion that Ericsson’s FRAND contract with ETSI compelled him to use actual revenue data that might not reflect the parties’ expectations during the license negotiation is unpersuasive. Rather, for at least three reasons, his reliance on data about actual sales to derive a FRAND royalty is improper.

First, Judge Selna ignored that his adopted interpretation of an SEP holder’s FRAND contract with ETSI could easily undermine ETSI’s goals of ensuring both (1) adequate compensation for the SEP holder’s patented contributions to ETSI’s standards³⁵³ and (2) implementers’ access to the patented standard-essential technology.³⁵⁴ As I explained in Part IV.C.1.b, if an SEP holder and an implementer execute a license agreement specifying a lump-sum payment on the basis of mutual expectations that turn out to be wrong, then relying on *ex post* information to unpack the license agreement could overestimate or underestimate the FRAND royalty rate that the implementer actually agreed to pay for those SEPs. If the court subsequently relies on those incorrect royalty rates to calculate a FRAND royalty that another licensee ought to pay for the use of those same SEPs, the awarded royalty might result in overpayment or underpayment to the SEP holder. Both outcomes would further distort the SEP holder’s incentives to participate in the standard-setting process and contribute its most valuable technologies to the standard; both outcomes would also distort the implementer’s incentives to adopt the standard and practice it in multiple products and services. Thus, Judge Selna’s decision to rely on actual (post-negotiation) revenue data to

³⁵¹ *Id.*

³⁵² ETSI’s IPR guide explains that “[s]pecific licensing terms and negotiations are commercial issues between the companies and shall not be addressed within ETSI.” ETSI, IPR Guide, Guide on Intellectual Property Rights (IPRs) § 4.1, at 66 (Sept. 19, 2013), https://portal.etsi.org/directives/39_directives_oct_2018.pdf.

³⁵³ ETSI IPR Policy, *supra* note 41, § 3.2, at 38 (“IPR holders[,] whether members of ETSI and their [affiliates] or third parties, should be adequately and fairly rewarded for the use of their IPRs in the implementation of [standards] and [technical specifications].”).

³⁵⁴ *Id.* § 3.1, at 38 (“[T]he ETSI IPR [policy] seeks to reduce the risk to ETSI, [members], and others applying ETSI [standards] and [technical specifications], that investment in the preparation, adoption[,] and application of [standards] could be wasted as a result of an [essential] IPR for a [standard] or [technical specification] being unavailable.”).

unpack the consideration exchanged in Ericsson's comparable licenses could contravene the goals of an SEP holder's FRAND contract with ETSI.

Second, Judge Selna ignored that his interpretation of the nondiscrimination requirement of an SEP holder's FRAND contract with ETSI, which would compel an SEP holder to license an SEP portfolio for the same royalty that other licensees are actually paying, would impose an unreasonable burden on SEP holders. Under his interpretation, to ensure compliance with its duties arising from its FRAND contract with ETSI, an SEP holder would need to monitor constantly the licensed sales of all its similarly situated licensees (including in cases where the parties executed a license agreement specifying a lump-sum payment and the implementer is *not* required to report its sales to the SEP holder). Only after obtaining information about each licensee's actual sales could an SEP holder determine the effective per-unit royalty that its licensees are paying and consequently make a nondiscriminatory offer to new licensees. Judge Selna never examined whether it would be possible for an SEP holder to comply with such a strict requirement or whether it is remotely plausible that ETSI and Ericsson ever intended their FRAND contract to impose that burden on the SEP holder.

Third, although Judge Selna said that the nondiscrimination component of an SEP holder's FRAND contract with ETSI applies to the actual terms and conditions of the license, he himself ignored the actual terms and conditions of Ericsson's comparable licenses.³⁵⁵ In particular, Judge Selna ignored the salient economic fact that, if Ericsson and its similarly situated licensees wanted to specify a royalty that corresponded to the licensee's actual use of the SEPs, the parties could have simply specified a royalty payment structure that would have allowed the royalty payment to vary with the licensee's actual revenue from selling licensed products.³⁵⁶ The plain fact that Ericsson and these licensees agreed upon a license agreement that specified a lump-sum royalty payment structure signals the parties' mutual intention *not* to rely on the licensee's actual use of the licensed technology to determine the effective royalty payment.³⁵⁷

And why might the parties have that contracting preference? Because of the higher transactions costs of enforcing a running royalty, which requires subsequent monitoring and reporting (and, potentially, the licensor's periodic

³⁵⁵ *TCL v. Ericsson*, 2018 WL 4488286, at *40.

³⁵⁶ See Sidak, *How Relevant Is Justice Cardozo's "Book of Wisdom" to Patent Damages?*, *supra* note 339, at 285–87.

³⁵⁷ Judge Richard Posner has explained that contracts allocate risk between parties in an intentional way, and that courts should not change the way in which the risk has been allocated. *Market St. Assocs. Ltd. v. Frey*, 941 F.2d 588, 595 (7th Cir. 1991) (“It is true that an essential function of contracts is to allocate risk, and would be defeated if courts treated the materializing of a bargained-over, allocated risk as a misfortune the burden of which is required to be shared between the parties (as it might be within a family, for example) rather than borne entirely by the party to whom the risk had been allocated by mutual agreement.”).

auditing) of the licensee's actual sales. As I have previously observed, "[a] lump-sum royalty removes the administrative burden and costs of monitoring the actual use of the licensed technology because the royalty payment is independent of the licensee's *actual* sales."³⁵⁸ Furthermore, the licensee might be disinclined to disclose in a contemporaneous manner its actual unit sales or revenues for particular products, since that proprietary information has obvious competitive value and, despite all of the usual representations and warranties of confidentiality, would be revealed to a party in direct communication with the licensee's competitors. Judge Selna did not address these transactions costs of licensing. Instead, by insisting on using actual revenue data to derive the implicit one-way royalty rates for Ericsson's SEPs, Judge Selna disregarded the parties' express intentions not to rely on information concerning the actual use of the patented technology to determine the effective royalty payment that Ericsson would receive.

Perhaps a difference in the effective royalty that similarly situated licensees pay could be relevant if an SEP holder's FRAND contract with ETSI imposed on the SEP holder a duty to ensure that all similarly situated licensees are all paying the same royalty at any given moment in time. Yet, Judge Selna himself concluded that "the concept of 'most favor (sic) nation,' or here 'most favored licensee,' was never part of the ETSI FRAND equation, and in fact was rejected."³⁵⁹ Thus, by Judge Selna's own reasoning, the fact that different licensees could ultimately pay different effective royalties for the same SEP portfolio as a result of the different royalty payment structures that they specified in their respective agreements should not affect the determination of a FRAND royalty for Ericsson's SEP portfolio. Nor should it affect the answer to the anterior question of whether Ericsson discharged its obligation to make a FRAND offer to license its SEP portfolio.

Indeed, in the real world, different licensees might end up paying different effective royalty rates if the parties' mutual expectations at the date of license execution deviate significantly from what actually followed in the years thereafter. However, that difference is irrelevant to whether Ericsson's royalty offers to TCL were FRAND. The relevant inquiry that would reveal whether Ericsson treated TCL differently than another similarly situated licensee is one that Judge Selna never resolved: Did Ericsson offer TCL and its similarly situated licensees both of the following payment options: (1) a running royalty (dependent on actual sales) and (2) a lump-sum royalty based on sales projections at the time of contract execution?³⁶⁰ If so, then all

³⁵⁸ J. Gregory Sidak, *Converting Royalty Payment Structures for Patent Licenses*, 1 CRITERION J. ON INNOVATION 901, 903 (2017) (emphasis in original).

³⁵⁹ *TCL v. Ericsson*, 2018 WL 4488286, at *49.

³⁶⁰ See Sidak, *The Meaning of FRAND, Part I: Royalties*, *supra* note 155, at 999 ("[T]he view of the SSO as a joint venture indicates that 'nondiscriminatory' pricing should mean that each licensee is offered the same menu of licensing options. However, it does not require that all licensees pay the same royalty rate.");

prospective licensees were treated equally in the sense that they all received the same choice. It is not differential treatment, much less discrimination, by the SEP holder if licensees choose among different payment structures that are available to all other similarly situated licensees.

e. Summation

In sum, Judge Selna's reliance on actual revenue from licensed sales to unpack Ericsson's comparable license agreements with licensees similarly situated to TCL contradicted principles of U.S. patent law, contravened basic economic principles, and risks undermining important goals of the Ericsson's FRAND contract with ETSI. Specifically, by using actual revenue data, Judge Selna most likely underestimated the actual implicit one-way royalty that Ericsson's similarly situated licensees agreed to pay for a license to Ericsson's SEP portfolio. Furthermore, he ignored the contractual preferences that induced Ericsson and its similarly situated licensees to structure their licenses with a lump-sum royalty rather than a running royalty—namely, to avoid basing the license compensation on the actual use of the SEPs, which would increase the transaction costs of licensing the SEPs.

