

CPI's IP Column Presents:

Comparable Agreements and the “Top-Down” Approach to FRAND Royalties Determination

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I. Introduction

The development of innovative standards hinges on a vibrant ecosystem of standardization inducing private investment by allowing contributors to earn a fair return on investment through the licensing of their standard-essential patents (“SEPs”), and by providing implementers with enforceable assurances that those SEPs will be available on fair, reasonable and non-discriminatory (“FRAND”) terms and conditions. Voluntary collaboration organized by Standards Development Organizations (“SDOs”) has had a stellar record of success: rapid rates of innovation and some of the most broadly adopted technologies in human history that laid the ground for highly competitive markets.

The widespread adoption of wireless technologies over the past decades has brought about friction and disputes regarding the interpretation of FRAND. Courts in several jurisdictions worldwide have been called upon to flesh out FRAND terms or to assess conformity with FRAND principles. This body of case law provides insight and practical guidance for parties as well as policymakers seeking a better understanding of the situation – business and legal – on the ground.

This article outlines some of the emerging patterns in global SEP litigation, focusing on the judicial determination of FRAND rates. The common thread in judicial FRAND determination is reliance on evidence in comparable licensing agreements. Comparable licensing agreements, i.e. licensing agreements signed with similarly situated parties, provide for the most reliable evidence on how markets price SEPs. Courts aiming to simulate efficient market outcomes have good reasons to look at real-life agreements for guidance in setting rates in accordance with FRAND principles. An alternative approach to FRAND rate determination is the so-called “top-down approach.” Top-down FRAND-rate determination starts from extrapolating the aggregate royalty rate of all SEPs reading on a particular standard and then identifying a SEP holder’s exact portion of this aggregate rate. The top-down approach presents, however, severe informational challenges for courts and this, in large part, accounts for its far narrower appeal.

II. Comparable Agreements

A. *The Case Law of European and U.S. Courts*

In the EU, judicial review of FRAND rates adheres to the framework developed by the Court of Justice of the EU (“CJEU”) in its *Huawei* ruling.² In *Huawei*, the Court established a safe harbor from antitrust liability under Article 102 TFEU for the SEP holder seeking injunctive relief, provided that it (a) notifies the SEP user of its acts of infringement and the rights infringed, and (b) makes a proper written licensing offer on FRAND terms, including the royalty rate and the way it was calculated.³ It is then for the alleged infringer to accept the offer or, in case of disagreement, to make a counter-offer on FRAND terms produce accounts of acts of use, and place an appropriate amount in escrow.⁴

The requirements under *Huawei* were further elaborated by national courts. In Germany, courts view the *Huawei* framework as a sequence of “steps,” with the fulfilment of each triggering the obligations in the next.⁵ German courts assess the

compliance with FRAND of proposed royalty rates and other contractual provisions in actions for injunctive relief. There is, so far, no ruling by a German court directly setting the royalty rate in a FRAND dispute. In assessing compliance with the *Huawei* requirement for the SEP holder to make a concrete offer on FRAND terms, German courts view comparable licensing agreements as highly instructive on the “appropriateness of the license terms offered.”⁶ Comparable agreements can provide reliable evidence not only on the royalty rate, but also on the scope of the license. Moreover, the higher the number of concluded licensing agreements on similar conditions, the stronger the presumption that such terms are indeed FRAND.⁷ Where comparable agreements reflect an industry practice of licensing on a worldwide portfolio basis, it could be unreasonable for the implementer to refuse an offer on such terms.⁸

German courts attach particular importance to comparable licensing agreements in reviewing compliance with the non-discrimination prong of FRAND. In principle, the non-discrimination obligation calls for the SEP owner to present similarly situated putative licensees with a licensing offer on similar terms.⁹ However, patent holders are not obliged to offer identical terms to all their business partners to satisfy the non-discrimination prong of FRAND.¹⁰ In proposing licensing terms SEP holders enjoy a margin of discretion,¹¹ provided that the diverging terms are not “significantly different” and are objectively justified “as a result of normal behavior on the market.”¹²

However, given that the SEP holder is generally in a better position to assess its compliance with its non-discrimination obligation possessing the relevant information regarding the terms offered to other licensees, plaintiff is required to produce in court comparable agreements establishing the non-discriminatory nature of its licensing offer and, in case of divergences in terms, to offer an objective justification.¹³ The SEP owner is expected to produce all the significant comparable agreements to ensure that courts are not presented with selective samples that might convey an incomplete picture.¹⁴ That said, the disclosure obligation of the patent holder does not arise already at negotiations.¹⁵