2. Judge Selna's Erroneous Rejection of Per-Unit Royalties, Royalty Caps, and Royalty Floors

Judge Selna also “decline[d] to adopt a dollar-per-unit approach in determining FRAND rates” for TCL's use of Ericsson's SEPs.³⁶¹ Instead, he specified the FRAND rates as a percentage of the net selling price of TCL's licensed products—that is, as *ad valorem* royalties.³⁶² In addition, Judge Selna declined to include in the license between Ericsson and TCL any royalty caps or floors that would have acted as upper and lower bounds on the effective per-unit royalty that TCL ultimately would pay Ericsson for each licensed product sold. He reasoned that the use of floors and caps would violate the nondiscrimination requirement of Ericsson's FRAND contract with ETSI.³⁶³ Consequently, when unpacking the license agreements, Judge Selna

Sidak, *Fair and Unfair Discrimination in Royalties for Standard-Essential Patents Encumbered by a FRAND or RAND Commitment*, *supra* note 60, at 365 (“As a general rule, evidence that the SEP holder presented the same menu of royalty options to similarly situated implementers should weigh against a finding of differential treatment.”); Richard J. Gilbert, *Deal or No Deal? Licensing Negotiations in Standard-Setting Organizations*, 77 ANTITRUST L.J. 855, 876 (2011) (emphasizing that, as long as similarly situated implementers can choose among the same license options, the SEP holder's licensing practice should be considered nondiscriminatory).

³⁶¹ *TCL v. Ericsson*, 2018 WL 4488286, at *37.

³⁶² *Id.* at *57 (“TCL shall pay as a percentage of the Net Selling Price . . . the rates set forth in Figure 17.”).

³⁶³ *See, e.g., id.* at *56.

converted the lump-sum payments that Ericsson received pursuant to each comparable license to *ad valorem* royalties.³⁶⁴

However, Judge Selna's reasoning for rejecting per-unit royalties, royalty caps, and royalty floors in the license agreement between Ericsson and TCL finds no support in the evidence presented in his opinion, in Ericsson's FRAND contract with ETSI, or in economic theory more generally. In my experience as an expert economic witness, I have observed many SEP licenses containing royalty caps or floors. It strains credulity that all of those many license agreements violate the nondiscrimination requirement of the FRAND or RAND contract in question. Although the SEP holder and the implementer might agree to an *ad valorem* royalty unconstrained by caps or floors, there are also valid justifications for adopting royalty payment structures that either hold constant the royalty payment for each licensed unit (as a per-unit royalty does) or limit the degree to which the royalty payment can vary across each licensed unit (as an *ad valorem* royalty with caps and floors does). Compelling the SEP holder's use of an *ad valorem* royalty without any cap or floor could both impair access to the standard for implementers and hinder the SEP holder's ability to obtain fair and reasonable compensation for its investment in the standard. Judge Selna provided no valid justification for concluding that an *ad valorem* royalty unconstrained by caps or floors is a superior royalty structure for FRAND-committed SEPs. Therefore, one should question whether it was appropriate for him to unpack the consideration in Ericsson's comparable licenses into one-way *ad valorem* royalties without caps and floors.

a. Judge Selna's Reasoning for Rejecting Per-Unit Royalties, Royalty Caps, and Royalty Floors

For two primary reasons, Judge Selna declined to set a per-unit FRAND royalty or to impose royalty floors and caps in the license between TCL and Ericsson.

First, Judge Selna said that such royalty structures are "at odds with industry practices generally and specifically Ericsson's own past licensing practices."³⁶⁵ In particular, he observed that Ericsson had agreed to adopt *ad valorem* royalties in its licenses with Coolpad, Doro, Huawei, Karbonn, LG, Sharp, and ZTE—although he also concluded elsewhere that Coolpad, Doro, Karbonn, and Sharp were not similarly situated to TCL and, thus, that their licenses were irrelevant for purposes of determining a FRAND royalty for TCL.³⁶⁶ In addition, Judge Selna found that, in its offers to TCL and in its

³⁶⁴ *Id.* at *38 ("[T]he Court will unpack these licenses as . . . a percentage of the net selling price of the licensed devices without a cap or floor.")

³⁶⁵ *Id.* at *37.

³⁶⁶ *Id.* at *31.

responses to TCL's interrogatories, "Ericsson itself has repeatedly reaffirmed that royalties should be a percentage running royalty."³⁶⁷ Thus, he concluded that adopting an *ad valorem* royalty without a cap and floor in Ericsson's license with TCL would conform to industry practice and to Ericsson's own licensing practices.

Second, Judge Selna found that an *ad valorem* royalty, rather than a per-unit royalty or an *ad valorem* royalty with caps and floors, "furthers ETSI's express policy objectives of both rewarding SEP-holders and making their intellectual property available to the public."³⁶⁸ He said that an *ad valorem* royalty "better aligns the incentives of the SEP-holder and the licensee."³⁶⁹ Elsewhere in his opinion, Judge Selna further reasoned that "Ericsson's use of floors in its rate is itself discriminatory."³⁷⁰ He explained that, in the absence of "a credible showing that Ericsson's SEPs add a measurable incremental value" to a licensed product, a per-unit royalty or an *ad valorem* royalty with a cap and floor would inappropriately discriminate among licensees "on the basis of the average selling price where a floor would result in a higher effective rate for lower priced phones."³⁷¹ In effect, Judge Selna concluded that the nondiscrimination component of an SEP holder's FRAND contract with ETSI requires that each licensee pay a royalty that is proportional to the net selling price of its licensed products. The implication of Judge Selna's reasoning is that, if a licensee sells its licensed product for a low price, the FRAND royalty that the licensee must pay for that product should also be proportionally lower relative to licensees that sell expensive phones.

b. Do SEP Holders and Handset Manufacturers Typically Specify Ad Valorem Royalties Without Caps or Floors in Licenses for FRAND-Committed SEPs?

Judge Selna's decision improperly disregarded evidence showing that Ericsson and other SEP holders use a variety of royalty payment structures—including per-unit royalties and *ad valorem* royalties with caps and floors—in their license agreements with handset manufacturers. Indeed, Judge Selna's survey of the evidence on the royalty structures actually used in Ericsson's comparable licenses contradicts his own conclusion elsewhere about per-unit royalties and *ad valorem* royalties with caps and floors. Table 12 summarizes the royalty payment structures in each of Ericsson's comparable license agreements that Judge Selna examined in the public version of his decision.

³⁶⁷ *Id.* at *37.

³⁶⁸ *Id.*

³⁶⁹ *Id.*

³⁷⁰ *Id.* at *56.

³⁷¹ *Id.*

Table 12. Summary of Royalty Payment Structures in Ericsson's Comparable Licenses

Licensee	Royalty Payment Structure*
Apple	Lump-sum royalty ³⁷²
Samsung	Lump-sum royalty; per-unit royalty ³⁷³
Huawei	<i>Ad valorem</i> royalty ³⁷⁴
LG	Lump-sum royalty ³⁷⁵
HTC	Lump-sum royalty ³⁷⁶
ZTE	<i>Ad valorem</i> royalty ³⁷⁷

Note: * Owing to the redactions in Judge Selna's public decision, it is impossible to determine with certainty the royalty payment structures specified in each of Ericsson's comparable licenses. The information in this table is based on representations that Judge Selna made in the public version of his decision.

As Table 12 shows, Judge Selna found that only Ericsson's licenses with Huawei and ZTE specified an *ad valorem* royalty—as opposed to the licenses with Apple, LG, and HTC, which specified a lump-sum royalty, and the license with Samsung, which specified a combination of a lump-sum royalty and a per-unit royalty. He also acknowledged that “Ericsson has in the past entered into some licenses with dollar-per-unit rates or licenses with caps and floors,” although he did not identify the licenses having those royalty structures.³⁷⁸ Therefore, Ericsson's own licensing practices reveal that, contrary to Judge Selna's findings of fact, Ericsson has chosen to use a variety of royalty payment structures in its license agreements for SEPs, not solely an *ad valorem* royalty without a cap or floor.

Furthermore, evidence from the mobile device industry at large indicates that SEP holders commonly adopt fixed royalty payment structures in their licenses. For example, the W-CDMA Patent Pool (which Via Licensing

³⁷² *Id.* at *42 (“Under the 2015 license, Apple agreed to make a one-time payment of [Redacted].”).

³⁷³ *Id.* at *43 (“Under the license, Samsung agreed to make a one-time payment of [Redacted], and annual royalty payments of either a [Redacted] lump sum or per unit royalties of [Redacted] per unit (2G), [Redacted] per unit [Redacted] (3G) and per unit (4G).”).

³⁷⁴ *Id.* at *44 (“The arbitrators determined that Huawei would pay running percentage royalty rates of [Redacted] for 2G and multi-mode 3G, and [Redacted] for multi-mode 4G.”).

³⁷⁵ *Id.* at *45 (“Pursuant to the license, LG agreed to (a) make cash payments of [Redacted] to Ericsson, plus additional cash royalties in the event that LG's sales exceeded specified thresholds, as consideration for a license under Ericsson's SEPs.”).

³⁷⁶ *Id.* at *46 (“Under this agreement, Ericsson and HTC provided each other with worldwide licenses to their respective patents necessary to comply with the 2G, 3G, CDMA, WiFi, and/or 4G standards, Ericsson provided a release for HTC's unlicensed 2014 sales, and HTC paid Ericsson [Redacted].”).

³⁷⁷ *Id.* at *48 (noting that one of the ZTE agreements specifies “express percentage rates for 3G units of [Redacted], and [Redacted] devices with pass-through rights”).

³⁷⁸ *Id.*

acquired in 2017³⁷⁹) had offered as of 2009 to license its W-CDMA SEP portfolio for either an *ad valorem* royalty with a royalty floor or a fixed per-unit royalty.³⁸⁰ Similarly, Via Licensing offers to license its LTE SEPs in exchange for per-unit royalties.³⁸¹ Moreover, in *Microsoft v. Motorola*, Judge Robart determined a per-unit royalty with caps and floors for a license to Motorola's Advanced Video Coding and Wi-Fi SEPs, which the Ninth Circuit affirmed.³⁸² Thus, evidence from the mobile device industry contradicts Judge Selna's finding that a per-unit royalty or an *ad valorem* royalty with caps and floors contravenes existing practice.

c. *Does the Use of Per-Unit Royalties, Royalty Caps, and Royalty Floors Promote the Goals of an SEP Holder's FRAND Contract with ETSI?*

From an economic perspective, it is incorrect to conclude (as Judge Selna did) that an SEP holder and a given licensee must use an unconstrained *ad valorem* royalty when executing a license for FRAND-committed SEPs. Depending on the circumstances of each case, both the SEP holder and the implementer might have legitimate business justifications for adopting either a per-unit royalty or an *ad valorem* royalty with a cap and floor.³⁸³ (Put differently, as an economic matter there is no *a priori* reason why an SEP holder and ETSI would agree to ban, in their FRAND contract, the SEP holder's use of such a royalty structure in its licenses with implementers.) A per-unit royalty ensures that the licensee's royalty payment positively correlates with the volume of licensed sales.³⁸⁴ Furthermore, if the SEP holder and the implementer wish to specify an *ad valorem* royalty, but they are uncertain whether the selling price of the licensed product will drastically change during the term of the

³⁷⁹ Press Release, Via Licensing, Via Takes Over Administration of W-CDMA Patent Pool (Mar. 7, 2017), <http://www.via-corp.com/newsdetail.aspx?id=2226>.

³⁸⁰ WORLD INTELLECTUAL PROPERTY ORGANIZATION, STANDING COMMITTEE ON THE LAW OF PATENTS 36 (Feb. 18, 2009), https://www.wipo.int/edocs/mdocs/scp/en/scp_13/scp_13_2.pdf (showing that for the W-CDMA Patent Pool, an example royalty is the "lower of (i) 1.5% of the net selling price per unit with a minimum of US\$1.50 or (ii) US\$3.00 per unit for W-CDMA terminal product.").

³⁸¹ *LTE License Fees*, VIA LICENSING, <http://www.via-corp.com/us/en/licensing/lte/licensefees.html>.

³⁸² *Microsoft Corp. v. Motorola, Inc.*, No. C10-1823, 2013 WL 2111217, at *101 (W.D. Wash. Apr. 25, 2013), *aff'd*, 795 F.3d 1024 (9th Cir. 2015) ("The RAND royalty rate for Motorola's H.264 SEP portfolio is 0.555 cents per unit; the upper bound of a RAND royalty for Motorola's H.264 SEP portfolio is 16.389 cents per unit; and the lower bound is 0.555 cents per unit."); *id.* ("The RAND royalty rate for Motorola's 802.11 SEP portfolio is 3.471 cents per unit; the upper bound of a RAND royalty for Motorola's 802.11 SEP portfolio is 19.5 cents per unit; and the lower bound is 0.8 cents per unit.").

³⁸³ See, e.g., J. Gregory Sidak, *Is a FRAND Royalty a Point or a Range?*, 2 CRITERION J. ON INNOVATION 401, 416-17 (2017) (explaining why different licensees might prefer different royalty payment structures depending on the licensee's aversion to risk).

³⁸⁴ See Sidak, *Converting Royalty Payment Structures for Patent Licenses*, *supra* note 358, at 903 ("When a license specifies a per-unit royalty, the royalty payment is dependent on and positively correlated with the number of shipped units—that is, the volume of patent-practicing products that the licensee sells during the term of the license agreement. . . . However, unlike a royalty rate, a per-unit royalty is independent of changes in the sales price of the patent-practicing product.").

license, then royalty floors and caps ensure that, even in the event of unexpected price changes, the SEP holder will receive compensation that reflects the value of its patented technology. The royalty cap and floor set an upper bound and a lower bound on the effective per-unit royalty that the licensee pays.³⁸⁵

Judge Selna said that the use of royalty floors specifically discriminated against firms that charge low prices for their mobile devices.³⁸⁶ That finding is not persuasive. From an economic perspective, it is unremarkable for a licensee that sells cheap handsets to pay a higher royalty (as a percentage of the average selling price) than a licensee that sells expensive handsets. A phone sold for a price of \$1000 most likely includes additional non-standardized features that add value to the handset, such as a high definition camera, facial recognition technology, and an OLED display. In contrast, a phone sold for \$100 most likely includes only a few non-standardized features in addition to the connectivity offered by the standard. As Ericsson observed in its brief to the Federal Circuit, “[m]akers of cheaper phones like TCL, Coolpad, and Karbonn pay higher percentage rates . . . because Ericsson’s technology represents a higher percentage of the value of their phones, and a lower percentage of the value of premium phones.”³⁸⁷ This reasoning is sound. In contrast, Judge Selna’s finding that royalty floors are discriminatory is erroneous as a matter of economic reasoning.

In addition, Judge Selna’s interpretation that the nondiscrimination component of Ericsson’s FRAND contract with ETSI precludes the use of royalty floors could, if widely adopted, harm the standard-setting process and undermine other goals of ETSI’s FRAND contract.³⁸⁸ For example, forcing the parties to structure the royalty payment around an *ad valorem* royalty without a cap and a floor could hinder access to the standard.³⁸⁹ Suppose a given licensee of LTE SEPs offers only luxury handsets and correspondingly charges extremely high prices for its products. Suppose further that the handset’s high price is unrelated to the functionality of the SEPs practiced in the LTE standard but merely reflects the licensee’s strong brand and the expensive non-standardized components—like a high-quality camera lens or

³⁸⁵ See *id.* at 907.

³⁸⁶ TCL Commc’n Tech. Holdings, Ltd. v. Telefonaktiebolaget LM Ericsson, Nos. SACV 14-341 JVS, CV 15-2370 JVS, 2018 WL 4488286, at *56 (C.D. Cal. Sept. 14, 2018).

³⁸⁷ Ericsson’s Appellate Brief, *supra* note 120, at *66.

³⁸⁸ In the United Kingdom, the Court of Appeal of England and Wales recognized in *Unwired Planet* that “a non-discrimination rule has the potential to harm the technological development of standards if it has the effect of compelling the SEP owner to accept a level of compensation for the use of its invention which does not reflect the value of the licensed technology.” *Unwired Planet Int’l Ltd v. Huawei Techs. Co.* [2018] EWCA (Civ) 2344 [198] (Eng.); see also Sidak, *Why Unwired Planet Might Revolutionize the Resolution of FRAND Licensing Disputes*, *supra* note 222, at 673–75.

³⁸⁹ Cf. Sidak, *The Meaning of FRAND, Part II: Injunctions*, *supra* note 18, at 209 (“One of the primary purposes of a FRAND contract is to ensure an implementer’s access to the patented standard-essential technology.”).

OLED display—that the licensee incorporates in its handsets. In that case, calculating that licensee’s royalty payment as a percentage of the uncapped price of its licensed products would overcompensate the SEP holder for its standard-essential technology. Thus, an unconstrained *ad valorem* royalty could force the implementer to pay a royalty that exceeds the value of the SEPs. In the long run, such an outcome could both hinder the licensee’s ability to access the standard and potentially undermine the success of the standard.

Similarly, requiring an SEP holder to charge an *ad valorem* royalty without a *floor* could prevent an SEP holder from obtaining licensing compensation that maintains its incentive to continue contributing its valuable patented technology to future standards. ETSI’s IPR policy states as one of three policy objectives that “IPR holders . . . should be adequately and fairly rewarded for the use of their IPRs in the implementation of” ETSI’s standards.³⁹⁰ A royalty floor ensures that the SEP holder obtains a minimum amount of compensation for each licensed product, regardless of its selling price. Gustav Brismark, Ericsson’s head of IPR and licensing, testified during the bench trial in *TCL v. Ericsson* that “Ericsson seeks to apply a floor to its license agreements so that it can obtain a certain minimum amount of revenue for itself.”³⁹¹ Without a royalty floor, the SEP holder might fail to recoup its investment in the standard.³⁹² Suppose a licensee sells some of its licensed handsets for a price of zero (perhaps because the licensee gives away its handset to consumers and attempts to sell them complementary services instead). In that case, an *ad valorem* royalty without a floor would result in a royalty of \$0 for the SEP holder, thereby failing to provide *any* compensation to the SEP holder. Thus, an *ad valorem* royalty without a floor could fail to compensate the SEP holder for its investment in the standard.