In the UK, the High Court, in *Unwired Planet v. Huawei* (Birss J.), set directly the (global) FRAND royalty rate for plaintiff’s portfolio of SEPs largely relying on comparable licensing agreements.¹⁶ Birss J. reaffirmed that a FRAND undertaking to the European Telecommunications Standards Institute (“ETSI”) is, under French law, a binding contract enforceable by third-parties, implementers of standards.¹⁷ Birss J. held that FRAND obligations constrain *both* parties in their conduct during licensing negotiations.¹⁸

In terms of content, Birss J. opined that for any given set of circumstances there is only one set of FRAND terms and conditions.¹⁹ FRAND terms, are those that reasonable parties would agree to after good-faith bilateral negotiations.²⁰ Comparable licensing agreements are highly instructive in this respect offering valuable evidence on the terms agreed by parties in actual licensing negotiations.²¹ Birss J. went on to examine, in depth, the terms observed in comparable agreements to extrapolate a FRAND rate that would fit the specific circumstances of the case.²²

In the U.S., patent courts have long relied on comparable agreements to establish a reasonable royalty for damages.²³ The Federal Circuit, in *Laser Dynamics*, held that comparable agreements are “probative not only of the proper amount of a reasonable royalty, but also of the proper form of the royalty structure.”²⁴ In *Ericsson v. D-Link*, the court reaffirmed the value of comparable agreements for providing guidance to juries deciding on patent damages.²⁵

Comparable licensing agreements have been relied upon by U.S. district courts in a number of rulings regarding infringement of SEPs to derive a FRAND royalty rate. More specifically, Judge Robart, in *Microsoft v. Motorola*, modified the *Georgia-Pacific* factors in the RAND context in order to arrive at the royalty rate a willing licensor and willing licensee would have agreed to in a hypothetical negotiation.²⁶ Judge Robart relied extensively on pool licensing arrangements to assess Motorola’s compliance with its FRAND obligations and to determine a reasonable royalty rate. More recently, the District Court for the Eastern District of Texas, in *HTC v. Ericsson*, held that comparable licensing agreements can be “highly probative, given the sophistication of the market and the amount of resources and time that the industry devotes to negotiations.”²⁷ According to the court, comparable agreements are “the best market-based evidence of the value” of a SEP portfolio and a “reliable method of establishing fair and reasonable royalty rates that is consistent” with FRAND.²⁸

B. Comparable Agreements: Challenges and Advantages

Given the complexity of real-life FRAND licensing agreements, courts have come across a number of practical challenges in assessing comparable agreements. One source of contention is which parties are “similarly situated.”²⁹ In real life, companies rarely operate in identical conditions: firms differ in many ways, including their size, their bargaining power, the scale and scope of their operations, their ownership of relevant and valuable intellectual property, and their resources for and expertise in negotiating licensing deals. Moreover, companies across different sectors value patented technologies differently resulting in non-identical licensing terms. Disparities in licensing terms, however, do not necessarily imply that a party has breached its FRAND commitment. Although courts in most jurisdictions broadly recognize business realities and the possibility for some differentiation in licensing terms,³⁰ the challenge remains in identifying those parties comparable to the case at hand.

Furthermore, while court determine damages awards are typically calculated as a one-way running royalty rate, real-life licensing agreements are more complex.³¹ First, the royalty structure might differ from a simple running royalty rate:³² Agreements may provide for lump-sum payment; or a running royalty rate may be calculated as a fixed-per-unit fee, or as a percentage of the end-selling price of the infringing product(s). Second, parties may agree to non-monetary consideration, such as technical assistance, transfer of patents or other forms of payment in kind. Third, many licensing agreements are cross-licenses,³³ whereby the observed royalty rate derives from the relative value of the respective portfolios of the parties. The “unpacking” of comparables can be a source of uncertainty in the judicial determination of FRAND rates.

However, courts worldwide have good reasons to rely primarily on observed rates in comparable licensing agreements. In fact, it has been argued that courts should rely

solely on comparable licenses to set FRAND rates.³⁴ To begin with, comparable licensing agreements go a long way in addressing the information challenge faced by courts determining a reasonable royalty rate. Recourse to comparable agreements allows courts to benefit from the resources and expertise invested by private parties in collecting information necessary for a proper evaluation of a patent portfolio. Licensing negotiations typically involve intensive technical and business discussions and parties reach an agreement only after all the relevant arguments regarding the value of the patent(s) in question have been put forwarded and properly addressed. Thus, the terms finally agreed upon in a voluntary transaction can, in principle, be relied upon as a safe indication of the patent(s)'s commercial value.

Moreover, comparable licensing agreements provide for the most informative evidence regarding a SEP owner's compliance with its non-discrimination obligations. Courts can gain a more or less clear picture of observed market rates and conditions and reach an informed decision on whether the proposed licensing terms in a specific case would be discriminatory. One open issue – given the observance, in practice, of varied licensing terms – is how to distinguish a legitimate difference in terms reflecting disparities in market conditions from discrimination. A plausible approach might be examining whether the diverging terms would place the putative licensee above a benchmark rate established by examining comparable licenses as a whole.³⁵

More importantly, reliance on comparable agreements reduces the risk of distortions in the operation of the price mechanism for standardized technologies. Courts relying on real-life transactions can better simulate market outcomes and set FRAND rates that reflect actual supply-and-demand conditions in markets for standards. Thus, market price signals based on which private parties make their investment decisions are not interfered with, contributing to efficient markets for standards and standardized technologies.

III. The Top-Down Approach

A. *The Top-Down Approach in TCL and Unwired Planet*

An alternative approach to the determination of FRAND rates is the so-called “top-down” approach, whereby a court estimates (a) the aggregate royalty rate of all SEPs reading on a given standard, and (b) the exact portion of a particular SEP holder's portfolio to this aggregate rate. The top-down approach has thus far been relied upon by courts mainly in two cases: in the now-vacated *TCL v. Ericsson* District Court case and in the above mentioned *Unwired Planet* matter, though the courts made different use of the top-down approach in each case.³⁶ An intriguing aspect of the two cases is that courts in both had to examine essentially the same portfolio of SEPs.³⁷ Thus, the two rulings present a good illustration of the actual working – and shortcomings – of the top-down approach.

The top-down approach has been used as the primary method for calculating the FRAND royalty rate in *TCL v. Ericsson*, by the District Court for the Central District of California (Judge Selna), subsequently reversed by the Federal Circuit.³⁸ As a first step, the court calculated the aggregate royalty rate for the standards in question based, to a large

extent, on Ericsson's past public pronouncements on its own estimations regarding the aggregate royalty rate it predicted for those standards.³⁹ Following that, the court calculated Ericsson's portion of the aggregate rate by estimating the sum of all patent families that were deemed essential for the standards at issue and then the number of Ericsson's essential patent families for the specific standards.⁴⁰ For its estimates regarding the number of essential patent families the court relied on declarations of potentially essential patents and patent applications submitted to ETSI and on evidence submitted by the parties.⁴¹ Having arrived at a figure for both the aggregate number of essential patent families for the relevant and Ericsson's essential patent families for those standards, Judge Selna calculated the FRAND rate for Ericsson's portfolio according to the principle of numerical proportionality: all SEPs were presumed of equal value and Ericsson's share to the aggregate rate derived from the estimated Ericsson's share of SEPs.⁴²

The top-down approach was also followed by Birss J, in *Unwired Planet*. However, contrary to the *TCL* judge, Birss J. used this approach only as a check for the findings of his thorough examination of comparable licensing agreements. Moreover, the analysis and findings by Birss J. departed significantly from those in *TCL*. To begin with, Birss J. dismissed the arguments on the probative value of public pronouncements regarding the aggregate reasonable royalty for wireless standards—the very same pronouncements that formed the basis of the top-down calculation in *TCL*. According to Birss J., such pronouncements offer no reliable evidence on the actual aggregate rate for the standards in question, reflecting only the subjective estimations of those making the pronouncements at a prior point in time.⁴³ Birss J. also arrived at markedly different findings regarding the number of essential patent families for wireless standards, rejecting the defendant's 30-minutes-per-patent-family review as highly over-inclusive of what was actually essential and, accordingly, acknowledging as essential to wireless standards far fewer patent families than in *TCL*. Given the discrepancies in methodology and inputs, it is not surprising that, for a broadly similar set of facts, the two courts reached very different conclusions on FRAND rates in the respective cases.