In sum, Judge Selna erroneously concluded that only an *ad valorem* royalty unconstrained by caps and floors was appropriate for the license agreement between Ericsson and TCL, negotiated pursuant to Ericsson’s FRAND contract with ETSI. However, the reasoning that Judge Selna presented in his public decision does not support his selection of that royalty structure. Thus, it is questionable whether Judge Selna was correct to unpack the consideration exchanged in each of Ericsson’s comparable licenses into an unconstrained *ad valorem* royalty, rather than into an *ad valorem* royalty with

³⁹⁰ ETSI IPR Policy, *supra* note 41, § 3.2, at 38.

³⁹¹ *TCL v. Ericsson*, 2018 WL 4488286, at *37.

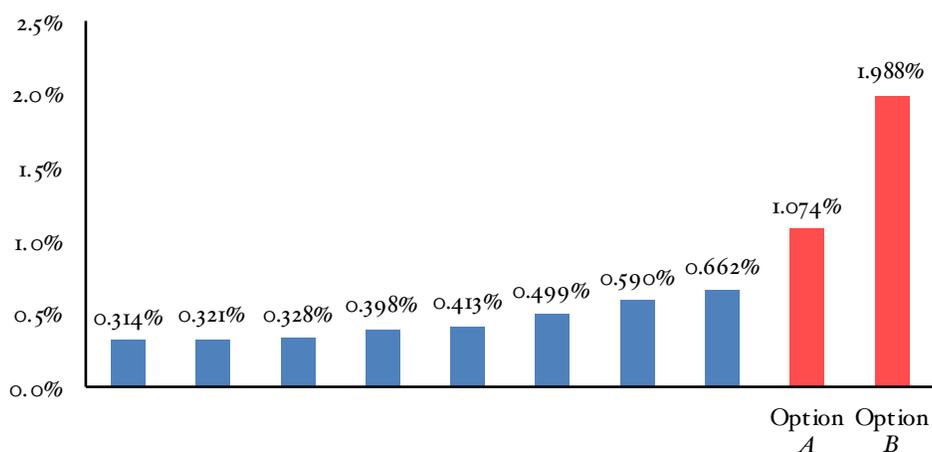
³⁹² See Sidak & Skog, *Hedonic Prices and Patent Royalties*, *supra* note 178, at 659 (“In expected-value terms, a participant in standard setting must earn a competitive risk-adjusted return on its investment.”); Sidak, *Tournaments and FRAND Royalties*, *supra* note 157, at 107 (“Without a prize, there would be no incentive for anyone to participate in the tournament given the cost of participating. Because the tournament’s organizer must create such an incentive, the tournament’s prize necessarily must be nonzero. The expected payoff for a participant must exceed the cost of participation.”).

caps and floors or a per-unit royalty. Furthermore, his subsequent reliance on those unconstrained *ad valorem* rates to determine a FRAND royalty for TCL indicates that he might have awarded Ericsson FRAND royalties that are not sufficiently tied to the value of Ericsson's SEPs.

D. Judge Selna's Conclusion That Ericsson's Offers to TCL Were Discriminatory

After unpacking the relevant license agreements, Judge Selna compared the 4G royalty rates that he derived from Ericsson's comparable licenses with the royalty rates that he derived from unpacking Ericsson's Option *A* and Option *B*. Figure 6 replicates Judge Selna's comparison.

Figure 6. Replication of Judge Selna's Comparison of 4G Royalty Rates Derived from Comparable License Agreements and 4G Royalty Rates Implied in Ericsson's Offers



Source: *TCL v. Ericsson*, 2018 WL 4488286, at *50.

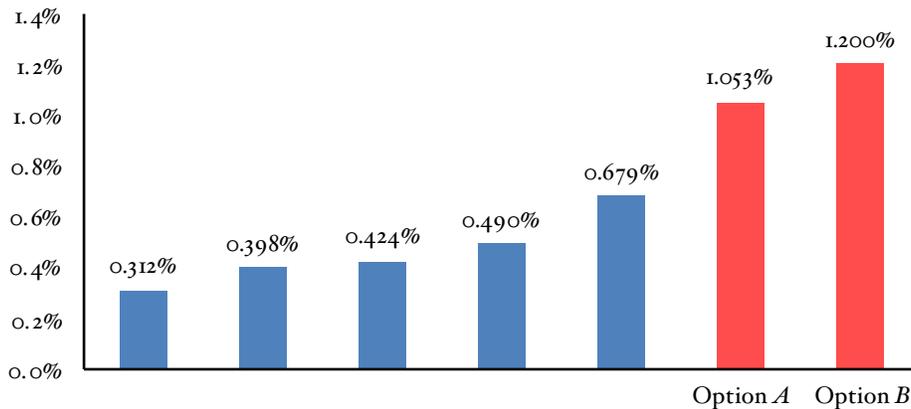
Note: Judge Selna did not present the different royalty rates in ascending order. Owing to redactions in his opinion, it is not possible to ascertain his reasoning for ordering the royalty rates in the way that he did. For ease of inspection, I have arranged the royalty rates in ascending order.

On the basis of the comparison shown in Figure 6, Judge Selna concluded that Ericsson's offers to TCL were discriminatory, because the 4G royalty rates that he derived from unpacking Option *A* and Option *B* substantially exceeded the rates that he derived from Ericsson's comparable license agreements. It bears emphasis that, although Judge Selna derived seven estimates of 4G royalty rates from three Ericsson license agreements—the LG license, the HTC license, and the Samsung license—and two estimates of "benchmark" 4G royalty rates from Ericsson license agreements with Apple and Huawei (for a total of nine royalty rates), he compared Ericsson's offers to TCL with only eight estimates. Because Judge Selna masked the licensee

that corresponds to each royalty rate in his public decision, it is unclear which one of the nine royalty rates he excluded and why.

Judge Selna also compared the 3G royalty rates that he obtained from unpacking licenses between Ericsson and third parties with the royalty rates that he derived from Ericsson's offers to TCL. Figure 7 again replicates Judge Selna's comparison.

Figure 7. Replication of Judge Selna's Comparison of 3G Royalty Rates Unpacked from Comparable License Agreements and 3G Royalty Rates Implied in Ericsson's Offers



Source: *TCL v. Ericsson*, 2018 WL 4488286, at *50.

Note: Judge Selna did not present the different royalty rates in ascending order. Owing to redactions in his opinion, it is not possible to ascertain his reasoning for ordering the royalty rates in the way that he did. For ease of inspection, I have arranged the royalty rates in ascending order.

As Figure 7 shows, the 3G royalty rates that Judge Selna derived from unpacking Option A and Option B substantially exceeded the 3G royalty rates that he derived from Ericsson's comparable license agreements. As in Figure 7, Judge Selna derived five estimates of 3G royalty rates from two Ericsson license agreements (the HTC license and the Samsung license) and one estimate of a "benchmark" 3G royalty rate from Ericsson's license with Huawei, but he compared Ericsson's offers to TCL with only five estimates. Again, because Judge Selna masked the licensee that corresponds to each royalty rate in his public decision, it is unclear which one of the six royalty rates he excluded and why.

Judge Selna observed that Ericsson's offered royalty rates in Option A and Option B were "radically divergent from the rates which Ericsson agreed to accept from licensees similarly situated to TCL,"³⁹³ and he concluded that Ericsson's offers to TCL were discriminatory.³⁹⁴ However, one could reach a

³⁹³ *TCL v. Ericsson*, 2018 WL 4488286, at *50.

³⁹⁴ *Id.*

different conclusion by correcting Judge Selna's errors in (1) identifying the relevant license agreements and (2) unpacking those license agreements.

V. JUDGE SELNA'S DETERMINATION OF A FRAND ROYALTY FOR ERICSSON'S SEP PORTFOLIO

After finding that Ericsson's offers to TCL were not FRAND, Judge Selna proceeded to determine a FRAND royalty for TCL's license to Ericsson's SEP portfolio. He did so by comparing the royalties derived from the top-down analysis with the royalties obtained from unpacking the comparable licenses that Ericsson had executed with third-party smartphone manufacturers.³⁹⁵ However, it is unclear how Judge Selna ultimately reached his conclusions about a FRAND royalty for a license to Ericsson's SEP portfolio. Notably, Judge Selna found that TCL should pay a lower royalty for a license to Ericsson's 3G SEP portfolio relative to other licensees, but he never explained why that price differential should not be considered discriminatory under his own interpretation of the nondiscrimination requirement in an SEP holder's FRAND contract with ETSI.

A. Judge Selna's Conversion of Global Rates into U.S. Rates

Judge Selna observed that the rates he derived from unpacking Ericsson's comparable license agreements were royalty rates for a license to Ericsson's global SEP portfolio. In contrast, the rates calculated using the top-down approach were royalty rates strictly for Ericsson's U.S. SEP portfolio.³⁹⁶ Therefore, to compare his top-down rates with his comparable license rates, Judge Selna first converted the global rates obtained from unpacking comparable license agreements into U.S. rates.³⁹⁷ To perform that conversion, he relied upon estimates of the "strength" of Ericsson's SEP portfolio in the United States and in the rest of the world, which I have examined in Part II.B.5.

1. Methodology

Judge Selna began his conversion of the global royalty rates into U.S. rates with the proposition that the value of a global license to Ericsson's SEP portfolio (V_G) equals the sum of the value of a license to Ericsson's U.S. SEPs (V_{US})

³⁹⁵ *Id.* at *50.

³⁹⁶ *Id.*

³⁹⁷ *Id.* at *51.

and the value of a license to Ericsson's SEPs in the rest of the world (V_{RoW}), as expressed in Equation 5:³⁹⁸

$$V_G = V_{US} + V_{RoW} \quad (5)$$

He then observed that the value of any given license (V) equals the product of the specified one-way royalty rate (r) and the licensee's revenue from sales of devices practicing the relevant standards (L), as expressed in Equation 6:³⁹⁹

$$V = r \times L. \quad (6)$$

Judge Selna then combined Equation 5 and Equation 6 to derive Equation 7:⁴⁰⁰

$$r_G \times L_G = (r_{US} \times L_{US}) + (r_{RoW} \times L_{RoW}), \quad (7)$$

where the product of a royalty rate for a license to Ericsson's global portfolio (r_G) and the licensee's global revenue (L_G) equals the sum of (1) the product of the royalty rate for a license to Ericsson's U.S. portfolio (r_{US}) and the licensee's revenue in the United States (L_{US}) and (2) the product of a rate for the rest of the world (r_{RoW}) and the licensee's revenue in the rest of the world (L_{RoW}).

Next, as I explained in Part II.B.5.a, Judge Selna said that the royalty rate for a license to Ericsson's SEP portfolio outside the United States would equal at least the royalty rate for a license to Ericsson's SEP portfolio in China. Relying on the opinion of Dr. Leonard, TCL's economic expert, Judge Selna found that the value of Ericsson's 4G SEP portfolio in China is 69.80 percent of the value of Ericsson's 4G SEP portfolio in the United States.⁴⁰¹ Thus, Judge Selna used the product of (1) the U.S. rate (r_{US}) and (2) the relative strength of Ericsson's 4G SEP portfolio in China (that is, 0.6980) as a proxy for a royalty rate that a licensee would pay for a license to Ericsson's SEP portfolio outside the United States (r_{RoW}), as Equation 8 shows:

$$r_G \times L_G = (r_{US} \times L_{US}) + [(r_{US} \times 0.6980) \times L_{RoW}]. \quad (8)$$

Judge Selna then rearranged Equation 8 to derive a royalty rate for a license to Ericsson's U.S. SEP portfolio, as Equation 9 shows:

$$r_{US} = (r_G \times L_G) \div [L_{US} + (0.6980 \times L_{RoW})]. \quad (9)$$

³⁹⁸ *Id.* at *50 (“[T]he global value of a 4G license equals the value of the license in the U.S. plus the value of the license outside the U.S.”).

³⁹⁹ *Id.*

⁴⁰⁰ *Id.*

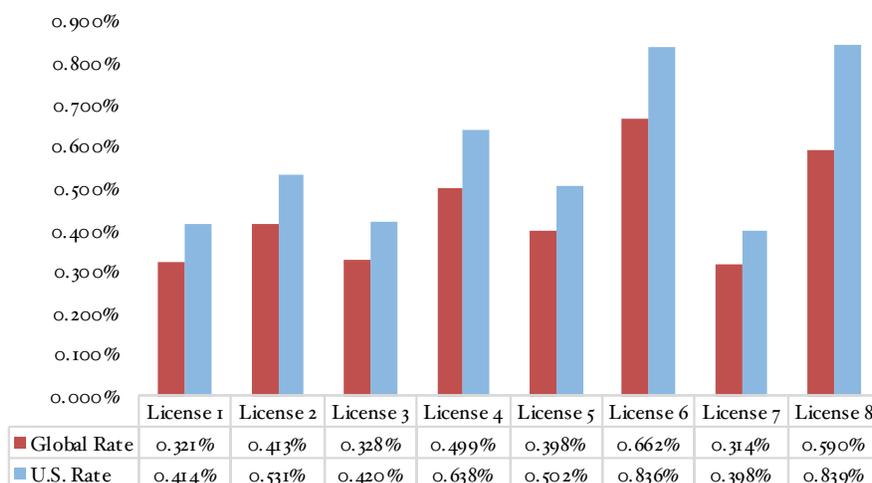
⁴⁰¹ *Id.*

After identifying an equation for converting a global rate to a U.S. rate (r_{US}), Judge Selna said that the court used data from IDC to determine “each licensee’s proportion of sales in the United States.”⁴⁰² In other words, the court used the IDC data to estimate the values of L_{US} (as well as L_G and L_{RoW}). On the basis of those values, Judge Selna converted the royalty rates for a license to Ericsson’s global SEP portfolio derived from comparable license agreements into royalty rates for a license to Ericsson’s U.S. SEP portfolio.

2. Results

Figure 8 summarizes Judge Selna’s findings regarding the implied rates for Ericsson’s U.S. 4G SEP portfolio contained in the eight comparable license agreements that Ericsson had executed with third parties.

Figure 8. Judge Selna’s Calculated Global and U.S. Rates for Ericsson’s 4G Portfolio



Source: *TCL v. Ericsson*, 2018 WL 4488286, at *51.

As Figure 8 illustrates, Judge Selna found that the royalty rates for a license to Ericsson’s U.S. 4G SEP portfolio derived from comparable licenses ranged from 0.398 percent to 0.839 percent of the licensee’s revenue. As Judge Selna noted, he found that the royalty rate for a license to Ericsson’s U.S. 4G SEP portfolio would be, on average, 30.35 percent higher than the rate for a global license to Ericsson’s 4G SEPs.⁴⁰³ (Because the global rate for a license to Ericsson’s SEP portfolio is a blend of a U.S. rate and a lower rate in other

⁴⁰² *Id.* at *51.

⁴⁰³ *Id.*

jurisdictions where Ericsson holds a weaker SEP portfolio, the rate for a global license to Ericsson's 4G SEP portfolio is necessarily lower than the rate for a U.S.-only license to Ericsson's 4G SEP portfolio.)

Judge Selna also converted the global rates for Ericsson's 3G SEP portfolio into U.S. rates. Although in the context of 4G patents he distinguished only between Ericsson's SEP portfolio in the United States and Ericsson's SEP portfolio in the rest of the world, when analyzing the 3G patents, Judge Selna also examined the relative strength of Ericsson's 3G SEP portfolio in Europe.⁴⁰⁴ As I explained in Part II.B.5.a, he found that the value of Ericsson's 3G SEP portfolio in Europe equaled 87.90 percent of the value of Ericsson's 3G SEP portfolio in the United States, and that the value of Ericsson's 3G SEP portfolio in China equaled 74.80 percent of the value of Ericsson's 3G SEP portfolio in the United States.⁴⁰⁵ However, Judge Selna did not explain how those findings affected the formula in Equation 9 (which did not contain any variable specific to Europe). He merely said that, because the court did not have data on sales in Europe for Samsung, Huawei, or HTC, he multiplied the 3G global rates by a factor of 1.25 to estimate a U.S. rate for Ericsson's 3G SEP portfolio.⁴⁰⁶ In other words, Judge Selna assumed that the royalty rate for a license to Ericsson's U.S. SEP portfolio should be 25 percent higher than the global rate. He did not provide any explanation for why a factor of 1.25 was appropriate.⁴⁰⁷

Figure 9 summarizes Judge Selna's findings regarding the U.S. rates for Ericsson's 3G SEP portfolio contained in the five license agreements that Ericsson had executed with third parties.

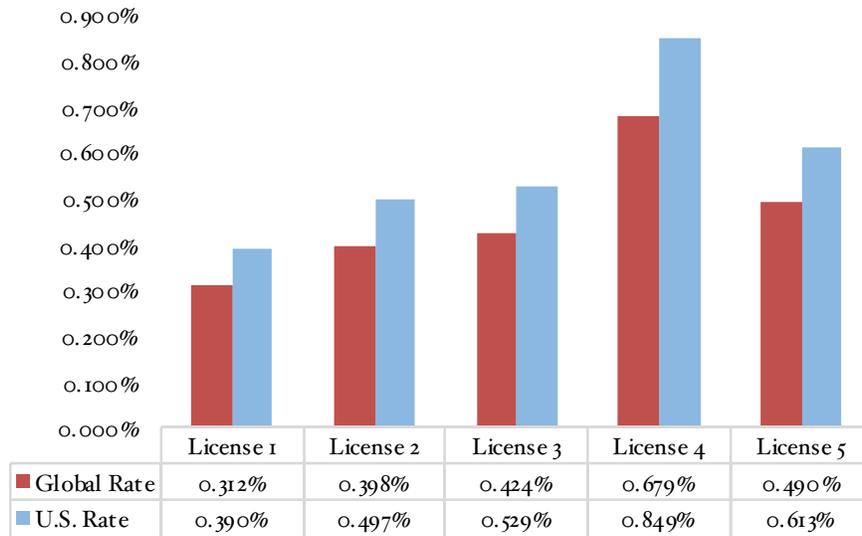
⁴⁰⁴ *Id.*

⁴⁰⁵ *Id.*

⁴⁰⁶ *Id.*

⁴⁰⁷ *Id.*

Figure 9. Judge Selna's Calculated Global and U.S. Rates for Ericsson's 3G SEP Portfolio



Source: *TCL v. Ericsson*, 2018 WL 4488286, at *51.