B. The Shortcomings of the Top-Down Approach

A comparison of the findings in *TCL* and *Unwired Planet* may give one pause with regard to the precision and reliability of the top-down approach. Although, in theory, the top-down approach could result in a reasonably accurate estimation of FRAND rates, provided the inputs are also accurate,⁴⁴ in practice, this may not be the case.⁴⁵

First, there is no reliable data on the aggregate, one-way royalty rates for all SEPs reading on any given standard. To arrive at the average, one-way aggregate running royalty for a given standard one would have to unpack all the major licensing deals in an industry in force at the same period of time, and such data is confidential and unavailable to researchers and is unlikely all those agreements to be available to a court either (courts have access only to evidence/agreements submitted by the parties to the case, not to agreements between third parties). The “solution” to this conundrum by Judge Selna in *TCL*, i.e. relying on pronouncements by stakeholders, is hardly satisfactory. Such pronouncements, made years in advance of the

commercialization of a standard and before the commercial value of standardized technologies can be inferred by data on consumers' willingness to pay for those technologies (and the features they enable) are inherently unreliable, as recognized by Birss J. in *Unwired Planet*.

Second, the apportionment according to the principle of numerical proportionality appears problematic in several respects.⁴⁶ An initial hurdle is to estimate the aggregate number of essential patent families reading on a given standard. The *TCL* court made such an attempt by making use of data on declarations of possibly essential patents in the ETSI database. However, these declarations cannot be relied upon to provide an accurate picture of the actual number of SEPs for any particular standard.⁴⁷ To begin with, providing accurate data on the actual number of SEPs is hardly the point of the declarations system. The aim of declarations is to alert implementers that patents *might* eventually read on the standard,⁴⁸ thus signaling the need for negotiating licenses. Declarations also indicate to SDOs that the SEP holder is prepared to offer FRAND licensing terms. However, the actual number of SEPs can be safely assumed to be lower than declarations suggest. Declarations begin long before a standard is officially released or commercialized and represent the declarer's subjective estimate at the time that those patents may be or may become essential. Yet, the standard might follow a different technical path than initially expected and initially declared patents may no longer read on the technical specifications. Moreover, declarations include pending patent applications that might be rejected, or narrowed down in a way that the standard is eventually outside the scope of the amended patent claims. Also, from a legal perspective, patent holders have strong incentives to declare broadly to be on the safe side: on the one hand, there is the risk of antitrust liability for "patent ambush," and on the other hand, the recent *Core Wireless* case in the U.S. suggests that SEPs that are not declared in a timely fashion might, under certain circumstances, be unenforceable in this jurisdiction.⁴⁹

Third, even if one were to assume an accurate estimation of the average aggregate rate, apportionment to a particular SEP holder is an exercise fraught with difficulties. It essentially calls for courts to render judgment on the *relative* value of the portfolio of the plaintiff in a given case, that is, on the value of plaintiff's portfolio *and* the combined value of the portfolios of all other SEP holders. Judge Selna, in *TCL*, tried to bypass the task by assuming each SEP to be of equal value. This assumption is, plainly, unrealistic. SEPs and SEP portfolios are not equally valuable.⁵⁰ Standards are lengthy complicated documents that include core features and optional features. A SEP reading on an optional feature is, strictly speaking, still a SEP for those implementing this feature. But it may not be of equal value as a SEP reading on a core functionality enabled by a standard. Moreover, standards are iterative: each new release introduces new innovations and technical improvements, and these improvements can make a big difference in performance and features. SEPs reading on later iterations might, thus, be more valuable than SEPs reading on earlier, more limited, versions of a standard. The assumption of equal value for SEPs misses these differences, and calculations based on that assumption can only produce inaccurate results.

To summarize, the top-down approach presents severe informational challenges for courts. It calls for estimations that can only be based on unreliable data and unrealistic

assumptions. Data for a sufficiently precise top-down calculation could only be gathered at a prohibitive cost in resources and time.⁵¹ The task of calculating patent infringement damages and a FRAND royalty rate for SEPs is complicated enough and the top-down approach introduces another substantial layer of complexity. At some point, judges applying the top-down approach will have to speculate about some of the parameters of what is essentially a very difficult equation.⁵² More importantly, the complexity and uncertainties of the top-down approach seem gratuitous. Markets generate sufficient information regarding the commercial value of a given portfolio: real-life comparable licensing agreements executed by sophisticated parties following extensive, arms-length negotiations.

IV. Conclusion

Over the past years, courts in several jurisdictions have amassed substantial experience in dealing with issues of determination of FRAND rates. Although different approaches to determining FRAND rates persist, some noteworthy patterns have emerged. The present article focused on the increasing reliance by courts on comparable licensing agreements as a source of reliable information regarding the commercial value of SEPs. Indeed, the vast majority of judicial opinions on FRAND rates follow this approach in setting FRAND rates because of its substantial advantages in terms of judicial economy perspective and standardization policy: comparable licensing agreements alleviate the information asymmetry between industry and courts by allowing the latter to benefit from the resources and expertise of the former. Judicially determined rates, calculated on the basis of comparable licenses, simulate efficient, mutually beneficial transactions contributing to well-functioning markets for standards.

An alternative approach to the calculation of FRAND rates is the so-called “top-down” approach. Top-down calculations present severe informational challenges: they require reliable data-inputs regarding the average aggregate, one-way running royalty rate for a particular standard, and then an apportionment of this royalty to a particular SEP holder based on data relating to the relative value of its SEP portfolio. Such data is impossible to obtain at reasonable cost. It is also unnecessary: courts can rely on actually observed market rates for SEPs, without having to engage in highly speculative assessments.

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- ² Case C-170/13, *Huawei Technologies Co. Ltd v. ZTE Corp.* [2015] ECLI:EU:C:2015:477.
- ³ *Ibid.* para 71.
- ⁴ *Ibid.*
- ⁵ *Sisvel v. Haier*, Case No. I-15 U 66/15, 30 March 2017, Higher Regional Court of Dusseldorf, para 245.
- ⁶ *Saint Lawrence v. Vodafone*, Case No. 4a O 73/14, March 31, 2016, Dusseldorf District Court, para 273; *Fraunhofer-Gesellschaft (MPEG-LA) v. ZTE*, Case No. 4a O 15/15, November 9, 2018, Dusseldorf District Court, para 391; *Tagivan (MPEG-LA) v. Huawei*, Case No. 4a O 17/15, November 15, 2018, Dusseldorf District Court, para 431.
- ⁷ *Saint Lawrence v. Vodafone*, *supra* note 6, para 273.
- ⁸ *Saint Lawrence v. Vodafone*, *supra* note 6, para 274.
- ⁹ *Sisvel v. Haier*, *supra* note 5, paras 254 et seq.
- ¹⁰ *Sisvel v. Haier*, *supra* note 5, para 254.
- ¹¹ *Ibid.* para 257.
- ¹² *Ibid.* para 256.
- ¹³ *Ibid.*
- ¹⁴ *Fraunhofer-Gesellschaft (MPEG-LA) v. ZTE*, *supra* note 6, para 381.
- ¹⁵ *Tagivan (MPEG-LA) v. Huawei*, *supra* note 6, para 426. See also, *Koninklijke Philips N.V. v. Asustek Computers INC.*, Case No. 200.221.250/01, 7 May 2019, Court of Appeal of The Hague, para 4.202.
- ¹⁶ *Unwired Planet v. Huawei* [2017] EWHC 711(Pat), affirmed *Unwired Planet v. Huawei* [2018] EWCA Civ 2344.
- ¹⁷ *Unwired Planet v. Huawei* [2017], *supra* note 16, paras 146 et seq.
- ¹⁸ *Ibid.* para 160.
- ¹⁹ *Ibid.* para 164.
- ²⁰ *Ibid.* para 170.
- ²¹ *Ibid.*
- ²² *Ibid.* paras 179 et seq.
- ²³ Observed royalty rates in comparable agreements was the first among the fifteen factors in *Georgia Pacific. Georgia-Pacific Corp. v. United States Plywood Corp.*, 318 F. Supp. 1116 (S.D.N.Y. 1970).
- ²⁴ *Laser Dynamics, Inc. v. Quanta Comp., Inc.*, 694 F.3d 51, 79-80 (Fed. Cir. 2012).
- ²⁵ *Ericsson, Inc. v. D-Link Sys., Inc.*, No. 13-1625 (Fed. Cir. 2014), at 41-42.
- ²⁶ *Microsoft Corp. v. Motorola, Inc.*, Case No. C10-1823JLR, at 129-206 (W.D. Wash. 2013).
- ²⁷ *HTC Corp. v. Telefonaktiebolaget Ericsson*, Case No. 6:18-CV-00243-JRG (E.D. Tex. 2019), at 10.
- ²⁸ *Ibid.* at 11, 13-14.
- ²⁹ See *Unwired Planet v. Huawei* [2017], *supra* note 16, paras 382-468; *HTC v. Ericsson*, *supra* note 27, at 11-14; *TCL Comm'n v. Telefonaktiebolaget Ericsson*, Case No. 8:14-cv-00341-JVS-DFM (C.D. Cal. 2019) at 54 et seq.
- ³⁰ *Sisvel v. Haier*, *supra* note 5, para 254; *Unwired Planet v. Huawei* [2017], *supra* note 16, para 501; *Philips v. Wiko*, Case No. C/09/511922/HA ZA 16-623, 2 July 2019, Court of Appeal of The Hague, para 4.34.
- ³¹ *HTC v. Ericsson*, *supra* note 27, at 13-14.
- ³² *Unwired Planet v. Huawei* [2017], *supra* note 16, para 187.
- ³³ *Ibid.*
- ³⁴ Alexander Galetovic & Stephen Haber, "SEP Royalties: What Theory of Value and Distribution Should Courts Apply?" (2019) https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3447641 accessed April 24, 2020.
- ³⁵ *Unwired Planet v. Huawei* [2017], *supra* note 16, paras 475 et seq.
- ³⁶ A recent study on the 5G patent landscape, commissioned by the German Federal Ministry for the Economic Affairs claimed that the top-down approach is increasing in relevance in judicial determination of FRAND rates. See, Tim Pohlmann & Knut Blind, "Fact Finding Study on Patents Declared to the 5G Standard," (2020) 36-39 https://www.iplytics.com/wp-content/uploads/2020/02/5G-patent-study_TU-Berlin_IPlytics-2020.pdf accessed April 24, 2020. This claim is, however, incorrect. German courts have not made use of the top-down approach, or even mentioned it at all.