As Figure 9 shows, Judge Selna found that the royalty rate for Ericsson's U.S. 3G SEP portfolio ranged from 0.390 percent to 0.849 percent of the licensee's revenue from sales of devices implementing the 3G standard.⁴⁰⁸

Judge Selna said that he "could not reliably unpack 2G rates from any comparable licenses."⁴⁰⁹ In other words, he did not derive a royalty for a license to Ericsson's 2G SEP portfolio from comparable license agreements. Consequently, Judge Selna did not convert any royalty rate for Ericsson's 2G SEP portfolio. Instead, he determined a royalty for Ericsson's U.S. 2G SEP portfolio relying exclusively on the top-down analysis.

B. Judge Selna's Methodology for Determining a FRAND Royalty Rate for Ericsson's 4G and 3G U.S. SEP Portfolios

Judge Selna determined a royalty rate for a license to Ericsson's 3G and 4G SEP portfolios by comparing (1) the royalties obtained from unpacking comparable license agreements that Ericsson had executed with third parties with (2) the royalties obtained from his top-down calculation. However, a close examination of Judge Selna's calculation of FRAND royalties reveals that he committed material errors that compromise the results of his analysis.

⁴⁰⁸ *Id.*

⁴⁰⁹ *Id.* at *52.

Furthermore, even if one ignores those errors, the analysis that Judge Selna disclosed in his decision does not support his conclusion that 0.45 percent is an appropriate FRAND royalty rate for Ericsson's U.S. 4G SEP portfolio and that 0.30 percent is an appropriate FRAND royalty rate for Ericsson's U.S. 3G SEP portfolio.

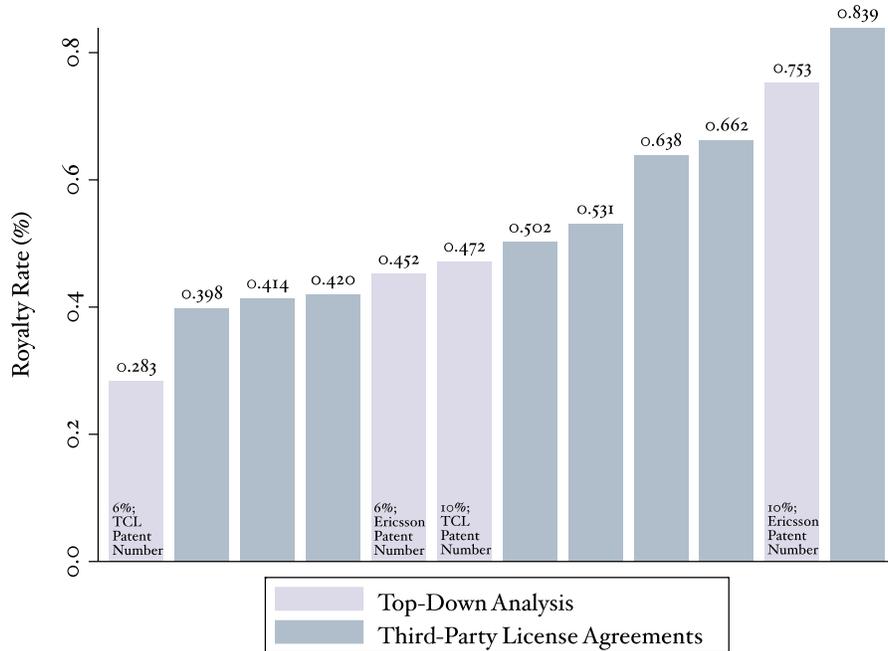
1. A FRAND Royalty Rate for Ericsson's U.S. 4G SEP Portfolio

Judge Selna first determined a royalty rate for a license to Ericsson's U.S. 4G SEP portfolio. He produced twelve estimates of a FRAND royalty rate for a license to Ericsson's U.S. 4G SEP portfolio: (1) eight estimates from his unpacking of the comparable license agreements that Ericsson had executed with third parties and (2) four estimates from the top-down analysis.⁴¹⁰ Judge Selna computed these top-down rates using (1) the two different estimates of the number of patents that Ericsson and TCL considered to be essential to 4G and (2) the total aggregate royalty for 4G SEPs that TCL and Ericsson had derived (6 percent and 10 percent, respectively).⁴¹¹ Those estimates of a royalty rate ranged from 0.283 percent to 0.839 percent of the licensee's revenue from the practicing device, as Figure 10 shows.

⁴¹⁰ *Id.* at *51.

⁴¹¹ *Id.*

Figure 10. Judge Selna's Estimates of a FRAND Royalty Rate for Ericsson's U.S. 4G SEP Portfolio



Source: *TCL v. Ericsson*, 2018 WL 4488286, at *51.

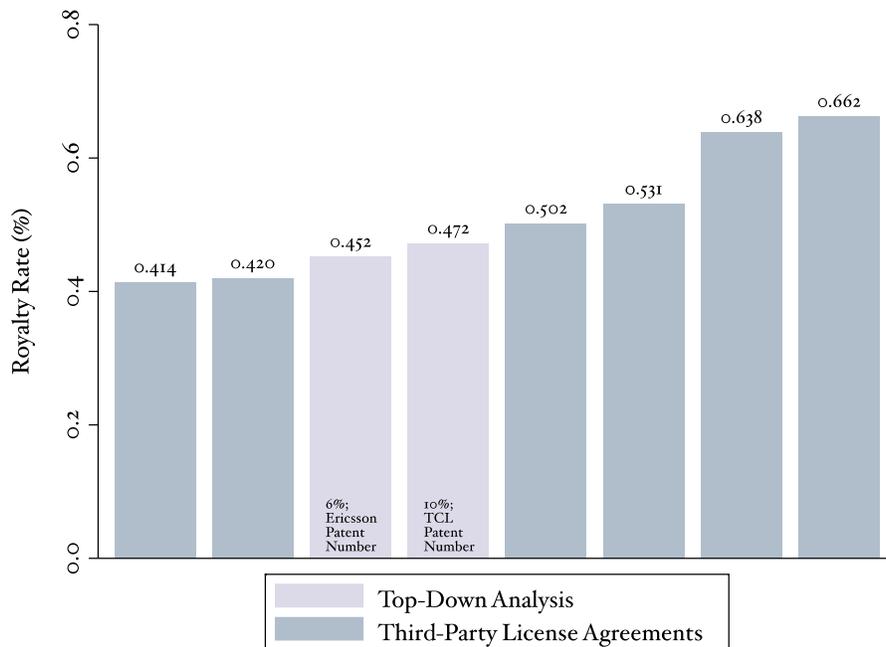
Referring to Figure 10, Judge Selna remarked that “the comparable licenses and top down analysis act as a reasonable check on each other, with the top two rates and bottom two rates each containing one result from each analysis.”⁴¹² In other words, Judge Selna found that the royalties obtained from unpacking comparable license agreements showed that the results of the top-down analysis were reliable, and vice versa.

To “narrow down the data,” Judge Selna then eliminated “the top two and the bottom two results to determine the central data points for a FRAND rate for Ericsson’s [U.S.] 4G SEP portfolio.”⁴¹³ Unfortunately, he did not explain why it was necessary to “narrow down” the observations obtained from comparable licenses and the top-down analysis. Figure 11 shows the remaining eight data points upon which Judge Selna relied to determine a FRAND royalty rate for Ericsson’s U.S. 4G SEPs.

⁴¹² *Id.*

⁴¹³ *Id.*

Figure 11. Judge Selna's Remaining Estimates of a FRAND Royalty Rate for Ericsson's U.S. 4G Portfolio After "Narrowing Down" the Observations



Source: *TCL v. Ericsson*, 2018 WL 4488286, at *51.

Referring to the estimated royalty rates reported in Figure 11, Judge Selna said that, “with abundant and largely congruent data before the Court, the Court finds that 0.45% is an appropriate FRAND [rate] for Ericsson’s 4G SEP portfolio in the United States.”⁴¹⁴ He then multiplied that rate by 69.8 percent to derive a FRAND royalty rate for a license to Ericsson’s 4G SEP portfolio outside the United States.⁴¹⁵ (As I explained in Part II.B.5.a, Judge Selna found that the value of Ericsson’s Chinese 4G SEP portfolio was only 69.8 percent of the value of Ericsson’s U.S. 4G SEP portfolio and thus supported a lower royalty for a license outside the United States.) He concluded that a FRAND royalty rate for a license to Ericsson’s 4G SEP portfolio outside the United States would equal 0.314 percent (that is, 0.45% × 69.8%).⁴¹⁶

Judge Selna did not explicitly say what royalty base he used. He did not say whether the royalty rates of 0.45 percent and 0.314 percent would apply to (1) some measure of the licensee’s revenue, (2) some measure of the average

⁴¹⁴ *Id.*

⁴¹⁵ *Id.* at *25.