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- ³⁷ Unwired Planet's portfolio of SEPs was transferred from Ericsson.
- ³⁸ *TCL v. Ericsson*, *supra* note 29. The ruling was, on appeal, vacated-in-part, reversed-in-part and remanded by the Federal Circuit. See *TCL Comm'n v. Telefonaktiebolaget Ericsson*, Case-Nos. 2018-1363, 2018-1732, 2018-1380, 2018-1382 (Fed. Cir. 2019). On the *TCL* case, see also, Gregory Sidak, "Judge Selna's Errors in *TCL v. Ericsson* Concerning Apportionment, Nondiscrimination, and Royalties Under the FRAND Contract," (2019) 4 *The Criterion Journal on Innovation* 101; Peter Picht, "FRAND Determination in *TCL v. Ericsson* and *Unwired Planet v. Huawei*: Same Same but Different?" (2018) *Max Planck Institute for Innovation & Competition Research Paper No. 18-07* https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3177975 accessed March 31, 2020; Richard Vary, "Dissecting *TCL v. Ericsson* – What Went Wrong?" (2018) 5 *Intellectual Asset Management* 9.
- ³⁹ *TCL v. Ericsson*, *supra* note 29, at 20-26.
- ⁴⁰ *Ibid.* at 26 et seq.
- ⁴¹ *Ibid.* at 27 et seq.
- ⁴² *Ibid.* at 37 et seq.
- ⁴³ *Unwired Planet v. Huawei* [2017], *supra* note 16, para 269.
- ⁴⁴ Sidak, *supra* note 38, 149.
- ⁴⁵ See also, Galetovic & Haber, *supra* note 34, 4-5.
- ⁴⁶ Picht, *supra* note 38, 30-31.
- ⁴⁷ Claudia Tapia & Gabriele Mohsler, "The Current Cost of Transparency in IoT Patent Licensing," (April 8, 2019) *Intellectual Asset Management - IAM* <https://www.iam-media.com/frandseps/transparency-iot-licensing> accessed April 24, 2020.
- ⁴⁸ See Article 4.1 ETSI IPR Policy <https://www.etsi.org/images/files/IPR/etsi-ipr-policy.pdf> accessed April 24, 2020.
- ⁴⁹ *Core Wireless Licensing, S.A.R.L. v. Apple, Inc.*, No. 17-2102 (Fed. Cir. 2018).
- ⁵⁰ Sidak, *supra* note 38, 158-159.
- ⁵¹ Kelce Wilson, "Designing A Standard Essential Patent (SEP) Program," (2018) 53(3) *les Nouvelles-Journal of the Licensing Executives Society* 202, 203.
- ⁵² Picht, *supra* note 38, 30.