⁴¹⁶ *Id.* at *51.

selling price of the licensee's phones, or (3) some other royalty base. However, because Ericsson presented its offers to TCL as percentages of the net selling price of TCL's phones, I infer that Judge Selna used a practicing device's net selling price as the royalty base for his calculation. That inference comports with Judge Selna's remark, at the end of his decision, that TCL shall pay the determined FRAND royalty rates as a percentage of the "Net Selling Price" of its products.⁴¹⁷

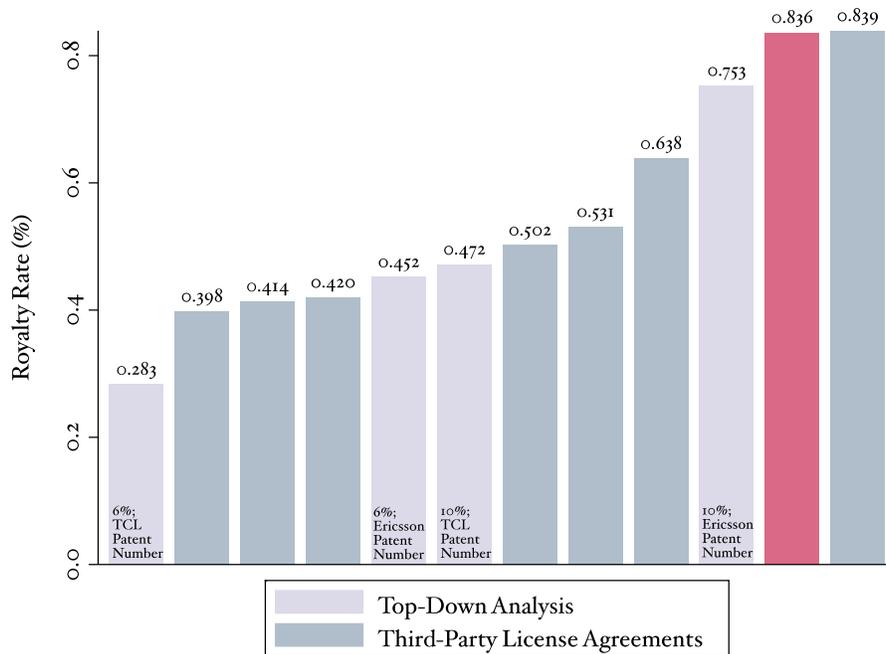
Unfortunately, Judge Selna's determination of a FRAND royalty rate for Ericsson's U.S. 4G SEP portfolio contains an incorrect input. None of the eight license agreements that Judge Selna unpacked provided a royalty rate of 0.662 percent for a license to Ericsson's U.S. 4G SEP portfolio. One license for Ericsson's *global* portfolio produced such a royalty rate.⁴¹⁸ As explained in Part V.A.2 (and as shown in Figure 12), Judge Selna found that the implied U.S. royalty rate in that license was 0.836 percent. Hence, it appears that Judge Selna committed an error of transcription or transposition: he mistakenly used as one of the inputs for his final determination a global rate, rather than a U.S. rate. Instead of relying on a royalty rate of 0.662 percent, Judge Selna should have relied on the royalty rate of 0.836 percent.

After one corrects for that error, it is evident that the U.S. royalty rate corresponding to that license would have been the second-highest implied royalty rate among all twelve observations, as Figure 12 shows.

⁴¹⁷ *Id.* at *57.

⁴¹⁸ *Id.* at *51.

Figure 12. Corrected Estimates of a FRAND Royalty Rate for Ericsson's U.S. 4G SEP Portfolio



Source: *TCL v. Ericsson*, 2018 WL 4488286, at *51.

Figure 12 reveals that the error of transcription or transposition that Judge Selna committed affects two aspects of his unexplained decision to exclude the two royalty rates at the top and bottom of the range of royalty rates that he derived. First, Judge Selna's observation that the top two rates and bottom two rates each contained one result from the comparable licenses analysis and one result from the top-down analysis no longer holds after one corrects his mistake.⁴¹⁹ Second, as I will explain presently, Judge Selna's computation of the average royalty rate of his winnowed data set does not hold, whether one corrects his mistake or not.

Even if one ignores his use of an incorrect input, Judge Selna did not clarify how his analysis supported the conclusion that a rate of 0.45 percent was the correct FRAND rate for Ericsson's 4G SEP portfolio in the United States. The average rate of the eight royalty observations that Judge Selna obtained after excluding the two highest and lowest rates is 0.511 percent,⁴²⁰ whereas the median rate of those eight observations is 0.487 percent. (The

⁴¹⁹ *Id.*

⁴²⁰ That is, $(0.414 + 0.420 + 0.452 + 0.472 + 0.502 + 0.531 + 0.638 + 0.662) \div 8 = 0.511$.

average rate of all twelve observations is even higher—0.530 percent.⁴²¹ Given those observations, it is unclear why Judge Selna concluded that a rate of 0.45 percent was FRAND for a license to Ericsson’s U.S. 4G SEP portfolio. That conclusion certainly does not follow from any statistical measure of central tendency.⁴²² In addition, after one corrects Judge Selna’s error in using the global rate (rather than the derived U.S. rate) of one of the comparable licenses, the average rate of the eight observations after excluding the two highest and lowest rates rises to 0.523 percent.⁴²³ Similarly, the average rate of all twelve observations after correcting for Judge Selna’s error rises to 0.545 percent.⁴²⁴

Table 13 summarizes the mean and median values of Judge Selna’s estimates for Ericsson’s 4G U.S. SEP portfolio.

Table 13. Mean and Median Values of Judge Selna’s Estimates of a FRAND Royalty Rate for Ericsson’s 4G U.S. SEP Portfolio

Estimates	Mean	Median
Judge Selna’s Original Estimates (12 data points)	0.530%	0.487%
Judge Selna’s Narrowed Estimates (8 data points)	0.511%	0.487%
Correction of Judge Selna’s Estimates (12 data points)	0.545%	0.487%
Corrected and Narrowed Estimates (8 data points)	0.523%	0.487%

Source: *TCL v. Ericsson*, 2018 WL 4488286, at *51.

As Table 13 shows, each of the mean and median values of Judge Selna’s estimates and the corrected versions of his estimates exceeds 0.45 percent. Thus, if central tendency in a statistical sense is relevant to the legal conclusion as to what the evidence properly reveals to be a FRAND royalty rate, the analysis that Judge Selna discloses in his decision fails to support his conclusion that 0.45 percent is an appropriate FRAND royalty rate for Ericsson’s U.S. 4G SEP portfolio.

⁴²¹ That is, $(0.283 + 0.398 + 0.414 + 0.420 + 0.452 + 0.472 + 0.502 + 0.531 + 0.638 + 0.662 + 0.753 + 0.839) \div 12 = 0.530$.

⁴²² For a representative explanation of the statistical concept of central tendency, see JEFFREY M. WOOLRIDGE, *INTRODUCTORY ECONOMETRICS: A MODERN APPROACH* 672–76 (South-Western College 2000).

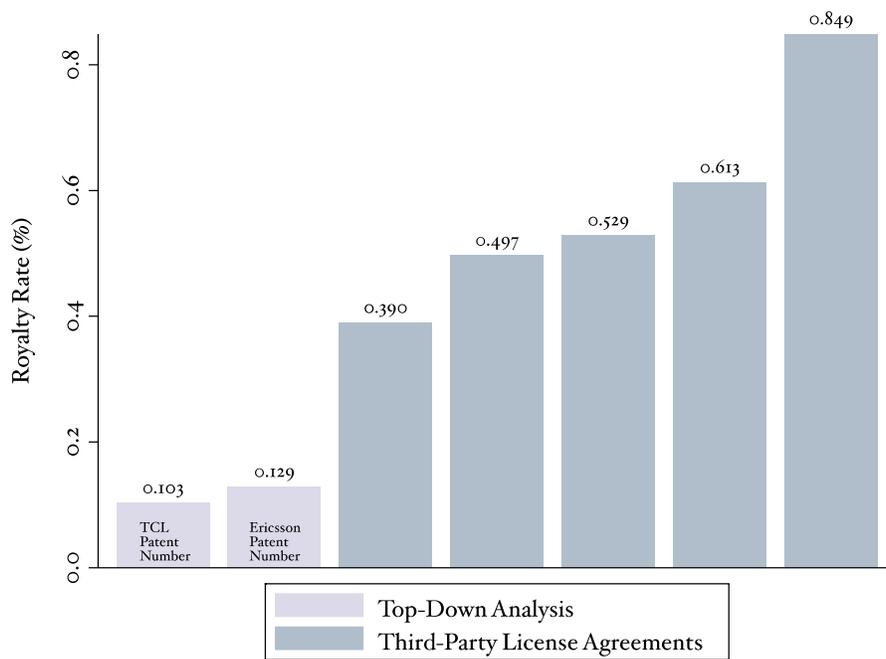
⁴²³ That is, $(0.414 + 0.420 + 0.452 + 0.472 + 0.502 + 0.531 + 0.638 + 0.753) \div 8 = 0.523$.

⁴²⁴ That is, $(0.283 + 0.398 + 0.414 + 0.420 + 0.452 + 0.472 + 0.502 + 0.531 + 0.638 + 0.753 + 0.836 + 0.839) \div 12 = 0.545$.

2. *A FRAND Royalty Rate for Ericsson's 3G SEP Portfolio*

Judge Selna adopted the same approach that he used to determine FRAND royalty rates for Ericsson's U.S. 4G SEP portfolio to determine a FRAND royalty rate for Ericsson's U.S. 3G SEP portfolio.⁴²⁵ He relied on two estimates derived from the top-down analysis and five estimates derived from unpacking comparable license agreements.⁴²⁶ Figure 13 summarizes Judge Selna's estimated royalties for Ericsson's U.S. 3G SEP portfolio.

Figure 13. Judge Selna's Estimates of a FRAND Royalty Rate for Ericsson's U.S. 3G SEP Portfolio



Source: *TCL v. Ericsson*, 2018 WL 4488286, at *51.

As Figure 13 shows, the estimated 3G royalty rates obtained from the top-down methodology (shaded in lavender) ranged from 0.103 percent to 0.129 percent of the net selling price of a licensed device. In contrast, the royalties obtained from unpacking the comparable license agreements (shaded in blue) ranged from 0.390 percent to 0.849 percent.

Judge Selna acknowledged that the rates obtained from the top-down analysis were substantially lower than the royalties that he derived from

⁴²⁵ *TCL v. Ericsson*, 2018 WL 4488286, at *51.

⁴²⁶ *Id.*

unpacking Ericsson's comparable license agreements. He thus questioned the reliability of the results obtained from the top-down analysis.⁴²⁷ Nonetheless, Judge Selna said that the "3G rates were less important to Samsung, HTC, and Huawei, who all generate substantially more 4G revenue than 3G revenue,"⁴²⁸ which perhaps suggests that Judge Selna believed that the license agreements did not accurately reflect what TCL and Ericsson considered to be a FRAND royalty rate for a license to Ericsson's 3G portfolio.

Despite the large difference between his top-down rates and his comparable-license rates, Judge Selna decided to rely upon the rates obtained from both approaches to determine a FRAND royalty rate for a license to Ericsson's 3G SEP portfolio. Unlike his 4G analysis, Judge Selna's 3G analysis did not narrow the set of royalty observations that he obtained for Ericsson's 3G SEP portfolio before determining a FRAND royalty rate.

Judge Selna ultimately found that a FRAND royalty rate for a license to Ericsson's 3G SEPs would equal 0.30 percent of the net selling price of a device, which is lower than all of the one-way 3G royalty rates that he derived from unpacking Ericsson's comparable licenses.⁴²⁹ Applying the regional filters to adjust for Ericsson's relatively stronger portfolio in the United States, Judge Selna found that a FRAND royalty rate for a license to Ericsson's 3G portfolio in Europe would be 0.264 percent of the net selling price of a device, and that a FRAND royalty rate for a license to Ericsson's 3G portfolio in the rest of the world would be 0.224 percent of the net selling price of a device.⁴³⁰

Again, the information disclosed in Judge Selna's public decision does not support the conclusion that a FRAND royalty rate for Ericsson's U.S. 3G portfolio is 0.30 percent. The average rate of the seven estimates upon which he relied is 0.444 percent, and the median rate is 0.497 percent.⁴³¹ The average rate exceeds Judge Selna's result by 48 percent, and the median rate exceeds his result by nearly 66 percent. Therefore, if statistical measures of central tendency of the record evidence are legally relevant to determining a FRAND royalty, it is unclear how the estimates that Judge Selna obtained from Ericsson's comparable licenses and from his own top-down analysis support his estimated FRAND rates for Ericsson's 3G SEP portfolio.

⁴²⁷ *Id.*

⁴²⁸ *Id.*

⁴²⁹ *Id.*

⁴³⁰ *Id.* Using Judge Selna's methodology, one can calculate the royalty for a license to Ericsson's 3G SEP Portfolio in Europe as follows: $0.3\% \times 87.9\% = 0.264\%$. Again, using Judge Selna's methodology, one can calculate the royalty for a license to Ericsson's 3G SEP portfolio in the rest of the world as follows: $0.3\% \times 74.8\% = 0.224\%$. As I explained in Part II.B.5.a, Judge Selna found that the value of Ericsson's 3G SEPs in Europe was only 87.9 percent of the value of Ericsson's 3G SEPs in the United States, and that the value of Ericsson's 3G SEPs in China was only 74.8 percent of the value of Ericsson's 3G SEPs in the United States. *Id.*

⁴³¹ That is, $(0.103 + 0.129 + 0.390 + 0.497 + 0.529 + 0.613 + 0.849) \div 7 = 0.444$.

3. *A FRAND Royalty Rate for Ericsson's 2G SEP Portfolio*

As explained in Part V.B.2, Judge Selna said that the court could not reliably unpack 2G royalty rates from Ericsson's comparable licenses.⁴³² Instead, he adopted as a FRAND royalty rate for a license to Ericsson's 2G SEP portfolio the results that he obtained from his top-down analysis. Specifically, Judge Selna found that a FRAND royalty rate for a license to Ericsson's U.S. 2G SEP portfolio was 0.16 percent of "2G sales."⁴³³ Furthermore, he found that a FRAND royalty rate for a license to Ericsson's 2G SEP portfolio was 0.12 percent in Europe and 0.09 percent in the rest of the world.⁴³⁴ Although Judge Selna did not define "sales," on the basis of his statement that all FRAND rates he determined are a percentage of "Net Selling Price,"⁴³⁵ one can reasonably infer that "sales" refers to the net selling price of 2G devices that practice Ericsson's SEPs.

CONCLUSION

Judge James Selna's opinion in *TCL v. Ericsson* determining a fair, reasonable, and nondiscriminatory (FRAND) royalty for Ericsson's portfolio of standard essential patents (SEPs) contains at least four material errors of legal or economic analysis.

First, despite his having recognized that Ericsson's FRAND commitment is a binding contract between Ericsson and ETSI and that TCL was a third-party beneficiary of that contract, Judge Selna failed to identify the precise rights and obligations arising from Ericsson's FRAND contract with ETSI. His interpretation of those rights and obligations conflicted with what he found to be the purpose of Ericsson's FRAND contract with ETSI. It is perplexing why, after his having remarked that Ericsson had negotiated with TCL for over six years and had made over a dozen licensing offers to TCL, Judge Selna did not address the obvious question: had TCL exhausted its rights as a third-party beneficiary of Ericsson's FRAND contract with ETSI?

Second, Judge Selna's top-down analysis used faulty inputs and unsupported assumptions, including (1) an arbitrary assessment of an appropriate aggregate SEP royalty for each standard and (2) the improbable assumption

⁴³² *TCL v. Ericsson*, 2018 WL 4488286, at *52.

⁴³³ *Id.*

⁴³⁴ *Id.* Using Judge Selna's methodology, one can calculate the royalty for Ericsson's 2G SEP portfolio in Europe as follows: $0.16\% \times 72.2\% = 0.12\%$. Again, using Judge Selna's methodology, one can calculate the royalty for a license to Ericsson's 2G SEP portfolio in the rest of the world as follows: $0.16\% \times 54.9\% = 0.09\%$. As I explained in Part II.B.5.a, Judge Selna found that the value of Ericsson's 2G SEP portfolio in Europe was only 72.2 percent of the value of Ericsson's 2G SEP portfolio in the United States, and that the value of Ericsson's 2G SEP portfolio in the rest of the world was only 54.9 percent of the value of Ericsson's 2G SEP portfolio in the United States. *Id.* at *25.

⁴³⁵ *Id.* at *57.

that all SEPs in a given standard have equal value. Consequently, his top-down analysis produced unreliable estimates of a fair and reasonable royalty for a license to Ericsson's SEP portfolio.

Third, Judge Selna's analysis of the license agreements that Ericsson executed with third parties contradicted U.S. jurisprudence, industry practice, and established principles of economics and FRAND licensing. Judge Selna used actual revenue from licensed sales to unpack Ericsson's comparable license agreements, despite the fact that the parties to those license agreements could not have known that information at the time of license execution. Consequently, his unpacking analysis failed to identify correctly the implied royalty that the parties considered to be FRAND compensation for a license to Ericsson's SEP portfolio. For the same reasons, Judge Selna's unpacking analysis failed to shed light on whether Ericsson's offers to TCL were discriminatory.

Fourth, when calculating a FRAND royalty for Ericsson's SEPs, Judge Selna committed an error in transposition that invalidated his calculations. He also failed to explain how his analysis supported his determination of a FRAND royalty. It is telling that Judge Selna's determination of a FRAND royalty for Ericsson's SEP portfolios was significantly lower than Mr. Justice Birss' determination of a FRAND royalty for the same Ericsson SEP portfolios in *Unwired Planet*. Finally, Judge Selna failed to recognize that the royalties that he identified would violate his own definition of nondiscrimination under Ericsson's FRAND contract with ETSI.

These errors of legal or economic analysis are material. Each reduces the reliability of Judge Selna's analysis. Collectively, they make it improbable that the evidence supports Judge Selna's findings.